2. Engine Coolant S106060

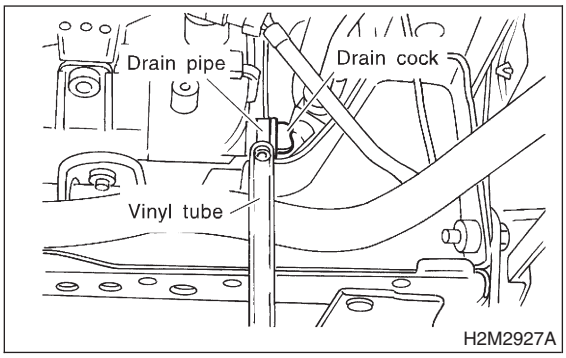
A: REPLACEMENT S106060A20

1. DRAINING OF ENGINE COOLANT

S106060A2001

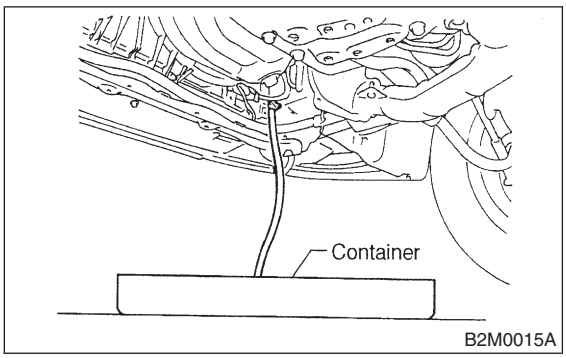
WARNING:
The radiator is pressurized. Wait until engine cools down before working on the radiator.

1) Lift-up the vehicle.
2) Remove under cover.
3) Fit vinyl tube to drain pipe.



4) Loosen drain cock to drain engine coolant into container.

NOTE:
Remove radiator cap so that engine coolant will drain faster.



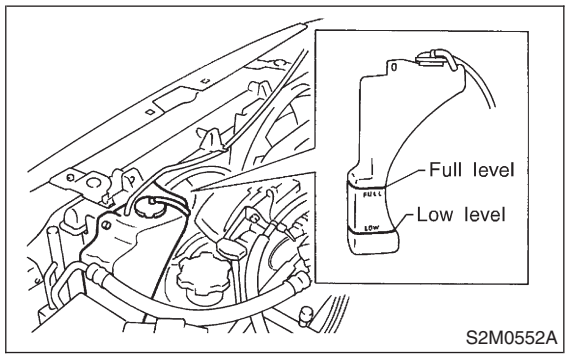
2. FILLING OF ENGINE COOLANT S106060A2002

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

Coolant capacity (fill up to "FULL" level):
Approx. 6.2 ℓ (6.6 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.

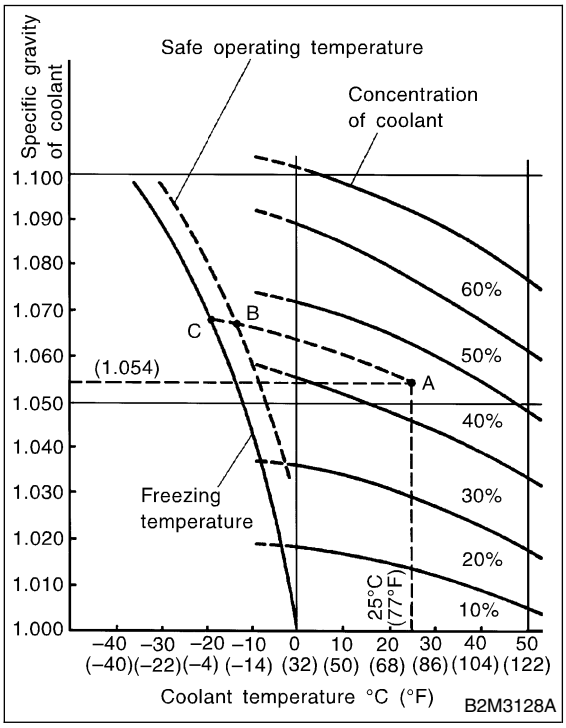


3) Attach radiator cap and reservoir tank cap properly.
4) Warm-up engine completely for more than five minutes at 2,000 to 3,000 rpm.
5) If engine coolant level drops in radiator, add engine coolant to filler neck position.
6) If engine coolant level drops from upper level of reservoir tank, add engine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

B: INSPECTION S106060A10

1. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE S106060A1001

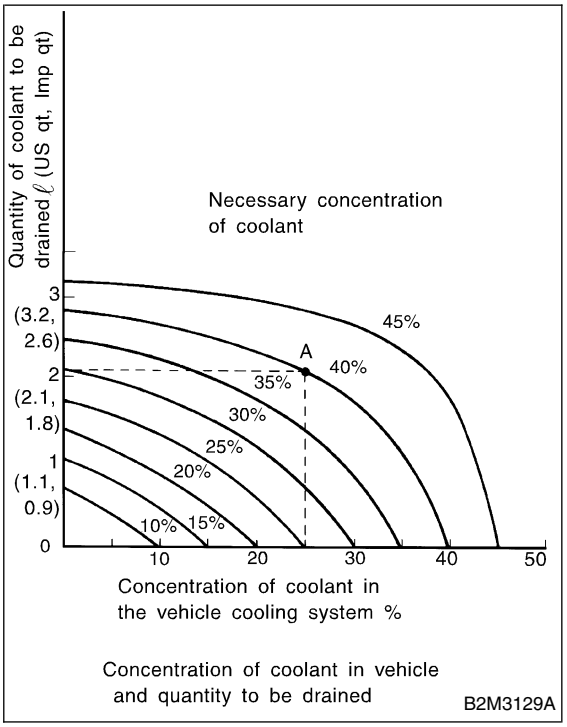
The concentration and safe operating temperature of the SUBARU coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.
[Example]
If the coolant temperature is 25°C (77°F) and its specific gravity is 1.054, the concentration is 35% (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

S106060A1002

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 form 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.



10. Engine Cooling System Trouble in General S106078

A: INSPECTION S106078A10

Trouble	Possible cause	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. Refer to “2-7 On-Board Diagnostics II System”.
	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. Refer to “2-7 On-Board Diagnostics II System”.
	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 crankcase	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.

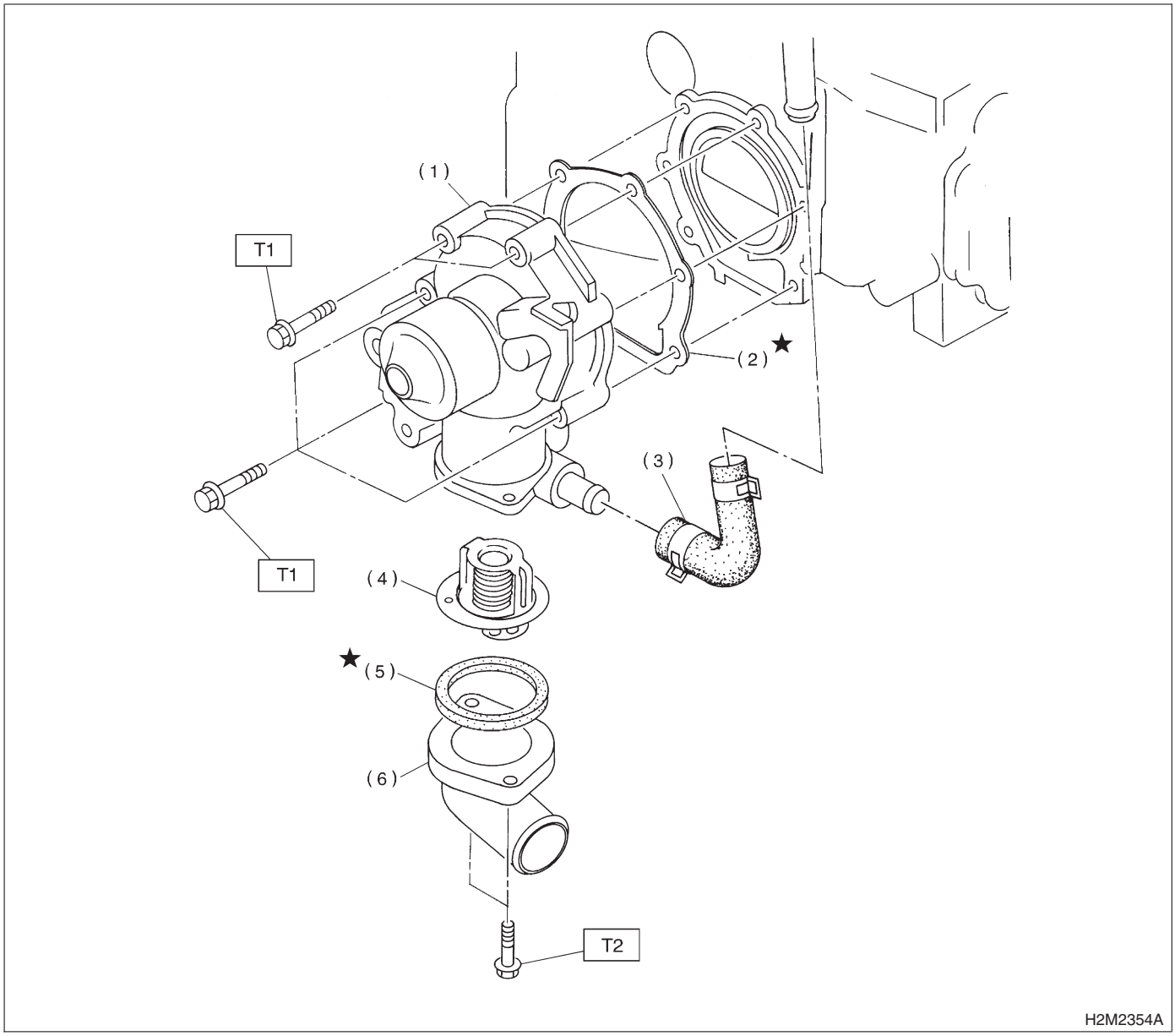
1. General Description S106001

A: SPECIFICATIONS S106001E49

Cooling system			Electric fan + Forced engine coolant circulation system
Total engine coolant capacity		ℓ (US qt, Imp qt)	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)
	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)
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		70 W (main fan) 70 W (sub fan)
	Fan diameter × Blade		320 mm (12.60 in) × 5 (main fan) 320 mm (12.60 in) × 7 (sub fan)
Radiator	Type		Down flow, pressure type
	Core dimensions		691 × 340 × 16 mm (27.20 × 13.39 × 0.63 in)
	Pressure range in which cap valve is open		Above: 108±15 kPa (1.1±0.15 kg/cm^2, 15.6±2.1 psi) Below: –9.8 to –4.9 kPa (–0.1 to –0.05 kg/cm^2, –1.4 to –0.7 psi)
	Fins		Corrugated fin type
Reservoir tank	Capacity		0.45 ℓ (0.5 US qt, 0.4 Imp qt)

B: COMPONENT S106001A05

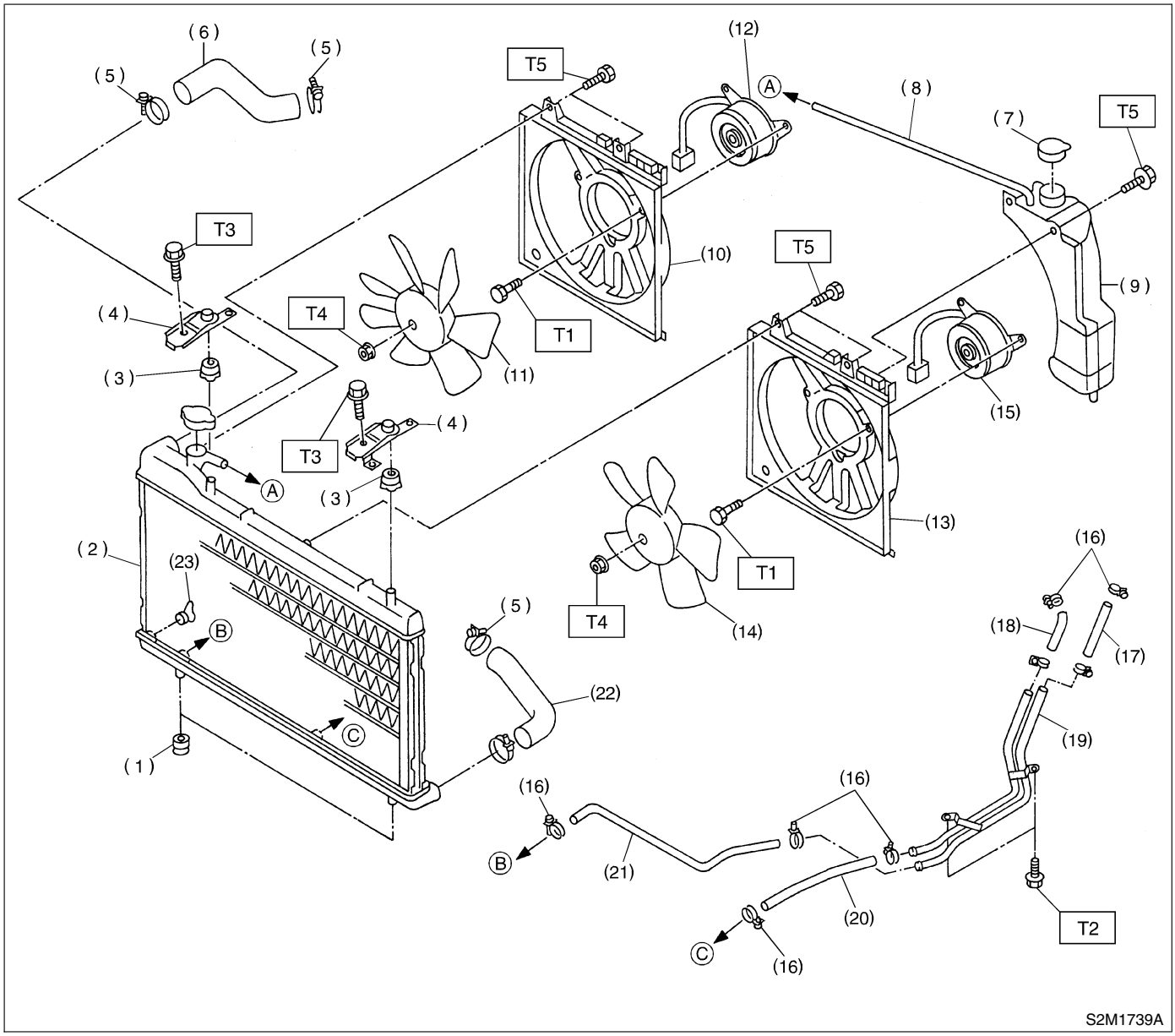
1. WATER PUMP S106001A0501



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

Tightening torque: N·m (kgf-m, ft-lb)
T1:
First:
12 (1.2, 8.7)
Second:
12 (1.2, 8.7)
T2: 6.4 (0.65, 4.7)

2. RADIATOR AND RADIATOR FAN S106001A0502



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

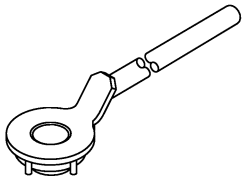
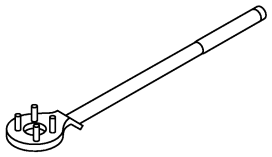
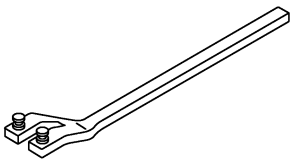
Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 12 (1.2, 8.7)
T3: 18 (1.8, 13.0)
T4: 3.4 (0.35, 2.5)
T5: 4.9 (0.50, 3.6)

C: CAUTION S106001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

D: PREPARATION TOOL S106001A17

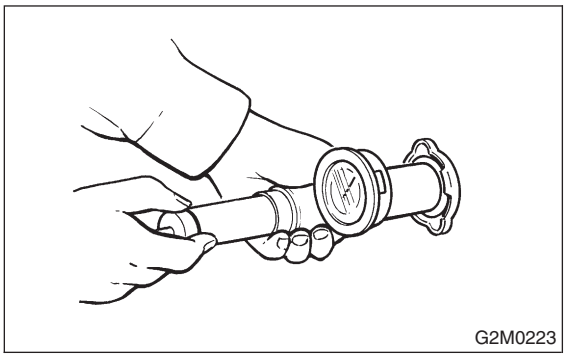
1. SPECIAL TOOL S106001A1701

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 H5M0977	499977300	CRANK PULLEY WRENCH	• Used for stopping crankshaft pulley when loosening and tightening crankshaft pulley bolts. • For 2200 cc engine.
 B2M3870	499977100	CRANK PULLEY WRENCH	• Used for stopping crankshaft pulley when loosening and tightening crankshaft pulley bolts. • For 2500 cc engine.
 B2M3859	499207100	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket.

6. Radiator Cap S106064

A: INSPECTION S106064A10

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/cm^2, 14 — 18 psi)

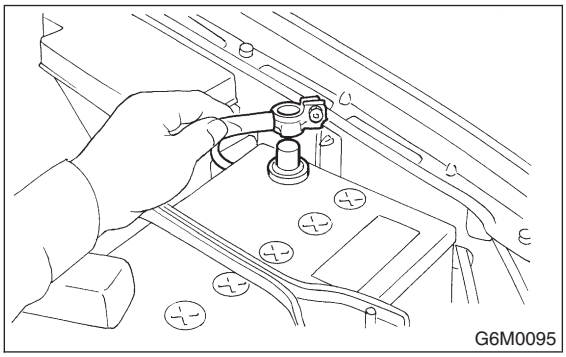
Service limit pressure:
83 kPa (0.85 kg/cm^2, 12 psi)

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

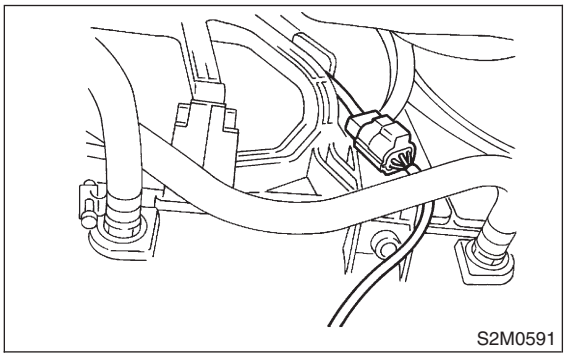
7. Radiator Main Fan and Fan Motor S106059

A: REMOVAL S106059A18

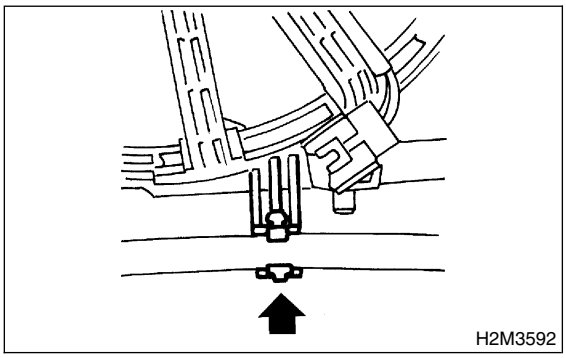
1) Disconnect battery ground cable.


G6M0095

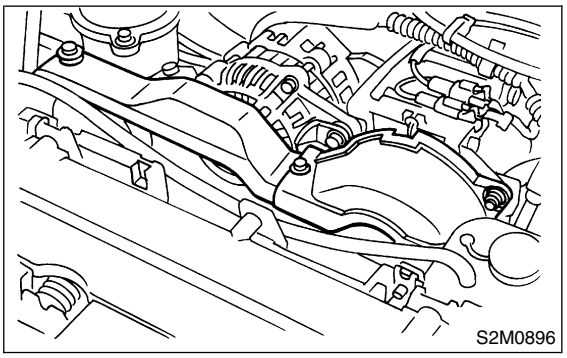
2) Lift-up the vehicle.
3) Remove under cover.
4) Disconnect connector of main fan motor.


S2M0591

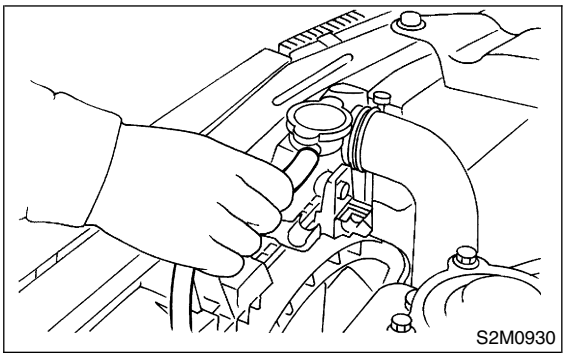
5) Detach ATF cooler hose attached to 2 clips under the radiator main fan shroud.


H2M3592

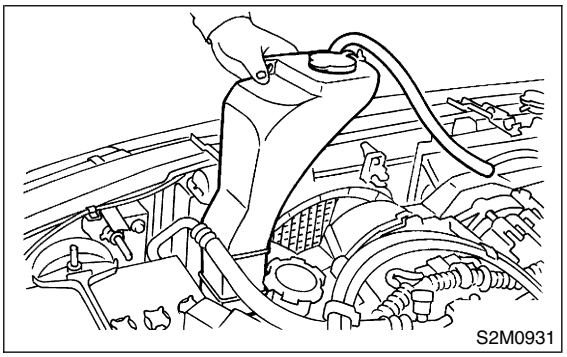
6) Lower the vehicle.
7) Remove V-belt covers.


S2M0896

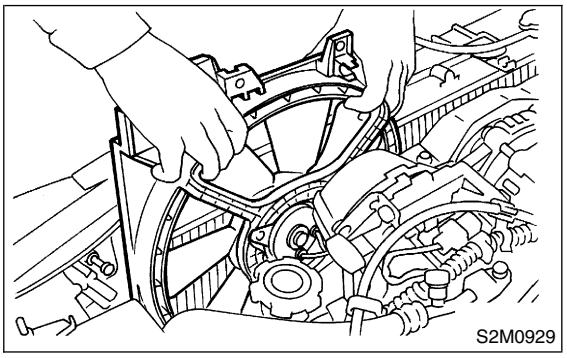
8) Disconnect over flow hose.


S2M0930

9) Remove reservoir tank.


S2M0931

10) Remove radiator main fan motor assembly.

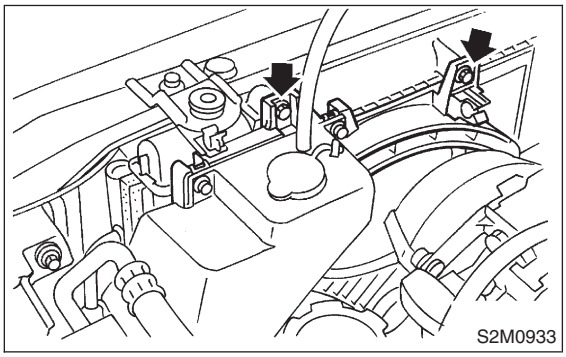

S2M0929

B: INSTALLATION S106059A11

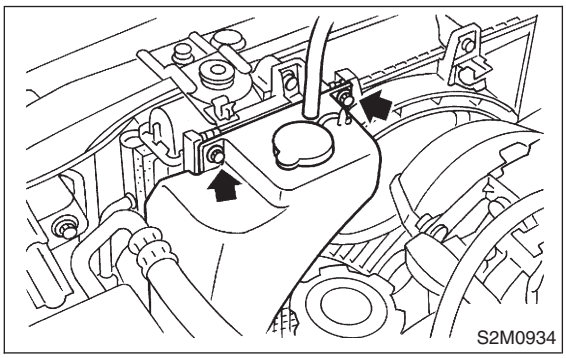
Install in the reverse order of removal.

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 CO-23 INSTALLATION, Radiator Sub Fan and Fan Motor.>

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)

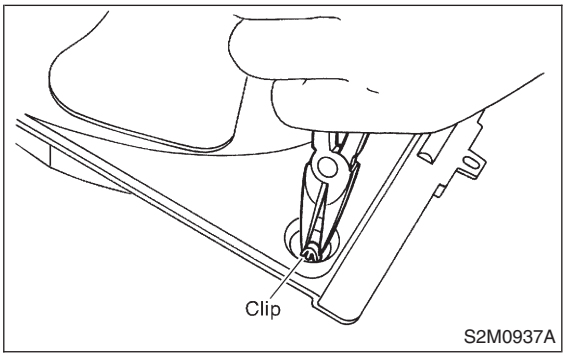

S2M0933

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)


S2M0934

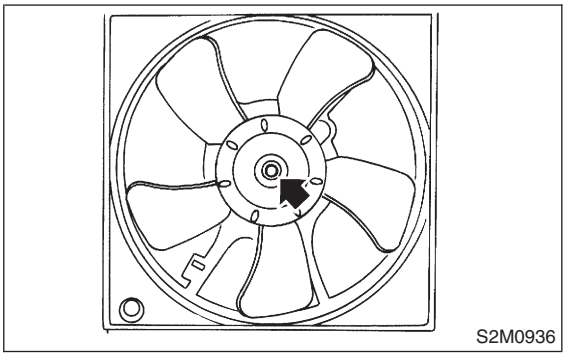
C: DISASSEMBLY S106059A06

1) Remove clip which holds motor connector onto shroud.

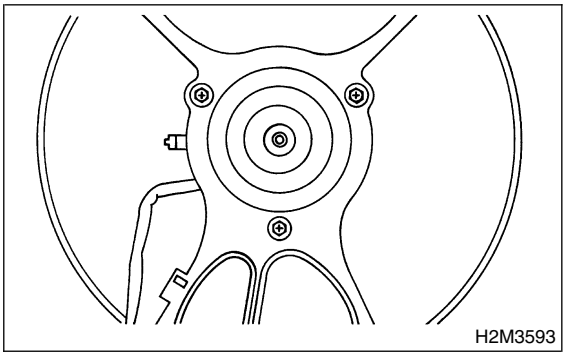


S2M0937A

2) Remove bolt which install fan itself onto fan motor and shroud assembly.


S2M0936

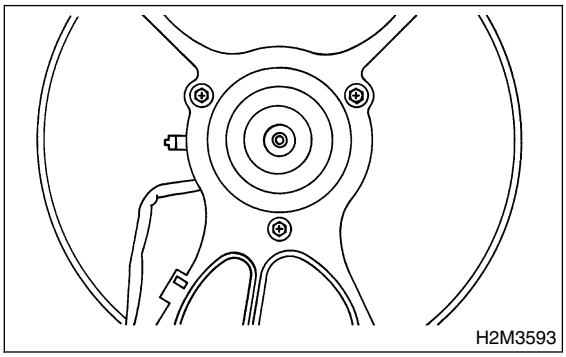
3) Remove bolts which install fan motor onto shroud.


H2M3593

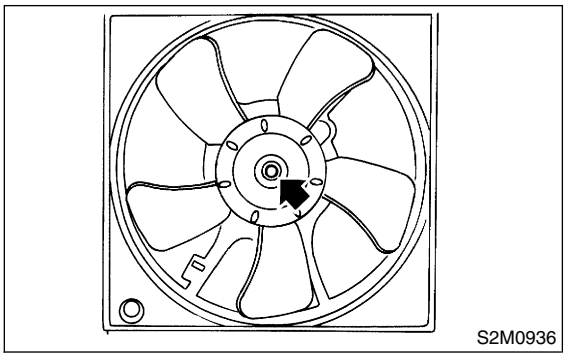
D: ASSEMBLY S106059A02

Assemble in the reverse order of disassembly.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)



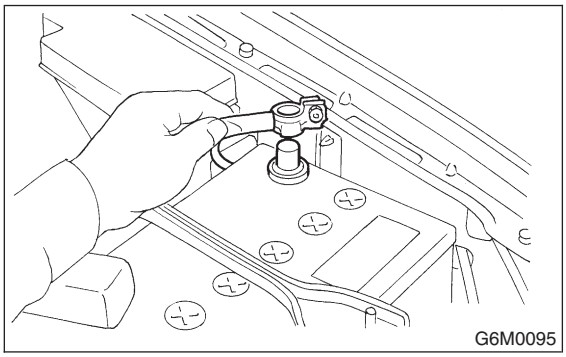
E: INSPECTION S106059A10

1) Connect battery positive (+) terminal to terminal No. 2, and negative (–) terminal to terminal No. 1 of main fan motor connector.
2) Make sure the main fan motor operates properly. Replace it if it doesn't.

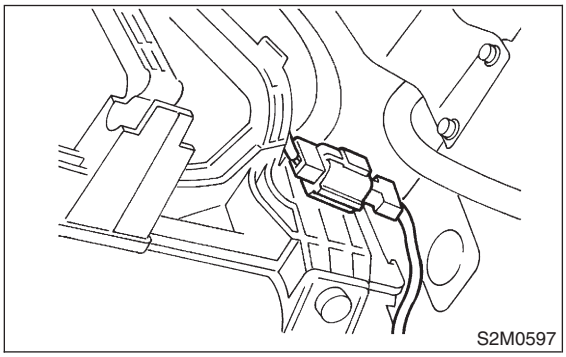
8. Radiator Sub Fan and Fan Motor S106074

A: REMOVAL S106074A18

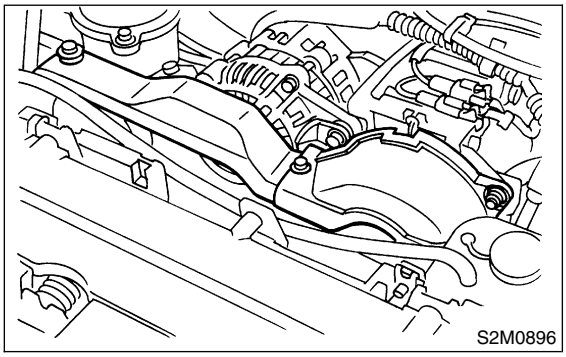
1) Disconnect battery ground cable.


G6M0095

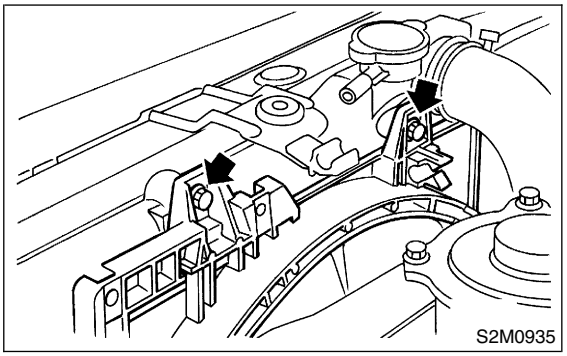
2) Lift-up the vehicle.
3) Remove under cover.
4) Disconnect connector of sub fan motor.


S2M0597

5) Lower the vehicle.
6) Remove V-belt covers.


S2M0896

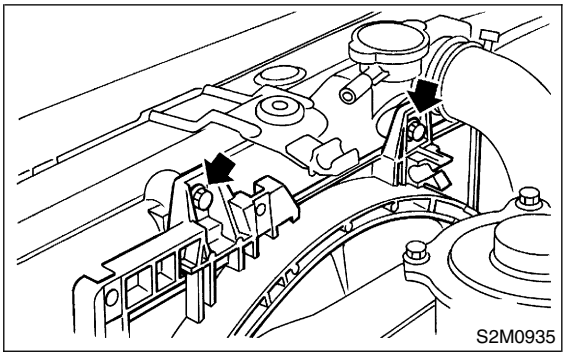
7) Remove bolts which hold sub fan shroud to radiator.
8) Remove radiator sub fan motor assembly.


S2M0935

B: INSTALLATION S106074A11

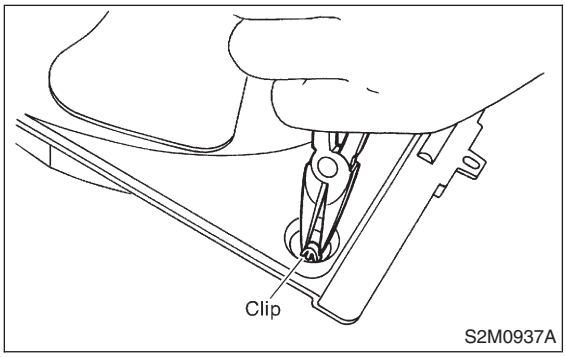
Install in the reverse order of removal.

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)

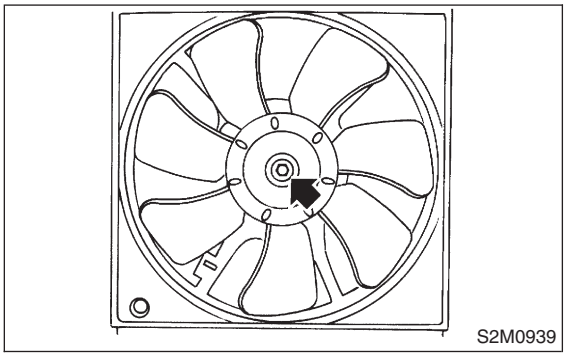

S2M0935

C: DISASSEMBLY S106074A06

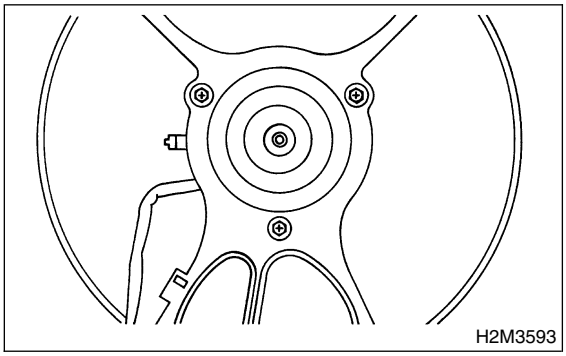
1) Remove clip which holds motor harness onto shroud.



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



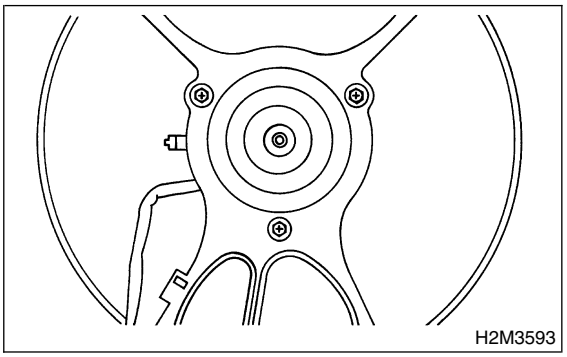
3) Remove bolts which install fan motor onto shroud.



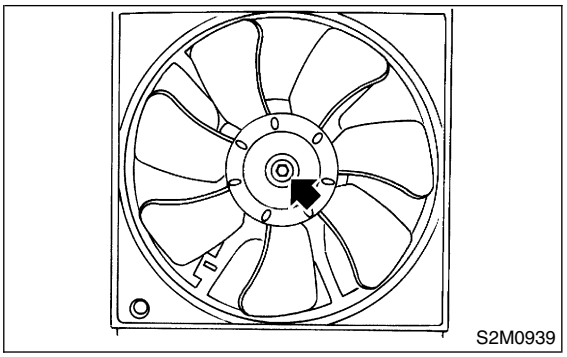
D: ASSEMBLY S106074A02

Assemble in the reverse order of disassembly.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)



E: INSPECTION S106074A10

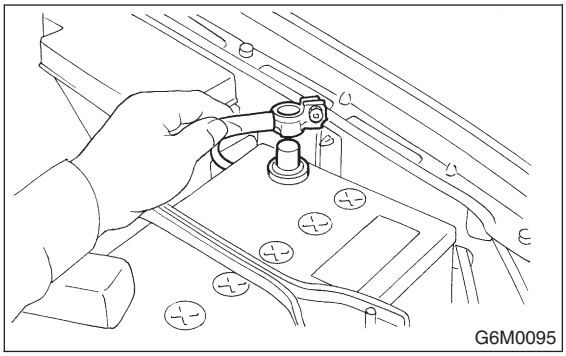
1) Connect battery positive (+) terminal to terminal No. 2, and negative (–) terminal to terminal No. 1 of sub fan motor connector.
2) Make sure the sub-fan motor operates properly. Replace it if it doesn't.

5. Radiator S106058

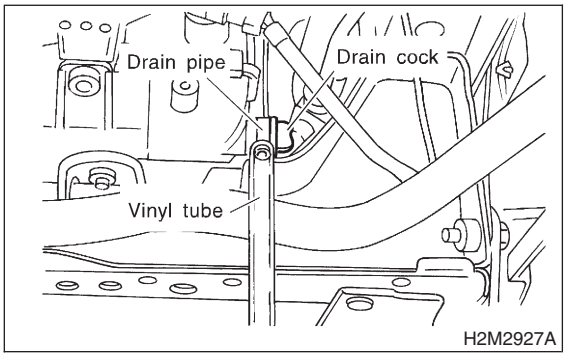
A: REMOVAL S106058A18

WARNING:
The radiator is pressurized. Wait until engine cools down before working on the radiator.

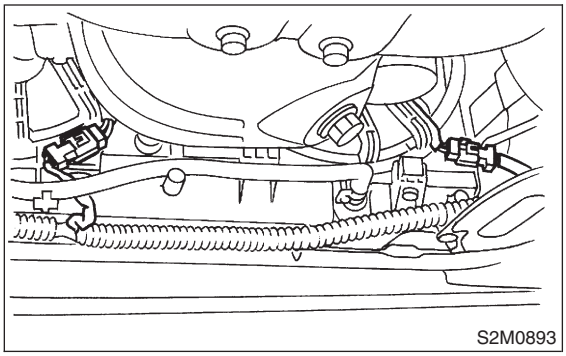
1) Disconnect battery ground cable.



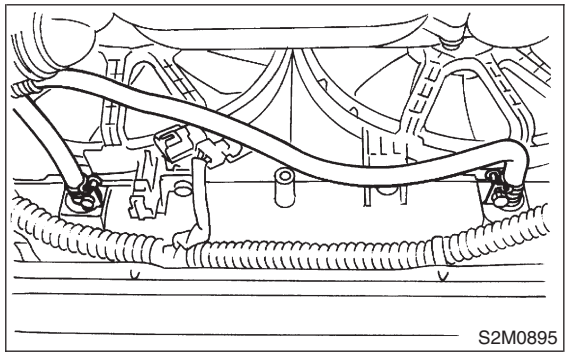
2) Lift-up the vehicle.
3) Remove under cover.
4) Drain engine coolant completely. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>



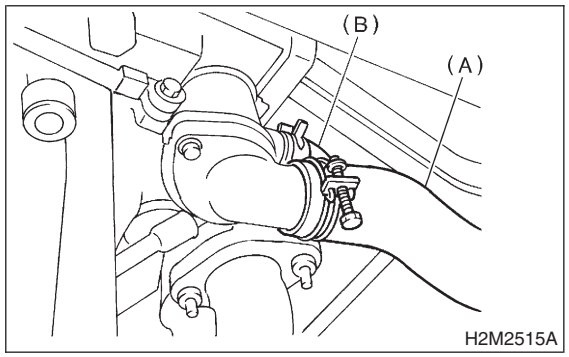
5) Disconnect connectors of radiator main fan and sub fan motor.



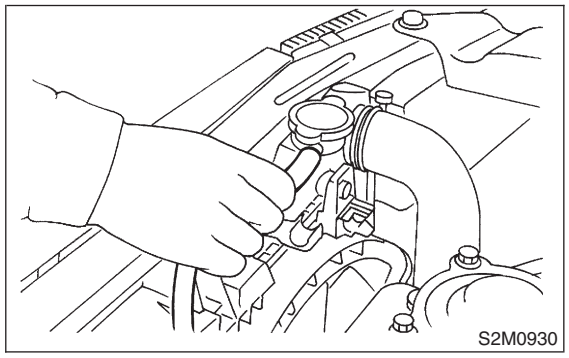
6) Disconnect ATF cooler hoses from radiator. (AT vehicles only)



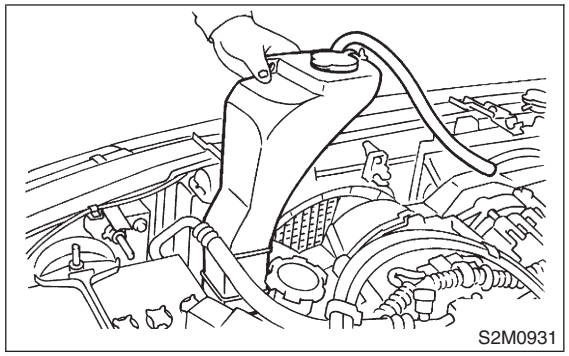
7) Disconnect radiator outlet hose (A) and water by-pass hose (B) (AT vehicles) from thermostat cover.



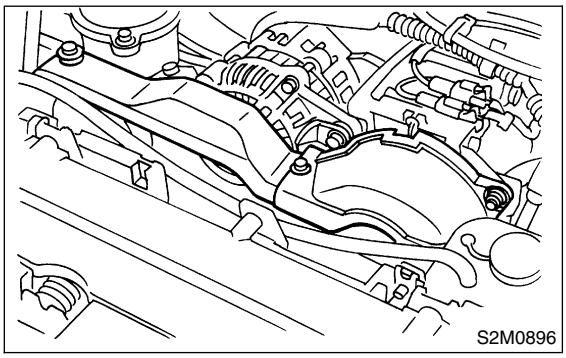
8) Lower the vehicle.
9) Disconnect over flow hose.



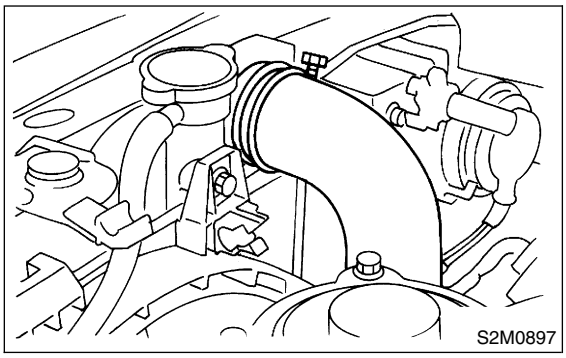
10) Remove reservoir tank.



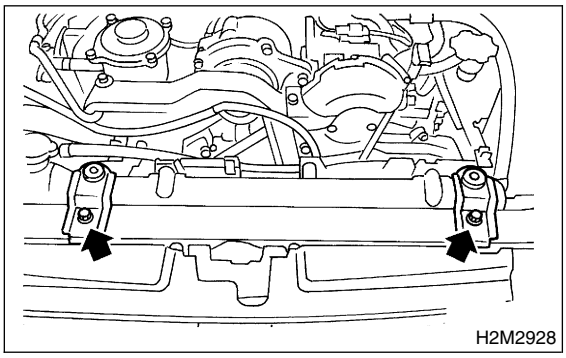
11) Remove V-belt covers.


S2M0896

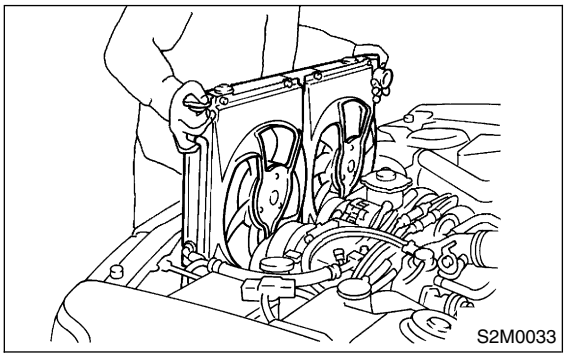
12) Disconnect radiator inlet hose from radiator.


S2M0897

13) Remove radiator upper brackets.

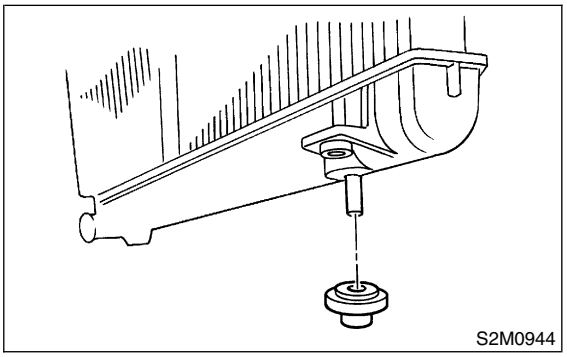

H2M2928

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


S2M0033

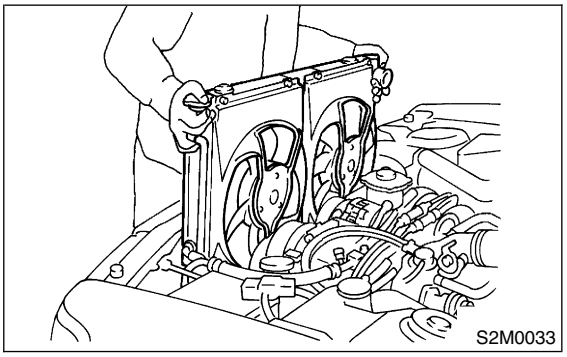
B: INSTALLATION S106058A11

1) Attach radiator mounting cushions to pins on the lower side of radiator.


S2M0944

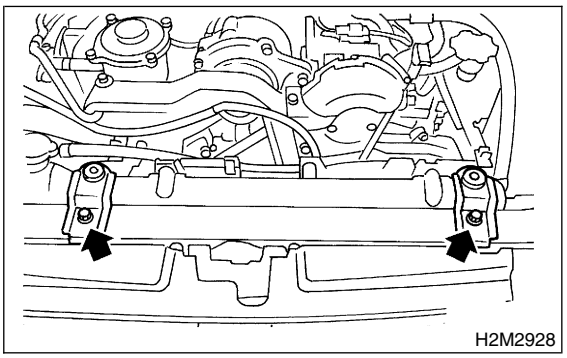
2) Install radiator while fitting radiator pins to cushions.

NOTE:
Fit cushion on lower side of radiator into holes on body side.

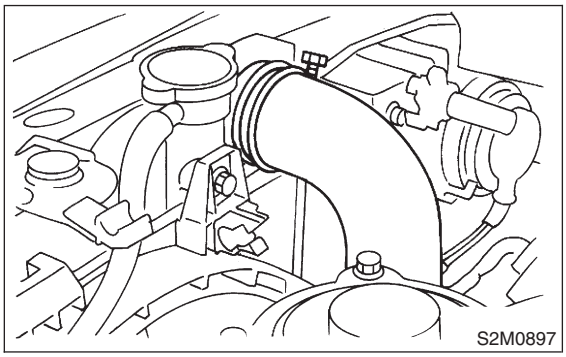

S2M0033

3) Install radiator brackets and tighten bolts.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

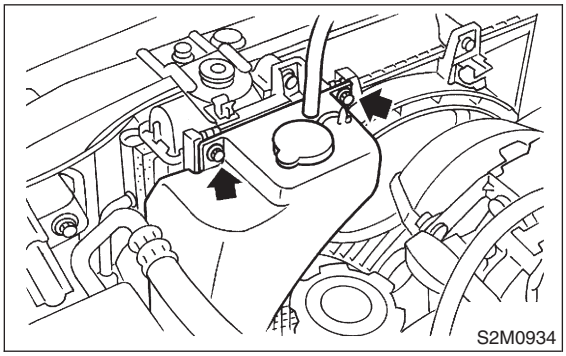

H2M2928

4) Connect radiator inlet hose.

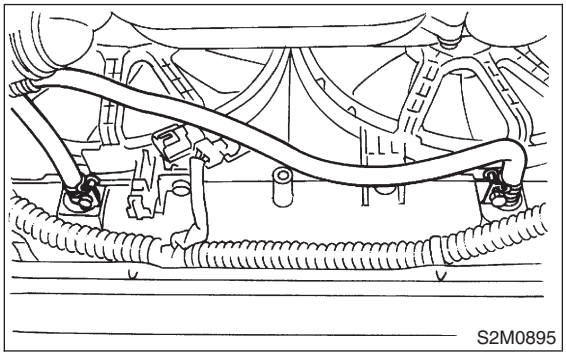

S2M0897

5) Install reservoir tank.

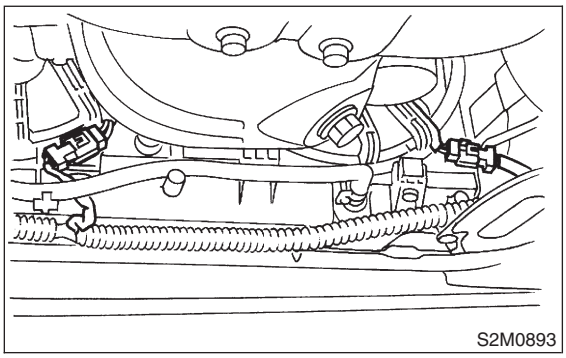
Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)


S2M0934

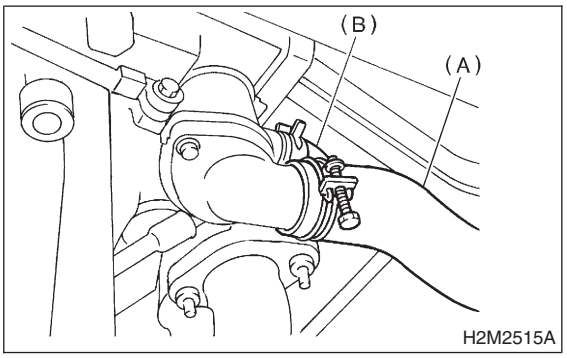
6) Lift-up the vehicle.
7) Connect ATF cooler hoses. (AT vehicles only)


S2M0895

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

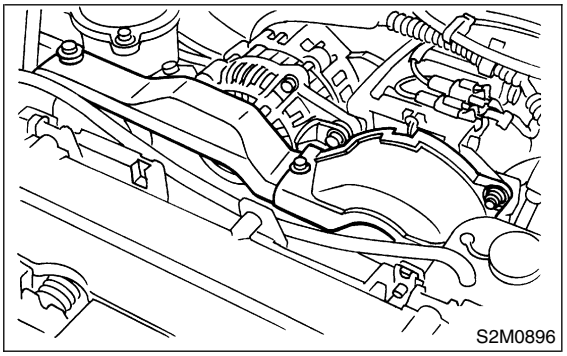

S2M0893

9) Connect radiator outlet hose (A) and water by-pass hose (B). (AT vehicles)

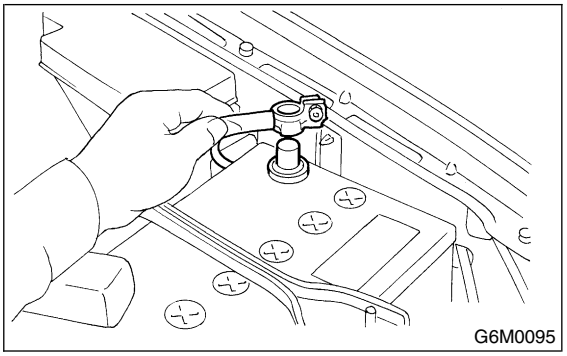


H2M2515A

10) Install under cover.
11) Lower the vehicle.
12) Install V-belt covers.


S2M0896

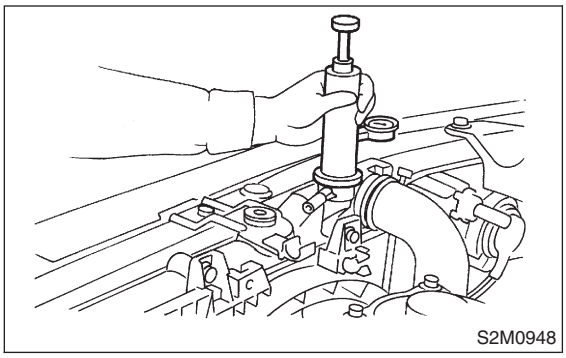
13) Connect battery ground cable.


G6M0095

14) Fill engine coolant. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>

C: INSPECTION S106058A10

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/cm^2, 23 psi) to radiator to check if:
(1) Engine coolant leaks at/around radiator.
(2) Engine coolant leaks at/around hoses or connections.

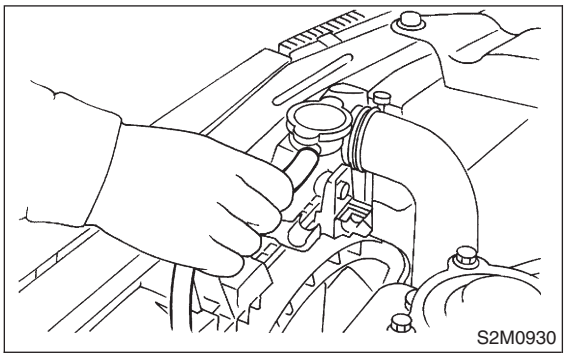

S2M0948

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.

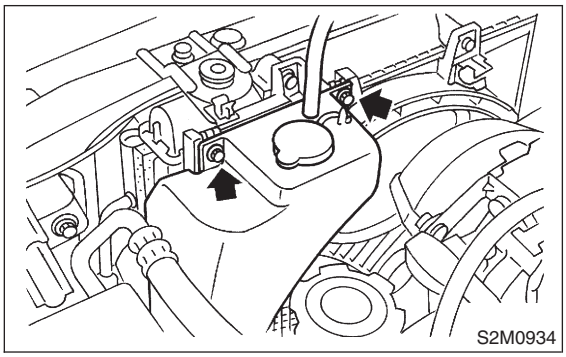
9. Reservoir Tank S106075

A: REMOVAL S106075A18

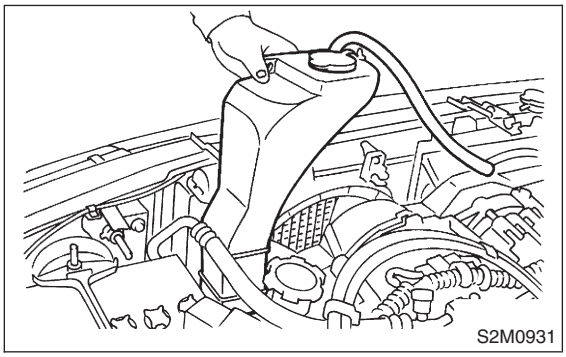
1) Disconnect over flow hose from radiator filler neck position.


S2M0930

2) Remove bolts which install reservoir tank onto radiator main fan shroud.


S2M0934

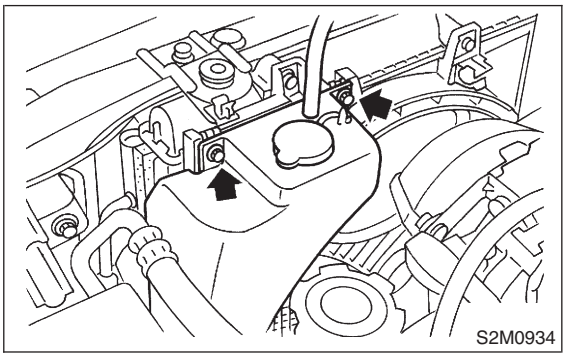
3) Remove reservoir tank.


S2M0931

B: INSTALLATION S106075A11

Install in the reverse order of removal.

Tightening torque:
4.9 N·m (0.50 kgf-m, 3.6 ft-lb)


S2M0934

C: INSPECTION S106075A10

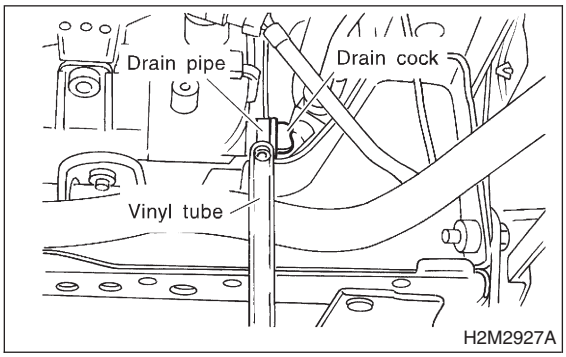
Make sure the engine coolant level is between full and low.

4. Thermostat S106062

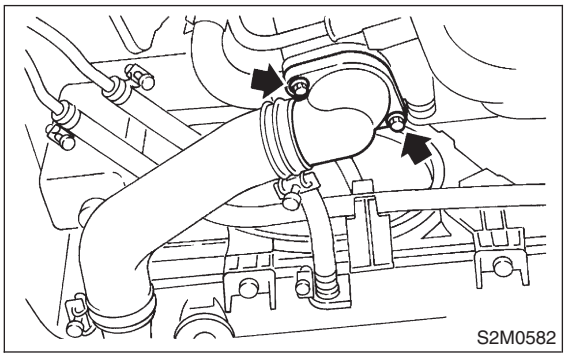
A: REMOVAL S106062A18

WARNING:
The radiator is pressurized. Wait until engine cools down before working on the radiator.

1) Lift-up the vehicle.
2) Remove under cover.
3) Drain engine coolant completely. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>



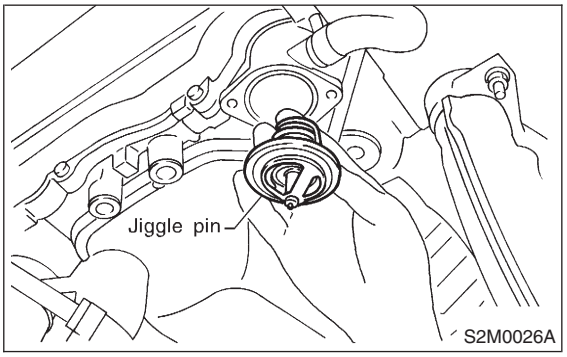
4) Remove thermostat cover and gasket, and pull out the thermostat.



B: INSTALLATION S106062A11

1) 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 upward.
● In this time, set the jiggle pin of thermostat for front side.



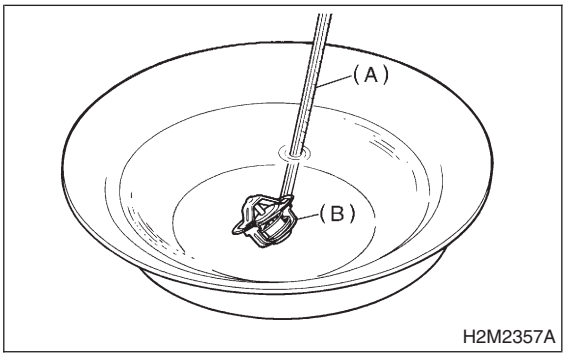
2) Fill engine coolant. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>

C: INSPECTION S106062A10

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)



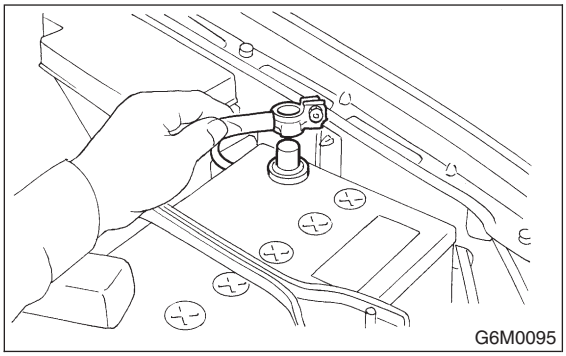
(A) Thermometer
(B) Thermostat

3. Water Pump S106061

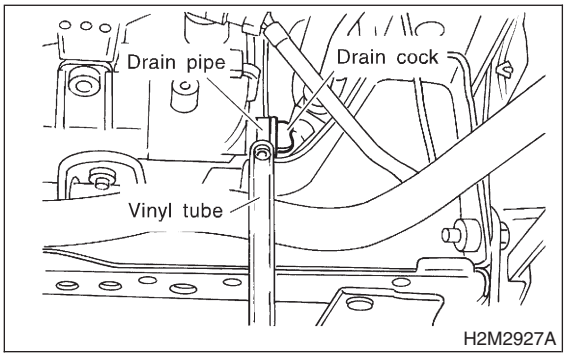
A: REMOVAL S106061A18

WARNING:
The radiator is pressurized. Wait until engine cools down before working on the radiator.

1) Disconnect ground cable from battery.

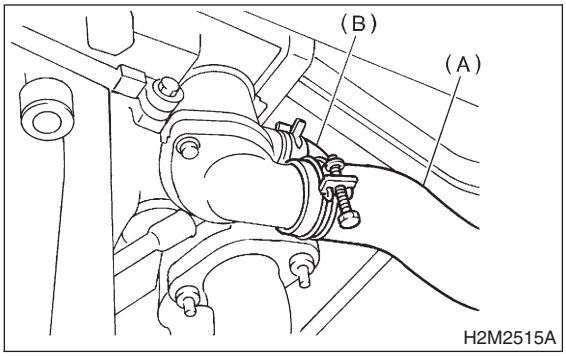

G6M0095

2) Lift-up the vehicle.
3) Remove under cover.
4) Drain engine coolant completely. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>



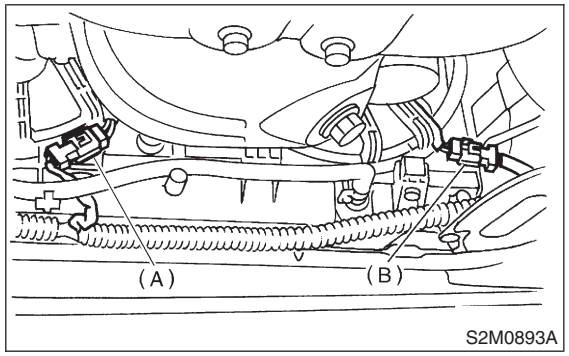
H2M2927A

5) Disconnect radiator outlet hose (A) and heater by-pass hose (B) from water pump.



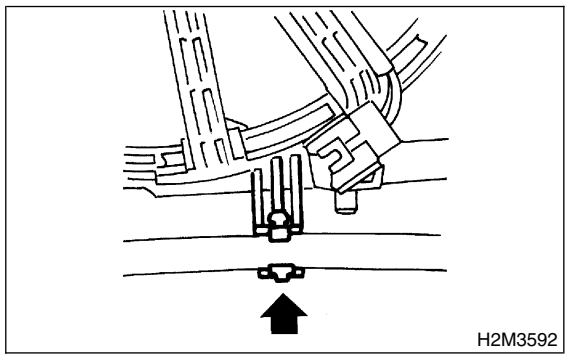
H2M2515A

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

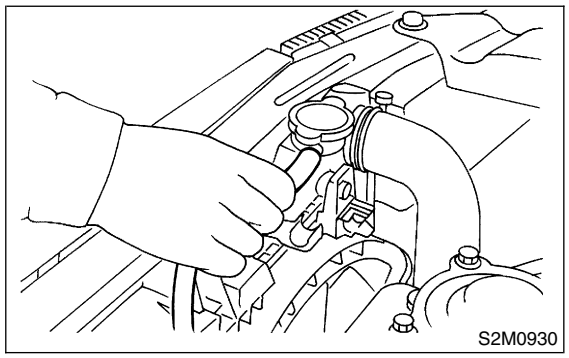


S2M0893A

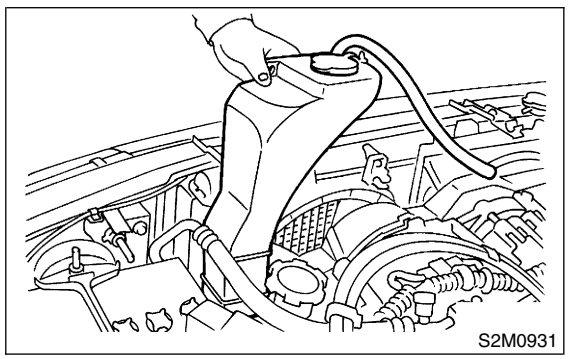
7) Detach ATF cooler hose attached to a clip under the radiator main fan shroud.


H2M3592

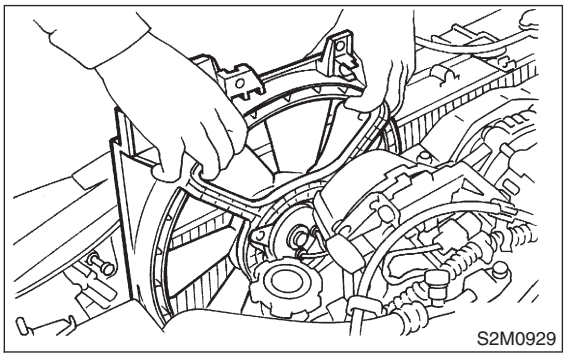
8) Lower the vehicles.
9) Disconnect over flow hose.


S2M0930

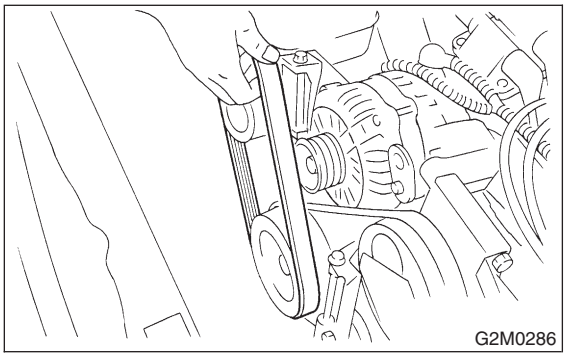
10) Remove reservoir tank.


S2M0931

11) Remove radiator main fan assembly <Ref. to CO-20 REMOVAL, Radiator Main Fan and Fan Motor.> and sub fan motor assembly. <Ref. to CO-23 REMOVAL, Radiator Sub Fan and Fan Motor.>

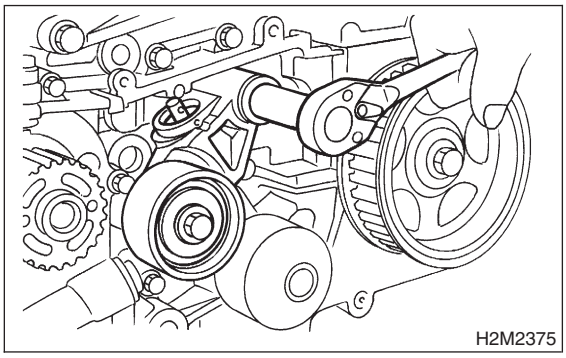

S2M0929

12) Remove V-belts.
<Ref. to ME-48 REMOVAL, V-belt.>

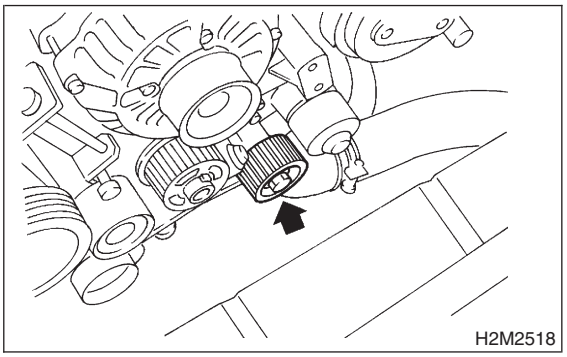

G2M0286

13) Remove timing belt.
<Ref. to ME-53 REMOVAL, Timing Belt Assembly.>

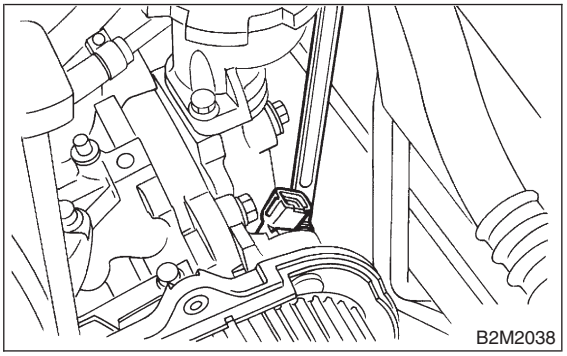
14) Remove automatic belt tension adjuster.


H2M2375

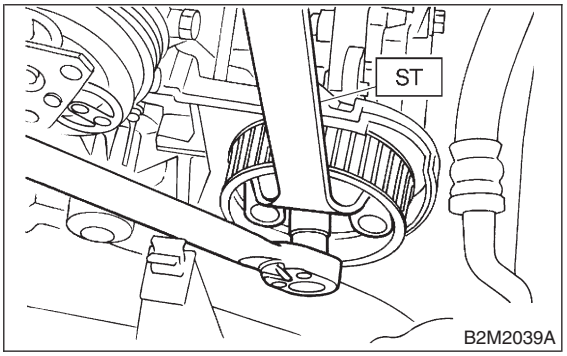
15) Remove belt idler No. 2.


H2M2518

16) Remove camshaft position sensor.
<Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

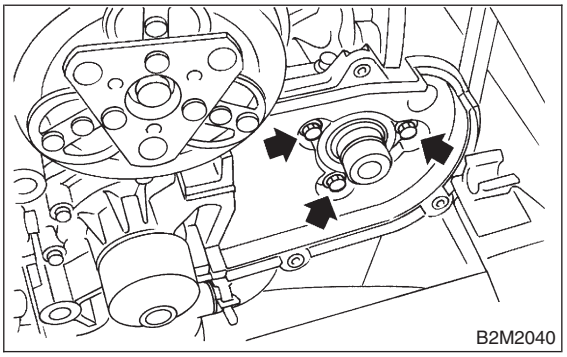

B2M2038

17) Remove left-hand camshaft sprocket by using ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH

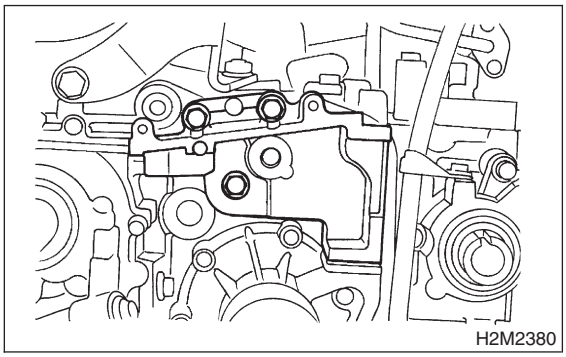


B2M2039A

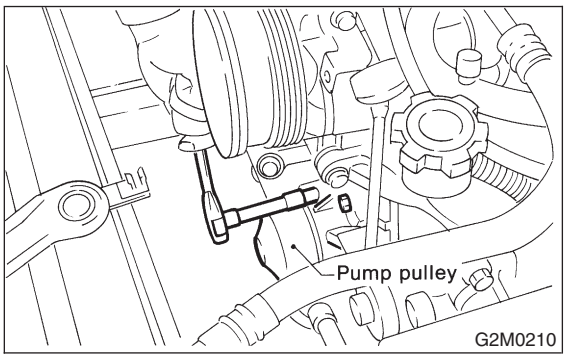
18) Remove left-hand belt cover No. 2.


B2M2040

19) Remove tensioner bracket.



20) Remove tensioner bracket.
21) Disconnect heater hose from water pump.
22) Remove water pump.

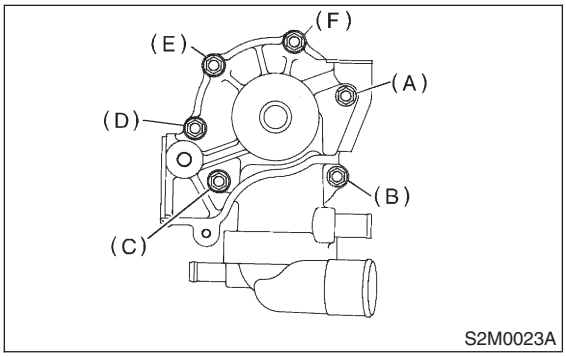


B: INSTALLATION S106061A11

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

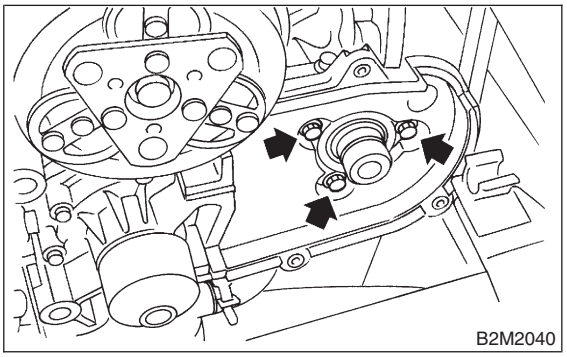
CAUTION:
- **Replace gasket with a new one.**
- **When installing water pump, tighten bolts in two stages in alphabetical sequence as shown in figure.**

Tightening torque:
First:
12 N·m (1.2 kgf-m, 8.7 ft-lb)
Second:
12 N·m (1.2 kgf-m, 8.7 ft-lb)



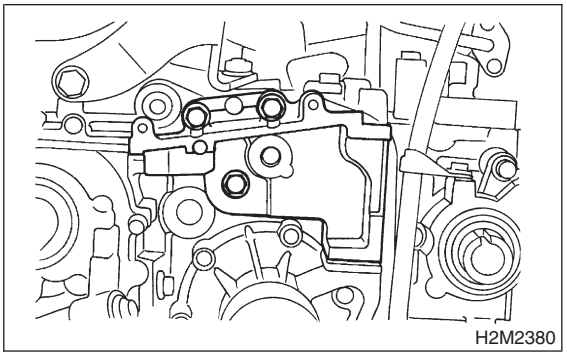
2) Install left-hand belt cover No. 2.

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



3) Install tensioner bracket.

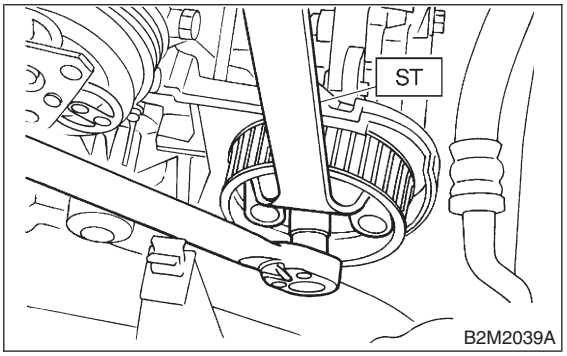
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



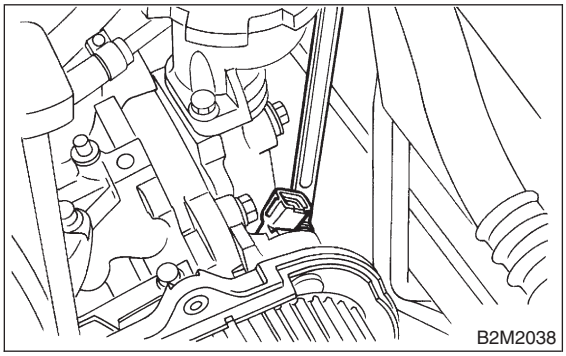
4) Install left-hand camshaft sprockets by using ST.

ST 4992707100 CAMSHAFT SPROCKET WRENCH

Tightening torque:
78 N·m (8.0 kgf-m, 57.9 ft-lb)

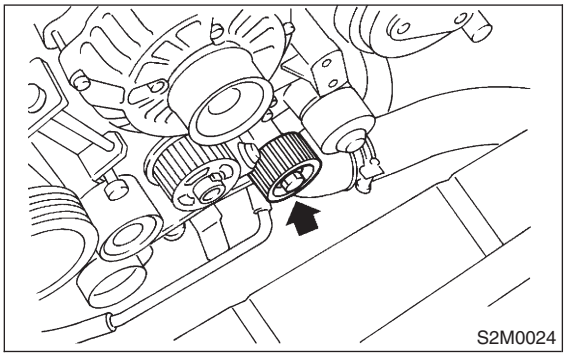


5) Install camshaft position sensor. <Ref. to FU-40 INSTALLATION, Camshaft Position Sensor.>

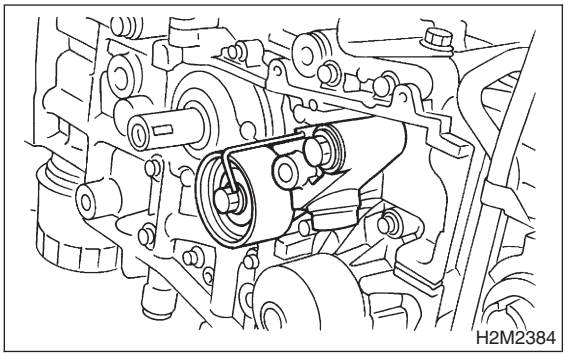

B2M2038

6) Install belt idler No. 2.

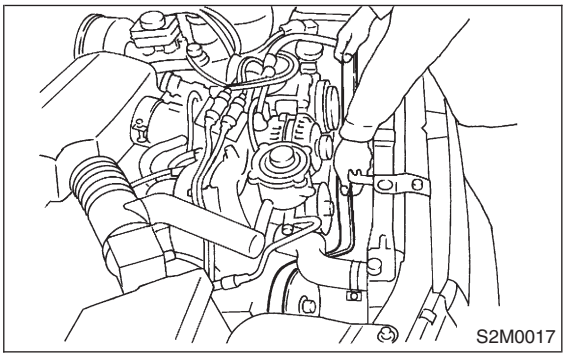
Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)


S2M0024

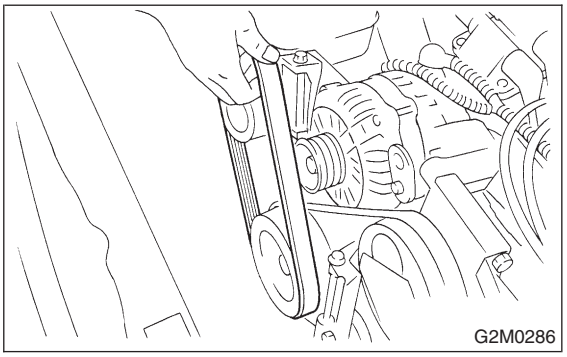
7) Install automatic belt tension adjuster which tension rod is holded with pin. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>


H2M2384

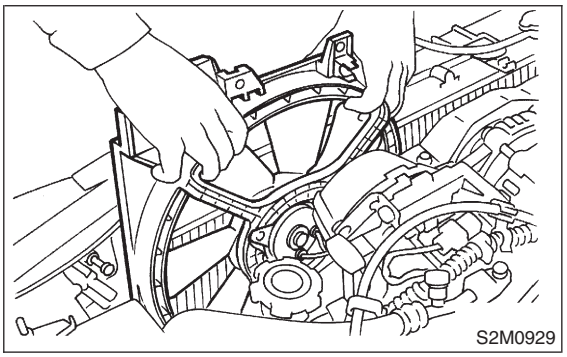
8) Install timing belt. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>


S2M0017

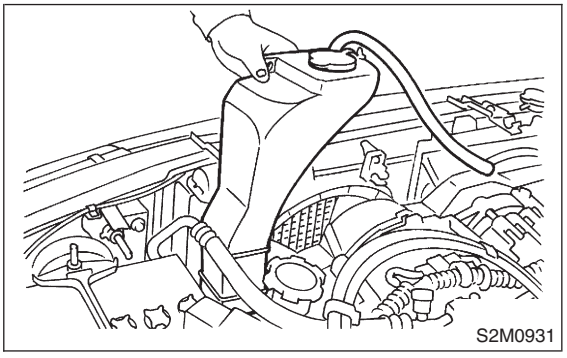
9) Install V-belts. <Ref. to ME-48 INSTALLATION, V-belt.>


G2M0286

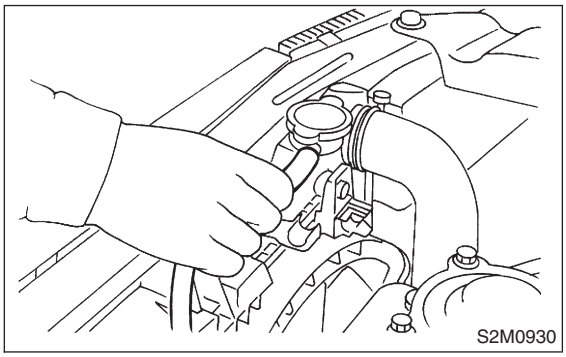
10) Install radiator main fan assembly <Ref. to CO-21 INSTALLATION, Radiator Main Fan and Fan Motor.> and sub fan motor assembly. <Ref. to CO-23 INSTALLATION, Radiator Sub Fan and Fan Motor.>


S2M0929

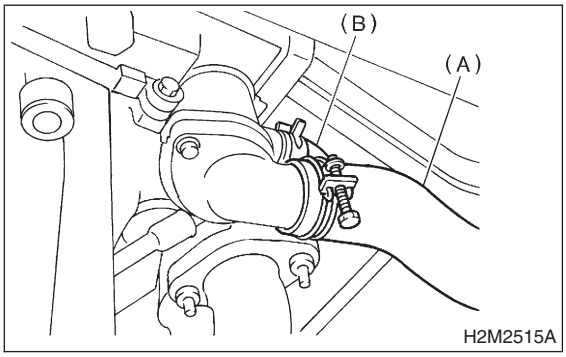
11) Install reservoir tank.


S2M0931

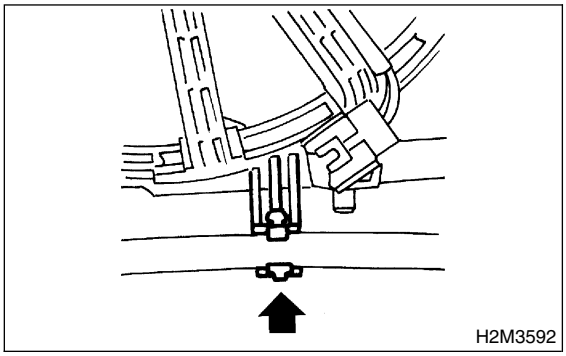
12) Connect over flow hose.



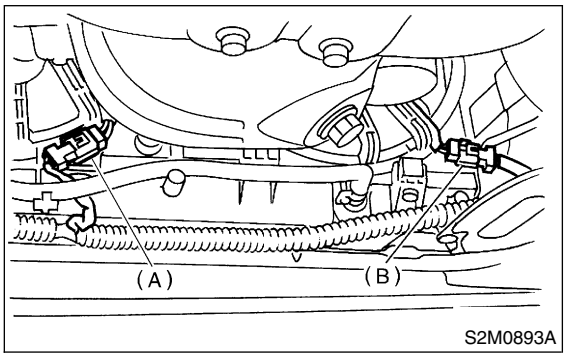
13) Lift-up the vehicle.
14) Connect radiator outlet hose (A) and heater hose (B) (AT vehicles) to water pump.



15) Attach ATF cooler hose to a clip under the radiator main fan shroud.

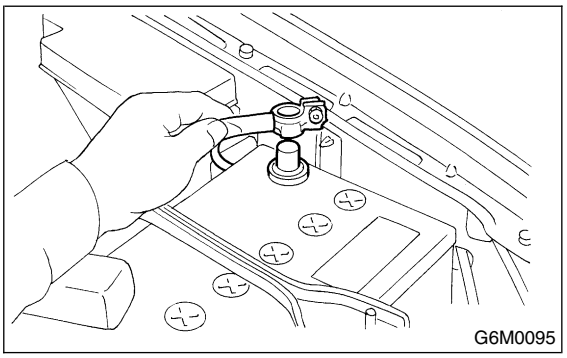


16) Connect connectors to radiator main fan (A) and sub fan (B) motors.



17) Install under cover.
18) Lower the vehicle.

19) Connect battery ground cable.

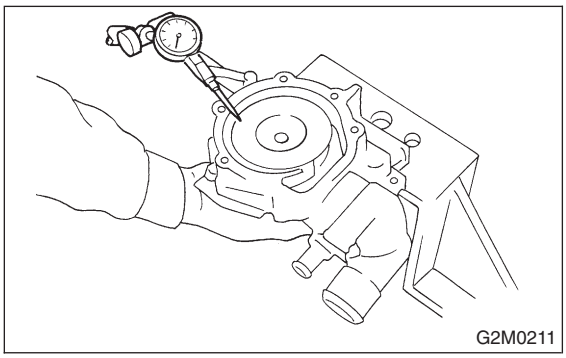


20) Fill engine coolant. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>

C: INSPECTION S106061A10

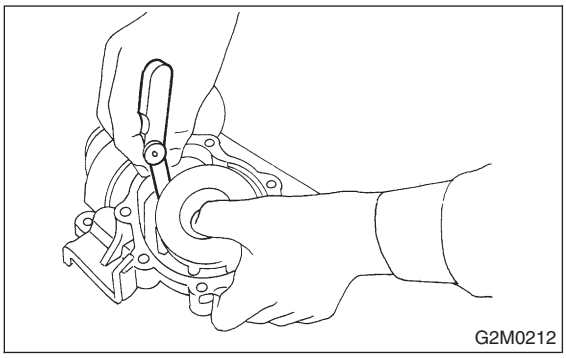
1) Check water pump bearing for smooth rotation.
2) Check water pump pulley for abnormalities.
3) Using a dial gauge, measure impeller runout in thrust direction while rotating the pulley.

"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)

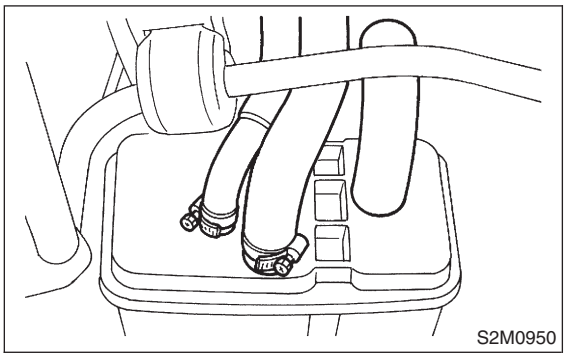


5) After water pump installation, check pulley shaft for engine coolant leaks. If leaks are noted, replace water pump assembly.

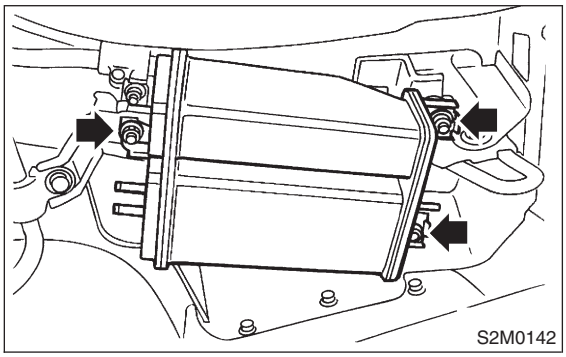
4. Canister S110037

A: REMOVAL S110037A18

1) Lift-up the vehicle.
2) Disconnect evaporation hoses from canister.



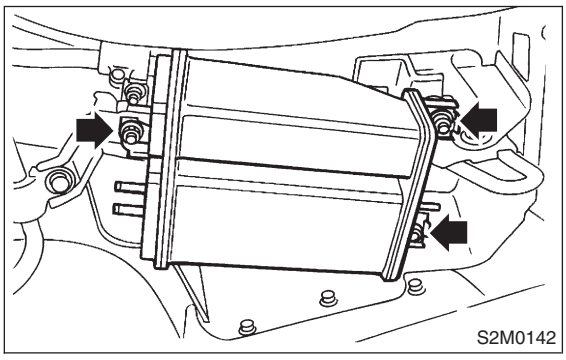
3) Remove canister from body.



B: INSTALLATION S110037A11

Install in the reverse order of removal.

Tightening torque:
22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



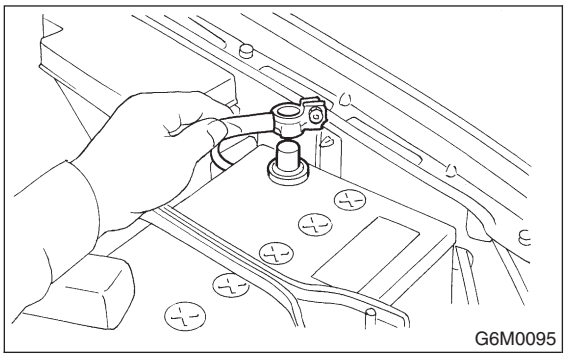
C: INSPECTION S110037A10

Make sure the canister and canister hoses are not cracked or loose.

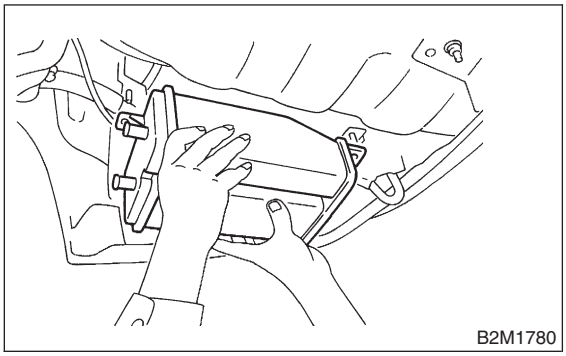
11. Drain Filter S110567

A: REMOVAL S110567A18

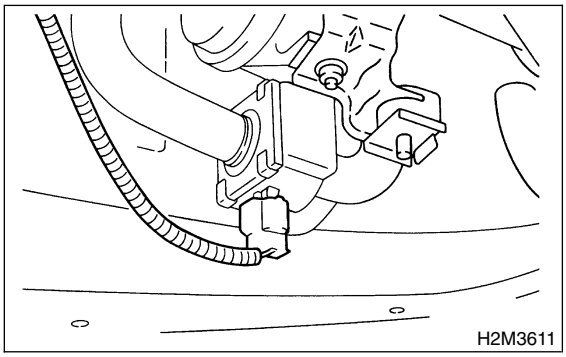
1) Disconnect battery ground cable.



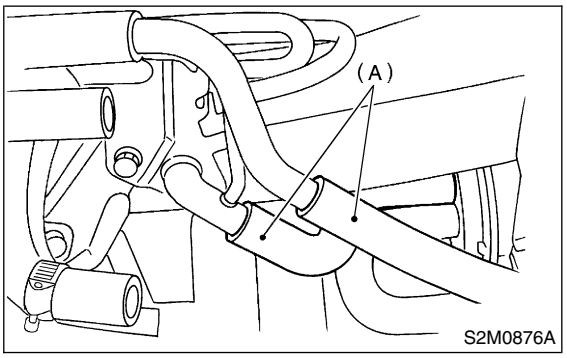
2) Lift-up the vehicle.
3) Remove canister. <Ref. to EC-7 REMOVAL, Canister.>



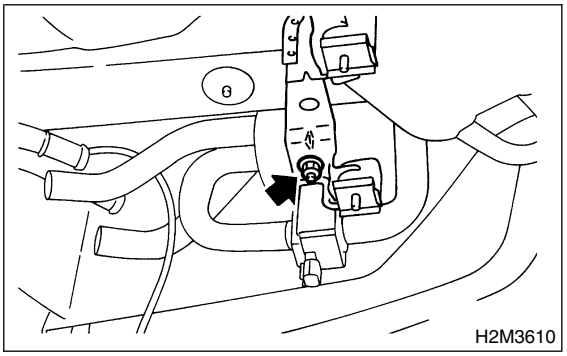
4) Disconnect connector from drain valve.



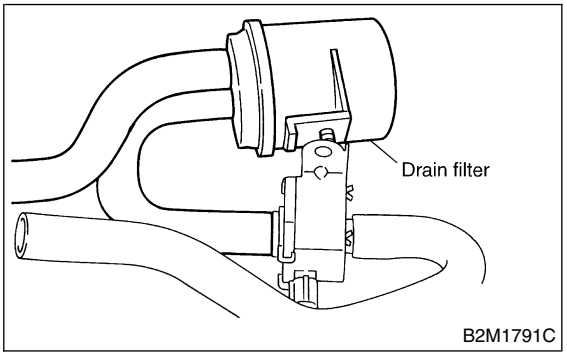
5) Disconnect evaporation hoses (A) from joint pipes.



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



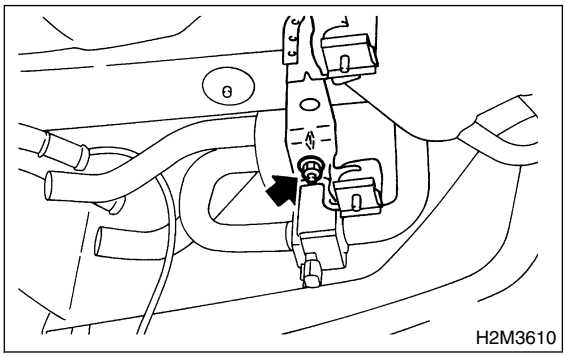
7) Disconnect evaporation hoses, and remove drain filter.



B: INSTALLATION S110567A11

Install in the reverse order of removal.

Tightening torque:
22.5 N·m (2.3 kgf-m, 16.6 ft-lb)



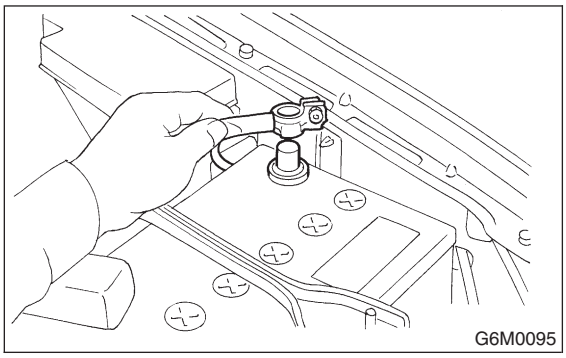
C: INSPECTION S110567A10

1) Make sure that all hoses are installed correctly.
2) Make sure that hoses are not cracked or loose.

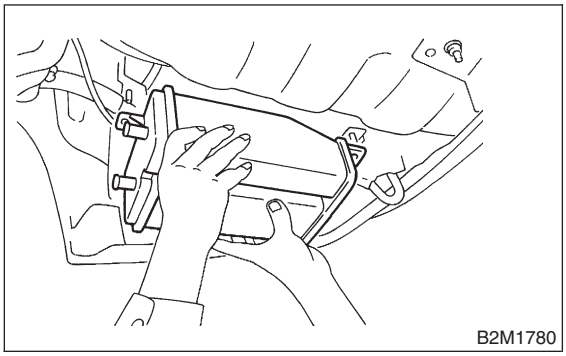
14. Drain Valve S110088

A: REMOVAL S110088A18

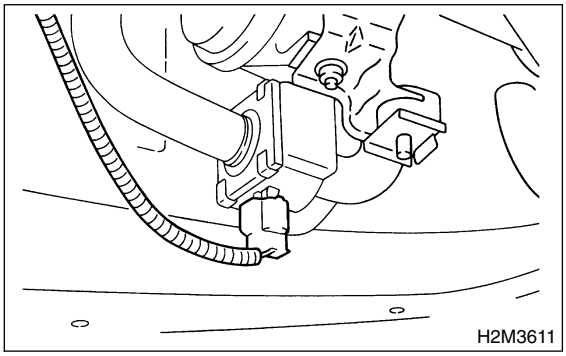
1) Disconnect battery ground cable.


G6M0095

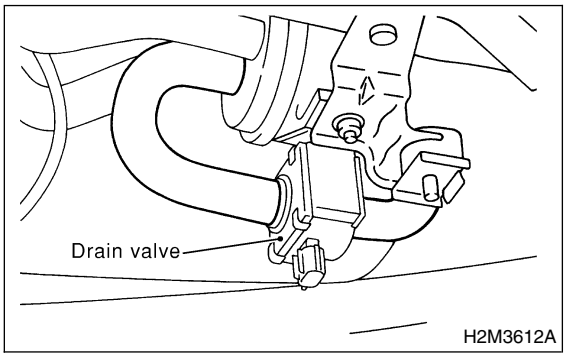
2) Lift-up the vehicle.
3) Remove canister. <Ref. to EC-9 REMOVAL, Canister.>


B2M1780

4) Disconnect connector from drain valve.

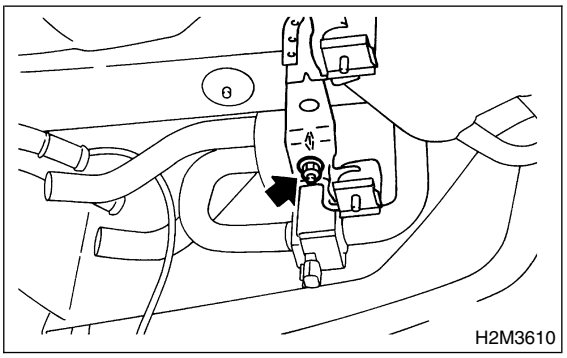

H2M3611

5) Disconnect evaporation hoses from drain valve.

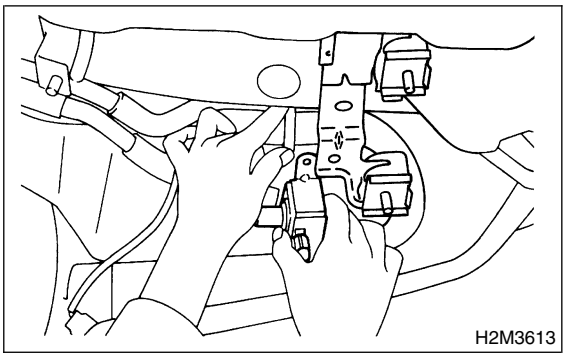


H2M3612A

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


H2M3610

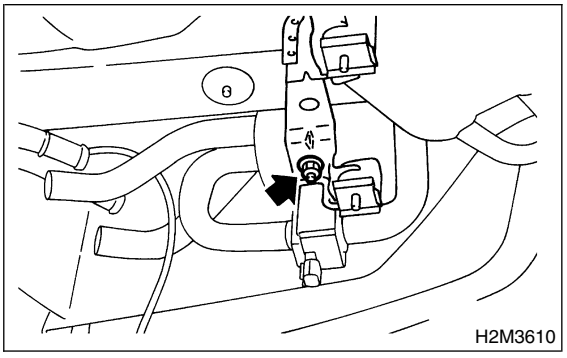
7) Move drain filter to upper side, and remove drain valve with bracket.


H2M3613

B: INSTALLATION S110088A11

Install in the reverse order of removal.

Tightening torque:
22.5 N·m (2.3 kgf-m, 16.6 ft-lb)


H2M3610

C: INSPECTION S110088A10

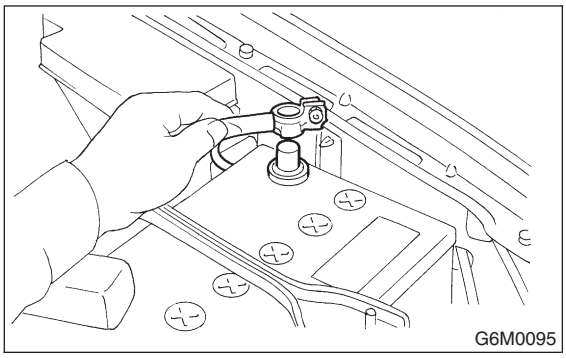
1) Make sure that all hoses are installed correctly.
2) Make sure that hoses are not cracked or loose.

MEMO:

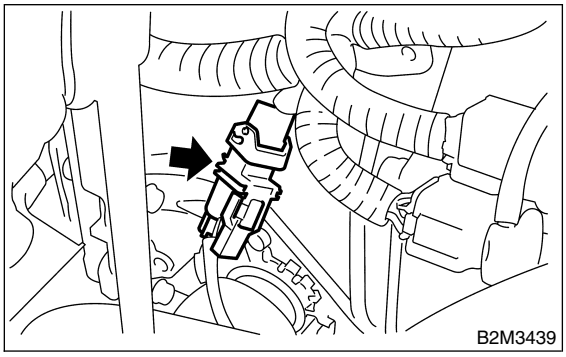
2. Front Catalytic Converter S110017

A: REMOVAL S110017A18

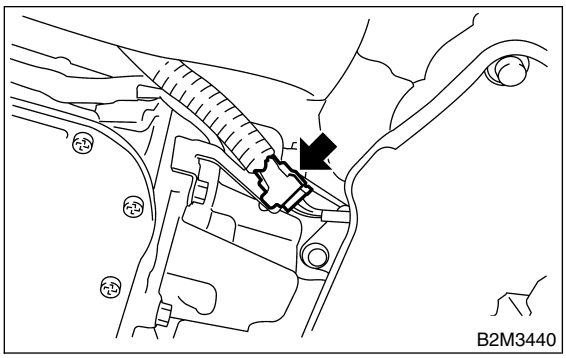
1) Disconnect battery ground cable.



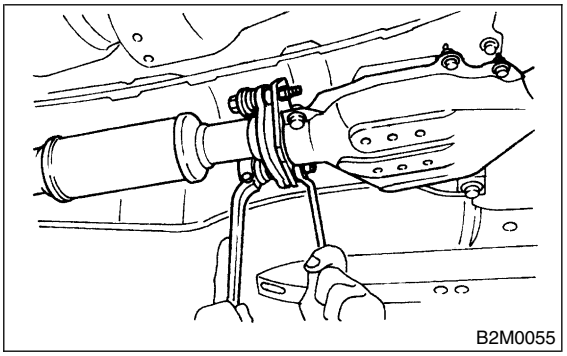
2) Disconnect front oxygen (A/F) sensor connector.



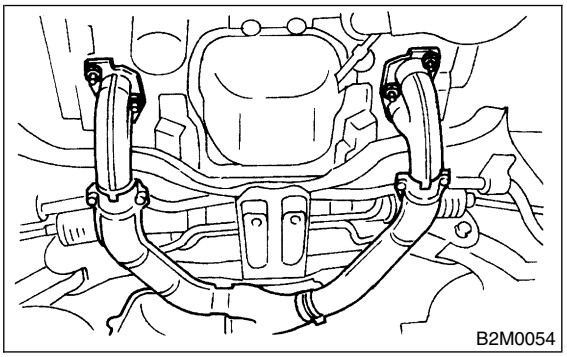
3) Lift-up the vehicle.
4) Remove under cover.
5) Disconnect rear oxygen sensor connector.



6) Separate front and rear catalytic converter assembly from rear exhaust pipe.

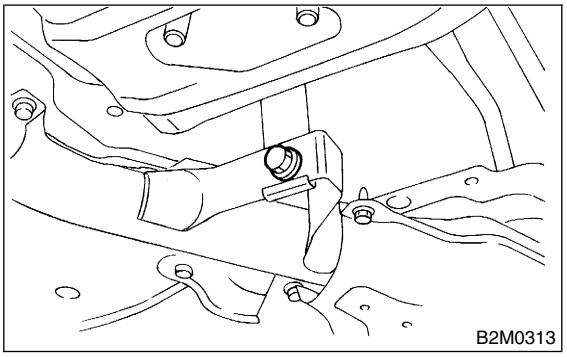


7) Remove front exhaust pipe from cylinder heads.



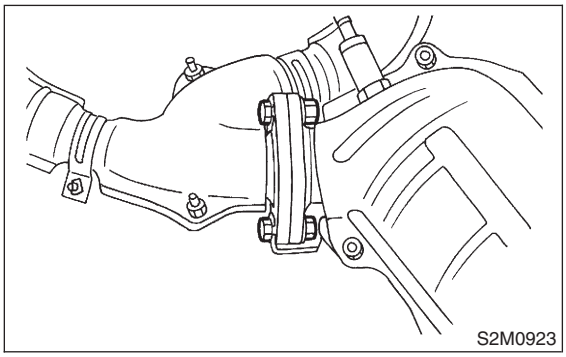
8) Remove front and rear catalytic converter assembly from hanger bracket.

CAUTION:
• Be careful not to pull down center exhaust pipe.
• After removing center exhaust pipe, do not apply excessive pulling force on rear exhaust pipe.



9) Separate front and rear catalytic converter assembly from front exhaust pipe.

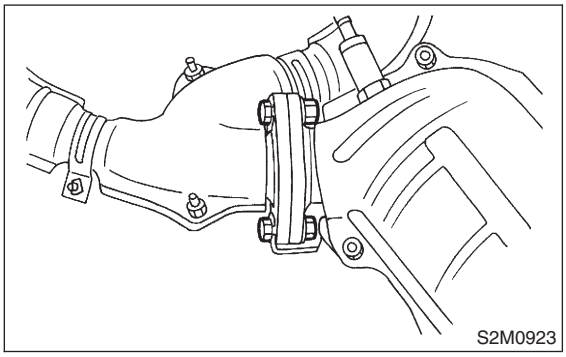
NOTE:
The rear catalytic converter is integrated with front catalytic converter. Therefore, the procedure for removing rear catalytic converter is the same as the description above.


S2M0923

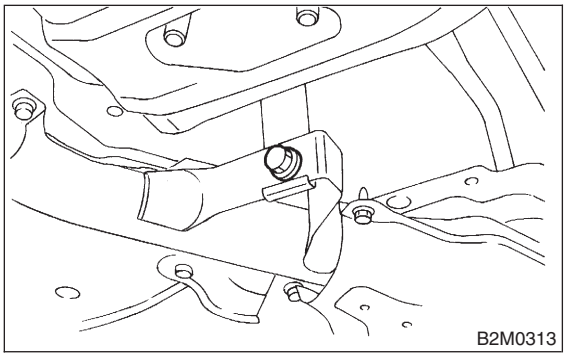
B: INSTALLATION S110017A11

CAUTION:
Replace gaskets with new ones.

1) Install front and rear catalytic converter assembly to front exhaust pipe.

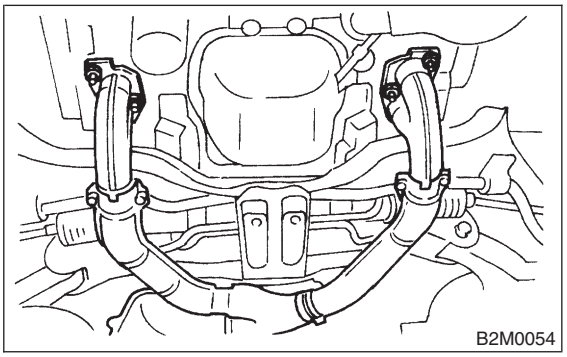

S2M0923

2) Install front and rear catalytic converter assembly.
Temporarily tighten bolt which installs center exhaust pipe to hanger bracket.


B2M0313

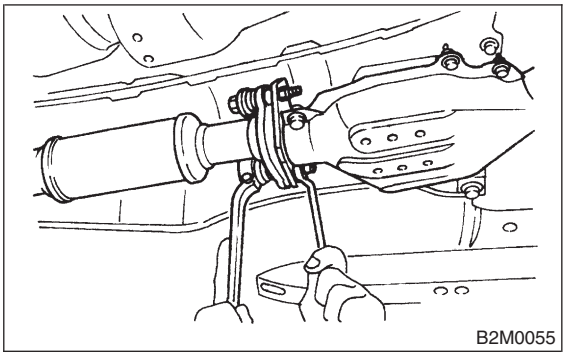
3) Install front exhaust pipe to cylinder heads.

Tightening torque:
30 N·m (3.1 kgf-m, 22.4 ft-lb)


B2M0054

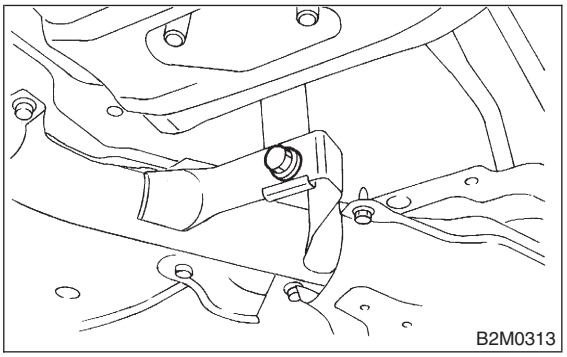
4) Install front and rear catalytic converter assembly to rear exhaust pipe.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

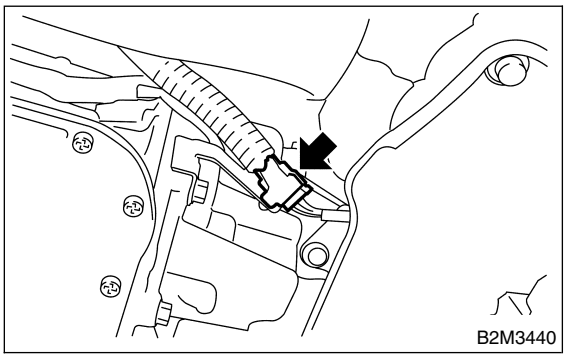

B2M0055

5) Tighten bolt which holds front and rear catalytic converter assembly to hanger bracket.

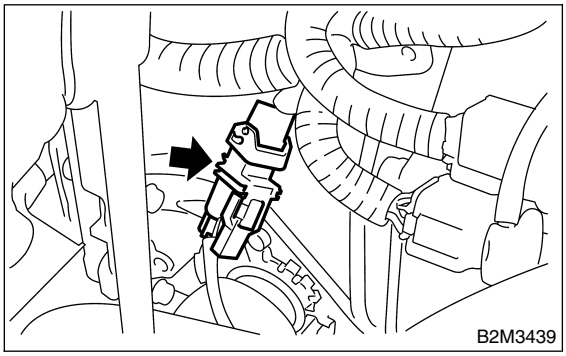
Tightening torque:
35 N·m (3.6 kgf-m, 26.0 ft-lb)


B2M0313

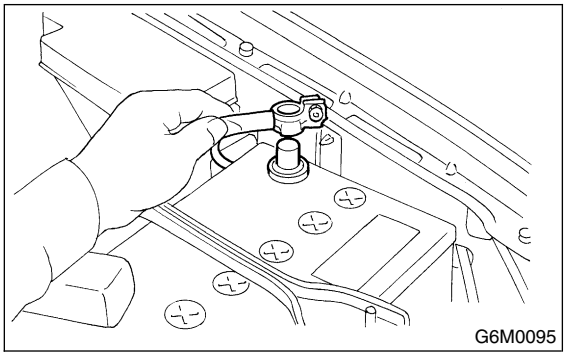
6) Connect rear oxygen sensor connector.



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



10) Connect battery ground cable.



C: INSPECTION *S110017A10*

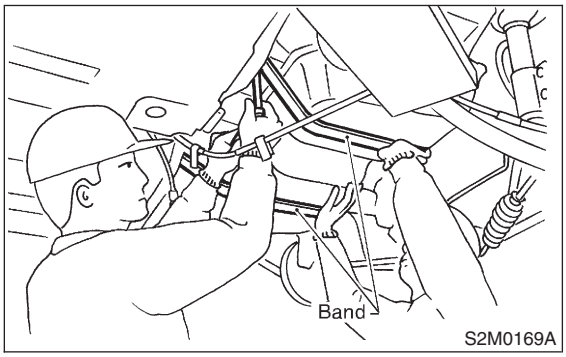
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

9. Fuel Tank Pressure Sensor

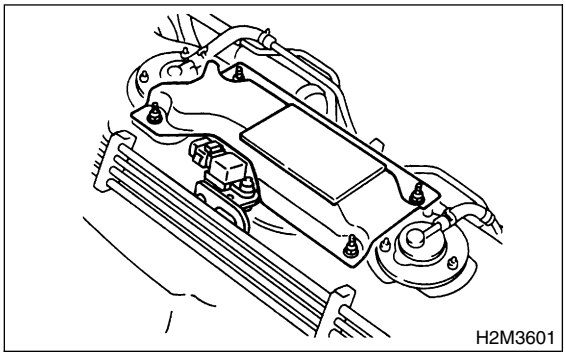
S110030

A: REMOVAL S110030A18

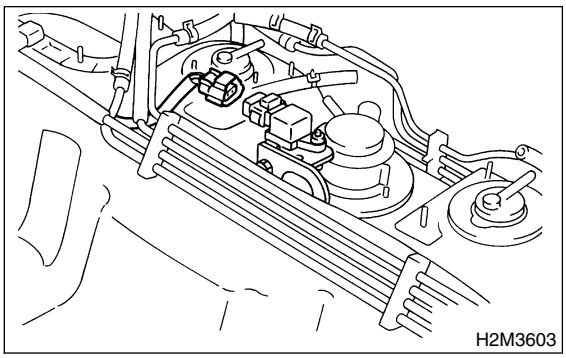
1) Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>



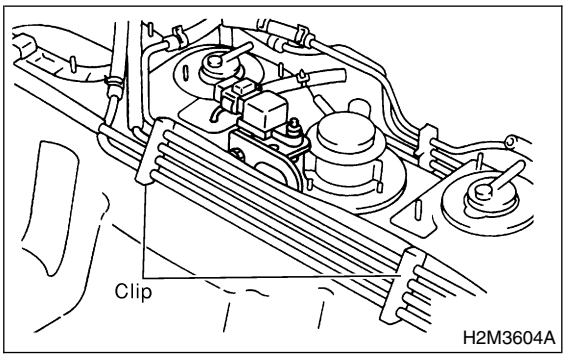
2) Remove protector cover.



