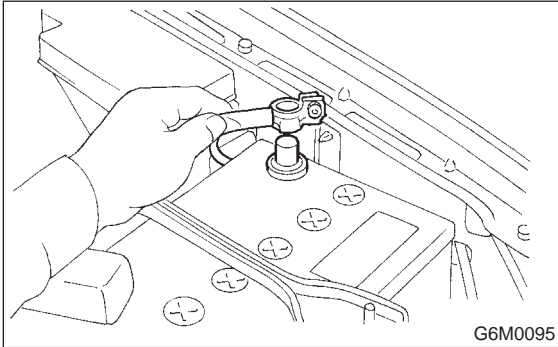


1. Front Catalytic Converter

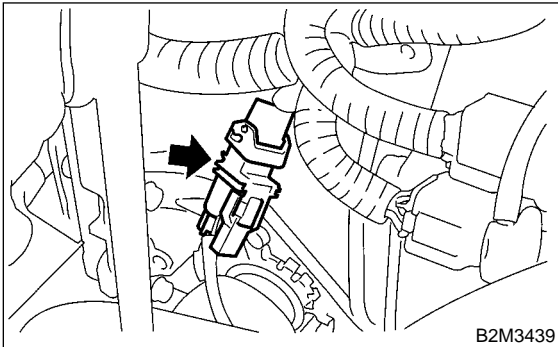
1. Front Catalytic Converter

A: REMOVAL

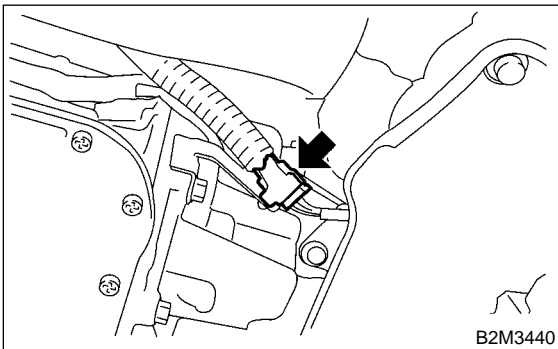
- 1) Set the vehicle on the lift.
- 2) Disconnect battery ground cable.



- 3) Disconnect front oxygen (A/F) sensor connector.



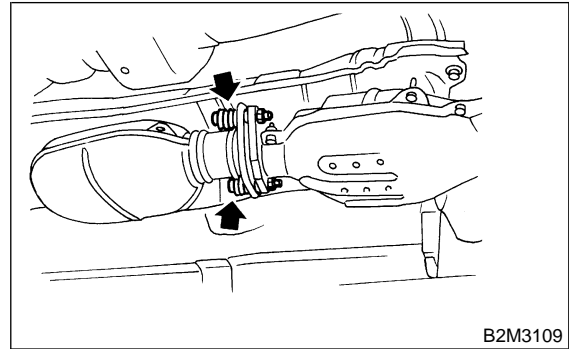
- 4) Lift-up the vehicle.
- 5) Remove under cover.
- 6) Disconnect connector from rear oxygen sensor connector.



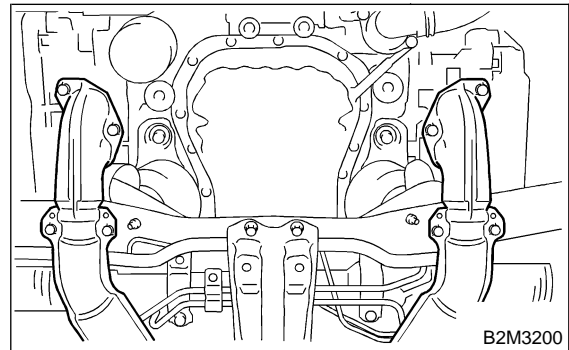
- 7) Separate center exhaust pipe from rear exhaust pipe.

CAUTION:

Be careful, exhaust pipe is hot.



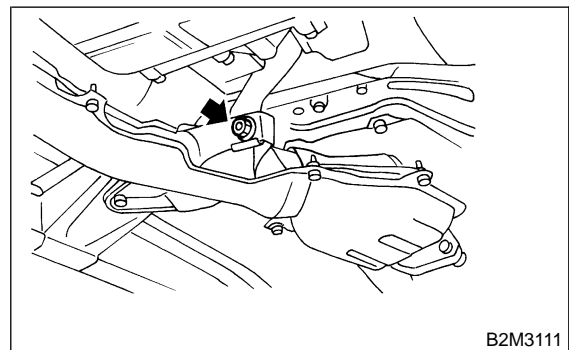
- 8) Remove bolts which hold front exhaust pipe onto cylinder heads.



- 9) Remove front exhaust pipe and center exhaust pipe from hanger bracket.

CAUTION:

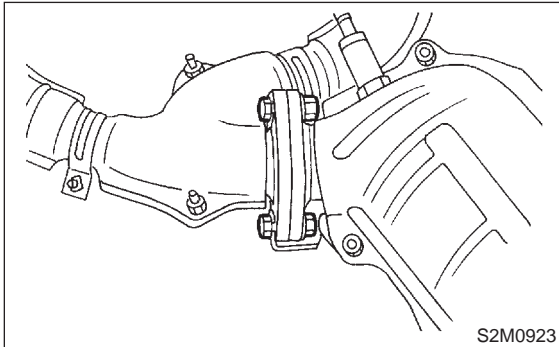
Be careful not to pull down front exhaust pipe and center exhaust pipe.



10) Separate front catalytic converter from front exhaust pipe.

NOTE:

The rear catalytic converter is integrated with front catalytic converter. Therefore, the procedure for removing rear catalytic converter is the same as the description above.



B: INSTALLATION

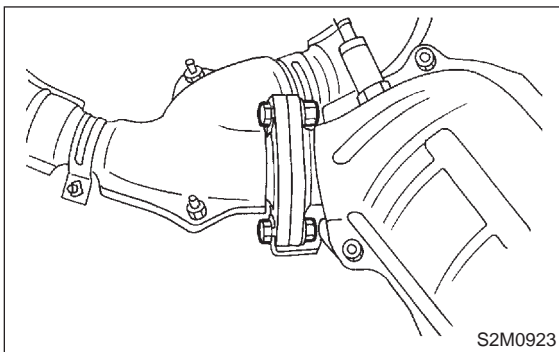
CAUTION:

Replace gaskets with new ones.

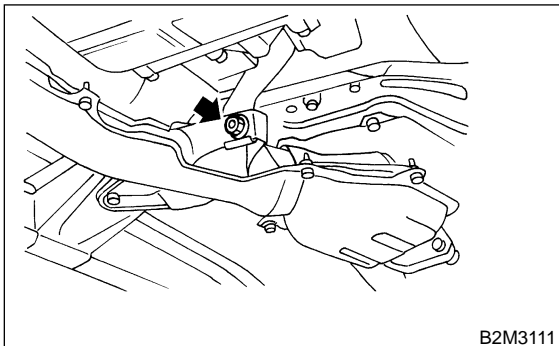
1) Install front catalytic converter to front exhaust pipe.

Tightening torque:

30 ± 5 N·m (3.1 ± 0.5 kg·m, 22.4 ± 3.6 ft·lb)



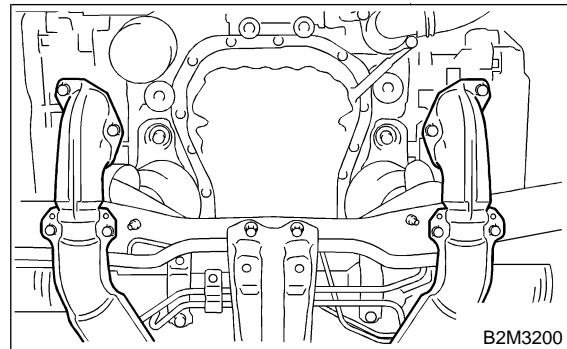
2) Install front exhaust pipe and center exhaust pipe. And temporarily tighten bolt which installs center exhaust pipe to hanger bracket.



3) Tighten bolts which hold front exhaust pipe onto cylinder heads.

Tightening torque:

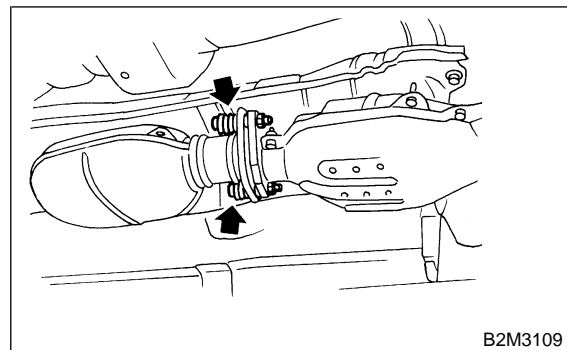
18 ± 5 N·m (1.8 ± 0.5 kg·m, 13.0 ± 3.6 ft·lb)



4) Install center exhaust pipe to rear exhaust pipe.

Tightening torque:

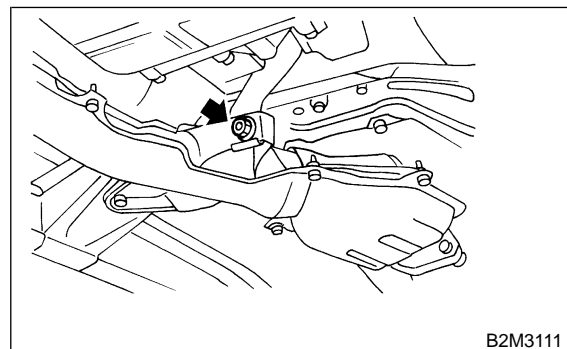
35 ± 5 N·m (3.6 ± 0.5 kg·m, 26.0 ± 3.6 ft·lb)



5) Tighten bolt which holds center exhaust pipe to hanger bracket.

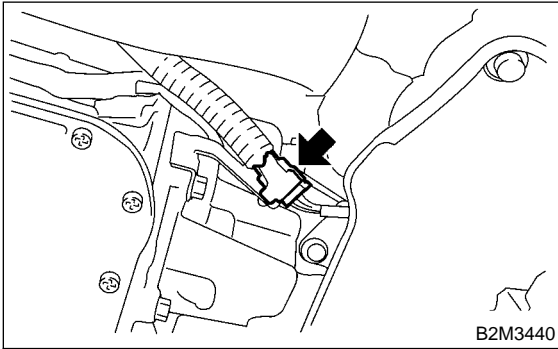
Tightening torque:

35 ± 5 N·m (3.6 ± 0.5 kg·m, 26.0 ± 3.6 ft·lb)

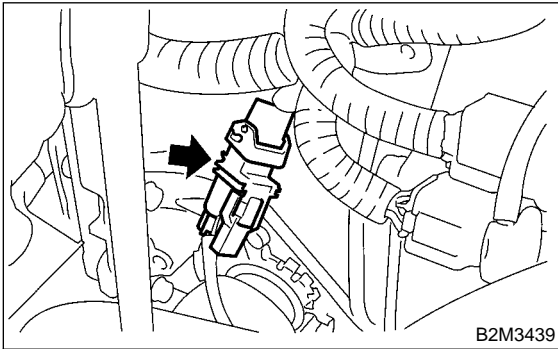


2. Rear Catalytic Converter

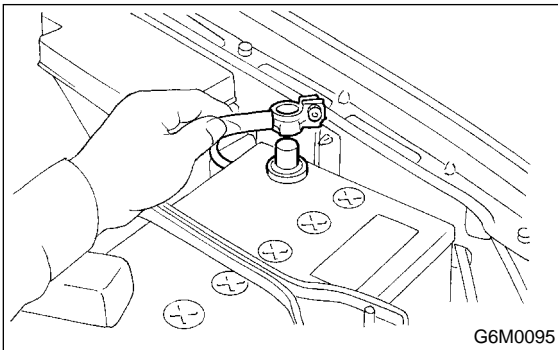
- 6) Connect connector to rear oxygen sensor connector.



- 7) Install under cover.
8) Lower the vehicle.
9) Connect front oxygen (A/F) sensor connector.



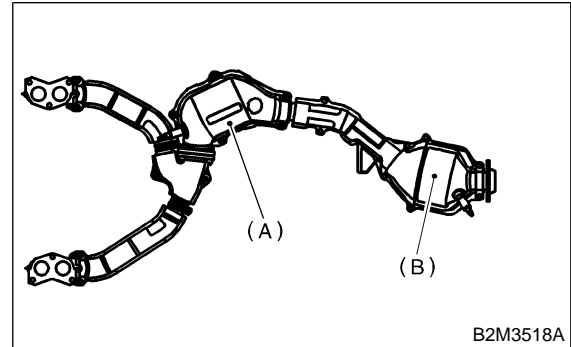
- 10) Connect battery ground cable.

**NOTE:**

The rear catalytic converter is integrated with front catalytic converter. Therefore, the procedure for installing rear catalytic converter is the same as the description above.

2. Rear Catalytic Converter**A: REMOVAL**

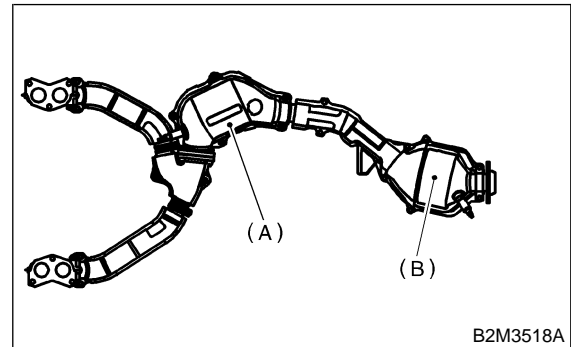
The front and rear catalytic converter and center exhaust pipe are integrated into one unit. Therefore, the removal and installation procedures are the same as the those for the front catalytic converter. <Ref. to 2-1 [W1A0].>



- (A) Front catalytic converter
(B) Rear catalytic converter

B: INSTALLATION

The front and rear catalytic converter and center exhaust pipe are integrated into one unit. Therefore, the removal and installation procedures are the same as the ones described under front catalytic converter. <Ref. to 2-1 [W1B0].>

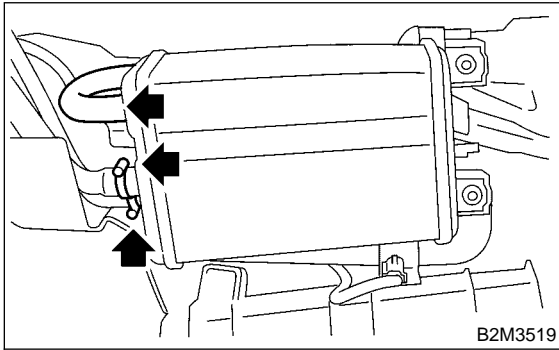


- (A) Front catalytic converter
(B) Rear catalytic converter

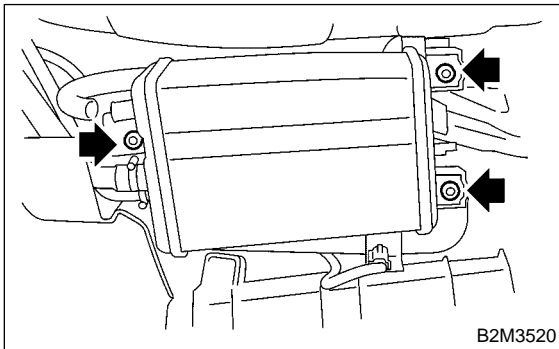
3. Canister

A: REMOVAL AND INSTALLATION

- 1) Lift-up the vehicle.
- 2) Loosen two clamps which hold two canister hoses, and disconnect evaporation three hoses from canister.



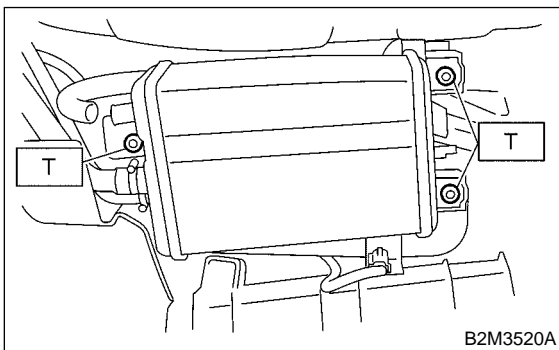
- 3) Remove canister from body.



- 4) Installation is in the reverse order of removal.

Tightening torque:

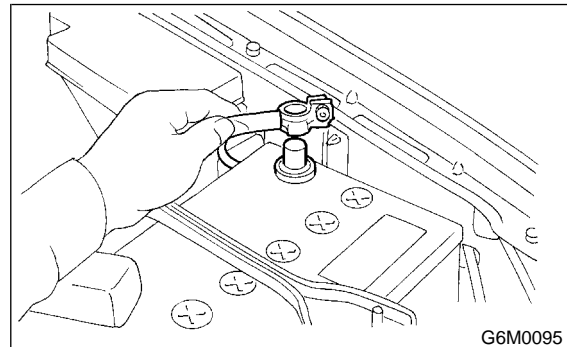
22.5±7 N·m (2.3±0.7 kg·m, 16.6±5.1 ft·lb)



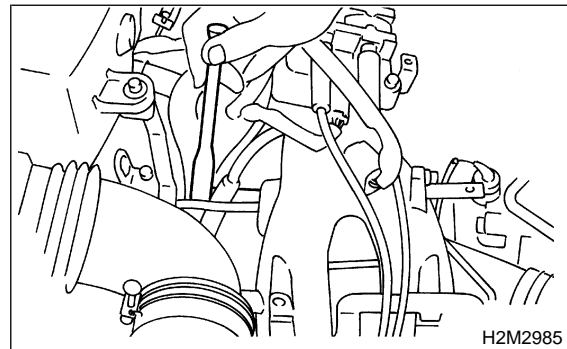
4. Purge Control Solenoid Valve

A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.

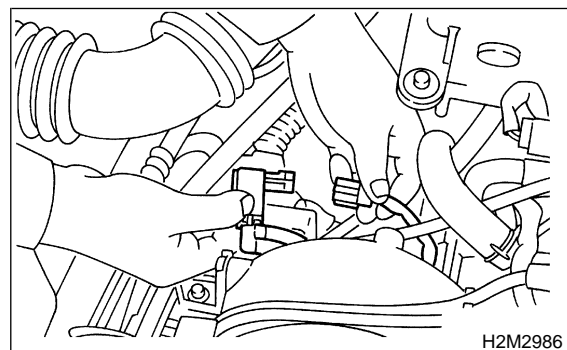


- 2) Remove bolt which installs purge control solenoid valve onto intake manifold.



- 3) Take out purge control solenoid valve through the bottom of the intake manifold.

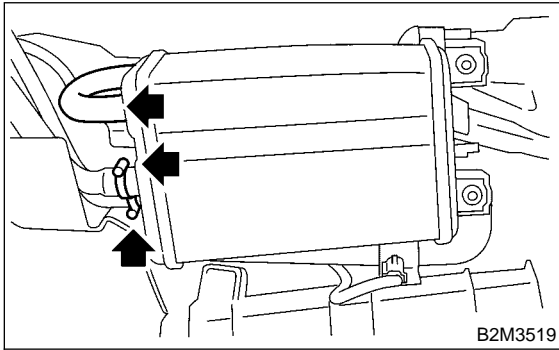
- 4) Disconnect connector and hoses from purge control solenoid valve.



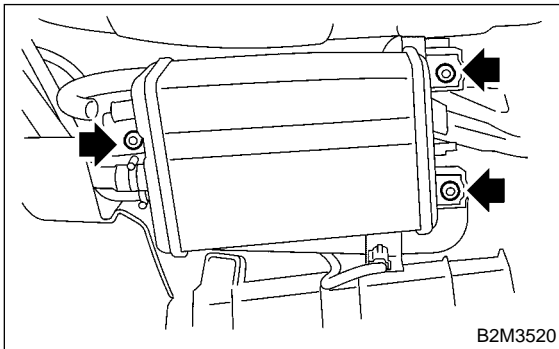
3. Canister

A: REMOVAL AND INSTALLATION

- 1) Lift-up the vehicle.
- 2) Loosen two clamps which hold two canister hoses, and disconnect evaporation three hoses from canister.



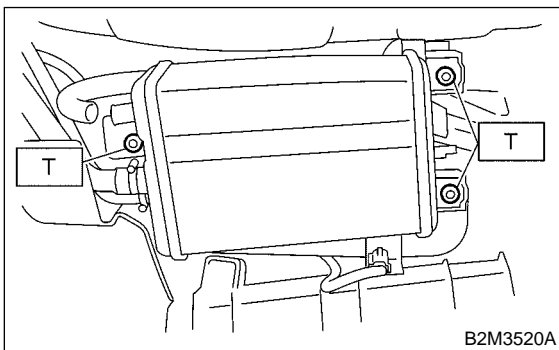
- 3) Remove canister from body.



- 4) Installation is in the reverse order of removal.

Tightening torque:

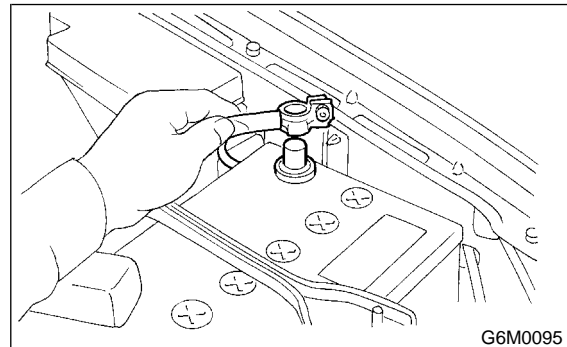
22.5±7 N·m (2.3±0.7 kg·m, 16.6±5.1 ft·lb)



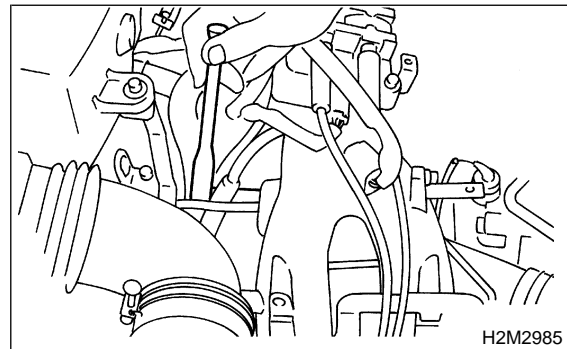
4. Purge Control Solenoid Valve

A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.

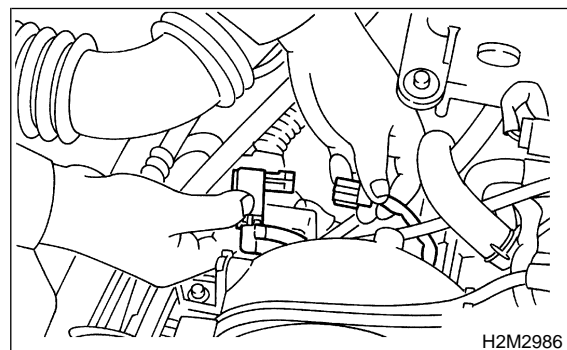


- 2) Remove bolt which installs purge control solenoid valve onto intake manifold.



- 3) Take out purge control solenoid valve through the bottom of the intake manifold.

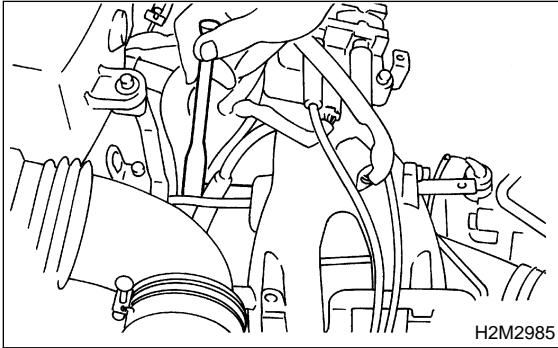
- 4) Disconnect connector and hoses from purge control solenoid valve.



5) Installation is in the reverse order of removal.

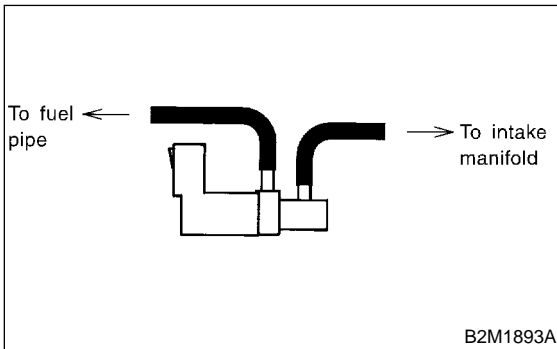
Tightening torque:

$16 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.6 \pm 0.15 \text{ kg}\cdot\text{m}$, $11.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)



CAUTION:

Carefully connect the evaporation hoses.



5. Main Fuel Level Sensor

A: REMOVAL AND INSTALLATION

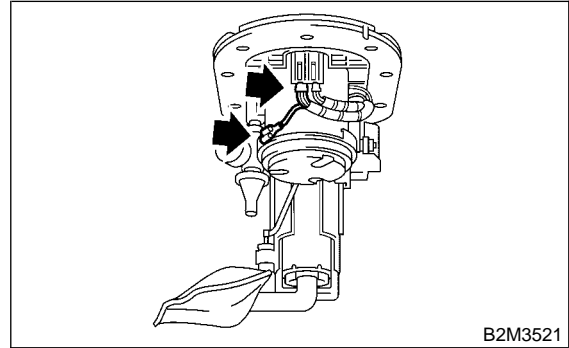
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

NOTE:

Fuel level sensor is built in fuel pump assembly.

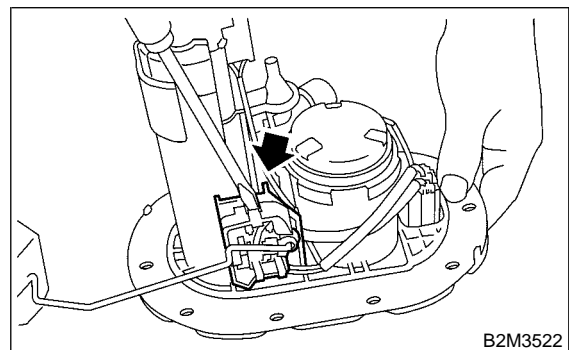
- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Disconnect connector from fuel pump bracket.



- 3) Pushing the pawls with a screwdriver, remove fuel meter unit by pulling it downwards.

NOTE:

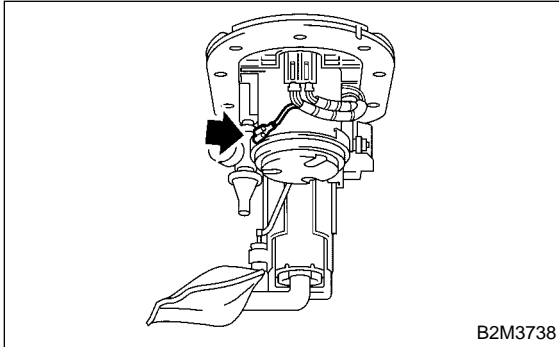
- Replace fuel level sensor pawls with new ones as they might brake when removed.
- When replacing fuel level sensor, also replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>



4) Installation is in the reverse order of removal.

WARNING:

- Ground cable must be connected.
- Spark may occur and ignite if fuel is nearby.



6. Fuel Temperature Sensor

A: REMOVAL AND INSTALLATION

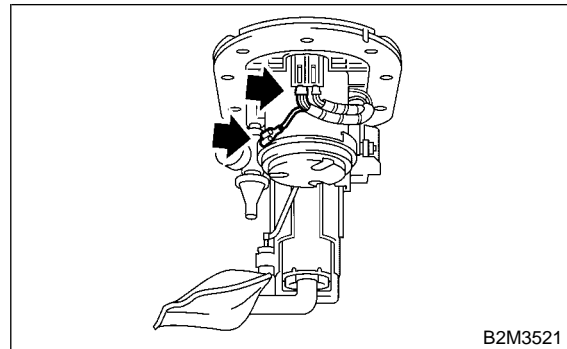
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

NOTE:

Fuel temperature sensor is built in fuel pump assembly.

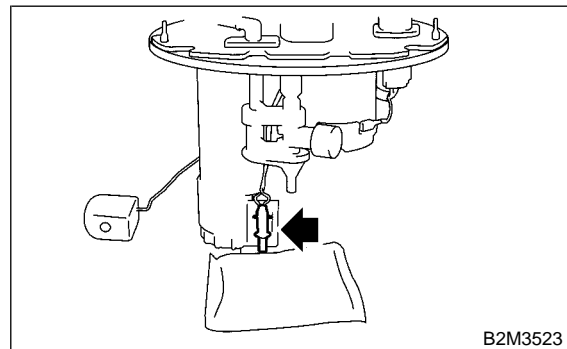
- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Disconnect connector from fuel pump bracket.



- 3) Remove fuel temperature sensor.

NOTE:

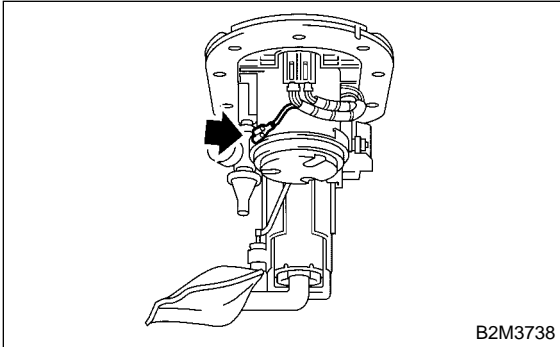
When replacing fuel temperature sensor, also replace fuel level sensor. <Ref. to 2-1 [W5A0].>



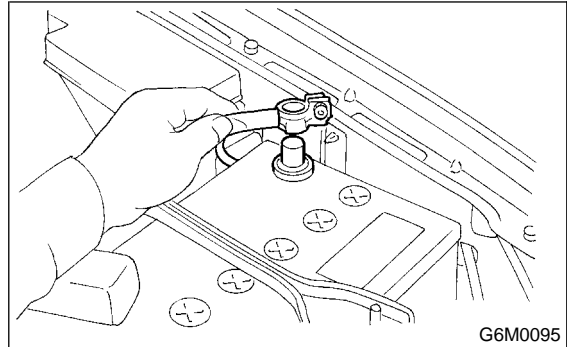
4) Installation is in the reverse order of removal.

WARNING:

- Ground cable must be connected.
- Spark may occur and ignite if fuel is nearby.

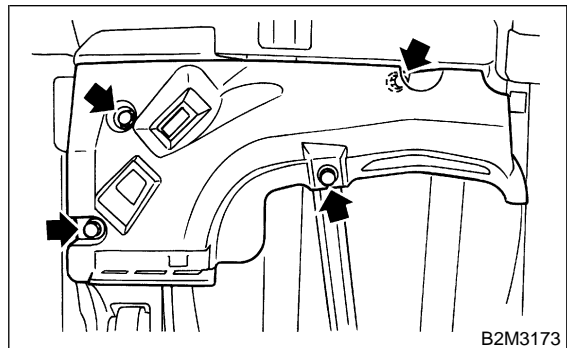
**7. Sub Fuel Level Sensor****A: REMOVAL AND INSTALLATION**

1) Disconnect battery ground cable.

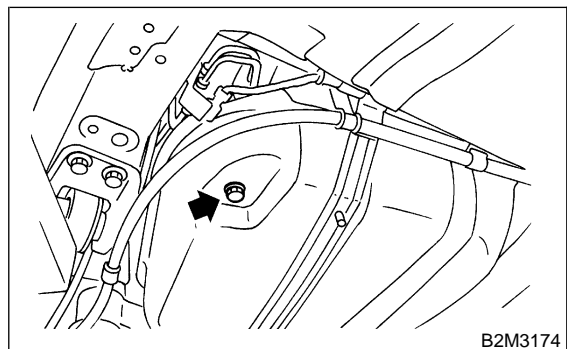


2) Lift-up the vehicle.

3) Remove front side fuel tank cover.



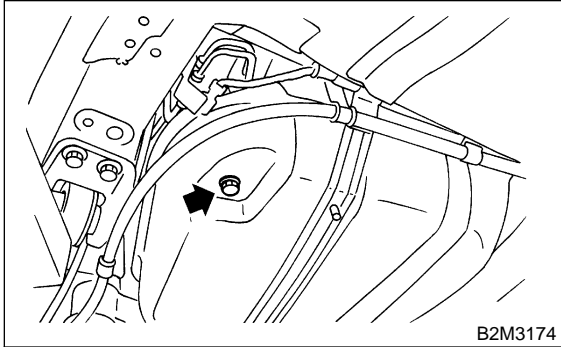
4) Drain fuel from fuel tank. Set a container under the vehicle and remove drain plug from fuel tank.



5) Tighten fuel drain plug and install front right side fuel tank cover.

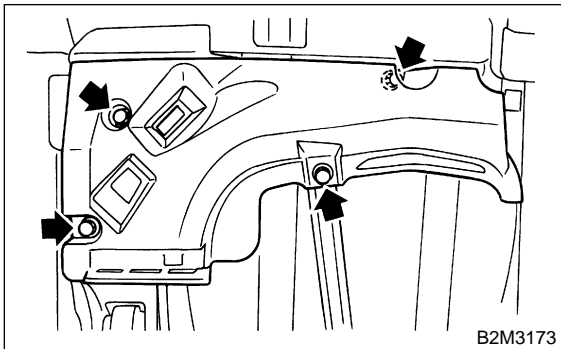
Tightening torque:

$26 \pm 7 \text{ N}\cdot\text{m}$ ($2.65 \pm 0.7 \text{ kg}\cdot\text{m}$, $19.2 \pm 5.1 \text{ ft}\cdot\text{lb}$)



Tightening torque:

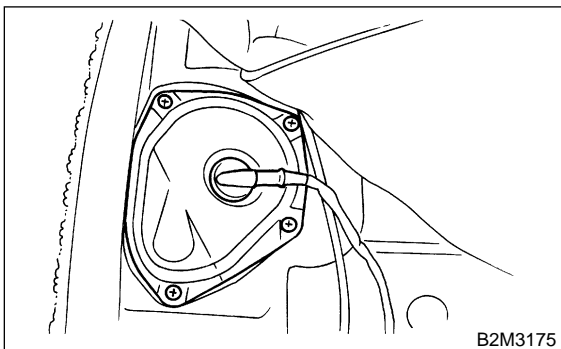
$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)



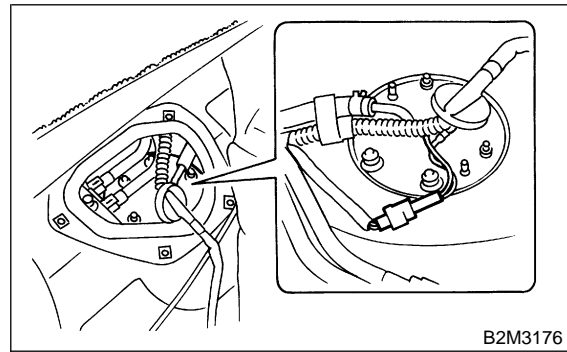
6) Raise rear seat and turn floor mat up. (Wagon model)

7) Remove rear seat. (Sedan model)

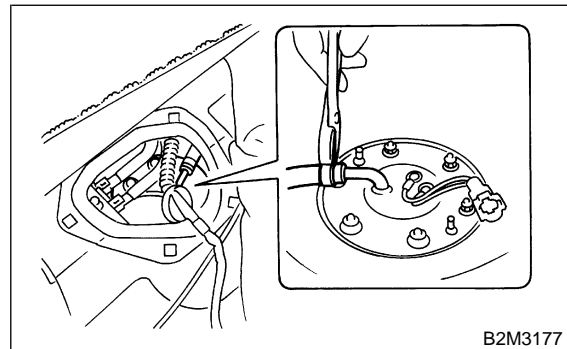
8) Remove service hole cover.



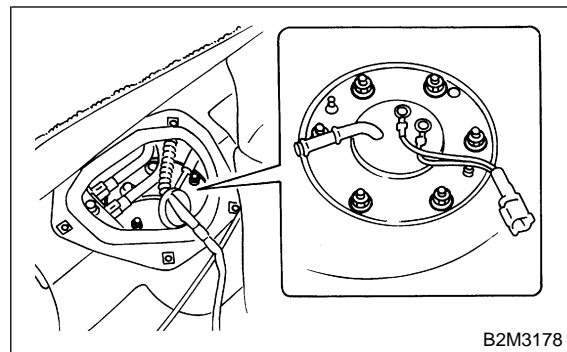
9) Disconnect connector from fuel sub level sensor.



10) Disconnect fuel jet pump hose.



11) Remove bolts which install fuel sub level sensor on fuel tank.

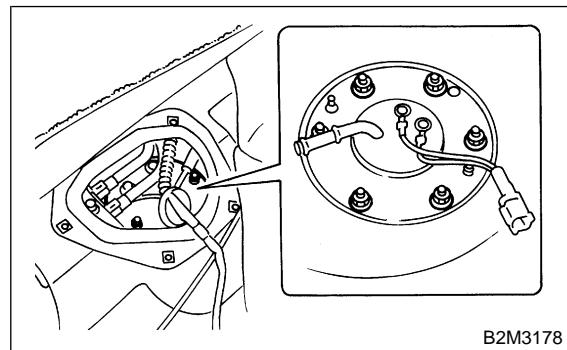


12) Remove fuel sub level sensor.

13) Installation is in the reverse order of removal.

Tightening torque:

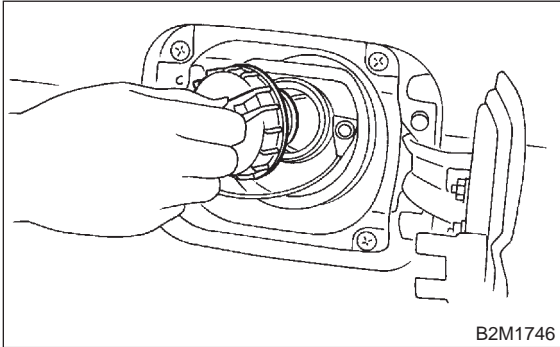
$4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



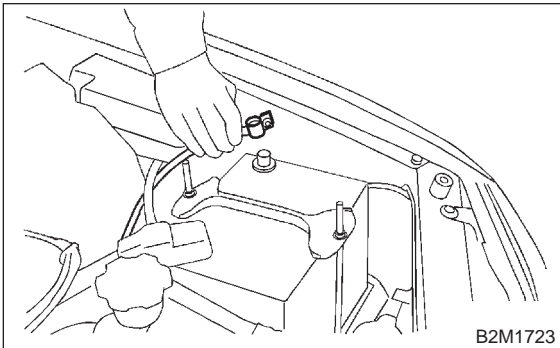
8. Fuel Tank Pressure Sensor

A: REMOVAL AND INSTALLATION

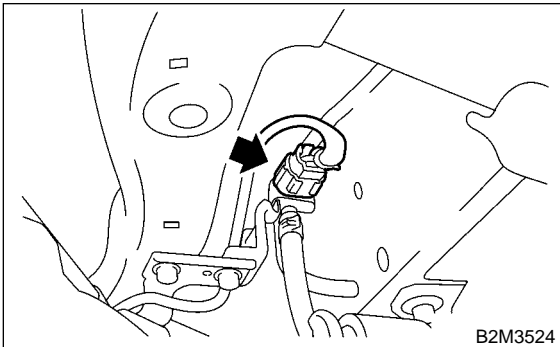
- 1) Set the vehicle on the lift.
- 2) Open fuel flap lid, and remove fuel filler cap.



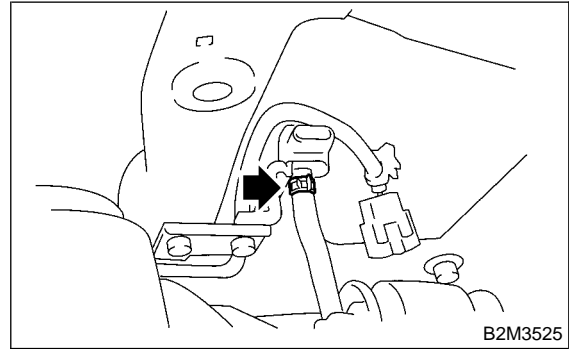
- 3) Disconnect battery ground cable.



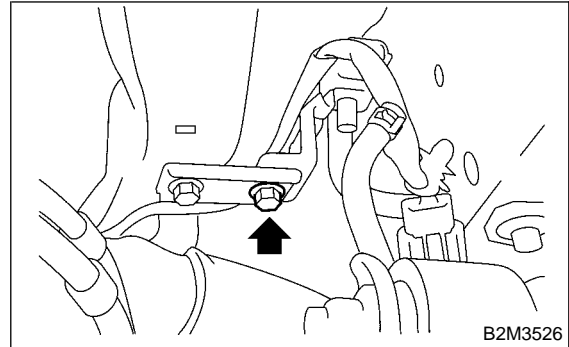
- 4) Lift-up the vehicle.
- 5) Disconnect connector from fuel tank pressure sensor.



- 6) Disconnect pressure hose from fuel tank pressure sensor.



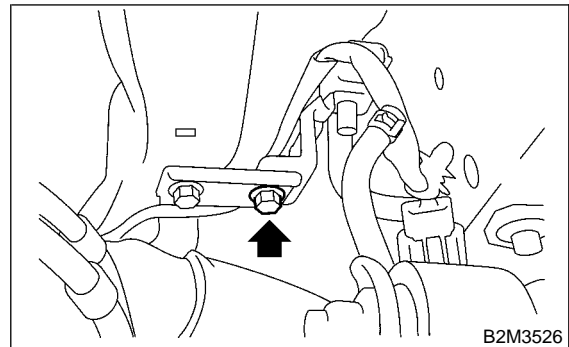
- 7) Remove fuel tank pressure sensor.



- 8) Installation is in the reverse order of removal.

Tightening torque:

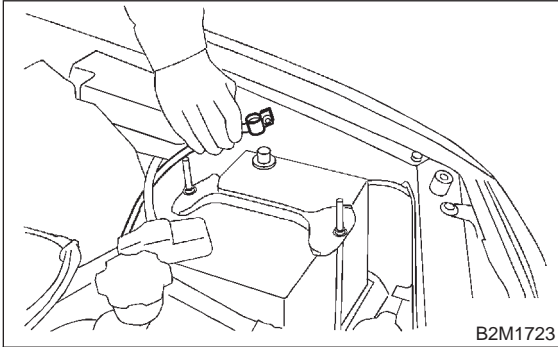
7.4 ± 2.0 N·m (0.75 ± 0.2 kg·m, 5.4 ± 1.4 ft·lb)



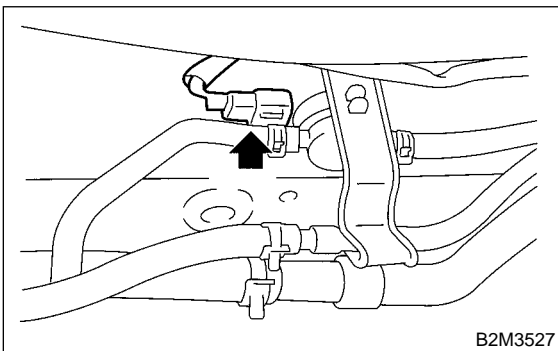
9. Pressure Control Solenoid Valve

A: REMOVAL AND INSTALLATION

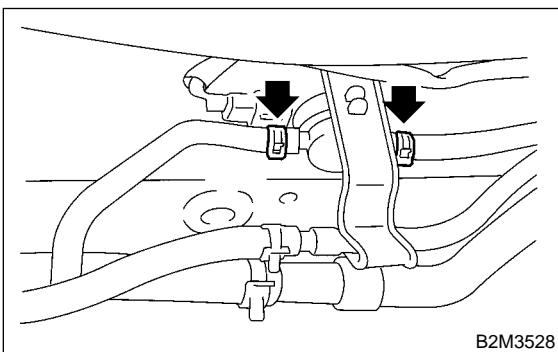
- 1) Set the vehicle on the lift.
- 2) Disconnect battery ground cable.



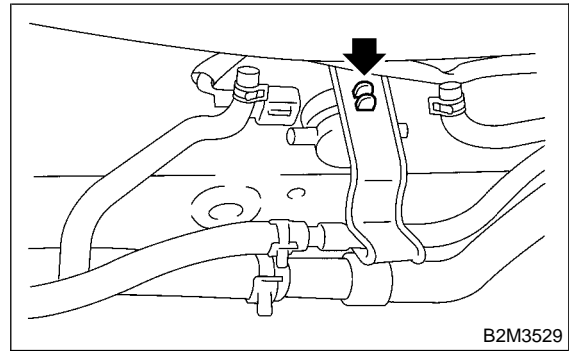
- 3) Lift-up the vehicle.
- 4) Disconnect connector from pressure control solenoid valve.



- 5) Disconnect two evaporation hoses from pressure control solenoid valve.



- 6) Remove pressure control solenoid valve from bracket.

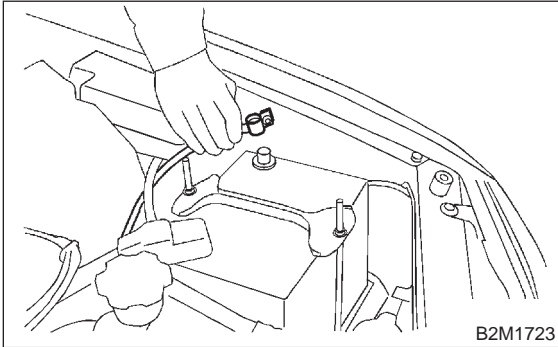


- 7) Installation is in the reverse order of removal.

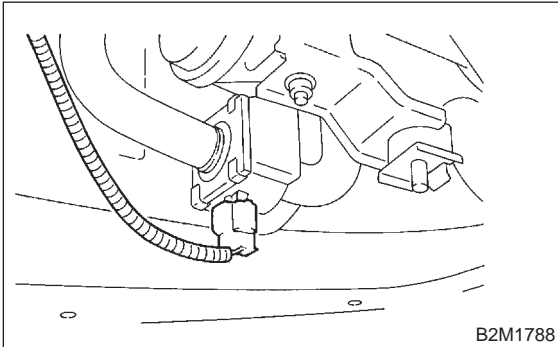
10. Drain Filter

A: REMOVAL AND INSTALLATION

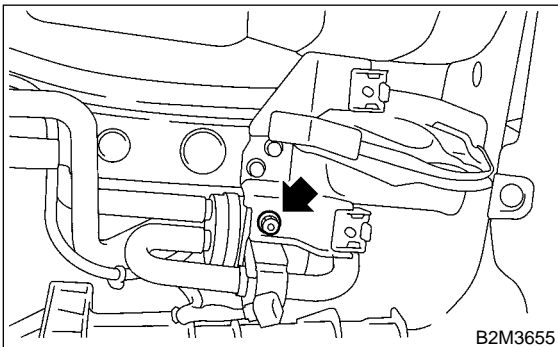
- 1) Set the vehicle on the lift.
- 2) Disconnect battery ground cable.



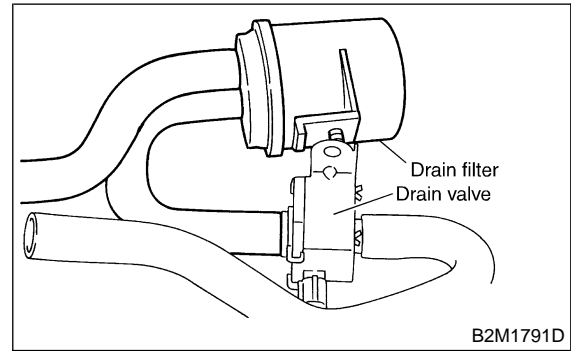
- 3) Lift-up the vehicle.
- 4) Remove canister. <Ref. to 2-1 [W3A0].>
- 5) Disconnect connector from drain valve.



- 6) Remove nut which installs drain filter and drain valve brackets on body, and remove them as a unit.



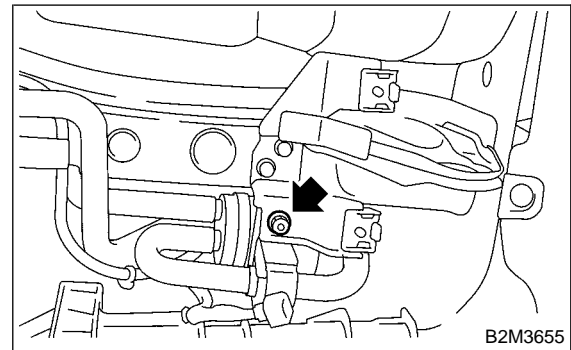
- 7) Disconnect evaporation hoses, and remove drain filter.



- 8) Installation is in the reverse order of removal.

Tightening torque:

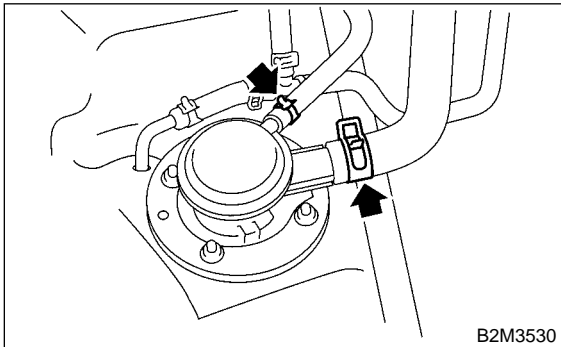
$22.5 \pm 7 \text{ N}\cdot\text{m}$ ($2.3 \pm 0.7 \text{ kg}\cdot\text{m}$, $16.6 \pm 5.1 \text{ ft}\cdot\text{lb}$)



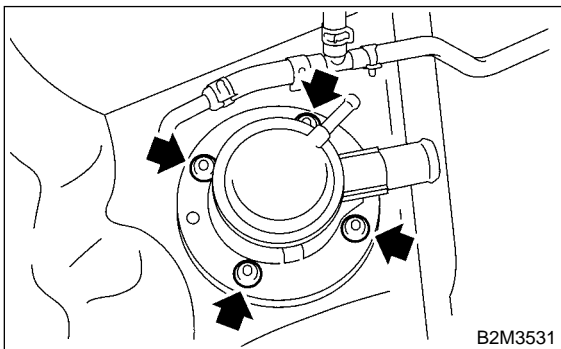
11. Vent Valve

A: REMOVAL AND INSTALLATION

- 1) Remove fuel tank. <Ref. to 2-8 [W1C0].>
- 2) Move clips, and disconnect hoses from vent valve.



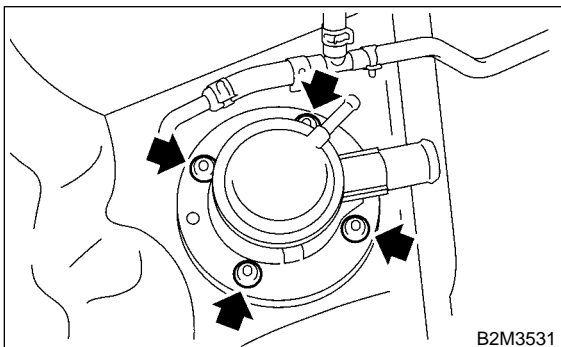
- 3) Remove nuts which install vent valve on fuel tank.



- 4) Installation is in the reverse order of removal.

CAUTION:
Replace rubber seat with a new one.

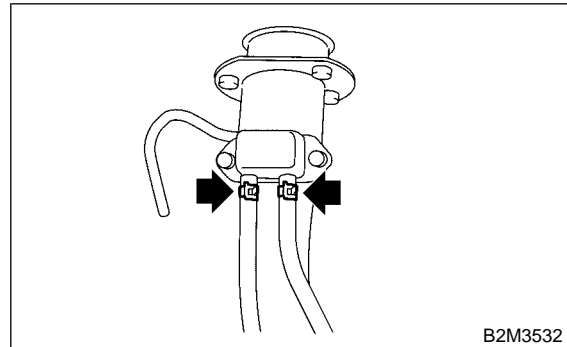
Tightening torque:
 $4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



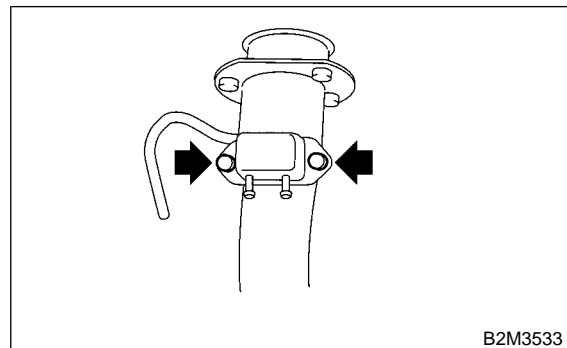
12. Shut Valve

A: REMOVAL AND INSTALLATION

- 1) Drain fuel from fuel tank. <Ref. to 2-8 [W1B0].>
- 2) Remove fuel filler pipe. <Ref. to 2-8 [W3A0].>
- 3) Disconnect evaporation hoses from shut valve.

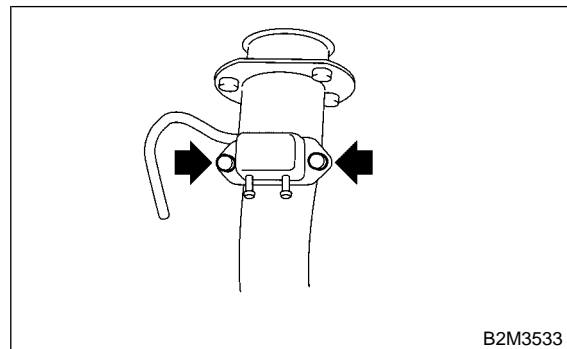


- 4) Remove shut valve from fuel filler pipe.



- 5) Installation is in the reverse order of removal.

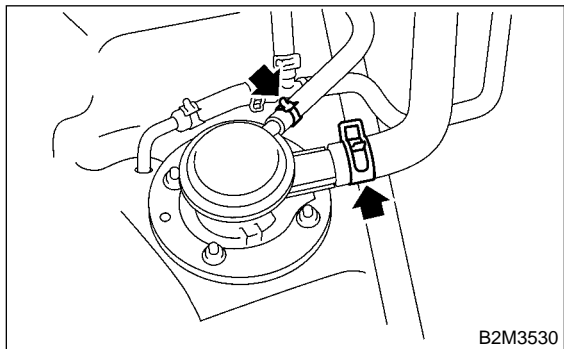
Tightening torque:
 $4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



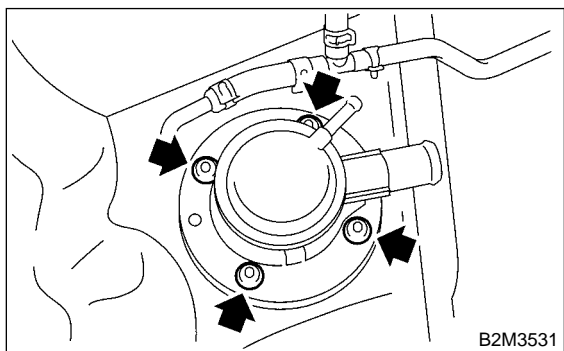
11. Vent Valve

A: REMOVAL AND INSTALLATION

- 1) Remove fuel tank. <Ref. to 2-8 [W1C0].>
- 2) Move clips, and disconnect hoses from vent valve.



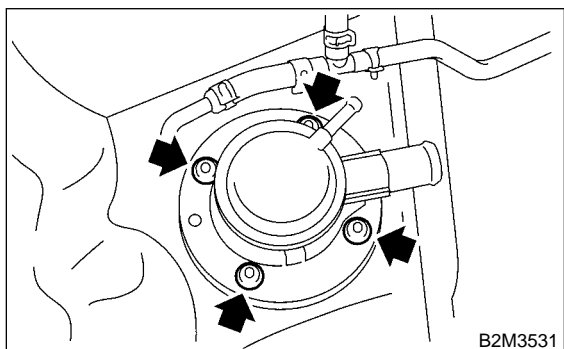
- 3) Remove nuts which install vent valve on fuel tank.



- 4) Installation is in the reverse order of removal.

CAUTION:
Replace rubber seat with a new one.

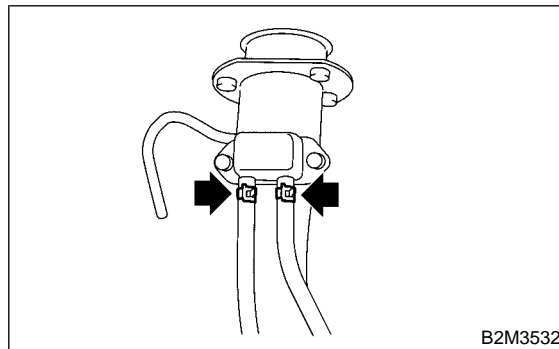
Tightening torque:
 $4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



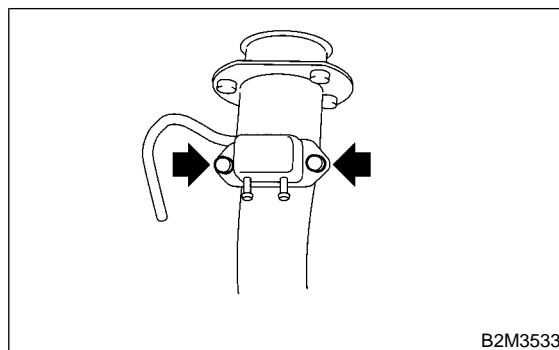
12. Shut Valve

A: REMOVAL AND INSTALLATION

- 1) Drain fuel from fuel tank. <Ref. to 2-8 [W1B0].>
- 2) Remove fuel filler pipe. <Ref. to 2-8 [W3A0].>
- 3) Disconnect evaporation hoses from shut valve.

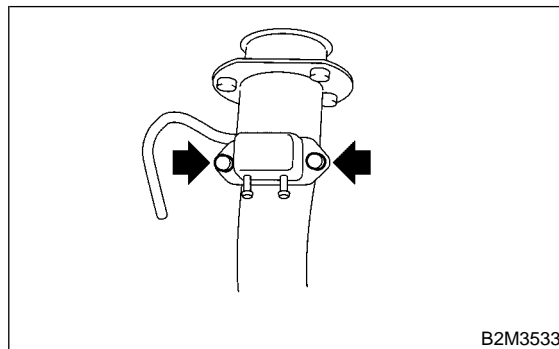


- 4) Remove shut valve from fuel filler pipe.



- 5) Installation is in the reverse order of removal.

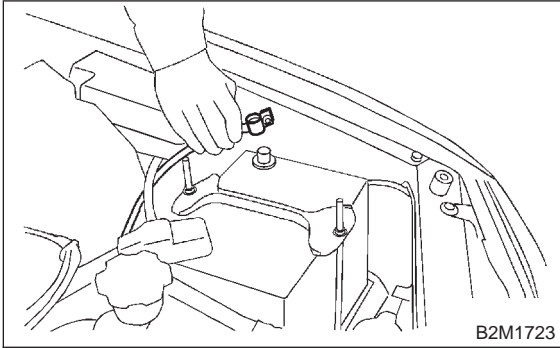
Tightening torque:
 $4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



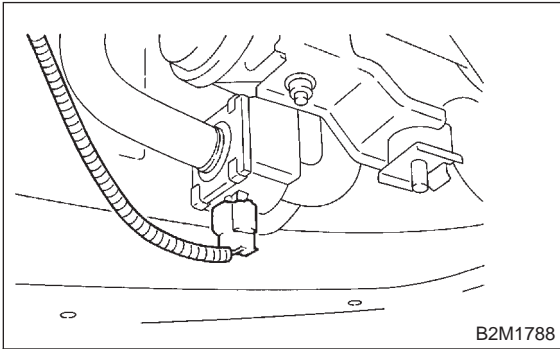
13. Drain Valve

A: REMOVAL AND INSTALLATION

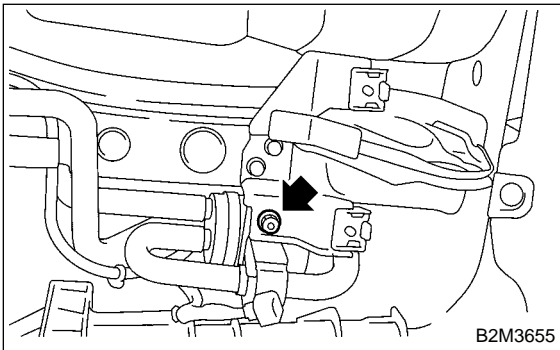
- 1) Set the vehicle on the lift.
- 2) Disconnect battery ground cable.



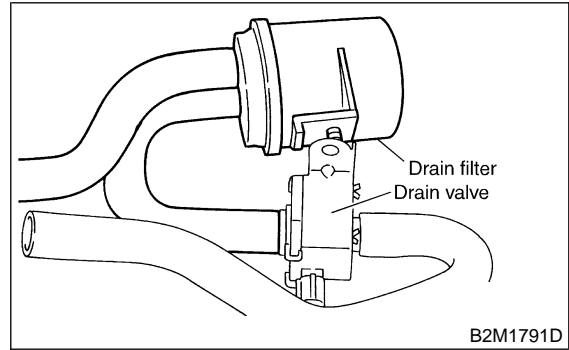
- 3) Lift-up the vehicle.
- 4) Remove canister. <Ref. to 2-1 [W3A0].>
- 5) Disconnect connector from drain valve.



- 6) Remove bolt which installs air filter and drain valve brackets on body.



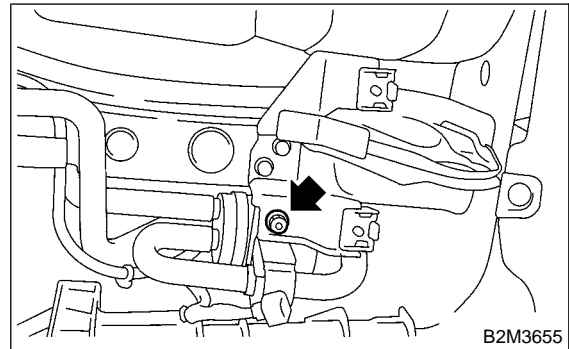
- 7) Disconnect evaporation hose and remove drain valve.



- 8) Installation is in the reverse order of removal.

Tightening torque:

22.5 ± 7 N·m (2.3 ± 0.7 kg·m, 16.6 ± 5.1 ft·lb)



1. Foreword

A: GENERAL

This chapter describes major inspection and service procedures for the engine mounted on the body. For procedures not found in this chapter, refer to the service procedure section in the applicable chapter.

2. Ignition Timing

A: MEASUREMENT

CAUTION:

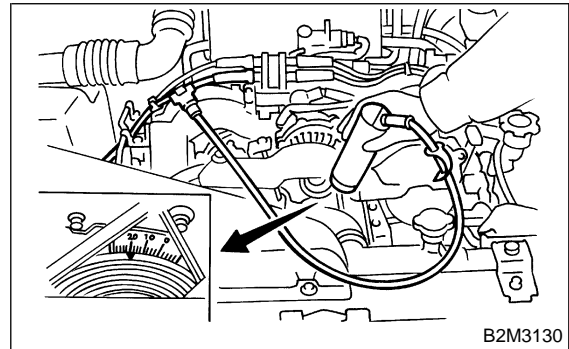
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.

- 1) Warm-up the engine.
- 2) To check the ignition timing, connect a timing light to #1 cylinder spark plug cord, and illuminate the timing mark with the timing light.
- 3) Start the engine at idle speed and check the ignition timing.

Ignition timing [BTDC/rpm]:

MT vehicle: $10^{\circ} \pm 10^{\circ} / 650$

AT vehicle: $10^{\circ} \pm 10^{\circ} / 700$



If the timing is not correct, check the ignition control system.

Refer to 2-7 Fuel Injection System. <Ref. to 2-7 [T100].>

1. Foreword

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This chapter describes major inspection and service procedures for the engine mounted on the body. For procedures not found in this chapter, refer to the service procedure section in the applicable chapter.

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A: MEASUREMENT

CAUTION:

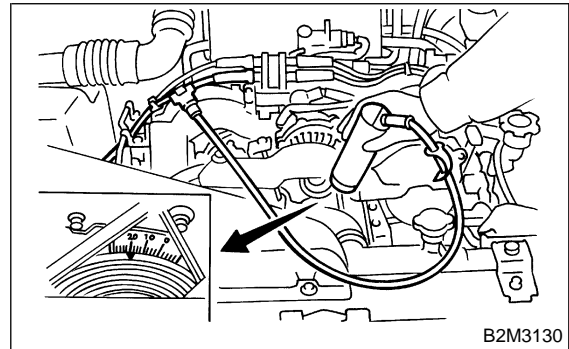
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Refer to 2-7 Fuel Injection System. <Ref. to 2-7 [T100].>

3. Engine Idle Speed

A: MEASUREMENT

1) Before checking idle speed, check the following:

(1) Ensure that air cleaner element is free from clogging, ignition timing is correct, spark plugs are in good condition, and that hoses are connected properly.

(2) Ensure that malfunction indicator light (CHECK ENGINE light) does not illuminate.

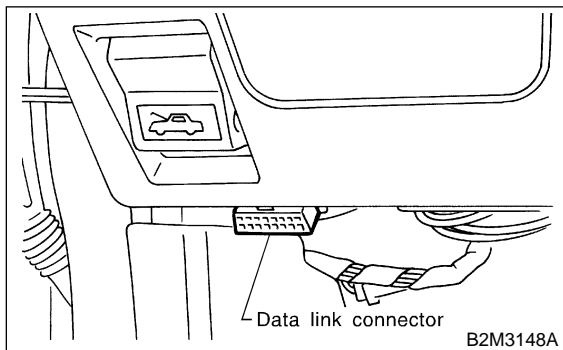
2) Warm-up the engine.

3) Stop the engine, and turn ignition switch to OFF.

4) When using SUBARU SELECT MONITOR;

(1) Insert the cartridge to SUBARU SELECT MONITOR.

(2) Connect SUBARU SELECT MONITOR to the data link connector.



(3) Turn ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.

(4) Select {2. Each System Check} in Main Menu.

(5) Select {Engine Control System} in Selection Menu.

(6) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.

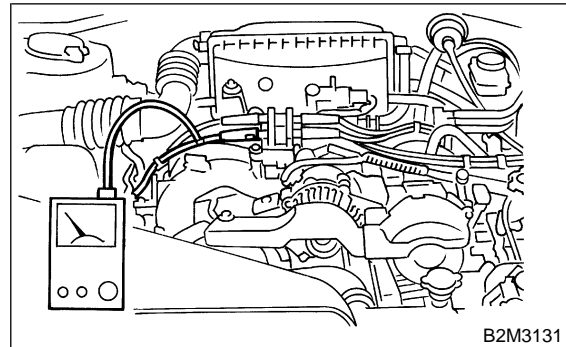
(7) Select {1.12 Data Display} in Data Display Menu.

(8) Start the engine, and read engine idle speed.

5) When using tachometer (Secondary pick-up type).

(1) Attach the pick-up clip to No. 1 cylinder spark plug cord.

(2) Start the engine, and read engine idle speed.



NOTE:

- When using the OBD-II general scan tool, carefully read its operation manual.

- This ignition system provides simultaneous ignition for #1 and #2 plugs. It must be noted that some tachometers may register twice that of actual engine speed.

6) Check idle speed when unloaded. (With headlights, heater fan, rear defroster, radiator fan, air conditioning, etc. OFF)

Idle speed (No load and gears in neutral (MT), or N or P (AT) position):

MT vehicle: 650±100 rpm

AT vehicle: 700±100 rpm

7) Check idle speed when loaded. (Turn air conditioning switch to "ON" and operate compressor for at least one minute before measurement.)

Idle speed [A/C "ON", no load and gears in neutral (MT) or N or P (AT) position]:

850±100 rpm

CAUTION:

Never rotate idle adjusting screw. If idle speed is out of specifications, refer to General On-board Diagnosis Table under "2-7 Fuel Injection System". <Ref. to 2-7 [T100].>

4. Engine Compression

A: MEASUREMENT

CAUTION:

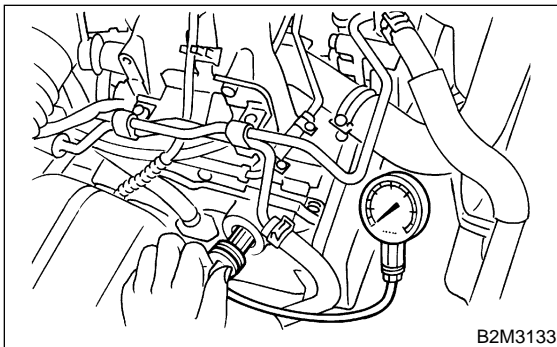
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.

- 1) After warming-up the engine, turn ignition switch to OFF.
- 2) Make sure that the battery is fully charged.
- 3) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 4) Remove all the spark plugs. <Ref. to 6-1 [W3A0].>
- 5) Fully open throttle valve.
- 6) Check the starter motor for satisfactory performance and operation.
- 7) Hold the compression gauge tight against the spark plug hole.

CAUTION:

When using a screw-in type compression gauge, the screw (put into cylinder head spark plug hole) should be less than 18 mm (0.71 in) long.

- 8) Crank the engine by means of the starter motor, and read the maximum value on the gauge when the pointer is steady.



- 9) Perform at least two measurements per cylinder, and make sure that the values are correct.

Compression (350 rpm and fully open throttle):

Standard;

1,216 kPa (12.4 kg/cm², 176 psi)

Limit;

941 kPa (9.6 kg/cm², 137 psi)

Difference between cylinders;

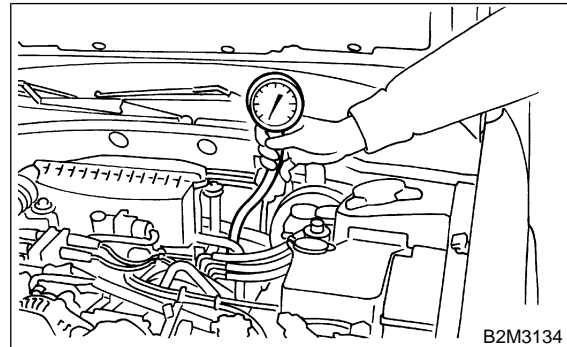
49 kPa (0.5 kg/cm², 7 psi), or less

5. Intake Manifold Vacuum

A: MEASUREMENT

- 1) Warm-up the engine.
- 2) Disconnect the brake vacuum hose and install the vacuum gauge to the hose fitting on the manifold.

- 3) Keep the engine at the idle speed and read the vacuum gauge indication.
By observing the gauge needle movement, the internal condition of the engine can be diagnosed as described below.



B2M3134

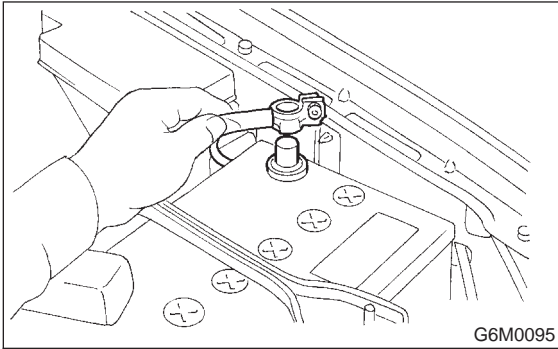
Vacuum pressure (at idling, A/C "OFF"):
Less than -60.0 kPa (-450 mmHg, -17.72 inHg)

Diagnosis of engine condition by measurement of manifold vacuum	
Vacuum gauge indication	Possible engine condition
1. Needle is steady but lower than normal position. This tendency becomes more evident as engine temperature rises.	Leakage around intake manifold gasket or disconnection or damaged vacuum hose
2. When engine speed is reduced slowly from higher speed, needle stops temporarily when it is lowering or becomes steady above normal position.	Back pressure too high, or exhaust system clogged
3. Needle intermittently drops to position lower than normal position.	Leakage around cylinder
4. Needle drops suddenly and intermittently from normal position.	Sticky valves
5. When engine speed is gradually increased, needle begins to vibrate rapidly at certain speed, and then vibration increases as engine speed increases.	Weak or broken valve springs
6. Needle vibrates above and below normal position in narrow range.	Defective ignition system or throttle chamber idle adjustment

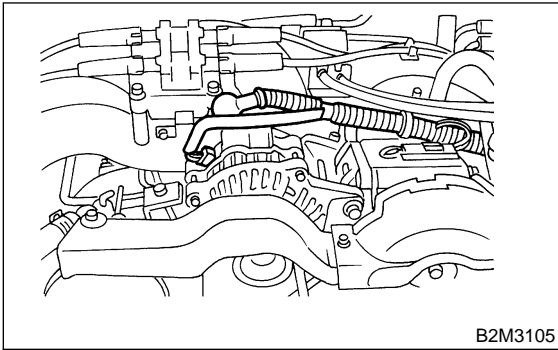
6. Engine Oil Pressure

A: MEASUREMENT

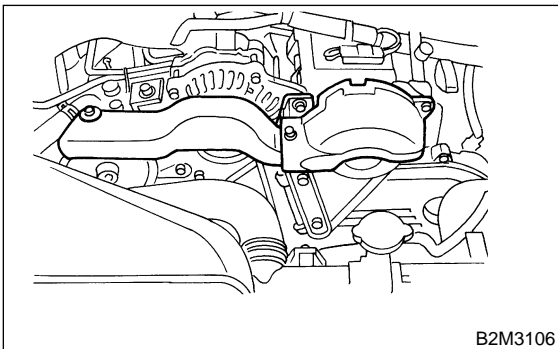
- 1) Disconnect battery ground cable.



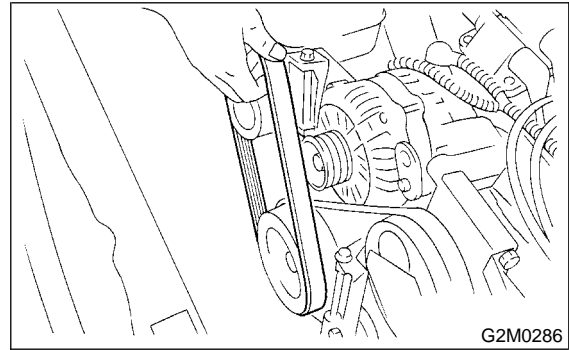
- 2) Remove generator from bracket.
(1) Disconnect connector and terminal from generator.



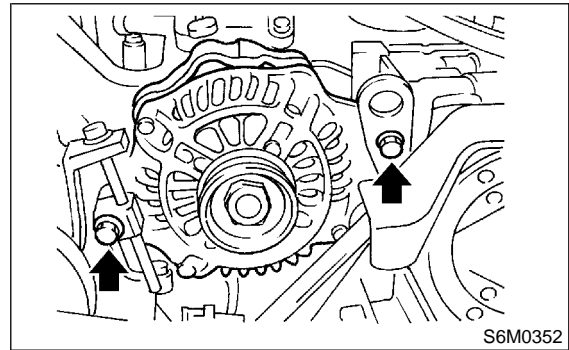
- (2) Remove V-belt cover.



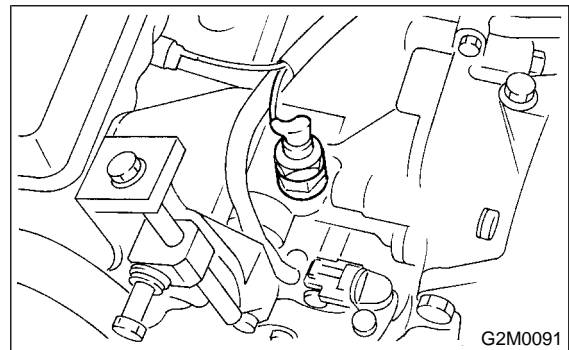
- (3) Loosen lock bolt and slider bolt, and remove front side V-belt.



- (4) Remove generator lock bolt.
(5) Remove bolt which install generator on bracket.

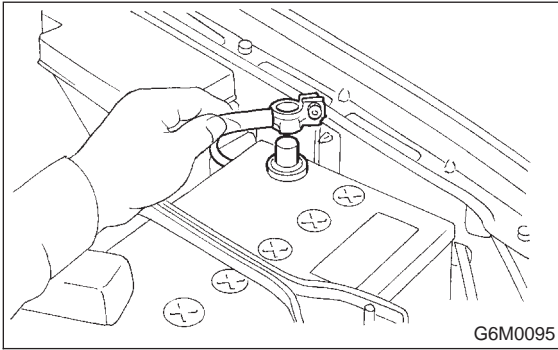


- 3) Disconnect connector from oil pressure switch.
4) Remove oil pressure switch from engine cylinder block. <Ref. to 2-4 [W3A0].>

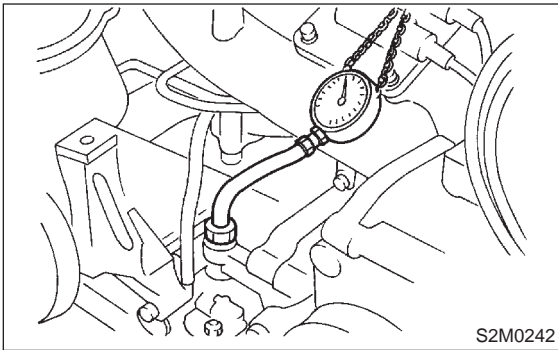


- 5) Connect oil pressure gauge hose to cylinder block.

6) Connect battery ground cable.



7) Start the engine, and measure oil pressure.



Oil pressure:
98 kPa (1.0 kg/cm², 14 psi) or more at 800 rpm
294 kPa (3.0 kg/cm², 43 psi) or more at 5,000 rpm

CAUTION:

- If oil pressure is out of specification, check oil pump, oil filter and lubrication line. <Ref. to 2-4 [W100].>
- If oil pressure warning light is turned ON and oil pressure is in specification, replace oil pressure switch. <Ref. to 2-4 [W100].>

NOTE:

The specified data is based on an engine oil temperature of 80°C (176°F).

8) After measuring oil pressure, install oil pressure switch. <Ref. to 2-4 [W3B0].>

Tightening torque:

25±3 N·m (2.5±0.3 kg·m, 18.1±2.2 ft·lb)

9) Install generator and V-belt in the reverse order of removal, and adjust the V-belt deflection. <Ref. to 1-5 [G2A0].>

7. Fuel Pressure

A: PRECAUTIONS

WARNING:

- Place “No fire” signs near the working area.
- Disconnect ground terminal from battery.
- Be careful not to spill fuel on the floor.

B: MEASUREMENT OF FUEL PRESSURE

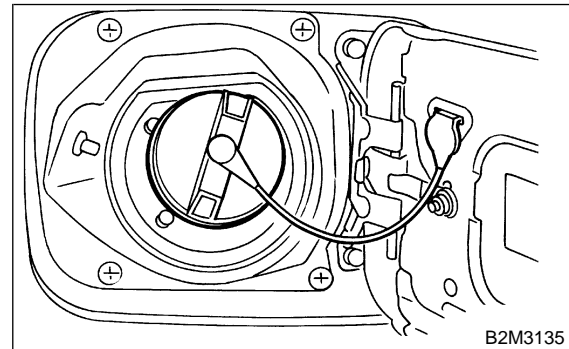
WARNING:

Before removing fuel pressure gauge, release fuel pressure.

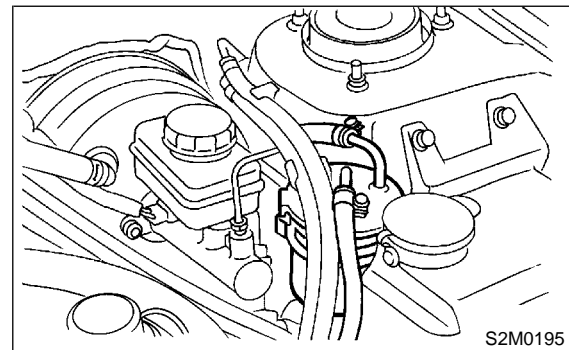
NOTE:

If out of specification, check or replace pressure regulator and pressure regulator vacuum hose.

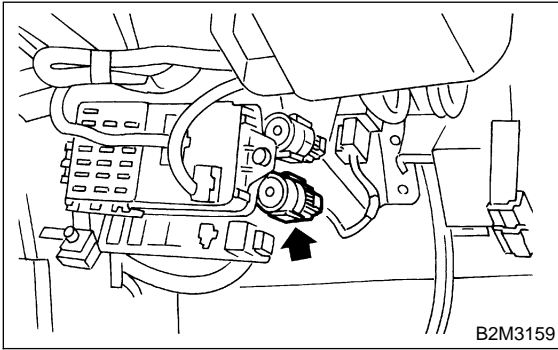
- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Open fuel flap lid, and remove fuel filler cap.



3) Disconnect fuel delivery hoses from fuel filter, and connect fuel pressure gauge.



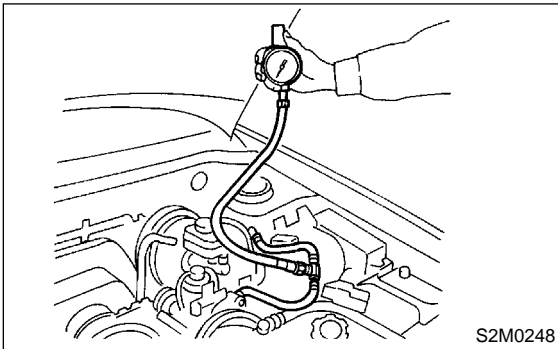
- 4) Connect connector of fuel pump relay.



- 5) Start the engine.
6) Measure fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

Fuel pressure:

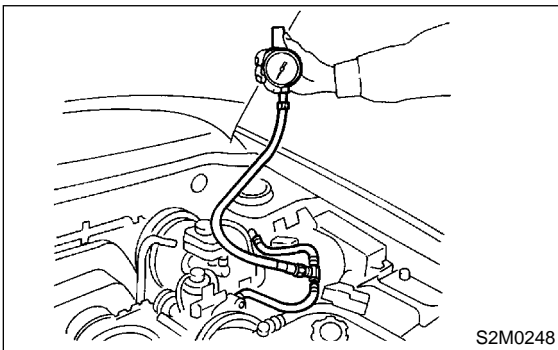
Standard; 284 — 314 kPa (2.9 — 3.2 kg/cm², 41 — 46 psi)



- 7) After connecting pressure regulator vacuum hose, measure fuel pressure.

Fuel pressure:

Standard; 206 — 235 kPa (2.1 — 2.4 kg/cm², 30 — 34 psi)



NOTE:

The fuel pressure gauge registers 10 to 20 kPa (0.1 to 0.2 kg/cm², 1 to 3 psi) higher than standard values during high-altitude operations.

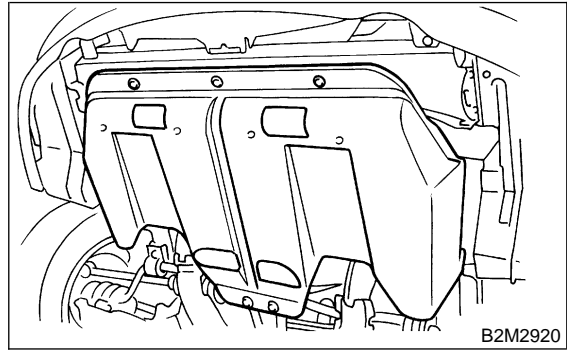
8. Valve Clearance

A: INSPECTION

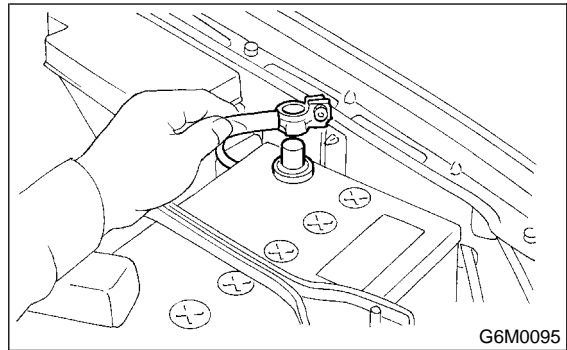
CAUTION:

Inspection and adjustment of valve clearance should be performed while engine is cold.

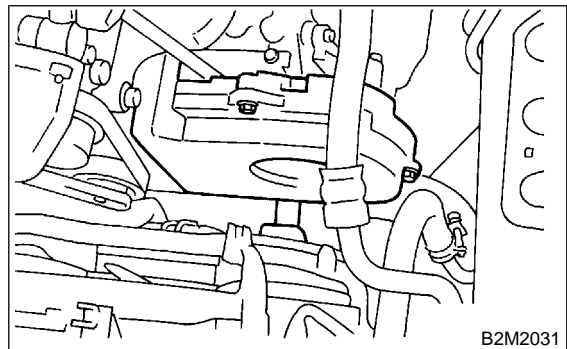
- 1) Set the vehicle onto the lift.
- 2) Lift-up the vehicle.
- 3) Remove under cover.



- 4) Disconnect battery ground cable.



- 5) Lower the vehicle.
- 6) Remove timing belt cover (LH).



1. Engine

1. Engine

A: SPECIFICATIONS

Engine	Type		Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gaso- line engine
	Valve arrangement		Belt driven, single over-head camshaft, 4-valve/cylinder
	Bore x Stroke		mm (in) 99.5 x 79.0 (3.917 x 3.110)
	Displacement		cm ³ (cu in) 2,457 (150)
	Compression ratio		10.0
	Compression pres- sure (at 200 — 300 rpm)		kPa (kg/cm ² , psi) 1,079 — 1,275 (11.0 — 13.0, 156 — 185)
	Number of piston rings		Pressure ring: 2, Oil ring: 1
	Intake valve timing	Opening	1° BTDC
		Closing	51° ABDC
	Exhaust valve timing	Opening	50° BBDC
		Closing	6° ATDC
	Valve clearance	Intake	mm (in) 0.20±0.02 (0.0079±0.0008)
		Exhaust	mm (in) 0.25±0.02 (0.0098±0.0008)
	Idling speed [At neutral position on MT, or "P" or "N" position on AT]		rpm 700±100 (No load) 850±100 (A/C switch ON)
Firing order		1 → 3 → 2 → 4	
Ignition timing		BTDC/rpm 10°±10°/700	

B: SERVICE DATA

NOTE:

STD: Standard I.D.: Inner Diameter O.D.: Outer Diameter US: Undersize OS: Oversize

Belt ten- sioner adjuster	Protrusion of adjuster rod		5.2 — 6.2 mm (0.205 — 0.244 in)	
Belt ten- sioner	Spacer O.D.		17.955 — 17.975 mm (0.7069 — 0.7077 in)	
	Tensioner bush I.D.		18.00 — 18.08 mm (0.7087 — 0.7118 in)	
	Clearance between spacer and bush	STD	0.025 — 0.125 mm (0.0010 — 0.0049 in)	
		Limit	0.175 mm (0.0069 in)	
Side clearance of spacer	STD	0.20 — 0.55 mm (0.0079 — 0.0217 in)		
	Limit	0.81 mm (0.0319 in)		
Valve rocker arm	Clearance between shaft and arm	STD	0.020 — 0.054 mm (0.0008 — 0.0021 in)	
		Limit	0.10 mm (0.0039 in)	
Camshaft	Bend limit		0.020 mm (0.0008 in)	
	Thrust clearance	STD	0.030 — 0.090 mm (0.0012 — 0.0035 in)	
		Limit	0.11 mm (0.0043 in)	
	Cam lobe height	Intake	STD	39.485 — 39.585 mm (1.5545 — 1.5585 in)
			Limit	39.385 mm (1.5506 in)
		Exhaust	STD	39.257 — 39.357 mm (1.5455 — 1.5495 in)
			Limit	39.157 mm (1.5416 in)
	Camshaft journal O.D.		31.928 — 31.945 mm (1.2570 — 1.2577 in)	
Camshaft journal hole I.D.		32.000 — 32.018 mm (1.2598 — 1.2605 in)		
Oil clearance	STD	0.055 — 0.090 mm (0.0022 — 0.0035 in)		
	Limit	0.10 mm (0.0039 in)		
Cylinder head	Surface warp page limit		0.05 mm (0.0020 in)	
	Surface grinding limit		0.1 mm (0.004 in)	
	Standard height		98.3 mm (3.870 in)	

SPECIFICATIONS AND SERVICE DATA

[S1B0] 2-3

1. Engine

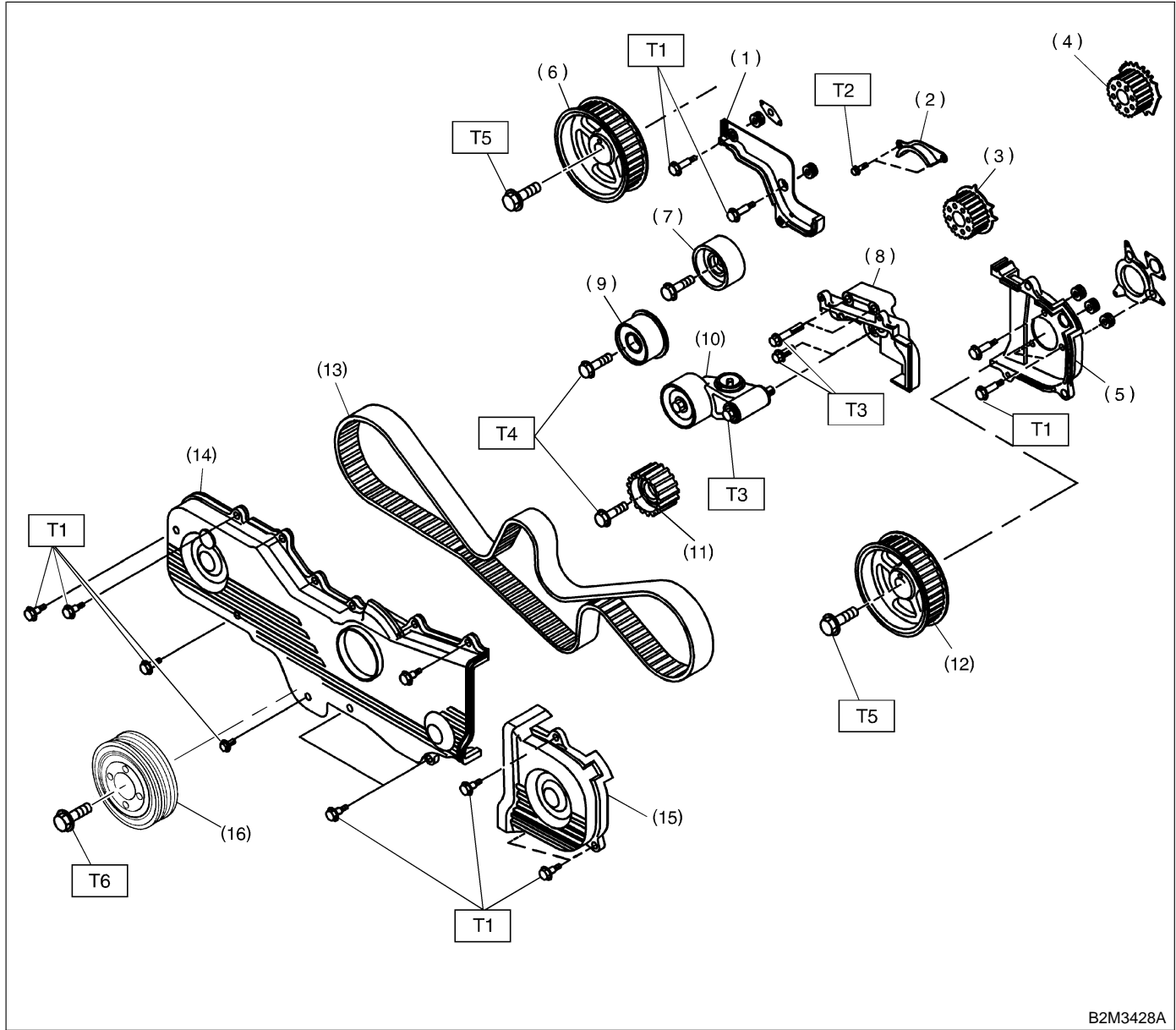
Valve set	Refacing angle			90°	
	Contacting width	Intake	STD	1.0 mm (0.039 in)	
			Limit	1.7 mm (0.067 in)	
		Exhaust	STD	1.4 mm (0.055 in)	
Limit			2.1 mm (0.083 in)		
Valve guide	Inner diameter			6.000 — 6.012 mm (0.2362 — 0.2367 in)	
	Protrusion above head		Intake	20.0 — 20.5 mm (0.787 — 0.807 in)	
			Exhaust	16.5 — 17.0 mm (0.650 — 0.669 in)	
Valve	Head edge thickness	Intake	STD	1.0 mm (0.039 in)	
			Limit	0.6 mm (0.024 in)	
		Exhaust	STD	1.2 mm (0.047 in)	
			Limit	0.6 mm (0.024 in)	
	Stem diameter		Intake	5.950 — 5.965 mm (0.2343 — 0.2348 in)	
			Exhaust	5.945 — 5.960 mm (0.2341 — 0.2346 in)	
	Stem oil clearance	STD	Intake	0.035 — 0.062 mm (0.0014 — 0.0024 in)	
			Exhaust	0.040 — 0.067 mm (0.0016 — 0.0026 in)	
	Overall length	Limit	Intake	120.6 mm (4.75 in)	
Exhaust			121.7 mm (4.79 in)		
Valve spring	Free length			54.30 mm (2.1378 in)	
	Squareness			2.5°, 2.4 mm (0.094 in)	
	Tension/spring height			214.8 — 246.2 N (21.9 — 25.1 kg, 48.3 — 55.3 lb)/45.0 mm (1.772 in) 526.6 — 581.6 N (53.7 — 59.3 kg, 118.4 — 130.8 lb)/34.7 mm (1.366 in)	
Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm (0.0020 in)	
	Surface grinding limit			0.1 mm (0.004 in)	
	Cylinder bore	STD	A	99.505 — 99.515 mm (3.9175 — 3.9179 in)	
			B	99.495 — 99.505 mm (3.9171 — 3.9175 in)	
	Taper		STD	0.015 mm (0.0006 in)	
			Limit	0.050 mm (0.0020 in)	
	Out-of-roundness		STD	0.010 mm (0.0004 in)	
			Limit	0.050 mm (0.0020 in)	
	Piston clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)	
Limit			0.050 mm (0.0020 in)		
Enlarging (boring) limit			0.5 mm (0.020 in)		
Piston	Outer diameter	STD	A	99.485 — 99.495 mm (3.9167 — 3.9171 in)	
			B	99.475 — 99.485 mm (3.9163 — 3.9167 in)	
		0.25 mm (0.0098 in) OS			99.725 — 99.735 mm (3.9262 — 3.9266 in)
		0.50 mm (0.0197 in) OS			99.975 — 99.985 mm (3.9360 — 3.9364 in)
Standard inner diameter of piston pin hole				23.000 — 23.006 mm (0.9055 — 0.9057 in)	
Piston pin	Outer diameter			22.994 — 23.000 mm (0.9053 — 0.9055 in)	
	Standard clearance between piston pin and hole in piston			0.004 — 0.008 mm (0.0002 — 0.0003 in)	
	Degree of fit			Piston pin must be fitted into position with thumb at 20°C (68°F).	

1. Engine

Piston ring	Piston ring gap	Top ring	STD	0.20 — 0.35 mm (0.0079 — 0.0138 in)	
			Limit	1.0 mm (0.039 in)	
		Second ring	STD	0.35 — 0.50 mm (0.0138 — 0.0197 in)	
			Limit	1.0 mm (0.039 in)	
		Oil ring	STD	0.20 — 0.70 mm (0.0079 — 0.0276 in)	
			Limit	1.5 mm (0.059 in)	
	Clearance between piston ring and piston ring groove	Top ring	STD	0.040 — 0.080 mm (0.0016 — 0.0031 in)	
			Limit	0.15 mm (0.0059 in)	
Second ring		STD	0.030 — 0.070 mm (0.0012 — 0.0028 in)		
		Limit	0.15 mm (0.0059 in)		
Connecting rod	Bend twist per 100 mm (3.94 in) in length		Limit	0.10 mm (0.0039 in)	
	Side clearance		STD	0.070 — 0.330 mm (0.0028 — 0.0130 in)	
			Limit	0.4 mm (0.016 in)	
Connecting rod bearing	Oil clearance		STD	0.020 — 0.046 mm (0.0008 — 0.0018 in)	
			Limit	0.05 mm (0.0020 in)	
	Thickness at center portion		STD	1.486 — 1.498 mm (0.0585 — 0.0590 in)	
			0.03 mm (0.0012 in) US	1.504 — 1.512 mm (0.0592 — 0.0595 in)	
			0.05 mm (0.0020 in) US	1.514 — 1.522 mm (0.0596 — 0.0599 in)	
			0.25 mm (0.0098 in) US	1.614 — 1.622 mm (0.0635 — 0.0639 in)	
Connecting rod bushing	Clearance between piston pin and bushing		STD	0 — 0.022 mm (0 — 0.0009 in)	
			Limit	0.030 mm (0.0012 in)	
Crankshaft	Bend limit			0.035 mm (0.0014 in)	
	Crank pin and crank journal	Out-of-roundness		0.020 mm (0.0008 in) or less	
		Grinding limit		0.250 mm (0.0098 in)	
	Crank pin outer diameter		STD	51.984 — 52.000 mm (2.0466 — 2.0472 in)	
			0.03 mm (0.0012 in) US	51.954 — 51.970 mm (2.0454 — 2.0461 in)	
			0.05 mm (0.0020 in) US	51.934 — 51.950 mm (2.0446 — 2.0453 in)	
			0.25 mm (0.0098 in) US	51.734 — 51.750 mm (2.0368 — 2.0374 in)	
	Crank journal outer diameter		#1, #5, #3	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
				0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
				0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
				0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
			#2, #4	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
				0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
				0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
				0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
	Thrust clearance		STD	0.030 — 0.115 mm (0.0012 — 0.0045 in)	
			Limit	0.25 mm (0.0098 in)	
Oil clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)		
		Limit	0.040 mm (0.0016 in)		

Crankshaft bearing	Crankshaft bearing thickness	#1, #5	STD	1.998 — 2.011 mm (0.0787 — 0.0792 in)
			0.03 mm (0.0012 in) US	2.017 — 2.020 mm (0.0794 — 0.0795 in)
			0.05 mm (0.0020 in) US	2.027 — 2.030 mm (0.0798 — 0.0799 in)
			0.25 mm (0.0098 in) US	2.127 — 2.130 mm (0.0837 — 0.0839 in)
		#2, #3, #4	STD	2.000 — 2.013 mm (0.0787 — 0.0793 in)
			0.03 mm (0.0012 in) US	2.019 — 2.022 mm (0.0795 — 0.0796 in)
			0.05 mm (0.0020 in) US	2.029 — 2.032 mm (0.0799 — 0.0800 in)
			0.25 mm (0.0098 in) US	2.129 — 2.132 mm (0.0838 — 0.0839 in)

1. Timing Belt



B2M3428A

- | | |
|--|---|
| (1) Belt cover No. 2 (RH) | (8) Tensioner bracket |
| (2) Timing belt guide (MT vehicles only) | (9) Belt idler (No. 2) |
| (3) Crankshaft sprocket (AT vehicles) | (10) Automatic belt tension adjuster ASSY |
| (4) Crankshaft sprocket (MT vehicles) | (11) Belt idler No. 2 |
| (5) Belt cover No. 2 (LH) | (12) Camshaft sprocket No. 2 |
| (6) Camshaft sprocket No. 1 | (13) Timing belt |
| (7) Belt idler (No. 1) | (14) Front belt cover |
| | (15) Belt cover (LH) |
| | (16) Crankshaft pulley |

Tightening torque: N-m (kg-m, ft-lb)

T1: 5±1 (0.5±0.1, 3.6±0.7)

T2: 9.8±1.0 (1.0±0.1, 7.2±0.7)

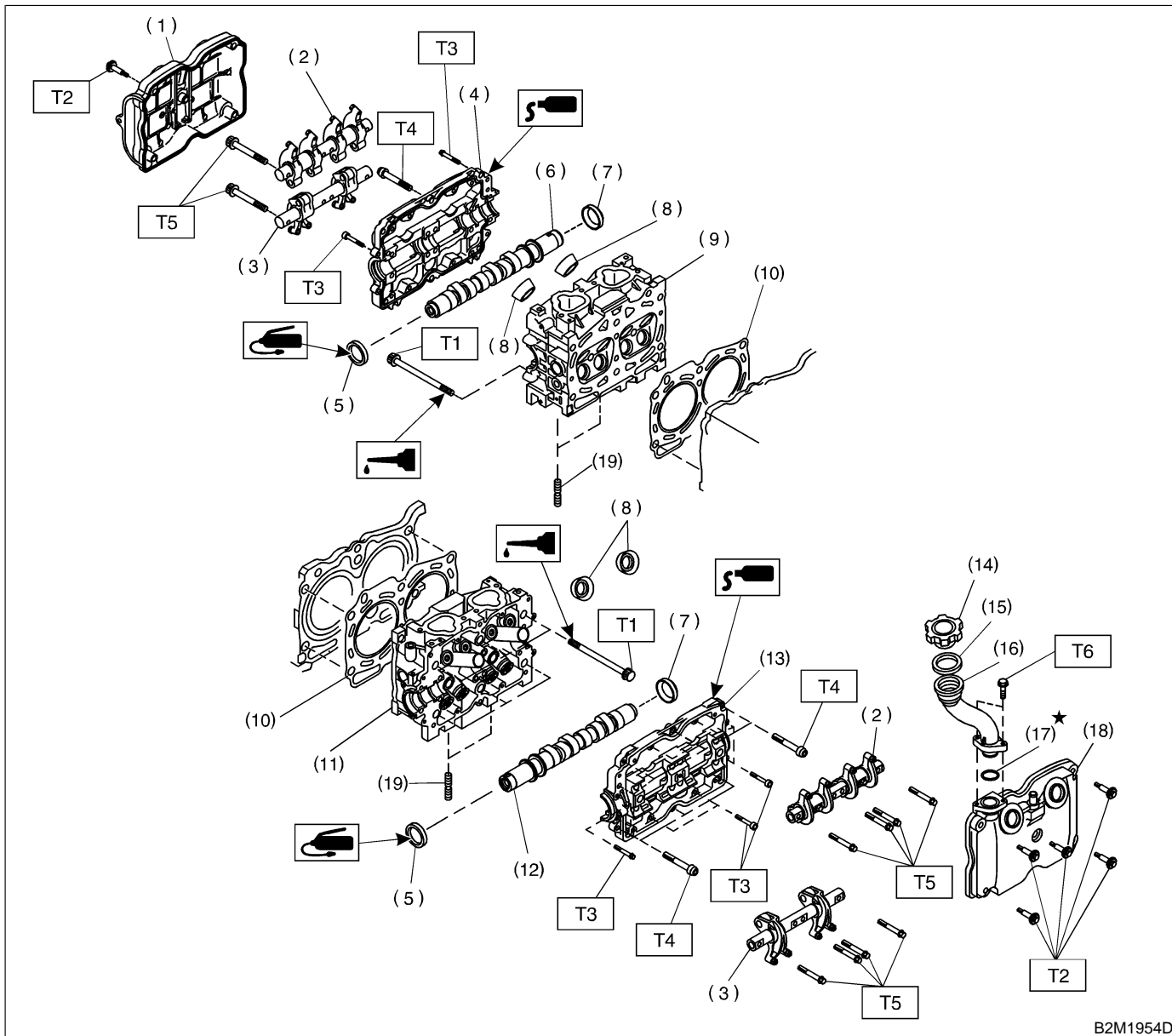
T3: 25±3 (2.5±0.3, 18.1±2.2)

T4: 39±4 (4.0±0.4, 28.9±2.9)

T5: 78±5 (8.0±0.5, 57.9±3.6)

T6: 177±5 (18.0±0.5, 130.2±3.6)

2. Cylinder Head and Camshaft



B2M1954D

- | | |
|-------------------------------|-------------------------|
| (1) Rocker cover (RH) | (11) Cylinder head (LH) |
| (2) Intake valve rocker ASSY | (12) Camshaft (LH) |
| (3) Exhaust valve rocker ASSY | (13) Camshaft cap (LH) |
| (4) Camshaft cap (RH) | (14) Oil filler cap |
| (5) Oil seal | (15) Gasket |
| (6) Camshaft (RH) | (16) Oil filler pipe |
| (7) Plug | (17) O-ring |
| (8) Spark plug pipe gasket | (18) Rocker cover (LH) |
| (9) Cylinder head (RH) | (19) Stud bolt |
| (10) Cylinder head gasket | |

Tightening torque: N·m (kg·m, ft·lb)

T1: Refer to [W6E1].

T2: 5±1 (0.5±0.1, 3.6±0.7)

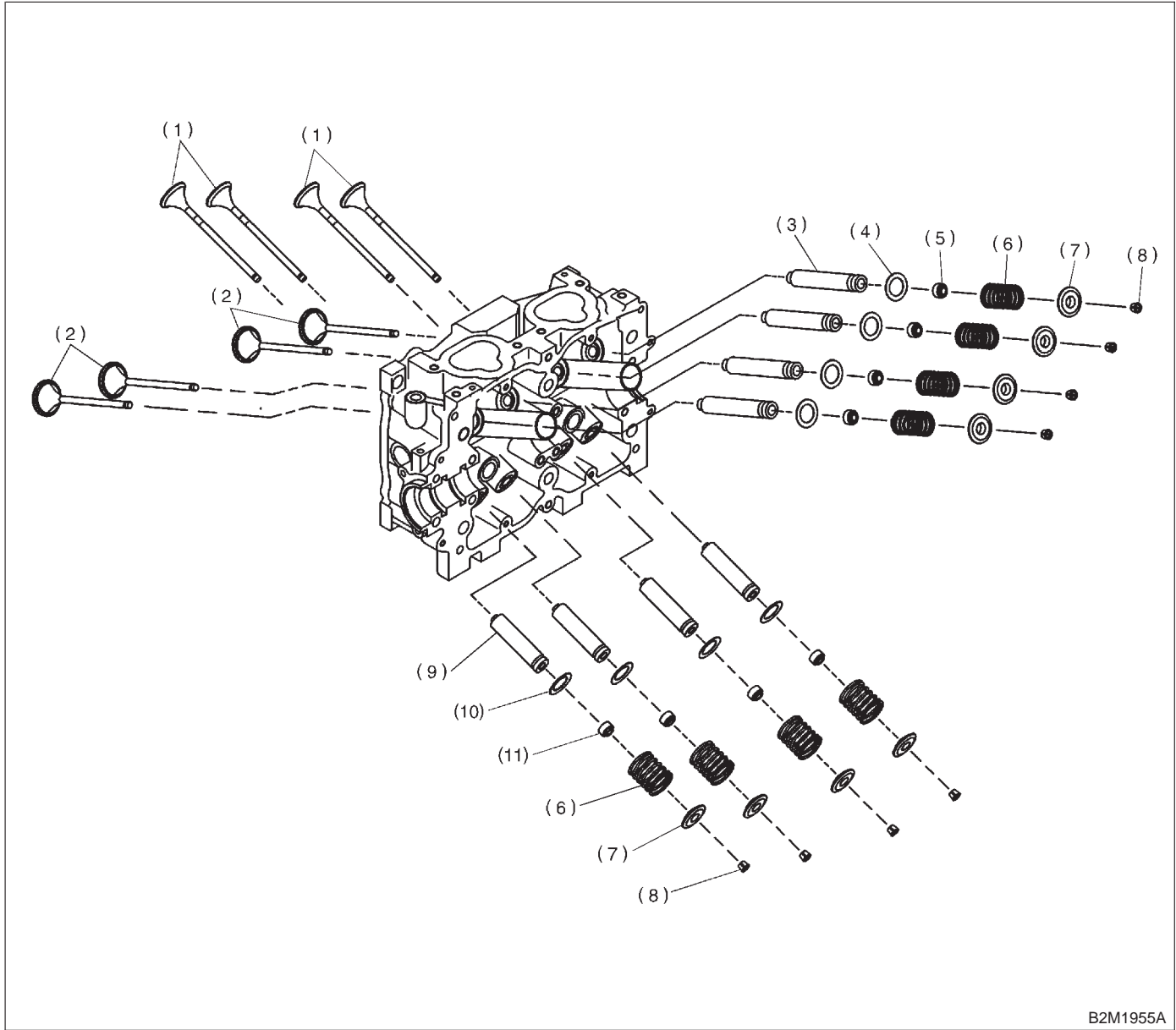
T3: 10±2 (1.0±0.2, 7.2±1.4)

T4: 18±2 (1.8±0.2, 13.0±1.4)

T5: 25±2 (2.5±0.2, 18.1±1.4)

T6: 6.4±0.5 (0.65±0.05, 4.7±0.4)

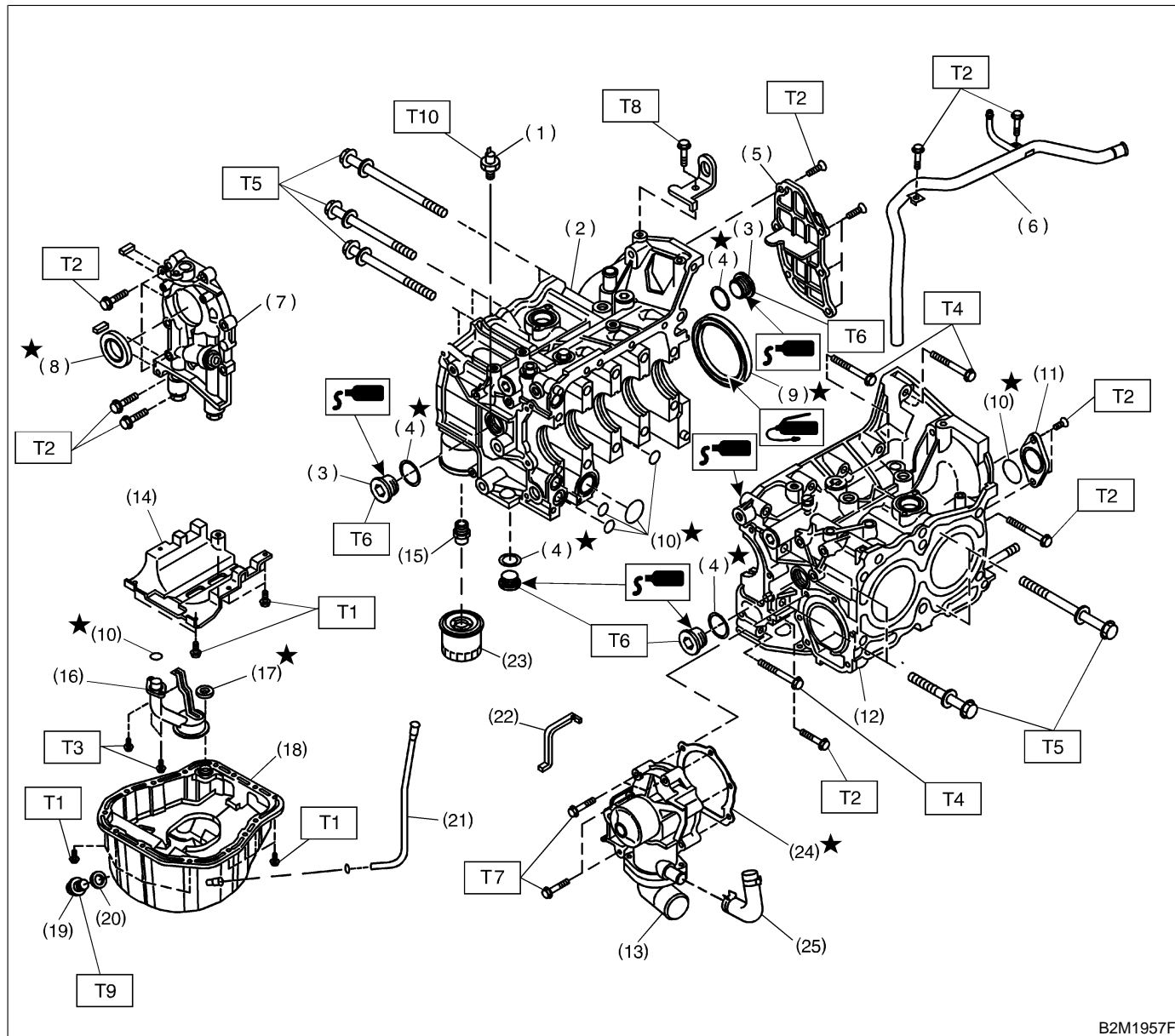
3. Cylinder Head and Valve Assembly



B2M1955A

- | | | |
|------------------------------|---------------------------|--------------------------------|
| (1) Exhaust valve | (5) Intake valve oil seal | (9) Exhaust valve guide |
| (2) Intake valve | (6) Valve spring | (10) Exhaust valve spring seat |
| (3) Intake valve guide | (7) Retainer | (11) Exhaust valve oil seal |
| (4) Intake valve spring seat | (8) Retainer key | |

4. Cylinder Block



B2M1957F

- (1) Oil pressure switch
- (2) Cylinder block (RH)
- (3) Service hole plug
- (4) Gasket
- (5) Oil separator cover
- (6) Water by-pass pipe
- (7) Oil pump
- (8) Front oil seal
- (9) Rear oil seal
- (10) O-ring
- (11) Service hole cover
- (12) Cylinder block (LH)
- (13) Water pump
- (14) Baffle plate
- (15) Oil filter connector
- (16) Oil strainer
- (17) Gasket
- (18) Oil pan
- (19) Drain plug
- (20) Metal gasket
- (21) Oil level gauge guide
- (22) Water pump sealing
- (23) Oil filter
- (24) Gasket
- (25) Water pump hose

Tightening torque: N-m (kg-m, ft-lb)

T1: 5 (0.5, 3.6)

T2: 6.4 (0.65, 4.7)

T3: 10 (1.0, 7)

T4: 25±2 (2.5±0.2, 18.1±1.4)

T5: 47±3 (4.8±0.3, 34.7±2.2)

T6: 69±7 (7.0±0.7, 50.6±5.1)

T7: First 12±2 (1.2±0.2, 8.7±1.4)

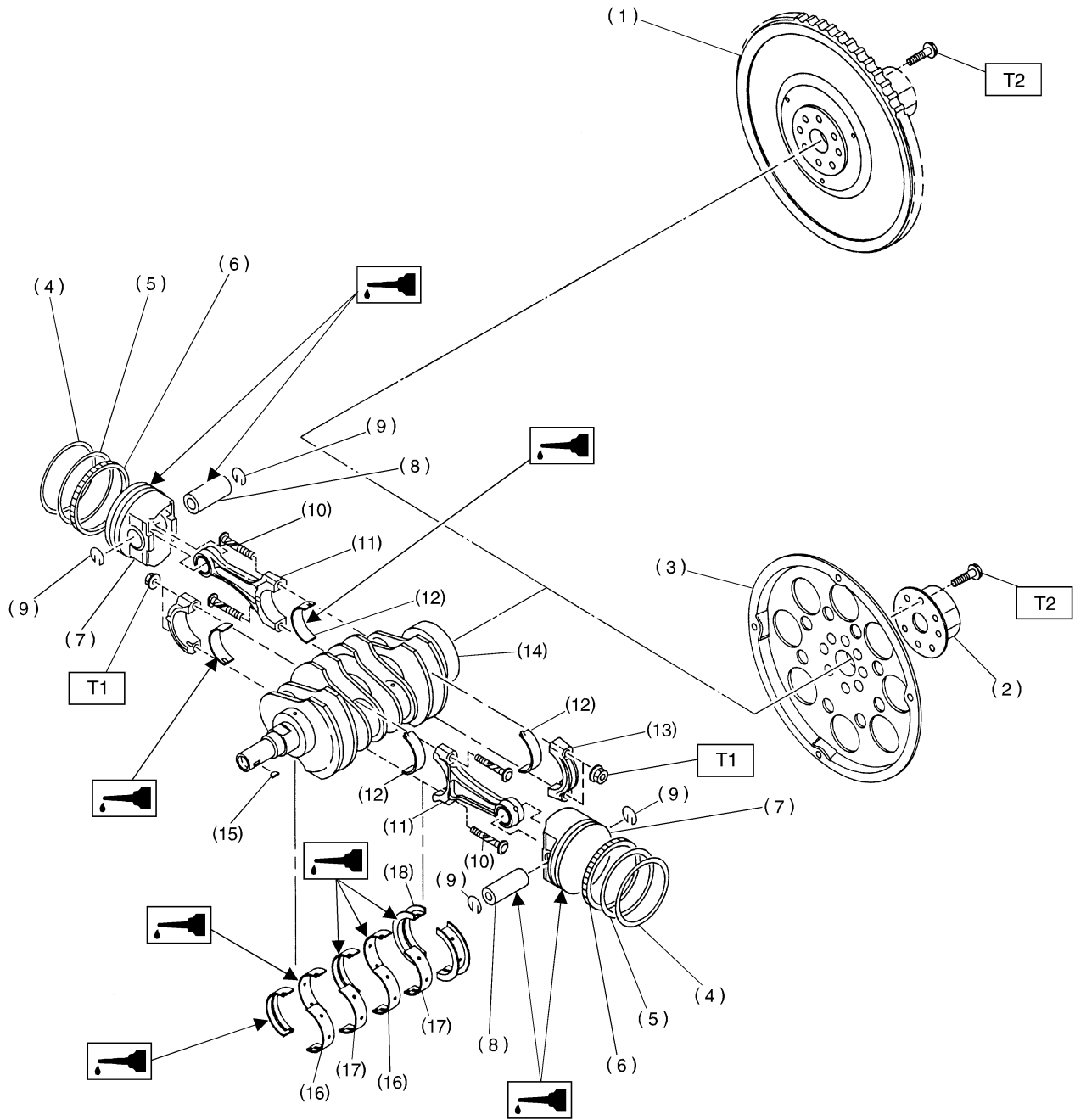
Second 12±2 (1.2±0.2, 8.7±1.4)

T8: 16±1.5 (1.6±0.15, 11.6±1.1)

T9: 44 (4.5, 33)

T10: 25±3 (2.5±0.3, 18.1±2.2)

5. Crankshaft and Piston



B2M3429A

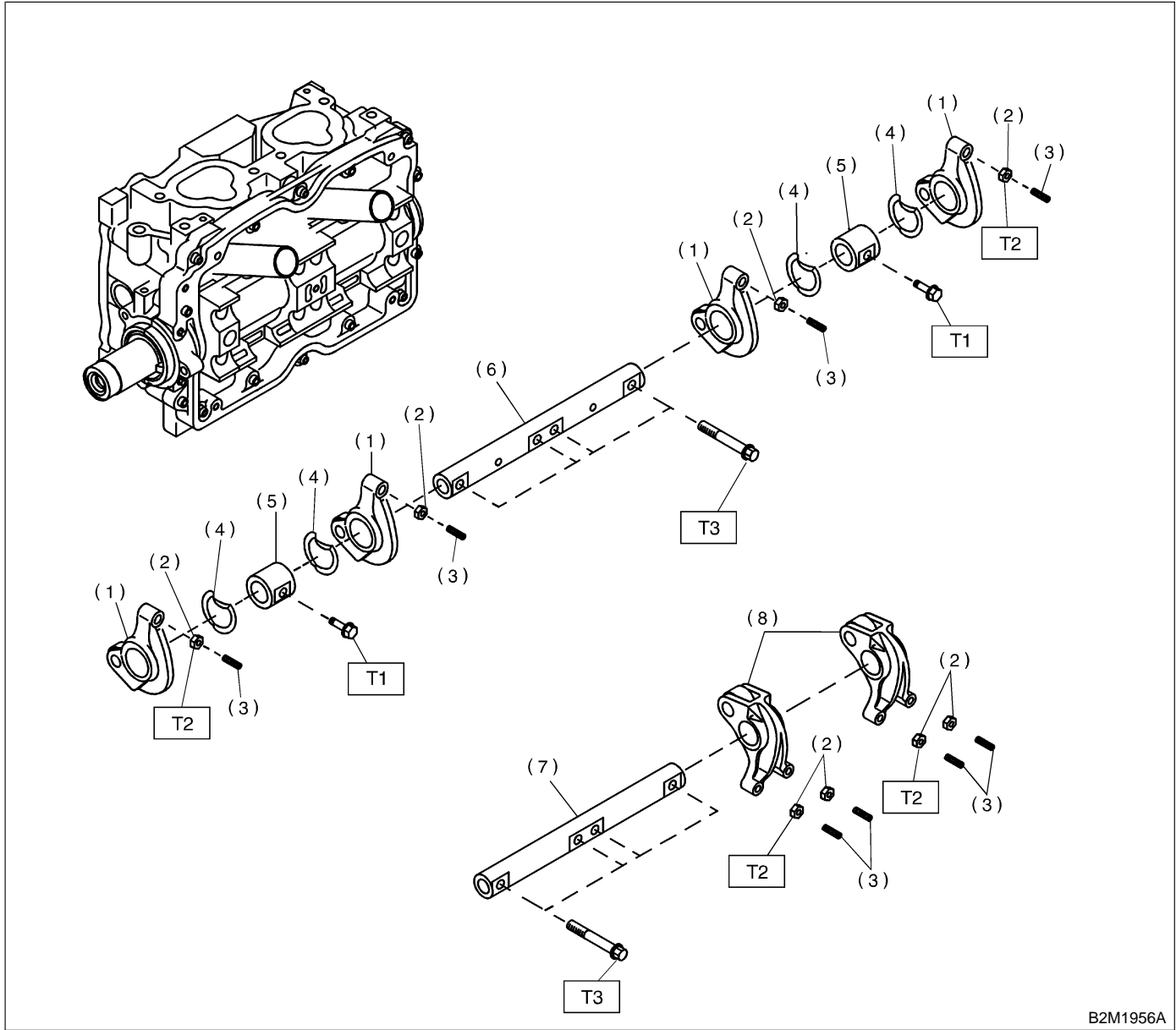
- | | | |
|------------------------|--------------------------------|--------------------------------|
| (1) Flywheel (MT) | (9) Circlip | (17) Crankshaft bearing #2, #4 |
| (2) Reinforcement (AT) | (10) Connecting rod bolt | (18) Crankshaft bearing #5 |
| (3) Drive plate (AT) | (11) Connecting rod | |
| (4) Top ring | (12) Connecting rod bearing | |
| (5) Second ring | (13) Connecting rod cap | |
| (6) Oil ring | (14) Crankshaft | |
| (7) Piston | (15) Woodruff key | |
| (8) Piston pin | (16) Crankshaft bearing #1, #3 | |

Tightening torque: N·m (kg·m, ft·lb)

T1: 44.6±1.5 (4.55±0.15, 32.9±1.1)

T2: 72±3 (7.3±0.3, 52.8±2.2)

6. Valve Rocker Assembly



- | | |
|-------------------------------|------------------------------|
| (1) Intake valve rocker arm | (6) Intake rocker shaft |
| (2) Valve rocker nut | (7) Exhaust rocker shaft |
| (3) Valve rocker adjust screw | (8) Exhaust valve rocker arm |
| (4) Spring | |
| (5) Rocker shaft support | |

Tightening torque: N-m (kg-m, ft-lb)

T1: 5±1 (0.5±0.1, 3.6±0.7)

T2: 10±1 (1.0±0.1, 7.2±0.7)

T3: 25±2 (2.5±0.2, 18.1±1.4)

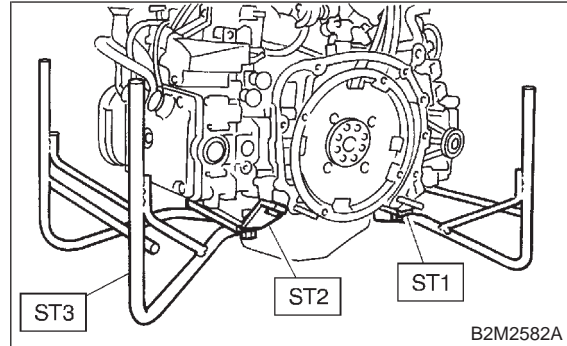
1. General Precautions

- 1) All parts should be thoroughly cleaned, paying special attention to the engine oil passages, pistons and bearings.
- 2) Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil prior to assembly.
- 3) Be careful not to let oil, grease or coolant contact the timing belt, clutch disc and flywheel.
- 4) All removed parts, if to be reused, should be reinstalled in the original positions and directions.
- 5) Bolts, nuts and washers should be replaced with new ones as required.
- 6) Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.

2. General Procedure

- 1) For the procedure of removing the engine from the vehicle, refer to 2-11 ENGINE AND TRANSMISSION MOUNTING SYSTEM. <Ref. to 2-11 [W2A0].> However, before going into the procedure, it is necessary to do the following.

- Before disassembling engine, place it on ST3.
- | | | |
|-----|-----------|----------------------------|
| ST1 | 498457000 | ENGINE STAND ADAPTER
RH |
| ST2 | 498457100 | ENGINE STAND ADAPTER
LH |
| ST3 | 499817000 | ENGINE STAND |



- 2) It is possible to conduct the following service procedures with engine on the vehicle, however, the procedures described in this section are based on the condition that the engine is removed from the vehicle.

- Timing Belt
- Valve Rocker Assembly
- Camshaft
- Cylinder Head

- 3) In this section the procedures described under each index are all connected and stated in order. It will be the complete procedure for over hauling of the engine it-self when you go through all steps in the process.

Therefore, in this section, to conduct the particular procedure within the flow of a section, you need to go back and conduct the procedure described previously in order to do that particular procedure.

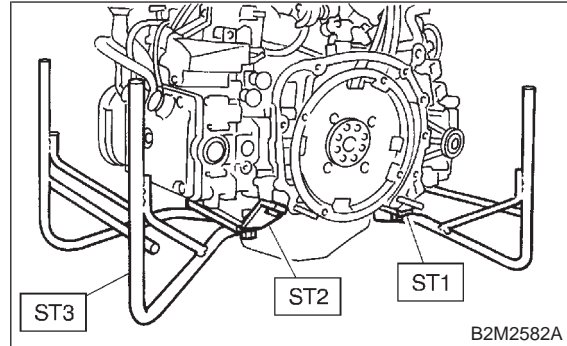
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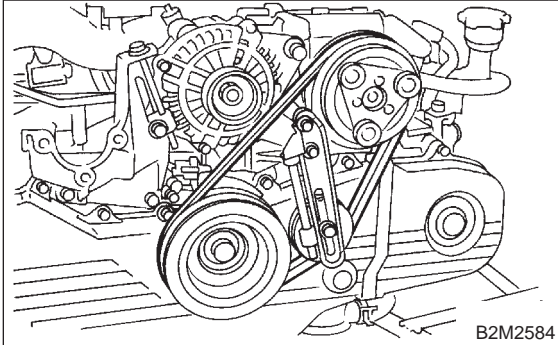
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3. Timing Belt

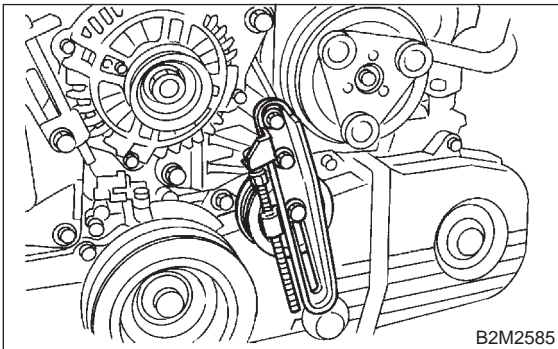
A: REMOVAL

1. CRANKSHAFT PULLEY AND BELT COVER

1) Remove A/C belt. (With A/C model)



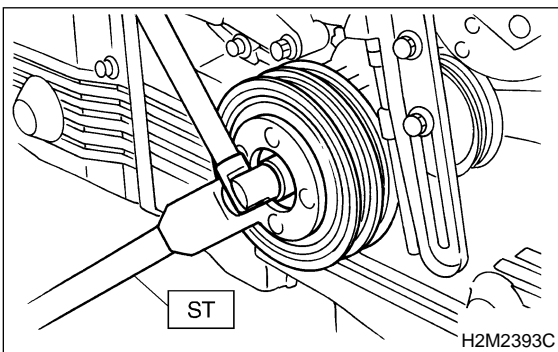
2) Remove A/C belt tensioner. (With A/C model)



3) Remove crankshaft pulley bolt. To lock crankshaft, use ST.

ST 499977100

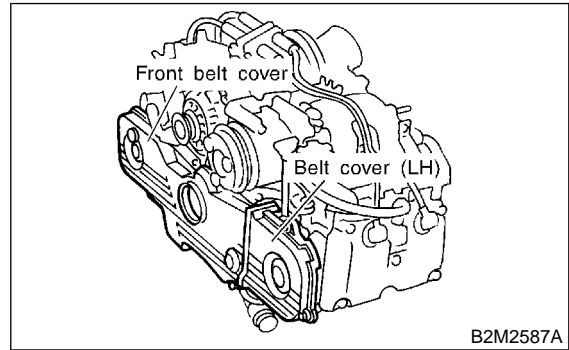
CRANKSHAFT PULLEY WRENCH



4) Remove crankshaft pulley.

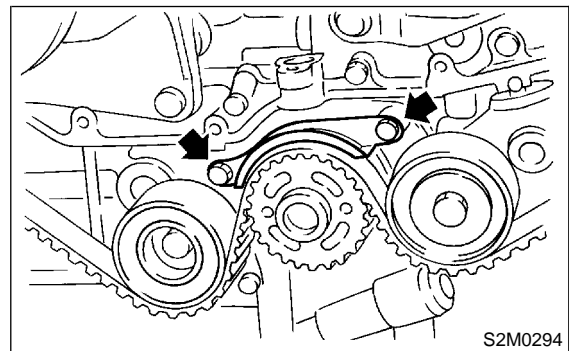
5) Remove belt cover (LH).

6) Remove front belt cover.



2. TIMING BELT

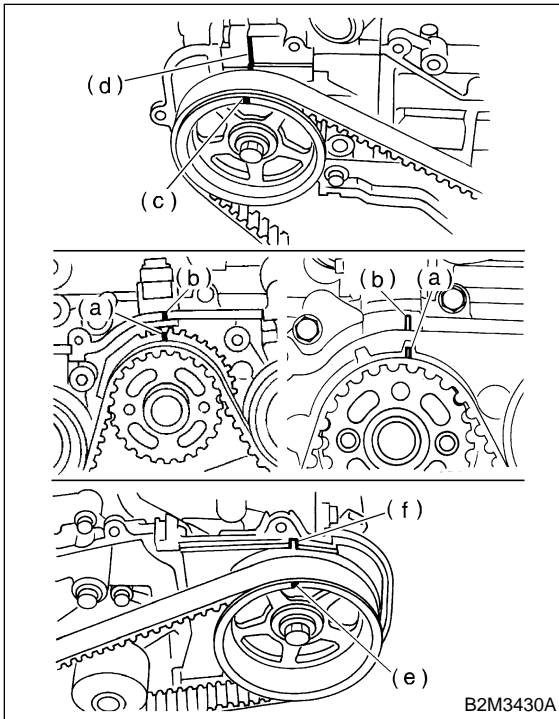
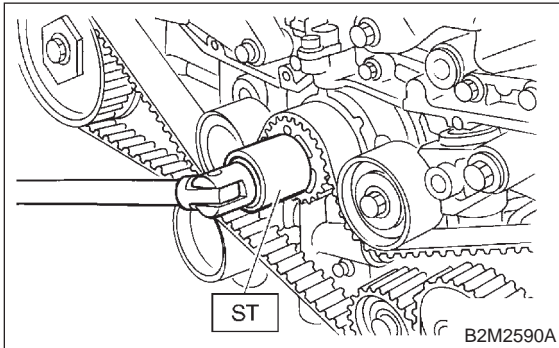
1) Remove timing belt guide. (MT vehicles only)



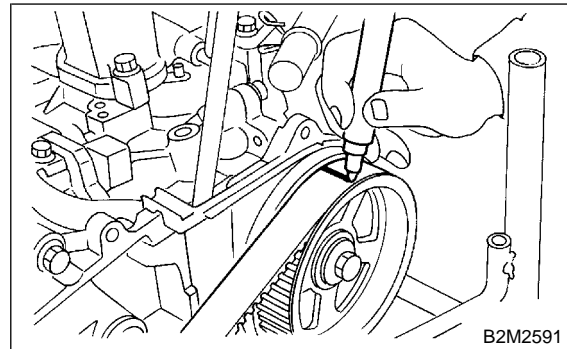
2) If alignment mark (a) and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as shown in procedures below.

(1) Turn crankshaft using ST. Align mark (a) of sprocket to cylinder block notch (b) and ensure that right side cam sprocket mark (c), cam cap and cylinder head matching surface (d) and/or left side cam sprocket mark (e) and belt cover notch (f) are properly adjusted.

ST 499987500 CRANKSHAFT SOCKET



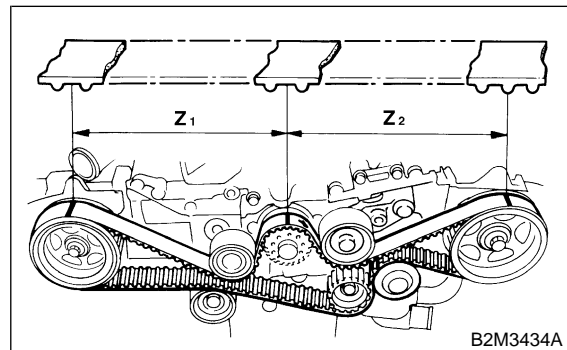
(2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the crank sprocket and cam sprockets.



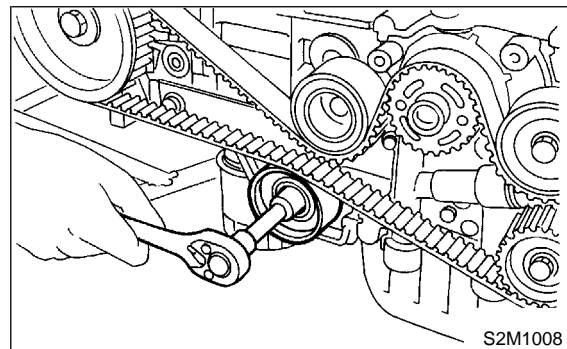
Specified data:

Z₁: 44 tooth length

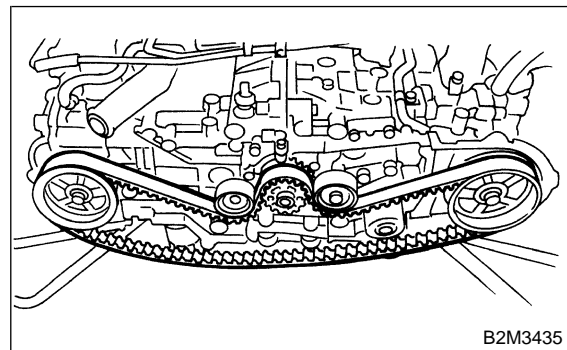
Z₂: 40.5 tooth



- 3) Remove belt idler (No. 2).
- 4) Remove belt idler No. 2.

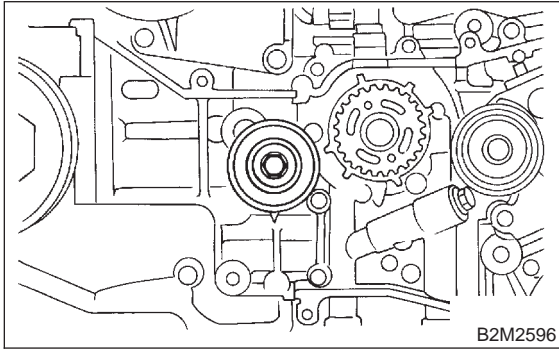


- 5) Remove timing belt.

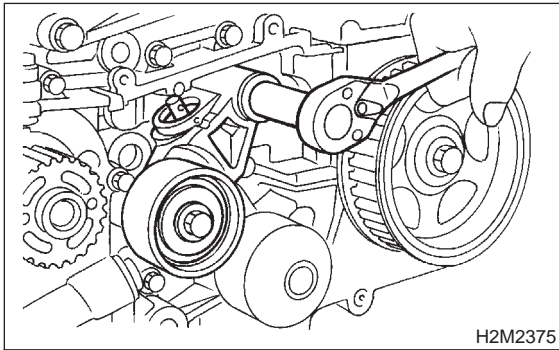


3. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY

- 1) Remove belt idler (No. 1).

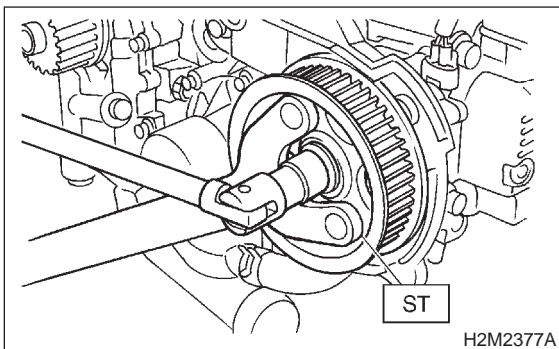


- 2) Remove automatic belt tension adjuster assembly.

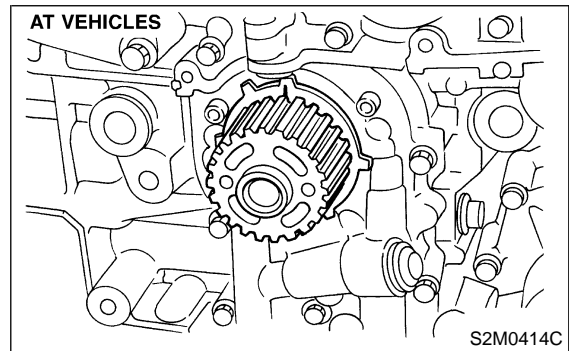
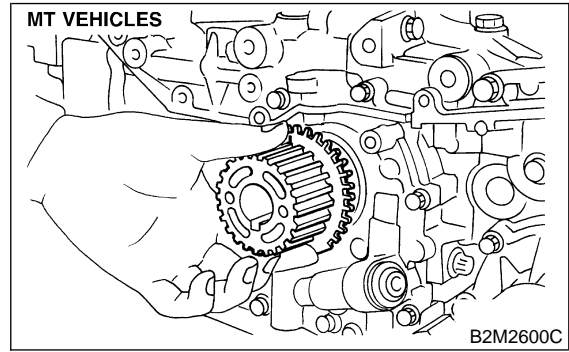


4. CAMSHAFT AND CRANKSHAFT SPROCKET

- 1) Remove camshaft sprocket No. 1 and No. 2. To lock camshaft, use ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH

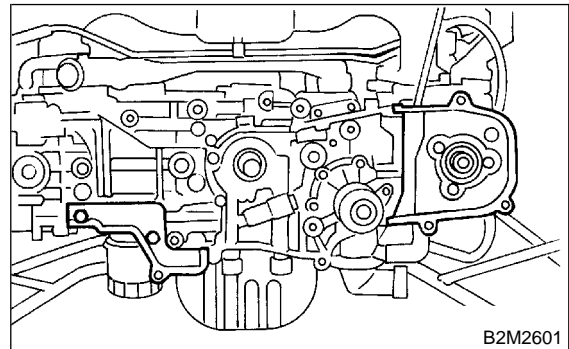


- 2) Remove crankshaft sprocket.

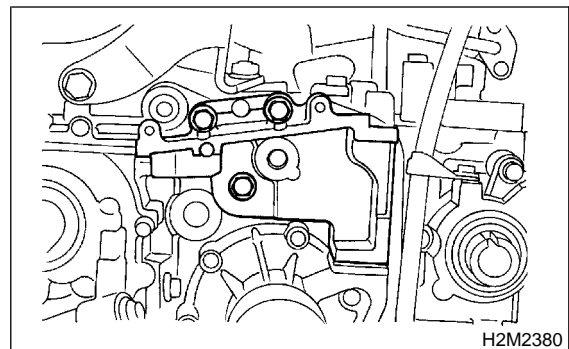


- 3) Remove belt cover No. 2 (LH).
- 4) Remove belt cover No. 2 (RH).

CAUTION:
Do not damage or lose the seal rubber when removing belt covers.



- 5) Remove tensioner bracket.



B: INSPECTION**1. TIMING BELT**

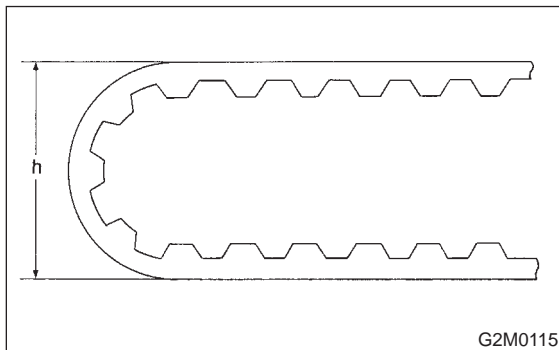
- 1) Check timing belt teeth for breaks, cracks, and wear. If any fault is found, replace belt.
- 2) Check the condition of back side of belt; if any crack is found, replace belt.

CAUTION:

- Be careful not to let oil, grease or coolant contact the belt. Remove quickly and thoroughly if this happens.
- Do not bend the belt sharply.

Bending radius: h

60 mm (2.36 in) or more

**2. AUTOMATIC BELT TENSION ADJUSTER**

- 1) Visually check oil seals for leaks, and rod ends for abnormal wear or scratches. If necessary, replace faulty parts.

CAUTION:

Slight traces of oil at rod's oil seal does not indicate a problem.

- 2) Check that the adjuster rod does not move when a pressure of 294 N (30 kg, 66 lb) is applied to it. This is to check adjuster rod stiffness.
- 3) If the adjuster rod is not stiff and moves freely when applying 294 N (30 kg, 66 lb), check it using the following procedures:

(1) Slowly press the adjuster rod down to the end surface of the cylinder. Repeat this motion 2 or 3 times.

(2) With the adjuster rod moved all the way up, apply a pressure of 294 N (30 kg, 66 lb) to it. Check adjuster rod stiffness.

(3) If the adjuster rod is not stiff and moves down, replace the automatic belt tension adjuster assembly with a new one.

CAUTION:

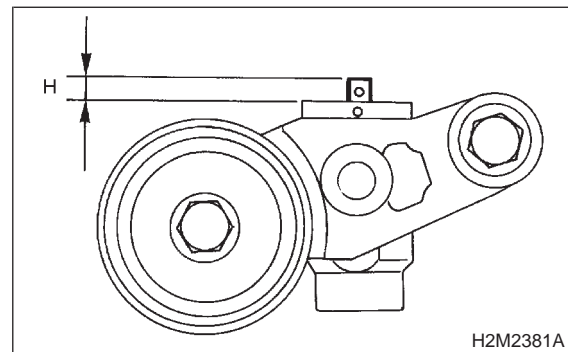
- Always use a vertical type pressing tool to move the adjuster rod down.
- Do not use a lateral type vise.
- Push adjuster rod vertically.

- Press-in the push adjuster rod gradually taking more than three minutes.
- Do not allow press pressure to exceed 9,807 N (1,000 kg, 2,205 lb).
- Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.

- 4) Measure the extension of rod beyond the body. If it is not within specifications, replace with a new one.

Rod extension: H

5.7±0.5 mm (0.224±0.020 in)

**3. BELT TENSION PULLEY**

- 1) Check mating surfaces of timing belt and contact point of adjuster rod for abnormal wear or scratches. Replace automatic belt tension adjuster assembly if faulty.
- 2) Check tension pulley for smooth rotation. Replace if noise or excessive play is noted.
- 3) Check tension pulley for grease leakage.

4. BELT IDLER

- 1) Check belt idler for smooth rotation. Replace if noise or excessive play is noted.
- 2) Check belt outer contacting surfaces of idler pulley for abnormal wear and scratches.
- 3) Check belt idler for grease leakage.

5. CAMSHAFT AND CRANKSHAFT SPROCKET

- 1) Check sprocket teeth for abnormal wear and scratches.
- 2) Make sure there is no free play between sprocket and key.
- 3) Check crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

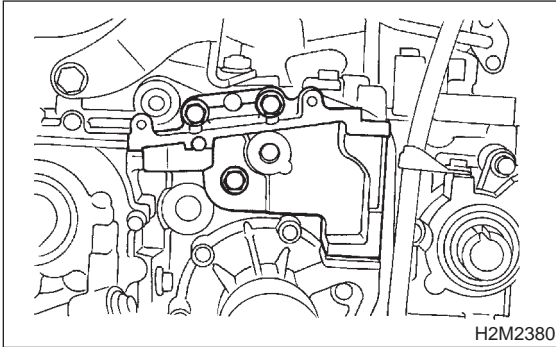
C: INSTALLATION

1. CAMSHAFT AND CRANKSHAFT SPROCKET

- 1) Install tensioner bracket.

Tightening torque:

25 ± 3 N·m (2.5 ± 0.3 kg·m, 18.1 ± 2.2 ft·lb)



- 2) Install belt cover No. 2 (RH).

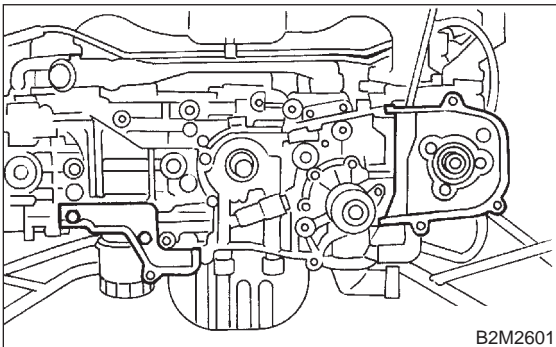
Tightening torque:

5 ± 1 N·m (0.5 ± 0.1 kg·m, 3.6 ± 0.7 ft·lb)

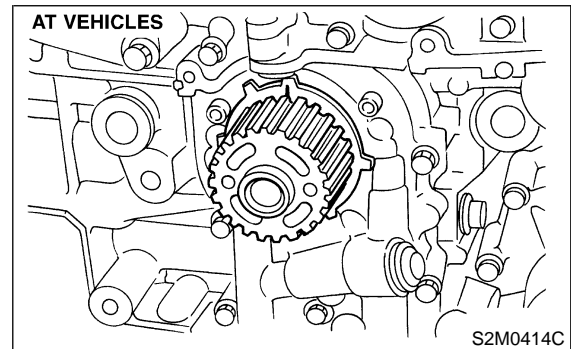
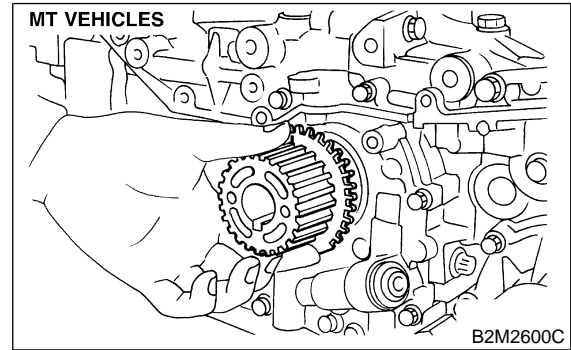
- 3) Install belt cover No. 2 (LH).

Tightening torque:

5 ± 1 N·m (0.5 ± 0.1 kg·m, 3.6 ± 0.7 ft·lb)



- 4) Install crankshaft sprocket.



- 5) Install camshaft sprocket No. 1 and No. 2. To lock camshaft, use ST.

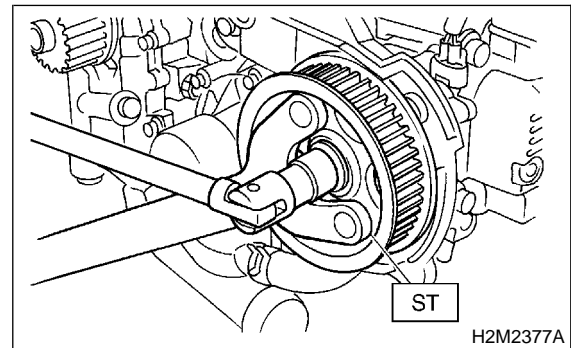
ST 499207100 CAMSHAFT SPROCKET WRENCH

Tightening torque:

78 ± 5 N·m (8.0 ± 0.5 kg·m, 57.9 ± 3.6 ft·lb)

CAUTION:

Do not confuse left and right side camshaft sprockets during installation. The camshaft sprocket No. 2 is identified by a projection used to monitor camshaft position sensor.



2. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER

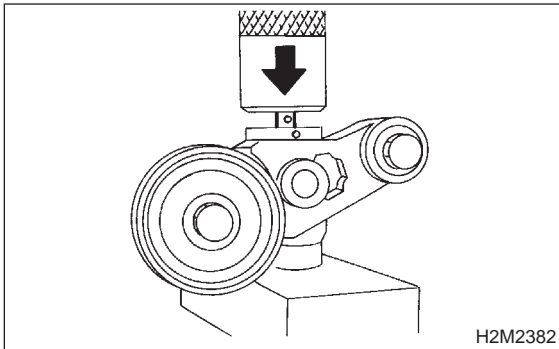
- 1) Preparation for installation of automatic belt tension adjuster assembly;

CAUTION:

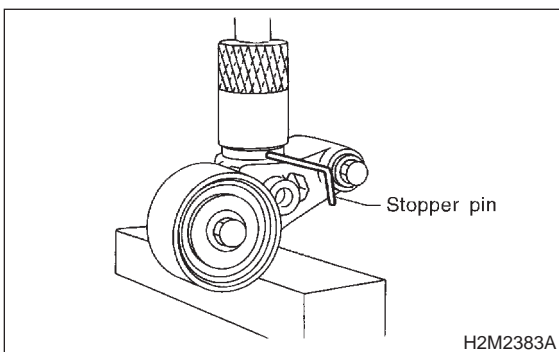
● Always use a vertical type pressing tool to move the adjuster rod down.

- Do not use a lateral type vise.
- Push adjuster rod vertically.
- Be sure to slowly move the adjuster rod down applying a pressure of 294 N (30 kg, 66 lb).
- Press-in the push adjuster rod gradually taking more than three minutes.
- Do not allow press pressure to exceed 9,807 N (1,000 kg, 2,205 lb).
- Press the adjuster rod as far as the end surface of the cylinder. Do not press the adjuster rod into the cylinder. Doing so may damage the cylinder.
- Do not release press pressure until stopper pin is completely inserted.

- (1) Attach the automatic belt tension adjuster assembly to the vertical pressing tool.
- (2) Slowly move the adjuster rod down with a pressure of 294 N (30 kg, 66 lb) until the adjuster rod is aligned with the stopper pin hole in the cylinder.

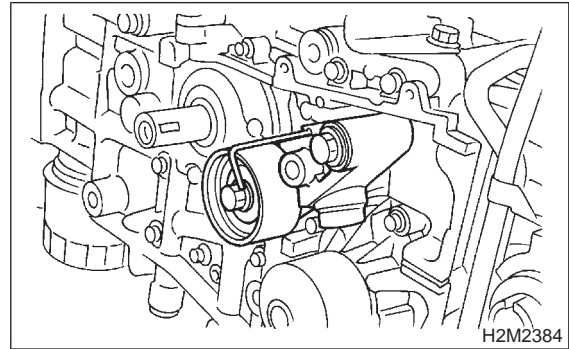


- (3) With a 2 mm (0.08 in) dia. stopper pin or a 2 mm (0.08 in) (nominal) dia. hex bar wrench inserted into the stopper pin hole in the cylinder, secure the adjuster rod.



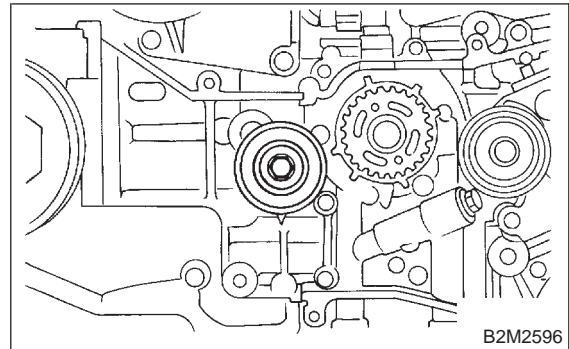
- 2) Install automatic belt tension adjuster assembly.

Tightening torque:
39±4 N·m (4.0±0.4 kg-m, 28.9±2.9 ft-lb)



- 3) Install belt idler (No. 1).

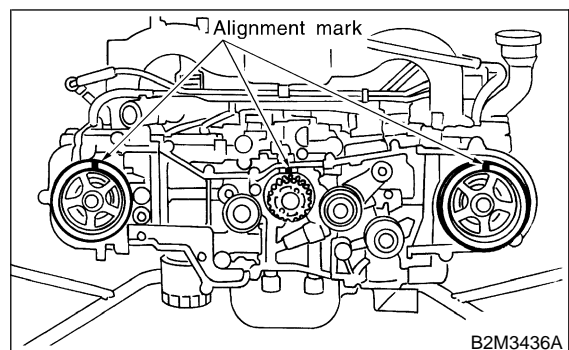
Tightening torque:
39±4 N·m (4.0±0.4 kg-m, 28.9±2.9 ft-lb)



3. TIMING BELT

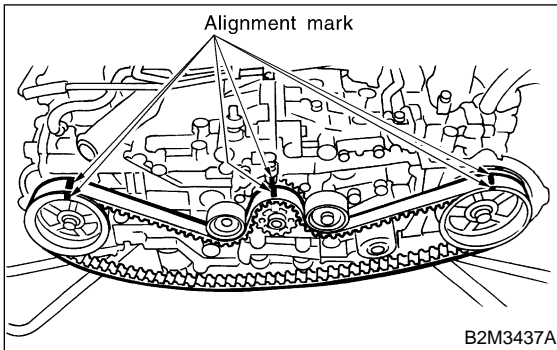
- 1) Installation of timing belt
 - (1) Turn camshaft sprocket No. 2 using ST1, and turn camshaft sprocket No. 1 using ST2 so that their alignment marks come to top positions.

- | | | |
|-----|-----------|--------------------------|
| ST1 | 499207100 | CAMSHAFT SPROCKET WRENCH |
| ST2 | 499207400 | CAMSHAFT SPROCKET WRENCH |



(2) While aligning alignment mark on timing belt with marks on sprockets, position timing belt properly.

CAUTION:
Ensure belt's rotating direction is correct.

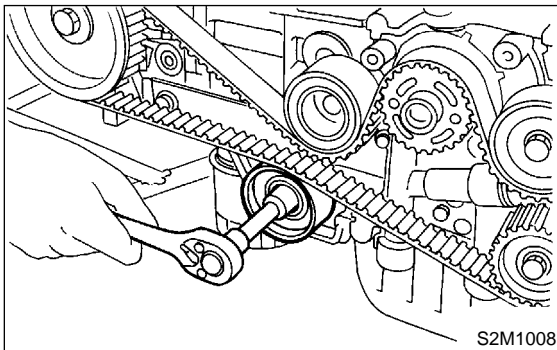


2) Install belt idler No. 2.

Tightening torque:
 $39 \pm 4 \text{ N}\cdot\text{m}$ ($4.0 \pm 0.4 \text{ kg}\cdot\text{m}$, $28.9 \pm 2.9 \text{ ft}\cdot\text{lb}$)

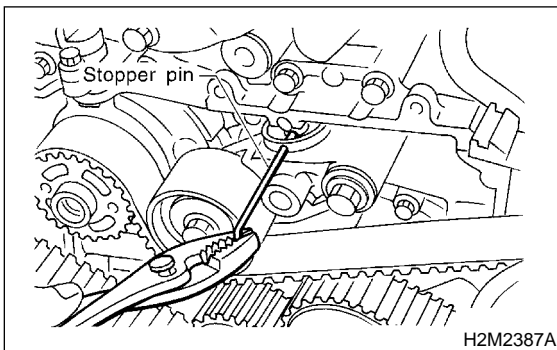
3) Install belt idler (No. 2).

Tightening torque:
 $39 \pm 4 \text{ N}\cdot\text{m}$ ($4.0 \pm 0.4 \text{ kg}\cdot\text{m}$, $28.9 \pm 2.9 \text{ ft}\cdot\text{lb}$)

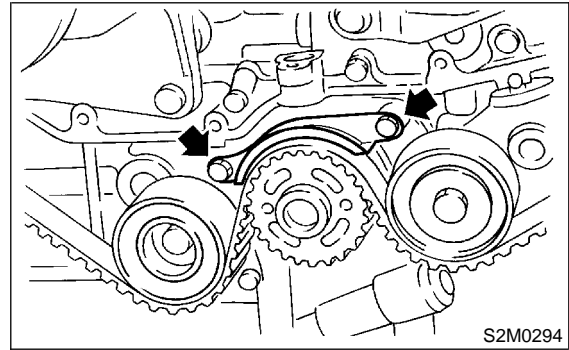


4) After ensuring that the marks on timing belt and camshaft sprockets are aligned, remove stopper pin from belt tensioner adjuster.

CAUTION:
After properly installing timing belt, remove rocker cover and ensure that the valve lash adjuster contains no air.

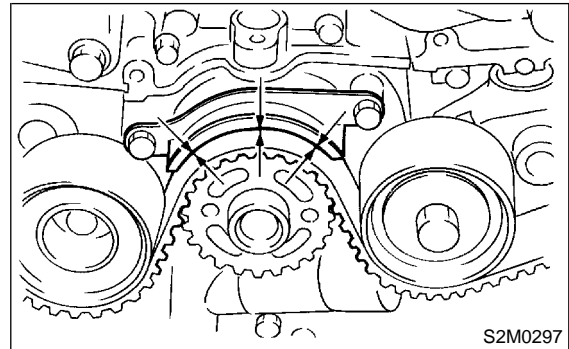


5) Install timing belt guide. (MT vehicles only)
(1) Temporarily tighten remaining bolts.



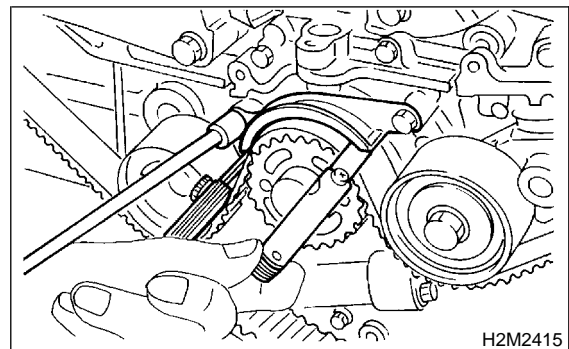
(2) Check and adjust clearance between timing belt and timing belt guide by using thickness gauge.

Clearance:
 $1.0 \pm 0.5 \text{ mm}$ ($0.039 \pm 0.020 \text{ in}$)



(3) Tighten remaining bolts.

Tightening torque:
 $9.8 \pm 1.0 \text{ N}\cdot\text{m}$ ($1.0 \pm 0.1 \text{ kg}\cdot\text{m}$, $7.2 \pm 0.7 \text{ ft}\cdot\text{lb}$)



4. CRANKSHAFT PULLEY AND BELT COVER

1) Install front belt cover.

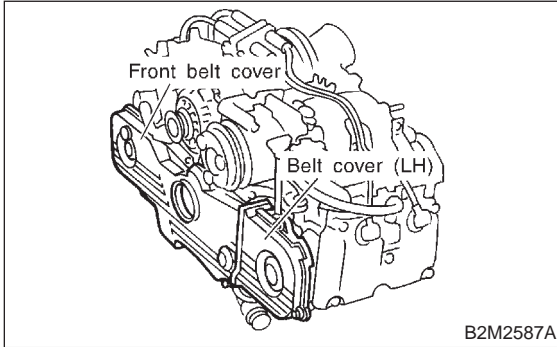
Tightening torque:

5 ± 1 N·m (0.5 ± 0.1 kg·m, 3.6 ± 0.7 ft·lb)

2) Install belt cover (LH).

Tightening torque:

5 ± 1 N·m (0.5 ± 0.1 kg·m, 3.6 ± 0.7 ft·lb)



3) Install crankshaft pulley.

4) Install pulley bolt.

To lock crankshaft, use ST.

ST 499977100 CRANKSHAFT PULLEY WRENCH

(1) Clean the crankshaft pulley thread using an air gun.

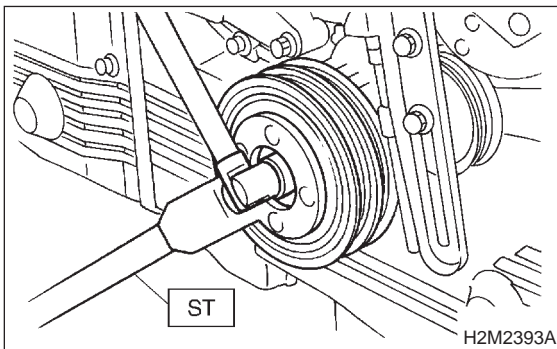
(2) Apply engine oil to the crankshaft pulley bolt seat and thread.

(3) Tighten the bolts temporarily with tightening torque of 44 N·m (4.5 kg·m, 33 ft·lb).

(4) Tighten the crankshaft pulley bolts.

Tightening torque:

177 ± 5 N·m (18.0 ± 0.5 kg·m, 130.2 ± 3.6 ft·lb)



5) Confirm that the tightening angle of the crankshaft pulley bolt is 65 degrees or more. If not, conduct the following procedures (1) through (4).

(1) Replace the crankshaft pulley bolts and clean them.

Crankshaft pulley bolt:

12369AA011

(2) Clean the crankshaft thread using an air gun.

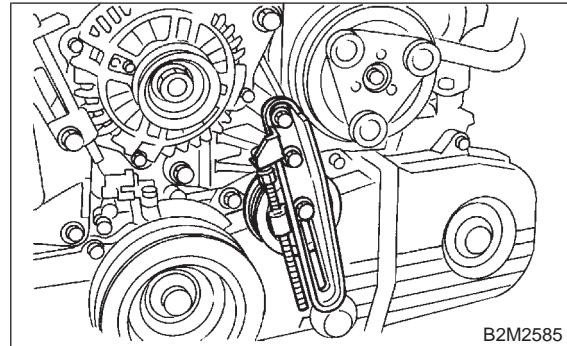
(3) Tighten the bolts temporarily with tightening torque of 44 N·m (4.5 kg·m, 33 ft·lb).

(4) Tighten the crankshaft pulley bolts keeping them in an angle between 65 degrees and 75 degrees.

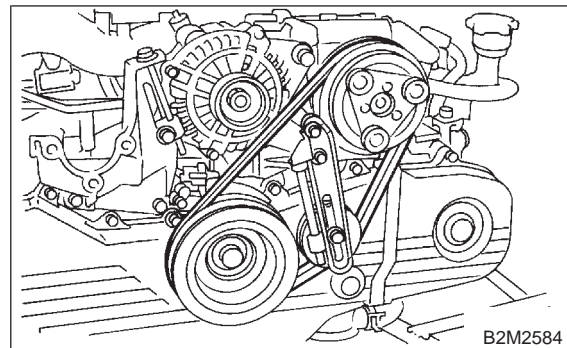
CAUTION:

Conduct the tightening procedures by confirming the turning angle of the crankshaft pulley bolt referring to the gauge indicated on the belt cover.

6) Install A/C belt tensioner. (With A/C model)



7) Install A/C belt. (With A/C model)



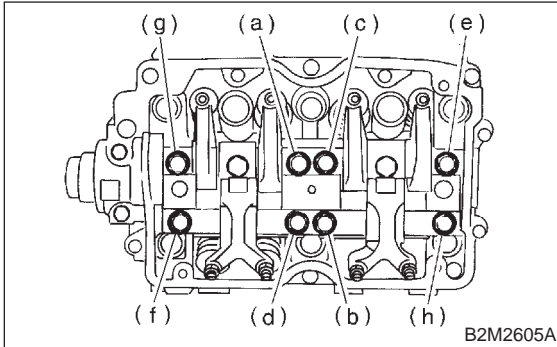
4. Valve Rocker Assembly

A: REMOVAL

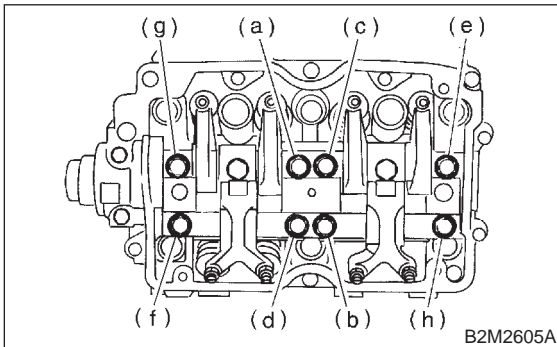
- 1) Disconnect PCV hose and remove rocker cover.
- 2) Removal of valve rocker assembly
 - (1) Remove bolts (a) through (b) in alphabetical sequence.

CAUTION:

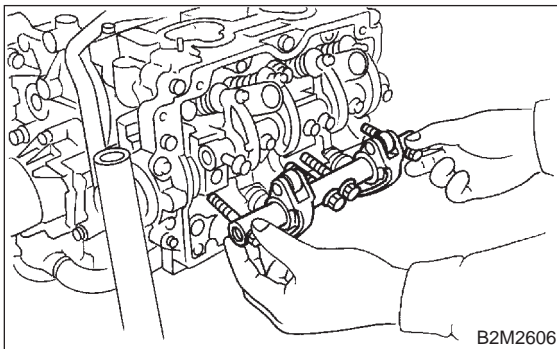
Leave two or three threads of bolt (a) engaged to retain valve rocker assembly.



- (2) Equally loosen bolts (e) through (h) all the way, being careful that knock pin is not gouged.



- (3) Remove valve rocker assembly.



B: DISASSEMBLY

- 1) Remove bolts which secure rocker shaft.
- 2) Extract rocker shaft. Remove valve rocker arms, springs, plates and shaft supports from rocker shaft.

CAUTION:

Arrange all removed parts in order so that they can be installed in their original positions.

- 3) Remove nut and adjuster screw from valve rocker.

C: INSPECTION

1. VALVE ROCKER ARM

- 1) Measure inside diameter of valve rocker arm and outside diameter of valve rocker shaft, and determine the difference between the two (= oil clearance).

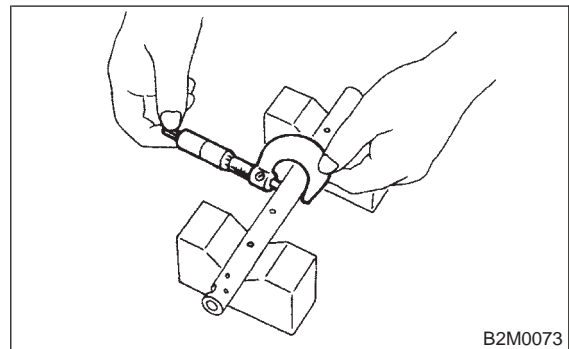
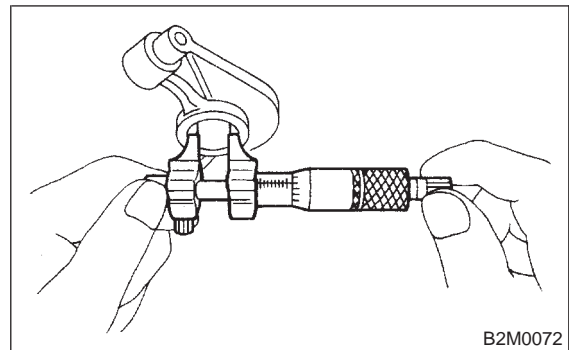
Clearance between arm and shaft:

Standard

0.020 — 0.054 mm (0.0008 — 0.0021 in)

Limit

0.10 mm (0.0039 in)



- 2) If oil clearance exceeds the limit, replace valve rocker arm or shaft, whichever shows greater amount of wear.

Rocker arm inside diameter:

22.020 — 22.041 mm (0.8669 — 0.8678 in)

Rocker shaft diameter:

21.987 — 22.000 mm (0.8656 — 0.8661 in)

- 3) Measure inside diameter of rocker shaft support and outside diameter of valve rocker shaft, and determine the difference between the two (= oil clearance).

Clearance between support and shaft:

Standard

0.005 — 0.039 mm (0.0002 — 0.0015 in)

Limit

0.05 mm (0.0020 in)

4) If oil clearance exceeds the limit, replace rocker shaft support or shaft, whichever shows greater amount of wear.

Rocker shaft support inside diameter:

22.005 — 22.026 mm (0.8663 — 0.8672 in)

Rocker shaft diameter:

21.987 — 22.000 mm (0.8656 — 0.8661 in)

5) If cam or valve contact surface of valve rocker arm is worn or dented excessively, replace valve rocker arm.

6) Check that valve rocker arm roller rotates smoothly. If not, replace valve rocker arm.

2. INTAKE AND EXHAUST VALVE ROCKER SHAFT

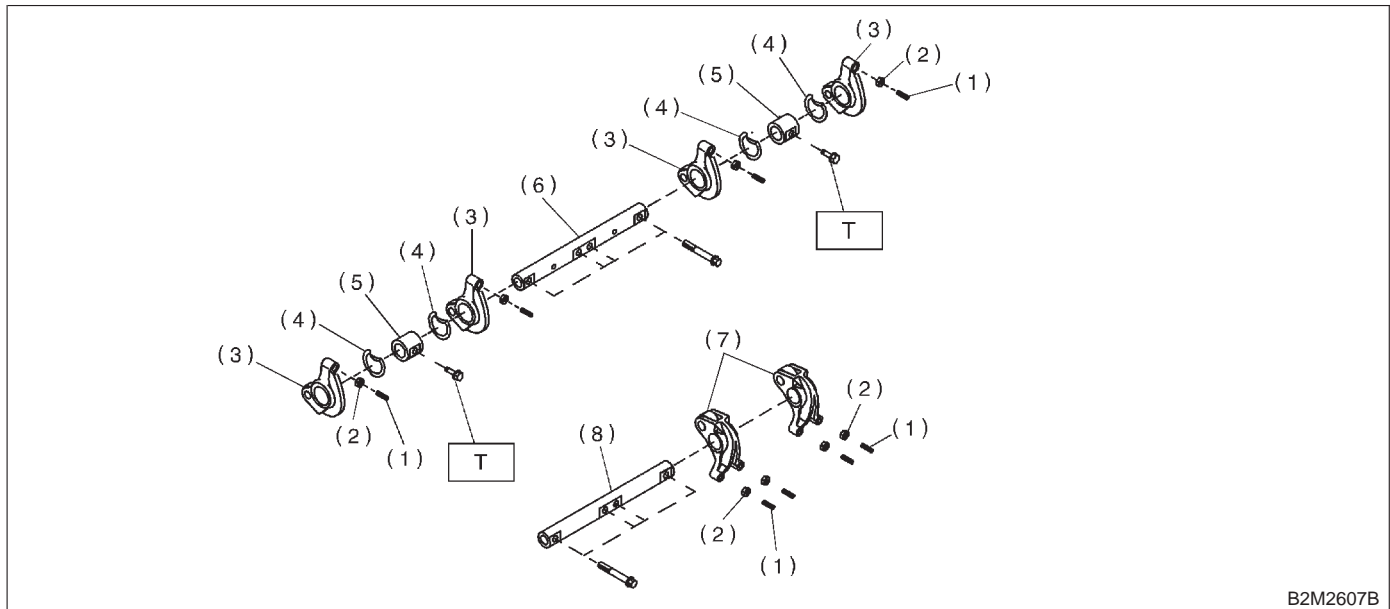
Visually check oil relief valve of shaft end for any of the following abnormalities.

- Breaks in check ball body
- Foreign particles caught in valve spring
- Oil leakage at check ball

CAUTION:

Repair or replace valve rocker shaft as necessary.

D: ASSEMBLY



B2M2607B

- | | |
|-------------------------------|--------------------------------|
| (1) Valve rocker adjust screw | (5) Rocker shaft support |
| (2) Valve rocker nut | (6) Intake valve rocker shaft |
| (3) Intake valve rocker arm | (7) Exhaust valve rocker arm |
| (4) Spring | (8) Exhaust valve rocker shaft |

Tightening torque: N-m (kg-m, ft-lb)

T: 5±1 (0.5±0.1, 3.6±0.7)

- 1) Install adjuster screw and nut to valve rocker.
- 2) Arrange valve rocker arms, springs and shaft supports in assembly order and insert valve rocker shaft.

Tightening torque (Shaft supports installing bolts):

5±1 N-m (0.5±0.1 kg-m, 3.6±0.7 ft-lb)

CAUTION:

Valve rocker arms, rocker shaft and shaft supports have identification marks. Ensure parts with same markings are properly assembled.

- 3) Install valve rocker shaft securing bolts.

E: INSTALLATION

- 1) Installation of valve rocker assembly
 - (1) Temporarily tighten bolts (a) through (d) equally as shown in figure.

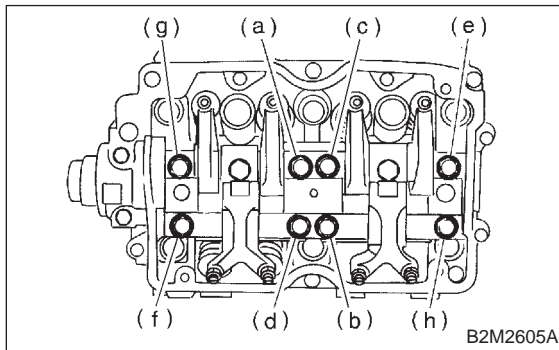
CAUTION:

Do not allow valve rocker assembly to gouge knock pins.

- (2) Tighten bolts (e) through (h) to specified torque.
- (3) Tighten bolts (a) through (d) to specified torque.

Tightening torque:

25 ± 2 N·m (2.5 ± 0.2 kg·m, 18.1 ± 1.4 ft·lb)



- 2) Adjust the valve clearances. <Ref. to 2-2 [W8B1].>
- 3) Install rocker cover and connect PCV hose.

5. Camshaft

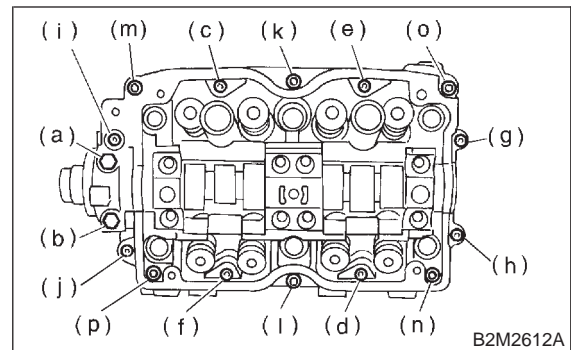
A: REMOVAL

1. RELATED PARTS

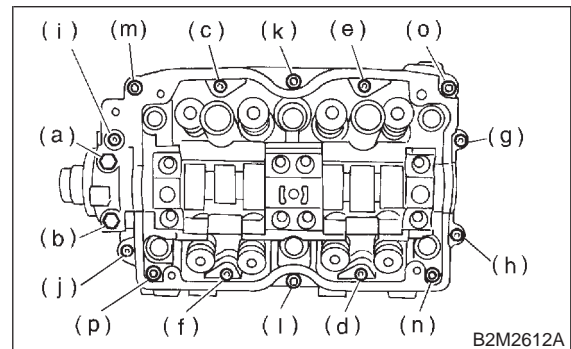
Remove timing belt, camshaft sprockets <Ref. to 2-3 [W3A0].> and valve rocker assembly. <Ref. to 2-3 [W4A0].>

2. CAMSHAFT (LH)

- 1) Remove camshaft cap.
 - (1) Remove bolts (a) through (b) in alphabetical sequence.

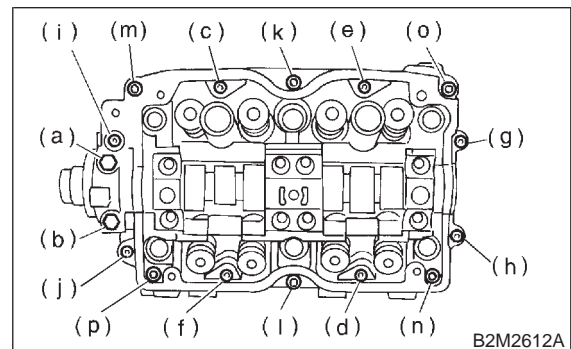


- (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.

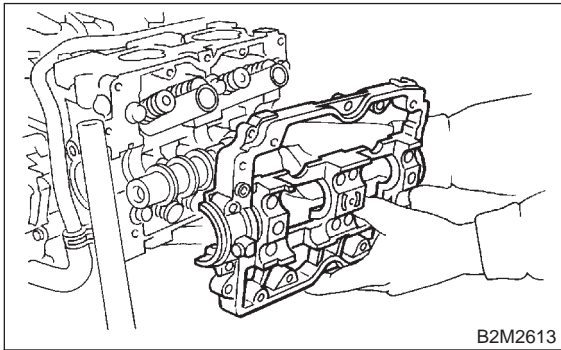


- (3) Remove bolts (k) through (p) in alphabetical sequence using ST.

ST 499497000 TORX PLUS



(4) Remove camshaft cap.



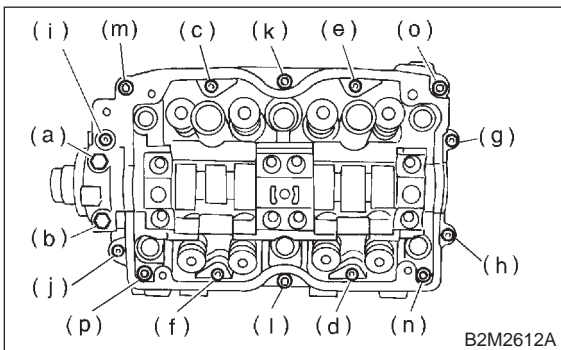
- 2) Remove camshaft (LH).
- 3) Remove oil seal.
- 4) Remove plug from rear side of camshaft (LH).

CAUTION:

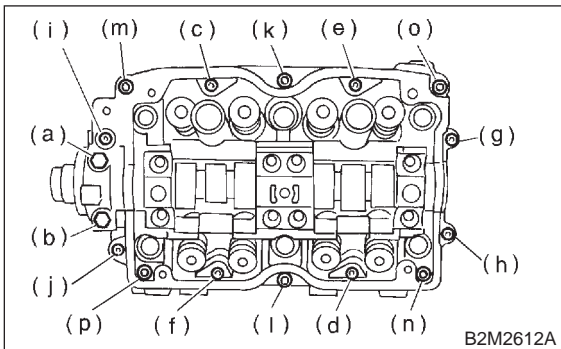
- Do not remove oil seal unless necessary.
- Do not scratch journal surface when removing oil seal.

3. CAMSHAFT (RH)

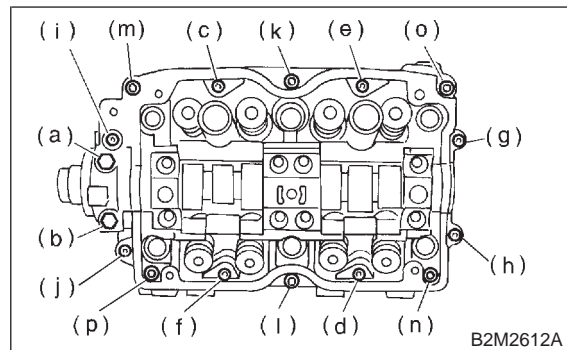
- 1) Remove camshaft cap.
 - (1) Remove bolts (a) through (b) in alphabetical sequence.



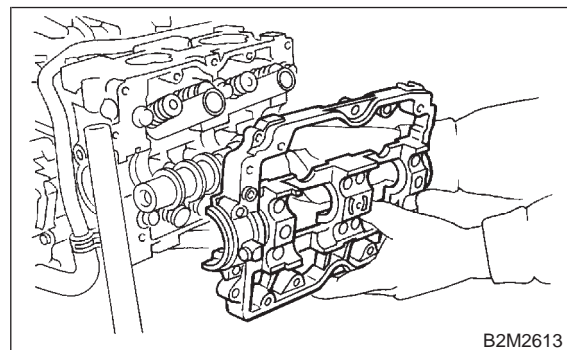
(2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.



(3) Remove bolts (k) through (p) in alphabetical sequence using ST.
ST 499497000 TORX PLUS



(4) Remove camshaft cap.



- 2) Remove camshaft (RH).
- 3) Remove oil seal.
- 4) Remove plug from rear side of camshaft (RH).

CAUTION:

- Do not remove oil seal unless necessary.
- Do not scratch journal surface when removing oil seal.

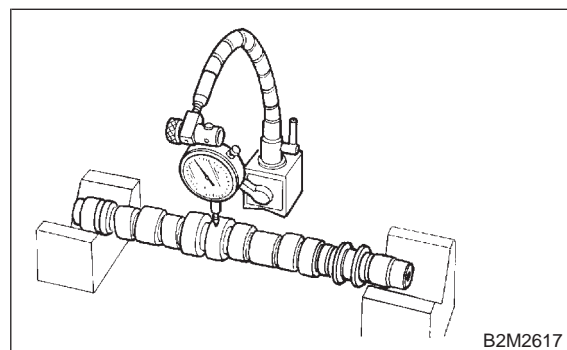
B: INSPECTION

1. CAMSHAFT

1) Measure the bend, and repair or replace if necessary.

Limit:

0.025 mm (0.0010 in)



2) Check journal for damage and wear. Replace if faulty.

3) Measure outside diameter of camshaft journal and inside diameter of cylinder head journal, and determine the difference between the two (= oil

clearance). If oil clearance exceeds specifications, replace camshaft or cylinder head as necessary.

		Unit: mm (in)
Clearance at journal	Standard	0.055 — 0.090 (0.0022 — 0.0035)
	Limit	0.10 (0.0039)
Camshaft journal O.D.		31.928 — 31.945 (1.2570 — 1.2577)
Journal hole I.D.		32.000 — 32.018 (1.2598 — 1.2605)

4) Check cam face condition; remove minor faults by grinding with oil stone. Measure the cam height H; replace if the limit has been exceeded.

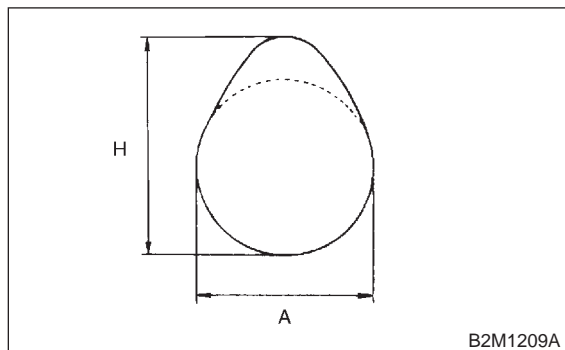
Cam height: H

Item		Unit: mm (in)
Intake	STD	39.485 — 39.585 (1.5545 — 1.5585)
	Limit	39.385 (1.5506)
Exhaust	STD	39.257 — 39.357 (1.5455 — 1.5495)
	Limit	39.157 (1.5416)

Cam base circle diameter A:

IN: 34.00 mm (1.3386 in)

EX: 34.00 mm (1.3386 in)



B2M1209A

2. CAMSHAFT SUPPORT

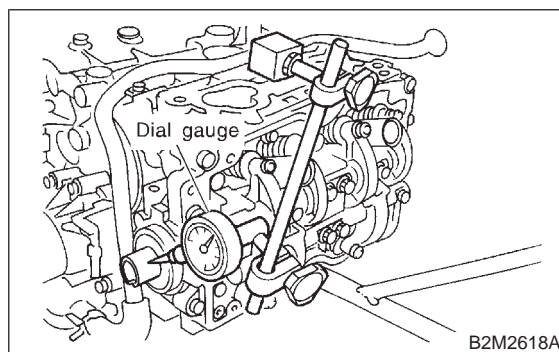
Measure the thrust clearance of camshaft with dial gauge. If the clearance exceeds the limit, replace camshaft support.

Standard:

0.030 — 0.090 mm (0.0012 — 0.0035 in)

Limit:

0.10 mm (0.0039 in)



B2M2618A

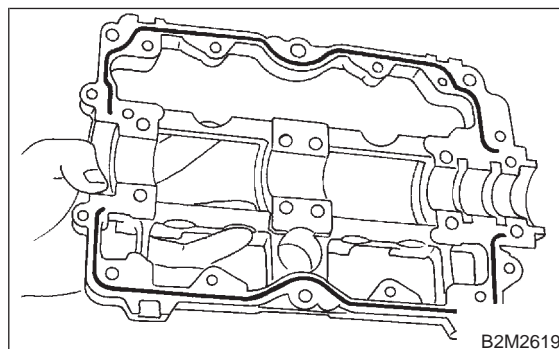
C: INSTALLATION

1. CAMSHAFT (LH)

- 1) Apply a coat of engine oil to camshaft journals and install camshaft (LH).
- 2) Install camshaft cap.
 - (1) Apply liquid gasket on the around of camshaft cap.

Liquid gasket:

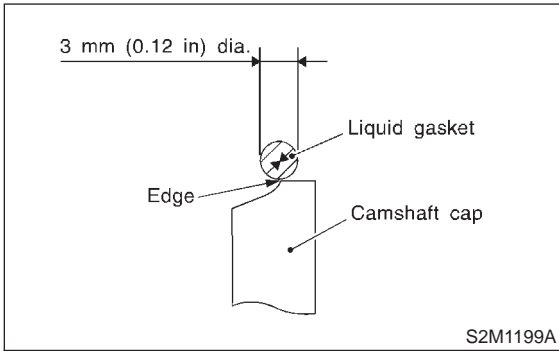
THREE BOND 1280B



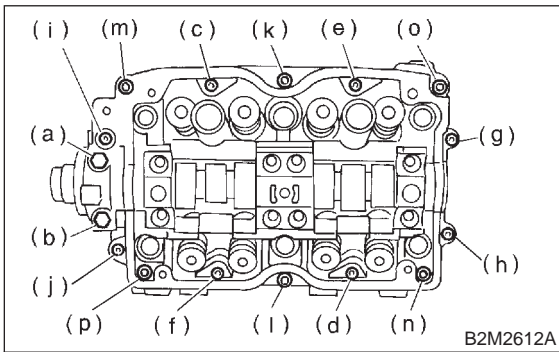
B2M2619

NOTE:

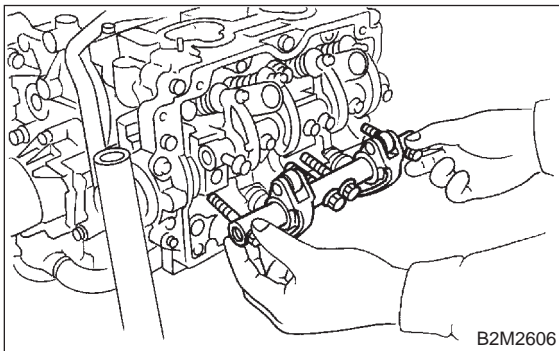
Apply a coat of 3 mm (0.12 in) dia. liquid gasket along edge of cam cap mating surface.



(2) Temporarily tighten bolts (g) through (j) in alphabetical sequence.



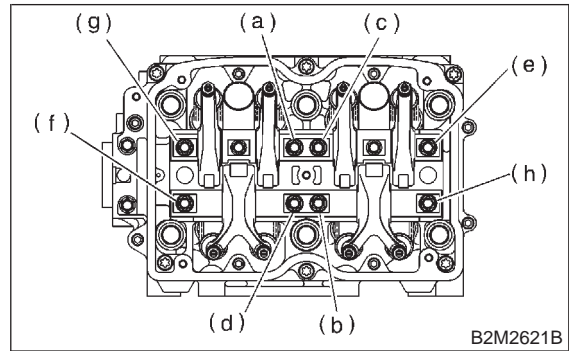
(3) Install valve rocker assembly.
<Ref. to 2-3 [W4E0].>



(4) Tighten bolts (a) through (h) in alphabetical sequence.

Tightening torque:

25±2 N·m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)

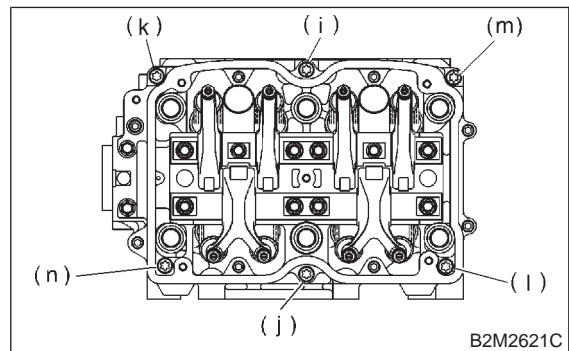


(5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.

ST 499497000 TORX PLUS

Tightening torque:

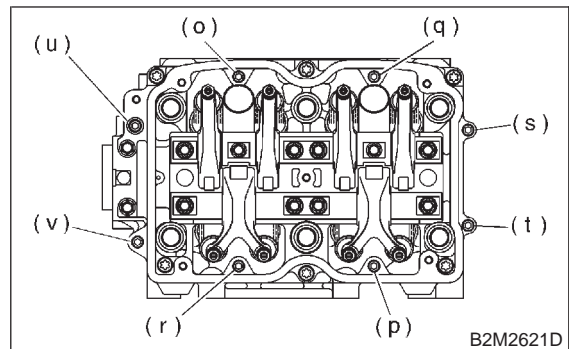
18±2 N·m (1.8±0.2 kg-m, 13.0±1.4 ft-lb)



(6) Tighten bolts (o) through (v) in alphabetical sequence.

Tightening torque:

10±2 N·m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)

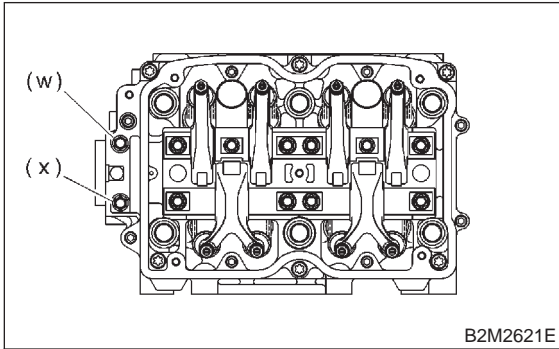


5. Camshaft

(7) Tighten bolts (w) through (x) in alphabetical sequence.

Tightening torque:

10±2 N·m (1.0±0.2 kg·m, 7.2±1.4 ft·lb)



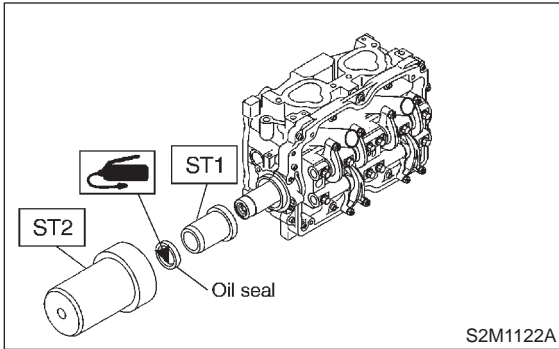
B2M2621E

3) Apply a coat of grease to oil seal lips and install oil seal (A) on camshaft using ST1 and ST2.

CAUTION:

Use a new oil seal.

- ST1 499597000 OIL SEAL GUIDE
- ST2 499587500 OIL SEAL INSTALLER



S2M1122A

- 4) Install plug using ST.
- ST 499587700 OIL SEAL INSTALLER
- 5) Install oil level gauge guide.
- 6) Install camshaft position sensor support.

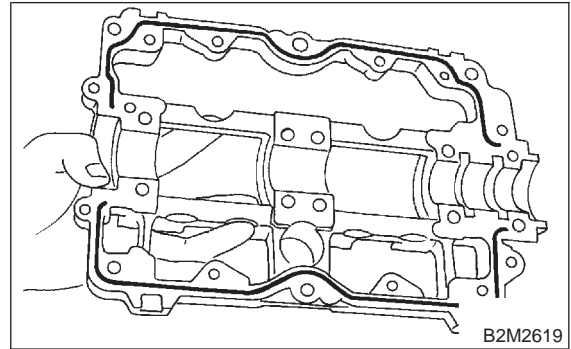
2. CAMSHAFT (RH)

- 1) Apply a coat of engine oil to camshaft journals and install camshaft (RH).
- 2) Install camshaft cap.

(1) Apply liquid gasket on the around of camshaft cap.

Liquid gasket:

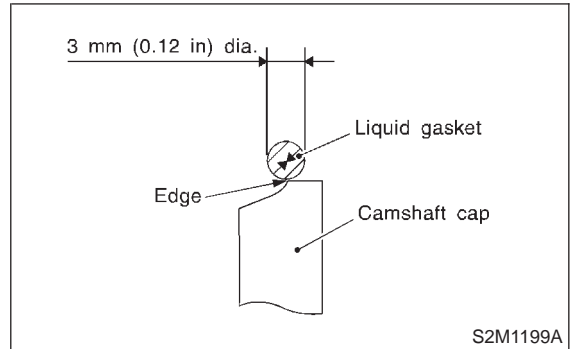
THREE BOND 1280B



B2M2619

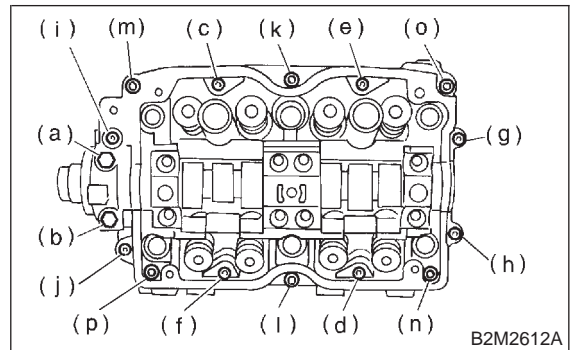
NOTE:

Apply a coat of 3 mm (0.12 in) dia. liquid gasket along edge of cam cap mating surface.



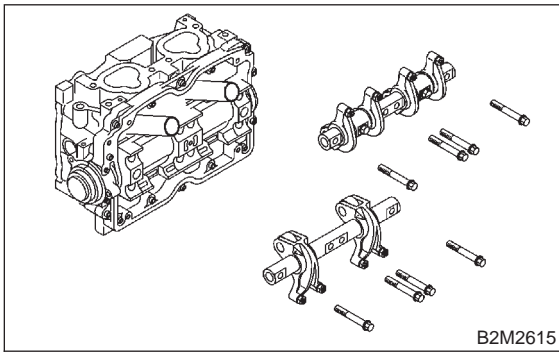
S2M1199A

(2) Temporarily tighten bolts (g) through (j) in alphabetical sequence.



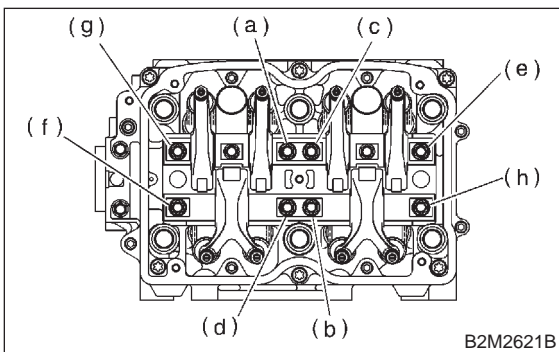
B2M2612A

(3) Install valve rocker assembly.
<Ref. to 2-3 [W4E0].>



(4) Tighten bolts (a) through (h) in alphabetical sequence.

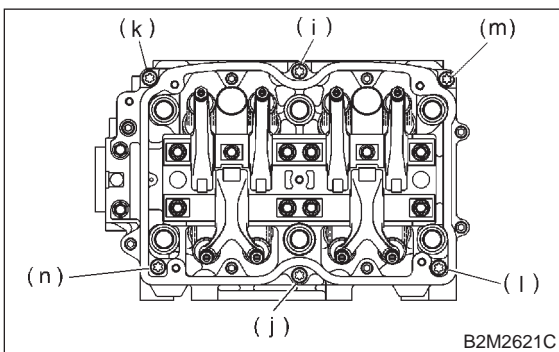
Tightening torque:
25±2 N-m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



(5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.

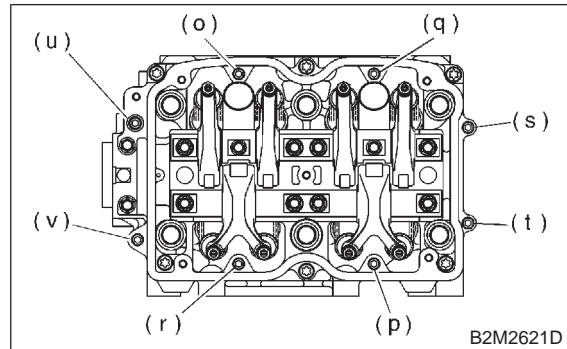
ST 499427000 TORX PLUS

Tightening torque:
18±2 N-m (1.8±0.2 kg-m, 13.0±1.4 ft-lb)



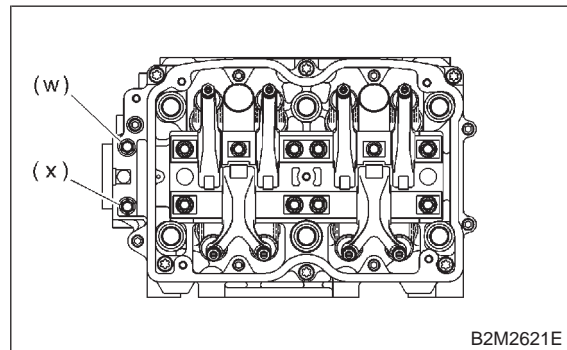
(6) Tighten bolts (o) through (v) in alphabetical sequence.

Tightening torque:
10±2 N-m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)



(7) Tighten bolts (o) through (p) in alphabetical sequence.

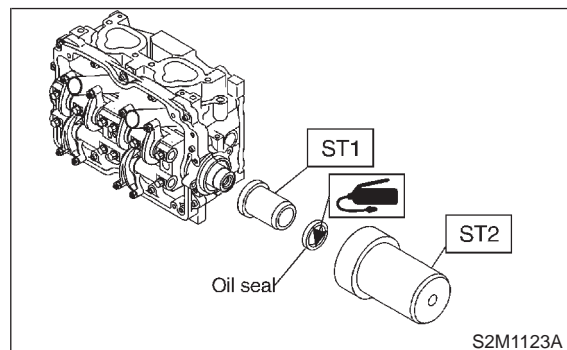
Tightening torque:
10±2 N-m (1.0±0.2 kg-m, 7.2±1.4 ft-lb)



3) Apply a coat of grease to oil seal lips and install oil seal (A) on camshaft using ST1 and ST2.

CAUTION:
Use a new oil seal.

ST1 499597000 OIL SEAL GUIDE
ST2 499587500 OIL SEAL INSTALLER



4) Install plug using ST.
ST 499587700 OIL SEAL INSTALLER

3. RELATED PARTS

- 1) Adjust the valve clearance. <Ref. to 2-2 [W8B1].>
- 2) Install rocker cover and connect PCV hose.
- 3) Install timing belt. <Ref. to 2-3 [W3C0].>

6. Cylinder Head

A: REMOVAL

1. RELATED PARTS

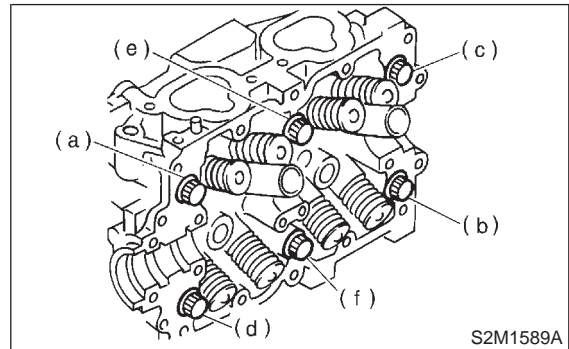
- 1) Remove intake manifold. <Ref. to 2-7 [W3A0].>
- 2) Remove bolt which installs A/C compressor bracket on cylinder head. (With A/C model)
- 3) Remove camshafts. <Ref. to 2-3 [W5A2].>

2. CYLINDER HEAD

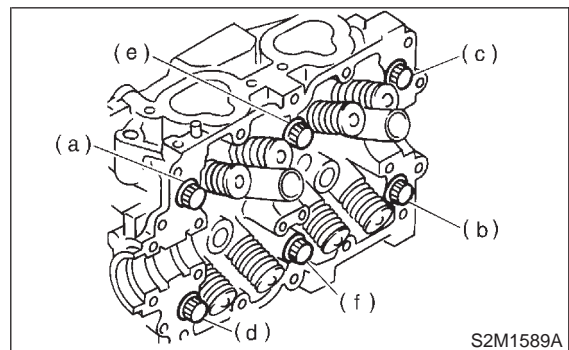
- 1) Remove oil level gauge guide attaching bolt (left hand only) and oil level gauge guide.
- 2) Remove cylinder head bolts in alphabetical sequence shown in figure.

CAUTION:

Leave bolts (a) and (c) engaged by three or four threads to prevent cylinder head from falling.



- 3) While tapping cylinder head with a plastic hammer, separate it from cylinder block.
- 4) Remove bolts (a) and (b) to remove cylinder head.



- 5) Remove cylinder head gasket.

CAUTION:

Do not scratch the mating surface of cylinder head and cylinder block.

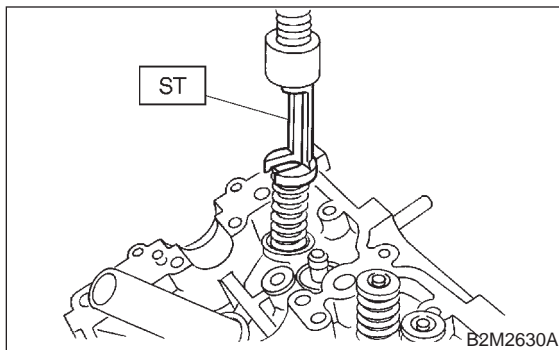
- 6) Similarly, remove right side cylinder head.

B: DISASSEMBLY

- 1) Place cylinder head on ST.
ST 498267800 CYLINDER HEAD TABLE
- 2) Set ST on valve spring. Compress valve spring and remove the valve spring retainer key. Remove each valve and valve spring.
ST 499718000 VALVE SPRING REMOVER

CAUTION:

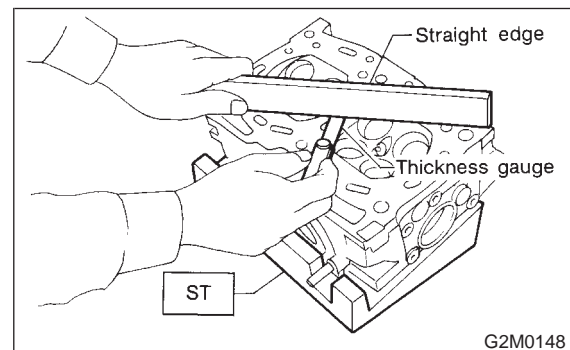
- Mark each valve to prevent confusion.
- Use extreme care not to damage the lips of the intake valve oil seals and exhaust valve oil seals.

**C: INSPECTION AND REPLACEMENT****1. CYLINDER HEAD**

- 1) Make sure that no crack or other damage exists. In addition to visual inspection, inspect important areas by means of red lead check. Also make sure that gasket installing surface shows no trace of gas and water leaks.
 - 2) Place cylinder head on ST.
ST 498267800 CYLINDER HEAD TABLE
 - 3) Measure the warping of the cylinder head surface that mates with crankcase using a straight edge and thickness gauge.
- If the warping exceeds 0.05 mm (0.0020 in), regrind the surface with a surface grinder.

Warping limit:**0.05 mm (0.0020 in)****Grinding limit:****0.3 mm (0.012 in)****Standard height of cylinder head:****97.5 mm (3.839 in)****CAUTION:**

Uneven torque for the cylinder head bolts can cause warping. When reassembling, pay special attention to the torque so as to tighten evenly.



2. VALVE SEAT

Inspect intake and exhaust valve seats, and correct the contact surfaces with valve seat cutter if they are defective or when valve guides are replaced.

Valve seat width: *W*

Intake

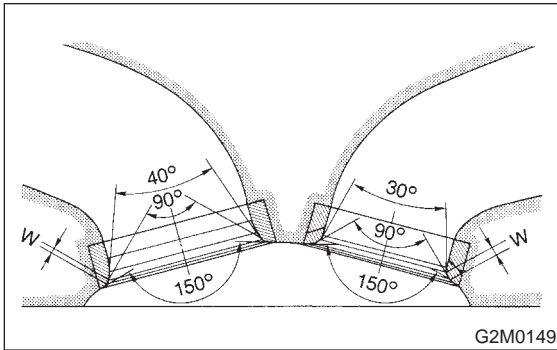
Standard 1.0 mm (0.039 in)

Limit 1.7 mm (0.067 in)

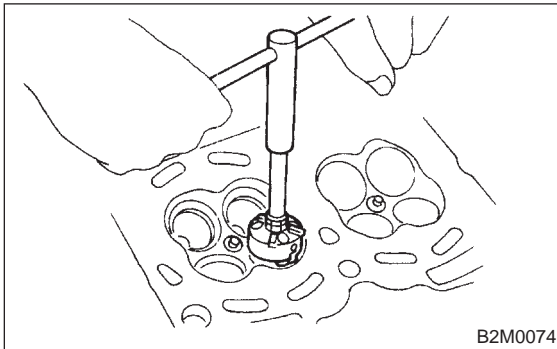
Exhaust

Standard 1.4 mm (0.055 in)

Limit 2.1 mm (0.083 in)



G2M0149



B2M0074

3. VALVE GUIDE

1) Check the clearance between valve guide and stem. The clearance can be checked by measuring the outside diameter of valve stem and the inside diameter of valve guide with outside and inside micrometers respectively.

Clearance between the valve guide and valve stem:

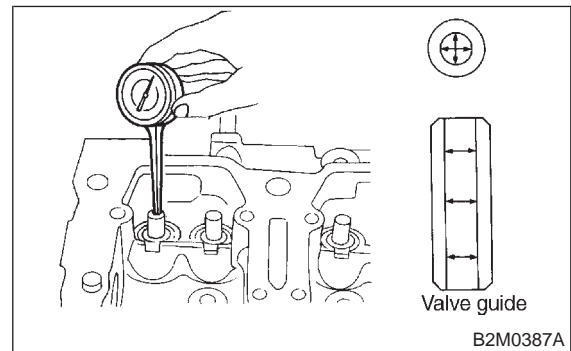
Standard

Intake 0.035 — 0.062 mm (0.0014 — 0.0024 in)

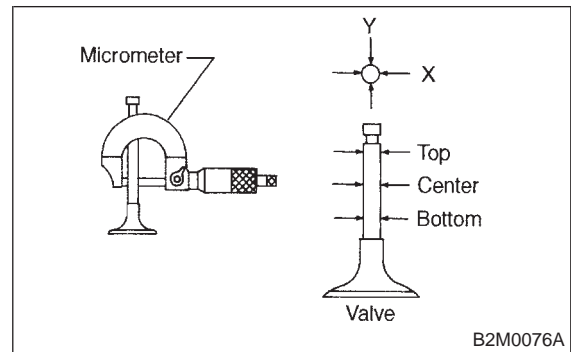
Exhaust 0.040 — 0.067 mm (0.0016 — 0.0026 in)

Limit

0.15 mm (0.0059 in)



B2M0387A



B2M0076A

2) If the clearance between valve guide and stem exceeds the limit, replace valve guide or valve itself whichever shows greater amount of wear. See following procedure for valve guide replacement.

Valve guide inner diameter:

6.000 — 6.012 mm (0.2362 — 0.2367 in)

Valve stem outer diameters:

Intake

5.950 — 5.965 mm (0.2343 — 0.2348 in)

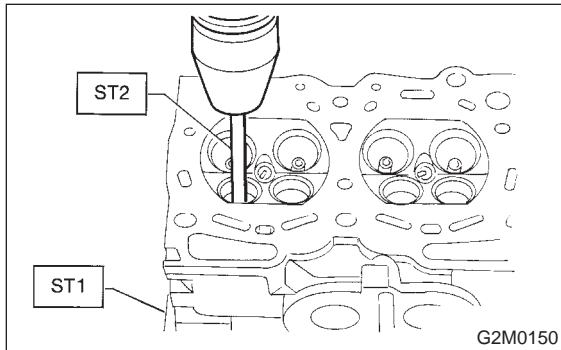
Exhaust

5.945 — 5.960 mm (0.2341 — 0.2346 in)

(1) Place cylinder head on ST1 with the combustion chamber upward so that valve guides enter the holes in ST1.

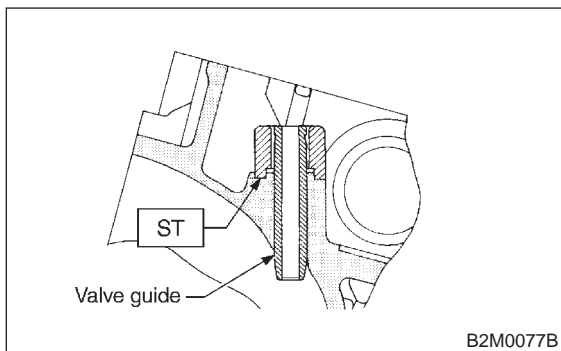
(2) Insert ST2 into valve guide and press it down to remove valve guide.

ST1 498267800 CYLINDER HEAD TABLE
ST2 499767400 VALVE GUIDE REMOVER



(3) Turn cylinder head upside down and place ST as shown in the figure.

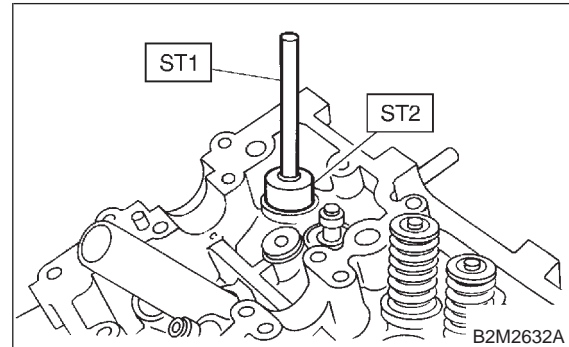
Intake side:
ST 499767700 VALVE GUIDE ADJUSTER
Exhaust side:
ST 499767800 VALVE GUIDE ADJUSTER



(4) Before installing new oversize valve guide, make sure that neither scratches nor damages exist on the inside surface of the valve guide holes in cylinder head.

(5) Put new valve guide, coated with sufficient oil, in cylinder, and insert ST1 into valve guide. Press in until the valve guide upper end is flush with the upper surface of ST2.

ST1 499767400 VALVE GUIDE REMOVER
Intake side:
ST2 499767700 VALVE GUIDE ADJUSTER
Exhaust side:
ST2 499767800 VALVE GUIDE ADJUSTER



(6) Check the valve guide protrusion.

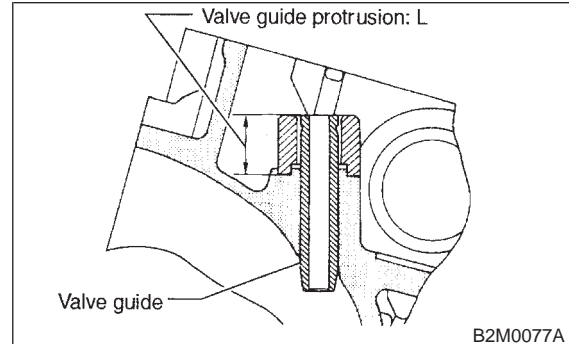
Valve guide protrusion: L

Intake

20.0 — 20.5 mm (0.787 — 0.807 in)

Exhaust

16.5 — 17.0 mm (0.650 — 0.669 in)

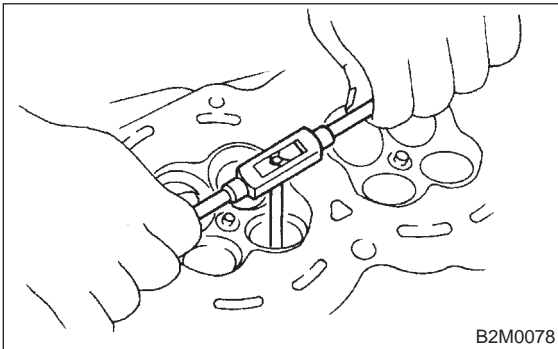


(7) Ream the inside of valve guide with ST. Gently rotate the reamer clockwise while pressing it lightly into valve guide, and return it also rotating clockwise. After reaming, clean valve guide to remove chips.

CAUTION:

- Apply engine oil to the reamer when reaming.
- If the inner surface of the valve guide is torn, the edge of the reamer should be slightly ground with an oil stone.
- If the inner surface of the valve guide becomes lustrous and the reamer does not chips, use a new reamer or remedy the reamer.

ST 499767400 VALVE GUIDE REAMER



(8) Recheck the contact condition between valve and valve seat after replacing valve guide.

4. INTAKE AND EXHAUST VALVE

1) Inspect the flange and stem of valve, and replace if damaged, worn, or deformed, or if "H" is less than the specified limit.

H:

Intake

Standard 1.0 mm (0.039 in)

Limit 0.6 mm (0.024 in)

Exhaust

Standard 1.2 mm (0.047 in)

Limit 0.6 mm (0.024 in)

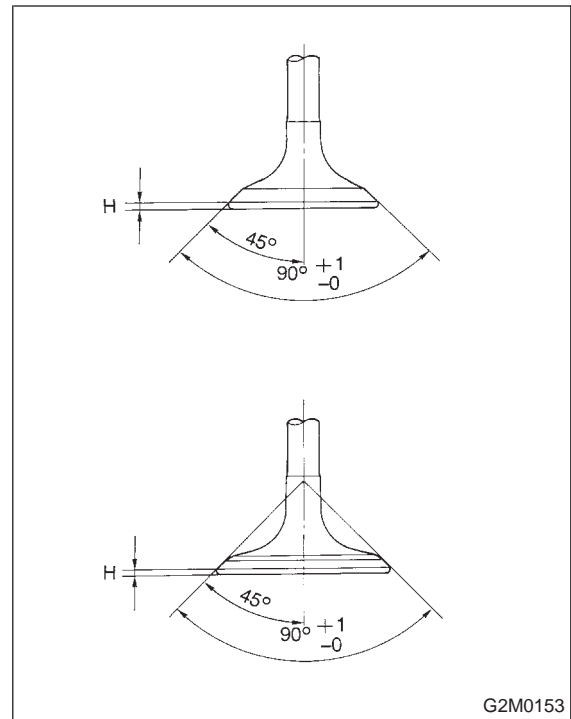
Valve overall length:

Intake

120.6 mm (4.75 in)

Exhaust

121.7 mm (4.79 in)

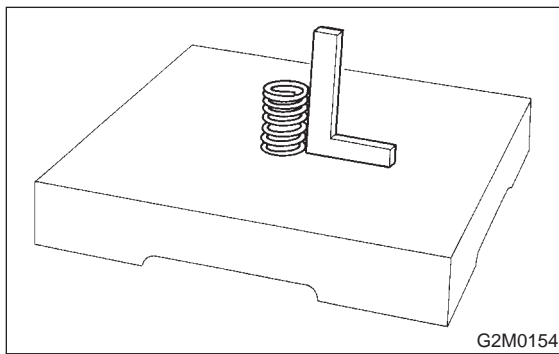


2) Put a small amount of grinding compound on the seat surface and lap the valve and seat surface. <Ref. to 2-3 [W6C2].> Install a new intake valve oil seal after lapping.

5. VALVE SPRING

- 1) Check valve springs for damage, free length, and tension. Replace valve spring if it is not to the specifications presented below.
- 2) To measure the squareness of the valve spring, stand the spring on a surface plate and measure its deflection at the top using a try square.

Free length	54.30 mm (2.1378 in)
Squareness	2.5°, 2.4 mm (0.094 in)
Tension/spring height	214.8 — 246.2 N (21.9 — 25.1 kg, 48.3 — 55.3 lb)/ 45.0 mm (1.772 in)
	526.6 — 581.6 N (53.7 — 59.3 kg, 118.4 — 130.8 lb)/34.7 mm (1.366 in)



6. INTAKE AND EXHAUST VALVE OIL SEAL

Replace oil seal with new one, if lip is damaged or spring out of place, or when the surfaces of intake valve and valve seat are reconditioned or intake valve guide is replaced. Use pliers to pinch and remove oil seal from valve.

- 1) Place cylinder head on ST1.
- 2) Press-fit oil seal to the specified dimension indicated in the figure using ST2.

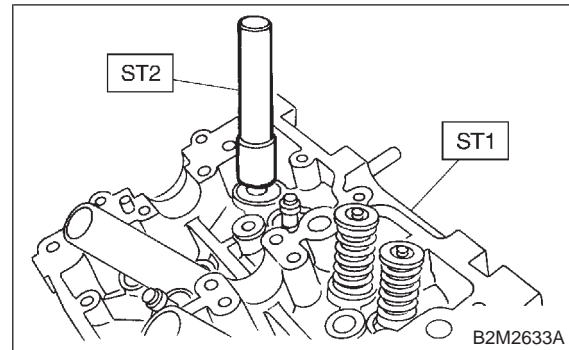
CAUTION:

- Apply engine oil to oil seal before press-fitting.
- When press-fitting oil seal, do not use hammer or strike in.
- Differentiate between intake valve oil seal and exhaust valve oil seal by noting their difference in color.

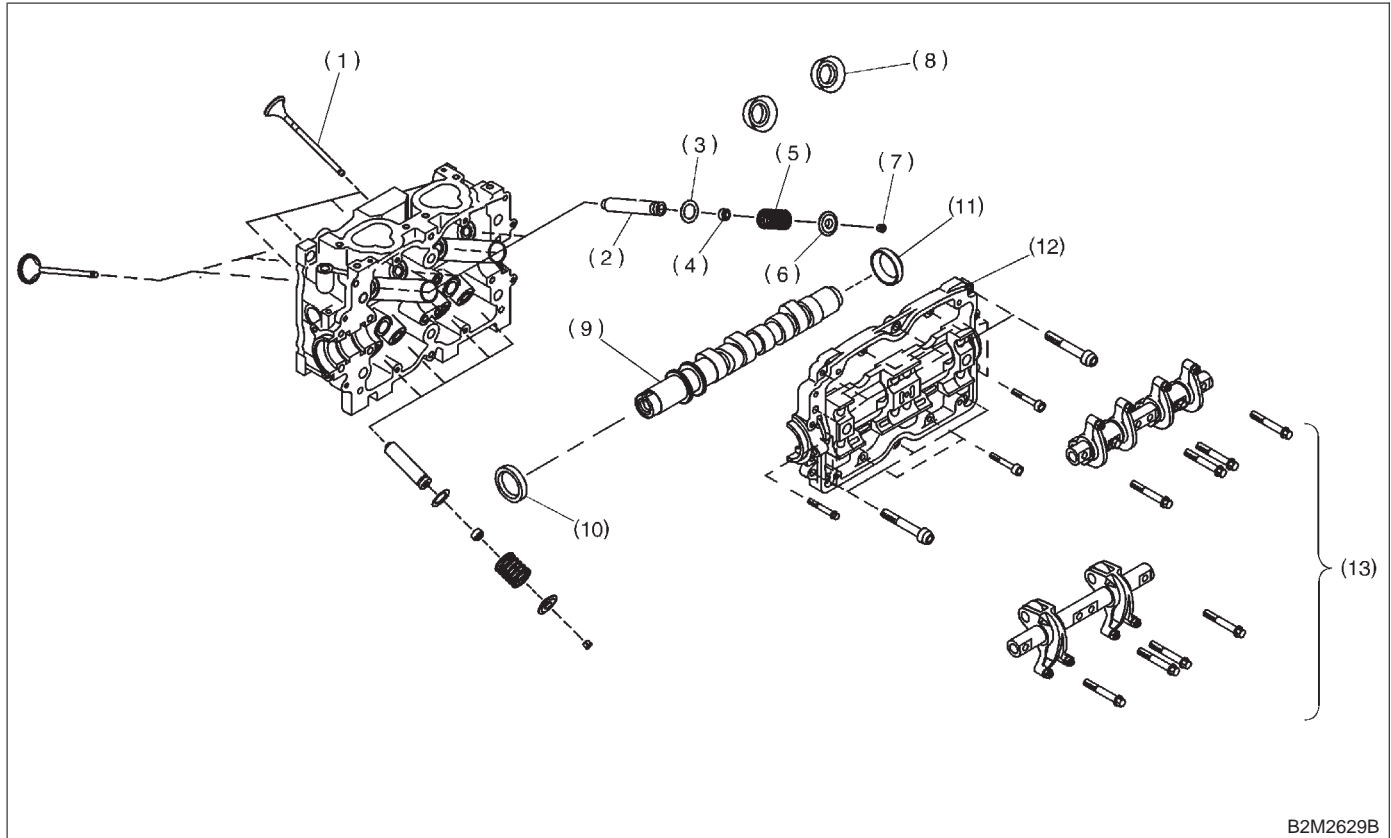
ST1 498267800 CYLINDER HEAD TABLE
ST2 498857100 VALVE OIL SEAL GUIDE

Color of rubber part:
Intake [Black]
Exhaust [Brown]

Color of spring part:
Intake [Silver]
Exhaust [Silver]



D: ASSEMBLY



B2M2629B

- | | | |
|-----------------------|-----------------------|------------------------|
| (1) Valve | (6) Retainer | (11) Plug |
| (2) Valve guide | (7) Retainer key | (12) Camshaft cap |
| (3) Valve spring seat | (8) Spark plug gasket | (13) Valve rocker ASSY |
| (4) Oil seal | (9) Camshaft | |
| (5) Valve spring | (10) Oil seal | |

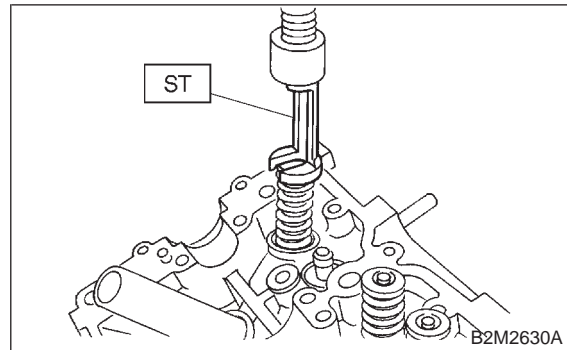
- 1) Installation of valve spring and valve
 (1) Place cylinder head on ST.
 ST 498267400 CYLINDER HEAD TABLE
 (2) Coat stem of each valve with engine oil and insert valve into valve guide.

CAUTION:
 When inserting valve into valve guide, use special care not to damage the oil seal lip.

- (3) Install valve spring and retainer.

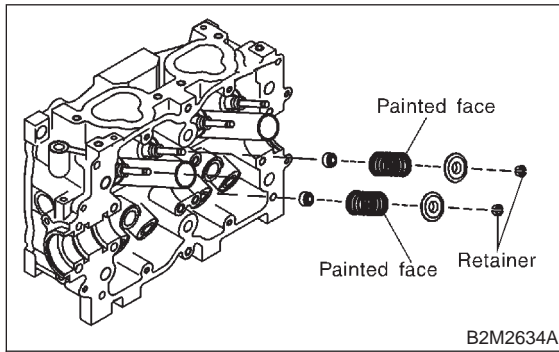
CAUTION:
 Be sure to install the valve springs with their close-coiled end facing the seat on the cylinder head.

- (4) Set ST on valve spring.
 ST 499718000 VALVE SPRING REMOVER



B2M2630A

(5) Compress valve spring and fit valve spring retainer key.

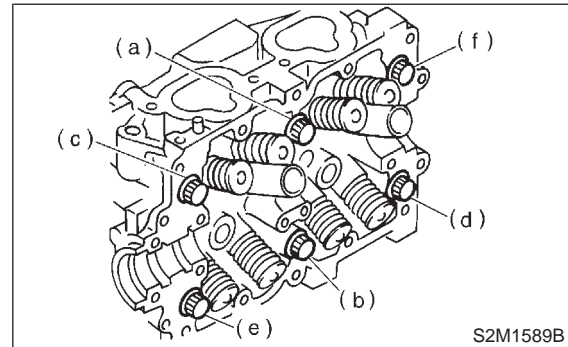


(6) After installing, tap valve spring retainers lightly with wooden hammer for better seating.

(7) Further tighten all bolts by 80 to 90° in alphabetical sequence shown in figure below.

CAUTION:

Ensure that the total “re-tightening angle” [in the former two steps], do not exceed 180°.



3) Install oil level gauge guide and tighten attaching bolt (left side only).

E: INSTALLATION

1. CYLINDER HEAD

1) Install cylinder head and gaskets on cylinder block.

CAUTION:

Use new cylinder head gaskets.

2) Tighten cylinder head bolts.

(1) Apply a coat of engine oil to washers and bolt threads.

(2) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb) in alphabetical sequence.

Then tighten all bolts to 69 N·m (7.0 kg-m, 51 ft-lb) in alphabetical sequence.

(3) Back off all bolts by 180° first; back them off by 180° again.

(4) Tighten bolts (a) and (b) to 34 N·m (3.5 kg-m, 25 ft-lb).

(5) Tighten bolts (c), (d), (e) and (f) to 15 N·m (1.5 kg-m, 11 ft-lb).

(6) Tighten all bolts by 80 to 90° in alphabetical sequence.

CAUTION:

Do not tighten bolts more than 90°.

2. RELATED PARTS

CAUTION:

Be careful not to scratch the mating surface of cylinder block and oil pump.

1) Install camshafts. <Ref. to 2-3 [W5C0].>

2) Install intake manifold. <Ref. to 2-7 [W3D0].>

3) Tighten bolt which installs A/C compressor bracket on cylinder head. (With A/C model)

7. Cylinder Block

A: REMOVAL

1. RELATED PARTS

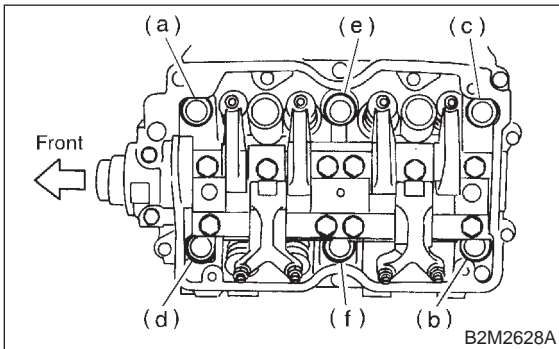
NOTE:

Before conducting this procedure drain engine oil completely if applicable.

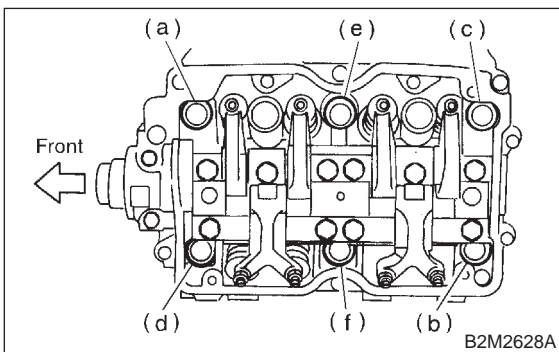
- 1) Remove intake manifold. <Ref. to 2-7 [W3A0].>
- 2) Remove timing belt. <Ref. to 2-3 [W3A0].>
- 3) Remove A/C compressor bracket. (With A/C model)
- 4) Remove generator and A/C compressor with their brackets.
- 5) Remove cylinder head bolts in alphabetical sequence shown in figure.

CAUTION:

Leave bolts (a) and (c) engaged by three or four threads to prevent cylinder head from falling.



- 6) While tapping cylinder head with a plastic hammer, separate it from cylinder block.
- 7) Remove bolts (a) and (b) to remove cylinder head.



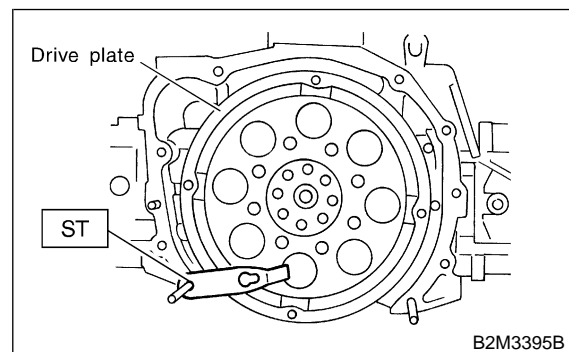
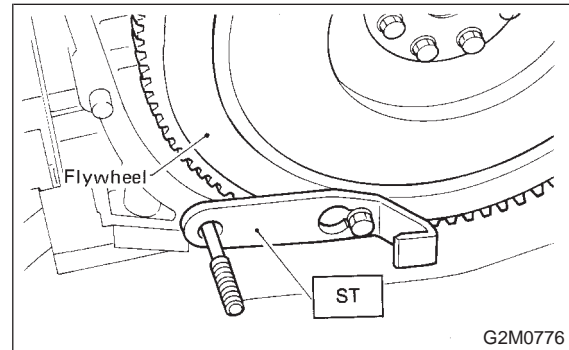
- 8) Remove cylinder head gasket.

CAUTION:

Do not scratch the mating surface of cylinder head and cylinder block.

- 9) Similarly, remove right side cylinder head.
- 10) Remove clutch housing cover (MT vehicles only).

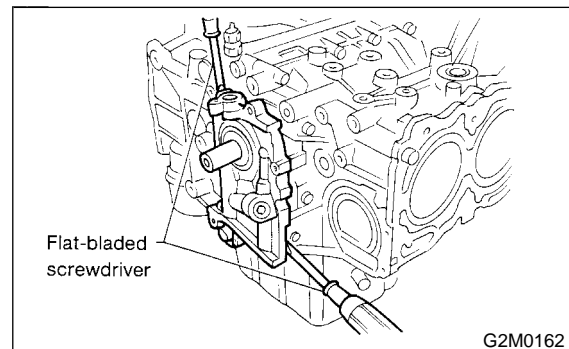
- 11) Remove flywheel (MT vehicles only) or drive plate (AT vehicles only).
Using ST, lock crankshaft.
ST 498497100 CRANKSHAFT STOPPER



- 12) Remove oil separator cover.
- 13) Remove water by-pass pipe for heater.
- 14) Remove water pump.
- 15) Remove oil pump from cylinder block.
Use a flat-bladed screwdriver as shown in figure when removing oil pump.

CAUTION:

Be careful not to scratch the mating surface of cylinder block and oil pump.

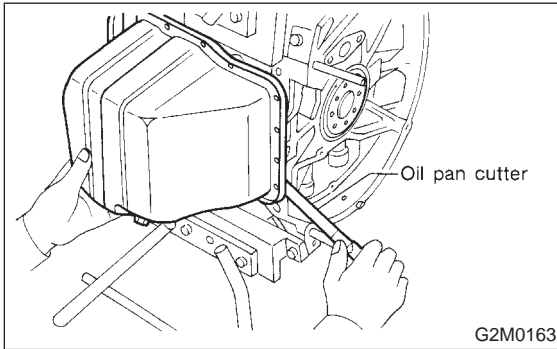


- 16) Removal of oil pan
 - (1) Turn cylinder block with #2 and #4 piston sides facing upward.
 - (2) Remove bolts which secure oil pan to cylinder block.

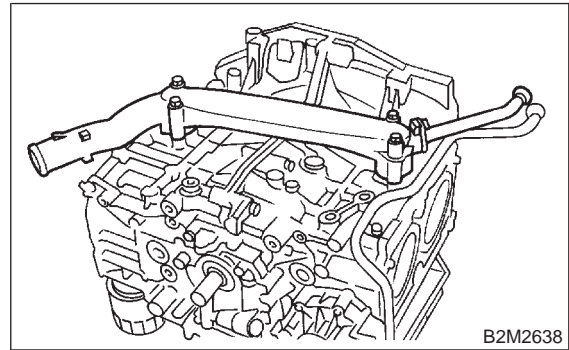
(3) Insert a oil pan cutter blade between cylinder block-to-oil pan clearance and remove oil pan.

CAUTION:

Do not use a screwdriver or similar tool in place of oil pan cutter.



21) Remove water pipe. <Ref. to 2-5 [W7A0].>



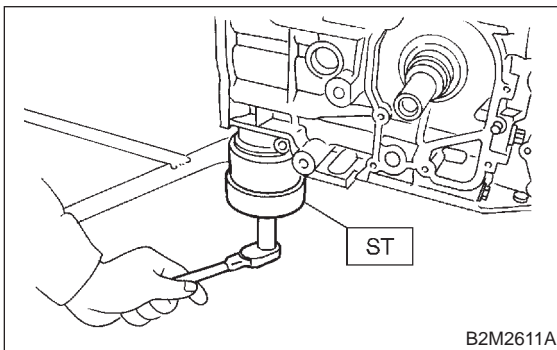
17) Remove oil strainer stay.

18) Remove oil strainer.

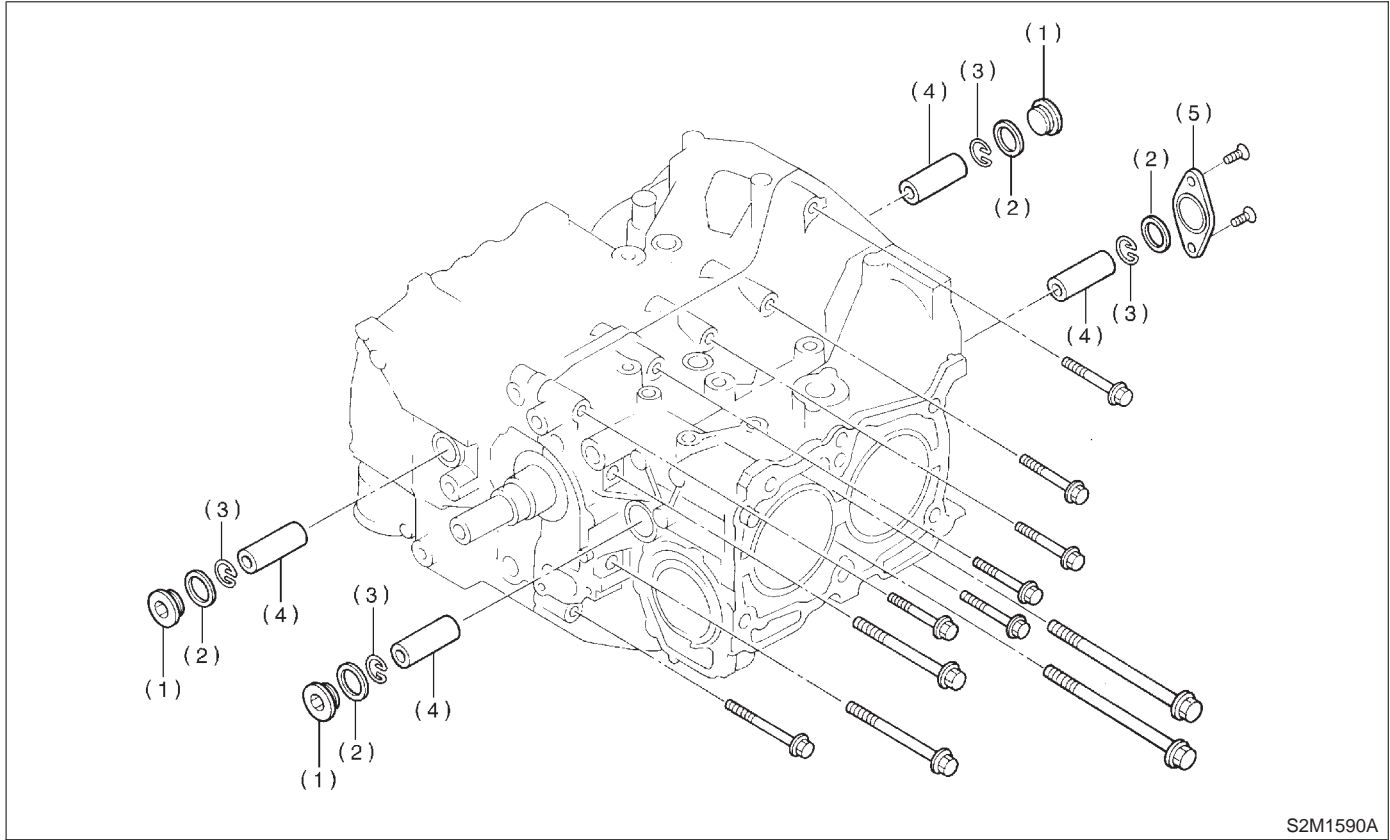
19) Remove baffle plate.

20) Remove oil filter using ST.

ST 498187300 OIL FILTER WRENCH



2. CYLINDER BLOCK

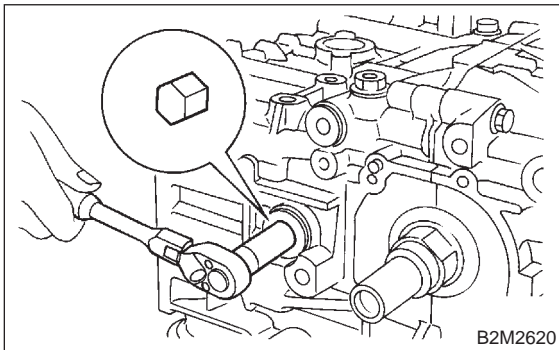


(1) Service hole plug
(2) Gasket

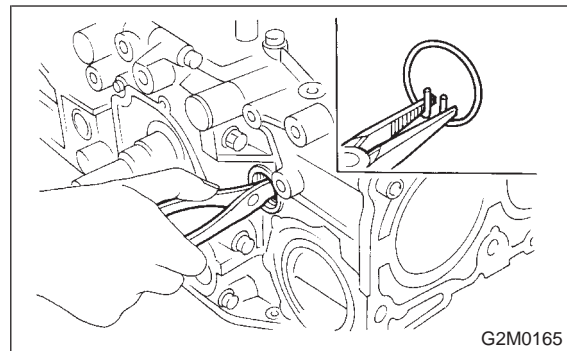
(3) Circlip
(4) Piston pin

(5) Service hole cover

1) Remove service hole cover and service hole plugs using hexagon wrench [14 mm (0.55 in)].

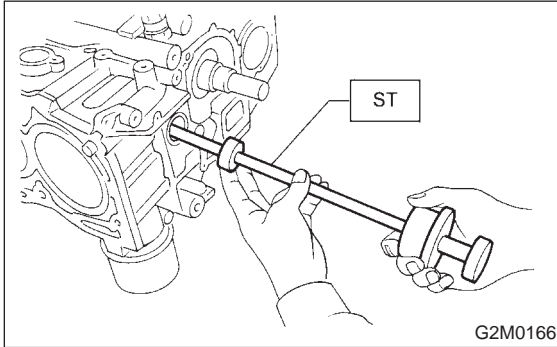


2) Rotate crankshaft to bring #1 and #2 pistons to bottom dead center position, then remove piston circlip through service hole of #1 and #2 cylinders.



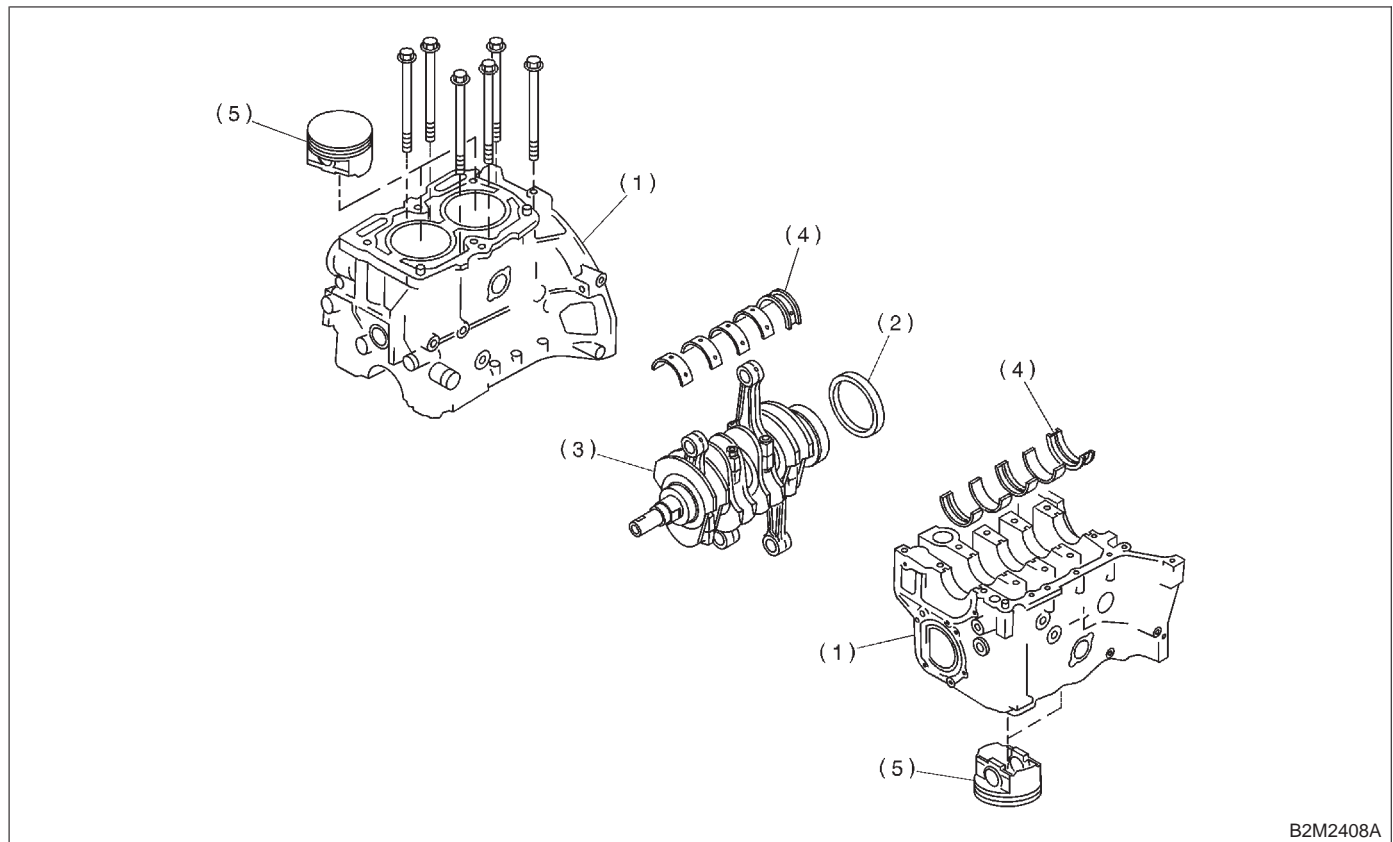
3) Draw out piston pin from #1 and #2 pistons using ST.
ST 499097700 PISTON PIN REMOVER

CAUTION:
Be careful not to confuse original combination of piston, piston pin and cylinder.



4) Similarly remove piston pins from #3 and #4 pistons.
5) Remove bolts which connect cylinder block on the side of #2 and #4 cylinders.
6) Back off bolts which connect cylinder block on the side of #1 and #3 cylinders two or three turns.
7) Set up cylinder block so that #1 and #3 cylinders are on the upper side, then remove cylinder block connecting bolts.
8) Separate left-hand and right-hand cylinder blocks.

CAUTION:
When separating cylinder block, do not allow the connecting rod to fall and damage the cylinder block.



- | | | |
|--------------------|------------------------|------------|
| (1) Cylinder block | (3) Crankshaft | (5) Piston |
| (2) Rear oil seal | (4) Crankshaft bearing | |

9) Remove rear oil seal.
10) Remove crankshaft together with connecting rod.
11) Remove crankshaft bearings from cylinder block using hammer handle.

CAUTION:
Do not confuse combination of crankshaft bearings. Press bearing at the end opposite to locking lip.

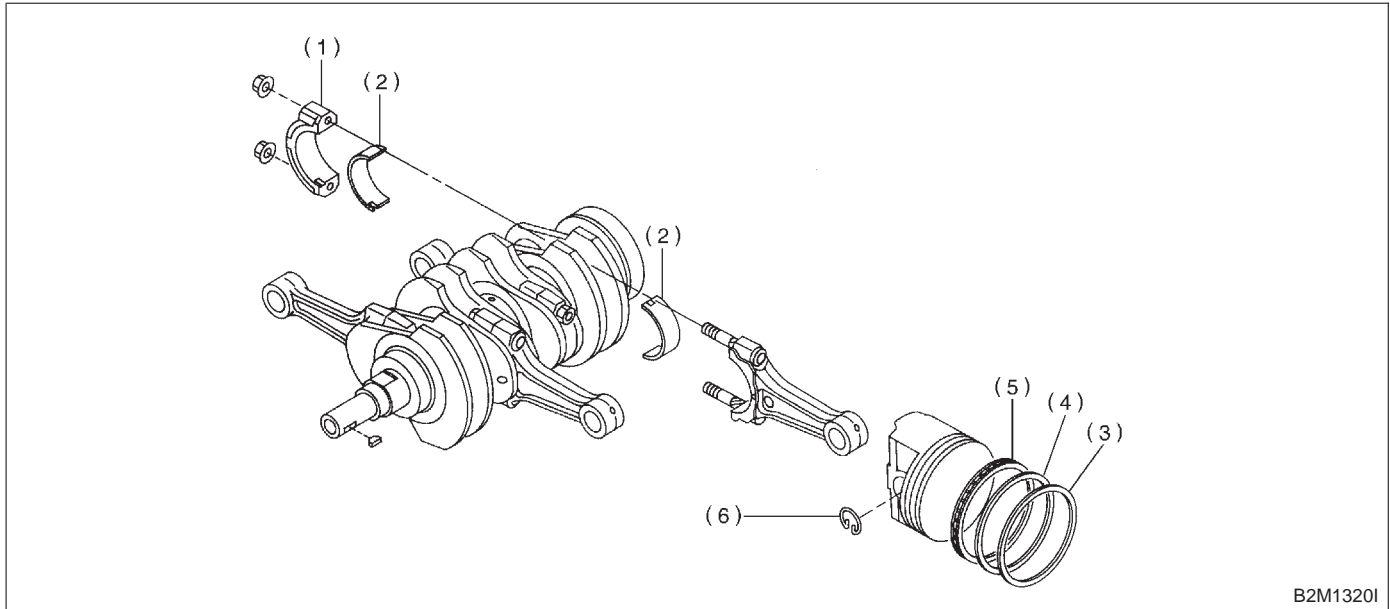
12) Draw out each piston from cylinder block using wooden bar or hammer handle.

CAUTION:

Do not confuse combination of piston and cylinder.

B: DISASSEMBLY

1. CRANKSHAFT AND PISTON



B2M1320I

- (1) Connecting rod cap
- (2) Connecting rod bearing

- (3) Top ring
- (4) Second ring

- (5) Oil ring
- (6) Circlip

- 1) Remove connecting rod cap.
- 2) Remove connecting rod bearing.

CAUTION:

Arrange removed connecting rod, connecting rod cap and bearing in order to prevent confusion.

- 3) Remove piston rings using the piston ring expander.
- 4) Remove the oil ring by hand.

CAUTION:

Arrange the removed piston rings in good order to prevent confusion.

- 5) Remove circlip.

Warping limit:

0.05 mm (0.0020 in)

Grinding limit:

0.1 mm (0.004 in)

Standard height of cylinder block:

201.0 mm (7.91 in)

C: INSPECTION

1. CYLINDER BLOCK

- 1) Visually check for cracks and damage. Especially, inspect important parts by means of red lead check.
- 2) Check the oil passages for clogging.
- 3) Inspect crankcase surface that mates with cylinder head for warping by using a straight edge, and correct by grinding if necessary.

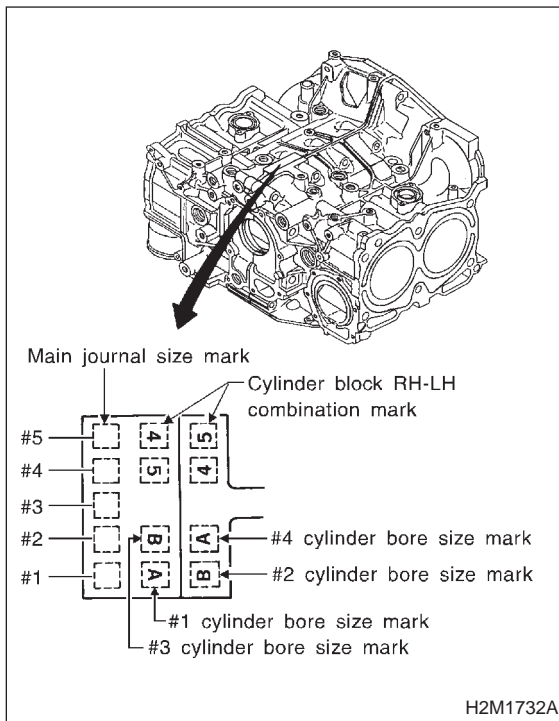
2. CYLINDER AND PISTON

1) The cylinder bore size is stamped on the cylinder block's front upper surface.

CAUTION:
Measurement should be performed at a temperature 20°C (68°F).

NOTE:
Standard sized pistons are classified into two grades, "A" and "B". These grades should be used as a guide line in selecting a standard piston.

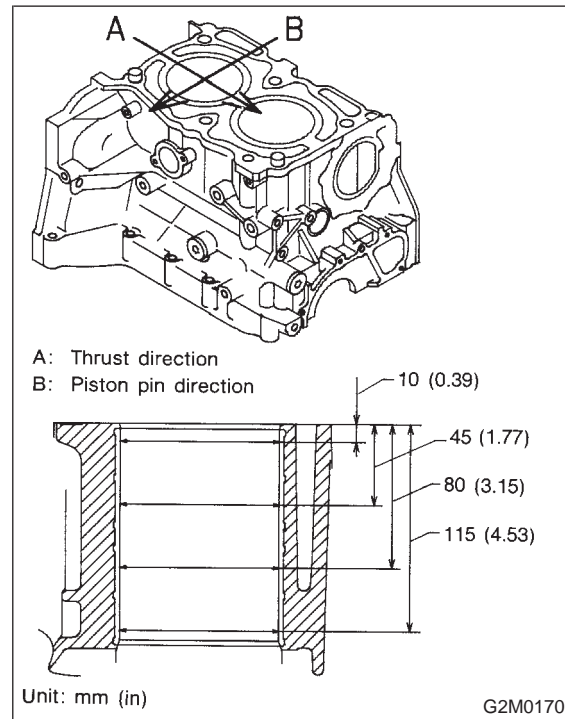
- Standard diameter:**
A: 99.505 — 99.515 mm (3.9175 — 3.9179 in)
B: 99.495 — 99.505 mm (3.9171 — 3.9175 in)



2) How to measure the inner diameter of each cylinder
 Measure the inner diameter of each cylinder in both the thrust and piston pin directions at the heights shown in the figure, using a cylinder bore gauge.

CAUTION:
Measurement should be performed at a temperature 20°C (68°F).

- Taper:**
Standard
 0.015 mm (0.0006 in)
Limit
 0.050 mm (0.0020 in)
- Out-of-roundness:**
Standard
 0.010 mm (0.0004 in)
Limit
 0.050 mm (0.0020 in)



3) When piston is to be replaced due to general or cylinder wear, determine a suitable sized piston by measuring the piston clearance.

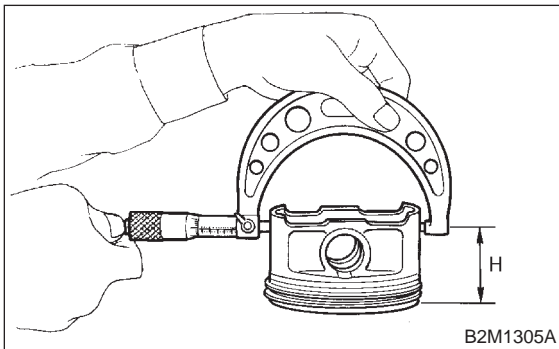
4) How to measure the outer diameter of each piston
Measure the outer diameter of each piston at the height shown in the figure. (Thrust direction)

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Piston grade point H:
37.0 mm (1.457 in)

Piston outer diameter:
Standard

- A: 99.485 — 99.495 mm (3.9167 — 3.9171 in)
- B: 99.475 — 99.485 mm (3.9163 — 3.9167 in)
- 0.25 mm (0.0098 in) oversize
99.725 — 99.735 mm (3.9262 — 3.9266 in)
- 0.50 mm (0.0197 in) oversize
99.975 — 99.985 mm (3.9360 — 3.9364 in)



5) Calculate the clearance between cylinder and piston.

CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Cylinder to piston clearance at 20°C (68°F):
Standard

0.010 — 0.030 mm (0.0004 — 0.0012 in)

Limit

0.050 mm (0.0020 in)

6) Boring and honing

(1) If the value of taper, out-of-roundness, or cylinder-to-piston clearance measured exceeds the specified limit or if there is any damage on the cylinder wall, rebores it to use an oversize piston.

CAUTION:
When any of the cylinders needs reboring, all other cylinders must be bored at the same time, and use oversize pistons. Do not perform boring on one cylinder only, nor use an oversize piston for one cylinder only.

(2) If the cylinder inner diameter exceeds the limit after boring and honing, replace the crankcase.

CAUTION:
Immediately after reboring, the cylinder diameter may differ from its real diameter due to temperature rise. Thus, pay attention to this when measuring the cylinder diameter.

Limit of cylinder enlarging (boring):
0.5 mm (0.020 in)

3. PISTON AND PISTON PIN

- 1) Check pistons and piston pins for damage, cracks, and wear and the piston ring grooves for wear and damage. Replace if defective.
- 2) Measure the piston-to-cylinder clearance at each cylinder. <Ref. to 2-3 [W7C2].> If any of the clearances is not to specification, replace the piston or bore the cylinder to use an oversize piston.
- 3) Make sure that piston pin can be inserted into the piston pin hole with a thumb at 20°C (68°F). Replace if defective.

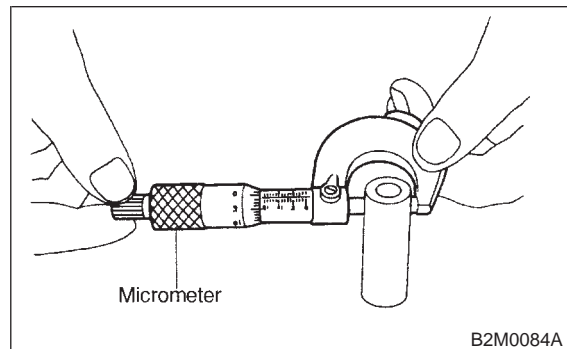
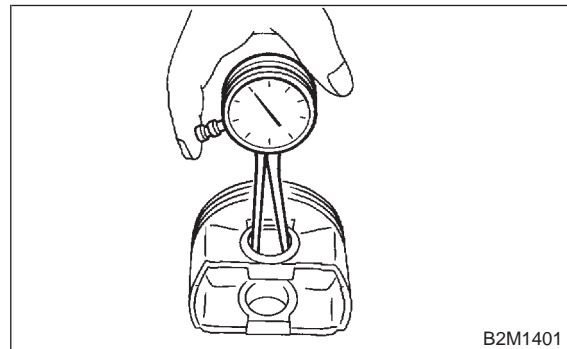
Standard clearance between piston pin and hole in piston:

Standard

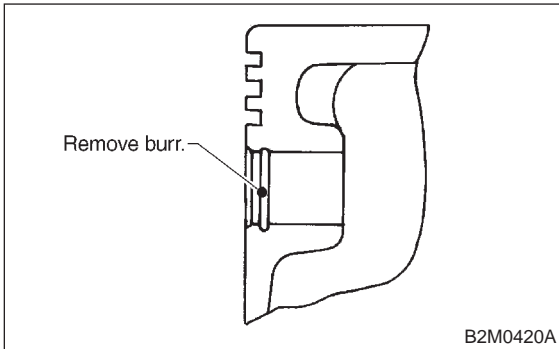
0.004 — 0.008 mm (0.0002 — 0.0003 in)

Limit

0.020 mm (0.0008 in)



4) Check circlip installation groove on the piston for burr. If necessary, remove burr from the groove so that piston pin can lightly move.



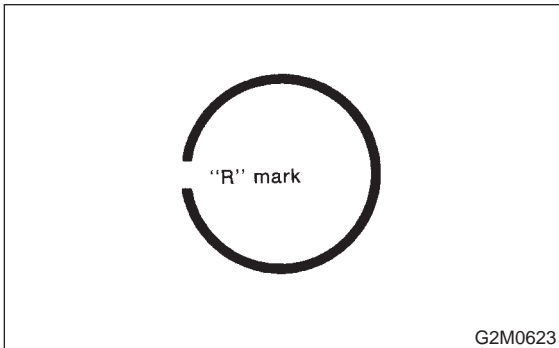
5) Check piston pin circlip for distortion, cracks and wear.

4. PISTON RING

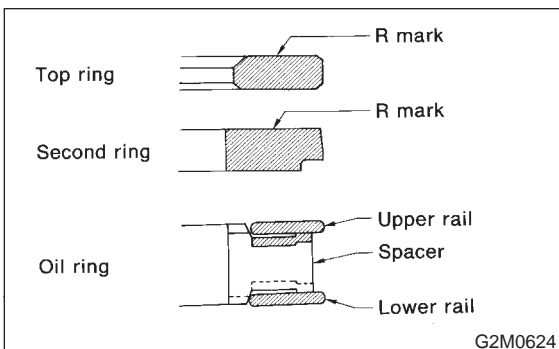
1) If piston ring is broken, damaged, or worn, or if its tension is insufficient, or when the piston is replaced, replace piston ring with a new one of the same size as the piston.

CAUTION:

● "R" is marked on the end of the top and second rings. When installing the rings to the piston, face this mark upward.

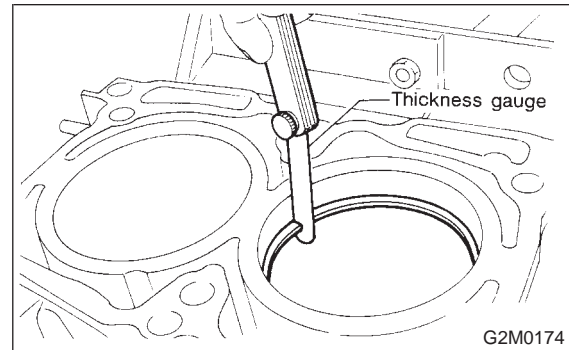


● The oil ring is a combined ring consisting of two rails and a spacer in between. When installing, be careful to assemble correctly.



2) Squarely place piston ring and oil ring in cylinder, and measure the piston ring gap with a thickness gauge.

		Unit: mm (in)	
		Standard	Limit
Piston ring gap	Top ring	0.20 — 0.35 (0.0079 — 0.0138)	1.0 (0.039)
	Second ring	0.35 — 0.50 (0.0138 — 0.0197)	1.0 (0.039)
	Oil ring rail	0.20 — 0.70 (0.0079 — 0.0276)	1.5 (0.059)

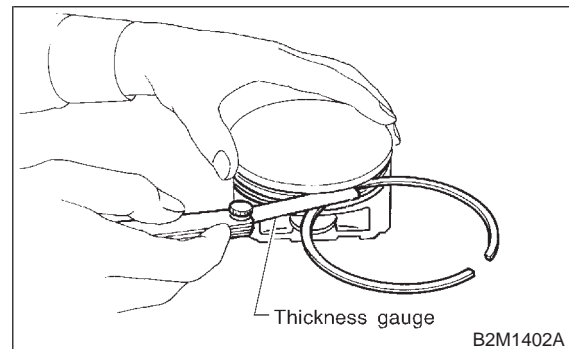


3) Measure the clearance between piston ring and piston ring groove with a thickness gauge.

CAUTION:

Before measuring the clearance, clean the piston ring groove and piston ring.

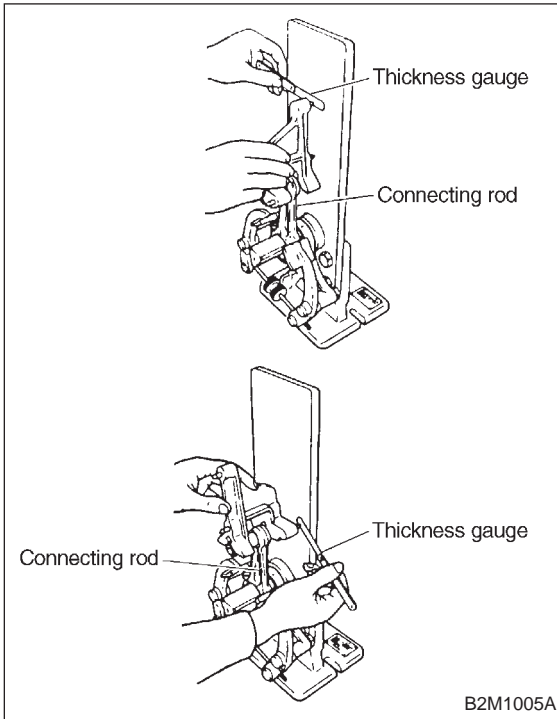
		Unit: mm (in)	
		Standard	Limit
Clearance between piston ring and piston ring groove	Top ring	0.040 — 0.080 (0.0016 — 0.0031)	0.15 (0.0059)
	Second ring	0.030 — 0.070 (0.0012 — 0.0028)	0.15 (0.0059)



5. CONNECTING ROD

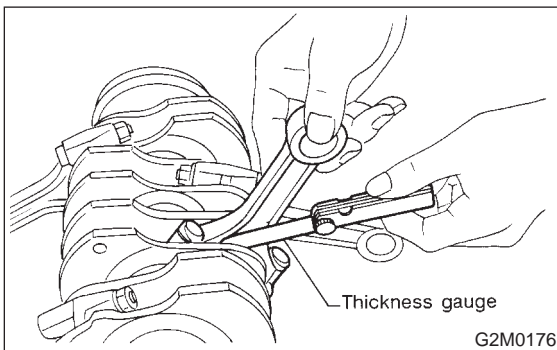
- 1) Replace connecting rod, if the large or small end thrust surface is damaged.
- 2) Check for bend or twist using a connecting rod aligner. Replace connecting rod if the bend or twist exceeds the limit.

Limit of bend or twist per 100 mm (3.94 in) in length:
0.10 mm (0.0039 in)



- 3) Install connecting rod fitted with bearing to crankshaft and measure the side clearance (thrust clearance). Replace connecting rod if the side clearance exceeds the specified limit.

Connecting rod side clearance:
Standard
0.070 — 0.330 mm (0.0028 — 0.0130 in)
Limit
0.4 mm (0.016 in)



- 4) Inspect connecting rod bearing for scar, peeling, seizure, melting, wear, etc.

- 5) Measure the oil clearance on individual connecting rod bearings by means of plastigauge. If any oil clearance is not within specification, replace the defective bearing with a new one of standard size or undersize as necessary. (See the table below.)

Connecting rod oil clearance:
Standard
0.020 — 0.046 mm (0.0008 — 0.0018 in)
Limit
0.050 mm (0.0020 in)

Unit: mm (in)		
Bearing	Bearing size (Thickness at center)	Outer diameter of crank pin
Standard	1.486 — 1.498 (0.0585 — 0.0590)	51.984 — 52.000 (2.0466 — 2.0472)
0.03 (0.0012) undersize	1.504 — 1.512 (0.0592 — 0.0595)	51.954 — 51.970 (2.0454 — 2.0461)
0.05 (0.0020) undersize	1.514 — 1.522 (0.0596 — 0.0599)	51.934 — 51.950 (2.0446 — 2.0453)
0.25 (0.0098) undersize	1.614 — 1.622 (0.0635 — 0.0639)	51.734 — 51.750 (2.0368 — 2.0374)

6) Inspect bushing at connecting rod small end, and replace if worn or damaged. Also measure the piston pin clearance at the connecting rod small end.

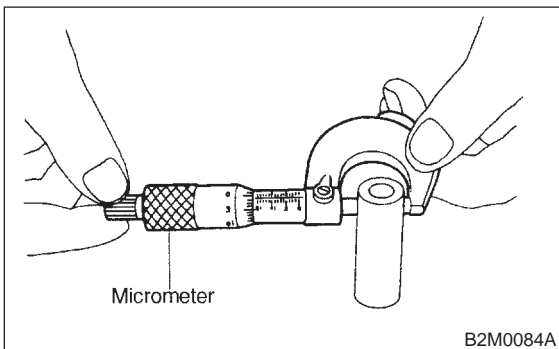
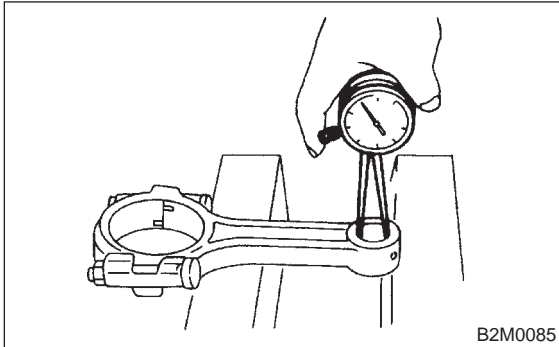
Clearance between piston pin and bushing:

Standard

0 — 0.022 mm (0 — 0.0009 in)

Limit

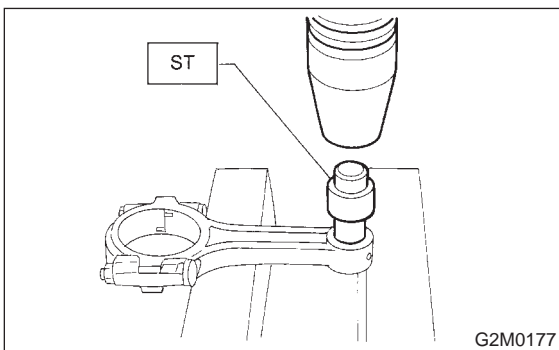
0.030 mm (0.0012 in)



7) Replacement procedure is as follows.

- (1) Remove bushing from connecting rod with ST and press.
- (2) Press bushing with ST after applying oil on the periphery of bushing.

ST 499037100 CONNECTING ROD BUSHING REMOVER AND INSTALLER



- (3) Make two 3 mm (0.12 in) holes in bushing. Ream the inside of bushing.
- (4) After completion of reaming, clean bushing to remove chips.

6. CRANKSHAFT AND CRANKSHAFT BEARING

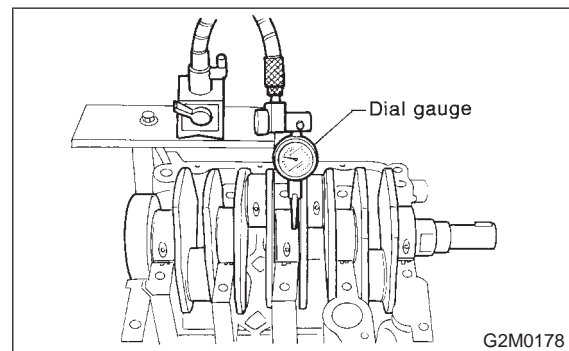
- 1) Clean crankshaft completely and check for cracks by means of red lead check etc., and replace if defective.
- 2) Measure the crankshaft bend, and correct or replace if it exceeds the limit.

CAUTION:

If a suitable V-block is not available, install #1 and #5 crankshaft bearing on cylinder block, position crankshaft on these bearings and measure crankshaft bend using a dial gauge.

Crankshaft bend limit:

0.035 mm (0.0014 in)



3) Inspect the crank journal and crank pin for wear. If they are not within the specifications, replace bearing with a suitable (undersize) one, and replace or recondition crankshaft as necessary. When grinding crank journal or crank pin, finish them to the specified dimensions according to the undersize bearing to be used.

Crank pin and crank journal:

Out-of-roundness

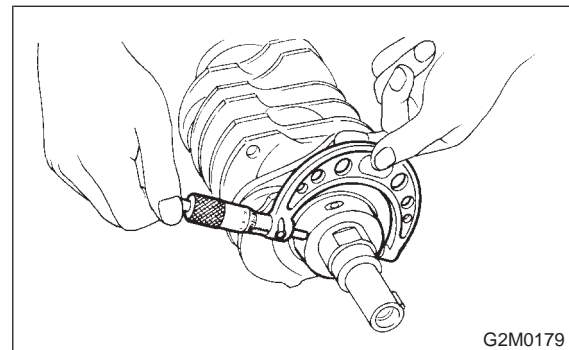
0.020 mm (0.0008 in) or less

Taper limit

0.07 mm (0.0028 in)

Grinding limit

0.250 mm (0.0098 in)



		Crank journal diameter		Unit: mm (in)
		#1, #3	#2, #4, #5	Crank pin diameter
Standard	Journal O.D.	59.992 — 60.008 (2.3619 — 2.3625)	59.992 — 60.008 (2.3619 — 2.3625)	51.984 — 52.000 (2.0466 — 2.0472)
	Bearing size (Thickness at center)	1.998 — 2.011 (0.0787 — 0.0792)	2.000 — 2.013 (0.0787 — 0.0793)	1.492 — 1.501 (0.0587 — 0.0591)
0.03 (0.0012) undersize	Journal O.D.	59.962 — 59.978 (2.3607 — 2.3613)	59.962 — 59.978 (2.3607 — 2.3613)	51.954 — 51.970 (2.0454 — 2.0461)
	Bearing size (Thickness at center)	2.017 — 2.020 (0.0794 — 0.0795)	2.019 — 2.022 (0.0795 — 0.0796)	1.510 — 1.513 (0.0594 — 0.0596)
0.05 (0.0020) undersize	Journal O.D.	59.942 — 59.958 (2.3599 — 2.3605)	59.942 — 59.958 (2.3599 — 2.3605)	51.934 — 51.950 (2.0446 — 2.0453)
	Bearing size (Thickness at center)	2.027 — 2.030 (0.0798 — 0.0799)	2.029 — 2.032 (0.0799 — 0.0800)	1.520 — 1.523 (0.0598 — 0.0600)
0.25 (0.0098) undersize	Journal O.D.	59.742 — 59.758 (2.3520 — 2.3527)	59.742 — 59.758 (2.3520 — 2.3527)	51.734 — 51.750 (2.0368 — 2.0374)
	Bearing size (Thickness at center)	2.127 — 2.130 (0.0837 — 0.0839)	2.129 — 2.132 (0.0838 — 0.0839)	1.620 — 1.623 (0.0638 — 0.0639)

O.D. ... Outer Diameter

4) Measure the thrust clearance of crankshaft at center bearing. If the clearance exceeds the limit, replace bearing.

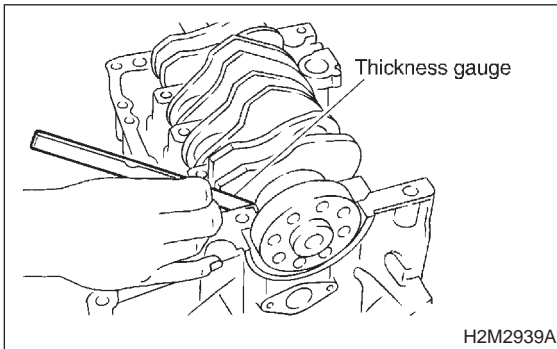
Crankshaft thrust clearance:

Standard

0.030 — 0.115 mm (0.0012 — 0.0045 in)

Limit

0.25 mm (0.0098 in)



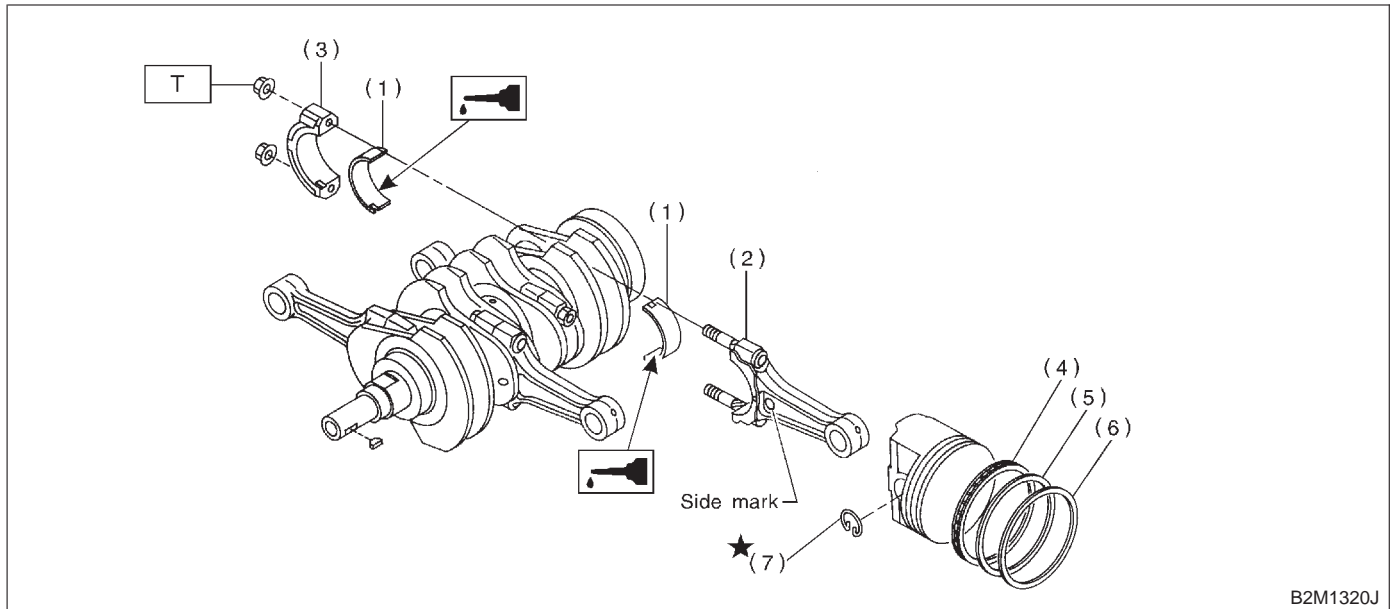
5) Inspect individual crankshaft bearings for signs of flaking, seizure, melting, and wear.

6) Measure the oil clearance on each crankshaft bearing by means of plastigauge. If the measurement is not within the specification, replace defective bearing with an undersize one, and replace or recondition crankshaft as necessary.

		Unit: mm (in)
		Crankshaft oil clearance
Standard		0.010 — 0.030 (0.0004 — 0.0012)
Limit		0.040 (0.0016)

D: ASSEMBLY

1. CRANKSHAFT AND PISTON



- | | |
|----------------------------|-----------------|
| (1) Connecting rod bearing | (5) Second ring |
| (2) Connecting rod | (6) Top ring |
| (3) Connecting rod cap | (7) Circlip |
| (4) Oil ring | |

Tightening torque: N·m (kg·m, ft·lb)
T: 44.6±1.5 (4.55±0.15, 32.9±1.1)

1) Install connecting rod bearings on connecting rods and connecting rod caps.

CAUTION:
Apply oil to the surfaces of the connecting rod bearings.

2) Install connecting rod on crankshaft.

CAUTION:
Position each connecting rod with the side marked facing forward.

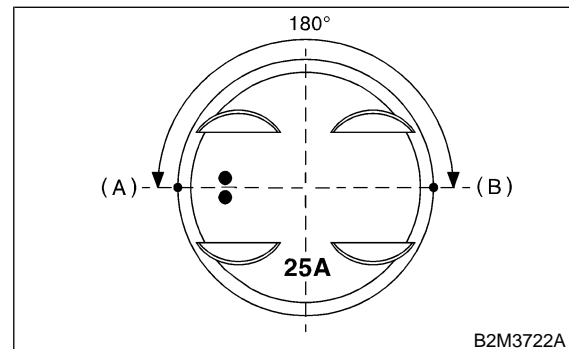
3) Install connecting rod cap with connecting rod nut.
Ensure the arrow on connecting rod cap faces the front during installation.

CAUTION:

- Each connecting rod has its own mating cap. Make sure that they are assembled correctly by checking their matching number.
- When tightening the connecting rod nuts, apply oil on the threads.

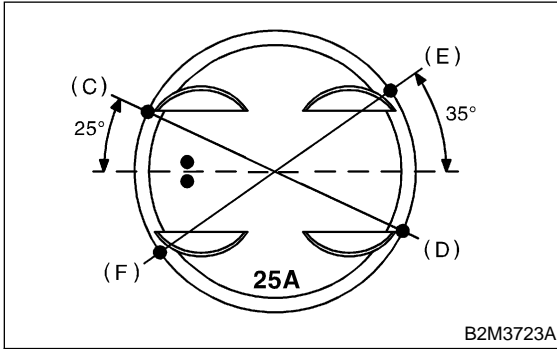
4) Installation of piston rings and oil ring
(1) Install oil ring spacer, upper rail and lower rail in this order by hand. Then install second ring and top ring with a piston ring expander.

(2) Position the top ring gap at (A) or (B) in the figure.



(3) Position the second ring gap at 180° on the reverse side for the top ring gap.

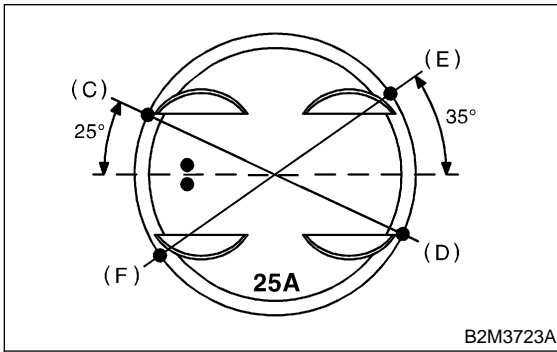
(4) Position the upper rail gap at (C) or (D) in the figure.



(5) Position the expander gap at 180° of the reverse side for the upper rail gap.
(6) Position the lower rail gap at (E) or (F) in the figure.

CAUTION:

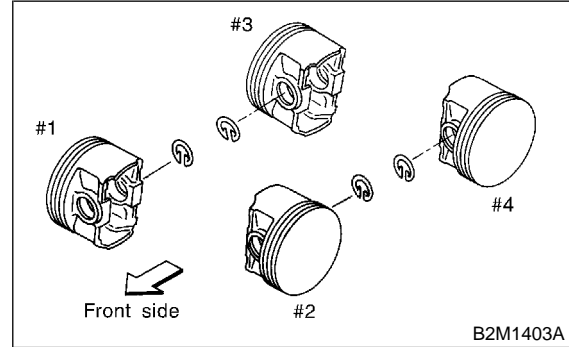
- Ensure ring gaps do not face the same direction.
- Ensure ring gaps are not within the piston skirt area.



5) Install circlip.
Install circlips in piston holes located opposite service holes in cylinder block, when positioning all pistons in the corresponding cylinders.

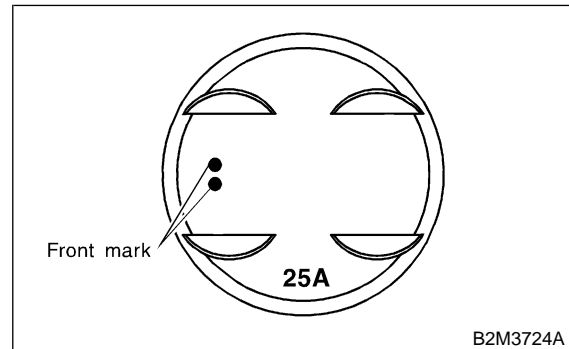
CAUTION:

Use new circlips.



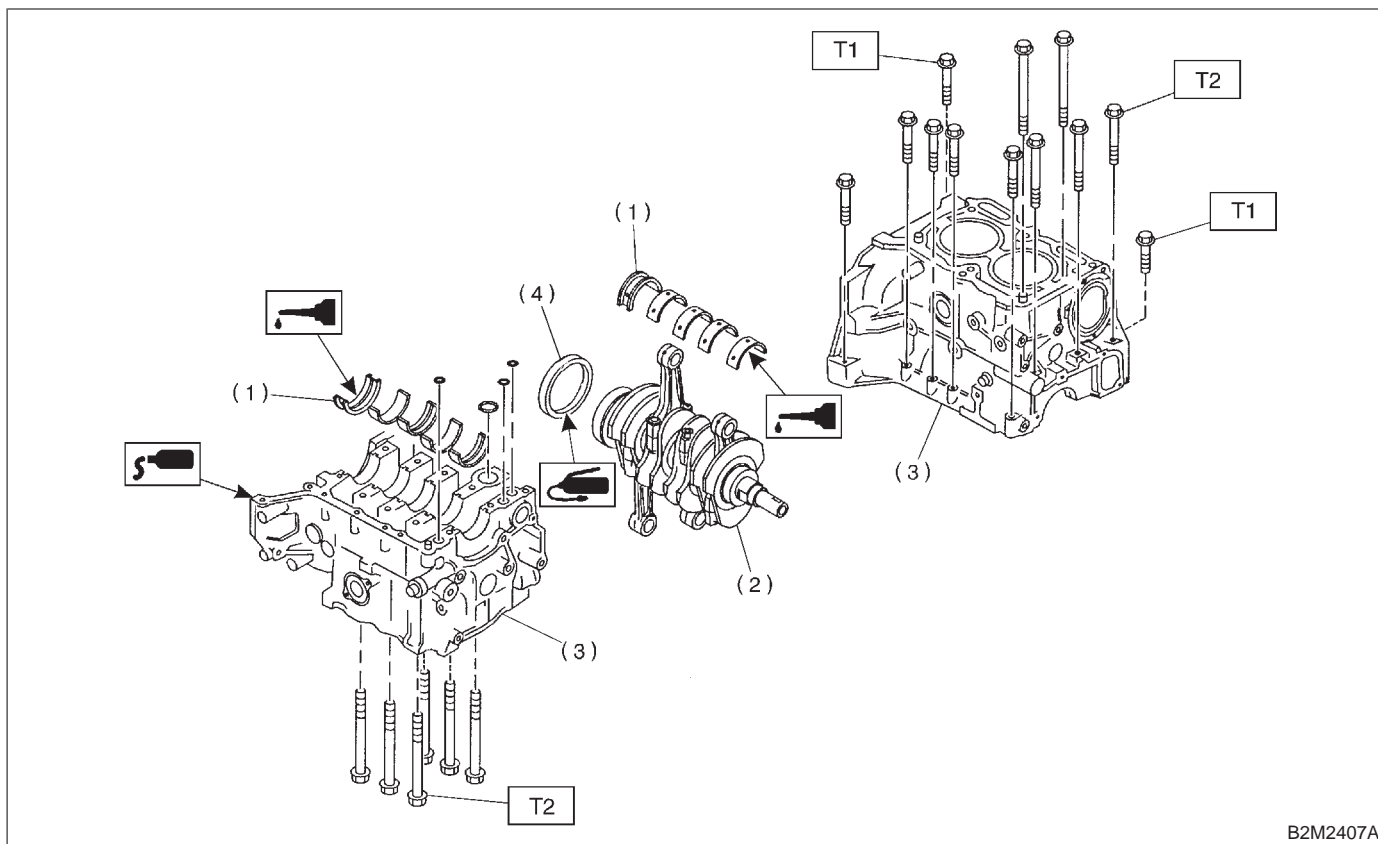
CAUTION:

Piston front mark faces towards the front of the engine.



E: INSTALLATION

1. CYLINDER BLOCK



- (1) Crankshaft bearing
- (2) Crankshaft
- (3) Cylinder block
- (4) Rear oil seal

Tightening torque: N-m (kg-m, ft-lb)

T1: 25±2 (2.5±0.2, 18.1±1.4)

T2: 47±3 (4.8±0.3, 34.7±2.2)

1) Install ST to cylinder block, then install crankshaft bearings.

ST 499817000 ENGINE STAND

CAUTION:

Remove oil in the mating surface of bearing and cylinder block before installation. Also apply a coat of engine oil to crankshaft pins.

2) Position crankshaft on the #2 and #4 cylinder block.

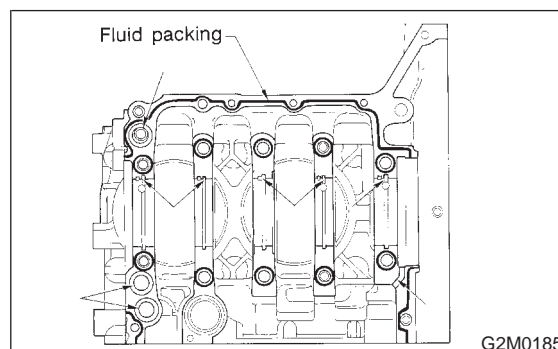
3) Apply fluid packing to the mating surface of #1 and #3 cylinder block, and position it on #2 and #4 cylinder block.

Fluid packing:

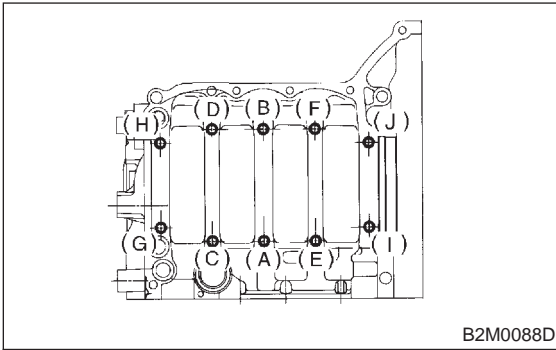
THREE BOND 1215 or equivalent

CAUTION:

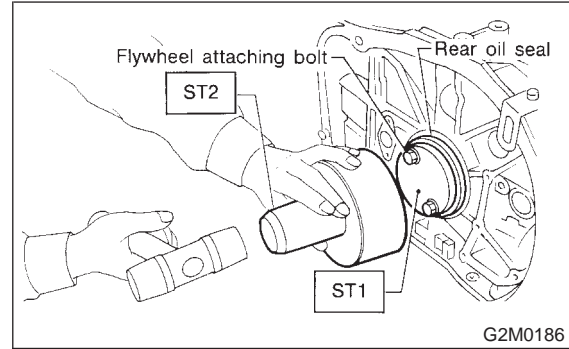
Do not allow fluid packing to jut into O-ring grooves, oil passages, bearing grooves, etc.



4) Temporarily tighten 10 mm cylinder block connecting bolts in alphabetical sequence shown in figure.



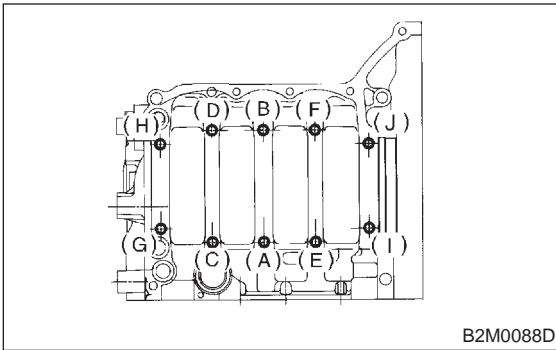
7) Install rear oil seal using ST1 and ST2.
ST1 499597100 OIL SEAL GUIDE
ST2 499587200 OIL SEAL INSTALLER



5) Tighten 10 mm cylinder block connecting bolts in alphabetical sequence.

Tightening torque:

47 ± 3 N·m (4.8 ± 0.3 kg·m, 34.7 ± 2.2 ft·lb)

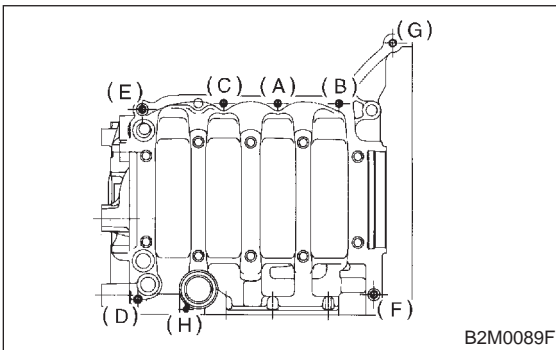


6) Tighten 8 mm and 6 mm cylinder block connecting bolts in alphabetical sequence shown in figure.

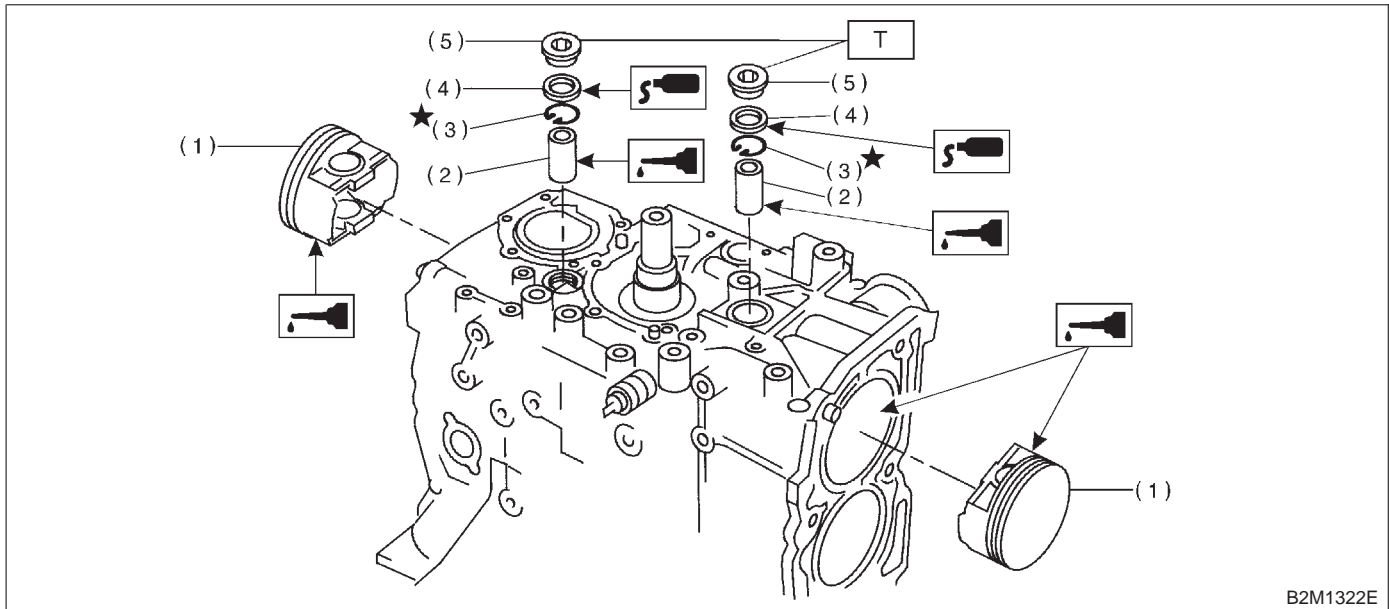
Tightening torque:

(A) — (G): 25 ± 2 N·m (2.5 ± 0.2 kg·m, 18.1 ± 1.4 ft·lb)

(H): 6.4 N·m (0.65 kg·m, 4.7 ft·lb)



2. PISTON AND PISTON PIN (#1 AND #2)



- | | |
|----------------|-----------------------|
| (1) Piston | (4) Gasket |
| (2) Piston pin | (5) Service hole plug |
| (3) Circlip | |

Tightening torque: N·m (kg·m, ft·lb)
T: 69±7 (7.0±0.7, 50.6±5.1)

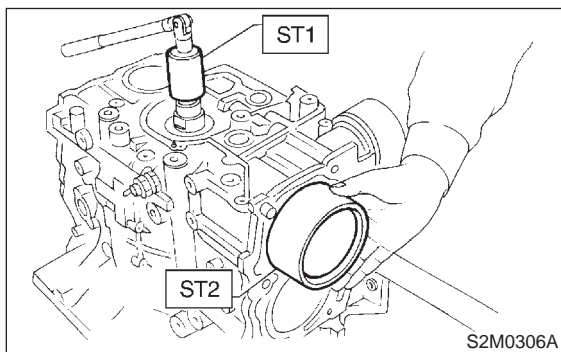
1) Installing piston

- (1) Turn cylinder block so that #1 and #2 cylinders face upward.
- (2) Using ST1, turn crankshaft so that #1 and #2 connecting rods are set at bottom dead center.

ST1 499987500 CRANKSHAFT SOCKET

- (3) Apply a coat of engine oil to pistons and cylinders and insert pistons in their cylinders using ST2.

ST2 498747100 PISTON GUIDE



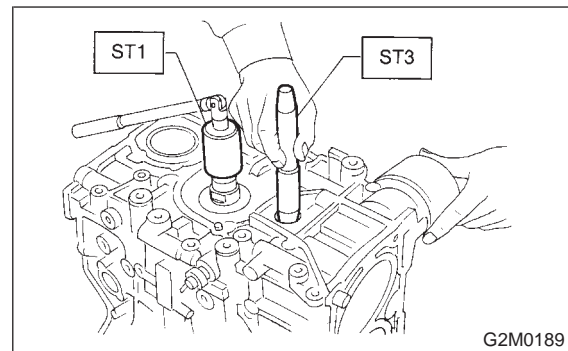
2) Installing piston pin

- (1) Insert ST3 into service hole to align piston pin hole with connecting rod small end.

CAUTION:

Apply a coat of engine oil to ST3 before insertion.

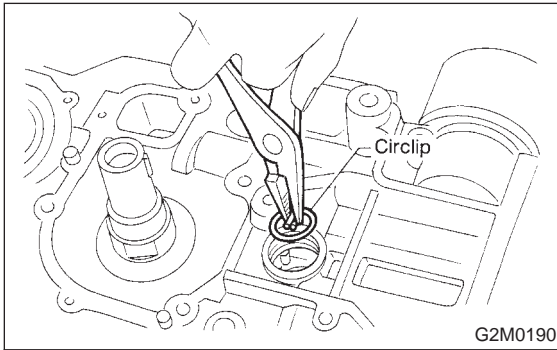
ST3 499017100 PISTON PIN GUIDE



- (2) Apply a coat of engine oil to piston pin and insert piston pin into piston and connecting rod through service hole.

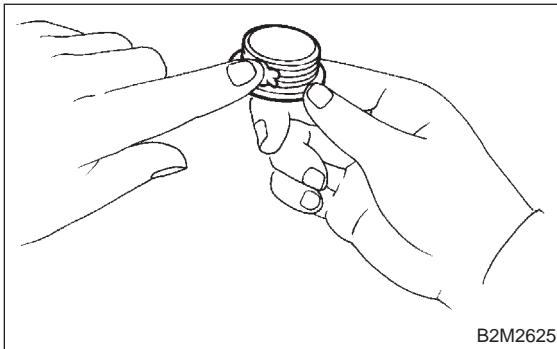
(3) Install circlip.

CAUTION:
Use new circlips.



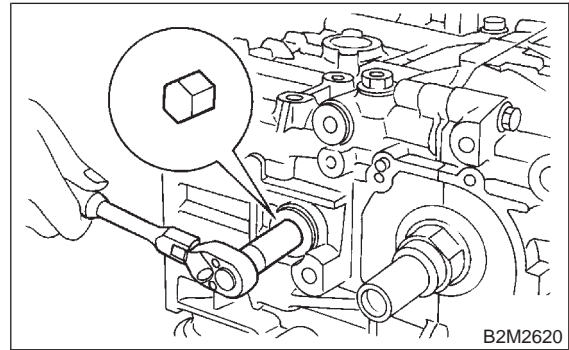
(4) Apply fluid packing around the service hole plug.

Fluid packing:
THREE BOND 1215 or equivalent

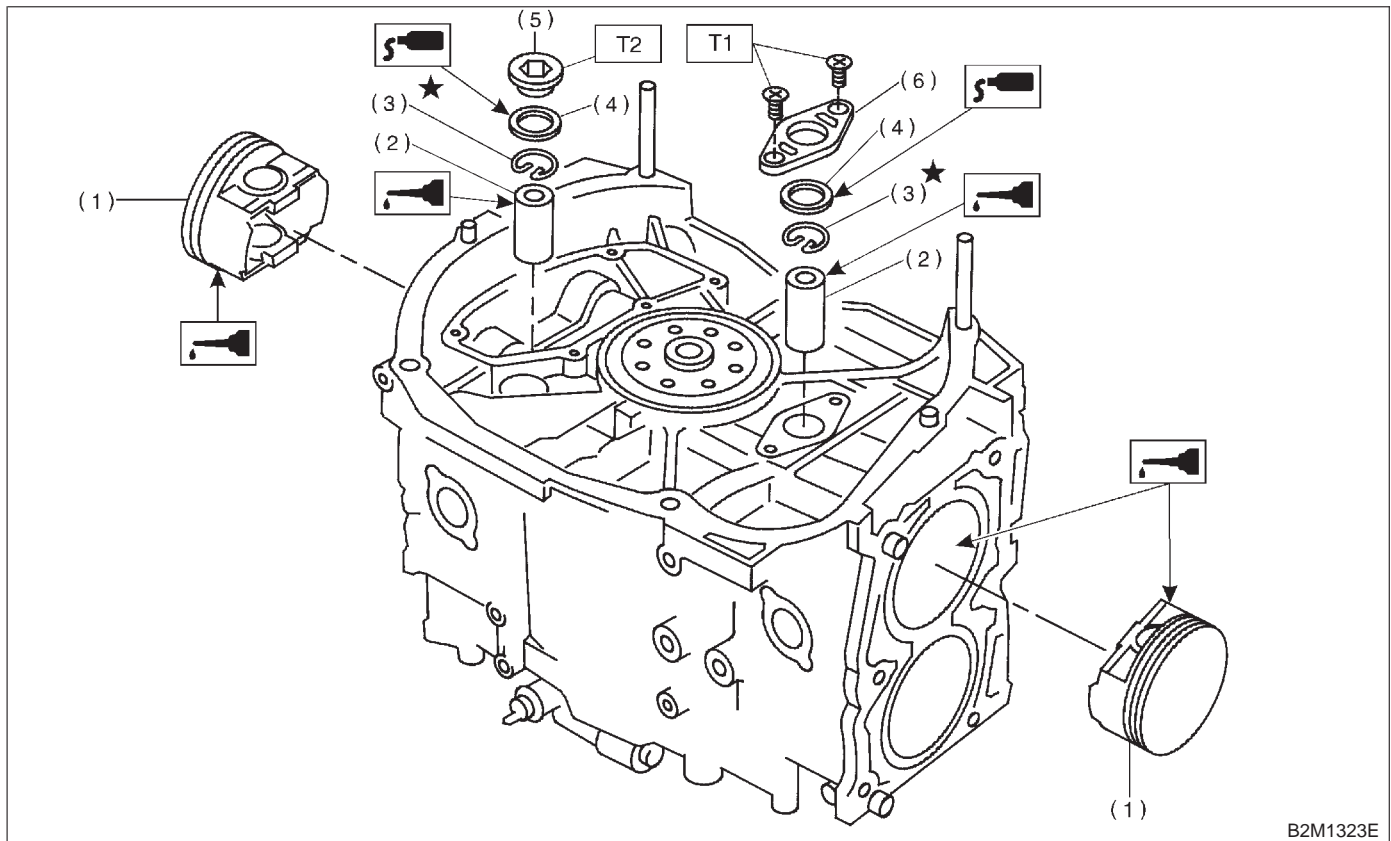


(5) Install service hole plug and gasket.

CAUTION:
Use a new gasket.



3. PISTON AND PISTON PIN (#3 AND #4)



B2M1323E

- (1) Piston
- (2) Piston pin
- (3) Circlip
- (4) Gasket
- (5) Service hole plug
- (6) Service hole cover

Tightening torque: N-m (kg-m, ft-lb)

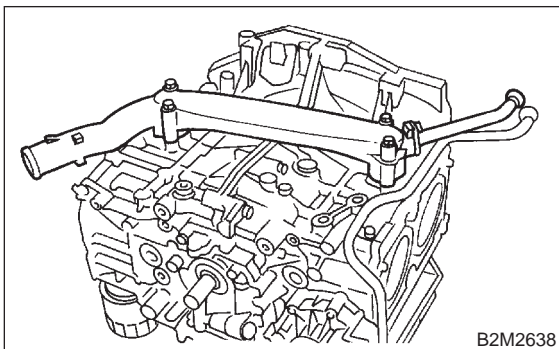
T1: 6.4 (0.65, 4.7)

T2: 69±7 (7.0±0.7, 50.6±5.1)

Turn cylinder block so that #3 and #4 cylinders face upward. Using the same procedures as used for #1 and #2 cylinders, install pistons and piston pins.

4. RELATED PARTS

- 1) Install water pipe. <Ref. to 2-5 [W7B0].>



B2M2638

- 2) Install baffle plate.

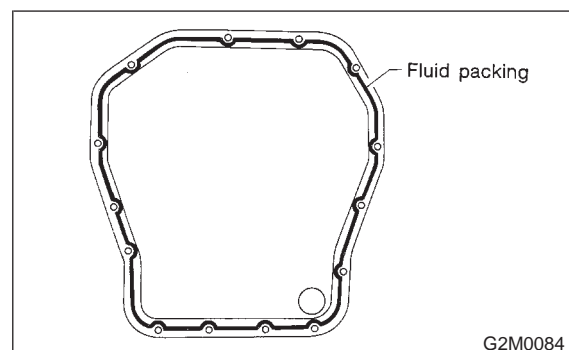
Tightening torque:
6.4 N-m (0.65 kg-m, 4.7 ft-lb)

- 3) Install oil strainer and O-ring

Tightening torque:
10 N-m (1.0 kg-m, 7 ft-lb)

- 4) Install oil strainer stay.
- 5) Apply fluid packing to matching surfaces and install oil pan.

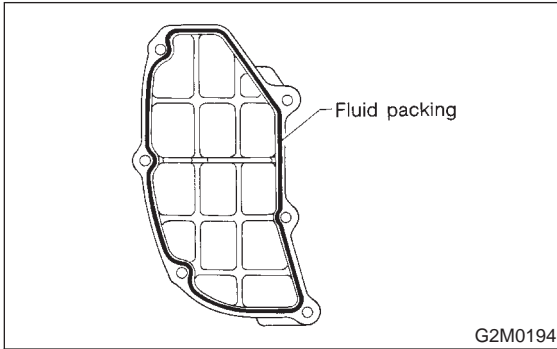
Fluid packing:
THREE BOND 1215 or equivalent



G2M0084

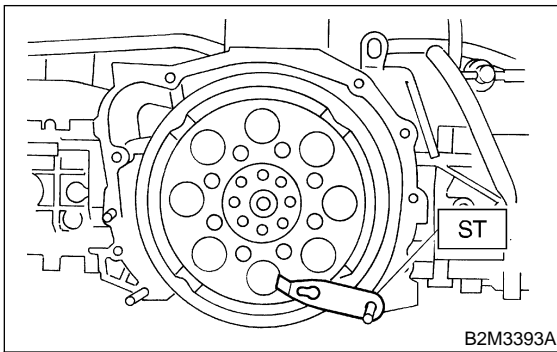
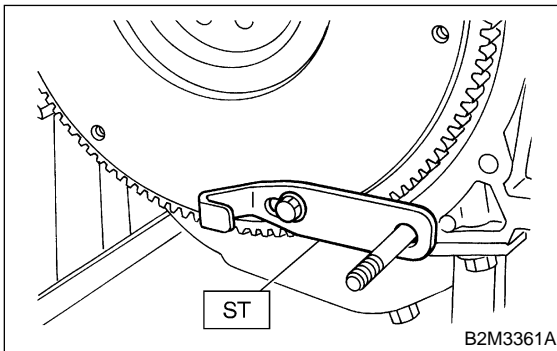
6) Apply fluid packing to matching surfaces and install oil separator cover.

Fluid packing:
THREE BOND 1215 or equivalent



7) Install flywheel or drive plate.
To lock crankshaft, use ST.
ST 498497100 CRANKSHAFT STOPPER

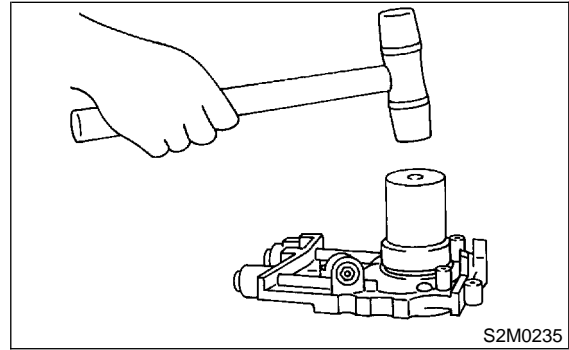
Tightening torque:
72±3 N·m (7.3±0.3 kg·m, 52.8±2.2 ft·lb)



8) Install housing cover.

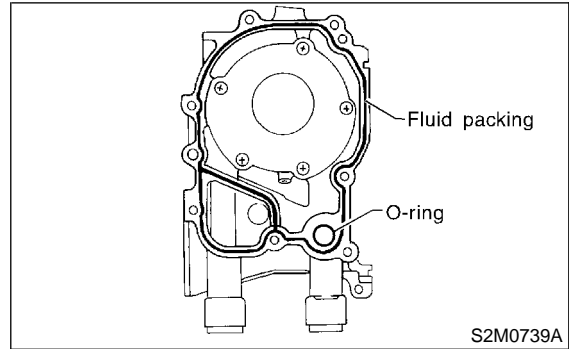
9) Installation of oil pump
(1) Discard front oil seal after removal. Replace with a new one using ST.

ST 499587100 OIL SEAL INSTALLER

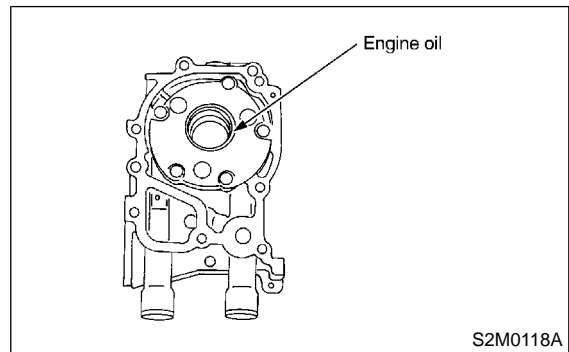


(2) Apply fluid packing to matching surface of oil pump.

Fluid packing:
THREE BOND 1215 or equivalent



(3) Apply a coat of engine oil to the inside of the oil seal.



(4) Install oil pump on cylinder block. Be careful not to damage oil seal during installation.

Tightening torque:
6.4 N·m (0.65 kg·m, 4.7 ft·lb)

CAUTION:

- Do not forget to install O-ring and seal when installing oil pump.
- Align flat surface of oil pump's inner rotor with crankshaft before installation.

10) Install water pump and gasket.

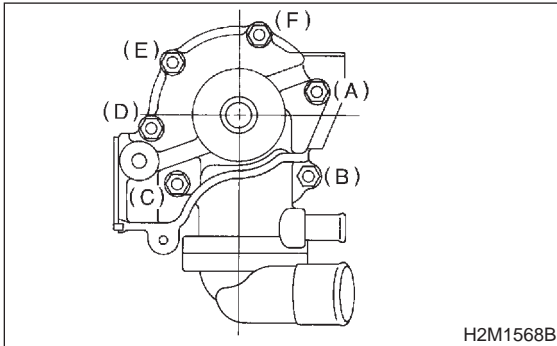
Tightening torque:

First; 12±2 N·m (1.2±0.2 kg-m, 8.7±1.4 ft-lb)

Second; 12±2 N·m (1.2±0.2 kg-m, 8.7±1.4 ft-lb)

CAUTION:

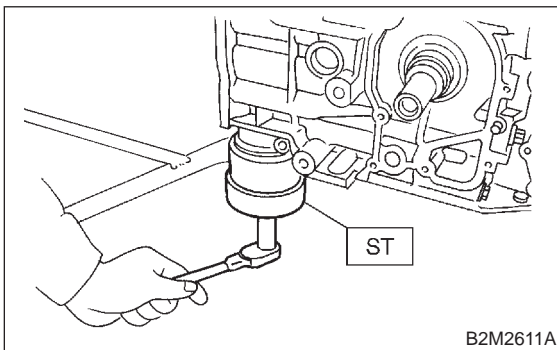
- Be sure to use a new gasket.
- When installing water pump, tighten bolts in two stages in alphabetical sequence as shown in figure.



11) Install water by-pass pipe for heater.

12) Install oil filter using ST.

ST 498187300 OIL FILTER WRENCH



13) Tighten cylinder head bolts.

(1) Apply a coat of engine oil to washers and bolt threads.

(2) Tighten all bolts to 29 N·m (3.0 kg-m, 22 ft-lb) in alphabetical sequence.

Then tighten all bolts to 69 N·m (7.0 kg-m, 51 ft-lb) in alphabetical sequence.

(3) Back off all bolts by 180° first; back them off by 180° again.

(4) Tighten bolts (a) and (b) to 34 N·m (3.5 kg-m, 25 ft-lb).

(5) Tighten bolts (c), (d), (e) and (f) to 15 N·m (1.5 kg-m, 11 ft-lb).

(6) Tighten all bolts by 80 to 90° in alphabetical sequence.

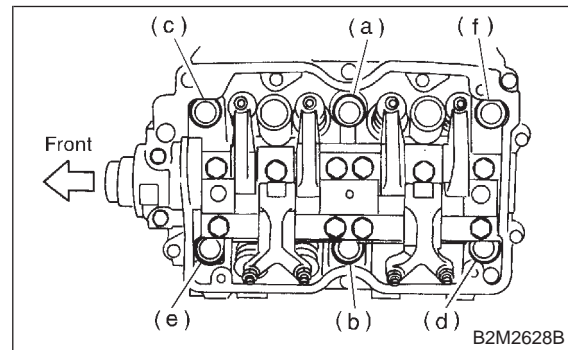
CAUTION:

Do not tighten bolts more than 90°.