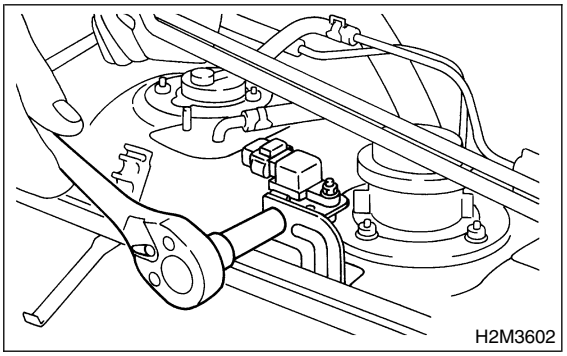
3) Disconnect connector from fuel tank pressure sensor.



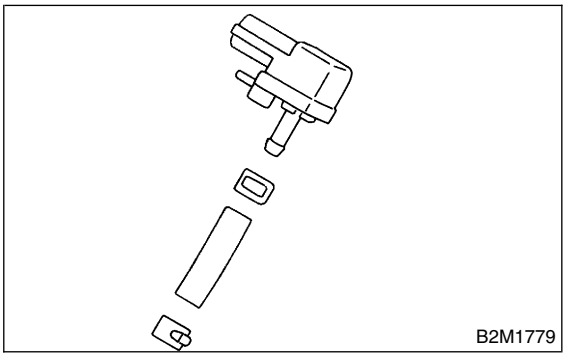
4) Release clips which hold fuel pipes onto fuel tank.



5) Move two fuel pipes to upper side, and remove bolt which install fuel tank pressure sensor to bracket.



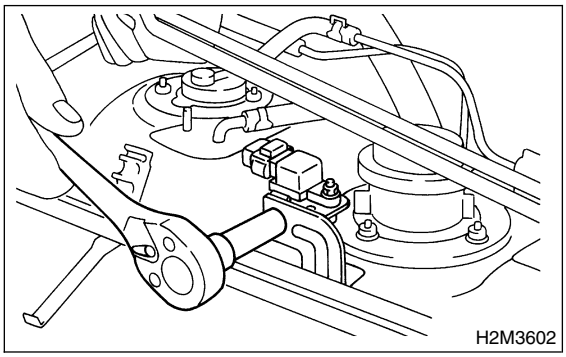
6) Move clip, and disconnect pressure hose from fuel tank.
7) Disconnect pressure hose from fuel tank pressure sensor.



B: INSTALLATION S110030A11

Install in the reverse order of removal.

Tightening torque:
7.35 N·m (0.75 kgf-m, 5.4 ft-lb)



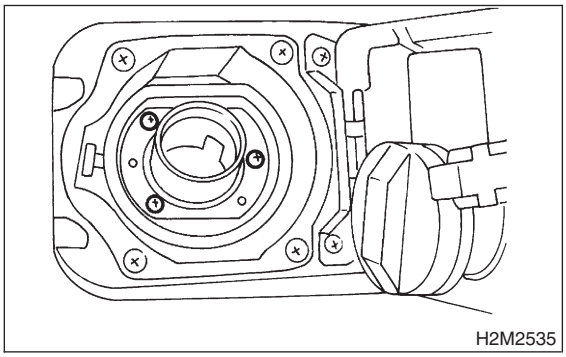
C: INSPECTION S110030A10

Make sure that hoses are not cracked or loose.

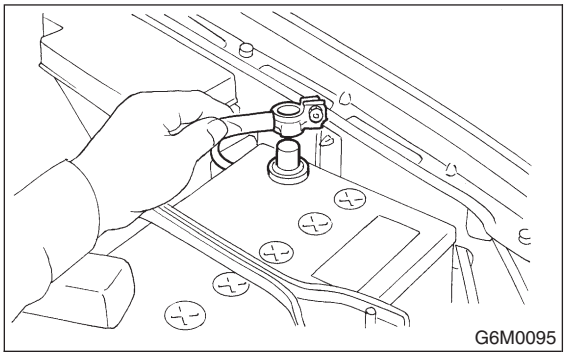
7. Fuel Temperature Sensor S110032

A: REMOVAL S110032A18

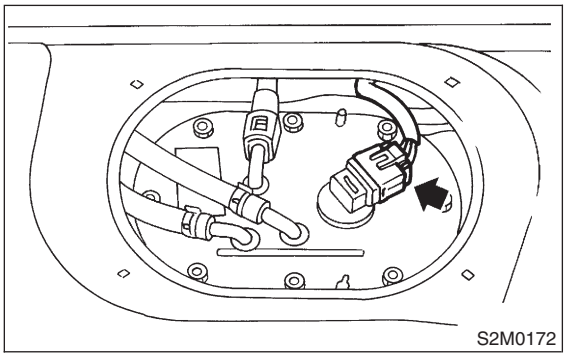
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel filler lid, and remove fuel filler cap.


H2M2535

3) Disconnect battery ground cable.

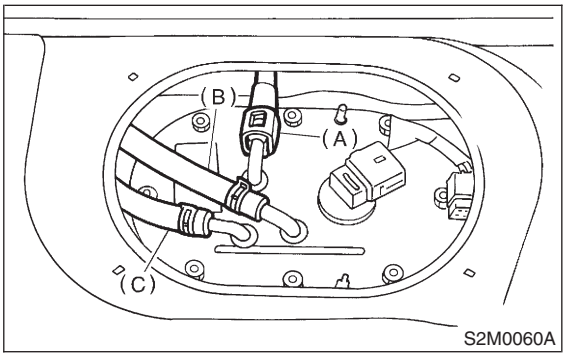

G6M0095

4) Disconnect connector from fuel pump.


S2M0172

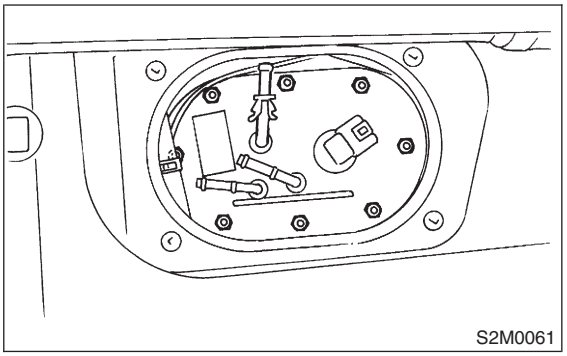
5) Move clips, and then disconnect fuel delivery hose (A), return hose (B) and jet pump hose (C).

6) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

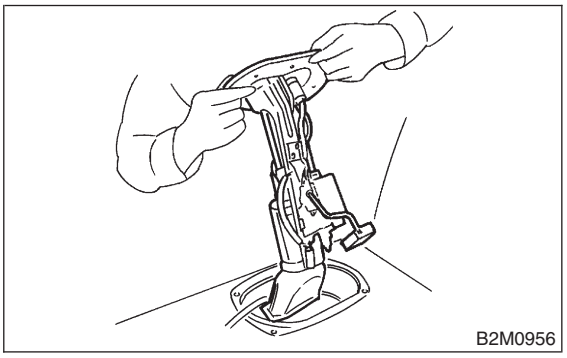


S2M0060A

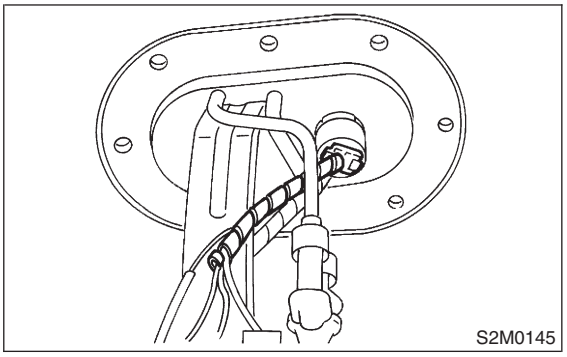
7) Remove nuts which install fuel pump assembly onto fuel tank.


S2M0061

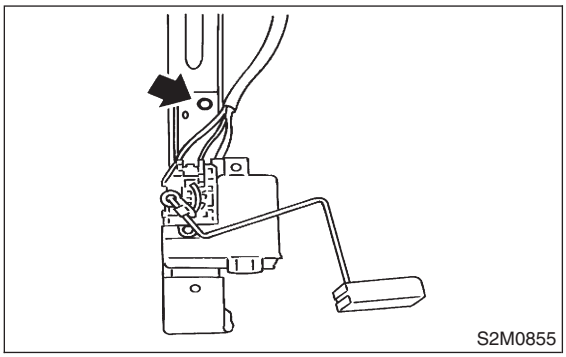
8) Take off fuel pump assembly from fuel tank.


B2M0956

9) Disconnect connector from fuel pump bracket.


S2M0145

10) Remove main fuel level sensor from fuel pump assembly. <Ref. to EC-9 REMOVAL, Main Fuel Level Sensor.>


S2M0855

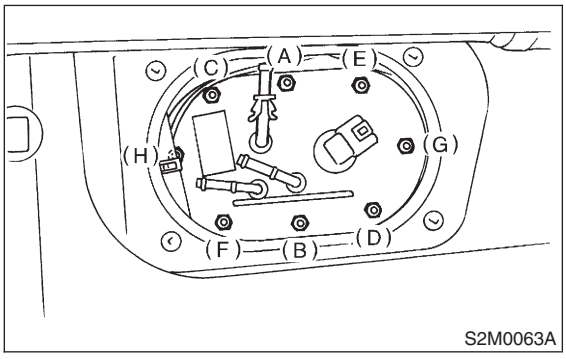
NOTE:
Fuel temperature sensor is a unit with fuel pump. If replacing it, replace as a fuel pump.

B: INSTALLATION S110032A11

CAUTION:
Leave fuel filler cap open when tightening nuts, to prevent fuel from flowing out through fuel delivery and return pipes. Close fuel filler cap after tightening nuts.

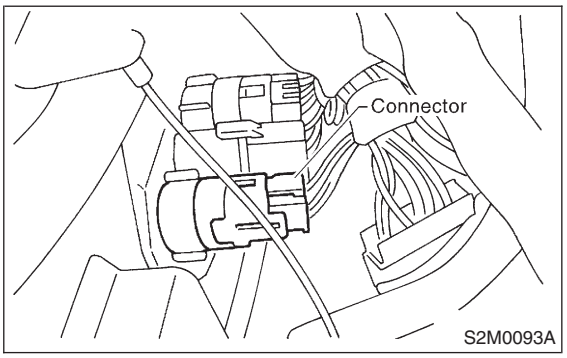
Install in the reverse order of removal. Do the following:
(1) Always use new gaskets.
(2) Ensure sealing portion is free from fuel or foreign particles before installation.
(3) Tighten nuts in alphabetical sequence shown in figure to specified torque.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



S2M0063A

(4) Connect connector to fuel pump relay.



S2M0093A

1. General Description S110001

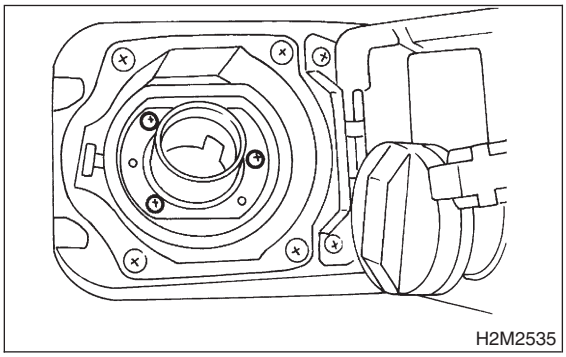
A: CAUTION S110001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

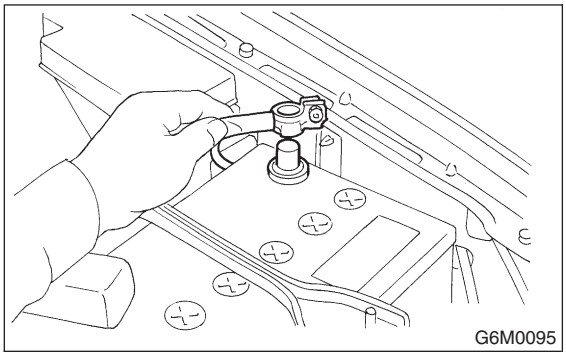
6. Main Fuel Level Sensor S110038

A: REMOVAL S110038A18

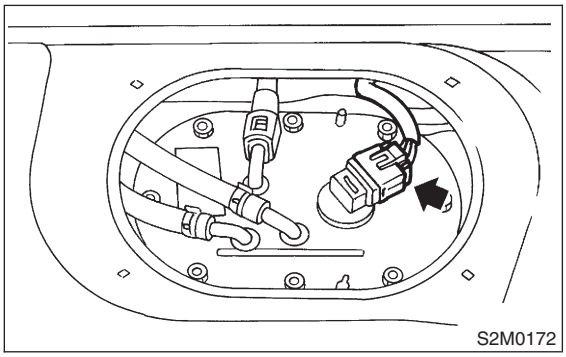
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

3) Disconnect battery ground cable.

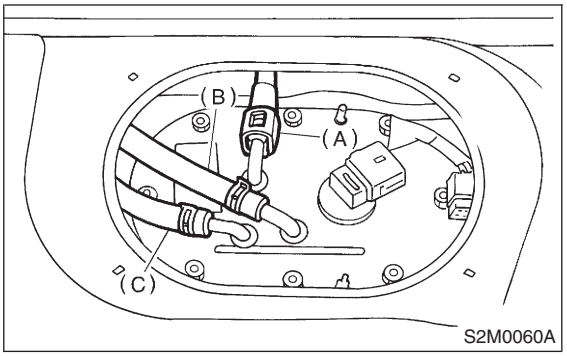

G6M0095

4) Disconnect connector from fuel pump.


S2M0172

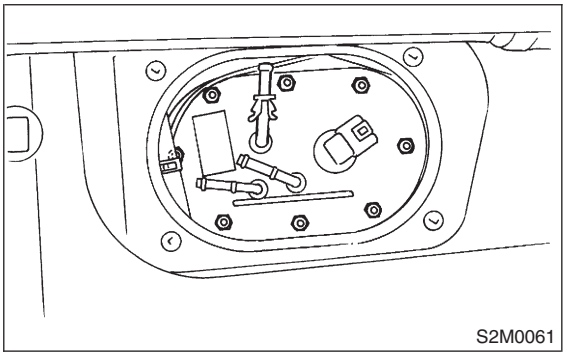
5) Move clips, and then disconnect fuel delivery hose (A), return hose (B) and jet pump hose (C).

6) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

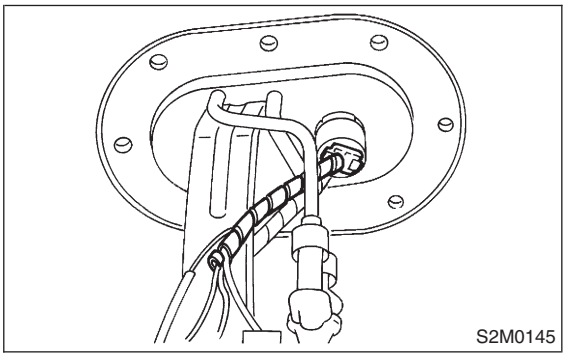


S2M0060A

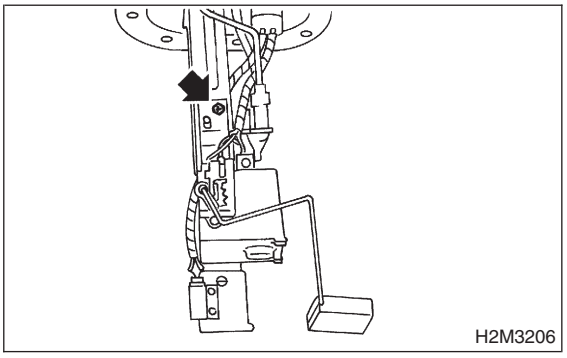
7) Remove nuts which install fuel pump assembly onto fuel tank.


S2M0061

8) Take off fuel pump assembly from fuel tank.
9) Disconnect connector from fuel pump bracket.


S2M0145

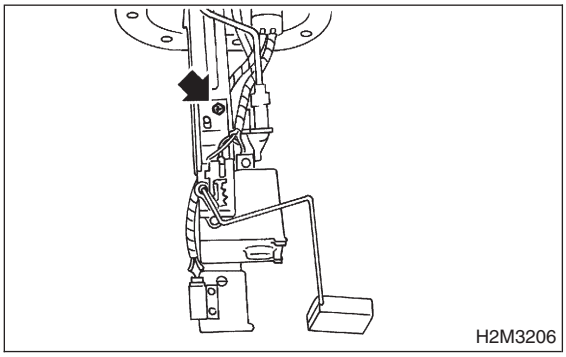
10) Remove bolt which installs fuel level sensor on mounting bracket.


H2M3206

B: INSTALLATION S110038A11

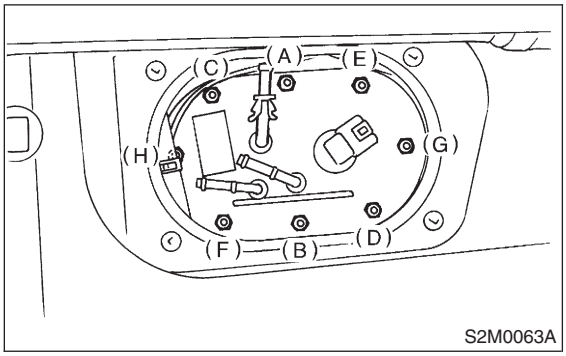
CAUTION:
Leave fuel filler cap open when tightening nuts, to prevent fuel from flowing out through fuel delivery and return pipes. Close fuel filler cap after tightening nuts.

Install in the reverse order of removal. Do the following:
1) Install the fuel level sensor onto the mounting bracket.

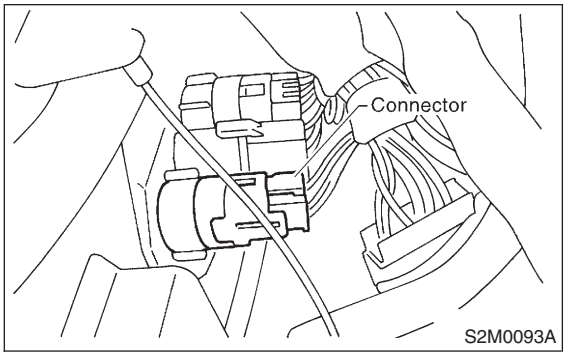


2) Always use new gaskets.
3) Ensure sealing portion is free from fuel or foreign particles before installation.
4) Tighten nuts in alphabetical sequence shown in figure to specified torque.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



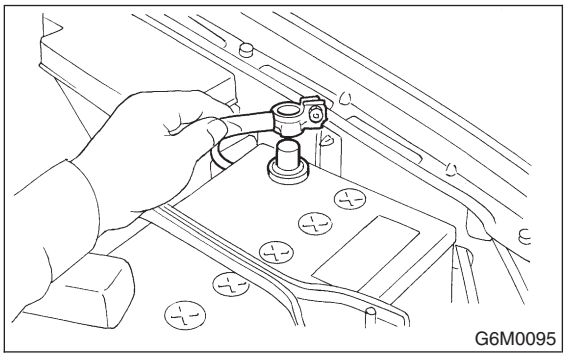
5) Connect connector to fuel pump relay.



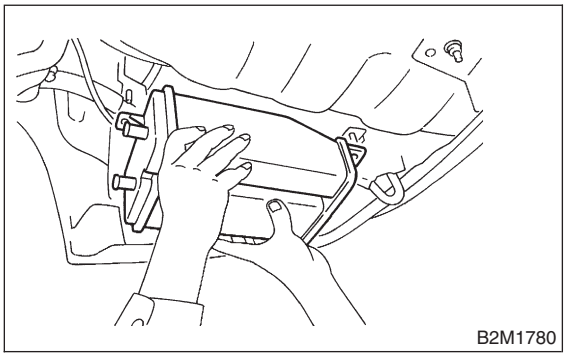
10. Pressure Control Solenoid Valve S110031

A: REMOVAL S110031A18

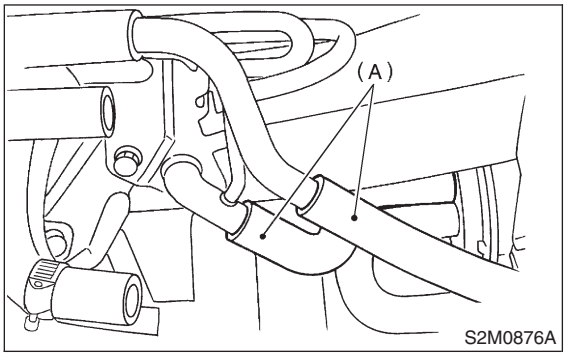
1) Disconnect battery ground cable.


G6M0095

2) Remove canister. <Ref. to EC-7 REMOVAL, Canister.>

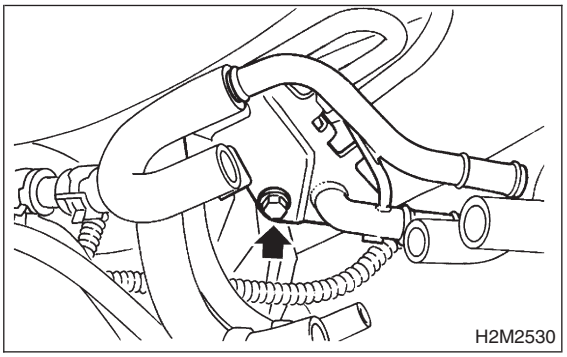

B2M1780

3) Disconnect evaporation hoses (A) from joint pipes.

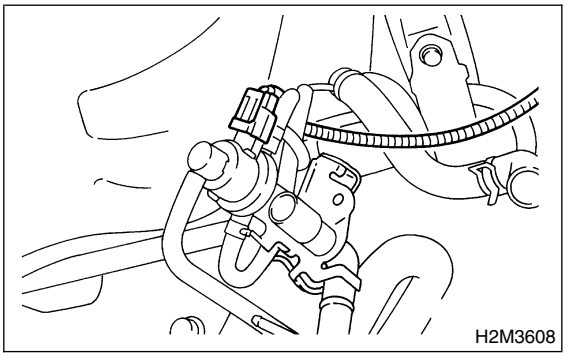


S2M0876A

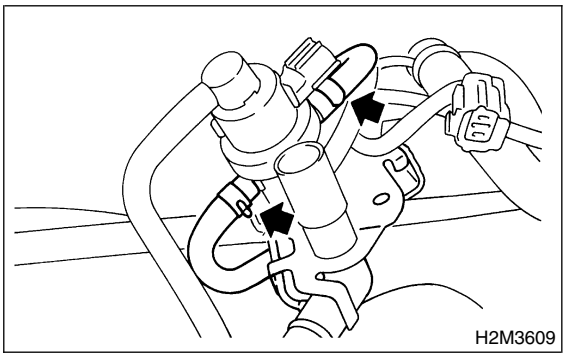
4) Remove bolt which installs pressure control solenoid valve holding bracket on body.


H2M2530

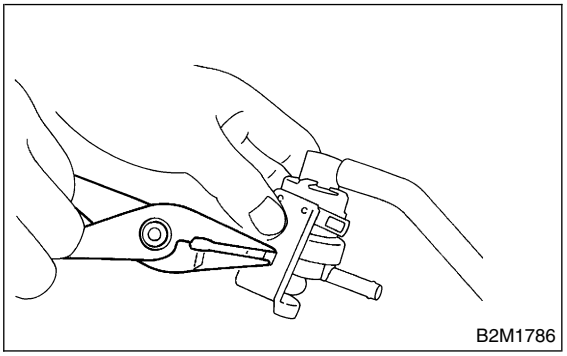
5) Disconnect connector from pressure control solenoid valve.


H2M3608

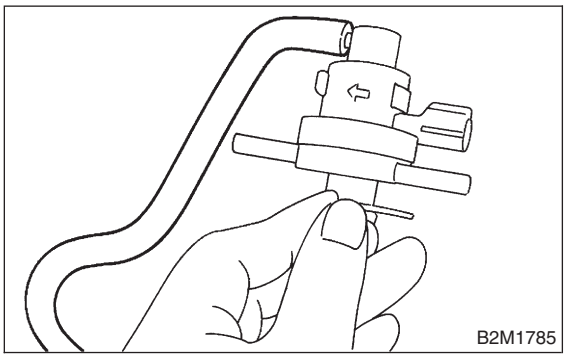
6) Disconnect two evaporation hoses from pressure control solenoid valve.
7) Remove pressure control solenoid valve with bracket.


H2M3609

8) Remove pressure control solenoid valve from bracket.


B2M1786

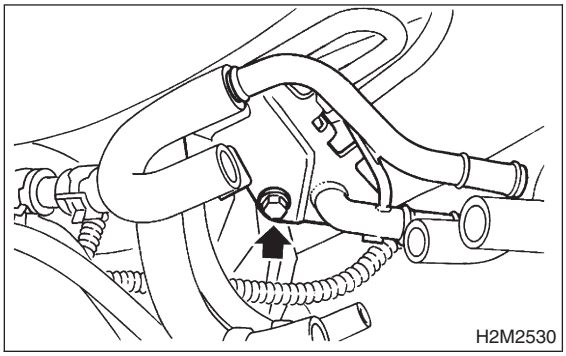
9) Disconnect vacuum hose from pressure control solenoid valve.



B: INSTALLATION S110031A11

Install in the reverse order of removal.

Tightening torque:
17.6 N·m (1.8 kgf-m, 13.0 ft-lb)



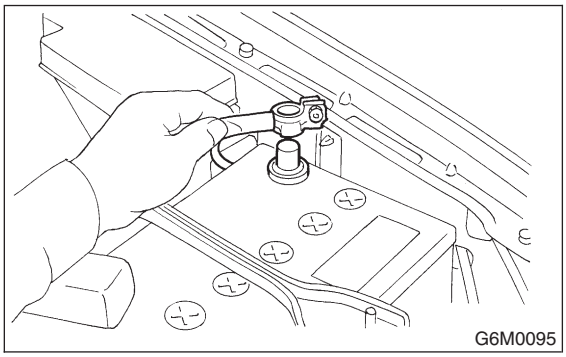
C: INSPECTION S110031A10

Make sure that hoses are not cracked or loose.

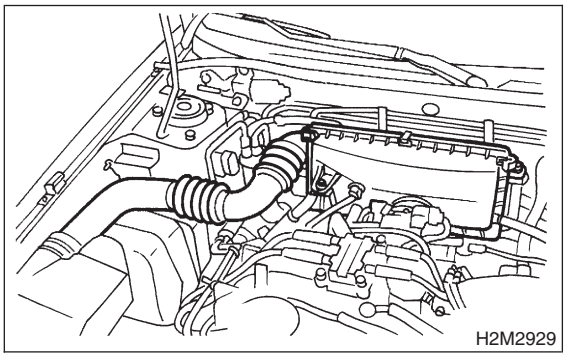
5. Purge Control Solenoid Valve S110035

A: REMOVAL S110035A18

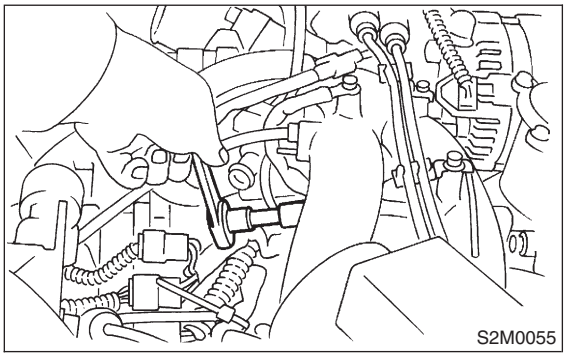
1) Disconnect battery ground cable.


G6M0095

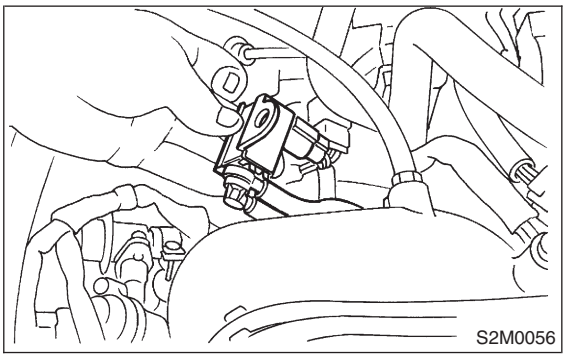
2) Remove air cleaner case <Ref. to IN-4 REMOVAL, Air Cleaner Case.> and air intake duct. <Ref. to IN-5 REMOVAL, Air Intake Duct.>


H2M2929

3) Remove bolt which installs purge control solenoid valve to intake manifold.


S2M0055

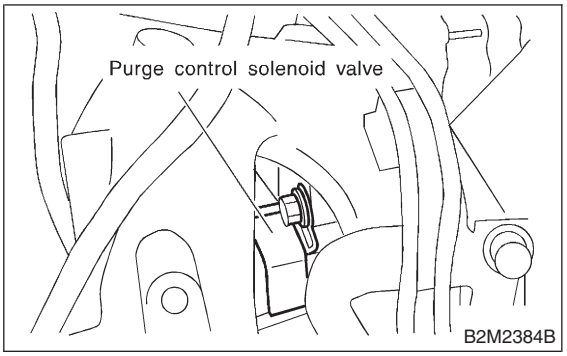
4) Take out purge control solenoid valve.
5) Disconnect connector from purge control solenoid valve.
6) Disconnect vacuum hoses from purge control solenoid valve.


S2M0056

B: INSTALLATION S110035A11

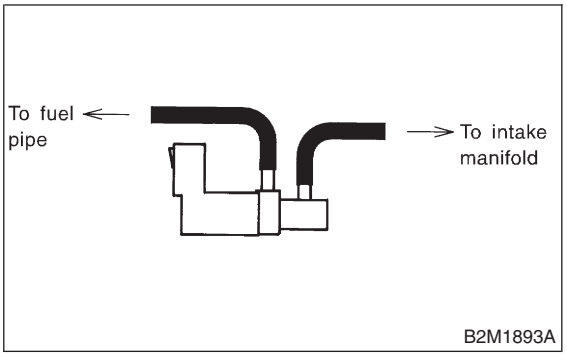
Install in the reverse order of removal.

Tightening torque:
15.7 N·m (1.6 kgf-m, 11.6 ft-lb)



B2M2384B

CAUTION:
Carefully connect the evaporation hoses.



B2M1893A

C: INSPECTION S110035A10

Make sure hoses are not cracked or loose.

3. Rear Catalyatic Converter S110036

A: REMOVAL S110036A18

The front and rear catalytic converter and center exhaust pipe are integrated into one unit. Therefore, the removal procedures are the same as the those for the front catalytic converter. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

B: INSTALLATION S110036A11

The front and rear catalytic converter and center exhaust pipe are integrated into one unit. Therefore, the installation procedures are the same as the ones described under front catalytic converter. <Ref. to EC-4 INSTALLATION, Front Catalytic Converter.>

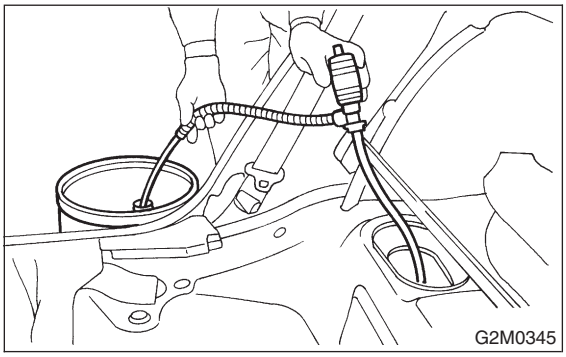
C: INSPECTION S110036A10

1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

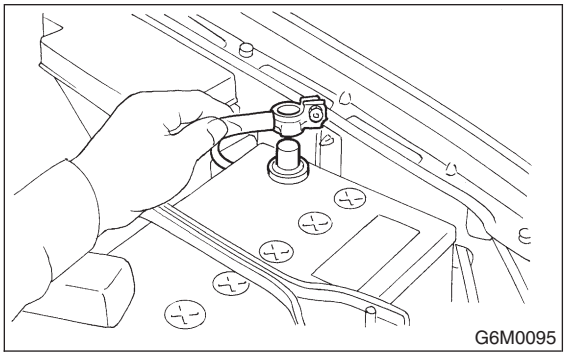
13. Shut Valve S110024

A: REMOVAL S110024A18

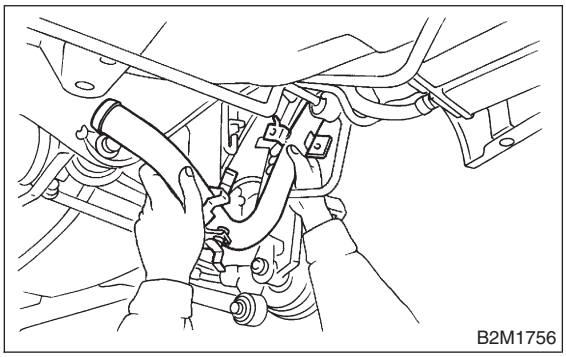
1) Drain fuel from fuel tank. <Ref. to FU-64 DRAINING FUEL, Fuel.>


G2M0345

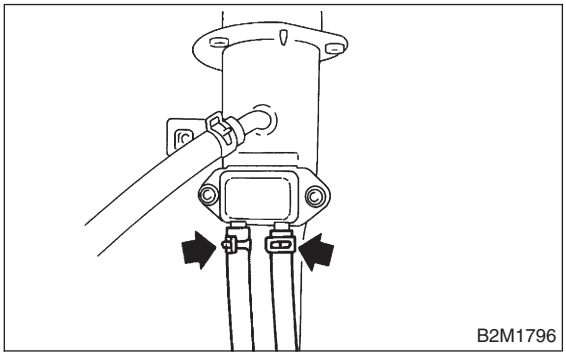
2) Disconnect battery ground cable.


G6M0095

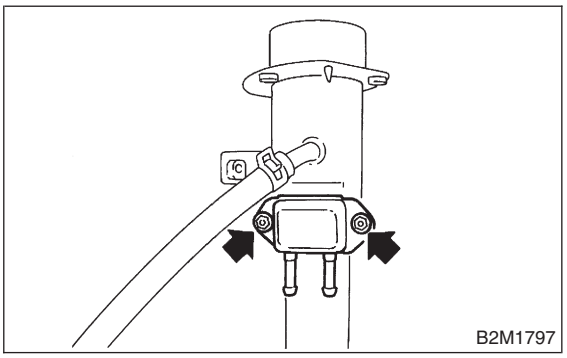
3) Remove fuel filler pipe. <Ref. to FU-72 REMOVAL, Fuel Filler Pipe.>


B2M1756

4) Disconnect evaporation hoses from shut valve.


B2M1796

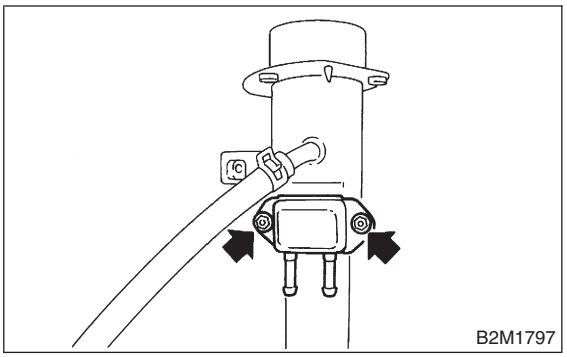
5) Remove shut valve from fuel filler pipe.


B2M1797

B: INSTALLATION S110024A11

Install in the reverse order of removal.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)


B2M1797

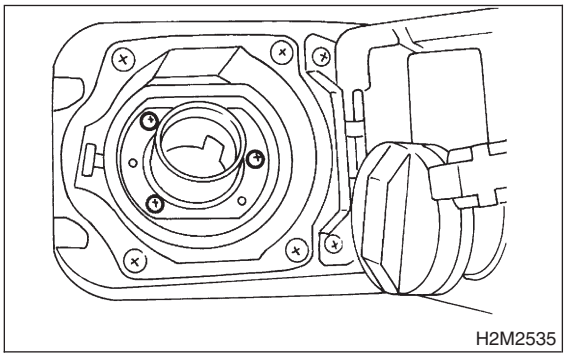
C: INSPECTION S110024A10

Make sure that hoses are not cracked or loose.

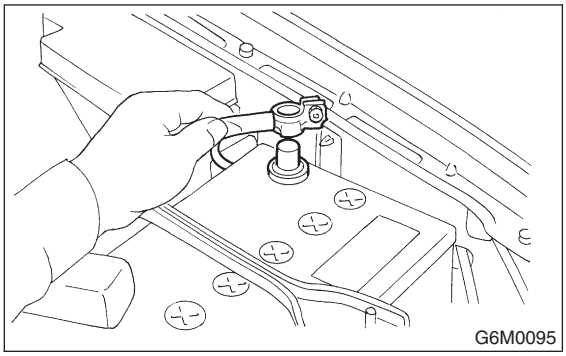
8. Sub Fuel Level Sensor S110029

A: REMOVAL S110029A18

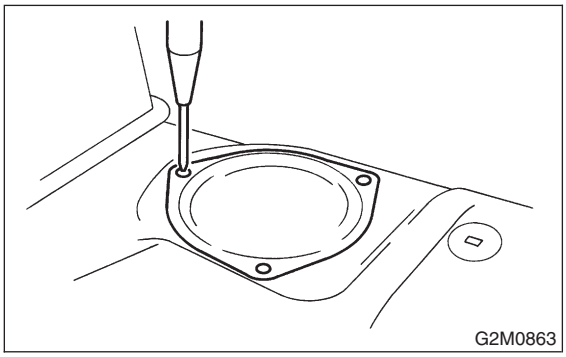
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

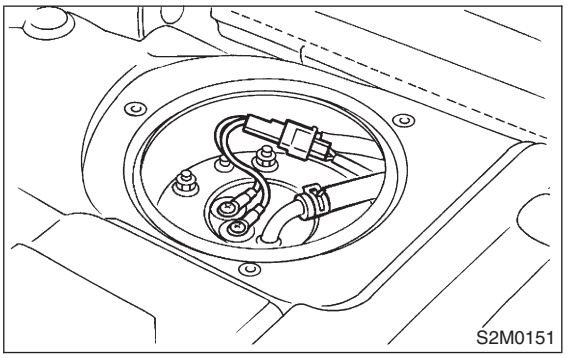
3) Disconnect battery ground cable.


G6M0095

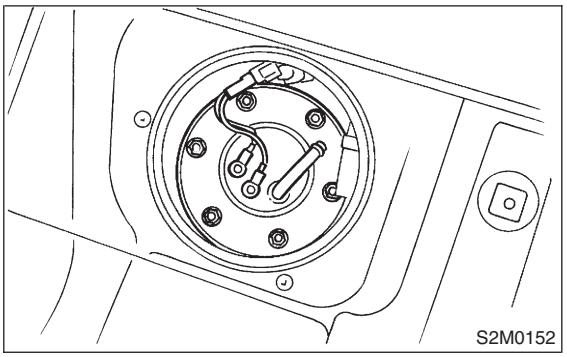
4) Remove service hole cover.


G2M0863

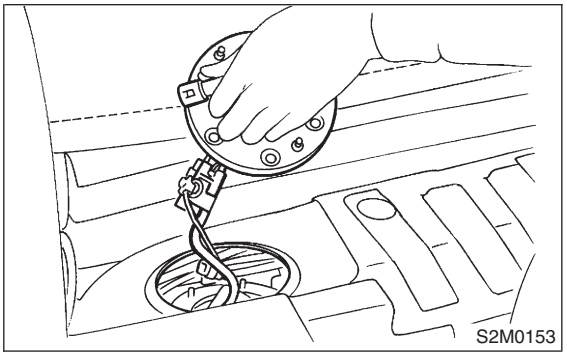
5) Disconnect connector from fuel sub level sensor, and disconnect jet pump hose.


S2M0151

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


S2M0152

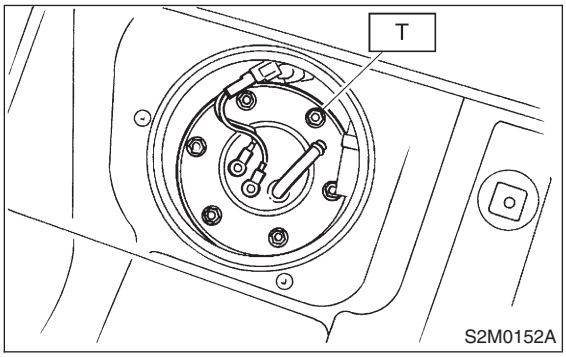
7) Remove fuel sub level sensor.


S2M0153

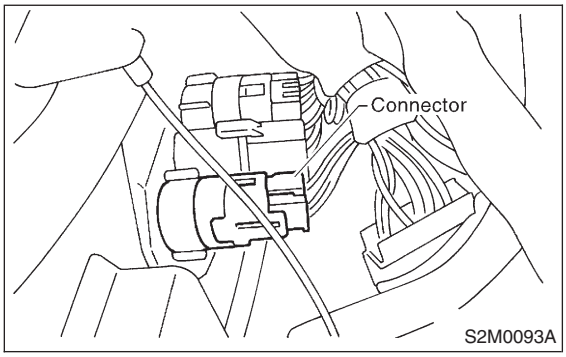
B: INSTALLATION S110029A11

Install in the reverse order of removal.
Do the following:
(1) Install fuel sub level sensor.

Tightening torque:
T: 4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



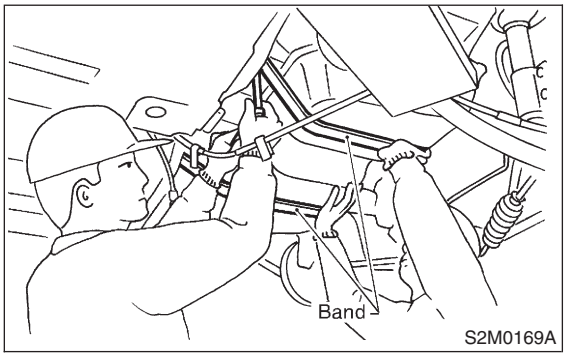
(2) Connect connector to fuel pump relay.



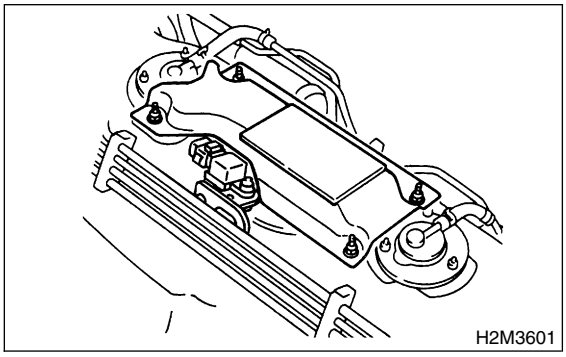
12. Vent Valve S110033

A: REMOVAL S110033A18

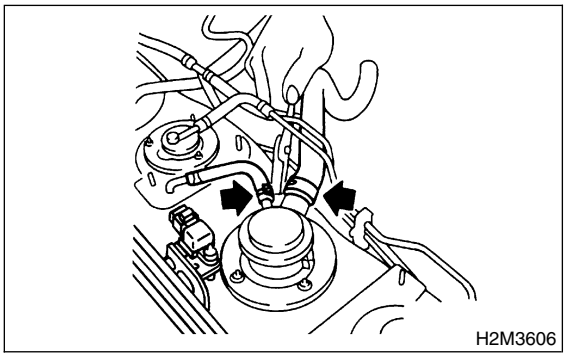
1) Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>



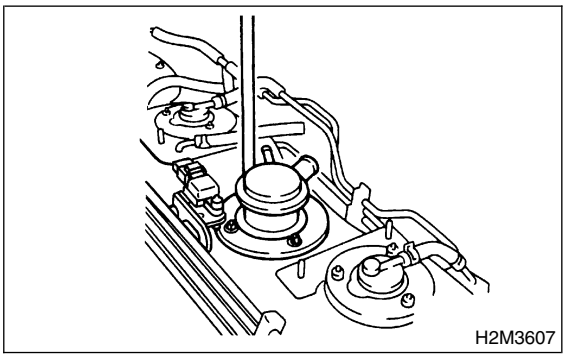
2) Remove protector cover.



3) Move clips, and disconnect hoses from vent valve.



4) Remove nuts which install vent valve on fuel tank.

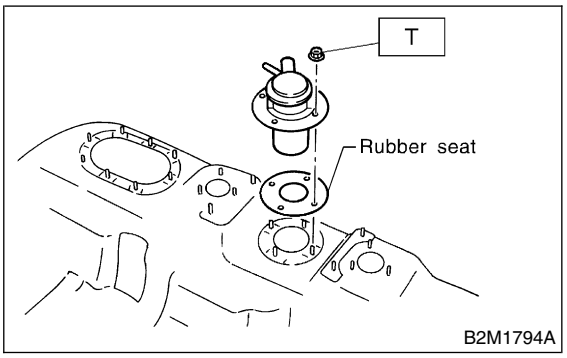


B: INSTALLATION S110033A11

Install in the reverse order of removal.

CAUTION:
Replace rubber seat with a new one.

Tightening torque:
T: 4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



C: INSPECTION S110033A10

Make sure that hoses are not cracked or loose.

1. Basic Diagnostic Procedure

S008501

A: PROCEDURE S008501E45

1. ENGINE S008501E4501

No.	Step	Check	Yes	No
1	**CHECK ENGINE START FAILURE.** 1) Ask the customer when and how the trouble occurred using the interview check list. <Ref. to EN-4 CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step **2**.	Inspection using “Diagnostics for Engine Starting Failure”. <Ref. to EN-71 PROCEDURE, Diagnostics for Engine Starting Failure.>
2	**CHECK ILLUMINATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).**	Does CHECK ENGINE malfunction indicator lamp illuminate?	Go to step **3**.	Inspection using “General Diagnostic Table”. <Ref. to EN-532 INSPECTION, General Diagnostic Table.>
3	**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.	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?	Go to step **4**.	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 EN-63 ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL) Illumination Pattern.>

No.	Step	Check	Yes	No
4	**PERFORM THE DIAGNOSIS.** 1) Inspect using “List of Diagnostic Trouble Code (DTC)”. NOTE: ● 2200 cc Models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> ● 2500 cc Models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: Carry out the basic check, only when DTC about automatic transmission is shown on display. <Ref. to EN-63 ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL) Illumination Pattern.> 2) Repair the trouble cause. 3) Perform the clear memory mode. <Ref. to EN-60 OPERATION, Clear Memory Mode.> 4) Perform the inspection mode. <Ref. to EN-57 OPERATION, Inspection Mode.>	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?	Inspect using “List of Diagnostic Trouble Code (DTC)”. NOTE: ● 2200 cc Models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> ● 2500 cc Models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Complete the diagnosis.

2. AUTOMATIC TRANSMISSION S008501E4502

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 AT-9 REPLACEMENT, Automatic Transmission Fluid.>
2) Differential gear oil level check <Ref. to AT-10 REPLACEMENT, Differential Gear Oil.>
3) ATF leak check <Ref. to AT-9 REPLACEMENT, Automatic Transmission Fluid.>
4) Differential gear oil leak check <Ref. to AT-10 REPLACEMENT, Differential Gear Oil.>
5) Stall test <Ref. to AT-12 INSPECTION, Stall Test.>
6) Line pressure test <Ref. to AT-15 MEASUREMENT, Line Pressure Test.>
7) Transfer clutch pressure test <Ref. to AT-17 INSPECTION, Transfer Clutch Pressure Test.>
8) Time lag test <Ref. to AT-14 INSPECTION, Time Lag Test.>
9) Road test <Ref. to AT-11 INSPECTION, Road Test.>
10) Shift characteristics <Ref. to AT-17 INSPECTION, Transfer Clutch Pressure Test.>

2. Check List for Interview S008502

A: CHECK S008502A04

1. CHECK LIST NO. 1 S008502A0401

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	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others:		
Outdoor temperature	°F (°C)		
	☐ Hot ☐ Warm ☐ Cool ☐ Cold		
Place	☐ Highway ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Downhill ☐ Rough road ☐ Others:		
Engine temperature	☐ Cold ☐ Warming-up ☐ After warming-up ☐ Any temperature ☐ Others:		
Engine speed	rpm		
Vehicle speed	MPH		
Driving conditions	☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH)		
Headlight	☐ ON/☐ OFF	Rear defogger	☐ ON/☐ OFF
Blower	☐ ON/☐ OFF	Radio	☐ ON/☐ OFF
A/C compressor	☐ ON/☐ OFF	CD/Cassette	☐ ON/☐ OFF
Cooling fan	☐ ON/☐ OFF	Car phone	☐ ON/☐ OFF
Front wiper	☐ ON/☐ OFF	CB	☐ ON/☐ OFF
Rear wiper	☐ ON/☐ OFF		

2. CHECK LIST NO. 2 S008502A0402

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. ☐ Yes/☐ No
☐ Low fuel warning light ☐ Charge indicator light ☐ AT diagnostics indicator light ☐ ABS warning light ☐ TCS warning light ☐ Engine oil pressure warning light
b) Fuel level
• Lack of gasoline: ☐ Yes/☐ No • Indicator position of fuel gauge:
c) Intentional connecting or disconnecting of harness connectors or spark plug cords: ☐ Yes/☐ No
• What:
d) Intentional connecting or disconnecting of hoses: ☐ Yes/☐ No
• What:
e) Installing of parts other than genuine parts: ☐ Yes/☐ No
• What: • Where:
f) Occurrence of noise: ☐ Yes/☐ No
• From where: • What kind:
g) Occurrence of smell: ☐ Yes/☐ No
• From where: • What kind:
h) Intrusion of water into engine compartment or passenger compartment: ☐ Yes/☐ No
i) Troubles occurred
☐ Engine does not start. ☐ Engine stalls during idling. ☐ Engine stalls while driving. ☐ Engine speed decreases. ☐ Engine speed does not decrease. ☐ Rough idling ☐ Poor acceleration ☐ Back fire ☐ After fire ☐ No shift ☐ Excessive shift shock

13. Clear Memory Mode S008513

A: OPERATION S008513A16

1. SUBARU SELECT MONITOR (NORMAL MODE) S008513A1601

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. (2500 cc models only)
● For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

2. SUBARU SELECT MONITOR (OBD MODE) S008513A1602

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. (2500 cc models only)
● For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

3. OBD-II GENERAL SCAN TOOL S008513A1603

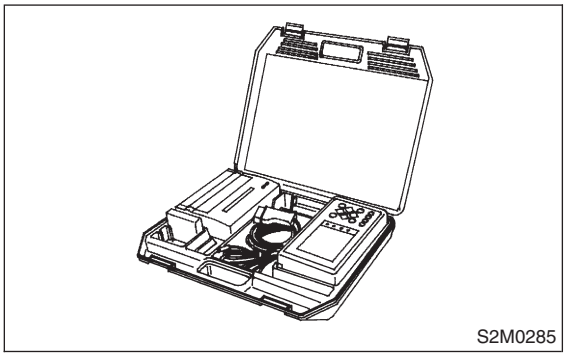
For clear memory procedures using the OBD-II general scan tool, refer to the OBD-II General Scan Tool Instruction Manual.
After the memory has been cleared, the ISC must be initialized. To do this, turn the ignition switch to the ON position. Wait 3 seconds before starting the engine. (2500 cc models only)

14. Compulsory Valve Operation Check Mode S008528

A: OPERATION S008528A16

1. SUBARU SELECT MONITOR S008528A1601

1) Prepare Subaru Select Monitor kit.


S2M0285

2) Connect diagnosis cable to Subaru Select Monitor.

- 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.

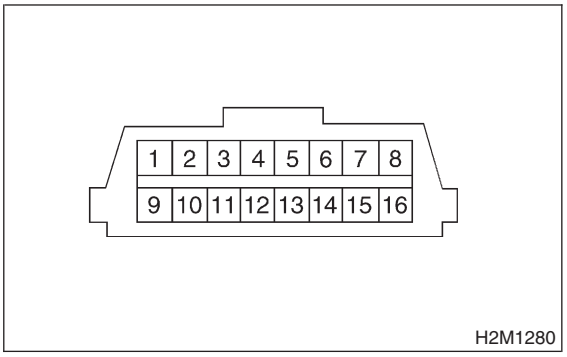
MEMO:

8. Data Link Connector S008505

A: NOTE S008505A15

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

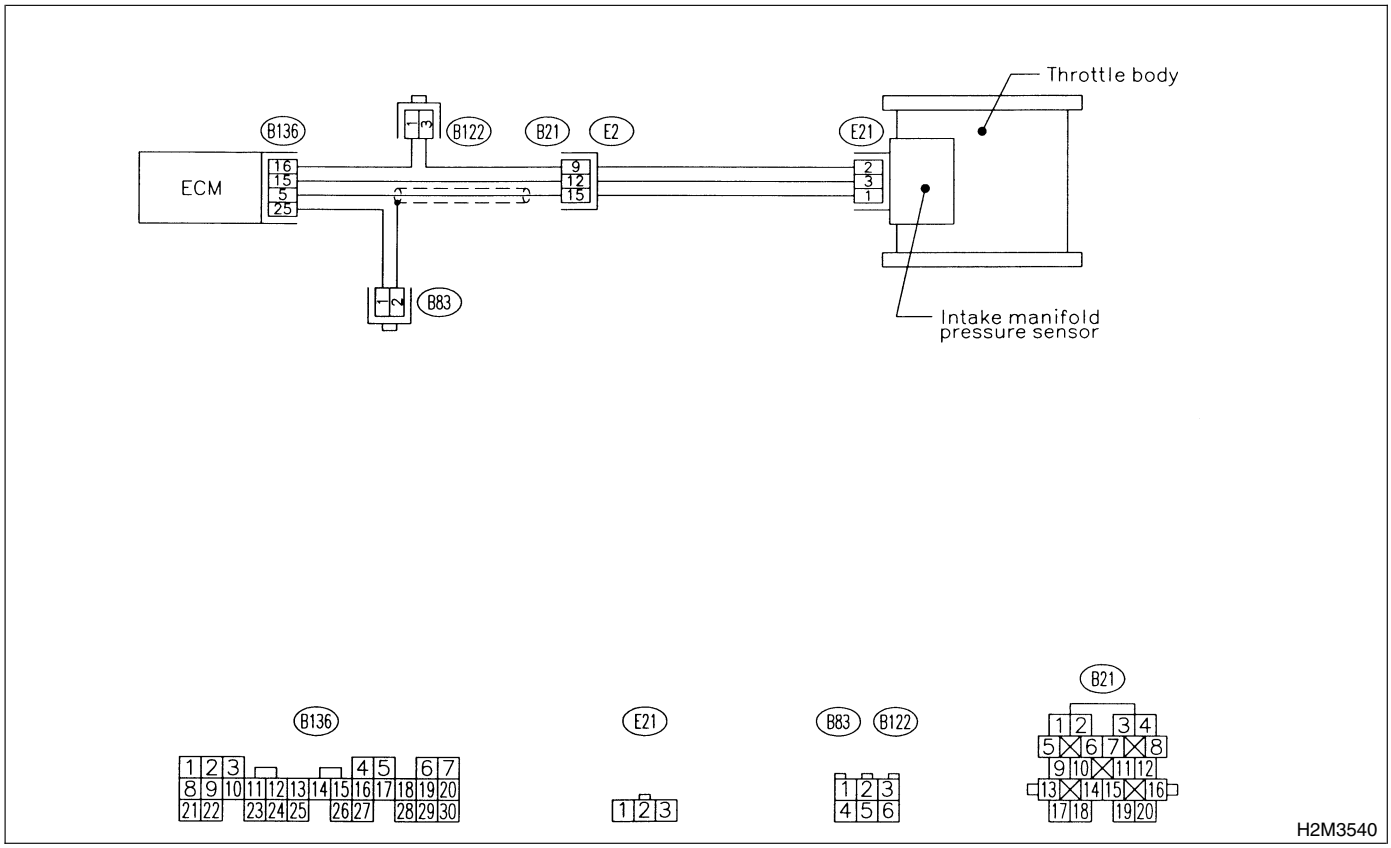
18. Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models S008636

A: DTC P0106 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S008636F00

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



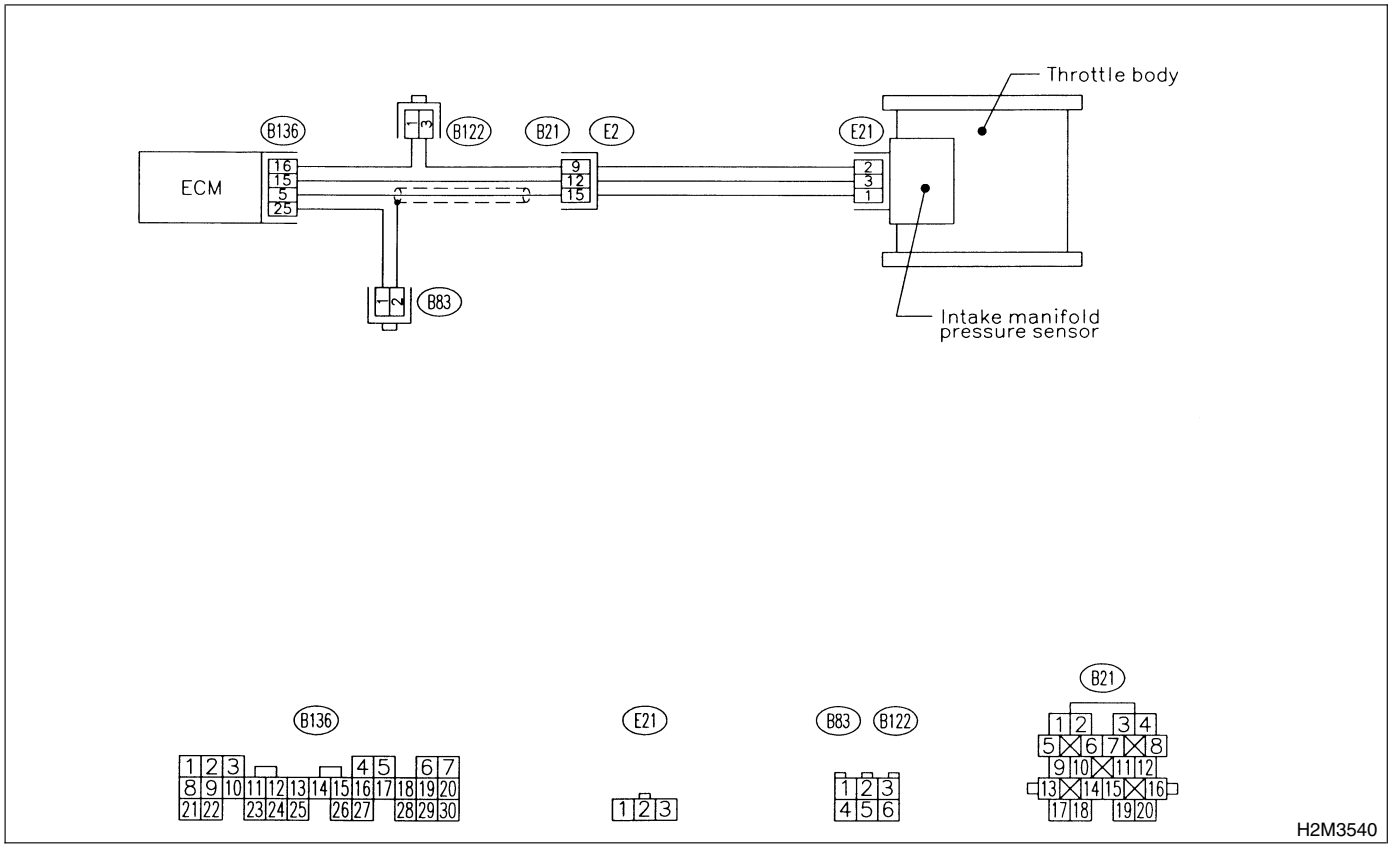
No.	Step	Check	Yes	No
1	**CHECK IDLE SWITCH SIGNAL.** 1) Turn ignition switch to ON. 2) Operate the LED operation mode for engine using Subaru Select Monitor. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "LED OPERATION MODE FOR ENGINE". <Ref. to EN-262 DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Does the LED of {Idle Switch Signal} come on?	Go to step **2**.	Check throttle position sensor circuit. <Ref. to EN-126 DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0106.
2	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107 or P0108?	Inspect DTC P0107 or P0108 using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0106.	Go to step **3**.
3	**CHECK CONDITION OF INTAKE MANIFOLD PRESSURE SENSOR.**	Is the intake manifold pressure sensor installation bolt tightened securely?	Go to step **4**.	Tighten intake manifold pressure sensor installation bolt securely.
4	**CHECK CONDITION OF THROTTLE BODY.**	Is the throttle body installation bolt tightened securely?	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>	Tighten throttle body installation bolt securely.

B: DTC P0107 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT LOW INPUT — S008636F01

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 3.3 kPa (25 mmHg, 0.98 inHg)?	Go to step **3**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in ECM and pressure sensor connector. <Ref. to EN-262 DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/ PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Is there poor contact in ECM or pressure sensor connector?	Repair poor contact in ECM or pressure sensor connector.	Even if MIL lights up, the circuit has returned to a normal condition at this time.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **5**.	Go to step **4**.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 0.7 V?	Go to step **7**.	Go to step **6**.
6	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **7**.
7	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **8**.	Repair open circuit in harness between ECM and intake manifold pressure sensor connector.
8	**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. 16 — (E21) No. 2:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

No.	Step	Check	Yes	No
9	**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:***	Is the resistance more than 500 kΩ?	Go to step **10**.	Repair ground short circuit in harness between ECM and intake manifold pressure sensor connector.
10	**CHECK POOR CONTACT.** Check poor contact in intake manifold pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in intake manifold pressure sensor connector?	Repair poor contact in intake manifold pressure sensor connector.	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>

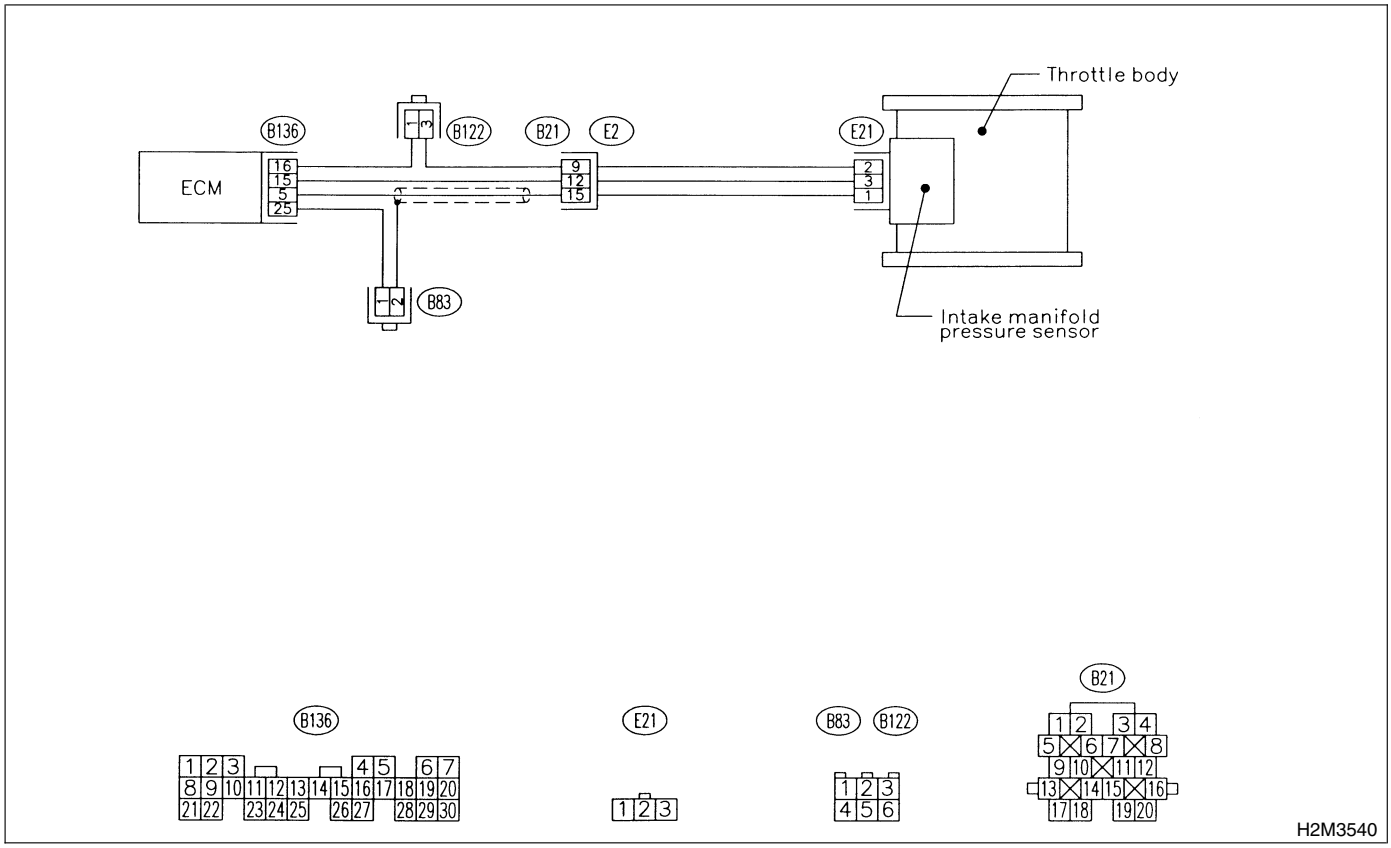
MEMO:

C: DTC P0108 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT HIGH INPUT — S008636F02

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 130 kPa (975 mmHg, 38.39 inHg)?	Go to step **10**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 0.7 V?	Go to step **6**.	Go to step **5**.
5	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair open circuit in harness between ECM and intake manifold pressure sensor connector.
7	**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:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair open circuit in harness between ECM and intake manifold pressure sensor connector.
8	**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:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair open circuit in harness between ECM and intake manifold pressure sensor connector.

No.	Step	Check	Yes	No
9	**CHECK POOR CONTACT.** Check poor contact in intake manifold pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in intake manifold pressure sensor connector?	Repair poor contact in intake manifold pressure sensor connector.	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>
10	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 130 kPa (975 mmHg, 38.39 inHg)?	Repair battery short circuit in harness between ECM and intake manifold pressure sensor connector.	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>

MEMO:

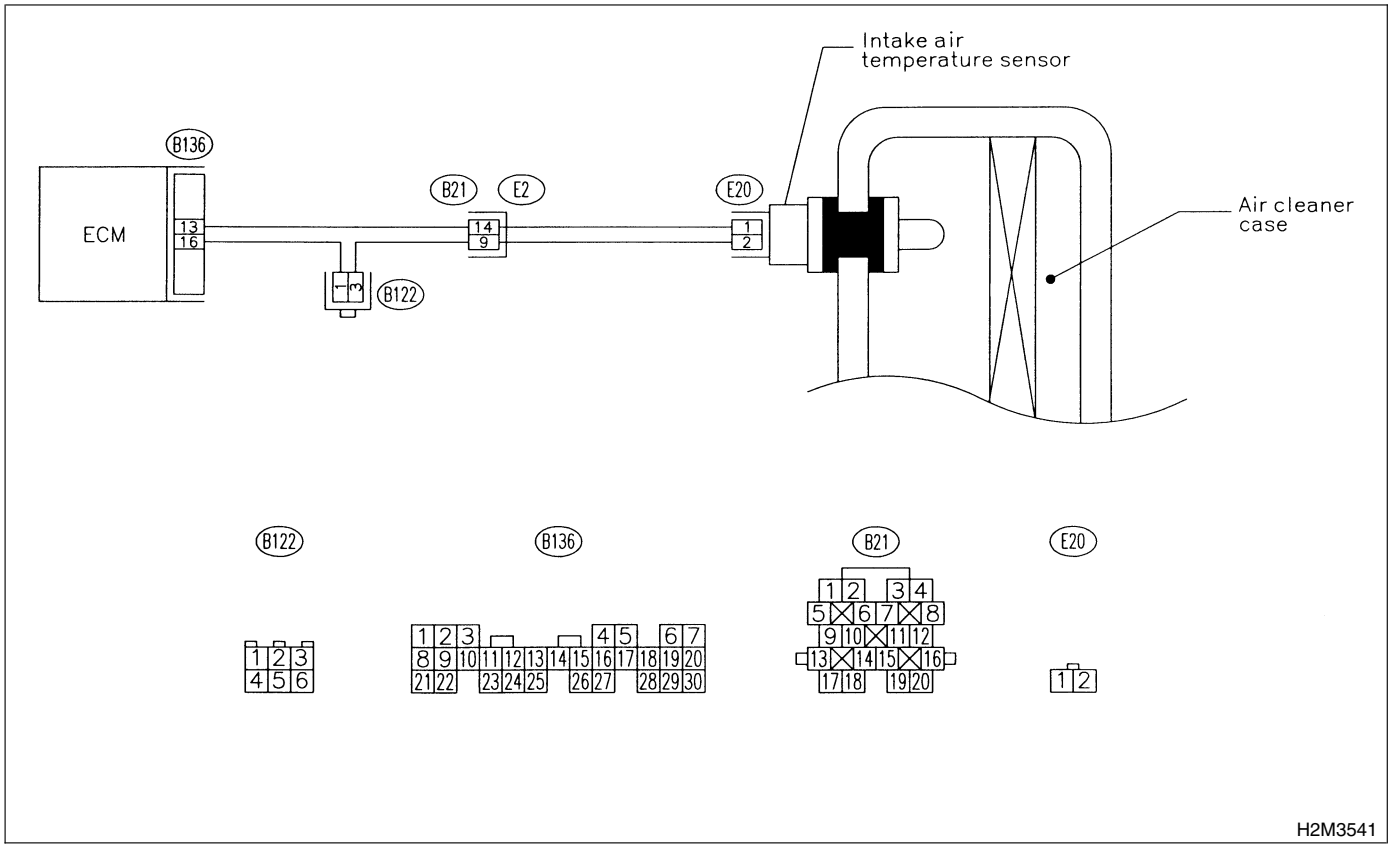
D: DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S008636B14

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3541

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0112 or P0113?	Inspect DTC P0112 or P0113 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0111.	Replace intake air temperature sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>

E: DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT

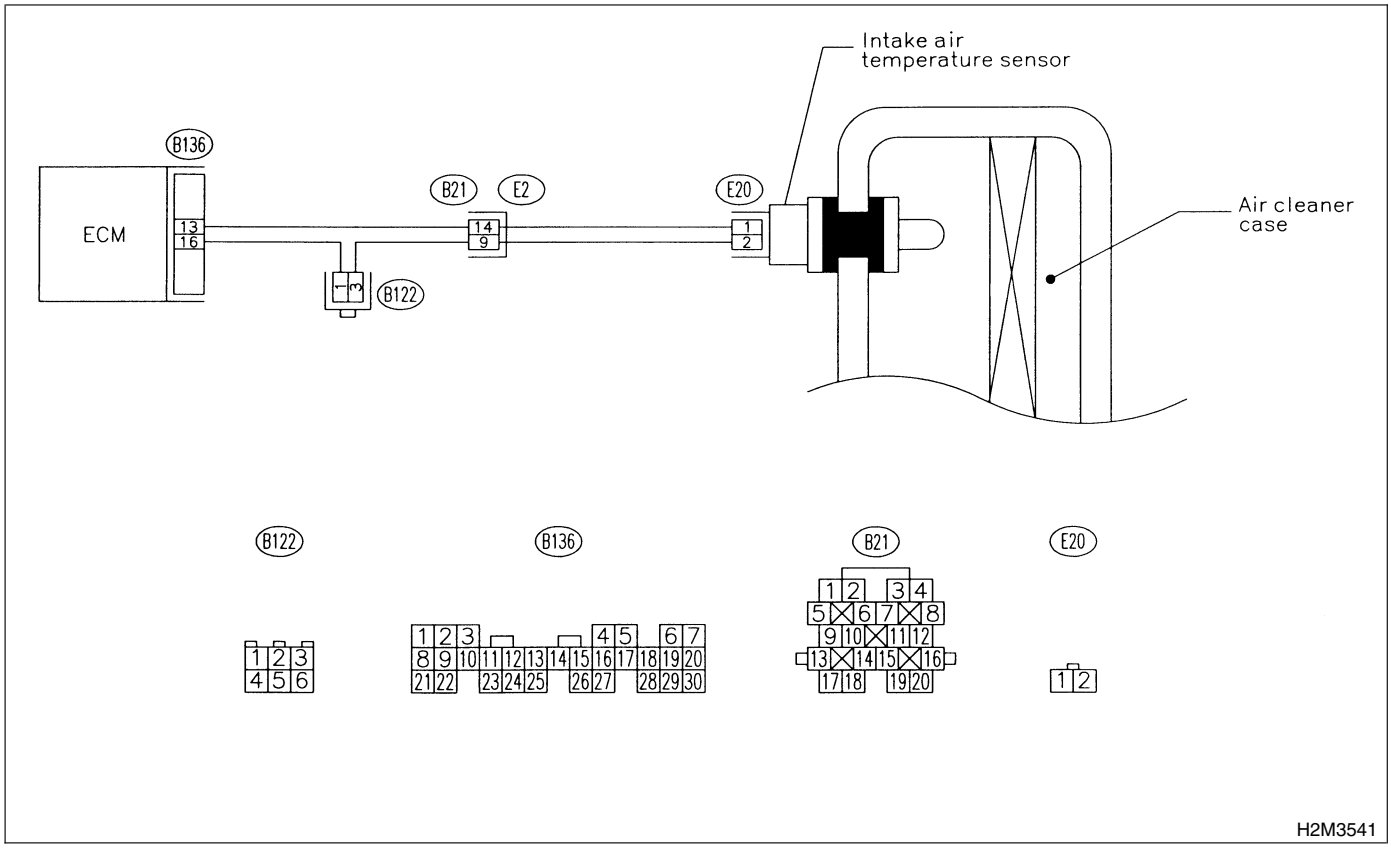
S008636B15

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3541

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value greater than 120°C (248°F)?	Go to step **2**.	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 (B122)
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –40°C (–40°F)?	Replace intake air temperature sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	Repair ground short circuit in harness between intake air temperature sensor and ECM connector.

F: DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

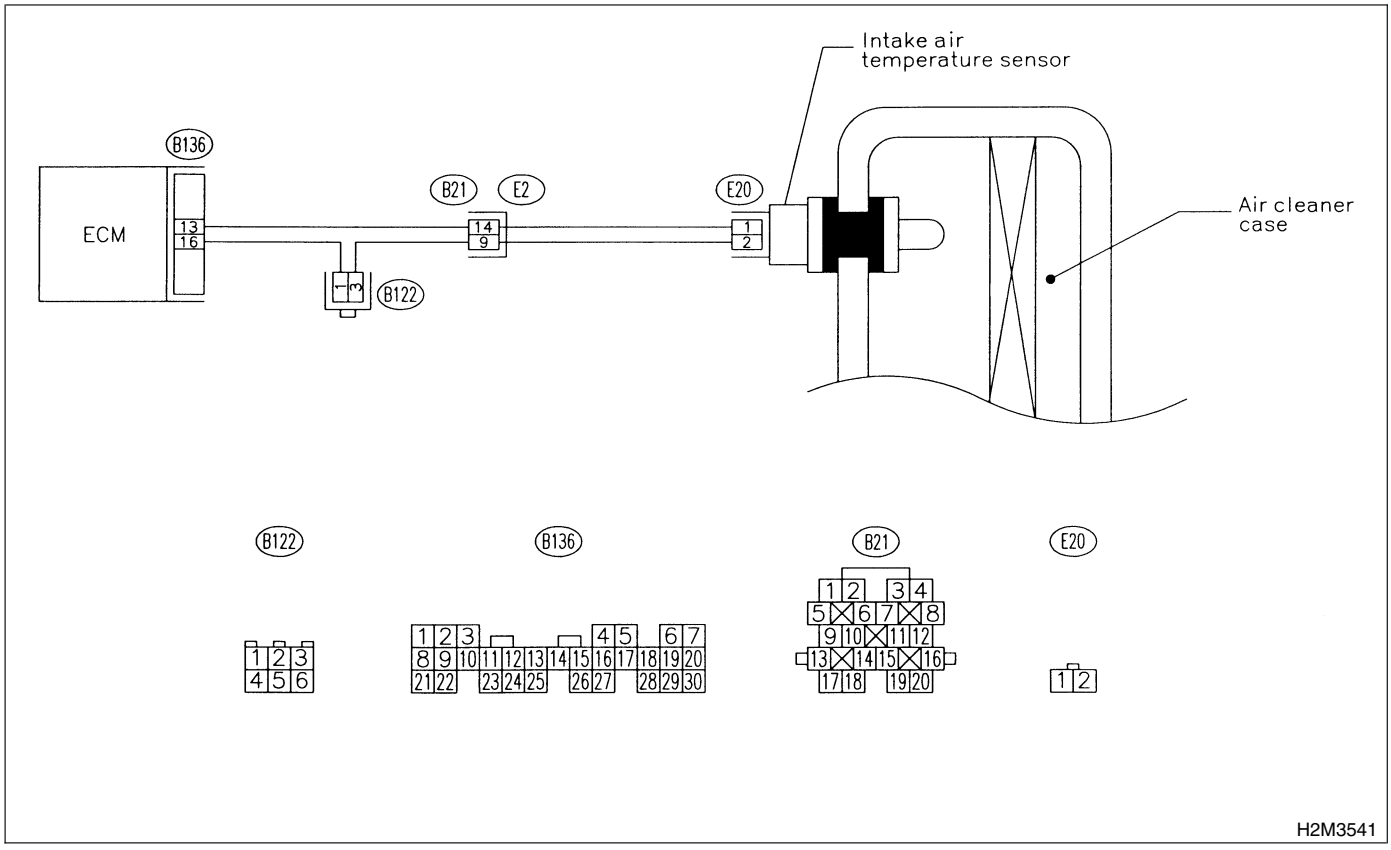
S008636B16

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3541

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –40°C (–40°F)?	Go to step **2**.	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 (B122)
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between intake air temperature sensor and ECM connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between intake air temperature sensor and ECM connector.	Go to step **4**.
4	**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 (–):***	Is the voltage more than 3 V?	Go to step **5**.	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 (B122)

No.	Step	Check	Yes	No
5	**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:***	Is the resistance less than 5 Ω?	Replace intake air temperature sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	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 (B122)

MEMO:

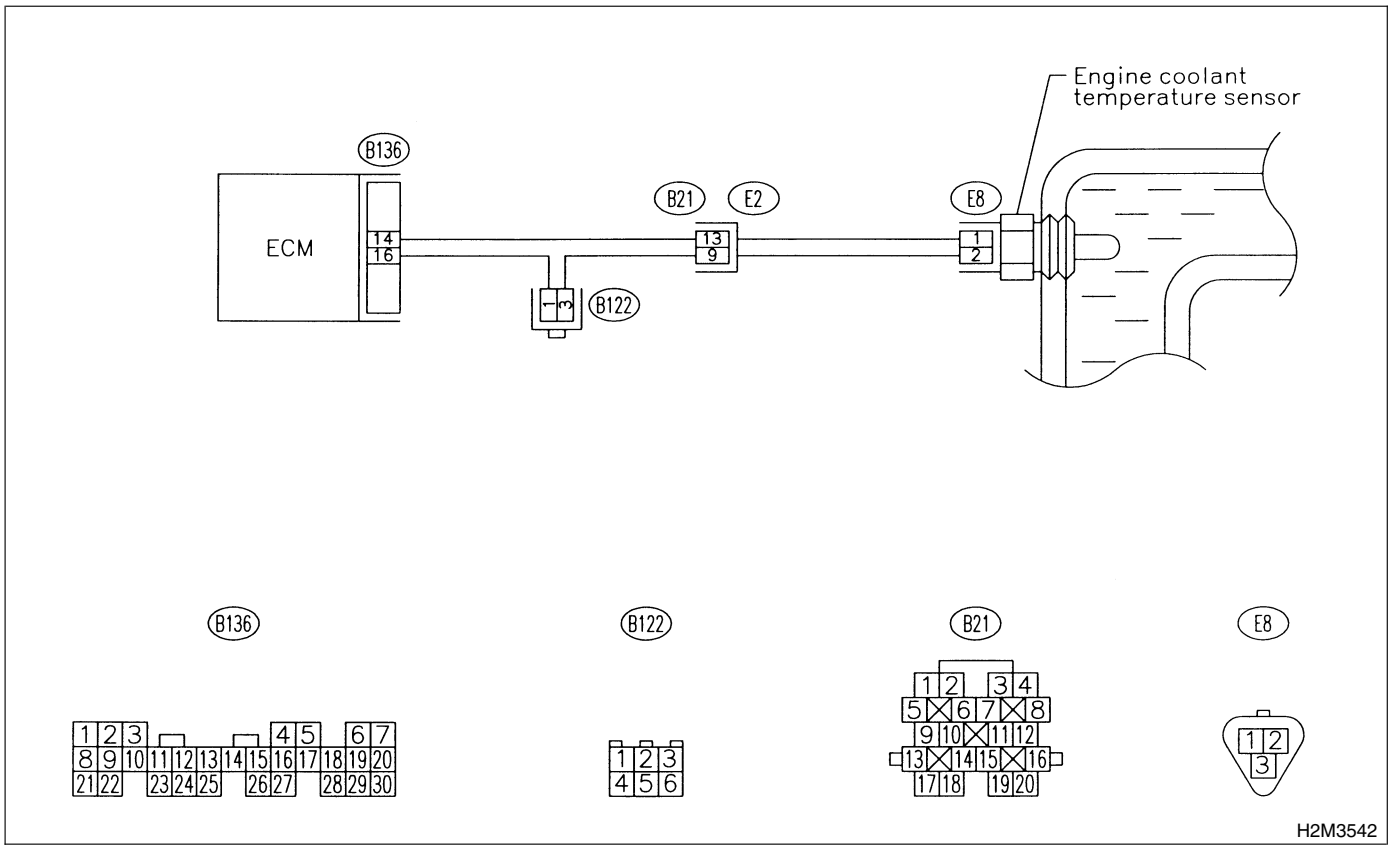
G: DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT — S008636B17

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



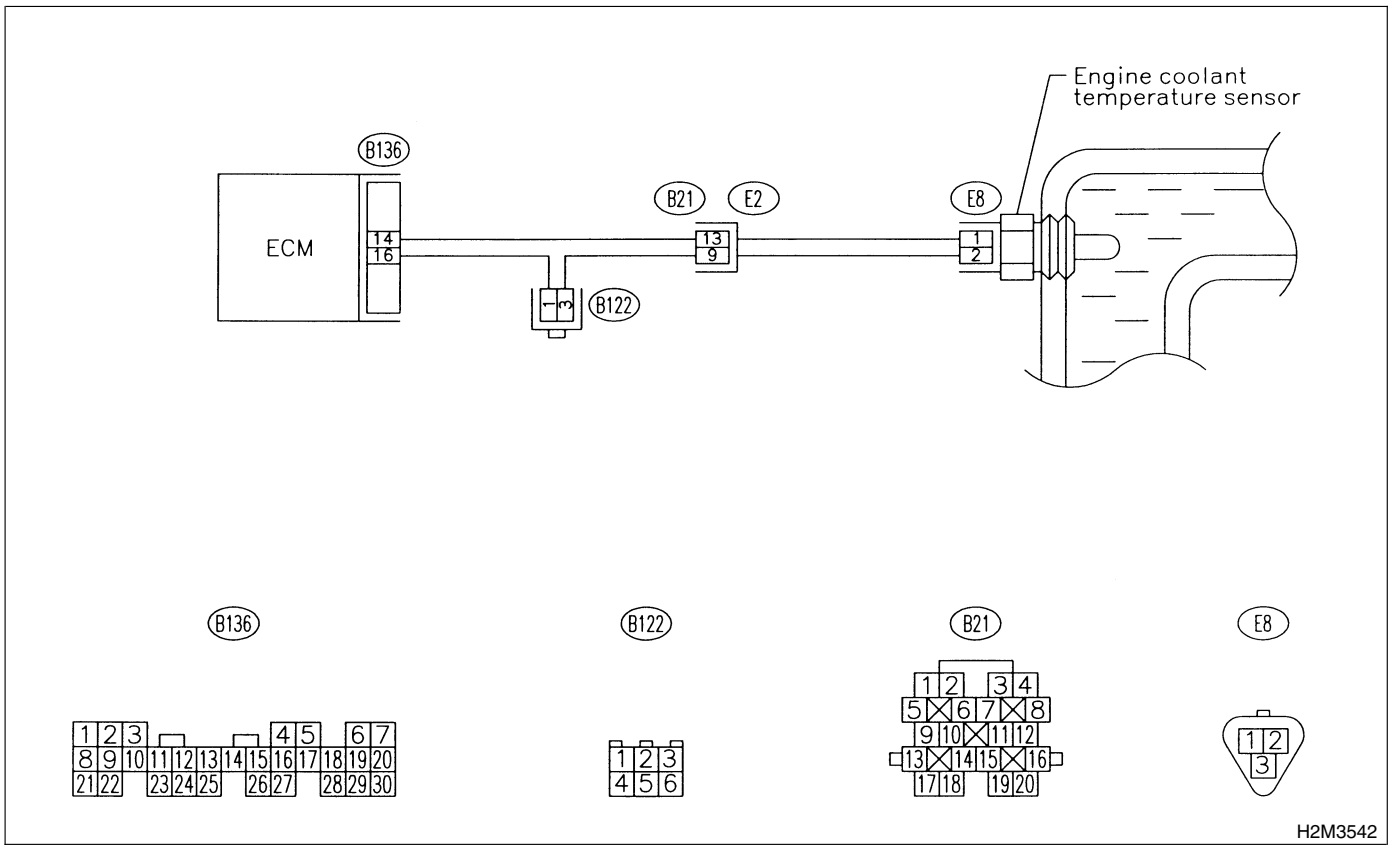
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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 **2**.	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 (B122)
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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 FU-38 REMOVAL, Engine Coolant Temperature Sensor.>	Repair ground short circuit in harness between engine coolant temperature sensor and ECM connector.

H: DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT — S008636B18

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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)?	Go to step **2**.	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 (B122)
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step **4**.

No.	Step	Check	Yes	No
4	**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 (–):***	Is the voltage more than 4 V?	Go to step **5**.	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 (B122)
5	**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:***	Is the resistance less than 5 Ω?	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>	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 (B122)

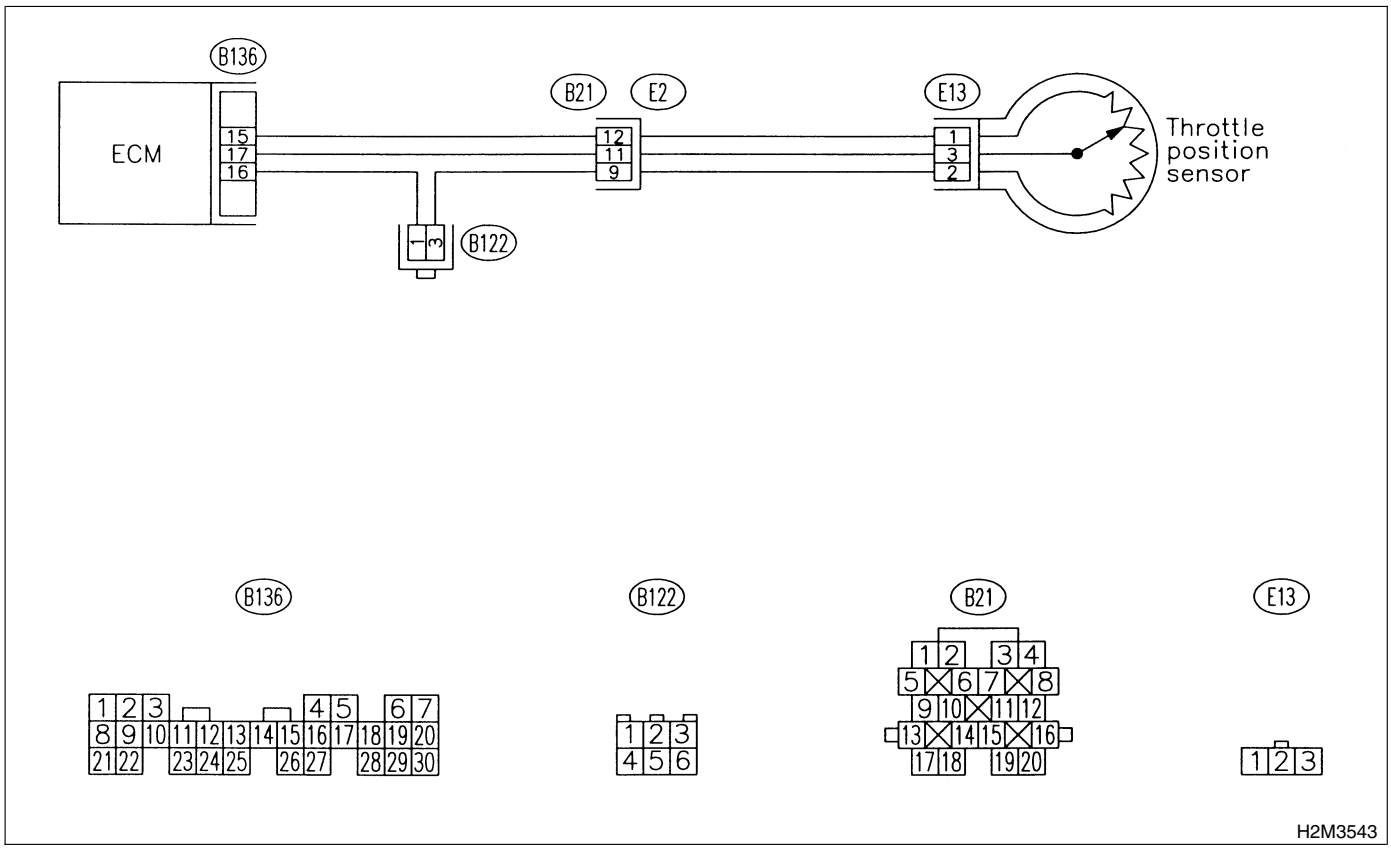
MEMO:

I: DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S008636B19

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107, P0108, P0122 or P0123?	Inspect DTC P0107, P0108, P0122 or P0123 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0121.	Go to step **2**.
2	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 53.3 kPa (400 mmHg, 15.75 inHg)?	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

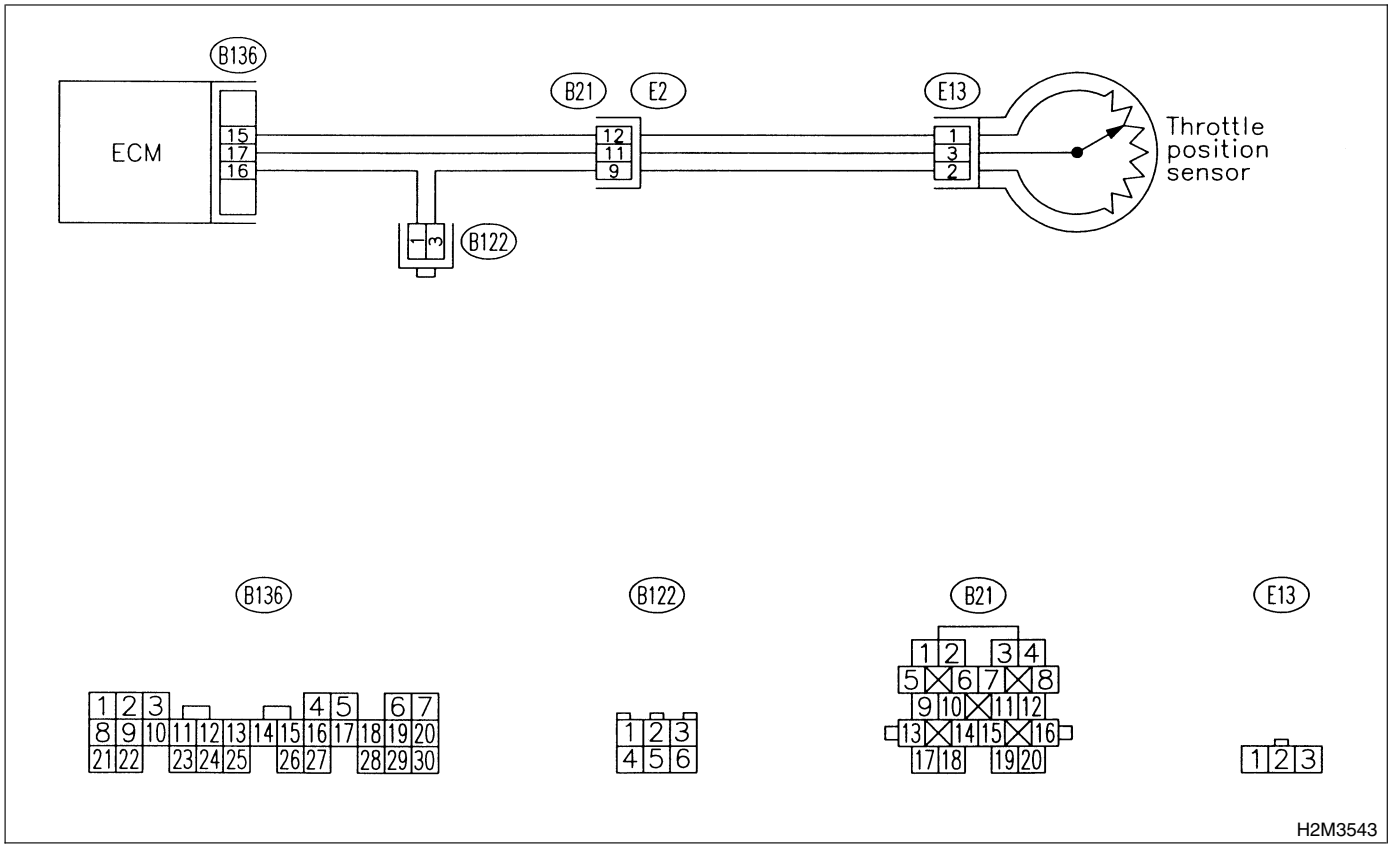
J: DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT — S008636B20

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 0.1 V?	Go to step **2**.	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 (B122)
2	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 17 (+) — Chassis ground (–):***	Is the voltage less than 0.1 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** Measure voltage between ECM connector and chassis ground.	Does the voltage change more than 0.1 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?	Repair poor contact in ECM connector.	Go to step **6**.

No.	Step	Check	Yes	No
6	**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. 1 (+) — Engine ground (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	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 (B122)
7	**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:***	Is the resistance less than 1 Ω?	Go to step **8**.	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 (B122)
8	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between throttle position sensor and ECM connector.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in throttle position sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in throttle position sensor connector?	Repair poor contact in throttle position sensor connector.	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

MEMO:

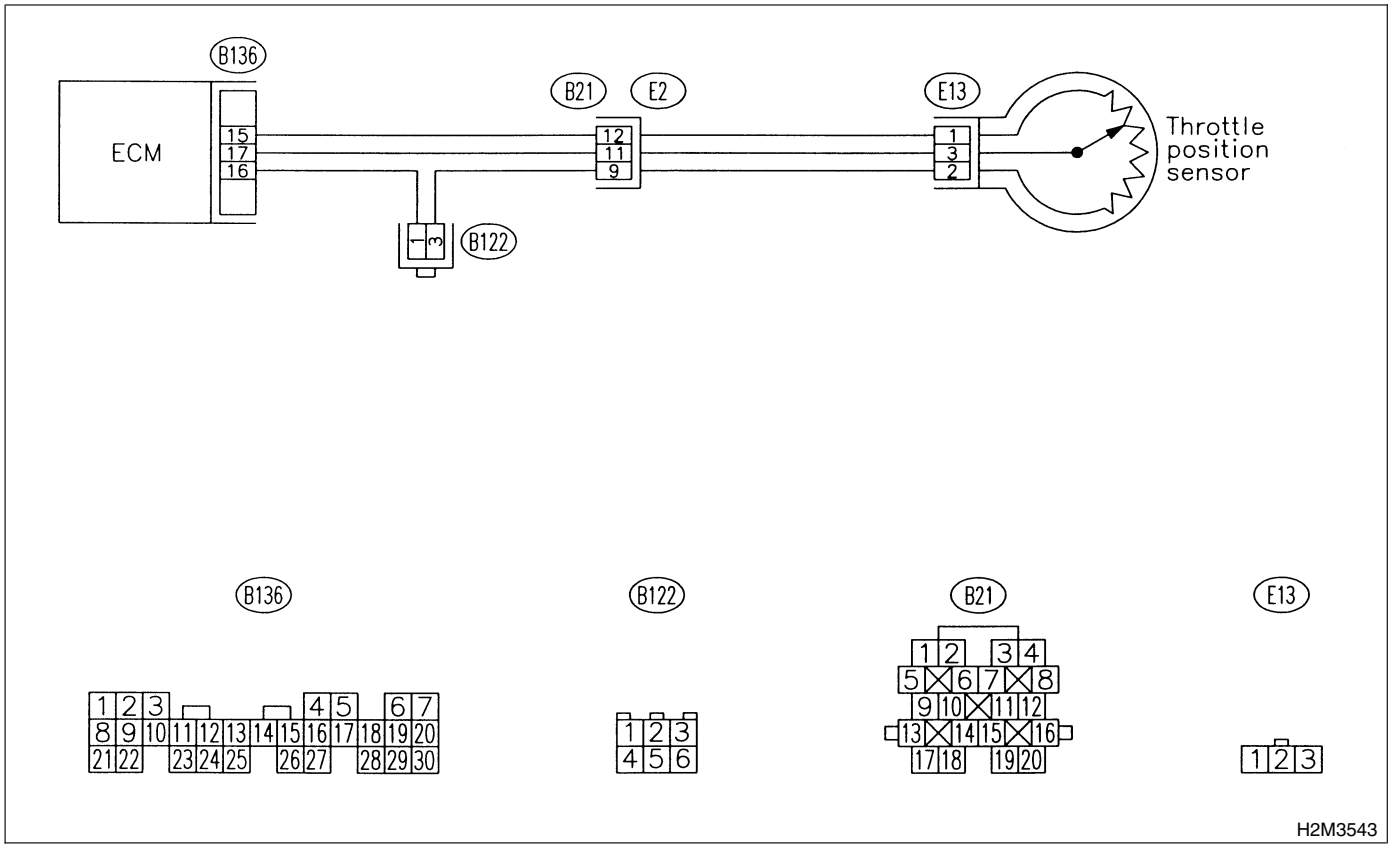
K: DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT — S008636B21

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



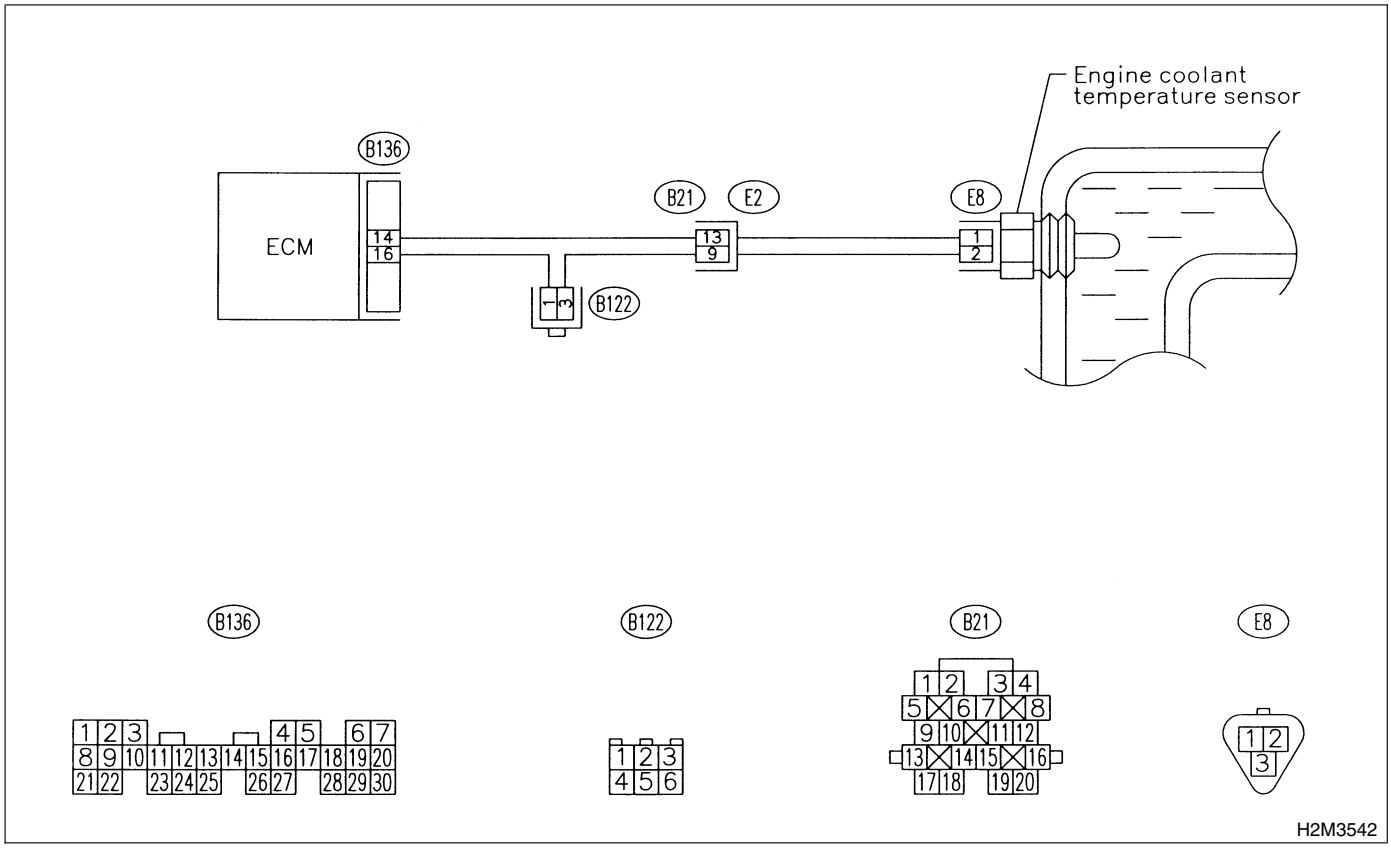
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 4.9 V?	Go to step **2**.	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 (B122)
2	**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:***	Is the resistance less than 5 Ω?	Go to step **3**.	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)
3	**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 (–):***	Is the voltage more than 4.9 V?	Repair battery short circuit in harness between throttle position sensor and ECM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

L: DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL — S008636B22

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117?	Inspect DTC P0116 or P0117 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0125.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK THERMOSTAT.**	Does thermostat remain opened?	Replace thermostat. <Ref. to CO-14 REMOVAL, Thermostat.>	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>

M: DTC P0131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S008636B24

NOTE:
For the diagnostic procedure, refer to DTC P0132. <Ref. to EN-136 DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

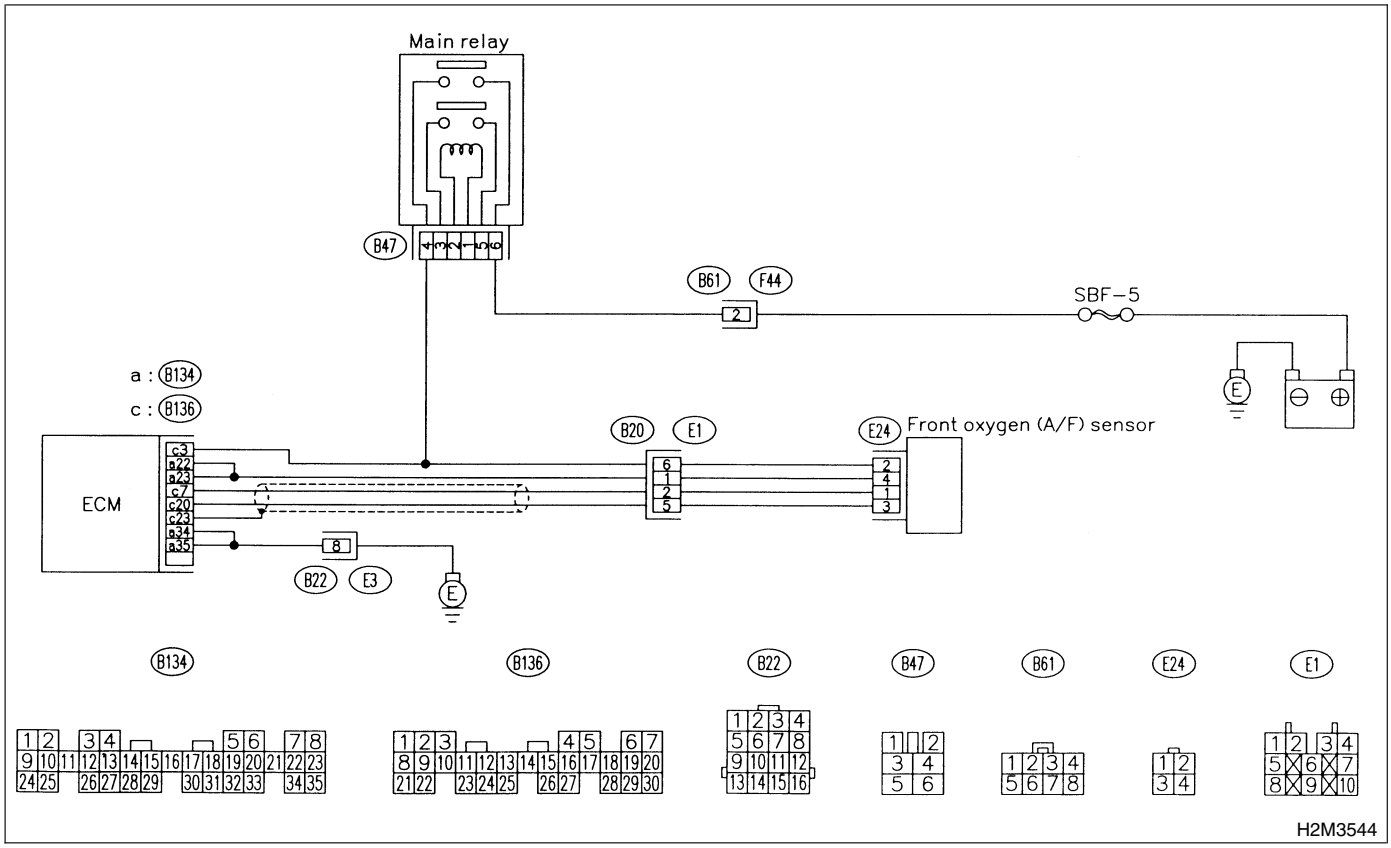
MEMO:

N: DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S008636B25

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132, P1133 or P1134?	Inspect DTC P1130, P1131, P1132, P1133 or P1134 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.

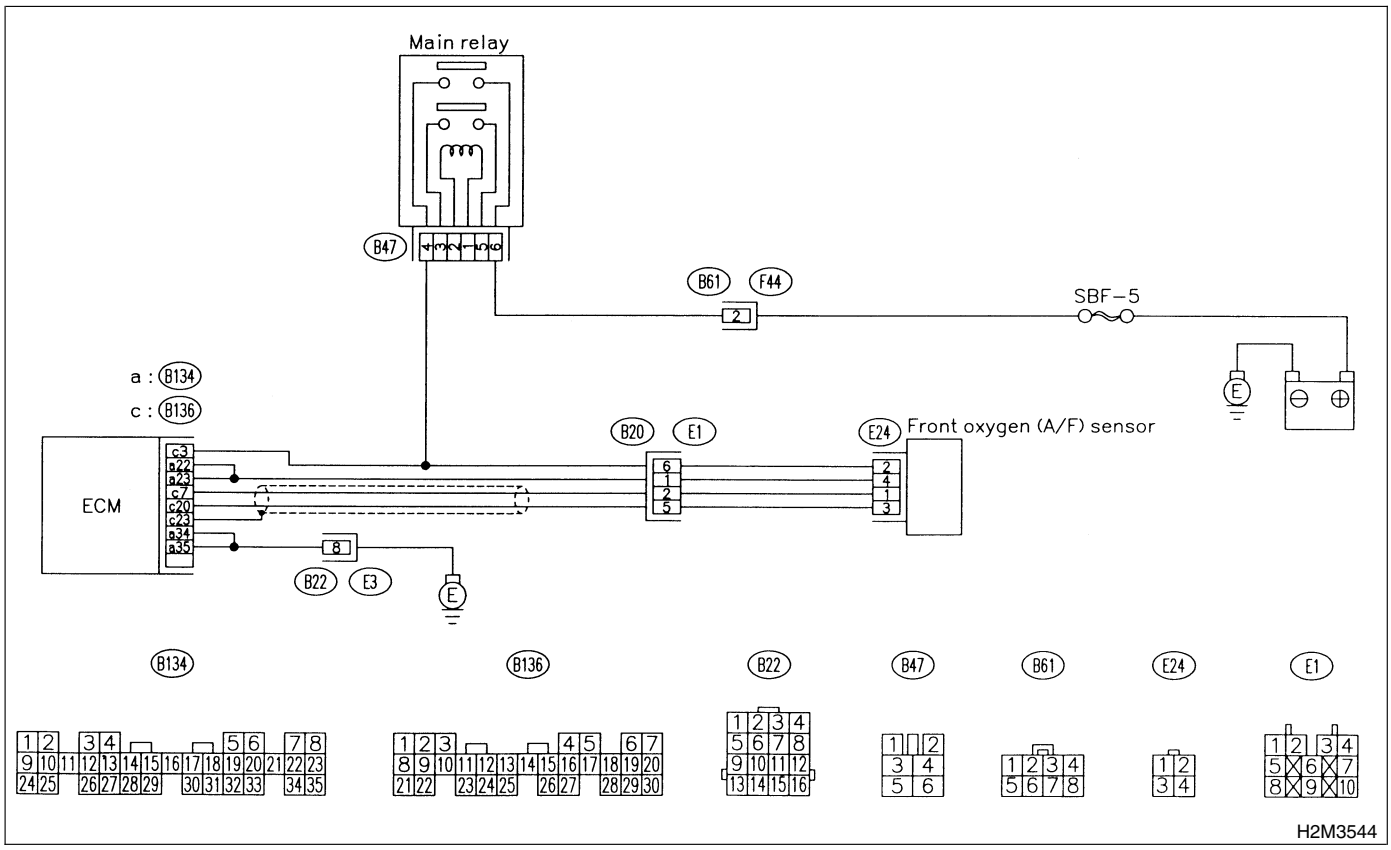
No.	Step	Check	Yes	No
2	**CHECK FRONT (A/F) OXYGEN SENSOR DATA.** 1) Start engine. 2) While observing the Subaru Select Monitor or OBD-II general scan tool screen, warm-up the engine until coolant temperature is above 70°C (158°F). If the engine is already warmed-up, operate at idle speed for at least 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 EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value equal to or more than 0.85 and equal to less than 1.15 in idling?	Go to step **3**.	Go to step **4**.
3	**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 EN-50 OPERATION, Subaru Select Monitor.>	Does the LED of {Rear O2 Rich Signal} blink?	Repair poor contact in front oxygen (A/F) sensor and rear oxygen sensor connector.	Check rear oxygen sensor circuit. <Ref. to EN-142 DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
4	**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	Is there a fault in exhaust system?	Repair or replace faulty parts.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

O: DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE — S008636B26

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132, P1133 or P1134?	Inspect DTC P1130, P1131, P1132, P1133 or P1134 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0133.	Go to step **2**.

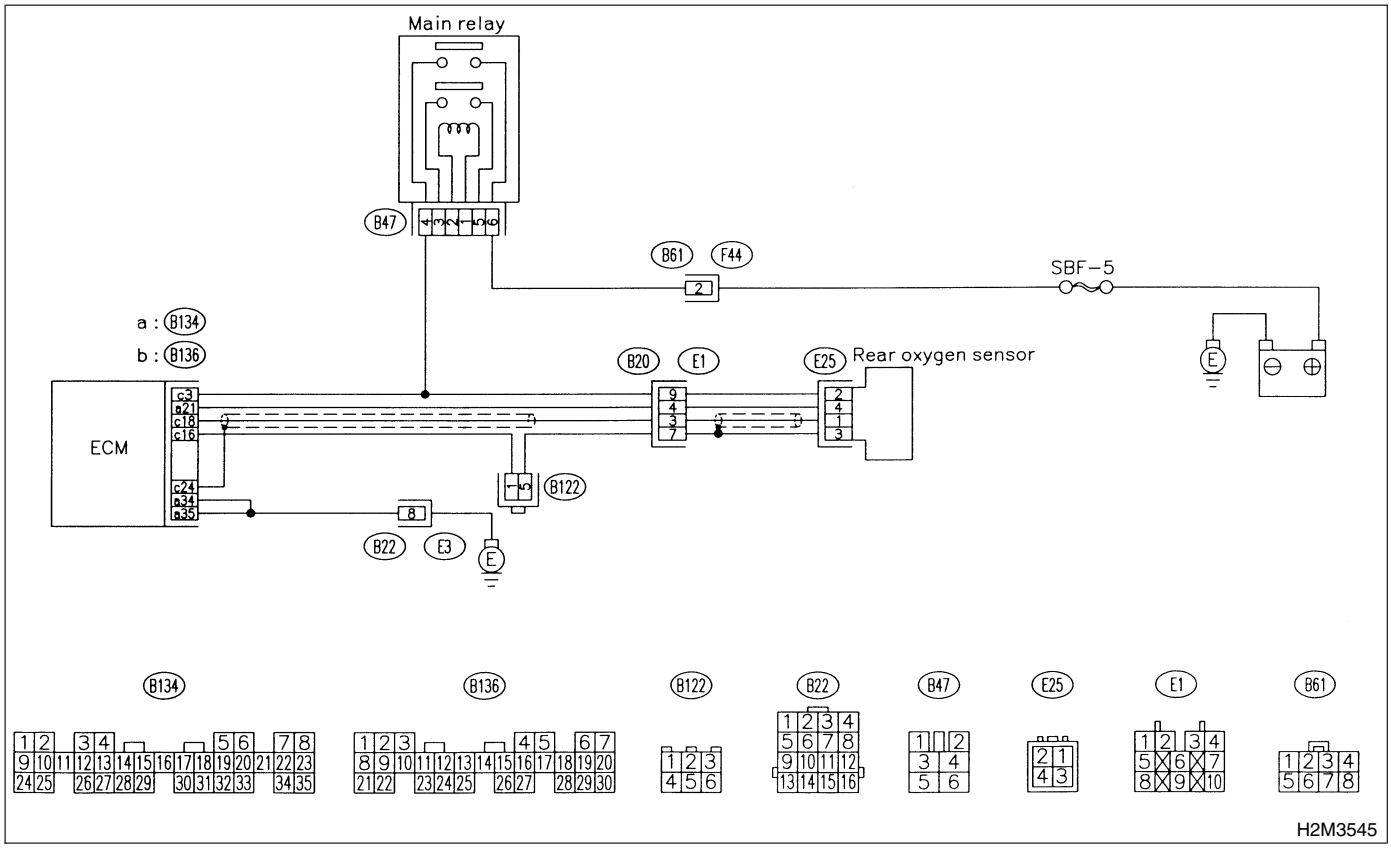
No.	Step	Check	Yes	No
2	**CHECK EXHAUST SYSTEM.** NOTE: Check the following items. ● Loose installation of front portion of exhaust pipe onto cylinder heads ● Loose connection between front exhaust pipe and front catalytic converter ● Damage of exhaust pipe resulting in a hole	Is there a fault in exhaust system?	Repair exhaust system.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

P: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION — S008636B28

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130 or P1131?	Go to step **2**.	Go to step **3**.
2	**CHECK FAILURE CAUSE OF P1130 or P1131.** Inspect DTC P1130 or P1131 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Is the failure cause of P1130 or P1131 in the fuel system?	Check fuel system. NOTE: In this case, it is not necessary to inspect DTC P0136.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Does the value fluctuate?	Go to step **7**.	Go to step **4**.
4	**CHECK REAR OXYGEN SENSOR DATA.** Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II General Scan Tool.	Is the value fixed between 0.2 and 0.4 V?	Go to step **5**.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>
5	**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 — (E25) No. 3:***	Is the resistance more than 3 Ω?	Repair open circuit in harness between ECM and rear oxygen sensor connector.	Go to step **6**.
6	**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*** ***(E25) No. 4 (+) — Engine ground (–):***	Is the voltage more than 0.2 V?	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>	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
7	**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	Is there a fault in exhaust system?	Repair or replace faulty parts.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

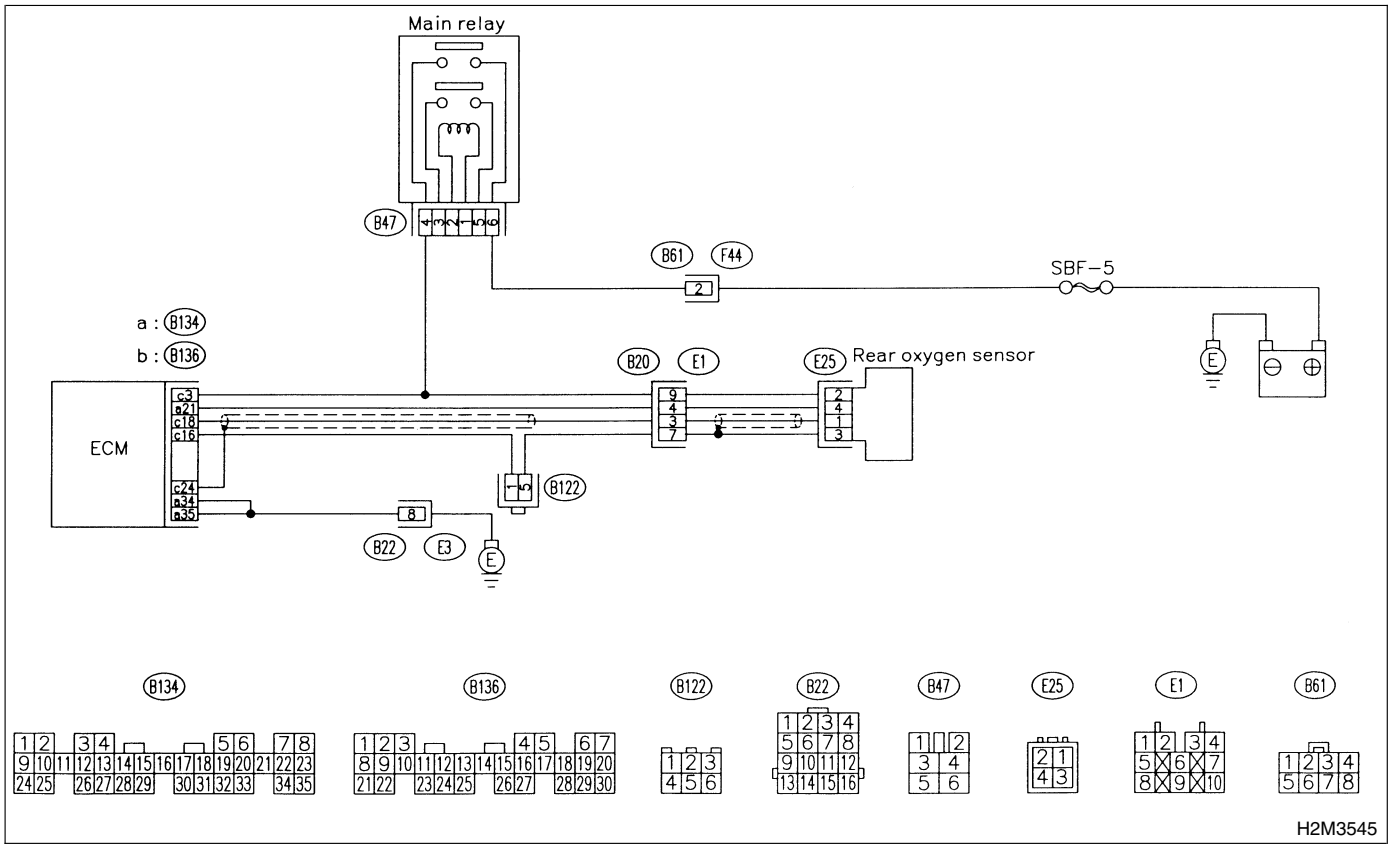
Q: DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —

S008636B29

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0136?	Inspect DTC P0136 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0139.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

MEMO:

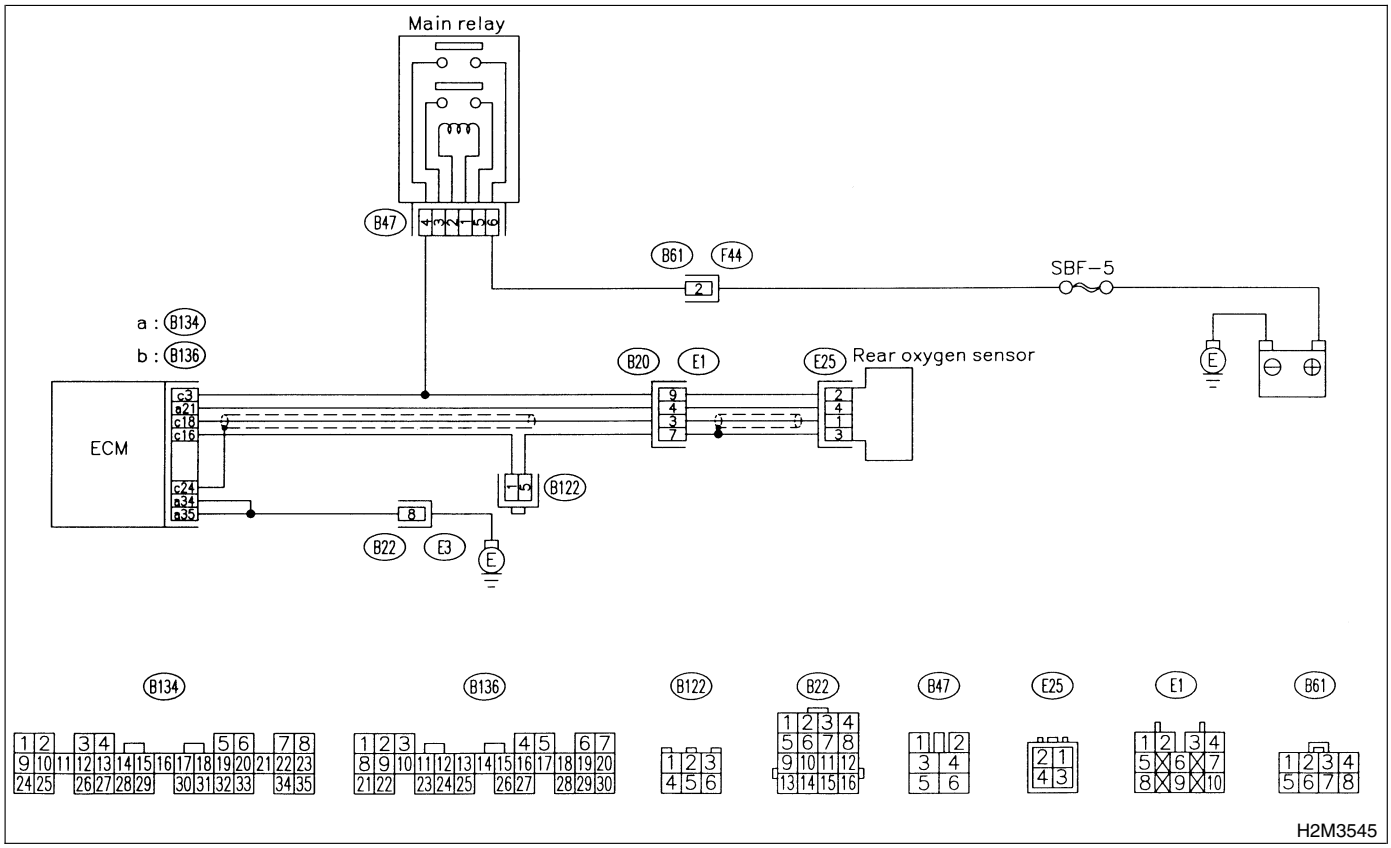
R: DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT LOW INPUT —

S008636F03

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0141 and P0135 at the same time?	Go to step **2**.	Go to step **3**.
2	**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:***	Is the resistance less than 10 Ω?	Go to step **4**.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and rear oxygen sensor connector.	Go to step **5**.
5	**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 — (E25) No. 4:***	Is the resistance less than 3 Ω?	Go to step **6**.	Repair open circuit in harness between ECM and rear oxygen sensor connector.
6	**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*** ***(E25) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **7**.	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 (E1)

No.	Step	Check	Yes	No
7	**CHECK REAR OXYGEN SENSOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between rear oxygen sensor connector terminals. ***Terminals*** ***No. 2 — No. 4:***	Is the resistance less than 30 Ω?	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 (E1)	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

S: DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) — S008636B33

NOTE:
For the diagnostic procedure, refer to DTC P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

T: DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) — S008636B32

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair exhaust system.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair air intake system.	Go to step **3**.
3	**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.	Is fuel pressure between 284 and 314 kPa (2.9 — 3.2 kg/cm^2, 41 — 46 psi)?	Go to step **4**.	Repair the following items. **Fuel pressure too high** • Clogged fuel return line or bent hose **Fuel pressure too low** • Improper fuel pump discharge • Clogged fuel supply line

No.	Step	Check	Yes	No
4	**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.	Is fuel pressure between 206 and 235 kPa (2.1 — 2.4 kg/cm^2, 30 — 34 psi)?	Go to step **5**.	Repair the following items. **Fuel pressure too high** ● Faulty pressure regulator ● Clogged fuel return line or bent hose **Fuel pressure too low** ● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line
5	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is temperature greater than 60°C (140°F)?	Go to step **6**.	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>
6	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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*** ***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)***	Is the value within the specifications?	Go to step **7**.	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>

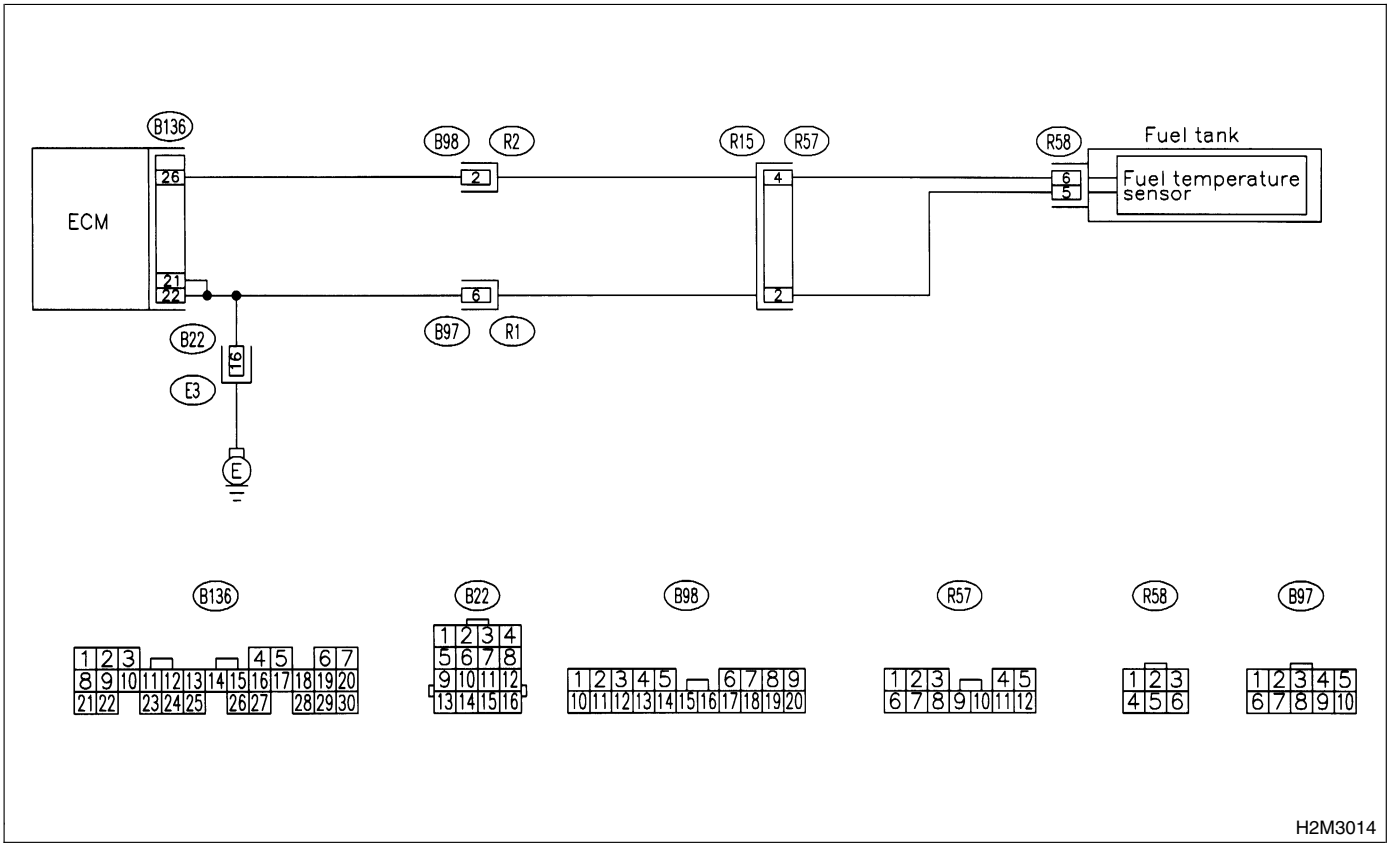
No.	Step	Check	Yes	No
7	**CHECK INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn A/C switch to OFF. 4) Turn all accessory switches to OFF. 5) Open front hood. 6) Measure 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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	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)?	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Check intake air temperature sensor. <Ref. to EN-110 DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

U: DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM — S008636B34

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0182 or P0183?	Inspect DTC P0182 or P0183 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0181.	Replace fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>

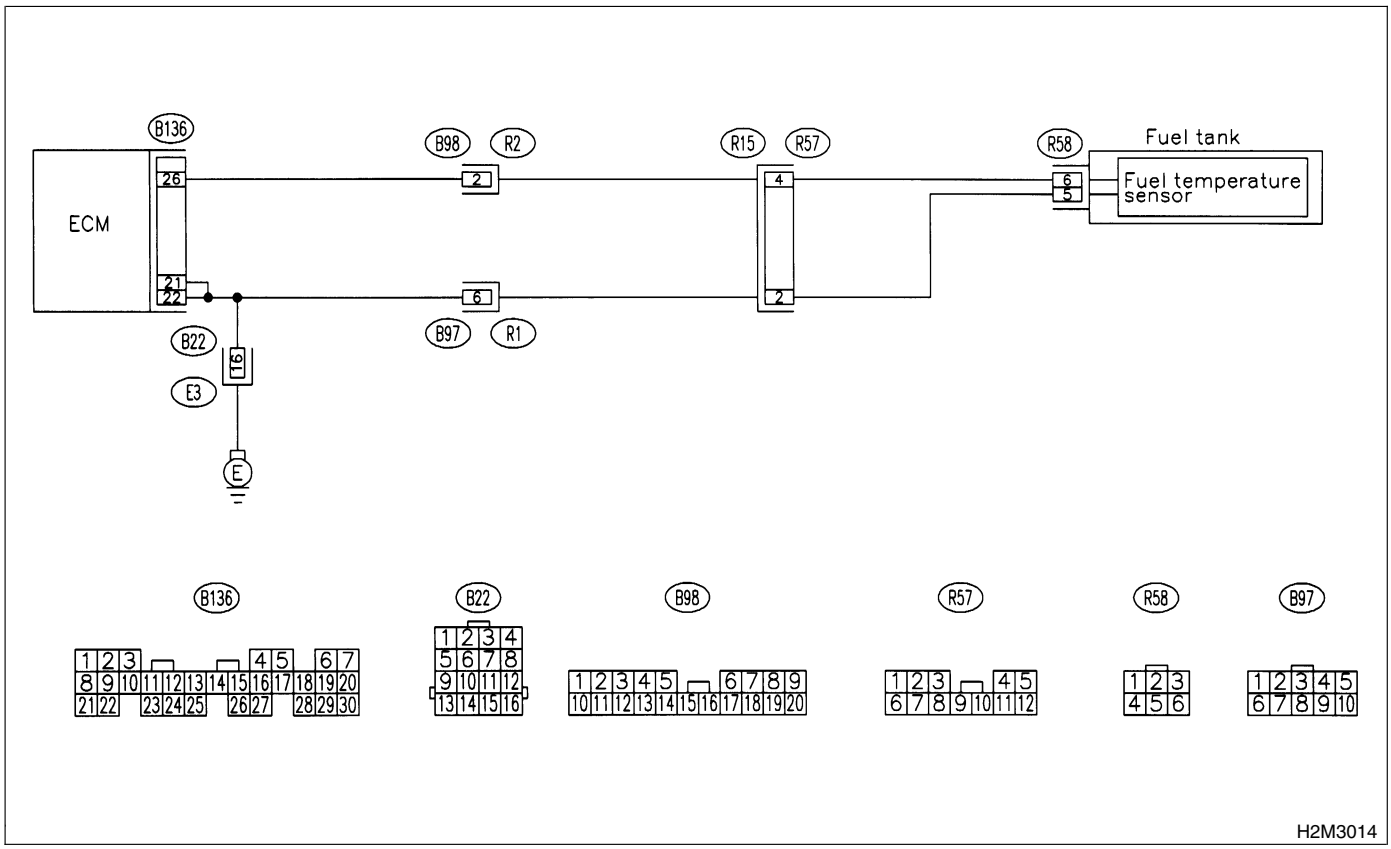
V: DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —

S008636B35

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value greater than 150°C (302°F)?	Go to step **2**.	Even if MIL lights up, the circuit has returned to a normal condition at this time.

No.	Step	Check	Yes	No
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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 fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>	Repair ground short circuit in harness between fuel pump and ECM connector.

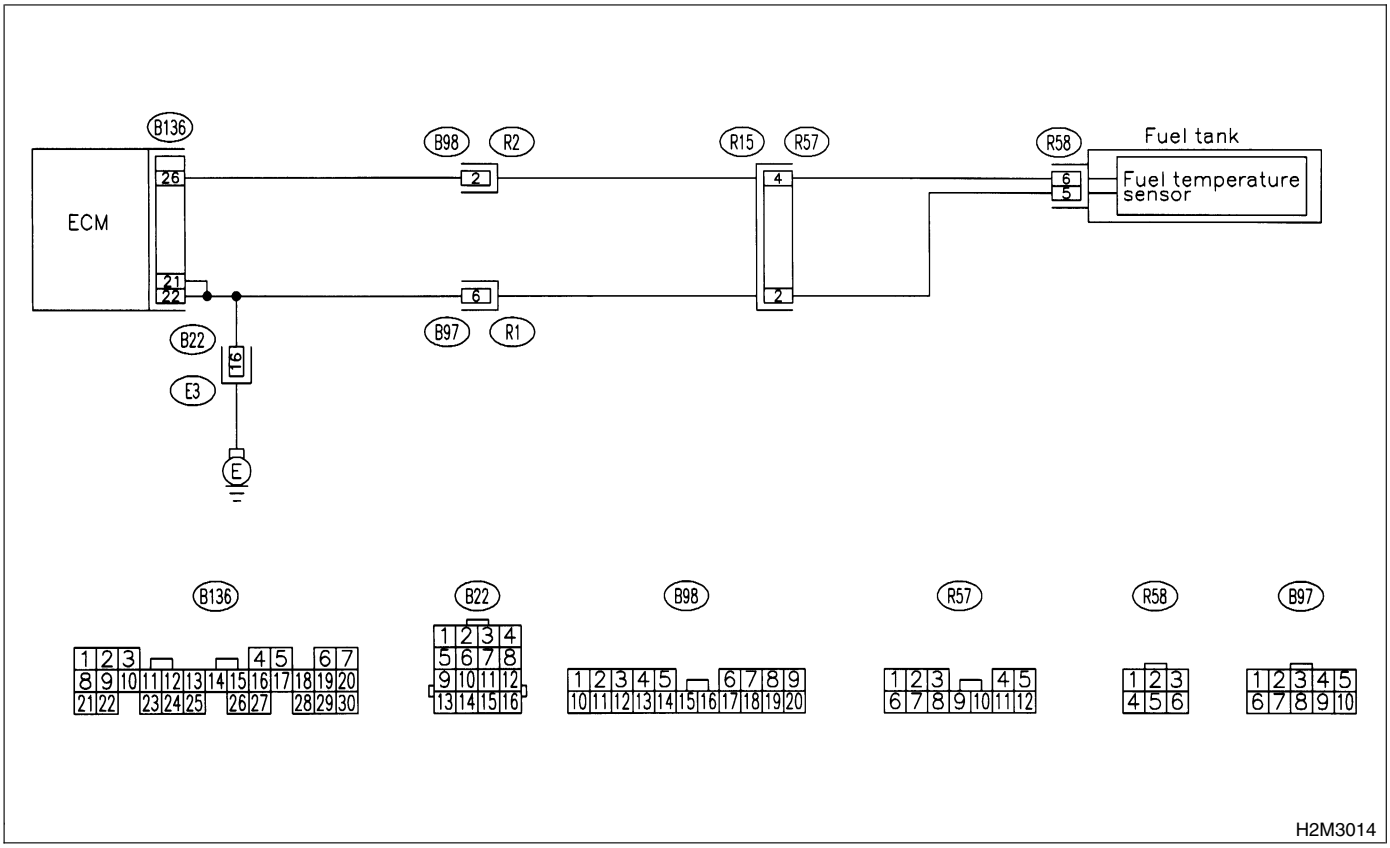
W: DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —

S008636B36

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • 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)?	Go to step **2**.	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, B97, B98 and R57)

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel pump connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel pump connector.	Go to step **4**.
4	**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 (–):***	Is the voltage more than 4 V?	Go to step **5**.	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 (B98 and R57)
5	**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:***	Is the resistance less than 5 Ω?	Replace fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>	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, B97 and R57)

X: DTC P0301 — CYLINDER 1 MISFIRE DETECTED — S008636B37

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-158 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

Y: DTC P0302 — CYLINDER 2 MISFIRE DETECTED — S008636B38

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-158 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

Z: DTC P0303 — CYLINDER 3 MISFIRE DETECTED — S008636B39

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-158 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

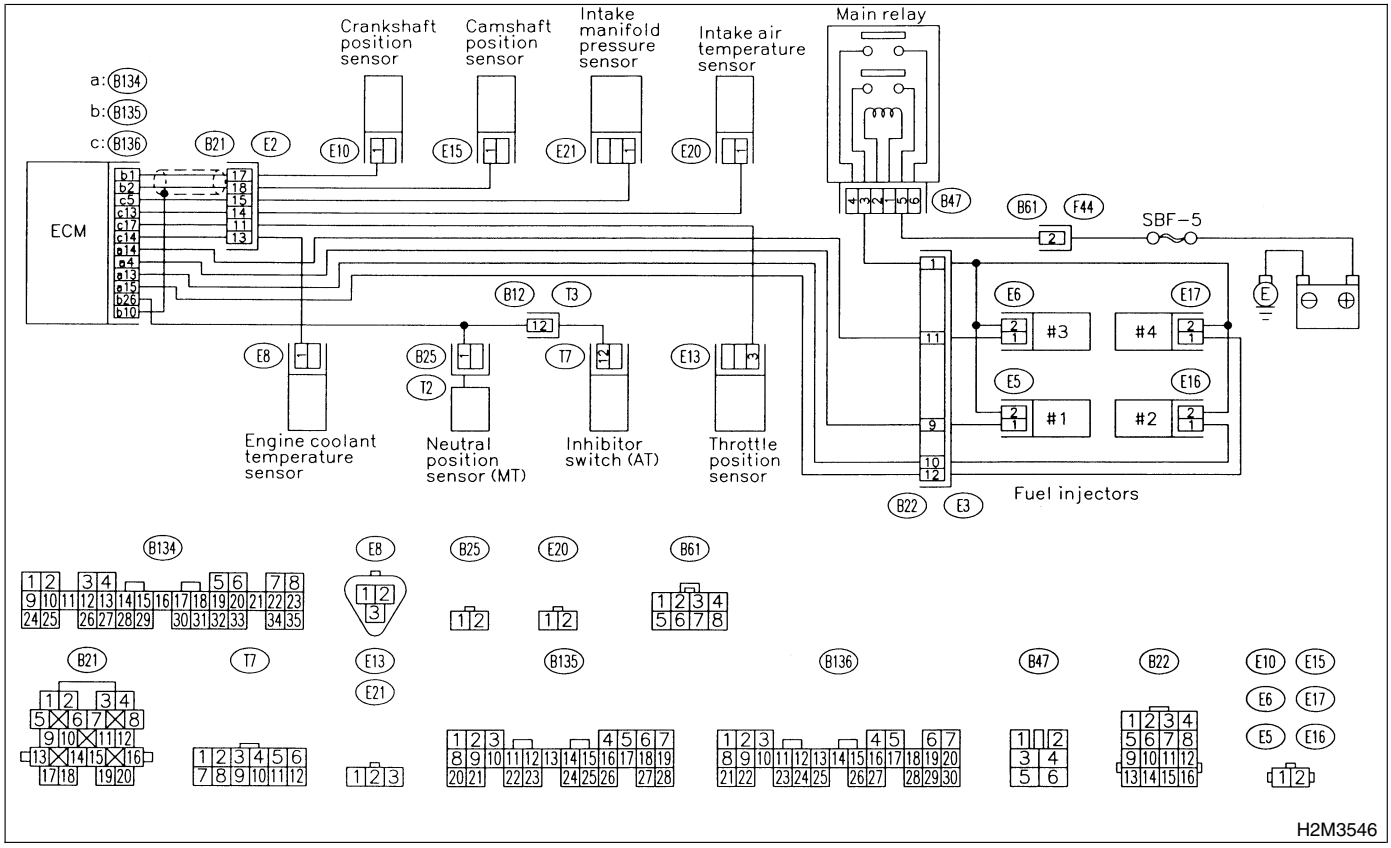
MEMO:

AA: DTC P0304 — CYLINDER 4 MISFIRE DETECTED — S008636B40

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0116, P0117 or P0125?	Inspect DTC P0106, P0107, P0108, P0116, P0117 or P0125 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0301, P0302, P0303 and P0304.	Go to step **2**.
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	Go to step **3**.
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between fuel injector and ECM connector.	Go to step **4**.
4	**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:***	Is the resistance less than 1 Ω?	Go to step **5**.	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)

No.	Step	Check	Yes	No
5	**CHECK FUEL INJECTOR.** Measure resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 5 and 20 Ω?	Go to step **6**.	Replace faulty fuel injector. <Ref. to FU-54 REMOVAL, Fuel Injector.>
6	**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 (–):***	Is the voltage more than 10 V?	Repair poor contact in all connectors in fuel injector circuit.	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
7	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel injector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **8**.
8	**CHECK FUEL INJECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace faulty fuel injector <Ref. to FU-54 REMOVAL, Fuel Injector.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **9**.
9	**CHECK INSTALLATION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is camshaft position sensor or crankshaft position sensor loosely installed?	Tighten camshaft position sensor or crankshaft position sensor.	Go to step **10**.

No.	Step	Check	Yes	No
10	**CHECK CRANKSHAFT SPROCKET.** Remove timing belt cover.	Is crankshaft sprocket rusted or does it have broken teeth?	Replace crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>	Go to step **11**.
11	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Go to step **12**.
12	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **13**.	Replenish fuel so fuel meter indication is higher than the “Lower” level. After replenishing fuel, Go to step **13**.
13	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Clear memory using Subaru Select Monitor. <Ref. to EN-60 OPERATION, Clear Memory Mode.> 2) Start engine, and drive the vehicle more than 10 minutes.	Is the MIL coming on or blinking?	Go to step **15**.	Go to step **14**.
14	**CHECK CAUSE OF MISFIRE DIAGNOSED.**	Was the cause of misfire diagnosed when the engine is running?	Finish diagnostics operation, if the engine has no abnormality. NOTE: Ex. Remove spark plug cord, etc.	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)

No.	Step	Check	Yes	No
15	**CHECK AIR INTAKE SYSTEM.**	Is there a fault in air intake system?	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?	Go to step **16**.
16	**CHECK MISFIRE SYMPTOM.** 1) Turn ignition switch to ON. 2) Read diagnostic trouble code (DTC). ● Subaru Select Monitor <Ref. to EN-56 OPERATION, Read Diagnostic Trouble Code.> ● 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.	Does the Subaru Select Monitor or OBD-II general scan tool indicate only one DTC?	Go to step **21**.	Go to step **17**.
17	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0302?	Go to step **22**.	Go to step **18**.
18	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0303 and P0304?	Go to step **23**.	Go to step **19**.
19	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0303?	Go to step **24**.	Go to step **20**.
20	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0302 and P0304?	Go to step **25**.	Go to step **26**.

No.	Step	Check	Yes	No
21	**ONLY ONE CYLINDER**	Is there a fault in that cylinder?	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plug ● Spark plug cord ● Fuel injector ● Compression ratio	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
22	**GROUP OF #1 AND #2 CYLINDERS**	Are there faults in #1 and #2 cylinders?	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 “D: IGNITION CONTROL SYSTEM” of #1 and #2 cylinders side. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

No.	Step	Check	Yes	No
23	**GROUP OF #3 AND #4 CYLINDERS**	Are there faults in #3 and #4 cylinders?	Repair or replace faulty parts. NOTE: ● Check the following items. Spark plugs Fuel injectors Ignition coil ● If no abnormal is discovered, check for “D: IGNITION CONTROL SYSTEM” of #3 and #4 cylinders side. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
24	**GROUP OF #1 AND #3 CYLINDERS**	Are there faults in #1 and #3 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plugs ● Fuel injectors ● Skipping timing belt teeth	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

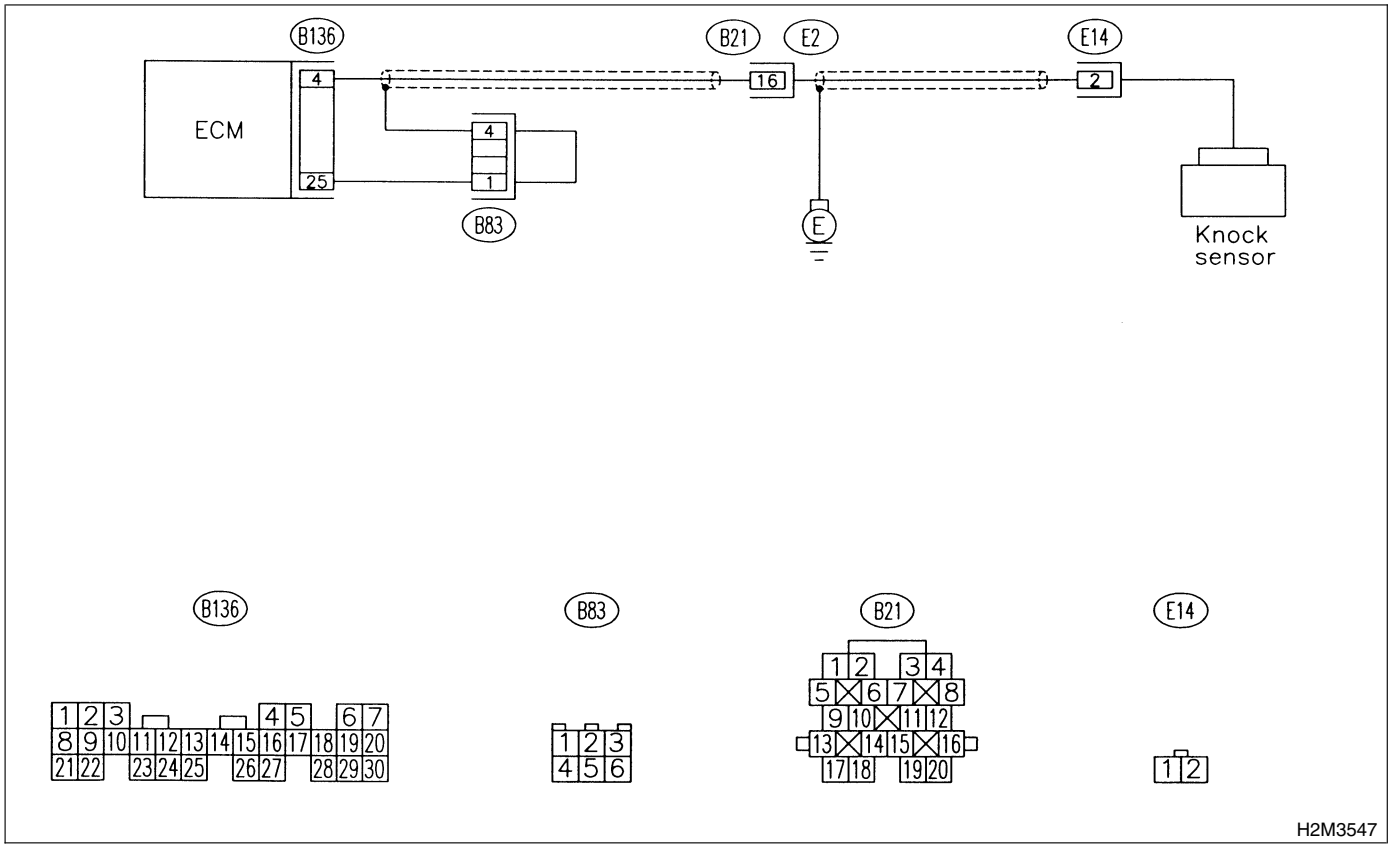
No.	Step	Check	Yes	No
25	**GROUP OF #2 AND #4 CYLINDERS**	Are there faults in #2 and #4 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plugs ● Fuel injectors ● Compression ratio ● Skipping timing belt teeth	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
26	**CYLINDER AT RANDOM**	Is the engine idle rough?	Go to DTC P0171 <Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.> and P0172. <Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plugs ● Fuel injectors ● Compression ratio

AB: DTC P0325 — KNOCK SENSOR CIRCUIT MALFUNCTION — S008636F04

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 700 kΩ?	Go to step **3**.	Go to step **2**.
2	**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:***	Is the resistance less than 400 kΩ?	Go to step **5**.	Go to step **6**.

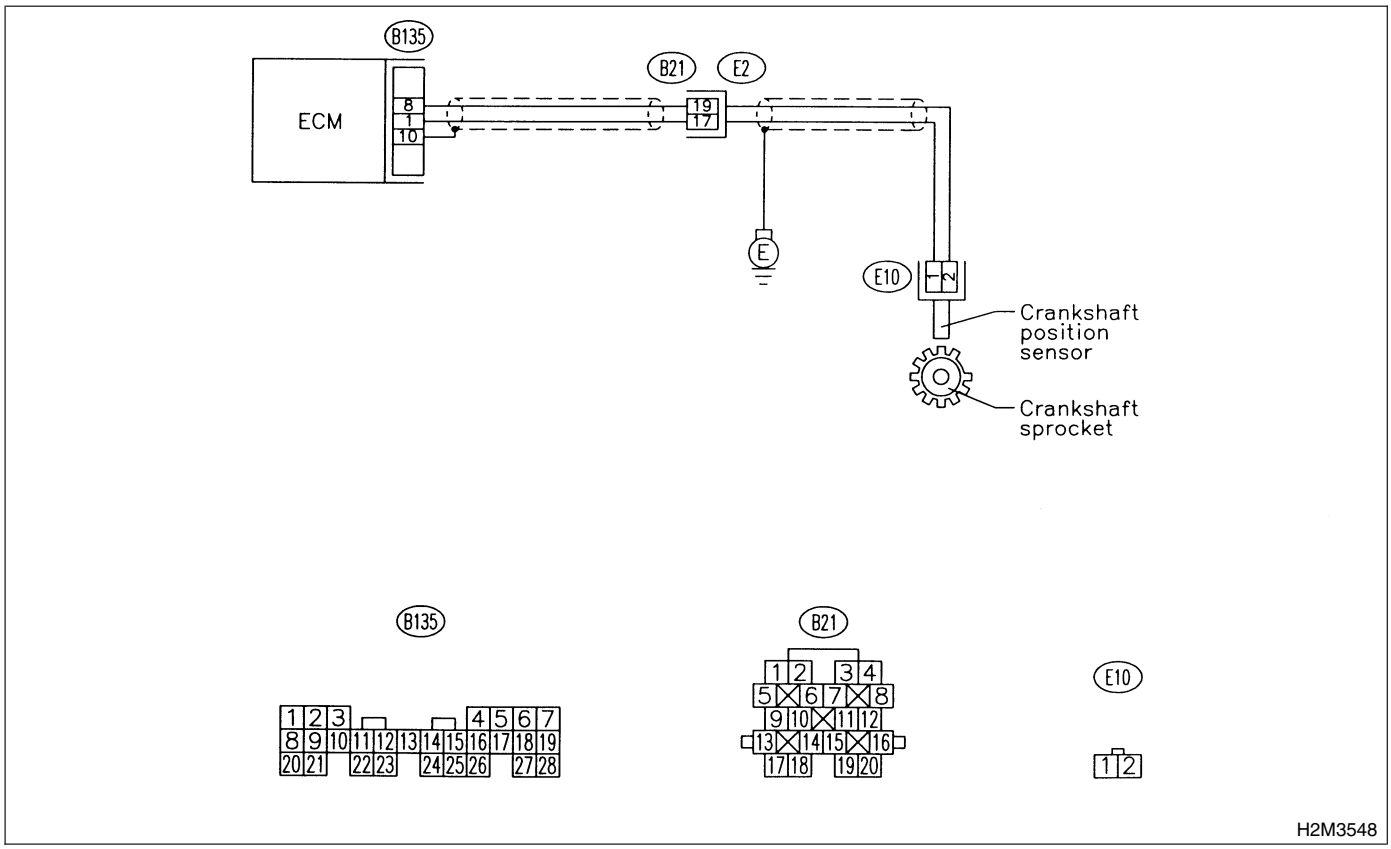
No.	Step	Check	Yes	No
3	**CHECK KNOCK SENSOR.** 1) Disconnect connector from knock sensor. 2) Measure resistance between knock sensor connector terminal and engine ground. ***Terminal*** ***No. 2 — Engine ground:***	Is the resistance more than 700 kΩ?	Go to step **4**.	Repair harness and connector. NOTE: 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)
4	**CHECK CONDITION OF KNOCK SENSOR INSTALLATION.**	Is the knock sensor installation bolt tightened securely?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	Tighten knock sensor installation bolt securely.
5	**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:***	Is the resistance less than 400 kΩ?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	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.
6	**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 (–):***	Is the voltage more than 2 V?	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)	Repair poor contact in ECM connector.

AC: DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION — S008636B42

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **2**.

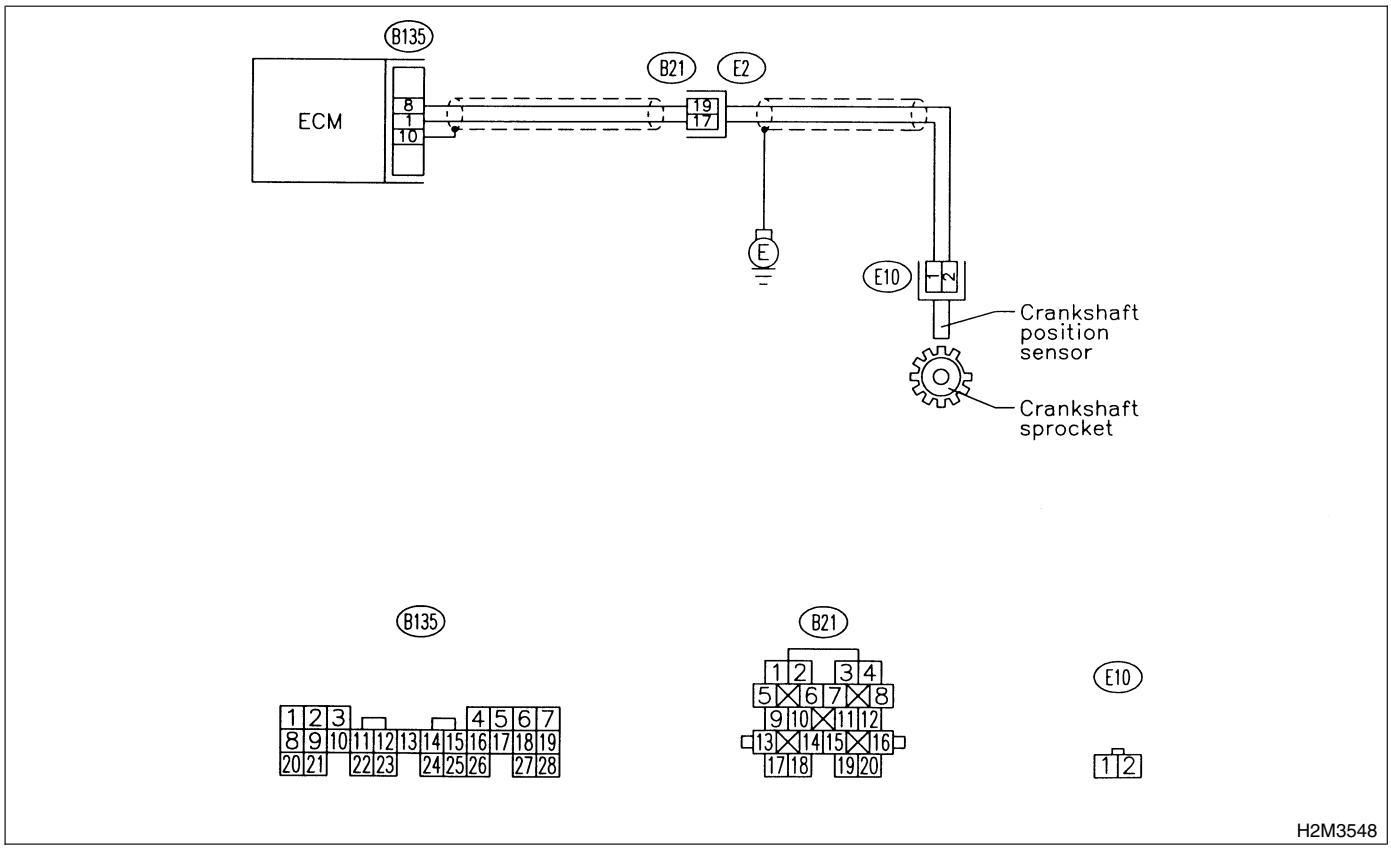
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure resistance of harness between crankshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E10) No. 1 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short 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.	Go to step **3**.
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.**	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **5**.	Tighten crankshaft position sensor installation bolt securely.
5	**CHECK CRANKSHAFT POSITION SENSOR.** 1) Remove crankshaft position sensor. 2) Measure resistance between connector terminals of crankshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Repair poor contact in crankshaft position sensor connector.	Replace crankshaft position sensor. <Ref. to FU-39 REMOVAL, Crankshaft Position Sensor.>

AD: DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008636B43

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0335?	Inspect DTC P0335 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.
2	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.** Turn ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **3**.	Tighten crankshaft position sensor installation bolt securely.

No.	Step	Check	Yes	No
3	**CHECK CRANKSHAFT SPROCKET.** Remove front belt cover.	Are crankshaft sprocket teeth cracked or damaged?	Replace crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>	Go to step **4**.
4	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Replace crankshaft position sensor. <Ref. to FU-39 REMOVAL, Crankshaft Position Sensor.>

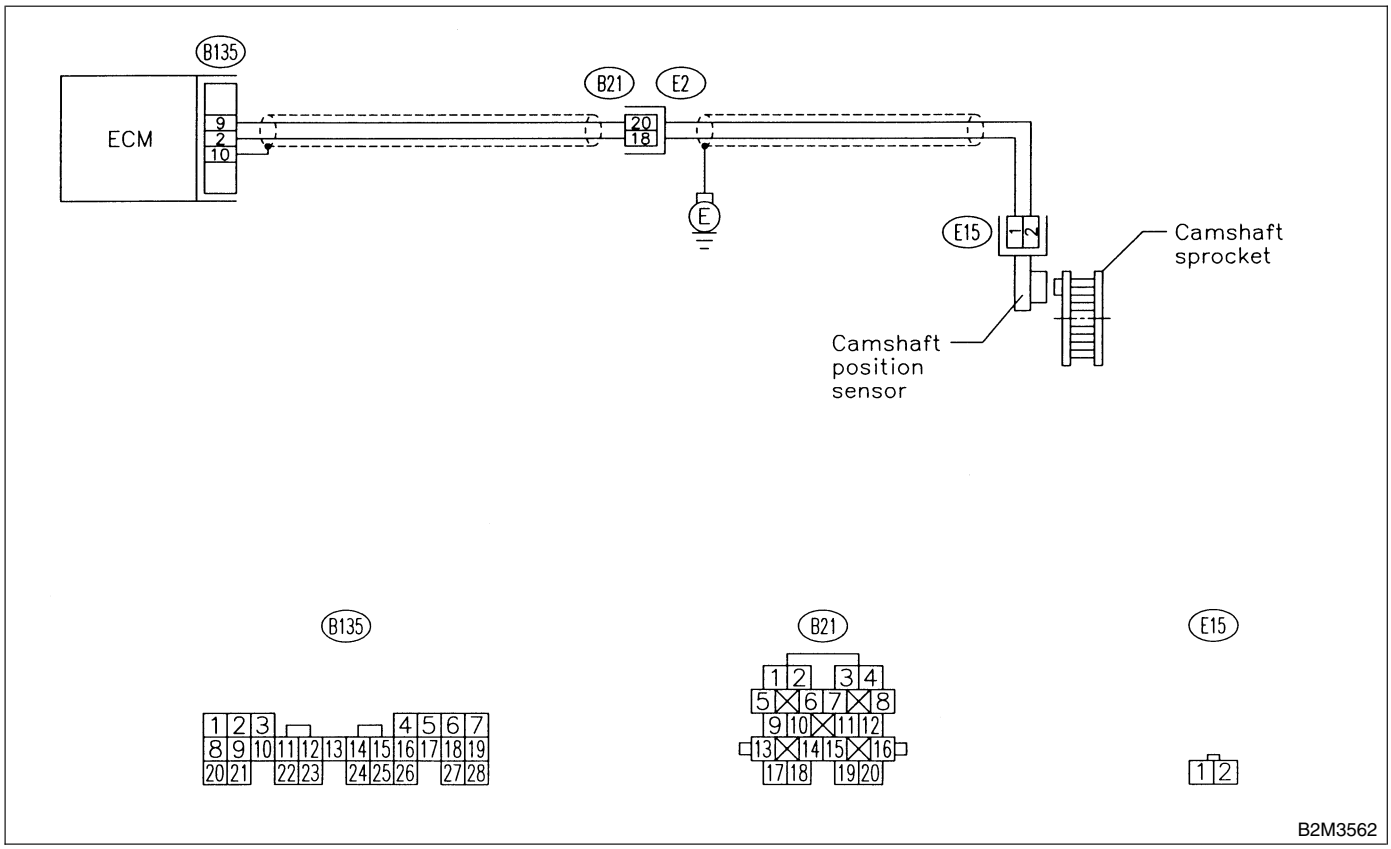
AE: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION

— S008636B44

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **2**.

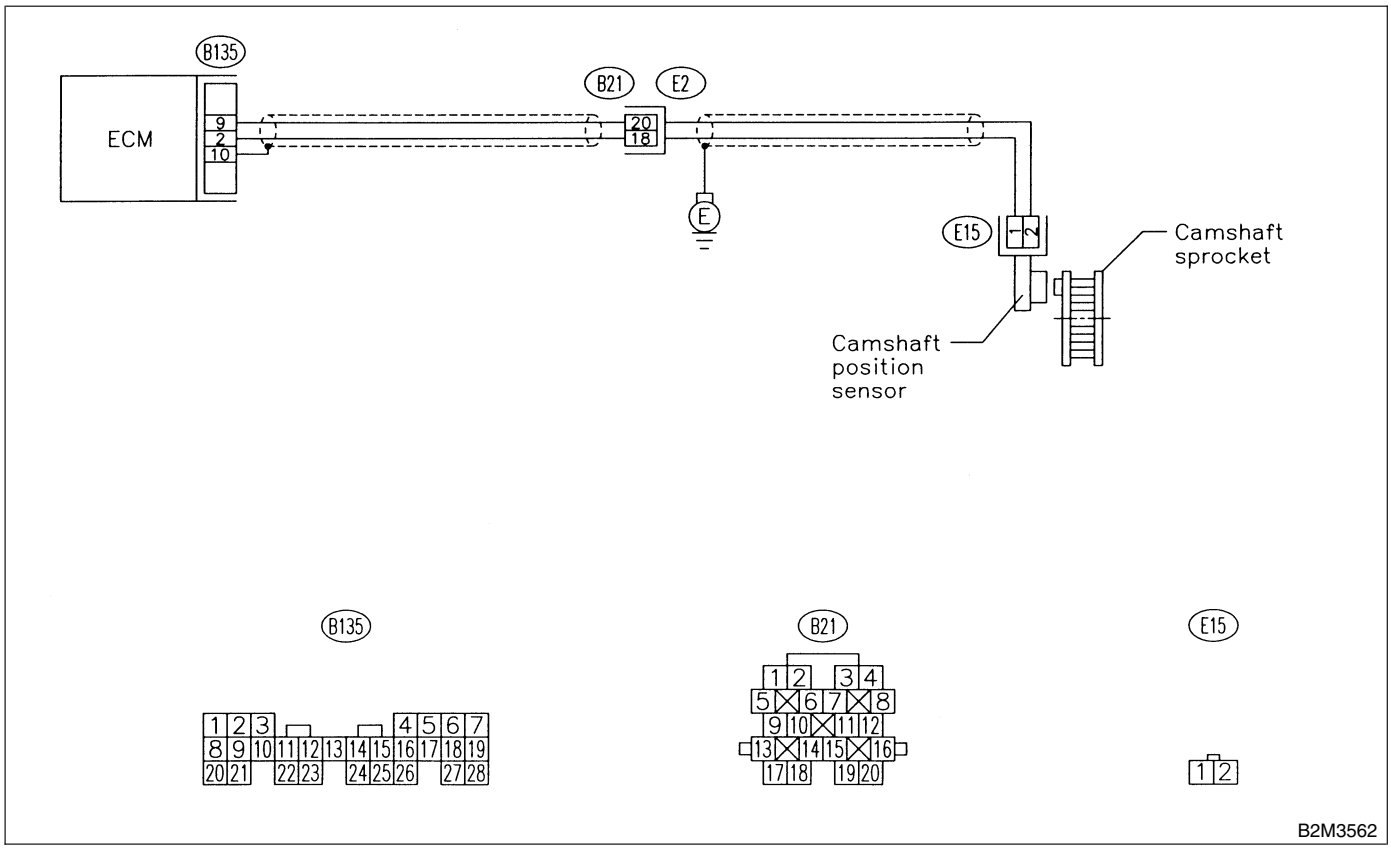
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure resistance of harness between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E15) No. 1 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short 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.	Go to step **3**.
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **5**.	Tighten camshaft position sensor installation bolt securely.
5	**CHECK CAMSHAFT POSITION SENSOR.** 1) Remove camshaft position sensor. 2) Measure resistance between connector terminals of camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Repair poor contact in camshaft position sensor connector.	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

AF: DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008636B45

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0340?	Inspect DTC P0340 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **3**.
3	**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:***	Is the resistance less than 10 Ω?	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.	Go to step **4**.
4	**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:***	Is the resistance less than 5 Ω?	Go to step **5**.	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)
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** 1) Remove camshaft position sensor. 2) Measure resistance between connector terminals of camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Go to step **7**.	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

No.	Step	Check	Yes	No
7	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.** Turn ignition switch to OFF.	Is the camshaft position sensor installation bolt tightened securely?	Go to step **8**.	Tighten camshaft position sensor installation bolt securely.
8	**CHECK CAMSHAFT SPROCKET.** Remove front belt cover. <Ref. to ME-52 REMOVAL, Belt Cover.>	Are camshaft sprocket teeth cracked or damaged?	Replace camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>	Go to step **9**.
9	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

MEMO:

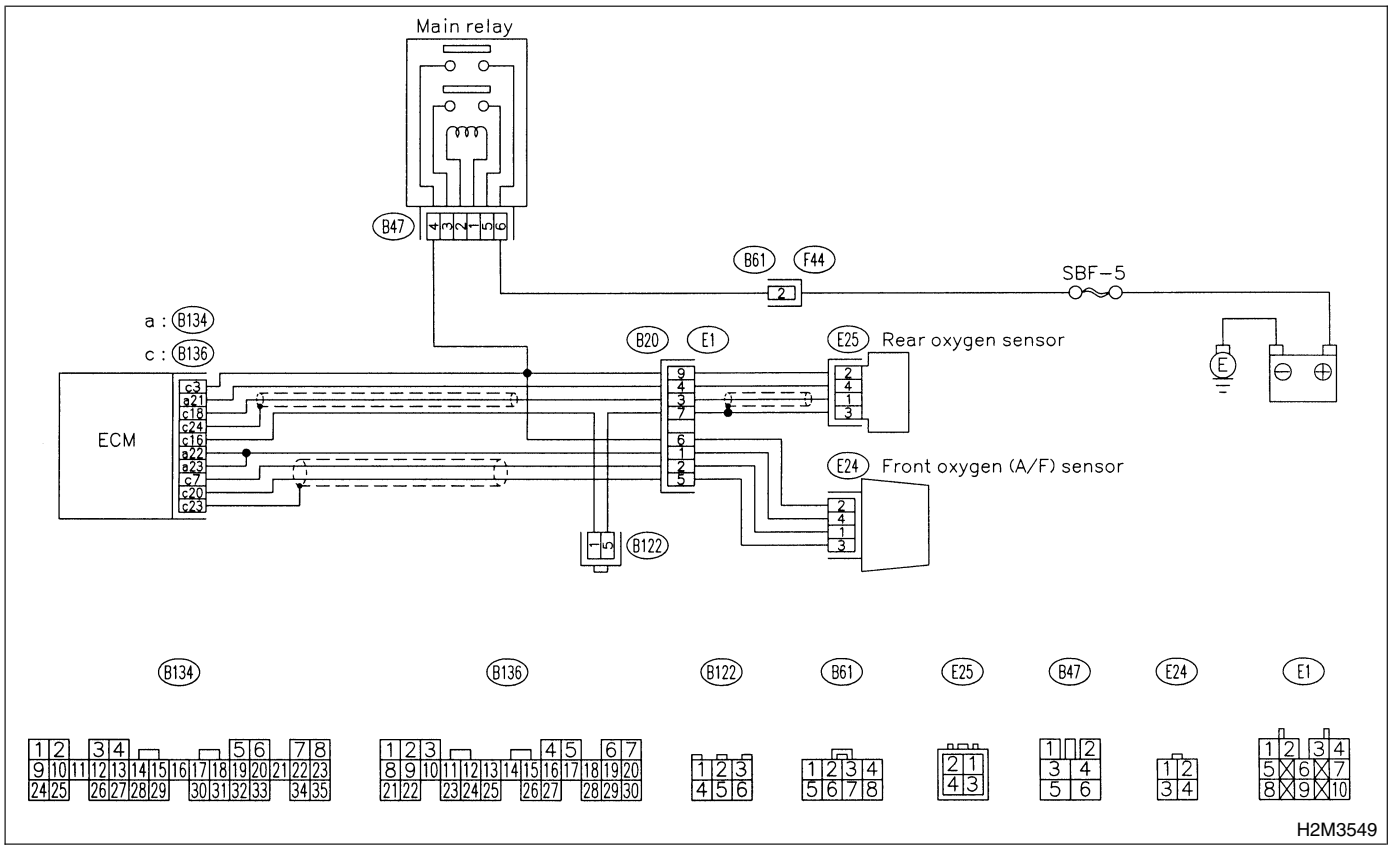
AG: DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD

S008636B46

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	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?	Inspect the relevant DTC using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0420.	Go to step **2**.

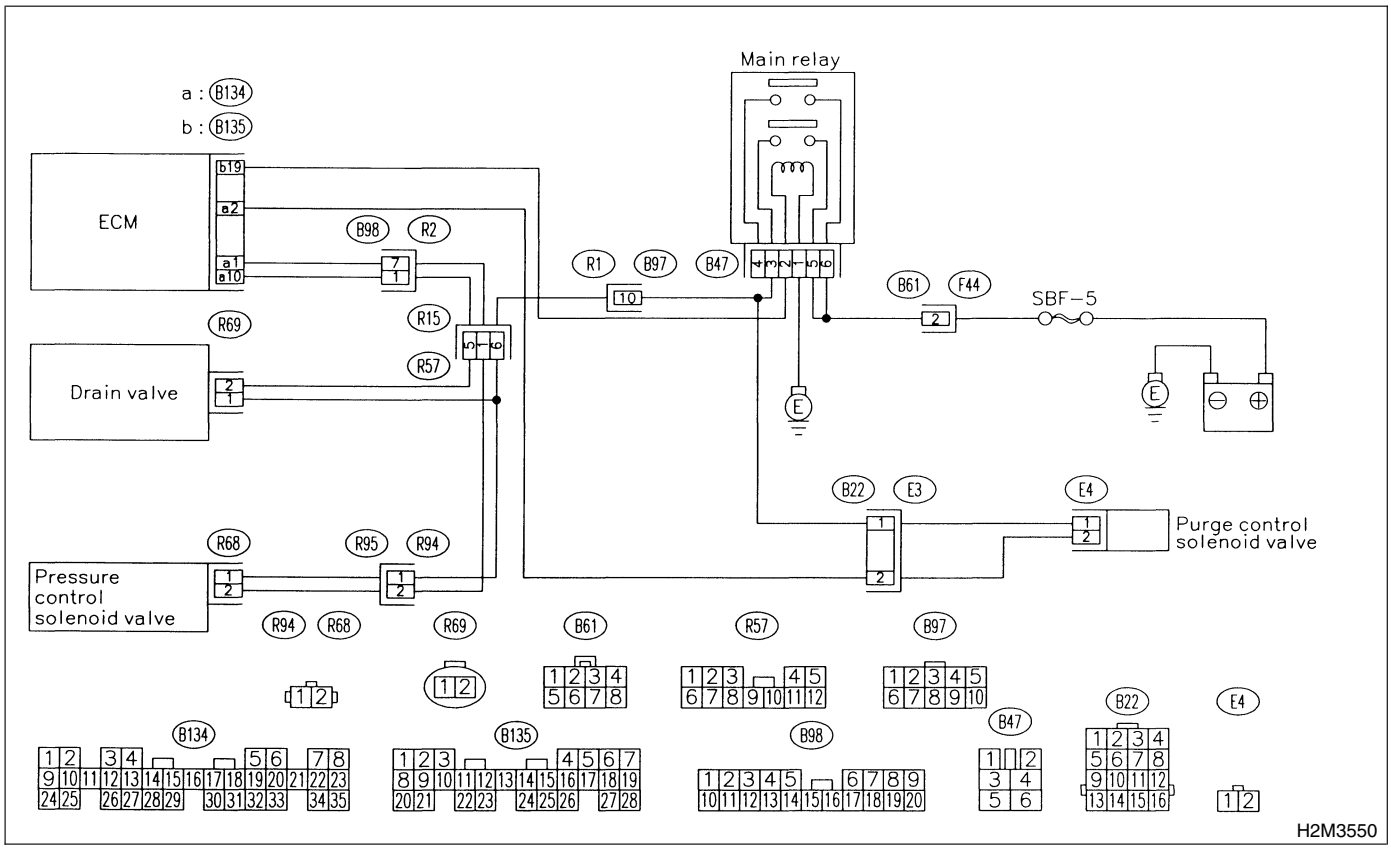
No.	Step	Check	Yes	No
2	**CHECK EXHAUST SYSTEM.** Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes. NOTE: Check the following positions. ● Between cylinder head and front exhaust pipe ● Between front exhaust pipe and front catalytic converter ● Between front catalytic converter and rear catalytic converter	Is there a fault in exhaust system?	Repair or replace exhaust system. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>	Go to step **3**.
3	**CHECK REAR CATALYTIC CONVERTER.** Separate rear catalytic converter from rear exhaust pipe.	Is there damage at rear face of rear catalyst?	Replace front catalytic converter <Ref. to EC-3 REMOVAL, Front Catalytic Converter.> and rear catalytic converter <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>.	Go to step **4**.
4	**CHECK FRONT CATALYTIC CONVERTER.** Remove front catalytic converter.	Is there damage at rear face or front face of front catalyst?	Replace front catalytic converter. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AH: DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION — S008636B47

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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.	Is the fuel filler cap tightened securely?	Go to step **3**.	Tighten fuel filler cap securely.
3	**CHECK FUEL FILLER PIPE PACKING.**	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace fuel filler cap and fuel filler pipe. <Ref. to FU-72 REMOVAL, Fuel Filler Pipe.>	Go to step **4**.
4	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does drain valve produce operating sound?	Go to step **5**.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>
5	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does purge control solenoid valve produce operating sound?	Go to step **6**.	Replace purge control solenoid valve. <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.>
6	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does pressure control solenoid valve produce operating sound?	Go to step **7**.	Replace pressure control solenoid valve. <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.>
7	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.** Turn ignition switch to OFF.	Is there a hole of more than 1.0 mm (0.04 in) dia. on fuel line?	Repair or replace fuel line. <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>	Go to step **8**.
8	**CHECK CANISTER.**	Is canister damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace canister. <Ref. to EC-7 REMOVAL, Canister.>	Go to step **9**.
9	**CHECK FUEL TANK.** Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>	Is fuel tank damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace fuel tank. <Ref. to FU-69 INSTALLATION, Fuel Tank.>	Go to step **10**.

No.	Step	Check	Yes	No
10	**CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.**	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?	Repair or replace hoses or pipes.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

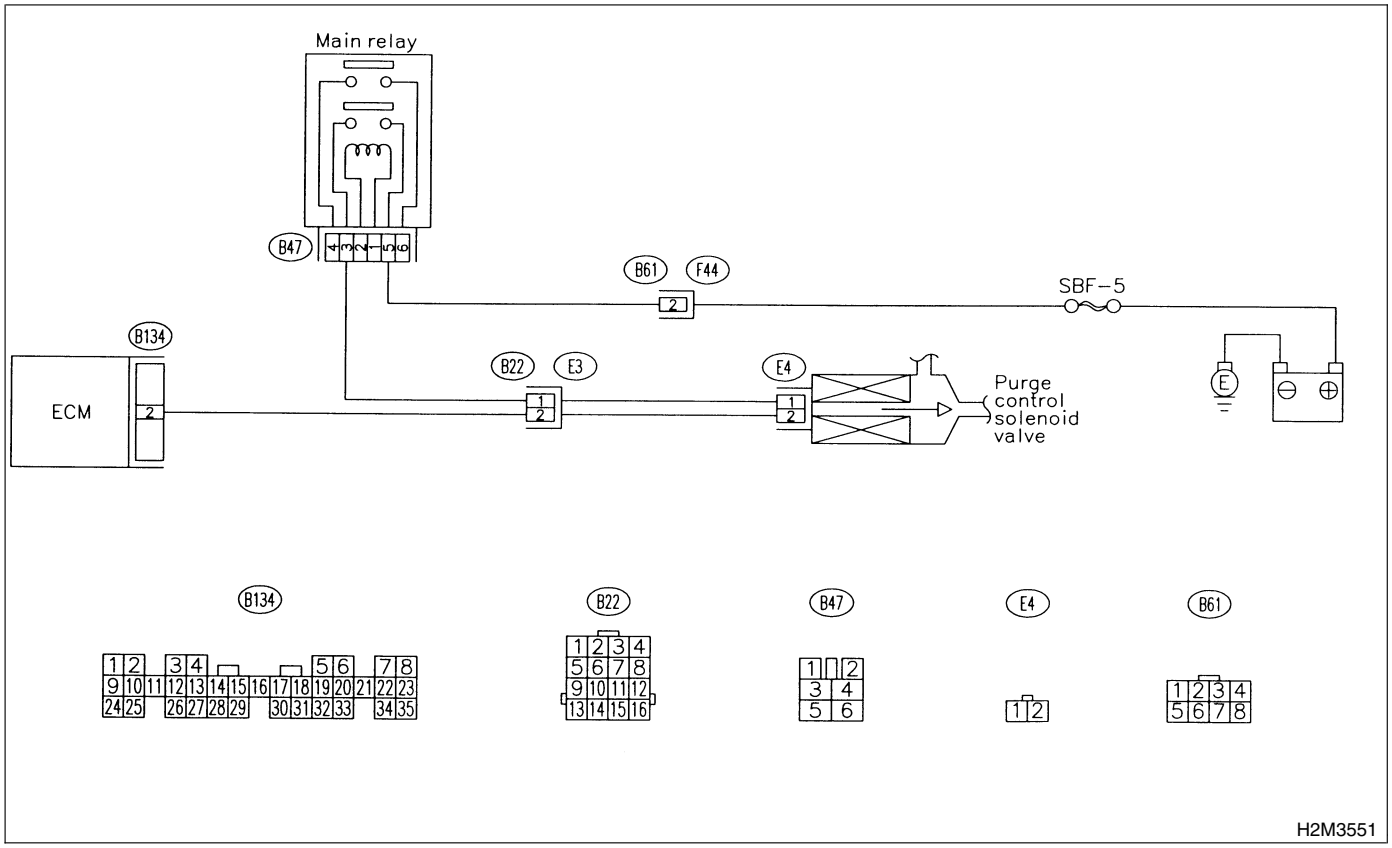
MEMO:

AI: DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT — S008636B49

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	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.	Go to step **2**.

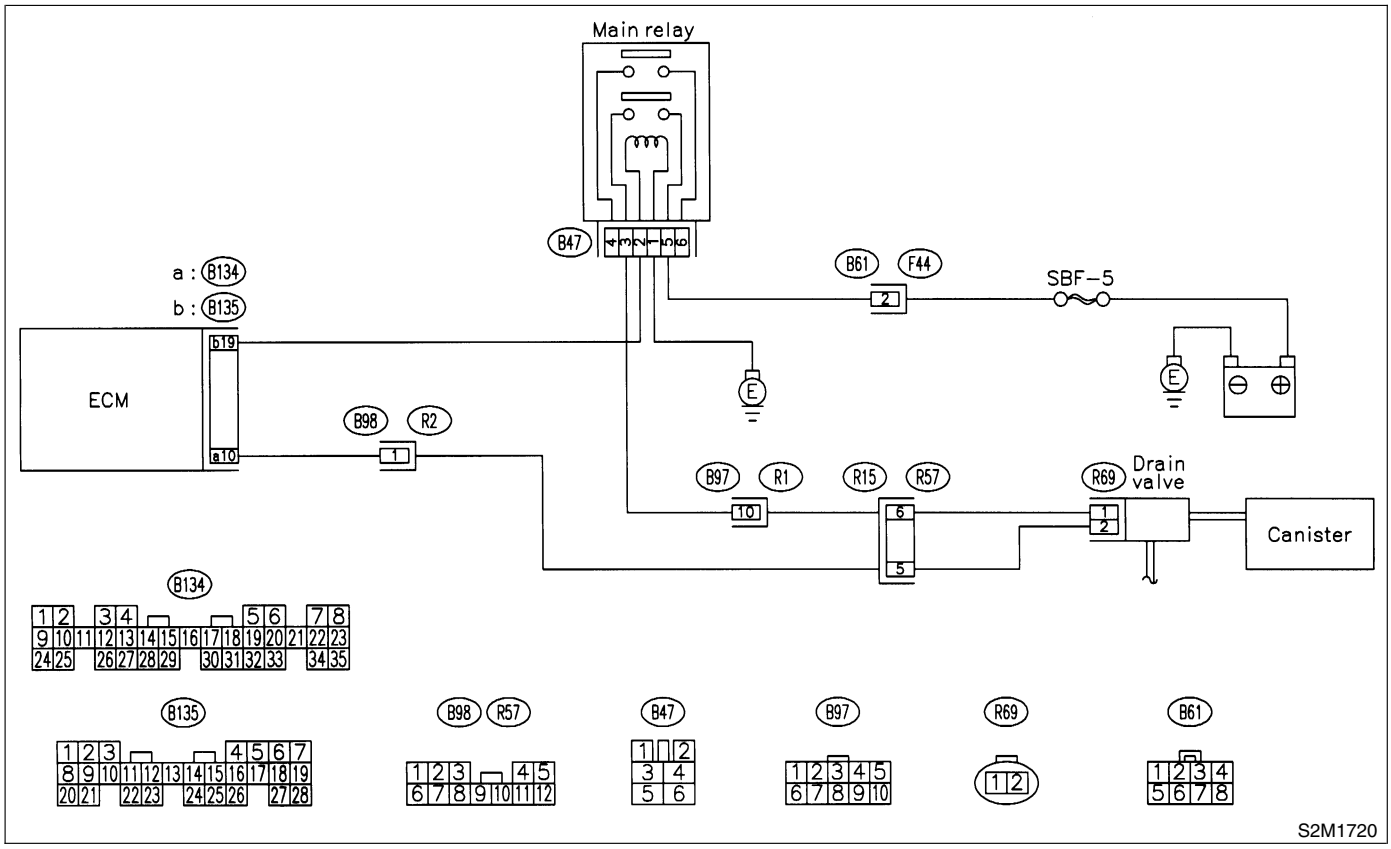
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from purge control solenoid valve and ECM. 3) Measure resistance of harness between purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 2 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and purge control solenoid valve connector.	Go to step **3**.
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance between 10 and 100 Ω?	Go to step **5**.	Replace purge control solenoid valve. <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.>
5	**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 (–):***	Is the voltage more than 10 V?	Go to step **6**.	Repair open circuit in harness between main relay and purge control solenoid valve connector.
6	**CHECK POOR CONTACT.** Check poor contact in purge control solenoid valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in purge control solenoid valve connector?	Repair poor contact in purge control solenoid valve connector.	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 — S008636B50

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (−):***	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.

No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	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, B98 and R57)
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and drain valve connector.	Go to step **4**.
4	**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:***	Is the voltage less than 1 Ω?	Go to step **5**.	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 (B98 and R57)
5	**CHECK DRAIN VALVE.** Measure resistance between drain valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 10 and 100 Ω?	Go to step **6**.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>

No.	Step	Check	Yes	No
6	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	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 and R57) ● Poor contact in main relay connector
7	**CHECK POOR CONTACT.** Check poor contact in drain valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in drain valve connector?	Repair poor contact in drain valve connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

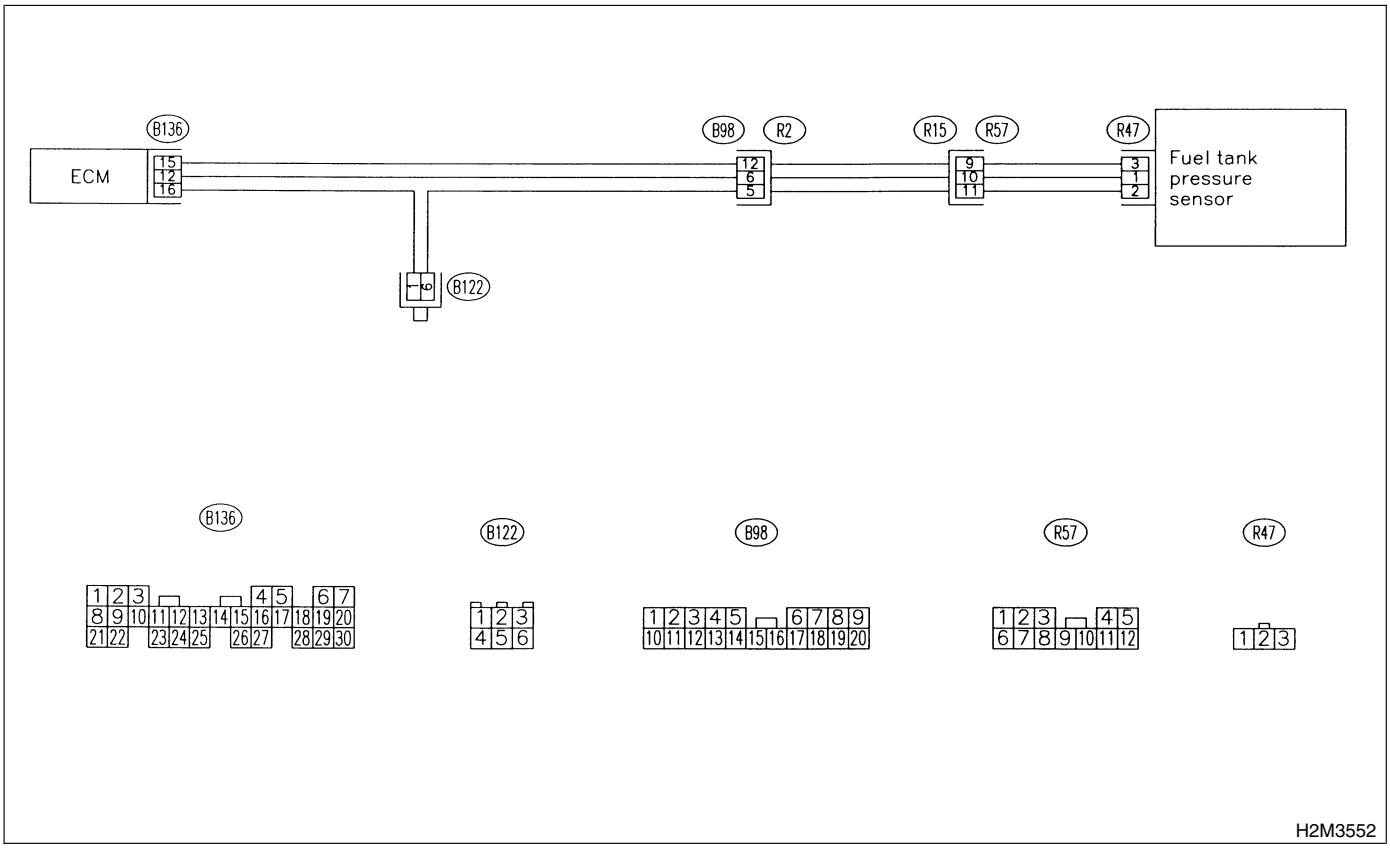
MEMO:

AK: DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE PROBLEM — S008636B51

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any DTC on display?	Inspect the relevant DTC using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.
2	**CHECK FUEL FILLER CAP.** 1) Turn ignition switch to OFF. 2) Open the fuel flap.	Is the fuel filler cap tightened securely?	Go to step **3**.	Tighten fuel filler cap securely.

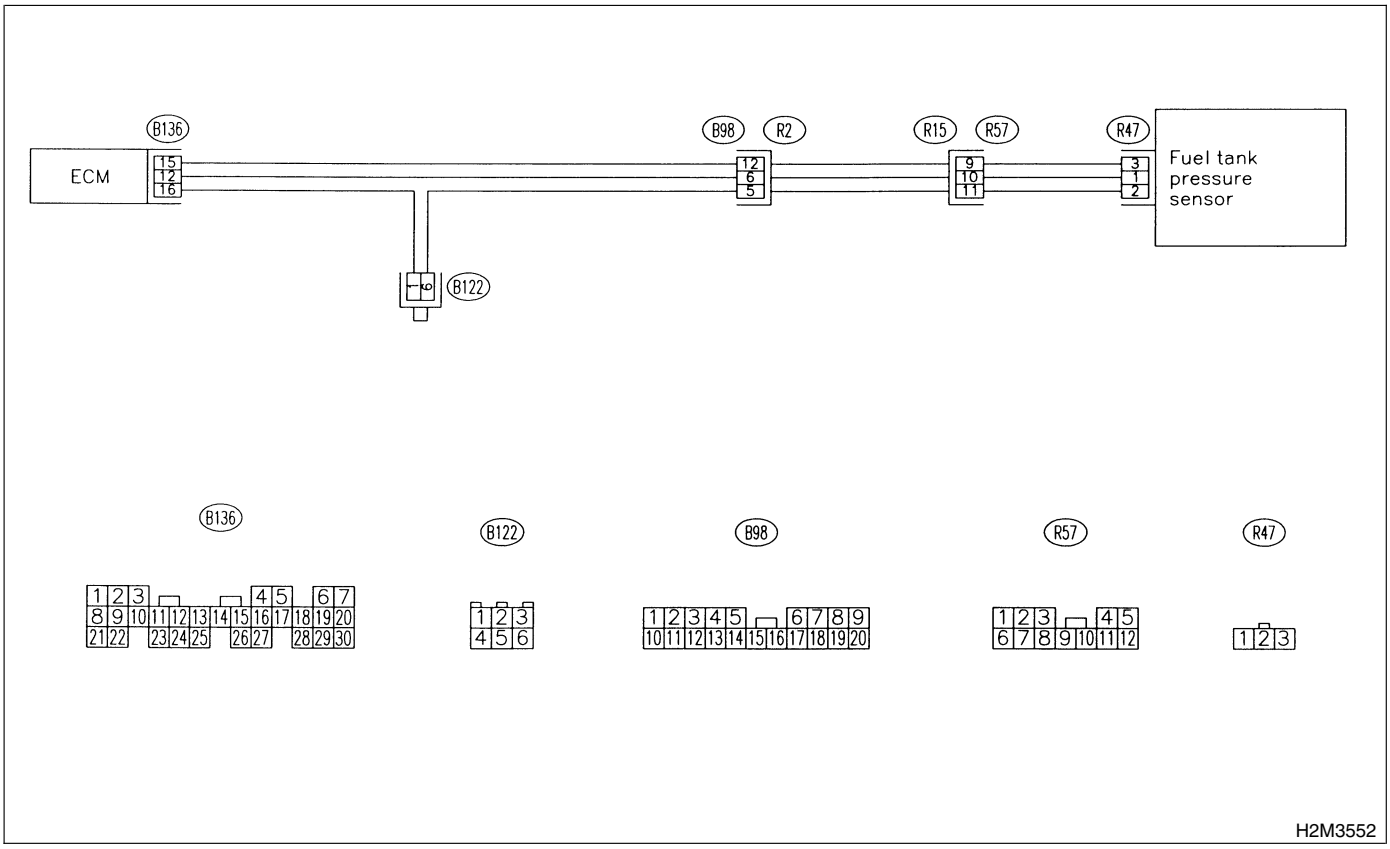
No.	Step	Check	Yes	No
3	**CHECK PRESSURE/VACUUM LINE.** NOTE: Check the following items. ● Disconnection, leakage and clogging of the vacuum hoses and pipes between fuel tank pressure sensor and fuel tank ● Disconnection, leakage and clogging of air ventilation hoses and pipes between fuel filler pipe and fuel tank	Is there a fault in pressure/ vacuum line?	Repair or replace hoses and pipes.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

AL: DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT — S008636B52

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3552

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –2.8 kPa (–21.0 mmHg, –0.827 inHg)?	Go to step **2**.	Even if MIL lights up, the circuit has returned to a normal condition at this time.

No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** 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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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*** ***(R15) No. 9 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98)

No.	Step	Check	Yes	No
7	**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 — (R15) No. 11:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98) ● Poor contact in joint connector (B122)
8	**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*** ***(R15) No. 11 — Chassis ground:***	Is the resistance more than 500 kΩ?	Go to step **9**.	Repair ground short circuit in harness between ECM and rear wiring harness connector (B98).
9	**CHECK FUEL TANK CORD.** 1) Disconnect connector from fuel tank pressure sensor. 2) Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 9 — (R47) No. 3:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair open circuit in fuel tank cord.
10	**CHECK FUEL TANK CORD.** Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 10 — (R47) No. 1:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair open circuit in fuel tank cord.
11	**CHECK FUEL TANK CORD.** Measure resistance of harness between fuel tank pressure sensor connector and chassis ground. ***Connector & terminal*** ***(R47) No. 2 — Chassis ground:***	Is the resistance more than 500 kΩ?	Go to step **12**.	Repair ground short circuit in fuel tank cord.
12	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure sensor connector?	Repair poor contact in fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

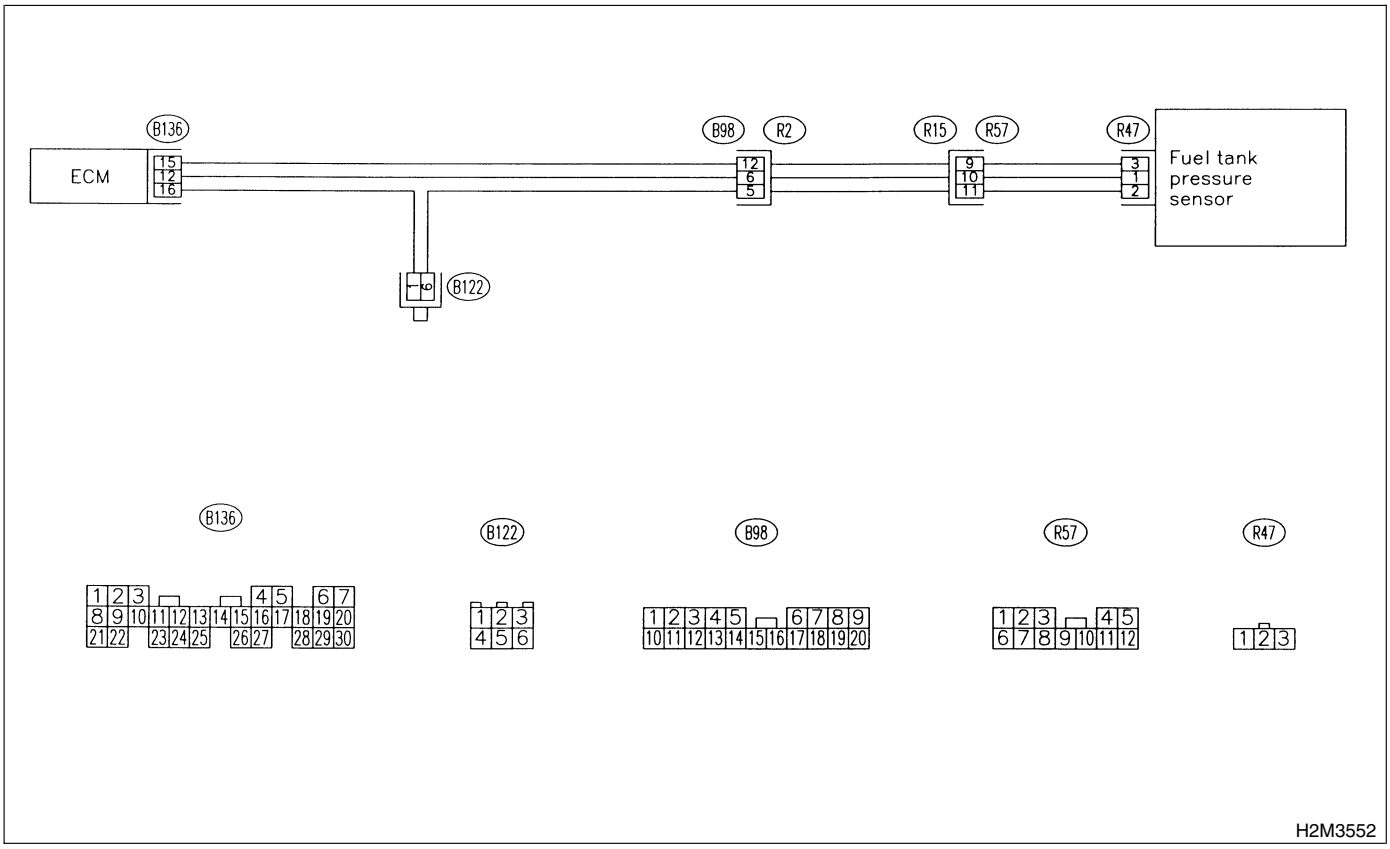
MEMO:

AM: DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT — S008636B53

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?	Go to step **12**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** 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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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*** ***(R15) No. 9 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98)
7	**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 — (R15) No. 10:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98)

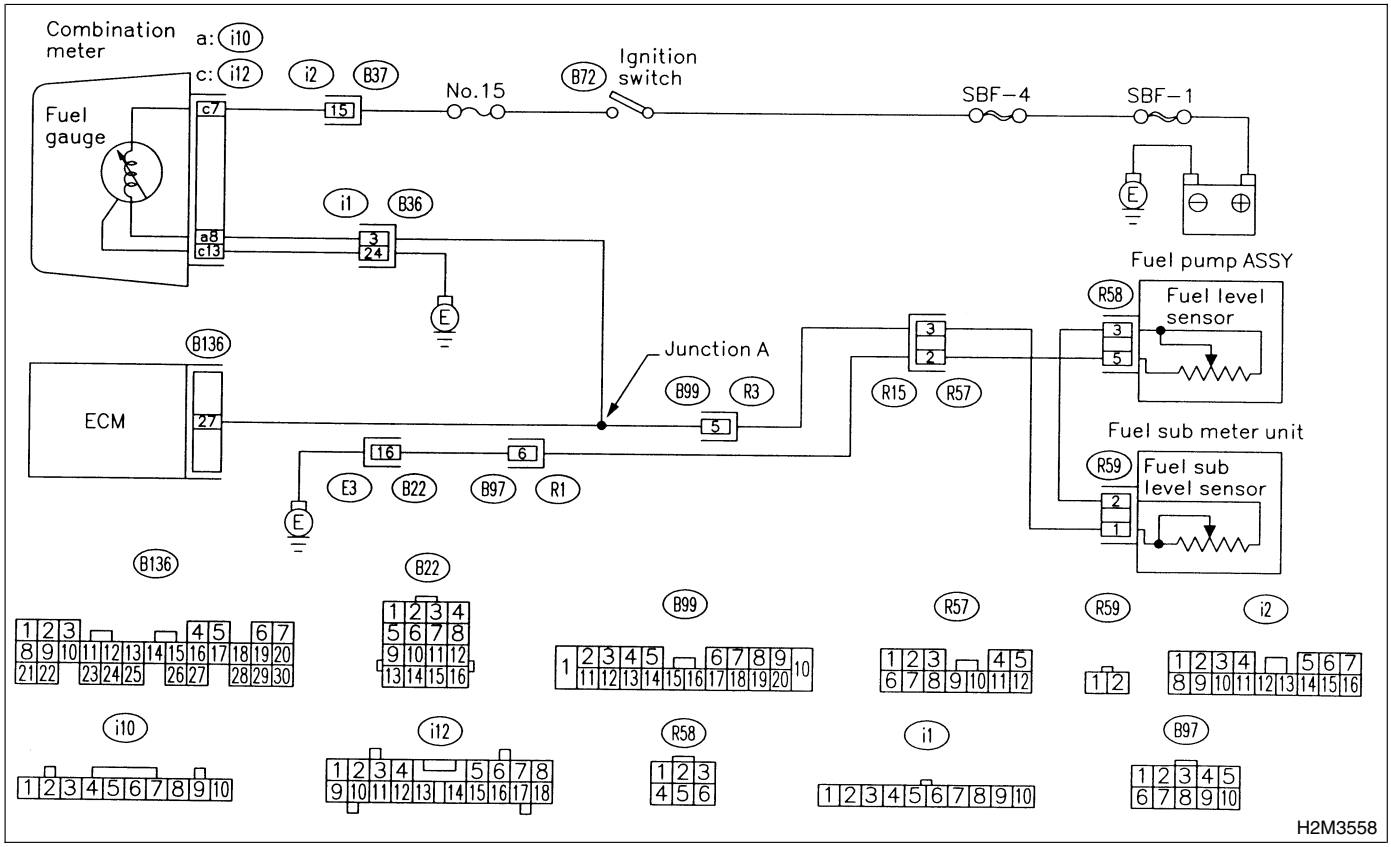
No.	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.** Measure resistance of harness between rear wiring harness connector and chassis ground. ***Connector & terminal*** ***(B136) No. 16 — (R15) No. 11:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair ground short circuit in harness between ECM and rear wiring harness connector (R15).
9	**CHECK FUEL TANK CORD.** 1) Disconnect connector from fuel tank pressure sensor. 2) Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 11 — (R47) No. 2:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair open circuit in fuel tank cord.
10	**CHECK FUEL TANK CORD.** Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 10 — (R47) No. 1:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair open circuit in fuel tank cord.
11	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure sensor connector?	Repair poor contact in fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>
12	**CHECK HARNESS BETWEEN ECM AND FUEL TANK 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 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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?	Repair battery short circuit in harness between ECM and fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

AN: DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008636B54

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



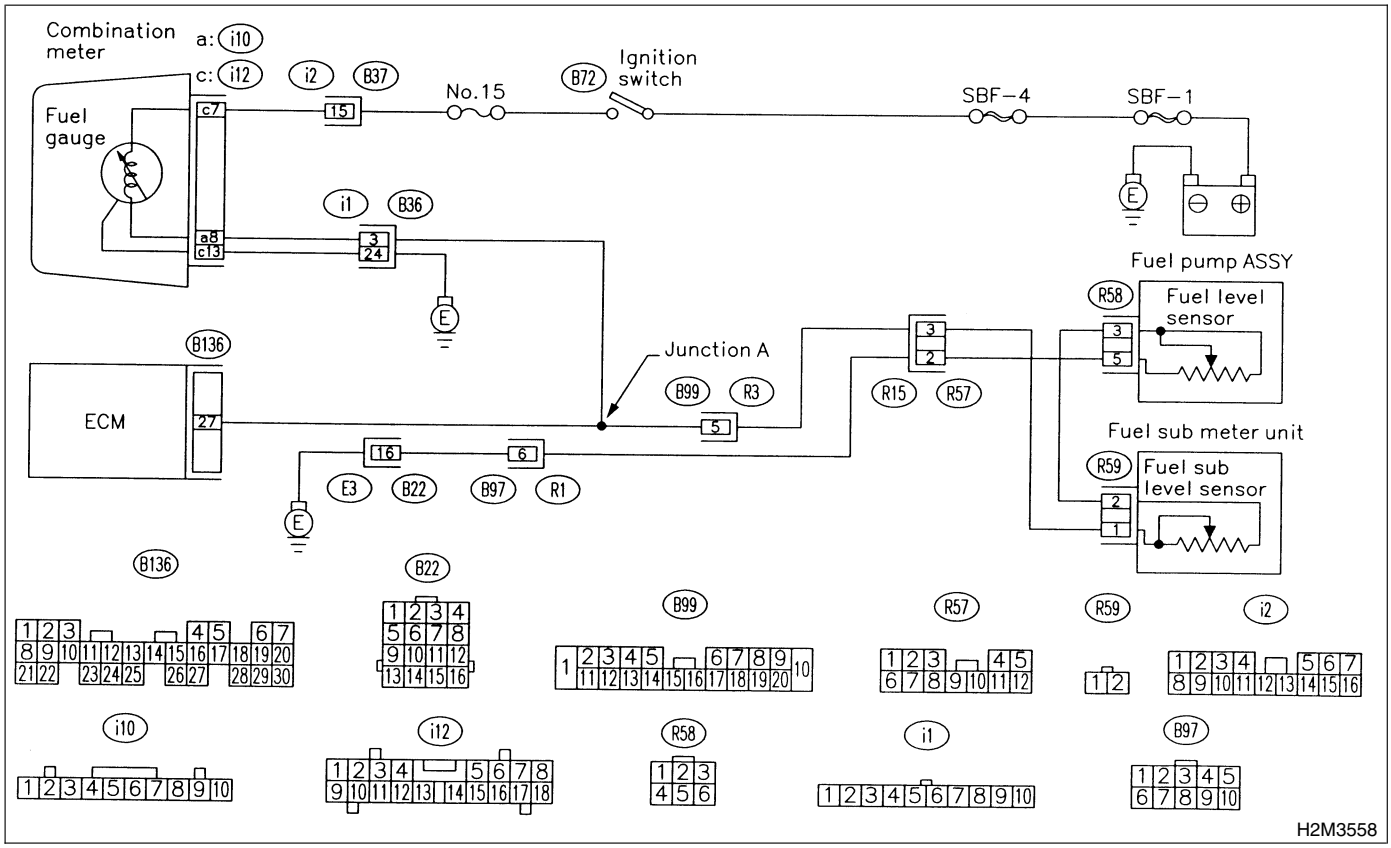
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0462 or P0463?	Inspect DTC P0462 or P0463 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect this trouble.	Replace fuel sending unit and fuel sub level sensor <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>.

AO: DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT — S008636B55

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.**	Does speedometer and tachometer operate normally?	Go to step **2**.	Repair or replace combination meter.
2	**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 (−):***	Is the voltage less than 0.12 V?	Go to step **4**.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	Does the value change less than 0.12 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?	Repair poor contact in ECM connector.	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)
4	**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 (–):***	Is the voltage less than 0.12 V?	Go to step **5**.	Go to step **7**.
5	**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:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair ground short circuit in harness between ECM and combination meter connector.
6	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER.** Measure resistance between ECM and combination meter connector. ***Connector & terminal*** ***(B136) No. 27 — (i10) No. 8:***	Is the resistance less than 10 Ω?	Repair or replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>	Repair open circuit between ECM and combination meter connector. NOTE: In this case, repair the following: Poor contact in coupling connector (i1)
7	**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:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair ground short circuit in fuel tank cord.

No.	Step	Check	Yes	No
8	**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:***	Is the resistance more than 1 MΩ?	Go to step **9**.	Repair ground short circuit in fuel tank cord.
9	**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 FU-77 REMOVAL, Fuel Pump.> 2) Measure resistance between fuel level sensor and terminals with its float set to the full position. ***Terminals*** ***No. 3 — No. 6:***	Is the resistance between 0.5 and 2.5 Ω?	Go to step **10**.	Replace fuel level sensor.
10	**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 EC-13 REMOVAL, Sub Fuel Level Sensor.> 2) Measure resistance between fuel sub level sensor and terminals with its float set to the full position. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 0.5 and 2.5 Ω?	Repair poor contact in harness between ECM and combination meter connector.	Replace fuel sub level sensor. <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>

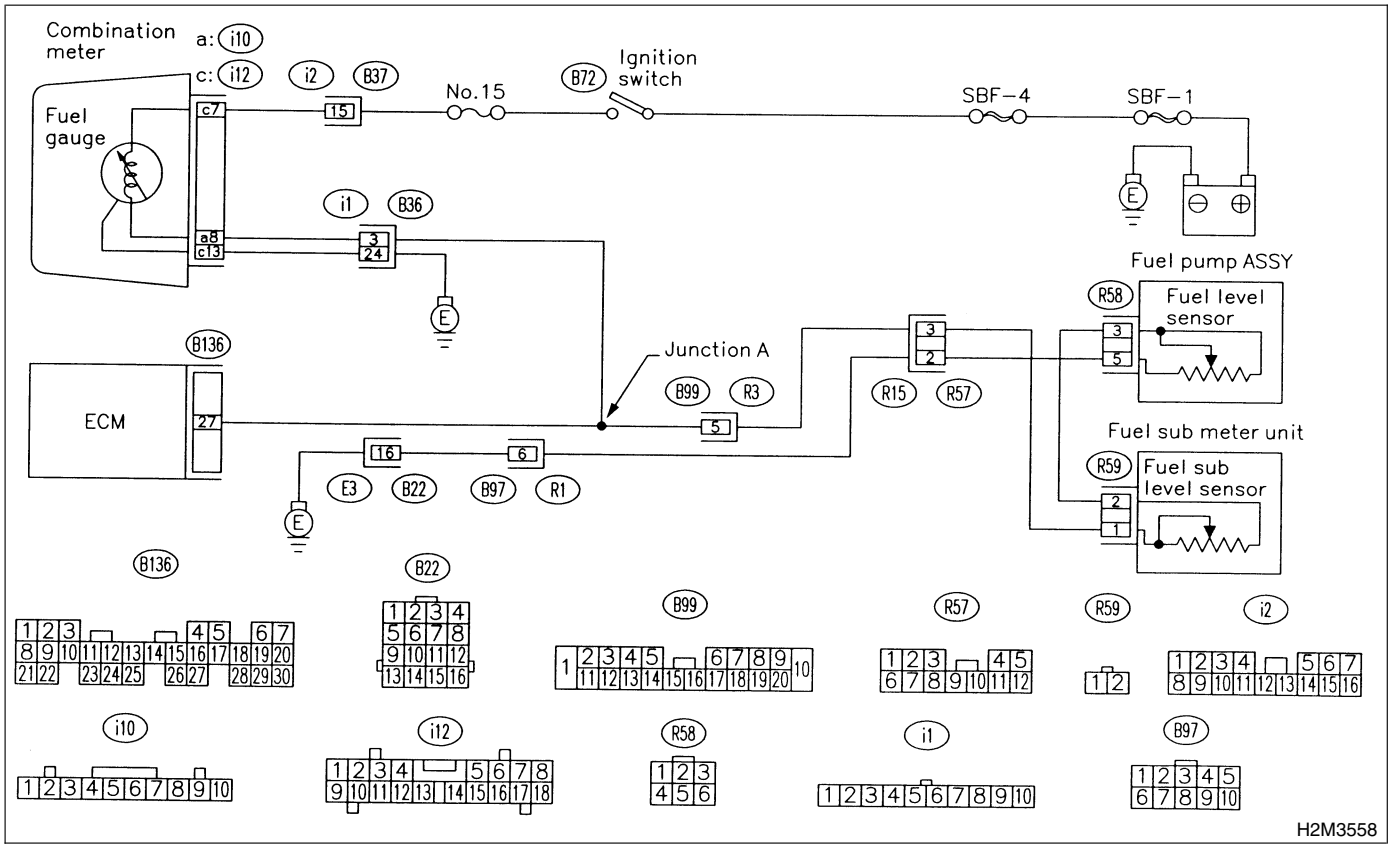
MEMO:

AP: DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT — S008636B56

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.**	Does speedometer and tachometer operate normally?	Go to step **2**.	Repair or replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 4.75 V?	Go to step **3**.	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, B97 and R57)
3	**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 (–):***	Is the voltage more than 4.75 V?	Go to step **4**.	Repair battery short circuit between ECM and combination meter connector.
4	**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. 3:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair open circuit between ECM and fuel tank cord.
5	**CHECK HARNESS BETWEEN FUEL TANK CORD AND CHASSIS GROUND.** Measure resistance between fuel tank cord and chassis ground. ***Connector & terminal*** ***(R15) No. 2 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **6**.	Repair open circuit between fuel tank cord and chassis ground. NOTE: In this case, repair the following: Poor contact in coupling connectors (B97 and B22)
6	**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. 2 — (R58) No. 5:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair open circuit between coupling connector and fuel level sensor.

No.	Step	Check	Yes	No
7	**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. 3 — (R59) No. 2:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair open circuit between fuel level sensor and fuel sub level sensor.
8	**CHECK FUEL TANK CORD.** Measure resistance between fuel sub level sensor and coupling connector. ***Connector & terminal*** ***(R57) No. 3 — (R59) No. 1:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair open circuit between coupling connector and fuel sub level sensor.
9	**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 FU-77 REMOVAL, Fuel Pump.> 2) While moving fuel level sensor float up and down, measure resistance between fuel level sensor terminals. ***Terminals*** ***No. 3 — No. 6:***	Is the resistance more than 54.5 Ω?	Go to step **10**.	Replace fuel level sensor. <Ref. to FU-80 REMOVAL, Fuel Level Sensor.>
10	**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 EC-13 REMOVAL, Sub Fuel Level Sensor.> 2) Measure resistance between connector terminals of fuel sub level sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance more than 41.5 Ω?	Replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>	Replace fuel sub level sensor. <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>

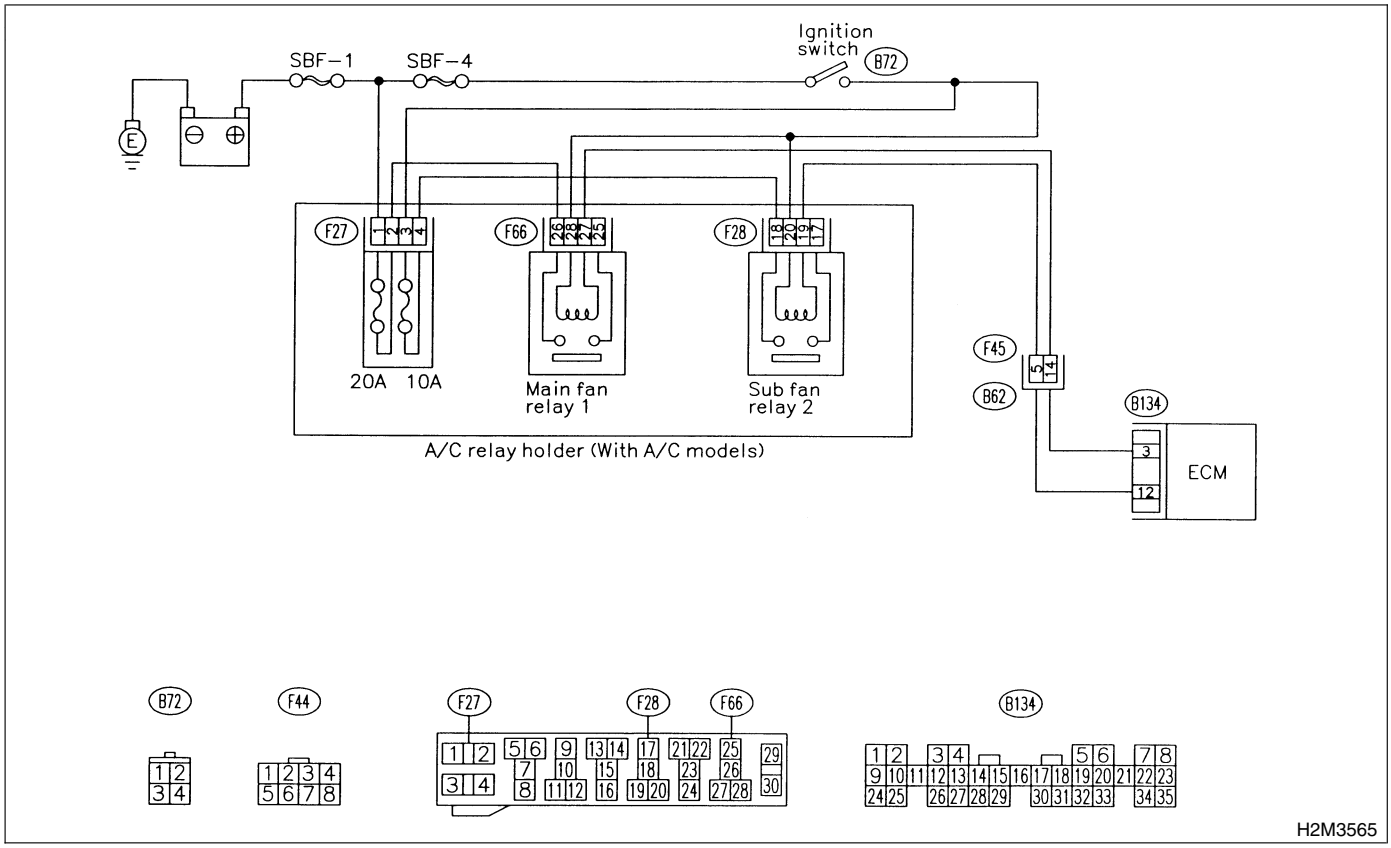
MEMO:

AQ: DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT — S008636B57

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3565

No.	Step	Check	Yes	No
1	**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 operation, 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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in radiator fan relay control circuit.	Go to step **3**.
3	**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. 28 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Repair open circuit in harness between ignition switch and fuse and relay box (F/B) connector.
4	**CHECK MAIN FAN RELAY.** 1) Turn ignition switch to OFF. 2) Measure resistance between main fan relay terminals. ***Terminal*** ***No. 5 — No. 6:***	Is the resistance between 87 and 107 Ω?	Go to step **5**.	Replace main fan relay.
5	**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. 27:***	Is the resistance less than 1 Ω?	Go to step **6**.	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)
6	**CHECK POOR CONTACT.** Check poor contact in ECM or main fan relay connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM or main fan relay connector?	Repair poor contact in ECM or main fan relay connector.	Contact with SOA service.