(7) Further tighten all bolts by 80 to 90° in alphabetical sequence.

CAUTION:

Ensure that the total “re-tightening angle” [in the former two steps], do not exceed 180°.



14) Install oil level gauge guide and tighten attaching bolt (left side only).

15) Install timing belt, camshaft sprocket and related parts.

<Ref. to 2-3 [W3C0].>

16) Install generator and A/C compressor brackets on cylinder head.

17) Install drive belts. <Ref. to 1-5 [G2A0].>

18) Install intake manifold. <Ref. to 2-7 [W3D0].>

1. Engine Trouble in General

NOTE:

“RANK” shown in the chart refer to the possibility of reason for the trouble in order (“Very often” to “Rarely”)

A — Very often

B — Sometimes

C — Rarely

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
1. Engine will not start.			
1) Starter does not turn.	● Starter	● Defective battery-to-starter harness	B
		● Defective starter switch	C
		● Defective inhibitor switch or neutral switch	C
		● Defective starter	B
	● Battery	● Poor terminal connection	A
		● Run-down battery	A
		● Defective charging system	B
	● Friction	● Seizure of crankshaft and connecting rod bearing	C
		● Seized camshaft	C
		● Seized or stuck piston and cylinder	C
2) Initial combustion does not occur.	● Starter	● Defective starter	C
	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Fuel line	● Defective fuel pump and relay	A
		● Lack of or insufficient fuel	B
	● Belt	● Defective	B
		● Defective timing	B
	● Compression	● Incorrect valve clearance	C
		● Loosened spark plugs or defective gasket	C
		● Loosened cylinder head bolts or defective gasket	C
		● Improper valve seating	C
		● Defective valve stem	C
		● Worn or broken valve spring	B
		● Worn or stuck piston rings, cylinder and piston	C
		● Incorrect valve timing	B
		● Improper engine oil (low viscosity)	B
3) Initial combustion occur.	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Defective intake manifold gasket	B
		● Defective throttle body gasket	B
	● Fuel line	● Defective fuel pump and relay	C
		● Clogged fuel line	C
		● Lack of or insufficient fuel	B
	● Belt	● Defective	B
		● Defective timing	B
	● Compression	● Incorrect valve clearance	C
		● Loosened spark plugs or defective gasket	C
		● Loosened cylinder head bolts or defective gasket	C
		● Improper valve seating	C
		● Defective valve stem	C
		● Worn or broken valve spring	B
		● Worn or stuck piston rings, cylinder and piston	C
● Incorrect valve timing		B	
● Improper engine oil (low viscosity)		B	

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
4) Engine stalls after initial combustion.	Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked intake duct	B
		● Loosened or cracked PCV hose	C
		● Loosened or cracked vacuum hose	C
		● Defective intake manifold gasket	B
		● Defective throttle body gasket	B
		● Dirty air cleaner element	C
	● Fuel line	● Clogged fuel line	C
		● Lack of or insufficient fuel	B
	● Belt	● Defective	B
		● Defective timing	B
	● Compression	● Incorrect valve clearance	C
		● Loosened spark plugs or defective gasket	C
		● Loosened cylinder head bolts or defective gasket	C
		● Improper valve seating	C
		● Defective valve stem	C
		● Worn or broken valve spring	B
● Worn or stuck piston rings, cylinder and piston		C	
● Incorrect valve timing		B	
● Improper engine oil (low viscosity)	B		
2. Rough idle and engine stall	Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked intake duct	A
		● Loosened or cracked PCV hose	A
		● Loosened or cracked vacuum hose	A
		● Defective intake manifold gasket	B
		● Defective throttle body gasket	B
		● Defective PCV valve	C
		● Loosened oil filter cap	B
		● Dirty air cleaner element	C
	● Fuel line	● Defective fuel pump and relay	C
		● Clogged fuel line	C
		● Lack of or insufficient fuel	B
	● Belt	● Defective timing	C
	● Compression	● Incorrect valve clearance	B
		● Loosened spark plugs or defective gasket	B
		● Loosened cylinder head bolts or defective gasket	B
		● Improper valve seating	B
		● Defective valve stem	C
		● Worn or broken valve spring	B
		● Worn or stuck piston rings, cylinder and piston	B
		● Incorrect valve timing	A
	● Improper engine oil (low viscosity)	B	
	● Lubrication system	● Incorrect oil pressure	B
		● Defective rocker cover gasket	C
	● Cooling system	● Overheating	C
	● Others	● Malfunction of evaporative emission control system	A
		● Stuck or damaged throttle valve	B
		● Accelerator cable out of adjustment	C

1. Engine Trouble in General

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
3. Low output, hesitation and poor acceleration	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked intake duct	A
		● Loosened or cracked PCV hose	A
		● Loosened or cracked vacuum hose	B
		● Defective intake manifold gasket	B
		● Defective throttle body gasket	B
		● Defective PCV valve	B
		● Loosened oil filter cap	B
		● Dirty air cleaner element	A
	● Fuel line	● Defective fuel pump and relay	B
		● Clogged fuel line	B
		● Lack of or insufficient fuel	C
	● Belt	● Defective timing	B
	● Compression	● Incorrect valve clearance	B
		● Loosened spark plugs or defective gasket	B
		● Loosened cylinder head bolts or defective gasket	B
		● Improper valve seating	B
		● Defective valve stem	C
		● Worn or broken valve spring	B
		● Worn or stuck piston rings, cylinder and piston	C
		● Incorrect valve timing	A
● Improper engine oil (low viscosity)	B		
● Lubrication system	● Incorrect oil pressure	B	
● Cooling system	● Overheating	C	
	● Over cooling	C	
● Others	● Malfunction of evaporative emission control system	A	
4. Surging	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked intake duct	A
		● Loosened or cracked PCV hose	A
		● Loosened or cracked vacuum hose	A
		● Defective intake manifold gasket	B
		● Defective throttle body gasket	B
		● Defective PCV valve	B
		● Loosened oil filter cap	B
		● Dirty air cleaner element	B
	● Fuel line	● Defective fuel pump and relay	B
		● Clogged fuel line	B
		● Lack of or insufficient fuel	C
	● Belt	● Defective timing	B
	● Compression	● Incorrect valve clearance	B
		● Loosened spark plugs or defective gasket	C
		● Loosened cylinder head bolts or defective gasket	C
		● Improper valve seating	C
		● Defective valve stem	C
		● Worn or broken valve spring	C
		● Worn or stuck piston rings, cylinder and piston	C
		● Incorrect valve timing	A
● Improper engine oil (low viscosity)	B		
● Cooling system	● Overheating	B	
● Others	● Malfunction of evaporative emission control system	C	

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
5. Engine does not return to idle.	Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked vacuum hose	A
	● Others	● Stuck or damaged throttle valve	A
		● Accelerator cable out of adjustment	B
6. Dieseling (Run-on)	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Cooling system	● Overheating	B
	● Others	● Malfunction of evaporative emission control system	B
7. After burning in exhaust system	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened or cracked intake duct	C
		● Loosened or cracked PCV hose	C
		● Loosened or cracked vacuum hose	B
		● Defective PCV valve	B
		● Loosened oil filler cap	C
	● Belt	● Defective timing	B
	● Compression	● Incorrect valve clearance	B
		● Loosened spark plugs or defective gasket	C
		● Loosened cylinder head bolts or defective gasket	C
		● Improper valve seating	B
		● Defective valve stem	C
		● Worn or broken valve spring	C
		● Worn or stuck piston rings, cylinder and piston	C
		● Incorrect valve timing	A
● Lubrication system	● Incorrect oil pressure	C	
● Cooling system	● Over cooling	C	
● Others	● Malfunction of evaporative emission control system	C	
8. Knocking	● Fuel injection system <Ref. to 2-7 [T100].>		A
	● Intake system	● Loosened oil filter cap	B
	● Belt	● Defective timing	B
	● Compression	● Incorrect valve clearance	C
		● Incorrect valve timing	B
	● Cooling system	● Overheating	A
9. Excessive engine oil consumption	● Intake system	● Loosened or cracked PCV hose	A
		● Defective PCV valve	B
		● Loosened oil filter cap	C
	● Compression	● Defective valve stem	A
		● Worn or stuck piston rings, cylinder and piston	A
	● Lubrication system	● Loosened oil pump attaching bolts and defective gasket	B
		● Defective oil filter seal	B
		● Defective crankshaft oil seal	B
		● Defective rocker cover gasket	B
		● Loosened oil drain plug or defective gasket	B
	● Loosened oil pan fitting bolts or defective oil pan	B	

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK	
10. Excessive fuel consumption	● Fuel injection system <Ref. to 2-7 [T100].>		A	
	● Intake system	● Dirty air cleaner element	A	
	● Belt	● Defective timing	B	
	● Compression	● Incorrect valve clearance		B
		● Loosened spark plugs or defective gasket		C
		● Loosened cylinder head bolts or defective gasket		C
		● Improper valve seating		B
		● Defective valve stem		C
		● Worn or broken valve spring		C
		● Worn or stuck piston rings, cylinder and piston		B
		● Incorrect valve timing		B
	● Lubrication system	● Incorrect oil pressure		C
	● Cooling system	● Over cooling		C
● Others	● Accelerator cable out of adjustment		B	

2. Engine Noise

Type of sound	Condition	Possible cause
Regular clicking sound	Sound increases as engine speed increases.	<ul style="list-style-type: none"> ● Valve mechanism is defective. ● Incorrect valve clearance ● Worn valve rocker ● Worn camshaft ● Broken valve spring
Heavy and dull clank	Oil pressure is low.	<ul style="list-style-type: none"> ● Worn crankshaft main bearing ● Worn connecting rod bearing (big end)
	Oil pressure is normal.	<ul style="list-style-type: none"> ● Loose flywheel mounting bolts ● Damaged engine mounting
High-pitched clank (Spark knock)	Sound is noticeable when accelerating with an overload.	<ul style="list-style-type: none"> ● Ignition timing advanced ● Accumulation of carbon inside combustion chamber ● Wrong spark plug ● Improper gasoline
Clank when engine speed is medium (1,000 to 2,000 rpm).	Sound is reduced when fuel injector connector of noisy cylinder is disconnected. (NOTE*)	<ul style="list-style-type: none"> ● Worn crankshaft main bearing ● Worn bearing at crankshaft end of connecting rod
Knocking sound when engine is operating under idling speed and engine is warm	Sound is reduced when fuel injector connector of noisy cylinder is disconnected. (NOTE*)	<ul style="list-style-type: none"> ● Worn cylinder liner and piston ring ● Broken or stuck piston ring ● Worn piston pin and hole at piston end of connecting rod
	Sound is not reduced if each fuel injector connector is disconnected in turn. (NOTE*)	<ul style="list-style-type: none"> ● Unusually worn valve lifter ● Worn cam gear ● Worn camshaft journal bore in crankcase
Squeaky sound	—	<ul style="list-style-type: none"> ● Insufficient generator lubrication
Rubbing sound	—	<ul style="list-style-type: none"> ● Defective generator brush and rotor contact
Gear scream when starting engine	—	<ul style="list-style-type: none"> ● Defective ignition starter switch ● Worn gear and starter pinion
Sound like polishing glass with a dry cloth	—	<ul style="list-style-type: none"> ● Loose drive belt ● Defective engine coolant pump shaft
Hissing sound	—	<ul style="list-style-type: none"> ● Loss of compression ● Air leakage in air intake system, hoses, connections or manifolds
Timing belt noise	—	<ul style="list-style-type: none"> ● Loose timing belt ● Belt contacting case/adjacent part
Valve tappet noise	—	<ul style="list-style-type: none"> ● Incorrect valve clearance

NOTE*:

When disconnecting fuel injector connector, Malfunction Indicator Light (CHECK ENGINE light) illuminates and trouble code is stored in ECM memory.

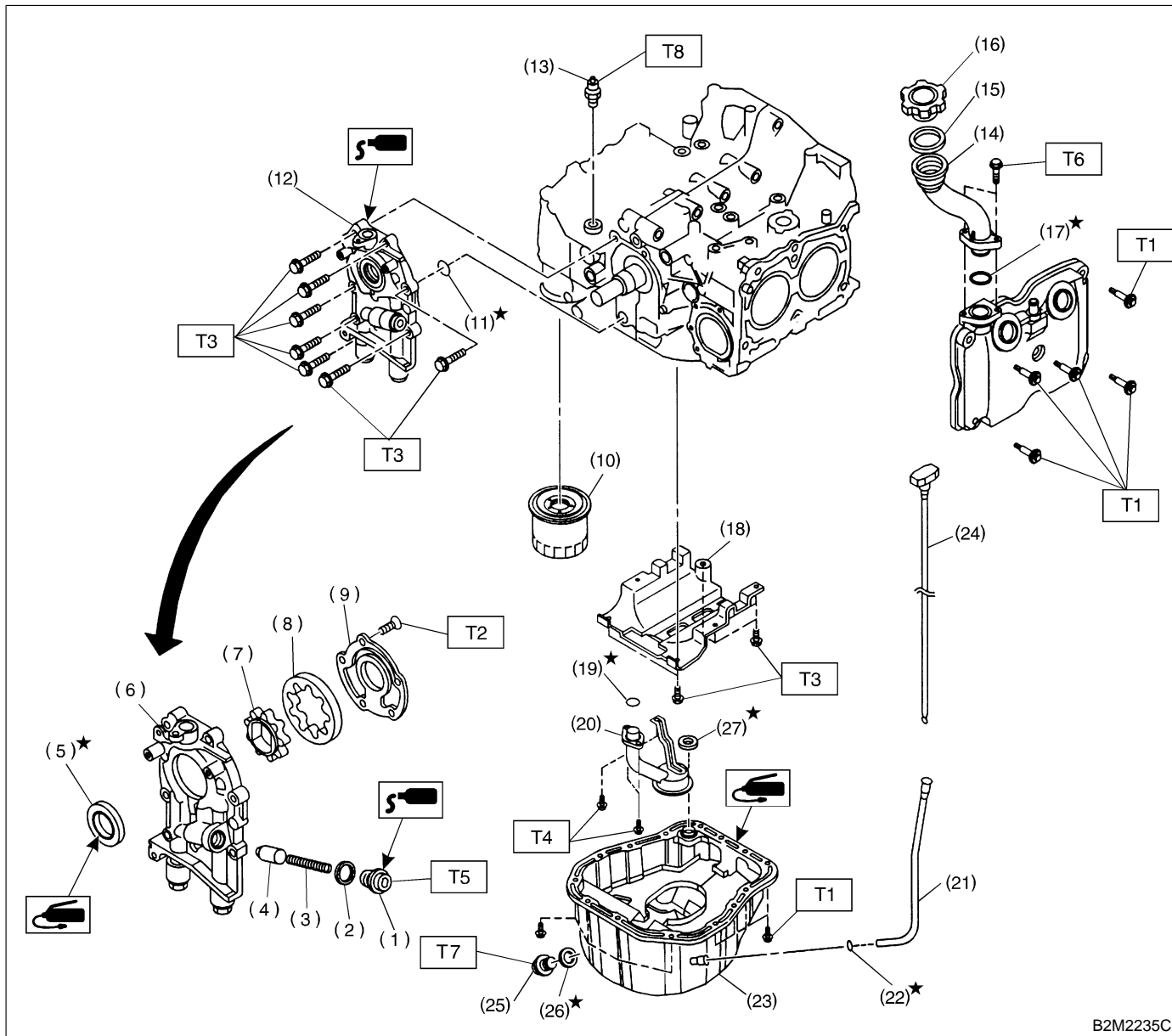
Therefore, carry out the CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].> after connecting fuel injector connector.

MEMO:

1. Specifications

Lubrication method				Forced lubrication	
Oil pump	Pump type			Trochoid type	
	Number of teeth	Inner rotor		9	
		Outer rotor		10	
	Outer rotor diameter × thickness			78 × 9 mm (3.07 × 0.35 in)	
	Tip clearance between inner and outer rotor			STANDARD	0.04 — 0.14 mm (0.0016 — 0.0055 in)
				LIMIT	0.18 mm (0.0071 in)
	Side clearance between inner rotor and pump case			STANDARD	0.02 — 0.07 mm (0.0008 — 0.0028 in)
				LIMIT	0.12 mm (0.0047 in)
	Case clearance between outer rotor and pump case			STANDARD	0.10 — 0.175 mm (0.0039 — 0.0069 in)
				LIMIT	0.20 mm (0.0079 in)
Capacity at 80°C (176°F)	700 rpm	Discharge	- pressure	98 kPa (1.0 kg/cm ² , 14 psi)	
			- quantity	4.2 ℓ (4.4 US qt, 3.7 Imp qt)/min.	
	5,000 rpm	Discharge	- pressure	294 kPa (3.0 kg/cm ² , 43 psi)	
			- quantity	42.0 ℓ (11.10 US gal, 9.24 Imp gal)/min.	
Relief valve operation pressure				490 kPa (5.0 kg/cm ² , 71 psi)	
Oil filter	Type			Full-flow filter type	
	Filtration area			1,000 cm ² (155 sq in)	
	By-pass valve opening pressure			156 kPa (1.6 kg/cm ² , 23 psi)	
	Outer diameter × width			80 × 70 mm (3.15 × 2.76 in)	
	Oil filter to engine thread size			M 20 × 1.5	
Relief valve (on rocker shaft) operation pressure				69 kPa (0.7kg/cm ² , 10 psi)	
Oil pressure switch	Type			Immersed contact point type	
	Working voltage — wattage			12 V — 3.4 W or less	
	Warning light activation pressure			14.7 kPa (0.15 kg/cm ² , 2.1 psi)	
	Proof pressure			More than 981 kPa (10 kg/cm ² , 142 psi)	
Oil capacity (at replacement)				4.5 ℓ (4.8 US qt, 4.0 Imp qt)	

1. Lubrication System



B2M2235C

- | | |
|--------------------------|----------------------------|
| (1) Plug | (14) Oil filler duct |
| (2) Washer | (15) O-ring |
| (3) Relief valve spring | (16) Oil filler cap |
| (4) Relief valve | (17) O-ring |
| (5) Oil seal | (18) Baffle plate |
| (6) Oil pump case | (19) O-ring |
| (7) Inner rotor | (20) Oil strainer |
| (8) Outer rotor | (21) Oil level gauge guide |
| (9) Oil pump cover | (22) O-ring |
| (10) Oil filter | (23) Oil pan |
| (11) O-ring | (24) Oil level gauge |
| (12) Oil pump ASSY | (25) Drain plug |
| (13) Oil pressure switch | (26) Metal gasket |

- (27) Gasket

Tightening torque: N-m (kg-m, ft-lb)

T1: 5 (0.5, 3.6)

T2: 5^{+1}_{-0} (0.5^{+0.1}/₋₀, 3.6^{+0.7}/₋₀)

T3: 6.4 (0.65, 4.7)

T4: 10 (1.0, 7.0)

T5: 44.1 ± 3.4 (4.5 \pm 0.35, 32.5 \pm 2.5)

T6: 6.4 ± 0.5 (0.65 \pm 0.05, 4.7 \pm 0.4)

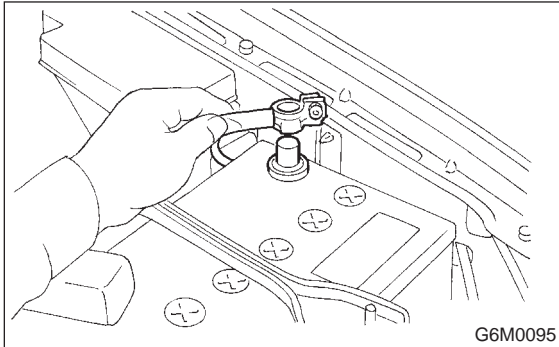
T7: 44 (4.5, 33)

T8: 25 ± 3 (2.5 \pm 0.3, 18.1 \pm 2.2)

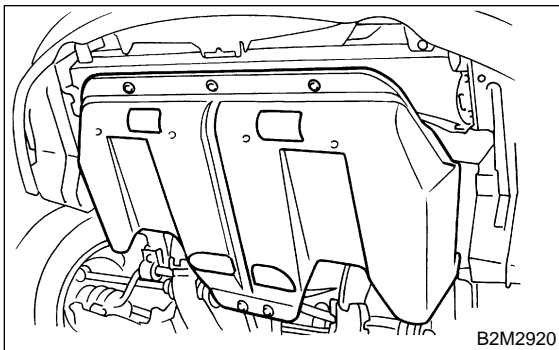
1. Oil Pump

A: REMOVAL

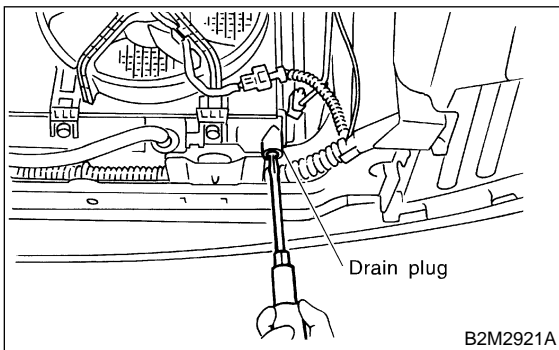
- 1) Disconnect battery ground cable.



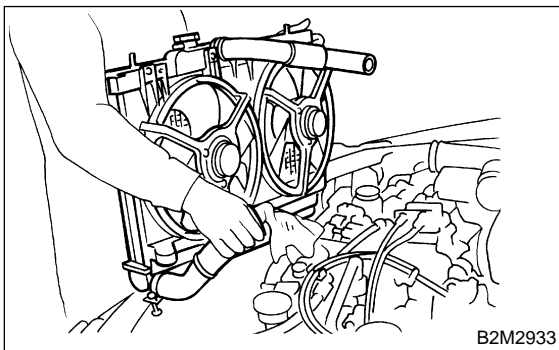
- 2) Lift-up the vehicle.
3) Remove under cover.



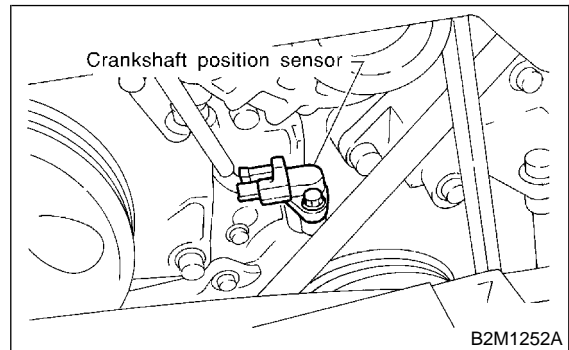
- 4) Drain coolant. <Ref. to 2-5 [W9A0].>



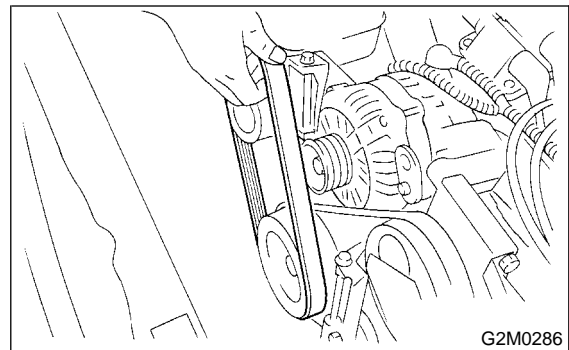
- 5) Lower the vehicle.
6) Remove radiator. <Ref. to 2-5 [W3A0].>



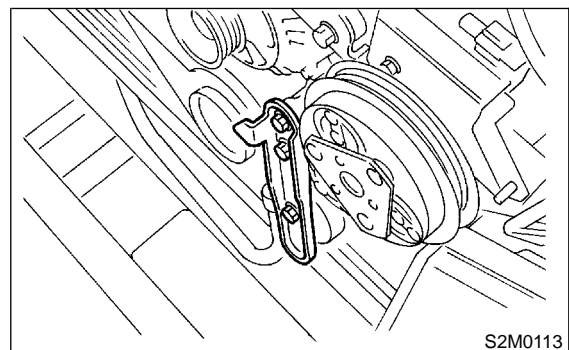
- 7) Remove crankshaft position sensor.



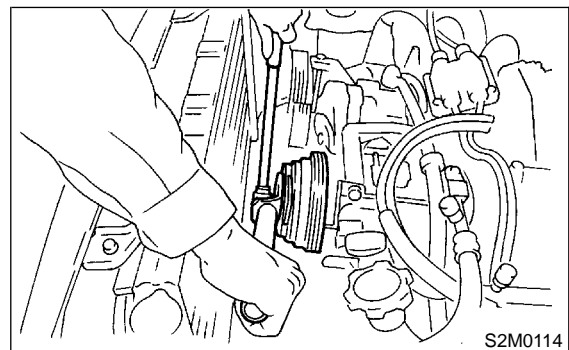
- 8) Remove V-belts. <Ref. to 1-5 [G2A0].>



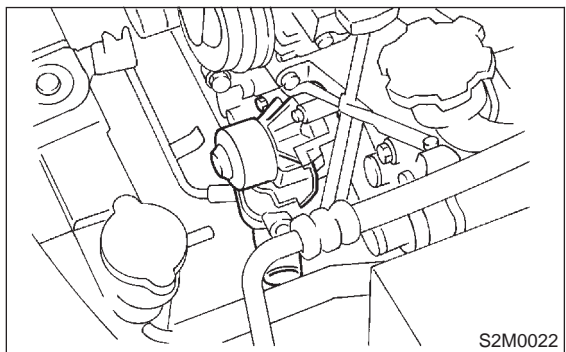
- 9) Remove rear side V-belt tensioner.



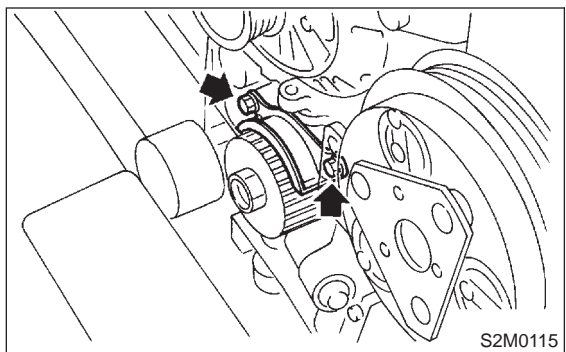
- 10) Remove crankshaft pulley by using ST.
ST 499977100 CRANKSHAFT PULLEY
WRENCH



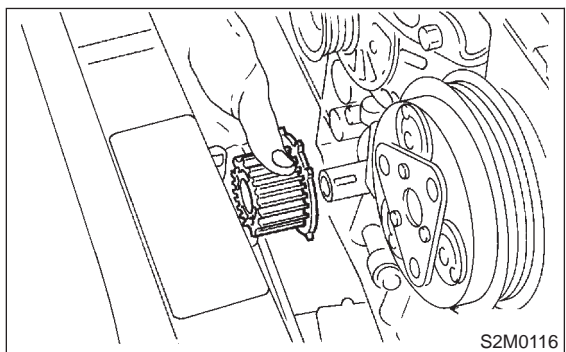
11) Remove water pump. <Ref. to 2-5 [W1A0].>



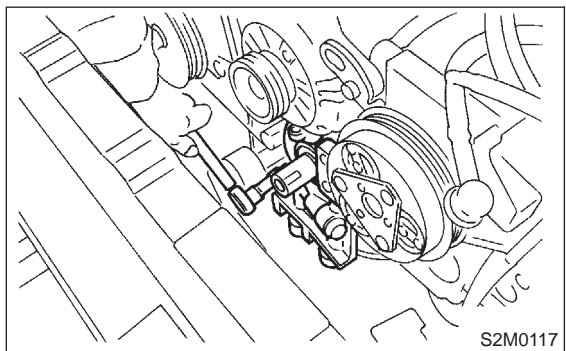
12) Remove timing belt guide. (MT vehicles only)



13) Remove crankshaft sprocket.

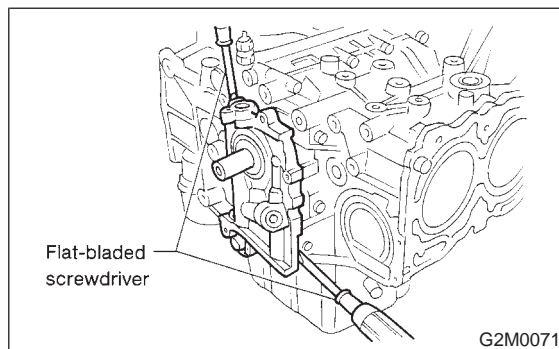


14) Remove bolts which install oil pump onto cylinder block.



15) Remove oil pump by using flat bladed screwdriver.

CAUTION:
Be careful not to scratch mating surfaces of cylinder block and oil pump.

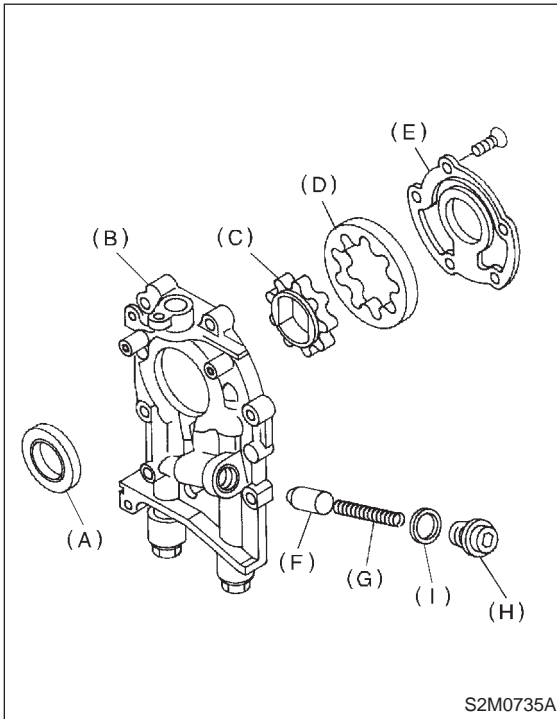


B: DISASSEMBLY

Remove screws which secure oil pump cover and disassemble oil pump. Inscribe alignment marks on inner and outer rotors so that they can be replaced in their original positions during reassembly.

CAUTION:

Before removing relief valve, loosen plug when removing oil pump from cylinder block.



- (A) Oil seal
- (B) Pump case
- (C) Inner rotor
- (D) Outer rotor
- (E) Pump cover
- (F) Relief valve
- (G) Relief spring
- (H) Plug
- (I) Washer

C: INSPECTION

1. TIP CLEARANCE

Measure the tip clearance of rotors. If the clearance exceeds the limit, replace rotors as a matched set.

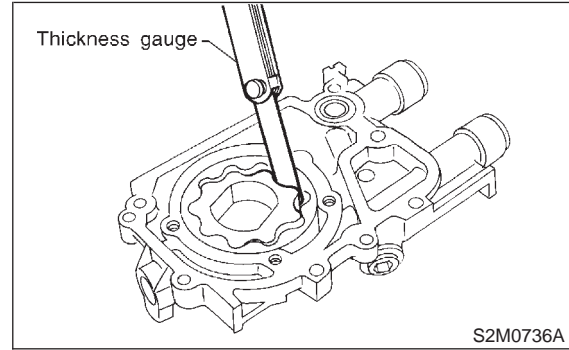
Tip clearance:

Standard

0.04 — 0.14 mm (0.0016 — 0.0055 in)

Limit

0.18 mm (0.0071 in)



2. CASE CLEARANCE

Measure the clearance between the outer rotor and the cylinder block rotor housing. If the clearance exceeds the limit, replace the rotor.

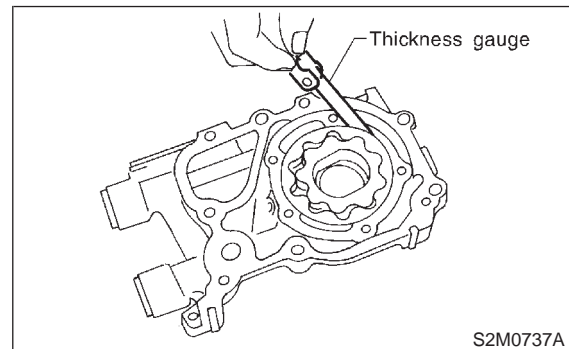
Case clearance:

Standard

0.10 — 0.175 mm (0.0039 — 0.0069 in)

Limit

0.20 mm (0.0079 in)



3. SIDE CLEARANCE

Measure clearance between oil pump inner rotor and pump cover. If the clearance exceeds the limit, replace rotor or pump body.

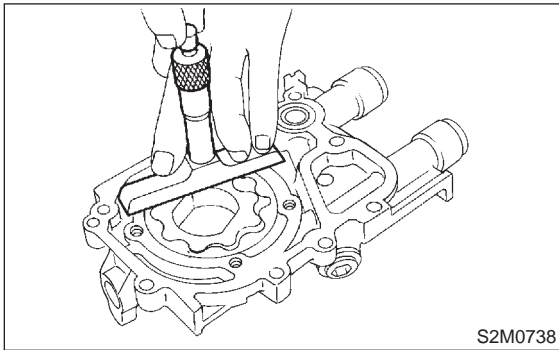
Side clearance:

Standard

0.02 — 0.07 mm (0.0008 — 0.0028 in)

Limit

0.15 mm (0.0059 in)



4. OIL RELIEF VALVE

Check the valve for fitting condition and damage, and the relief valve spring for damage and deterioration. Replace the parts if defective.

Relief valve spring:

Free length

71.8 mm (2.827 in)

Installed length

54.7 mm (2.154 in)

Load when installed

77.08 N (7.86 kg, 17.33 lb)

5. OIL PUMP CASE

Check the oil pump case for worn shaft hole, clogged oil passage, worn rotor chamber, cracks, and other faults.

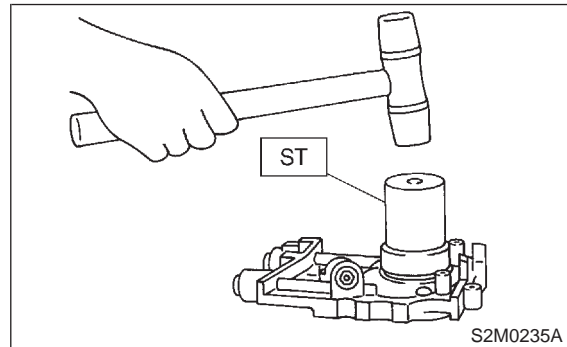
6. OIL SEAL

Check the oil seal lips for deformation, hardening, wear, etc. and replace if defective.

D: ASSEMBLY

- 1) Install front oil seal by using ST.
ST 499587100 OIL SEAL INSTALLER

CAUTION:
Use a new oil seal.

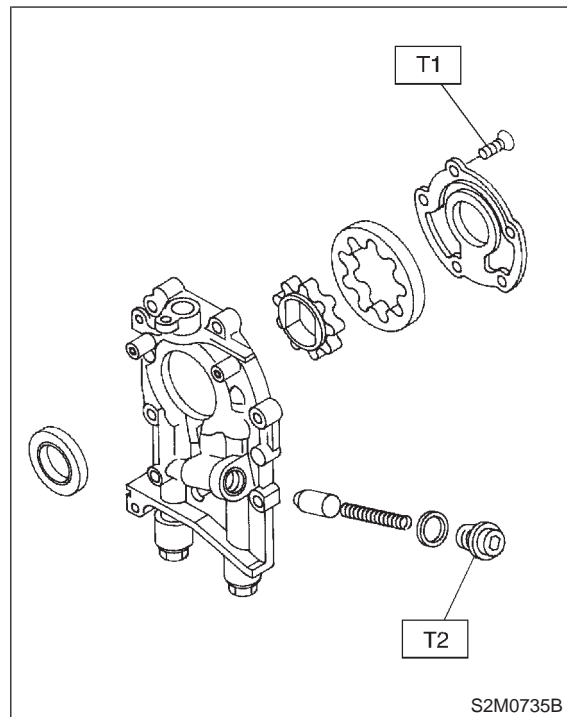


- 2) Install inner and outer rotors in their original positions.
- 3) Install oil relief valve and relief spring.
- 4) Install oil pump cover.

Tightening torque:

T1: $5^{+1}/_{-0}$ N·m ($0.5^{+0.1}/_{-0}$ kg·m, $3.6^{+0.7}/_{-0}$ ft·lb)

T2: 44.1 ± 3.4 N·m (4.5 ± 0.35 kg·m, 32.5 ± 2.5 ft·lb)



E: INSTALLATION

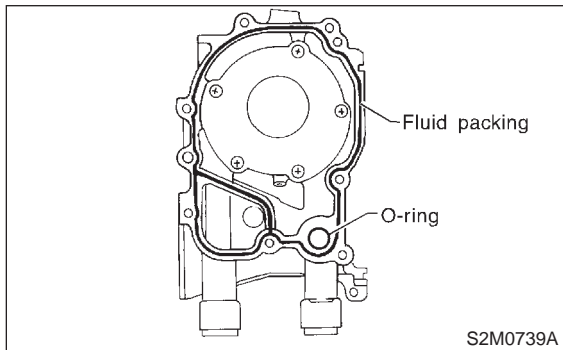
Installation is in the reverse order of removal.

Do the following:

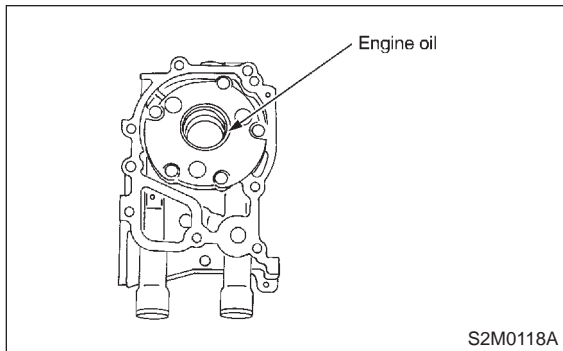
- 1) Apply fluid packing to matching surfaces of oil pump.

Fluid packing:

THREE BOND 1215 or equivalent



- 2) Replace O-ring with a new one.
- 3) Apply a coat of engine oil to the inside of the oil seal.



- 4) Be careful not to scratch oil seal when installing oil pump on cylinder block.
- 5) Position the oil pump, aligning the notched area with the crankshaft, and push the oil pump straight.

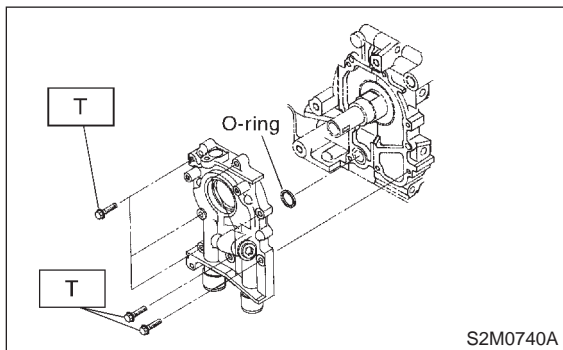
CAUTION:

Make sure the oil seal lip is not folded.

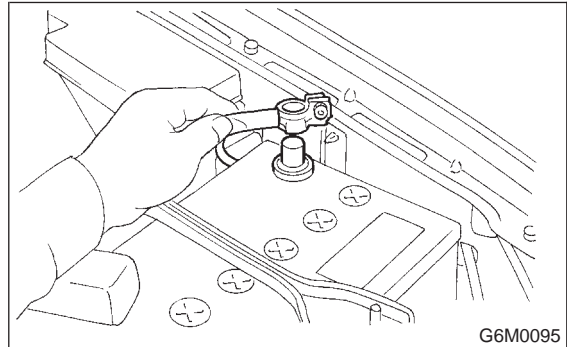
- 6) Install oil pump.

Tightening torque:

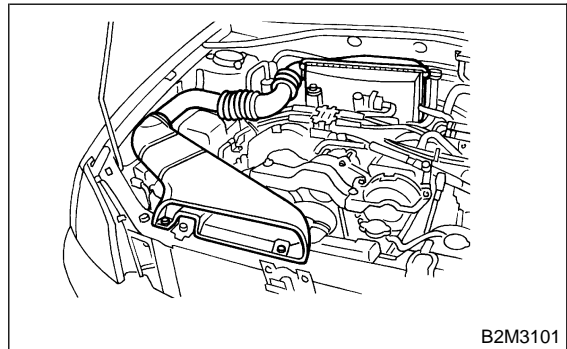
6.4 N·m (0.65 kg·m, 4.7 ft·lb)

**2. Oil Pan and Oil Strainer****A: REMOVAL**

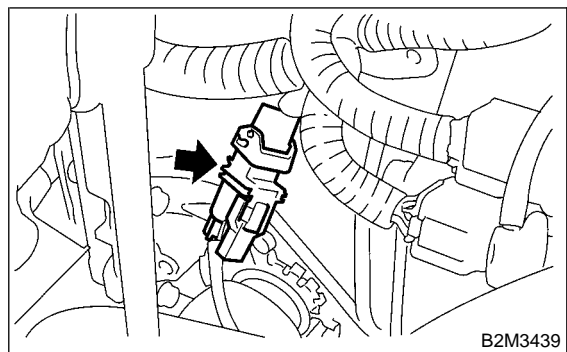
- 1) Set the vehicle on lift arms.
- 2) Remove front wheels.
- 3) Disconnect battery ground cable.



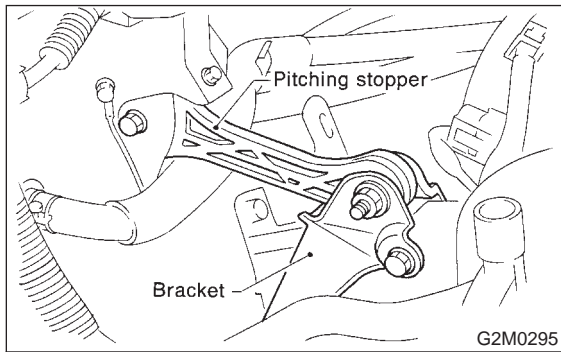
- 4) Remove air intake duct and air cleaner case. <Ref. to 2-7 [W1A0].>



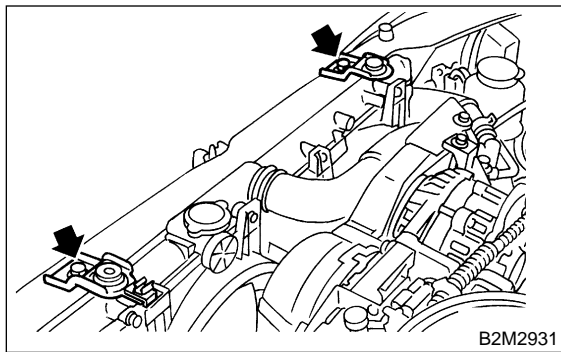
- 5) Disconnect connector from front oxygen (A/F) sensor.



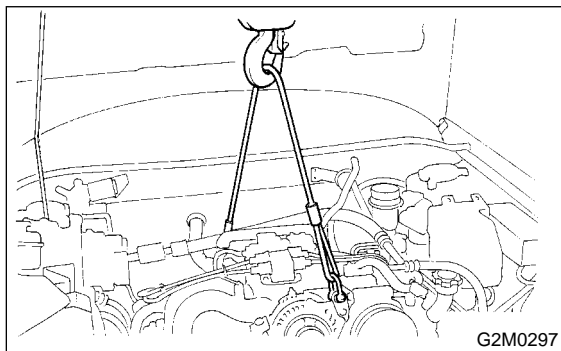
6) Remove pitching stopper.



7) Remove radiator upper brackets.



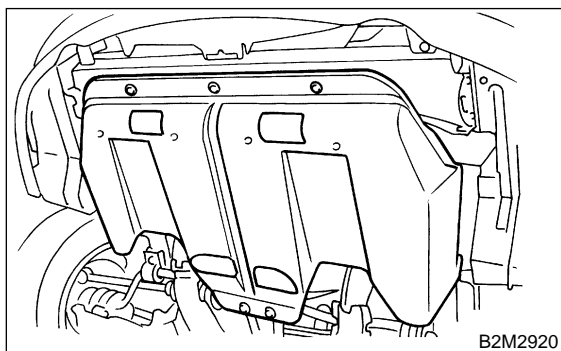
8) Support engine with a lifting device and wire ropes.



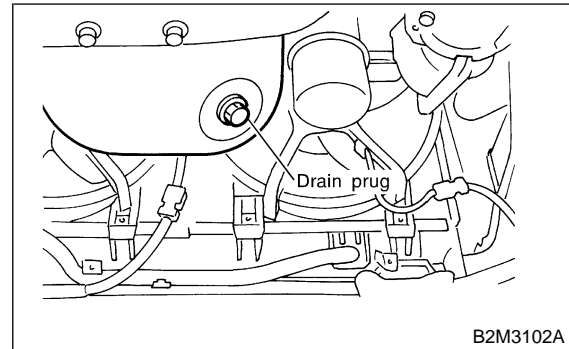
9) Lift-up the vehicle.

CAUTION:
At this time, raise up wire ropes.

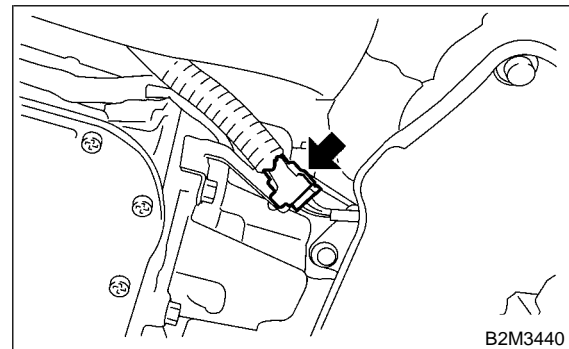
10) Remove under cover.



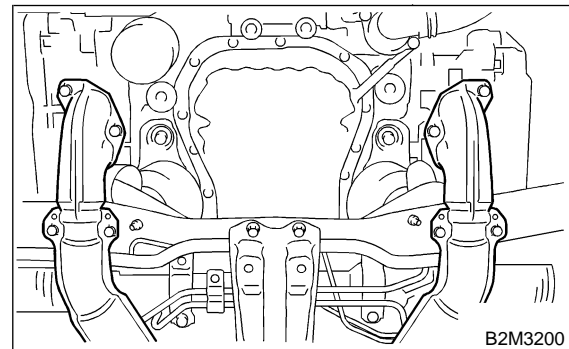
11) Drain engine oil.
Set container under the vehicle, and remove drain plug from oil pan.



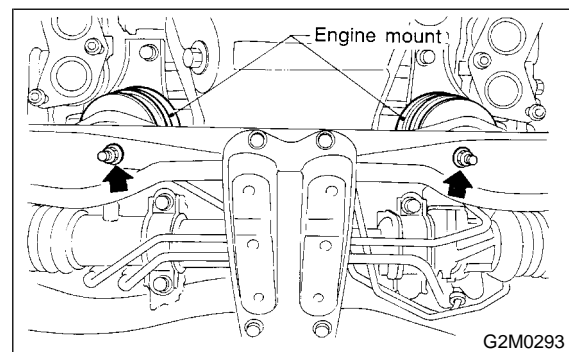
12) Disconnect connector from rear oxygen sensor.



13) Remove front and center exhaust pipes. <Ref. to 2-9 [W1A0].>



14) Remove nuts which install front cushion rubber onto front crossmember.



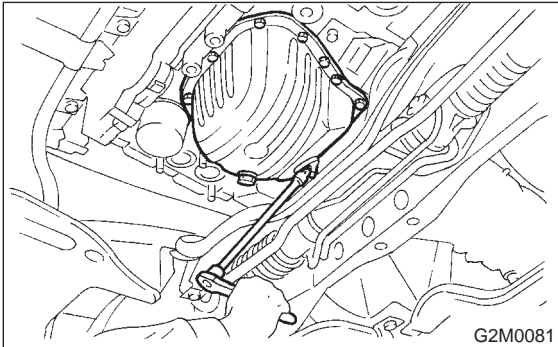
2. Oil Pan and Oil Strainer

15) Remove bolts which install oil pan on cylinder block while raising up engine.

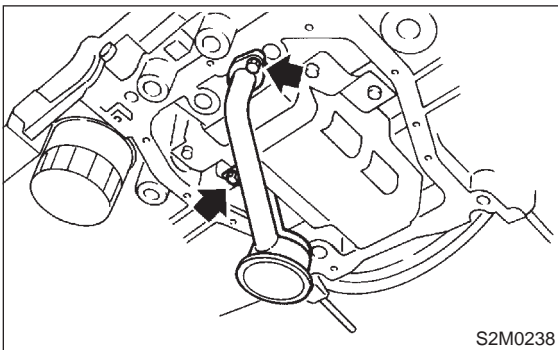
16) Insert oil pan cutter blade between cylinder block-to-oil pan clearance.

CAUTION:

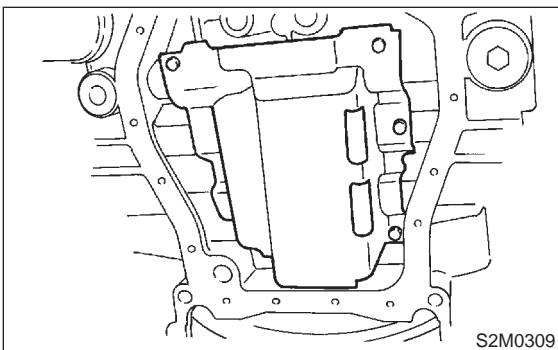
Do not use a screwdriver or similar tool in place of oil pan cutter.



17) Remove oil strainer.



18) Remove baffle plate.

**B: INSPECTION**

By visual check make sure oil pan, oil strainer, oil strainer stay and baffle plate are not damaged.

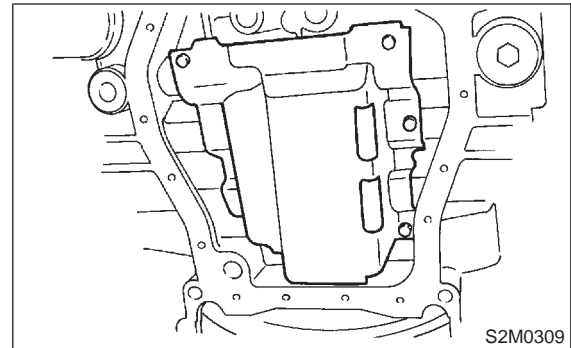
C: INSTALLATION**CAUTION:**

Before installing oil pan, clean sealant from oil pan and engine block.

1) Install baffle plate.

Tightening torque:

6.4 N-m (0.65 kg-m, 4.7 ft-lb)



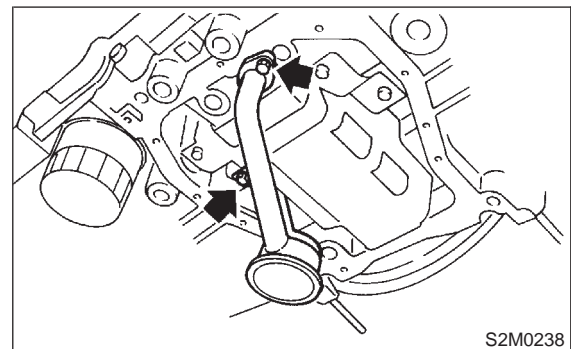
2) Install oil strainer onto baffle plate.

CAUTION:

Replace O-ring with a new one.

Tightening torque:

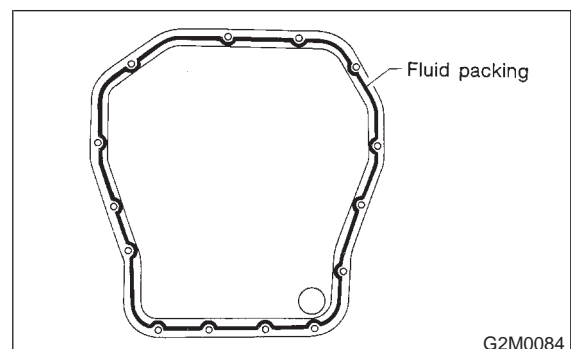
10 N-m (1.0 kg-m, 7 ft-lb)



3) Apply fluid packing to mating surfaces and install oil pan.

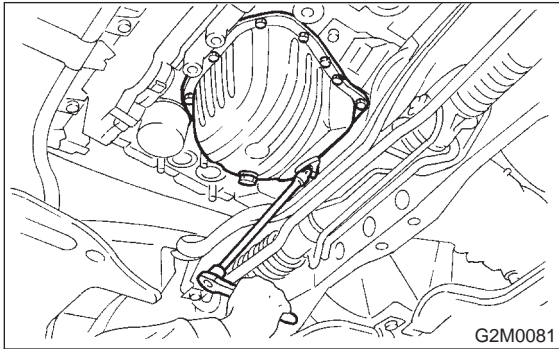
Fluid packing:

THREE BOND 1215 or equivalent



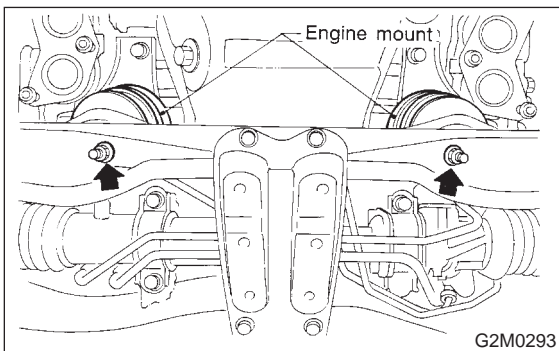
4) Tighten bolts which install oil pan onto engine block.

Tightening torque:
5 N-m (0.5 kg-m, 3.6 ft-lb)



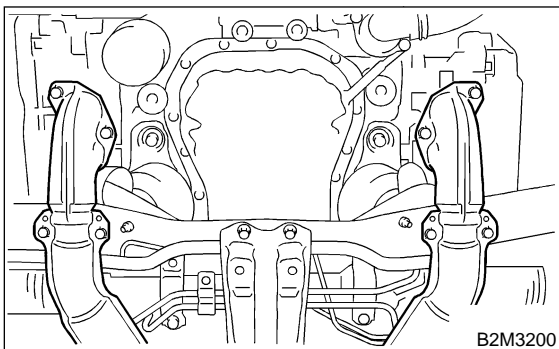
5) Lower engine onto front crossmember.
6) Tighten nuts which install front cushion rubber onto front crossmember.

Tightening torque:
69±15 N-m (7.0±1.5 kg-m, 51±11 ft-lb)

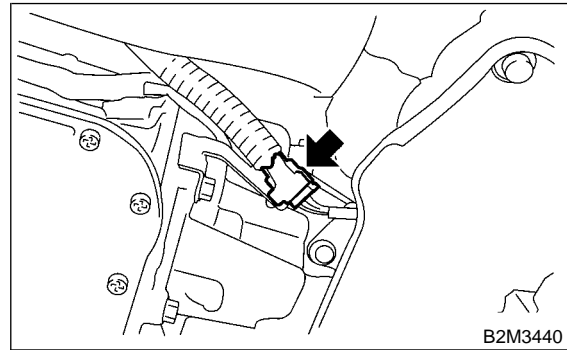


7) Install front and center exhaust pipes.
<Ref. to 2-9 [W1B0].>

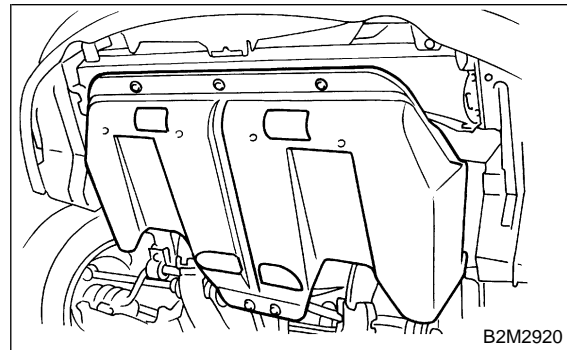
CAUTION:
Always use the new gaskets.



8) Connect connector to rear oxygen sensor.



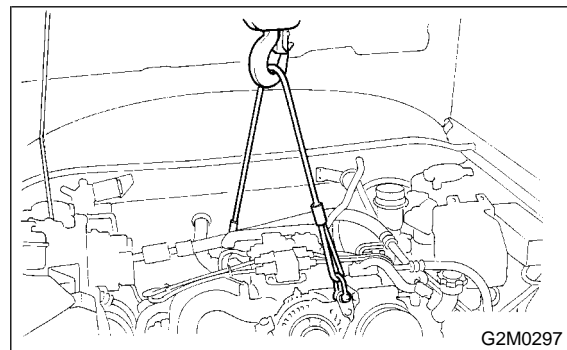
9) Install under cover.



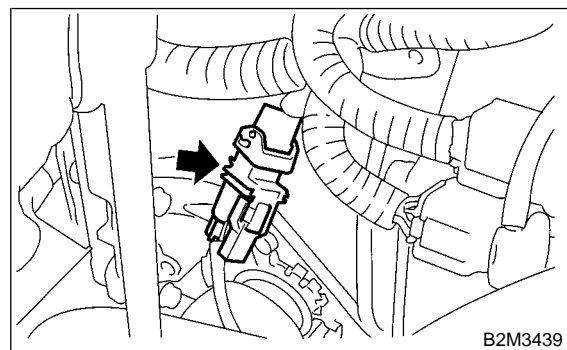
10) Lower the vehicle.

CAUTION:
At this time, lower lifting device and release steel cables.

11) Remove lifting device and steel cables.



12) Connect connector to front oxygen (A/F) sensor.



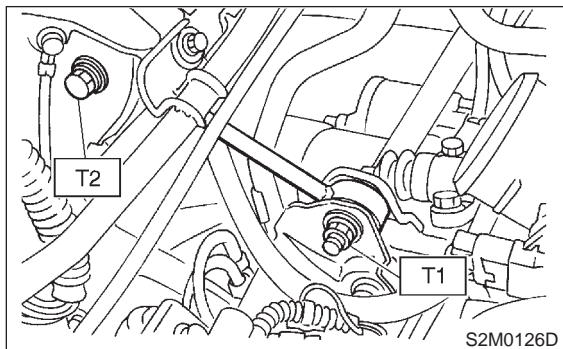
2. Oil Pan and Oil Strainer

13) Install pitching stopper.

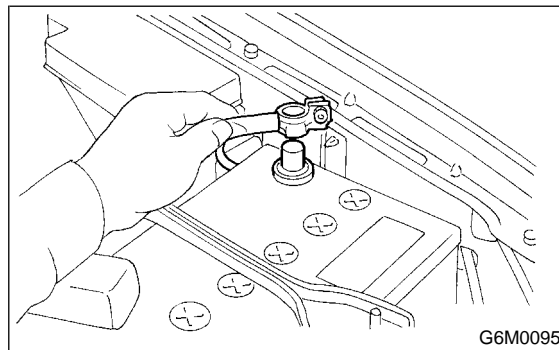
Tightening torque:

T1: 49 ± 5 N·m (5.0 ± 0.5 kg·m, 36.2 ± 3.6 ft·lb)

T2: 57 ± 10 N·m (5.8 ± 1.0 kg·m, 42 ± 7 ft·lb)

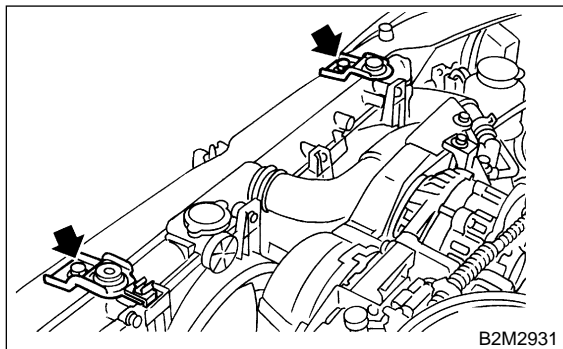


17) Connect battery ground cable.



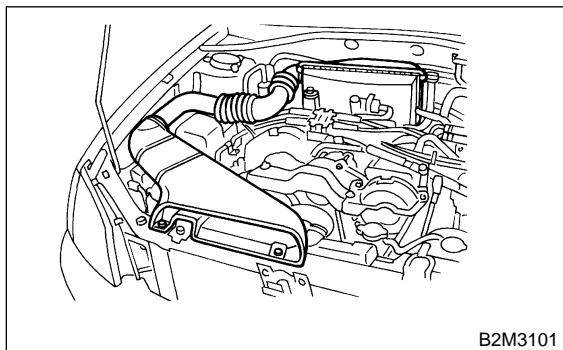
18) Fill engine oil. <Ref. to 1-5 [G4A0].>

14) Install radiator upper brackets.



15) Install air intake duct.

<Ref. to 2-7 [W1A0].>

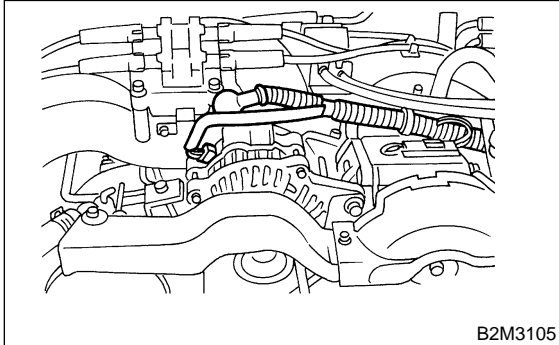


16) Install front wheels.

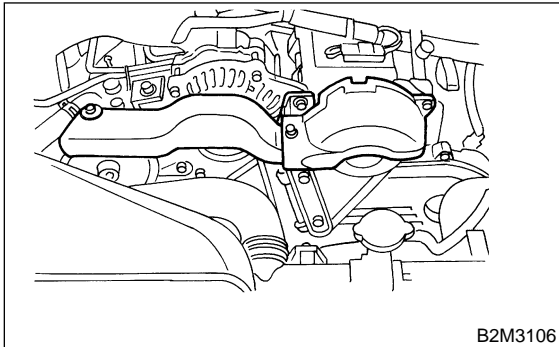
3. Oil Pressure Switch

A: REMOVAL

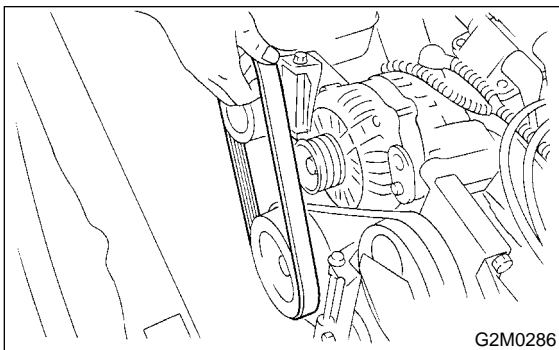
- 1) Remove generator from bracket.
 - (1) Disconnect connector and terminal from generator.



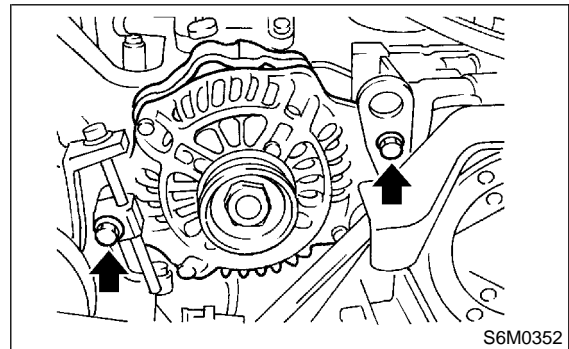
- (2) Remove V-belt cover.



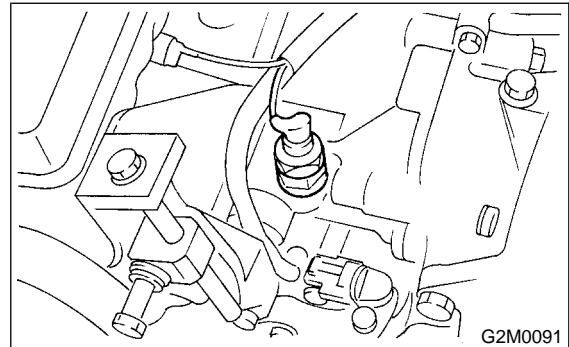
- (3) Loosen lock bolt and slider bolt, and remove front side V-belt.



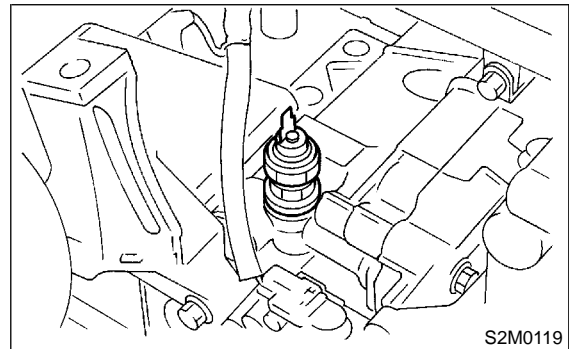
- (4) Remove bolts which install generator on bracket.



- 2) Disconnect terminal from oil pressure switch.



- 3) Remove oil pressure switch.

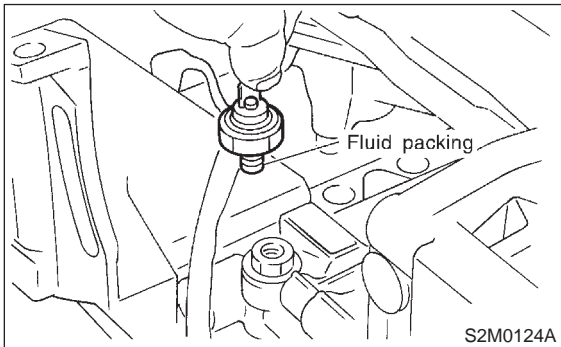


B: INSTALLATION

1) Apply fluid packing to oil pressure switch threads.

Fluid packing:

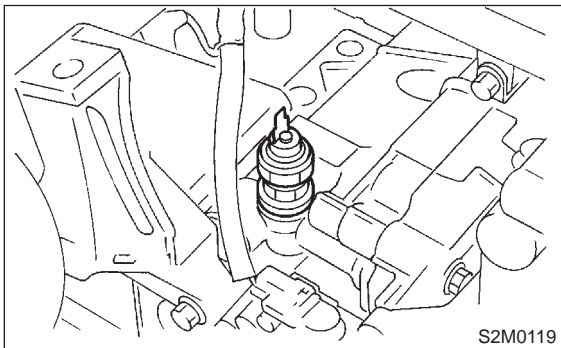
THREE BOND 1215 or equivalent



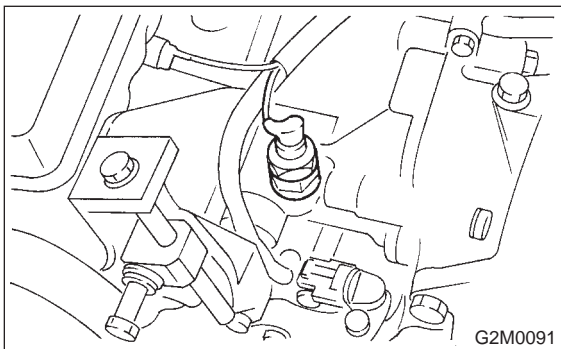
2) Install oil pressure switch onto engine block.

Tightening torque:

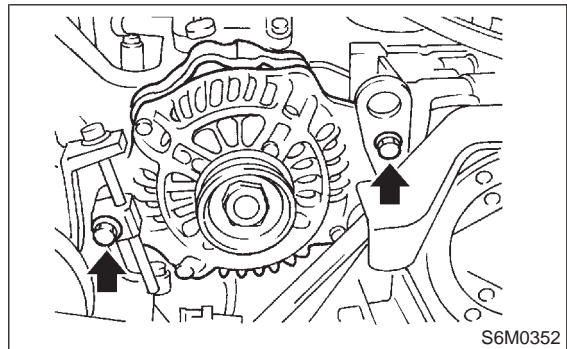
25 ± 3 N·m (2.5 ± 0.3 kg·m, 18.1 ± 2.2 ft·lb)



3) Connect terminal of oil pressure switch.



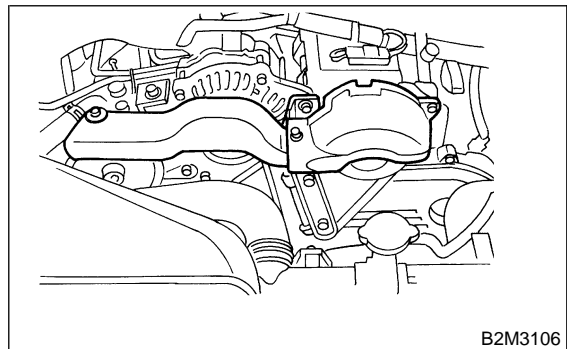
4) Install generator on bracket and temporarily tighten installing bolts.



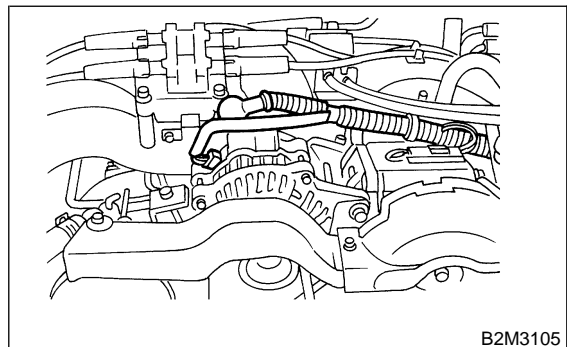
5) Install front side V-belt and adjust it.

<Ref. to 1-5 [G2A0].>

6) Install V-belt cover.



7) Connect connector and terminal to generator.



1. Engine Lubrication System Trouble in General

Before performing diagnostics, make sure that the engine oil level is correct and no oil leakage exists.

Trouble	Possible cause	Corrective action	
1. Warning light remains on.	1) Oil pressure switch failure	Cracked diaphragm or oil leakage within switch	Replace.
		Broken spring or seized contacts	Replace.
	2) Low oil pressure	Clogged oil filter	Replace.
		Malfunction of oil by-pass valve of oil filter	Clean or replace.
		Malfunction of oil relief valve of oil pump	Clean or replace.
		Clogged oil passage	Clean.
		Excessive tip clearance and side clearance of oil pump rotor and gear	Replace.
		Clogged oil strainer or broken pipe	Clean or replace.
	3) No oil pressure	Insufficient engine oil	Replenish.
		Broken pipe of oil strainer	Replace.
Stuck oil pump rotor		Replace.	
2. Warning light does not go on.	1) Burn-out bulb	Replace.	
	2) Poor contact of switch contact points	Replace.	
	3) Disconnection of wiring	Repair.	
3. Warning light flickers momentarily.	1) Poor contact at terminals	Repair.	
	2) Defective wiring harness	Repair.	
	3) Low oil pressure	Check for the same possible causes as listed in 1.—2).	

MEMO:

1. Specifications

Cooling system		Electric fan + Forced engine coolant circulation system	
Total engine coolant capacity		ℓ (US qt, Imp qt)	
		MT: Approx. 6.0 (6.3, 5.3) AT: Approx. 6.2 (6.6, 5.5)	
Water pump	Type	Centrifugal impeller type	
	Discharge performance I	Discharge	20 ℓ (5.3 US gal, 4.4 Imp gal)/min.
		Pump speed—total engine coolant head	760 rpm — 0.3 mAq (1.0 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance II	Discharge	100 ℓ (26.4 US gal, 22.0 Imp gal)/min.
		Pump speed—total engine coolant head	3,000 rpm — 5.0 mAq (16.4 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance III	Discharge	200 ℓ (52.8 US gal, 44.0 Imp gal)/min.
		Pump speed—total engine coolant head	6,000 rpm — 23.0 mAq (75.5 ftAq)
		Engine coolant temperature	85°C (185°F)
Impeller diameter	76 mm (2.99 in)		
Number of impeller vanes	8		
Pump pulley diameter	60 mm (2.36 in)		
Thermostat	Type	Wax pellet type	
	Starts to open	76 — 80°C (169 — 176°F)	
	Fully opened	91°C (196°F)	
	Valve lift	9.0 mm (0.354 in) or more	
	Valve bore	35 mm (1.38 in)	
Radiator fan	Motor	75 W (main fan) 75 W (sub fan)	
	Fan diameter × Blade	300 mm (11.81 in) × 5 (main fan) 300 mm (11.81 in) × 4 (sub fan)	
Radiator	Type	Down flow, pressure type	
	Core dimensions	691.5 × 340 × 16 mm (27.22 × 13.39 × 0.63 in)	
	Pressure range in which cap valve is open	Above: 108±15 kPa (1.1±0.15 kg/cm ² , 16±2 psi) Below: -1.0 to -4.9 kPa (-0.01 to -0.05 kg/cm ² , -0.1 to -0.7 psi)	
	Fins	Corrugated fin type	
Reservoir tank	Capacity	0.45 ℓ (0.5 US qt, 0.4 Imp qt)	

2. Service Data

Water pump	Clearance between impeller and case	Standard	0.5 — 0.7 mm (0.020 — 0.028 in)
		Limit	1.0 mm (0.039 in)
	"Thrust" runout of impeller end		0.5 mm (0.020 in)

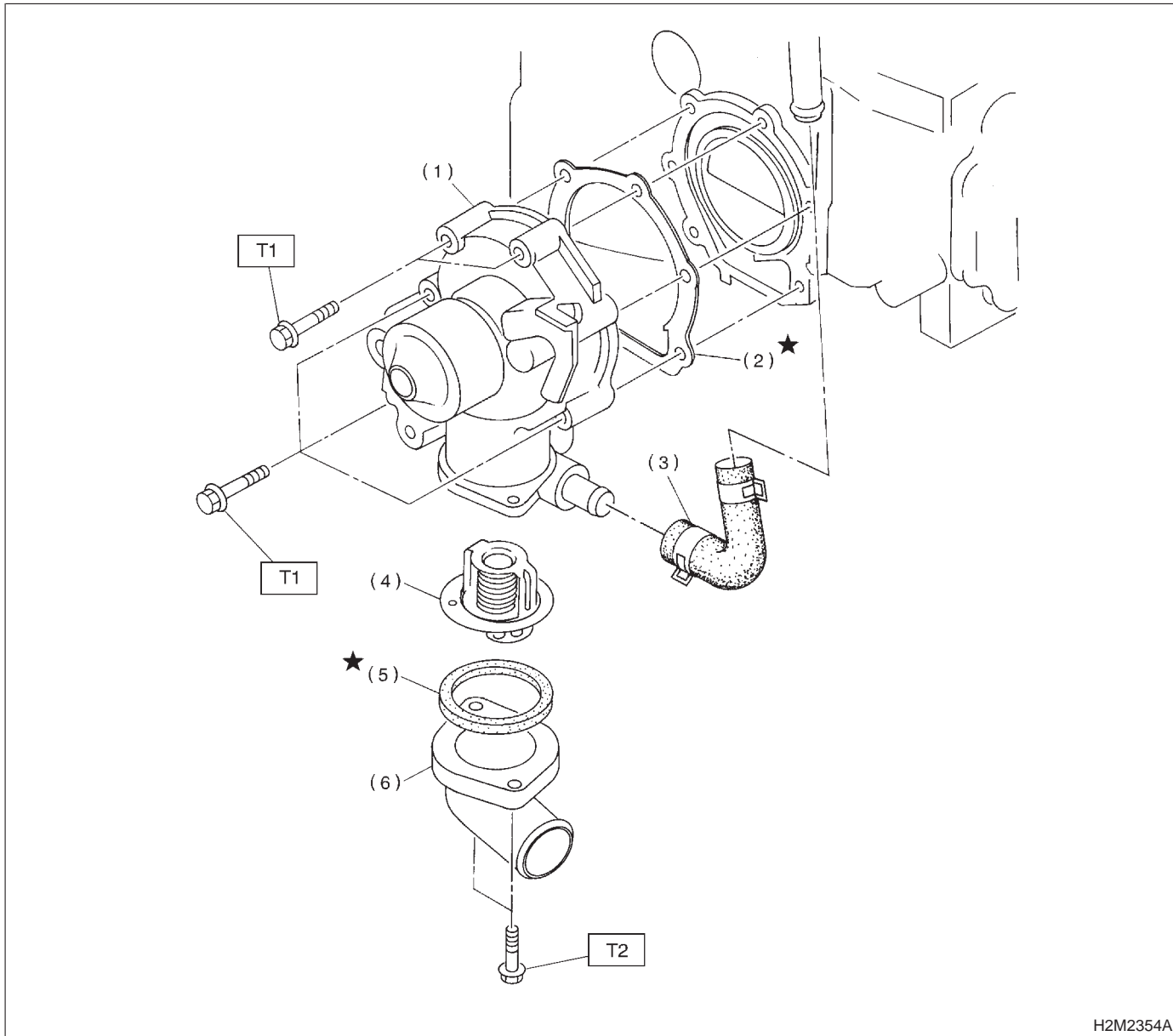
1. Specifications

Cooling system		Electric fan + Forced engine coolant circulation system	
Total engine coolant capacity		ℓ (US qt, Imp qt)	
		MT: Approx. 6.0 (6.3, 5.3) AT: Approx. 6.2 (6.6, 5.5)	
Water pump	Type	Centrifugal impeller type	
	Discharge performance I	Discharge	20 ℓ (5.3 US gal, 4.4 Imp gal)/min.
		Pump speed—total engine coolant head	760 rpm — 0.3 mAq (1.0 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance II	Discharge	100 ℓ (26.4 US gal, 22.0 Imp gal)/min.
		Pump speed—total engine coolant head	3,000 rpm — 5.0 mAq (16.4 ftAq)
		Engine coolant temperature	85°C (185°F)
	Discharge performance III	Discharge	200 ℓ (52.8 US gal, 44.0 Imp gal)/min.
		Pump speed—total engine coolant head	6,000 rpm — 23.0 mAq (75.5 ftAq)
		Engine coolant temperature	85°C (185°F)
Impeller diameter	76 mm (2.99 in)		
Number of impeller vanes	8		
Pump pulley diameter	60 mm (2.36 in)		
Thermostat	Type	Wax pellet type	
	Starts to open	76 — 80°C (169 — 176°F)	
	Fully opened	91°C (196°F)	
	Valve lift	9.0 mm (0.354 in) or more	
	Valve bore	35 mm (1.38 in)	
Radiator fan	Motor	75 W (main fan) 75 W (sub fan)	
	Fan diameter × Blade	300 mm (11.81 in) × 5 (main fan) 300 mm (11.81 in) × 4 (sub fan)	
Radiator	Type	Down flow, pressure type	
	Core dimensions	691.5 × 340 × 16 mm (27.22 × 13.39 × 0.63 in)	
	Pressure range in which cap valve is open	Above: 108±15 kPa (1.1±0.15 kg/cm ² , 16±2 psi) Below: -1.0 to -4.9 kPa (-0.01 to -0.05 kg/cm ² , -0.1 to -0.7 psi)	
	Fins	Corrugated fin type	
Reservoir tank	Capacity	0.45 ℓ (0.5 US qt, 0.4 Imp qt)	

2. Service Data

Water pump	Clearance between impeller and case	Standard	0.5 — 0.7 mm (0.020 — 0.028 in)
		Limit	1.0 mm (0.039 in)
	"Thrust" runout of impeller end		0.5 mm (0.020 in)

1. Water Pump



H2M2354A

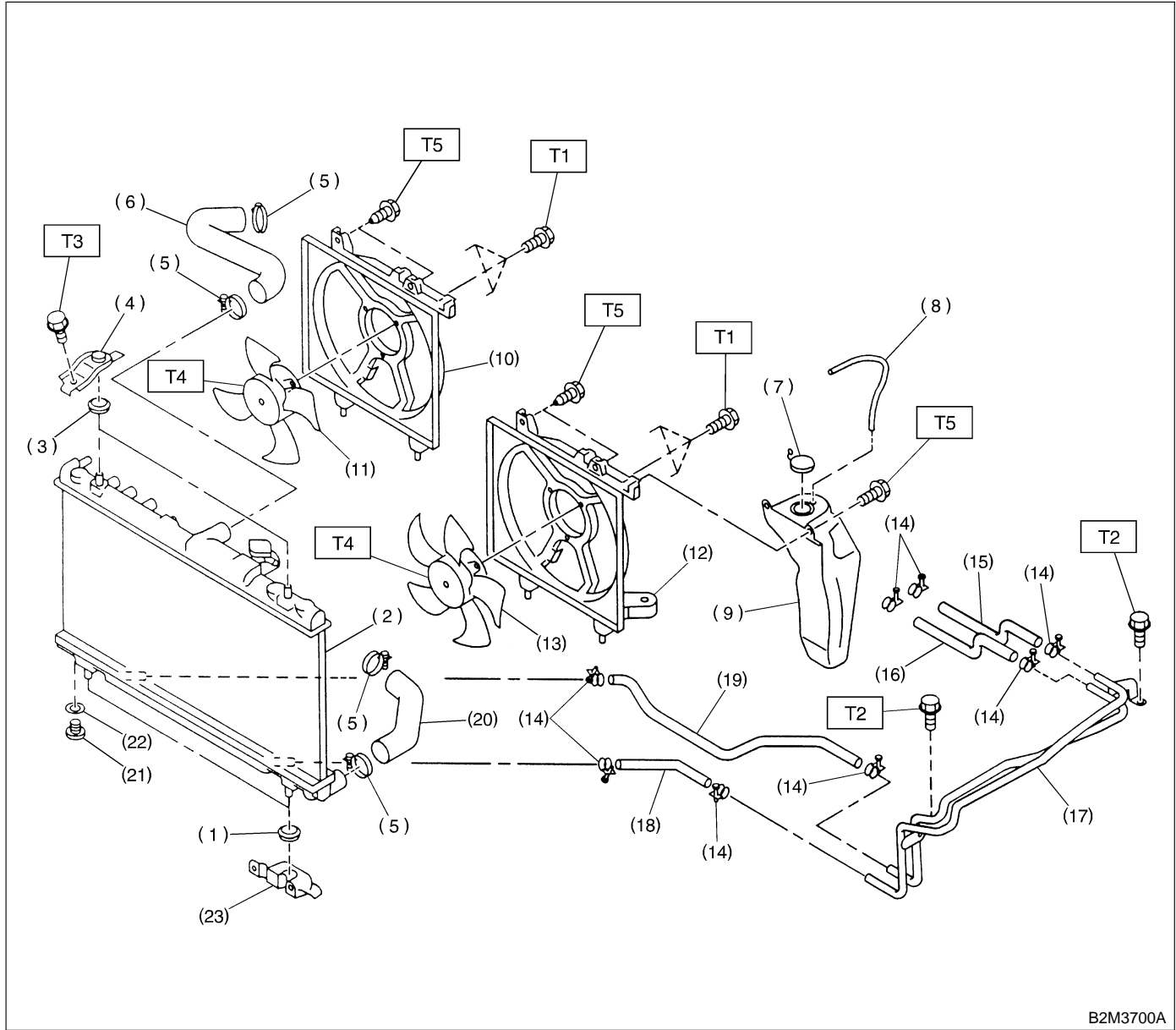
- (1) Water pump ASSY
- (2) Gasket
- (3) Heater by-pass hose
- (4) Thermostat
- (5) Gasket
- (6) Thermostat cover

Tightening torque: N·m (kg·m, ft·lb)

T1: First 12±2 (1.2±0.2, 8.7±1.4)
Second 12±2 (1.2±0.2, 8.7±1.4)

T2: 6.4±0.5 (0.65±0.05, 4.7±0.4)

2. Radiator and Radiator Fan



B2M3700A

- | | | |
|--|--|--|
| (1) Radiator lower cushion | (12) Main fan shroud | (19) ATF inlet hose B (AT vehicles only) |
| (2) Radiator | (13) Radiator main fan and main fan motor ASSY | (20) Radiator outlet hose |
| (3) Radiator upper cushion | (14) ATF hose clamp (AT vehicles only) | (21) Radiator drain plug |
| (4) Radiator upper bracket | (15) ATF inlet hose A (AT vehicles only) | (22) O-ring |
| (5) Clamp | (16) ATF outlet hose A (AT vehicles only) | (23) Radiator lower bracket |
| (6) Radiator inlet hose | (17) ATF pipe (AT vehicles only) | |
| (7) Engine coolant reservoir tank cap | (18) ATF outlet hose B (AT vehicles only) | |
| (8) Over flow hose | | |
| (9) Engine coolant reservoir tank | | |
| (10) Sub fan shroud | | |
| (11) Radiator sub fan and sub fan motor ASSY | | |

Tightening torque: N·m (kg·m, ft·lb)

T1: 4.4±0.5 (0.45±0.05, 3.3±0.4)

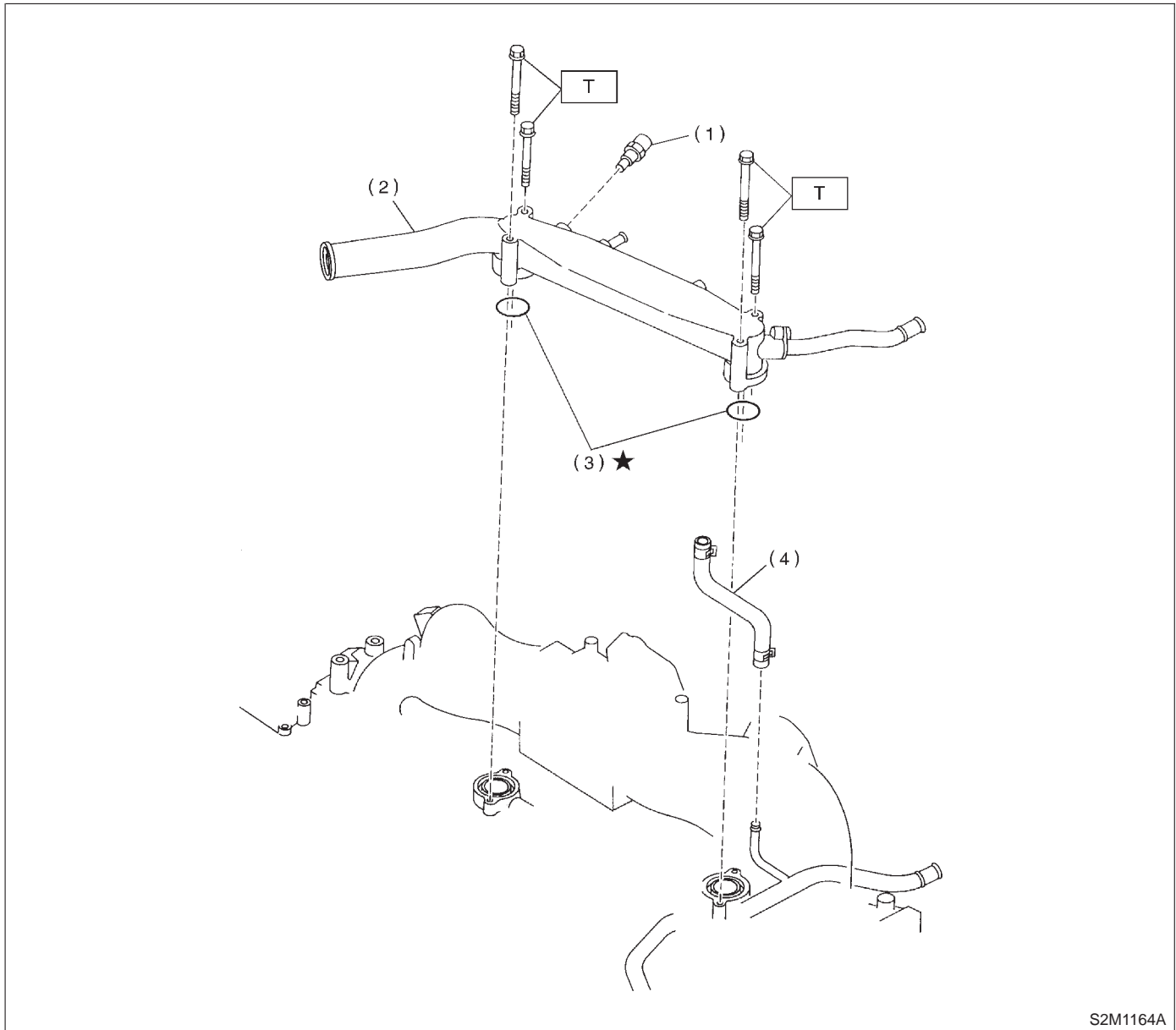
T2: 12±3 (1.2±0.3, 8.7±2.2)

T3: 18±5 (1.8±0.5, 13.0±3.6)

T4: 3.4±0.5 (0.35±0.05, 2.5±0.4)

T5: 4.9±1.5 (0.50±0.15, 3.6±1.1)

3. Water Pipe



S2M1164A

- (1) Engine coolant temperature sensor
- (2) Water pipe

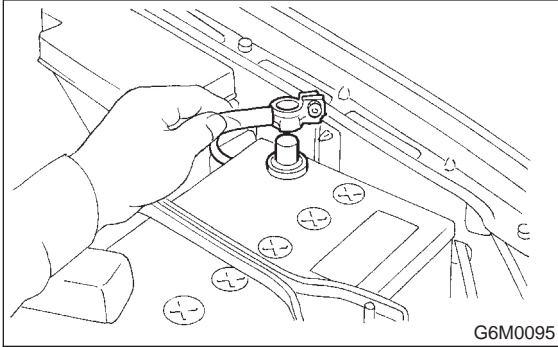
- (3) O-ring
- (4) By-pass hose

Tightening torque: N·m (kg·m, ft·lb)
T: 6.4±0.5 (0.65±0.05, 4.7±0.4)

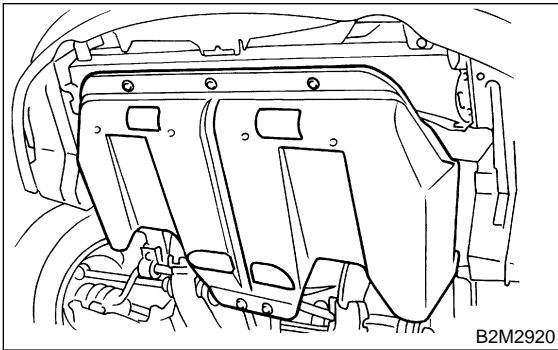
1. Water Pump

A: REMOVAL

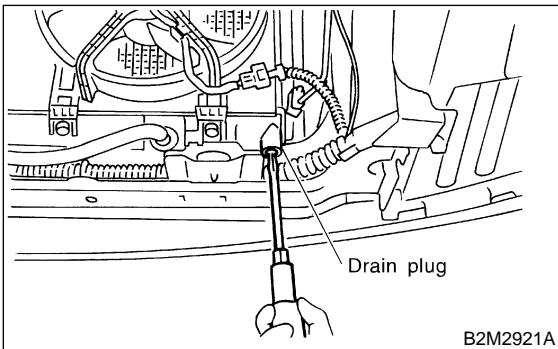
1) Disconnect ground cable from the battery.



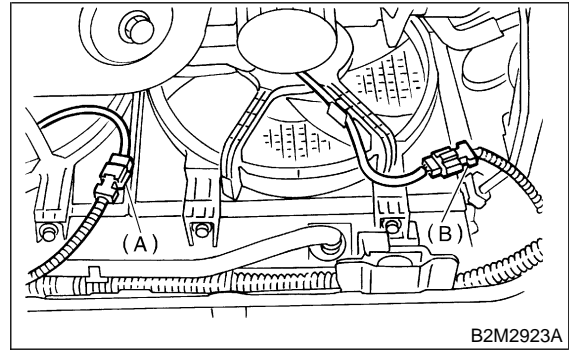
2) Lift-up the vehicle.
3) Remove under cover.



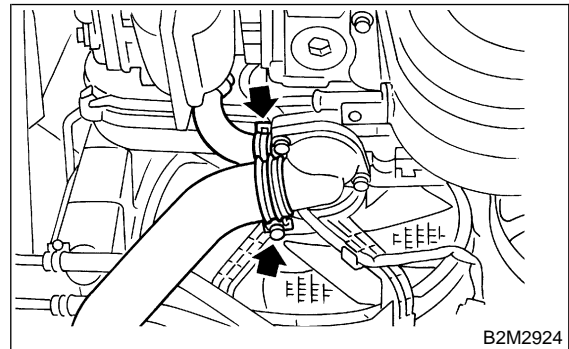
4) Drain engine coolant completely.
<Ref. to 2-5 [W9A0].>



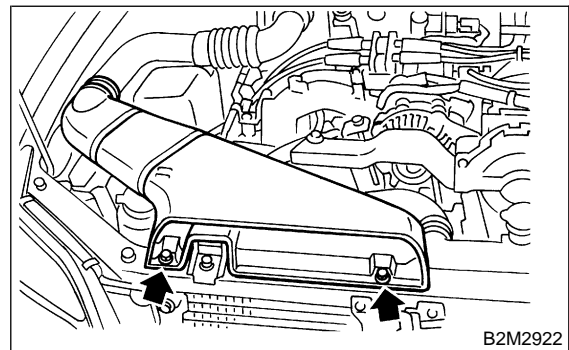
5) Disconnect connectors from radiator main fan (A) and sub fan (B) motors.



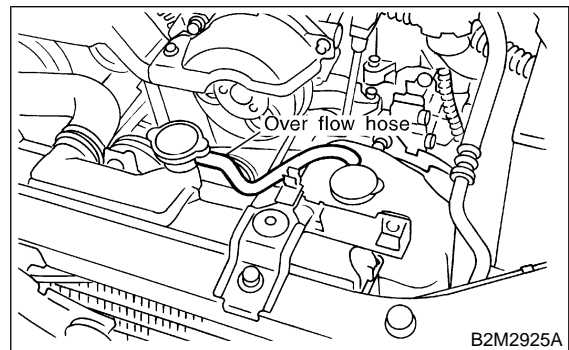
6) Disconnect radiator outlet hose and heater hose from water pump.



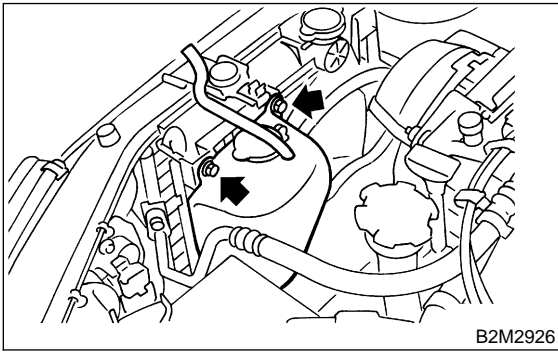
7) Lower the vehicle.
8) Remove air intake duct.



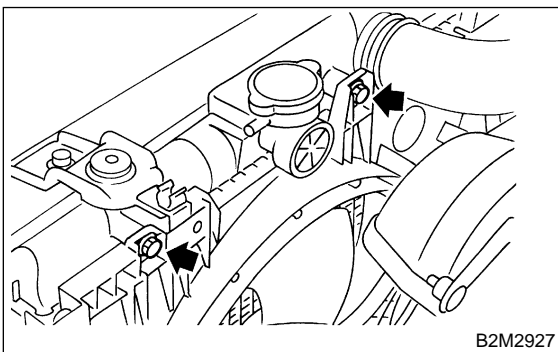
9) Disconnect over flow hose.



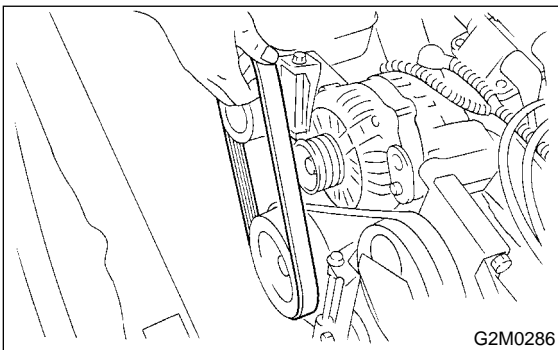
10) Remove reservoir tank.



11) Remove radiator main fan and sub fan assemblies. <Ref. to 2-5 [W5A0].> and <Ref. to 2-5 [W6A0].>

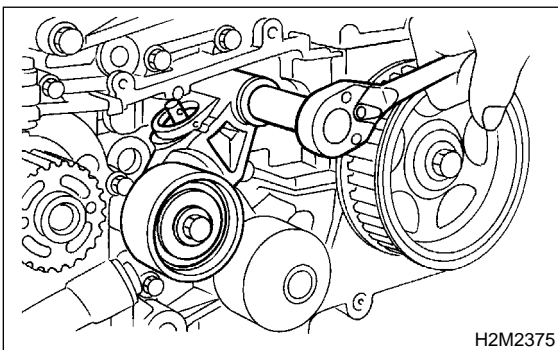


12) Remove V-belts.
<Ref. to 1-5 [G1B0].>

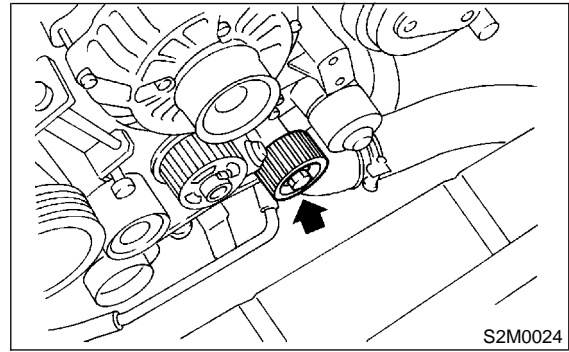


13) Remove timing belt.
<Ref. to 2-3 [W2A0].>

14) Remove automatic belt tension adjuster.

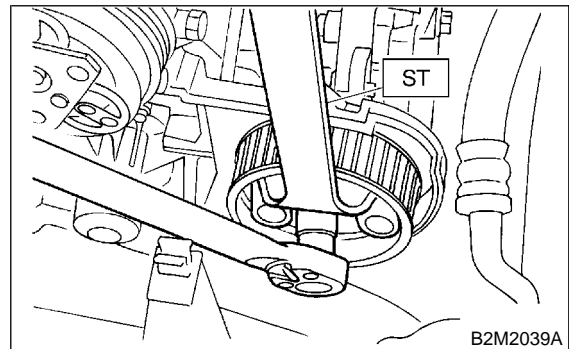


15) Remove belt idler No. 2.

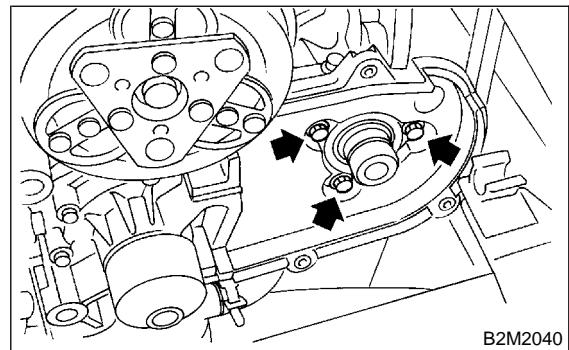


16) Remove left-hand camshaft sprocket by using ST.

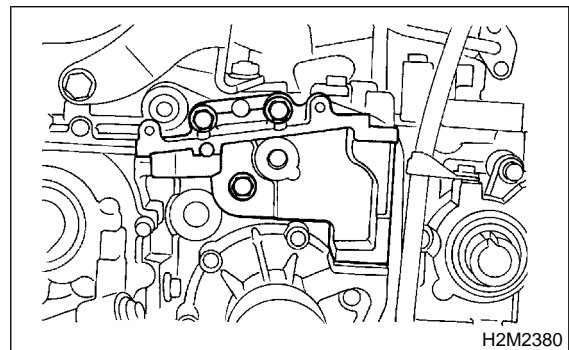
ST 499207100 CAMSHAFT SPROCKET WRENCH



17) Remove left-hand belt cover No. 2.

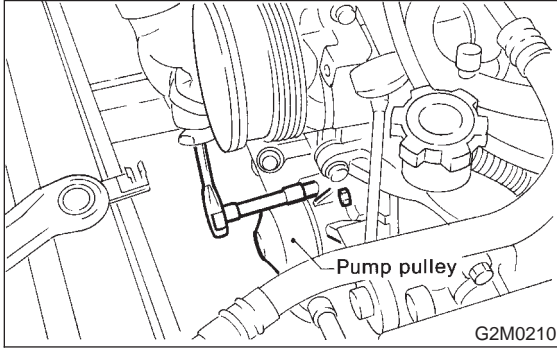


18) Remove tensioner bracket.



19) Disconnect heater hose from water pump.

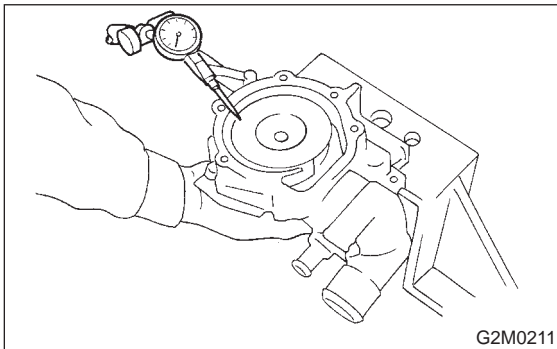
20) Remove water pump.



B: INSPECTION

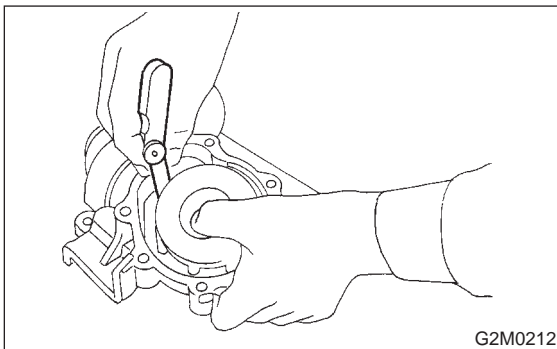
- 1) Check water pump bearing for smooth rotation.
- 2) Check water pump pulley for abnormalities.
- 3) Using a dial gauge, measure impeller runout in thrust direction while rotating the pulley.

“Thrust” runout limit:
0.5 mm (0.020 in)



- 4) Check clearance between impeller and pump case.

Clearance between impeller and pump case:
Standard
0.5 — 0.7 mm (0.020 — 0.028 in)
Limit
1.0 mm (0.039 in)



- 5) After water pump installation, check pulley shaft for engine coolant leaks. If leaks are noted, replace water pump assembly.

C: INSTALLATION

- 1) Install water pump onto left-hand cylinder head.

CAUTION:

- Replace gasket with a new one.
- When installing water pump, tighten bolts in two stages in alphabetical sequence as shown in figure.

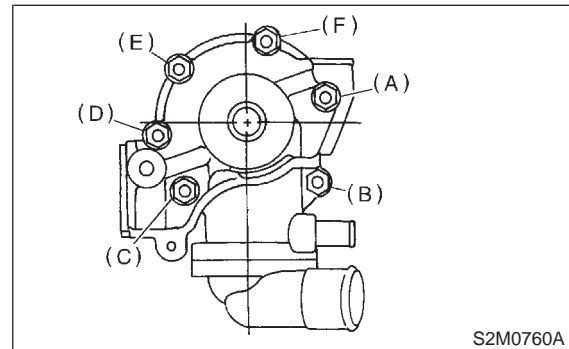
Tightening torque:

First:

12±2 N·m (1.2±0.2 kg·m, 8.7±1.4 ft·lb)

Second:

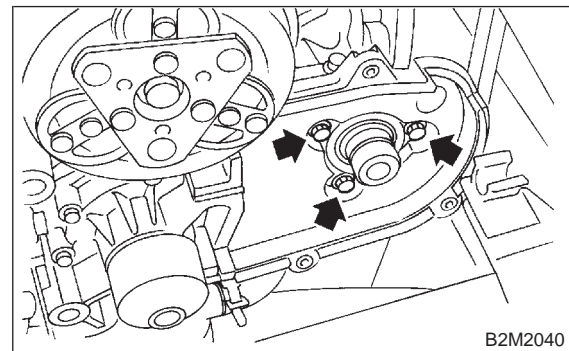
12±2 N·m (1.2±0.2 kg·m, 8.7±1.4 ft·lb)



- 2) Install left-hand belt cover No. 2.

Tightening torque:

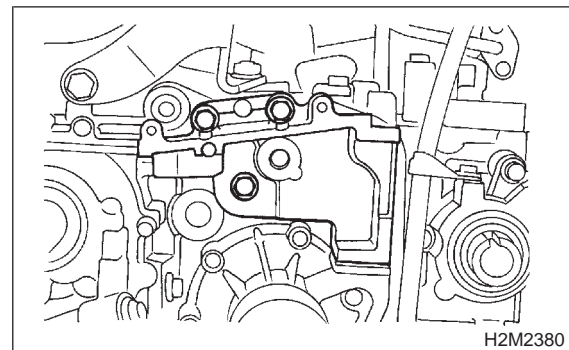
5±1 N·m (0.5±0.1 kg·m, 3.6±0.7 ft·lb)



- 3) Install tensioner bracket.

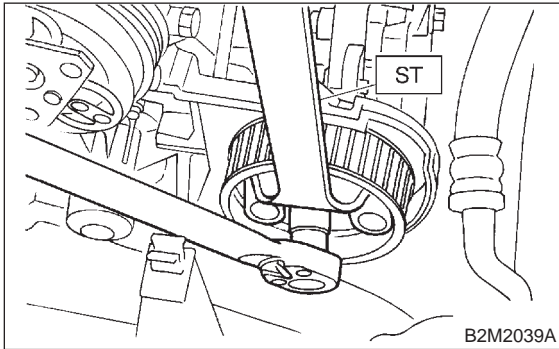
Tightening torque:

25±3 N·m (2.5±0.3 kg·m, 18.1±2.2 ft·lb)



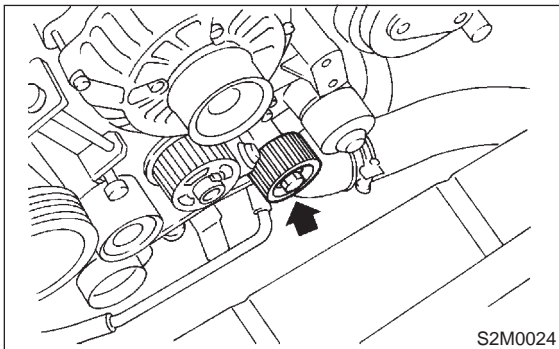
- 4) Install left-hand camshaft sprockets by using ST.
ST 4992707100 CAMSHAFT SPROCKET WRENCH

Tightening torque:
78±5 N·m (8.0±0.5 kg·m, 57.9±3.6 ft·lb)

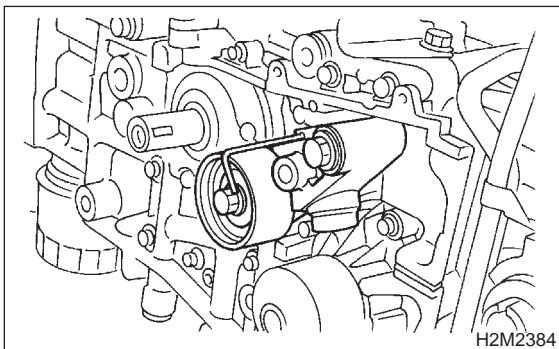


- 5) Install belt idler No. 2.

Tightening torque:
39±4 N·m (4.0±0.4 kg·m, 28.9±2.9 ft·lb)

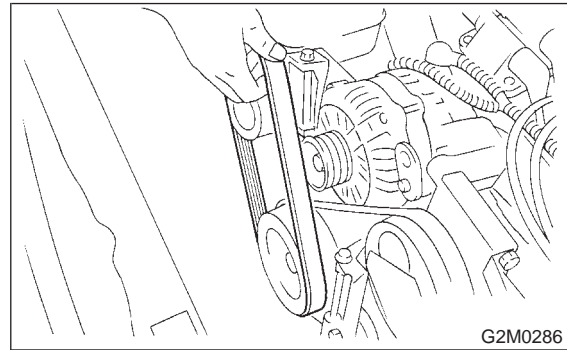


- 6) Install automatic belt tension adjuster which tension rod is held with pin. <Ref. to 2-3 [W3C2].>

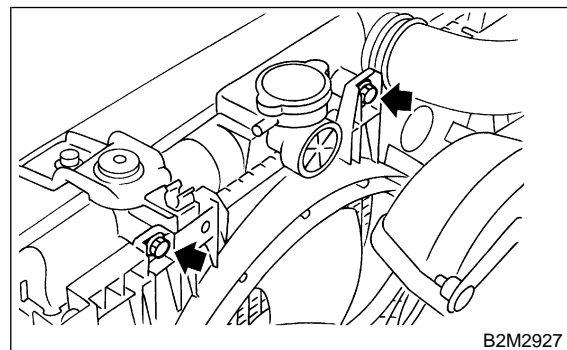


- 7) Install timing belt. <Ref. to 2-3 [W2C0].>

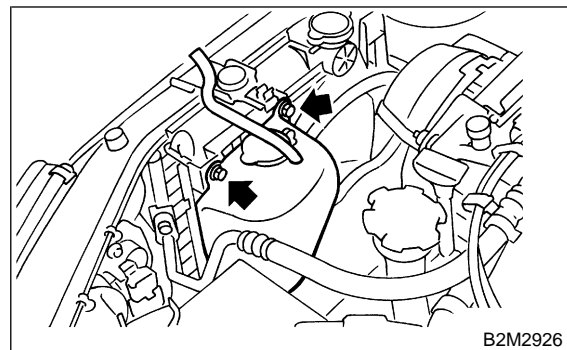
- 8) Install V-belts. <Ref. to 1-5 [G1B0].>



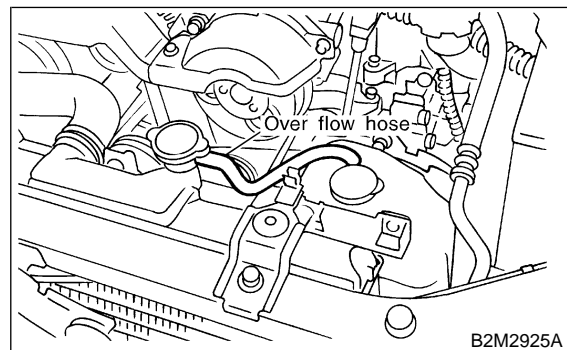
- 9) Install radiator main fan and sub fan motor assemblies. <Ref. to 2-5 [W5A0].> and <Ref. to 2-5 [W6A0].>



- 10) Install reservoir tank.

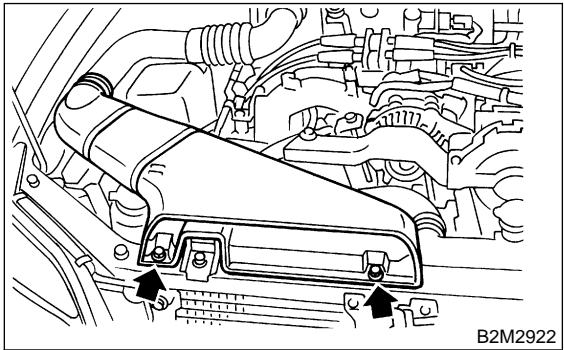


- 11) Connect over flow hose.



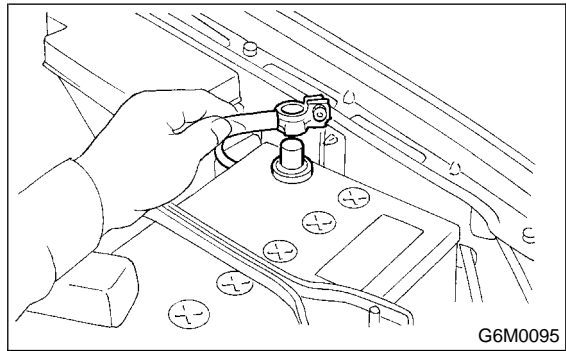
1. Water Pump

12) Install air intake duct.



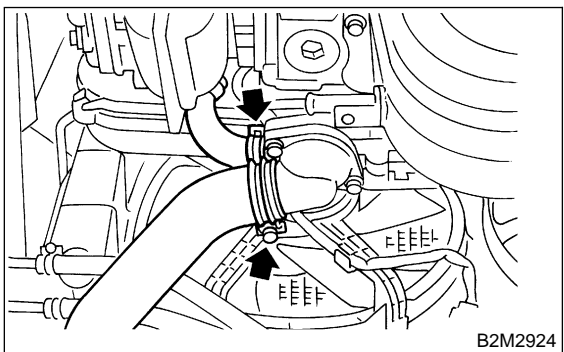
17) Lower the vehicle.

18) Connect battery ground cable.



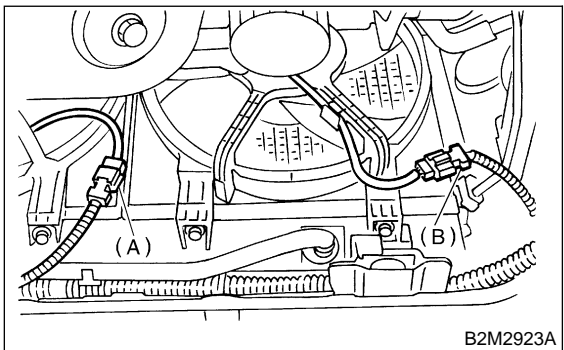
13) Lift-up the vehicle.

14) Connect radiator outlet hose and heater hose to water pump.

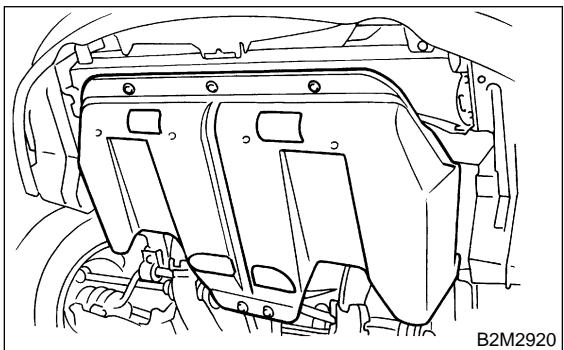


19) Fill coolant. <Ref. to 2-5 [W9B0].>

15) Connect connectors to radiator main fan (A) and sub fan (B) motors.



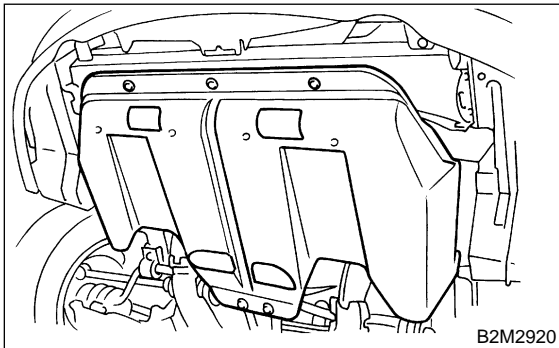
16) Install under cover.



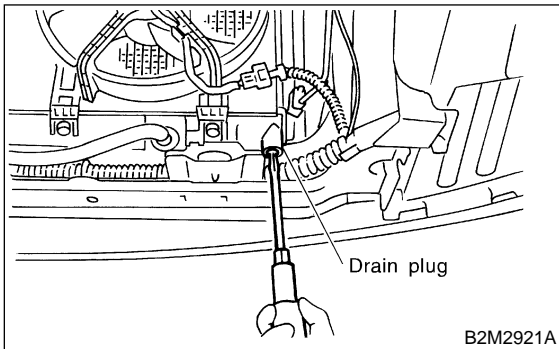
2. Thermostat

A: REMOVAL AND INSTALLATION

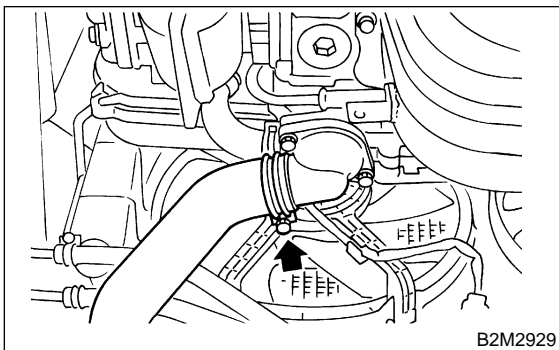
- 1) Lift-up the vehicle.
- 2) Remove under cover.



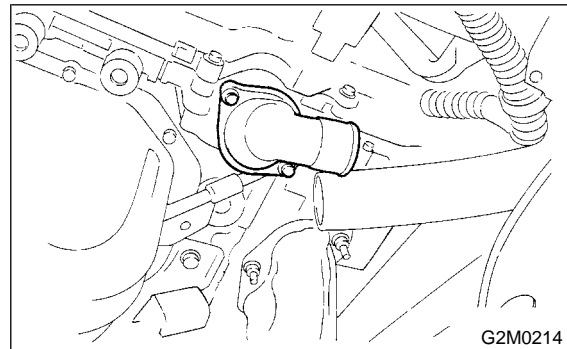
- 3) Drain engine coolant completely. <Ref. to 2-5 [W9A0].>



- 4) Disconnect radiator outlet hose from thermostat cover.



- 5) Remove thermostat cover and gasket, and pull out the thermostat.



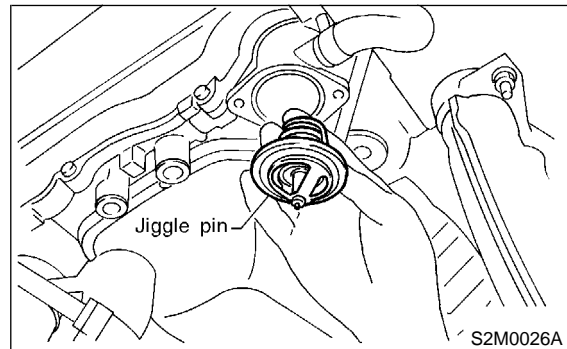
- 6) Install the thermostat in the water pump, and install the thermostat cover together with a gasket.

CAUTION:

- When reinstalling the thermostat, use a new gasket.
- The thermostat must be installed with the jiggle pin facing to front side.
- At this time, set the jiggle pin of thermostat for front side.

Tightening torque:

$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)



- 7) Fill coolant. <Ref. to 2-5 [W9B0].>

B: INSPECTION

Replace the thermostat if the valve does not close completely at an ambient temperature or if the following test shows unsatisfactory results.

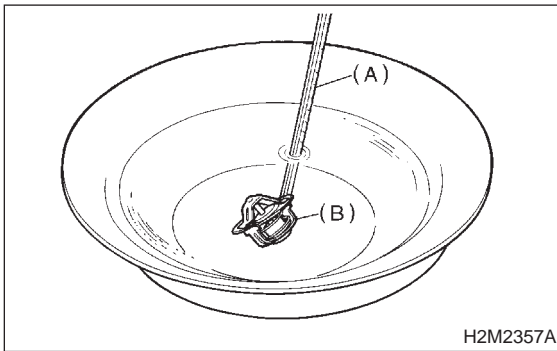
Immerse the thermostat and a thermometer in water. Raise water temperature gradually, and measure the temperature and valve lift when the valve begins to open and when the valve is fully opened. During the test, agitate the water for even temperature distribution. The measurement should be to the specification.

Starts to open:

76.0 — 80.0°C (169 — 176°F)

Fully opens:

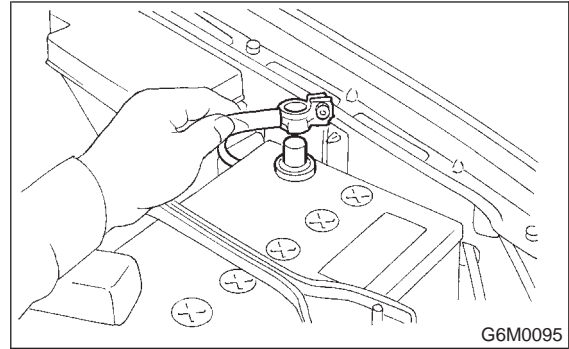
91°C (196°F)



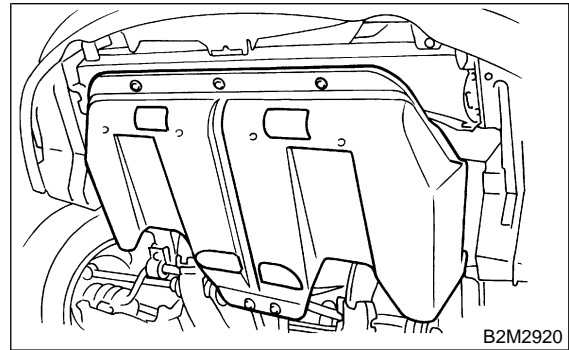
- (A) Thermometer
- (B) Thermostat

3. Radiator**A: REMOVAL**

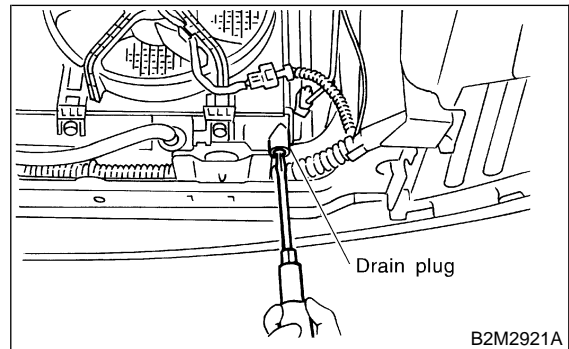
- 1) Disconnect battery ground cable.



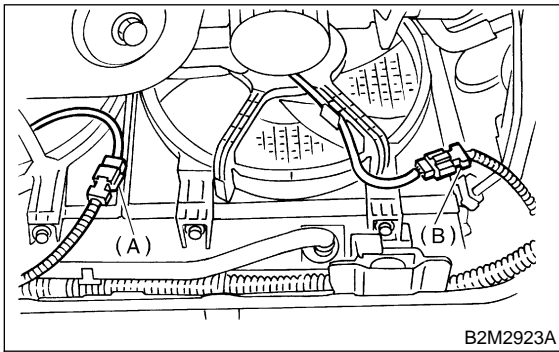
- 2) Lift-up the vehicle.
- 3) Remove under cover.



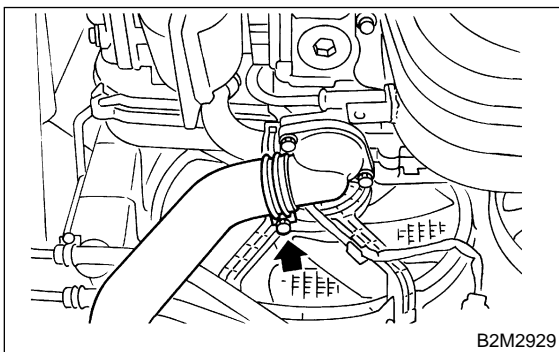
- 4) Drain engine coolant completely. <Ref. to 2-5 [W9A0].>



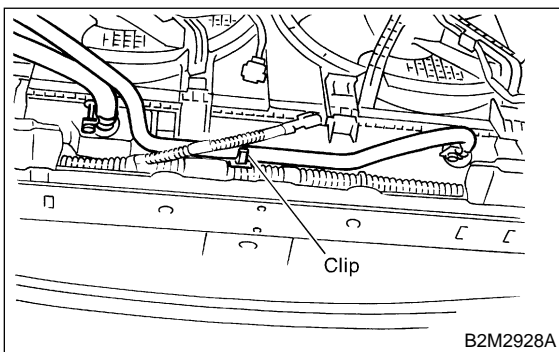
5) Disconnect connectors of radiator main fan (A) and sub fan (B) motor.



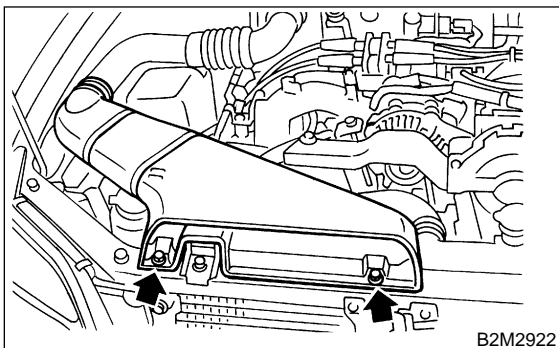
6) Disconnect radiator outlet hose from thermostat cover.



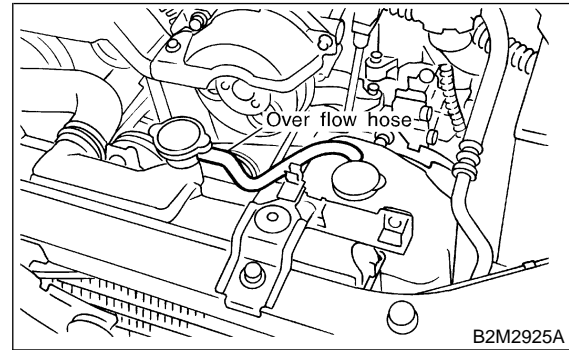
7) Disconnect ATF cooler hoses from radiator. (AT vehicles only)



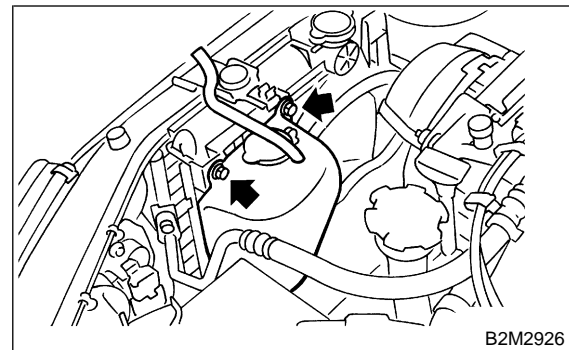
8) Lower the vehicle.
9) Remove air intake duct.



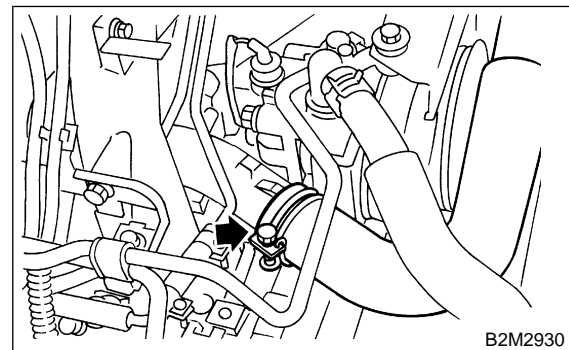
10) Disconnect over flow hose.



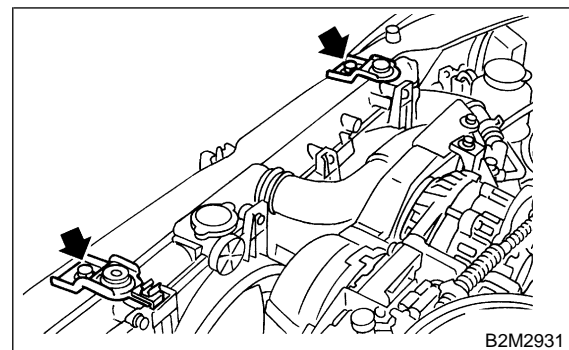
11) Remove reservoir tank.



12) Disconnect radiator inlet hose from engine.

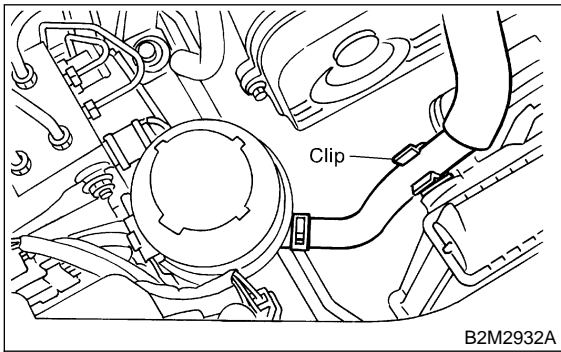


13) Remove radiator upper brackets.

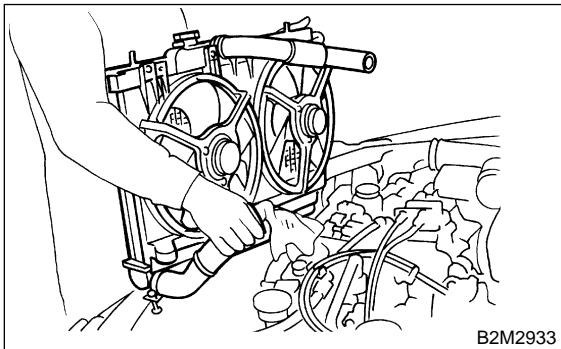


3. Radiator

- 14) Detach power steering hose from the clip on the radiator.



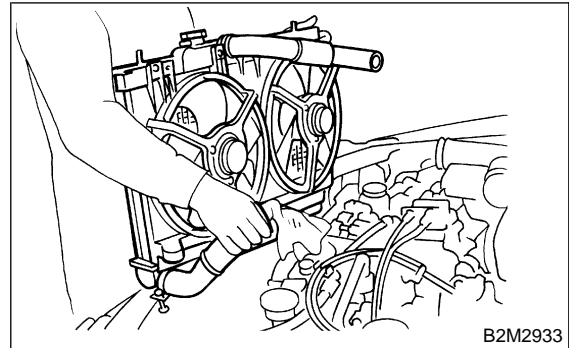
- 15) While slightly lifting radiator, slide it to left.
16) Lift radiator up and away from vehicle.



- 2) Install radiator while fitting radiator pins to cushions.

NOTE:

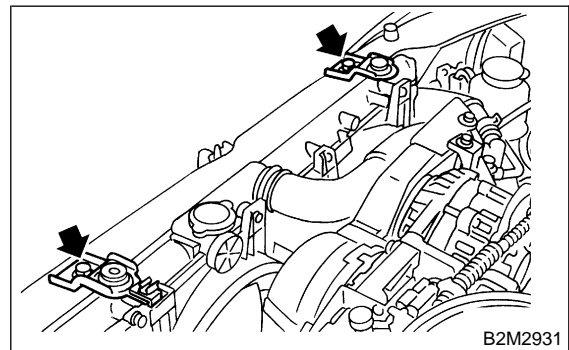
Fit pins on lower side of radiator into cushions on body side.



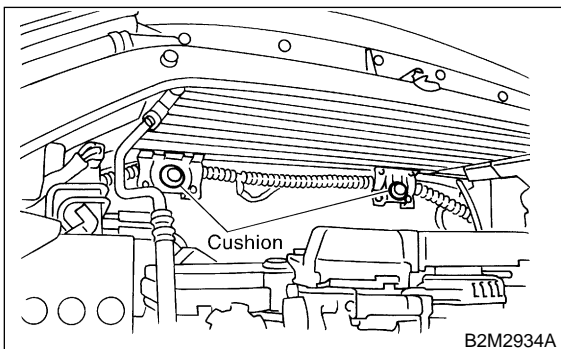
- 3) Install radiator brackets and tighten bolts.

Tightening torque:

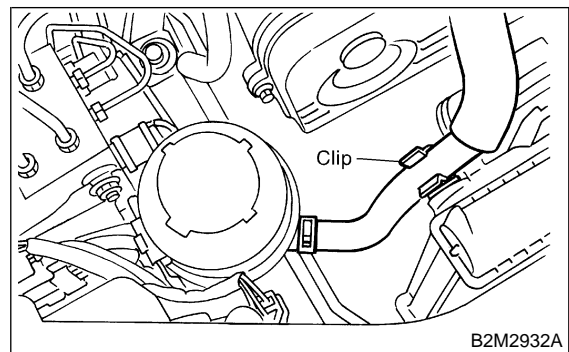
$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)

**B: INSTALLATION**

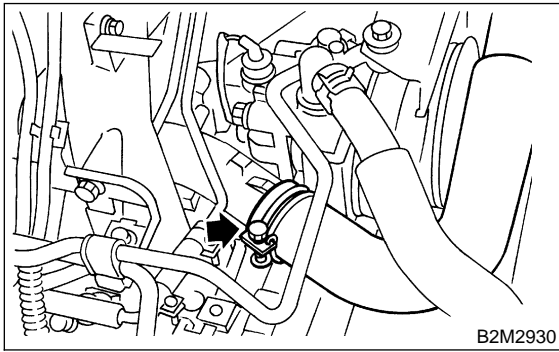
- 1) Attach radiator mounting cushions to holes on the vehicle.



- 4) Attach power steering hose to the radiator.



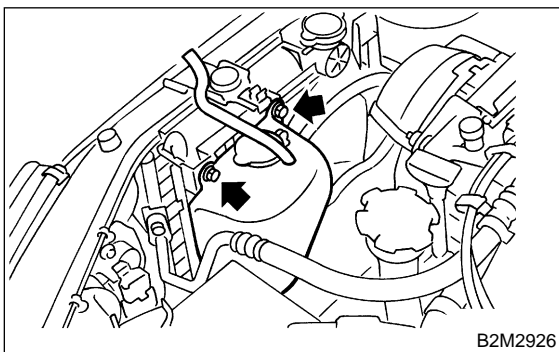
5) Connect radiator inlet hose.



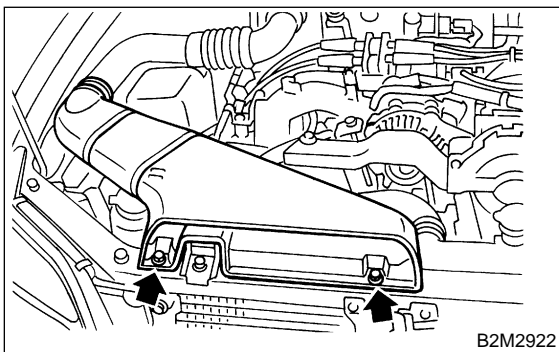
6) Install reservoir tank.

Tightening torque:

$4.9 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.50 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)

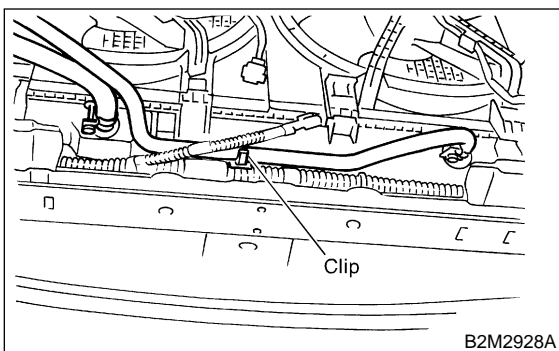


7) Install air intake duct.

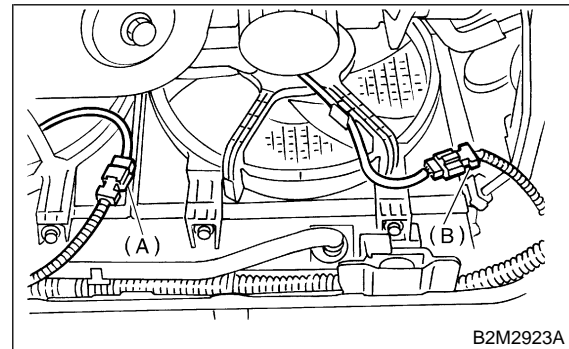


8) Lift-up the vehicle.

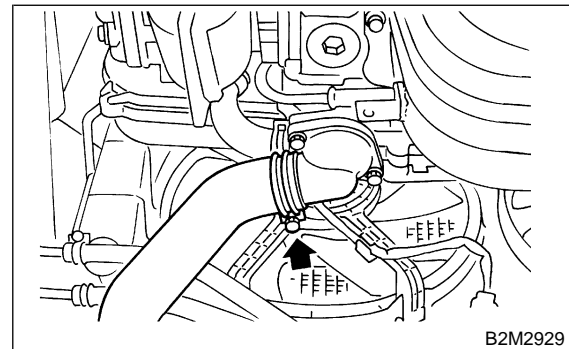
9) Connect ATF cooler hoses. (AT vehicles only)



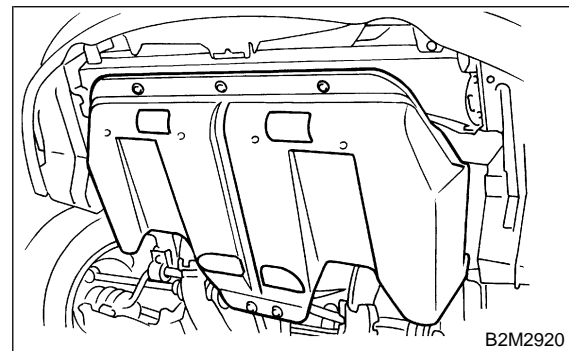
10) Connect connectors to radiator main fan motor and sub fan motor.



11) Connect radiator outlet hose.

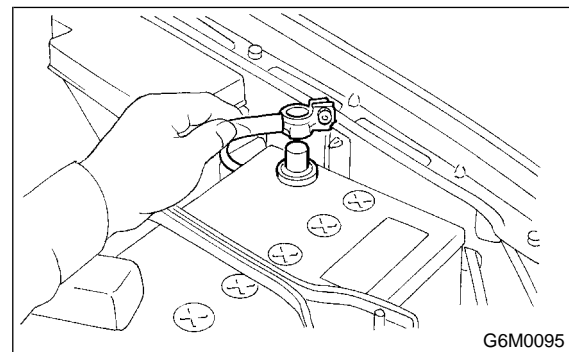


12) Install under cover.



13) Lower the vehicle.

14) Connect battery ground cable.



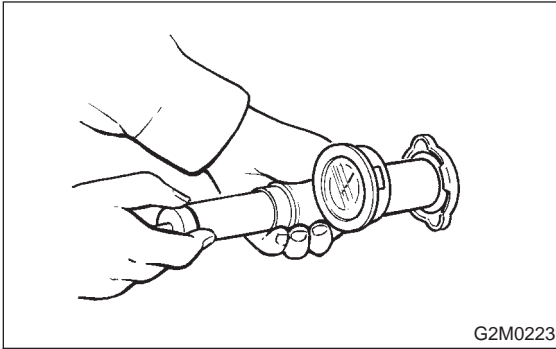
15) Fill coolant. <Ref. to 2-5 [W9B0].>

16) Check ATF level. <Ref. to 3-2 [W1B1].>

4. Radiator Cap

A: INSPECTION

- 1) Attach radiator cap to tester.



- 2) Increase pressure until tester gauge pointer stops. Radiator cap is functioning properly if it holds the service limit pressure for five to six seconds.

Standard pressure:

93 — 123 kPa (0.95 — 1.25 kg/cm², 14 — 18 psi)

Service limit pressure:

83 kPa (0.85 kg/cm², 12 psi)

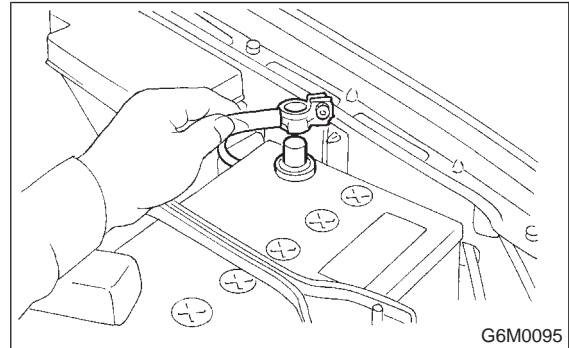
CAUTION:

Be sure to remove foreign matter and rust from the cap in advance otherwise, results of pressure test will be incorrect.

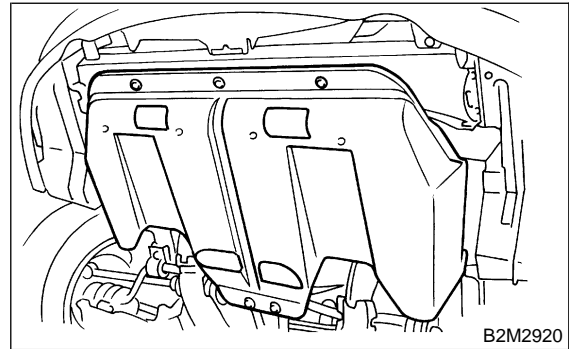
5. Radiator Main Fan and Fan Motor

A: REMOVAL AND INSTALLATION

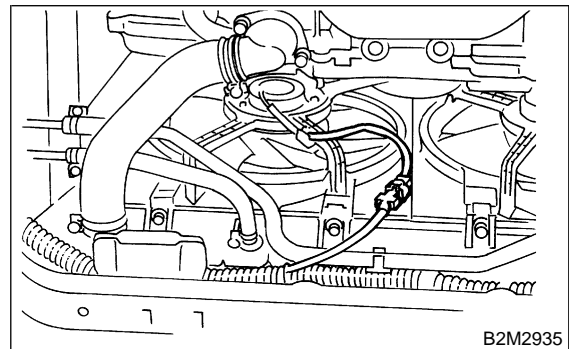
- 1) Disconnect battery ground cable.



- 2) Lift-up the vehicle.
- 3) Remove under cover.



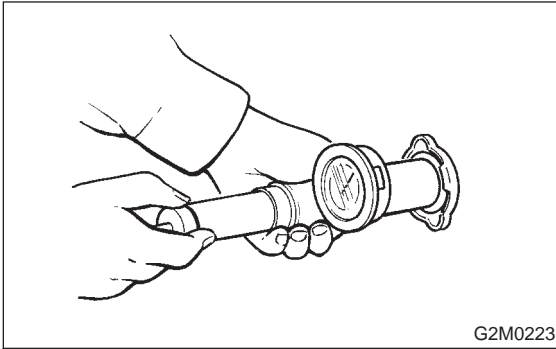
- 4) Disconnect connector of main fan motor.



4. Radiator Cap

A: INSPECTION

- 1) Attach radiator cap to tester.



- 2) Increase pressure until tester gauge pointer stops. Radiator cap is functioning properly if it holds the service limit pressure for five to six seconds.

Standard pressure:

93 — 123 kPa (0.95 — 1.25 kg/cm², 14 — 18 psi)

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83 kPa (0.85 kg/cm², 12 psi)

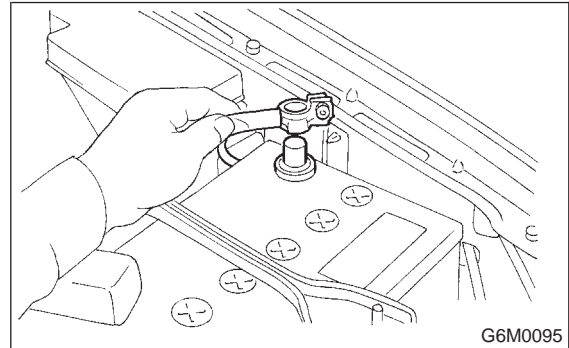
CAUTION:

Be sure to remove foreign matter and rust from the cap in advance otherwise, results of pressure test will be incorrect.

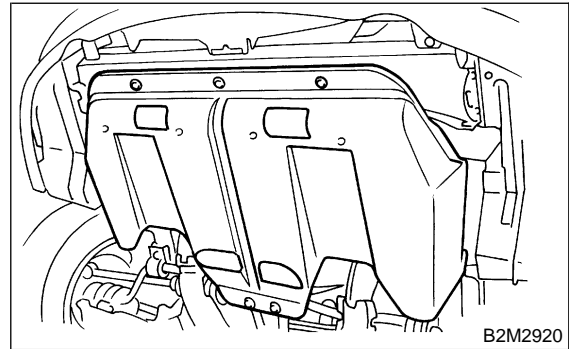
5. Radiator Main Fan and Fan Motor

A: REMOVAL AND INSTALLATION

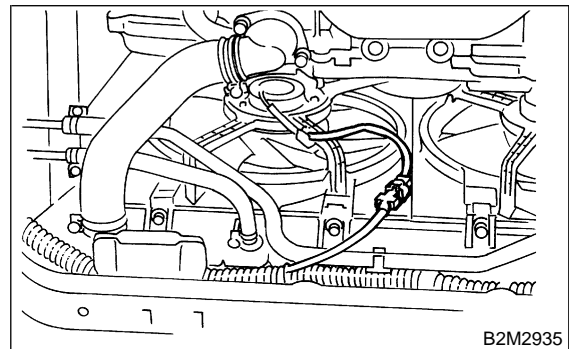
- 1) Disconnect battery ground cable.



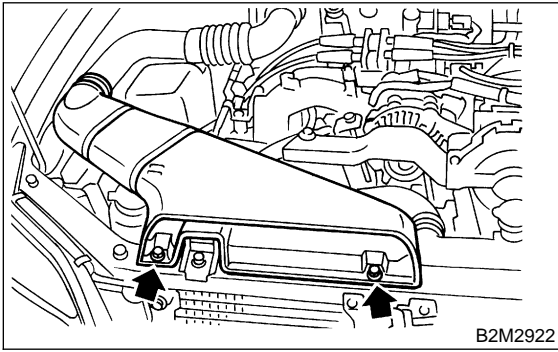
- 2) Lift-up the vehicle.
- 3) Remove under cover.



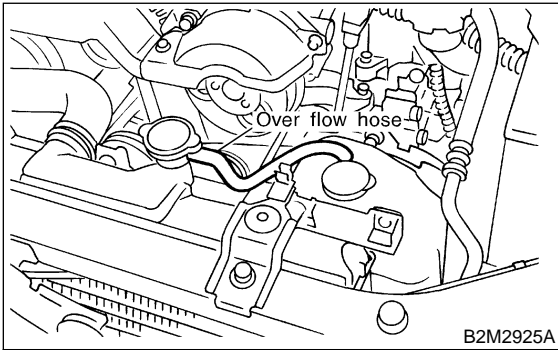
- 4) Disconnect connector of main fan motor.



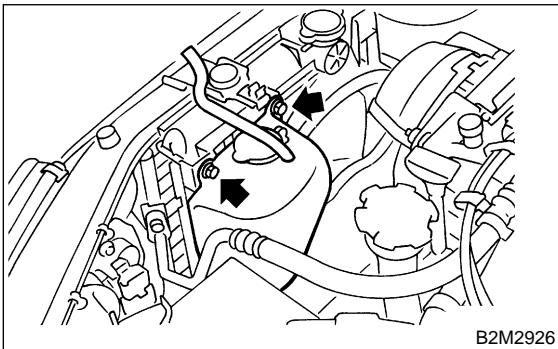
- 5) Lower the vehicle.
- 6) Remove air intake duct.



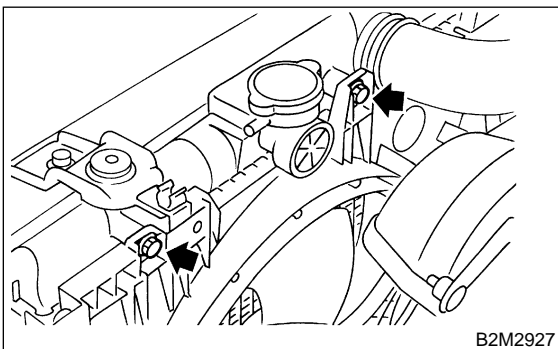
- 7) Disconnect over flow hose.



- 8) Remove reservoir tank.



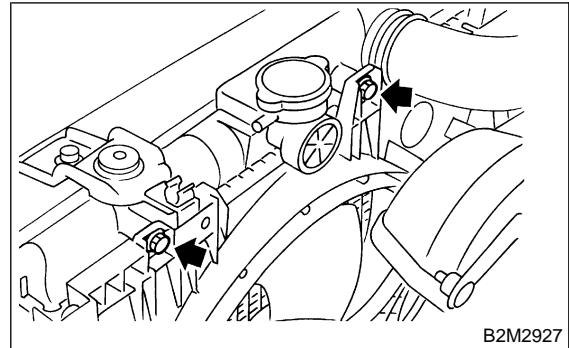
- 9) Remove radiator main fan motor assembly.



- 10) Installation is in the reverse order of removal.

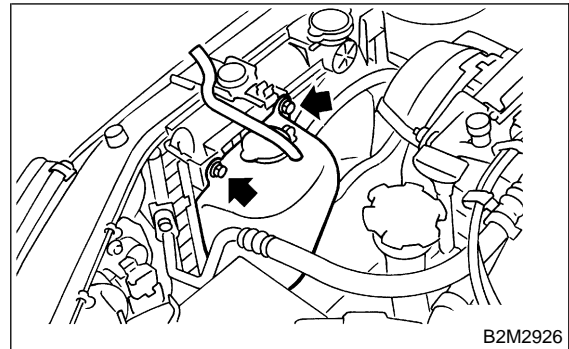
NOTE:

When the main fan motor assembly cannot be installed as is, loosen the sub fan motor assembly securing bolts to install it. <Ref. to 2-5 [W6A0].>



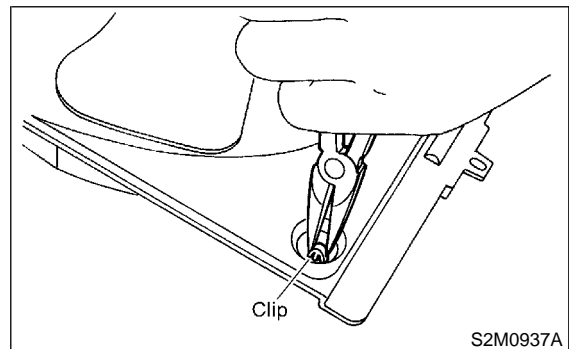
Tightening torque:

$4.9 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.50 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)



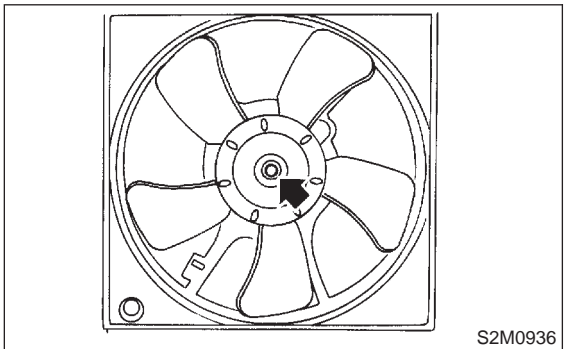
B: DISASSEMBLY AND ASSEMBLY

- 1) Remove clip which holds motor connector onto shroud.

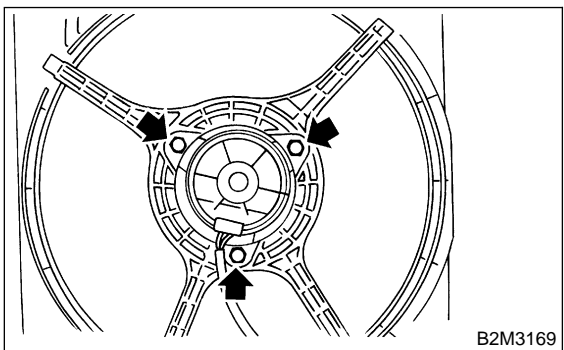


6. Radiator Sub Fan and Fan Motor

2) Remove nut which holds fan itself onto fan motor and shroud assembly.



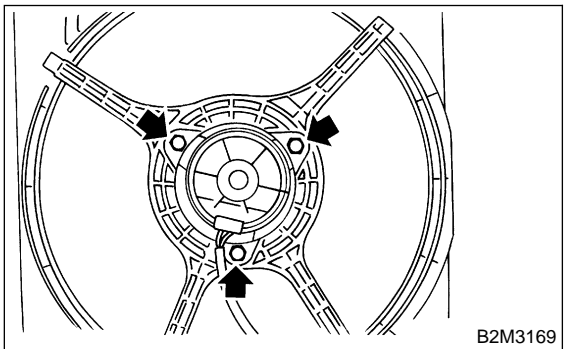
3) Remove bolts which install fan motor onto shroud.



4) Installation is in the reverse order of removal.

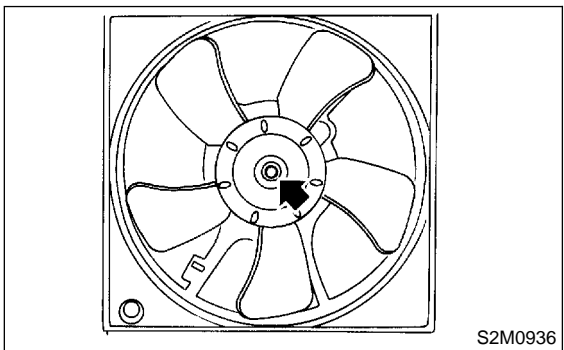
Tightening torque:

$4.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.3 \pm 0.4 \text{ ft}\cdot\text{lb}$)



Tightening torque:

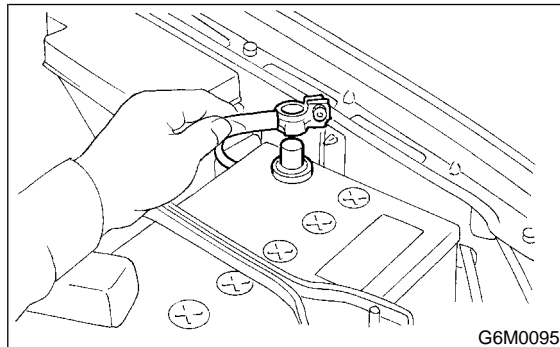
$3.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.35 \pm 0.05 \text{ kg}\cdot\text{m}$, $2.5 \pm 0.4 \text{ ft}\cdot\text{lb}$)



6. Radiator Sub Fan and Fan Motor

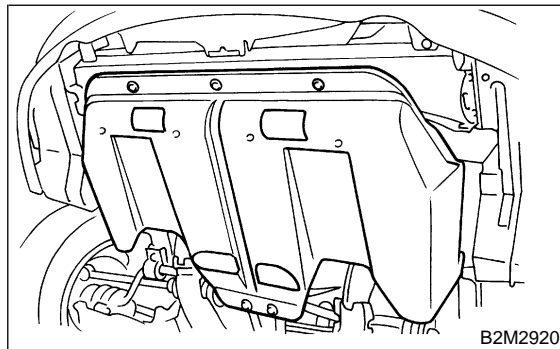
A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.

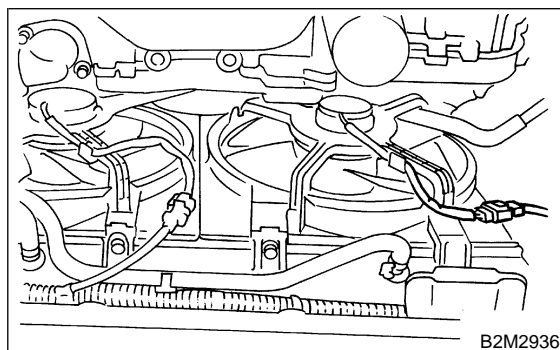


2) Lift-up the vehicle.

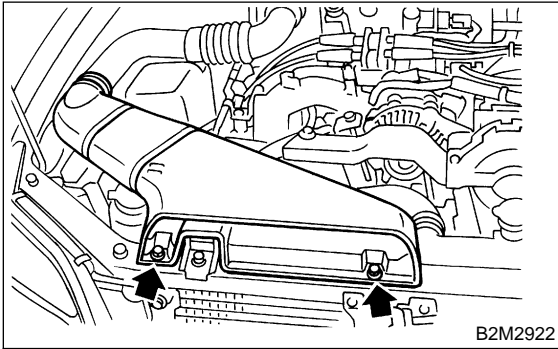
3) Remove under cover.



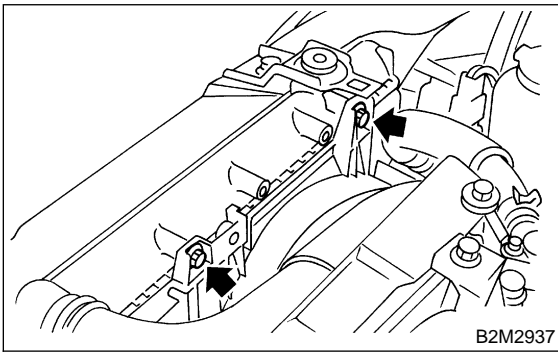
4) Disconnect connector of sub fan motor.



- 5) Lower the vehicle.
- 6) Remove air intake duct.



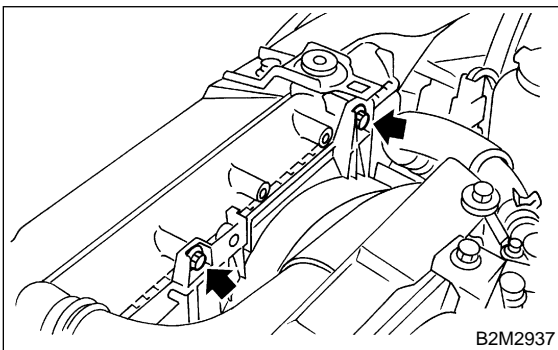
- 7) Remove bolts which hold sub fan shroud to radiator.
- 8) Remove radiator sub fan shroud through the under side of vehicle.



- 9) Installation is in the reverse order of removal.

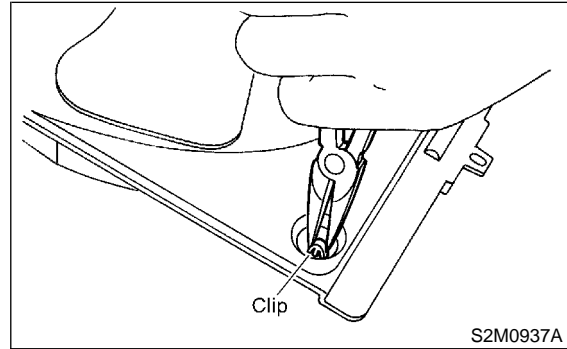
Tightening torque:

$4.9 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.50 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)

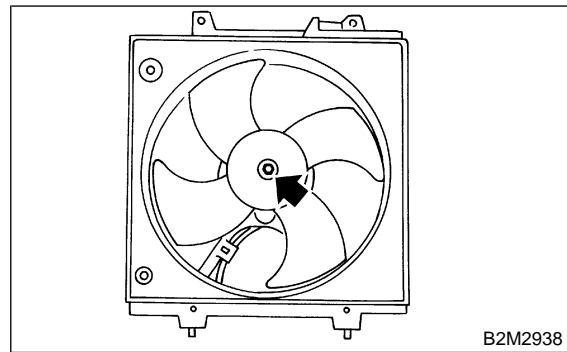


B: DISASSEMBLY AND ASSEMBLY

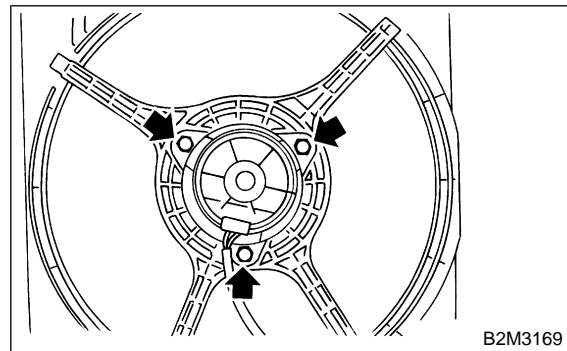
- 1) Remove clip which holds motor harness onto shroud.



- 2) Remove nut which holds fan itself onto fan motor and shroud assembly.



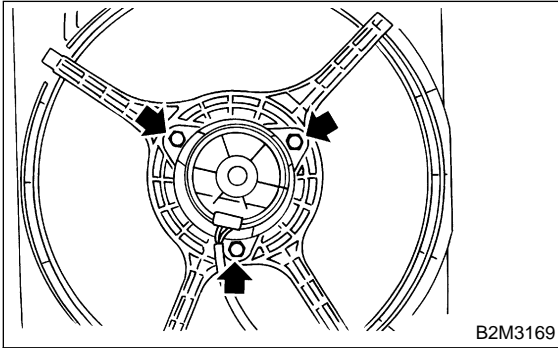
- 3) Remove bolts which install fan motor onto shroud.



4) Installation is in the reverse order of removal.

Tightening torque:

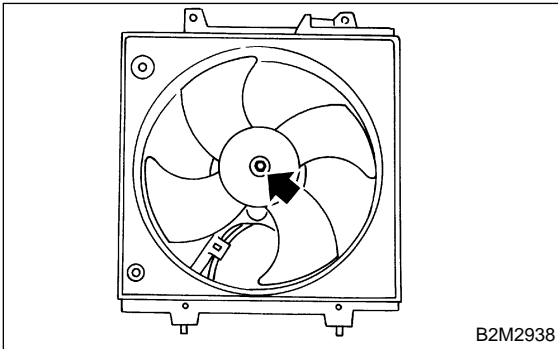
$4.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.3 \pm 0.4 \text{ ft}\cdot\text{lb}$)



B2M3169

Tightening torque:

$3.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.35 \pm 0.05 \text{ kg}\cdot\text{m}$, $2.5 \pm 0.4 \text{ ft}\cdot\text{lb}$)

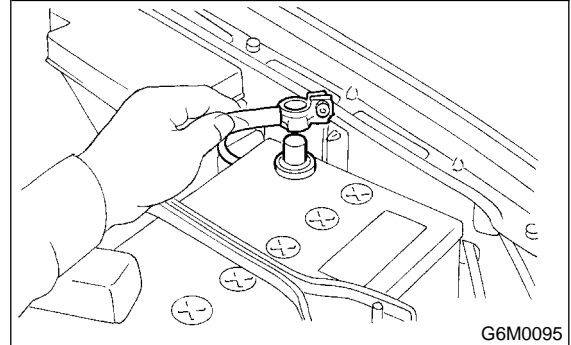


B2M2938

7. Water Pipe

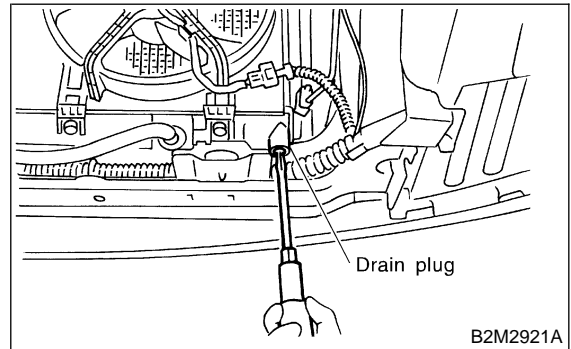
A: REMOVAL

- 1) Release fuel pressure.
<Ref. to 2-8 [W1A0].>
- 2) Disconnect ground cable from the battery.



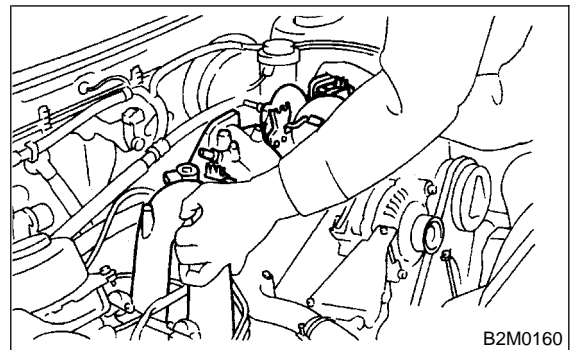
G6M0095

- 3) Drain engine coolant completely.
<Ref. to 2-5 [W9A0].>



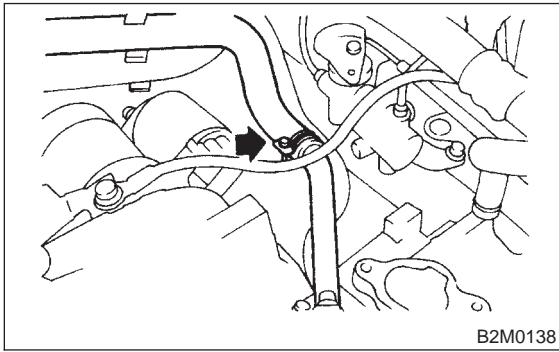
B2M2921A

- 4) Remove intake manifold.
<Ref. to 2-7 [W3A0].>

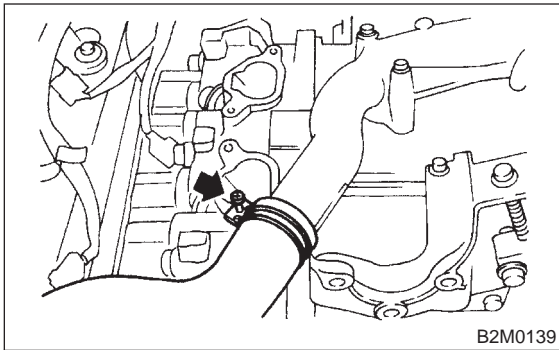


B2M0160

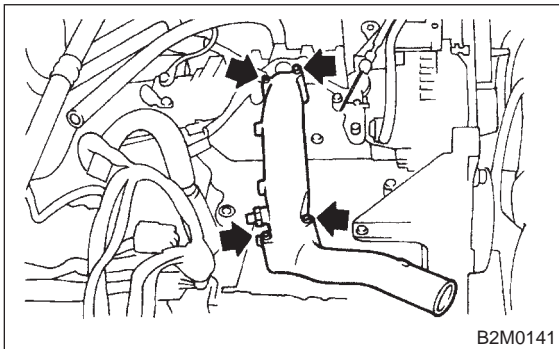
5) Disconnect heater inlet hose.



6) Disconnect radiator inlet hose from water pipe.



7) Remove bolts which install water pipe on cylinder block.



B: INSTALLATION

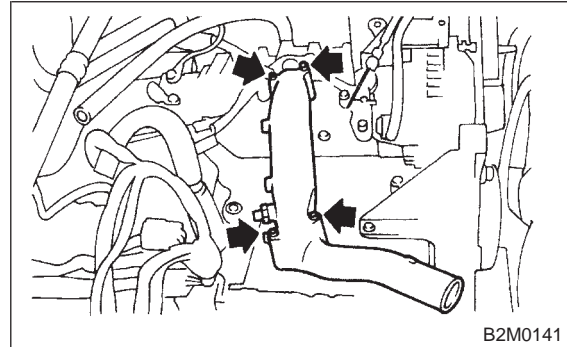
1) Install water pipe on cylinder block.

Tightening torque:

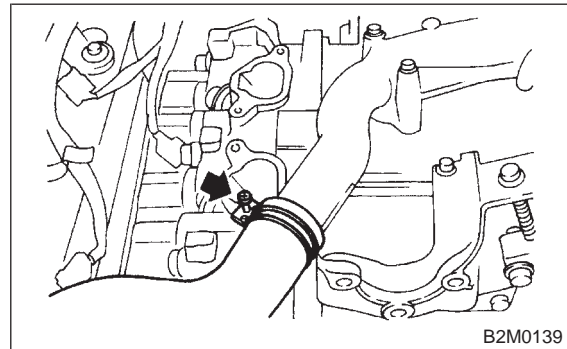
$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)

CAUTION:

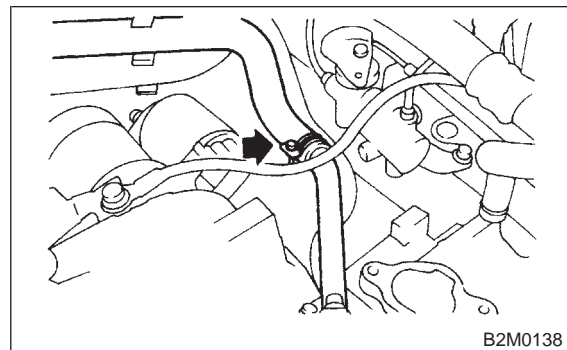
Use a new O-ring.



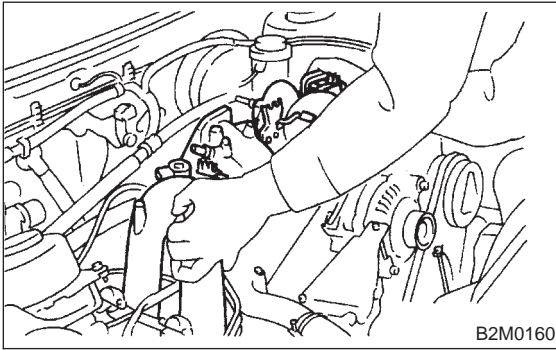
2) Connect radiator inlet hose.



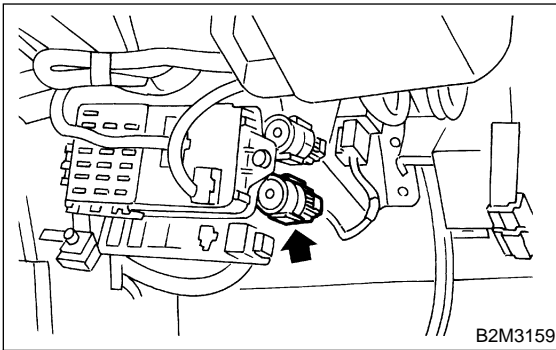
3) Connect heater inlet hose.



- 4) Install intake manifold. <Ref. to 2-7 [W3D0].>



- 5) Connect connector of fuel pump relay.

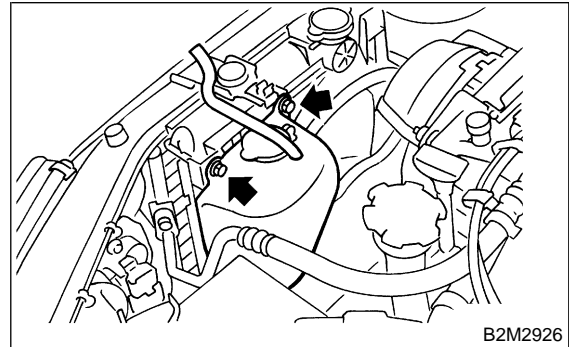


- 6) Connect battery ground cable.
7) Fill coolant. <Ref. to 2-5 [W9B0].>

8. Reservoir Tank

A: REMOVAL AND INSTALLATION

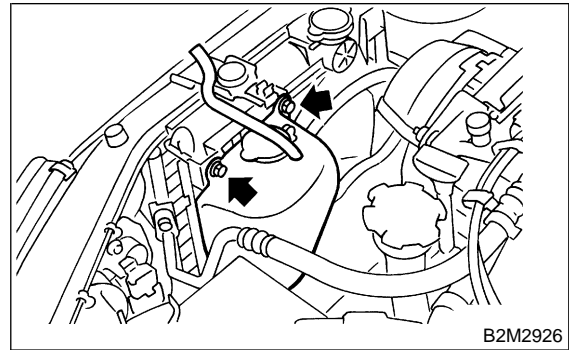
- 1) Disconnect over flow hose from radiator filler neck position.
- 2) Remove bolts which install reservoir tank onto radiator main fan shroud.
- 3) Remove reservoir tank.



- 4) Installation is in the reverse order of removal.

Tightening torque:

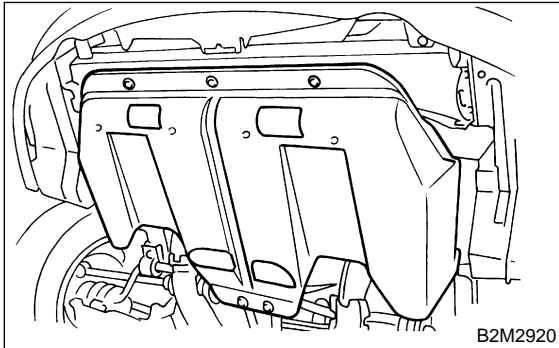
4.9 ± 1.5 N·m (0.50 ± 0.15 kg·m, 3.6 ± 1.1 ft·lb)



9. Engine Coolant

A: DRAINING OF ENGINE COOLANT

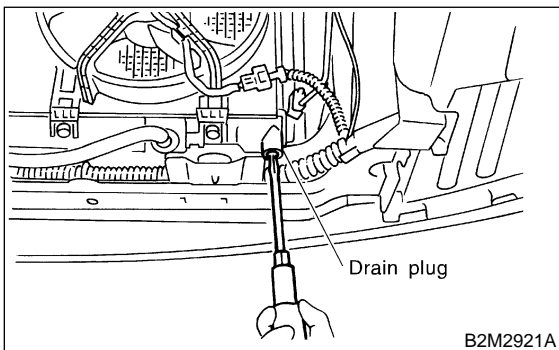
- 1) Lift-up the vehicle.
- 2) Remove under cover.



- 3) Remove drain cock to drain engine coolant into container.

NOTE:

Remove radiator cap so that engine coolant will drain faster.



B: FILLING OF ENGINE COOLANT

- 1) Fill engine coolant into radiator up to filler neck position.

Coolant capacity (fill up to "FULL" level):

MT model;

Approx. 6.4 ℓ (6.8 US qt, 5.6 Imp qt)

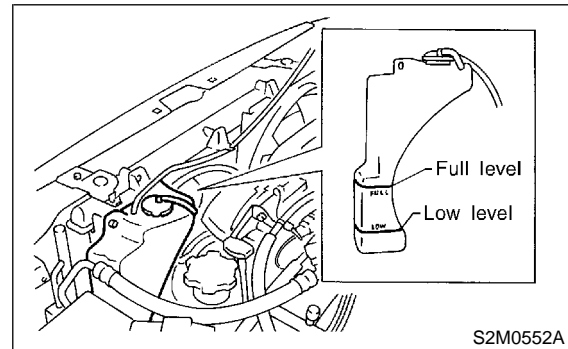
AT model;

Approx. 6.3 ℓ (6.7 US qt, 5.5 Imp qt)

CAUTION:

The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crankcase. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.

- 2) Fill engine coolant into reservoir tank up to upper level.



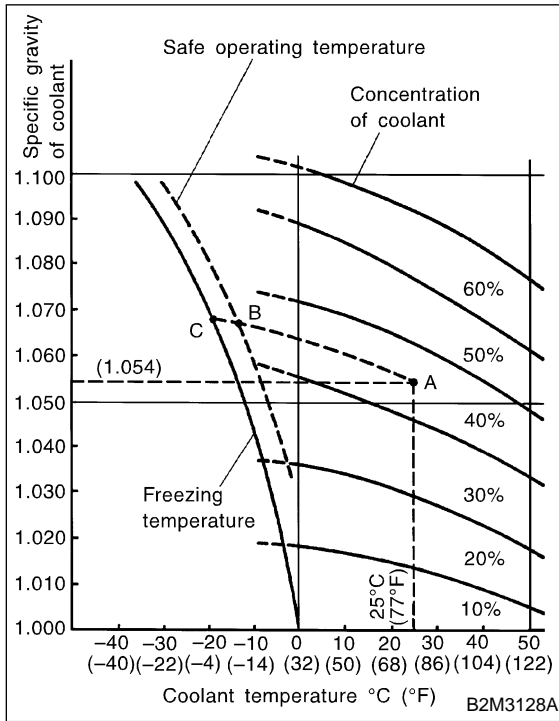
- 3) Attach radiator cap and reservoir tank cap properly.
- 4) Warm-up engine completely for more than five minutes at 2,000 to 3,000 rpm.
- 5) If engine coolant level drops in radiator, add engine coolant to filler neck position.
- 6) If engine coolant level drops from upper level of reservoir tank, add engine coolant to upper level.
- 7) Attach radiator cap and reservoir tank cap properly.

1. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

The concentration and safe operating temperature of the SUBARU coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.

[Example]

If the coolant temperature is 25°C (77°F) and its specific gravity is 1.054, the concentration is 35% (point A), the safe operating temperature is -14°C (7°F) (point B), and the freezing temperature is -20°C (-4°F) (point C).



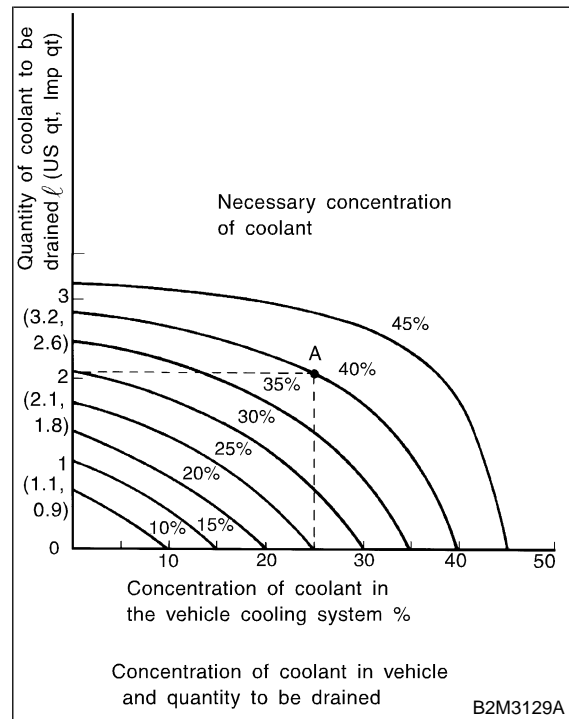
2. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

To adjust the concentration of the coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU genuine coolant (concentration 50). The amount of coolant that should be replaced can be determined using the diagram.

[Example]

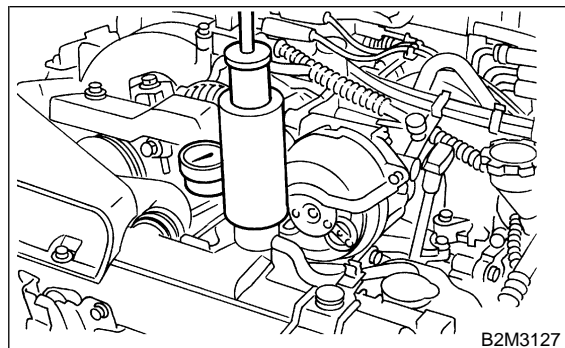
Assume that the coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of coolant concentration intersects with the 40% curve of the necessary coolant concentration, and read the scale on the vertical axis of the graph at height A. The quantity of coolant to be drained is 2.1 liters (2.2 US qt, 1.8 Imp qt). Drain 2.1 liters (2.2 US qt, 1.8 Imp qt) of coolant from the cooling system and add 2.1 liters (2.2 US qt, 1.8 Imp qt) of the undiluted solution of SUBARU coolant.

If a coolant concentration of 50% is needed, drain all the coolant and refill with the undiluted solution only.



C: CHECKING OF COOLING SYSTEM

- 1) Remove radiator cap, top off radiator, and attach tester to radiator in place of cap.



2) Apply a pressure of 157 kPa (1.6 kg/cm², 23 psi) to radiator to check if:

- (1) Engine coolant leaks at/around radiator.
- (2) Engine coolant leaks at/around hoses or connections.

CAUTION:

- Engine should be off.

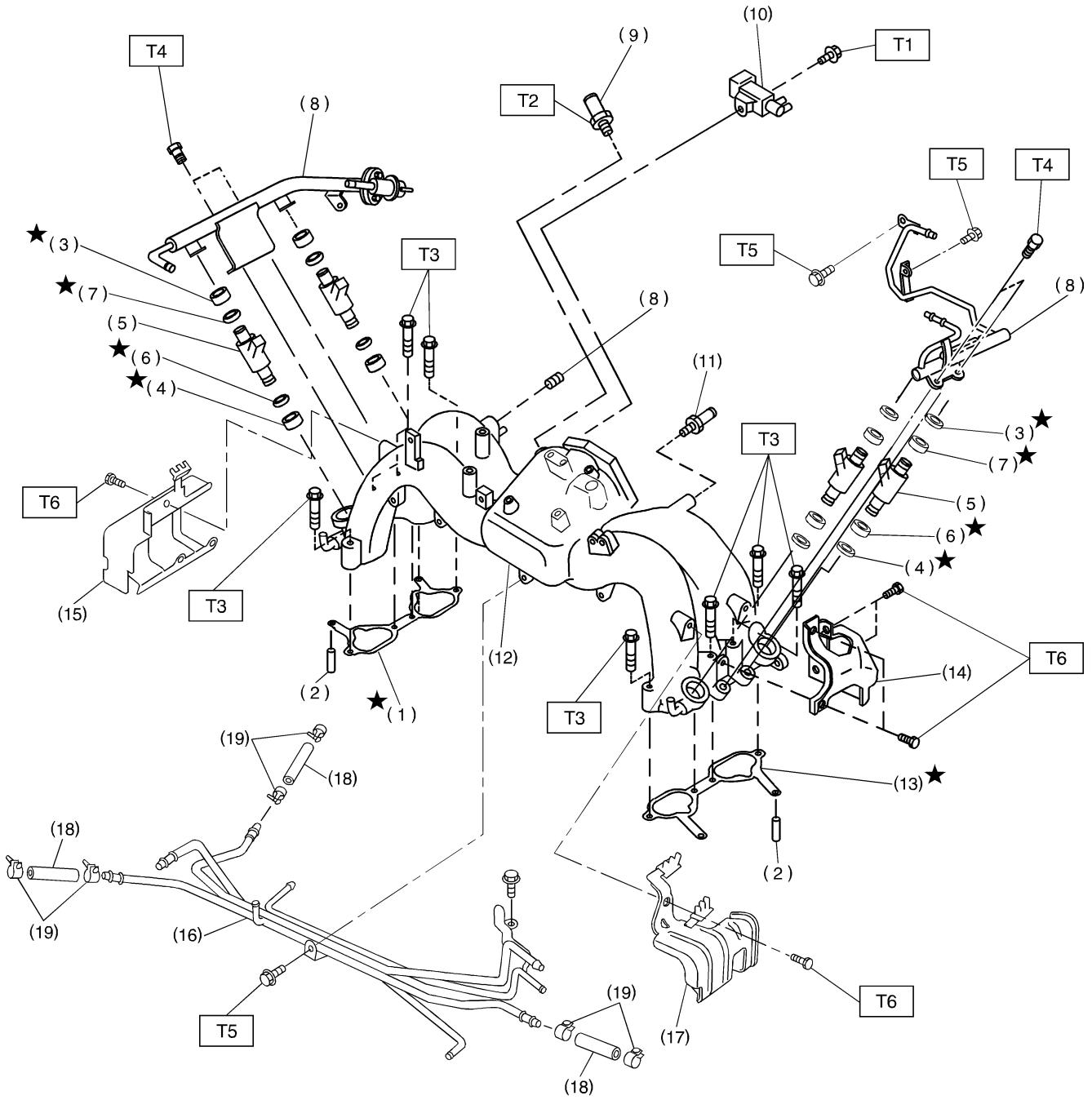
- Wipe engine coolant from check points in advance.
- Be careful to prevent engine coolant from spurting out when removing tester.
- Be careful also not to deform filler neck of radiator when installing or removing tester.

1. Engine Cooling System Trouble in General

Trouble		Corrective action
Over-heating	a. Insufficient engine coolant	Replenish engine coolant, inspect for leakage, and repair.
	b. Loose timing belt	Repair or replace timing belt tensioner.
	c. Oil on drive belt	Replace.
	d. Malfunction of thermostat	Replace.
	e. Malfunction of water pump	Replace.
	f. Clogged engine coolant passage	Clean.
	g. Improper ignition timing	Inspect and repair ignition control system. <Ref. to 2-7 [T100].>
	h. Clogged or leaking radiator	Clean or repair, or replace.
	i. Improper engine oil in engine coolant	Replace engine coolant.
	j. Air/fuel mixture ratio too lean	Inspect and repair fuel injection system. <Ref. to 2-7 [T100].>
	k. Excessive back pressure in exhaust system	Clean or replace.
	l. Insufficient clearance between piston and cylinder	Adjust or replace.
	m. Slipping clutch	Repair or replace.
	n. Dragging brake	Adjust.
	o. Improper transmission oil	Replace.
p. Defective thermostat	Replace.	
q. Malfunction of electric fan	Inspect radiator fan relay, engine coolant temperature sensor or radiator motor and replace there.	
Over-cooling	a. Atmospheric temperature extremely low	Partly cover radiator front area.
	b. Defective thermostat	Replace.
Engine coolant leaks.	a. Loosened or damaged connecting units on hoses	Repair or replace.
	b. Leakage from water pump	Replace.
	c. Leakage from water pipe	Repair or replace.
	d. Leakage around cylinder head gasket	Retighten cylinder head bolts or replace gasket.
	e. Damaged or cracked cylinder head and crank-case	Repair or replace.
	f. Damaged or cracked thermostat case	Repair or replace.
	g. Leakage from radiator	Repair or replace.
Noise	a. Defective drive belt	Replace.
	b. Defective radiator fan	Replace.
	c. Defective water pump bearing	Replace water pump.
	d. Defective water pump mechanical seal	Replace water pump.

1. Intake Manifold

A: MT VEHICLES



- | | |
|-----------------------------------|--------------------------------|
| (1) Intake manifold gasket RH | (11) Nipple |
| (2) Guide pin | (12) Intake manifold |
| (3) Insulator A | (13) Intake manifold gasket LH |
| (4) Insulator B | (14) Fuel pipe protector LH |
| (5) Fuel injector | (15) Fuel pipe protector RH |
| (6) O-ring B | (16) Fuel pipe ASSY |
| (7) O-ring A | (17) Fuel pipe protector LH |
| (8) Plug | (18) Fuel hose |
| (9) PCV valve | (19) Clip |
| (10) Purge control solenoid valve | |

Tightening torque: N·m (kg·m, ft·lb)

T1: 16±1.5 (1.6±0.15, 11.6±1.1)

T2: 23±3 (2.3±0.3, 16.6±2.2)

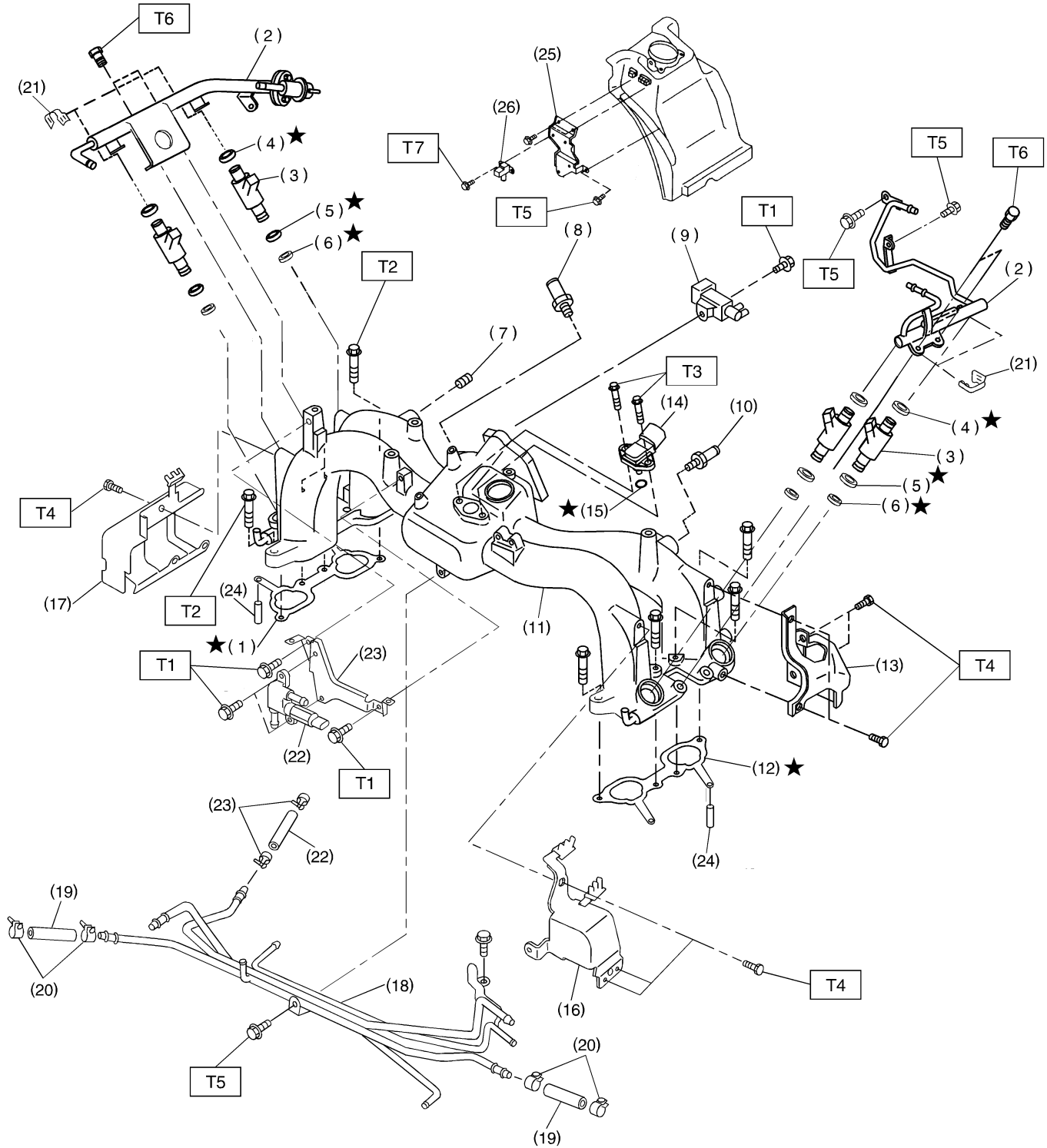
T3: 25±2 (2.5±0.2, 18.1±1.4)

T4: 3.4±0.5 (0.35±0.05, 2.5±0.4)

T5: 4.9±0.5 (0.5±0.05, 3.6±0.4)

T6: 18.6±1.5 (1.9±0.15, 13.7±1.1)

B: AT VEHICLES



B2M3454A

(1) Intake manifold gasket RH	(14) Intake air temperature and pressure sensor	(25) Atmospheric pressure sensor bracket
(2) Fuel injector pipe	(15) O-ring	(26) Atmospheric pressure sensor
(3) Fuel injector	(16) Fuel pipe protector LH	
(4) O-ring	(17) Fuel pipe protector RH	
(5) O-ring	(18) Fuel pipe ASSY	
(6) O-ring	(19) Fuel hose	
(7) Plug	(20) Clip	
(8) PCV valve	(21) Clip	
(9) Purge control solenoid valve	(22) Air assist injector solenoid valve	
(10) Nipple	(23) Air assist injector solenoid valve bracket	
(11) Intake manifold	(24) Guide pin	
(12) Intake manifold gasket LH		
(13) Fuel pipe protector LH		

Tightening torque: N-m (kg-m, ft-lb)

T1: 16±1.5 (1.6±0.15, 11.6±1.1)

T2: 25±2 (2.5±0.2, 18.1±1.4)

T3: 2.0±0.4 (0.2±0.04, 1.4±0.3)

T4: 18.6±1.5 (1.9±0.15, 13.7±1.1)

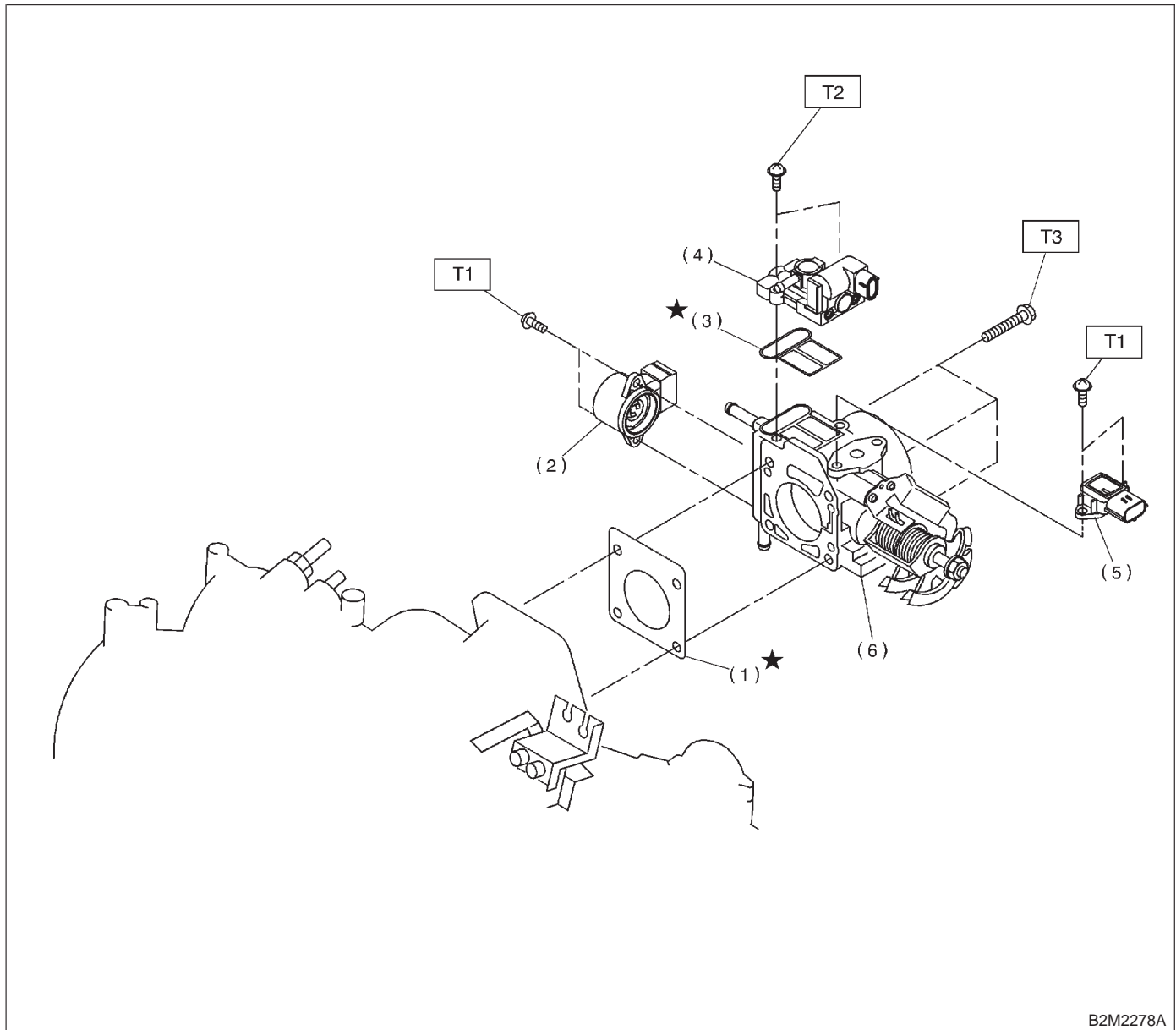
T5: 4.9±0.5 (0.5±0.05, 3.6±0.4)

T6: 3.4±0.5 (0.35±0.05, 2.5±0.4)

T7: 6.4±0.5 (0.65±0.05, 4.7±0.4)

2. Air Intake System

A: MT VEHICLES



- (1) Gasket
- (2) Throttle position sensor
- (3) Gasket
- (4) Idle air control solenoid valve
- (5) Intake manifold pressure sensor
- (6) Throttle body

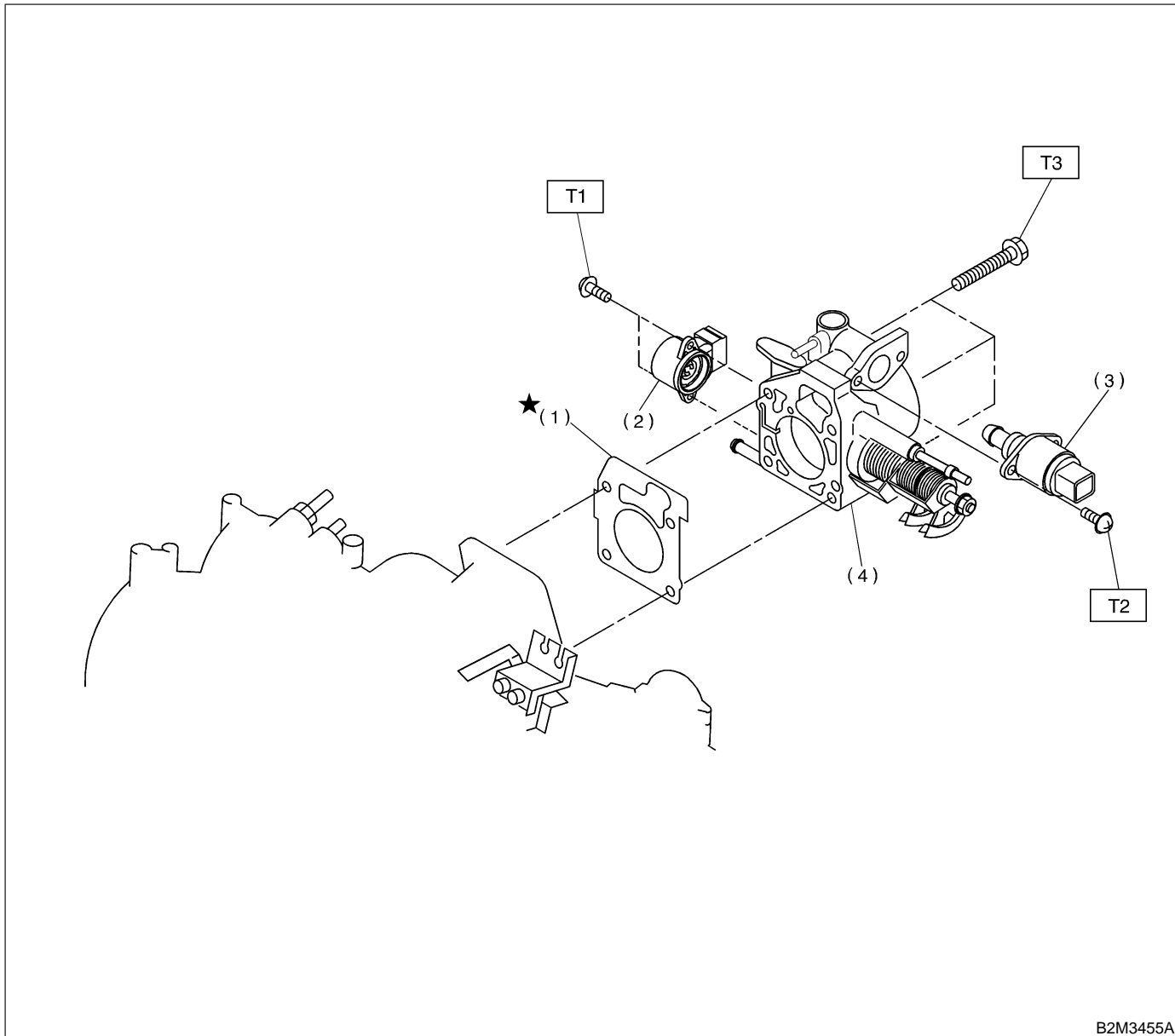
Tightening torque: N·m (kg·m, ft·lb)

T1: 2.2±0.2 (0.22±0.02, 1.6±0.1)

T2: 6.0±0.8 (0.61±0.08, 4.4±0.6)

T3: 22±2 (2.2±0.2, 15.9±1.4)

B: AT VEHICLES



B2M3455A

- (1) Gasket
- (2) Throttle position sensor
- (3) Idle air control solenoid valve
- (4) Throttle body

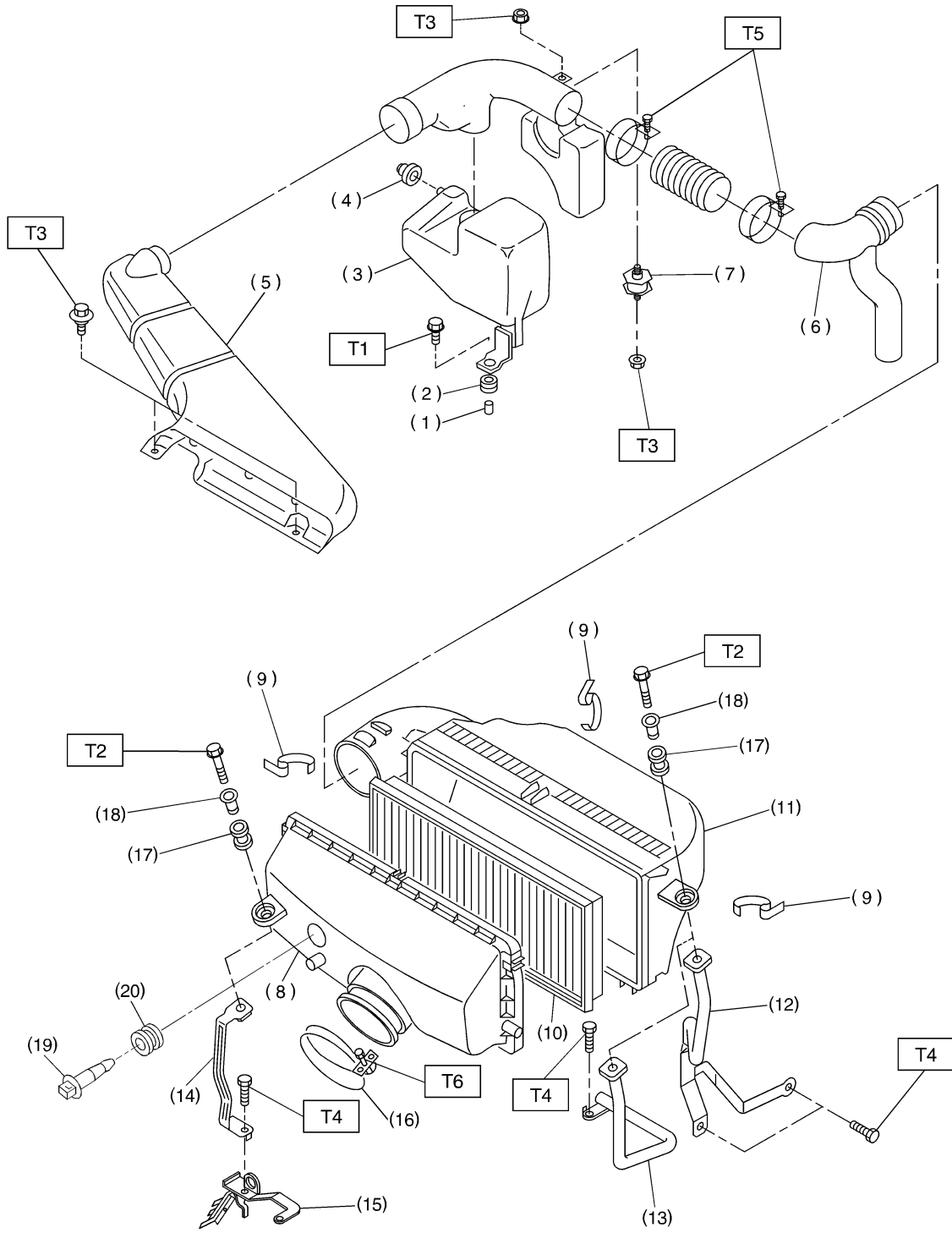
Tightening torque: N·m (kg·m, ft·lb)

T1: 2.0±0.4 (0.2±0.04, 1.4±0.3)

T2: 6.0±0.8 (0.61±0.08, 4.4±0.6)

T3: 19±5 (1.9±0.5, 13.7±3.6)

3. Air Cleaner



B2M3456A

- | | |
|--------------------------|---|
| (1) Spacer | (12) Air cleaner case stay LH (MT vehicles) |
| (2) Bush | (13) Air cleaner case stay LH (AT vehicles) |
| (3) Air chamber | (14) Air cleaner case stay RH |
| (4) Cushion rubber | (15) Engine harness bracket |
| (5) Air intake duct A | (16) Clamp |
| (6) Air intake duct B | (17) Bush |
| (7) Cushion | (18) Spacer |
| (8) Air cleaner case A | (19) Intake air temperature sensor |
| (9) Clip | (20) Rubber bush |
| (10) Air cleaner element | |
| (11) Air cleaner case B | |

Tightening torque: N·m (kg·m, ft·lb)

T1: 33±10 (3.4±1.0, 24.6±7.2)

T2: 6.4±0.5 (0.65±0.05, 4.7±0.4)

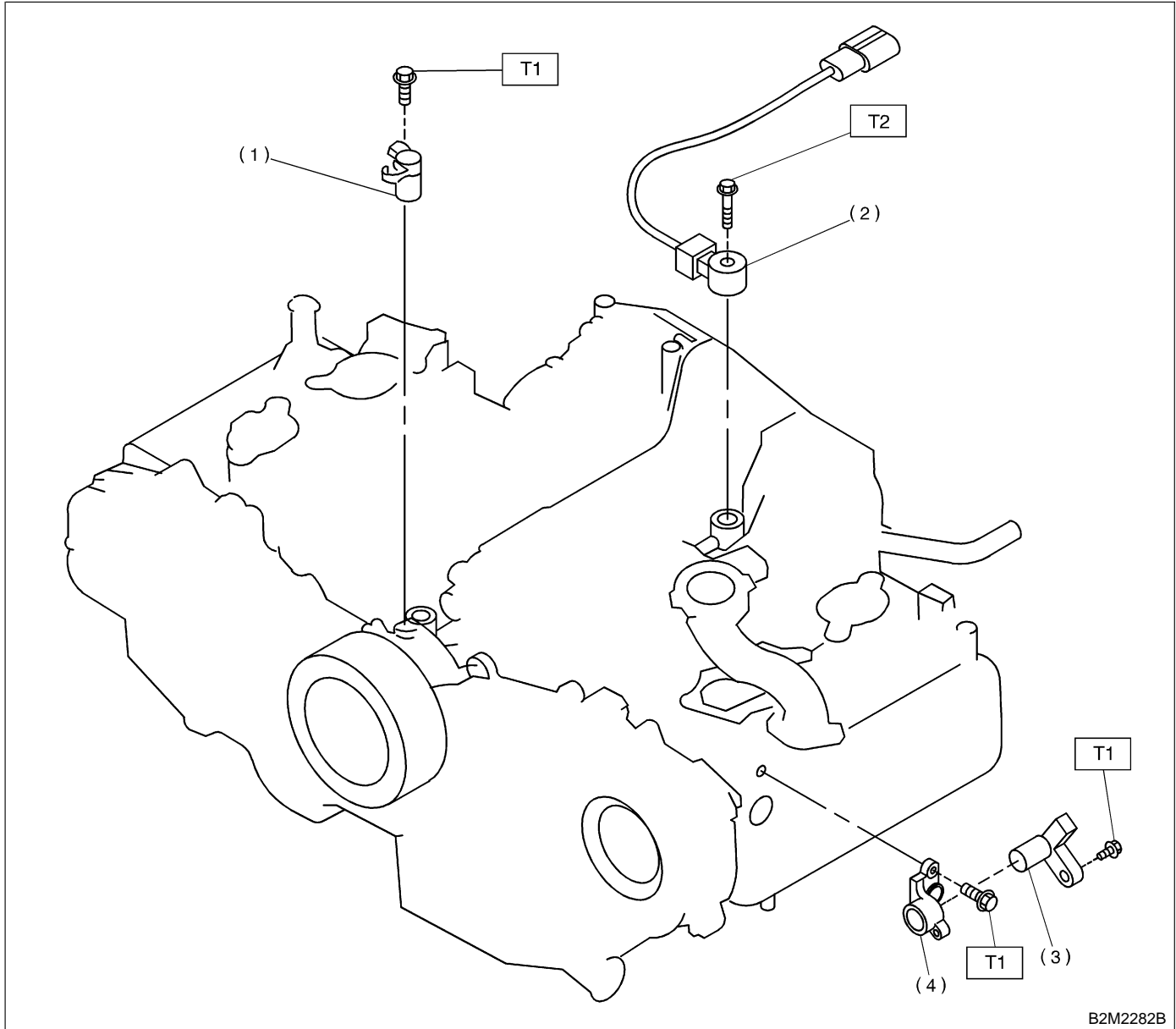
T3: 7.4±2.0 (0.75±0.2, 5.4±1.4)

T4: 16±5 (1.6±0.5, 11.6±3.6)

T5: 2.5±0.5 (0.25±0.05, 1.8±0.4)

T6: 2.9±1.0 (0.3±0.1, 2.2±0.7)

4. Crankshaft Position, Camshaft Position and Knock Sensors



(1) Crankangle position sensor
 (2) Knock sensor

(3) Camshaft position sensor
 (4) Camshaft position sensor support

Tightening torque: N-m (kg-m, ft-lb)

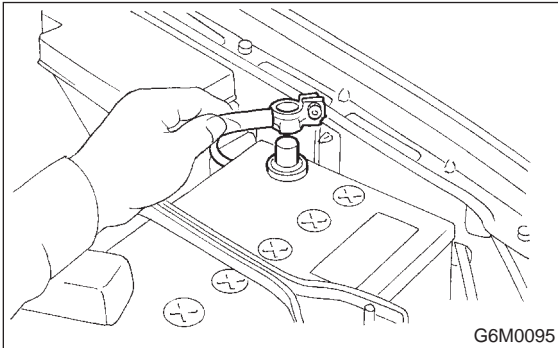
T1: 6.4±0.5 (0.65±0.05, 4.7±0.4)

T2: 23.5±2.9 (2.4±0.3, 17.4±2.2)

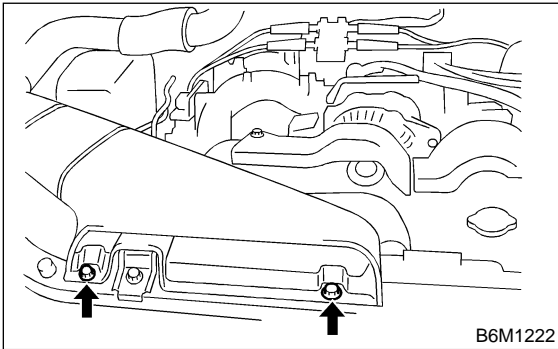
1. Air Cleaner Case and Air Intake Duct

A: REMOVAL AND INSTALLATION

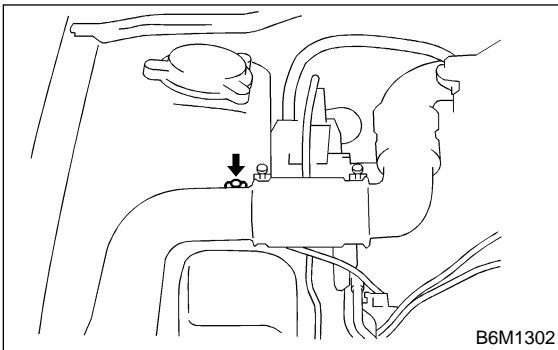
1) Disconnect battery ground cable.



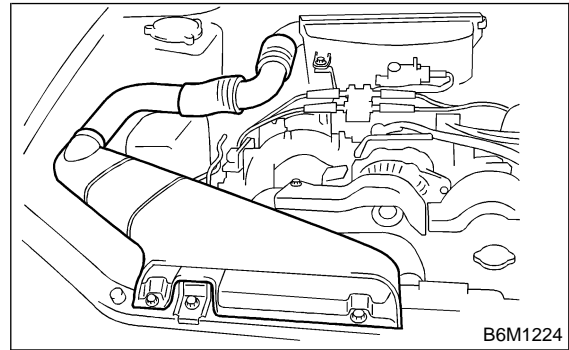
2) Remove bolts which install air intake duct on the front side of body.



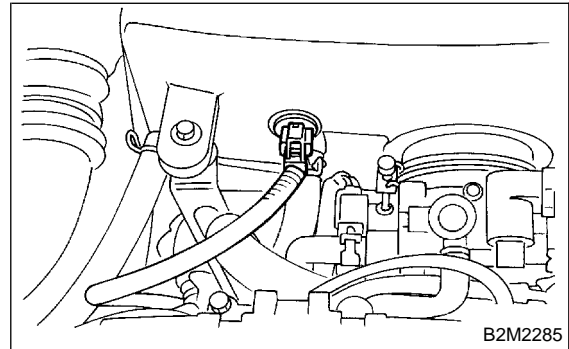
3) Remove bolt which installs air intake duct on body.



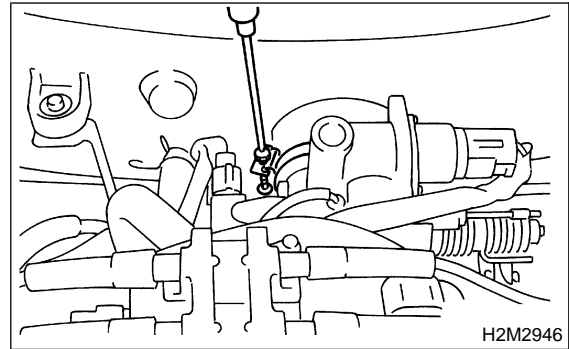
4) Remove air intake ducts as a unit.



5) Disconnect connector from intake air temperature sensor. (MT vehicles)

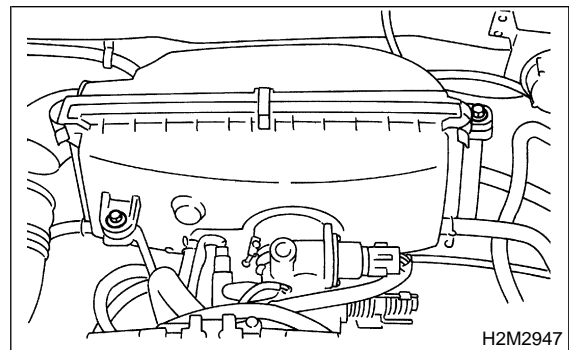


6) Loosen clamp which connects air cleaner case to throttle body.



7) Disconnect hoses from air cleaner case.

8) Remove bolts which install air cleaner case to stays.



9) Remove air cleaner case.

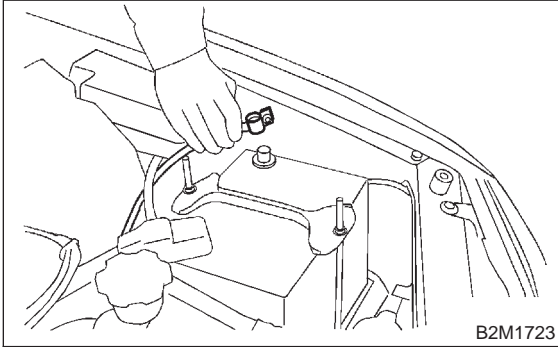
10) Installation is in the reverse order of removal.

2. Throttle Body

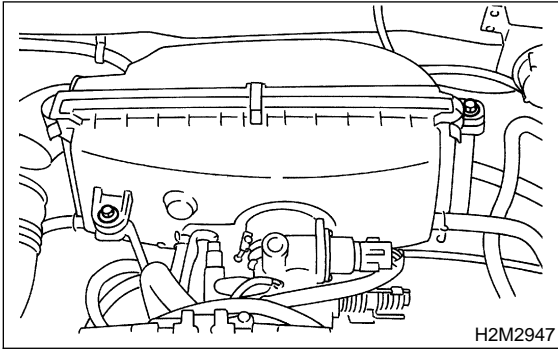
A: REMOVAL AND INSTALLATION

1. MT VEHICLES

1) Disconnect battery ground cable.

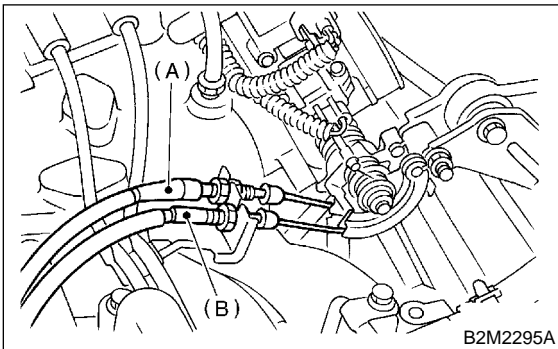


2) Remove air cleaner case. <Ref. to 2-7 [W1A0].>



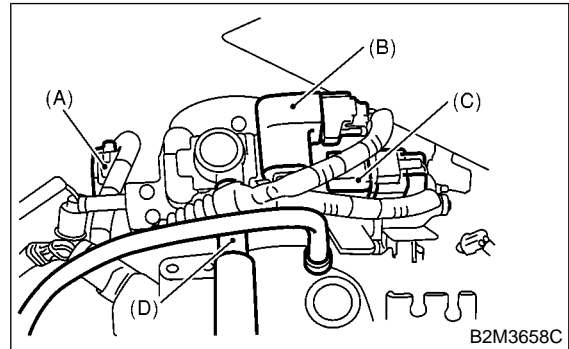
3) Disconnect accelerator cable (A).

4) Disconnect cruise control cable (B). (With cruise control model)

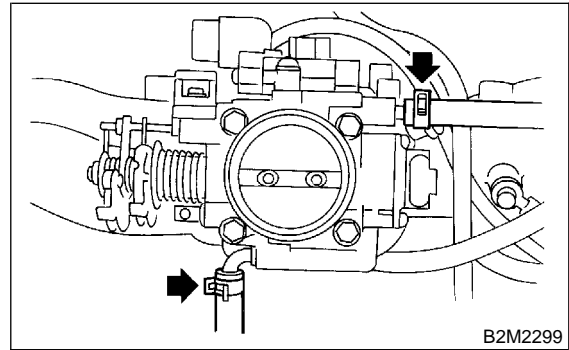


5) Disconnect connectors from throttle position sensor (A), idle air control solenoid valve (B) and intake manifold pressure sensor (C).

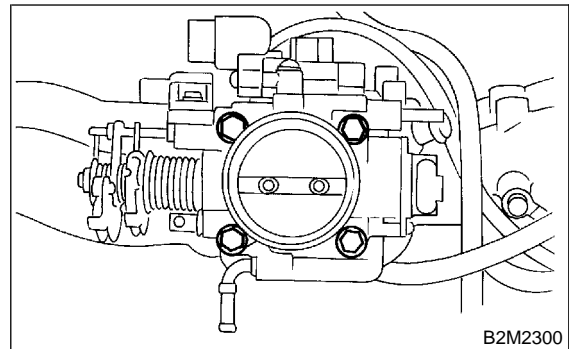
6) Disconnect air by-pass hose (D) from idle air control solenoid valve.



7) Disconnect engine coolant hoses from throttle body.



8) Remove bolts which install throttle body to intake manifold.



9) Installation is in the reverse order of removal.

CAUTION:
Always use a new gasket.

Tightening torque:

Throttle body:

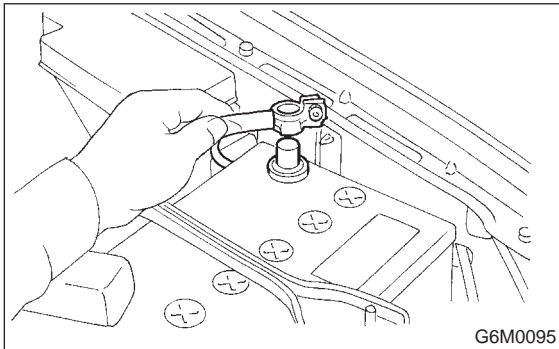
22±2 N·m (2.2±0.2 kg·m, 15.9±1.4 ft·lb)

Air cleaner case:

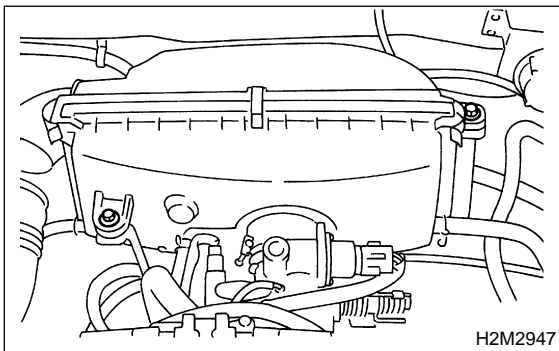
4.9±0.5 N·m (0.5±0.05 kg·m, 3.6±0.4 ft·lb)

2. AT VEHICLES

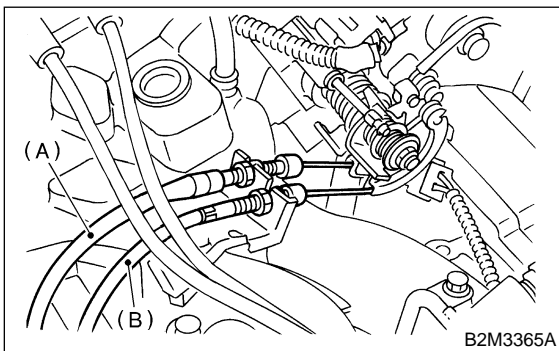
- 1) Disconnect battery ground cable.



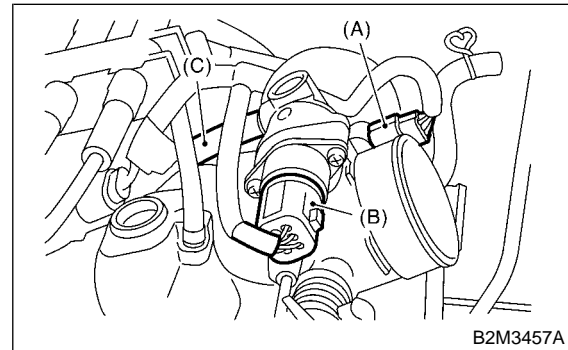
- 2) Remove air cleaner case.



- 3) Disconnect accelerator cable (A).
- 4) Disconnect cruise control cable (B). (With cruise control model)

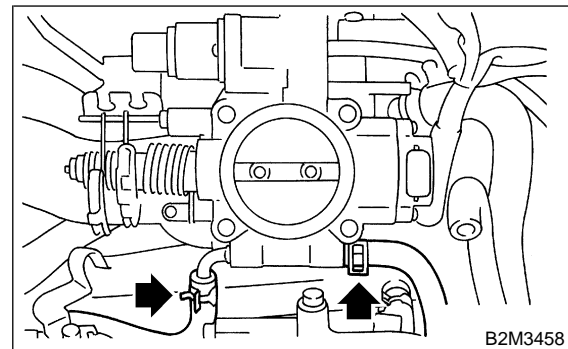


- 5) Disconnect connectors from idle air control solenoid valve, throttle position sensor.
- 6) Disconnect air by-pass hose from air assist injector solenoid valve.



- (A) Throttle position sensor
(B) Idle air control solenoid valve
(C) Air by-pass hose from air assist injector solenoid valve

- 7) Disconnect engine coolant hoses from throttle body.



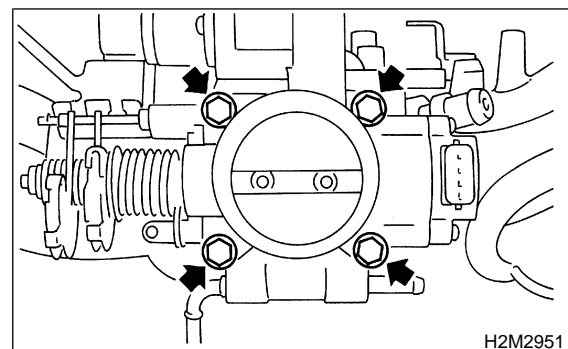
- 8) Remove bolts which install throttle body to intake manifold.
- 9) Installation is in the reverse order of removal.

CAUTION:
Always use a new gasket.

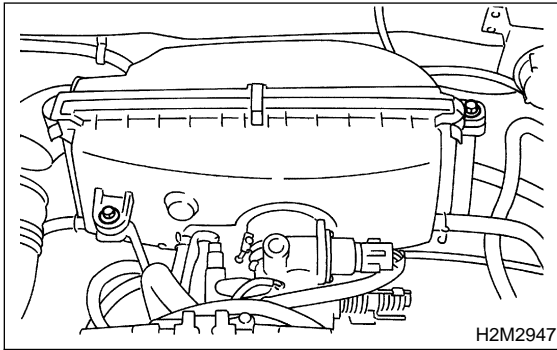
Tightening torque:

Throttle body;

22±2 N·m (2.2±0.2 kg·m, 15.9±1.4 ft·lb)



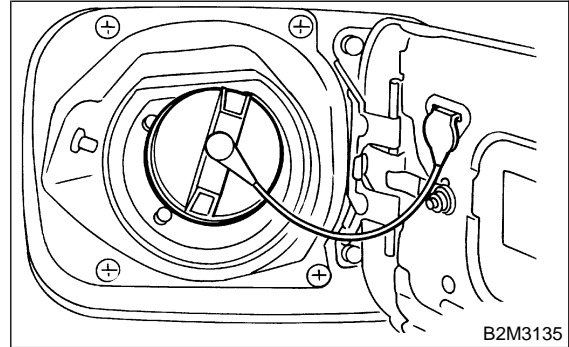
Tightening torque:
Air cleaner case;
4.9±0.5 N·m (0.5±0.05 kg·m, 3.6±0.4 ft·lb)



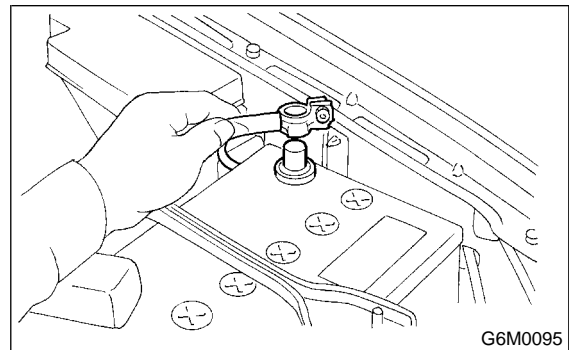
3. Intake Manifold

A: REMOVAL

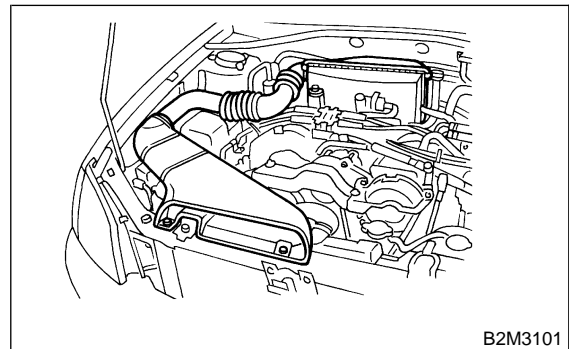
- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Open fuel flap lid, and remove fuel filler cap.



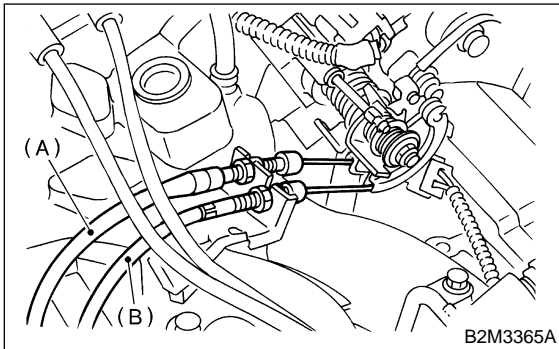
- 3) Disconnect battery ground cable.



- 4) Remove air intake duct and air cleaner assembly. <Ref. to 2-7 [W1A0].>

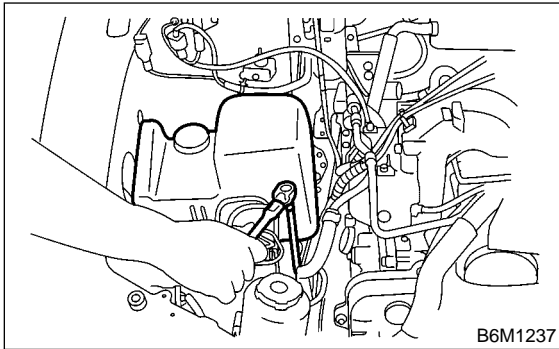


- 5) Disconnect accelerator cable (A).
- 6) Disconnect cruise control cable (B). (With cruise control model)

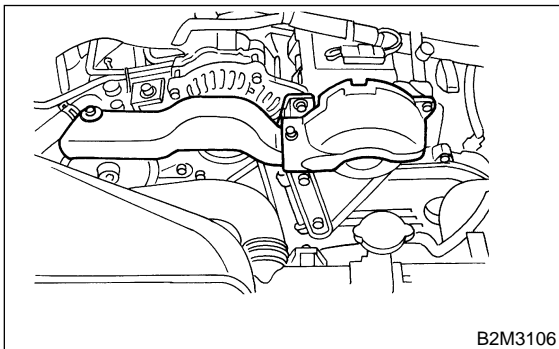


- 7) Remove power steering pump and tank from brackets.

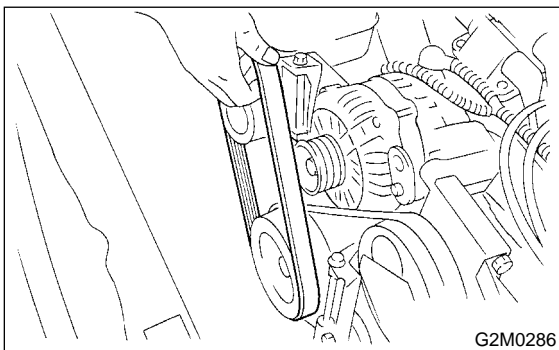
- (1) Remove resonator chamber.



- (2) Remove V-belt covers.



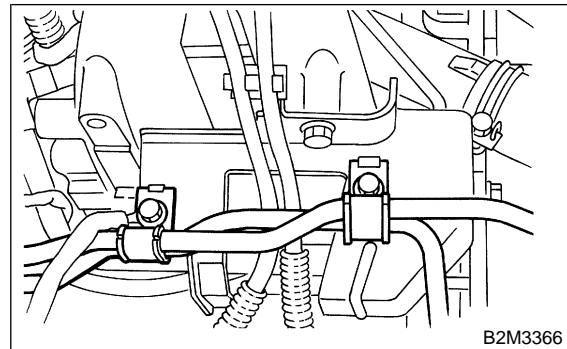
- (3) Loosen lock bolt and slider bolt, and remove power steering pump drive V-belt.



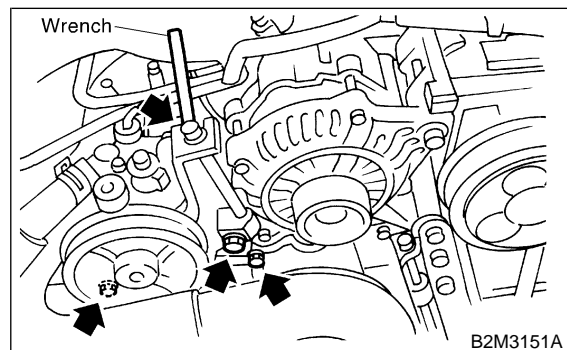
- (4) Remove bolts which hold power steering pipes onto intake manifold protector.

NOTE:

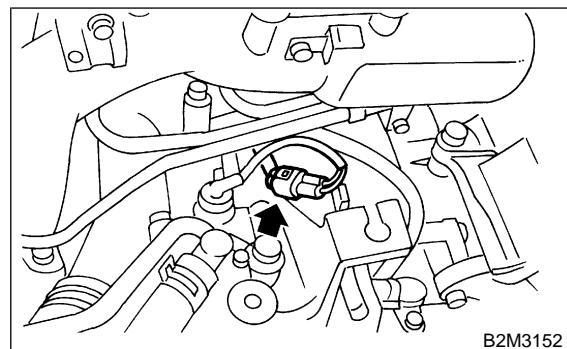
Do not disconnect power steering hose.



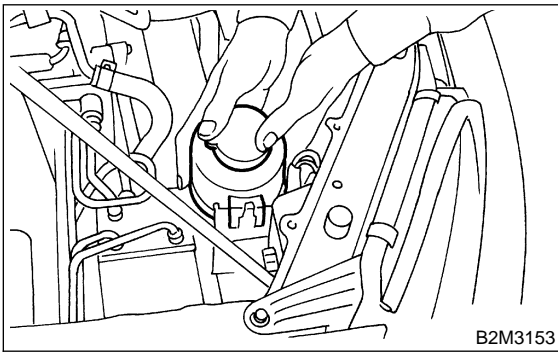
- (5) Remove bolts which install power steering pump bracket.



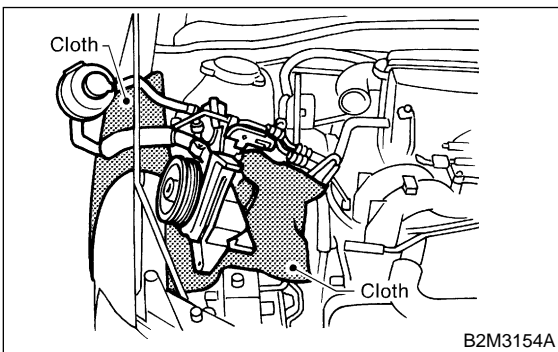
- (6) Disconnect connector from power steering pump switch.



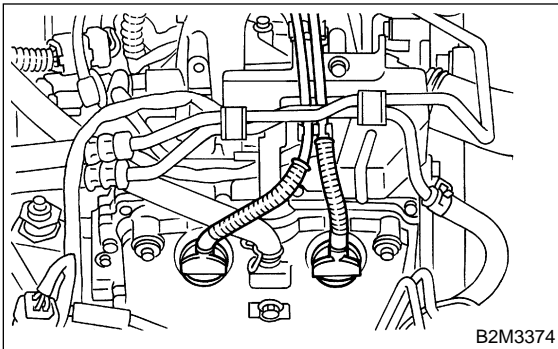
(7) Remove power steering tank from the bracket by pulling it upwards.



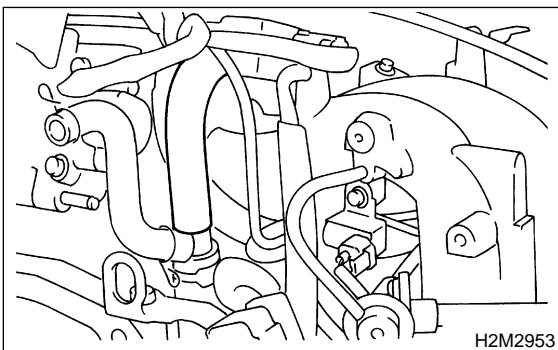
(8) Place power steering pump and tank on the right side wheel apron.



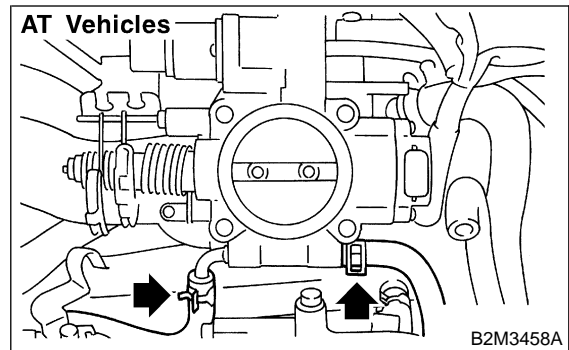
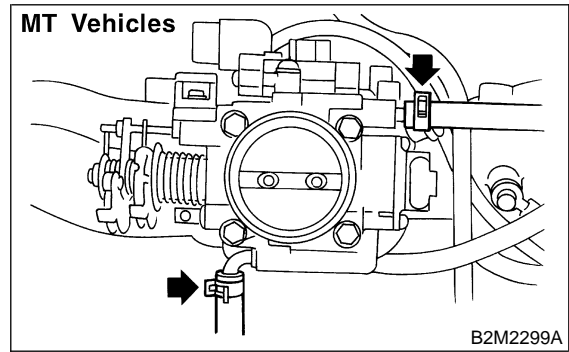
8) Disconnect spark plug cords from spark plugs.



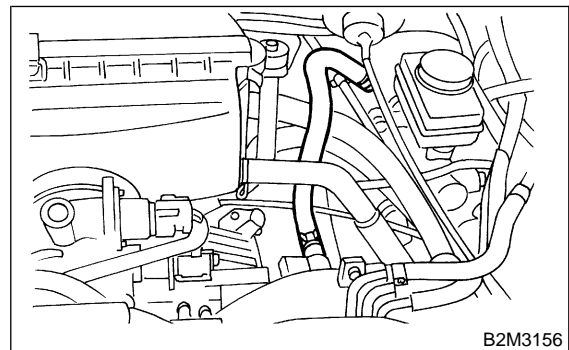
9) Disconnect PCV hose from intake manifold.



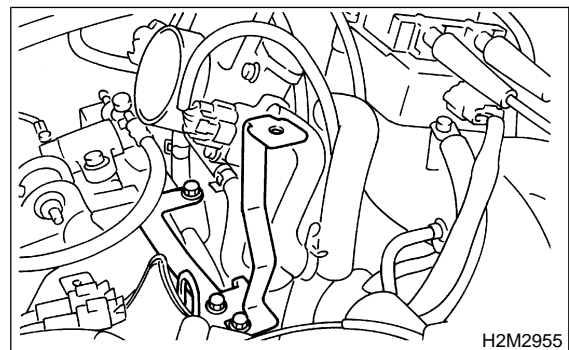
10) Disconnect engine coolant hose from throttle body.



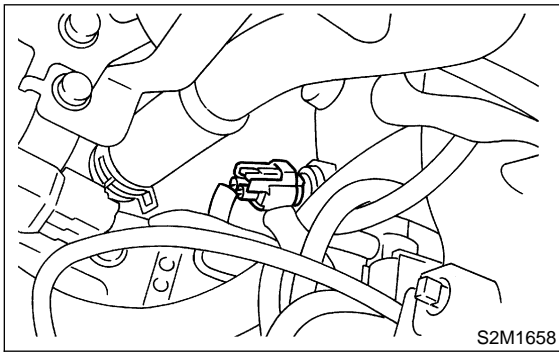
11) Disconnect brake booster hose.



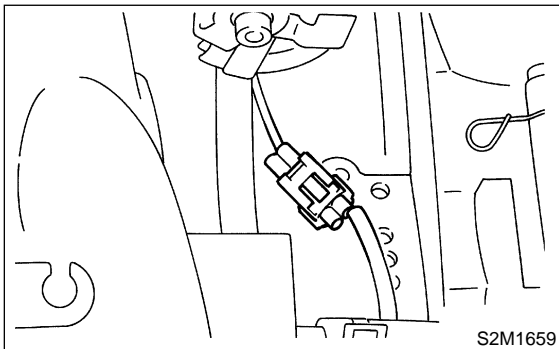
12) Remove air cleaner case stay RH and engine harness bracket, and disconnect engine harness connectors from bulkhead harness connectors.



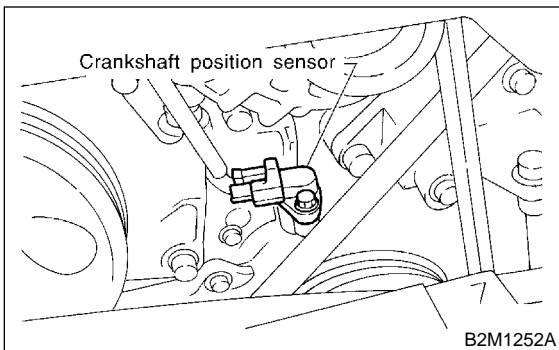
13) Disconnect connectors from engine coolant temperature sensor.



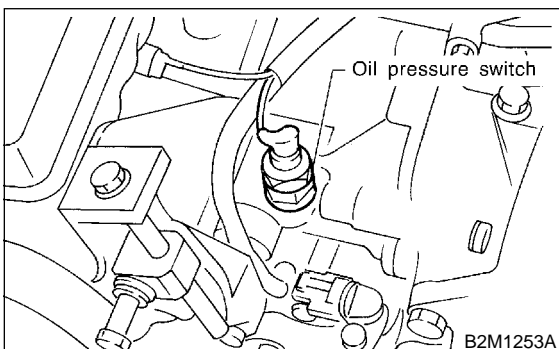
14) Disconnect knock sensor connector.



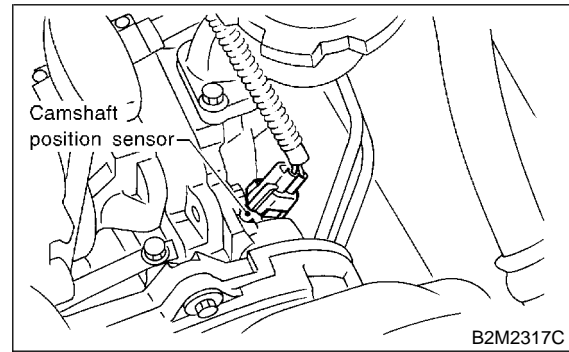
15) Disconnect connector from crankshaft position sensor.



16) Disconnect connector from oil pressure switch.



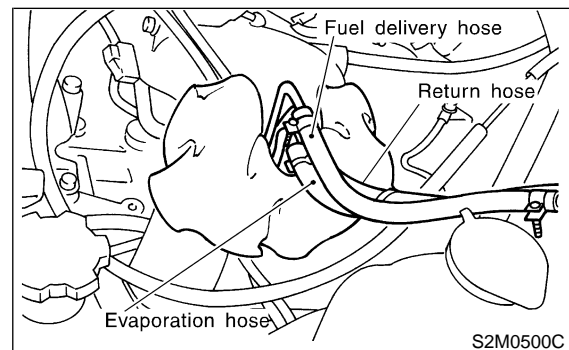
17) Disconnect connector from camshaft position sensor.



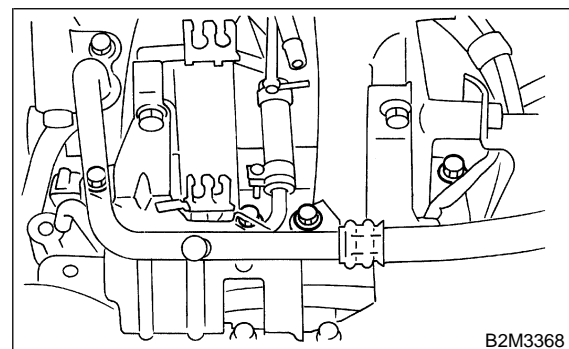
18) Disconnect fuel hoses from fuel pipes.

WARNING:

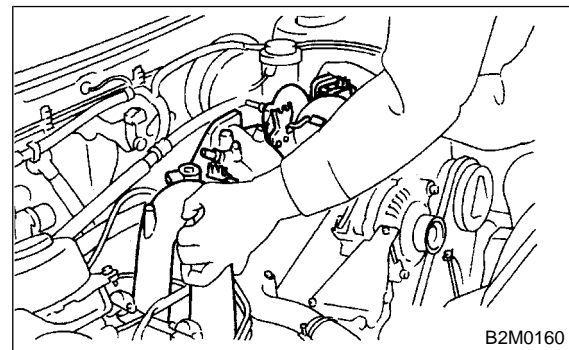
- Do not spill fuel.
- Catch fuel from hoses in a container or cloth.



19) Remove bolts which hold intake manifold onto cylinder heads.

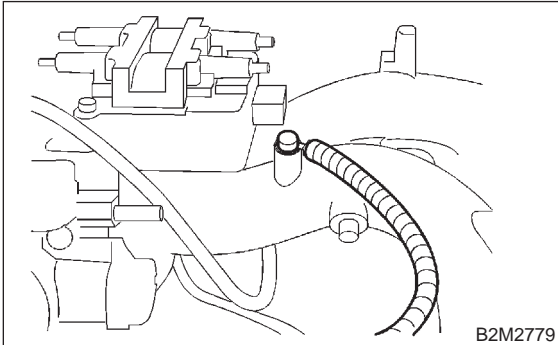


20) Remove intake manifold.



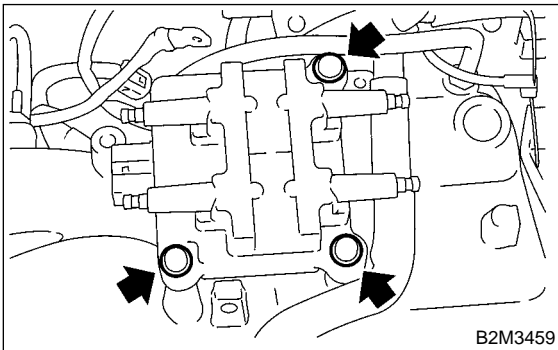
B: DISASSEMBLY**1. MT VEHICLES**

1) Disconnect engine ground terminal from intake manifold.



2) Disconnect connector from ignition coil and ignitor assembly.

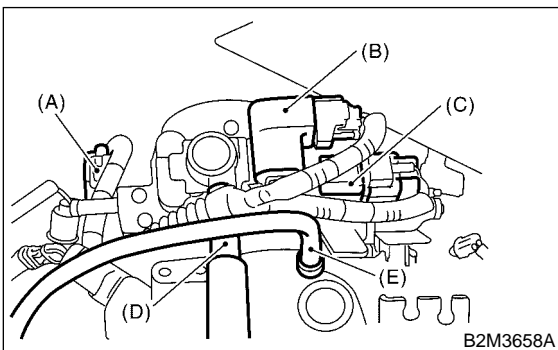
3) Remove ignition coil and ignitor assembly.



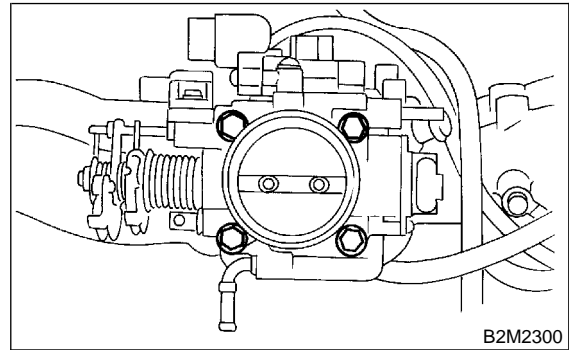
4) Disconnect connectors from throttle position sensor (A), idle air control solenoid valve (B) and intake manifold pressure sensor (C).

5) Disconnect air by-pass hose (D) from idle air control solenoid valve.

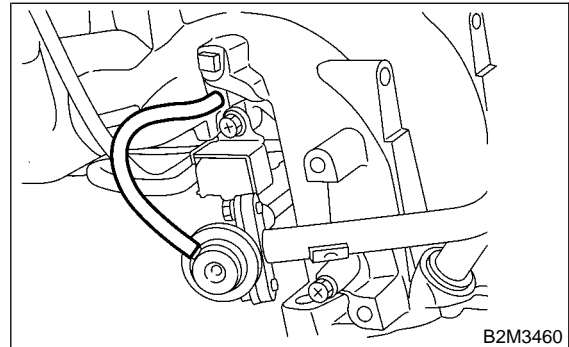
6) Disconnect air by-pass hose (E) from intake manifold.



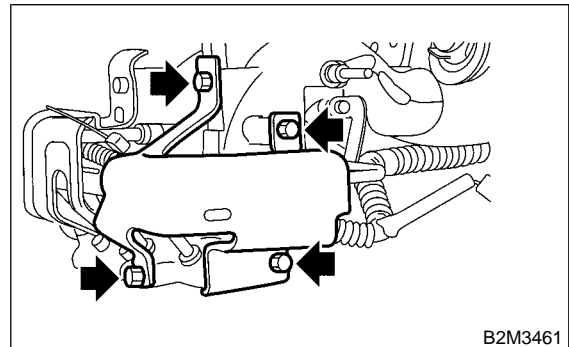
7) Remove throttle body.



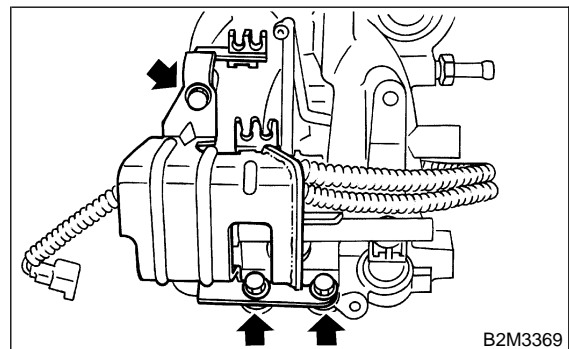
8) Disconnect pressure regulator vacuum hose from intake manifold.



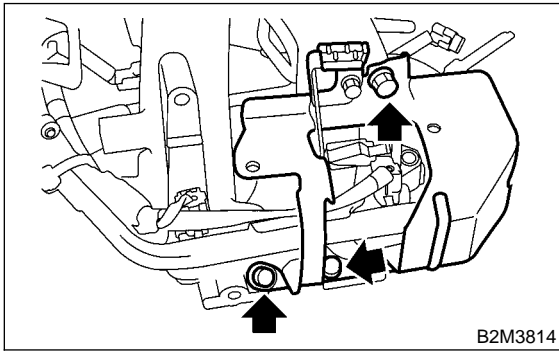
9) Remove fuel pipe protector LH.



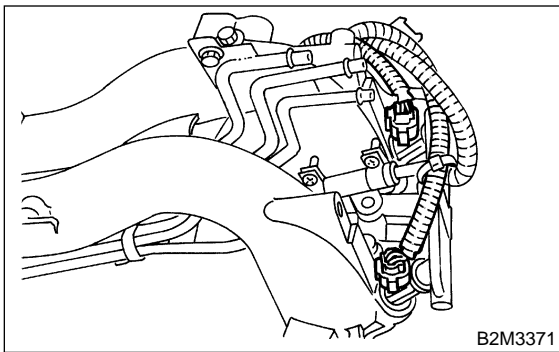
10) Remove intake manifold protector LH.



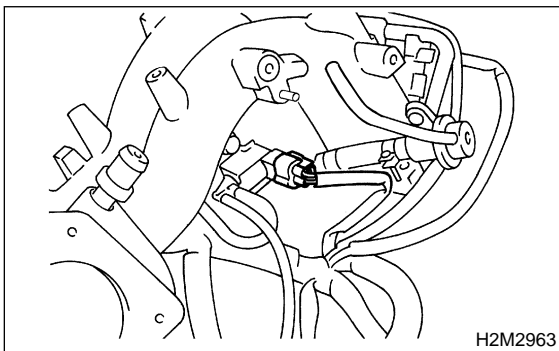
11) Remove intake manifold protector RH.



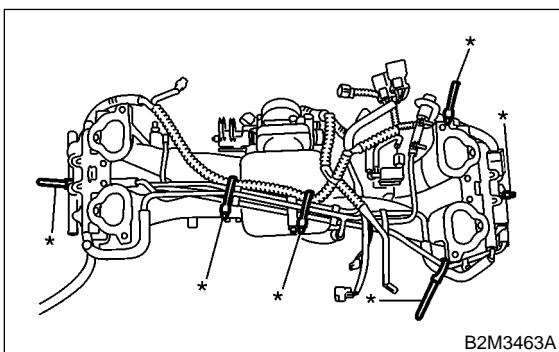
12) Disconnect connectors from fuel injectors.



13) Disconnect connector from purge control solenoid valve.

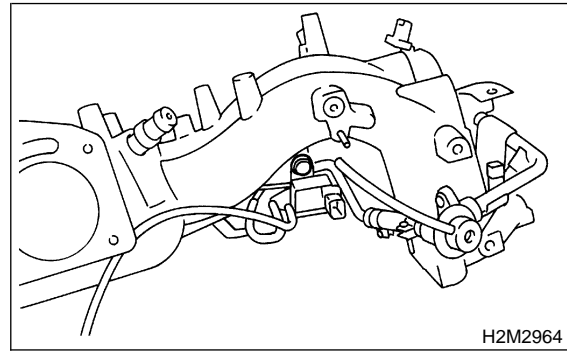


14) Remove harness bands (*) which hold engine harness onto intake manifold.

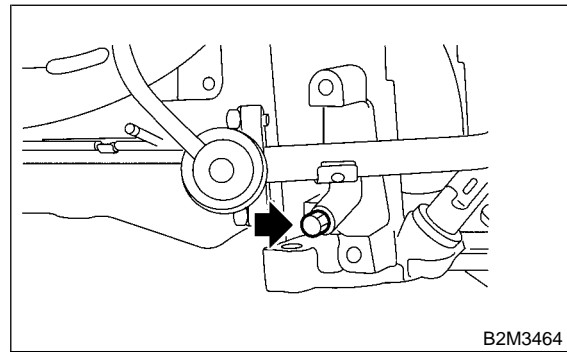


15) Remove engine harness from intake manifold.

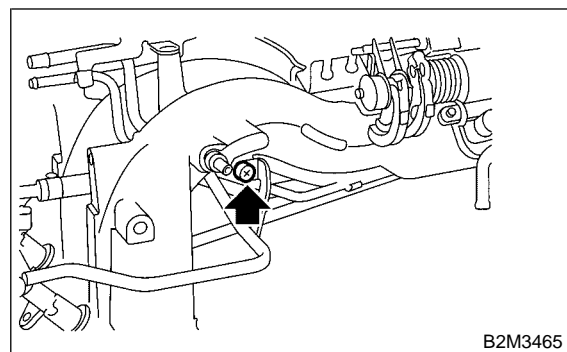
16) Remove purge control solenoid valve.



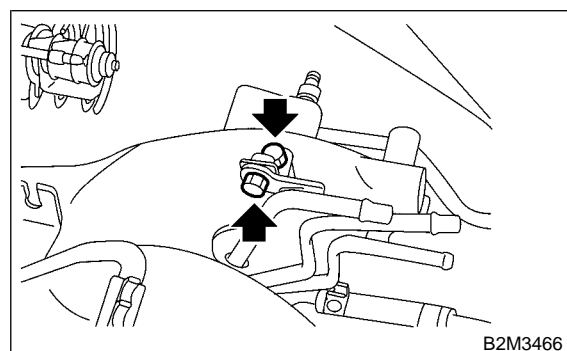
17) Remove bolt which installs injector pipe on intake manifold as shown in figure.



18) Remove bolt which installs injector pipe on intake manifold.

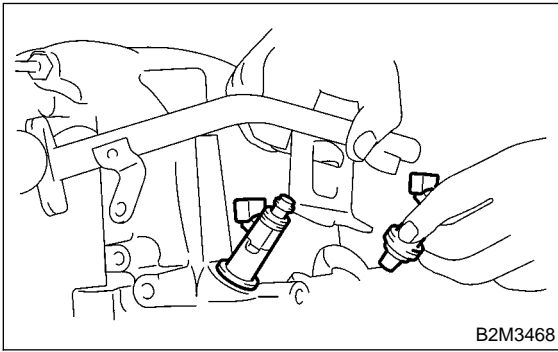


19) Remove two bolts which hold fuel pipes on the left side of intake manifold.

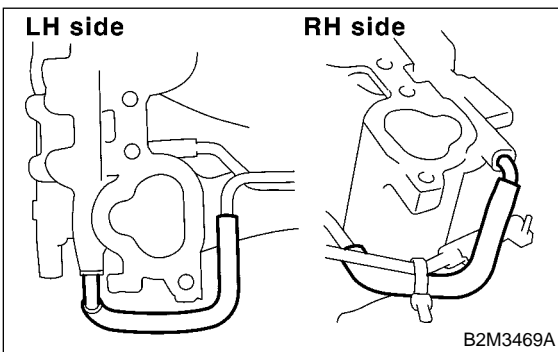


3. Intake Manifold

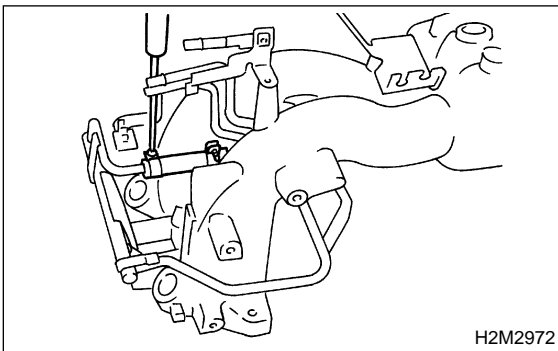
20) Remove fuel injector while lifting up fuel injector pipe.



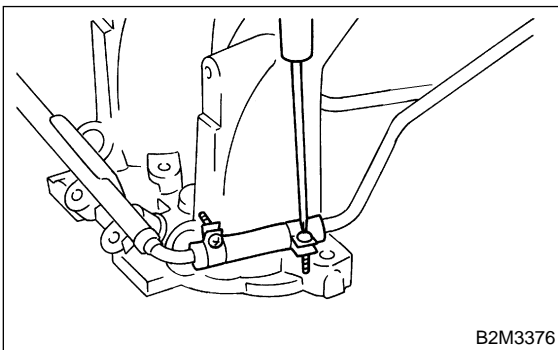
21) Disconnect air by-pass hoses from intake manifold.



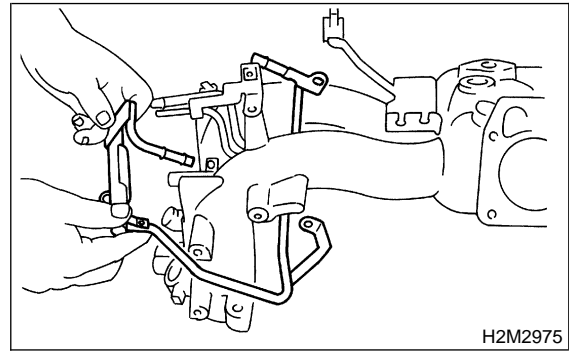
22) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.



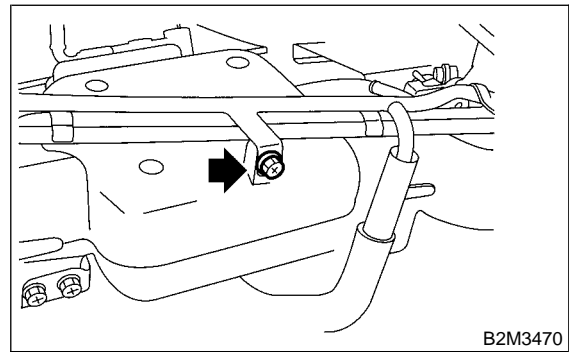
23) Loosen clamp which holds front right side fuel hose to injector pipe and remove the pipe from clamp.



24) Remove fuel injector pipe.



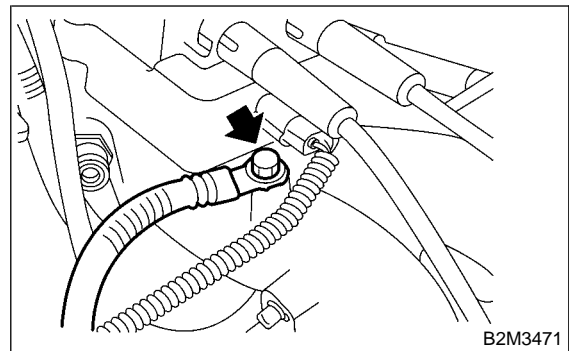
25) Remove bolt which installs fuel pipes on intake manifold.



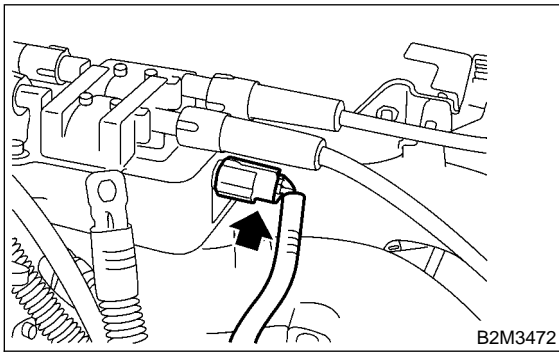
26) Remove fuel pipe assembly and pressure regulator, from intake manifold.

2. AT VEHICLES

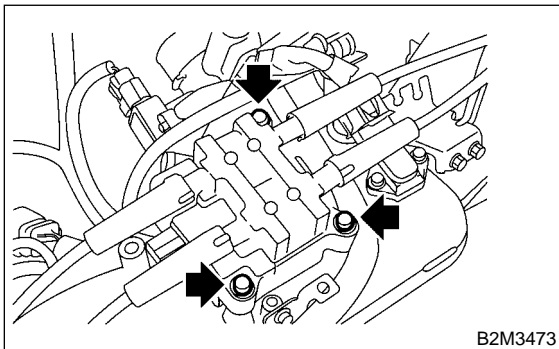
1) Disconnect engine ground terminal from intake manifold.



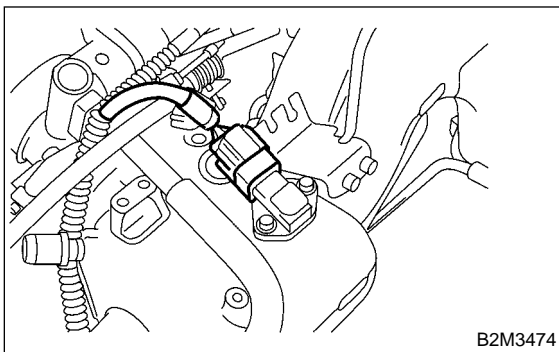
2) Disconnect connector from ignition coil and ignitor assembly.



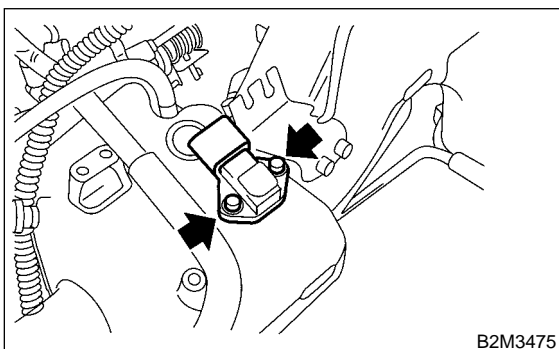
3) Remove ignition coil and ignitor assembly.



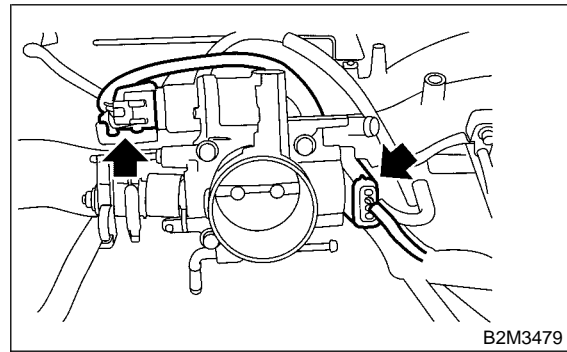
4) Disconnect connector from intake air temperature and pressure sensor.



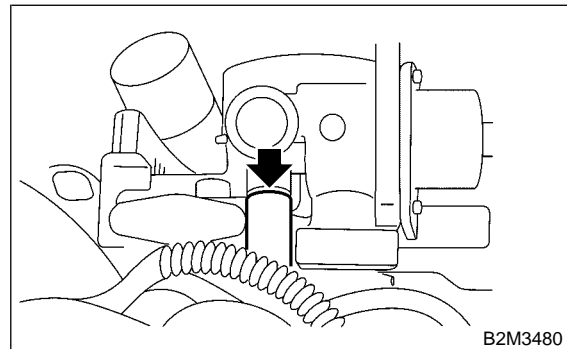
5) Remove intake air temperature and pressure sensor from intake manifold.



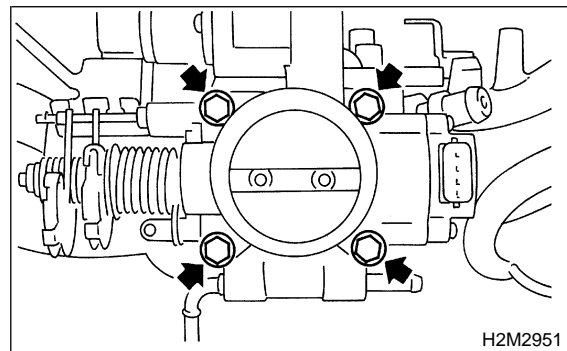
6) Disconnect connectors from throttle position sensor and idle air control solenoid valve.



7) Disconnect air by-pass hose from throttle body.

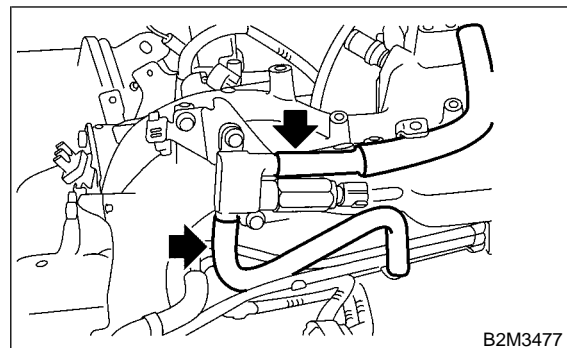


8) Remove throttle body.



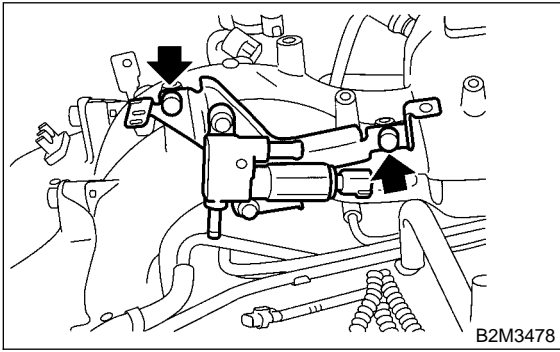
9) Disconnect connector from air assist injector solenoid valve.

10) Disconnect air by-pass hoses from air assist solenoid valve.

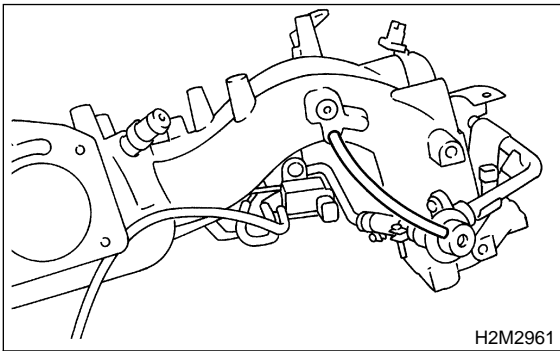


3. Intake Manifold

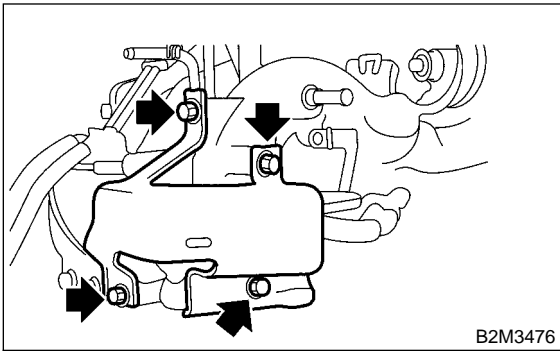
11) Remove air assist injector solenoid valve from intake manifold.



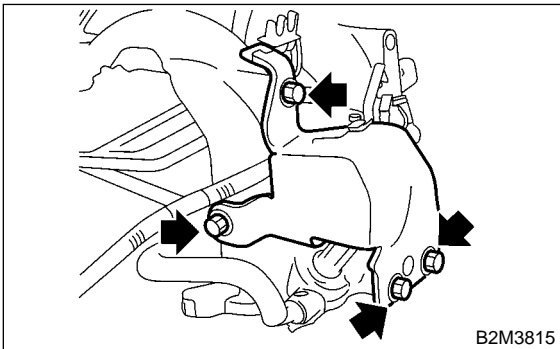
12) Disconnect pressure regulator vacuum hose from intake manifold.



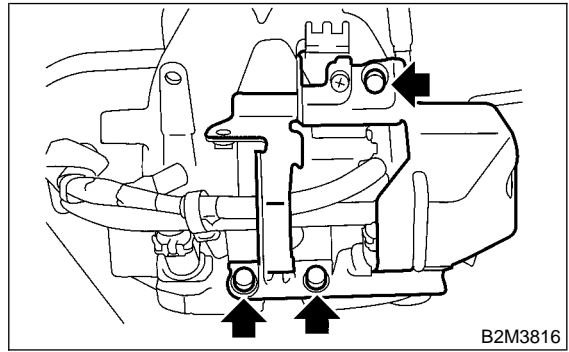
13) Remove fuel pipe protector LH.



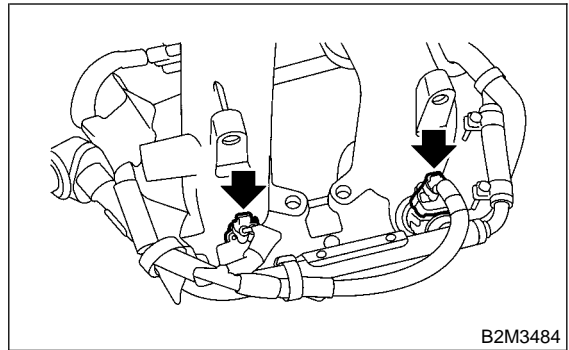
14) Remove intake manifold protector LH.



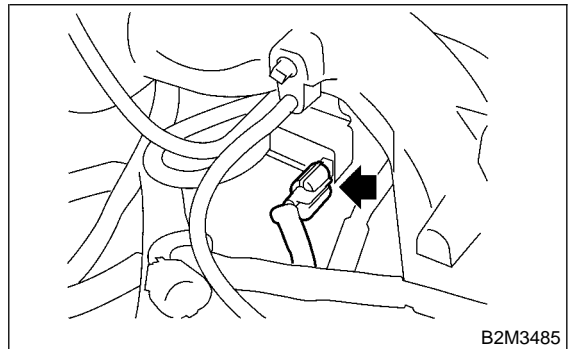
15) Remove intake manifold protector RH.



16) Disconnect connectors from fuel injectors.

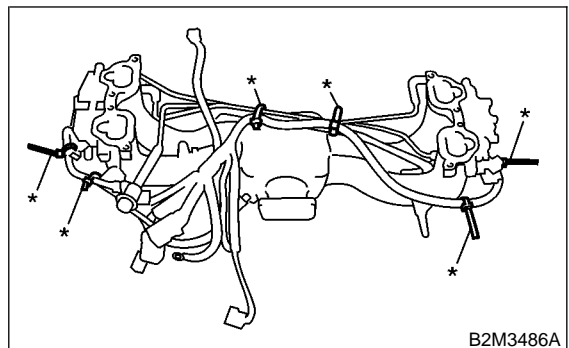


17) Disconnect connector from purge control solenoid valve.



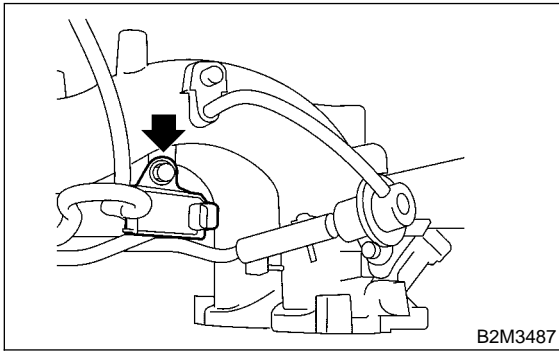
18) Disconnect air by-pass hose from purge control solenoid valve.

19) Remove harness bands (*) which hold engine harness onto intake manifold.

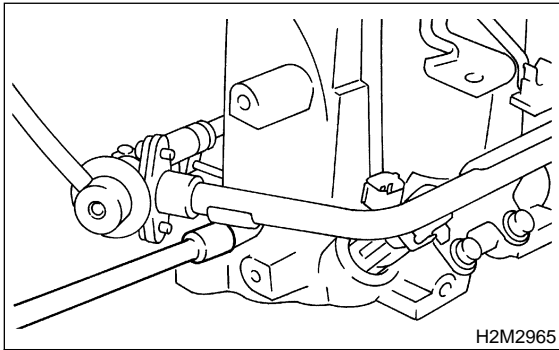


20) Remove engine harness from intake manifold.

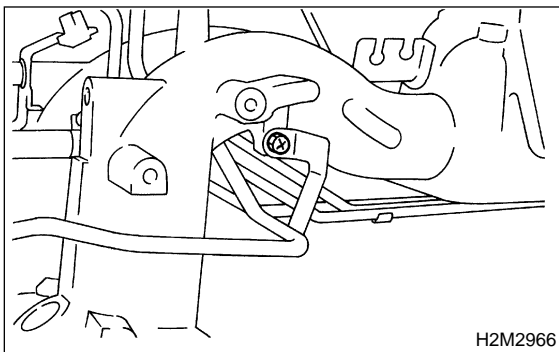
21) Remove purge control solenoid valve.



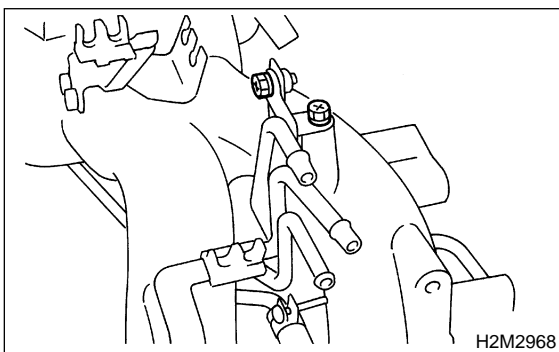
22) Remove bolt which installs injector pipe on intake manifold as shown in figure.



23) Remove bolt which installs injector pipe on intake manifold.

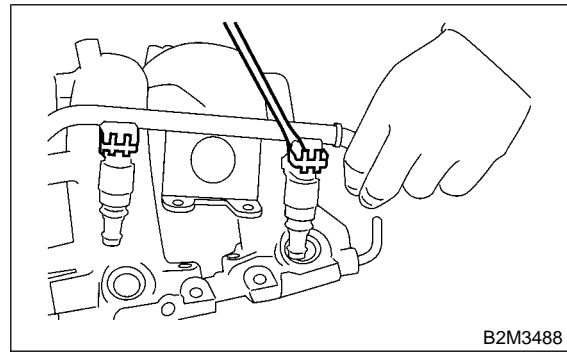


24) Remove two bolts which hold fuel pipes on the left side of intake manifold.

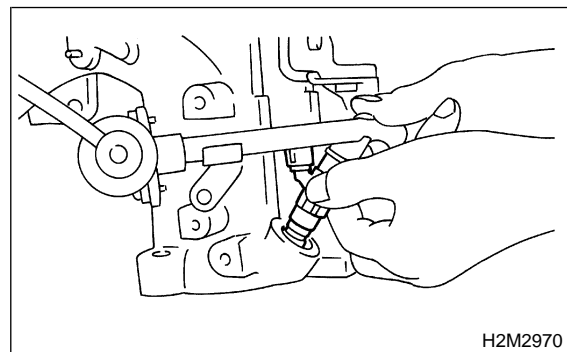


25) Remove fuel injectors.

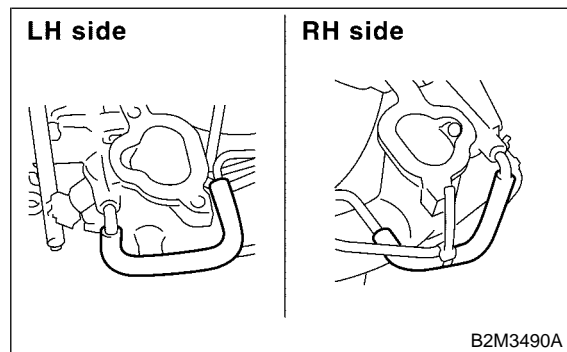
(1) Remove fuel injector securing clip.



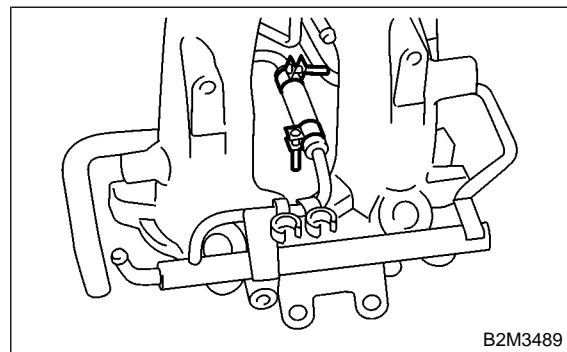
(2) Remove fuel injector while lifting up fuel injector pipe.



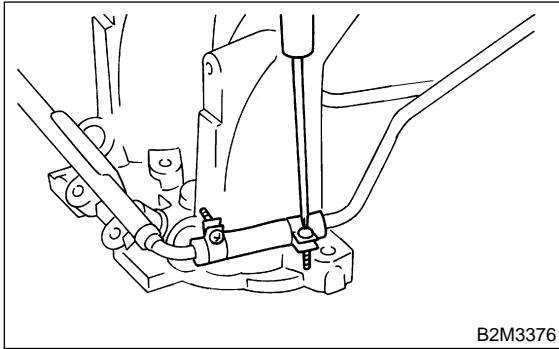
26) Disconnect air by-pass hoses from intake manifold.



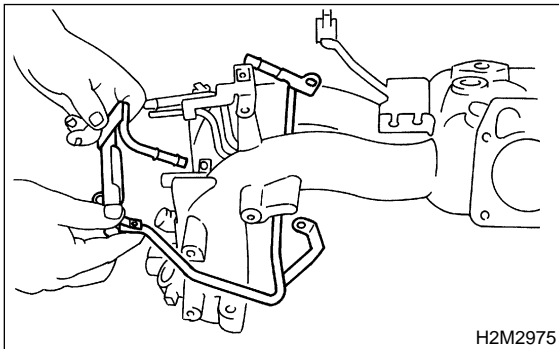
27) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.



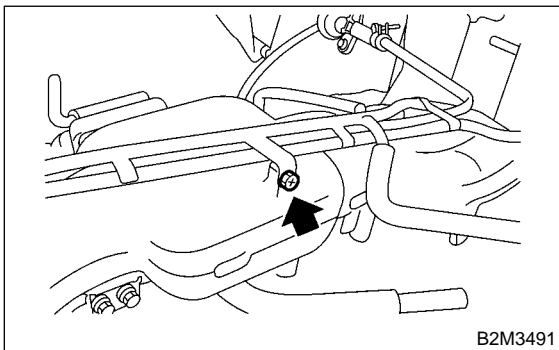
28) Loosen clamp which holds front right side fuel hose to injector pipe and remove the pipe from clamp.



29) Remove fuel injector pipe.



30) Remove bolt which installs fuel pipes on intake manifold.



31) Remove fuel pipe assembly and pressure regulator, from intake manifold.

C: ASSEMBLY

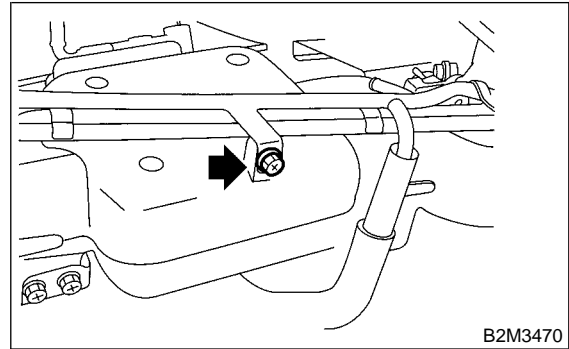
1. MT VEHICLES

1) Install fuel pipe assembly and pressure regulator, etc. to intake manifold.

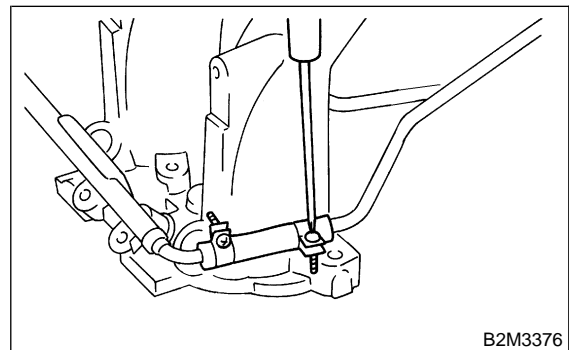
2) Tighten bolt which installs fuel pipes on intake manifold.

Tightening torque:

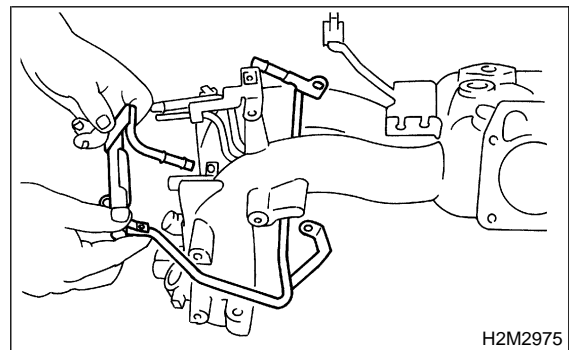
$4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



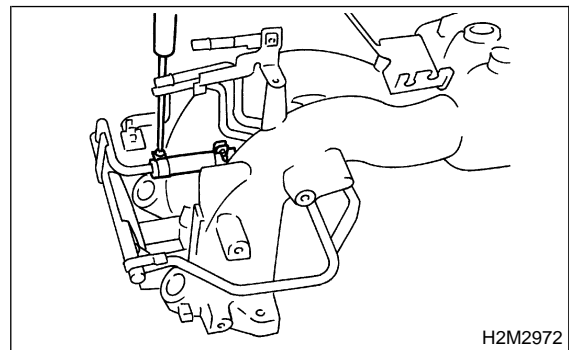
3) Connect right side fuel hose to injector pipe, and tighten clamp screw.



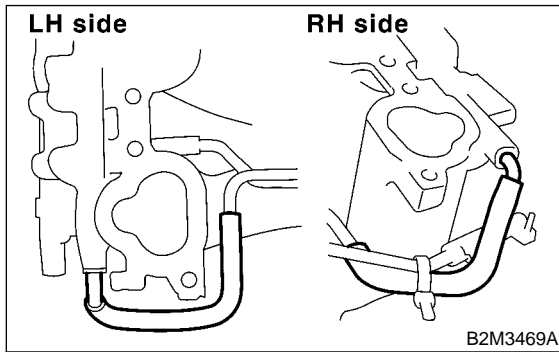
4) Install fuel injector pipe.



5) Connect left side fuel hose to injector pipe, and tighten clamp screw.

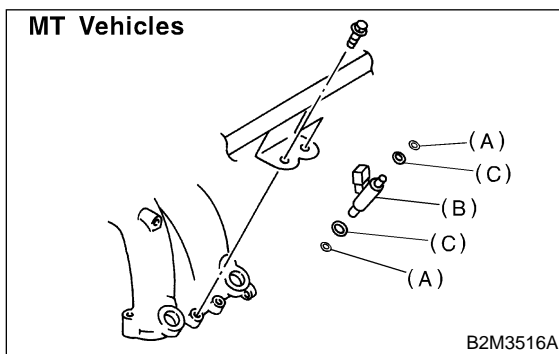


6) Connect air by-pass hoses.



7) Install fuel injectors.

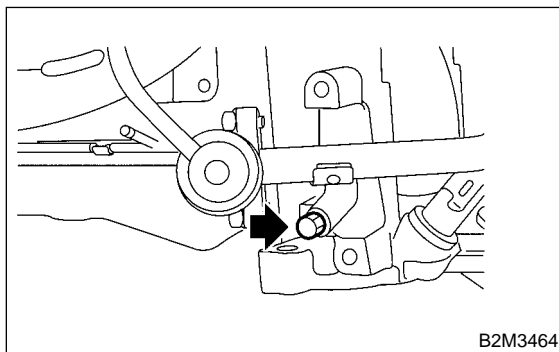
CAUTION:
Always use new o-rings and insulators.



- (A) O-ring
- (B) Fuel injector
- (C) Insulator

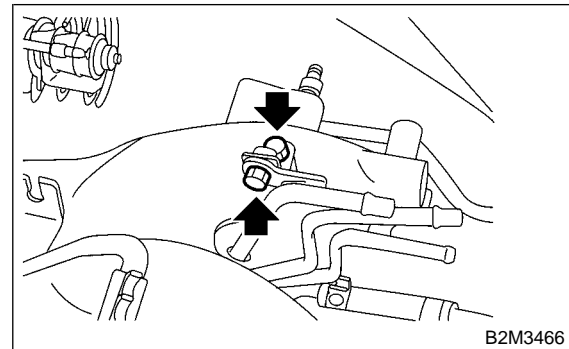
8) Tighten bolt which installs injector pipe on intake manifold.

Tightening torque:
 $4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



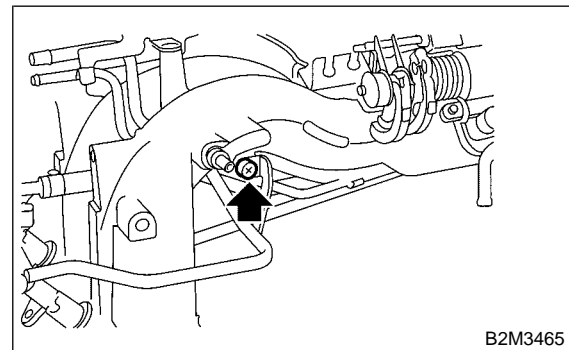
9) Tighten two bolts which install fuel pipes on the left side of intake manifold.

Tightening torque:
 $4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)

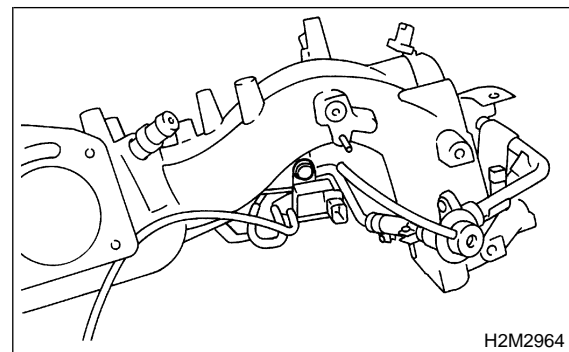


10) Tighten bolt which install injector pipe on intake manifold.

Tightening torque:
 $4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



11) Install purge control solenoid valve.

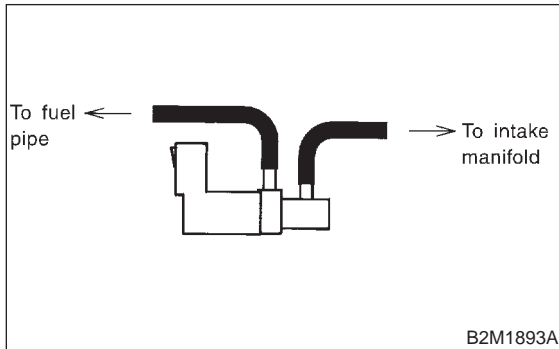


3. Intake Manifold

12) Connect hoses to purge control solenoid valve.

CAUTION:

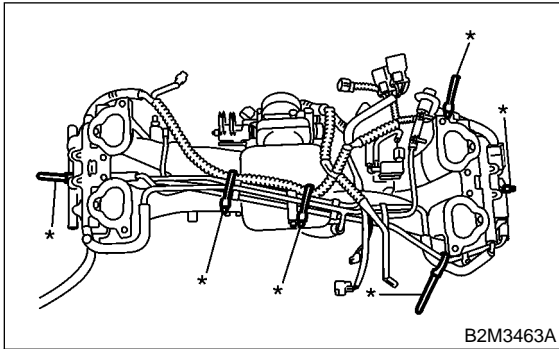
Carefully connect the evaporation hoses.



13) Install engine harness onto intake manifold.

14) Connect connectors to fuel injectors and purge control solenoid valve.

15) Hold engine harness by harness band (*).

**NOTE:**

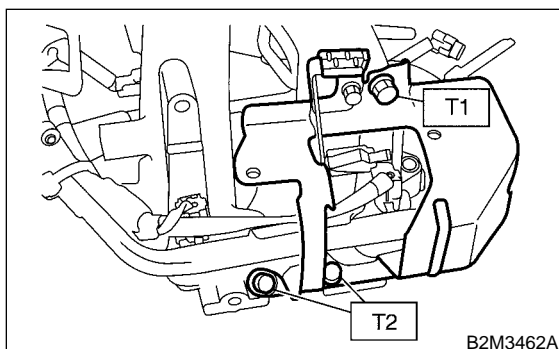
Do not use harness band on harnesses where they are supposed to be protected by the fuel pipe protector.

16) Install intake manifold protector RH.

Tightening torque:

T1: 18.6 ± 1.5 N-m (1.9 ± 0.15 kg-m, 13.7 ± 1.1 ft-lb)

T2: 19 ± 2 N-m (1.9 ± 0.2 kg-m, 13.7 ± 1.4 ft-lb)

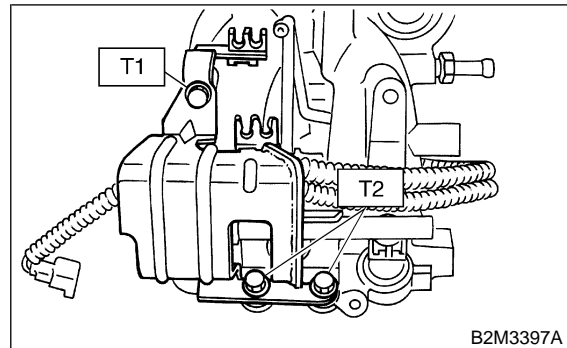


17) Install intake manifold protector LH.

Tightening torque:

T1: 18.6 ± 1.5 N-m (1.9 ± 0.15 kg-m, 13.7 ± 1.1 ft-lb)

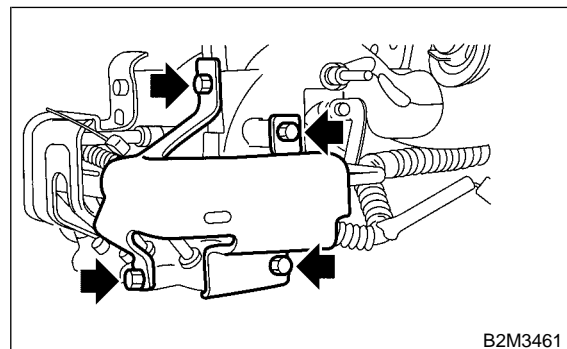
T2: 19 ± 2 N-m (1.9 ± 0.2 kg-m, 13.7 ± 1.4 ft-lb)



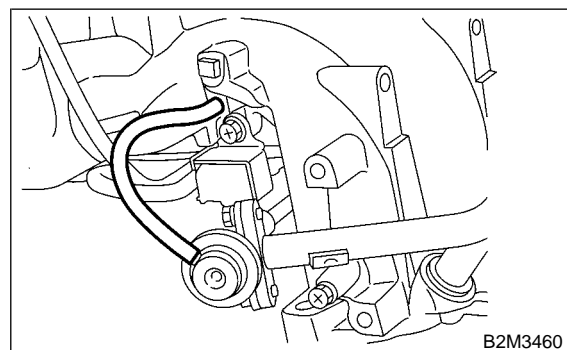
18) Install fuel pipe protector LH.

Tightening torque:

18.6 ± 1.5 N-m (1.9 ± 0.15 kg-m, 13.7 ± 1.1 ft-lb)



19) Connect pressure regulator vacuum hose to intake manifold.



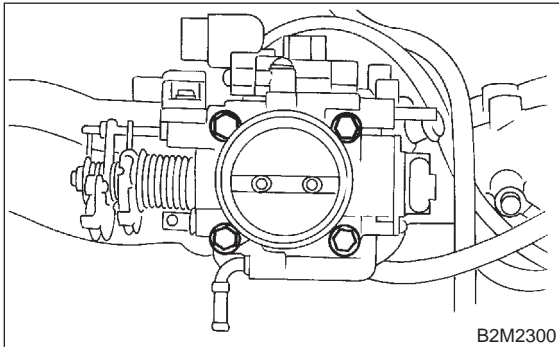
20) Install throttle body to intake manifold.

CAUTION:

Replace gasket with a new one.

Tightening torque:

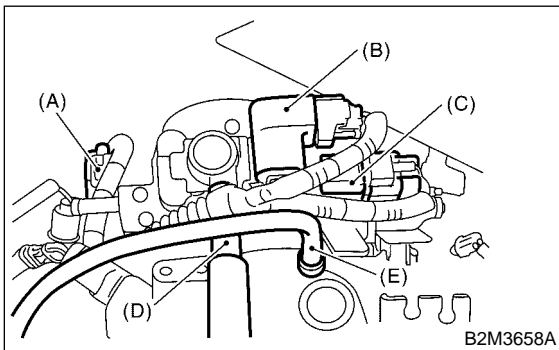
$22 \pm 2 \text{ N}\cdot\text{m}$ ($2.2 \pm 0.2 \text{ kg}\cdot\text{m}$, $15.9 \pm 1.4 \text{ ft}\cdot\text{lb}$)



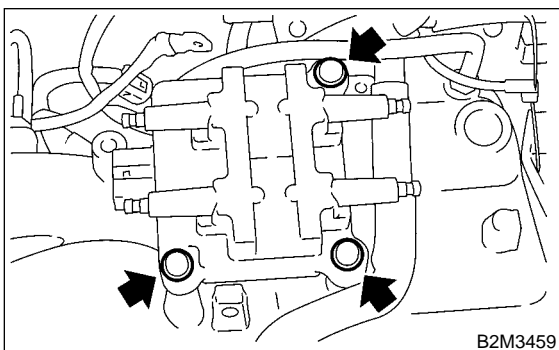
21) Connect connectors to throttle position sensor (A), idle air control solenoid valve (B) and intake manifold pressure sensor (C).

22) Connect air by-pass hose (D) to idle air control solenoid valve.

23) Connect air by-pass hose (E) to intake manifold.

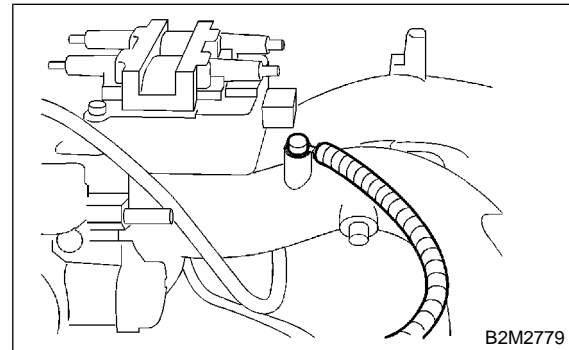


24) Install ignition coil and ignitor assembly.



25) Connect connector to ignition coil and ignitor assembly.

26) Install engine ground terminal to intake manifold.



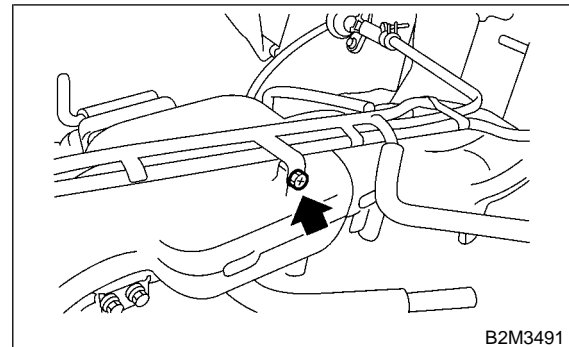
2. AT VEHICLES

1) Install fuel pipe assembly and pressure regulator, etc. to intake manifold.

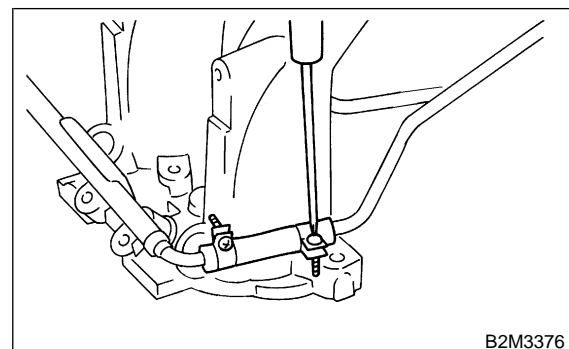
2) Tighten bolt which installs fuel pipes on intake manifold.

Tightening torque:

$4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)

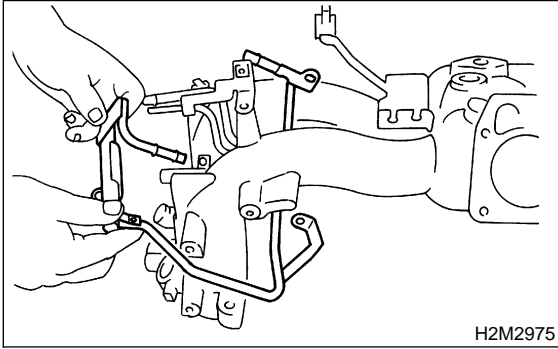


3) Connect right side fuel hose to injector pipe, and tighten clamp screw.

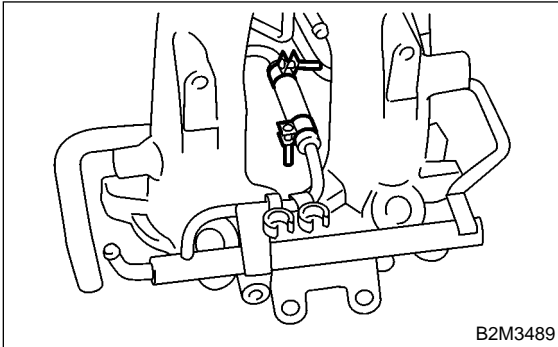


3. Intake Manifold

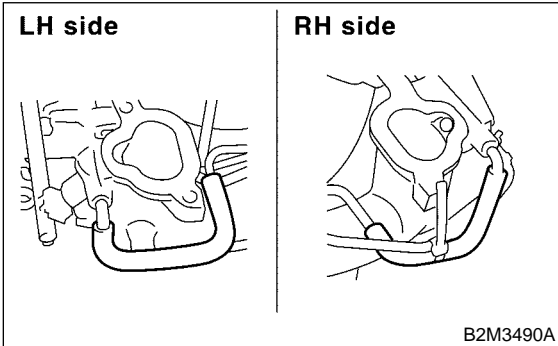
4) Install fuel injector pipe.



5) Connect left side fuel hose to injector pipe, and tighten clamp screw.

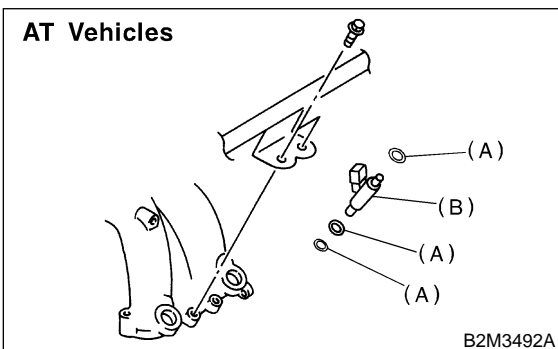


6) Connect air assist hoses.



7) Install fuel injectors.

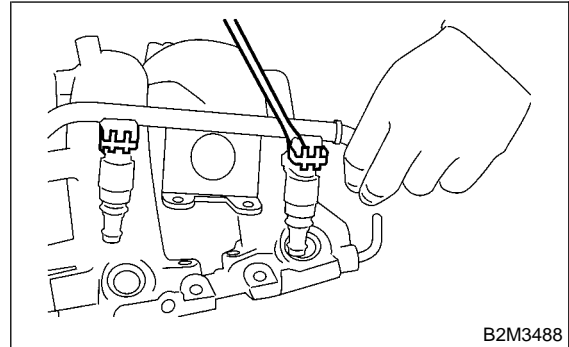
CAUTION:
Always use new o-rings.



- (A) O-ring
- (B) Fuel injector

NOTE:

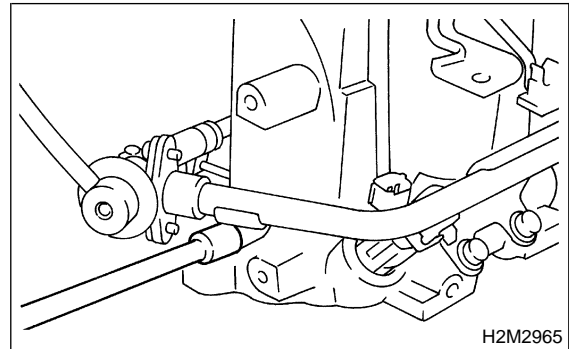
Do not forget to install the fuel injector securing clip.



8) Tighten bolt which installs injector pipe on intake manifold.

Tightening torque:

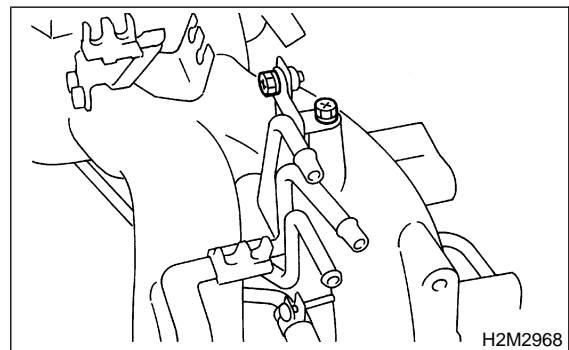
$4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



9) Tighten two bolts which install fuel pipes on the left side of intake manifold.

Tightening torque:

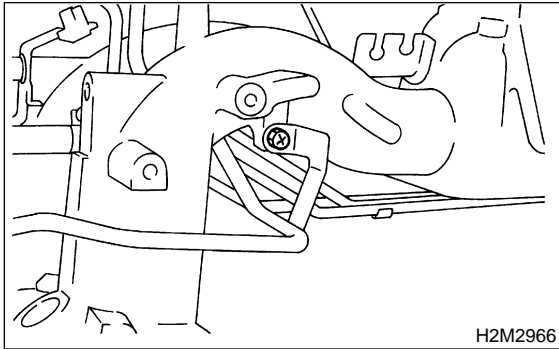
$4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



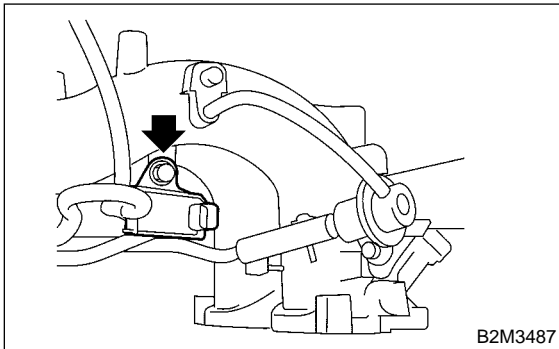
10) Tighten bolt which install injector pipe on intake manifold.

Tightening torque:

$4.9 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.5 \pm 0.05 \text{ kg}\cdot\text{m}$, $3.6 \pm 0.4 \text{ ft}\cdot\text{lb}$)



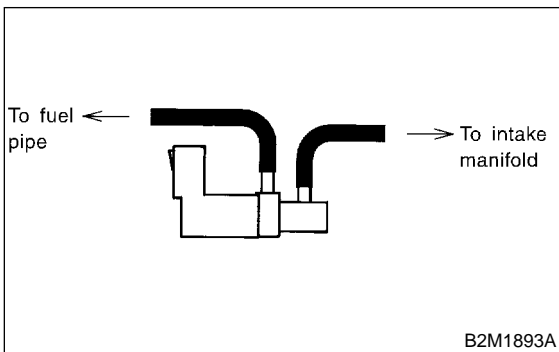
11) Install purge control solenoid valve.



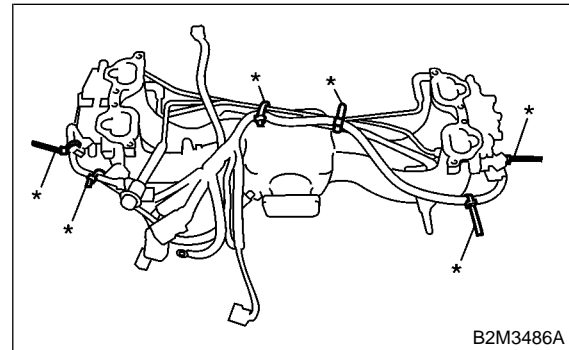
12) Connect hoses to purge control solenoid valve.

CAUTION:

Carefully connect the evaporation hoses.



13) Install engine harness onto intake manifold.
14) Connect connectors to fuel injectors and purge control solenoid valve.
15) Hold engine harness by harness band (*).



NOTE:

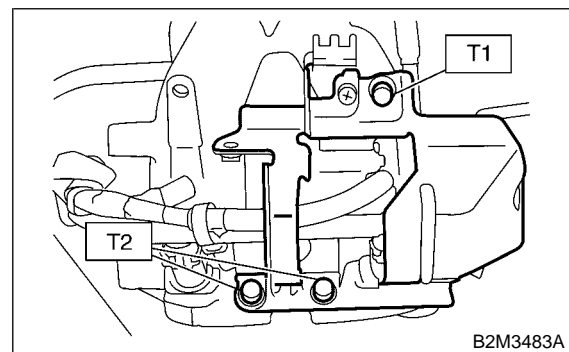
Do not use harness band on harnesses where they are supposed to be protected by the fuel pipe protector.

16) Install intake manifold protector RH.

Tightening torque:

$T1: 18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)

$T2: 19 \pm 2 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.2 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.4 \text{ ft}\cdot\text{lb}$)

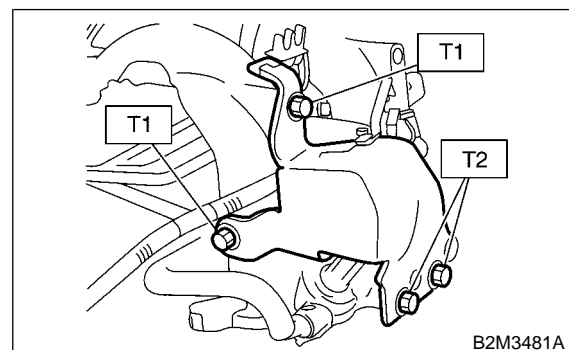


17) Install intake manifold protector LH.

Tightening torque:

$T1: 18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)

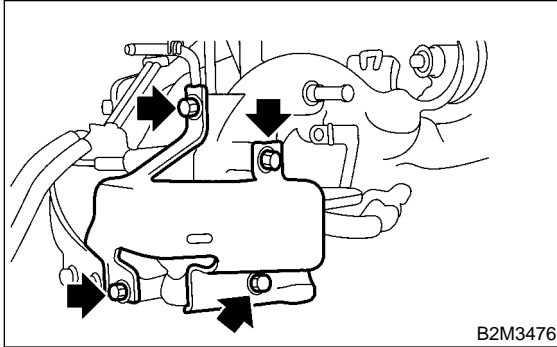
$T2: 19 \pm 2 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.2 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.4 \text{ ft}\cdot\text{lb}$)



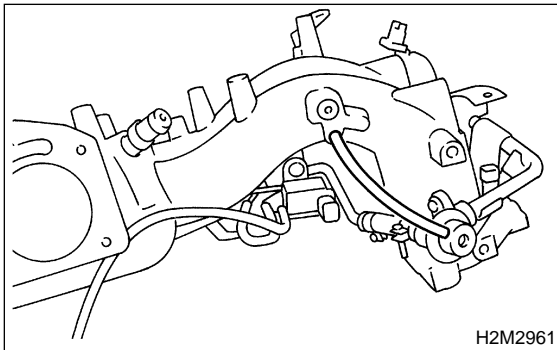
18) Install fuel pipe protector LH.

Tightening torque:

$18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)



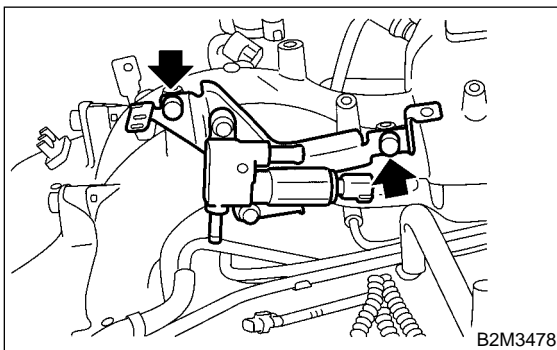
19) Connect pressure regulator vacuum hose to intake manifold.



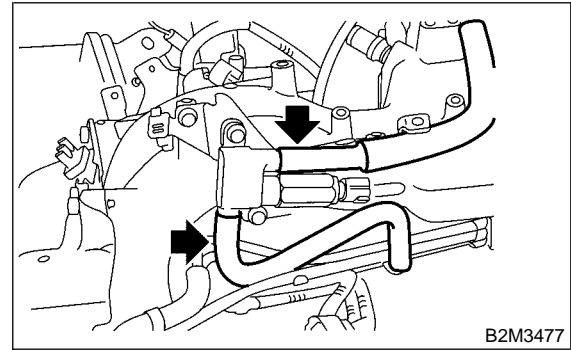
20) Install air assist injector solenoid valve to bracket.

Tightening torque:

$15.7 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.6 \pm 0.15 \text{ kg}\cdot\text{m}$, $11.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)



21) Connect air by-pass hoses to air assist solenoid valve.



22) Connect connector to air assist solenoid valve.

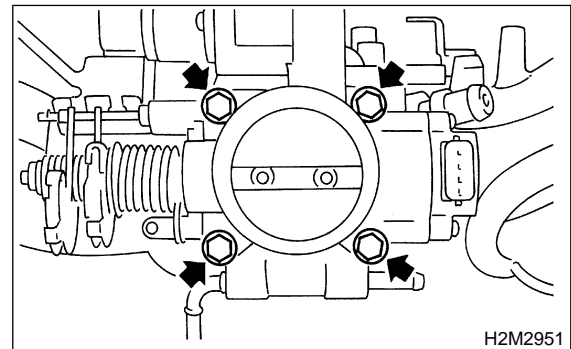
23) Install throttle body to intake manifold.

CAUTION:

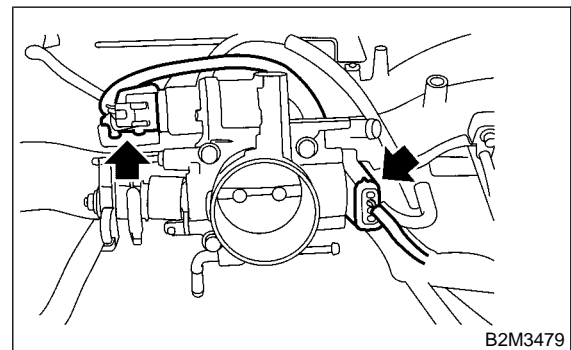
Replace gasket with a new one.