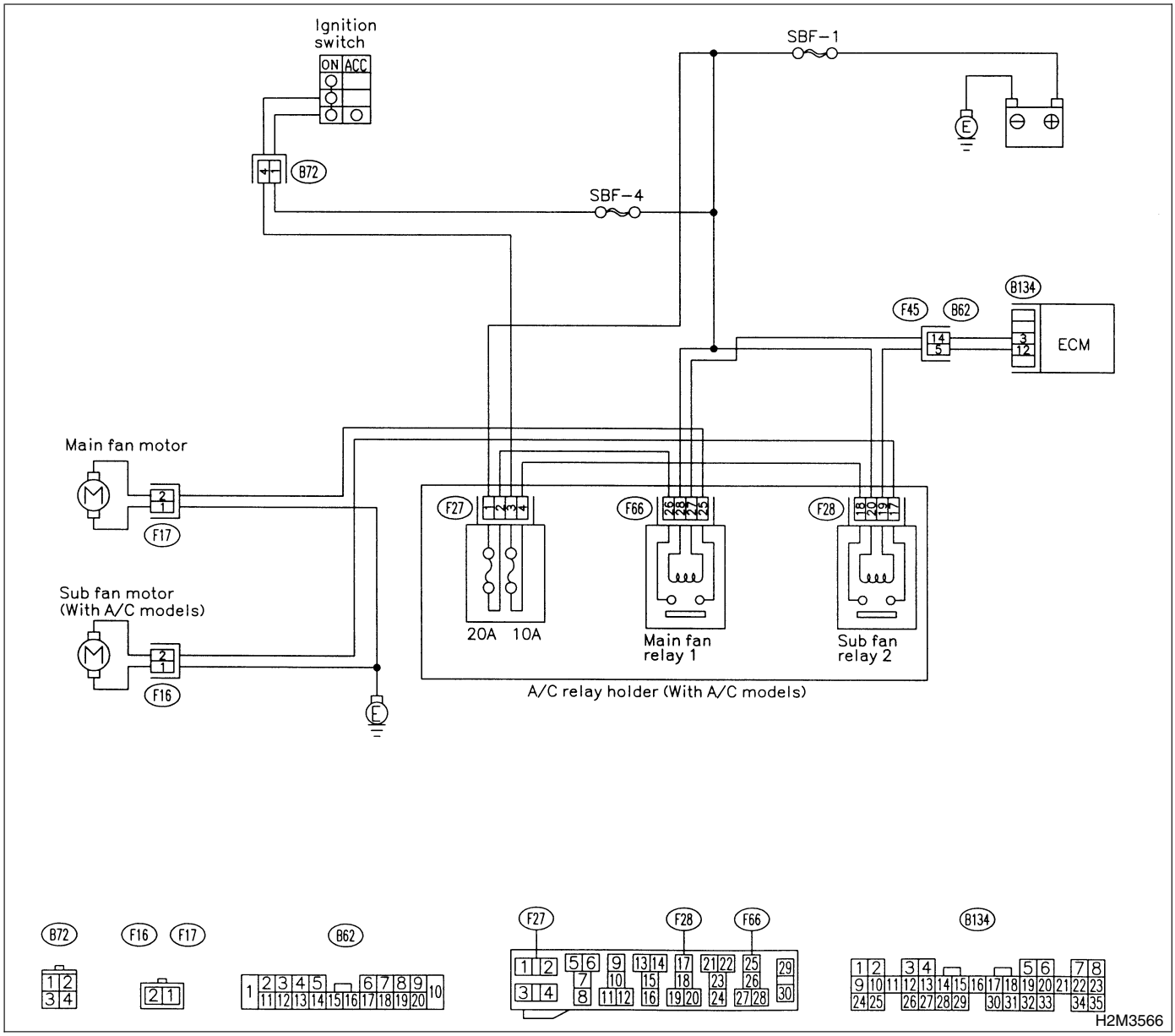
AR: DTC P0483 — COOLING FAN FUNCTION PROBLEM — S008636B58

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

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:**



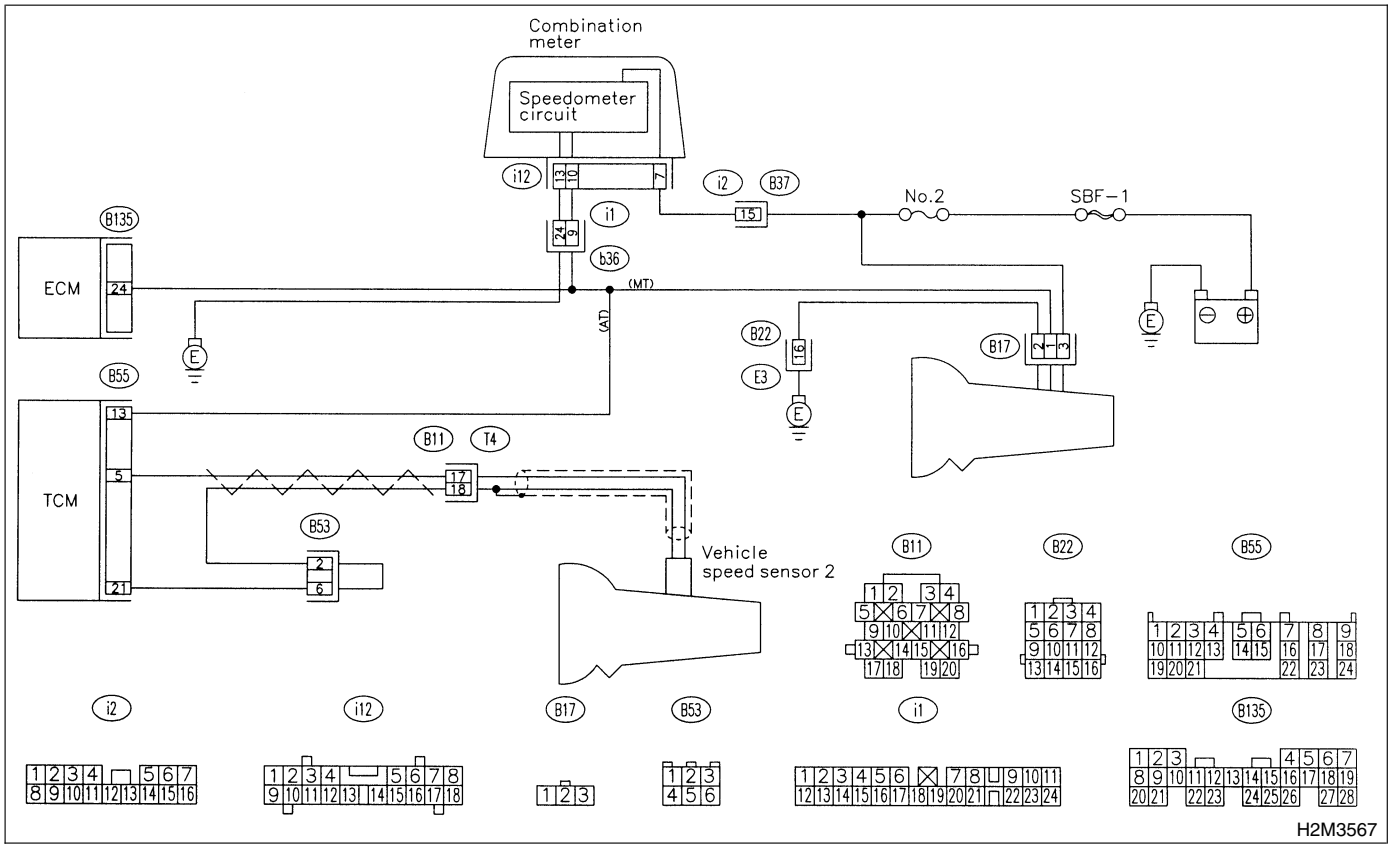
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Check engine cooling system. <Ref. to CO-22 INSPECTION, Radiator Main Fan and Fan Motor.>

AS: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION — S008636B59

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC P0720 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?	Check vehicle speed sensor 2 signal circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>	Go to step **3**.
3	**CHECK SPEEDOMETER OPERATION IN COMBINATION METER.**	Does speedometer operate normally?	Go to step **4**.	Check speedometer and vehicle speed sensor. <Ref. to IDI-4 INSPECTION, General Diagnostic.>

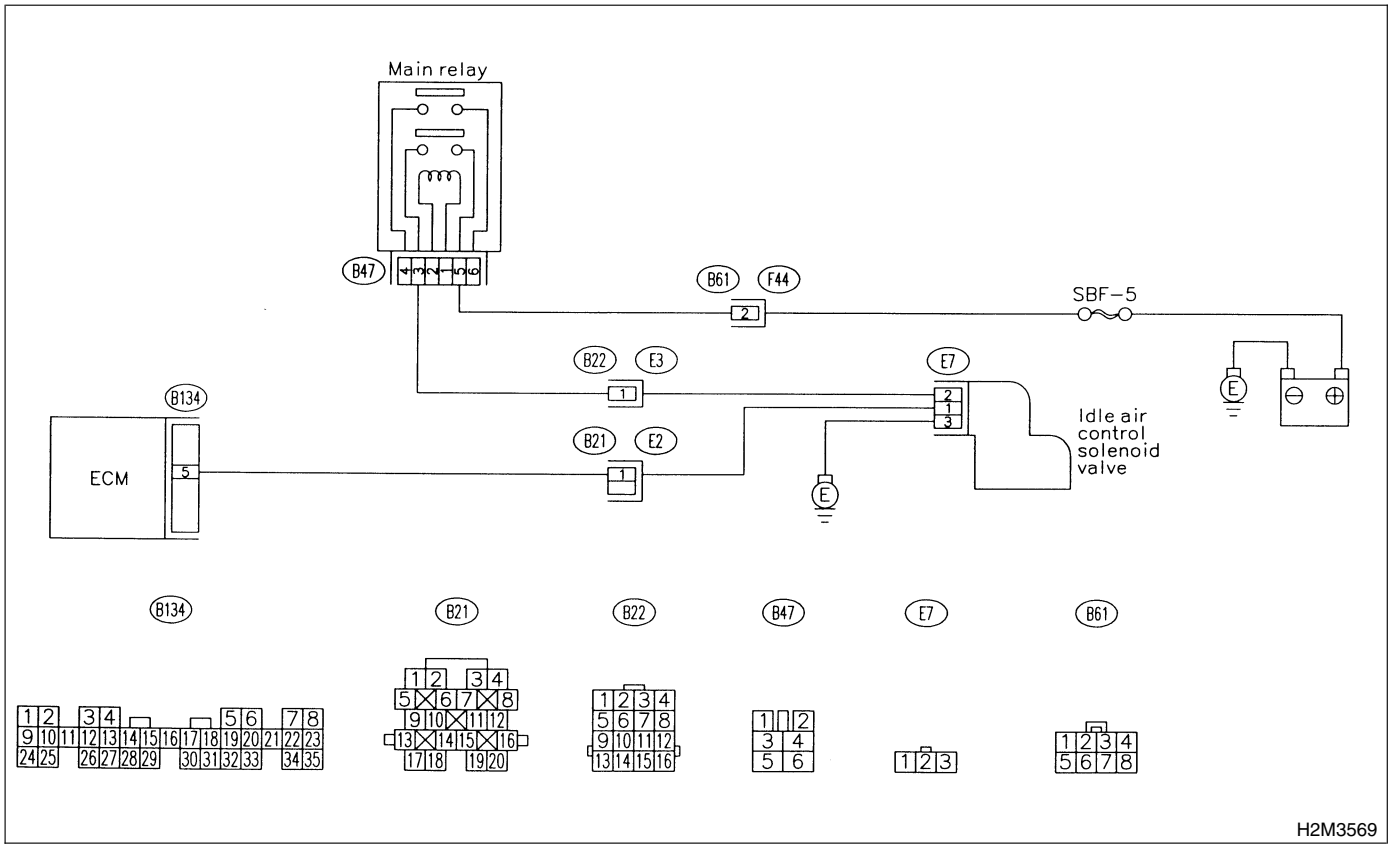
No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from combination meter. 3) Measure resistance between ECM and combination meter. ***Connector & terminal*** ***(B135) No. 24 — (i12) No. 10:***	Is the resistance less than 10 Ω?	Repair poor contact in ECM connector.	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 (i1)

AT: DTC P0505 — IDLE CONTROL SYSTEM CIRCUIT LOW INPUT — S008636B60

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 3 V?	Repair poor contact in ECM connector.	Go to step **2**.

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **3**.	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)
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.	Go to step **5**.
5	**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:***	Is the resistance less than 5 Ω?	Go to step **6**.	Repair open circuit in harness between idle air control solenoid valve connector and engine ground terminal.
6	**CHECK POOR CONTACT.** Check poor contact in ECM and idle air control solenoid valve connectors. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM and idle air control solenoid valve connectors?	Repair poor contact in ECM and idle air control solenoid valve connectors.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>

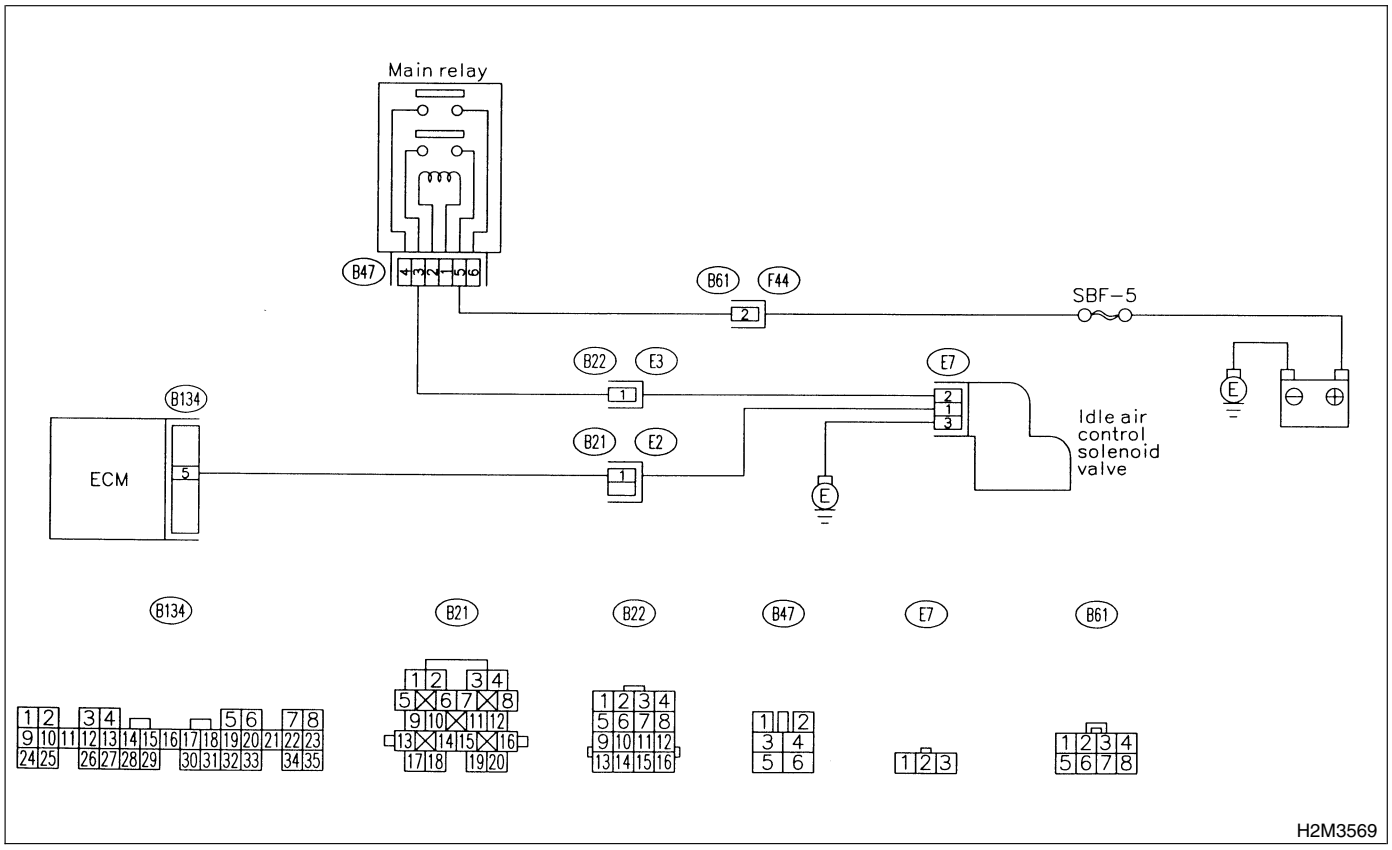
AU: DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED

— S008636B61

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0505 or P1505?	Inspect DTC P0505 or P1505 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0506.	Go to step **2**.
2	**CHECK IDLE AIR CONTROL SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Remove idle air control solenoid valve from throttle body. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> 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.	Does air flow out?	Go to step **4**.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> After replace, Go to step **3**.
3	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 60%?	Go to step **4**.	END.
4	**CHECK BY-PASS AIR LINE.** 1) Turn ignition switch to OFF. 2) Remove idle air control solenoid valve from throttle body. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> 3) Remove throttle body to intake manifold. <Ref. to FU-18 REMOVAL, Intake Manifold.> 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.	Does air flow out?	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>	Replace throttle body. <Ref. to FU-15 REMOVAL, Throttle Body.>

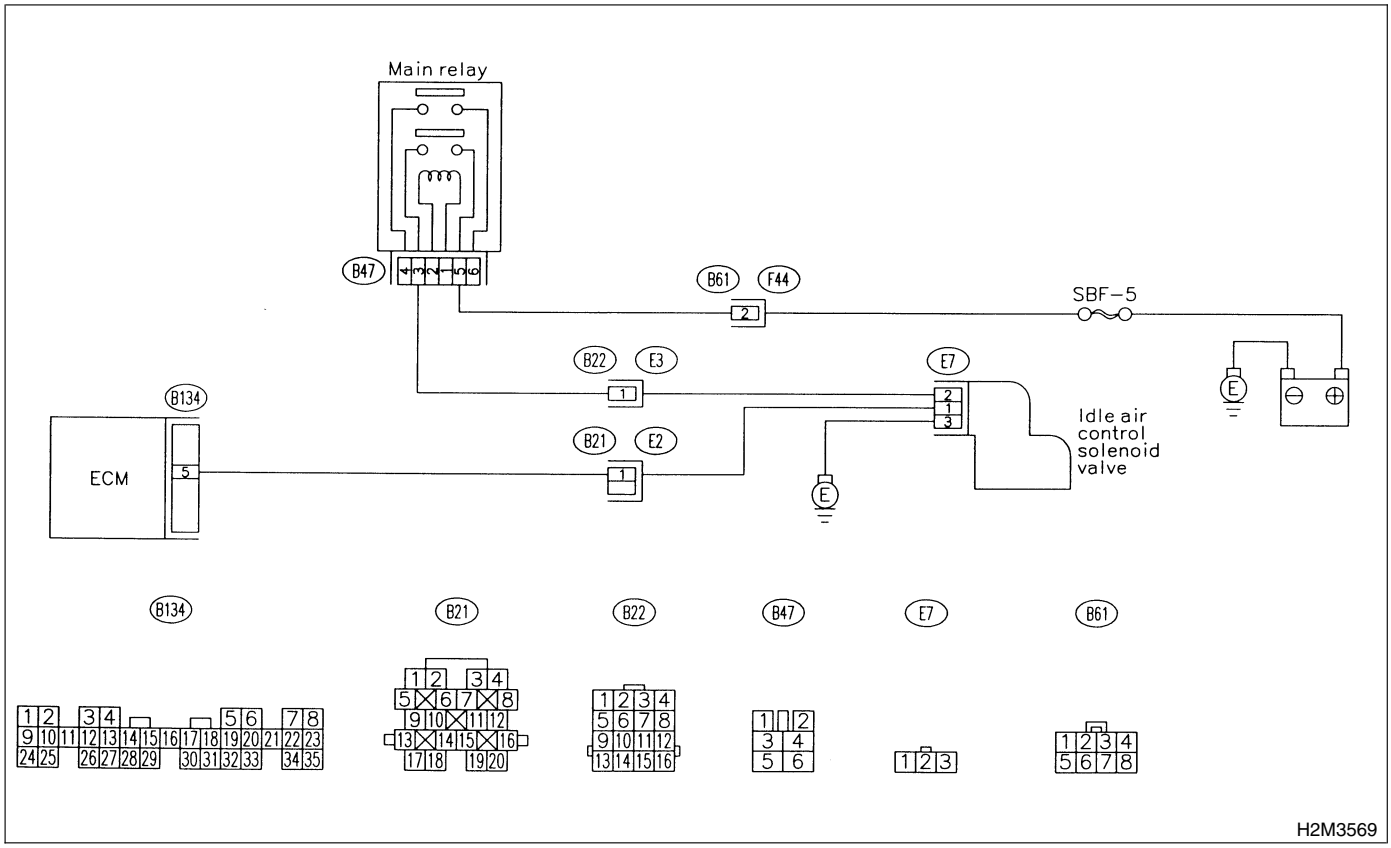
AV: DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED

— S008636B62

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0505 or P1505?	Inspect DTC P0505 or P1505 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0507.	Go to step **2**.

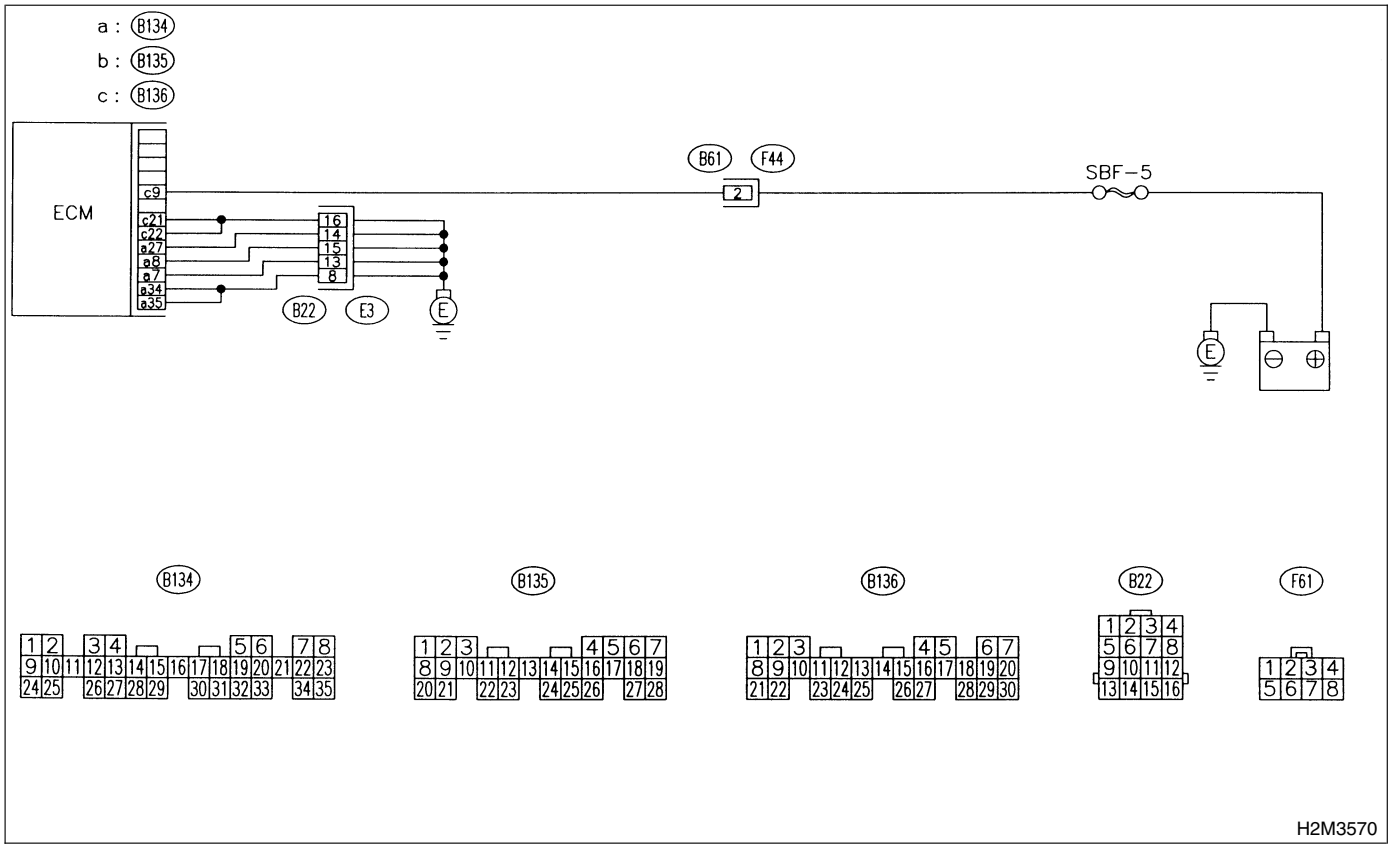
No.	Step	Check	Yes	No
2	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **3**.	Adjust throttle cable. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>
3	**CHECK AIR INTAKE SYSTEM.** 1) Turn ignition switch to ON. 2) Start engine, and idle it. 3) Check the following 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	Is there a fault in air intake system?	Repair air suction and leaks.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>

AW: DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR — S008636B63

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0601?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	It is not necessary to inspect DTC P0601.

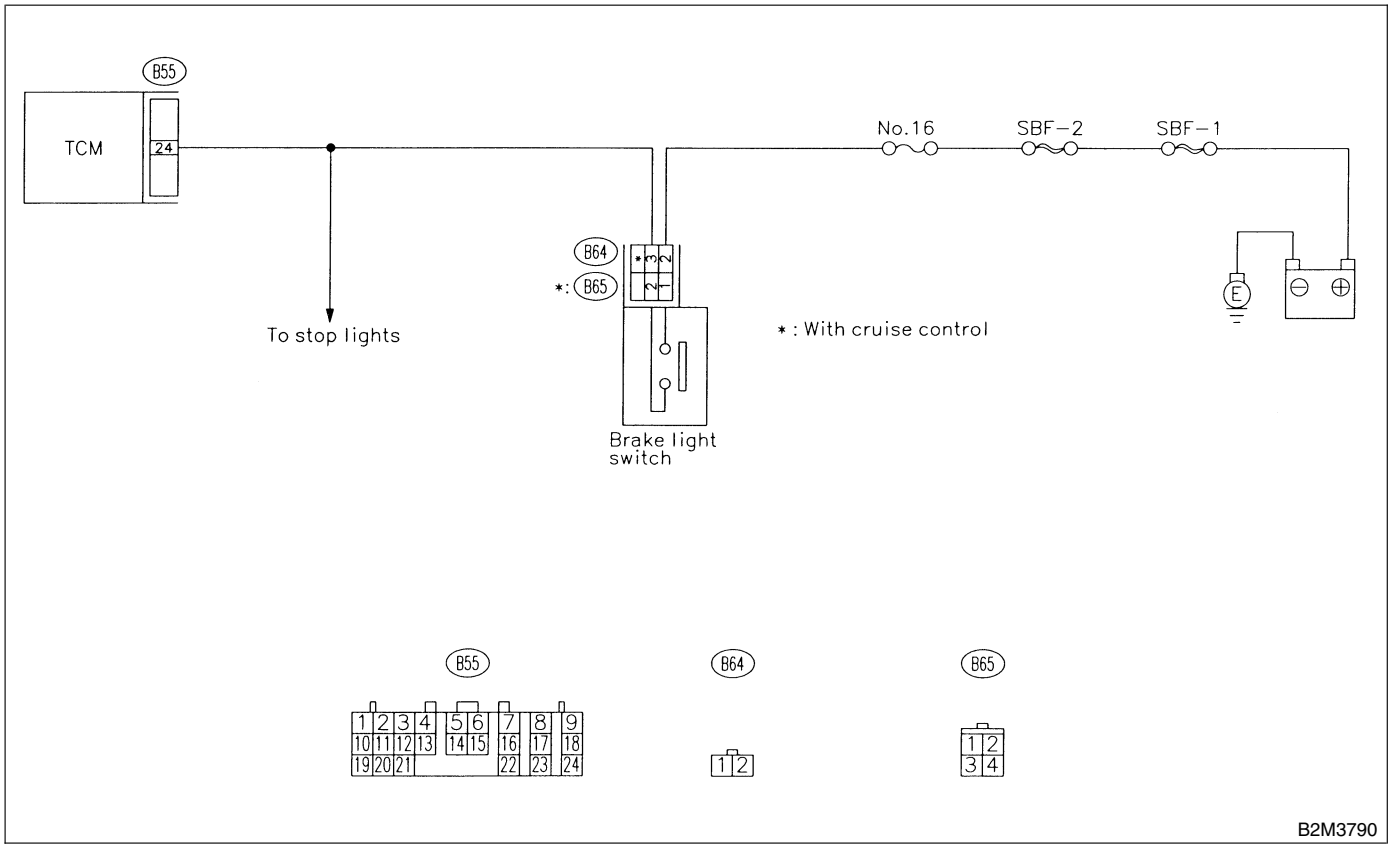
MEMO:

AX: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION — S008636B64

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF BRAKE LIGHT.**	Does brake light come on when depressing the brake pedal?	Go to step **2**.	Repair or replace brake light circuit.
2	**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):***	Is the resistance less than 1 Ω?	Go to step **3**.	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

No.	Step	Check	Yes	No
3	**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:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Repair ground short circuit in harness between TCM and brake light switch connector.
4	**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 (–):***	Is the voltage less than 1 V when releasing the brake pedal?	Go to step **5**.	Adjust or replace brake light switch. <Ref. to BR-57 REMOVAL, Stop Light Switch.>
5	**CHECK INPUT SIGNAL FOR TCM.** Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 24 (+) — Chassis ground (–):***	Is the voltage more than 10 V when depressing the brake pedal?	Go to step **6**.	Adjust or replace brake light switch. <Ref. to BR-57 REMOVAL, Stop Light Switch.>
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

AY: DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION — S008636F05

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check inhibitor switch circuit. <Ref. to AT-84 CHECK INHIBITOR SWITCH., Diagnostic Procedure for No-trouble Code.>

AZ: DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION — S008636B66

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check ATF temperature sensor circuit. <Ref. to AT-31 TROUBLE CODE 27 — ATF TEMPERATURE SENSOR —, Diagnostic Procedure with Trouble Code.>

BA: DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION — S008636B67

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>

BB: DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION — S008636B68

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check vehicle speed sensor 2 circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>

BC: DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION — S008636B69

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check engine speed input signal circuit. <Ref. to AT-29 TROUBLE CODE 11 — ENGINE SPEED SIGNAL —, Diagnostic Procedure with Trouble Code.>

BD: DTC P0731 — GEAR 1 INCORRECT RATIO — S008636B70

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-226 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

BE: DTC P0732 — GEAR 2 INCORRECT RATIO — S008636B71

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-226 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

BF: DTC P0733 — GEAR 3 INCORRECT RATIO — S008636B72

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-226 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

BG: DTC P0734 — GEAR 4 INCORRECT RATIO — S008636B73

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect relevant DTC using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.
2	**CHECK THROTTLE POSITION SENSOR CIRCUIT.** Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in throttle position sensor circuit?	Repair or replace throttle position sensor circuit.	Go to step **3**.
3	**CHECK VEHICLE SPEED SENSOR 2 CIRCUIT.** Check vehicle speed sensor 2 circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in vehicle speed sensor 2 circuit?	Repair or replace vehicle speed sensor 2 circuit.	Go to step **4**.
4	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.** Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in torque converter turbine speed sensor circuit?	Repair or replace torque converter turbine speed sensor circuit.	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Go to step **6**.
6	**CHECK MECHANICAL TROUBLE.** Check mechanical trouble in automatic transmission.	Is there any mechanical trouble in automatic transmission?	Repair or replace automatic transmission. <Ref. to AT-18 REMOVAL, Automatic Transmission Assembly.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BH: DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION

— S008636B74

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID CIRCUIT.** Check lock-up duty solenoid circuit. <Ref. to AT-70 TROUBLE CODE 77 — LOCK-UP DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in duty solenoid B circuit?	Repair or replace lock-up duty solenoid circuit.	Go to step **3**.
3	**CHECK THROTTLE POSITION SENSOR CIRCUIT.** Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in throttle position sensor circuit?	Repair or replace throttle position sensor circuit.	Go to step **4**.
4	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.** Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in torque converter turbine speed sensor circuit?	Repair or replace torque converter turbine speed sensor circuit.	Go to step **5**.
5	**CHECK ENGINE SPEED INPUT CIRCUIT.** Check engine speed input signal circuit. <Ref. to AT-29 TROUBLE CODE 11 — ENGINE SPEED SIGNAL —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in engine speed input circuit?	Repair or replace engine speed input circuit.	Go to step **6**.
6	**CHECK INHIBITOR SWITCH CIRCUIT.** Check inhibitor switch circuit. <Ref. to AT-84 CHECK INHIBITOR SWITCH., Diagnostic Procedure for No-trouble Code.>	Is there any trouble in inhibitor switch circuit?	Repair or replace inhibitor switch circuit.	Go to step **7**.
7	**CHECK BRAKE LIGHT SWITCH CIRCUIT.** Check brake light switch circuit. <Ref. to AT-83 CHECK BRAKE SWITCH., Diagnostic Procedure for No-trouble Code.>	Is there any trouble in brake light switch circuit?	Repair or replace brake light switch circuit.	Go to step **8**.

No.	Step	Check	Yes	No
8	**CHECK ATF TEMPERATURE SENSOR CIRCUIT.** Check ATF temperature sensor circuit. <Ref. to AT-31 TROUBLE CODE 27 — ATF TEMPERATURE SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in ATF temperature sensor circuit?	Repair or replace ATF temperature sensor circuit.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Go to step **10**.
10	**CHECK MECHANICAL TROUBLE.** Check mechanical trouble in automatic transmission.	Is there any mechanical trouble in automatic transmission?	Repair or replace automatic transmission. <Ref. to AT-18 REMOVAL, Automatic Transmission Assembly.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BI: DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL — S008636B75

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check lock-up duty solenoid circuit. <Ref. to AT-70 TROUBLE CODE 77 — LOCK-UP DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

BJ: DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL — S008636B76

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check line pressure duty solenoid circuit. <Ref. to AT-62 TROUBLE CODE 75 — LINE PRESSURE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

BK: DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL — S008636B77

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check shift solenoid 1 circuit. <Ref. to AT-51 TROUBLE CODE 71 — SHIFT SOLENOID 1 —, Diagnostic Procedure with Trouble Code.>

BL: DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —

S008636B78

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

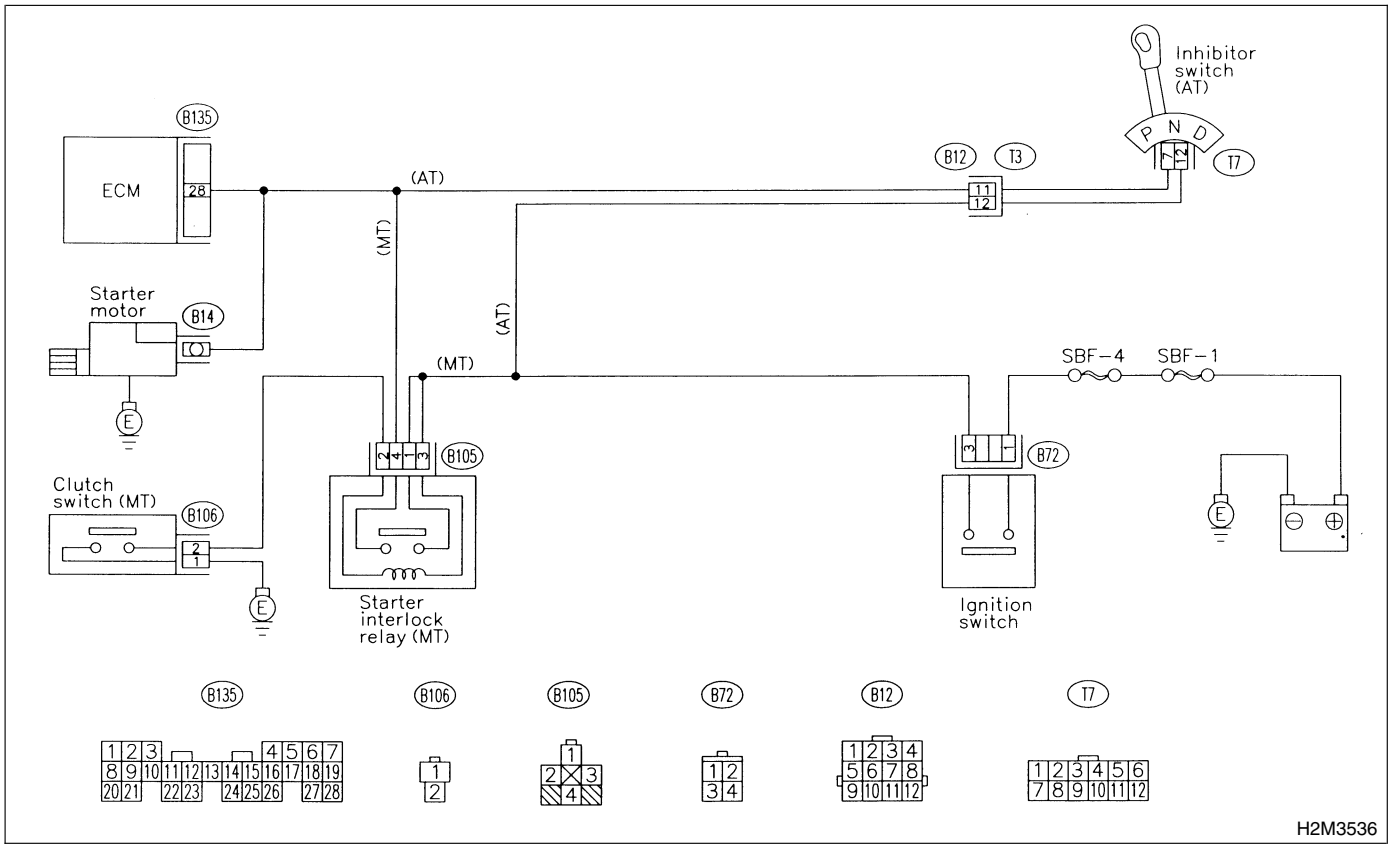
NOTE:
Check shift solenoid 2 circuit. <Ref. to AT-54 TROUBLE CODE 72 — SHIFT SOLENOID 2 —, Diagnostic Procedure with Trouble Code.>

BM: DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT — S008636B79

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



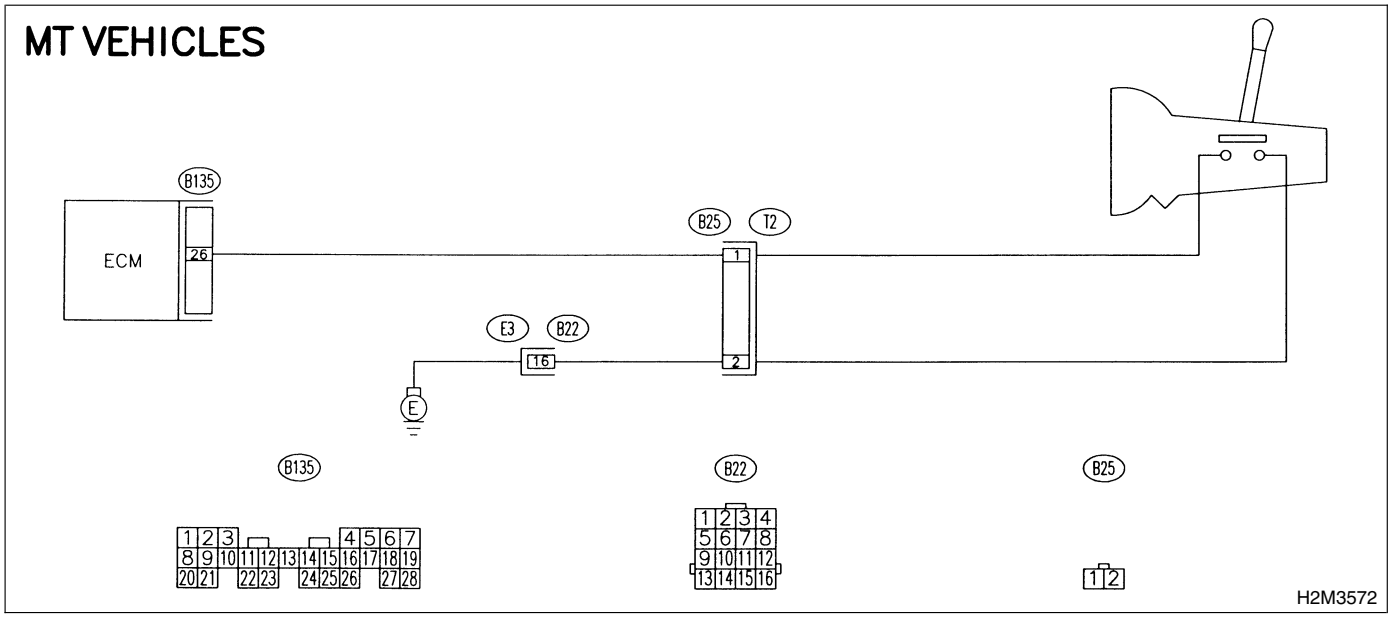
No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: • Depress the clutch pedal. (MT) • Place the inhibitor switch in the “P” or “N” position. (AT)	Does starter motor operate when ignition switch to “ST”?	Repair harness and connector. NOTE: In this case, repair the following: • Open or ground short circuit in harness between ECM and starter motor connector. • Poor contact in ECM connector.	Check starter motor circuit. <Ref. to EN-72 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

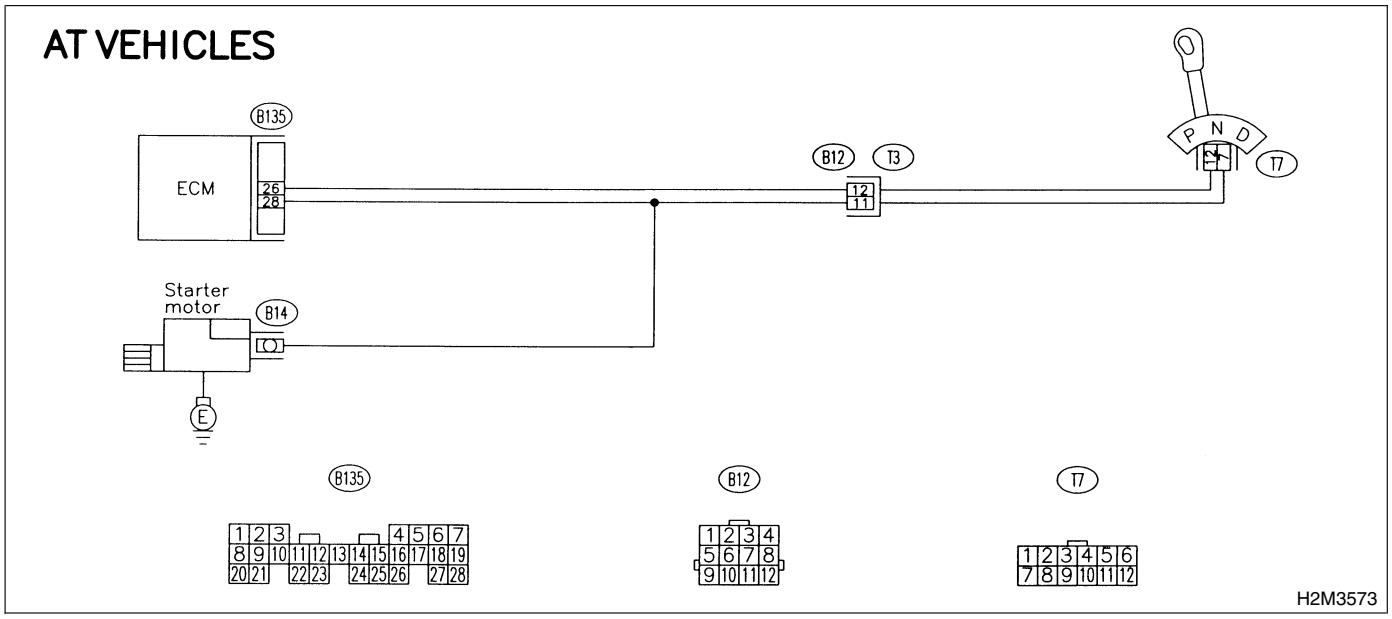
BN: DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [AT VEHICLES]— S008636F56

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**





No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type MT?	Go to step **2**.	Go to step **8**.
2	**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 (–):***	Is the voltage more than 10 V in neutral position?	Go to step **3**.	Go to step **5**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V in other positions?	Go to step **4**.	Go to step **5**.
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**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:***	Is the resistance more than 1 MΩ in neutral position?	Go to step **6**.	Repair short circuit in transmission harness or replace neutral position switch.
6	**CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.** Measure resistance between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **7**.
7	**CHECK POOR CONTACT.** Check poor contact in transmission harness connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in transmission harness connector?	Repair poor contact in transmission harness connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
8	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **9**.

No.	Step	Check	Yes	No
9	**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 (–):***	Is the voltage less than 1 V?	Go to step **10**.	Go to step **12**.
10	**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 (–):***	Is the voltage between 4.5 and 5.5 V?	Go to step **11**.	Go to step **12**.
11	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
12	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and inhibitor switch connector.	Go to step **13**.
13	**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:***	Is the resistance less than 1 Ω?	Go to step **14**.	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

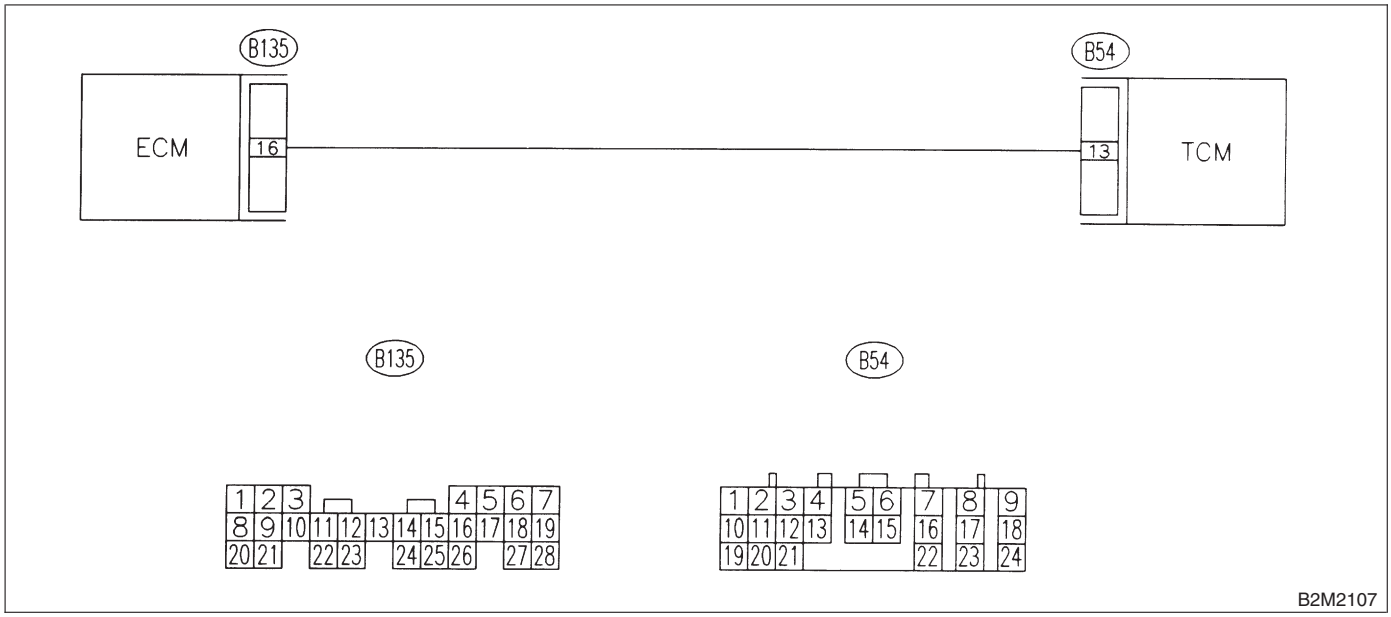
No.	Step	Check	Yes	No
14	**CHECK INHIBITOR SWITCH GROUND LINE.** Measure resistance of harness between inhibitor switch connector and engine ground. ***Connector & terminal*** ***(T7) No. 7 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **15**.	Repair open circuit in harness between 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
15	**CHECK INHIBITOR SWITCH.** Measure resistance between inhibitor switch connector receptacle's terminals in selector lever "N" and "P" positions. ***Terminals*** ***No. 7 — No. 12:***	Is the resistance less than 1 Ω?	Go to step **16**.	Replace inhibitor switch. <Ref. to AT-31 REMOVAL, Inhibitor Switch.>
16	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-5 REMOVAL, AT Select Lever.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BO: DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION — S008636F07

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 16 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

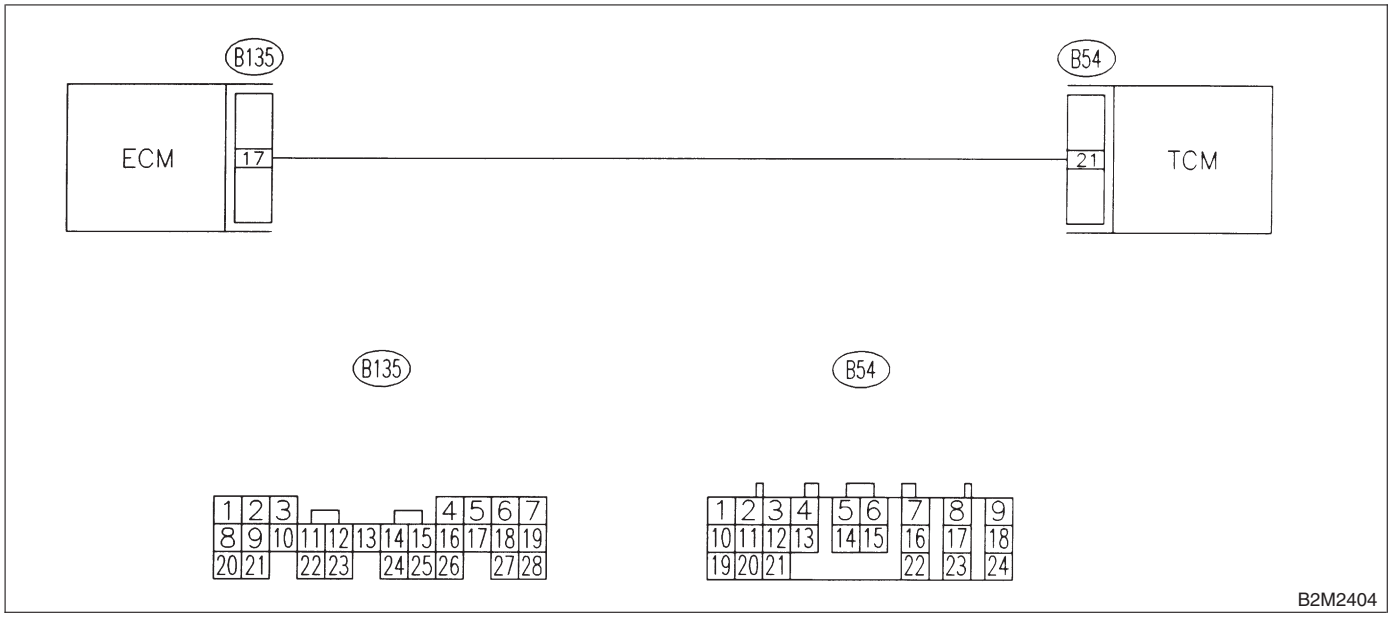
No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from ECM and TCM. 3) Measure resistance of harness between ECM and TCM connector. ***Connector & terminal*** ***(B135) No. 16 — (B54) No. 13:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and TCM connector.
5	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 16 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BP: DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION — S008636B83

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 17 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

No.	Step	Check	Yes	No
4	**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:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and TCM connector.
5	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 17 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BQ: DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT — S008636B84

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1110?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.	It is not necessary to inspect DTC P1110.

BR: DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT — S008636B85

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1111?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.	It is not necessary to inspect DTC P1111.

BS: DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S008636B86

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

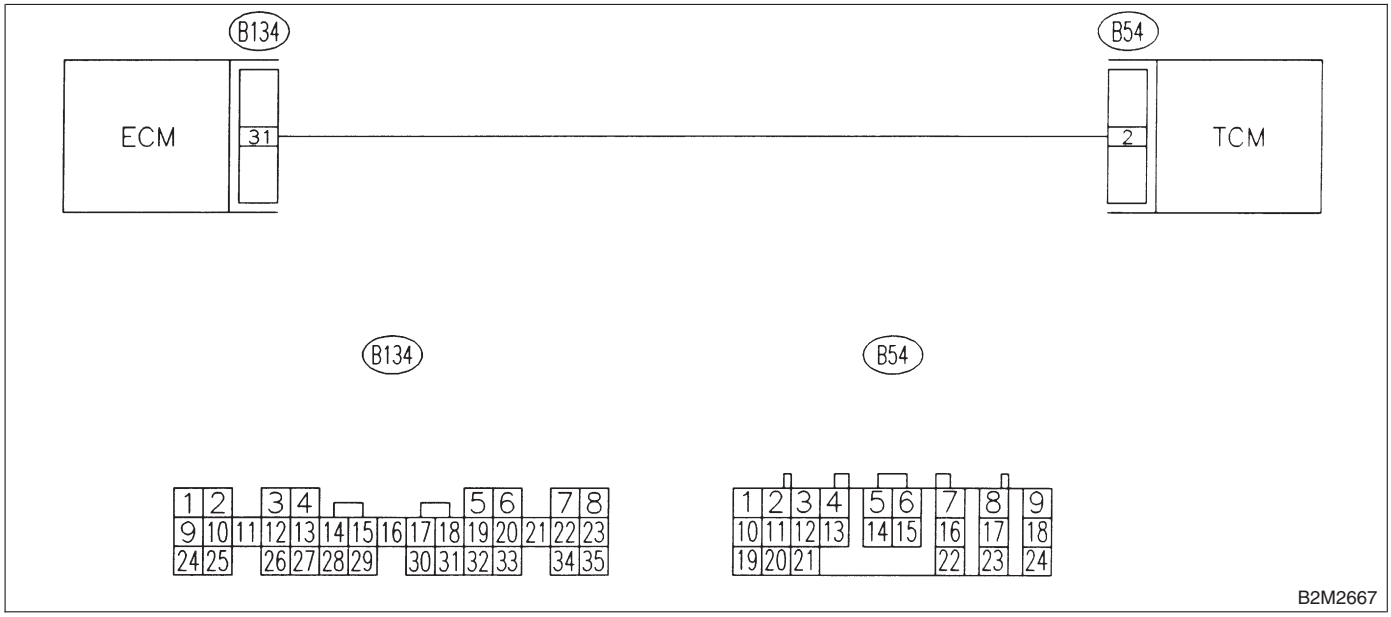
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P1110 or P1111?	Inspect DTC P0106, P0107, P0108, P1110 or P1111 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.

BT: DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT — S008636B87

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



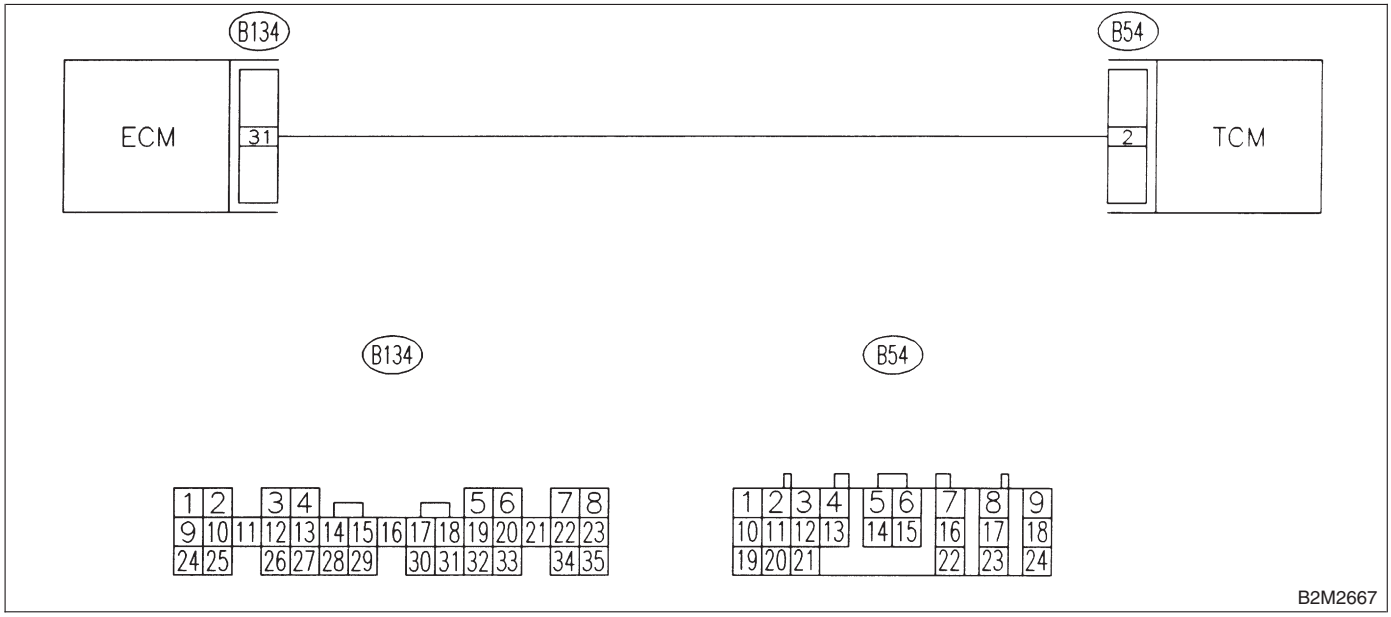
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start engine, and warm-up the engine. 2) Turn ignition swtich to OFF. 3) Disconnect connector from TCM. 4) Turn ignition switch to ON. 5) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 31 (+) — Chassis ground (–):***	Is the voltage less than 3 V?	Go to step **2**.	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
2	**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 (–):***	Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BU: DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT — S008636B88

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



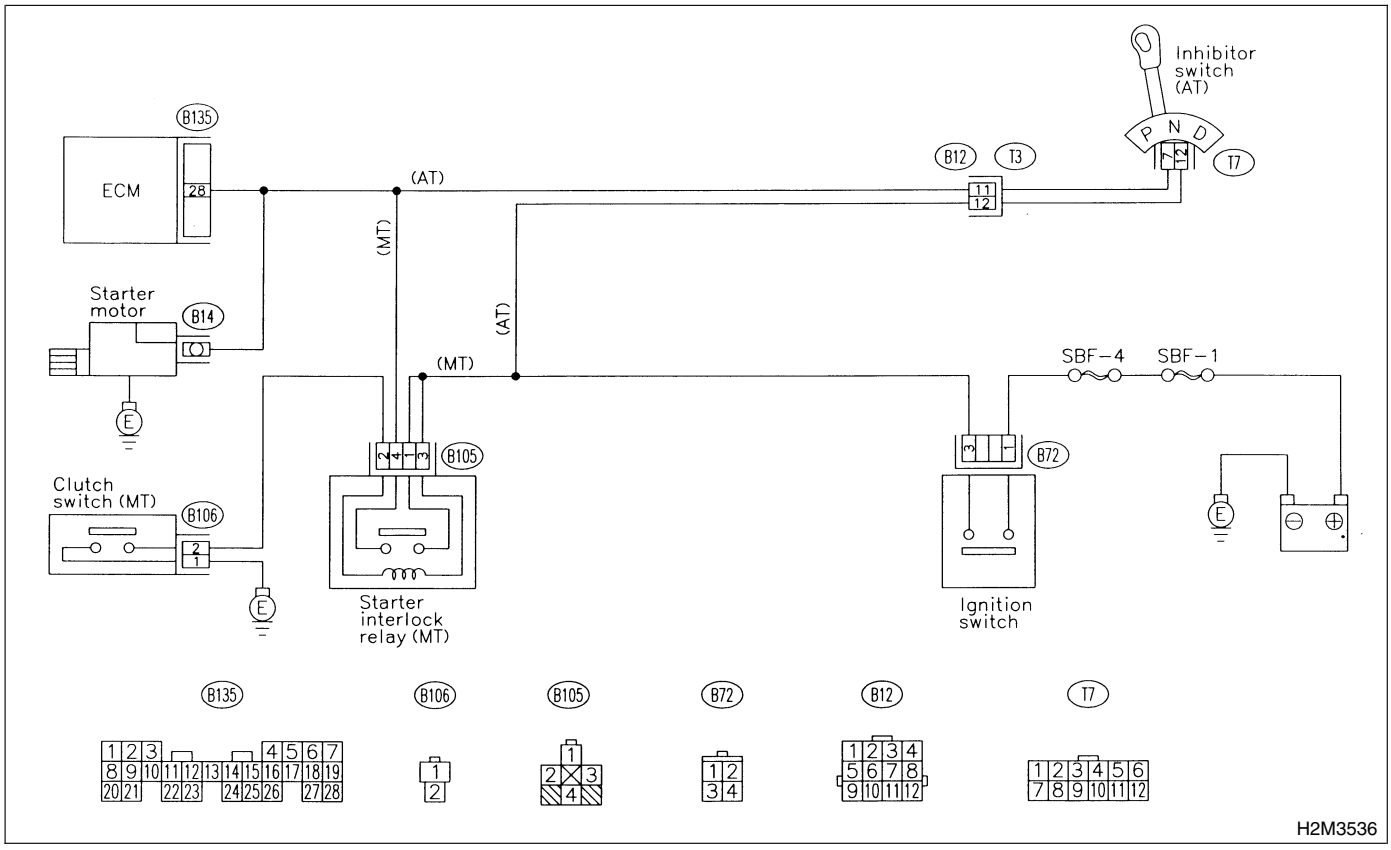
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start engine, and warm-up the engine. 2) Turn ignition switch to OFF. 3) Turn ignition switch to ON. 4) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 31 (+) — Chassis ground (–):***	Is the voltage more than 3 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness betwee ECM and TCM connector. ***Connector & terminal*** ***(B134) No. 31 — (B54) No. 2:***	Is the resistance less than 1 Ω?	Repair poor contact in ECM or TCM connector.	Repair open circuit in harness between ECM and TCM connector.

BV: DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT — S008636B89

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: • On AT vehicles, place the inhibitor switch in each position. • On MT vehicles, depress or release the clutch pedal.	Does starter motor operate when ignition switch to "ON"?	Repair battery short circuit in starter motor circuit. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Check starter motor circuit. <Ref. to EN-72 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

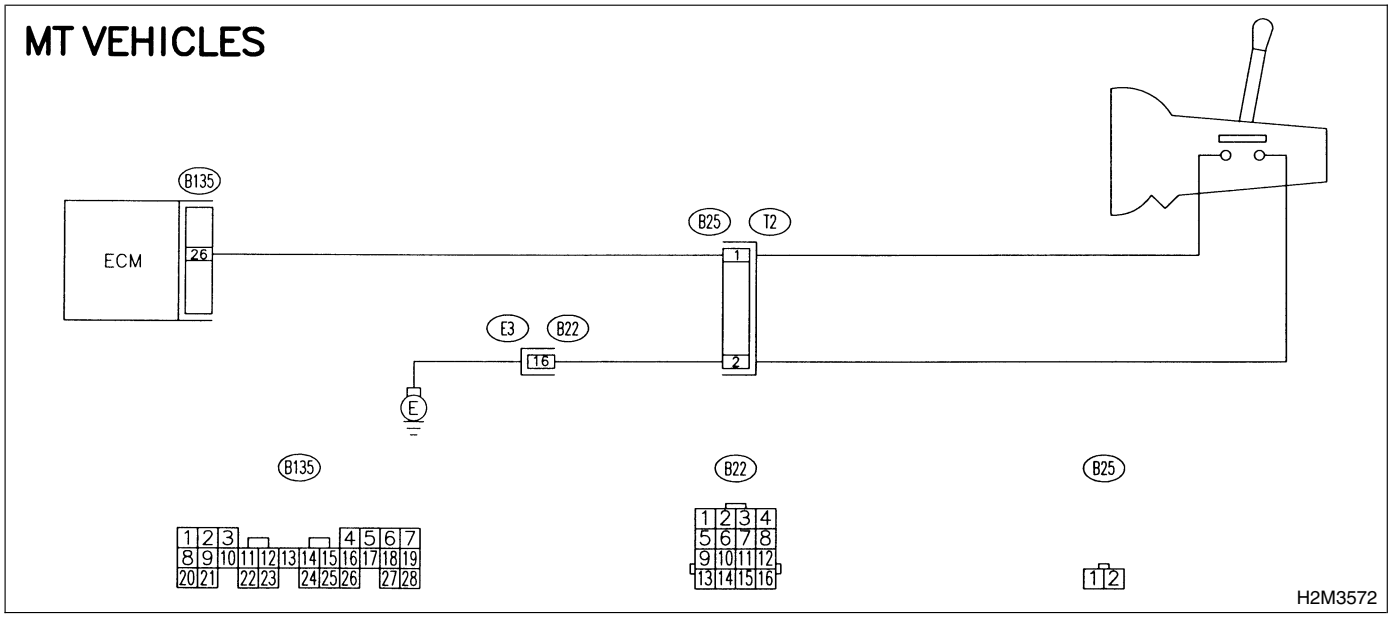
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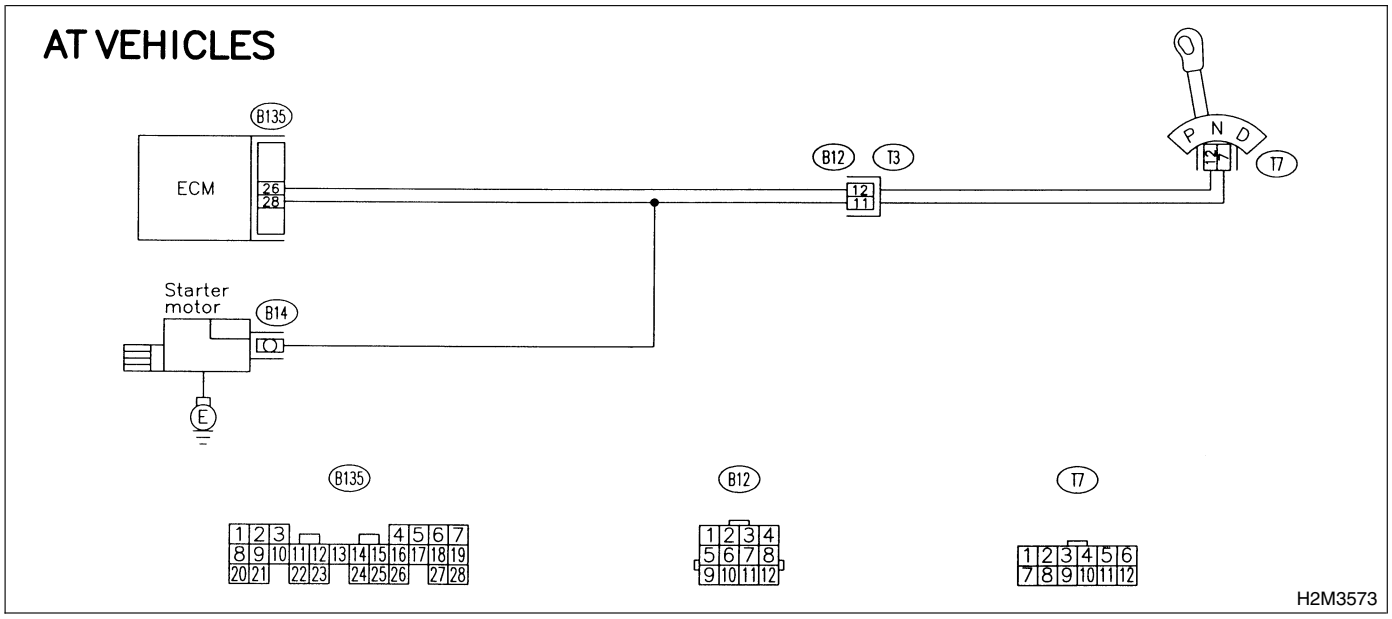
BW: DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [AT VEHICLES] — S008636F57

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**





No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type MT?	Go to step **2**.	Go to step **9**.
2	**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 (–):***	Is the voltage more than 10 V in neutral position?	Go to step **3**.	Go to step **5**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V in other positions?	Go to step **4**.	Go to step **6**.
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK NEUTRAL POSITION SWITCH.** Measure resistance between transmission harness connector terminals. ***Connector & terminal*** ***(T2) No. 1 — No. 2:***	Is the resistance less than 1 Ω in other positions?	Go to step **6**.	Repair open circuit in transmission harness or replace neutral position switch.
6	**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:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair open circuit in harness between ECM and transmission harness connector.
7	**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:***	Is the resistance less than 5 Ω?	Go to step **8**.	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)

No.	Step	Check	Yes	No
8	**CHECK POOR CONTACT.** Check poor contact in transmission harness connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in transmission harness connector?	Repair poor contact in transmission harness connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
9	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **10**.
10	**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 (–):***	Is the voltage between 4.5 and 5.5 V at except "N" and "P" positions?	Even if MIL lights up, the circuit has returned to a normal condition at this time.	Go to step **11**.
11	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **12**.
12	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between transmission harness and inhibitor switch connector.	Go to step **13**.
13	**CHECK INHIBITOR SWITCH.** Measure resistance between inhibitor switch connector receptacle's terminals in selector lever except for "N" position. ***Terminals*** ***No. 7 — No. 12:***	Is the resistance more than 1 MΩ at except "N" and "P" positions?	Go to step **14**.	Replace inhibitor switch. <Ref. to AT-31 REMOVAL, Inhibitor Switch.>
14	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-5 REMOVAL, AT Select Lever.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

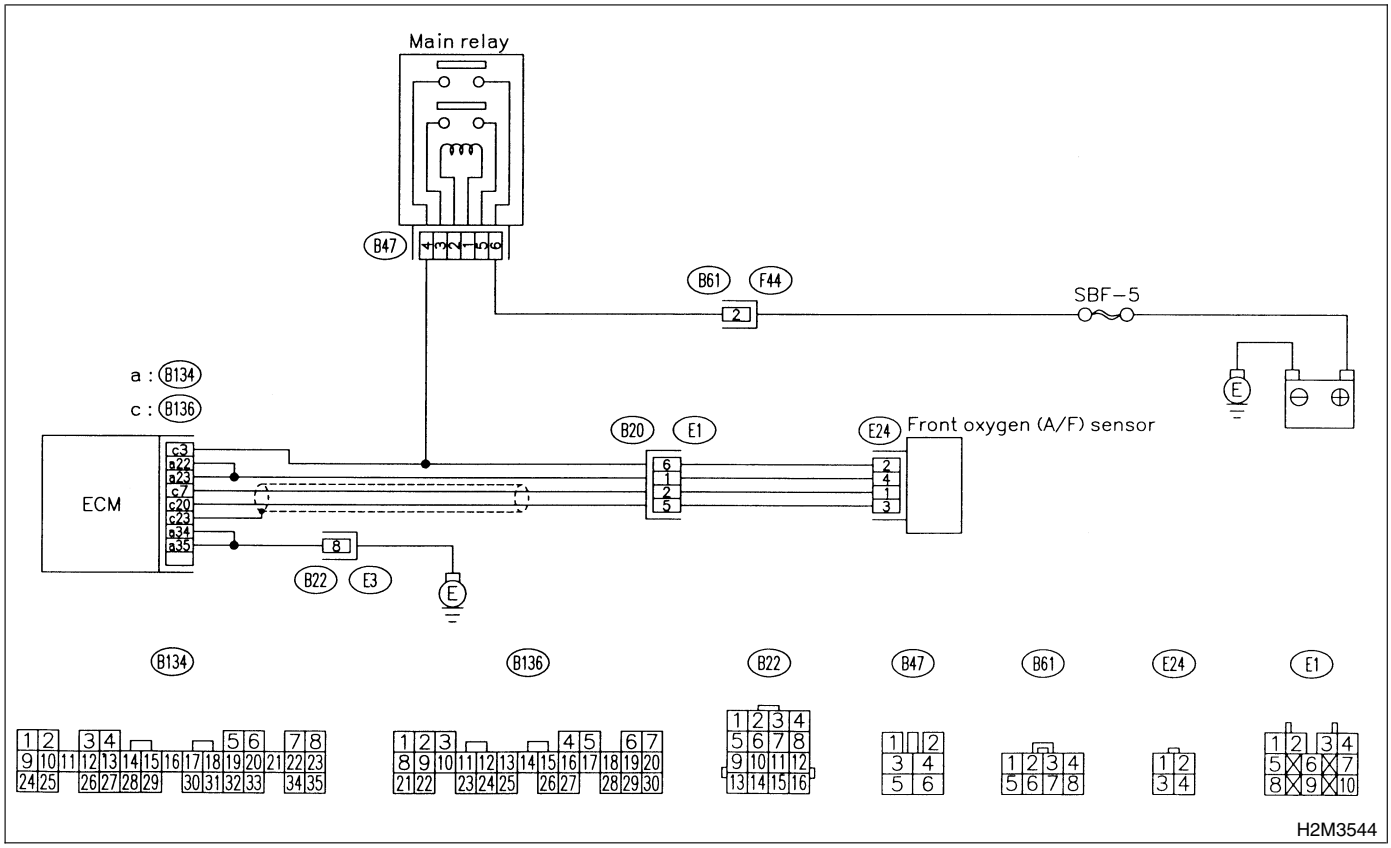
MEMO:

BX: DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) — S008636B92

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 — (E24) No. 1:***	Is the resistance less than 1 Ω?	Go to step **2**.	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

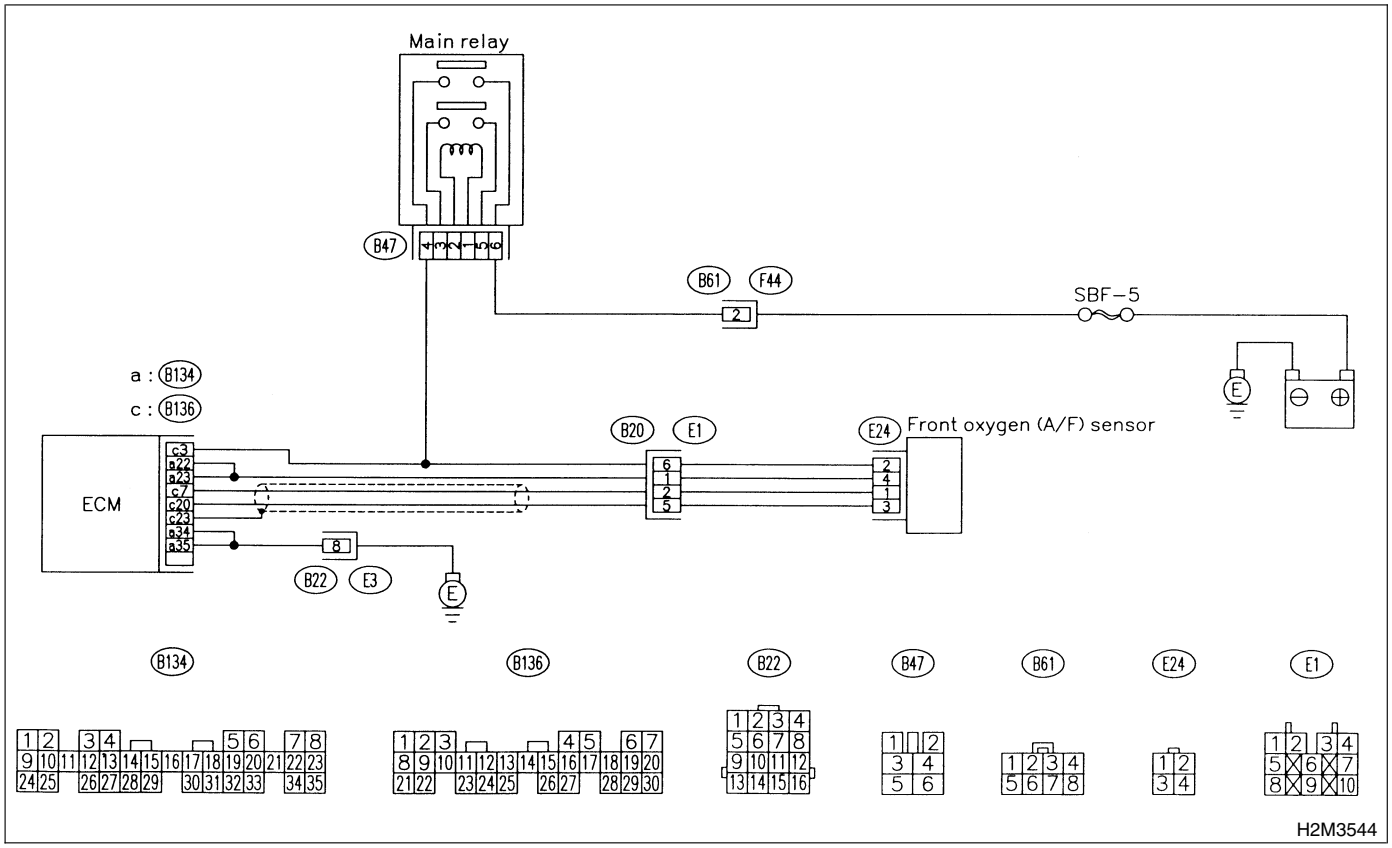
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure resistance of harness between ECM and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 20 — (E24) No. 3:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair harness 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
3	**CHECK POOR CONTACT.** Check poor contact in front oxygen (A/F) sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in front oxygen (A/F) sensor connector?	Repair poor contact in front oxygen (A/F) sensor connector.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

BY: DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) — S008636B93

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 10 Ω?	Go to step **2**.	Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.
2	**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:***	Is the resistance more than 10 Ω?	Go to step **3**.	Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.

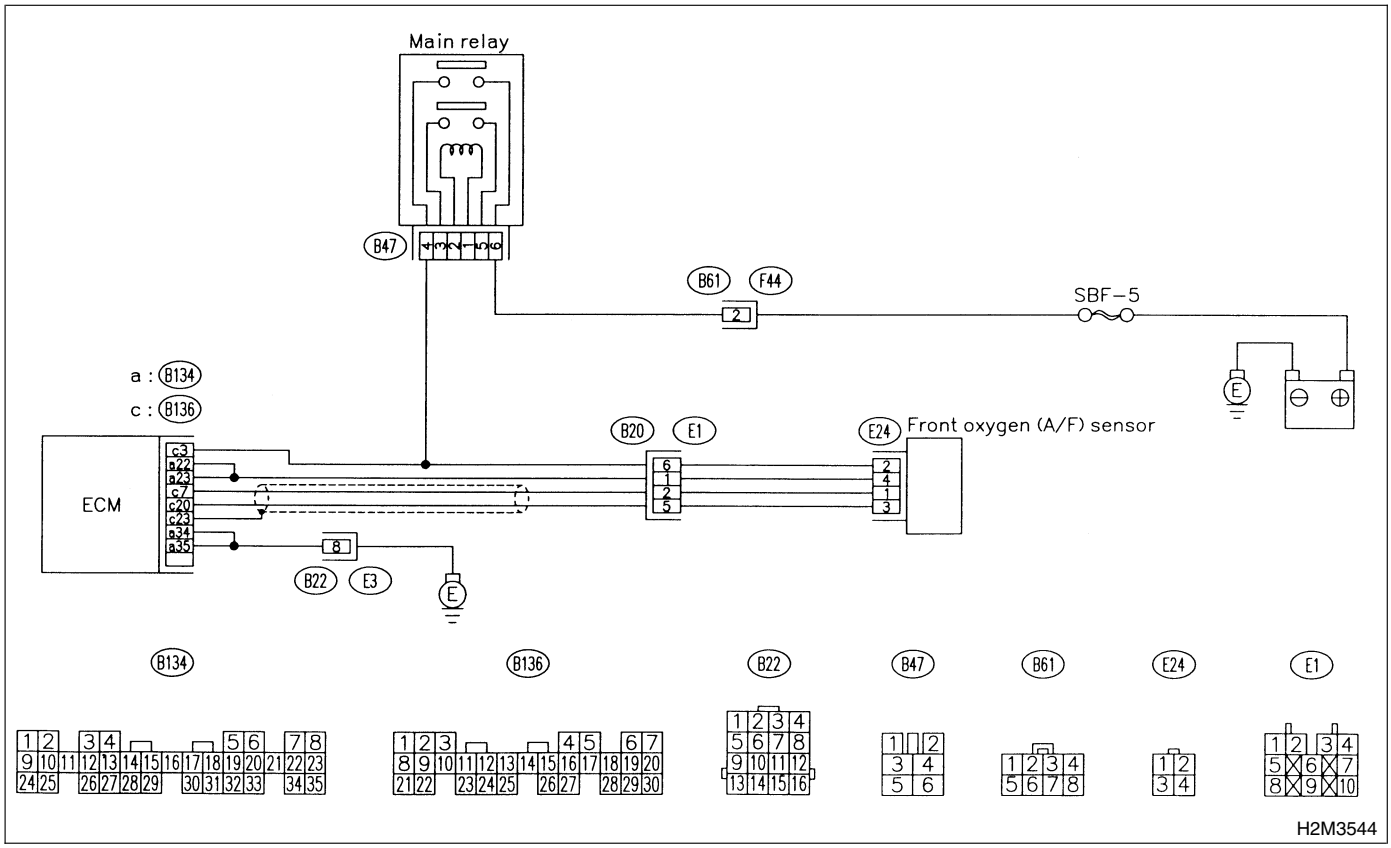
No.	Step	Check	Yes	No
3	**CHECK OUTPUT SIGNAL FOR ECM.** 1) Connect connector to ECM. 2) Turn ignition switch to ON. 3) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 7 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **5**.
4	**CHECK OUTPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 7 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Repair poor contact in ECM connector.
5	**CHECK OUTPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 20 (+) — Chassis ground (–):***	Is the voltage more than 4.95 V?	Go to step **6**.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 20 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Repair poor contact in ECM connector.

BZ: DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT — S008636B94

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1132 and P0141 at the same time?	Go to step **2**.	Go to step **5**.

No.	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 35 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **6**.	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)
3	**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:***	Is there resistance less than 5 Ω?	Go to step **6**.	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)
4	**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 (–):***	Is the voltage more than 8 V?	Go to step **3**.	Repair open or ground short circuit in harness of power supply circuit.
5	**CHECK POWER SUPPLY CIRCUIT OF ECM.** Measure power supply voltage between ECM connector terminals. ***Connector & terminal*** ***(B136) No. 3 (+) — (B136) No. 35 (–):***	Is the voltage more than 8 V?	Go to step **4**.	Repair open or ground short circuit in harness of power supply circuit.
6	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 0.2 A?	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	Go to step **7**.

No.	Step	Check	Yes	No
7	**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 (–):***	Is the voltage less than 1.0 V?	Go to step **9**.	Go to step **8**.
8	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **9**.
9	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Is the voltage less than 1.0 V?	Go to step **11**.	Go to step **10**.
10	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **11**.
11	**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*** ***(E24) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **12**.	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
12	**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:***	Is the resistance less than 10 Ω?	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	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

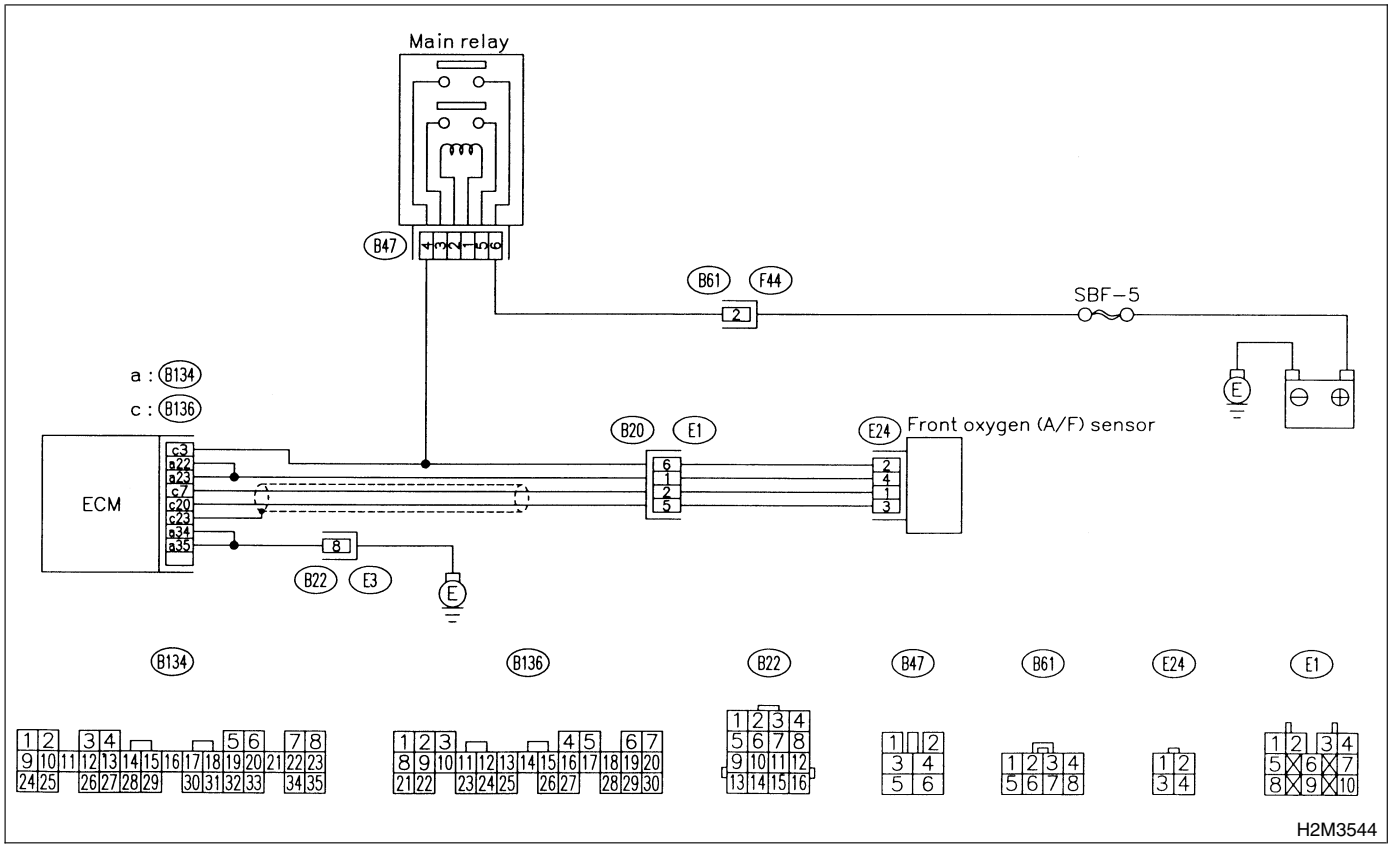
MEMO:

CA: DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT — S008636B95

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 8 V?	Go to step **3**.	Go to step **2**.
2	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **3**.	Go to step **4**.

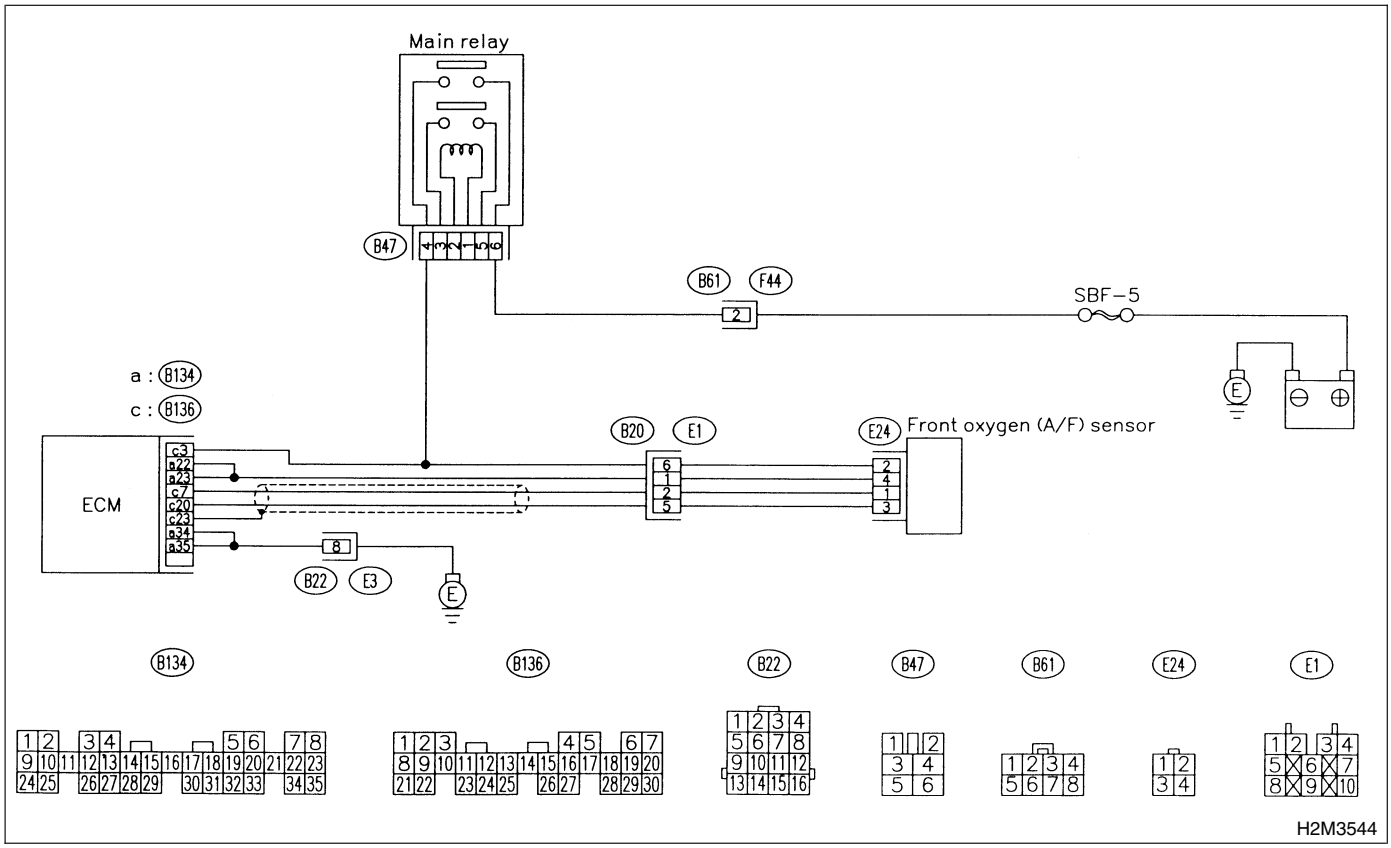
No.	Step	Check	Yes	No
3	**CHECK FRONT OXYGEN (A/F) SENSOR HEATER CURRENT.** 1) Turn ignition switch to OFF. 2) Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. 3) Turn ignition switch to ON. 4) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or the OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.3 A?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	END
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.	END

CB: DTC P1134 — FRONT OXYGEN (A/F) SENSOR MICRO-COMPUTER PROBLEM — S008636B96

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1134?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	It is not necessary to inspect DTC P1134.

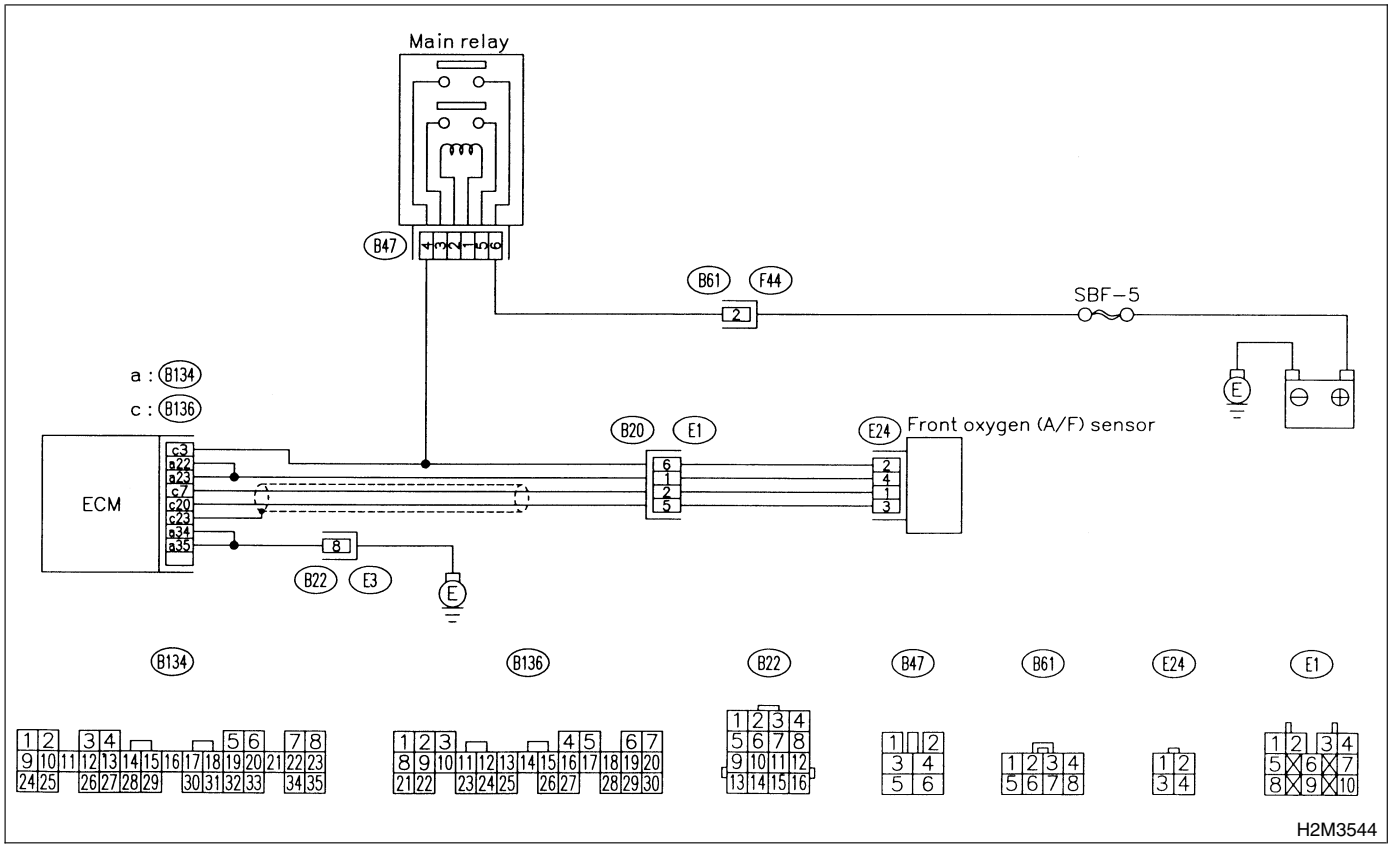
MEMO:

CC: DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM — S008636B97

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.

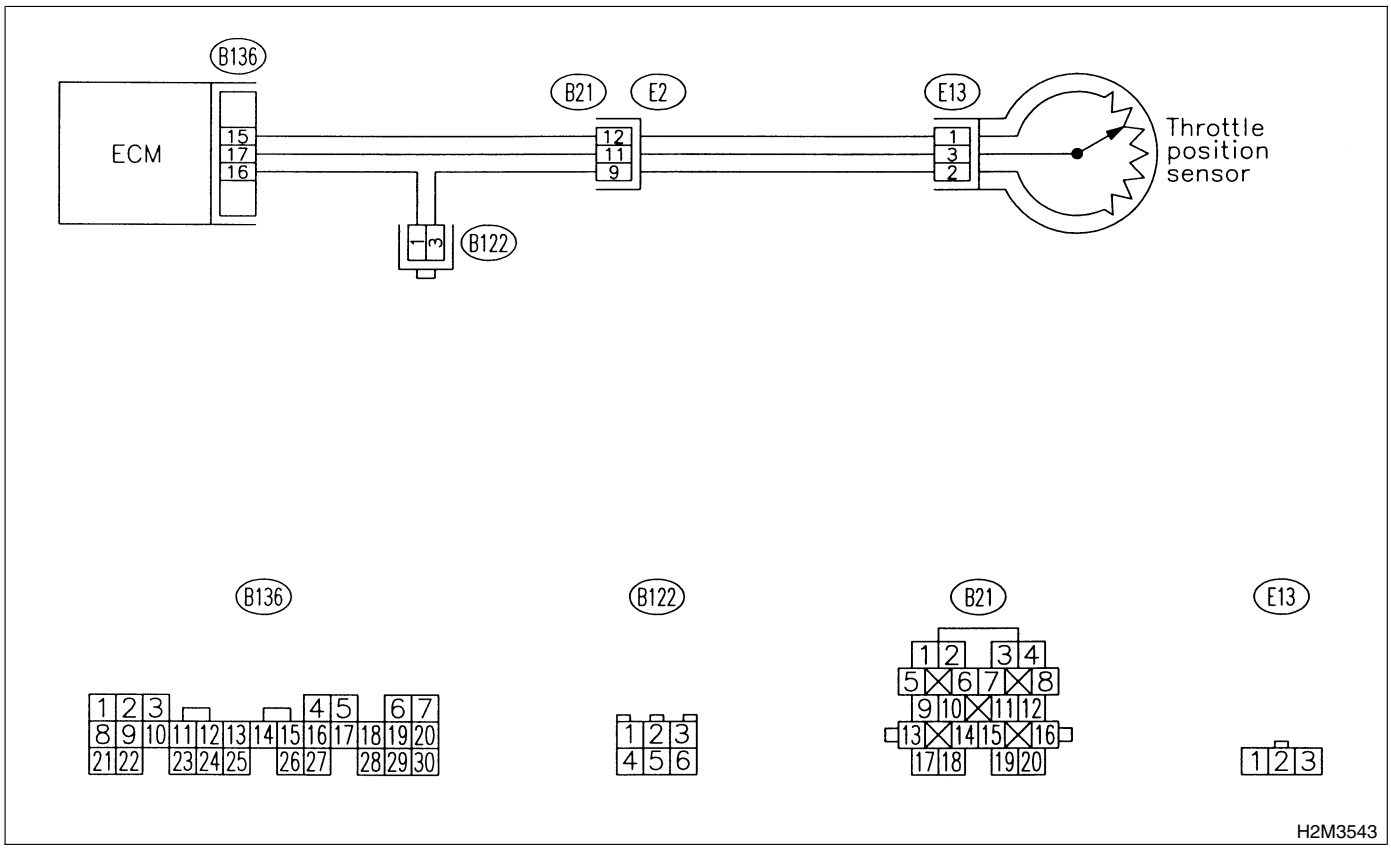
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** Measure resistance of harness between ECM and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B136) No. 7 — (E24) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.
3	**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 — (E24) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.
4	**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 — (E24) No. 2:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and front oxygen (A/F) sensor connector.
5	**CHECK FRONT OXYGEN (A/F) SENSOR.** Measure resistance between front oxygen (A/F) sensor connector terminals. ***Terminals*** ***No. 2 — No. 4:***	Is the resistance less than 5 Ω?	Go to step **6**.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>
6	**CHECK POOR CONTACT.** Check poor contact in ECM and front oxygen (A/F) sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM or front oxygen (A/F) sensor connector?	Repair poor contact in ECM or front oxygen (A/F) sensor connector.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

CD: DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S008636B99

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0122 or P0123?	Inspect DTC P0106, P0107, P0108, P0122 or P0123 using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P1142.	Go to step **2**.
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 0 kPa (0 mmHg, 0 inHg)?	Replace intake manifold pressure sensor. <Ref. to FU-47 REMOVAL, Intake Manifold Pressure Sensor.>	Replace throttle position sensor.<Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

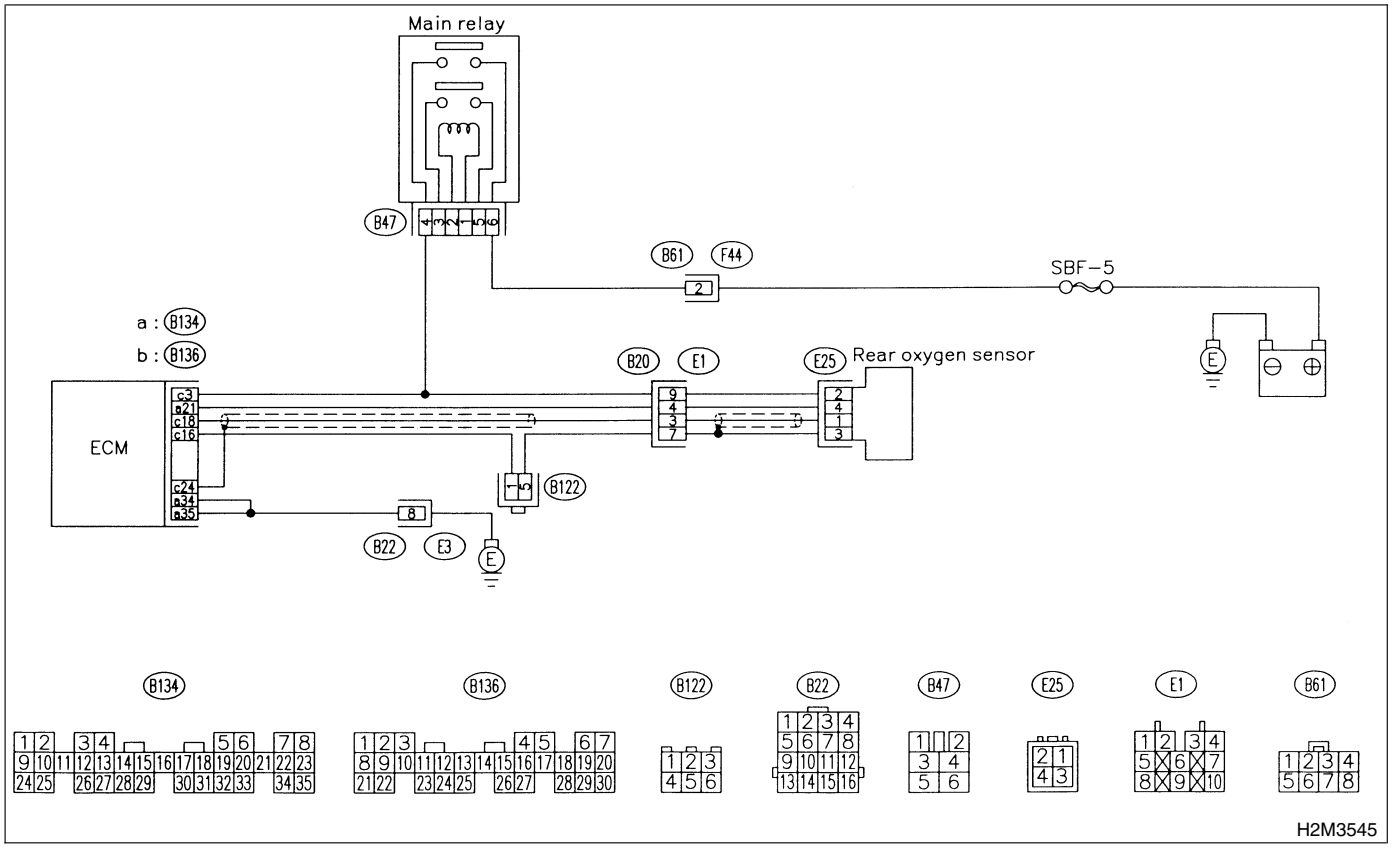
CE: DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT

S008636C03

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **2**.	Go to step **3**.
2	**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 EN-57 OPERATION, Inspection Mode.>	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1151?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	END

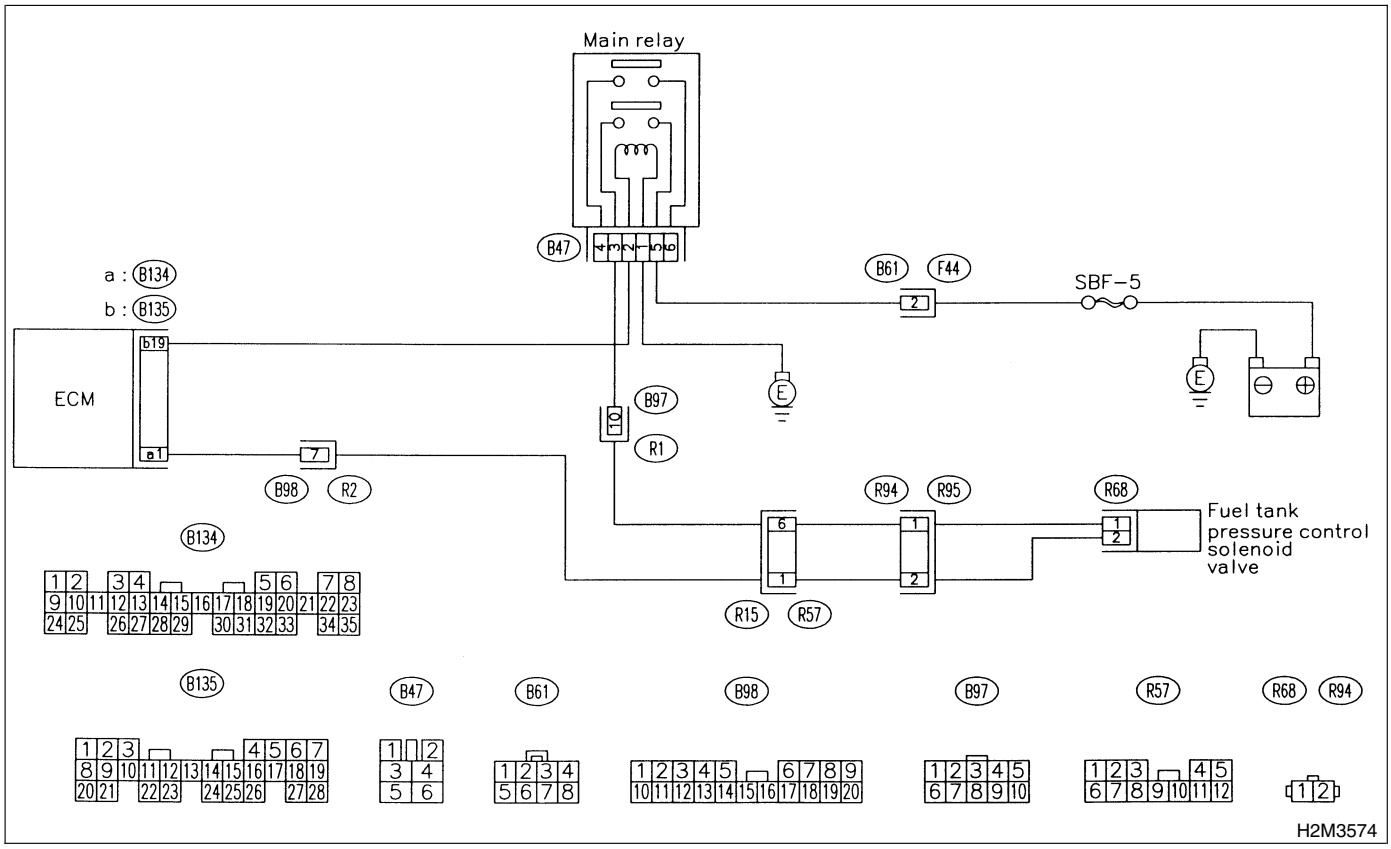
No.	Step	Check	Yes	No
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **4**.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of rear oxygen sensor while monitoring the value with voltage meter?	Repair poor contact in rear oxygen sensor connector.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking coupling connector (E2) while monitoring the value with voltage meter?	Repair poor contact in coupling connector.	Even if MIL lights up, the circuit has returned to normal condition at this time.

CF: DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT — S008636C07

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

No.	Step	Check	Yes	No
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and fuel tank pressure control solenoid valve connector.	Go to step **4**.
4	**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:***	Is the voltage less than 1 Ω?	Go to step **5**.	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 (B98, R57 and R94)
5	**CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.** Measure resistance between fuel tank pressure control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 10 and 100 Ω?	Go to step **6**.	Replace fuel tank pressure control solenoid valve. <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.>
6	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	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, R57 and R94) ● Poor contact in main relay connector

No.	Step	Check	Yes	No
7	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure control solenoid valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure control solenoid valve connector?	Repair poor contact in fuel tank pressure control solenoid valve connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

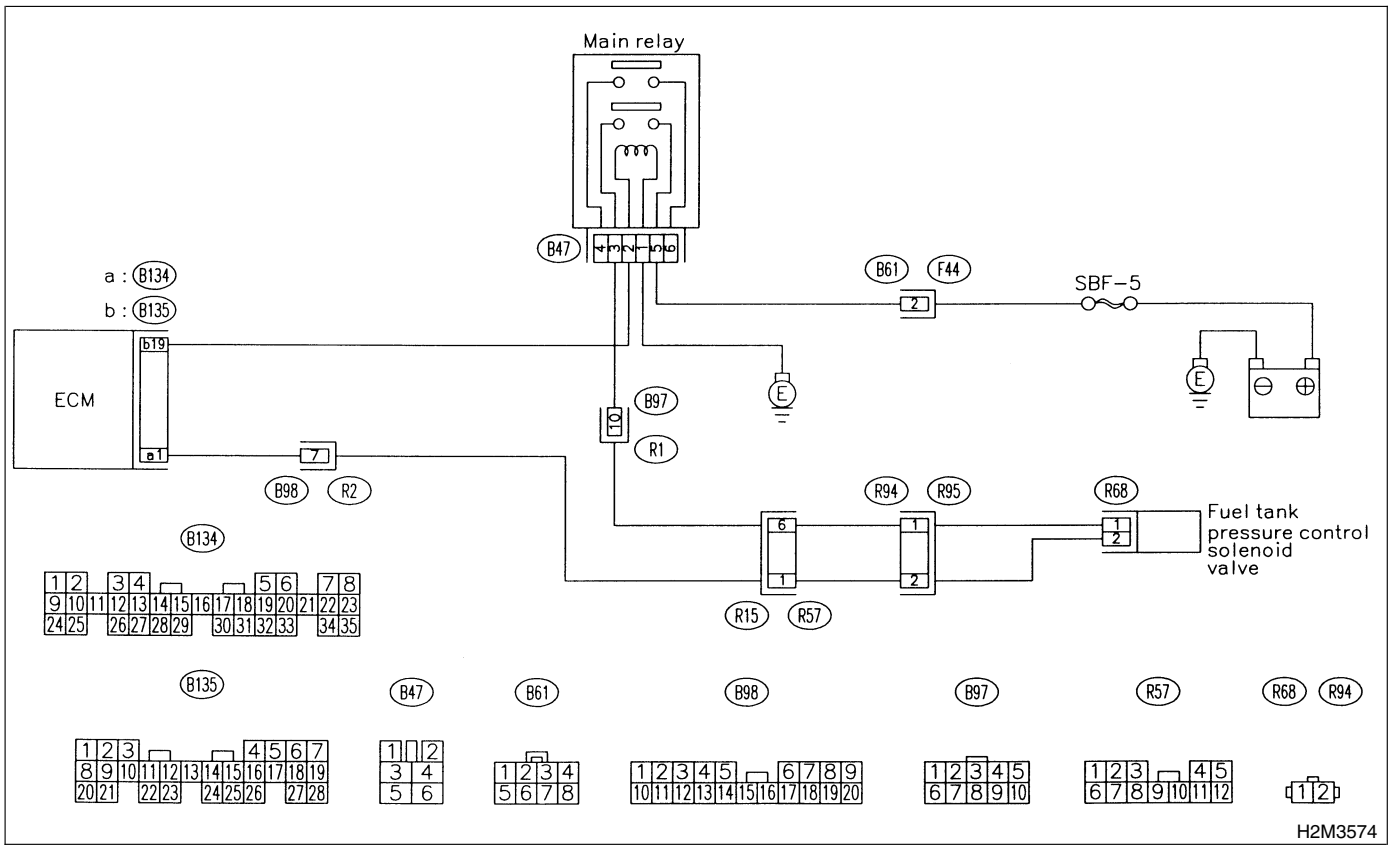
MEMO:

CG: DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT — S008636C08

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 1 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.

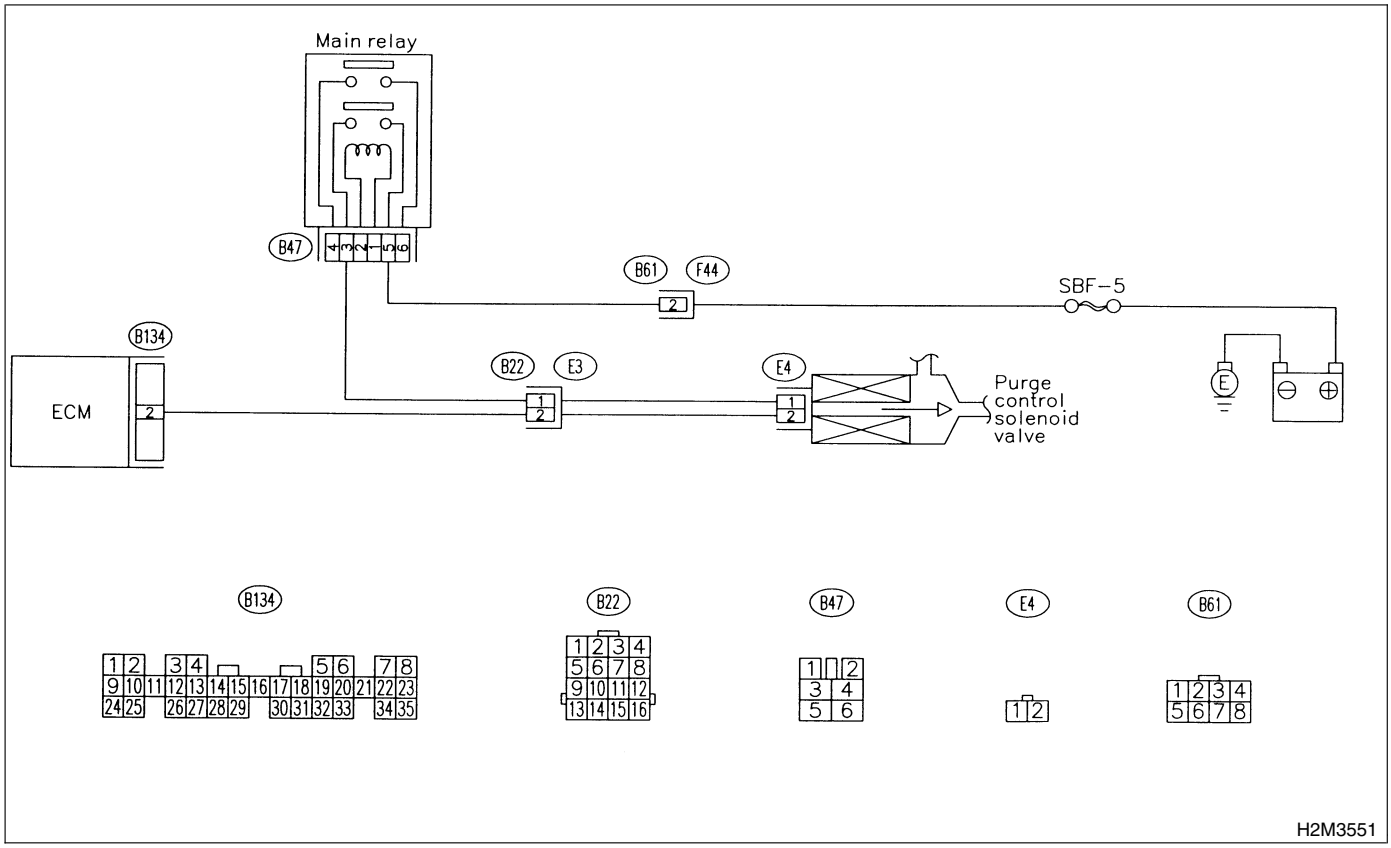
No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 1 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel tank pressure control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**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:***	Is the resistance less than 1 Ω?	Replace fuel tank pressure control solenoid valve <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CH: DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT — S008636C09

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



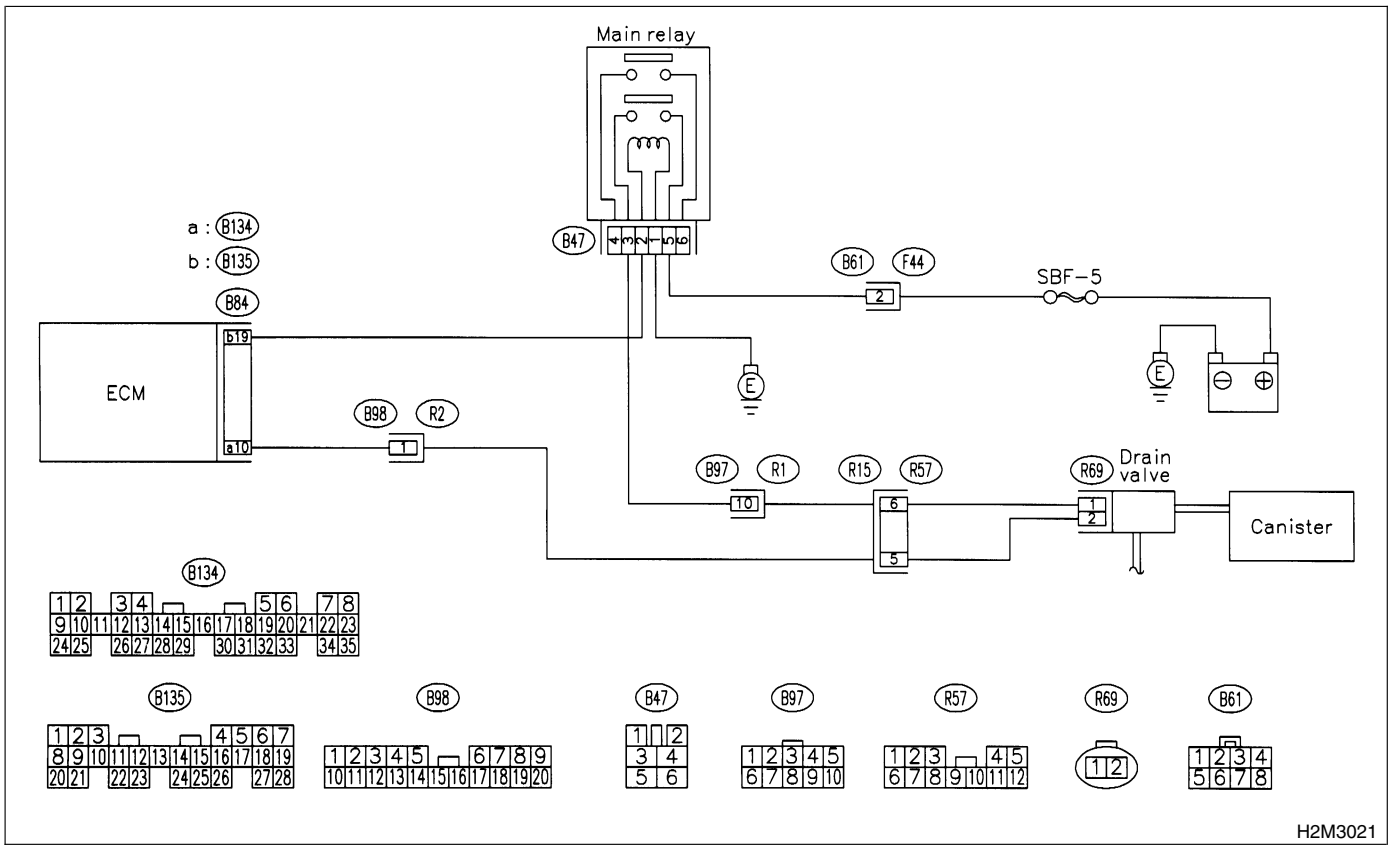
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to OFF. 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box. 3) Turn ignition switch to ON. 4) While operating purge control solenoid valve, 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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 2 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and purge control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**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:***	Is the resistance less than 1 Ω?	Replace purge control solenoid valve <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CI: DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT — S008636C10

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 excecuted using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 10 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.

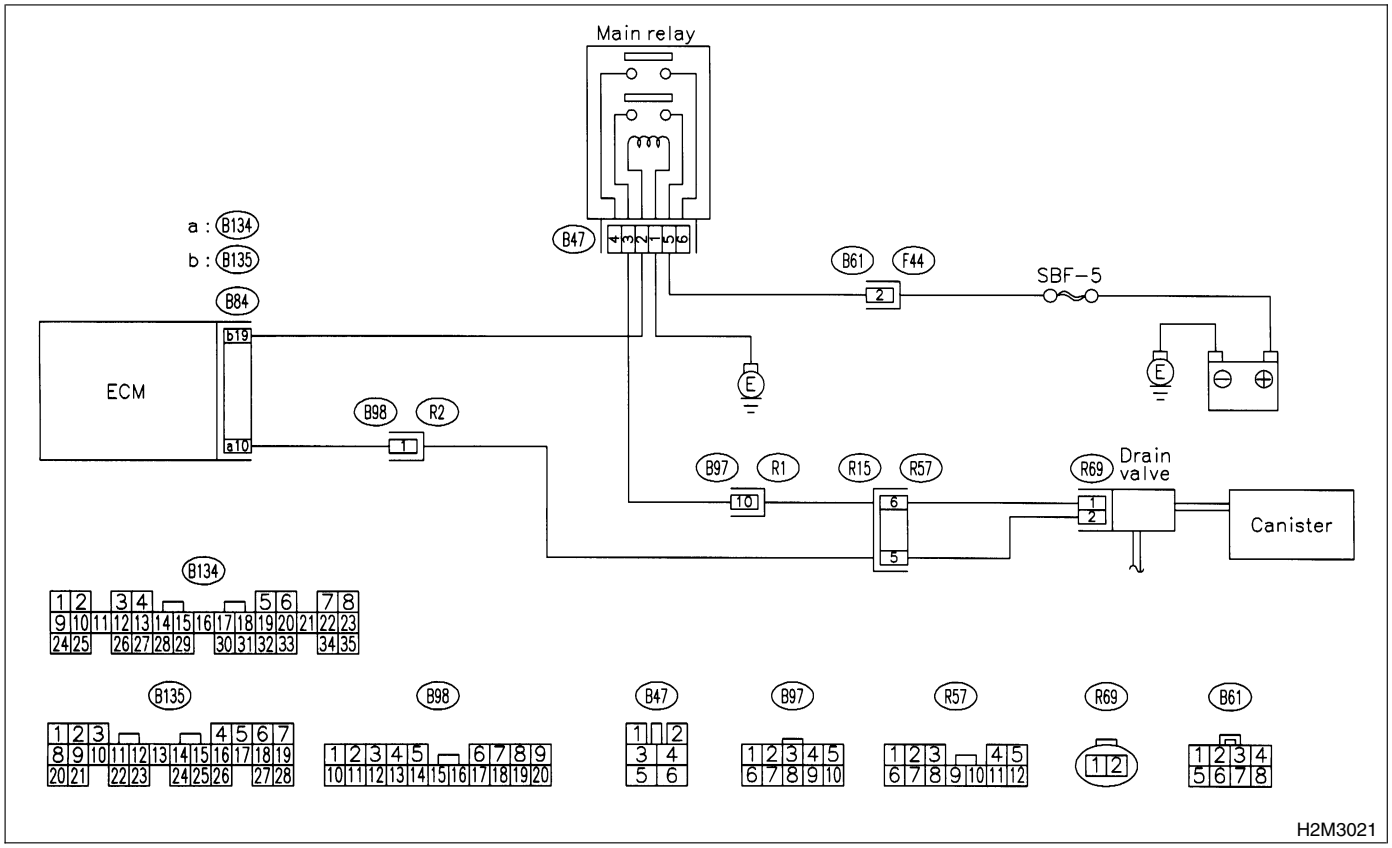
No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and drain valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**CHECK DRAIN VALVE.** 1) Turn ignition switch to OFF. 2) Measure resistance between drain valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace drain valve <Ref. to EC-23 REMOVAL, Drain Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CJ: DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM — S008636C12

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3021

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models". <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Go to step **2**.

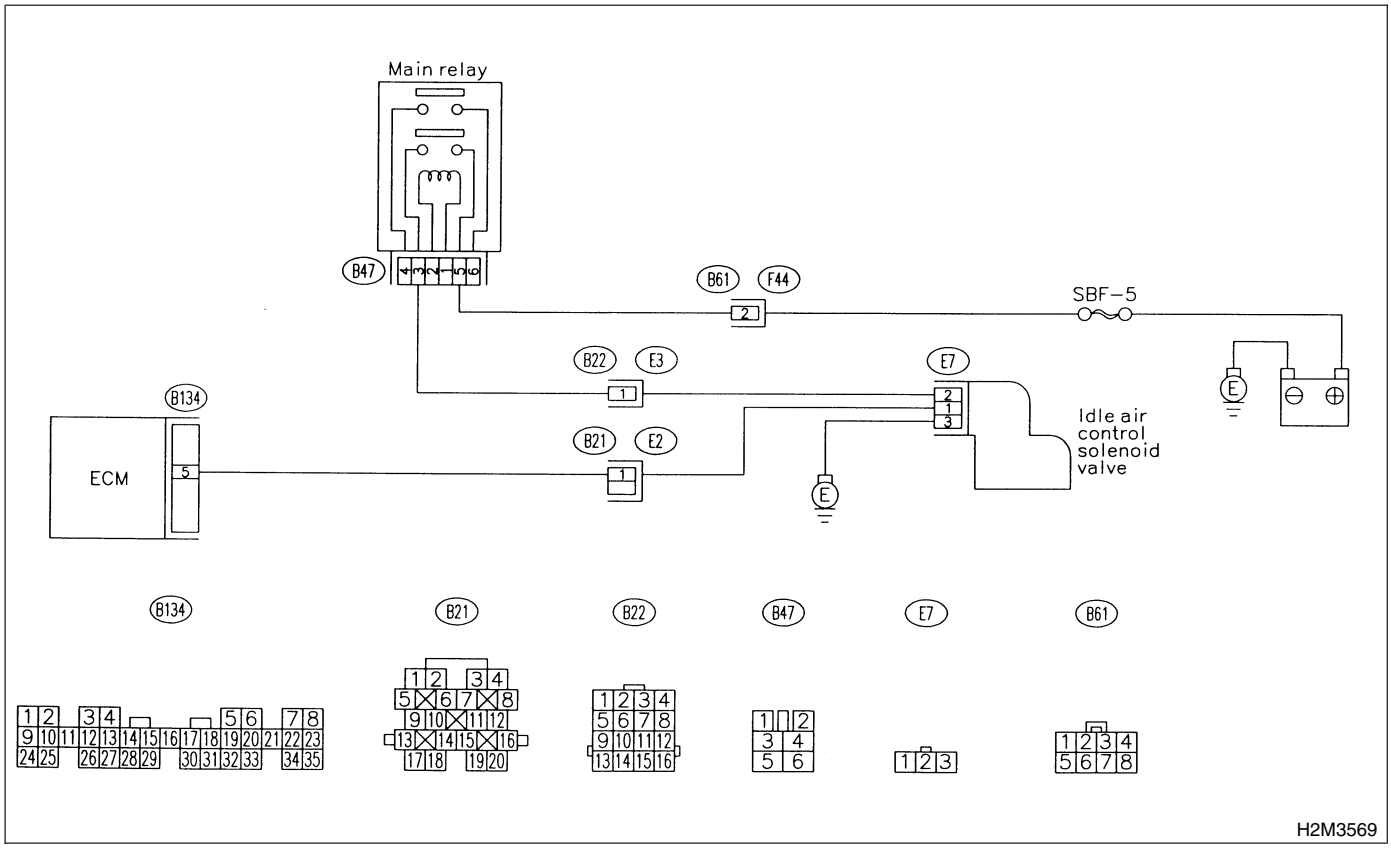
No.	Step	Check	Yes	No
2	**CHECK VENT LINE HOSES.** Check the following items. ● Clogging of vent hoses between canister and drain valve ● Clogging of vent hose between drain valve and air filter ● Clogging of vent hose between drain filter and junction pipe ● Clogging of junction pipe ● Clogging of drain filter	Is there a fault in vent line?	Repair or replace the faulty part.	Go to step **3**.
3	**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. NOTE: Drain valve operating check can also be executed using Subaru Select Monitor. For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does drain valve produce operating sound?	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>

CK: DTC P1505 — IDLE CONTROL SYSTEM CIRCUIT HIGH INPUT — S008636C15

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **2**.	Adjust throttle cable. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **3**.	Go to step **4**.

No.	Step	Check	Yes	No
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Replace idle air control solenoid valve <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 5 (+) — Chassis ground (–):***	Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Contact with SOA service. NOTE: Insepction by DTM is required, because probable cause is deterioration of multiple parts.

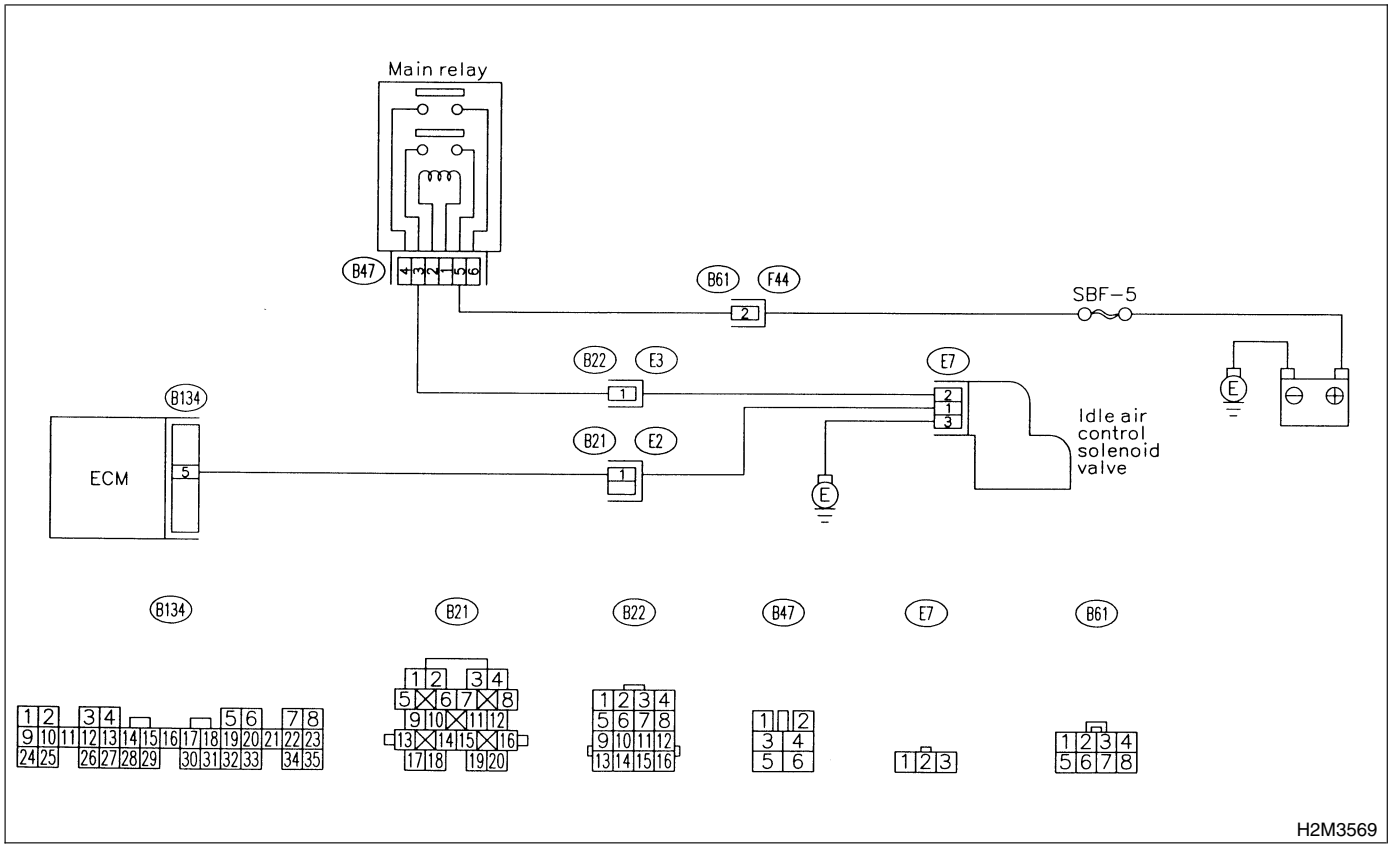
CL: DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —

S008636C16

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



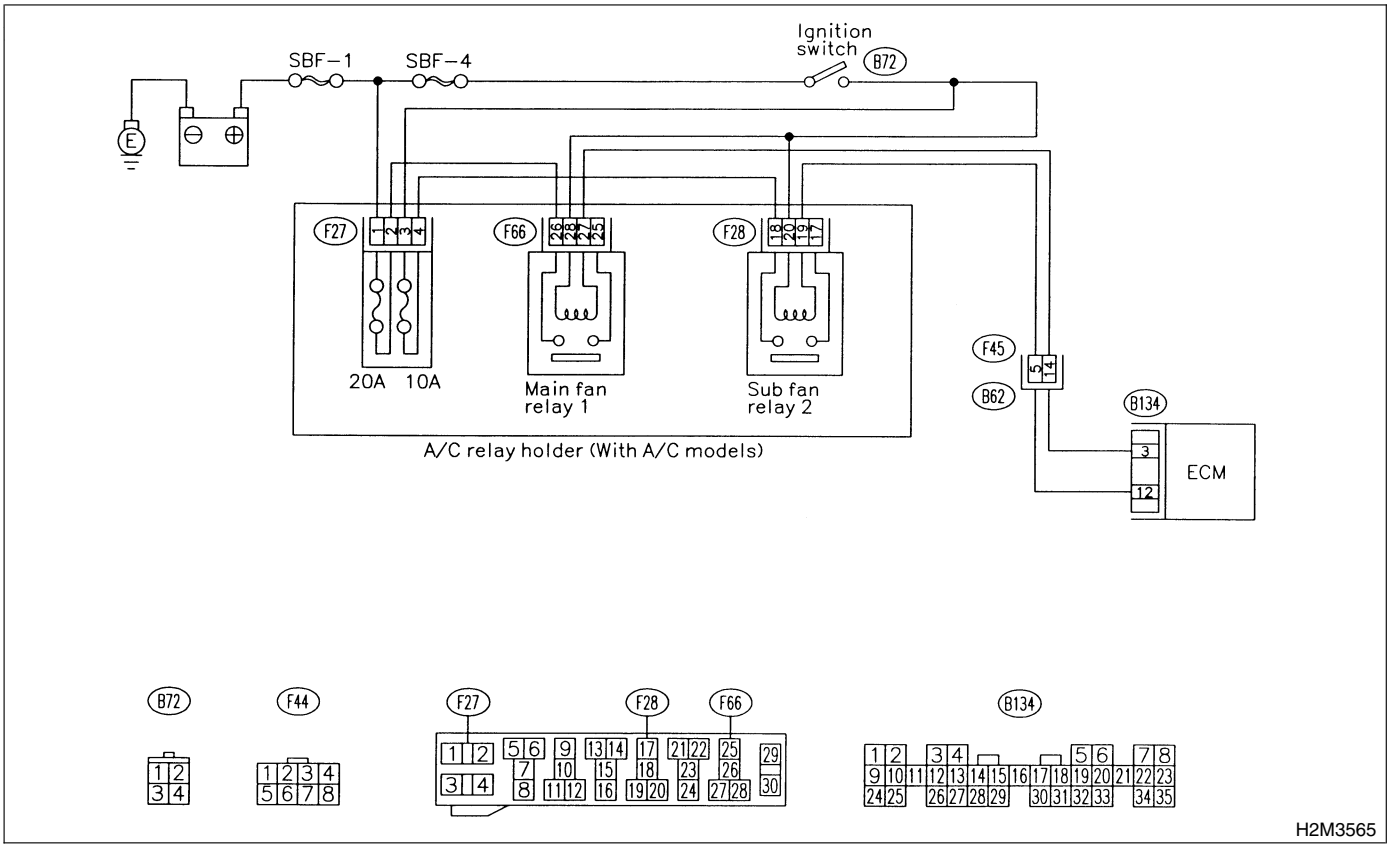
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117 or P0505 or P1505?	Inspect DTC P0116 or P0117 or P0505 or P1505 using “17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models”. <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P1507.	Go to step **2**.
2	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **2**.	Adjust throttle cable. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>
3	**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	Is there a fault in air intake system?	Repair air suction and leaks.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>

CM: DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT — S008636C25

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	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.	Go to step **2**.

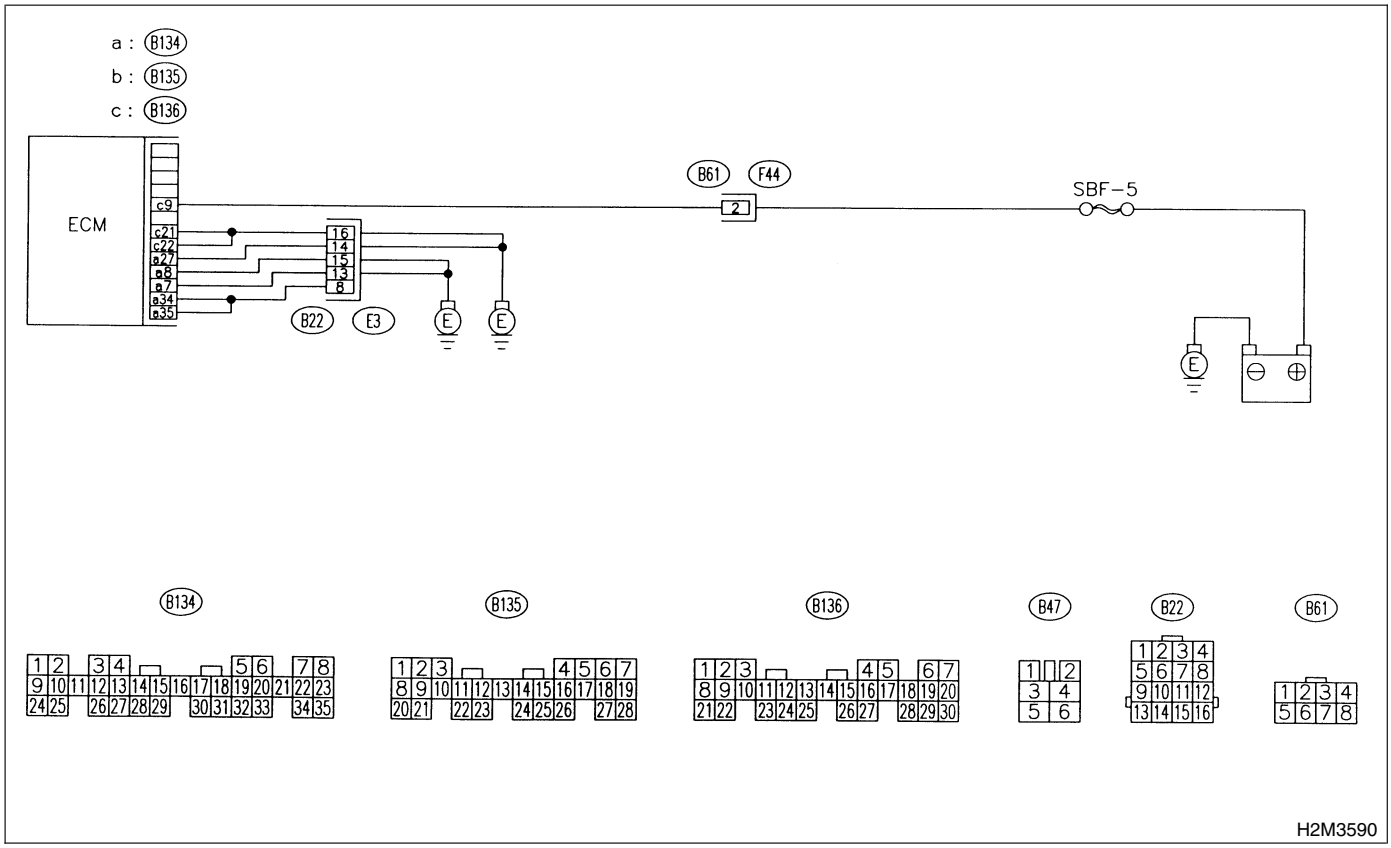
No.	Step	Check	Yes	No
2	**CHECK SHORT CIRCUIT IN RADIATOR FAN RELAY CONTROL CIRCUIT.** 1) Turn ignition switch to OFF. 2) Remove main fan relay and sub fan relay. (with A/C models) 3) Disconnect test mode connector. 4) Turn ignition switch to ON. 5) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in radiator fan relay control circuit. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **3**.
3	**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:***	Is the resistance less than 1 Ω?	Replace main fan relay and ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **4**.
4	**CHECK SUB FAN RELAY.** 1) Remove sub fan relay. 2) Measure resistance between sub fan relay terminals. ***Terminal*** ***No. 1 — No. 3:***	Is the resistance less than 1 Ω?	Replace sub fan relay and ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CN: DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION — S008636C27

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3590

No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM connector and battery terminal.	Go to step **3**.

No.	Step	Check	Yes	No
3	**CHECK FUSE SBF-5.**	Is fuse blown?	Replace fuse.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and battery ● Poor contact in coupling connector (F44) ● Poor contact in ECM connector ● Poor contact in battery terminal

CO: DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION — S008636C28

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>

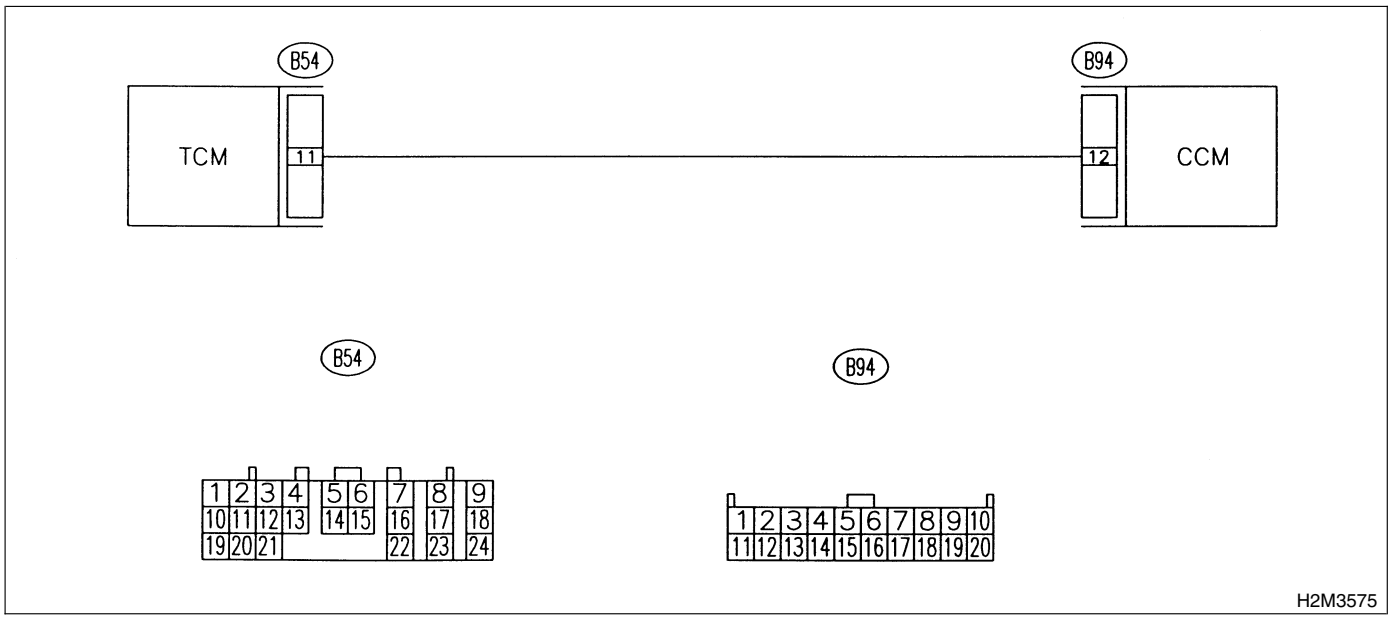
MEMO:

CP: DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION — S008636C29

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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. ***Connector & terminal*** ***(B54) No. 11 — (B94) No. 12:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair open circuit in harness between TCM and CCM connector.
2	**CHECK HARNESS BETWEEN TCM AND CCM CONNECTOR.** Measure resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 11 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair short circuit in harness between TCM and CCM connector.	Go to step **3**.

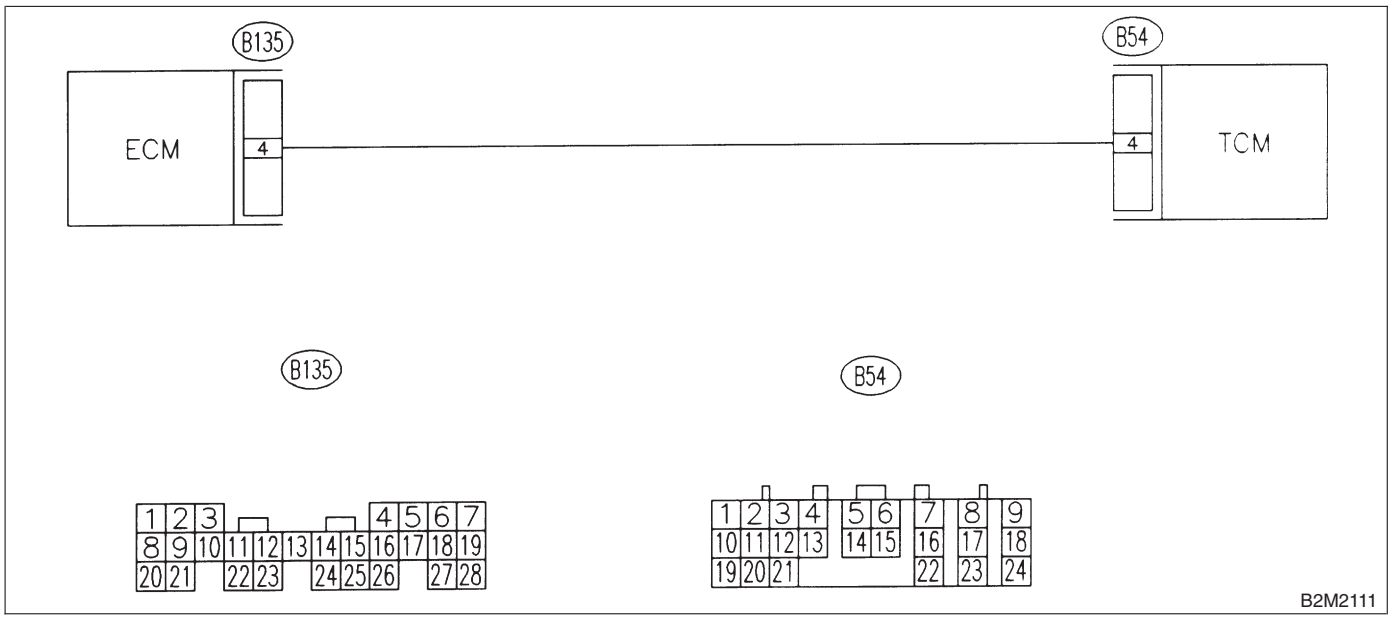
No.	Step	Check	Yes	No
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect connector to TCM and CCM. 2) Lift-up the vehicle or set the vehicle on free rollers. **CAUTION:** **On AWD models, raise all wheels off ground.** 3) Start the engine. 4) Cruise control main switch to ON. 5) Move selector lever to “D” 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 (–):***	Is the resistance less than 1 V?	Go to step **4**.	Check cruise control set circuit. <Ref. to CC-13 SYMPTOM CHART, Diagnostics Chart with Symptom.>
4	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

CQ: DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT — S008636C30

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage less than 1 V?	Go to step **2**.	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
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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 (–):***	Is the voltage more than 5 V?	Go to step **4**.	Repair poor contact in ECM connector.
4	**CHECK TROUBLE CODE FOR AUTOMATIC TRANSMISSION.** Read trouble code for automatic transmission. <Ref. to AT-18 OPERATION, Read Diagnostic Trouble Code.>	Does trouble code appear for automatic transmission?	Inspect trouble code for automatic transmission. <Ref. to AT-18 OPERATION, Read Diagnostic Trouble Code.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

CR: DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008636C31

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check low clutch timing control solenoid valve circuit. <Ref. to AT-56 TROUBLE CODE 73 — LOW CLUTCH TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>

CS: DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008636C32

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check 2-4 brake timing control solenoid valve circuit. <Ref. to AT-59 TROUBLE CODE 74 — 2-4 BRAKE TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>

CT: DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008636F10

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check 2-4 brake duty solenoid circuit. <Ref. to AT-66 TROUBLE CODE 76 — 2-4 BRAKE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

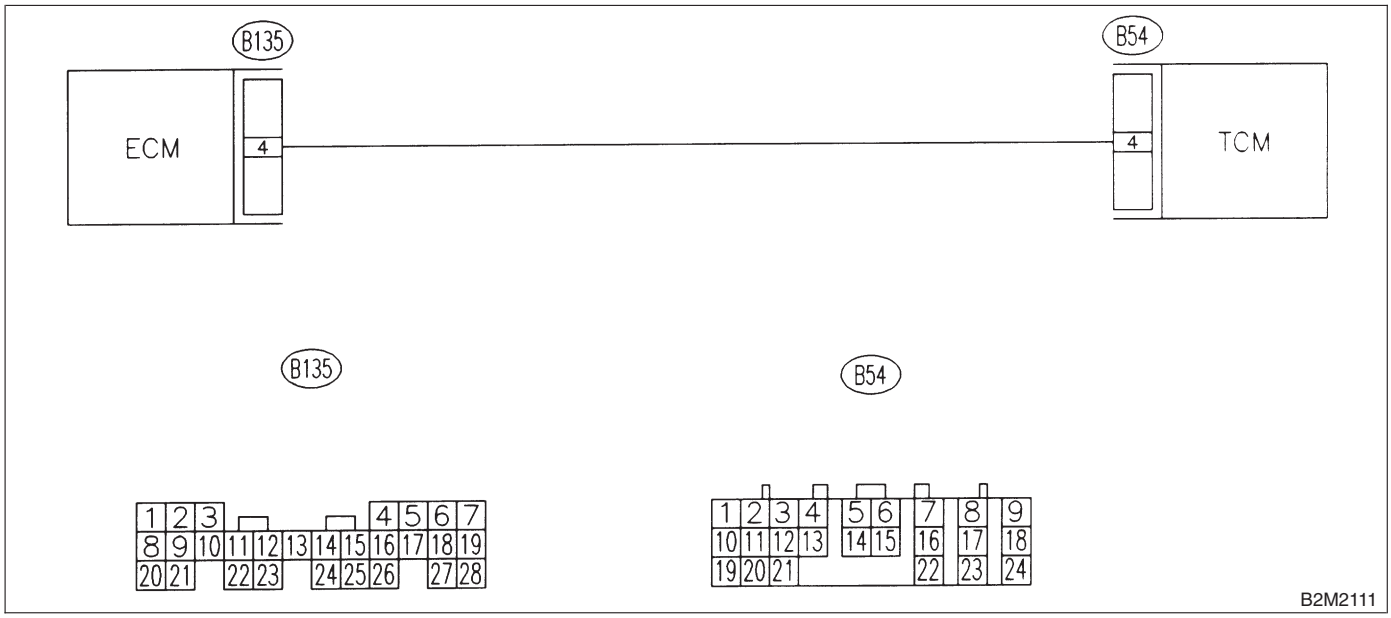
MEMO:

CU: DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT — S008636C34

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 4 V?	Go to step **5**.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair poor contact in ECM connector.	Go to step **4**.

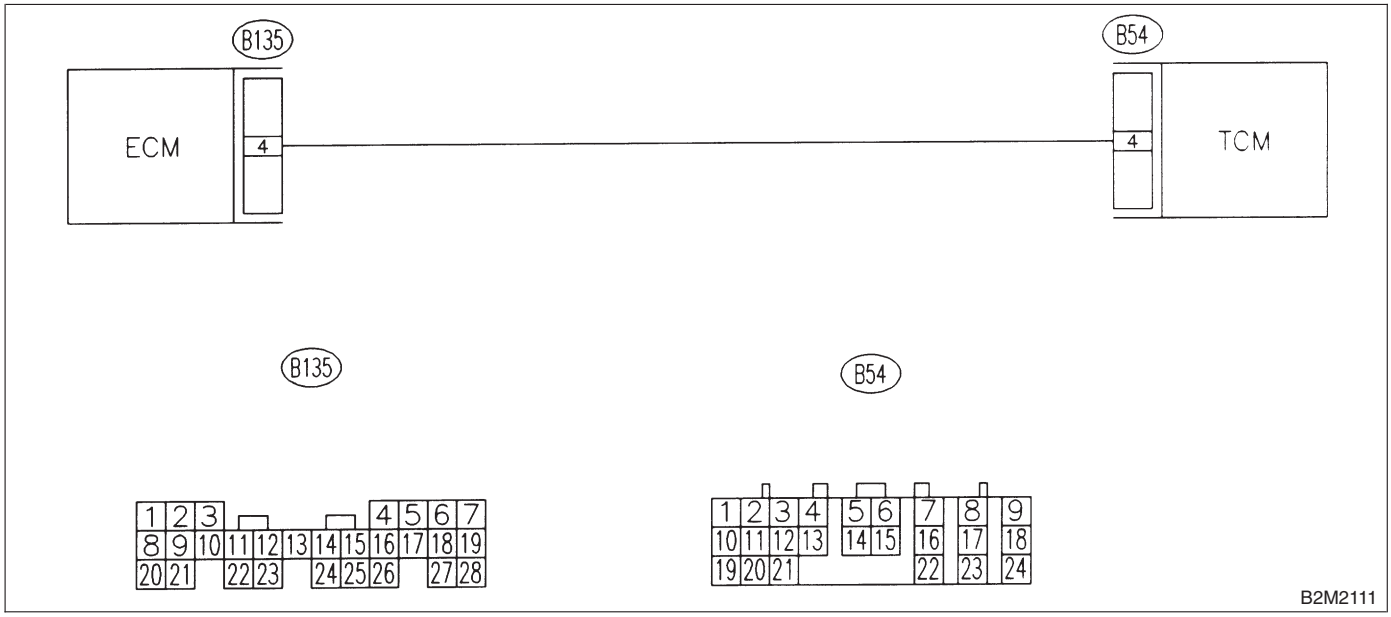
No.	Step	Check	Yes	No
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Does the voltage change from 1 V to 4 V while monitoring the value with voltage meter?	Even if MIL lights up, the circuit has 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	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 4 V?	Go to step **6**.	Repair open circuit in harness between ECM and TCM connector.
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Check TCM power supply line and grounding line.

CV: DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION — S008636C35

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK DRIVING CONDITION.** 1) Start and warm-up the engine until the radiator fan makes one complete rotation. 2) Drive the vehicle.	Is AT shift control functioning properly?	Go to step **2**.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>
2	**CHECK ACCESSORY.**	Are car phone and/or CB installed on vehicle?	Repair grounding line of car phone or CB system.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

MEMO:

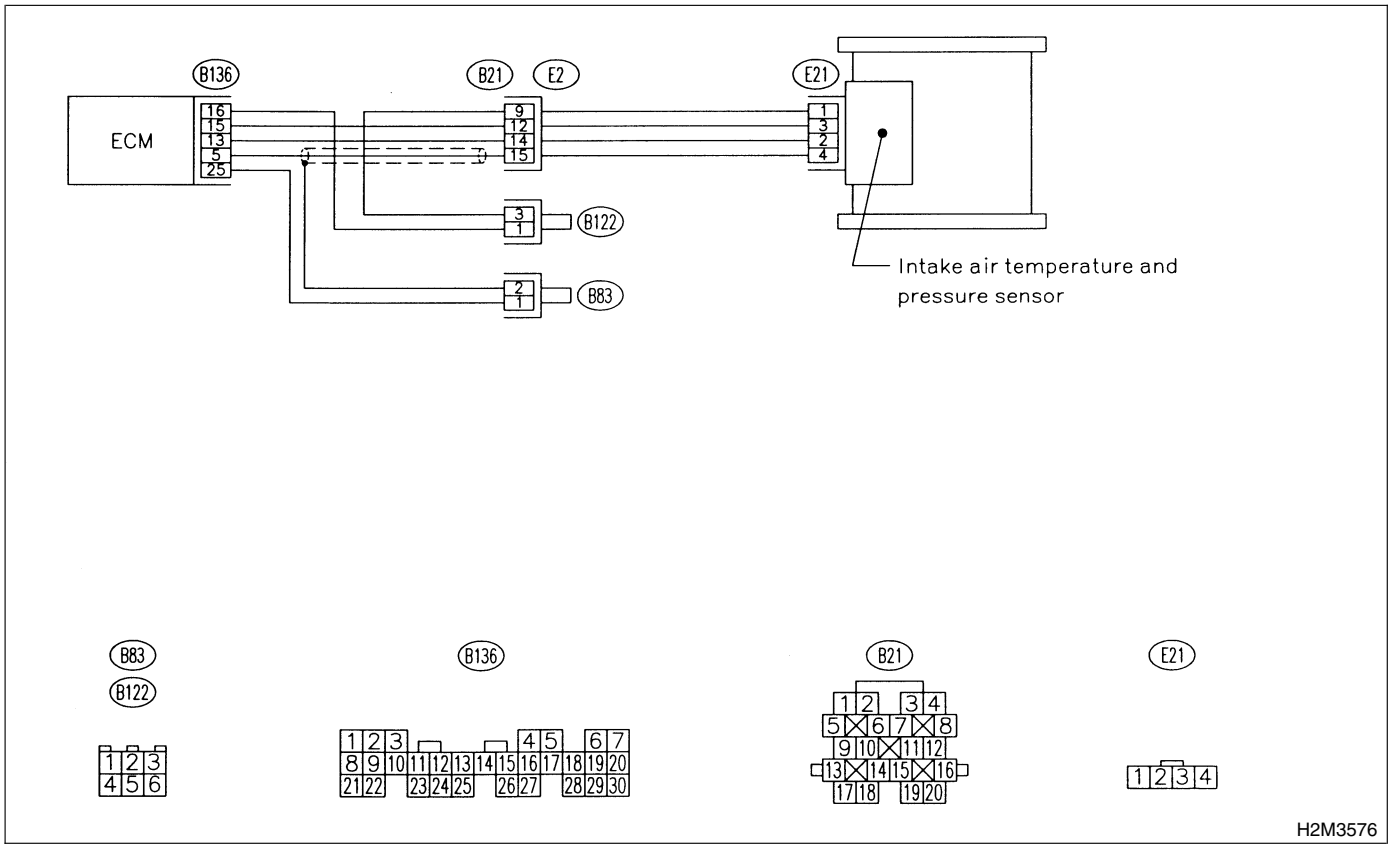
20. Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models S008638

A: DTC P0106 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B11

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.** NOTE: In this case, it is not necessary to inspect DTC P0106.	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0107, P0108 or P1112?	Inspect DTC P0107, P0108 or P1112 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

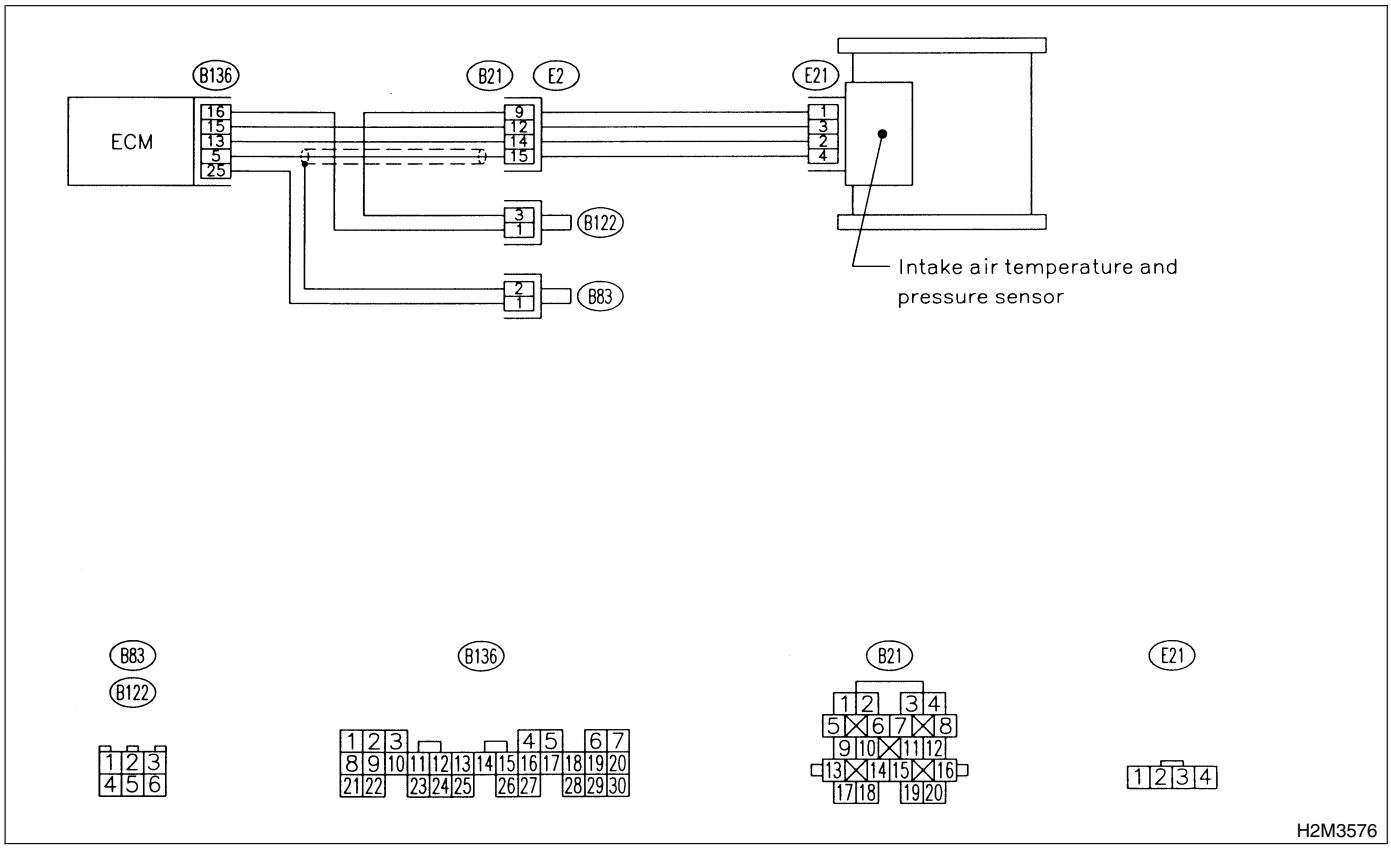
No.	Step	Check	Yes	No
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair air intake system.	Go to step **3**.
3	**CHECK PRESSURE SENSOR.** 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place 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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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*** ***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)***	Is the value within the specifications?	Go to step **4**.	Replace intake air temperature sensor and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>
4	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is throttle positioning ratio equal to or less than 5% when throttle is fully closed?	Go to step **5**.	Adjust or replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>
5	**CHECK THROTTLE POSITION.**	Is throttle positioning ratio equal to or more than 85% when throttle is fully open?	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

B: DTC P0107 — PRESSURE SENSOR CIRCUIT LOW INPUT — S008638B12

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 13.3 kPa (100 mmHg, 3.94 inHg)?	Go to step **3**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in ECM and pressure sensor connector. <Ref. to EN-262 DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/ PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Is there poor contact in ECM or pressure sensor connector?	Repair poor contact in ECM or pressure sensor connector.	Even if MIL lights up, the circuit has returned to a normal condition at this time.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **5**.	Go to step **4**.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **7**.	Go to step **6**.
6	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **7**.
7	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.** 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 (–):***	Is the voltage more than 4.5 V?	Go to step **8**.	Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.
8	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.** 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:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

No.	Step	Check	Yes	No
9	**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:***	Is the resistance more than 500 kΩ?	Go to step **10**.	Repair ground short circuit in harness between ECM and intake air temperature and pressure sensor connector.
10	**CHECK POOR CONTACT.** Check poor contact in intake manifold pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in intake manifold pressure sensor connector?	Repair poor contact in intake air temperature and pressure sensor connector.	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>

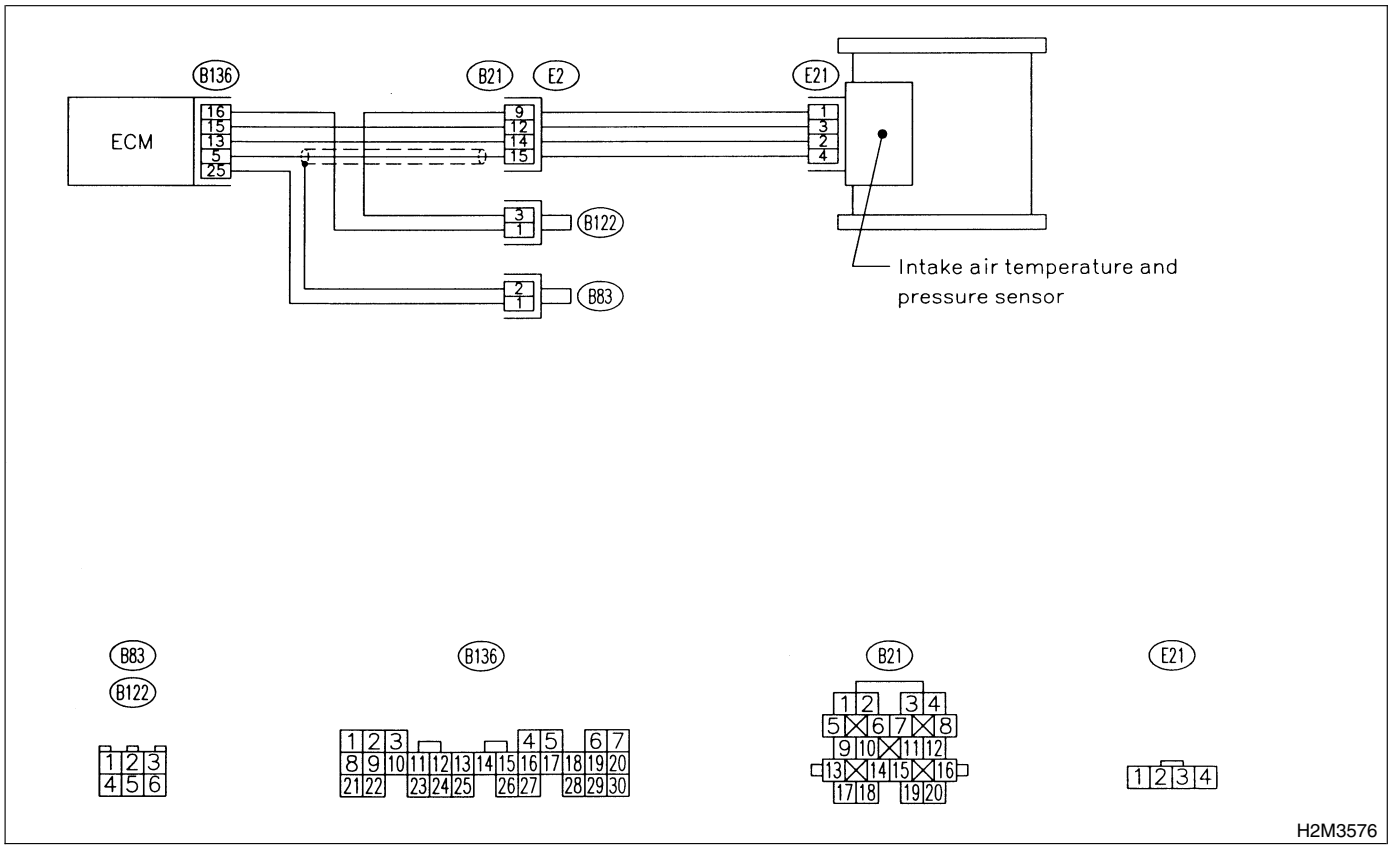
MEMO:

C: DTC P0108 — PRESSURE SENSOR CIRCUIT HIGH INPUT — S008638B13

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 119.5 kPa (896.5 mmHg, 35.29 inHg)?	Go to step **10**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.** 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 (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.
7	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE AND PRESSURE SENSOR CONNECTOR.** 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:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.
8	**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:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair open circuit in harness between ECM and intake air temperature and pressure sensor connector.

No.	Step	Check	Yes	No
9	**CHECK POOR CONTACT.** Check poor contact in intake air temperature and pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in intake manifold pressure sensor connector?	Repair poor contact in intake air temperature and pressure sensor connector.	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>
10	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 119.5 kPa (896.5 mmHg, 35.29 inHg)?	Repair battery short circuit in harness between ECM and intake air temperature and pressure sensor connector.	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>

MEMO:

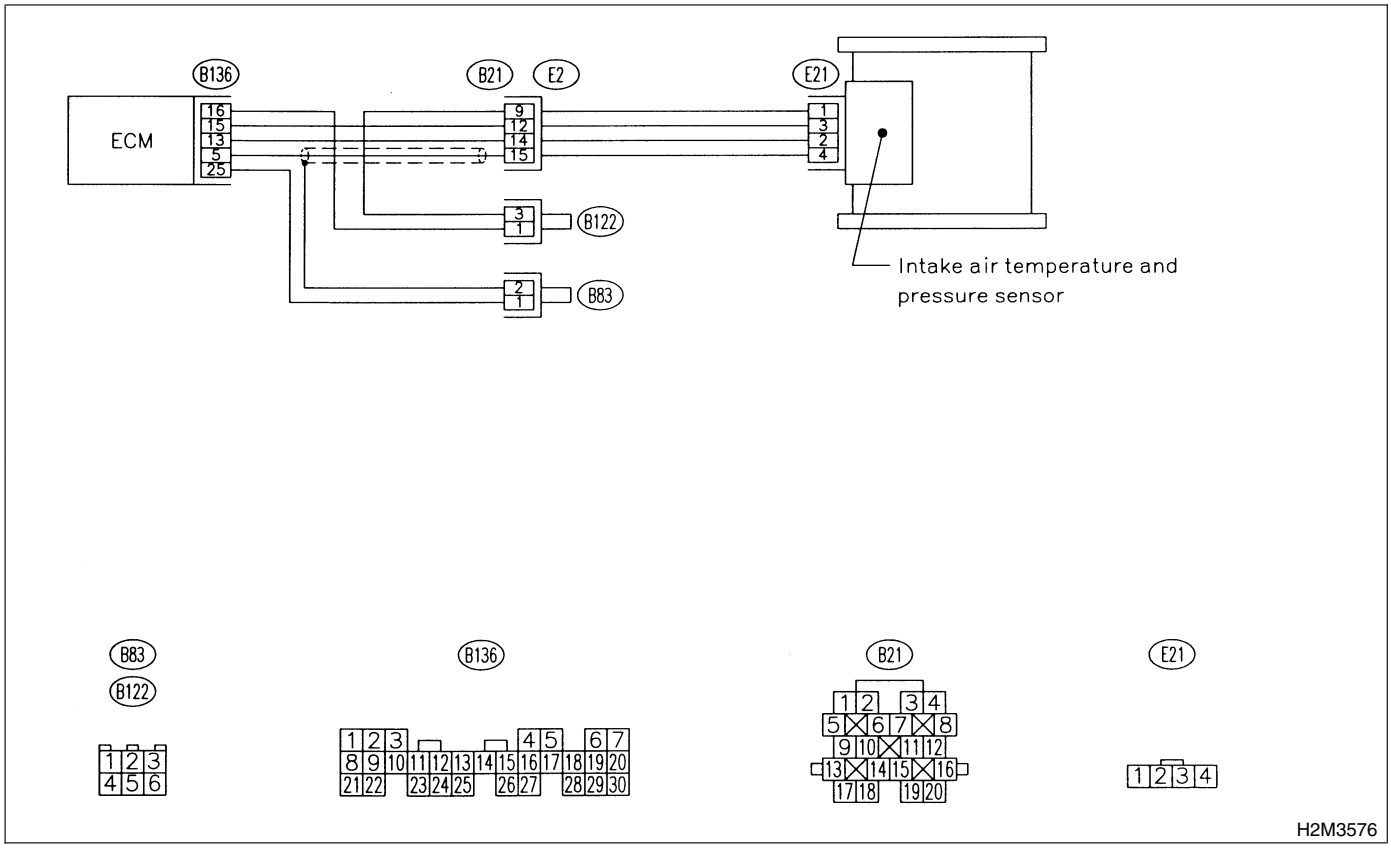
D: DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S008638B14

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0112, P0113, P0116, P0117 or P0125?	Inspect DTC P0112, P0113, P0116, P0117 or P0125 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0111.	Go to step **2**.
2	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the engine coolant temperature between 75°C (167°F) and 95°C (203°F)?	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	Inspect DTC P0125 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

E: DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT —

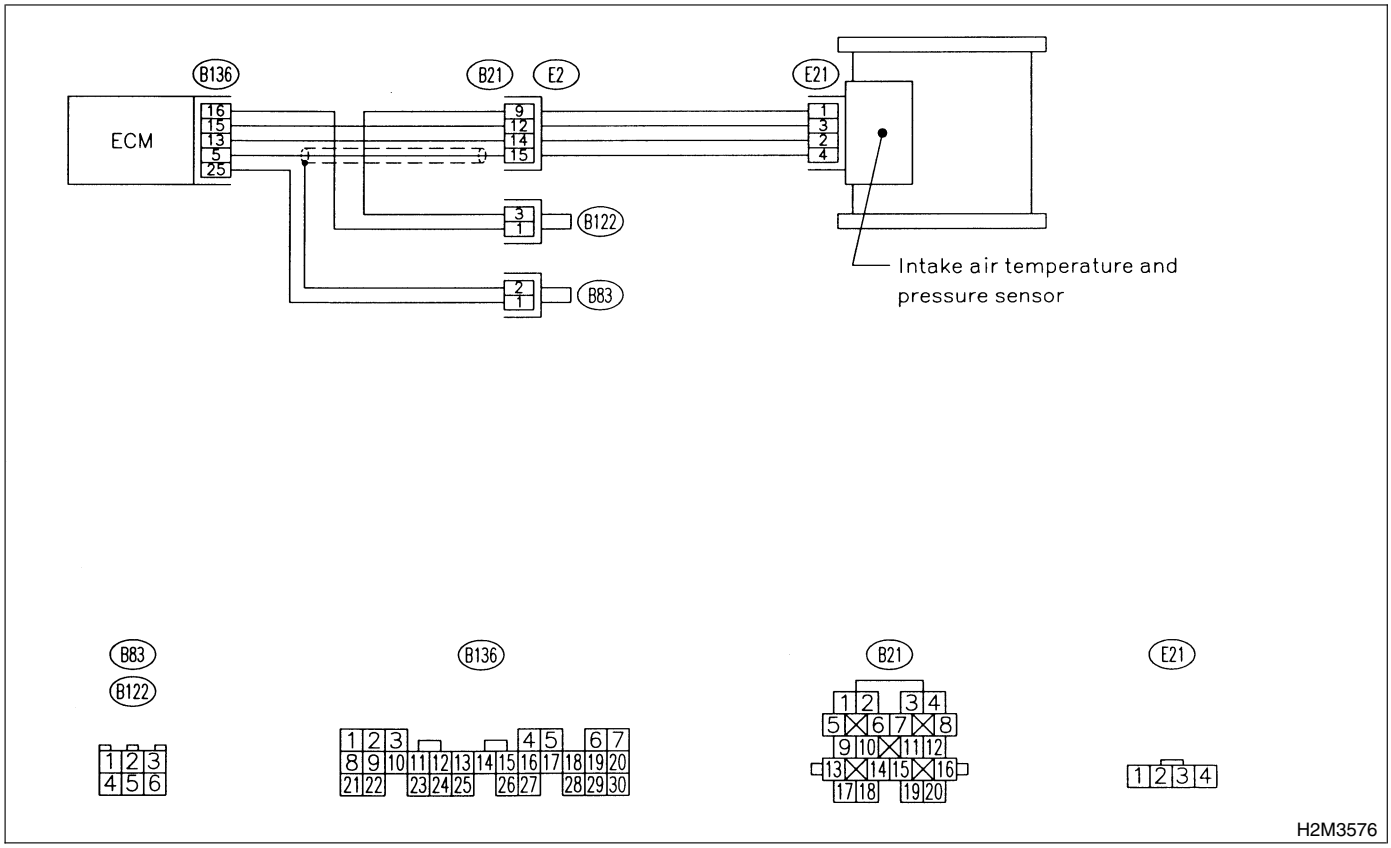
S008638B15

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value greater than 120°C (248°F)?	Go to step **2**.	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 and B122)
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –40°C (–40°F)?	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	Repair ground short circuit in harness between intake air temperature and pressure sensor and ECM connector.

F: DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —

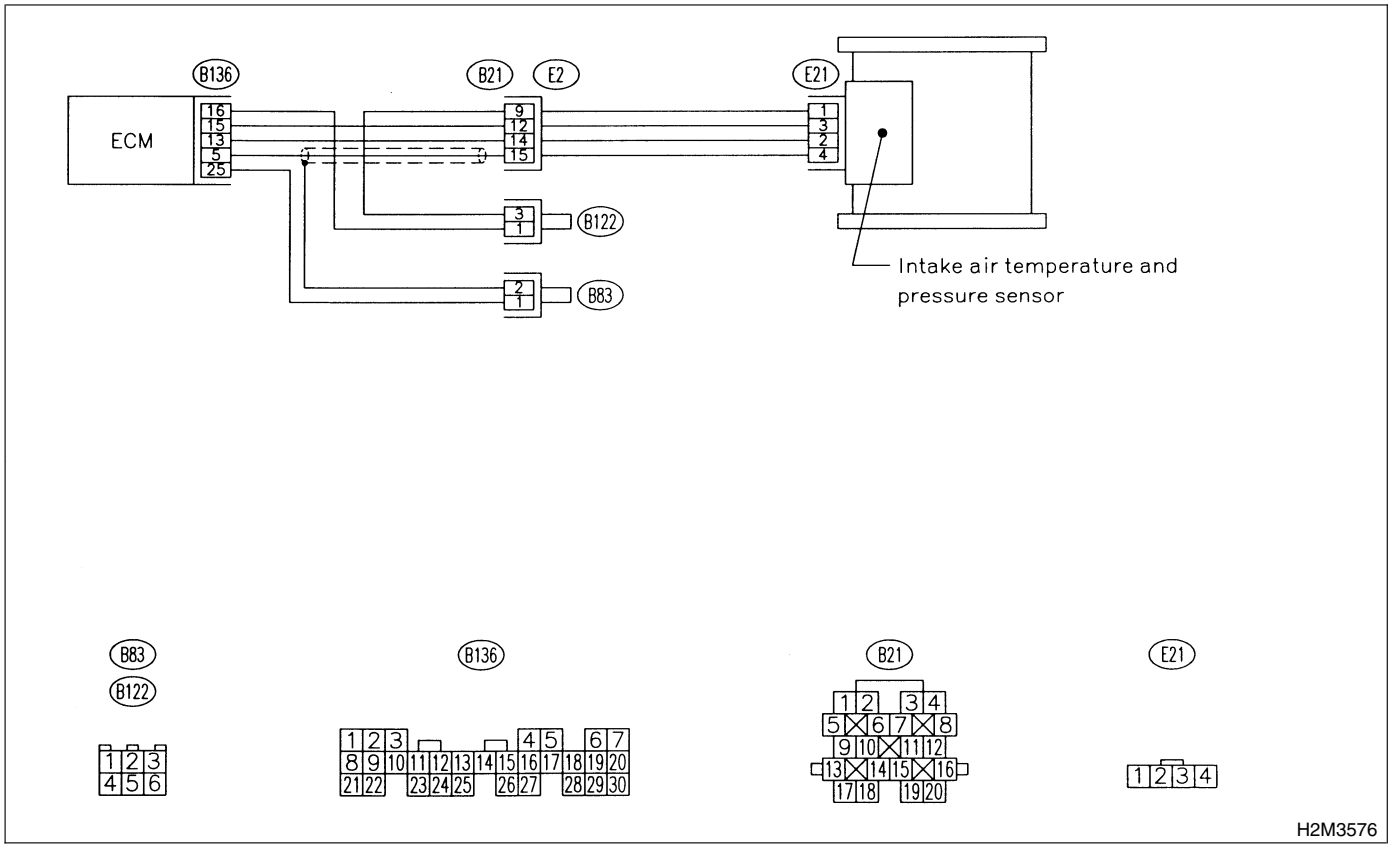
S008638B16

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –40°C (–40°F)?	Go to step **2**.	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 and B122)
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between intake air temperature and pressure sensor and ECM connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between intake air temperature and pressure sensor and ECM connector.	Go to step **4**.

No.	Step	Check	Yes	No
4	**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 (–):***	Is the voltage more than 3 V?	Go to step **5**.	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 and B122)
5	**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:***	Is the resistance less than 5 Ω?	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>	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 and B122)

MEMO:

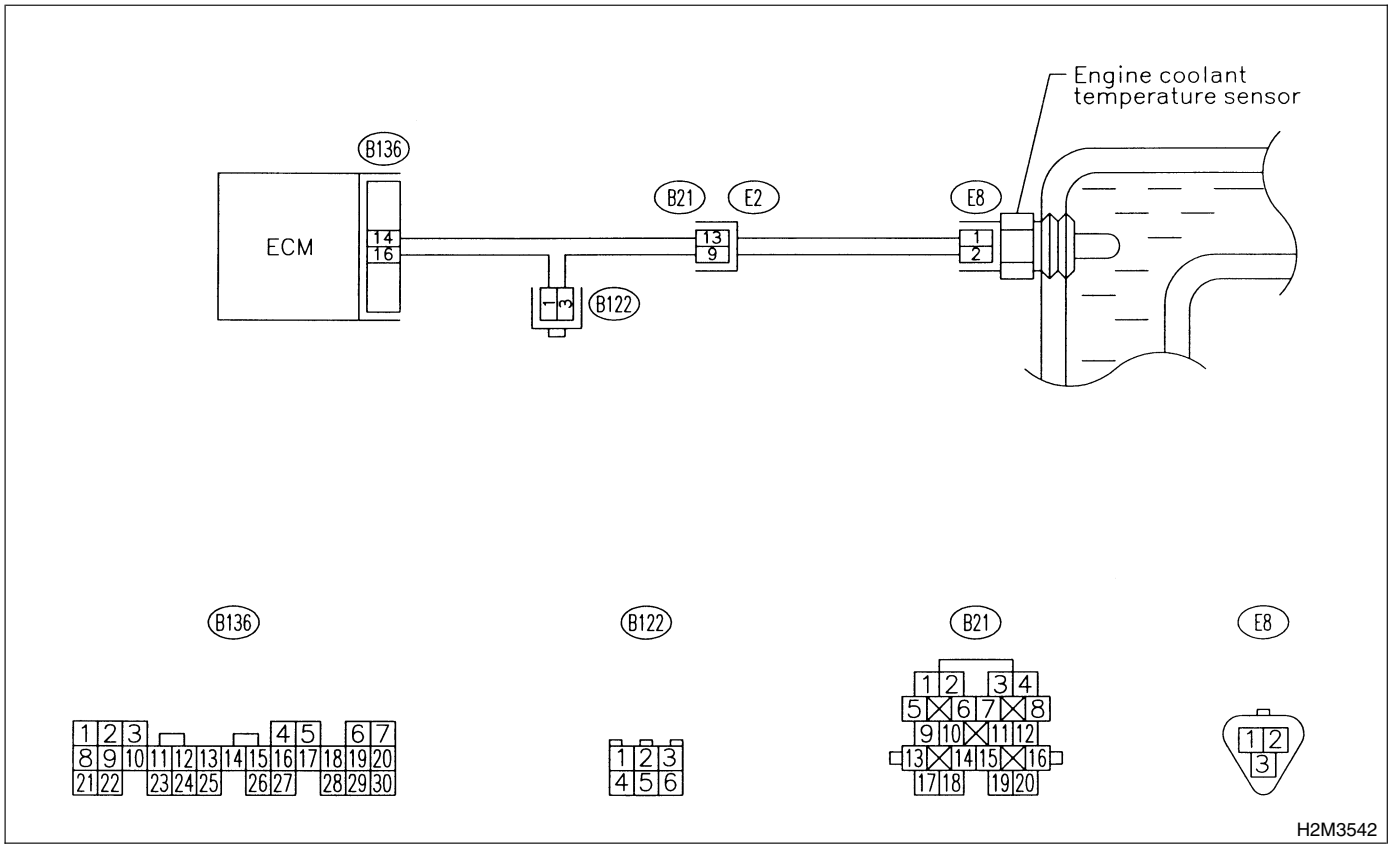
G: DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT — S008638B17

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



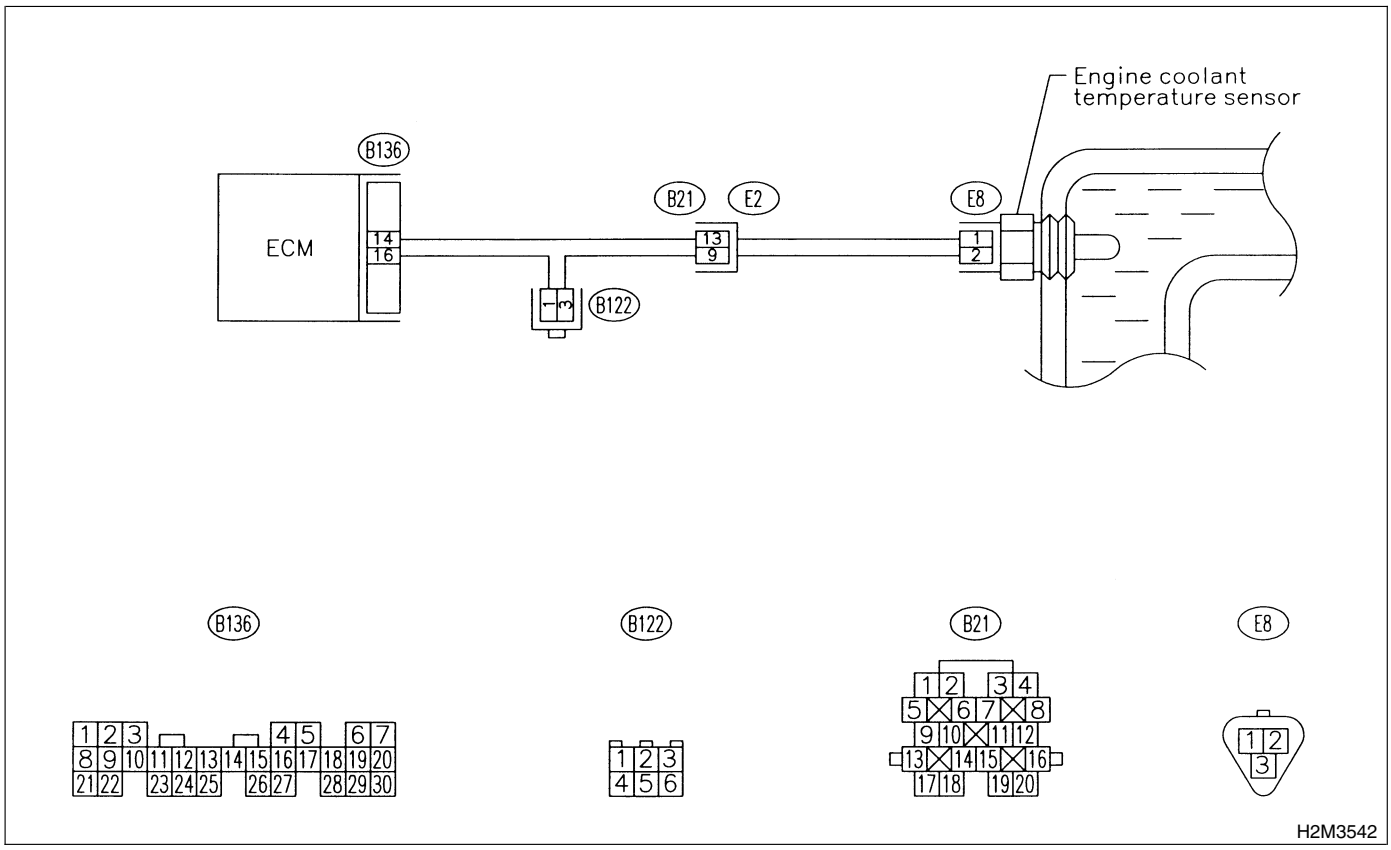
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value greater than 150°C (302°F)?	Go to step **2**.	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 (B122)
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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 FU-38 REMOVAL, Engine Coolant Temperature Sensor.>	Repair ground short circuit in harness between engine coolant temperature sensor and ECM connector.

H: DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT — S008638B18

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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)?	Go to step **2**.	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 (B122)
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and engine coolant temperature sensor connector.	Go to step **4**.

No.	Step	Check	Yes	No
4	**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 (–):***	Is the voltage more than 4 V?	Go to step **5**.	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 (B122)
5	**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:***	Is the resistance less than 5 Ω?	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>	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 (B122)

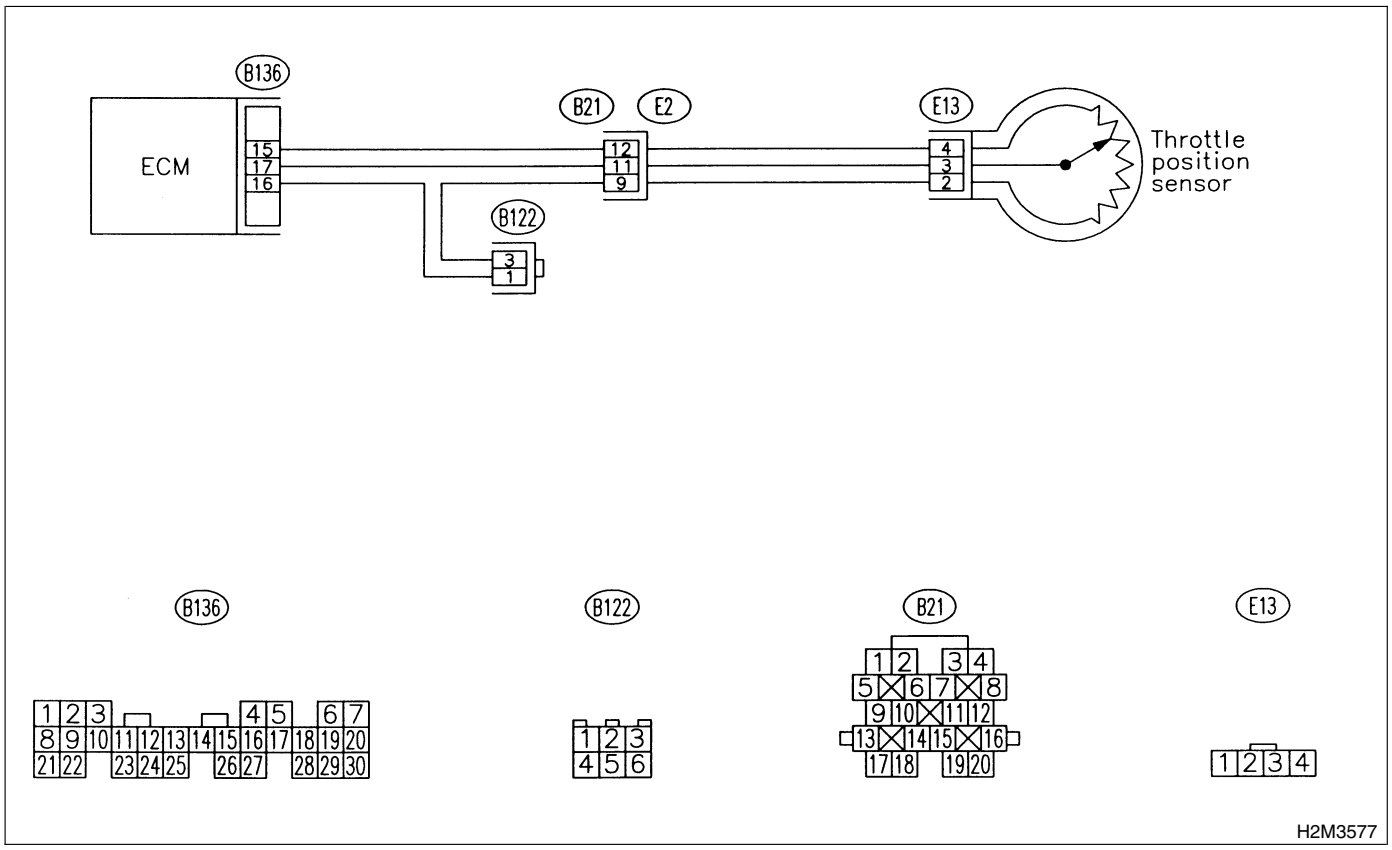
MEMO:

I: DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S008638B19

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0122 or P0123?	Inspect DTC P0122 or P0123 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0121.	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

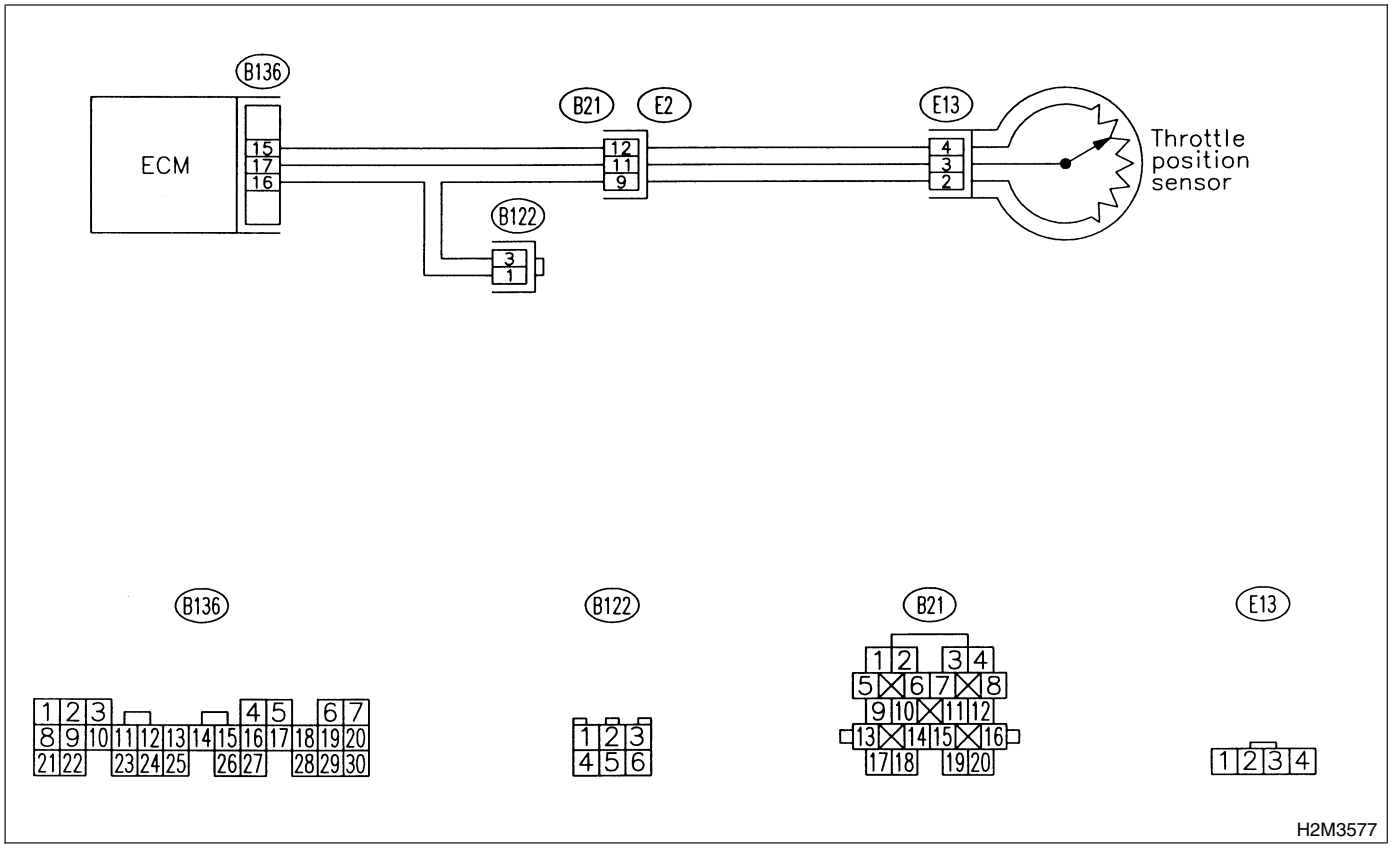
J: DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT — S008638B20

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 0.1 V?	Go to step **2**.	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 (B122)
2	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 17 (+) — Chassis ground (–):***	Is the voltage less than 0.1 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** Measure voltage between ECM connector and chassis ground.	Does the voltage change more than 0.1 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?	Repair poor contact in ECM connector.	Go to step **6**.

No.	Step	Check	Yes	No
6	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	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 (B122)
7	**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:***	Is the resistance less than 1 Ω?	Go to step **8**.	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)
8	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between throttle position sensor and ECM connector.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in throttle position sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in throttle position sensor connector?	Repair poor contact in throttle position sensor connector.	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

MEMO:

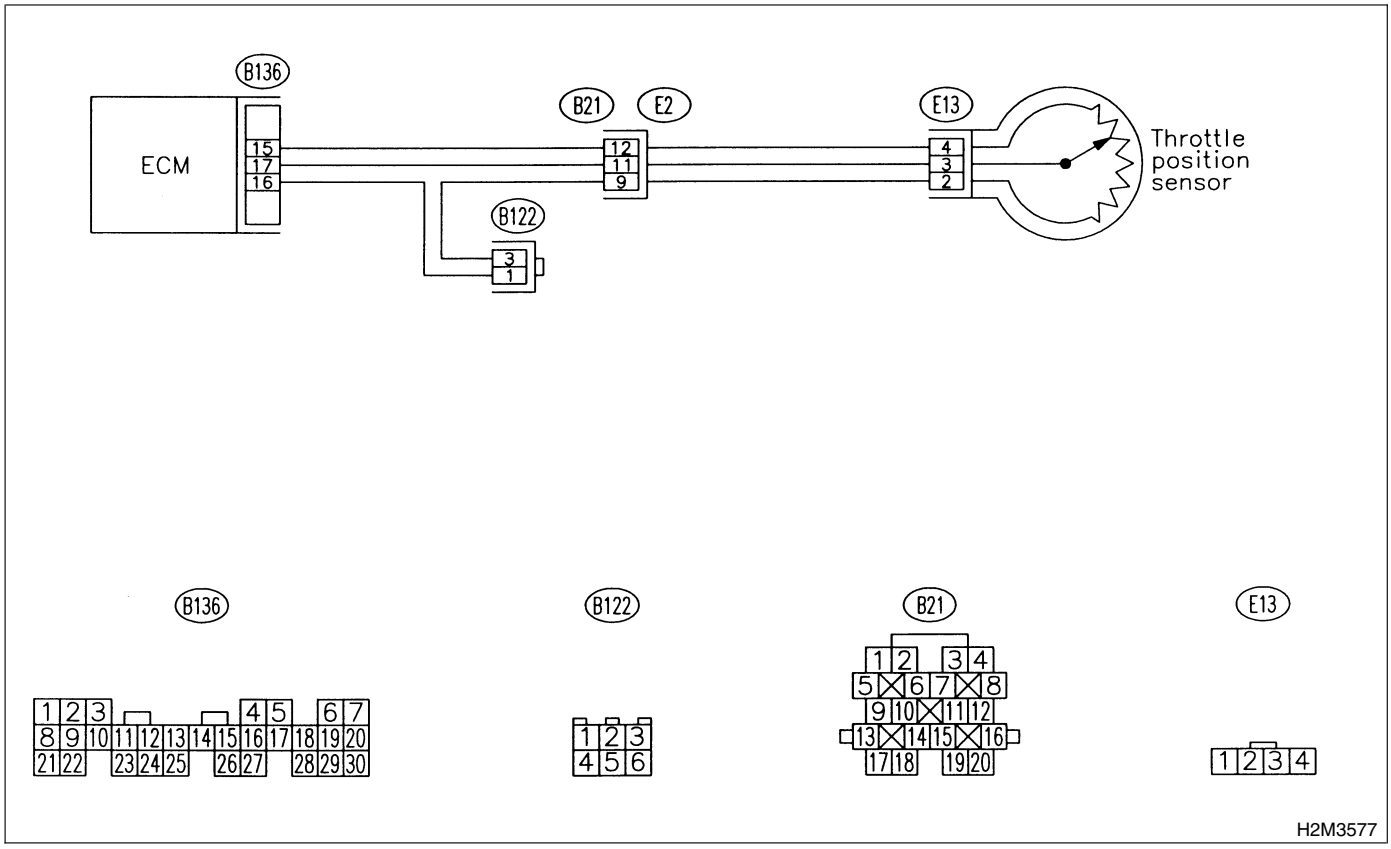
K: DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT — S008638B21

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



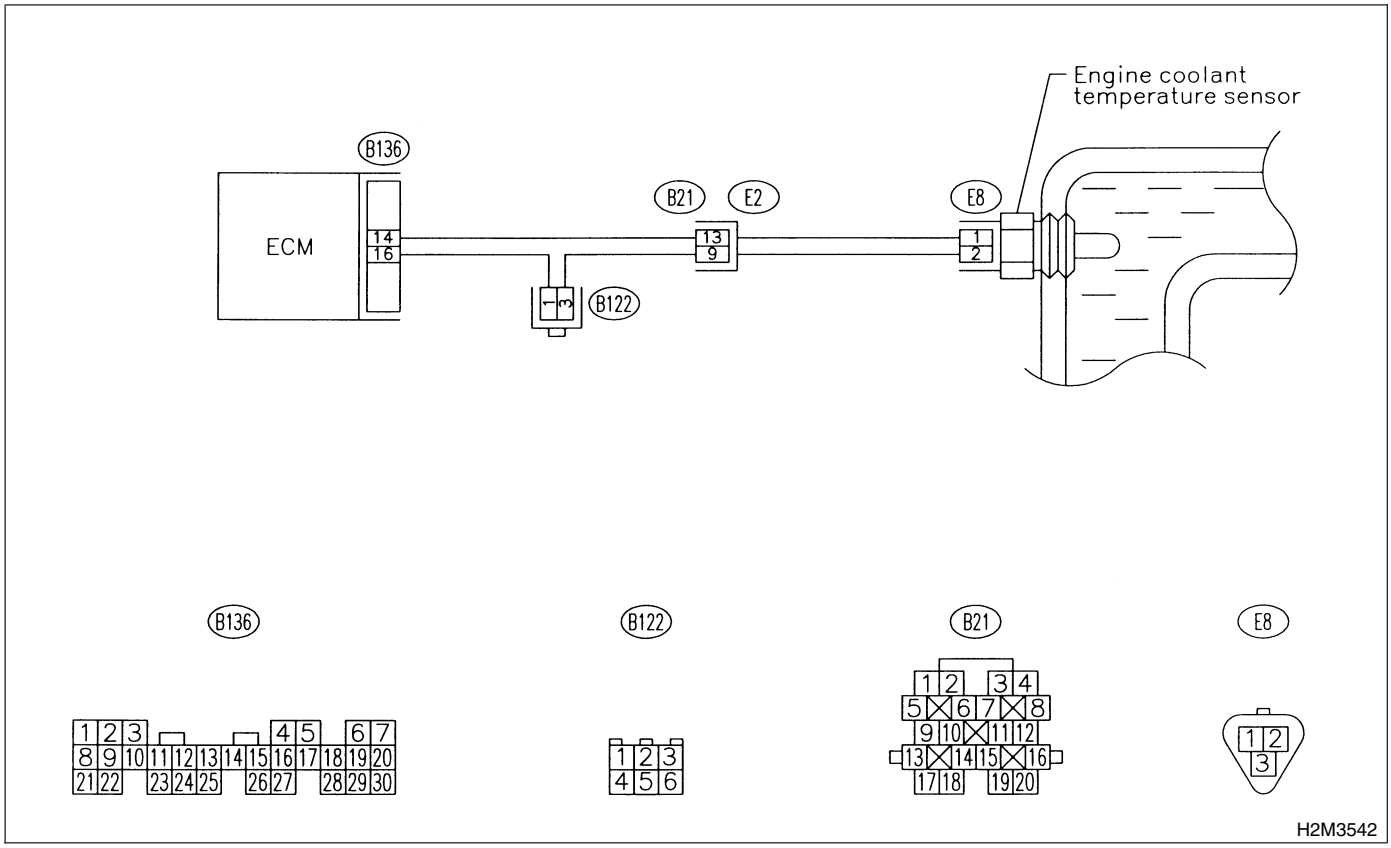
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of throttle position sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 4.9 V?	Go to step **2**.	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)
2	**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:***	Is the resistance less than 5 Ω?	Go to step **3**.	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 (B122)
3	**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 (–):***	Is the voltage more than 4.9 V?	Repair battery short circuit in harness between throttle position sensor and ECM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

L: DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL — S008638B22

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0116 or P0117?	Inspect DTC P0116 or P0117 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0125.	Go to step **2**.

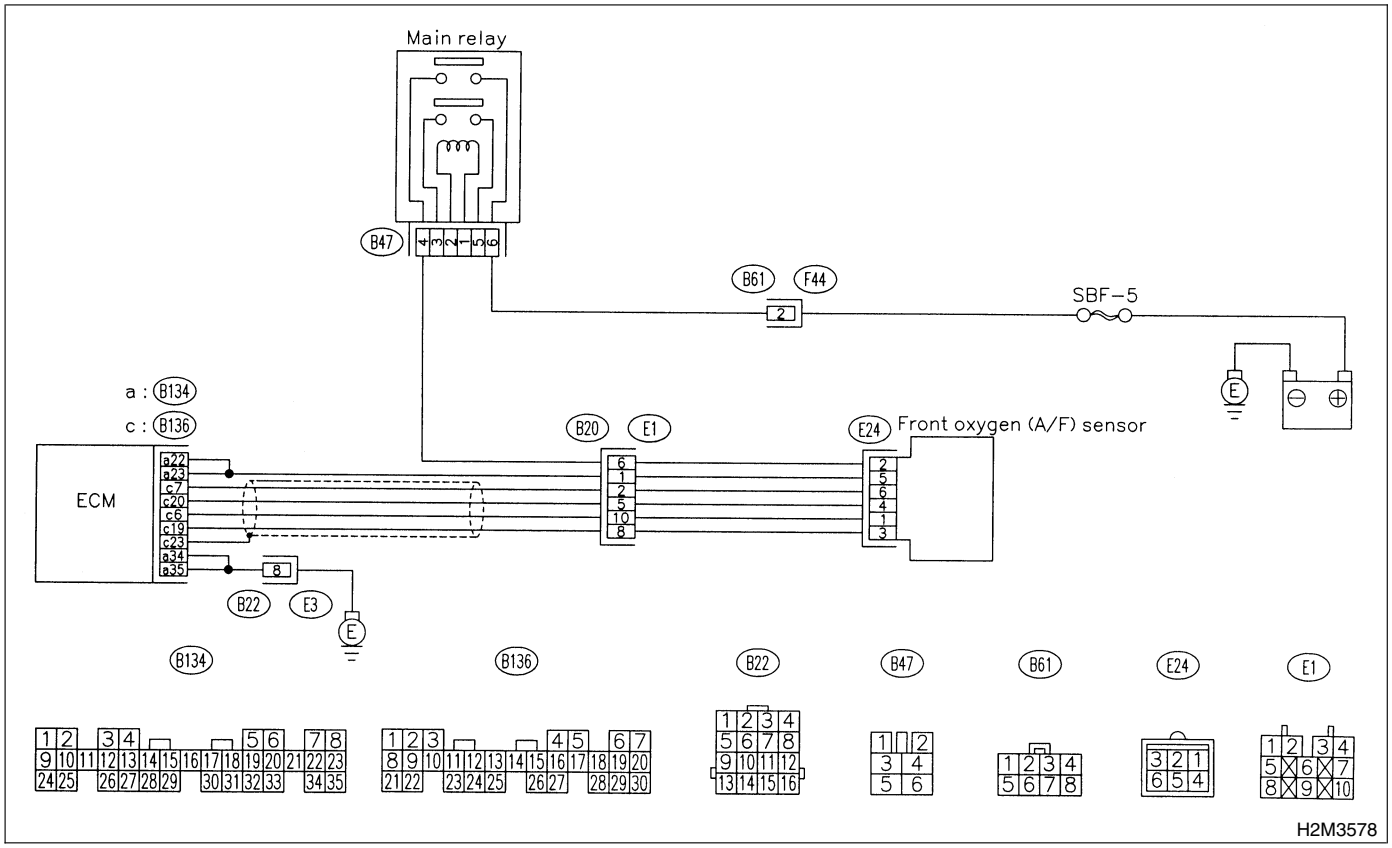
No.	Step	Check	Yes	No
2	**CHECK THERMOSTAT.**	Does thermostat remain opened?	Replace thermostat. <Ref. to CO-14 REMOVAL, Thermostat.>	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>

M: DTC P0130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B23

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132 or P1133?	Inspect DTC P1130, P1131, P1132 or P1133 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value equal to or more than 0.85 and equal to less than 1.15 in idling?	Go to step **3**.	Go to step **4**.
3	**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.	Is the value more than 1.1 for a moment?	Go to step **6**.	Go to step **4**.
4	**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 — (E24) No. 1:*** ***(B136) No. 7 — (E24) No. 6:*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 20 — (E24) No. 4:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair open circuit between ECM and front oxygen (A/F) sensor.
5	**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:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair ground short circuit between ECM and front oxygen (A/F) sensor.

No.	Step	Check	Yes	No
6	**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	Is there a fault in exhaust system?	Repair or replace faulty parts.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

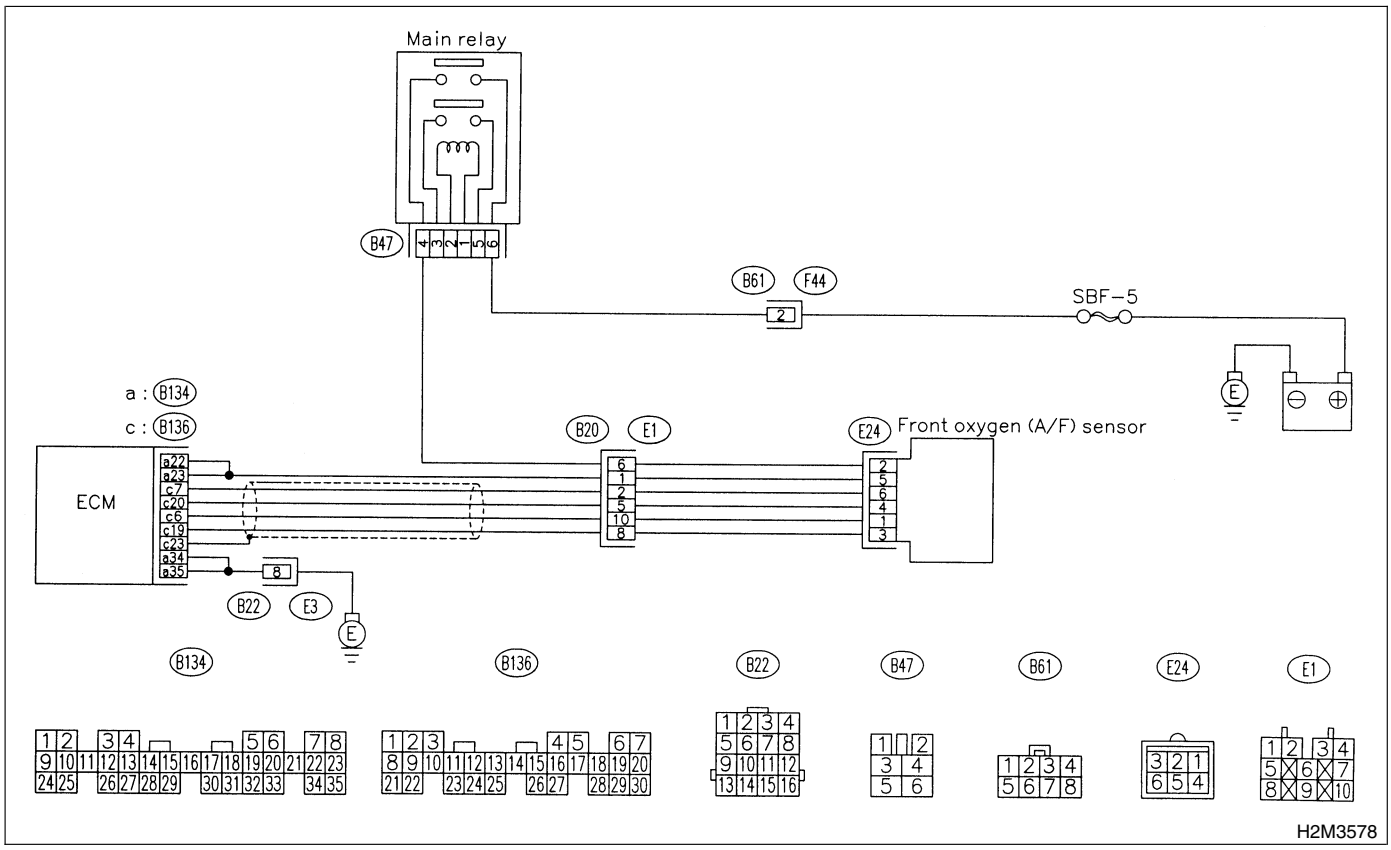
MEMO:

N: DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE — S008638B26

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130, P1131, P1132 or P1133?	Inspect DTC P1130, P1131, P1132 or P1133 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0133.	Go to step **2**.

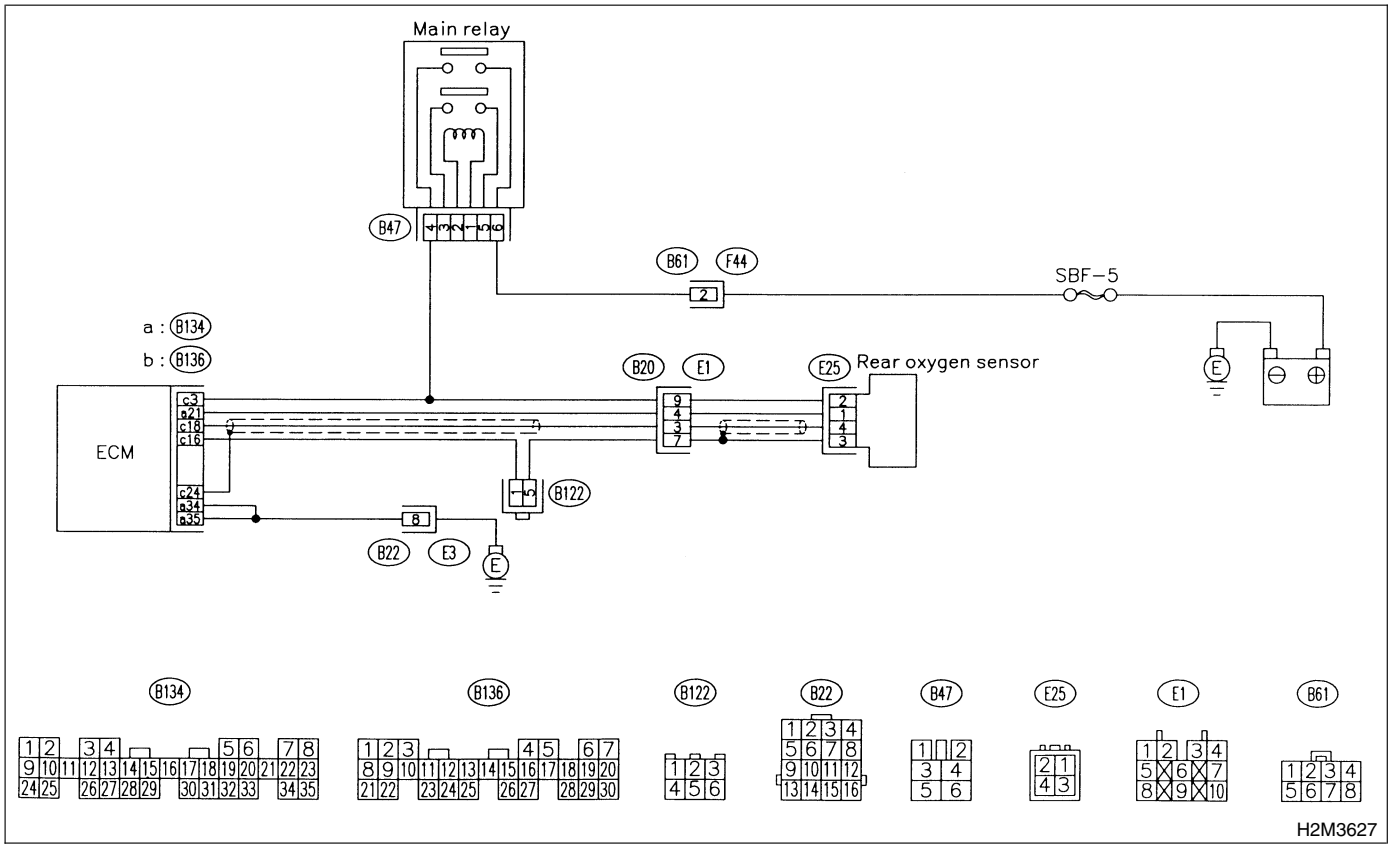
No.	Step	Check	Yes	No
2	**CHECK EXHAUST SYSTEM.** NOTE: Check the following items. ● Loose installation of front portion of exhaust pipe onto cylinder heads ● Loose connection between front exhaust pipe and front catalytic converter ● Damage of exhaust pipe resulting in a hole	Is there a fault in exhaust system?	Repair exhaust system.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

O: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION — S008638B28

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1130 or P1131?	Go to step **2**.	Go to step **3**.
2	**CHECK FAILURE CAUSE OF P0130.** Inspect DTC P1130 or P1131 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Is the failure cause of P1130 or P1131 in the fuel system?	Check fuel system. NOTE: In this case, it is not necessary to inspect DTC P0136.	Go to step **3**.