Tightening torque:

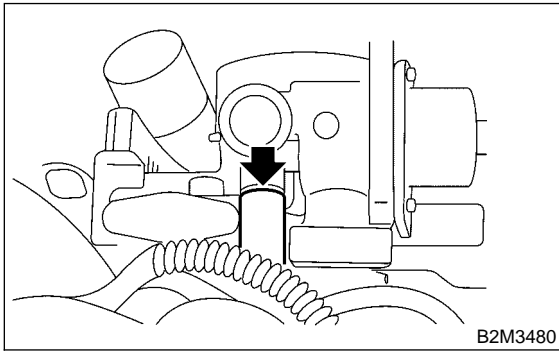
$22 \pm 2 \text{ N}\cdot\text{m}$ ($2.2 \pm 0.2 \text{ kg}\cdot\text{m}$, $15.9 \pm 1.4 \text{ ft}\cdot\text{lb}$)



24) Connect connector to throttle position sensor and idle air control solenoid valve.



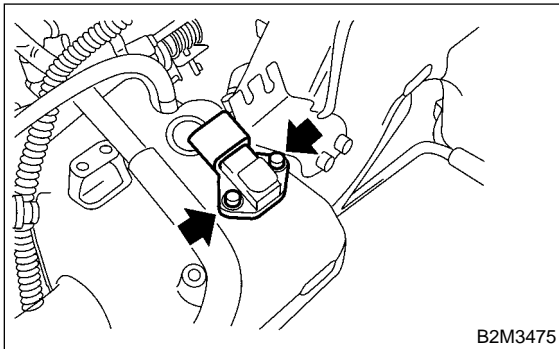
25) Connect air by-pass hose to throttle body.



26) Install intake air temperature and pressure sensor.

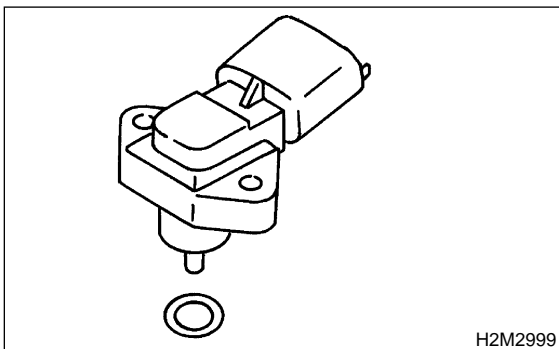
Tightening torque:

$2.0 \pm 0.4 \text{ N}\cdot\text{m}$ ($0.2 \pm 0.04 \text{ kg}\cdot\text{m}$, $1.4 \pm 0.3 \text{ ft}\cdot\text{lb}$)



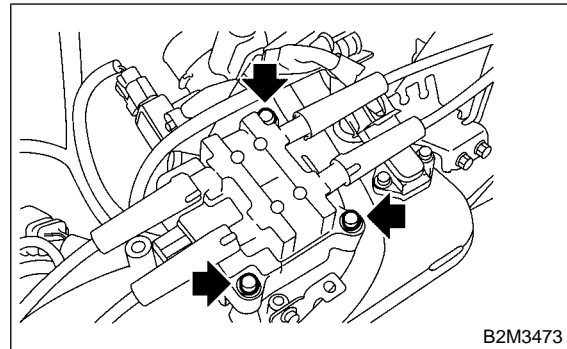
CAUTION:

Replace O-ring with new one.



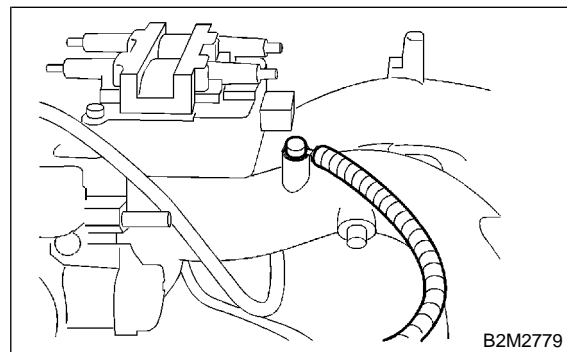
27) Connect connector to intake air temperature and pressure sensor.

28) Install ignition coil and ignitor assembly.



29) Connect connector to ignition coil and ignitor assembly.

30) Install engine ground terminal to intake manifold.



D: INSTALLATION

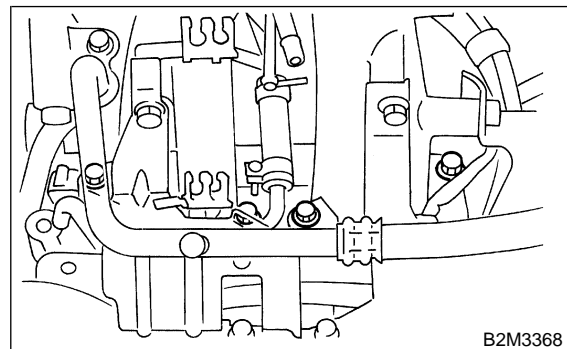
1) Install intake manifold onto cylinder heads.

CAUTION:

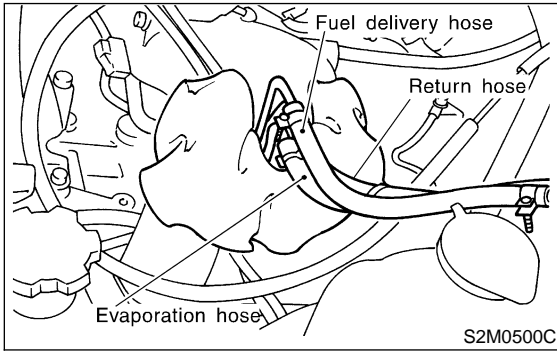
Always use new gaskets.

Tightening torque:

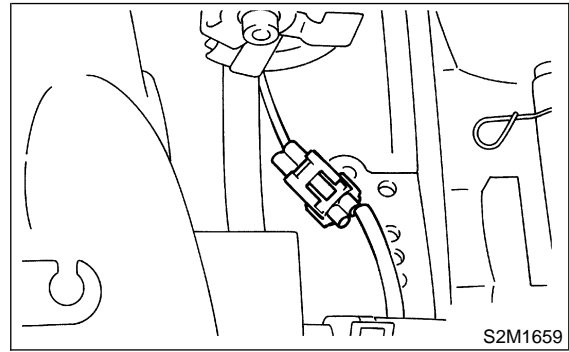
$25 \pm 2 \text{ N}\cdot\text{m}$ ($2.5 \pm 0.2 \text{ kg}\cdot\text{m}$, $18.1 \pm 1.4 \text{ ft}\cdot\text{lb}$)



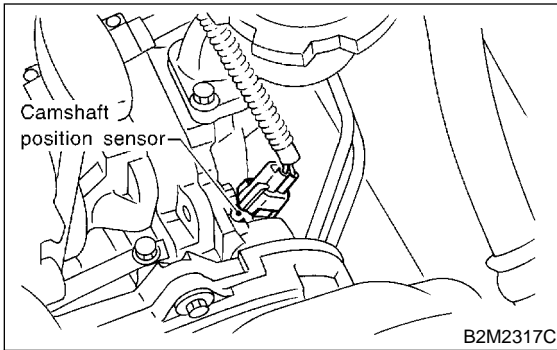
2) Connect fuel hoses.



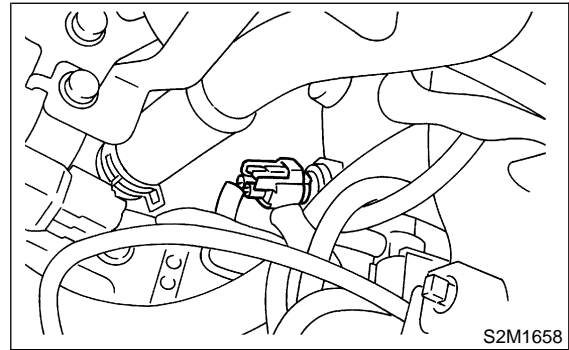
6) Connect knock sensor connector.



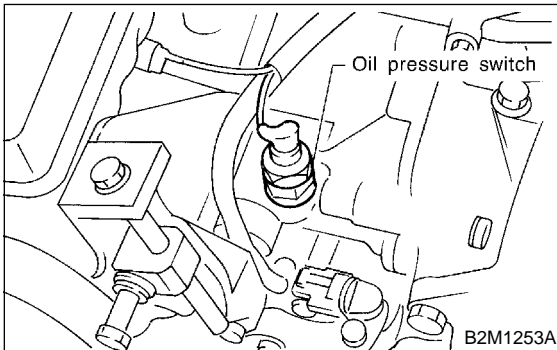
3) Connect connector to camshaft position sensor.



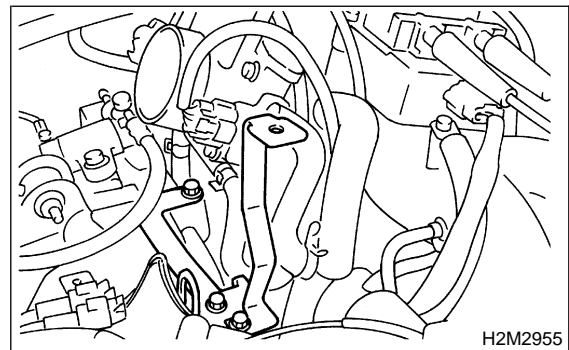
7) Connect connectors to engine coolant temperature sensor.



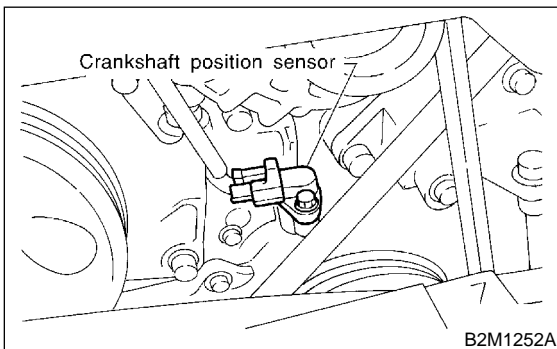
4) Connect connector to oil pressure switch.



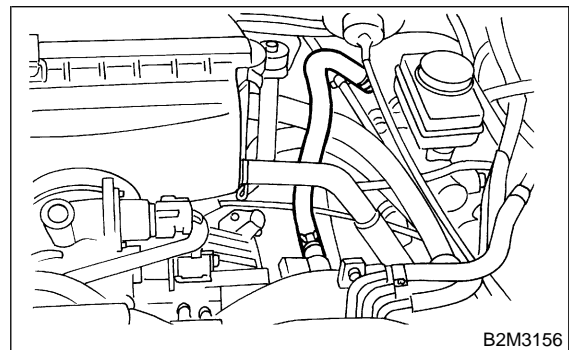
8) Install air cleaner case stay RH and engine harness bracket, and connect engine harness connectors to bulkhead connectors.



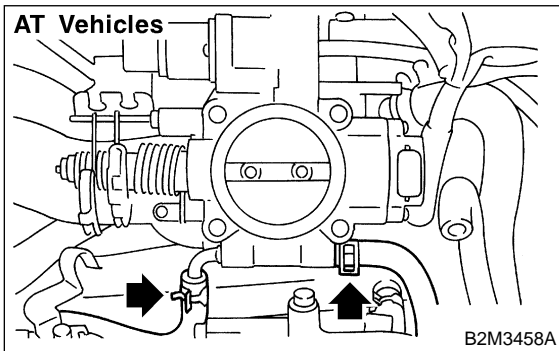
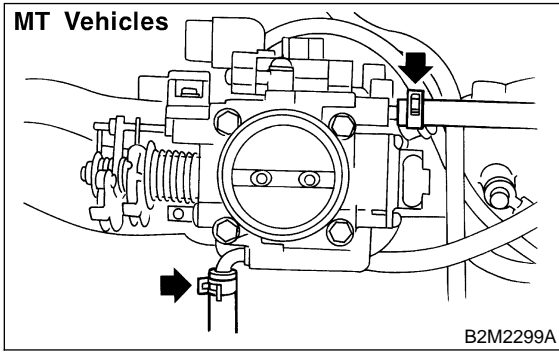
5) Connect connector to crankshaft position sensor.



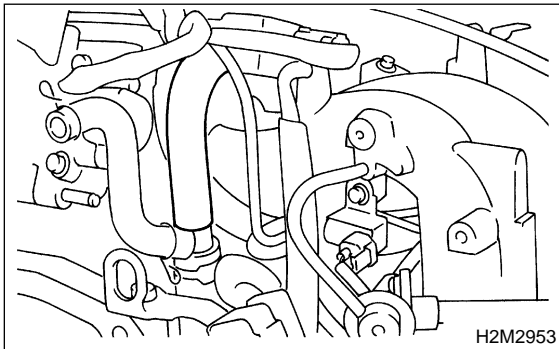
9) Connect brake booster hose.



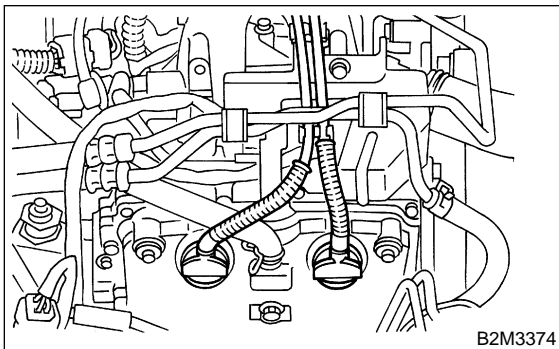
10) Connect engine coolant hose to throttle body.



11) Connect PCV hose to intake manifold.

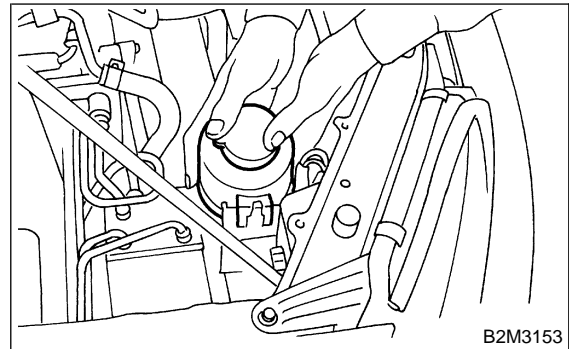


12) Connect spark plug cords to spark plugs.

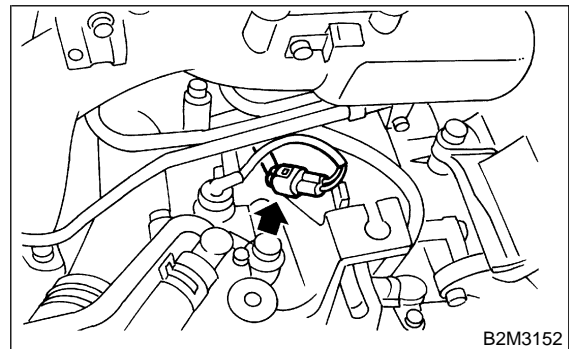


13) Install power steering pump and tank on brackets.

(1) Install power steering tank on bracket.



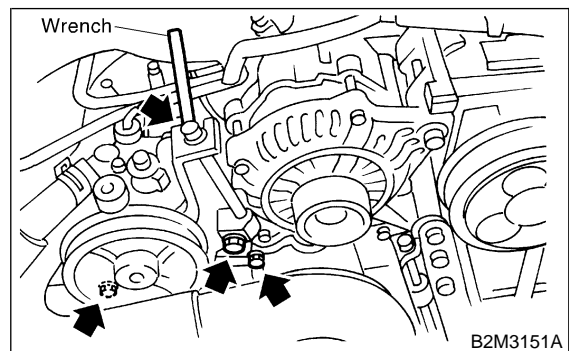
(2) Connect connector to power steering pump switch.



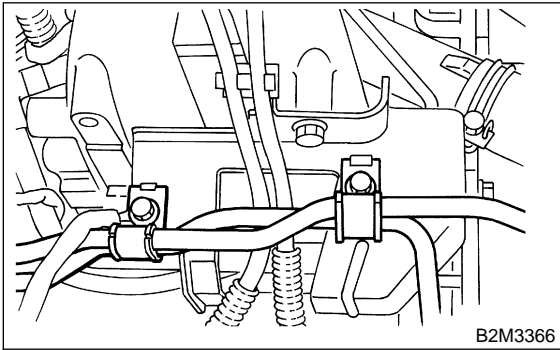
(3) Tighten bolts which install power steering pump on bracket.

Tightening torque:

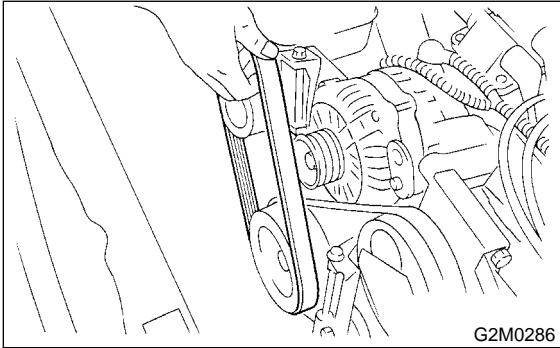
20.1±2.5 N·m (2.05±0.25 kg·m, 14.8±1.8 ft·lb)



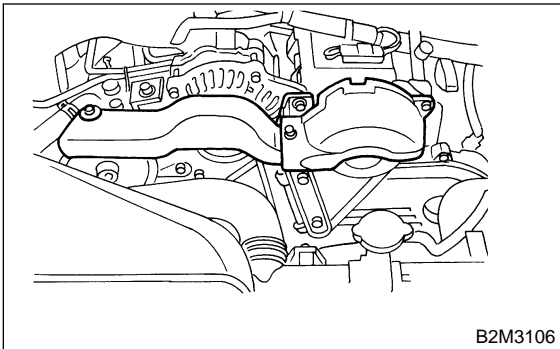
- (4) Install power steering pipes onto right side intake manifold protector.



- (5) Install power steering pump drive V-belt.



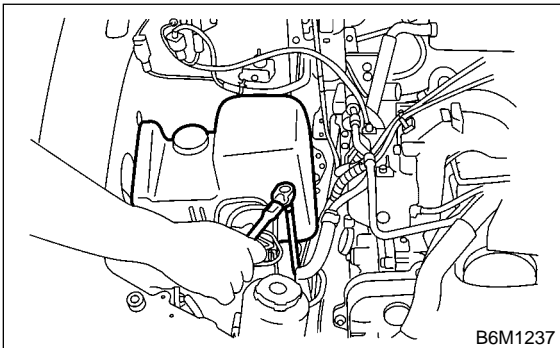
- (6) Adjust V-belt. <Ref. to 1-5 [G1A0].>
 (7) Install V-belt covers.



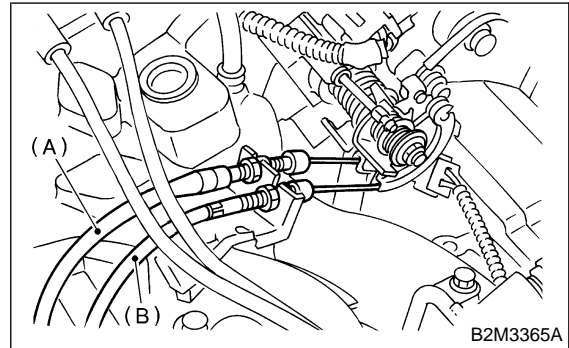
- (8) Install resonator chamber.

Tightening torque:

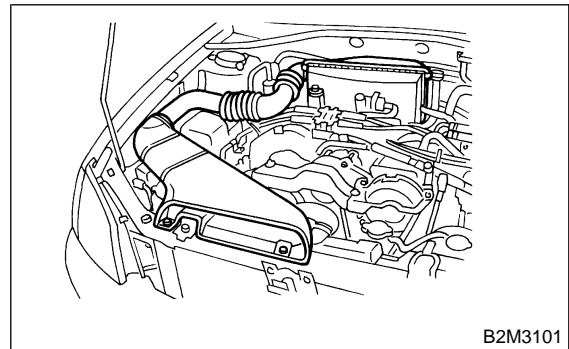
$33 \pm 10 \text{ N}\cdot\text{m}$ ($3.4 \pm 1.0 \text{ kg}\cdot\text{m}$, $24.6 \pm 7.2 \text{ ft}\cdot\text{lb}$)



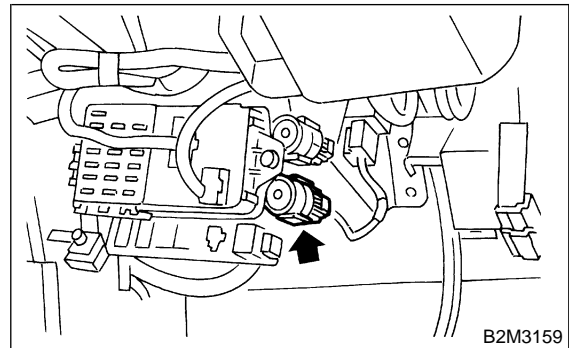
- 14) Connect accelerator cable (A).
 15) Connect cruise control cable (B). (With cruise control models)



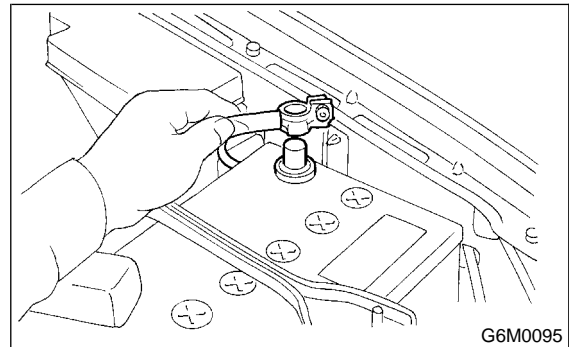
- 16) Install air intake duct and air cleaner assembly. <Ref. to 2-7 [W1A0].>



- 17) Connect connector to fuel pump relay.



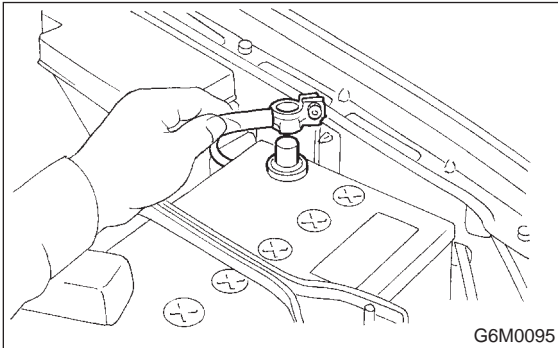
- 18) Connect battery ground cable.



4. Engine Coolant Temperature Sensor

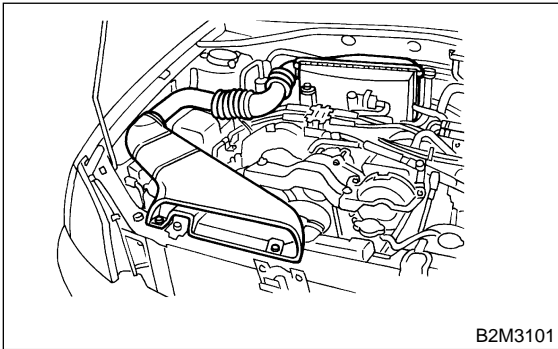
A: REMOVAL AND INSTALLATION

- 1) Disconnect battery ground cable.



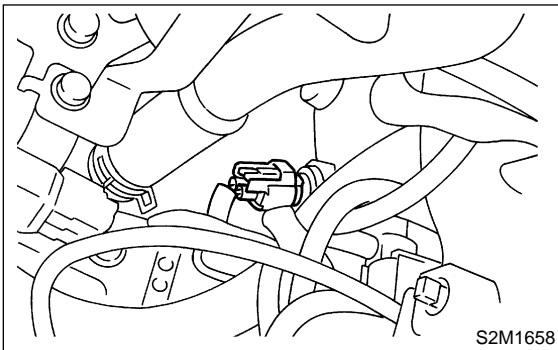
G6M0095

- 2) Remove air intake duct and air cleaner assembly. <Ref. to 2-7 [W1A0].>



B2M3101

- 3) Disconnect connector from engine coolant temperature sensor.

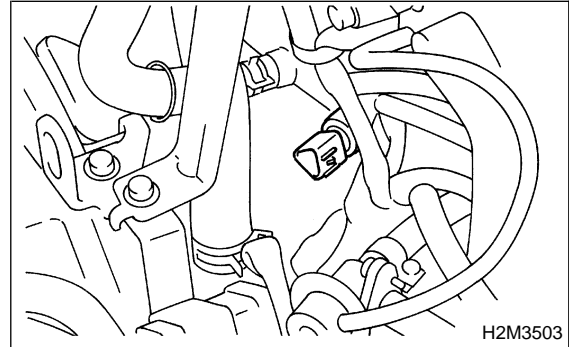


S2M1658

- 4) Remove engine coolant temperature sensor.
- 5) Installation is in the reverse order of removal.

Tightening torque:

25 ± 3 N·m (2.5 ± 0.3 kg·m, 18.1 ± 2.2 ft·lb)

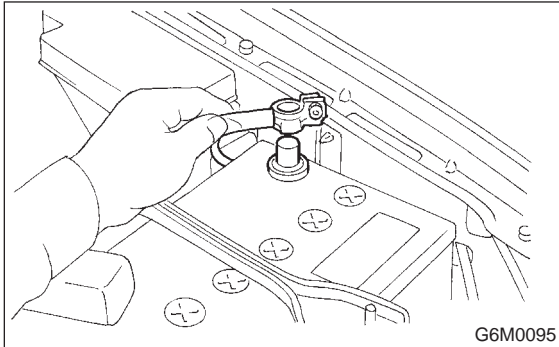


H2M3503

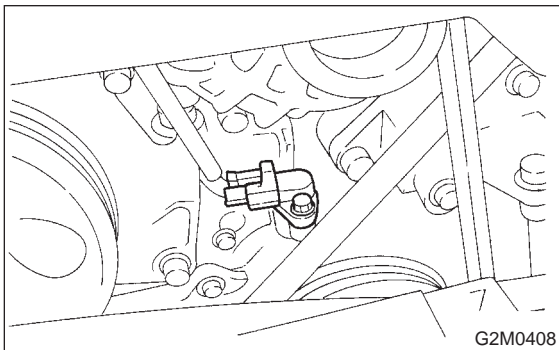
5. Crankshaft Position Sensor

A: REMOVAL AND INSTALLATION

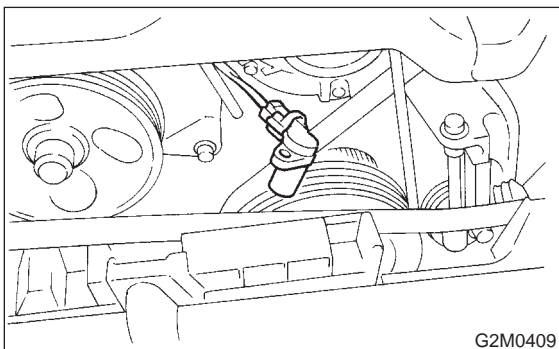
- 1) Disconnect battery ground cable.



- 2) Remove bolt which install crankshaft position sensor to cylinder block.



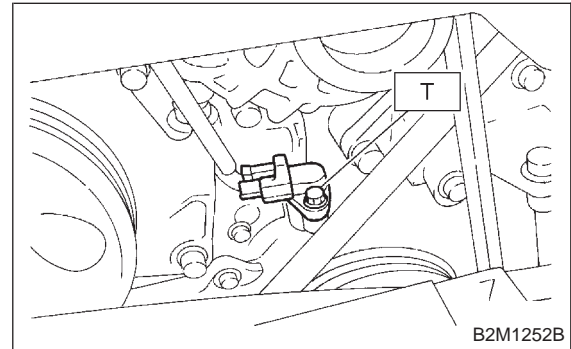
- 3) Remove crankshaft position sensor, and disconnect connector from it.



- 4) Installation is in the reverse order of removal.

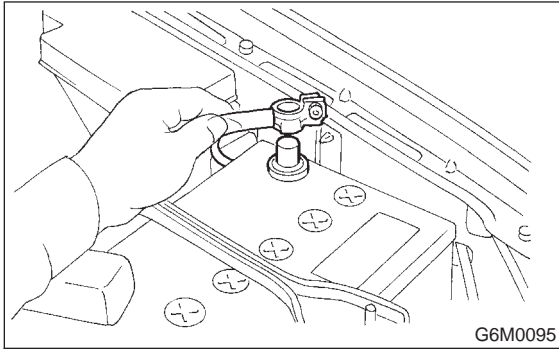
Tightening torque:

T: 6.4 ± 0.5 N·m (0.65 ± 0.05 kg·m, 4.7 ± 0.4 ft·lb)

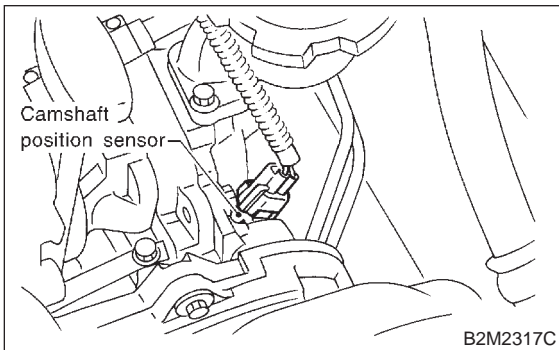


6. Camshaft Position Sensor
A: REMOVAL AND INSTALLATION

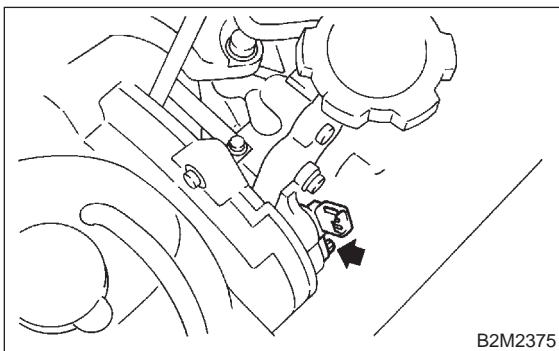
1) Disconnect battery ground cable.



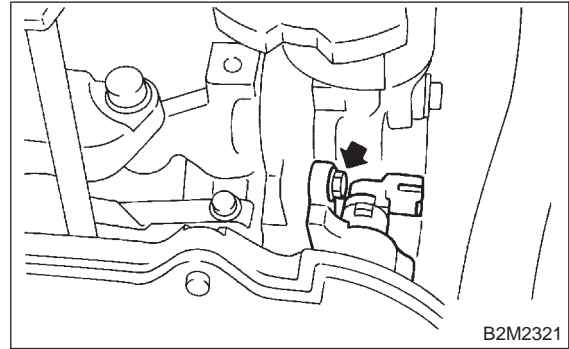
2) Disconnect connector from camshaft position sensor.



3) Remove bolt which installs camshaft position sensor to camshaft position sensor support.

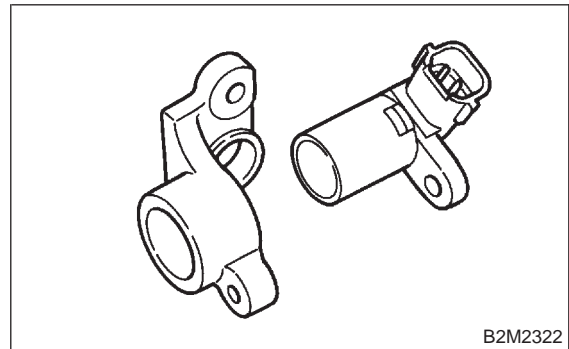


4) Remove bolt which installs camshaft position sensor support to camshaft cap LH.



5) Remove camshaft position sensor and camshaft position sensor support as a unit.

6) Remove camshaft position sensor itself.



7) Installation is in the reverse order of removal.

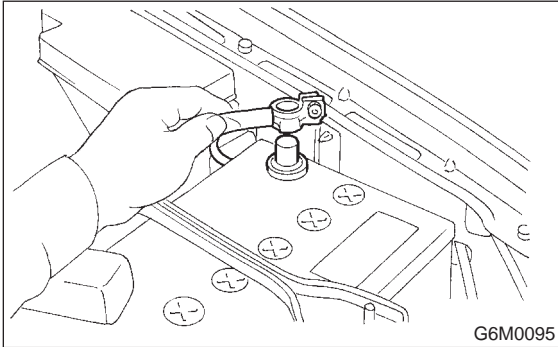
Tightening torque:

- **Camshaft position sensor support;**
6.4±0.5 N·m (0.65±0.05 kg·m, 4.7±0.4 ft·lb)
- **Camshaft position sensor;**
6.4±0.5 N·m (0.65±0.05 kg·m, 4.7±0.4 ft·lb)

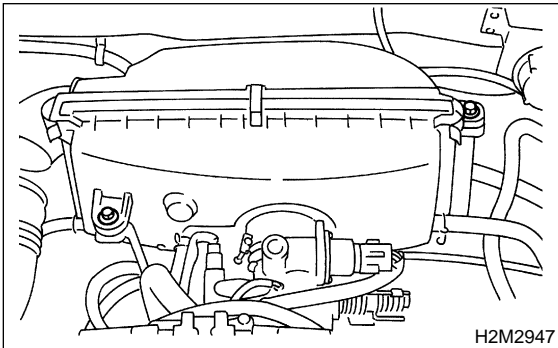
7. Knock Sensor

A: REMOVAL

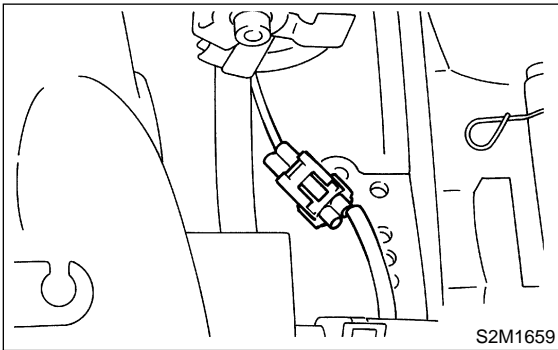
- 1) Disconnect battery ground cable from battery ground terminal.



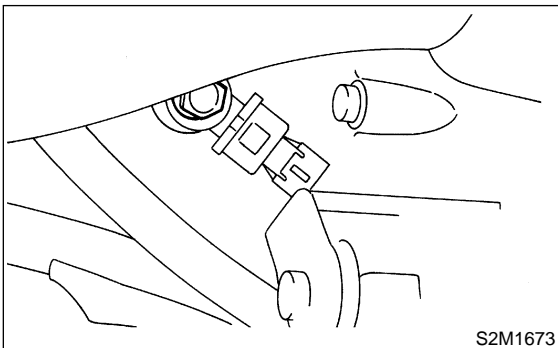
- 2) Remove air cleaner case.



- 3) Disconnect knock sensor connector.



- 4) Remove knock sensor from cylinder block.



B: INSTALLATION

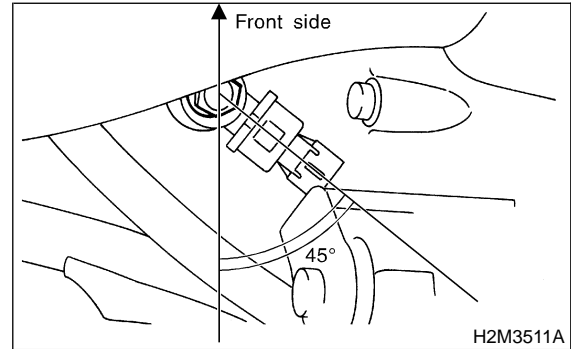
- 1) Install knock sensor to cylinder block.

Tightening torque:

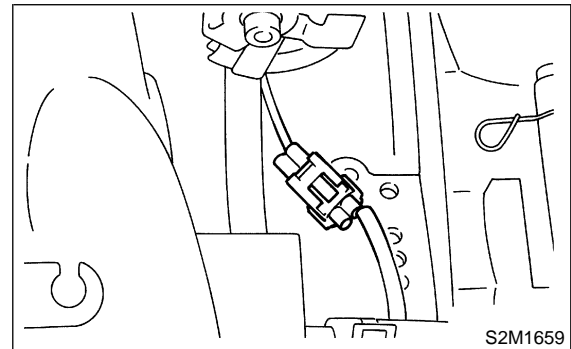
$23.5 \pm 2.9 \text{ N}\cdot\text{m}$ ($2.4 \pm 0.3 \text{ kg}\cdot\text{m}$, $17.4 \pm 2.2 \text{ ft}\cdot\text{lb}$)

NOTE:

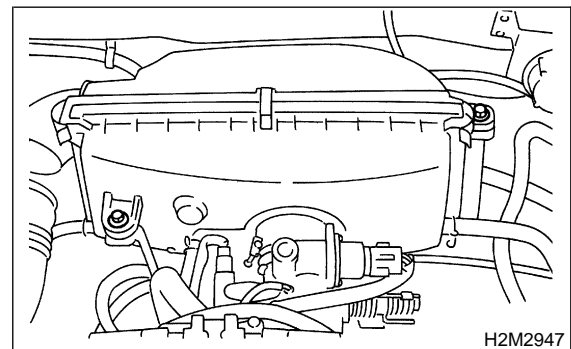
The extraction area of the knock sensor cord must be positioned at a 45° angle relative to the engine rear.



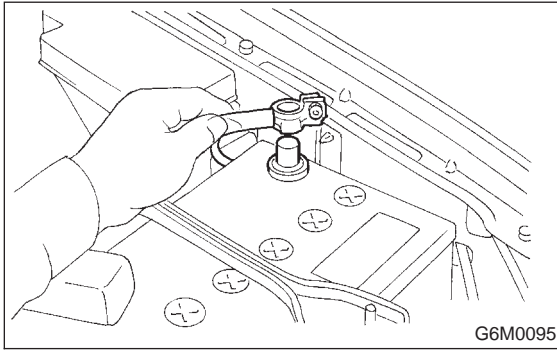
- 2) Connect knock sensor connector.



- 3) Install air cleaner case.



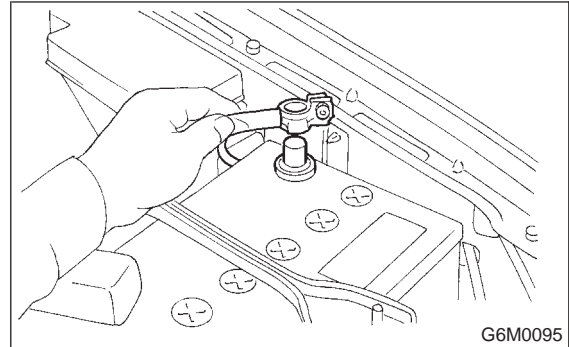
4) Connect battery ground cable.



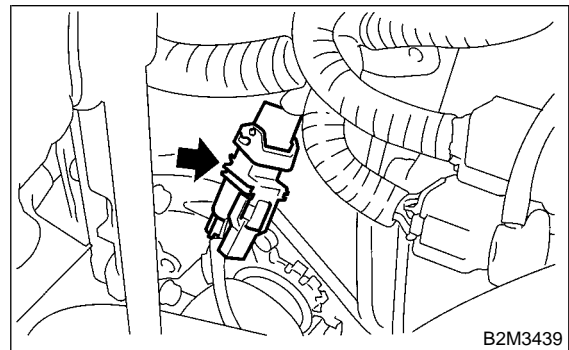
8. Front Oxygen (A/F) Sensor

A: REMOVAL

1) Disconnect battery ground cable.



2) Disconnect connector from front oxygen (A/F) sensor.



3) Lift-up the vehicle.

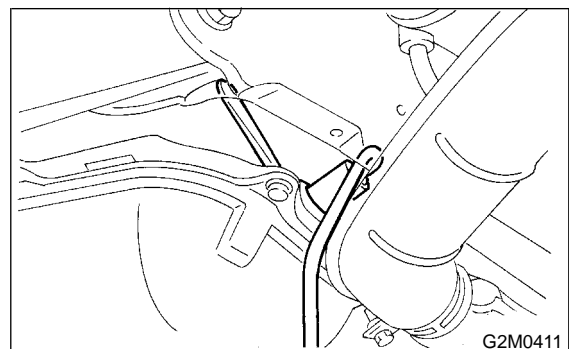
4) Apply SUBARU CRC or its equivalent to threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

5) Remove front oxygen (A/F) sensor.

CAUTION:

When removing front oxygen (A/F) sensor, do not force front oxygen (A/F) sensor especially when exhaust pipe is cold, otherwise it will damage exhaust pipe.



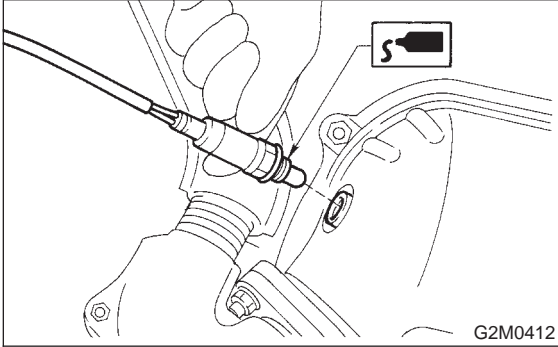
8. Front Oxygen (A/F) Sensor

B: INSTALLATION

1) Before installing front oxygen (A/F) sensor, apply anti-seize compound only to threaded portion of front oxygen (A/F) sensor to make the next removal easier.

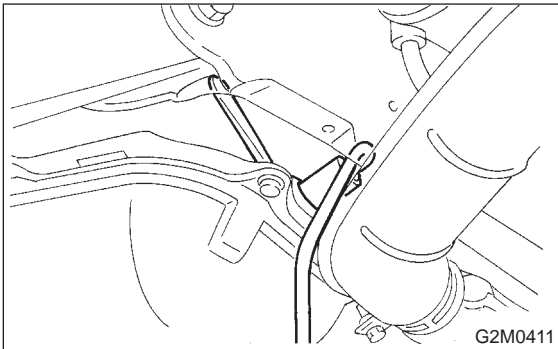
Anti-seize compound:
SS-30 by JET LUBE

CAUTION:
Never apply anti-seize compound to protector of front oxygen (A/F) sensor.



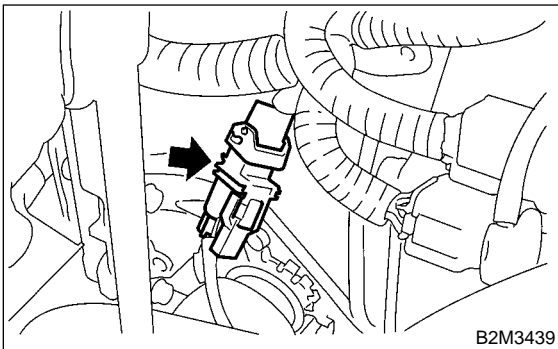
2) Install front oxygen (A/F) sensor.

Tightening torque:
21±3 N·m (2.1±0.3 kg·m, 15.2±2.2 ft·lb)

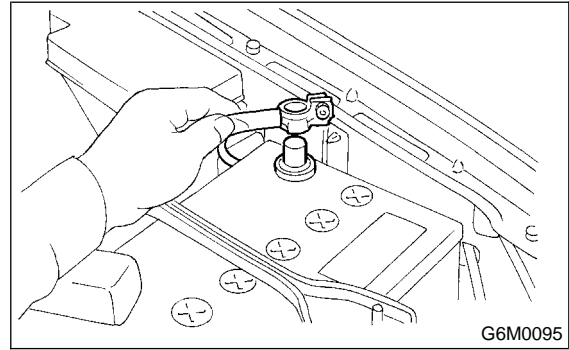


3) Lower the vehicle.

4) Connect connector of front oxygen (A/F) sensor.



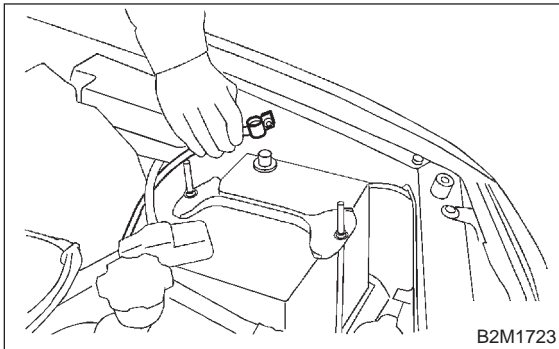
5) Connect battery ground cable.



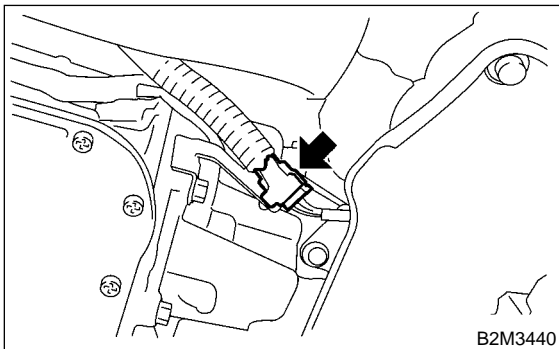
9. Rear Oxygen Sensor

A: REMOVAL

- 1) Disconnect battery ground cable.



- 2) Disconnect connector from rear oxygen sensor.



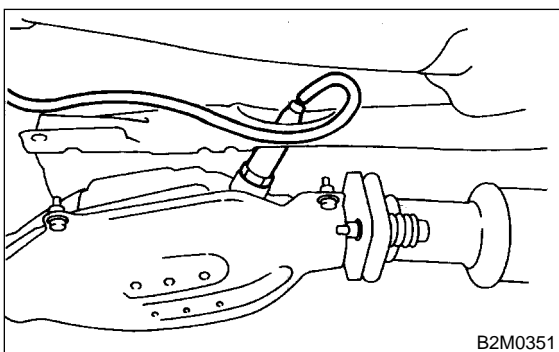
- 3) Lift-up the vehicle.
- 4) Apply SUBARU CRC or its equivalent to threaded portion of rear oxygen sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

- 5) Remove rear oxygen sensor.

CAUTION:

When removing, do not force rear oxygen sensor in an unnatural way especially when exhaust pipe is cold, otherwise it will damage exhaust pipe.



B: INSTALLATION

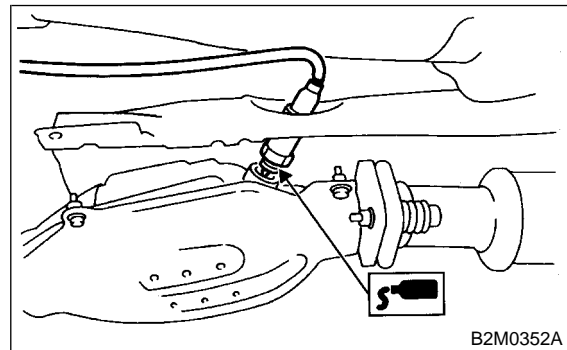
- 1) Before installing rear oxygen sensor, apply anti-seize compound only to threaded portion of rear oxygen sensor to make the next removal easier.

CAUTION:

Never apply anti-seize compound to protector of rear oxygen sensor.

Anti-seize compound:

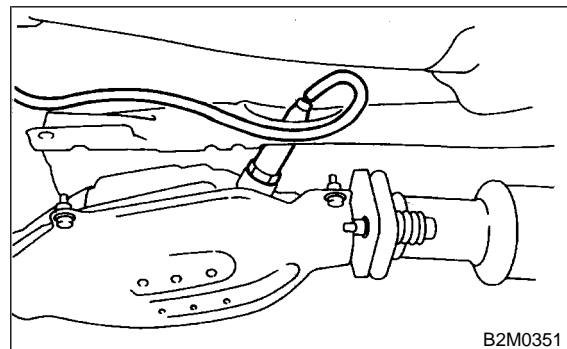
SS-30 by JET LUBE



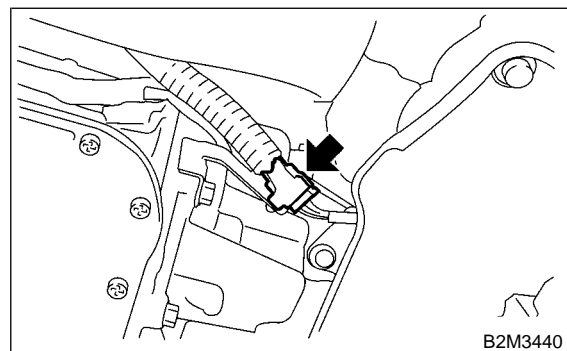
- 2) Install rear oxygen sensor.

Tightening torque:

21±3 N·m (2.1±0.3 kg·m, 15.2±2.2 ft·lb)

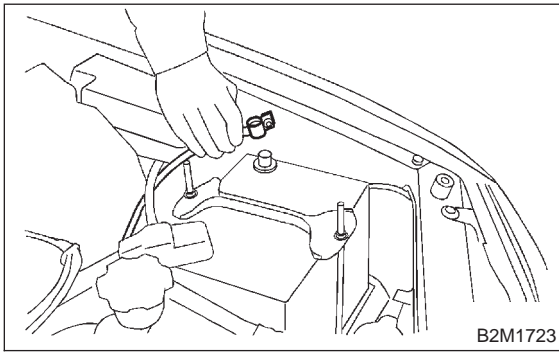


- 3) Connect connector to rear oxygen sensor.



- 4) Lower the vehicle.

5) Connect battery ground cable.

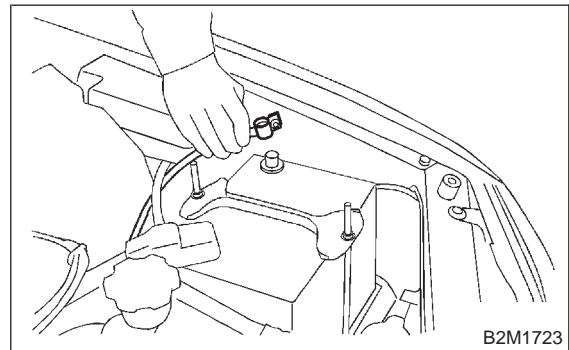


10. Throttle Position Sensor

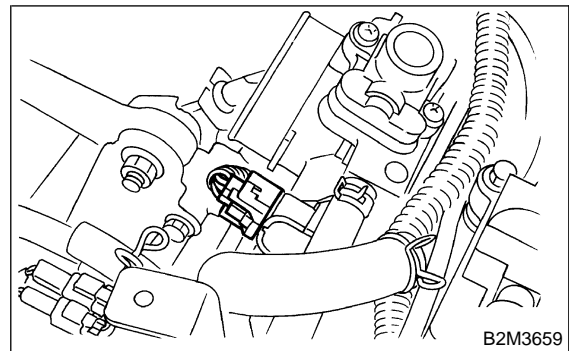
A: REMOVAL AND INSTALLATION

1. MT VEHICLES

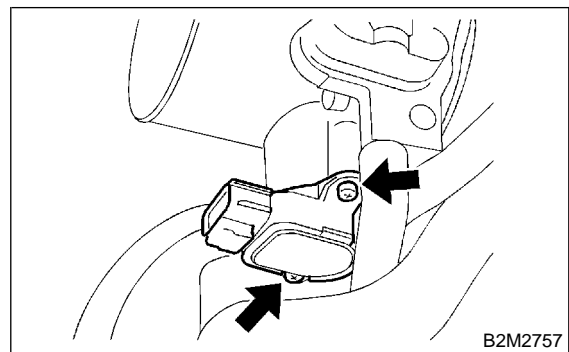
1) Disconnect battery ground cable.



2) Disconnect connector from throttle position sensor.



3) Remove throttle position sensor holding screws, and remove throttle position sensor itself.



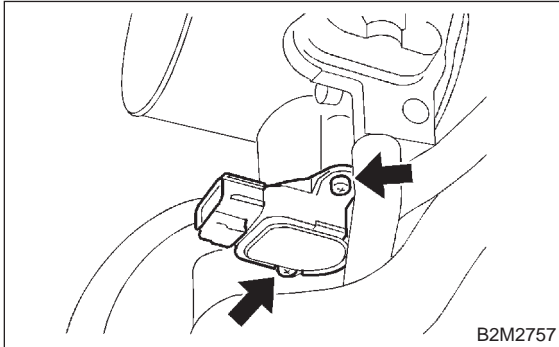
4) Installation is in the reverse order of removal.

CAUTION:

When installing throttle position sensor, adjust the position to match with the specified data.

Tightening torque:

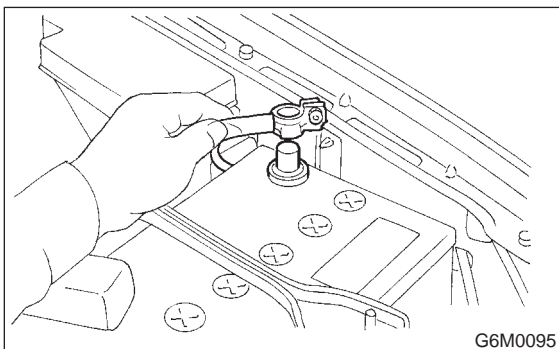
$2.2 \pm 0.2 \text{ N}\cdot\text{m}$ ($0.22 \pm 0.02 \text{ kg}\cdot\text{m}$, $1.6 \pm 0.1 \text{ ft}\cdot\text{lb}$)



B2M2757

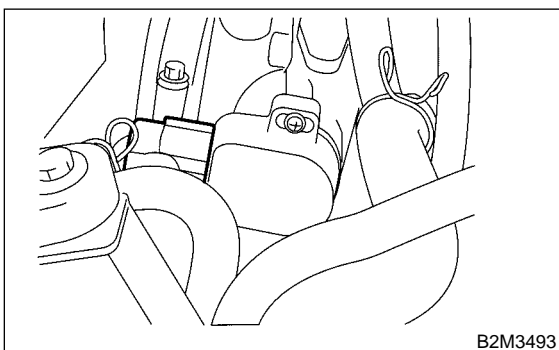
2. AT VEHICLES

1) Disconnect battery ground cable.



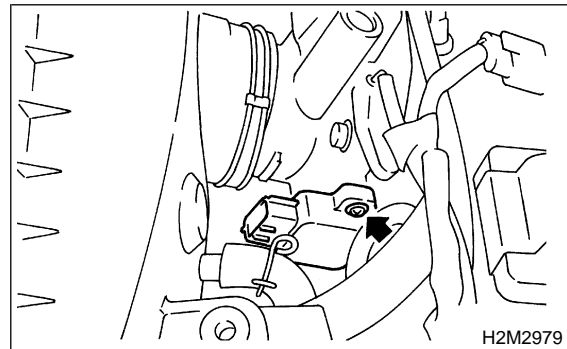
G6M0095

2) Disconnect connector from throttle position sensor.



B2M3493

3) Remove throttle position sensor holding screws, and remove it.



H2M2979

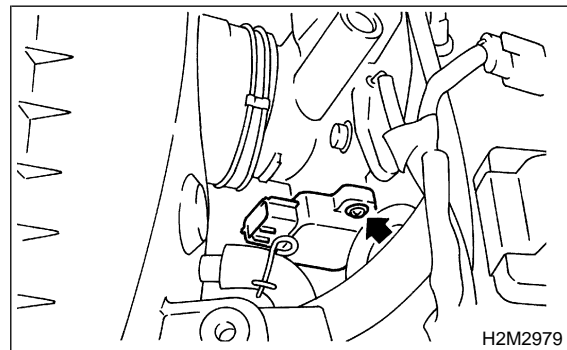
4) Installation is in the reverse order of removal.

Tightening torque:

$2.2 \pm 0.2 \text{ N}\cdot\text{m}$ ($0.22 \pm 0.02 \text{ kg}\cdot\text{m}$, $1.6 \pm 0.1 \text{ ft}\cdot\text{lb}$)

CAUTION:

When installing throttle position sensor, adjust to the specified data.

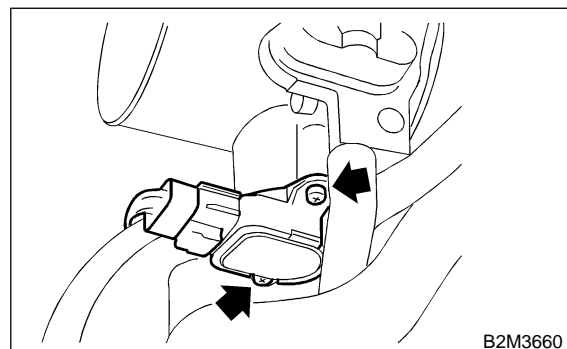


H2M2979

B: ADJUSTMENT

1. MT VEHICLES

- 1) Turn ignition switch to OFF.
- 2) Loosen throttle position sensor holding screws.



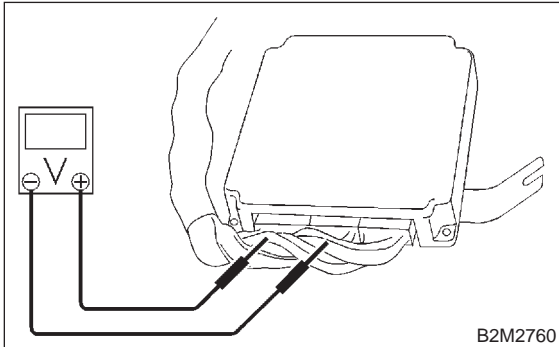
B2M3660

- 3) When using voltage meter;
 - (1) Take out ECM.
 - (2) Turn ignition switch to ON.

10. Throttle Position Sensor

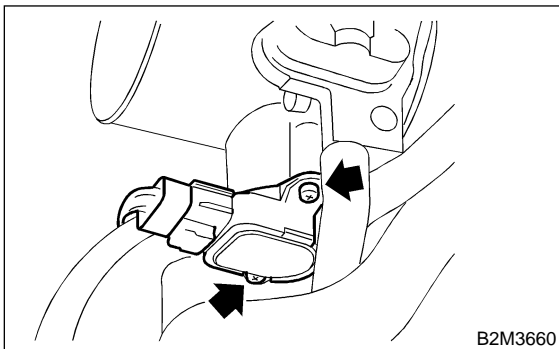
(3) Adjust throttle position sensor to the proper position to allow the voltage signal to ECM to be in specification.

Connector & terminal / Specified voltage
(B136) No. 15 — (B136) No. 17 / 0.45 —
0.55 V
[Fully closed.]



(4) Tighten throttle position sensor holding screws.

Tightening torque:
 2.2 ± 0.2 N·m (0.22 ± 0.02 kg·m, 1.6 ± 0.1 ft·lb)



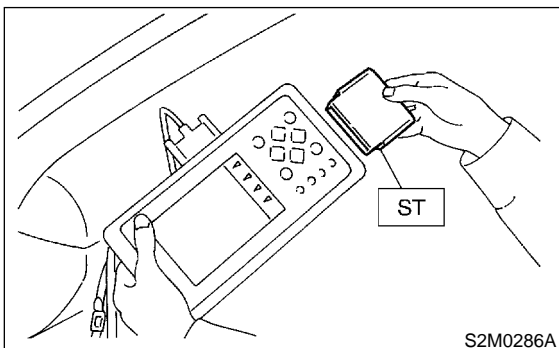
4) When using Subaru Select Monitor;

NOTE:

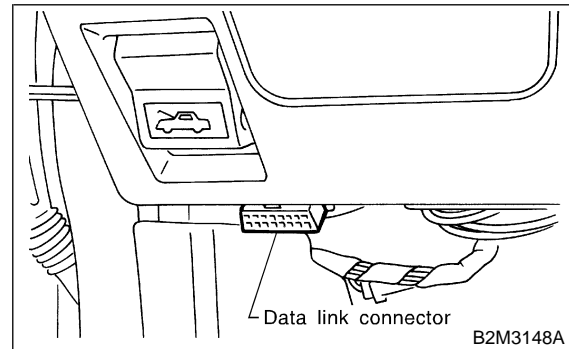
For detailed operation procedures, refer to the Subaru Select Monitor Operation Manual.

(1) Insert the cartridge to Subaru Select Monitor.

<Ref. to 1-6 [G1100].>



(2) Connect Subaru Select Monitor to the data link connector.



(3) Turn ignition switch to ON, and Subaru Select Monitor switch to ON.

(4) Select {2. Each System Check} in Main Menu.

(5) Select {Engine Control System} in Selection Menu.

(6) Select {1. Current Data Display & Save} in EGI/EMPI Diagnosis.

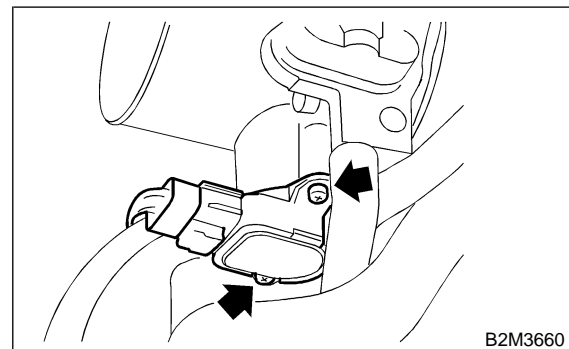
(7) Select {1.12 Data Display} in Data Display Menu.

(8) Adjust throttle position sensor to the proper position to match with the following specifications.

Condition: Throttle fully closed
Throttle opening angle 0.00%
Throttle sensor voltage 0.50 V

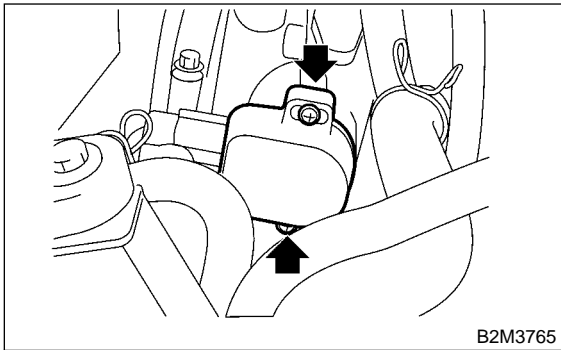
(9) Tighten throttle position sensor holding screws.

Tightening torque:
 2.2 ± 0.2 N·m (0.22 ± 0.02 kg·m, 1.6 ± 0.1 ft·lb)

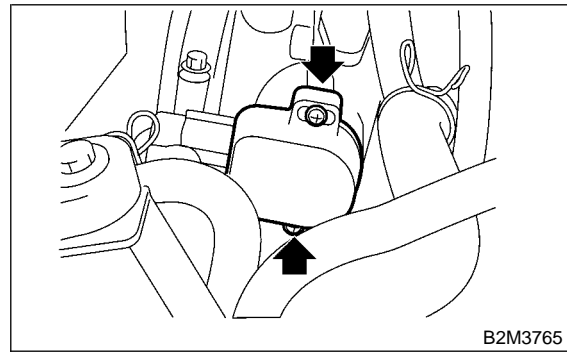


2. AT VEHICLES

- 1) Turn ignition switch to OFF.
- 2) Loosen throttle position sensor holding screws.

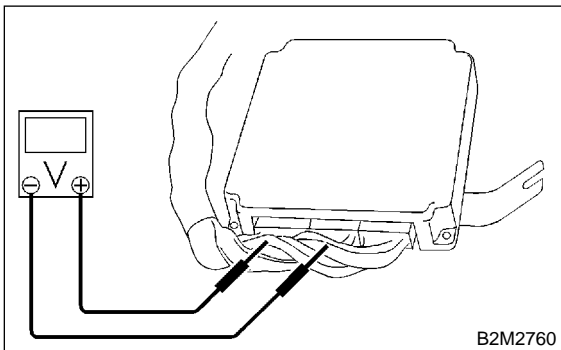


- (2) Loosen throttle position sensor holding screws.



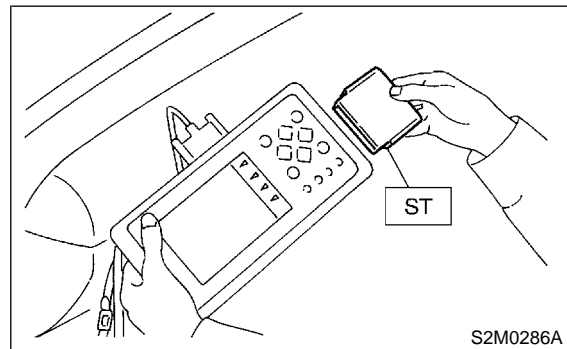
- 3) When using voltage meter;
 - (1) Take out ECM.
 - (2) Turn ignition switch to ON.
 - (3) Adjust throttle position sensor to the proper position to allow the voltage signal to ECM to be in specification.

Connector & terminal / Specified voltage
(B136) No. 15 — (B136) No. 17 / 0.45 —
0.55 V
[Fully closed.]



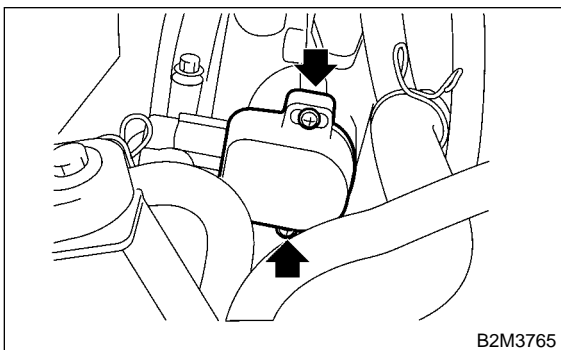
NOTE:
 For detailed operation procedures, refer to the Subaru Select Monitor Operation Manual.

- (3) Insert the cartridge to Subaru Select Monitor.
 <Ref. to 1-6 [G1100].>

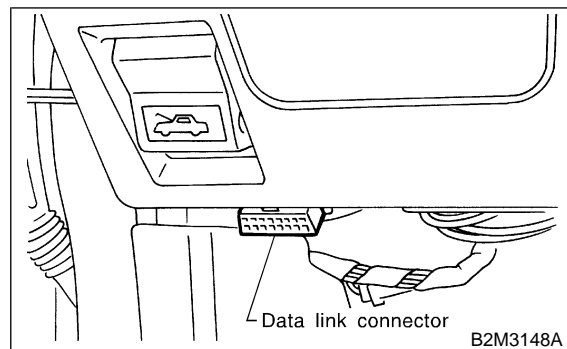


- (4) Tighten throttle position sensor holding screws.

Tightening torque:
2.2±0.2 N·m (0.22±0.02 kg·m, 1.6±0.1 ft·lb)



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



- 4) When using Subaru Select Monitor;
 - (1) Turn ignition switch to OFF.

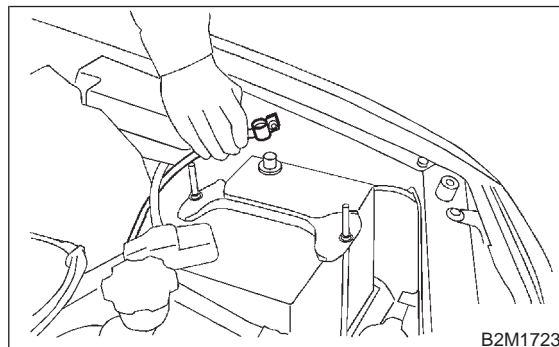
- 5) Turn ignition switch to ON, and Subaru Select Monitor switch to ON.
- 6) Select {2. Each System Check} in Main Menu.
- 7) Select {Engine Control System} in Selection Menu.
- 8) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.
- 9) Select {1.12 Data Display} in Data Display Menu.
- 10) Adjust throttle position sensor to the proper position to match with the following specifications.

*Condition: Throttle fully closed
Throttle opening angle 0.00%
Throttle sensor voltage 0.50 V*

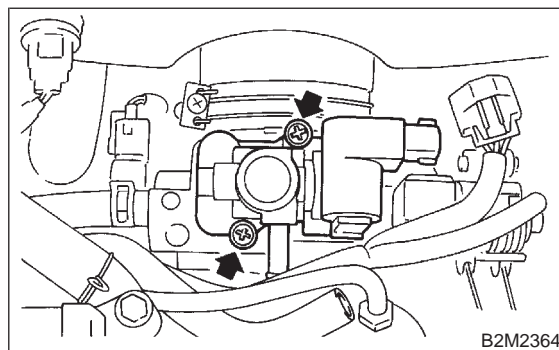
11. Intake Manifold Pressure Sensor (MT vehicles)

A: REMOVAL AND INSTALLATION

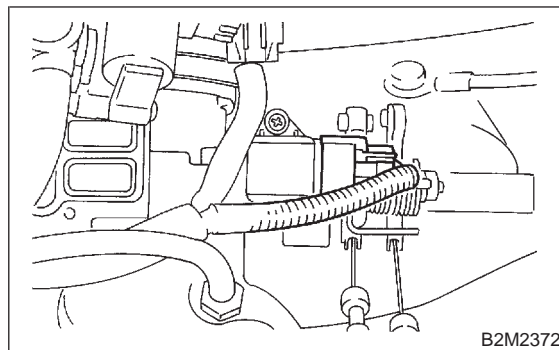
- 1) Disconnect battery ground cable.



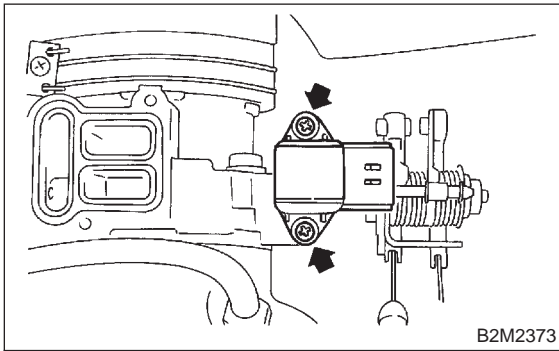
- 2) Remove idle air control solenoid valve. <Ref. to 2-7 [W15A1].>



- 3) Disconnect connector from intake manifold pressure sensor.



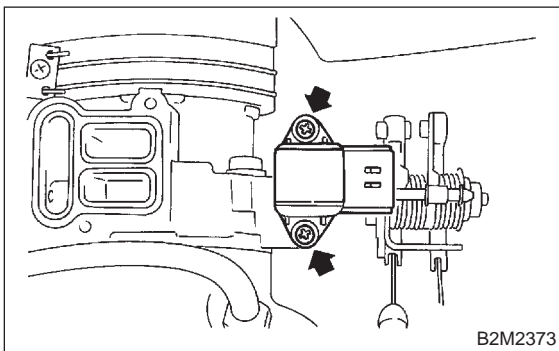
4) Remove intake manifold pressure sensor from throttle body.



5) Installation is in the reverse order of removal.

CAUTION:
 Replace gaskets for intake air pressure sensor and idle air control solenoid valve with new ones.

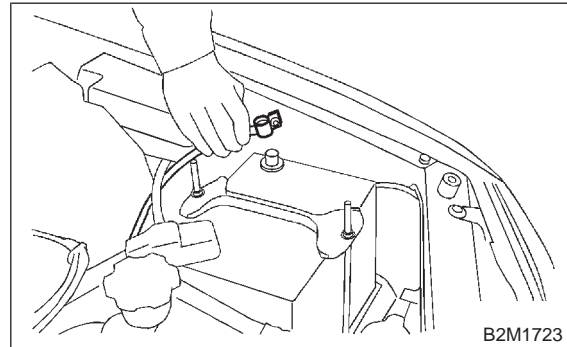
Tightening torque:
 $2.2 \pm 0.2 \text{ N}\cdot\text{m}$ ($0.22 \pm 0.02 \text{ kg}\cdot\text{m}$, $1.6 \pm 0.1 \text{ ft}\cdot\text{lb}$)



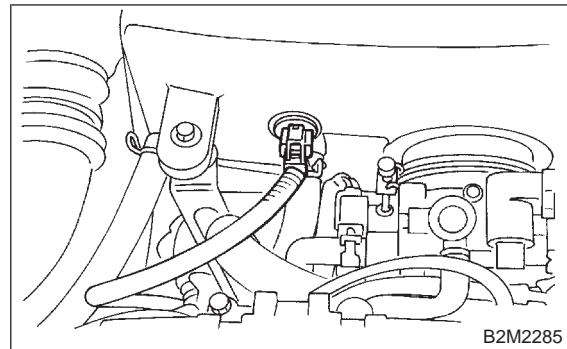
12. Intake Air Temperature Sensor (MT vehicles)

A: REMOVAL AND INSTALLATION

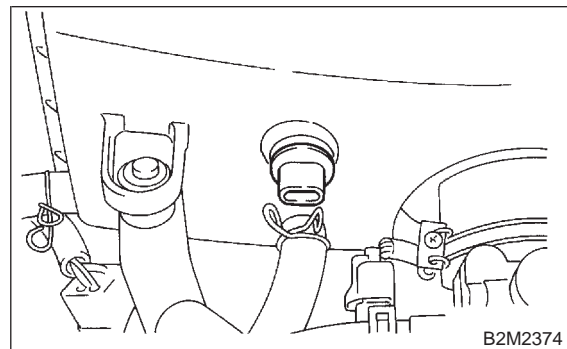
1) Disconnect battery ground cable.



2) Disconnect connector from intake air temperature sensor.



3) Remove intake air temperature sensor from air cleaner case.

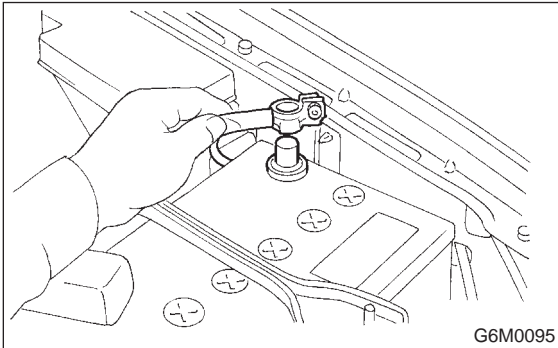


4) Installation is in the reverse order of removal.

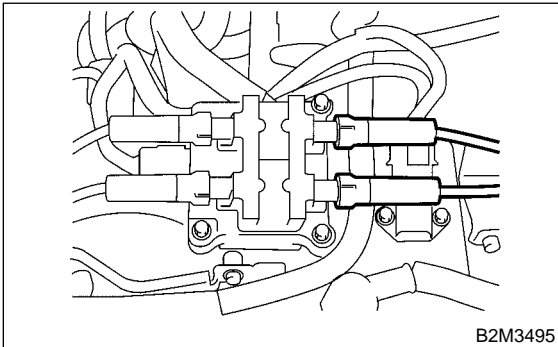
13. Intake Air Temperature and Pressure Sensor (AT vehicles)

A: REMOVAL AND INSTALLATION

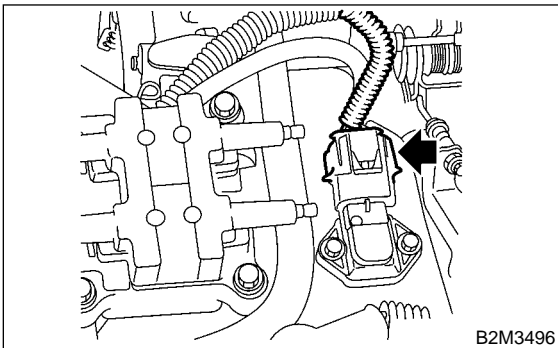
- 1) Disconnect battery ground cable.



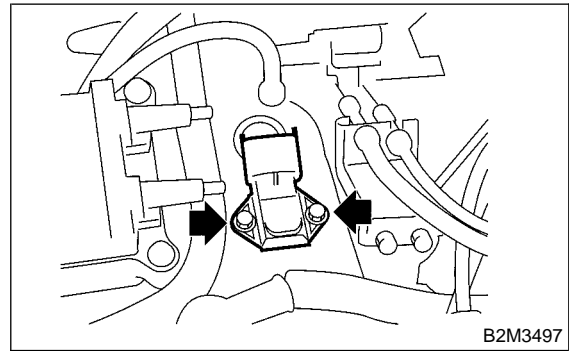
- 2) Disconnect spark plug cord from ignition coil and ignitor assembly.



- 3) Disconnect connector from intake air temperature and pressure sensor.



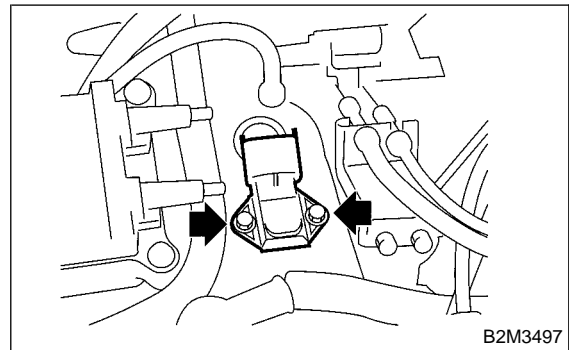
- 4) Remove intake air temperature and pressure sensor.



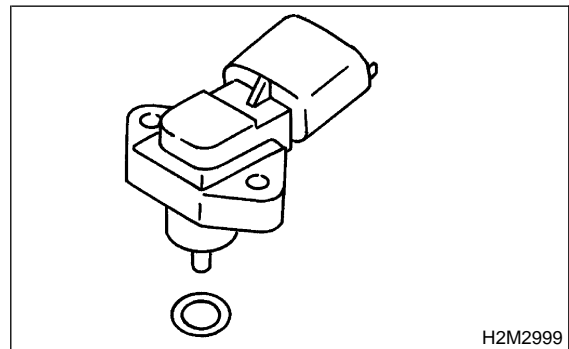
- 5) Installation is in the reverse order of removal.

Tightening torque:

2.0 ± 0.4 N·m (0.2 ± 0.04 kg·m, 1.4 ± 0.3 ft·lb)



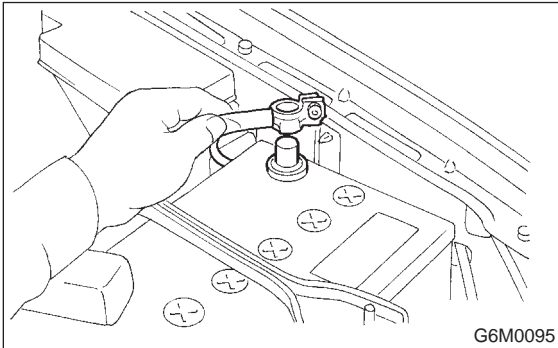
CAUTION:
Replace O-ring with new one.



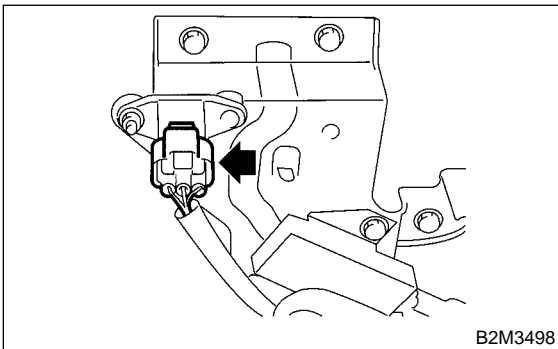
14. Atmospheric Pressure Sensor (AT vehicles)

A: REMOVAL AND INSTALLATION

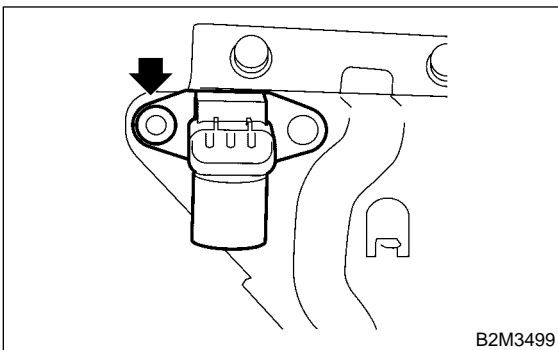
1) Disconnect battery ground cable.



2) Disconnect connector from atmospheric pressure sensor.



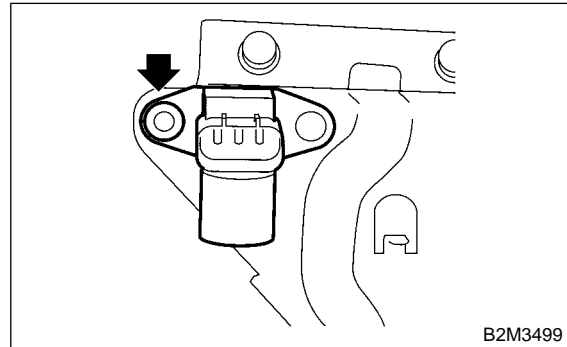
3) Remove atmospheric pressure sensor from bracket.



4) Installation is in the reverse order of removal.

Tightening torque:

6.4±0.5 N·m (0.65±0.05 kg·m, 4.7±0.4 ft·lb)

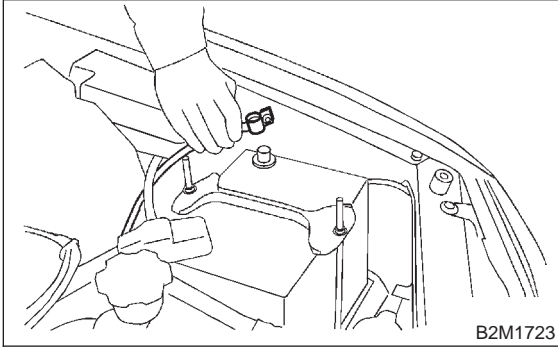


15. Idle Air Control Solenoid Valve

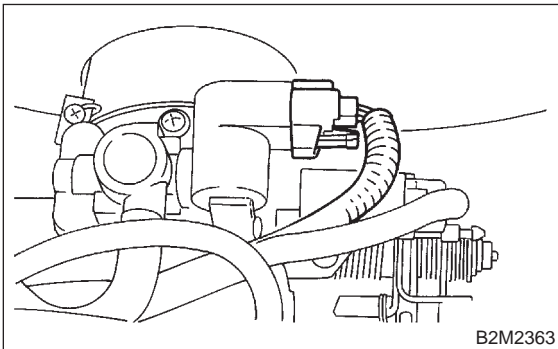
A: REMOVAL AND INSTALLATION

1. MT VEHICLES

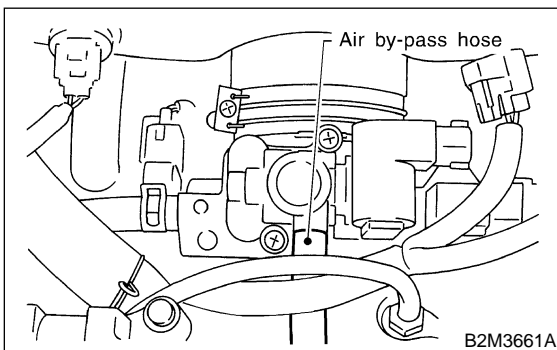
- 1) Disconnect battery ground cable.



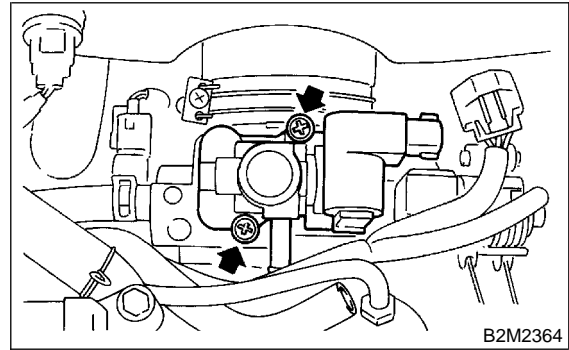
- 2) Disconnect connector from idle air control solenoid valve.



- 3) Disconnect air by-pass hose from idle air control solenoid valve.



- 4) Remove idle air control solenoid valve from throttle body.

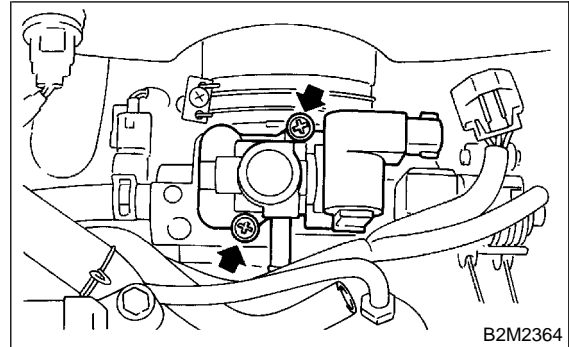


- 5) Installation is in the reverse order of removal.

CAUTION:
Replace gasket with a new one.

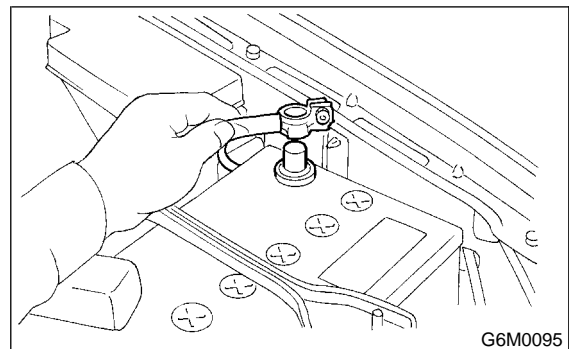
Tightening torque:

$6.0 \pm 0.8 \text{ N}\cdot\text{m}$ ($0.61 \pm 0.08 \text{ kg}\cdot\text{m}$, $4.4 \pm 0.6 \text{ ft}\cdot\text{lb}$)

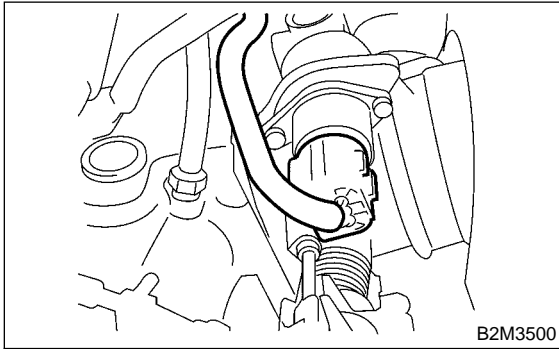


2. AT VEHICLES

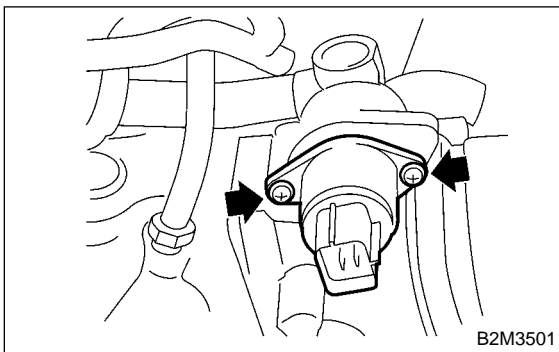
- 1) Disconnect battery ground cable.



2) Disconnect connector from idle air control solenoid valve.



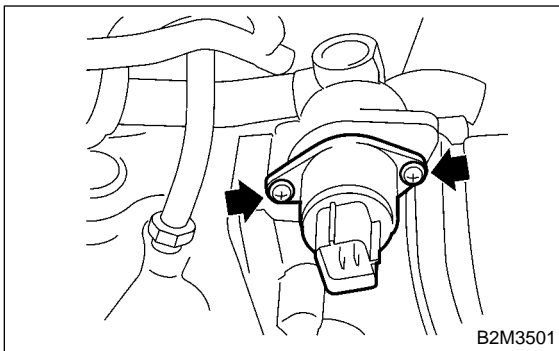
3) Remove idle air control solenoid valve from throttle body.



4) Installation is in the reverse order of removal.

CAUTION:
Always use new gasket.

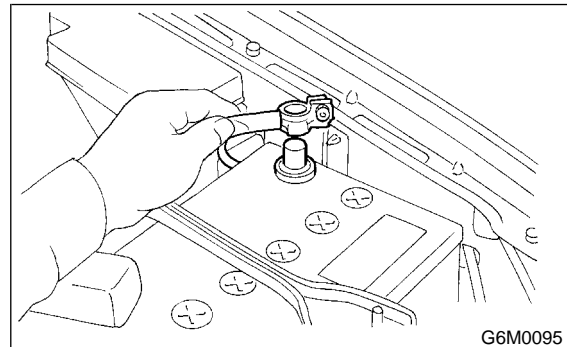
Tightening torque:
 $6.0 \pm 0.8 \text{ N}\cdot\text{m}$ ($0.61 \pm 0.08 \text{ kg}\cdot\text{m}$, $4.4 \pm 0.6 \text{ ft}\cdot\text{lb}$)



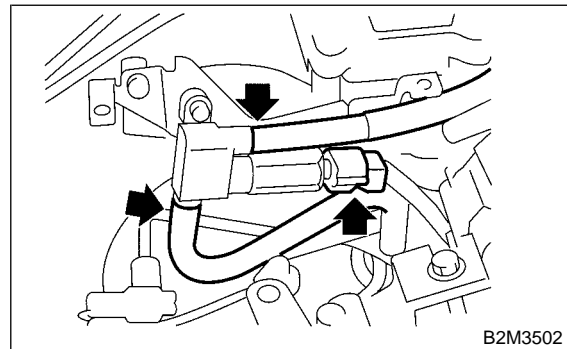
16. Air Assist Injector Solenoid Valve (AT vehicles)

A: REMOVAL AND INSTALLATION

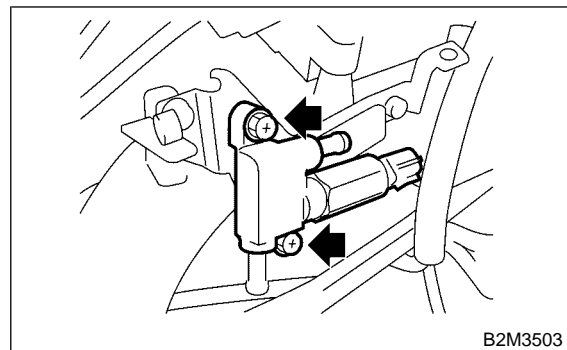
1) Disconnect battery ground cable.



2) Disconnect connector from air assist injector solenoid valve and disconnect air by-pass hoses.



3) Remove air assist injector solenoid valve from intake manifold.

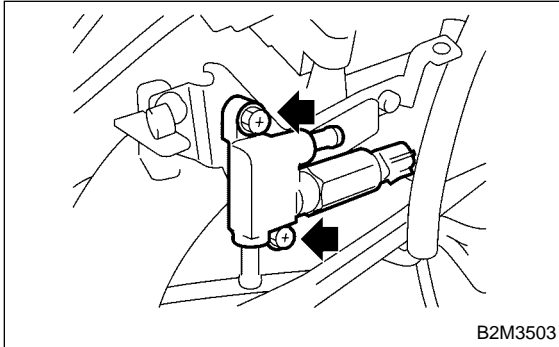


17. Purge Control Solenoid Valve

4) Installation is in the reverse order of removal.

Tightening torque:

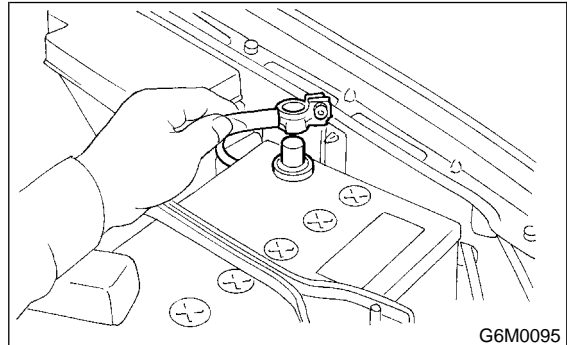
$15.7 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.6 \pm 0.15 \text{ kg}\cdot\text{m}$, $11.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)



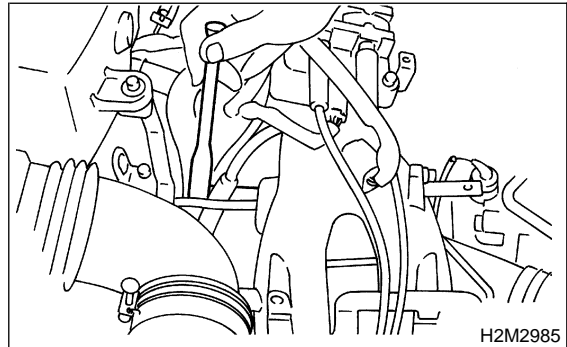
17. Purge Control Solenoid Valve

A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.

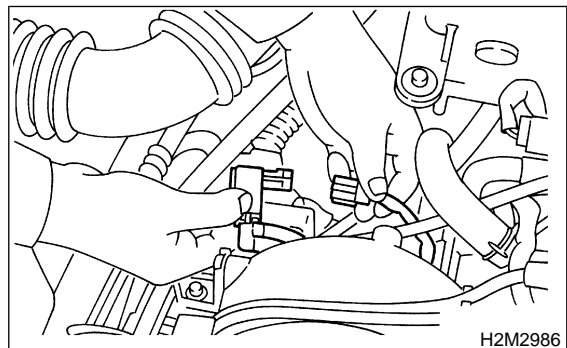


2) Remove bolt which installs purge control solenoid valve onto intake manifold.



3) Take out purge control solenoid valve through the bottom of the intake manifold.

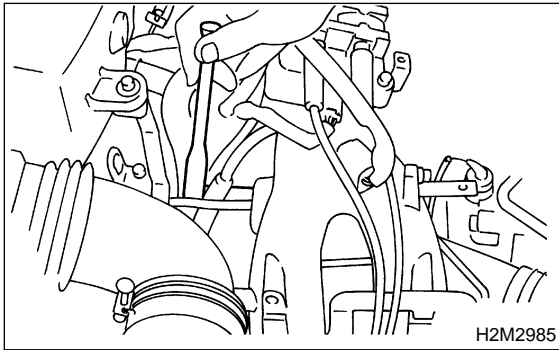
4) Disconnect connector and hoses from purge control solenoid valve.



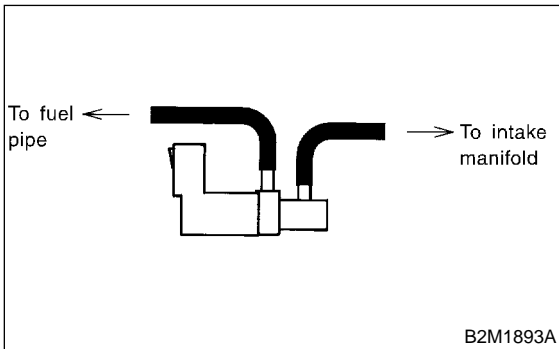
5) Installation is in the reverse order of removal.

Tightening torque:

16±1.5 N·m (1.6±0.15 kg·m, 11.6±1.1 ft·lb)



CAUTION:
Carefully connect the evaporation hoses.

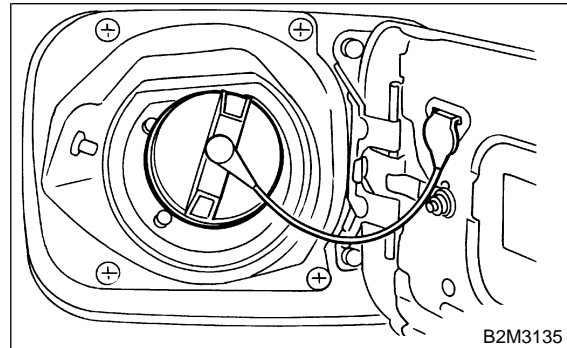


18. Fuel Injector

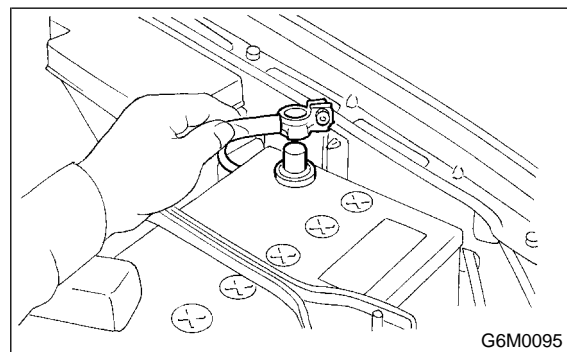
A: REMOVAL AND INSTALLATION

1. RH SIDE

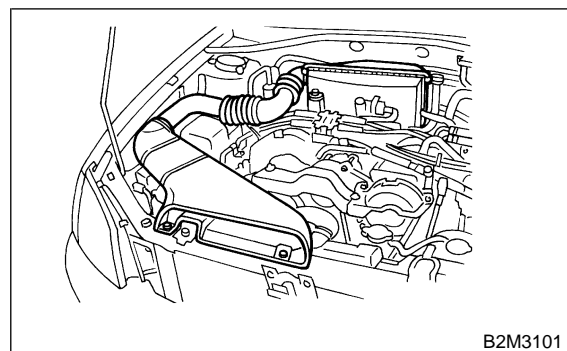
- 1) Release fuel pressure.
<Ref. to 2-8 [W1A0].>
- 2) Open fuel flap lid, and remove fuel filler cap.



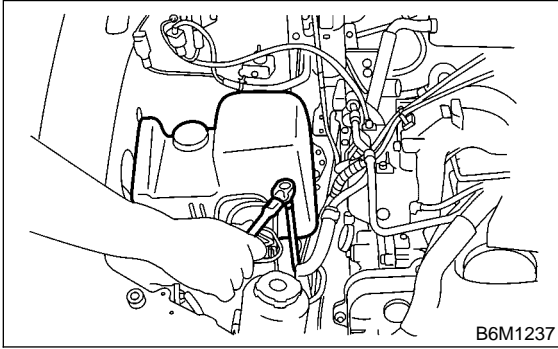
- 3) Disconnect battery ground cable.



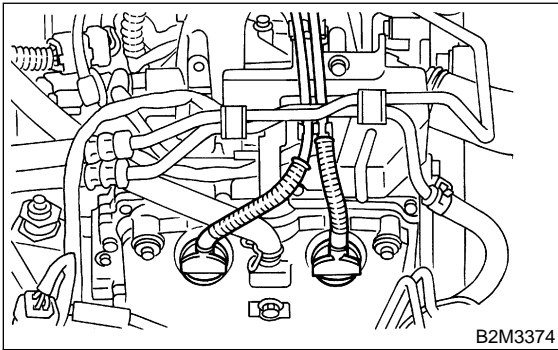
- 4) Remove air intake duct and air cleaner assembly. <Ref. to 2-7 [W1A0].>



5) Remove resonator chamber.

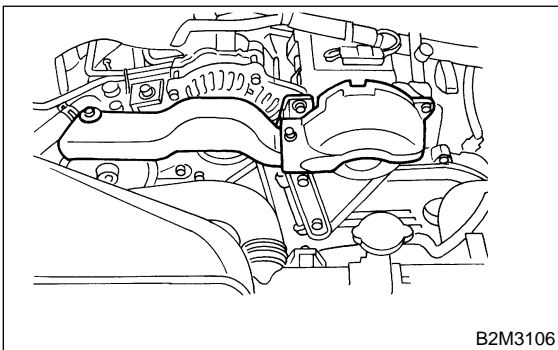


6) Remove spark plug cords from spark plugs (#1 and #3 cylinders).

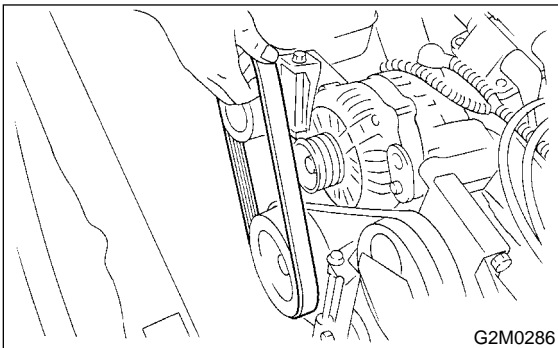


7) Remove power steering pump and tank from brackets.

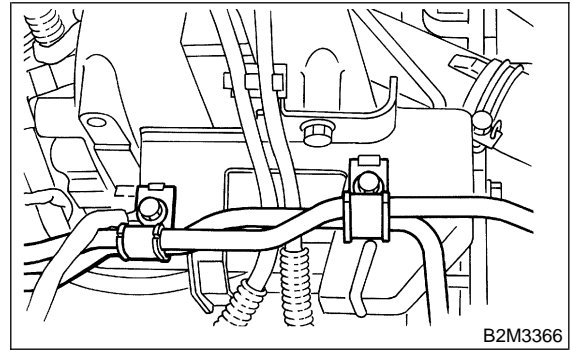
(1) Remove V-belt covers.



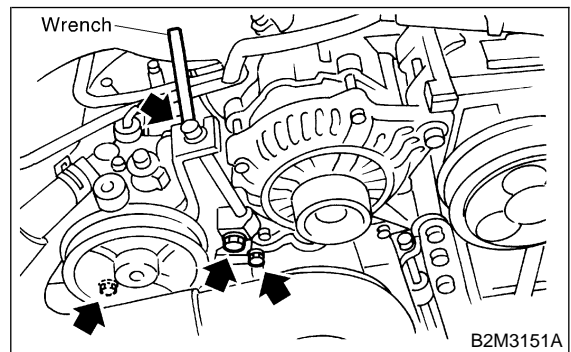
(2) Loosen lock bolt and slider bolt, and remove power steering pump drive V-belt.



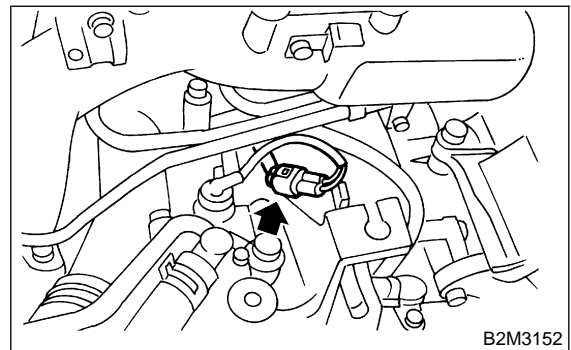
(3) Remove bolts which hold power steering pipes onto intake manifold protector.



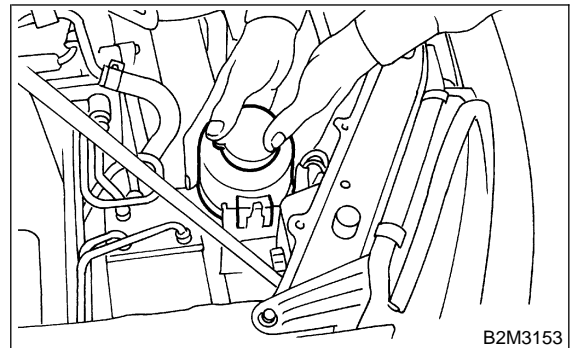
(4) Remove bolts which install power steering pump to bracket.



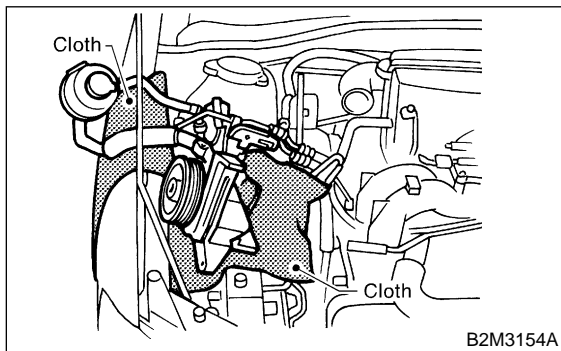
(5) Disconnect connector from power steering pump switch.



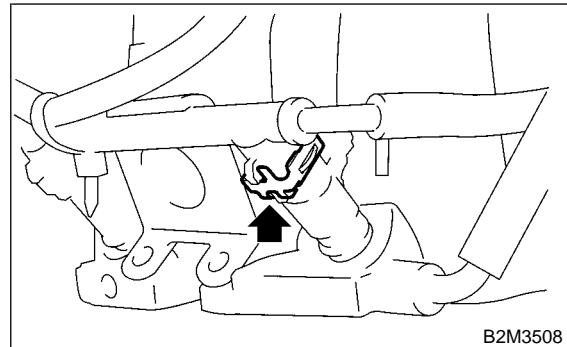
(6) Remove power steering tank from the bracket by pulling it upwards.



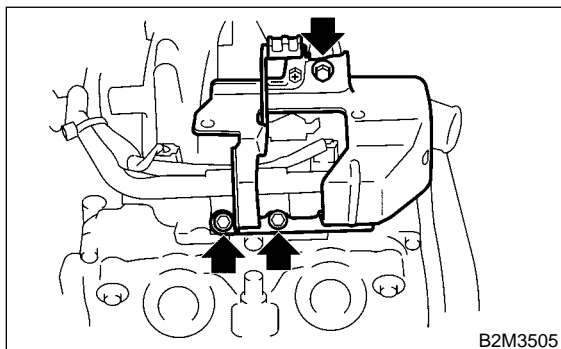
(7) Place power steering pump and tank on the right side wheel apron.



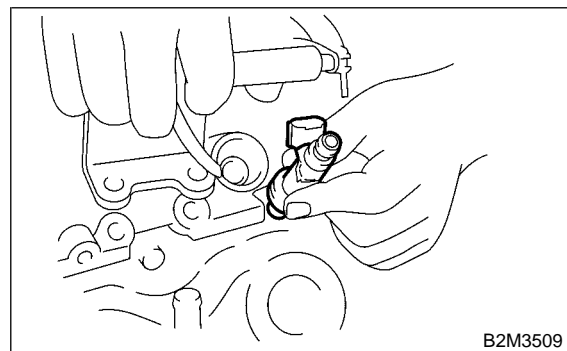
11) Remove fuel injector from intake manifold.
(1) Remove fuel injector securing clip. (AT vehicle)



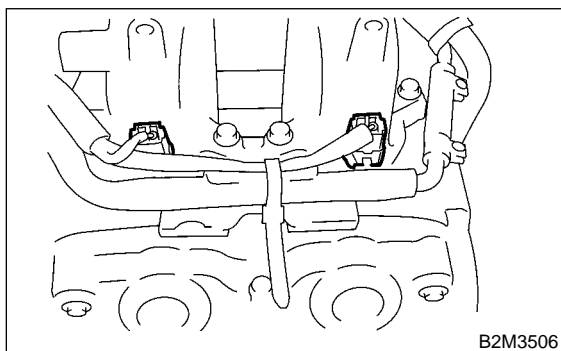
8) Remove intake manifold protector RH.



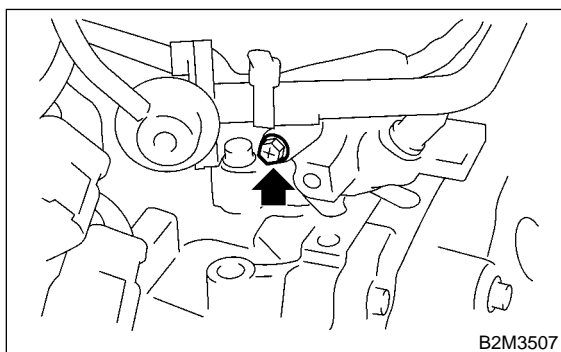
(2) Remove fuel injector while lifting up fuel injector pipe.



9) Disconnect connector from fuel injector.



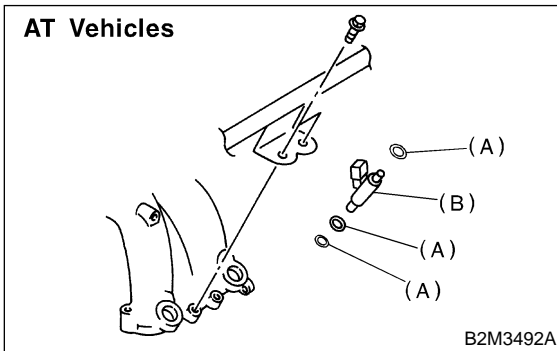
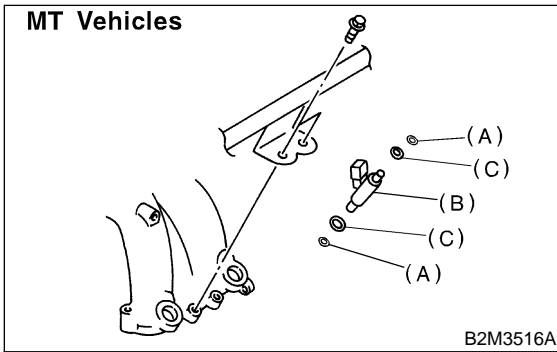
10) Remove bolt which install injector pipe to intake manifold.



12) Installation is in the reverse order of removal.

CAUTION:

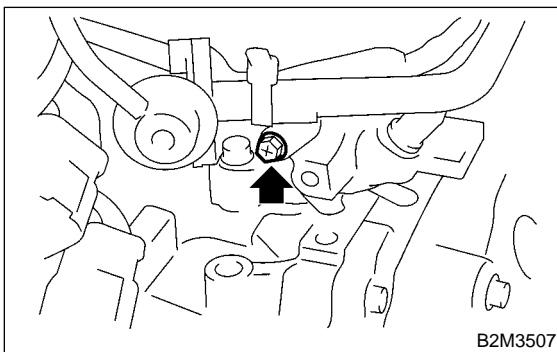
Replace O-rings and insulators with new ones.



- (A) O-ring
- (B) Fuel injector
- (C) Insulator

Tightening torque:

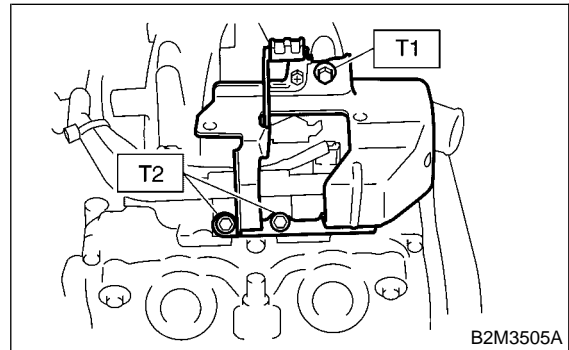
$3.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.35 \pm 0.05 \text{ kg}\cdot\text{m}$, $2.5 \pm 0.4 \text{ ft}\cdot\text{lb}$)



Tightening torque:

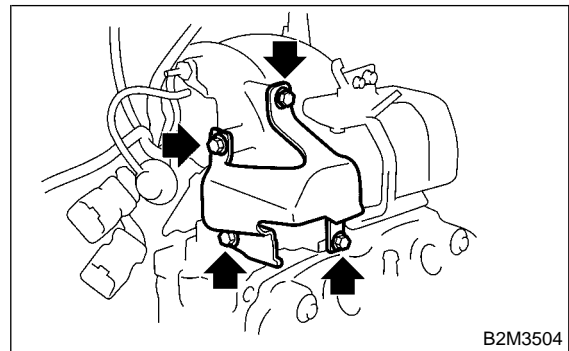
$T1: 18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)

$T2: 19 \pm 2 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.2 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.4 \text{ ft}\cdot\text{lb}$)



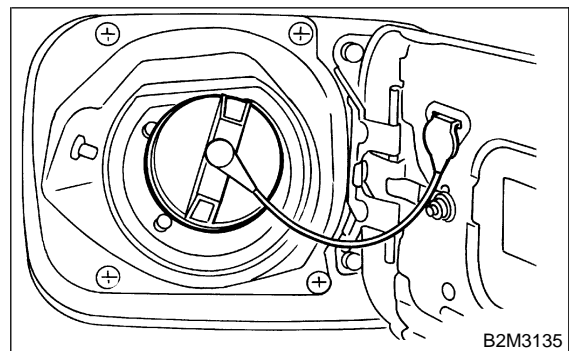
Tightening torque:

$18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)

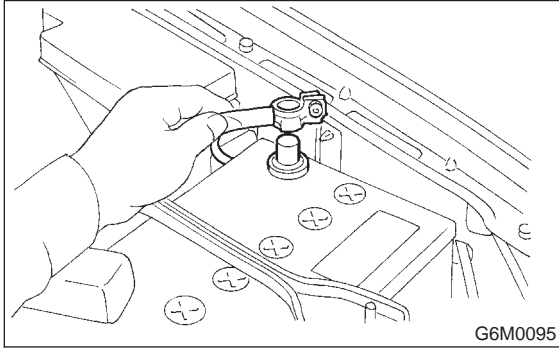


2. LH SIDE

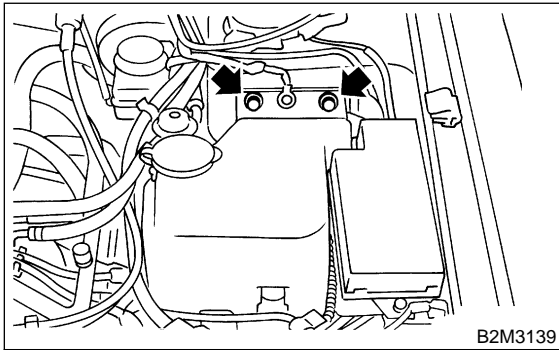
- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Open fuel flap lid, and remove fuel filler cap.



3) Disconnect battery ground cable.

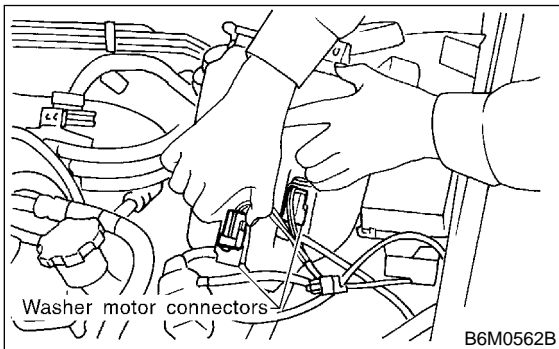


4) Remove two bolts which install washer tank on body.



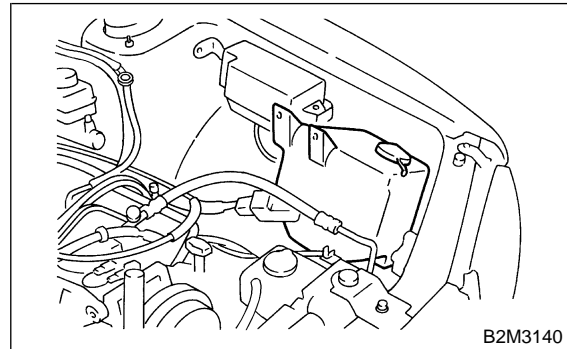
5) Disconnect connector from front window washer motor.

6) Disconnect connector from rear gate glass washer motor.

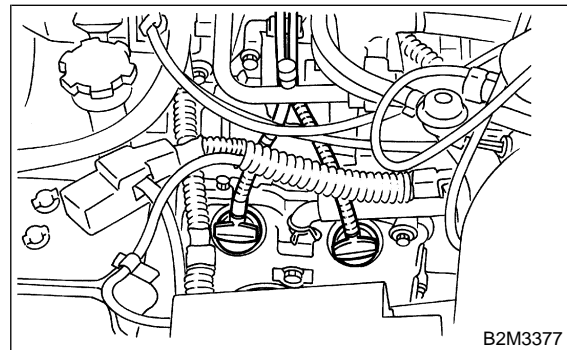


7) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.

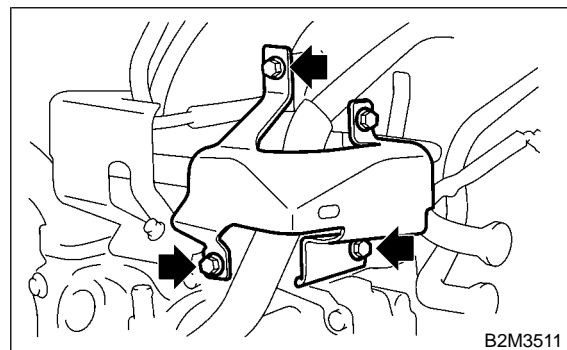
8) Move washer tank, and secure it away from working area.



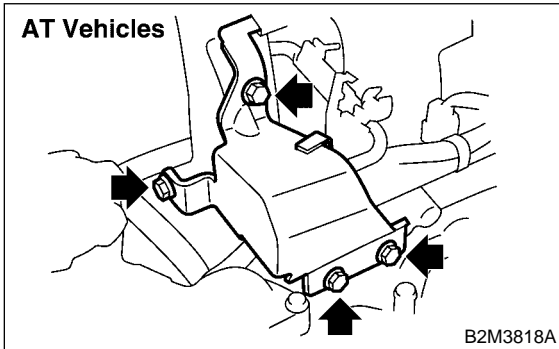
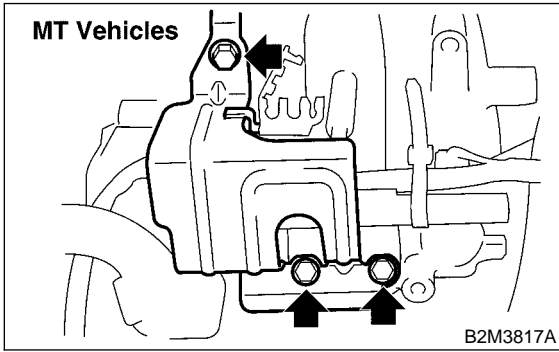
9) Remove spark plug cords from spark plugs (#2 and #4 cylinders).



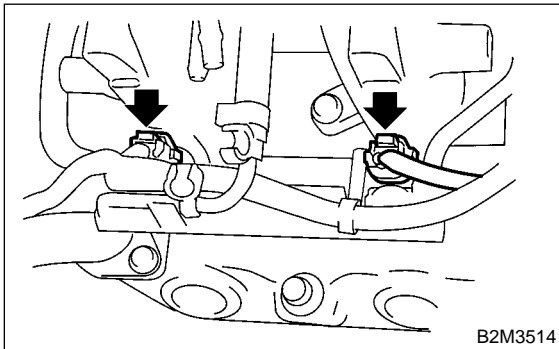
10) Remove fuel pipe protector LH.



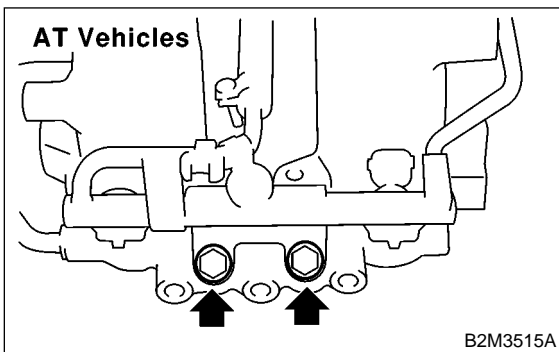
11) Remove intake manifold protector LH.



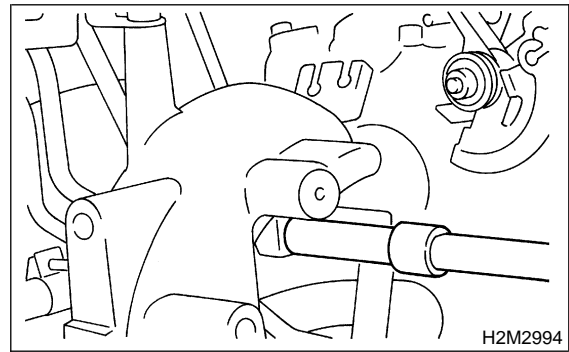
12) Disconnect connector from fuel injector.



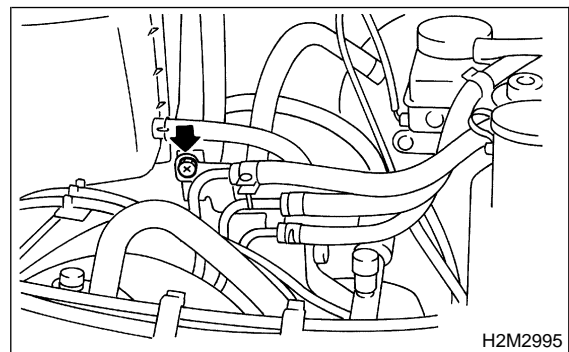
13) Remove bolt which holds injector pipe to intake manifold. (AT vehicles)



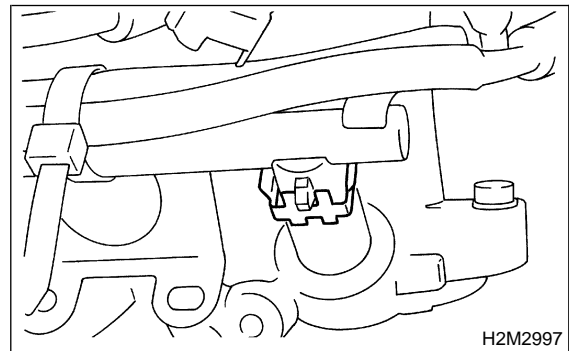
14) Remove bolt which installs injector pipe to intake manifold.



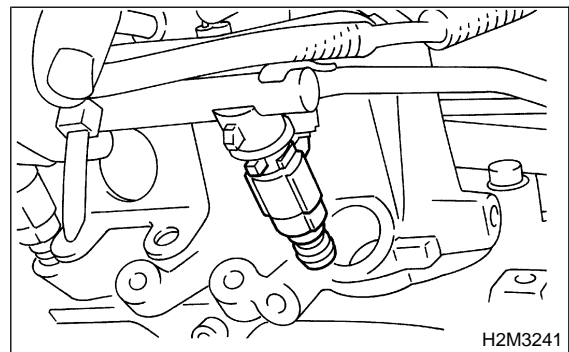
15) Remove bolt which holds fuel pipe on the left side intake manifold.



16) Remove fuel injector from intake manifold.
(1) Remove fuel injector securing clip. (AT vehicles)



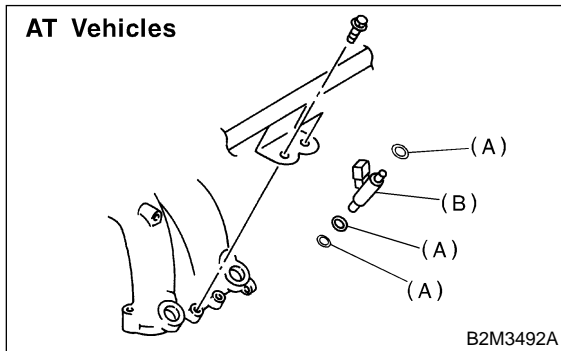
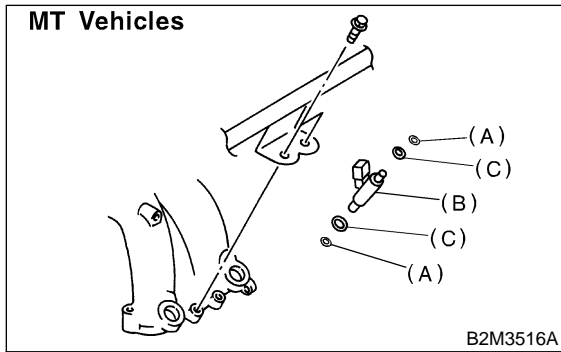
(2) Remove fuel injector while lifting up fuel injector pipe.



17) Installation is in the reverse order of removal.

CAUTION:

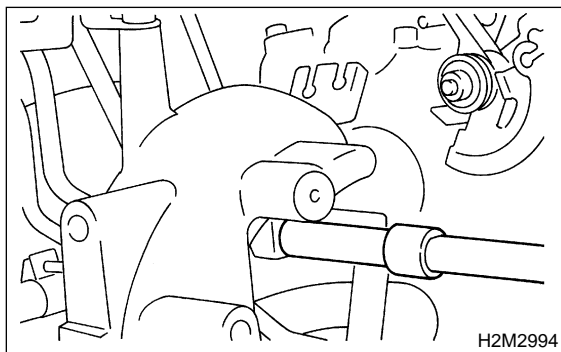
Replace O-rings and insulators with new ones.



- (A) O-ring
- (B) Fuel injector
- (C) Insulator

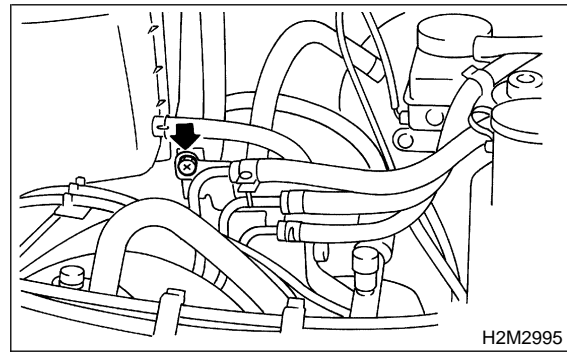
Tightening torque:

4.9±0.5 N·m (0.5±0.05 kg-m, 3.6±0.4 ft-lb)



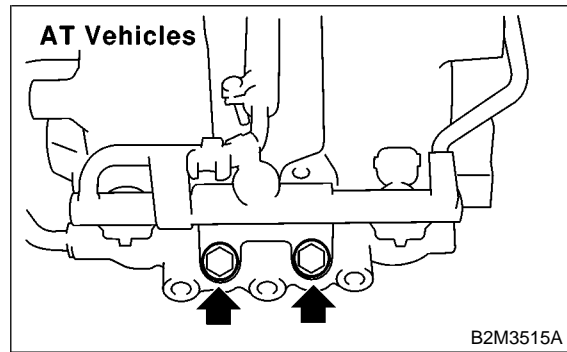
Tightening torque:

4.9±0.5 N·m (0.5±0.05 kg-m, 3.6±0.4 ft-lb)



Tightening torque:

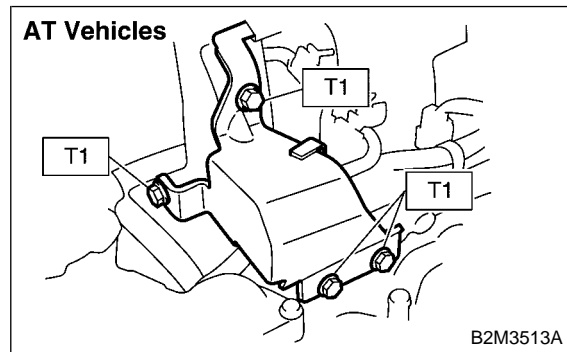
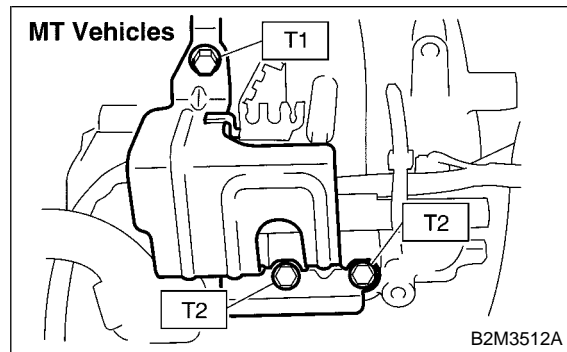
18.6±1.5 N·m (1.9±0.15 kg-m, 13.7±1.1 ft-lb)



Tightening torque:

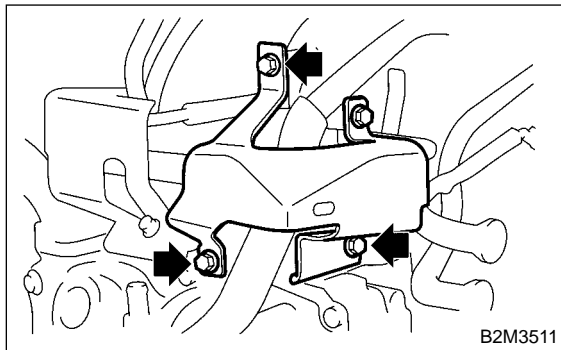
T1: 18.6±1.5 N·m (1.9±0.15 kg-m, 13.7±1.1 ft-lb)

T2: 19±2 N·m (1.9±0.2 kg-m, 13.7±1.4 ft-lb)

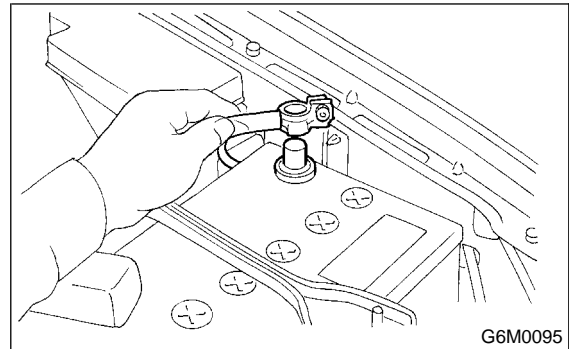


Tightening torque:

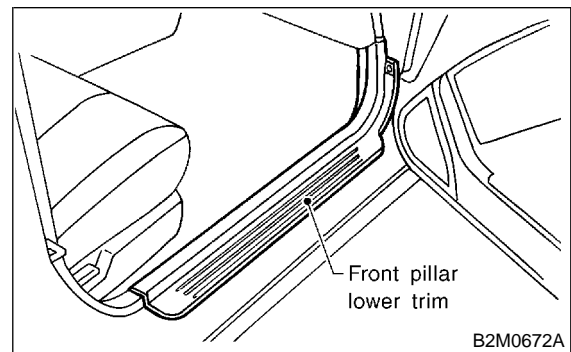
$18.6 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.9 \pm 0.15 \text{ kg}\cdot\text{m}$, $13.7 \pm 1.1 \text{ ft}\cdot\text{lb}$)

**19. Engine Control Module****A: REMOVAL AND INSTALLATION**

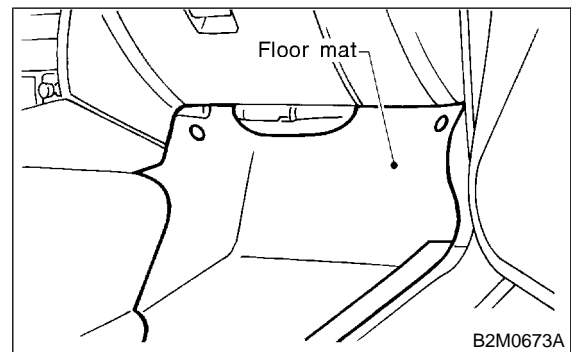
- 1) Disconnect battery ground cable.



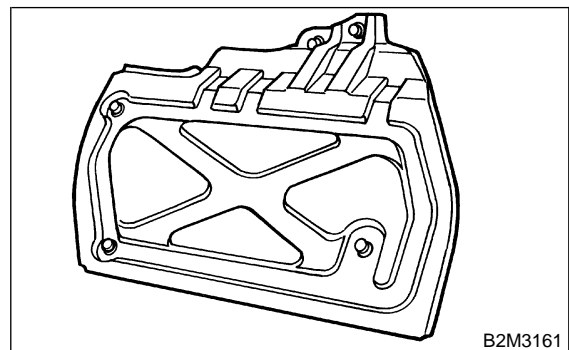
- 2) Remove side sill front cover of passenger side.
<Ref. to 5-3 [W5A0].>



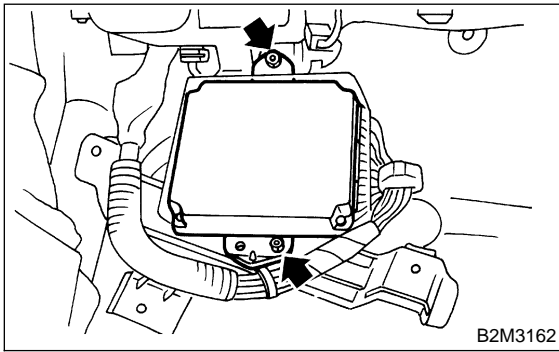
- 3) Detach floor mat of front passenger seat.



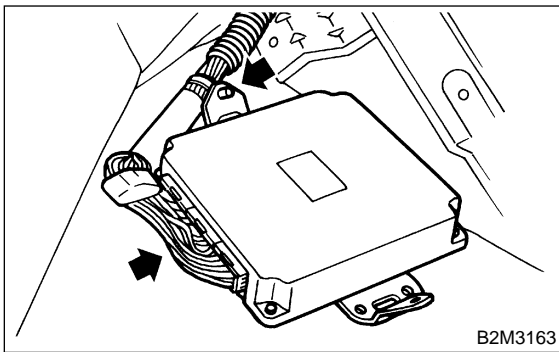
- 4) Remove protect cover.



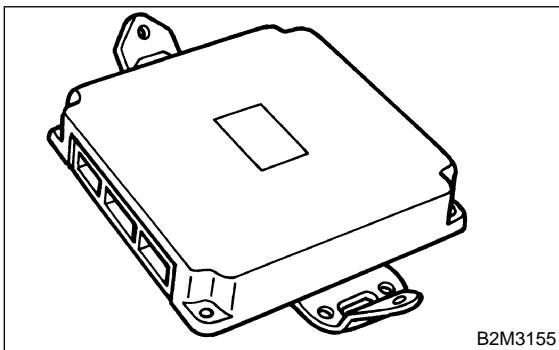
5) Remove nuts which hold ECM to bracket.



6) Remove clip from bracket.



7) Disconnect ECM connectors and take out ECM.



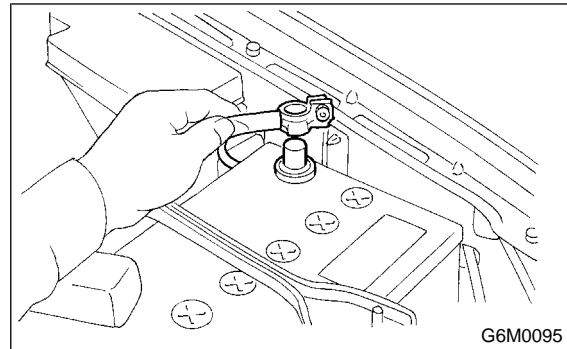
8) Installation is in the reverse order of removal.

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

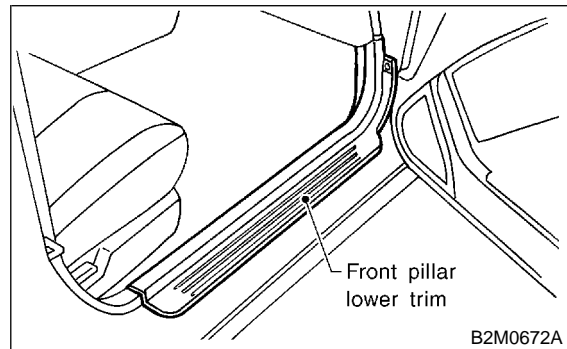
20. Main Relay

A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.

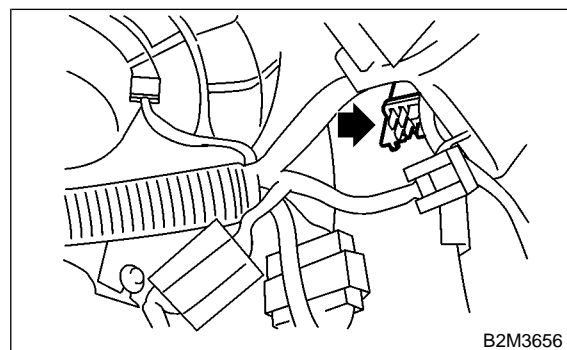


2) Remove side sill front cover of passenger side.
<Ref. to 5-3 [W5A0].>



3) Disconnect connectors from main relay.

4) Remove bolt which holds main relay bracket on body.

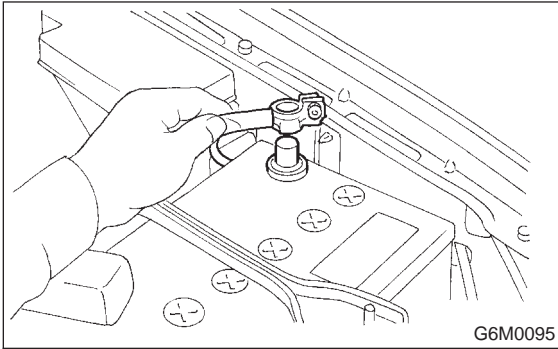


5) Installation is in the reverse order of removal.

21. Fuel Pump Relay

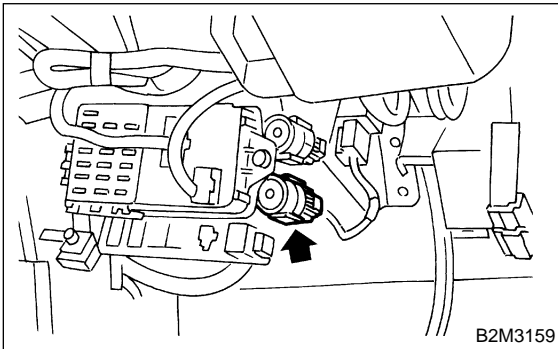
A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.



2) Remove lower cover. <Ref. to 5-4 [W1A0].>

3) Disconnect connector from fuel pump relay.



4) Remove fuel pump relay from mounting bracket.

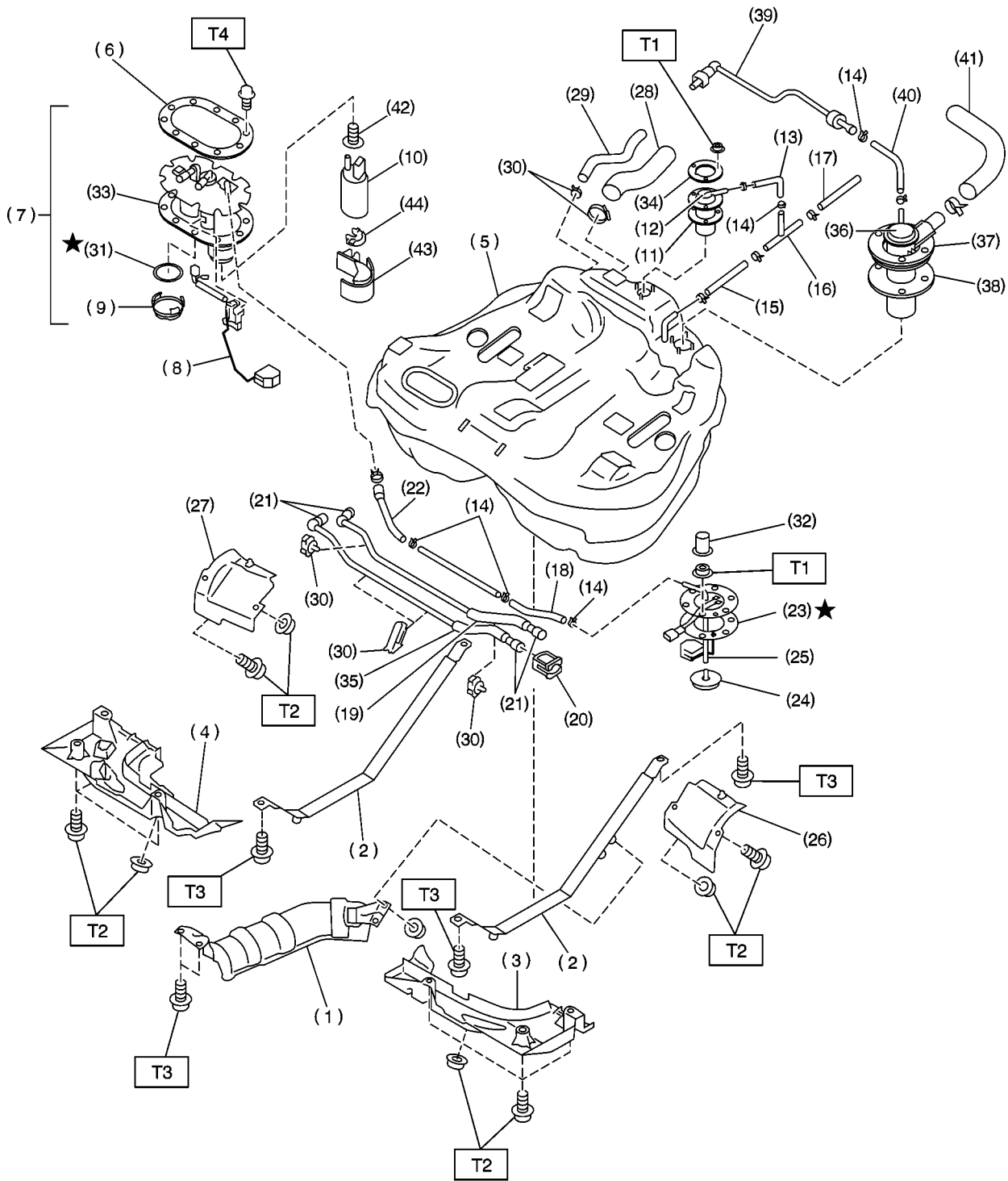
5) Installation is in the reverse order of removal.

1. Specifications

Model		
Fuel tank	Capacity	64 ℓ (16.9 US gal, 14.1 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	370 — 677 kPa (3.77 — 6.9 kg/cm ² , 53.6 — 98 psi)
	Discharge flow	More than 65 ℓ (17.2 US gal, 14.3 Imp gal)/h [12 V at 300 kPa (3.06 kg/cm ² , 43.5 psi)]
Fuel filter		Cartridge type

MEMO:

1. Fuel Tank



B2M3662A

- | | | |
|----------------------------|-------------------------------------|-------------------------|
| (1) Heat sealed cover | (18) Jet pump hose A | (35) Fuel delivery tube |
| (2) Fuel tank band | (19) Fuel return tube | (36) Vent valve |
| (3) Protector LH (Front) | (20) Retainer | (37) Vent valve plate |
| (4) Protector RH (Front) | (21) Quick connector | (38) Vent valve gasket |
| (5) Fuel tank | (22) Jet pump hose B | (39) Evaporation tube |
| (6) Fuel pump plate | (23) Fuel sub level sensor gasket | (40) Evaporation hose D |
| (7) Fuel pump ASSY | (24) Jet pump filter | (41) Air vent hose |
| (8) Fuel level sensor | (25) Fuel sub level sensor | (42) Seal |
| (9) Cap | (26) Protector LH (Rear) | (43) Fuel pump holder |
| (10) Fuel pump | (27) Protector RH (Rear) | (44) Grommet |
| (11) Fuel cut valve gasket | (28) Fuel filler hose | |
| (12) Fuel cut valve | (29) Fuel tank pressure sensor hose | |
| (13) Evaporation hose A | (30) Clamp | |
| (14) Clip | (31) Gasket | |
| (15) Evaporation hose C | (32) Cap | |
| (16) Joint pipe | (33) Gasket | |
| (17) Evaporation hose B | (34) Fuel cut valve plate | |

Tightening torque: N·m (kg·m, ft·lb)

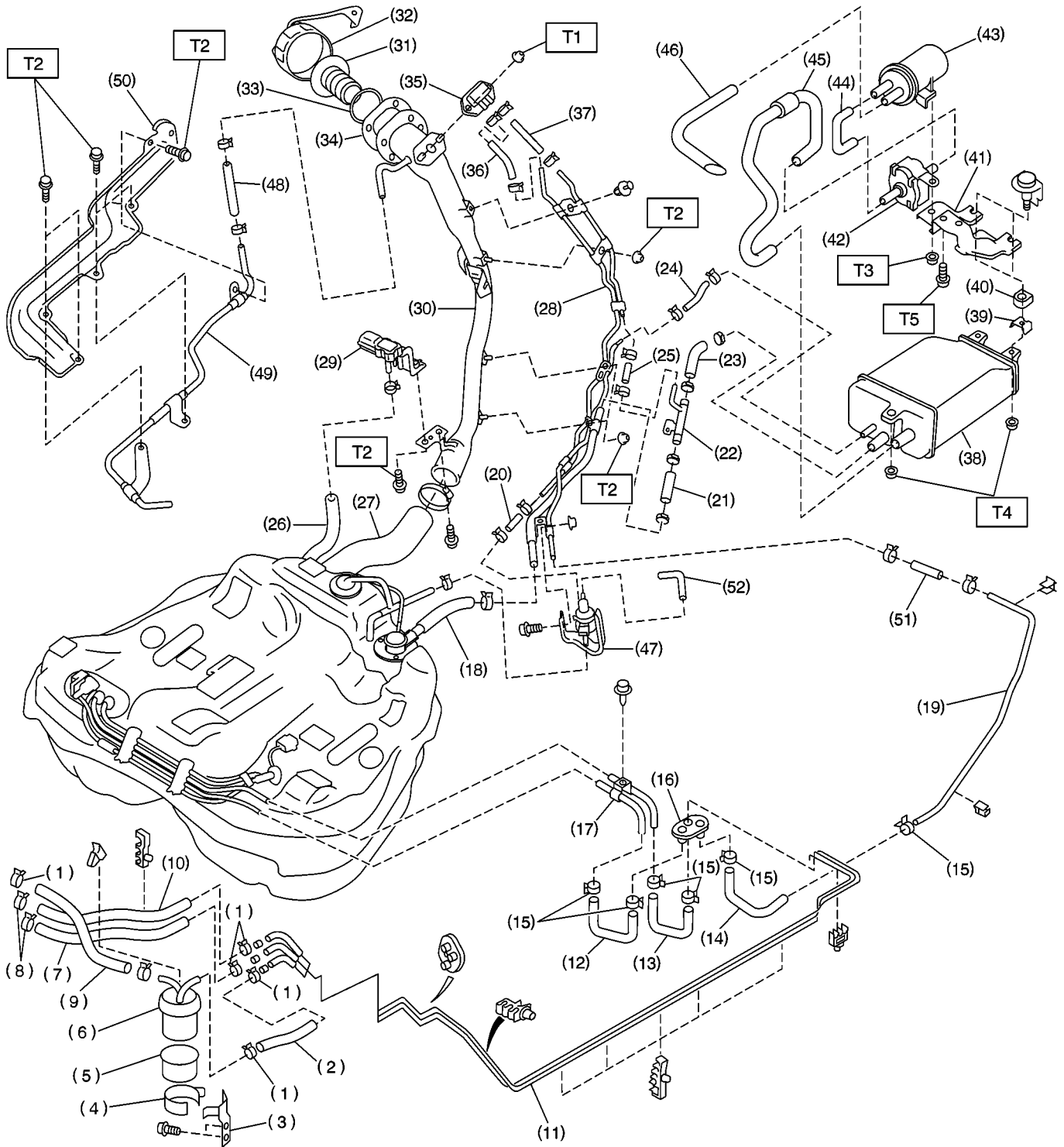
T1: 4.4±1.5 (0.45±0.15, 3.3±1.1)

T2: 18±5 (1.8±0.5, 13.0±3.6)

T3: 33±10 (3.4±1.0, 25±7)

T4: 5.9±1.5 (0.6±0.15, 4.3±1.1)

2. Fuel Line



B2M3663A

- | | | |
|---------------------------|-------------------------------------|--|
| (1) Clamp | (22) Air vent pipe | (43) Drain filter |
| (2) Fuel delivery hose A | (23) Evaporation hose J | (44) Drain filter hose A |
| (3) Fuel filter bracket | (24) Evaporation hose K | (45) Drain valve hose |
| (4) Fuel filter holder | (25) Evaporation hose L | (46) Drain filter hose B |
| (5) Fuel filter cup | (26) Fuel tank pressure sensor hose | (47) Pressure control solenoid valve |
| (6) Fuel filter | (27) Fuel filler hose | (48) Evaporation hose O |
| (7) Evaporation hose F | (28) Evaporation pipe B | (49) Evaporation pipe C |
| (8) Clip | (29) Fuel tank pressure sensor | (50) Pipe protector |
| (9) Fuel delivery hose B | (30) Fuel filler pipe | (51) Evaporation hose P |
| (10) Fuel return hose | (31) Ring A | (52) Pressure control solenoid valve
hose |
| (11) Fuel pipe ASSY | (32) Fuel filler cap | |
| (12) Fuel delivery hose C | (33) Ring B | |
| (13) Fuel return hose C | (34) Packing | |
| (14) Evaporation hose G | (35) Shut valve | |
| (15) Clamp | (36) Evaporation hose M | |
| (16) Grommet | (37) Evaporation hose N | |
| (17) Fuel pipe ASSY | (38) Canister | |
| (18) Air vent hose A | (39) Canister lower bracket | |
| (19) Evaporation hose H | (40) Cushion rubber | |
| (20) Evaporation hose I | (41) Canister upper bracket | |
| (21) Air vent hose B | (42) Drain valve | |

Tightening torque: N-m (kg-m, ft-lb)

T1: 4.5±1.5 (0.46±0.15, 3.3±1.1)

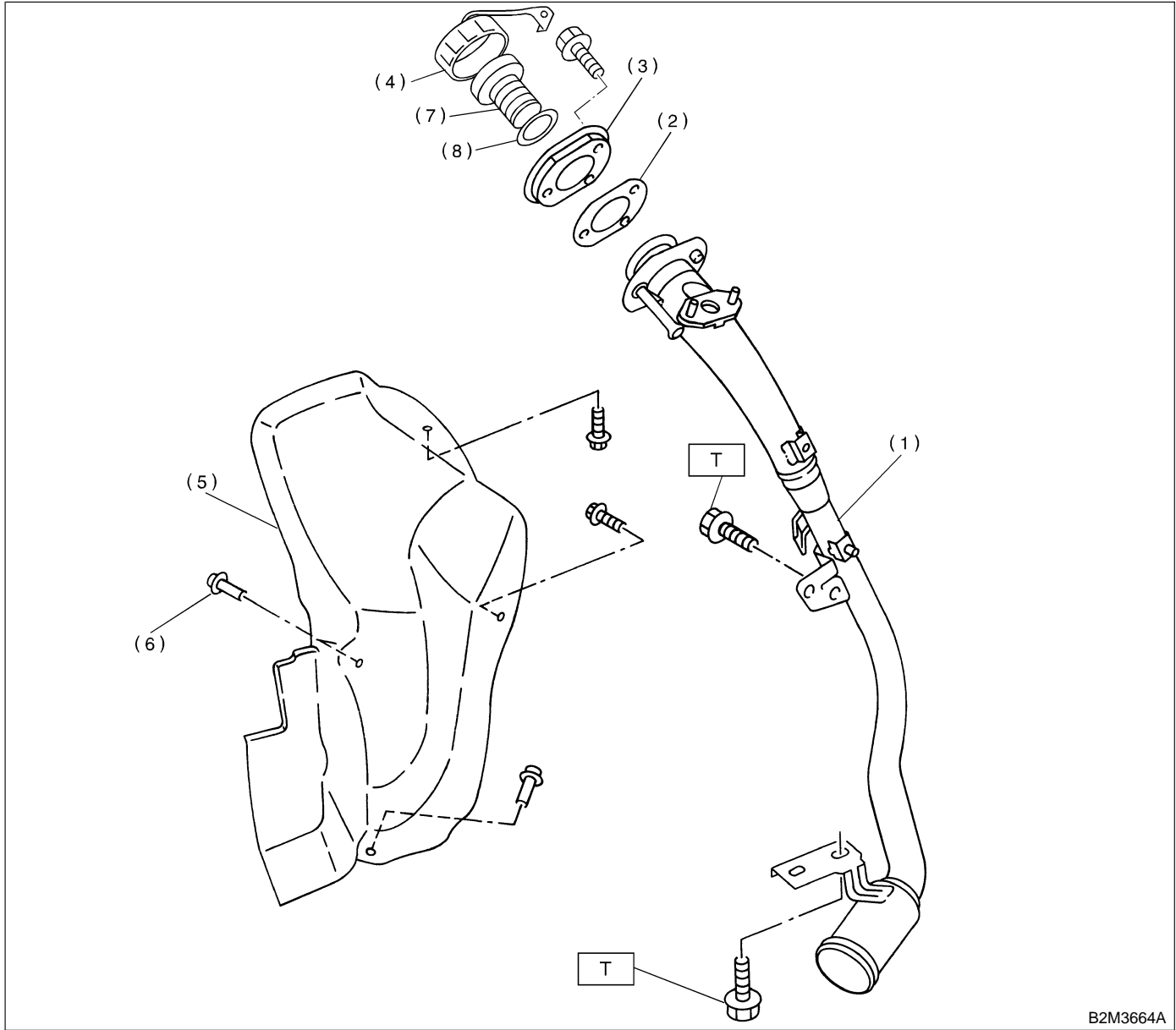
T2: 7.5±2.0 (0.76±0.2, 5.5±1.4)

T3: 18±5 (1.8±0.5, 13.0±3.6)

T4: 23±7 (2.3±0.7, 16.6±5.1)

T5: 33±10 (3.4±0.1, 25±7)

3. Fuel Filler Pipe



B2M3664A

- (1) Fuel filler pipe ASSY
- (2) Filler pipe packing
- (3) Filler ring
- (4) Filler cap
- (5) Filler pipe protector
- (6) Clip
- (7) Ring A
- (8) Ring B

Tightening torque: N-m (kg-m, ft-lb)

T: 7.5±2.0 (0.75±0.2, 5.4±1.4)

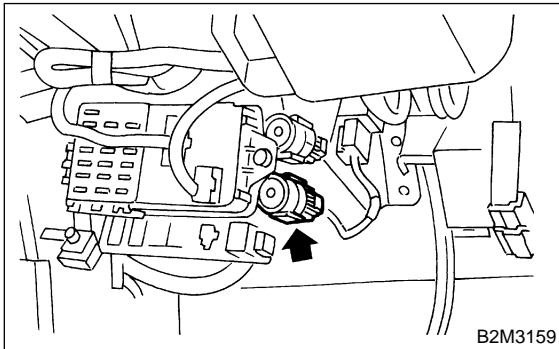
1. Fuel Tank

A: RELEASING OF FUEL PRESSURE

WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

- 1) Disconnect connector from fuel pump relay.



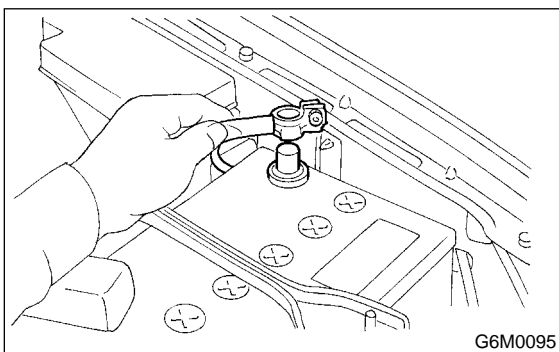
- 2) Start the engine and run it until it stalls.
- 3) After the engine stalls, crank it for five more seconds.
- 4) Turn ignition switch to OFF.

B: DRAINING FUEL

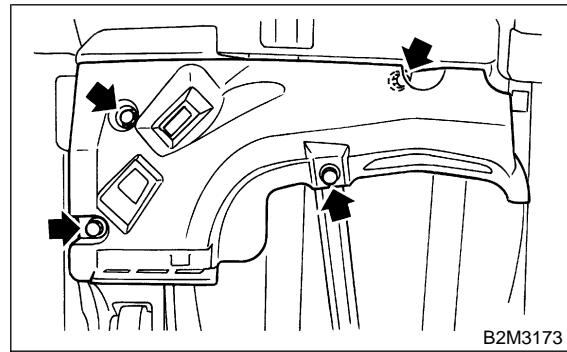
WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

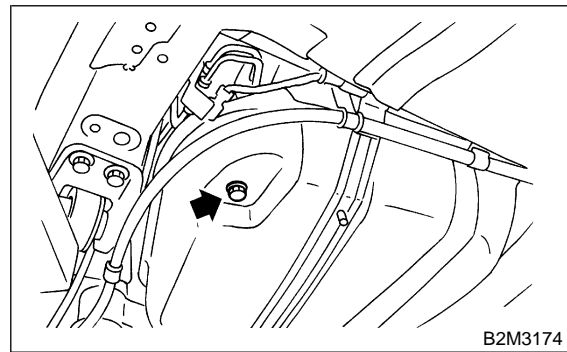
- 1) Set vehicle on the lift.
- 2) Disconnect battery ground cable.



- 3) Lift-up the vehicle.
- 4) Remove front right side fuel tank cover.



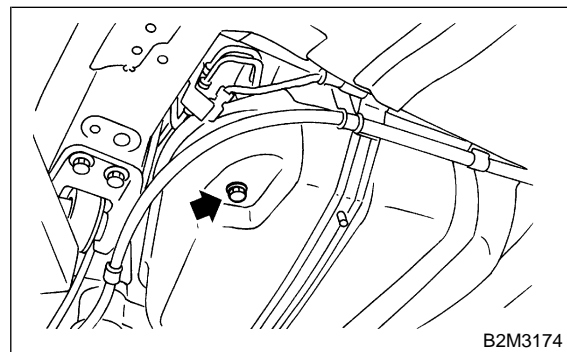
- 5) Drain fuel from fuel tank.
Set a container under the vehicle and remove drain plug from fuel tank.



- 6) Tighten fuel drain plug and install front right side tank cover.

Tightening torque:

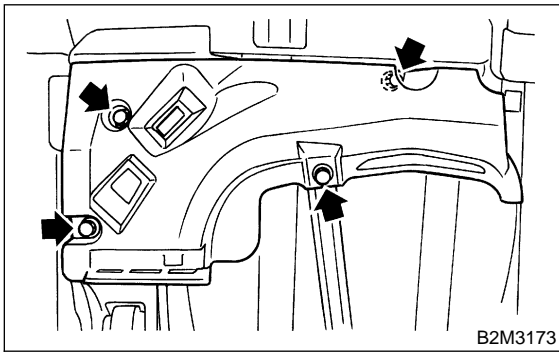
26±7 N·m (2.65±0.7 kg·m, 19.2±5.1 ft·lb)



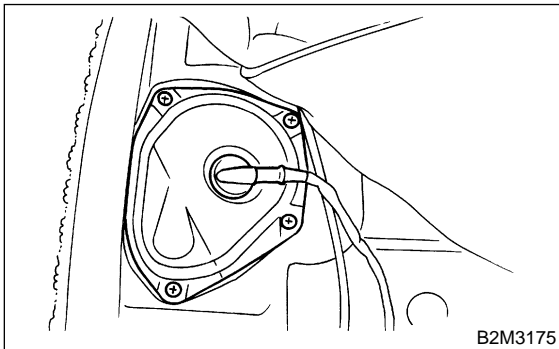
1. Fuel Tank

Tightening torque:

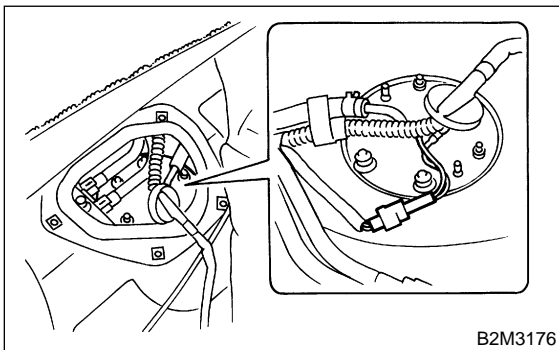
18±5 N·m (1.8±0.5 kg·m, 13.0±3.6 ft·lb)



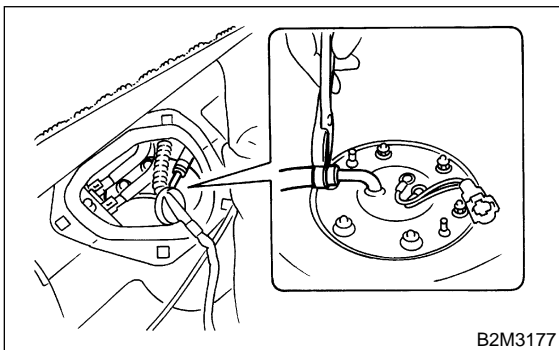
- 7) Lower the vehicle.
- 8) Remove sub service hole cover.



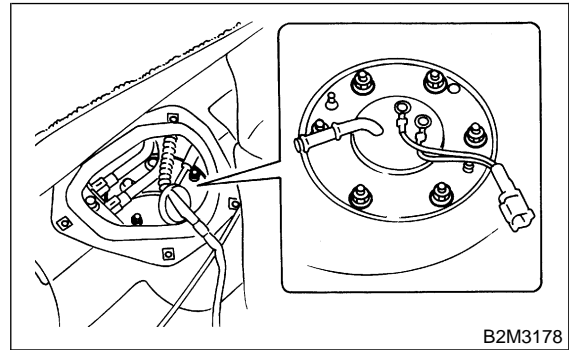
- 9) Disconnect connector from fuel sub level sensor.



- 10) Disconnect fuel jet pump hose.



- 11) Remove fuel sub level sensor.



- 12) Drain fuel from fuel tank by using hand pump.

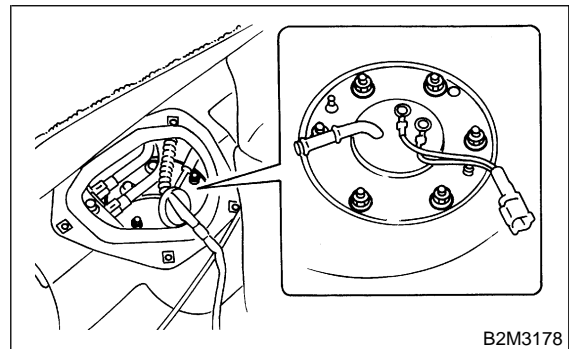
WARNING:

Do not use a motor pump when draining fuel.

- 13) After draining fuel, reinstall fuel sub level sensor.

Tightening torque:

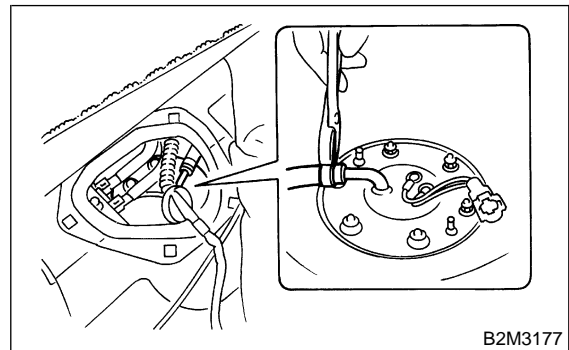
T: 4.4±1.5 N·m (0.45±0.15 kg·m, 3.3±1.1 ft·lb)



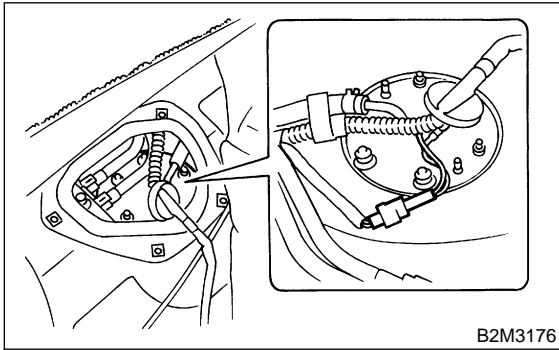
NOTE:

If you have not removed fuel tank yet, proceed with the procedure below for installation.

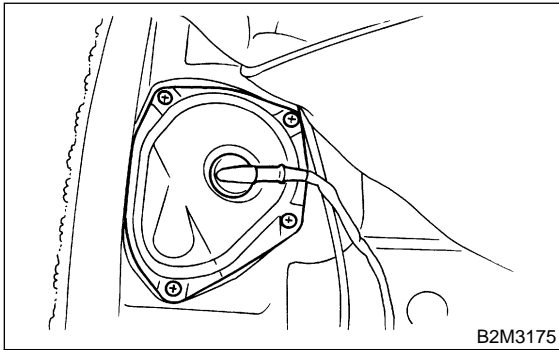
- (1) Connect fuel jet pump hose.



- (2) Connect connector from fuel sub level sensor.

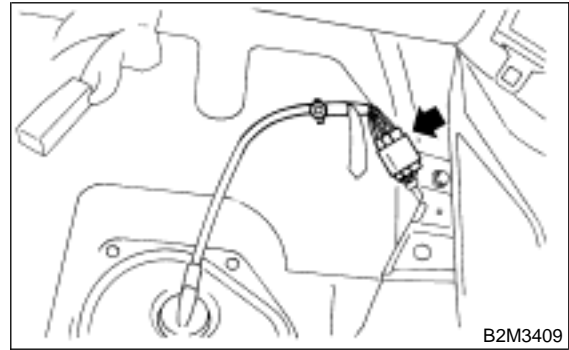


- (3) Install sub service hole cover.

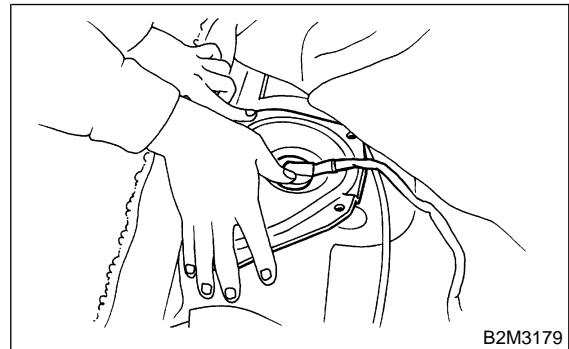


- (4) Set rear seat and floor mat.

- 5) Disconnect connector of fuel tank cord to rear harness.

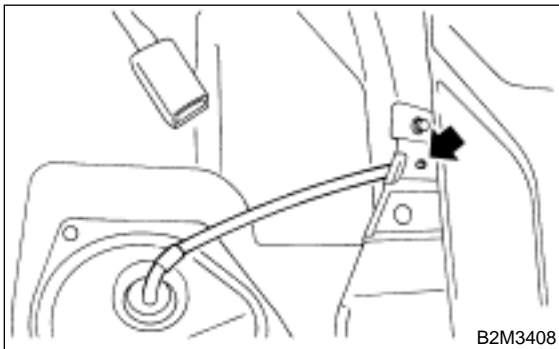


- 6) Push grommet which holds fuel tank cord on service hole cover into body side.

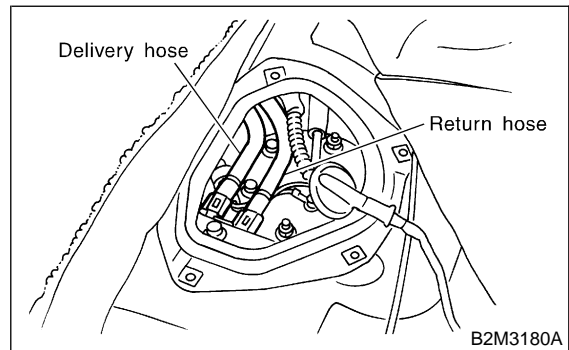


C: REMOVAL

- 1) Set vehicle on the lift.
- 2) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 3) Drain fuel from fuel tank. <Ref. to 2-8 [W1B0].>
- 4) Remove holder clip which secures fuel tank cord on bracket.

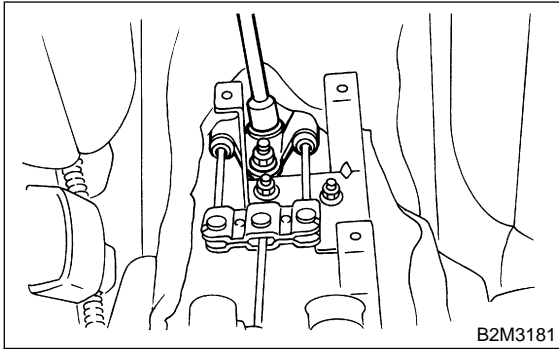


- 7) Separate quick connector of fuel delivery and return hose. <Ref. to 2-8 [W9A0].>



- 8) Remove parking brake cable.
(1) Remove center console. <Ref. to 5-4 [W1A0].>

(2) Remove parking brake bracket and disconnect parking brake cable from equalizer. <Ref. to 4-4 [W10A0].>



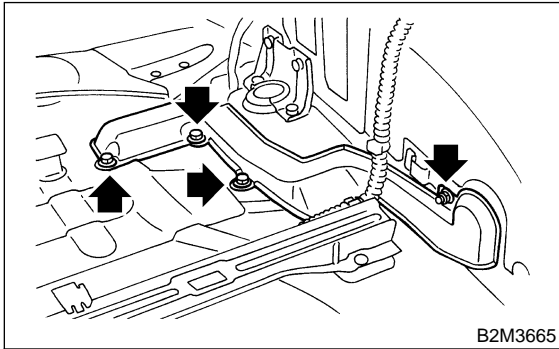
9) Remove trunk trim. (Sedan model)

<Ref. to 5-3 [W5A0].>

10) Remove luggage room trim. (Wagon model)

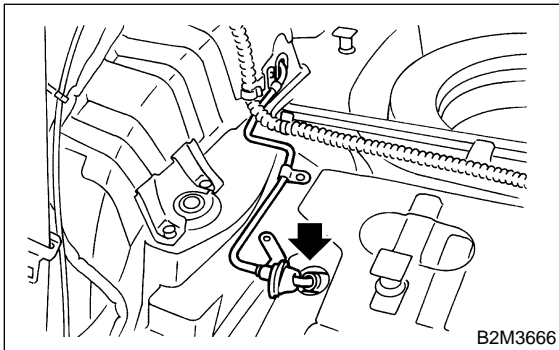
<Ref. to 5-3 [W5A0].>

11) Remove pipe protector.



12) Separate quick connector of evaporation pipe

(A). <Ref. to 2-8 [W8A0].>

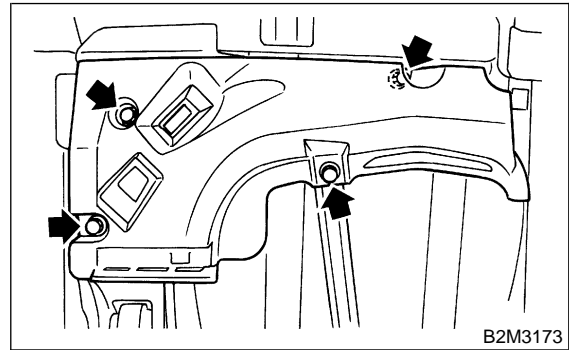


13) Remove wheel nuts from rear wheels.

14) Lift-up the vehicle.

15) Remove rear wheel.

16) Remove front side fuel tank cover.



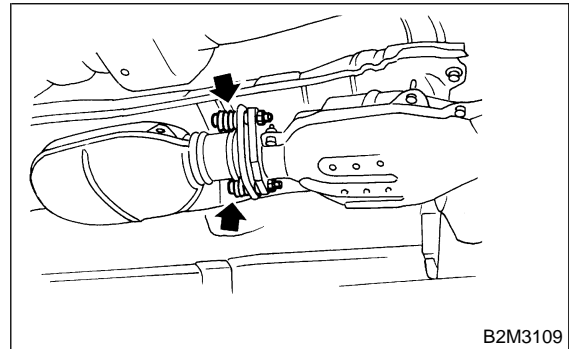
17) Remove rear exhaust pipe and muffler.

NOTE:

To facilitate removal, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

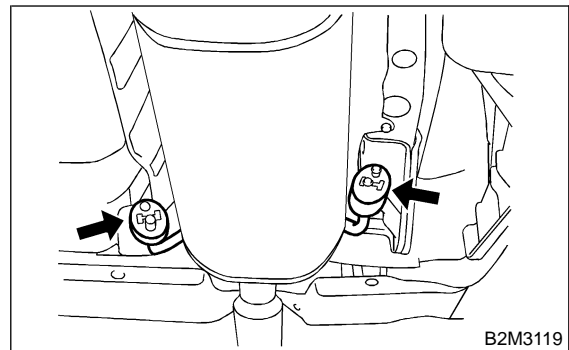
(1) Separate rear exhaust pipe from center exhaust pipe.



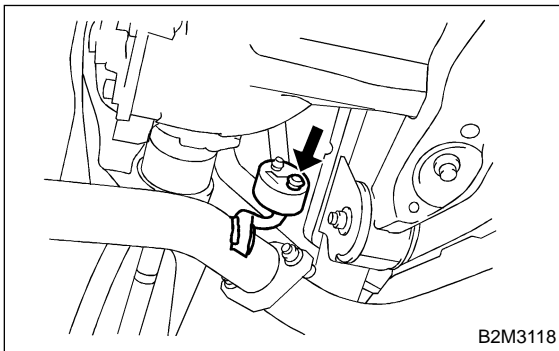
(2) Remove left and right rubber cushions.

CAUTION:

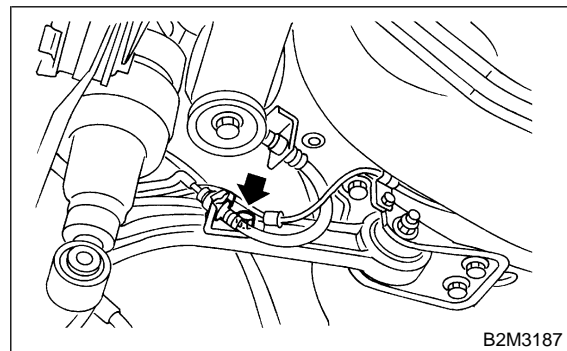
Be careful not to pull down muffler.



(3) Remove front rubber cushion and detach muffler assembly.

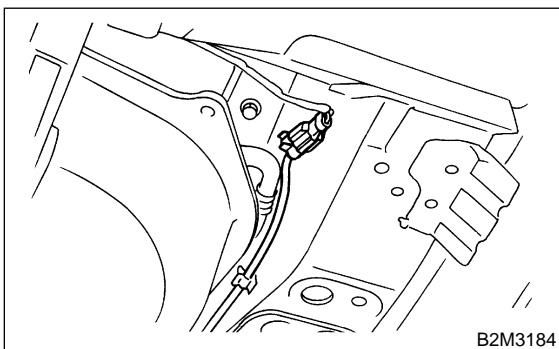


23) Remove bolts which hold rear brake hoses holding bracket.

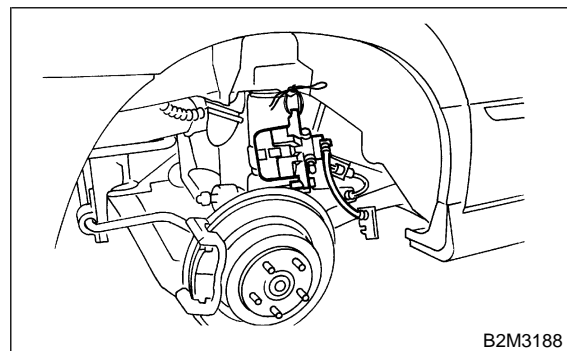


18) Remove propeller shaft. <Ref. to 3-4 [W1B0].>

19) Disconnect connector from ABS sensor.

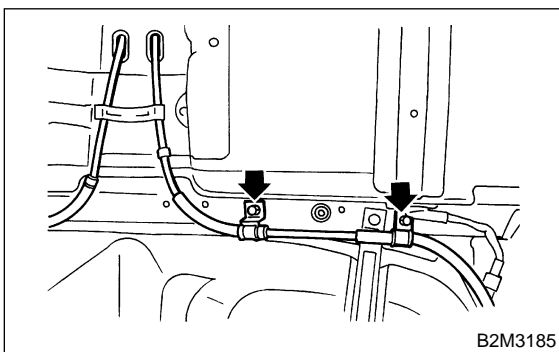


24) Remove rear brake caliper, then tie it up to the body side of the vehicle as shown in figure. (Rear disk brake model)

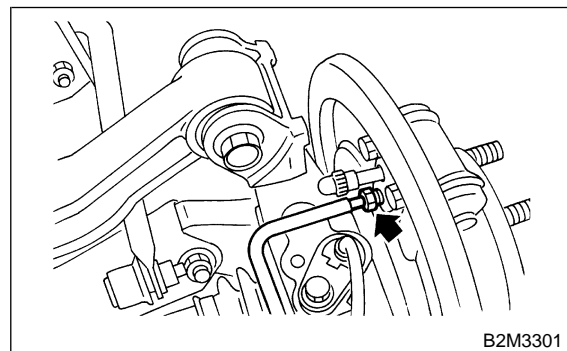


20) Remove bolts which hold parking brake cable holding bracket.

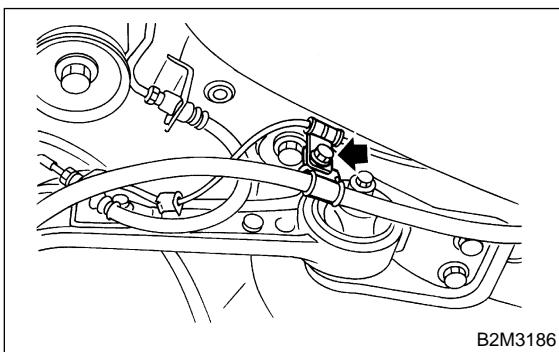
21) Remove parking brake cable from cabin by forcibly pulling it backward.



25) Disconnect brake pipes from wheel cylinder. (Rear drum brake model) <Ref. to 4-4 [W3A2].>



22) Remove bolts which hold parking brake cable holding bracket.



26) Remove rear suspension assembly.

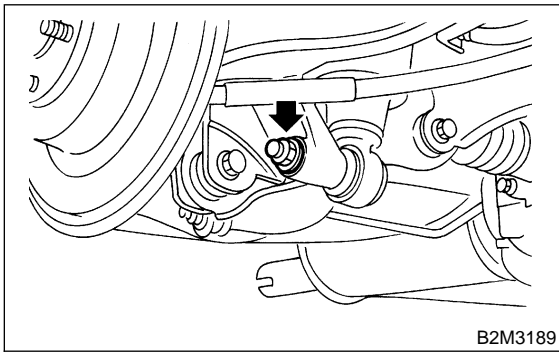
WARNING:

A helper is required to perform this work.

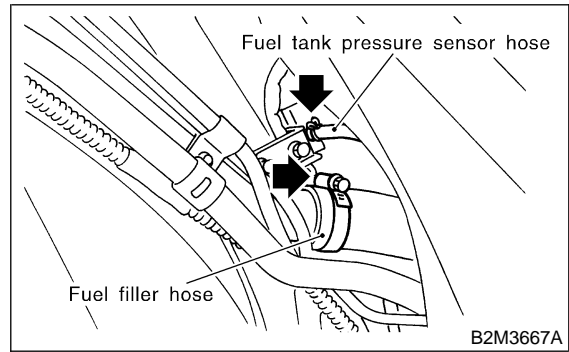
- (1) Support rear differential with transmission jack.

1. Fuel Tank

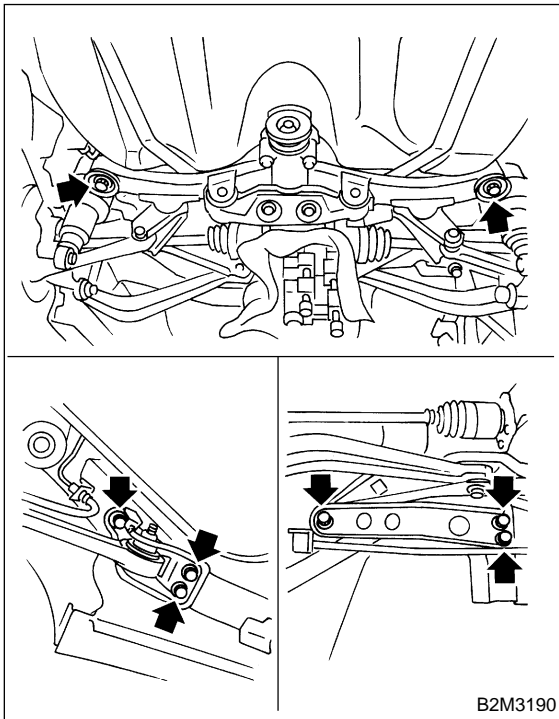
(2) Remove bolt which holds rear shock absorber to rear suspension arm.



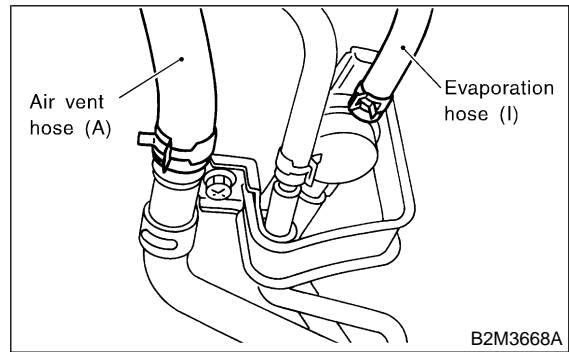
28) Disconnect fuel filler hose and fuel tank pressure sensor hose.



(3) Remove bolt which secure rear suspension assembly to body.

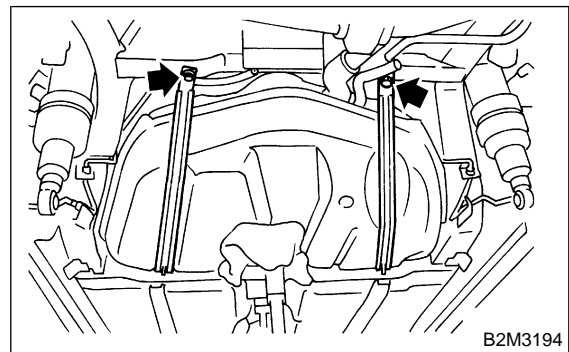


29) Disconnect air vent hose (A) from evaporation pipe assembly and disconnect evaporation hose (I) from pressure control solenoid valve.

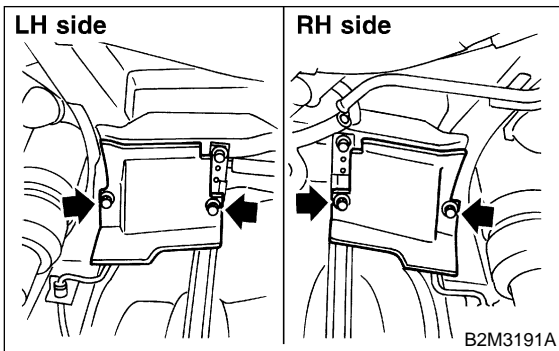


30) Support fuel tank with transmission jack, remove bolts from bands and dismount fuel tank from the vehicle.

WARNING:
A helper is required to perform this work.



(4) Remove rear suspension assembly.
27) Remove rear side fuel tank cover.

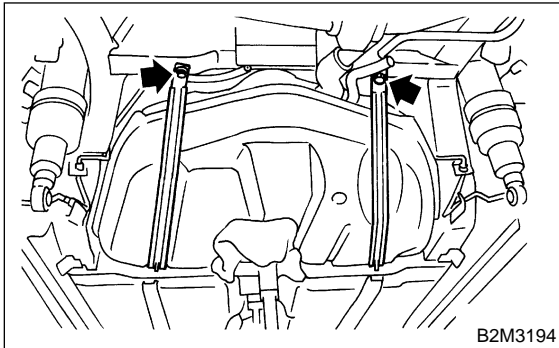


D: INSTALLATION

- 1) Support fuel tank with transmission jack and push fuel tank harness into access hole with grommet.
- 2) Set fuel tank and temporarily tighten bolts of fuel tank bands.

WARNING:

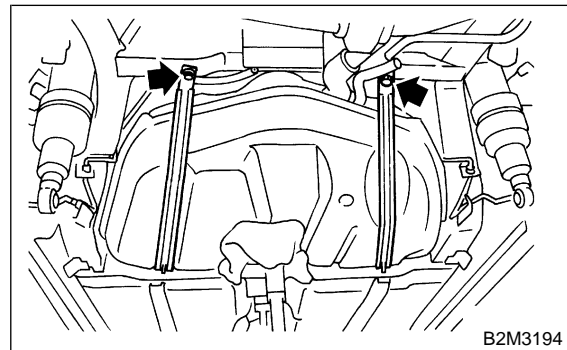
A helper is required to perform this work.



- 5) Tighten band mounting bolts.

Tightening torque:

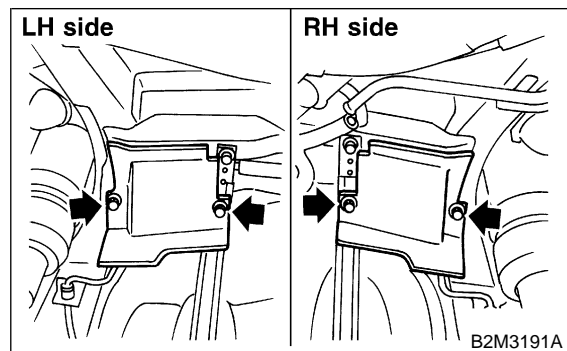
$33 \pm 10 \text{ N-m}$ ($3.4 \pm 1.0 \text{ kg-m}$, $25 \pm 7 \text{ ft-lb}$)



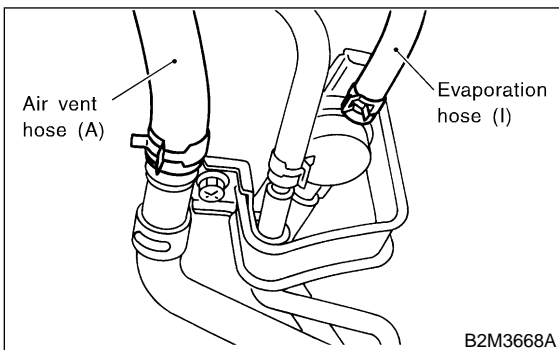
- 6) Install rear side fuel tank cover.

Tightening torque:

$18 \pm 5 \text{ N-m}$ ($1.8 \pm 0.5 \text{ kg-m}$, $13.0 \pm 3.6 \text{ ft-lb}$)



- 3) Connect air vent hose (A) to evaporation pipe assembly and connect evaporation hose (I) to pressure control solenoid valve.

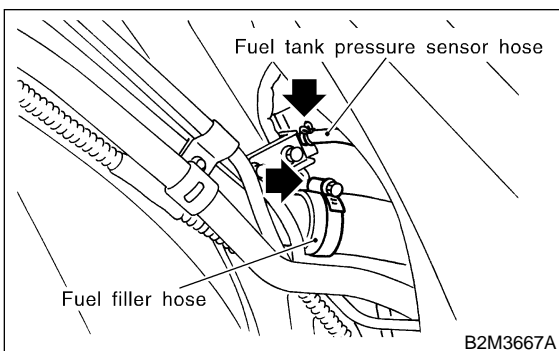


- 7) Install rear suspension assembly.

WARNING:

A helper is required to perform this work.

- 4) Connect fuel filler hose and fuel tank pressure sensor hose.



1. Fuel Tank

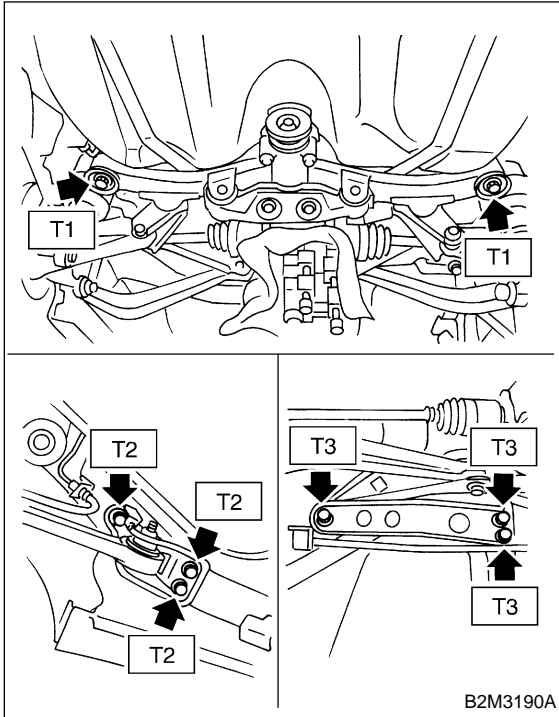
(1) Support rear suspension assembly and then tighten bolts which secure rear suspension assembly.

Tightening torque:

T1: 172 ± 20 N·m (17.5 ± 2.0 kg·m, 127 ± 14 ft·lb)

T2: 108 ± 15 N·m (11.0 ± 1.5 kg·m, 80 ± 11 ft·lb)

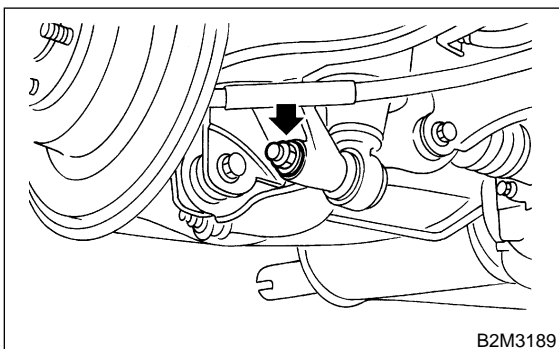
T3: 66 ± 10 N·m (6.7 ± 1.0 kg·m, 48 ± 7 ft·lb)



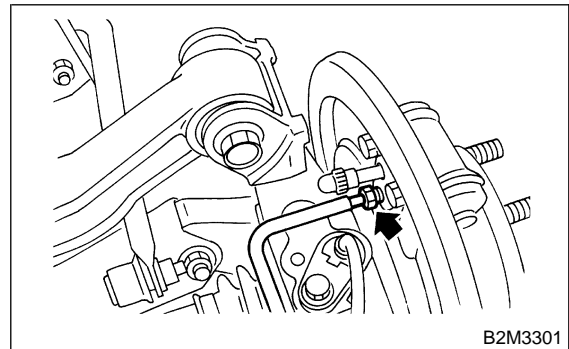
(2) Tighten bolt which holds rear shock absorber to rear suspension arm. <Ref. to 4-1 [W11E0].>

Tightening torque:

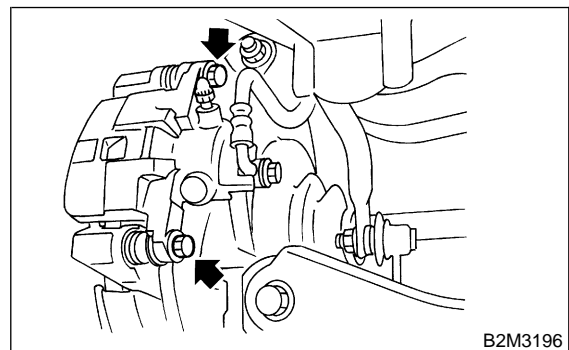
157 ± 20 N·m (16 ± 2 kg·m, 116 ± 14 ft·lb)



8) Connect brake pipes to wheel cylinder. (Rear drum brake model) <Ref. to 4-4 [W3E3].>



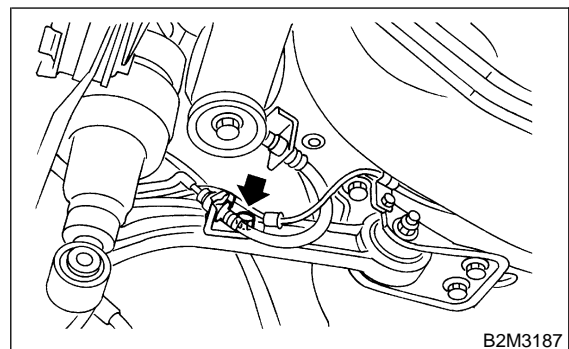
9) Install rear brake caliper. (Rear disk brake model) <Ref. to 4-4 [W2F0].>



10) Tighten bolts which hold rear brake hoses holding bracket.

Tightening torque:

33 ± 10 N·m (3.4 ± 1.0 kg·m, 25 ± 7 ft·lb)

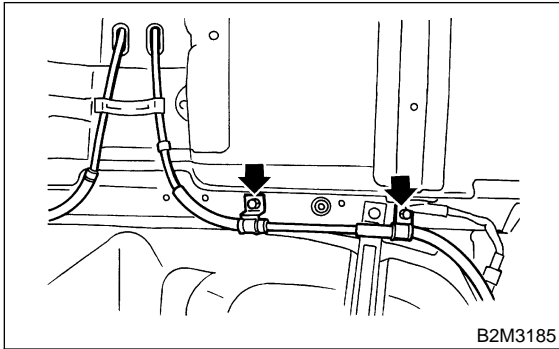


11) Install parking brake cable to cabin by forcibly pushing it forward.

12) Tighten bolts which hold parking brake cable holding bracket.

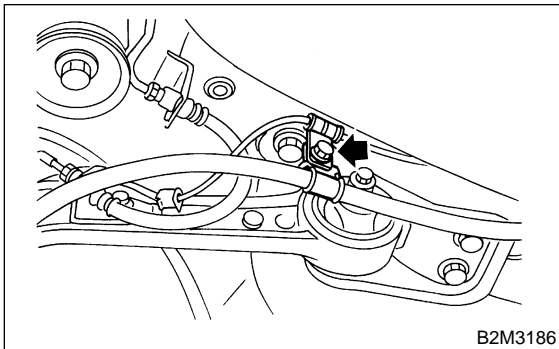
Tightening torque:

18±5 N·m (1.8±0.5 kg·m, 13.0±3.6 ft-lb)

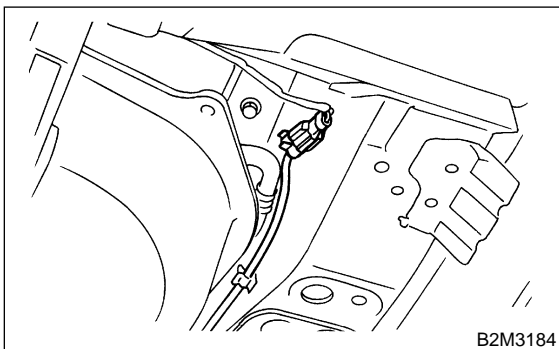


Tightening torque:

32±10 N·m (3.3±1.0 kg·m, 23.9±7.2 ft-lb)



13) Connect connector to ABS sensor.



14) Install propeller shaft. <Ref. to 3-4 [W1E0].>

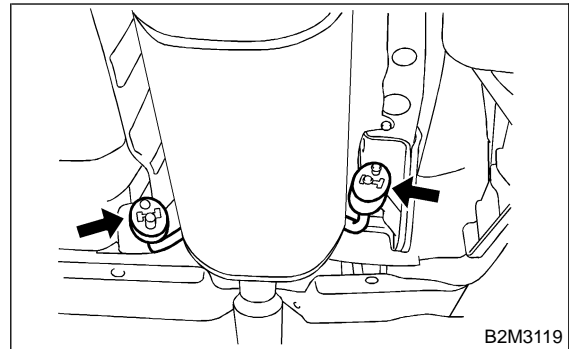
15) Install rear exhaust pipe and muffler.

NOTE:

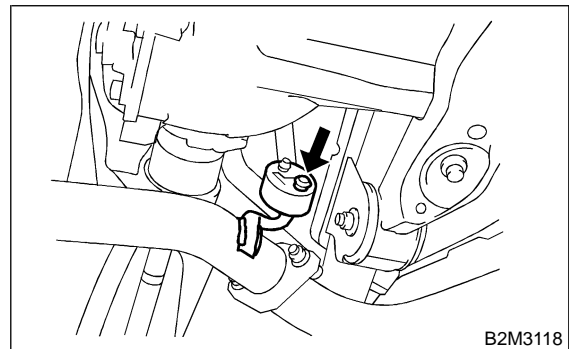
To facilitate the procedure, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

(1) Install left and right rubber cushions.



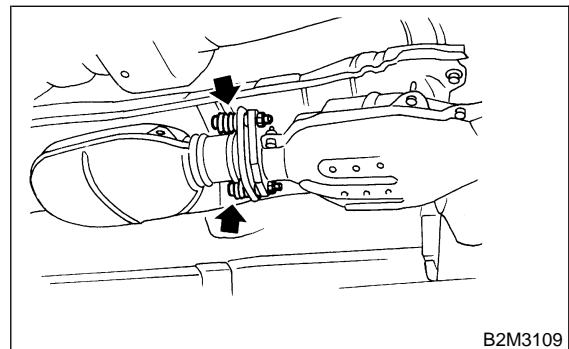
(2) Install front rubber cushion and attach muffler assembly.



(3) Install rear exhaust pipe to center exhaust pipe.

Tightening torque:

18±5 N·m (1.8±0.5 kg·m, 13.0±3.6 ft-lb)

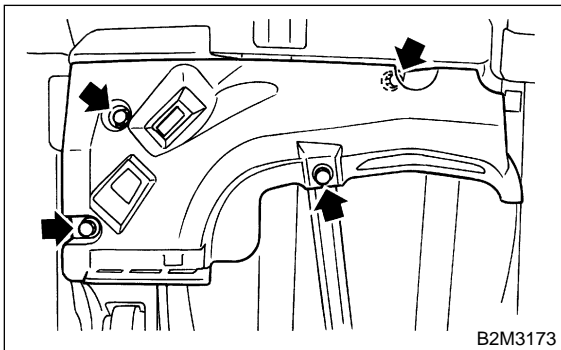


1. Fuel Tank

16) Install front side fuel tank cover.

Tightening torque:

$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)

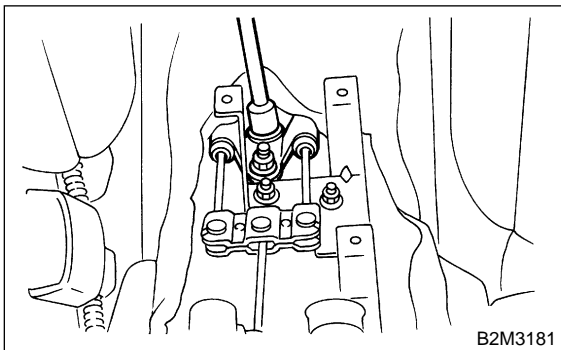


17) Install rear wheel.

18) Lower the vehicle.

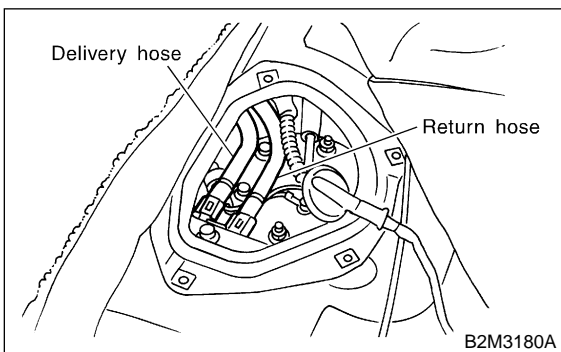
19) Tighten wheel nuts to rear wheel.

20) Install parking brake cable. <Ref. to 4-4a [W10A0].>

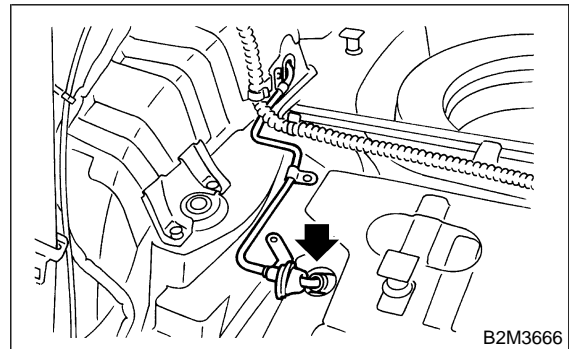


21) Install center console. <Ref. to 5-4 [W1A0].>

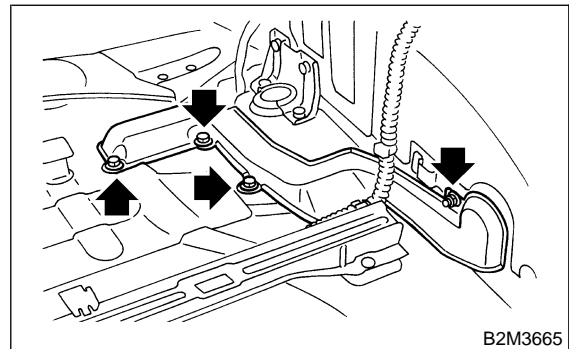
22) Connect fuel hoses and hold them with quick connector. <Ref. to 2-8 [W9A0].>



23) Connect evaporation pipe (A) and hold it with quick connector. <Ref. to 2-8 [W8A0].>



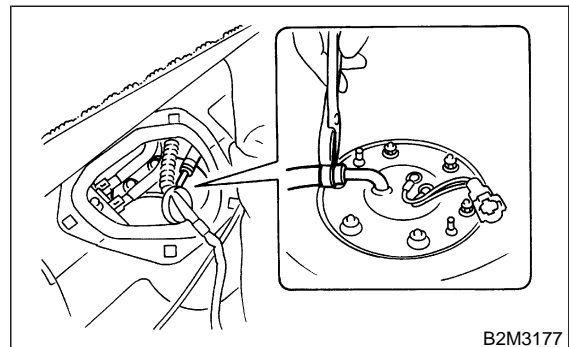
24) Install pipe protector.



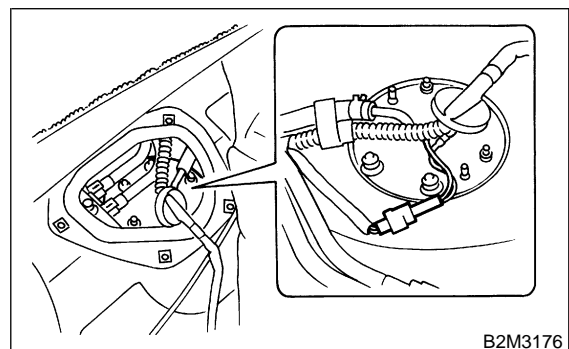
25) Install trunk room trim. (Sedan model)

26) Install luggage room trim. (Wagon model)

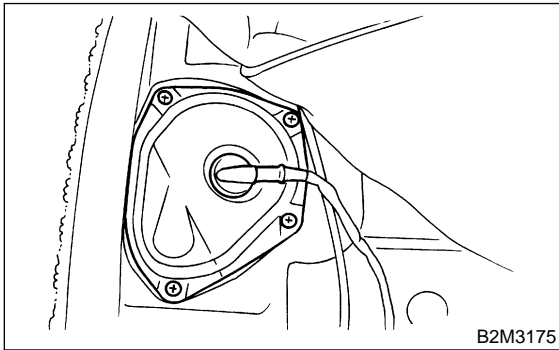
27) Connect fuel jet pump hose.



28) Connect connector to fuel sub level sensor.



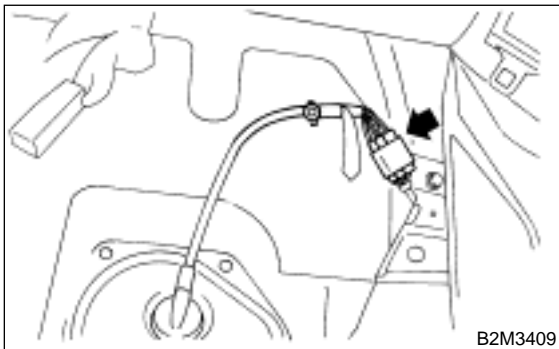
29) Install sub service hole cover.



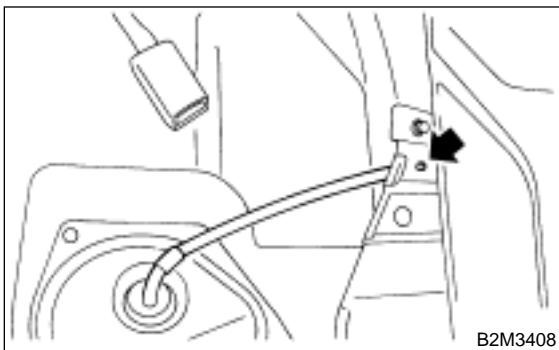
35) Adjust parking brake lever stroke. <Ref. to 4-4 [W4D2].>

36) Check wheel alignment and adjust if necessary. <Ref. to 4-1 [W100].>

30) Connect connectors to fuel tank cord and plug service hole with grommet.

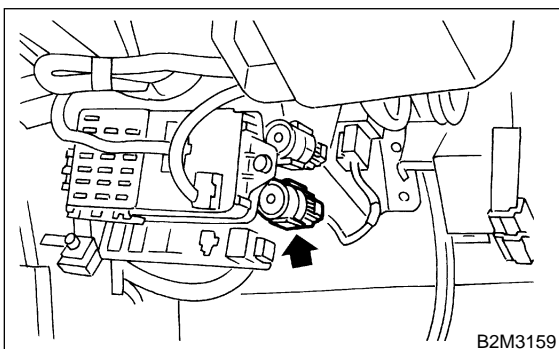


31) Install holder clip which secures fuel tank cord on bracket.



32) Set rear seat and floor mat.

33) Connect connector to fuel pump relay.



34) Bleed air from brake system. (Rear drum brake model only) <Ref. to 4-4 [W1100].>

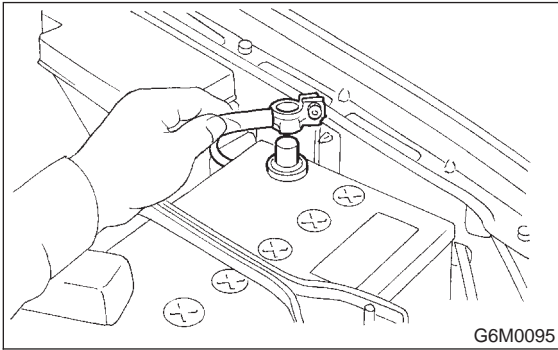
2. Fuel Filler Pipe

A: REMOVAL

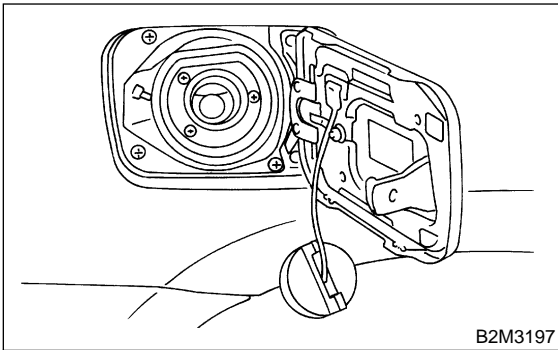
WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

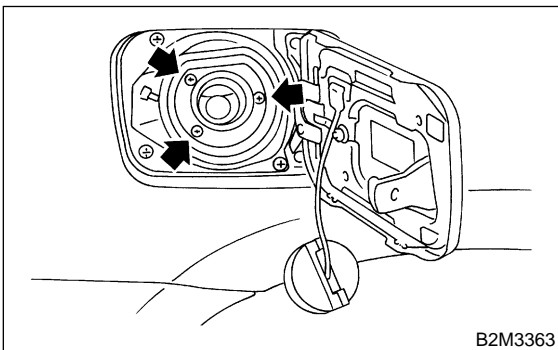
- 1) Set the vehicle on the lift.
- 2) Disconnect battery ground cable.



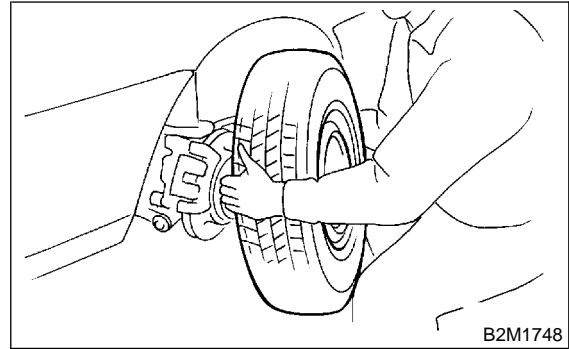
- 3) Open fuel filler flap lid and remove filler cap.



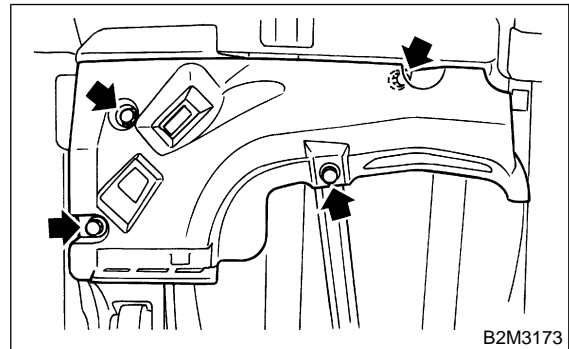
- 4) Remove screws holding packing in place.



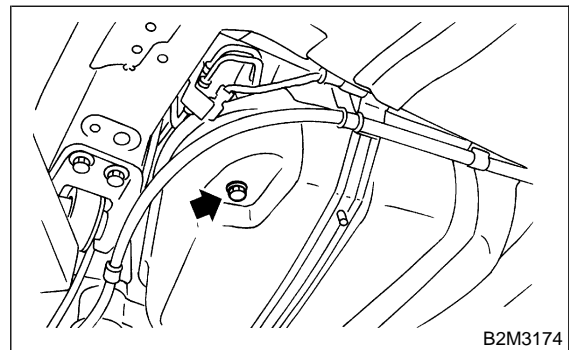
- 5) Lift-up the vehicle.
- 6) Remove rear wheel nuts.
- 7) Remove rear wheel.



- 8) Remove front right side fuel tank cover.



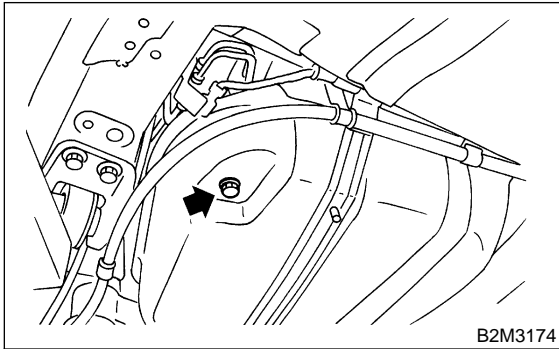
- 9) Drain fuel from fuel tank. Set a container under the vehicle and remove drain plug from fuel tank.



10) Tighten fuel drain plug and then install front right side tank cover.

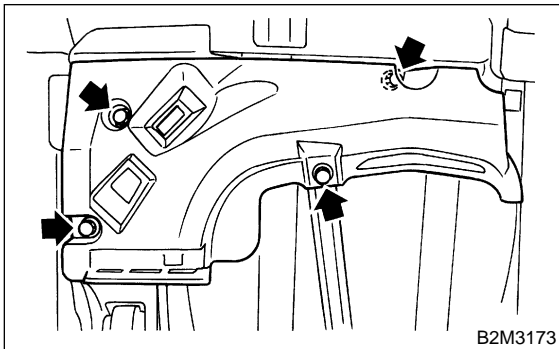
Tightening torque:

26 ± 7 N·m (2.65 ± 0.7 kg·m, 19.2 ± 5.1 ft·lb)



Tightening torque:

18 ± 5 N·m (1.8 ± 0.5 kg·m, 13.0 ± 3.6 ft·lb)



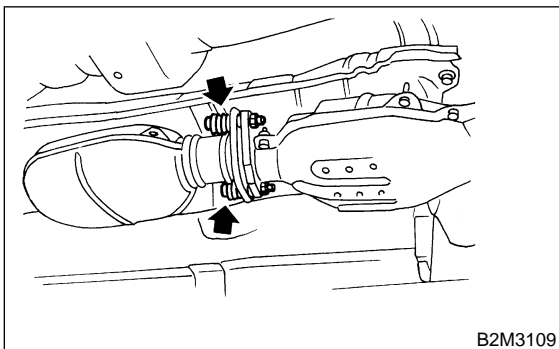
11) Remove rear exhaust pipe and muffler.

NOTE:

To facilitate removal, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

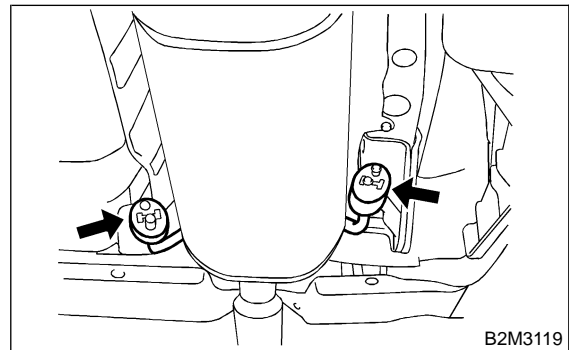
(1) Separate rear exhaust pipe from center exhaust pipe.



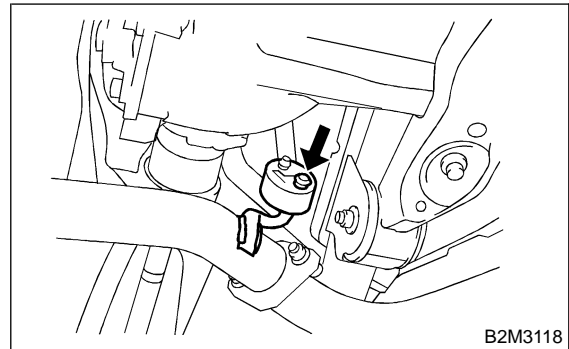
(2) Remove left and right rubber cushions.

CAUTION:

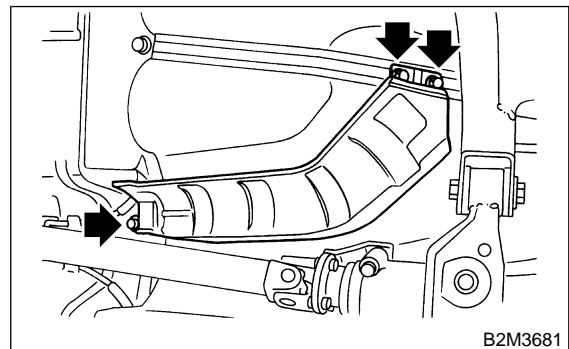
Be careful not to pull down muffler.



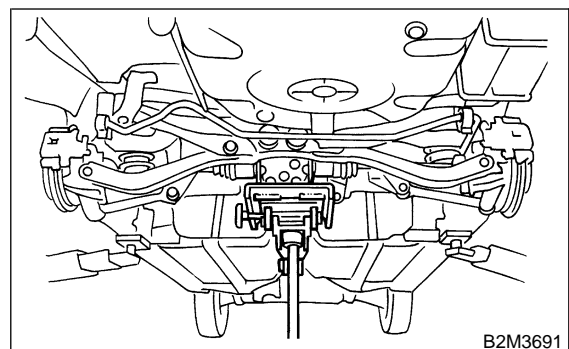
(3) Remove front rubber cushion and detach muffler assembly.



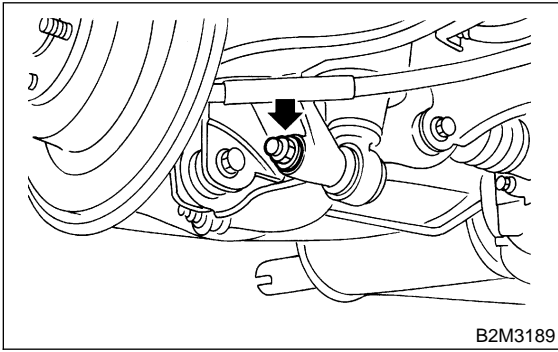
12) Remove heat sealed cover.



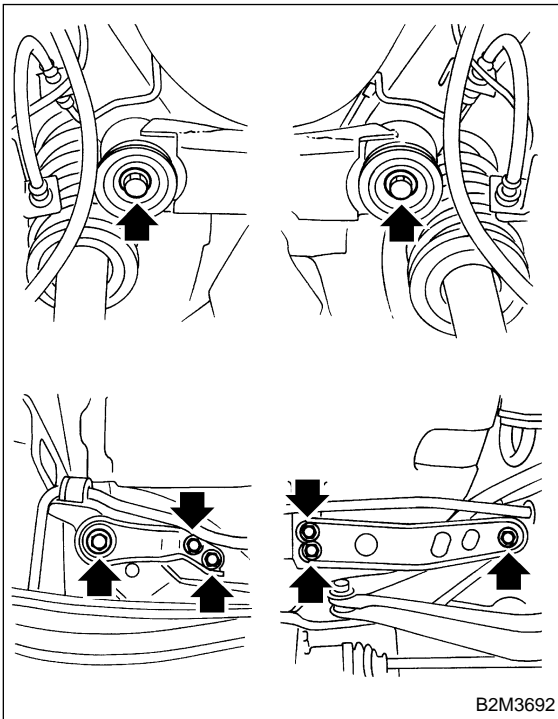
13) Place transmission jack under sub frame.



14) Remove bolt which holds rear shock absorber to rear suspension arm.



15) Remove bolts which hold rear sub frame on body.

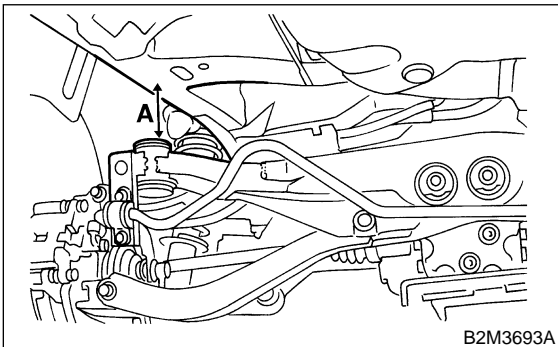


16) Lower the rear sub frame.

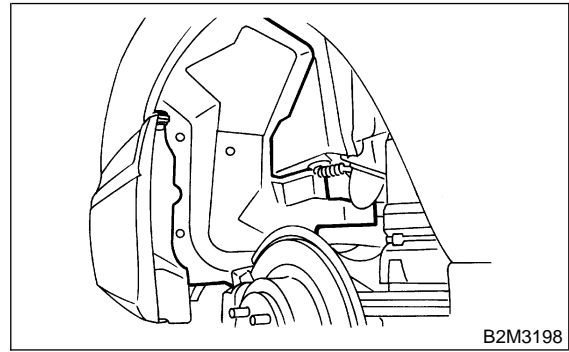
CAUTION:

Be sure to lower sub frame slowly.

A = 150 mm (5.91 in)

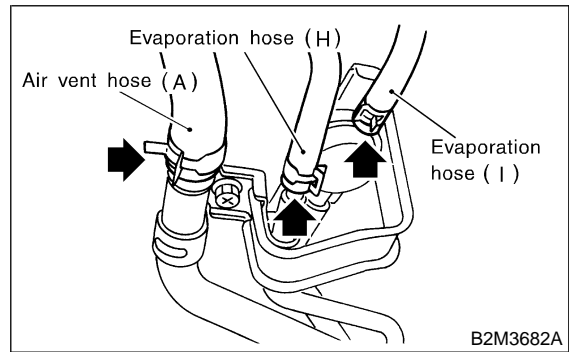


17) Remove fuel filler pipe protector.

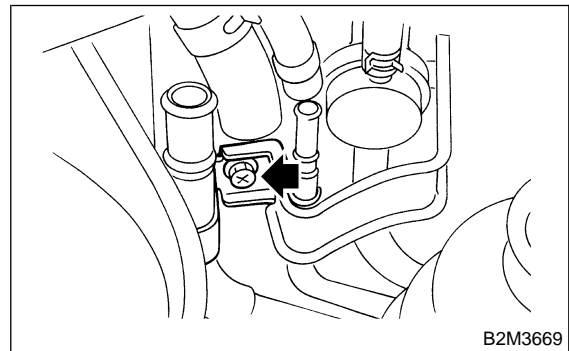


18) Disconnect air vent hose (A) and evaporation hose (H) from evaporation pipe assembly.

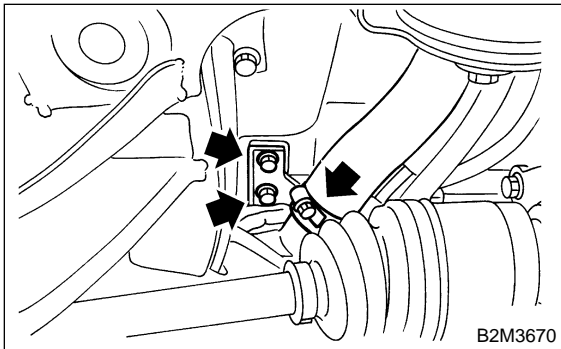
19) Disconnect evaporation hose (I) from pressure control solenoid valve.



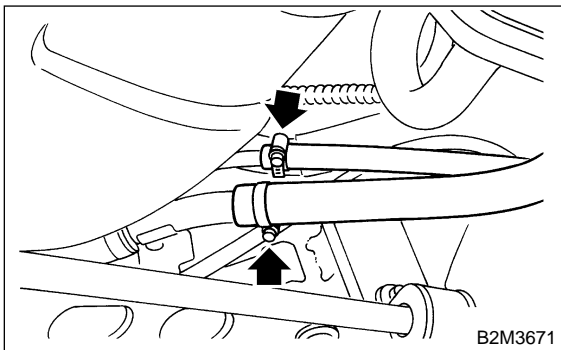
20) Remove bolt which holds evaporation pipe assembly on body.



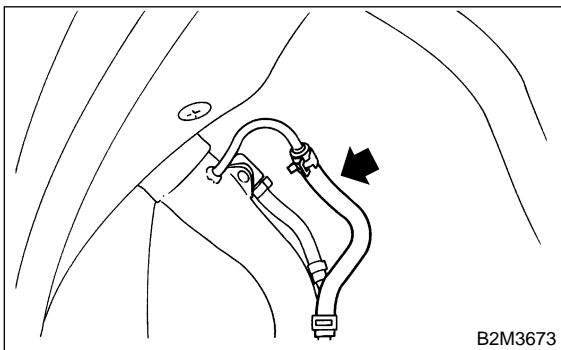
- 21) Disconnect fuel filler hose.
- 22) Remove bolt which holds fuel pressure sensor on fuel filler pipe and remove bolt which holds fuel filler pipe on body.



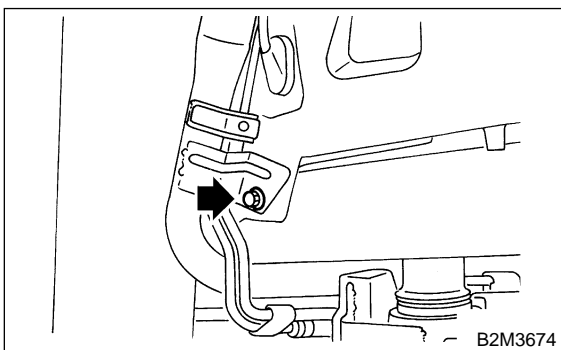
- 23) Disconnect canister hose from evaporation pipe assembly.



- 24) Disconnect evaporation hose (O) from fuel filler pipe.



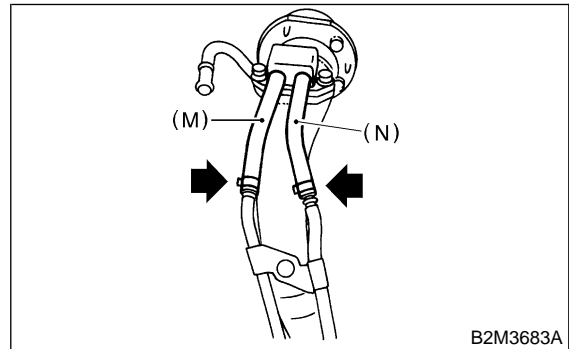
- 25) Remove bolt which holds fuel filler pipe to body.



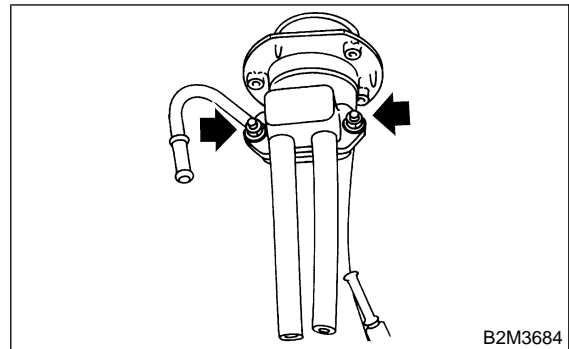
- 26) Remove fuel filler pipe to under side of the vehicle.

B: DISASSEMBLY AND ASSEMBLY

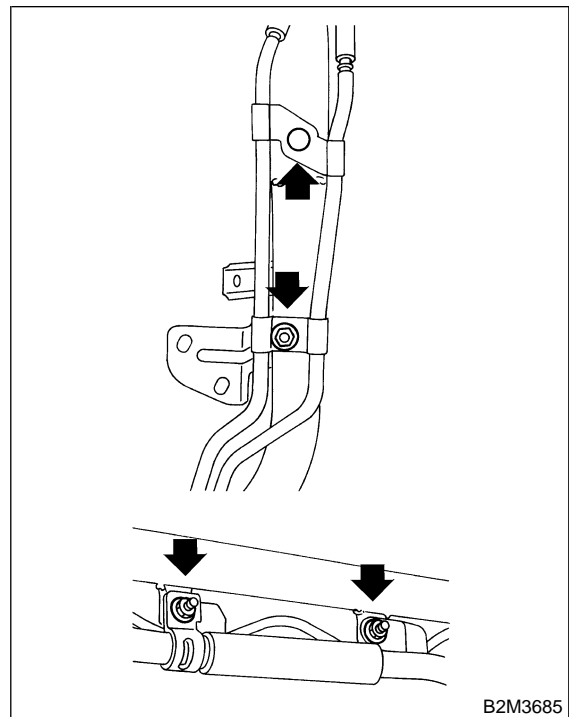
- 1) Disconnect evaporation hose (M) and (N) from evaporation pipe assembly.



- 2) Remove shut valve from fuel filler pipe.



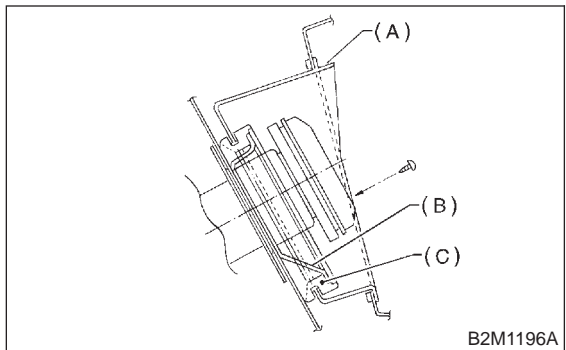
- 3) Remove nut which holds evaporation pipe assembly on fuel filler pipe.



4) Assembly is in the reverse order of disassembly.

C: INSTALLATION

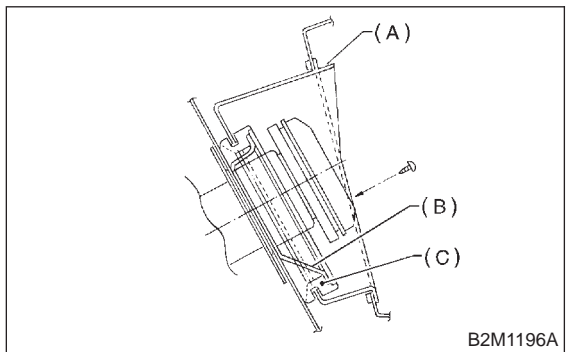
- 1) Hold fuel filler flap open.
- 2) Set fuel saucer (A) with rubber packing (C) and insert fuel filler pipe into hole from the inner side of apron.



3) Align holes in fuel filler pipe neck and set cup (B), and tighten screws.

NOTE:

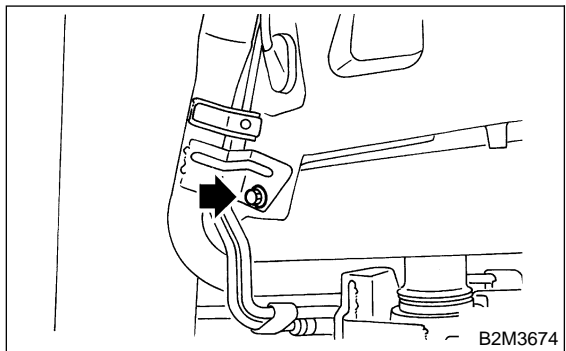
If edges of rubber packing are folded toward the inside, straighten it with a screwdriver.



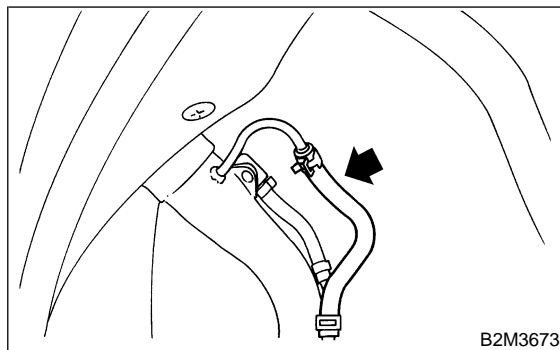
4) Tighten bolt which holds fuel filler pipe on body.

Tightening torque:

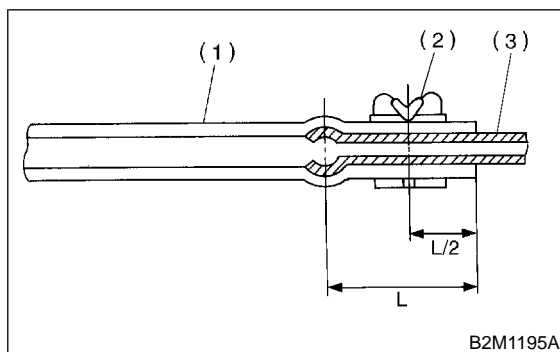
$7.5 \pm 2.0 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.2 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.4 \text{ ft}\cdot\text{lb}$)



5) Insert evaporation hose (O) approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of evaporation pipe and hold clip.

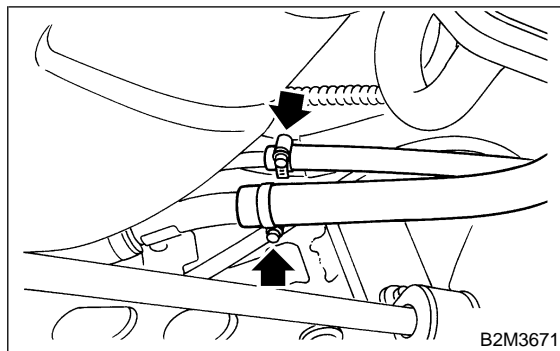


$L = 27.5 \pm 2.5 \text{ mm}$ ($1.083 \pm 0.098 \text{ in}$)

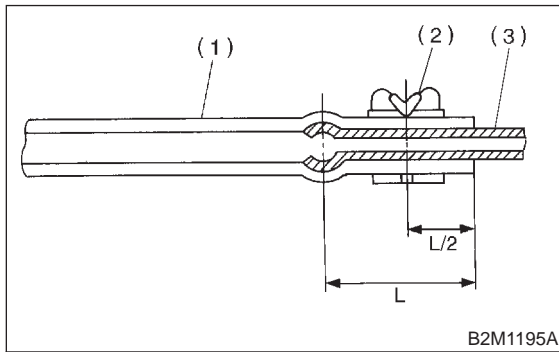


- (1) Hose
- (2) Clip
- (3) Pipe

6) Insert canister hoses approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of evaporation pipe assembly and tighten clamp.



$L = 27.5 \pm 2.5 \text{ mm (1.083 \pm 0.098 in)}$

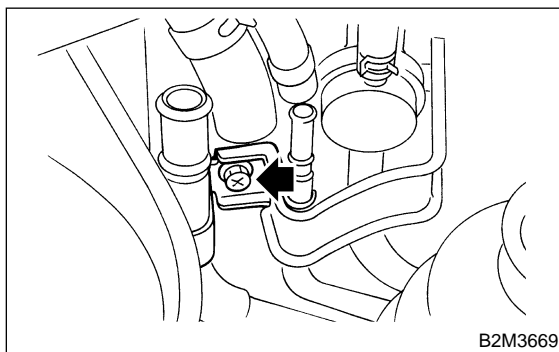


- (1) Hose
- (2) Clip
- (3) Pipe

7) Tighten bolt which holds evaporation pipe assembly on body.

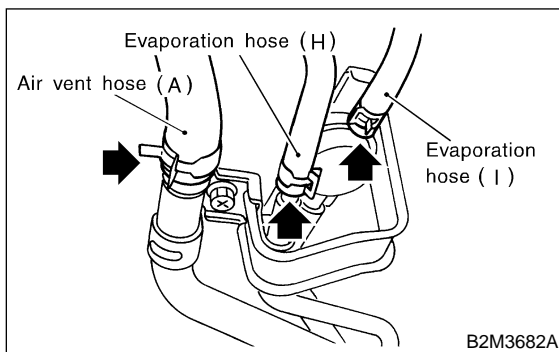
Tightening torque:

$7.5 \pm 2.0 \text{ N}\cdot\text{m (0.75 \pm 0.2 kg}\cdot\text{m, 5.4 \pm 1.4 ft}\cdot\text{lb)}$

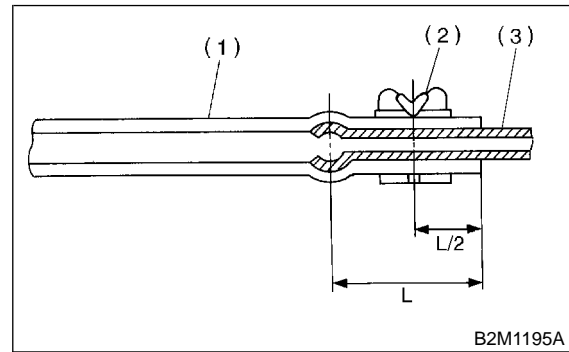


8) Insert air vent hose (A), evaporation hose (H) approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of evaporation pipe assembly and hold clip.

9) Insert evaporation hose (I) to pressure control solenoid valve and hold clip.



$L = 27.5 \pm 2.5 \text{ mm (1.083 \pm 0.098 in)}$



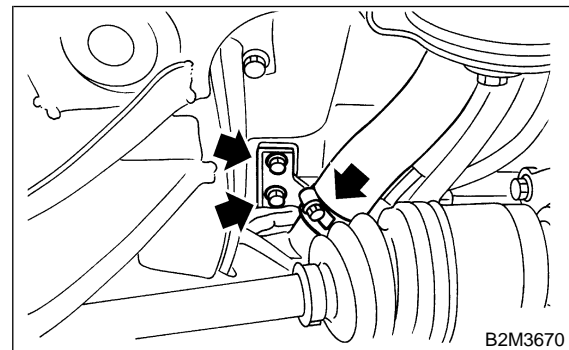
- (1) Hose
- (2) Clip
- (3) Pipe

10) Tighten bolt which holds fuel filler pipe on body and tighten bolt which holds fuel pressure sensor on fuel filler pipe.

Tightening torque:

$7.5 \pm 2.0 \text{ N}\cdot\text{m (0.75 \pm 0.2 kg}\cdot\text{m, 5.4 \pm 1.4 ft}\cdot\text{lb)}$

11) Insert fuel filler hose approximately 35 to 40 mm (1.38 to 1.57 in) over the lower end of fuel filler pipe and tighten clamp.

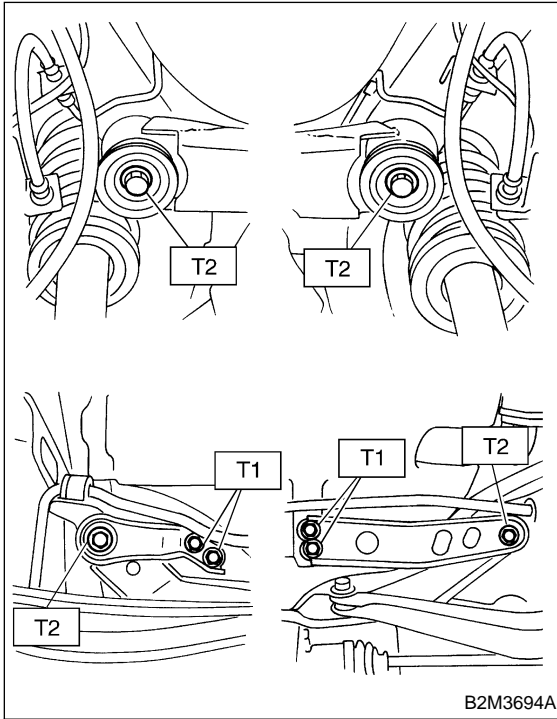


12) Jack-up the rear sub frame and tighten bolts which hold rear sub frame on body.

Tightening torque:

T1: 66 ± 10 N-m (6.7 ± 1.0 kg-m, 48.5 ± 7.2 ft-lb)

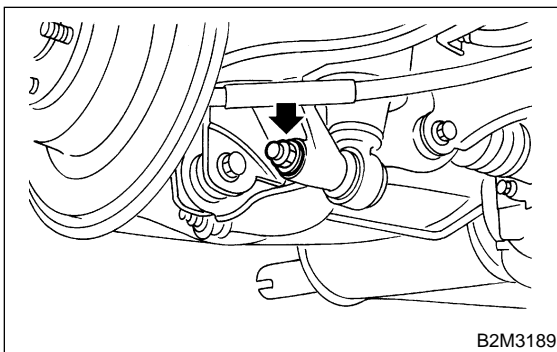
T2: 172 ± 20 N-m (17.5 ± 2 kg-m, 127 ± 14 ft-lb)



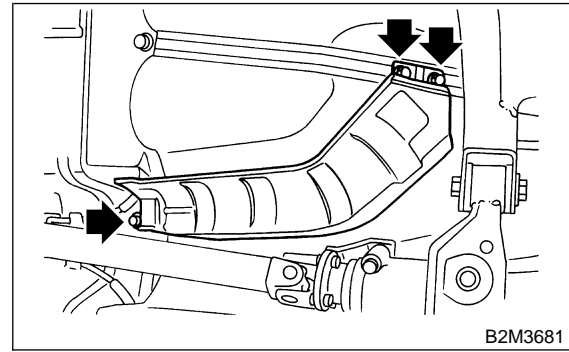
13) Tighten bolt which holds rear shock absorber to rear suspension arm. <Ref. to 4-1 [W11E0].>

Tightening torque:

157 ± 20 N-m (16 ± 2 kg-m, 116 ± 14 ft-lb)



14) Install heat shield cover.



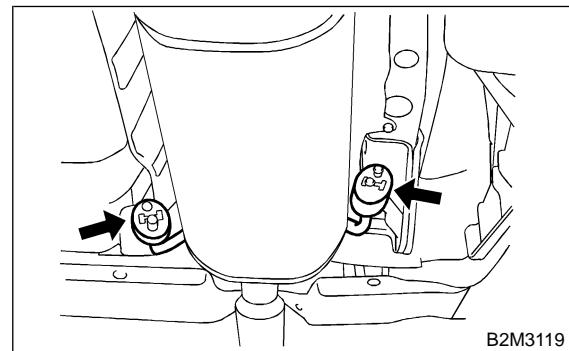
15) Install rear exhaust pipe and muffler.

NOTE:

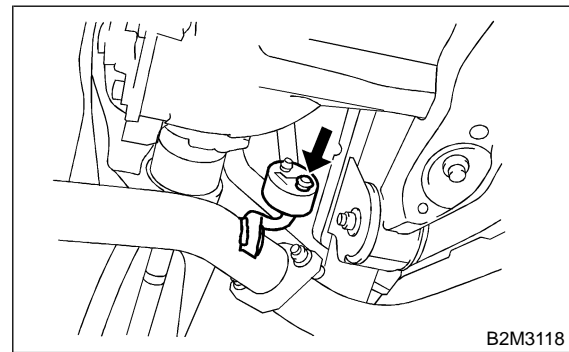
To facilitate the procedure, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

(1) Install left and right rubber cushions.



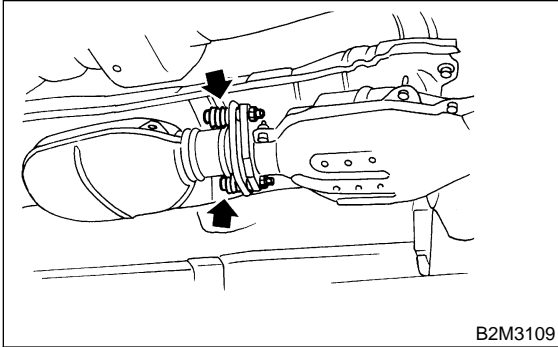
(2) Install front rubber cushion and attach muffler assembly.



(3) Install rear exhaust pipe to center exhaust pipe.

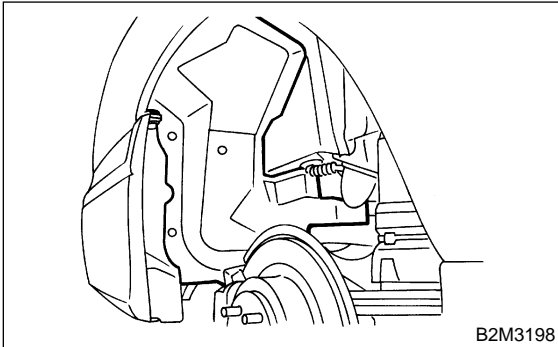
Tightening torque:

18±5 N·m (1.8±0.5 kg·m, 13.0±3.6 ft·lb)



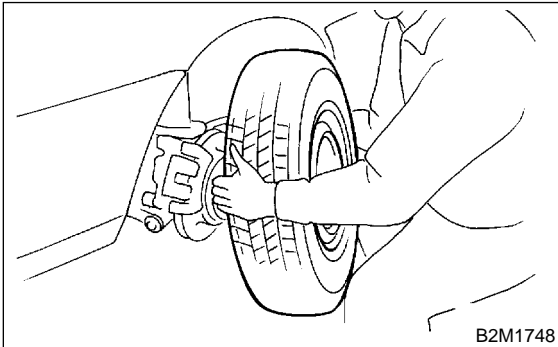
B2M3109

16) Install fuel filler pipe protector.



B2M3198

17) Install rear right wheel.

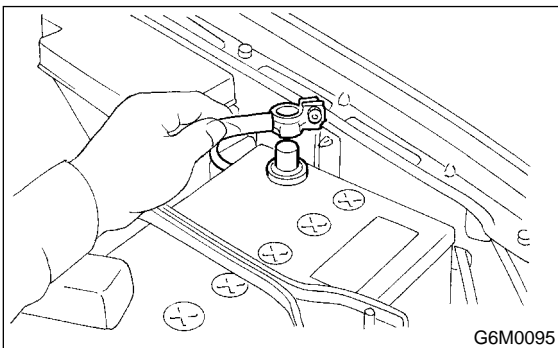


B2M1748

18) Lower the vehicle.

19) Tighten wheel nuts.

20) Connect battery ground terminal.



G6M0095

3. Fuel Pump

A: REMOVAL

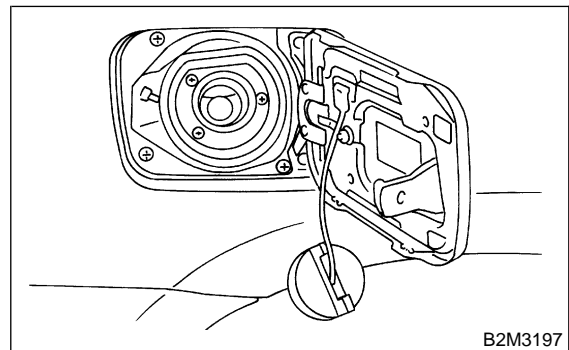
WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel on the floor.
- During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

NOTE:

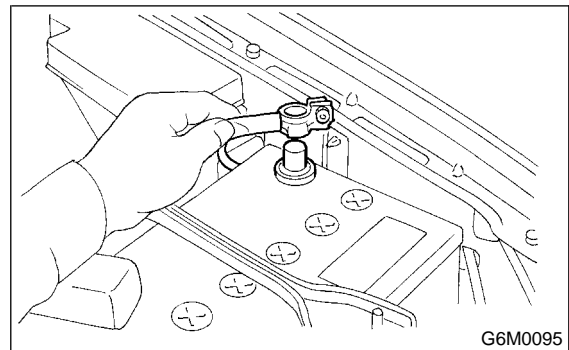
Fuel pump assembly consists of fuel pump and fuel level sensor.

- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Open fuel filler flap lid and remove fuel filler cap.



B2M3197

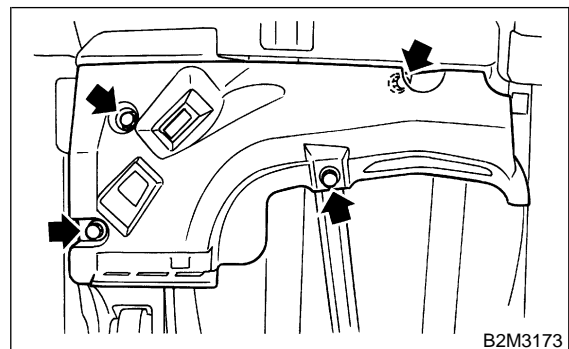
3) Disconnect battery ground cable.



G6M0095

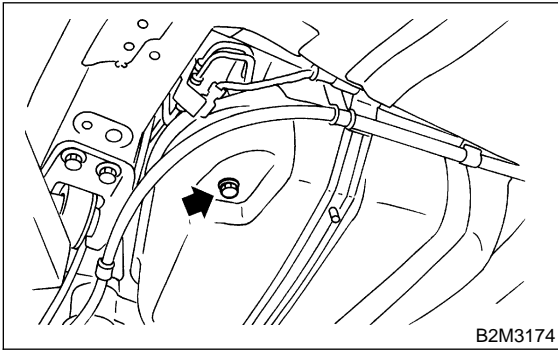
4) Lift-up the vehicle.

5) Remove front side fuel tank cover.



B2M3173

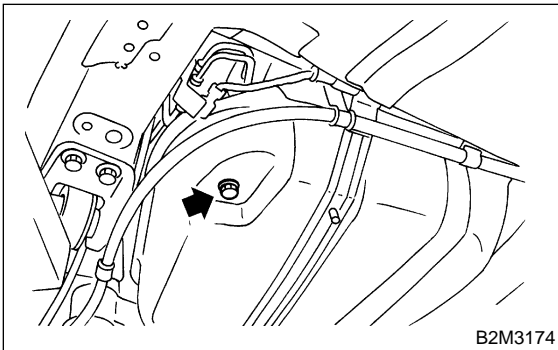
6) Drain fuel from fuel tank. Set a container under the vehicle and remove drain plug from fuel tank.



7) Tighten fuel drain plug and install front right side fuel tank cover.

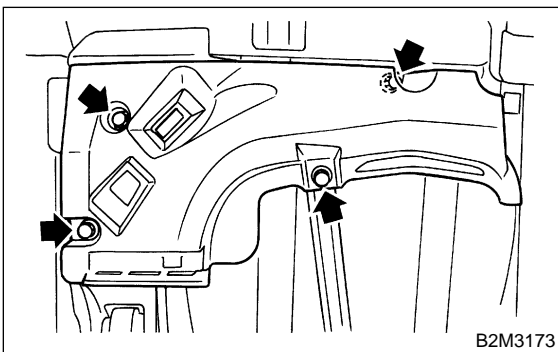
Tightening torque:

$26 \pm 7 \text{ N}\cdot\text{m}$ ($2.65 \pm 0.7 \text{ kg}\cdot\text{m}$, $19.2 \pm 5.1 \text{ ft}\cdot\text{lb}$)



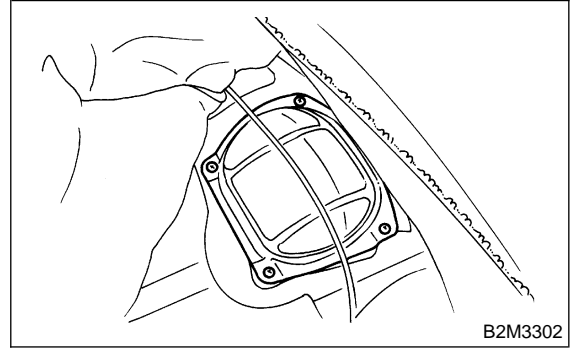
Tightening torque:

$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)

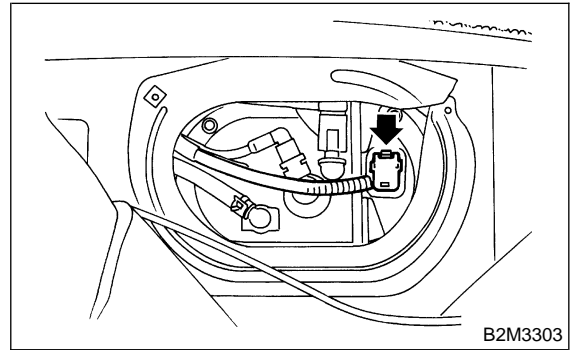


8) Raise rear seat and turn floor mat up.

9) Remove access hole lid.

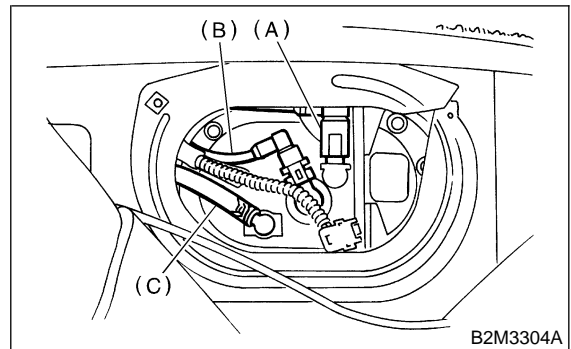


10) Disconnect connector from fuel pump.

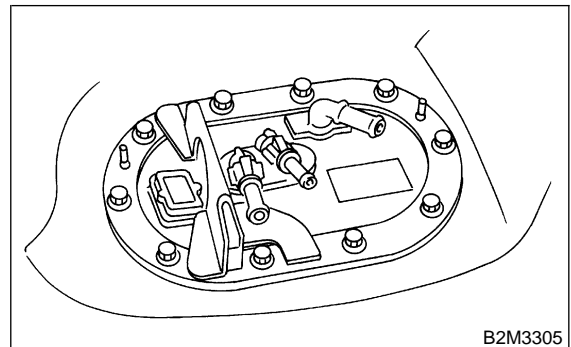


11) Move clips and then disconnect jet pump hose (C).

12) Disconnect quick connector and then disconnect fuel delivery hose (A) and return hose (B). <Ref. to 2-8 [W6A0].>



13) Remove nuts which install fuel pump assembly onto fuel tank.



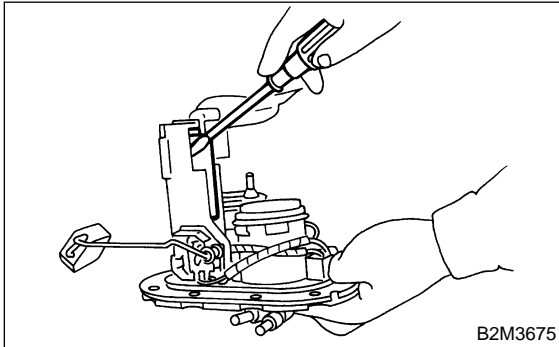
14) Take off fuel pump assembly from fuel tank.

B: DISASSEMBLY AND ASSEMBLY

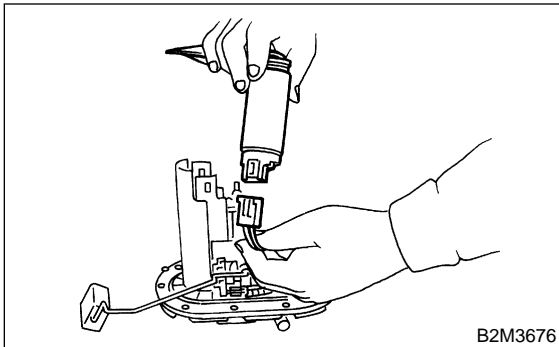
1) Remove fuel pump and pump holder.

NOTE:

When disassembling pump holder, be careful as it is installed with two pawls.



2) Disconnect connector from fuel pump.



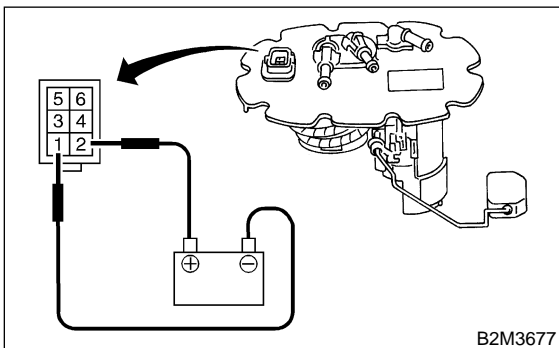
3) Installation is in the reverse order of removal.

C: INSPECTION

Connect lead harness to connector terminal of fuel pump and apply battery power supply to check whether the pump operate.

WARNING:

- Wipe off the fuel completely.
- Keep battery as far apart from fuel pump as possible.
- Be sure to turn the battery supply ON and OFF on the battery side.
- Do not run fuel pump for a long time under non-load condition.



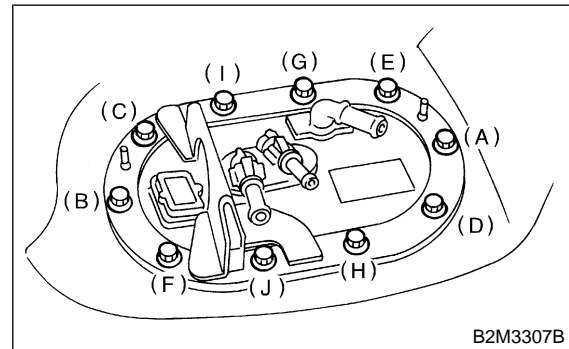
D: INSTALLATION

Installation is in the reverse order of removal. Do the following:

- (1) Always use new gaskets.
- (2) Ensure sealing portion is free from fuel or foreign particles before installation.
- (3) Tighten nuts in alphabetical sequence shown in figure to specified torque.

Tightening torque:

5.9±1.5 N·m (0.6±0.15 kg·m, 4.3±1.1 ft·lb)



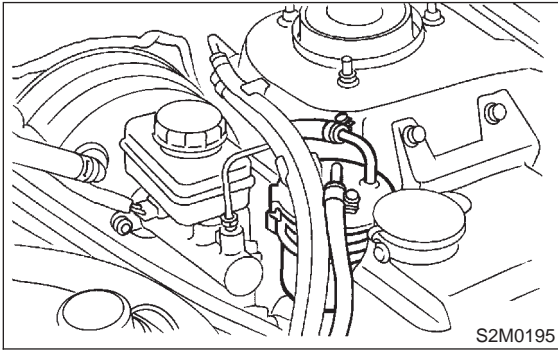
4. Fuel Filter

A: REMOVAL

WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Disconnect fuel delivery hoses from fuel filter.



- 3) Remove filter from holder.

B: INSPECTION

- 1) Check the inside of fuel filter for dirt and water sediment.
- 2) If it is clogged, or if replacement interval has been reached, replace it.
- 3) If water is found in it, shake and expel the water from inlet port.

C: INSTALLATION

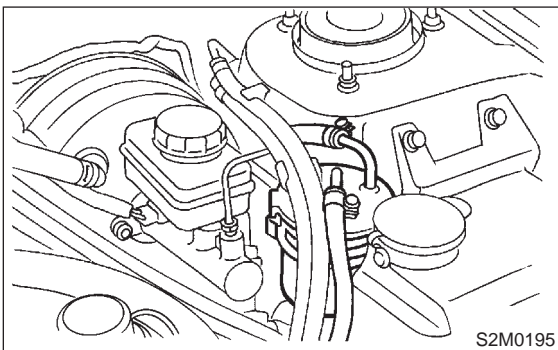
CAUTION:

- If fuel hoses are damaged at the connecting portion, replace it with a new one.
- If clamps are badly damaged, replace with new ones.

- 1) Installation is in the reverse order of removal.
- 2) Tighten hose clamp screws.

Tightening torque:

$1.0^{+0.5}/_{-0}$ N·m ($0.1^{+0.05}/_{-0}$ kg·m, $0.7^{+0.4}/_{-0}$ ft·lb)



5. Fuel Level Sensor

A: REMOVAL AND INSTALLATION

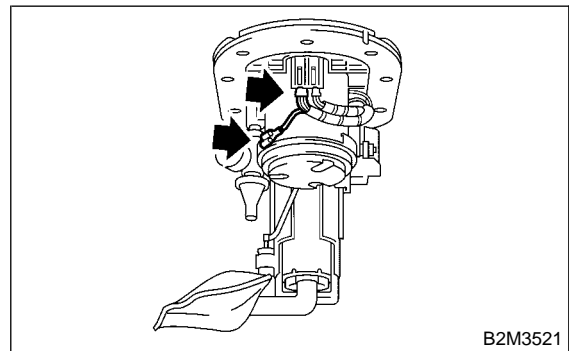
WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.
- During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

NOTE:

Fuel level sensor is built in fuel pump assembly.

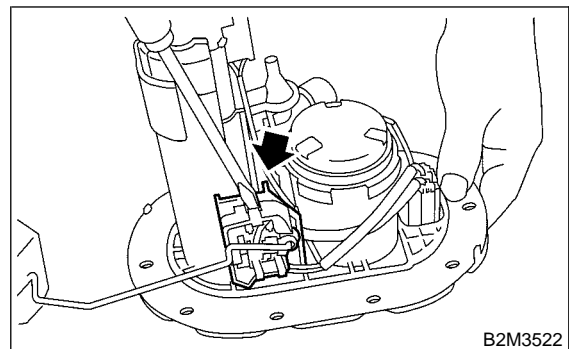
- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Disconnect connector from fuel pump bracket.



- 3) Pushing the pawls with a screwdriver, remove fuel meter unit by pulling it downwards.

NOTE:

Replace fuel filter pawls with new ones as they might brake when removed.



- 4) Installation is in the reverse order of removal.

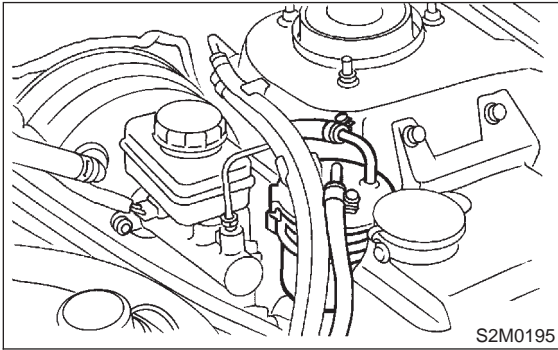
4. Fuel Filter

A: REMOVAL

WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Disconnect fuel delivery hoses from fuel filter.



- 3) Remove filter from holder.

B: INSPECTION

- 1) Check the inside of fuel filter for dirt and water sediment.
- 2) If it is clogged, or if replacement interval has been reached, replace it.
- 3) If water is found in it, shake and expel the water from inlet port.

C: INSTALLATION

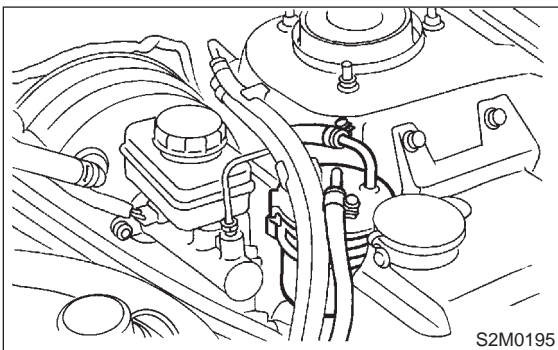
CAUTION:

- If fuel hoses are damaged at the connecting portion, replace it with a new one.
- If clamps are badly damaged, replace with new ones.

- 1) Installation is in the reverse order of removal.
- 2) Tighten hose clamp screws.

Tightening torque:

$1.0^{+0.5}/_{-0}$ N·m ($0.1^{+0.05}/_{-0}$ kg·m, $0.7^{+0.4}/_{-0}$ ft·lb)



5. Fuel Level Sensor

A: REMOVAL AND INSTALLATION

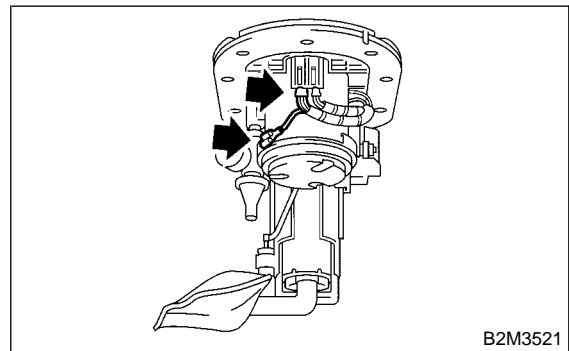
WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.
- During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

NOTE:

Fuel level sensor is built in fuel pump assembly.

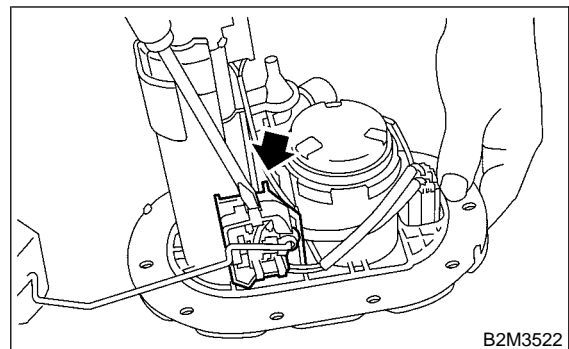
- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Disconnect connector from fuel pump bracket.



- 3) Pushing the pawls with a screwdriver, remove fuel meter unit by pulling it downwards.

NOTE:

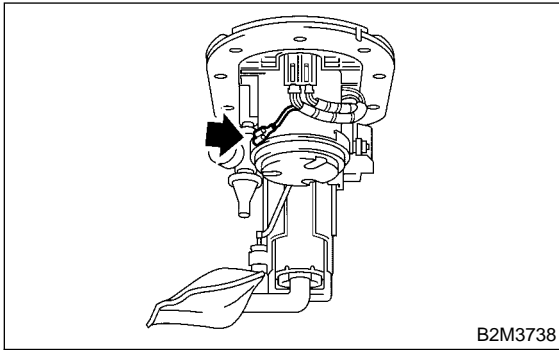
Replace fuel filter pawls with new ones as they might brake when removed.



- 4) Installation is in the reverse order of removal.

WARNING:

- Ground cable must be connected.
- Spark may occur and ignite if fuel is nearby.



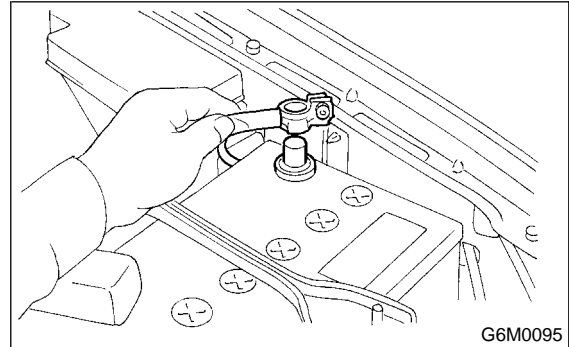
6. Fuel Sub Level Sensor

A: REMOVAL AND INSTALLATION

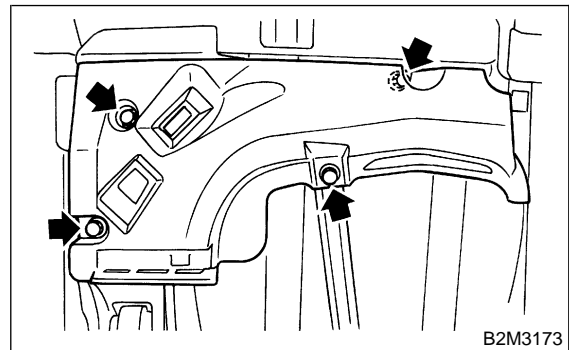
WARNING:

- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.
- During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

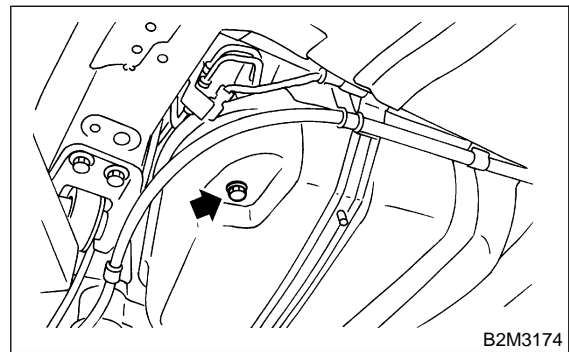
- 1) Disconnect battery ground cable.



- 2) Lift-up the vehicle.
- 3) Remove front side fuel tank cover.



- 4) Drain fuel from fuel tank. Set a container under the vehicle and remove drain plug from fuel tank.

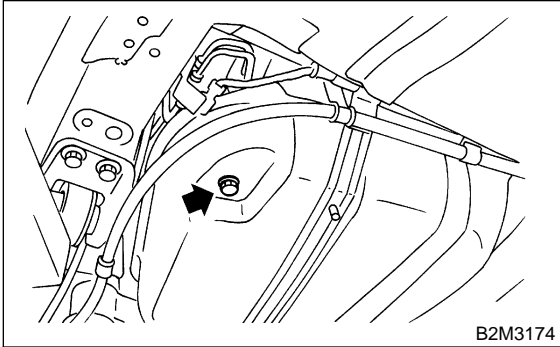


6. Fuel Sub Level Sensor

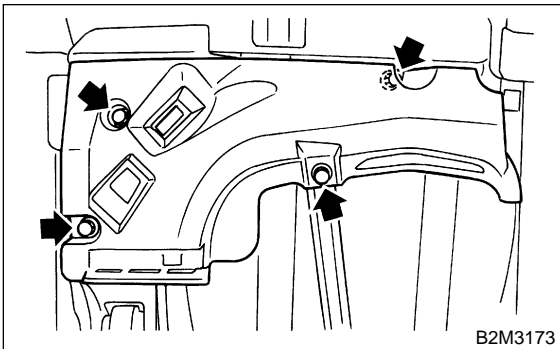
5) Tighten fuel drain plug and install front right side fuel tank cover.

Tightening torque:

$26 \pm 7 \text{ N}\cdot\text{m}$ ($2.65 \pm 0.7 \text{ kg}\cdot\text{m}$, $19.2 \pm 5.1 \text{ ft}\cdot\text{lb}$)

**Tightening torque:**

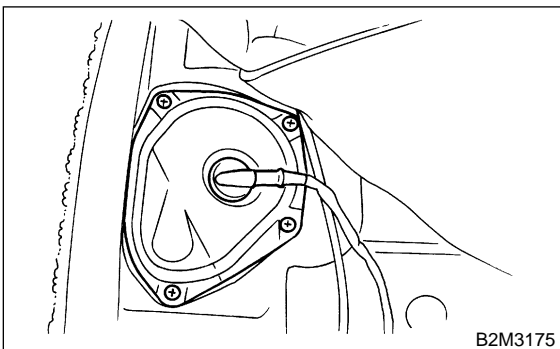
$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)



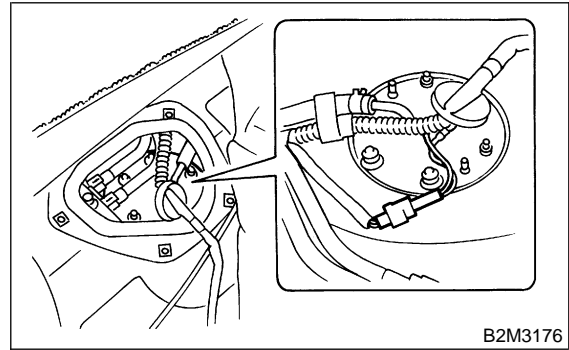
6) Raise rear seat and turn floor mat up. (Wagon model)

7) Remove rear seat. (Sedan model)

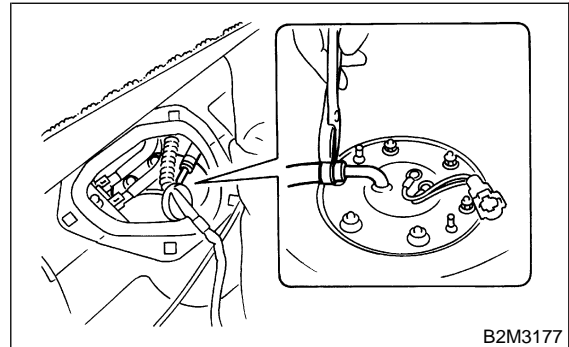
8) Remove service hole cover.



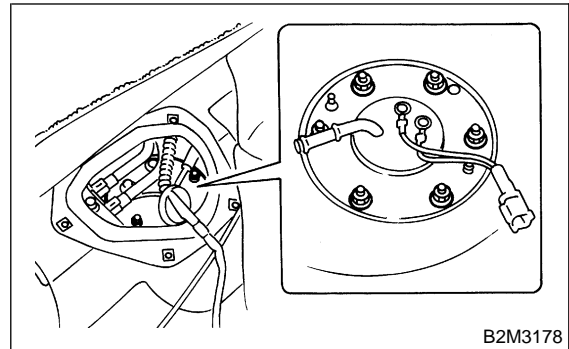
9) Disconnect connector from fuel sub level sensor.



10) Disconnect fuel jet pump hose.



11) Remove bolts which install fuel sub level sensor on fuel tank.

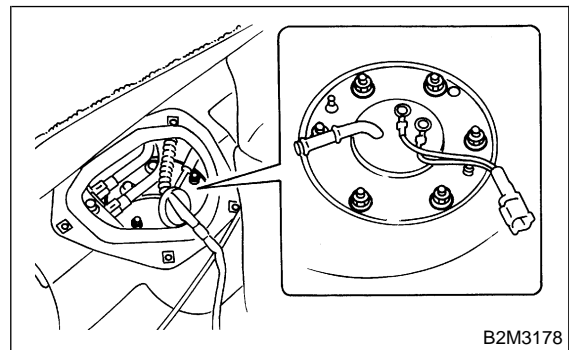


12) Remove fuel sub level sensor.

13) Installation is in the reverse order of removal.

Tightening torque:

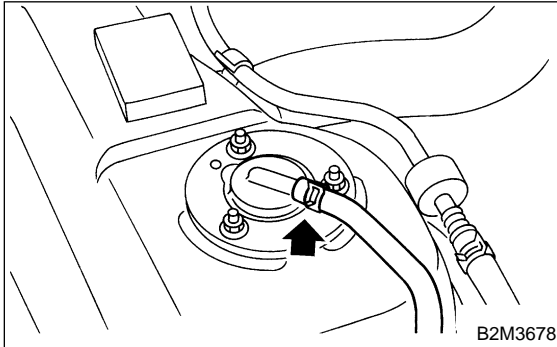
$4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)



7. Fuel Cut Valve

A: REMOVAL AND INSTALLATION

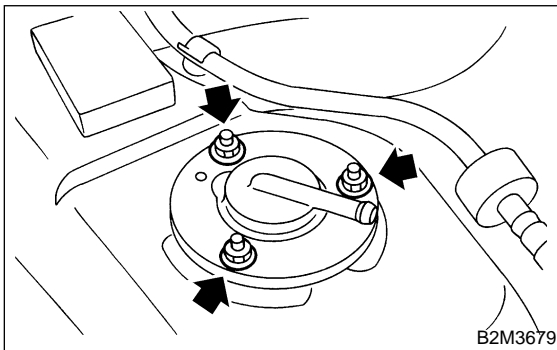
- 1) Remove fuel tank. <Ref. to 2-8 [W1C0].>
- 2) Move clip and disconnect evaporation hose from fuel cut valve.



- 3) Remove bolts which install fuel cut valve.
- 4) Installation is in the reverse order of removal.

Tightening torque:

$4.4 \pm 1.5 \text{ N}\cdot\text{m}$ ($0.45 \pm 0.15 \text{ kg}\cdot\text{m}$, $3.3 \pm 1.1 \text{ ft}\cdot\text{lb}$)

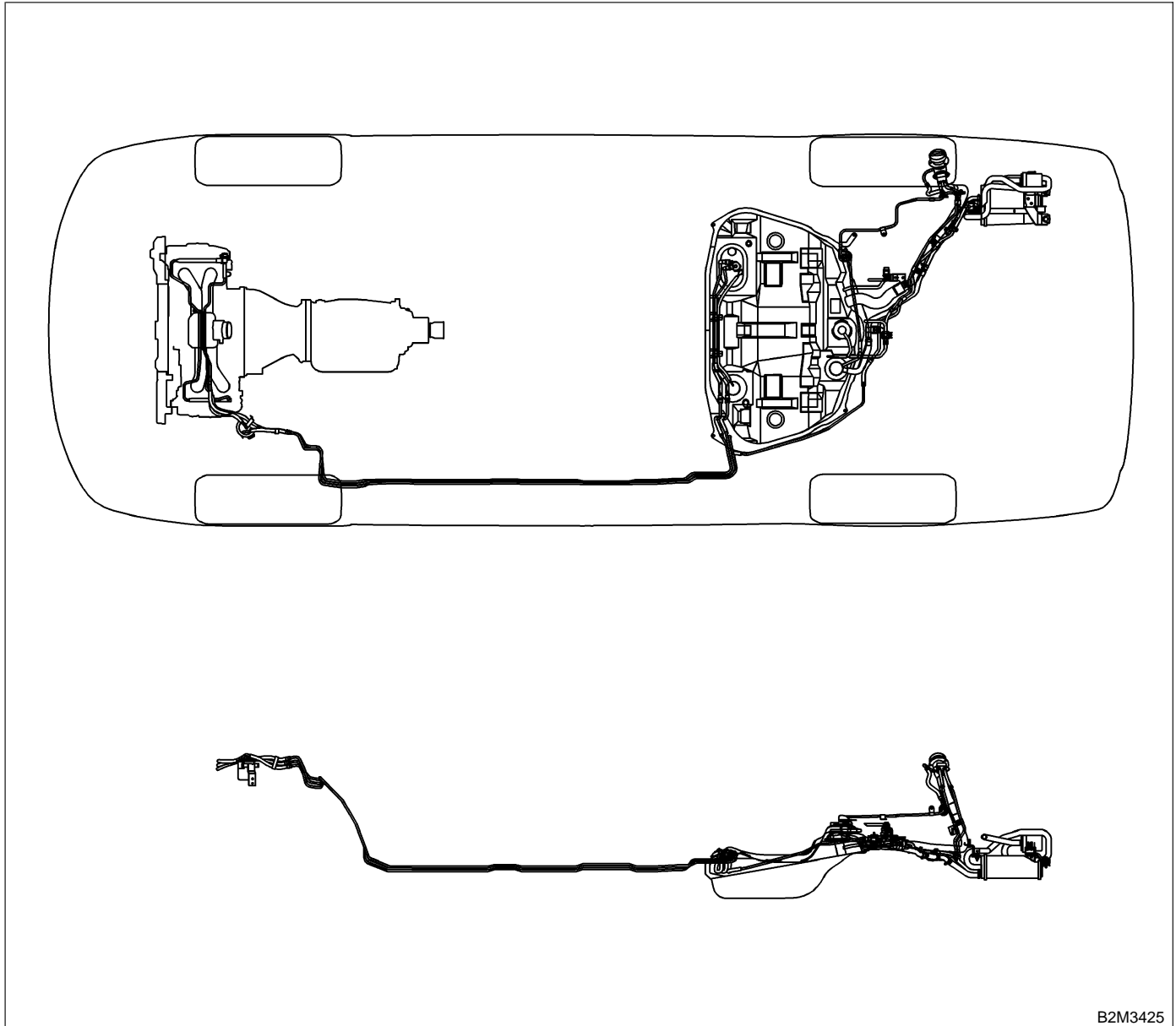


8. Fuel Delivery, Return and Evaporation Lines

A: REMOVAL

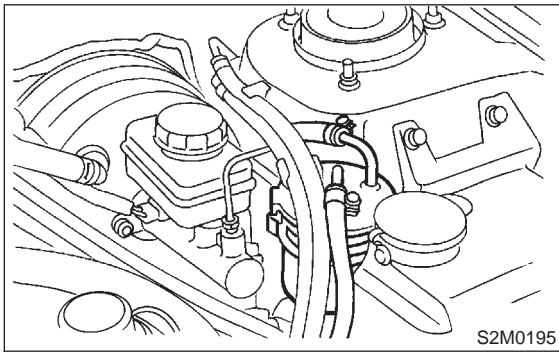
- 1) Set vehicle on the lift.
- 2) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 3) Open fuel filler flap lid and remove fuel filler cap.

- 4) Remove fuel tank. <Ref. to 2-8 [W1C0].>
- 5) Remove fuel filler pipe. <Ref. to 2-8 [W2A0].>
- 6) Remove inner trim, insulator and rear seat. <Ref. to 5-3 [W2A0].>
- 7) Remove fuel delivery pipes and hoses, fuel return pipes and hoses, evaporation pipes and hoses.



B2M3425

8) In engine compartment, detach fuel delivery hoses, return hoses and evaporation hose.

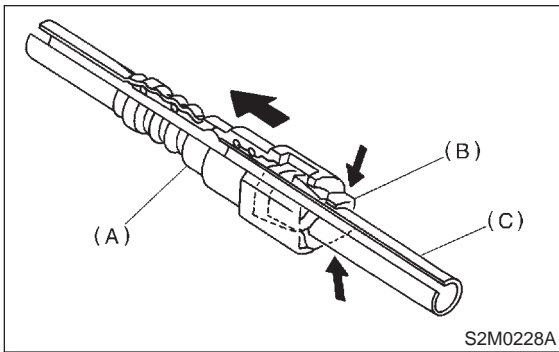


9) Separate quick connector on fuel delivery, return line and evaporation line.

- (1) Clean pipe and connector, if they are covered with dust.
- (2) Hold connector (A) and push retainer (B) down.
- (3) Pull out connector (A) from retainer (B).

CAUTION:

Replace retainer with new ones.



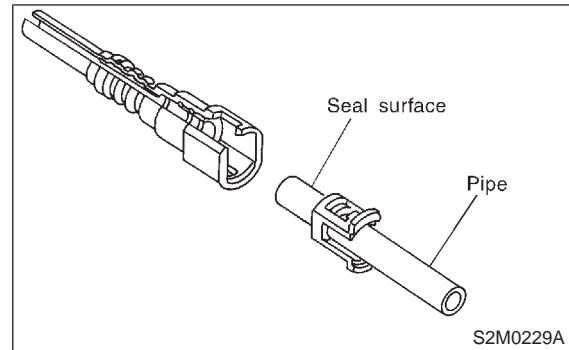
- (A) Connector
- (B) Retainer
- (C) Pipe

B: INSTALLATION

1) Connect quick connector on fuel delivery and return line.

CAUTION:

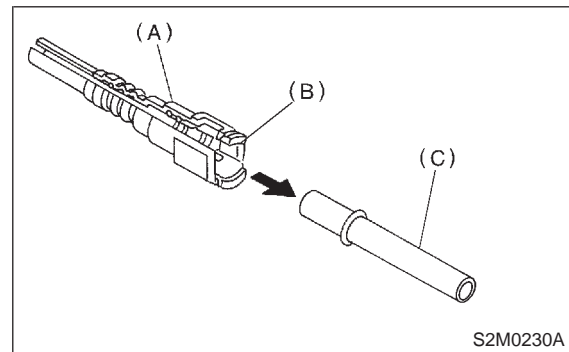
- Always use a new retainer.
- Make sure that the connected portion is not damaged or has dust. If necessary, clean seal surface of pipe.



- (1) Set new retainer (B) to connector (A).
- (2) Push pipe into connector completely.

NOTE:

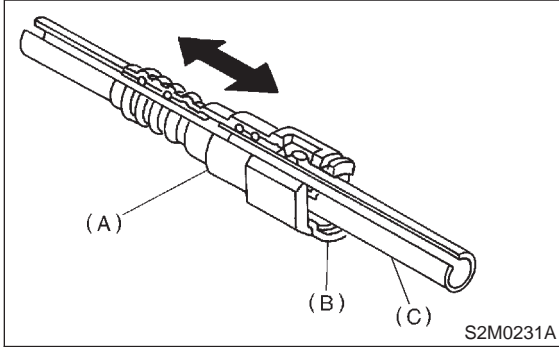
At this time, two clicking sounds are heard.



- (A) Connector
- (B) Retainer
- (C) Pipe

CAUTION:

- Pull the connector to ensure it is connected securely.
- Ensure the two retainer pawls are engaged in their mating positions in the connector.
- Be sure to inspect hoses and their connections for any leakage of fuel.



- (A) Connector
- (B) Retainer
- (C) Pipe

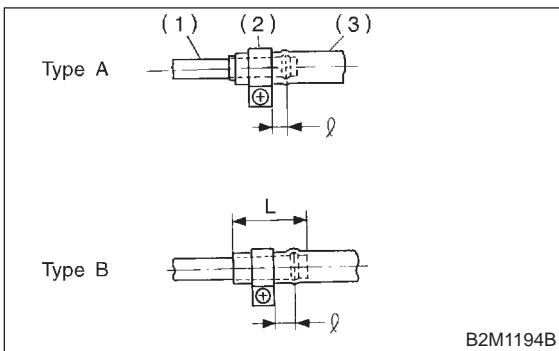
2) Connect fuel delivery hose to pipe with an overlap of 20 to 25 mm (0.79 to 0.98 in).

Type A: When fitting length is specified.

Type B: When fitting length is not specified.

$\ell : 2.5 \pm 1.5 \text{ mm } (0.098 \pm 0.059 \text{ in})$

$L : 22.5 \pm 2.5 \text{ mm } (0.886 \pm 0.098 \text{ in})$



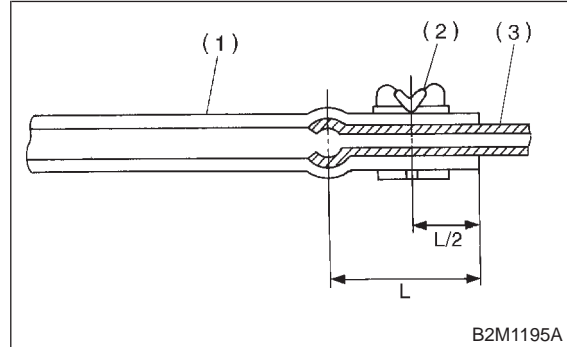
- (1) Fitting
- (2) Clamp
- (3) Hose

3) Connect evaporation hose to pipe by approx. 15 mm (0.59 in) from hose end.

$L = 17.5 \pm 2.5 \text{ mm } (0.689 \pm 0.098 \text{ in})$

CAUTION:

Be sure to inspect hoses and their connections for any leakage of fuel.



- (1) Hose
- (2) Clip
- (3) Pipe

1. Fuel System Trouble in General

Trouble and possible cause		Corrective action
1. Insufficient fuel supply to the injector		
1)	Fuel pump will not operate.	
	○ Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	○ Trouble in electromagnetic or electronic circuit parts.	Replace fuel pump.
2)	Lowering of fuel pump function.	Replace fuel pump.
3)	Clogged dust or water in the fuel filter.	Replace fuel filter, clean or replace fuel tank.
4)	Clogged or bent fuel pipe or hose.	Clean, correct or replace fuel pipe or hose.
5)	Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)	Clogged or bent breather tube or pipe.	Clean, correct or replace air breather tube or pipe.
7)	Damaged diaphragm of pressure regulator.	Replace.
2. Leakage or blow out fuel		
1)	Loosened joints of the fuel pipe.	Retightening.
2)	Cracked fuel pipe, hose and fuel tank.	Replace.
3)	Defective welding part on the fuel tank.	Replace.
4)	Defective drain packing of the fuel tank.	Replace.
5)	Clogged or bent air breather tube or air vent tube.	Clean, correct or replace air breather tube or air vent tube.
3. Gasoline smell inside of compartment		
1)	Loose joints at air breather tube, air vent tube and fuel filler pipe.	Retightening.
2)	Defective packing air tightness on the fuel saucer.	Correct or replace packing.
3)	Cracked fuel separator.	Replace separator.
4)	Inoperative fuel pump modulator or circuit.	Replace.
4. Defective fuel meter indicator		
1)	Defective operation of fuel meter unit.	Replace.
2)	Defective operation of fuel meter.	Replace.
5. Noise		
1)	Large operation noise or vibration of fuel pump.	Replace.

NOTE:

- When the vehicle is left unattended for an extended period of time, water may accumulate in the fuel tank.

To prevent water condensation.

(1) Top off the fuel tank or drain the fuel completely.

(2) Drain water condensation from the fuel filter.

- Refilling the fuel tank.

Refill the fuel tank while there is still some fuel left in the tank.

- Protecting the fuel system against freezing and water condensation.

(1) Cold areas

In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F) throughout the winter

season, use an anti-freeze solution in the cooling system. Refueling will also complement the effect of anti-freeze solution each time the fuel level drops to about one-half. After the winter season, drain water which may have accumulated in the fuel filter and fuel tank in the manner same as that described under Affected areas below.

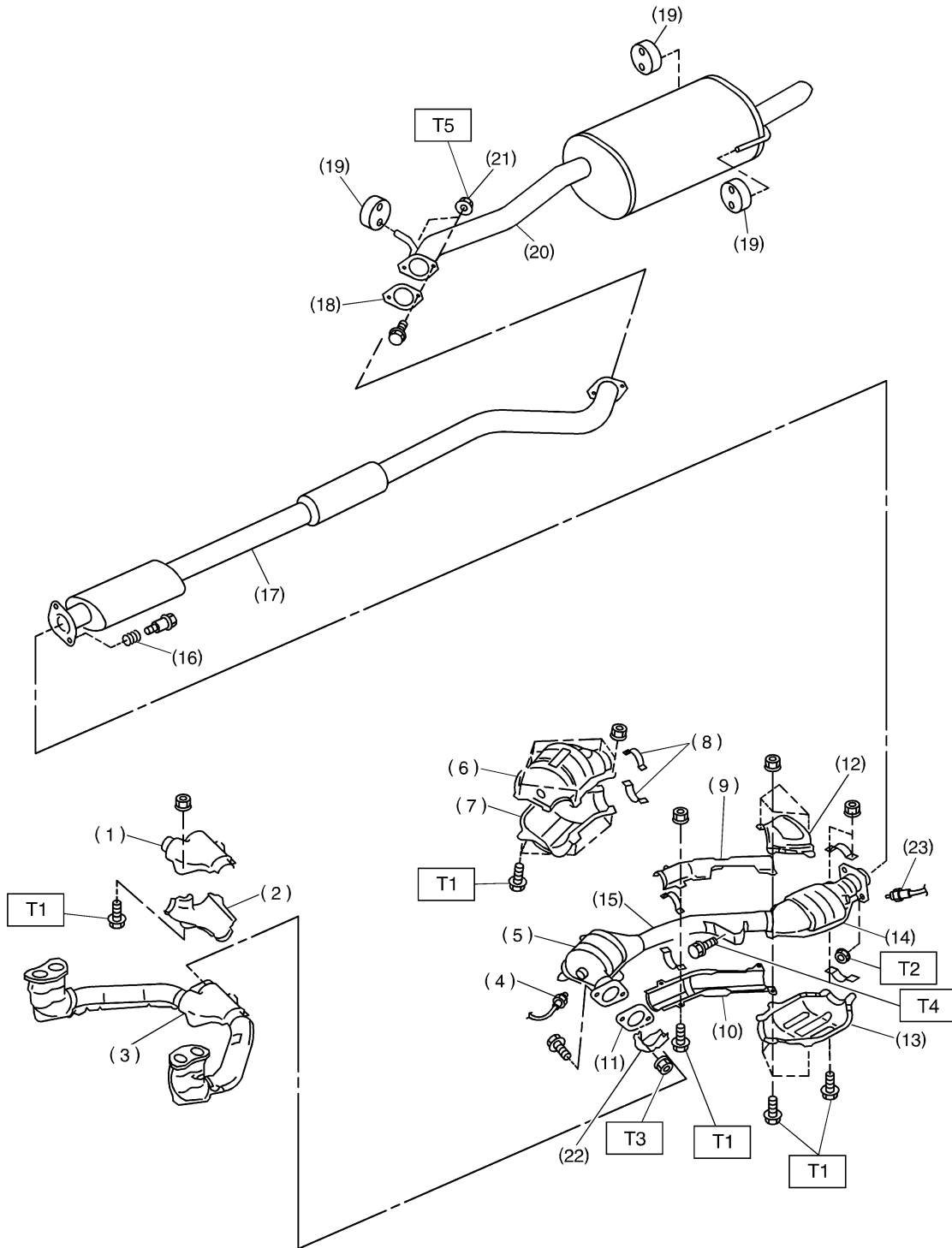
(2) Affected areas

When water condensation is notched in the fuel filter, drain water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.

- Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.

MEMO:

1. Exhaust System



B2M3438A

- (1) Upper front exhaust pipe cover
CTR
- (2) Lower front exhaust pipe cover
CTR
- (3) Front exhaust pipe
- (4) Front oxygen (A/F) sensor
- (5) Front catalytic converter
- (6) Upper front catalytic converter
cover
- (7) Lower front catalytic converter
cover
- (8) Clamp
- (9) Upper center exhaust pipe cover

- (10) Lower center exhaust pipe cover
- (11) Gasket
- (12) Upper rear catalytic converter
cover
- (13) Lower rear catalytic converter
cover
- (14) Rear catalytic converter
- (15) Center exhaust pipe
- (16) Spring
- (17) Rear exhaust pipe
- (18) Gasket
- (19) Cushion rubber
- (20) Muffler

- (21) Self-locking nut
- (22) Protector
- (23) Rear oxygen sensor

Tightening torque: N·m (kg·m, ft·lb)

T1: 13±3 (1.3±0.3, 9.4±2.2)

T2: 18±5 (1.8±0.5, 13.0±3.6)

T3: 30±5 (3.1±0.5, 22.4±3.6)

T4: 35±5 (3.6±0.5, 26.0±3.6)

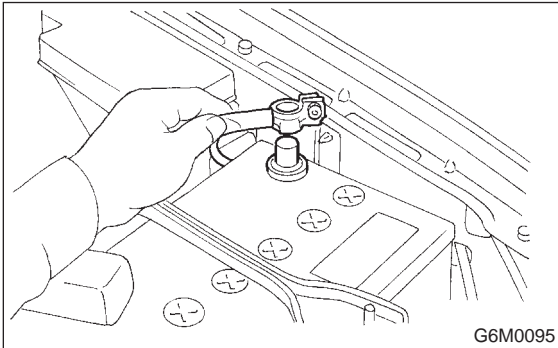
T5: 48±5 (4.9±0.5, 35.4±3.6)

1. Front and Center Exhaust Pipe Assembly

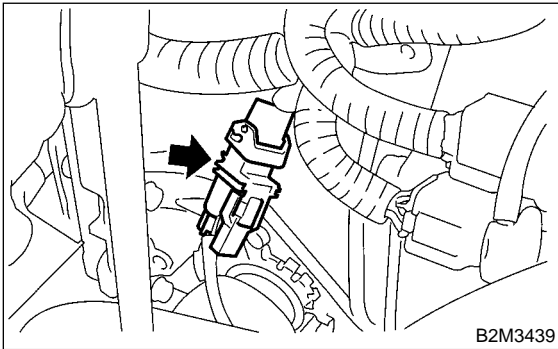
1. Front and Center Exhaust Pipe Assembly

A: REMOVAL

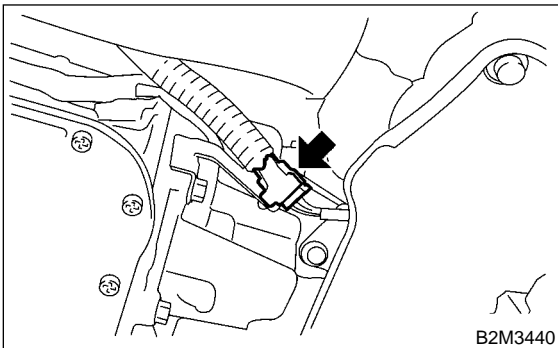
- 1) Disconnect battery ground cable.



- 2) Disconnect front oxygen (A/F) sensor connector.



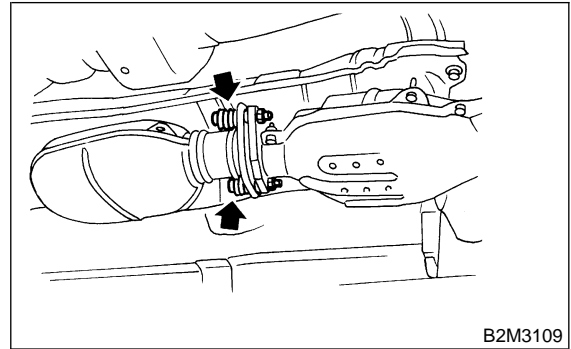
- 3) Lift-up the vehicle.
4) Disconnect rear oxygen sensor connector.



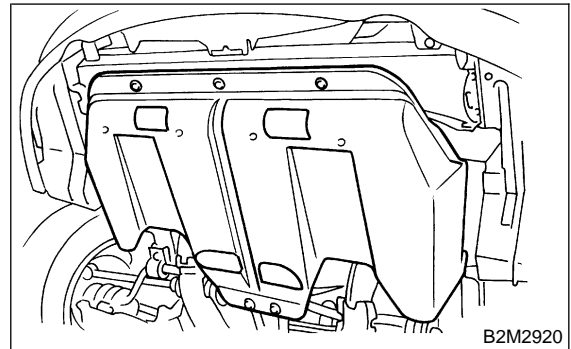
- 5) Separate front and center exhaust pipe assembly from rear exhaust pipe.

WARNING:

Be careful, exhaust pipe is hot.



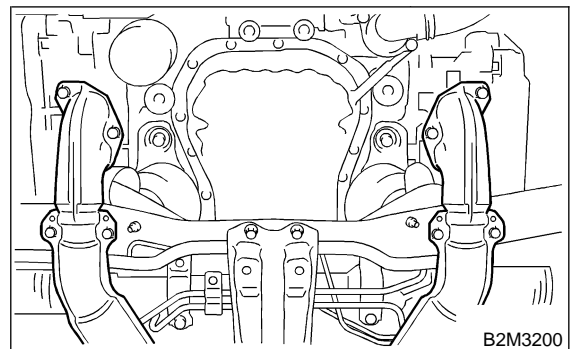
- 6) Remove under cover.



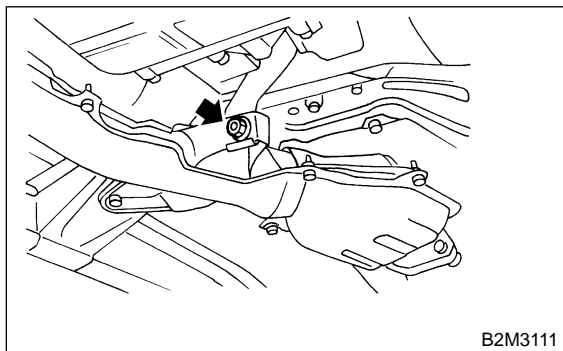
- 7) Remove bolts which hold front exhaust pipe onto cylinder heads.

CAUTION:

Be careful not to pull down front and center exhaust pipe assembly.



8) Remove bolt which installs front and center exhaust pipe assembly to hanger bracket.

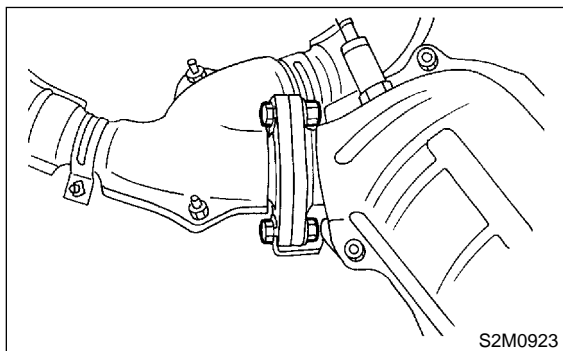


9) Remove front and center exhaust pipe assembly from the vehicle.

CAUTION:

- Be careful not to let front and center exhaust pipe assembly fall off when removing as it is quite heavy.
- After removing front and center exhaust assembly, do not apply excessive pulling force on rear exhaust pipe.

10) Separate front exhaust pipe from center exhaust pipe.

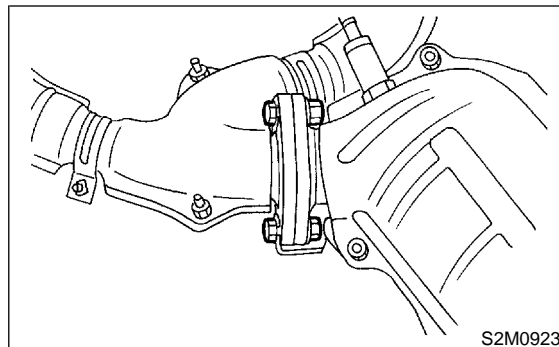


B: INSTALLATION

1) Install front exhaust pipe to center exhaust pipe.

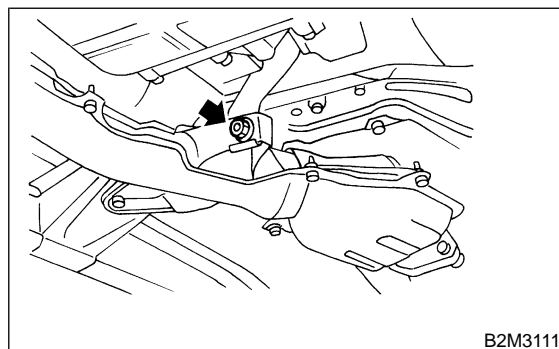
CAUTION:
Replace gaskets with new ones.

Tightening torque:
 $30 \pm 5 \text{ N-m}$ ($3.1 \pm 0.5 \text{ kg-m}$, $22.4 \pm 3.6 \text{ ft-lb}$)



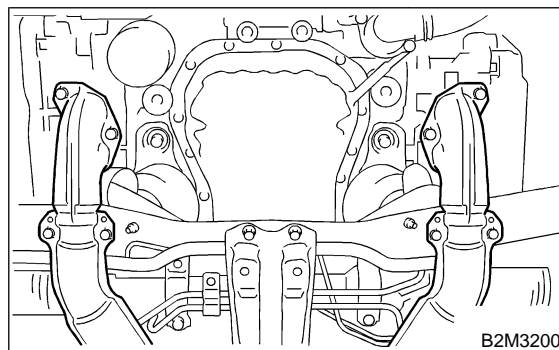
2) Install front and center exhaust pipe assembly to the vehicle.

3) Temporarily tighten bolt which installs front and center exhaust pipe assembly to hanger bracket.



4) Tighten bolts which hold front exhaust pipe onto cylinder heads.

Tightening torque:
 $30 \pm 5 \text{ N-m}$ ($3.1 \pm 0.5 \text{ kg-m}$, $22.4 \pm 3.6 \text{ ft-lb}$)



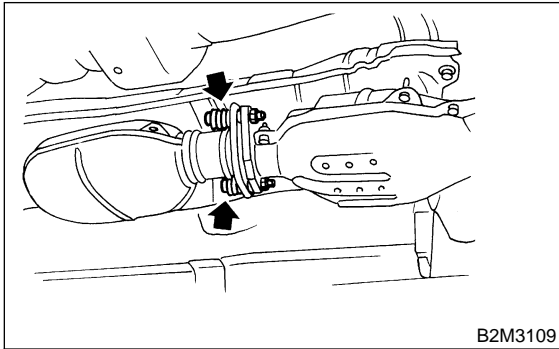
5) Install under cover.

1. Front and Center Exhaust Pipe Assembly

6) Tighten bolts which install front and center exhaust pipe assembly to rear exhaust pipe.

Tightening torque:

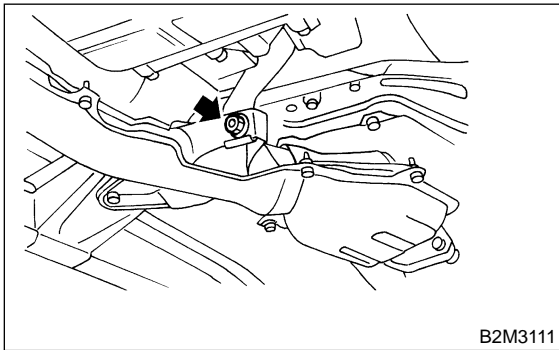
18±5 N·m (1.8±0.5 kg·m, 13.0±3.6 ft·lb)



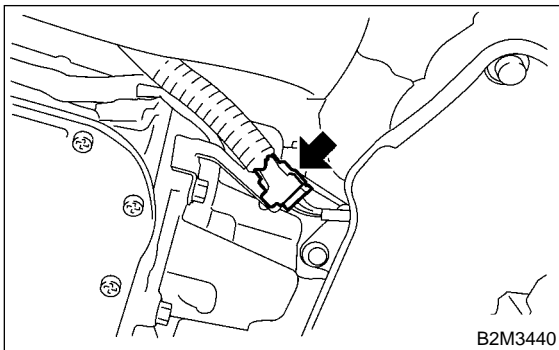
7) Tighten bolt which holds front and center exhaust pipe assembly to hanger bracket.

Tightening torque:

35±5 N·m (3.6±0.5 kg·m, 26.0±3.6 ft·lb)

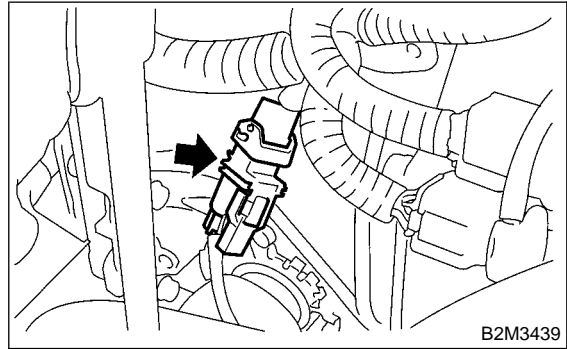


8) Connect rear oxygen sensor connector.

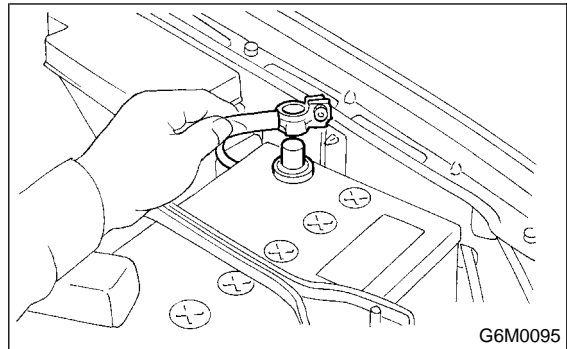


9) Lower the vehicle.

10) Connect front oxygen (A/F) sensor connector.



11) Connect battery ground cable.



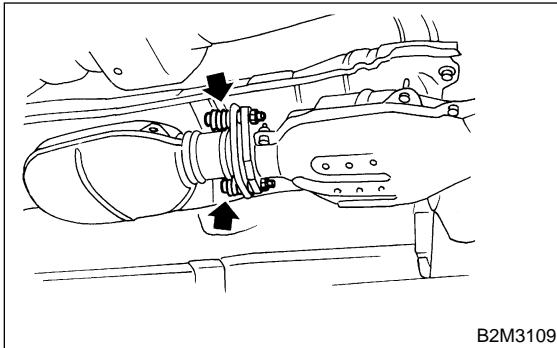
2. Rear Exhaust Pipe

A: REMOVAL

1) Separate rear exhaust pipe from center exhaust pipe.

CAUTION:

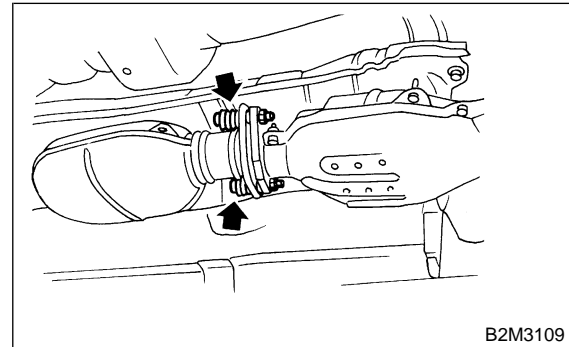
Be careful, exhaust pipe is hot.



2) Install rear exhaust pipe to center exhaust pipe.

Tightening torque:

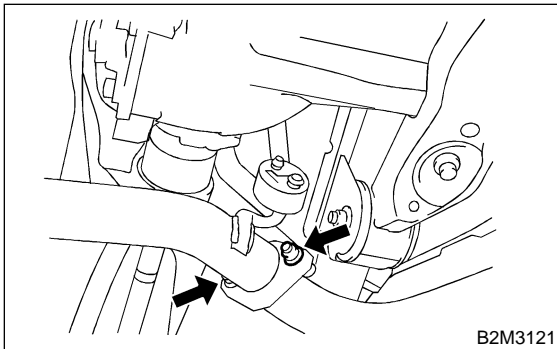
$18 \pm 5 \text{ N}\cdot\text{m}$ ($1.8 \pm 0.5 \text{ kg}\cdot\text{m}$, $13.0 \pm 3.6 \text{ ft}\cdot\text{lb}$)



2) Separate rear exhaust pipe from muffler.

CAUTION:

Be careful not to pull down rear exhaust pipe.



3) Remove rear exhaust pipe.

B: INSTALLATION

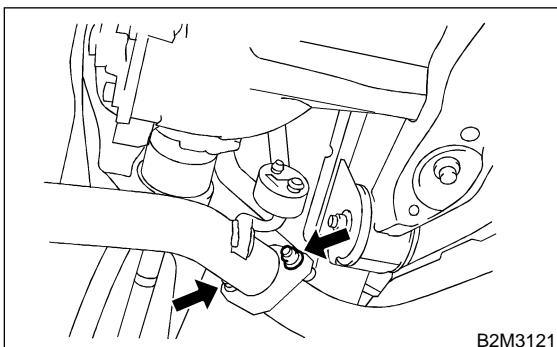
CAUTION:

Replace gaskets with new ones.

1) Install rear exhaust pipe to muffler.

Tightening torque:

$48 \pm 5 \text{ N}\cdot\text{m}$ ($4.9 \pm 0.5 \text{ kg}\cdot\text{m}$, $35.4 \pm 3.6 \text{ ft}\cdot\text{lb}$)



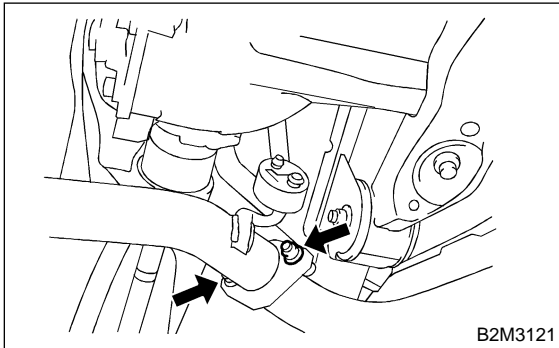
3. Muffler

A: REMOVAL AND INSTALLATION

1) Separate muffler from rear exhaust pipe.

CAUTION:

Be careful, exhaust pipe is hot.



2) Remove left and right rubber cushions.

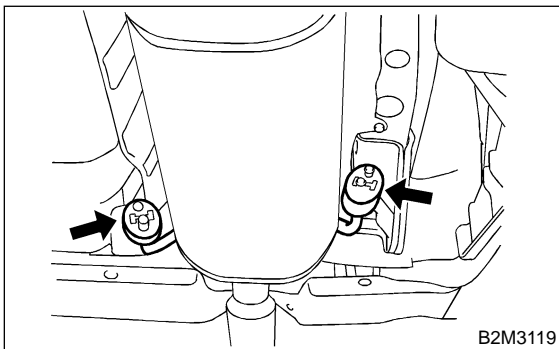
CAUTION:

Be careful not to drop the muffler during removal.

NOTE:

To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

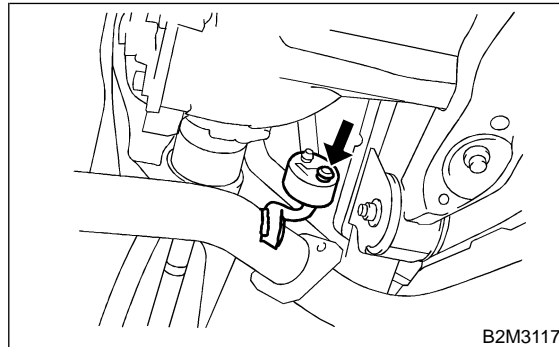


3) Remove front rubber cushion, and detach muffler assembly.

NOTE:

To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushion in advance.

SUBARU CRC (Part No. 004301003)



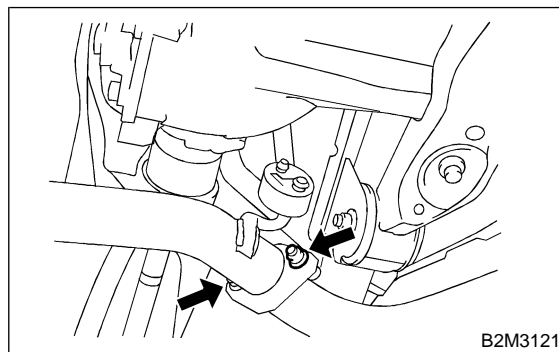
4) Installation is in the reverse order of removal.

CAUTION:

Replace gasket with a new one.