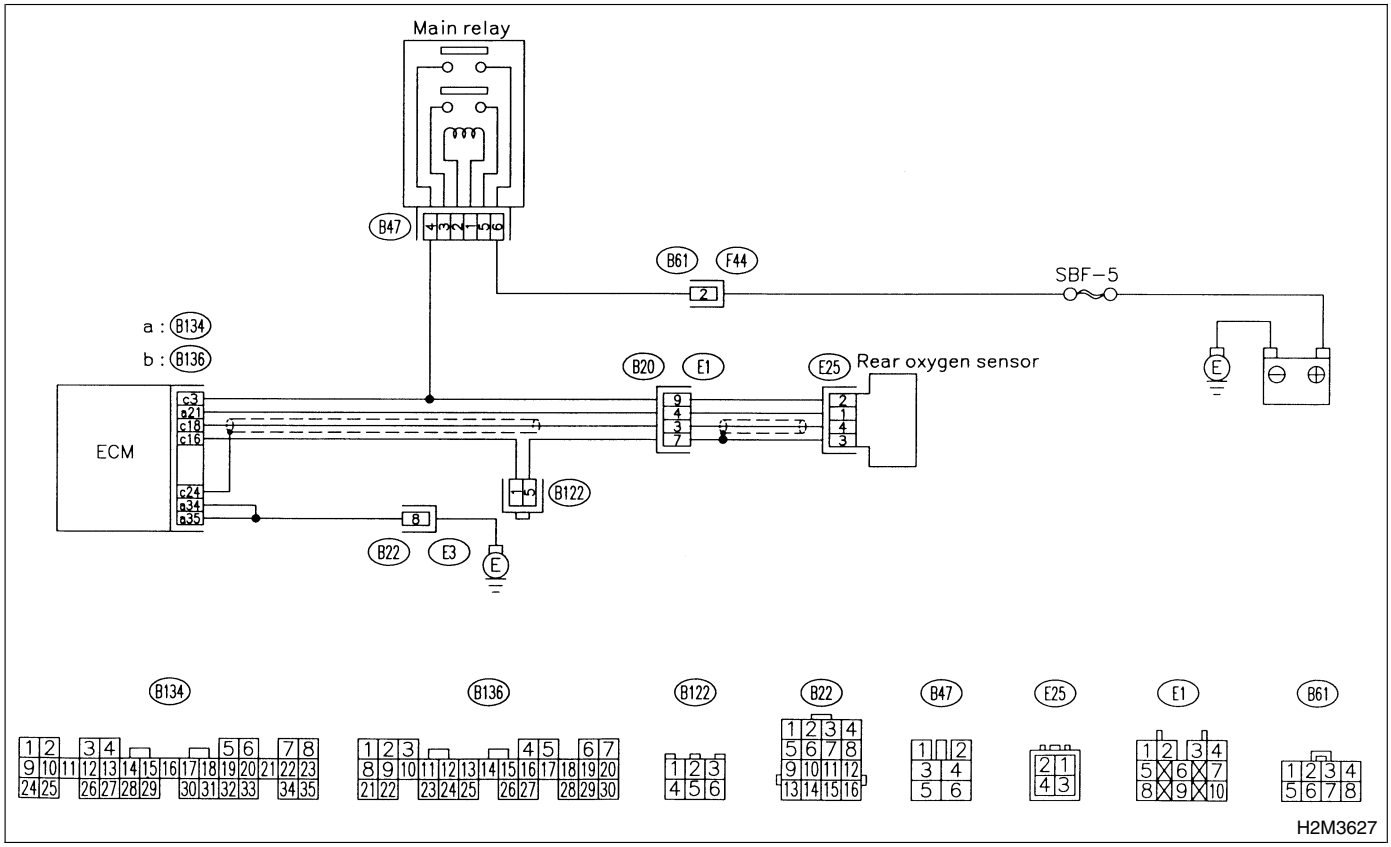
No.	Step	Check	Yes	No
3	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm-up the engine until engine coolant temperature is above 70°C (160°F), and keep the engine speed at 2,000 rpm to 3,000 rpm for two minutes. 2) Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Does the value fluctuate?	Go to step **7**.	Go to step **4**.
4	**CHECK REAR OXYGEN SENSOR DATA.** Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II General Scan Tool.	Is the value fixed between 0.2 and 0.4 V?	Go to step **5**.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>
5	**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 — (E25) No. 3:***	Is the resistance more than 3 Ω?	Repair open circuit in harness between ECM and rear oxygen sensor connector.	Go to step **6**.
6	**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*** ***(E25) No. 4 (+) — Engine ground (–):***	Is the voltage more than 0.2 V?	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>	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
7	**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	Is there a fault in exhaust system?	Repair or replace faulty parts.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

P: DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE — S008638B29

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0136?	Inspect DTC P0136 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0139.	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

MEMO:

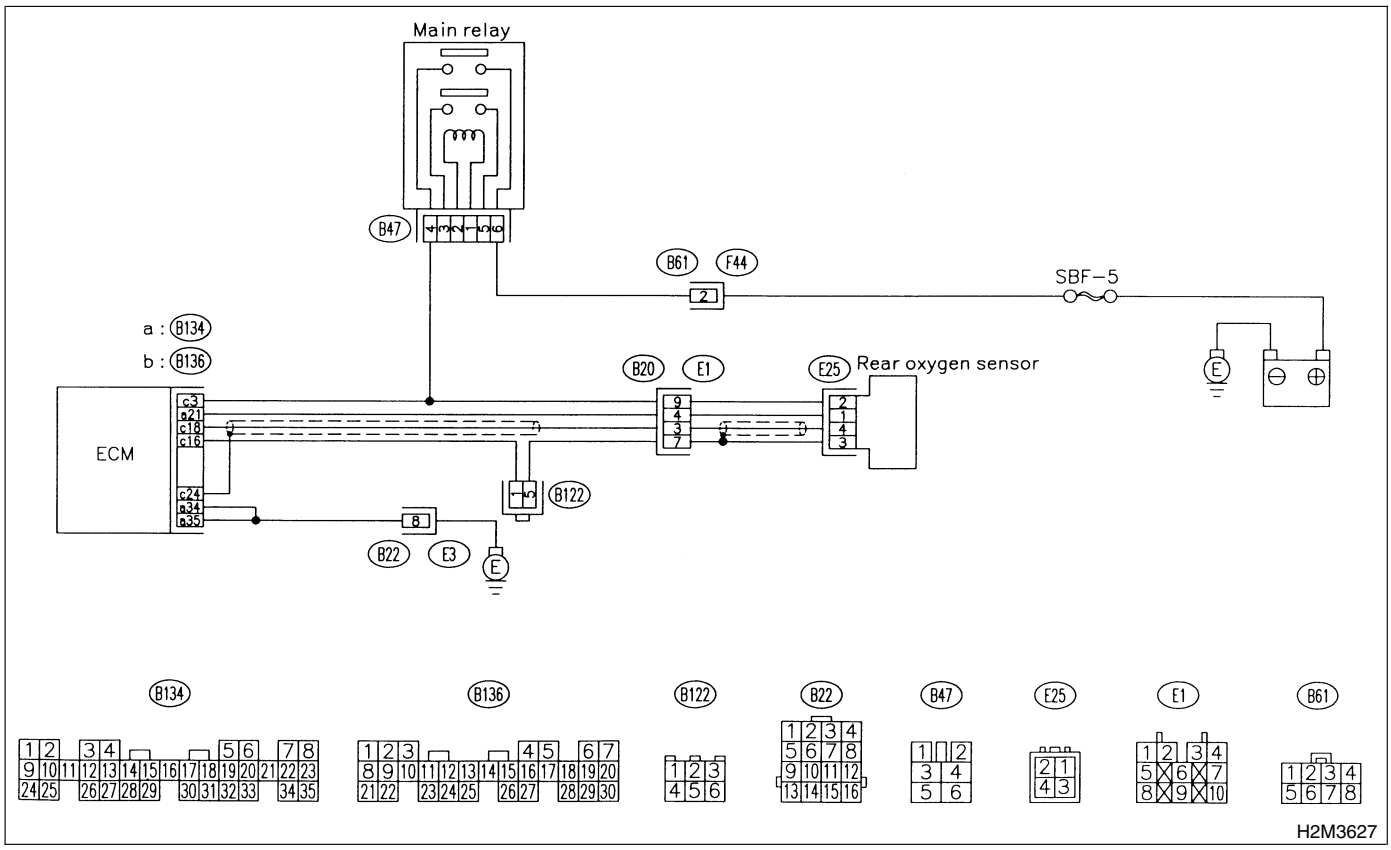
Q: DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION

— S008638B30

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance less than 5 Ω?	Go to step **3**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**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:***	Is the resistance less than 5 Ω?	Go to step **3**.	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)
3	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 0.2 A?	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	Go to step **4**.
4	**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 (–):***	Is the voltage less than 1.0 V?	Go to step **7**.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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 (–):***	Is the voltage less than 1.0 V?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Repair battery short circuit in harness between ECM and rear oxygen sensor connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

No.	Step	Check	Yes	No
7	**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*** ***(E25) No. 2 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **8**.	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 (E1)
8	**CHECK REAR OXYGEN SENSOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between rear oxygen sensor connector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 30 Ω?	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 (E1)	Replace rear oxygen sensor. <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>

R: DTC P0170 — FUEL TRIM MALFUNCTION — S008638B31

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK EXHAUST SYSTEM.**	Are there holes or loose bolts on exhaust system?	Repair exhaust system.	Go to step **2**.
2	**CHECK AIR INTAKE SYSTEM.**	Are there holes, loose bolts or disconnection of hose on air intake system?	Repair air intake system.	Go to step **3**.
3	**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.	Is fuel pressure between 284 and 314 kPa (2.9 — 3.2 kg/cm^2, 41 — 46 psi)?	Go to step **4**.	Repair the following items. **Fuel pressure too high** • Clogged fuel return line or bent hose **Fuel pressure too low** • Improper fuel pump discharge • Clogged fuel supply line

No.	Step	Check	Yes	No
4	**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.	Is fuel pressure between 206 and 235 kPa (2.1 — 2.4 kg/cm^2, 30 — 34 psi)?	Go to step **5**.	Repair the following items. **Fuel pressure too high** ● Faulty pressure regulator ● Clogged fuel return line or bent hose **Fuel pressure too low** ● Faulty pressure regulator ● Improper fuel pump discharge ● Clogged fuel supply line
5	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is temperature between 70°C (158°F) and 100°C (212°F)?	Go to step **6**.	Replace engine coolant temperature sensor. <Ref. to FU-38 REMOVAL, Engine Coolant Temperature Sensor.>

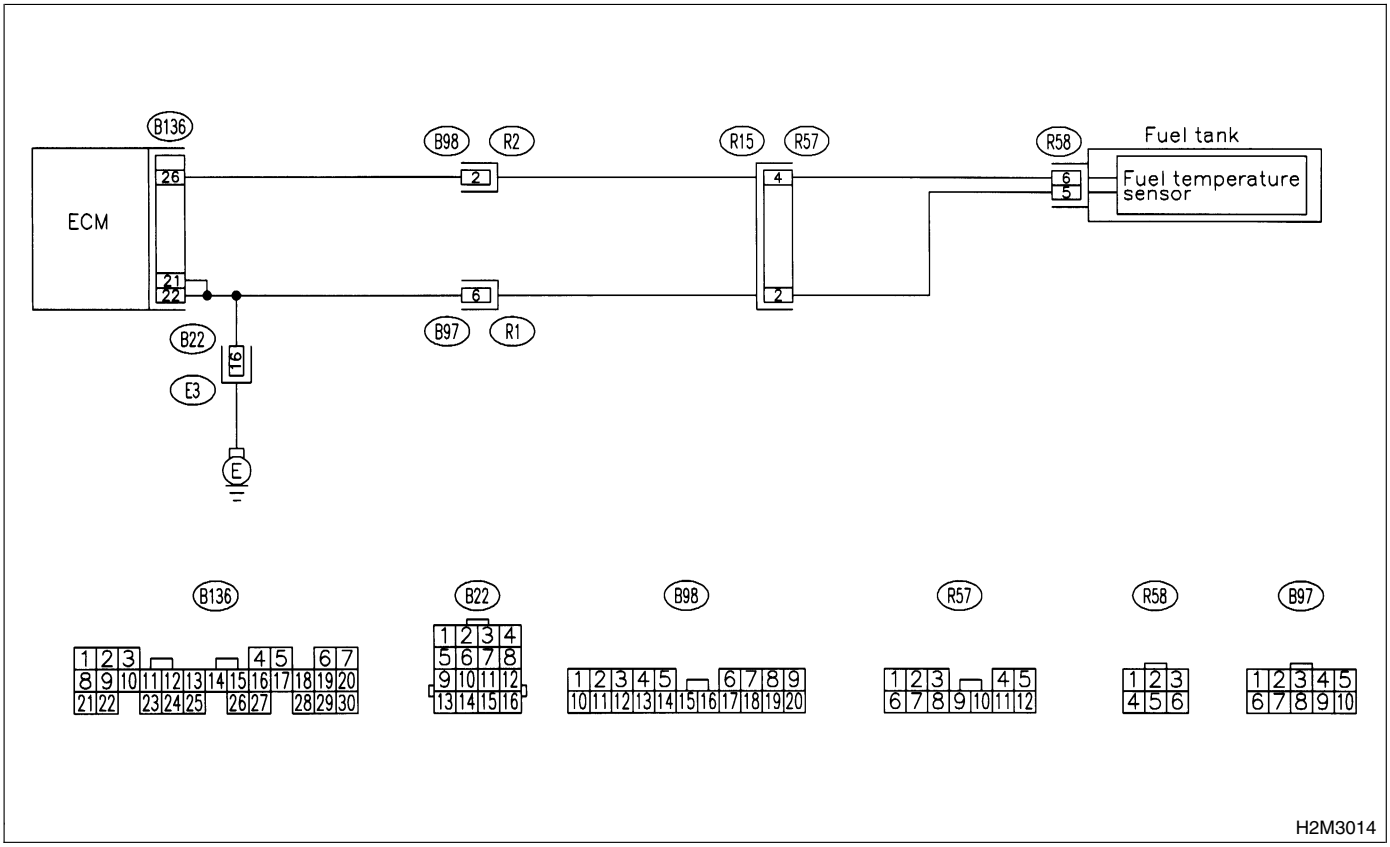
No.	Step	Check	Yes	No
6	**CHECK INTAKE MANIFOLD PRESSURE SENSOR SIGNAL.** 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the selector lever in “N” or “P” position. 3) Turn A/C switch to OFF. 4) Turn all accessory switches to OFF. 5) Read data of 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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual. Specification: ***Engine speed*** ***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)***	Is the voltage within the specifications?	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>

S: DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B34

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0182 or P0183?	Inspect DTC P0182 or P0183 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0181.	Replace fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>

MEMO:

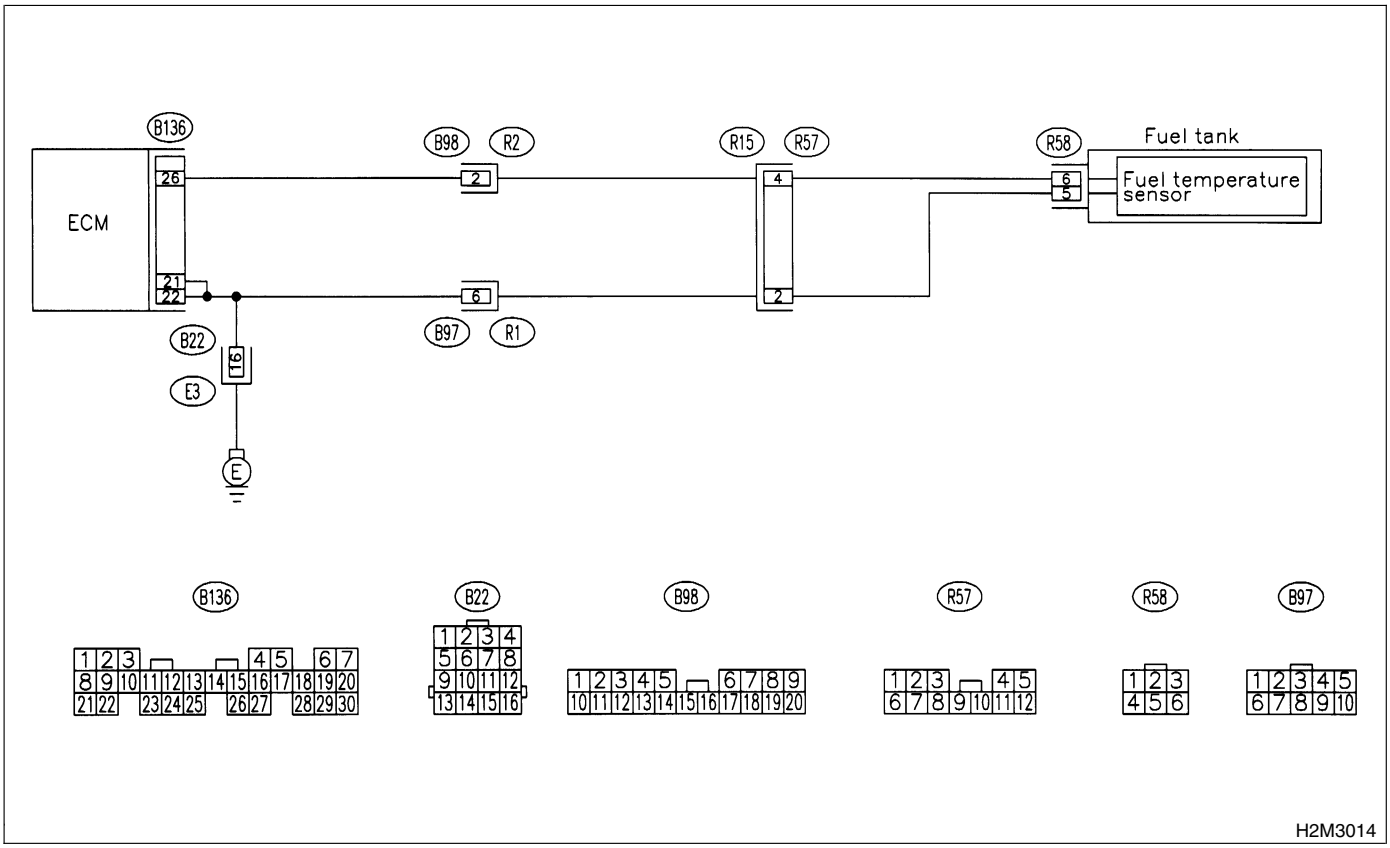
T: DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —

S008638B35

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value greater than 150°C (300°F)?	Go to step **2**.	Even if MIL lights up, the circuit has returned to a normal condition at this time.

No.	Step	Check	Yes	No
2	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● 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 fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>	Repair ground short circuit in harness between fuel pump and ECM connector.

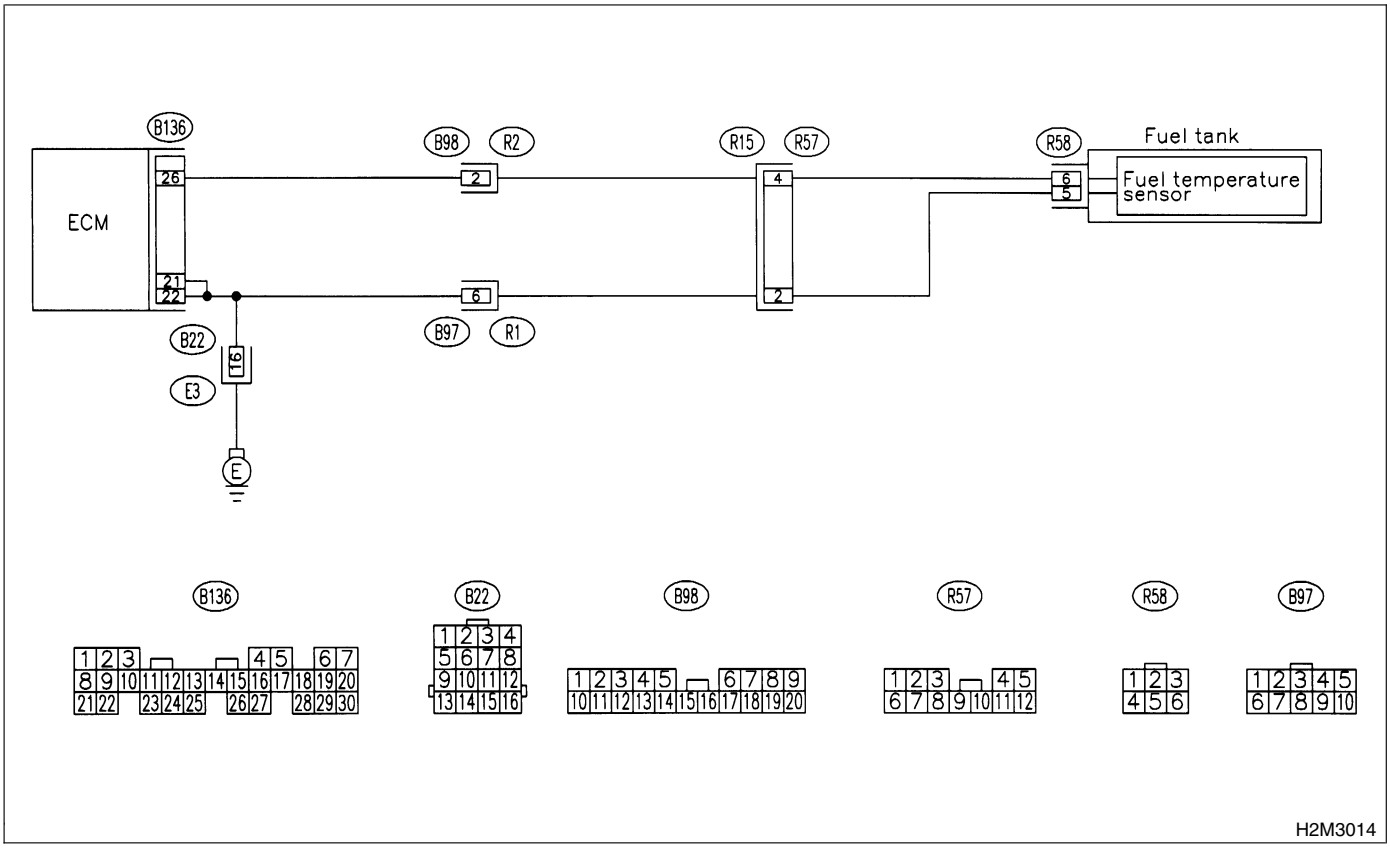
U: DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —

S008638B36

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3014

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • 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)?	Go to step **2**.	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, B98, B97 and R57)

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel pump connector.	Go to step **3**.
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel pump connector.	Go to step **4**.
4	**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 (–):***	Is the voltage more than 4 V?	Go to step **5**.	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 (B98 and R57)
5	**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:***	Is the resistance less than 5 Ω?	Replace fuel temperature sensor. <Ref. to EC-11 REMOVAL, Fuel Temperature Sensor.>	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 (B97 and R57)

V: DTC P0301 — CYLINDER 1 MISFIRE DETECTED — S008638B37

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-366 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

W: DTC P0302 — CYLINDER 2 MISFIRE DETECTED — S008638B38

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-366 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

X: DTC P0303 — CYLINDER 3 MISFIRE DETECTED — S008638B39

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN-366 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

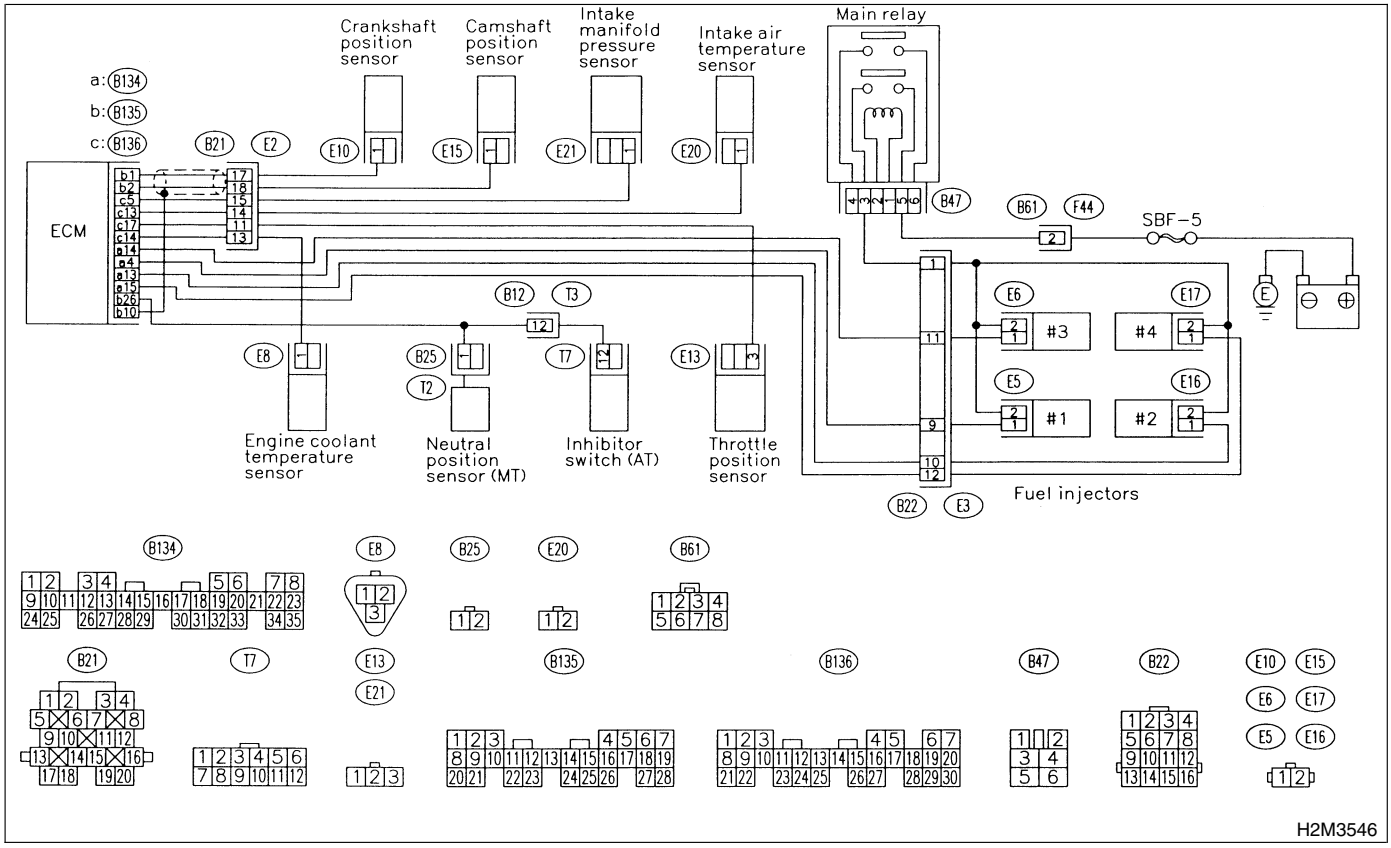
MEMO:

Y: DTC P0304 — CYLINDER 4 MISFIRE DETECTED — S008638B40

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P0116, P0117 or P0125?	Inspect DTC P0106, P0107, P0108, P0116, P0117 or P0125 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0301, P0302, P0303 and P0304.	Go to step **2**.
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	Go to step **3**.
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between fuel injector and ECM connector.	Go to step **4**.
4	**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:***	Is the resistance less than 1 Ω?	Go to step **5**.	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)

No.	Step	Check	Yes	No
5	**CHECK FUEL INJECTOR.** Measure resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 5 and 20 Ω?	Go to step **6**.	Replace faulty fuel injector. <Ref. to FU-54 REMOVAL, Fuel Injector.>
6	**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 (–):***	Is the voltage more than 10 V?	Repair poor contact in all connectors in fuel injector circuit.	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
7	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel injector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **8**.
8	**CHECK FUEL INJECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between fuel injector terminals on faulty cylinder. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace faulty fuel injector <Ref. to FU-54 REMOVAL, Fuel Injector.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **9**.
9	**CHECK INSTALLATION OF CAMSHAFT POSITION SENSOR/CRANKSHAFT POSITION SENSOR.**	Is camshaft position sensor or crankshaft position sensor loosely installed?	Tighten camshaft position sensor or crankshaft position sensor.	Go to step **10**.

No.	Step	Check	Yes	No
10	**CHECK CRANKSHAFT SPROCKET.** Remove timing belt cover.	Is crankshaft sprocket rusted or does it have broken teeth?	Replace crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>	Go to step **11**.
11	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Go to step **12**.
12	**CHECK FUEL LEVEL.**	Is the fuel meter indication higher than the “Lower” level?	Go to step **13**.	Replenish fuel so fuel meter indication is higher than the “Lower” level. After replenishing fuel, Go to step **13**.
13	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Clear memory using Subaru Select Monitor. <Ref. to EN-60 OPERATION, Clear Memory Mode.> 2) Start engine, and drive the vehicle more than 10 minutes.	Is the MIL coming on or blinking?	Go to step **15**.	Go to step **14**.
14	**CHECK CAUSE OF MISFIRE DIAGNOSED.**	Was the cause of misfire diagnosed when the engine is running?	Finish diagnostics operation, if the engine has no abnormality. NOTE: Ex. Remove spark plug cord, etc.	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 (B21)

No.	Step	Check	Yes	No
15	**CHECK AIR INTAKE SYSTEM.**	Is there a fault in air intake system?	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?	Go to step **16**.
16	**CHECK MISFIRE SYMPTOM.** 1) Turn ignition switch to ON. 2) Read diagnostic trouble code (DTC). ● Subaru Select Monitor <Ref. to EN-56 OPERATION, Read Diagnostic Trouble Code.> ● 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.	Does the Subaru Select Monitor or OBD-II general scan tool indicate only one DTC?	Go to step **21**.	Go to step **17**.
17	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0302?	Go to step **22**.	Go to step **18**.
18	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0303 and P0304?	Go to step **23**.	Go to step **19**.
19	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0301 and P0303?	Go to step **24**.	Go to step **20**.
20	**CHECK DIAGNOSTIC TROUBLE CODE (DTC) ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0302 and P0304?	Go to step **25**.	Go to step **26**.
21	**ONLY ONE CYLINDER**	Is there a fault in that cylinder?	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plug ● Spark plug cord ● Fuel injector ● Compression ratio	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

No.	Step	Check	Yes	No
22	**GROUP OF #1 AND #2 CYLINDERS**	Are there faults in #1 and #2 cylinders?	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 "D: IGNITION CONTROL SYSTEM" of #1 and #2 cylinders side. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
23	**GROUP OF #3 AND #4 CYLINDERS**	Are there faults in #3 and #4 cylinders?	Repair or replace faulty parts. NOTE: • Check the following items. Spark plugs Fuel injectors Ignition coil • If no abnormal is discovered, check for "D: IGNITION CONTROL SYSTEM" of #3 and #4 cylinders side. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
24	**GROUP OF #1 AND #3 CYLINDERS**	Are there faults in #1 and #3 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. • Spark plugs • Fuel injectors • Skipping timing belt teeth	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

No.	Step	Check	Yes	No
25	**GROUP OF #2 AND #4 CYLINDERS**	Are there faults in #2 and #4 cylinders?	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plugs ● Fuel injectors ● Compression ratio ● Skipping timing belt teeth	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
26	**CYLINDER AT RANDOM**	Is the engine idle rough?	Go to DTC P0170. <Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Repair or replace faulty parts. NOTE: Check the following items. ● Spark plugs ● Fuel injectors ● Compression ratio

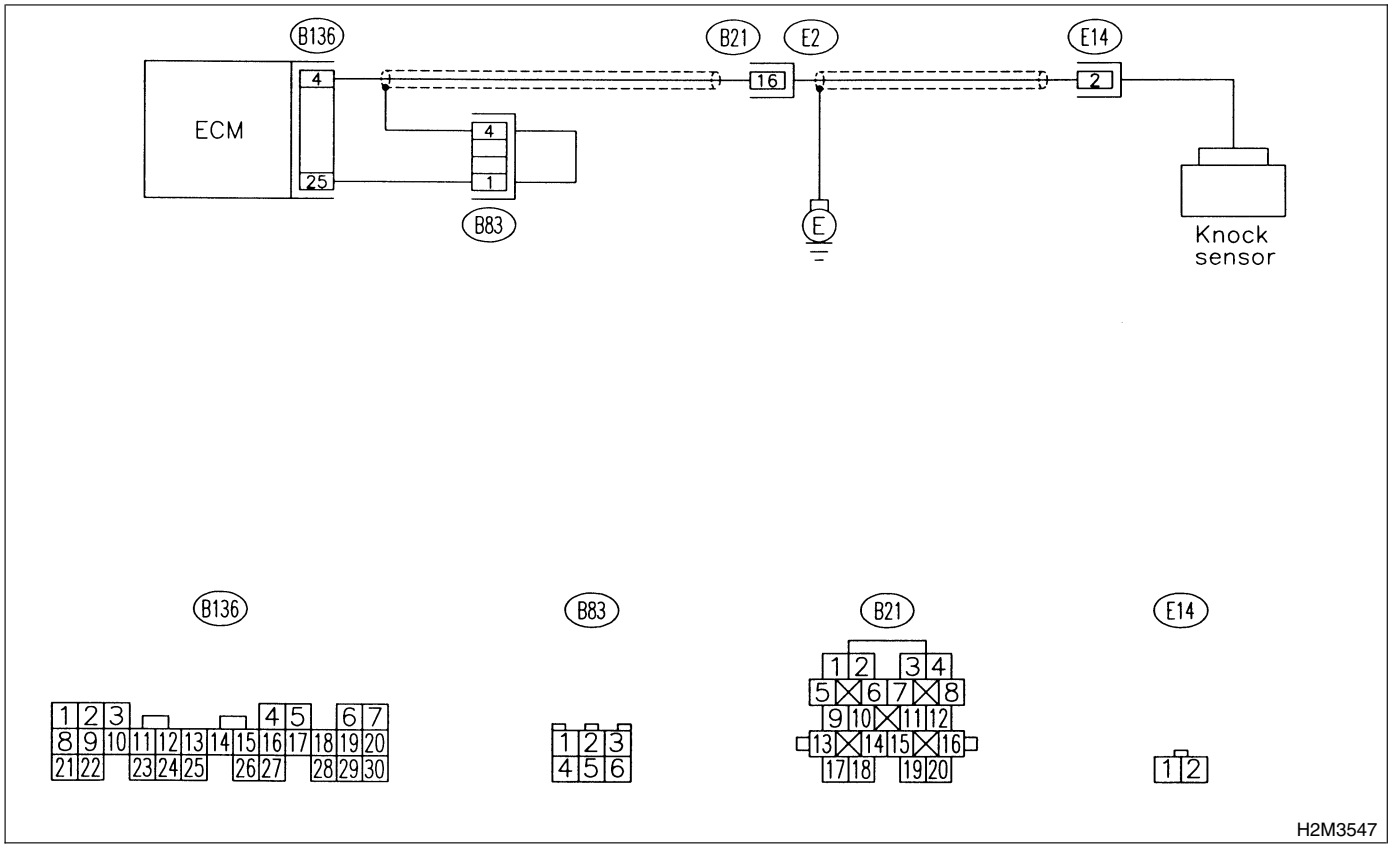
MEMO:

Z: DTC P0325 — KNOCK SENSOR CIRCUIT HIGH INPUT — S008638B41

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 700 kΩ?	Go to step **3**.	Go to step **2**.
2	**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:***	Is the resistance less than 400 kΩ?	Go to step **5**.	Go to step **6**.

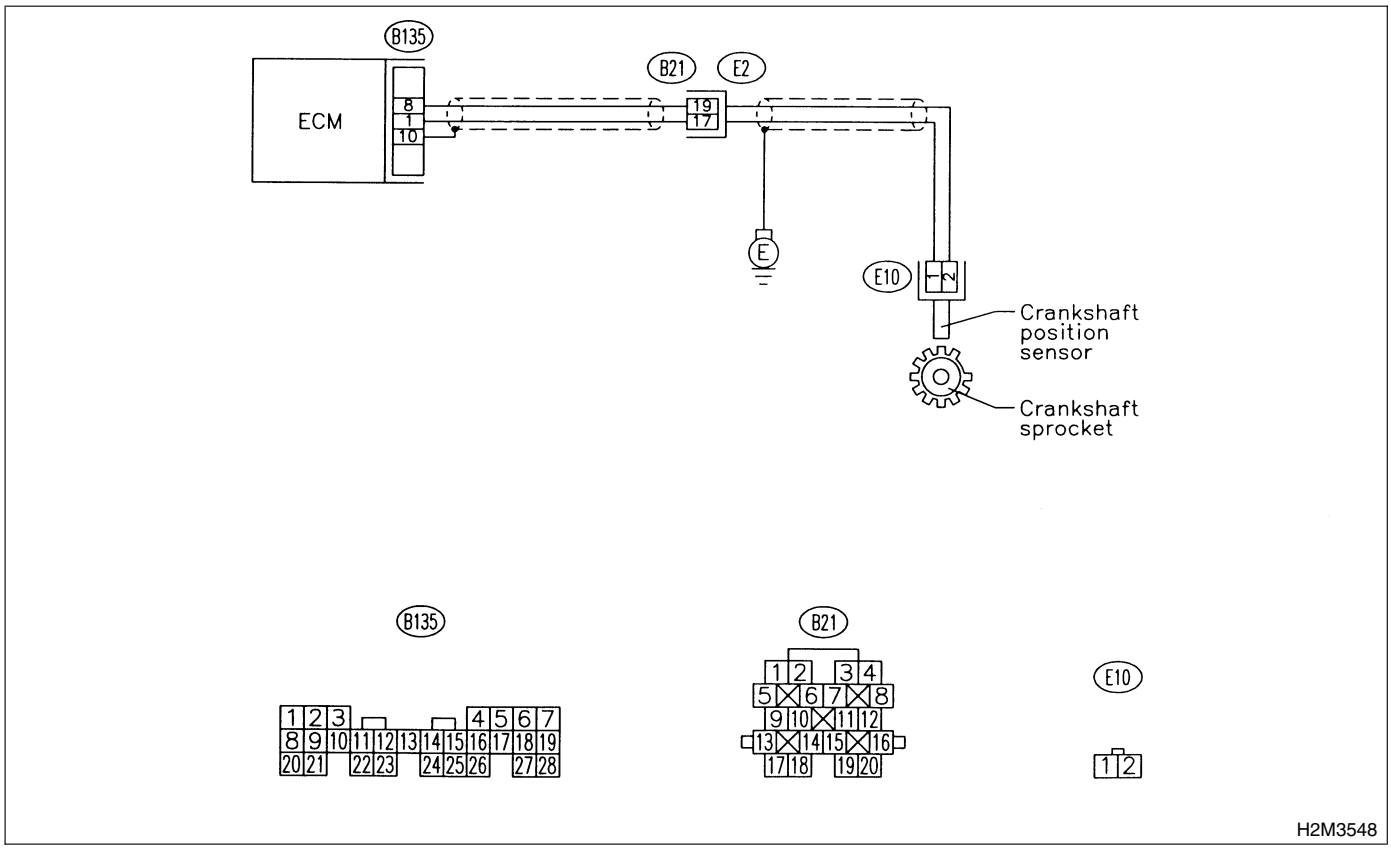
No.	Step	Check	Yes	No
3	**CHECK KNOCK SENSOR.** 1) Disconnect connector from knock sensor. 2) Measure resistance between knock sensor connector terminal and engine ground. ***Terminal*** ***No. 2 — Engine ground:***	Is the resistance more than 700 kΩ?	Go to step **4**.	Repair harness and connector. NOTE: 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)
4	**CHECK CONDITION OF KNOCK SENSOR INSTALLATION.**	Is the knock sensor installation bolt tightened securely?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	Tighten knock sensor installation bolt securely.
5	**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:***	Is the resistance less than 400 kΩ?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	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.
6	**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 (–):***	Is the voltage more than 2 V?	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)	Repair poor contact in ECM connector.

AA: DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION — S008638B42

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **2**.

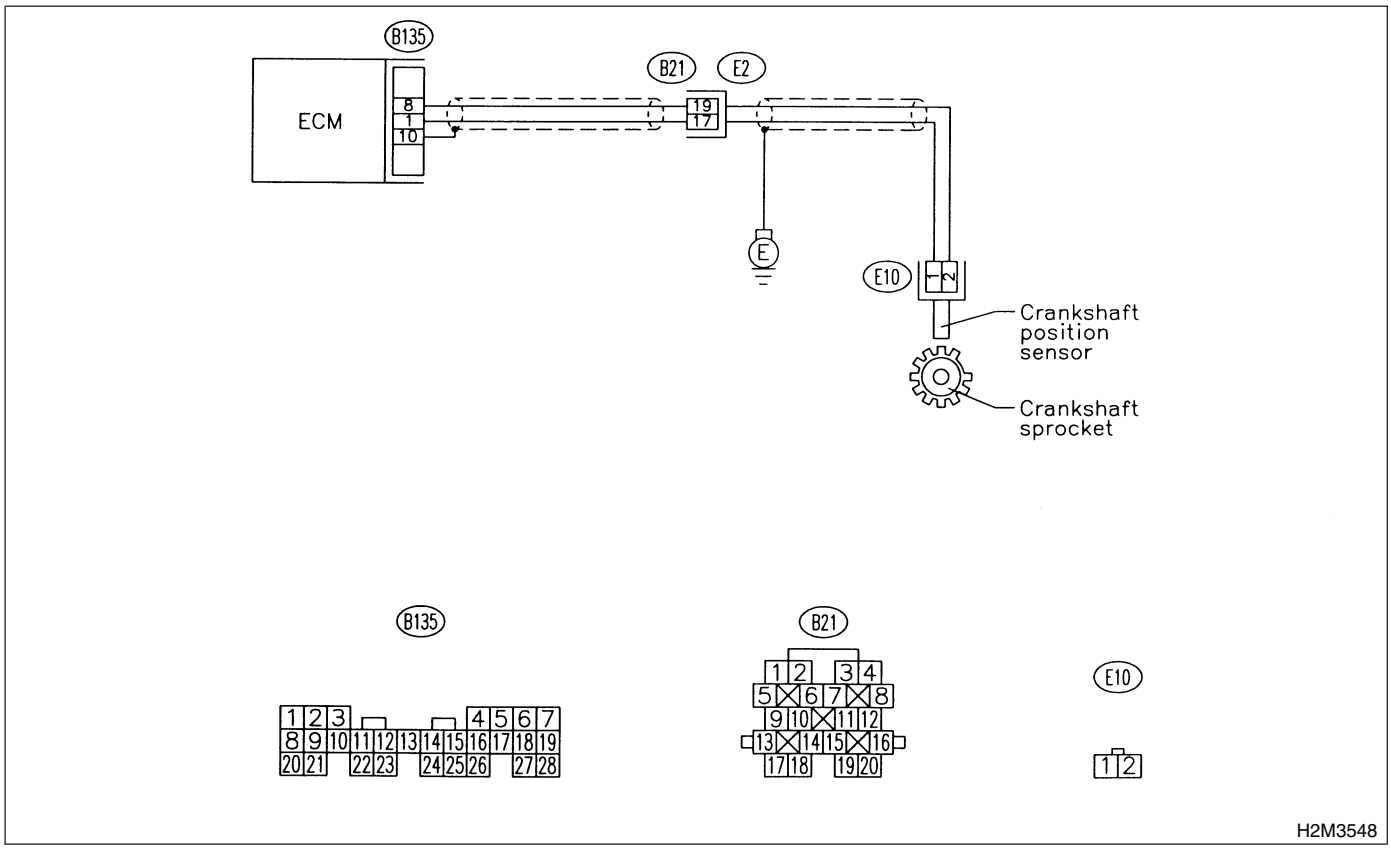
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN CRANKSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure resistance of harness between crankshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E10) No. 1 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short 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.	Go to step **3**.
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.**	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **5**.	Tighten crankshaft position sensor installation bolt securely.
5	**CHECK CRANKSHAFT POSITION SENSOR.** 1) Remove crankshaft position sensor. 2) Measure resistance between connector terminals of crankshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Repair poor contact in crankshaft position sensor connector.	Replace crankshaft position sensor. <Ref. to FU-39 REMOVAL, Crankshaft Position Sensor.>

AB: DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B43

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0335?	Inspect DTC P0335 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.
2	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR.** Turn ignition switch to OFF.	Is the crankshaft position sensor installation bolt tightened securely?	Go to step **3**.	Tighten crankshaft position sensor installation bolt securely.

No.	Step	Check	Yes	No
3	**CHECK CRANKSHAFT SPROCKET.** Remove front belt cover.	Are crankshaft sprocket teeth cracked or damaged?	Replace crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>	Go to step **4**.
4	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Replace crankshaft position sensor. <Ref. to FU-39 REMOVAL, Crankshaft Position Sensor.>

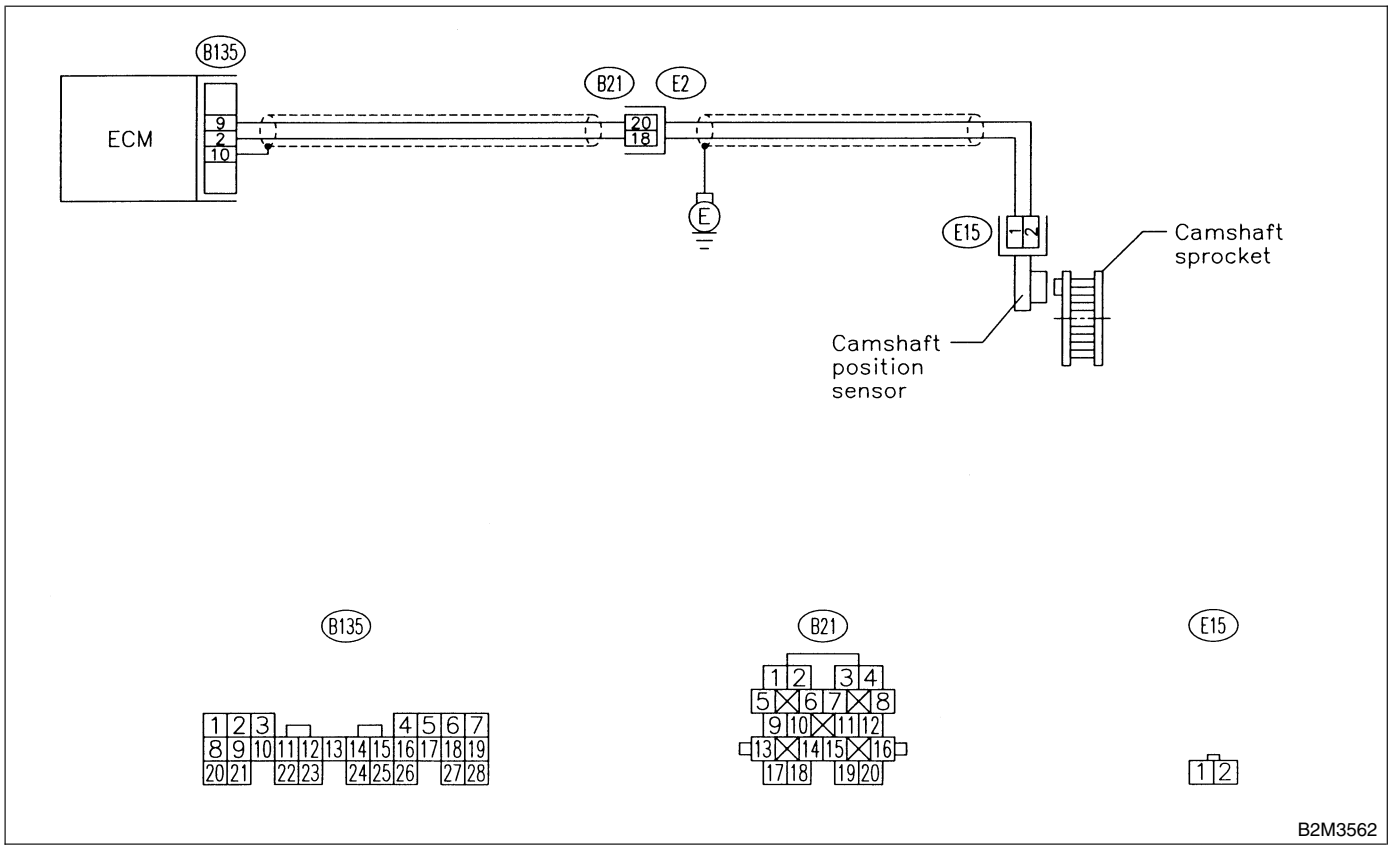
AC: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION

S008638B44

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **2**.

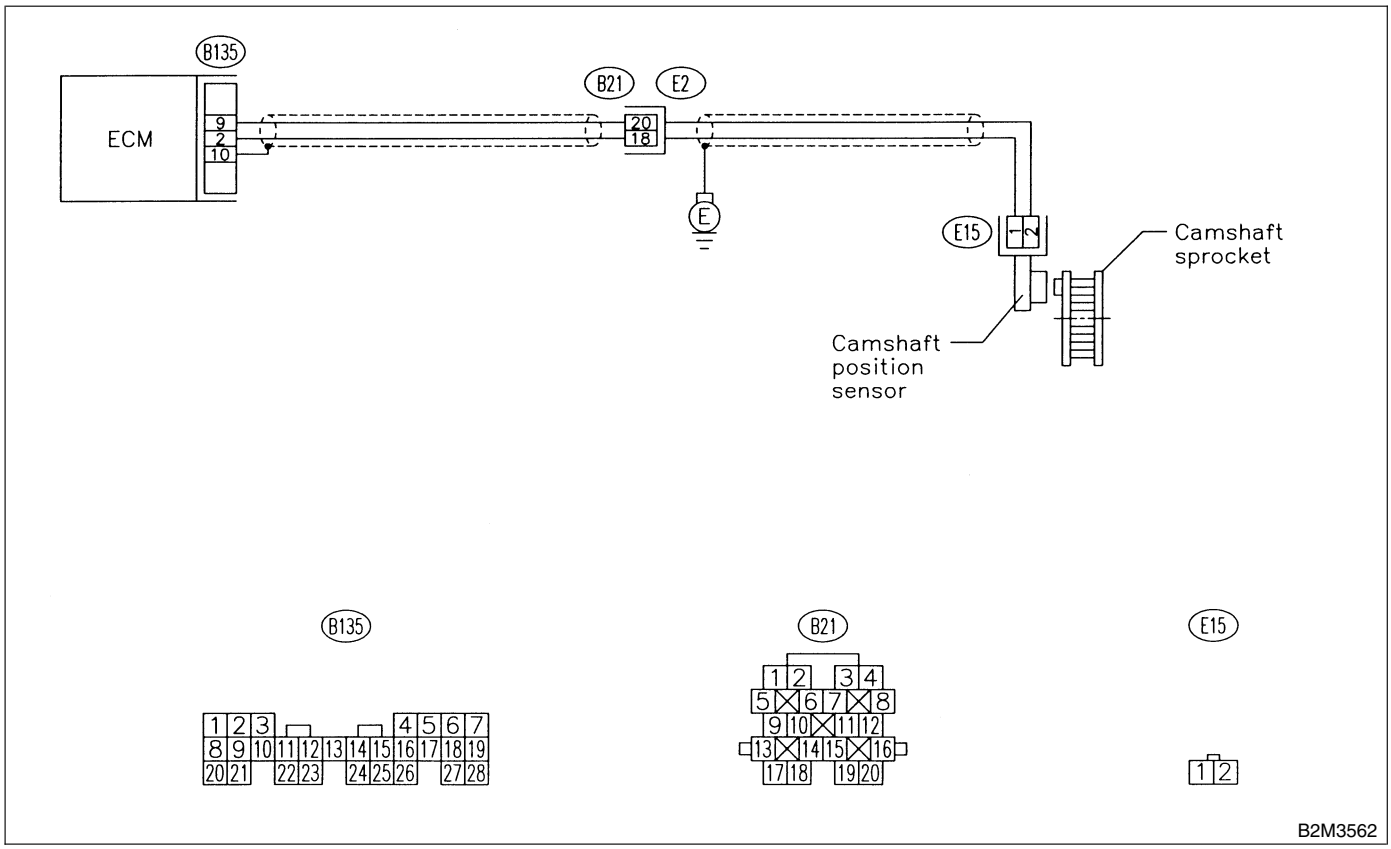
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN CAMSHAFT POSITION SENSOR AND ECM CONNECTOR.** Measure resistance of harness between camshaft position sensor connector and engine ground. ***Connector & terminal*** ***(E15) No. 1 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short 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.	Go to step **3**.
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **5**.	Tighten camshaft position sensor installation bolt securely.
5	**CHECK CAMSHAFT POSITION SENSOR.** 1) Remove camshaft position sensor. 2) Measure resistance between connector terminals of camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Repair poor contact in camshaft position sensor connector.	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

AD: DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B45

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0340?	Inspect DTC P0340 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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:***	Is the resistance more than 100 kΩ?	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)	Go to step **3**.
3	**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:***	Is the resistance less than 10 Ω?	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.	Go to step **4**.
4	**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:***	Is the resistance less than 5 Ω?	Go to step **5**.	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)
5	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.**	Is the camshaft position sensor installation bolt tightened securely?	Go to step **6**.	Tighten camshaft position sensor installation bolt securely.
6	**CHECK CAMSHAFT POSITION SENSOR.** 1) Remove camshaft position sensor. 2) Measure resistance between connector terminals of camshaft position sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 1 and 4 kΩ?	Go to step **7**.	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

No.	Step	Check	Yes	No
7	**CHECK CONDITION OF CAMSHAFT POSITION SENSOR.** Turn ignition switch to OFF.	Is the camshaft position sensor installation bolt tightened securely?	Go to step **8**.	Tighten camshaft position sensor installation bolt securely.
8	**CHECK CAMSHAFT SPROCKET.** Remove front belt cover. <Ref. to ME-52 REMOVAL, Belt Cover.>	Are camshaft sprocket teeth cracked or damaged?	Replace camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>	Go to step **9**.
9	**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	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>	Replace camshaft position sensor. <Ref. to FU-40 REMOVAL, Camshaft Position Sensor.>

MEMO:

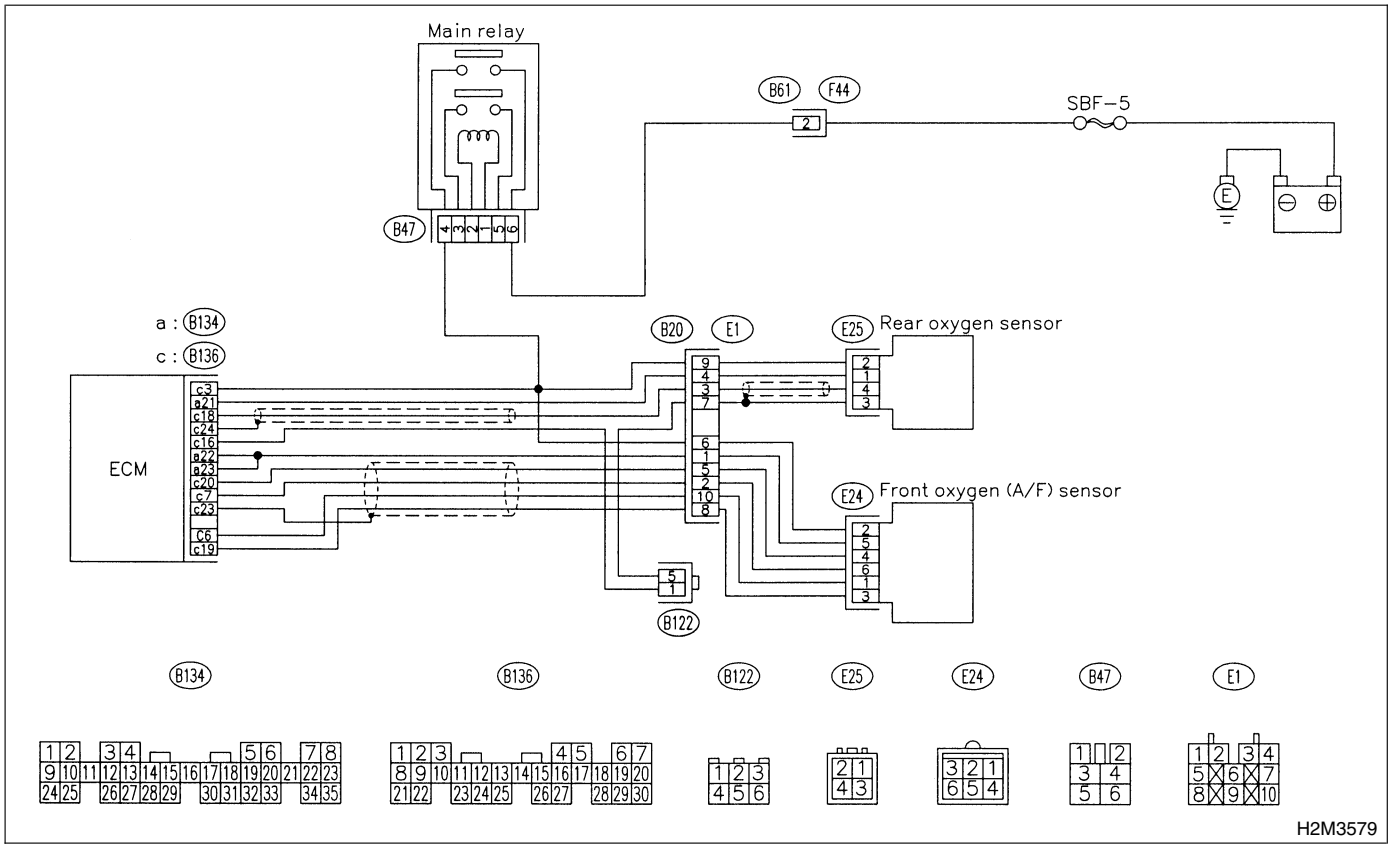
AE: DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD

S008638B46

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	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?	Inspect the relevant DTC using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0420.	Go to step **2**.

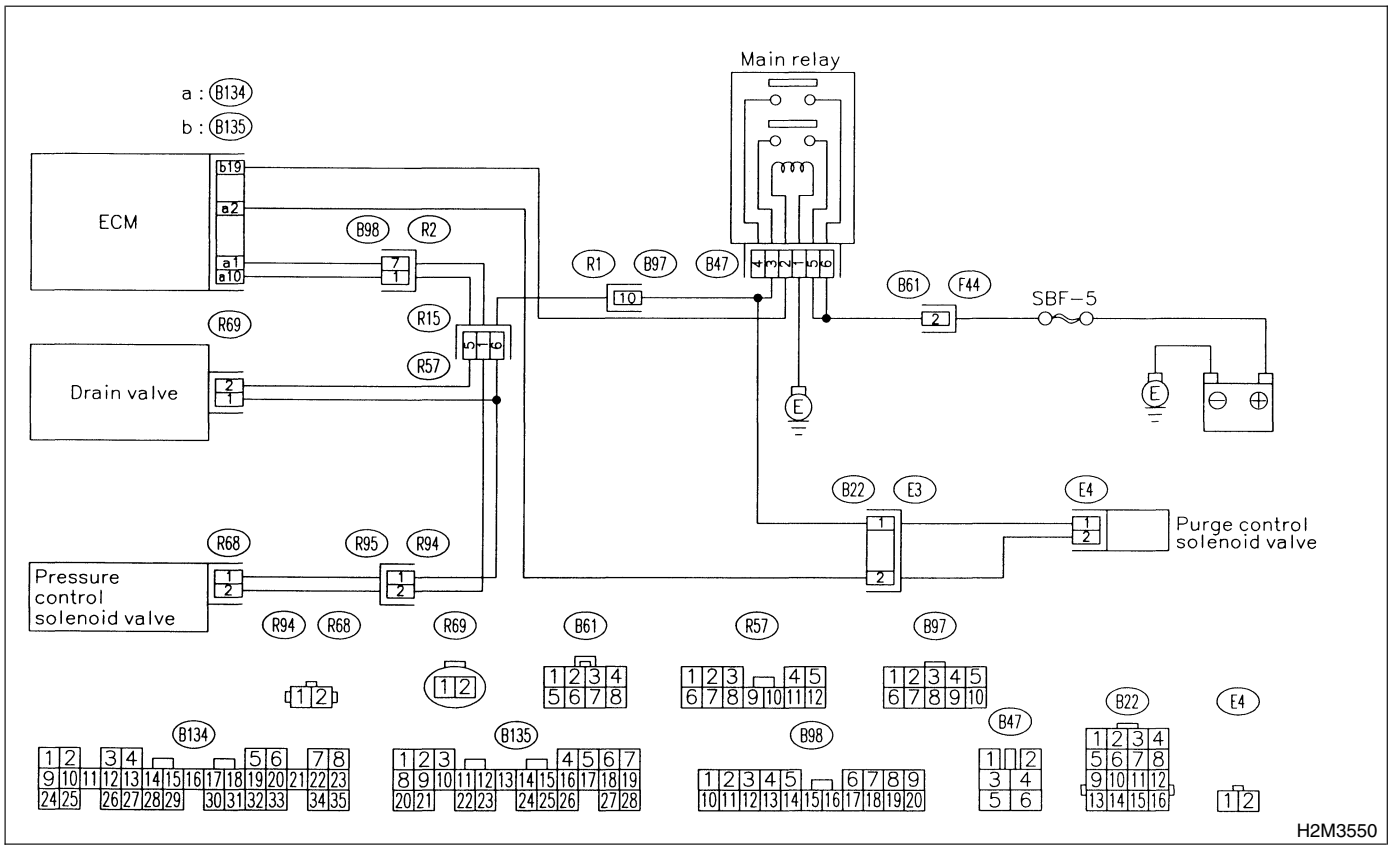
No.	Step	Check	Yes	No
2	**CHECK EXHAUST SYSTEM.** Check for gas leaks or air suction caused by loose or dislocated nuts and bolts, and open hole at exhaust pipes. NOTE: Check the following positions. ● Between cylinder head and front exhaust pipe ● Between front exhaust pipe and front catalytic converter ● Between front catalytic converter and rear catalytic converter	Is there a fault in exhaust system?	Repair or replace exhaust system. <Ref. to EX-6 REMOVAL, Front Exhaust Pipe.>	Go to step **3**.
3	**CHECK REAR CATALYTIC CONVERTER.** Separate rear catalytic converter from rear exhaust pipe.	Is there damage at rear face of rear catalyst?	Replace front catalytic converter <Ref. to EC-3 REMOVAL, Front Catalytic Converter.> and rear catalytic converter <Ref. to EC-6 REMOVAL, Rear Catalytic Converter.>.	Go to step **4**.
4	**CHECK FRONT CATALYTIC CONVERTER.** Remove front catalytic converter.	Is there damage at rear face or front face of front catalyst?	Replace front catalytic converter. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AF: DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION — S008638B47

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Gasoline smell
  - There is a hole of more than 1.0 mm (0.039 in) dia. in evaporation system or fuel tank.

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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.	Is the fuel filler cap tightened securely?	Go to step **3**.	Tighten fuel filler cap securely.
3	**CHECK FUEL FILLER PIPE PACKING.**	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace fuel filler cap and fuel filler pipe. <Ref. to FU-72 REMOVAL, Fuel Filler Pipe.>	Go to step **4**.
4	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does drain valve produce operating sound?	Go to step **5**.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>
5	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does purge control solenoid valve produce operating sound?	Go to step **6**.	Replace purge control solenoid valve. <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.>
6	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does pressure control solenoid valve produce operating sound?	Go to step **7**.	Replace pressure control solenoid valve. <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.>
7	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.** Turn ignition switch to OFF.	Is there a hole of more than 1.0 mm (0.04 in) dia. on fuel line?	Repair or replace fuel line. <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>	Go to step **8**.
8	**CHECK CANISTER.**	Is canister damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace canister. <Ref. to EC-7 REMOVAL, Canister.>	Go to step **9**.
9	**CHECK FUEL TANK.** Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>	Is fuel tank damaged or is there a hole of more than 1.0 mm (0.04 in) dia. in it?	Repair or replace fuel tank. <Ref. to FU-69 INSTALLATION, Fuel Tank.>	Go to step **10**.

No.	Step	Check	Yes	No
10	**CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.**	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?	Repair or replace hoses or pipes.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

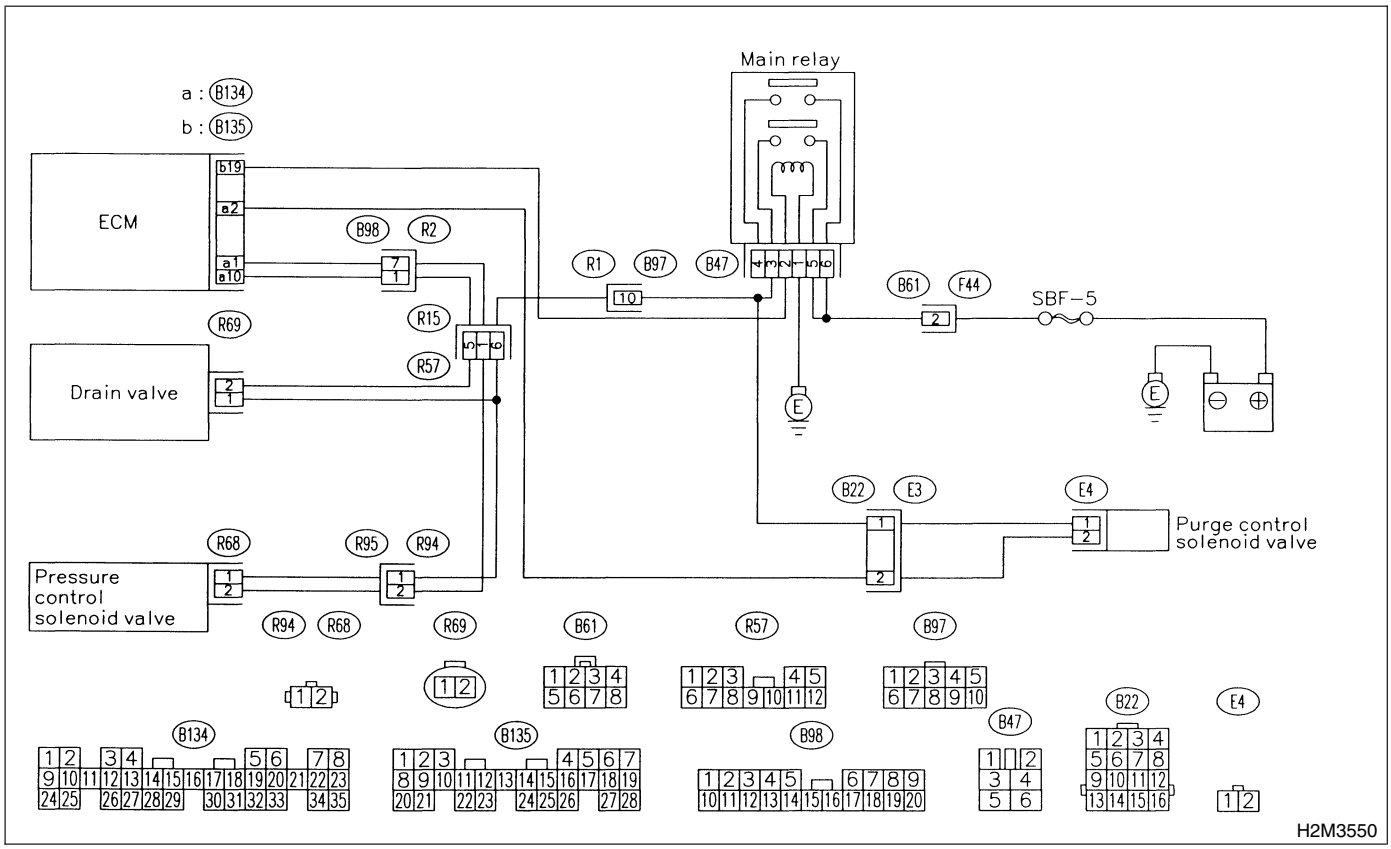
MEMO:

AG: DTC P0442 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION — S008638B48

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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.	Is the fuel filler cap tightened securely?	Go to step **3**.	Tighten fuel filler cap securely.
3	**CHECK FUEL FILLER PIPE PACKING.**	Is there any damage to the seal between fuel filler cap and fuel filler pipe?	Repair or replace fuel filler cap and fuel filler pipe. <Ref. to FU-72 REMOVAL, Fuel Filler Pipe.>	Go to step **4**.
4	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does drain valve produce operating sound?	Go to step **5**.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>
5	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does purge control solenoid valve produce operating sound?	Go to step **6**.	Replace purge control solenoid valve. <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.>
6	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does pressure control solenoid valve produce operating sound?	Go to step **7**.	Replace pressure control solenoid valve. <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.>
7	**CHECK EVAPORATIVE EMISSION CONTROL SYSTEM LINE.** Turn ignition switch to OFF.	Is there a hole of more than 0.5 mm (0.020 in) dia. on fuel line?	Repair or replace fuel line. <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>	Go to step **8**.
8	**CHECK CANISTER.**	Is canister damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?	Repair or replace canister. <Ref. to EC-7 REMOVAL, Canister.>	Go to step **9**.
9	**CHECK FUEL TANK.** Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>	Is fuel tank damaged or is there a hole of more than 0.5 mm (0.020 in) dia. in it?	Repair or replace fuel tank. <Ref. to FU-69 INSTALLATION, Fuel Tank.>	Go to step **10**.

No.	Step	Check	Yes	No
10	**CHECK ANY OTHER MECHANICAL TROUBLE IN EVAPORATIVE EMISSION CONTROL SYSTEM.**	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?	Repair or replace hoses or pipes.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

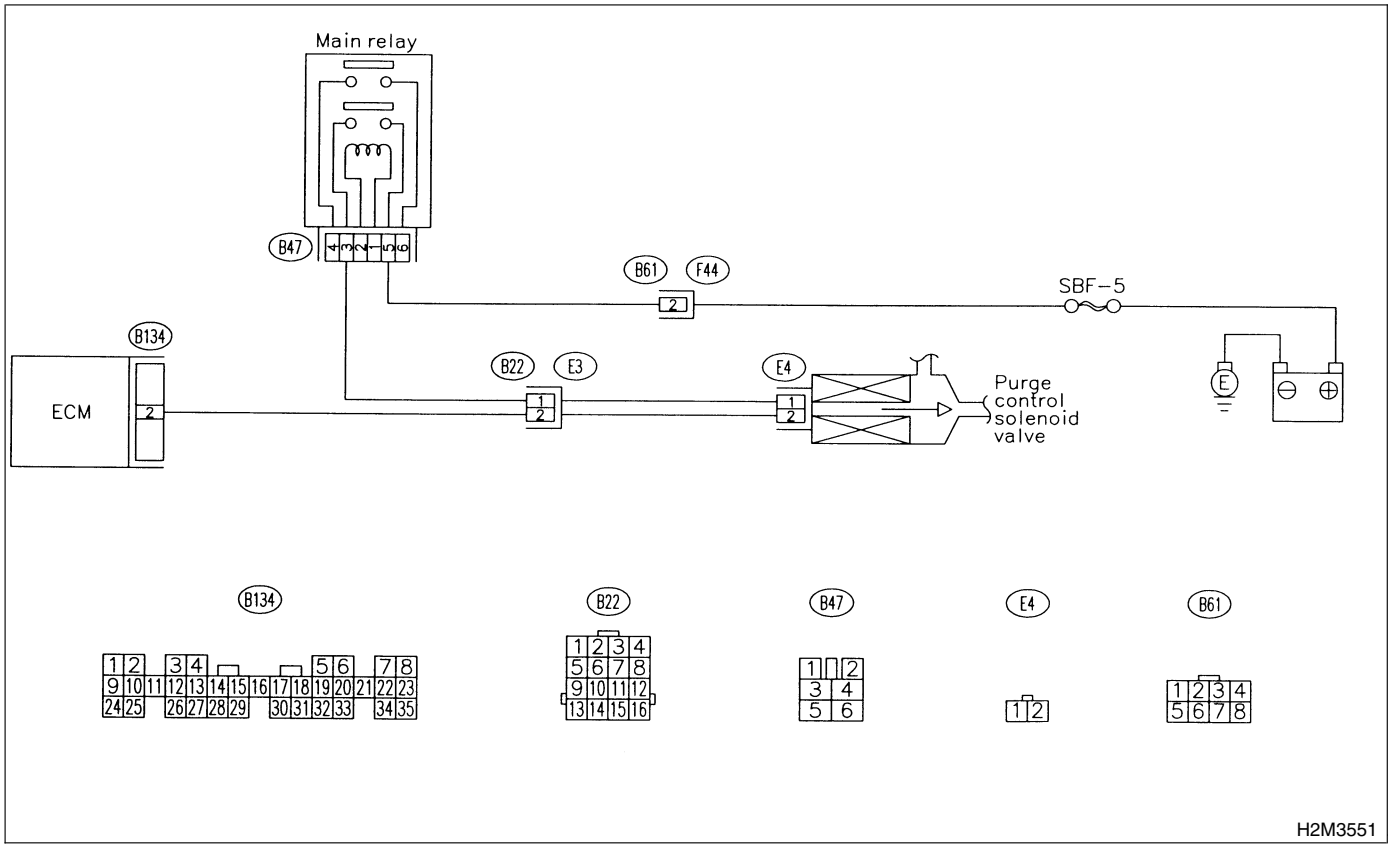
MEMO:

AH: DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT — S008638B49

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	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.	Go to step **2**.

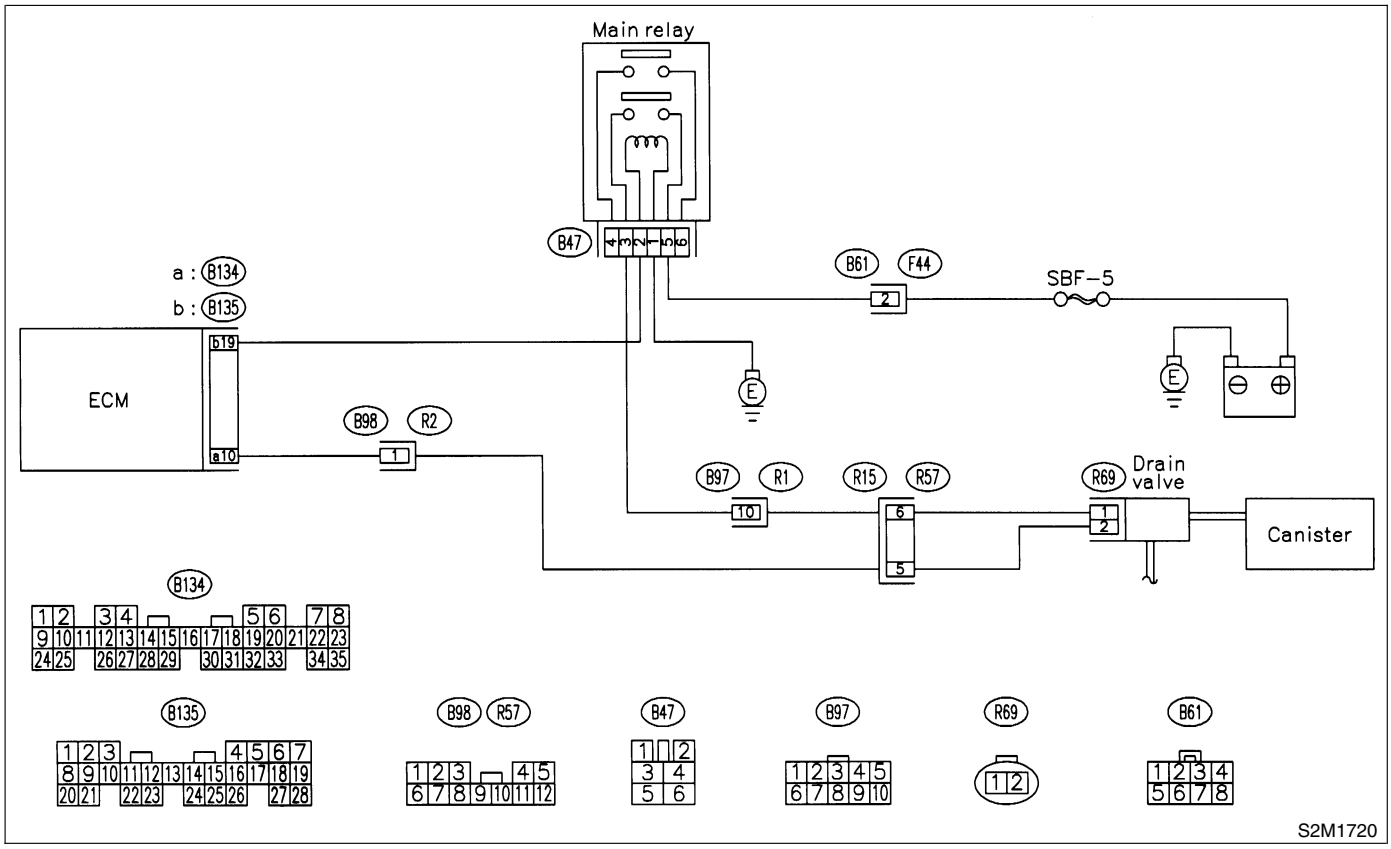
No.	Step	Check	Yes	No
2	**CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from purge control solenoid valve and ECM. 3) Measure resistance of harness between purge control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E4) No. 2 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and purge control solenoid valve connector.	Go to step **3**.
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance between 10 and 100 Ω?	Go to step **5**.	Replace purge control solenoid valve. <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.>
5	**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 (–):***	Is the voltage more than 10 V?	Go to step **6**.	Repair open circuit in harness between main relay and purge control solenoid valve connector.
6	**CHECK POOR CONTACT.** Check poor contact in purge control solenoid valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in purge control solenoid valve connector?	Repair poor contact in purge control solenoid valve connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AI: DTC P0446 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL LOW INPUT — S008638B50

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (−):***	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.

No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	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, B98 and R57)
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and drain valve connector.	Go to step **4**.
4	**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:***	Is the voltage less than 1 Ω?	Go to step **5**.	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 (B98 and R57)
5	**CHECK DRAIN VALVE.** Measure resistance between drain valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 10 and 100 Ω?	Go to step **6**.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>

No.	Step	Check	Yes	No
6	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	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 and R57) ● Poor contact in main relay connector
7	**CHECK POOR CONTACT.** Check poor contact in drain valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in drain valve connector?	Repair poor contact in drain valve connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

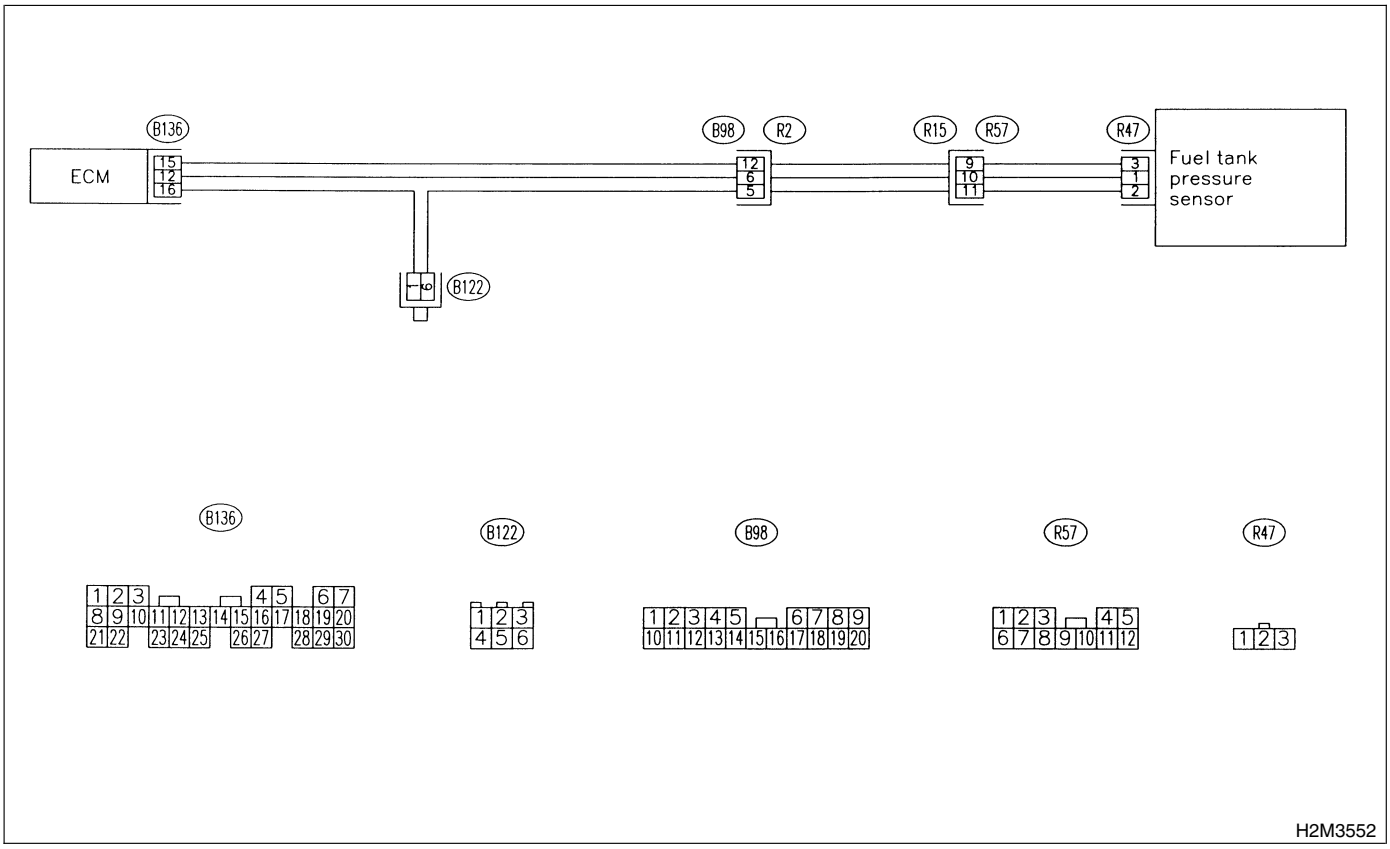
MEMO:

AJ: DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE PROBLEM — S008638B51

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any DTC on display?	Inspect the relevant DTC using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.
2	**CHECK FUEL FILLER CAP.** 1) Turn ignition switch to OFF. 2) Open the fuel flap.	Is the fuel filler cap tightened securely?	Go to step **3**.	Tighten fuel filler cap securely.

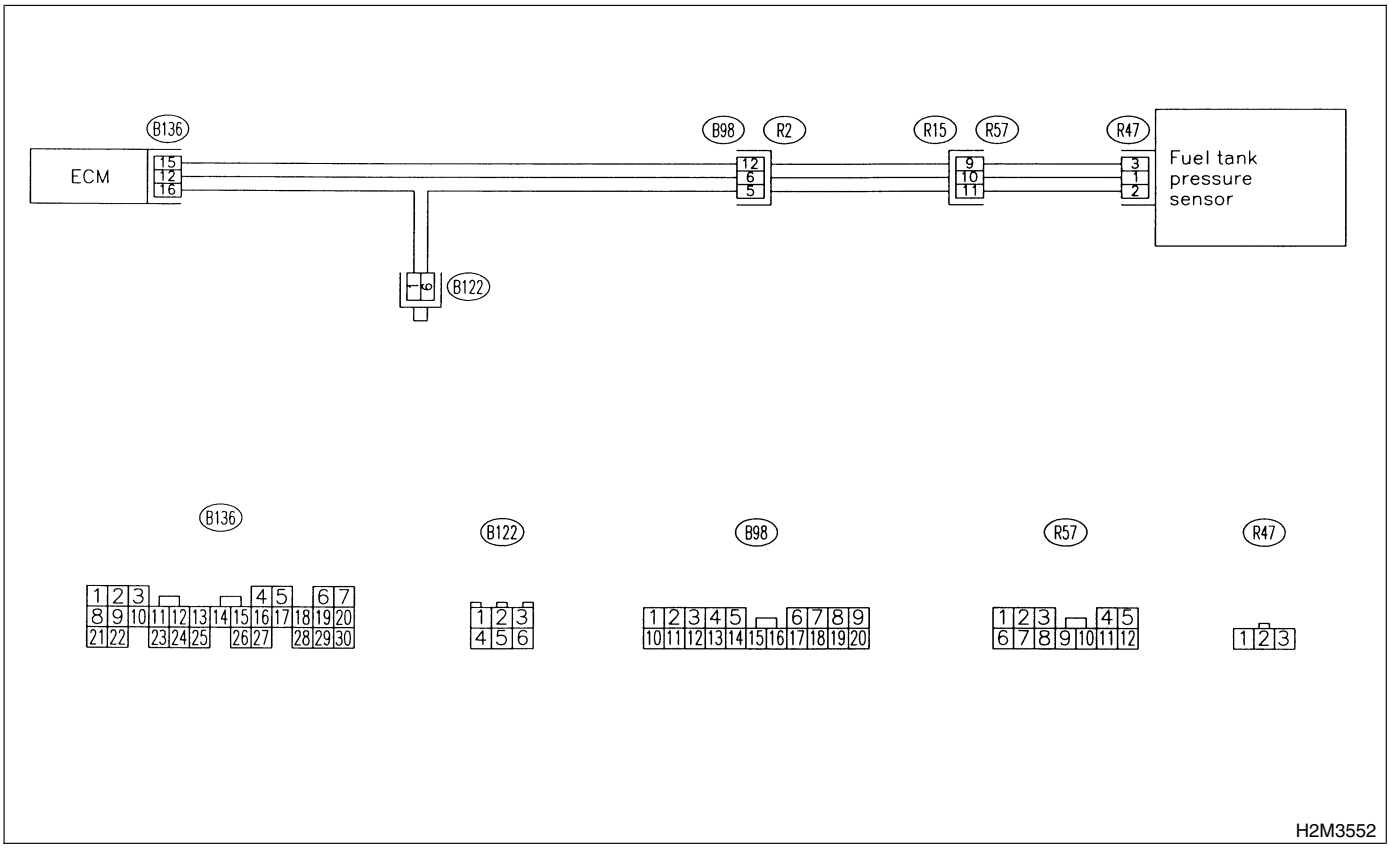
No.	Step	Check	Yes	No
3	**CHECK PRESSURE/VACUUM LINE.** NOTE: Check the following items. ● Disconnection, leakage and clogging of the vacuum hoses and pipes between fuel tank pressure sensor and fuel tank ● Disconnection, leakage and clogging of air ventilation hoses and pipes between fuel filler pipe and fuel tank	Is there a fault in pressure/ vacuum line?	Repair or replace hoses and pipes.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

AK: DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT — S008638B52

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3552

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than –2.8 kPa (–21.0 mmHg, –0.827 inHg)?	Go to step **2**.	Even if MIL lights up, the circuit has returned to a normal condition at this time.

No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** 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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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*** ***(R15) No. 9 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98) ● Poor contact in joint connector (B122)

No.	Step	Check	Yes	No
7	**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 — (R15) No. 11:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98) ● Poor contact in joint connector (B122)
8	**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*** ***(R15) No. 11 — Chassis ground:***	Is the resistance more than 500 kΩ?	Go to step **9**.	Repair ground short circuit in harness between ECM and rear wiring harness connector (R15).
9	**CHECK FUEL TANK CORD.** 1) Disconnect connector from fuel tank pressure sensor. 2) Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 9 — (R47) No. 3:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair open circuit in fuel tank cord.
10	**CHECK FUEL TANK CORD.** Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 10 — (R47) No. 1:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair open circuit in fuel tank cord.
11	**CHECK FUEL TANK CORD.** Measure resistance of harness between fuel tank pressure sensor connector and chassis ground. ***Connector & terminal*** ***(R47) No. 2 — Chassis ground:***	Is the resistance more than 500 kΩ?	Go to step **12**.	Repair ground short circuit in fuel tank cord.
12	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure sensor connector?	Repair poor contact in fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

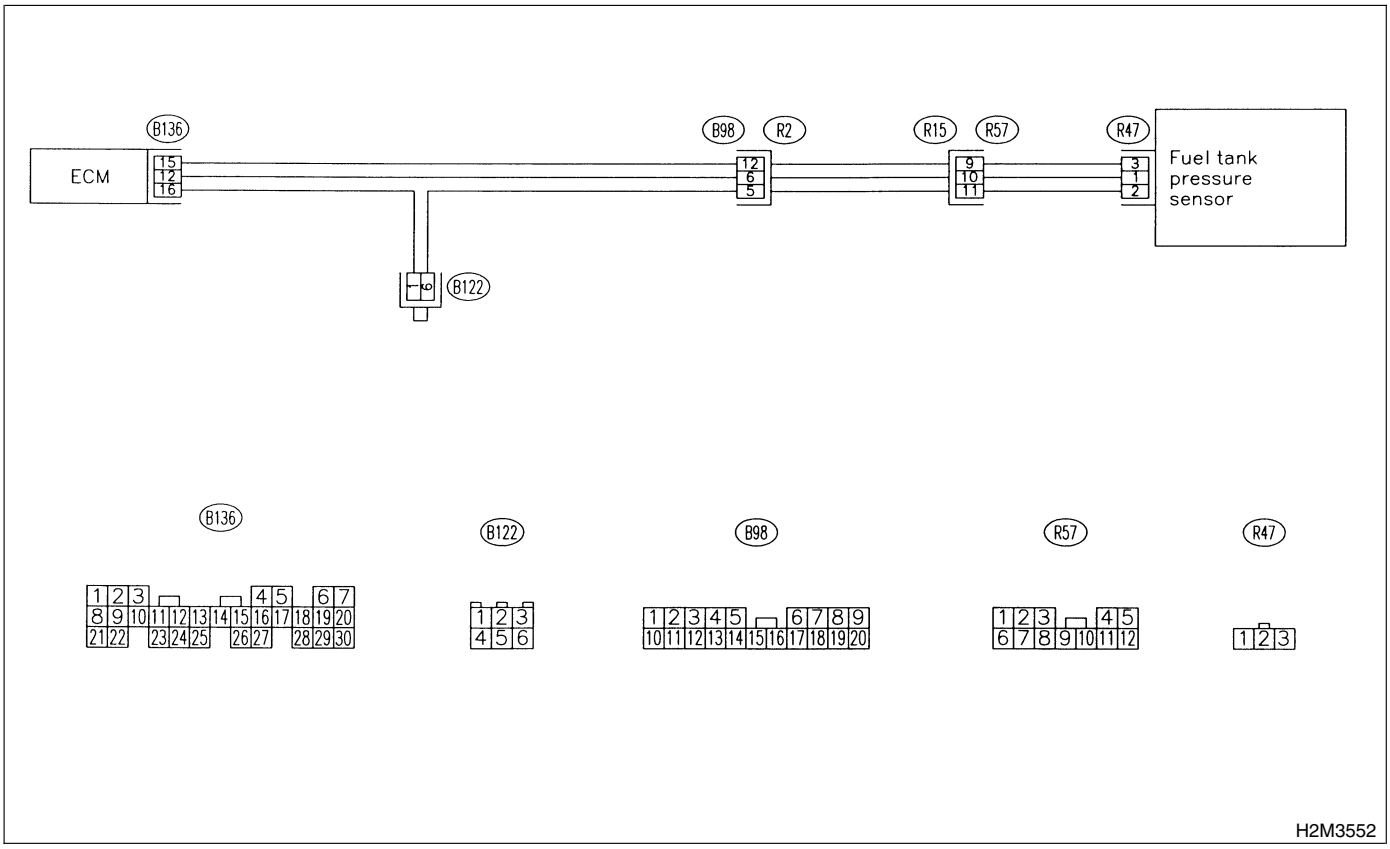
MEMO:

AL: DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT — S008638B53

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3552

No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?	Go to step **12**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POWER SUPPLY TO FUEL TANK PRESSURE SENSOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM. (USING SUBARU SELECT MONITOR.)** 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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**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*** ***(R15) No. 9 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98)
7	**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 — (R15) No. 10:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and rear wiring harness connector (R15) ● Poor contact in coupling connector (B98)

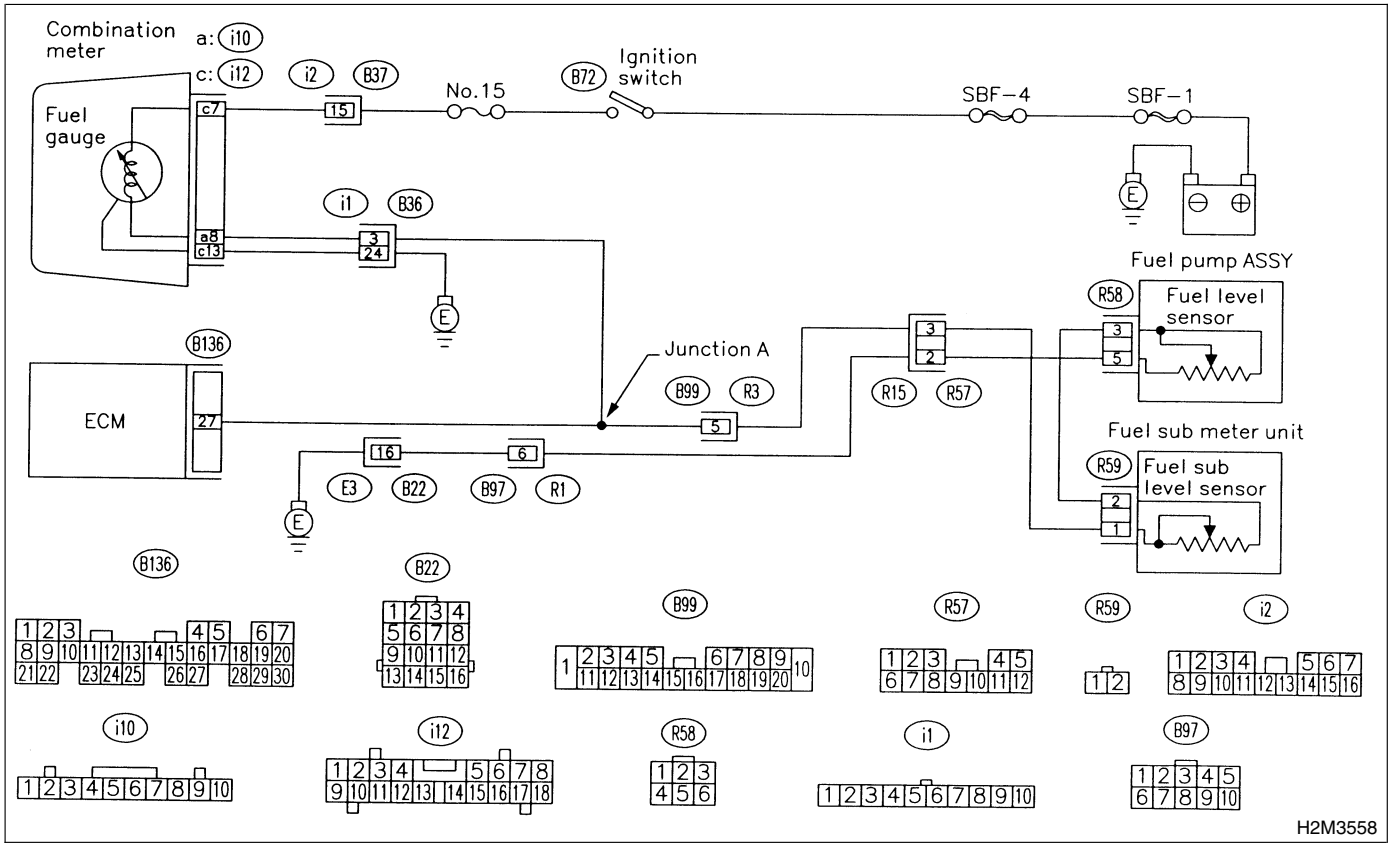
No.	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN ECM AND COUPLING CONNECTOR IN REAR WIRING HARNESS.** Measure resistance of harness between rear wiring harness connector and chassis ground. ***Connector & terminal*** ***(B136) No. 16 — (R15) No. 11:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair ground short circuit in harness between ECM and rear wiring harness connector (R15).
9	**CHECK FUEL TANK CORD.** 1) Disconnect connector from fuel tank pressure sensor. 2) Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 11 — (R47) No. 2:***	Is the resistance less than 1 Ω?	Go to step **10**.	Repair open circuit in fuel tank cord.
10	**CHECK FUEL TANK CORD.** Measure resistance of fuel tank cord. ***Connector & terminal*** ***(R57) No. 10 — (R47) No. 1:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair open circuit in fuel tank cord.
11	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure sensor connector?	Repair poor contact in fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>
12	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.8 kPa (21.0 mmHg, 0.827 inHg)?	Repair battery short circuit in harness between ECM and fuel tank pressure sensor connector.	Replace fuel tank pressure sensor. <Ref. to EC-15 REMOVAL, Fuel Tank Pressure Sensor.>

AM: DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S008638B54

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



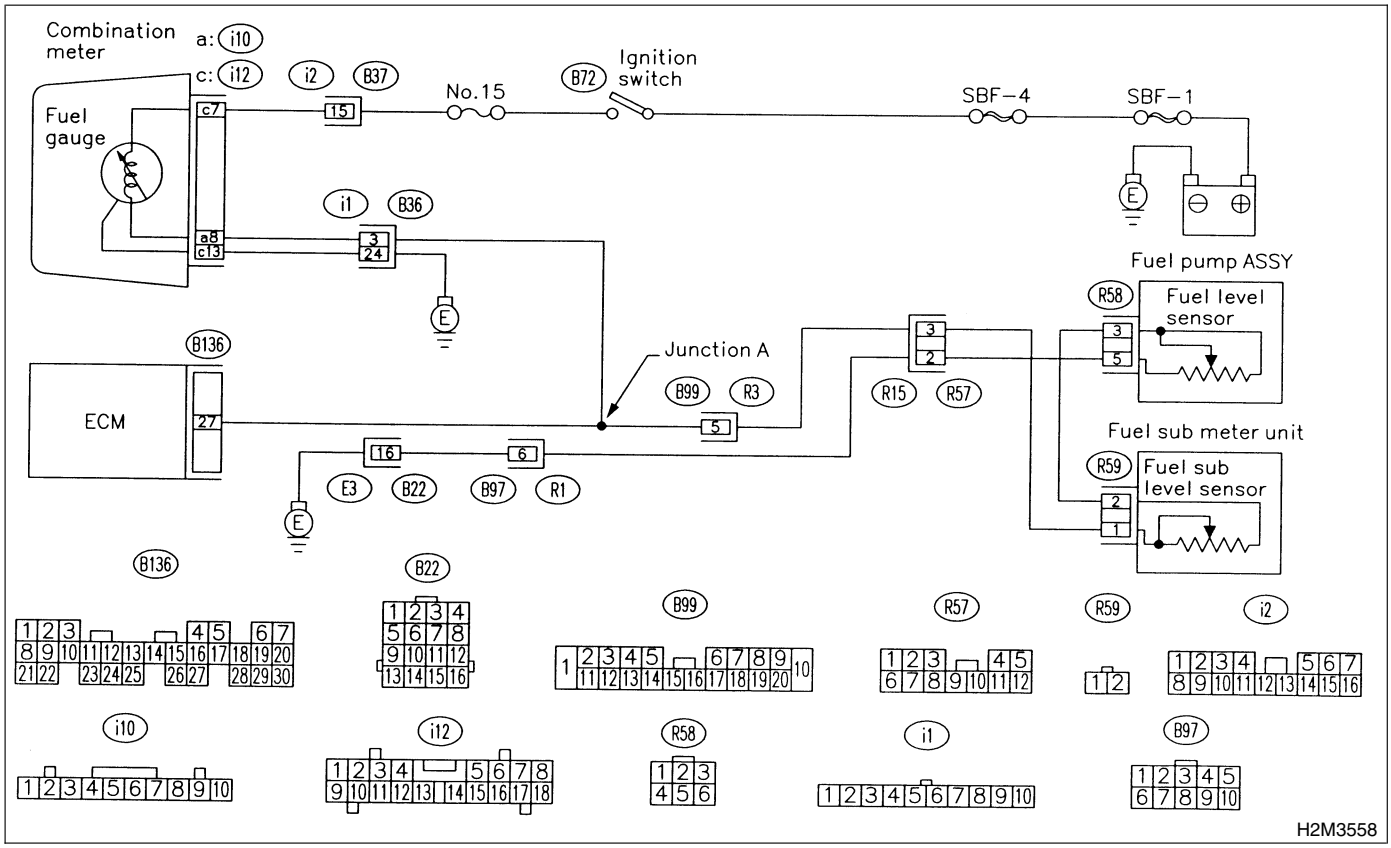
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0462 or P0463?	Inspect DTC P0462 or P0463 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect this trouble.	Replace fuel sending unit and fuel sub level sensor <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>.

AN: DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT — S008638B55

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.**	Does speedometer and tachometer operate normally?	Go to step **2**.	Repair or replace combination meter.
2	**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 (−):***	Is the voltage less than 0.12 V?	Go to step **6**.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	Does the value change less than 0.12 V by shaking harness and connector of ECM while monitoring the value with Subaru Select Monitor?	Repair poor contact in ECM connector.	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 and R57)
4	**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 (–):***	Is the voltage more than 0.12 V?	Go to step **4**.	Go to step **7**.
5	**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:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair ground short circuit in harness between ECM and combination meter connector.
6	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER.** Measure resistance between ECM and combination meter connector. ***Connector & terminal*** ***(B136) No. 27 — (i10) No. 8:***	Is the resistance less than 10 Ω?	Repair or replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>	Repair open circuit between ECM and combination meter connector. NOTE: In this case, repair the following: Poor contact in coupling connector (i1)
7	**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:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair ground short circuit in fuel tank cord.

No.	Step	Check	Yes	No
8	**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:***	Is the resistance more than 1 MΩ?	Go to step **9**.	Repair ground short circuit in fuel tank cord.
9	**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 FU-77 REMOVAL, Fuel Pump.> 2) Measure resistance between fuel level sensor and terminals with its float set to the full position. ***Terminals*** ***No. 3 — No. 6:***	Is the resistance between 0.5 and 2.5 Ω?	Go to step **10**.	Replace fuel level sensor.
10	**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 EC-13 REMOVAL, Sub Fuel Level Sensor.> 2) Measure resistance between fuel sub level sensor and terminals with its float set to the full position. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 0.5 and 2.5 Ω?	Repair poor contact in harness between ECM and combination meter connector.	Replace fuel sub level sensor.

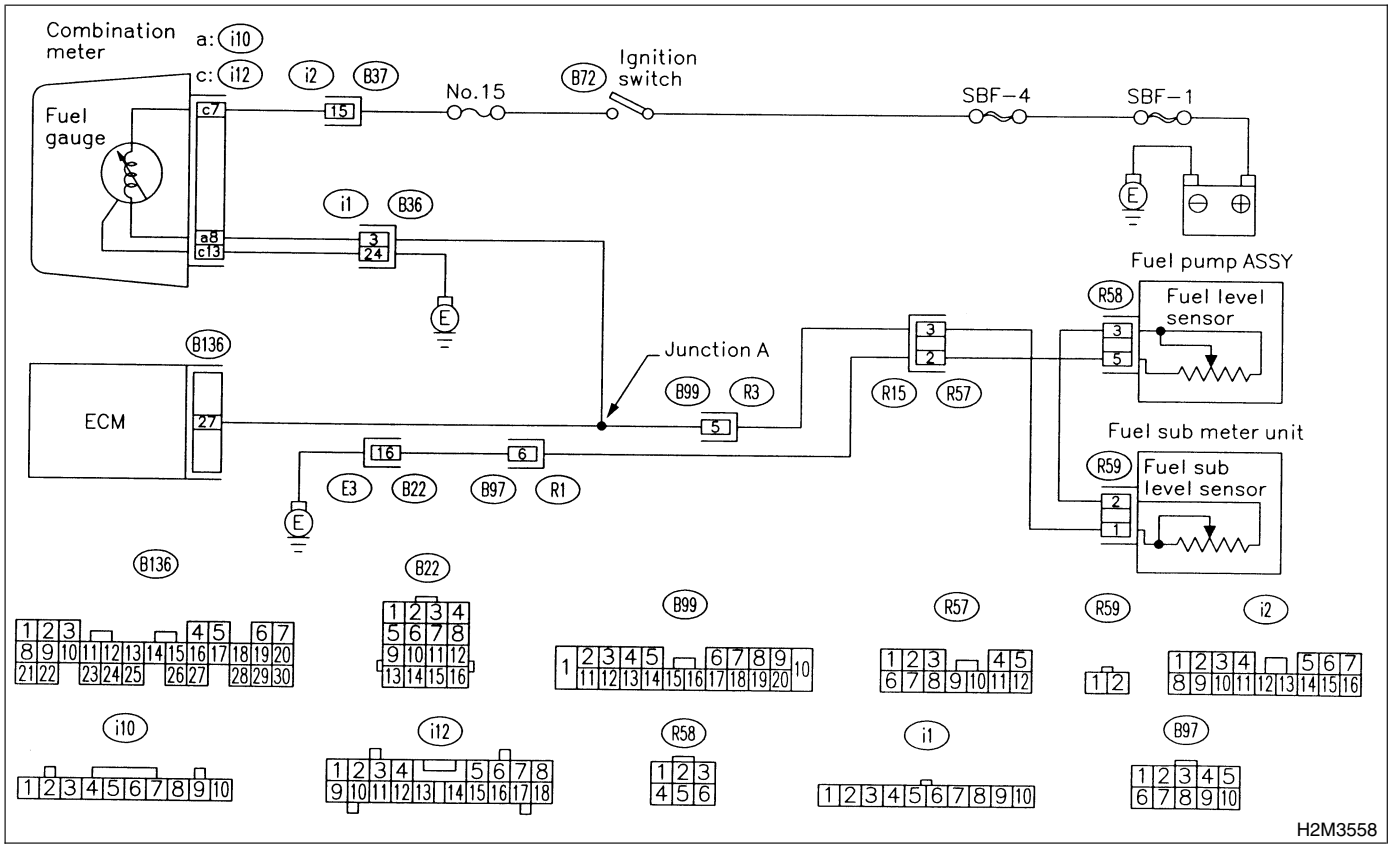
MEMO:

AO: DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT — S008638B56

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK SPEEDOMETER AND TACHOMETER OPERATION IN COMBINATION METER.**	Does speedometer and tachometer operate normally?	Go to step **2**.	Repair or replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 4.75 V?	Go to step **3**.	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, B97 and R57)
3	**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 (–):***	Is the voltage more than 4.75 V?	Go to step **4**.	Repair battery short circuit between ECM and combination meter connector.
4	**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. 3:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair open circuit between ECM and fuel tank cord.
5	**CHECK HARNESS BETWEEN FUEL TANK CORD AND CHASSIS GROUND.** Measure resistance between fuel tank cord and chassis ground. ***Connector & terminal*** ***(R15) No. 2 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **6**.	Repair open circuit between fuel tank cord and chassis ground. NOTE: In this case, repair the following: Poor contact in coupling connectors (B22 and B97)
6	**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. 2 — (R58) No. 5:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair open circuit between coupling connector and fuel level sensor.

No.	Step	Check	Yes	No
7	**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. 3 — (R59) No. 2:***	Is the resistance less than 10 Ω?	Go to step **8**.	Repair open circuit between fuel level sensor and fuel sub level sensor.
8	**CHECK FUEL TANK CORD.** Measure resistance between fuel sub level sensor and coupling connector. ***Connector & terminal*** ***(R57) No. 3 — (R59) No. 1:***	Is the resistance less than 10 Ω?	Go to step **9**.	Repair open circuit between coupling connector and fuel sub level sensor.
9	**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 FU-77 REMOVAL, Fuel Pump.> 2) While moving fuel level sensor float up and down, measure resistance between fuel level sensor terminals. ***Terminals*** ***No. 3 — No. 6:***	Is the resistance more than 54.5 Ω?	Go to step **10**.	Replace fuel level sensor. <Ref. to FU-80 REMOVAL, Fuel Level Sensor.>
10	**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 EC-13 REMOVAL, Sub Fuel Level Sensor.> 2) Measure resistance between connector terminals of fuel sub level sensor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance more than 41.5 Ω?	Replace combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.>	Replace fuel sub level sensor. <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>

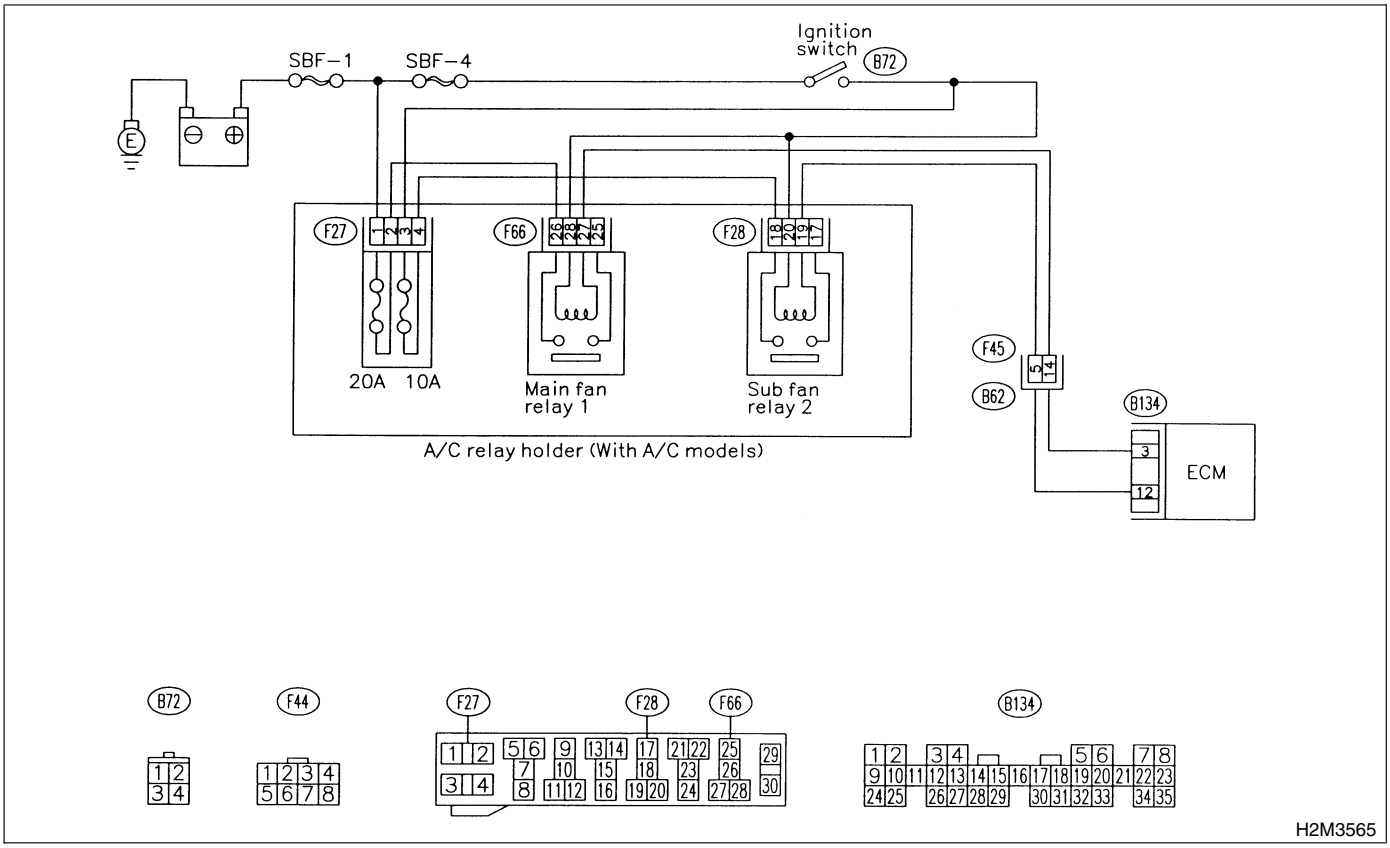
MEMO:

AP: DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT — S008638B57

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Repair poor contact in ECM connector.	Go to step **2**.

No.	Step	Check	Yes	No
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in radiator fan relay 1 control circuit.	Go to step **3**.
3	**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. 28 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Repair open circuit in harness between ignition switch and fuse and relay box (F/B) connector.
4	**CHECK MAIN FAN RELAY.** 1) Turn ignition switch to OFF. 2) Measure resistance between main fan relay terminals. ***Terminal*** ***No. 5 — No. 6:***	Is the resistance between 87 and 107 Ω?	Go to step **5**.	Replace main fan relay.
5	**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. 27:***	Is the resistance less than 1 Ω?	Go to step **6**.	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)
6	**CHECK POOR CONTACT.** Check poor contact in ECM or main fan relay connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM or main fan relay connector?	Repair poor contact in ECM or main fan relay connector.	Contact with SOA service.