Tightening torque:

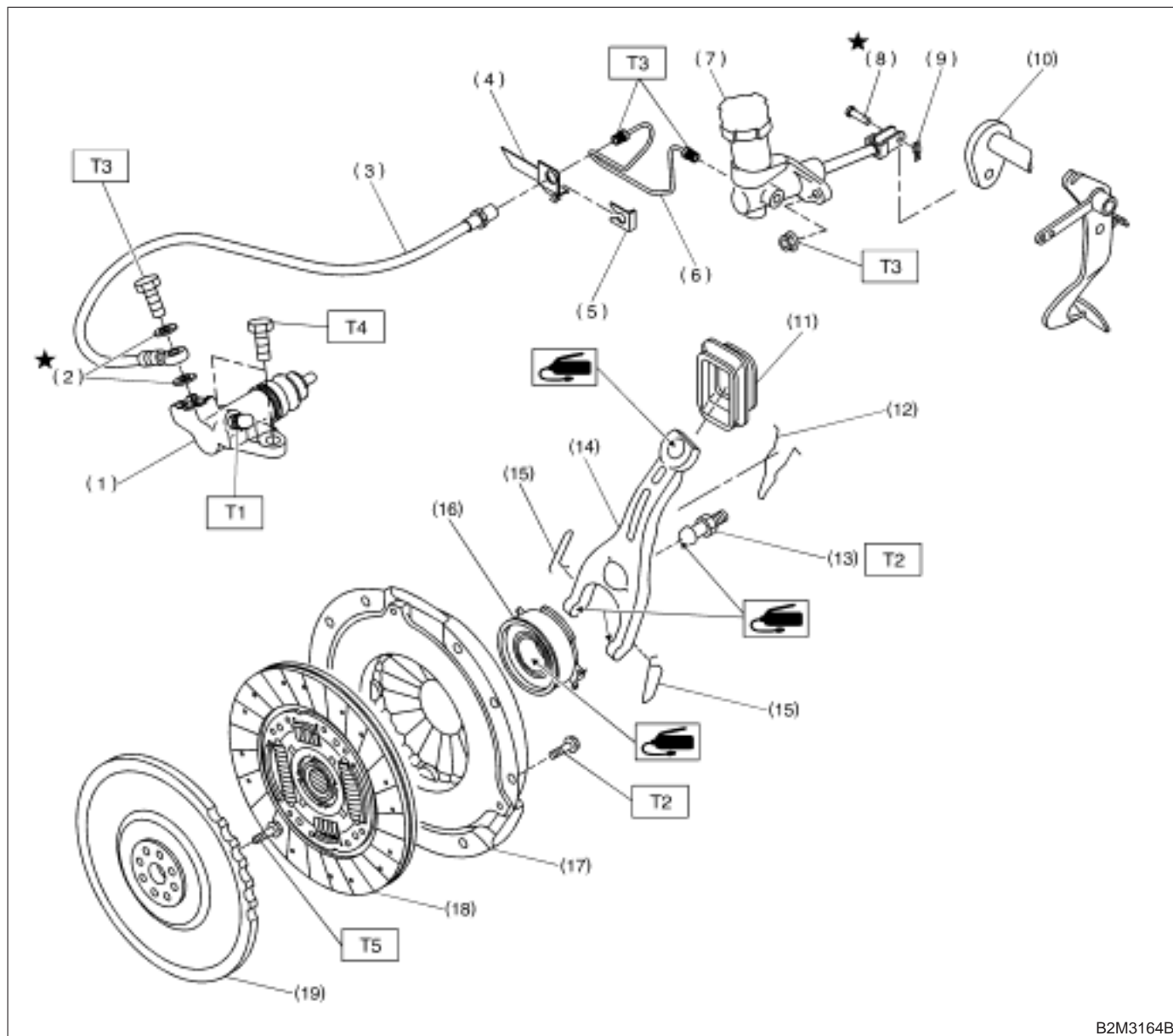
48 ± 5 N·m (4.9 ± 0.5 kg·m, 35.4 ± 3.6 ft·lb)



1. Clutch System

Clutch cover	Diaphragm set load kg (lb)	580 (1,279)
Clutch disc	Facing material	Woven
	O.D. × I.D. × thickness mm (in)	225 × 150 × 3.5 (8.86 × 5.91 × 0.138)
	Spline O.D. (No. of teeth) mm (in)	25.2 (0.992) (24)
	Depth of rivet head mm (in)	Limit of sinking 0.3 (0.012)
	Limit for runout mm (in)	
Clutch release lever ratio		1.6
Release bearing		Grease-packed self-aligning
Release lever	Stroke mm (in)	12 — 13.6 (0.472 — 0.535)
Clutch pedal	Full stroke mm (in)	130 — 135 (5.12 — 5.31)

1. Clutch System



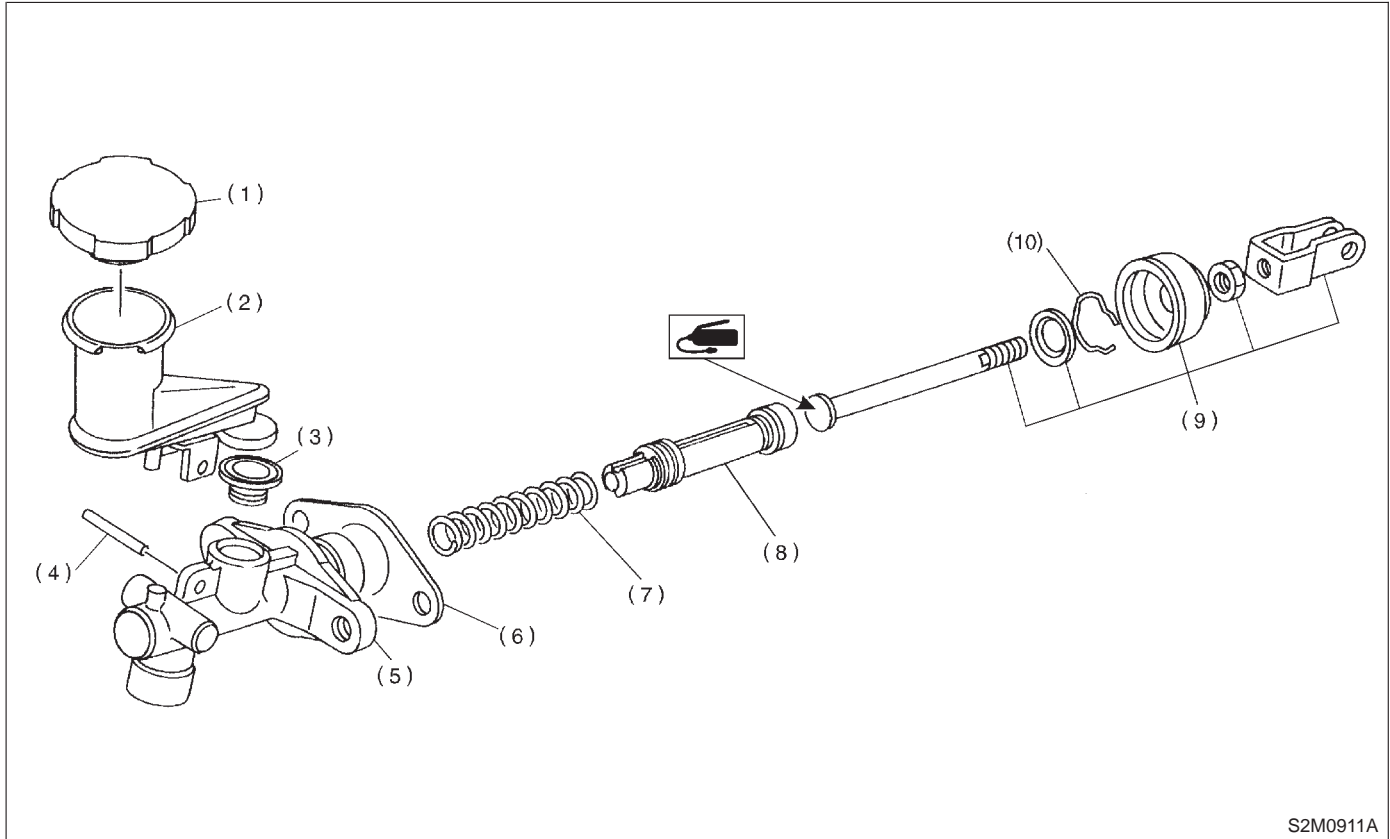
B2M3164B

- | | |
|--------------------------|-----------------------------------|
| (1) Operating cylinder | (10) Lever |
| (2) Washer | (11) Clutch release lever sealing |
| (3) Clutch hose | (12) Retainer spring |
| (4) Bracket | (13) Pivot |
| (5) Clip | (14) Release lever |
| (6) Pipe | (15) Clip |
| (7) Master cylinder ASSY | (16) Release bearing |
| (8) Clevis pin | (17) Clutch cover |
| (9) Snap pin | (18) Clutch disc |

- (19) Flywheel

Tightening torque: N-m (kg-m, ft-lb)
T1: 8±2 (0.8±0.2, 5.8±1.4)
T2: 15.7±1.5 (1.6±0.15, 11.6±1.1)
T3: 18±3 (1.8±0.3, 13.0±2.2)
T4: 37±3 (3.8±0.3, 27.5±2.2)
T5: 72±3 (7.3±0.3, 52.8±2.2)

2. Master Cylinder and Reservoir Tank



S2M0911A

- (1) Reservoir cap
- (2) Reservoir tank
- (3) Oil seal
- (4) Straight pin

- (5) Master cylinder
- (6) Seat
- (7) Return spring
- (8) Piston

- (9) Push rod
- (10) Piston stop ring

1. General

A: PRECAUTION

When servicing clutch system, pay attention to the following items.

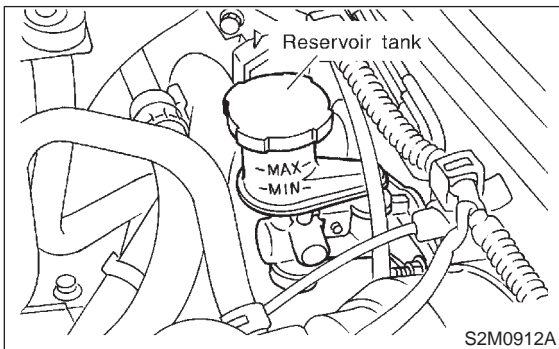
1) Check fluid level using a scale on outside of reservoir tank. If the level is below "MIN", add brake fluid to bring it up to "MAX".

Recommended brake fluid:

FMVSS No. 116, fresh DOT3 or DOT4 brake fluid

CAUTION:

- Avoid mixing different brands of brake fluid to prevent degradation of the fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.
- Use fresh DOT3 or DOT4 brake fluid when refilling fluid.



- 2) Make sure that brake fluid does not leak from master cylinder, operating cylinder and piping.
- 3) Apply grease sufficiently to the release lever pinion.
- 4) Check for proper clutch disengagement and clutch pedal return ability.

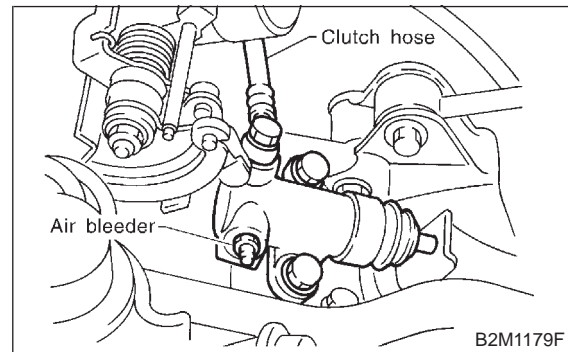
2. On-car Service

A: ADJUSTMENT

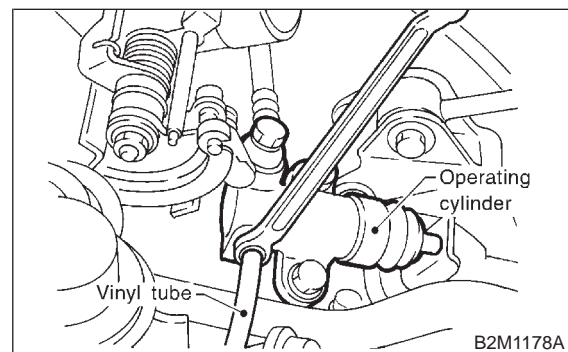
NOTE:

Bleed air from oil line with the help of a co-worker.

- 1) Remove air chamber.
- 2) Fit one end of a vinyl tube into the air bleeder of operating cylinder and put the other end into a brake fluid container.



- 3) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the fluid. Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.



- 4) Repeat these steps until there are no more air bubbles in the vinyl tube.

CAUTION:

Cover bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

1. General

A: PRECAUTION

When servicing clutch system, pay attention to the following items.

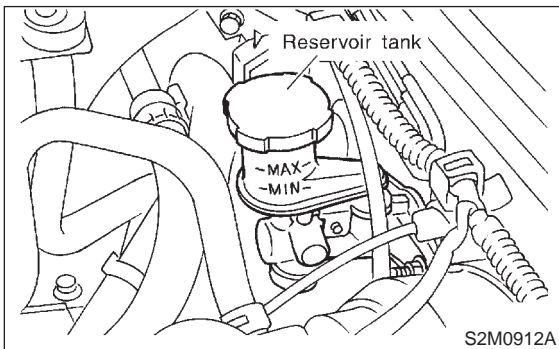
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Recommended brake fluid:

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- 2) Make sure that brake fluid does not leak from master cylinder, operating cylinder and piping.
- 3) Apply grease sufficiently to the release lever pinion.
- 4) Check for proper clutch disengagement and clutch pedal return ability.

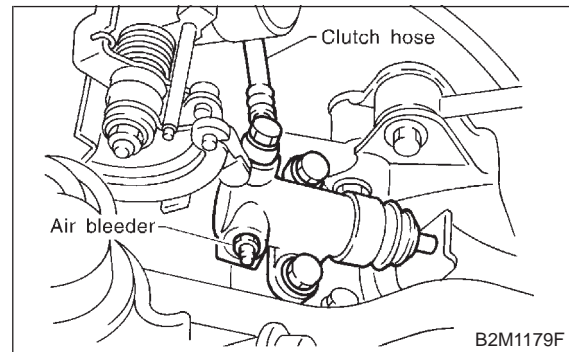
2. On-car Service

A: ADJUSTMENT

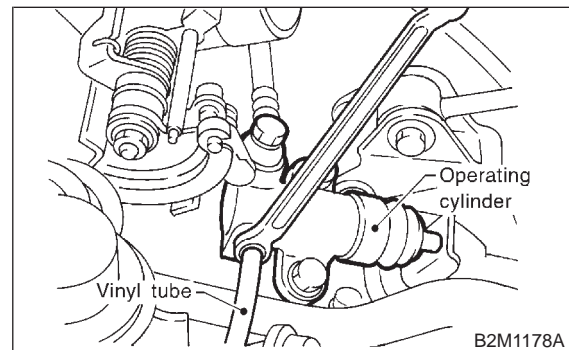
NOTE:

Bleed air from oil line with the help of a co-worker.

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- 3) Slowly depress the clutch pedal and keep it depressed. Then open the air bleeder to discharge air together with the fluid. Release the air bleeder for 1 or 2 seconds. Next, with the bleeder closed, slowly release the clutch pedal.



- 4) Repeat these steps until there are no more air bubbles in the vinyl tube.

CAUTION:

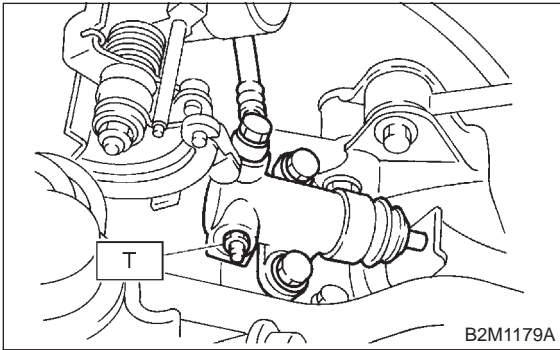
Cover bleeder with waste cloth when loosening it, to prevent brake fluid from being splashed over surrounding parts.

3. Release Bearing and Lever

5) Tighten air bleeder.

Tightening torque:

T: 8 ± 2 N·m (0.8 ± 0.2 kg·m, 5.8 ± 1.4 ft·lb)



6) After depressing the clutch pedal, make sure that there are no leaks evident in the entire system.
7) After bleeding air from system, ensure that clutch operates properly.

3. Release Bearing and Lever**A: REMOVAL**

1) Remove transmission assembly from vehicle body.

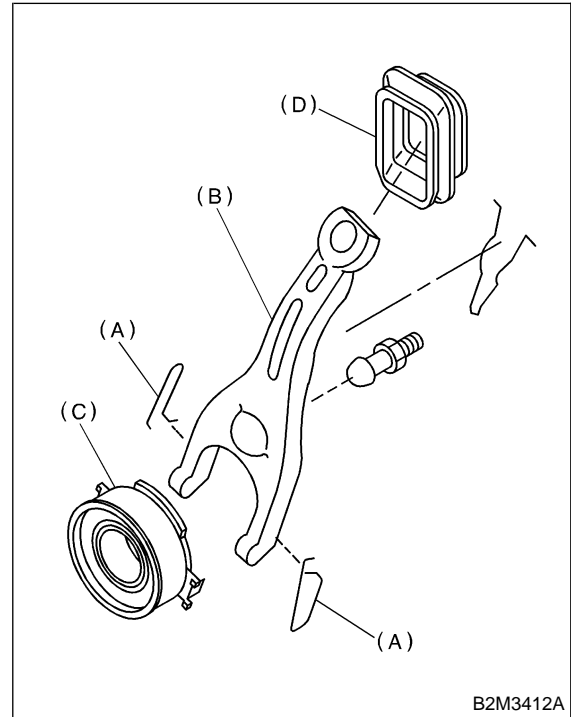
<Ref. to 2-11 [W2A0].>

2) Remove the two clips from clutch release lever and remove release bearing.

CAUTION:

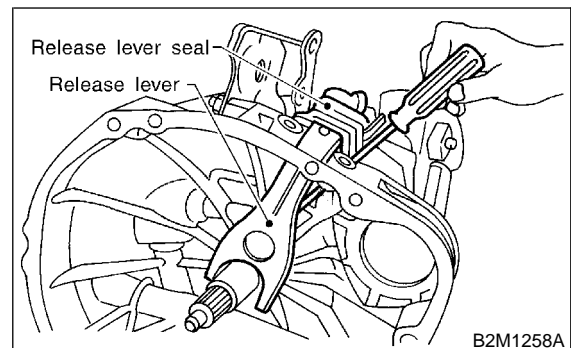
Be careful not to deform clips.

3) Remove release lever seal.



- (A) Clip
- (B) Clutch release lever
- (C) Release bearing
- (D) Release lever seal

4) Remove release lever retainer spring from release lever pivot with a screwdriver by accessing it through clutch housing release lever hole. Then remove release lever.



B: INSPECTION

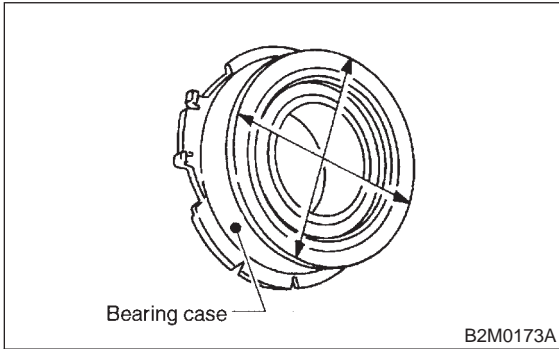
1. RELEASE BEARING

CAUTION:

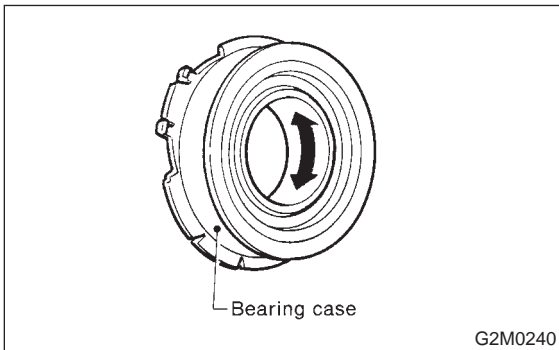
Since this bearing is grease sealed and is of a non-lubrication type, do not wash with gasoline or any solvent when servicing the clutch.

1) Check the bearing for smooth movement by applying force in the radial direction.

Radial direction stroke:
1.4 mm (0.055 in)



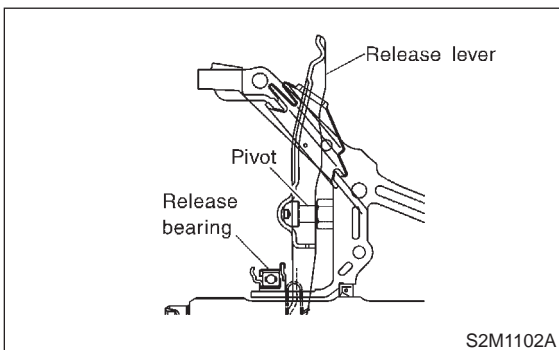
2) Check the bearing for smooth rotation by applying pressure in the thrust direction.



3) Check wear and damage of bearing case surface contacting with lever.

2. RELEASE LEVER

1) Check lever pivot portion and the point of contact with release bearing case for wear.



C: INSTALLATION

CAUTION:

Before or during assembling, lubricate the following points with a light coat of grease.

- Contact surface of lever and pivot
- Contact surface of lever and bearing
- Transmission main shaft spline (Use grease containing molybdenum disulphide.)
- Contact surface of lever and operating cylinder

1) While pushing release lever to pivot and twisting it to both sides, fit retainer spring onto the constricted portion of pivot.

NOTE:

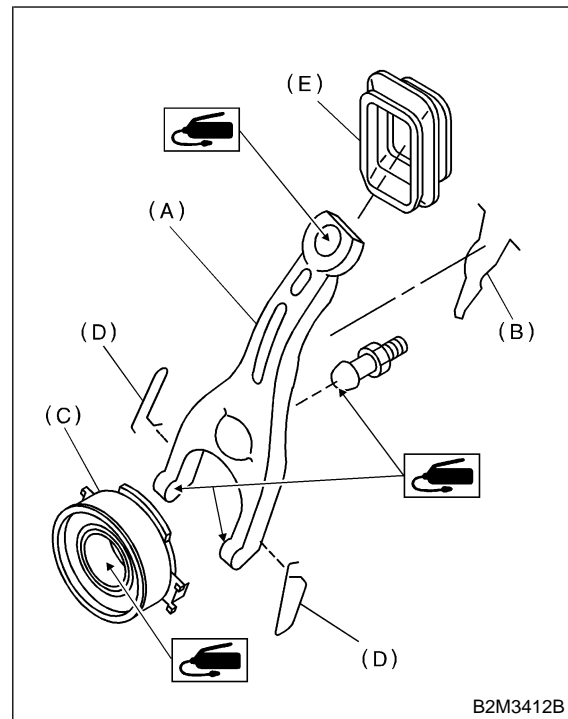
- Apply grease (SUNLIGHT 2: P/N 003602010) to contact point of release lever and operating cylinder.
- Confirm that retainer spring is securely fitted by observing it through the main case hole.

2) Install release bearing and fasten it with two clips.

3) Install release lever seal.

Tightening torque:

T: 37±3 N·m (3.8±0.3 kg·m, 27.5±2.2 ft·lb)



- (A) Release lever
- (B) Retainer spring
- (C) Release bearing
- (D) Clip
- (E) Release lever seal

4. Clutch Disc and Cover

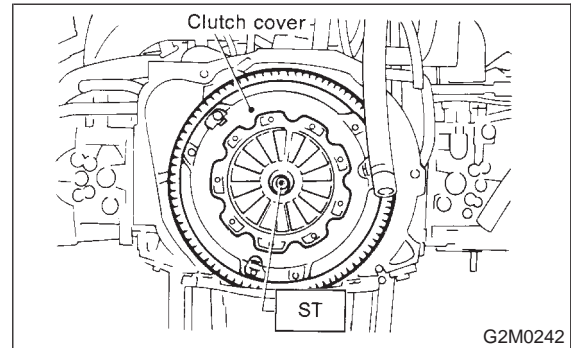
4) After remounting engine and transmission on body.
<Ref. to 2-11 [W2B0].>

4. Clutch Disc and Cover

A: REMOVAL

1) Install ST on flywheel.

ST 498497100 CRANKSHAFT STOPPER

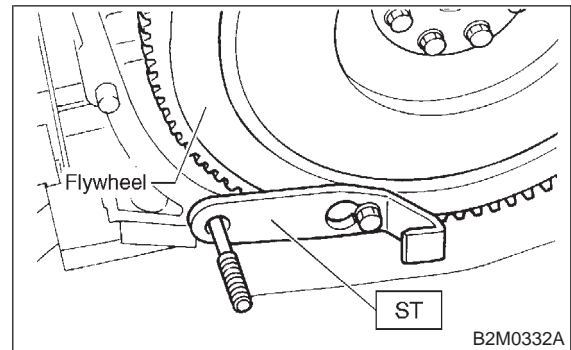


2) Remove clutch cover and clutch disc.

CAUTION:

- Take care not to allow oil on the clutch disc facing.
- Do not disassemble either clutch cover or clutch disc.

3) Remove flywheel.



B: INSPECTION

1. CLUTCH DISC

1) Facing wear

Measure the depth of rivet head from the surface of facing. Replace if facings are worn locally or worn down to less than the specified value.

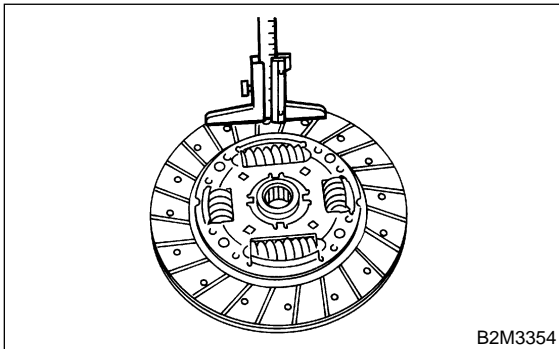
Depth of rivet head:

Limit of sinking

0.3 mm (0.012 in)

CAUTION:

Do not wash clutch disc with any cleaning fluid.

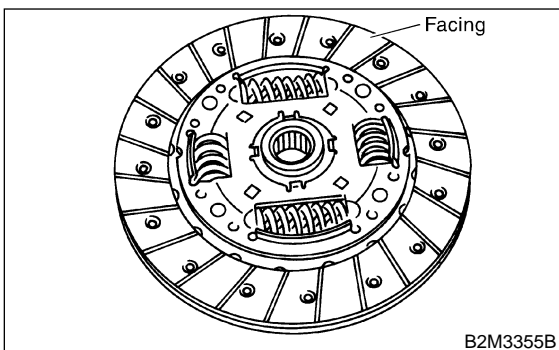


2) Hardened facing

Correct by using emery paper or replace.

3) Oil soakage on facing

Replace clutch disc and inspect transmission front oil seal, transmission case mating surface, engine rear oil seal and other points for oil leakage.



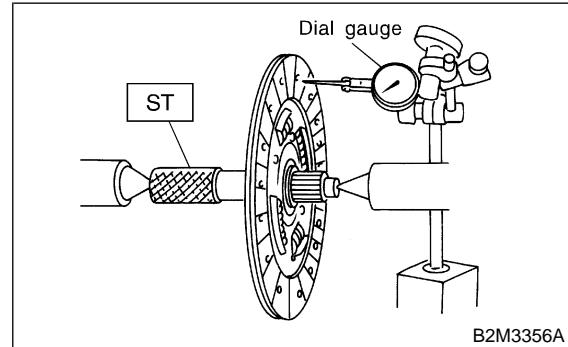
4) Deflection on facing

If deflection exceeds the specified value at the outer circumference of facing, repair or replace.

ST 499747100 CLUTCH DISC GUIDE

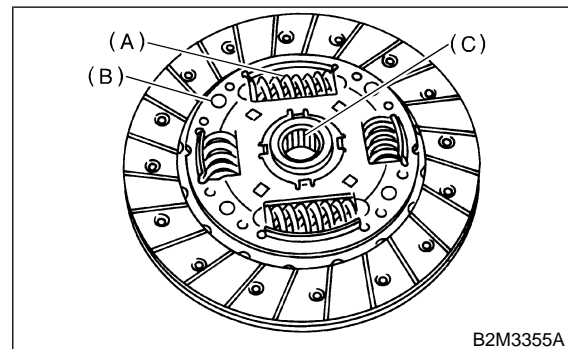
Limit for deflection:

1.0 mm (0.039 in) at R = 107 mm (4.21 in)



5) Worn spline, loose rivets and torsion spring failure

Replace defective parts.



- (A) Torsion spring
- (B) Rivet
- (C) Spline

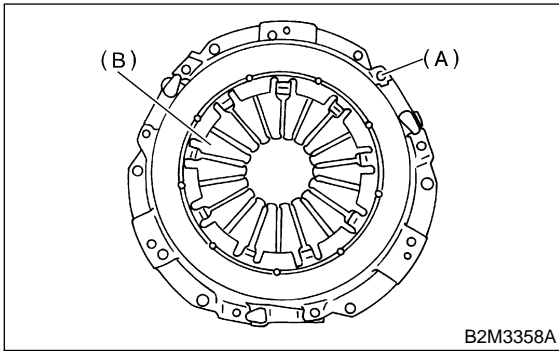
2. CLUTCH COVER

NOTE:

Visually check for the following items without disassembling, and replace or repair if defective.

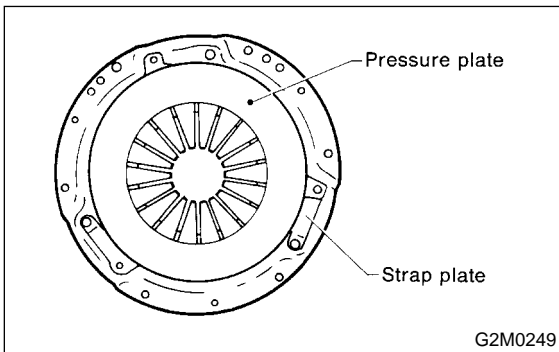
4. Clutch Disc and Cover

- 1) Loose thrust rivet.
- 2) Damaged or worn bearing contact area at center of diaphragm spring.



- (A) Thrust rivet
- (B) Diaphragm spring

- 3) Damaged or worn disc contact surface of pressure plate.
- 4) Loose strap plate setting bolt.
- 5) Worn diaphragm sliding surface.

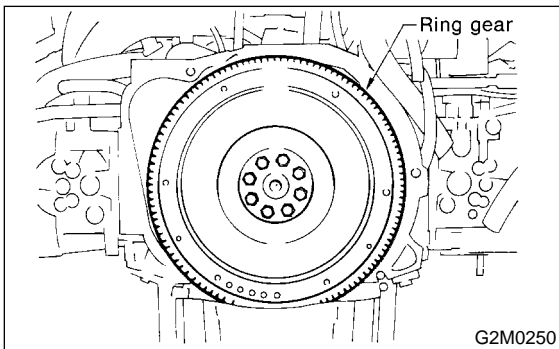


3. FLYWHEEL

CAUTION:

Since this bearing is grease sealed and is of a non-lubrication type, do not wash with gasoline or any solvent.

- 1) Damage of facing and ring gear
If defective, replace flywheel.



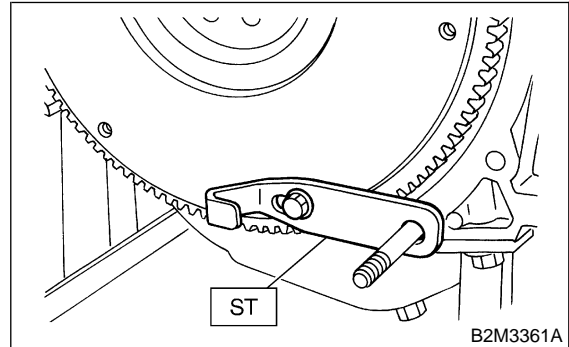
- 2) Smoothness of rotation
Rotate ball bearing applying pressure in thrust direction.

- 3) If noise or excessive play is noted, replace flywheel.

C: INSTALLATION

- 1) Install flywheel and ST.

ST 498497100 CRANKSHAFT STOPPER



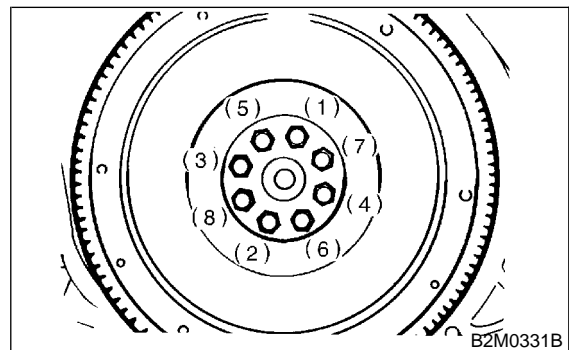
- 2) Tighten the flywheel attaching bolts to the specified torque.

NOTE:

Tighten flywheel installing bolts gradually. Each bolt should be tightened to the specified torque in a crisscross fashion.

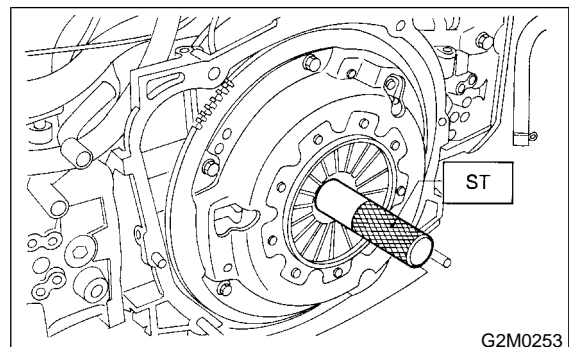
Tightening torque:

72±3 N·m (7.3±0.3 kg·m, 52.8±2.2 ft·lb)



- 3) Insert ST into the clutch disc and install them on the flywheel by inserting the ST end into the pilot bearing.

ST 499747100 CLUTCH DISC GUIDE



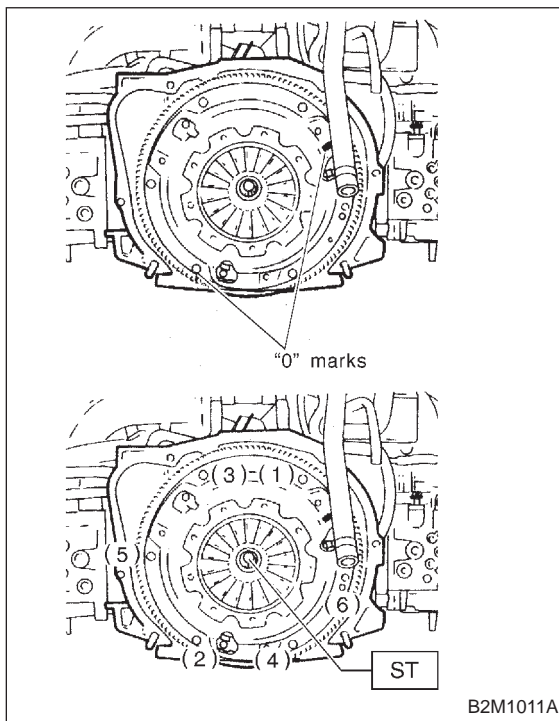
4) Install clutch cover on flywheel and tighten bolts to the specified torque.

NOTE:

- When installing the clutch cover on the flywheel, position the clutch cover so that there is a gap of 120° or more between “0” marks on the flywheel and clutch cover. (“0” marks indicate the directions of residual unbalance.)
- Note the front and rear of the clutch disc when installing.
- Temporarily tighten bolts by hand. Each bolt should be tightened to the specified torque in a crisscross fashion.

Tightening torque:

15.7±1.5 N·m (1.6±0.15 kg·m, 11.6±1.1 ft·lb)



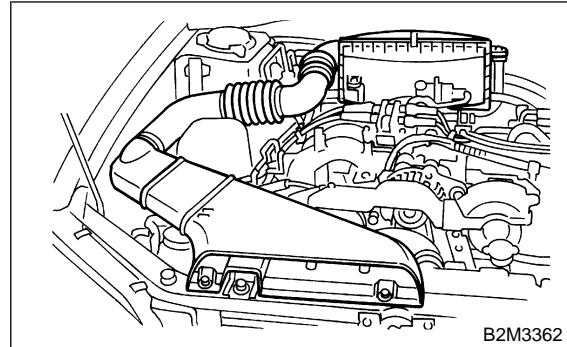
B2M1011A

5) Remove ST.
ST 499747100 CLUTCH DISC GUIDE

5. Operating Cylinder

A: REMOVAL AND INSTALLATION

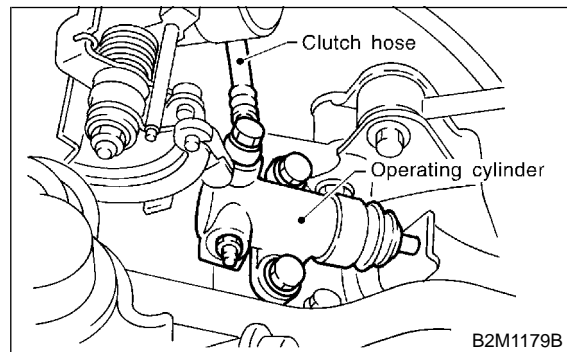
1) Remove air chamber.



B2M3362

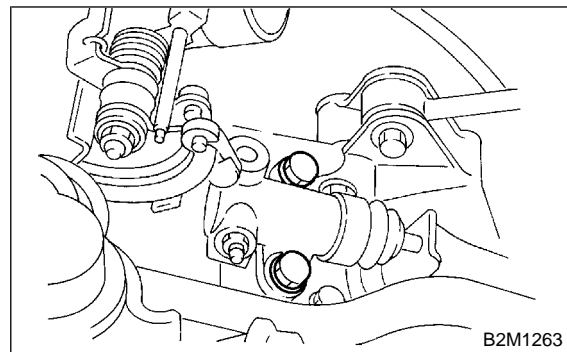
2) Remove clutch hose from operating cylinder.

CAUTION:
Cover hose joint to prevent clutch fluid from flowing out.



B2M1179B

3) Remove operating cylinder from transmission.



B2M1263

6. Master Cylinder and Reservoir Tank

4) Installation is in the reverse order of removal.

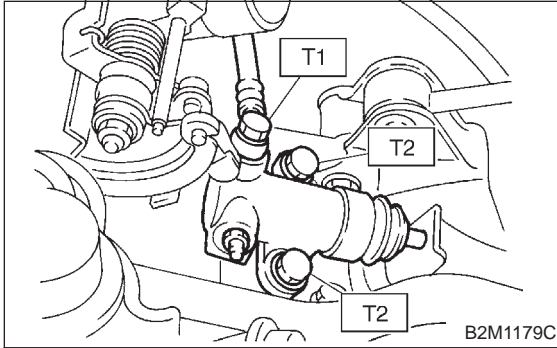
NOTE:

Before installing operating cylinder, apply grease (SUNLIGHT 2: P/N 003602010) to contact point of release lever and operating cylinder.

Tightening torque:

T1: 18 ± 3 N·m (1.8 ± 0.3 kg·m, 13.0 ± 2.2 ft·lb)

T2: 37 ± 3 N·m (3.8 ± 0.3 kg·m, 27.5 ± 2.2 ft·lb)

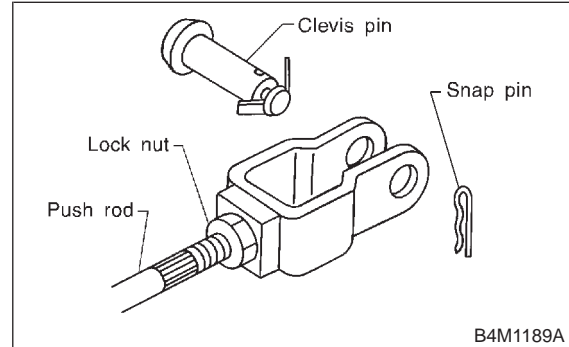


5) After bleeding air from operating cylinder, ensure that clutch operates properly.
<Ref. to 2-10 [W2A0].>

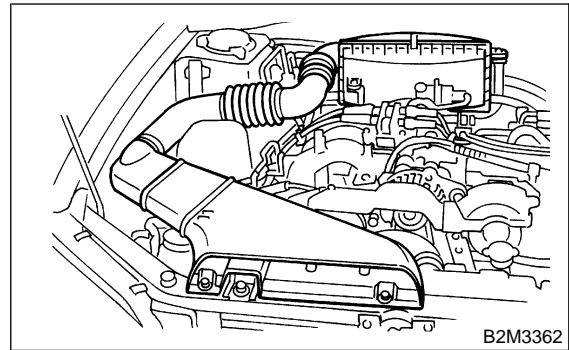
6. Master Cylinder and Reservoir Tank

A: REMOVAL

- 1) Thoroughly drain brake fluid from reservoir tank.
- 2) Remove snap pin, clevis pin and separate push rod of master cylinder from clutch pedal.



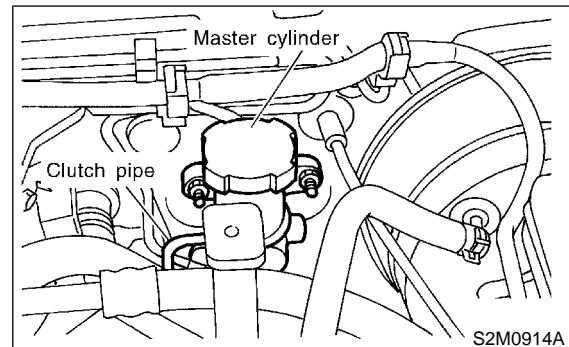
- 3) Remove air cleaner case and air intake duct.
<Ref. to 2-7 [W1A0].>



- 4) Remove clutch pipe from master cylinder.
- 5) Remove master cylinder with reservoir tank.

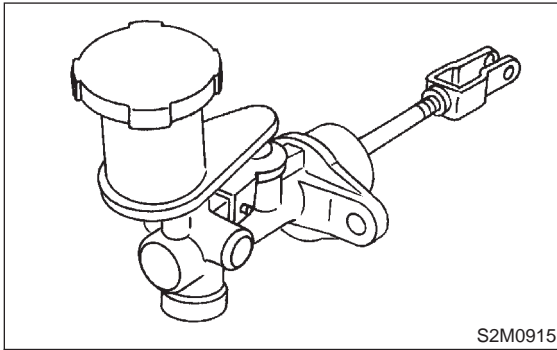
CAUTION:

Be extremely careful not to spill brake fluid. Brake fluid spilt on the vehicle body will harm the paint surface; wipe it off quickly if spilt.

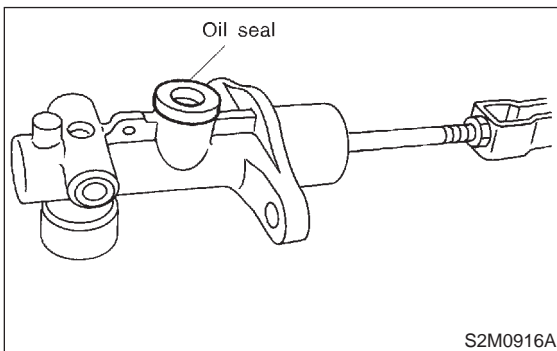


B: DISASSEMBLY

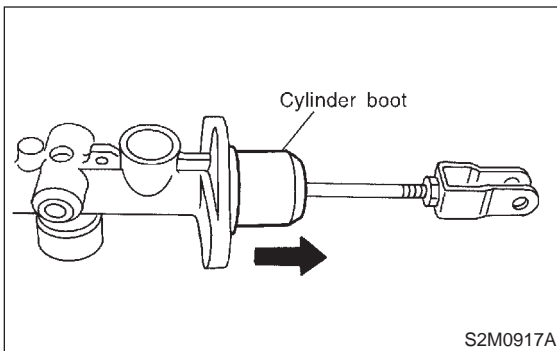
1) Remove straight pin and reservoir tank.



2) Remove oil seal.



3) Move the cylinder boot backward.



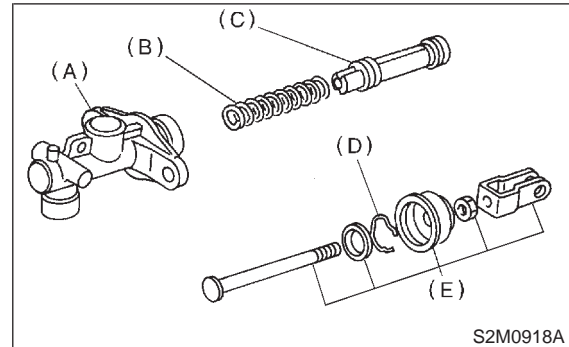
4) Remove snap ring.

CAUTION:

Be careful when removing the snap ring to prevent the rod, washer, piston and return spring from flying out.

C: INSPECTION

If any damage, deformation, wear, swelling, rust or other faults are found on the cylinder, piston, push rod, fluid reservoir, return spring and gasket, replace the faulty part.



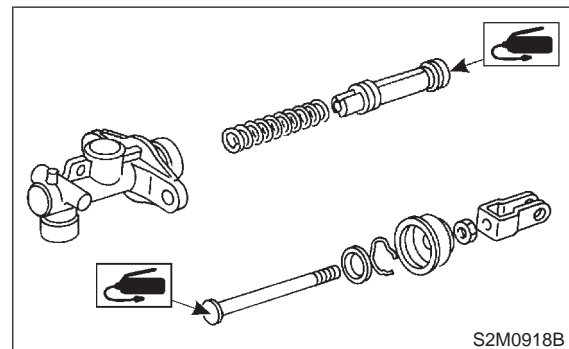
- (A) Master cylinder body
- (B) Return spring
- (C) Piston
- (D) Snap ring
- (E) Rod ASSY

D: ASSEMBLY

1) Apply a coat of grease to the contacting surfaces of the push rod and piston before installation.

Grease:

SILICONE GREASE G40M (Part No. 004404003)



2) To assemble the master cylinder reverse the sequence of disassembly procedure.

E: INSTALLATION

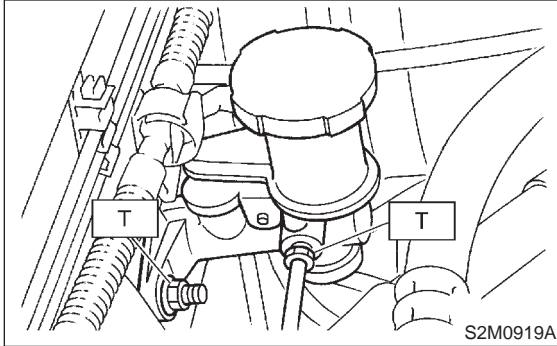
1) Install master cylinder to body, and install clutch pipe to master cylinder.

CAUTION:

Check that pipe is routed properly.

Tightening torque:

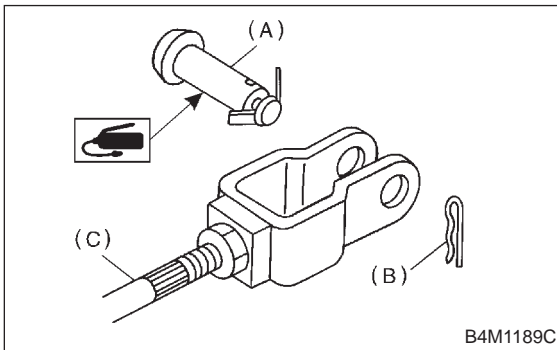
T: 18 ± 3 N·m (1.8 ± 0.3 kg·m, 13.0 ± 2.2 ft·lb)



2) Connect push rod of master cylinder to clutch pedal, and install clevis pin and snap pin.

NOTE:

Apply grease to clevis pin.

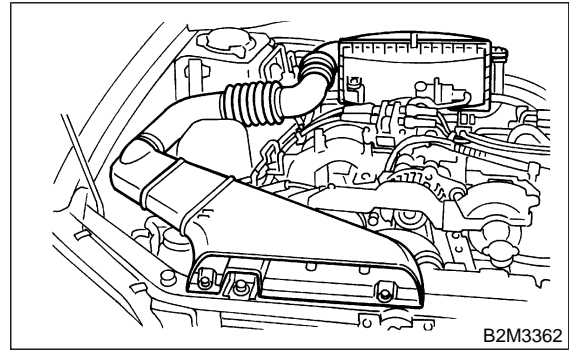


- (A) Clevis pin
- (B) Snap pin
- (C) Push rod

3) After bleeding air from system, ensure that clutch operates properly.

<Ref. to 2-10 [W2A0].>

4) Install air cleaner case and air intake duct.
<Ref. to 2-7 [W1A0].>



7. Brake Fluid

A: REPLACEMENT

CAUTION:

- The FMVSS No. 116, fresh DOT3 or 4 brake fluid must be used.
- Cover bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
- Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.

NOTE:

- During bleeding operation, keep the clutch reservoir tank filled with brake fluid to eliminate entry of air.
- Clutch pedal operating must be very slow.
- For convenience and safety, it is advisable to have two men working.

- The amount of brake fluid required is approximately 70 mℓ (2.4 US fl oz, 2.5 Imp fl oz) for total clutch system.

- 1) Either jack-up vehicle and place a safety stand under it, or lift-up vehicle.
- 2) Remove both front and rear wheels.
- 3) Draw out the brake fluid from reservoir tank with syringe.
- 4) Refill reservoir tank with recommended brake fluid.

Recommended brake fluid:

FMVSS No. 116, fresh DOT3 or 4 brake fluid

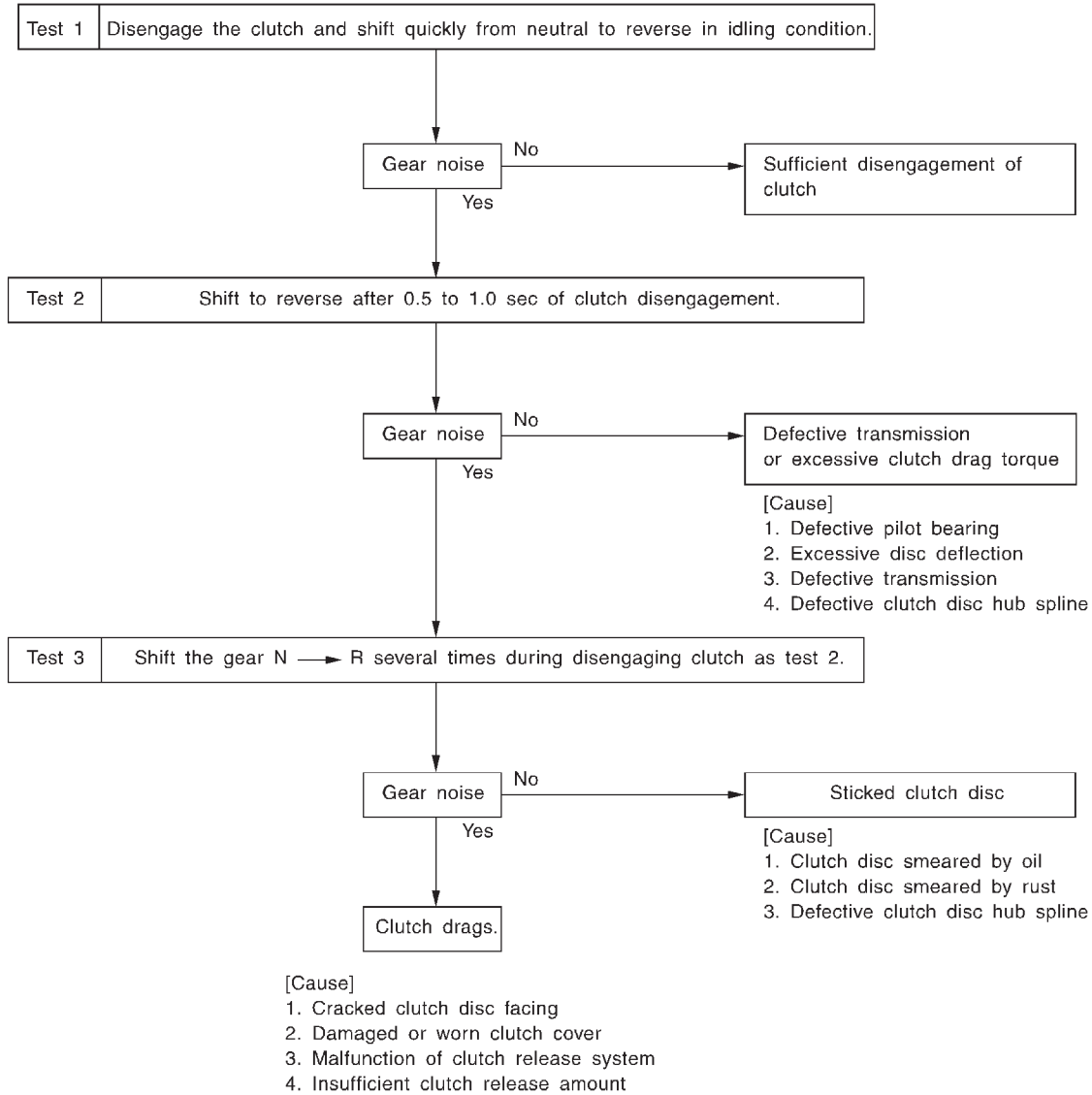
- 5) Bleed air from oil line with the help of a co-worker.
<Ref. to 2-10 [W2A0].>

1. Clutch System

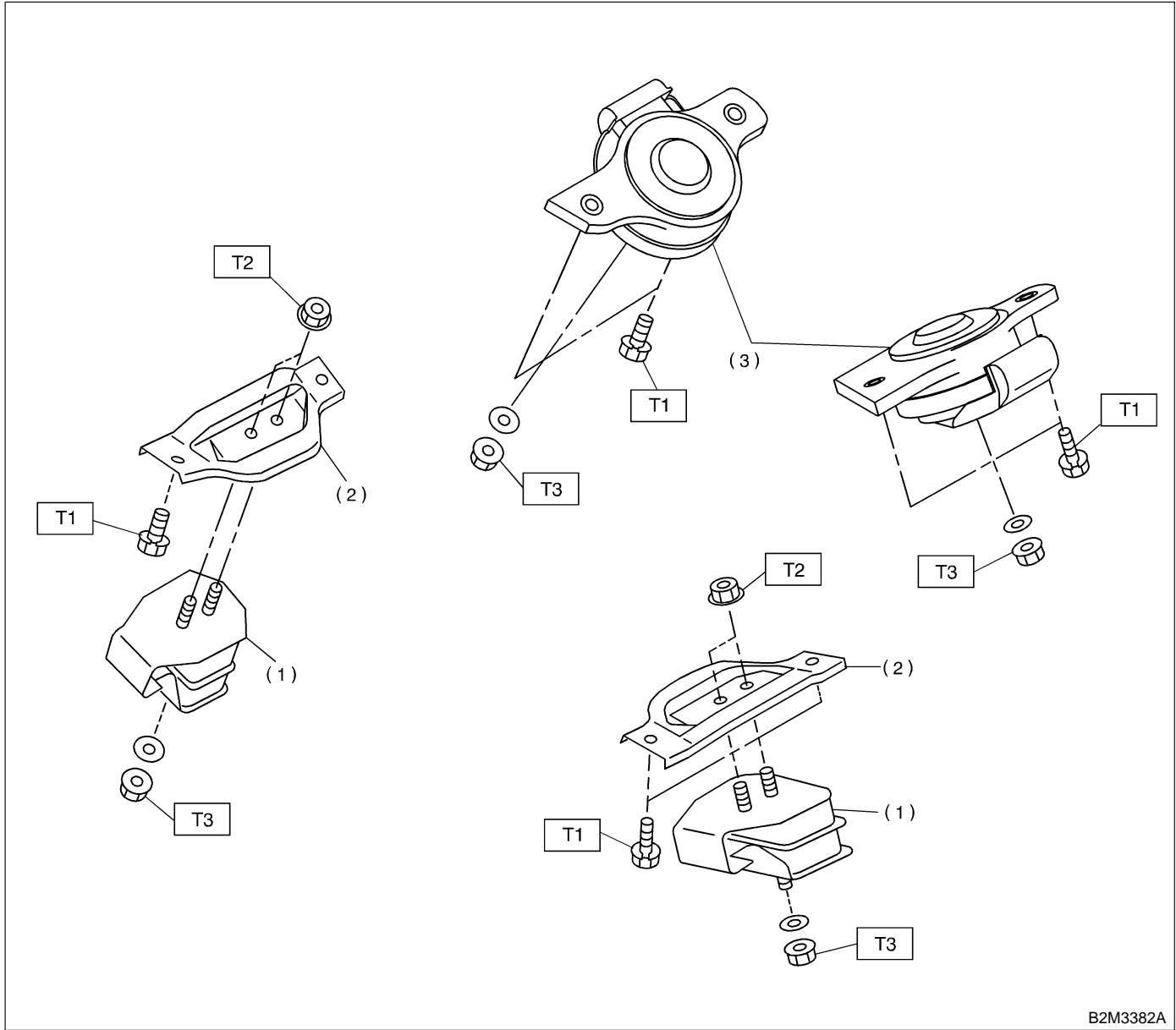
Symptom	Possible cause	Corrective
<p>1. Clutch slippage. It is hard to perceive clutch slippage in the early stage, but pay attention to the following symptoms</p> <ul style="list-style-type: none"> ● Engine speed up when shifting. ● High speed driving is impossible; especially rapid acceleration impossible and vehicle speed does not increase in proportion to an increase in engine speed. ● Power falls, particularly when ascending a slope, and there is a smell of burning of the clutch facing. ● Method of testing: Put the vehicle in stationary condition with parking brake fully applied. Disengage the clutch and shift the transmission gear into the first. Gradually allow the clutch to engage while gradually increasing the engine speed. The clutch function is satisfactory if the engine stalls. However, the clutch is slipping if the vehicle does not start off and the engine does not stall. 	(a) Clutch facing smeared by oil	Replace.
	(b) Worn clutch facing	Replace.
	(c) Deteriorated diaphragm spring	Replace.
	(d) Distorted pressure plate or flywheel	Correct or replace.
	(e) Defective release bearing holder	Correct or replace.
<p>2. Clutch drags. As a symptom of this trouble, a harsh scratching noise develops and control becomes quite difficult when shifting gears. The symptom becomes more apparent when shifting into the first gear. However, because much trouble of this sort is due to defective synchronization mechanism, carry out the test as described after.</p> <ul style="list-style-type: none"> ● Method of testing: <Ref. to 2-10 [K1A0].> <p>It may be judged as insufficient disengagement of clutch if any noise occurs during this test.</p>	(a) Worn or rusty clutch disc hub spline	Replace clutch disc.
	(b) Excessive deflection of clutch disc facing	Correct or replace.
	(c) Seized crankshaft pilot needle bearing	Replace.
	(d) Cracked clutch disc facing	Replace.
	(e) Sticked clutch disc (smeared by oil or water)	Replace.
<p>3. Clutch chatters. Clutch chattering is an unpleasant vibration to the whole body when the vehicle is just started with clutch partially engaged.</p>	(a) Adhesion of oil on the facing	Replace clutch disc.
	(b) Weak or broken torsion spring	Replace clutch disc.
	(c) Defective facing contact or excessive disc	Replace clutch disc deflection.
	(d) Warped pressure plate or flywheel	Correct or replace.
	(e) Loose disc rivets	Replace clutch disc.
	(f) Loose engine mounting	Retighten or replace mounting.
	(g) Improper adjustment of pitching stopper	Adjustment.
<p>4. Noisy clutch Examine whether the noise is generated when the clutch is disengaged, engaged, or partially engaged.</p>	(a) Broken, worn or unlubricated release bearing	Replace release bearing.
	(b) Insufficient lubrication of pilot bearing	Apply grease.
	(c) Loose clutch disc hub	Replace clutch disc.
	(d) Loose torsion spring retainer	Replace clutch disc.
	(e) Deteriorated or broken torsion spring	Replace clutch disc.

Symptom	Possible cause	Corrective
5. Clutch grabs. When starting the vehicle with the clutch partially engaged, the clutch engages suddenly and the vehicle jumps instead of making a smooth start.	(a) Grease or oil on facing	Replace clutch disc.
	(b) Deteriorated cushioning spring	Replace clutch disc.
	(c) Worn or rusted spline of clutch disc or main shaft	Take off rust, apply grease or replace clutch disc or main shaft.
	(d) Deteriorated or broken torsion spring	Replace clutch disc.
	(e) Loose engine mounting	Retighten or replace mounting.
	(f) Deteriorated diaphragm spring	Replace.

A: DIAGNOSTIC DIAGRAM OF CLUTCH DRAG



1. Engine Mounting



B2M3382A

- (1) Front cushion rubber
(BRIGHTON and L AT vehicles)
- (2) Front engine mounting bracket
(BRIGHTON and L AT vehicles)
- (3) Front cushion rubber (Except
BRIGHTON and L AT vehicles)

Tightening torque: N·m (kg·m, ft·lb)

T1: 34±5 (3.5±0.5, 25.3±3.6)

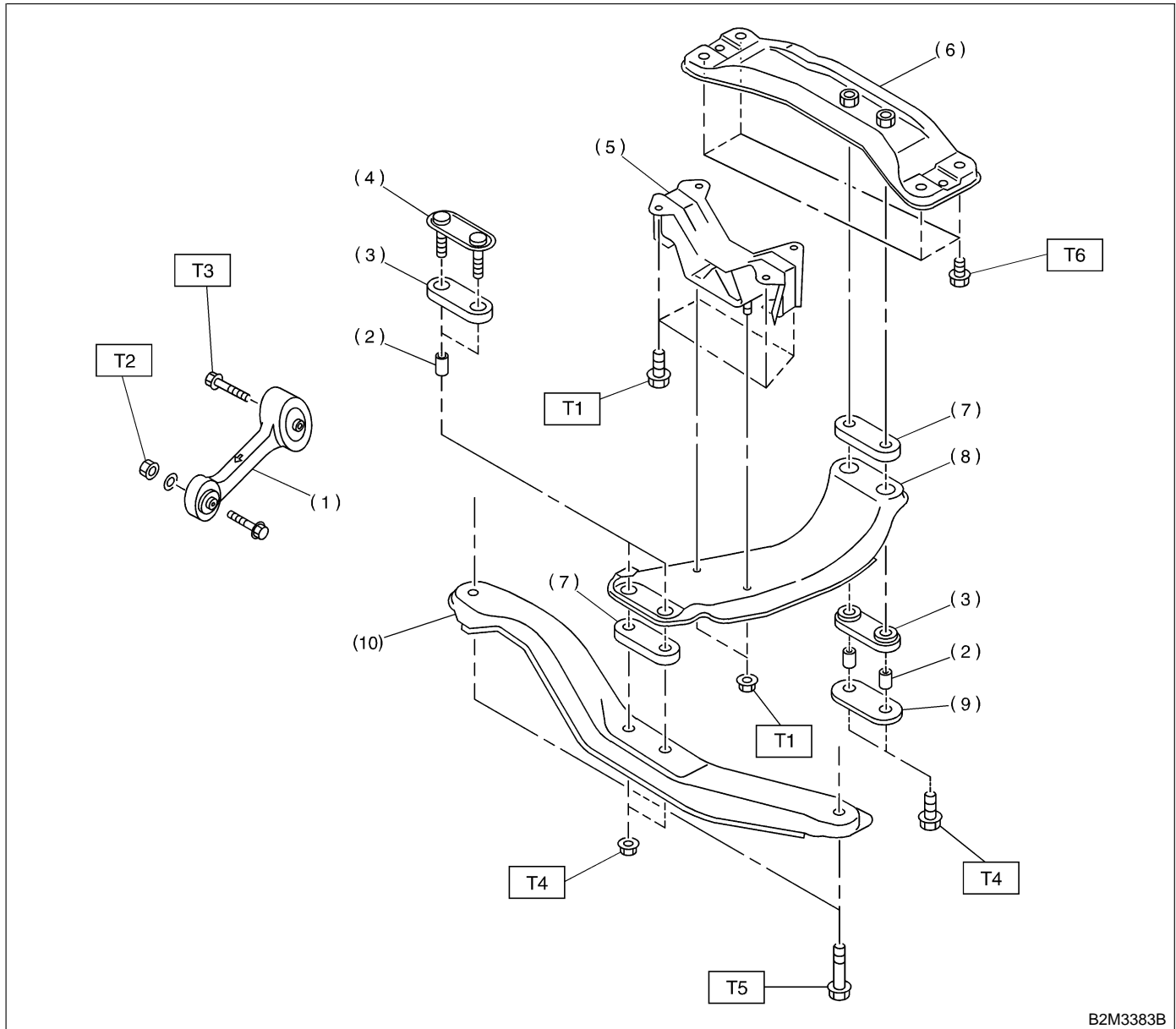
T2: 41±10 (4.2±1.0, 30±7)

T3: 74⁺¹⁰/₋₅ (7.5^{+1.0}/_{-0.5}, 54^{+7.2}/_{-3.6})

2. Transmission Mounting

A: MT VEHICLES

1. EXCEPT OUTBACK MODEL



B2M3383B

- (1) Pitching stopper
- (2) Spacer
- (3) Cushion C
- (4) Front plate
- (5) Rear cushion rubber
- (6) Rear crossmember
- (7) Cushion D
- (8) Center crossmember
- (9) Rear plate
- (10) Front crossmember

Tightening torque: N·m (kg·m, ft·lb)

T1: 34±5 (3.5±0.5, 25.3±3.6)

T2: 49±5 (5.0±0.5, 36.2±3.6)

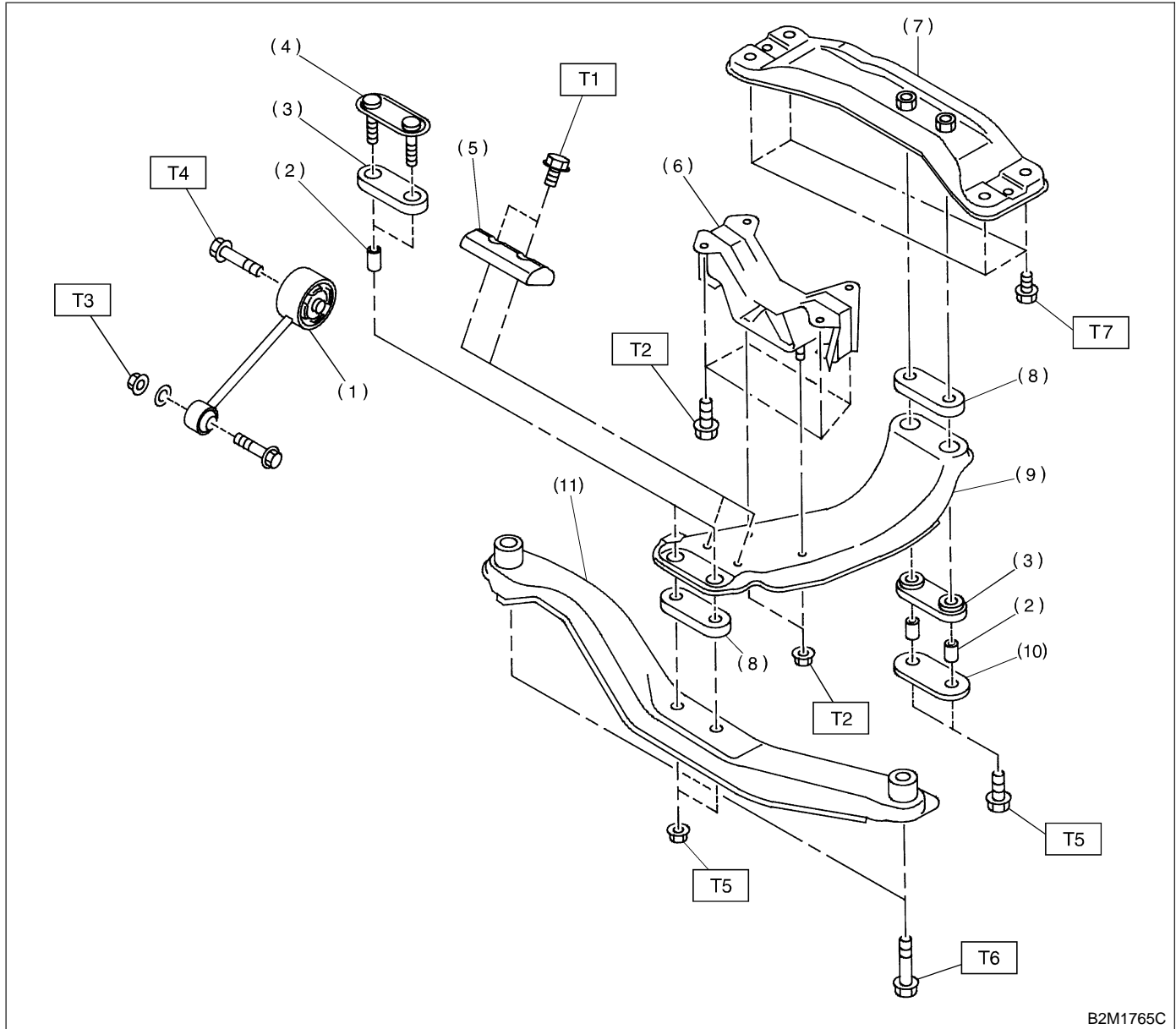
T3: 57±10 (5.8±1.0, 42±7)

T4: 69±15 (7.0±1.5, 51±11)

T5: 137±20 (14±2, 101±14)

T6: 74⁺¹⁰/₋₅ (7.5^{+1.0}/_{-0.5}, 54^{+7.2}/_{-3.6})

2. OUTBACK MODEL



B2M1765C

- (1) Pitching stopper
- (2) Spacer
- (3) Cushion C
- (4) Front plate
- (5) Damper
- (6) Rear cushion rubber
- (7) Rear crossmember
- (8) Cushion D
- (9) Center crossmember
- (10) Rear plate
- (11) Front crossmember

Tightening torque: N·m (kg·m, ft·lb)

T1: 7.4±2.0 (0.75±0.2, 5.4±1.4)

T2: 34±5 (3.5±0.5, 25.3±3.6)

T3: 49±5 (5.0±0.5, 36.2±3.6)

T4: 57±10 (5.8±1.0, 42±7)

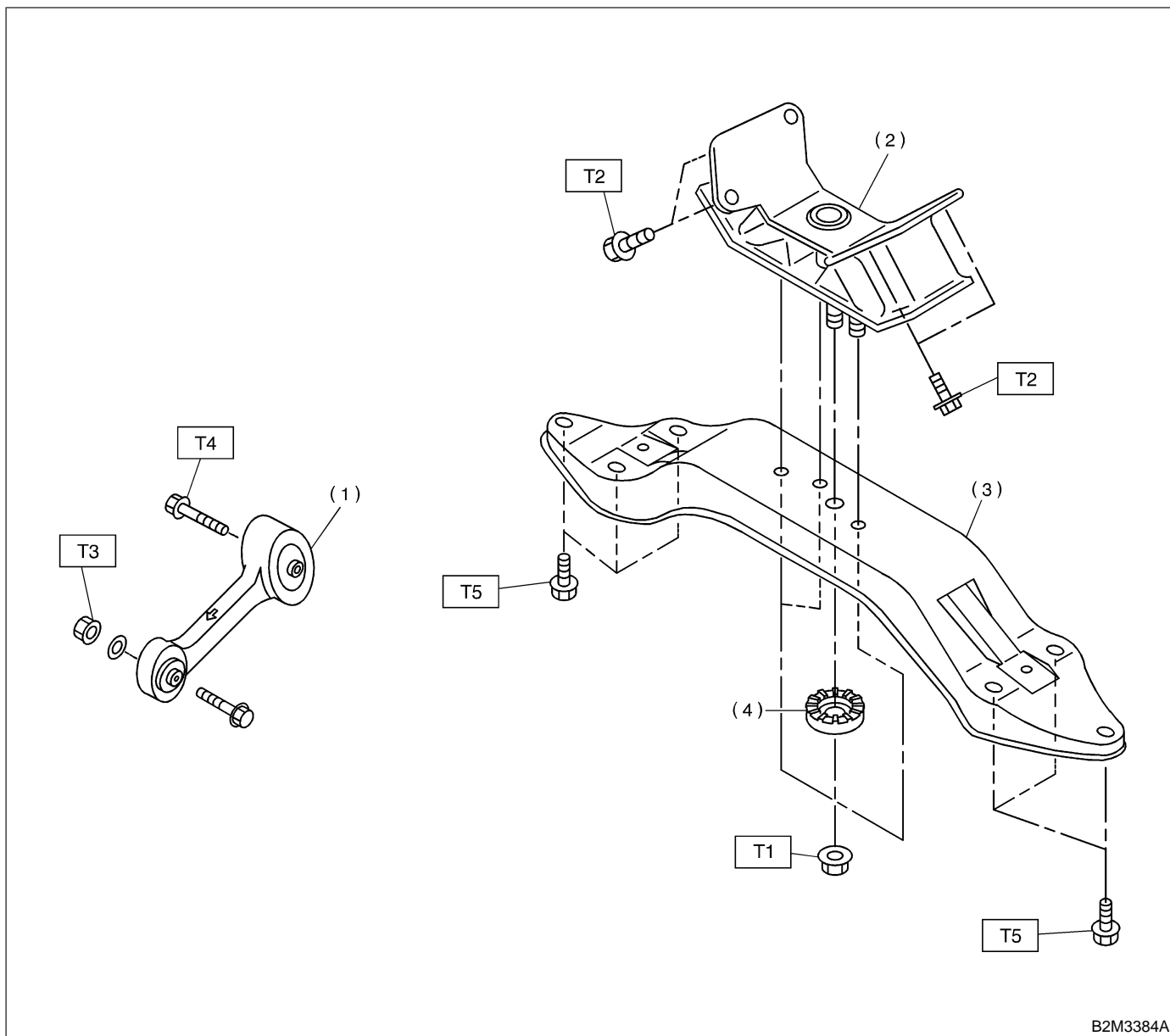
T5: 69±15 (7.0±1.5, 51±11)

T6: 137±20 (14±2, 101±14)

T7: 74⁺¹⁰/₋₅ (7.5^{+1.0}/_{-0.5}, 54^{+7.2}/_{-3.6})

B: AT VEHICLES

1. EXCEPT OUTBACK MODEL

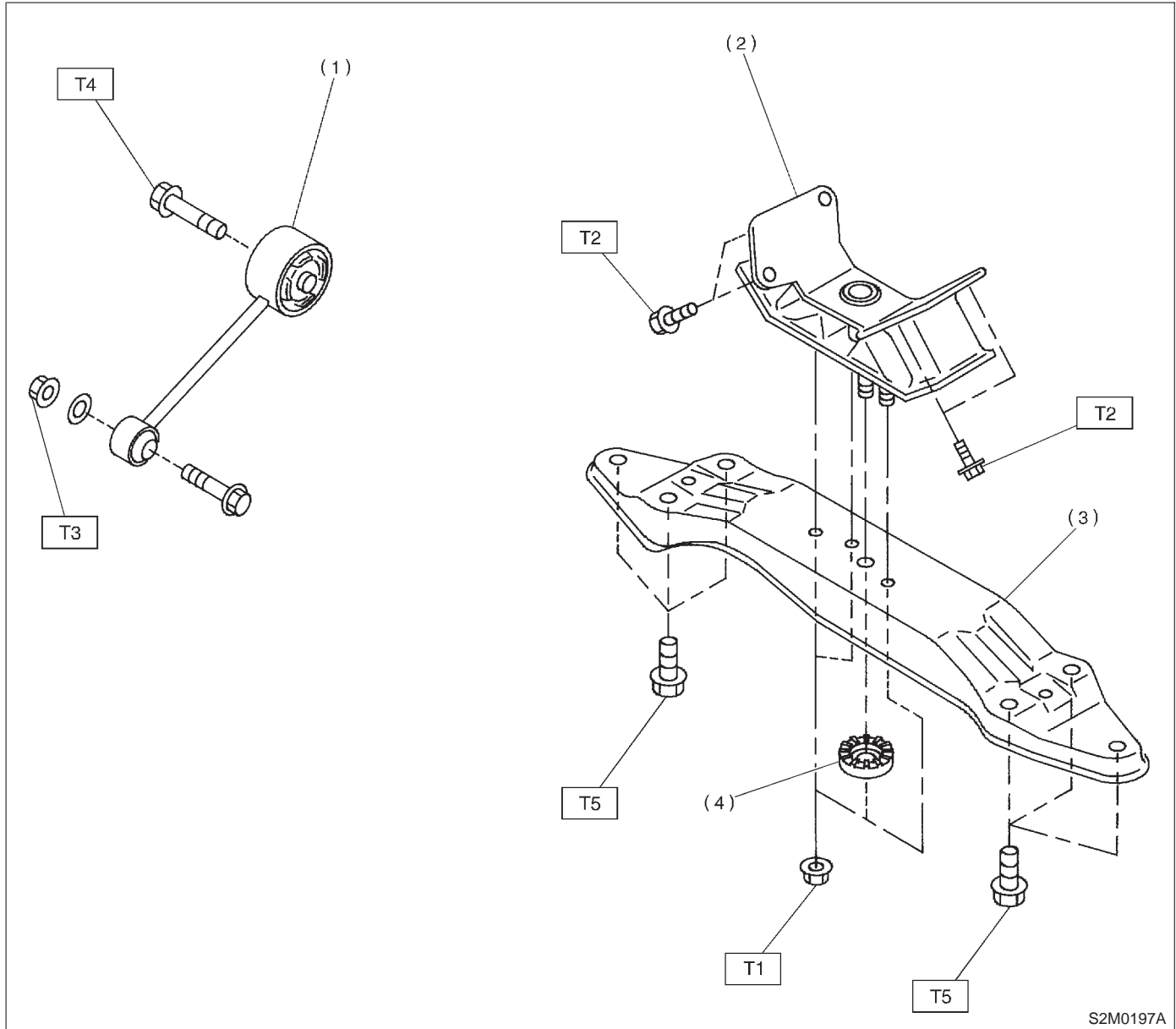


- (1) Pitching stopper
- (2) Rear cushion rubber
- (3) Crossmember
- (4) Stopper

Tightening torque: N·m (kg·m, ft·lb)

- T1: 34±5 (3.5±0.5, 25.3±3.6)**
- T2: 38±15 (3.9±1.5, 28±11)**
- T3: 49±5 (5.0±0.5, 36.2±3.6)**
- T4: 57±10 (5.8±1.0, 42±7)**
- T5: 74⁺¹⁰/₋₅ (7.5^{+1.0}/_{-0.5}, 54^{+7.2}/_{-3.6})**

2. OUTBACK MODEL



- (1) Pitching stopper
- (2) Rear cushion rubber
- (3) Crossmember
- (4) Stopper

Tightening torque: N·m (kg·m, ft·lb)

T1: 34±5 (3.5±0.5, 25.3±3.6)

T2: 38±15 (3.9±1.5, 28±11)

T3: 49±5 (5.0±0.5, 36.2±3.6)

T4: 57±10 (5.8±1.0, 42±7)

T5: 74⁺¹⁰/₋₅ (7.5^{+1.0}/_{-0.5}, 54^{+7.2}/_{-3.6})

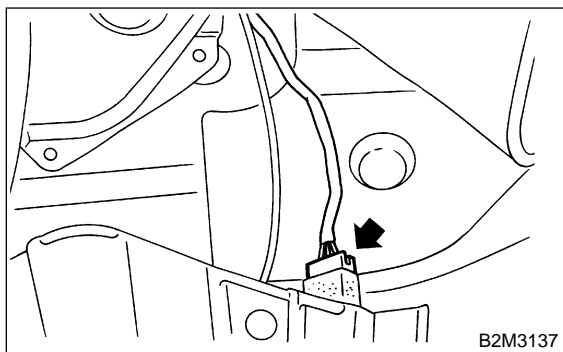
1. Engine

A: GENERAL PRECAUTION

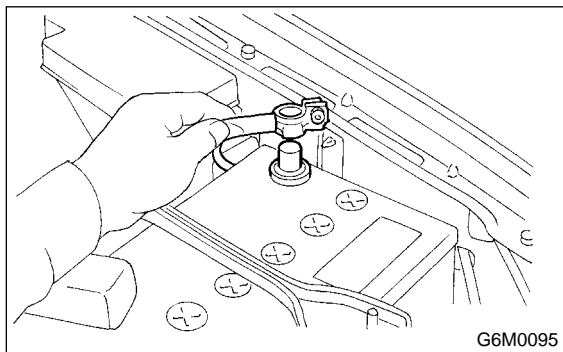
- 1) Remove or install engine in an area where chain hoists, lifting devices, etc. are available for ready use.
- 2) Be sure not to damage coated surfaces of body panels with tools or stain seats and windows with coolant or oil. Place a cover over fenders, as required, for protection.
- 3) Prior to starting work, prepare the following: Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
- 4) Lift-up or lower the vehicle when necessary. Make sure to support the correct positions. <Ref. to 1-3 [G7B0].>

B: REMOVAL

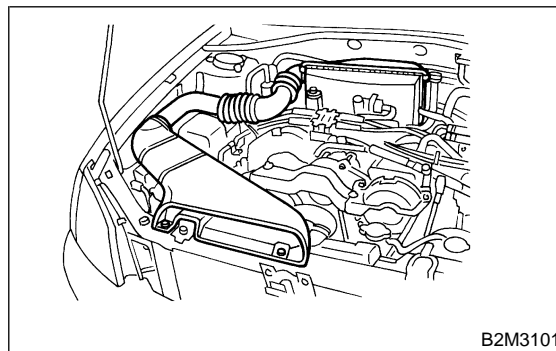
- 1) Set the vehicle on lift arms.
- 2) Open front hood fully and support with stay.
- 3) Raise rear seat, and turn floor mat up.
- 4) Release fuel pressure.
 - (1) Disconnect connector of fuel tank cord from the nearest harness.



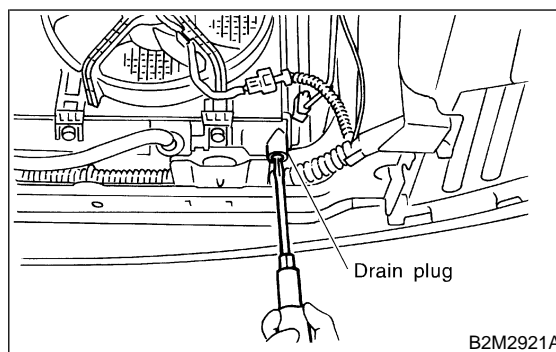
- (2) Start the engine, and run until it stalls.
 - (3) After the engine stalls, crank it for five seconds more.
 - (4) Turn ignition switch to "OFF".
- 5) Remove filler cap.
- 6) Disconnect battery ground terminal.



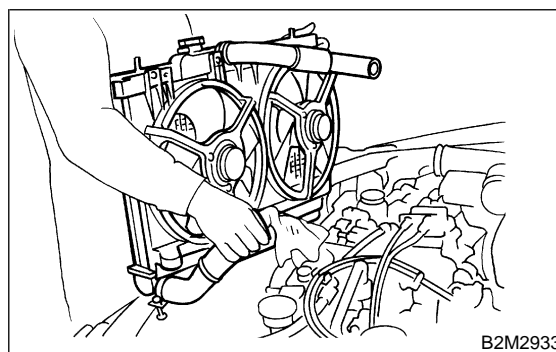
- 7) Remove air intake duct and air cleaner case. <Ref. to 2-7 [W1A0].>



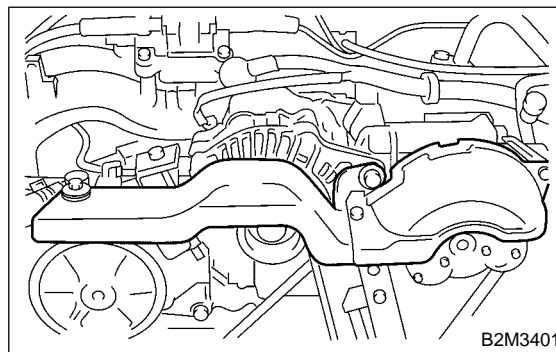
- 8) Remove under cover.
- 9) Drain coolant. Set container under the vehicle, and loose drain cock from radiator. <Ref. to 2-5 [W9A0].>



- 10) Remove radiator from vehicle. <Ref. to 2-5 [W3A0].>



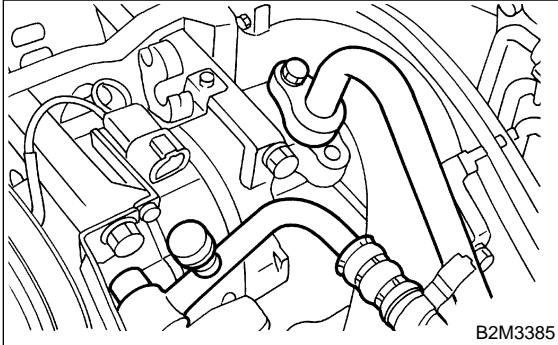
- 11) Remove V-belt cover.



1. Engine

12) Collect refrigerant, and remove pressure hoses. (With A/C)

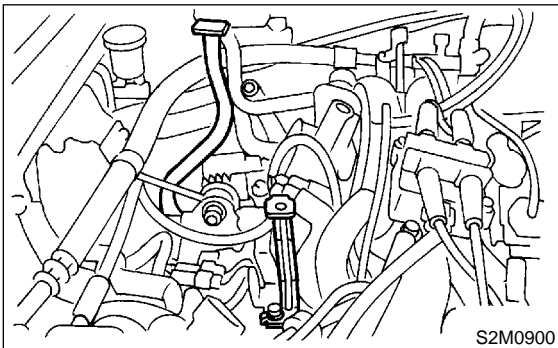
- (1) Place and connect the attachment hose to the refrigerant recycle system.
- (2) Collect refrigerant from A/C system.
- (3) Disconnect A/C pressure hoses from A/C compressor.



B2M3385

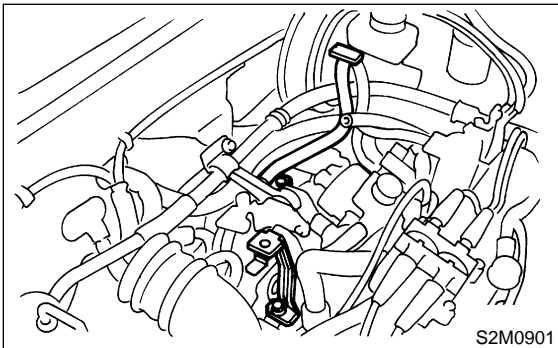
13) Remove air cleaner case stay.

● MT model



S2M0900

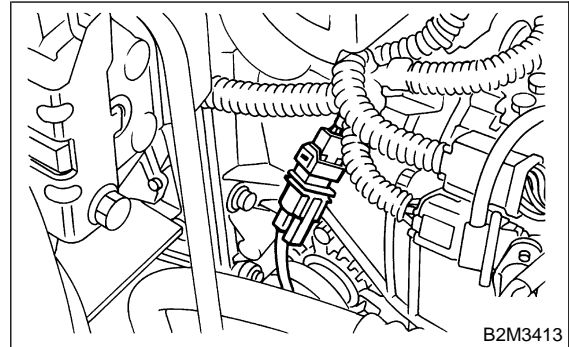
● AT model



S2M0901

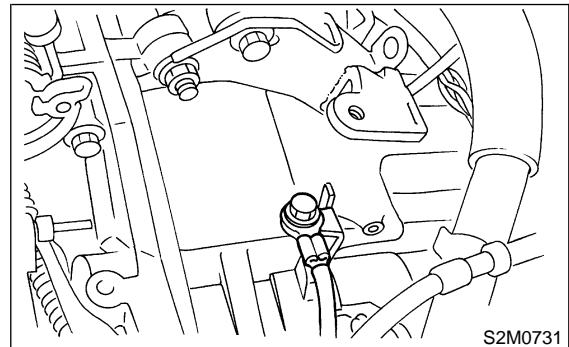
14) Disconnect the following connectors and cables.

- (1) Front oxygen sensor connector



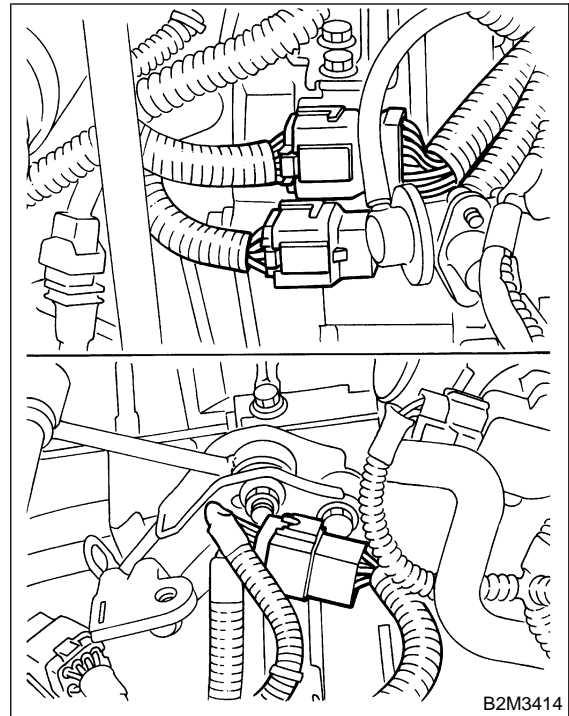
B2M3413

- (2) Engine ground terminal



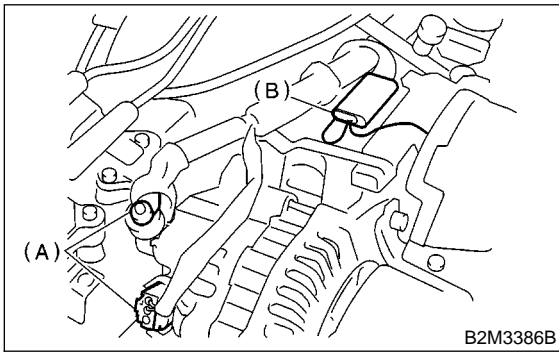
S2M0731

- (3) Engine harness connectors



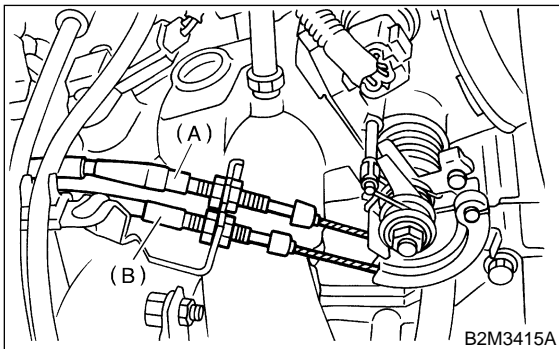
B2M3414

- (4) Alternator connector, terminal and A/C compressor connector



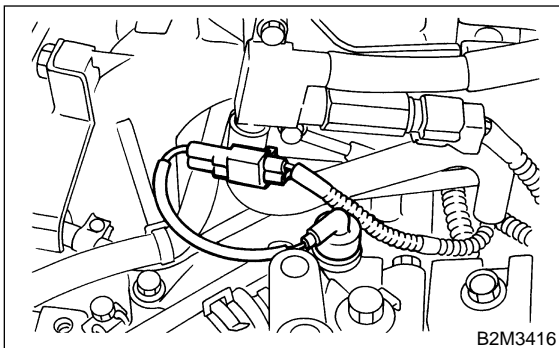
- (A) A/C compressor connector
(B) Alternator connector and terminal

- (5) Accelerator cable and cruise control cable

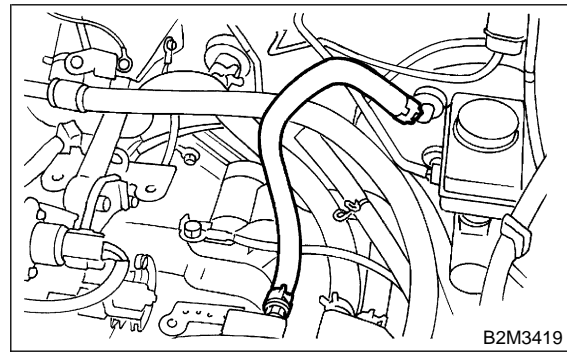


- (A) Accelerator cable
(B) Cruise control cable

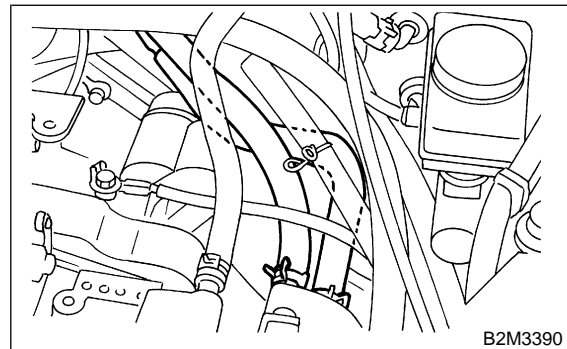
- (6) Pressure switch



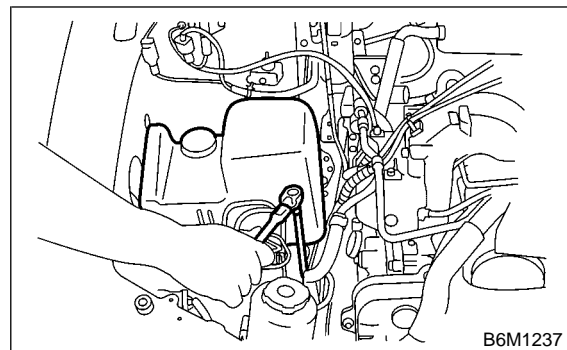
- 15) Disconnect the following hoses.
(1) Brake booster vacuum hose



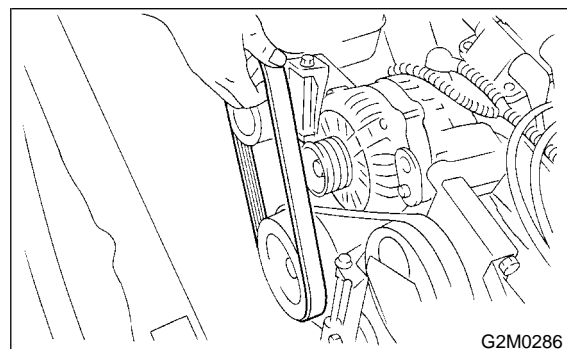
- (2) Heater inlet outlet hose



- 16) Remove power steering pump from bracket.
(1) Remove resonator chamber.

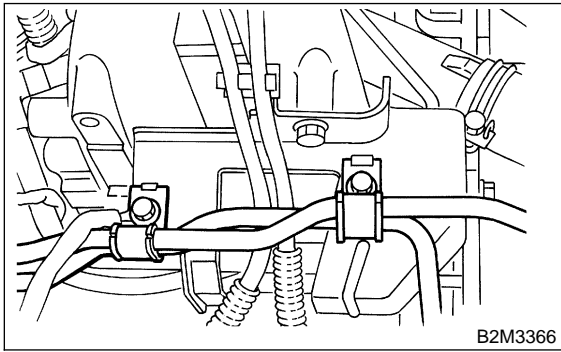


- (2) Loosen lock bolt and slider bolt, and remove front side V-belt.

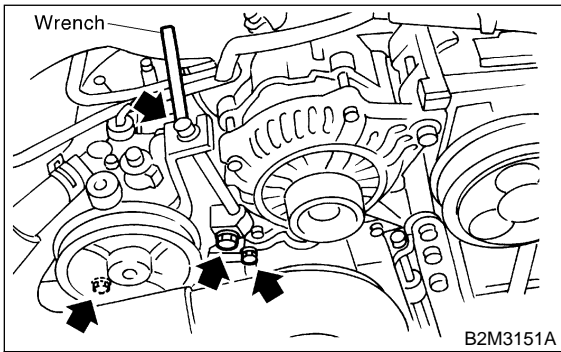


1. Engine

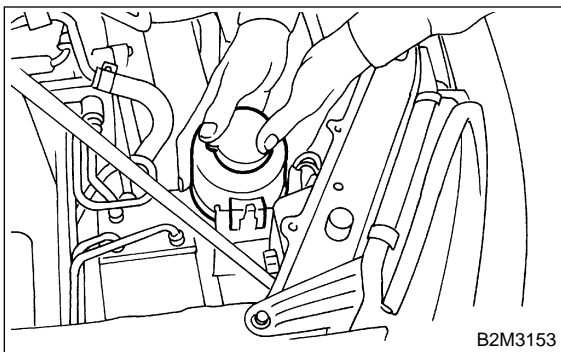
(3) Remove pipe with bracket.



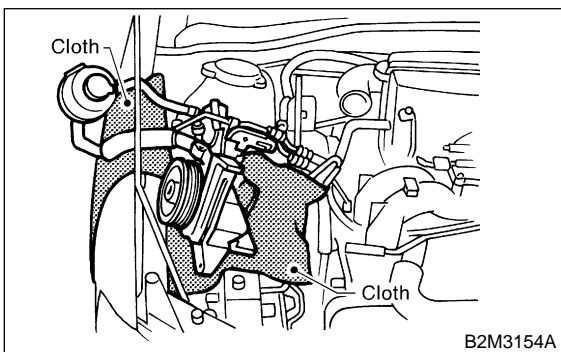
(4) Remove bolts which install power steering pump bracket.



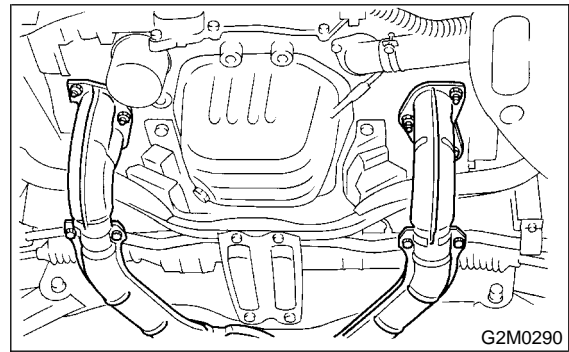
(5) Remove power steering tank from the bracket by pulling it upward.



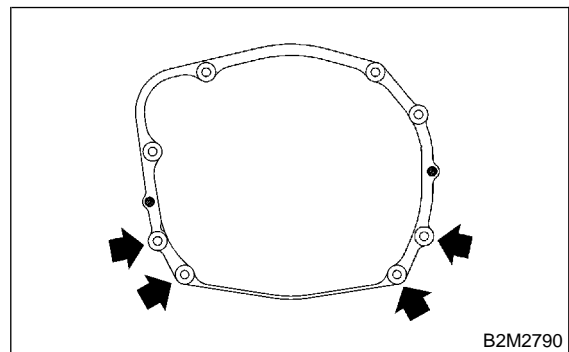
(6) Place power steering pump on the right side wheel apron.



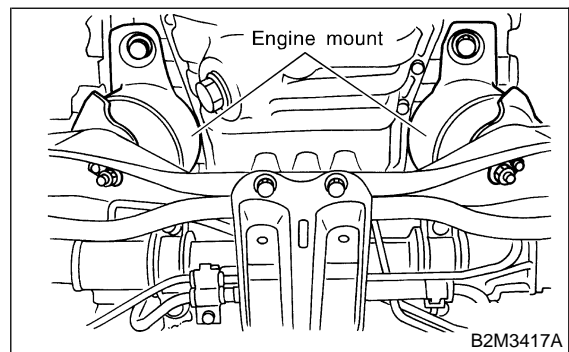
17) Remove front and center exhaust pipe.
<Ref. to 2-9 [W1A0].>



18) Remove nuts which hold lower side of transmission to engine.



19) Remove nuts which install front cushion rubber onto front crossmember.



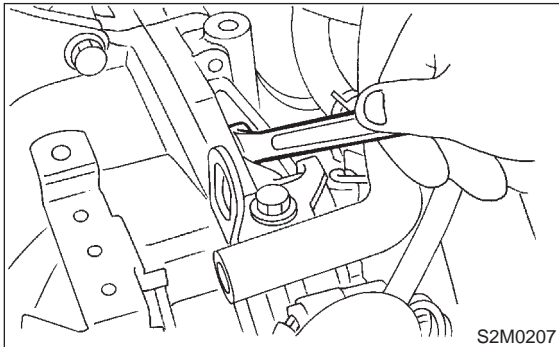
20) Separate torque converter clutch from drive plate. (AT model)

- (1) Lower the vehicle.
- (2) Remove service hole plug.

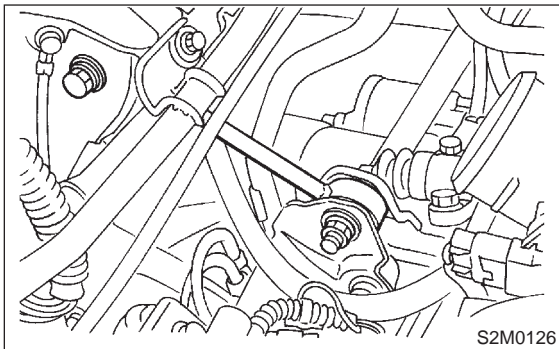
(3) Remove bolts which hold torque converter clutch to drive plate.

(4) Remove other bolts while rotating the engine using ST.

ST 499977000 CRANK PULLEY WRENCH



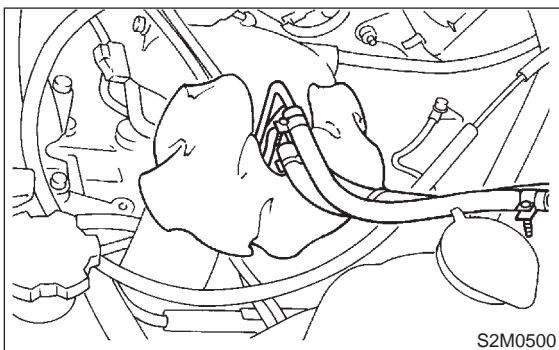
21) Remove pitching stopper.



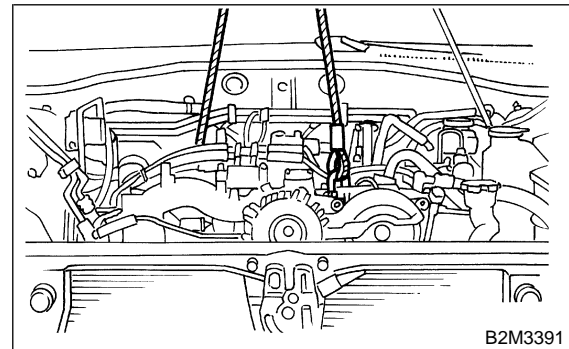
22) Disconnect fuel delivery hose, return hose and evaporation hose.

CAUTION:

- Disconnect hose with its end wrapped with cloth to prevent fuel from splashing.
- Catch fuel from hose into container.



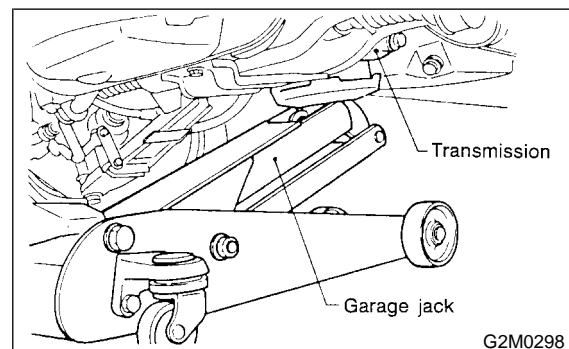
23) Support engine with a lifting device and wire ropes.



24) Support transmission with a garage jack.

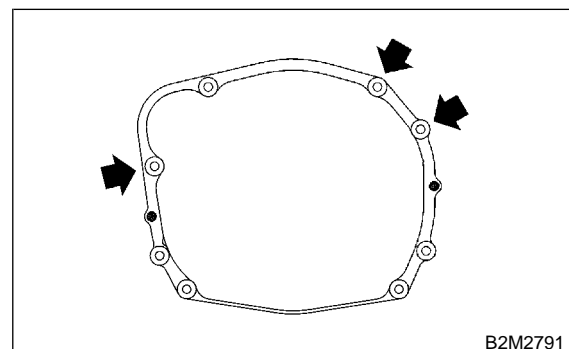
CAUTION:

Before moving engine away from transmission, check to be sure no work has been overlooked. Doing this is very important in order to facilitate re-installation and because transmission lowers under its own weight.



25) Separation of engine and transmission.

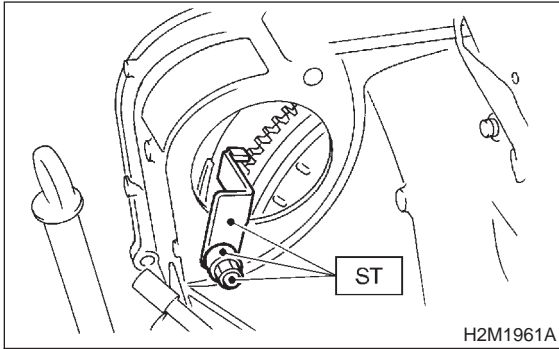
- (1) Remove starter. <Ref. to 6-1 [W1A0].>
- (2) Remove bolts which hold upper side of transmission to engine.



1. Engine

26) Install ST to torque converter clutch case. (AT model)

ST 498277200 STOPPER SET

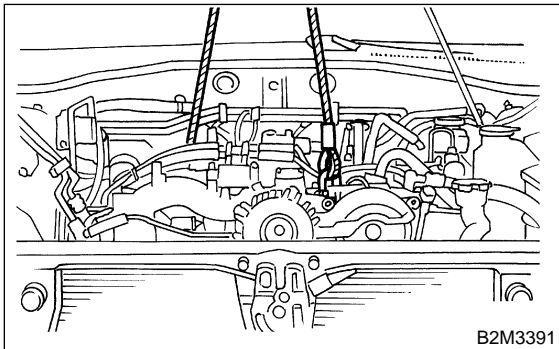


27) Remove engine from vehicle.

- (1) Slightly raise engine.
- (2) Raise transmission with garage jack.
- (3) Move engine horizontally until main shaft is withdrawn from clutch cover.
- (4) Slowly move engine away from engine compartment.

CAUTION:

Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.



28) Remove front cushion rubbers.

C: INSTALLATION

1) Install front cushion rubbers.

Tightening torque:

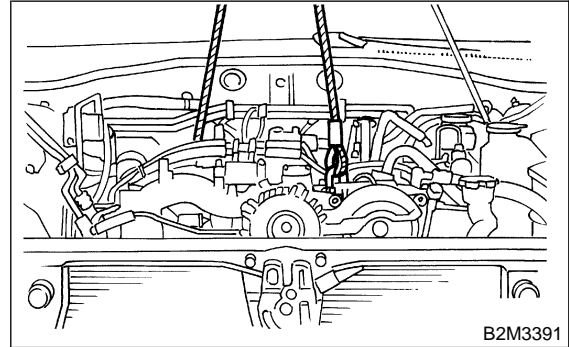
$34 \pm 5 \text{ N}\cdot\text{m}$ ($3.5 \pm 0.5 \text{ kg}\cdot\text{m}$, $25.3 \pm 3.6 \text{ ft}\cdot\text{lb}$)

2) Install engine onto transmission.

(1) Position engine in engine compartment and align it with transmission.

CAUTION:

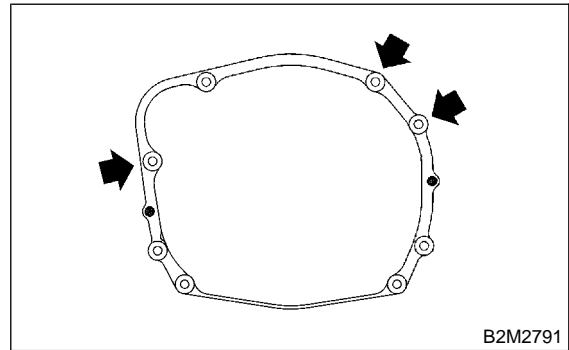
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.



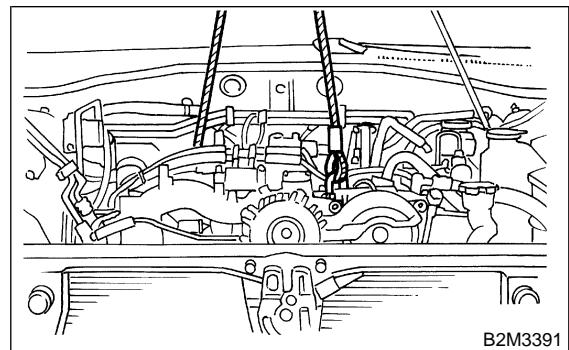
- (2) Apply a small amount of grease to spline of main shaft. (MT model)
- 3) Tighten bolts which hold upper side of transmission to engine.

Tightening torque:

$50 \pm 4 \text{ N}\cdot\text{m}$ ($5.1 \pm 0.4 \text{ kg}\cdot\text{m}$, $36.9 \pm 2.9 \text{ ft}\cdot\text{lb}$)



4) Remove lifting device and wire ropes.

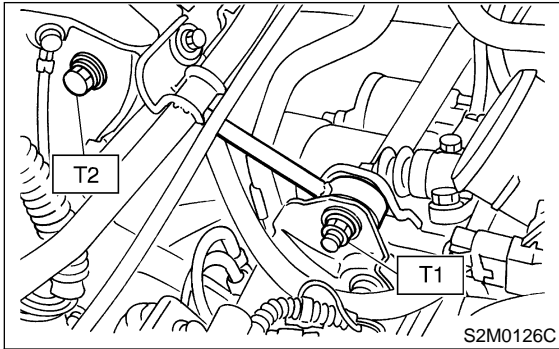


5) Remove garage jack.

6) Install pitching stopper.

Tightening torque:

T1: 49±5 N·m (5.0±0.5 kg·m, 36.2±3.6 ft·lb)
T2: 57±10 N·m (5.8±1.0 kg·m, 42±7 ft·lb)



7) Remove ST from torque converter clutch case. (AT model)

NOTE:

Be careful not to drop the ST into the torque converter clutch case when removing ST.

ST 498277200 STOPPER SET

8) Install starter. <Ref. to 6-1 [W1A0].>

9) Install torque converter clutch onto drive plate. (AT model)

- (1) Tighten bolts which hold torque converter clutch to drive plate.
- (2) Tighten other bolts while rotating the engine by using ST.

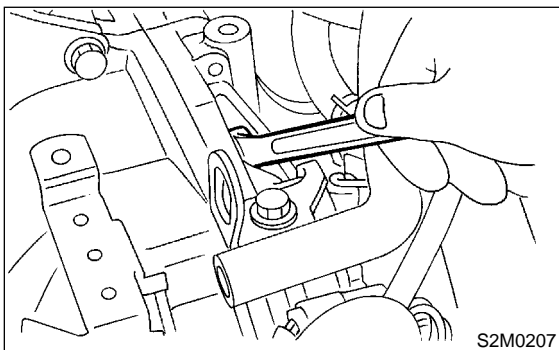
CAUTION:

Be careful not to drop bolts into torque converter clutch housing.

ST 499977000 CRANK PULLEY WRENCH

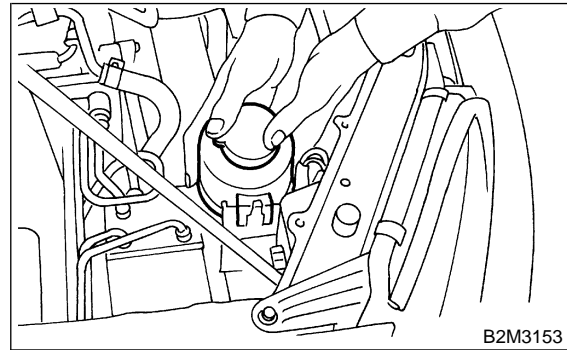
Tightening torque:

25±2 N·m (2.5±0.2 kg·m, 18.1±1.4 ft·lb)



- (3) Clog plug onto service hole.
- 10) Install power steering pump on bracket.

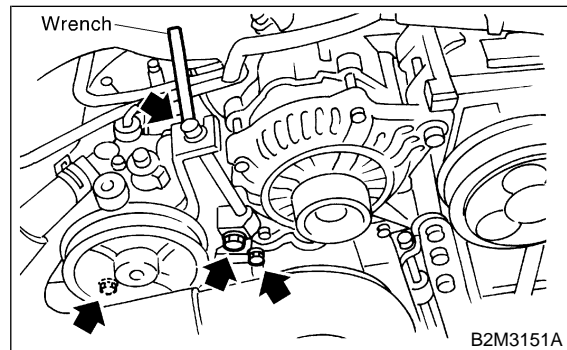
(1) Install power steering tank on bracket.



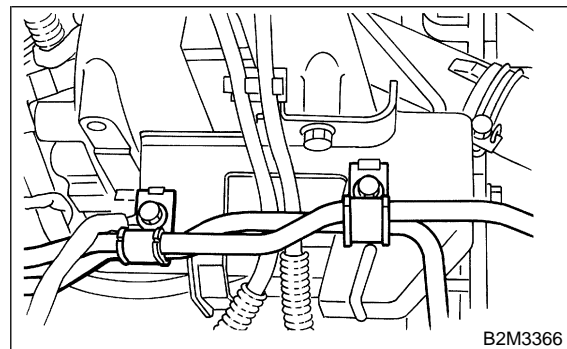
(2) Install power steering pump on bracket, and tighten bolts.

Tightening torque:

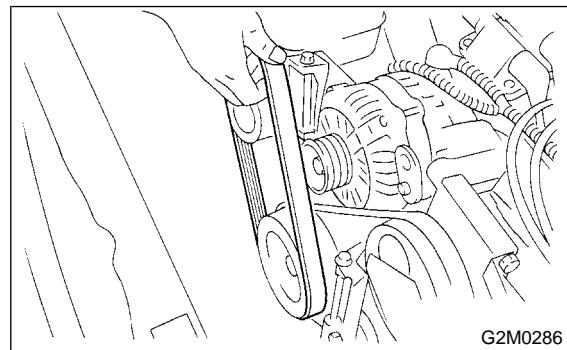
20.1±2.5 N·m (2.05±0.25 kg·m, 14.8±1.8 ft·lb)



(3) Tighten bolt which installs power steering pump bracket, and install spark plug codes.



(4) Intake front side V-belt, and adjust it.

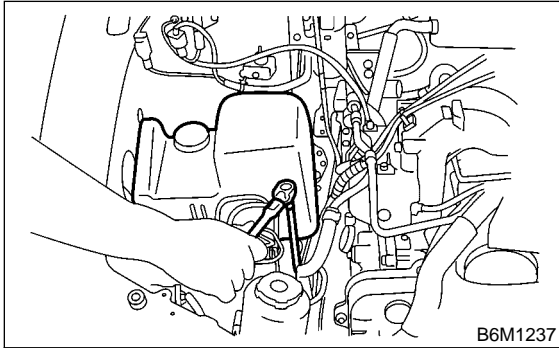


1. Engine

(5) Install resonator chamber.

Tightening torque:

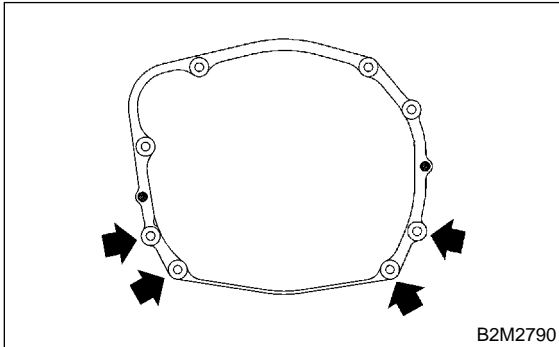
33 ± 10 N·m (3.4 ± 1.0 kg·m, 24.6 ± 7.2 ft·lb)



11) Tighten nuts which hold lower side of transmission to engine.

Tightening torque:

50 ± 4 N·m (5.1 ± 0.4 kg·m, 36.9 ± 2.9 ft·lb)



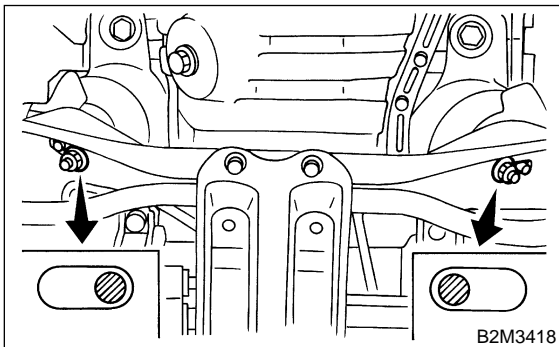
12) Tighten nuts which install front cushion rubber onto crossmember.

Tightening torque:

83 ± 15 N·m (8.5 ± 1.5 kg·m, 61 ± 11 ft·lb)

CAUTION:

Be sure to tighten front cushion rubber mounting bolts in the innermost elliptical hole in the front crossmember.



13) Install front and center exhaust pipe.

<Ref. to 2-9 [W1B0].>

14) Connect the following hoses.

- (1) Fuel delivery hose, return hose and evaporation hose

- (2) Heater inlet and outlet hoses
 - (3) Brake booster vacuum hose
- 15) Connect the following connectors.
- (1) Engine ground terminals

Tightening torque:

14 ± 4 N·m (1.4 ± 0.4 kg·m, 10.1 ± 2.9 ft·lb)

- (2) Engine harness connectors
 - (3) Oxygen sensor connector (Except general model)
 - (4) Alternator connector and terminal
 - (5) A/C compressor connectors (With A/C)
 - (6) Power steering pressure switch
- 16) Connect the following cables.
- (1) Accelerator cable
 - (2) Cruise control cables (With cruise control)

CAUTION:

After connecting each cable, adjust them.

17) Install air cleaner case stay.

Tightening torque:

16 ± 5 N·m (1.6 ± 0.5 kg·m, 11.6 ± 3.6 ft·lb)

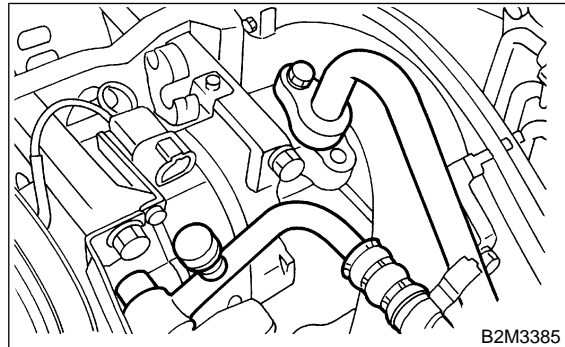
18) Install A/C pressure hoses. (With A/C)
<Ref. to 4-7 [W1C0].>

CAUTION:

Use new O-rings.

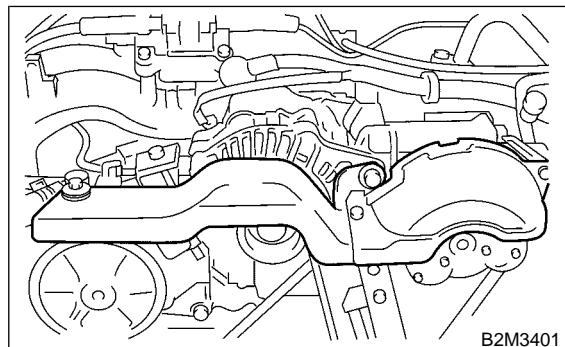
Tightening torque:

25 ± 7 N·m (2.5 ± 0.7 kg·m, 18.1 ± 5.1 ft·lb)

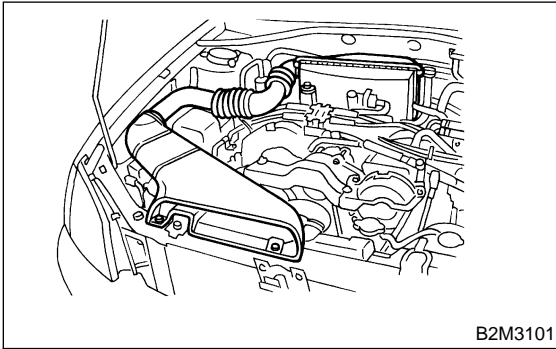


19) Install radiator to vehicle. <Ref. to 2-5 [W3B0].>

20) Install V-belt cover.



- 21) Install air intake duct and cleaner case.
<Ref. to 2-7 [W1A0].>



- 22) Install under cover.
 23) Install battery in the vehicle, and connect cables.
 24) Fill coolant.
 <Ref. to 2-5 [W9B0].>
 25) Check ATF level and correct if necessary. (AT model)
 <Ref. to 3-2 [W1B1].>
 26) Charge A/C system with refrigerant.
 <Ref. to 4-7 [W700].>
 27) Remove front hood stay, and close front hood.
 28) Take off the vehicle from lift arms.

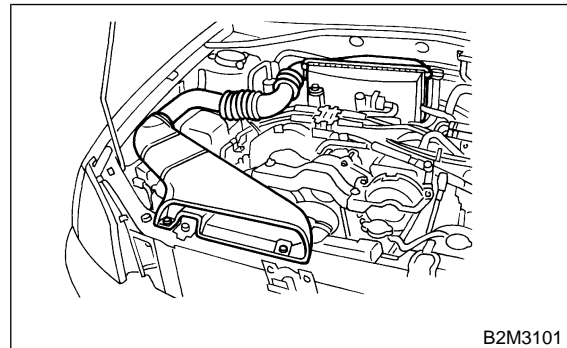
2. Transmission

A: GENERAL PRECAUTION

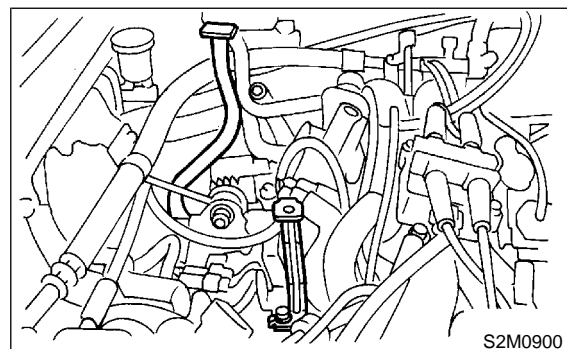
- 1) Remove or install transmission in an area where chain hoists, lifting devices, etc. are available for ready use.
- 2) Be sure not to damage coated surfaces of body panels with tools or stain seats and windows with coolant or oil. Place a cover over fenders, as required, for protection.
- 3) Prior to starting work, prepare the following: Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
- 4) Lift-up or lower the vehicle when necessary. Make sure to support the correct positions. <Ref. to 1-3 [G7B0].>

B: REMOVAL

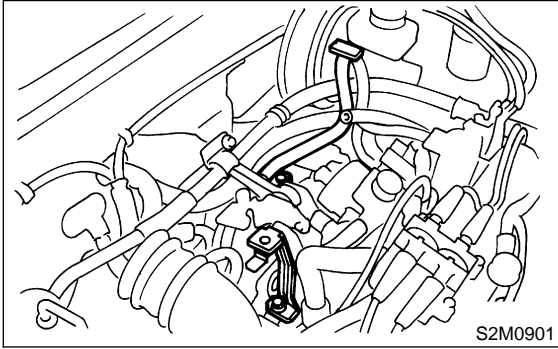
- 1) Open front hood fully, and support with stay.
- 2) Disconnect battery ground terminal.
- 3) Remove air intake duct and cleaner case.
<Ref. to 2-7 [W1A0].>



- 4) Remove air cleaner case stay.
 ● **MT model**

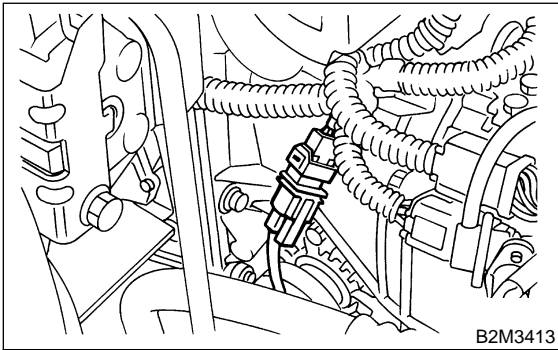


● AT model

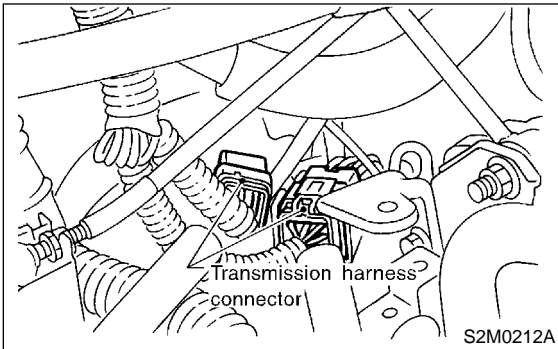


5) Disconnect the following connectors.

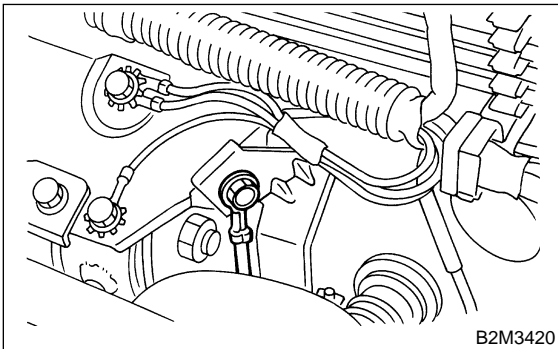
(1) Front oxygen sensor connector



(2) Transmission harness connector (AT model)

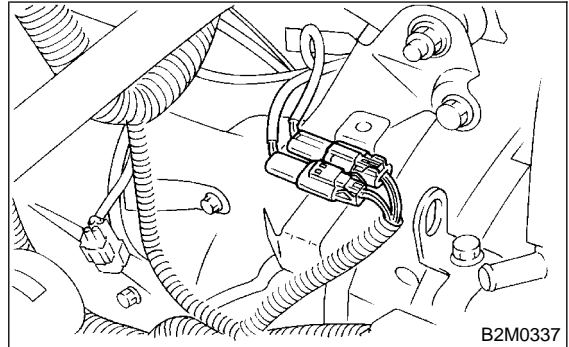


(3) Transmission ground terminal

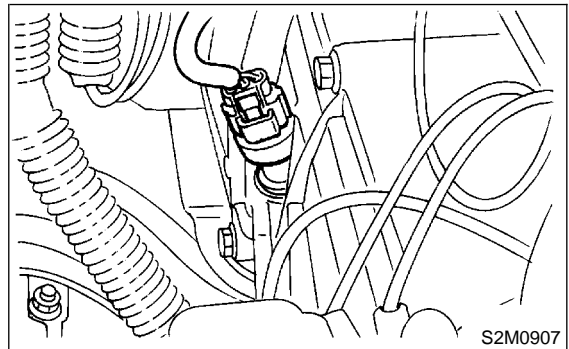


(4) Neutral position switch connector (MT model)

(5) Back-up light switch connector (MT model)



(6) Vehicle speed sensor (MT model)

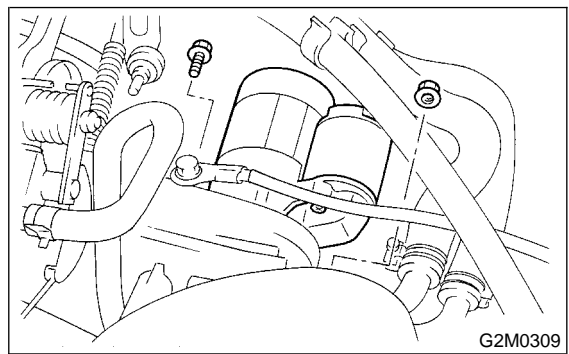


6) Remove starter.

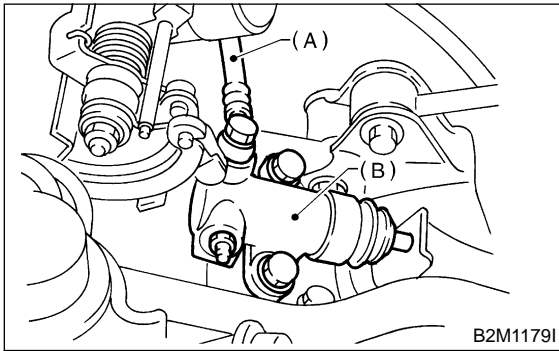
(1) Disconnect connectors and terminal from starter.

(2) Remove bolt which installs upper side of starter.

(3) Remove nut which installs lower side of starter, and remove starter from transmission.

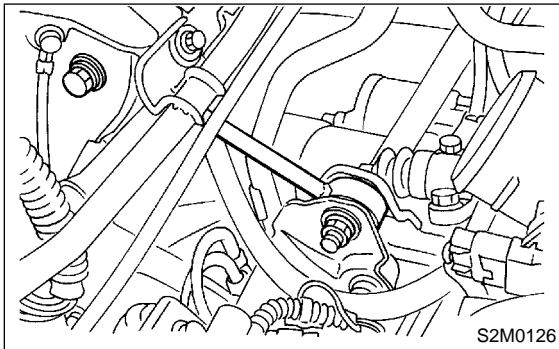


7) Remove operating cylinder from transmission.
(MT model)



- (A) Clutch hose
- (B) Operating cylinder

8) Remove pitching stopper.

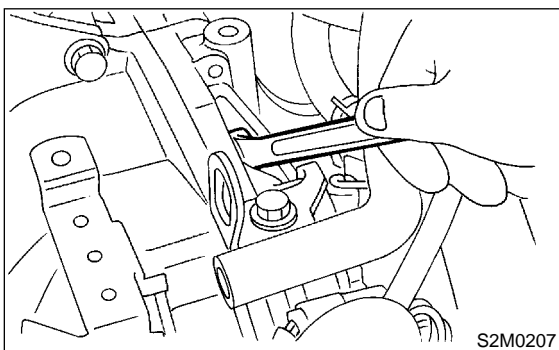


9) Separate torque converter clutch from drive plate. (AT model)

- (1) Remove service hole plug.
- (2) Remove bolts which hold torque converter clutch to drive plate.
- (3) While rotating the engine, remove other bolts using ST.

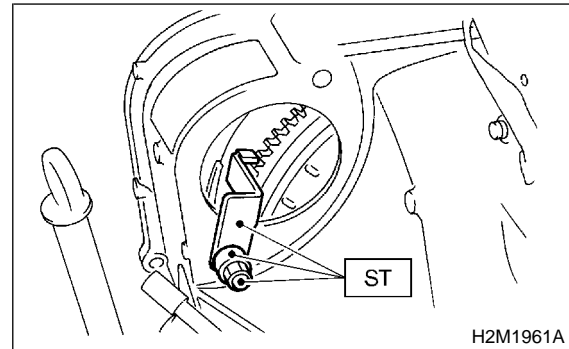
CAUTION:
Be careful not to drop bolts into torque converter clutch housing.

ST 499977000 CRANK PULLEY WRENCH



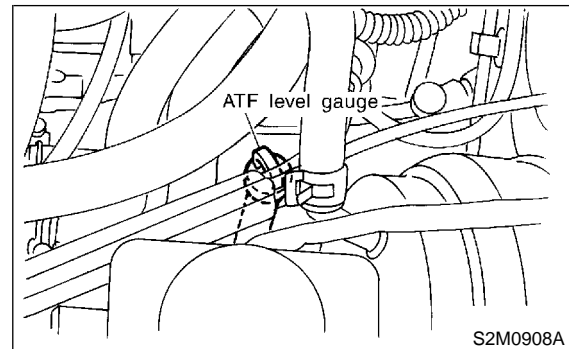
10) Install ST to torque converter clutch case. (AT model)

ST 498277200 STOPPER SET



11) Remove ATF level gauge. (AT model)

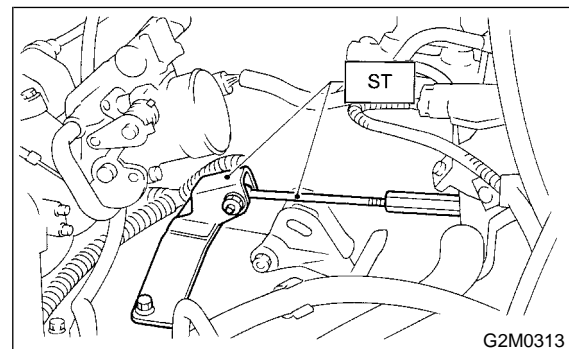
CAUTION:
Plug opening to prevent entry of foreign particles into transmission fluid.



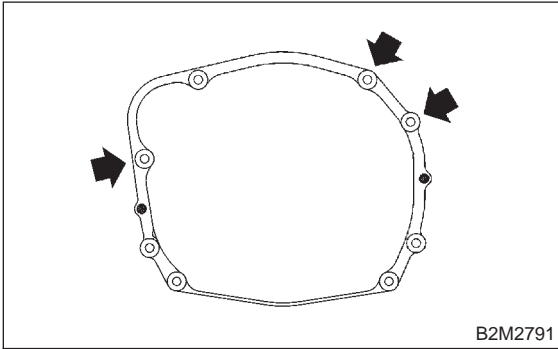
12) Set ST.

NOTE:
Also is available Part No. 927670000.

ST 41099AA020 ENGINE SUPPORT ASSY



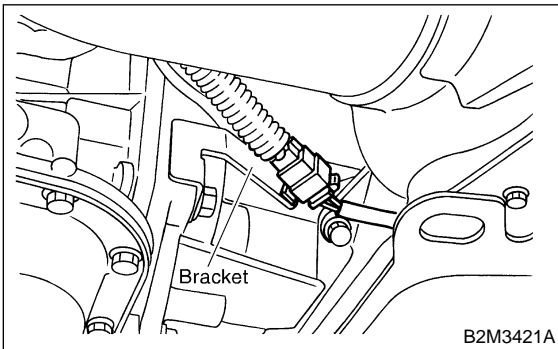
13) Remove bolt which holds right upper side of transmission to engine.



B2M2791

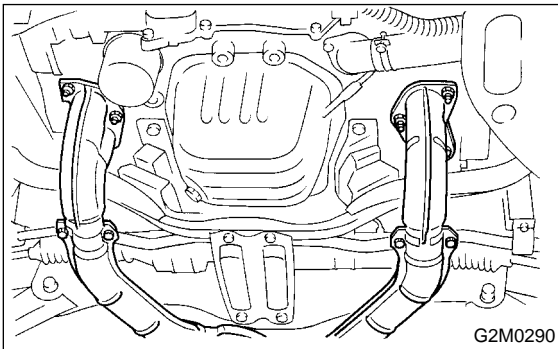
14) Remove under cover.

15) Remove rear oxygen sensor connector from bracket.



B2M3421A

16) Remove front and center exhaust pipes.
<Ref. to 2-9 [W1A0].>



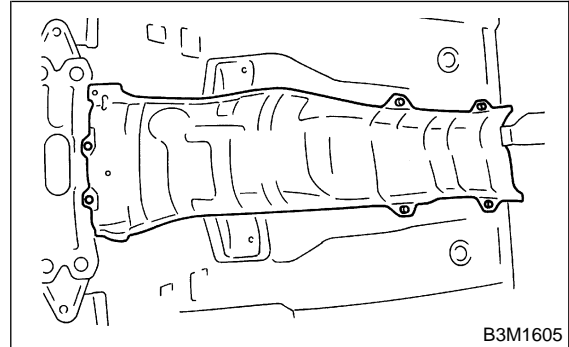
G2M0290

17) Remove rear exhaust pipe and muffler.
<Ref. to 2-9 [W2A0].>

CAUTION:

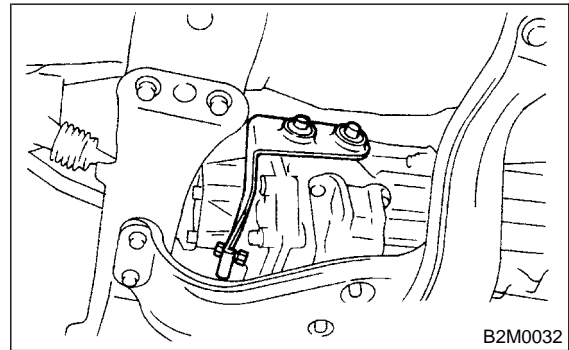
When removing exhaust pipes, be careful each exhaust pipe does not drop out.

18) Remove heat shield cover.



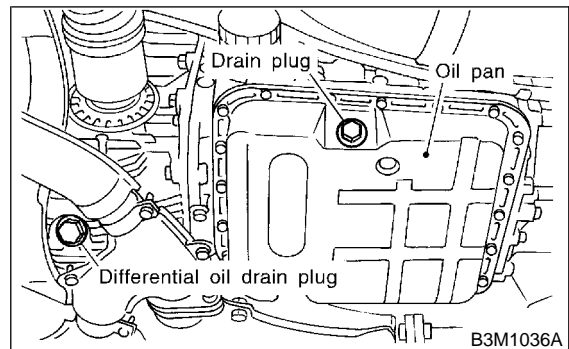
B3M1605

19) Remove hanger bracket from right side of transmission.



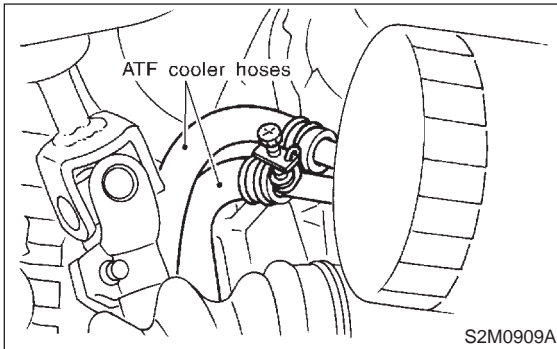
B2M0032

20) Drain ATF to remove ATF drain plug. (AT model)



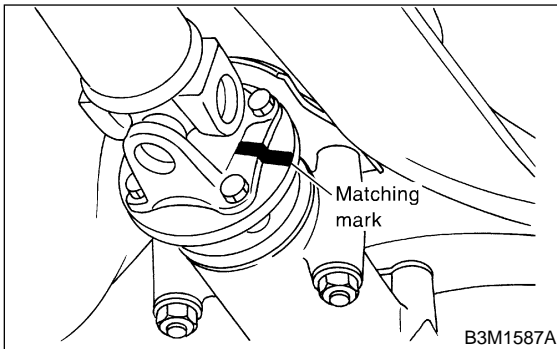
B3M1036A

21) Disconnect ATF cooler hoses from pipes of transmission side, and remove ATF level gauge guide. (AT model)



22) Remove propeller shaft.

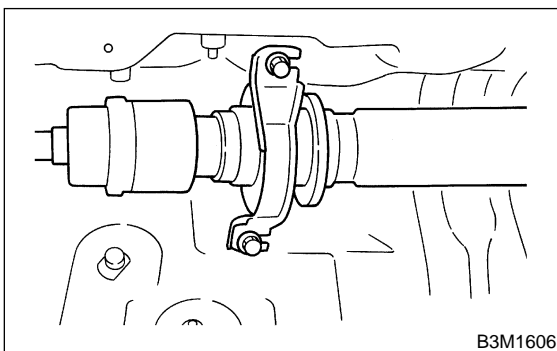
(1) Separate propeller shaft from rear differential.



(2) Remove bolts which hold center bearing onto body.

CAUTION:

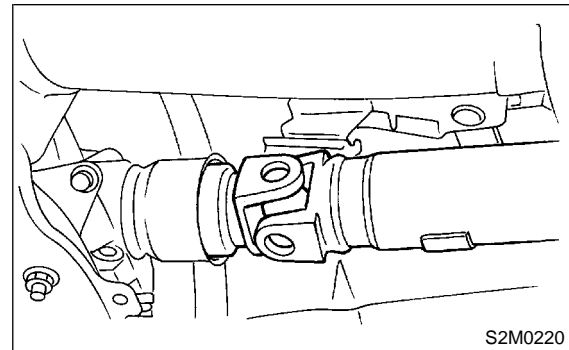
Be careful not to drop propeller shaft.



(3) Remove propeller shaft from transmission.

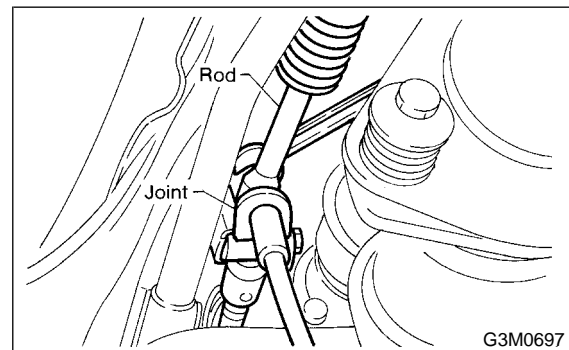
CAUTION:

- Be sure to use an empty container to catch oil flowing out when removing propeller shaft.
- Be sure not to damage oil seals and the frictional surface of sleeve yoke.
- Be sure to plug the opening in transmission after removal of propeller shaft.



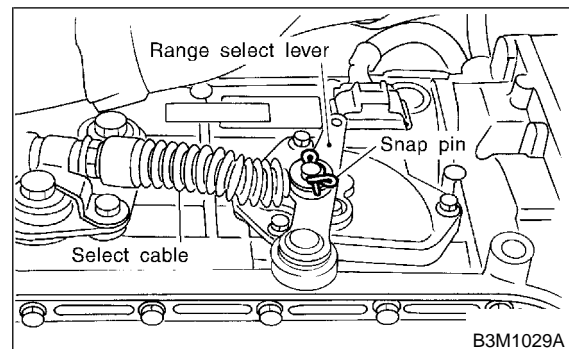
23) Remove gear shift rod and stay from transmission. (MT model)

- (1) Remove spring.
- (2) Disconnect stay from transmission.
- (3) Disconnect rod from transmission.

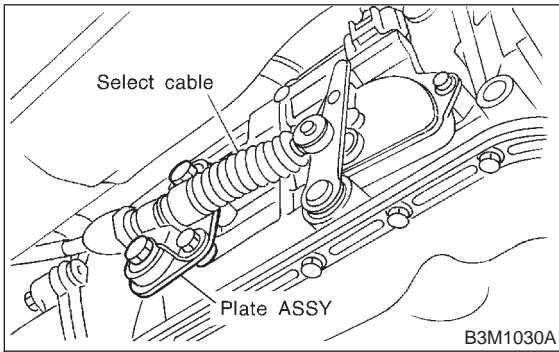


24) Remove shift selector cable. (AT model)

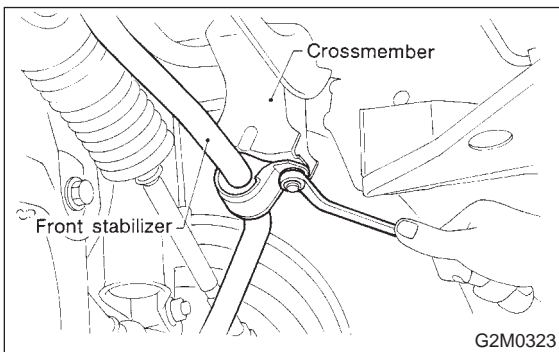
- (1) Remove snap pin from range select lever.



(2) Remove plate assembly from transmission case.

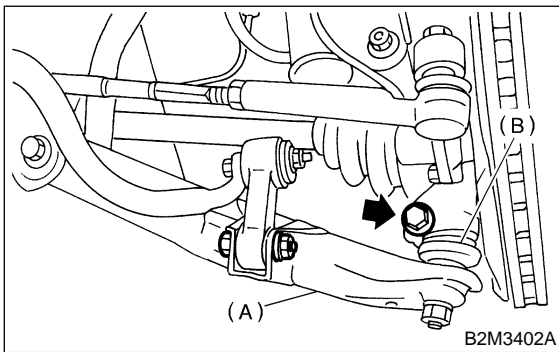


25) Remove bolts which install stabilizer clamps onto crossmember.



26) Remove front drive shafts from transmission.

(1) Remove transverse link from housing.



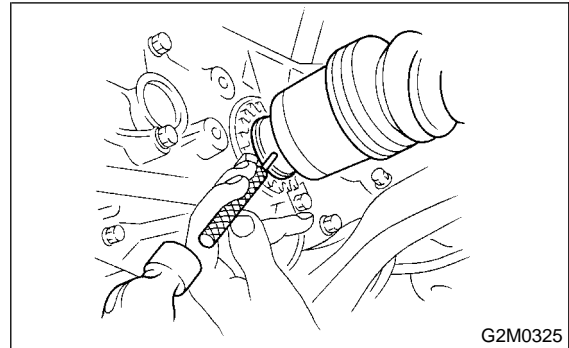
- (A) Transverse link
- (B) Ball joint

(2) Lower transverse link.

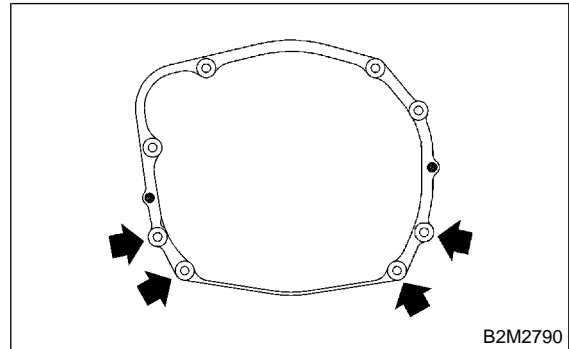
(3) Remove spring pins and separate front drive shafts from each side of the transmission.

CAUTION:

Discard removing spring pin. Replace with a new one.



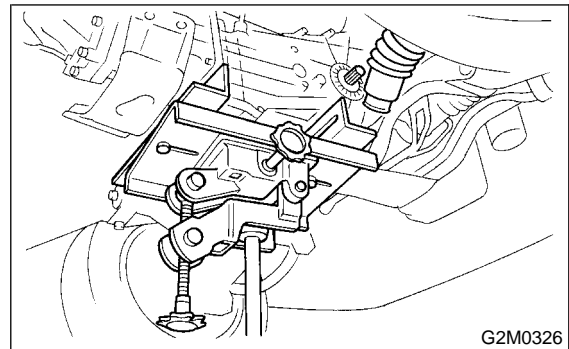
27) Remove nuts which hold lower side of transmission to engine.



28) Place transmission jack under transmission.

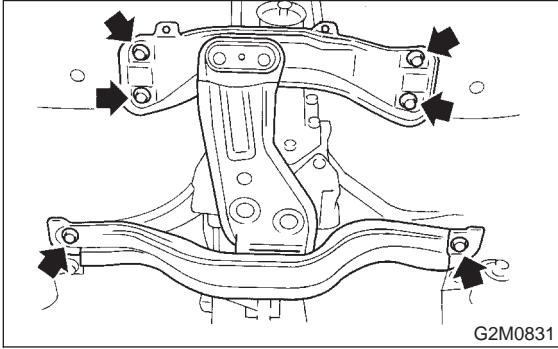
CAUTION:

- Always support transmission case with a transmission jack.
- On AT vehicles, make sure that the support plates of transmission jack don't touch the oil pan.

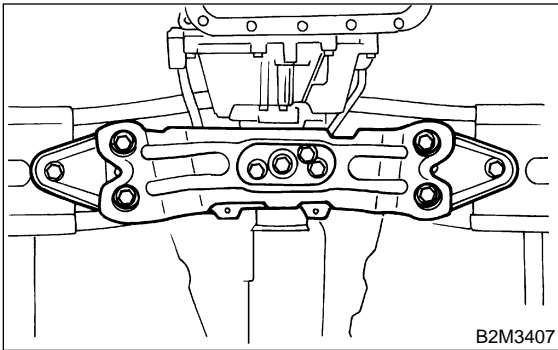


29) Remove transmission rear crossmember from vehicle.

● MT model



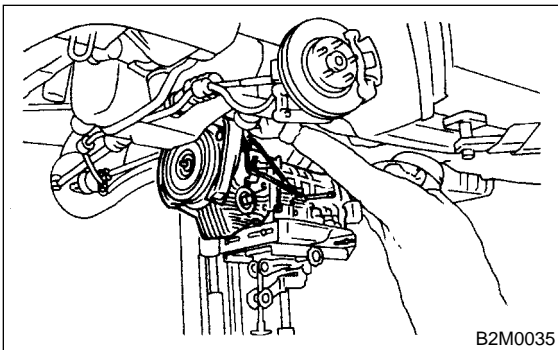
● AT model



30) Remove transmission.

CAUTION:

- Move transmission jack toward rear until main shaft is withdrawn from clutch cover. (MT model)
- Move transmission and torque converter as a unit away from engine. (AT model)



31) Separate transmission assembly and rear cushion rubber.

C: INSTALLATION

1) Install rear cushion rubber to transmission assembly.

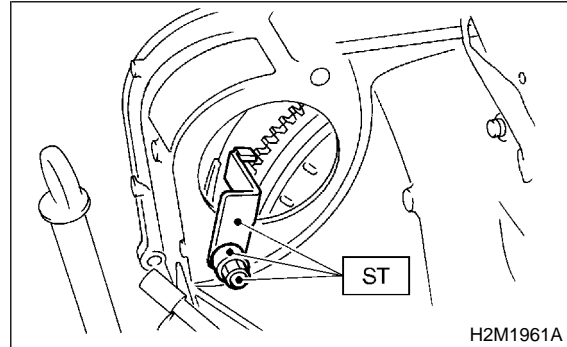
Tightening torque:

MT; 34 ± 5 N·m (3.5 ± 0.5 kg·m, 25.3 ± 3.6 ft·lb)

AT; 38 ± 15 N·m (3.9 ± 1.5 kg·m, 28 ± 11 ft·lb)

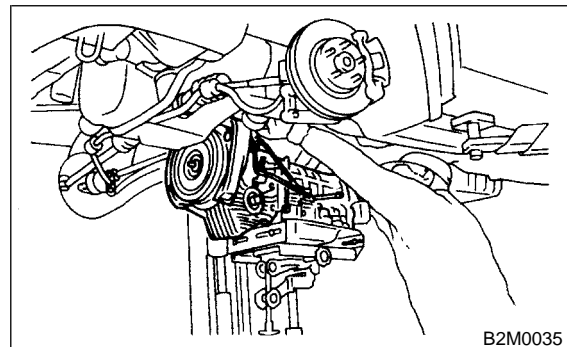
2) Install ST to torque converter clutch case. (AT model)

ST 498277200 STOPPER SET



3) Install transmission onto engine.

(1) Gradually raise transmission with transmission jack.



(2) Engage them at splines.

CAUTION:

Be careful not to strike main shaft against clutch cover. (MT model)

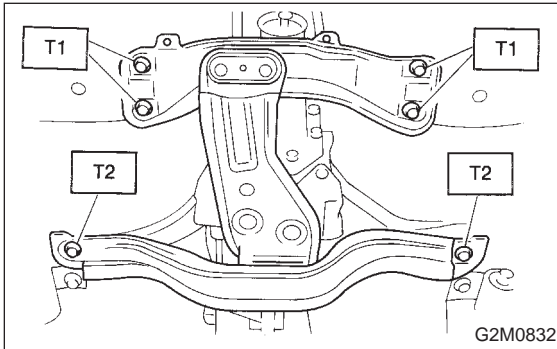
4) Install transmission rear crossmember.

● MT model

Tightening torque:

T1: 69±15 N-m (7.0±1.5 kg-m, 51±11 ft-lb)

T2: 137±20 N-m (14±2 kg-m, 101±14 ft-lb)

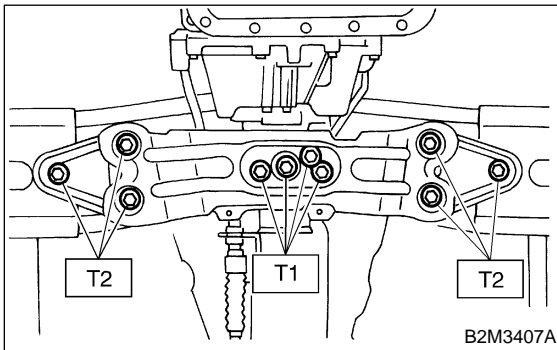


● AT model

Tightening torque:

T1: 34±5 N-m (3.5±0.5 kg-m, 25.3±3.6 ft-lb)

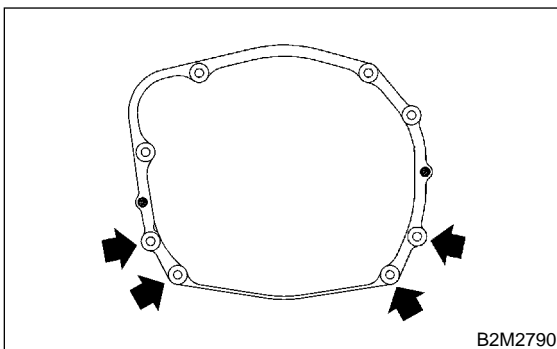
T2: 69±15 N-m (7.0±1.5 kg-m, 51±11 ft-lb)



- 5) Take off transmission jack.
- 6) Tighten nuts which hold lower side of transmission to engine.

Tightening torque:

50±4 N-m (5.1±0.4 kg-m, 36.9±2.9 ft-lb)



- 7) Connect engine and transmission.
 - (1) Remove ST from torque converter clutch case. (AT model)

NOTE:

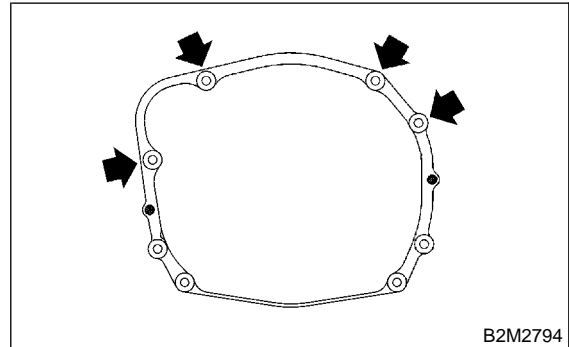
Be careful not to drop the ST into the torque converter clutch case when removing ST.

ST 498277200 STOPPER SET

- (2) Install starter.
 - <Ref. to 6-1 [W1A0].>
- (3) Tighten bolt which holds right upper side of transmission to engine.

Tightening torque:

50±4 N-m (5.1±0.4 kg-m, 36.9±2.9 ft-lb)



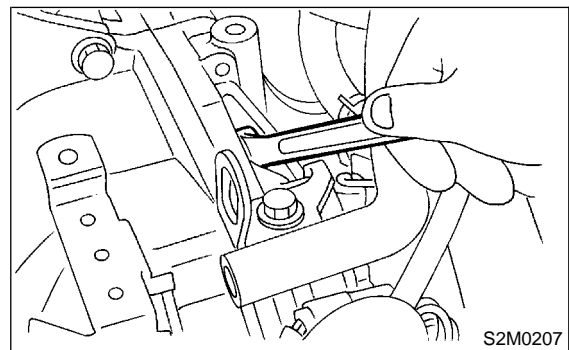
- 8) Install torque converter clutch to drive plate. (AT model)
 - (1) Tighten bolts which hold torque converter clutch to drive plate.
 - (2) Tighten other bolts while rotating the engine by using ST.

CAUTION:
Be careful not to drop bolts into torque converter clutch housing.

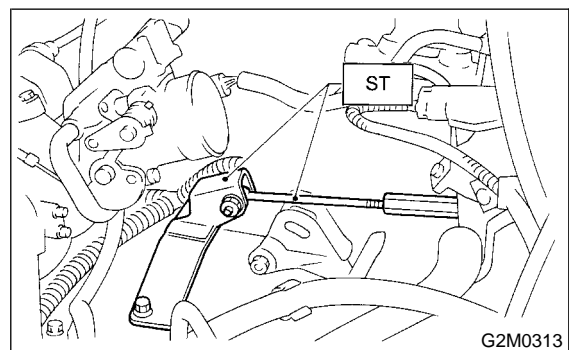
ST 499977000 CRANK PULLEY WRENCH

Tightening torque:

25±2 N-m (2.5±0.2 kg-m, 18.1±1.4 ft-lb)



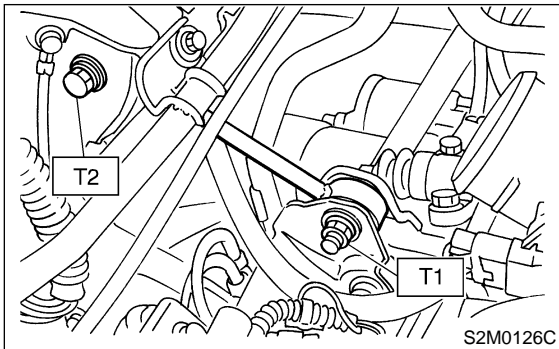
- (3) Clog plug onto service hole.
- 9) Remove ST.



10) Install pitching stopper.

Tightening torque:

T1: 49±5 N·m (5.0±0.5 kg·m, 36.2±3.6 ft·lb)
T2: 57±10 N·m (5.8±1.0 kg·m, 42±7 ft·lb)

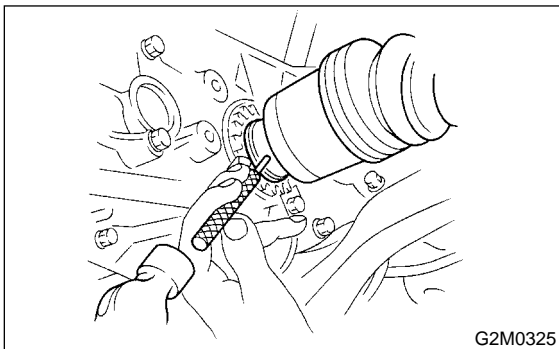


11) Install front drive shafts into transmission.

- (1) Lift-up the vehicle.
- (2) Install front drive shaft into transmission.
- (3) Drive spring pin into chamfered hole of drive shaft.

CAUTION:

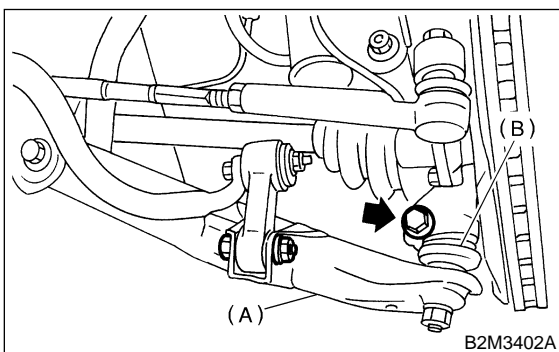
Always use a new spring pin.



- (4) Install ball joints of lower arm into knuckle arm of housing, and tighten installing bolts.

Tightening torque:

49±10 N·m (5.0±1.0 kg·m, 36±7 ft·lb)

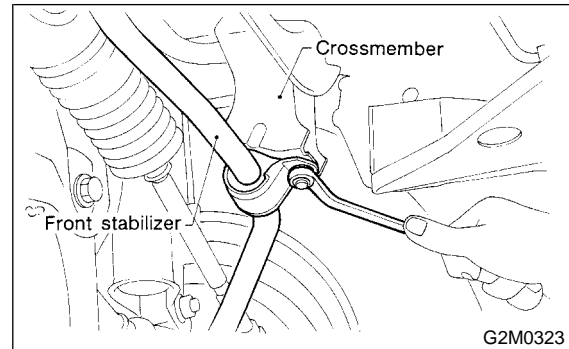


- (A) Transverse link
- (B) Ball joint

12) Install stabilizer clamps onto front crossmember.

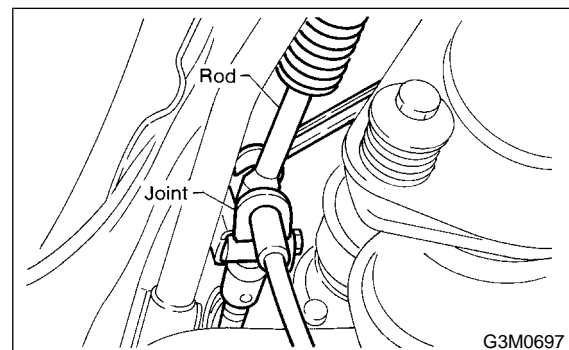
Tightening torque:

25±4 N·m (2.5±0.4 kg·m, 18.1±2.9 ft·lb)



13) Install gear shift rod and stay. (MT model)

- (1) Install gear shift rod onto transmission.



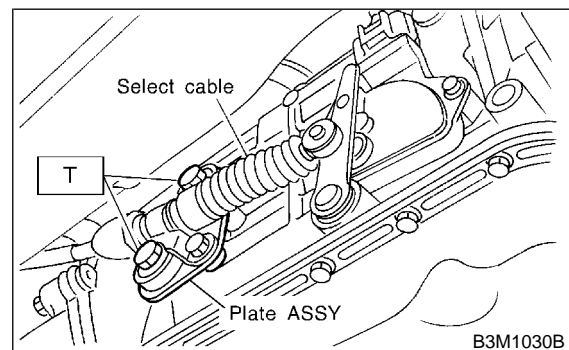
- (2) Install stay onto transmission.
- (3) Install spring.

14) Install shift selector cable onto select lever. (AT model)

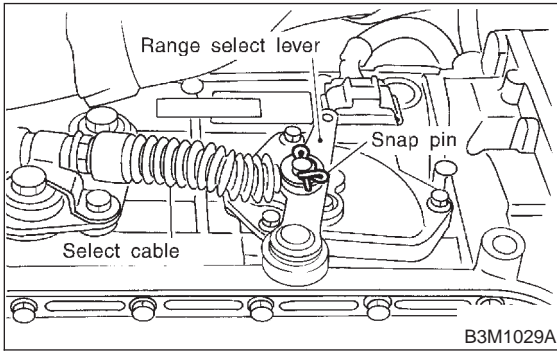
- (1) Install selector cable to range select lever.
- (2) Install plate assembly to transmission.

Tightening torque:

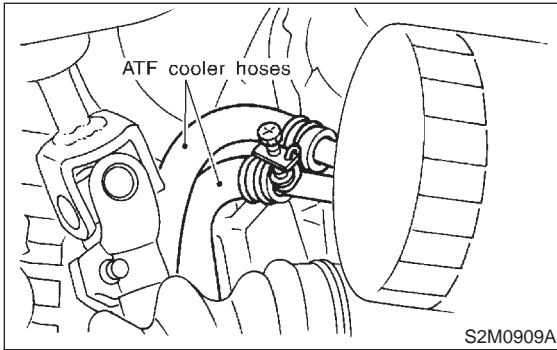
T: 24.5±2.0 N·m (2.50±0.20 kg·m, 18.1±1.4 ft·lb)



(3) Install snap pin to range select lever.



15) Install ATF level gauge guide, and connect ATF cooler hoses to pipe. (AT model)

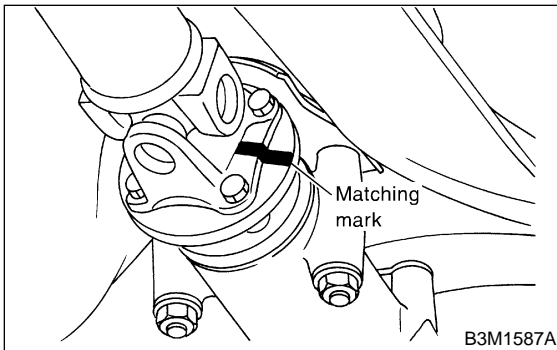


16) Install propeller shaft.

- (1) Install propeller shaft into transmission.
- (2) Tighten bolts which install propeller shaft onto companion flange of rear differential.

Tightening torque:

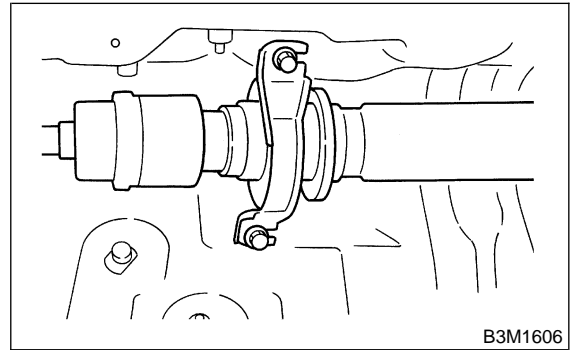
31±8 N-m (3.2±0.8 kg-m, 23.1±5.8 ft-lb)



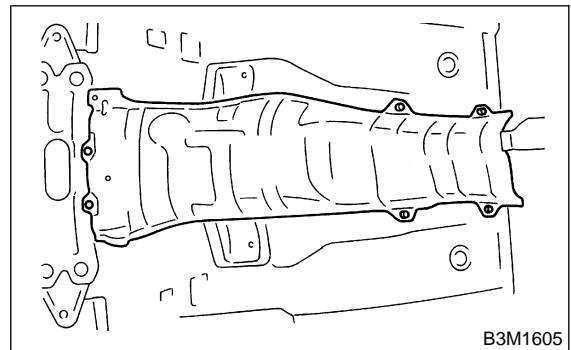
(3) Install center bearing bracket on body.

Tightening torque:

52±5 N-m (5.3±0.5 kg-m, 38.3±3.6 ft-lb)

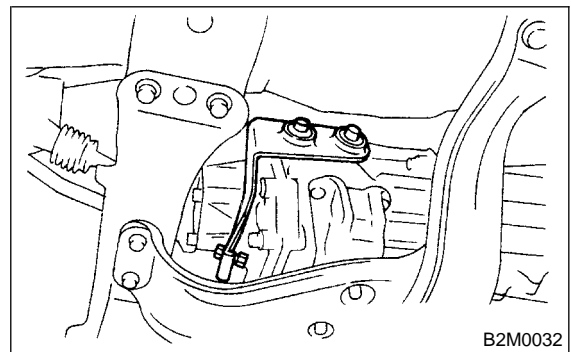


17) Install heat shield cover.

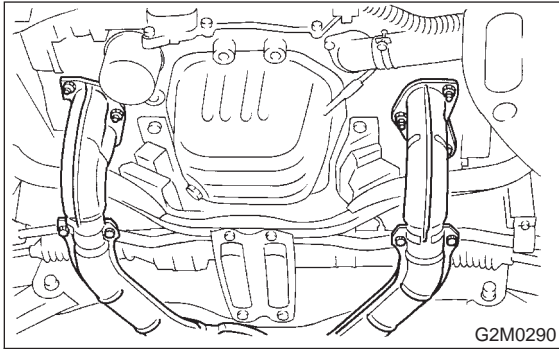


18) Install rear exhaust pipe and muffler.

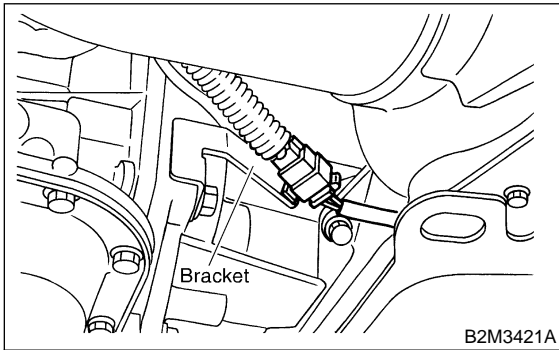
19) Install hanger bracket on right side of transmission.



- 20) Install front exhaust pipe and center exhaust pipe.
<Ref. to 2-9 [W1B0].>

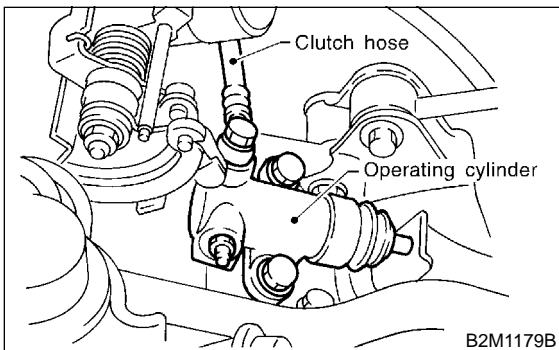


- 21) Connect rear oxygen sensor connector, and install rear oxygen sensor connector to bracket.

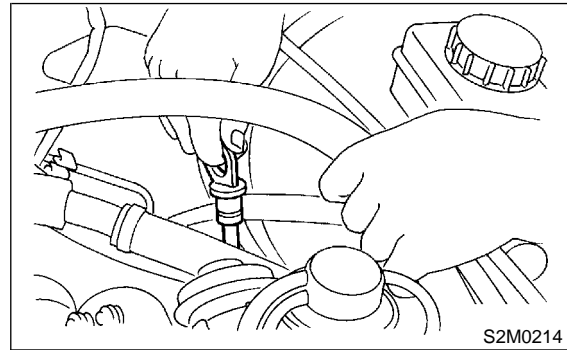


- 22) Install under cover.
23) Install operating cylinder. (MT model)

Tightening torque:
37±3 N·m (3.8±0.3 kg·m, 27.5±2.2 ft·lb)



- 24) Install ATF level gauge. (AT model)



- 25) Connect the following connectors.
(1) Transmission harness connectors (AT model)
(2) Transmission ground terminal

Tightening torque:

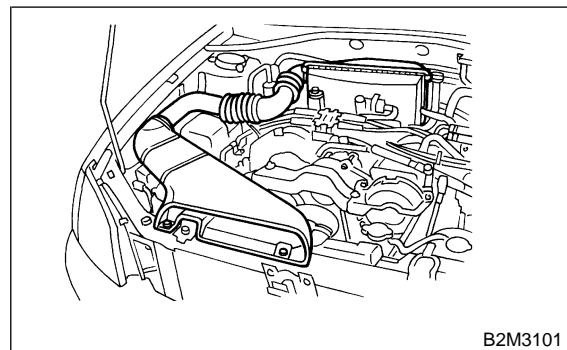
13±3 N·m (1.3±0.3 kg·m, 9.4±2.2 ft·lb)

- (3) Oxygen sensor connector
(4) Vehicle speed sensor connector (MT model)
(5) Neutral position switch connector (MT model)
(6) Back-up light switch connector (MT model)
26) Install air cleaner case stay.

Tightening torque:

16±5 N·m (1.6±0.5 kg·m, 11.6±3.6 ft·lb)

- 27) Install air cleaner case. <Ref. to 2-7 [W1A0].>



- 28) Connect battery ground cable.
29) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. (AT model)

Recommended fluid:

Dexron IIE or Dexron III type automatic transmission fluid

Fluid capacity:

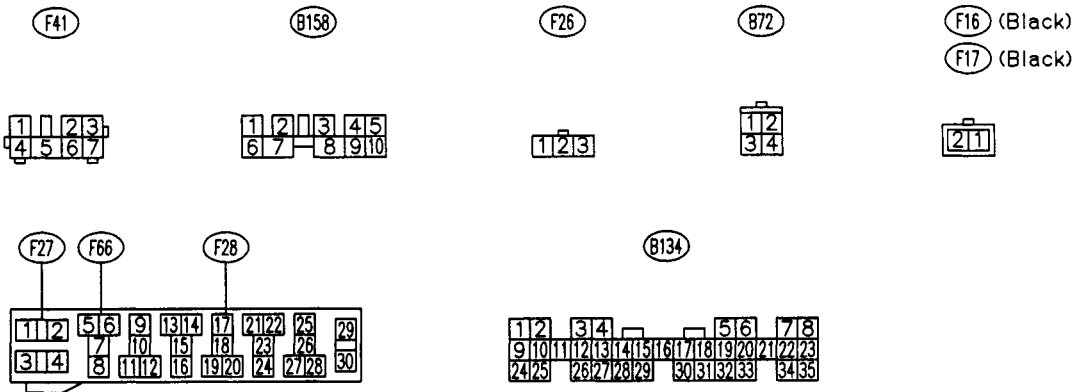
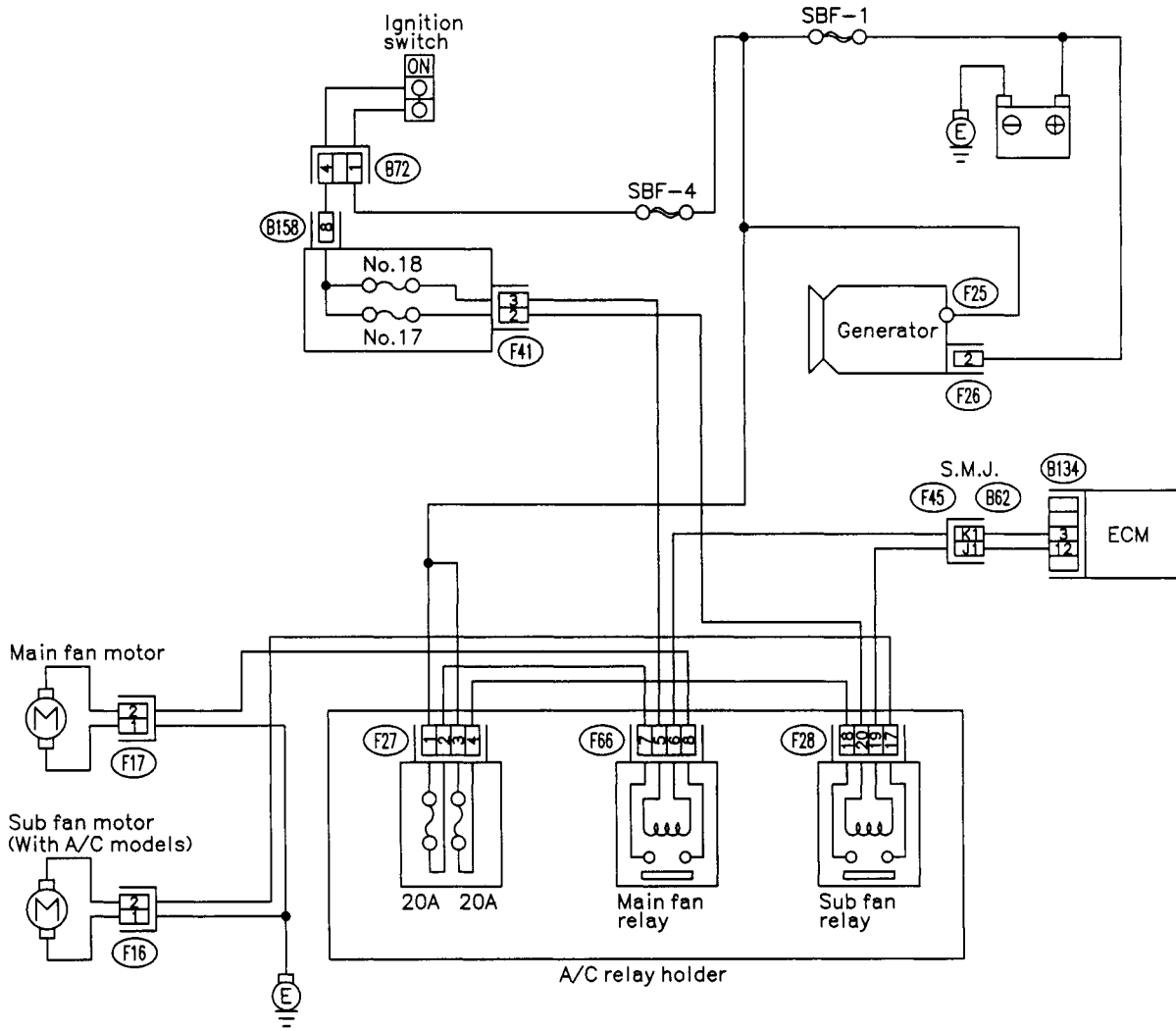
8.4 — 8.7 ℓ (8.9 — 9.2 US qt, 7.4 — 7.7 Imp qt)

- 30) Take off vehicle from lift arms.
31) Check selector lever operation. (AT model)
<Ref. to 3-2 [T2C0].>

32) Run the vehicle until the ATF temperature rises from 60 to 80°C (140 to 176°F) and check the ATF level of the "HOT" side on level gauge. (AT model)

33) Check the vehicle on the road tester. (AT model)
<Ref. to 3-2 [W7A0].>

1. Wiring Diagram



2. Radiator Main Fan

A: OPERATION

DETECTING CONDITION:

Condition:

- Engine coolant temperature is above 95°C (203°F).
- Vehicle speed is below 19 km/h (12 MPH).

TROUBLE SYMPTOM:

- Radiator main fan does not rotate under the above conditions.

2A1 : CHECK POWER SUPPLY TO MAIN FAN MOTOR.

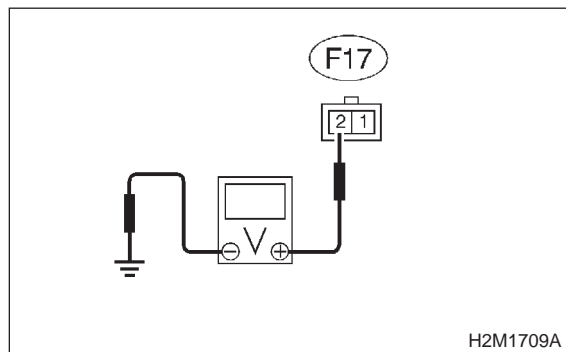
CAUTION:

Be careful not to overheat engine during repair.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from main fan motor.
- 3) Start the engine, and warm it up until engine coolant temperature increases over 95°C (203°F).
- 4) Stop the engine and turn ignition switch to ON.
- 5) Measure voltage between main fan motor connector and chassis ground.

Connector & terminal

(F17) No. 2 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Go to step **2A2**.

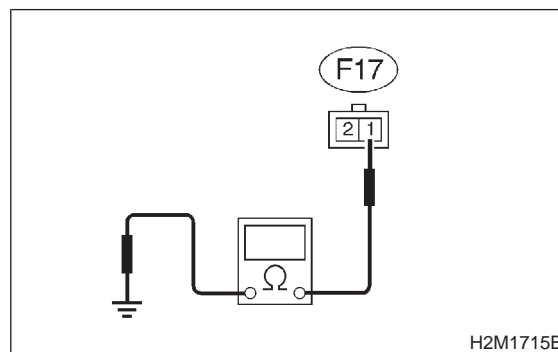
NO : Go to step **2A5**.

2A2 : CHECK GROUND CIRCUIT OF MAIN FAN MOTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between main fan motor connector and chassis ground.

Connector & terminal

(F17) No. 1 — Chassis ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step **2A3**.

NO : Repair open circuit in harness between main fan motor connector and chassis ground.

2A3 : CHECK POOR CONTACT.

Check poor contact in main fan motor connector.
<Ref. to FOREWORD [W3C1].>

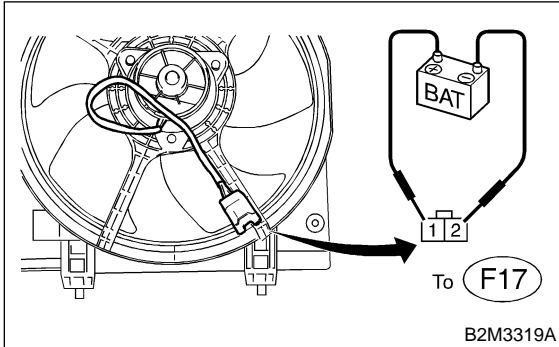
CHECK : **Is there poor contact in main fan motor connector?**

YES : Repair poor contact in main fan motor connector.

NO : Go to step **2A4**.

2A4 : CHECK MAIN FAN MOTOR.

Connect battery positive (+) terminal to terminal No. 2, and negative (-) terminal to terminal No. 1 of main fan motor connector.

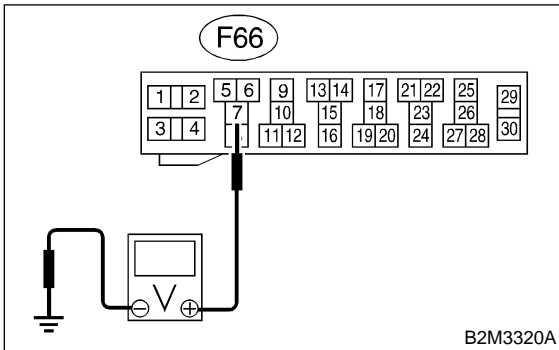


- CHECK** : *Does the main fan rotate?*
- YES** : Repair poor contact in main fan motor connector.
- NO** : Replace main fan motor with a new one.

2A5 : CHECK POWER SUPPLY TO MAIN FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay from A/C relay holder.
- 3) Measure voltage between main fan relay terminal and chassis ground.

Connector & terminal
(F66) No. 7 (+) — Chassis ground (-):

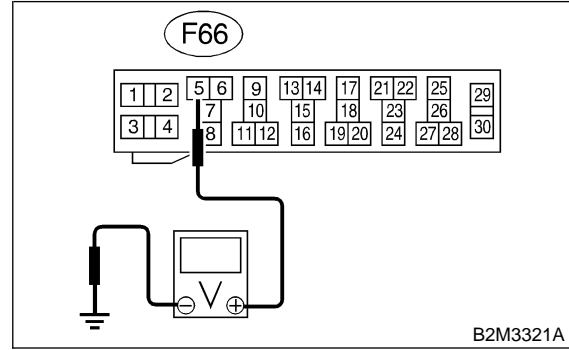


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **2A6**.
- NO** : Go to step **2A7**.

2A6 : CHECK POWER SUPPLY TO MAIN FAN RELAY.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between main fan relay terminal and chassis ground.

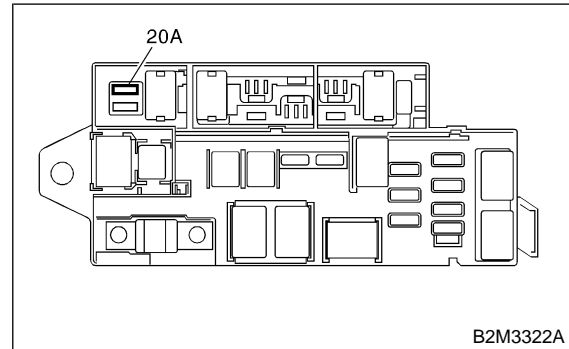
Connector & terminal
(F66) No. 5 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **2A10**.
- NO** : Go to step **2A9**.

2A7 : CHECK 20 A FUSE.

- 1) Remove 20 A fuse from A/C relay holder.
- 2) Check condition of fuse.



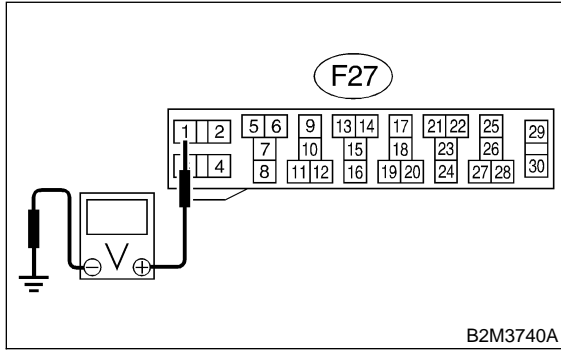
- CHECK** : *Is the fuse blown-out?*
- YES** : Replace fuse.
- NO** : Go to step **2A8**.

2A8 : CHECK POWER SUPPLY TO A/C RELAY HOLDER 20 A FUSE TERMINAL.

Measure voltage of harness between A/C relay holder 20 A fuse terminal and chassis ground.

Connector & terminal

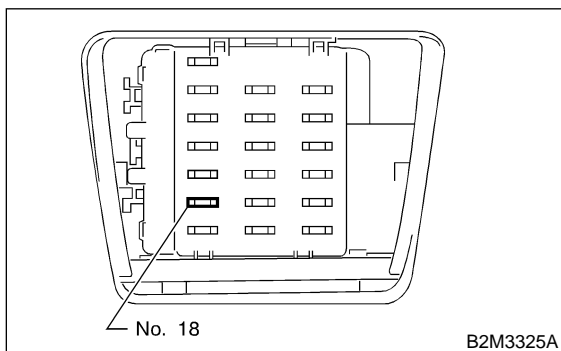
(F27) No. 1 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair open circuit in harness between 20 A fuse and main fan relay terminal.
- NO** : Repair open circuit in harness between main fuse box connector and 20 A fuse terminal.

2A9 : CHECK FUSE.

- 1) Turn ignition switch to OFF.
- 2) Remove fuse No. 18 from joint box.
- 3) Check condition of fuse.



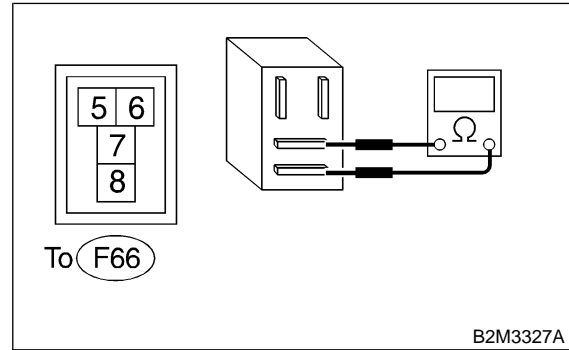
- CHECK** : **Is the fuse blown-out?**
- YES** : Replace fuse.
- NO** : Repair open circuit in harness between main fan relay and ignition switch.

2A10 : CHECK MAIN FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of main fan relay.

Terminal

No. 7 — No. 8:



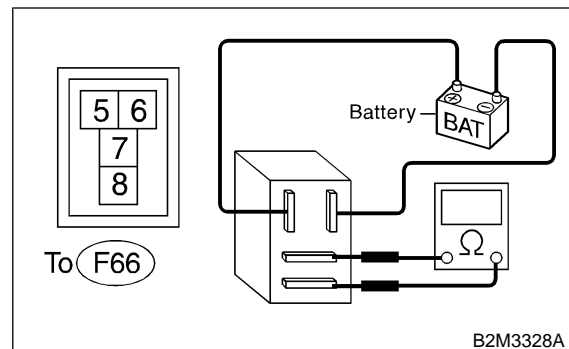
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 2A11.
- NO** : Replace main fan relay.

2A11 : CHECK MAIN FAN RELAY.

- 1) Connect battery to terminals No. 6 and No. 5 of main fan relay.
- 2) Measure resistance of main fan relay.

Terminal

No. 7 — No. 8:



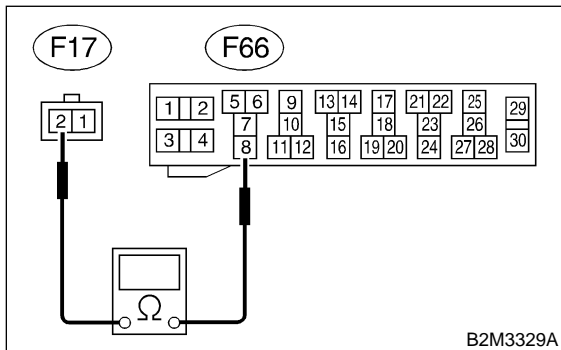
- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step 2A12.
- NO** : Replace main fan relay.

2A12 : CHECK HARNESS BETWEEN MAIN FAN RELAY TERMINAL AND MAIN FAN MOTOR CONNECTOR.

Measure resistance of harness between main fan motor connector and main fan relay terminal.

Connector & terminal

(F17) No. 2 — (F66) No. 8:



B2M3329A

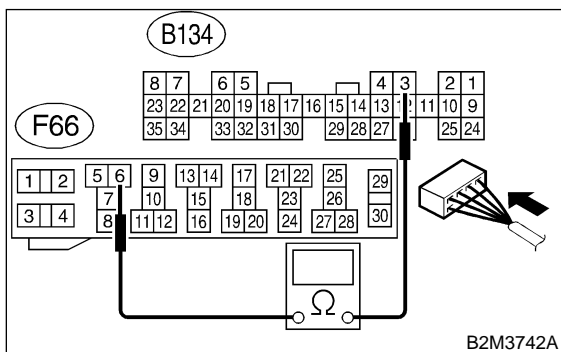
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **2A13**.
- NO** : Repair open circuit in harness between main fan motor connector and main fan relay terminal.

2A13 : CHECK HARNESS BETWEEN MAIN FAN RELAY AND ECM.

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

Connector & terminal

(F66) No. 6 — (B134) No. 3:



B2M3742A

- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **2A14**.
- NO** : Repair open circuit in harness between main fan relay and ECM.

2A14 : CHECK POOR CONTACT.

Check poor contact in connector between main fan and ECM. <Ref. to FOREWORD [W3C1].>

- CHECK** : *Is there poor contact in connector between main fan motor and ECM?*
- YES** : Repair poor contact connector.
- NO** : Contact with your Subaru distributor.

NOTE:

Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

3. Radiator Sub Fan (With A/C model only)

A: OPERATION

DETECTING CONDITION:

Condition (1):

- Engine coolant temperature is below 95°C (203°F).
- A/C switch is turned ON.
- Vehicle speed is below 19 km/h (12 MPH).

Condition (2):

- Engine coolant temperature is above 100°C (212°F).
- A/C switch is turned OFF.
- Vehicle speed is below 19 km/h (12 MPH).

TROUBLE SYMPTOM:

- Radiator sub fan does not rotate under conditions (1) and (2) above.

3A1 : CHECK POWER SUPPLY TO SUB FAN MOTOR.

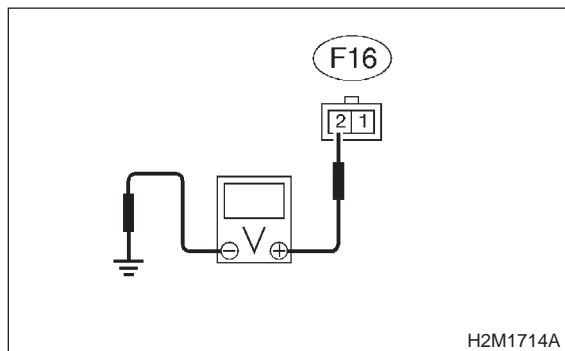
CAUTION:

Be careful not to overheat engine during repair.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from sub fan motor and main fan motor.
- 3) Start the engine, and warm it up until engine coolant temperature increases over 100°C (212°F).
- 4) Stop the engine and turn ignition switch to ON.
- 5) Measure voltage between sub fan motor connector and chassis ground.

Connector & terminal

(F16) No. 2 (+) — Chassis ground (-):



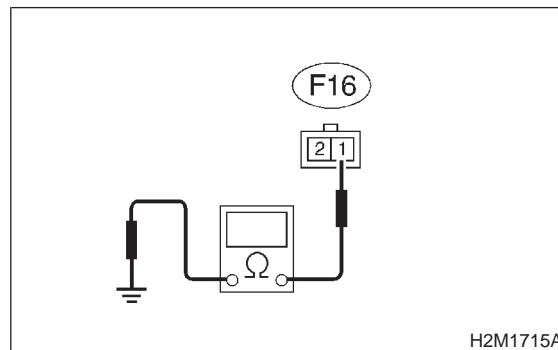
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **3A2**.
- NO** : Go to step **3A5**.

3A2 : CHECK GROUND CIRCUIT OF SUB FAN MOTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between sub fan motor connector and chassis ground.

Connector & terminal

(F16) No. 1 — Chassis ground:



- CHECK** : **Is the resistance less than 5 Ω?**
- YES** : Go to step **3A3**.
- NO** : Repair open circuit in harness between sub fan motor connector and chassis ground.

3A3 : CHECK POOR CONTACT.

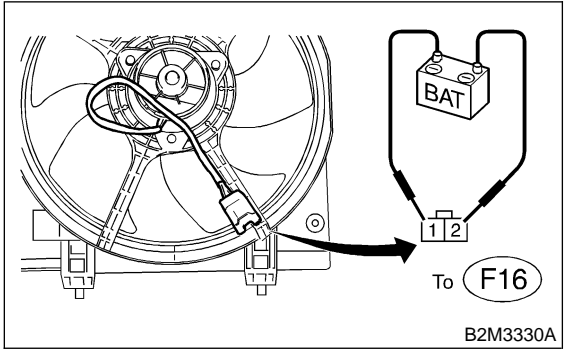
Check poor contact in sub fan motor connector.
<Ref. to FOREWORD [W3C1].>

- CHECK** : **Is there poor contact in sub fan motor connector?**
- YES** : Repair poor contact in sub fan motor connector.
- NO** : Go to step **3A4**.

3. Radiator Sub Fan (With A/C model only)

3A4 : CHECK SUB FAN MOTOR.

Connect battery positive (+) terminal to terminal No. 2, and negative (-) terminal to terminal No. 1 of sub fan motor connector.

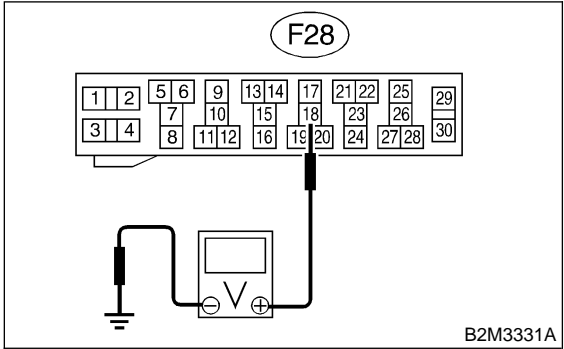


- CHECK** : *Does the sub fan rotate?*
- YES** : Repair poor contact in sub fan motor connector.
- NO** : Replace sub fan motor with a new one.

3A5 : CHECK POWER SUPPLY TO SUB FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Remove sub fan relay from A/C relay holder.
- 3) Measure voltage between sub fan relay terminal and chassis ground.

Connector & terminal
(F28) No. 18 (+) — Chassis ground (-):

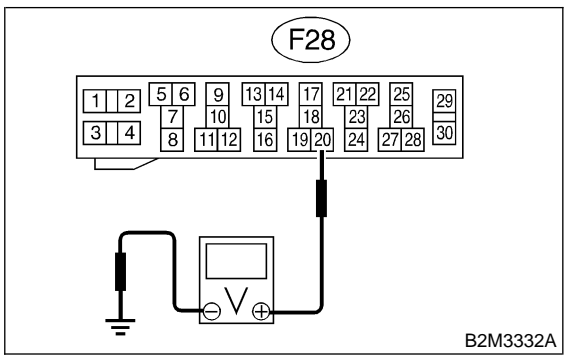


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 3A6.
- NO** : Go to step 3A7.

3A6 : CHECK POWER SUPPLY TO SUB FAN RELAY.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between sub fan relay terminal and chassis ground.

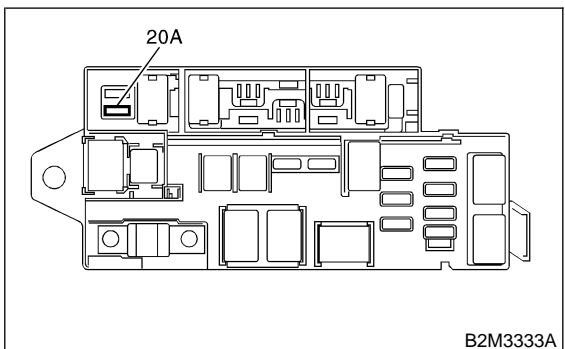
Connector & terminal
(F28) No. 20 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 3A10.
- NO** : Go to step 3A9.

3A7 : CHECK 20 A FUSE.

- 1) Remove 20 A fuse from A/C relay holder.
- 2) Check condition of fuse.



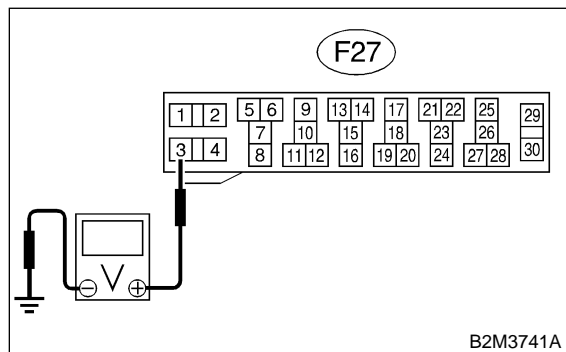
- CHECK** : *Is the fuse blown-out?*
- YES** : Replace fuse.
- NO** : Go to step 3A8.

3A8 : CHECK POWER SUPPLY TO A/C RELAY HOLDER 20 A FUSE TERMINAL.

Measure voltage of harness between A/C relay holder 20 A fuse terminal and chassis ground.

Connector & terminal

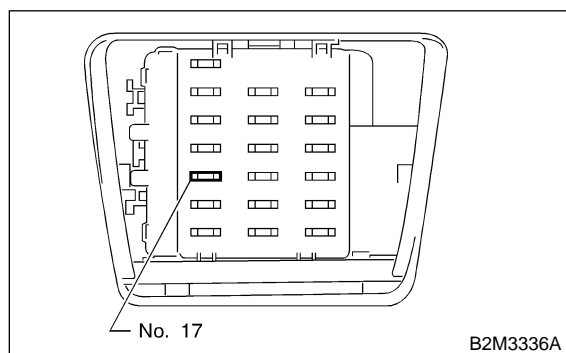
(F27) No. 3 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair open circuit in harness between 20 A fuse and sub fan relay terminal.
- NO** : Repair open circuit in harness between main fuse box connector and 20 A fuse terminal.

3A9 : CHECK FUSE.

- 1) Turn ignition switch to OFF.
- 2) Remove fuse No. 17 from joint box.
- 3) Check condition of fuse.



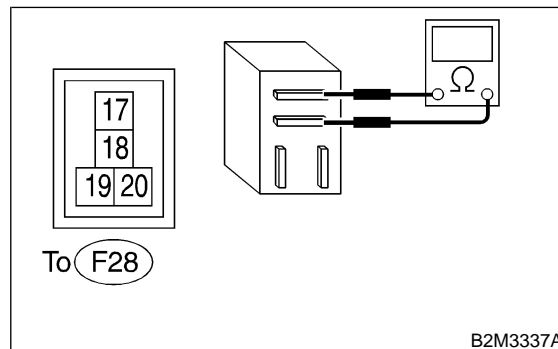
- CHECK** : **Is the fuse blown-out?**
- YES** : Replace fuse.
- NO** : Repair open circuit in harness between sub fan relay and ignition switch.

3A10 : CHECK SUB FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of sub fan relay.

Terminal

No. 17 — No. 18:



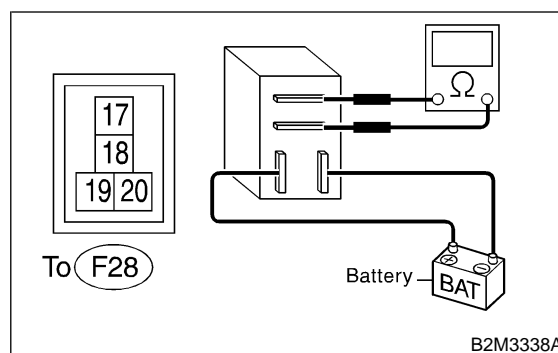
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 3A11.
- NO** : Replace sub fan relay.

3A11 : CHECK SUB FAN RELAY.

- 1) Connect battery to terminals No. 20 and No. 19 of sub fan relay.
- 2) Measure resistance of sub fan relay.

Terminal

No. 17 — No. 18:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step 3A12.
- NO** : Replace sub fan relay.

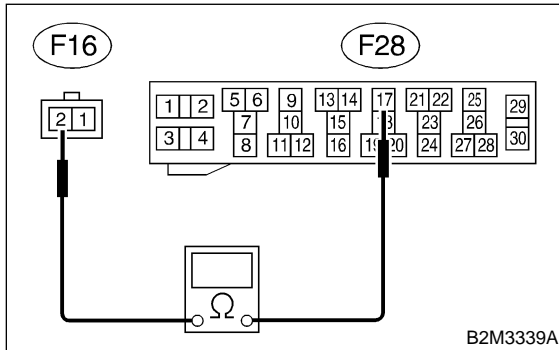
3. Radiator Sub Fan (With A/C model only)

3A12 : CHECK HARNESS BETWEEN SUB FAN RELAY TERMINAL AND SUB FAN MOTOR CONNECTOR.

Measure resistance of harness between sub fan motor connector and sub fan relay terminal.

Connector & terminal

(F16) No. 2 — (F28) No. 17:



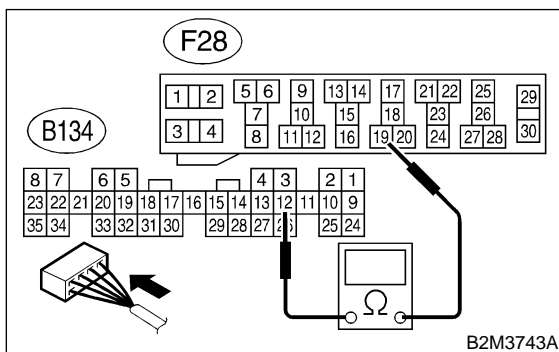
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **3A13**.
- NO** : Repair open circuit in harness between sub fan motor and sub fan relay connector.

3A13 : CHECK HARNESS BETWEEN SUB FAN RELAY AND ECM.

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

Connector & terminal

(F28) No. 19 — (B134) No. 12:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **3A14**.
- NO** : Repair open circuit in harness between sub fan relay and ECM.

3A14 : CHECK POOR CONTACT.

Check poor contact in connector between sub fan and ECM. <Ref. to FOREWORD [W3C1].>

- CHECK** : *Is there poor contact in connector between sub fan motor and ECM?*
- YES** : Repair poor contact connector.
- NO** : Contact with your Subaru distributor.

NOTE:

Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

MEMO:

1. General

A: GENERAL DESCRIPTION

- The on-board diagnostics (OBD) system detects and indicates a fault in various inputs and outputs of the complex electronic control. CHECK ENGINE malfunction indicator lamp (MIL) in the combination meter indicates occurrence of a fault or trouble.
- Further, against such a failure or sensors as may disable the drive, the fail-safe function is provided to ensure the minimal driveability.
- The OBD system incorporated with the vehicles within this engine family complies with Section 1968.1, California Code of Regulations (OBD-II regulation). The OBD system monitors the components and the system malfunction listed in Engine Section which affects on emissions.
- When the system decides that a malfunction occurs, MIL illuminates. At the same time of the MIL illumination or blinking, a diagnostic trouble code (DTC) and a freeze frame engine conditions are stored into on-board computer.
- The OBD system stores freeze frame engine condition data (engine load, engine coolant temperature, fuel trim, engine speed and vehicle speed, etc.) into on-board computer when it detects a malfunction first.
- If the OBD system detects the various malfunctions including the fault of fuel trim or misfire, the OBD system first stores freeze frame engine conditions about the fuel trim or misfire.
- When the malfunction does not occur again for three consecutive driving cycles, MIL is turned off, but DTC remains at on-board computer.
- The OBD-II system is capable of communication with a general scan tool (OBD-II general scan tool) formed by ISO 9141 CARB.
- The OBD-II diagnostics procedure is different from the usual diagnostics procedure. When troubleshooting OBD-II vehicles, connect Subaru Select Monitor or the OBD-II general scan tool to the vehicle.

B: ENGINE

1. ENGINE AND EMISSION CONTROL SYSTEM

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

With this system fuel, which is pressurized at a constant pressure, is injected into the intake air passage of the cylinder head. The injection quantity of fuel is controlled by an intermittent injection

system where the electro-magnetic injection valve (fuel injector) opens only for a short period of time, depending on the quantity of air required for one cycle of operation. In actual operation, the injection quantity is determined by the duration of an electric pulse applied to the fuel injector and this permits simple, yet highly precise metering of the fuel.

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

The MFI system also has the following features:

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

C: AUTOMATIC TRANSMISSION

1. ELECTRONIC-HYDRAULIC CONTROL SYSTEM

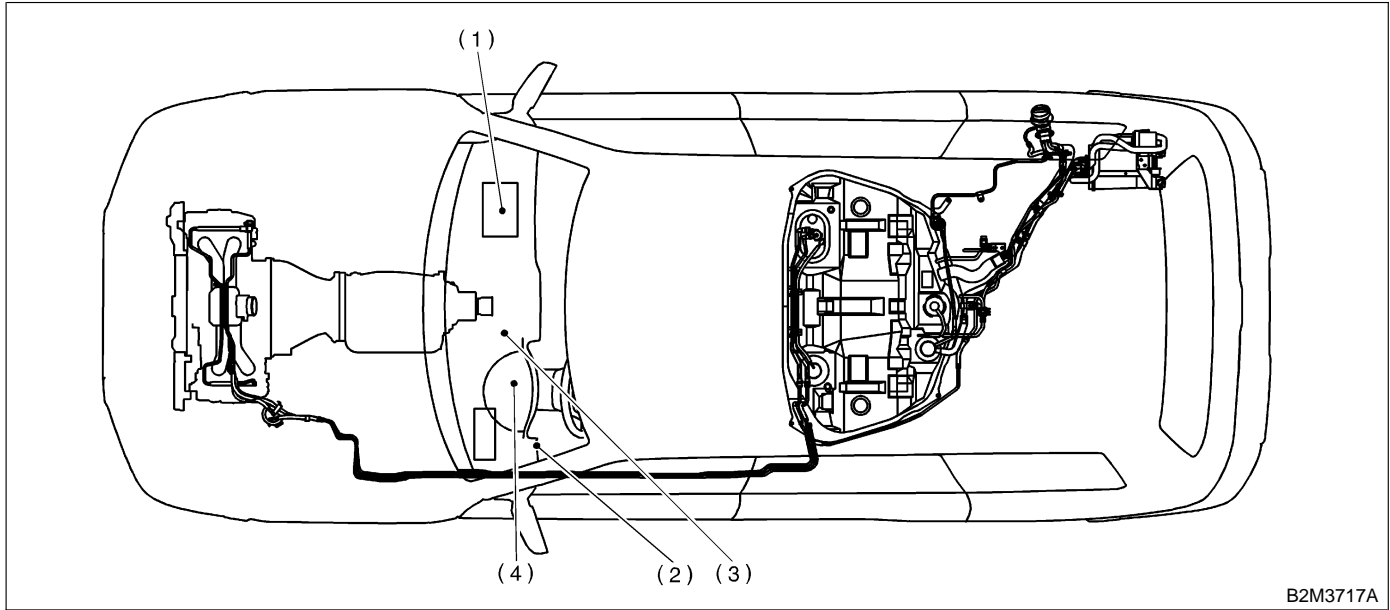
The electronic-hydraulic control system consists of various sensors and switches, a transmission control module (TCM) and the hydraulic controller including solenoid valves. The system controls the transmission proper including shift control, lock-up control, overrunning clutch control, line pressure control and shift timing control. It also controls the AWD transfer clutch. In other words, the system detects various operating conditions from various input signals and sends output signals to shift solenoids 1, 2 and low clutch timing solenoid and 2-4 brake timing solenoid, line pressure duty solenoid, lock-up duty solenoid, transfer duty solenoid and 2-4 brake duty solenoid (a total of eight solenoids).

MEMO:

2. Electrical Components Location

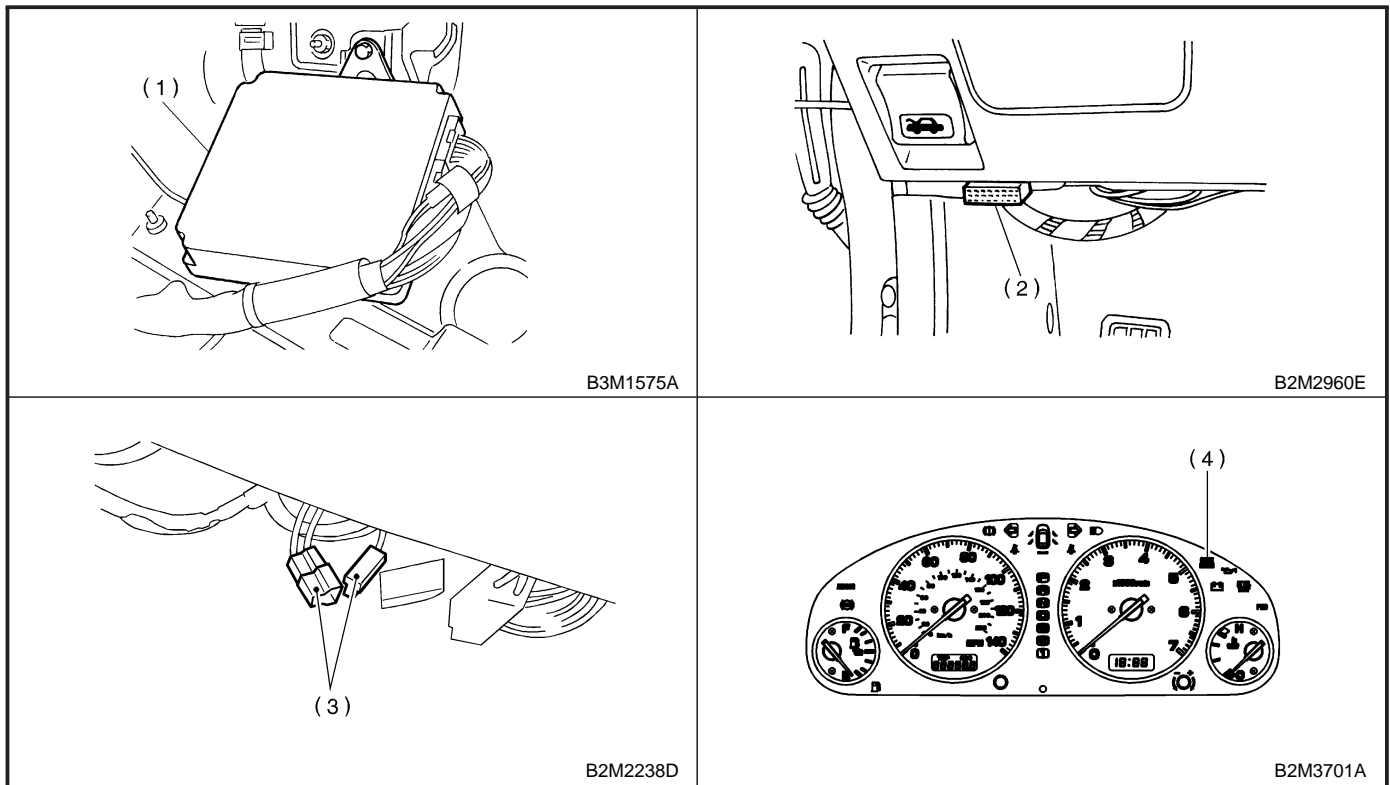
A: ENGINE (MT VEHICLES)

1. MODULE

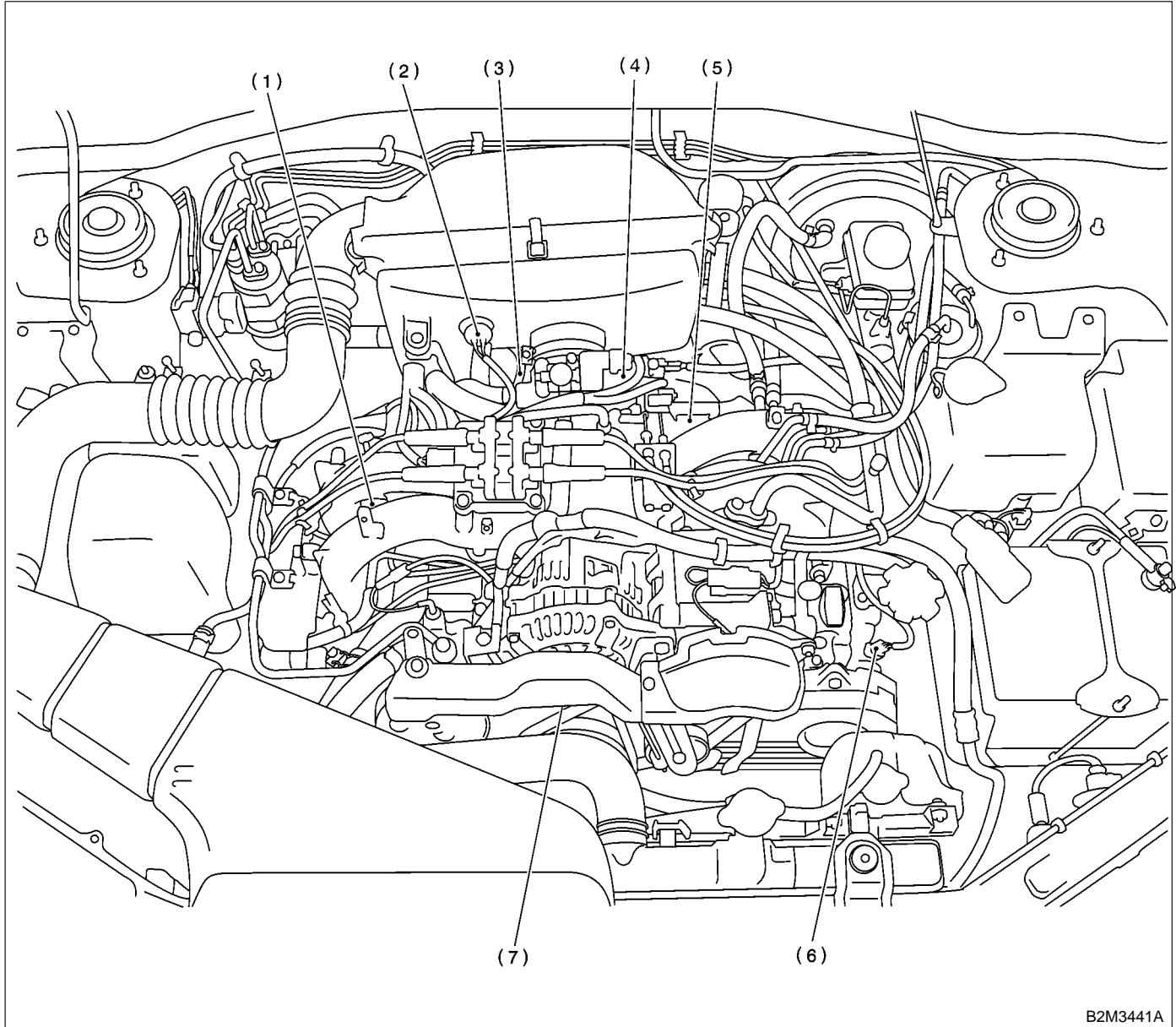


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- | | |
|--|---|
| (1) Engine control module (ECM) | (3) Test mode connector |
| (2) Data link connector (for Subaru Select Monitor and OBD-II general scan tool) | (4) CHECK ENGINE malfunction indicator lamp (MIL) |



2. SENSOR



B2M3441A

(1) Engine coolant temperature sensor

(3) Throttle position sensor

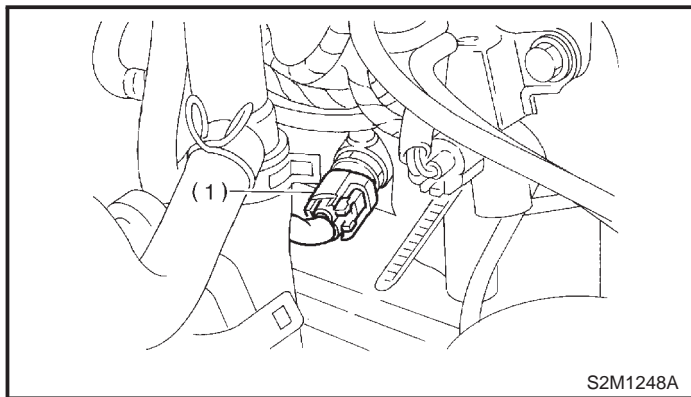
(6) Camshaft position sensor

(2) Intake air temperature sensor

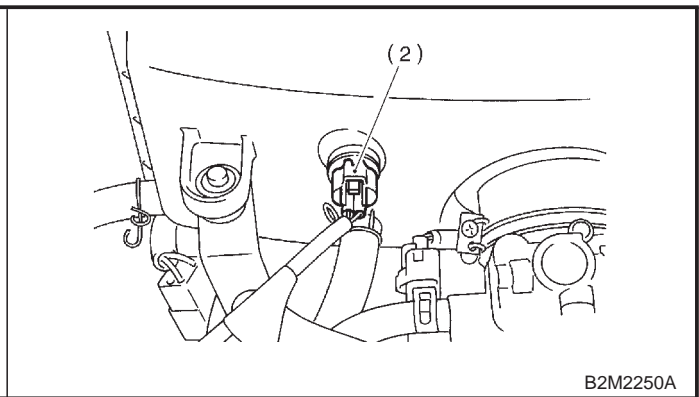
(4) Intake manifold pressure sensor

(7) Crankshaft position sensor

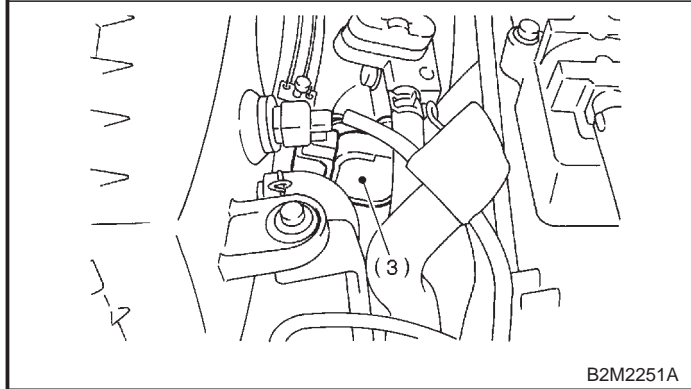
(5) Knock sensor



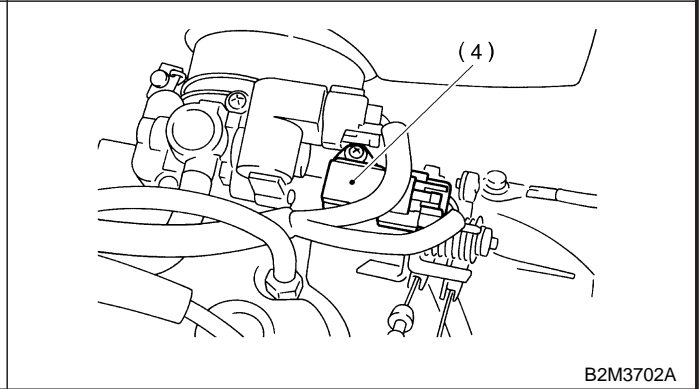
S2M1248A



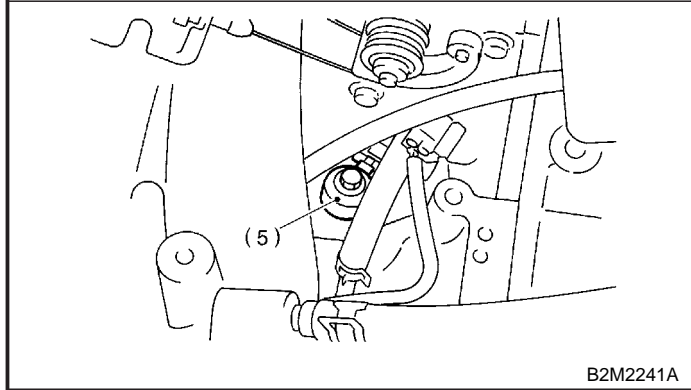
B2M2250A



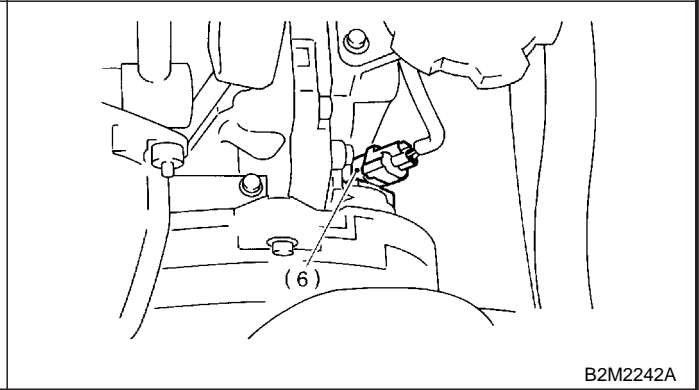
B2M2251A



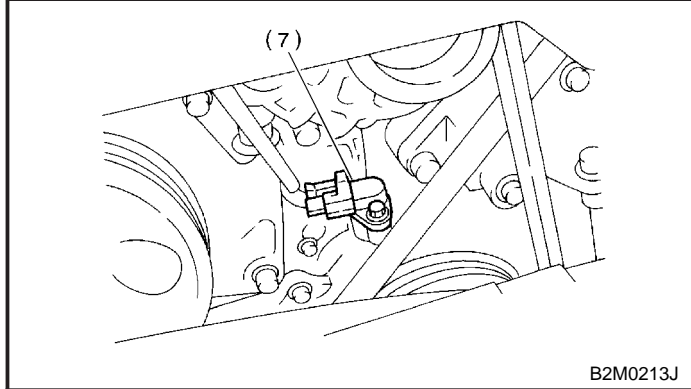
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B2M2241A



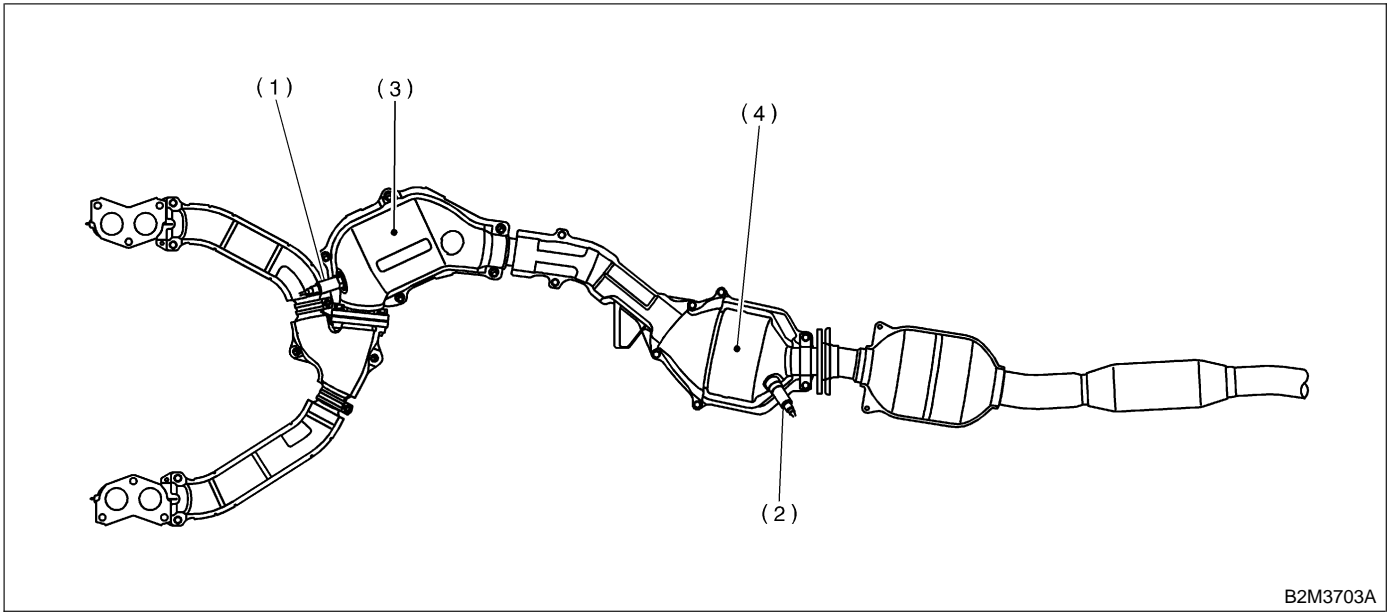
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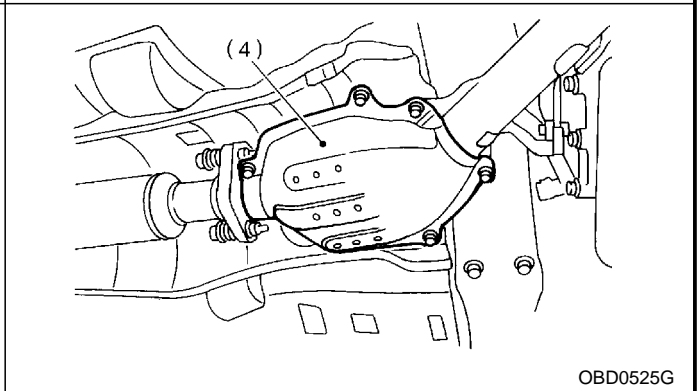
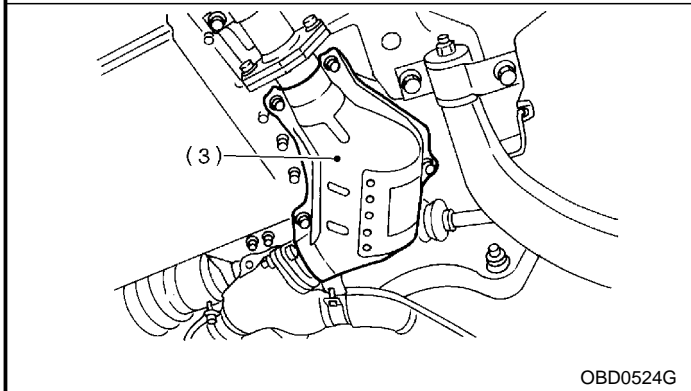
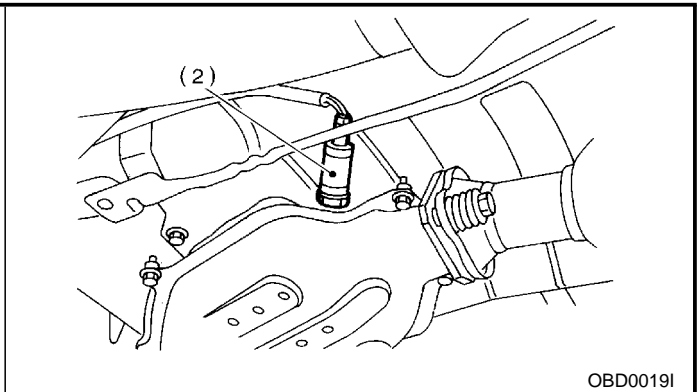
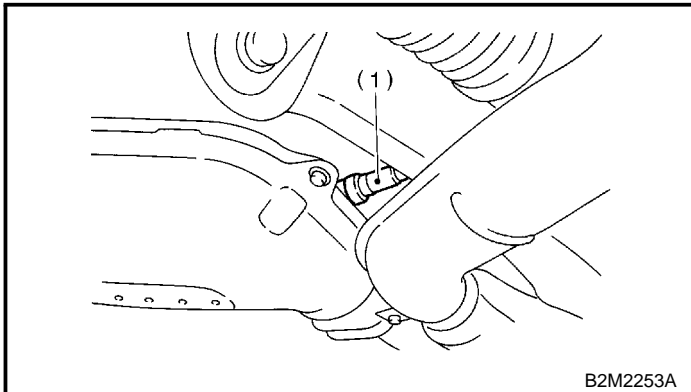
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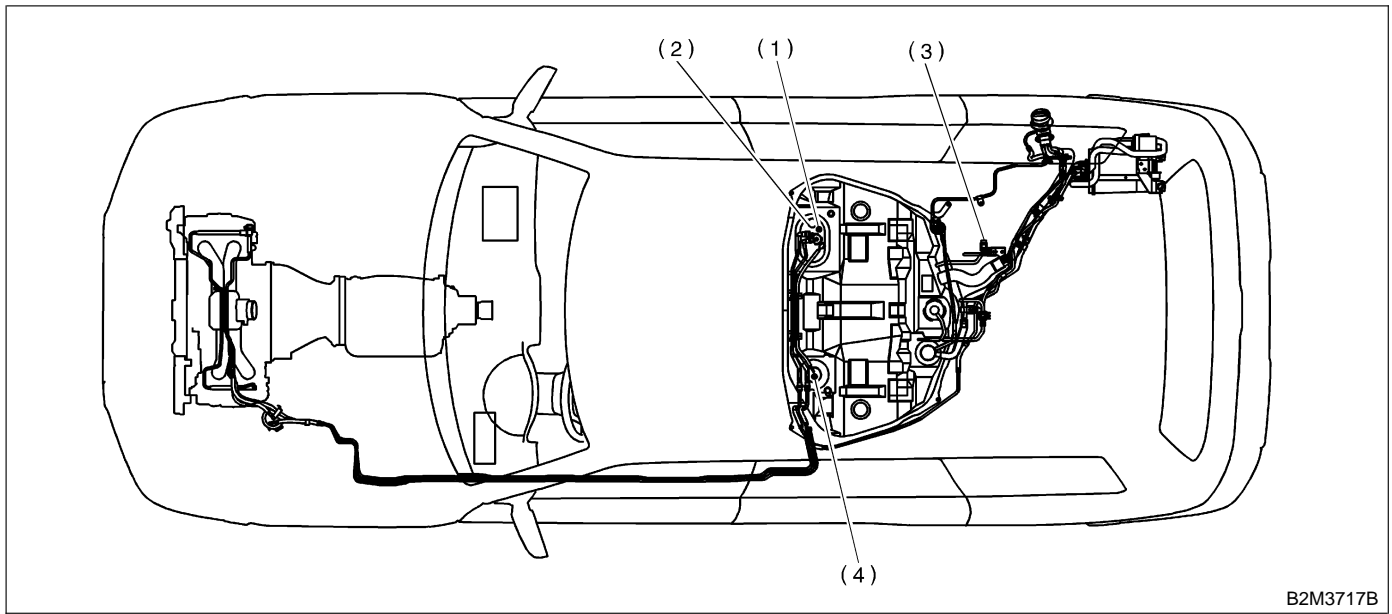


2. Electrical Components Location

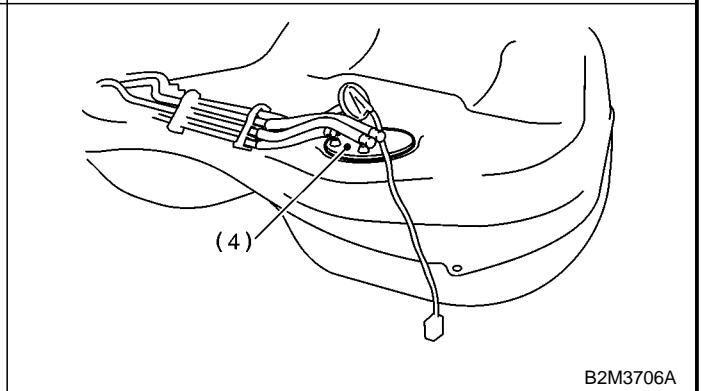
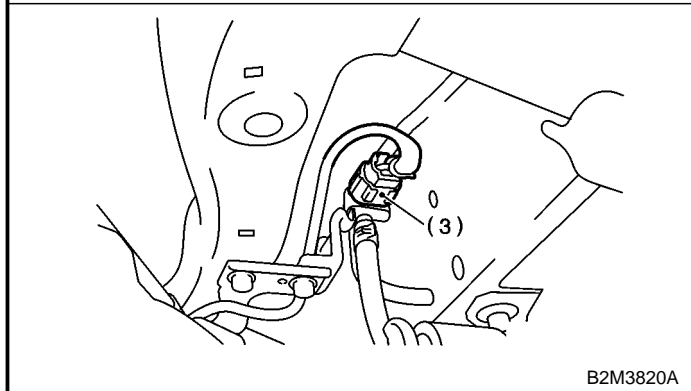
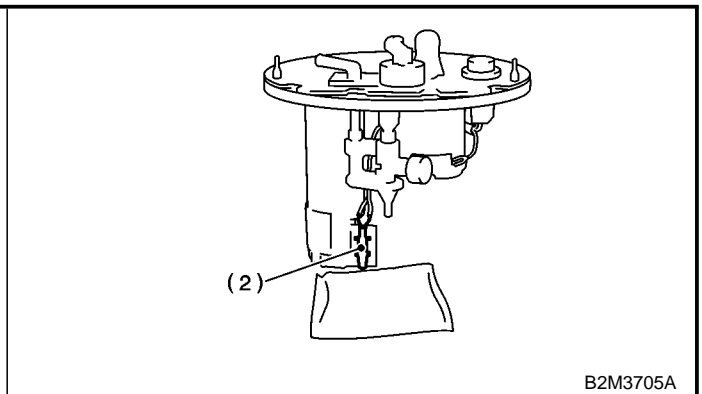
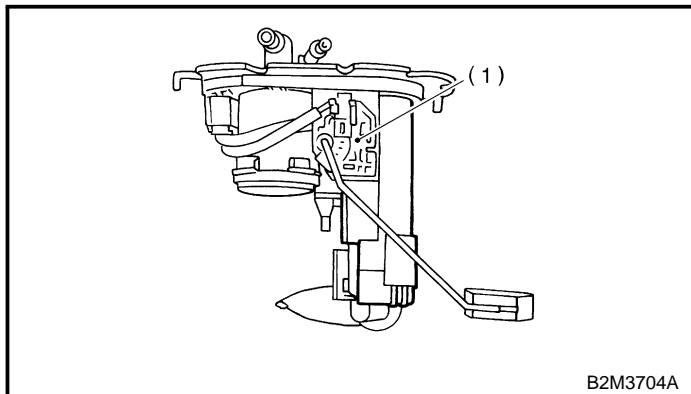


- (1) Front oxygen (A/F) sensor
- (2) Rear oxygen sensor
- (3) Front catalytic converter
- (4) Rear catalytic converter

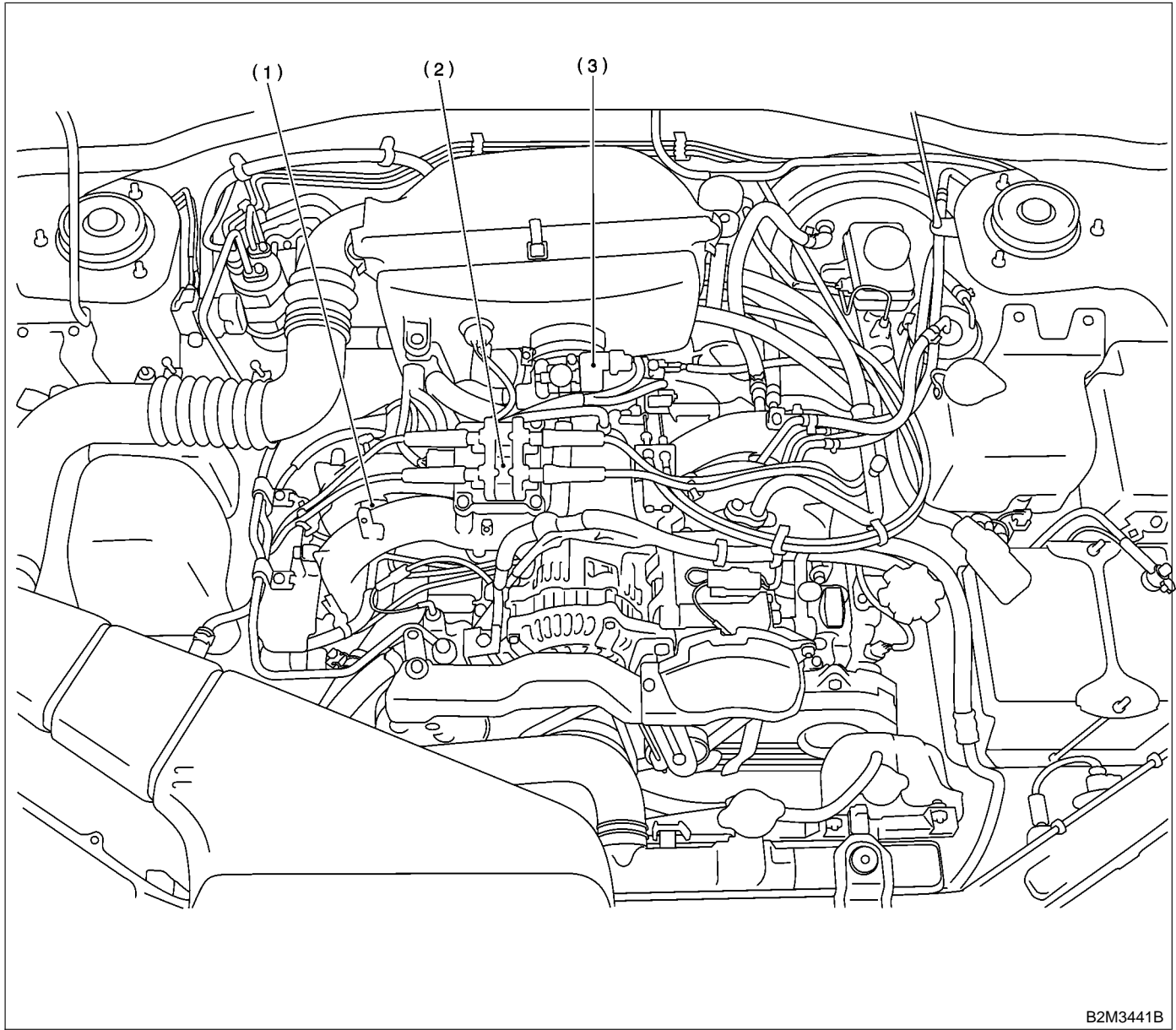




- (1) Fuel level sensor
- (2) Fuel temperature sensor
- (3) Fuel tank pressure sensor
- (4) Fuel sub level sensor



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

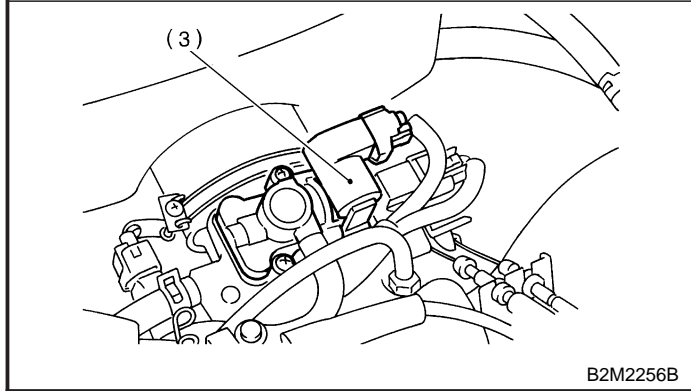
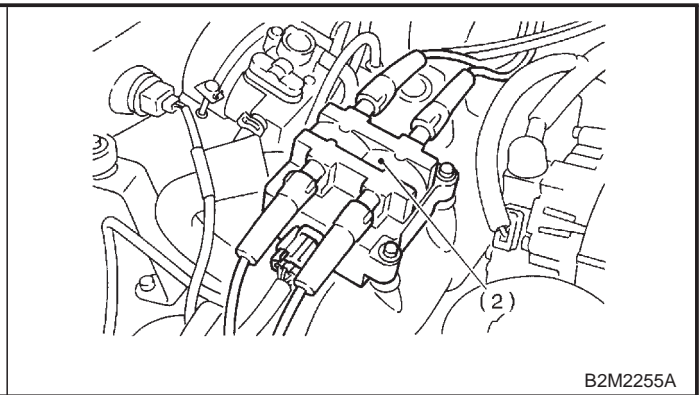
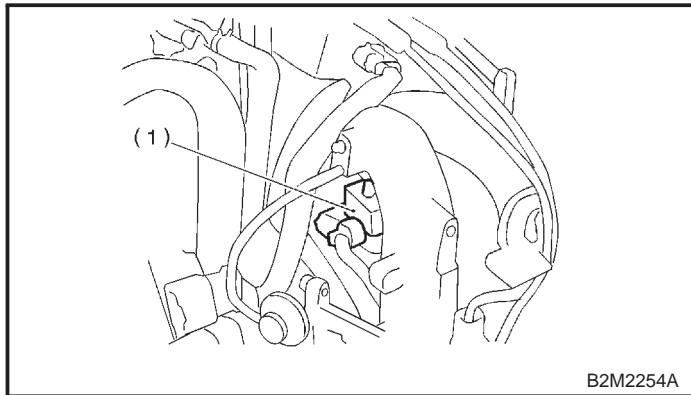


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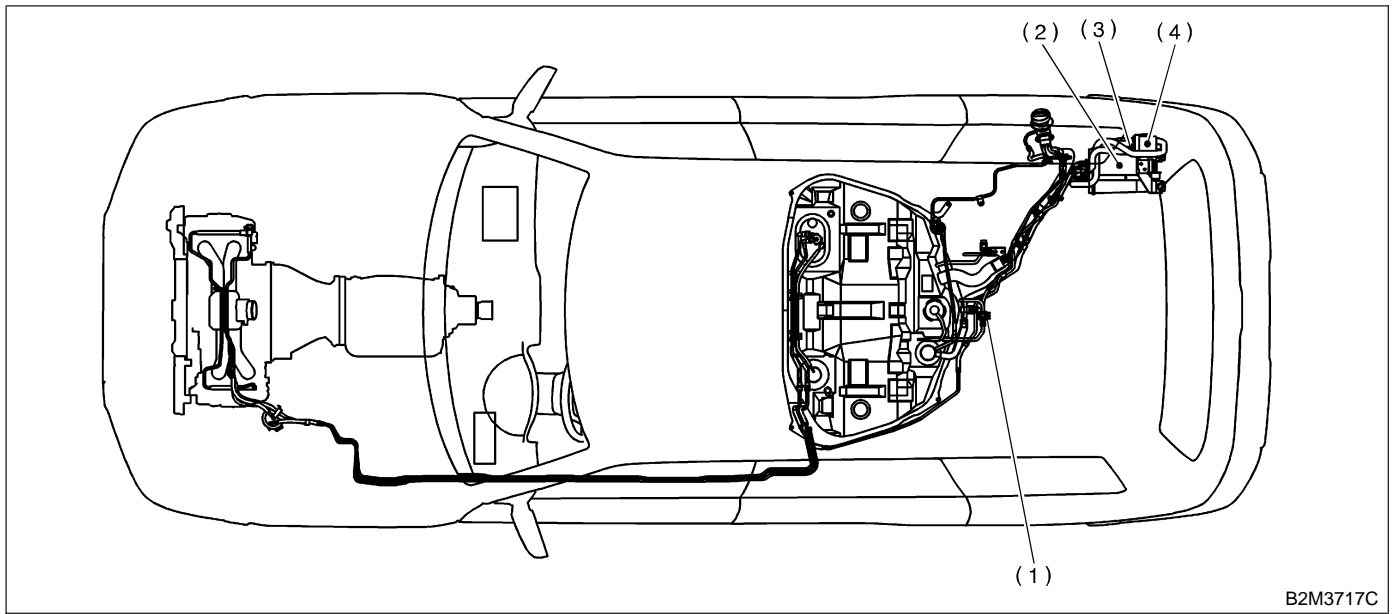
(1) Purge control solenoid valve

(2) Ignition coil & ignitor ASSY

(3) Idle air control solenoid valve

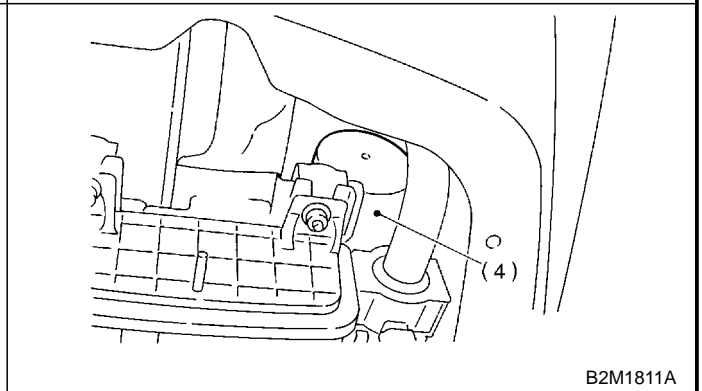
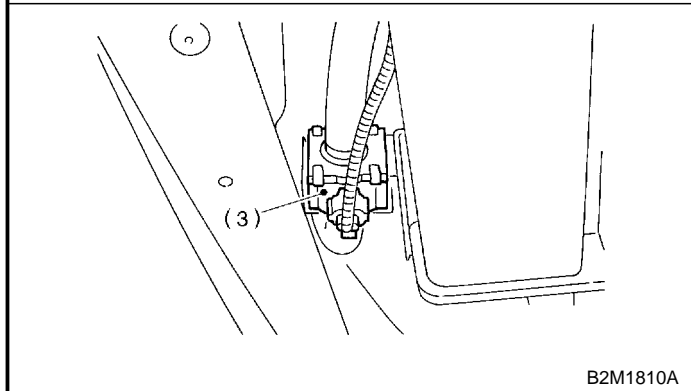
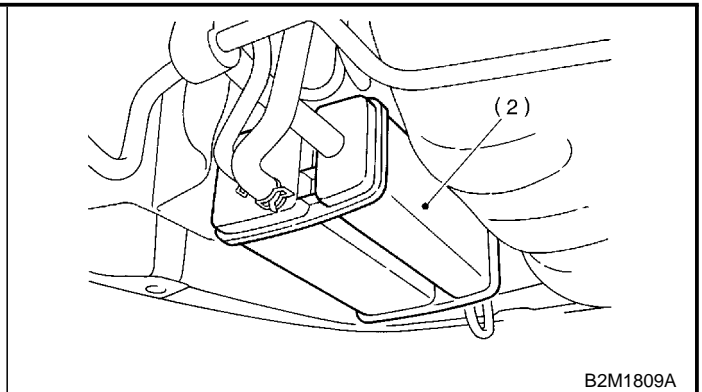
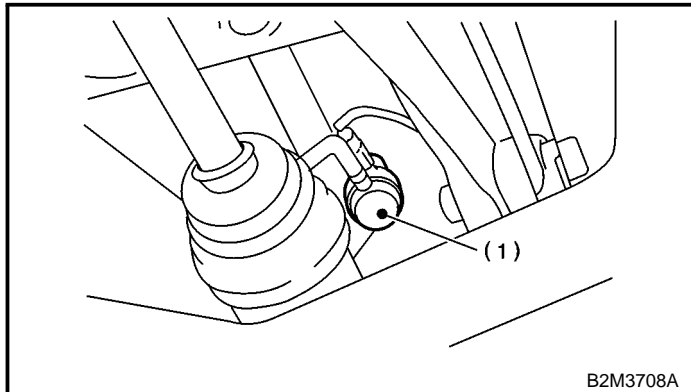


2. Electrical Components Location



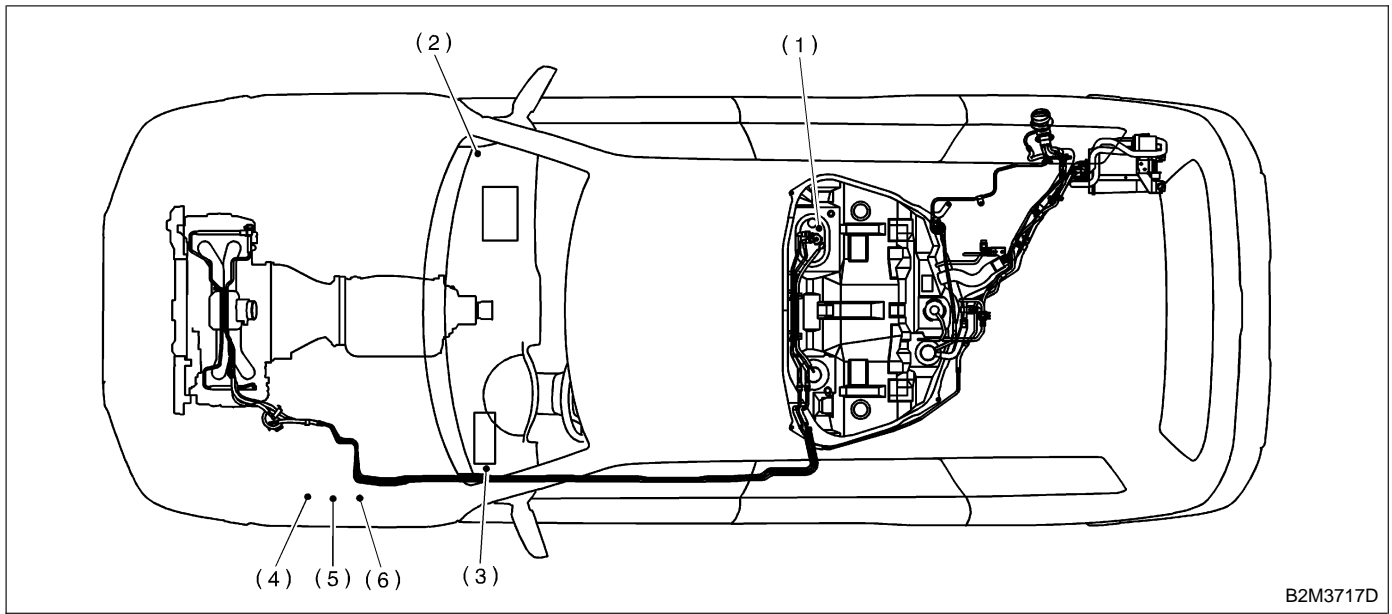
- (1) Pressure control solenoid valve
- (2) Canister

- (3) Drain valve
- (4) Drain filter



MEMO:

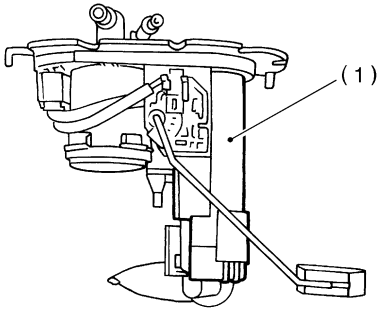
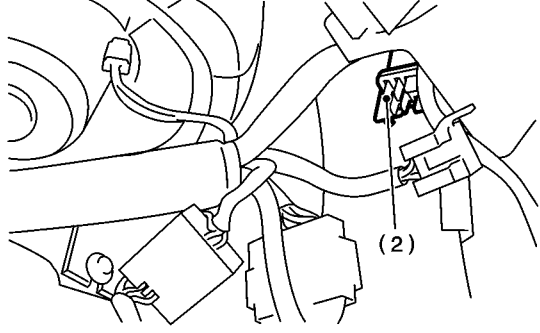
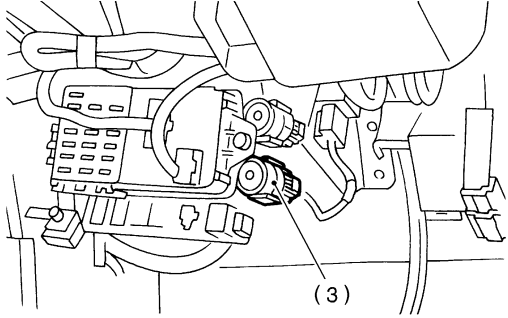
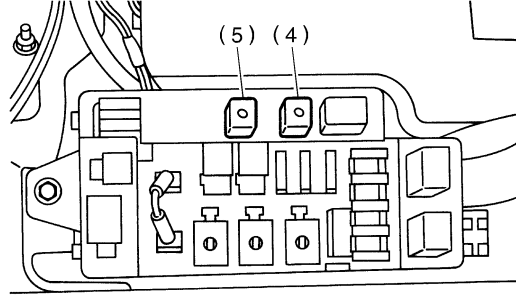
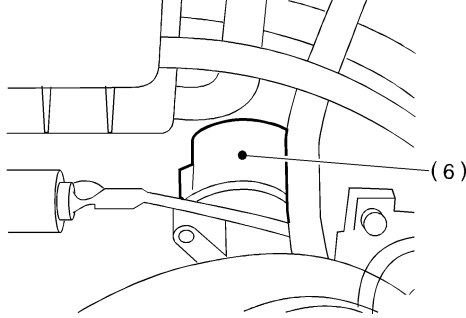
2. Electrical Components Location



(1) Fuel pump
(2) Main relay

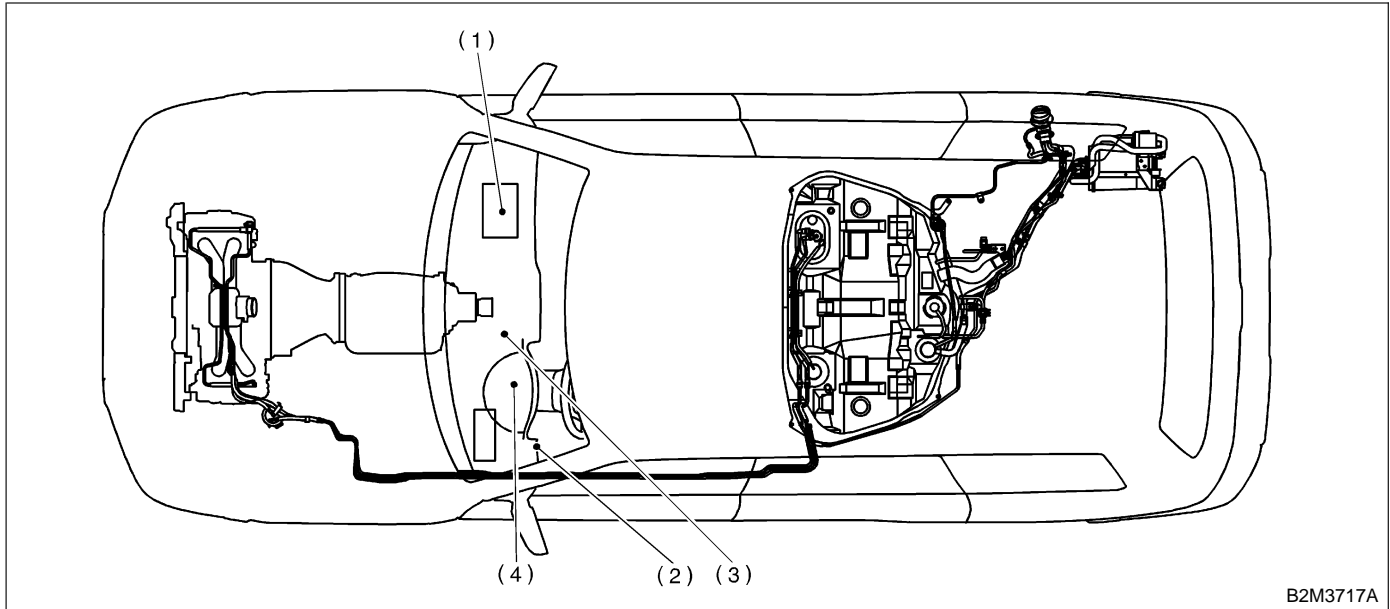
(3) Fuel pump relay
(4) Radiator main fan relay

(5) Radiator sub fan relay
(6) Starter

 <p>(1)</p> <p>B2M3704B</p>	 <p>(2)</p> <p>B2M3709A</p>
 <p>(3)</p> <p>B2M3710A</p>	 <p>(5) (4)</p> <p>B2M3711A</p>
 <p>(6)</p> <p>B2M2247D</p>	<p>SUBARU.</p>

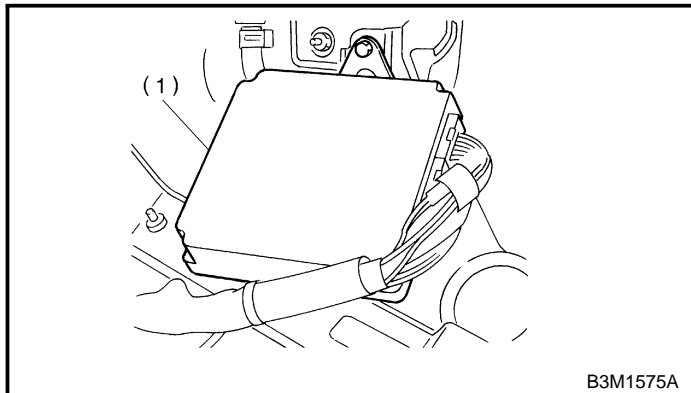
B: ENGINE (AT VEHICLES)

1. MODULE

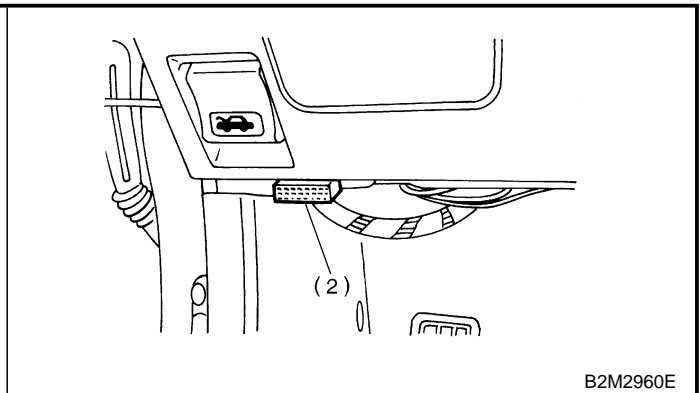


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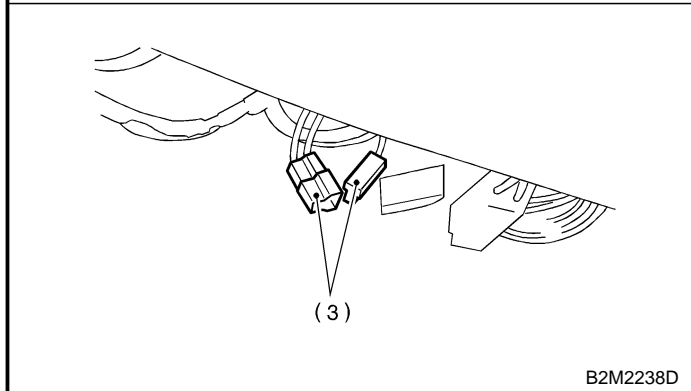
- (1) Engine control module (ECM)
- (2) Data link connector (for Subaru Select Monitor and OBD-II general scan tool)
- (3) Test mode connector
- (4) CHECK ENGINE malfunction indicator lamp (MIL)



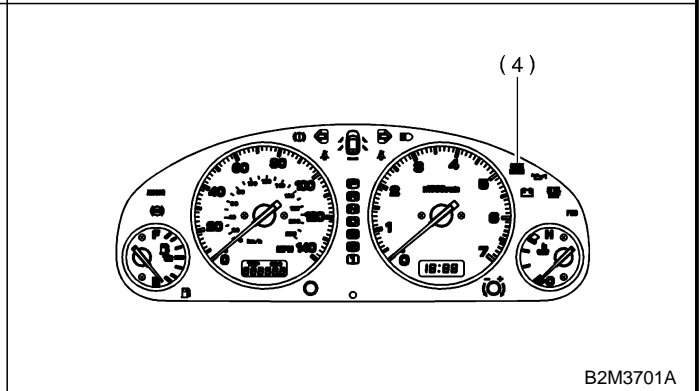
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B2M2960E



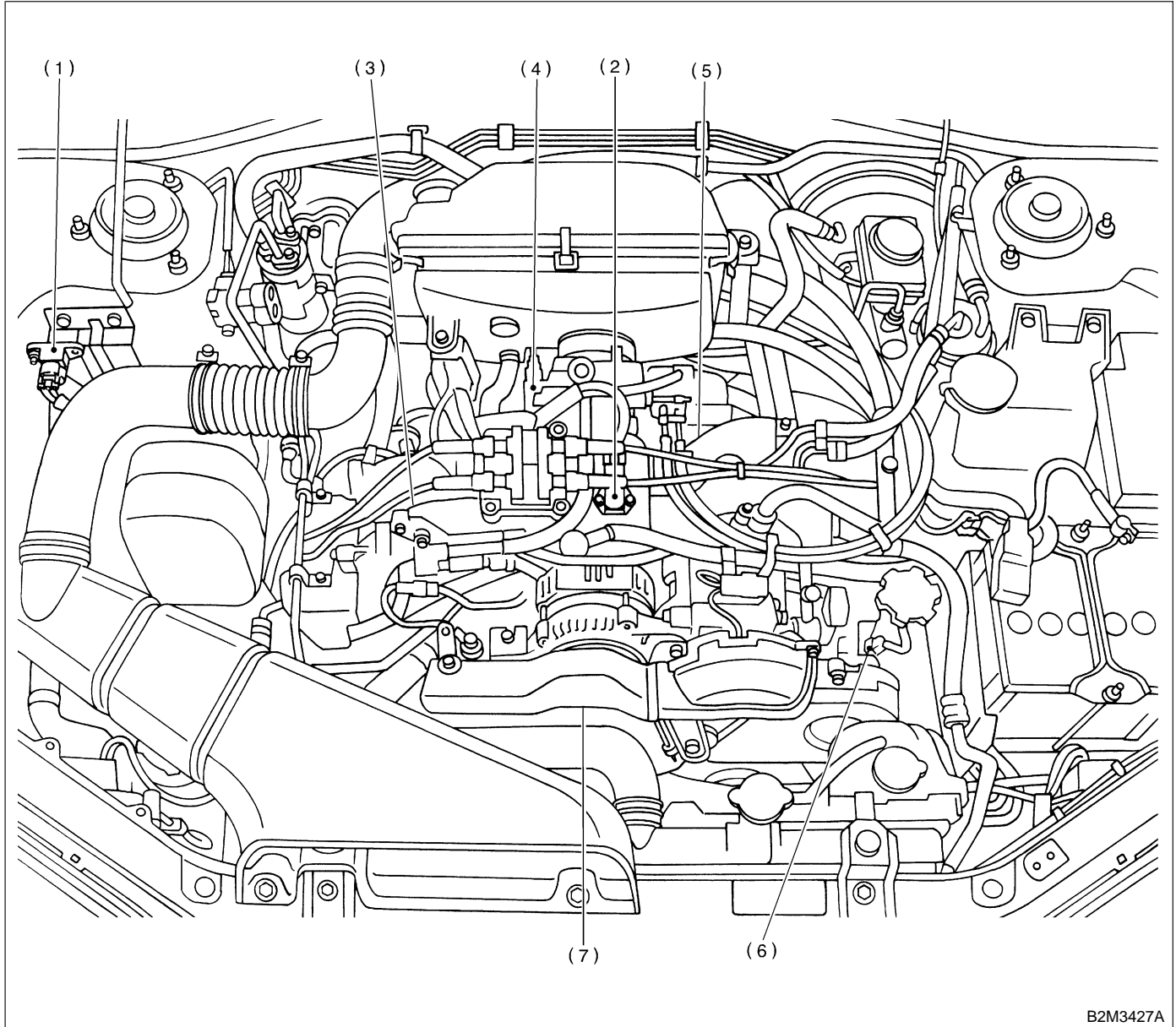
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B2M3701A

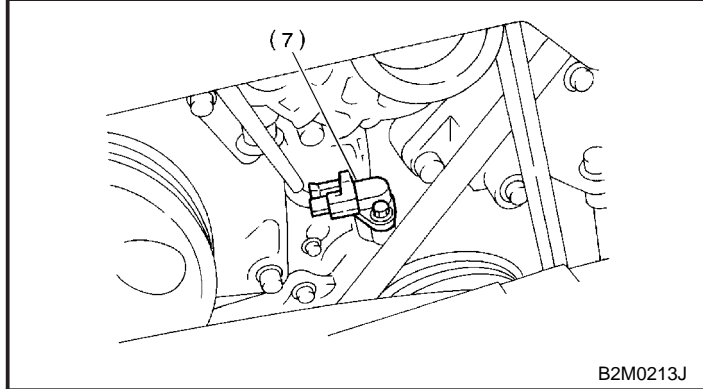
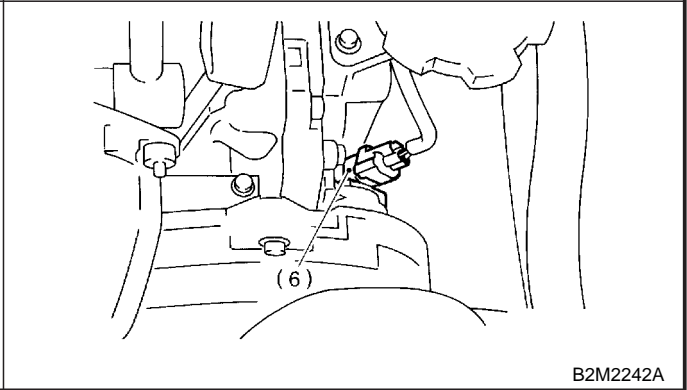
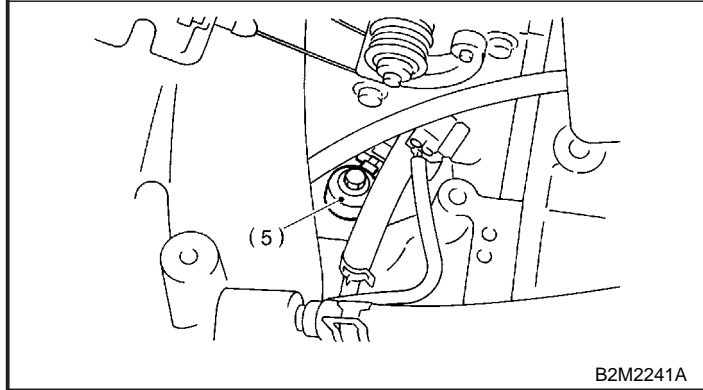
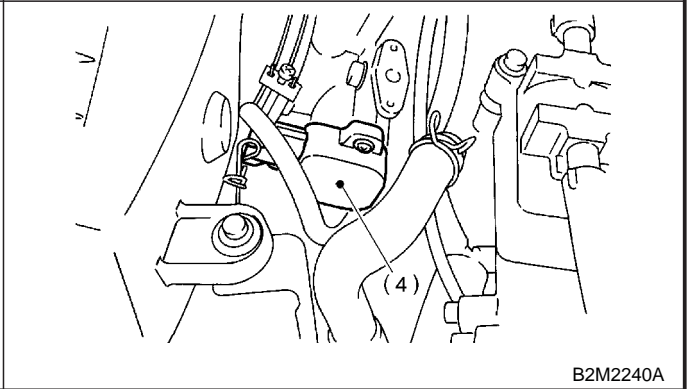
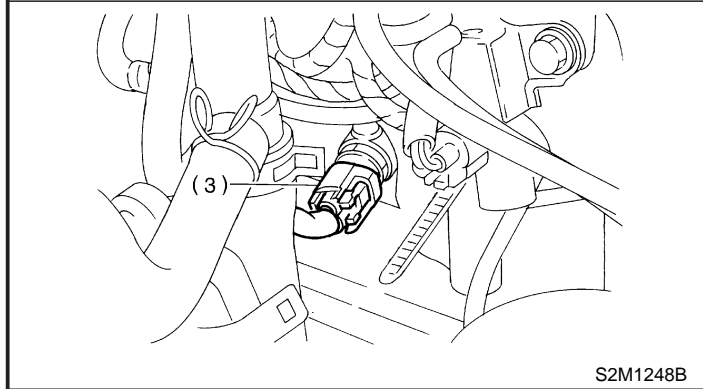
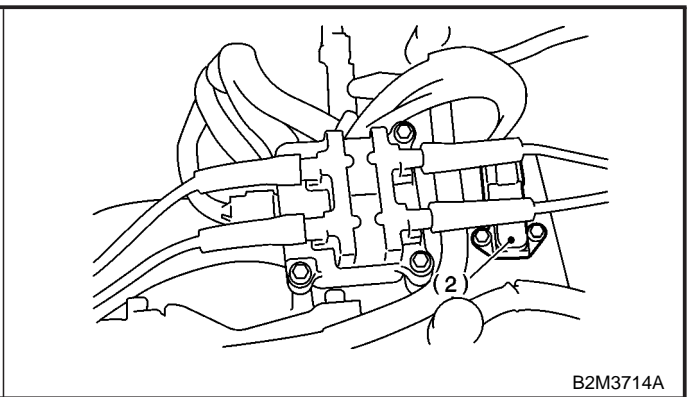
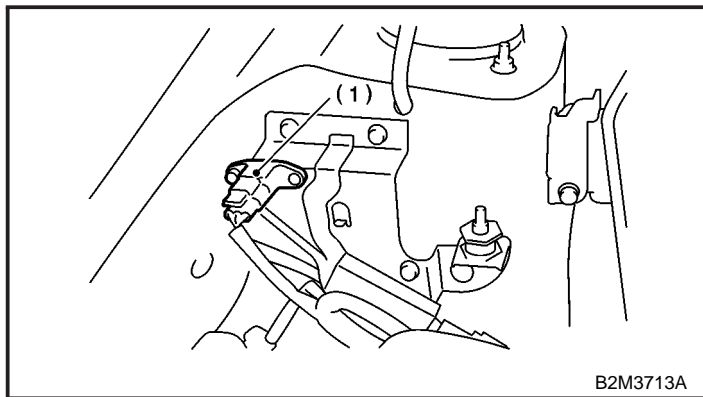
MEMO:

2. SENSOR



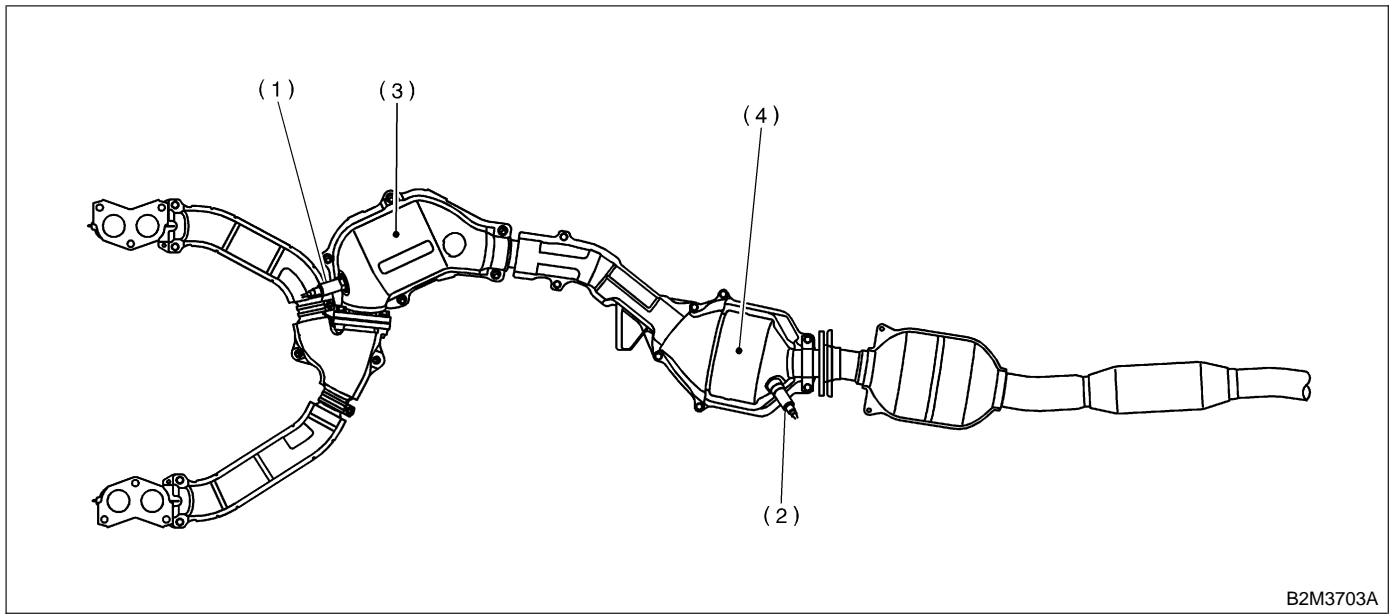
B2M3427A

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



SUBARU.

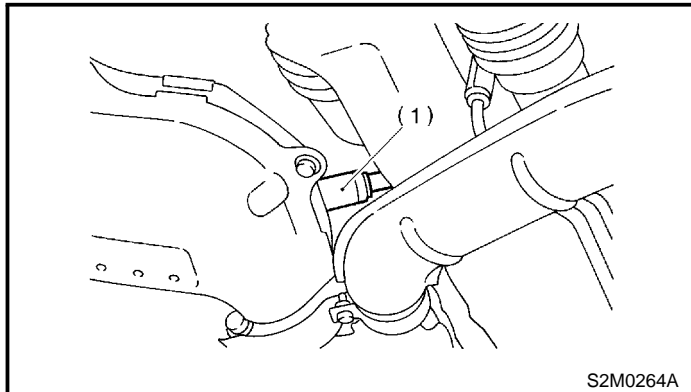
2. Electrical Components Location



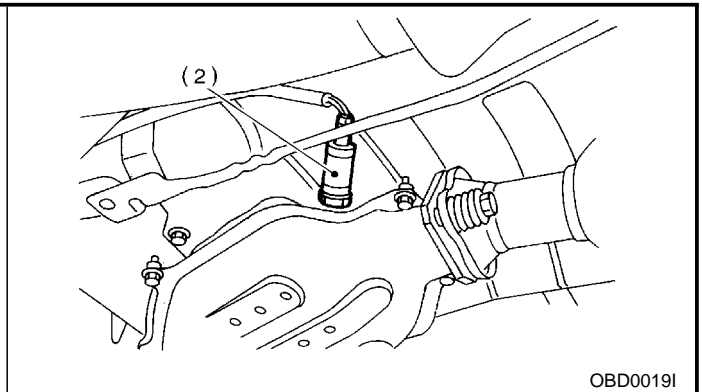
B2M3703A

- (1) Front oxygen (A/F) sensor
- (2) Rear oxygen sensor

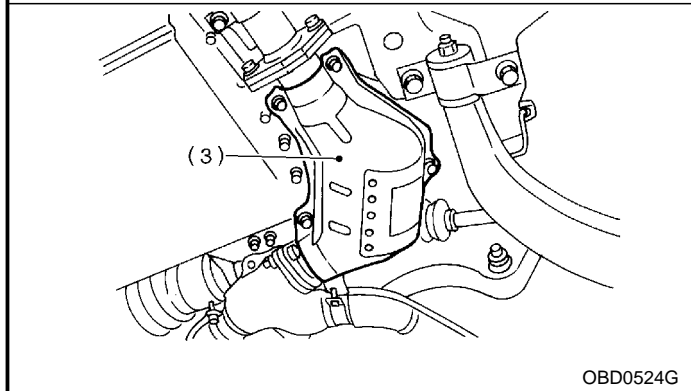
- (3) Front catalytic converter
- (4) Rear catalytic converter



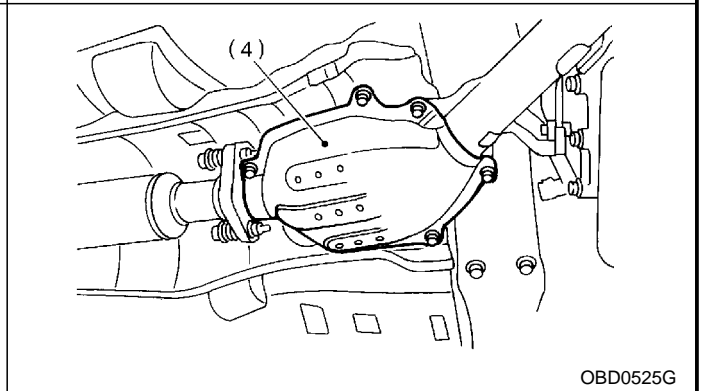
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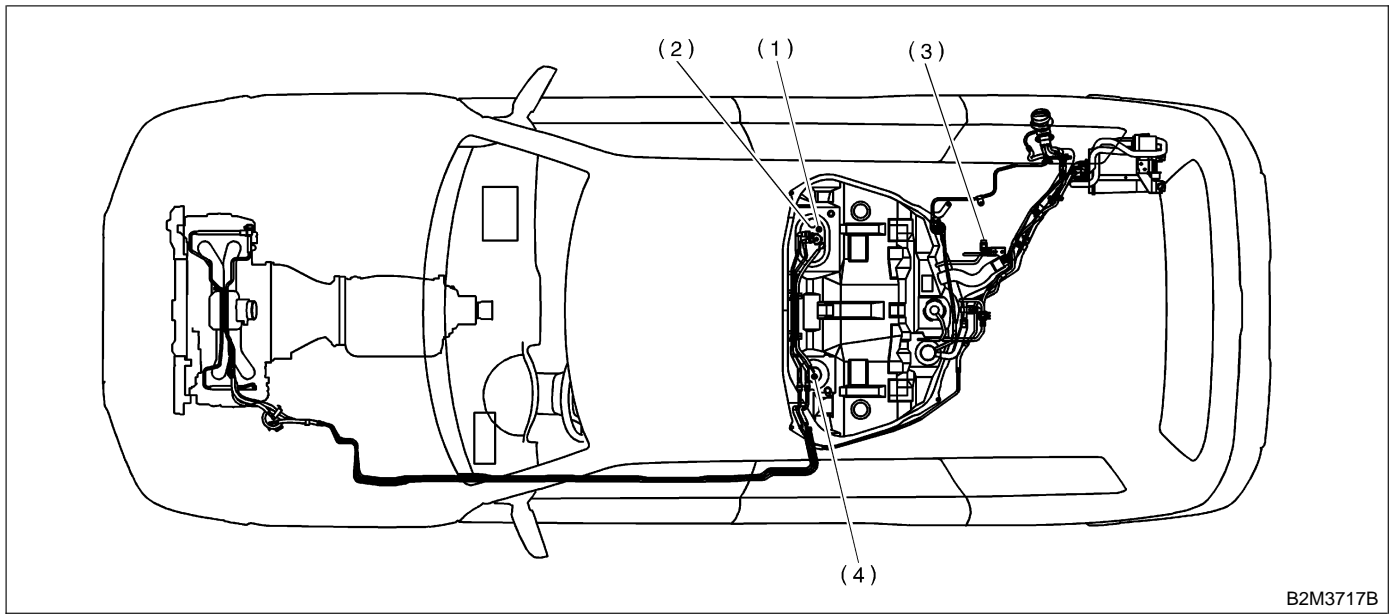
OBD0019I



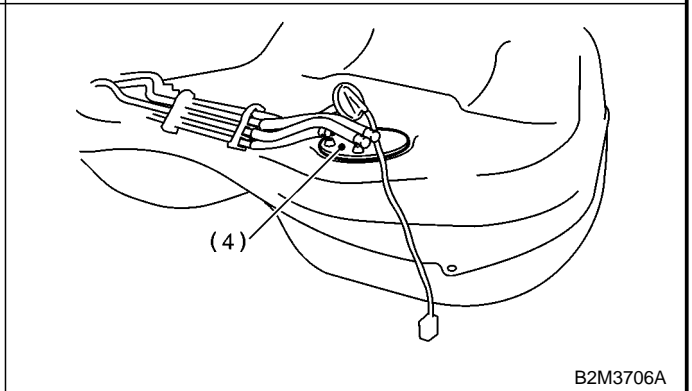
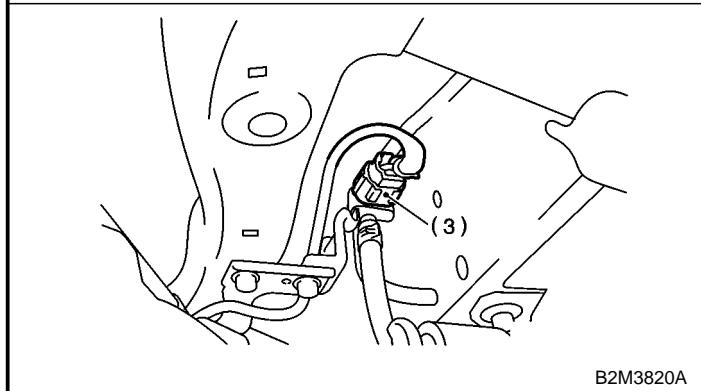
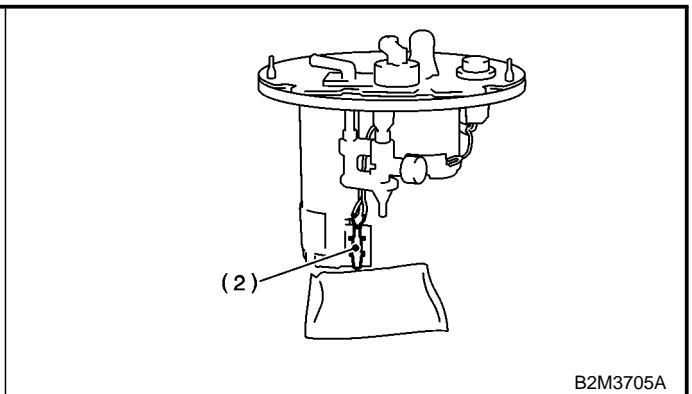
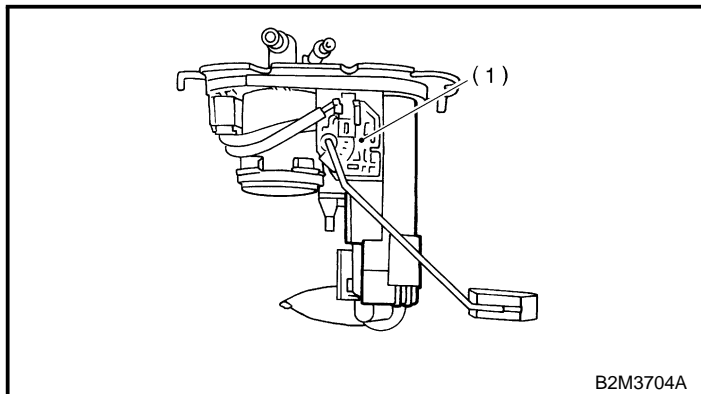
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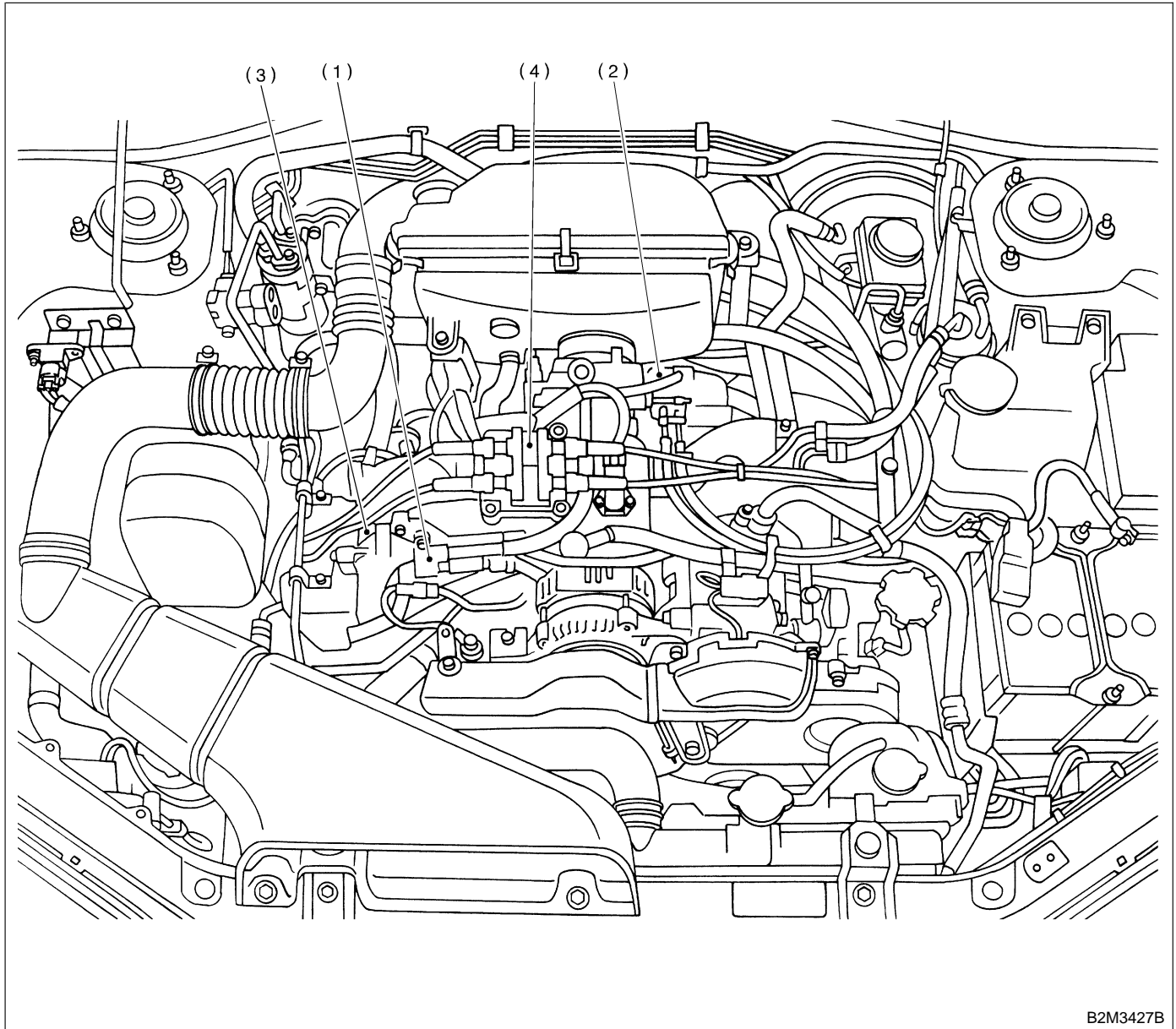
OBD0525G



- (1) Fuel level sensor
- (2) Fuel temperature sensor
- (3) Fuel tank pressure sensor
- (4) Fuel sub level sensor

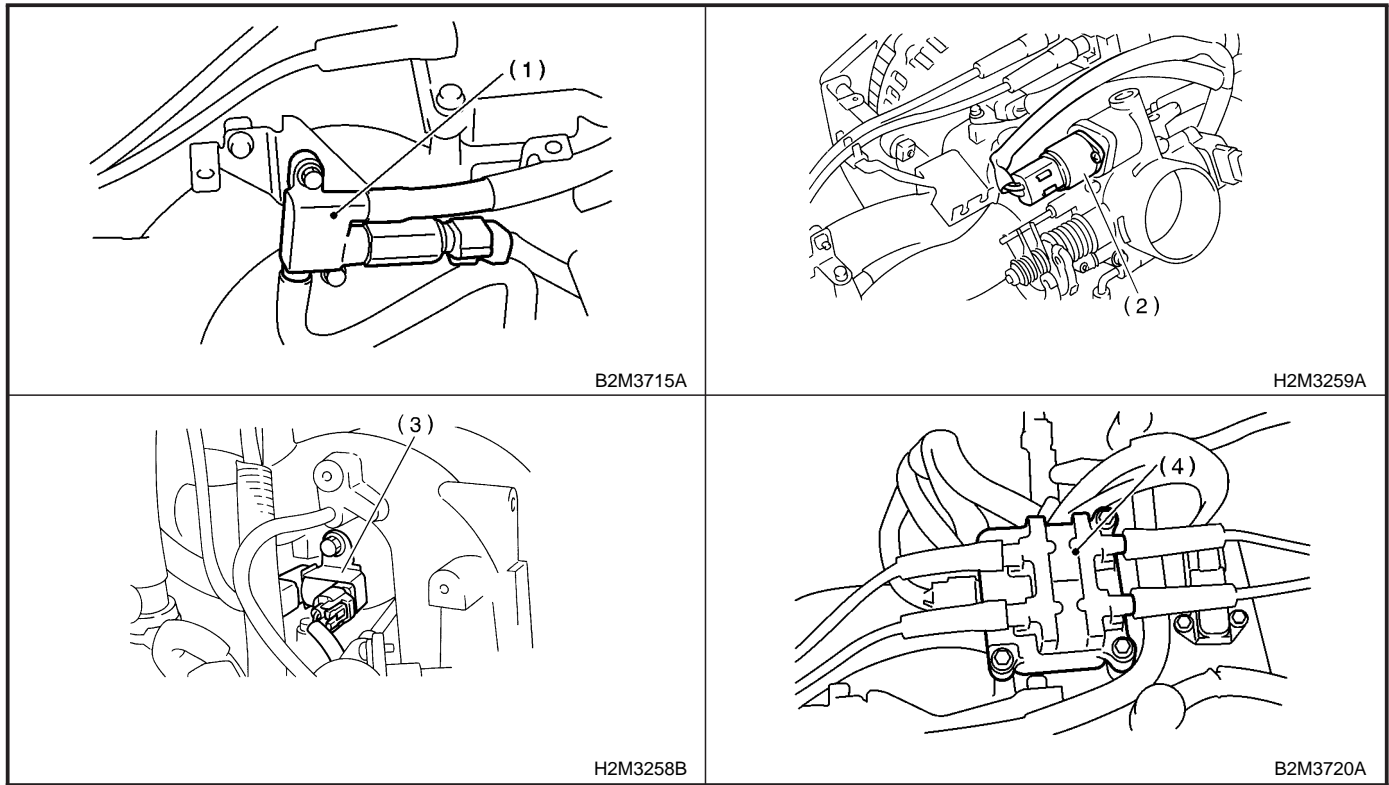


3. SOLENOID VALVE, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS

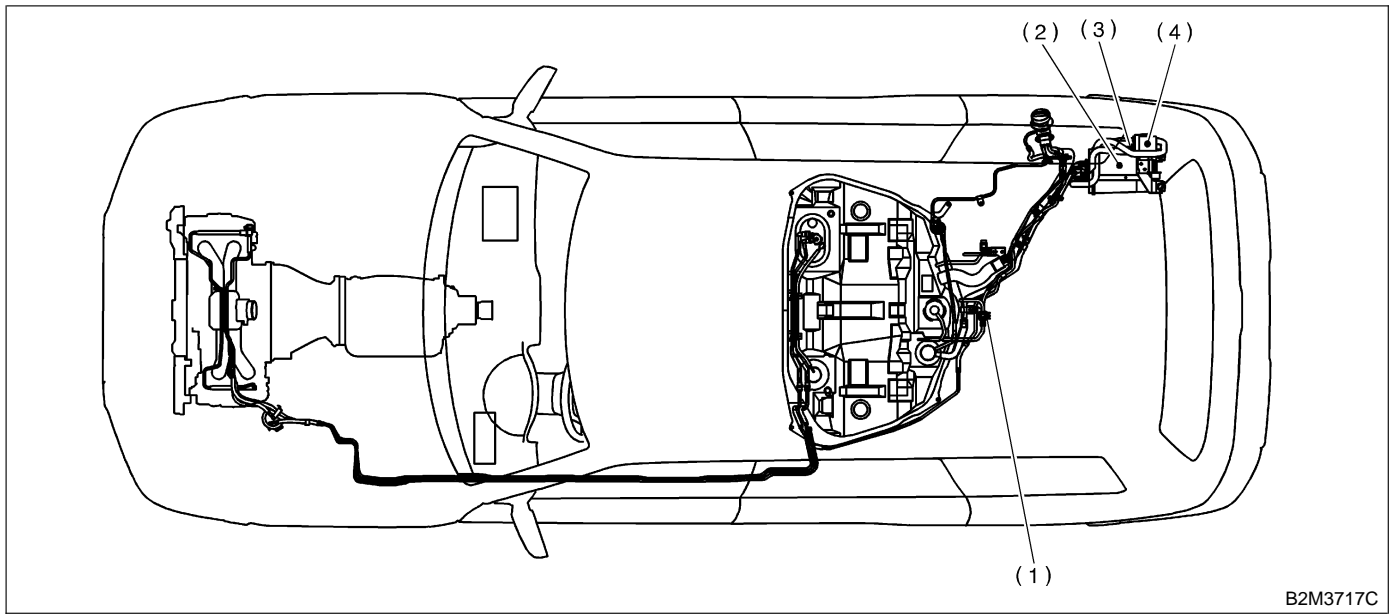


B2M3427B

- (1) Air assist injector solenoid valve
- (2) Idle air control solenoid valve
- (3) Purge control solenoid valve
- (4) Ignition coil & ignitor ASSY



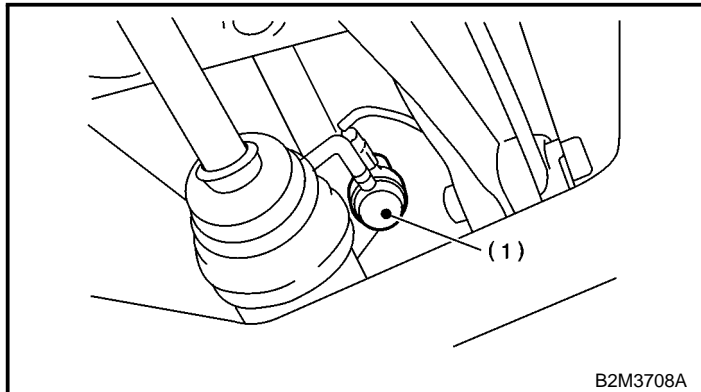
2. Electrical Components Location



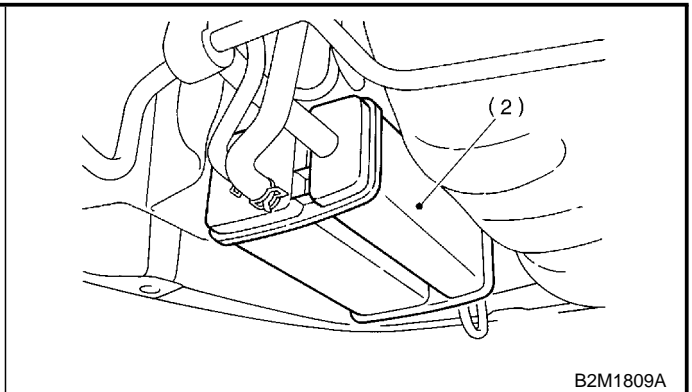
B2M3717C

- (1) Pressure control solenoid valve
- (2) Canister

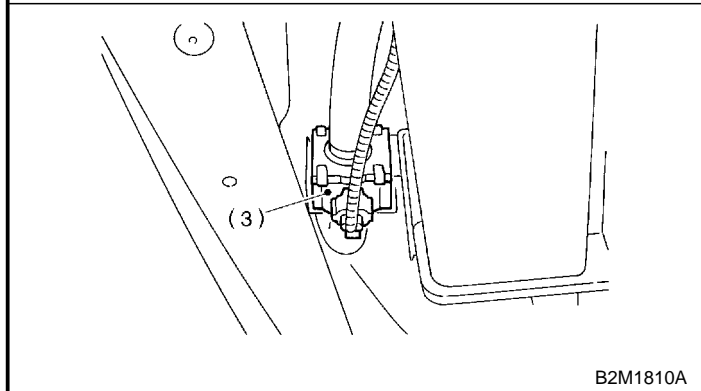
- (3) Drain valve
- (4) Air filter



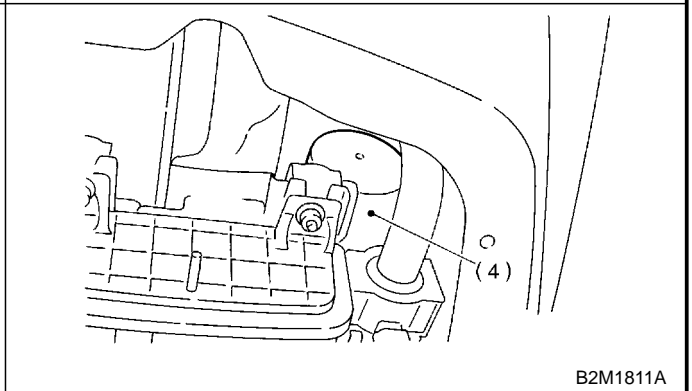
B2M3708A



B2M1809A



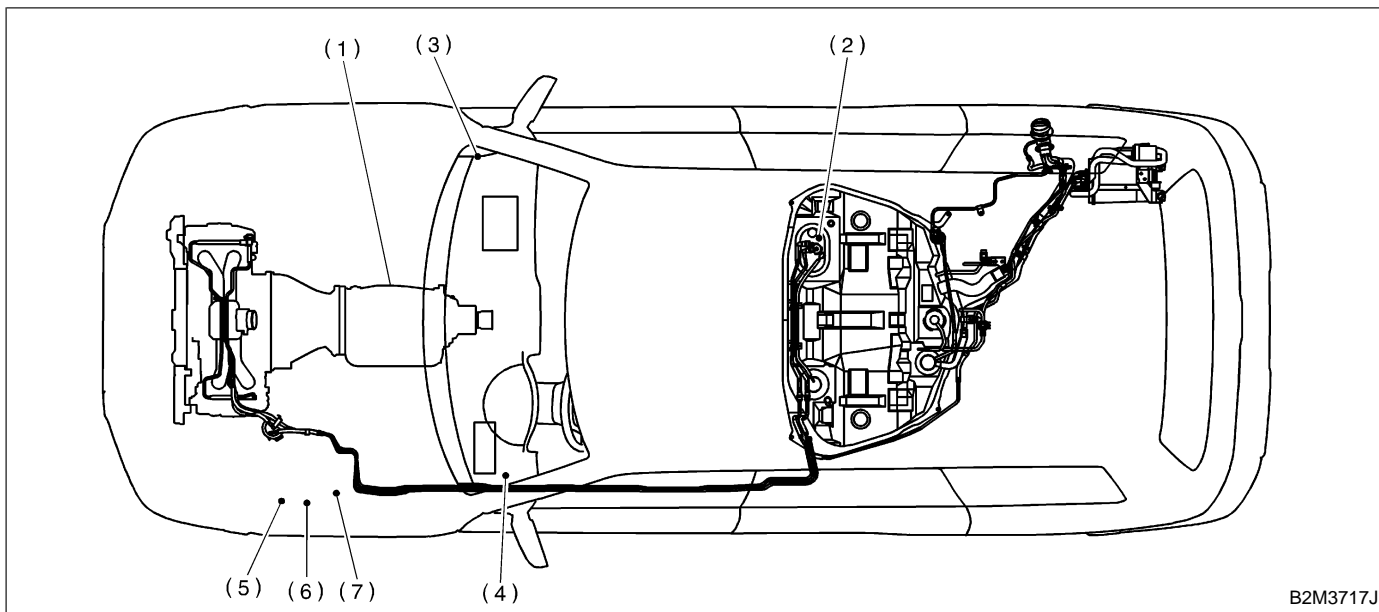
B2M1810A



B2M1811A

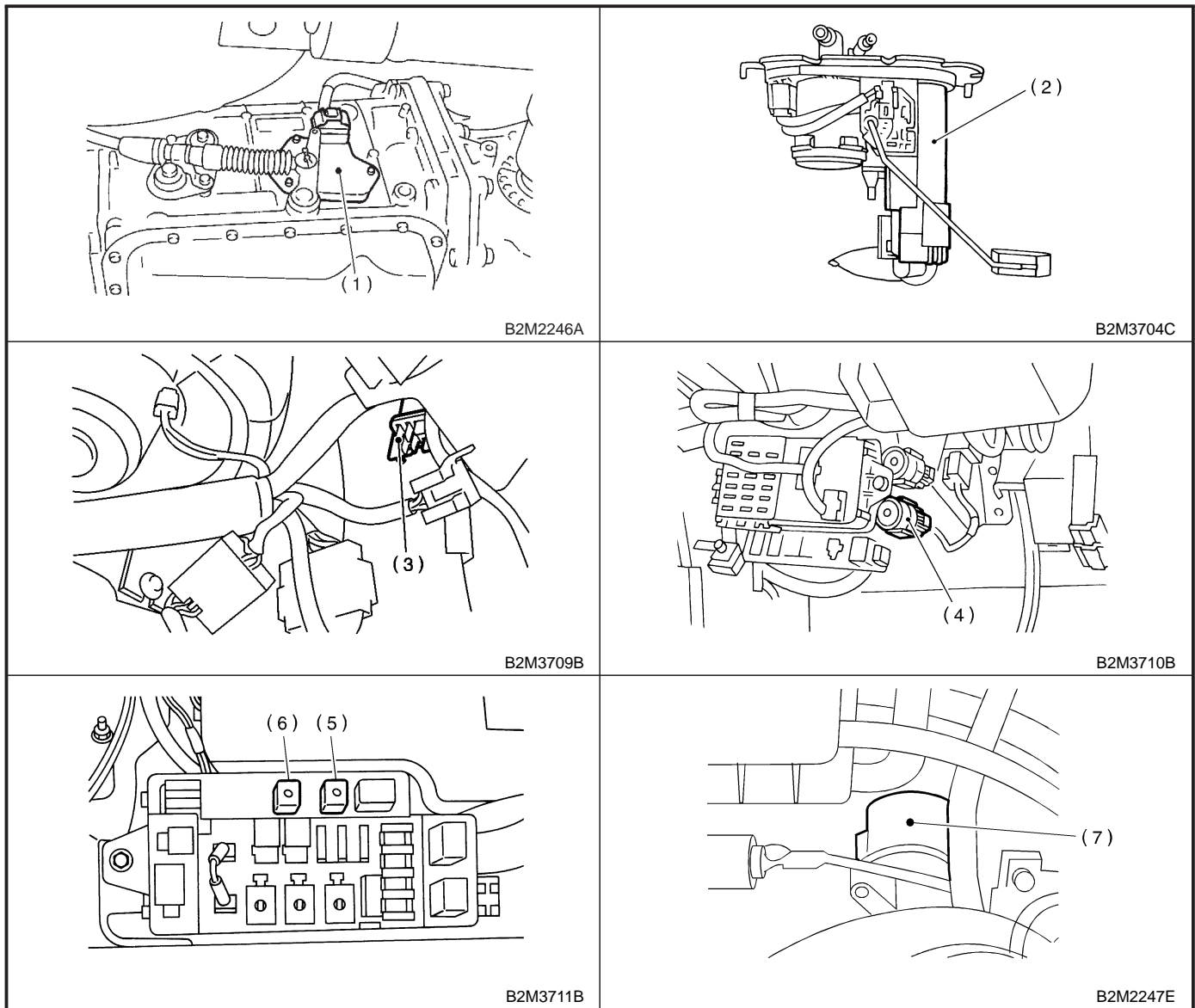
MEMO:

2. Electrical Components Location



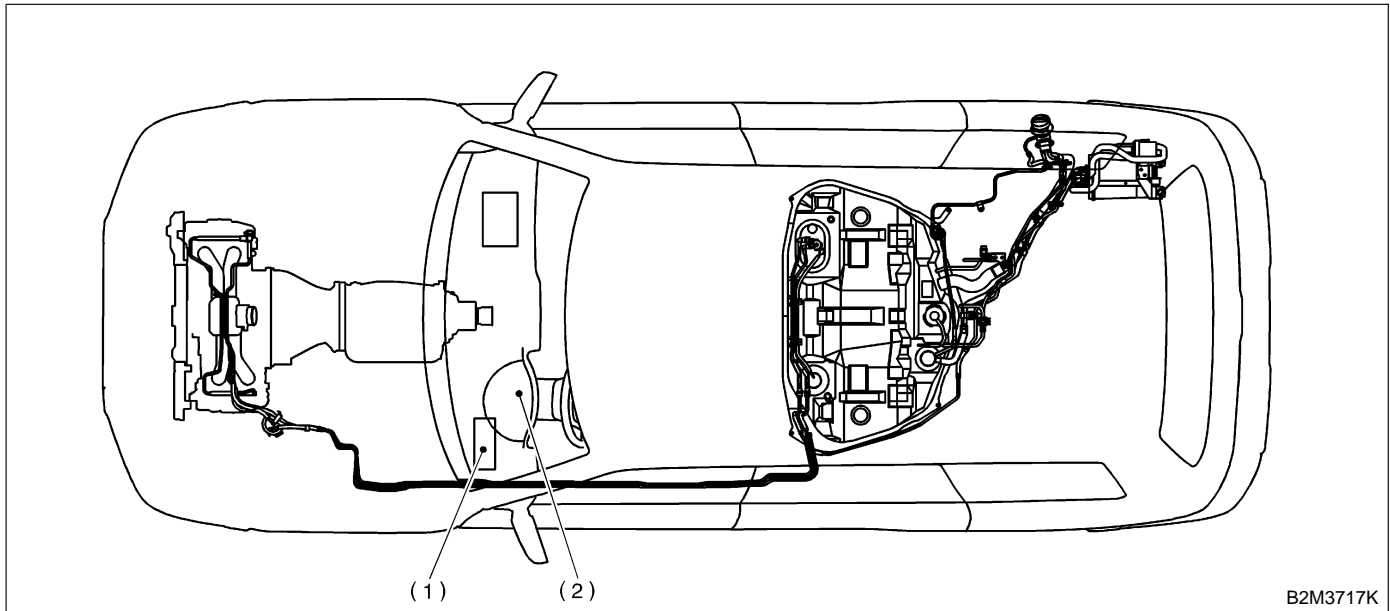
B2M3717J

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



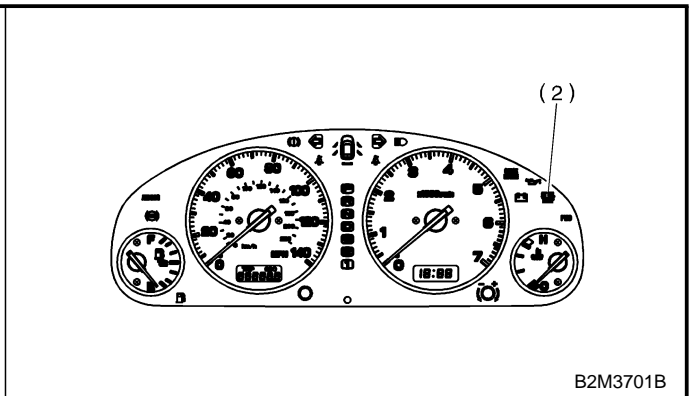
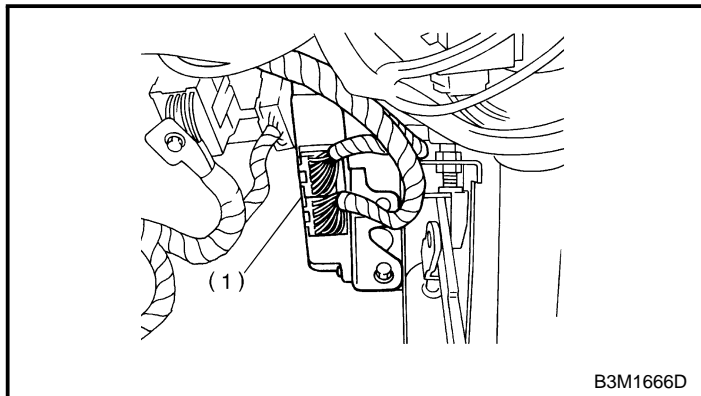
C: TRANSMISSION

1. MODULE

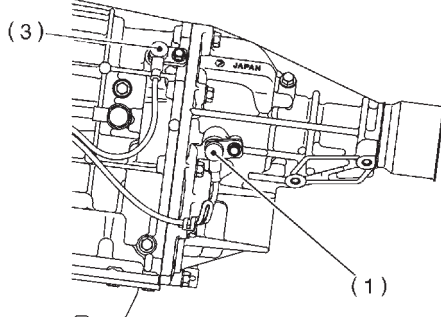
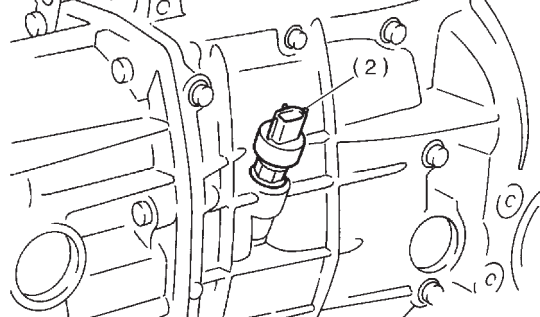
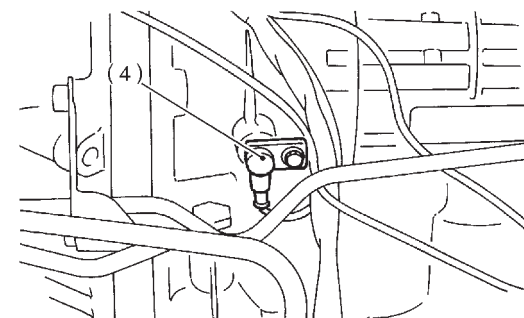
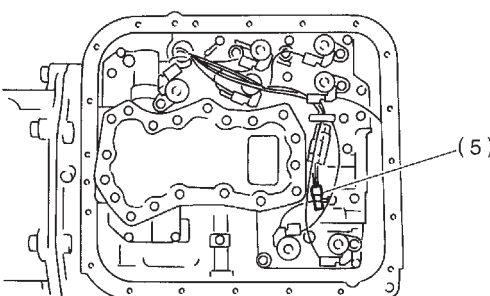
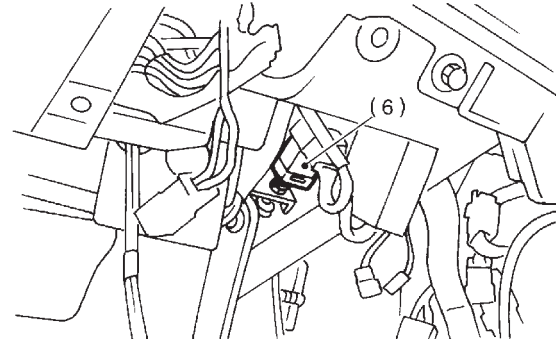


(1) Transmission Control Module (TCM) (for AT vehicles)

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



2. SENSOR

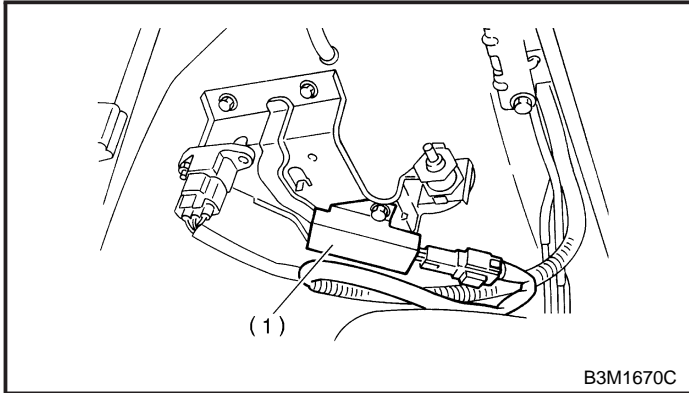
 <p>B2M2258A</p>	 <p>B2M2259A</p>
 <p>B2M2260A</p>	 <p>B2M2261A</p>
 <p>OBD0653B</p>	<p style="text-align: center;">SUBARU.</p>

- (1) Vehicle speed sensor 1 (for AT vehicles)
- (2) Vehicle speed sensor 2 (for MT vehicles)
- (3) Vehicle speed sensor 2 (for AT vehicles)
- (4) Torque converter turbine speed sensor
- (5) ATF temperature sensor (for AT vehicles)
- (6) Brake light switch

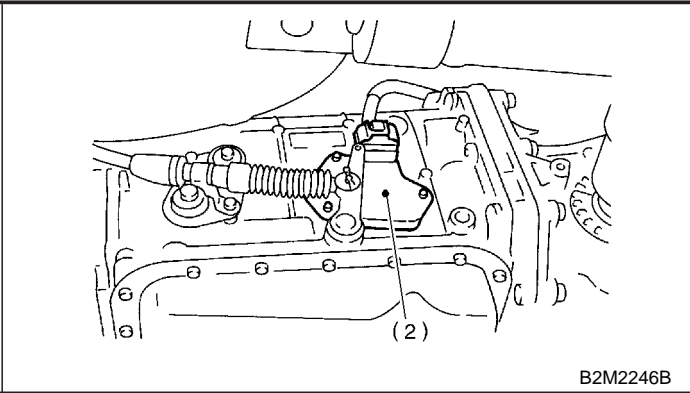
2. Electrical Components Location

3. SOLENOID VALVE AND RELAY

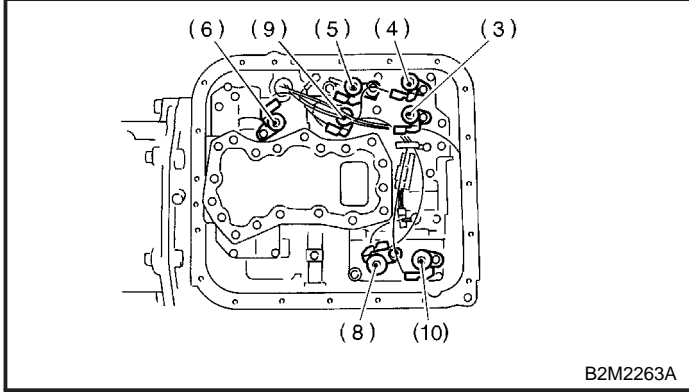
● For AT vehicles



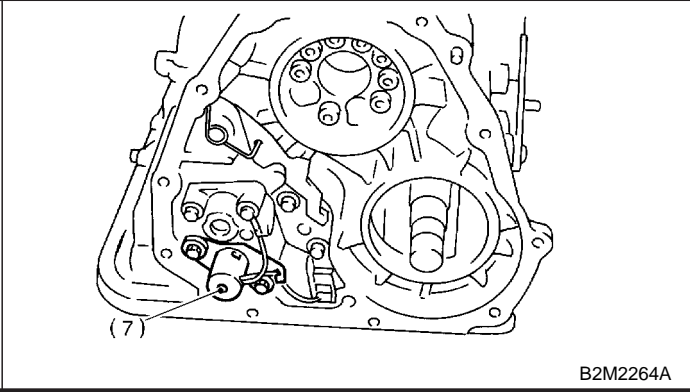
B3M1670C



B2M2246B



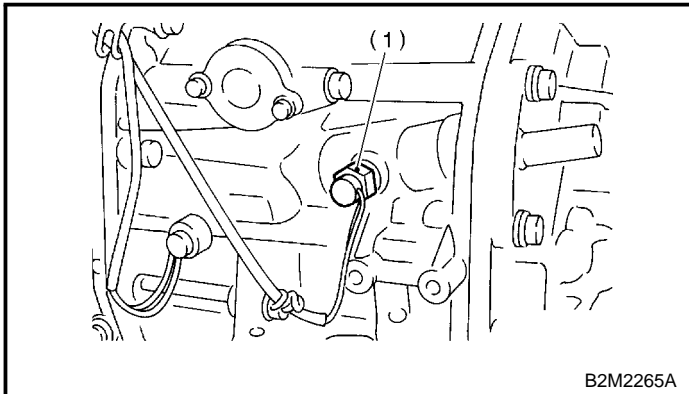
B2M2263A



B2M2264A

- (1) Dropping resistor
- (2) Inhibitor switch
- (3) Shift solenoid valve 1
- (4) Shift solenoid valve 2
- (5) Line pressure duty solenoid
- (6) Lock-up duty solenoid
- (7) Transfer duty solenoid
- (8) 2-4 brake duty solenoid
- (9) Low clutch timing solenoid valve
- (10) 2-4 brake timing solenoid valve

● For MT vehicles



B2M2265A



- (1) Neutral position switch

3. Diagnosis System

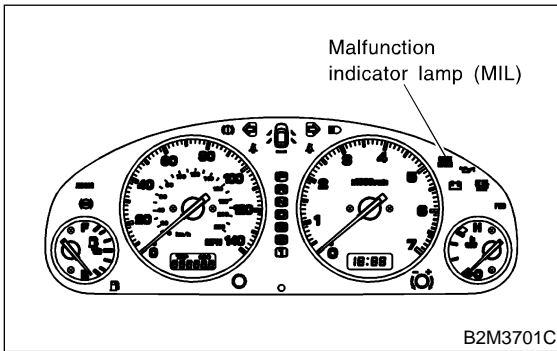
A: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL)

1. ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL)

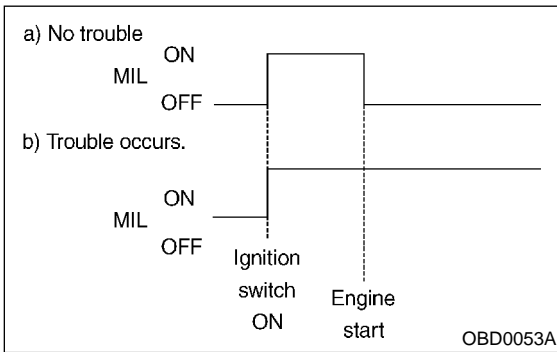
1) When ignition switch is turned to ON (engine off), the CHECK ENGINE malfunction indicator lamp (MIL) in the combination meter illuminates.

NOTE:

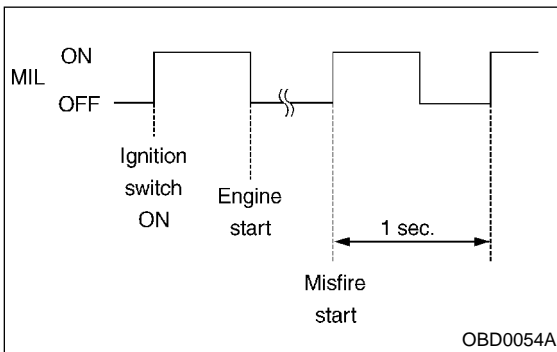
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Ref. to 2-7 [T700].>



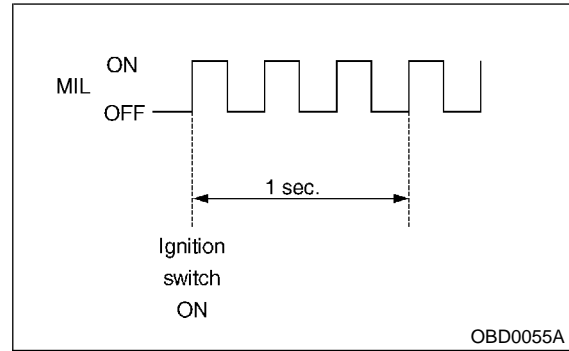
2) After starting the engine, the MIL goes out. If it does not, either the engine or the emission control system is malfunctioning.



3) If the diagnosis system senses a misfire which could damage the catalyzer, the MIL will blink at a cycle of 1 Hz.



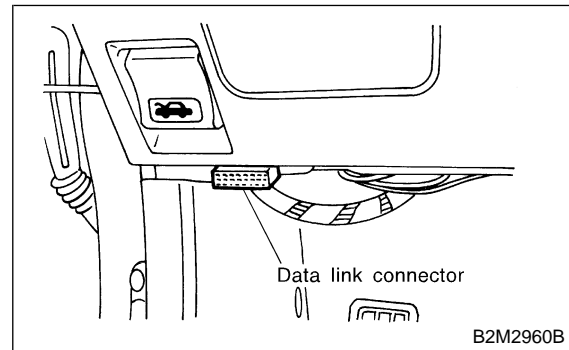
4) When ignition switch is turned to ON (engine off) or to "START" with the test mode connector connected, the MIL blinks at a cycle of 3 Hz.



B: OBD-II GENERAL SCAN TOOL

1. HOW TO USE OBD-II GENERAL SCAN TOOL

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



3) Using the OBD-II general scan tool, call up diagnostic trouble code(s) and freeze frame data. OBD-II general scan tool functions consist of:

- (1) MODE \$01: Current powertrain diagnostic data
- (2) MODE \$02: Powertrain freeze frame data
- (3) MODE \$03: Emission-related powertrain diagnostic trouble codes
- (4) MODE \$04: Clear/Reset emission-related diagnostic information

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

NOTE:

For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.

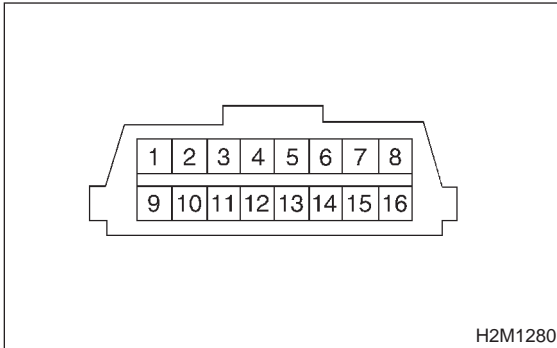
- MT vehicles: <Ref. to 2-7 [T10A0].>
- AT vehicles: <Ref. to 2-7 [T11A0].>

2. DATA LINK CONNECTOR (FOR OBD-II GENERAL SCAN TOOL AND SUBARU SELECT MONITOR)

- 1) This connector is used both for OBD-II general scan tools and the Subaru Select Monitor.
- 2) Terminal No. 4 to No. 6 of the data link connector is used for the Subaru Select Monitor signal.

CAUTION:

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



Terminal No.	Contents	Terminal No.	Contents
1	Power supply	9	Blank
2	Blank	10	K line of ISO 9141 CARB
3	Blank	11	Blank
4	Subaru Select Monitor signal (ECM to Subaru Select Monitor)*	12	Ground
5	Subaru Select Monitor signal (Subaru Select Monitor to ECM)*	13	Ground
6	Line end check signal 1	14	Blank
7	Blank	15	Blank
8	Line end check signal 2 (MT vehicles)	16	Blank

*: Circuit only for Subaru Select Monitor

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

Refers to data denoting the current operating condition of analog input/output, digital input/output and/or the powertrain system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
01	Number of emission-related powertrain trouble codes and MIL status	ON/OFF
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h
0E	Ignition timing advance	°
10	Air flow rate from pressure sensor	g/sec
11	Throttle valve opening angle	%
13	Check whether oxygen sensor is installed.	—
14	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor—bank 1	V and %
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor—bank 2	V and %
1C	On-board diagnosis system	—

NOTE:

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

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

Refers to data denoting the operating condition when trouble is sensed by the on-board diagnosis system.

A list of the support data and PID (Parameter Identification) codes are shown in the following table.

PID	Data	Unit of measure
02	Trouble code that caused CARB required freeze frame data storage	—
03	Fuel system control status	—
04	Calculated engine load value	%
05	Engine coolant temperature	°C
06	Short term fuel trim	%
07	Long term fuel trim	%
0B	Intake manifold absolute pressure	kPa
0C	Engine revolution	rpm
0D	Vehicle speed	km/h

NOTE:

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

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

Refers to data denoting emission-related powertrain diagnostic trouble codes.

For details concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.

- MT vehicles: <Ref. to 2-7 [T10A0].>
- AT vehicles: <Ref. to 2-7 [T11A0].>

NOTE:

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

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

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

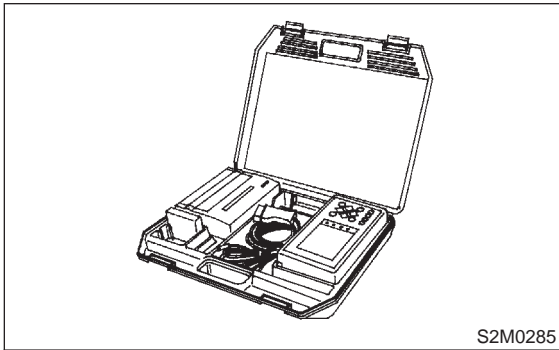
NOTE:

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

C: SUBARU SELECT MONITOR

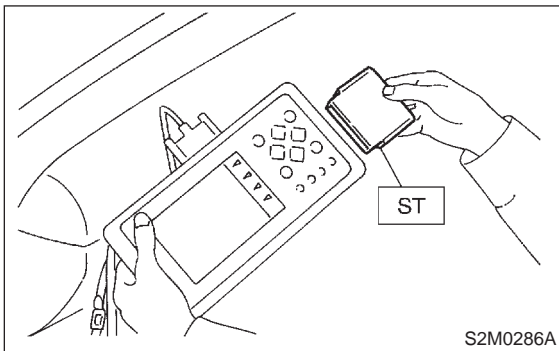
1. HOW TO USE SUBARU SELECT MONITOR

- 1) Prepare Subaru Select Monitor kit.



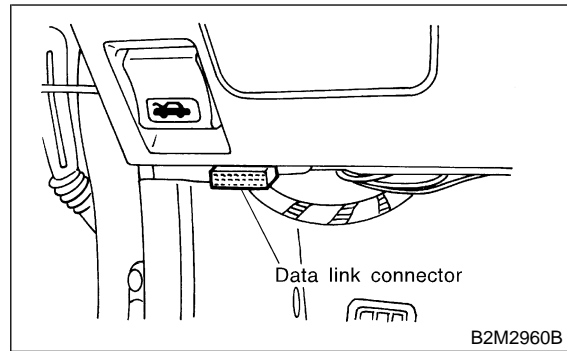
- 2) Connect diagnosis cable to Subaru Select Monitor.

- 3) Insert cartridge into Subaru Select Monitor.
<Ref. to 1-6 [G1100].>



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

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

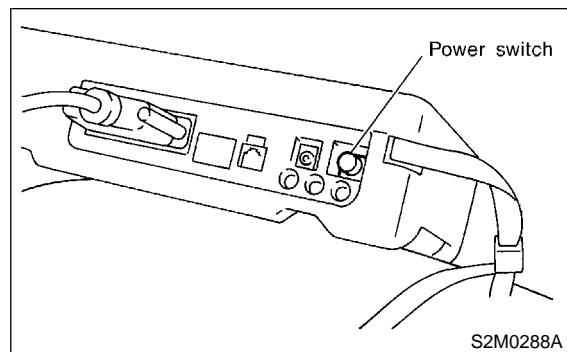


- (2) Connect diagnosis cable to data link connector.

CAUTION:

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

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



- 6) Using Subaru Select Monitor, call up diagnostic trouble code(s) and various data, then record them.

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

- 1) On the 「Main Menu」 display screen, select the {Each System Check} and press the [YES] key.
- 2) On the 「System Selection Menu」 display screen, select the {Engine Control System} and press the [YES] key.

- 3) Press the [YES] key after displayed the information of engine type.
- 4) On the 「Engine Diagnosis」 display screen, select the {Diagnostic Code(s) Display} and press the [YES] key.
- 5) On the 「Diagnostic Code(s) Display」 display screen, select the {Current Diagnostic Code(s)} or {History Diagnostic Code(s)} and press the [YES] key.

NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.
 - MT vehicles: <Ref. to 2-7 [T10A0].>
 - AT vehicles: <Ref. to 2-7 [T11A0].>

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

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

NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.
 - MT vehicles: <Ref. to 2-7 [T10A0].>
 - AT vehicles: <Ref. to 2-7 [T11A0].>

4. READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE. (NORMAL MODE)

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

Contents	Display	Unit of measure
Battery voltage	Battery Voltage	V
Vehicle speed signal	Vehicle Speed	km/h or MPH
Engine speed signal	Engine Speed	rpm
Engine coolant temperature signal	Coolant Temp.	°C or °F
Ignition timing signal	Ignition Timing	deg
Throttle position signal	Throttle Opening Angle	%
Throttle position signal	Throttle Sensor Voltage	V
Injection pulse width	Fuel Injection #1 Pulse	ms
Idle air control signal*2	ISC Valve Duty Ratio	%
Idle air control signal*1	ISC Valve Step	STEP
Engine load data	Engine Load	%
Front oxygen (A/F) sensor output signal	A/F Sensor #1	—
Front oxygen (A/F) sensor resistance	A/F Sensor #1 Resistance	Ω
Rear oxygen sensor output signal	Rear O2 Sensor	V
Short term fuel trim	A/F Correction #1	%
Knock sensor signal	Knocking Correction	deg
Atmospheric absolute pressure signal	Atmosphere Pressure	mmHg or kPa or inHg or psi
Intake manifold relative pressure signal	Mani. Relative Pressure	mmHg or kPa or inHg or psi
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg or kPa or inHg or psi
A/F correction (short term fuel trim) by rear oxygen sensor	A/F Correction #3	%
Long term whole fuel trim	A/F Learning #1	%
Front oxygen (A/F) sensor heater current	A/F Heater #1	A
Rear oxygen sensor heater voltage	Rear O2 Heater Voltage	V
Canister purge control solenoid valve duty ratio	CPC Valve Duty Ratio	%
Fuel tank pressure signal	Fuel Tank Pressure	mmHg or kPa or inHg or psi
Fuel temperature signal	Fuel Temp.	°C or °F
Fuel level signal	Fuel Level	V
Intake air temperature signal	Intake Air Temp.	°C or °F
Learned ignition timing	Learned Ignition Timing	V
Ignition switch signal	Ignition Switch	ON or OFF
Test mode connector signal	Test Mode Signal	ON or OFF
Neutral position switch signal	Neutral Position Switch	ON or OFF
Air conditioning switch signal	A/C Switch	ON or OFF
Air conditioning relay signal	A/C Relay	ON or OFF
Radiator main fan relay signal	Radiator Fan Relay #1	ON or OFF
Fuel pump relay signal	Fuel Pump Relay	ON or OFF
Knocking signal	Knocking Signal	ON or OFF
Radiator sub fan relay signal	Radiator Fan Relay #2	ON or OFF

Contents	Display	Unit of measure
Engine torque control signal #1	Torque Control Signal #1	ON or OFF
Engine torque control signal #2	Torque Control Signal #2	ON or OFF
Engine torque control permission signal	Torque Control Permit	ON or OFF
Rear oxygen sensor rich signal	Rear O2 Rich Signal	ON or OFF
Pressure control solenoid valve	PCV Solenoid Valve	ON or OFF
Drain valve	Vent. Solenoid Valve	ON or OFF
Starter switch signal	Starter Switch Signal	ON or OFF
Idle switch signal	Idle Switch Signal	ON or OFF
Crankshaft position sensor signal	Crankshaft Position Sig.	ON or OFF
Camshaft position sensor signal	Camshaft Position Sig.	ON or OFF
Rear defogger switch signal	Rear Defogger Switch	ON or OFF
Blower fan switch signal	Blower Fan Switch	ON or OFF
Small light switch signal	Small Light Switch	ON or OFF
Air assist injector solenoid valve signal	AAI Solenoid Valve	ON or OFF

*1: AT vehicles

*2: MT vehicles

NOTE:

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

5. READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE. (OBD MODE)

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

Contents	Display	Unit of measure
Number of diagnosis code	Number of Diagnosis Code	—
Malfunction indicator lamp status	MIL Status	ON or OFF
Monitoring test of misfire	Misfire monitoring	ON or OFF
Monitoring test of fuel system	Fuel system monitoring	ON or OFF
Monitoring test of comprehensive component	Component monitoring	ON or OFF
Test of catalyst	Catalyst Diagnosis	ON or OFF
Test of heated catalyst	Heated catalyst	ON or OFF
Test of evaporative emission purge control system	Evaporative purge system	ON or OFF
Test of secondary air system	Secondary air system	ON or OFF
Test of air conditioning system refrigerant	A/C system refrigerant	ON or OFF
Test of oxygen sensor	Oxygen sensor	ON or OFF
Test of oxygen sensor heater	Oxygen sensor heater	ON or OFF
Air fuel ratio control system for bank 1	Fuel System for Bank 1	ON or OFF
Engine load data	Engine Load	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg or kPa or inHg or psi
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH
Ignition timing advance for #1 cylinder	Ignition timing adv. #1	°
Intake air temperature signal	Intake Air Temp.	°C or °F
Throttle position signal	Throttle Opening Angle	%
A/F sensor equipment	A/F sensor	ON or OFF
Rear oxygen sensor output signal	Oxygen Sensor #12	V
Air fuel ratio correction by rear oxygen sensor	Short term fuel trim #12	%
On-board diagnostic system	OBD System	—

NOTE:

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

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

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

Contents	Display	Unit of measure
Diagnostic trouble code (DTC) for freeze frame data	Freeze frame data	DTC
Air fuel ratio control system for bank 1	Fuel system for Bank1	ON or OFF
Engine load data	Engine Load	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg or kPa or inHg or psi
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH

NOTE:

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

7. READ OXYGEN SENSOR MONITORING TEST RESULTS DATA SHOWN ON DISPLAY FOR ENGINE. (OBD MODE)

- 1) On the 「Main Menu」 display screen, select the {Each System Check} and press the [YES] key.
 - 2) On the 「System Selection Menu」 display screen, select the {Engine Control System} and press the [YES] key.
 - 3) Press the [YES] key after displayed the information of engine type.
 - 4) On the 「Engine Diagnosis」 display screen, select the {OBD System} and press the [YES] key.
 - 5) On the 「OBD Menu」 display screen, select the {O2 Sensor Monitor} and press the [YES] key.
 - 6) On the 「O2 Sensor Select」 display screen, select the {Bank 1-Sensor1} or {Bank 1-Sensor2} and press the [YES] key.
- Bank 1-Sensor1 indicates the front oxygen or A/F sensor, and Bank 1-Sensor2 indicates the rear oxygen sensor.
 - A list of the support data is shown in the following table.

Contents	Display	Unit of measure
Oxygen sensor for monitoring test	<O2 Sensor Monitor (-----)>	—
Rich to lean oxygen sensor threshold voltage	Rich to lean sensor volt	V
Lean to rich oxygen sensor threshold voltage	Lean to rich sensor volt	V
Low oxygen sensor voltage for switch time calculation	Low sensor voltage	V
High oxygen sensor voltage for switch time calculation	High sensor voltage	V
Rich to lean oxygen sensor switch time	Rich to lean switch time	sec
Lean to rich oxygen sensor switch time	Lean to rich switch time	sec
Maximum oxygen sensor voltage for test cycle	Maximum sensor Voltage	V
Minimum oxygen sensor voltage for test cycle	Minimum sensor Voltage	V

NOTE:

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

8. LED OPERATION MODE FOR ENGINE

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

Contents	Display	Message	LED "ON" requirements
Ignition switch signal	Ignition Switch	ON or OFF	When ignition switch is turned ON.
Test mode connector signal	Test Mode Signal	ON or OFF	When test mode connector is connected.
Neutral position switch signal	Neutral Position Switch	ON or OFF	When neutral position signal is entered.
Air conditioning switch signal	A/C Switch	ON or OFF	When air conditioning switch is turned ON.
Air conditioning relay signal	A/C Relay	ON or OFF	When air conditioning relay is in function.
Radiator main fan relay signal	Radiator Fan Relay #1	ON or OFF	When radiator main fan relay is in function.
Fuel pump relay signal	Fuel Pump Relay	ON or OFF	When fuel pump relay is in function.
Knocking signal	Knocking Signal	ON or OFF	When knocking signal is entered.
Radiator sub fan relay signal	Radiator Fan Relay #2	ON or OFF	When radiator sub fan relay is in function.
Engine torque control signal #1	Torque Control Signal #1	ON or OFF	When engine torque control signal 1 is entered.
Engine torque control signal #2	Torque Control Signal #2	ON or OFF	When engine torque control signal 2 is entered.
Engine torque control permission signal	Torque Control Permit	ON or OFF	When engine torque control permission signal is entered.
Front oxygen (A/F) sensor rich signal	Front O2 Rich Signal #1	ON or OFF	When front oxygen (A/F) sensor mixture ratio is rich.
Rear oxygen sensor rich signal	Rear O2 Rich Signal	ON or OFF	When rear oxygen sensor mixture ratio is rich.
Pressure control solenoid valve	PCV Solenoid Valve	ON or OFF	When pressure control solenoid valve is in function.
Drain valve	Vent. Solenoid Valve	ON or OFF	When drain valve is in function.
Starter switch signal	Starter Switch Signal	ON or OFF	When starter switch signal is entered.
Idle switch signal	Idle Switch Signal	ON or OFF	When idle switch signal is entered.
Crankshaft position sensor signal	Crankshaft Position Sig.	ON or OFF	When crankshaft position sensor signal is entered.
Camshaft position sensor signal	Camshaft Position Sig.	ON or OFF	When camshaft position sensor signal is entered.

NOTE:

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

9. READ CURRENT DATA SHOWN ON DISPLAY FOR AT.

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

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

NOTE:

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

D: CLEAR MEMORY MODE

1. SUBARU SELECT MONITOR (NORMAL MODE)

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

NOTE:

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

2. SUBARU SELECT MONITOR (OBD MODE)

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

NOTE:

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

3. OBD-II GENERAL SCAN TOOL

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

After the memory has been cleared, the ISC must be initialized. To do this, turn the ignition switch to the ON position. Wait 3 seconds before starting the engine. (AT vehicles only)

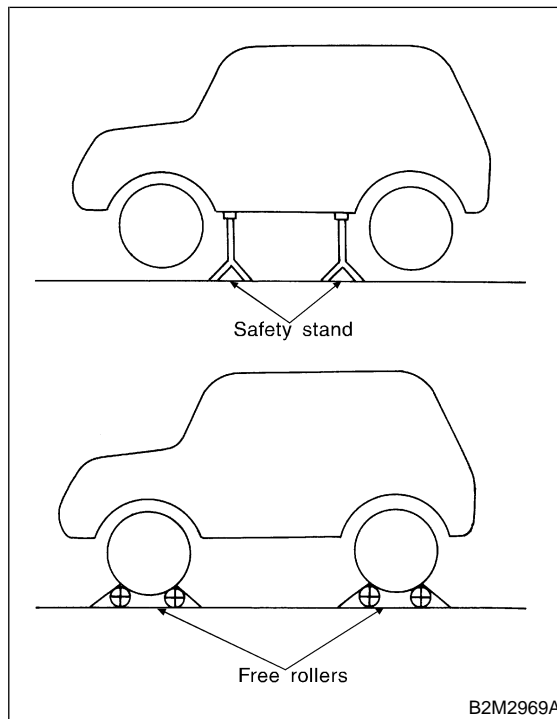
E: INSPECTION MODE

1. PREPARATIONS FOR THE INSPECTION MODE

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

WARNING:

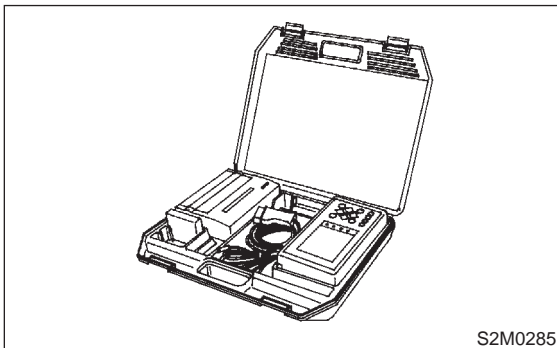
- Before raising the vehicle, ensure parking brakes are applied.
- Do not use a pantograph jack in place of a safety stand.
- Secure a rope or wire to the front and rear towing or tie-down hooks to prevent the lateral runoff of front wheels.
- Do not abruptly depress/release clutch pedal or accelerator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



2. SUBARU SELECT MONITOR

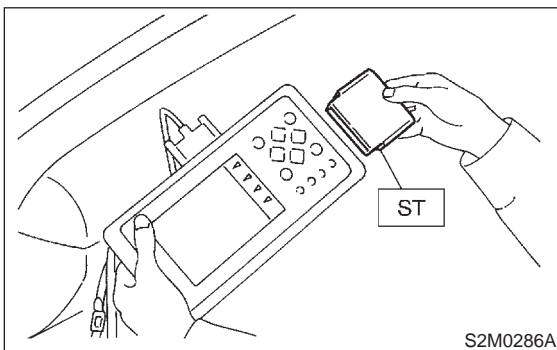
After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data.

1) Prepare Subaru Select Monitor kit.

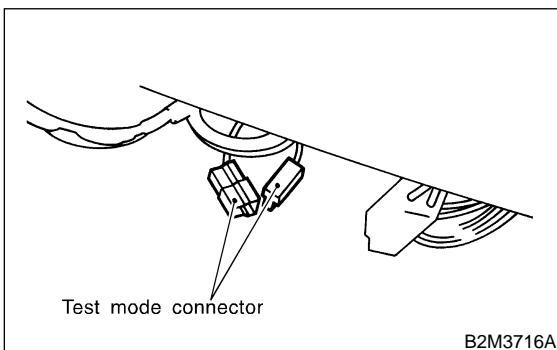


2) Connect diagnosis cable to Subaru Select Monitor.

3) Insert cartridge into Subaru Select Monitor.
<Ref. to 1-6 [G1100].>

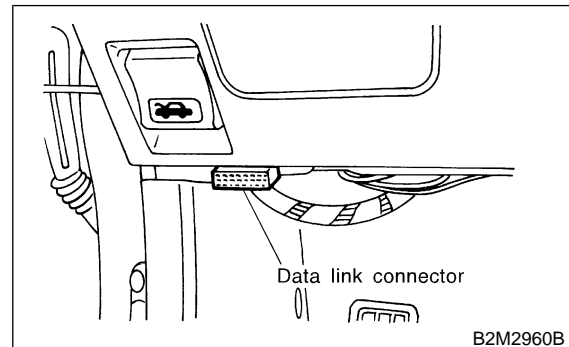


4) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



5) Connect Subaru Select Monitor to data link connector.

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

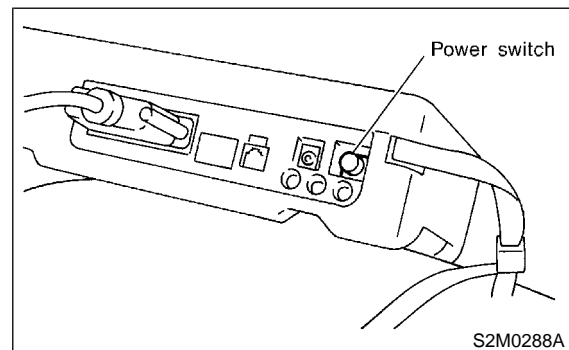


(2) Connect diagnosis cable to data link connector.

CAUTION:

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

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



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

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

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

10) On the 「Engine Diagnosis」 display screen, select the {Dealer Check Mode Procedure} and press the [YES] key.

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

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

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

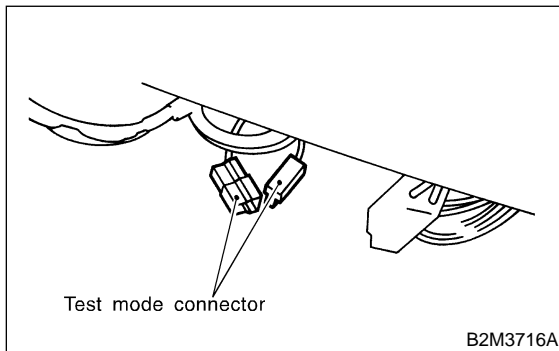
NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.
 - MT vehicles: <Ref. to 2-7 [T10A0].>
 - AT vehicles: <Ref. to 2-7 [T11A0].>
- Release the parking brake.
- The speed difference between front and rear wheels may light either the ABS warning light, but this indicates no malfunctions. When engine control diagnosis is finished, perform the ABS memory clearance procedure of self-diagnosis system.

3. OBD-II GENERAL SCAN TOOL

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

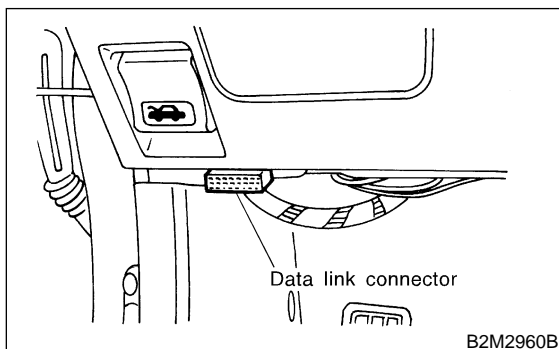
- 1) Connect test mode connector at the lower side of the instrument panel (on the driver's side), to the side of the center console box.



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

CAUTION:

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



- 3) Start the engine.

NOTE:

- Ensure the selector lever is placed in the "P" position before starting. (AT vehicles)
 - Depress clutch pedal when starting the engine. (MT vehicles)
- 4) Using the selector lever or shift lever, turn the "P" position switch and the "N" position switch to ON.
 - 5) Depress the brake pedal to turn the brake switch ON. (AT vehicles)
 - 6) Keep engine speed in the 2,500 — 3,000 rpm range for 40 seconds.

NOTE:

On models without tachometer, use the tachometer (Secondary pickup type).

- 7) Place the selector lever or shift lever in the "D" position (AT vehicles) or "1st" gear (MT vehicles) and drive the vehicle at 5 to 10 km/h (3 to 6 MPH).

NOTE:

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

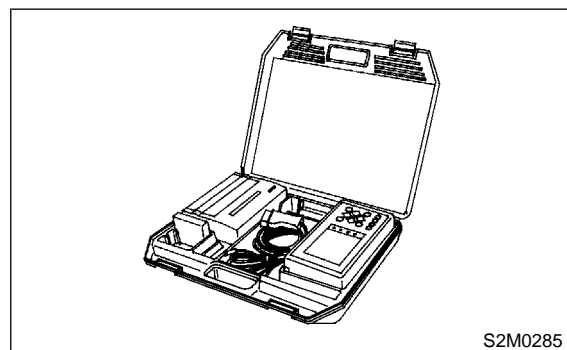
- 8) Using the OBD-II general scan tool, check for diagnostic trouble code(s) and record the result(s).

NOTE:

- For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.
- For detailed concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST.
 - MT vehicles: <Ref. to 2-7 [T10A0].>
 - AT vehicles: <Ref. to 2-7 [T11A0].>

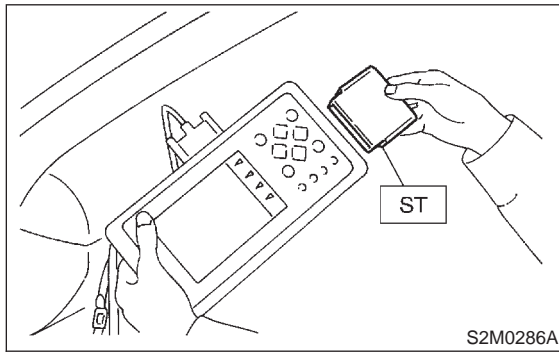
F: COMPULSORY VALVE OPERATION CHECK MODE**1. SUBARU SELECT MONITOR**

- 1) Prepare Subaru Select Monitor kit.

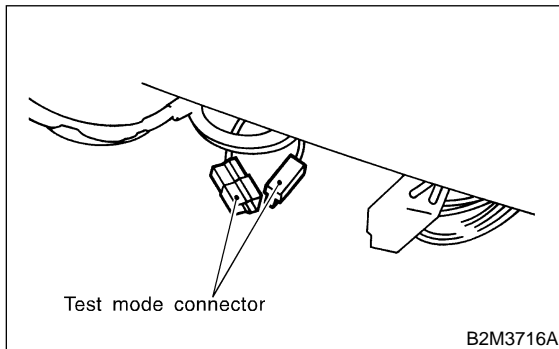


- 2) Connect diagnosis cable to Subaru Select Monitor.

3) Insert cartridge into Subaru Select Monitor.
<Ref. to 1-6 [G1100].>

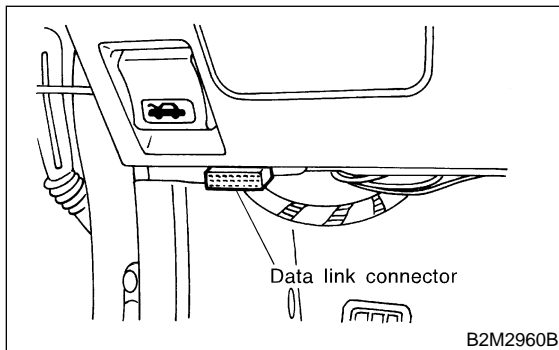


4) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



5) Connect Subaru Select Monitor to data link connector.

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

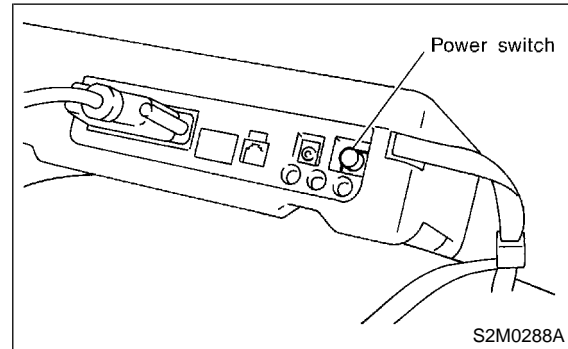


(2) Connect diagnosis cable to data link connector.

CAUTION:

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

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



7) On the 「Main Menu」 display screen, select the {2. Each System Check} and press the [YES] key.
8) On the 「System Selection Menu」 display screen, select the {Engine Control System} and press the [YES] key.

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

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

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

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

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

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

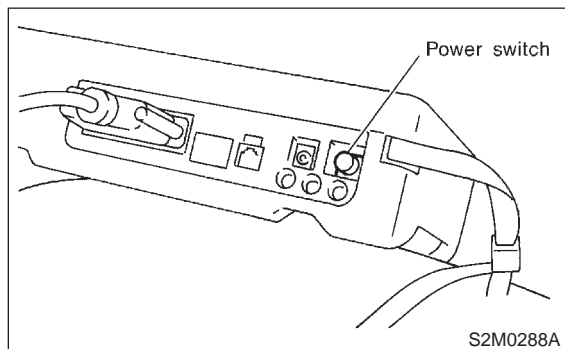
Contents	Display
Compulsory fuel pump relay operation check	Fuel Pump Relay
Compulsory radiator fan relay operation check	Radiator Fan Relay
Compulsory air conditioning relay operation check	A/C Relay
Compulsory pressure control solenoid valve operation check	PCV Solenoid Valve
Compulsory drain valve operation check	Vent Control Solenoid Valve

NOTE:

- Because ASV solenoid valve, FICD solenoid valve and air injection system diagnosis solenoid valve are not installed, ASV Solenoid Valve, FICD Solenoid Valve and Pressure Switching Sol.2 will be displayed but non-functional.
- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

G: FINISHING DIAGNOSIS OPERATION**1. SUBARU SELECT MONITOR**

- 1) Turn ignition switch to OFF.
- 2) Turn Subaru Select Monitor switch to OFF.



- 3) Disconnect test mode connector at the lower portion of instrument panel (on the driver's side).
- 4) Disconnect Subaru Select Monitor from its data link connector.

4. Cautions**A: 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), transmission control module (TCM), main relay and fuel pump relay.

B: PRECAUTIONS

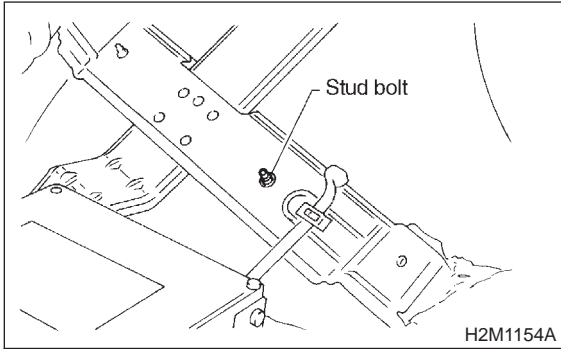
- 1) Never connect the battery in reverse polarity.
 - The ECM will be destroyed instantly.
 - The fuel injector and other part will be damaged in just a few minutes more.
- 2) Do not disconnect the battery terminals while the engine is running.
 - A large counter electromotive force will be generated in the alternator, and this voltage may damage electronic parts such as ECM, etc.
- 3) Before disconnecting the connectors of each sensor and the ECM, be sure to turn OFF the ignition switch.
- 4) Poor contact has been identified as a primary cause of this problem. To measure the voltage and/or resistance of individual sensors or all electrical control modules at the harness side connector, use a tapered pin with a diameter of less than 0.64 mm (0.025 in). Do not insert the pin more than 5 mm (0.20 in) into the part.
- 5) Before removing ECM from the located position, disconnect two cables on battery.
 - Otherwise, the ECM may be damaged.

CAUTION:

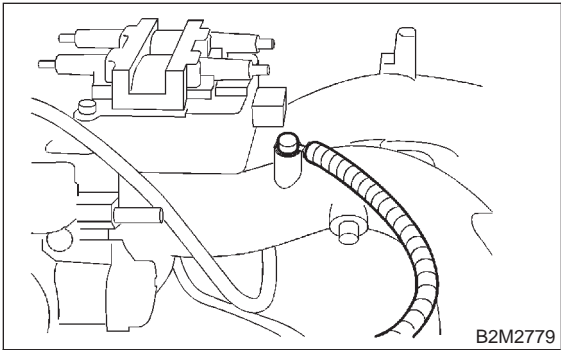
When replacing ECM, be careful not to use the wrong spec. ECM to avoid any damage on fuel injection system.

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

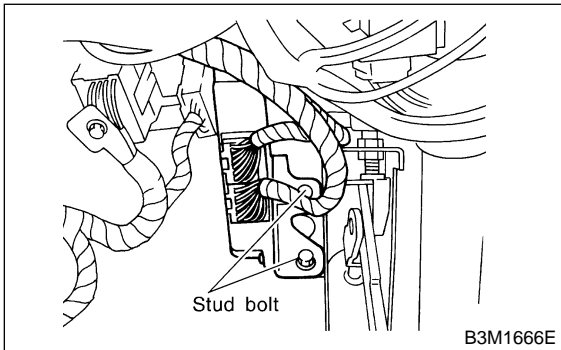
7) Use ECM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.



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



9) Use TCM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.



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

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

CAUTION:

- The antenna must be kept as far apart as possible from the control unit. (The ECM is located under the steering column, inside of the instrument panel lower trim panel.)

- The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.

- Carefully adjust the antenna for correct matching.

- When mounting a large power type radio, pay special attention to the three items above mentioned.

- Incorrect installation of the radio may affect the operation of the ECM.

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

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

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

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

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

C: 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.

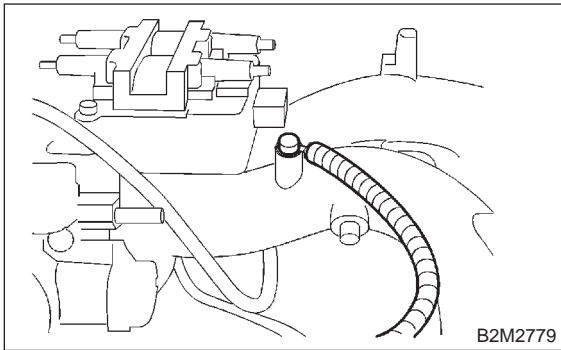
Standard voltage: 12 V

Specific gravity: Above 1.260

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

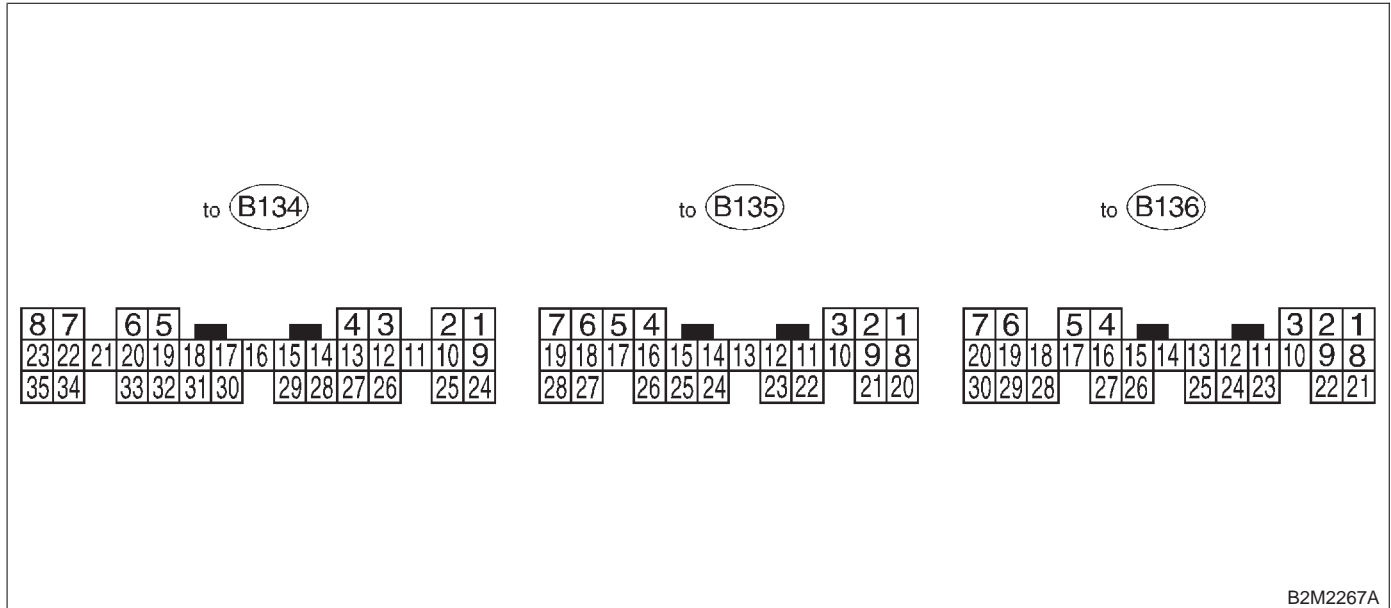
2. ENGINE GROUNDING

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



5. Specified Data

A: ENGINE CONTROL MODULE (ECM) I/O SIGNAL FOR MT VEHICLES



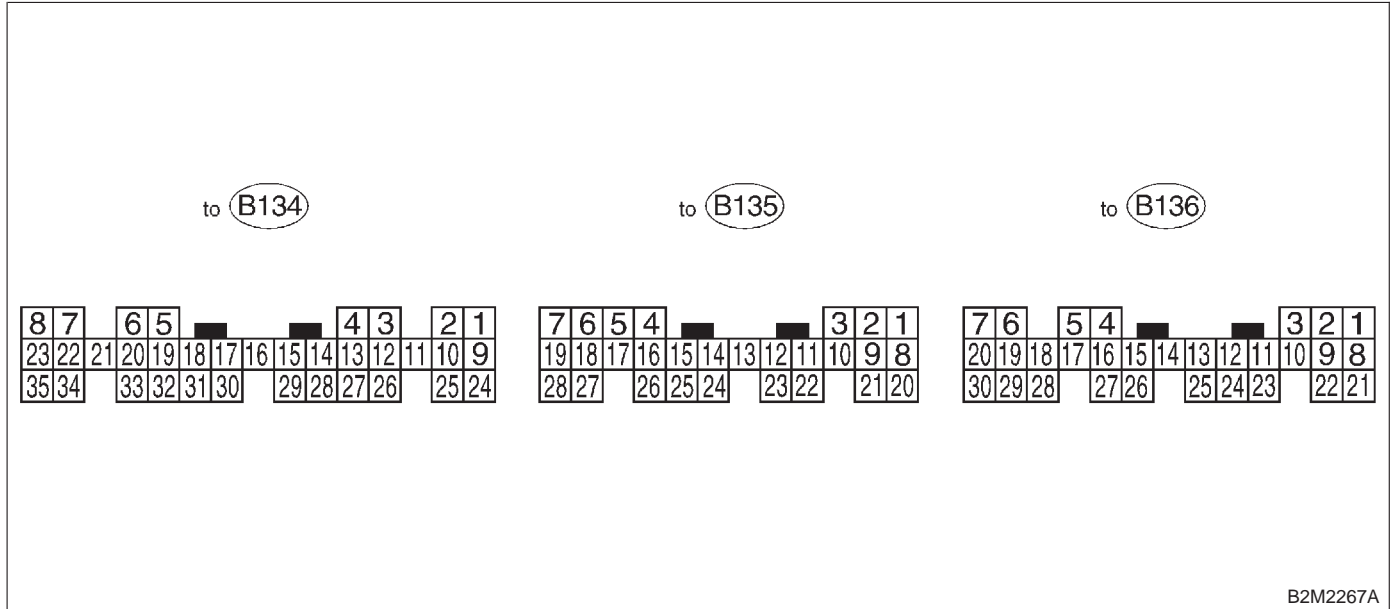
Content	Connector No.	Terminal No.	Signal (V)		Note	
			Ignition SW ON (Engine OFF)	Engine ON (Idling)		
Crankshaft position sensor	Signal (+)	B135	1	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	8	0	0	—
	Shield	B135	10	0	0	—
Camshaft position sensor	Signal (+)	B135	2	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	9	0	0	—
	Shield	B135	10	0	0	—
Throttle position sensor	Signal	B136	17	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Rear oxygen sensor	Signal	B136	18	0	0 — 0.9	—
	Shield	B136	24	0	0	—
	GND sensor	B136	16	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B134	22	0.5 — 13	0.5 — 14	Waveform
	Signal 2	B134	23	0.5 — 13	0.5 — 14	Waveform
	Power supply monitor	B136	3	10 — 13	13 — 14	—
Rear oxygen sensor heater	Signal	B134	21	0.5 — 13	0.5 — 14	Waveform
	Power supply monitor	B136	3	10 — 13	13 — 14	—
Engine coolant temperature sensor	Signal	B136	14	1.0 — 1.4	1.0 — 1.4	After warm-up the engine.
	GND (sensor)	B136	16	0	0	After warm-up the engine.
Vehicle speed signal	B135	24	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.	
Starter switch	B135	28	0	0	Cranking: 8 — 14	

Content	Connector No.	Terminal No.	Signal (V)		Note	
			Ignition SW ON (Engine OFF)	Engine ON (Idling)		
A/C switch	B135	27	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—	
Ignition switch	B135	7	10 — 13	13 — 14	—	
Neutral position switch	B135	26	ON: 12±0.5 OFF: 0		On MT vehicle; switch is ON when gear is in neutral position.	
Test mode connector	B135	14	5	5	When connected: 0	
Knock sensor	Signal	B136	4	2.5	2.5	—
	Shield	B136	25	0	0	—
Back-up power supply	B136	9	10 — 13	13 — 14	Ignition switch "OFF": 10 — 13	
Control unit power supply	B136	1	10 — 13	13 — 14	—	
	B136	2	10 — 13	13 — 14	—	
Sensor power supply	B136	15	5	5	—	
Line end check 1	B135	20	0	0	—	
Ignition control	#1, #2	B134	25	0	1 — 3.4	Waveform
	#3, #4	B134	26	0	1 — 3.4	Waveform
Fuel injector	#1	B134	4	10 — 13	1 — 14	Waveform
	#2	B134	13	10 — 13	1 — 14	Waveform
	#3	B134	14	10 — 13	1 — 14	Waveform
	#4	B134	15	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	Signal	B134	5	—	1 — 13	Waveform
	Power supply	B136	2	10 — 13	13 — 14	—
	GND (power)	B134	8	0	0	—
Fuel pump relay control	B134	16	ON: 0.5, or less OFF: 10 — 13	0.5, or less	—	
A/C relay control	B134	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—	
Radiator fan relay 1 control	B134	3	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—	
Radiator fan relay 2 control	B134	12	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only	
Self-shutoff control	B135	19	10 — 13	13 — 14	—	
Malfunction indicator lamp	B134	11	—	—	Light "ON": 1, or less Light "OFF": 10 — 14	
Engine speed output	B134	30	—	0 — 13, or more	Waveform	
Purge control solenoid valve	B134	2	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
Intake manifold pressure sensor	Signal	B136	5	3.4 — 3.6	1.2 — 1.8	—
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Fuel temperature sensor	B136	26	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (75°F)	
Fuel level sensor	B136	27	0.12 — 4.75	0.12 — 4.75	—	

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Fuel tank pressure sensor	Signal	B136	12	2.3 — 2.7	2.3 — 2.7	The value obtained after the fuel filler cap was removed once and recapped.
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Fuel tank pressure control solenoid valve	B134	1	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
Drain valve	B134	10	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
Small light switch	B135	18	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Blower fan switch	B135	5	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Rear defogger switch	B135	6	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Front oxygen (A/F) sensor signal 1	B136	7	3.7 — 3.9	3.7 — 3.9	—	
Front oxygen (A/F) sensor signal 2	B136	20	2.6 — 4.4	3.4 — 3.6	—	
SSM/GST communication line	B135	3	Less than 1 ↔ More than 4	Less than 1 ↔ More than 4	—	
Intake air temperature sensor	B136	13	3.0 — 3.4	3.0 — 3.4	Intake air temperature: 25°C (75°F)	
Line end check 2	B135	21	5	5	—	
GND (sensors)	B136	16	0	0	—	
GND (injectors)	B134	7	0	0	—	
GND (ignition system)	B134	27	0	0	—	
GND (power supply)	B134	8	0	0	—	
GND (control systems)	B136	21	0	0	—	
	B136	22	0	0	—	
GND (oxygen sensor heater 1)	B134	35	0	0	—	
GND (oxygen sensor heater 2)	B134	34	0	0	—	

MEMO:

B: ENGINE CONTROL MODULE (ECM) I/O SIGNAL FOR AT VEHICLES



B2M2267A

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B135	1	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	8	0	0	—
	Shield	B135	10	0	0	—
Camshaft position sensor	Signal (+)	B135	2	0	-7 — +7	Sensor output waveform
	Signal (-)	B135	9	0	0	—
	Shield	B135	10	0	0	—
Throttle position sensor	Signal	B136	17	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Rear oxygen sensor	Signal	B136	18	0	0 — 0.9	—
	Shield	B136	24	0	0	—
	GND (sensor)	B136	16	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B134	22	0 — 1.0	0 — 1.0	—
	Signal 2	B134	23	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		B134	21	0 — 1.0	0 — 1.0	—
Engine coolant temperature sensor	Signal	B136	14	1.0 — 1.4	1.0 — 1.4	After warm-up the engine.
	GND (sensor)	B136	16	0	0	After warm-up the engine.
Vehicle speed signal		B135	24	0 or 5	0 or 5	"5" and "0" are repeatedly displayed when vehicle is driven.
Starter switch		B135	28	0	0	Cranking: 8 — 14
A/C switch		B135	27	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B135	7	10 — 13	13 — 14	—

Content	Connector No.	Terminal No.	Signal (V)		Note	
			Ignition SW ON (Engine OFF)	Engine ON (Idling)		
Neutral position switch	B135	26	ON: 0 OFF: 12±0.5		Switch is ON when shift is in "N" or "P" position.	
Test mode connector	B135	14	5	5	When connected: 0	
Knock sensor	Signal	B136	4	2.8	—	
	Shield	B136	25	0	—	
Back-up power supply	B136	9	10 — 13	13 — 14	Ignition switch "OFF": 10 — 13	
Control unit power supply	B136	1	10 — 13	13 — 14	—	
	B136	2	10 — 13	13 — 14	—	
Sensor power supply	B136	15	5	5	—	
Line end check 1	B135	20	0	0	—	
Ignition control	#1, #2	B134	25	0	1 — 3.4	Waveform
	#3, #4	B134	26	0	1 — 3.4	Waveform
Fuel injector	#1	B134	4	10 — 13	1 — 14	Waveform
	#2	B134	13	10 — 13	1 — 14	Waveform
	#3	B134	14	10 — 13	1 — 14	Waveform
	#4	B134	15	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	Signal 1	B134	5	—	1 — 13	Waveform
	Signal 2	B134	6	—	1 — 13	Waveform
	Signal 3	B134	19	—	1 — 13	Waveform
	Signal 4	B134	20	—	1 — 13	Waveform
	Power supply	B136	2	10 — 13	13 — 14	—
Fuel pump relay control	B134	16	ON: 0.5, or less OFF: 10 — 13	0.5, or less	—	
A/C relay control	B134	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—	
Radiator fan relay 1 control	B134	3	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—	
Radiator fan relay 2 control	B134	2	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only	
Self-shutoff control	B135	19	10 — 13	13 — 14	—	
Malfunction indicator lamp	B134	11	—	—	Light "ON": 1, or less Light "OFF": 10 — 14	
Engine speed output	B134	30	—	0 — 13, or more	Waveform	
Torque control 1 signal	B135	16	5	5	—	
Torque control 2 signal	B135	17	5	5	—	
Torque control cut signal	B134	31	8	8	—	
Purge control solenoid valve	B134	2	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
Atmospheric pressure sensor	Signal	B136	29	3.9 — 4.1	2.0 — 2.3	—
	Power supply	B136	15	5	5	
	GND (sensor)	B136	16	0	0	
Fuel temperature sensor	B136	26	2.5 — 3.8	2.5 — 3.8	Ambient temperature: 25°C (75°F)	
Fuel level sensor	B136	27	0.12 — 4.75	0.12 — 4.75	—	

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Fuel tank pressure sensor	Signal	B136	12	2.3 — 2.7	2.3 — 2.7	The value obtained after the fuel filler cap was removed once and recapped.
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Fuel tank pressure control solenoid valve	B134	1	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
Drain valve	B134	10	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—	
AT diagnosis input signal	B135	4	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	Waveform	
Small light switch	B136	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Blower fan switch	B136	30	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Rear defogger switch	B135	21	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—	
Front oxygen (A/F) sensor signal 1	B136	19	2.8 — 3.2	2.8 — 3.2	—	
Front oxygen (A/F) sensor signal 2	B136	6	2.4 — 2.7	2.4 — 2.7	—	
Front oxygen (A/F) sensor signal 3	B136	7	0.2 — 4.9	0.2 — 4.9	—	
Front oxygen (A/F) sensor signal 4	B136	20	0.2 — 4.9	0.2 — 4.9	—	
Pressure sensor	B136	5	2.4 — 4.8	0.4 — 1.8	—	
Intake air temperature sensor	B136	13	2.3 — 2.5	1.4 — 1.6	—	
SSM/GST communication line	B135	3	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	—	
GND (sensors)	B136	16	0	0	—	
GND (injectors)	B134	7	0	0	—	
GND (ignition system)	B134	27	0	0	—	
GND (power supply)	B134	8	0	0	—	
GND (control systems)	B136	21	0	0	—	
	B136	22	0	0	—	
GND (oxygen sensor heater 1)	B134	35	0	0	—	
GND (oxygen sensor heater 2)	B134	34	0	0	—	

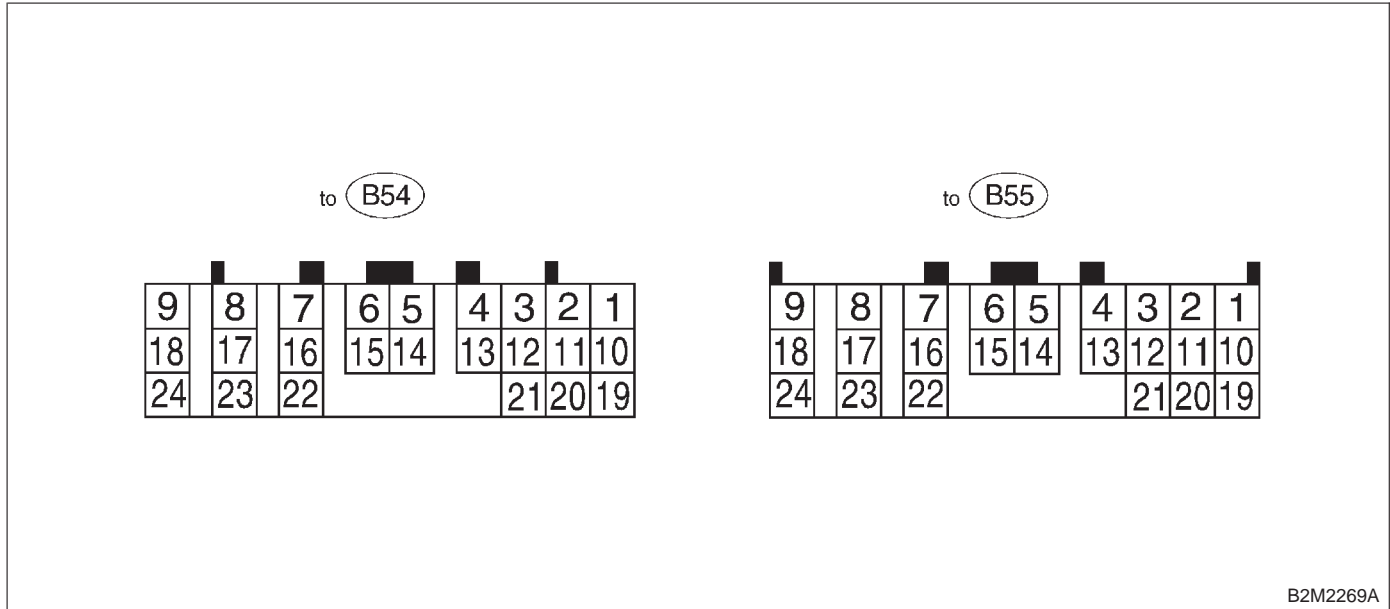
C: ENGINE CONDITION DATA

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

Measuring condition:

- After warm-up the engine.
- Gear position is in “N” or “P” position.
- A/C is turned OFF.
- All accessory switches are turned OFF.

D: TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL



B2M2269A

NOTE:
Check with ignition switch ON.

Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)
Back-up power supply		B55	6	Ignition switch OFF	10 — 16
Ignition power supply		B54	23	Ignition switch ON (with engine OFF)	10 — 16
		B54	24		
Inhibitor switch	“P” range switch	B55	23	Selector lever in “P” range	Less than 1
				Selector lever in any other than “P” range	More than 8
	“N” range switch	B55	22	Selector lever in “N” range	Less than 1
				Selector lever in any other than “N” range	More than 8
	“R” range switch	B55	17	Selector lever in “R” range	Less than 1
				Selector lever in any other than “R” range	More than 9.5
	“D” range switch	B55	8	Selector lever in “D” range	Less than 1
				Selector lever in any other than “D” range	More than 9.5
“3” range switch	B55	18	Selector lever in “3” range	Less than 1	
			Selector lever in any other than “3” range	More than 9.5	
“2” range switch	B54	10	Selector lever in “2” range	Less than 1	
			Selector lever in any other than “2” range	More than 9.5	
“1” range switch	B54	1	Selector lever in “1” range	Less than 1	
			Selector lever in any other than “1” range	More than 9.5	
Brake switch		B55	24	Brake pedal depressed	More than 10.5
				Brake pedal released	Less than 1
ABS signal		B54	19	ABS switch ON	Less than 1
				ABS switch OFF	More than 6.5

Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Throttle position sensor	B55	1	Throttle fully closed.	0.3 — 0.7	—
			Throttle fully open.	4.3 — 4.9	
Throttle position sensor power supply	B55	2	Ignition switch ON (with engine OFF)	4.8 — 5.3	—
ATF temperature sensor	B55	11	ATF temperature 20°C (68°F)	2.9 — 4.0	2.1 k — 2.9 k
			ATF temperature 80°C (176°F)	1.0 — 1.4	275 — 375
Vehicle speed sensor 1	B55	3	Vehicle stopped.	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed sensor 2	B55	5	Vehicle speed at most 10 km/h (6 MPH)	Less than 1 ← → More than 4	—
Torque converter turbine speed sensor	B55	12	Vehicle stopped.	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Vehicle speed output signal	B55	13	Vehicle speed at most 10 km/h (6 MPH)	Less than 1 ← → More than 4	—
Engine speed signal	B55	4	Ignition switch ON (with engine OFF).	More than 10.5	—
			Ignition switch ON (with engine ON).	8 — 11	
Cruise set signal	B54	11	When cruise control is set (SET lamp ON).	Less than 1	—
			When cruise control is not set (SET lamp OFF).	More than 6.5	
Torque control 1 signal	B54	13	Ignition switch ON (with engine ON)	More than 9	—
Torque control 2 signal	B54	21	Ignition switch ON (with engine ON)	More than 9	—
Torque control cut signal	B54	2	Ignition switch ON	8	—
AT load signal	B55	20	Engine idling after warm-up	1.2 — 1.8	—
Shift solenoid 1	B54	7	1st or 4th gear	More than 9	10 — 16
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B54	6	1st or 2nd gear	More than 9	10 — 16
			3rd or 4th gear	Less than 1	
Line pressure duty solenoid	B54	9	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 4.0	2.0 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Dropping resistor	B54	18	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 — 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
Lock-up duty solenoid	B54	16	When lock up occurs.	More than 8.5	10 — 17
			When lock up is released.	Less than 0.5	
Transfer duty solenoid	B54	15	Fuse on FWD switch	More than 8.5	10 — 17
			Fuse removed from FWD switch (with throttle fully open and with select lever in 1st gear).	Less than 0.5	

Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
2-4 brake duty solenoid	B54	8	Throttle fully closed (with engine OFF) after warm-up.	1.5 — 4.0	2.0 — 4.5
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake duty solenoid resistor	B54	17	Throttle fully closed (with engine OFF) after warm-up.	More than 8.5	9 — 15
			Throttle fully open (with engine OFF) after warm-up.	Less than 0.5	
2-4 brake timing solenoid	B54	5	3rd gear	More than 9	10 — 16
			1st gear	Less than 1	
Low clutch timing solenoid	B54	14	2nd gear	Less than 1	10 — 16
			4th gear	More than 9	
Sensor ground line 1	B55	10	—	0	Less than 1
Sensor ground line 2	B55	21	—	0	Less than 1
System ground line	B55	9	—	0	Less than 1
		19			
FWD switch	B55	14	Fuse removed.	6 — 9.1	—
			Fuse installed.	Less than 1	
FWD indicator lamp	B54	12	Fuse on FWD switch	Less than 1	—
			Fuse removed from FWD switch.	More than 9	
Data link signal (Subaru Select Monitor)	B55	7	—	—	—
		16	—	—	
AT diagnosis signal	B54	4	Ignition switch ON	Less than 1 ↔ More than 4	—

6. Basic Diagnostic Procedure

A: BASIC DIAGNOSTIC PROCEDURE FOR ENGINE

6A1 : CHECK ENGINE START FAILURE.

- 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to 2-7 [T6C0].>
- 2) Start the engine.

- CHECK** : **Does the engine start?**
- YES** : Go to step **6A2**.
- NO** : Inspection using "Diagnostics for Engine Start Failure". <Ref. to 2-7 [T800].>

6A2 : CHECK ILLUMINATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).

- CHECK** : **Does CHECK ENGINE malfunction indicator lamp illuminate?**
- YES** : Go to step **6A3**.
- NO** : Inspection using "9. General Diagnostics Table". <Ref. to 2-7 [T900].>

6A3 : CHECK INDICATION OF DTC ON DISPLAY.

- 1) Turn ignition switch to OFF.
- 2) Connect the Subaru Select Monitor or the OBD-II general scan tool to data link connector.
- 3) Turn ignition switch to ON and the Subaru Select Monitor or OBD-II general scan tool switch to ON.
- 4) Read DTC on the Subaru Select Monitor or OBD-II general scan tool.

- CHECK** : **Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?**
- YES** : Go to step **6A4**.
- NO** : Repair the related parts.

NOTE:

If DTC is not shown on display although the MIL illuminates, perform diagnostics of MIL (CHECK ENGINE malfunction indicator lamp) circuit or combination meter. <Ref. to 2-7 [T700].>

6A4 : PERFORM THE DIAGNOSIS.

- 1) Inspect using "Diagnostics Chart with Trouble Code (DTC)".

NOTE:

- MT vehicles: <Ref. to 2-7 [T10A0].>
- AT vehicles: <Ref. to 2-7 [T11A0].>

NOTE:

Carry out the basic check, only when DTC about automatic transmission is shown on display. <Ref. to 2-7 [T6B0].>

- 2) Repair the trouble cause.
- 3) Perform the clear memory mode. <Ref. to 2-7 [T3D0].>
- 4) Perform the inspection mode. <Ref. to 2-7 [T3E0].>

- CHECK** : **Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?**

- YES** : Inspect using "Diagnostics Chart with Trouble Code (DTC)".

NOTE:

- MT vehicles: <Ref. to 2-7 [T10A0].>
- AT vehicles: <Ref. to 2-7 [T11A0].>

- NO** : Complete the diagnosis.

B: BASIC CHECK ITEMS FOR AT

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

- 1) ATF level check <Ref. to 3-2 [W1B1].>
- 2) Differential gear oil level check <Ref. to 3-2 [W1B2].>
- 3) ATF leak check <Ref. to 3-2 [W1B3].>
- 4) Differential gear oil leak check <Ref. to 3-2 [W1B3].>
- 5) Stall test <Ref. to 3-2 [W8A0].>
- 6) Line pressure test <Ref. to 3-2 [W10A0].>
- 7) Transfer clutch pressure test <Ref. to 3-2 [W11A0].>
- 8) Time lag test <Ref. to 3-2 [W9A0].>
- 9) Road test <Ref. to 3-2 [W7A0].>
- 10) Shift characteristics <Ref. to 3-2 [W7A0].>

C: CHECK LIST FOR INTERVIEW**1. CHECK LIST NO. 1**

Check the following items when problem has occurred.

NOTE:

Use copies of this page for interviewing customers.

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

2. CHECK LIST NO. 2

Check the following items about the vehicle's state when MIL turns on.

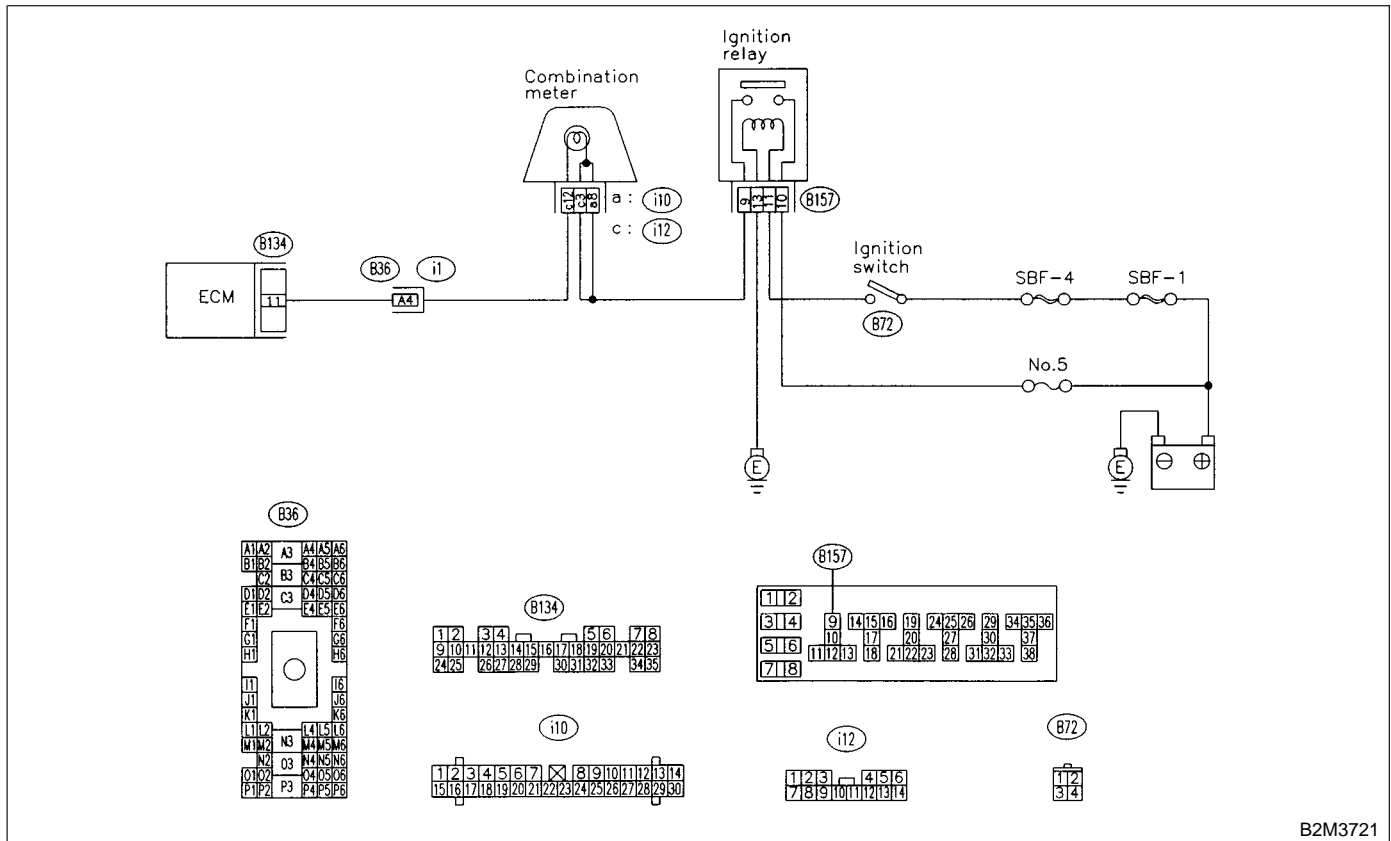
NOTE:
Use copies of this page for interviewing customers.

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

7. Diagnostics for CHECK ENGINE Malfunction Indicator Lamp (MIL)

A: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON.

- **DIAGNOSIS:**
 - The CHECK ENGINE malfunction indicator lamp (MIL) circuit is open or shorted.
- **TROUBLE SYMPTOM:**
 - When ignition switch is turned ON (engine OFF), MIL does not come on.
- **WIRING DIAGRAM:**



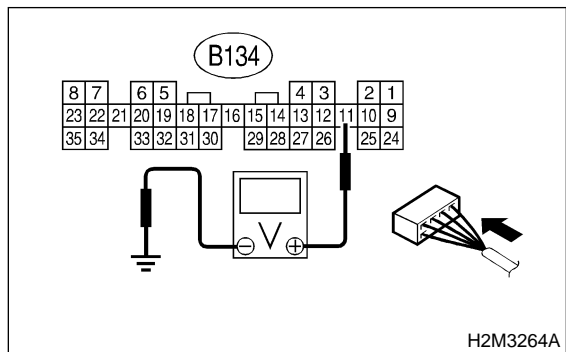
B2M3721

7A1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 11 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 1 V?*
- YES** : Go to step **7A4**.
- NO** : Go to step **7A2**.

7A2 : CHECK POOR CONTACT.

- CHECK** : *Does the MIL come on when shaking or pulling ECM connector and harness?*
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **7A3**.

7A3 : CHECK ECM CONNECTOR.

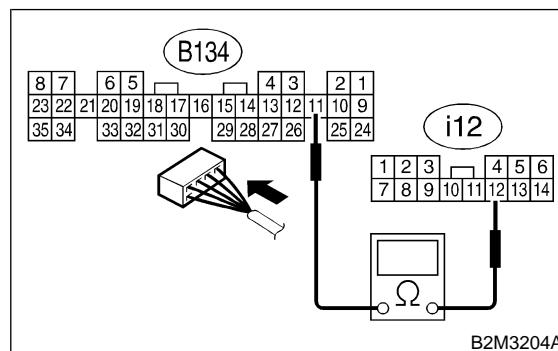
- CHECK** : *Is ECM connector correctly connected?*
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Repair connection of ECM connector.

7A4 : CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove combination meter. <Ref. to 6-2 [W8A0].>
- 3) Disconnect connector from ECM and combination meter.
- 4) Measure resistance of harness between ECM and combination meter connector.

Connector & terminal

(B134) No. 11 — (i12) No. 12:



- CHECK** : *Is resistance less than 1 Ω?*
- YES** : Go to step **7A5**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and combination meter connector
- Poor contact in coupling connector (B36)

7A5 : CHECK POOR CONTACT.

Check poor contact in combination meter connector. <Ref. to FOREWORD [W3C1].>

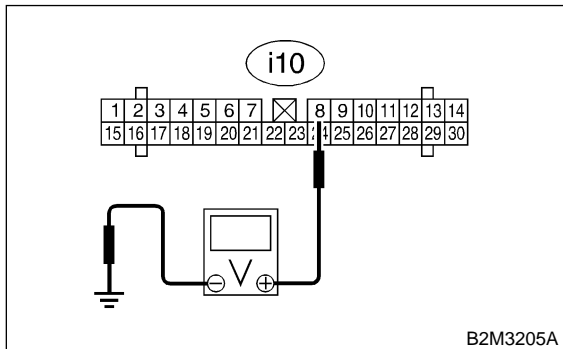
- CHECK** : *Is there poor contact in combination meter connector?*
- YES** : Repair poor contact in combination meter connector.
- NO** : Go to step **7A6**.

7A6 : CHECK HARNESS BETWEEN COMBINATION METER AND IGNITION SWITCH CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between combination meter connector and chassis ground.

Connector & terminal

(i10) No. 8 (+) — Chassis ground (-):



- CHECK** : **Is voltage more than 10 V?**
- YES** : Go to step **7A7**.
- NO** : Check the following and repair if necessary.

NOTE:

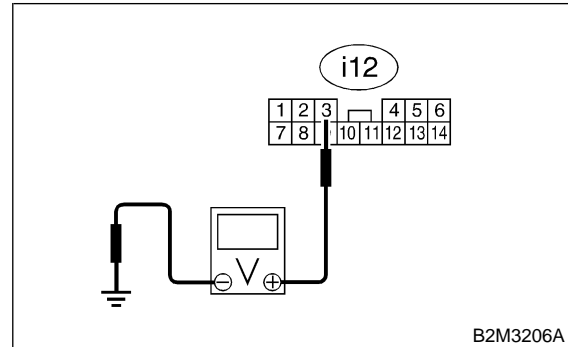
- Broken down ignition relay.
- Blown out fuse (No. 5).
- If replaced fuse (No. 5) blows easily, check the harness for short circuit of harness between fuse (No. 5) and ignition relay connector.
- Open or short circuit in harness between fuse (No. 5) and battery terminal
- Open circuit in harness between fuse (No. 5) and ignition relay connector
- Poor contact in ignition relay connector
- Poor contact in ignition switch connector

7A7 : CHECK HARNESS BETWEEN COMBINATION METER AND IGNITION SWITCH CONNECTOR.

Measure voltage between combination meter connector and chassis ground.

Connector & terminal

(i12) No. 3 (+) — Chassis ground (-):



- CHECK** : **Is voltage more than 10 V?**
- YES** : Go to step **7A8**.
- NO** : Check the following and repair if necessary.

NOTE:

- Broken down ignition relay.
- Blown out fuse (No. 5).
- If replaced fuse (No. 5) blows easily, check the harness for short circuit of harness between fuse (No. 5) and ignition relay connector.
- Open or short circuit in harness between fuse (No. 5) and battery terminal
- Open circuit in harness between fuse (No. 5) and ignition relay connector
- Poor contact in ignition relay connector
- Poor contact in ignition switch connector

7A8 : CHECK LAMP BULB.

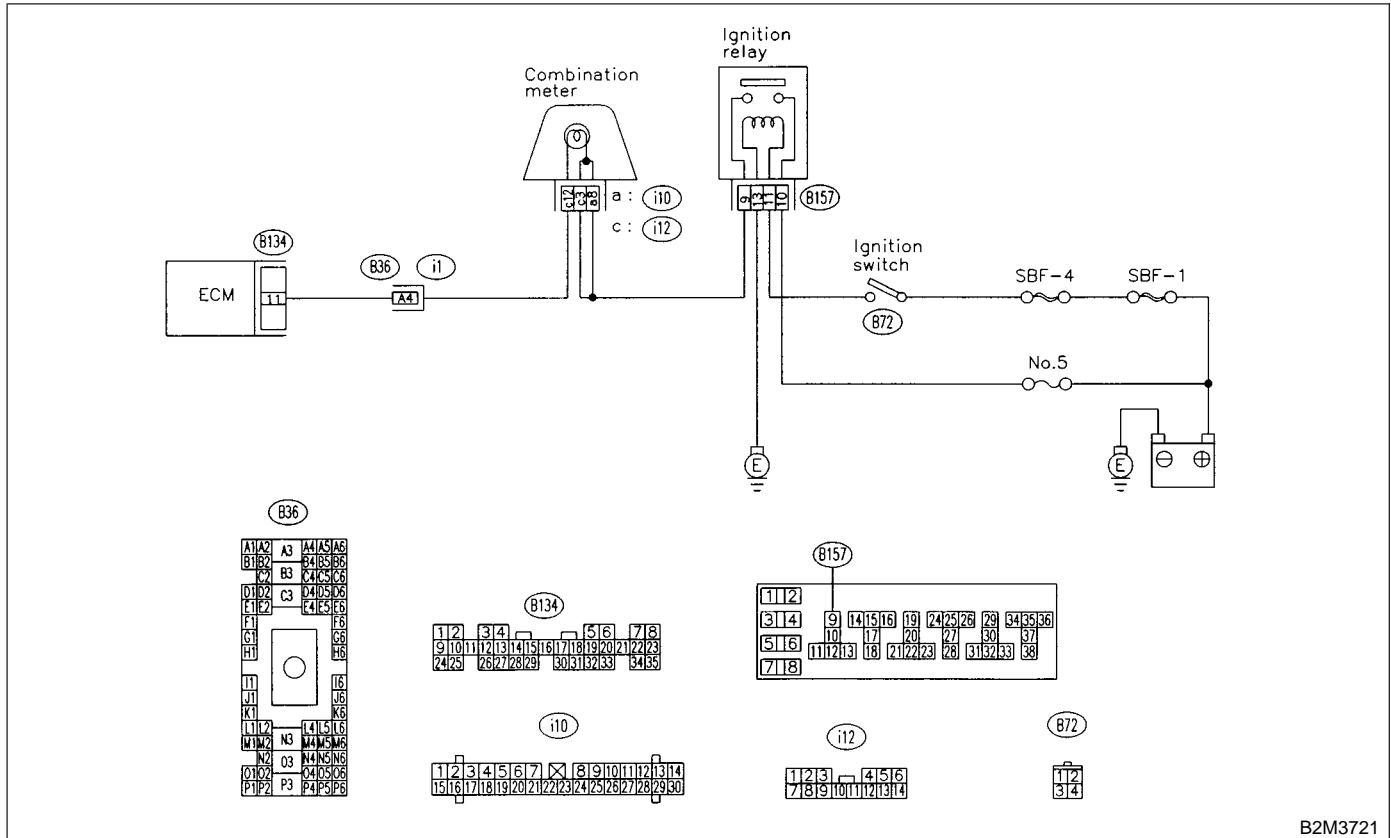
Remove engine malfunction indicator lamp bulb.

- CHECK** : **Is lamp bulb condition OK?**
- YES** : Repair combination meter connector.
- NO** : Replace lamp bulb.

MEMO:

B: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF.

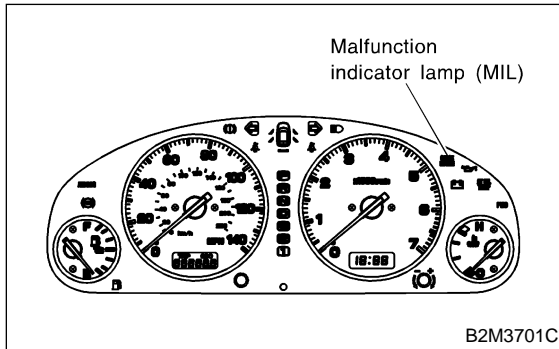
- **DIAGNOSIS:**
 - The CHECK ENGINE malfunction indicator lamp (MIL) circuit is shorted.
- **TROUBLE SYMPTOM:**
 - Although MIL comes on when engine runs, trouble code is not shown on Subaru select monitor or OBD-II general scan tool display.
- **WIRING DIAGRAM:**



B2M3721

7B1 : CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.

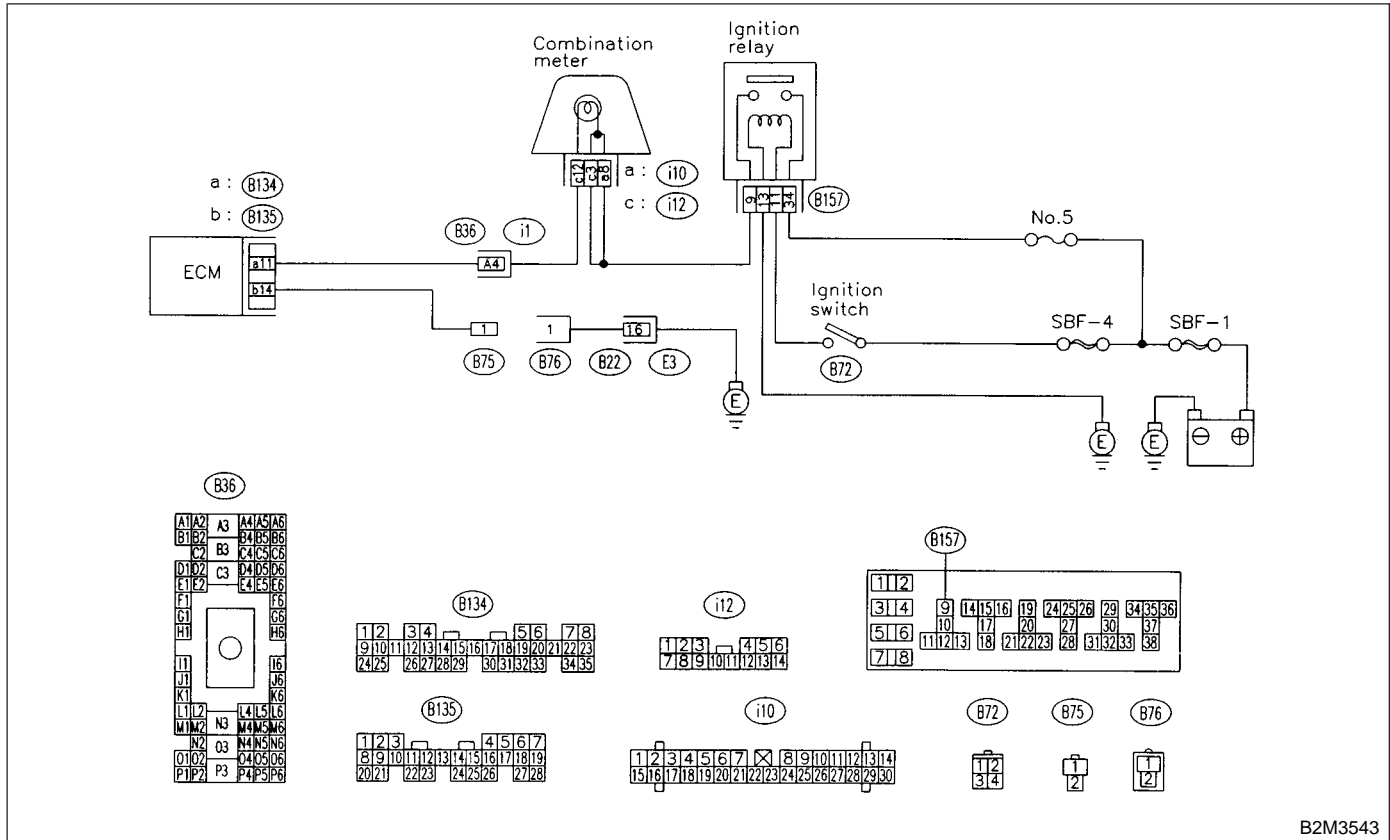
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Turn ignition switch to ON.



- CHECK** : ***Does the MIL come on?***
- YES** : Repair short circuit in harness between combination meter and ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

C: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 Hz.

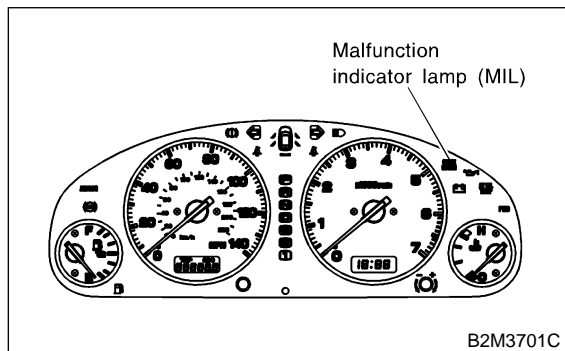
- **DIAGNOSIS:**
 - The CHECK ENGINE malfunction indicator lamp (MIL) circuit is open or shorted.
 - Test mode connector circuit is in open.
- **TROUBLE SYMPTOM:**
 - When inspection mode, MIL does not blink at a cycle of 3 Hz.
- **WIRING DIAGRAM:**



B2M3543

7C1 : CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).

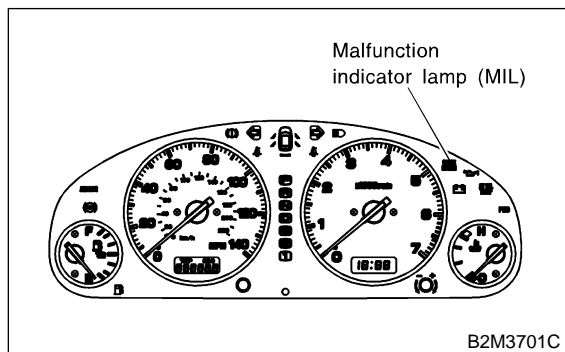
- 1) Turn ignition switch to OFF.
- 2) Disconnect test mode connector.
- 3) Turn ignition switch to ON. (engine OFF)



- CHECK** : Does the MIL come on?
YES : Go to step 7C2.
NO : Repair the MIL circuit. <Ref. to 2-7 [T7A0].>

7C2 : CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Turn ignition switch to ON.

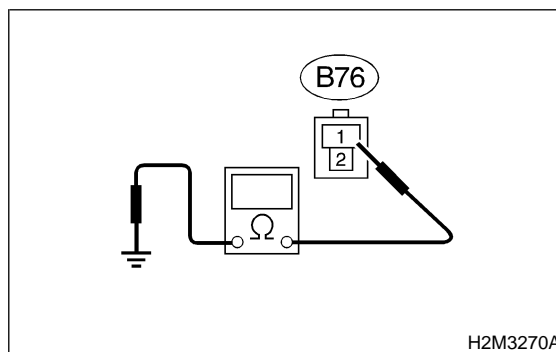


- CHECK** : Does the MIL come on?
YES : Repair ground short circuit in harness between combination meter and ECM connector.
NO : Go to step 7C3.

7C3 : CHECK HARNESS BETWEEN TEST MODE CONNECTOR AND CHASSIS GROUND.

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

Connector & terminal
(B76) No. 1 — Chassis ground:



- CHECK** : Is resistance less than 1 Ω?
YES : Go to step 7C4.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between test mode connector and chassis ground

7C4 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [W3C1].>

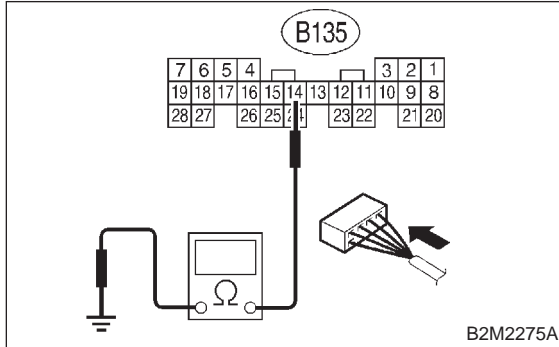
- CHECK** : Is there poor contact in ECM connector?
YES : Repair poor contact in ECM connector.
NO : Go to step 7C5.

7C5 : CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR.

- 1) Connect test mode connector.
- 2) Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B135) No. 14 — Chassis ground:



- CHECK** : **Is resistance less than 1 Ω?**
- YES** : Go to step **7C6**.
- NO** : Repair open circuit in harness between ECM and test mode connector.

7C6 : CHECK POOR CONTACT.

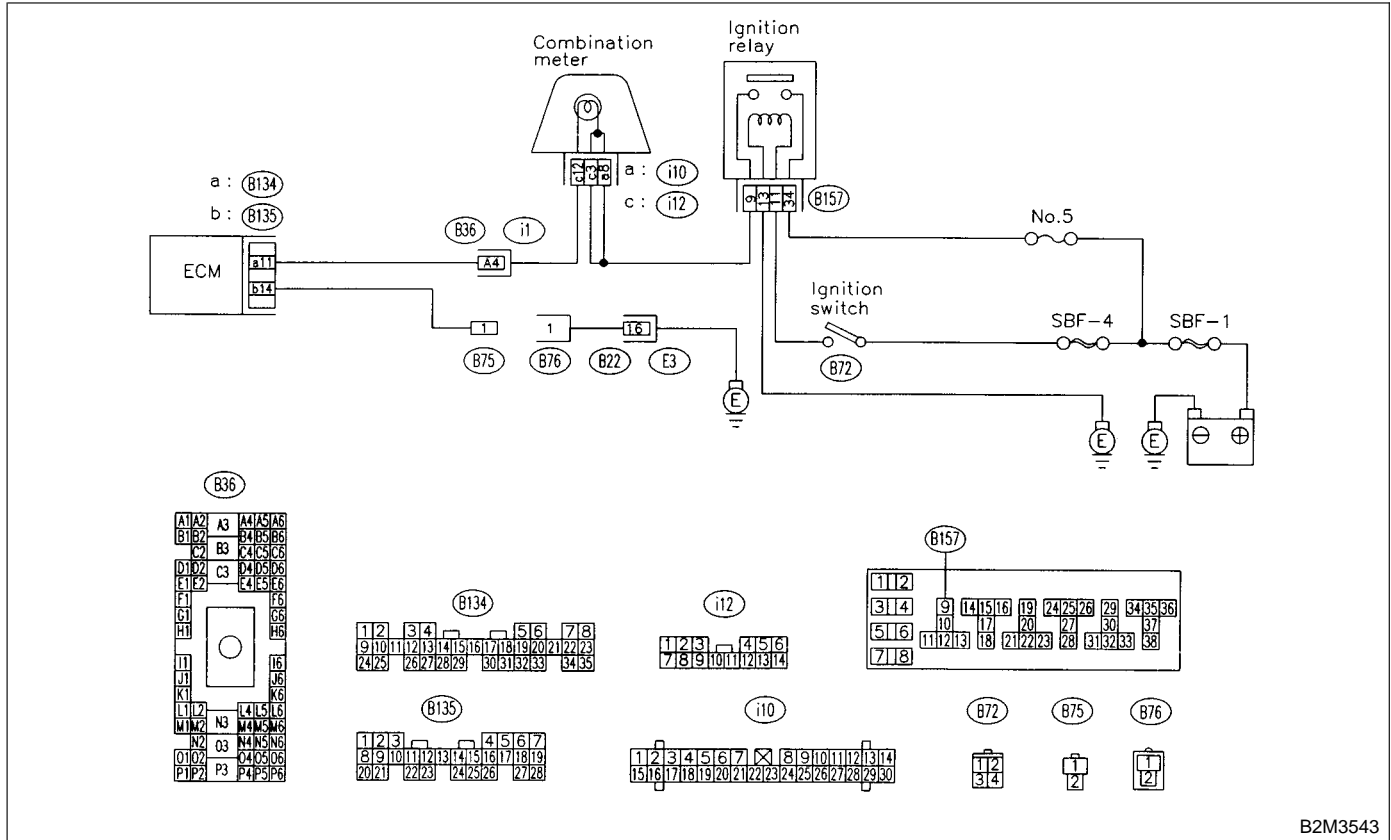
Check poor contact in ECM connector.
<Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

D: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 Hz.

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



B2M3543

7D1 : CHECK TEST MODE CONNECTOR.

- 1) Disconnect test mode connector.
- 2) Turn ignition switch to ON.

- CHECK** : Does MIL flash on and off?
- YES** : Go to step 7D2.
- NO** : System is in good order.

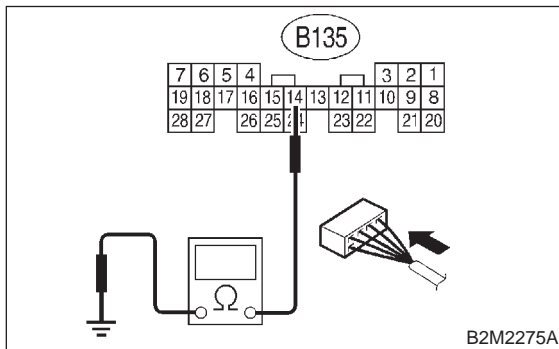
NOTE:
MIL blinks at a cycle of 3 Hz when test mode connector is connected.

7D2 : CHECK HARNESS BETWEEN ECM CONNECTOR AND ENGINE GROUNDING TERMINAL.

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

Connector & terminal

(B135) No. 14 — Chassis ground:



- CHECK** : **Is resistance less than 5 Ω?**
- YES** : Repair short circuit in harness between ECM and test mode connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

8. Diagnostics for Engine Starting Failure

A: BASIC DIAGNOSTICS CHART

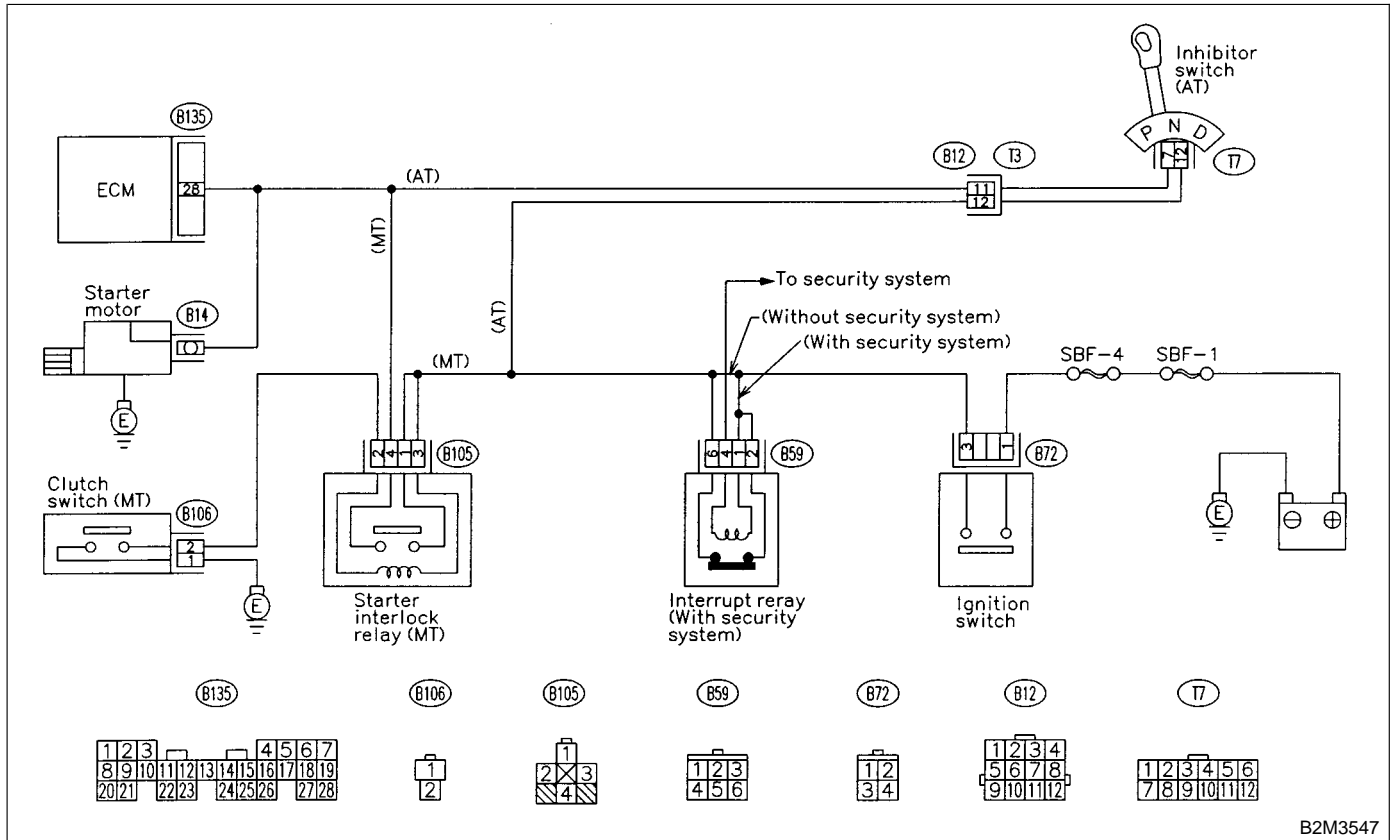
1. Inspection of starter motor circuit. <Ref. to 2-7 [T8B0].>	↓
2. Inspection of ECM power supply and ground line. <Ref. to 2-7 [T8C0].>	↓
3. Inspection of ignition control system. <Ref. to 2-7 [T8D0].>	↓
4. Inspection of fuel pump circuit. <Ref. to 2-7 [T8E0].>	↓
5. Inspection of fuel injector circuit. <Ref. to 2-7 [T8F0].>	↓
6. Inspection of crankshaft position sensor circuit. <Ref. to 2-7 [T8G0].>	↓
7. Inspection of camshaft position sensor circuit. <Ref. to 2-7 [T8H0].>	↓
8. Inspection using Subaru Select Monitor or OBD-II general scan tool (MT vehicles: <Ref. to 2-7 [T10A0].>, AT vehicles: <Ref. to 2-7 [T11A0].>) or inspection using "9. General Diagnostics Table". <Ref. to 2-7 [T900].>	

B: STARTER MOTOR CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3547

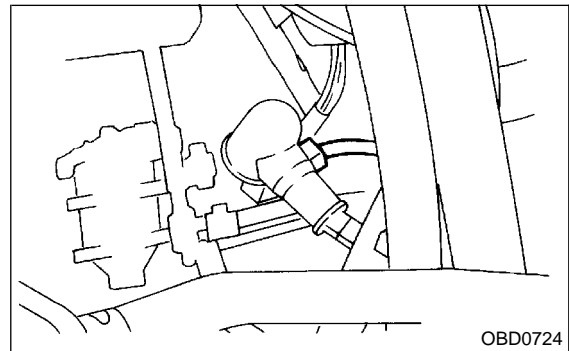
8B1 : CHECK BATTERY.

- CHECK** : *Is the voltage more than 12 V?*
- YES** : Go to step **8B2**.
- NO** : Charge or replace battery.

8B2 : CHECK INPUT SIGNAL FOR STARTER MOTOR.

1) Turn ignition switch to OFF.

2) Disconnect connector from starter motor.



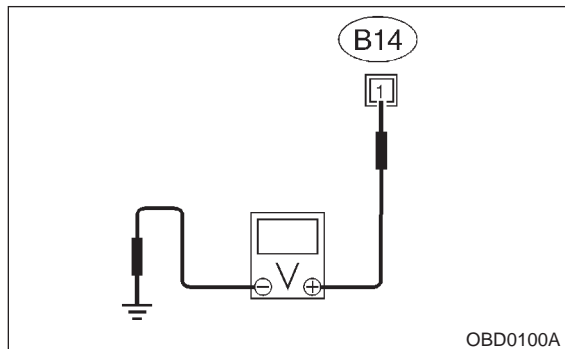
OBD0724

3) Turn ignition switch to ST.

4) Measure power supply voltage between starter motor connector terminal and engine ground.

Connector & terminal

(B14) No. 1 (+) — Engine ground (-):



NOTE:

- On AT vehicles, place the selector lever in the “P” or “N” position.
- On MT vehicles, depress the clutch pedal.

CHECK : **Is the voltage more than 10 V?**

YES : Go to step 8B3.

NO : Go to step 8B4.

8B3 : CHECK GROUND CIRCUIT OF STARTER MOTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect terminal from starter motor.



3) Measure resistance of ground cable between ground cable terminal and engine ground.

CHECK : **Is resistance less than 5 Ω?**

YES : Check starter motor. <Ref. to 6-1 [K100].>

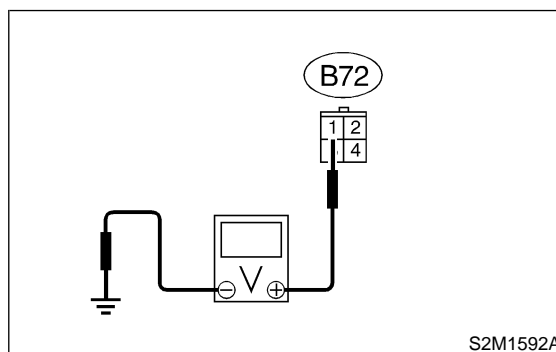
NO : Repair open circuit of ground cable.

8B4 : CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.

- 1) Disconnect connector from ignition switch.
- 2) Measure power supply voltage between ignition switch connector and chassis ground.

Connector & terminal

(B72) No. 1 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Go to step 8B6.

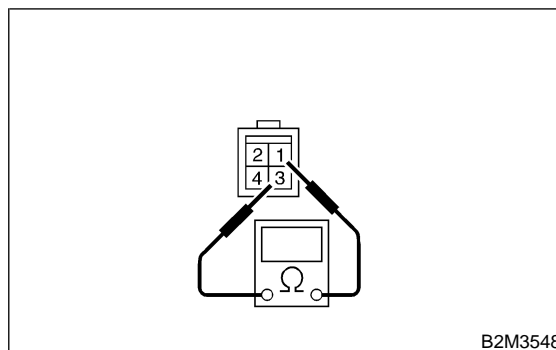
NO : Repair open circuit in harness between ignition switch and battery, and check fuse SBF No. 4 and SBF No.1.

8B5 : CHECK IGNITION SWITCH.

- 1) Disconnect connector from ignition switch.
- 2) Measure resistance between ignition switch terminals while turning ignition switch to the “ST” position.

Terminals

No. 1 — No. 3:



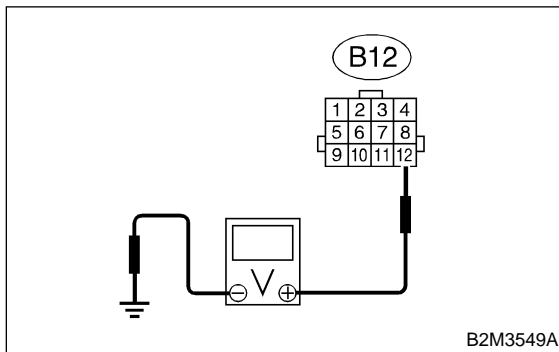
CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step 8B6.

NO : Replace ignition switch.

8B6 : CHECK TRANSMISSION TYPE.**CHECK** : *Is transmission type AT?***YES** : Go to step **8B7**.**NO** : Go to step **8B11**.**8B7 : CHECK INPUT VOLTAGE OF INHIBITOR SWITCH.**

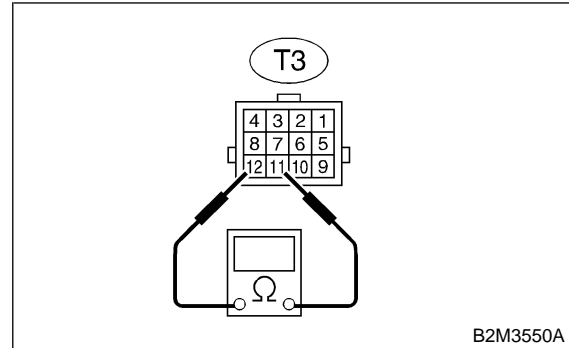
- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from inhibitor switch.
- 3) Connect connector to ignition switch.
- 4) Measure input voltage between inhibitor switch connector terminal and engine ground while turning ignition switch to ST.

Connector & terminal**(B12) No. 12 (+) — Engine ground (-):****CHECK** : *Is the voltage more than 10 V?***YES** : Go to step **8B8**.**NO** : Repair open or ground short circuit in harness between inhibitor switch and ignition switch.**NOTE:**

Check security system (if equipped). <Ref. to 6-2 [T100].>

8B8 : CHECK INHIBITOR SWITCH.

- 1) Place the selector lever in the “P” or “N” position.
- 2) Measure resistance between inhibitor switch terminals.

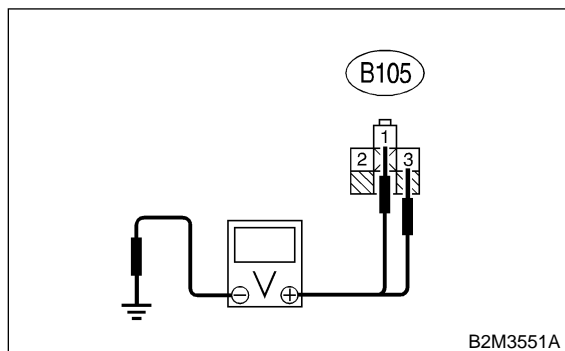
Connector & terminal**(T3) No. 11 — No. 12:****CHECK** : *Is the resistance less than 1 Ω?***YES** : Repair open or ground short circuit in harness between inhibitor switch and starter motor.**NO** : Replace inhibitor switch. <Ref. to 3-2 [W2C0].>

8B9 : CHECK INPUT VOLTAGE OF STARTER INTERLOCK RELAY.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from starter interlock relay.
- 3) Connect connector to ignition switch.
- 4) Measure input voltage between starter interlock relay connector and chassis ground while turning ignition switch to ST.

Connector & terminal

- (B105) No. 1 (+) — Chassis ground (-):
- (B105) No. 3 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 8B10.
- NO** : Repair open or ground short circuit in harness between starter interlock relay and ignition switch.

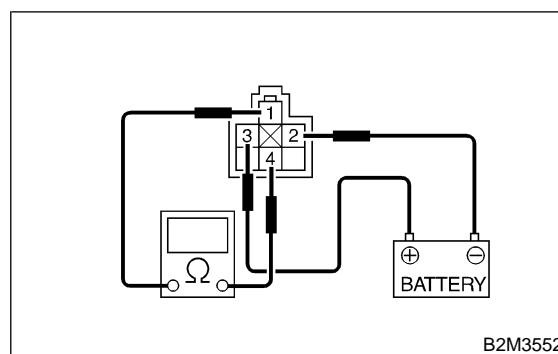
NOTE:
Check security system (if equipped). <Ref. to 6-2 [T100].>

8B10 : CHECK STARTER INTERLOCK RELAY.

- 1) Connect battery to starter interlock relay terminals No. 2 and No. 3.
- 2) Measure resistance between starter interlock relay terminals.

Terminals

- No. 1 — No. 4:



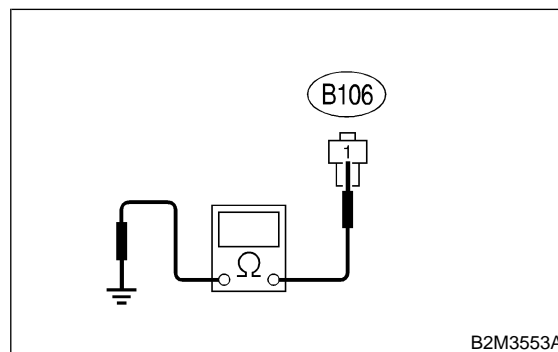
- CHECK** : Is the resistance less than 1 Ω?
- YES** : Go to step 8B11.
- NO** : Replace starter interlock relay.

8B11 : CHECK GROUND CIRCUIT OF CLUTCH SWITCH.

- 1) Disconnect connector from clutch switch.
- 2) Measure resistance between clutch switch connector and chassis ground.

Connector & terminal

- (B106) No. 1 — Chassis ground:



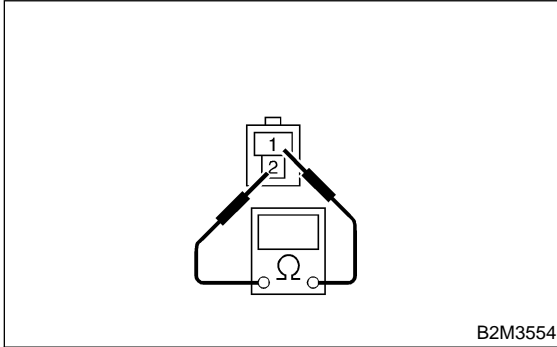
- CHECK** : Is the resistance less than 1 Ω?
- YES** : Go to step 8B12.
- NO** : Repair open circuit of ground cable.

8B12 : CHECK CLUTCH SWITCH.

1) Measure resistance between clutch switch terminal while depressing the clutch pedal.

Terminals

No. 1 — No. 2:



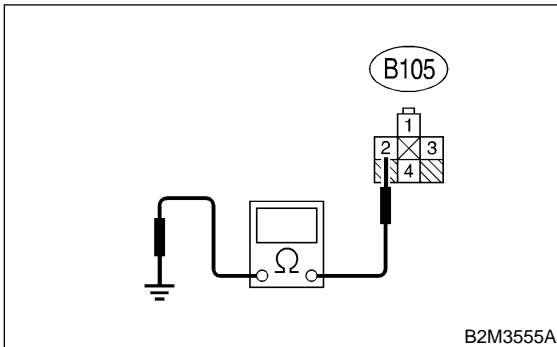
- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **8B13**.
- NO** : Replace clutch switch. <Ref. to 6-2 [T100].>

8B13 : CHECK CLUTCH SWITCH CIRCUIT.

1) Connect connector to clutch switch.
2) Measure resistance between starter interlock relay connector and chassis ground while depressing the clutch pedal.

Connector & terminal

(B105) No. 2 — Chassis ground:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Repair open or ground short circuit in harness between starter interlock relay and starter motor.
- NO** : Repair open circuit in harness between starter interlock relay and clutch switch.

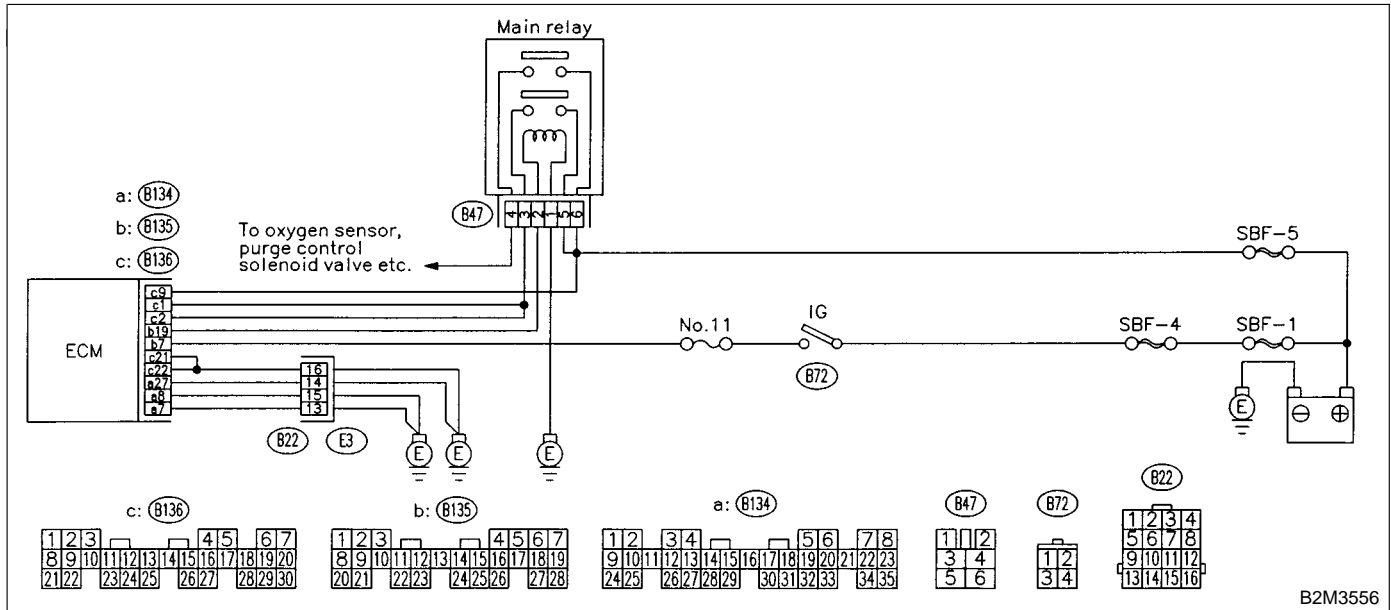
MEMO:

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE. <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

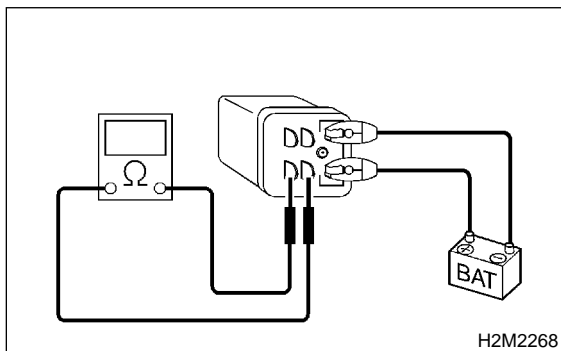


8C1 : CHECK MAIN RELAY.

- 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

No. 3 — No. 5:



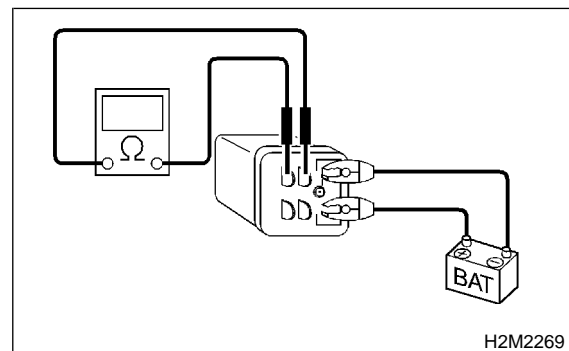
- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Go to step **8C2**.
- NO** : Replace main relay.

8C2 : CHECK MAIN RELAY.

Measure resistance between main relay terminals.

Terminals

No. 4 — No. 6:



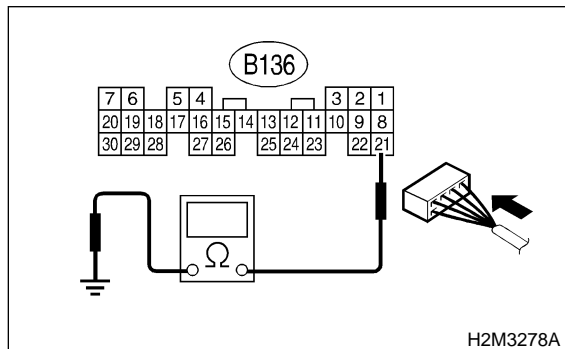
- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Go to step **8C3**.
- NO** : Replace main relay.

8C3 : CHECK GROUND CIRCUIT OF ECM.

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

Connector & terminal

(B136) No. 21 — Chassis ground:



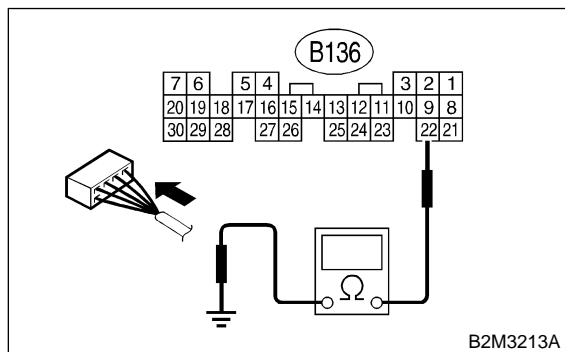
- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 8C4.
- NO** : Repair open circuit in harness between ECM connector and engine grounding terminal.

8C4 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B136) No. 22 — Chassis ground:



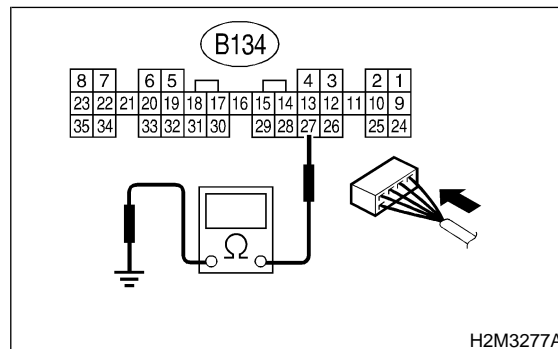
- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 8C5.
- NO** : Repair open circuit in harness between ECM connector and engine grounding terminal.

8C5 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B134) No. 27 — Chassis ground:



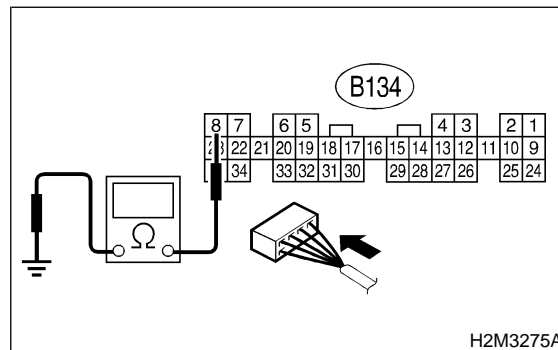
- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 8C6.
- NO** : Repair open circuit in harness between ECM connector and engine grounding terminal.

8C6 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B134) No. 8 — Chassis ground:



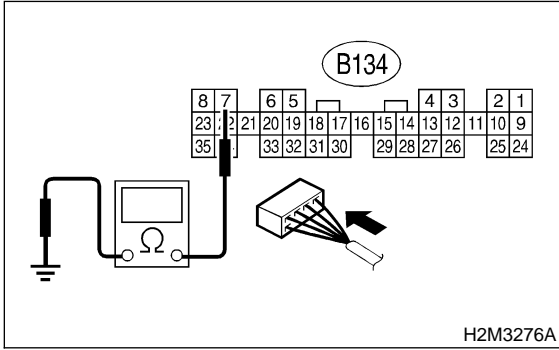
- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 8C7.
- NO** : Repair open circuit in harness between ECM connector and engine grounding terminal.

8C7 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B134) No. 7 — Chassis ground:



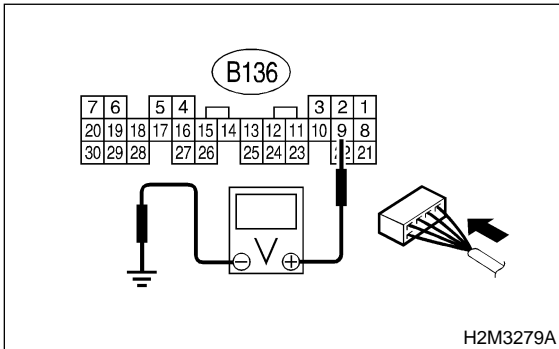
- CHECK** : **Is the resistance less than 5 Ω?**
- YES** : Go to step **8C8**.
- NO** : Repair open circuit in harness between ECM connector and engine ground terminal.

8C8 : CHECK INPUT VOLTAGE OF ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 9 (+) — Chassis ground (-):



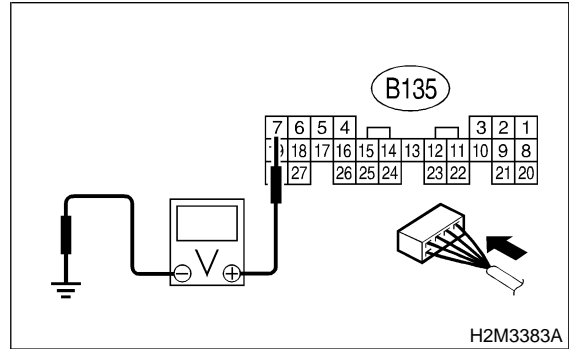
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **8C9**.
- NO** : Repair open or ground short circuit of power supply circuit.

8C9 : CHECK INPUT VOLTAGE OF ECM.

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

Connector & terminal

(B135) No. 7 (+) — Chassis ground (-):



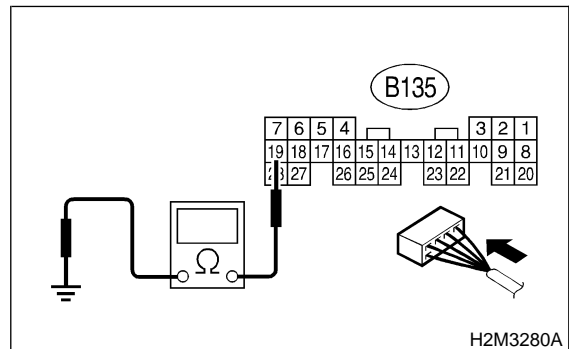
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **8C10**.
- NO** : Repair open or ground short circuit of power supply circuit.

8C10 : CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ECM and chassis ground.

Connector & terminal

(B135) No. 19 — Chassis ground:

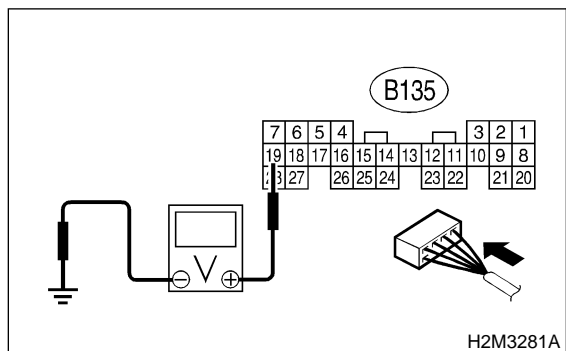


- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step **8C11**.
- NO** : Repair ground short circuit in harness between ECM connector and main relay connector, then replace ECM.

8C11 : CHECK OUTPUT VOLTAGE FROM ECM.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B135) No. 19 (+) — Chassis ground (-):

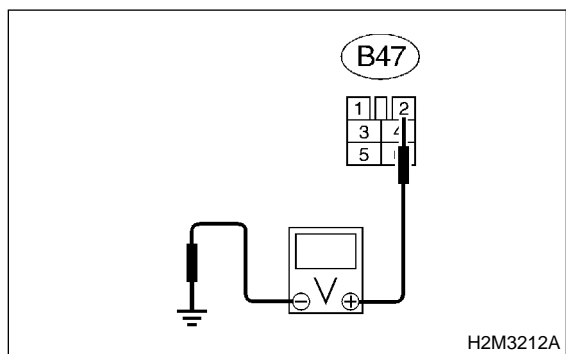


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **8C12**.
- NO** : Replace ECM.

8C12 : CHECK INPUT VOLTAGE OF MAIN RELAY.

Check voltage between main relay connector and chassis ground.

Connector & terminal
(B47) No. 2 (+) — Chassis ground (-):

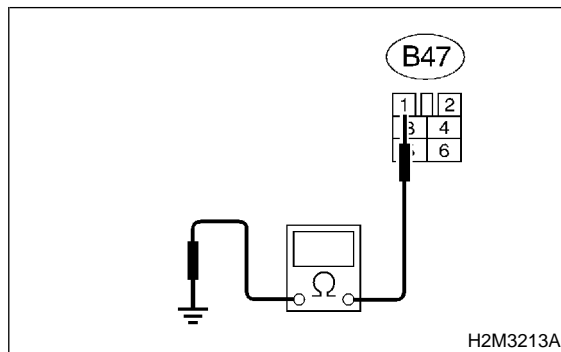


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **8C13**.
- NO** : Repair open circuit in harness between ECM connector and main relay connector.

8C13 : CHECK GROUND CIRCUIT OF MAIN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between main relay connector and chassis ground.

Connector & terminal
(B47) No. 1 — Chassis ground:

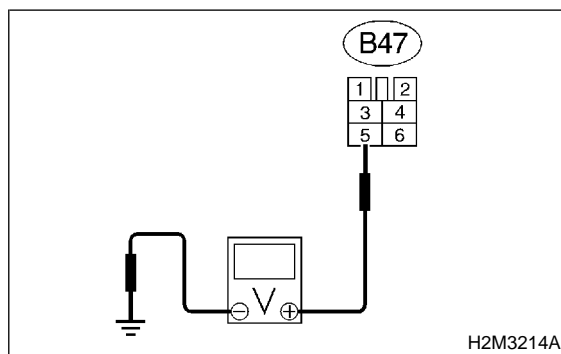


- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step **8C14**.
- NO** : Repair open circuit between main relay and chassis ground.

8C14 : CHECK INPUT VOLTAGE OF MAIN RELAY.

Measure voltage between main relay connector and chassis ground.

Connector & terminal
(B47) No. 5 (+) — Chassis ground (-):

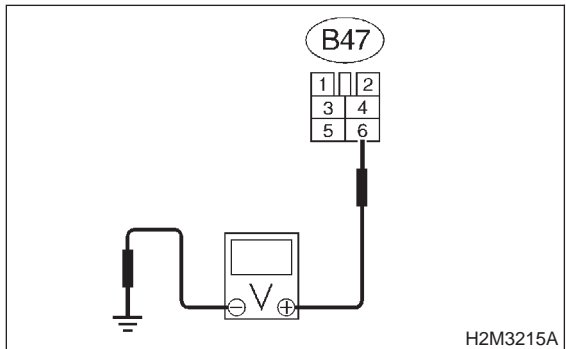


- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **8C15**.
- NO** : Repair open or ground short circuit in harness of power supply circuit.

8C15 : CHECK INPUT VOLTAGE OF MAIN RELAY.

Measure voltage between main relay connector and chassis ground.

Connector & terminal
(B47) No. 6 (+) — Chassis ground (-):

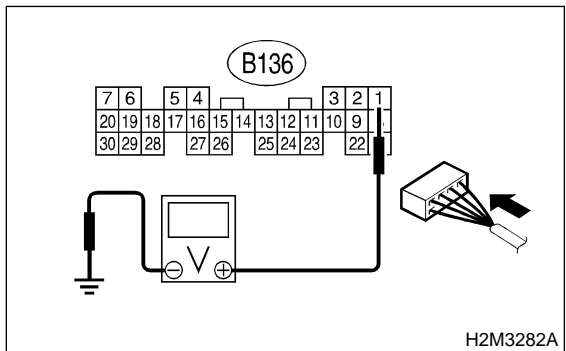


- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **8C16**.
- NO** : Repair open or ground short circuit in harness of power supply circuit.

8C16 : CHECK INPUT VOLTAGE OF ECM.

- 1) Connect main relay connector.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 1 (+) — Chassis ground (-):

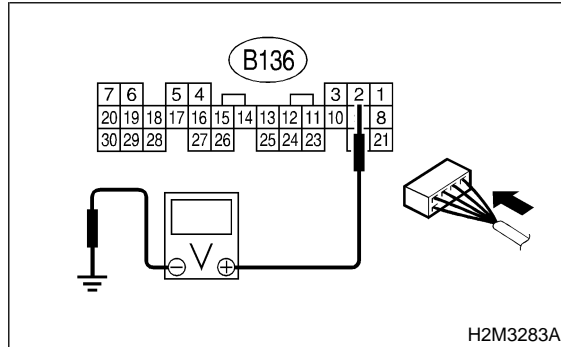


- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **8C17**.
- NO** : Repair open or ground short circuit in harness between ECM connector and main relay connector.

8C17 : CHECK INPUT VOLTAGE OF ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 2 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Check ignition control system. <Ref. to 2-7 [T8D0].>
- NO** : Repair open or ground short circuit in harness between ECM connector and main relay connector.

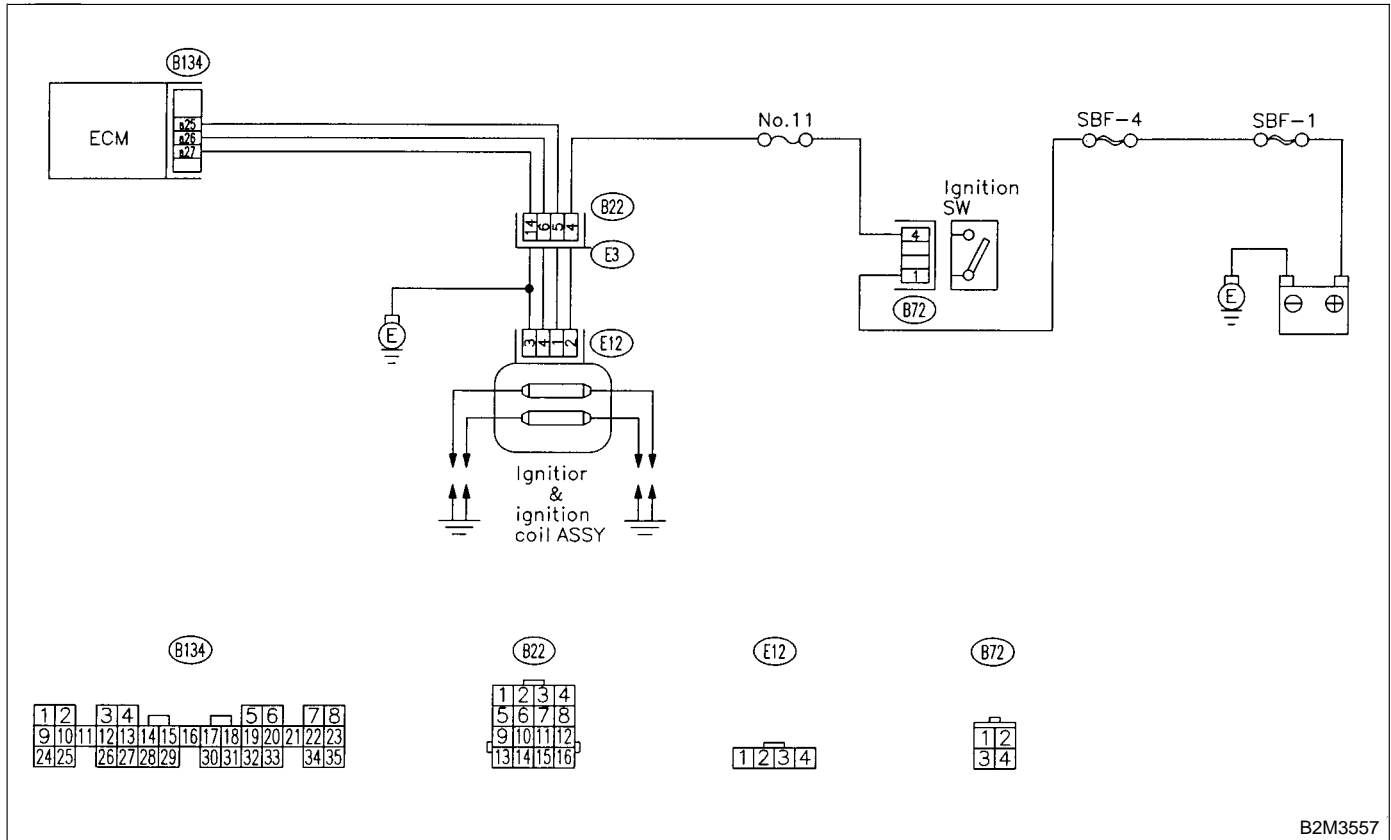
MEMO:

D: IGNITION CONTROL SYSTEM

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:



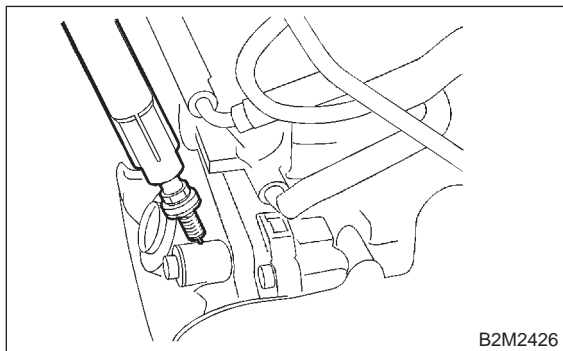
8D1 : CHECK IGNITION SYSTEM FOR SPARKS.

- 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.



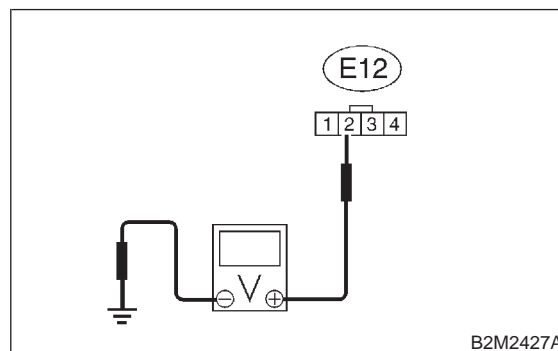
- CHECK** : **Does spark occur at each cylinder?**
- YES** : Check fuel pump system. <Ref. to 2-7 [T8E0].>
- NO** : Go to step **8D2**.

8D2 : CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL & IGNITOR ASSEMBLY.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ignition coil & ignitor assembly.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between ignition coil & ignitor assembly connector and engine ground.

Connector & terminal

(E12) No. 2 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **8D3**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

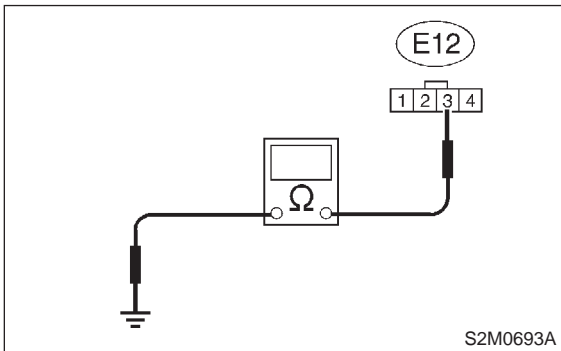
- Open circuit in harness between ignition coil & ignitor assembly, and ignition switch connector
- Poor contact in coupling connectors (B22)

8D3 : CHECK HARNESS OF IGNITION COIL & IGNITOR ASSEMBLY GROUND CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ignition coil & ignitor assembly connector and engine ground.

Connector & terminal

(E12) No. 3 — Engine ground:



CHECK : *Is the resistance between less than 5 Ω?*

YES : Go to step **8D4**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

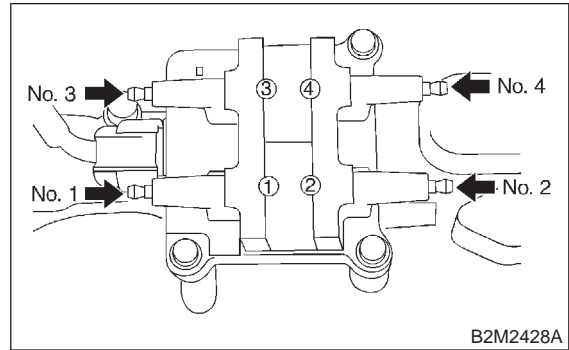
- Open circuit in harness between ignition coil & ignitor assembly connector and engine grounding terminal

8D4 : CHECK IGNITION COIL & IGNITOR ASSEMBLY.

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

Terminals

No. 1 — No. 2:



CHECK : *Is the resistance between 10 and 15 kΩ?*

YES : Go to step **8D5**.

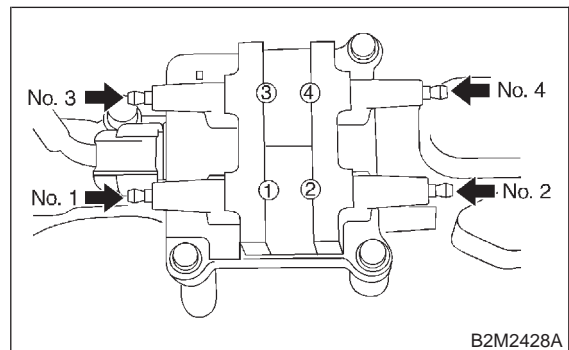
NO : Replace ignition coil & ignitor assembly. <Ref. to 6-1 [W4A0].>

8D5 : CHECK IGNITION COIL & IGNITOR ASSEMBLY.

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

Terminals

No. 3 — No. 4:



CHECK : *Is the resistance between 10 and 15 kΩ?*

YES : Go to step **8D6**.

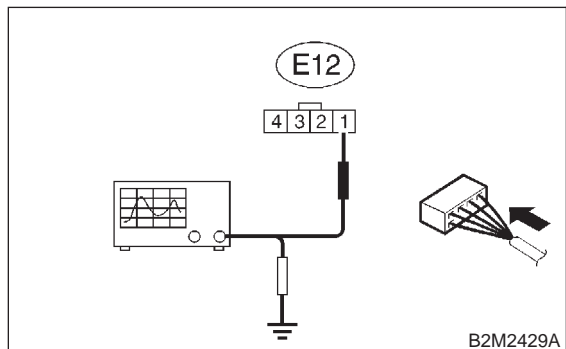
NO : Replace ignition coil & ignitor assembly. <Ref. to 6-1 [W4A0].>

8D6 : CHECK INPUT SIGNAL FOR IGNITION COIL & IGNITOR ASSEMBLY.

- 1) Connect connector to ignition coil & ignitor assembly.
- 2) Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil & ignitor assembly connector and engine ground.

Connector & terminal

(E12) No. 1 (+) — Engine ground (-):



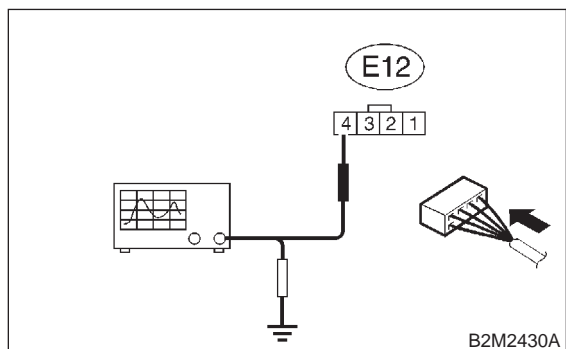
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 8D7.
- NO** : Replace ignition coil & ignitor assembly. <Ref. to 6-1 [W4A0].>

8D7 : CHECK INPUT SIGNAL FOR IGNITION COIL & IGNITOR ASSEMBLY.

Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil & ignitor assembly connector and engine ground.

Connector & terminal

(E12) No. 4 (+) — Engine ground (-):



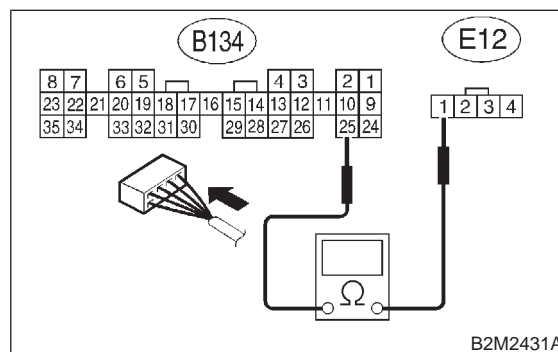
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 8D8.
- NO** : Replace ignition coil & ignitor assembly. <Ref. to 6-1 [W4A0].>

8D8 : CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.

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

Connector & terminal

(B134) No. 25 — (E12) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 8D9.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

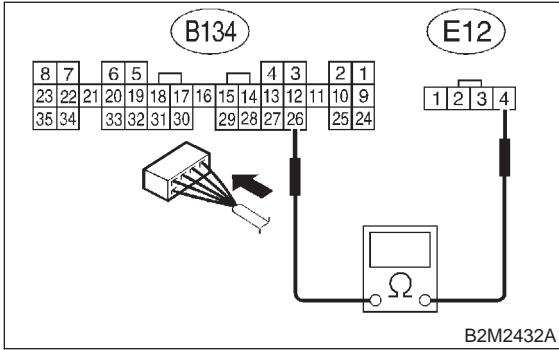
- Open circuit in harness between ECM and ignition coil & ignitor assembly connector
- Poor contact in coupling connector (B22)

8D9 : CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.

Measure resistance of harness between ECM and ignition coil & ignitor assembly connector.

Connector & terminal

(B134) No. 26 — (E12) No. 4:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **8D10**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

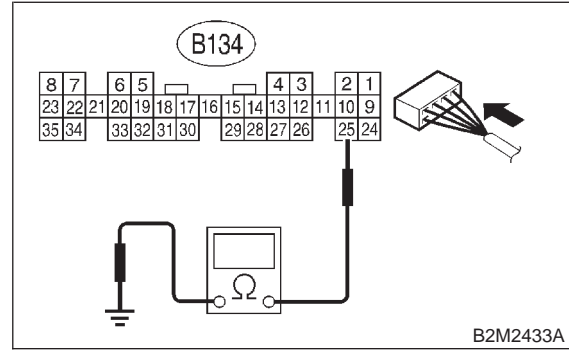
- Open circuit in harness between ECM and ignition coil & ignitor assembly connector
- Poor contact in coupling connector (B22)

8D10 : CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.

Measure resistance of harness between ECM and engine ground.

Connector & terminal:

(B134) No. 25 — Engine ground:



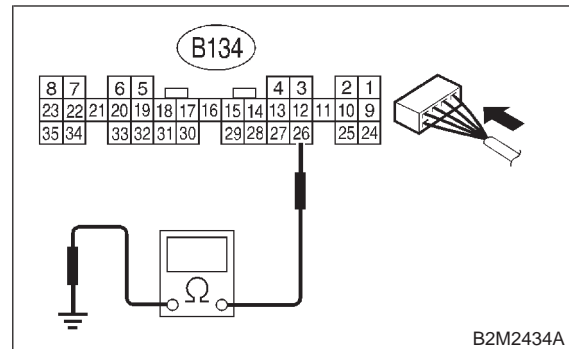
- CHECK** : *Is the resistance more than 1 MΩ?*
- YES** : Go to step **8D11**.
- NO** : Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.

8D11 : CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.

Measure resistance of harness between ECM and engine ground.

Connector & terminal

(B134) No. 26 — Engine ground:



- CHECK** : *Is the resistance more than 1 MΩ?*
- YES** : Go to step **8D12**.
- NO** : Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.

8D12 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

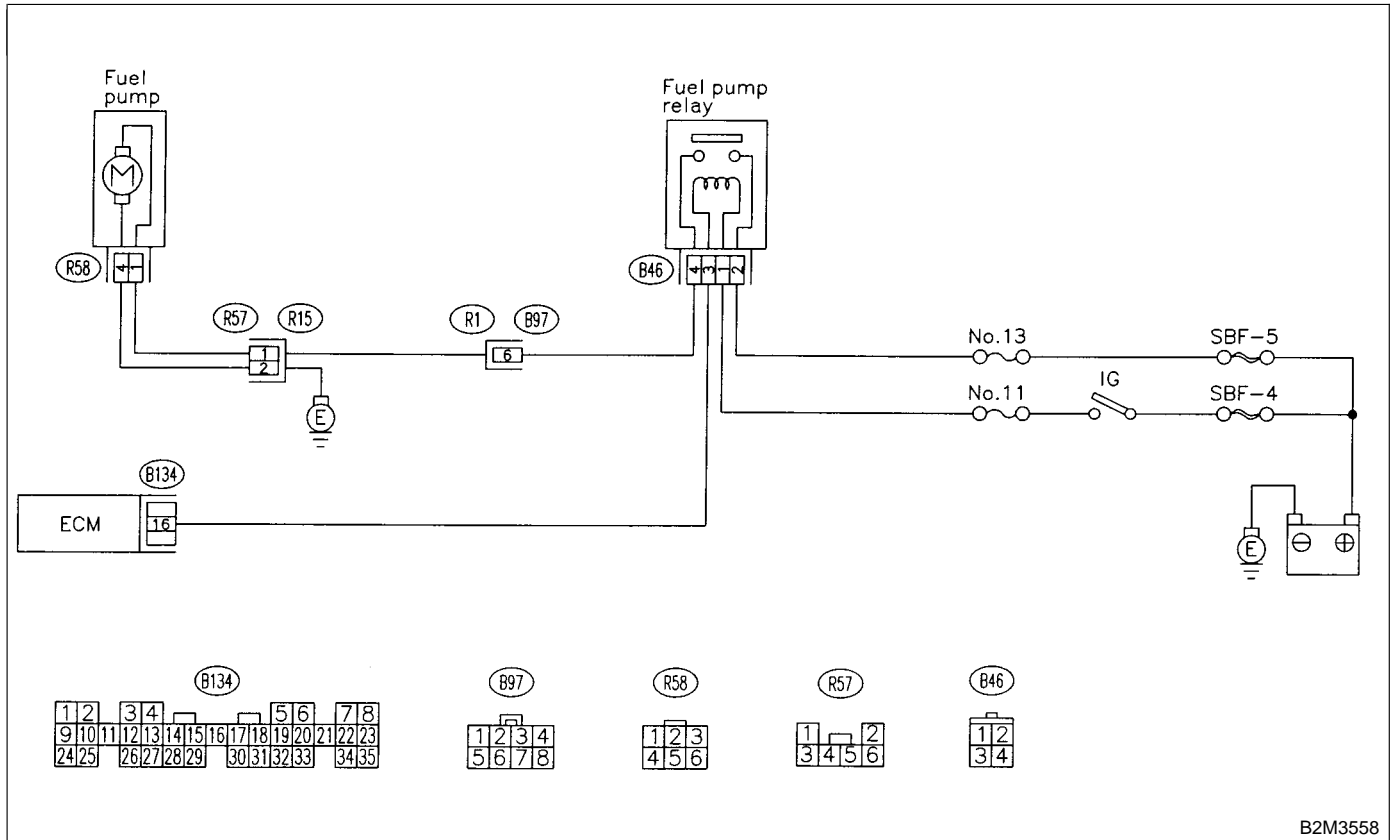
- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Check fuel pump circuit. <Ref. to 2-7 [T8E0].>

E: FUEL PUMP CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



8E1 : CHECK OPERATING SOUND OF FUEL PUMP.

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

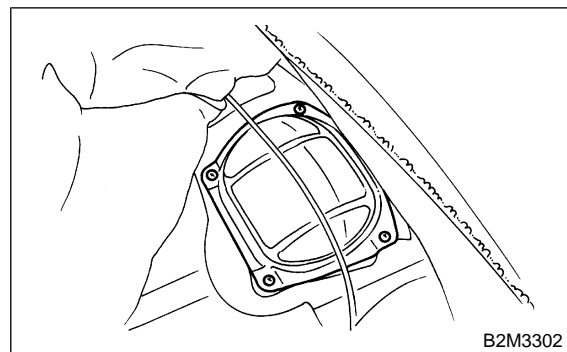
NOTE:

Fuel pump operation can also be executed using Subaru Select Monitor (Function mode: FD01). For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

- CHECK** : Does fuel pump produce operating sound?
- YES** : Check fuel injector circuit. <Ref. to 2-7 [T8G0].>
- NO** : Go to step **8E2**.

8E2 : CHECK GROUND CIRCUIT OF FUEL PUMP.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel pump access hole lid located on the right rear of trunk compartment floor (Sedan) or luggage compartment floor (Wagon).

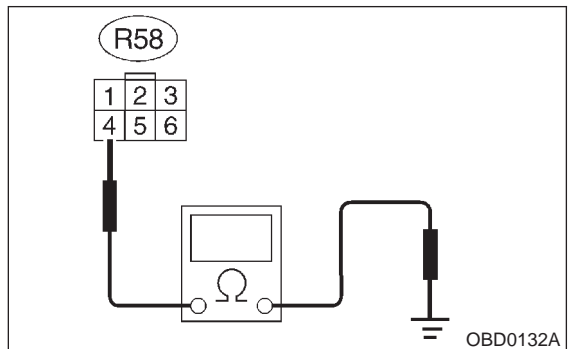


- 3) Disconnect connector from fuel pump.

4) Measure resistance of harness connector between fuel pump and chassis ground.

Connector & terminal

(R58) No. 4 — Chassis ground:



- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step 8E3.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

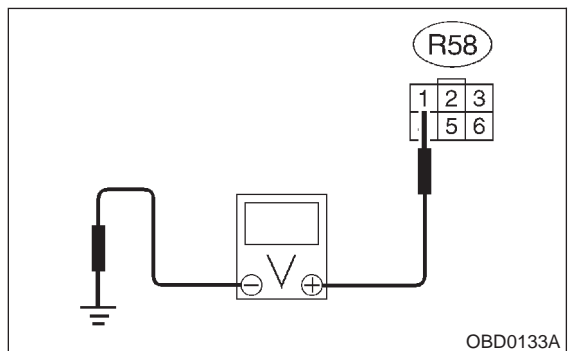
- Open circuit in harness between fuel pump connector and chassis grounding terminal
- Poor contact in coupling connector (R57)

8E3 : CHECK POWER SUPPLY TO FUEL PUMP.

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

Connector & terminal

(R58) No. 1 (+) — Chassis ground (-):



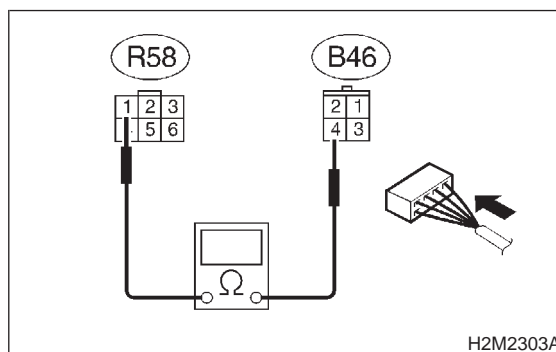
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Replace fuel pump. <Ref. to 2-8 [W3A0].>
- NO** : Go to step 8E4.

8E4 : CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR.

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

Connector & terminal

(R58) No. 1 — (B46) No. 4:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 8E5.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

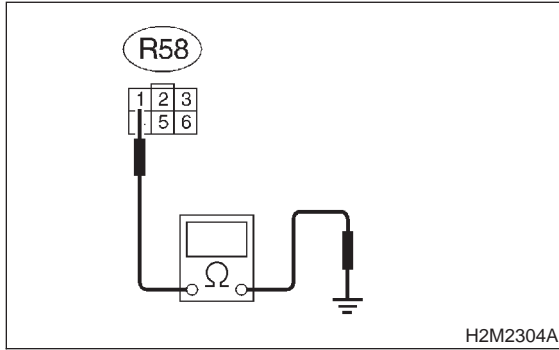
- Open circuit in harness between fuel pump connector and chassis grounding terminal
- Poor contact in coupling connectors (R57 and B97)

8E5 : CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR.

Measure resistance of harness between fuel pump and fuel pump relay connector.

Connector & terminal

(R58) No. 1 — Chassis ground:



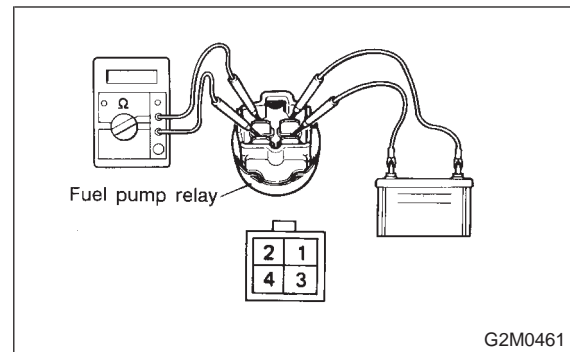
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step **8E6**.
- NO** : Repair short circuit in harness between fuel pump and fuel pump relay connector.

8E6 : 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

No. 2 — No. 4:



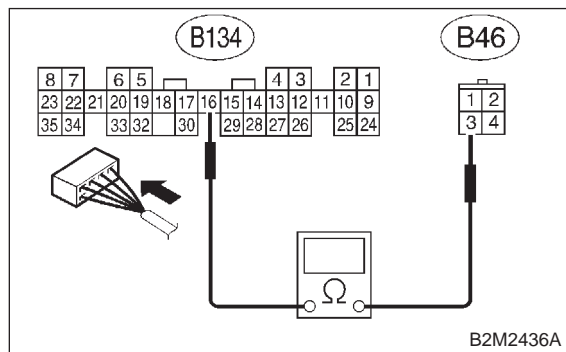
- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Go to step **8E7**.
- NO** : Replace fuel pump relay. <Ref. to 2-7 [W21A0].>

8E7 : CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR.

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

Connector & terminal

(B134) No. 16 — (B46) No. 3:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **8E8**.
- NO** : Repair open circuit in harness between ECM and fuel pump relay connector.

8E8 : CHECK POOR CONTACT.

Check poor contact in ECM connector.
<Ref. to FOREWORD [T3C1].>

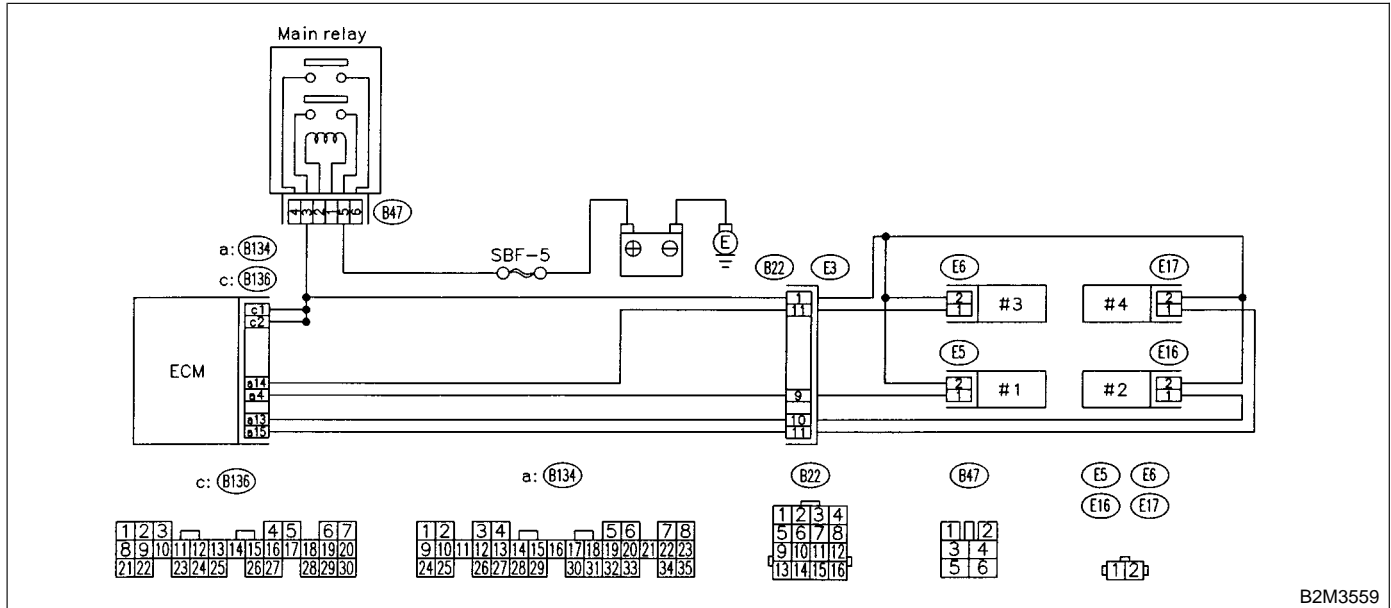
- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Check fuel injector circuit. <Ref. to 2-7 [T8G0].>

F: FUEL INJECTOR CIRCUIT

CAUTION:

- Check or repair only faulty parts.
- After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE. <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



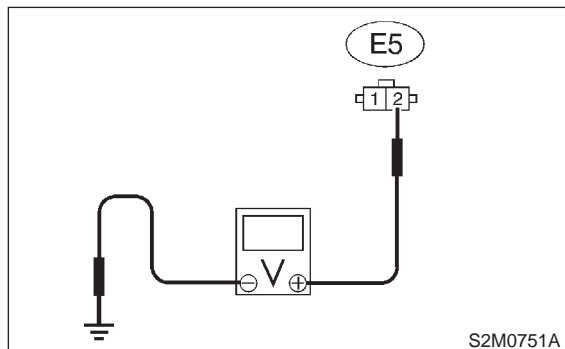
8F1 : CHECK OPERATION OF EACH FUEL INJECTOR.

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.

- CHECK** : *Is the fuel injector emits “operating” sound?*
- YES** : Check fuel pressure. <Ref. to 2-2 [W7A0].>
- NO** : Go to step **8F2**.

8F2 : CHECK POWER SUPPLY TO EACH FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from #1 cylinder fuel injector.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between the fuel injector terminal and engine ground.

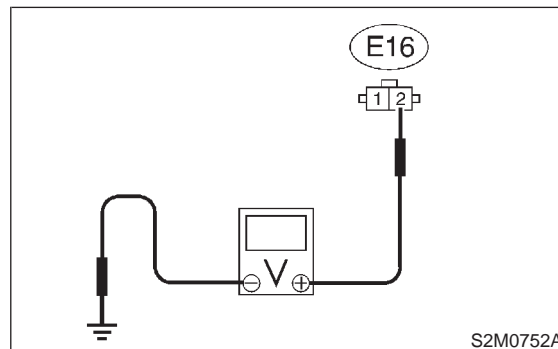
Connector & terminal**#1 (E5) No. 2 (+) — Engine ground (-):****CHECK** : *Is the voltage more than 10 V?***YES** : Go to step 8F3.**NO** : Repair harness and connector.**NOTE:**

In this case, repair the following:

- Open circuit in harness between main relay and fuel injector connector
- Poor contact in main relay connector
- Poor contact in coupling connector (B22)
- Poor contact in fuel injector connector

8F3 : CHECK POWER SUPPLY TO EACH FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from #2 cylinder fuel injector.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between the fuel injector terminal and engine ground.

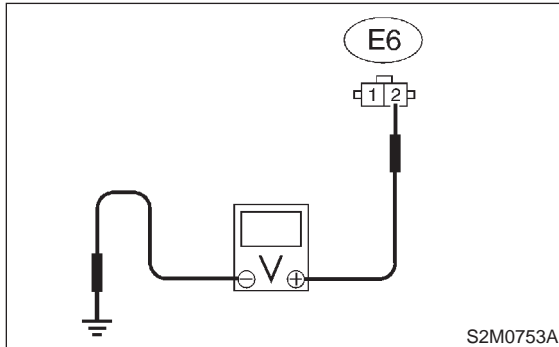
Connector & terminal**#2 (E16) No. 2 (+) — Engine ground (-):****CHECK** : *Is the voltage more than 10 V?***YES** : Go to step 8F4.**NO** : Repair harness and connector.**NOTE:**

In this case, repair the following:

- Open circuit in harness between main relay and fuel injector connector
- Poor contact in main relay connector
- Poor contact in coupling connector (B22)
- Poor contact in fuel injector connector

8F4 : CHECK POWER SUPPLY TO EACH FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from #3 cylinder fuel injector.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between the fuel injector terminal and engine ground.

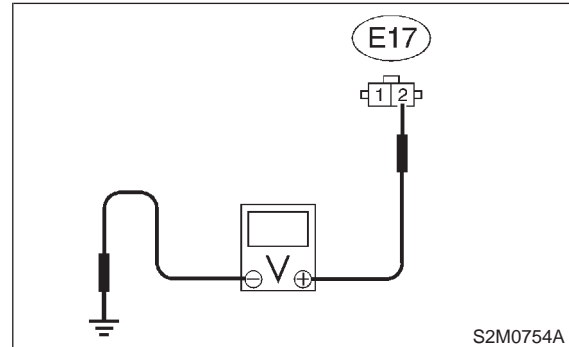
Connector & terminal**#3 (E6) No. 2 (+) — Engine ground (-):****CHECK** : **Is the voltage more than 10 V?****YES** : Go to step 8F5.**NO** : Repair harness and connector.**NOTE:**

In this case, repair the following:

- Open circuit in harness between main relay and fuel injector connector
- Poor contact in main relay connector
- Poor contact in coupling connectors (B22)
- Poor contact in fuel injector connector

8F5 : CHECK POWER SUPPLY TO EACH FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from #4 cylinder fuel injector.
- 3) Turn ignition switch to ON.
- 4) Measure power supply voltage between the fuel injector terminal and engine ground.

Connector & terminal**#4 (E17) No. 2 (+) — Engine ground (-):****CHECK** : **Is the voltage more than 10 V?****YES** : Go to step 8F6.**NO** : Repair harness and connector.**NOTE:**

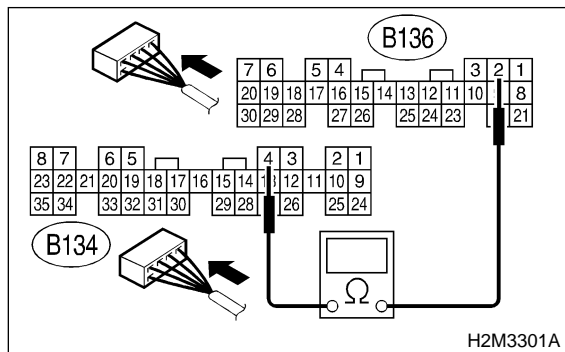
In this case, repair the following:

- Open circuit in harness between main relay and fuel injector connector
- Poor contact in main relay connector
- Poor contact in coupling connectors (B22)
- Poor contact in fuel injector connector

8F6 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

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

Connector & terminal
(B134) No. 4 — (B136) No. 2:



- CHECK** : Is the resistance between 5 and 20 Ω?
- YES** : Go to step 8F7.
- NO** : Repair harness and connector.

NOTE:

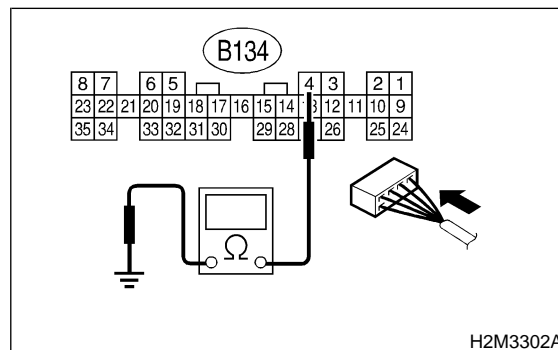
In this case, repair the following:

- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B22)

8F7 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 4 — Chassis ground:

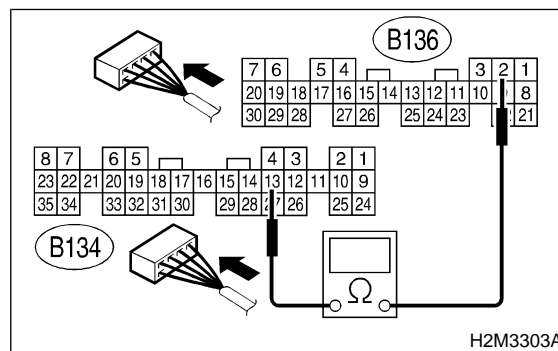


- CHECK** : Is the resistance less than 1 Ω?
- YES** : Repair ground short circuit in harness between ECM and fuel injector connector.
- NO** : Go to step 8F8.

8F8 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 13 — (B136) No. 2:



- CHECK** : Is the resistance between 5 and 20 Ω?
- YES** : Go to step 8F9.
- NO** : Repair harness and connector.

NOTE:

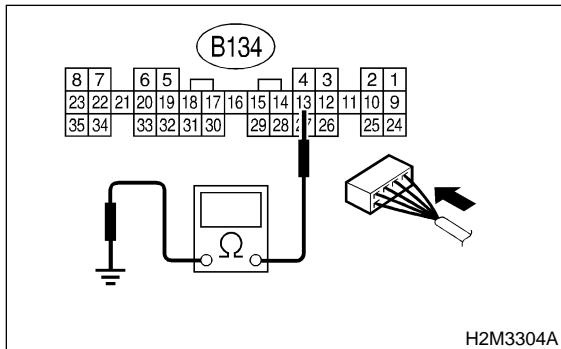
In this case, repair the following:

- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B22)

8F9 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 13 — Chassis ground:

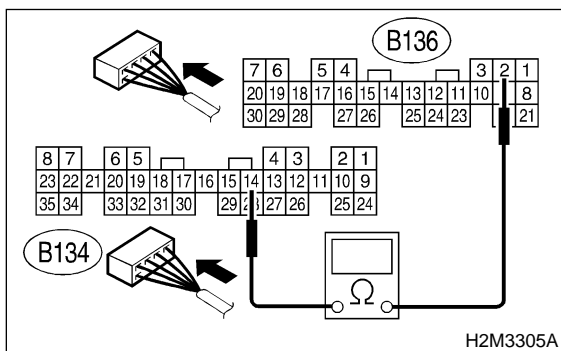


- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Repair ground short circuit in harness between ECM and fuel injector connector.
- NO** : Go to step 8F10.

8F10 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 14 — (B136) No. 2:



- CHECK** : *Is the resistance between 5 and 20 Ω?*
- YES** : Go to step 8F11.
- NO** : Repair harness and connector.

NOTE:

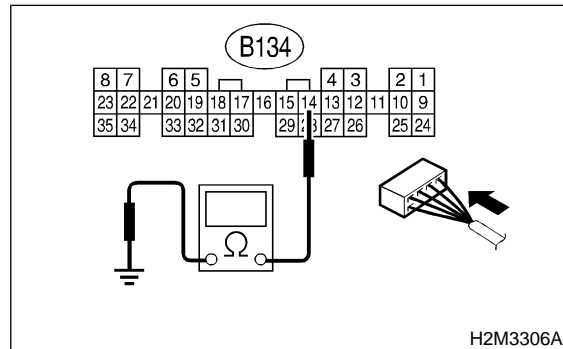
In this case, repair the following:

- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B22)

8F11 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 14 — Chassis ground:

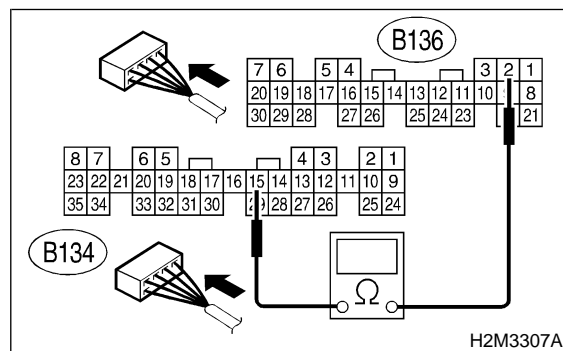


- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Repair ground short circuit in harness between ECM and fuel injector connector.
- NO** : Go to step 8F12.

8F12 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 15 — (B136) No. 2:



- CHECK** : *Is the resistance between 5 and 20 Ω?*
- YES** : Go to step 8F13.
- NO** : Repair harness and connector.

NOTE:

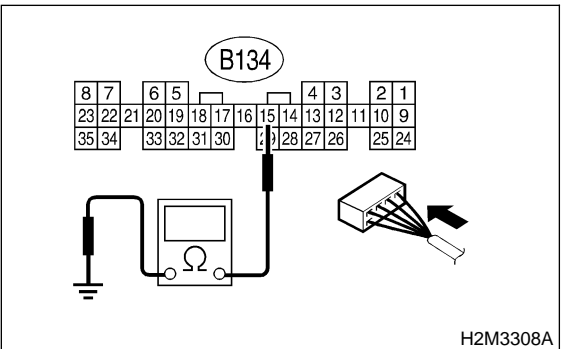
In this case, repair the following:

- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B22)

8F13 : CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.

Measure resistance of harness between ECM and fuel injector connector.

Connector & terminal
(B134) No. 15 — Chassis ground:

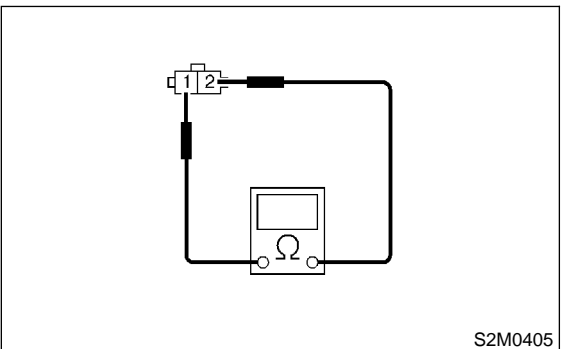


- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Repair ground short circuit in harness between ECM and fuel injector connector.
- NO** : Go to step **8F14**.

8F14 : CHECK EACH FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between each fuel injector terminals.

Terminals
No. 1 — No. 2:



- CHECK** : *Is the resistance between 5 and 20 Ω?*
- YES** : Go to step **8F15**.
- NO** : Replace faulty fuel injector.

8F15 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [W3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Check crankshaft position sensor circuit. <Ref. to 2-7 [T8G0].>

G: CRANKSHAFT POSITION SENSOR CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check crankshaft position sensor circuit.

- MT vehicles: <Ref. to 2-7 [T10AD0].>
- AT vehicles: <Ref. to 2-7 [T11AD0].>

H: CAMSHAFT POSITION SENSOR CIRCUIT

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check camshaft position sensor circuit.

- MT vehicles: <Ref. to 2-7 [T10AF0].>
- AT vehicles: <Ref. to 2-7 [T11AF0].>

9. General Diagnostic Table

A: GENERAL DIAGNOSTICS TABLE WITH NON-CONFORMITY SYMPTOM FOR ENGINE

NOTE:

Malfunction of parts other than those listed is also possible. <Ref. to 2-3 [K100].>

Symptom	Problem parts
1. Engine stalls during idling.	1) Idle air control solenoid valve 2) Intake manifold pressure sensor 3) Intake air temperature sensor 4) Intake air temperature and pressure sensor 5) Ignition parts (*1) 6) Engine coolant temperature sensor (*2) 7) Crankshaft position sensor (*3) 8) Camshaft position sensor (*3) 9) Fuel injection parts (*4)
2. Rough idling	1) Idle air control solenoid valve 2) Intake manifold pressure sensor 3) Intake air temperature sensor 4) Intake air temperature and pressure sensor 5) Engine coolant temperature sensor (*2) 6) Ignition parts (*1) 7) Air intake system (*5) 8) Fuel injection parts (*4) 9) Throttle position sensor 10) Crankshaft position sensor (*3) 11) Camshaft position sensor (*3) 12) Oxygen sensor 13) Fuel pump and fuel pump relay
3. Engine does not return to idle.	1) Idle air control solenoid valve 2) Engine coolant temperature sensor 3) Accelerator cable (*6) 4) Throttle position sensor 5) Intake manifold pressure sensor 6) Intake air temperature sensor 7) Intake air temperature and pressure sensor
4. Poor acceleration	1) Intake manifold pressure sensor 2) Intake air temperature sensor 3) Intake air temperature and pressure sensor 4) Throttle position sensor 5) Fuel injection parts (*4) 6) Fuel pump and fuel pump relay 7) Engine coolant temperature sensor (*2) 8) Crankshaft position sensor (*3) 9) Camshaft position sensor (*3) 10) A/C switch and A/C cut relay 11) Engine torque control signal circuit 12) Ignition parts (*1)
5. Engine stalls or engine sags or hesitates at acceleration.	1) Intake manifold pressure sensor 2) Intake air temperature sensor 3) Intake air temperature and pressure sensor 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Purge control solenoid valve 8) Fuel injection parts (*4) 9) Throttle position sensor 10) Fuel pump and fuel pump relay

Symptom	Problem parts
6. Surge	1) Intake manifold pressure sensor 2) Intake air temperature sensor 3) Intake air temperature and pressure sensor 4) Engine coolant temperature sensor (*2) 5) Crankshaft position sensor (*3) 6) Camshaft position sensor (*3) 7) Fuel injection parts (*4) 8) Throttle position sensor 9) Fuel pump and fuel pump relay
7. Spark knock	1) Intake manifold pressure sensor 2) Intake air temperature sensor 3) Intake air temperature and pressure sensor 4) Engine coolant temperature sensor 5) Knock sensor 6) Fuel injection parts (*4) 7) Fuel pump and fuel pump relay
8. After burning in exhaust system	1) Intake manifold pressure sensor 2) Intake air temperature sensor 3) Intake air temperature and pressure sensor 4) Engine coolant temperature sensor (*2) 5) Fuel injection parts (*4) 6) Fuel pump and fuel pump relay

*1: Check ignition coil & ignitor assembly and spark plug.

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

*3: Ensure the secure installation.

*4: Check fuel injector, fuel pressure regulator and fuel filter.

*5: Inspect air leak in air intake system.

*6: Adjust accelerator cable.

B: GENERAL DIAGNOSTICS TABLE WITH NON-CONFORMITY SYMPTOM FOR AUTOMATIC TRANSMISSION

NOTE:

Check general diagnostics table with non-conformity symptom for automatic transmission. <Ref. to 3-2 [T1000].>

MEMO:

10. Diagnostics Chart with Trouble Code for MT Vehicles

A: DIAGNOSTIC TROUBLE CODE (DTC) LIST

DTC No.	Item	Index
P0106	Intake manifold pressure sensor circuit range/performance problem	<Ref. to 2-7 [T10B0].>
P0107	Intake manifold pressure sensor circuit low input	<Ref. to 2-7 [T10C0].>
P0108	Intake manifold pressure sensor circuit high input	<Ref. to 2-7 [T10D0].>
P0111	Intake air temperature sensor circuit range/performance problem	<Ref. to 2-7 [T10E0].>
P0112	Intake air temperature sensor circuit low input	<Ref. to 2-7 [T10F0].>
P0113	Intake air temperature sensor circuit high input	<Ref. to 2-7 [T10G0].>
P0116	Engine coolant temperature sensor circuit low input	<Ref. to 2-7 [T10H0].>
P0117	Engine coolant temperature sensor circuit high input	<Ref. to 2-7 [T10I0].>
P0121	Throttle position sensor circuit range/performance problem (high input)	<Ref. to 2-7 [T10J0].>
P0122	Throttle position sensor circuit low input	<Ref. to 2-7 [T10K0].>
P0123	Throttle position sensor circuit high input	<Ref. to 2-7 [T10L0].>
P0125	Insufficient coolant temperature for closed loop fuel control	<Ref. to 2-7 [T10M0].>
P0131	Front oxygen (A/F) sensor circuit range/performance problem (low input)	<Ref. to 2-7 [T10N0].>
P0132	Front oxygen (A/F) sensor circuit range/performance problem (high input)	<Ref. to 2-7 [T10O0].>
P0133	Front oxygen (A/F) sensor circuit slow response	<Ref. to 2-7 [T10P0].>
P0136	Rear oxygen sensor circuit malfunction	<Ref. to 2-7 [T10Q0].>
P0139	Rear oxygen sensor circuit slow response	<Ref. to 2-7 [T10R0].>
P0141	Rear oxygen sensor heater circuit low input	<Ref. to 2-7 [T10S0].>
P0171	Fuel trim malfunction (A/F too lean)	<Ref. to 2-7 [T10T0].>
P0172	Fuel trim malfunction (A/F too rich)	<Ref. to 2-7 [T10U0].>
P0181	Fuel temperature sensor A circuit range/performance problem	<Ref. to 2-7 [T10V0].>
P0182	Fuel temperature sensor A circuit low input	<Ref. to 2-7 [T10W0].>
P0183	Fuel temperature sensor A circuit high input	<Ref. to 2-7 [T10X0].>
P0301	Cylinder 1 misfire detected	<Ref. to 2-7 [T10Y0].>
P0302	Cylinder 2 misfire detected	<Ref. to 2-7 [T10Z0].>

DTC No.	Item	Index
P0303	Cylinder 3 misfire detected	<Ref. to 2-7 [T10AA0].>
P0304	Cylinder 4 misfire detected	<Ref. to 2-7 [T10AB0].>
P0325	Knock sensor circuit malfunction	<Ref. to 2-7 [T10AC0].>
P0335	Crankshaft position sensor circuit malfunction	<Ref. to 2-7 [T10AD0].>
P0336	Crankshaft position sensor circuit range/performance problem	<Ref. to 2-7 [T10AE0].>
P0340	Camshaft position sensor circuit malfunction	<Ref. to 2-7 [T10AF0].>
P0341	Camshaft position sensor circuit range/performance problem	<Ref. to 2-7 [T10AG0].>
P0420	Catalyst system efficiency below threshold	<Ref. to 2-7 [T10AH0].>
P0440	Evaporative emission control system malfunction	<Ref. to 2-7 [T10AI0].>
P0443	Evaporative emission control system purge control valve circuit low input	<Ref. to 2-7 [T10AJ0].>
P0446	Evaporative emission control system vent control low input	<Ref. to 2-7 [T10AK0].>
P0451	Evaporative emission control system pressure sensor range/performance problem	<Ref. to 2-7 [T10AL0].>
P0452	Evaporative emission control system pressure sensor low input	<Ref. to 2-7 [T10AM0].>
P0453	Evaporative emission control system pressure sensor high input	<Ref. to 2-7 [T10AN0].>
P0461	Fuel level sensor circuit range/performance problem	<Ref. to 2-7 [T10AO0].>
P0462	Fuel level sensor circuit low input	<Ref. to 2-7 [T10AP0].>
P0463	Fuel level sensor circuit high input	<Ref. to 2-7 [T10AQ0].>
P0480	Cooling fan relay 1 circuit low input	<Ref. to 2-7 [T10AR0].>
P0483	Cooling fan function problem	<Ref. to 2-7 [T10AS0].>
P0500	Vehicle speed sensor malfunction	<Ref. to 2-7 [T10AT0].>
P0505	Idle control system circuit low input	<Ref. to 2-7 [T10AU0].>
P0506	Idle control system RPM lower than expected	<Ref. to 2-7 [T10AV0].>
P0507	Idle control system RPM higher than expected	<Ref. to 2-7 [T10AW0].>
P0601	Internal control module memory check sum error	<Ref. to 2-7 [T10AX0].>
P0703	Brake switch input malfunction	<Ref. to 2-7 [T10AY0].>
P0705	Transmission range sensor circuit malfunction	<Ref. to 2-7 [T10AZ0].>
P0710	Transmission fluid temperature sensor circuit malfunction	<Ref. to 2-7 [T10BA0].>

DTC No.	Item	Index
P0715	Torque converter turbine speed sensor circuit malfunction	<Ref. to 2-7 [T10BB0].>
P0720	Output speed sensor (vehicle speed sensor 2) circuit malfunction	<Ref. to 2-7 [T10BC0].>
P0725	Engine speed input circuit malfunction	<Ref. to 2-7 [T10BD0].>
P0731	Gear 1 incorrect ratio	<Ref. to 2-7 [T10BE0].>
P0732	Gear 2 incorrect ratio	<Ref. to 2-7 [T10BF0].>
P0733	Gear 3 incorrect ratio	<Ref. to 2-7 [T10BG0].>
P0734	Gear 4 incorrect ratio	<Ref. to 2-7 [T10BH0].>
P0740	Torque converter clutch system malfunction	<Ref. to 2-7 [T10BI0].>
P0743	Torque converter clutch system (Lock-up duty solenoid) electrical	<Ref. to 2-7 [T10BJ0].>
P0748	Pressure control solenoid (Line pressure duty solenoid) electrical	<Ref. to 2-7 [T10BK0].>
P0753	Shift solenoid A (shift solenoid 1) electrical	<Ref. to 2-7 [T10BL0].>
P0758	Shift solenoid B (shift solenoid 2) electrical	<Ref. to 2-7 [T10BM0].>
P1100	Starter switch circuit low input	<Ref. to 2-7 [T10BN0].>
P1101	Neutral position switch circuit low input	<Ref. to 2-7 [T10BO0].>
P1103	Engine torque control signal 1 circuit malfunction	<Ref. to 2-7 [T10BP0].>
P1106	Engine torque control signal 2 circuit malfunction	<Ref. to 2-7 [T10BQ0].>
P1110	Atmospheric pressure sensor circuit low input	<Ref. to 2-7 [T10BR0].>
P1111	Atmospheric pressure sensor circuit high input	<Ref. to 2-7 [T10BS0].>
P1112	Atmospheric pressure sensor circuit range/performance problem	<Ref. to 2-7 [T10BT0].>
P1115	Engine torque control cut signal circuit high input	<Ref. to 2-7 [T10BU0].>
P1116	Engine torque control cut signal circuit low input	<Ref. to 2-7 [T10BV0].>
P1120	Starter switch circuit high input	<Ref. to 2-7 [T10BW0].>
P1121	Neutral position switch circuit high input	<Ref. to 2-7 [T10BX0].>
P1130	Front oxygen (A/F) sensor circuit malfunction (open circuit)	<Ref. to 2-7 [T10BY0].>
P1131	Front oxygen (A/F) sensor circuit malfunction (short circuit)	<Ref. to 2-7 [T10BZ0].>
P1132	Front oxygen (A/F) sensor heater circuit low input	<Ref. to 2-7 [T10CA0].>
P1133	Front oxygen (A/F) sensor heater circuit high input	<Ref. to 2-7 [T10CB0].>

DTC No.	Item	Index
P1134	Front oxygen (A/F) sensor micro-computer problem	<Ref. to 2-7 [T10CC0].>
P1139	Front oxygen (A/F) sensor #1 heater circuit range/performance problem	<Ref. to 2-7 [T10CD0].>
P1142	Throttle position sensor circuit range/performance problem (low input)	<Ref. to 2-7 [T10CE0].>
P1151	Rear oxygen sensor heater circuit high input	<Ref. to 2-7 [T10CF0].>
P1400	Fuel tank pressure control solenoid valve circuit low input	<Ref. to 2-7 [T10CG0].>
P1420	Fuel tank pressure control solenoid valve circuit high input	<Ref. to 2-7 [T10CH0].>
P1422	Evaporative emission control system purge control valve circuit high input	<Ref. to 2-7 [T10CI0].>
P1423	Evaporative emission control system vent control high input	<Ref. to 2-7 [T10CJ0].>
P1443	Evaporative emission control system vent control function problem	<Ref. to 2-7 [T10CK0].>
P1505	Idle control system circuit high input	<Ref. to 2-7 [T10CL0].>
P1507	Idle control system malfunction (fail-safe)	<Ref. to 2-7 [T10CM0].>
P1520	Cooling fan relay 1 circuit high input	<Ref. to 2-7 [T10CN0].>
P1560	Back-up voltage circuit malfunction	<Ref. to 2-7 [T10CO0].>
P1700	Throttle position sensor circuit malfunction for automatic transmission	<Ref. to 2-7 [T10CP0].>
P1701	Cruise control set signal circuit malfunction for automatic transmission	<Ref. to 2-7 [T10CQ0].>
P1702	Automatic transmission diagnosis input signal circuit low input	<Ref. to 2-7 [T10CR0].>
P1703	Low clutch timing control solenoid valve circuit malfunction	<Ref. to 2-7 [T10CS0].>
P1704	2-4 brake timing control solenoid valve circuit malfunction	<Ref. to 2-7 [T10CT0].>
P1705	2-4 brake pressure control solenoid valve circuit malfunction	<Ref. to 2-7 [T10CU0].>
P1722	Automatic transmission diagnosis input signal circuit high input	<Ref. to 2-7 [T10CV0].>
P1742	Automatic transmission diagnosis input signal circuit malfunction	<Ref. to 2-7 [T10CW0].>

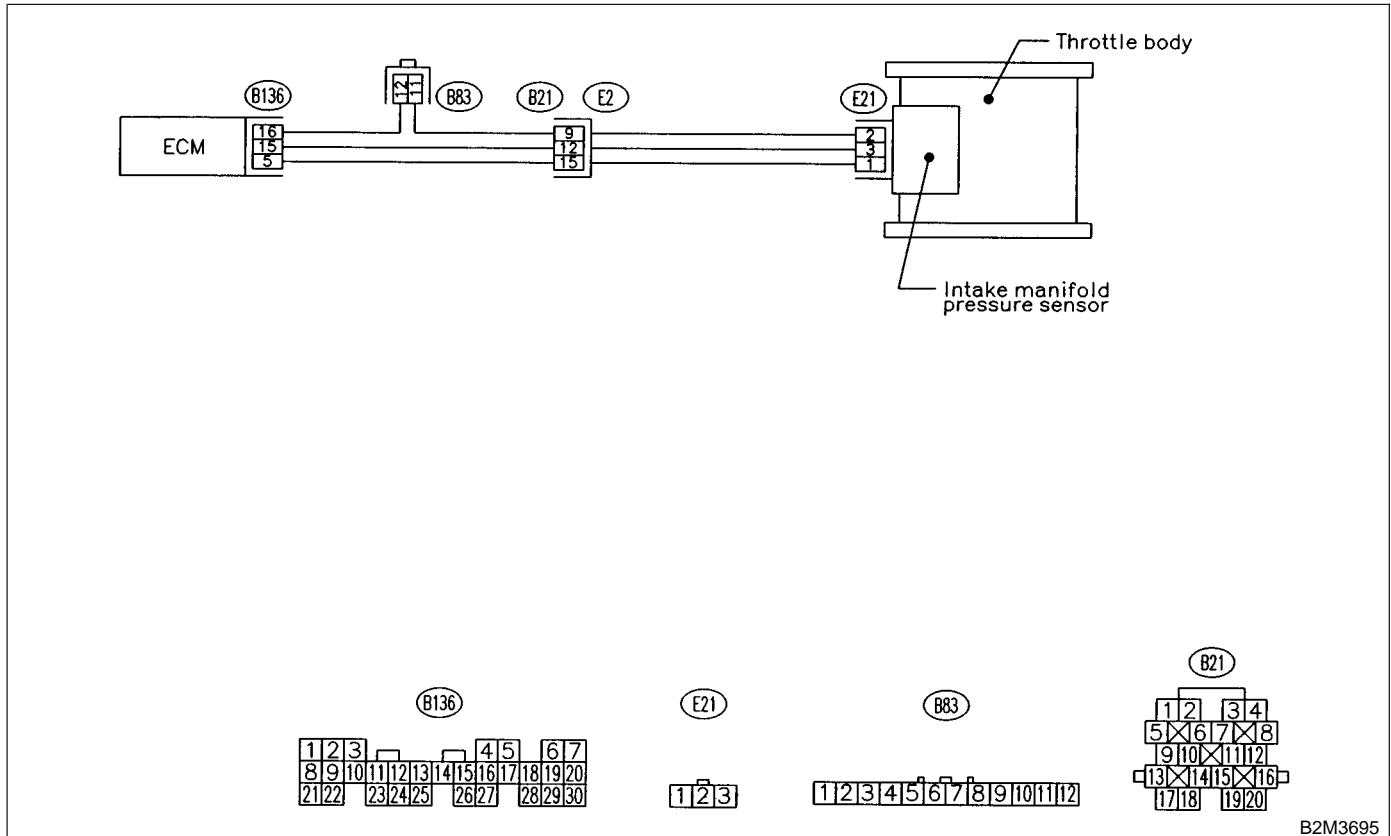
B: DTC P0106 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM —

- DTC DETECTING CONDITION:
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



B2M3695

10B1 : CHECK IDLE SWITCH SIGNAL.

- 1) Turn ignition switch to ON.
- 2) Operate the LED operation mode for engine using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "LED OPERATION MODE FOR ENGINE". <Ref. to 2-7 [T3C8].>

CHECK : *Does the LED of {Idle Switch Signal} come on?*

YES : Go to step **10B2**.

NO : Check throttle position sensor circuit. <Ref. to 2-7 [T10K0].>

NOTE:

In this case, it is not necessary to inspect DTC P0106.

10B2 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107 or P0108?*

YES : Inspect DTC P0107 or P0108 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0106.

NO : Go to step **10B3**.

10B3 : CHECK CONDITION OF INTAKE MANIFOLD PRESSURE SENSOR.

CHECK : *Is the intake manifold pressure sensor installation bolt tightened securely?*

YES : Go to step **10B4**.

NO : Tighten intake manifold pressure sensor installation bolt securely.

10B4 : CHECK CONDITION OF THROTTLE BODY.

CHECK : *Is the throttle body installation bolt tightened securely?*

YES : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

NO : Tighten throttle body installation bolt securely.

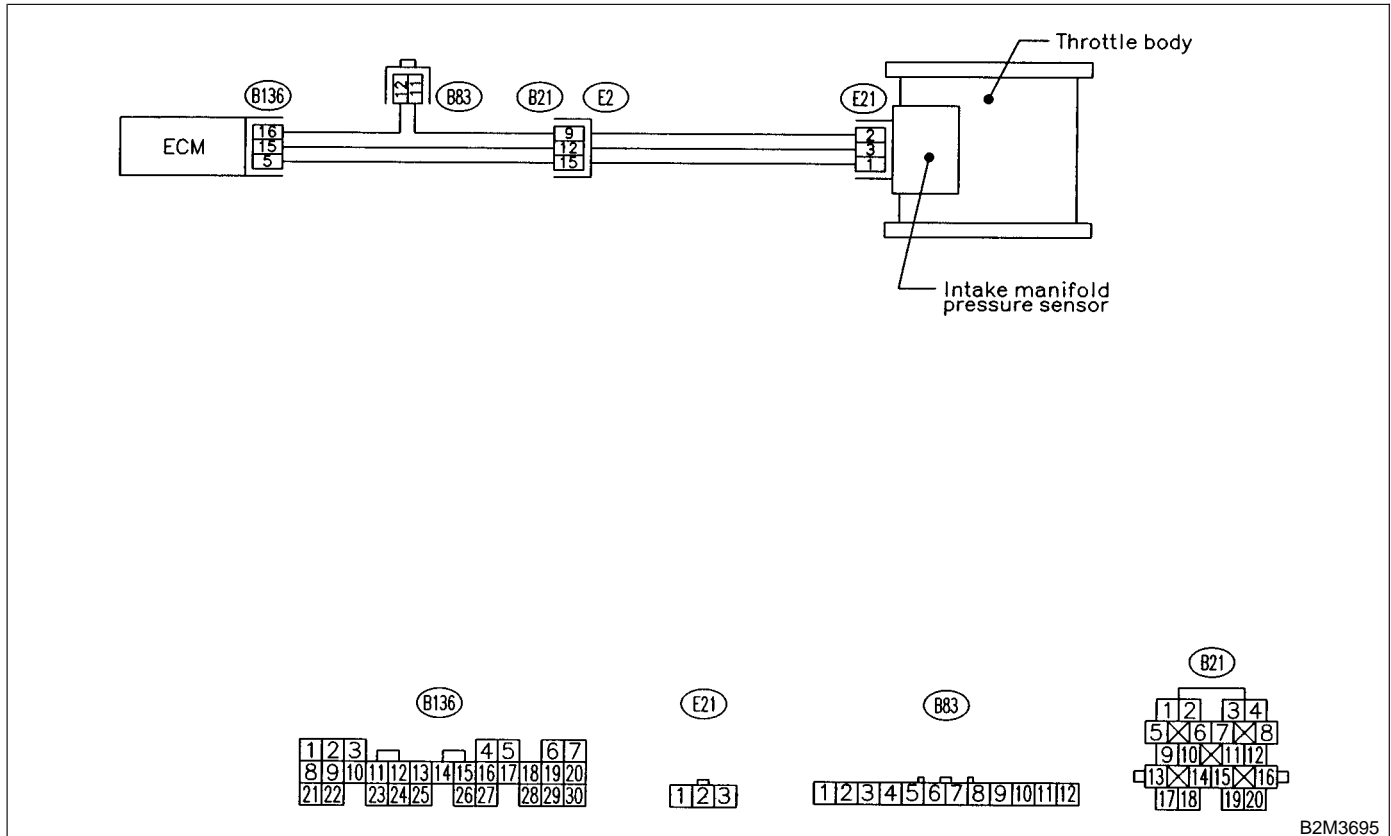
C: DTC P0107 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3695

10C1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than 3.3 kPa (25 mmHg, 0.98 inHg)?*

YES : Go to step 10C3.

NO : Go to step 10C2.

10C2 : CHECK POOR CONTACT.

Check poor contact in ECM and pressure sensor connector. <Ref. to 2-7 [T3C8].>

CHECK : *Is there poor contact in ECM or pressure sensor connector?*

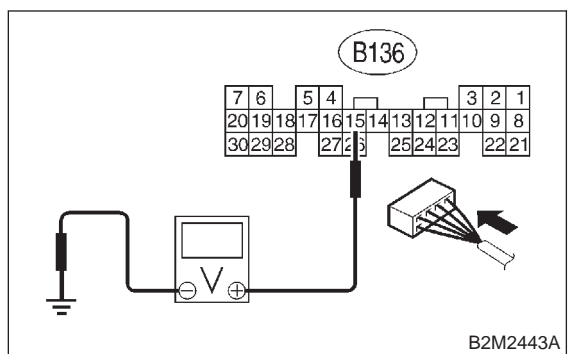
YES : Repair poor contact in ECM or pressure sensor connector.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time.

10C3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Is the voltage more than 4.5 V?*

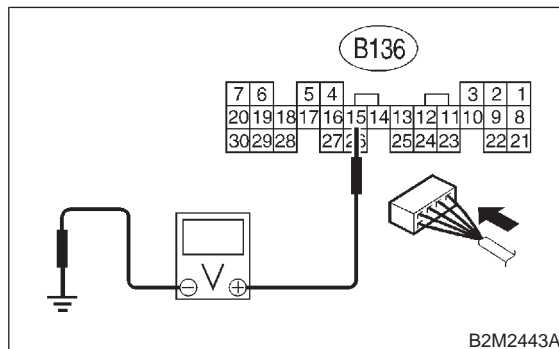
YES : Go to step 10C5.

NO : Go to step 10C4.

10C4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

NO : Contact with SOA service.

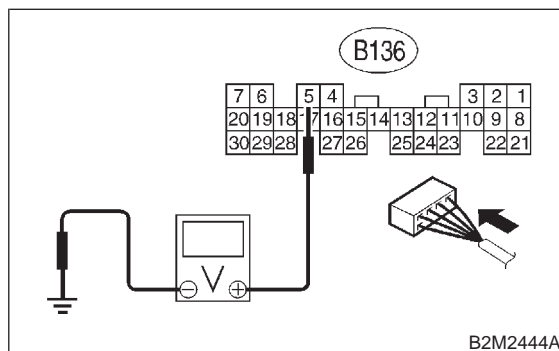
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10C5 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 5 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 0.7 V?*

YES : Go to step 10C7.

NO : Go to step 10C6.

**10C6 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than 3.3 kPa (25 mmHg, 0.98 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

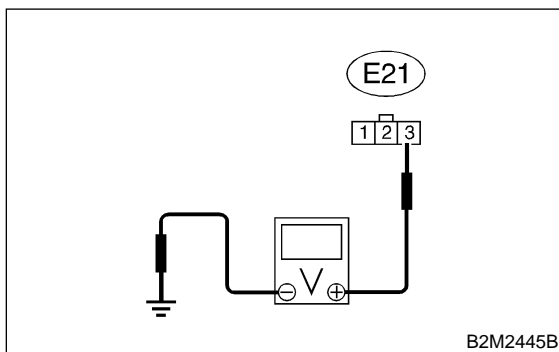
- YES** : Repair poor contact in ECM connector.
NO : Go to step **10C7**.

**10C7 : CHECK HARNESS BETWEEN ECM
AND INTAKE MANIFOLD PRES-
SURE SENSOR CONNECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake manifold pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between intake manifold pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 3 (+) — Engine ground (-):



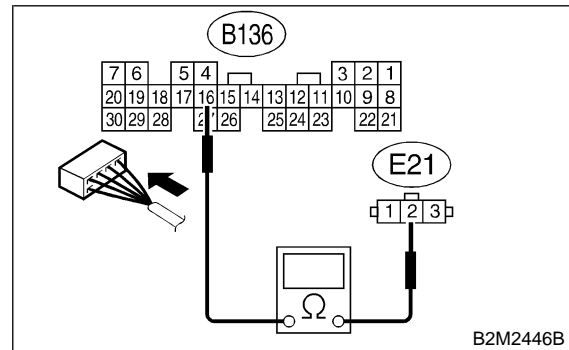
- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step **10C8**.
NO : Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

**10C8 : CHECK HARNESS BETWEEN ECM
AND INTAKE MANIFOLD PRES-
SURE SENSOR CONNECTOR.**

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

Connector & terminal

(B136) No. 16 — (E21) No. 2:



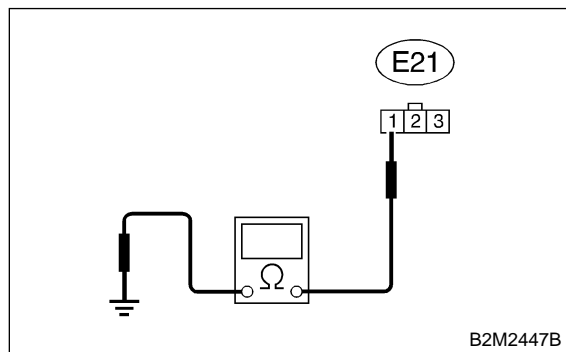
- CHECK** : *Is the resistance less than 1 Ω?*
YES : Go to step **10C9**.
NO : Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

10C9 : CHECK HARNESS BETWEEN ECM AND INTAKE MANIFOLD PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between intake manifold pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 1 — Engine ground:



- CHECK** : **Is the resistance more than 500 kΩ?**
- YES** : Go to step **10C10**.
- NO** : Repair ground short circuit in harness between ECM and intake manifold pressure sensor connector.

10C10 : CHECK POOR CONTACT.

Check poor contact in intake manifold pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in intake manifold pressure sensor connector?**
- YES** : Repair poor contact in intake manifold pressure sensor connector.
- NO** : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

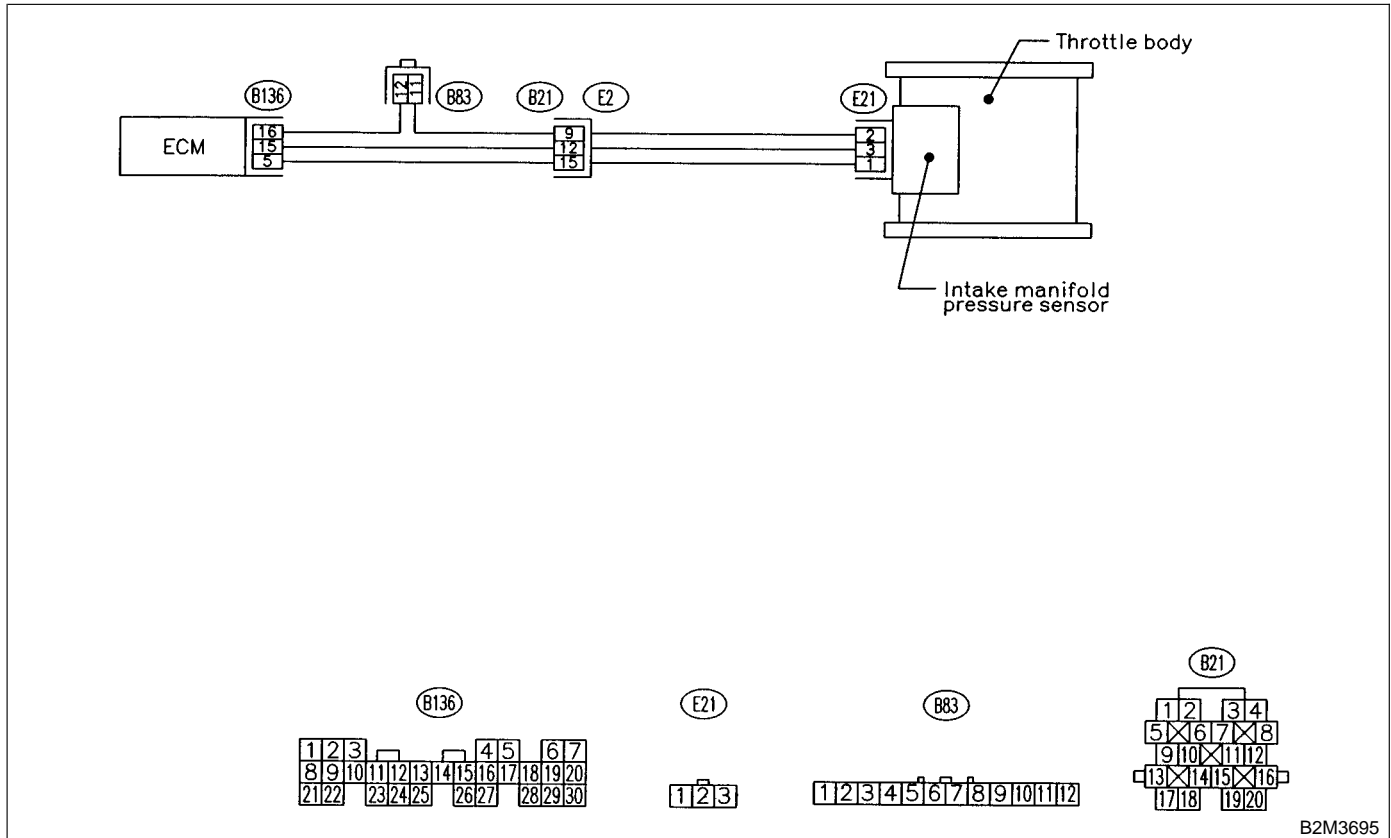
D: DTC P0108 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3695

10D1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 130 kPa (975 mmHg, 38.39 inHg)?*

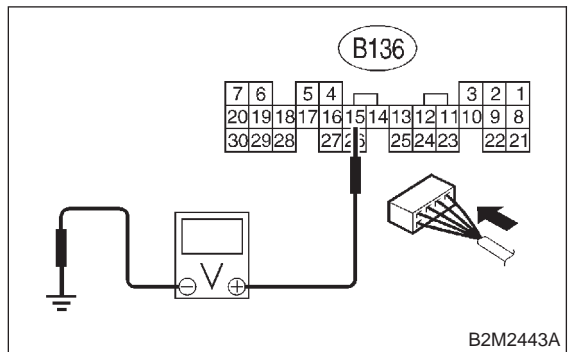
YES : Go to step 10D10.

NO : Go to step 10D2.

10D2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Is the voltage more than 4.5 V?*

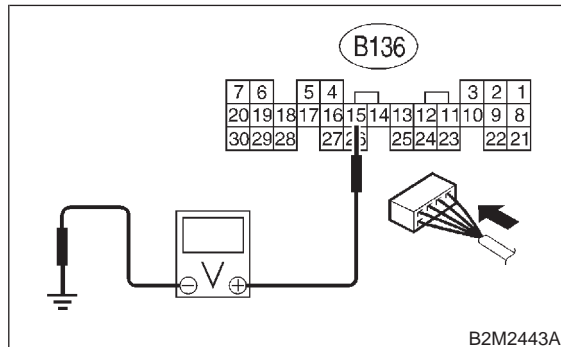
YES : Go to step 10D4.

NO : Go to step 10D3.

10D3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

NO : Contact with SOA service.

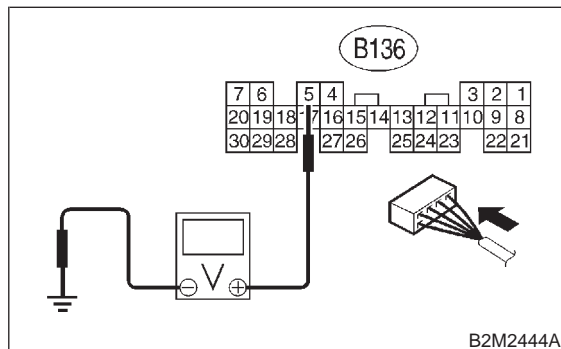
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10D4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 5 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 0.7 V?*

YES : Go to step 10D6.

NO : Go to step 10D5.

10D5 : CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : Does the value change more than 3.3 kPa (25 mmHg, 0.98 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?

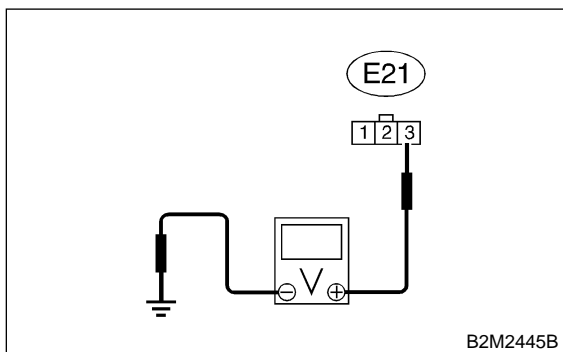
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 10D6.

10D6 : CHECK HARNESS BETWEEN ECM AND INTAKE MANIFOLD PRESSURE SENSOR CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake manifold pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between intake manifold pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 3 (+) — Engine ground (-):



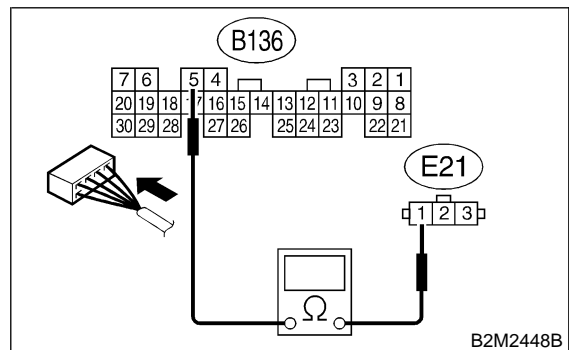
- CHECK** : Is the voltage more than 4.5 V?
- YES** : Go to step 10D7.
- NO** : Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

10D7 : CHECK HARNESS BETWEEN ECM AND INTAKE MANIFOLD PRESSURE SENSOR CONNECTOR.

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

Connector & terminal

(B136) No. 5 — (E21) No. 1:



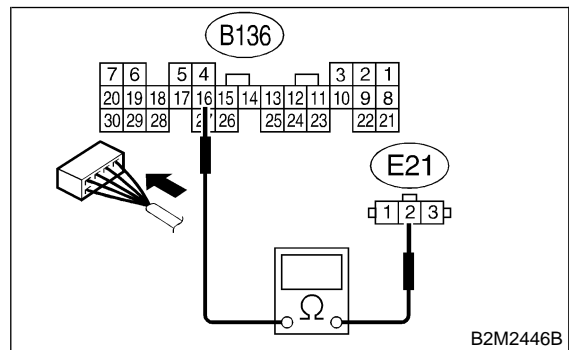
- CHECK** : Is the resistance less than 1 Ω?
- YES** : Go to step 10D8.
- NO** : Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

10D8 : CHECK HARNESS BETWEEN ECM AND INTAKE MANIFOLD PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between ECM and intake manifold pressure sensor connector.

Connector & terminal

(B136) No. 16 — (E21) No. 2:



- CHECK** : Is the resistance less than 1 Ω?
- YES** : Go to step 10D9.
- NO** : Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

10D9 : CHECK POOR CONTACT.

Check poor contact in intake manifold pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : ***Is there poor contact in intake manifold pressure sensor connector?***
- YES** : Repair poor contact in intake manifold pressure sensor connector.
- NO** : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

10D10 : CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.

- 1) Turn ignition switch to OFF and Subaru Select Monitor or the OBD-II general scan tool switch to OFF.
- 2) Disconnect connector from pressure sensor.
- 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON.
- 4) Read data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : ***Is the value more than 130 kPa (975 mmHg, 38.39 inHg)?***
- YES** : Repair battery short circuit in harness between ECM and intake manifold pressure sensor connector.
- NO** : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

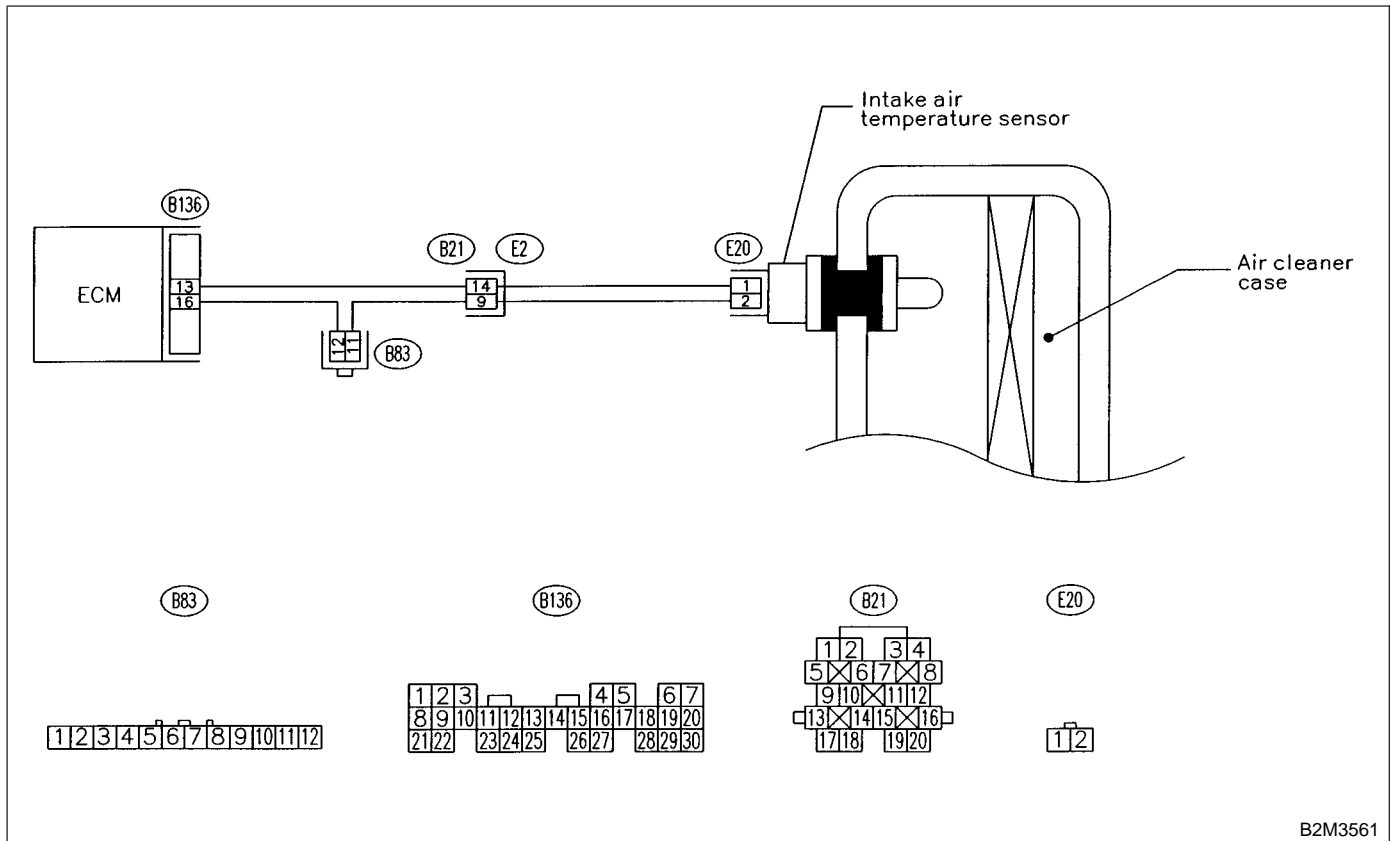
E: DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3561

10E1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0112 or P0113?*

YES : Inspect DTC P0112 or P0113 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0111.

NO : Replace intake air temperature sensor. <Ref. to 2-7 [W12A0].>

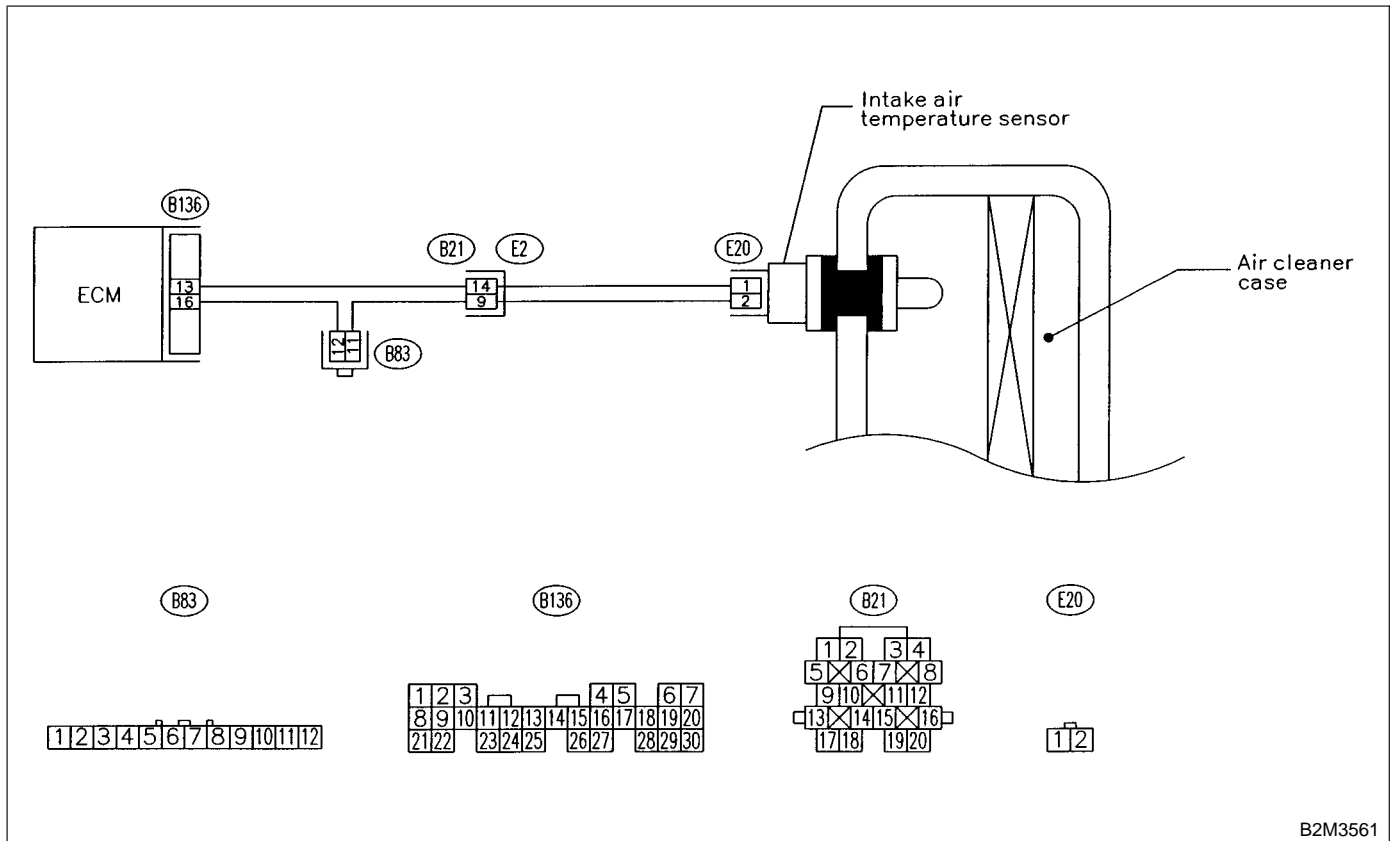
F: DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3561

10F1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value greater than 120°C (248°F)?*

YES : Go to step **10F2**.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in intake air temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

10F2 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than -40°C (-40°F)?*

YES : Replace intake air temperature sensor. <Ref. to 2-7 [W12A0].>

NO : Repair ground short circuit in harness between intake air temperature sensor and ECM connector.

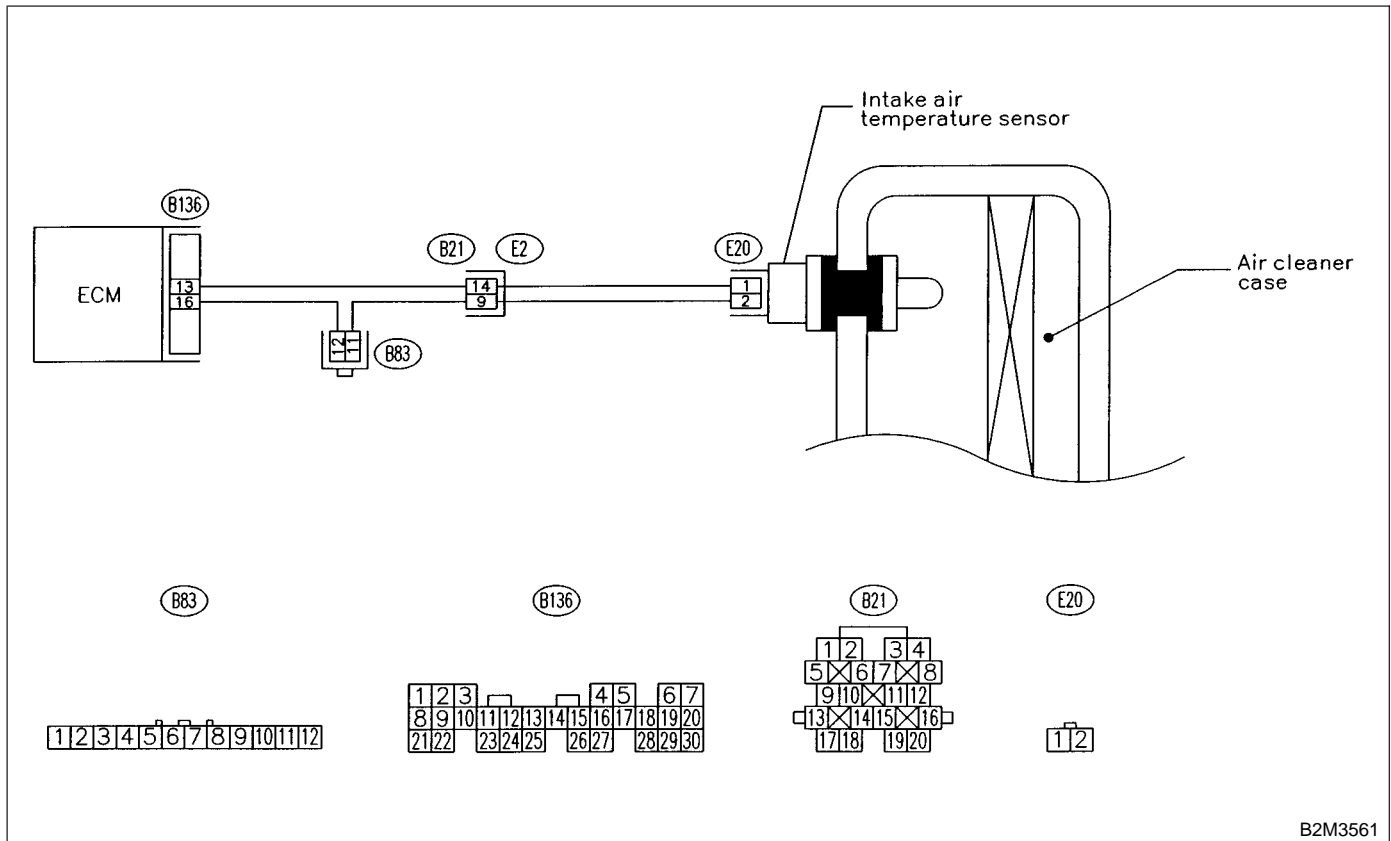
G: DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3561

10G1 : CHECK CURRENT DATA.

- 1) Turn ignition switch to ON.
- 2) Start engine.
- 3) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than -40°C (-40°F)?*
- YES** : Go to step **10G2**.
- NO** : Repair poor contact.

NOTE:

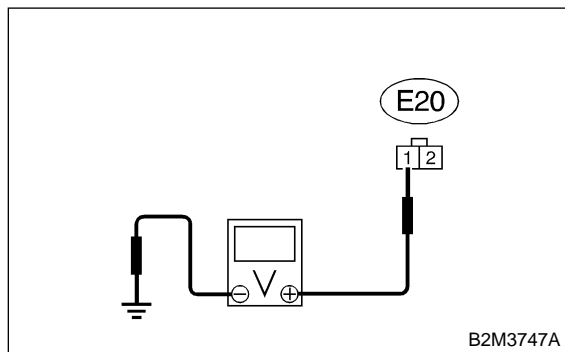
- In this case, repair the following:
- Poor contact in intake air temperature sensor
 - Poor contact in ECM
 - Poor contact in coupling connector (B21)
 - Poor contact in joint connector (B83)

10G2 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature sensor.
- 3) Measure voltage between intake air temperature sensor connector and engine ground.

Connector & terminal

(E20) No. 1 (+) — Engine ground (-):



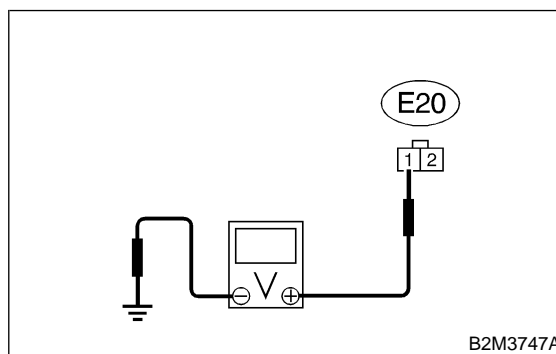
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between intake air temperature sensor and ECM connector.
- NO** : Go to step **10G3**.

10G3 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between intake air temperature sensor connector and engine ground.

Connector & terminal

(E20) No. 1 (+) — Engine ground (-):



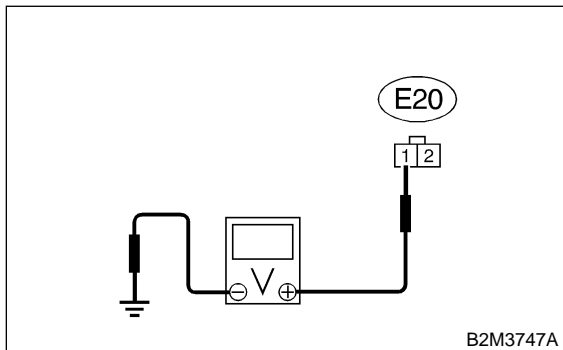
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between intake air temperature sensor and ECM connector.
- NO** : Go to step **10G4**.

10G4 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.

Measure voltage between intake air temperature sensor connector and engine ground.

Connector & terminal

(E20) No. 1 (+) — Engine ground (-):



CHECK : **Is the voltage more than 3 V?**

YES : Go to step **10G5**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

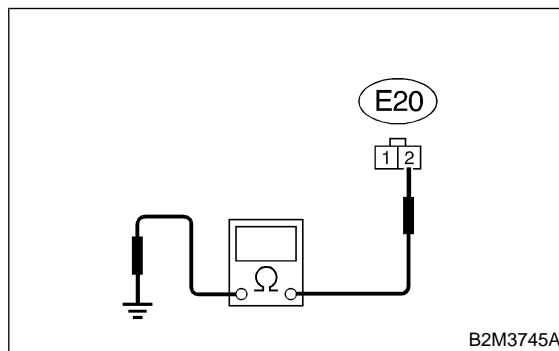
- Open circuit in harness between intake air temperature sensor and ECM connector
- Poor contact in intake air temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

10G5 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness between intake air temperature sensor connector and engine ground.

Connector & terminal

(E20) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace intake air temperature sensor.
<Ref. to 2-7 [W12A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between intake air temperature sensor and ECM connector
- Poor contact in intake air temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

MEMO:

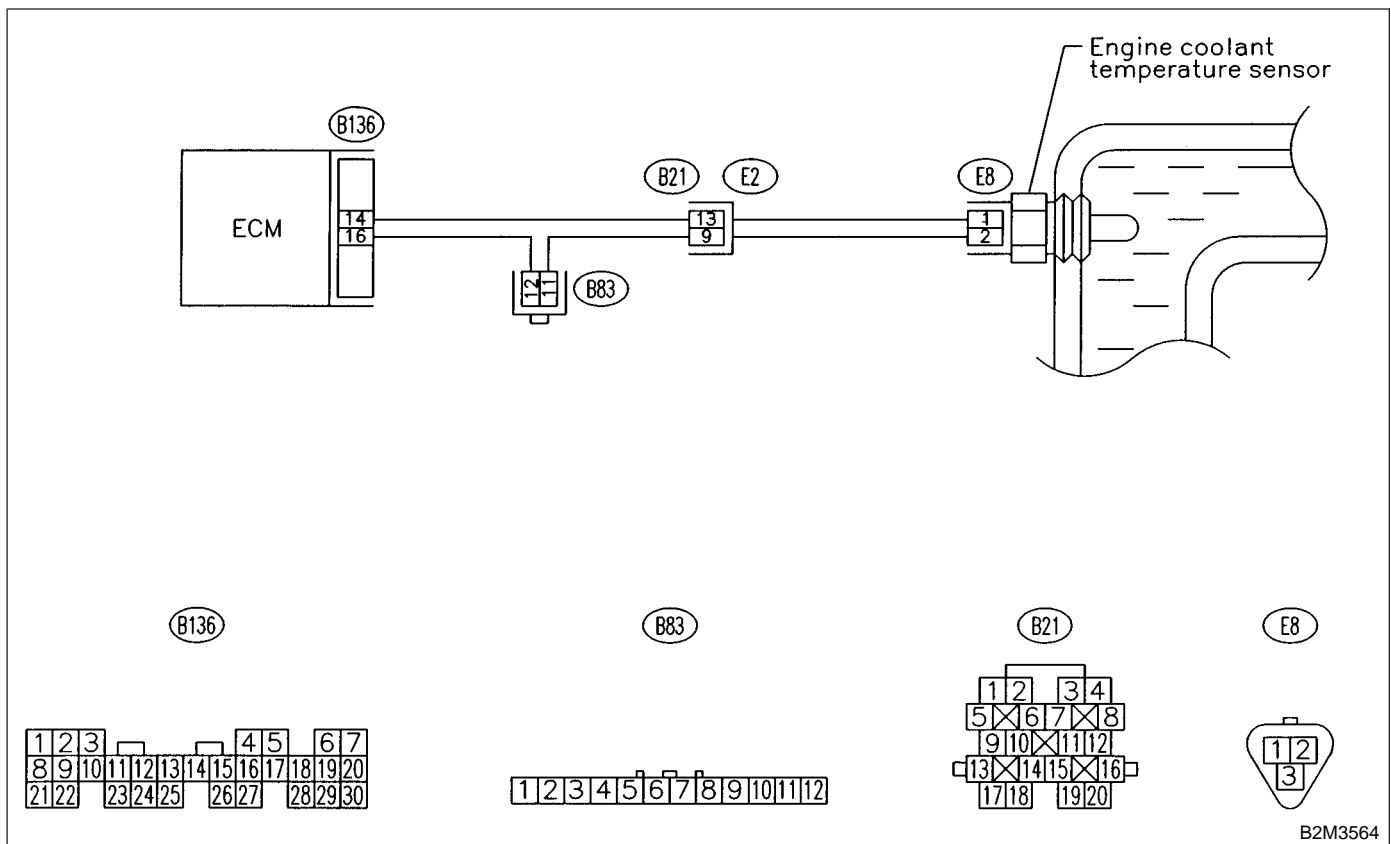
H: DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Hard to start
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3564

10H1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:


- Subaru Select Monitor


For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

 : ***Is the value greater than 120°C (248°F)?***

 : Go to step **10H2**.

 : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in engine coolant temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

10H2 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from engine coolant temperature sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:


- Subaru Select Monitor


For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

 : ***Is the value less than -40°C (-40°F)?***

 : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

 : Repair ground short circuit in harness between engine coolant temperature sensor and ECM connector.

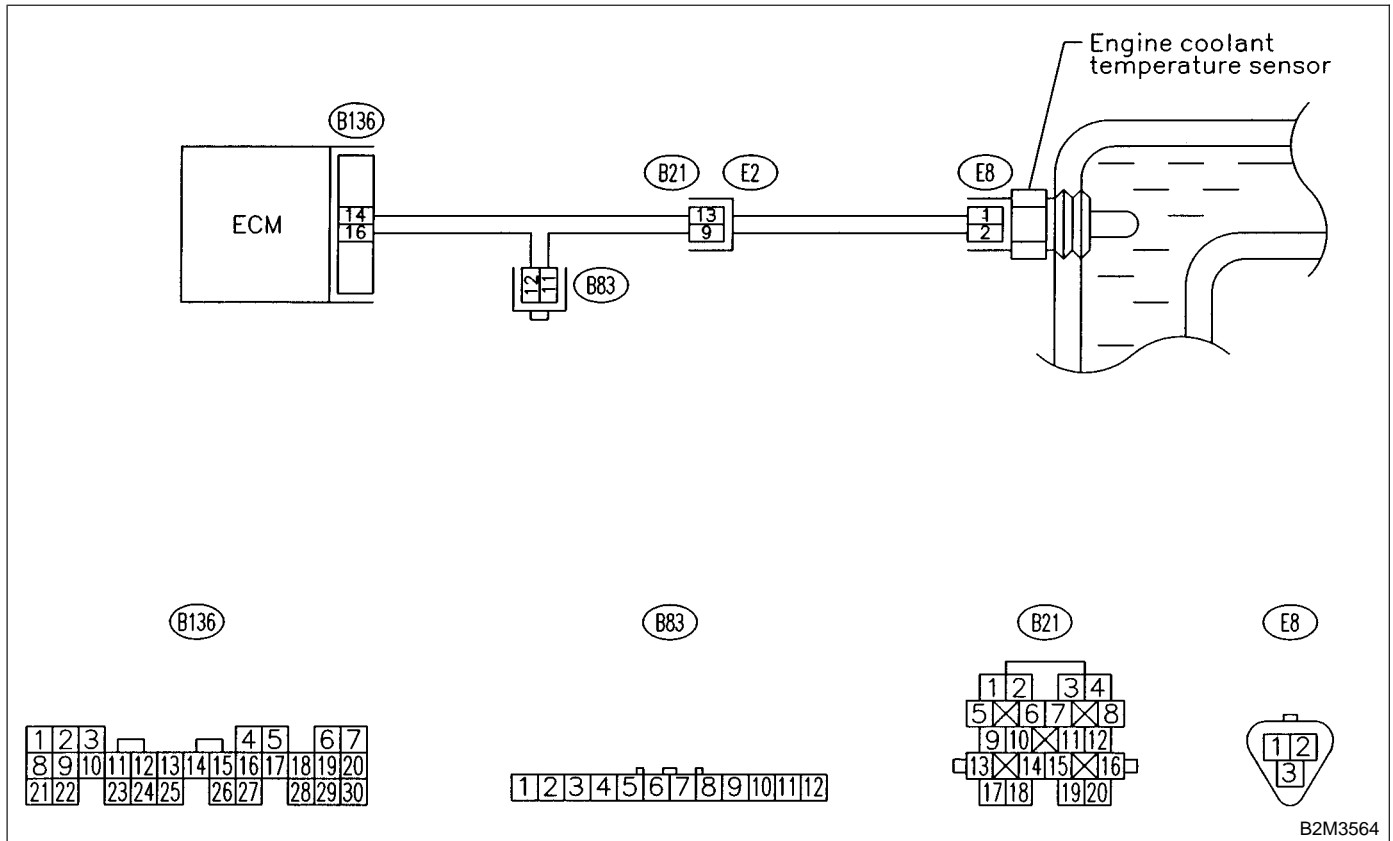
I: DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Hard to start
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



1011 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than -40°C (-40°F)?*
- YES** : Go to step **1012**.
- NO** : Repair poor contact.

NOTE:

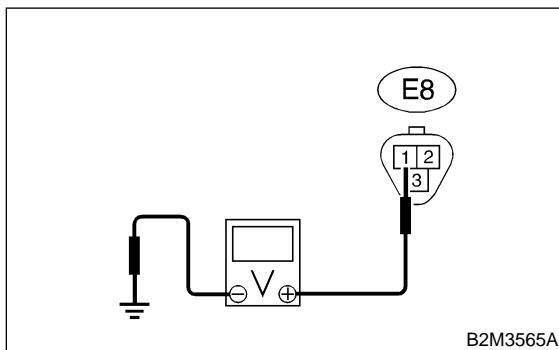
- In this case, repair the following:
- Poor contact in engine coolant temperature sensor
 - Poor contact in ECM
 - Poor contact in coupling connector (B21)
 - Poor contact in joint connector (B83)

1012 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



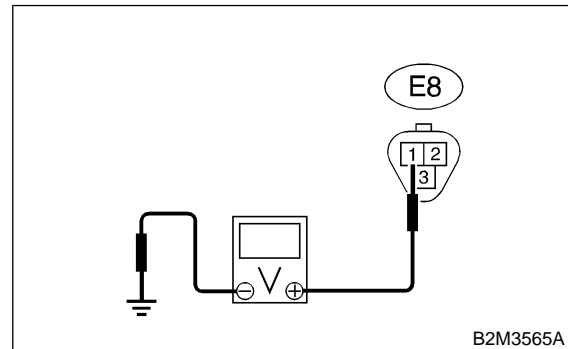
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.
- NO** : Go to step **1013**.

1013 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



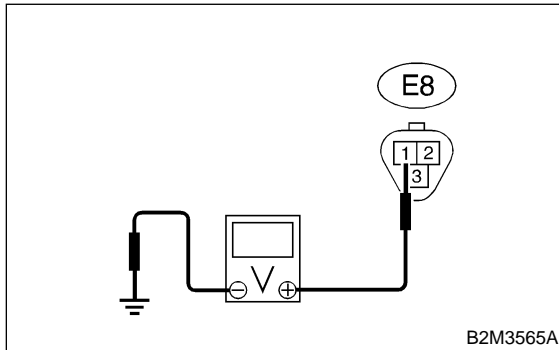
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.
- NO** : Go to step **1014**.

1014 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

Measure voltage between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



CHECK : **Is the voltage more than 4 V?**

YES : Go to step **1015**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

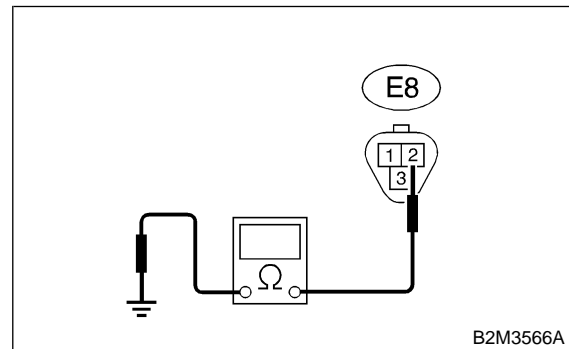
- Open circuit in harness between ECM and engine coolant temperature sensor connector
- Poor contact in engine coolant temperature sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

1015 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine coolant temperature sensor connector
- Poor contact in engine coolant temperature sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

MEMO:

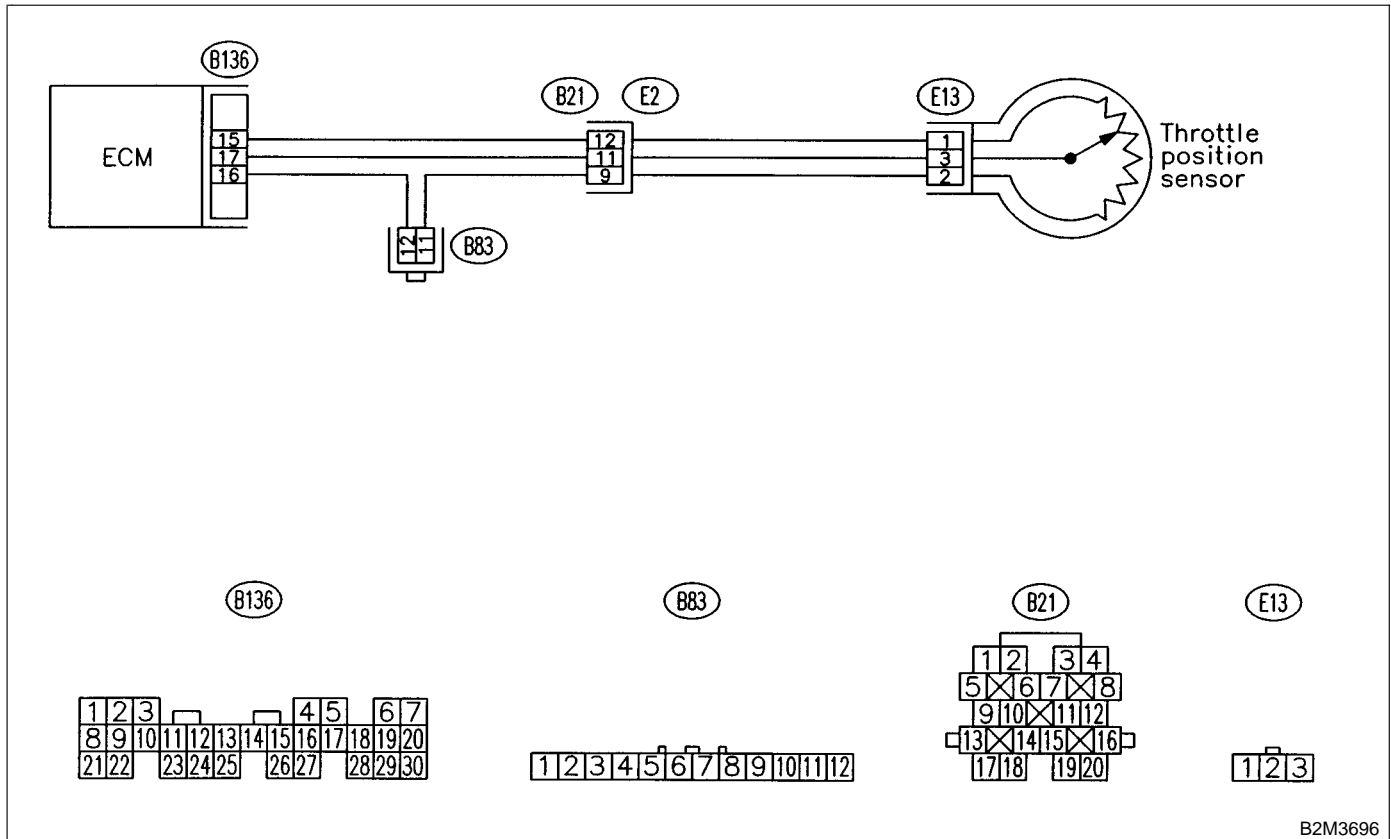
J: DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3696

10J1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107, P0108, P0122 or P0123?
- YES** : Inspect DTC P0107, P0108, P0122 or P0123 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0121.

- NO** : Go to step 10J2.

10J2 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is the value more than 53.3 kPa (400 mmHg, 15.75 inHg)?***

YES : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

NO : Replace throttle position sensor. <Ref. to 2-7 [W10A1].>

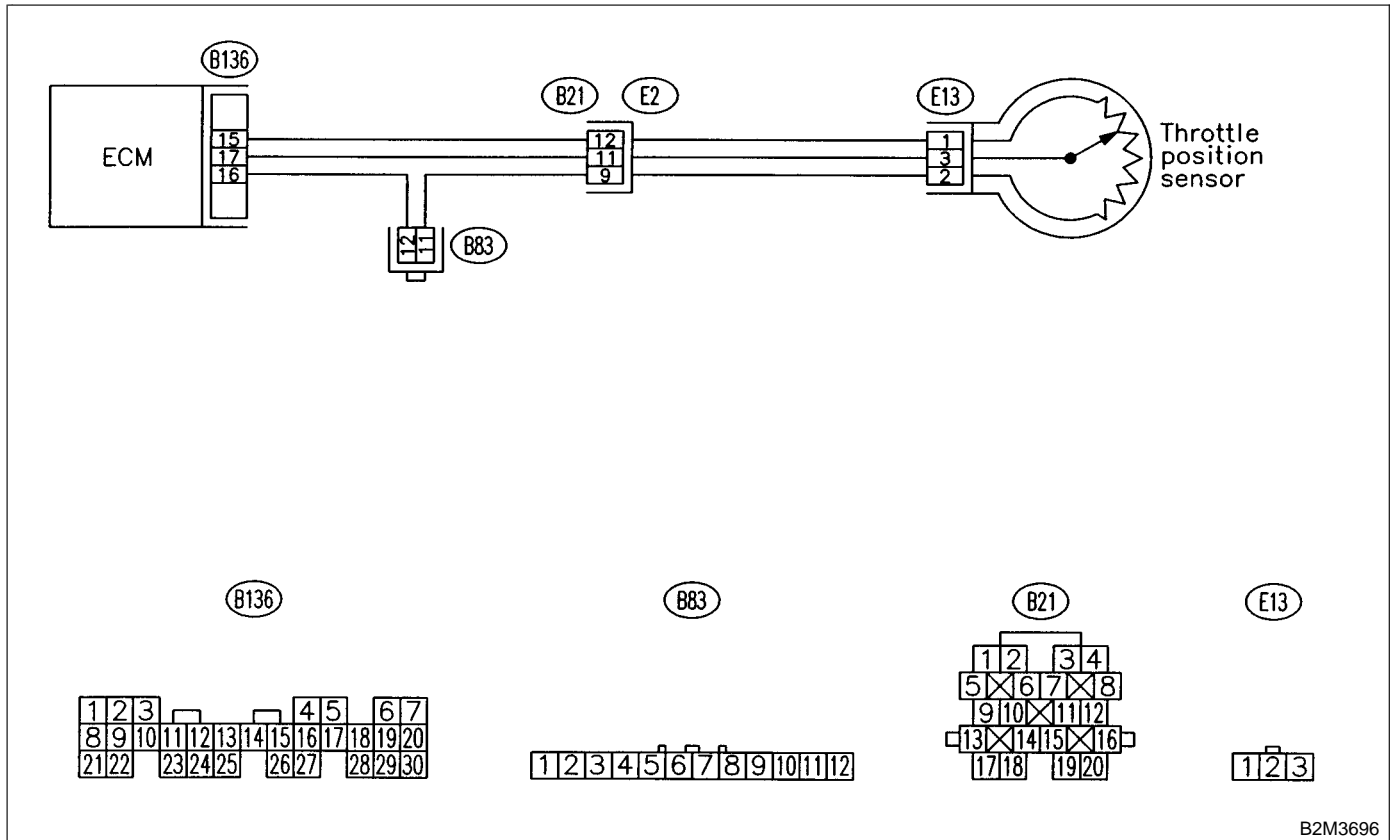
K: DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10K1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than 0.1 V?*
- YES** : Go to step **10K2**.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

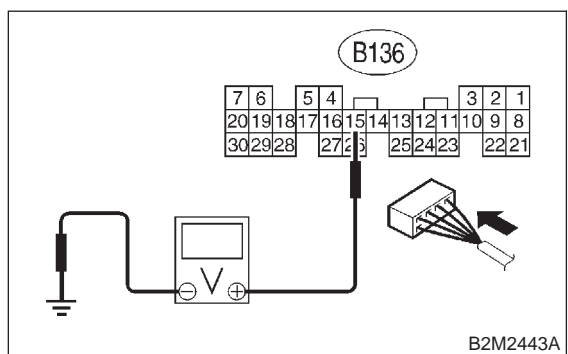
NOTE:

- In this case, repair the following:
- Poor contact in throttle position sensor connector
 - Poor contact in ECM connector
 - Poor contact in coupling connector (B21)
 - Poor contact in joint connector (B83)

10K2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground while throttle valve is fully closed.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

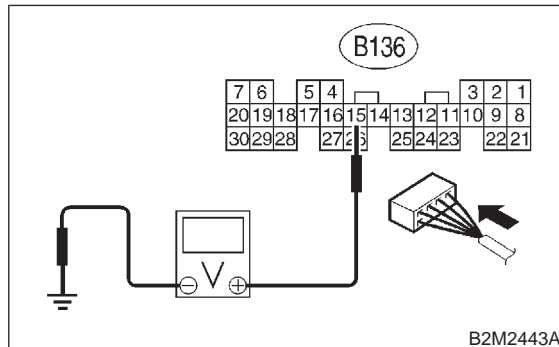


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step **10K4**.
- NO** : Go to step **10K3**.

10K3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

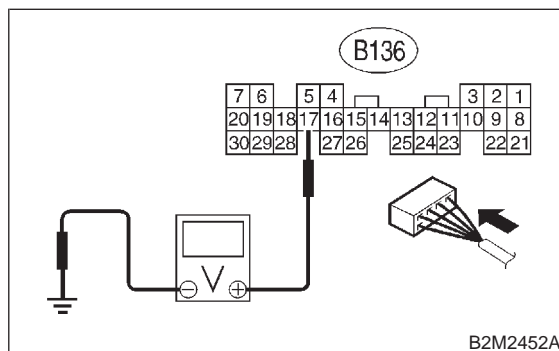
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10K4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 17 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.1 V?*
- YES** : Go to step **10K6**.
- NO** : Go to step **10K5**.

**10K5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Measure voltage between ECM connector and chassis ground.

CHECK : *Does the voltage change more than 0.1 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

YES : Repair poor contact in ECM connector.

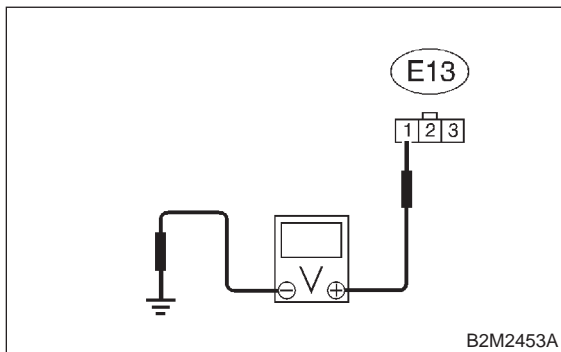
NO : Go to step 10K6.

**10K6 : CHECK HARNESS BETWEEN ECM
AND THROTTLE POSITION SEN-
SOR CONNECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from throttle position sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 1 (+) — Engine ground (-):



CHECK : *Is the voltage more than 4.5 V?*

YES : Go to step 10K7.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

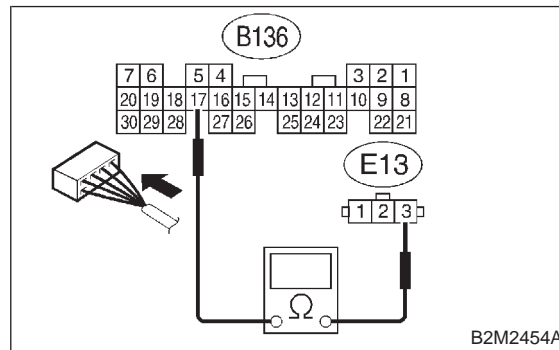
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in throttle position sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

**10K7 : CHECK HARNESS BETWEEN ECM
AND THROTTLE POSITION SEN-
SOR CONNECTOR.**

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

Connector & terminal

(B136) No. 17 — (E13) No. 3:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 10K8.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

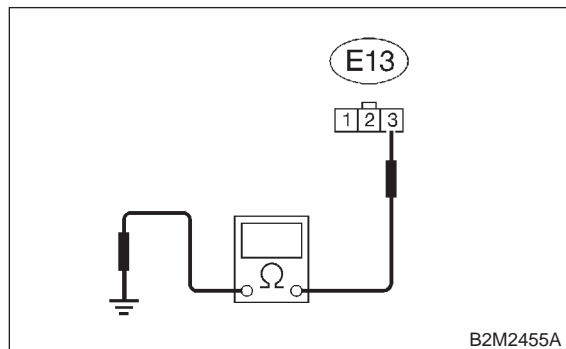
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in throttle position sensor connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

10K8 : CHECK HARNESS BETWEEN ECM AND THROTTLE POSITION SENSOR CONNECTOR.

Measure resistance of harness between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 3 — Engine ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between throttle position sensor and ECM connector.
- NO** : Go to step **10K9**.

10K9 : CHECK POOR CONTACT.

Check poor contact in throttle position sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in throttle position sensor connector?**
- YES** : Repair poor contact in throttle position sensor connector.
- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A1].>

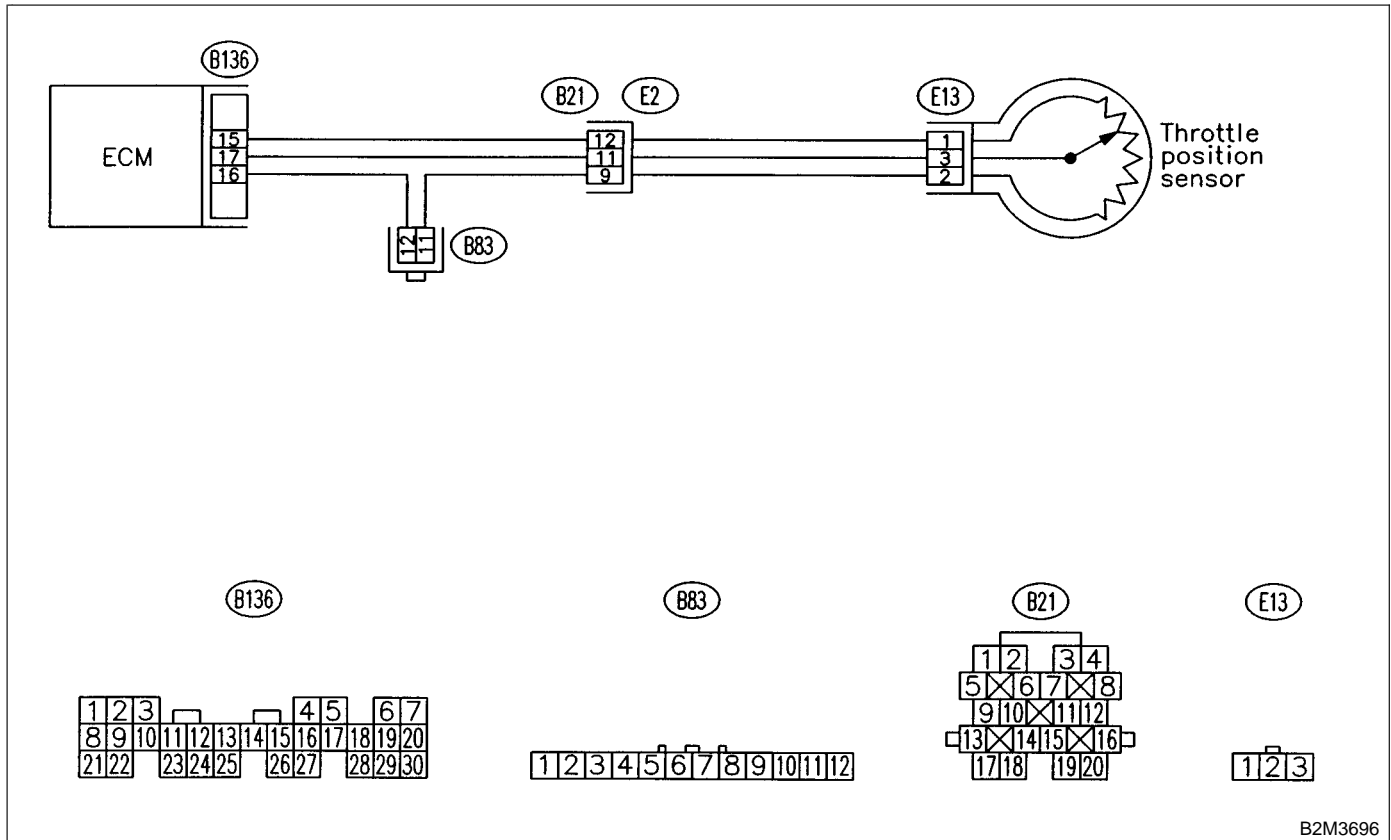
L: DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10L1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 4.9 V?*

YES : Go to step **10L2**.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

In this case, repair the following:

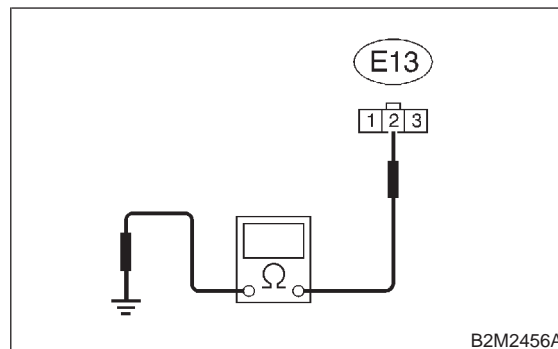
- Poor contact in throttle position sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

10L2 : CHECK HARNESS BETWEEN THROTTLE POSITION SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(E13) No. 2 — Engine ground:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step **10L3**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

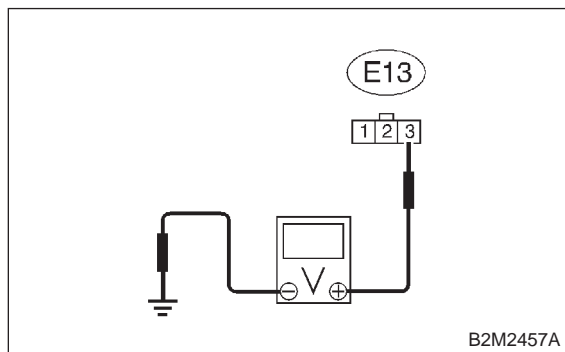
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in coupling connector (B21)

10L3 : CHECK HARNESS BETWEEN THROTTLE POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 3 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 4.9 V?**
- YES** : Repair battery short circuit in harness between throttle position sensor and ECM connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A1].>

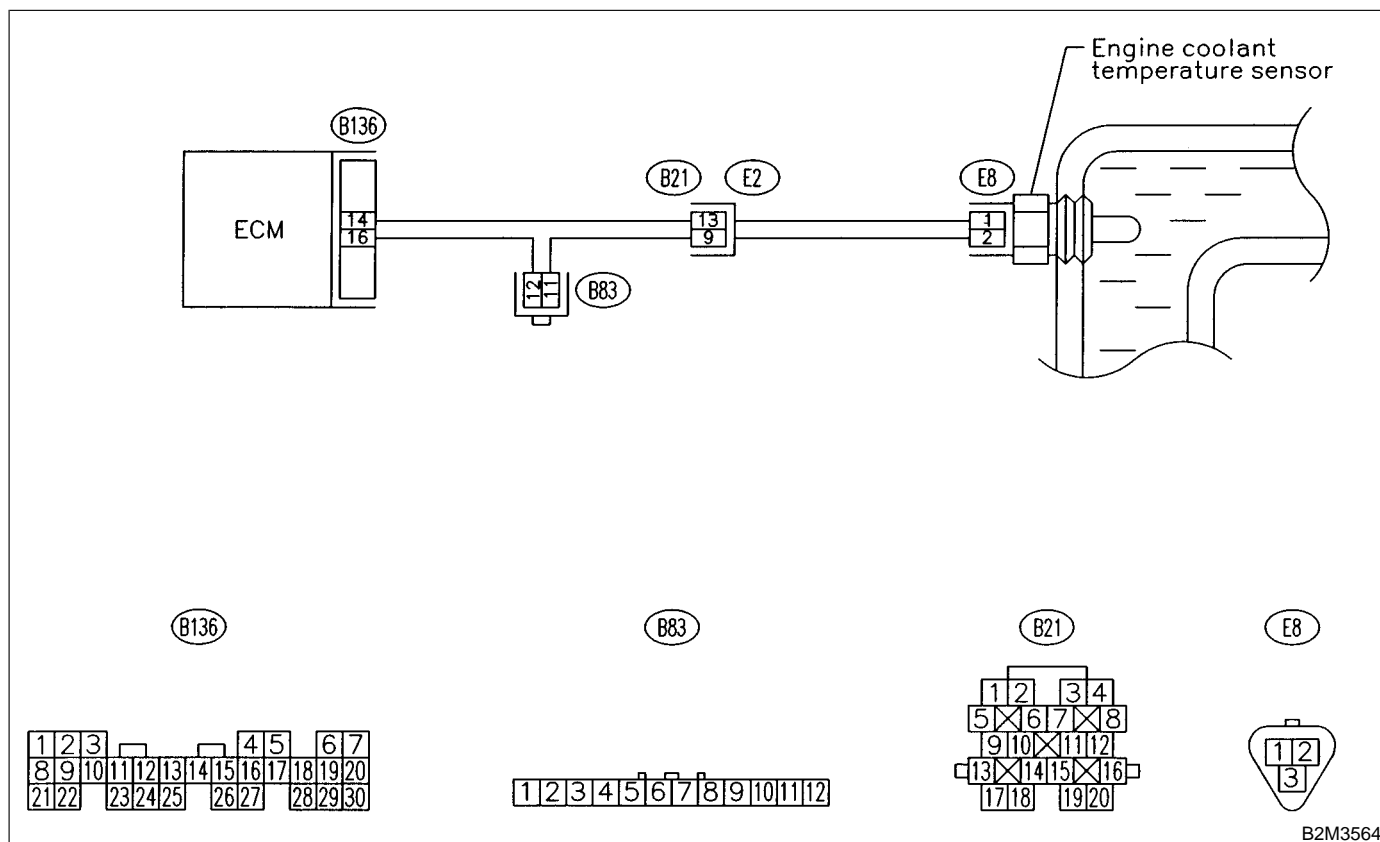
M: DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine would not return to idling.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10M1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117?
- YES** : Inspect DTC P0116 or P0117 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0125.

- NO** : Go to step **10M2**.

10M2 : CHECK THERMOSTAT.

- CHECK** : Does thermostat remain opened?
- YES** : Replace thermostat. <Ref. to 2-5 [W2A0].>
- NO** : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

N: DTC P0131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —

NOTE:

For the diagnostic procedure, refer to DTC P0132. <Ref. to 2-7 [T10O0].>

O: DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —

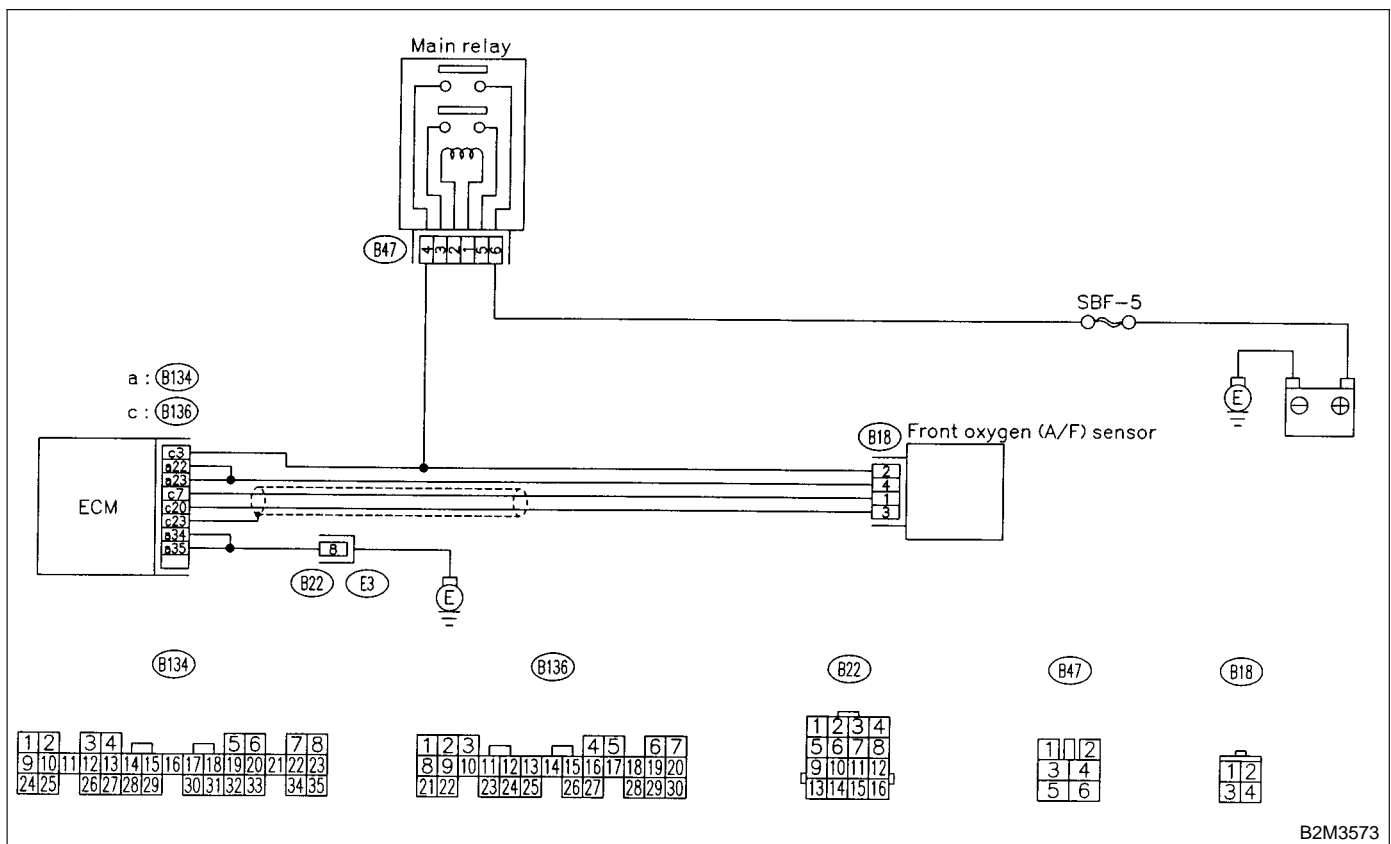
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:



B2M3573

1001 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132, P1133 or P1134?*

YES : Inspect DTC P1130, P1131, P1132, P1133 or P1134 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NO : Go to step **1002**.

1002 : CHECK FRONT (A/F) OXYGEN SENSOR DATA.

- 1) Start engine.
- 2) While observing the Subaru Select Monitor or OBD-II general scan tool screen, warm-up the engine until coolant temperature is above 70°C (158°F).
If the engine is already warmed-up, operate at idle speed for at least 1 minute.
- 3) Read data of front oxygen (A/F) sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value equal to or more than 0.85 and equal to less than 1.15 in idling?*

YES : Go to step **1003**.

NO : Go to step **1004**.

1003 : CHECK REAR OXYGEN SENSOR SIGNAL.

- 1) Race engine at speeds from idling to 5,000 rpm for a total of 5 cycles.

NOTE:

To increase engine speed to 5,000 rpm, slowly depress accelerator pedal, taking approximately 5 seconds, and quickly release accelerator pedal to decrease engine speed.

- 2) Operate the LED operation mode for engine.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "LED OPERATION MODE FOR ENGINE". <Ref. to 2-7 [T3C8].>

CHECK : *Does the LED of {Rear O2 Rich Signal} blink?*

YES : Repair poor contact in front oxygen (A/F) sensor and rear oxygen sensor connector.

NO : Check rear oxygen sensor circuit. <Ref. to 2-7 [T10R0].>

1004 : CHECK EXHAUST SYSTEM.

Check exhaust system parts.

NOTE:

Check the following items.

- Loose installation of portions
- Damage (crack, hole etc.) of parts
- Looseness of front oxygen (A/F) sensor
- Looseness and ill fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor

CHECK : *Is there a fault in exhaust system?*

YES : Repair or replace faulty parts.

NO : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

P: DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE —

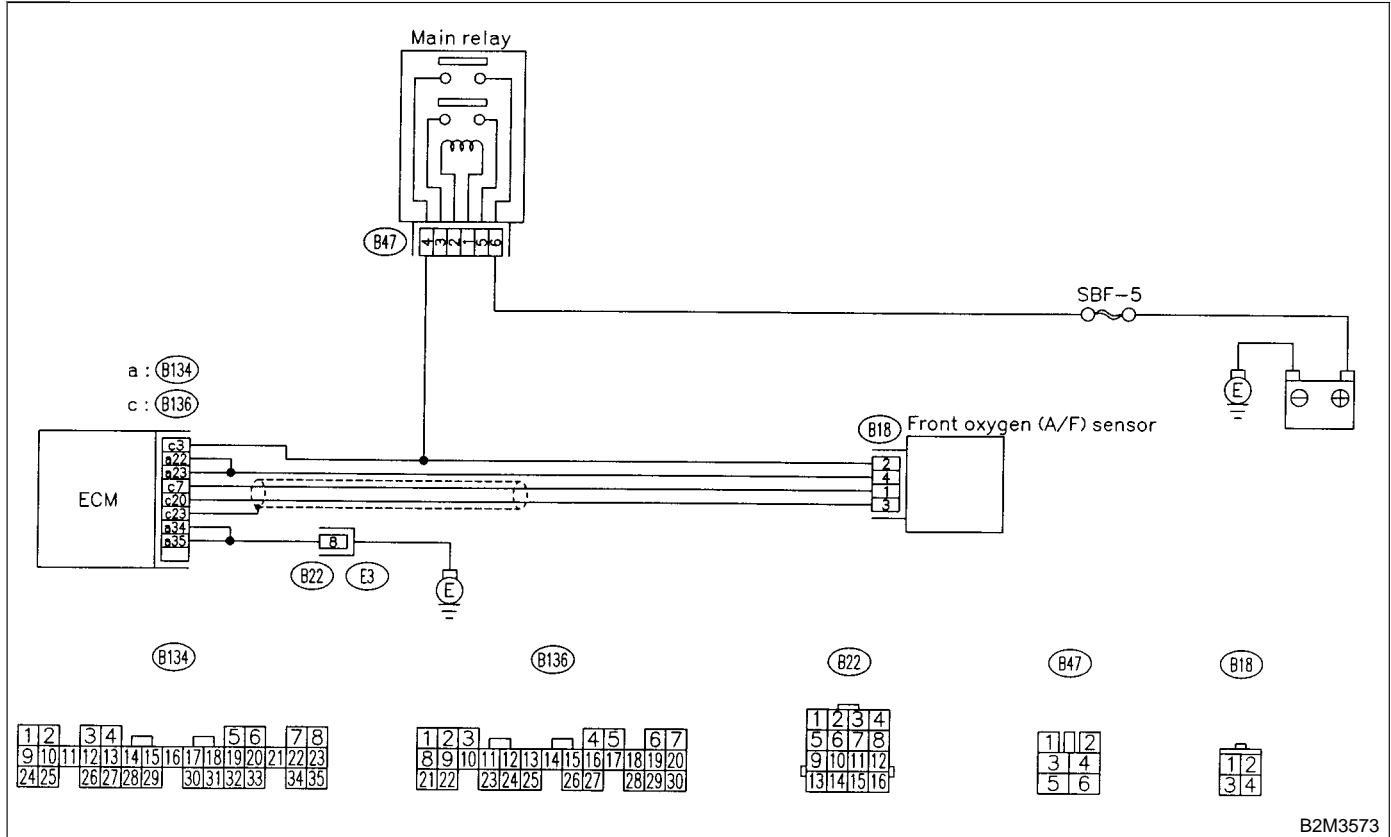
• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3573

10P1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132, P1133 or P1134?
- YES** : Inspect DTC P1130, P1131, P1132, P1133 or P1134 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0133.

- NO** : Go to step **10P2**.

10P2 : CHECK EXHAUST SYSTEM.

NOTE:

Check the following items.

- Loose installation of front portion of exhaust pipe onto cylinder heads
- Loose connection between front exhaust pipe and front catalytic converter
- Damage of exhaust pipe resulting in a hole

- CHECK** : Is there a fault in exhaust system?
- YES** : Repair exhaust system.
- NO** : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

MEMO:

Q: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION —

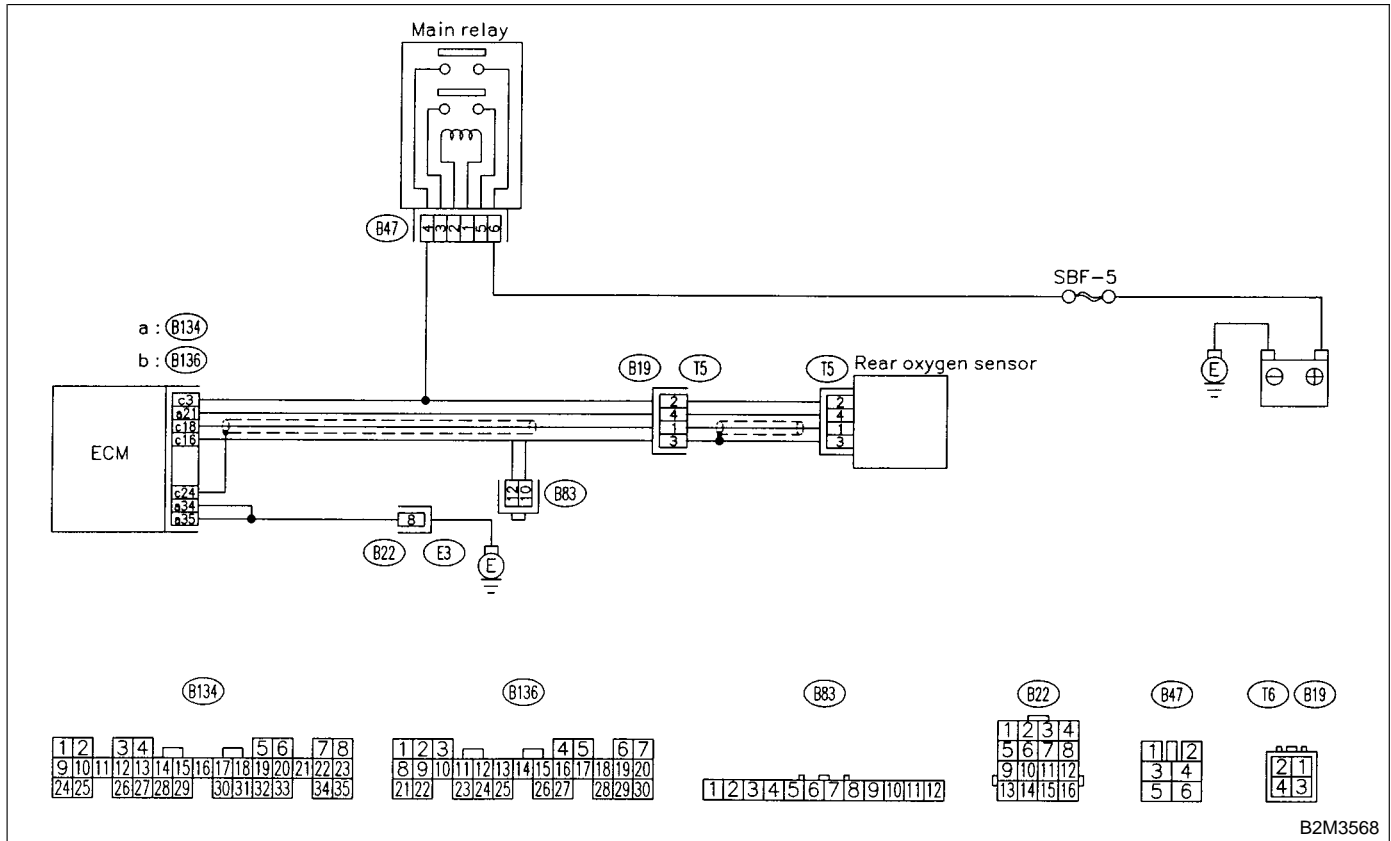
• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

• WIRING DIAGRAM:



B2M3568

10Q1 : CHECK ANY OTHER DTC ON DISPLAY.

10Q2 : CHECK FAILURE CAUSE OF P1130 OR P1131.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130 or P1131?
- YES** : Go to step 10Q2.
- NO** : Go to step 10Q3.

Inspect DTC P1130 or P1131 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

- CHECK** : Is the failure cause of P1130 or P1131 in the fuel system?
- YES** : Check fuel system.

NOTE:
In this case, it is not necessary to inspect DTC P0136.

- NO** : Go to step 10Q3.

10Q3 : CHECK REAR OXYGEN SENSOR DATA.

- 1) Start the engine.
- 2) Warm-up the engine until engine coolant temperature is above 70°C (160°F), and keep the engine speed at 2,000 rpm to 3,000 rpm for two minutes.
- 3) Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Does the value fluctuate?*
- YES** : Go to step **10Q7**.
- NO** : Go to step **10Q4**.

10Q4 : CHECK REAR OXYGEN SENSOR DATA.

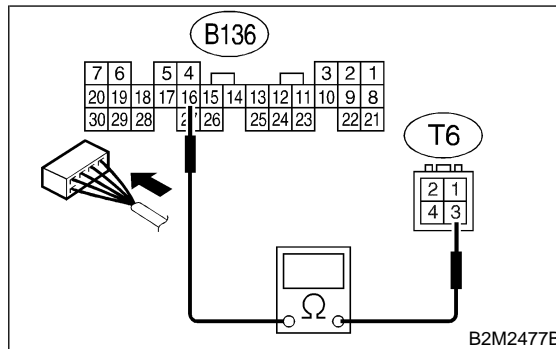
Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II General Scan Tool.

- CHECK** : *Is the value fixed between 0.2 and 0.4 V?*
- YES** : Go to step **10Q5**.
- NO** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

10Q5 : CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.

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

Connector & terminal
(B136) No. 16 — (T6) No. 3:



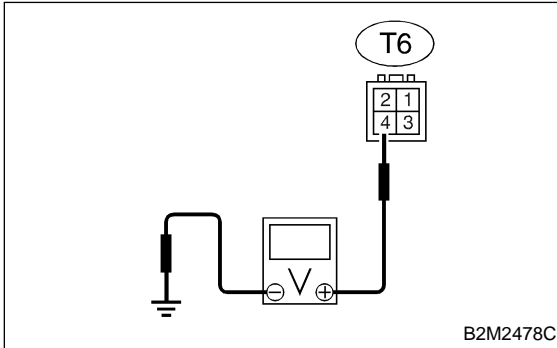
- CHECK** : *Is the resistance more than 3 Ω?*
- YES** : Repair open circuit in harness between ECM and rear oxygen sensor connector.
- NO** : Go to step **10Q6**.

10Q6 : CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between rear oxygen sensor harness connector and engine ground or chassis ground.

Connector & terminal

(T6) No. 4 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 0.2 V?**
- YES** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between rear oxygen sensor and ECM connector
- Poor contact in rear oxygen sensor connector
- Poor contact in ECM connector

10Q7 : CHECK EXHAUST SYSTEM.

Check exhaust system parts.

NOTE:

Check the following items.

- Loose installation of portions
- Damage (crack, hole etc.) of parts
- Looseness and ill fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor

- CHECK** : **Is there a fault in exhaust system?**
- YES** : Repair or replace faulty parts.
- NO** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

R: DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —

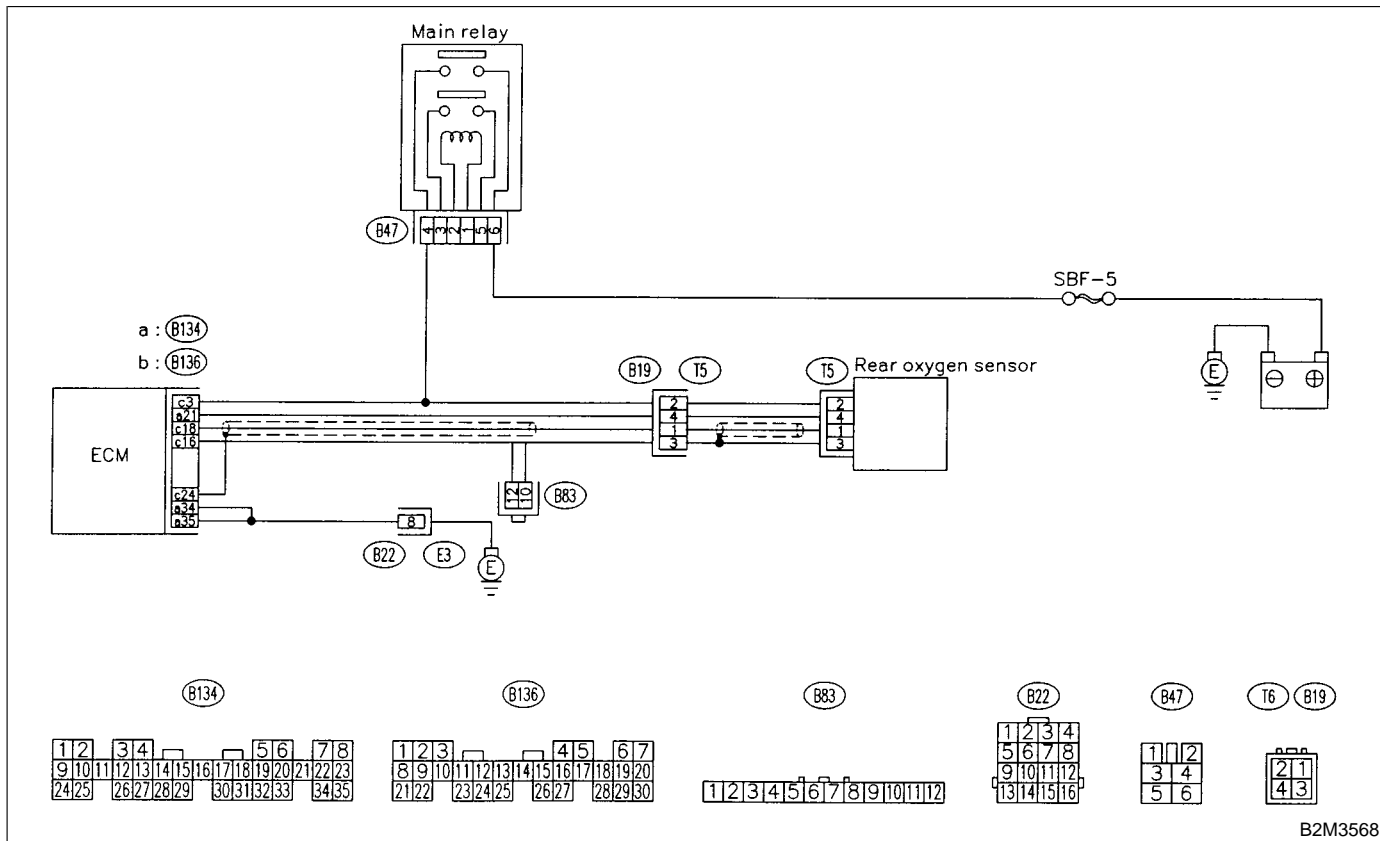
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



10R1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0136?

YES : Inspect DTC P0136 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0139.

NO : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

S: DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT LOW INPUT —

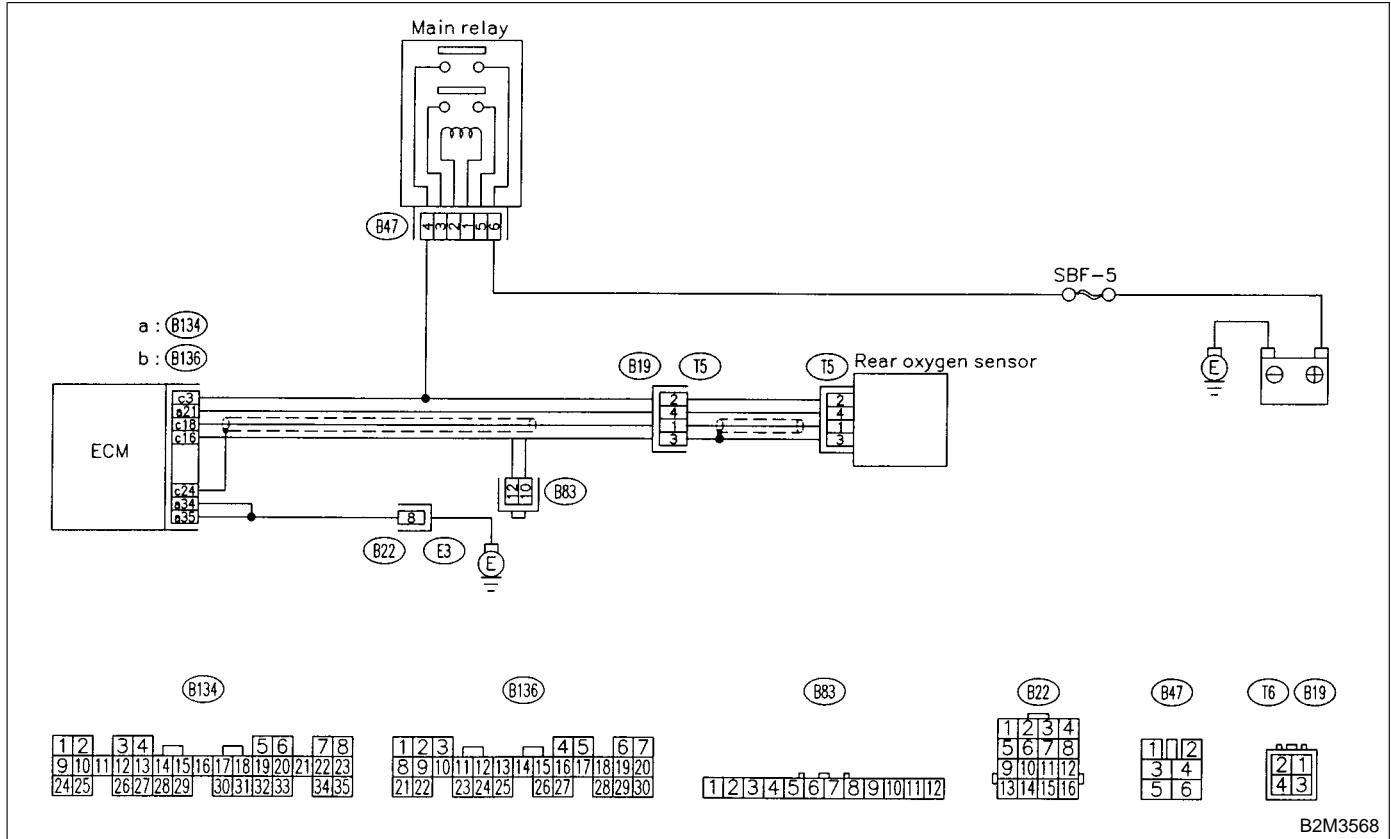
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



10S1 : CHECK ANY OTHER DTC ON DISPLAY.

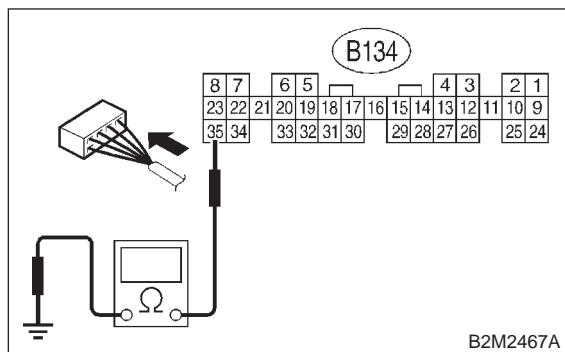
- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0141 and P0135 at the same time?
- YES** : Go to step 10S2.
- NO** : Go to step 10S3.

10S2 : CHECK GROUND CIRCUIT OF ECM.

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

Connector & terminal

(B134) No. 35 — Chassis ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Go to step **10S4**.
- NO** : Go to step **10S3**.

10S3 : CHECK GROUND CIRCUIT OF ECM.

- 1) Repair harness and connector.

NOTE:

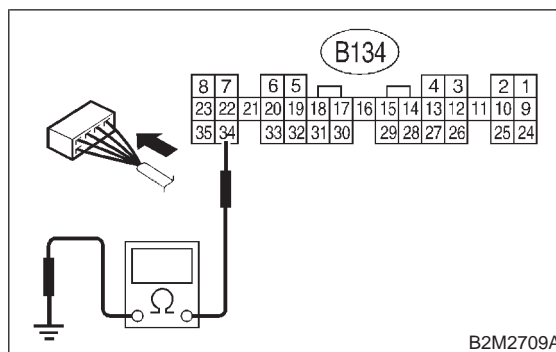
In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

- 2) Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 34 — Chassis ground:



- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step **10S4**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

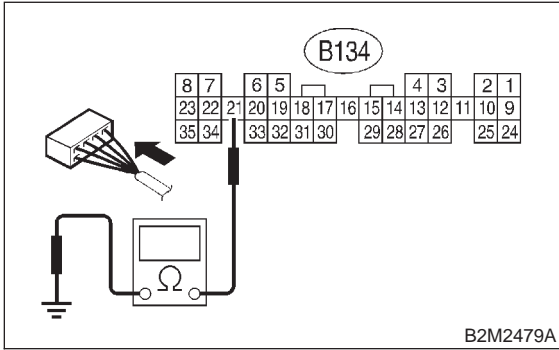
- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

10S4 : CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 — Chassis ground:



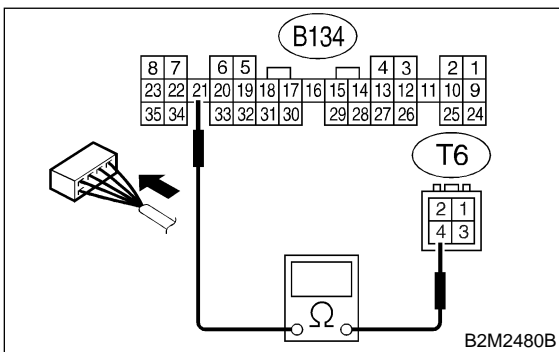
- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and rear oxygen sensor connector.
- NO** : Go to step **10S5**.

10S5 : CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.

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

Connector & terminal

(B134) No. 21 — (T6) No. 4:



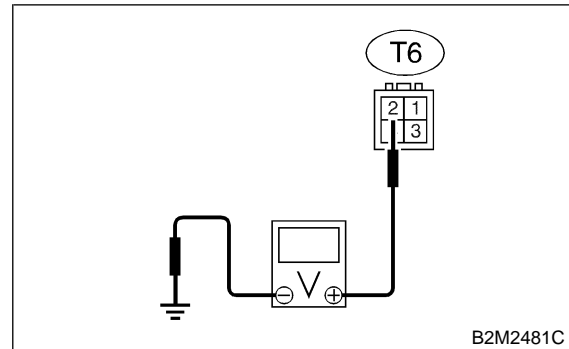
- CHECK** : **Is the resistance less than 3 Ω?**
- YES** : Go to step **10S6**.
- NO** : Repair open circuit in harness between ECM and rear oxygen sensor connector.

10S6 : CHECK POWER SUPPLY TO REAR OXYGEN SENSOR.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between rear oxygen sensor connector and engine ground or chassis ground.

Connector & terminal

(T6) No. 2 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **10S7**.
- NO** : Repair power supply line.

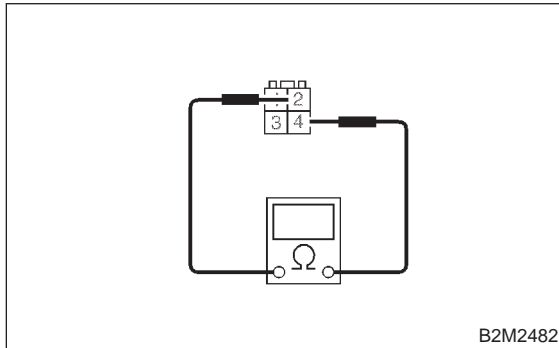
NOTE:

In this case, repair the following:

- Open circuit in harness between main relay and rear oxygen sensor connector
- Poor contact in rear oxygen sensor connector
- Poor contact in coupling connector (T5)

10S7 : CHECK REAR OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between rear oxygen sensor connector terminals.

Terminals**No. 2 — No. 4:**

CHECK : **Is the resistance less than 30 Ω ?**

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between rear oxygen sensor and ECM connector
- Poor contact in rear oxygen sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (T5)

NO : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

T: DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —**NOTE:**

For the diagnostic procedure, refer to DTC P0172. <Ref. to 2-7 [T10U0].>

U: DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY MODE** <Ref. to 2-7 [T3D0].> and **INSPECTION MODE** <Ref. to 2-7 [T3E0].>.

10U1 : CHECK EXHAUST SYSTEM.

CHECK : *Are there holes or loose bolts on exhaust system?*

YES : Repair exhaust system.

NO : Go to step **10U2**.

10U2 : CHECK AIR INTAKE SYSTEM.

CHECK : *Are there holes, loose bolts or disconnection of hose on air intake system?*

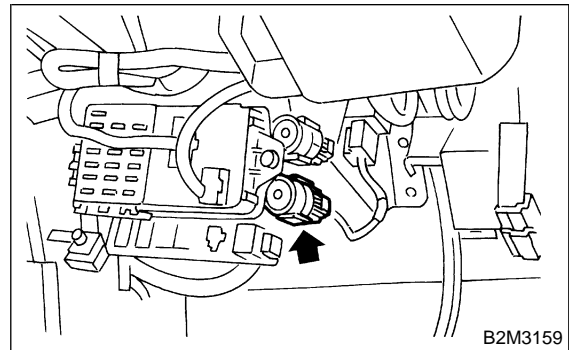
YES : Repair air intake system.

NO : Go to step **10U3**.

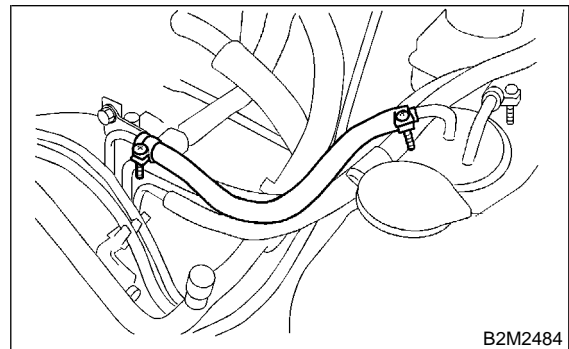
10U3 : CHECK FUEL PRESSURE.**WARNING:**

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel on the floor.

- 1) Release fuel pressure.
 - (1) Disconnect connector from fuel pump relay.



- (2) Start the engine and run it until it stalls.
 - (3) After the engine stalls, crank it for five more seconds.
 - (4) Turn ignition switch to OFF.
- 2) Connect connector to fuel pump relay.
 - 3) Disconnect fuel delivery hose from fuel filter, and connect fuel pressure gauge.



- 4) Install fuel filler cap.

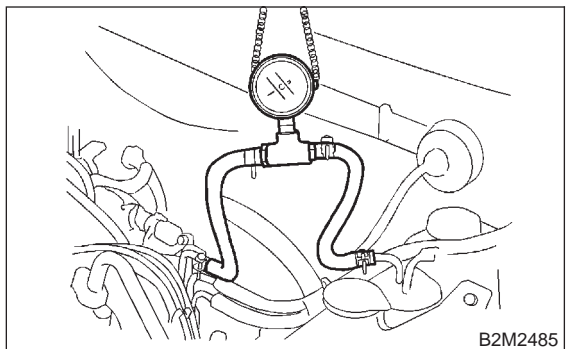
- 5) Start the engine and idle while gear position is neutral.
- 6) Measure fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

WARNING:

Before removing fuel pressure gauge, release fuel pressure.

NOTE:

If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.



B2M2485

CHECK : *Is fuel pressure between 284 and 314 kPa (2.9 — 3.2 kg/cm², 41 — 46 psi)?*

YES : Go to step 10U4.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Improper fuel pump discharge ● Clogged fuel supply line

10U4 : CHECK FUEL PRESSURE.

After connecting pressure regulator vacuum hose, measure fuel pressure.

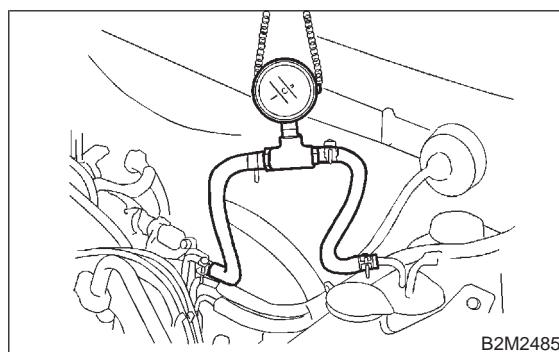
WARNING:

Before removing fuel pressure gauge, release fuel pressure.

NOTE:

- If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.

- If out of specification as measured at this step, check or replace pressure regulator and pressure regulator vacuum hose.



B2M2485

CHECK : *Is fuel pressure between 206 and 235 kPa (2.1 — 2.4 kg/cm², 30 — 34 psi)?*

YES : Go to step 10U5.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line

10U5 : CHECK ENGINE COOLANT TEMPERATURE SENSOR.

- 1) Start the engine and warm-up completely.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is temperature greater than 60°C (140°F)?***

YES : Go to step **10U6**.

NO : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

10U6 : CHECK INTAKE MANIFOLD PRESSURE SENSOR.

- 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F).
- 2) Place the shift lever in neutral position.
- 3) Turn A/C switch to OFF.
- 4) Turn all accessory switches to OFF.
- 5) Read data of intake manifold pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

Specification:

- Intake manifold absolute pressure

Engine speed	Specified value
Ignition ON	73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg)
Idling	24.0 — 41.3 kPa (180 — 310 mmHg, 7.09 — 12.20 inHg)

CHECK : ***Is the value within the specifications?***

YES : Go to step **10U7**.

NO : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

10U7 : CHECK INTAKE AIR TEMPERATURE SENSOR.

- 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F).
- 2) Place the shift lever in neutral position.
- 3) Turn A/C switch to OFF.
- 4) Turn all accessory switches to OFF.
- 5) Open front hood.
- 6) Measure ambient temperature.
- 7) Read data of intake manifold pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is value obtained when ambient temperature is subtracted from intake air temperature greater than -10°C (14°F) and less than 50°C (122°F)?***

YES : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

NO : Check intake air temperature sensor.
<Ref. to 2-7 [T10E0].>

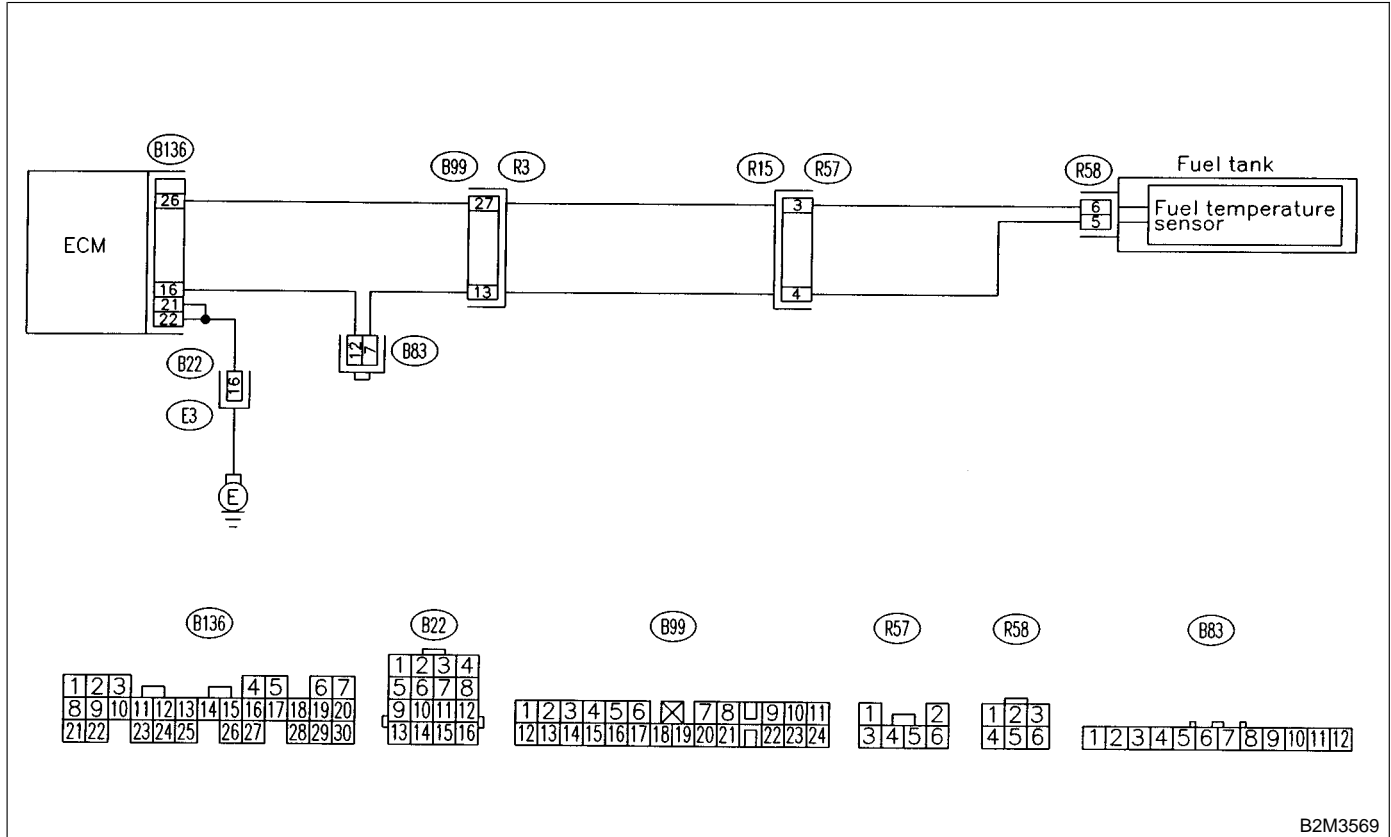
V: DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3569

10V1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0182 or P0183?

YES : Inspect DTC P0182 or P0183 using “10. Diagnostics Chart with Trouble Code for MT Vehicles”. <Ref. to 2-7 [T10A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0181.

NO : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

MEMO:

W: DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —

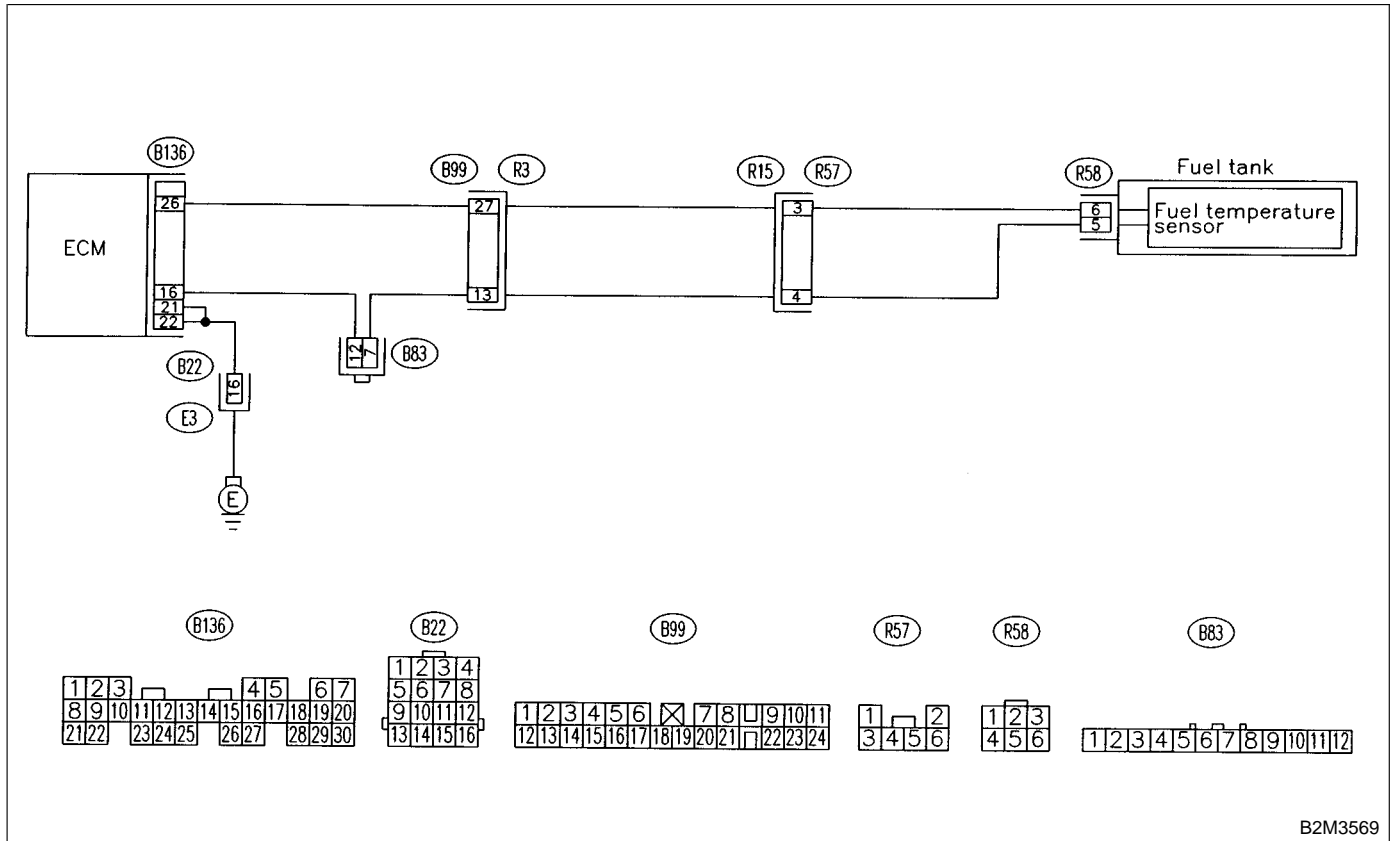
● **DTC DETECTING CONDITION:**

- Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3569

10W1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of fuel temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

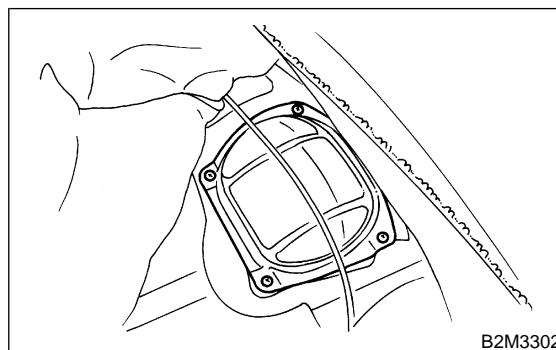
CHECK : **Is the value greater than 150°C (300°F)?**

YES : Go to step **10W2**.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time.

10W2 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.



- 3) Disconnect connector from fuel pump.
- 4) Turn ignition switch to ON.
- 5) Read data of fuel temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : **Is the value less than -40°C (-40°F)?**

YES : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

NO : Repair ground short circuit in harness between fuel pump and ECM connector.

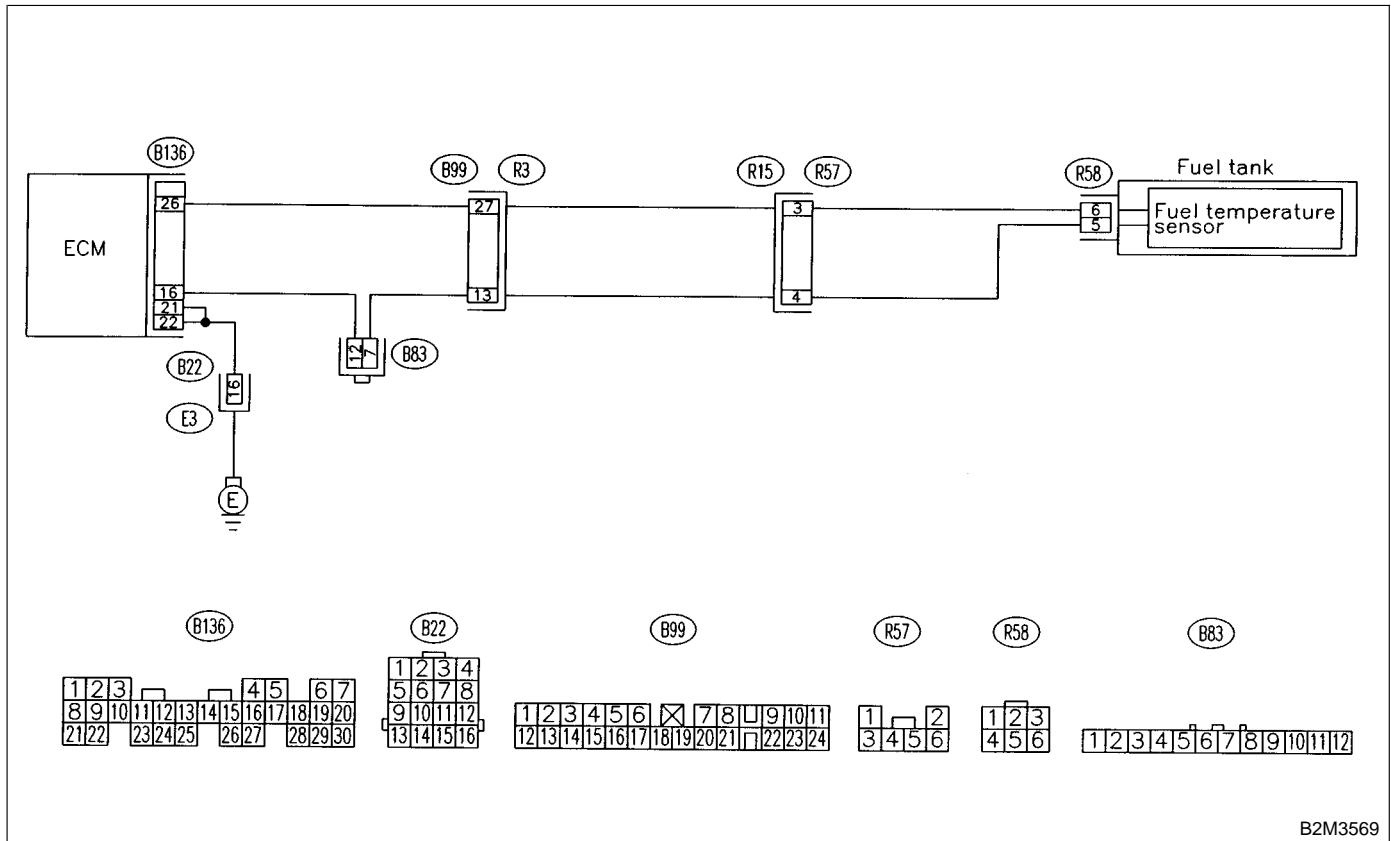
X: DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3569

10X1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of fuel temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

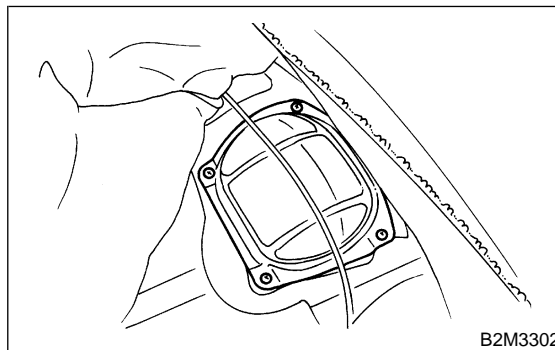
- CHECK** : *Is the value less than -40°C (-40°F)?*
YES : Go to step **10X2**.
NO : Repair poor contact.

NOTE:

- In this case, repair the following:
- Poor contact in fuel pump connector
 - Poor contact in ECM connector
 - Poor contact in coupling connectors (B22, B99 and R57)
 - Poor contact in joint connector (B83)

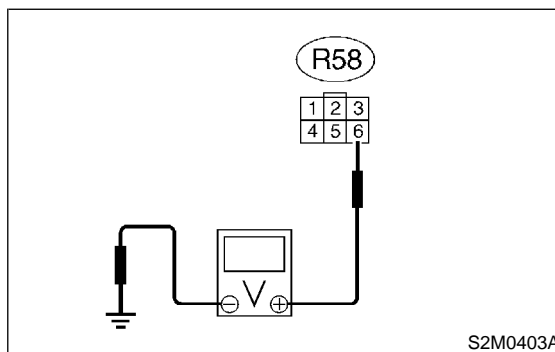
10X2 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.