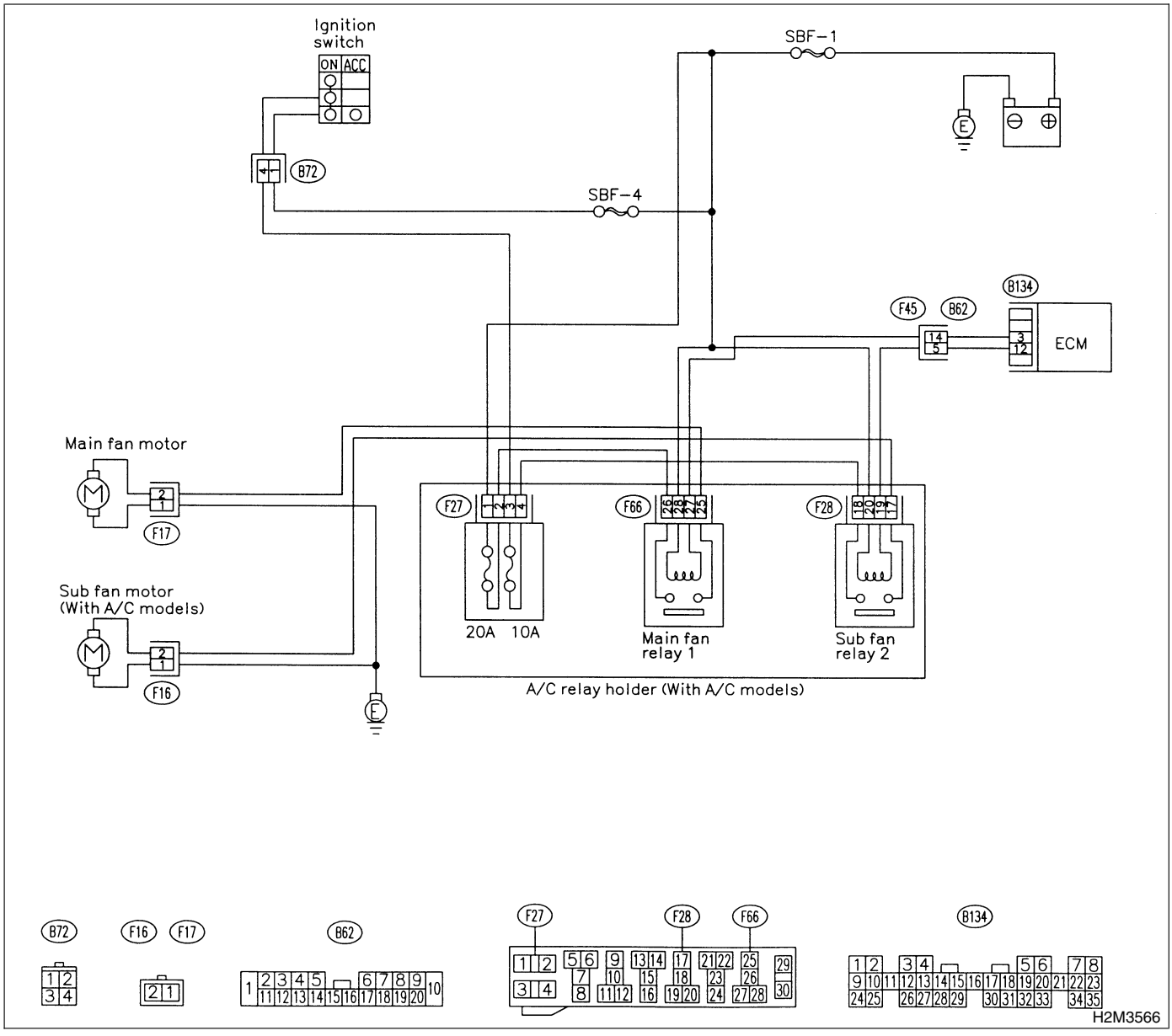
AQ: DTC P0483 — COOLING FAN FUNCTION PROBLEM — S008638B58

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

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:**



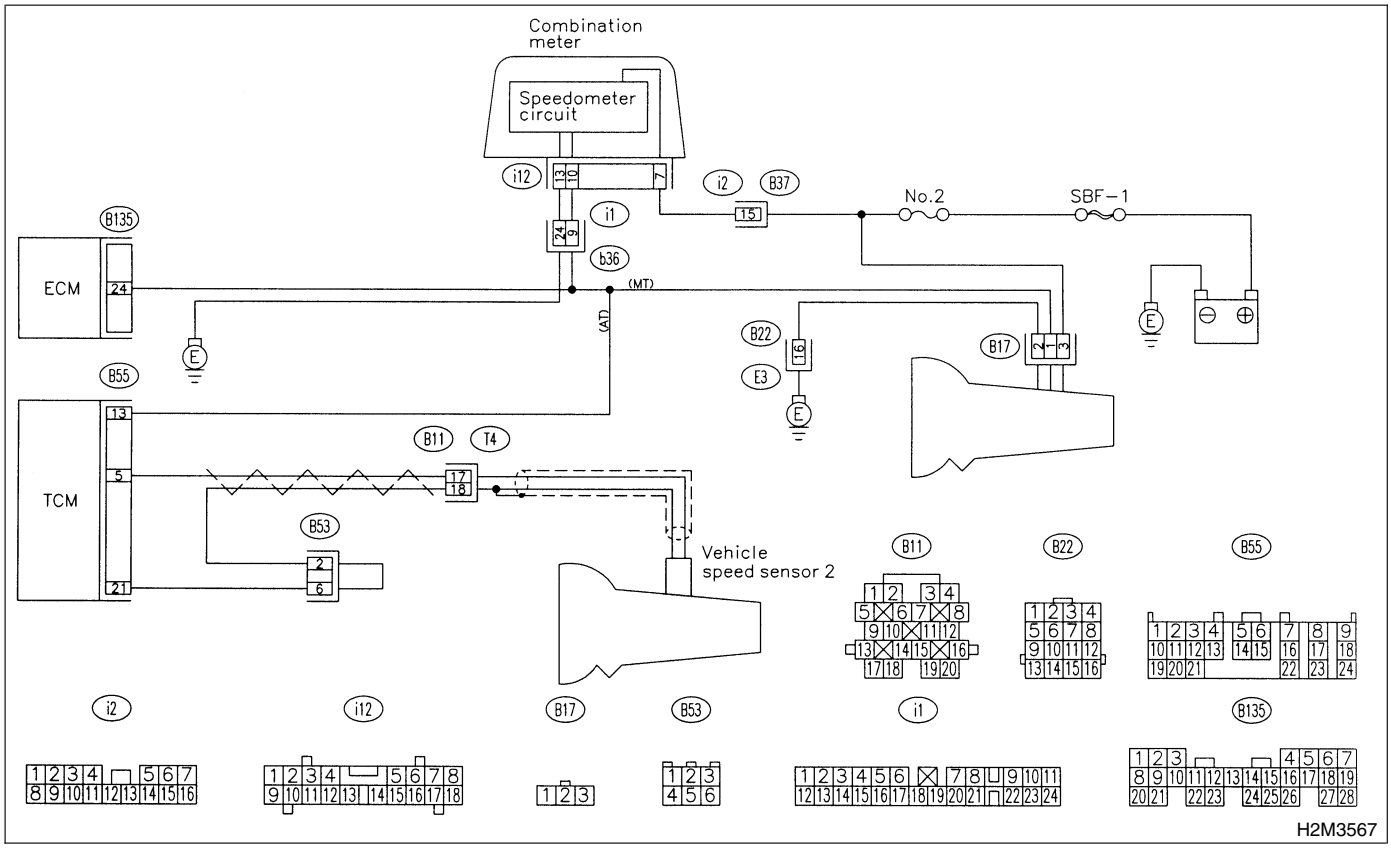
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Check engine cooling system. <Ref. to CO-22 INSPECTION, Radiator Main Fan and Fan Motor.>

AR: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION — S008638B59

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC P0720 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?	Check vehicle speed sensor 2 signal circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>	Go to step **3**.
3	**CHECK SPEEDOMETER OPERATION IN COMBINATION METER.**	Does speedometer operate normally?	Go to step **4**.	Check speedometer and vehicle speed sensor. <Ref. to IDI-4 INSPECTION, General Diagnostic.>

No.	Step	Check	Yes	No
4	**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 — (i12) No. 10:***	Is the resistance less than 10 Ω?	Repair poor contact in ECM connector.	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 (i1)

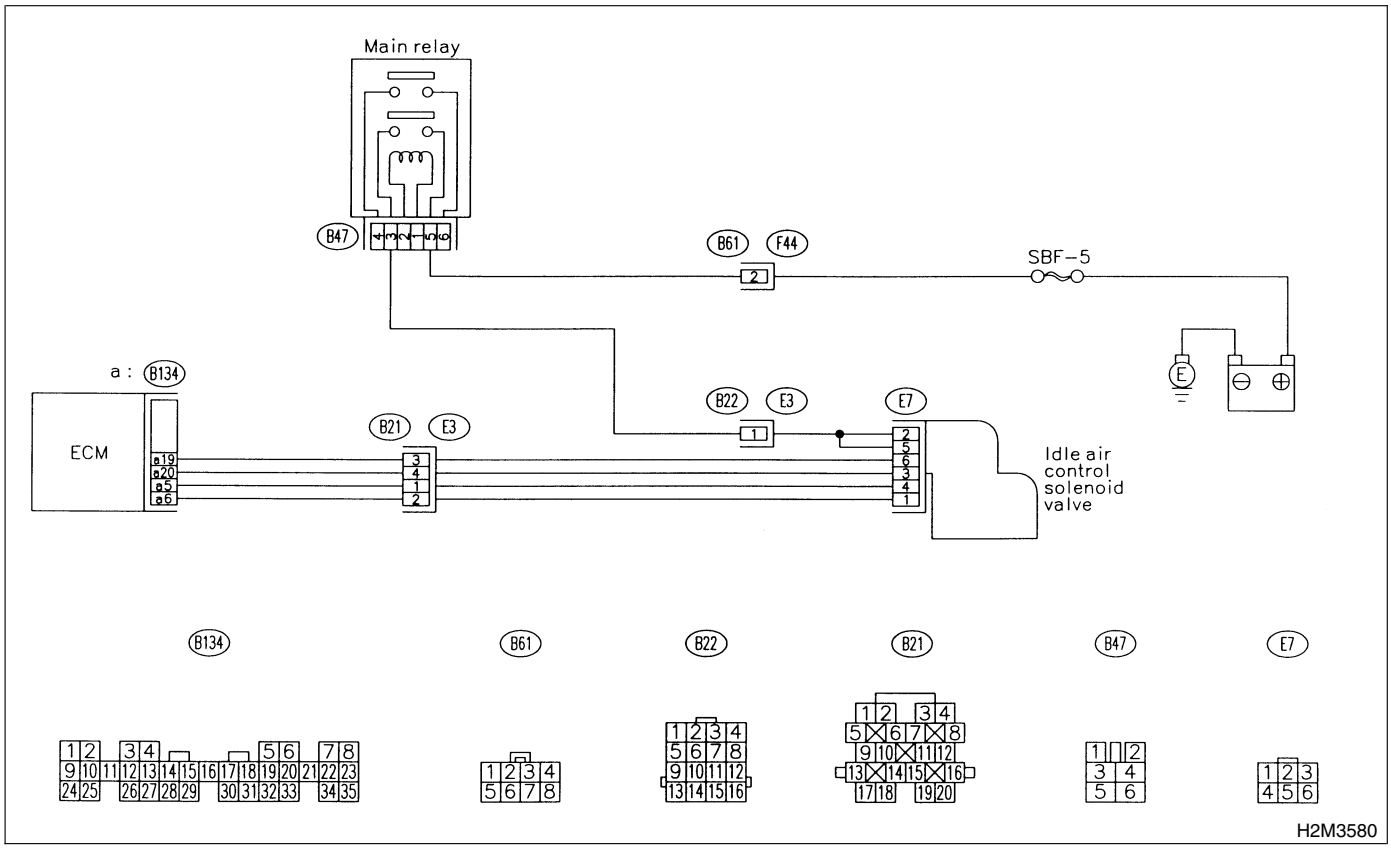
AS: DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED

— S008638B61

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?	Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0506.	Go to step **2**.
2	**CHECK AIR BY-PASS LINE.** 1) Turn ignition switch to OFF. 2) Remove idle air control solenoid valve from throttle body. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> 3) Remove throttle body from intake manifold. <Ref. to FU-15 REMOVAL, Throttle Body.> 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.	Does air flow out?	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>	Replace throttle body. <Ref. to FU-15 REMOVAL, Throttle Body.>

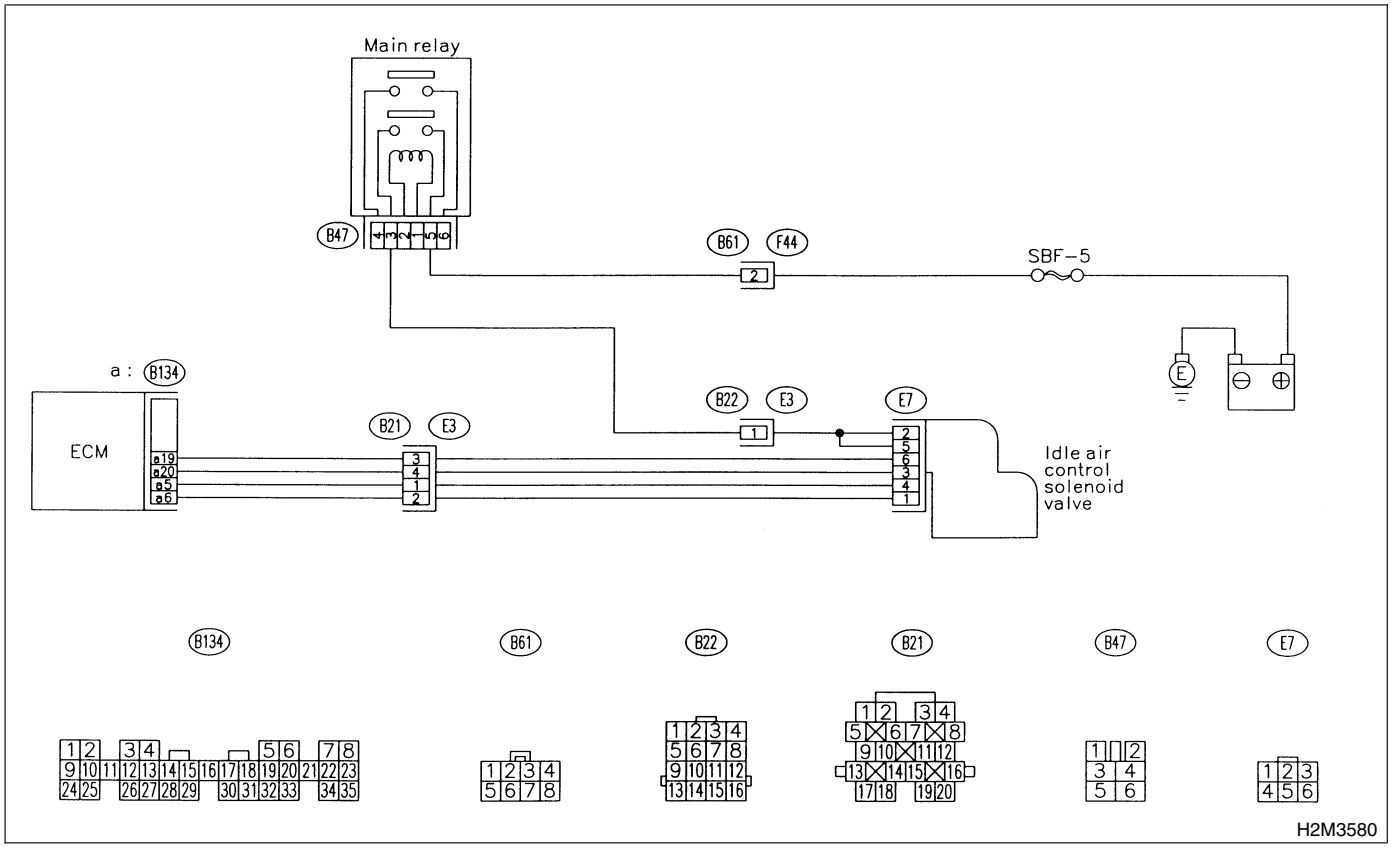
AT: DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED

S008638B62

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



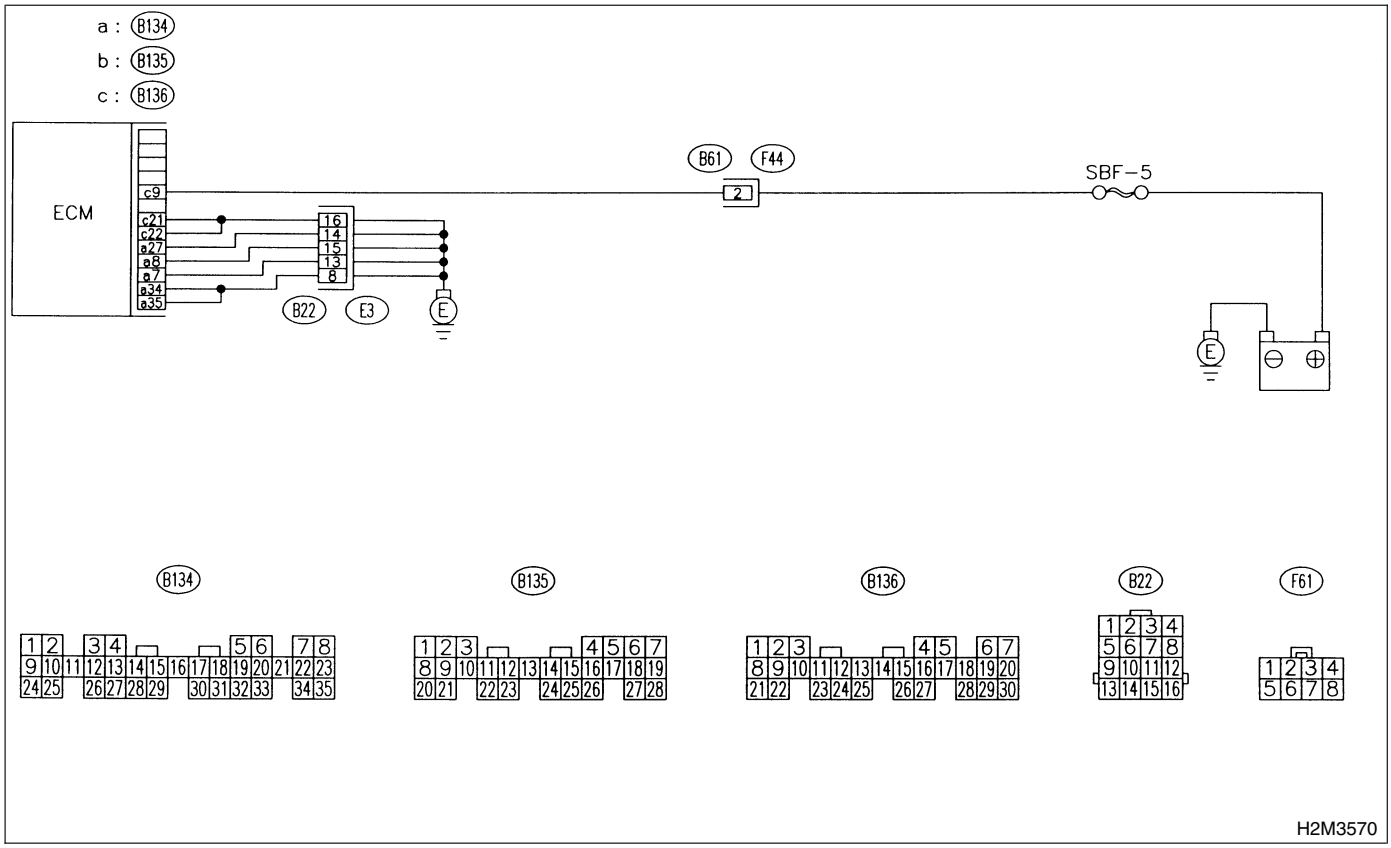
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?	Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0507.	Go to step **2**.
2	**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	Is there a fault in air intake system?	Repair air suction and leaks.	Go to step **3**.
3	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **4**.	Adjust throttle cable. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>
4	**CHECK AIR BY-PASS LINE.** 1) Turn ignition switch to OFF. 2) Remove idle air control solenoid valve from throttle body. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> 3) Confirm that there are no foreign particles in by-pass air line.	Are foreign particles in by-pass air line?	Remove foreign particles from by-pass air line.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>

AU: DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR — S008638B63

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0601?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	It is not necessary to inspect DTC P0601.

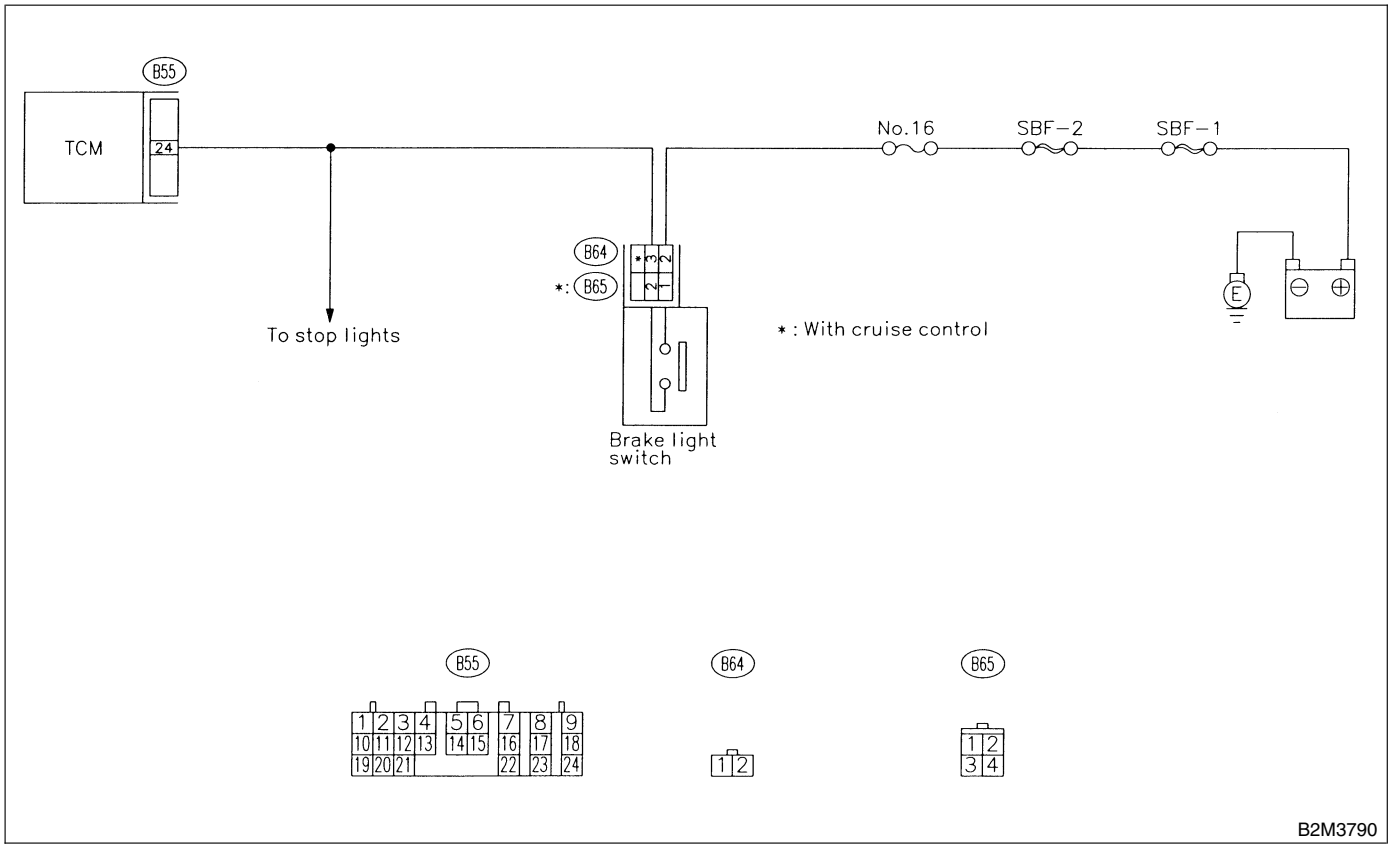
MEMO:

AV: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION — S008638B64

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF BRAKE LIGHT.**	Does brake light come on when depressing the brake pedal?	Go to step **2**.	Repair or replace brake light circuit.
2	**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):***	Is the resistance less than 1 Ω?	Go to step **3**.	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

No.	Step	Check	Yes	No
3	**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:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Repair ground short circuit in harness between TCM and brake light switch connector.
4	**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 (–):***	Is the voltage less than 1 V when releasing the brake pedal?	Go to step **5**.	Adjust or replace brake light switch. <Ref. to BR-57 REMOVAL, Stop Light Switch.>
5	**CHECK INPUT SIGNAL FOR TCM.** Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 24 (+) — Chassis ground (–):***	Is the voltage more than 10 V when depressing the brake pedal?	Go to step **6**.	Adjust or replace brake light switch. <Ref. to BR-57 REMOVAL, Stop Light Switch.>
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

AW: DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION — S008638F05

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check inhibitor switch circuit. <Ref. to AT-84 CHECK INHIBITOR SWITCH., Diagnostic Procedure for No-trouble Code.>

AX: DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION — S008638B66

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check ATF temperature sensor circuit. <Ref. to AT-31 TROUBLE CODE 27 — ATF TEMPERATURE SENSOR —, Diagnostic Procedure with Trouble Code.>

AY: DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION — S008638B67

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>

AZ: DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION — S008638B68

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check vehicle speed sensor 2 circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>

BA: DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION — S008638B69

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check engine speed input signal circuit. <Ref. to AT-29 TROUBLE CODE 11 — ENGINE SPEED SIGNAL —, Diagnostic Procedure with Trouble Code.>

BB: DTC P0731 — GEAR 1 INCORRECT RATIO — S008638B70

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-436 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

BC: DTC P0732 — GEAR 2 INCORRECT RATIO — S008638B71

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-436 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

BD: DTC P0733 — GEAR 3 INCORRECT RATIO — S008638B72

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN-436 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

BE: DTC P0734 — GEAR 4 INCORRECT RATIO — S008638B73

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect relevant DTC using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.
2	**CHECK THROTTLE POSITION SENSOR CIRCUIT.** Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in throttle position sensor circuit?	Repair or replace throttle position sensor circuit.	Go to step **3**.
3	**CHECK VEHICLE SPEED SENSOR 2 CIRCUIT.** Check vehicle speed sensor 2 circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in vehicle speed sensor 2 circuit?	Repair or replace vehicle speed sensor 2 circuit.	Go to step **4**.
4	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.** Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in torque converter turbine speed sensor circuit?	Repair or replace torque converter turbine speed sensor circuit.	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Go to step **6**.
6	**CHECK MECHANICAL TROUBLE.** Check mechanical trouble in automatic transmission.	Is there any mechanical trouble in automatic transmission?	Repair or replace automatic transmission. <Ref. to AT-18 REMOVAL, Automatic Transmission Assembly.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BF: DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION

— S008638B74

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID CIRCUIT.** Check lock-up duty solenoid circuit. <Ref. to AT-70 TROUBLE CODE 77 — LOCK-UP DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in lock-up duty solenoid circuit?	Repair or replace lock-up duty solenoid circuit.	Go to step **3**.
3	**CHECK THROTTLE POSITION SENSOR CIRCUIT.** Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in throttle position sensor circuit?	Repair or replace throttle position sensor circuit.	Go to step **4**.
4	**CHECK TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT.** Check torque converter turbine speed sensor circuit. <Ref. to AT-44 TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in torque converter turbine speed sensor circuit?	Repair or replace torque converter turbine speed sensor circuit.	Go to step **5**.
5	**CHECK ENGINE SPEED INPUT CIRCUIT.** Check engine speed input circuit. <Ref. to AT-29 TROUBLE CODE 11 — ENGINE SPEED SIGNAL —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in engine speed input circuit?	Repair or replace engine speed input circuit.	Go to step **6**.
6	**CHECK INHIBITOR SWITCH CIRCUIT.** Check inhibitor switch circuit. <Ref. to AT-84 CHECK INHIBITOR SWITCH., Diagnostic Procedure for No-trouble Code.>	Is there any trouble in inhibitor switch circuit?	Repair or replace inhibitor switch circuit.	Go to step **7**.
7	**CHECK BRAKE LIGHT SWITCH CIRCUIT.** Check brake light switch circuit. <Ref. to AT-83 CHECK BRAKE SWITCH., Diagnostic Procedure for No-trouble Code.>	Is there any trouble in brake light switch circuit?	Repair or replace brake light switch circuit.	Go to step **8**.

No.	Step	Check	Yes	No
8	**CHECK ATF TEMPERATURE SENSOR CIRCUIT.** Check ATF temperature sensor circuit. <Ref. to AT-31 TROUBLE CODE 27 — ATF TEMPERATURE SENSOR —, Diagnostic Procedure with Trouble Code.>	Is there any trouble in ATF temperature sensor circuit?	Repair or replace ATF temperature sensor circuit.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Go to step **10**.
10	**CHECK MECHANICAL TROUBLE.** Check mechanical trouble in automatic transmission.	Is there any mechanical trouble in automatic transmission?	Repair or replace automatic transmission. <Ref. to AT-18 REMOVAL, Automatic Transmission Assembly.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BG: DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL — S008638B75

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check lock-up duty solenoid circuit. <Ref. to AT-70 TROUBLE CODE 77 — LOCK-UP DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

BH: DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL — S008638B76

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check line pressure duty solenoid circuit. <Ref. to AT-62 TROUBLE CODE 75 — LINE PRESSURE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

BI: DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL — S008638B77

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check shift solenoid 1 circuit. <Ref. to AT-51 TROUBLE CODE 71 — SHIFT SOLENOID 1 —, Diagnostic Procedure with Trouble Code.>

BJ: DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —

S008638B78

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

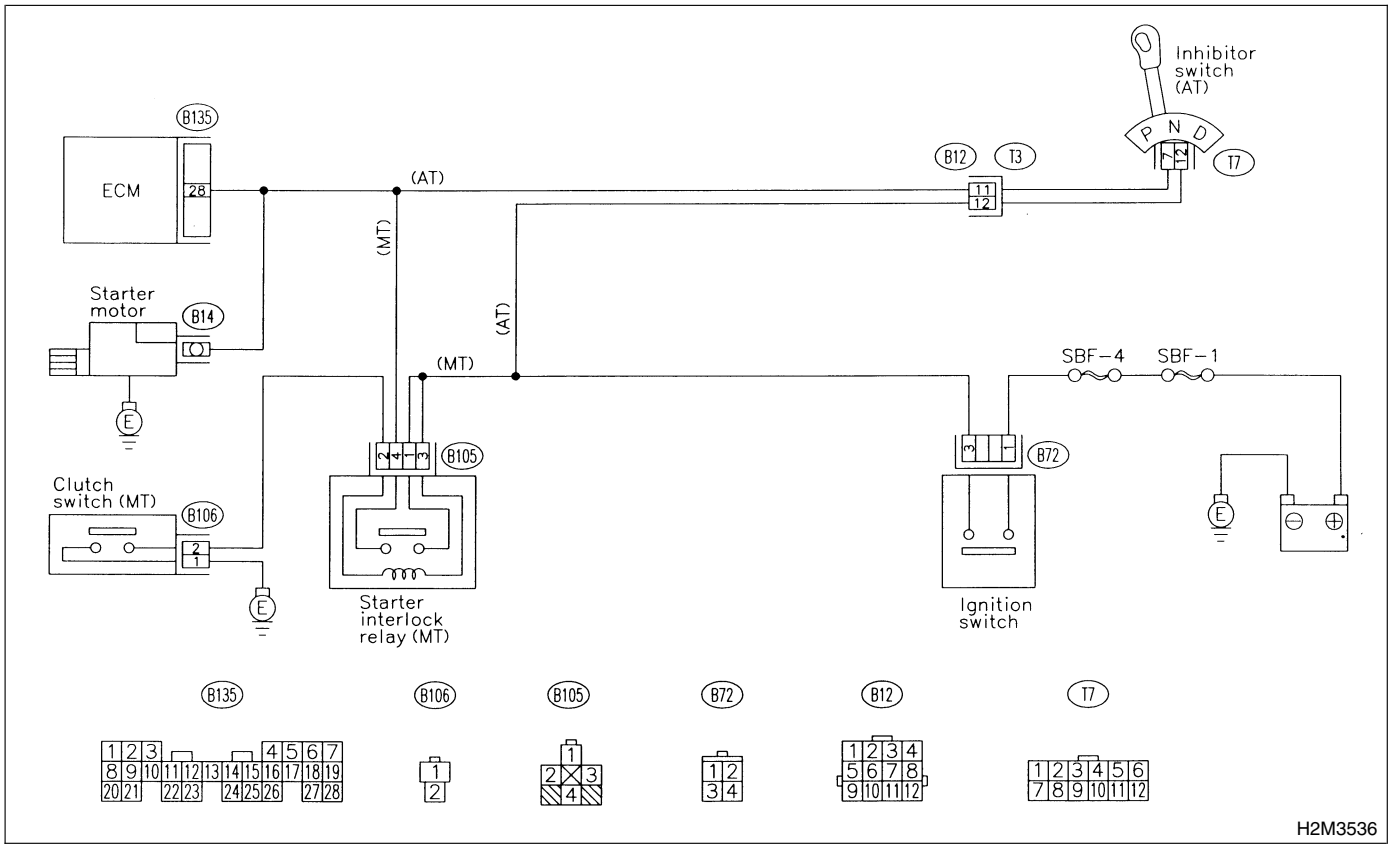
NOTE:
Check shift solenoid 2 circuit. <Ref. to AT-54 TROUBLE CODE 72 — SHIFT SOLENOID 2 —, Diagnostic Procedure with Trouble Code.>

BK: DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT — S008638B79

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



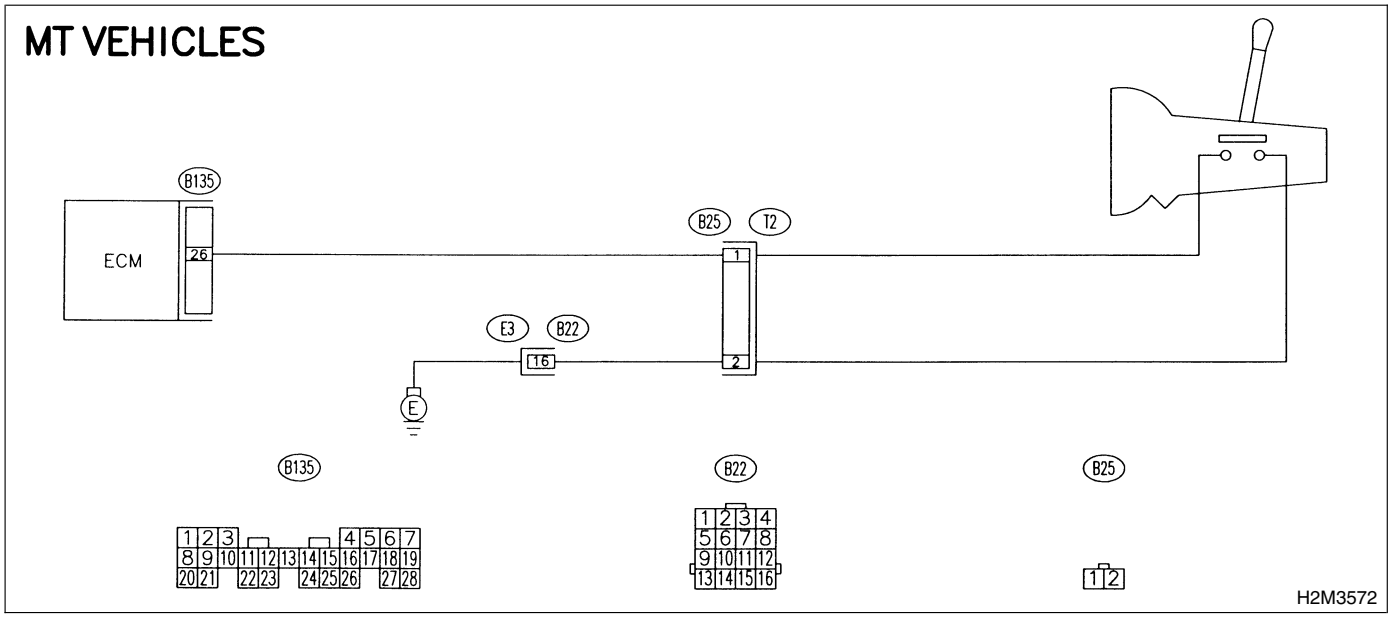
No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: • Depress the clutch pedal (MT). • Place the inhibitor switch in the “P” or “N” position (AT).	Does starter motor operate when ignition switch to “ST”?	Repair harness and connector. NOTE: In this case, repair the following: • Open or ground short circuit in harness between ECM and starter motor connector. • Poor contact in ECM connector.	Check starter motor circuit. <Ref. to EN-72 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

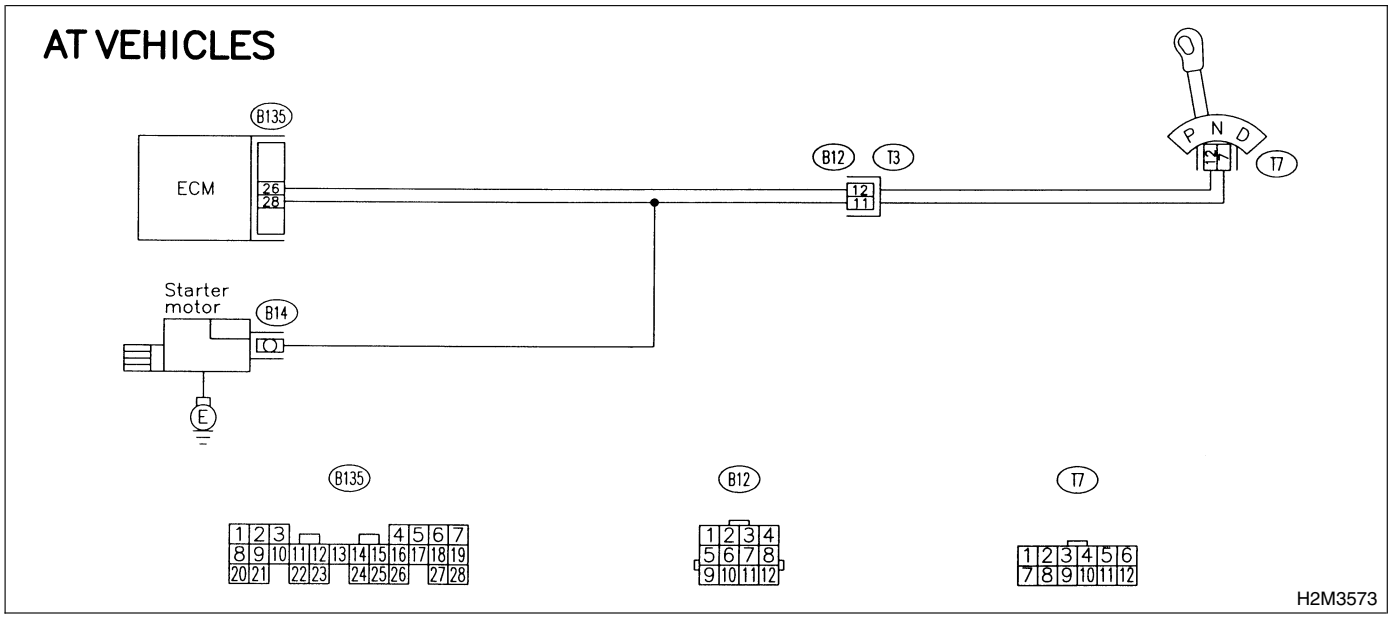
BL: DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [AT VEHICLES]— S008638F56

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**





No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type MT?	Go to step **2**.	Go to step **8**.
2	**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 (–):***	Is the voltage more than 10 V in neutral position?	Go to step **3**.	Go to step **5**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V in other positions?	Go to step **4**.	Go to step **5**.
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**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:***	Is the resistance more than 1 MΩ in neutral position?	Go to step **6**.	Repair short circuit in transmission harness or replace neutral position switch.
6	**CHECK HARNESS BETWEEN ECM AND NEUTRAL POSITION SWITCH CONNECTOR.** Measure resistance between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **7**.
7	**CHECK POOR CONTACT.** Check poor contact in transmission harness connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in transmission harness connector?	Repair poor contact in transmission harness connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
8	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **9**.

No.	Step	Check	Yes	No
9	**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 (–):***	Is the voltage less than 1 V?	Go to step **10**.	Go to step **12**.
10	**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 (–):***	Is the voltage between 4.5 and 5.5 V?	Go to step **11**.	Go to step **12**.
11	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
12	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and inhibitor switch connector.	Go to step **13**.
13	**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:***	Is the resistance less than 1 Ω?	Go to step **14**.	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

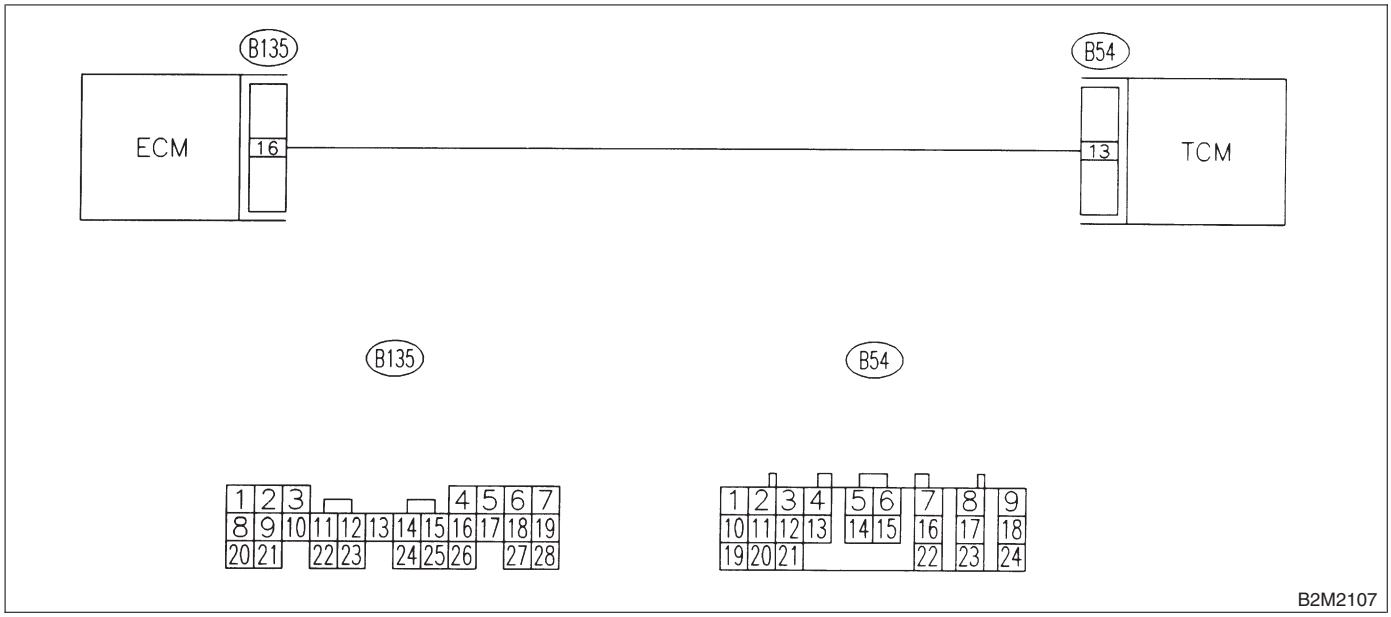
No.	Step	Check	Yes	No
14	**CHECK INHIBITOR SWITCH GROUND LINE.** Measure resistance of harness between inhibitor switch connector and engine ground. ***Connector & terminal*** ***(T7) No. 7 — Engine ground:***	Is the resistance less than 5 Ω?	Go to step **15**.	Repair open circuit in harness between 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
15	**CHECK INHIBITOR SWITCH.** Measure resistance between inhibitor switch connector receptacle's terminals in selector lever "N" and "P" positions. ***Terminals*** ***No. 7 — No. 12:***	Is the resistance less than 1 Ω?	Go to step **16**.	Replace inhibitor switch. <Ref. to AT-31 REMOVAL, Inhibitor Switch.>
16	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-5 REMOVAL, AT Select Lever.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BM: DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION — S008638F07

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 16 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

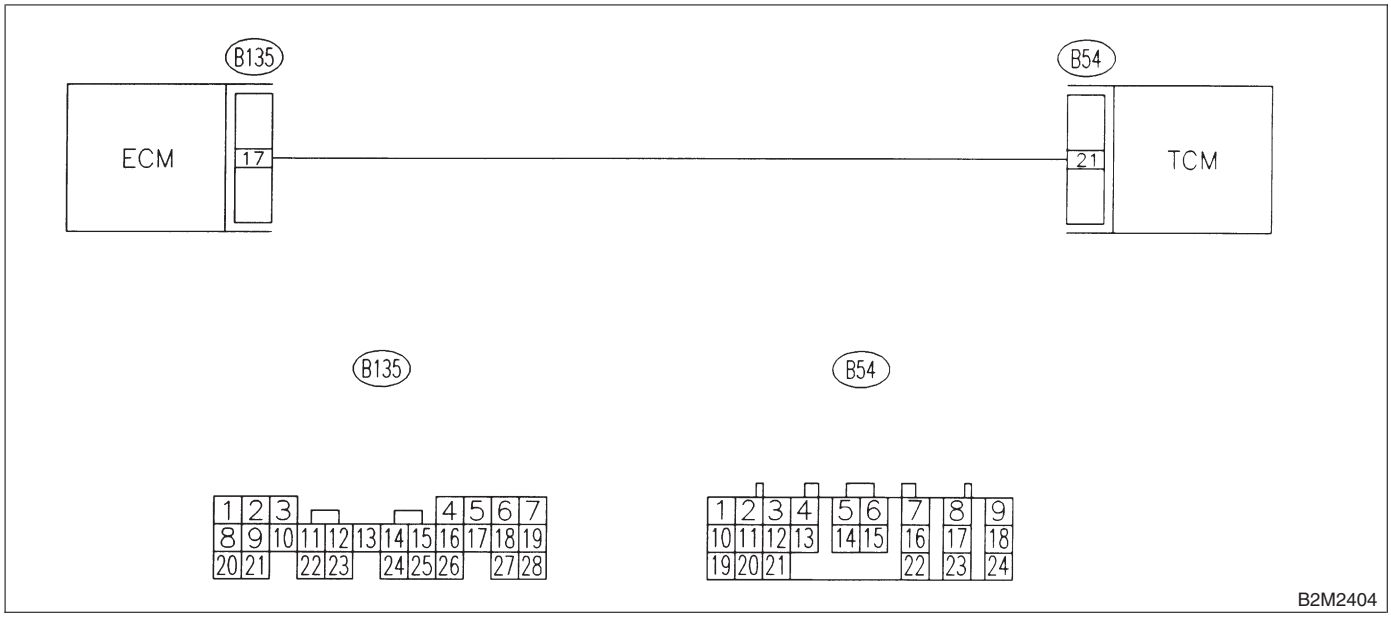
No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from ECM and TCM. 3) Measure resistance of harness between ECM and TCM connector. ***Connector & terminal*** ***(B135) No. 16 — (B54) No. 13:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and TCM connector.
5	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 16 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BN: DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION — S008638B83

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 17 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

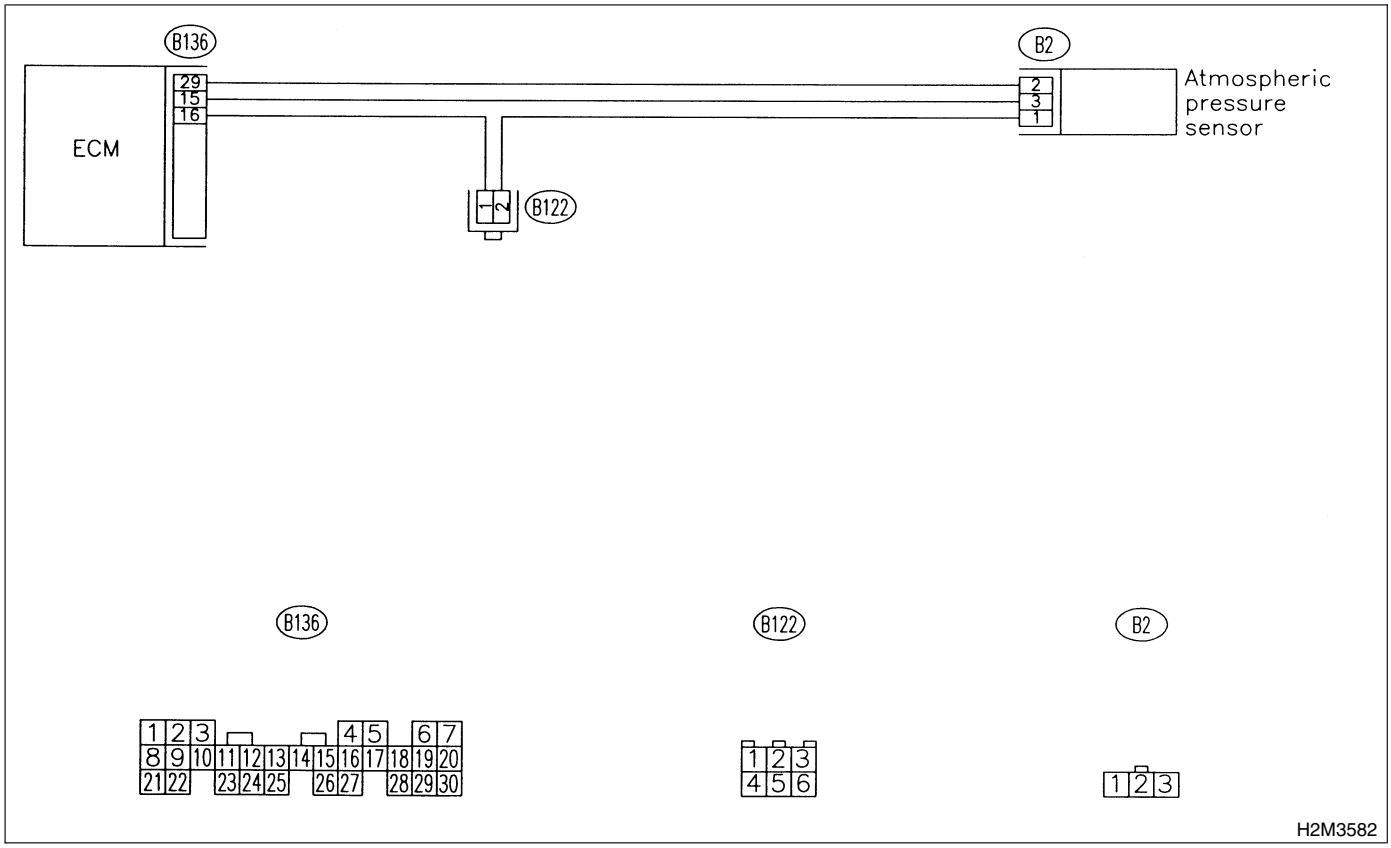
No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from ECM and TCM. 3) Measure resistance of harness between ECM and TCM connector. ***Connector & terminal*** ***(B135) No. 17 — (B54) No. 21:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and TCM connector.
5	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 17 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

BO: DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT — S008638B84

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value less than 0 kPa (0 mmHg, 0 inHg)?	Go to step **3**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in ECM and pressure sensor connector. <Ref. to EN-262 DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/ PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>	Is there poor contact in ECM or pressure sensor connector?	Repair poor contact in ECM or atmospheric pressure sensor connector.	Even if MIL lights up, the circuit has returned to a normal condition at this time.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **5**.	Go to step **4**.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **7**.	Go to step **6**.
6	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **7**.
7	**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 (–):***	Is the voltage more than 4.5 V?	Go to step **8**.	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 (B122)

No.	Step	Check	Yes	No
8	**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:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and pressure sensor connector
9	**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:***	Is the resistance more than 500 kΩ?	Go to step **10**.	Repair ground short circuit in harness between ECM and pressure sensor connector.
10	**CHECK POOR CONTACT.** Check poor contact in pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in pressure sensor connector?	Repair poor contact in atmospheric pressure sensor connector.	Replace atmospheric pressure sensor. <Ref. to FU-50 REMOVAL, Atmospheric Pressure Sensor.>

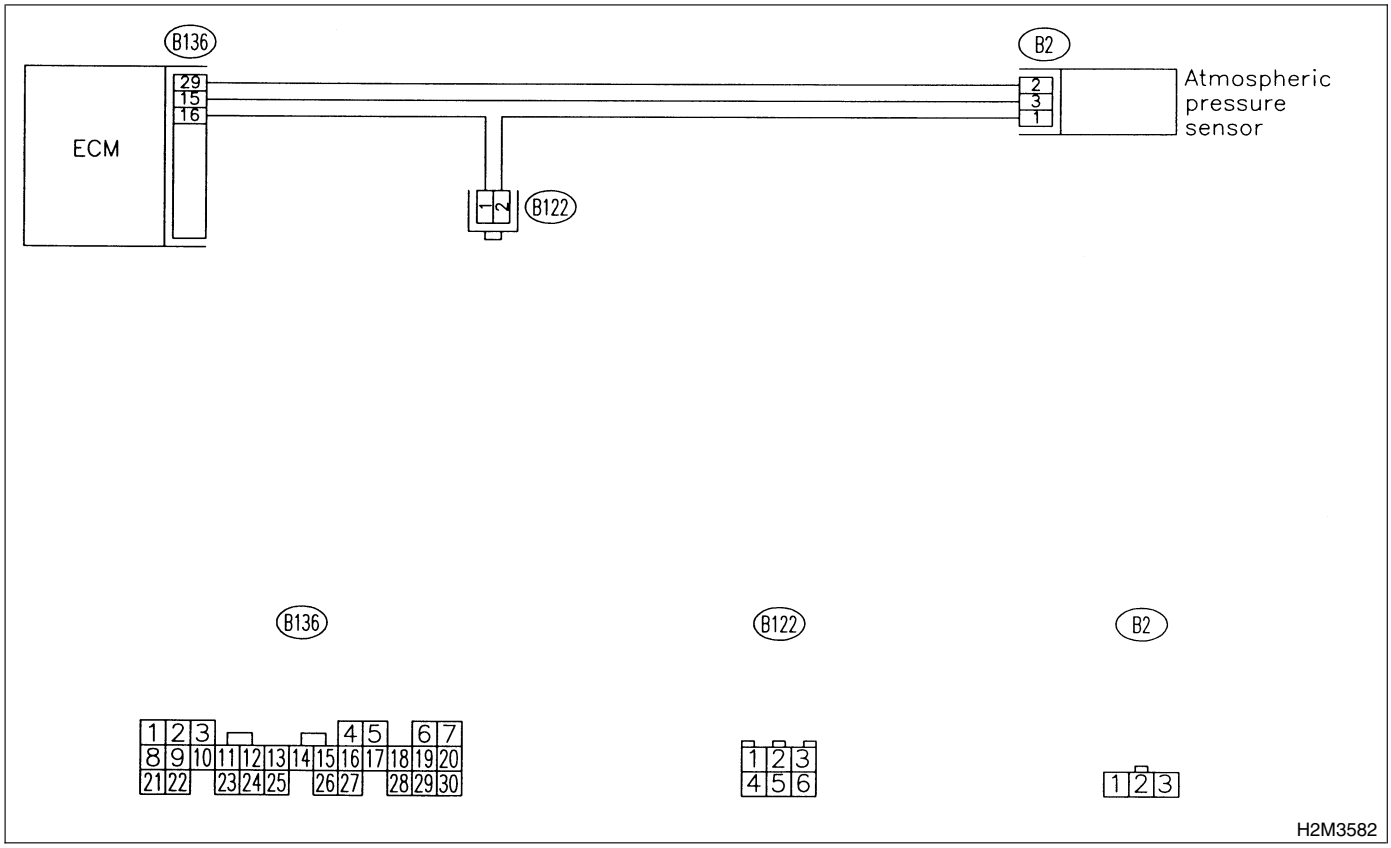
MEMO:

BP: DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT — S008638B85

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> • OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 140 kPa (1,050 mmHg, 41.34 inHg)?	Go to step **10**.	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 15 (+) — Chassis ground (–):***	Does the voltage change more than 4.5 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **6**.	Go to step **5**.
5	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.>	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?	Repair poor contact in ECM connector.	Go to step **6**.
6	**CHECK HARNESS BETWEEN ECM AND 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 (–):***	Is the voltage more than 4.5 V?	Go to step **7**.	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 (B122)
7	**CHECK HARNESS BETWEEN ECM AND 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. 29 — (B2) No. 2:***	Is the resistance less than 1 Ω?	Go to step **8**.	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 (B122)

No.	Step	Check	Yes	No
8	**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:***	Is the resistance less than 1 Ω?	Go to step **9**.	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 (B122)
9	**CHECK POOR CONTACT.** Check poor contact in pressure sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in pressure sensor connector?	Repair poor contact in atmospheric pressure sensor connector.	Replace atmospheric pressure sensor. <Ref. to FU-50 REMOVAL, Atmospheric Pressure Sensor.>
10	**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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 140 kPa (1,050 mmHg, 41.34 inHg)?	Repair battery short circuit in harness between ECM and atmospheric pressure sensor connector.	Replace atmospheric pressure sensor. <Ref. to FU-50 REMOVAL, Atmospheric Pressure Sensor.>

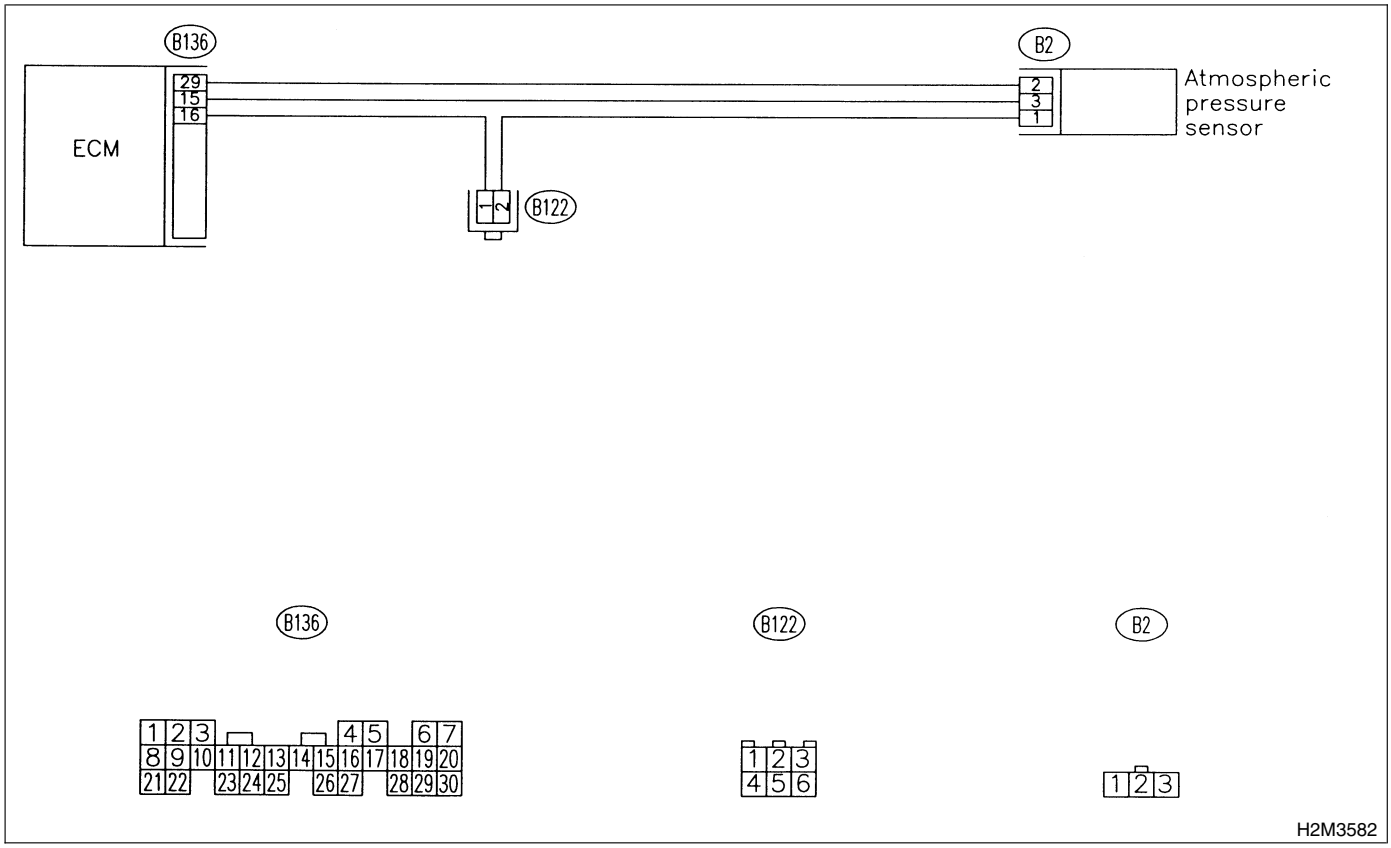
MEMO:

BQ: DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S008638B86

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.** NOTE: In this case, it is not necessary to inspect DTC P0106.	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P1110 or P1111?	Inspect DTC P0106, P0107, P0108, P1110 or P1111 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

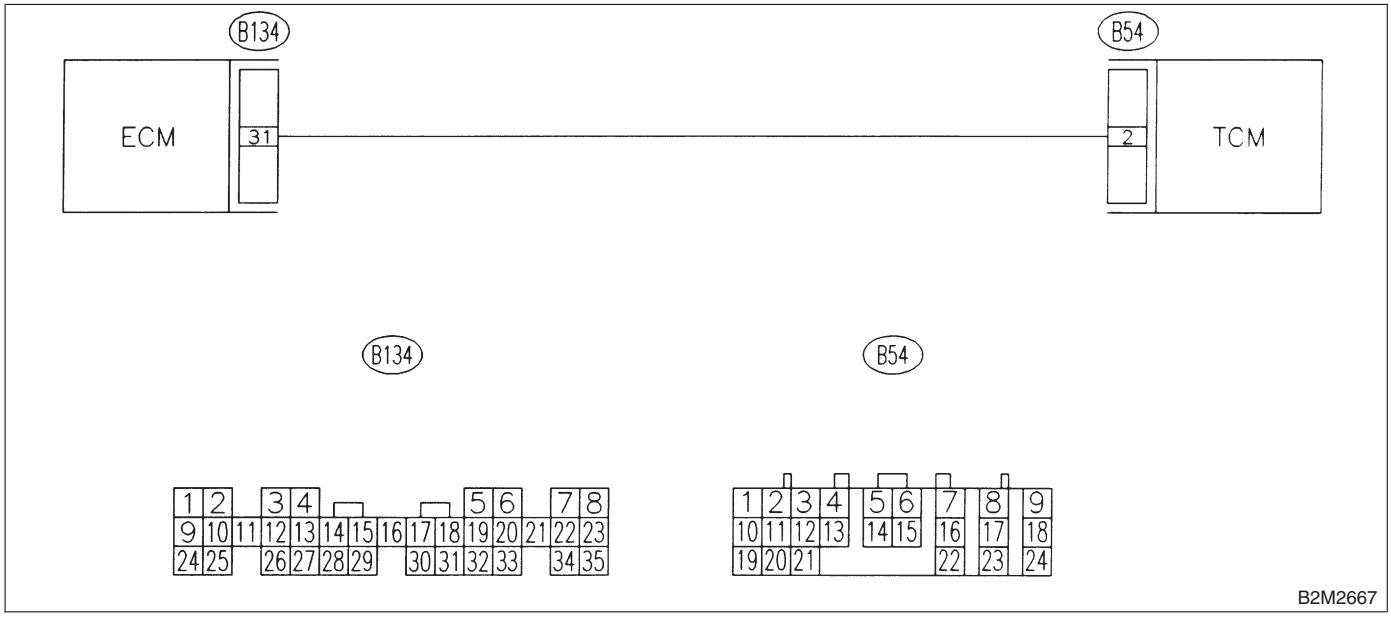
No.	Step	Check	Yes	No
2	**CHECK ATMOSPHERIC PRESSURE SENSOR FILTER.** 1) Turn ignition switch to OFF. 2) Disconnect connector from atmospheric pressure sensor. 3) Remove atmospheric pressure sensor. 4) Check atmospheric pressure sensor filter.	Is atmospheric pressure sensor filter non-functional? (Check for contamination, damage, water leakage, etc.)	Replace atmospheric pressure sensor filter.	Go to step **3**.
3	**CHECK CURRENT DATA.** 1) Turn ignition switch 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 FOR ENGINE”. <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value between 73.3 kPa (550 mmHg, 21.65 inHg) and 106.6 kPa (800 mmHg, 31.50 inHg)?	Replace atmospheric pressure sensor. <Ref. to FU-50 REMOVAL, Atmospheric Pressure Sensor.>	Replace intake air temperature and pressure sensor. <Ref. to FU-49 REMOVAL, Intake Air Temperature and Pressure Sensor.>

BR: DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT — S008638B87

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



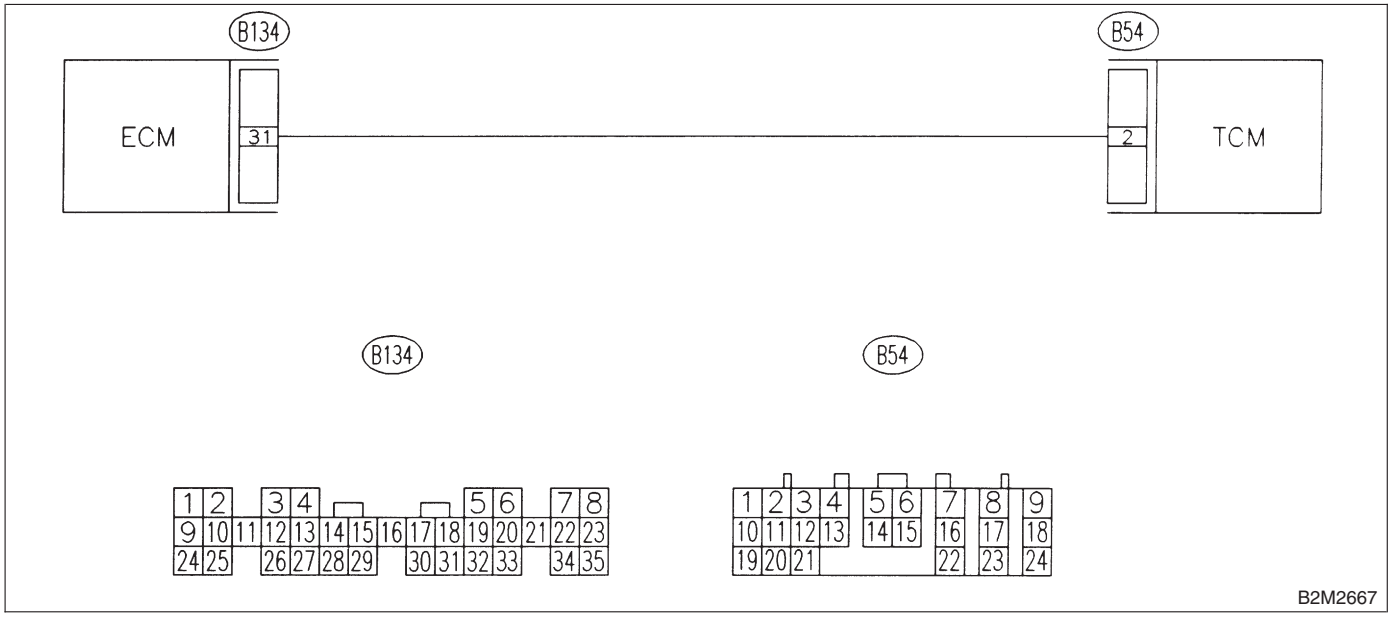
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start engine, and warm-up the engine. 2) Turn ignition swtich to OFF. 3) Disconnect connector from TCM. 4) Turn ignition switch to ON. 5) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 31 (+) — Chassis ground (–):***	Is the voltage less than 3 V?	Go to step **2**.	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
2	**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 (–):***	Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BS: DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT — S008638B88

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



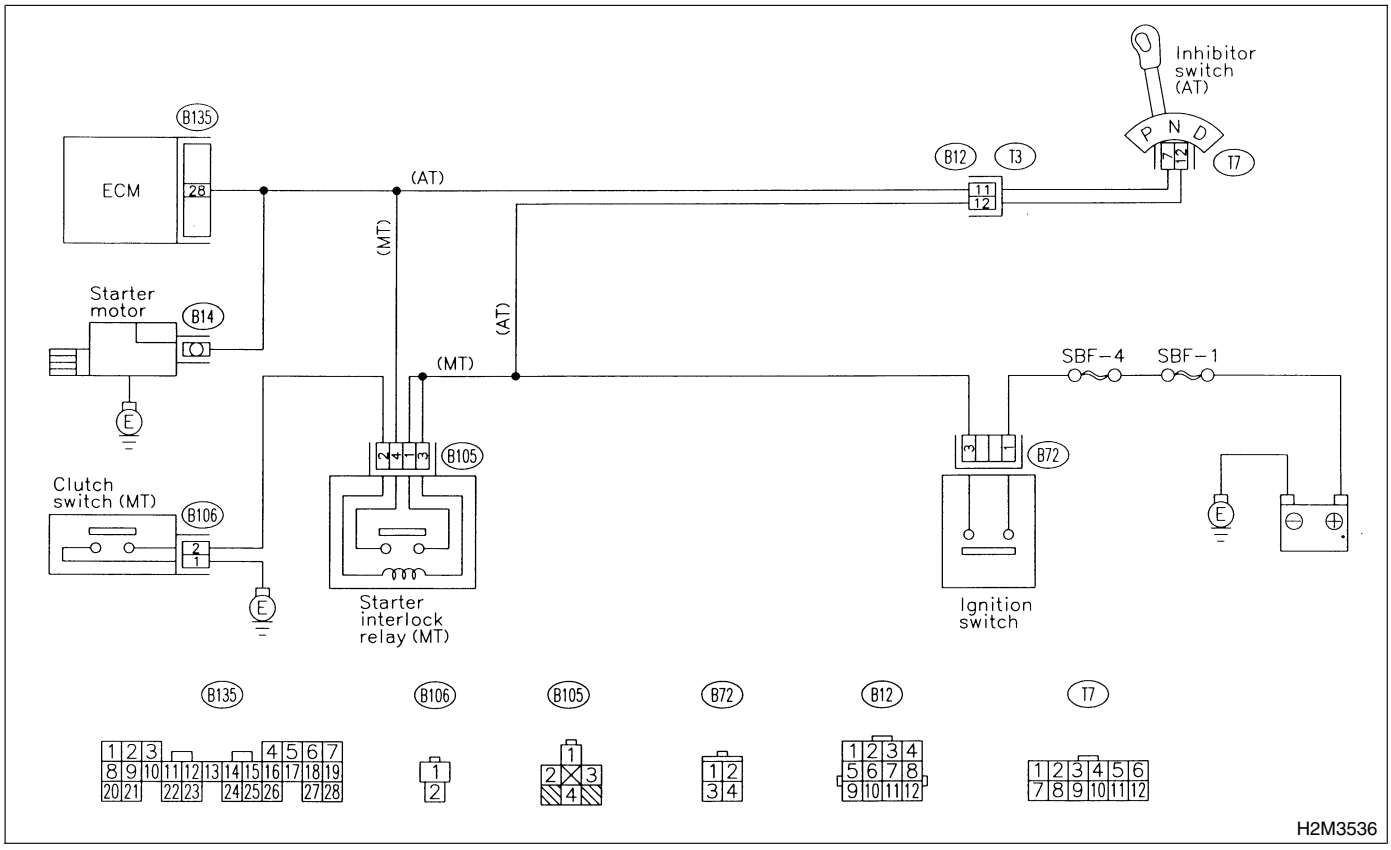
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start engine, and warm-up the engine. 2) Turn ignition switch to OFF. 3) Turn ignition switch to ON. 4) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 31 (+) — Chassis ground (–):***	Is the voltage more than 3 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness betwee ECM and TCM connector. ***Connector & terminal*** ***(B134) No. 31 — (B54) No. 2:***	Is the resistance less than 1 Ω?	Repair poor contact in ECM or TCM connector.	Repair open circuit in harness between ECM and TCM connector.

BT: DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT — S008638B89

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: • On AT vehicles, place the inhibitor switch in each position. • On MT vehicles, depress or release the clutch pedal.	Does starter motor operate when ignition switch to "ON"?	Repair battery short circuit in starter motor circuit. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Check starter motor circuit. <Ref. to EN-72 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

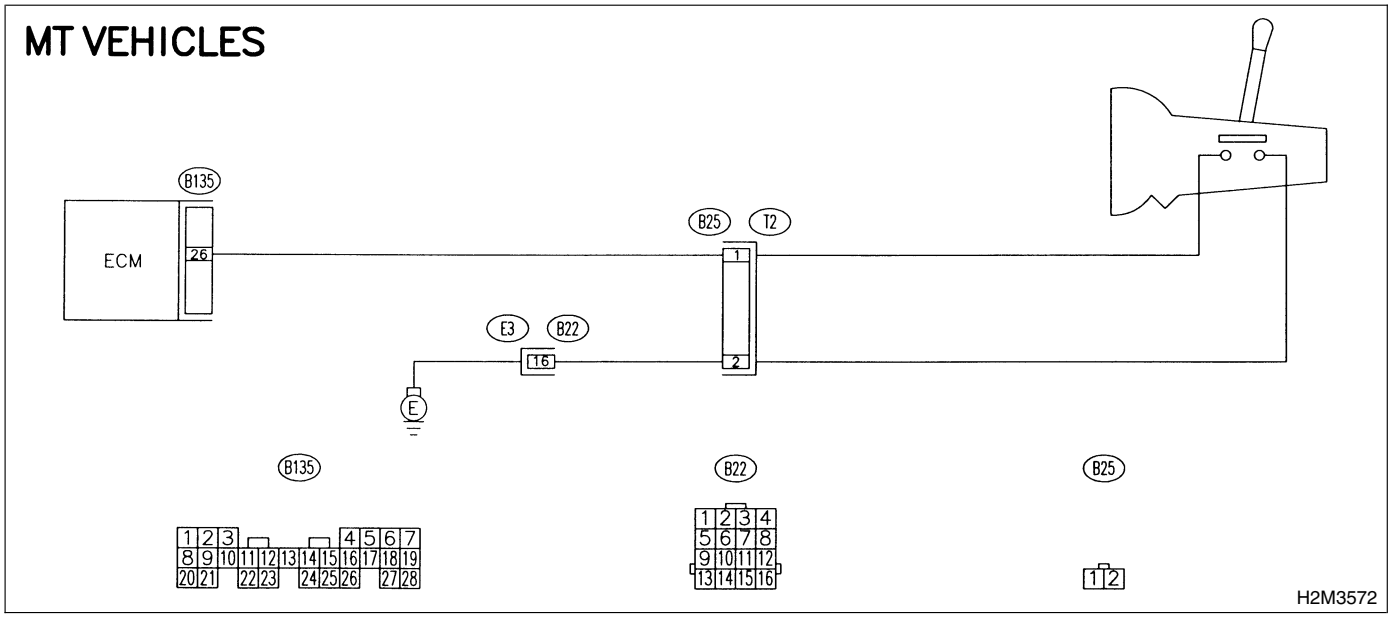
MEMO:

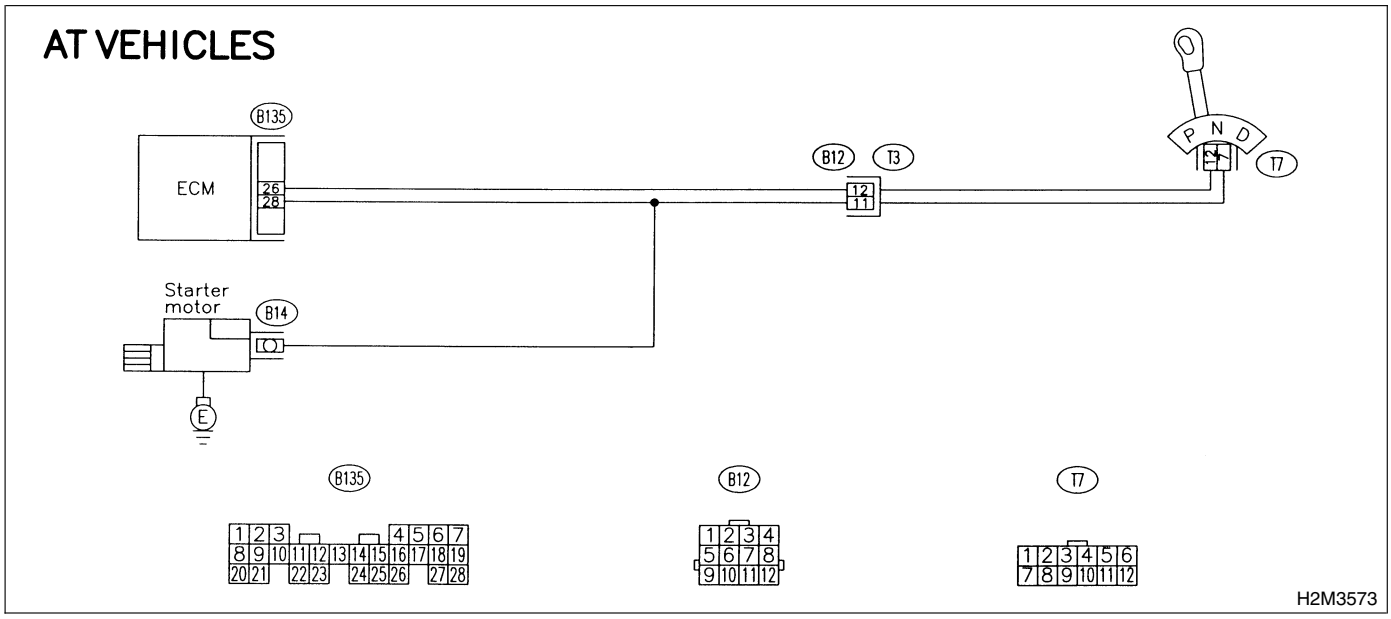
BU: DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [AT VEHICLES] — S008638F57

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**





No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type MT?	Go to step **2**.	Go to step **9**.
2	**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 (–):***	Is the voltage more than 10 V in neutral position?	Go to step **3**.	Go to step **5**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V in other positions?	Go to step **4**.	Go to step **6**.
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK NEUTRAL POSITION SWITCH.** Measure resistance between transmission harness connector terminals. ***Connector & terminal*** ***(T2) No. 1 — No. 2:***	Is the resistance less than 1 Ω in other positions?	Go to step **6**.	Repair open circuit in transmission harness or replace neutral position switch.
6	**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:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair open circuit in harness between ECM and transmission harness connector.
7	**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:***	Is the resistance less than 5 Ω?	Go to step **8**.	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)

No.	Step	Check	Yes	No
8	**CHECK POOR CONTACT.** Check poor contact in transmission harness connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in transmission harness connector?	Repair poor contact in transmission harness connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
9	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **10**.
10	**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 (–):***	Is the voltage between 4.5 and 5.5 V at except "N" and "P" positions?	Even if MIL lights up, the circuit has returned to a normal condition at this time.	Go to step **11**.
11	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **12**.
12	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between transmission harness and inhibitor switch connector.	Go to step **13**.
13	**CHECK INHIBITOR SWITCH.** Measure resistance between inhibitor switch connector receptacle's terminals in selector lever except for "N" position. ***Terminals*** ***No. 7 — No. 12:***	Is the resistance more than 1 MΩ at except "N" and "P" positions?	Go to step **14**.	Replace inhibitor switch. <Ref. to AT-31 REMOVAL, Inhibitor Switch.>
14	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-5 REMOVAL, AT Select Lever.>	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

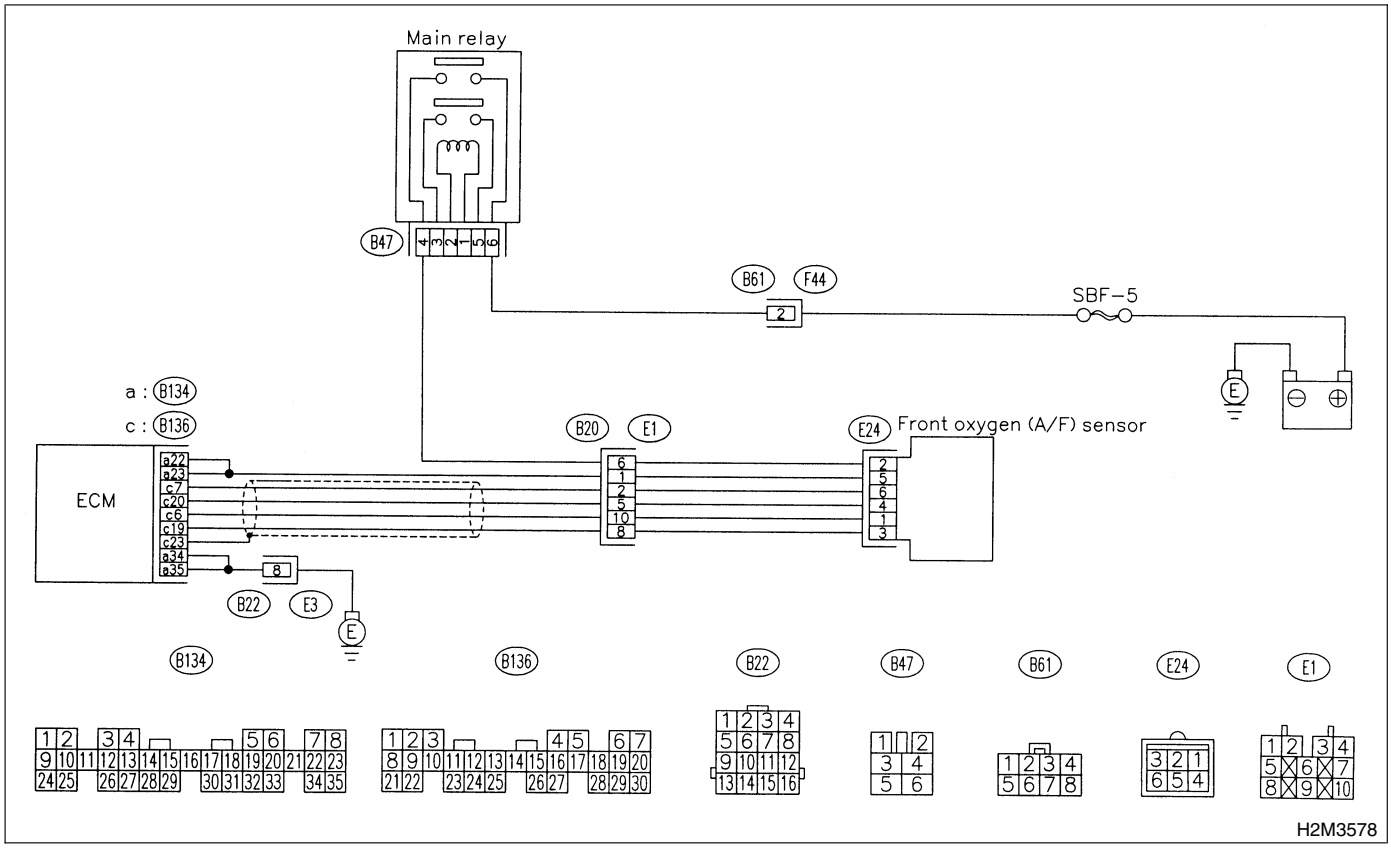
MEMO:

BV: DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) — S008638B92

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 — (E24) No. 1:*** ***(B136) No. 7 — (E24) No. 6:*** ***(B136) No. 19 — (E24) No. 3:*** ***(B136) No. 20 — (E24) No. 4:***	Is the resistance less than 1 Ω?	Go to step **2**.	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

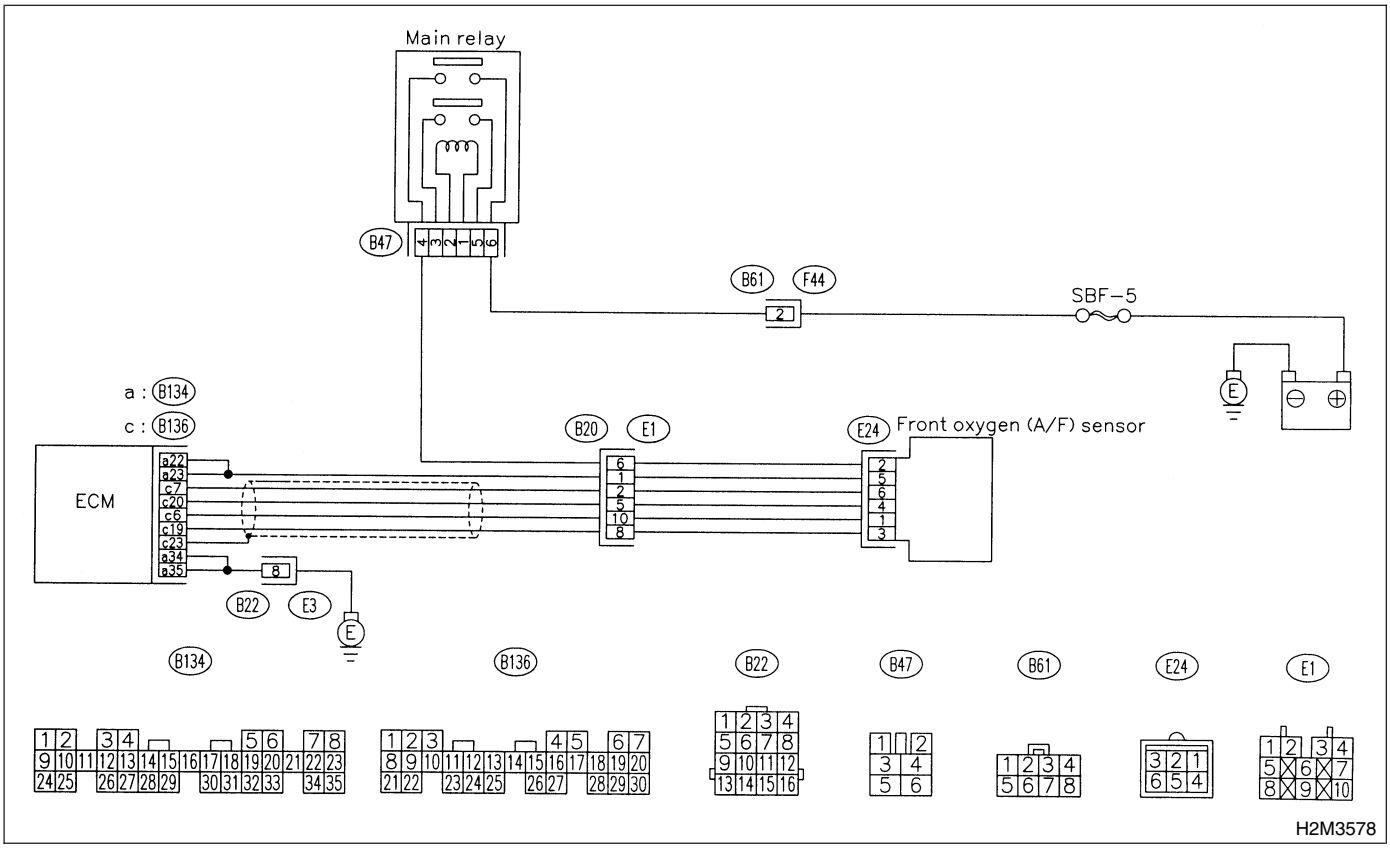
No.	Step	Check	Yes	No
2	**CHECK POOR CONTACT.** Check poor contact in front oxygen (A/F) sensor connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in front oxygen (A/F) sensor connector?	Repair poor contact in front oxygen (A/F) sensor connector.	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

BW: DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) — S008638B93

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 10 Ω?	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>	Repair ground short circuit in harness between ECM and front oxygen (A/F) sensor connector.

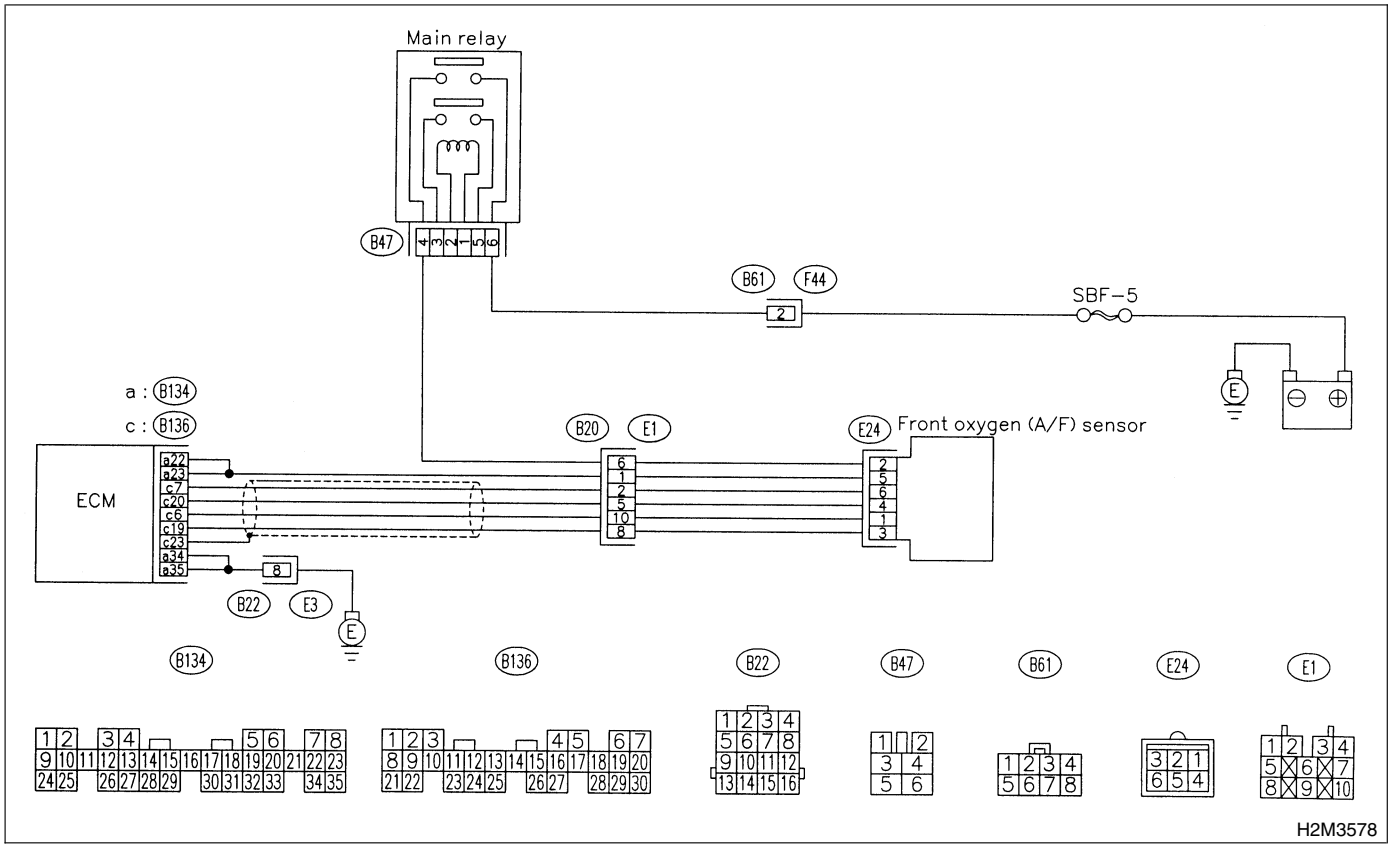
MEMO:

BX: DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT — S008638B94

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1132 and P0141 at the same time?	Go to step **2**.	Go to step **5**.

No.	Step	Check	Yes	No
2	**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*** ***(E24) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **3**.	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
3	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 35 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **4**.	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)
4	**CHECK GROUND CIRCUIT OF ECM.** 1) Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 34 — Chassis ground:***	Is there resistance less than 5 Ω?	Go to step **5**.	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)

No.	Step	Check	Yes	No
5	**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 FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II scan tool For detailed operation procedures, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 0.2 A?	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	Go to step **6**.
6	**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 (–):***	Is the voltage less than 1.0 V?	Go to step **8**.	Go to step **7**.
7	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **8**.
8	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Is the voltage less than 1.0 V?	Go to step **10**.	Go to step **9**.
9	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Does the voltage change less than 1.0 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair poor contact in ECM connector.	Go to step **10**.
10	**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:***	Is the resistance less than 10 Ω?	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	Replace front oxygen (A/F) sensor. <Ref. to EC-3 REMOVAL, Front Catalytic Converter.>

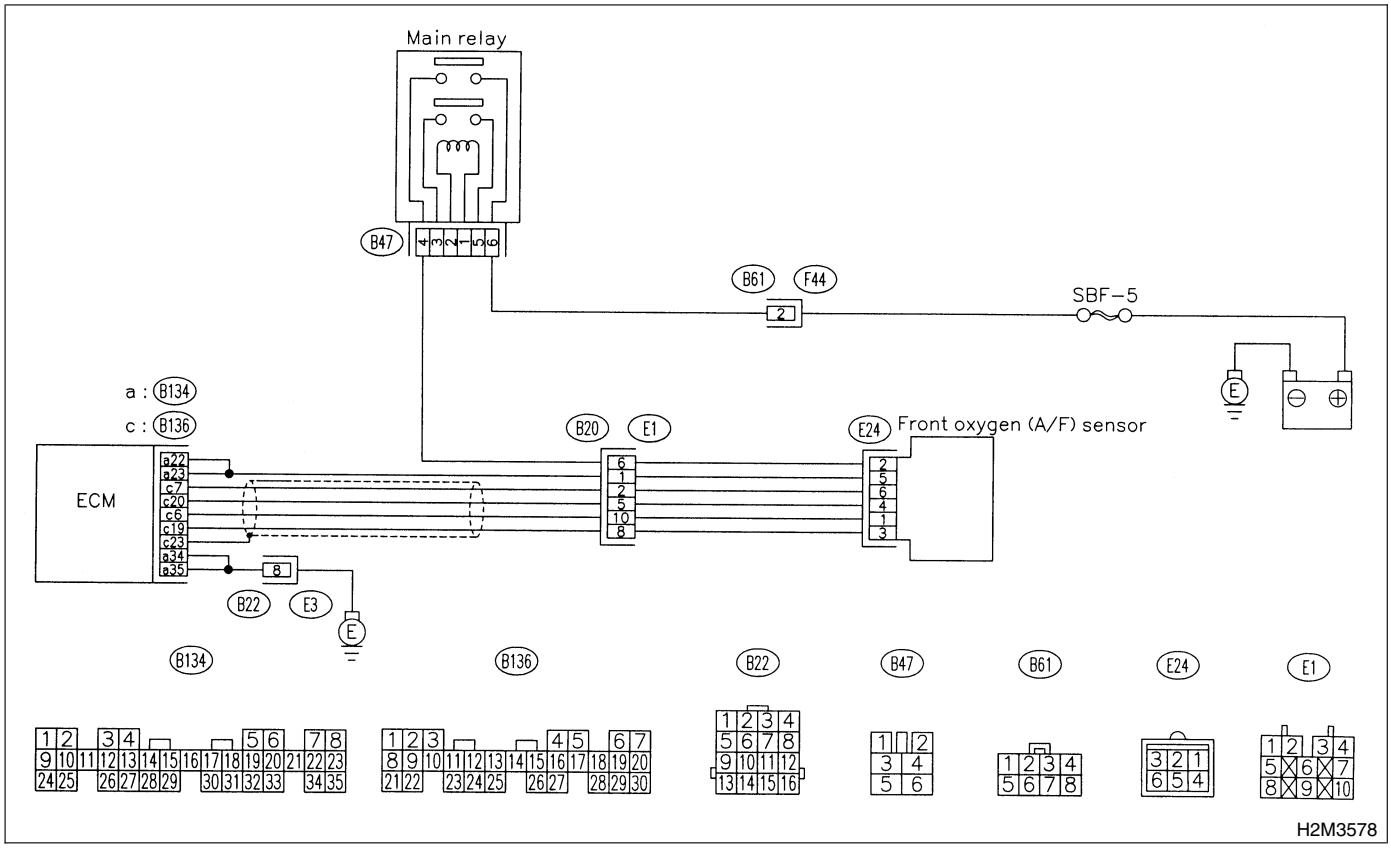
MEMO:

BY: DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT — S008638B95

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 8 V?	Go to step **3**.	Go to step **2**.
2	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **3**.	Go to step **4**.

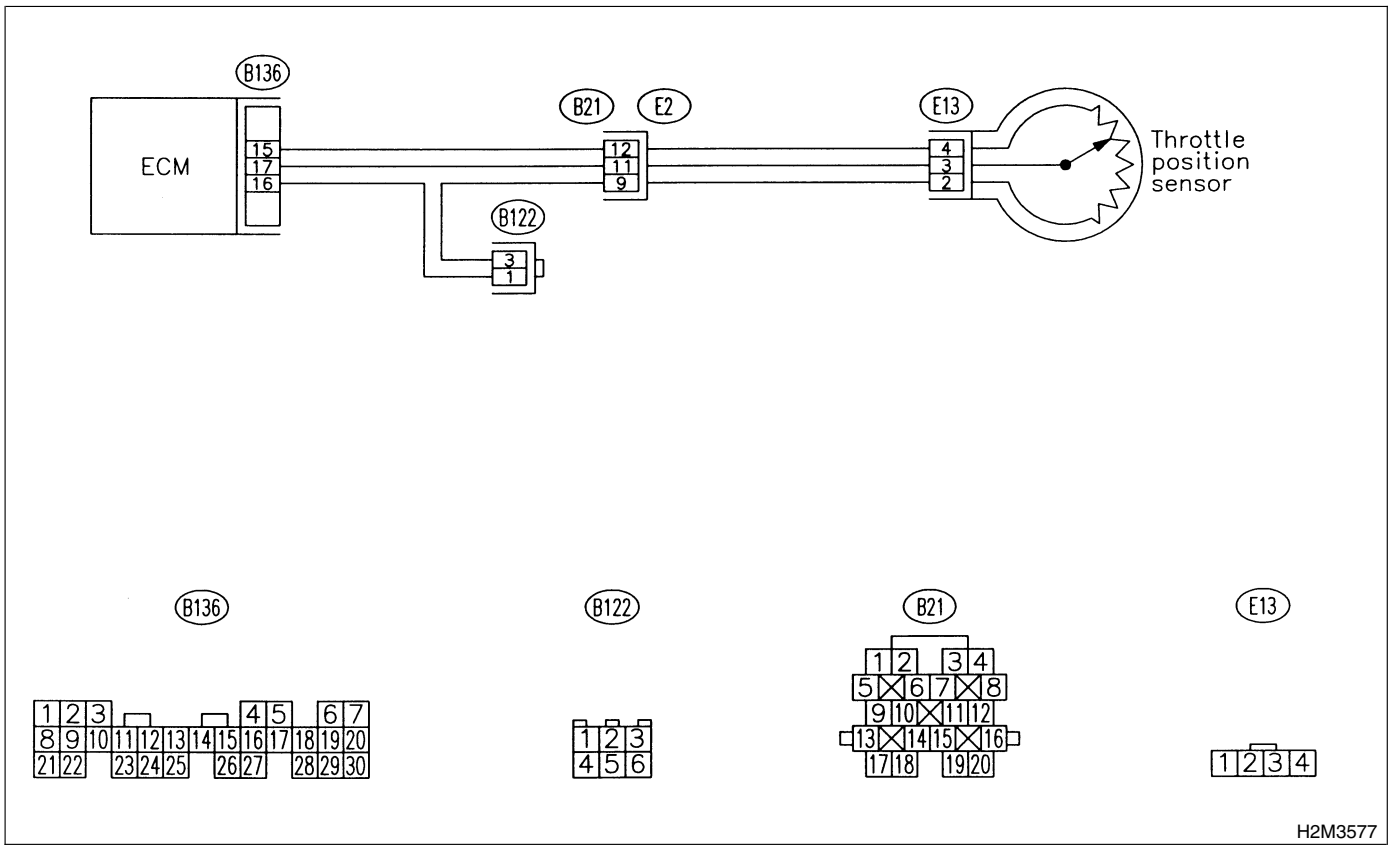
No.	Step	Check	Yes	No
3	**CHECK FRONT OXYGEN (A/F) SENSOR HEATER CURRENT.** 1) Turn ignition switch to OFF. 2) Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector. 3) Turn ignition switch to ON. 4) Read data of front oxygen (A/F) sensor heater current using Subaru Select Monitor or the OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 2.3 A?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	END
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 23 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 22 (+) — Chassis ground (–):***	Does the voltage change more than 8 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and front oxygen (A/F) sensor connector.	END

BZ: DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S008638B99

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0122 or P0123?	Inspect DTC P0122 or P0123 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P1142.	Replace throttle position sensor. <Ref. to FU-43 REMOVAL, Throttle Position Sensor.>

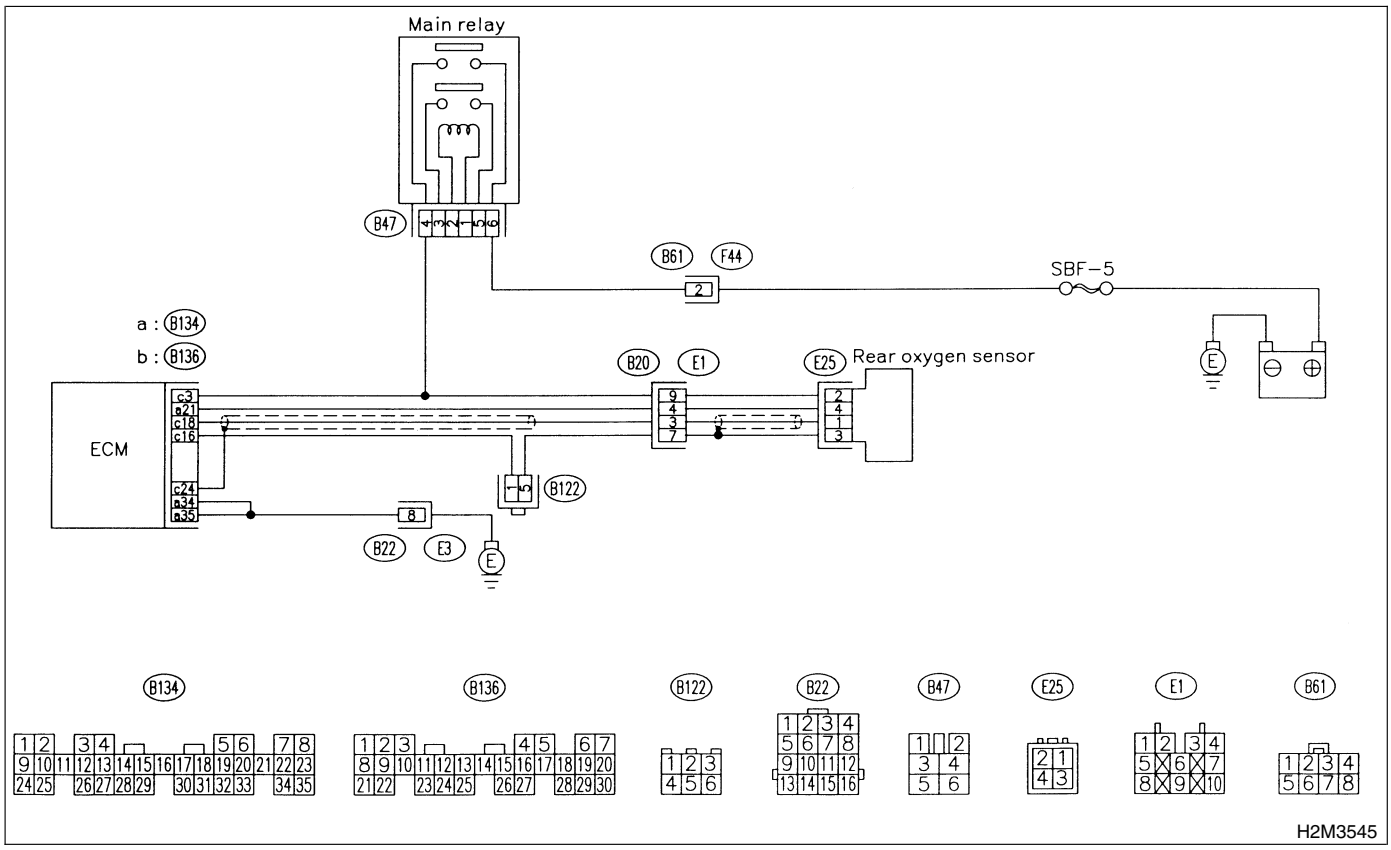
CA: DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT

— S008638C03

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 21 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **2**.	Go to step **3**.

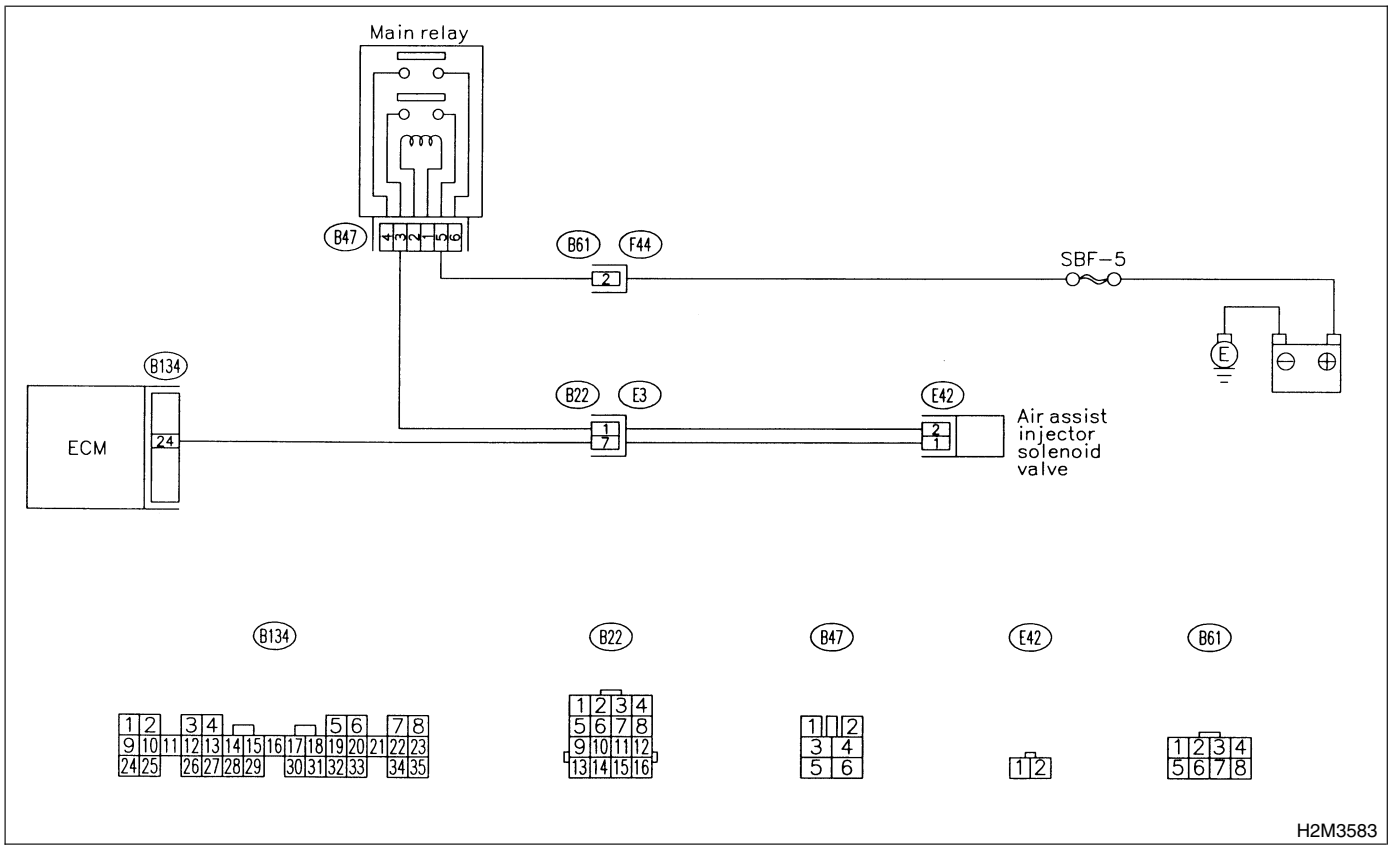
No.	Step	Check	Yes	No
2	**CHECK CURRENT DATA.** 1) Turn ignition switch to OFF. 2) Repair battery short circuit in harness between ECM and rear oxygen sensor connector. 3) Turn ignition switch to ON. 4) Read data of rear oxygen sensor heater current using Subaru Select Monitor or the OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN-50 OPERATION, Subaru Select Monitor.> ● OBD-II general scan tool For detailed operation procedure, refer to the OBD-II General Scan Tool Instruction Manual.	Is the value more than 7 A?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	END
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	END

CB: DTC P1207 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT LOW INPUT — S008638C04

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Repair poor contact in ECM connector.	Go to step **2**.

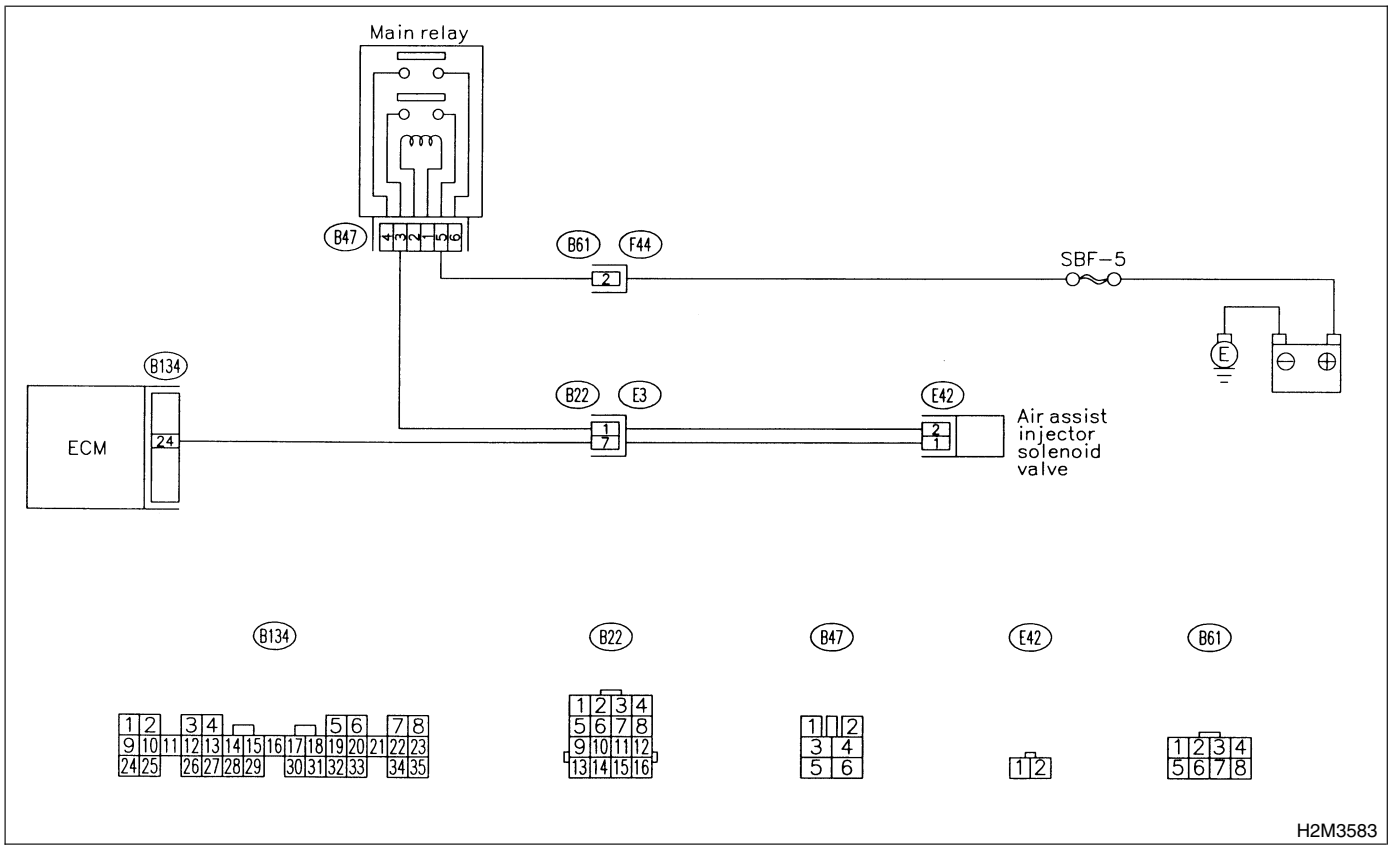
No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO AIR ASSIST INJECTOR SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Disconnect connector from air assist injector solenoid valve. 3) Turn ignition switch to ON. 4) Measure voltage between air assist injector solenoid valve and engine ground. ***Connector & terminal*** ***(E42) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **3**.	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)
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and air assist injector solenoid valve connector.	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in ECM and air assist injector solenoid valve connectors. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM and air assist injector solenoid valve connectors?	Repair poor contact in ECM and air assist injector solenoid valve connectors.	Replace air assist injector solenoid valve. <Ref. to FU-53 REMOVAL, Air Assist Injector Solenoid Valve.>

CC: DTC P1208 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT HIGH INPUT — S008638C05

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.

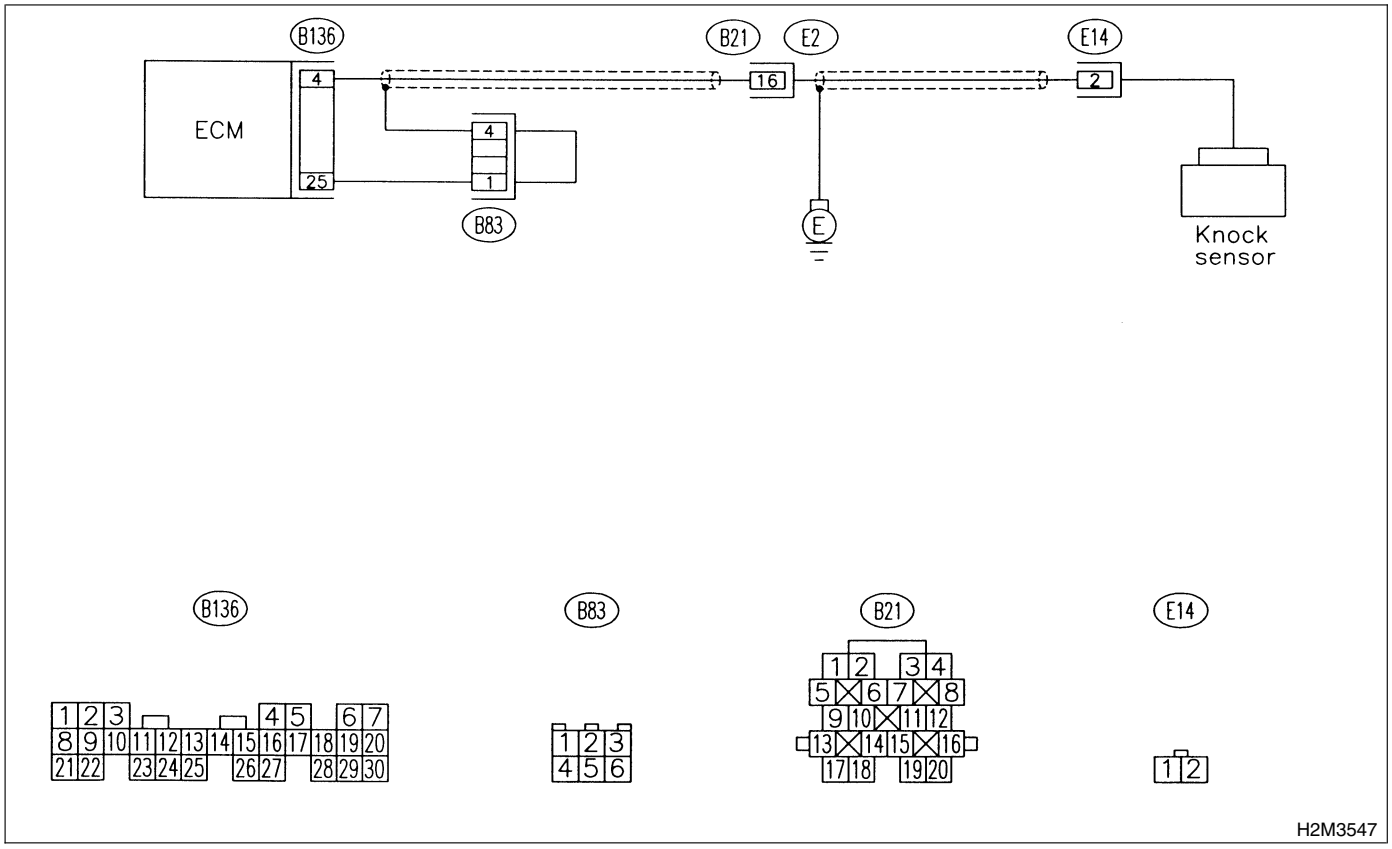
No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from air assist injector solenoid valve. 3) Turn ignition switch to ON. 4) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 24 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and air assist injector solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Replace air assist injector solenoid valve <Ref. to FU-53 REMOVAL, Air Assist Injector Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.
3	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 24 (+) — Chassis ground (–):***	Does the voltage change more than 10 V by shaking harness and connector of ECM while monitoring the value with voltage meter?	Repair battery short circuit in harness between ECM and air assist injector solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Contact with SOA service. NOTE: Insepction by DTM is required, because probable cause is deterioration of multiple parts.

CD: DTC P1325 — KNOCK SENSOR CIRCUIT LOW INPUT — S008638C06

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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:***	Is the resistance more than 700 kΩ?	Go to step **3**.	Go to step **2**.
2	**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:***	Is the resistance less than 400 kΩ?	Go to step **5**.	Go to step **6**.

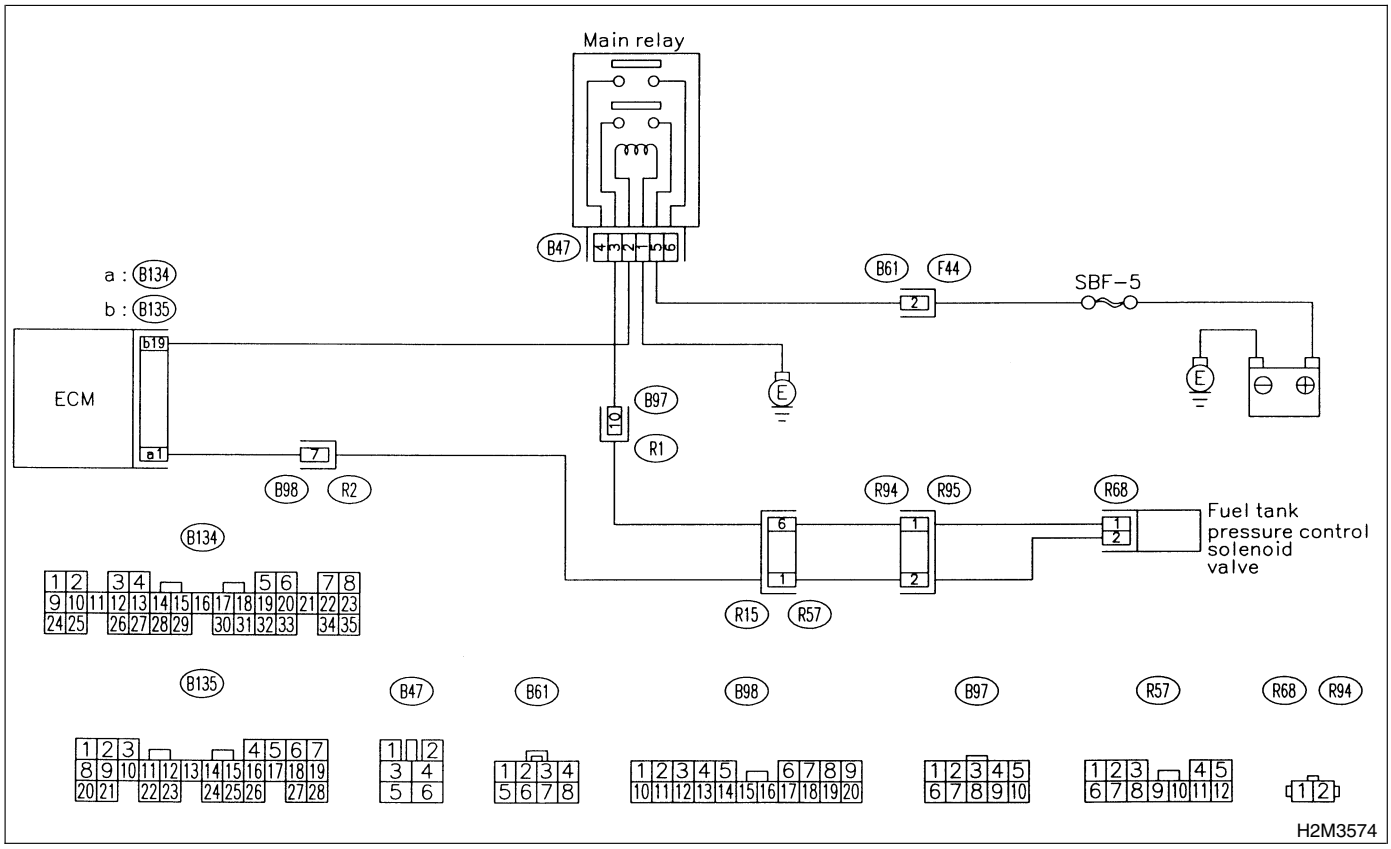
No.	Step	Check	Yes	No
3	**CHECK KNOCK SENSOR.** 1) Disconnect connector from knock sensor. 2) Measure resistance between knock sensor connector terminal and engine ground. ***Terminal*** ***No. 2 — Engine ground:***	Is the resistance more than 700 kΩ?	Go to step **4**.	Repair harness and connector. NOTE: 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)
4	**CHECK CONDITION OF KNOCK SENSOR INSTALLATION.**	Is the knock sensor installation bolt tightened securely?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	Tighten knock sensor installation bolt securely.
5	**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:***	Is the resistance less than 400 kΩ?	Replace knock sensor. <Ref. to FU-41 REMOVAL, Knock Sensor.>	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.
6	**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 (–):***	Is the voltage more than 2 V?	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)	Repair poor contact in ECM connector.

CE: DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT — S008638C07

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

No.	Step	Check	Yes	No
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and fuel tank pressure control solenoid valve connector.	Go to step **4**.
4	**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:***	Is the voltage less than 1 Ω?	Go to step **5**.	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 (B98, R57 and R94)
5	**CHECK FUEL TANK PRESSURE CONTROL SOLENOID VALVE.** Measure resistance between fuel tank pressure control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 10 and 100 Ω?	Go to step **6**.	Replace fuel tank pressure control solenoid valve. <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.>
6	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	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 (R94, R57 and B97) ● Poor contact in main relay connector

No.	Step	Check	Yes	No
7	**CHECK POOR CONTACT.** Check poor contact in fuel tank pressure control solenoid valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in fuel tank pressure control solenoid valve connector?	Repair poor contact in fuel tank pressure control solenoid valve connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

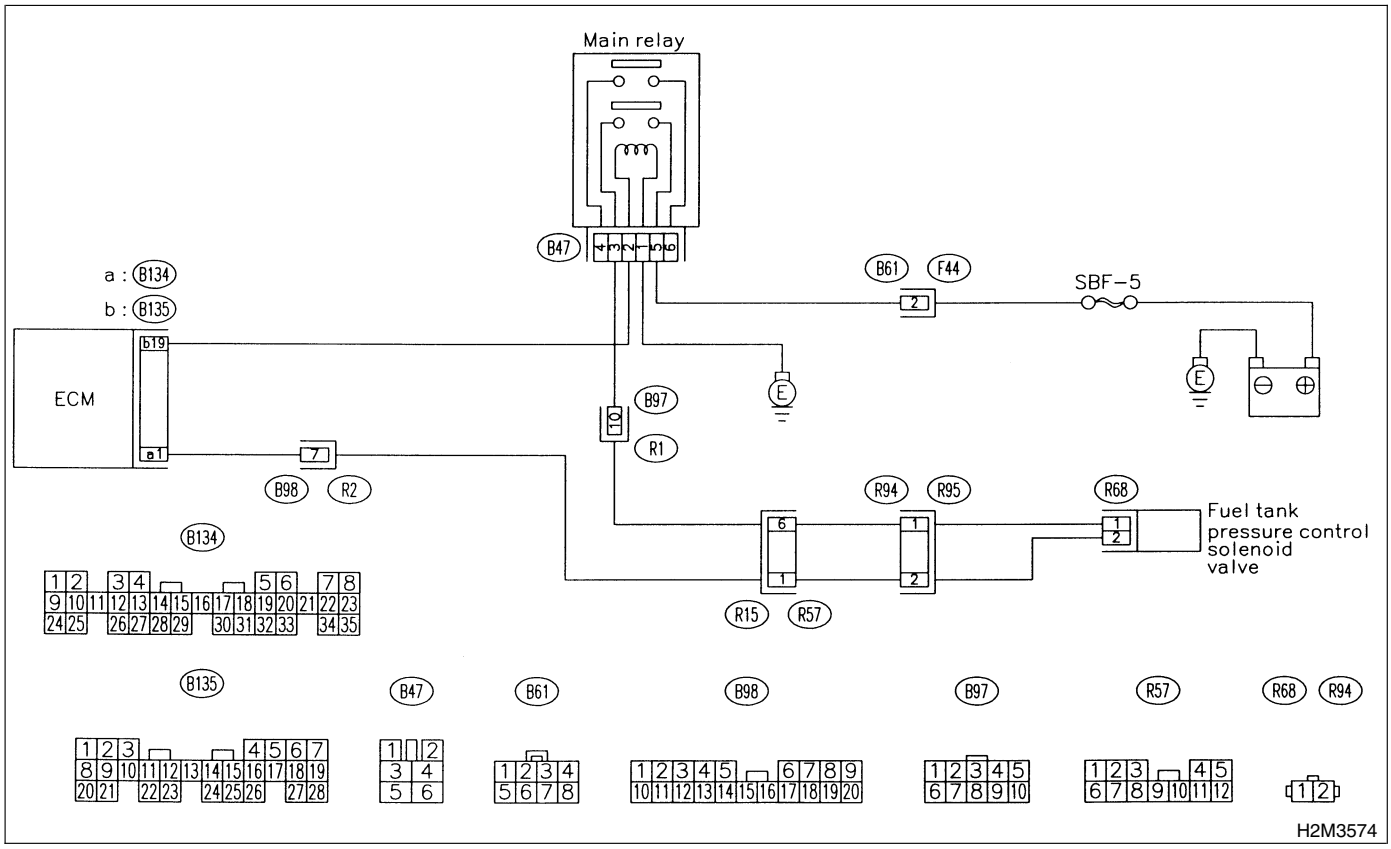
MEMO:

CF: DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT — S008638C08

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 1 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.

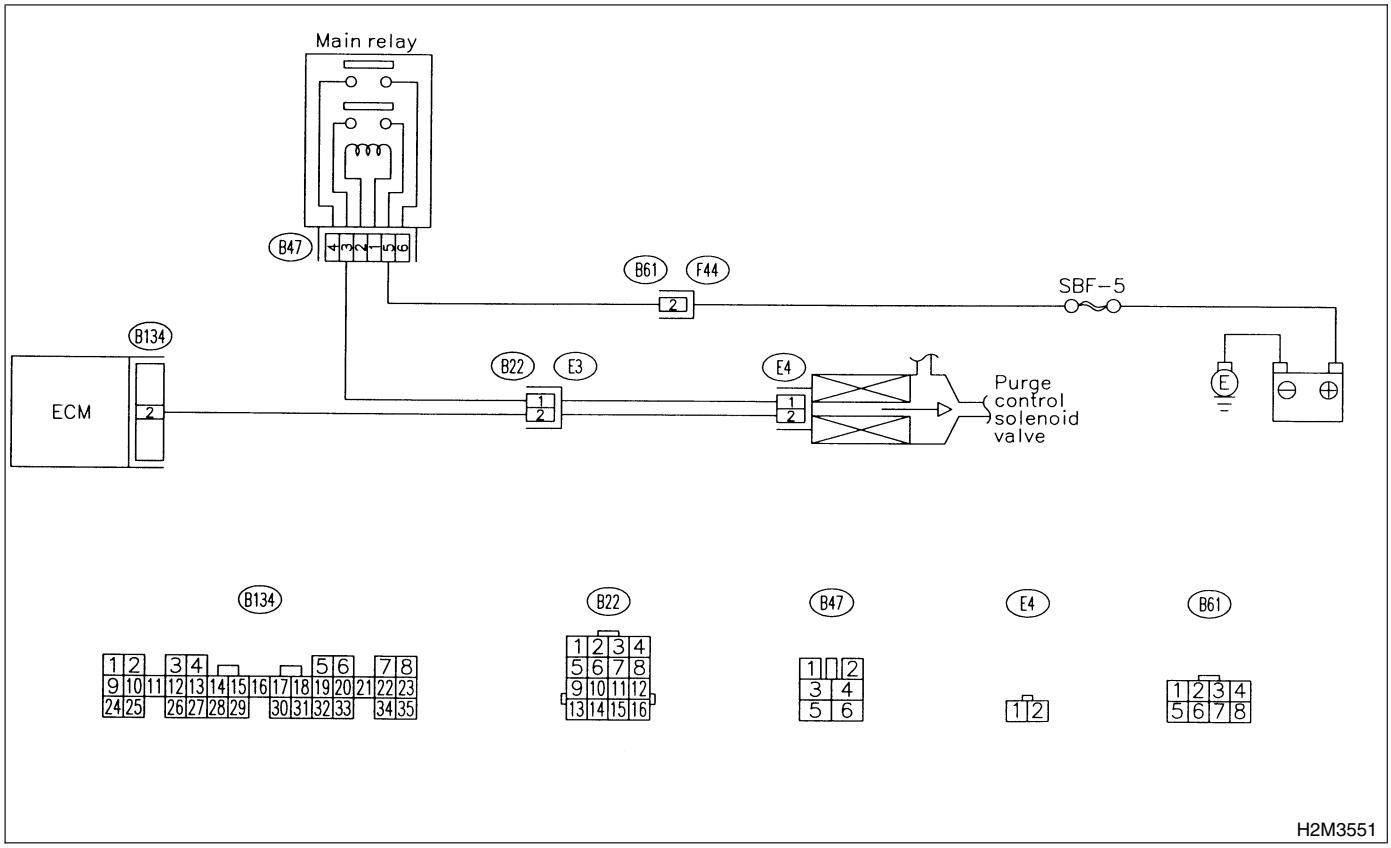
No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 1 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and fuel tank pressure control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**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:***	Is the resistance less than 1 Ω?	Replace fuel tank pressure control solenoid valve <Ref. to EC-17 REMOVAL, Pressure Control Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CG: DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT — S008638C09

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



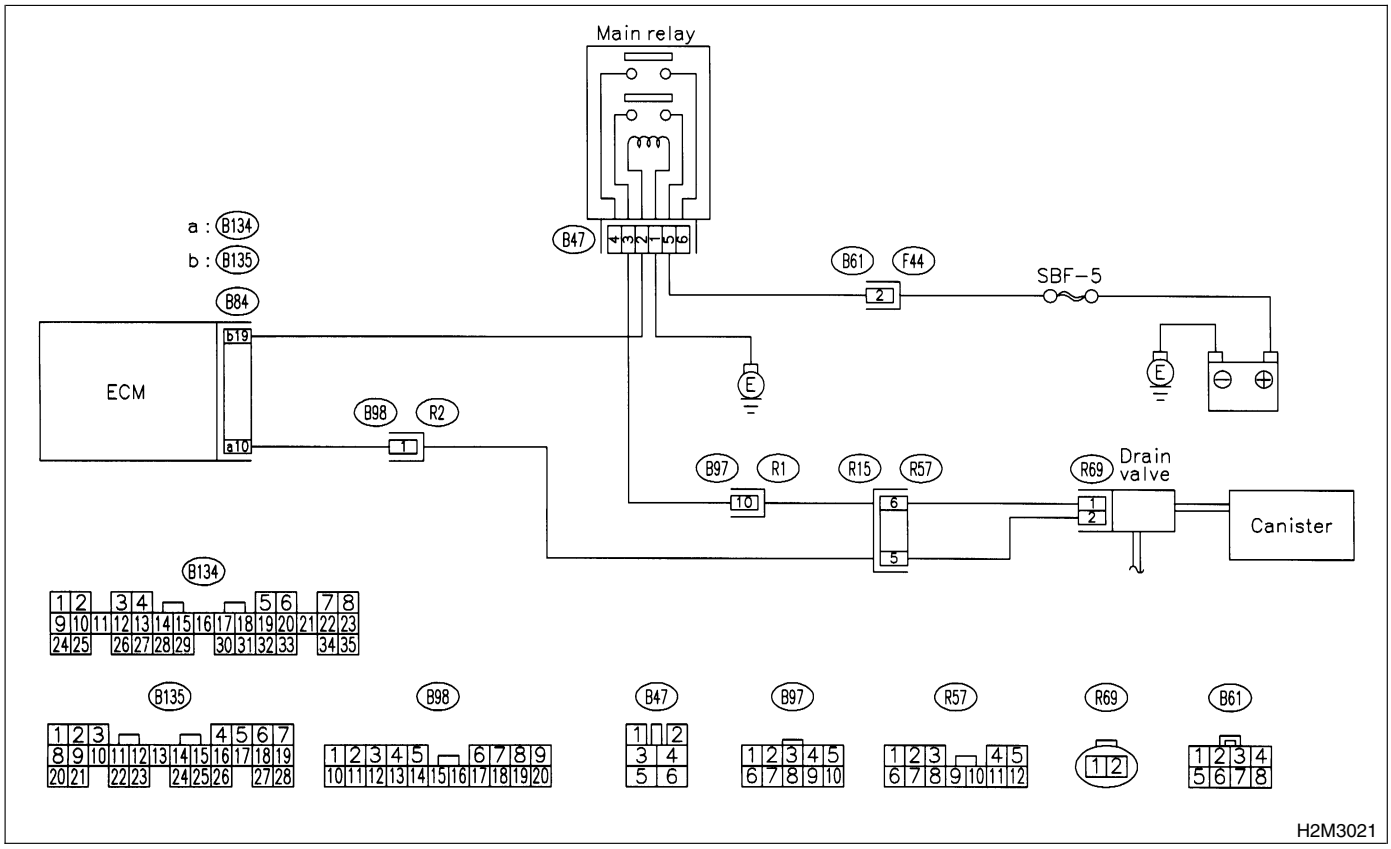
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to OFF. 2) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box. 3) Turn ignition switch to ON. 4) While operating purge control solenoid valve, 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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 2 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and purge control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**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:***	Is the resistance less than 1 Ω?	Replace purge control solenoid valve <Ref. to FU-88 REMOVAL, Purge Control Solenoid Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CH: DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT — S008638C10

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 excecuted using Subaru Select Monitor. For procedure, refer to "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 10 (+) — Chassis ground (–):***	Does voltage change between 0 and 10 V?	Go to step **2**.	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.

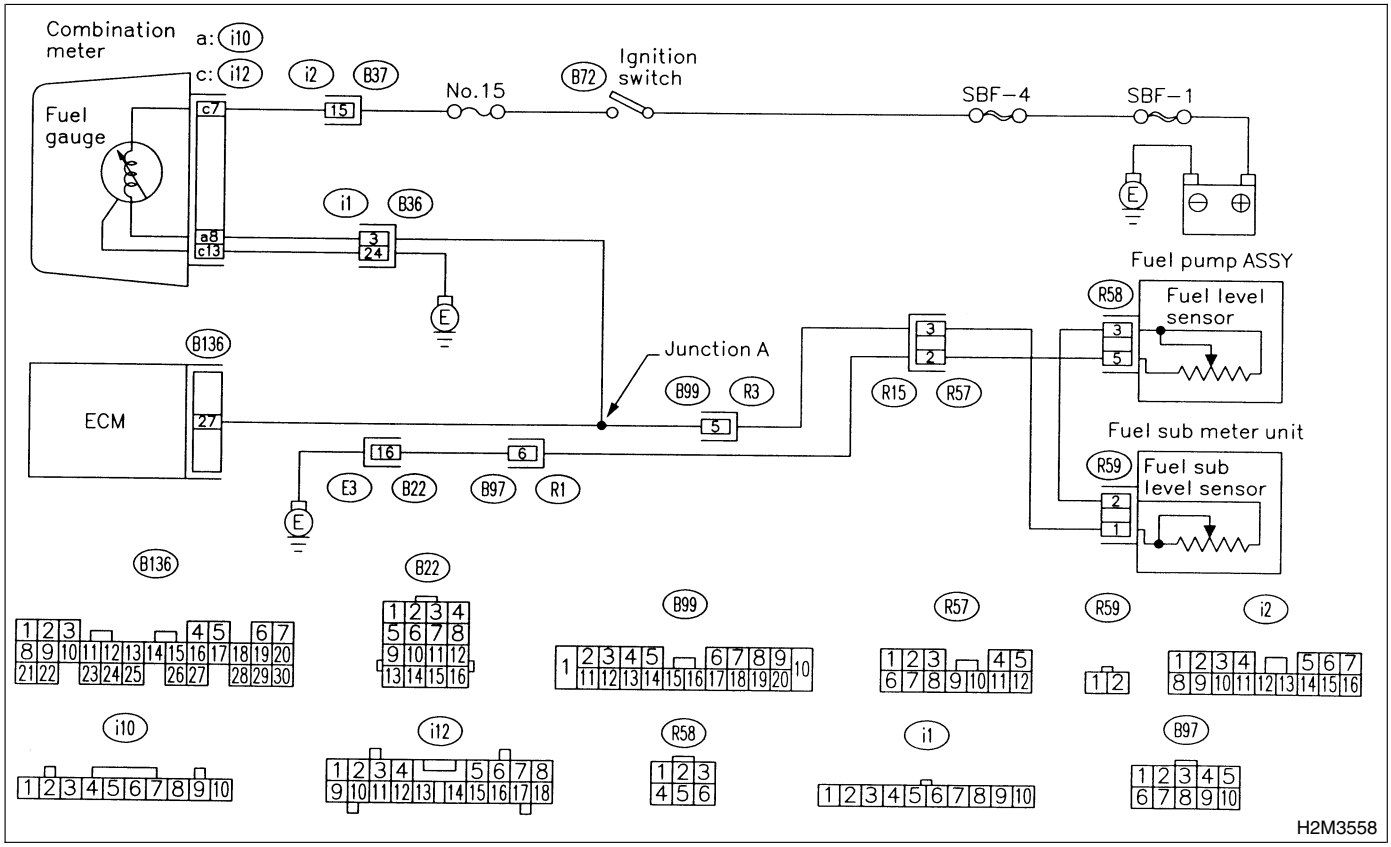
No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Go to step **3**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>
4	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and drain valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**CHECK DRAIN VALVE.** 1) Turn ignition switch to OFF. 2) Measure resistance between drain valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace drain valve <Ref. to EC-23 REMOVAL, Drain Valve.> and ECM <Ref. to FU-60 REMOVAL, Engine Control Module.>.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CI: DTC P1442 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM 2 — S008638C11

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0461, P0462 or P0463?	Inspect DTC P0461, P0462 or P0463 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect this trouble.	Replace fuel level sensor <Ref. to FU-80 REMOVAL, Fuel Level Sensor.> and fuel sub level sensor. <Ref. to EC-13 REMOVAL, Sub Fuel Level Sensor.>

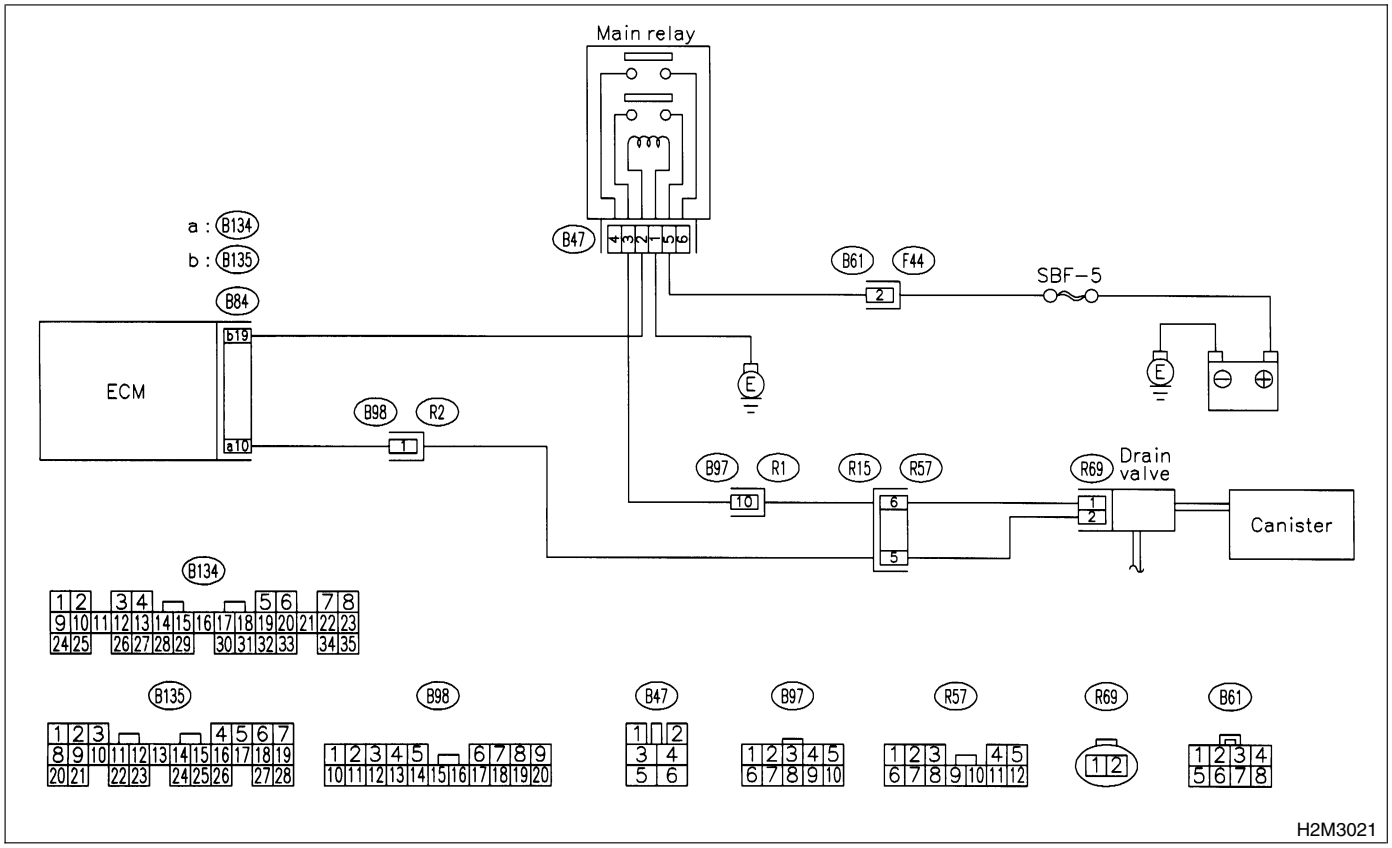
MEMO:

CJ: DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM — S008638C12

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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 vent hose between drain filter and junction pipe ● Clogging of junction pipe ● Clogging of drain filter	Is there a fault in vent line?	Repair or replace the faulty part.	Go to step **3**.
3	**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 operating can also be executed using Subaru Select Monitor. For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does drain valve produce operating sound?	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterio-ration of multiple parts.	Replace drain valve. <Ref. to EC-23 REMOVAL, Drain Valve.>

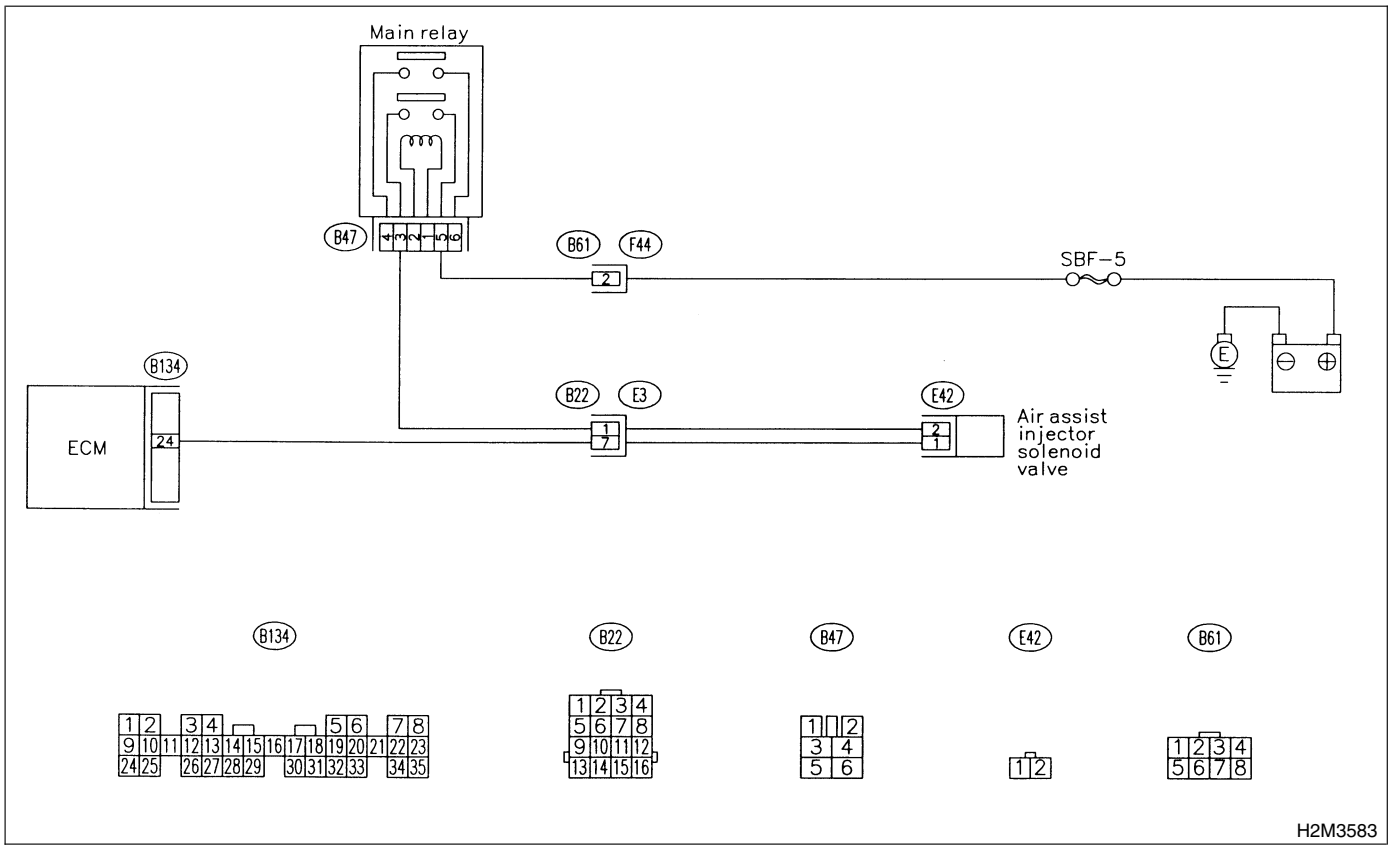
CK: DTC P1445 — AIR ASSIST INJECTOR SOLENOID VALVE MALFUNCTION

S008638C13

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does air assist injector solenoid valve operating sound?	Go to step **3**.	Replace air assist injector solenoid valve. <Ref. to FU-53 REMOVAL, Air Assist Injector Solenoid Valve.>
3	**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).	Is air by-pass hose damaged?	Repair or replace air by-pass hoses.	Go to step **4**.
4	**CHECK FUEL INJECTOR.** 1) Turn ignition switch to OFF. 2) Remove fuel injector. <Ref. to FU-54 REMOVAL, Fuel Injector.> 3) Check for clogged fuel injectors.	Is fuel injector clogged?	Replace fuel injector. <Ref. to FU-58 INSTALLATION, Fuel Injector.>	Replace air assist injector solenoid valve. <Ref. to FU-53 REMOVAL, Air Assist Injector Solenoid Valve.>

CL: DTC P1490 — THERMOSTAT MALFUNCTION — S008638C14

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

No.	Step	Check	Yes	No
1	**CHECK VEHICLE CONDITION.**	Has engine operated at idle or has vehicle been driven with part of engine submerged under water?	In this case, it is not necessary to inspect DTC P1490.	Go to step **2**.
2	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0125, P0301, P0302, P0303 and P0304 at same time?	Go to step **3**.	Inspect DTC P0125, P0301, P0302, P0303 and P0304 using “19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models”. <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>
3	**CHECK ENGINE COOLANT.**	Are coolant level and mixture ratio of cooling water to anti-freeze solution correct?	Go to step **4**.	Replace engine coolant. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>
4	**CHECK RADIATOR FAN.** 1) Start the engine. 2) Check radiator fan operation.	Does radiator fan continuously rotate for more than 3 minutes during idling?	Repair radiator fan circuit. <Ref. to CO-22 INSPECTION, Radiator Main Fan and Fan Motor.>	Replace thermostat. <Ref. to CO-14 REMOVAL, Thermostat.>

MEMO:

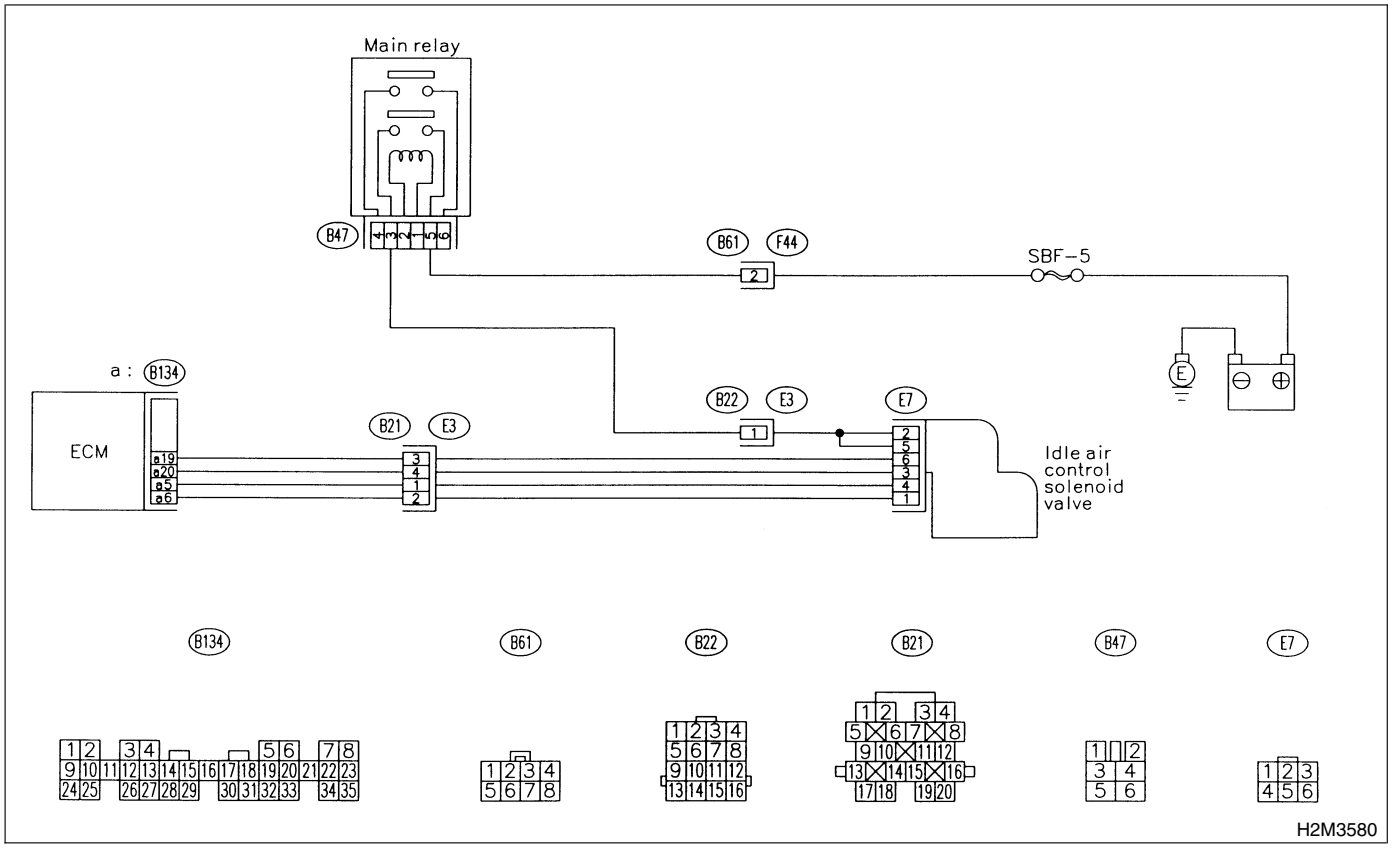
CM: DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —

S008638C16

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517?	Inspect DTC P1510, P1511, P1512, P1513, P1514, P1515, P1516 or P1517 using "19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models". <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.> NOTE: In this case, it is not necessary to inspect DTC P0507.	Go to step **2**.
2	**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	Is there a fault in air intake system?	Repair air suction and leaks.	Go to step **3**.
3	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **4**.	Adjust throttle cable. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>
4	**CHECK AIR BY-PASS LINE.** 1) Turn ignition switch to OFF. 2) Remove idle air control solenoid valve from throttle body. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.> 3) Confirm that there are no foreign particles in by-pass air line.	Are foreign particles in by-pass air line?	Remove foreign particles from by-pass air line.	Replace idle air control solenoid valve. <Ref. to FU-52 INSTALLATION, Idle Air Control Solenoid Valve.>

CN: DTC P1510 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1 CIRCUIT LOW INPUT — S008638C17

NOTE:
For the diagnostic procedure, refer to DTC P1516. <Ref. to EN-510 DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

CO: DTC P1511 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1 CIRCUIT HIGH INPUT — S008638C18

NOTE:
For the diagnostic procedure, refer to DTC P1517. <Ref. to EN-512 DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

CP: DTC P1512 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2 CIRCUIT LOW INPUT — S008638C19

NOTE:
For the diagnostic procedure, refer to DTC P1516. <Ref. to EN-510 DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

CQ: DTC P1513 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2 CIRCUIT HIGH INPUT — S008638C20

NOTE:
For the diagnostic procedure, refer to DTC P1517. <Ref. to EN-512 DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

CR: DTC P1514 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3 CIRCUIT LOW INPUT — S008638C21

NOTE:
For the diagnostic procedure, refer to DTC P1516. <Ref. to EN-510 DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

CS: DTC P1515 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3 CIRCUIT HIGH INPUT — S008638C22

NOTE:
For the diagnostic procedure, refer to DTC P1517. <Ref. to EN-512 DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

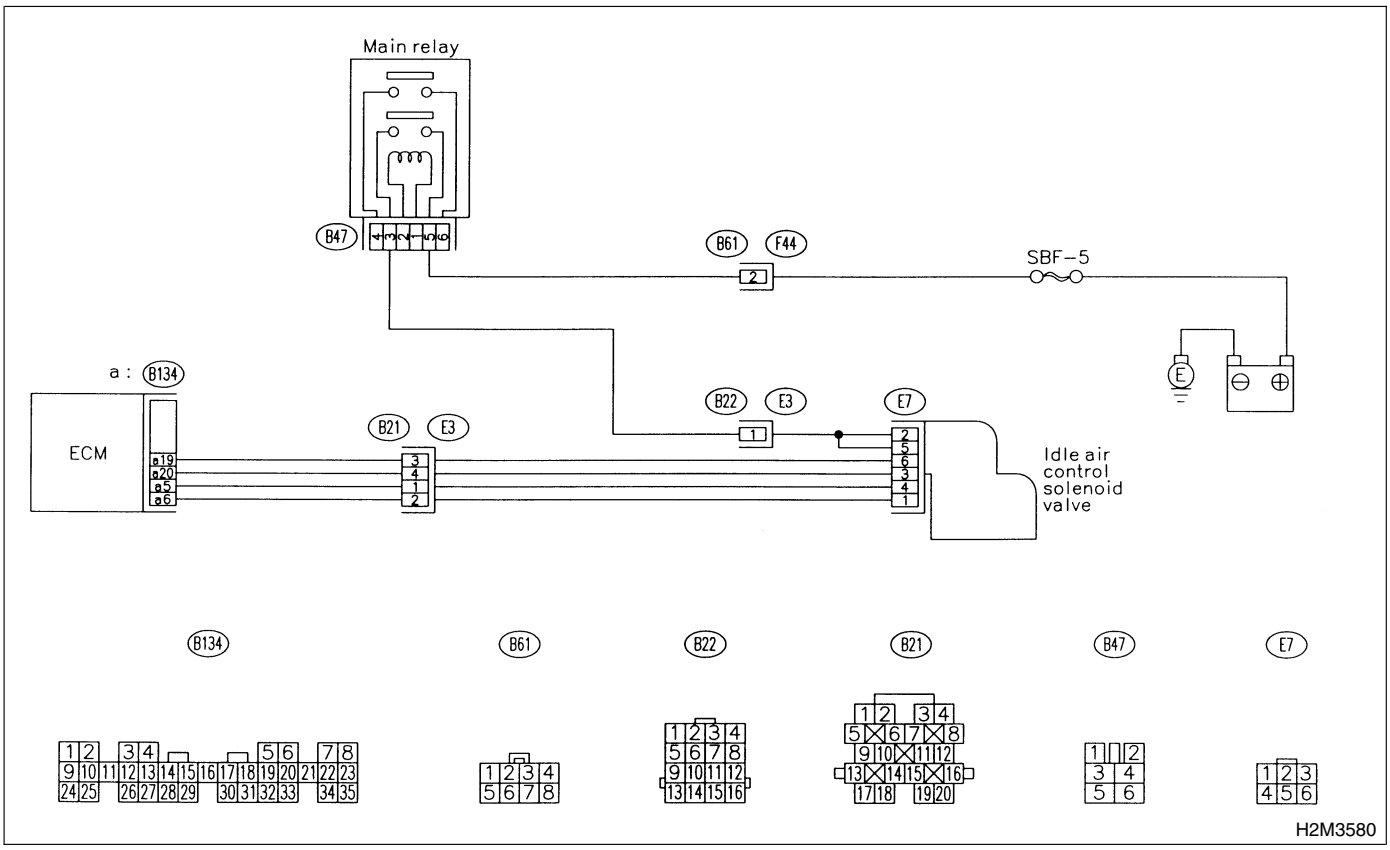
MEMO:

CT: DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT LOW INPUT — S008638C23

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Go to step **2**.	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)

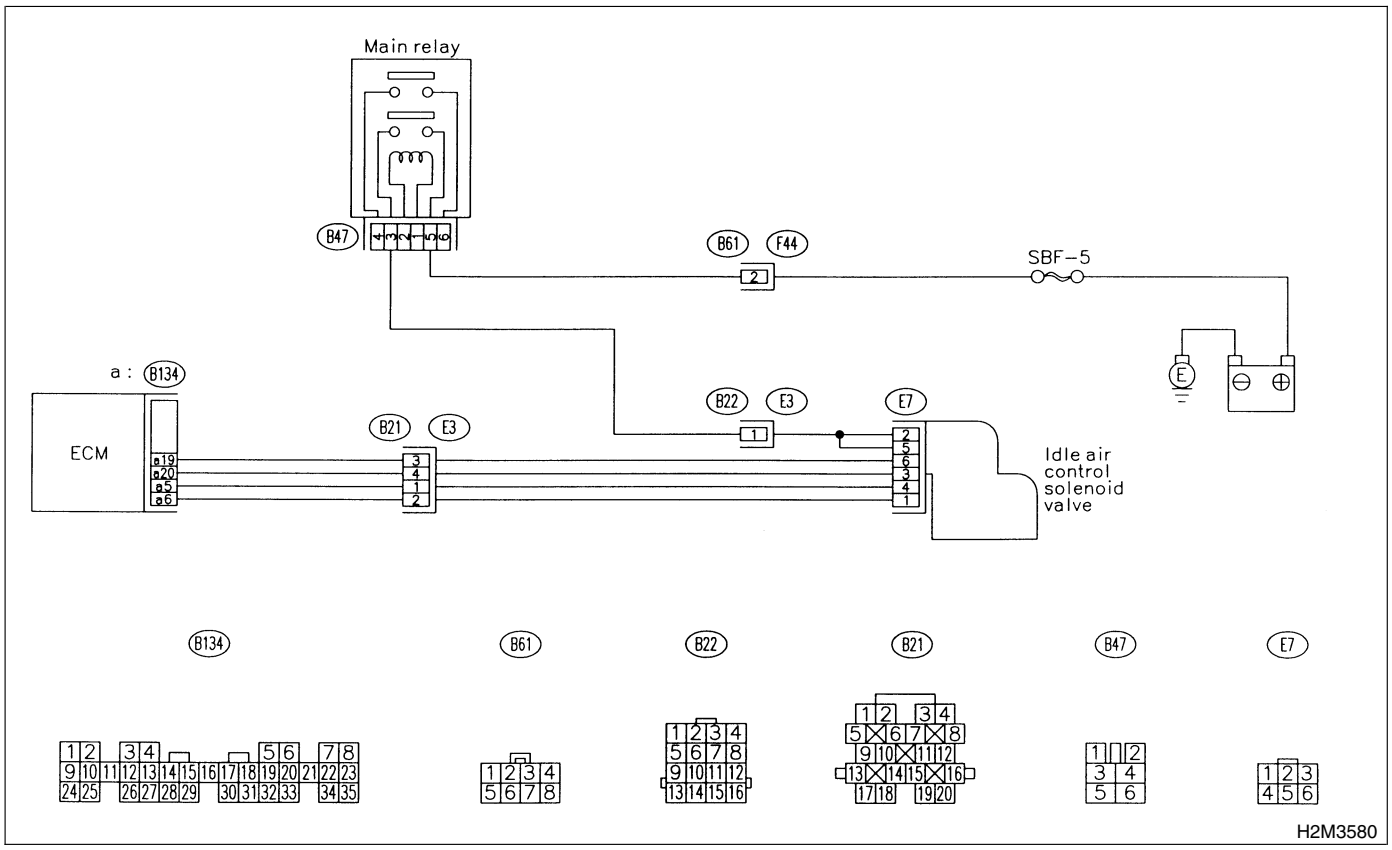
No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.** Measure voltage between idle air control solenoid valve connector and engine ground. ***Connector & terminal*** ***(E7) No. 5 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **3**.	Repair harness 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)
3	**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:***	Is the resistance less than 1 Ω?	Go to step **4**.	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)
4	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in ECM connector and idle air control solenoid valve connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector or idle air control solenoid valve connector?	Repair poor contact in ECM connector or idle air control solenoid valve connector.	Replace idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>

CU: DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT HIGH INPUT — S008638C24

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1511, P1513, P1515 and P1517 at same time?	Go to step **2**.	Go to step **3**.

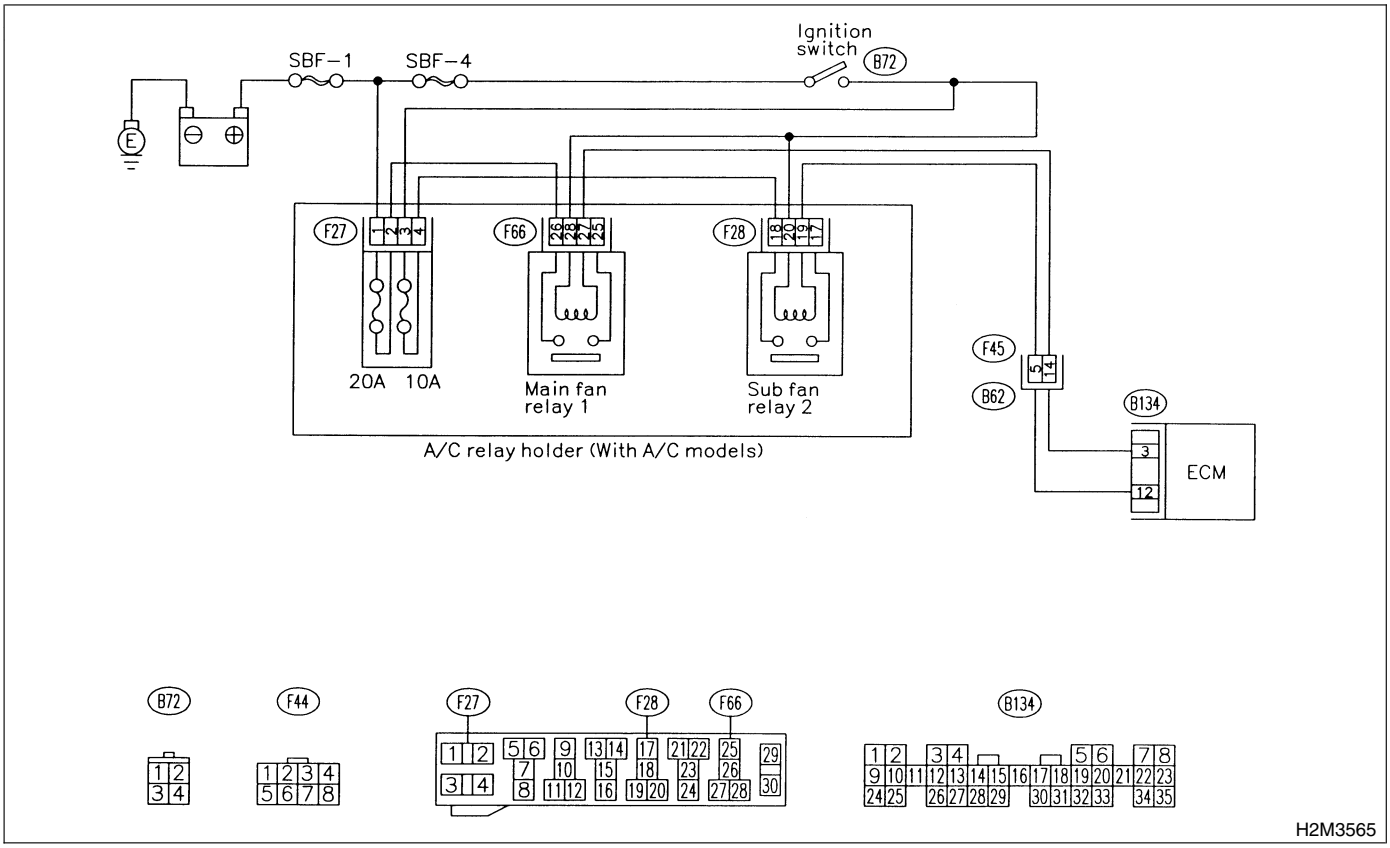
No.	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Turn ignition switch to OFF. 2) Measure resistance between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 7 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair harness and connector. NOTE: 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)
3	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and idle air control solenoid valve connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CV: DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT — S008638C25

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (−):***	Does voltage change between 0 and 10 V?	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.	Go to step **2**.

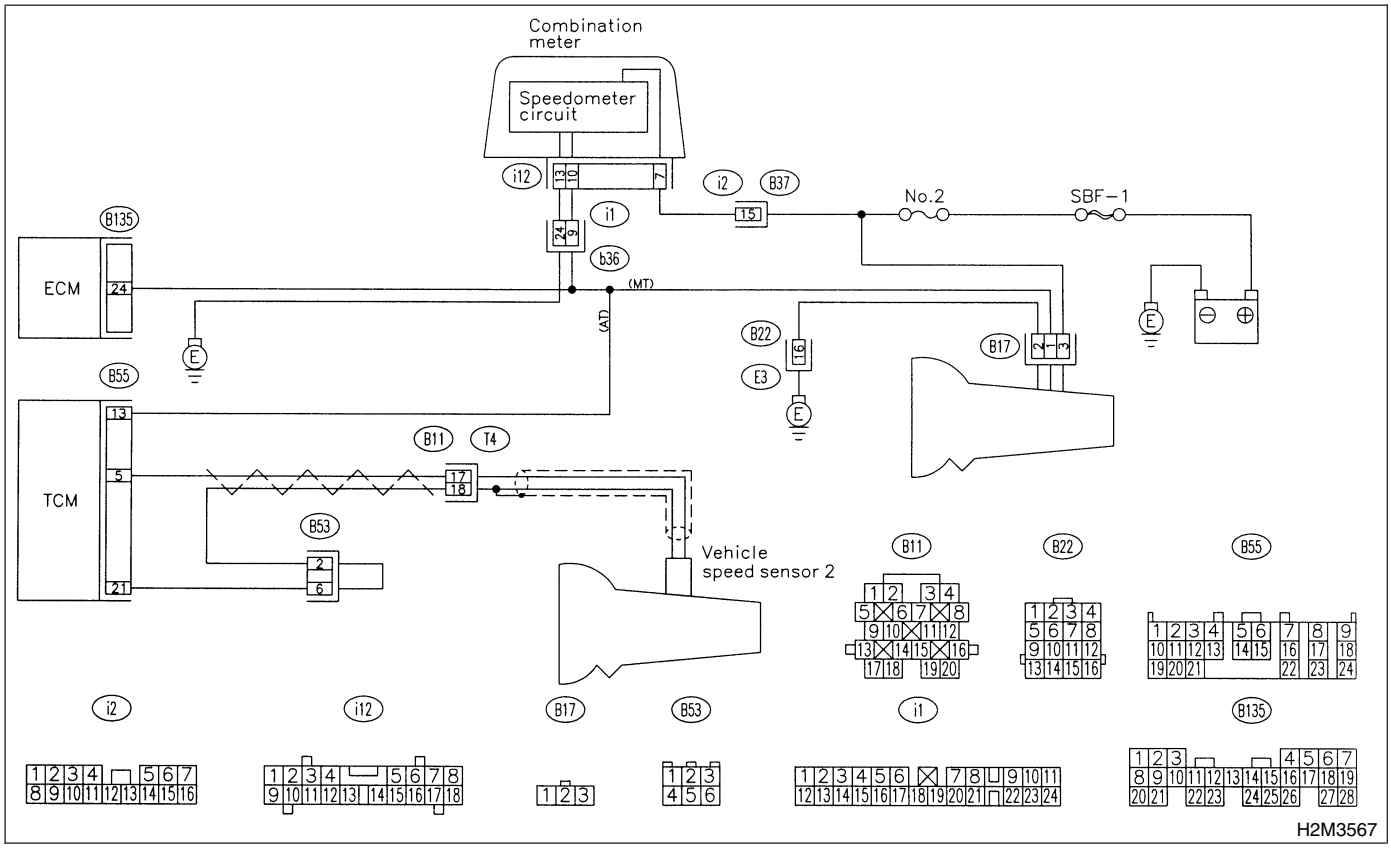
No.	Step	Check	Yes	No
2	**CHECK SHORT CIRCUIT IN RADIATOR FAN RELAY CONTROL CIRCUIT.** 1) Turn ignition switch to OFF. 2) Remove main fan relay and sub fan relay. (with A/C models) 3) Disconnect test mode connector. 4) Turn ignition switch to ON. 5) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in radiator fan relay control circuit. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **3**.
3	**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:***	Is the resistance less than 1 Ω?	Replace main fan relay and ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **4**.
4	**CHECK SUB FAN RELAY.** 1) Remove sub fan relay. 2) Measure resistance between sub fan relay terminals. ***Terminal*** ***No. 1 — No. 3***	Is the resistance less than 1 Ω?	Replace sub fan relay and ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

CW: DTC P1540 — VEHICLE SPEED SENSOR MALFUNCTION 2 — S008638C26

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC P0720 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?	Check vehicle speed sensor 2 signal circuit. <Ref. to AT-39 TROUBLE CODE 33 — VEHICLE SPEED SENSOR 2 (FRONT) —, Diagnostic Procedure with Trouble Code.>	Go to step **3**.
3	**CHECK SPEEDOMETER OPERATION IN COMBINATION METER.**	Does speedometer operate normally?	Go to step **4**.	Check speedometer and vehicle speed sensor. <Ref. to IDI-4 INSPECTION, General Diagnostic.>

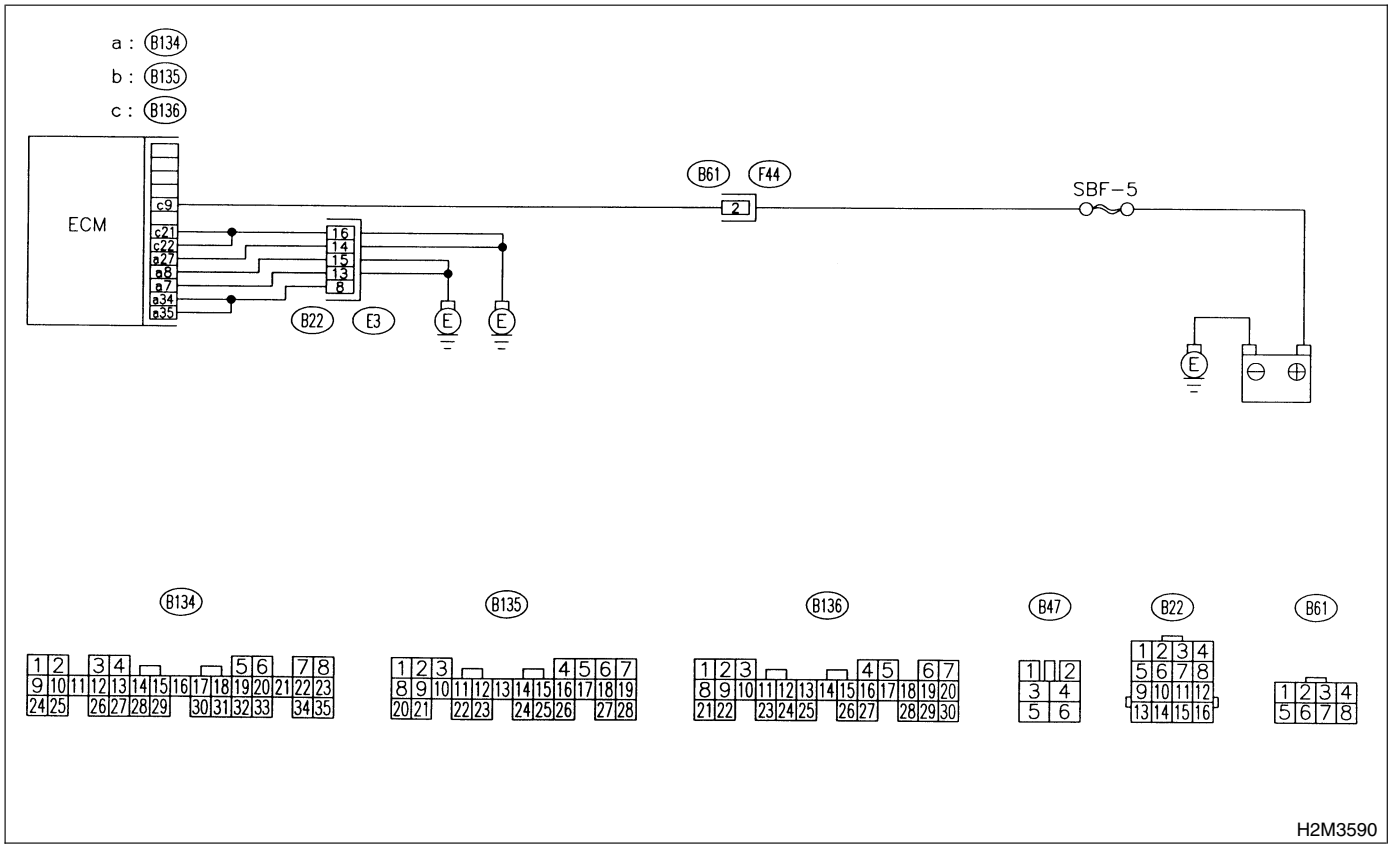
No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from combination meter. 3) Measure resistance between ECM and combination meter. ***Connector & terminal*** ***(B135) No. 24 — (i12) No. 10:***	Is the resistance less than 10 Ω?	Repair poor contact in ECM connector.	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 (i1)

CX: DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION — S008638C27

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



H2M3590

No.	Step	Check	Yes	No
1	**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 (–):***	Is the voltage more than 10 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM connector and battery terminal.	Go to step **3**.

No.	Step	Check	Yes	No
3	**CHECK FUSE SBF-5.**	Is fuse blown?	Replace fuse.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and battery ● Poor contact in coupling connector (F44) ● Poor contact in ECM connector ● Poor contact in battery terminal

CY: DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION — S008638C28

- **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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check throttle position sensor circuit. <Ref. to AT-35 TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>

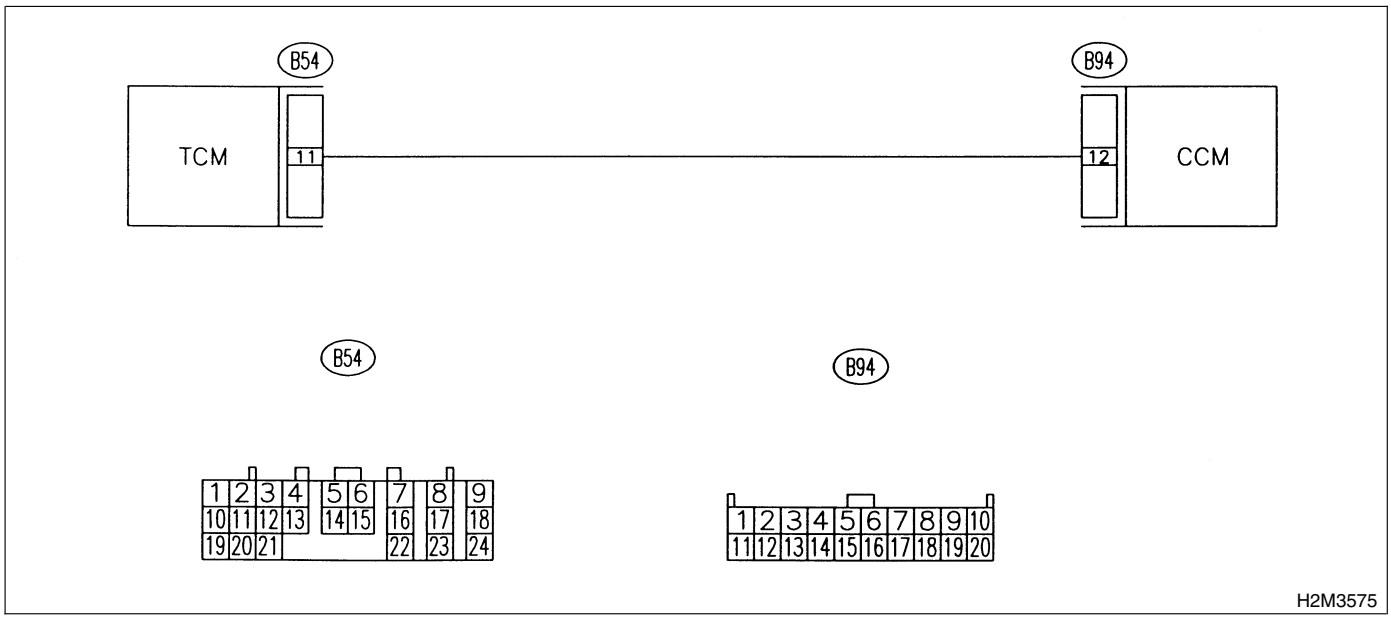
MEMO:

CZ: DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION — S008638C29

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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. ***Connector & terminal*** ***(B54) No. 11 — (B94) No. 12:***	Is the resistance less than 1 Ω?	Go to step **2**.	Repair open circuit in harness between TCM and CCM connector.
2	**CHECK HARNESS BETWEEN TCM AND CCM CONNECTOR.** Measure resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 11 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair short circuit in harness between TCM and CCM connector.	Go to step **3**.

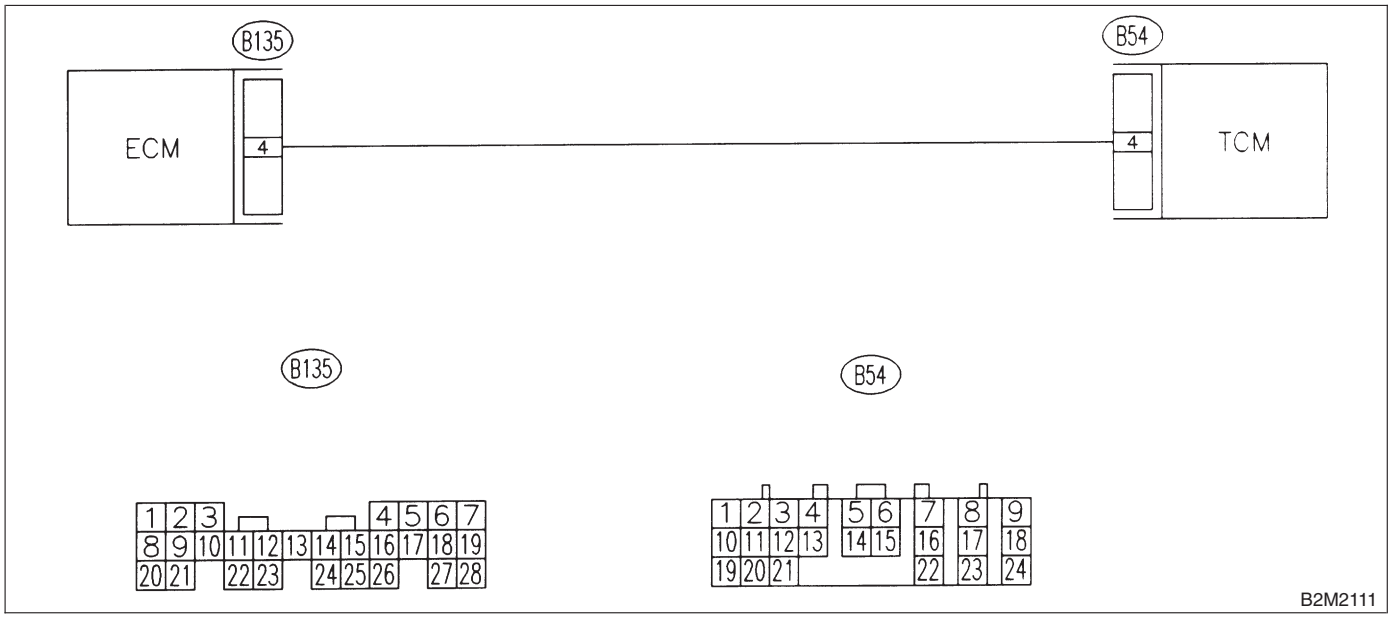
No.	Step	Check	Yes	No
3	**CHECK INPUT SIGNAL FOR TCM.** 1) Connect connector to TCM and CCM. 2) Lift-up the vehicle or set the vehicle on free rollers. **CAUTION:** **On AWD models, raise all wheels off ground.** 3) Start the engine. 4) Cruise control main switch to ON. 5) Move selector lever to “D” 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 (–):***	Is the resistance less than 1 V?	Go to step **4**.	Check cruise control set circuit. <Ref. to CC-13 SYMPTOM CHART, Diagnostics Chart with Symptom.>
4	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

DA: DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT — S008638C30

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Check AT/MT identification circuit. <Ref. to EN-531 AT/MT IDENTIFICATION CIRCUIT MALFUNCTION [MT VEHICLES], Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
2	**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 (–):***	Is the voltage less than 1 V?	Go to step **3**.	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.	Step	Check	Yes	No
3	**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:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **4**.
4	**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 (–):***	Is the voltage more than 5 V?	Go to step **5**.	Repair poor contact in ECM connector.
5	**CHECK TROUBLE CODE FOR AUTOMATIC TRANSMISSION.** Read trouble code for automatic transmission. <Ref. to AT-18 OPERATION, Read Diagnostic Trouble Code.>	Does trouble code appear for automatic transmission?	Inspect trouble code for automatic transmission. <Ref. to AT-18 OPERATION, Read Diagnostic Trouble Code.>	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

DB: DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008638C31

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check low clutch timing control solenoid valve circuit. <Ref. to AT-56 TROUBLE CODE 73 — LOW CLUTCH TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>

DC: DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008638C32

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check 2-4 brake timing control solenoid valve circuit. <Ref. to AT-59 TROUBLE CODE 74 — 2-4 BRAKE TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>

DD: DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION — S008638F10

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check 2-4 brake duty solenoid circuit. <Ref. to AT-66 TROUBLE CODE 76 — 2-4 BRAKE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>

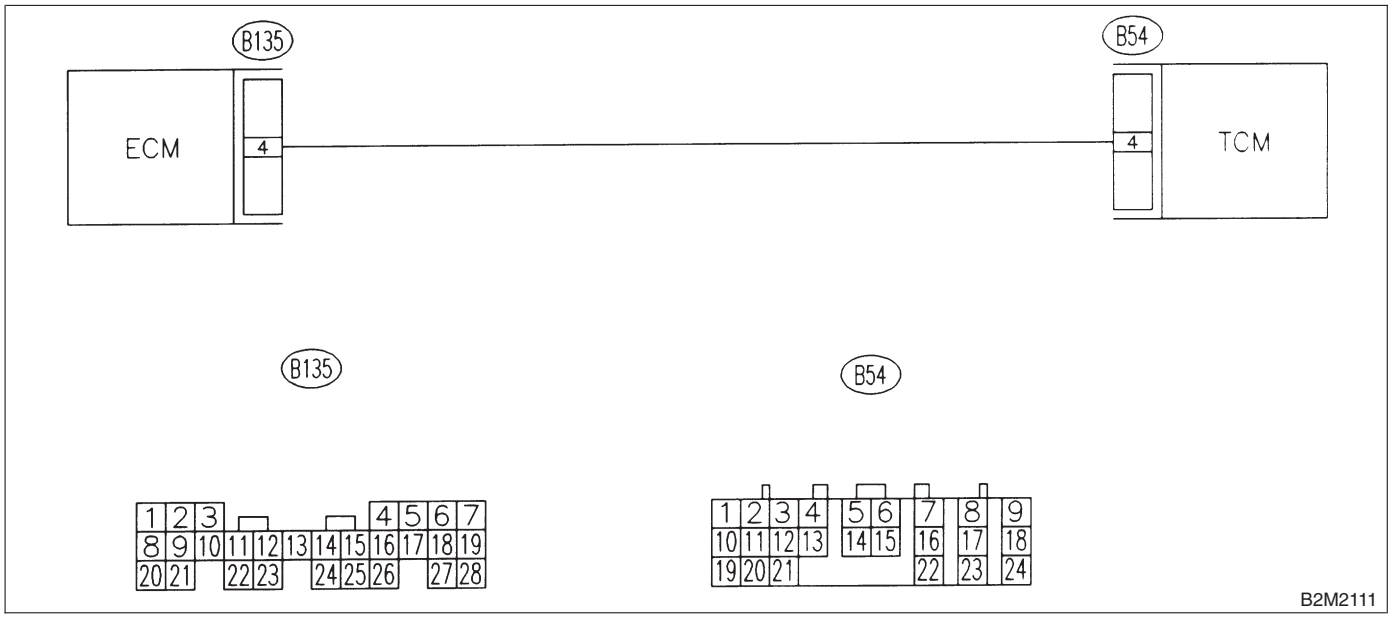
MEMO:

DE: DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT — S008638C34

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Check AT/MT identification circuit. <Ref. to EN-531 AT/MT IDENTIFICATION CIRCUIT MALFUNCTION [MT VEHICLES], Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
2	**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 (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector. After repair, replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Go to step **3**.

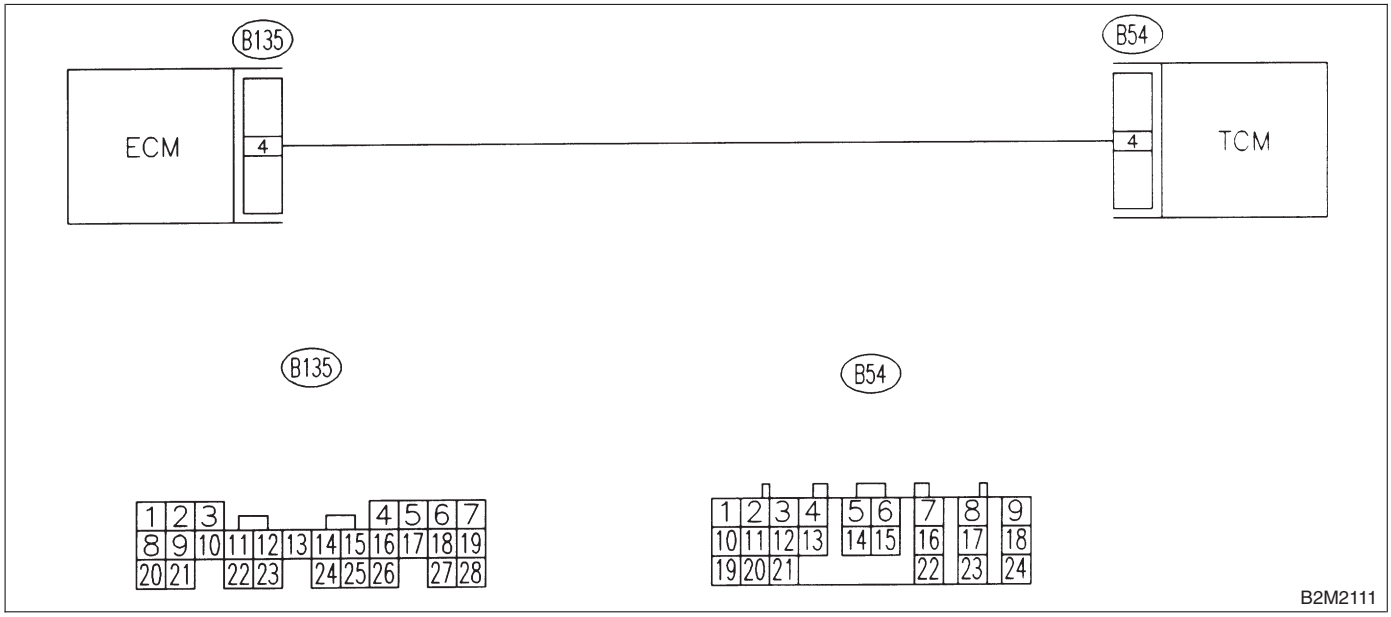
No.	Step	Check	Yes	No
3	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 4 V?	Go to step **6**.	Go to step **4**.
4	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair poor contact in ECM connector.	Go to step **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 4 (+) — Chassis ground (–):***	Does the voltage change from 1 V to 4 V while monitoring the value with voltage meter?	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	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
6	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B54) No. 4 (+) — Chassis ground (–):***	Is the voltage more than 4 V?	Go to step **7**.	Repair open circuit in harness between ECM and TCM connector.
7	**CHECK POOR CONTACT.** Check poor contact in TCM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Check TCM power supply line and grounding line.

DF: DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION — S008638C35

- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



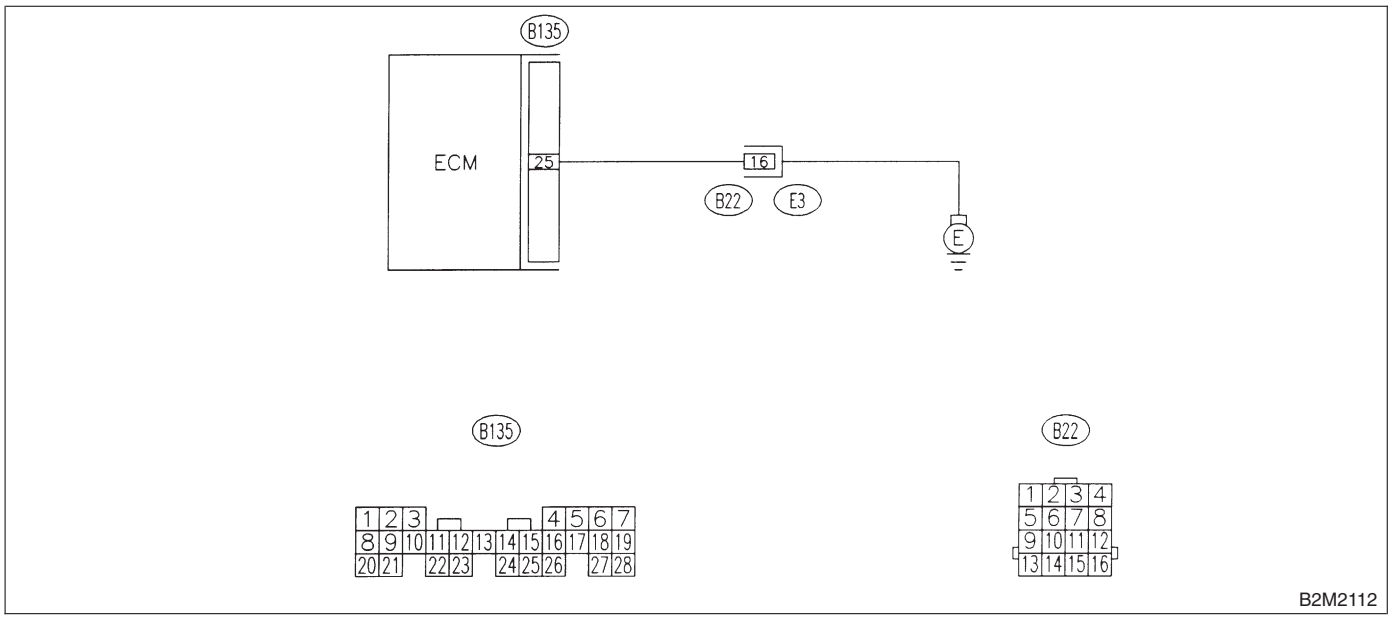
No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **2**.	Check AT/MT identification circuit. <Ref. to EN-531 AT/MT IDENTIFICATION CIRCUIT MALFUNCTION [MT VEHICLES], Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
2	**CHECK DRIVING CONDITION.** 1) Start and warm-up the engine until the radiator fan makes one complete rotation. 2) Drive the vehicle.	Is AT shift control functioning properly?	Go to step **3**.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>
3	**CHECK ACCESSORY.**	Are car phone and/or CB installed on vehicle?	Repair grounding line of car phone or CB system.	Replace TCM. <Ref. to AT-41 REMOVAL, Transmission Control Module (TCM).>

DG: — AT/MT IDENTIFICATION CIRCUIT MALFUNCTION [MT VEHICLES] —

S008638F58

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM CONNECTOR AND ENGINE GROUNDING TERMINAL.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 25 (+) — Chassis ground (–):***	Is the voltage more than 2 V?	Repair harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM connector and engine grounding terminal • Poor contact in engine grounding terminal • Poor contact in coupling connector (B22)	Go to step **2**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact with SOA service. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

16. Diagnostics for Engine Starting Failure S008533

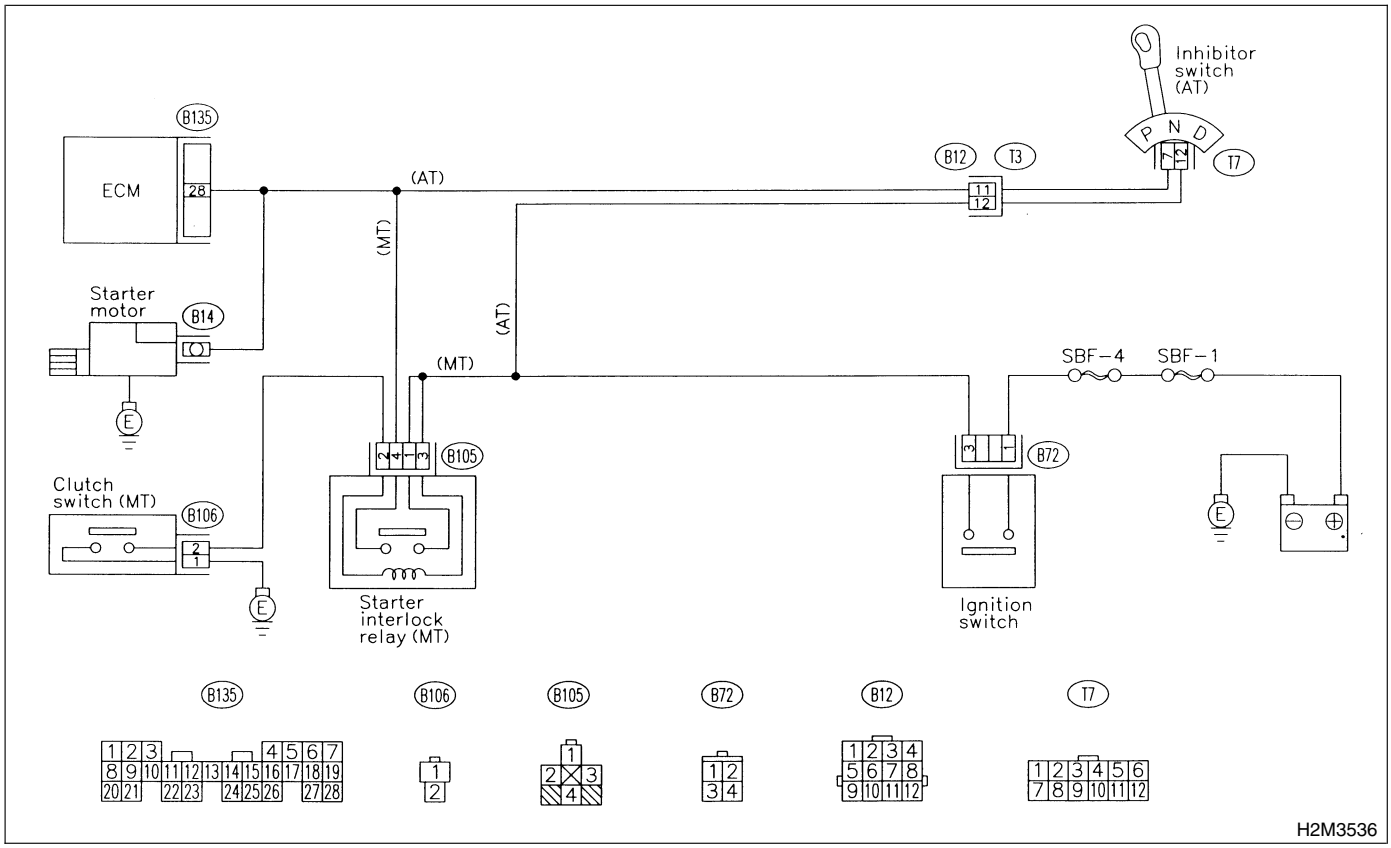
A: PROCEDURE S008533E45

1. Inspection of starter motor circuit. <Ref. to EN-72 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
2. Inspection of ECM power supply and ground line. <Ref. to EN-76 CONTROL MODULE POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN-84 FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel injector circuit. <Ref. to EN-88 FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of crankshaft position sensor circuit. <Ref. to EN-92 CRANKSHAFT POSITION SENSOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
7. Inspection of camshaft position sensor circuit. <Ref. to EN-92 CAMSHAFT POSITION SENSOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
8. Inspection using Subaru Select Monitor or OBD-II general scan tool (2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>, 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>) or inspection using “12. General Diagnostic Table”. <Ref. to EN-532 INSPECTION, General Diagnostic Table.>

B: STARTER MOTOR CIRCUIT S008533E94

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK BATTERY.**	Is the voltage more than 12 V?	Go to step **2**.	Charge or replace battery.
2	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from starter motor. 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.	Is the voltage more than 10 V?	Go to step **3**.	Go to step **4**.
3	**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.	Is resistance less than 5 Ω?	Check starter motor. <Ref. to SC-7 INSPECTION, Starter.>	Repair open circuit of ground cable.

No.	Step	Check	Yes	No
4	**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 (–):***	Is the voltage more than 10 V?	Go to step **6**.	Repair open circuit in harness between ignition switch and battery, and check fuse SBF No. 4 and SBF No. 1.
5	**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:***	Is the resistance less than 5 Ω?	Go to step **6**.	Replace ignition switch.
6	**CHECK TRANSMISSION TYPE.**	Is transmission type AT?	Go to step **7**.	Go to step **11**.
7	**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 (–):***	Is the voltage more than 10 V?	Go to step **8**.	Repair open or ground short circuit in harness between inhibitor switch and ignition switch.
8	**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:***	Is the resistance less than 1 Ω?	Repair open or ground short circuit in harness between inhibitor switch and starter motor.	Replace inhibitor switch. <Ref. to AT-31 REMOVAL, Inhibitor Switch.>
9	**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 (–):***	Is the voltage more than 10 V?	Go to step **10**.	Repair open or ground short circuit in harness between starter interlock relay and ignition switch.
10	**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:***	Is the resistance less than 1 Ω?	Go to step **11**.	Replace starter interlock relay.
11	**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:***	Is the resistance less than 1 Ω?	Go to step **12**.	Repair open circuit of ground cable.

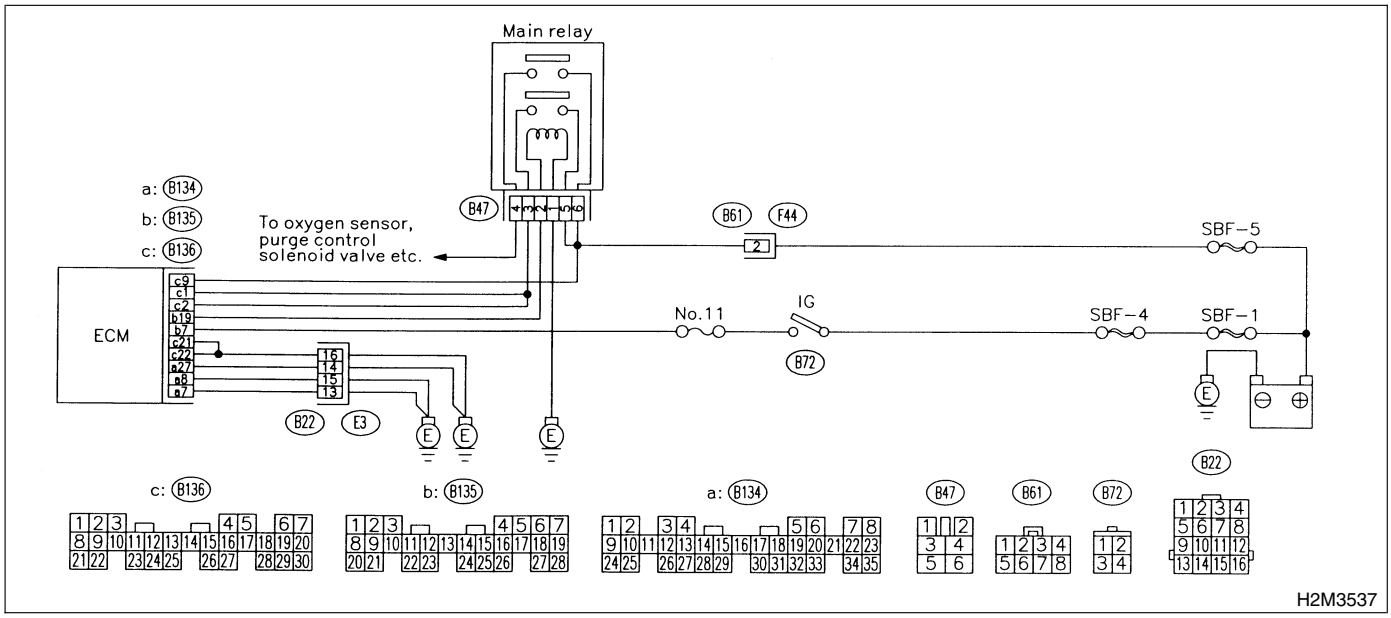
No.	Step	Check	Yes	No
12	**CHECK CLUTCH SWITCH.** 1) Measure resistance between clutch switch terminal while depressing the clutch pedal. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Go to step **13**.	Replace clutch switch. <Ref. to CL-23 INSPECTION, Clutch Pedal.>
13	**CHECK 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:***	Is the resistance less than 1 Ω?	Repair open or ground short circuit in harness between starter interlock relay and starter motor.	Repair open circuit in harness between starter interlock relay and clutch switch.

MEMO:

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE S008533E37

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE. <Ref. to EN-57 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove main relay. 3) Connect battery to main relay terminals No. 1 and No. 2. 4) Measure resistance between main relay terminals. ***Terminals*** ***No. 3 — No. 5:***	Is the resistance less than 10 Ω?	Go to step **2**.	Replace main relay.
2	**CHECK MAIN RELAY.** Measure resistance between main relay terminals. ***Terminals*** ***No. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **3**.	Replace main relay.
3	**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:***	Is the resistance less than 5 Ω?	Go to step **4**.	Repair open circuit in harness between ECM connector and engine grounding terminal.
4	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 22 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair open circuit in harness between ECM connector and engine grounding terminal.

No.	Step	Check	Yes	No
5	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 27 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **6**.	Repair open circuit in harness between ECM connector and engine grounding terminal.
6	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 8 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **7**.	Repair open circuit in harness between ECM connector and engine grounding terminal.
7	**CHECK GROUND CIRCUIT OF ECM.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 7 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **8**.	Repair open circuit in harness between ECM connector and engine ground terminal.
8	**CHECK INPUT VOLTAGE OF ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 9 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **9**.	Repair open or ground short circuit of power supply circuit.
9	**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 (–):***	Is the voltage more than 10 V?	Go to step **10**.	Repair open or ground short circuit of power supply circuit.
10	**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:***	Is the resistance more than 1 MΩ?	Go to step **11**.	Repair ground short circuit in harness between ECM connector and main relay connector, then replace ECM.
11	**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 (–):***	Is the voltage more than 10 V?	Go to step **12**.	Replace ECM.
12	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Check voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 2 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **13**.	Repair open circuit in harness between ECM connector and main relay connector.
13	**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:***	Is the resistance less than 5 Ω?	Go to step **14**.	Repair open circuit between main relay and chassis ground.

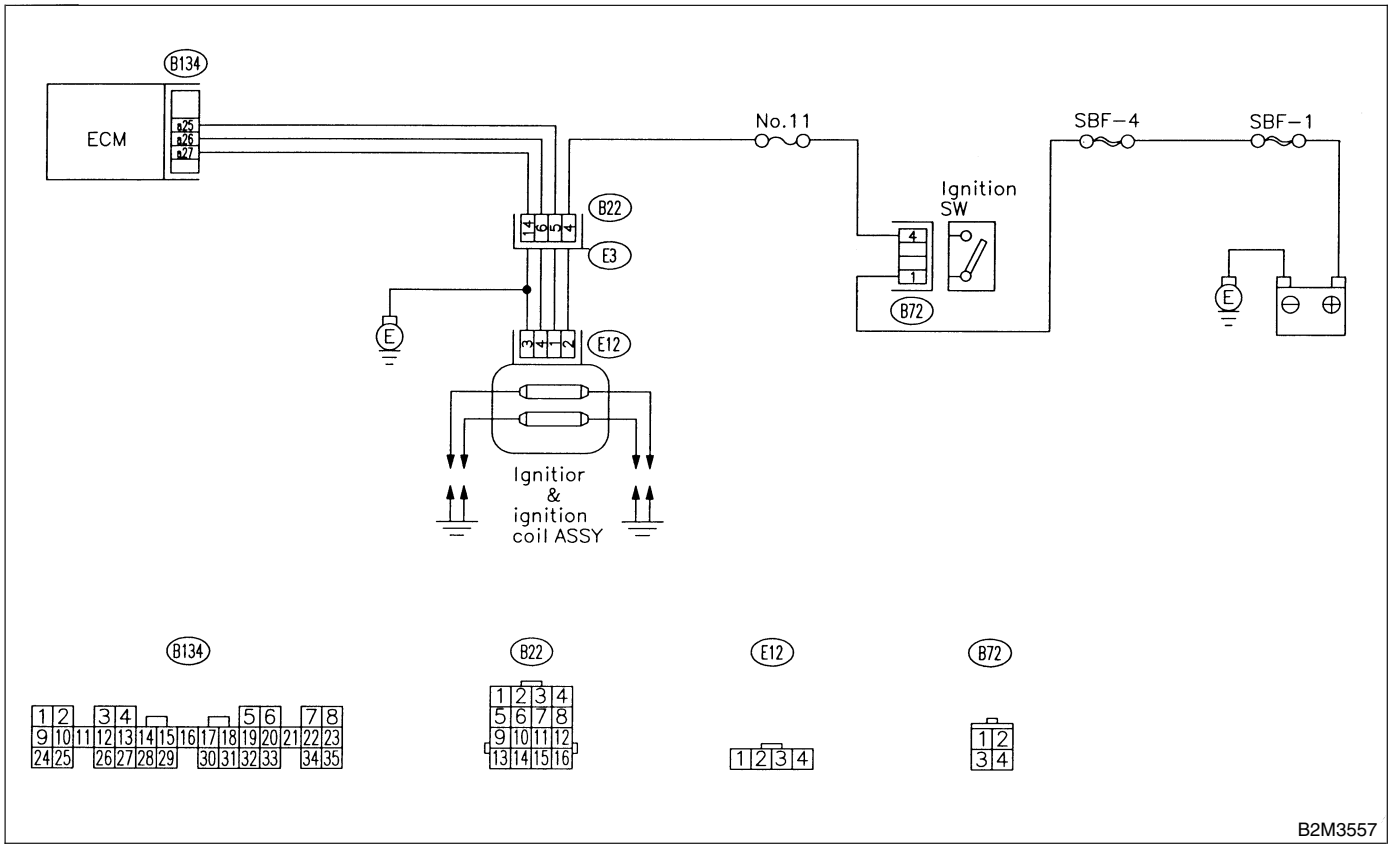
No.	Step	Check	Yes	No
14	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 5 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **15**.	Repair open or ground short circuit in harness of power supply circuit.
15	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 6 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **16**.	Repair open or ground short circuit in harness of power supply circuit.
16	**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 (–):***	Is the voltage more than 10 V?	Go to step **17**.	Repair open or ground short circuit in harness between ECM connector and main relay connector.
17	**CHECK INPUT VOLTAGE OF ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 2 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Check ignition control system. <Ref. to EN-80 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair open or ground short circuit in harness between ECM connector and main relay connector.

MEMO:

D: IGNITION CONTROL SYSTEM S008533E95

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK IGNITION SYSTEM FOR SPARKS.** 1) Remove plug cord cap from each spark plug. 2) Install new spark plug on plug cord cap. **CAUTION:** **Do not remove spark plug from engine.** 3) Contact spark plug's thread portion on engine. 4) While opening throttle valve fully, crank engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN-84 FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **3**.	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)
3	**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:***	Is the resistance between less than 5 Ω?	Go to step **4**.	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
4	**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:***	Is the resistance between 10 and 15 kΩ?	Go to step **5**.	Replace ignition coil & ignitor assembly. <Ref. to IG-9 REMOVAL, Ignition Coil and Ignitor Assembly.>
5	**CHECK IGNITION COIL & IGNITOR ASSEMBLY.** Measure resistance between spark plug cord contact portions to check secondary coil. ***Terminals*** ***No. 3 — No. 4:***	Is the resistance between 10 and 15 kΩ?	Go to step **6**.	Replace ignition coil & ignitor assembly. <Ref. to IG-9 REMOVAL, Ignition Coil and Ignitor Assembly.>
6	**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 (–):***	Is the voltage more than 10 V?	Go to step **7**.	Replace ignition coil & ignitor assembly. <Ref. to IG-9 REMOVAL, Ignition Coil and Ignitor Assembly.>
7	**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 (–):***	Is the voltage more than 10 V?	Go to step **8**.	Replace ignition coil & ignitor assembly. <Ref. to IG-9 REMOVAL, Ignition Coil and Ignitor Assembly.>

DIAGNOSTICS FOR ENGINE STARTING FAILURE

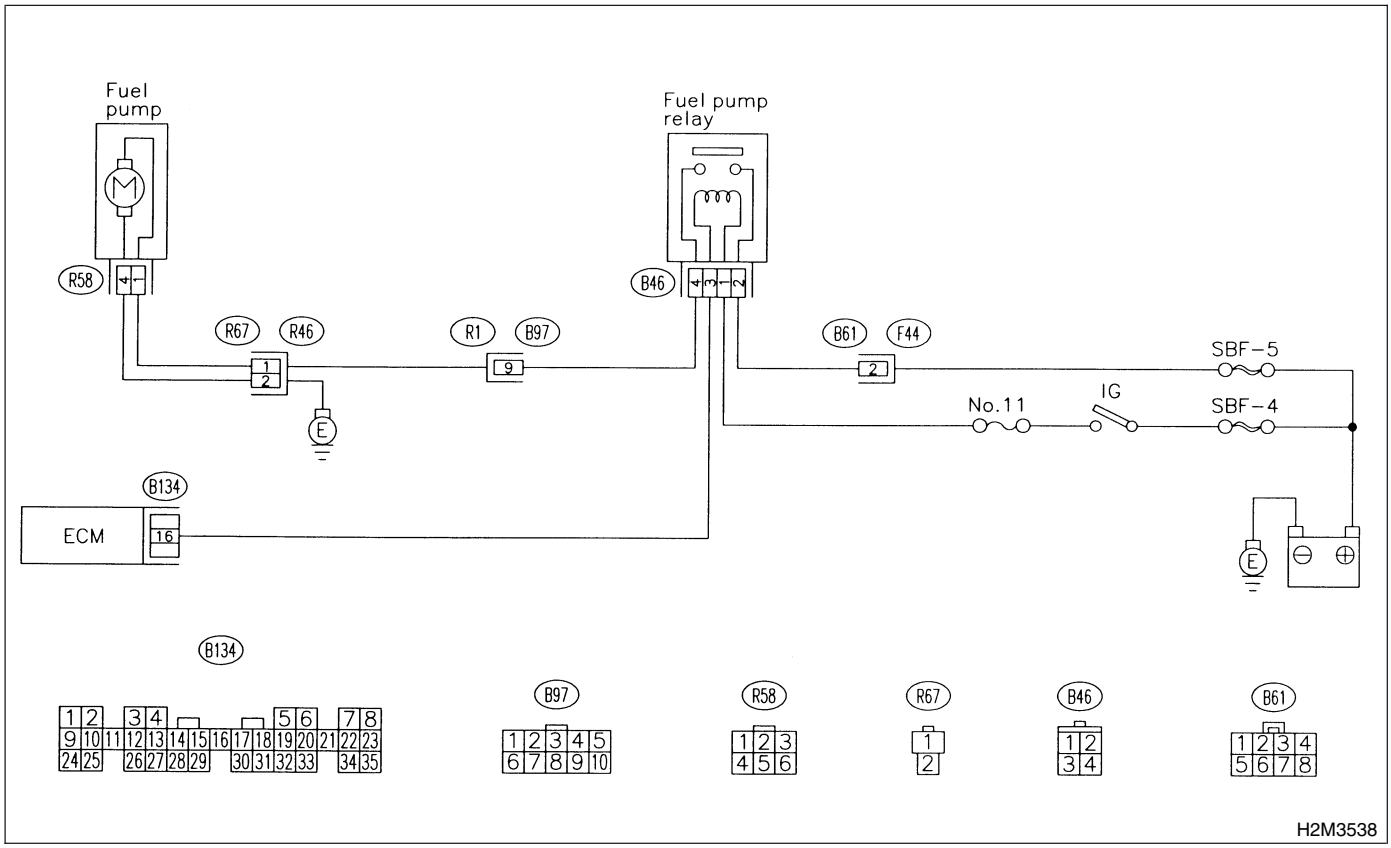
No.	Step	Check	Yes	No
8	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Disconnect connector from ignition coil & ignitor assembly. 4) Measure resistance of harness between ECM and ignition coil & ignitor assembly connector. ***Connector & terminal*** ***(B134) No. 25 — (E12) No. 1:***	Is the resistance less than 1 Ω?	Go to step **9**.	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)
9	**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:***	Is the resistance less than 1 Ω?	Go to step **10**.	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)
10	**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:***	Is the resistance more than 1 MΩ?	Go to step **11**.	Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.
11	**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:***	Is the resistance more than 1 MΩ?	Go to step **12**.	Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.
12	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel pump circuit. <Ref. to EN-84 FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>

MEMO:

E: FUEL PUMP CIRCUIT S008533E96

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 EN-61 OPERATION, Compulsory Valve Operation Check Mode.>	Does fuel pump produce operating sound?	Check fuel injector circuit. <Ref. to EN-88 FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**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:***	Is the resistance less than 5 Ω?	Go to step **3**.	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 (R67)
3	**CHECK POWER SUPPLY TO FUEL PUMP.** 1) Turn ignition switch to ON. 2) Measure voltage of power supply circuit between fuel pump connector and chassis ground. ***Connector & terminal*** ***(R58) No. 1 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Replace fuel pump. <Ref. to FU-77 REMOVAL, Fuel Pump.>	Go to step **4**.
4	**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:***	Is the resistance less than 1 Ω?	Go to step **5**.	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 (R67 and B97)
5	**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:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair short circuit in harness between fuel pump and fuel pump relay connector.
6	**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:***	Is the resistance less than 10 Ω?	Go to step **7**.	Replace fuel pump relay. <Ref. to FU-63 REMOVAL, Fuel Pump Relay.>

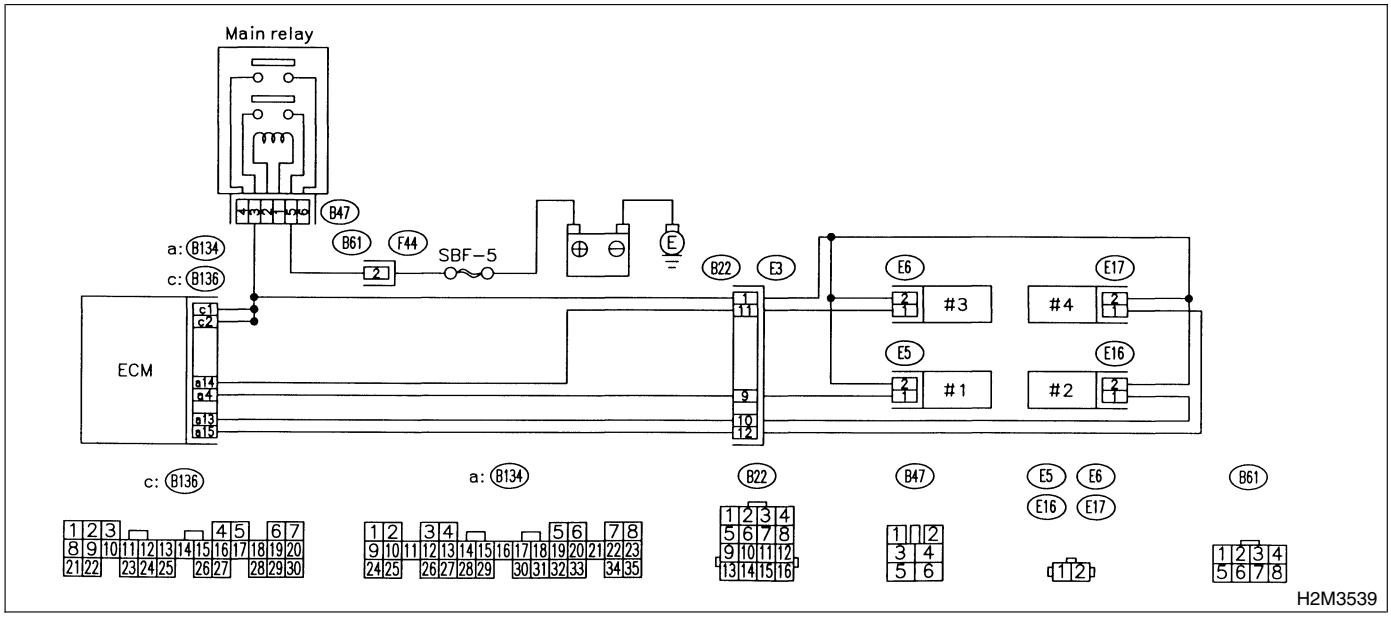
No.	Step	Check	Yes	No
7	**CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR.** 1) Disconnect connectors from ECM. 2) Measure resistance of harness between ECM and fuel pump relay connector. ***Connector & terminal*** ***(B134) No. 16 — (B46) No. 3:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair open circuit in harness between ECM and fuel pump relay connector.
8	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel injector circuit. <Ref. to EN-88 FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

MEMO:

F: FUEL INJECTOR CIRCUIT S008533E97

CAUTION:
- **Check or repair only faulty parts.**
- **After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE. <Ref. to EN-57 OPERATION, Inspection Mode.>**

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF EACH FUEL INJECTOR.** While cranking the engine, check that each fuel injector emits “operating” sound. Use a sound scope or attach a screwdriver to injector for this check.	Is the fuel injector emits “operating” sound?	Check fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>	Go to step **2**.
2	**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 (–):***	Is the voltage more than 10 V?	Go to step **3**.	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

No.	Step	Check	Yes	No
3	**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 (–):***	Is the voltage more than 10 V?	Go to step **4**.	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
4	**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 (–):***	Is the voltage more than 10 V?	Go to step **5**.	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
5	**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 (–):***	Is the voltage more than 10 V?	Go to step **6**.	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

DIAGNOSTICS FOR ENGINE STARTING FAILURE

No.	Step	Check	Yes	No
6	**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:***	Is the resistance between 5 and 20 Ω?	Go to step **7**.	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)
7	**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:***	Is the resistance less than 1 Ω?	Repair ground short circuit in harness between ECM and fuel injector connector.	Go to step **8**.
8	**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:***	Is the resistance between 5 and 20 Ω?	Go to step **9**.	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)
9	**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:***	Is the resistance less than 1 Ω?	Repair ground short circuit in harness between ECM and fuel injector connector.	Go to step **10**.
10	**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:***	Is the resistance between 5 and 20 Ω?	Go to step **11**.	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)
11	**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:***	Is the resistance less than 1 Ω?	Repair ground short circuit in harness between ECM and fuel injector connector.	Go to step **12**.

No.	Step	Check	Yes	No
12	**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:***	Is the resistance between 5 and 20 Ω?	Go to step **13**.	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)
13	**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:***	Is the resistance less than 1 Ω?	Repair ground short circuit in harness between ECM and fuel injector connector.	Go to step **14**.
14	**CHECK EACH FUEL INJECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between each fuel injector terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 5 and 20 Ω?	Go to step **15**.	Replace faulty fuel injector.
15	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check crankshaft position sensor circuit. <Ref. to EN-92 CRANKSHAFT POSITION SENSOR CIRCUIT, Diagnostics for Engine Starting Failure.>

G: CRANKSHAFT POSITION SENSOR CIRCUIT S008533E98

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

NOTE:
Check crankshaft position sensor circuit.
- 2200 cc models: <Ref. to EN-168 DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
- 2500 cc models: <Ref. to EN-376 DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

H: CAMSHAFT POSITION SENSOR CIRCUIT S008533E99

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.>.

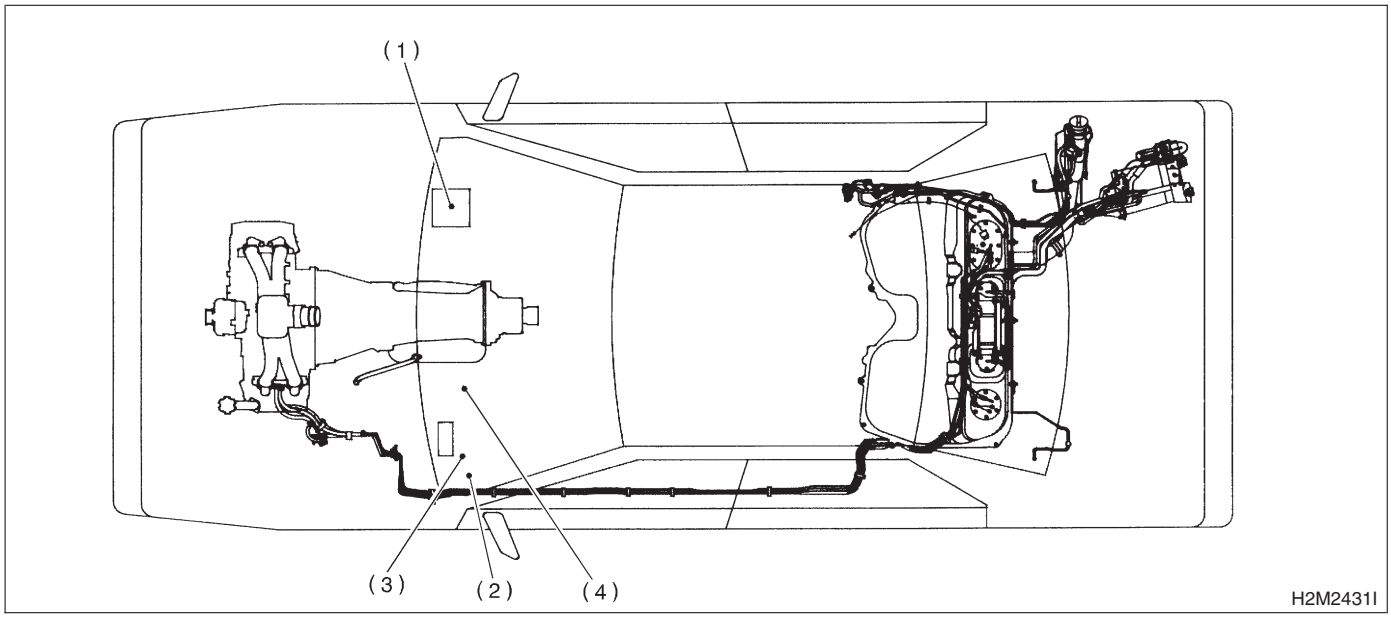
NOTE:
Check camshaft position sensor circuit.
- 2200 cc models: <Ref. to EN-172 DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
- 2500 cc models: <Ref. to EN-380 DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

4. Electrical Components Location S008507

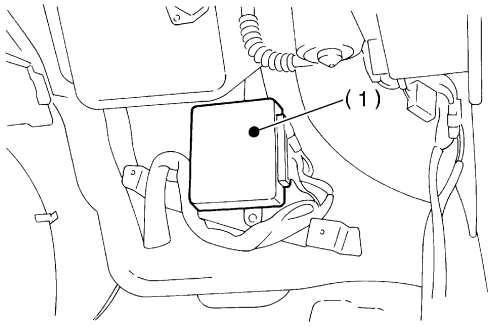
A: LOCATION S008507A13

1. ENGINE (2200 cc MODELS) S008507A1305