- 3) Disconnect connector from fuel pump.
- 4) Measure voltage between fuel pump connector and chassis ground.

Connector & terminal
(R58) No. 6 (+) — Chassis ground (-):



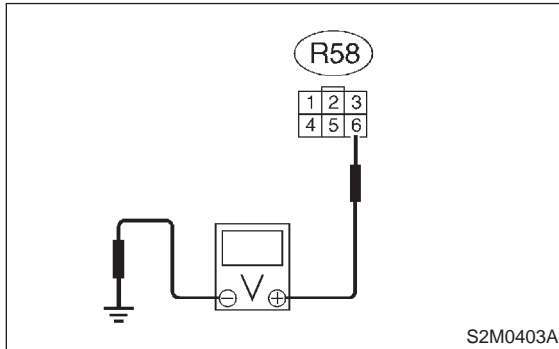
- CHECK** : *Is the voltage more than 10 V?*
YES : Repair battery short circuit in harness between ECM and fuel pump connector.
NO : Go to step **10X3**.

10X3 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel pump connector and chassis ground.

Connector & terminal

(R58) No. 6 (+) — Chassis ground (-):



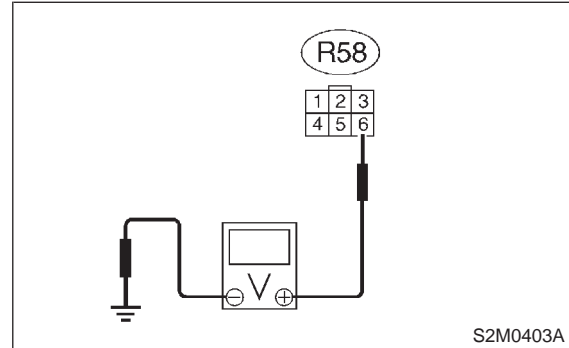
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and fuel pump connector.
- NO** : Go to step **10X4**.

10X4 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

Measure voltage between fuel pump connector and chassis ground.

Connector & terminal

(R58) No. 6 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 4 V?**
- YES** : Go to step **10X5**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

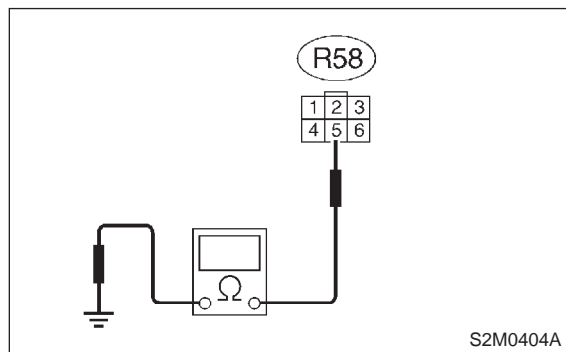
- Open circuit in harness between ECM and fuel pump connector
- Poor contact in fuel pump connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B99 and R57)

10X5 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(R58) No. 5 — Chassis ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and fuel pump connector
- Poor contact in fuel pump connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B22, B99 and R57)
- Poor contact in joint connector (B83)

Y: DTC P0301 — CYLINDER 1 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T10AB0].>

Z: DTC P0302 — CYLINDER 2 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T10AB0].>

AA: DTC P0303 — CYLINDER 3 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T10AB0].>

AB: DTC P0304 — CYLINDER 4 MISFIRE DETECTED —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

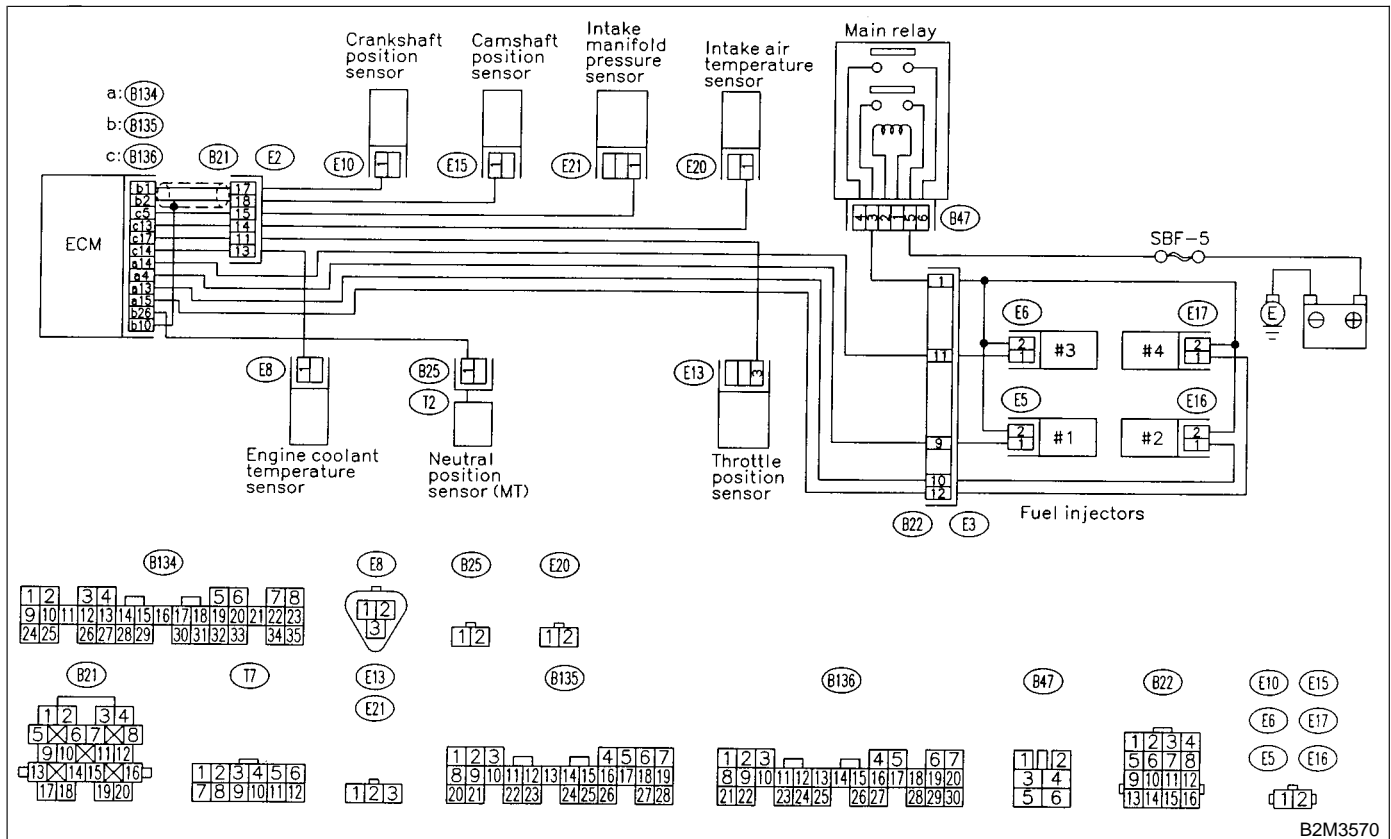
• TROUBLE SYMPTOM:

- Engine stalls.
- Erroneous idling
- Rough driving

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



10AB1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0116, P0117 or P0125?

YES : Inspect DTC P0106, P0107, P0108, P0116, P0117 or P0125 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0301, P0302, P0303 and P0304.

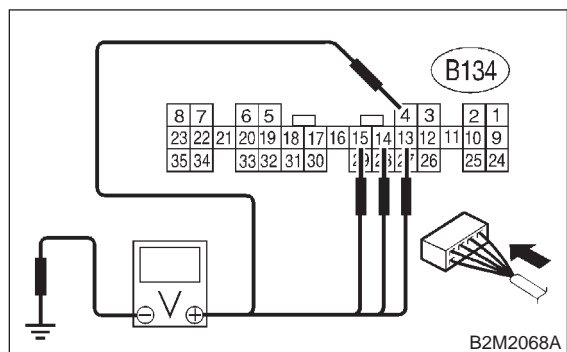
NO : Go to step **10AB2**.

10AB2 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector and chassis ground on faulty cylinders.

Connector & terminal

- #1 (B134) No. 4 (+) — Chassis ground (-):
- #2 (B134) No. 13 (+) — Chassis ground (-):
- #3 (B134) No. 14 (+) — Chassis ground (-):
- #4 (B134) No. 15 (+) — Chassis ground (-):



CHECK : Is the voltage more than 10 V?

YES : Go to step **10AB7**.

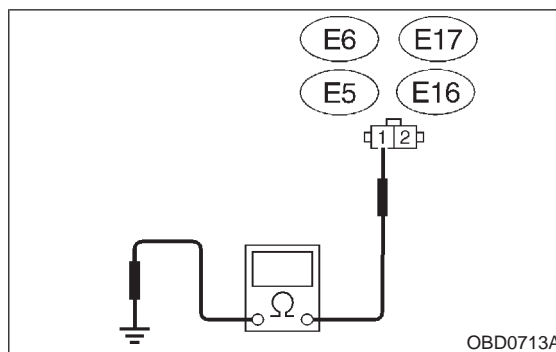
NO : Go to step **10AB3**.

10AB3 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinders.
- 3) Measure voltage between ECM connector and engine ground on faulty cylinders.

Connector & terminal

- #1 (E5) No. 1 — Engine ground:
- #2 (E16) No. 1 — Engine ground:
- #3 (E6) No. 1 — Engine ground:
- #4 (E17) No. 1 — Engine ground:



CHECK : Is the resistance less than 10 Ω?

YES : Repair ground short circuit in harness between fuel injector and ECM connector.

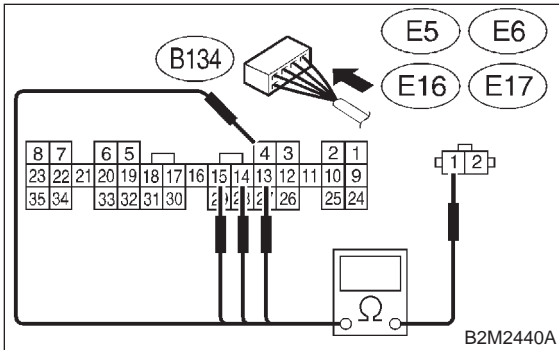
NO : Go to step **10AB4**.

10AB4 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

Measure resistance of harness connector between ECM connector and fuel injector on faulty cylinders.

Connector & terminal

- #1 (B134) No. 4 — (E5) No. 1:
- #2 (B134) No. 13 — (E16) No. 1:
- #3 (B134) No. 14 — (E6) No. 1:
- #4 (B134) No. 15 — (E17) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AB5**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

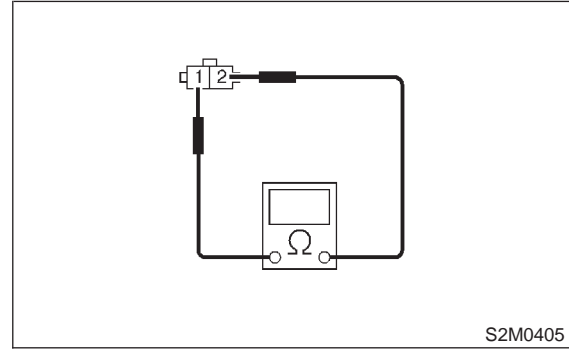
- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B22)

10AB5 : CHECK FUEL INJECTOR.

Measure resistance between fuel injector terminals on faulty cylinder.

Terminals

No. 1 — No. 2:



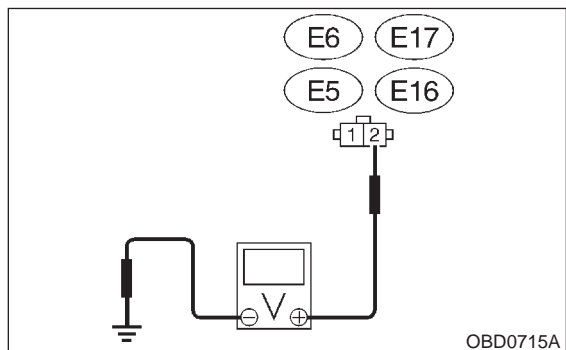
- CHECK** : *Is the resistance between 5 and 20 Ω?*
- YES** : Go to step **10AB6**.
- NO** : Replace faulty fuel injector. <Ref. to 2-7 [W18A0].>

10AB6 : CHECK POWER SUPPLY LINE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel injector and engine ground on faulty cylinders.

Connector & terminal

- #1 (E5) No. 2 (+) — Engine ground (-):
- #2 (E16) No. 2 (+) — Engine ground (-):
- #3 (E6) No. 2 (+) — Engine ground (-):
- #4 (E17) No. 2 (+) — Engine ground (-):



OBD0715A

- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair poor contact in all connectors in fuel injector circuit.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

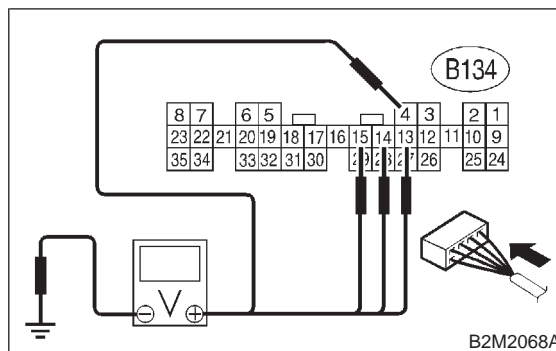
- Open circuit in harness between main relay and fuel injector connector on faulty cylinders
- Poor contact in coupling connector (B22)
- Poor contact in main relay connector
- Poor contact in fuel injector connector on faulty cylinders

10AB7 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinder.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM connector and chassis ground on faulty cylinders.

Connector & terminal

- #1 (B134) No. 4 (+) — Chassis ground (-):
- #2 (B134) No. 13 (+) — Chassis ground (-):
- #3 (B134) No. 14 (+) — Chassis ground (-):
- #4 (B134) No. 15 (+) — Chassis ground (-):

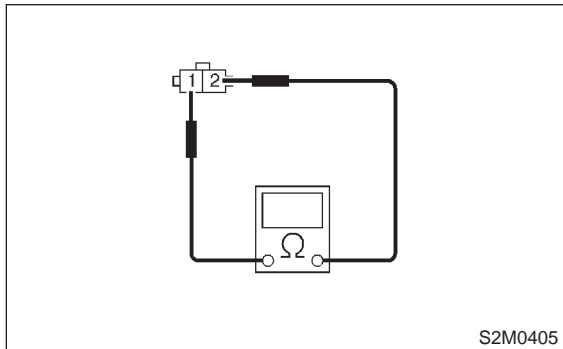


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- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and fuel injector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10AB8**.

10AB8 : CHECK FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between fuel injector terminals on faulty cylinder.

Terminals**No. 1 — No. 2:**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace faulty fuel injector <Ref. to 2-7 [W18A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10AB9**.

10AB9 : CHECK INSTALLATION OF CAMSHAFT POSITION SENSOR/ CRANKSHAFT POSITION SENSOR.

- CHECK** : **Is camshaft position sensor or crankshaft position sensor loosely installed?**
- YES** : Tighten camshaft position sensor or crankshaft position sensor.
- NO** : Go to step **10AB10**.

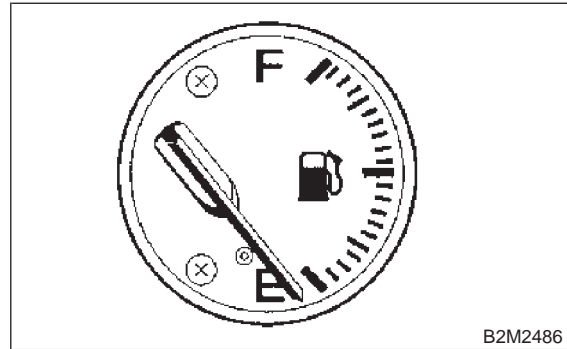
10AB10 : CHECK CRANKSHAFT SPROCKET.

Remove timing belt cover.

- CHECK** : **Is crankshaft sprocket rusted or does it have broken teeth?**
- YES** : Replace crankshaft sprocket. <Ref. to 2-3 [W3A4].>
- NO** : Go to step **10AB11**.

10AB11 : CHECK TIMING BELT.

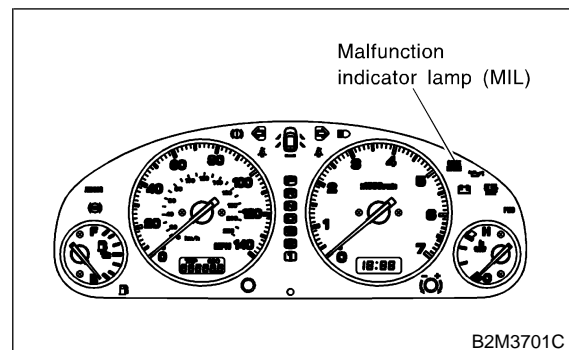
- CHECK** : **Is timing belt out of alignment?**
- YES** : Align timing belt. <Ref. to 2-3 [W3C0].>
- NO** : Go to step **10AB12**.

10AB12 : CHECK FUEL LEVEL.

- CHECK** : **Is the fuel meter indication higher than the "Lower" level?**
- YES** : Go to step **10AB13**.
- NO** : Replenish fuel so fuel meter indication is higher than the "Lower" level. After replenishing fuel, Go to step **10AB13**.

10AB13 : CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).

- 1) Clear memory using Subaru Select Monitor. <Ref. to 2-7 [T3D0].>
- 2) Start engine, and drive the vehicle more than 10 minutes.



- CHECK** : **Is the MIL coming on or blinking?**
- YES** : Go to step **10AB15**.
- NO** : Go to step **10AB14**.

10AB14 : CHECK CAUSE OF MISFIRE DIAGNOSED.

CHECK : *Was the cause of misfire diagnosed when the engine is running?*

YES : Finish diagnostics operation, if the engine has no abnormality.

NOTE:

Ex. Remove spark plug cord, etc.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in ignitor connector
- Poor contact in ignition coil connector
- Poor contact in fuel injector connector on faulty cylinders
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

10AB15 : CHECK AIR INTAKE SYSTEM.

CHECK : *Is there a fault in air intake system?*

YES : Repair air intake system.

NOTE:

Check the following items:

- Are there air leaks or air suction caused by loose or dislocated nuts and bolts?
- Are there cracks or any disconnection of hoses?

NO : Go to step 10AB16.

10AB16 : CHECK MISFIRE SYMPTOM.

- 1) Turn ignition switch to ON.
- 2) Read diagnostic trouble code (DTC).

- Subaru Select Monitor
- <Ref. to 2-7 [T3C2].>
- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Operation Manual.

NOTE:

Perform diagnosis according to the items listed below.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate only one DTC?*

YES : Go to step 10AB21.

NO : Go to step 10AB17.

10AB17 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0302?*

YES : Go to step 10AB22.

NO : Go to step 10AB18.

10AB18 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0303 and P0304?*

YES : Go to step 10AB23.

NO : Go to step 10AB19.

10AB19 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0303?*

YES : Go to step 10AB24.

NO : Go to step 10AB20.

10AB20 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0302 and P0304?*

YES : Go to step 10AB25.

NO : Go to step 10AB26.

10AB21 : ONLY ONE CYLINDER

CHECK : *Is there a fault in that cylinder?*

YES : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plug
- Spark plug cord
- Fuel injector
- Compression ratio

NO : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>

10AB22 : GROUP OF #1 AND #2 CYLINDERS**CHECK** : *Are there faults in #1 and #2 cylinders?***YES** : Repair or replace faulty parts.

NOTE:

- Check the following items.
 - Spark plugs
 - Fuel injectors
 - Ignition coil
 - Compression ratio
- If no abnormal is discovered, check for "8. D: IGNITION CONTROL SYSTEM" of #1 and #2 cylinders side. <Ref. to 2-7 [T8D0].>

NO : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>**10AB23 : GROUP OF #3 AND #4 CYLINDERS****CHECK** : *Are there faults in #3 and #4 cylinders?***YES** : Repair or replace faulty parts.

NOTE:

- Check the following items.
 - Spark plugs
 - Fuel injectors
 - Ignition coil
- If no abnormal is discovered, check for "8. D: IGNITION CONTROL SYSTEM" of #3 and #4 cylinders side. <Ref. to 2-7 [T8D0].>

NO : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>**10AB24 : GROUP OF #1 AND #3 CYLINDERS****CHECK** : *Are there faults in #1 and #3 cylinders?***YES** : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Skipping timing belt teeth

NO : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>**10AB25 : GROUP OF #2 AND #4 CYLINDERS****CHECK** : *Are there faults in #2 and #4 cylinders?***YES** : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Compression ratio
- Skipping timing belt teeth

NO : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>**10AB26 : CYLINDER AT RANDOM****CHECK** : *Is the engine idle rough?***YES** : Go to DTC P0171 and P0172. <Ref. to 2-7 [T10U0].>**NO** : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Compression ratio

MEMO:

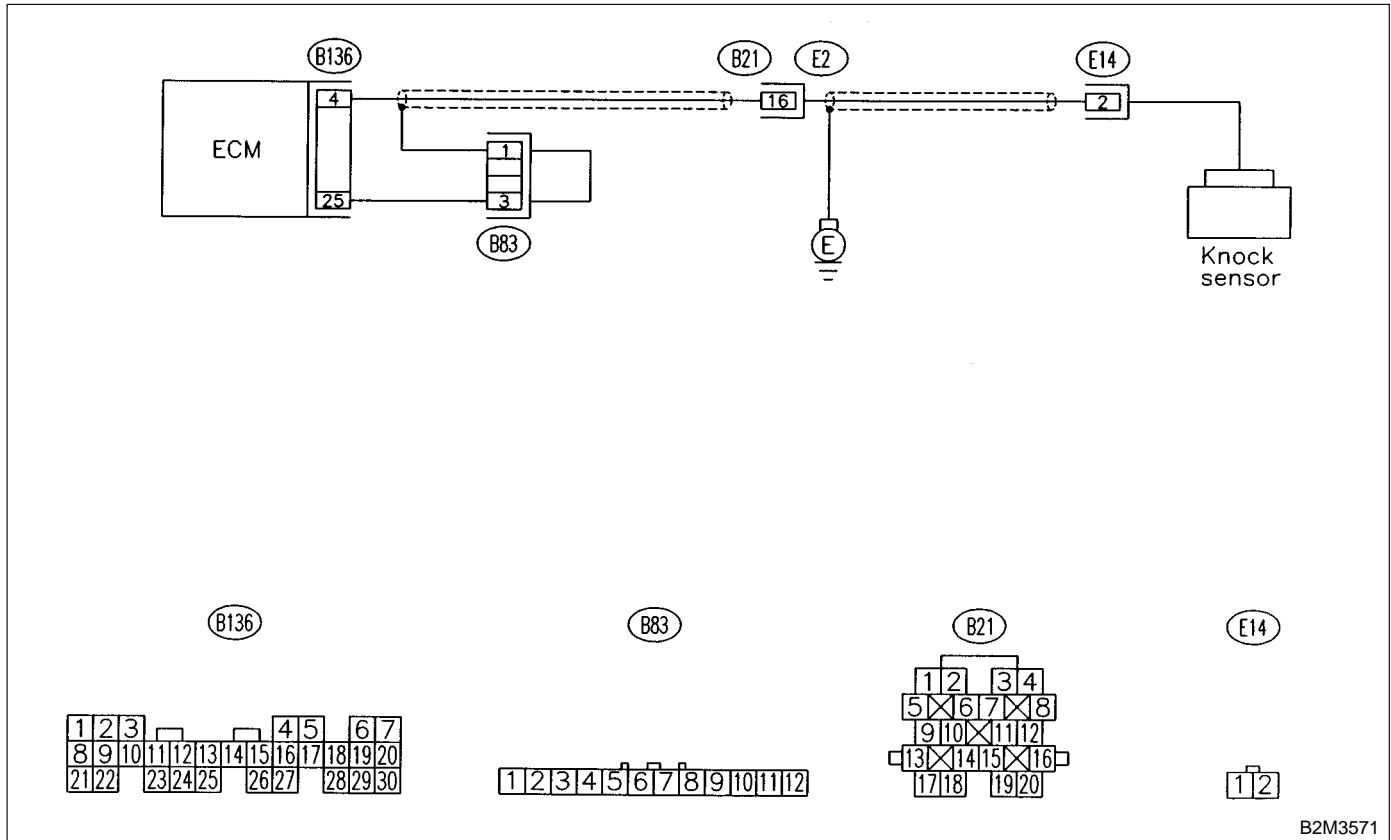
AC: DTC P0325 — KNOCK SENSOR CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Poor driving performance
 - Knocking occurs.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

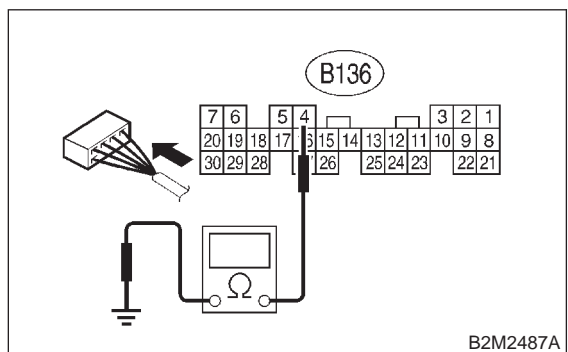


B2M3571

10AC1 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

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

Connector & terminal
(B136) No. 4 — Chassis ground:

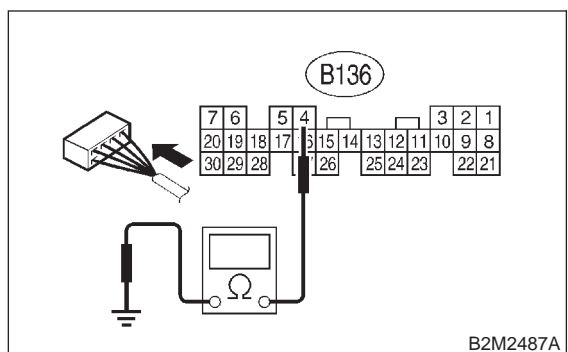


- CHECK** : *Is the resistance more than 700 kΩ?*
YES : Go to step **10AC3**.
NO : Go to step **10AC2**.

10AC2 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal
(B136) No. 4 — Chassis ground:

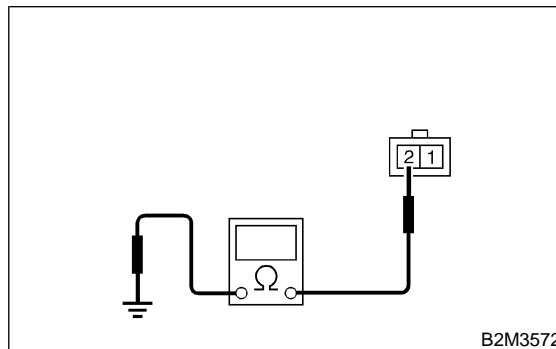


- CHECK** : *Is the resistance less than 400 kΩ?*
YES : Go to step **10AC5**.
NO : Go to step **10AC6**.

10AC3 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal
No. 2 — Engine ground:



- CHECK** : *Is the resistance more than 700 kΩ?*
YES : Go to step **10AC4**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between knock sensor and ECM connector
- Poor contact in knock sensor connector
- Poor contact in coupling connector (B21)

10AC4 : CHECK CONDITION OF KNOCK SENSOR INSTALLATION.

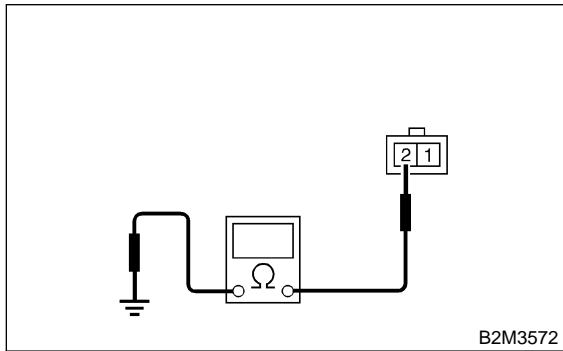
- CHECK** : *Is the knock sensor installation bolt tightened securely?*
YES : Replace knock sensor. <Ref. to 2-7 [W7A0].>
NO : Tighten knock sensor installation bolt securely.

10AC5 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal

No. 2 — Engine ground:



- CHECK** : **Is the resistance less than 400 kΩ?**
- YES** : Replace knock sensor. <Ref. to 2-7 [W7A0].>
- NO** : Repair ground short circuit in harness between knock sensor connector and ECM connector.

NOTE:

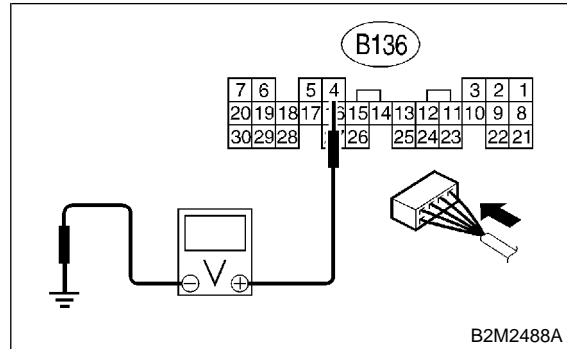
The harness between both connectors is shielded. Repair short circuit of harness together with shield.

10AC6 : CHECK INPUT SIGNAL FOR ECM.

- 1) Connect connectors to ECM and knock sensor.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM and chassis ground.

Connector & terminal

(B136) No. 4 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 2 V?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)

NOTE:

In this case, repair the following:

- Poor contact in knock sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- NO** : Repair poor contact in ECM connector.

MEMO:

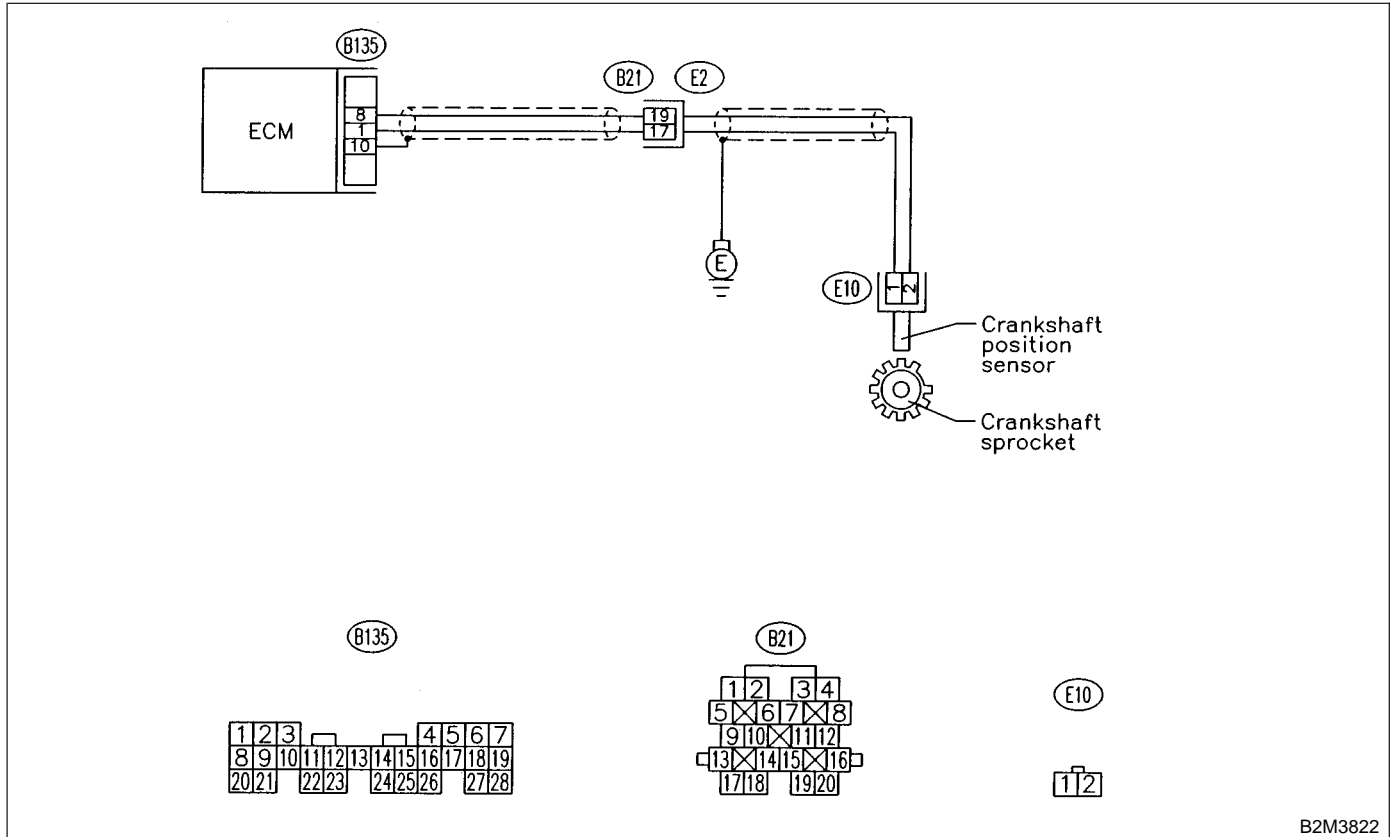
AD: DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**

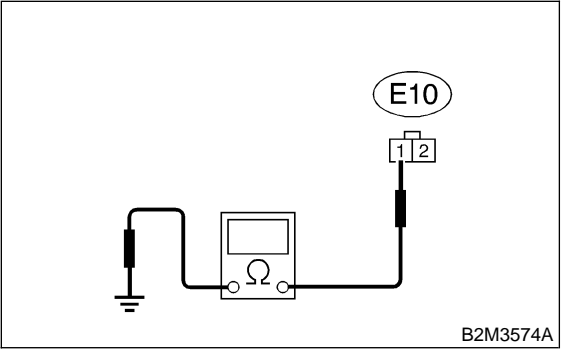


B2M3822

10AD1 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from crankshaft position sensor.
- 3) Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal
(E10) No. 1 — Engine ground:



- CHECK** : *Is the resistance more than 100 kΩ?*
- YES** : Repair harness and connector.

NOTE:
In this case, repair the following:

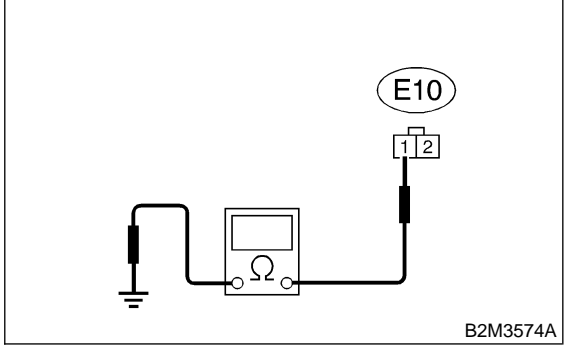
- Open circuit in harness between crankshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

NO : Go to step **10AD2**.

10AD2 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal
(E10) No. 1 — Engine ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between crankshaft position sensor and ECM connector.

NOTE:
The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

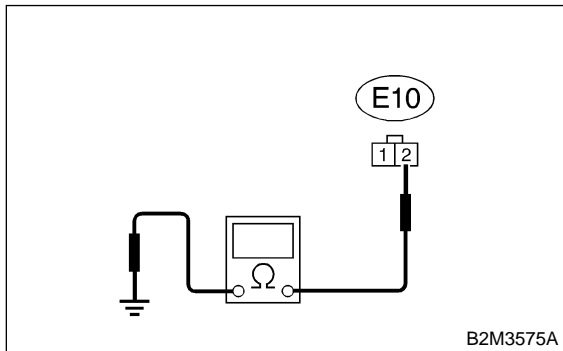
- NO** : Go to step **10AD3**.

10AD3 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal

(E10) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step **10AD4**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between crankshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

10AD4 : CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.

CHECK : **Is the crankshaft position sensor installation bolt tightened securely?**

YES : Go to step **10AD5**.

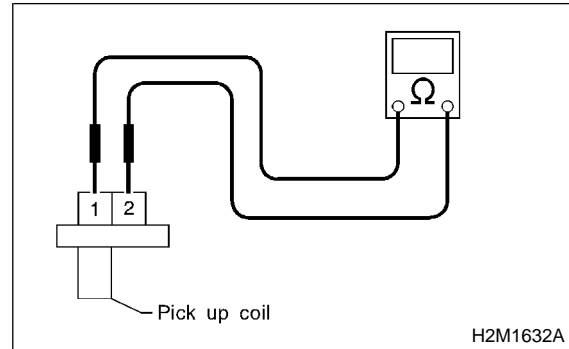
NO : Tighten crankshaft position sensor installation bolt securely.

10AD5 : CHECK CRANKSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



CHECK : **Is the resistance between 1 and 4 kΩ?**

YES : Repair poor contact in crankshaft position sensor connector.

NO : Replace crankshaft position sensor. <Ref. to 2-7 [W5A0].>

MEMO:

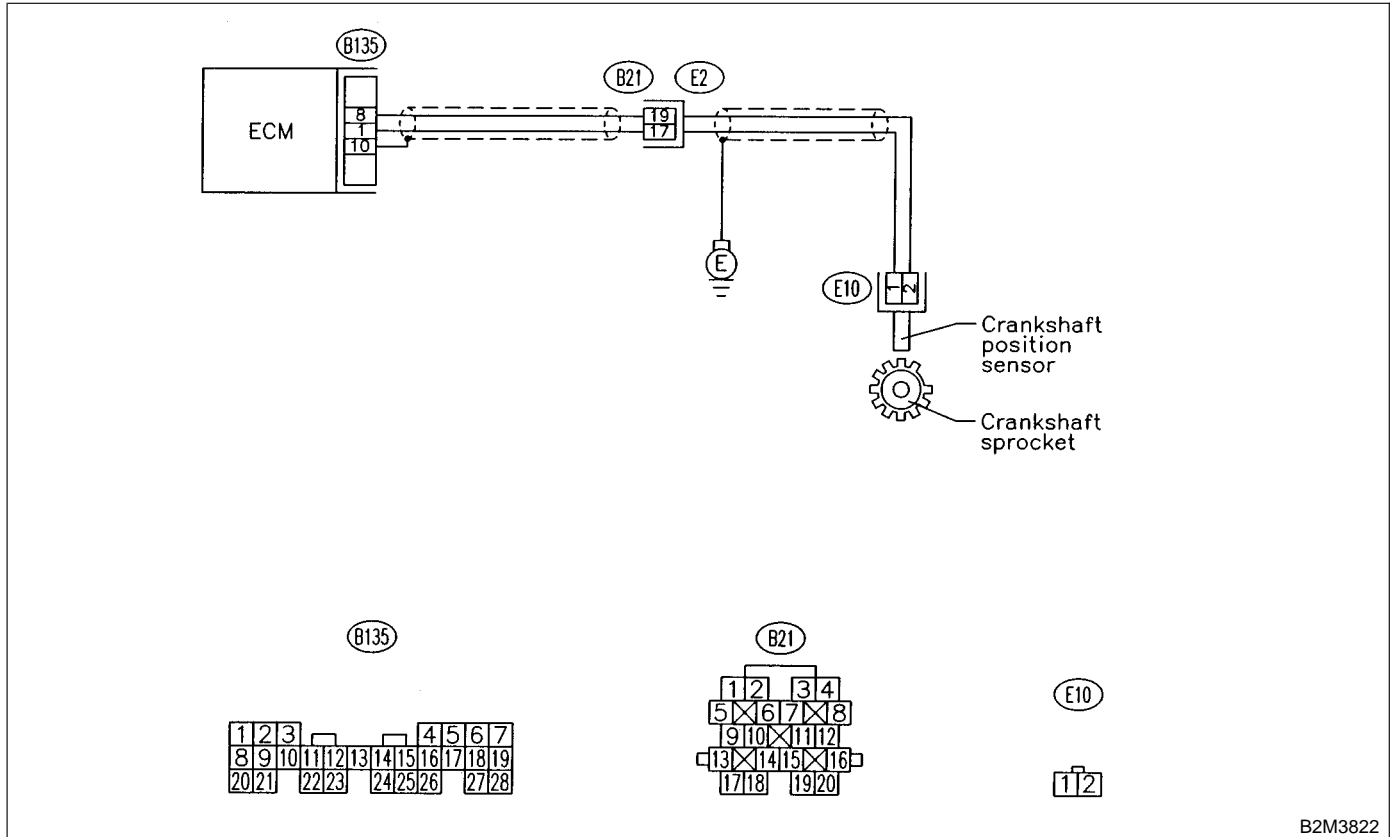
AE: DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3822

10AE1 : CHECK ANY OTHER DTC ON DISPLAY.

10AE2 : CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0335?
- YES** : Inspect DTC P0335 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>
- NO** : Go to step **10AE2**.

- Turn ignition switch to OFF.
- CHECK** : Is the crankshaft position sensor installation bolt tightened securely?
 - YES** : Go to step **10AE3**.
 - NO** : Tighten crankshaft position sensor installation bolt securely.

10AE3 : CHECK CRANKSHAFT SPROCKET.

Remove front belt cover.

CHECK : **Are crankshaft sprocket teeth cracked or damaged?**

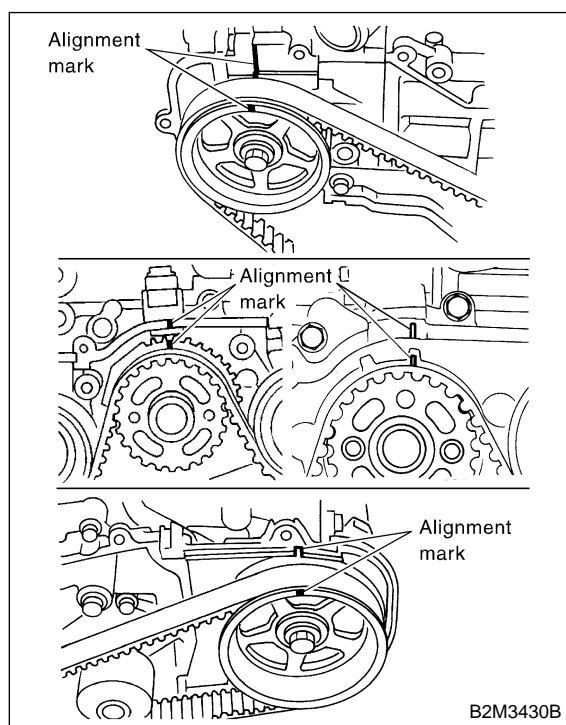
YES : Replace crankshaft sprocket. <Ref. to 2-3 [W3A0].>

NO : Go to step **10AE4**.

10AE4 : CHECK INSTALLATION CONDITION OF TIMING BELT.

Turn crankshaft using ST, and align alignment mark on crankshaft sprocket with alignment mark on cylinder block.

ST 499987500 CRANKSHAFT SOCKET



CHECK : **Is timing belt dislocated from its proper position?**

YES : Repair installation condition of timing belt. <Ref. to 2-3 [W3A0].>

NO : Replace crankshaft position sensor. <Ref. to 2-7 [W5A0].>

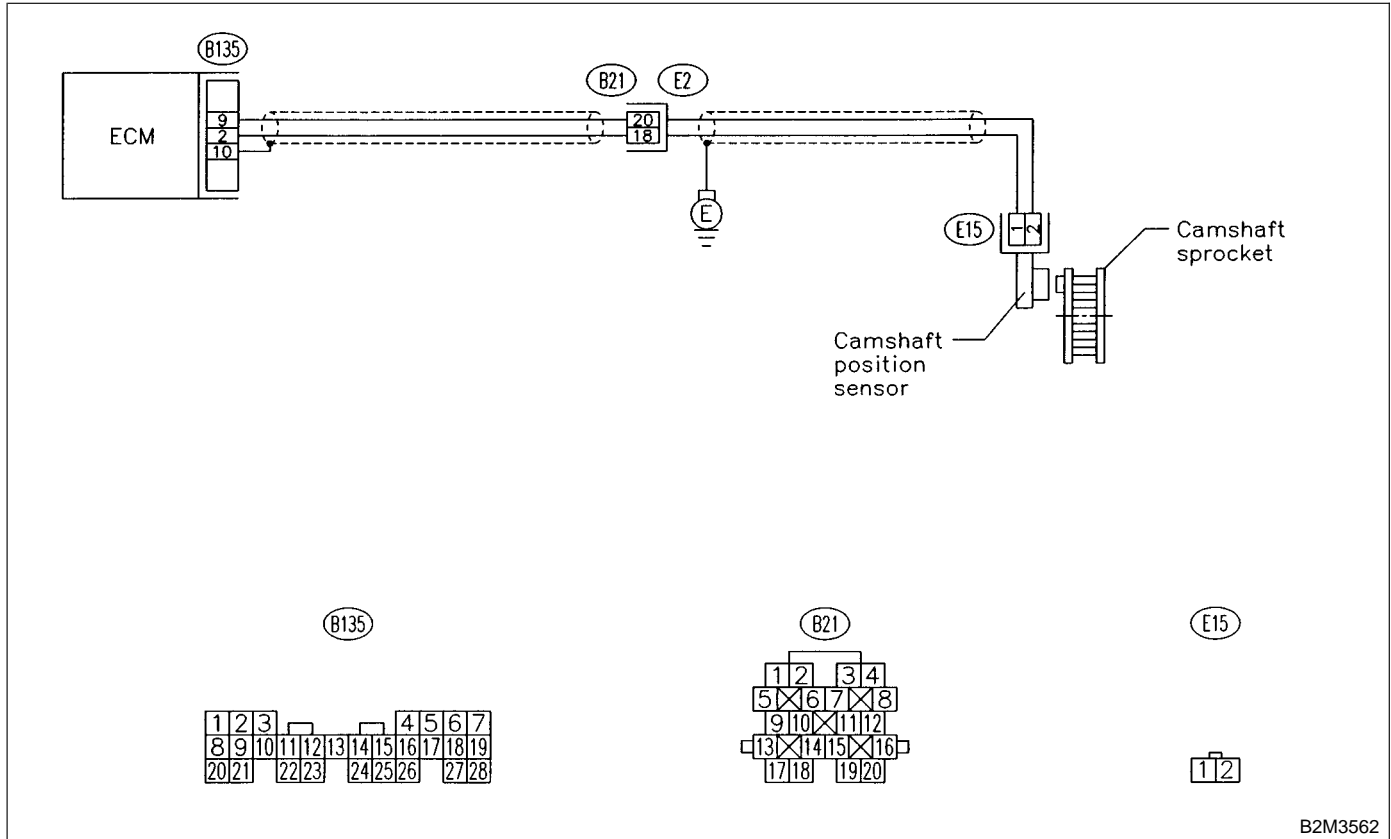
AF: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

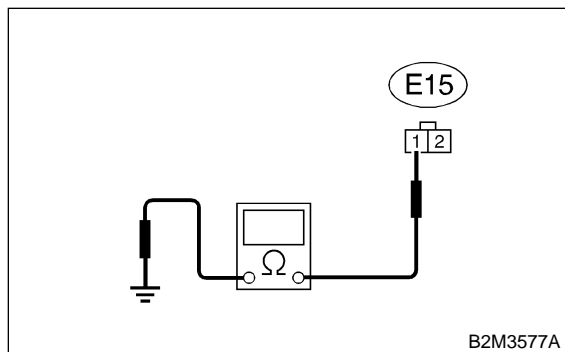


B2M3562

10AF1 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal
(E15) No. 1 — Engine ground:



- CHECK** : **Is the resistance more than 100 kΩ?**
- YES** : Repair harness and connector.

NOTE:

In this case, repair the following:

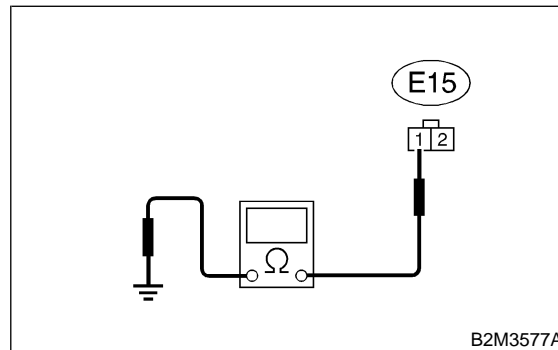
- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

- NO** : Go to step **10AF2**.

10AF2 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal
(E15) No. 1 — Engine ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between camshaft position sensor and ECM connector.

NOTE:

The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

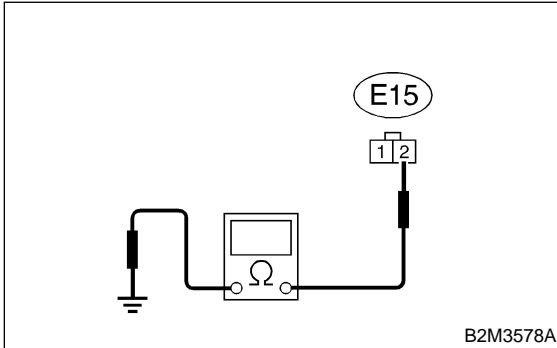
- NO** : Go to step **10AF3**.

10AF3 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 2 — Engine ground:



- CHECK** : *Is the resistance less than 5 Ω ?*
YES : Go to step **10AF4**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

10AF4 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

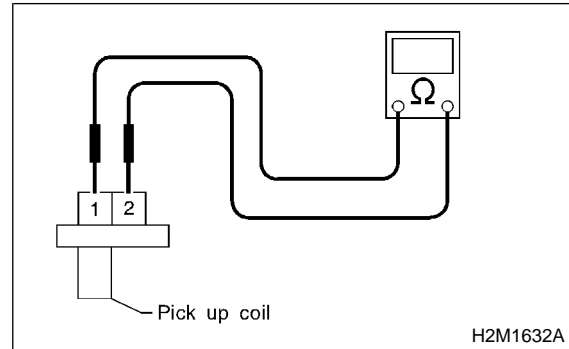
- CHECK** : *Is the camshaft position sensor installation bolt tightened securely?*
YES : Go to step **10AF5**.
NO : Tighten camshaft position sensor installation bolt securely.

10AF5 : CHECK CAMSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



- CHECK** : *Is the resistance between 1 and 4 $k\Omega$?*
YES : Repair poor contact in camshaft position sensor connector.
NO : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

MEMO:

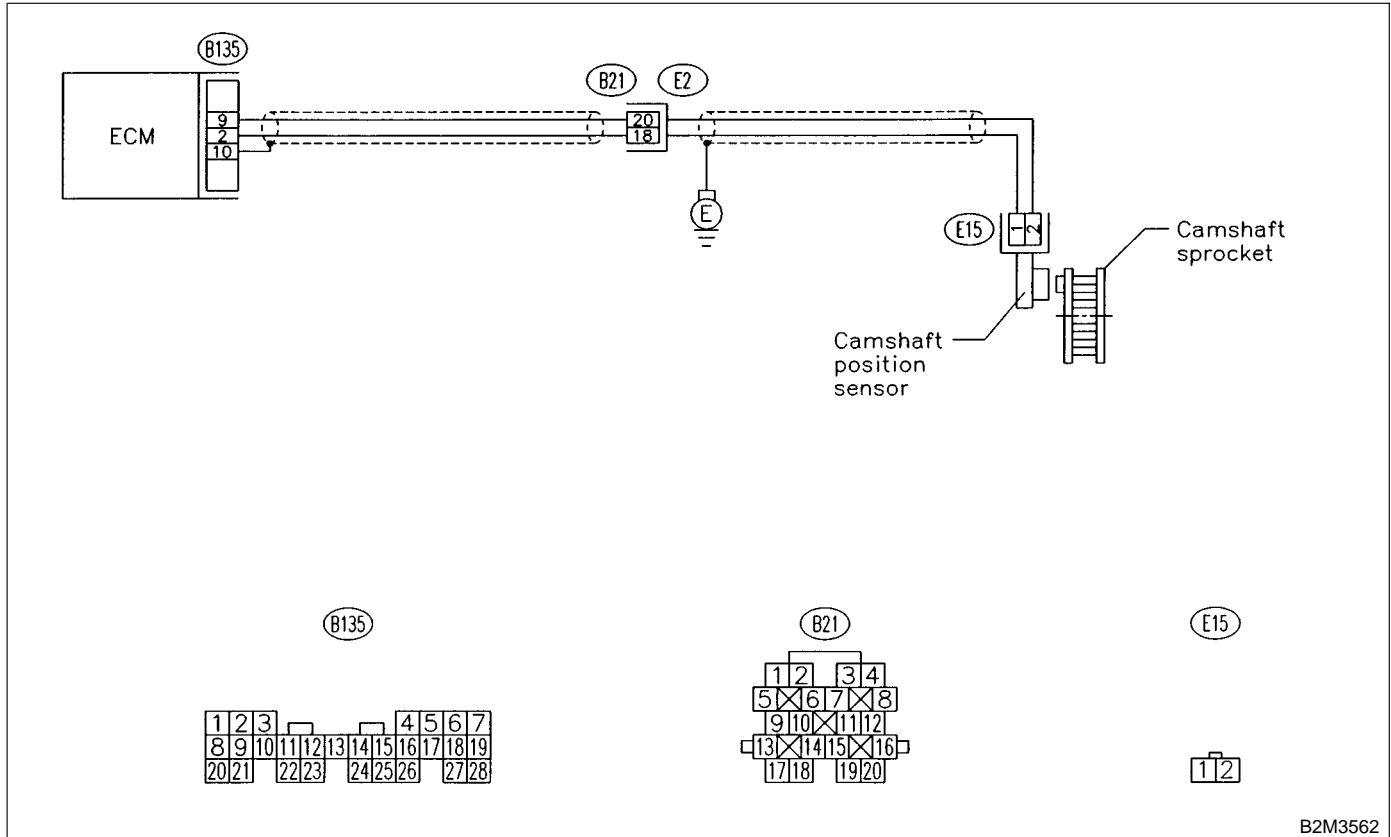
AG: DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3562

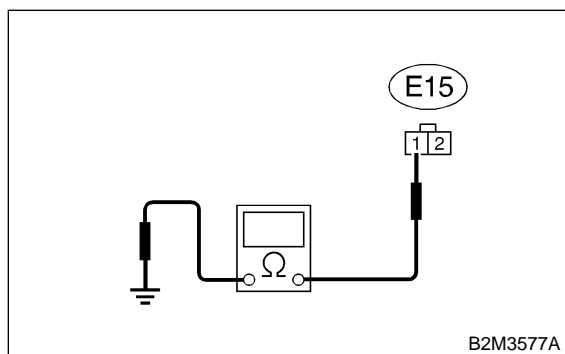
10AG1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0340?
- YES** : Inspect DTC P0340 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>
- NO** : Go to step **10AG2**.

10AG2 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal
(E15) No. 1 — Engine ground:



- CHECK** : **Is the resistance more than 100 kΩ?**
- YES** : Repair harness and connector.

NOTE:

In this case, repair the following:

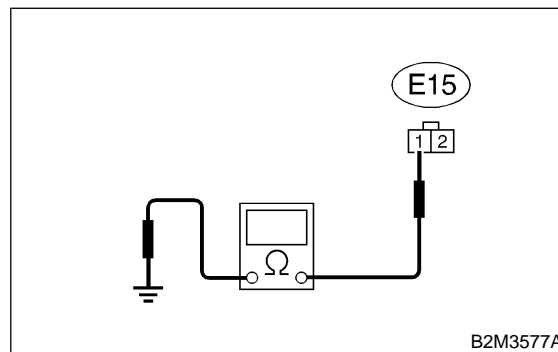
- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

- NO** : Go to step **10AG3**.

10AG3 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal
(E15) No. 1 — Engine ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between camshaft position sensor and ECM connector.

NOTE:

The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

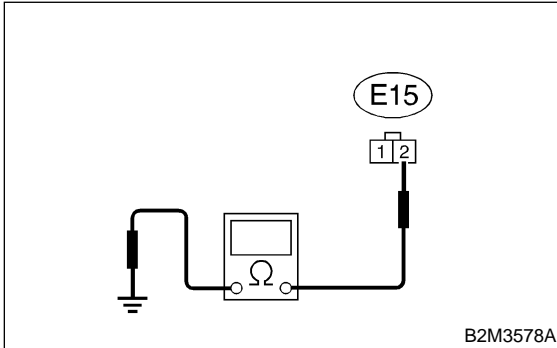
- NO** : Go to step **10AG4**.

10AG4 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 2 — Engine ground:



- CHECK** : *Is the resistance less than 5 Ω ?*
YES : Go to step **10AG5**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

10AG5 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

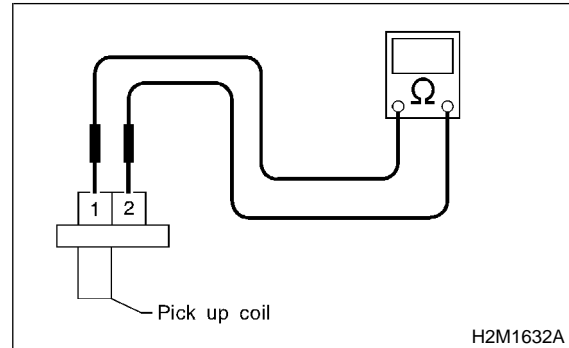
- CHECK** : *Is the camshaft position sensor installation bolt tightened securely?*
YES : Go to step **10AG6**.
NO : Tighten camshaft position sensor installation bolt securely.

10AG6 : CHECK CAMSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



- CHECK** : *Is the resistance between 1 and 4 $k\Omega$?*
YES : Go to step **10AG7**.
NO : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

10AG7 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

Turn ignition switch to OFF.

- CHECK** : *Is the camshaft position sensor installation bolt tightened securely?*
YES : Go to step **10AG8**.
NO : Tighten camshaft position sensor installation bolt securely.

10AG8 : CHECK CAMSHAFT SPROCKET.

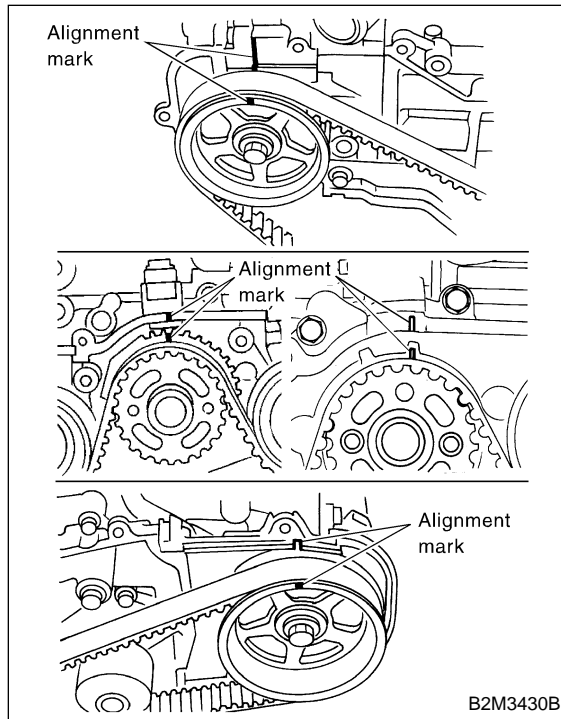
Remove front belt cover. <Ref. to 2-3 [W3A0].>

- CHECK** : *Are camshaft sprocket teeth cracked or damaged?*
YES : Replace camshaft sprocket. <Ref. to 2-3 [W3A0].>
NO : Go to step **10AG9**.

10AG9 : CHECK INSTALLATION CONDITION OF TIMING BELT.

Turn camshaft using ST, and align alignment mark on camshaft sprocket with alignment mark on timing belt cover LH.

ST 499207100 CAMSHAFT SPROCKET WRENCH



- CHECK** : ***Is timing belt dislocated from its proper position?***
- YES** : Repair installation condition of timing belt. <Ref. to 2-3 [W3A0].>
- NO** : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

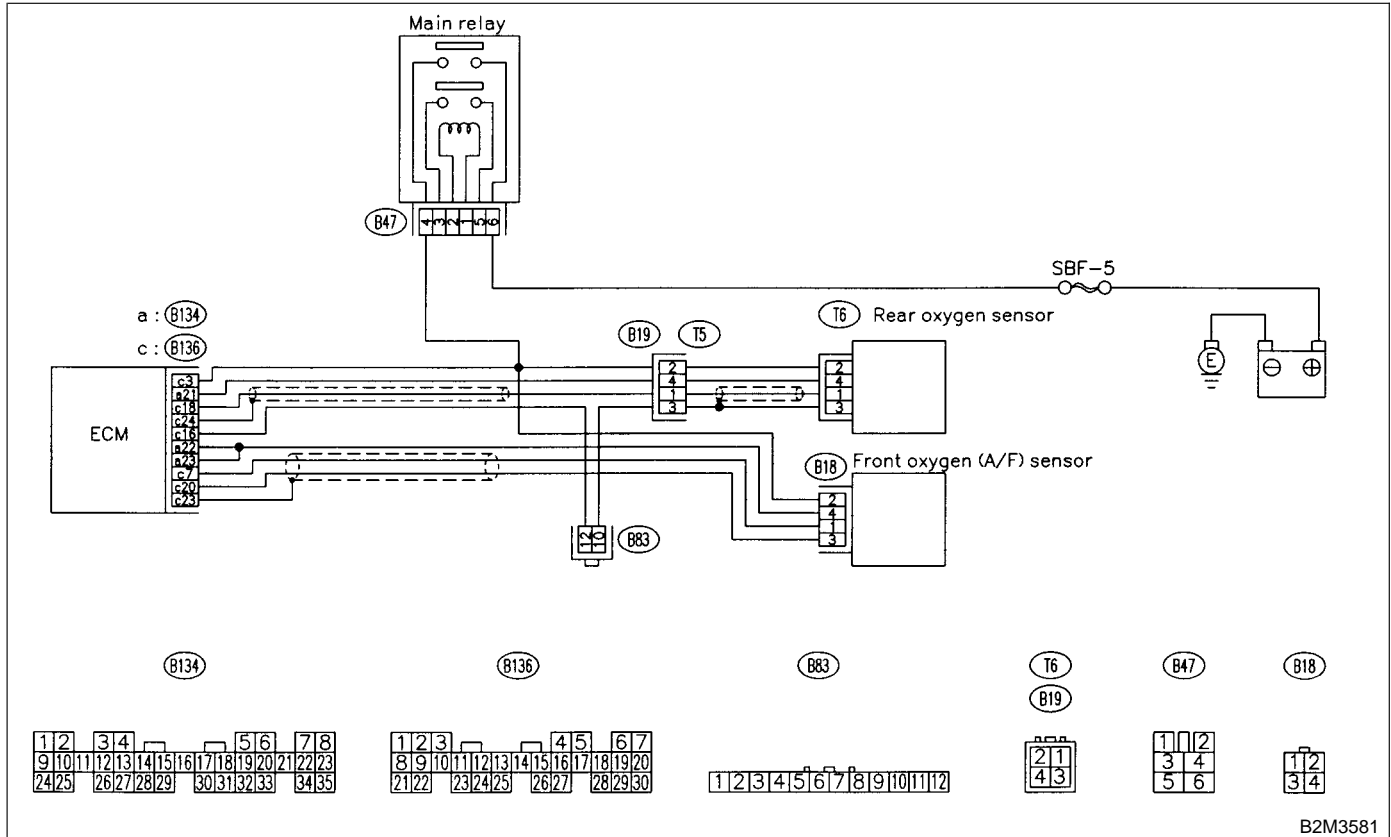
AH: DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Idle mixture is out of specifications.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3581

10AH1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0131, P0132, P0133, P0135, P0136, P0139, P0141, P0301, P0302, P0303, P0304, P1130, P1131, P1134, P1139, P1150 and P1151?*

YES : Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0420.

NO : Go to step **10AH2**.

10AH2 : CHECK EXHAUST SYSTEM.

Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes.

NOTE:

Check the following positions.

- Between cylinder head and front exhaust pipe
- Between front exhaust pipe and front catalytic converter
- Between front catalytic converter and rear catalytic converter

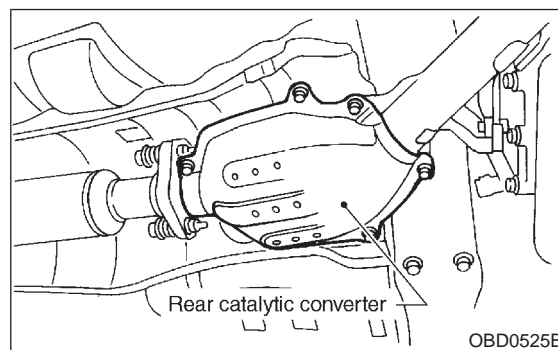
CHECK : *Is there a fault in exhaust system?*

YES : Repair or replace exhaust system. <Ref. to 2-9 [W1A0].>

NO : Go to step **10AH3**.

10AH3 : CHECK REAR CATALYTIC CONVERTER.

Separate rear catalytic converter from rear exhaust pipe.



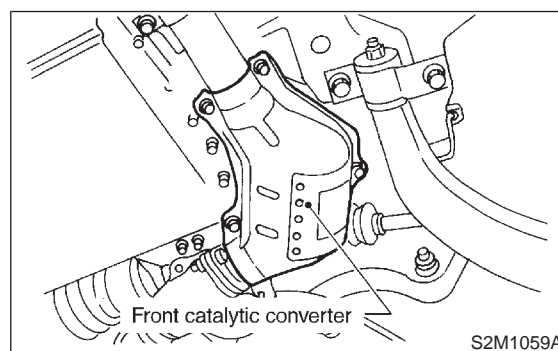
CHECK : *Is there damage at rear face of rear catalyst?*

YES : Replace front catalytic converter <Ref. to 2-1 [W1A0].> and rear catalytic converter <Ref. to 2-1 [W2A0].>

NO : Go to step **10AH4**.

10AH4 : CHECK FRONT CATALYTIC CONVERTER.

Remove front catalytic converter.



CHECK : *Is there damage at rear face or front face of front catalyst?*

YES : Replace front catalytic converter. <Ref. to 2-1 [W1A0].>

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AI: DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

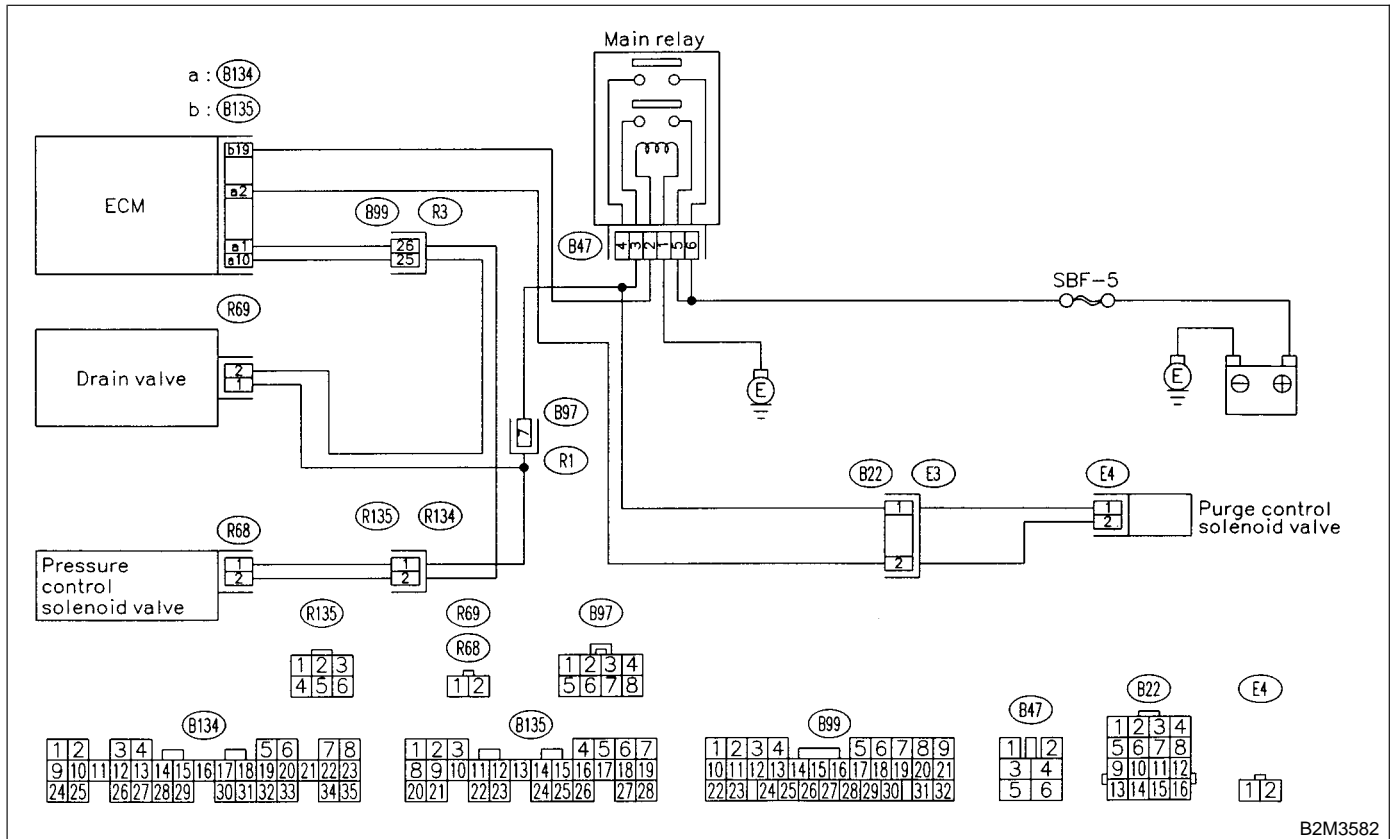
• TROUBLE SYMPTOM:

- Gasoline smell
- There is a hole of more than 1.0 mm (0.04 in) dia. in evaporation system or fuel tank.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3582

10A11 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>
- NO** : Go to step **10A12**.

10A12 : CHECK FUEL FILLER CAP.

- 1) Turn ignition switch to OFF.
- 2) Check the fuel filler cap.

NOTE:

The DTC code is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.

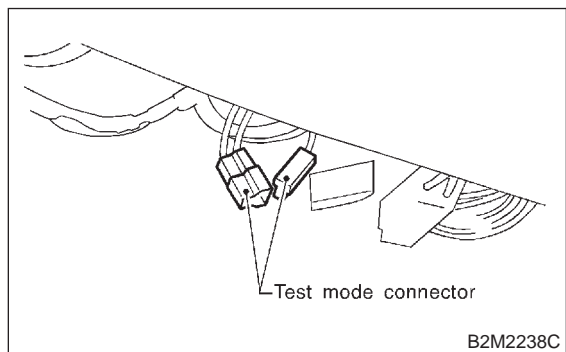
- CHECK** : *Is the fuel filler cap tightened securely?*
- YES** : Go to step **10A13**.
- NO** : Tighten fuel filler cap securely.

10A13 : CHECK FUEL FILLER PIPE PACKING.

- CHECK** : *Is there any damage to the seal between fuel filler cap and fuel filler pipe?*
- YES** : Repair or replace fuel filler cap and fuel filler pipe. <Ref. to 2-8 [W2A0].>
- NO** : Go to step **10A14**.

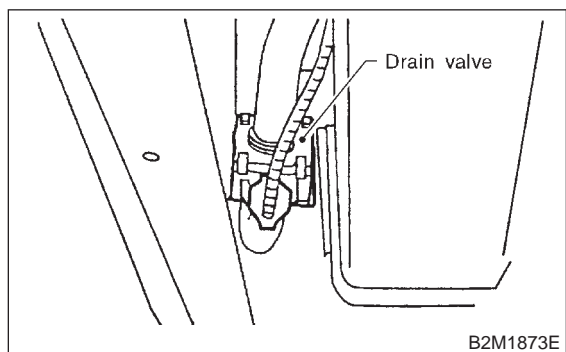
10A14 : CHECK DRAIN VALVE.

1) Connect test mode connector.



- 2) Turn ignition switch to ON.
- 3) Operate drain valve.

NOTE:
Drain valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

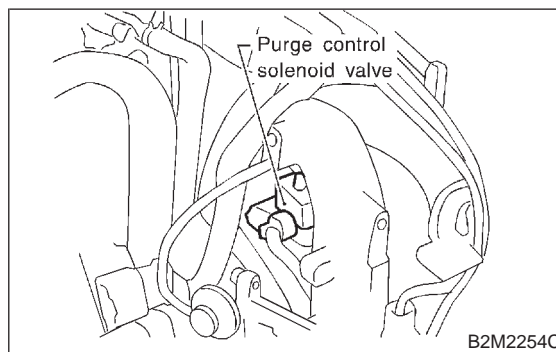


- CHECK** : *Does drain valve produce operating sound?*
- YES** : Go to step **10A15**.
- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

10A15 : CHECK PURGE CONTROL SOLENOID VALVE.

Operate purge control solenoid valve.

NOTE:
Purge control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



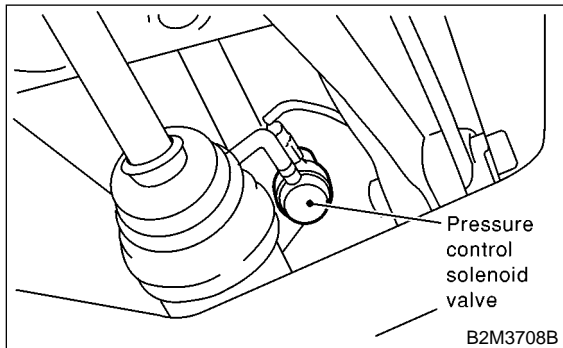
- CHECK** : *Does purge control solenoid valve produce operating sound?*
- YES** : Go to step **10A16**.
- NO** : Replace purge control solenoid valve. <Ref. to 2-1 [W4A0].>

10A16 : CHECK PRESSURE CONTROL SOLENOID VALVE.

Operate pressure control solenoid valve.

NOTE:

Pressure control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



- CHECK** : **Does pressure control solenoid valve produce operating sound?**
- YES** : Go to step **10A17**.
- NO** : Replace pressure control solenoid valve. <Ref. to 2-1 [W9A0].>

10A17 : CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.

Turn ignition switch to OFF.

- CHECK** : **Is there a hole of more than 1.0 mm (0.04 in) dia. on fuel line?**
- YES** : Repair or replace fuel line. <Ref. to 2-8 [W8A0].>
- NO** : Go to step **10A18**.

10A18 : CHECK CANISTER.

- CHECK** : **Is canister damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?**
- YES** : Repair or replace canister. <Ref. to 2-1 [W3A0].>
- NO** : Go to step **10A19**.

10A19 : CHECK FUEL TANK.

Remove fuel tank. <Ref. to 2-8 [W1C0].>

- CHECK** : **Is fuel tank damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?**
- YES** : Repair or replace fuel tank. <Ref. to 2-8 [W1C0].>
- NO** : Go to step **10A110**.

10A110 : CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.

- CHECK** : **Are there holes of more than 1.0 mm (0.04 in) dia., cracks, clogging or disconnections of hoses or pipes in evaporative emission control system?**
- YES** : Repair or replace hoses or pipes.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

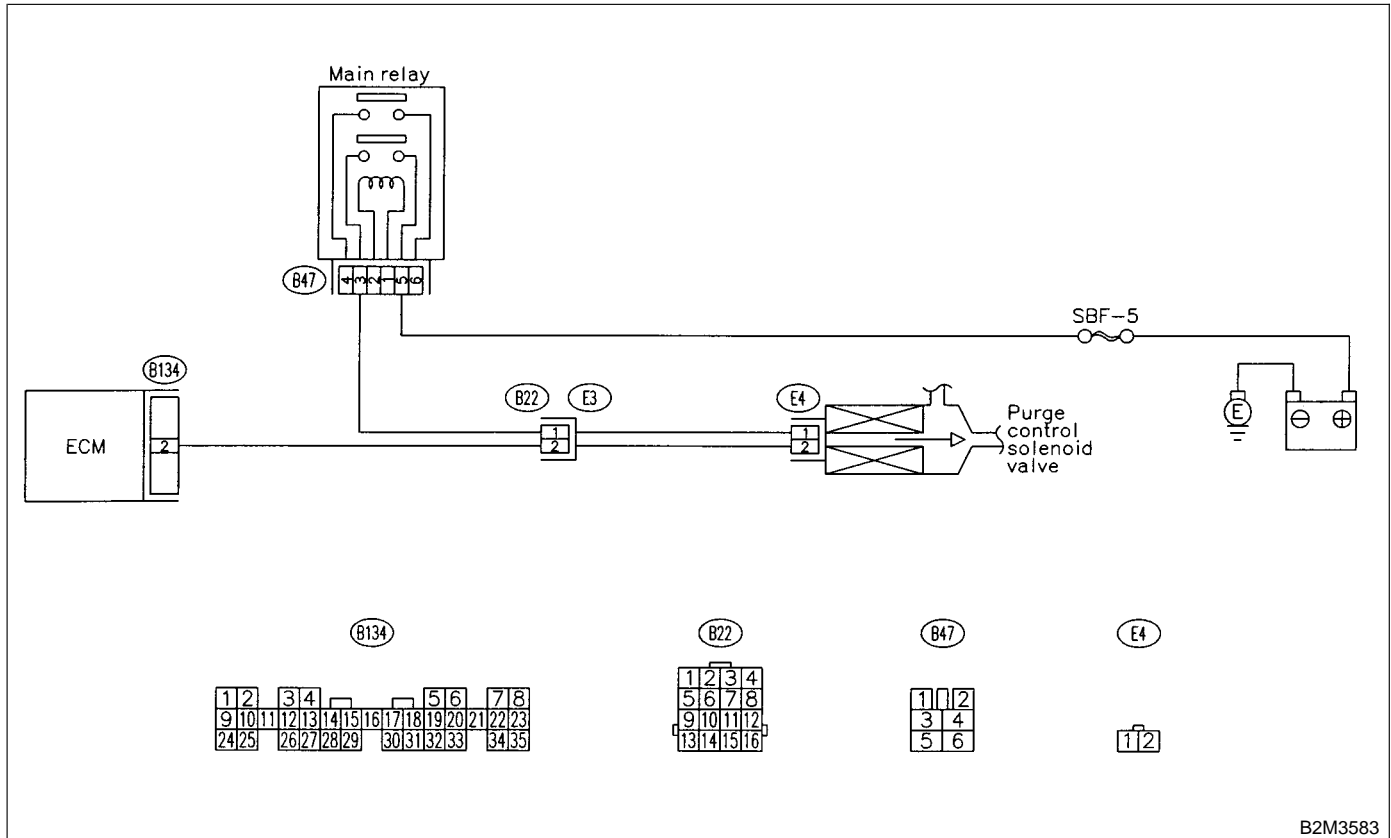
AJ: DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



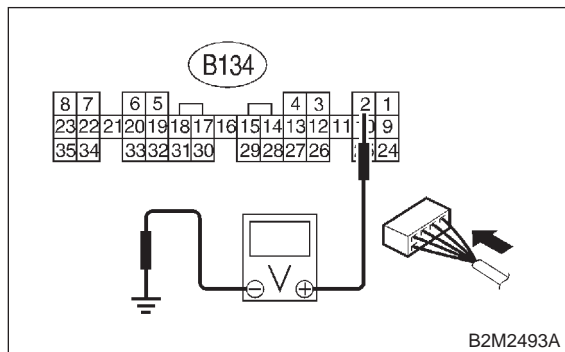
B2M3583

10AJ1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

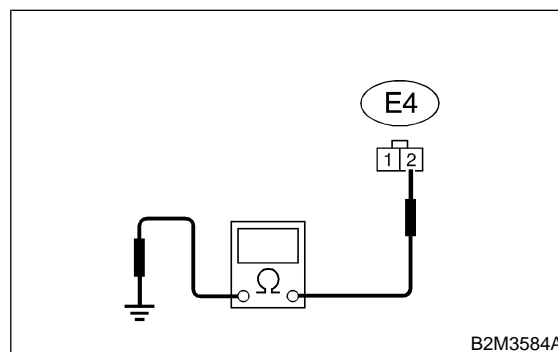
- NO** : Go to step **10AJ2**.

10AJ2 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from purge control solenoid valve and ECM.
- 3) Measure resistance of harness between purge control solenoid valve connector and engine ground.

Connector & terminal

(E4) No. 2 — Engine ground:



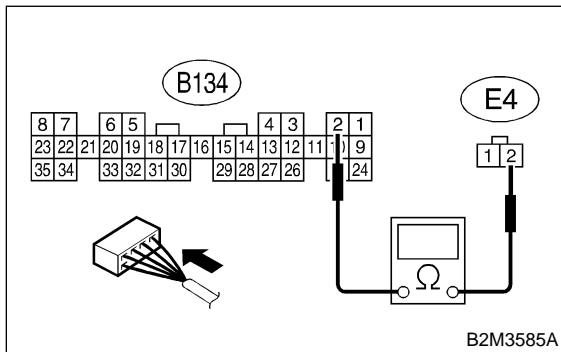
- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and purge control solenoid valve connector.
- NO** : Go to step **10AJ3**.

10AJ3 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and purge control solenoid valve of harness connector.

Connector & terminal

(B134) No. 2 — (E4) No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **10AJ4**.
- NO** : Repair open circuit in harness between ECM and purge control solenoid valve connector.

NOTE:

In this case, repair the following:

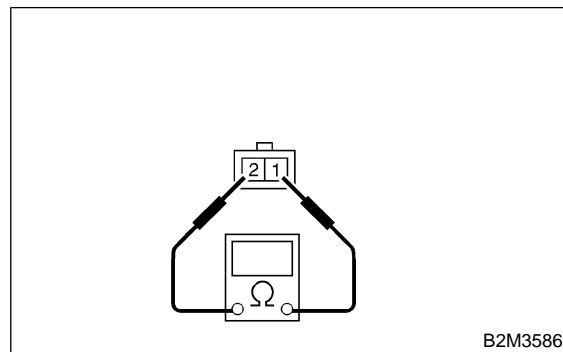
- Open circuit in harness between ECM and purge control solenoid valve connector
- Poor contact in coupling connector (B22)

10AJ4 : CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Remove purge control solenoid valve.
- 2) Measure resistance between purge control solenoid valve terminals.

Terminals

No. 1 — No. 2:



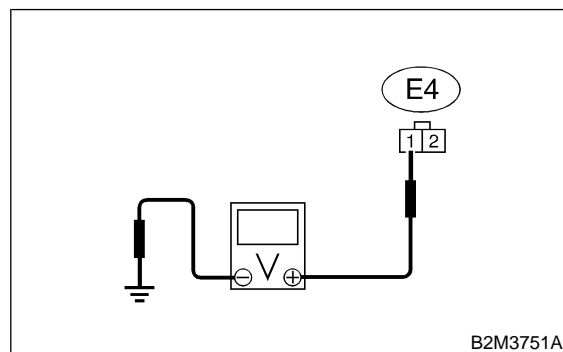
- CHECK** : **Is the resistance between 10 and 100 Ω?**
- YES** : Go to step **10AJ5**.
- NO** : Replace purge control solenoid valve. <Ref. to 2-1 [W4A0].>

10AJ5 : CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between purge control solenoid valve and engine ground.

Connector & terminal

(E4) No. 1 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **10AJ6**.
- NO** : Repair open circuit in harness between main relay and purge control solenoid valve connector.

10AJ6 : CHECK POOR CONTACT.

Check poor contact in purge control solenoid valve connector. <Ref. to FOREWORD [T3C1].>

CHECK : ***Is there poor contact in purge control solenoid valve connector?***

YES : Repair poor contact in purge control solenoid valve connector.

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AK: DTC P0446 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL LOW INPUT —

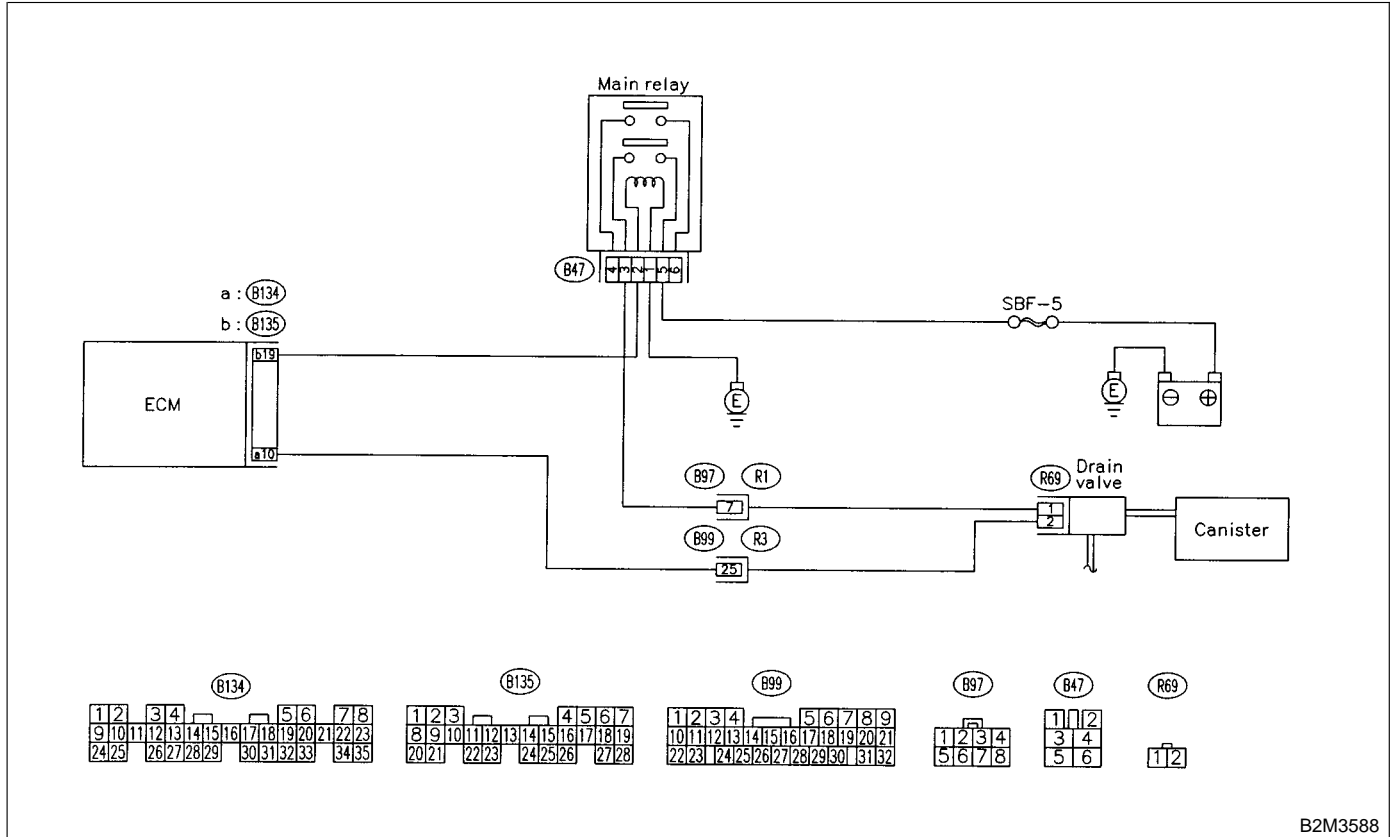
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:

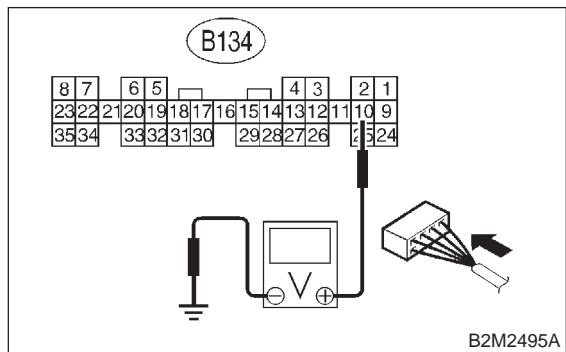


B2M3588

10AK1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal
(B134) No. 10 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **10AK2**.
- NO** : Go to step **10AK3**.

10AK2 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)

NOTE:

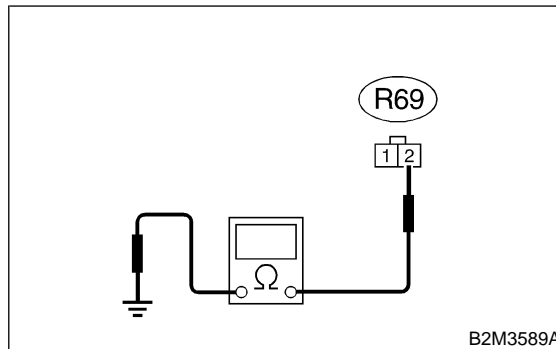
In this case, repair the following:

- Poor contact in drain valve connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B97 and B99)

10AK3 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

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

Connector & terminal
(R69) No. 2 — Chassis ground:

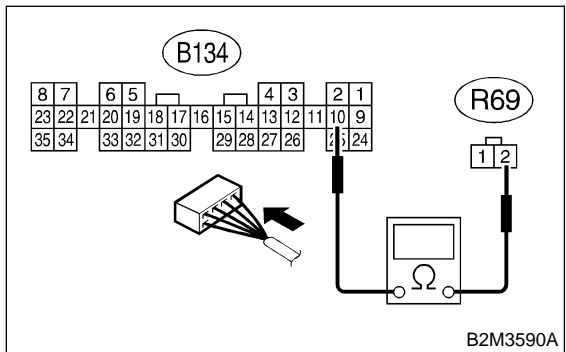


- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and drain valve connector.
- NO** : Go to step **10AK4**.

10AK4 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and drain valve connector.

Connector & terminal
(B134) No. 10 — (R69) No. 2:



- CHECK** : *Is the voltage less than 1 Ω?*
- YES** : Go to step **10AK5**.
- NO** : Repair harness and connector.

NOTE:

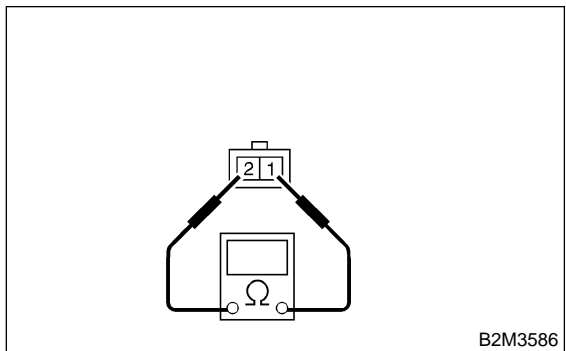
In this case, repair the following:

- Open circuit in harness between ECM and drain valve connector
- Poor contact in coupling connectors (B99)

10AK5 : CHECK DRAIN VALVE.

Measure resistance between drain valve terminals.

Terminals
No. 1 — No. 2:

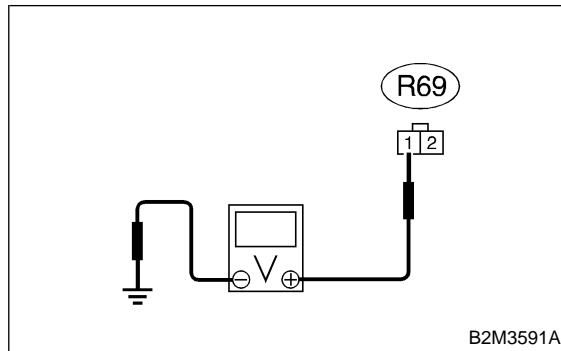


- CHECK** : *Is the resistance between 10 and 100 Ω?*
- YES** : Go to step **10AK6**.
- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

10AK6 : CHECK POWER SUPPLY TO DRAIN VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between drain valve and chassis ground.

Connector & terminal
(R69) No. 1 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **10AK7**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between main relay and drain valve
- Poor contact in coupling connectors (B97)
- Poor contact in main relay connector

10AK7 : CHECK POOR CONTACT.

Check poor contact in drain valve connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in drain valve connector?*
- YES** : Repair poor contact in drain valve connector.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AL: DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE PROBLEM —

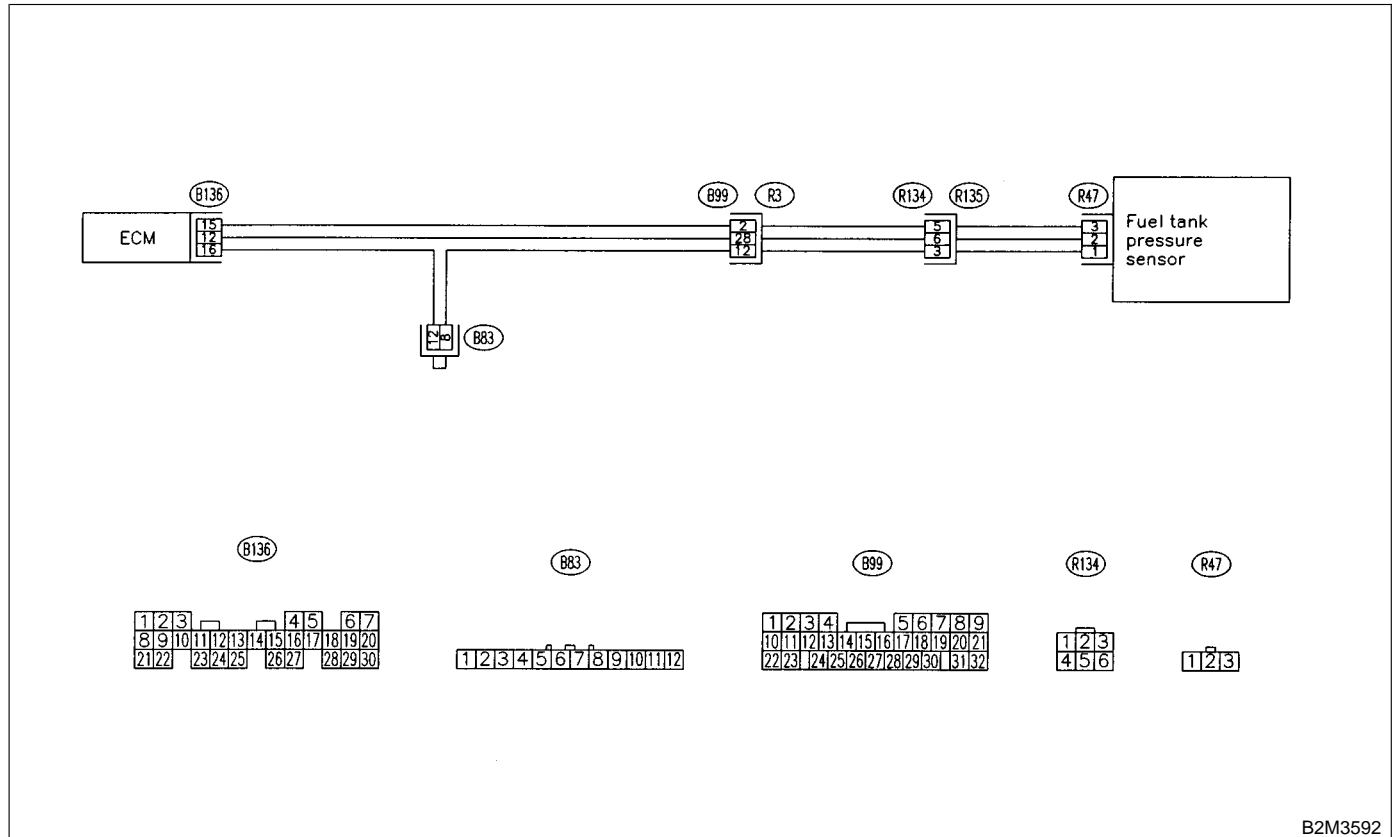
● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3592

10AL1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any DTC on display?*
YES : Inspect the relevant DTC using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>
NO : Go to step **10AL2**.

10AL2 : CHECK FUEL FILLER CAP.

- 1) Turn ignition switch to OFF.
 2) Open the fuel flap.
CHECK : *Is the fuel filler cap tightened securely?*
YES : Go to step **10AL3**.
NO : Tighten fuel filler cap securely.

10AL3 : CHECK PRESSURE/VACUUM LINE.

- NOTE:**
 Check the following items.
 ● Disconnection, leakage and clogging of the vacuum hoses and pipes between fuel tank pressure sensor and fuel tank
 ● Disconnection, leakage and clogging of air ventilation hoses and pipes between fuel filler pipe and fuel tank
- CHECK** : *Is there a fault in pressure/vacuum line?*
YES : Repair or replace hoses and pipes.
NO : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

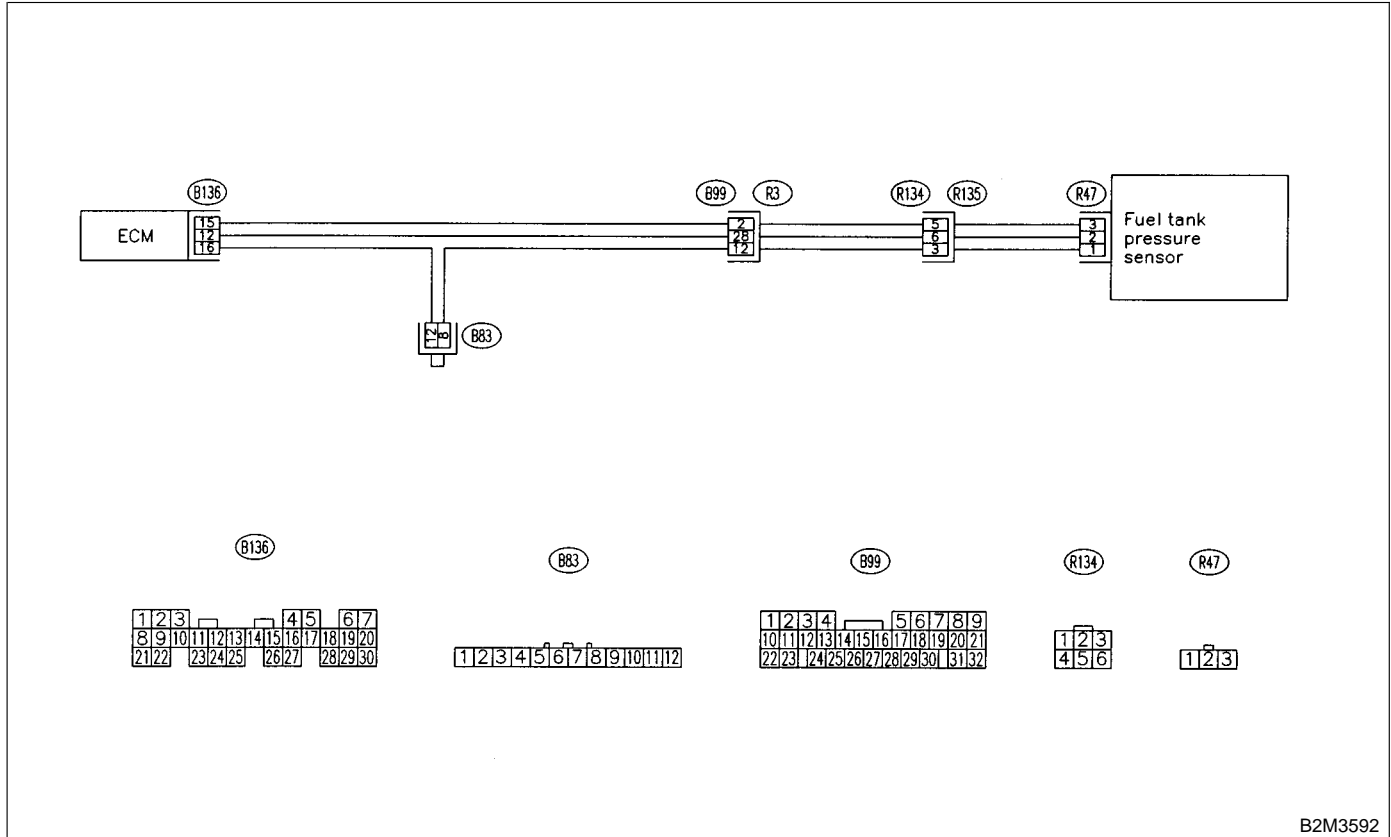
AM: DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

- **WIRING DIAGRAM:**



B2M3592

10AM1 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel filler cap.
- 3) Install fuel filler cap.
- 4) Turn ignition switch to ON.
- 5) Read the data of fuel tank pressure sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

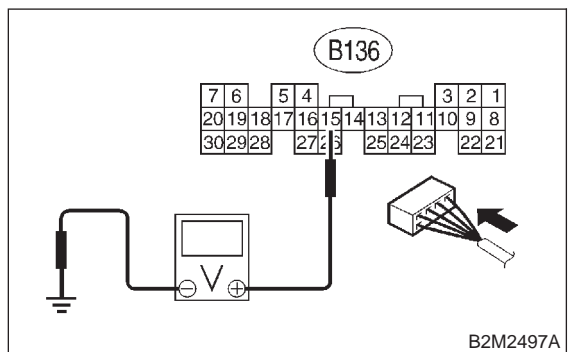
- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than -2.8 kPa (-21.0 mmHg, -0.827 inHg)?*
- YES** : Go to step **10AM2**.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time.

10AM2 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

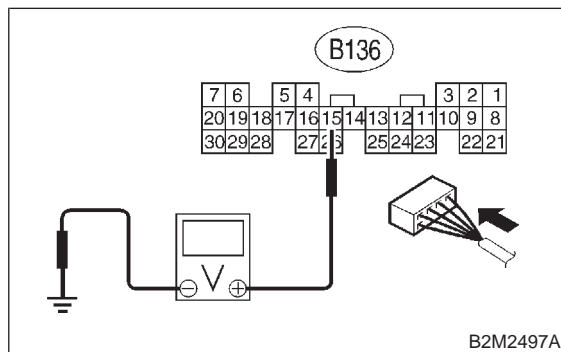


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step **10AM4**.
- NO** : Go to step **10AM3**.

10AM3 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

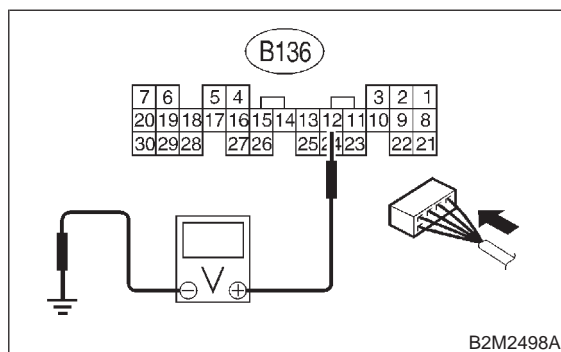
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10AM4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 12 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step **10AM6**.
- NO** : Go to step **10AM5**.

**10AM5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of fuel tank pressure sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than -2.8 kPa (-21.0 mmHg, -0.827 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

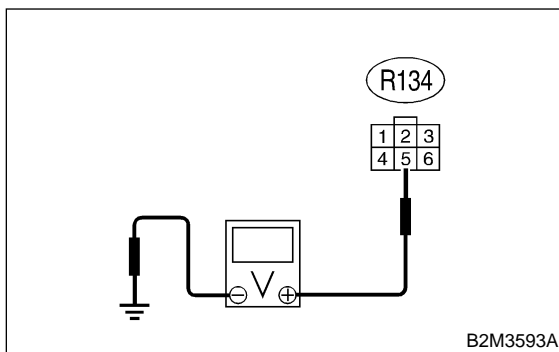
- YES** : Repair poor contact in ECM connector.
NO : Go to step **10AM6**.

**10AM6 : CHECK HARNESS BETWEEN
ECM AND COUPLING CONNec-
TOR IN REAR WIRING HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Remove rear seat cushion (Sedan) or move rear seat cushion (Wagon).
- 3) Separate rear wiring harness and fuel tank cord.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 5 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step **10AM7**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

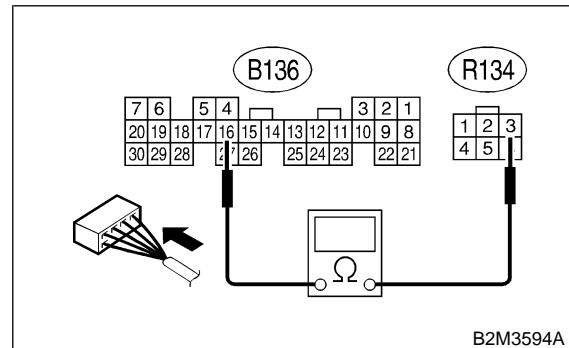
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

**10AM7 : CHECK HARNESS BETWEEN
ECM AND COUPLING CONNec-
TOR IN REAR WIRING HARNESS.**

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

Connector & terminal

(B136) No. 16 — (R134) No. 3:



- CHECK** : *Is the resistance less than 1 Ω?*
YES : Go to step **10AM8**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

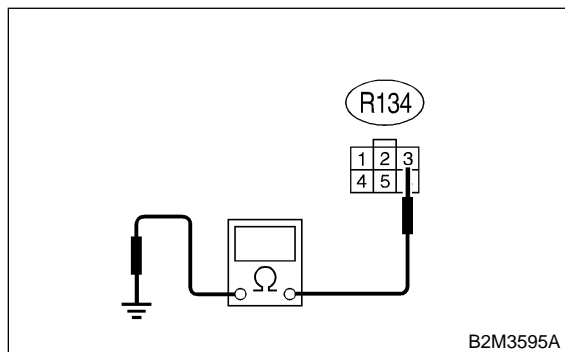
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)
- Poor contact in joint connector (B83)

10AM8 : CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.

Measure resistance of harness between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 3 — Chassis ground:



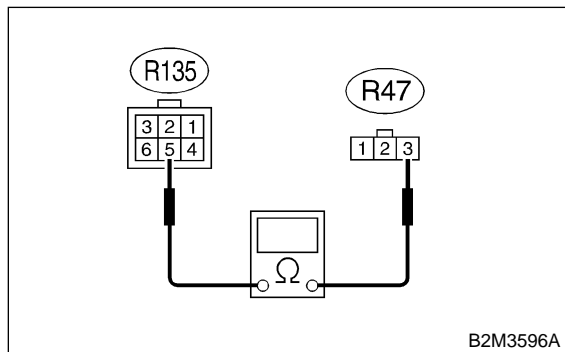
- CHECK** : *Is the resistance more than 500 kΩ?*
- YES** : Go to step **10AM9**.
- NO** : Repair ground short circuit in harness between ECM and rear wiring harness connector (R134).

10AM9 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel tank pressure sensor.
- 2) Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 5 — (R47) No. 3:



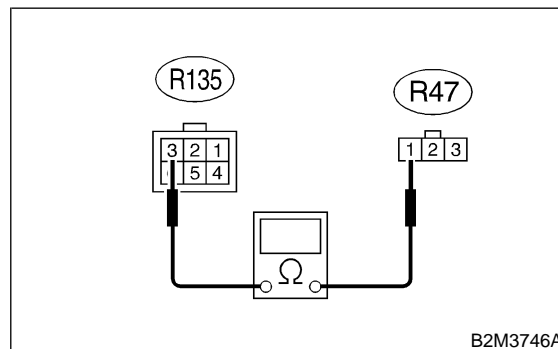
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AM10**.
- NO** : Repair open circuit in fuel tank cord.

10AM10 : CHECK FUEL TANK CORD.

Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 3 — (R47) No. 1:



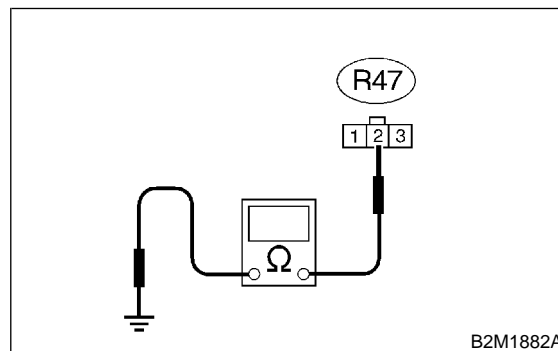
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AM11**.
- NO** : Repair open circuit in fuel tank cord.

10AM11 : CHECK FUEL TANK CORD.

Measure resistance of harness between fuel tank pressure sensor connector and chassis ground.

Connector & terminal

(R47) No. 2 — Chassis ground:



- CHECK** : *Is the resistance more than 500 kΩ?*
- YES** : Go to step **10AM12**.
- NO** : Repair ground short circuit in fuel tank cord.

10AM12 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in fuel tank pressure sensor connector?*
- YES** : Repair poor contact in fuel tank pressure sensor connector.
- NO** : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

MEMO:

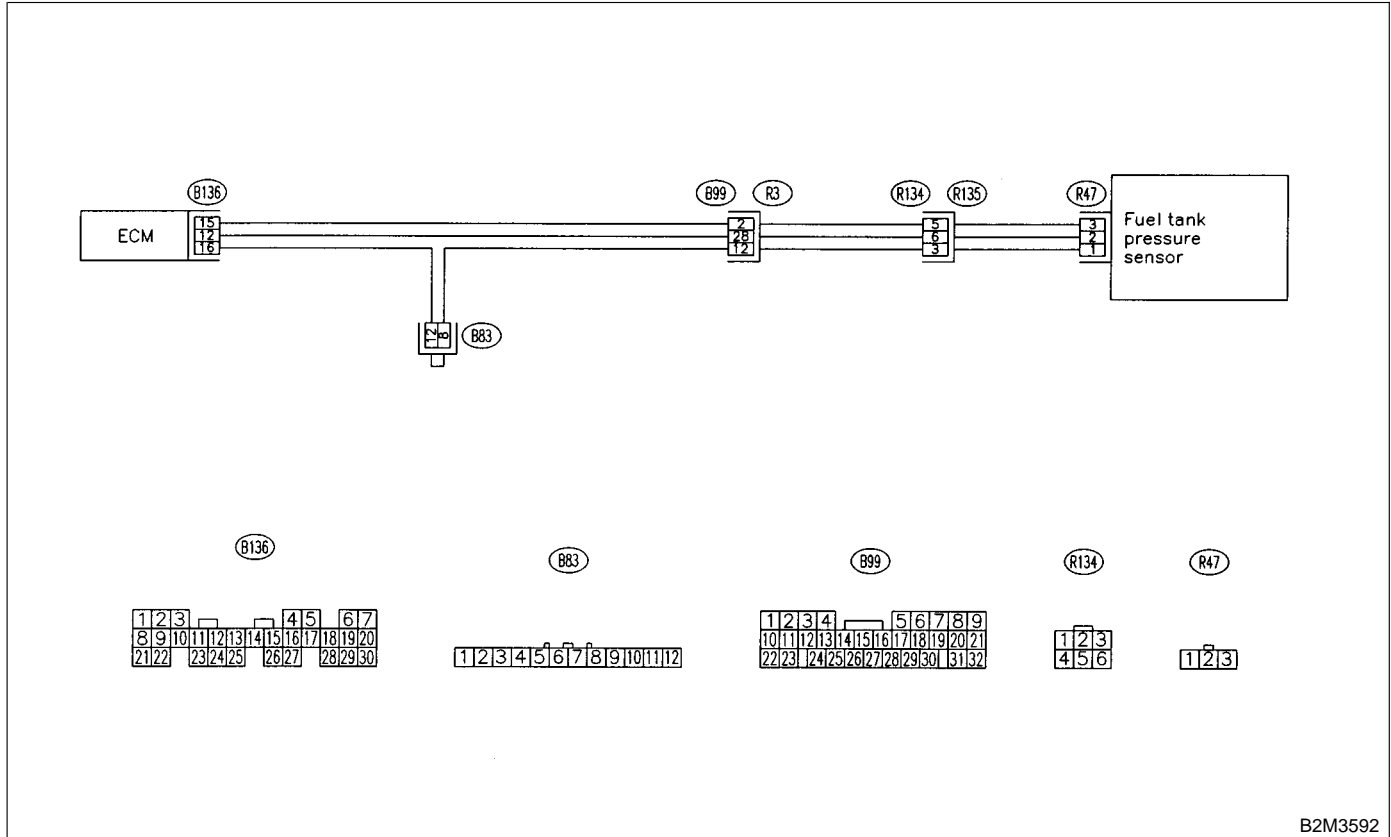
AN: DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

- **WIRING DIAGRAM:**



B2M3592

10AN1 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel filler cap.
- 3) Install fuel filler cap.
- 4) Turn ignition switch to ON.
- 5) Read data of fuel tank pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

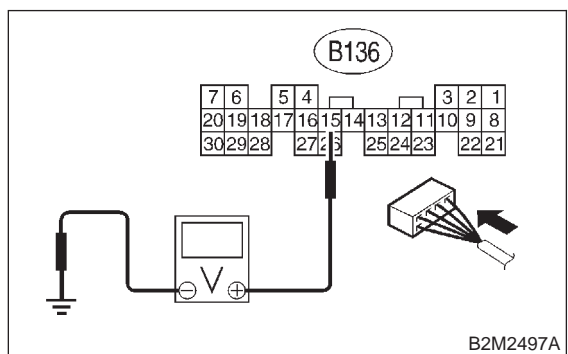
- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?*
- YES** : Go to step **10AN12**.
- NO** : Go to step **10AN2**.

10AN2 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

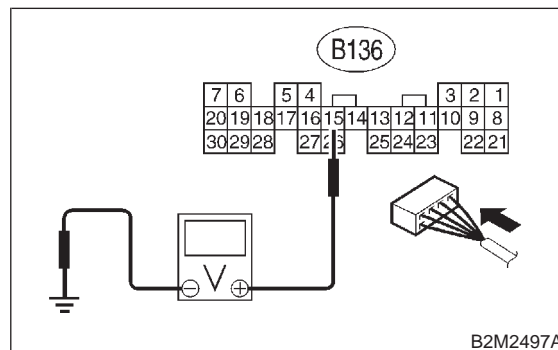


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step **10AN4**.
- NO** : Go to step **10AN3**.

10AN3 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

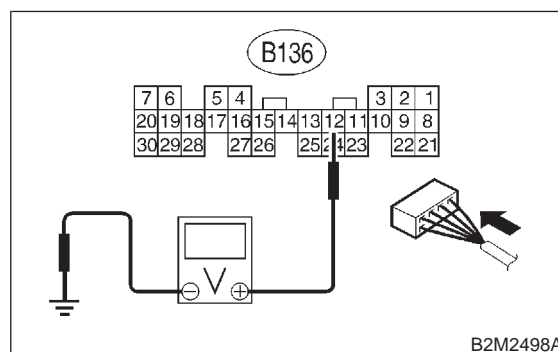


- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

10AN4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 12 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step **10AN6**.
- NO** : Go to step **10AN5**.

**10AN5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of fuel tank pressure sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than -2.8 kPa (-21.0 mmHg, -0.827 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

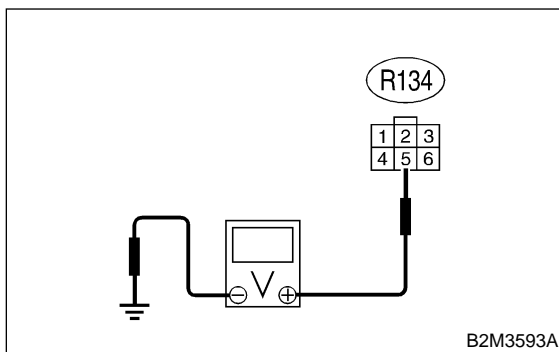
- YES** : Repair poor contact in ECM connector.
NO : Go to step **10AN6**.

**10AN6 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Remove rear seat cushion (Sedan) or move rear seat cushion (Wagon).
- 3) Separate rear wiring harness and fuel tank cord.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 5 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step **10AN7**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

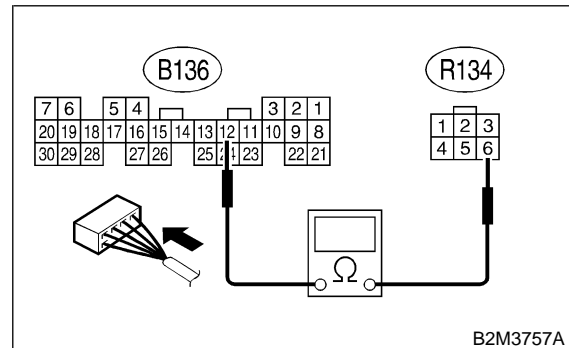
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

**10AN7 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

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

Connector & terminal

(B136) No. 12 — (R134) No. 6:



- CHECK** : *Is the resistance less than 1 Ω ?*
YES : Go to step **10AN8**.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

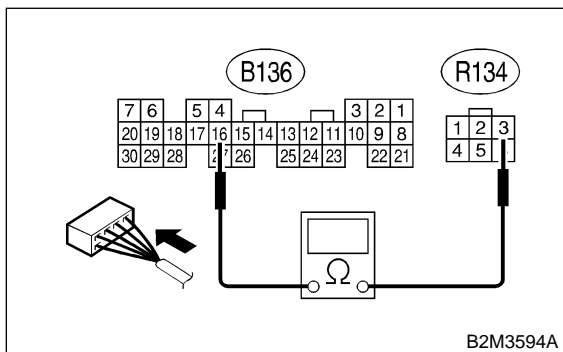
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

10AN8 : CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.

Measure resistance of harness between rear wiring harness connector and chassis ground.

Connector & terminal

(B136) No. 16 — (R134) No. 3:



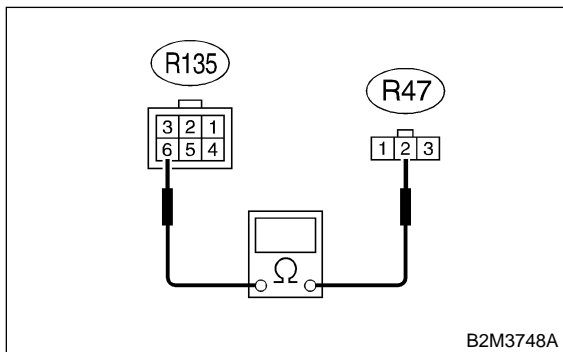
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AN9**.
- NO** : Repair ground short circuit in harness between ECM and rear wiring harness connector (R134).

10AN9 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel tank pressure sensor.
- 2) Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 6 — (R47) No. 2:



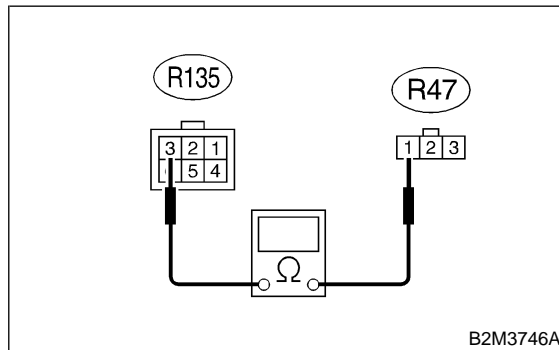
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AN10**.
- NO** : Repair open circuit in fuel tank cord.

10AN10 : CHECK FUEL TANK CORD.

Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 3 — (R47) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AN11**.
- NO** : Repair open circuit in fuel tank cord.

10AN11 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in fuel tank pressure sensor connector?*
- YES** : Repair poor contact in fuel tank pressure sensor connector.
- NO** : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

**10AN12 : CHECK HARNESS BETWEEN
ECM AND FUEL TANK PRES-
SURE SENSOR CONNECTOR.**

- 1) Turn ignition switch to OFF and Subaru Select Monitor or the OBD-II general scan tool switch to OFF.
- 2) Disconnect connector from fuel tank pressure sensor.
- 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON.
- 4) Read data of fuel tank pressure sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?***

YES : Repair battery short circuit in harness between ECM and fuel tank pressure sensor connector.

NO : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

AP: DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT —

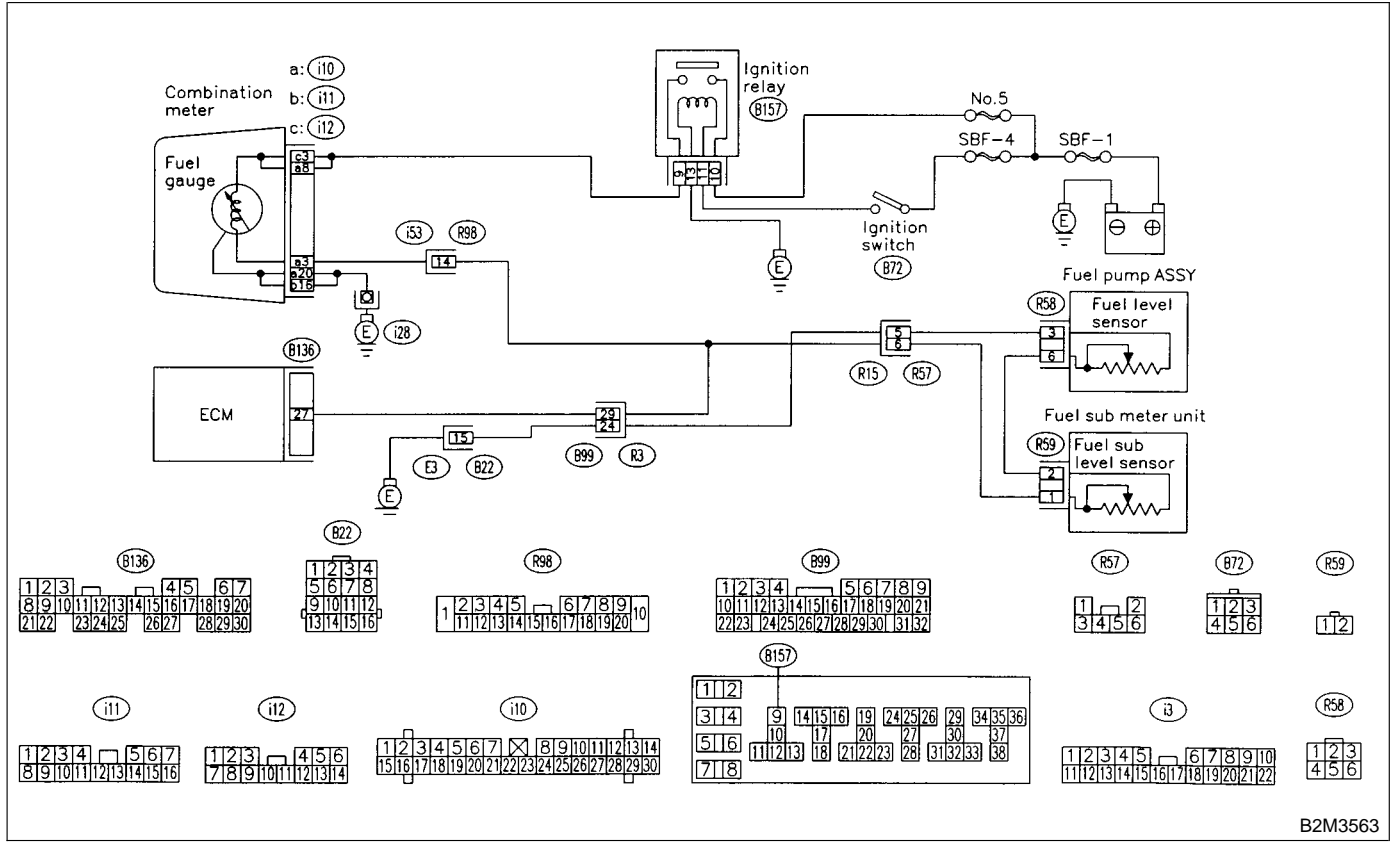
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

10AP1 : CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.

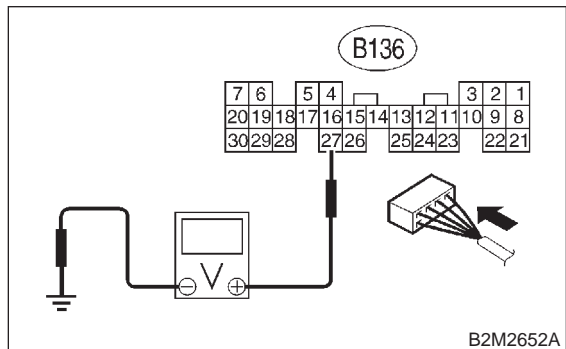
- CHECK** : Does speedometer and tachometer operate normally?
- YES** : Go to step 10AP2.
- NO** : Repair or replace combination meter.

10AP2 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON. (Engine OFF)
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.12 V?*
- YES** : Go to step 10AP4.
- NO** : Go to step 10AP3.

10AP3 : CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)

Read data of fuel level sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor
- For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- CHECK** : *Does the value change less than 0.12 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*
- YES** : Repair poor contact in ECM connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

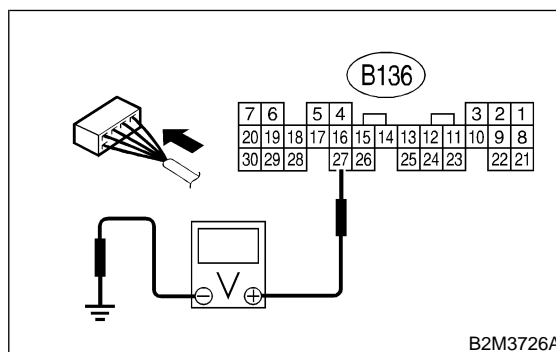
- In this case, repair the following:
- Poor contact in combination meter connector
 - Poor contact in ECM connector
 - Poor contact in coupling connectors (R98)

10AP4 : CHECK INPUT VOLTAGE OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Separate fuel tank cord connector (R57) and rear wiring harness connector (R15).
- 3) Turn ignition switch to ON.
- 4) Measure voltage of harness between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



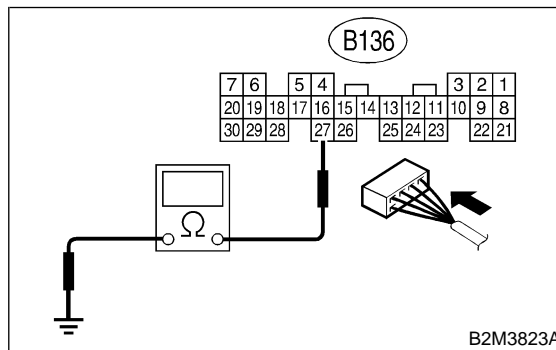
- CHECK** : *Is the voltage less than 0.12 V?*
- YES** : Go to step 10AP5.
- NO** : Go to step 10AP7.

10AP5 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from connector (i10) and ECM connector.
- 3) Measure resistance between ECM and chassis ground.

Connector & terminal

(B136) No. 27 — Chassis ground:



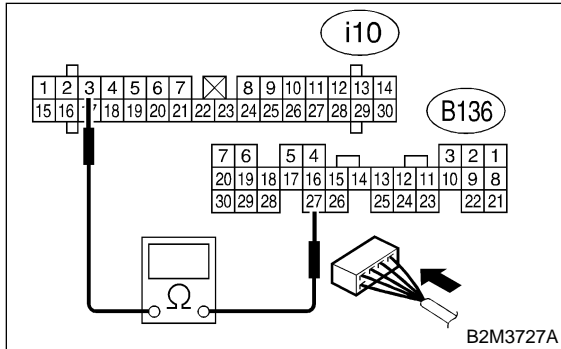
- CHECK** : *Is the resistance more than 1 MΩ?*
- YES** : Go to step 10AP6.
- NO** : Repair ground short circuit in harness between ECM and combination meter connector.

10AP6 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER.

Measure resistance between ECM and combination meter connector.

Connector & terminal

(B136) No. 27 — (i10) No. 3:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair or replace combination meter. <Ref. to 6-2 [W8A0].>
- NO** : Repair open circuit between ECM and combination meter connector.

NOTE:

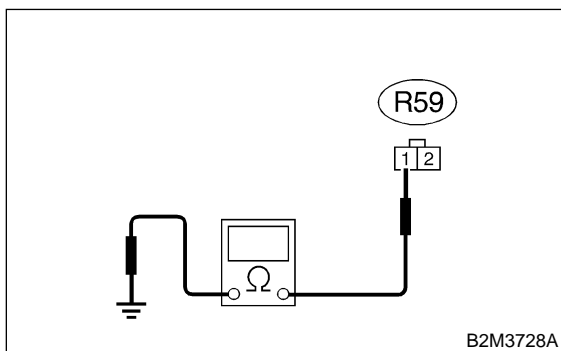
In this case, repair the following:
Poor contact in coupling connector (R98)

10AP7 : CHECK FUEL TANK CORD.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel sub level sensor.
- 3) Measure resistance between fuel sub level sensor and chassis ground.

Connector & terminal

(R59) No. 1 — Chassis ground:



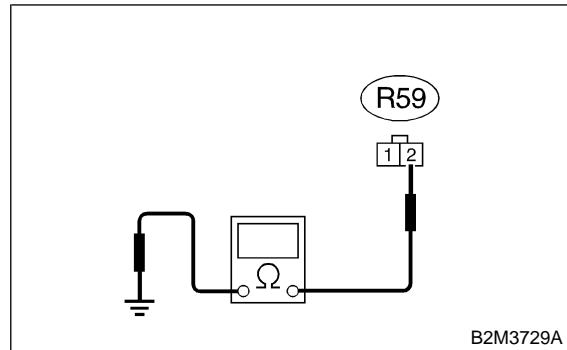
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 10AP8.
- NO** : Repair ground short circuit in fuel tank cord.

10AP8 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel pump assembly.
- 2) Measure resistance between fuel pump assembly and chassis ground.

Connector & terminal

(R59) No. 2 — Chassis ground:



- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 10AP9.
- NO** : Repair ground short circuit in fuel tank cord.

10AP9 : CHECK FUEL LEVEL SENSOR.

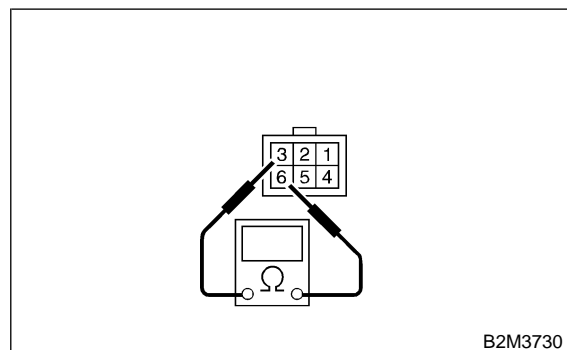
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Measure resistance between fuel level sensor and terminals with its float set to the full position.

Terminals

No. 3 — No. 6:



- CHECK** : **Is the resistance between 0.5 and 2.5 Ω?**
- YES** : Go to step 10AP10.
- NO** : Replace fuel level sensor.

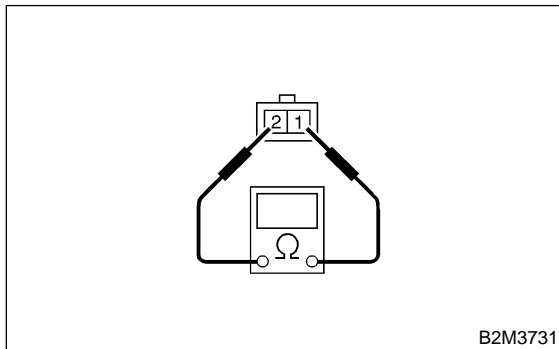
10AP10 : CHECK FUEL SUB LEVEL SENSOR.**WARNING:**

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- 2) Measure resistance between fuel sub level sensor and terminals with its float set to the full position.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance between 0.5 and 2.5 Ω?**
- YES** : Repair poor contact in harness between ECM and combination meter connector.
- NO** : Replace fuel sub level sensor. <Ref. to 2-8 [W6A0].>

AQ: DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT —

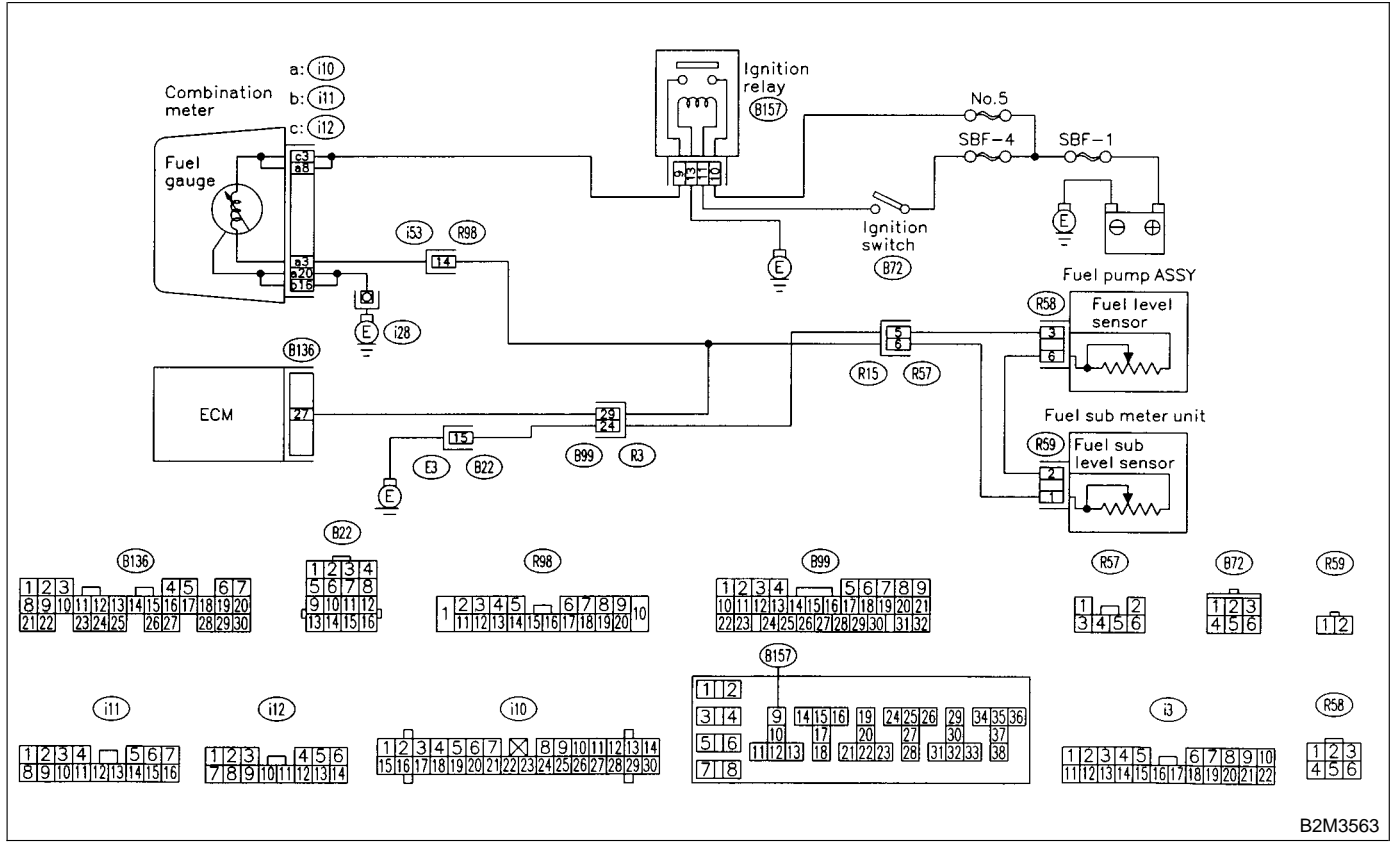
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

10AQ1 : CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.

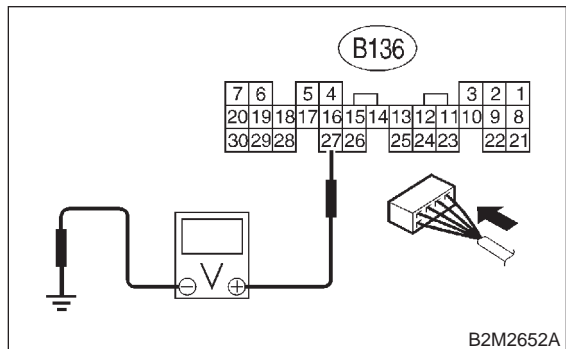
- CHECK** : Does speedometer and tachometer operate normally?
- YES** : Go to step 10AQ2.
- NO** : Repair or replace combination meter. <Ref. to 6-2 [W8A0].>

10AQ2 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON. (Engine OFF)
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 4.75 V?**
- YES** : Go to step **10AQ3**.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

In this case, repair the following:

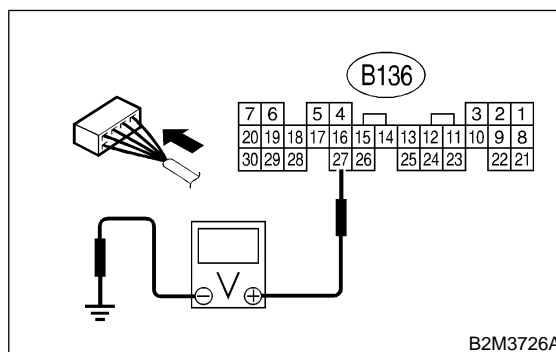
- Poor contact in fuel pump connector
- Poor contact in coupling connector (B22, R98 and R57)

10AQ3 : CHECK INPUT VOLTAGE OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect combination meter connector (i10) and ECM connector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage of harness between ECM and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



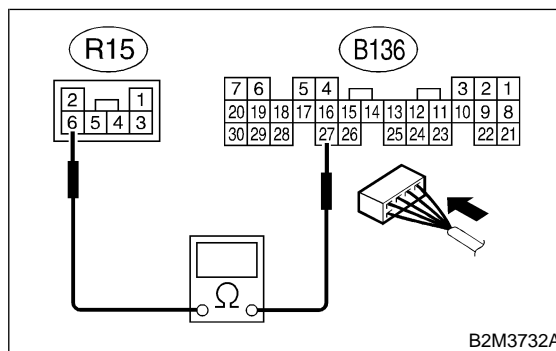
- CHECK** : **Is the voltage more than 4.75 V?**
- YES** : Go to step **10AQ4**.
- NO** : Repair battery short circuit between ECM and combination meter connector.

10AQ4 : CHECK HARNESS BETWEEN ECM AND FUEL TANK CORD.

- 1) Turn ignition switch to OFF.
- 2) Separate fuel tank cord connector (R57) and rear wiring harness connector (R15).
- 3) Measure resistance between ECM and fuel tank cord.

Connector & terminal

(B136) No. 27 — (R15) No. 6:

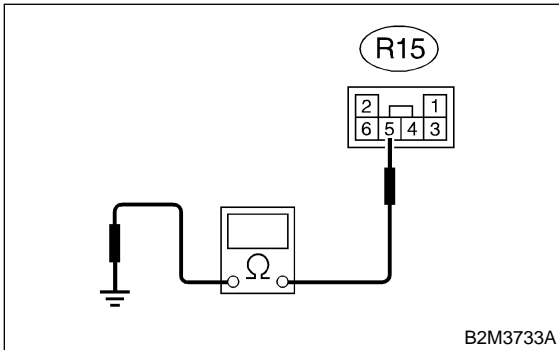


- CHECK** : **Is the resistance less than 5 Ω?**
- YES** : Go to step **10AQ5**.
- NO** : Repair open circuit between ECM and fuel tank cord.

10AQ5 : CHECK HARNESS BETWEEN FUEL TANK CORD AND CHASSIS GROUND.

Measure resistance between fuel tank cord and chassis ground.

Connector & terminal
(R15) No. 5 — Chassis ground:



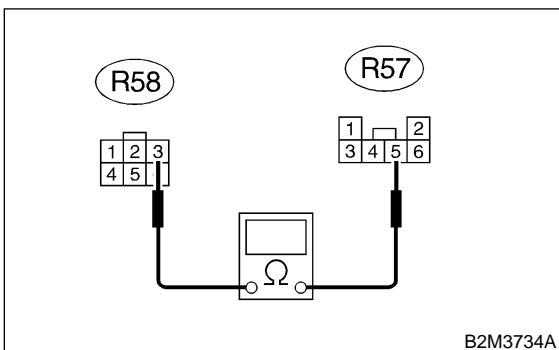
- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 10AQ6.
- NO** : Repair open circuit between fuel tank cord and chassis ground.

NOTE:
In this case, repair the following:
Poor contact in coupling connectors (B99 and B22)

10AQ6 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel level sensor.
- 2) Measure resistance between fuel level sensor and coupling connector.

Connector & terminal
(R57) No. 5 — (R58) No. 3:

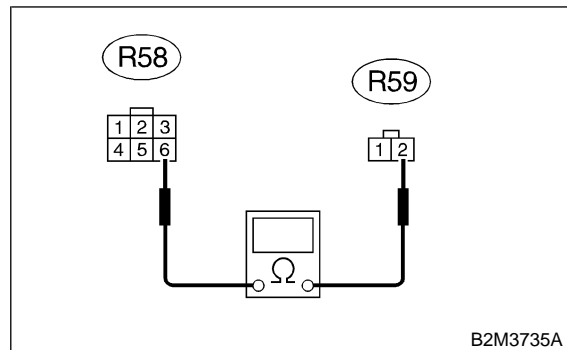


- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 10AQ7.
- NO** : Repair open circuit between coupling connector and fuel level sensor.

10AQ7 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel sub level sensor.
- 2) Measure resistance between fuel level sensor and fuel sub level sensor.

Connector & terminal
(R58) No. 6 — (R59) No. 2:

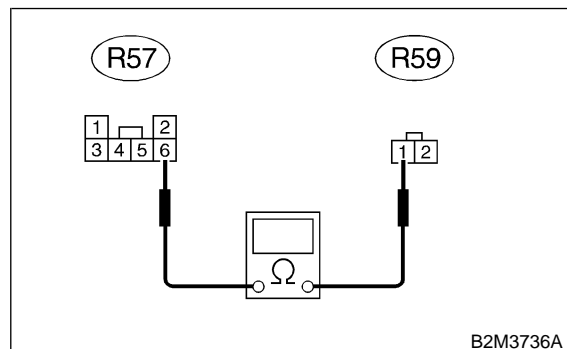


- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 10AQ8.
- NO** : Repair open circuit between fuel level sensor and fuel sub level sensor.

10AQ8 : CHECK FUEL TANK CORD.

Measure resistance between fuel sub level sensor and coupling connector.

Connector & terminal
(R57) No. 6 — (R59) No. 1:



- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 10AQ9.
- NO** : Repair open circuit between coupling connector and fuel sub level sensor.

10AQ9 : CHECK FUEL LEVEL SENSOR.

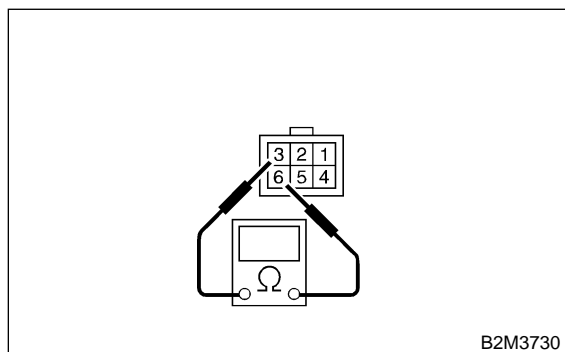
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) While moving fuel level sensor float up and down, measure resistance between fuel level sensor terminals.

Terminals

No. 3 — No. 6:



- CHECK** : **Is the resistance more than 54.5 Ω?**
- YES** : Replace fuel level sensor. <Ref. to 2-8 [W3A0].>
- NO** : Go to step **10AQ10**.

10AQ10 : CHECK FUEL SUB LEVEL SENSOR.

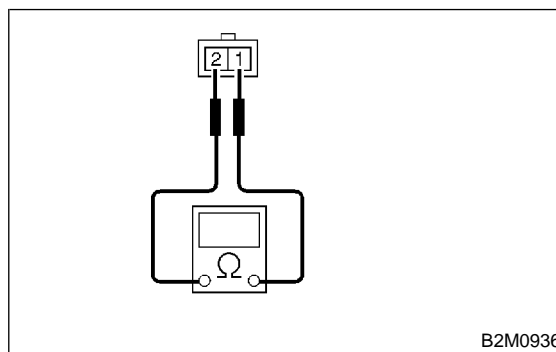
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- 2) While moving fuel sub level sensor float up and down, measure resistance between fuel sub level sensor terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance more than 41.5 Ω?**
- YES** : Replace fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- NO** : Replace combination meter. <Ref. to 6-2 [W8A0].>

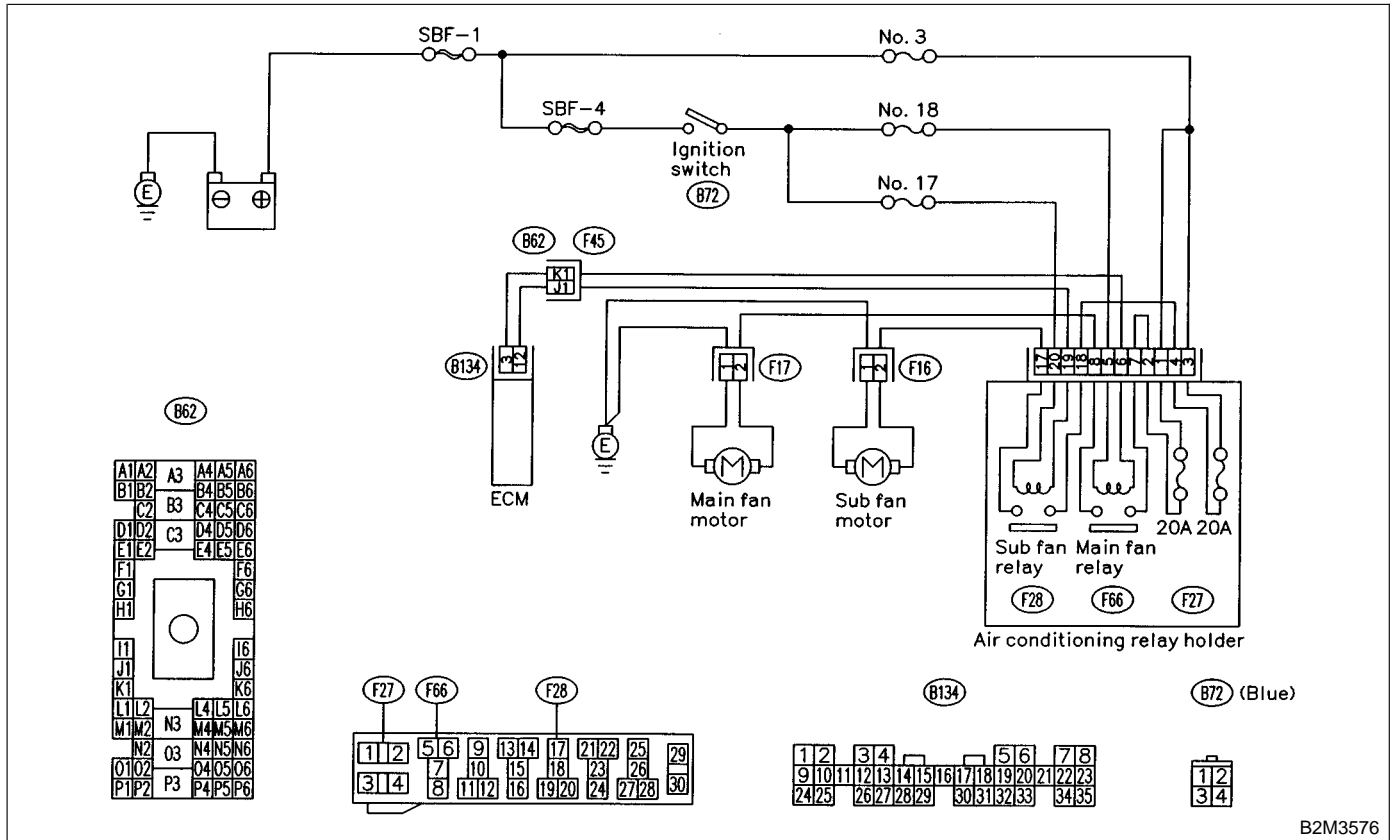
AR: DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Radiator fan does not operate properly.
 - Overheating

CAUTION:

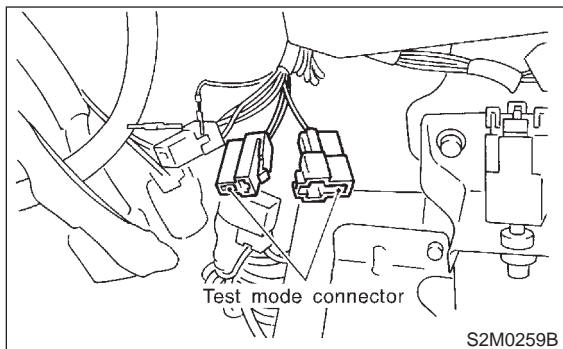
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10AR1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



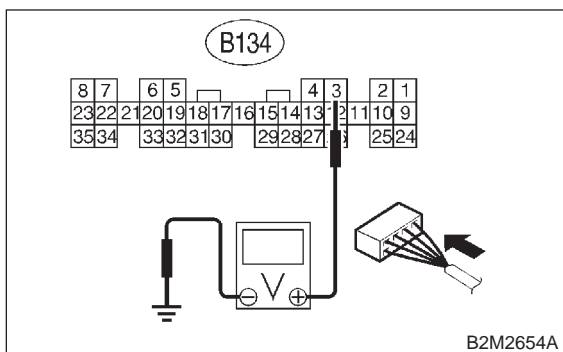
- 3) Turn ignition switch to ON.
- 4) While checking radiator fan relay operation, measure voltage between ECM terminal and ground.

NOTE:

Radiator fan relay operation check can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 3 (+) — Chassis ground (-):



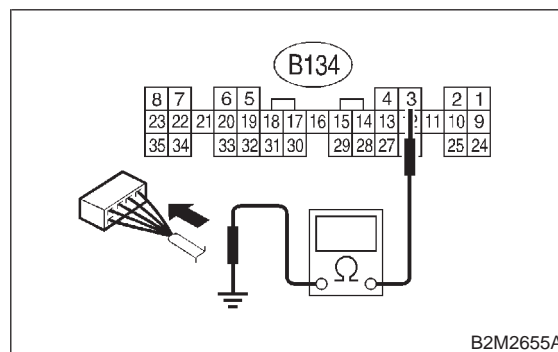
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **10AR2**.

10AR2 : CHECK GROUND SHORT CIRCUIT IN RADIATOR FAN RELAY CONTROL CIRCUIT.

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

Connector & terminal

(B134) No. 3 — Chassis ground:



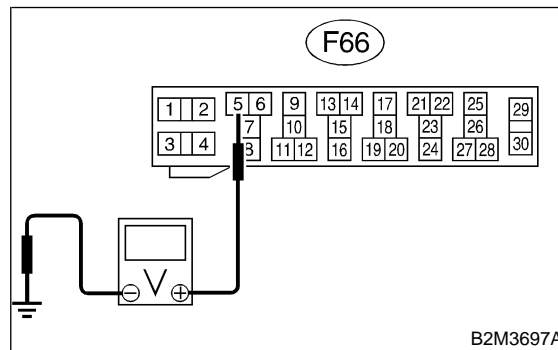
- CHECK** : Is the resistance less than 10 Ω?
- YES** : Repair ground short circuit in radiator fan relay control circuit.
- NO** : Go to step **10AR3**.

10AR3 : CHECK POWER SUPPLY FOR RELAY.

- 1) Remove main fan relay from A/C relay holder.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between fuse and relay box (F/B) connector and chassis ground.

Connector & terminal

(F66) No. 5 (+) — Chassis ground (-):



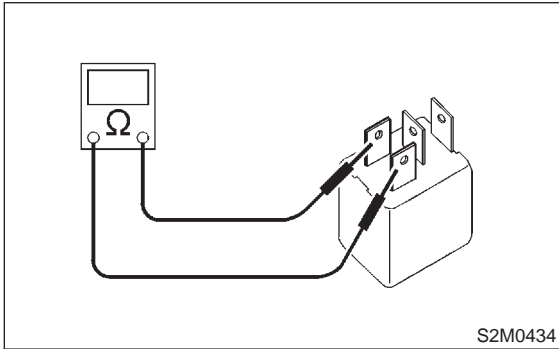
- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step **10AR4**.
- NO** : Repair open circuit in harness between ignition switch and fuse and relay box (F/B) connector.

10AR4 : CHECK MAIN FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between main fan relay terminals.

Terminal

No. 5 — No. 6:



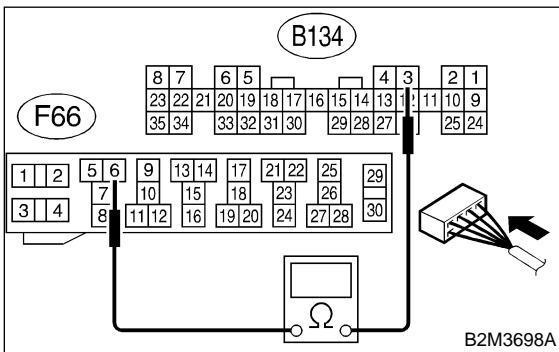
- CHECK** : *Is the resistance between 87 and 107 Ω ?*
- YES** : Go to step **10AR5**.
- NO** : Replace main fan relay.

10AR5 : CHECK OPEN CIRCUIT IN MAIN FAN RELAY CONTROL CIRCUIT.

Measure resistance of harness between ECM and main fan relay connector.

Connector & terminal

(B134) No. 3 — (F66) No. 6:



- CHECK** : *Is the resistance less than 1 Ω ?*
- YES** : Go to step **10AR6**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and main fan relay connector
- Poor contact in coupling connector (F45)

10AR6 : CHECK POOR CONTACT.

Check poor contact in ECM or main fan relay connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM or main fan relay connector?*
- YES** : Repair poor contact in ECM or main fan relay connector.
- NO** : Contact with SOA service.

AS: DTC P0483 — COOLING FAN FUNCTION PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Occurrence of noise
 - Overheating

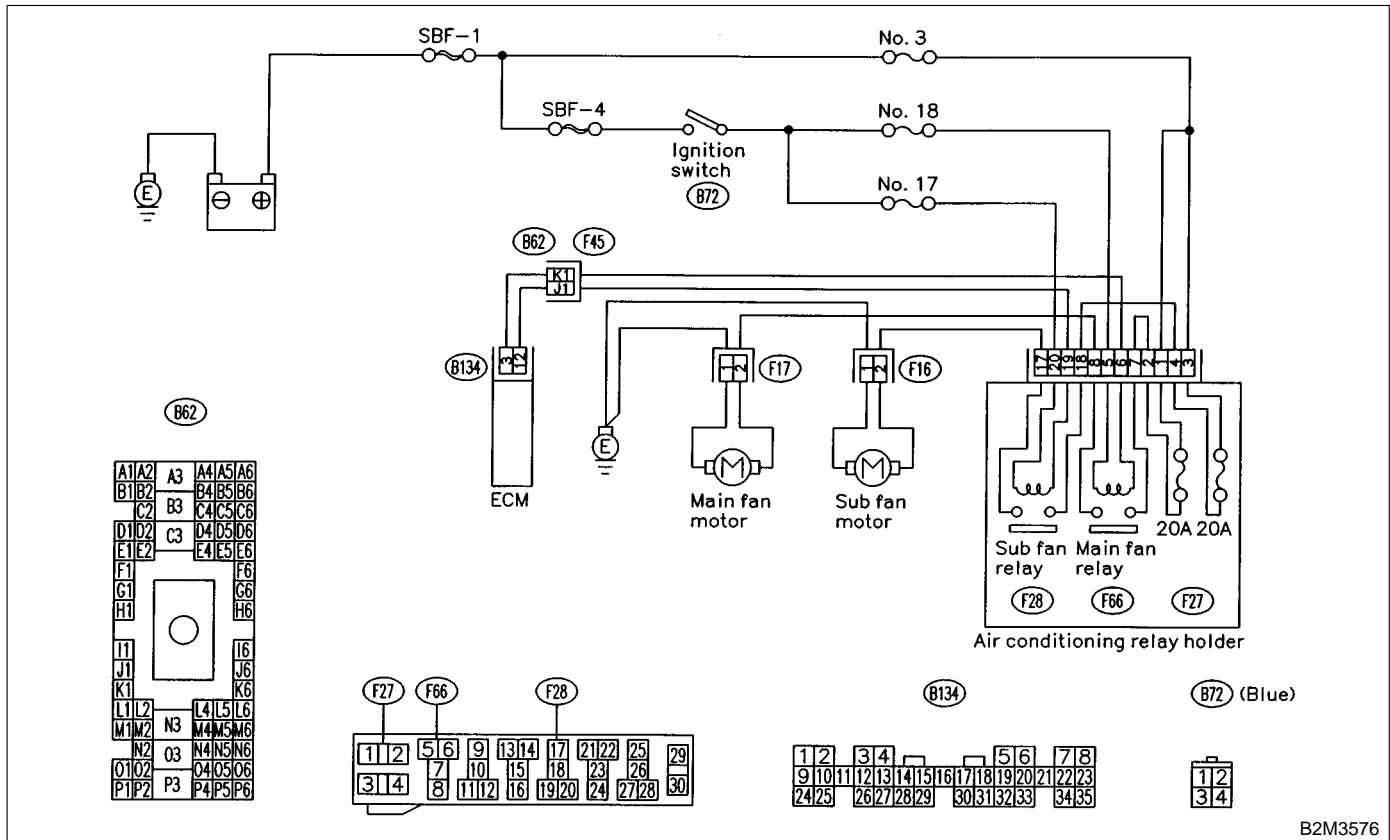
CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

NOTE:

If the vehicle, with the engine idling, is placed very close to a wall or another vehicle, preventing normal cooling function, the OBD system may detect malfunction.

● **WIRING DIAGRAM:**



10AS1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using “10. Diagnostics Chart with Trouble Code for MT Vehicles”. <Ref. to 2-7 [T10A0].>
- NO** : Check engine cooling system. <Ref. to 2-5 [T100].>

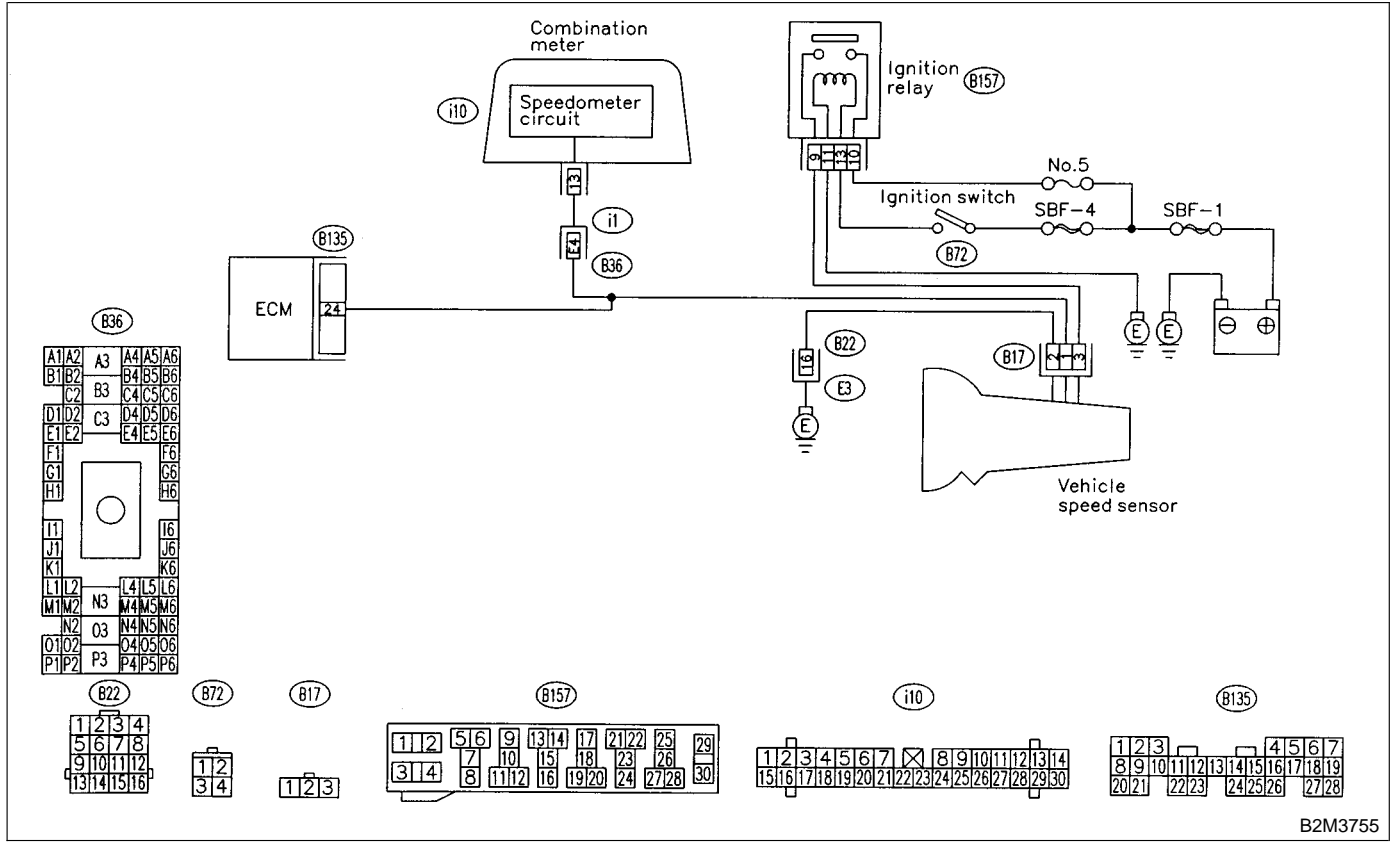
AT: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY MODE** <Ref. to 2-7 [T3D0].> and **INSPECTION MODE** <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3755

10AT1 : CHECK SPEEDOMETER OPERATION IN COMBINATION METER.

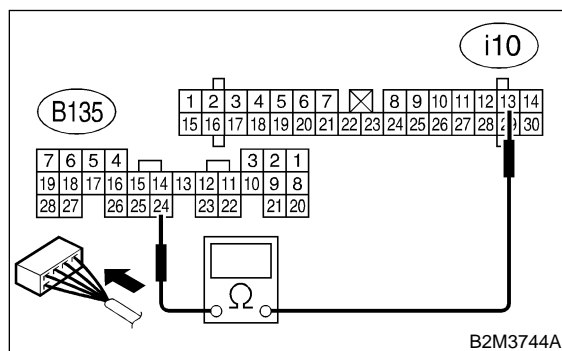
- CHECK** : Does speedometer operate normally?
- YES** : Go to step 10AT2.
- NO** : Check speedometer and vehicle speed sensor. <Ref. to 6-2 [K1A0].>

10AT2 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from combination meter.
- 3) Measure resistance between ECM and combination meter.

Connector & terminal

(B135) No. 24 — (i10) No. 13:



CHECK : **Is the resistance less than 10 Ω ?**

YES : Repair poor contact in ECM connector.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and combination meter connector
- Poor contact in ECM connector
- Poor contact in combination meter connector
- Poor contact in coupling connector (B36)

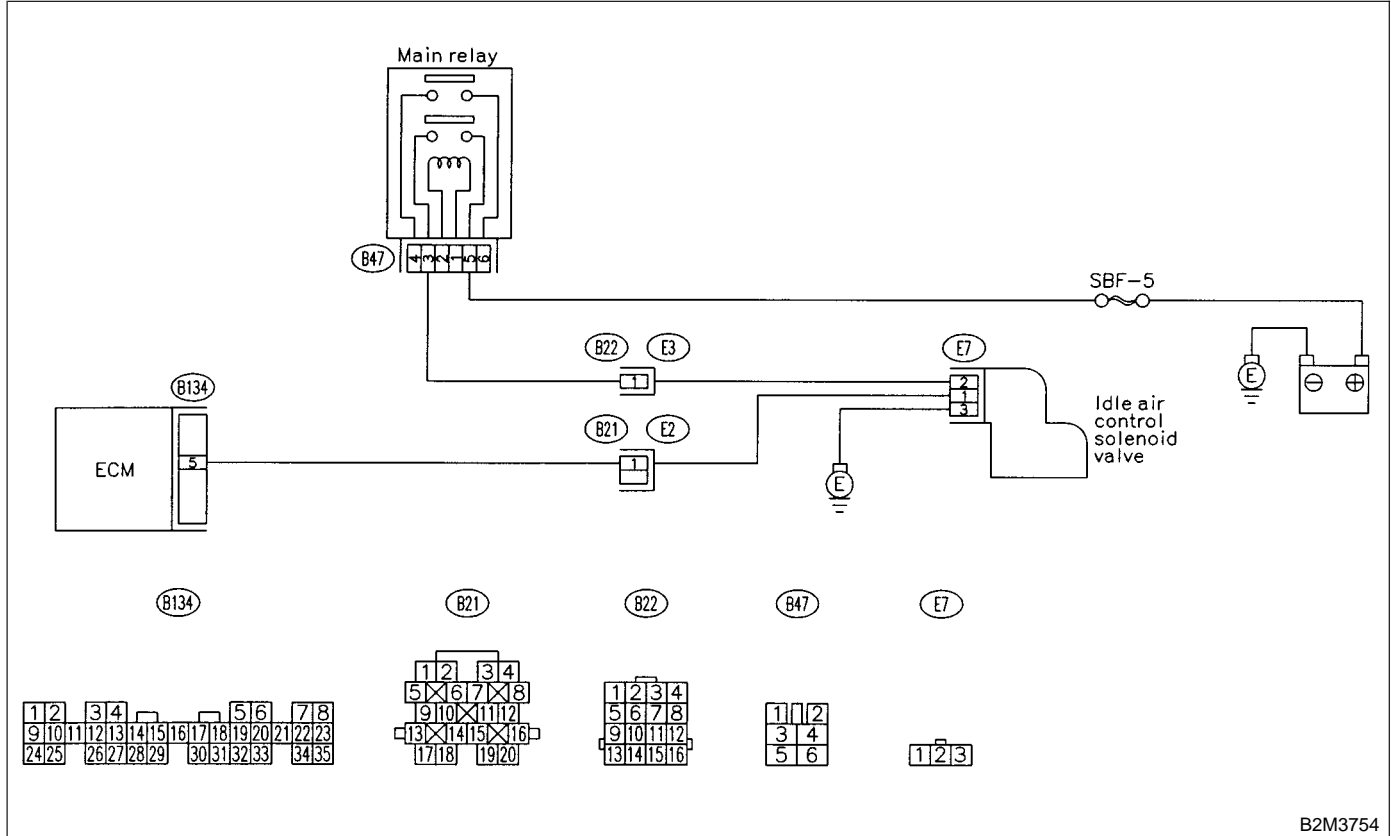
AU: DTC P0505 — IDLE CONTROL SYSTEM CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Engine breathing

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



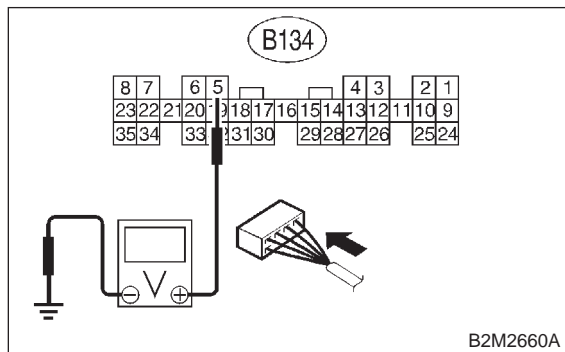
B2M3754

10AU1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 5 (+) — Chassis ground (-):



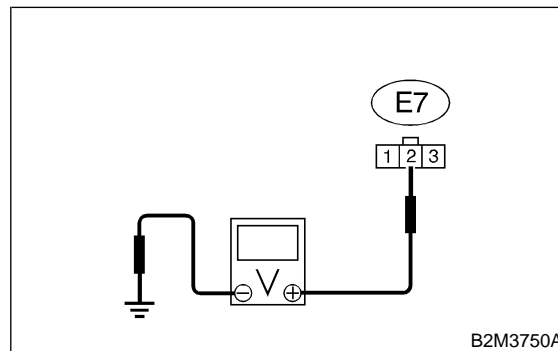
- CHECK** : *Is the voltage more than 3 V?*
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **10AU2**.

10AU2 : CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between idle air control solenoid valve and engine ground.

Connector & terminal

(E7) No. 2 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **10AU3**.
- NO** : Repair harness and connector.

NOTE:

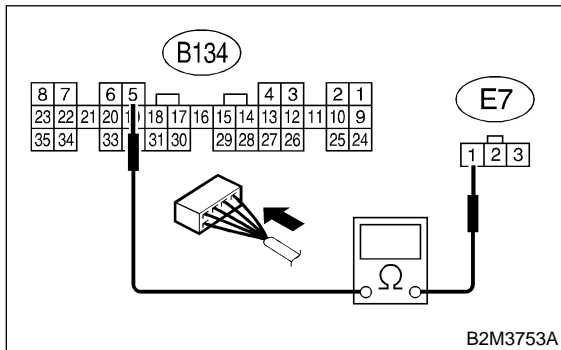
In this case, repair the following:

- Open circuit in harness between idle air control solenoid valve and main relay connector
- Poor contact in coupling connector (B22)

10AU3 : CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.

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

Connector & terminal
(B134) No. 5 — (E7) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10AU4**.
- NO** : Repair harness and connector.

NOTE:

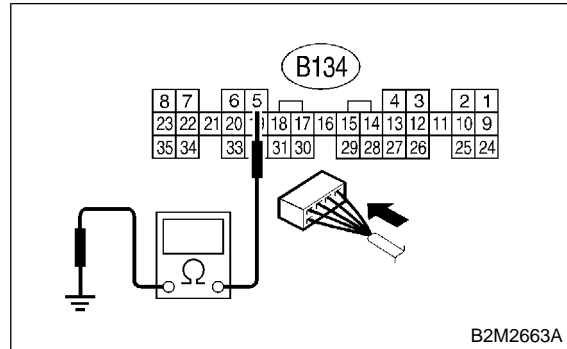
In this case, repair the following:

- Open circuit in harness between ECM and idle air control solenoid valve connector
- Poor contact in coupling connector (B21)

10AU4 : CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal
(B134) No. 5 — Chassis ground:

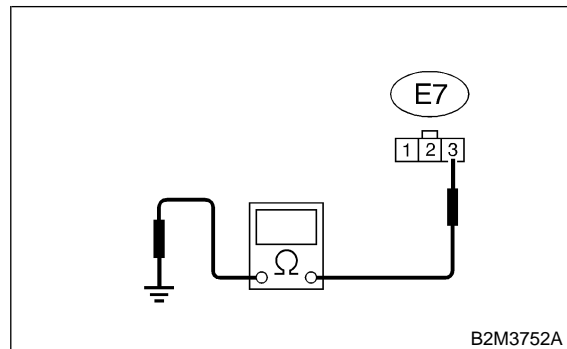


- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.
- NO** : Go to step **10AU5**.

10AU5 : CHECK GROUND CIRCUIT OF IDLE AIR CONTROL SOLENOID VALVE.

Measure resistance of harness between idle air control solenoid valve connector and engine ground.

Connector & terminal
(E7) No. 3 — Engine ground:



- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step **10AU6**.
- NO** : Repair open circuit in harness between idle air control solenoid valve connector and engine ground terminal.

10AU6 : CHECK POOR CONTACT.

Check poor contact in ECM and idle air control solenoid valve connectors. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM and idle air control solenoid valve connectors?*
- YES** : Repair poor contact in ECM and idle air control solenoid valve connectors.
- NO** : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A1].>

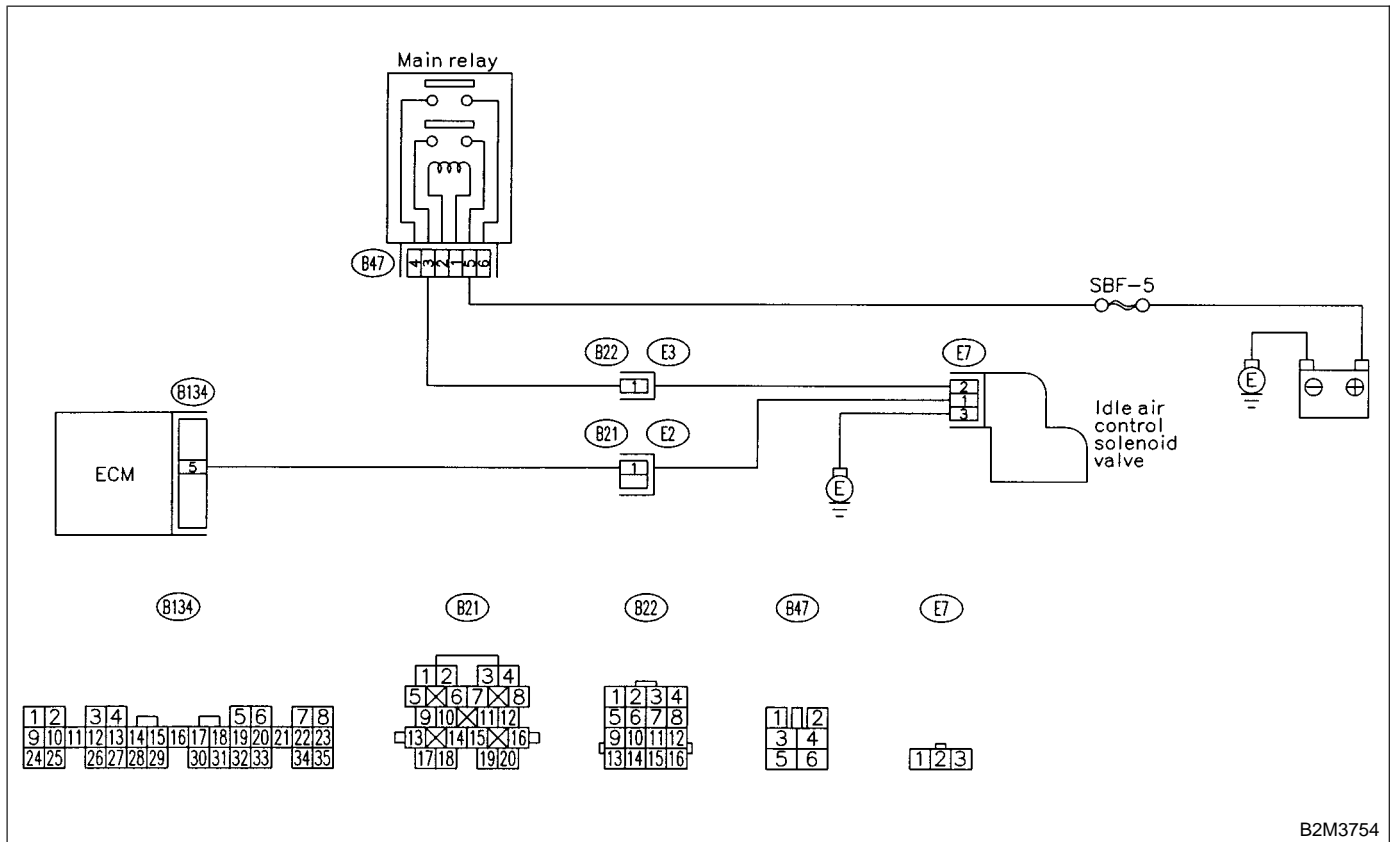
AV: DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine is difficult to start.
 - Engine does not start.
 - Erroneous idling
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3754

10AV1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0505 or P1505?

YES : Inspect DTC P0505 or P1505 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0506.

NO : Go to step **10AV2**.

10AV2 : CHECK IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve from throttle body. <Ref. to 2-7 [W15A1].>
- 3) Using an air gun, force air into idle air control solenoid valve by-pass air inlet. Confirm that forced air subsequently escapes from both main air passage and assist air passage.

- CHECK** : **Does air flow out?**
- YES** : Go to step **10AV4**.
- NO** : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A1].> After replace, Go to step **10AV3**.

10AV3 : CHECK IDLE AIR CONTROL SOLENOID VALVE DUTY RATIO.

- 1) Turn ignition switch to ON.
- 2) Start engine, and warm-up the engine.
- 3) Turn all accessory switches to OFF.
- 4) Read data of idle air control solenoid valve duty ratio using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedures, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : **Is the value more than 60%?**
- YES** : Go to step **10AV4**.
- NO** : END.

10AV4 : CHECK BY-PASS AIR LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve from throttle body. <Ref. to 2-7 [W15A1].>
- 3) Remove throttle body to intake manifold. <Ref. to 2-7 [W3A1].>
- 4) Using an air gun, force air into solenoid valve installation area and throttle valve interior. Confirm that forced air subsequently escapes from both these areas.

- CHECK** : **Does air flow out?**
- YES** : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A1].>
- NO** : Replace throttle body. <Ref. to 2-7 [W2A1].>

AW: DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED

● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

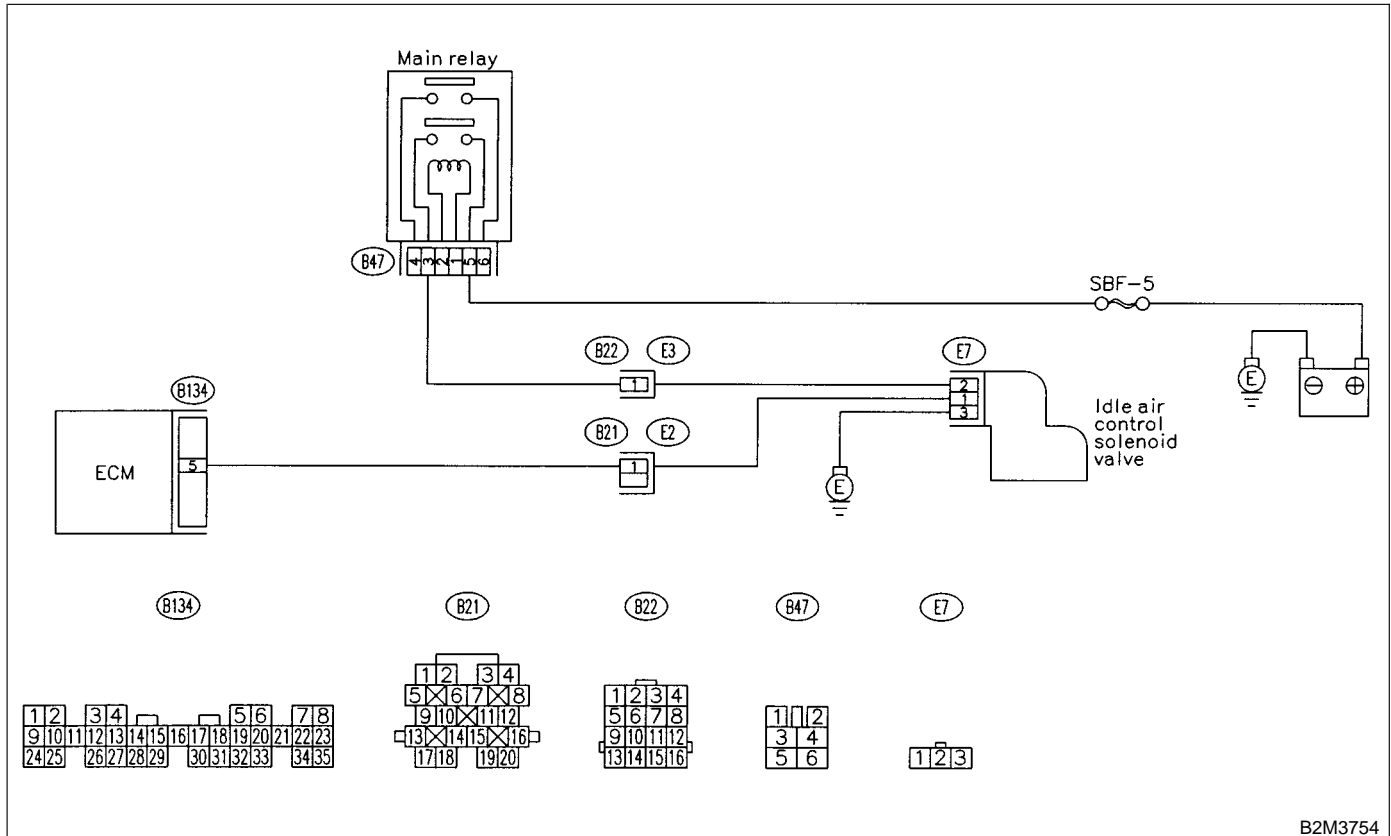
● **TROUBLE SYMPTOM:**

- Engine keeps running at higher revolution than specified idling revolution.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3754

10AW1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0505 or P1505?
- YES** : Inspect DTC P0505 or P1505 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T12A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0507.

- NO** : Go to step **10AW2**.

10AW2 : CHECK THROTTLE CABLE.

- CHECK** : Does throttle cable have play for adjustment?
- YES** : Go to step **10AW3**.
- NO** : Adjust throttle cable. <Ref. to 4-5 [W1A3].>

10AW3 : CHECK AIR INTAKE SYSTEM.

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.
- 3) Check the following items.
 - Loose installation of intake manifold, idle air control solenoid valve and throttle body
 - Cracks of intake manifold gasket, idle air control solenoid valve gasket and throttle body gasket
 - Disconnections of vacuum hoses

CHECK : *Is there a fault in air intake system?*

YES : Repair air suction and leaks.

NO : Replace idle air control solenoid valve.
<Ref. to 2-7 [W15A1].>

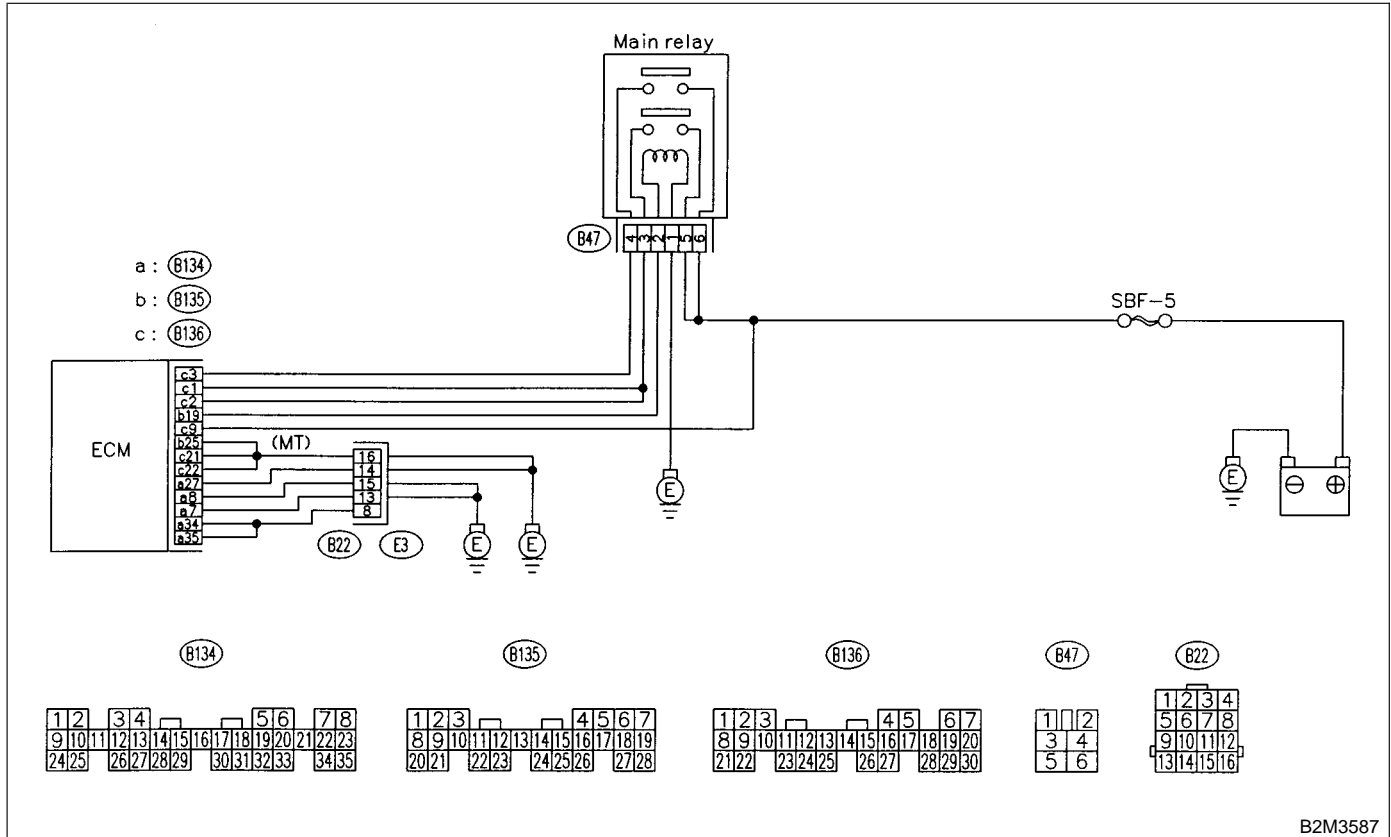
AX: DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine does not start.
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3587

10AX1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0601?
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : It is not necessary to inspect DTC P0601.

AY: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

AZ: DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BA: DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BB: DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BC: DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BD: DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BE: DTC P0731 — GEAR 1 INCORRECT RATIO —

NOTE:

This DTC code is not applicable to MT vehicles.

BF: DTC P0732 — GEAR 2 INCORRECT RATIO —

NOTE:

This DTC code is not applicable to MT vehicles.

BG: DTC P0733 — GEAR 3 INCORRECT RATIO —

NOTE:

This DTC code is not applicable to MT vehicles.

BH: DTC P0734 — GEAR 4 INCORRECT RATIO —

NOTE:

This DTC code is not applicable to MT vehicles.

BI: DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

BJ: DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL —

NOTE:

This DTC code is not applicable to MT vehicles.

BK: DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL —

NOTE:

This DTC code is not applicable to MT vehicles.

BL: DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL —

NOTE:

This DTC code is not applicable to MT vehicles.

BM: DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —

NOTE:

This DTC code is not applicable to MT vehicles.

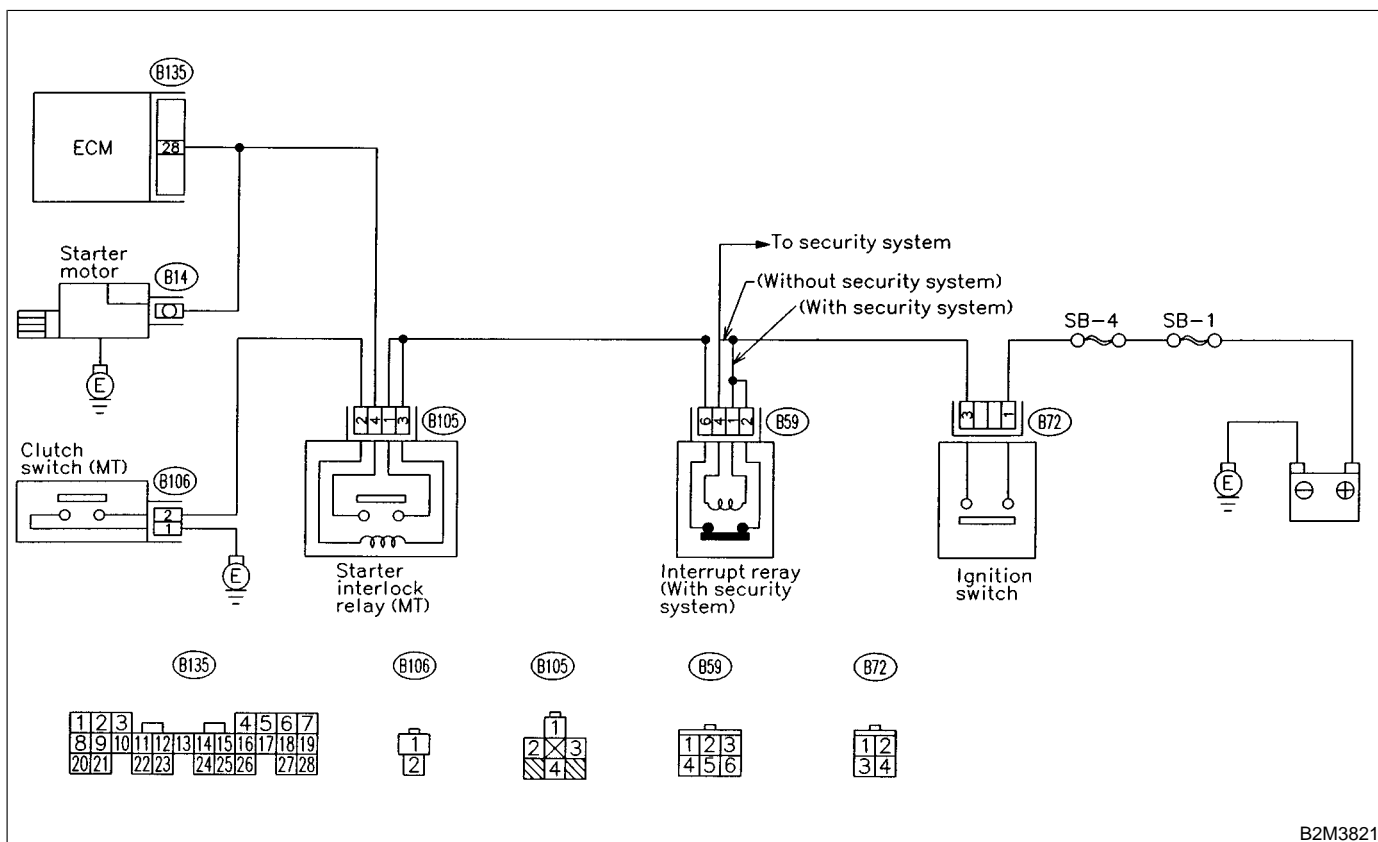
BN: DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10BN1 : CHECK OPERATION OF STARTER MOTOR.

Depress the clutch pedal.

CHECK : *Does starter motor operate when ignition switch to "ST"?*

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open or ground short circuit in harness between ECM and starter motor connector.
- Poor contact in ECM connector.

NO : Check starter motor circuit. <Ref. to 2-7 [T8B0].>

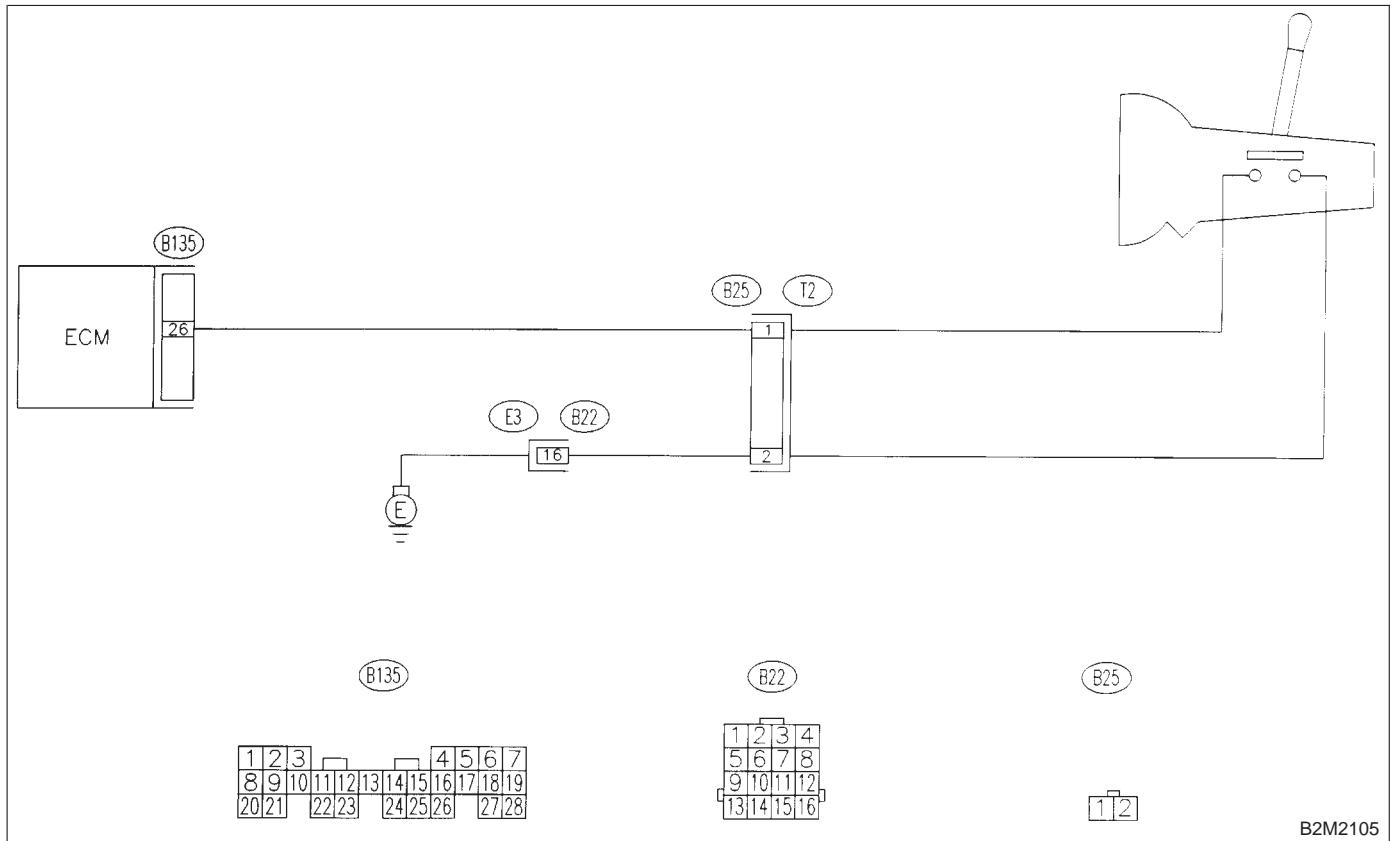
BO: DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



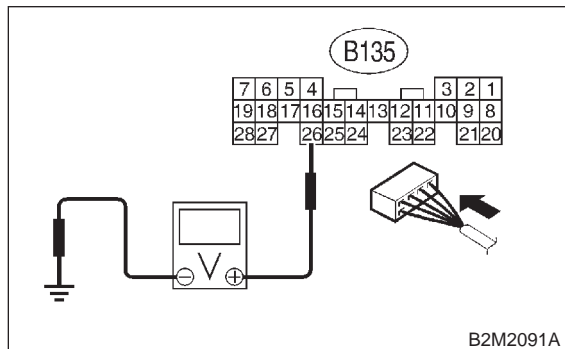
B2M2105

10B01 : CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 10 V in neutral position?**

YES : Go to step 10B02.

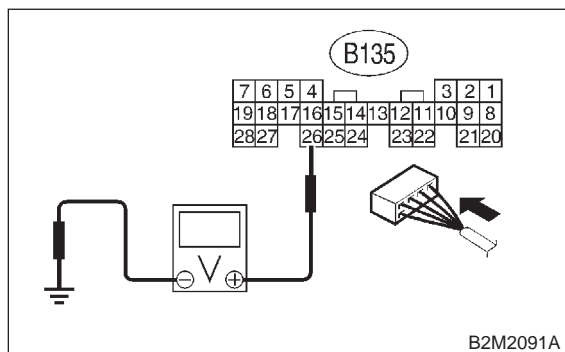
NO : Go to step 10B04.

10B02 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



CHECK : **Is the voltage less than 1 V in other positions?**

YES : Go to step 10B03.

NO : Go to step 10B04.

10B03 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : Contact with SOA service.

NOTE:

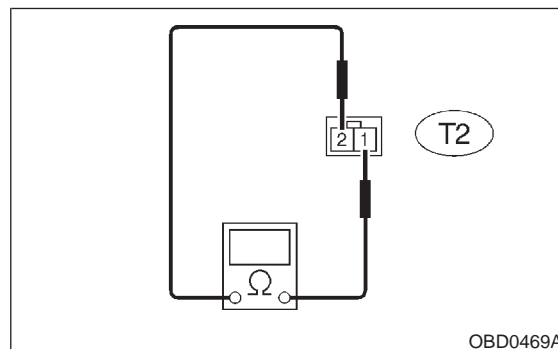
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10B04 : CHECK NEUTRAL POSITION SWITCH.

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

Connector & terminal

(T2) No. 1 — No. 2:



CHECK : **Is the resistance more than 1 MΩ in neutral position?**

YES : Go to step 10B05.

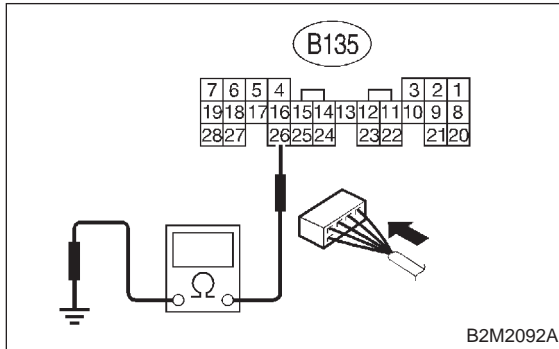
NO : Repair short circuit in transmission harness or replace neutral position switch.

10B05 : CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.

Measure resistance between ECM and chassis ground.

Connector & terminal

(B135) No. 26 — Chassis ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and transmission harness connector.
- NO** : Go to step **10B06**.

10B06 : CHECK POOR CONTACT.

Check poor contact in transmission harness connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in transmission harness connector?**
- YES** : Repair poor contact in transmission harness connector.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

**BP: DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT
MALFUNCTION —**

NOTE:

This DTC code is not applicable to MT vehicles.

**BQ: DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT
MALFUNCTION —**

NOTE:

This DTC code is not applicable to MT vehicles.

BR: DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

10BR1 : CHECK ANY OTHER DTC ON DISPLAY.
--

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1110?*

YES : Replace ECM. <Ref. to 2-7 [W19A0].>

NOTE:

Atmospheric pressure sensor is built into ECM.

NO : It is not necessary to inspect DTC P1110.

BS: DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

10BS1 : CHECK ANY OTHER DTC ON DISPLAY.
--

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1111?*

YES : Replace ECM. <Ref. to 2-7 [W19A0].>

NOTE:

Atmospheric pressure sensor is built into ECM.

NO : It is not necessary to inspect DTC P1111.

**BT: DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/
PERFORMANCE PROBLEM —****● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

10BT1 : CHECK ANY OTHER DTC ON DISPLAY.
--

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P1110 or P1111?*

YES : Inspect DTC P0106, P0107, P0108, P1110 or P1111 using “10. Diagnostics Chart with Trouble Code for MT Vehicles”. <Ref. to 2-7 [T10A0].>

NO : Replace ECM. <Ref. to 2-7 [W19A0].>

NOTE:

Atmospheric pressure sensor is built into ECM.

BU: DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT —

NOTE:

This DTC code is not applicable to MT vehicles.

BV: DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT —

NOTE:

This DTC code is not applicable to MT vehicles.

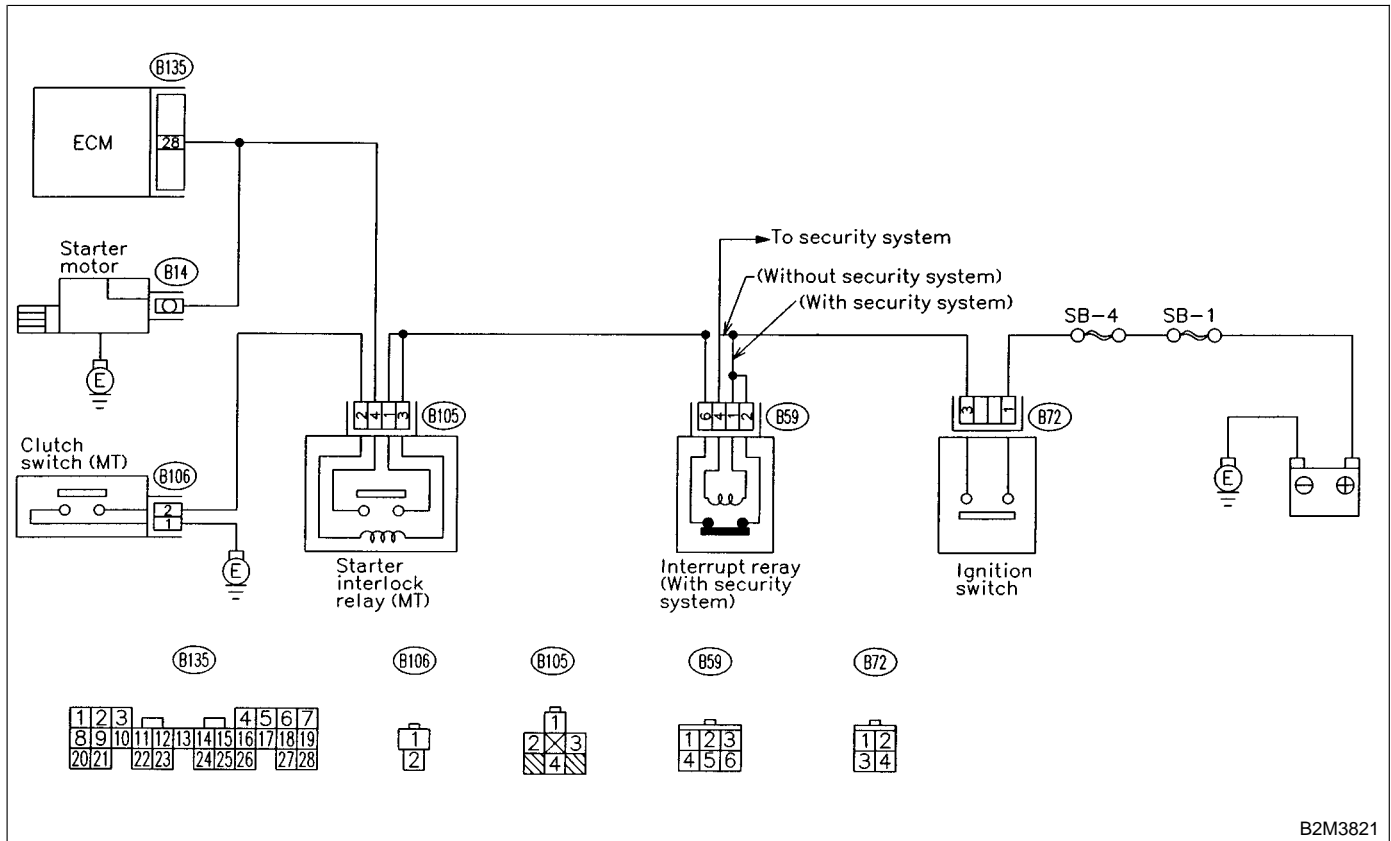
BW: DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10BW1 : CHECK OPERATION OF STARTER MOTOR.

NOTE:

Depress or release the clutch pedal.

- CHECK** : **Does starter motor operate when ignition switch to "ON"?**
- YES** : Repair battery short circuit in starter motor circuit. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Check starter motor circuit. <Ref. to 2-7 [T8B0].>

MEMO:

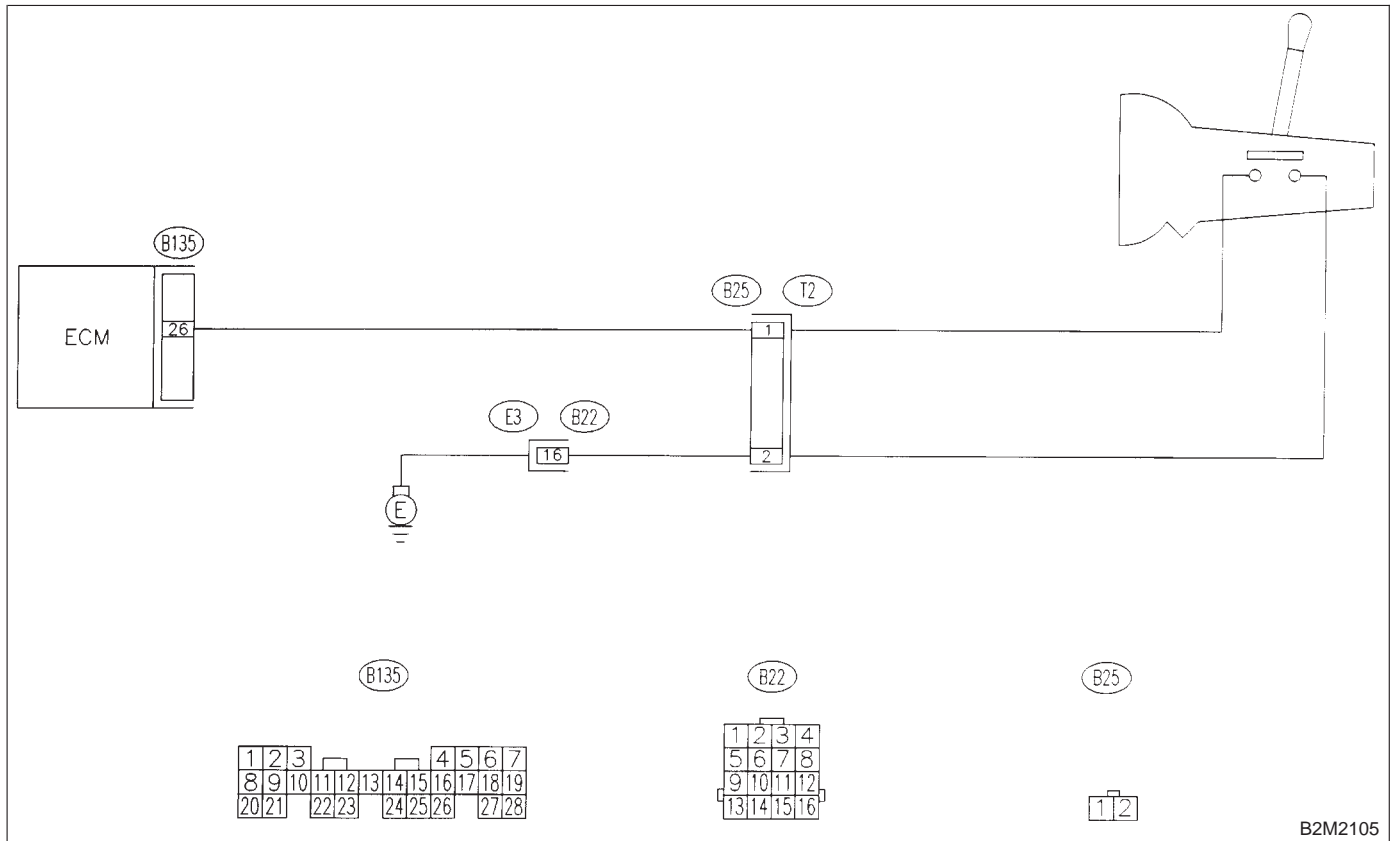
BX: DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

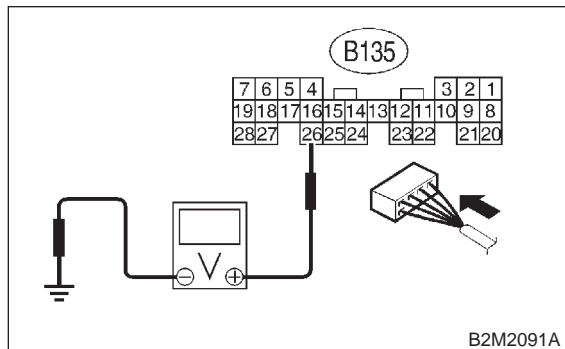


10BX1 : CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



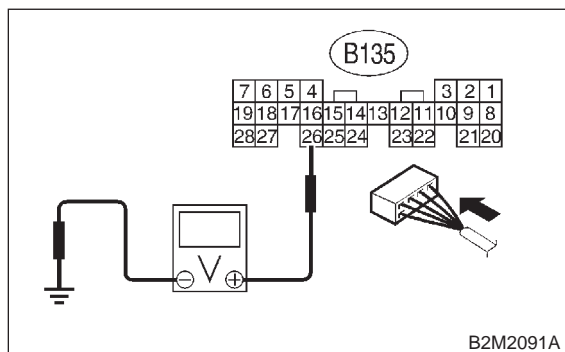
- CHECK** : *Is the voltage more than 10 V in neutral position?*
- YES** : Go to step **10BX2**.
- NO** : Go to step **10BX4**.

10BX2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 1 V in other positions?*
- YES** : Go to step **10BX3**.
- NO** : Go to step **10BX4**.

10BX3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

NOTE:

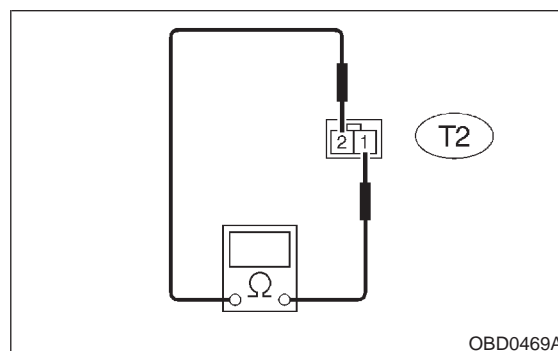
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10BX4 : CHECK NEUTRAL POSITION SWITCH.

Measure resistance between transmission harness connector terminals.

Connector & terminal

(T2) No. 1 — No. 2:



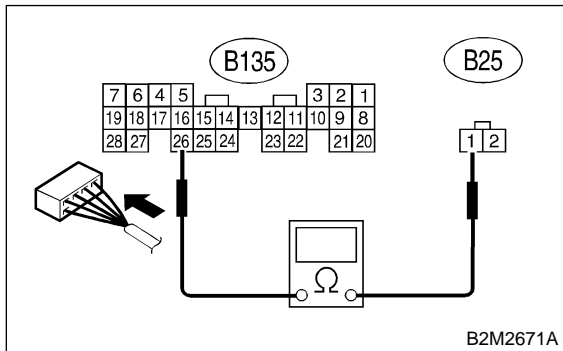
- CHECK** : *Is the resistance less than 1 Ω in other positions?*
- YES** : Go to step **10BX5**.
- NO** : Repair open circuit in transmission harness or replace neutral position switch.

10BX5 : CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.

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

Connector & terminal

(B135) No. 26 — (B25) No. 1:



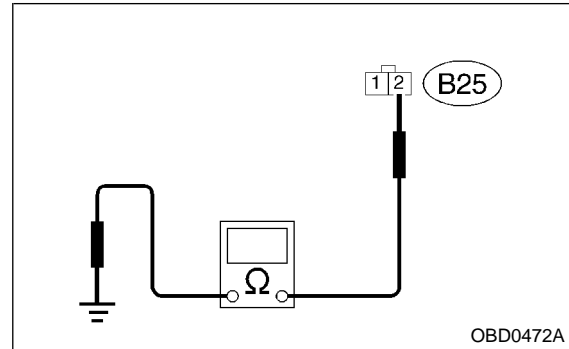
- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **10BX6**.
- NO** : Repair open circuit in harness between ECM and transmission harness connector.

10BX6 : CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.

Measure resistance of harness between transmission harness connector and engine ground.

Connector & terminal

(B25) No. 2 — Engine ground:



- CHECK** : **Is the resistance less than 5 Ω?**
- YES** : Go to step **10BX7**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between transmission harness connector and engine grounding terminal
- Poor contact in coupling connector (B22)

10BX7 : CHECK POOR CONTACT.

Check poor contact in transmission harness connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in transmission harness connector?**
- YES** : Repair poor contact in transmission harness connector.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

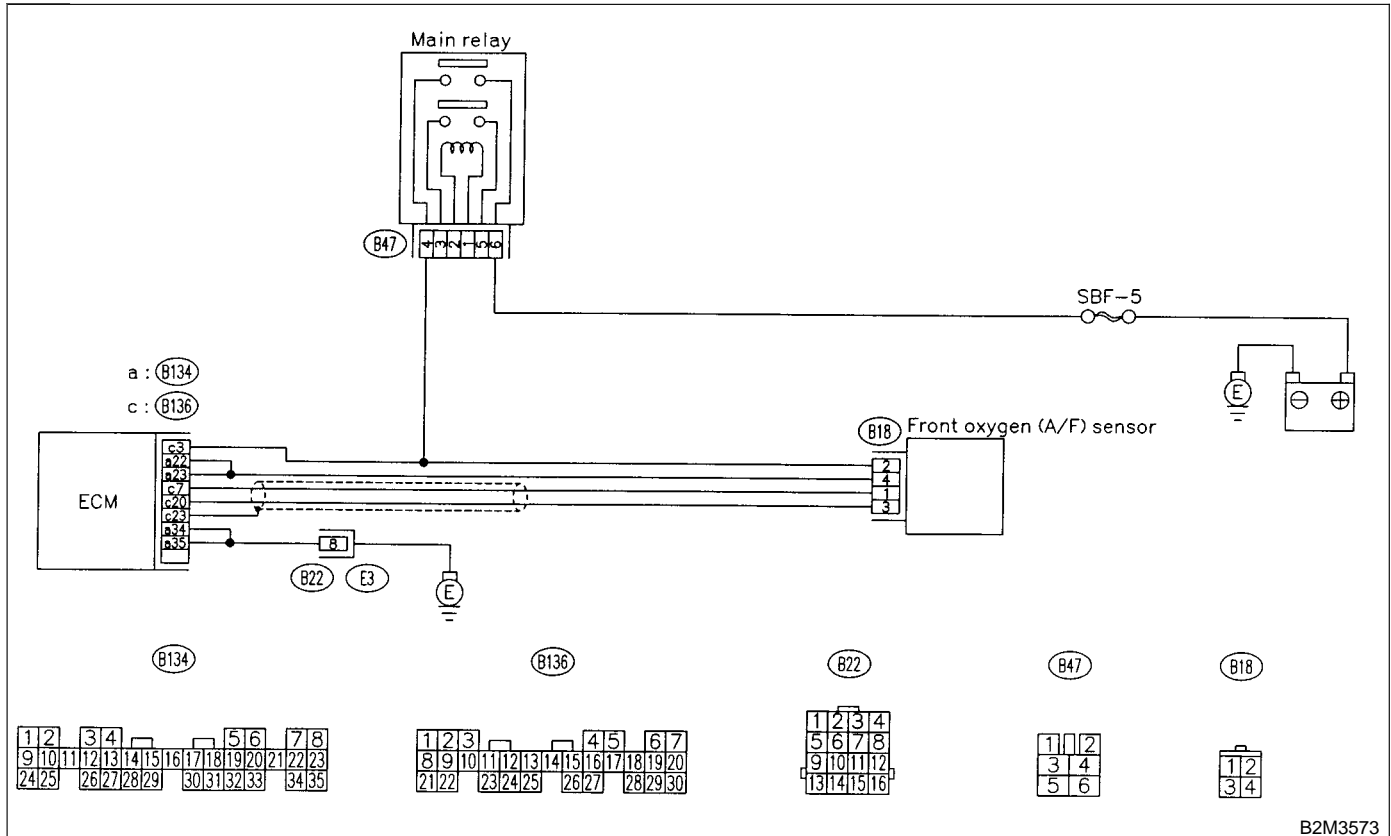
BY: DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



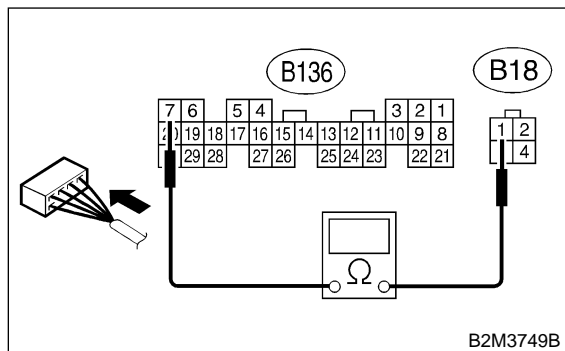
B2M3573

10BY1 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and front oxygen (A/F) sensor connector.
- 3) Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B136) No. 7 — (B18) No. 1:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step **10BY2**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

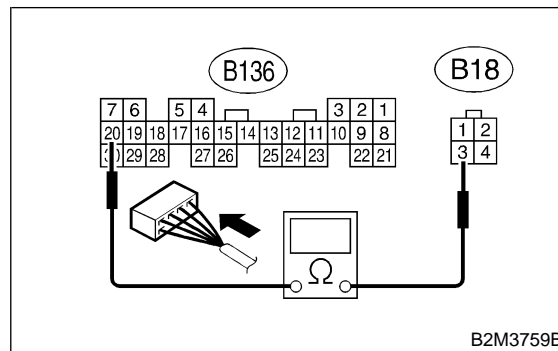
- Open circuit in harness between ECM and front oxygen (A/F) sensor connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

10BY2 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B136) No. 20 — (B18) No. 3:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step **10BY3**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and front oxygen (A/F) sensor connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

10BY3 : CHECK POOR CONTACT.

Check poor contact in front oxygen (A/F) sensor connector. <Ref. to FOREWORD [T3C1].>

CHECK : *Is there poor contact in front oxygen (A/F) sensor connector?*

YES : Repair poor contact in front oxygen (A/F) sensor connector.

NO : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

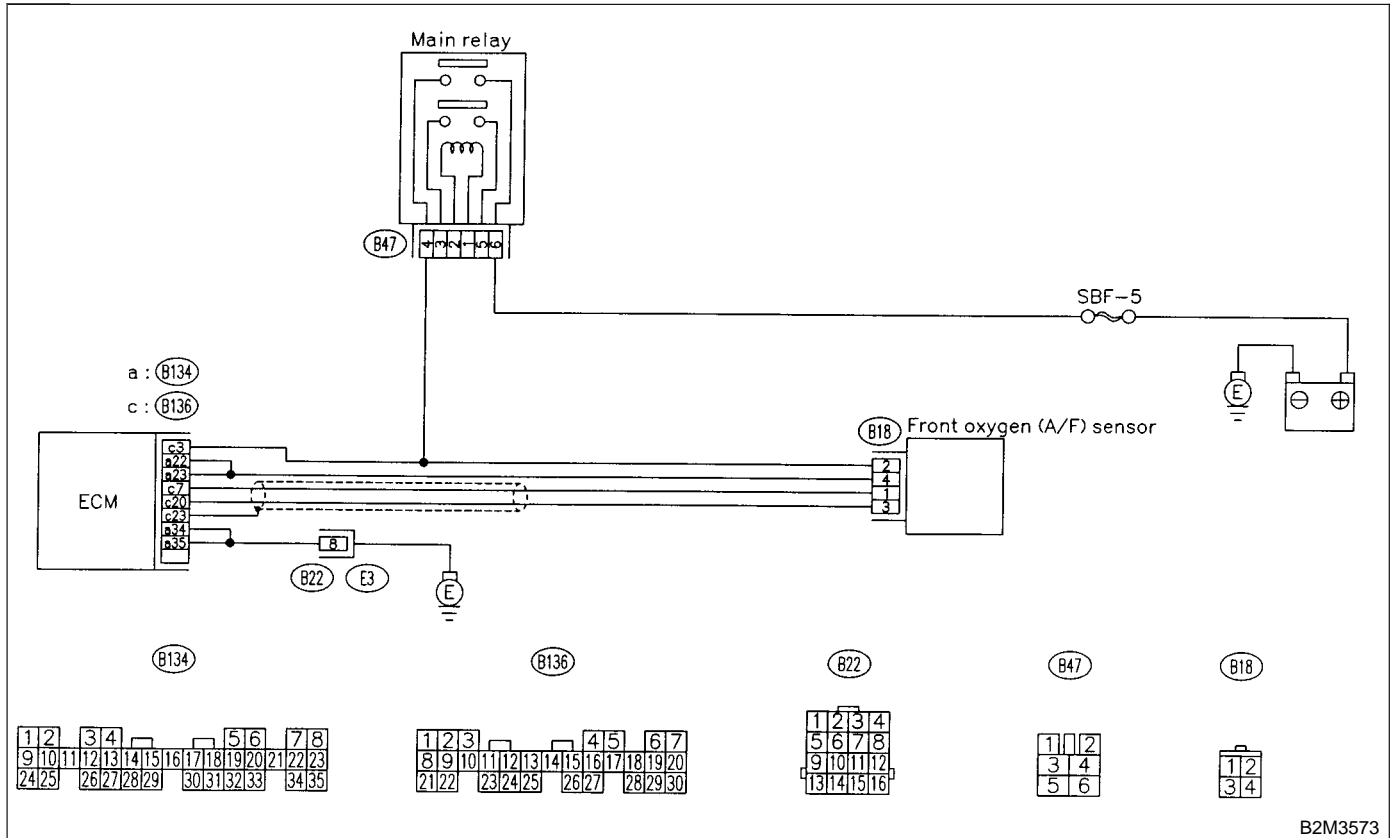
BZ: DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**

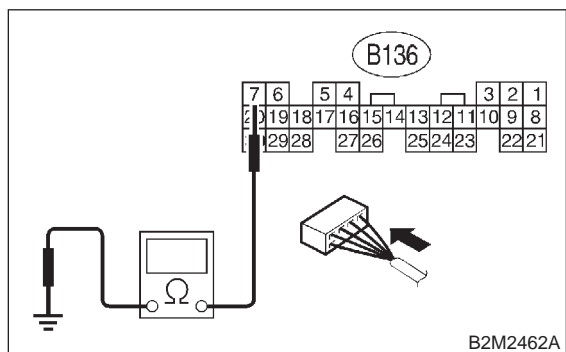


B2M3573

10BZ1 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

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

Connector & terminal
(B136) No. 7 (+) — Chassis ground (-):

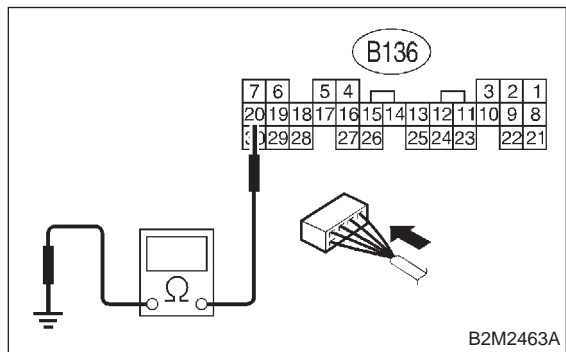


- CHECK** : Is the resistance more than 10 Ω?
YES : Go to step 10BZ2.
NO : Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.

10BZ2 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal
(B136) No. 20 — Chassis ground (-):

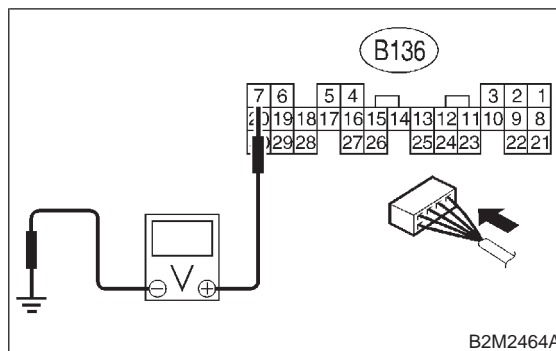


- CHECK** : Is the resistance more than 10 Ω?
YES : Go to step 10BZ3.
NO : Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.

10BZ3 : CHECK OUTPUT SIGNAL FOR ECM.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 7 (+) — Chassis ground (-):

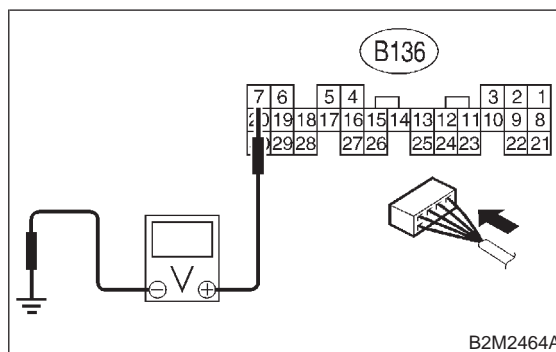


- CHECK** : Is the voltage more than 4.5 V?
YES : Go to step 10BZ4.
NO : Go to step 10BZ5.

10BZ4 : CHECK OUTPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 7 (+) — Chassis ground (-):



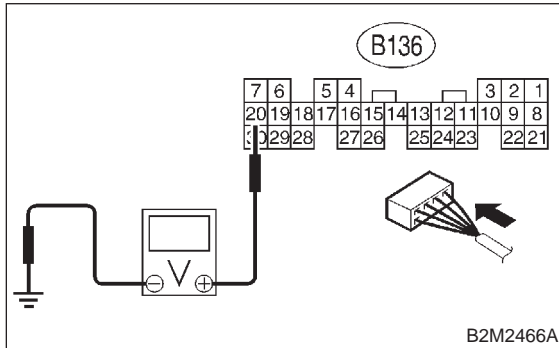
- CHECK** : Is the voltage more than 10 V?
YES : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
NO : Repair poor contact in ECM connector.

10BZ5 : CHECK OUTPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 20 (+) — Chassis ground (-):



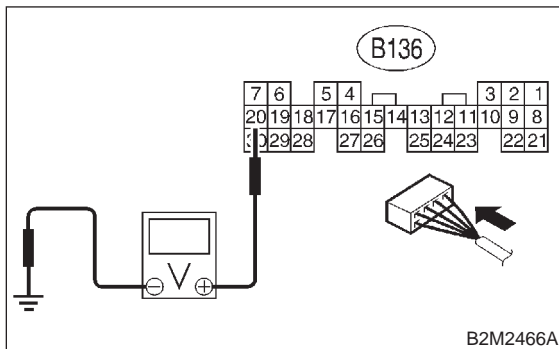
- CHECK** : **Is the voltage more than 4.95 V?**
- YES** : Go to step **10BZ6**.
- NO** : Replace front oxygen (A/F) sensor.
<Ref. to 2-7 [W8A0].>

10BZ6 : CHECK OUTPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 20 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Repair poor contact in ECM connector.

MEMO:

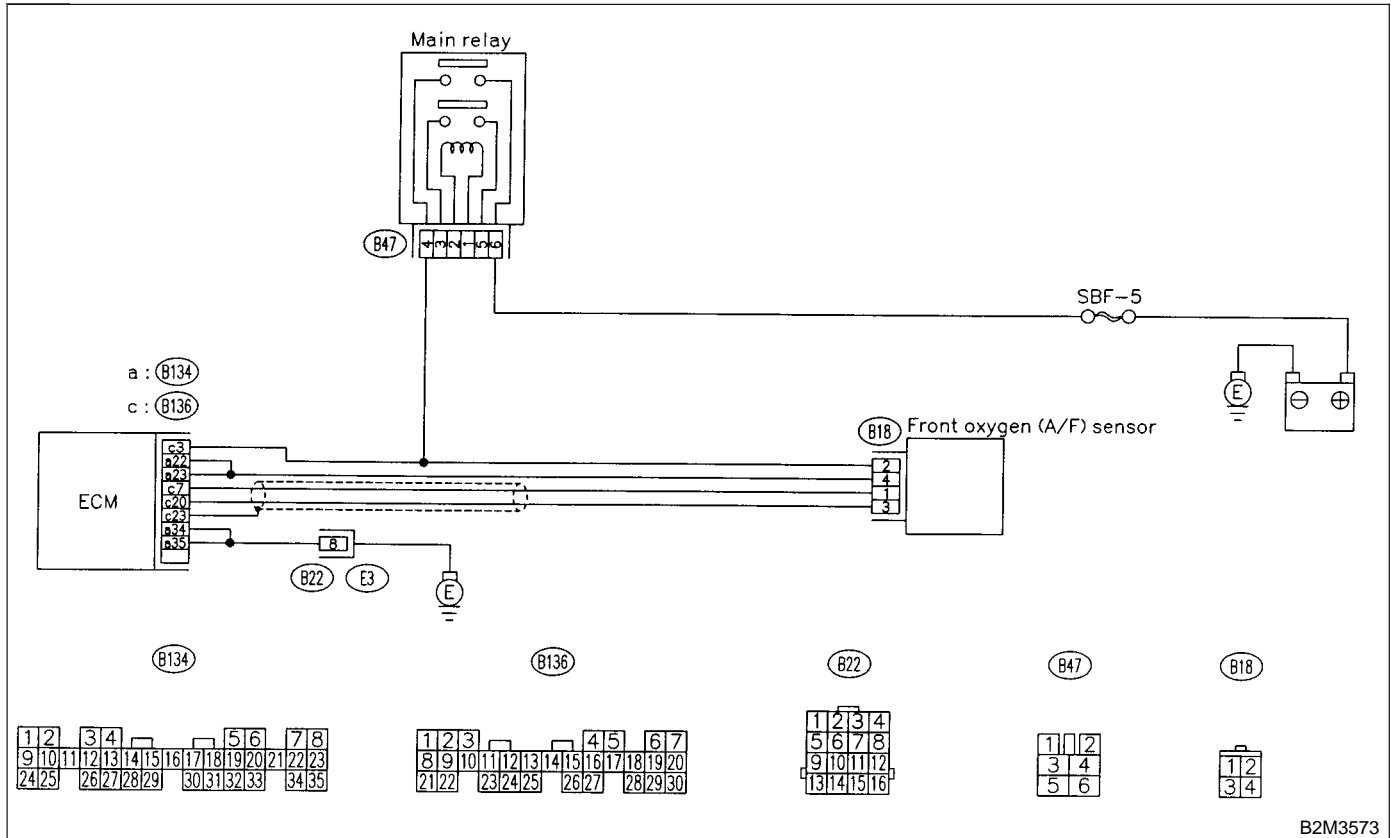
CA: DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3573

10CA1 : CHECK ANY OTHER DTC ON DISPLAY.

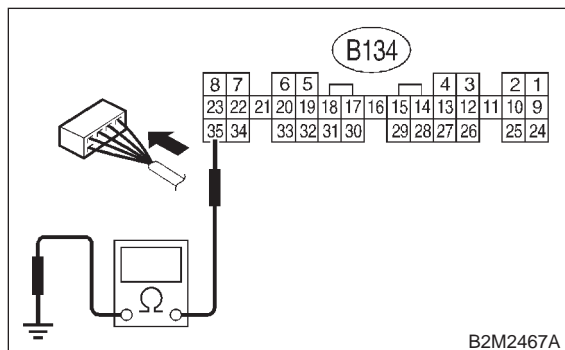
- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1132 and P0141 at the same time?
- YES** : Go to step 10CA2.
- NO** : Go to step 10CA5.

10CA2 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 35 — Chassis ground:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step **10CA6**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

10CA3 : CHECK GROUND CIRCUIT OF ECM.

1) Repair harness and connector.

NOTE:

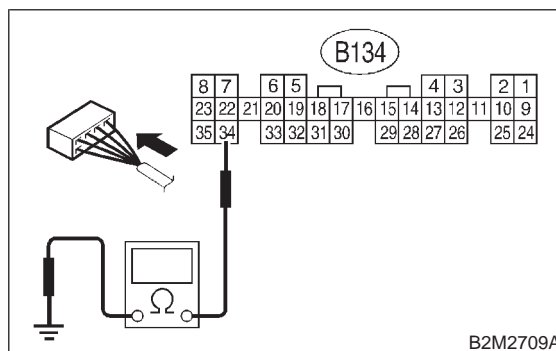
In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

2) Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 34 — Chassis ground:



CHECK : *Is there resistance less than 5 Ω?*

YES : Go to step **10CA6**.

NO : Repair harness and connector.

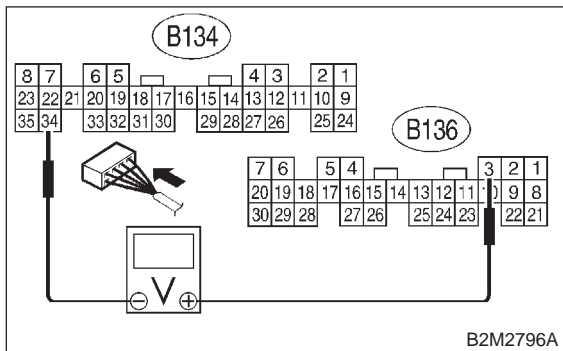
NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

10CA4 : CHECK POWER SUPPLY CIRCUIT OF ECM.

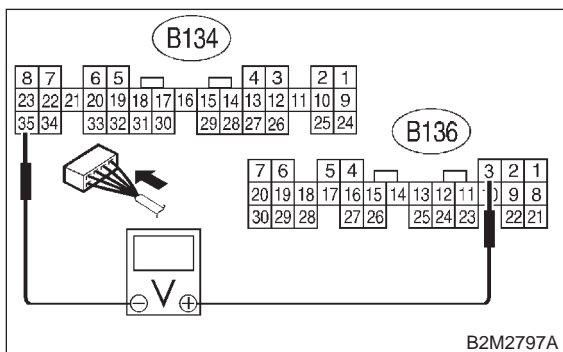
- 1) Disconnect connectors from ECM.
- 2) Turn ignition switch to ON.
- 3) Measure power supply voltage between ECM connector terminals.

Connector & terminal**(B136) No. 3 (+) — (B134) No. 34 (-):**

- CHECK** : **Is the voltage more than 8 V?**
- YES** : Go to step **10CA3**.
- NO** : Repair open or ground short circuit in harness of power supply circuit.

10CA5 : CHECK POWER SUPPLY CIRCUIT OF ECM.

Measure power supply voltage between ECM connector terminals.

Connector & terminal**(B136) No. 3 (+) — (B136) No. 35 (-):**

- CHECK** : **Is the voltage more than 8 V?**
- YES** : Go to step **10CA4**.
- NO** : Repair open or ground short circuit in harness of power supply circuit.

10CA6 : CHECK CURRENT DATA.

- 1) Start engine
- 2) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : **Is the value more than 0.2 A?**

YES : Repair poor contact in connector.

NOTE:

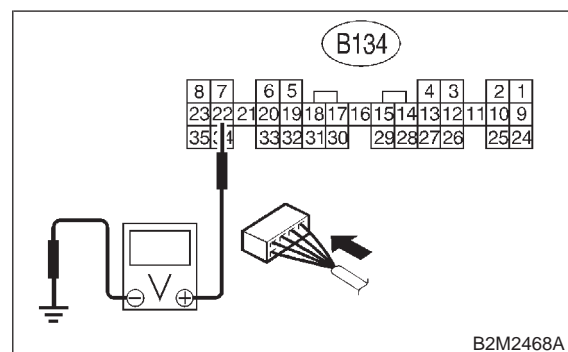
In this case, repair the following:

- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

NO : Go to step **10CA7**.

10CA7 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Start and idle the engine.
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal**(B134) No. 22 (+) — Chassis ground (-):**

CHECK : **Is the voltage less than 1.0 V?**

YES : Go to step **10CA9**.

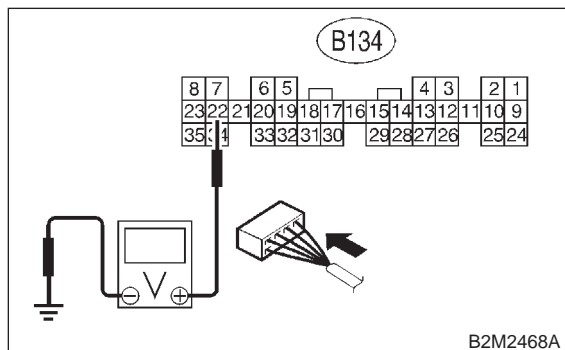
NO : Go to step **10CA8**.

10CA8 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



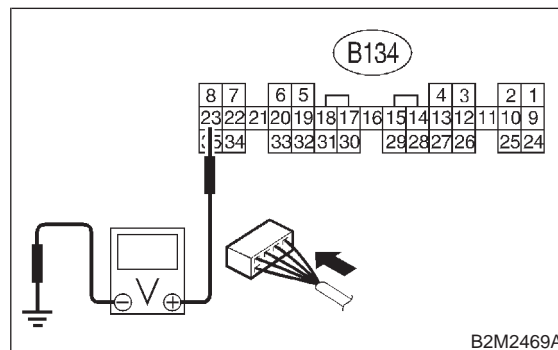
- CHECK** : Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 10CA9.

10CA10 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



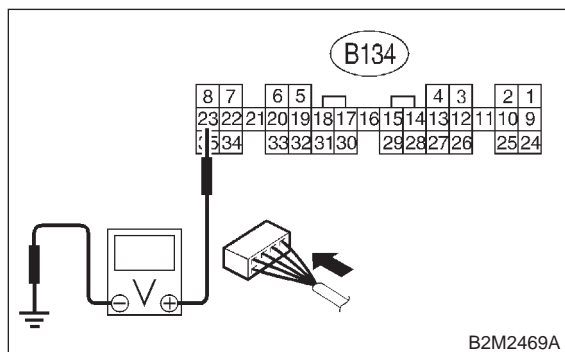
- CHECK** : Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 10CA11.

10CA9 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



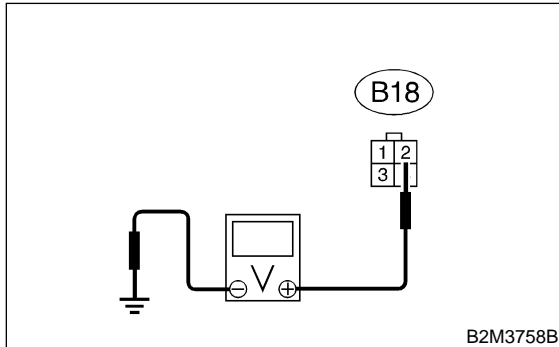
- CHECK** : Is the voltage less than 1.0 V?
- YES** : Go to step 10CA11.
- NO** : Go to step 10CA10.

10CA11 : CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from front oxygen (A/F) sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between front oxygen (A/F) sensor connector and engine ground.

Connector & terminal

(E18) No. 2 (+) — Engine ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Go to step **10CA12**.

NO : Repair power supply line.

NOTE:

In this case, repair the following:

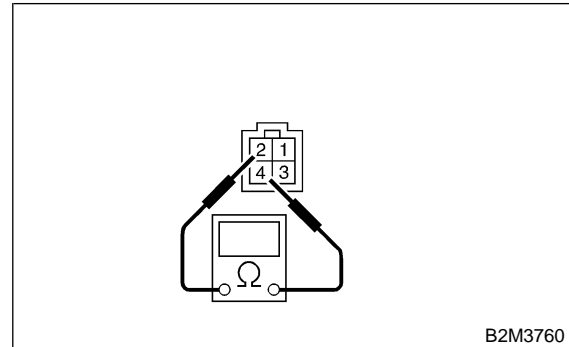
- Open circuit in harness between main relay and front oxygen (A/F) sensor connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in main relay connector

10CA12 : CHECK FRONT OXYGEN (A/F) SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between front oxygen (A/F) sensor connector terminals.

Terminals

No. 2 — No. 4:



CHECK : **Is the resistance less than 10 Ω?**

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open or ground short circuit in harness between front oxygen (A/F) sensor and ECM connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

NO : Replace front oxygen (A/F) sensor.
<Ref. to 2-7 [W8A0].>

MEMO:

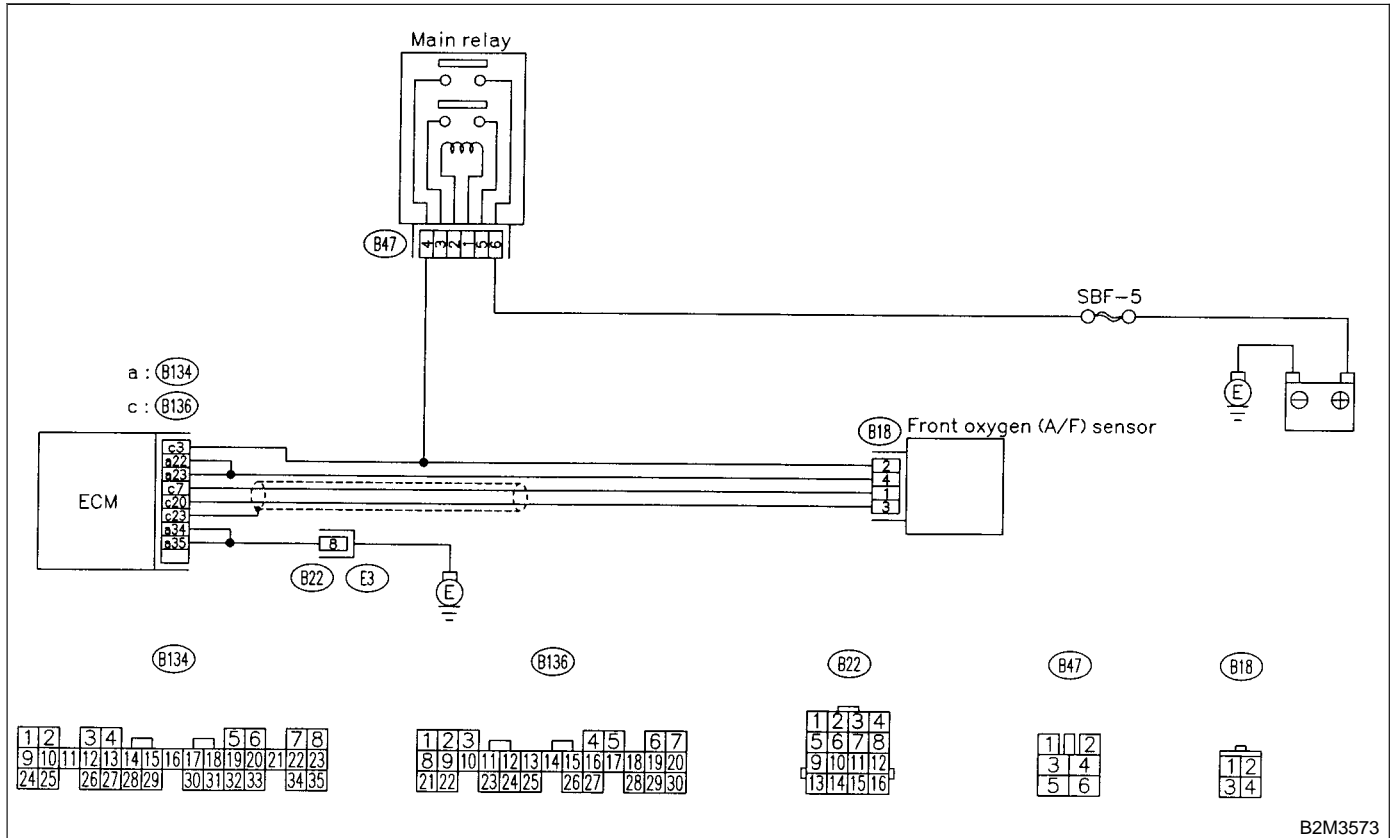
CB: DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



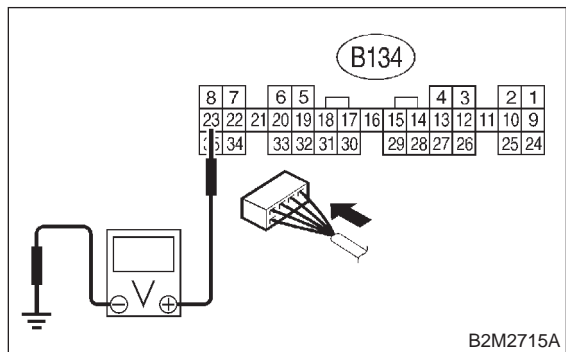
B2M3573

10CB1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



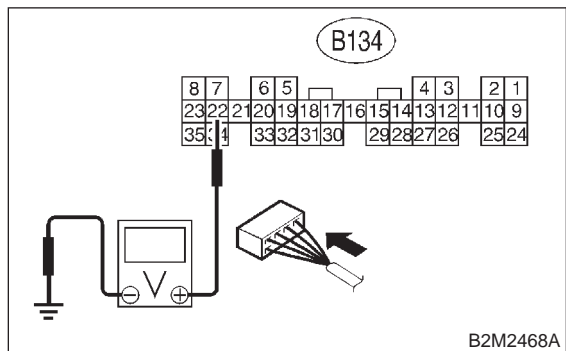
- CHECK** : *Is the voltage more than 8 V?*
- YES** : Go to step **10CB3**.
- NO** : Go to step **10CB2**.

10CB2 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 8 V?*
- YES** : Go to step **10CB3**.
- NO** : Go to step **10CB4**.

10CB3 : CHECK FRONT OXYGEN (A/F) SENSOR HEATER CURRENT.

- 1) Turn ignition switch to OFF.
- 2) Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- 3) Turn ignition switch to ON.
- 4) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

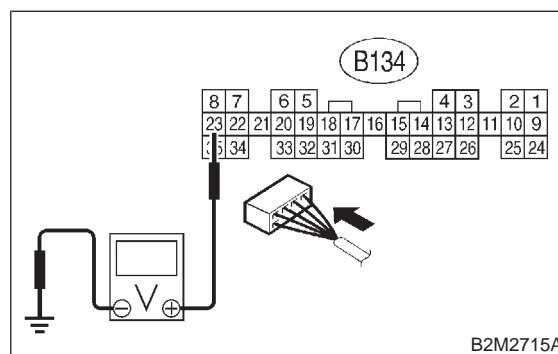
- CHECK** : *Is the value more than 2.3 A?*
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : END

10CB4 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



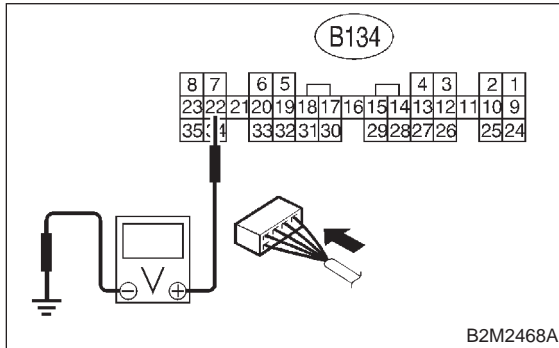
- CHECK** : *Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- NO** : Go to step **10CB5**.

10CB5 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



- CHECK** : **Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- NO** : END

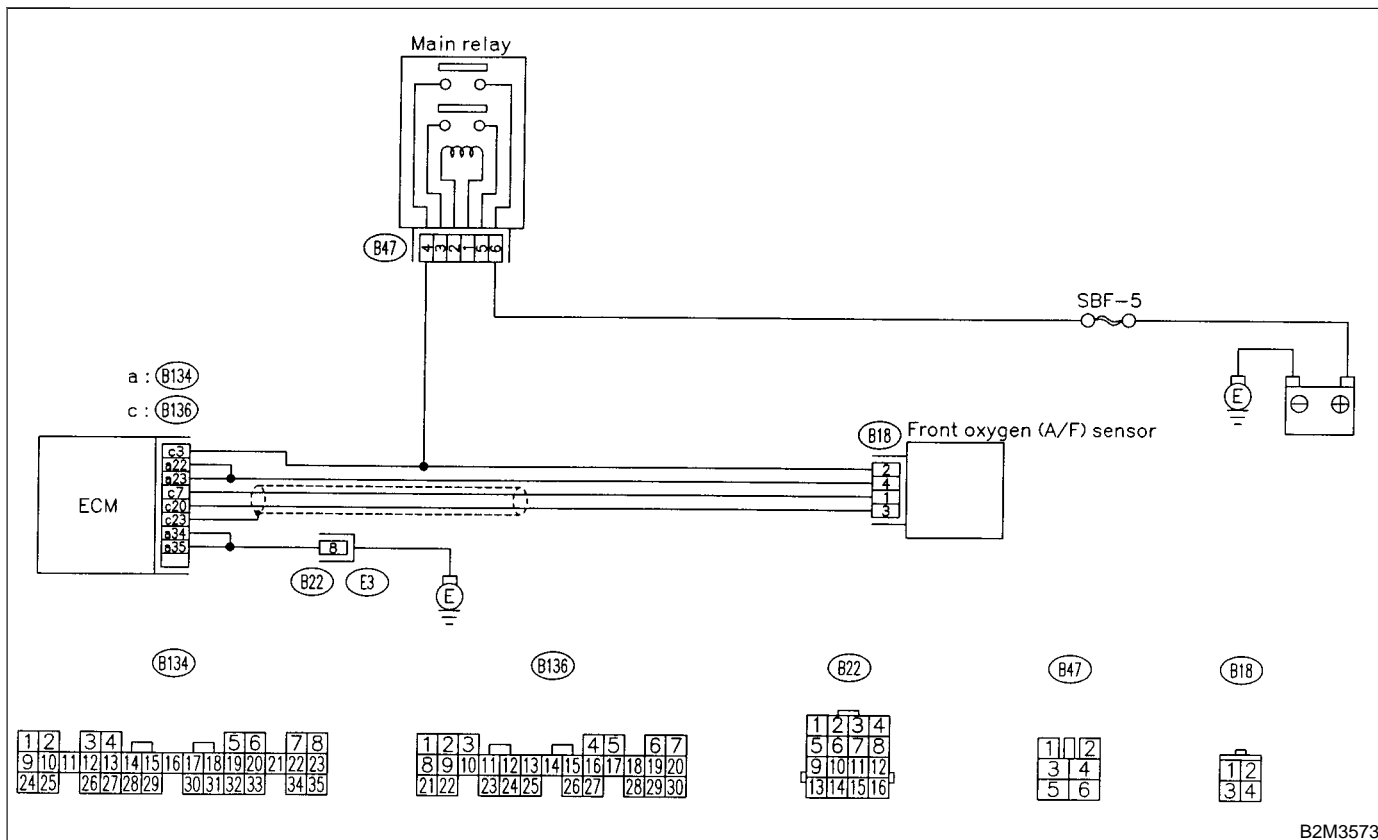
CC: DTC P1134 — FRONT OXYGEN (A/F) SENSOR MICRO-COMPUTER PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3573

10CC1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1134?
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : It is not necessary to inspect DTC P1134.

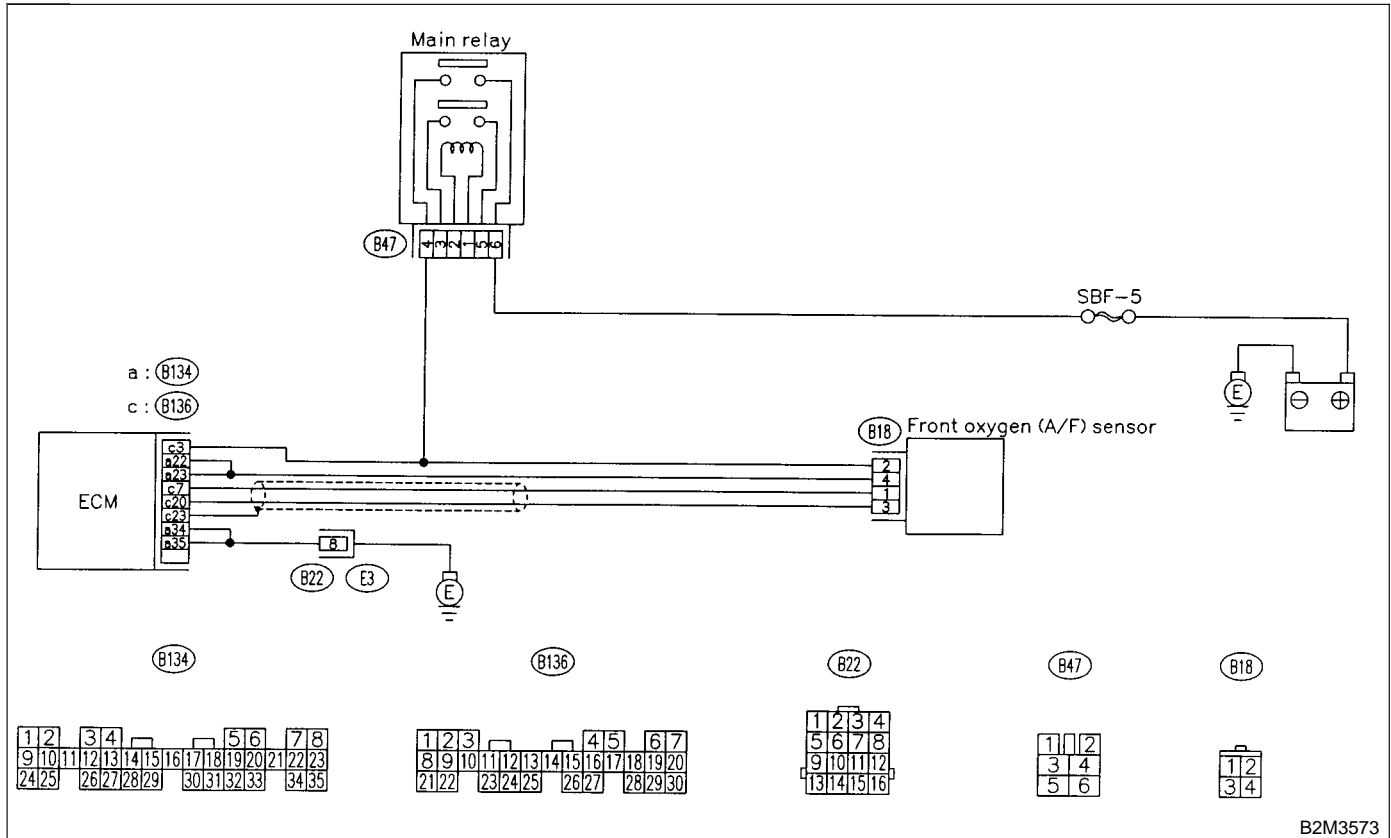
CD: DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



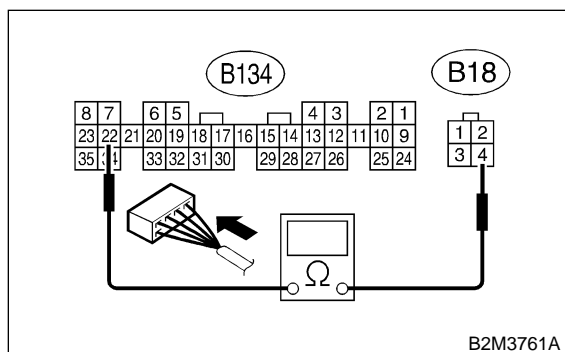
B2M3573

10CD1 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

- 1) Start engine, and warm-up the engine.
- 2) Turn ignition switch to OFF.
- 3) Disconnect connectors from ECM and front oxygen (A/F) sensor.
- 4) Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B134) No. 22 — (B18) No. 4:



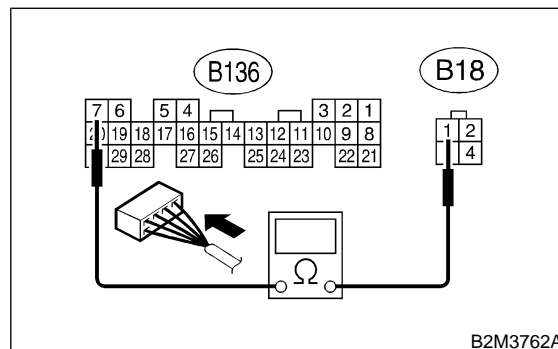
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10CD2**.
- NO** : Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.

10CD2 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B136) No. 7 — (B18) No. 1:



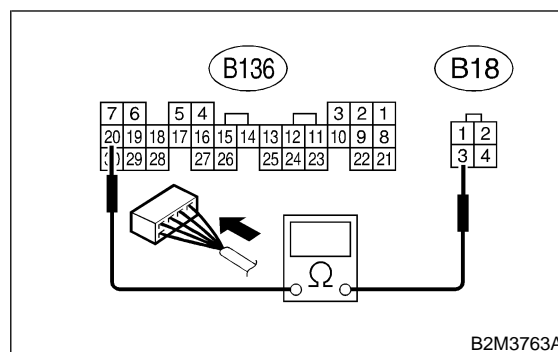
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10CD3**.
- NO** : Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.

10CD3 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B136) No. 20 — (B18) No. 3:



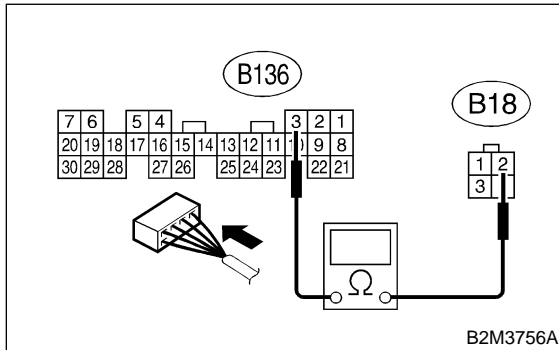
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **10CD4**.
- NO** : Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.

10CD4 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

Connector & terminal

(B136) No. 3 — (B18) No. 2:



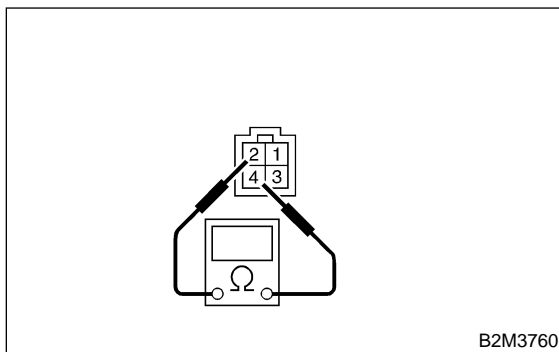
- CHECK** : **Is the resistance less than 1 Ω ?**
- YES** : Go to step **10CD5**.
- NO** : Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.

10CD5 : CHECK FRONT OXYGEN (A/F) SENSOR.

Measure resistance between front oxygen (A/F) sensor connector terminals.

Terminals

No. 2 — No. 4:



- CHECK** : **Is the resistance less than 5 Ω ?**
- YES** : Go to step **10CD6**.
- NO** : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

10CD6 : CHECK POOR CONTACT.

Check poor contact in ECM and front oxygen (A/F) sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM or front oxygen (A/F) sensor connector?**
- YES** : Repair poor contact in ECM or front oxygen (A/F) sensor connector.
- NO** : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

MEMO:

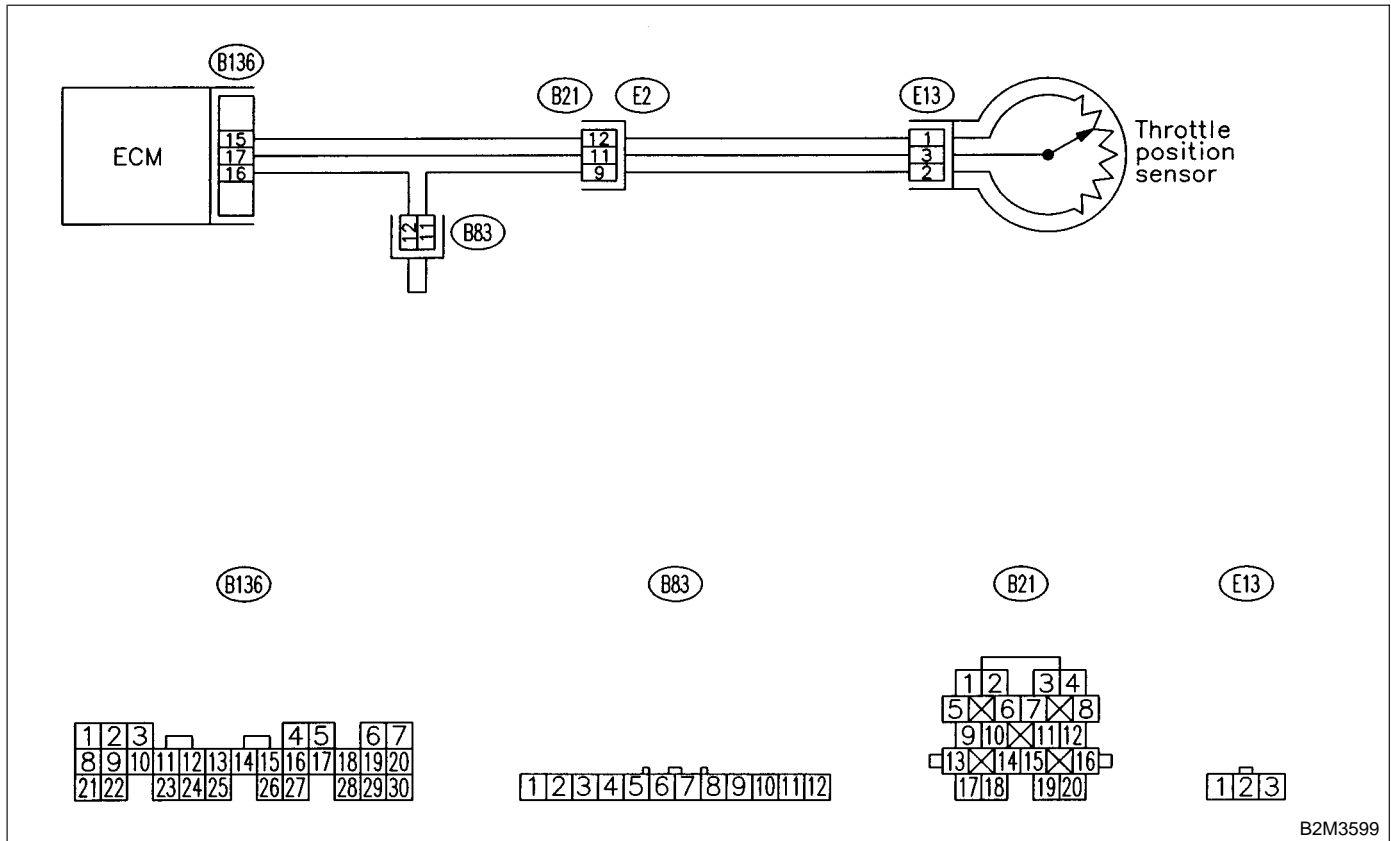
CE: DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



10CE1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0122 or P0123?*

YES : Inspect DTC P0106, P0107, P0108, P0122 or P0123 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P1142.

NO : Go to step **10CE2**.

10CE2 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than 0 kPa (0 mmHg, 0 inHg)?*

YES : Replace intake manifold pressure sensor. <Ref. to 2-7 [W11A0].>

NO : Replace throttle position sensor. <Ref. to 2-7 [W10A1].>

CF: DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT

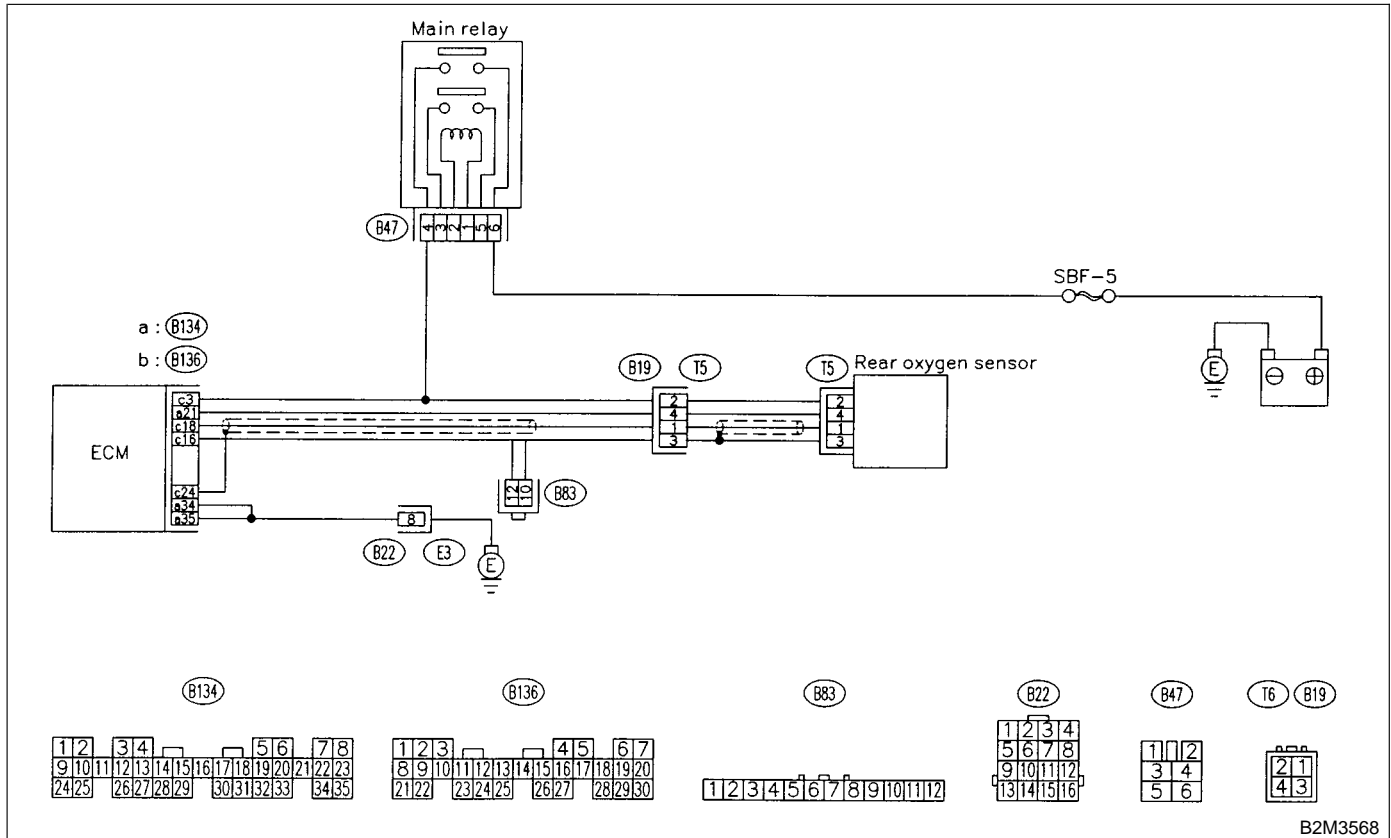
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



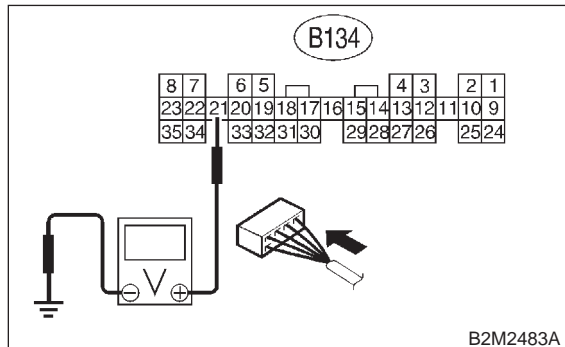
B2M3568

10CF1 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 8 V?**
- YES** : Go to step **10CF2**.
- NO** : Go to step **10CF3**.

10CF2 : CHECK DTC P1151 ON DISPLAY.

- 1) Turn ignition switch to OFF.
- 2) Repair battery short circuit in harness between ECM and rear oxygen sensor connector.
- 3) Operate the INSPECTION MODE. <Ref. to 2-7 [T3E1].>

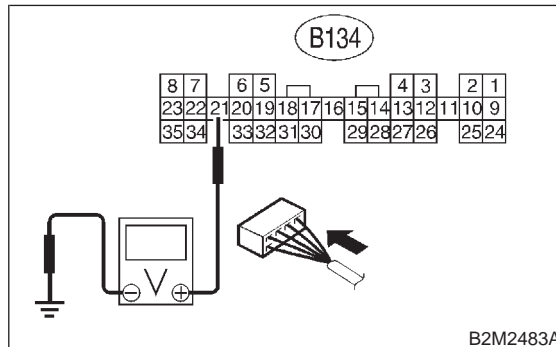
- CHECK** : **Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1151?**
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : END

10CF3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



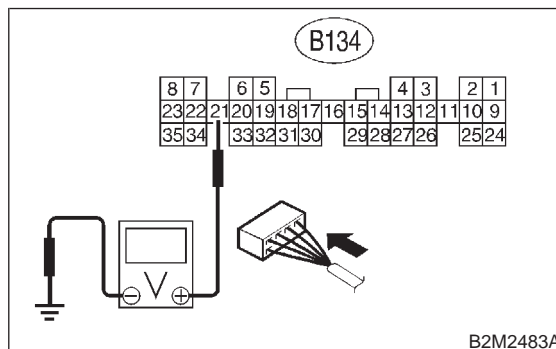
- CHECK** : **Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **10CF4**.

10CF4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



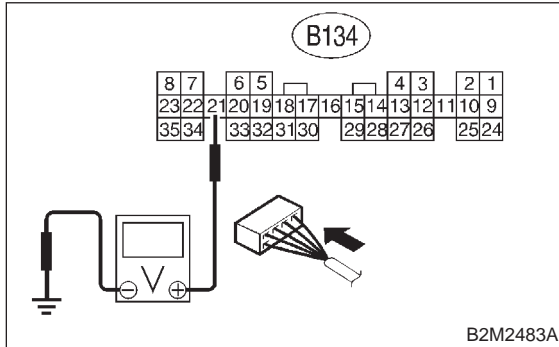
- CHECK** : **Does the voltage change more than 8 V by shaking harness and connector of rear oxygen sensor while monitoring the value with voltage meter?**
- YES** : Repair poor contact in rear oxygen sensor connector.
- NO** : Go to step **10CF5**.

10CF5 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



- CHECK** : **Does the voltage change more than 8 V by shaking coupling connector (E2) while monitoring the value with voltage meter?**
- YES** : Repair poor contact in coupling connector.
- NO** : Even if MIL lights up, the circuit has returned to normal condition at this time.

MEMO:

CG: DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT —

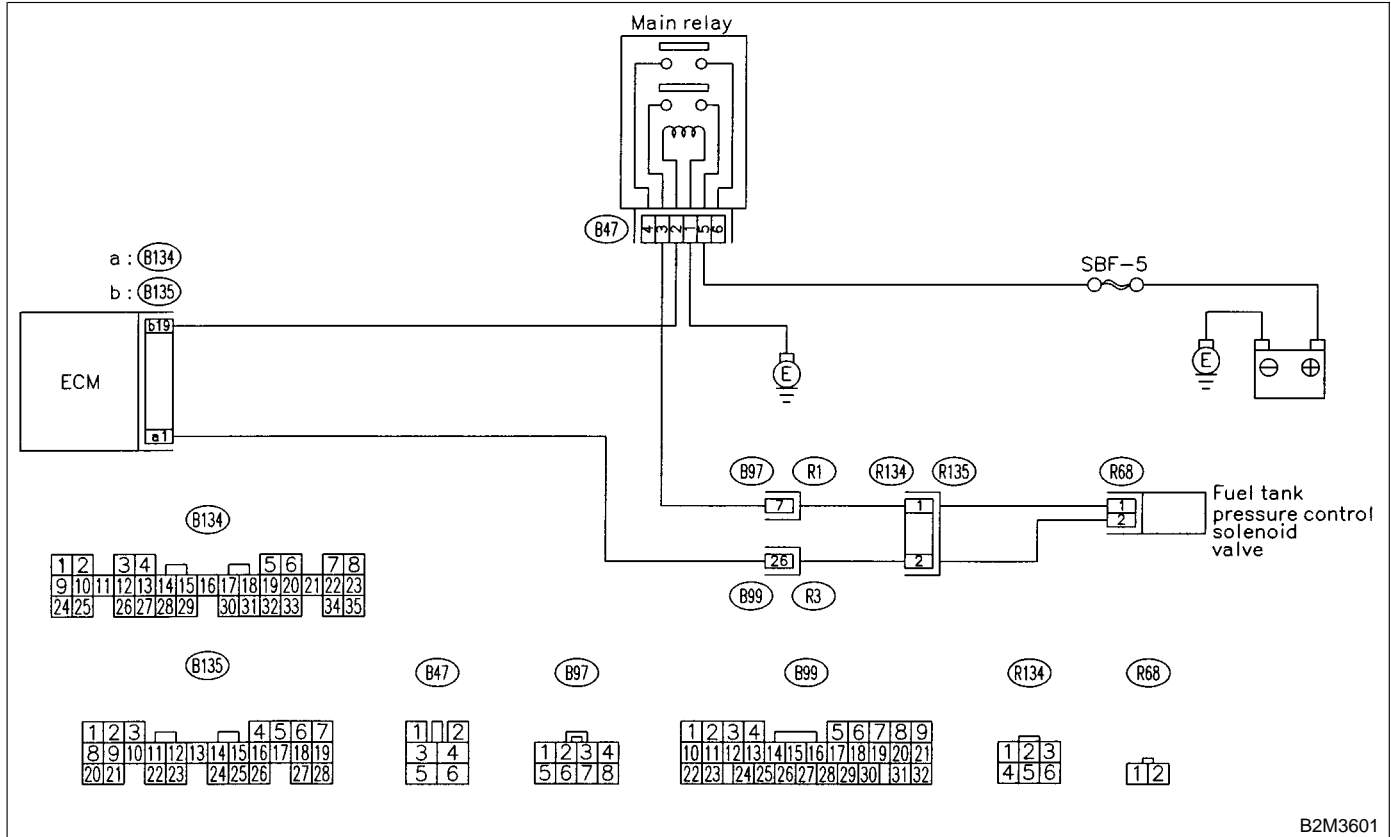
• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



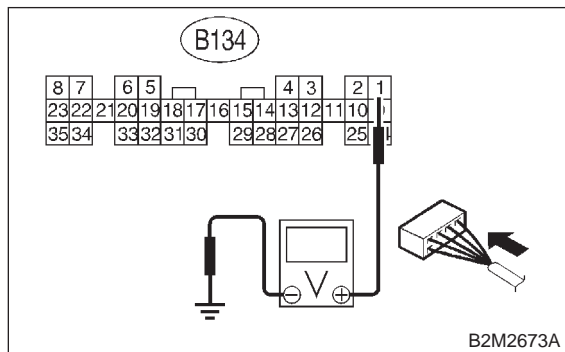
B2M3601

10CG1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **10CG2**.
- NO** : Go to step **10CG3**.

10CG2 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

NOTE:

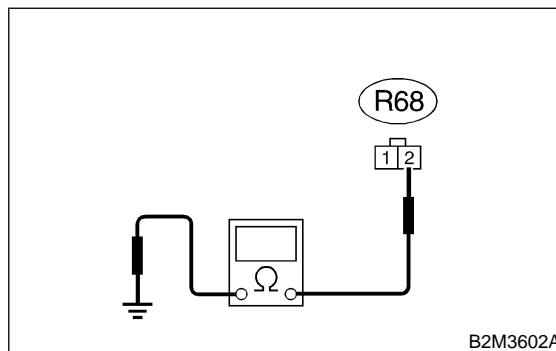
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

10CG3 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from fuel tank pressure control solenoid valve and ECM.
- 3) Measure resistance of harness between fuel tank pressure control solenoid valve connector and chassis ground.

Connector & terminal

(R68) No. 2 — Chassis ground:



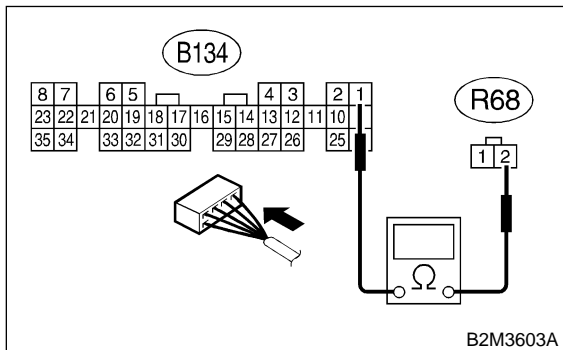
- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and fuel tank pressure control solenoid valve connector.
- NO** : Go to step **10CG4**.

10CG4 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and fuel tank pressure control solenoid valve connector.

Connector & terminal

(B134) No. 1 — (R68) No. 2:



CHECK : **Is the voltage less than 1 Ω?**

YES : Go to step **10CG5**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

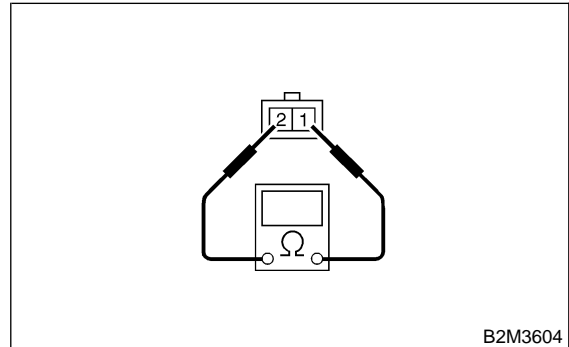
- Open circuit in harness between ECM and fuel tank pressure control solenoid valve connector
- Poor contact in coupling connectors (B99 and R134)

10CG5 : CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

Measure resistance between fuel tank pressure control solenoid valve terminals.

Terminals

No. 1 — No. 2:



CHECK : **Is the resistance between 10 and 100 Ω?**

YES : Go to step **10CG6**.

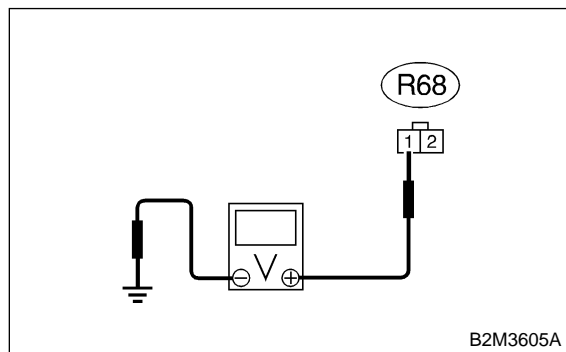
NO : Replace fuel tank pressure control solenoid valve. <Ref. to 2-1 [W9A0].>

10CG6 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel tank pressure control solenoid valve and chassis ground.

Connector & terminal

(R68) No. 1 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Go to step **10CG7**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between main relay and fuel tank pressure control solenoid valve connector
- Poor contact in coupling connectors (B97 and R134)
- Poor contact in main relay connector

10CG7 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure control solenoid valve connector. <Ref. to FOREWORD [T3C1].>

CHECK : **Is there poor contact in fuel tank pressure control solenoid valve connector?**

YES : Repair poor contact in fuel tank pressure control solenoid valve connector.

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

CH: DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT —

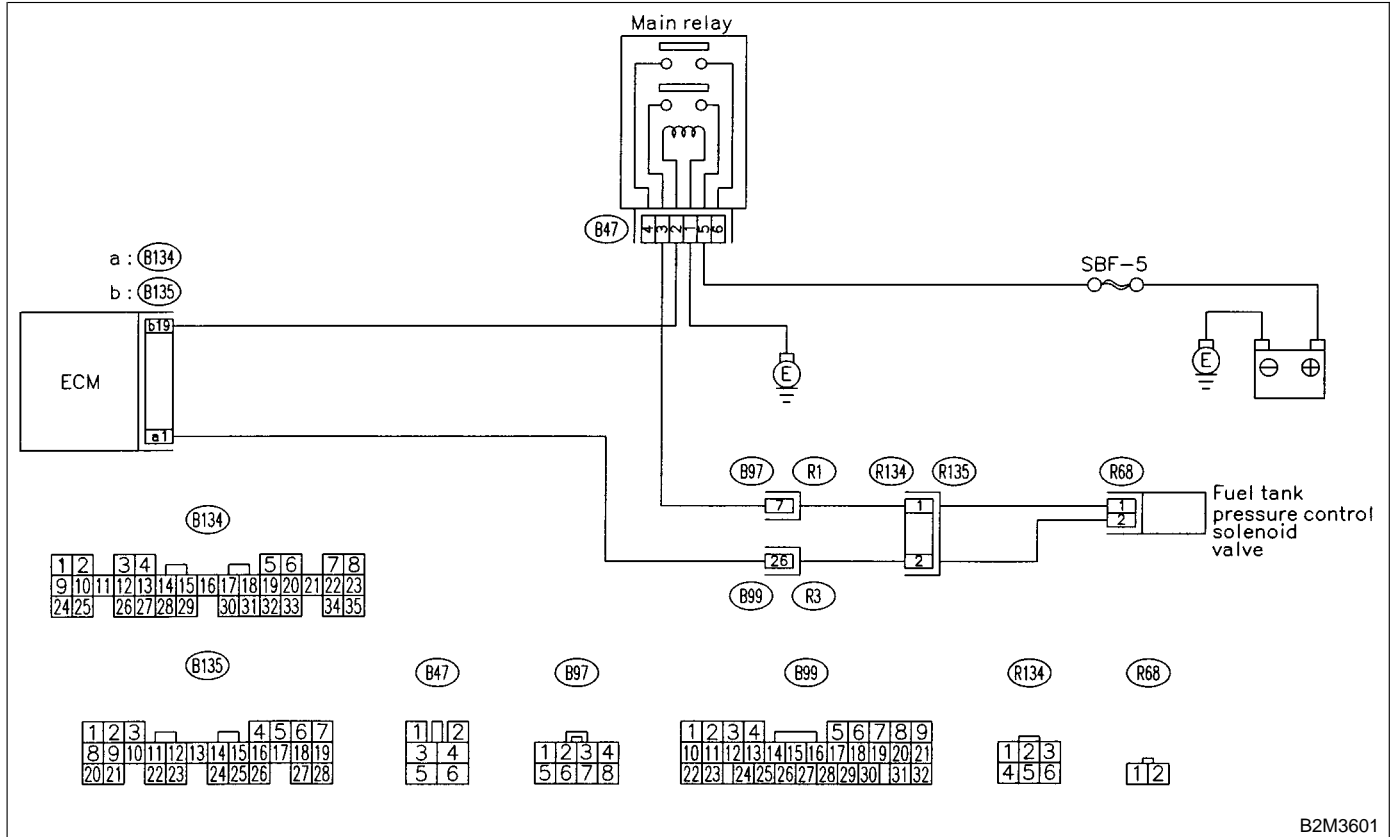
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

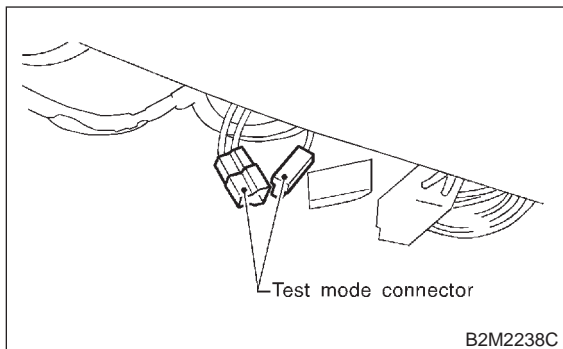
● WIRING DIAGRAM:



B2M3601

10CH1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



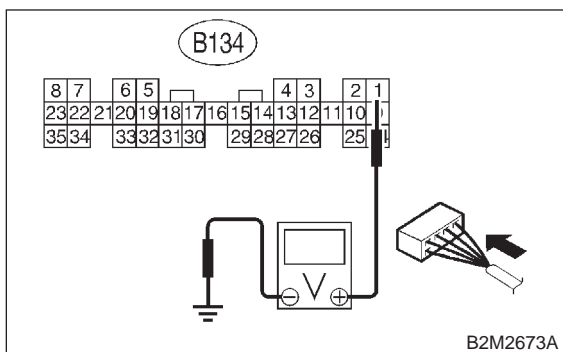
- 3) Turn ignition switch to ON.
- 4) While operating fuel tank pressure control solenoid valve, measure voltage between ECM and chassis ground.

NOTE:

Fuel tank pressure control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



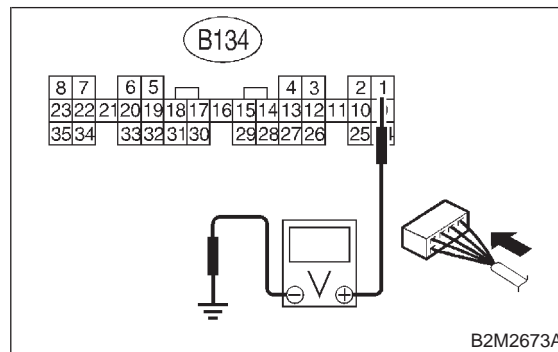
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 10CH2.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

10CH2 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 10CH4.
- NO** : Go to step 10CH3.

10CH3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

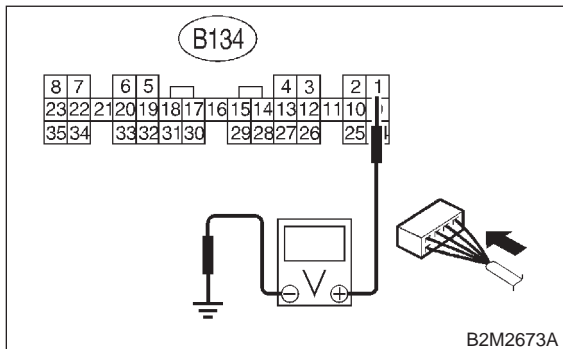
- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

10CH4 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel tank pressure control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



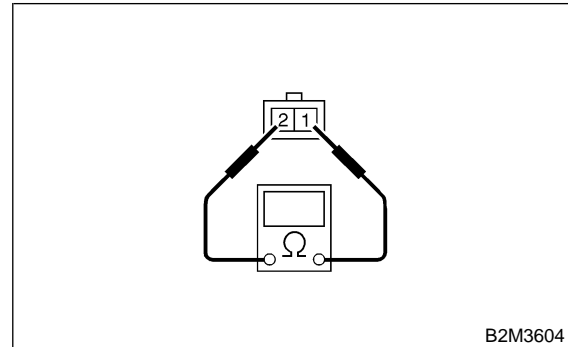
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and fuel tank pressure control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CH5**.

10CH5 : CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between fuel tank pressure control solenoid valve terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace fuel tank pressure control solenoid valve <Ref. to 2-1 [W9A0].> and ECM <Ref. to 2-7 [W9A0].>.
- NO** : Go to step **10CH6**.

10CH6 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

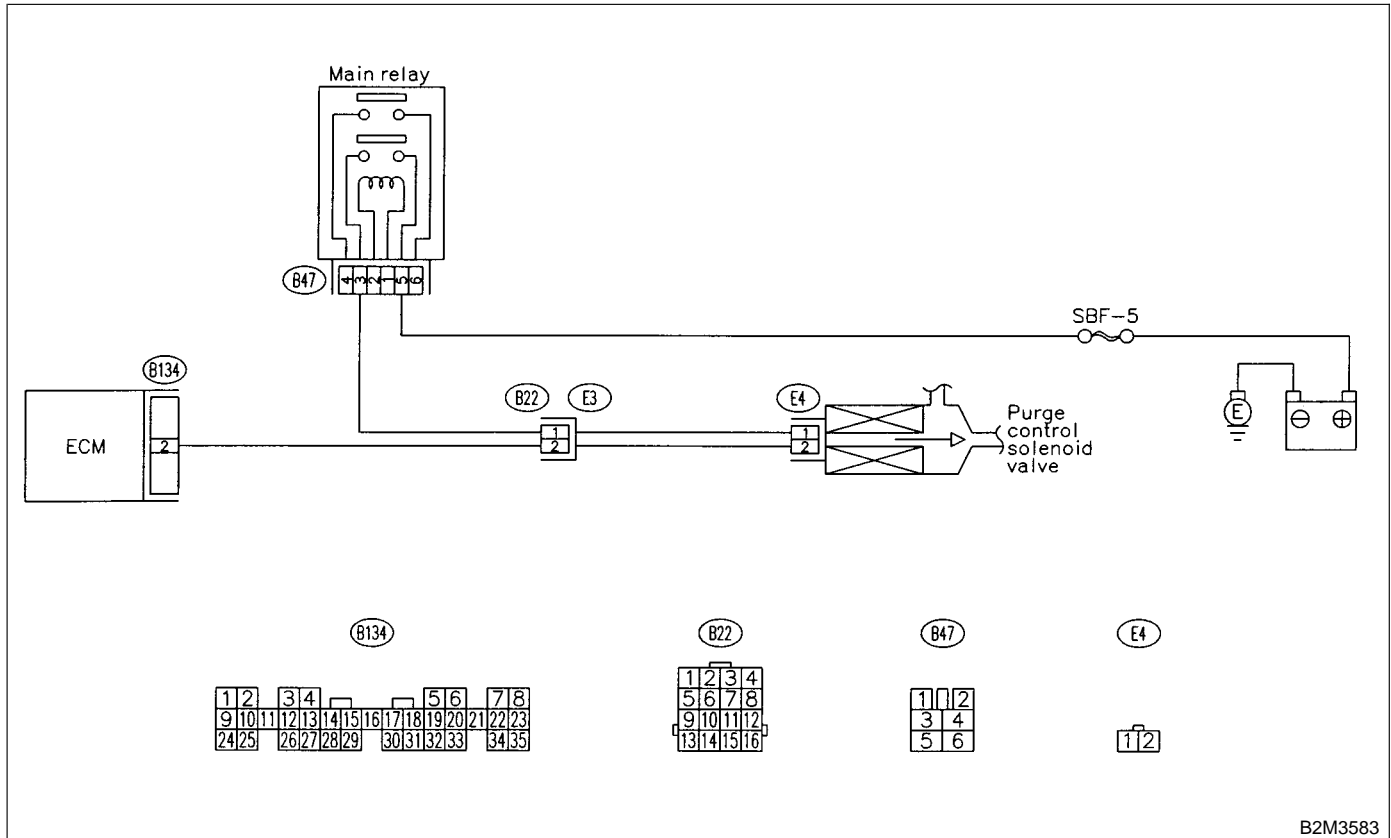
CI: DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

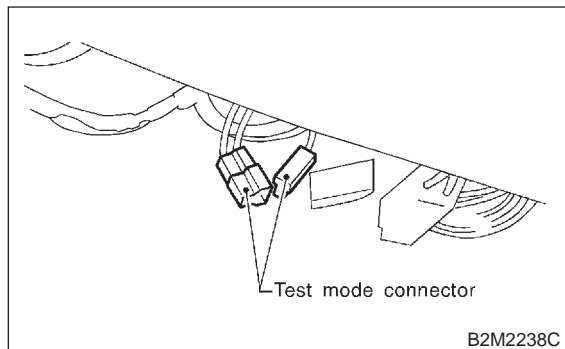
● **WIRING DIAGRAM:**



B2M3583

10C11 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



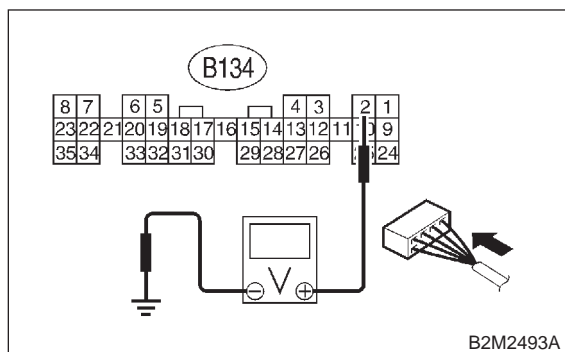
- 3) Turn ignition switch to ON.
- 4) While operating purge control solenoid valve, measure voltage between ECM and chassis ground.

NOTE:

Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



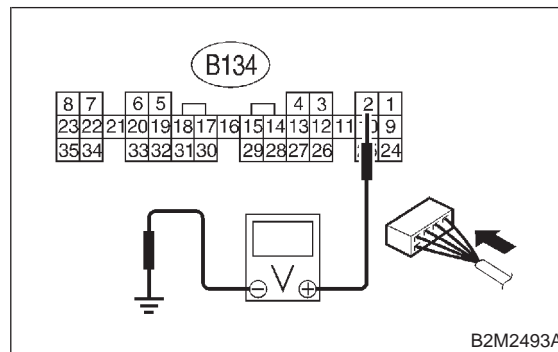
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 10C12.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

10C12 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 10C14.
- NO** : Go to step 10C13.

10C13 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

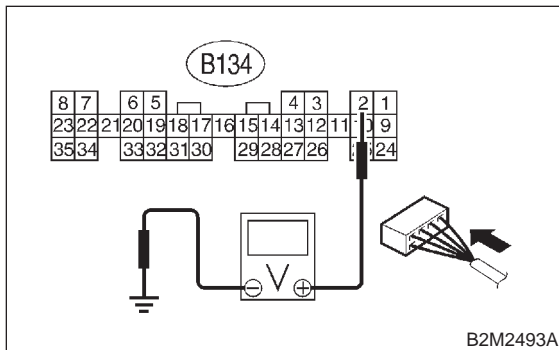
- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

10C14 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from purge control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



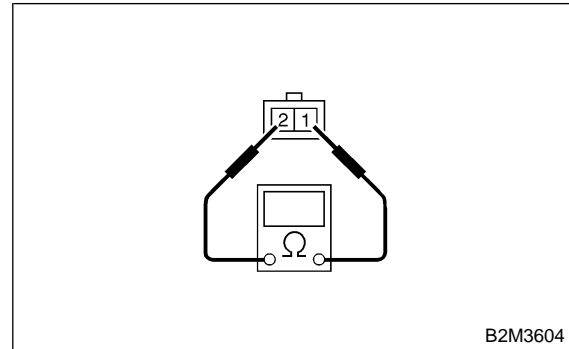
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and purge control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10C15**.

10C15 : CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between purge control solenoid valve terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace purge control solenoid valve <Ref. to 2-7 [W17A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10C16**.

10C16 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

CJ: DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT —

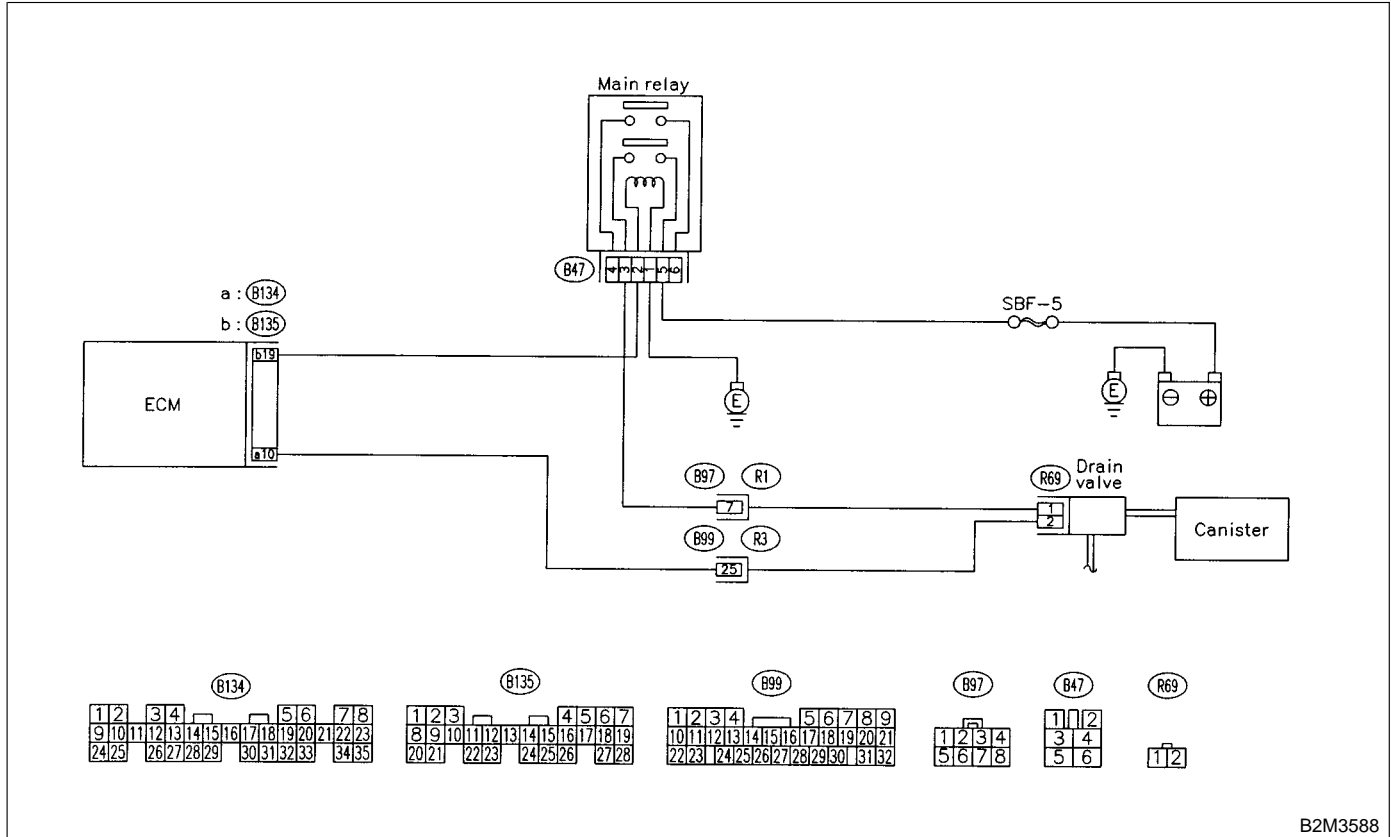
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

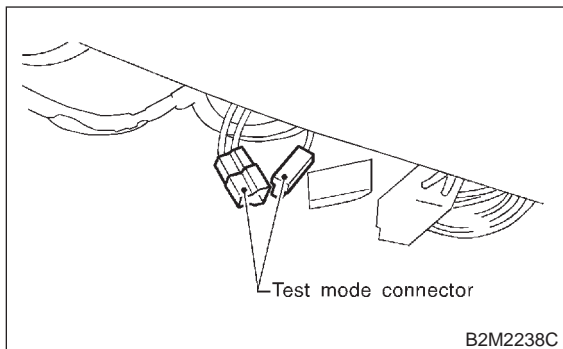
● WIRING DIAGRAM:



B2M3588

10CJ1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



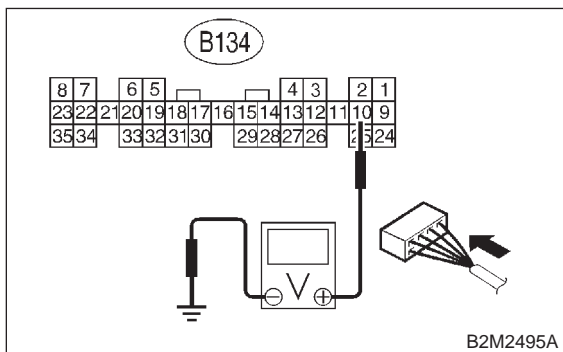
- 3) Turn ignition switch to ON.
- 4) While operating drain valve, measure voltage between ECM and chassis ground.

NOTE:

Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



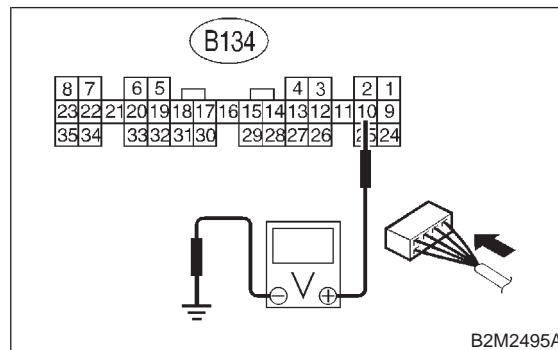
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 10CJ2.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

10CJ2 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 10CJ4.
- NO** : Go to step 10CJ3.

10CJ3 : CHECK POOR CONTACT.

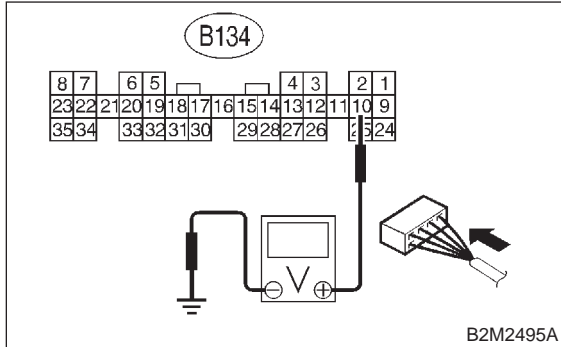
Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

10CJ4 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from drain valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal
(B134) No. 10 (+) — Chassis ground (-):

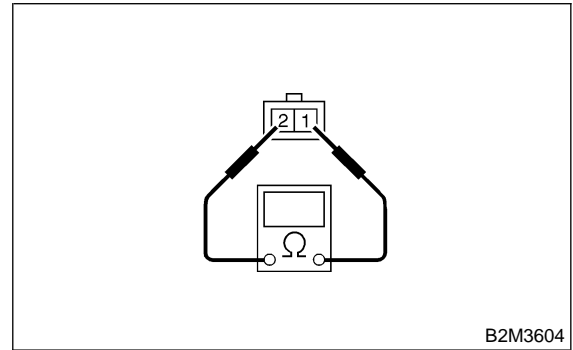


- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and drain valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CJ5**.

10CJ5 : CHECK DRAIN VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between drain valve terminals.

Terminals
No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace drain valve <Ref. to 2-1 [W13A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CJ6**.

10CJ6 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

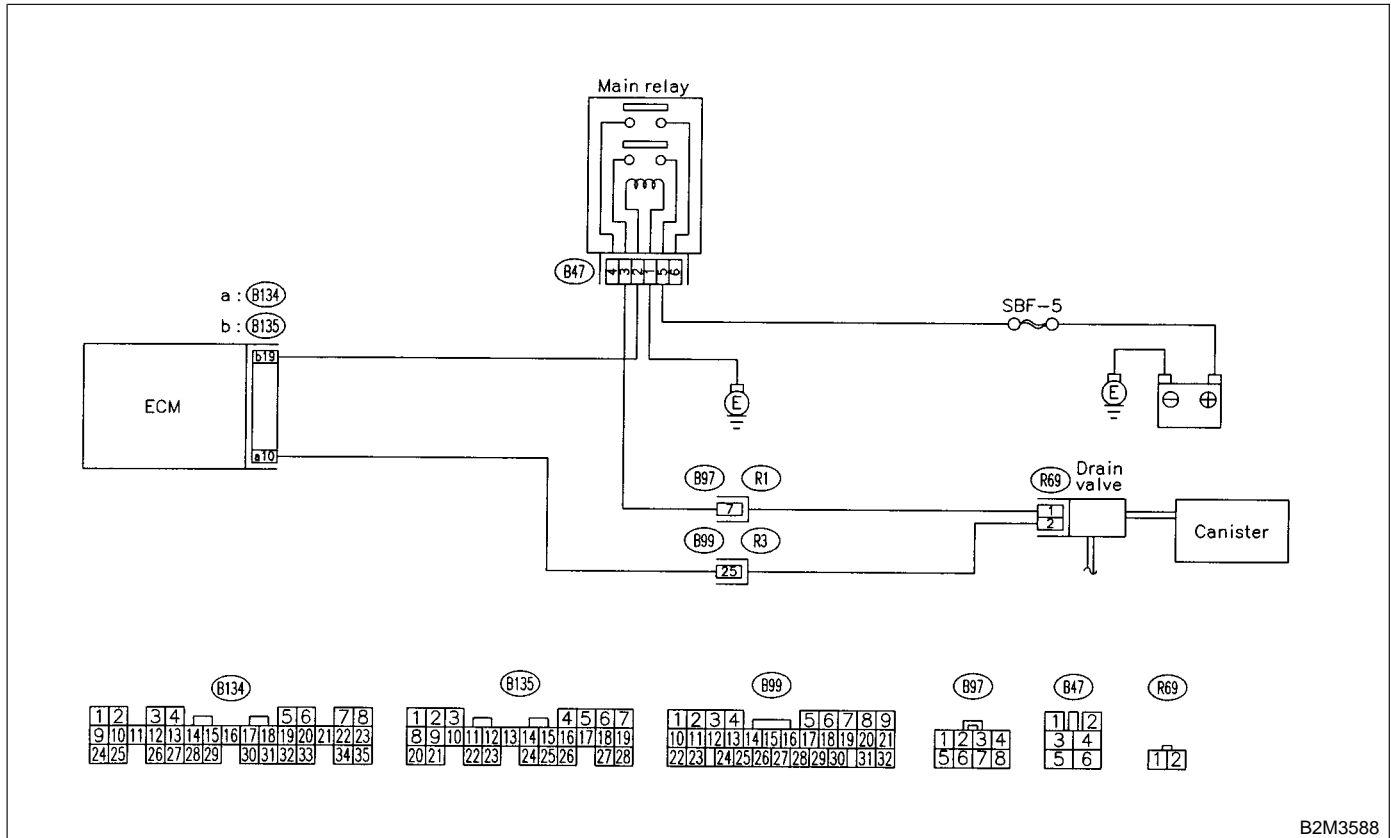
CK: DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately after fault occurrence
- **TROUBLE SYMPTOM:**
 - Improper fuel supply

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



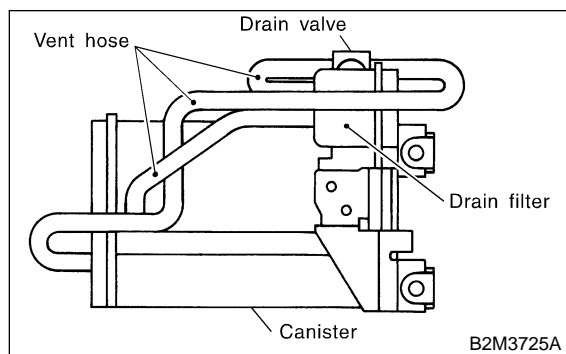
10CK1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using “10. Diagnostics Chart with Trouble Code for MT Vehicles”. <Ref. to 2-7 [T10A0].>
- NO** : Go to step **10CK2**.

10CK2 : CHECK VENT LINE HOSES.

Check the following items.

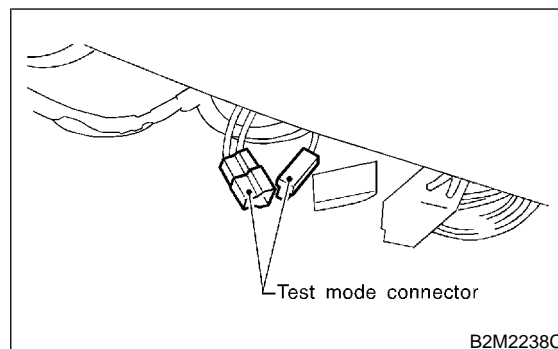
- Clogging of vent hoses between canister and drain valve
- Clogging of vent hose between drain valve and drain filter
- Clogging of drain filter



- CHECK** : **Is there a fault in vent line?**
- YES** : Repair or replace the faulty part.
- NO** : Go to step **10CK3**.

10CK3 : CHECK DRAIN VALVE OPERATION.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



- 3) Turn ignition switch to ON.
- 4) Operate drain valve.

NOTE:

Drain valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

- CHECK** : **Does drain valve produce operating sound?**

- YES** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

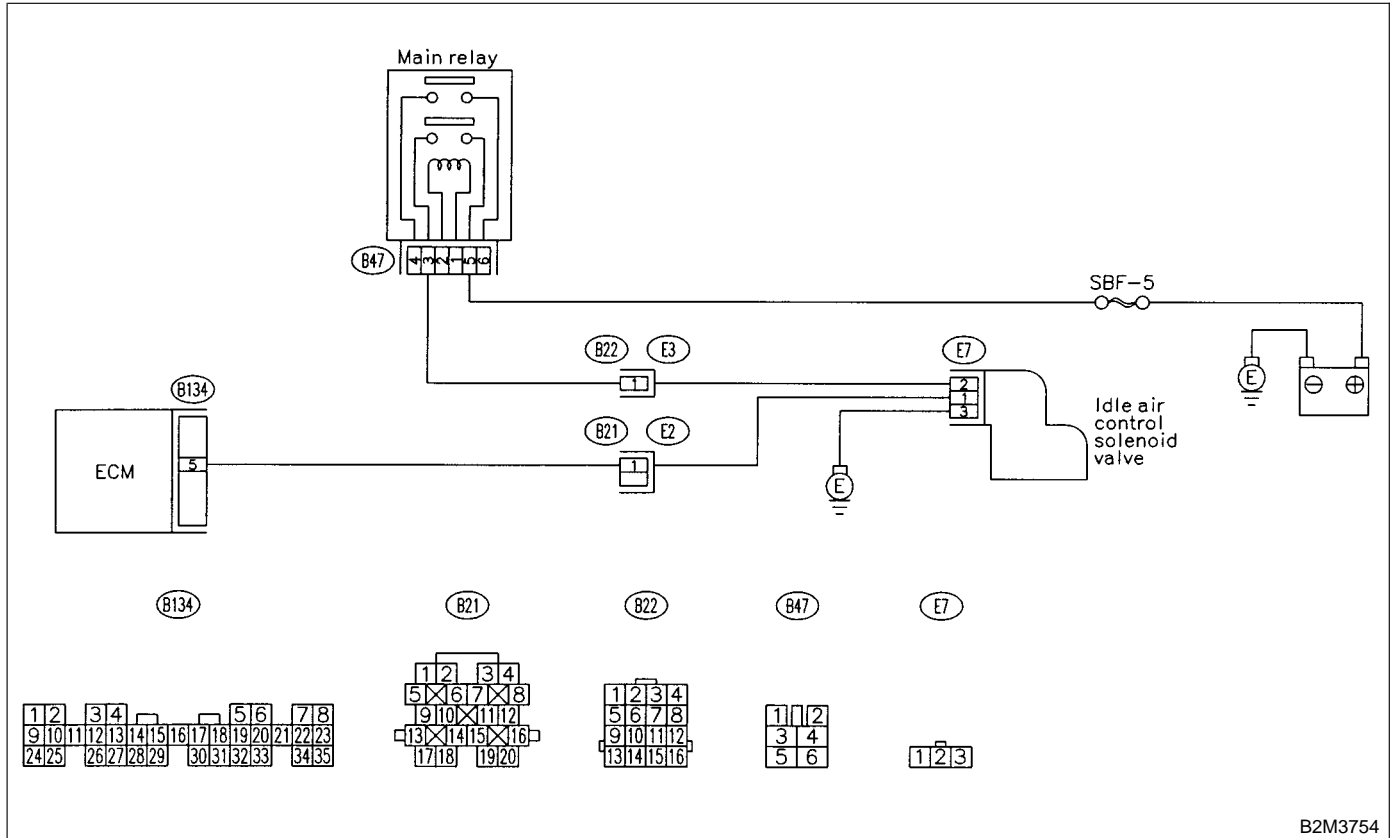
CL: DTC P1505 — IDLE CONTROL SYSTEM CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Engine breathing

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3754

10CL1 : CHECK THROTTLE CABLE.

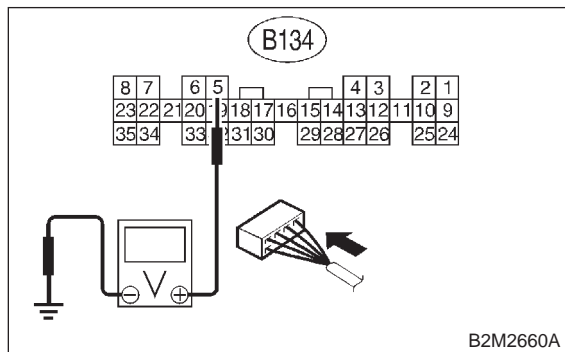
- CHECK** : Does throttle cable have play for adjustment?
- YES** : Go to step 10CL2.
- NO** : Adjust throttle cable. <Ref. to 4-5 [W1A3].>

10CL2 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 5 (+) — Chassis ground (-):



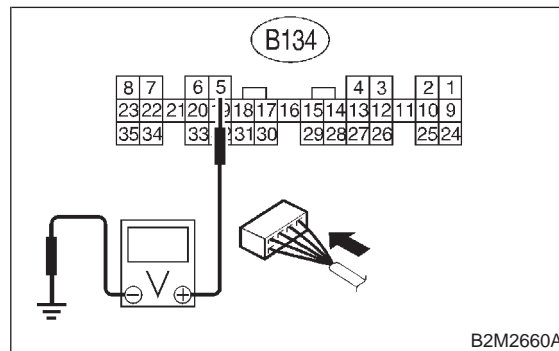
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **10CL3**.
- NO** : Go to step **10CL4**.

10CL3 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 5 (+) — Chassis ground (-):



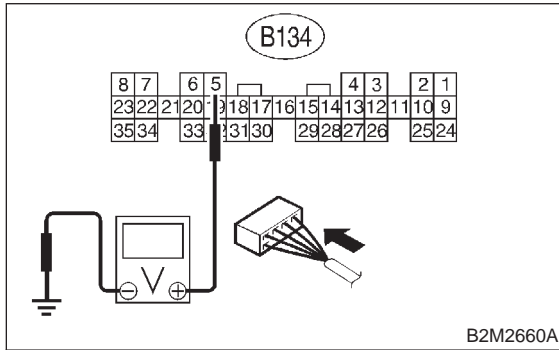
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Replace idle air control solenoid valve <Ref. to 2-7 [W15A1].> and ECM <Ref. to 2-7 [W19A0].>.

10CL4 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 5 (+) — Chassis ground (-):



- CHECK** : **Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Contact with SOA service.

NOTE:

Inseption by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

CM: DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

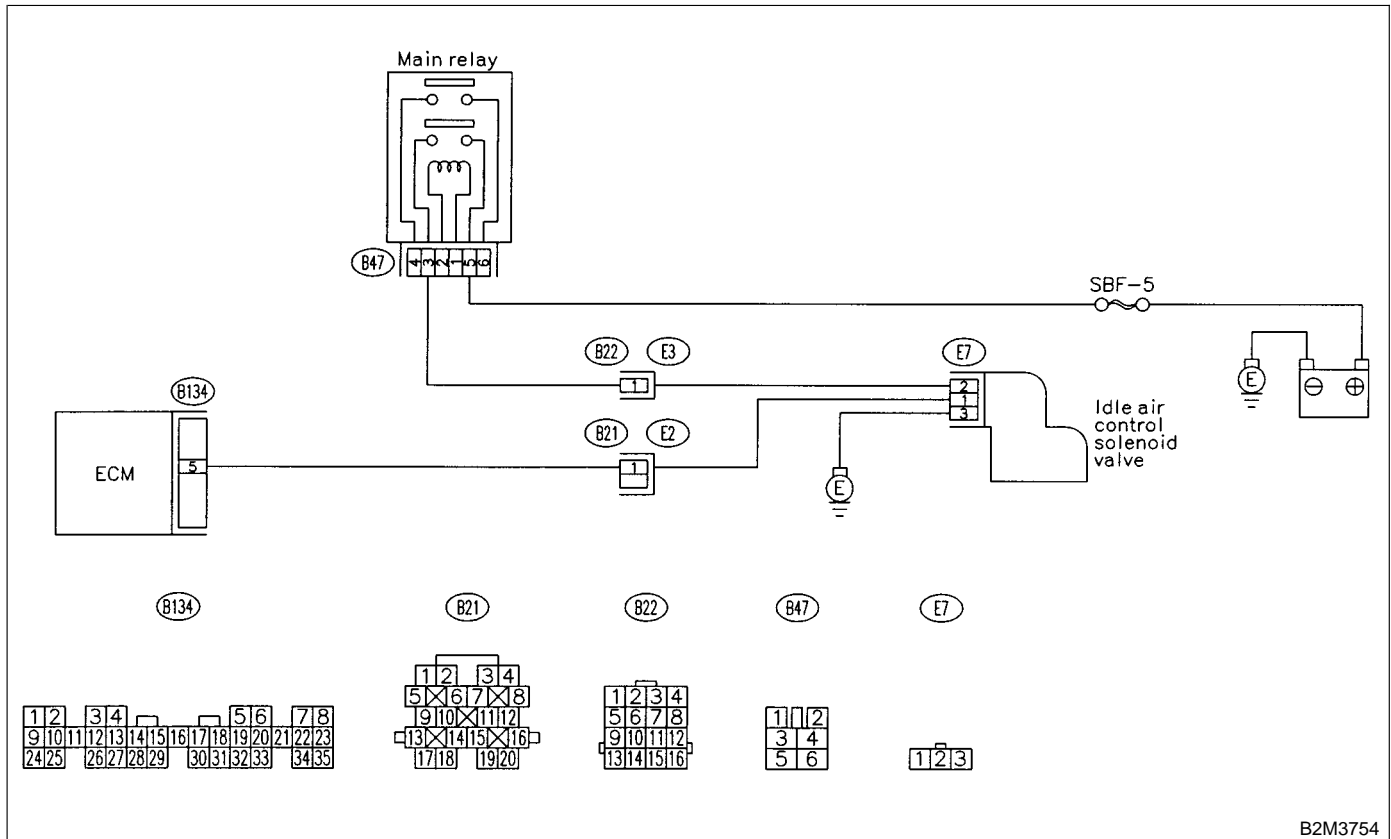
• TROUBLE SYMPTOM:

- Engine keeps running at higher revolution than specified idling revolution.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

• WIRING DIAGRAM:



B2M3754

10CM1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117 or P0505 or P1505?

YES : Inspect DTC P0116 or P0117 or P0505 or P1505 using "10. Diagnostics Chart with Trouble Code for MT Vehicles". <Ref. to 2-7 [T10A0].>

NOTE:

In this case, it is not necessary to inspect DTC P1507.

NO : Go to step **10CM2**.

10CM2 : CHECK THROTTLE CABLE.

CHECK : Does throttle cable have play for adjustment?

YES : Go to step **10CM2**.

NO : Adjust throttle cable. <Ref. to 4-5 [W1A3].>

10CM3 : CHECK AIR INTAKE SYSTEM.

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.
- 3) Check the following items.
 - Loose installation of intake manifold, idle air control solenoid valve and throttle body
 - Cracks of intake manifold gasket, idle air control solenoid valve gasket and throttle body gasket
 - Disconnections of vacuum hoses

CHECK : ***Is there a fault in air intake system?***

YES : Repair air suction and leaks.

NO : Replace idle air control solenoid valve.
<Ref. to 2-7 [W15A0].>

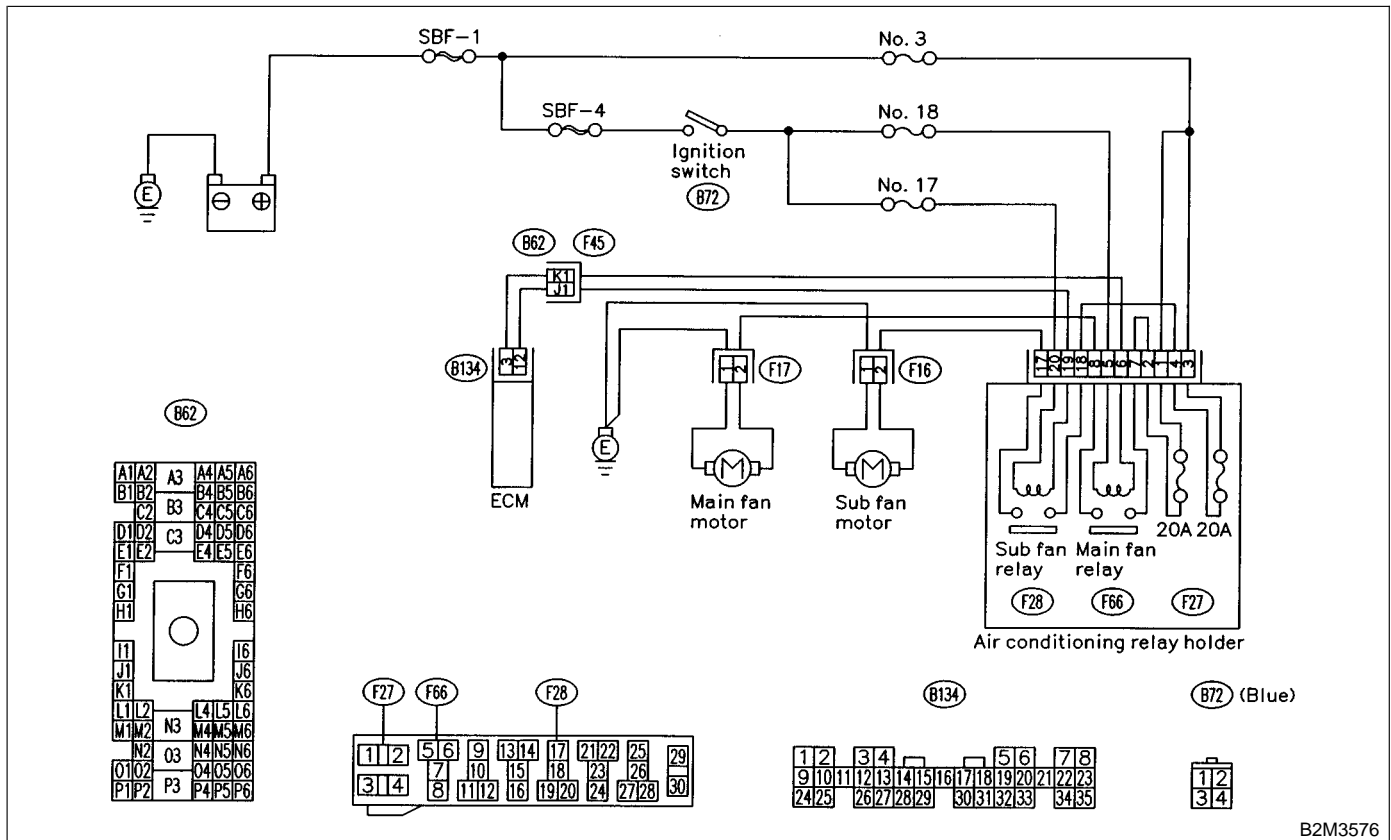
CN: DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Radiator fan does not operate properly.
 - Overheating

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

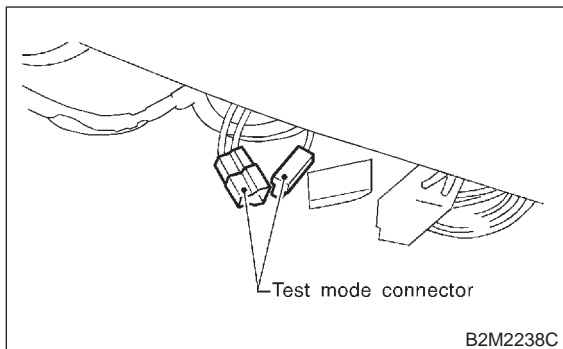
● **WIRING DIAGRAM:**



B2M3576

10CN1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



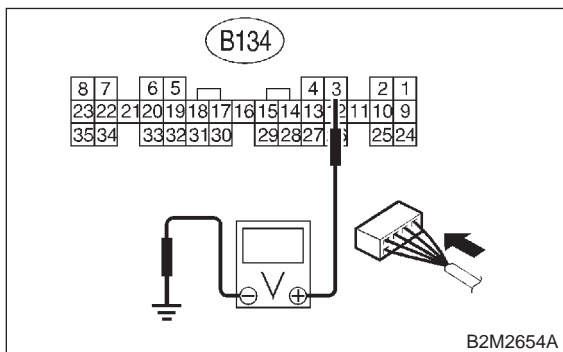
- 3) Turn ignition switch to ON.
- 4) While operating radiator fan relay, measure voltage between ECM and chassis ground.

NOTE:

Radiator fan relay operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 3 (+) — Chassis ground (-):



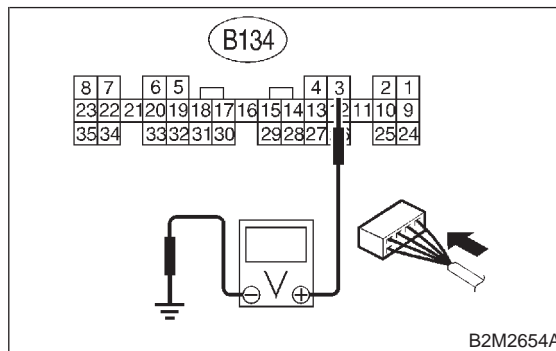
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.
- NO** : Go to step **10CN2**.

10CN2 : CHECK SHORT CIRCUIT IN RADIATOR FAN RELAY CONTROL CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay and sub fan relay. (with A/C models)
- 3) Disconnect test mode connector.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between ECM and chassis ground.

Connector & terminal

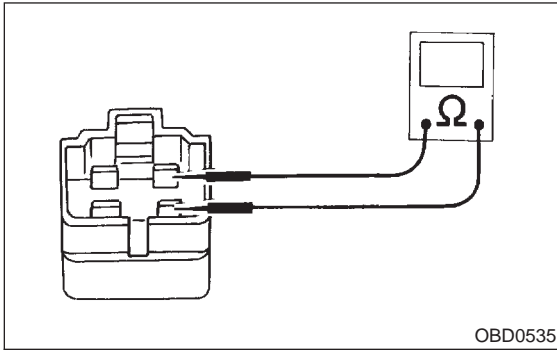
(B134) No. 3 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Repair battery short circuit in radiator fan relay control circuit. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CN3**.

10CN3 : CHECK MAIN FAN RELAY.

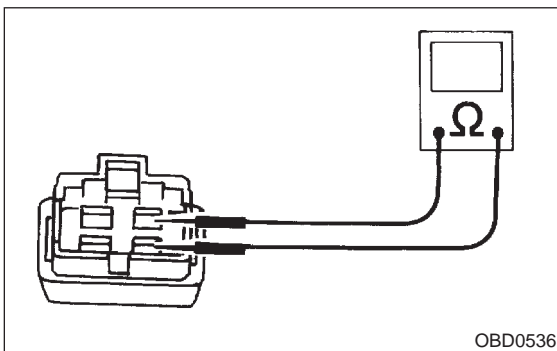
- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay.
- 3) Measure resistance between main fan relay terminals.

Terminal**No. 1 — No. 3:**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace main fan relay and ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CN4**.

10CN4 : CHECK SUB FAN RELAY.

- 1) Remove sub fan relay.
- 2) Measure resistance between sub fan relay terminals.

Terminal**No. 1 — No. 3:**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace sub fan relay and ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **10CN5**.

10CN5 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

CO: DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION —

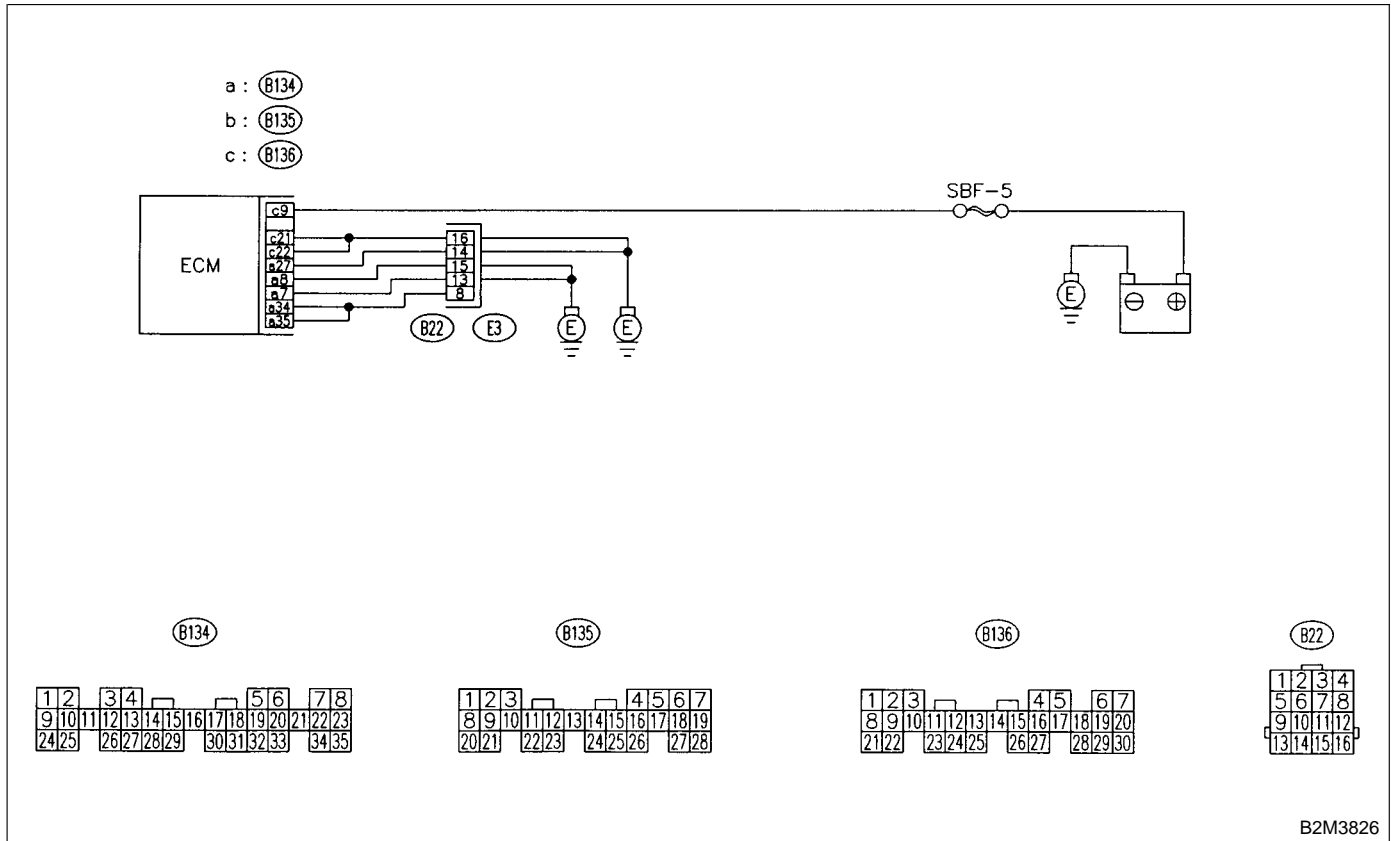
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



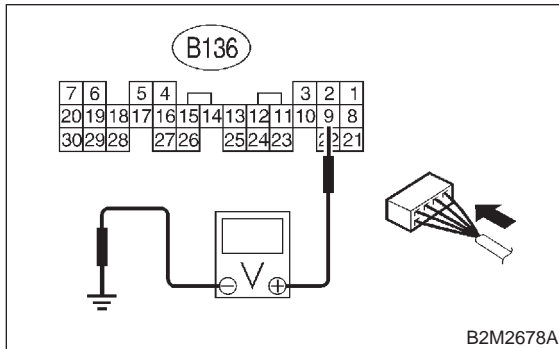
B2M3826

10CO1 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to OFF.
- 2) Measure voltage between ECM and chassis ground.

Connector & terminal

(B136) No. 9 (+) — Chassis ground (-):



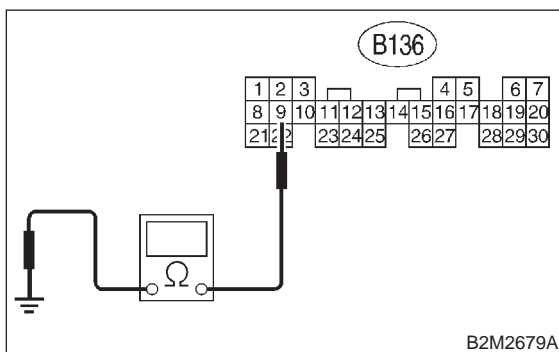
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **10CO2**.

10CO2 : CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR.

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

Connector & terminal

(B136) No. 9 — Chassis ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM connector and battery terminal.
- NO** : Go to step **10CO3**.

10CO3 : CHECK FUSE SBF-5.

- CHECK** : **Is fuse blown?**
- YES** : Replace fuse. <Ref. to 6-3 [D6A0].>
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and battery
- Poor contact in ECM connector
- Poor contact in battery terminal

CP: DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —

NOTE:

This DTC code is not applicable to MT vehicles.

CQ: DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —

NOTE:

This DTC code is not applicable to MT vehicles.

CR: DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT —

NOTE:

This DTC code is not applicable to MT vehicles.

CS: DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

CT: DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

CU: DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

CV: DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT —

NOTE:

This DTC code is not applicable to MT vehicles.

CW: DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION —

NOTE:

This DTC code is not applicable to MT vehicles.

MEMO:

11. Diagnostics Chart with Trouble Code for AT Vehicles

A: DIAGNOSTIC TROUBLE CODE (DTC) LIST

DTC No.	Item	Index
P0106	Pressure sensor circuit range/performance problem	<Ref. to 2-7 [T11B0].>
P0107	Pressure sensor circuit low input	<Ref. to 2-7 [T11C0].>
P0108	Pressure sensor circuit high input	<Ref. to 2-7 [T11D0].>
P0111	Intake air temperature sensor circuit range/performance problem	<Ref. to 2-7 [T11E0].>
P0112	Intake air temperature sensor circuit low input	<Ref. to 2-7 [T11F0].>
P0113	Intake air temperature sensor circuit high input	<Ref. to 2-7 [T11G0].>
P0116	Engine coolant temperature sensor circuit low input	<Ref. to 2-7 [T11H0].>
P0117	Engine coolant temperature sensor circuit high input	<Ref. to 2-7 [T11I0].>
P0121	Throttle position sensor circuit range/performance problem (high input)	<Ref. to 2-7 [T11J0].>
P0122	Throttle position sensor circuit low input	<Ref. to 2-7 [T11K0].>
P0123	Throttle position sensor circuit high input	<Ref. to 2-7 [T11L0].>
P0125	Insufficient coolant temperature for closed loop fuel control	<Ref. to 2-7 [T11M0].>
P0130	Front oxygen (A/F) sensor circuit range/performance problem	<Ref. to 2-7 [T11N0].>
P0133	Front oxygen (A/F) sensor circuit slow response	<Ref. to 2-7 [T11O0].>
P0136	Rear oxygen sensor circuit malfunction	<Ref. to 2-7 [T11P0].>
P0139	Rear oxygen sensor circuit slow response	<Ref. to 2-7 [T11Q0].>
P0141	Rear oxygen sensor heater circuit malfunction	<Ref. to 2-7 [T11R0].>
P0170	Fuel trim malfunction	<Ref. to 2-7 [T11S0].>
P0181	Fuel temperature sensor A circuit range/performance problem	<Ref. to 2-7 [T11T0].>
P0182	Fuel temperature sensor A circuit low input	<Ref. to 2-7 [T11U0].>
P0183	Fuel temperature sensor A circuit high input	<Ref. to 2-7 [T11V0].>
P0301	Cylinder 1 misfire detected	<Ref. to 2-7 [T11W0].>
P0302	Cylinder 2 misfire detected	<Ref. to 2-7 [T11X0].>
P0303	Cylinder 3 misfire detected	<Ref. to 2-7 [T11Y0].>
P0304	Cylinder 4 misfire detected	<Ref. to 2-7 [T11Z0].>

DTC No.	Item	Index
P0325	Knock sensor circuit high input	<Ref. to 2-7 [T11AA0].>
P0335	Crankshaft position sensor circuit malfunction	<Ref. to 2-7 [T11AB0].>
P0336	Crankshaft position sensor circuit range/performance problem	<Ref. to 2-7 [T11AC0].>
P0340	Camshaft position sensor circuit malfunction	<Ref. to 2-7 [T11AD0].>
P0341	Camshaft position sensor circuit range/performance problem	<Ref. to 2-7 [T11AE0].>
P0420	Catalyst system efficiency below threshold	<Ref. to 2-7 [T11AF0].>
P0440	Evaporative emission control system malfunction	<Ref. to 2-7 [T11AG0].>
P0442	Evaporative emission control system malfunction	<Ref. to 2-7 [T11AH0].>
P0443	Evaporative emission control system purge control valve circuit low input	<Ref. to 2-7 [T11AI0].>
P0446	Evaporative emission control system vent control low input	<Ref. to 2-7 [T11AJ0].>
P0451	Evaporative emission control system pressure sensor range/performance problem	<Ref. to 2-7 [T11AK0].>
P0452	Evaporative emission control system pressure sensor low input	<Ref. to 2-7 [T11AL0].>
P0453	Evaporative emission control system pressure sensor high input	<Ref. to 2-7 [T11AM0].>
P0461	Fuel level sensor circuit range/performance problem	<Ref. to 2-7 [T11AN0].>
P0462	Fuel level sensor circuit low input	<Ref. to 2-7 [T11AO0].>
P0463	Fuel level sensor circuit high input	<Ref. to 2-7 [T11AP0].>
P0480	Cooling fan relay 1 circuit low input	<Ref. to 2-7 [T11AQ0].>
P0483	Cooling fan function problem	<Ref. to 2-7 [T11AR0].>
P0500	Vehicle speed sensor malfunction	<Ref. to 2-7 [T11AS0].>
P0506	Idle control system RPM lower than expected	<Ref. to 2-7 [T11AT0].>
P0507	Idle control system RPM higher than expected	<Ref. to 2-7 [T11AU0].>
P0601	Internal control module memory check sum error	<Ref. to 2-7 [T11AV0].>
P0703	Brake switch input malfunction	<Ref. to 2-7 [T11AW0].>
P0705	Transmission range sensor circuit malfunction	<Ref. to 2-7 [T11AX0].>
P0710	Transmission fluid temperature sensor circuit malfunction	<Ref. to 2-7 [T11AY0].>
P0715	Torque converter turbine speed sensor circuit malfunction	<Ref. to 2-7 [T11AZ0].>
P0720	Output speed sensor (vehicle speed sensor 2) circuit malfunction	<Ref. to 2-7 [T11BA0].>

11. Diagnostics Chart with Trouble Code for AT Vehicles

DTC No.	Item	Index
P0725	Engine speed input circuit malfunction	<Ref. to 2-7 [T11BB0].>
P0731	Gear 1 incorrect ratio	<Ref. to 2-7 [T11BC0].>
P0732	Gear 2 incorrect ratio	<Ref. to 2-7 [T11BD0].>
P0733	Gear 3 incorrect ratio	<Ref. to 2-7 [T11BE0].>
P0734	Gear 4 incorrect ratio	<Ref. to 2-7 [T11BF0].>
P0740	Torque converter clutch system malfunction	<Ref. to 2-7 [T11BG0].>
P0743	Torque converter clutch system (Lock-up duty solenoid) electrical	<Ref. to 2-7 [T11BH0].>
P0748	Pressure control solenoid (Line pressure duty solenoid) electrical	<Ref. to 2-7 [T11BI0].>
P0753	Shift solenoid A (Shift solenoid 1) electrical	<Ref. to 2-7 [T11BJ0].>
P0758	Shift solenoid B (Shift solenoid 2) electrical	<Ref. to 2-7 [T11BK0].>
P1100	Starter switch circuit low input	<Ref. to 2-7 [T11BL0].>
P1101	Neutral position switch circuit high input	<Ref. to 2-7 [T11BM0].>
P1103	Engine torque control signal 1 circuit malfunction	<Ref. to 2-7 [T11BN0].>
P1106	Engine torque control signal 2 circuit malfunction	<Ref. to 2-7 [T11BO0].>
P1110	Atmospheric pressure sensor low input	<Ref. to 2-7 [T11BP0].>
P1111	Atmospheric pressure sensor high input	<Ref. to 2-7 [T11BQ0].>
P1112	Atmospheric pressure sensor range/performance problem	<Ref. to 2-7 [T11BR0].>
P1115	Engine torque control cut signal circuit high input	<Ref. to 2-7 [T11BS0].>
P1116	Engine torque control cut signal circuit low input	<Ref. to 2-7 [T11BT0].>
P1120	Starter switch circuit high input	<Ref. to 2-7 [T11BU0].>
P1121	Neutral position switch circuit low input	<Ref. to 2-7 [T11BV0].>
P1130	Front oxygen (A/F) sensor circuit malfunction (open circuit)	<Ref. to 2-7 [T11BW0].>
P1131	Front oxygen (A/F) sensor circuit malfunction (short circuit)	<Ref. to 2-7 [T11BX0].>
P1132	Front oxygen (A/F) sensor heater circuit low input	<Ref. to 2-7 [T11BY0].>
P1133	Front oxygen (A/F) sensor heater circuit high input	<Ref. to 2-7 [T11BZ0].>
P1142	Throttle position sensor circuit range/performance problem (low input)	<Ref. to 2-7 [T11CA0].>
P1151	Rear oxygen sensor heater circuit high input	<Ref. to 2-7 [T11CB0].>

DTC No.	Item	Index
P1207	Air assist injector solenoid valve circuit low input	<Ref. to 2-7 [T11CC0].>
P1208	Air assist injector solenoid valve circuit high input	<Ref. to 2-7 [T11CD0].>
P1325	Knock sensor circuit low input	<Ref. to 2-7 [T11CE0].>
P1400	Fuel tank pressure control solenoid valve circuit low input	<Ref. to 2-7 [T11CF0].>
P1420	Fuel tank pressure control solenoid valve circuit high input	<Ref. to 2-7 [T11CG0].>
P1422	Evaporative emission control system purge control valve circuit high input	<Ref. to 2-7 [T11CH0].>
P1423	Evaporative emission control system vent control high input	<Ref. to 2-7 [T11CI0].>
P1442	Fuel level sensor circuit range/performance problem 2	<Ref. to 2-7 [T11CJ0].>
P1443	Evaporative emission control system vent control function problem	<Ref. to 2-7 [T11CK0].>
P1445	Air assist injector solenoid valve malfunction	<Ref. to 2-7 [T11CL0].>
P1490	Thermostat malfunction	<Ref. to 2-7 [T11CM0].>
P1507	Idle control system malfunction (fail-safe)	<Ref. to 2-7 [T11CN0].>
P1510	Idle air control solenoid valve signal 1 circuit low input	<Ref. to 2-7 [T11CO0].>
P1511	Idle air control solenoid valve signal 1 circuit high input	<Ref. to 2-7 [T11CP0].>
P1512	Idle air control solenoid valve signal 2 circuit low input	<Ref. to 2-7 [T11CQ0].>
P1513	Idle air control solenoid valve signal 2 circuit high input	<Ref. to 2-7 [T11CR0].>
P1514	Idle air control solenoid valve signal 3 circuit low input	<Ref. to 2-7 [T11CS0].>
P1515	Idle air control solenoid valve signal 3 circuit high input	<Ref. to 2-7 [T11CT0].>
P1516	Idle air control solenoid valve signal 4 circuit low input	<Ref. to 2-7 [T11CU0].>
P1517	Idle air control solenoid valve signal 4 circuit high input	<Ref. to 2-7 [T11CV0].>
P1520	Cooling fan relay 1 circuit high input	<Ref. to 2-7 [T11CW0].>
P1540	Vehicle speed sensor malfunction 2	<Ref. to 2-7 [T11CX0].>
P1560	Back-up voltage circuit malfunction	<Ref. to 2-7 [T11CY0].>
P1700	Throttle position sensor circuit malfunction for automatic transmission	<Ref. to 2-7 [T11CZ0].>
P1701	Cruise control set signal circuit malfunction for automatic transmission	<Ref. to 2-7 [T11DA0].>
P1702	Automatic transmission diagnosis input signal circuit low input	<Ref. to 2-7 [T11DB0].>
P1703	Low clutch timing control solenoid valve circuit malfunction	<Ref. to 2-7 [T11DC0].>

DTC No.	Item	Index
P1704	2-4 brake timing control solenoid valve circuit malfunction	<Ref. to 2-7 [T11DD0].>
P1705	2-4 brake pressure control solenoid valve circuit malfunction	<Ref. to 2-7 [T11DE0].>
P1722	Automatic transmission diagnosis input signal circuit high input	<Ref. to 2-7 [T11DF0].>
P1742	Automatic transmission diagnosis input signal circuit malfunction	<Ref. to 2-7 [T11DG0].>

MEMO:

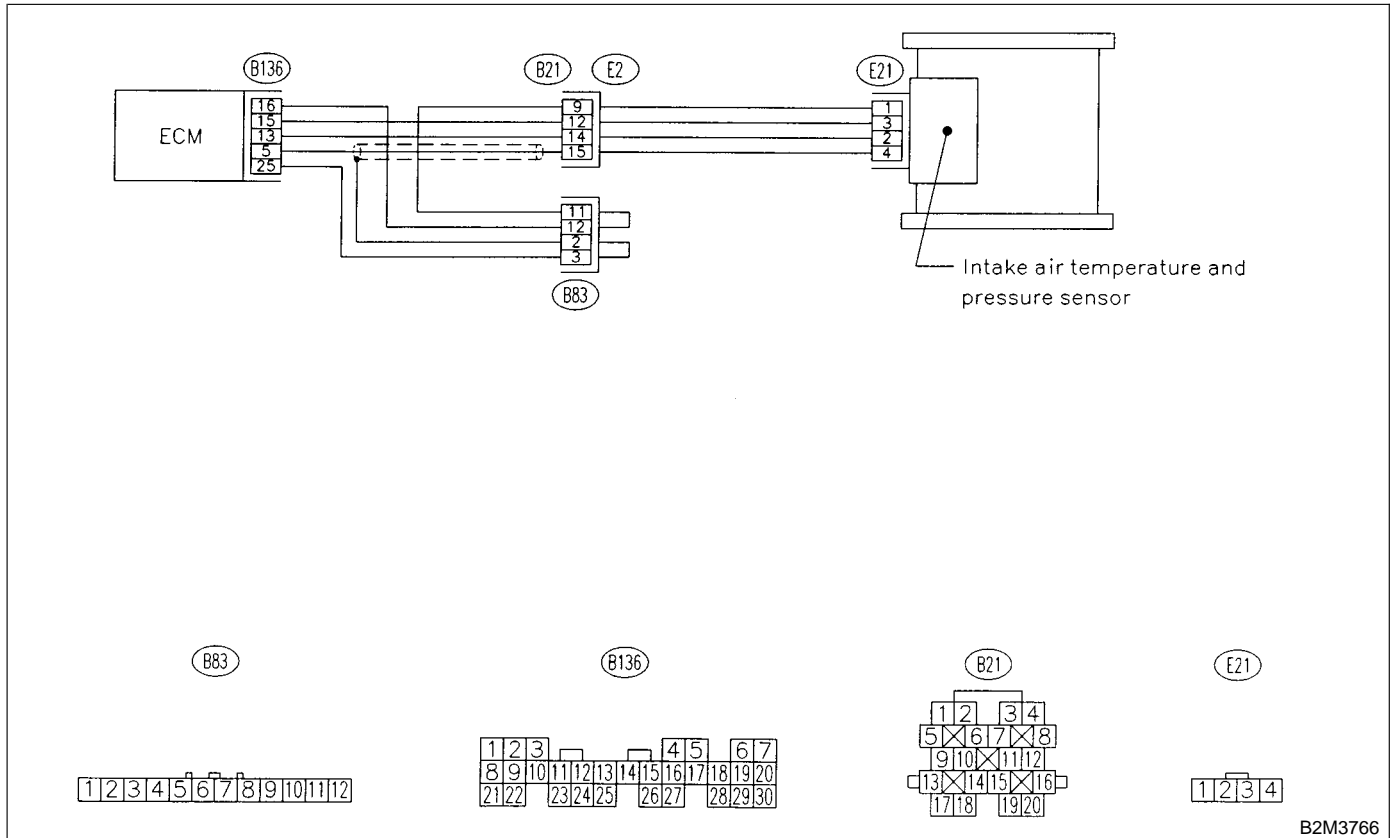
B: DTC P0106 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3766

11B1 : CHECK ANY OTHER DTC ON DISPLAY.

NOTE:

In this case, it is not necessary to inspect DTC P0106.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107, P0108 or P1112?
- YES** : Inspect DTC P0107, P0108 or P1112 using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
- NO** : Go to step 11B2.

11B2 : CHECK AIR INTAKE SYSTEM.

- CHECK** : Are there holes, loose bolts or disconnection of hose on air intake system?
- YES** : Repair air intake system.
- NO** : Go to step 11B3.

11B3 : CHECK PRESSURE SENSOR.

- 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F).
- 2) Place the shift lever in the selector lever in "N" or "P" position.
- 3) Turn A/C switch to OFF.
- 4) Turn all accessory switches to OFF.
- 5) Read data of intake manifold pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

Specification:

- Intake manifold absolute pressure

Engine speed	Specified value
Ignition ON	73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg)
Idling	20.0 — 46.7 kPa (150 — 350 mmHg, 5.91 — 13.78 inHg)

CHECK : *Is the value within the specifications?*

YES : Go to step **11B4**.

NO : Replace intake air temperature sensor and pressure sensor. <Ref. to 2-7 [W13A0].>

11B4 : CHECK THROTTLE POSITION.

Read data of throttle position signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is throttle positioning ratio equal to or less than 5% when throttle is fully closed?*

YES : Go to step **11B5**.

NO : Adjust or replace throttle position sensor. <Ref. to 2-7 [W10A0].>

11B5 : CHECK THROTTLE POSITION.

CHECK : *Is throttle positioning ratio equal to or more than 85% when throttle is fully open?*

YES : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

NO : Replace throttle position sensor. <Ref. to 2-7 [W10A0].>

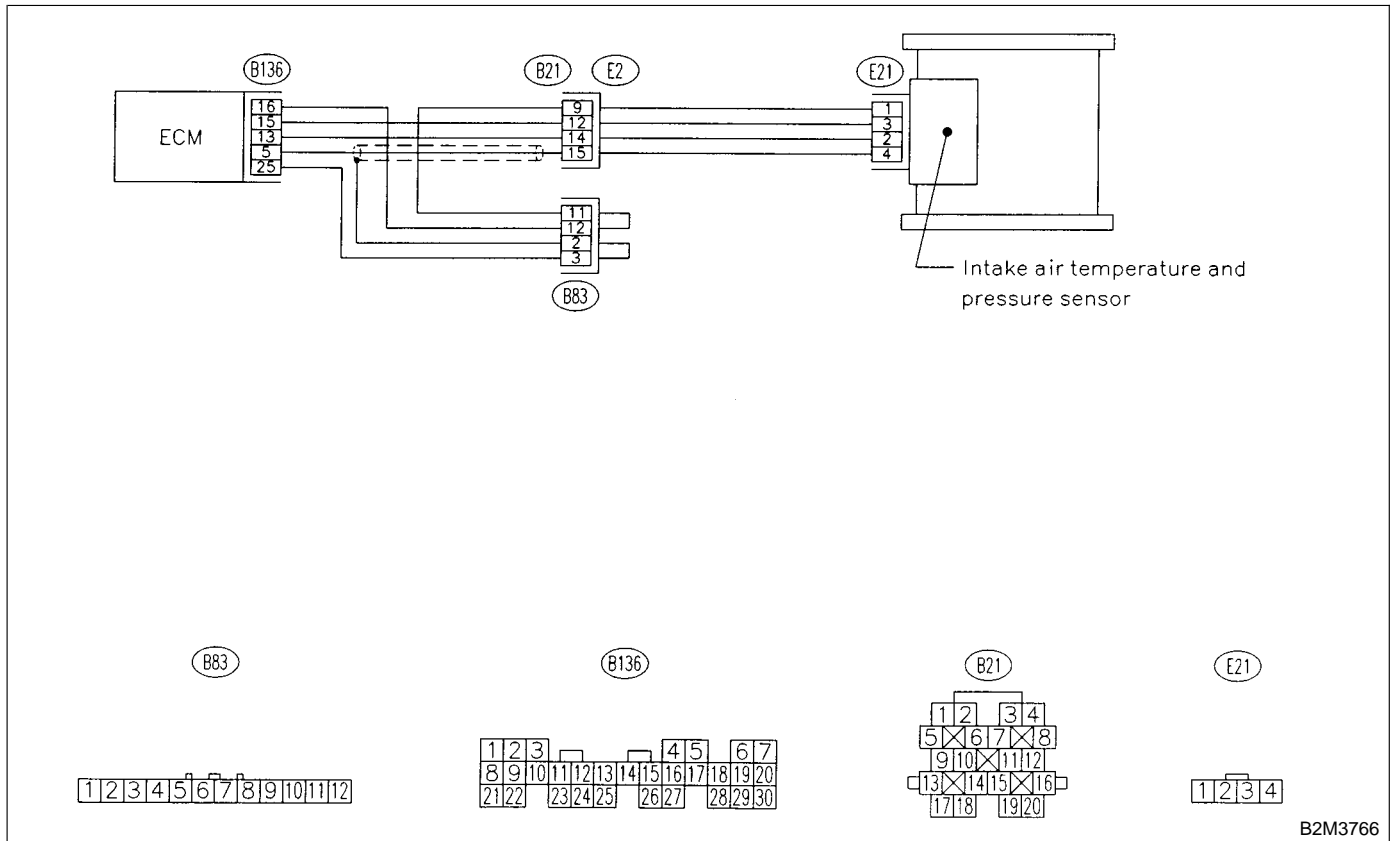
C: DTC P0107 — PRESSURE SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3766

11C1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than 13.3 kPa (100 mmHg, 3.94 inHg)?*
- YES** : Go to step 11C3.
- NO** : Go to step 11C2.

11C2 : CHECK POOR CONTACT.

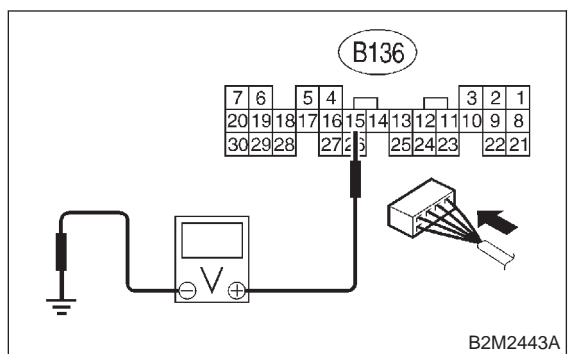
Check poor contact in ECM and pressure sensor connector. <Ref. to 2-7 [T3C8].>

- CHECK** : *Is there poor contact in ECM or pressure sensor connector?*
- YES** : Repair poor contact in ECM or pressure sensor connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time.

11C3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

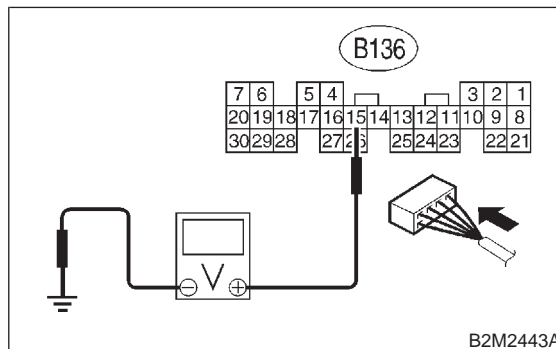


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step 11C5.
- NO** : Go to step 11C4.

11C4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

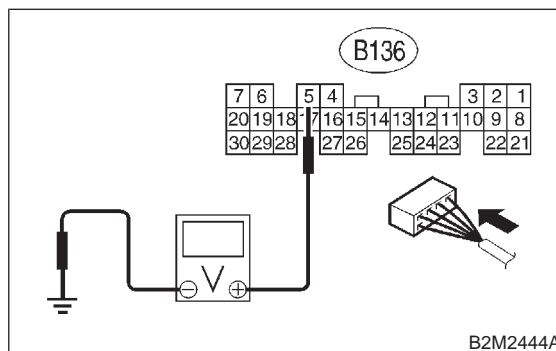
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11C5 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 5 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step 11C7.
- NO** : Go to step 11C6.

**11C6 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : Does the value change more than 13.3 kPa (100 mmHg, 3.94 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?

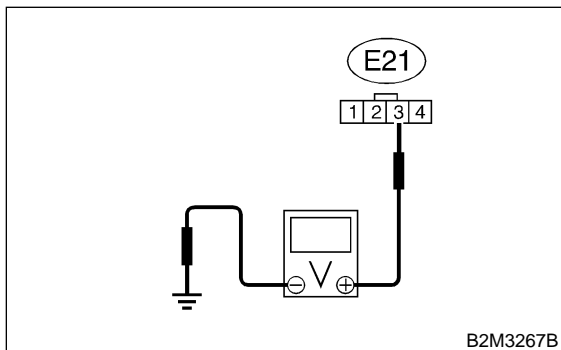
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11C7.

**11C7 : CHECK HARNESS BETWEEN ECM
AND INTAKE AIR TEMPERATURE
AND PRESSURE SENSOR CON-
NECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature and pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between intake air temperature sensor and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 3 (+) — Engine ground (-):



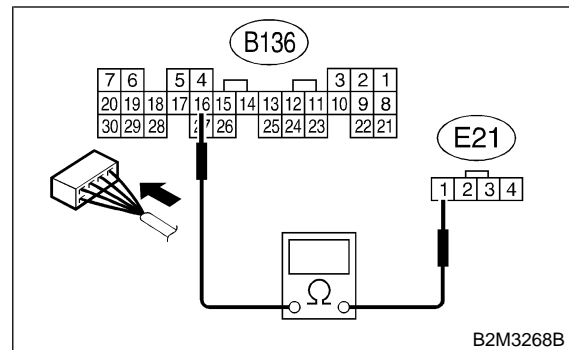
- CHECK** : Is the voltage more than 4.5 V?
YES : Go to step 11C8.
NO : Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

**11C8 : CHECK HARNESS BETWEEN ECM
AND INTAKE AIR TEMPERATURE
AND PRESSURE SENSOR CON-
NECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness between ECM and intake air temperature and pressure sensor connector.

Connector & terminal

(B136) No. 16 — (E21) No. 1:



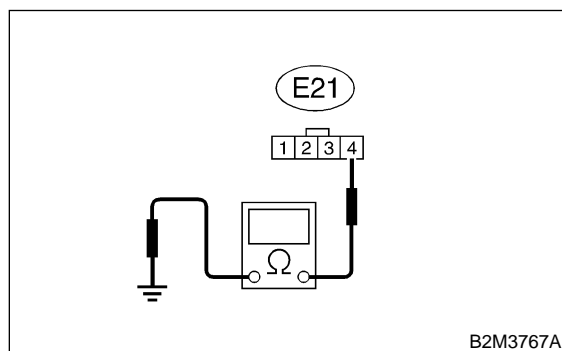
- CHECK** : Is the resistance less than 1 Ω?
YES : Go to step 11C9.
NO : Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

11C9 : CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 4 — Engine ground:



- CHECK** : **Is the resistance more than 500 kΩ?**
- YES** : Go to step **11C10**.
- NO** : Repair ground short circuit in harness between ECM and intake air temperature and pressure sensor connector.

11C10 : CHECK POOR CONTACT.

Check poor contact in intake manifold pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in intake manifold pressure sensor connector?**
- YES** : Repair poor contact in intake air temperature and pressure sensor connector.
- NO** : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

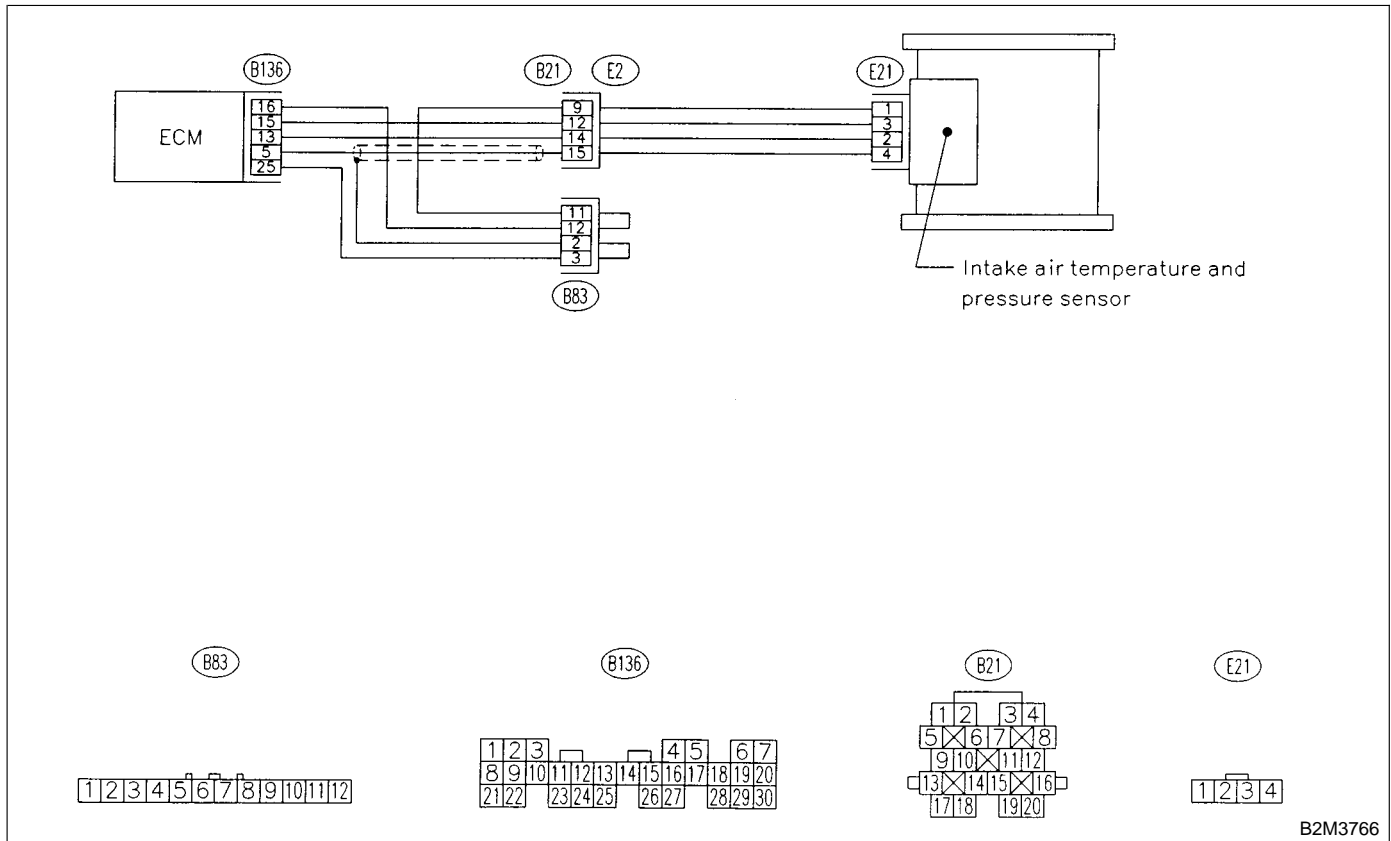
D: DTC P0108 — PRESSURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3766

11D1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 119.5 kPa (896.5 mmHg, 35.29 inHg)?*

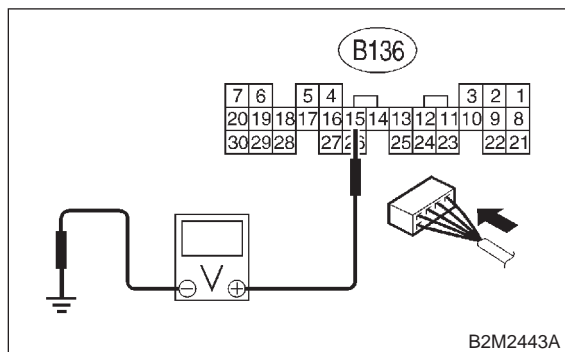
YES : Go to step 11D10.

NO : Go to step 11D2.

11D2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Is the voltage more than 4.5 V?*

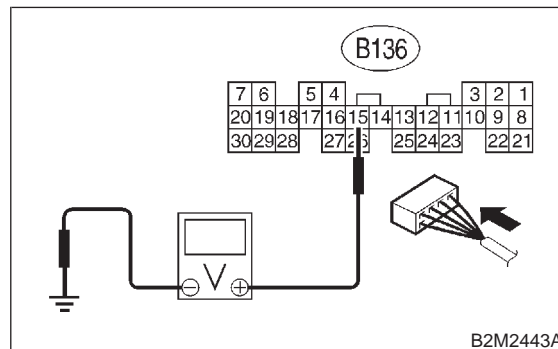
YES : Go to step 11D4.

NO : Go to step 11D3.

11D3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

NO : Contact with SOA service.

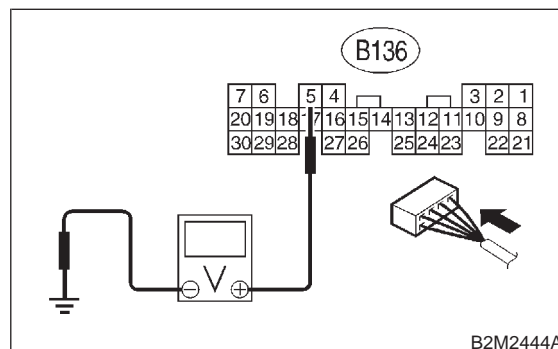
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11D4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 5 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 0.2 V?*

YES : Go to step 11D6.

NO : Go to step 11D5.

**11D5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : Does the value change more than 13.3 kPa (100 mmHg, 3.94 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?

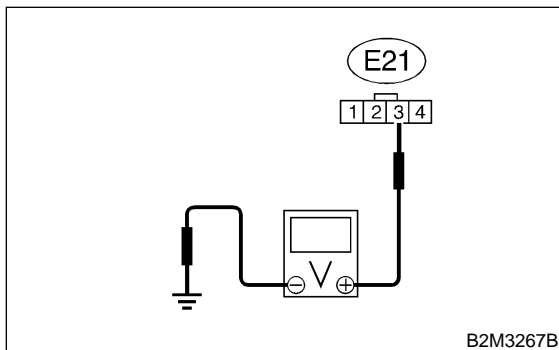
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11D6.

**11D6 : CHECK HARNESS BETWEEN ECM
AND INTAKE AIR TEMPERATURE
AND PRESSURE SENSOR CON-
NECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature and pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 3 (+) — Engine ground (-):



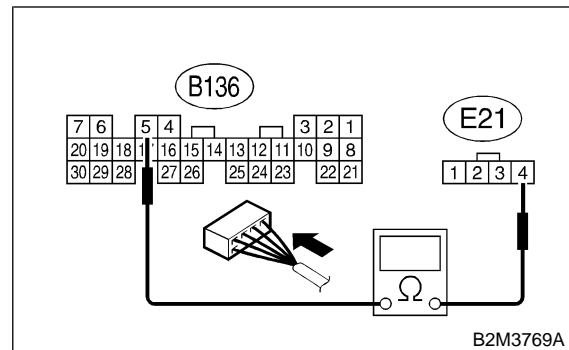
- CHECK** : Is the voltage more than 4.5 V?
YES : Go to step 11D7.
NO : Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

**11D7 : CHECK HARNESS BETWEEN ECM
AND INTAKE AIR TEMPERATURE
AND PRESSURE SENSOR CON-
NECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness between ECM and intake air temperature and pressure sensor connector.

Connector & terminal

(B136) No. 5 — (E21) No. 4:



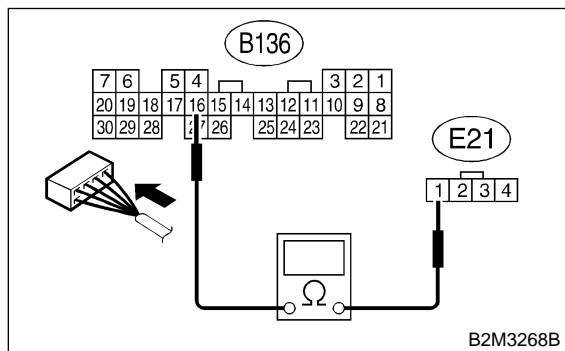
- CHECK** : Is the resistance less than 1 Ω?
YES : Go to step 11D8.
NO : Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

11D8 : CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between ECM and intake air temperature and pressure sensor connector.

Connector & terminal

(B136) No. 16 — (E21) No. 1:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **11D9**.
- NO** : Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

11D9 : CHECK POOR CONTACT.

Check poor contact in intake air temperature and pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in intake manifold pressure sensor connector?**
- YES** : Repair poor contact in intake air temperature and pressure sensor connector.
- NO** : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

11D10 : CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.

- 1) Turn ignition switch to OFF and Subaru Select Monitor or the OBD-II general scan tool switch to OFF.
- 2) Disconnect connector from intake air temperature and pressure sensor.
- 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON.
- 4) Read data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : **Is the value more than 119.5 kPa (896.5 mmHg, 35.29 inHg)?**
- YES** : Repair battery short circuit in harness between ECM and intake air temperature and pressure sensor connector.
- NO** : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

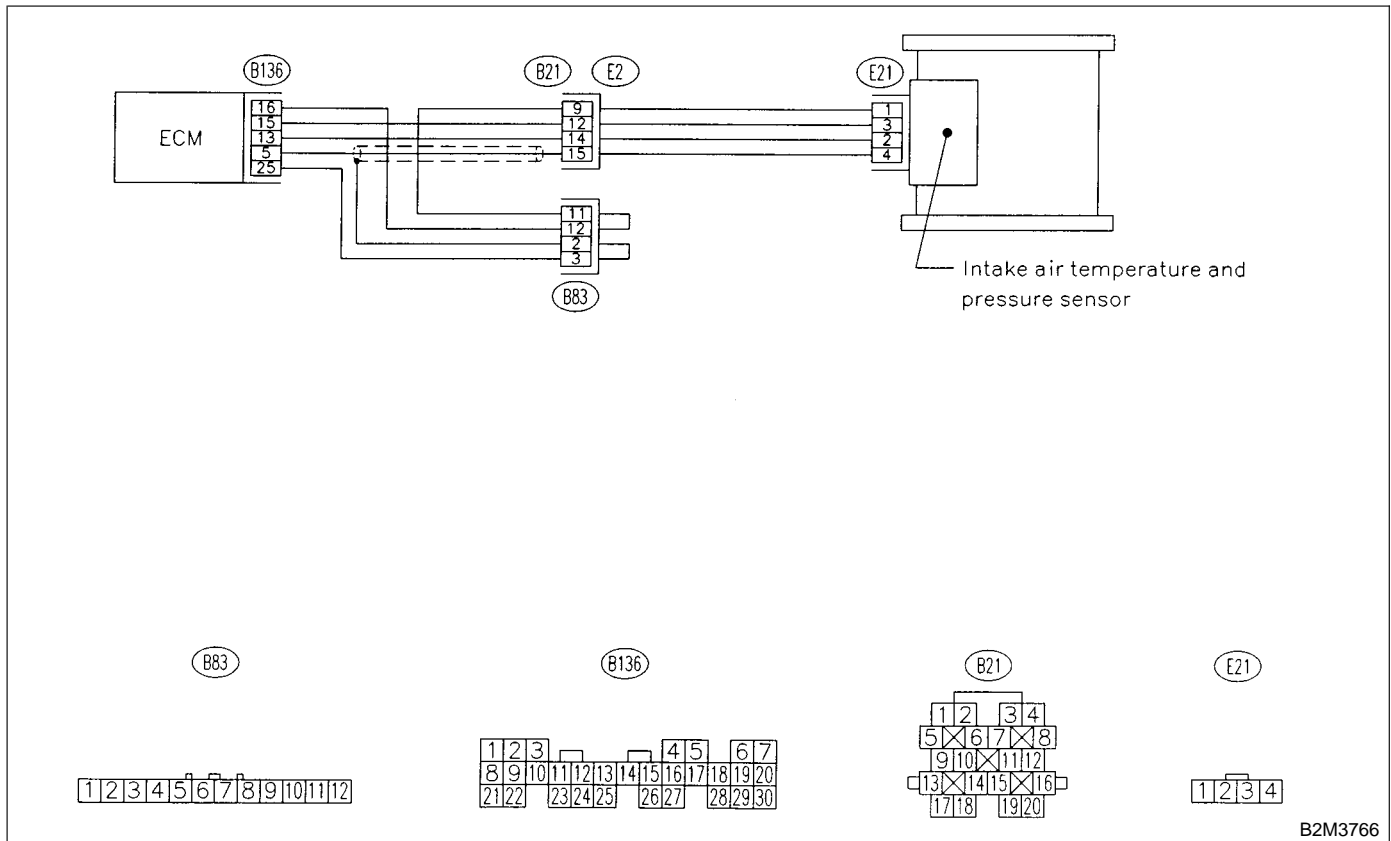
E: DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3766

11E1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0112, P0113, P0116, P0117 or P0125?*

YES : Inspect DTC P0112, P0113, P0116, P0117 or P0125 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0111.

NO : Go to step **11E2**.

11E2 : CHECK ENGINE COOLANT TEMPERATURE.

- 1) Start the engine and warm it up completely.
- 2) Measure engine coolant temperature using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the engine coolant temperature between 75°C (167°F) and 95°C (203°F)?*

YES : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

NO : Inspect DTC P0125 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

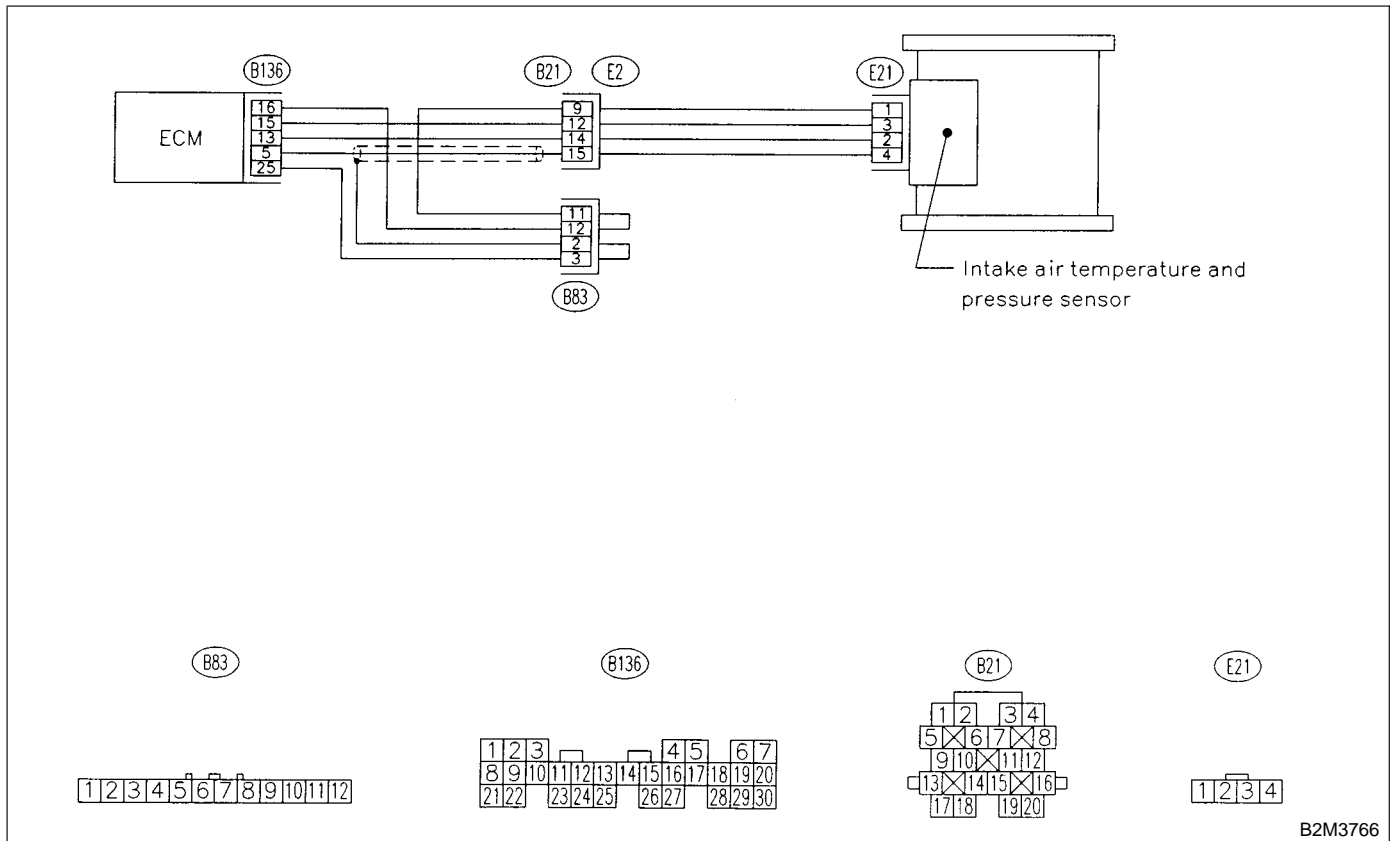
F: DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3766

11F1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value greater than 120°C (248°F)?*

YES : Go to step 11F2.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in intake air temperature and pressure sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

11F2 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE AND PRESSURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature and pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than -40°C (-40°F)?*

YES : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

NO : Repair ground short circuit in harness between intake air temperature sensor and ECM connector.

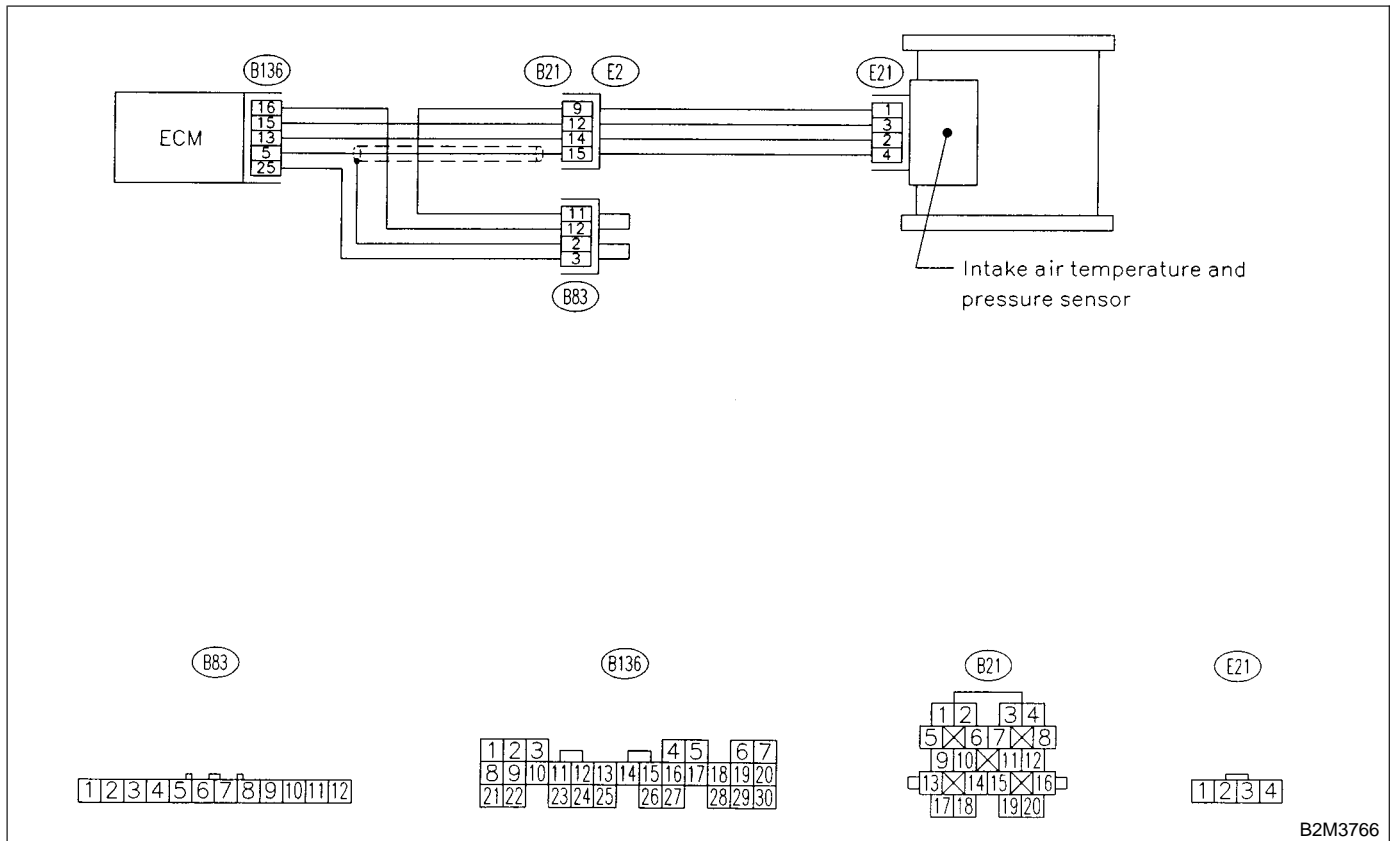
G: DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3766

11G1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of intake air temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than -40°C (-40°F)?*

YES : Go to step **11G2**.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

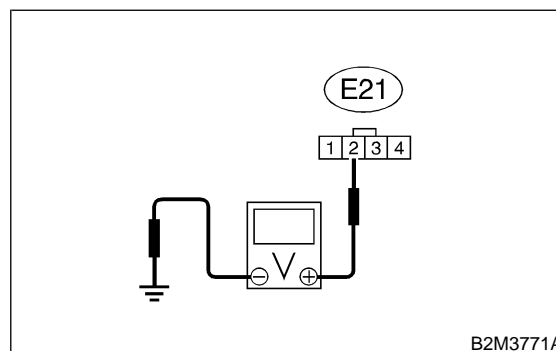
- Poor contact in intake air temperature and pressure sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

11G2 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE AND PRESSURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from intake air temperature and pressure sensor.
- 3) Measure voltage between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 2 (+) — Engine ground (-):



CHECK : *Is the voltage more than 10 V?*

YES : Repair battery short circuit in harness between intake air temperature and pressure sensor and ECM connector.

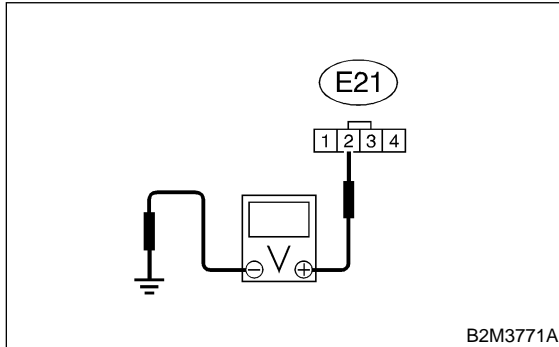
NO : Go to step **11G3**.

11G3 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE AND PRESSURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 2 (+) — Engine ground (-):



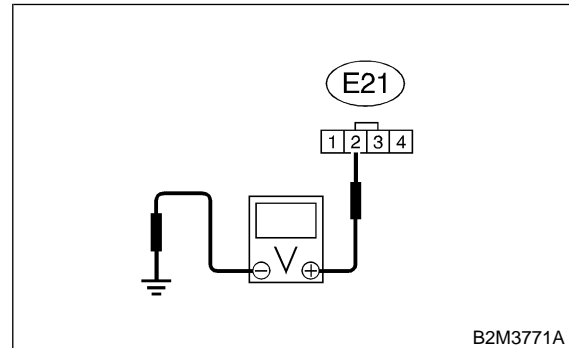
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between intake air temperature and pressure sensor and ECM connector.
- NO** : Go to step **11G4**.

11G4 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE AND PRESSURE SENSOR AND ECM CONNECTOR.

Measure voltage between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 2 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 3 V?**
- YES** : Go to step **11G5**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

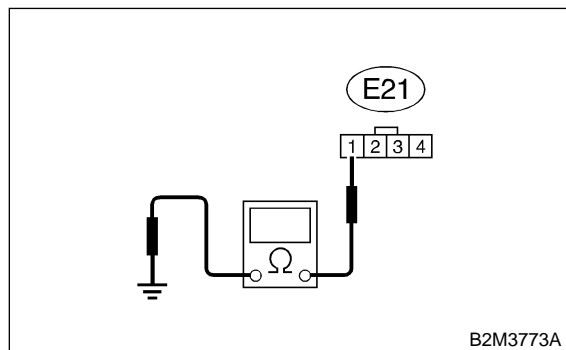
- Open circuit in harness between intake air temperature and pressure sensor and ECM connector
- Poor contact in intake air temperature and pressure sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

11G5 : CHECK HARNESS BETWEEN INTAKE AIR TEMPERATURE AND PRESSURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness between intake air temperature and pressure sensor connector and engine ground.

Connector & terminal

(E21) No. 1 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between intake air temperature and pressure sensor and ECM connector
- Poor contact in intake air temperature and pressure sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

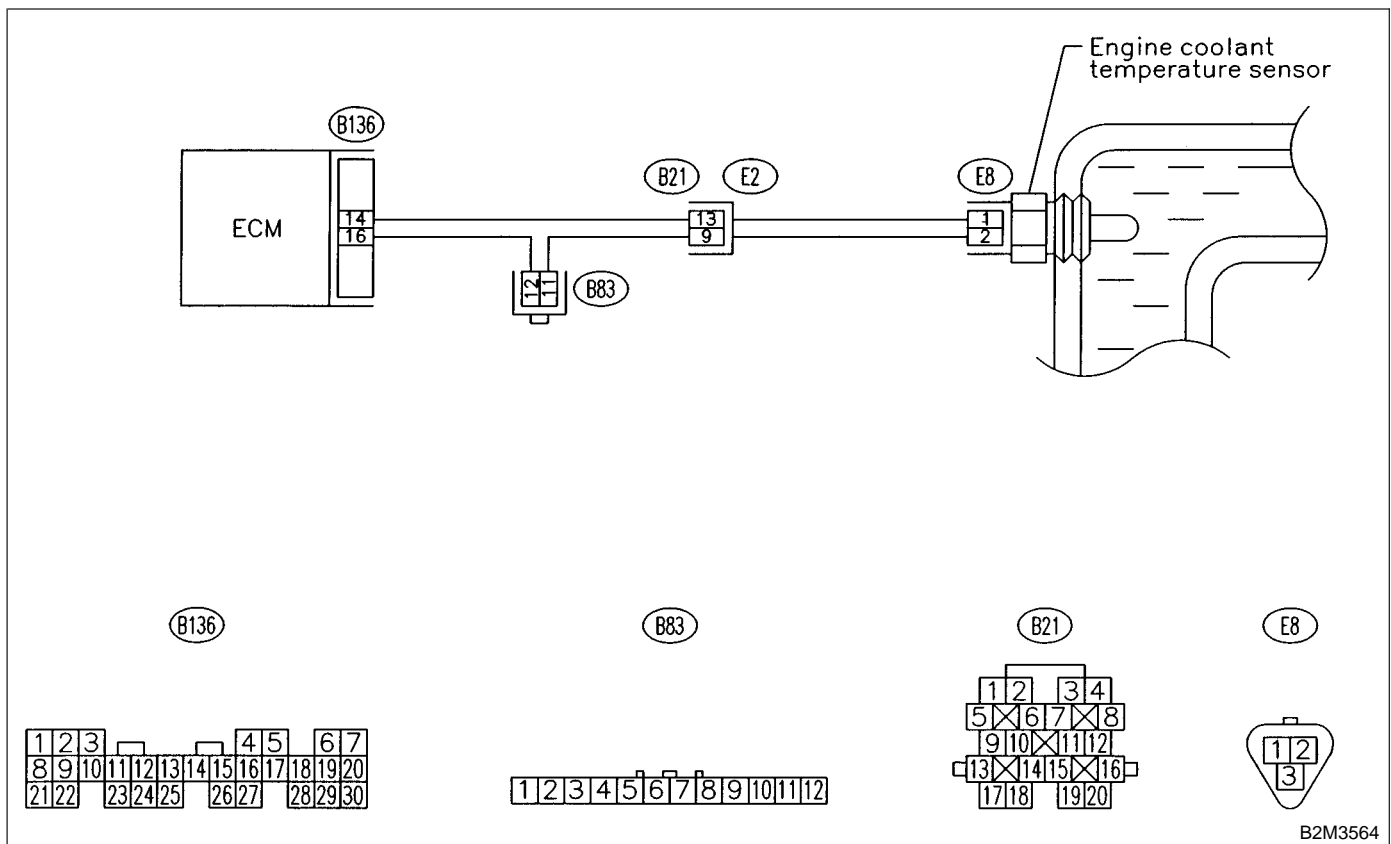
H: DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Hard to start
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3564

11H1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is the value greater than 150°C (302°F)?***

YES : Go to step **11H2**.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in engine coolant temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

11H2 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from engine coolant temperature sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is the value less than -40°C (-40°F)?***

YES : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

NO : Repair ground short circuit in harness between engine coolant temperature sensor and ECM connector.

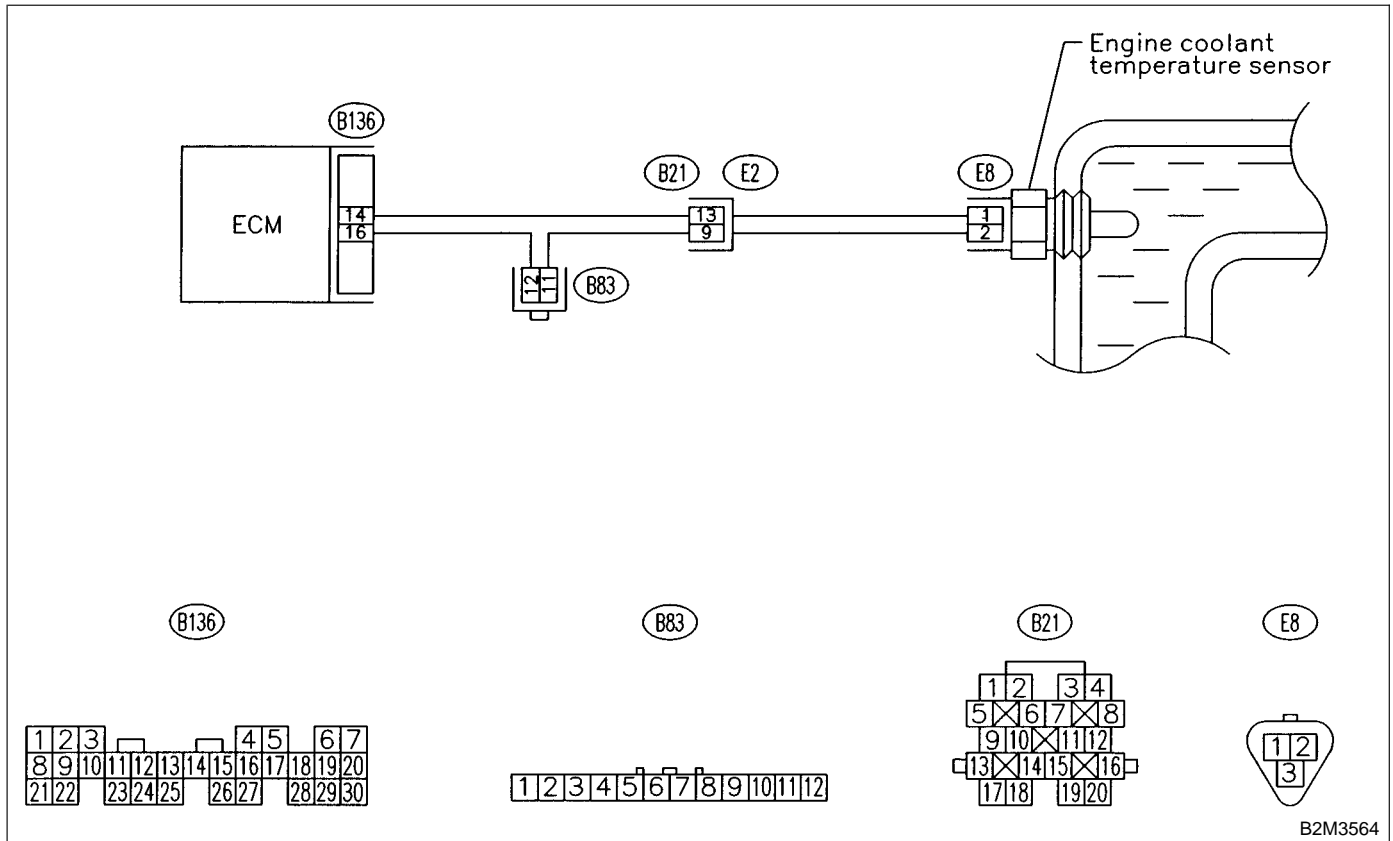
I: DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Hard to start
 - Erroneous idling
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



1111 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : **Is the value less than -40°C (-40°F)?**

YES : Go to step **1112**.

NO : Repair poor contact.

NOTE:

In this case, repair the following:

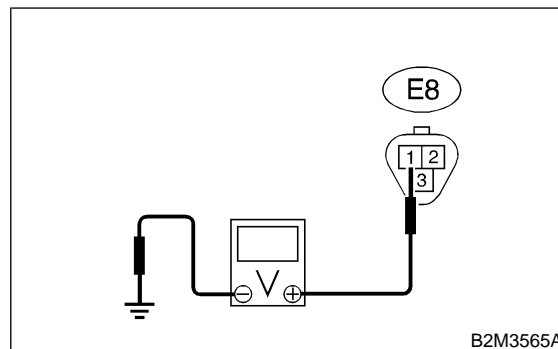
- Poor contact in engine coolant temperature sensor
- Poor contact in ECM
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

1112 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.

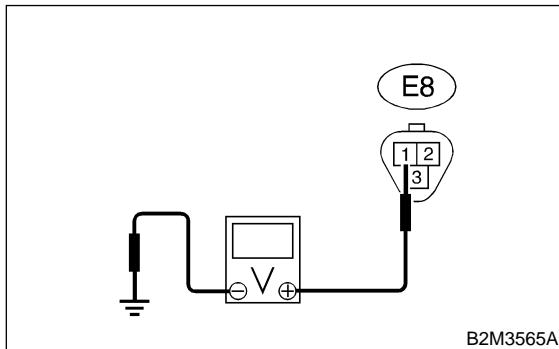
NO : Go to step **1113**.

1113 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



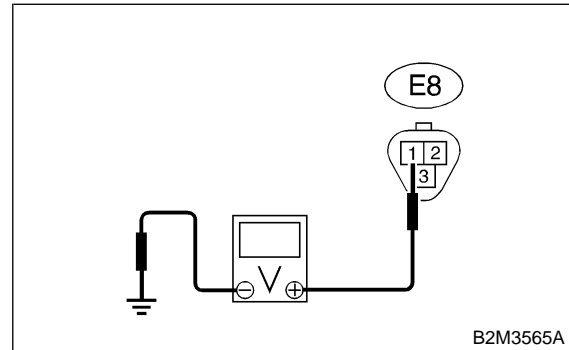
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.
- NO** : Go to step **1114**.

1114 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

Measure voltage between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 1 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 4 V?**
- YES** : Go to step **1115**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

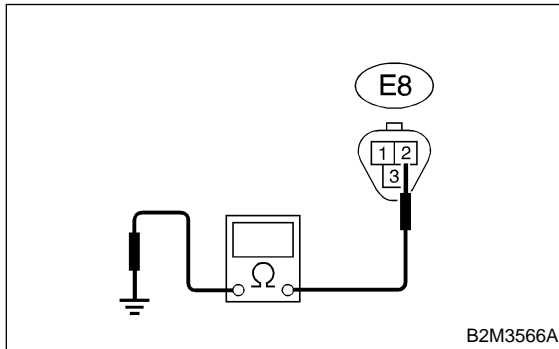
- Open circuit in harness between ECM and engine coolant temperature sensor connector
- Poor contact in engine coolant temperature sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

1115 : CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance of harness between engine coolant temperature sensor connector and engine ground.

Connector & terminal

(E8) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine coolant temperature sensor connector
- Poor contact in engine coolant temperature sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

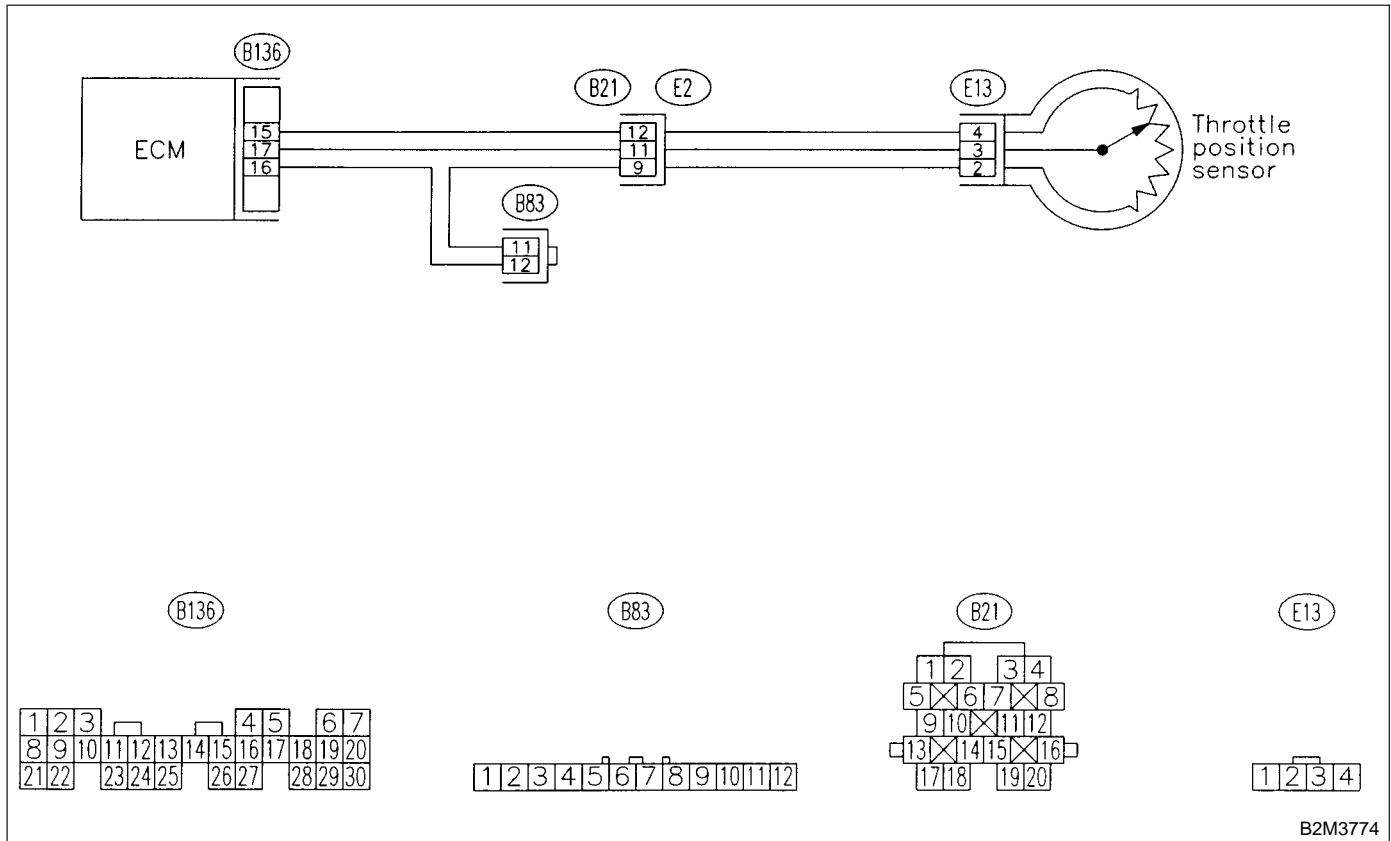
J: DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3774

11J1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0122 or P0123?
- YES** : Inspect DTC P0122 or P0123 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0121.

- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A2].>

MEMO:

K: DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —

● DTC DETECTING CONDITION:

- Immediately at fault recognition

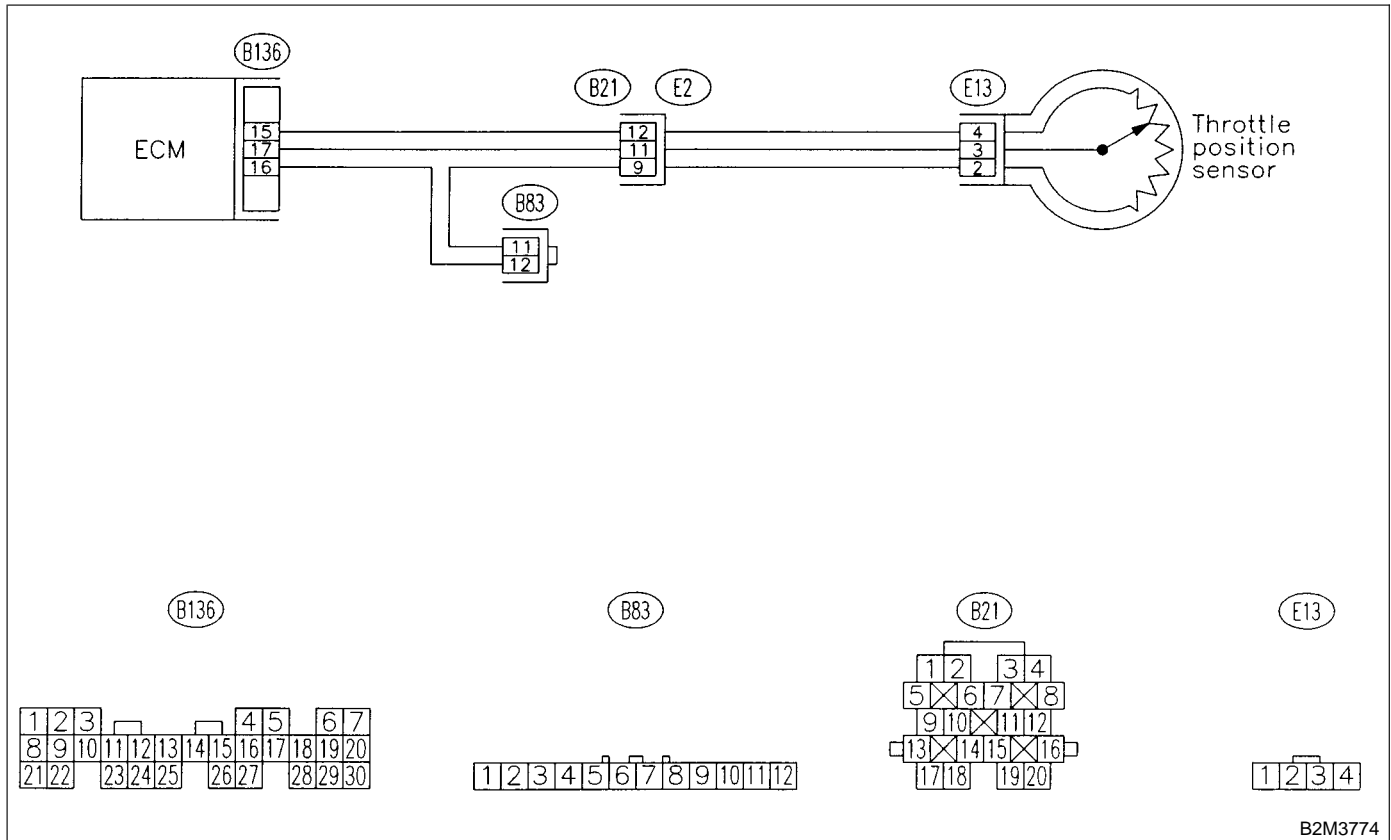
● TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



B2M3774

11K1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than 0.1 V?*
- YES** : Go to step 11K2.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

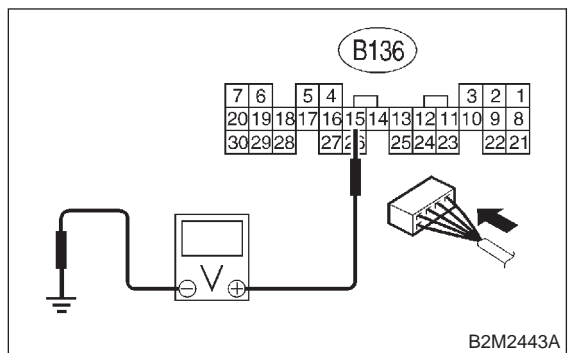
NOTE:

- In this case, repair the following:
- Poor contact in throttle position sensor connector
 - Poor contact in ECM connector
 - Poor contact in coupling connector (B21)

11K2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground while throttle valve is fully closed.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

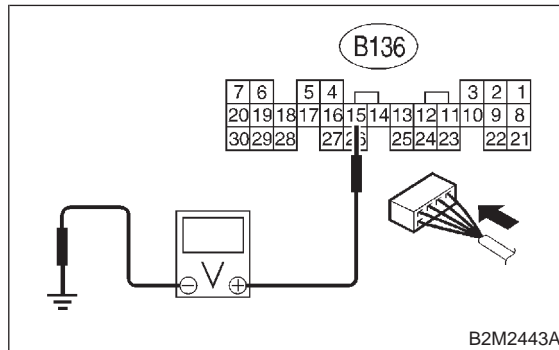


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step 11K4.
- NO** : Go to step 11K3.

11K3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

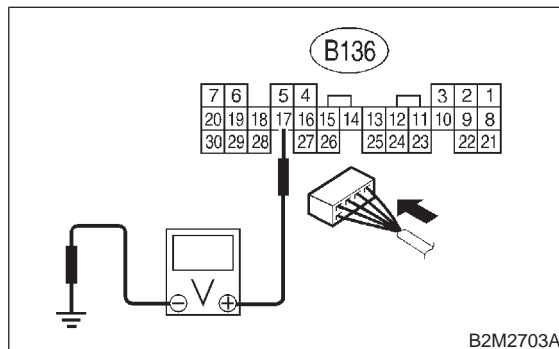
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11K4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 17 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.1 V?*
- YES** : Go to step 11K6.
- NO** : Go to step 11K5.

**11K5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Measure voltage between ECM connector and chassis ground.

CHECK : *Does the voltage change more than 0.1 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

YES : Repair poor contact in ECM connector.

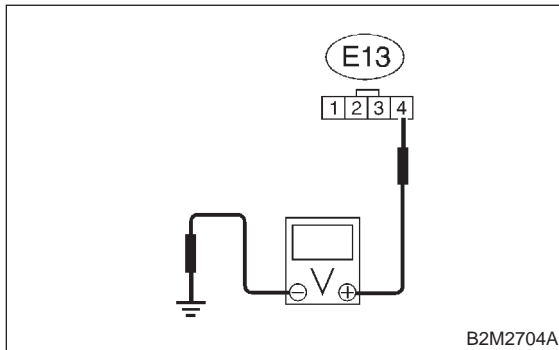
NO : Go to step 11K6.

**11K6 : CHECK HARNESS BETWEEN ECM
AND THROTTLE POSITION SENSOR
CONNECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from throttle position sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 4 (+) — Engine ground (-):



CHECK : *Is the voltage more than 4.5 V?*

YES : Go to step 11K7.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

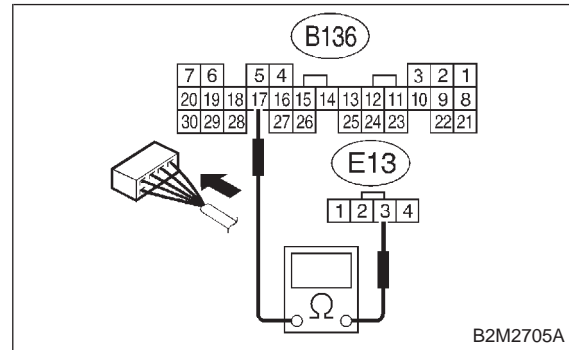
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in throttle position sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

**11K7 : CHECK HARNESS BETWEEN ECM
AND THROTTLE POSITION SENSOR
CONNECTOR.**

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

Connector & terminal

(B136) No. 17 — (E13) No. 3:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 11K8.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

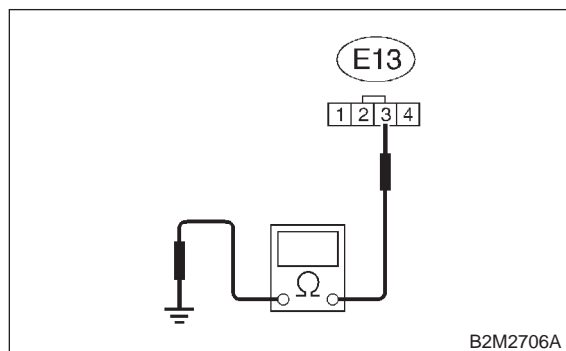
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in throttle position sensor connector
- Poor contact in coupling connector (B21)

11K8 : CHECK HARNESS BETWEEN ECM AND THROTTLE POSITION SENSOR CONNECTOR.

Measure resistance of harness between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 3 — Engine ground:



- CHECK** : **Is the resistance less than 10 Ω ?**
- YES** : Repair ground short circuit in harness between throttle position sensor and ECM connector.
- NO** : Go to step **11K9**.

11K9 : CHECK POOR CONTACT.

Check poor contact in throttle position sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in throttle position sensor connector?**
- YES** : Repair poor contact in throttle position sensor connector.
- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A2].>

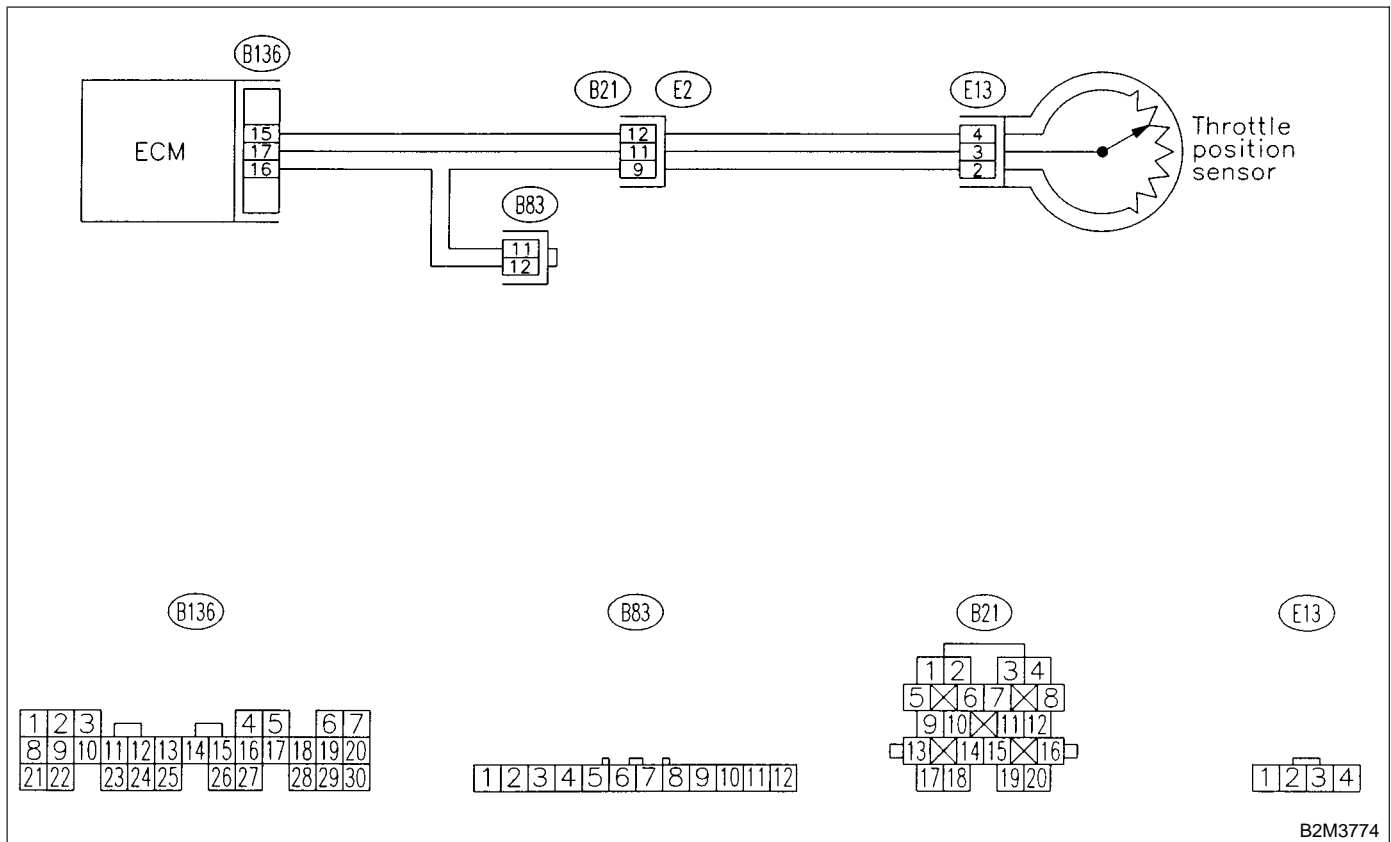
L: DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3774

11L1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 4.9 V?*

YES : Go to step 11L2.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

In this case, repair the following:

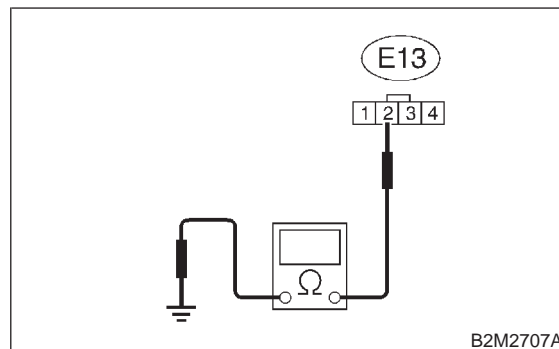
- Poor contact in throttle position sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

11L2 : CHECK HARNESS BETWEEN THROTTLE POSITION SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(E13) No. 2 — Engine ground:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step 11L3.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

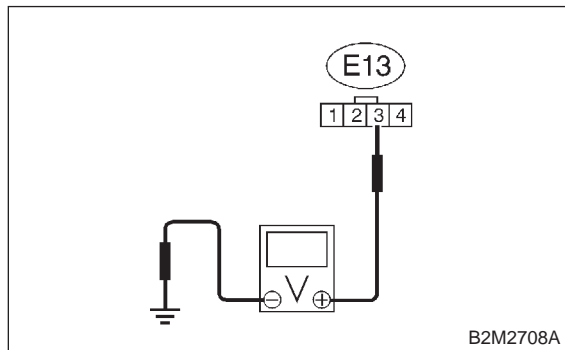
- Open circuit in harness between throttle position sensor and ECM connector
- Poor contact in coupling connector (B21)
- Poor contact in joint connector (B83)

11L3 : CHECK HARNESS BETWEEN THROTTLE POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between throttle position sensor connector and engine ground.

Connector & terminal

(E13) No. 3 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 4.9 V?**
- YES** : Repair battery short circuit in harness between throttle position sensor and ECM connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A2].>

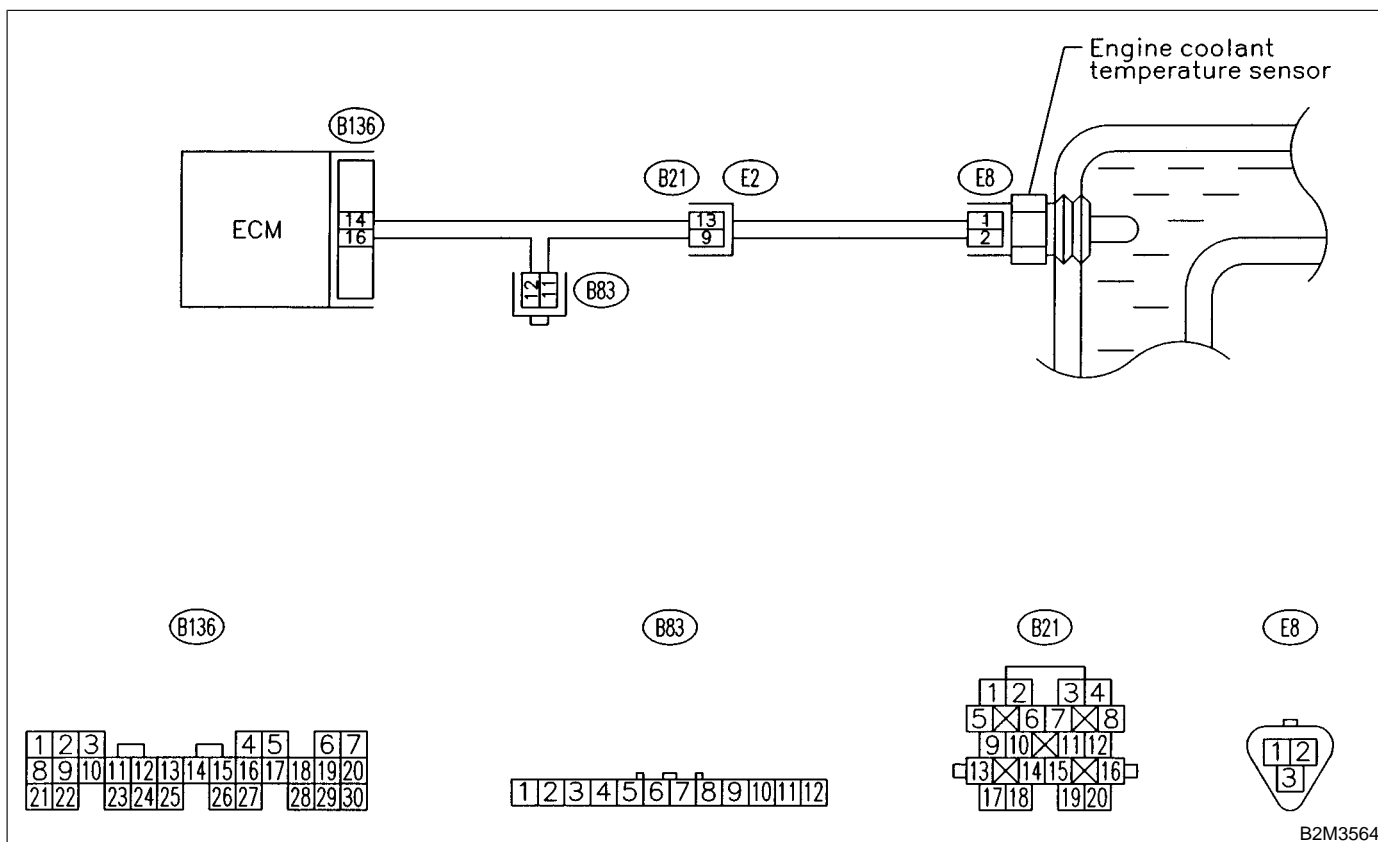
M: DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine would not return to idling.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3564

11M1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117?
- YES** : Inspect DTC P0116 or P0117 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0125.

- NO** : Go to step **11M2**.

11M2 : CHECK THERMOSTAT.

- CHECK** : Does thermostat remain opened?
- YES** : Replace thermostat. <Ref. to 2-5 [W2A0].>
- NO** : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

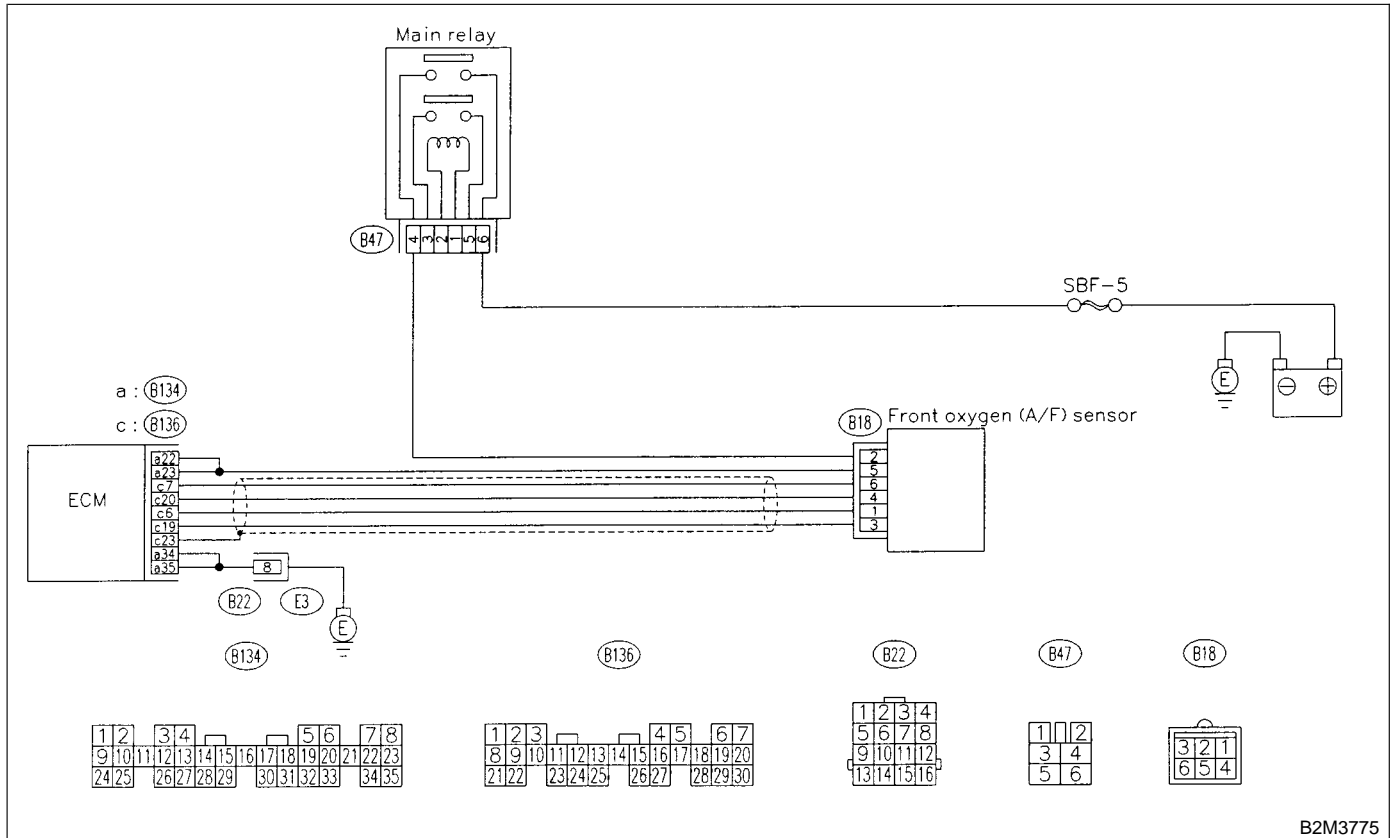
N: DTC P0130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3775

11N1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132 or P1133?
- YES** : Inspect DTC P1130, P1131, P1132 or P1133 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>
- NO** : Go to step 11N2.

11N2 : CHECK FRONT OXYGEN (A/F) SENSOR DATA.

- 1) Start engine.
- 2) While observing the Subaru Select Monitor or OBD-II general scan tool screen, warm-up the engine until coolant temperature is above 70°C (160°F).
If the engine is already warmed-up, operate at idle speed for at least 1 minute.
- 3) Read data of front oxygen (A/F) sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value equal to or more than 0.85 and equal to less than 1.15 in idling?*

YES : Go to step 11N3.

NO : Go to step 11N4.

11N3 : CHECK FRONT OXYGEN (A/F) SENSOR DATA.

Race engine at speeds from idling to 5,000 rpm for a total of 5 cycles.

NOTE:

To increase engine speed to 5,000 rpm, slowly depress accelerator pedal, taking approximately 5 seconds, and quickly release accelerator pedal to decrease engine speed.

CHECK : *Is the value more than 1.1 for a moment?*

YES : Go to step 11N6.

NO : Go to step 11N4.

11N4 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM and front oxygen (A/F) sensor connector.
- 3) Measure resistance between ECM and front oxygen (A/F) sensor.

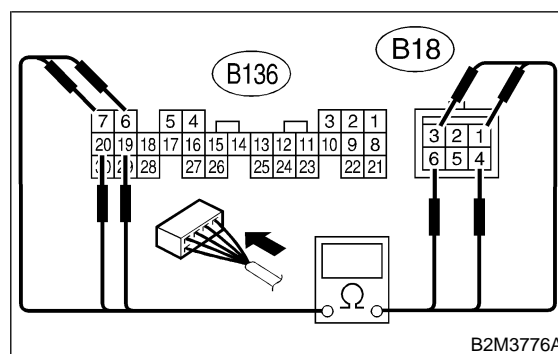
Connector & terminals

(B136) No. 6 — (B18) No. 1:

(B136) No. 7 — (B18) No. 6:

(B136) No. 19 — (B18) No. 3:

(B136) No. 20 — (B18) No. 4:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step 11N5.

NO : Repair open circuit between ECM and front oxygen (A/F) sensor.

11N5 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR.

Measure resistance between ECM and chassis ground.

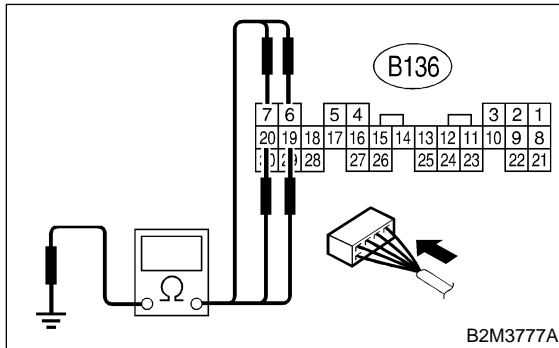
Connector & terminals

(B136) No. 6 — Chassis ground:

(B136) No. 7 — Chassis ground:

(B136) No. 19 — Chassis ground:

(B136) No. 20 — Chassis ground:



CHECK : **Is the resistance more than 1 MΩ?**

YES : Go to step 11N6.

NO : Repair ground short circuit between ECM and front oxygen (A/F) sensor.

11N6 : CHECK EXHAUST SYSTEM.

Check exhaust system parts.

NOTE:

Check the following items.

- Loose installation of portions
- Damage (crack, hole etc.) of parts
- Looseness of front oxygen (A/F) sensor
- Looseness and ill fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor

CHECK : **Is there a fault in exhaust system?**

YES : Repair or replace faulty parts.

NO : Replace front oxygen (A/F) sensor.
<Ref. to 2-7 [W8A0].>

O: DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE —

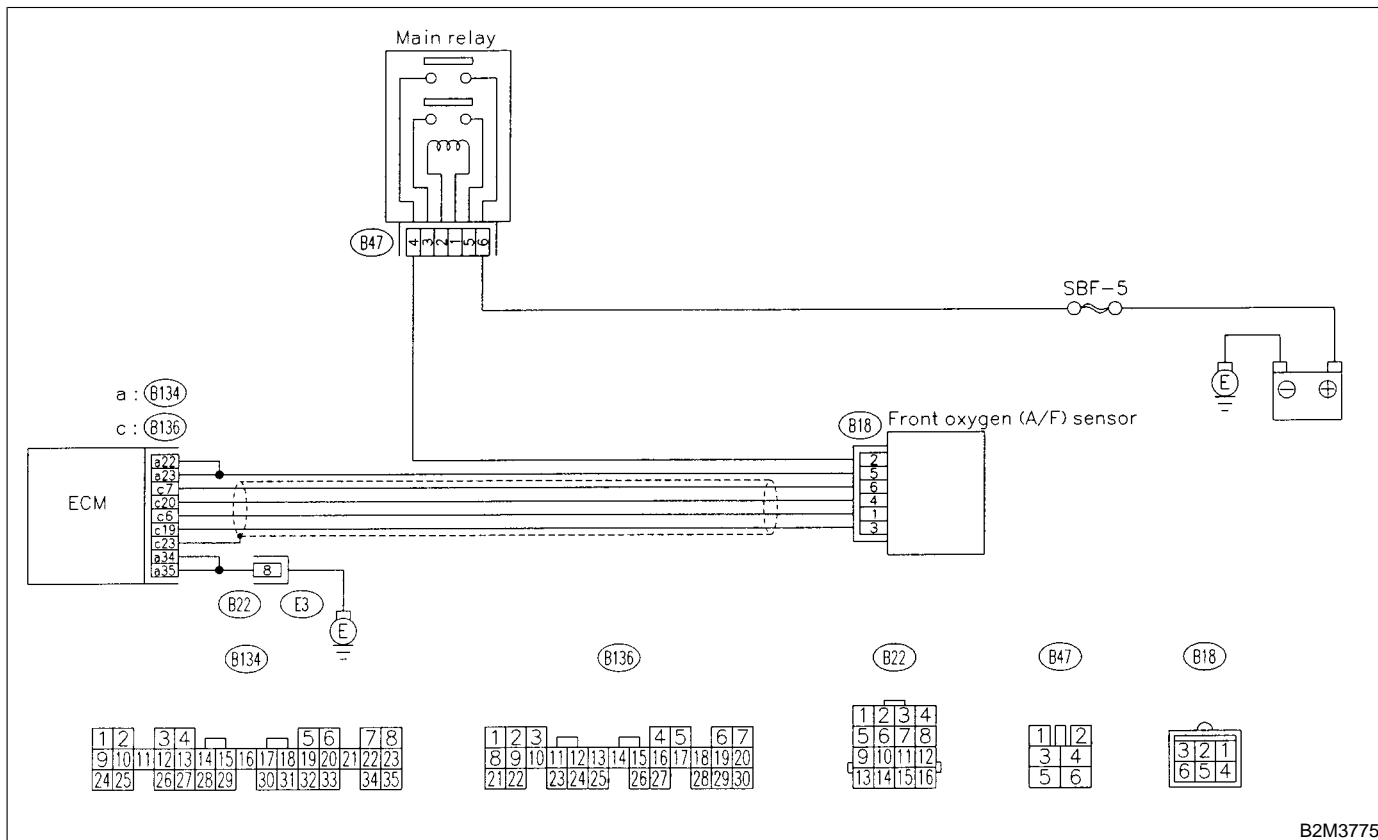
• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3775

1101 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132 or P1133?

YES : Inspect DTC P1130, P1131, P1132 or P1133 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0133.

NO : Go to step 1102.

1102 : CHECK EXHAUST SYSTEM.

NOTE:

Check the following items.

- Loose installation of front portion of exhaust pipe onto cylinder heads
- Loose connection between front exhaust pipe and front catalytic converter
- Damage of exhaust pipe resulting in a hole

CHECK : Is there a fault in exhaust system?

YES : Repair exhaust system.

NO : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

P: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION —

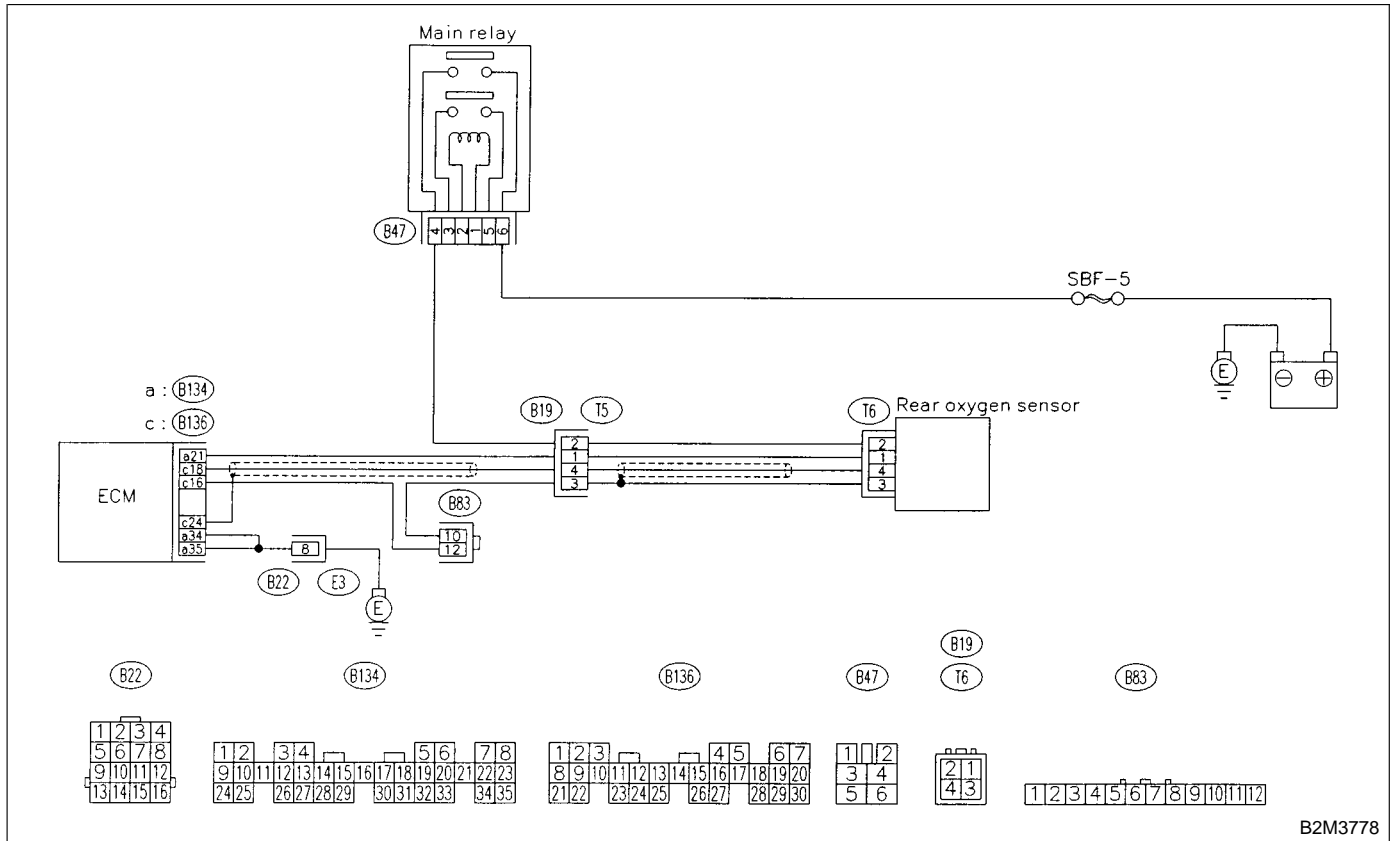
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



11P1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130 or P1131?
- YES** : Go to step 11P2.
- NO** : Go to step 11P3.

11P2 : CHECK FAILURE CAUSE OF P0130.

Inspect DTC P1130 or P1131 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

- CHECK** : Is the failure cause of P1130 or P1131 in the fuel system?
- YES** : Check fuel system.

NOTE:

In this case, it is not necessary to inspect DTC P0136.

- NO** : Go to step 11P3.

11P3 : CHECK REAR OXYGEN SENSOR DATA.

1) Warm-up the engine until engine coolant temperature is above 70°C (160°F), and keep the engine speed at 2,000 rpm to 3,000 rpm for two minutes.

2) Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : **Does the value fluctuate?**

YES : Go to step **11P7**.

NO : Go to step **11P4**.

11P4 : CHECK REAR OXYGEN SENSOR DATA.

Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II General Scan Tool.

CHECK : **Is the value fixed between 0.2 and 0.4 V?**

YES : Go to step **11P5**.

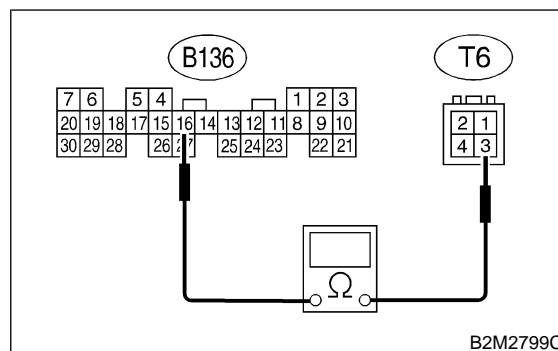
NO : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

11P5 : CHECK HARNESS BETWEEN ECM AND REAR OXYGEN SENSOR CONNECTOR.

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

Connector & terminal

(B136) No. 16 — (T6) No. 3:



CHECK : **Is the resistance more than 3 Ω?**

YES : Repair open circuit in harness between ECM and rear oxygen sensor connector.

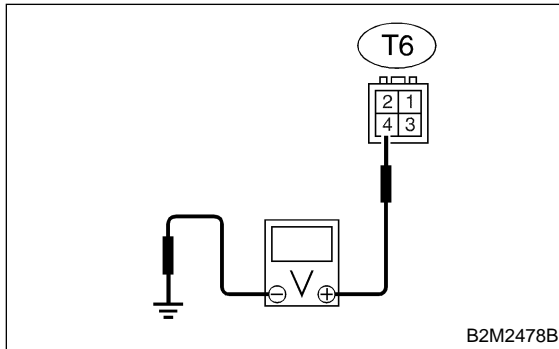
NO : Go to step **11P6**.

11P6 : CHECK HARNESS BETWEEN REAR OXYGEN SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from rear oxygen sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between rear oxygen sensor harness connector and engine ground or chassis ground.

Connector & terminal

(T6) No. 4 (+) — Engine ground (-):



- CHECK** : **Is the voltage more than 0.2 V?**
- YES** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between rear oxygen sensor and ECM connector
- Poor contact in rear oxygen sensor connector
- Poor contact in ECM connector

11P7 : CHECK EXHAUST SYSTEM.

Check exhaust system parts.

NOTE:

Check the following items.

- Loose installation of portions
- Damage (crack, hole etc.) of parts
- Looseness and ill fitting of parts between front oxygen (A/F) sensor and rear oxygen sensor

- CHECK** : **Is there a fault in exhaust system?**
- YES** : Repair or replace faulty parts.
- NO** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

Q: DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —

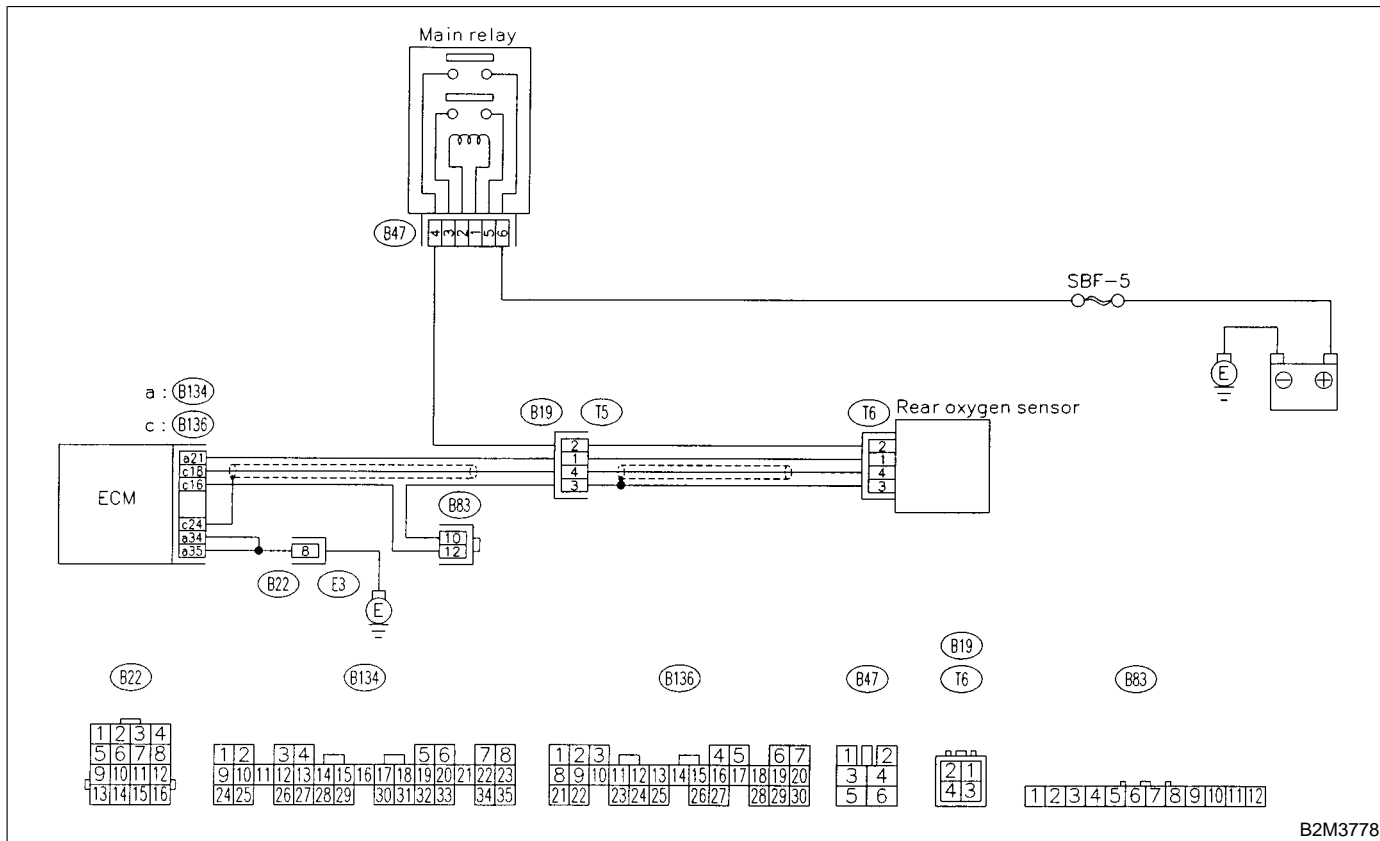
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:



B2M3778

11Q1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0136?

YES : Inspect DTC P0136 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0139.

NO : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

R: DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION

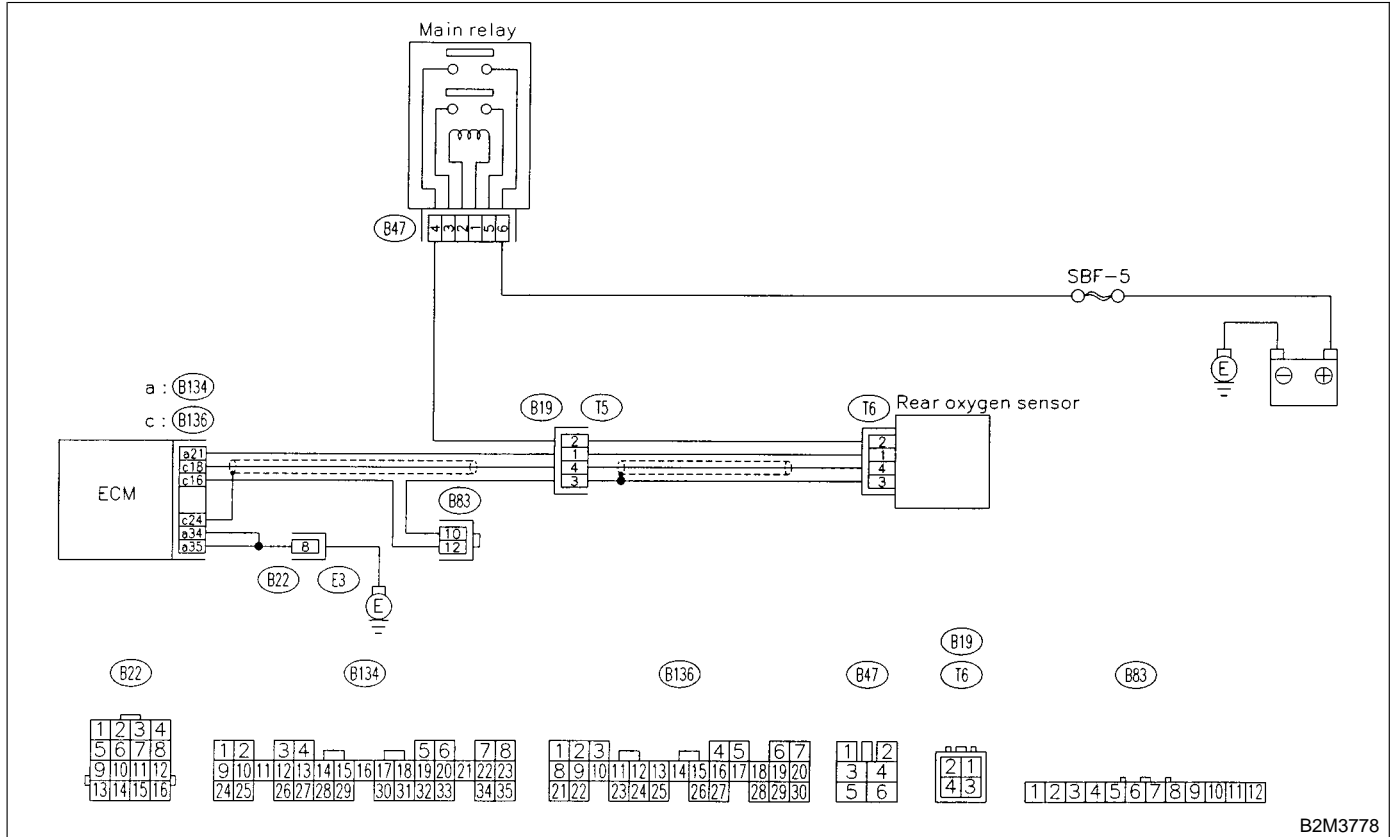
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



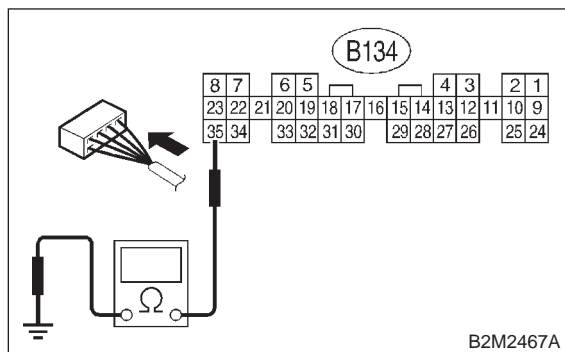
B2M3778

11R1 : CHECK GROUND CIRCUIT OF ECM.

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

Connector & terminal

(B134) No. 35 — Chassis ground:



- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step 11R3.
- NO** : Go to step 11R2.

11R2 : CHECK GROUND CIRCUIT OF ECM.

- 1) Repair harness and connector.

NOTE:

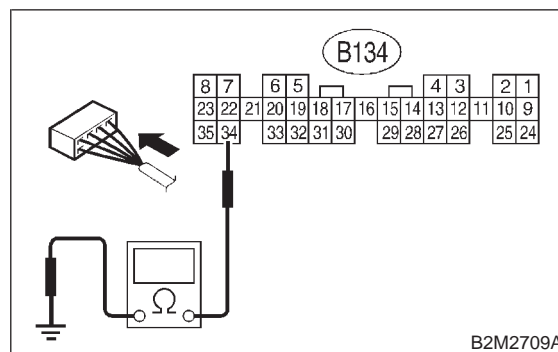
In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

- 2) Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 34 — Chassis ground:



- CHECK** : *Is the resistance less than 5 Ω?*
- YES** : Go to step 11R3.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

11R3 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of rear oxygen sensor heater current using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 0.2 A?*

YES : Repair connector.

NOTE:

In this case, repair the following:

- Poor contact in rear oxygen sensor connector
- Poor contact in rear oxygen sensor connecting harness connector
- Poor contact in ECM connector

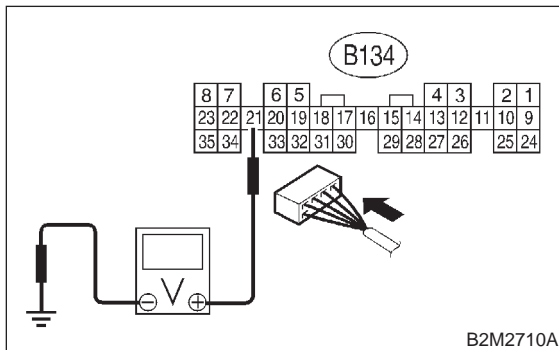
NO : Go to step 11R4.

11R4 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Start and idle the engine.
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 1.0 V?*

YES : Go to step 11R7.

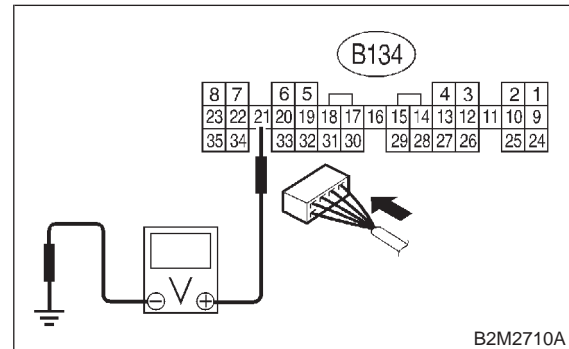
NO : Go to step 11R5.

11R5 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



CHECK : *Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

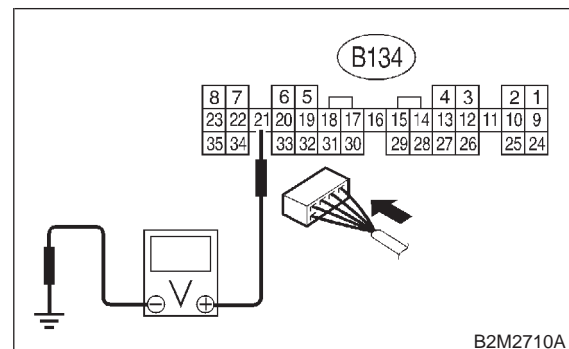
NO : Go to step 11R6.

11R6 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Disconnect connector from rear oxygen sensor.
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 1.0 V?*

YES : Replace ECM. <Ref. to 2-7 [W19A0].>

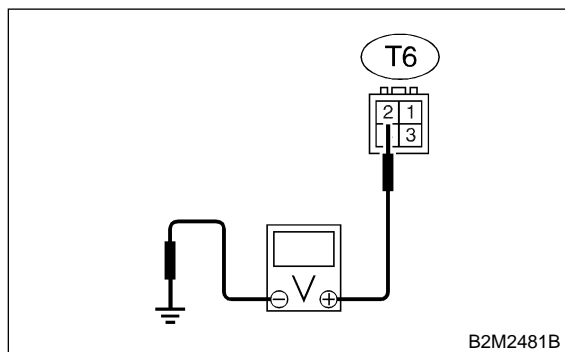
NO : Repair battery short circuit in harness between ECM and rear oxygen sensor connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>

11R7 : CHECK POWER SUPPLY TO REAR OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from rear oxygen sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between rear oxygen sensor connector and engine ground or chassis ground.

Connector & terminal

(T6) No. 2 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 11R8.
- NO** : Repair power supply line.

NOTE:

In this case, repair the following:

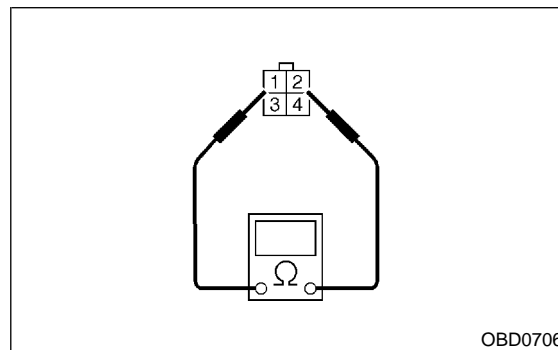
- Open circuit in harness between main relay and rear oxygen sensor connector
- Poor contact in rear oxygen sensor connector
- Poor contact in coupling connector (T5)

11R8 : CHECK REAR OXYGEN SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between rear oxygen sensor connector terminals.

Terminals

No. 1 — No. 2:



- CHECK** : *Is the resistance less than 30 Ω?*
- YES** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between rear oxygen sensor and ECM connector
- Poor contact in rear oxygen sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (T5)

- NO** : Replace rear oxygen sensor. <Ref. to 2-7 [W9A0].>

S: DTC P0170 — FUEL TRIM MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Erroneous idling
- Engine stalls.
- Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY MODE** <Ref. to 2-7 [T3D0].> and **INSPECTION MODE** <Ref. to 2-7 [T3E0].>.

11S1 : CHECK EXHAUST SYSTEM.

CHECK : *Are there holes or loose bolts on exhaust system?*

YES : Repair exhaust system.

NO : Go to step 11S2.

11S2 : CHECK AIR INTAKE SYSTEM.

CHECK : *Are there holes, loose bolts or disconnection of hose on air intake system?*

YES : Repair air intake system.

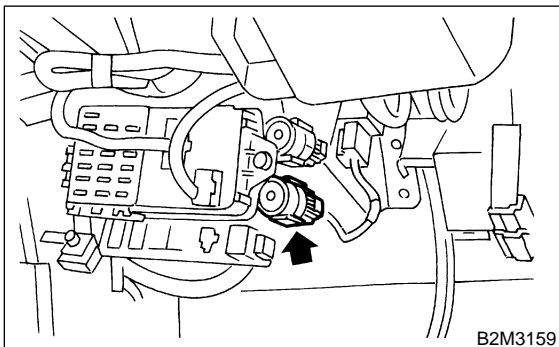
NO : Go to step 11S3.

11S3 : CHECK FUEL PRESSURE.**WARNING:**

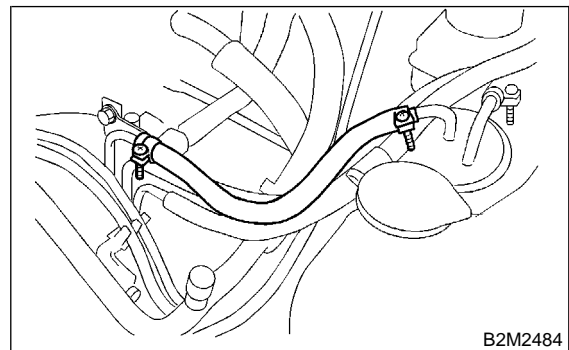
- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel on the floor.

1) Release fuel pressure.

(1) Disconnect connector from fuel pump relay.



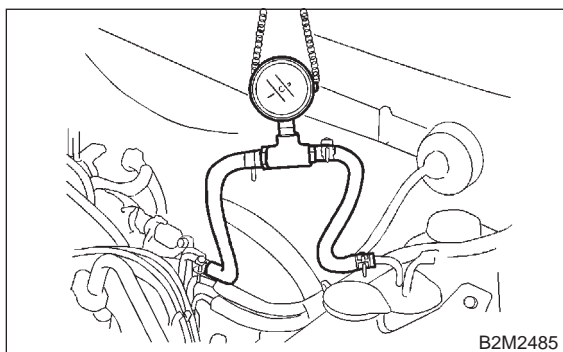
- (2) Start the engine and run it until it stalls.
 - (3) After the engine stalls, crank it for five more seconds.
 - (4) Turn ignition switch to OFF.
- 2) Connect connector to fuel pump relay.
 - 3) Disconnect fuel delivery hose from fuel filter, and connect fuel pressure gauge.



- 4) Install fuel filler cap.
- 5) Start the engine and idle while gear position is neutral.
- 6) Measure fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

WARNING:
Before removing fuel pressure gauge, release fuel pressure.

NOTE:
 If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.



CHECK : *Is fuel pressure between 284 and 314 kPa (2.9 — 3.2 kg/cm², 41 — 46 psi)?*

YES : Go to step 11S4.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Improper fuel pump discharge ● Clogged fuel supply line

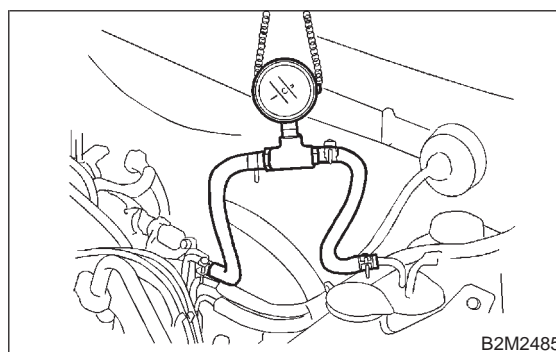
11S4 : CHECK FUEL PRESSURE.

After connecting pressure regulator vacuum hose, measure fuel pressure.

WARNING:
Before removing fuel pressure gauge, release fuel pressure.

NOTE:

- If fuel pressure does not increase, squeeze fuel return hose 2 to 3 times, then measure fuel pressure again.
- If out of specification as measured at this step, check or replace pressure regulator and pressure regulator vacuum hose.



CHECK : *Is fuel pressure between 206 and 235 kPa (2.1 — 2.4 kg/cm², 30 — 34 psi)?*

YES : Go to step 11S5.

NO : Repair the following items.

Fuel pressure too high	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Clogged fuel return line or bent hose
Fuel pressure too low	<ul style="list-style-type: none"> ● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line

11S5 : CHECK ENGINE COOLANT TEMPERATURE SENSOR.

- 1) Start the engine and warm-up completely.
- 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is temperature between 70°C (158°F) and 100°C (212°F)?***

YES : Go to step **11S6**.

NO : Replace engine coolant temperature sensor. <Ref. to 2-7 [W4A0].>

11S6 : CHECK INTAKE MANIFOLD PRESSURE SENSOR SIGNAL.

- 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F).
- 2) Place the selector lever in "N" or "P" position.
- 3) Turn A/C switch to OFF.
- 4) Turn all accessory switches to OFF.
- 5) Read data of intake manifold pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

Specification:

Engine speed	Specified value
Idling	24.0 — 41.3 kPa (180 — 310 mmHg, 7.09 — 41.3 inHg)
Ignition ON	73.3 — 106.6 kPa (550 — 800 mmHg, 21.65 — 31.50 inHg)

CHECK : ***Is the voltage within the specifications?***

YES : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

NO : Replace intake air temperature and pressure sensor. <Ref. to 2-7 [W13A0].>

T: DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM —

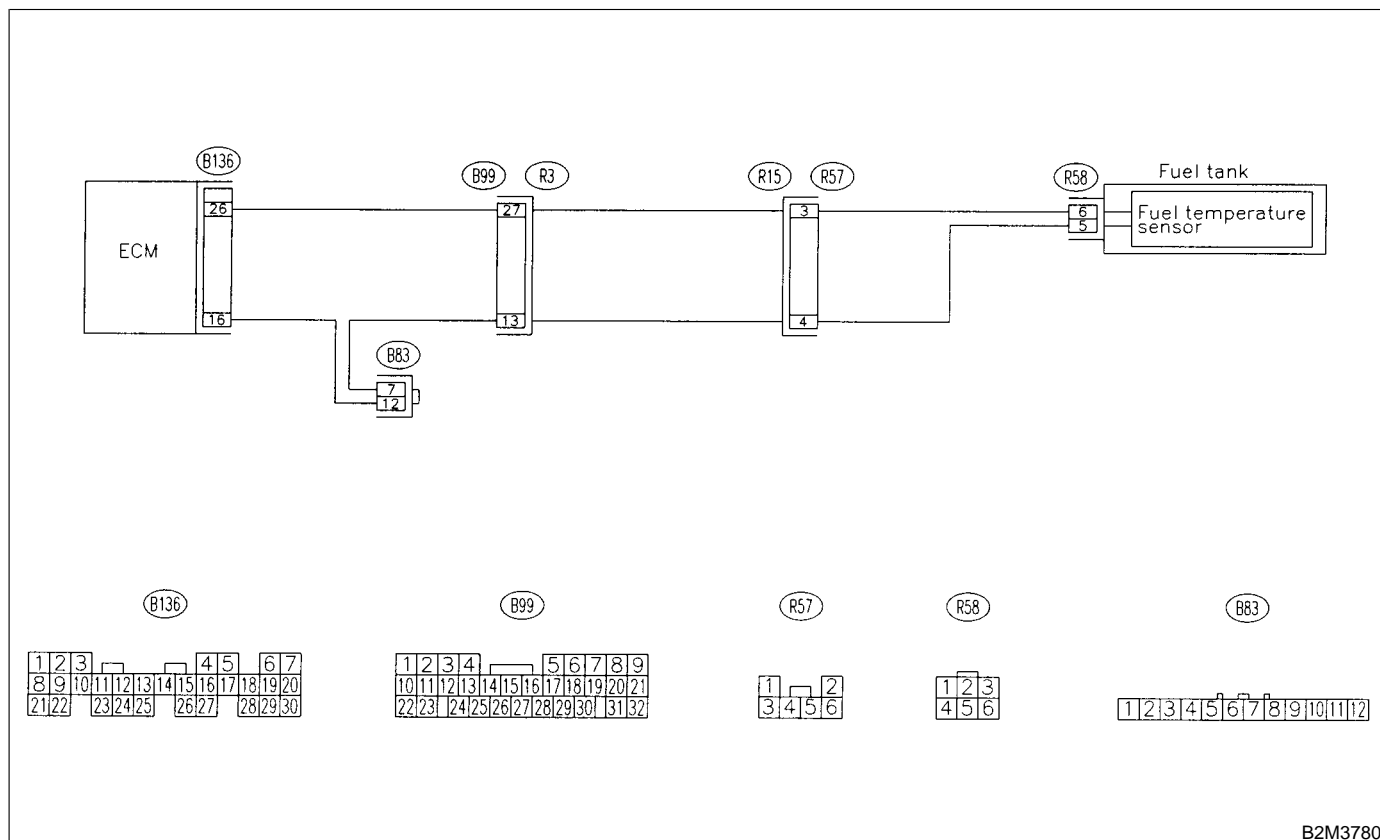
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



11T1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0182 or P0183?

YES : Inspect DTC P0182 or P0183 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0181.

NO : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

U: DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —

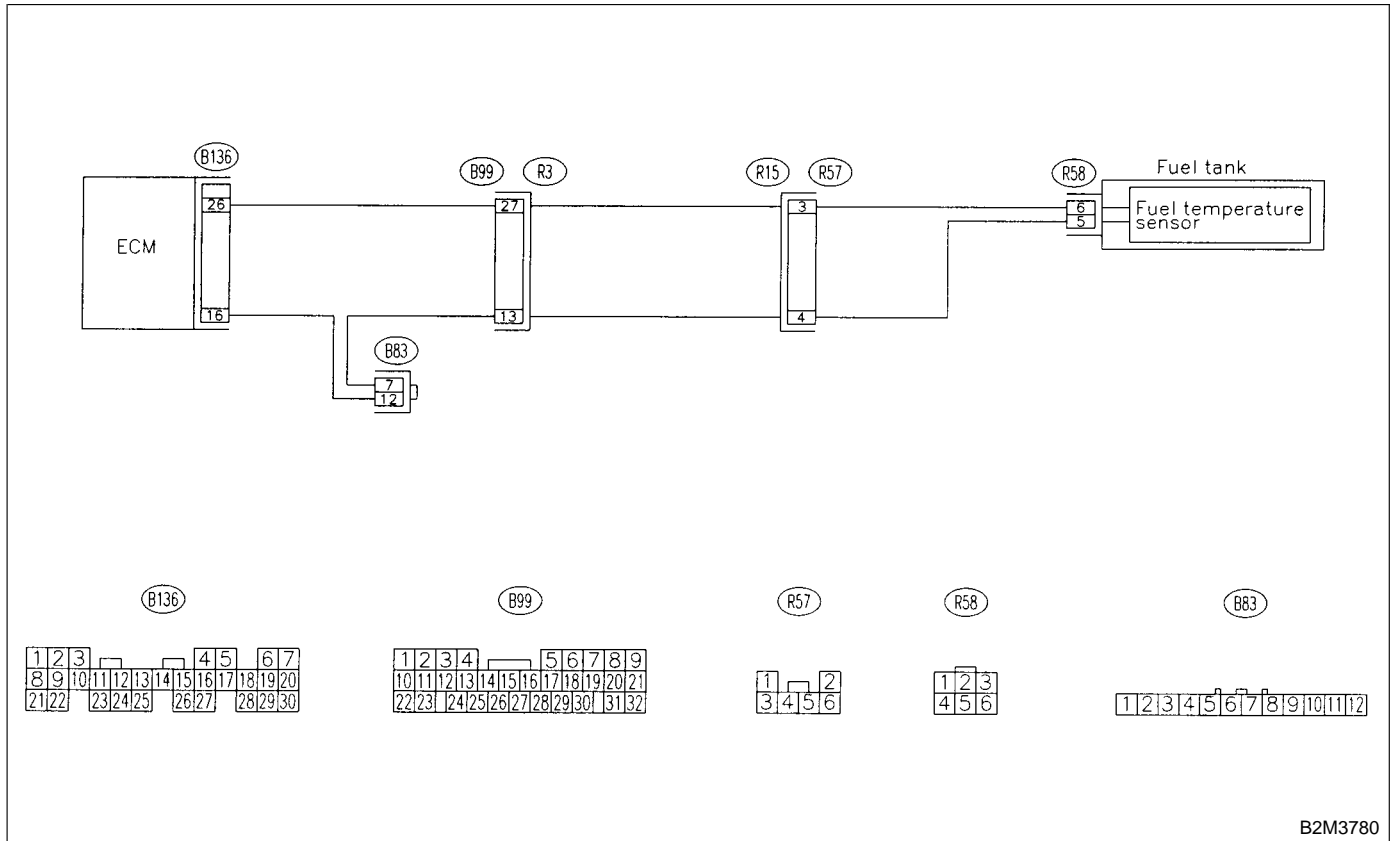
● DTC DETECTING CONDITION:

- Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:



B2M3780

11U1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of fuel temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

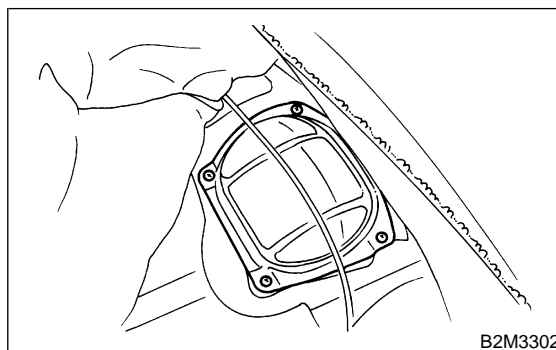
CHECK : *Is the value greater than 150°C (302°F)?*

YES : Go to step 11U2.

NO : Even if MIL lights up, the circuit has returned to a normal condition at this time.

11U2 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.



- 3) Disconnect connector from fuel pump.
- 4) Turn ignition switch to ON.
- 5) Read data of fuel temperature sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value less than -40°C (-40°F)?*

YES : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

NO : Repair ground short circuit in harness between fuel pump and ECM connector.

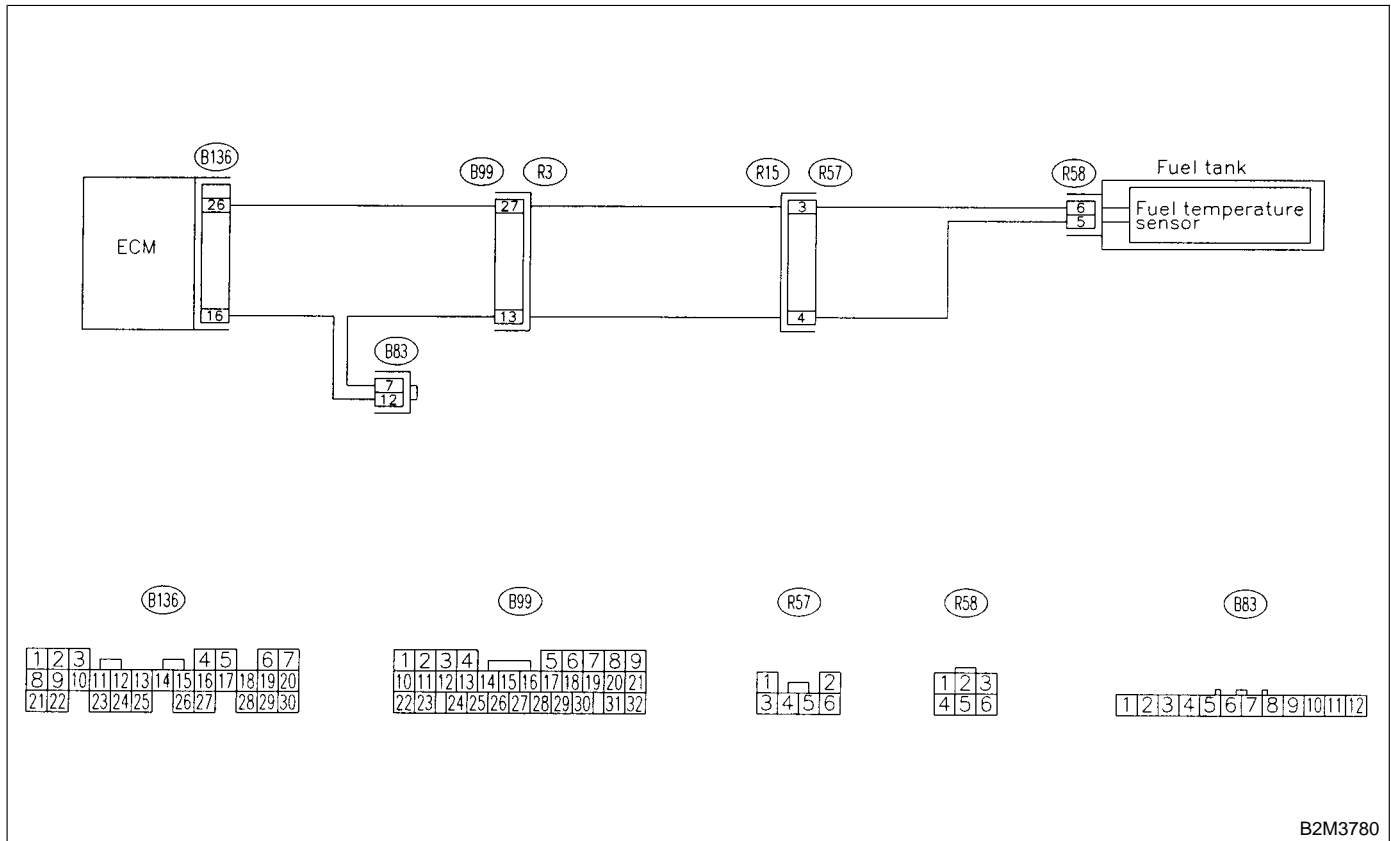
V: DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3780

11V1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read data of fuel temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

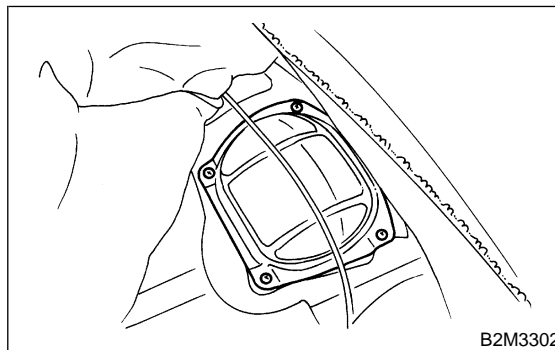
- CHECK** : *Is the value less than -40°C (-40°F)?*
YES : Go to step 11V2.
NO : Repair poor contact.

NOTE:

- In this case, repair the following:
- Poor contact in fuel pump connector
 - Poor contact in ECM connector
 - Poor contact in coupling connectors (B22, B99 and R57)
 - Poor contact in joint connector (B83)

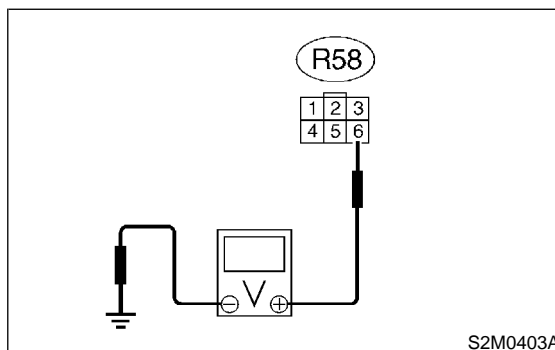
11V2 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove access hole lid.



- 3) Disconnect connector from fuel pump.
- 4) Measure voltage between fuel pump connector and chassis ground.

Connector & terminal
(R58) No. 6 (+) — Chassis ground (-):



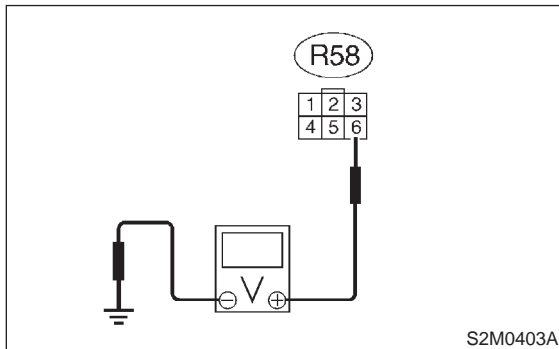
- CHECK** : *Is the voltage more than 10 V?*
YES : Repair battery short circuit in harness between ECM and fuel pump connector.
NO : Go to step 11V3.

11V3 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel pump connector and chassis ground.

Connector & terminal

(R58) No. 6 (+) — Chassis ground (-):



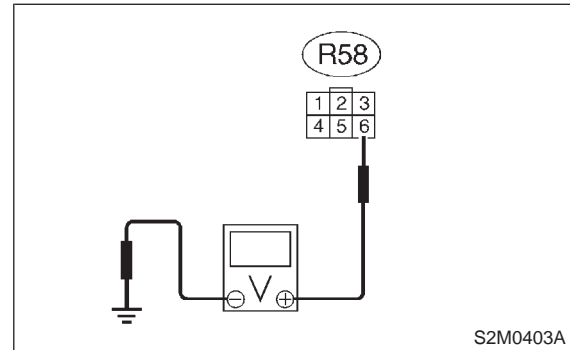
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and fuel pump connector.
- NO** : Go to step **11V4**.

11V4 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

Measure voltage between fuel pump connector and chassis ground.

Connector & terminal

(R58) No. 6 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 4 V?**
- YES** : Go to step **11V5**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

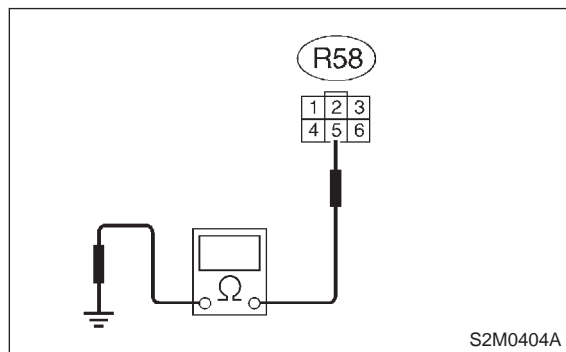
- Open circuit in harness between ECM and fuel pump connector
- Poor contact in fuel pump connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B99 and R57)

11V5 : CHECK HARNESS BETWEEN FUEL TEMPERATURE SENSOR AND ECM CONNECTOR.

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

Connector & terminal

(R58) No. 5 — Chassis ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Replace fuel temperature sensor. <Ref. to 2-1 [W6A0].>

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and fuel pump connector
- Poor contact in fuel pump connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B99 and R57)
- Poor contact in joint connector (B83)

W: DTC P0301 — CYLINDER 1 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T11Z0].>

X: DTC P0302 — CYLINDER 2 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T11Z0].>

Y: DTC P0303 — CYLINDER 3 MISFIRE DETECTED —

NOTE:

For the diagnostic procedure, refer to DTC P0304. <Ref. to 2-7 [T11Z0].>

Z: DTC P0304 — CYLINDER 4 MISFIRE DETECTED —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault
- Immediately at fault recognition (A misfire which could damage catalyst occurs.)

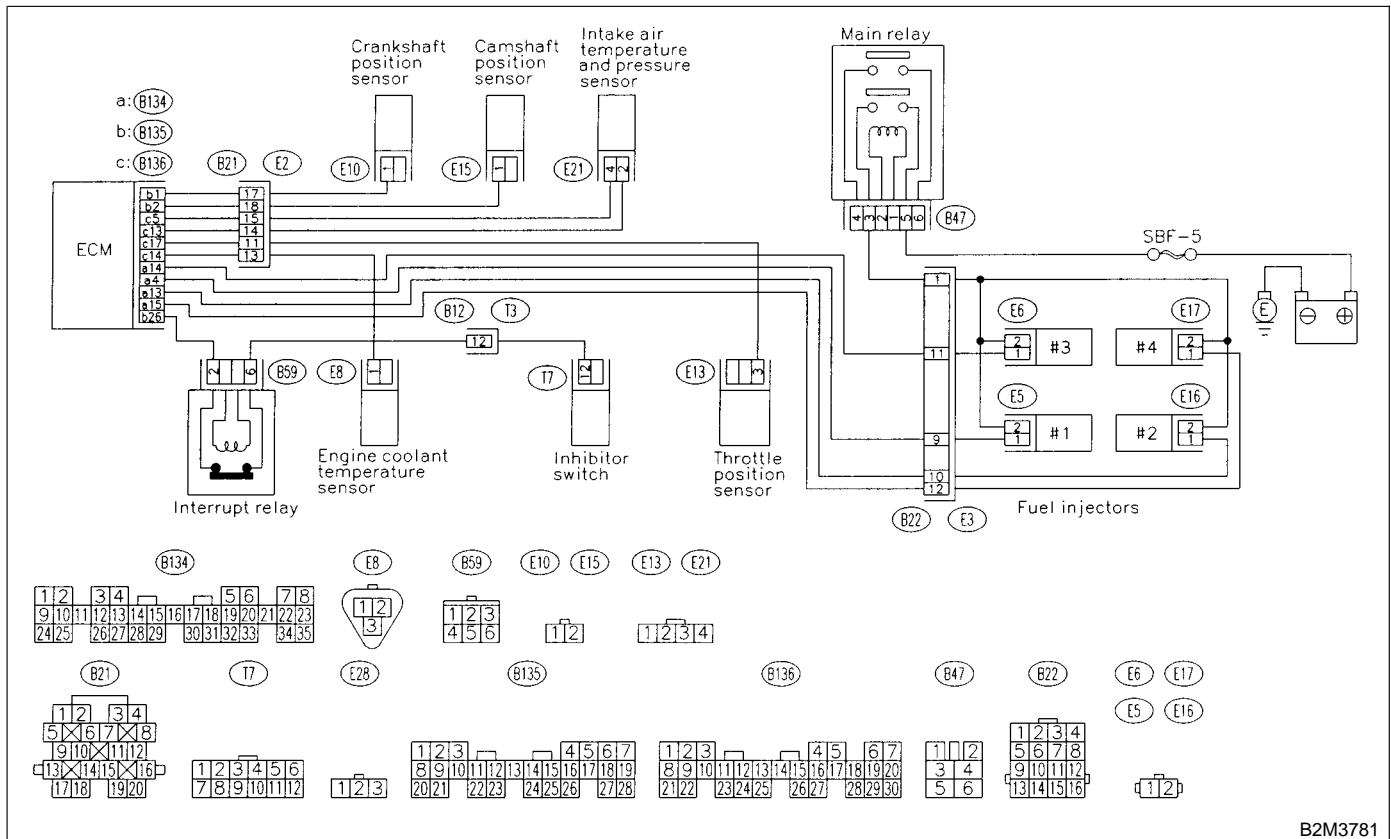
• TROUBLE SYMPTOM:

- Engine stalls.
- Erroneous idling
- Rough driving

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3781

11Z1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0116, P0117 or P0125?*

YES : Inspect DTC P0106, P0107, P0108, P0116, P0117 or P0125 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0301, P0302, P0303 and P0304.

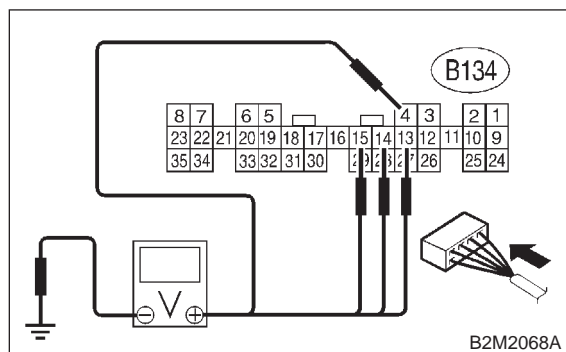
NO : Go to step 11Z2.

11Z2 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM connector and chassis ground on faulty cylinders.

Connector & terminal

- #1 (B134) No. 4 (+) — Chassis ground (-):
- #2 (B134) No. 13 (+) — Chassis ground (-):
- #3 (B134) No. 14 (+) — Chassis ground (-):
- #4 (B134) No. 15 (+) — Chassis ground (-):



CHECK : *Is the voltage more than 10 V?*

YES : Go to step 11Z7.

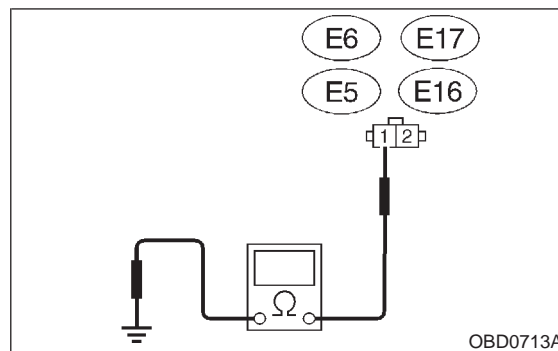
NO : Go to step 11Z3.

11Z3 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinders.
- 3) Measure voltage between ECM connector and engine ground on faulty cylinders.

Connector & terminal

- #1 (E5) No. 1 — Engine ground:
- #2 (E16) No. 1 — Engine ground:
- #3 (E6) No. 1 — Engine ground:
- #4 (E17) No. 1 — Engine ground:



CHECK : *Is the resistance less than 10 Ω?*

YES : Repair ground short circuit in harness between fuel injector and ECM connector.

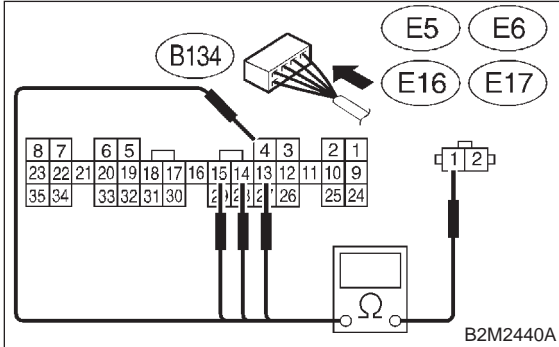
NO : Go to step 11Z4.

11Z4 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

Measure resistance of harness connector between ECM connector and fuel injector on faulty cylinders.

Connector & terminal

- #1 (B134) No. 4 — (E5) No. 1:
- #2 (B134) No. 13 — (E16) No. 1:
- #3 (B134) No. 14 — (E6) No. 1:
- #4 (B134) No. 15 — (E17) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 11Z5.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

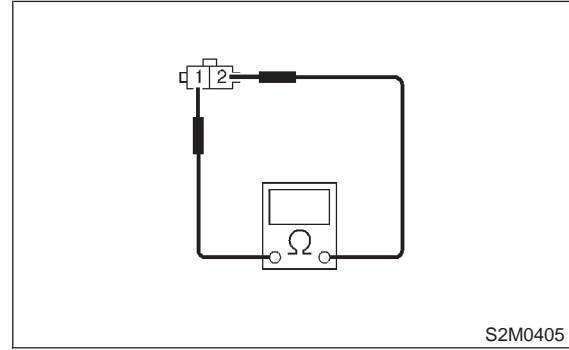
- Open circuit in harness between ECM and fuel injector connector
- Poor contact in coupling connector (B21)

11Z5 : CHECK FUEL INJECTOR.

Measure resistance between fuel injector terminals on faulty cylinder.

Terminals

No. 1 — No. 2:



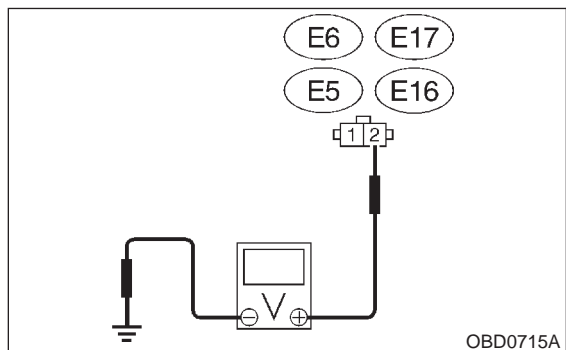
- CHECK** : *Is the resistance between 5 and 20 Ω?*
- YES** : Go to step 11Z6.
- NO** : Replace faulty fuel injector. <Ref. to 2-7 [W18A0].>

11Z6 : CHECK POWER SUPPLY LINE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel injector and engine ground on faulty cylinders.

Connector & terminal

- #1 (E5) No. 2 (+) — Engine ground (-):
- #2 (E16) No. 2 (+) — Engine ground (-):
- #3 (E6) No. 2 (+) — Engine ground (-):
- #4 (E17) No. 2 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair poor contact in all connectors in fuel injector circuit.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

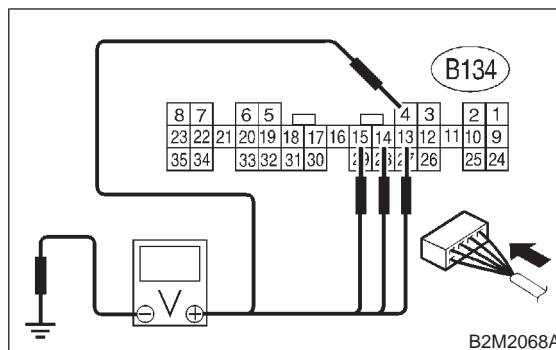
- Open circuit in harness between main relay and fuel injector connector on faulty cylinders
- Poor contact in coupling connector
- Poor contact in main relay connector
- Poor contact in fuel injector connector on faulty cylinders

11Z7 : CHECK HARNESS BETWEEN FUEL INJECTOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel injector on faulty cylinder.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM connector and chassis ground on faulty cylinders.

Connector & terminal

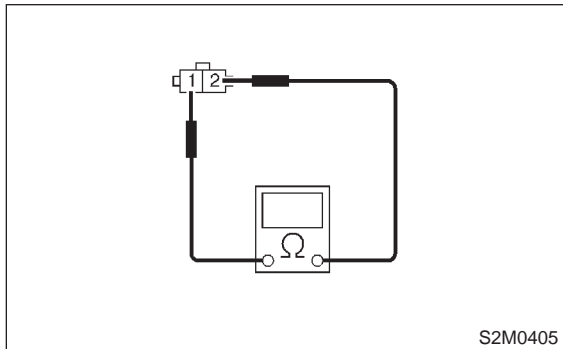
- #1 (B134) No. 4 (+) — Chassis ground (-):
- #2 (B134) No. 13 (+) — Chassis ground (-):
- #3 (B134) No. 14 (+) — Chassis ground (-):
- #4 (B134) No. 15 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and fuel injector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step 11Z8.

11Z8 : CHECK FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between fuel injector terminals on faulty cylinder.

Terminals**No. 1 — No. 2:**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace faulty fuel injector <Ref. to 2-7 [W18A0].> and ECM <Ref. to 2-7 [W19A0].>.
- NO** : Go to step **11Z9**.

11Z9 : CHECK INSTALLATION OF CAM-SHAFT POSITION SENSOR/ CRANKSHAFT POSITION SENSOR.

- CHECK** : **Is camshaft position sensor or crankshaft position sensor loosely installed?**
- YES** : Tighten camshaft position sensor or crankshaft position sensor.
- NO** : Go to step **11Z10**.

11Z10 : CHECK CRANKSHAFT SPROCKET.

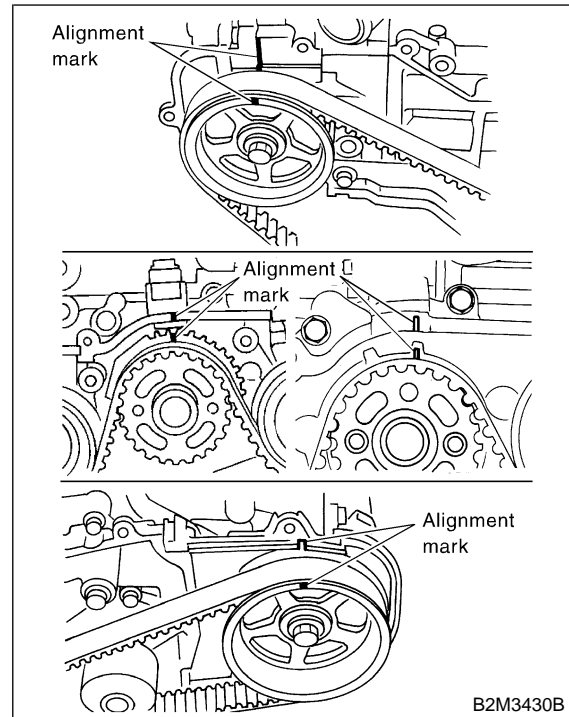
Remove timing belt cover.

- CHECK** : **Is crankshaft sprocket rusted or does it have broken teeth?**
- YES** : Replace crankshaft sprocket. <Ref. to 2-3 [W3A4].>
- NO** : Go to step **11Z11**.

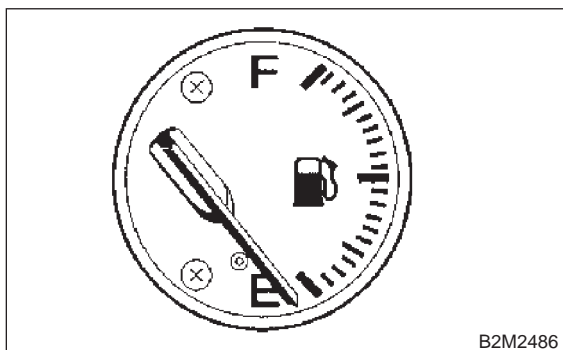
11Z11 : CHECK INSTALLATION CONDITION OF TIMING BELT.

Turn crankshaft using ST, and align alignment mark on crankshaft sprocket with alignment mark on cylinder block.

ST 499987500 CRANKSHAFT SOCKET



- CHECK** : **Is timing belt dislocated from its proper position?**
- YES** : Repair installation condition of timing belt. <Ref. to 2-3 [W3A0].>
- NO** : Go to step **11Z12**.

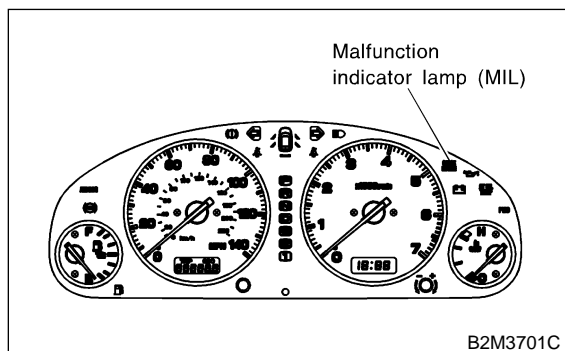
11Z12 : CHECK FUEL LEVEL.

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- CHECK** : *Is the fuel meter indication higher than the "Lower" level?*
- YES** : Go to step 11Z13.
- NO** : Replenish fuel so fuel meter indication is higher than the "Lower" level. After replenishing fuel, Go to step 11Z13.

11Z13 : CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).

- 1) Clear memory using Subaru Select Monitor.
<Ref. to 2-7 [T3D0].>
- 2) Start engine, and drive the vehicle more than 10 minutes.



B2M3701C

- CHECK** : *Is the MIL coming on or blinking?*
- YES** : Go to step 11Z15.
- NO** : Go to step 11Z14.

11Z14 : CHECK CAUSE OF MISFIRE DIAGNOSED.

- CHECK** : *Was the cause of misfire diagnosed when the engine is running?*
- YES** : Finish diagnostics operation, if the engine has no abnormality.

NOTE:

Ex. Remove spark plug cord, etc.

- NO** : Repair poor contact.

NOTE:

In this case, repair the following:

- Poor contact in ignitor connector
- Poor contact in ignition coil connector
- Poor contact in fuel injector connector on faulty cylinders
- Poor contact in ECM connector
- Poor contact in coupling connector

11Z15 : CHECK AIR INTAKE SYSTEM.

- CHECK** : *Is there a fault in air intake system?*
- YES** : Repair air intake system.

NOTE:

Check the following items:

- Are there air leaks or air suction caused by loose or dislocated nuts and bolts?
 - Are there cracks or any disconnection of hoses?
- NO** : Go to step 11Z16.

11Z16 : CHECK MISFIRE SYMPTOM.

- 1) Turn ignition switch to ON.
- 2) Read diagnostic trouble code (DTC).

- Subaru Select Monitor
<Ref. to 2-7 [T3C2].>
- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Operation Manual.

NOTE:

Perform diagnosis according to the items listed below.

- CHECK** : *Does the Subaru Select Monitor or OBD-II general scan tool indicate only one DTC?*
- YES** : Go to step 11Z21.
- NO** : Go to step 11Z17.

11Z17 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0302?*

YES : Go to step 11Z22.

NO : Go to step 11Z18.

11Z18 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0303 and P0304?*

YES : Go to step 11Z23.

NO : Go to step 11Z19.

11Z19 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0303?*

YES : Go to step 11Z24.

NO : Go to step 11Z20.

11Z20 : CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0302 and P0304?*

YES : Go to step 11Z25.

NO : Go to step 11Z26.

11Z21 : ONLY ONE CYLINDER

CHECK : *Is there a fault in that cylinder?*

YES : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plug
- Spark plug cord
- Fuel injector
- Compression ratio

NO : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

11Z22 : GROUP OF #1 AND #2 CYLINDERS

CHECK : *Are there faults in #1 and #2 cylinders?*

YES : Repair or replace faulty parts.

NOTE:

- Check the following items.
 - Spark plugs
 - Fuel injectors
 - Ignition coil
 - Compression ratio
- If no abnormal is discovered, check for "8. D: IGNITION CONTROL SYSTEM" of #1 and #2 cylinders side. <Ref. to 2-7 [T8D0].>

NO : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

11Z23 : GROUP OF #3 AND #4 CYLINDERS

CHECK : *Are there faults in #3 and #4 cylinders?*

YES : Repair or replace faulty parts.

NOTE:

- Check the following items.
 - Spark plugs
 - Fuel injectors
 - Ignition coil
- If no abnormal is discovered, check for "9. D: IGNITION CONTROL SYSTEM" of #3 and #4 cylinders side. <Ref. to 2-7 [T8D0].>

NO : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

11Z24 : GROUP OF #1 AND #3 CYLINDERS

CHECK : *Are there faults in #1 and #3 cylinders?*

YES : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Skipping timing belt teeth

NO : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

11Z25 : GROUP OF #2 AND #4 CYLINDERS

CHECK : *Are there faults in #2 and #4 cylinders?*

YES : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Compression ratio
- Skipping timing belt teeth

NO : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

11Z26 : CYLINDER AT RANDOM

CHECK : *Is the engine idle rough?*

YES : Go to DTC P0170. <Ref. to 2-7 [T11S0].>

NO : Repair or replace faulty parts.

NOTE:

Check the following items.

- Spark plugs
- Fuel injectors
- Compression ratio

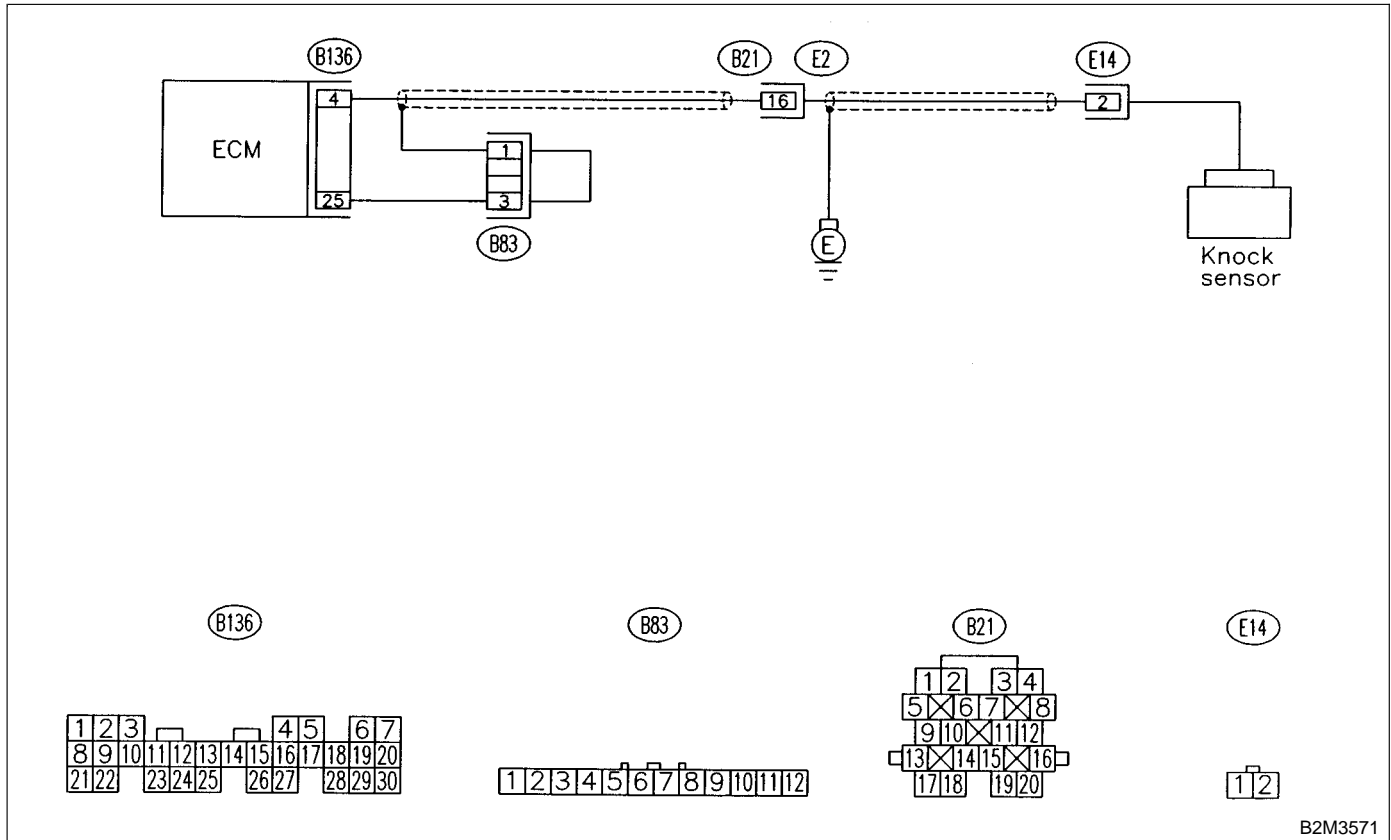
AA: DTC P0325 — KNOCK SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Poor driving performance
 - Knocking occurs.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

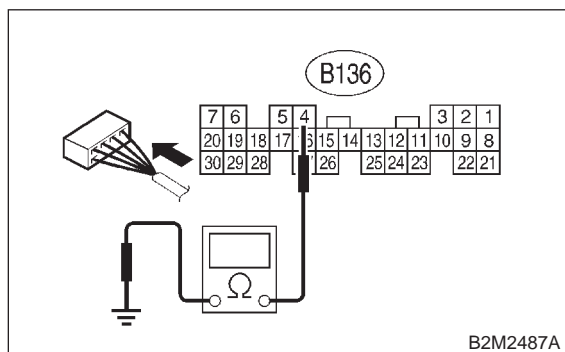


B2M3571

11AA1 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

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

Connector & terminal
(B136) No. 4 — Chassis ground:

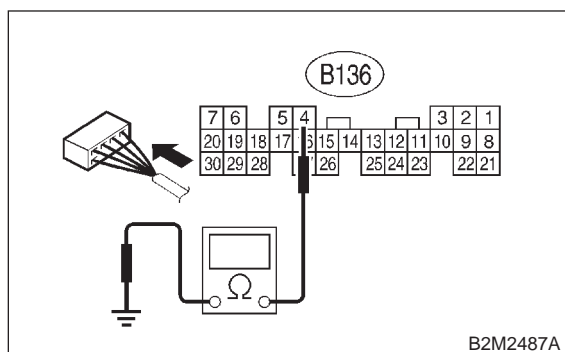


- CHECK** : Is the resistance more than 700 kΩ?
- YES** : Go to step 11AA3.
- NO** : Go to step 11AA2.

11AA2 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal
(B136) No. 4 — Chassis ground:

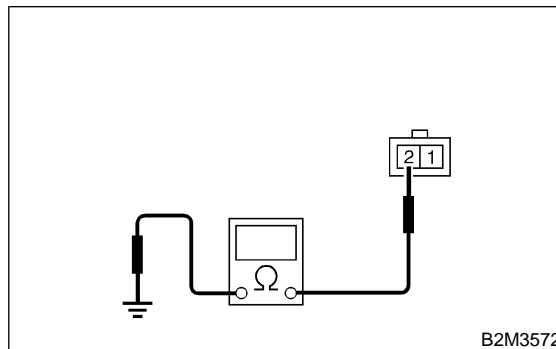


- CHECK** : Is the resistance less than 400 kΩ?
- YES** : Go to step 11AA5.
- NO** : Go to step 11AA6.

11AA3 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal
No. 2 — Engine ground:



- CHECK** : Is the resistance more than 700 kΩ?
- YES** : Go to step 11AA4.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between knock sensor and ECM connector
- Poor contact in knock sensor connector
- Poor contact in coupling connector (B21)

11AA4 : CHECK CONDITION OF KNOCK SENSOR INSTALLATION.

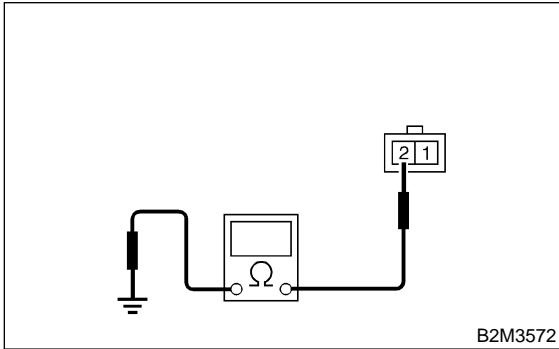
- CHECK** : Is the knock sensor installation bolt tightened securely?
- YES** : Replace knock sensor. <Ref. to 2-7 [W7A0].>
- NO** : Tighten knock sensor installation bolt securely.

11AA5 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal

No. 2 — Engine ground:



- CHECK** : **Is the resistance less than 400 kΩ?**
- YES** : Replace knock sensor. <Ref. to 2-7 [W7A0].>
- NO** : Repair ground short circuit in harness between knock sensor connector and ECM connector.

NOTE:

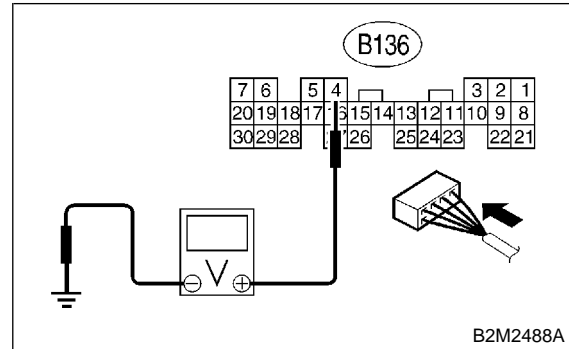
The harness between both connectors is shielded. Repair short circuit of harness together with shield.

11AA6 : CHECK INPUT SIGNAL FOR ECM.

- 1) Connect connectors to ECM and knock sensor.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM and chassis ground.

Connector & terminal

(B136) No. 4 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 2 V?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)

NOTE:

In this case, repair the following:

- Poor contact in knock sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- NO** : Repair poor contact in ECM connector.

MEMO:

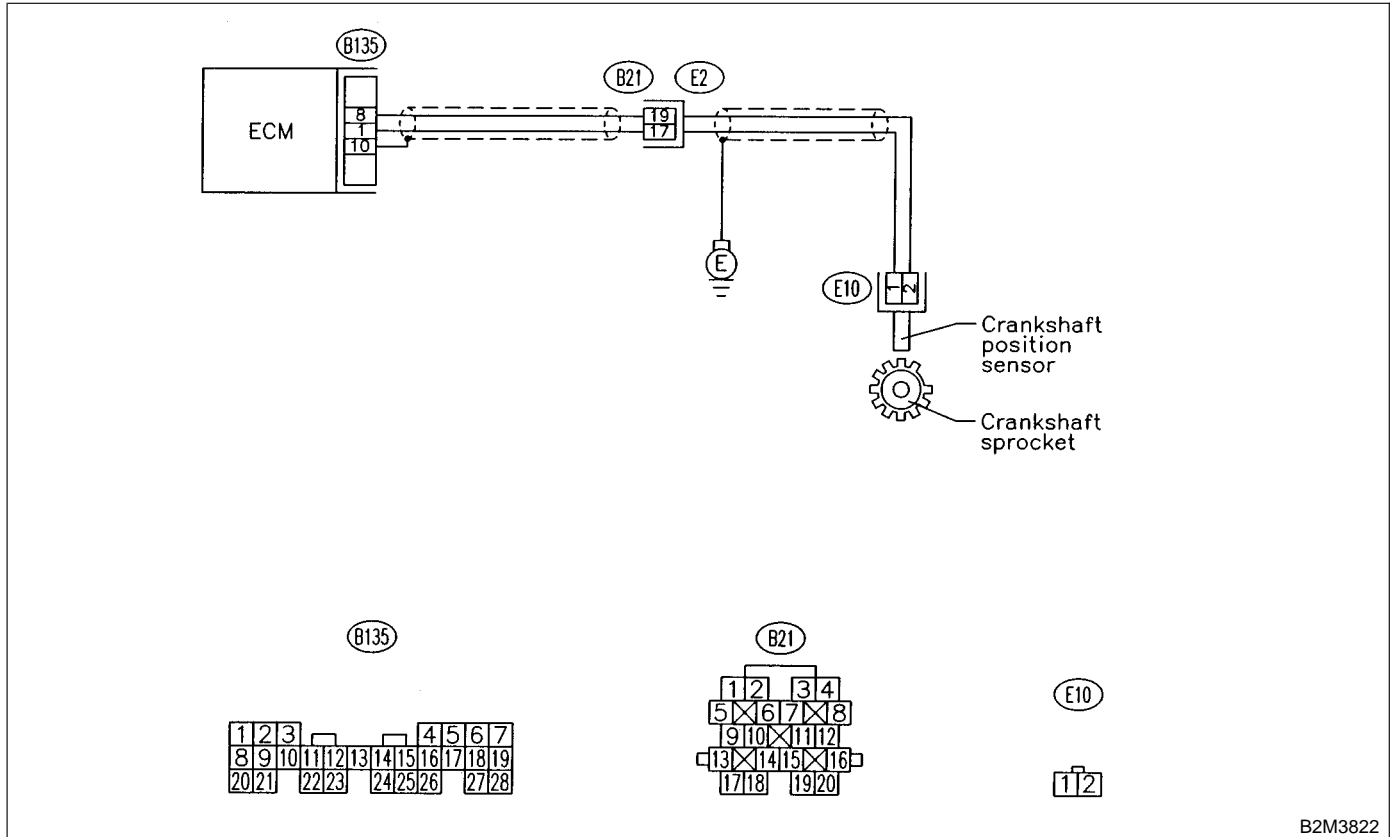
AB: DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**

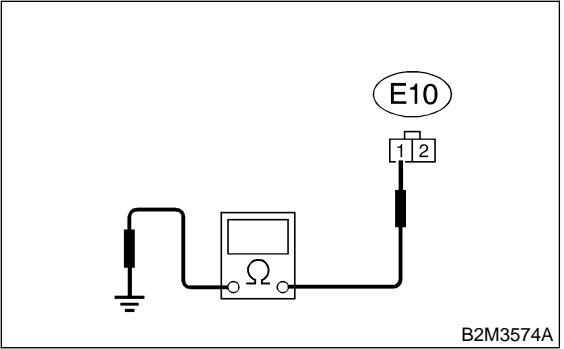


B2M3822

11AB1 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from crankshaft position sensor.
- 3) Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal
(E10) No. 1 — Engine ground:



- CHECK** : *Is the resistance more than 100 kΩ?*
- YES** : Repair harness and connector.

NOTE:
In this case, repair the following:

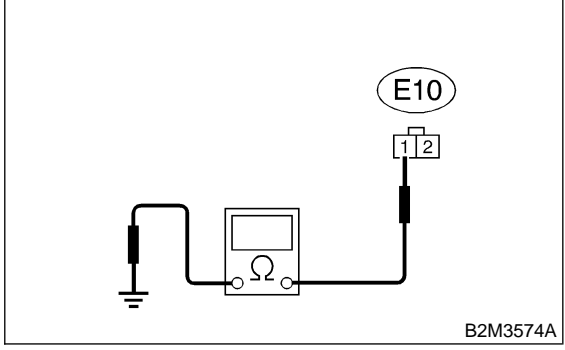
- Open circuit in harness between crankshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

NO : Go to step **11AB2**.

11AB2 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal
(E10) No. 1 — Engine ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between crankshaft position sensor and ECM connector.

NOTE:
The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

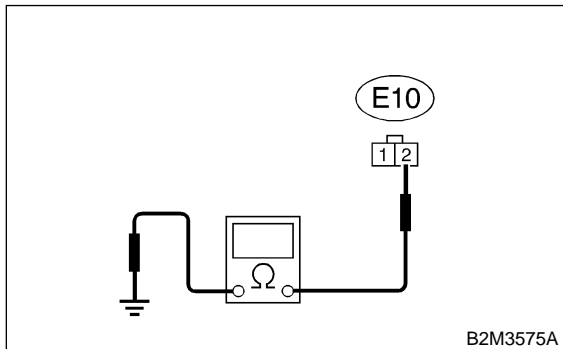
- NO** : Go to step **11AB3**.

11AB3 : CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between crankshaft position sensor connector and engine ground.

Connector & terminal

(E10) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step **11AB4**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between crankshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

11AB4 : CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.

CHECK : **Is the crankshaft position sensor installation bolt tightened securely?**

YES : Go to step **11AB5**.

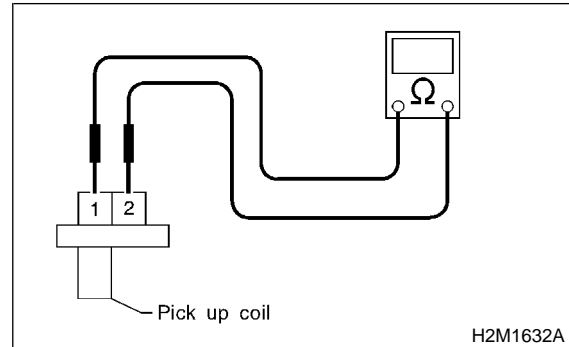
NO : Tighten crankshaft position sensor installation bolt securely.

11AB5 : CHECK CRANKSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



CHECK : **Is the resistance between 1 and 4 kΩ?**

YES : Repair poor contact in crankshaft position sensor connector.

NO : Replace crankshaft position sensor. <Ref. to 2-7 [W5A0].>

MEMO:

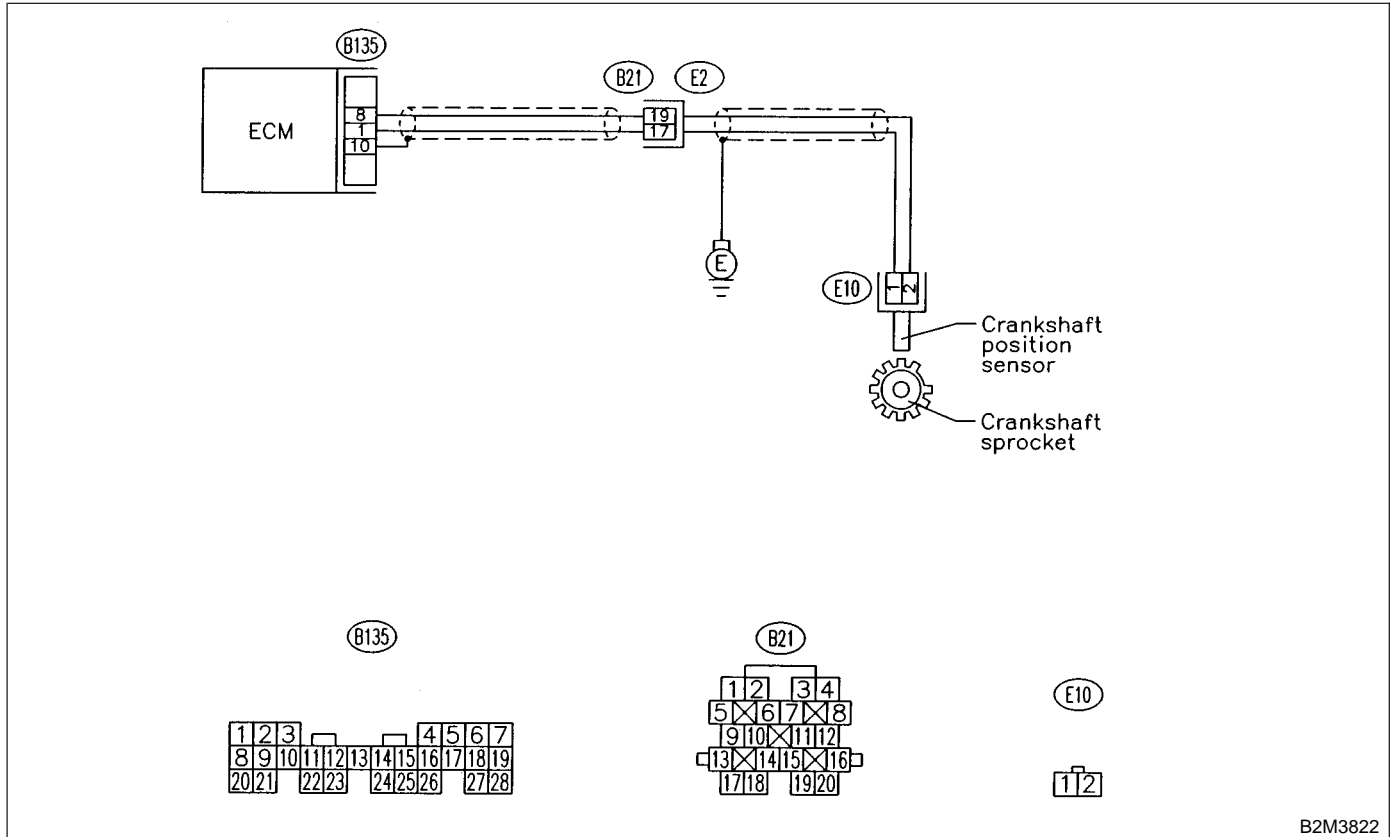
AC: DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3822

11AC1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0335?
- YES** : Inspect DTC P0335 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T10A0].>
- NO** : Go to step **11AC2**.

11AC2 : CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.

- Turn ignition switch to OFF.
- CHECK** : Is the crankshaft position sensor installation bolt tightened securely?
- YES** : Go to step **11AC3**.
- NO** : Tighten crankshaft position sensor installation bolt securely.

11AC3 : CHECK CRANKSHAFT SPROCKET.

Remove front belt cover.

CHECK : **Are crankshaft sprocket teeth cracked or damaged?**

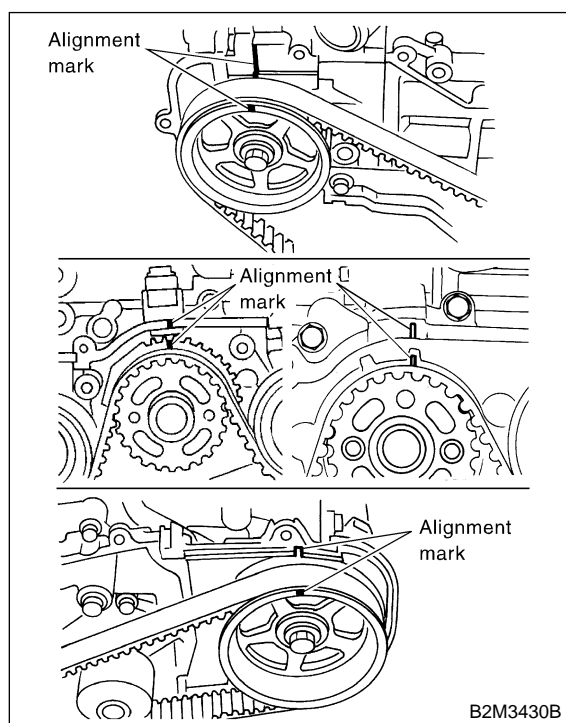
YES : Replace crankshaft sprocket. <Ref. to 2-3 [W3A0].>

NO : Go to step **11AC4**.

11AC4 : CHECK INSTALLATION CONDITION OF TIMING BELT.

Turn crankshaft using ST, and align alignment mark on crankshaft sprocket with alignment mark on cylinder block.

ST 499987500 CRANKSHAFT SOCKET



CHECK : **Is timing belt dislocated from its proper position?**

YES : Repair installation condition of timing belt. <Ref. to 2-3 [W3A0].>

NO : Replace crankshaft position sensor. <Ref. to 2-7 [W5A0].>

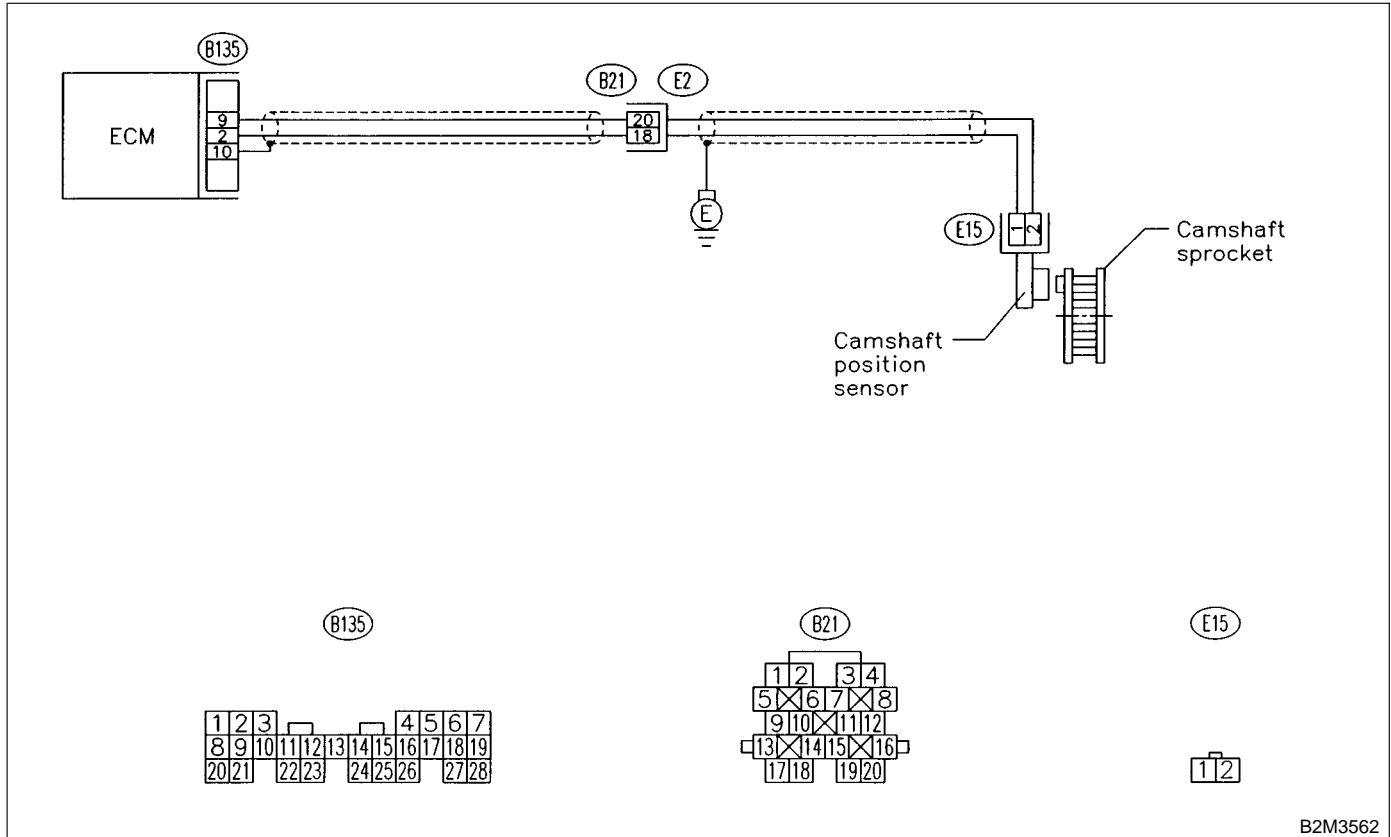
AD: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



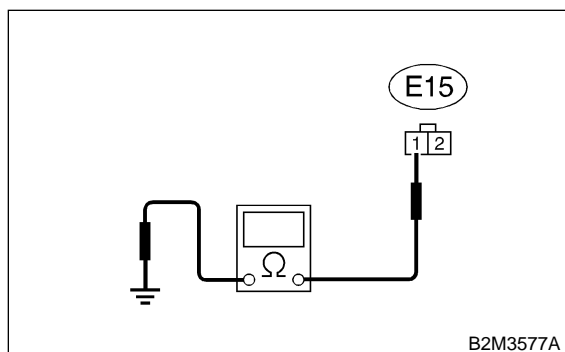
B2M3562

11AD1 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 1 — Engine ground:



- CHECK** : *Is the resistance more than 100 kΩ?*
- YES** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

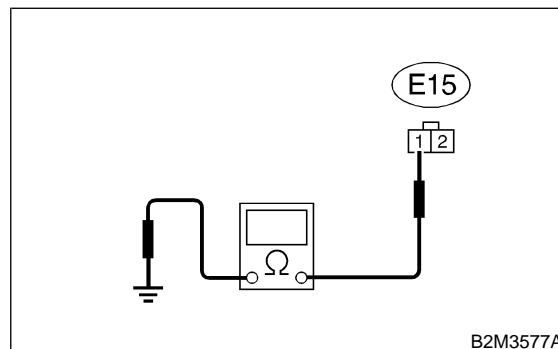
- NO** : Go to step **11AD2**.

11AD2 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 1 — Engine ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between camshaft position sensor and ECM connector.

NOTE:

The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

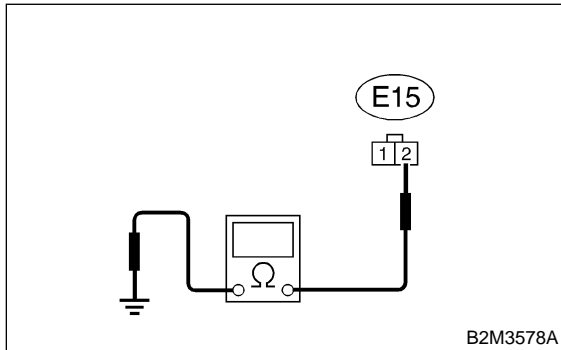
- NO** : Go to step **11AD3**.

11AD3 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 2 — Engine ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step **11AD4**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

11AD4 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

CHECK : **Is the camshaft position sensor installation bolt tightened securely?**

YES : Go to step **11AD5**.

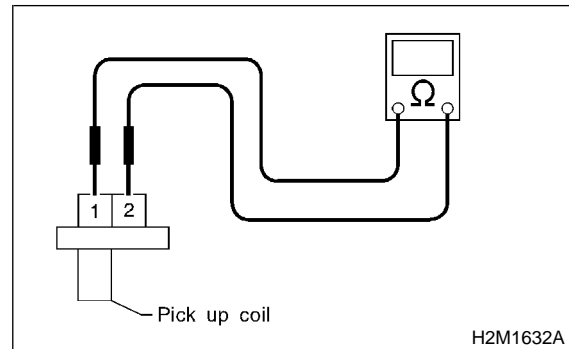
NO : Tighten camshaft position sensor installation bolt securely.

11AD5 : CHECK CAMSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



CHECK : **Is the resistance between 1 and 4 kΩ?**

YES : Repair poor contact in camshaft position sensor connector.

NO : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

MEMO:

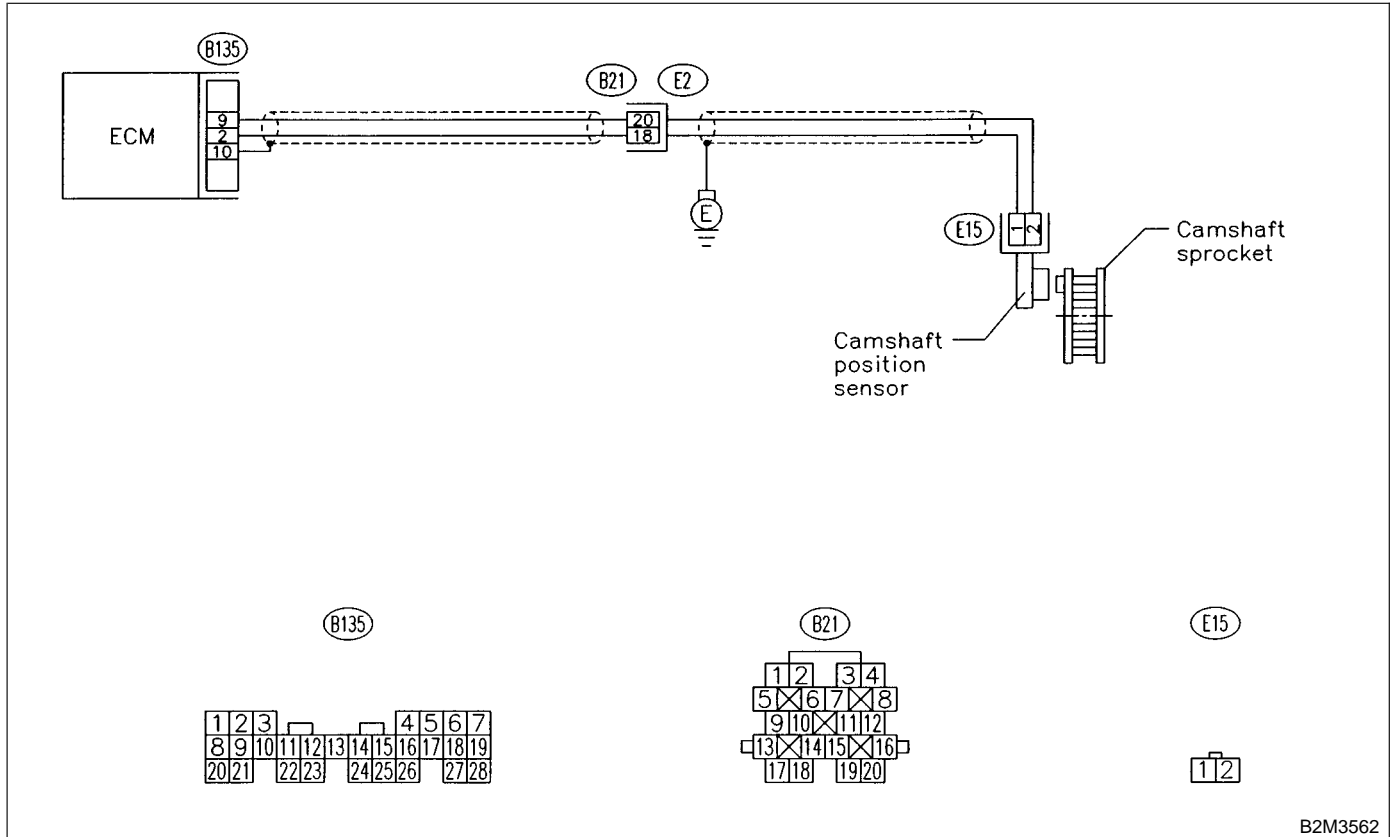
AE: DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3562

11AE1 : CHECK ANY OTHER DTC ON DISPLAY.

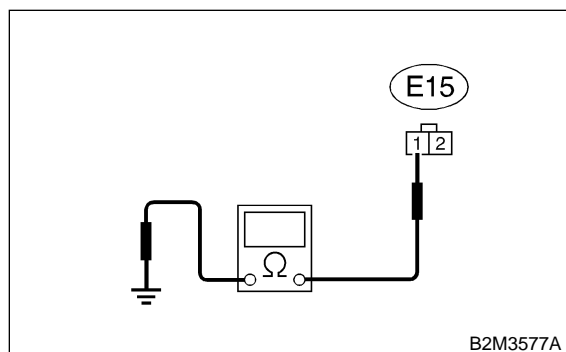
- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0340?
- YES** : Inspect DTC P0340 using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
- NO** : Go to step **11AE2**.

11AE2 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from camshaft position sensor.
- 3) Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 1 — Engine ground:



CHECK : **Is the resistance more than 100 kΩ?**

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

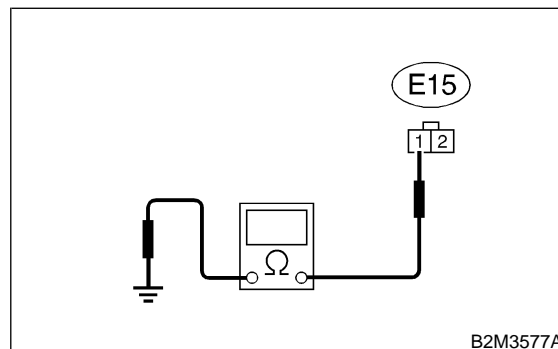
NO : Go to step **11AE3**.

11AE3 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 1 — Engine ground:



CHECK : **Is the resistance less than 10 Ω?**

YES : Repair ground short circuit in harness between camshaft position sensor and ECM connector.

NOTE:

The harness between both connectors are shielded. Repair ground short circuit in harness together with shield.

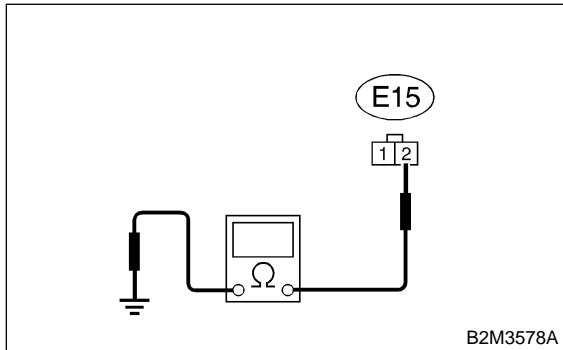
NO : Go to step **11AE4**.

11AE4 : CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.

Measure resistance of harness between camshaft position sensor connector and engine ground.

Connector & terminal

(E15) No. 2 — Engine ground:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step 11AE5.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between camshaft position sensor and ECM connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)

11AE5 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

CHECK : *Is the camshaft position sensor installation bolt tightened securely?*

YES : Go to step 11AE6.

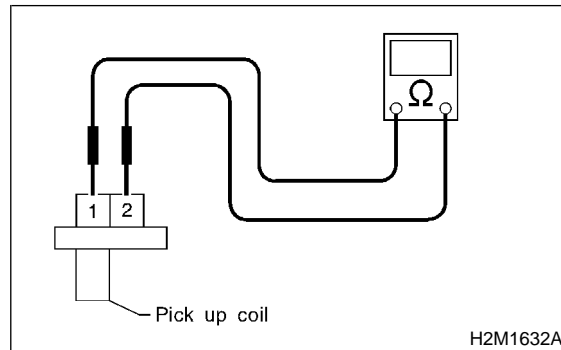
NO : Tighten camshaft position sensor installation bolt securely.

11AE6 : CHECK CAMSHAFT POSITION SENSOR.

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

Terminals

No. 1 — No. 2:



CHECK : *Is the resistance between 1 and 4 kΩ?*

YES : Go to step 11AE7.

NO : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

11AE7 : CHECK CONDITION OF CAMSHAFT POSITION SENSOR.

Turn ignition switch to OFF.

CHECK : *Is the camshaft position sensor installation bolt tightened securely?*

YES : Go to step 11AE8.

NO : Tighten camshaft position sensor installation bolt securely.

11AE8 : CHECK CAMSHAFT SPROCKET.

Remove front belt cover. <Ref. to 2-3 [W3A0].>

CHECK : *Are camshaft sprocket teeth cracked or damaged?*

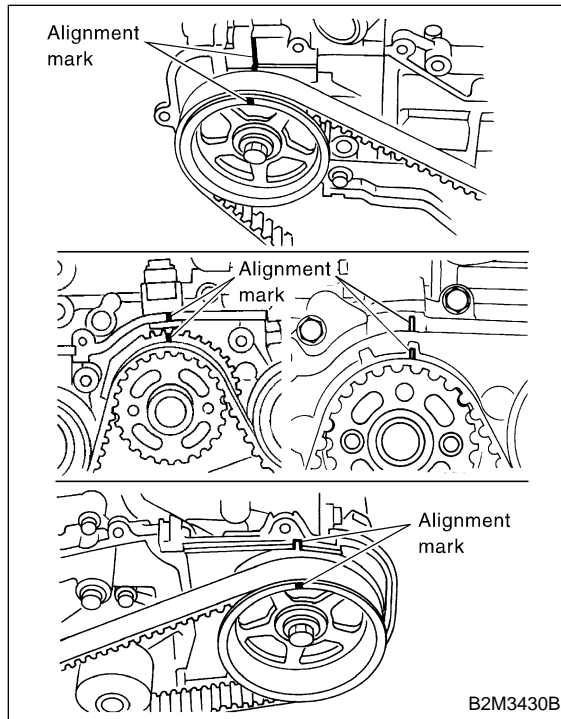
YES : Replace camshaft sprocket. <Ref. to 2-3 [W3A0].>

NO : Go to step 11AE9.

11AE9 : CHECK INSTALLATION CONDITION OF TIMING BELT.

Turn camshaft using ST, and align alignment mark on camshaft sprocket with alignment mark on timing belt cover LH.

ST 499207100 CAMSHAFT SPROCKET WRENCH



- CHECK** : ***Is timing belt dislocated from its proper position?***
- YES** : Repair installation condition of timing belt. <Ref. to 2-3 [W3A0].>
- NO** : Replace camshaft position sensor. <Ref. to 2-7 [W6A0].>

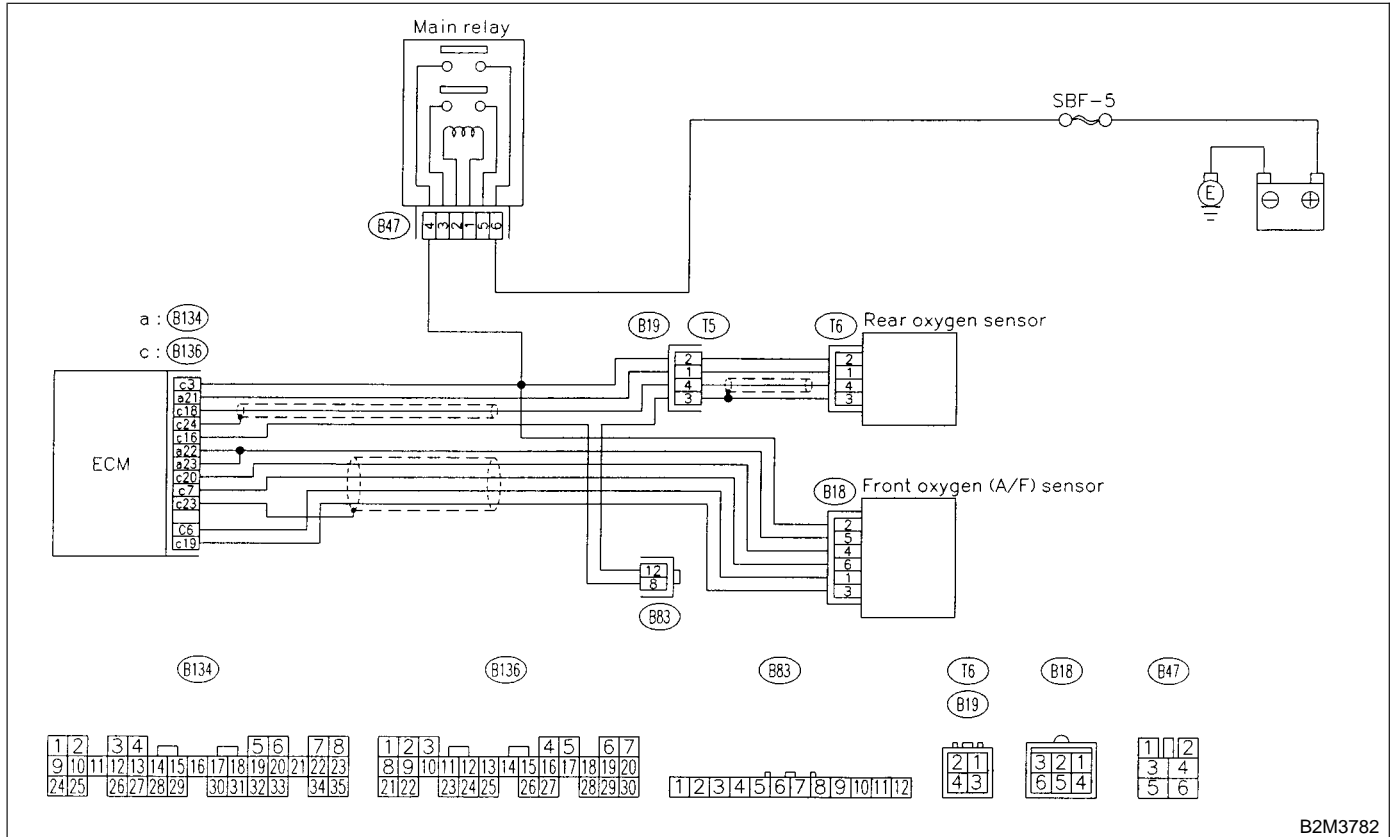
AF: DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine stalls.
 - Idle mixture is out of specifications.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3782

11AF1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0130, P0133, P0136, P0139, P0141, P0301, P0302, P0303, P0304, P1130, P1131, P1132, P1133 and P1151?*

YES : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0420.

NO : Go to step 11AF2.

11AF2 : CHECK EXHAUST SYSTEM.

Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes.

NOTE:

Check the following positions.

- Between cylinder head and front exhaust pipe
- Between front exhaust pipe and front catalytic converter
- Between front catalytic converter and rear catalytic converter

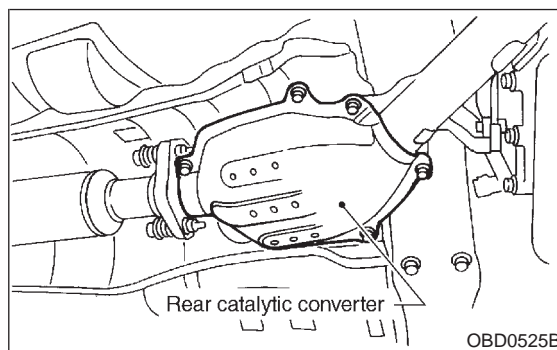
CHECK : *Is there a fault in exhaust system?*

YES : Repair or replace exhaust system. <Ref. to 2-9 [W1A0].>

NO : Go to step 11AF3.

11AF3 : CHECK REAR CATALYTIC CONVERTER.

Separate rear catalytic converter from rear exhaust pipe.



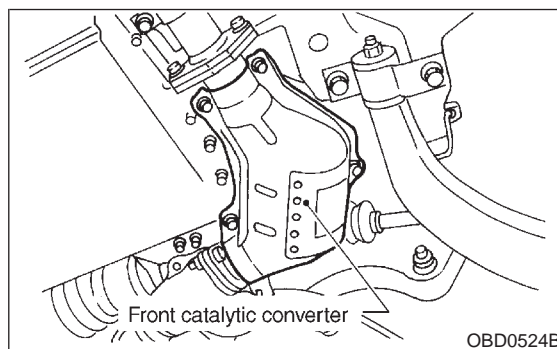
CHECK : *Is there damage at rear face of rear catalyst?*

YES : Replace front catalytic converter <Ref. to 2-1 [W1A0].> and rear catalytic converter <Ref. to 2-1 [W2A0].>

NO : Go to step 11AF4.

11AF4 : CHECK FRONT CATALYTIC CONVERTER.

Remove front catalytic converter.



CHECK : *Is there damage at rear face or front face of front catalyst?*

YES : Replace front catalytic converter. <Ref. to 2-1 [W1A0].>

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AG: DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

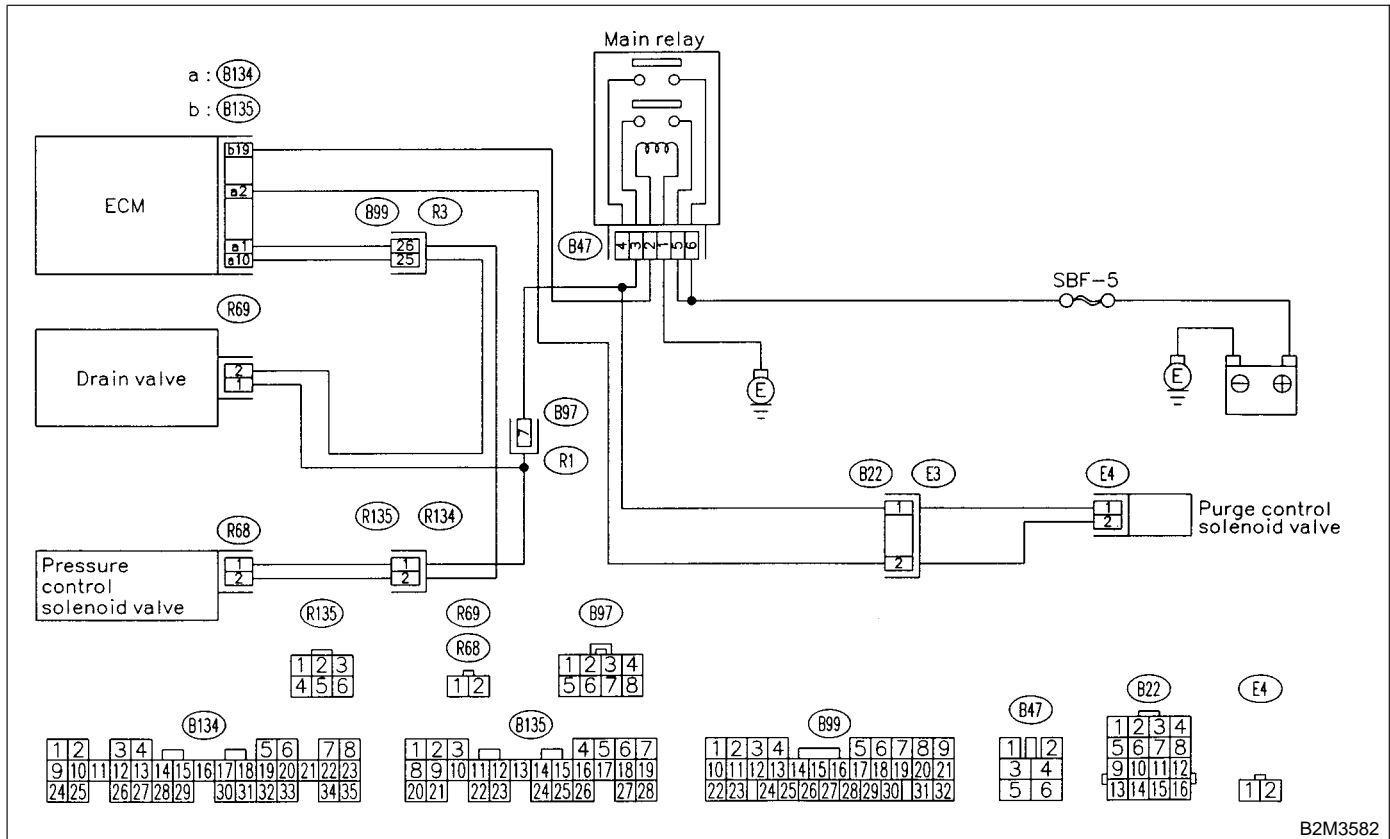
• TROUBLE SYMPTOM:

- Gasoline smell
- There is a hole of more than 1.0 mm (0.04 in) dia. in evaporation system or fuel tank.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3582

11AG1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>
- NO** : Go to step **11AG2**.

11AG2 : CHECK FUEL FILLER CAP.

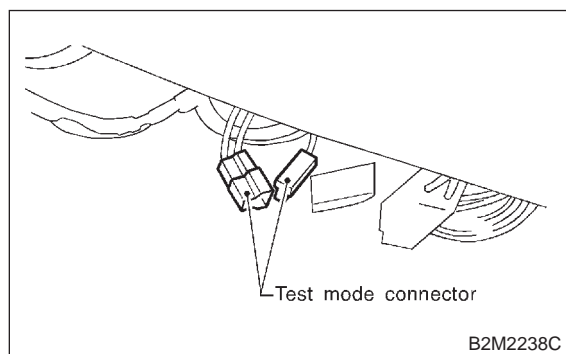
- 1) Turn ignition switch to OFF.
 - 2) Check the fuel filler cap.
- NOTE:**
The DTC code is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.
- CHECK** : *Is the fuel filler cap tightened securely?*
 - YES** : Go to step **11AG3**.
 - NO** : Tighten fuel filler cap securely.

11AG3 : CHECK FUEL FILLER PIPE PACKING.

- CHECK** : *Is there any damage to the seal between fuel filler cap and fuel filler pipe?*
- YES** : Repair or replace fuel filler cap and fuel filler pipe. <Ref. to 2-8 [W2A0].>
- NO** : Go to step **11AG4**.

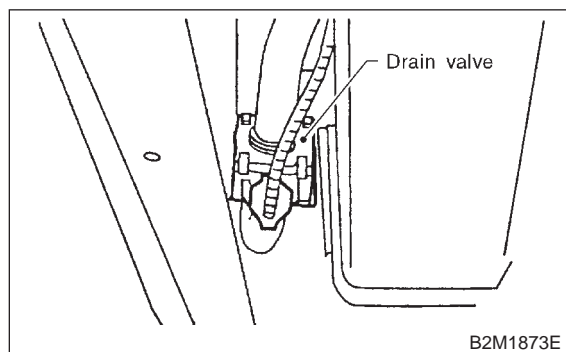
11AG4 : CHECK DRAIN VALVE.

1) Connect test mode connector.



- 2) Turn ignition switch to ON.
- 3) Operate drain valve.

NOTE:
Drain valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

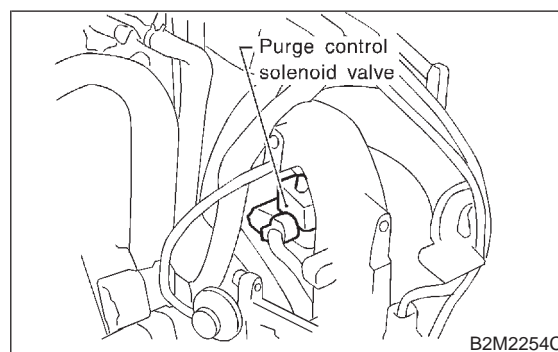


- CHECK** : *Does drain valve produce operating sound?*
- YES** : Go to step **11AG5**.
- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

11AG5 : CHECK PURGE CONTROL SOLENOID VALVE.

Operate purge control solenoid valve.

NOTE:
Purge control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



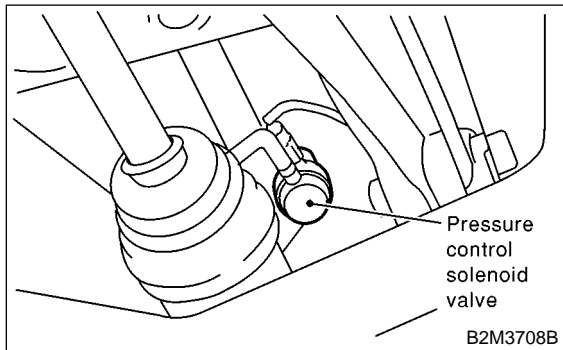
- CHECK** : *Does purge control solenoid valve produce operating sound?*
- YES** : Go to step **11AG6**.
- NO** : Replace purge control solenoid valve. <Ref. to 2-1 [W4A0].>

11AG6 : CHECK PRESSURE CONTROL SOLENOID VALVE.

Operate pressure control solenoid valve.

NOTE:

Pressure control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



- CHECK** : **Does pressure control solenoid valve produce operating sound?**
- YES** : Go to step **11AG7**.
- NO** : Replace pressure control solenoid valve. <Ref. to 2-1 [W9A0].>

11AG7 : CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.

Turn ignition switch to OFF.

- CHECK** : **Is there a hole of more than 1.0 mm (0.04 in) dia. on fuel line?**
- YES** : Repair or replace fuel line. <Ref. to 2-8 [W8A0].>
- NO** : Go to step **11AG8**.

11AG8 : CHECK CANISTER.

- CHECK** : **Is canister damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?**
- YES** : Repair or replace canister. <Ref. to 2-1 [W3A0].>
- NO** : Go to step **11AG9**.

11AG9 : CHECK FUEL TANK.

Remove fuel tank. <Ref. to 2-8 [W1C0].>

- CHECK** : **Is fuel tank damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?**
- YES** : Repair or replace fuel tank. <Ref. to 2-8 [W1C0].>
- NO** : Go to step **11AG10**.

11AG10 : CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.

- CHECK** : **Are there holes of more than 1.0 mm (0.04 in) dia., cracks, clogging or disconnections of hoses or pipes in evaporative emission control system?**
- YES** : Repair or replace hoses or pipes.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

AH: DTC P0442 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

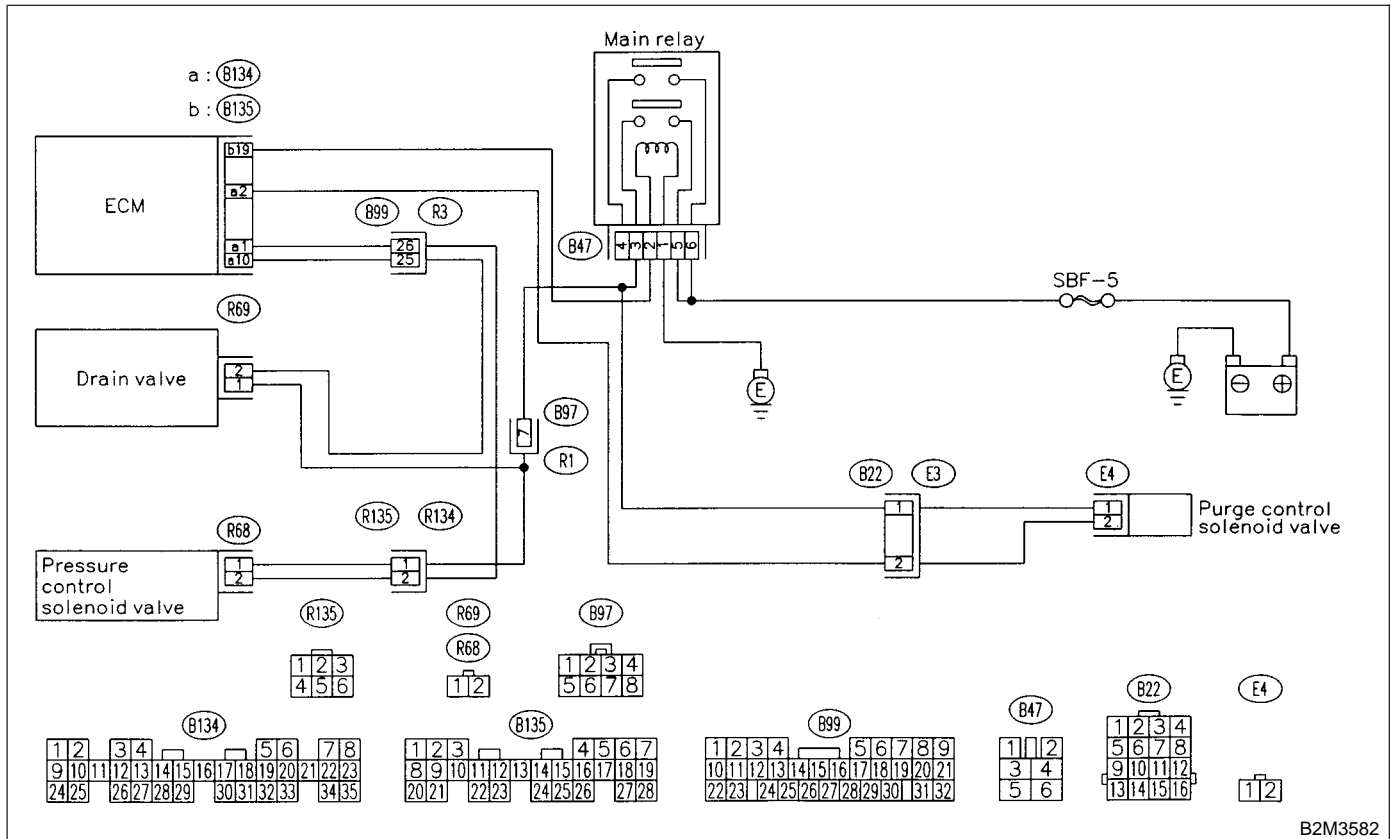
• TROUBLE SYMPTOM:

- Gasoline smell
- There is a hole of more than 0.5 mm (0.020 in) dia. in evaporation system or fuel tank.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3582

11AH1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
- NO** : Go to step **11AH2**.

11AH2 : CHECK FUEL FILLER CAP.

- 1) Turn ignition switch to OFF.
- 2) Check the fuel filler cap.

NOTE:

The DTC code is stored in memory if fuel filler cap is or was loose or if the cap chain was caught while tightening.

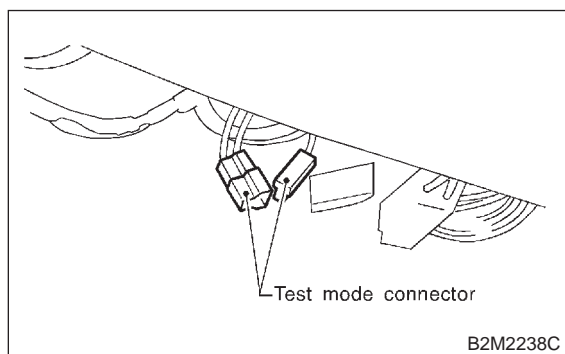
- CHECK** : *Is the fuel filler cap tightened securely?*
- YES** : Go to step **11AH3**.
- NO** : Tighten fuel filler cap securely.

11AH3 : CHECK FUEL FILLER PIPE PACKING.

- CHECK** : *Is there any damage to the seal between fuel filler cap and fuel filler pipe?*
- YES** : Repair or replace fuel filler cap and fuel filler pipe. <Ref. to 2-8 [W2A0].>
- NO** : Go to step 11AH4.

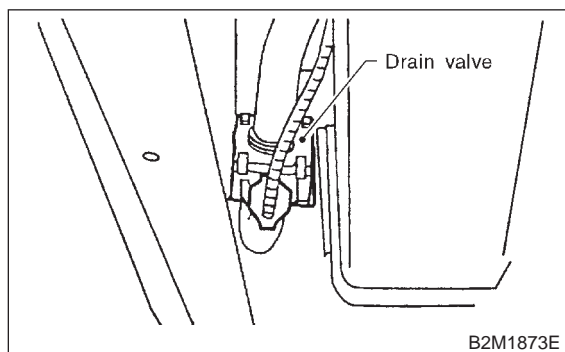
11AH4 : CHECK DRAIN VALVE.

1) Connect test mode connector.



- 2) Turn ignition switch to ON.
- 3) Operate drain valve.

NOTE:
Drain valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

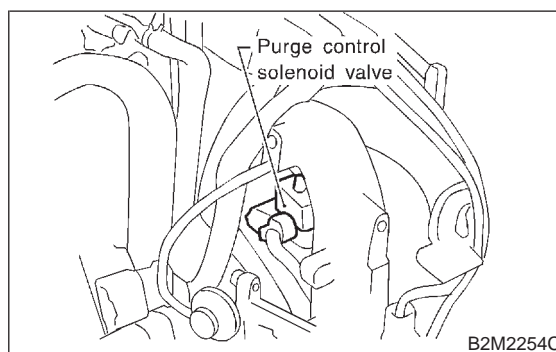


- CHECK** : *Does drain valve produce operating sound?*
- YES** : Go to step 11AH5.
- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

11AH5 : CHECK PURGE CONTROL SOLENOID VALVE.

Operate purge control solenoid valve.

NOTE:
Purge control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



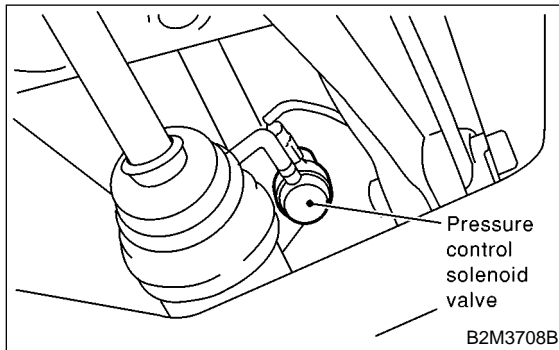
- CHECK** : *Does purge control solenoid valve produce operating sound?*
- YES** : Go to step 11AH6.
- NO** : Replace purge control solenoid valve. <Ref. to 2-1 [W4A0].>

11AH6 : CHECK PRESSURE CONTROL SOLENOID VALVE.

Operate pressure control solenoid valve.

NOTE:

Pressure control solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>



- CHECK** : **Does pressure control solenoid valve produce operating sound?**
- YES** : Go to step **11AH7**.
- NO** : Replace pressure control solenoid valve. <Ref. to 2-1 [W9A0].>

11AH7 : CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.

Turn ignition switch to OFF.

- CHECK** : **Is there a hole of more than 0.5 mm (0.020 in) dia. on fuel line?**
- YES** : Repair or replace fuel line. <Ref. to 2-8 [W8A0].>
- NO** : Go to step **11AH8**.

11AH8 : CHECK CANISTER.

- CHECK** : **Is canister damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?**
- YES** : Repair or replace canister. <Ref. to 2-1 [W3A0].>
- NO** : Go to step **11AH9**.

11AH9 : CHECK FUEL TANK.

Remove fuel tank. <Ref. to 2-8 [W1C0].>

- CHECK** : **Is fuel tank damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?**
- YES** : Repair or replace fuel tank. <Ref. to 2-8 [W1C0].>
- NO** : Go to step **11AH10**.

11AH10 : CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.

- CHECK** : **Are there holes of more than 0.5 mm (0.020 in) dia., cracks, clogging or disconnections of hoses or pipes in evaporative emission control system?**
- YES** : Repair or replace hoses or pipes.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

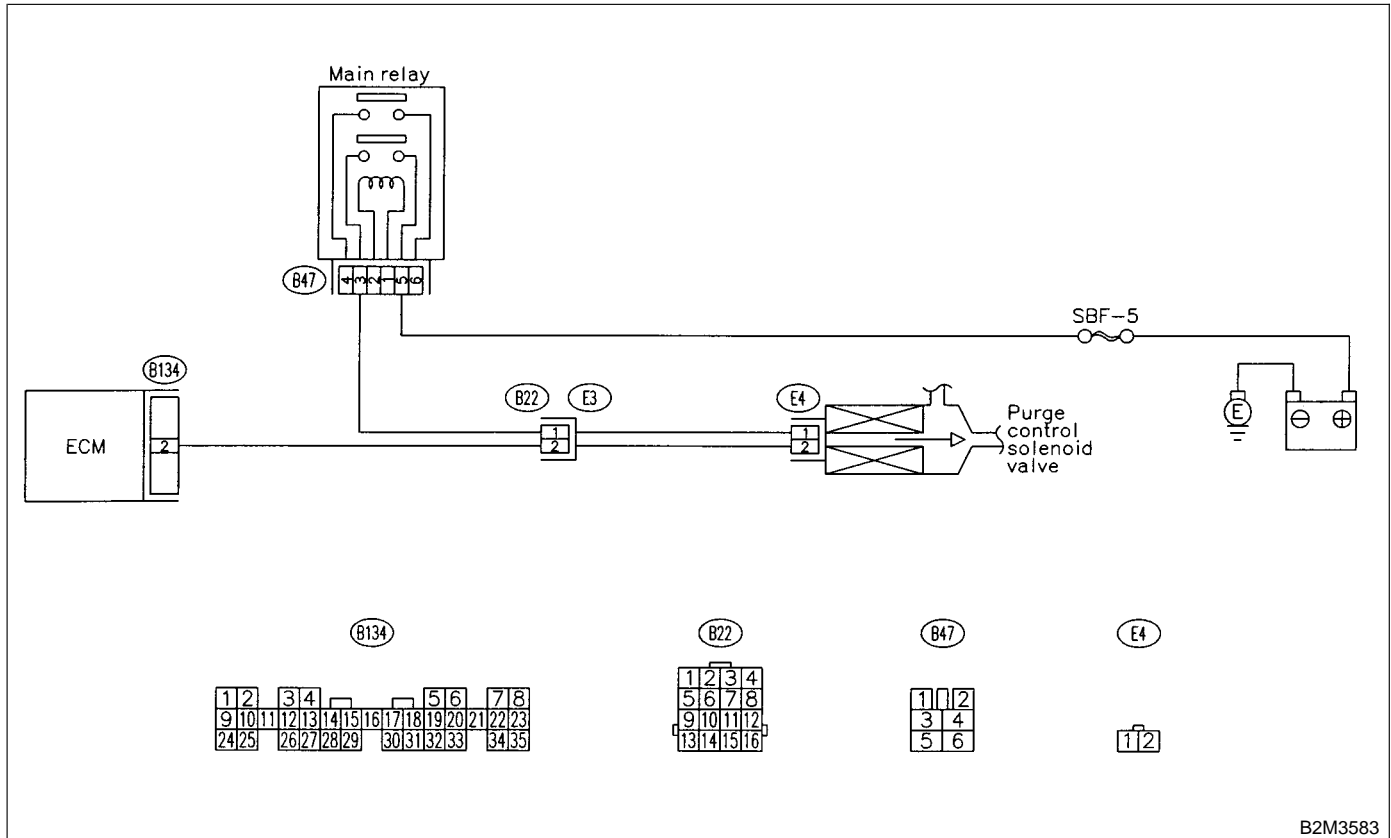
AI: DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



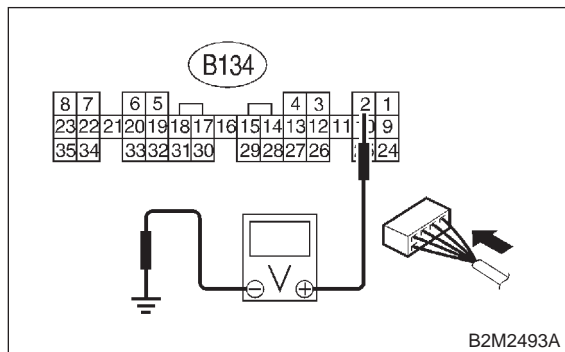
B2M3583

11A11 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

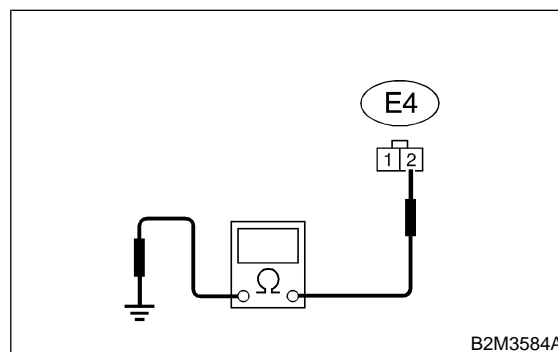
- NO** : Go to step **11A12**.

11A12 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from purge control solenoid valve and ECM.
- 3) Measure resistance of harness between purge control solenoid valve connector and engine ground.

Connector & terminal

(E4) No. 2 — Engine ground:



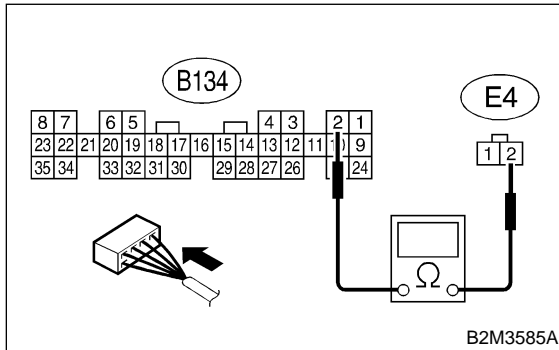
- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and purge control solenoid valve connector.
- NO** : Go to step **11A13**.

11A13 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and purge control solenoid valve of harness connector.

Connector & terminal

(B134) No. 2 — (E4) No. 2:



- CHECK** : *Is the resistance less than 1 Ω?*
YES : Go to step **11A14**.
NO : Repair open circuit in harness between ECM and purge control solenoid valve connector.

NOTE:

In this case, repair the following:

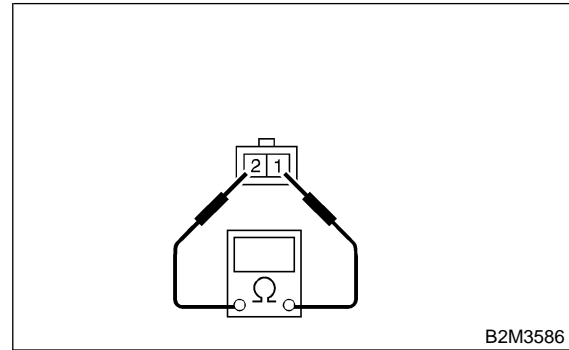
- Open circuit in harness between ECM and purge control solenoid valve connector
- Poor contact in coupling connector (B22)

11A14 : CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Remove purge control solenoid valve.
- 2) Measure resistance between purge control solenoid valve terminals.

Terminals

No. 1 — No. 2:



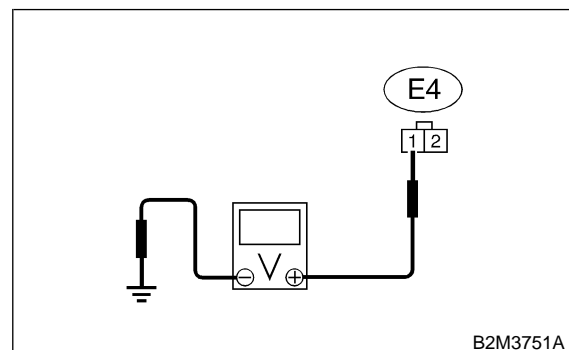
- CHECK** : *Is the resistance between 10 and 100 Ω?*
YES : Go to step **11A15**.
NO : Replace purge control solenoid valve. <Ref. to 2-1 [W4A0].>

11A15 : CHECK POWER SUPPLY TO PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between purge control solenoid valve and engine ground.

Connector & terminal

(E4) No. 1 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 10 V?*
YES : Go to step **11A16**.
NO : Repair open circuit in harness between main relay and purge control solenoid valve connector.

11A16 : CHECK POOR CONTACT.

Check poor contact in purge control solenoid valve connector. <Ref. to FOREWORD [T3C1].>

CHECK : ***Is there poor contact in purge control solenoid valve connector?***

YES : Repair poor contact in purge control solenoid valve connector.

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AJ: DTC P0446 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL LOW INPUT —

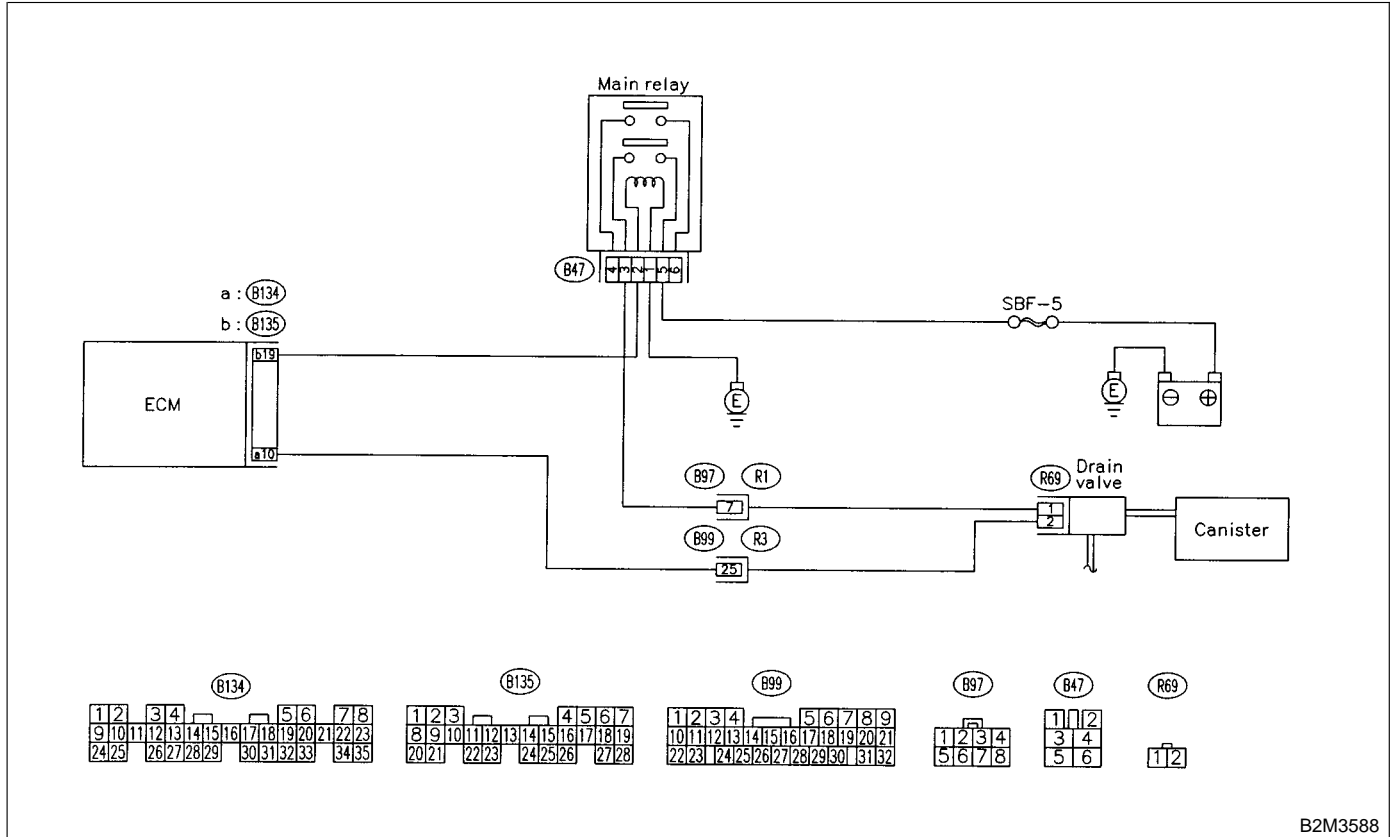
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



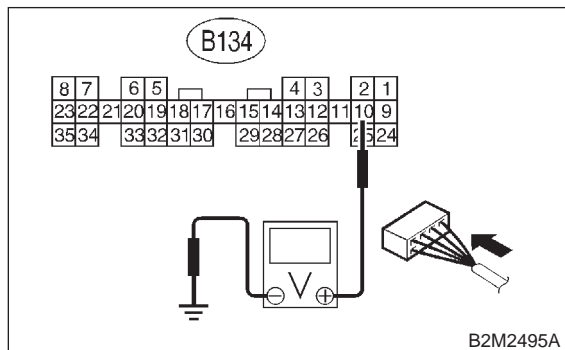
B2M3588

11AJ1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **11AJ2**.
- NO** : Go to step **11AJ3**.

11AJ2 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)

NOTE:

In this case, repair the following:

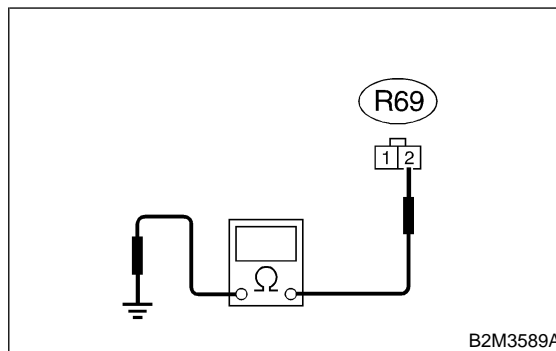
- Poor contact in drain valve connector
- Poor contact in ECM connector
- Poor contact in coupling connectors (B97 and B99)

11AJ3 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

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

Connector & terminal

(R69) No. 2 — Chassis ground:

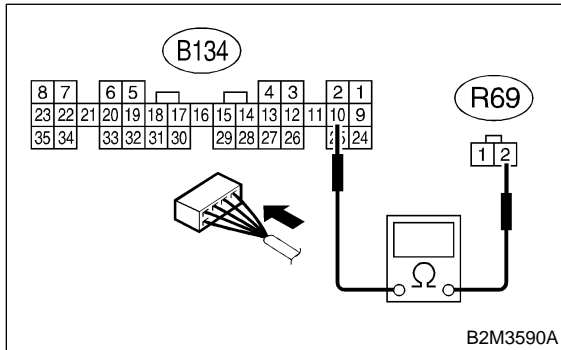


- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and drain valve connector.
- NO** : Go to step **11AJ4**.

11AJ4 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and drain valve connector.

Connector & terminal
(B134) No. 10 — (R69) No. 2:



- CHECK** : *Is the voltage less than 1 Ω?*
- YES** : Go to step 11AJ5.
- NO** : Repair harness and connector.

NOTE:

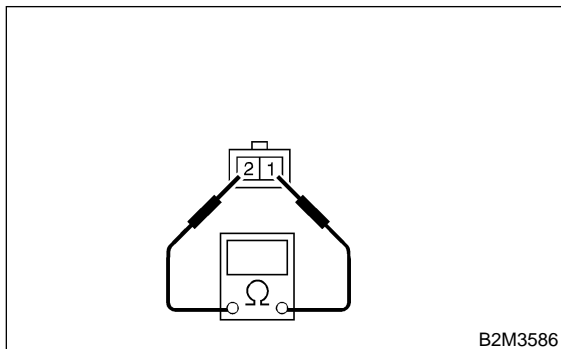
In this case, repair the following:

- Open circuit in harness between ECM and drain valve connector
- Poor contact in coupling connectors (B99)

11AJ5 : CHECK DRAIN VALVE.

Measure resistance between drain valve terminals.

Terminals
No. 1 — No. 2:

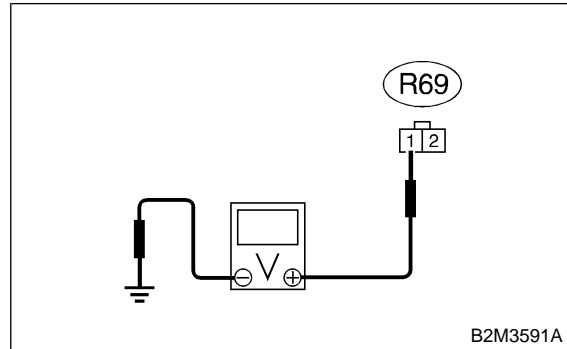


- CHECK** : *Is the resistance between 10 and 100 Ω?*
- YES** : Go to step 11AJ6.
- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

11AJ6 : CHECK POWER SUPPLY TO DRAIN VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between drain valve and chassis ground.

Connector & terminal
(R69) No. 1 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step 11AJ7.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between main relay and drain valve
- Poor contact in coupling connectors (B97)
- Poor contact in main relay connector

11AJ7 : CHECK POOR CONTACT.

Check poor contact in drain valve connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in drain valve connector?*
- YES** : Repair poor contact in drain valve connector.
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AK: DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE PROBLEM —

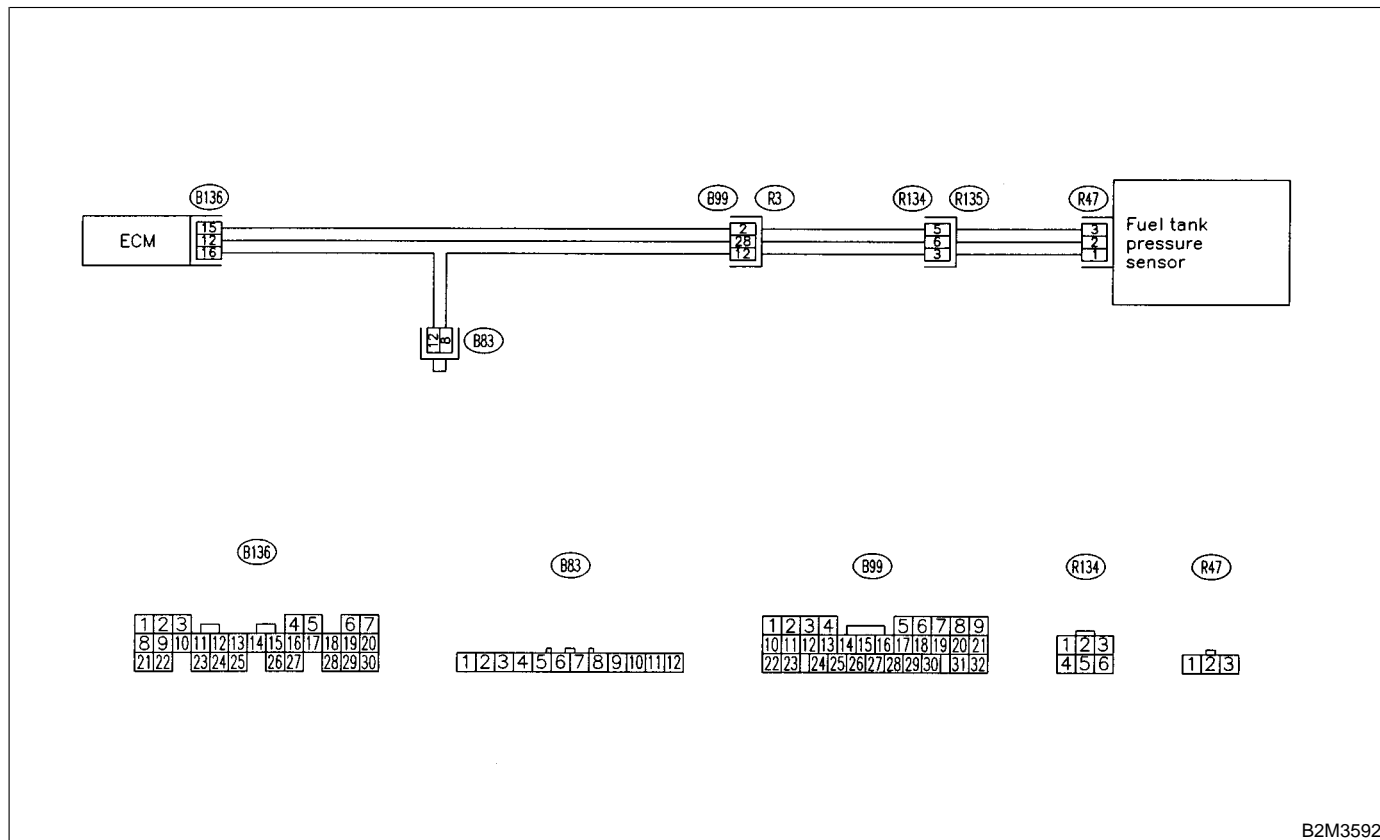
● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3592

11AK1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any DTC on display?*
YES : Inspect the relevant DTC using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
NO : Go to step **11AK2**.

11AK2 : CHECK FUEL FILLER CAP.

- 1) Turn ignition switch to OFF.
 2) Open the fuel flap.
CHECK : *Is the fuel filler cap tightened securely?*
YES : Go to step **11AK3**.
NO : Tighten fuel filler cap securely.

11AK3 : CHECK PRESSURE/VACUUM LINE.

- NOTE:**
 Check the following items.
 ● Disconnection, leakage and clogging of the vacuum hoses and pipes between fuel tank pressure sensor and fuel tank
 ● Disconnection, leakage and clogging of air ventilation hoses and pipes between fuel filler pipe and fuel tank
- CHECK** : *Is there a fault in pressure/vacuum line?*
YES : Repair or replace hoses and pipes.
NO : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

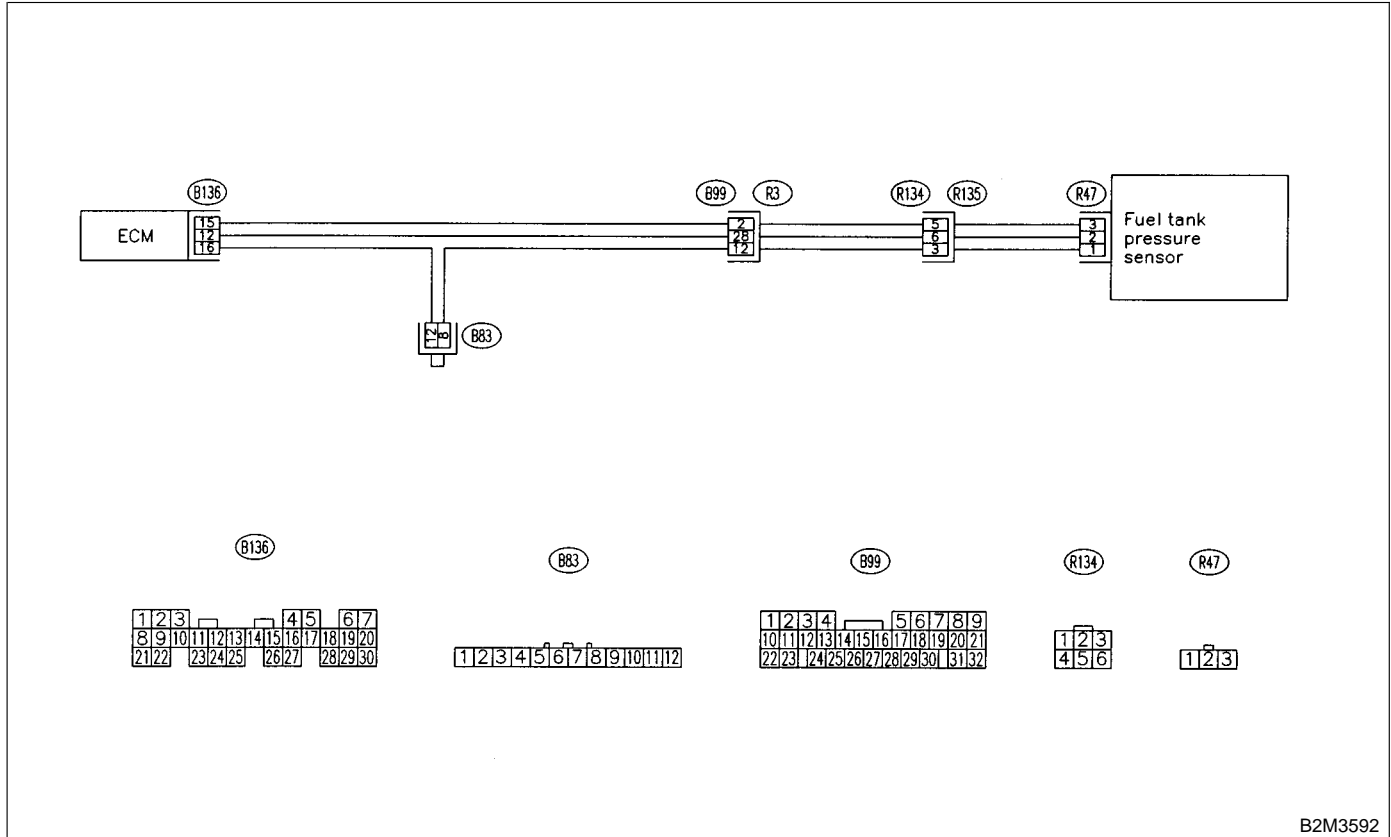
AL: DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

- **WIRING DIAGRAM:**



B2M3592

11AL1 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel filler cap.
- 3) Install fuel filler cap.
- 4) Turn ignition switch to ON.
- 5) Read the data of fuel tank pressure sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

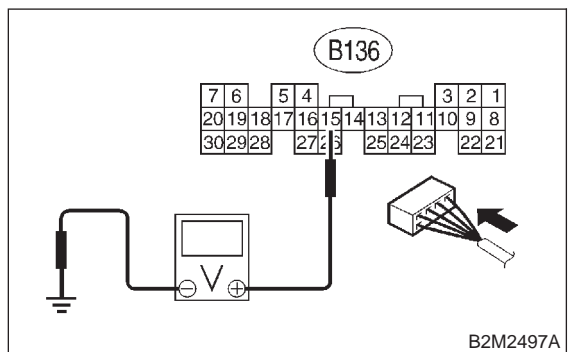
- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than -2.8 kPa (-21.0 mmHg, -0.827 inHg)?*
- YES** : Go to step 11AL2.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time.

11AL2 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

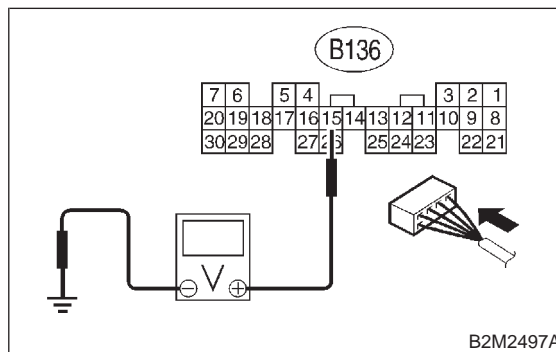


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step 11AL4.
- NO** : Go to step 11AL3.

11AL3 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

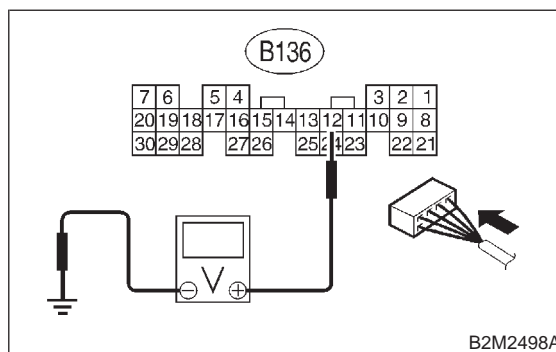
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11AL4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 12 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step 11AL6.
- NO** : Go to step 11AL5.

**11AL5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of fuel tank pressure sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : Does the value change more than -2.8 kPa (-21.0 mmHg , -0.827 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?

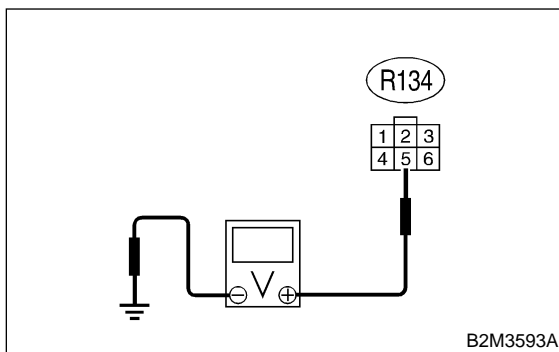
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11AL6.

**11AL6 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Remove rear seat cushion (Sedan) or move rear seat cushion (Wagon).
- 3) Separate rear wiring harness and fuel tank cord.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 5 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 4.5 V ?
YES : Go to step 11AL7.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

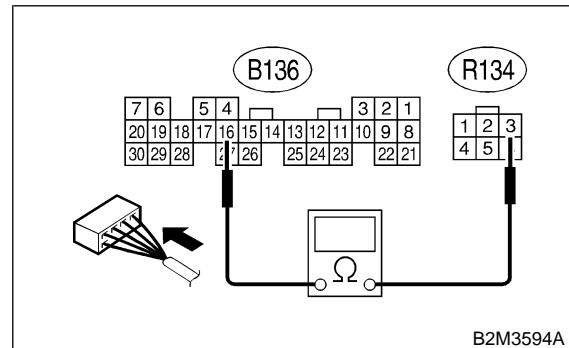
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

**11AL7 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

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

Connector & terminal

(B136) No. 16 — (R134) No. 3:



- CHECK** : Is the resistance less than 1Ω ?
YES : Go to step 11AL8.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

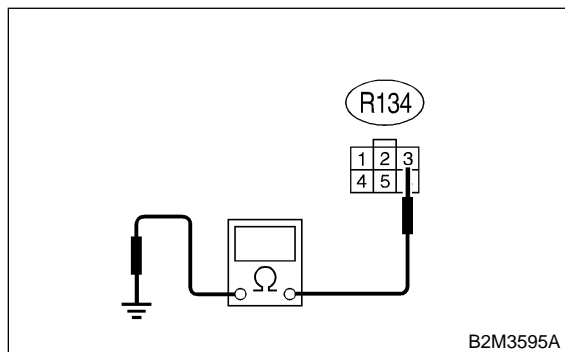
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)
- Poor contact in joint connector (B83)

11AL8 : CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.

Measure resistance of harness between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 3 — Chassis ground:



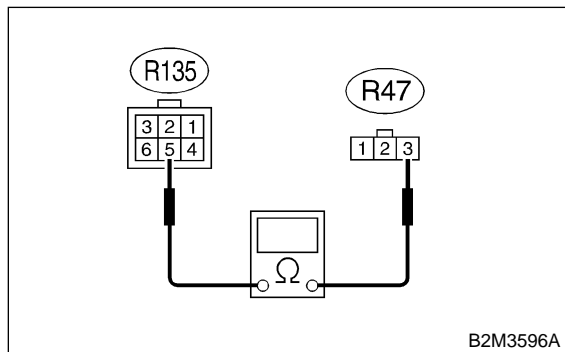
- CHECK** : **Is the resistance more than 500 kΩ?**
- YES** : Go to step **11AL9**.
- NO** : Repair ground short circuit in harness between ECM and rear wiring harness connector (R134).

11AL9 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel tank pressure sensor.
- 2) Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 5 — (R47) No. 3:



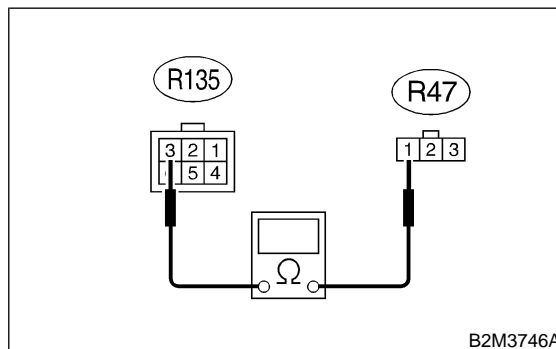
- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **11AL10**.
- NO** : Repair open circuit in fuel tank cord.

11AL10 : CHECK FUEL TANK CORD.

Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 3 — (R47) No. 1:



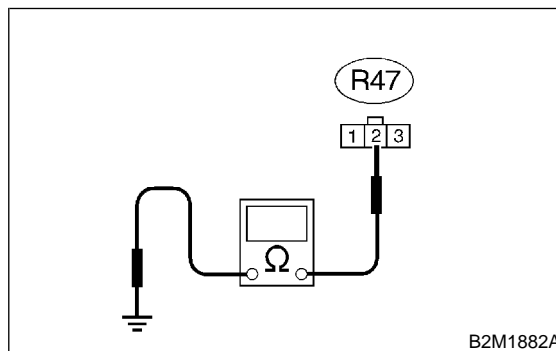
- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Go to step **11AL11**.
- NO** : Repair open circuit in fuel tank cord.

11AL11 : CHECK FUEL TANK CORD.

Measure resistance of harness between fuel tank pressure sensor connector and chassis ground.

Connector & terminal

(R47) No. 2 — Chassis ground:



- CHECK** : **Is the resistance more than 500 kΩ?**
- YES** : Go to step **11AL12**.
- NO** : Repair ground short circuit in fuel tank cord.

11AL12 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in fuel tank pressure sensor connector?*
- YES** : Repair poor contact in fuel tank pressure sensor connector.
- NO** : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

MEMO:

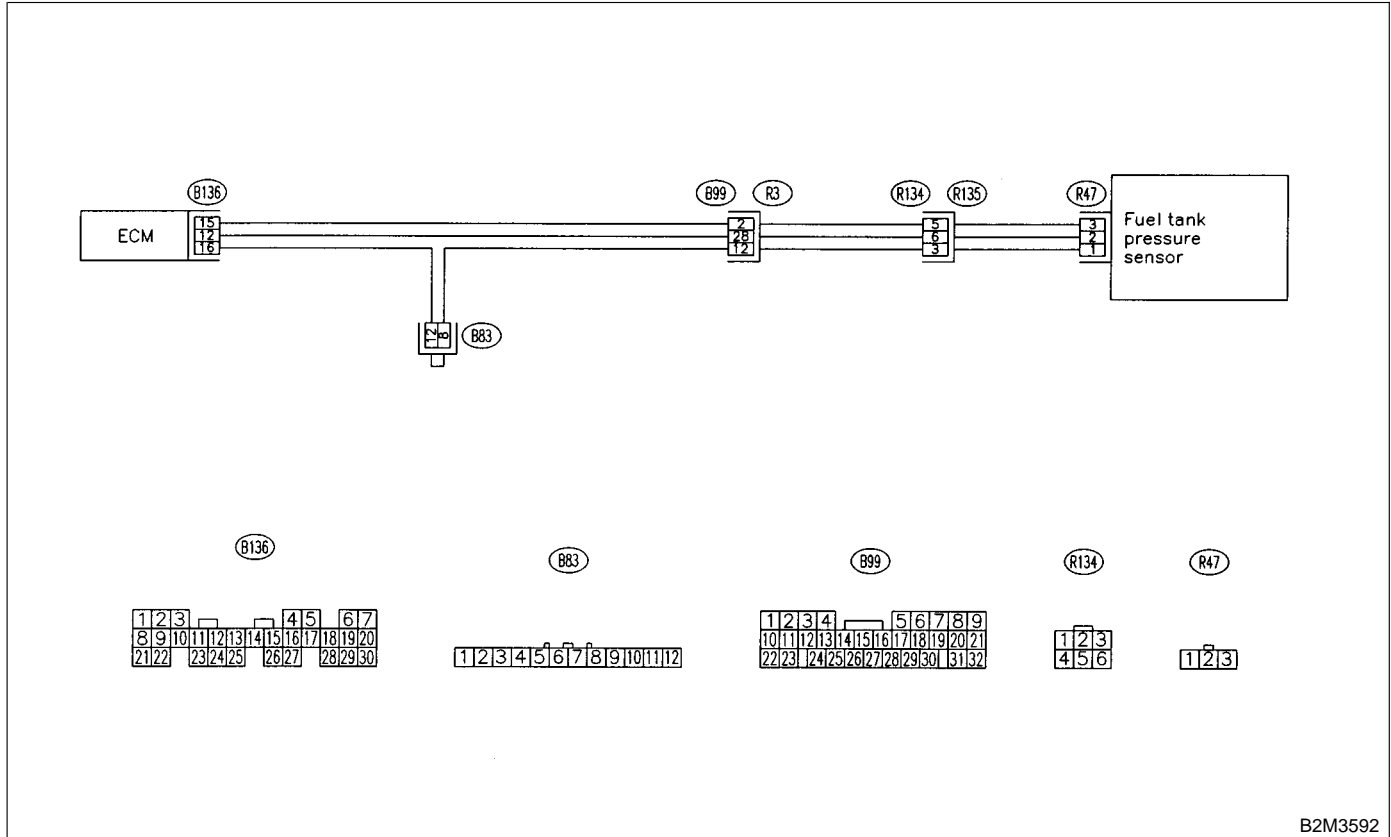
AM: DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

- **WIRING DIAGRAM:**



B2M3592

11AM1 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel filler cap.
- 3) Install fuel filler cap.
- 4) Turn ignition switch to ON.
- 5) Read data of fuel tank pressure sensor signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

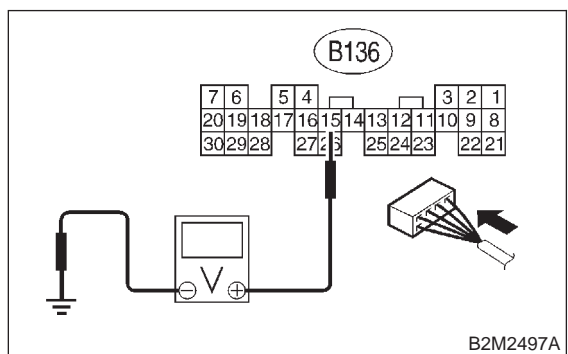
- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?*
- YES** : Go to step 11AM12.
- NO** : Go to step 11AM2.

11AM2 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

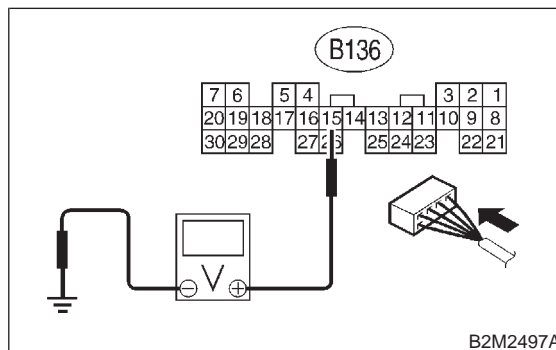


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step 11AM4.
- NO** : Go to step 11AM3.

11AM3 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

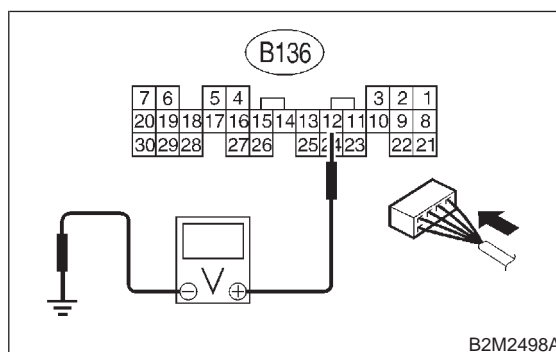


- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11AM4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 12 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step 11AM6.
- NO** : Go to step 11AM5.

**11AM5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of fuel tank pressure sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than -2.8 kPa (-21.0 mmHg, -0.827 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?*

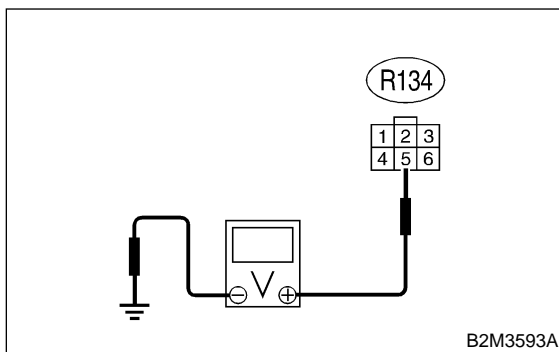
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11AM6.

**11AM6 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

- 1) Turn ignition switch to OFF.
- 2) Remove rear seat cushion (Sedan) or move rear seat cushion (Wagon).
- 3) Separate rear wiring harness and fuel tank cord.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between rear wiring harness connector and chassis ground.

Connector & terminal

(R134) No. 5 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step 11AM7.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

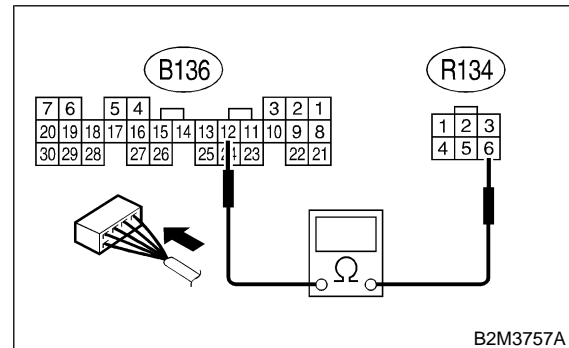
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

**11AM7 : CHECK HARNESS BETWEEN ECM
AND COUPLING CONNECTOR IN
REAR WIRING HARNESS.**

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

Connector & terminal

(B136) No. 12 — (R134) No. 6:



- CHECK** : *Is the resistance less than 1 Ω ?*
YES : Go to step 11AM8.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

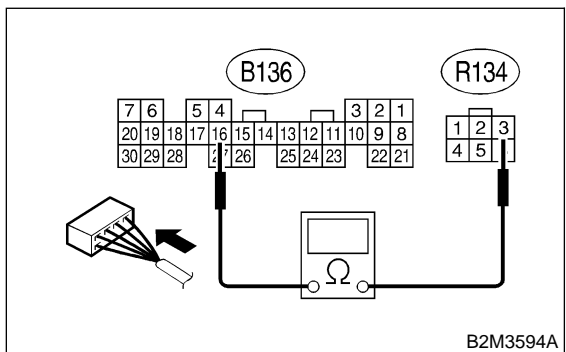
- Open circuit in harness between ECM and rear wiring harness connector (R134)
- Poor contact in coupling connector (B99)

11AM8 : CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.

Measure resistance of harness between rear wiring harness connector and chassis ground.

Connector & terminal

(B136) No. 16 — (R134) No. 3:



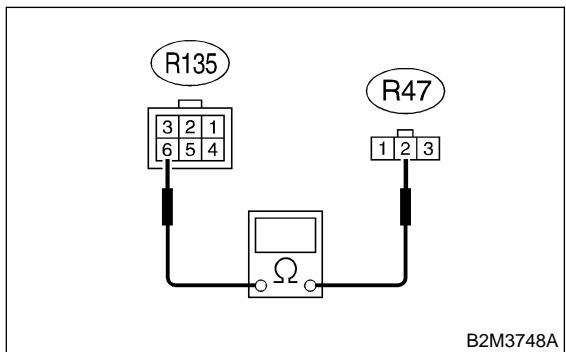
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **11AM9**.
- NO** : Repair ground short circuit in harness between ECM and rear wiring harness connector (R134).

11AM9 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel tank pressure sensor.
- 2) Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 6 — (R47) No. 2:



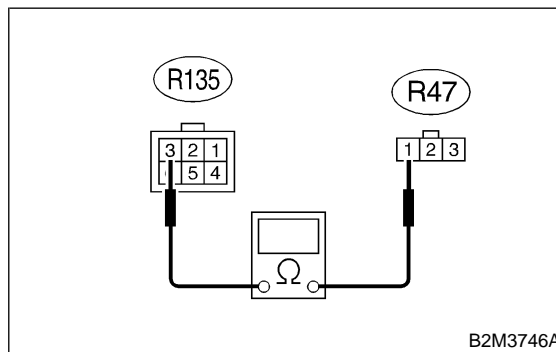
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **11AM10**.
- NO** : Repair open circuit in fuel tank cord.

11AM10 : CHECK FUEL TANK CORD.

Measure resistance of fuel tank cord.

Connector & terminal

(R135) No. 3 — (R47) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **11AM11**.
- NO** : Repair open circuit in fuel tank cord.

11AM11 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure sensor connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in fuel tank pressure sensor connector?*
- YES** : Repair poor contact in fuel tank pressure sensor connector.
- NO** : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

11AM12 : CHECK HARNESS BETWEEN ECM AND FUEL TANK PRESSURE SENSOR CONNECTOR.
--

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel tank pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of fuel tank pressure sensor signal using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : ***Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?***

YES : Repair battery short circuit in harness between ECM and fuel tank pressure sensor connector.

NO : Replace fuel tank pressure sensor. <Ref. to 2-1 [W8A0].>

AN: DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —

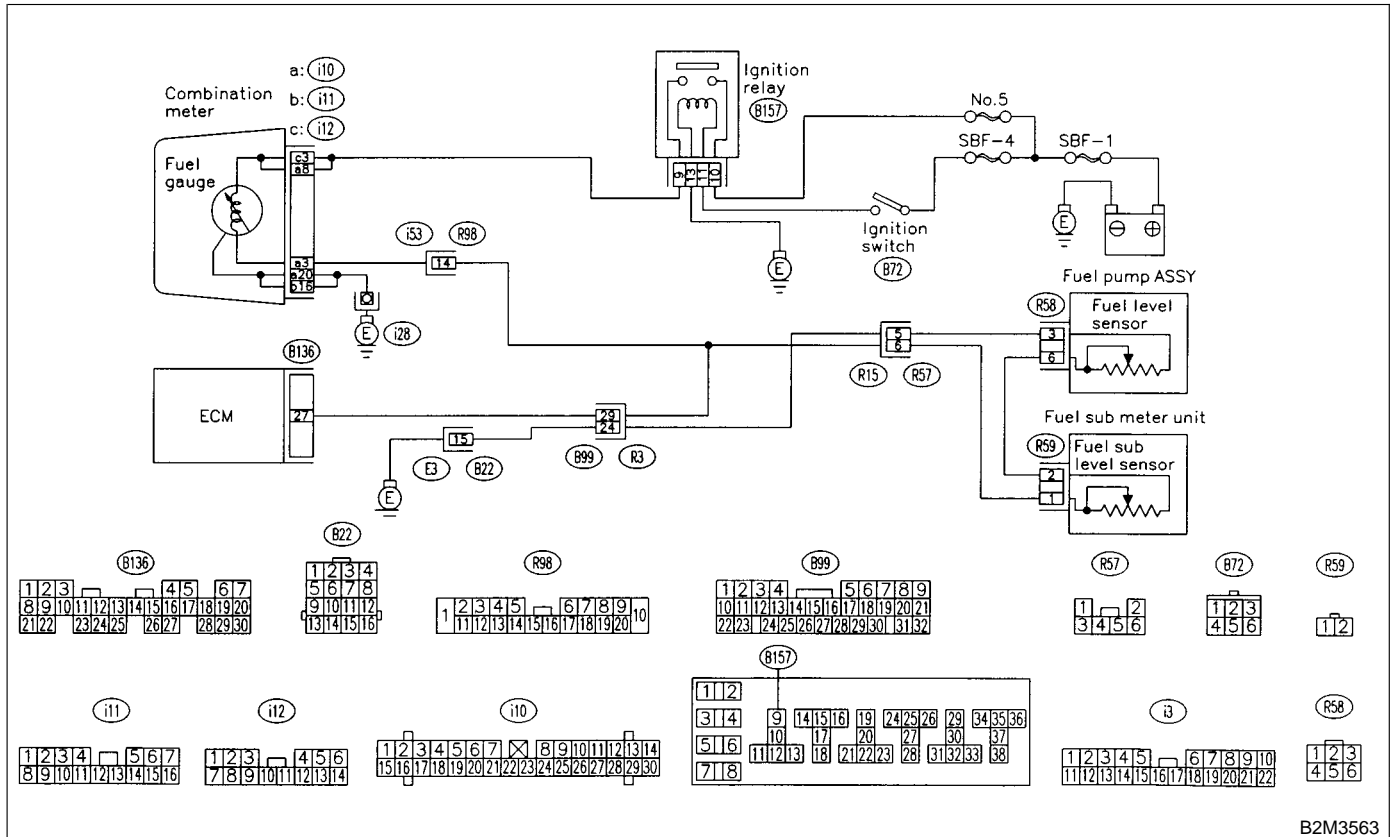
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

11AN1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0462 or P0463?

YES : Inspect DTC P0462 or P0463 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect this trouble.

NO : Replace fuel sending unit <Ref. to 2-1 [W5A0].> and fuel sub level sensor <Ref. to 2-1 [W7A0].>

AO: DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT —

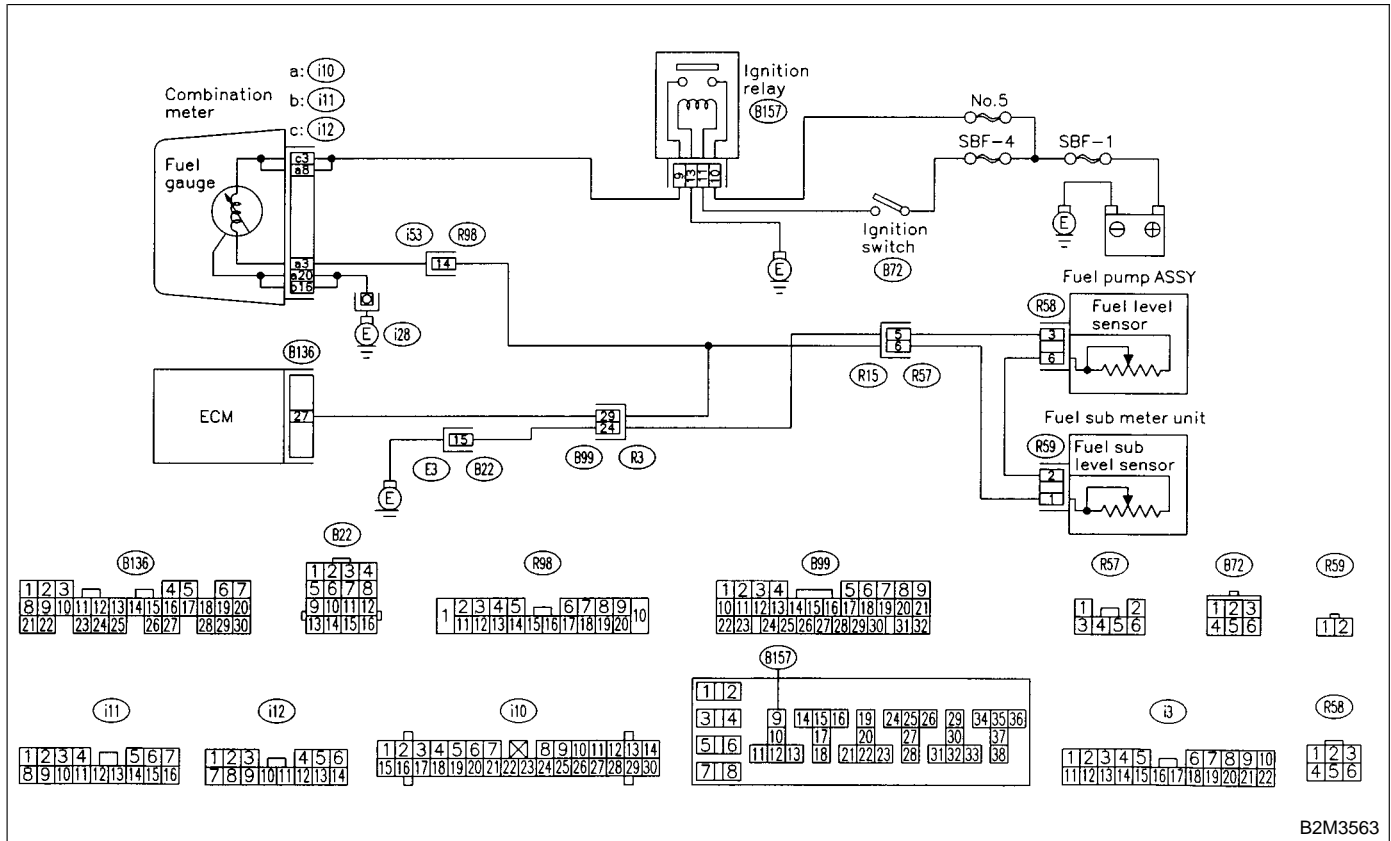
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

11A01 : CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.

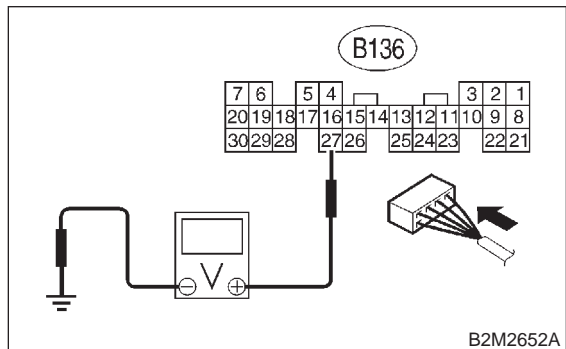
- CHECK** : Does speedometer and tachometer operate normally?
- YES** : Go to step 11A02.
- NO** : Repair or replace combination meter.

11A02 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON. (Engine OFF)
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



- CHECK** : Is the voltage less than 0.12 V?
- YES** : Go to step 11A06.
- NO** : Go to step 11A03.

11A03 : CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)

Read data of fuel level sensor signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor
- For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- CHECK** : Does the value change less than 0.12 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?
- YES** : Repair poor contact in ECM connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

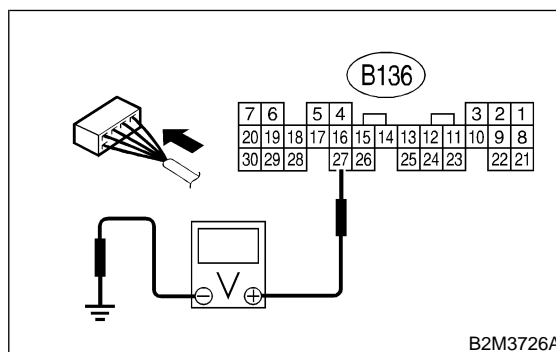
- In this case, repair the following:
- Poor contact in combination meter connector
 - Poor contact in ECM connector
 - Poor contact in coupling connectors (B99)

11A04 : CHECK INPUT VOLTAGE OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Separate fuel tank cord connector (R57) and rear wiring harness connector (R15).
- 3) Turn ignition switch to ON.
- 4) Measure voltage of harness between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



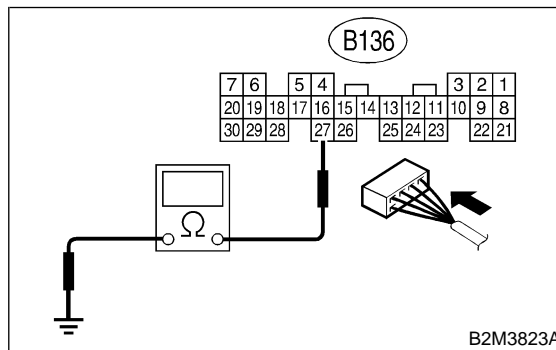
- CHECK** : Is the voltage more than 0.12 V?
- YES** : Go to step 11A04.
- NO** : Go to step 11A07.

11A05 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from connector (i10) and ECM connector.
- 3) Measure resistance between ECM and chassis ground.

Connector & terminal

(B136) No. 27 — Chassis ground:



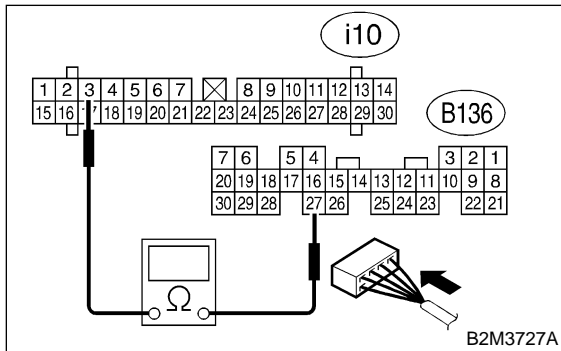
- CHECK** : Is the resistance more than 1 MΩ?
- YES** : Go to step 11A06.
- NO** : Repair ground short circuit in harness between ECM and combination meter connector.

11A06 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER.

Measure resistance between ECM and combination meter connector.

Connector & terminal

(B136) No. 27 — (i10) No. 3:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair or replace combination meter. <Ref. to 6-2 [W8A0].>
- NO** : Repair open circuit between ECM and combination meter connector.

NOTE:

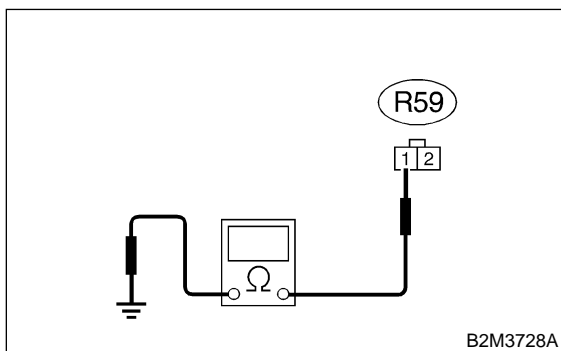
In this case, repair the following:
Poor contact in coupling connector (R98)

11A07 : CHECK FUEL TANK CORD.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel sub level sensor.
- 3) Measure resistance between fuel sub level sensor and chassis ground.

Connector & terminal

(R59) No. 1 — Chassis ground:



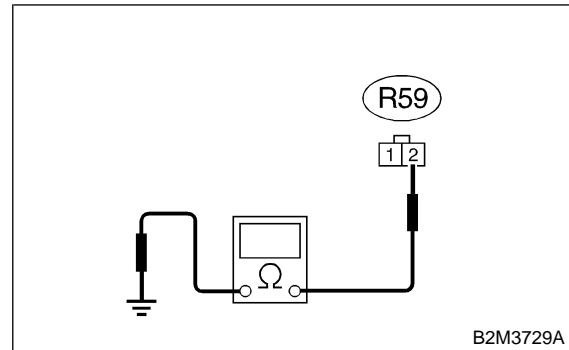
- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 11A08.
- NO** : Repair ground short circuit in fuel tank cord.

11A08 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel pump assembly.
- 2) Measure resistance between fuel pump assembly and chassis ground.

Connector & terminal

(R59) No. 2 — Chassis ground:



- CHECK** : **Is the resistance more than 1 MΩ?**
- YES** : Go to step 11A09.
- NO** : Repair ground short circuit in fuel tank cord.

11A09 : CHECK FUEL LEVEL SENSOR.

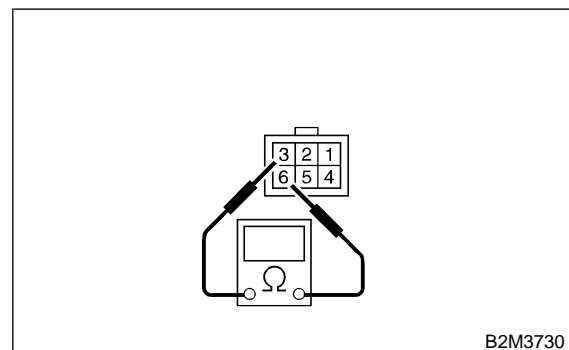
WARNING:

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) Measure resistance between fuel level sensor and terminals with its float set to the full position.

Terminals

No. 3 — No. 6:



- CHECK** : **Is the resistance between 0.5 and 2.5 Ω?**
- YES** : Go to step 11A010.
- NO** : Replace fuel level sensor.

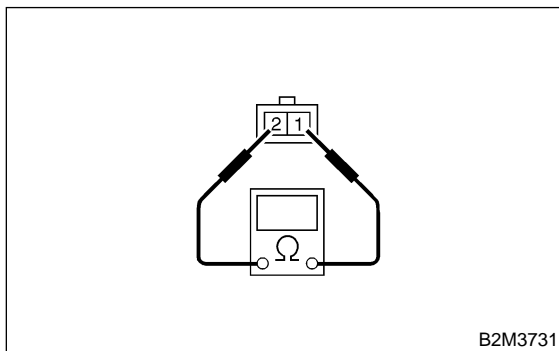
11A010 : CHECK FUEL SUB LEVEL SENSOR.**WARNING:**

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- 2) Measure resistance between fuel sub level sensor and terminals with its float set to the full position.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance between 0.5 and 2.5 Ω?**
- YES** : Repair poor contact in harness between ECM and combination meter connector.
- NO** : Replace fuel sub level sensor.

AP: DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT —

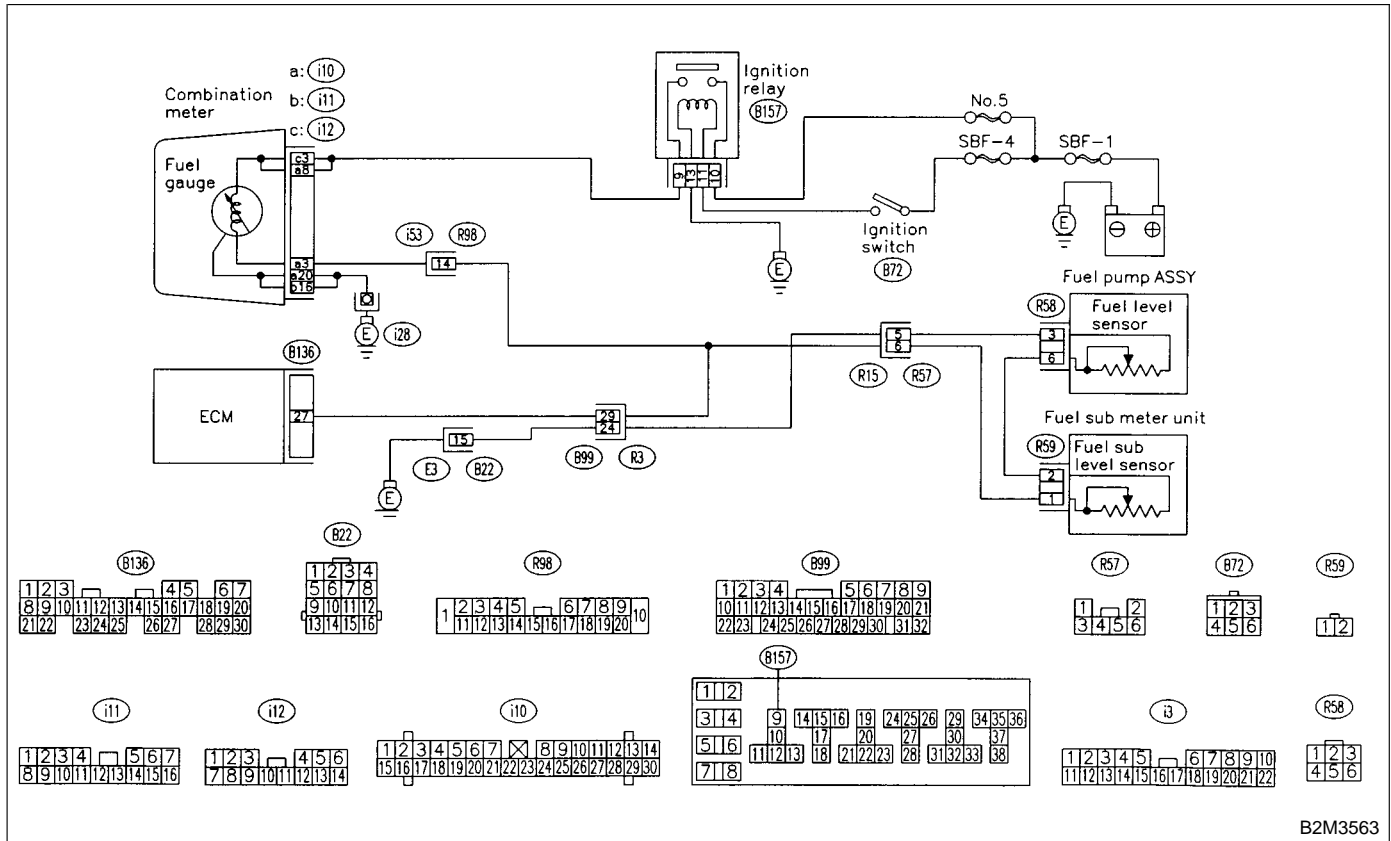
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

11AP1 : CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.

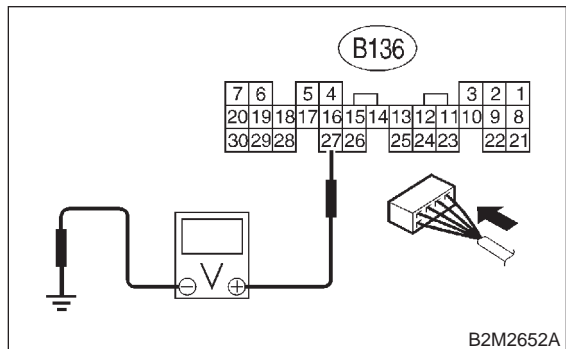
- CHECK** : Does speedometer and tachometer operate normally?
- YES** : Go to step 11AP2.
- NO** : Repair or replace combination meter. <Ref. to 6-2 [W8A0].>

11AP2 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON. (Engine OFF)
- 2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 4.75 V?**
- YES** : Go to step **11AP3**.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector may be the cause.

NOTE:

In this case, repair the following:

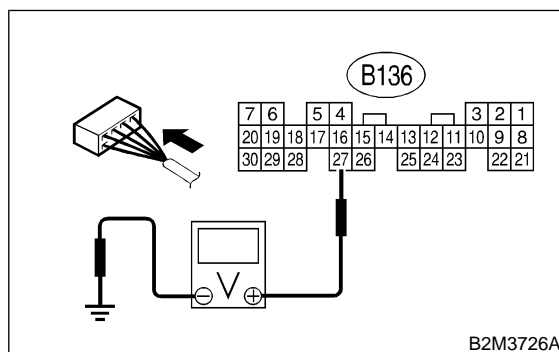
- Poor contact in fuel pump connector
- Poor contact in coupling connector (B22, R98 and R57)

11AP3 : CHECK INPUT VOLTAGE OF ECM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect combination meter connector (i10) and ECM connector.
- 3) Turn ignition switch to ON.
- 4) Measure voltage of harness between ECM and chassis ground.

Connector & terminal

(B136) No. 27 (+) — Chassis ground (-):



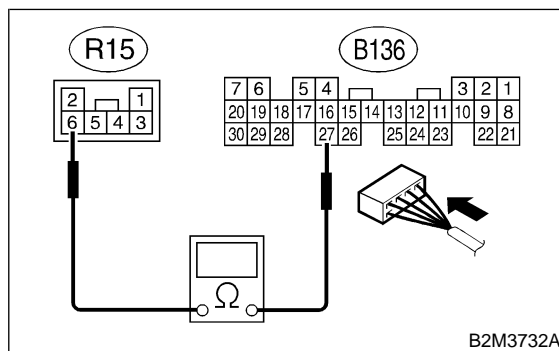
- CHECK** : **Is the voltage more than 4.75 V?**
- YES** : Go to step **11AP4**.
- NO** : Repair battery short circuit between ECM and combination meter connector.

11AP4 : CHECK HARNESS BETWEEN ECM AND FUEL TANK CORD.

- 1) Turn ignition switch to OFF.
- 2) Separate fuel tank cord connector (R57) and rear wiring harness connector (R15).
- 3) Measure resistance between ECM and fuel tank cord.

Connector & terminal

(B136) No. 27 — (R15) No. 6:

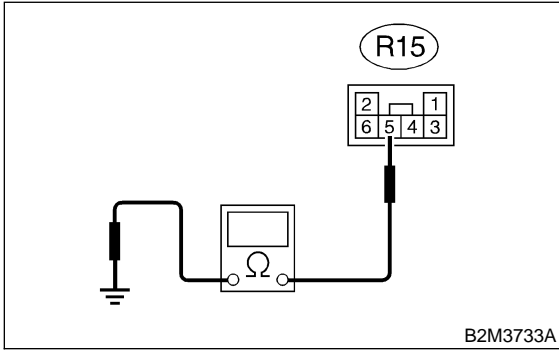


- CHECK** : **Is the resistance less than 5 Ω?**
- YES** : Go to step **11AP5**.
- NO** : Repair open circuit between ECM and fuel tank cord.

11AP5 : CHECK HARNESS BETWEEN FUEL TANK CORD AND CHASSIS GROUND.

Measure resistance between fuel tank cord and chassis ground.

Connector & terminal
(R15) No. 5 — Chassis ground:



- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 11AP6.
- NO** : Repair open circuit between fuel tank cord and chassis ground.

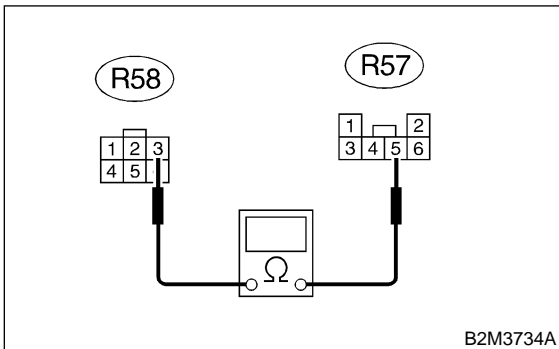
NOTE:

In this case, repair the following:
Poor contact in coupling connectors (B22 and B99)

11AP6 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel level sensor.
- 2) Measure resistance between fuel level sensor and coupling connector.

Connector & terminal
(R57) No. 5 — (R58) No. 3:

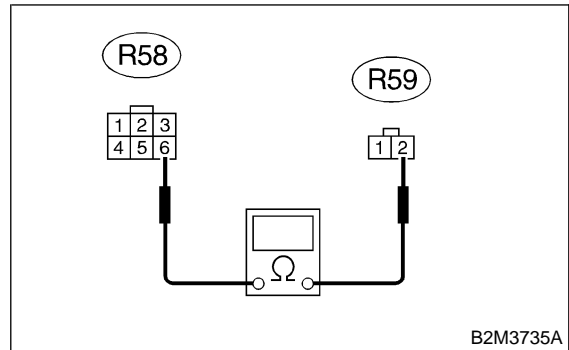


- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 11AP7.
- NO** : Repair open circuit between coupling connector and fuel level sensor.

11AP7 : CHECK FUEL TANK CORD.

- 1) Disconnect connector from fuel sub level sensor.
- 2) Measure resistance between fuel level sensor and fuel sub level sensor.

Connector & terminal
(R58) No. 6 — (R59) No. 2:

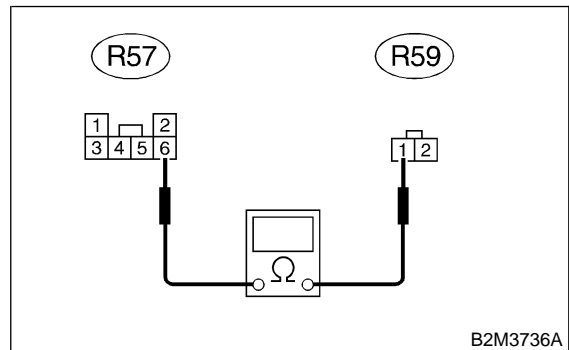


- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 11AP8.
- NO** : Repair open circuit between fuel level sensor and fuel sub level sensor.

11AP8 : CHECK FUEL TANK CORD.

Measure resistance between fuel sub level sensor and coupling connector.

Connector & terminal
(R57) No. 6 — (R59) No. 1:



- CHECK** : Is the resistance less than 10 Ω?
- YES** : Go to step 11AP9.
- NO** : Repair open circuit between coupling connector and fuel sub level sensor.

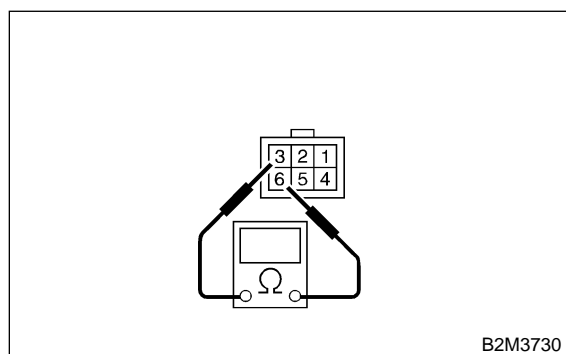
11AP9 : CHECK FUEL LEVEL SENSOR.**WARNING:**

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel pump assembly. <Ref. to 2-8 [W3A0].>
- 2) While moving fuel level sensor float up and down, measure resistance between fuel level sensor terminals.

Terminals

No. 3 — No. 6:



- CHECK** : **Is the resistance more than 54.5 Ω?**
- YES** : Replace fuel level sensor. <Ref. to 2-8 [W3A0].>
- NO** : Go to step **11AP10**.

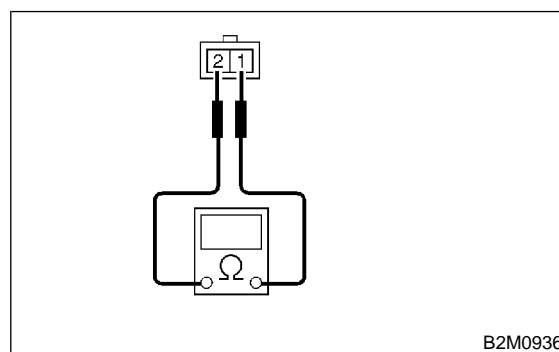
11AP10 : CHECK FUEL SUB LEVEL SENSOR.**WARNING:**

During work procedures, if fuel tank is more than 3/4 full, be careful because fuel may spill.

- 1) Remove fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- 2) While moving fuel sub level sensor float up and down, measure resistance between fuel sub level sensor terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance more than 41.5 Ω?**
- YES** : Replace fuel sub level sensor. <Ref. to 2-8 [W6A0].>
- NO** : Replace combination meter. <Ref. to 6-2 [W13A1].>

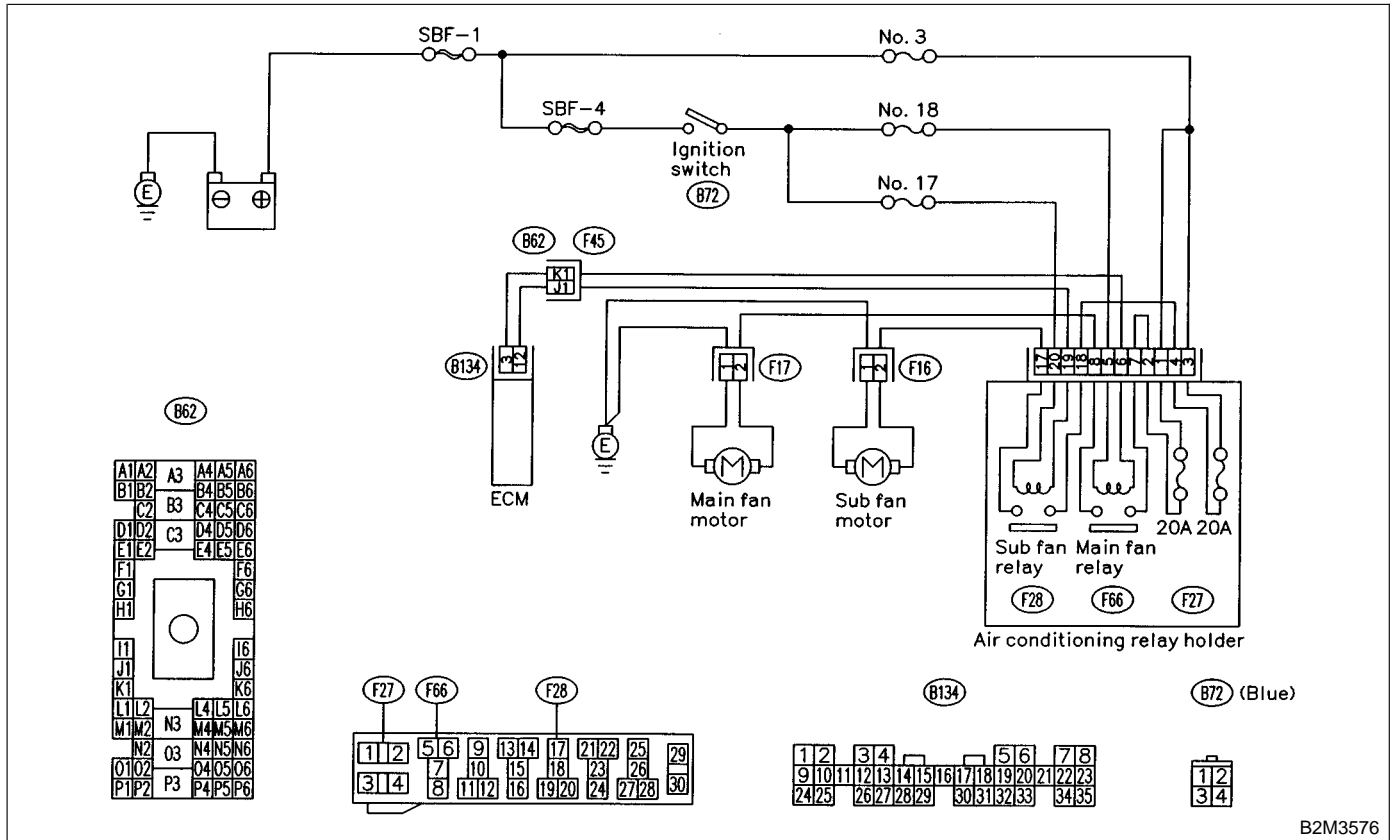
AQ: DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Radiator fan does not operate properly.
 - Overheating

CAUTION:

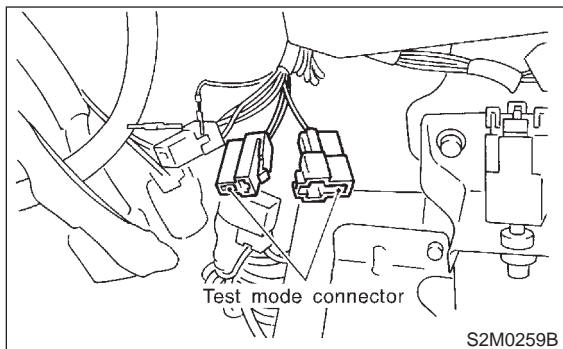
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



11AQ1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



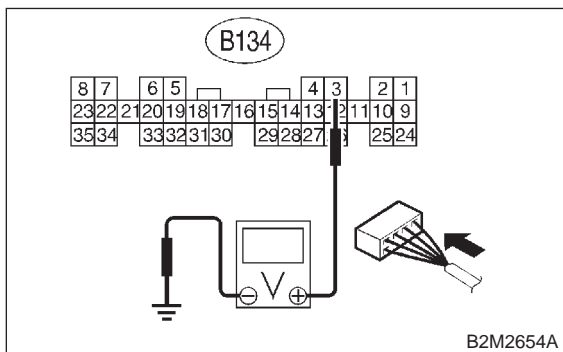
- 3) Turn ignition switch to ON.
- 4) While operating radiator fan relay, measure voltage between ECM terminal and ground.

NOTE:

Radiator fan relay operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 3 (+) — Chassis ground (-):



CHECK : Does voltage change between 0 and 10 V?

YES : Repair poor contact in ECM connector.

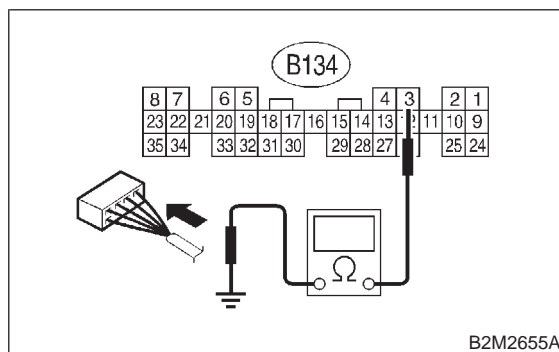
NO : Go to step 11AQ2.

11AQ2 : CHECK GROUND SHORT CIRCUIT IN RADIATOR FAN RELAY 1 CONTROL CIRCUIT.

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

Connector & terminal

(B134) No. 3 — Chassis ground:



CHECK : Is the resistance less than 10 Ω?

YES : Repair ground short circuit in radiator fan relay 1 control circuit.

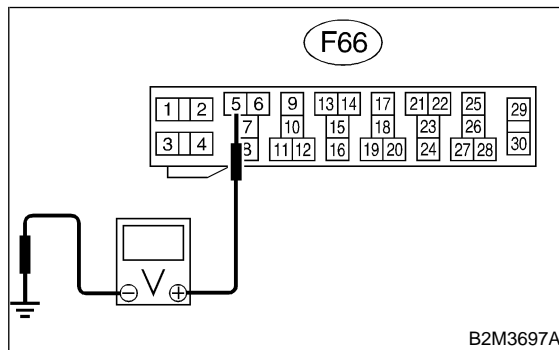
NO : Go to step 11AQ3.

11AQ3 : CHECK POWER SUPPLY FOR RELAY.

- 1) Remove main fan relay from A/C relay holder.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between fuse and relay box (F/B) connector and chassis ground.

Connector & terminal

(F66) No. 5 (+) — Chassis ground (-):



CHECK : Is the voltage more than 10 V?

YES : Go to step 11AQ4.

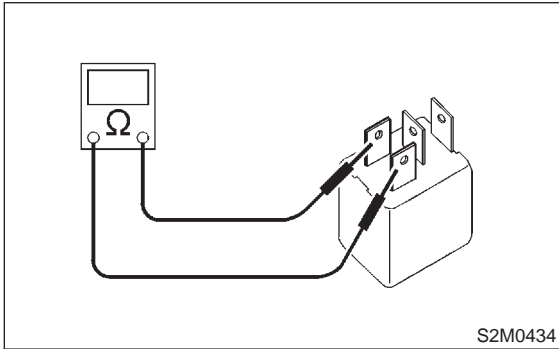
NO : Repair open circuit in harness between ignition switch and fuse and relay box (F/B) connector.

11AQ4 : CHECK MAIN FAN RELAY.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between main fan relay terminals.

Terminal

No. 5 — No. 6:



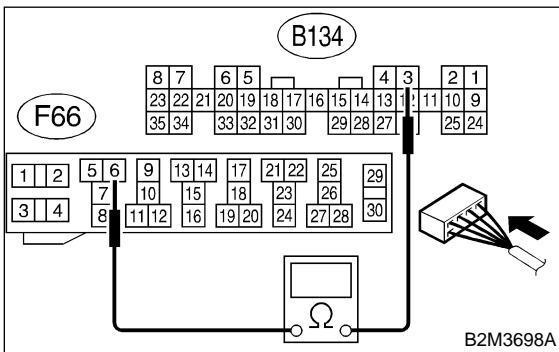
- CHECK** : *Is the resistance between 87 and 107 Ω ?*
- YES** : Go to step 11AQ5.
- NO** : Replace main fan relay.

11AQ5 : CHECK OPEN CIRCUIT IN MAIN FAN RELAY CONTROL CIRCUIT.

Measure resistance of harness between ECM and main fan relay connector.

Connector & terminal

(B134) No. 3 — (F66) No. 6:



- CHECK** : *Is the resistance less than 1 Ω ?*
- YES** : Go to step 11AQ6.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and main fan relay connector
- Poor contact in coupling connector (F45)

11AQ6 : CHECK POOR CONTACT.

Check poor contact in ECM or main fan relay connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM or main fan relay connector?*
- YES** : Repair poor contact in ECM or main fan relay connector.
- NO** : Contact with SOA service.

AR: DTC P0483 — COOLING FAN FUNCTION PROBLEM —

● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Occurrence of noise
- Overheating

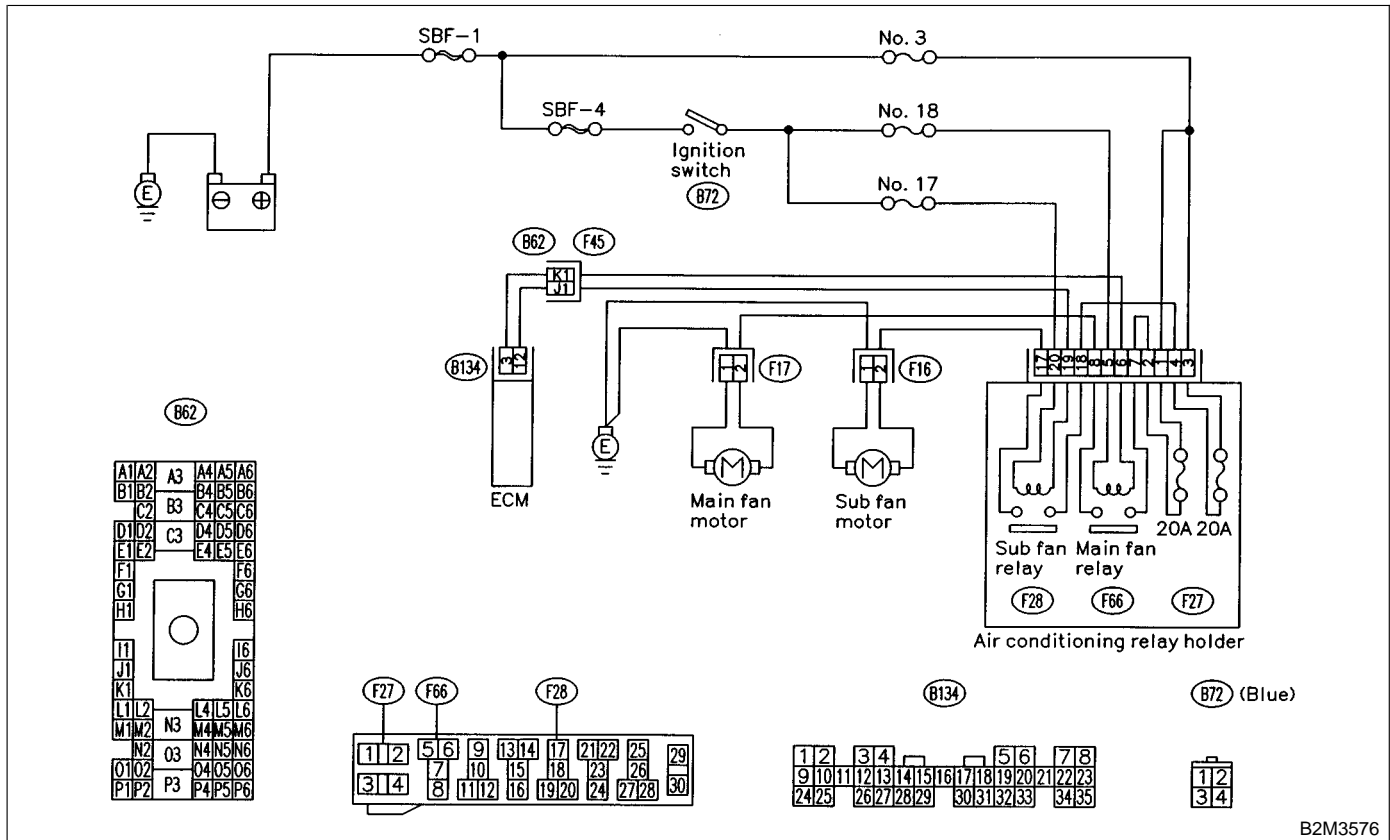
CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

NOTE:

If the vehicle, with the engine idling, is placed very close to a wall or another vehicle, preventing normal cooling function, the OBD system may detect malfunction.

● WIRING DIAGRAM:



B2M3576

11AR1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>
- NO** : Check engine cooling system. <Ref. to 2-5 [T100].>

AS: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —

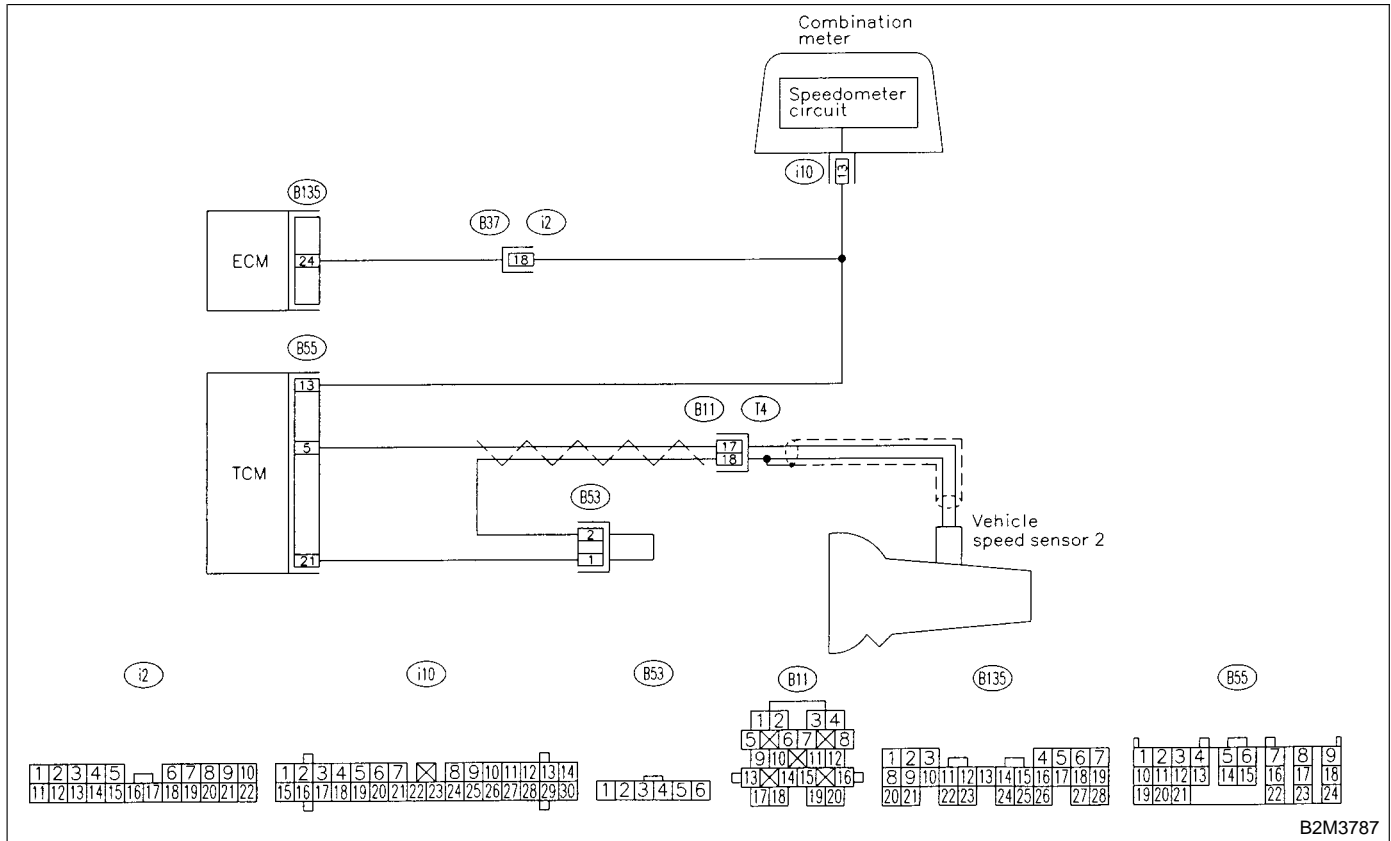
DTC DETECTING CONDITION:

- Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3787

11AS1 : CHECK DTC P0720 ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?
- YES** : Check vehicle speed sensor 2 signal circuit. <Ref. to 3-2 [T8F0].>
- NO** : Go to step 11AS2.

11AS2 : CHECK SPEEDOMETER OPERATION IN COMBINATION METER.

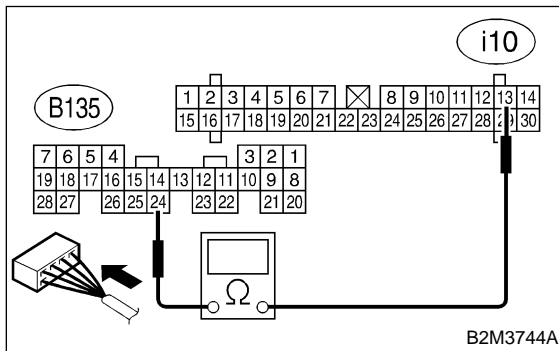
- CHECK** : Does speedometer operate normally?
- YES** : Go to step 11AS3.
- NO** : Check speedometer and vehicle speed sensor. <Ref. to 6-2 [K3A0].>

11AS3 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from combination meter.
- 3) Measure resistance between ECM and combination meter.

Connector & terminal

(B135) No. 24 — (i10) No. 13:



- CHECK** : **Is the resistance less than 10 Ω ?**
- YES** : Repair poor contact in ECM connector.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and combination meter connector
- Poor contact in ECM connector
- Poor contact in combination meter connector
- Poor contact in coupling connector (B36)

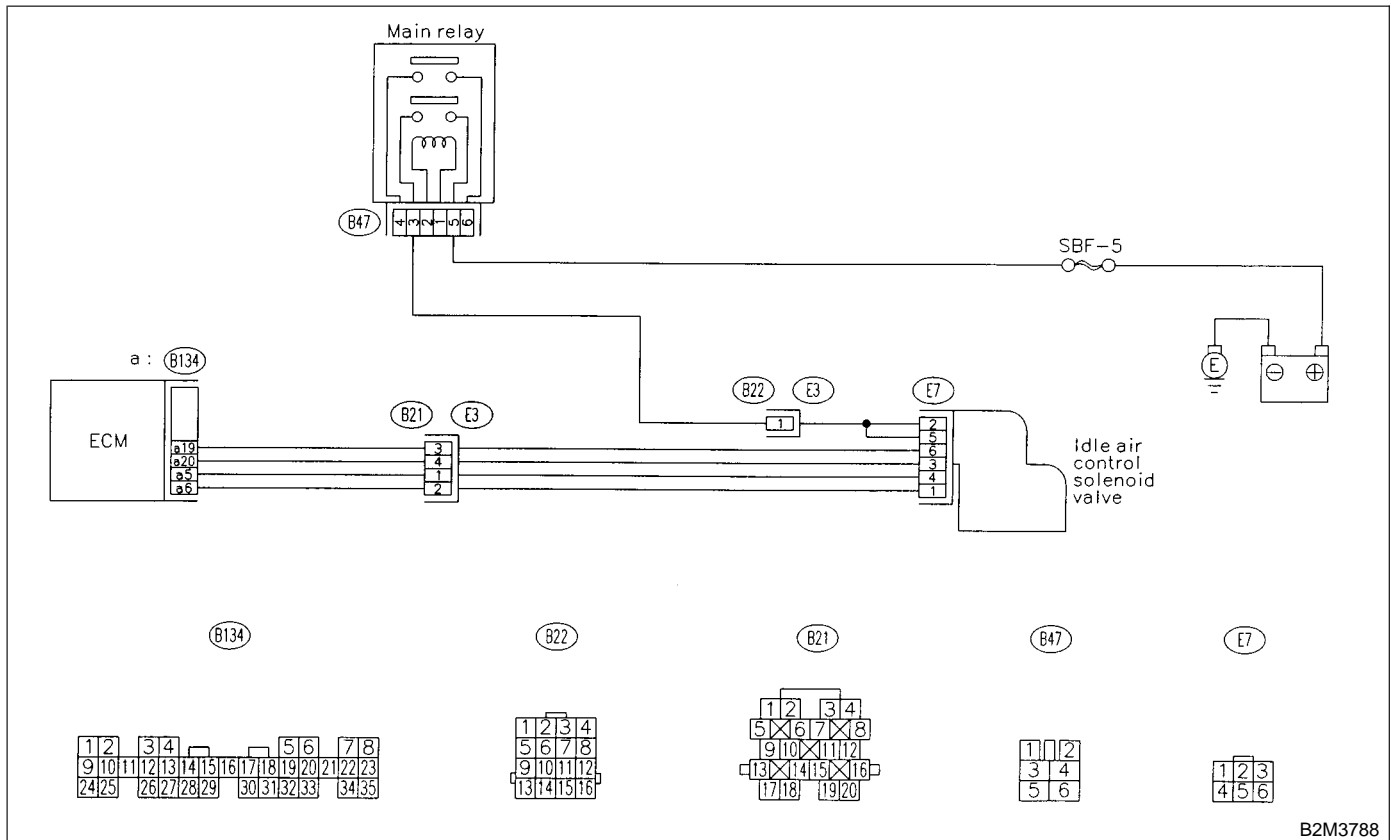
AT: DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine is difficult to start.
 - Engine does not start.
 - Erroneous idling
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3788

11AT1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?*

YES : Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P0506.

NO : Go to step **11AT2**.

11AT2 : CHECK AIR BY-PASS LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve from throttle body. <Ref. to 2-7 [W15A2].>
- 3) Remove throttle body from intake manifold. <Ref. to 2-7 [W2A2].>
- 4) Using an air gun, force air into idle air control solenoid valve installation area. Confirm that forced air subsequently escapes from throttle body interior.

CHECK : *Does air flow out?*

YES : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A2].>

NO : Replace throttle body. <Ref. to 2-7 [W2A2].>

AU: DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED

DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

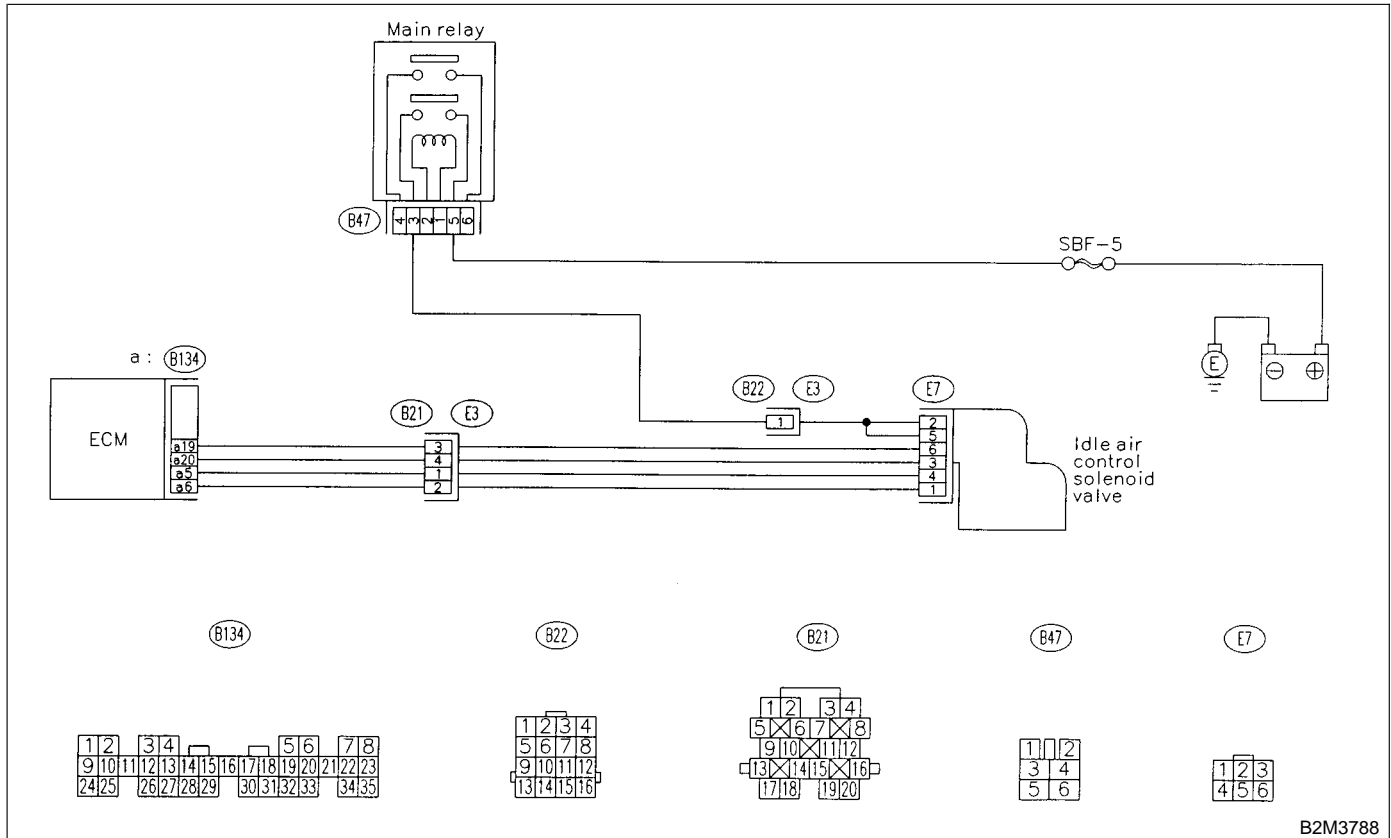
TROUBLE SYMPTOM:

- Engine keeps running at higher revolution than specified idling revolution.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3788

11AU1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?

YES : Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0507.

NO : Go to step 11AU2.

11AU2 : CHECK AIR INTAKE SYSTEM.

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.
- 3) Check the following items.
 - Loose installation of intake manifold, idle air control solenoid valve and throttle body
 - Cracks of intake manifold gasket, idle air control solenoid valve gasket and throttle body gasket
 - Disconnections of vacuum hoses

CHECK : Is there a fault in air intake system?

YES : Repair air suction and leaks.

NO : Go to step 11AU3.

11AU3 : CHECK THROTTLE CABLE.

- CHECK** : *Does throttle cable have play for adjustment?*
- YES** : Go to step 11AU4.
- NO** : Adjust throttle cable. <Ref. to 4-5 [W1A3].>

11AU4 : CHECK AIR BY-PASS LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve from throttle body. <Ref. to 2-7 [W15A2].>
- 3) Confirm that there are no foreign particles in by-pass air line.

- CHECK** : *Are foreign particles in by-pass air line?*
- YES** : Remove foreign particles from by-pass air line.
- NO** : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A2].>

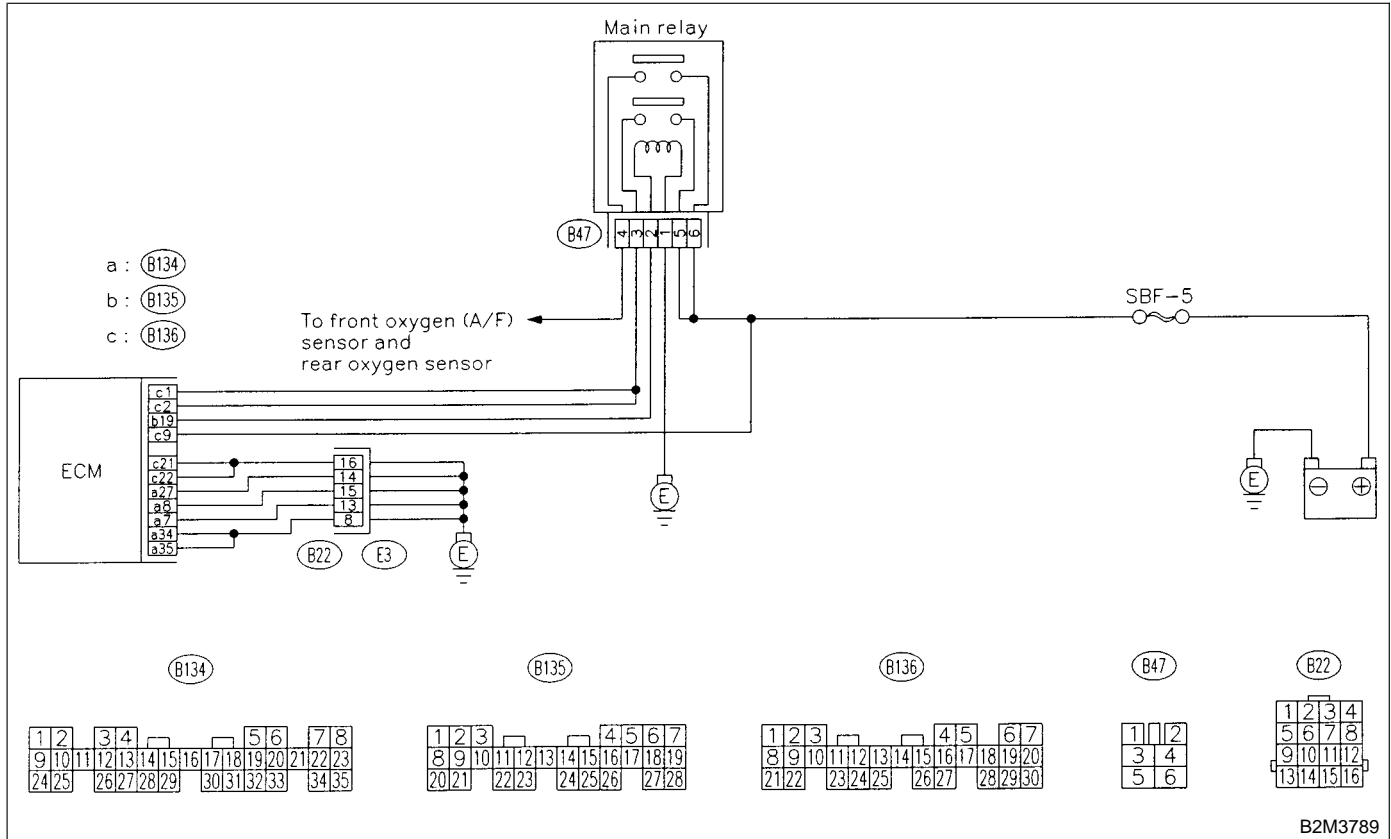
AV: DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Engine does not start.
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3789

11AV1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0601?
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : It is not necessary to inspect DTC P0601.

MEMO:

AW: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION —

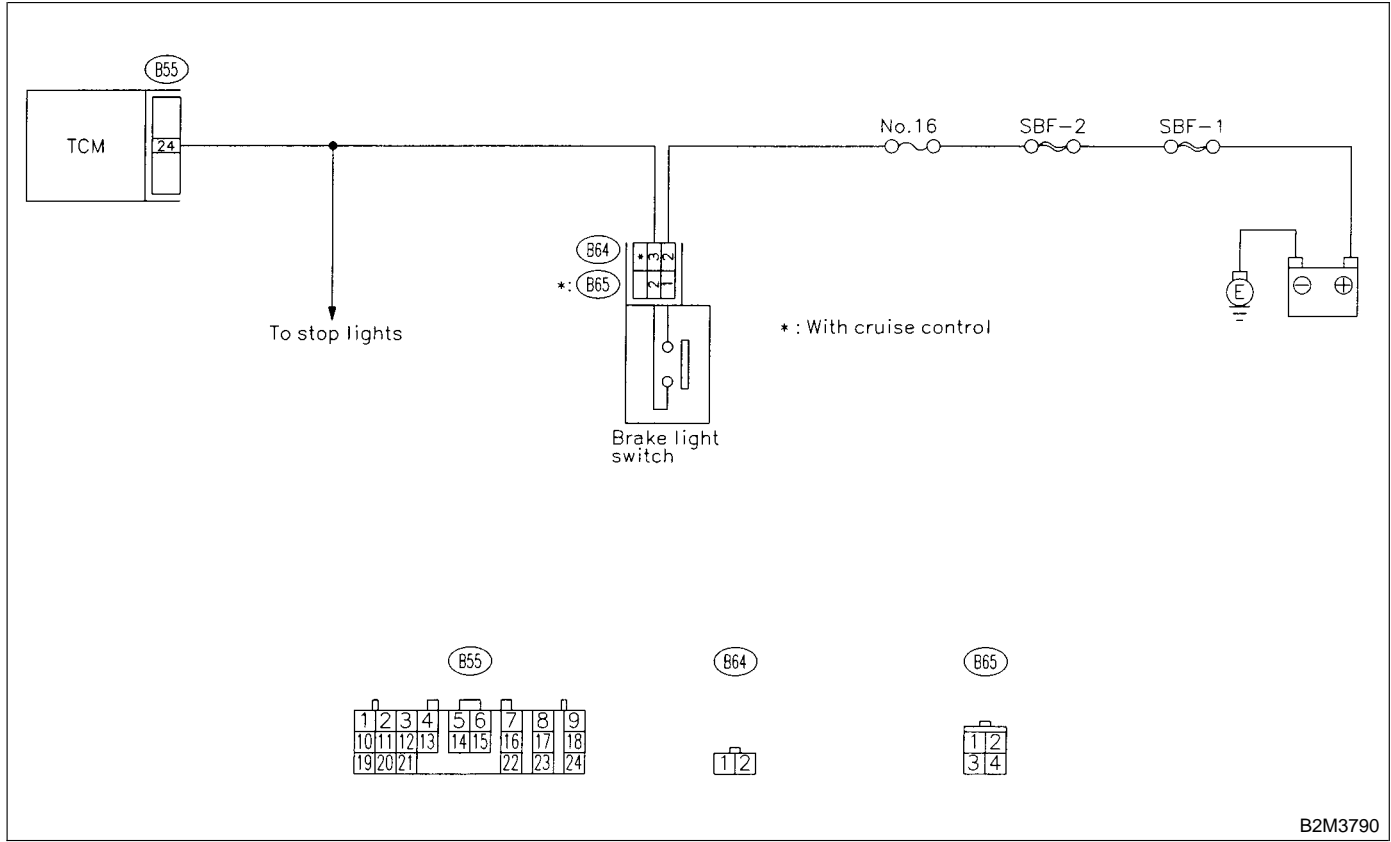
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



11AW1 : CHECK OPERATION OF BRAKE LIGHT.

- CHECK** : Does brake light come on when depressing the brake pedal?
- YES** : Go to step 11AW2.
- NO** : Repair or replace brake light circuit.

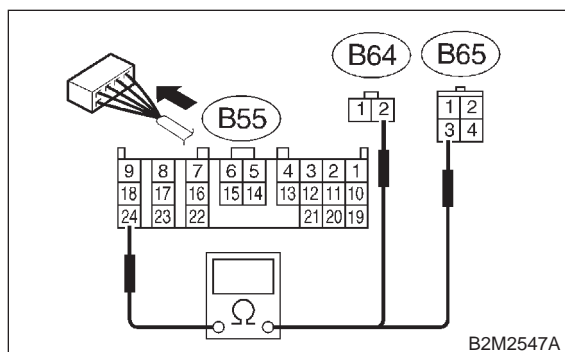
11AW2 : CHECK HARNESS BETWEEN TCM AND BRAKE LIGHT SWITCH CONNECTOR.

- 1) Disconnect connectors from TCM and brake light switch.
- 2) Measure resistance of harness between TCM and brake light switch connector.

Connector & terminal

(B55) No. 24 — (B64) No. 2:

(B55) No. 24 — (B65) No. 3 (With cruise control):



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 11AW3.
- NO** : Repair or replace harness and connector.

NOTE:

In this case, repair the following:

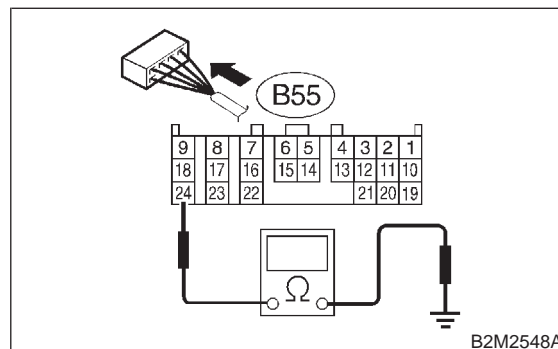
- Open circuit in harness between TCM and brake light switch connector
- Poor contact in TCM connector
- Poor contact in brake light switch connector

11AW3 : CHECK HARNESS BETWEEN TCM AND BRAKE LIGHT SWITCH CONNECTOR.

Measure resistance of harness between TCM and chassis ground.

Connector & terminal

(B55) No. 24 — Chassis ground:



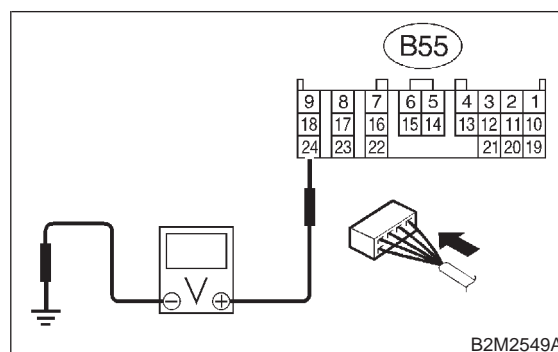
- CHECK** : *Is the resistance more than 1 MΩ?*
- YES** : Go to step 11AW4.
- NO** : Repair ground short circuit in harness between TCM and brake light switch connector.

11AW4 : CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connectors to TCM and brake light switch.
- 2) Measure voltage between TCM and chassis ground.

Connector & terminal

(B55) No. 24 (+) — Chassis ground (-):



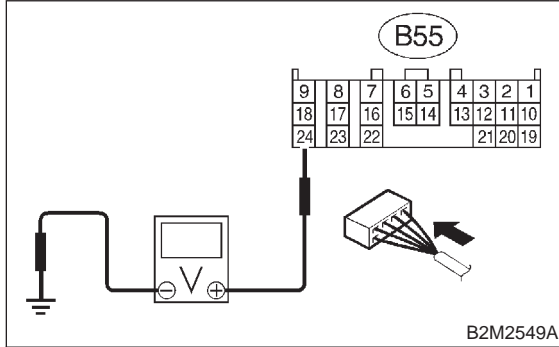
- CHECK** : *Is the voltage less than 1 V when releasing the brake pedal?*
- YES** : Go to step 11AW5.
- NO** : Adjust or replace brake light switch. <Ref. to 4-5 [W1A1].>

11AW5 : CHECK INPUT SIGNAL FOR TCM.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B55) No. 24 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V when depressing the brake pedal?*
- YES** : Go to step **11AW6**.
- NO** : Adjust or replace brake light switch. <Ref. to 4-5 [W1A1].>

11AW6 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in TCM connector?*
- YES** : Repair poor contact in TCM connector.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

AX: DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Starter does not rotate when selector lever is in “P” or “N” range.
- Starter rotates when selector lever is in “R”, “D”, “3”, “2” or “1” range.
- Engine brake is not effected when selector lever is in “3” range.
- Shift characteristics are erroneous.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

AY: DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- No shift up to 4th speed (after engine warm-up)
- No lock-up (after engine warm-up)
- Excessive shift shock

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check ATF temperature sensor circuit. <Ref. to 3-2 [T8D0].>

AZ: DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check torque converter turbine speed sensor circuit. <Ref. to 3-2 [T8G0].>

BA: DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- No shift or excessive tight corner “braking”

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check vehicle speed sensor 2 circuit. <Ref. to 3-2 [T8F0].>

BB: DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- No lock-up (after engine warm-up)
- AT diagnostic indicator light (AT OIL TEMP indicator light) remains on when vehicle speed is “0”.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check engine speed input signal circuit. <Ref. to 3-2 [T8C0].>

BC: DTC P0731 — GEAR 1 INCORRECT RATIO —**NOTE:**

For the diagnostic procedure, refer to DTC P0734. <Ref. to 2-7 [T11BF0].>

BD: DTC P0732 — GEAR 2 INCORRECT RATIO —**NOTE:**

For the diagnostic procedure, refer to DTC P0734. <Ref. to 2-7 [T11BF0].>

BE: DTC P0733 — GEAR 3 INCORRECT RATIO —**NOTE:**

For the diagnostic procedure, refer to DTC P0734. <Ref. to 2-7 [T11BF0].>

BF: DTC P0734 — GEAR 4 INCORRECT RATIO —● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● **TROUBLE SYMPTOM:**

- Shift point too high or too low; engine brake not effected in “3” range; excessive shift shock; excessive tight corner “braking”

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY MODE** <Ref. to 2-7 [T3D0].> and **INSPECTION MODE** <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**

11BF1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
YES : Inspect relevant DTC using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
NO : Go to step **11BF2**.

11BF2 : CHECK THROTTLE POSITION SENSOR CIRCUIT.

Check throttle position sensor circuit. <Ref. to 3-2 [T8E0].>

- CHECK** : *Is there any trouble in throttle position sensor circuit?*
YES : Repair or replace throttle position sensor circuit.
NO : Go to step **11BF3**.

11BF3 : CHECK VEHICLE SPEED SENSOR 2 CIRCUIT.

Check vehicle speed sensor 2 circuit. <Ref. to 3-2 [T8F0].>

- CHECK** : *Is there any trouble in vehicle speed sensor 2 circuit?*
YES : Repair or replace vehicle speed sensor 2 circuit.
NO : Go to step **11BF4**.

11BF4 : CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.

Check torque converter turbine speed sensor circuit. <Ref. to 3-2 [T8G0].>

- CHECK** : *Is there any trouble in torque converter turbine speed sensor circuit?*
YES : Repair or replace torque converter turbine speed sensor circuit.
NO : Go to step **11BF5**.

11BF5 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in TCM connector?*
YES : Repair poor contact in TCM connector.
NO : Go to step **11BF6**.

11BF6 : CHECK MECHANICAL TROUBLE.

Check mechanical trouble in automatic transmission.

- CHECK** : *Is there any mechanical trouble in automatic transmission?*
YES : Repair or replace automatic transmission. <Ref. to 3-2 [W100].>
NO : Replace TCM. <Ref. to 3-2 [W23A0].>

BG: DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION**• DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

• TROUBLE SYMPTOM:

- No lock-up (after engine warm-up)
- No shift or excessive tight corner “braking”

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

11BG1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
YES : Inspect the relevant DTC using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
NO : Go to step **11BG2**.

11BG2 : CHECK DUTY SOLENOID B CIRCUIT.

Check duty solenoid B circuit. <Ref. to 3-2 [T8P0].>

- CHECK** : *Is there any trouble in duty solenoid B circuit?*
YES : Repair or replace duty solenoid B circuit.
NO : Go to step **11BG3**.

11BG3 : CHECK THROTTLE POSITION SENSOR CIRCUIT.

Check throttle position sensor circuit. <Ref. to 3-2 [T8E0].>

- CHECK** : *Is there any trouble in throttle position sensor circuit?*
YES : Repair or replace throttle position sensor circuit.
NO : Go to step **11BG4**.

11BG4 : CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.

Check torque converter turbine speed sensor circuit. <Ref. to 3-2 [T8G0].>

- CHECK** : *Is there any trouble in torque converter turbine speed sensor circuit?*
YES : Repair or replace torque converter turbine speed sensor circuit.
NO : Go to step **11BG5**.

11BG5 : CHECK ENGINE SPEED INPUT CIRCUIT.

Check engine speed input circuit. <Ref. to 3-2 [T8C0].>

- CHECK** : *Is there any trouble in engine speed input circuit?*
YES : Repair or replace engine speed input circuit.
NO : Go to step **11BG6**.

11BG6 : CHECK INHIBITOR SWITCH CIRCUIT.

Check inhibitor switch circuit. <Ref. to 3-2 [T9T0].>

- CHECK** : *Is there any trouble in inhibitor switch circuit?*
YES : Repair or replace inhibitor switch circuit.
NO : Go to step **11BG7**.

11BG7 : CHECK BRAKE LIGHT SWITCH CIRCUIT.

Check brake light switch circuit. <Ref. to 2-7 [T11AW0].>

CHECK : *Is there any trouble in brake light switch circuit?*

YES : Repair or replace brake light switch circuit.

NO : Go to step **11BG8**.

11BG8 : CHECK ATF TEMPERATURE SENSOR CIRCUIT.

Check ATF temperature sensor circuit. <Ref. to 3-2 [T8D0].>

CHECK : *Is there any trouble in ATF temperature sensor circuit?*

YES : Repair or replace ATF temperature sensor circuit.

NO : Go to step **11BG9**.

11BG9 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

CHECK : *Is there poor contact in TCM connector?*

YES : Repair poor contact in TCM connector.

NO : Go to step **11BG10**.

11BG10 : CHECK MECHANICAL TROUBLE.

Check mechanical trouble in automatic transmission.

CHECK : *Is there any mechanical trouble in automatic transmission?*

YES : Repair or replace automatic transmission. <Ref. to 3-2 [W100].>

NO : Replace TCM. <Ref. to 3-2 [W23A0].>

BH: DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - No lock-up (after engine warm-up)

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check lock-up duty solenoid circuit. <Ref. to 3-2 [T8R0].>

BI: DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Excessive shift shock

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check line pressure duty solenoid circuit. <Ref. to 3-2 [T8N0].>

BJ: DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - No shift

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check shift solenoid 1 circuit. <Ref. to 3-2 [T8J0].>

BK: DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - No shift

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check shift solenoid 2 circuit. <Ref. to 3-2 [T8K0].>

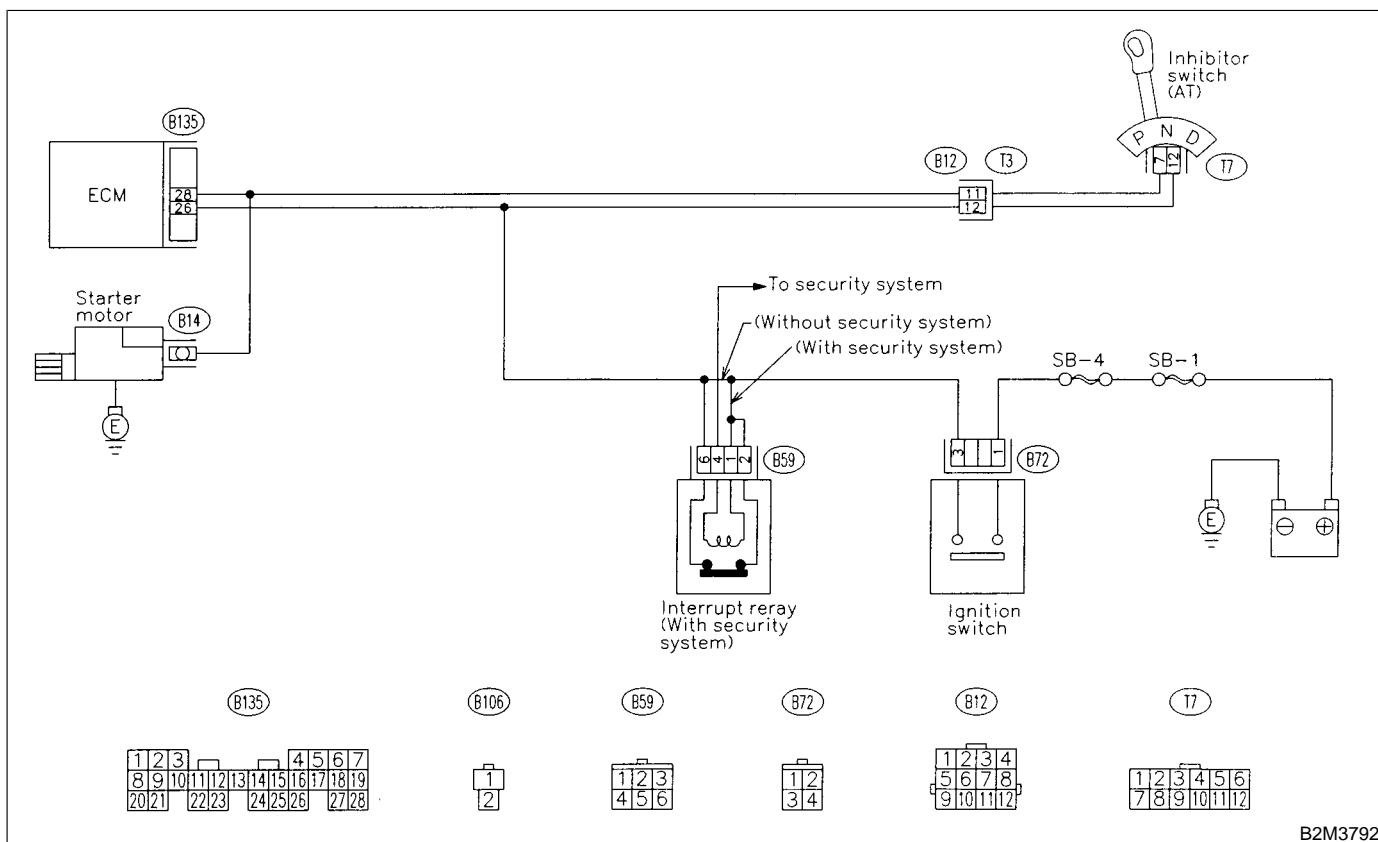
BL: DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3792

11BL1 : CHECK OPERATION OF STARTER MOTOR.

NOTE:

Place the inhibitor switch in the “P” or “N” position.

CHECK : *Does starter motor operate when ignition switch to “ST”?*

YES : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open or ground short circuit in harness between ECM and starter motor connector.
- Poor contact in ECM connector.

NO : Check starter motor circuit. <Ref. to 2-7 [T8B0].>

BM: DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT —**● DTC DETECTING CONDITION:**

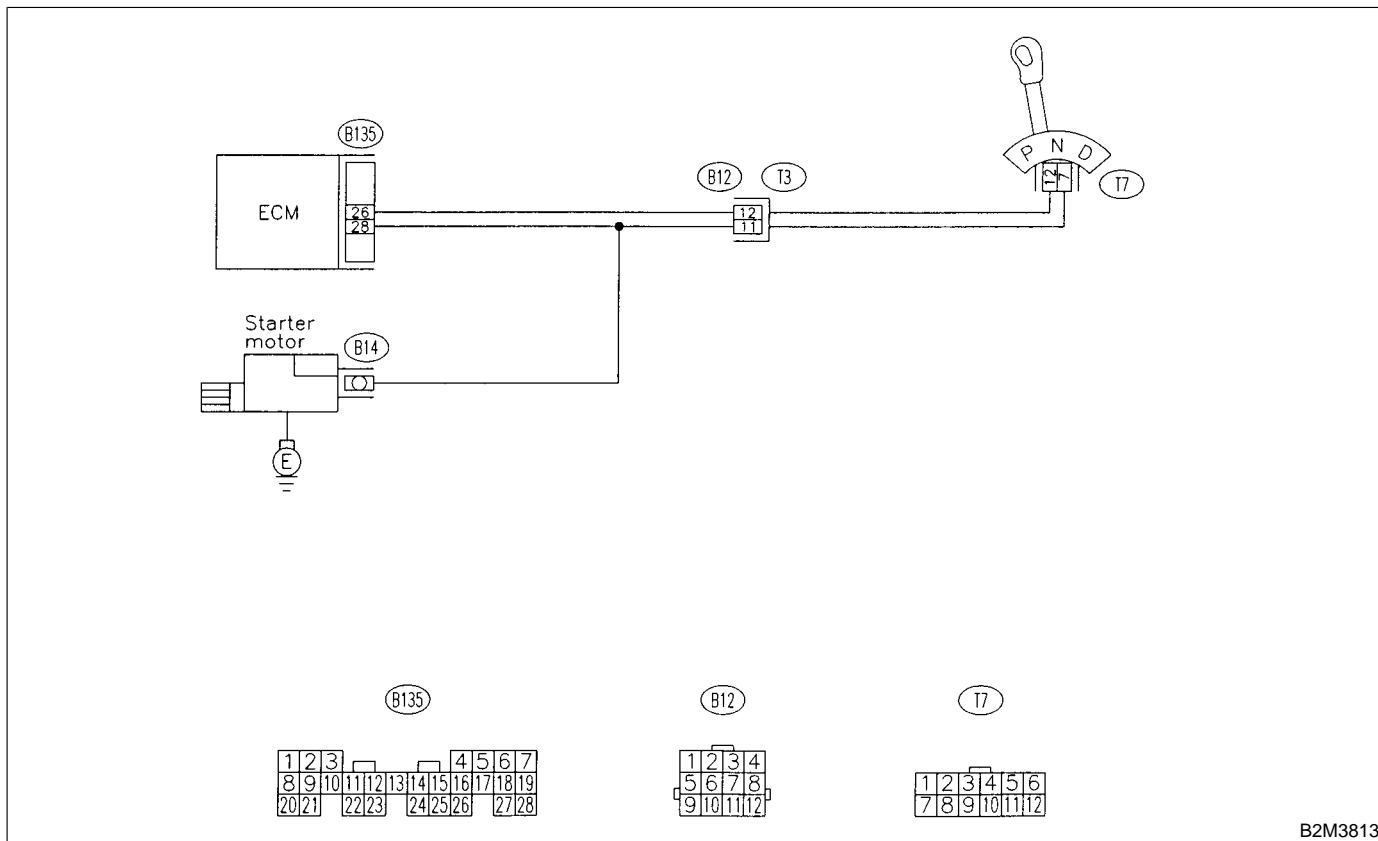
- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:**11BM1 : CHECK DTC P0705 ON DISPLAY.**

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?

YES : Inspect DTC P0705 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

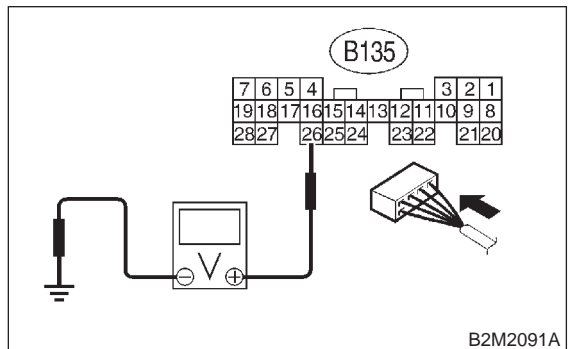
NO : Go to step 11BM2.

11BM2 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between ECM and chassis ground in selector lever "N" and "P" positions.

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



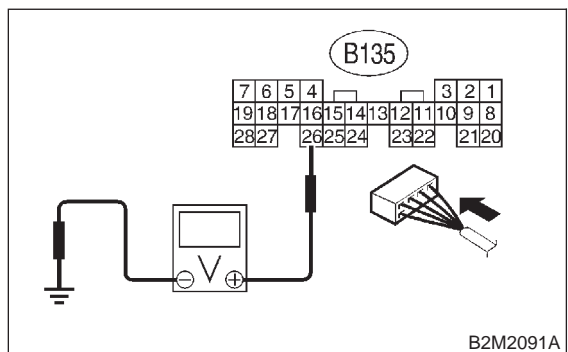
- CHECK** : *Is the voltage less than 1 V?*
- YES** : Go to step 11BM3.
- NO** : Go to step 11BM5.

11BM3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground in selector lever except for "N" and "P" positions.

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



- CHECK** : *Is the voltage between 4.5 and 5.5 V?*
- YES** : Go to step 11BM4.
- NO** : Go to step 11BM5.

11BM4 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

NOTE:

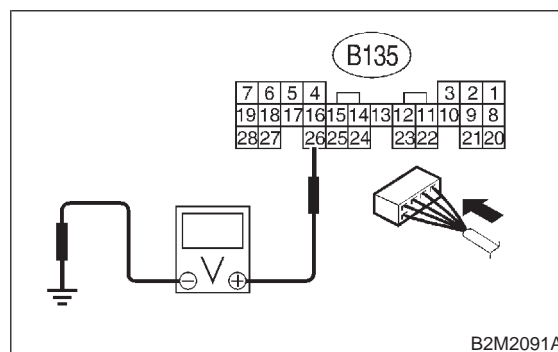
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11BM5 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



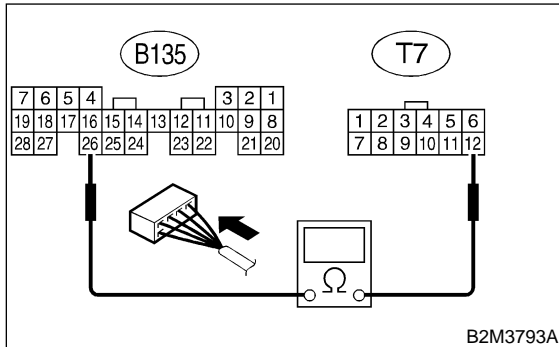
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and inhibitor switch connector.
- NO** : Go to step 11BM6.

11BM6 : CHECK HARNESS BETWEEN ECM AND INHIBITOR SWITCH CONNECTOR.

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

Connector & terminal

(B135) No. 26 — (T7) No. 12:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step 11BM7.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

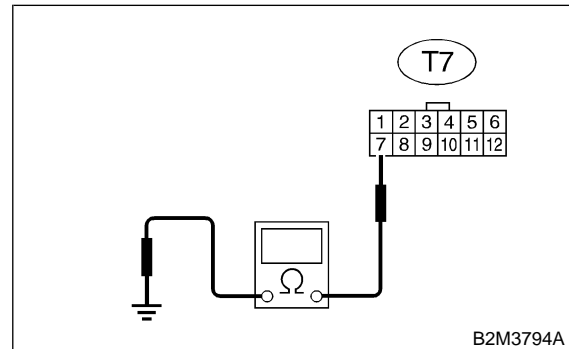
- Open circuit in harness between ECM and inhibitor switch connector
- Poor contact in coupling connector (B12)
- Poor contact in inhibitor switch connector
- Poor contact in ECM connector

11BM7 : CHECK INHIBITOR SWITCH GROUND LINE.

Measure resistance of harness between inhibitor switch connector and engine ground.

Connector & terminal

(T7) No. 7 — Engine ground:



CHECK : *Is the resistance less than 5 Ω?*

YES : Go to step 11BM8.

NO : Repair open circuit in harness between inhibitor switch connector and starter motor ground line.

NOTE:

In this case, repair the following:

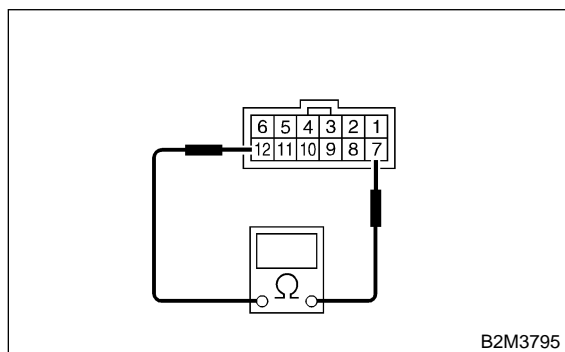
- Open circuit in harness between inhibitor switch connector and starter motor ground line
- Poor contact in starter motor connector
- Poor contact in starter motor ground
- Starter motor

11BM8 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals in selector lever "N" and "P" positions.

Terminals

No. 7 — No. 12:



- CHECK** : ***Is the resistance less than 1 Ω?***
- YES** : Go to step **11BM9**.
- NO** : Replace inhibitor switch. <Ref. to 3-2 [W2C0].>

11BM9 : CHECK SELECTOR CABLE CONNECTION.

- CHECK** : ***Is there any fault in selector cable connection to inhibitor switch?***
- YES** : Repair selector cable connection. <Ref. to 3-2 [W2A0].>
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

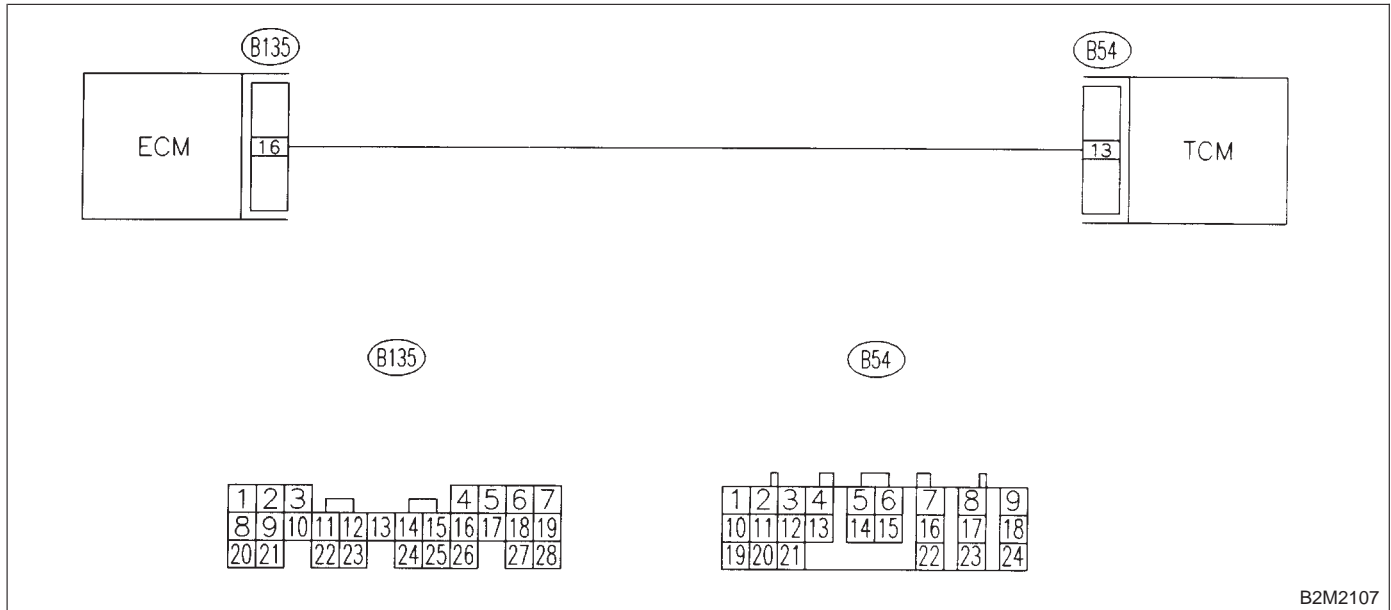
BN: DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Excessive shift shock

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

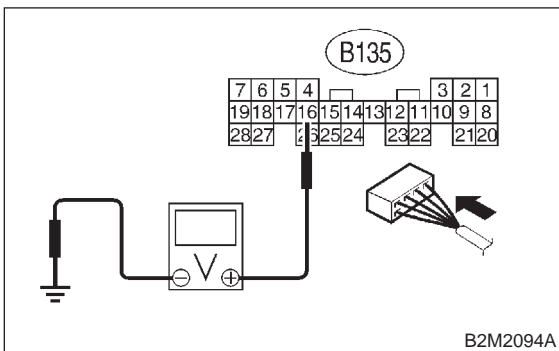


B2M2107

11BN1 : CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal
(B135) No. 16 (+) — Chassis ground (-):



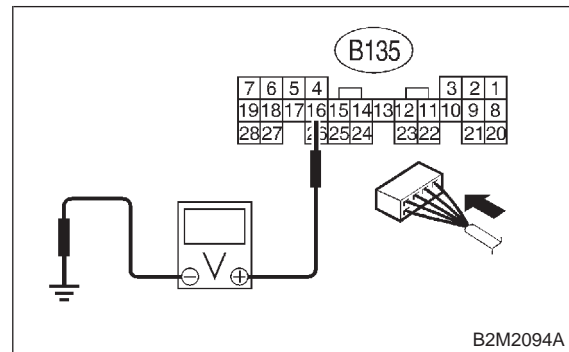
B2M2094A

- CHECK** : Is the voltage more than 4.5 V?
- YES** : Go to step 11BN2.
- NO** : Go to step 11BN4.

11BN2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B135) No. 16 (+) — Chassis ground (-):



B2M2094A

- CHECK** : Is the voltage more than 10 V?
- YES** : Repair battery short circuit in harness between ECM and TCM connector.
- NO** : Go to step 11BN3.

11BN3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

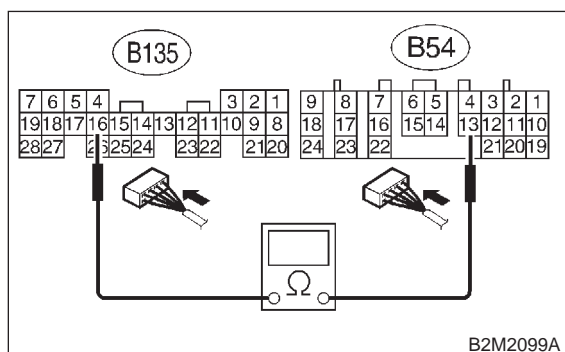
- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11BN4 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal

(B135) No. 16 — (B54) No. 13:



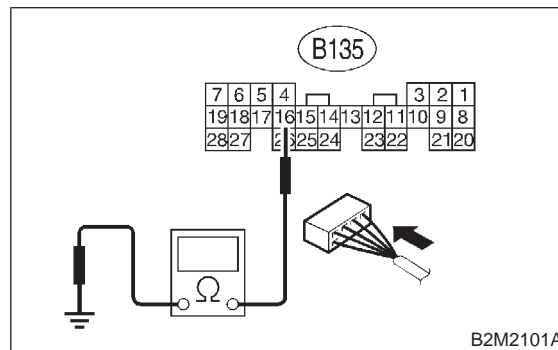
- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 11BN5.
- NO** : Repair open circuit in harness between ECM and TCM connector.

11BN5 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B135) No. 16 — Chassis ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and TCM connector.
- NO** : Go to step 11BN6.

11BN6 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in TCM connector?*
- YES** : Repair poor contact in TCM connector.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

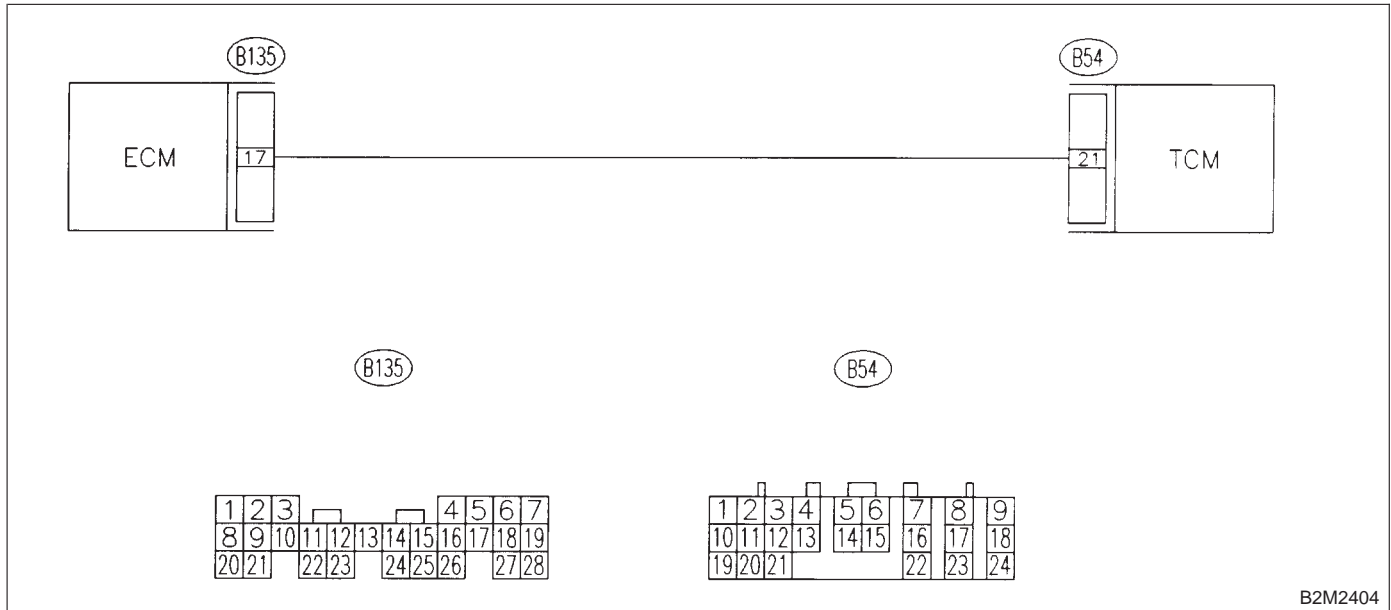
BO: DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Excessive shift shock

CAUTION:

After repair or replacement of faulty parts, conduct **CLEAR MEMORY MODE** <Ref. to 2-7 [T3D0].> and **INSPECTION MODE** <Ref. to 2-7 [T3E0].>.

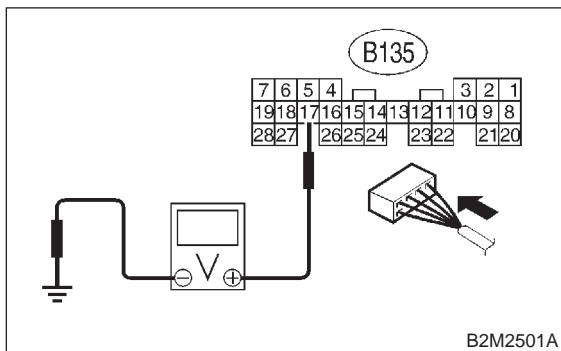
● **WIRING DIAGRAM:**



11B01 : CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal
(B135) No. 17 (+) — Chassis ground (-):

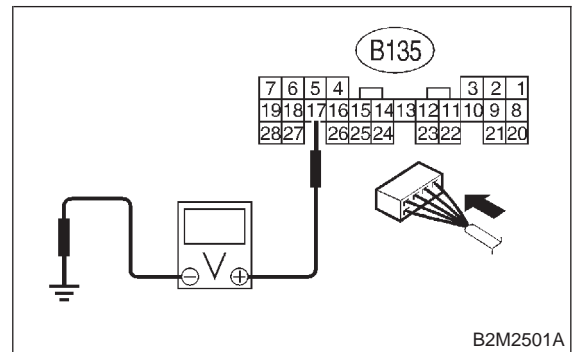


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step **11B02**.
- NO** : Go to step **11B04**.

11B02 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B135) No. 17 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair battery short circuit in harness between ECM and TCM connector.
- NO** : Go to step **11B03**.

11B03 : CHECK POOR CONTACT.

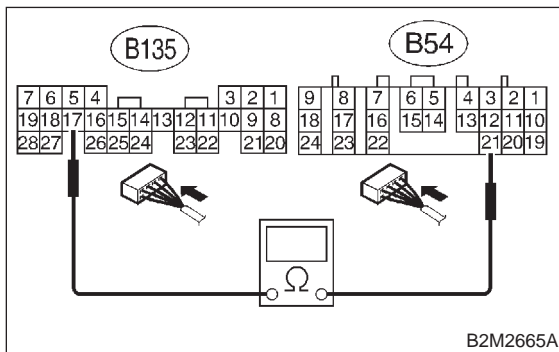
Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11B04 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal
(B135) No. 17 — (B54) No. 21:

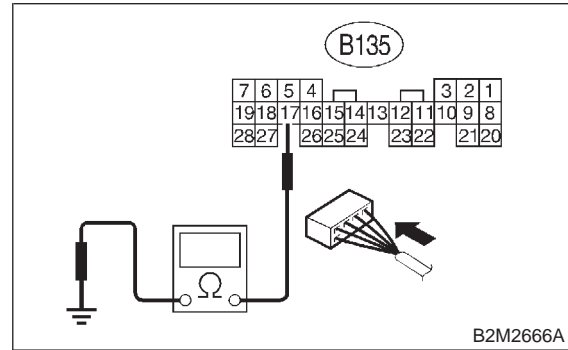


- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step 11B05.
- NO** : Repair open circuit in harness between ECM and TCM connector.

11B05 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal
(B135) No. 17 — Chassis ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and TCM connector.
- NO** : Go to step 11B06.

11B06 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in TCM connector?*
- YES** : Repair poor contact in TCM connector.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

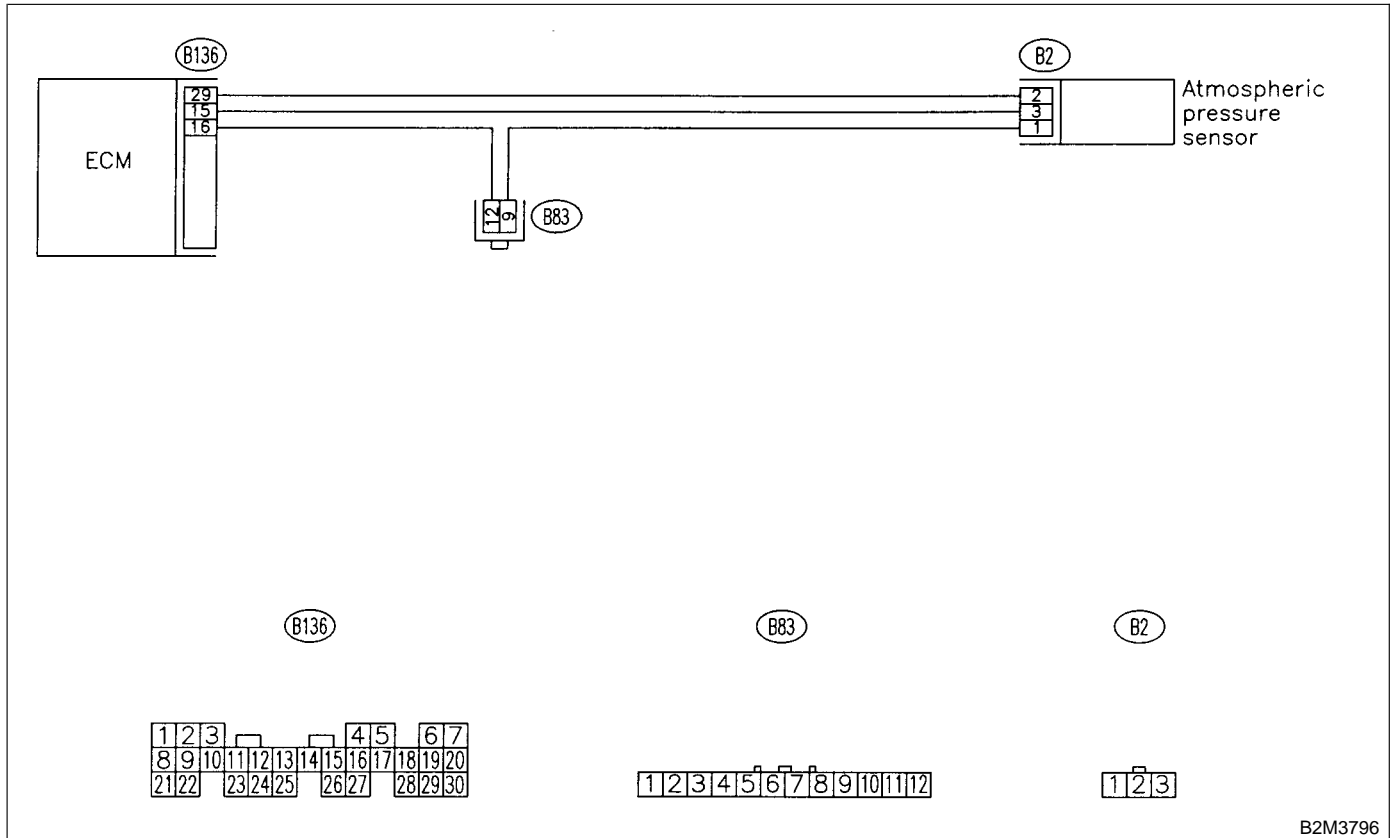
BP: DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



11BP1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

- CHECK** : *Is the value less than 0 kPa (0 mmHg, 0 inHg)?*
- YES** : Go to step 11BP3.
- NO** : Go to step 11BP2.

11BP2 : CHECK POOR CONTACT.

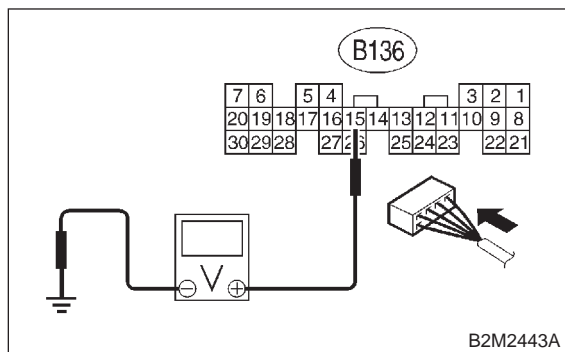
Check poor contact in ECM and pressure sensor connector. <Ref. to 2-7 [T3C8].>

- CHECK** : *Is there poor contact in ECM or pressure sensor connector?*
- YES** : Repair poor contact in ECM or atmospheric pressure sensor connector.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time.

11BP3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):

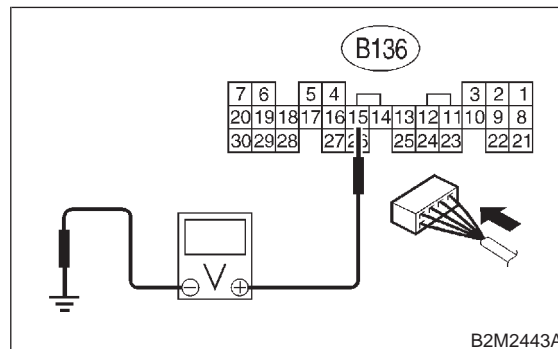


- CHECK** : *Is the voltage more than 4.5 V?*
- YES** : Go to step 11BP5.
- NO** : Go to step 11BP4.

11BP4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal
(B136) No. 15 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

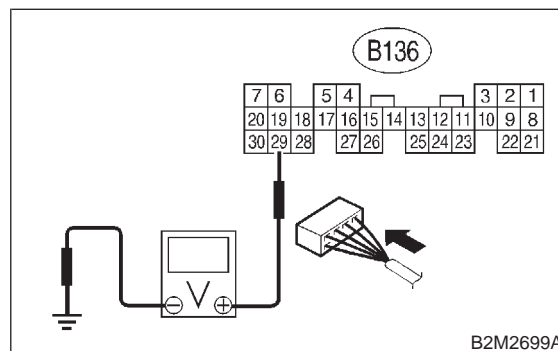
NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11BP5 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal
(B136) No. 29 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 0.2 V?*
- YES** : Go to step 11BP7.
- NO** : Go to step 11BP6.

**11BP6 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than 0 kPa (0 mmHg, 0 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru select monitor?*

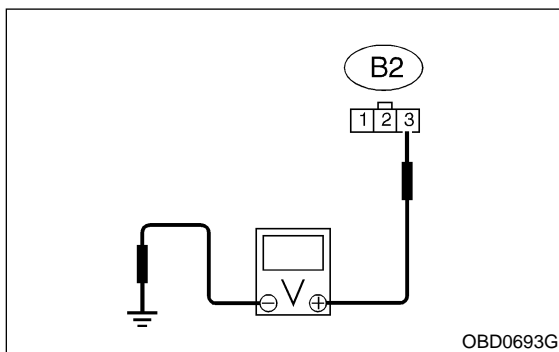
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11BP7.

**11BP7 : CHECK HARNESS BETWEEN ECM
AND ATMOSPHERIC PRESSURE
SENSOR CONNECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from atmospheric pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between atmospheric pressure sensor connector and engine ground.

Connector & terminal

(B2) No. 3 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step 11BP8.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

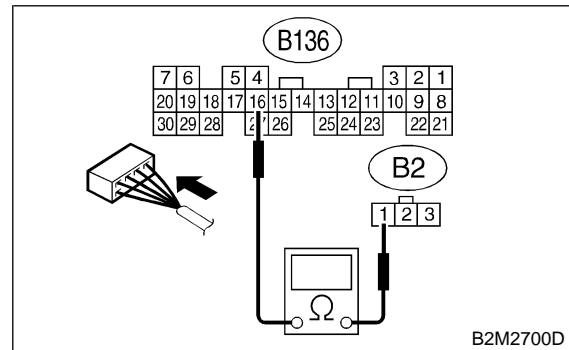
- Open circuit in harness between ECM and atmospheric pressure sensor connector
- Poor contact in joint connector (B83)

**11BP8 : CHECK HARNESS BETWEEN ECM
AND ATMOSPHERIC PRESSURE
SENSOR CONNECTOR.**

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

Connector & terminal

(B136) No. 16 — (B2) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
YES : Go to step 11BP9.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

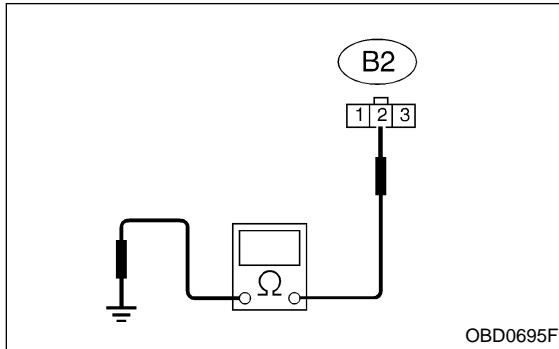
- Open circuit in harness between ECM and pressure sensor connector

11BP9 : CHECK HARNESS BETWEEN ECM AND ATMOSPHERIC PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between pressure sensor connector and engine ground.

Connector & terminal

(B2) No. 2 — Engine ground:



- CHECK** : **Is the resistance more than 500 kΩ?**
- YES** : Go to step **11BP10**.
- NO** : Repair ground short circuit in harness between ECM and pressure sensor connector.

11BP10 : CHECK POOR CONTACT.

Check poor contact in pressure sensor connector.
<Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in pressure sensor connector?**
- YES** : Repair poor contact in atmospheric pressure sensor connector.
- NO** : Replace atmospheric pressure sensor.
<Ref. to 2-7 [W14A0].>

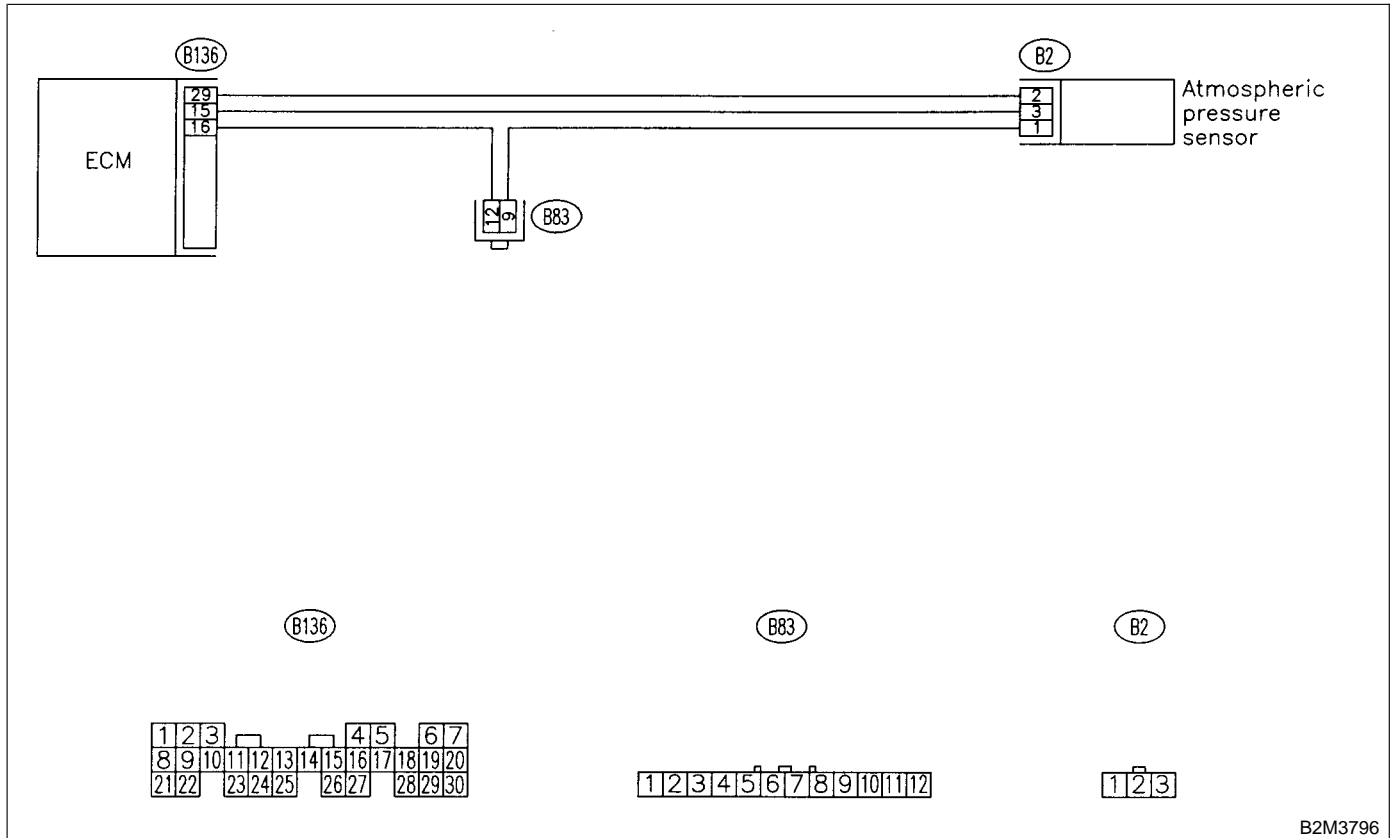
BQ: DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3796

11BQ1 : CHECK CURRENT DATA.

- 1) Start engine.
- 2) Read the data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 140 kPa (1,050 mmHg, 41.34 inHg)?*

YES : Go to step 11BQ10.

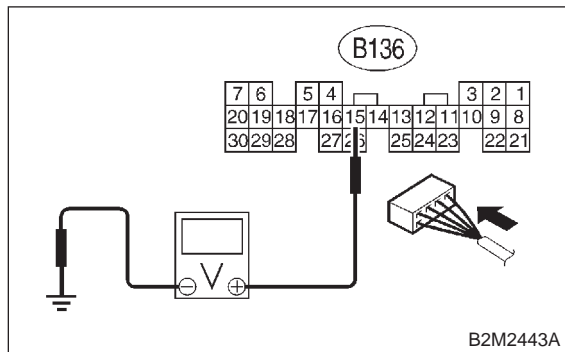
NO : Go to step 11BQ2.

11BQ2 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Is the voltage more than 4.5 V?*

YES : Go to step 11BQ4.

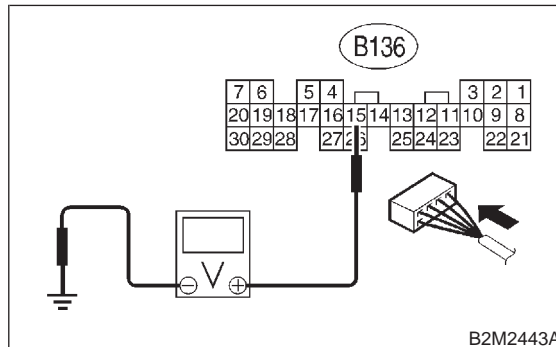
NO : Go to step 11BQ3.

11BQ3 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 15 (+) — Chassis ground (-):



CHECK : *Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

NO : Contact with SOA service.

NOTE:

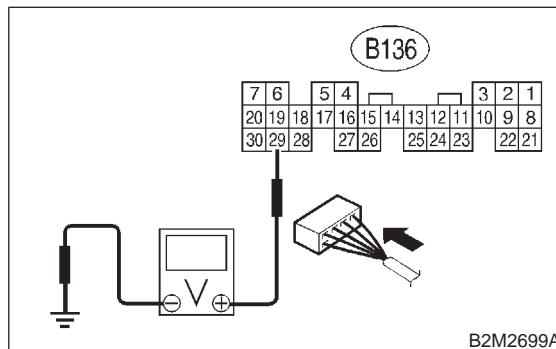
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11BQ4 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B136) No. 29 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 0.2 V?*

YES : Go to step 11BQ6.

NO : Go to step 11BQ5.

**11BQ5 : CHECK INPUT SIGNAL FOR ECM.
(USING SUBARU SELECT MONI-
TOR.)**

Read data of atmospheric absolute pressure signal using Subaru Select Monitor.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

CHECK : *Does the value change more than 0 kPa (0 mmHg, 0 inHg) by shaking harness and connector of ECM while monitoring the value with Subaru select monitor?*

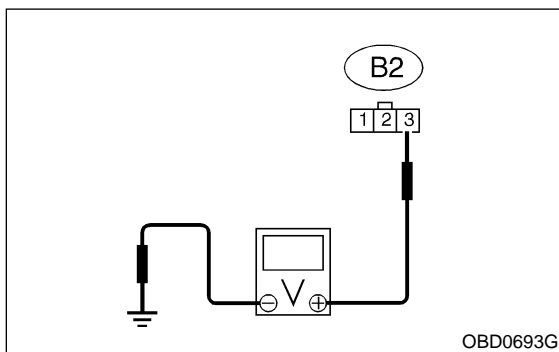
- YES** : Repair poor contact in ECM connector.
NO : Go to step 11BQ6.

**11BQ6 : CHECK HARNESS BETWEEN ECM
AND PRESSURE SENSOR CON-
NECTOR.**

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from atmospheric pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between atmospheric pressure sensor connector and engine ground.

Connector & terminal

(B2) No. 3 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 4.5 V?*
YES : Go to step 11BQ7.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

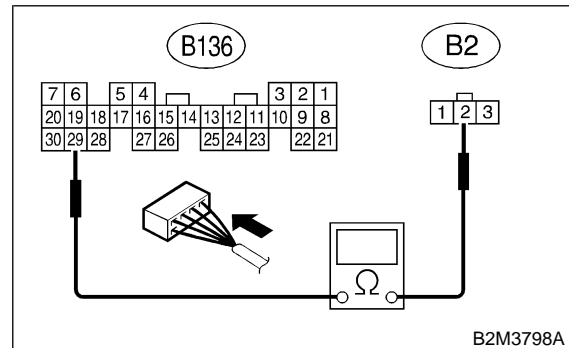
- Open circuit in harness between ECM and pressure sensor connector
- Poor contact in joint connector (B83)

**11BQ7 : CHECK HARNESS BETWEEN ECM
AND PRESSURE SENSOR CON-
NECTOR.**

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

Connector & terminal

(B136) No. 29 — (B2) No. 2:



- CHECK** : *Is the resistance less than 1 Ω?*
YES : Go to step 11BQ8.
NO : Repair harness and connector.

NOTE:

In this case, repair the following:

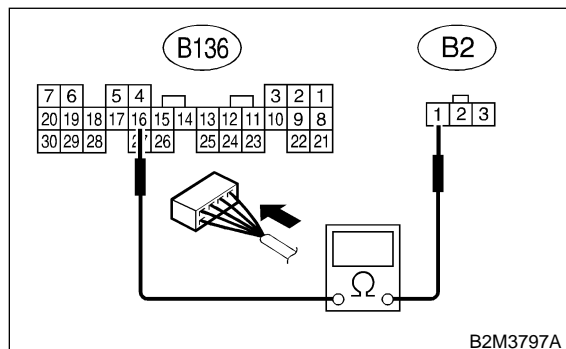
- Open circuit in harness between ECM and pressure sensor connector
- Poor contact in joint connector (B83)

11BQ8 : CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.

Measure resistance of harness between ECM and pressure sensor connector.

Connector & terminal

(B136) No. 16 — (B2) No. 1:



CHECK : *Is the resistance less than 1 Ω?*

YES : Go to step **11BQ9**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and pressure sensor connector
- Poor contact in joint connector (B83)

11BQ9 : CHECK POOR CONTACT.

Check poor contact in pressure sensor connector.
<Ref. to FOREWORD [T3C1].>

CHECK : *Is there poor contact in pressure sensor connector?*

YES : Repair poor contact in atmospheric pressure sensor connector.

NO : Replace atmospheric pressure sensor.
<Ref. to 2-7 [W14A0].>

11BQ10 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from atmospheric pressure sensor.
- 3) Turn ignition switch to ON.
- 4) Read data of intake manifold absolute pressure signal using Subaru select monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 140 kPa (1,050 mmHg, 41.34 inHg)?*

YES : Repair battery short circuit in harness between ECM and atmospheric pressure sensor connector.

NO : Replace atmospheric pressure sensor.
<Ref. to 2-7 [W14A0].>

BR: DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM —

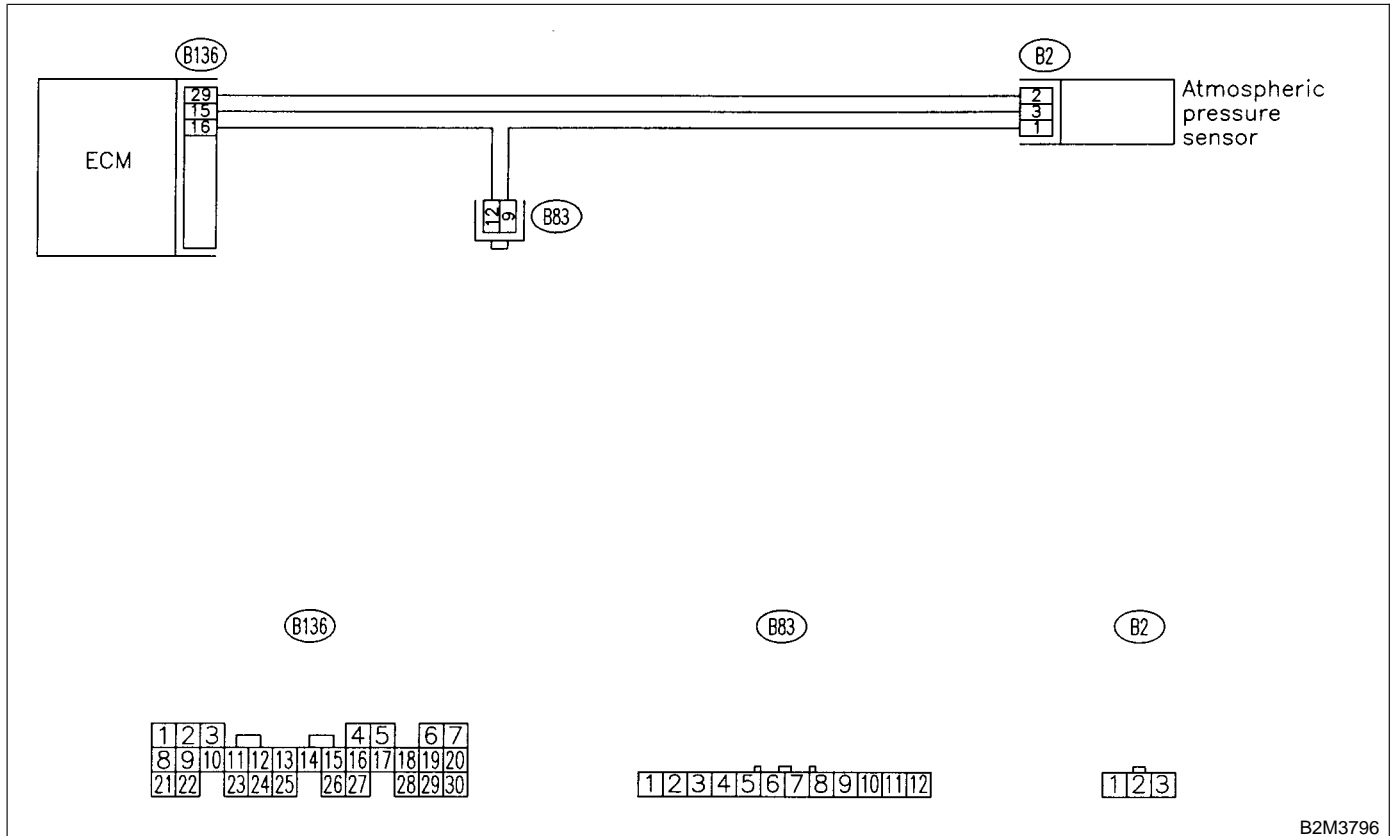
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



11BR1 : CHECK ANY OTHER DTC ON DISPLAY.

11BR2 : CHECK ATMOSPHERIC PRESSURE SENSOR FILTER.

NOTE:

In this case, it is not necessary to inspect DTC P0106.

CHECK : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P1110 or P1111?*

YES : Inspect DTC P0106, P0107, P0108, P1110 or P1111 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NO : Go to step **11BR2**.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from atmospheric pressure sensor.
- 3) Remove atmospheric pressure sensor.
- 4) Check atmospheric pressure sensor filter.

CHECK : *Is atmospheric pressure sensor filter non-functional? (Check for contamination, damage, water leakage, etc.)*

YES : Replace atmospheric pressure sensor filter.

NO : Go to step **11BR3**.

11BR3 : CHECK CURRENT DATA.

- 1) Turn ignition switch to ON.
- 2) Read data of intake manifold absolute pressure signal using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value between 73.3 kPa (550 mmHg, 21.65 inHg) and 106.6 kPa (800 mmHg, 31.50 inHg)?*

YES : Replace atmospheric pressure sensor. <Ref. to 2-7 [W14A0].>

NO : Replace intake air temperature and pressure. <Ref. to 2-7 [W13A0].>

BS: DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT —

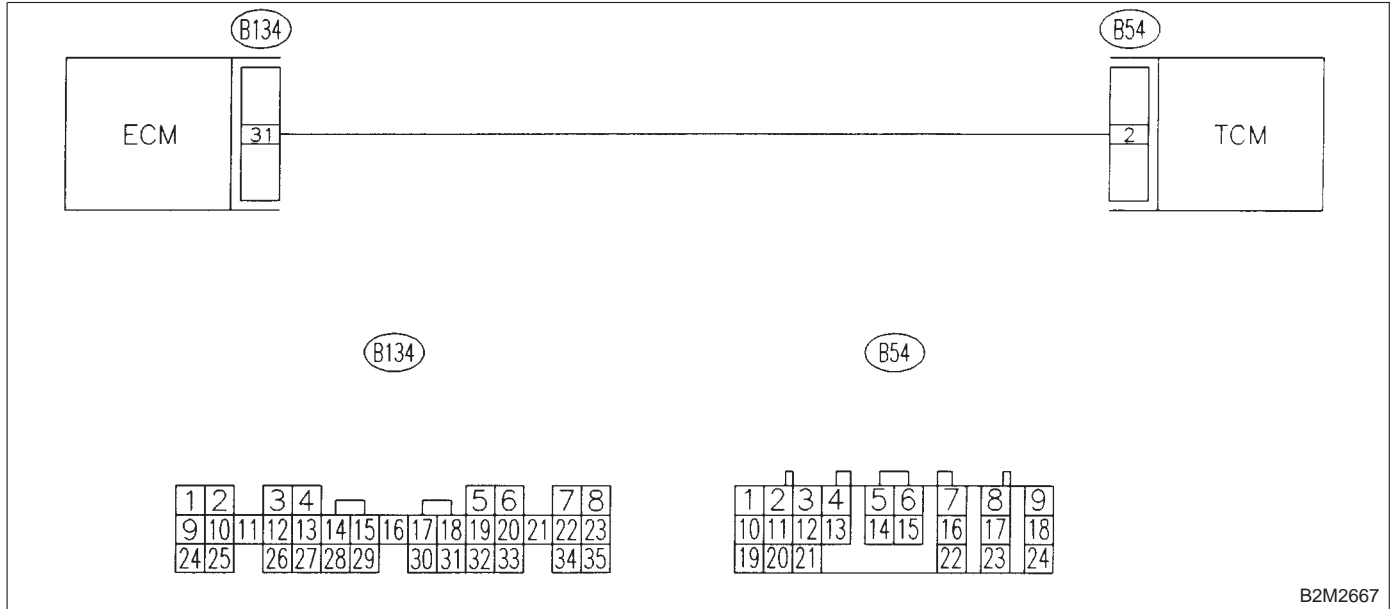
● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



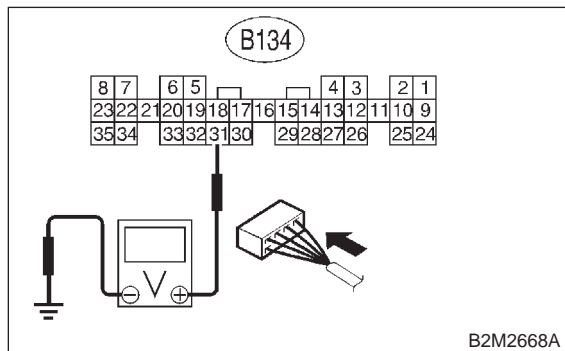
B2M2667

11BS1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Start engine, and warm-up the engine.
- 2) Turn ignition switch to OFF.
- 3) Disconnect connector from TCM.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 31 (+) — Chassis ground (-):



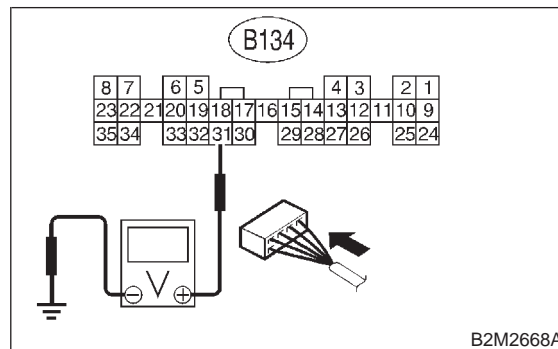
- CHECK** : *Is the voltage less than 3 V?*
- YES** : Go to step **11BS2**.
- NO** : Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>

11BS2 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 31 (+) — Chassis ground (-):



- CHECK** : *Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*
- YES** : Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BT: DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT —

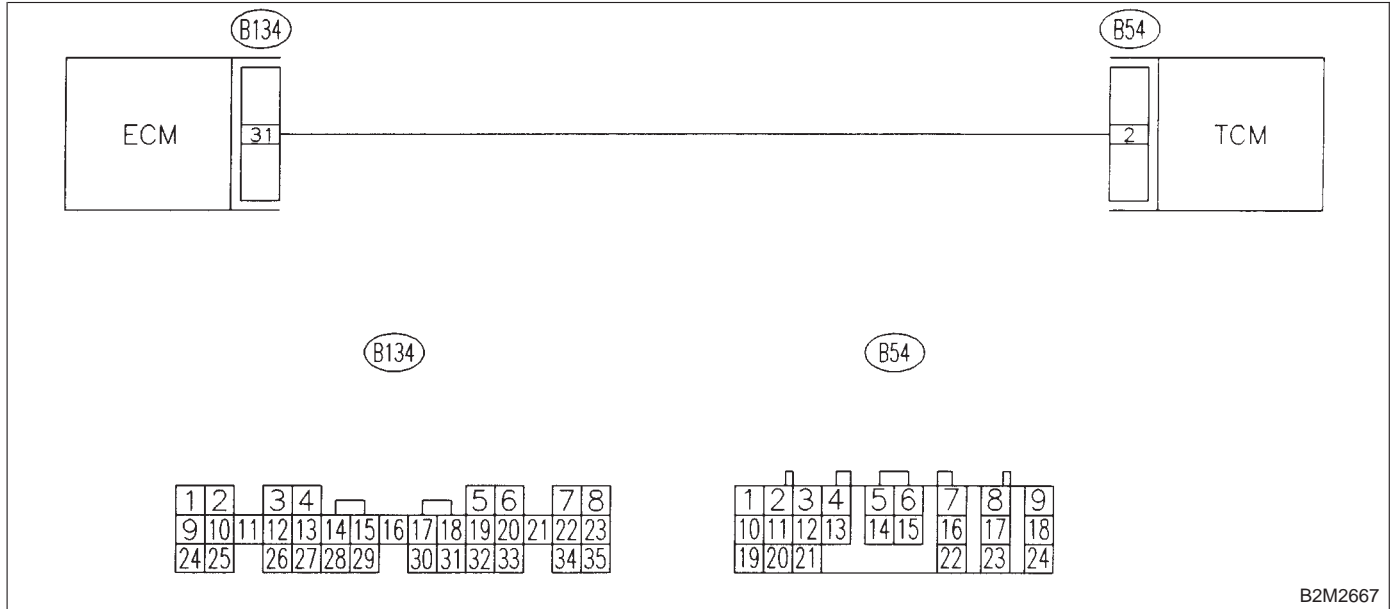
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



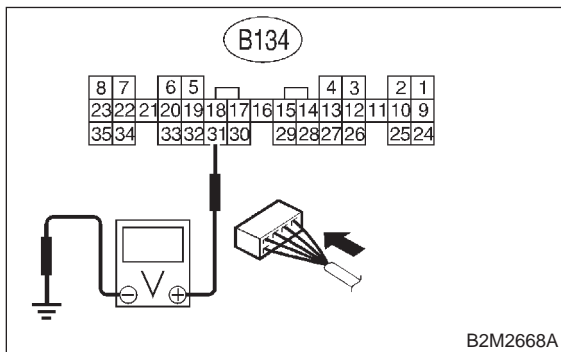
B2M2667

11BT1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Start engine, and warm-up the engine.
- 2) Turn ignition switch to OFF.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 31 (+) — Chassis ground (-):



B2M2668A

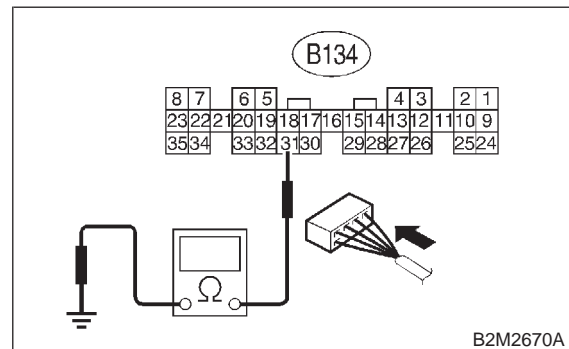
- CHECK** : Is the voltage more than 3 V?
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 11BT2.

11BT2 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal

(B134) No. 31 — Chassis ground:



B2M2670A

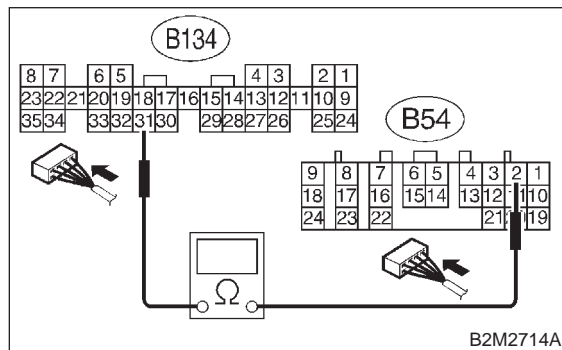
- CHECK** : Is the resistance less than 10 Ω?
- YES** : Repair ground short circuit in harness between ECM and TCM connector.
- NO** : Go to step 11BT3.

11BT3 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure resistance of harness between ECM and TCM connector.

Connector & terminal

(B134) No. 31 — (B54) No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Repair poor contact in ECM or TCM connector.
- NO** : Repair open circuit in harness between ECM and TCM connector.

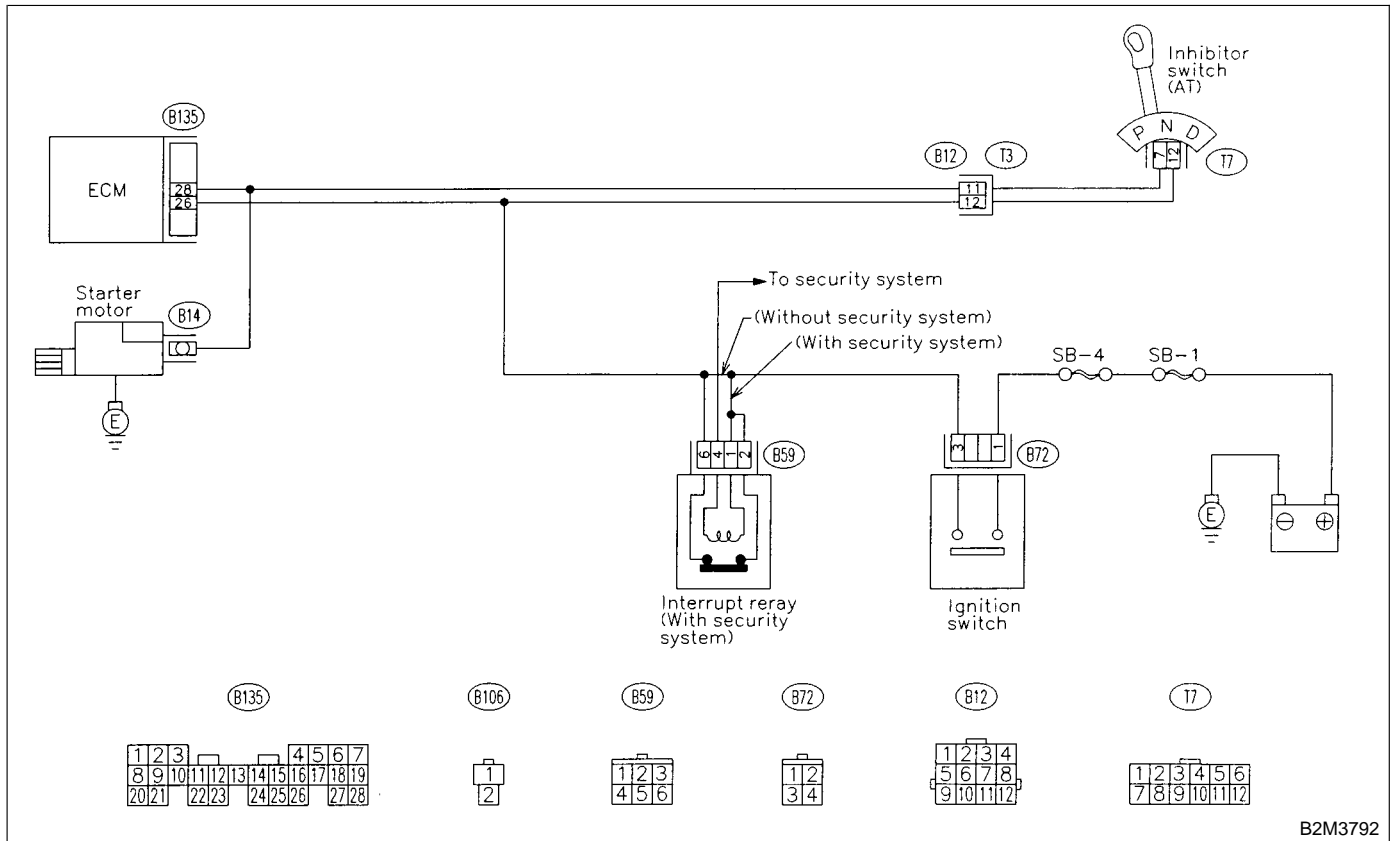
BU: DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Failure of engine to start

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3792

11BU1 : CHECK OPERATION OF STARTER MOTOR.

NOTE:

Place the inhibitor switch in each position.

- CHECK** : **Does starter motor operate when ignition switch to "ON"?**
- YES** : Repair battery short circuit in starter motor circuit. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Check starter motor circuit. <Ref. to 2-7 [T8B0].>

MEMO:

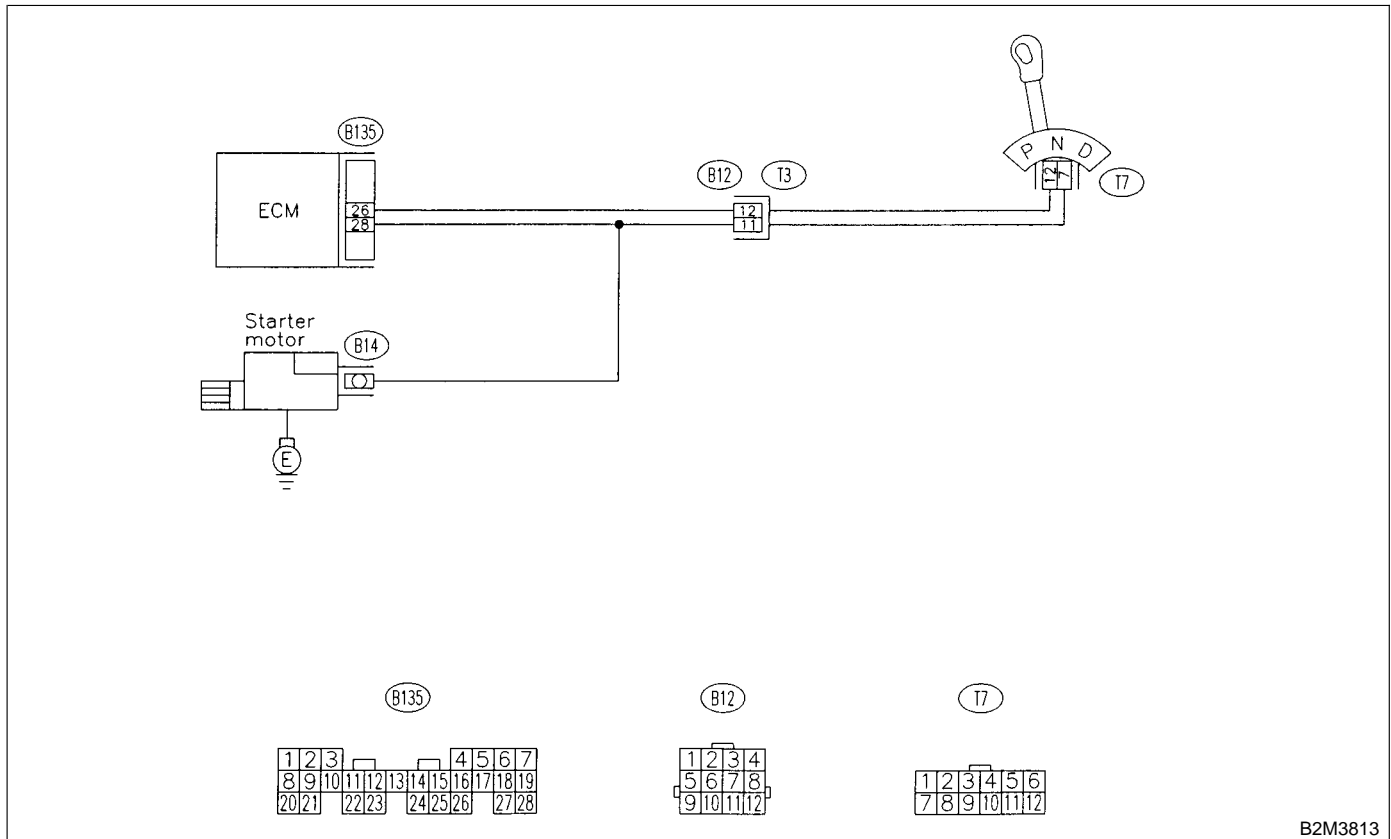
BV: DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



B2M3813

11BV1 : CHECK DTC P0705 ON DISPLAY.

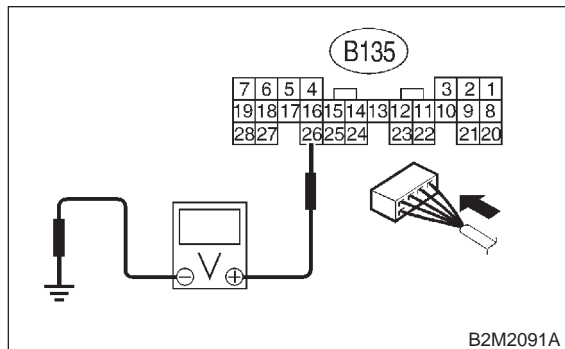
- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?
- YES** : Inspect DTC P0705 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>
- NO** : Go to step 11BV2.

11BV2 : CHECK INPUT SIGNAL FOR ECM.

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

Connector & terminal

(B135) No. 26 (+) — Chassis ground (-):



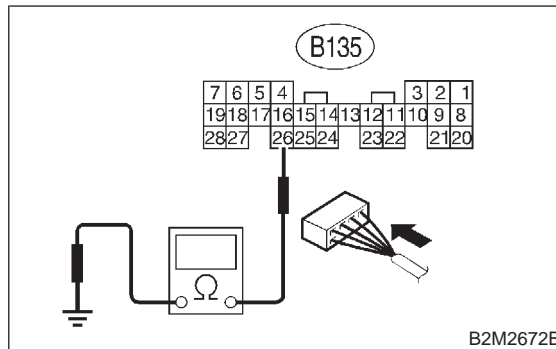
- CHECK** : **Is the voltage between 4.5 and 5.5 V at except "N" and "P" positions?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time.
- NO** : Go to step **11BV3**.

11BV3 : CHECK HARNESS BETWEEN ECM AND TRANSMISSION HARNESS CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and transmission harness connector (T3).
- 3) Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

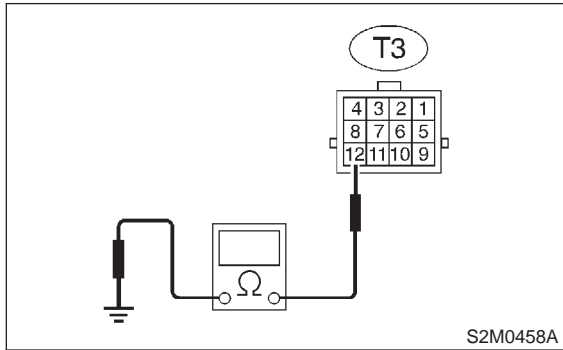
(B135) No. 26 — Chassis ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM and transmission harness connector.
- NO** : Go to step **11BV4**.

11BV4 : CHECK TRANSMISSION HARNESS CONNECTOR.

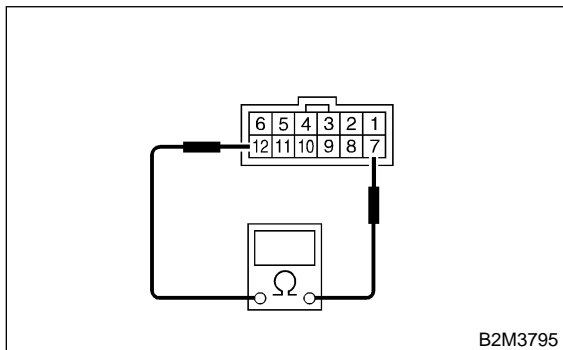
- 1) Disconnect connector from inhibitor switch.
- 2) Measure resistance of harness between transmission harness connector and engine ground.

Connector & terminal**(T3) No. 12 — Engine ground:**

- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between transmission harness and inhibitor switch connector.
- NO** : Go to step **11BV5**.

11BV5 : CHECK INHIBITOR SWITCH.

Measure resistance between inhibitor switch connector receptacle's terminals in selector lever except for "N" position.

Terminals**No. 7 — No. 12:**

- CHECK** : **Is the resistance more than 1 MΩ at except "N" and "P" positions?**
- YES** : Go to step **11BV6**.
- NO** : Replace inhibitor switch. <Ref. to 3-2 [W2C0].>

11BV6 : CHECK SELECTOR CABLE CONNECTION.

- CHECK** : **Is there any fault in selector cable connection to inhibitor switch?**
- YES** : Repair selector cable connection. <Ref. to 3-2 [W2A0].>
- NO** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

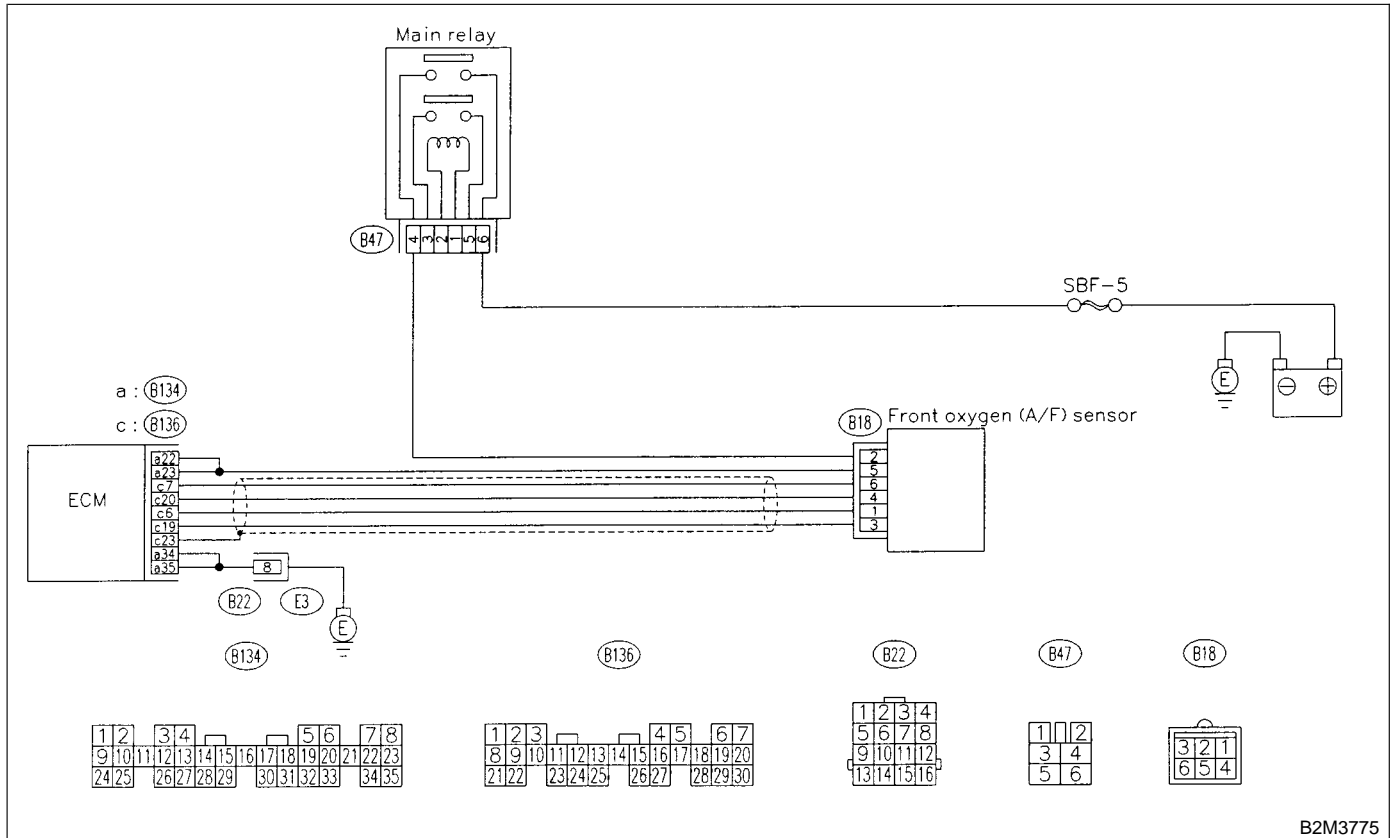
BW: DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3775

11BW1 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from ECM and front oxygen (A/F) sensor connector.
- 3) Measure resistance of harness between ECM and front oxygen (A/F) sensor connector.

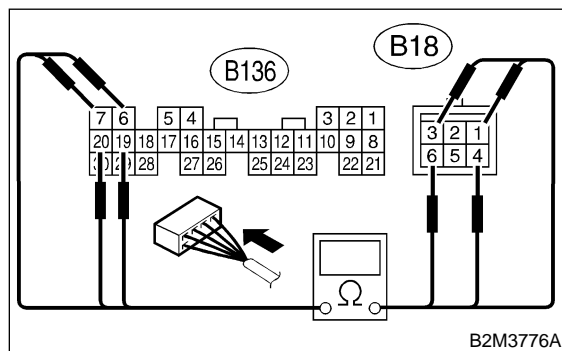
Connector & terminal

(B136) No. 6 — (E18) No. 1:

(B136) No. 7 — (B18) No. 6:

(B136) No. 19 — (B18) No. 3:

(B136) No. 20 — (B18) No. 4:



CHECK : **Is the resistance less than 1 Ω?**

YES : Go to step **11BW2**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and front oxygen (A/F) sensor connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

11BW2 : CHECK POOR CONTACT.

Check poor contact in front oxygen (A/F) sensor connector. <Ref. to FOREWORD [T3C1].>

CHECK : **Is there poor contact in front oxygen (A/F) sensor connector?**

YES : Repair poor contact in front oxygen (A/F) sensor connector.

NO : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

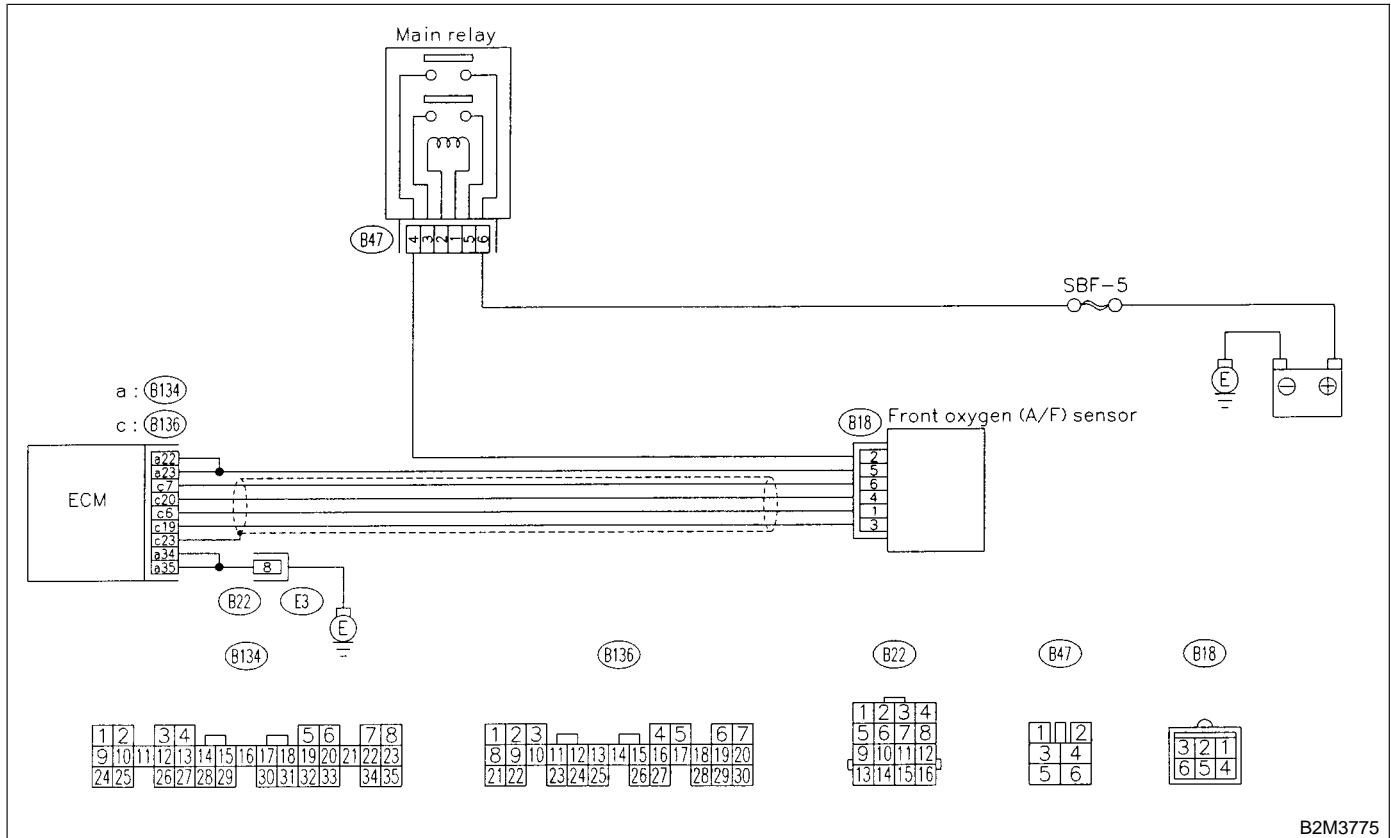
BX: DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3775

11BX1 : CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.

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

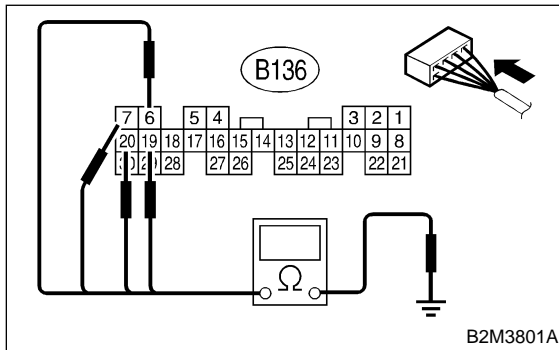
Connector & terminal

(B136) No. 6 — Chassis ground:

(B136) No. 7 — Chassis ground:

(B136) No. 19 — Chassis ground:

(B136) No. 20 — Chassis ground:



- CHECK** : **Is the resistance more than 10 Ω?**
- YES** : Replace front oxygen (A/F) sensor.
<Ref. to 2-7 [W8A0].>
- NO** : Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.

BY: DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT —

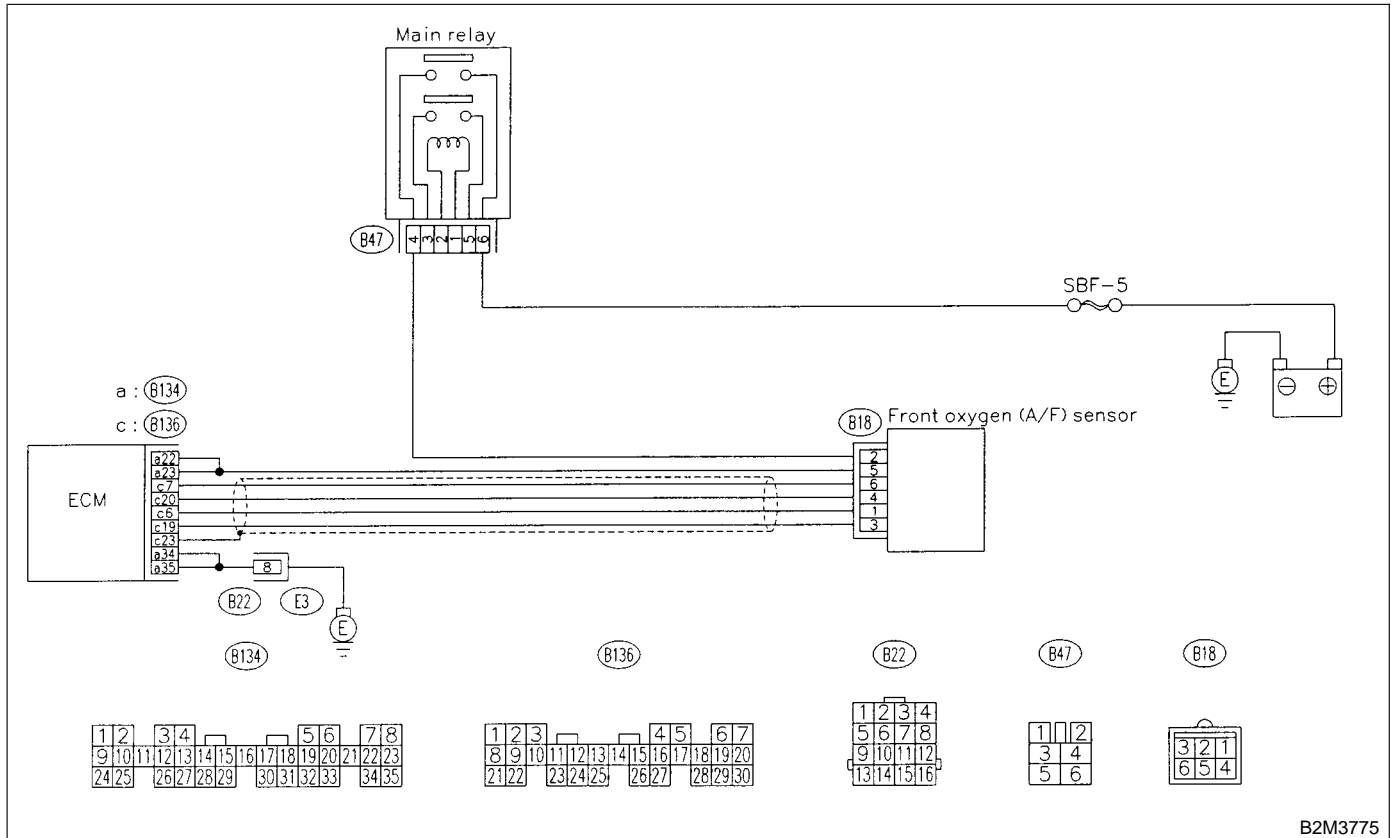
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



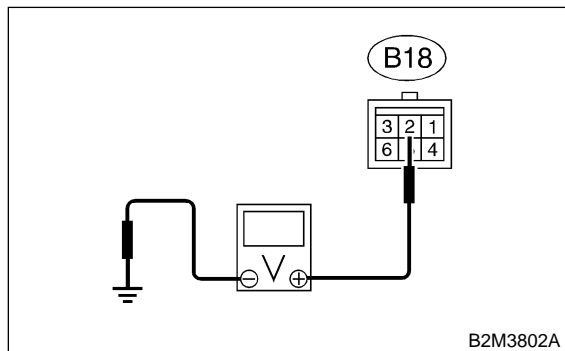
11BY1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1132 and P0141 at the same time?
- YES** : Go to step 11BY2.
- NO** : Go to step 11BY5.

11BY2 : CHECK POWER SUPPLY TO FRONT OXYGEN (A/F) SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from front oxygen (A/F) sensor.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between front oxygen (A/F) sensor connector and engine ground.

Connector & terminal
(B18) No. 2 (+) — Engine ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 11BY3.
- NO** : Repair power supply line.

NOTE:

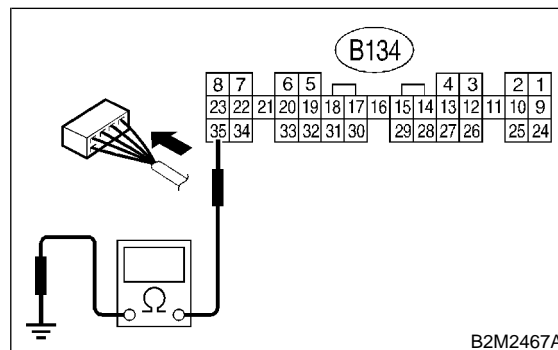
In this case, repair the following:

- Open circuit in harness between main relay and front oxygen (A/F) sensor connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in main relay connector

11BY3 : CHECK GROUND CIRCUIT OF ECM.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal
(B134) No. 35 — Chassis ground:



- CHECK** : Is the resistance less than 5 Ω?
- YES** : Go to step 11BY4.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

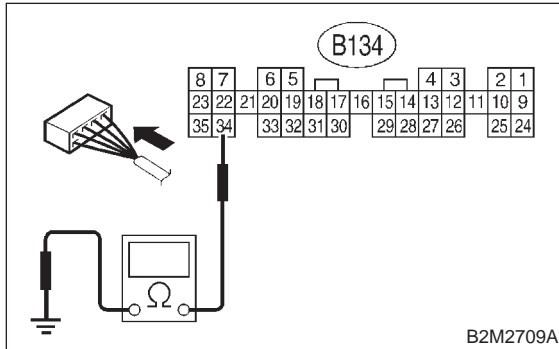
- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

11BY4 : CHECK GROUND CIRCUIT OF ECM.

1) Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal

(B134) No. 34 — Chassis ground:



CHECK : *Is there resistance less than 5 Ω?*

YES : Go to step 11BY5.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

11BY5 : CHECK CURRENT DATA.

1) Start engine
2) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II scan tool

For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : *Is the value more than 0.2 A?*

YES : Repair poor contact in connector.

NOTE:

In this case, repair the following:

- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector

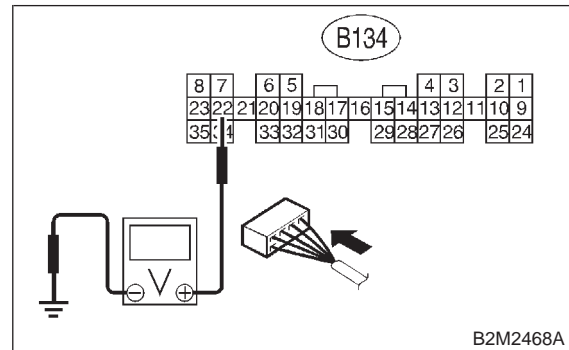
NO : Go to step 11BY6.

11BY6 : CHECK OUTPUT SIGNAL FROM ECM.

1) Start and idle the engine.
2) Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



CHECK : *Is the voltage less than 1.0 V?*

YES : Go to step 11BY8.

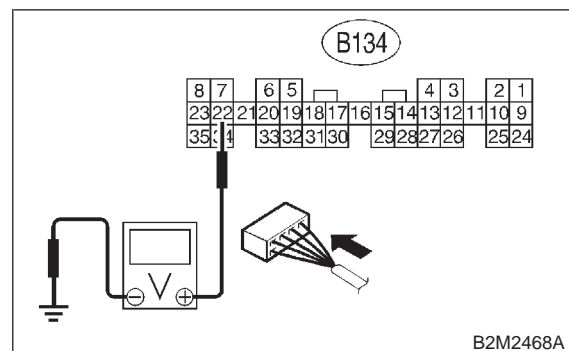
NO : Go to step 11BY7.

11BY7 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



CHECK : *Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?*

YES : Repair poor contact in ECM connector.

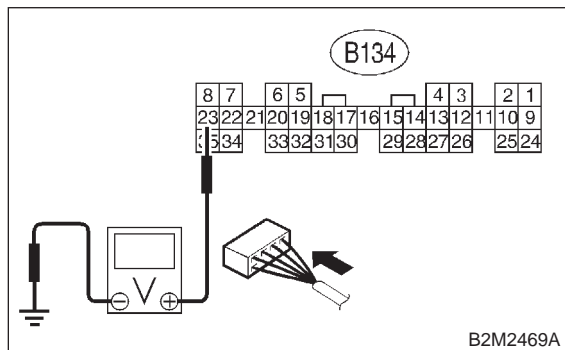
NO : Go to step 11BY8.

11BY8 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



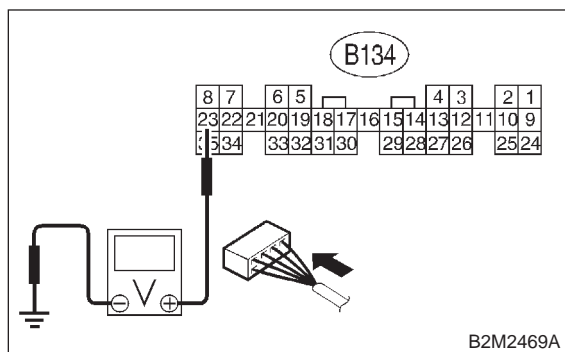
- CHECK** : **Is the voltage less than 1.0 V?**
- YES** : Go to step 11BY10.
- NO** : Go to step 11BY9.

11BY9 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



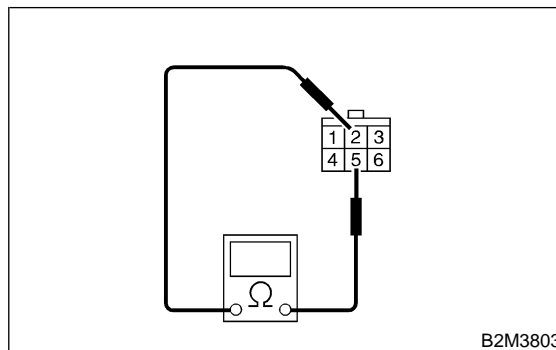
- CHECK** : **Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step 11BY10.

11BY10 : CHECK FRONT OXYGEN (A/F) SENSOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between front oxygen (A/F) sensor connector terminals.

Terminals

No. 2 — No. 5:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open or ground short circuit in harness between front oxygen (A/F) sensor and ECM connector
- Poor contact in front oxygen (A/F) sensor connector
- Poor contact in ECM connector
- NO** : Replace front oxygen (A/F) sensor. <Ref. to 2-7 [W8A0].>

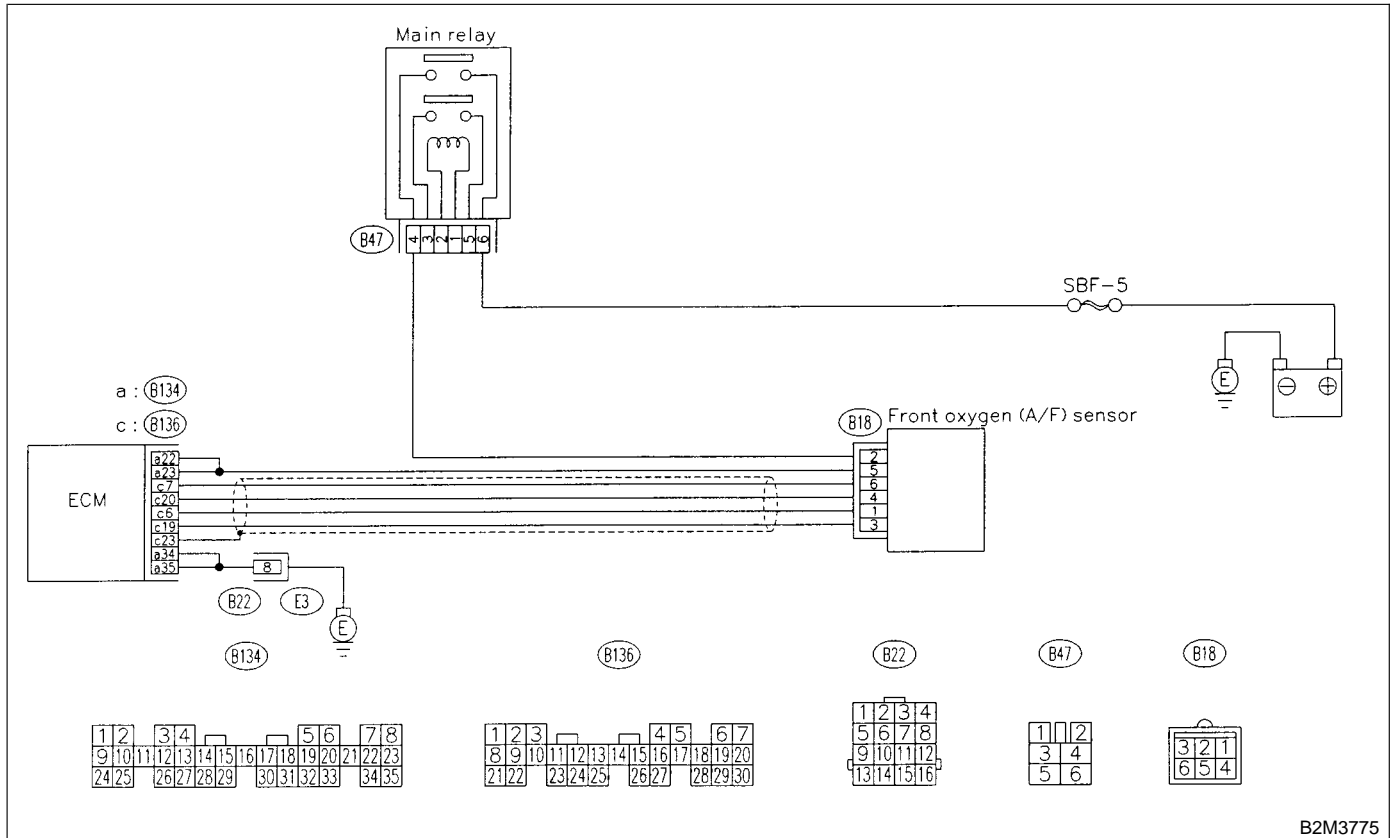
BZ: DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



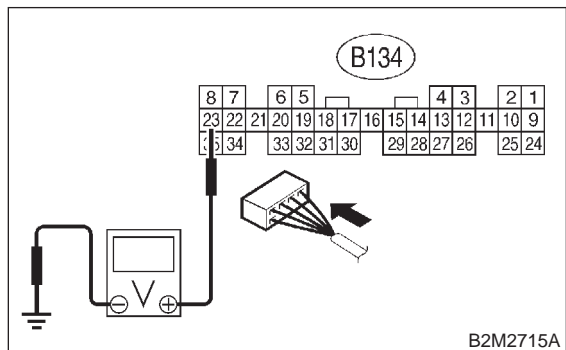
B2M3775

11BZ1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



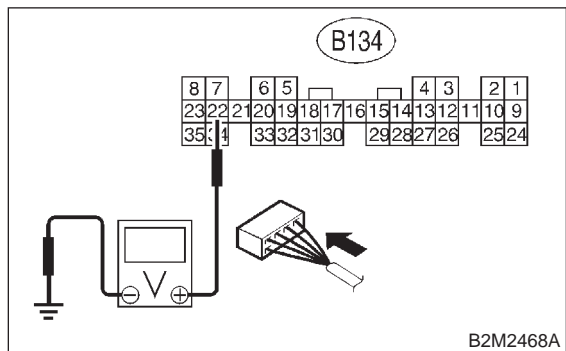
- CHECK** : Is the voltage more than 8 V?
- YES** : Go to step 11BZ3.
- NO** : Go to step 11BZ2.

11BZ2 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 8 V?
- YES** : Go to step 11BZ3.
- NO** : Go to step 11BZ4.

11BZ3 : CHECK FRONT OXYGEN (A/F) SENSOR HEATER CURRENT.

- 1) Turn ignition switch to OFF.
- 2) Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- 3) Turn ignition switch to ON.
- 4) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor
For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>
- OBD-II general scan tool
For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

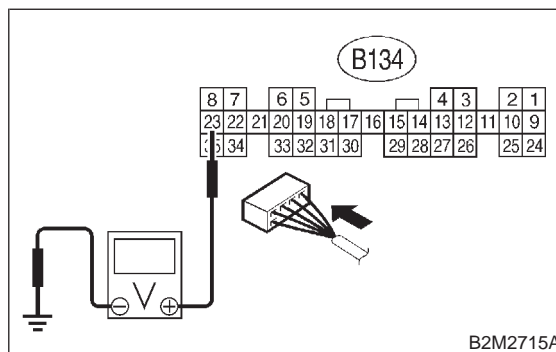
- CHECK** : Is the value more than 2.3 A?
- YES** : Replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : END

11BZ4 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 23 (+) — Chassis ground (-):



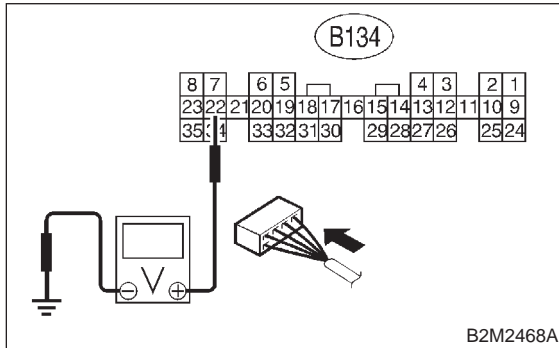
- CHECK** : Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?
- YES** : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- NO** : Go to step 11BZ5.

11BZ5 : CHECK OUTPUT SIGNAL FROM ECM.
--

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 22 (+) — Chassis ground (-):



- CHECK** : **Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.
- NO** : END

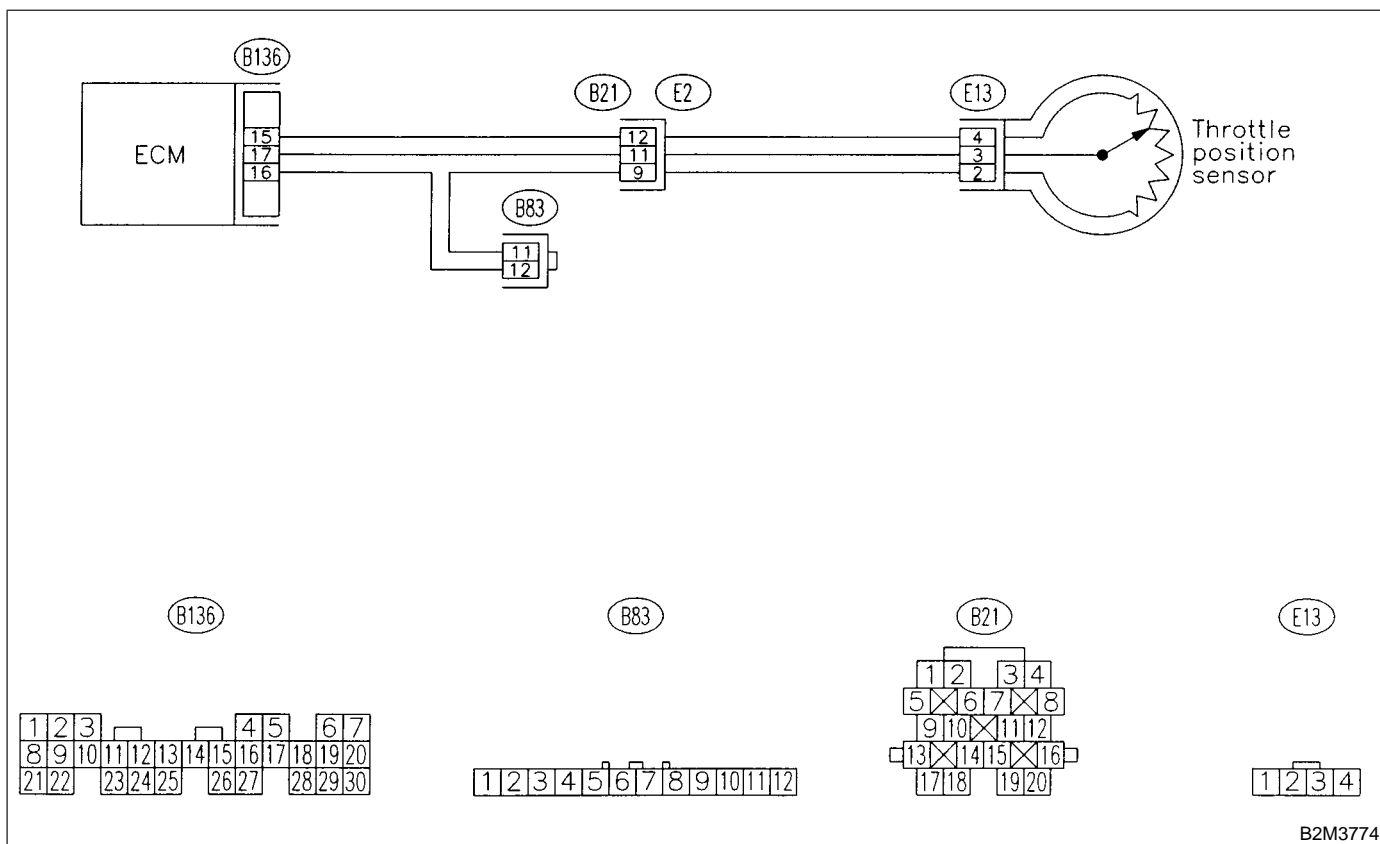
CA: DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Poor driving performance

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3774

11CA1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0122 or P0123?
- YES** : Inspect DTC P0122 or P0123 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect DTC P1142.

- NO** : Replace throttle position sensor. <Ref. to 2-7 [W10A2].>

CB: DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT

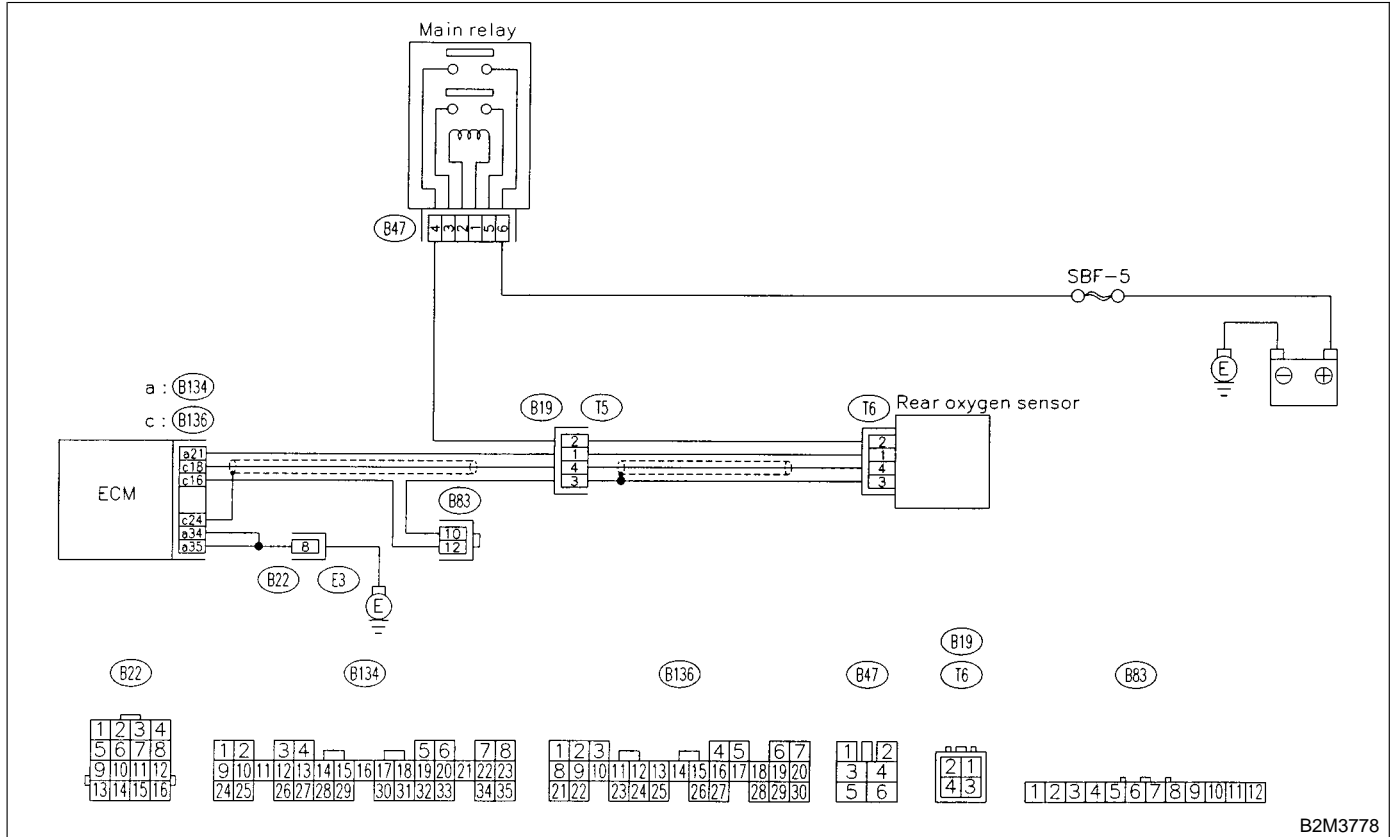
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



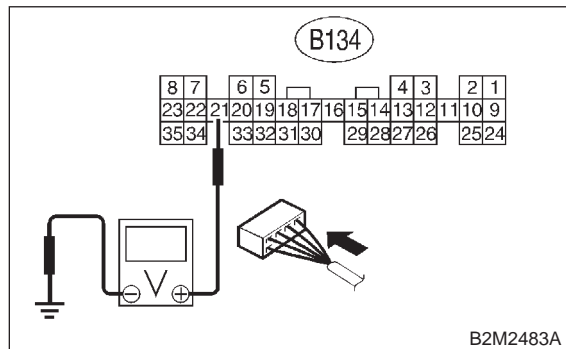
B2M3778

11CB1 : CHECK INPUT SIGNAL FOR ECM.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B134) No. 21 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 8 V?**

YES : Go to step **11CB2**.

NO : Go to step **11CB3**.

11CB2 : CHECK CURRENT DATA.

- 1) Turn ignition switch to OFF.
- 2) Repair battery short circuit in harness between ECM and rear oxygen sensor connector.
- 3) Turn ignition switch to ON.
- 4) Read data of rear oxygen sensor heater current using Subaru Select Monitor or the OBD-II general scan tool.

NOTE:

- Subaru Select Monitor

For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to 2-7 [T3C4].>

- OBD-II general scan tool

For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.

CHECK : **Is the value more than 7 A?**

YES : Replace ECM. <Ref. to 2-7 [W19A0].>

NO : END

11CB3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

CHECK : **Is there poor contact in ECM connector?**

YES : Repair poor contact in ECM connector.

NO : END

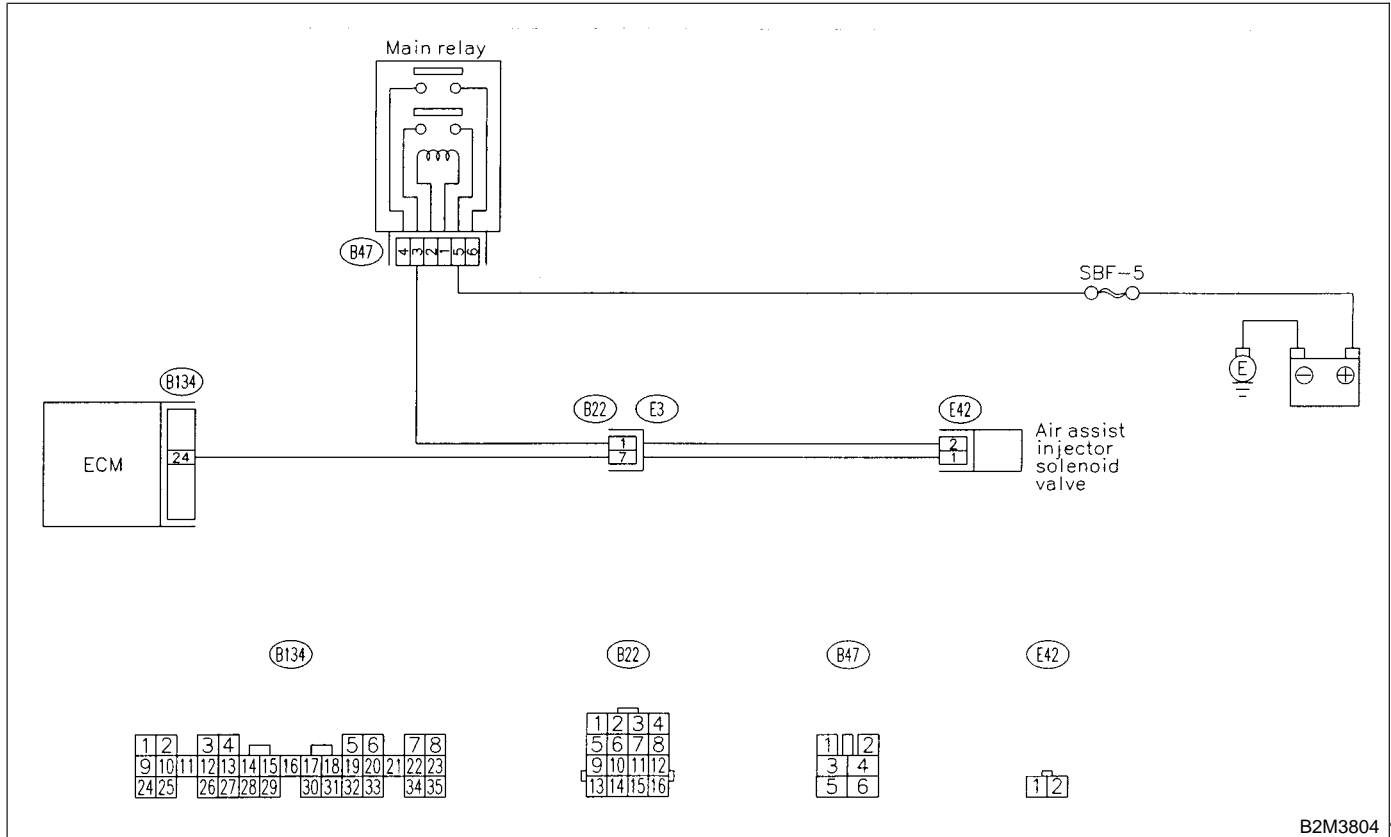
CC: DTC P1207 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



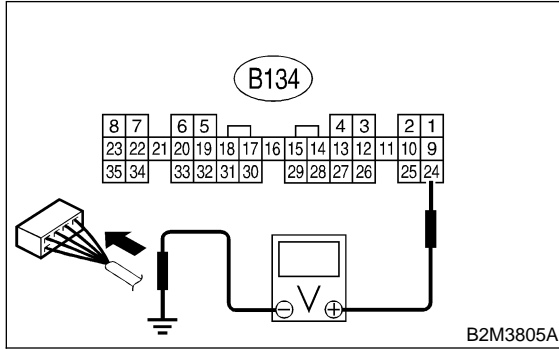
B2M3804

11CC1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 24 (+) — Chassis ground (-):



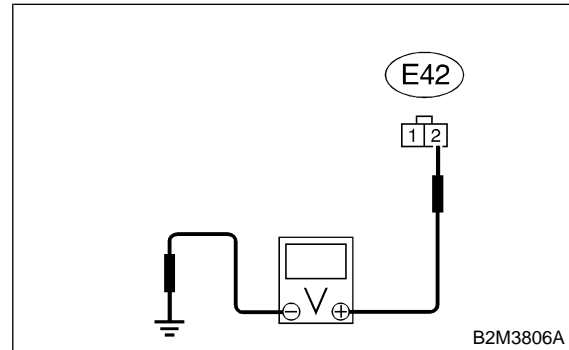
- CHECK** : *Is the voltage more than 10 V?*
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **11CC2**.

11CC2 : CHECK POWER SUPPLY TO AIR ASSIST INJECTOR SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from air assist injector solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between air assist injector solenoid valve and engine ground.

Connector & terminal

(E42) No. 2 (+) — Engine ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **11CC3**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

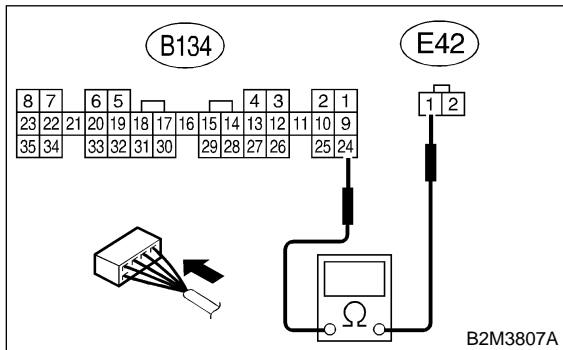
- Open circuit in harness between air assist injector solenoid valve and main relay connector
- Poor contact in coupling connector (B22)

11CC3 : CHECK HARNESS BETWEEN ECM AND AIR ASSIST INJECTOR SOLENOID VALVE CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from ECM.
- 3) Measure resistance of harness between ECM and air assist injector solenoid valve connector.

Connector & terminal

(B134) No. 24 — (E42) No. 1:



- CHECK** : *Is the resistance less than 1 Ω?*
- YES** : Go to step **11CC4**.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

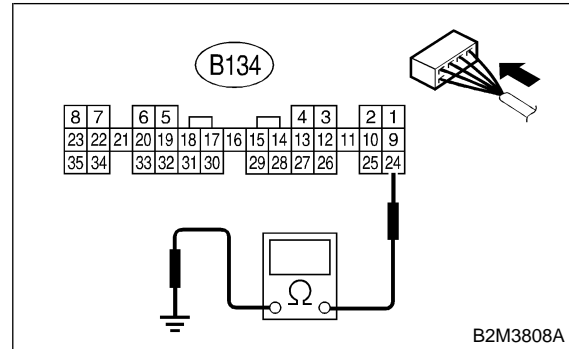
- Open circuit in harness between ECM and air assist injector solenoid valve connector
- Poor contact in coupling connector (B22)

11CC4 : CHECK HARNESS BETWEEN ECM AND AIR ASSIST INJECTOR SOLENOID VALVE CONNECTOR.

Measure resistance of harness between ECM and chassis ground.

Connector & terminal

(B134) No. 24 — Chassis ground:



- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and air assist injector solenoid valve connector.
- NO** : Go to step **11CC5**.

11CC5 : CHECK POOR CONTACT.

Check poor contact in ECM and air assist injector solenoid valve connectors. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM and air assist injector solenoid valve connectors?*
- YES** : Repair poor contact in ECM and air assist injector solenoid valve connectors.
- NO** : Replace air assist injector solenoid valve. <Ref. to 2-7 [W16A0].>

MEMO:

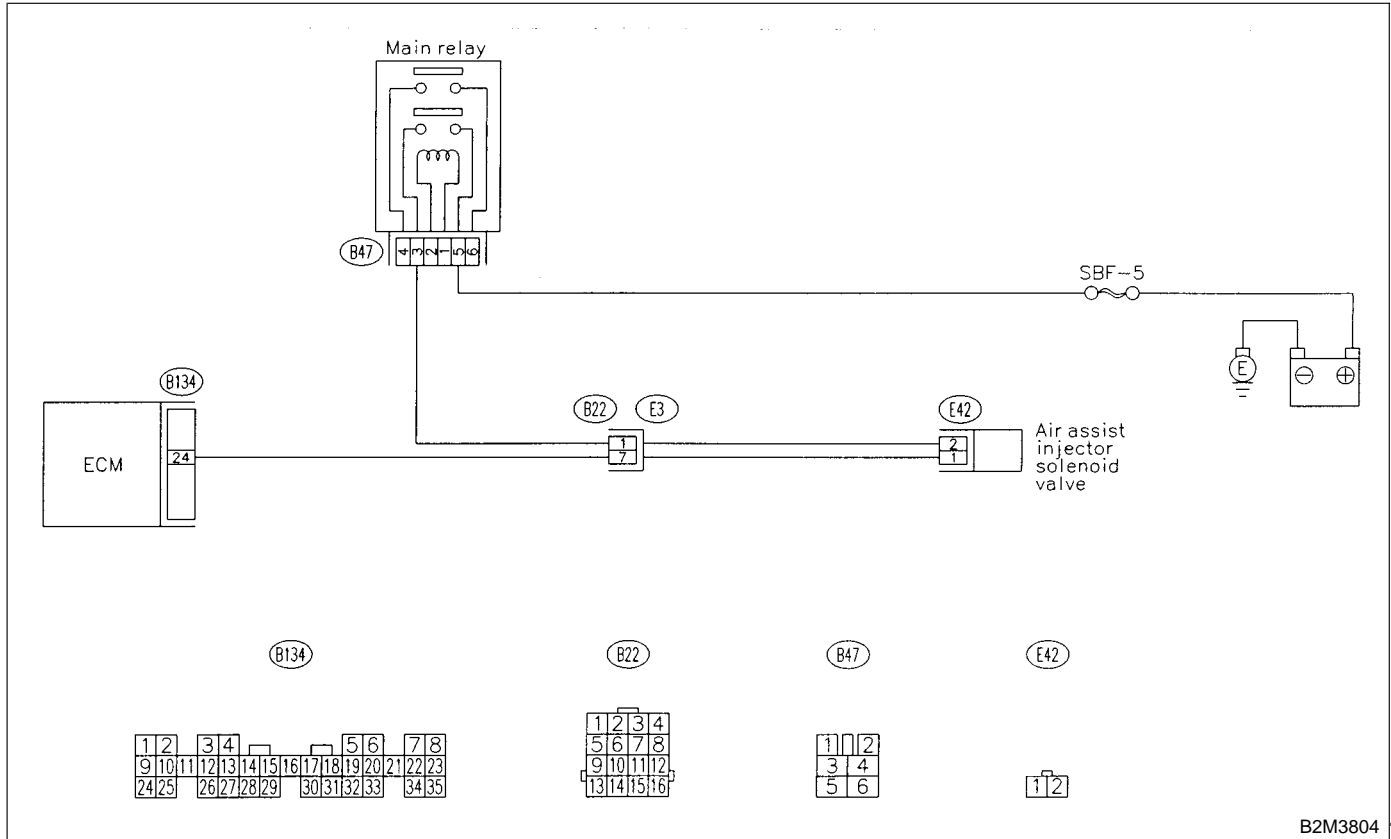
CD: DTC P1208 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



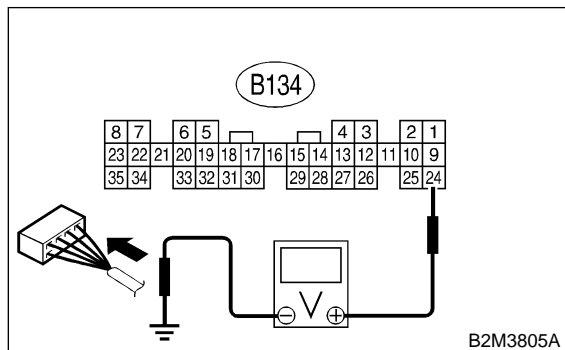
B2M3804

11CD1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 24 (+) — Chassis ground (-):



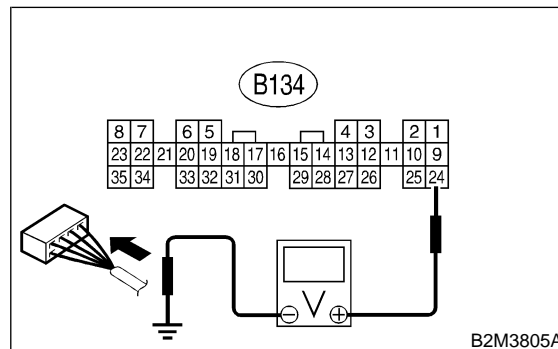
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Go to step **11CD2**.
- NO** : Go to step **11CD3**.

11CD2 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from air assist injector solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 24 (+) — Chassis ground (-):



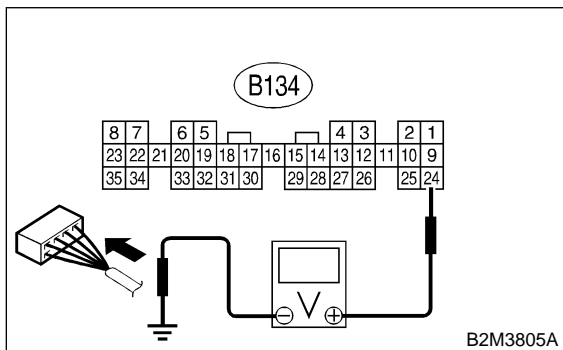
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and air assist injector solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Replace air assist injector solenoid valve <Ref. to 2-7 [W16A0].> and ECM <Ref. to 2-7 [W19A0].>.

11CD3 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 24 (+) — Chassis ground (-):



- CHECK** : **Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?**
- YES** : Repair battery short circuit in harness between ECM and air assist injector solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Contact with SOA service.

NOTE:

Insepection by DTM is required, because probable cause is deterioration of multiple parts.

MEMO:

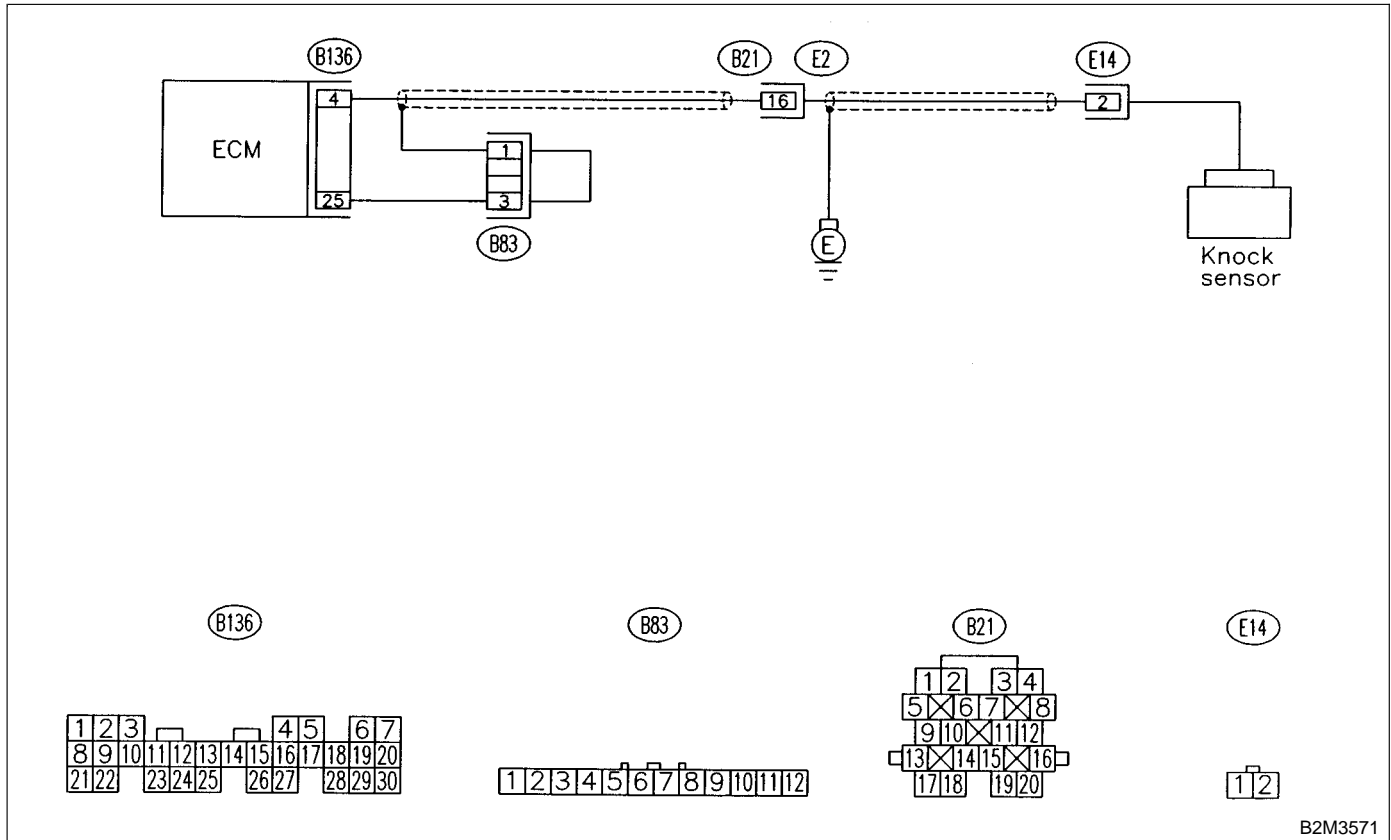
CE: DTC P1325 — KNOCK SENSOR CIRCUIT LOW INPUT —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Poor driving performance
 - Knocking occurs.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**

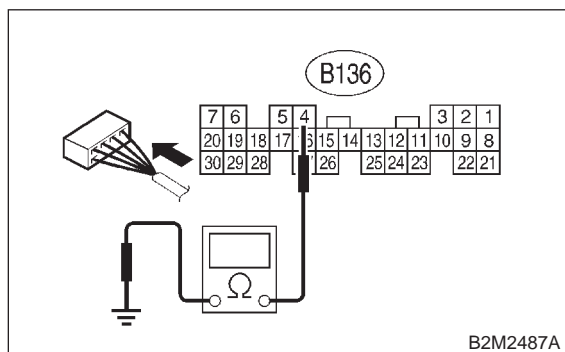


B2M3571

11CE1 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

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

Connector & terminal
(B136) No. 4 — Chassis ground:

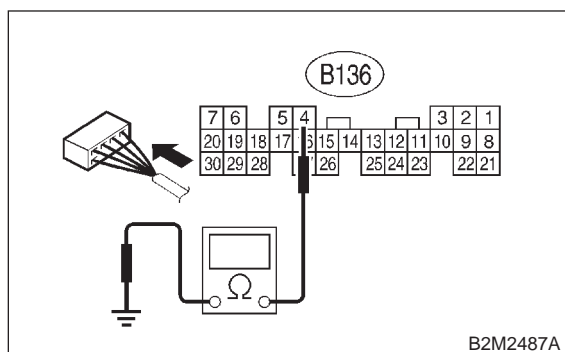


- CHECK** : *Is the resistance more than 700 kΩ?*
- YES** : Go to step 11CE3.
- NO** : Go to step 11CE2.

11CE2 : CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.

Measure resistance of harness between ECM connector and chassis ground.

Connector & terminal
(B136) No. 4 — Chassis ground:

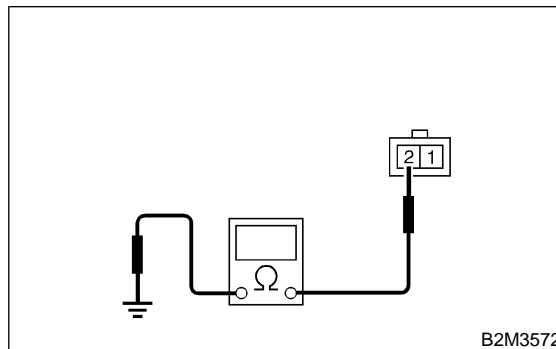


- CHECK** : *Is the resistance less than 400 kΩ?*
- YES** : Go to step 11CE5.
- NO** : Go to step 11CE6.

11CE3 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal
No. 2 — Engine ground:



- CHECK** : *Is the resistance more than 700 kΩ?*
- YES** : Go to step 11CE4.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between knock sensor and ECM connector
- Poor contact in knock sensor connector
- Poor contact in coupling connector (B21)

11CE4 : CHECK CONDITION OF KNOCK SENSOR INSTALLATION.

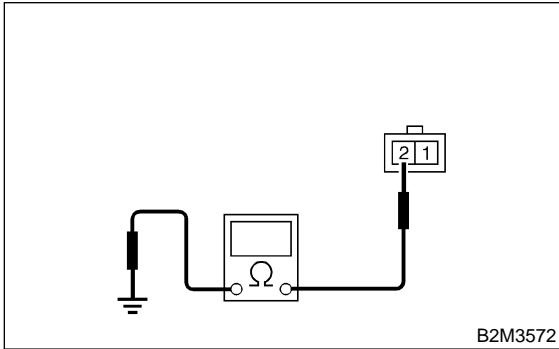
- CHECK** : *Is the knock sensor installation bolt tightened securely?*
- YES** : Replace knock sensor. <Ref. to 2-7 [W7A1].>
- NO** : Tighten knock sensor installation bolt securely.

11CE5 : CHECK KNOCK SENSOR.

- 1) Disconnect connector from knock sensor.
- 2) Measure resistance between knock sensor connector terminal and engine ground.

Terminal

No. 2 — Engine ground:



- CHECK** : **Is the resistance less than 400 kΩ?**
- YES** : Replace knock sensor. <Ref. to 2-7 [W7A0].>
- NO** : Repair ground short circuit in harness between knock sensor connector and ECM connector.

NOTE:

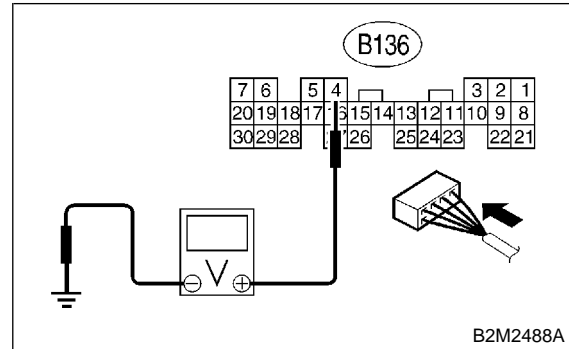
The harness between both connectors is shielded. Repair short circuit of harness together with shield.

11CE6 : CHECK INPUT SIGNAL FOR ECM.

- 1) Connect connectors to ECM and knock sensor.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM and chassis ground.

Connector & terminal

(B136) No. 4 (+) — Chassis ground (-):



- CHECK** : **Is the voltage more than 2 V?**
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. (However, the possibility of poor contact still remains.)

NOTE:

In this case, repair the following:

- Poor contact in knock sensor connector
- Poor contact in ECM connector
- Poor contact in coupling connector (B21)
- NO** : Repair poor contact in ECM connector.

MEMO:

CF: DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT —

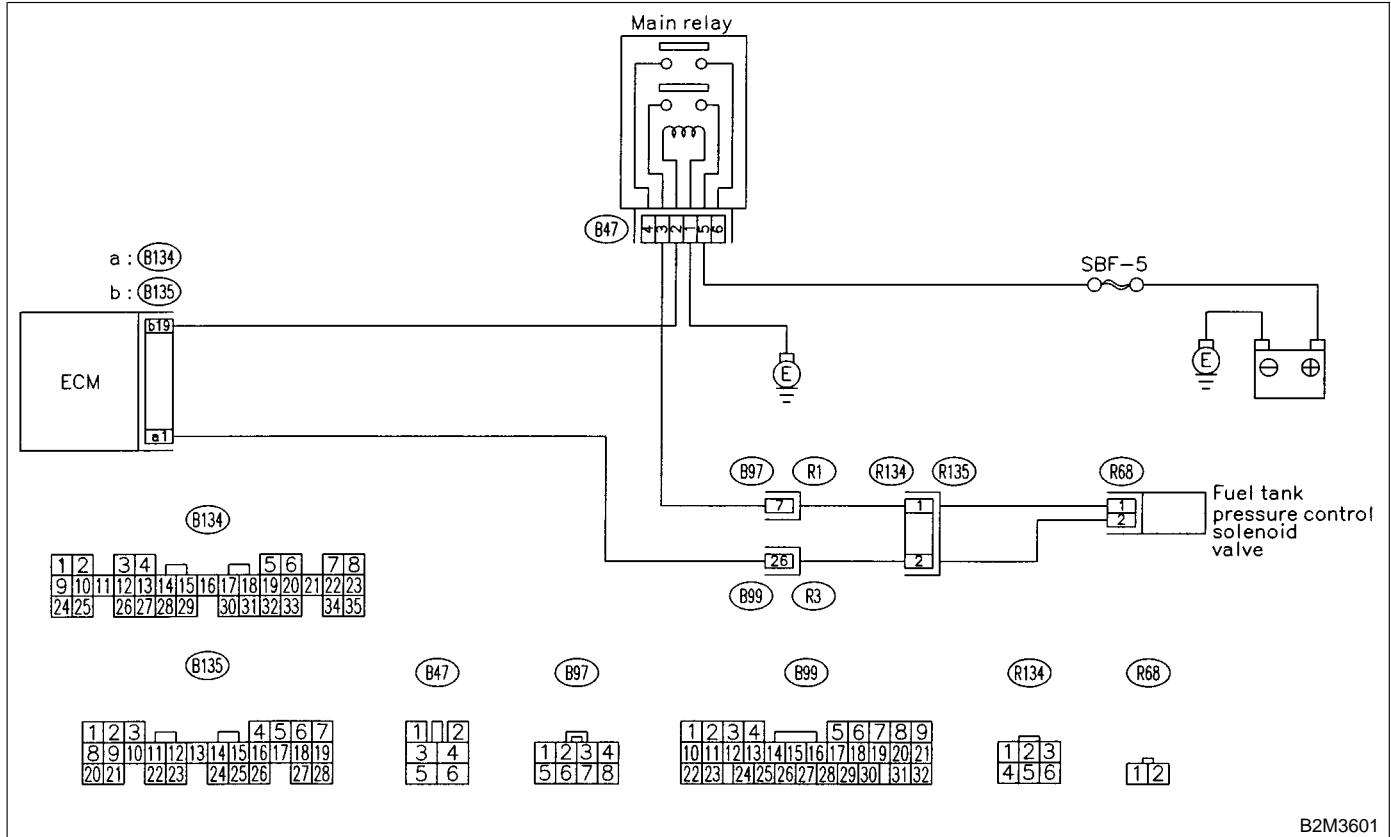
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



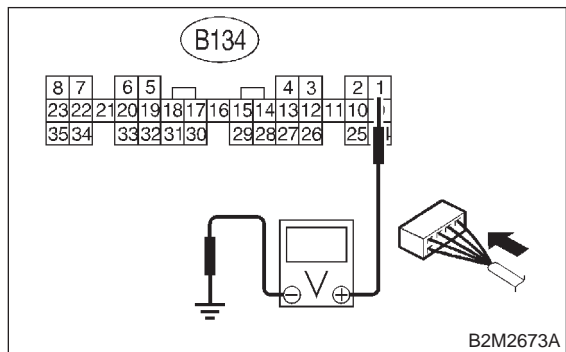
B2M3601

11CF1 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 10 V?*
- YES** : Go to step **11CF2**.
- NO** : Go to step **11CF3**.

11CF2 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : *Is there poor contact in ECM connector?*
- YES** : Repair poor contact in ECM connector.
- NO** : Contact with SOA service.

NOTE:

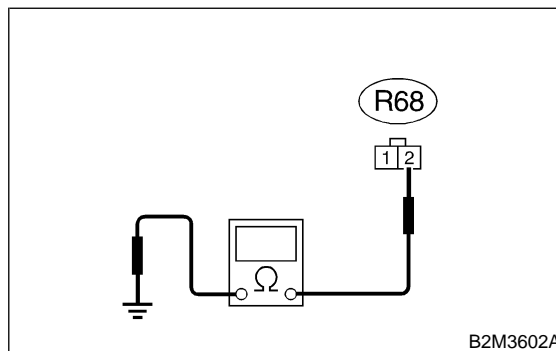
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11CF3 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connectors from fuel tank pressure control solenoid valve and ECM.
- 3) Measure resistance of harness between fuel tank pressure control solenoid valve connector and chassis ground.

Connector & terminal

(R68) No. 2 — Chassis ground:

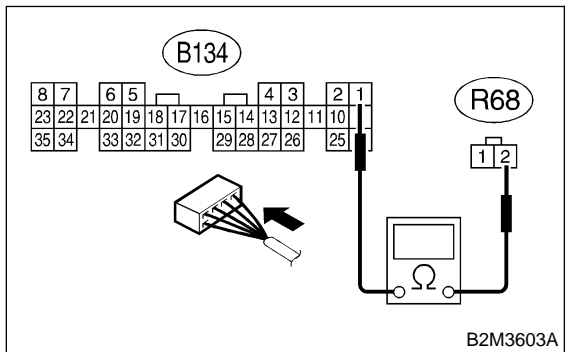


- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and fuel tank pressure control solenoid valve connector.
- NO** : Go to step **11CF4**.

11CF4 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

Measure resistance of harness between ECM and fuel tank pressure control solenoid valve connector.

Connector & terminal
(B134) No. 1 — (R68) No. 2:



- CHECK** : *Is the voltage less than 1 Ω?*
- YES** : Go to step **11CF5**.
- NO** : Repair harness and connector.

NOTE:

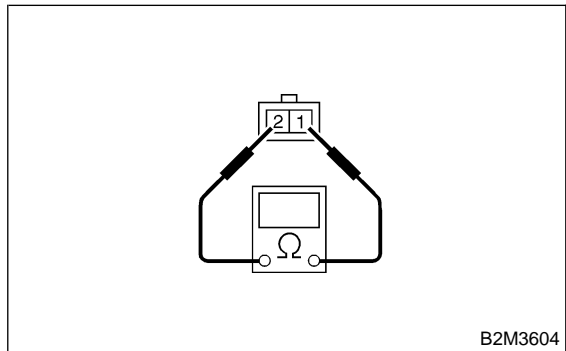
In this case, repair the following:

- Open circuit in harness between ECM and fuel tank pressure control solenoid valve connector
- Poor contact in coupling connectors (R134 and B99)

11CF5 : CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

Measure resistance between fuel tank pressure control solenoid valve terminals.

Terminals
No. 1 — No. 2:



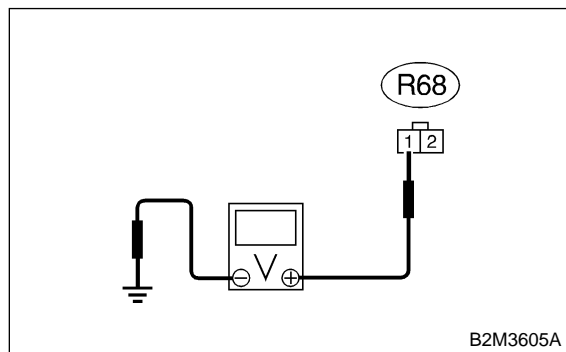
- CHECK** : *Is the resistance between 10 and 100 Ω?*
- YES** : Go to step **11CF6**.
- NO** : Replace fuel tank pressure control solenoid valve. <Ref. to 2-1 [W9A0].>

11CF6 : CHECK POWER SUPPLY TO FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to ON.
- 2) Measure voltage between fuel tank pressure control solenoid valve and chassis ground.

Connector & terminal

(R68) No. 1 (+) — Chassis ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Go to step **11CF7**.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between main relay and fuel tank pressure control solenoid valve connector
- Poor contact in coupling connectors (R134 and B97)
- Poor contact in main relay connector

11CF7 : CHECK POOR CONTACT.

Check poor contact in fuel tank pressure control solenoid valve connector. <Ref. to FOREWORD [T3C1].>

CHECK : **Is there poor contact in fuel tank pressure control solenoid valve connector?**

YES : Repair poor contact in fuel tank pressure control solenoid valve connector.

NO : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

CG: DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT —

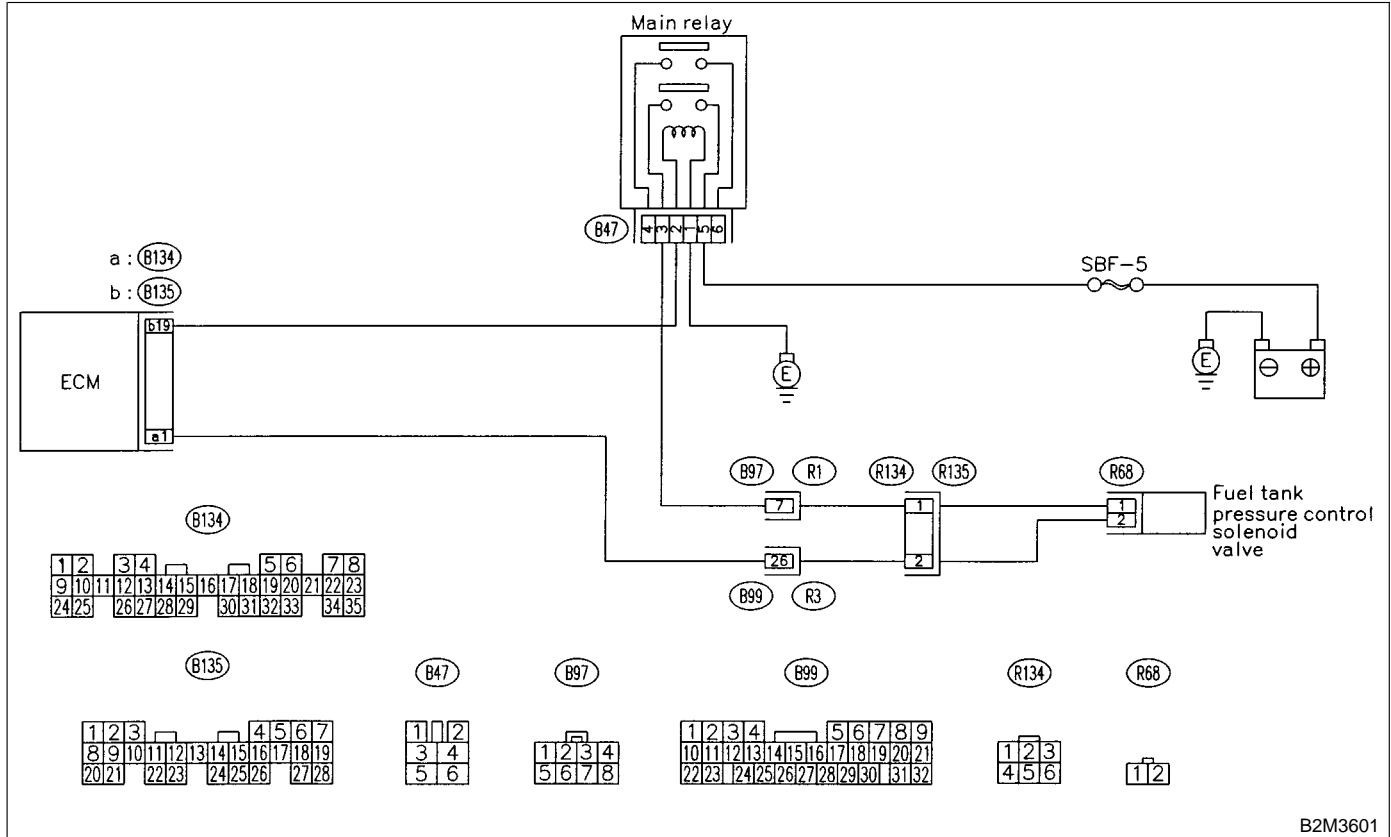
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

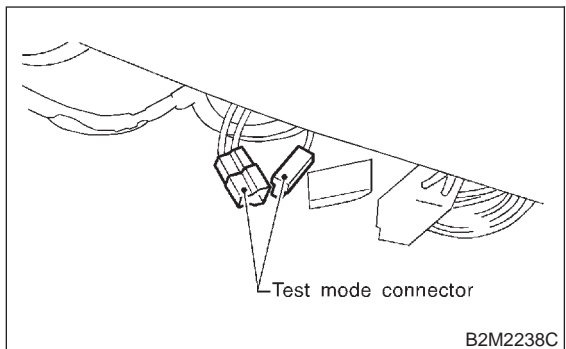
● WIRING DIAGRAM:



B2M3601

11CG1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



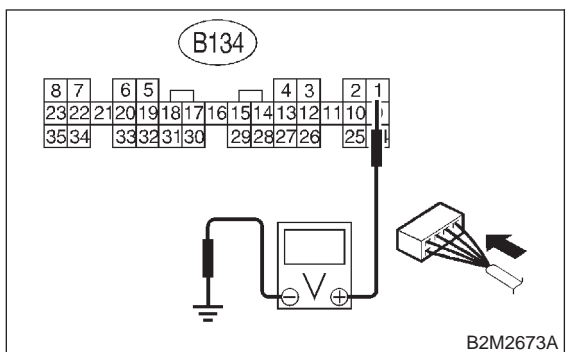
- 3) Turn ignition switch to ON.
- 4) While operating fuel tank pressure control solenoid valve, measure voltage between ECM and chassis ground.

NOTE:

Fuel tank pressure control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



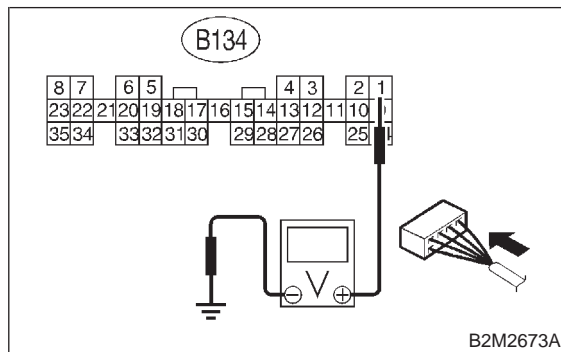
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 11CG2.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

11CG2 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 11CG4.
- NO** : Go to step 11CG3.

11CG3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

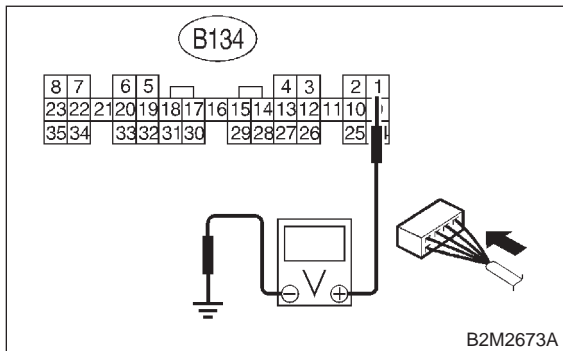
- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11CG4 : CHECK HARNESS BETWEEN FUEL TANK PRESSURE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from fuel tank pressure control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 1 (+) — Chassis ground (-):



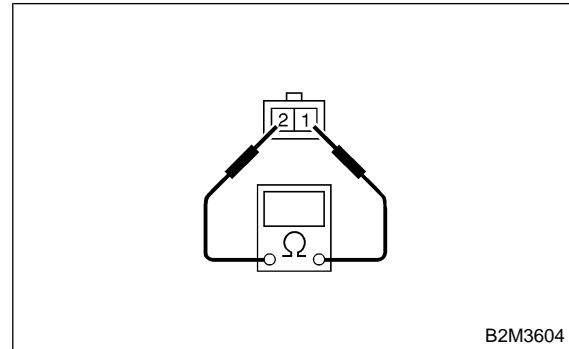
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and fuel tank pressure control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CG5**.

11CG5 : CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between fuel tank pressure control solenoid valve terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace fuel tank pressure control solenoid valve <Ref. to 2-1 [W9A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CG6**.

11CG6 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

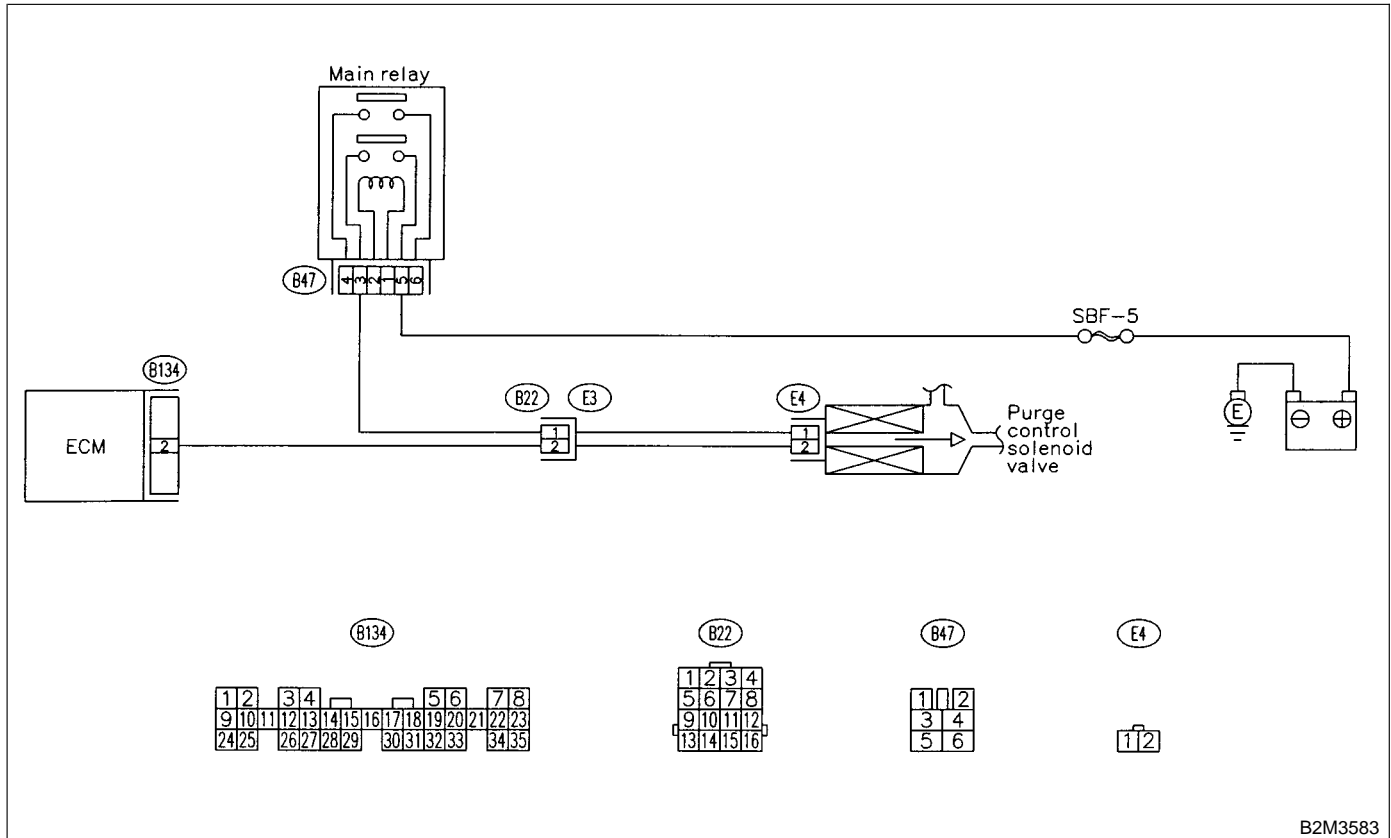
CH: DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Erroneous idling

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

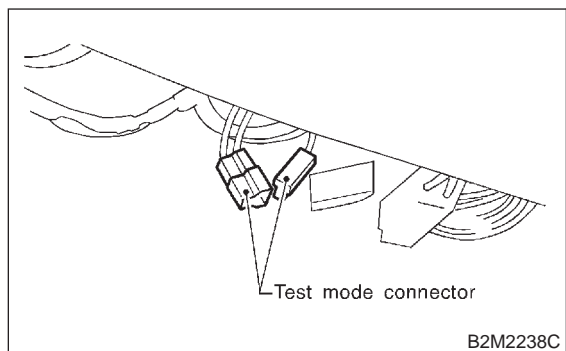
● **WIRING DIAGRAM:**



B2M3583

11CH1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



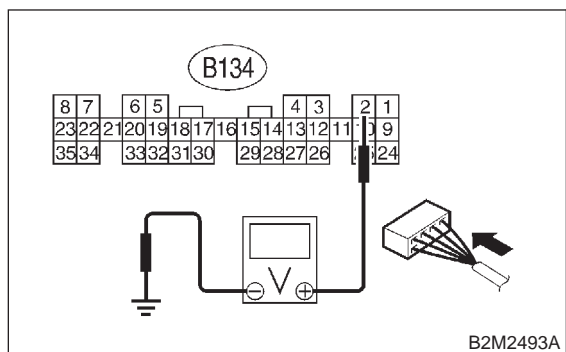
- 3) Turn ignition switch to ON.
- 4) While operating purge control solenoid valve, measure voltage between ECM and chassis ground.

NOTE:

Purge control solenoid valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



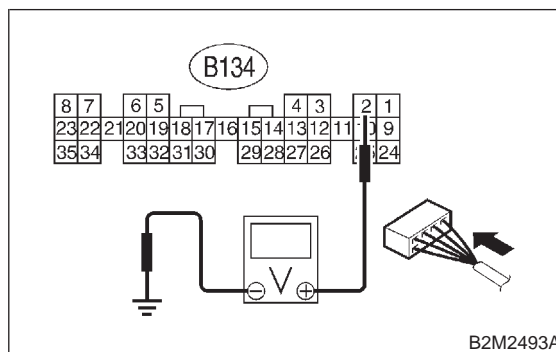
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 11CH2.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

11CH2 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 11CH4.
- NO** : Go to step 11CH3.

11CH3 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

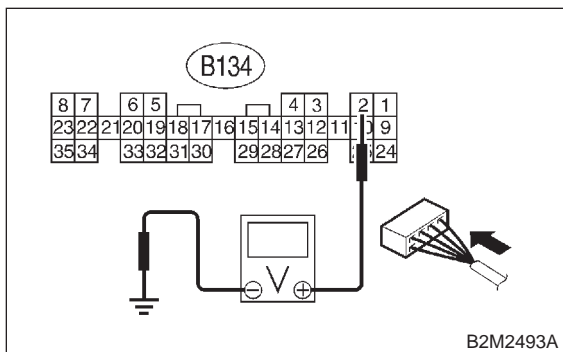
- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11CH4 : CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from purge control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 2 (+) — Chassis ground (-):



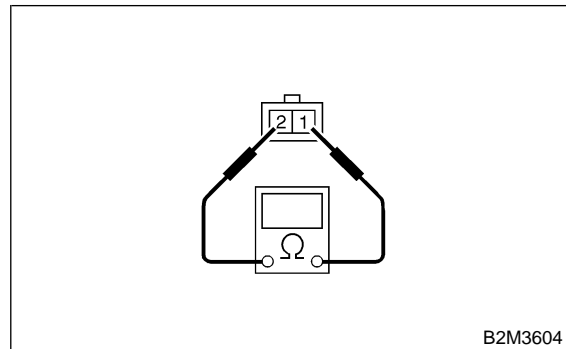
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and purge control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CH5**.

11CH5 : CHECK PURGE CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between purge control solenoid valve terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace purge control solenoid valve <Ref. to 2-1 [W17A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CH6**.

11CH6 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

CI: DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT —

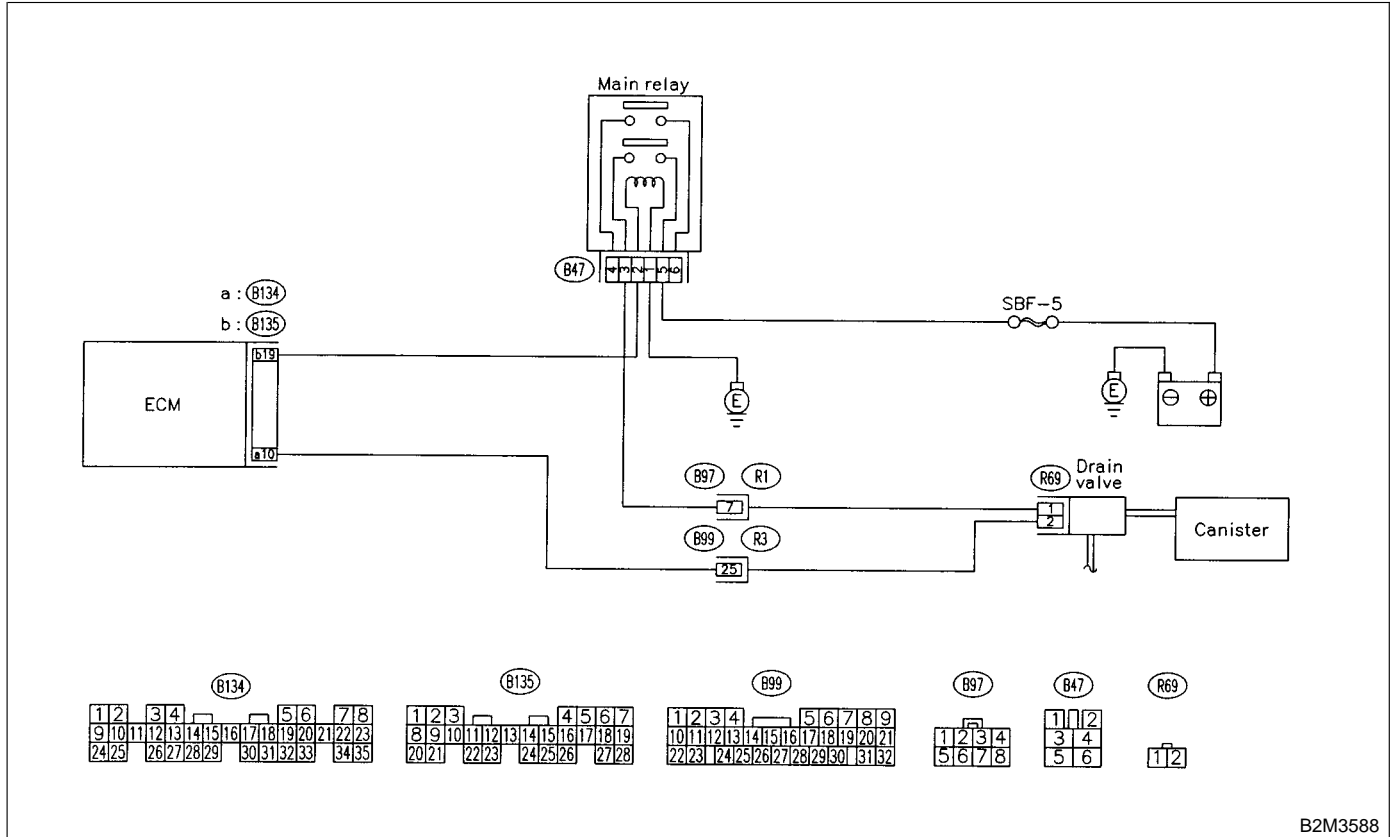
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

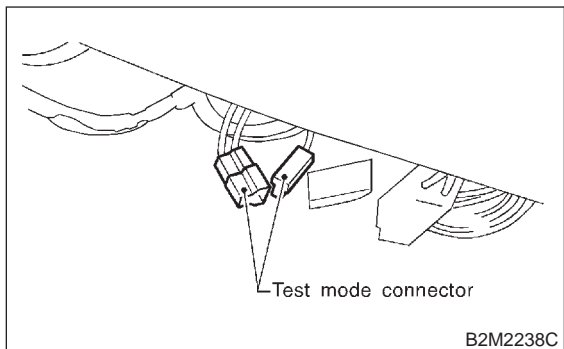
● WIRING DIAGRAM:



B2M3588

11C11 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



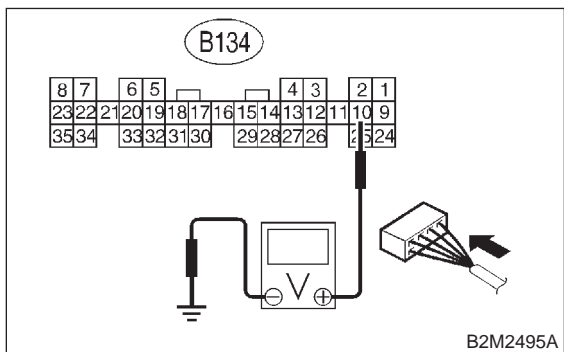
- 3) Turn ignition switch to ON.
- 4) While operating drain valve, measure voltage between ECM and chassis ground.

NOTE:

Drain valve operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



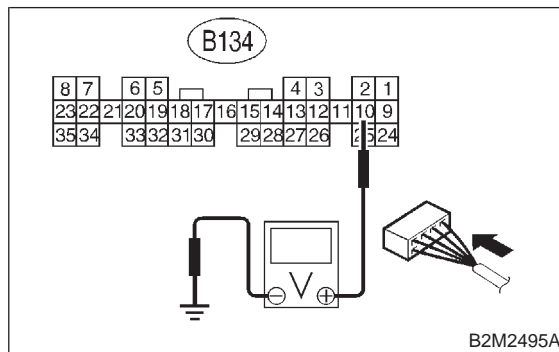
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Go to step 11C12.
- NO** : Even if MIL light up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.

11C12 : CHECK OUTPUT SIGNAL FROM ECM.

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

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Go to step 11C14.
- NO** : Go to step 11C13.

11C13 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

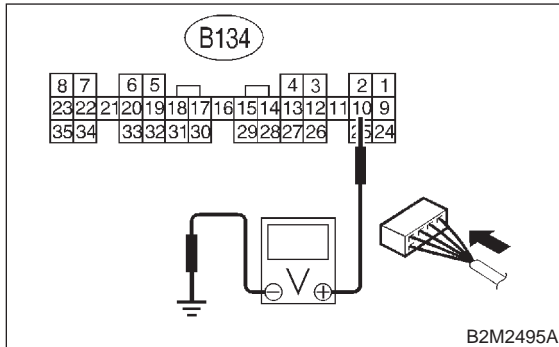
- CHECK** : Is there poor contact in ECM connector?
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

11CI4 : CHECK HARNESS BETWEEN DRAIN VALVE AND ECM CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from drain valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM and chassis ground.

Connector & terminal

(B134) No. 10 (+) — Chassis ground (-):



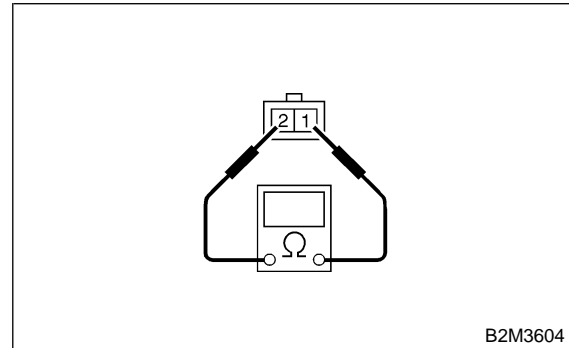
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and drain valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CI5**.

11CI5 : CHECK DRAIN VALVE.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between drain valve terminals.

Terminals

No. 1 — No. 2:



- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace drain valve <Ref. to 2-1 [W13A0].> and ECM <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CI6**.

11CI6 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

CJ: DTC P1442 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM 2 —

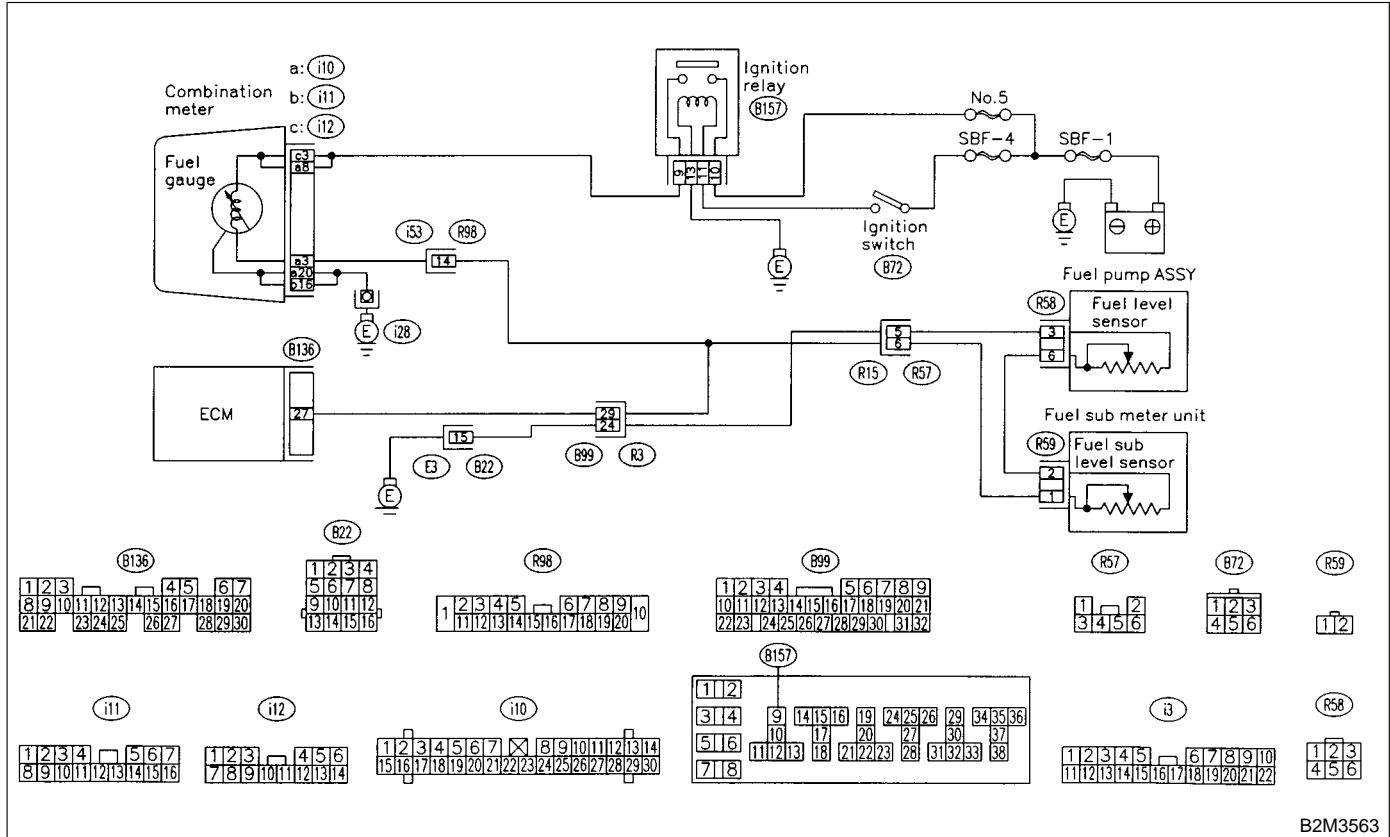
DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3563

11CJ1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK :** Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0461, P0462 or P0463?
- YES :** Inspect DTC P0461, P0462 or P0463 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:

In this case, it is not necessary to inspect this trouble.

- NO :** Replace fuel level sensor <Ref. to 2-8 [W5A0].> and fuel sub level sensor. <Ref. to 2-8 [W6A0].>

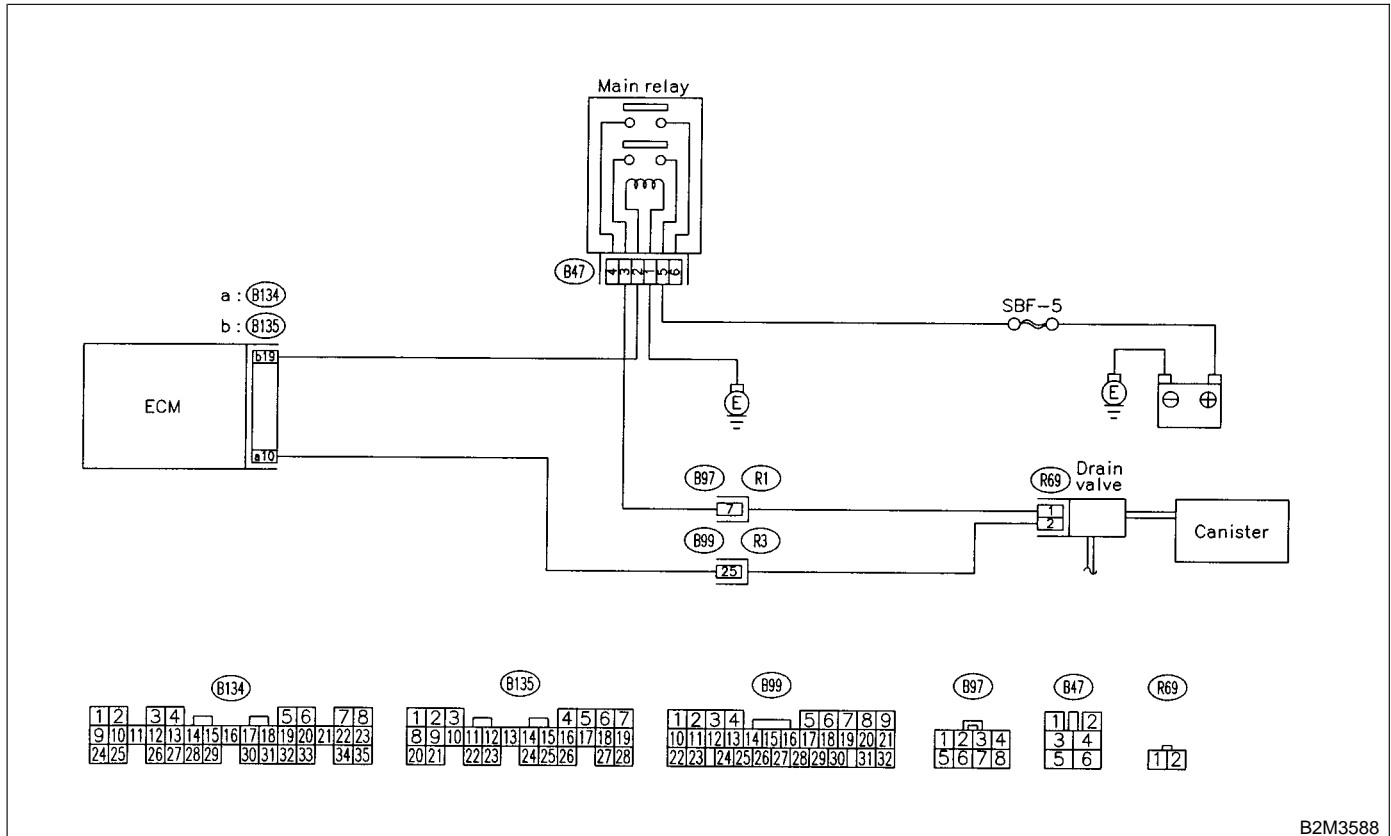
CK: DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM —

- **DTC DETECTING CONDITION:**
 - Immediately after fault occurrence
- **TROUBLE SYMPTOM:**
 - Improper fuel supply

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



B2M3588

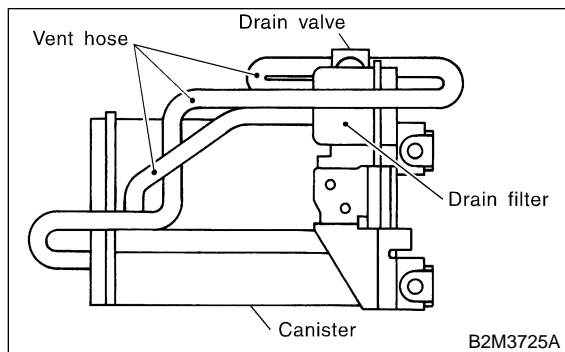
11CK1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using “11. Diagnostics Chart with Trouble Code for AT Vehicles”. <Ref. to 2-7 [T11A0].>
- NO** : Go to step **11CK2**.

11CK2 : CHECK VENT LINE HOSES.

Check the following items.

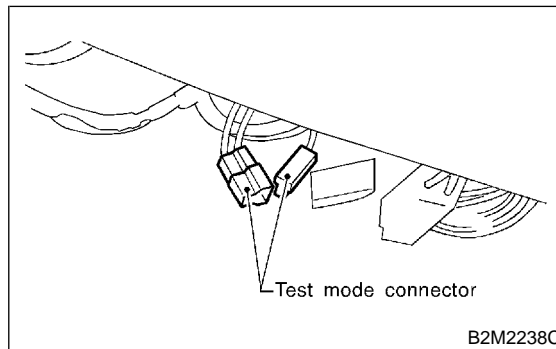
- Clogging of vent hoses between canister and drain valve
- Clogging of vent hose between drain valve and air filter
- Clogging of drain filter



- CHECK** : **Is there a fault in vent line?**
- YES** : Repair or replace the faulty part.
- NO** : Go to step **11CK3**.

11CK3 : CHECK DRAIN VALVE OPERATION.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



- 3) Turn ignition switch to ON.
- 4) Operate drain valve.

NOTE:

Drain valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

- CHECK** : **Does drain valve produce operating sound?**

- YES** : Contact with SOA service.

NOTE:

Inspection by DTM is required, because probable cause is deterioration of multiple parts.

- NO** : Replace drain valve. <Ref. to 2-1 [W13A0].>

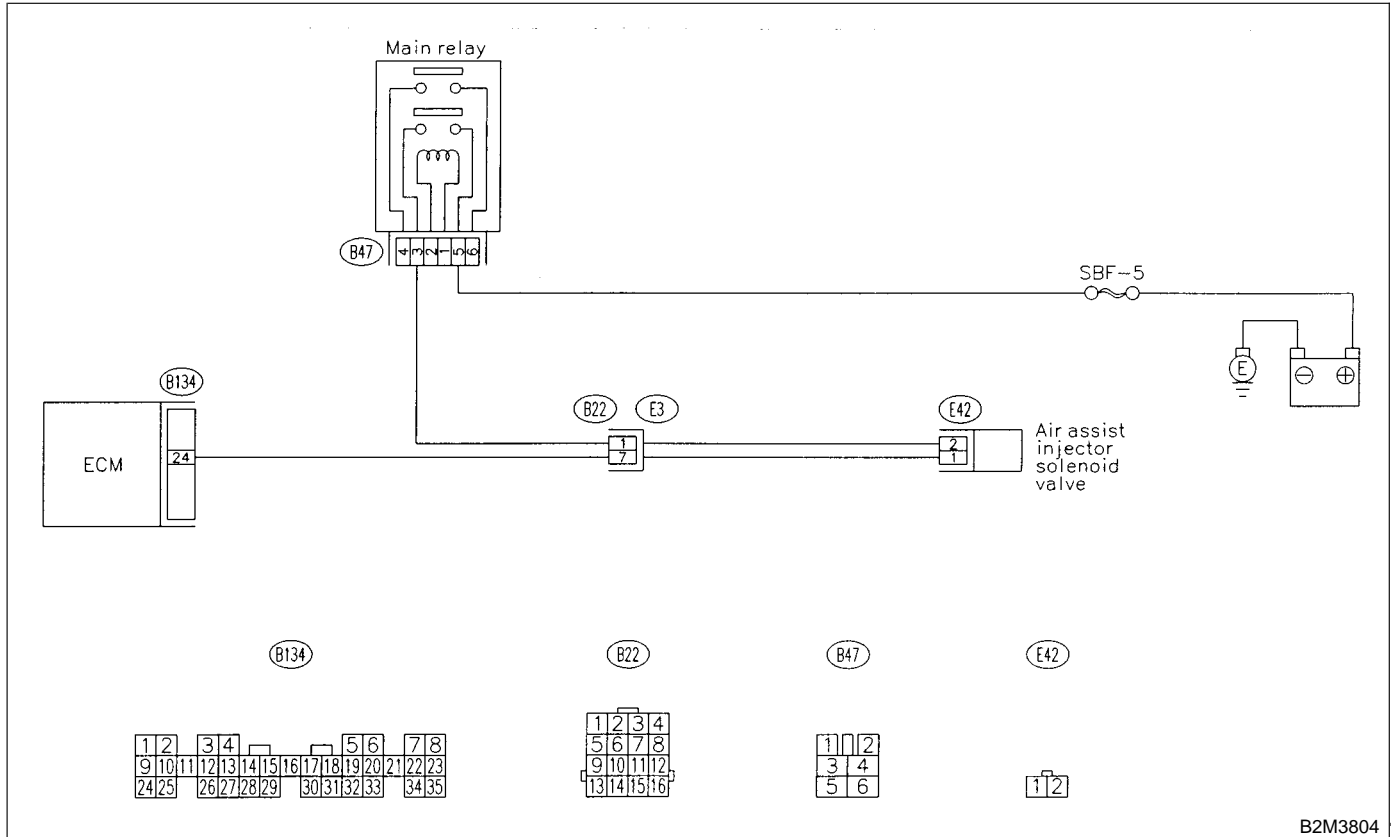
CL: DTC P1445 — AIR ASSIST INJECTOR SOLENOID VALVE MALFUNCTION

- **DTC DETECTING CONDITION:**
 - Immediately after fault occurrence
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



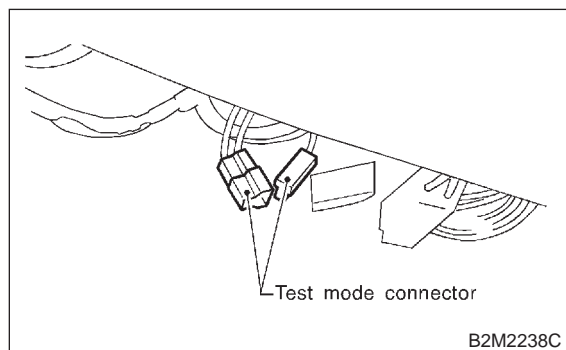
B2M3804

11CL1 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Is there any other DTC on display?*
- YES** : Inspect the relevant DTC using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>
- NO** : Go to step **11CL2**.

11CL2 : CHECK AIR ASSIST INJECTOR SOLENOID VALVE OPERATION.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



- 3) Turn ignition switch to ON.
- 4) Operate air assist injector solenoid valve.

NOTE:

Air assist injector solenoid valve operation can also be executed using Subaru Select Monitor. For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

CHECK : **Does air assist injector solenoid valve operating sound?**

YES : Go to step **11CL3**.

NO : Replace air assist injector solenoid valve. <Ref. to 2-1 [W16A0].>

11CL3 : CHECK AIR BY-PASS HOSES.

Use your mouth to blow through air by-pass hose to make sure that there is a smooth air flow (no clogging).

CHECK : **Is air by-pass hose damaged?**

YES : Repair or replace air by-pass hoses.

NO : Go to step **11CL4**.

11CL4 : CHECK FUEL INJECTOR.

- 1) Turn ignition switch to OFF.
- 2) Remove fuel injector. <Ref. to 2-7 [W18A0].>
- 3) Check for clogged fuel injectors.

CHECK : **Is fuel injector clogged?**

YES : Replace fuel injector. <Ref. to 2-7 [W18A0].>

NO : Replace air assist injector solenoid valve. <Ref. to 2-7 [W16A0].>

CM: DTC P1490 — THERMOSTAT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Thermostat remains open.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

11CM1 : CHECK VEHICLE CONDITION.

- CHECK** : *Has engine operated at idle or has vehicle been driven with part of engine submerged under water?*
- YES** : In this case, it is not necessary to inspect DTC P1490.
- NO** : Go to step 11CM2.

11CM2 : CHECK ANY OTHER DTC ON DISPLAY.

- CHECK** : *Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0125, P0301, P0302, P0303 and P0304 at same time?*
- YES** : Go to step 11CM3.
- NO** : Inspect DTC P0125, P0301, P0302, P0303 and P0304 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

11CM3 : CHECK ENGINE COOLANT.

- CHECK** : *Are coolant level and mixture ratio of cooling water to anti-freeze solution correct?*
- YES** : Go to step 11CM4.
- NO** : Replace engine coolant. <Ref. to 2-5 [W9A0].>

11CM4 : CHECK RADIATOR FAN.

- 1) Start the engine.
 - 2) Check radiator fan operation.
- CHECK** : *Does radiator fan continuously rotate for more than 3 minutes during idling?*
- YES** : Repair radiator fan circuit. <Ref. to 2-5 [T100].>
- NO** : Replace thermostat. <Ref. to 2-5 [W2A0].>

MEMO:

CN: DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —

• DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

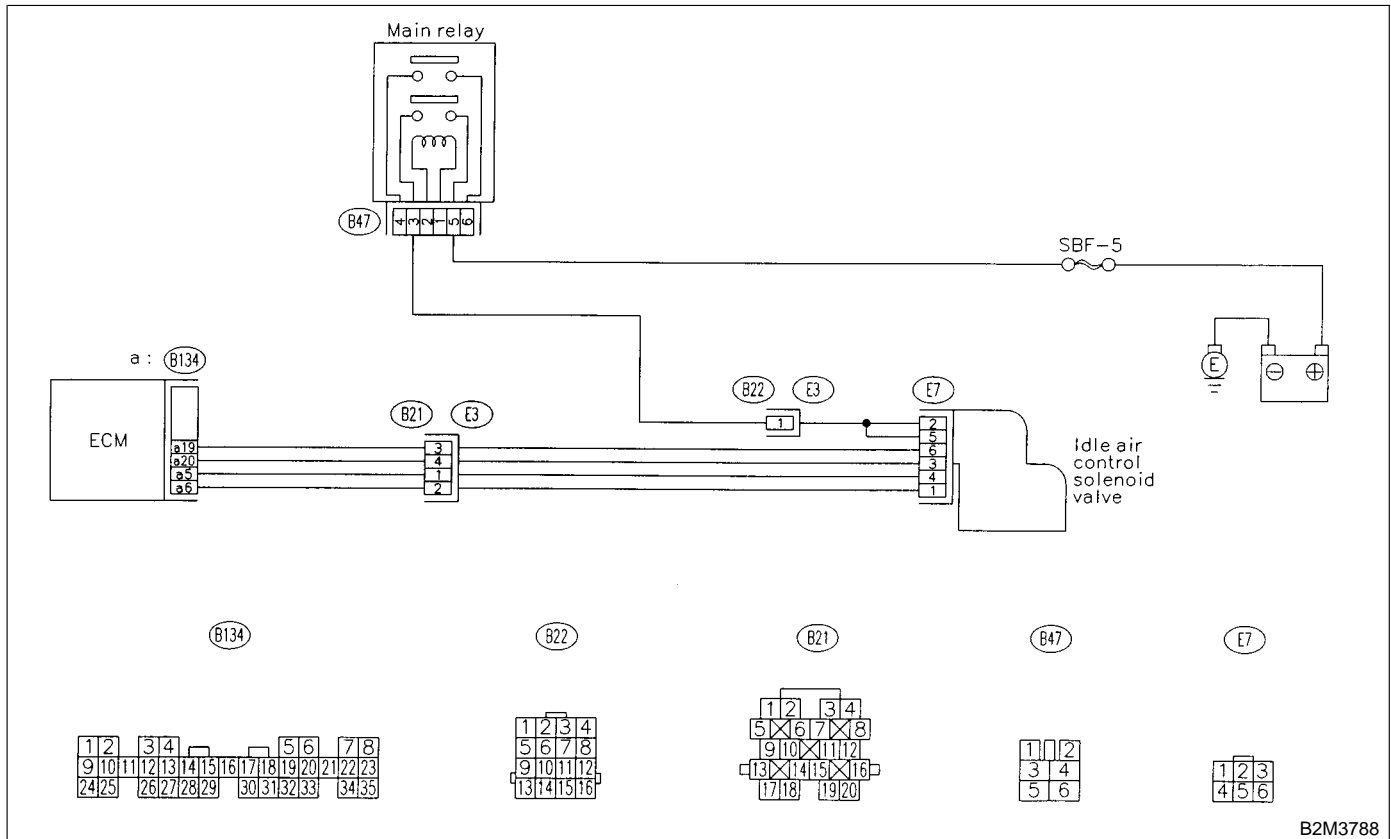
• TROUBLE SYMPTOM:

- Engine keeps running at higher revolution than specified idling revolution.

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

• WIRING DIAGRAM:



B2M3788

11CN1 : CHECK ANY OTHER DTC ON DISPLAY.

CHECK : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?

YES : Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "11. Diagnostics Chart with Trouble Code for AT Vehicles". <Ref. to 2-7 [T11A0].>

NOTE:
In this case, it is not necessary to inspect DTC P0507.

NO : Go to step 11CN2.

11CN2 : CHECK AIR INTAKE SYSTEM.

- 1) Turn ignition switch to ON.
- 2) Start engine, and idle it.
- 3) Check the following items.
 - Loose installation of intake manifold, idle air control solenoid valve and throttle body
 - Cracks of intake manifold gasket, idle air control solenoid valve gasket and throttle body gasket
 - Disconnections of vacuum hoses

CHECK : Is there a fault in air intake system?

YES : Repair air suction and leaks.

NO : Go to step 11CN3.

11CN3 : CHECK THROTTLE CABLE.

- CHECK** : *Does throttle cable have play for adjustment?*
- YES** : Go to step **11CN4**.
- NO** : Adjust throttle cable. <Ref. to 4-5 [W1A3].>

11CN4 : CHECK AIR BY-PASS LINE.

- 1) Turn ignition switch to OFF.
- 2) Remove idle air control solenoid valve from throttle body. <Ref. to 2-7 [W15A2].>
- 3) Confirm that there are no foreign particles in by-pass air line.

- CHECK** : *Are foreign particles in by-pass air line?*
- YES** : Remove foreign particles from by-pass air line.
- NO** : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A2].>

MEMO:

**CO: DTC P1510 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1
CIRCUIT LOW INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1516. <Ref. to 2-7 [T11CU0].>

**CP: DTC P1511 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1
CIRCUIT HIGH INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1517. <Ref. to 2-7 [T11CV0].>

**CQ: DTC P1512 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2
CIRCUIT LOW INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1516. <Ref. to 2-7 [T11CU0].>

**CR: DTC P1513 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2
CIRCUIT HIGH INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1517. <Ref. to 2-7 [T11CV0].>

**CS: DTC P1514 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3
CIRCUIT LOW INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1516. <Ref. to 2-7 [T11CU0].>

**CT: DTC P1515 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3
CIRCUIT HIGH INPUT —****NOTE:**

For the diagnostic procedure, refer to DTC P1517. <Ref. to 2-7 [T11CV0].>

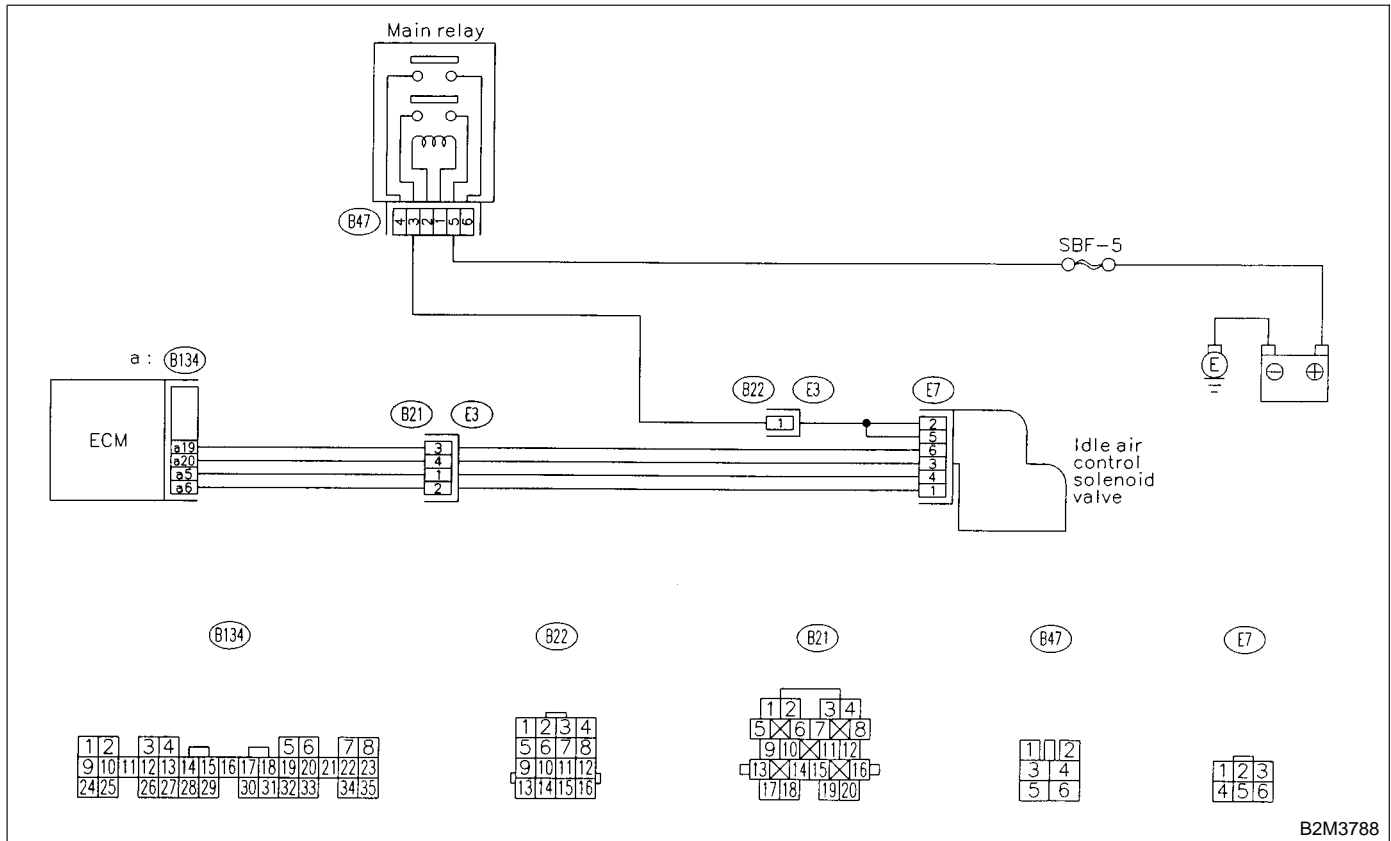
**CU: DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4
CIRCUIT LOW INPUT —**

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Engine breathing

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



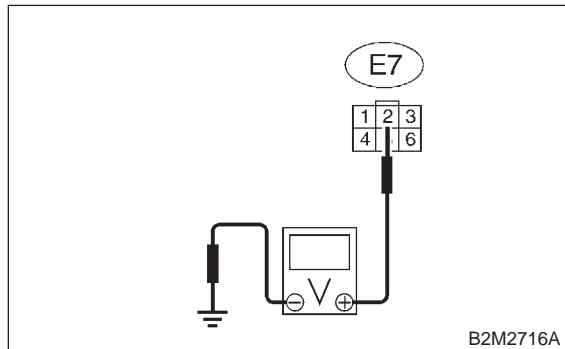
B2M3788

11CU1 : CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between idle air control solenoid valve connector and engine ground.

Connector & terminal

(E7) No. 2 (+) — Engine ground (-):



CHECK : *Is the voltage more than 10 V?*

YES : Go to step 11CU2.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

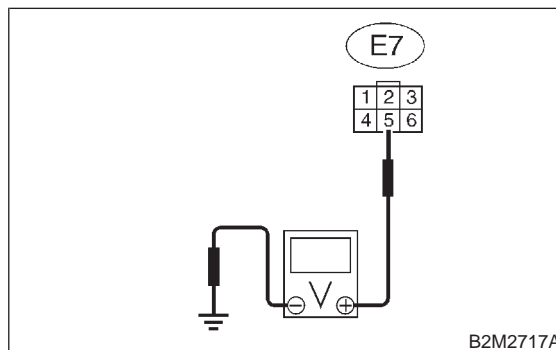
- Open circuit in harness between idle air control solenoid valve and main relay connector
- Poor contact in coupling connector (B22)

11CU2 : CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.

Measure voltage between idle air control solenoid valve connector and engine ground.

Connector & terminal

(E7) No. 5 (+) — Engine ground (-):



CHECK : *Is the voltage more than 10 V?*

YES : Go to step 11CU3.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

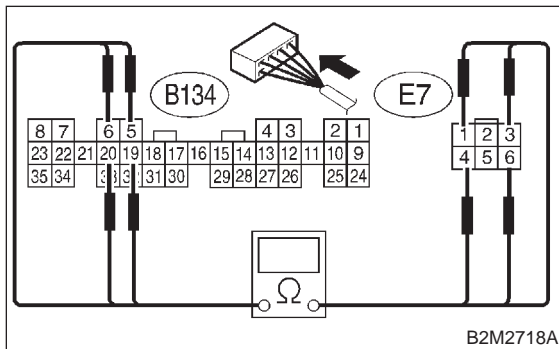
- Open circuit in harness between idle air control solenoid valve and main relay connector
- Poor contact in coupling connector (B22)

11CU3 : CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ECM and idle air control solenoid valve connector.

Connector & terminal

DTC P1510; (B134) No. 5 — (E7) No. 3:
DTC P1512; (B134) No. 6 — (E7) No. 1:
DTC P1514; (B134) No. 19 — (E7) No. 6:
DTC P1516; (B134) No. 20 — (E7) No. 4:



CHECK : **Is the resistance less than 1 Ω?**

YES : Go to step 11CU4.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

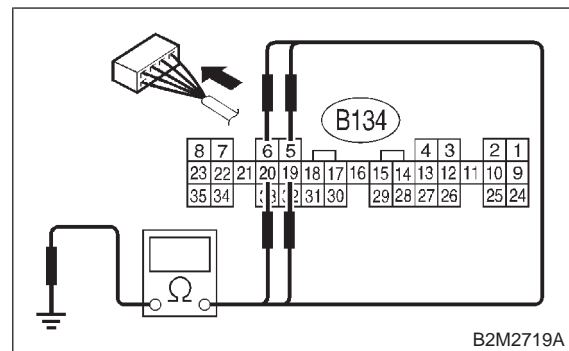
- Open circuit in harness between ECM and idle air control solenoid valve connector
- Poor contact in coupling connector (B21)

11CU4 : CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.

- 1) Disconnect connector from ECM.
- 2) Measure resistance between ECM connector and chassis ground.

Connector & terminal

DTC P1510; (B134) No. 5 — Chassis ground:
DTC P1512; (B134) No. 6 — Chassis ground:
DTC P1514; (B134) No. 19 — Chassis ground:
DTC P1516; (B134) No. 20 — Chassis ground:



CHECK : **Is the resistance less than 10 Ω?**

YES : Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.

NO : Go to step 11CU5.

11CU5 : CHECK POOR CONTACT.

Check poor contact in ECM connector and idle air control solenoid valve connector. <Ref. to FOREWORD [T3C1].>

CHECK : *Is there poor contact in ECM connector or idle air control solenoid valve connector?*

YES : Repair poor contact in ECM connector or idle air control solenoid valve connector.

NO : Replace idle air control solenoid valve. <Ref. to 2-7 [W15A2].>

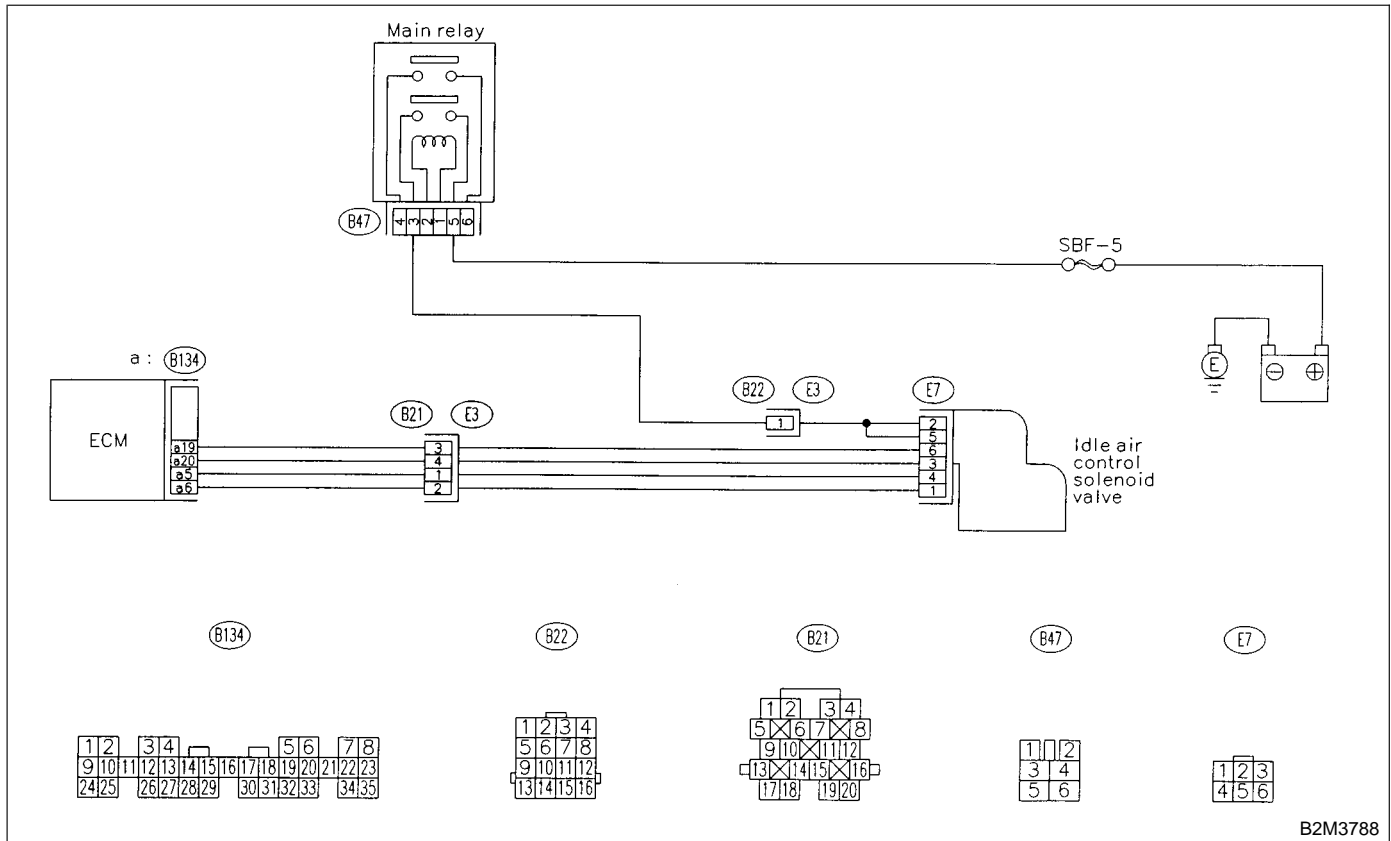
**CV: DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4
CIRCUIT HIGH INPUT —**

- **DTC DETECTING CONDITION:**
 - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
 - Erroneous idling
 - Engine stalls.
 - Engine breathing

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● **WIRING DIAGRAM:**



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11CV1 : CHECK ANY OTHER DTC ON DISPLAY.

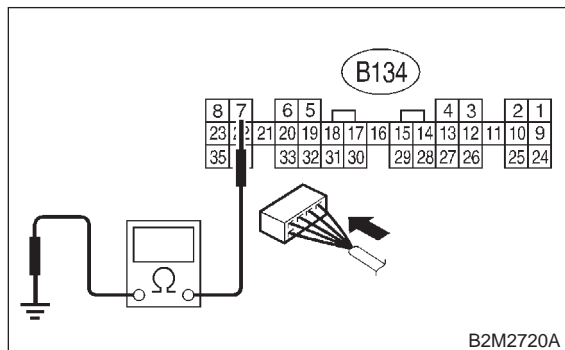
- CHECK** : Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1511, P1513, P1515 and P1517 at same time?
- YES** : Go to step 11CV2.
- NO** : Go to step 11CV3.

11CV2 : CHECK GROUND CIRCUIT FOR ECM.

- 1) Turn ignition switch to OFF.
- 2) Measure resistance between ECM connector and chassis ground.

Connector & terminal

(B134) No. 7 — Chassis ground:



CHECK : **Is the resistance less than 5 Ω?**

YES : Go to step 11CV3.

NO : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM connector and engine ground terminal
- Poor contact in ECM connector
- Poor contact in coupling connector (B22)

11CV3 : CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from idle air control solenoid valve.
- 3) Turn ignition switch to ON.
- 4) Measure voltage between ECM connector and chassis ground.

Connector & terminal

DTC P1511; (B134) No. 5 (+) — Chassis

ground (-):

DTC P1513; (B134) No. 6 (+) — Chassis

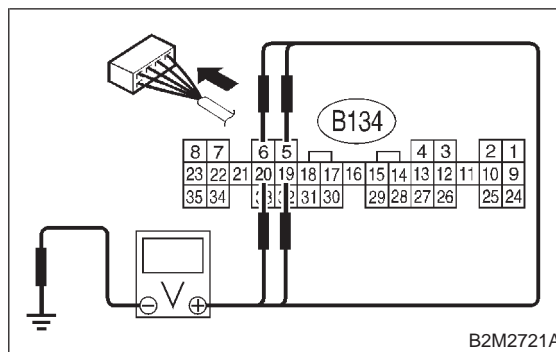
ground (-):

DTC P1515; (B134) No. 19 (+) — Chassis

ground (-):

DTC P1517; (B134) No. 20 (+) — Chassis

ground (-):



CHECK : **Is the voltage more than 10 V?**

YES : Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>

NO : Replace ECM. <Ref. to 2-7 [W19A0].>

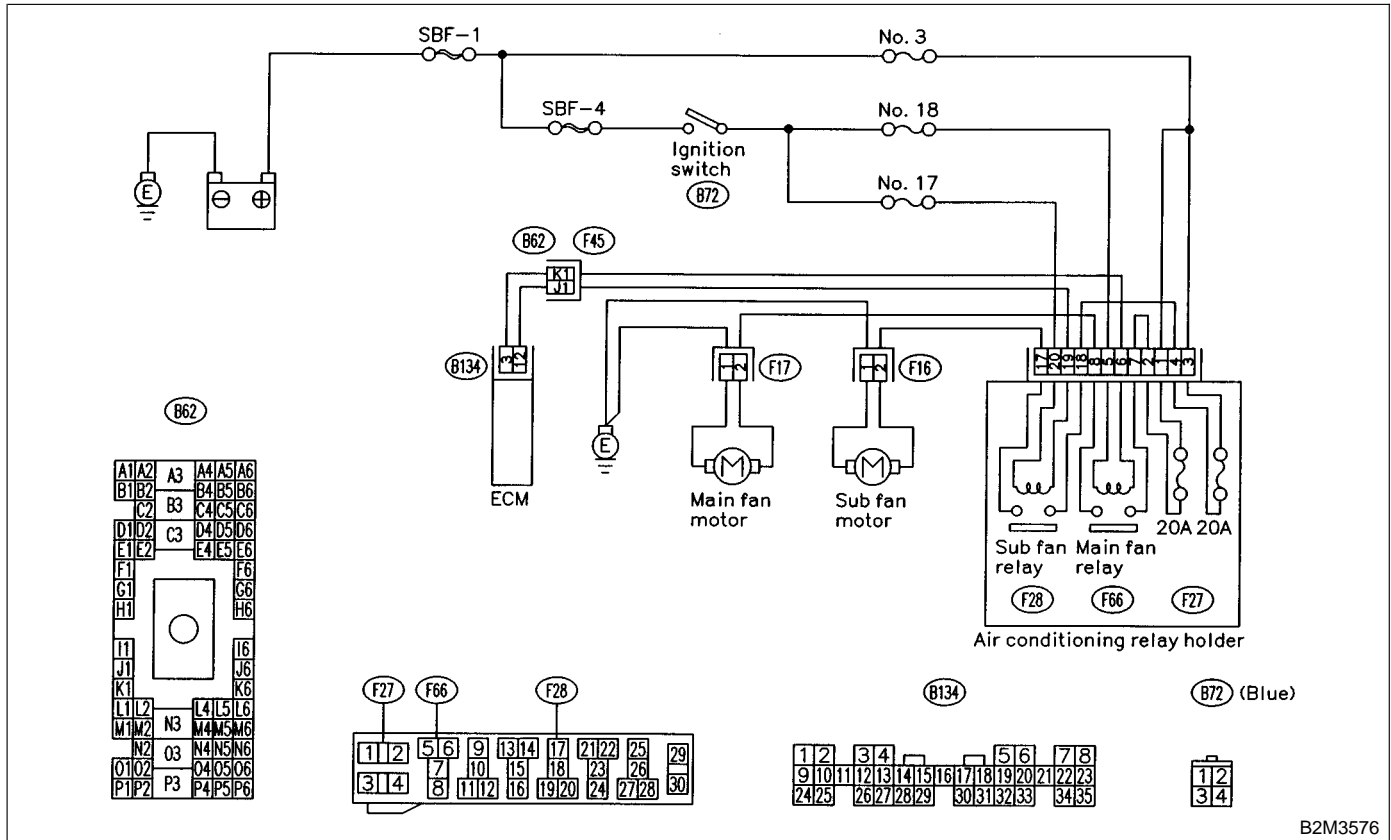
CW: DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
 - Radiator fan does not operate properly.
 - Overheating

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

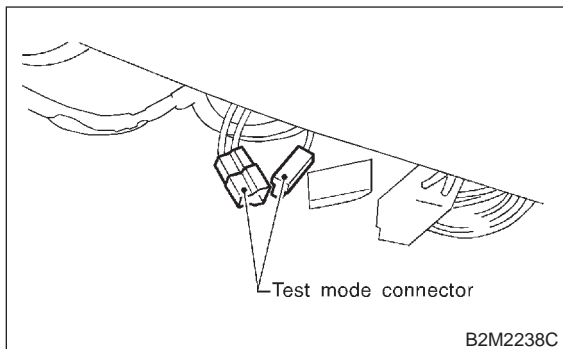
● **WIRING DIAGRAM:**



B2M3576

11CW1 : CHECK OUTPUT SIGNAL FROM ECM.

- 1) Turn ignition switch to OFF.
- 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



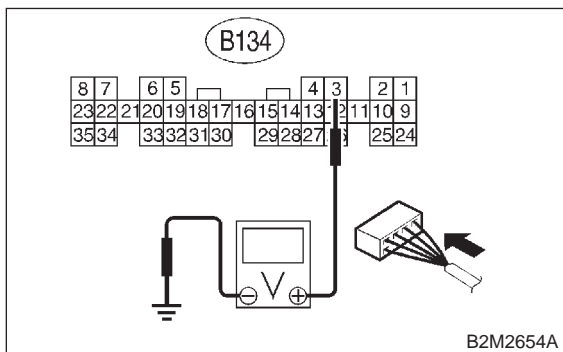
- 3) Turn ignition switch to ON.
- 4) While operating radiator fan relay, measure voltage between ECM and chassis ground.

NOTE:

Radiator fan relay operation can be executed using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to 2-7 [T3F0].>

Connector & terminal

(B134) No. 3 (+) — Chassis ground (-):



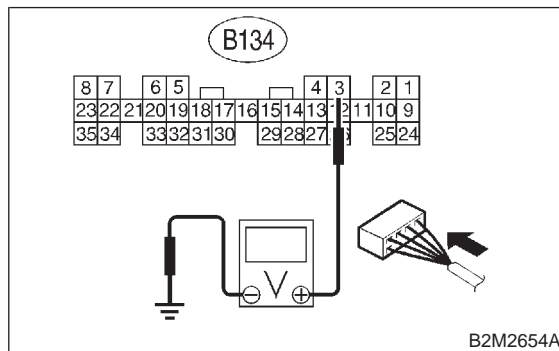
- CHECK** : Does voltage change between 0 and 10 V?
- YES** : Even if MIL lights up, the circuit has returned to a normal condition at this time. In this case, repair poor contact in ECM connector.
- NO** : Go to step 11CW2.

11CW2 : CHECK SHORT CIRCUIT IN RADIATOR FAN RELAY CONTROL CIRCUIT.

- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay and sub fan relay. (with A/C models)
- 3) Disconnect test mode connector.
- 4) Turn ignition switch to ON.
- 5) Measure voltage between ECM and chassis ground.

Connector & terminal

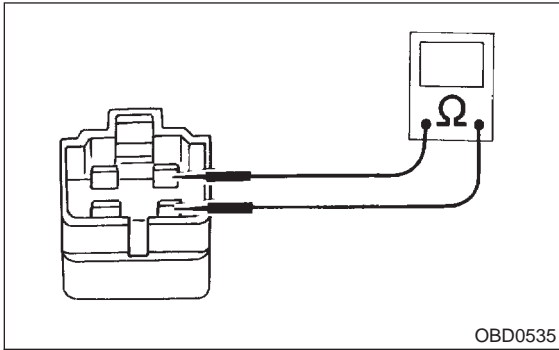
(B134) No. 3 (+) — Chassis ground (-):



- CHECK** : Is the voltage more than 10 V?
- YES** : Repair battery short circuit in radiator fan relay control circuit. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step 11CW3.

11CW3 : CHECK MAIN FAN RELAY.

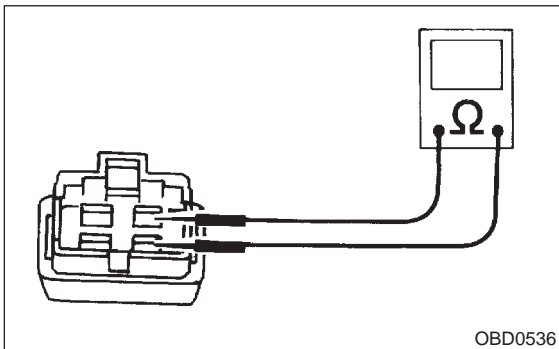
- 1) Turn ignition switch to OFF.
- 2) Remove main fan relay.
- 3) Measure resistance between main fan relay terminals.

Terminal**No. 1 — No. 3:**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace main fan relay and ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CW4**.

11CW4 : CHECK SUB FAN RELAY.

- 1) Remove sub fan relay.
- 2) Measure resistance between sub fan relay terminals.

Terminal**No. 1 — No. 3**

- CHECK** : **Is the resistance less than 1 Ω?**
- YES** : Replace sub fan relay and ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11CW5**.

11CW5 : CHECK POOR CONTACT.

Check poor contact in ECM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in ECM connector?**
- YES** : Repair poor contact in ECM connector.
- NO** : Replace ECM. <Ref. to 2-7 [W19A0].>

MEMO:

CX: DTC P1540 — VEHICLE SPEED SENSOR MALFUNCTION 2 —

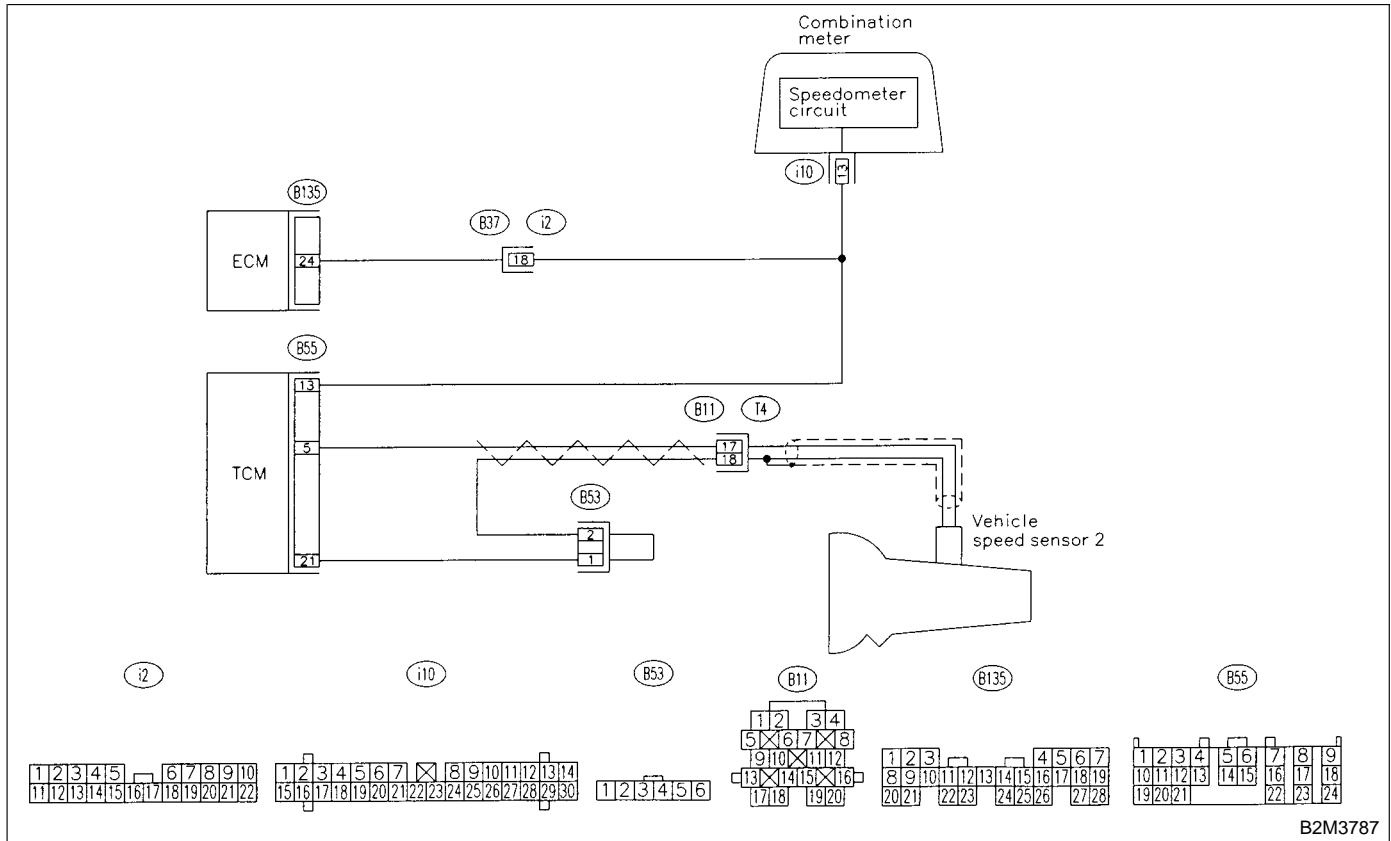
DTC DETECTING CONDITION:

- Immediately at fault recognition

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

WIRING DIAGRAM:



B2M3787

11CX1 : CHECK DTC P0720 ON DISPLAY.

- CHECK :** Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?
- YES :** Check vehicle speed sensor 2 signal circuit. <Ref. to 3-2 [T8F0].>
- NO :** Go to step 11CX2.

11CX2 : CHECK SPEEDOMETER OPERATION IN COMBINATION METER.

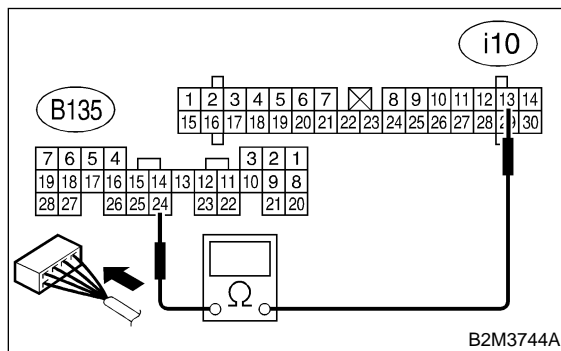
- CHECK :** Does speedometer operate normally?
- YES :** Go to step 11CX3.
- NO :** Check speedometer and vehicle speed sensor. <Ref. to 6-2 [K3A0].>

11CX3 : CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.

- 1) Turn ignition switch to OFF.
- 2) Disconnect connector from combination meter.
- 3) Measure resistance between ECM and combination meter.

Connector & terminal

(B135) No. 24 — (i10) No. 13:



- CHECK** : **Is the resistance less than 10 Ω ?**
- YES** : Repair poor contact in ECM connector.
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and combination meter connector
- Poor contact in ECM connector
- Poor contact in combination meter connector
- Poor contact in coupling connector (i2)

CY: DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION —

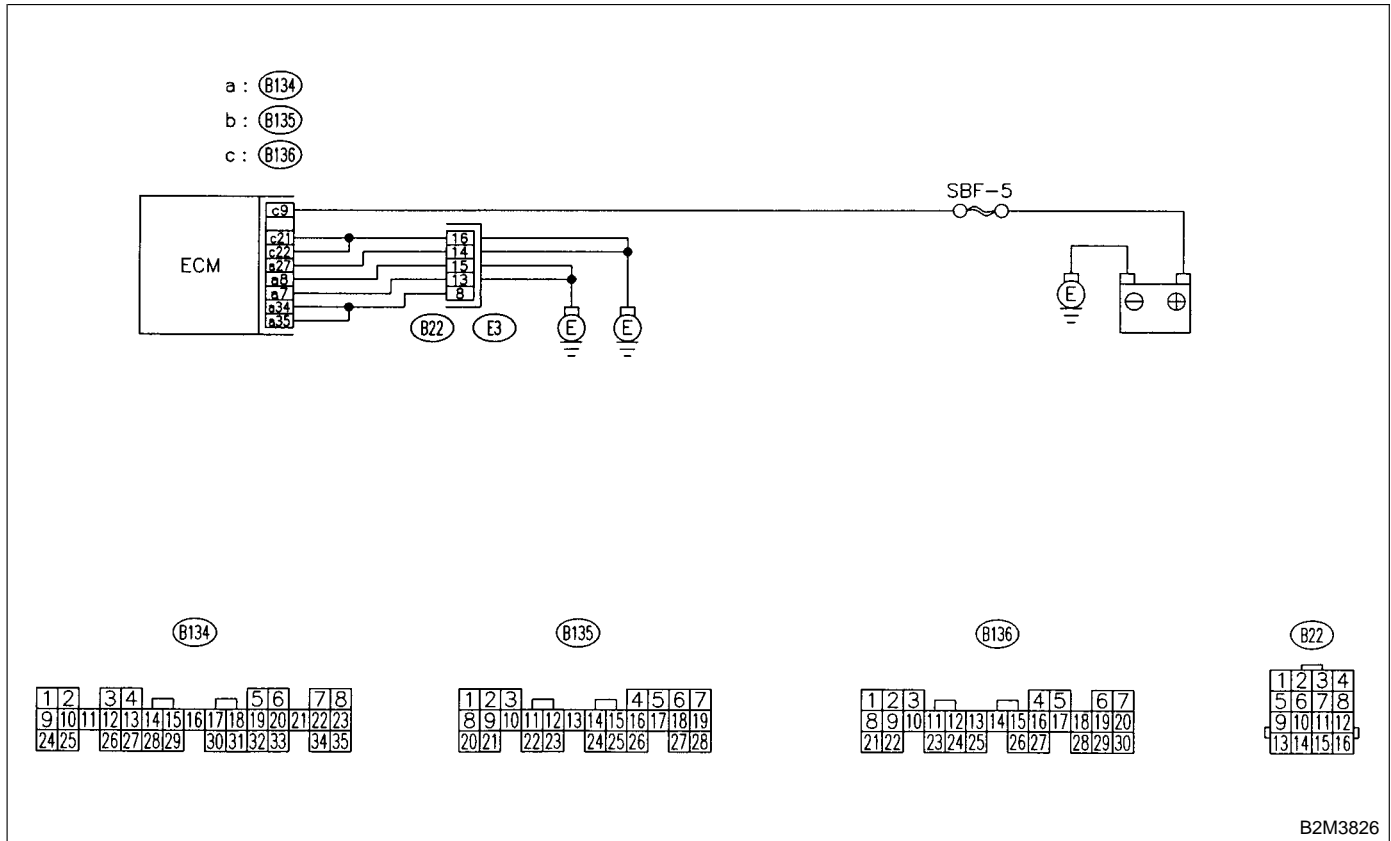
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:

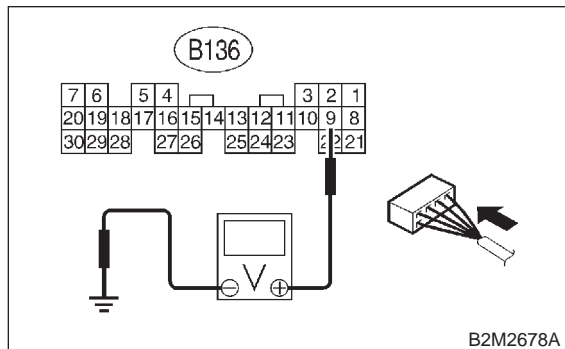


11CY1 : CHECK INPUT SIGNAL FOR ECM.

- 1) Turn ignition switch to OFF.
- 2) Measure voltage between ECM and chassis ground.

Connector & terminal

(B136) No. 9 (+) — Chassis ground (-):



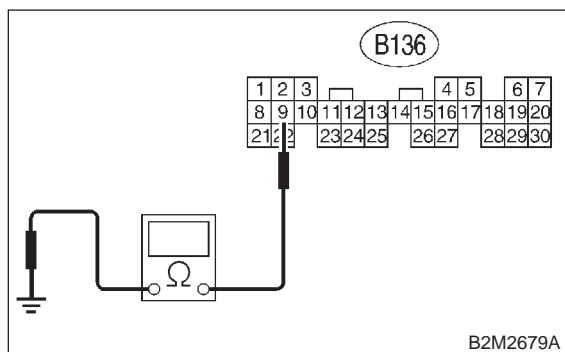
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **11CY2**.

11CY2 : CHECK HARNESS BETWEEN ECM AND MAIN FUSE BOX CONNECTOR.

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

Connector & terminal

(B136) No. 9 — Chassis ground:



- CHECK** : **Is the resistance less than 10 Ω?**
- YES** : Repair ground short circuit in harness between ECM connector and battery terminal.
- NO** : Go to step **11CY3**.

11CY3 : CHECK FUSE SBF-5.

- CHECK** : **Is fuse blown?**
- YES** : Replace fuse. <Ref. to 6-3 [D6A0].>
- NO** : Repair harness and connector.

NOTE:

In this case, repair the following:

- Open circuit in harness between ECM and battery
- Poor contact in ECM connector
- Poor contact in battery terminal

CZ: DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —**● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

● TROUBLE SYMPTOM:

- Shift point too high or too low; engine brake not effected in “3” range; excessive shift shock; excessive tight corner “braking”

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check throttle position sensor circuit. <Ref. to 3-2 [T8F0].>

MEMO:

DA: DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —

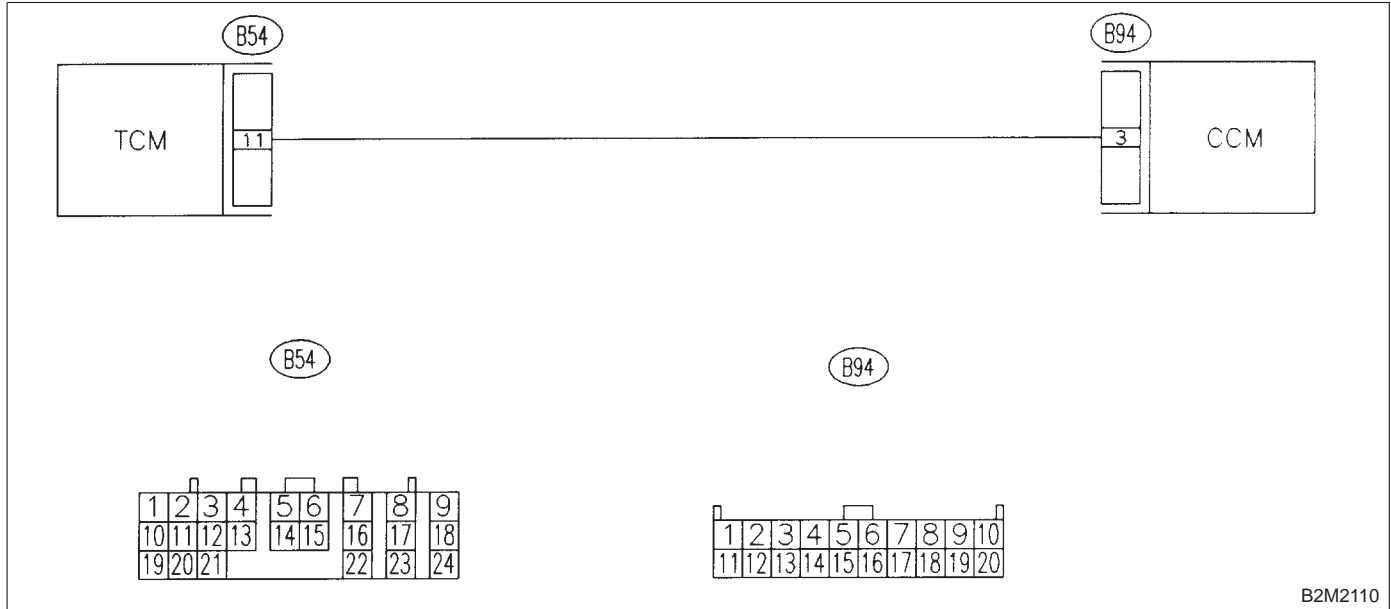
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>

● WIRING DIAGRAM:



B2M2110

11DA1 : CHECK HARNESS BETWEEN TCM AND CCM CONNECTOR.

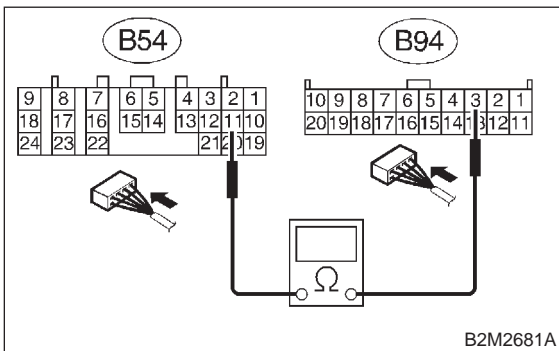
11DA2 : CHECK HARNESS BETWEEN TCM AND CCM CONNECTOR.

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

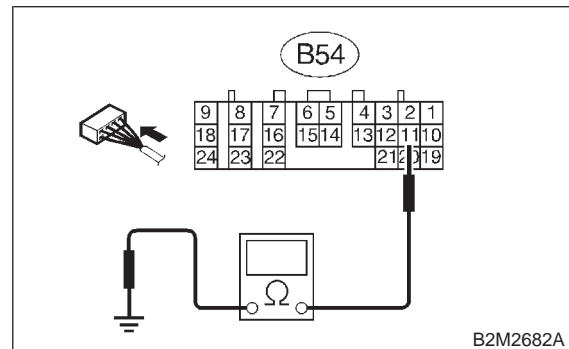
Measure resistance of harness between TCM and chassis ground.

Connector & terminal
(B54) No. 11 — Chassis ground:

Connector & terminal
(B54) No. 11 — (B94) No. 3:



B2M2681A



B2M2682A

- CHECK** : Is the resistance less than 1 Ω?
- YES** : Go to step 11DA2.
- NO** : Repair open circuit in harness between TCM and CCM connector.

- CHECK** : Is the resistance less than 10 Ω?
- YES** : Repair short circuit in harness between TCM and CCM connector.
- NO** : Go to step 11DA3.

11DA3 : CHECK INPUT SIGNAL FOR TCM.

- 1) Connect connector to TCM and CCM.
- 2) Lift-up the vehicle or set the vehicle on free rollers.

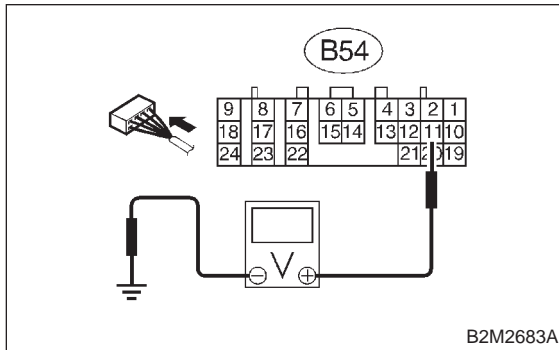
CAUTION:

On AWD models, raise all wheels off ground.

- 3) Start the engine.
- 4) Cruise control main switch to ON.
- 5) Move selector lever to "D" and slowly increase vehicle speed to 50 km/h (31 MPH).
- 6) Cruise control set switch to ON.
- 7) Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 11 (+) — Chassis ground (-):



- CHECK** : **Is the resistance less than 1 V?**
- YES** : Go to step **11DA4**.
- NO** : Check cruise control set circuit. <Ref. to 6-2 [T7A0].>

11DA4 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

- CHECK** : **Is there poor contact in TCM connector?**
- YES** : Repair poor contact in TCM connector.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

DB: DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT —

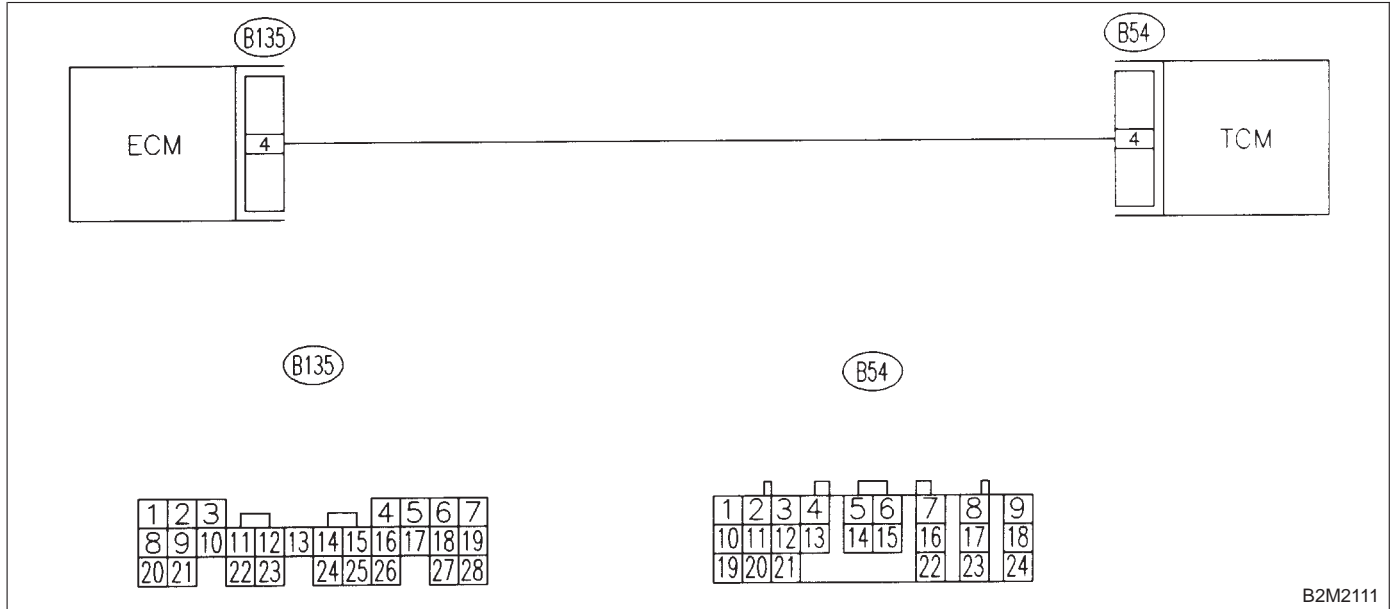
● **DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**

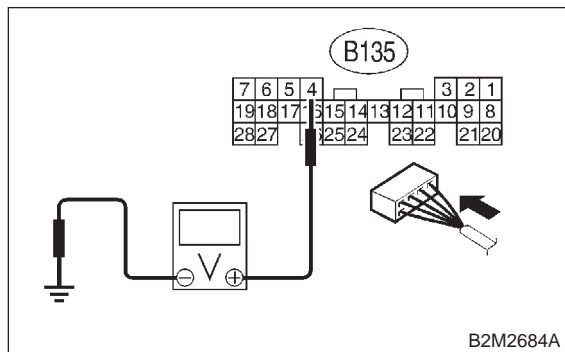


11DB1 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



- CHECK** : *Is the voltage less than 1 V?*
- YES** : Go to step 11DB2.
- NO** : Even if MIL lights up, the circuit has returned to a normal condition at this time.

NOTE:

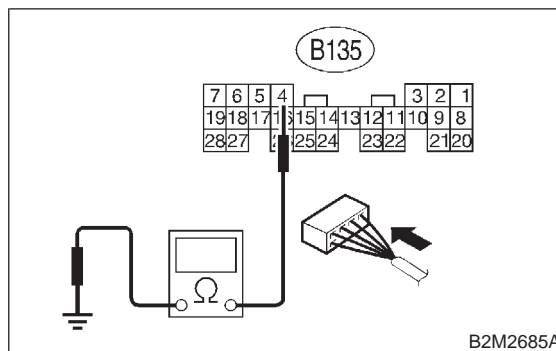
- In this case, repair the following:
- Poor contact in ECM connector
 - Poor contact in TCM connector

11DB2 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal

(B135) No. 4 — Chassis ground:



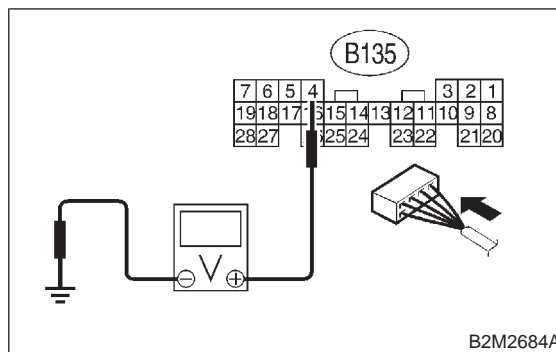
- CHECK** : *Is the resistance less than 10 Ω?*
- YES** : Repair ground short circuit in harness between ECM and TCM connector.
- NO** : Go to step 11DB3.

11DB3 : CHECK OUTPUT SIGNAL FOR ECM.

- 1) Connect connector to ECM.
- 2) Turn ignition switch to ON.
- 3) Measure voltage between ECM and chassis ground.

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



- CHECK** : *Is the voltage more than 5 V?*
- YES** : Go to step 11DB4.
- NO** : Repair poor contact in ECM connector.

**11DB4 : CHECK TROUBLE CODE FOR
AUTOMATIC TRANSMISSION.**

Read trouble code for automatic transmission.
<Ref. to 3-2 [T8A0].>

- CHECK** : ***Does trouble code appear for automatic transmission?***
- YES** : Inspect trouble code for automatic transmission. <Ref. to 3-2 [T8A0].>
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

**DC: DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE
CIRCUIT MALFUNCTION —****● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check low clutch timing control solenoid valve circuit. <Ref. to 3-2 [T8L0].>

**DD: DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE
CIRCUIT MALFUNCTION —****● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check 2-4 brake timing control solenoid valve circuit. <Ref. to 3-2 [T8M0].>

**DE: DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE
CIRCUIT MALFUNCTION —****● DTC DETECTING CONDITION:**

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

NOTE:

Check 2-4 brake pressure control solenoid valve circuit. <Ref. to 3-2 [T8O0].>

DF: DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT —

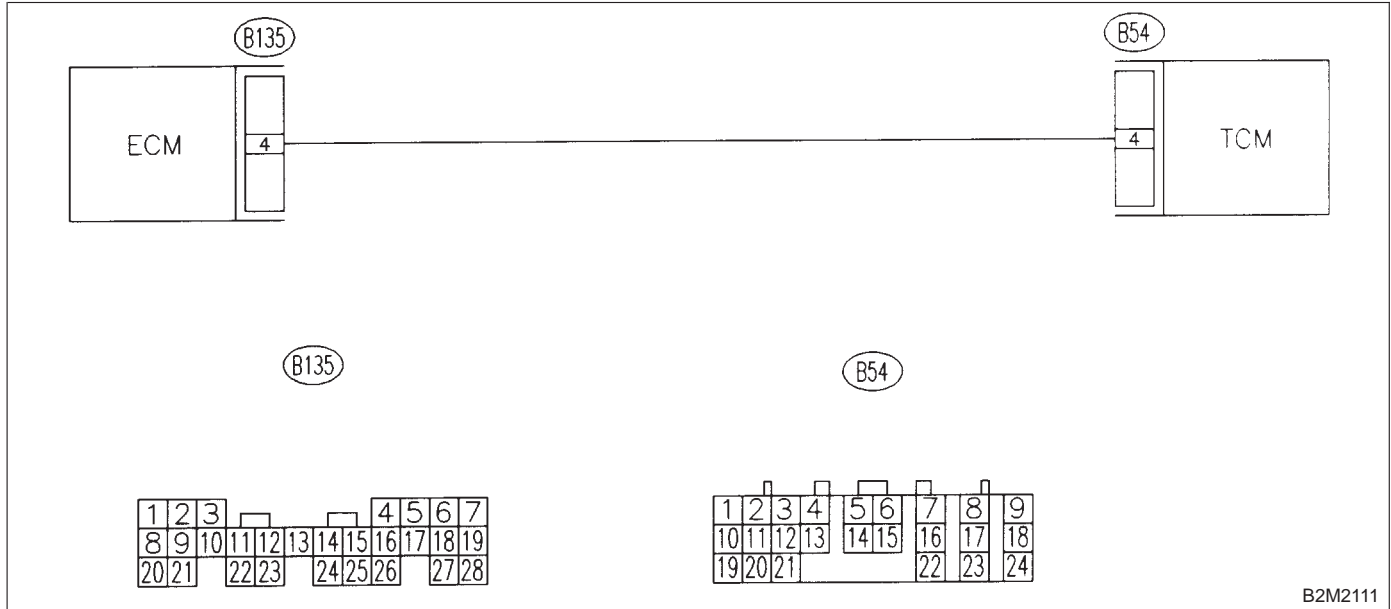
● DTC DETECTING CONDITION:

- Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● WIRING DIAGRAM:



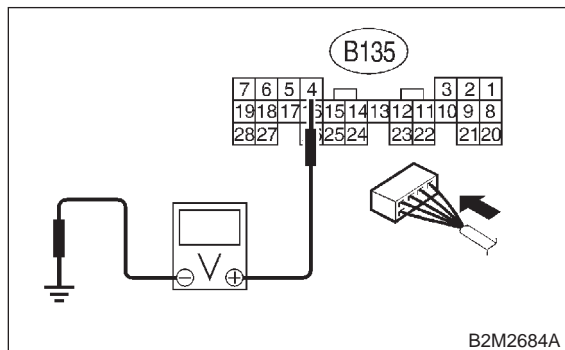
B2M2111

11DF1 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

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

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



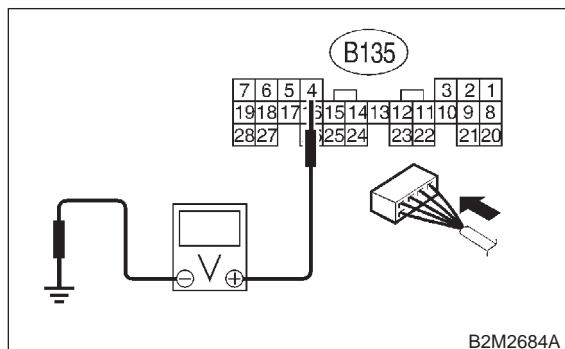
- CHECK** : **Is the voltage more than 10 V?**
- YES** : Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to 2-7 [W19A0].>
- NO** : Go to step **11DF2**.

11DF2 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



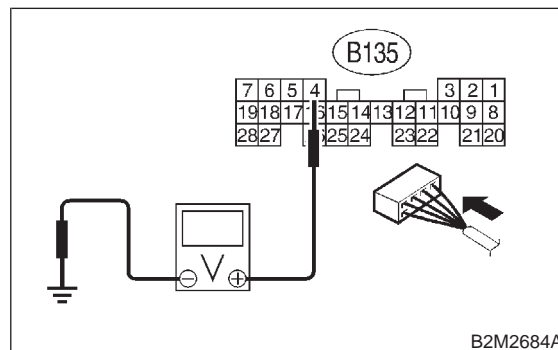
- CHECK** : **Is the voltage more than 4 V?**
- YES** : Go to step **11DF5**.
- NO** : Go to step **11DF3**.

11DF3 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure voltage between ECM connector and chassis ground.

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



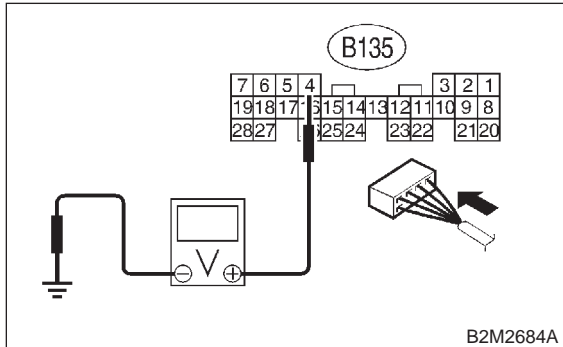
- CHECK** : **Is the voltage less than 1 V?**
- YES** : Repair poor contact in ECM connector.
- NO** : Go to step **11DF4**.

11DF4 : CHECK OUTPUT SIGNAL FROM ECM.

Measure voltage between ECM and chassis ground.

Connector & terminal

(B135) No. 4 (+) — Chassis ground (-):



CHECK : Does the voltage change from 1 V to 4 V while monitoring the value with voltage meter?

YES : Even if MIL lights up, the circuit has returned to a normal condition at this time.

NOTE:

In this case, repair the following:

- Poor contact in ECM connector
- Poor contact in TCM connector

NO : Contact with SOA service.

NOTE:

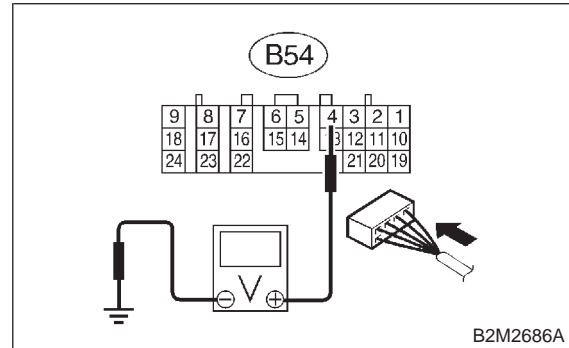
Inspection by DTM is required, because probable cause is deterioration of multiple parts.

11DF5 : CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.

Measure voltage between TCM and chassis ground.

Connector & terminal

(B54) No. 4 (+) — Chassis ground (-):



CHECK : Is the voltage more than 4 V?

YES : Go to step 11DF6.

NO : Repair open circuit in harness between ECM and TCM connector.

11DF6 : CHECK POOR CONTACT.

Check poor contact in TCM connector. <Ref. to FOREWORD [T3C1].>

CHECK : Is there poor contact in TCM connector?

YES : Repair poor contact in TCM connector.

NO : Check TCM power supply line and grounding line.

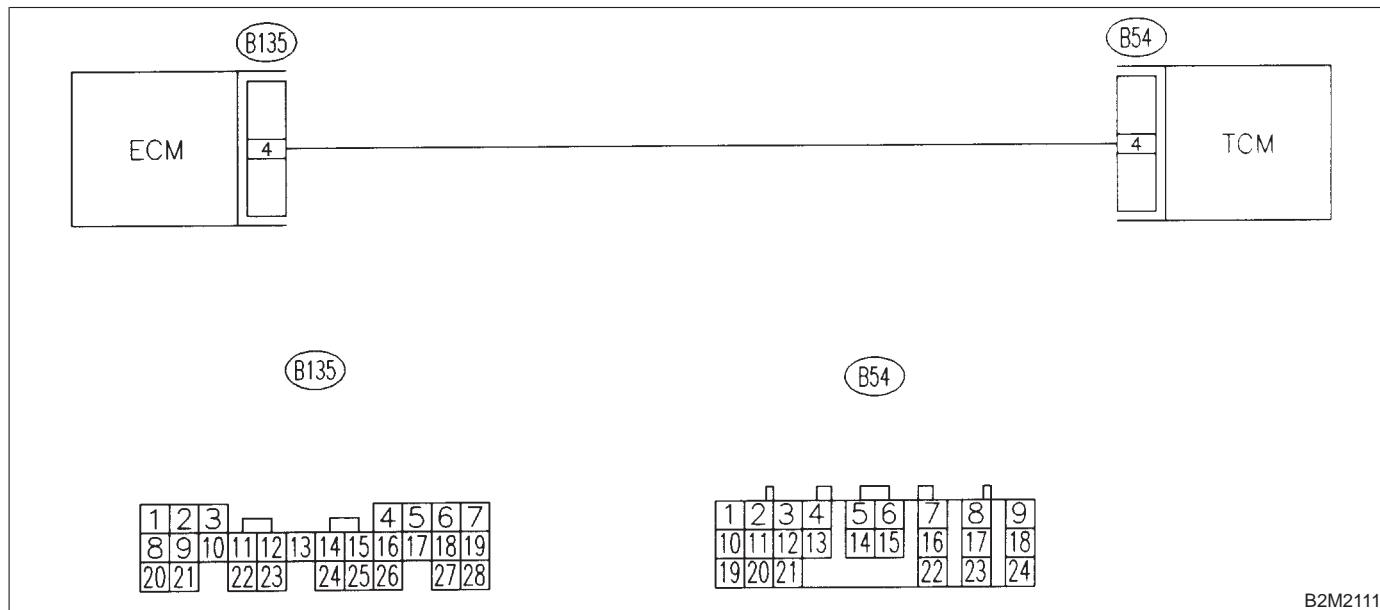
DG: DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION —

- **DTC DETECTING CONDITION:**
 - Two consecutive driving cycles with fault

CAUTION:

After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to 2-7 [T3D0].> and INSPECTION MODE <Ref. to 2-7 [T3E0].>.

● **WIRING DIAGRAM:**



11DG1 : CHECK DRIVING CONDITION.

- 1) Start and warm-up the engine until the radiator fan makes one complete rotation.
- 2) Drive the vehicle.

- CHECK** : **Is AT shift control functioning properly?**
- YES** : Go to step **11DG2**.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

11DG2 : CHECK ACCESSORY.

- CHECK** : **Are car phone and/or CB installed on vehicle?**
- YES** : Repair grounding line of car phone or CB system.
- NO** : Replace TCM. <Ref. to 3-2 [W23A0].>

MEMO: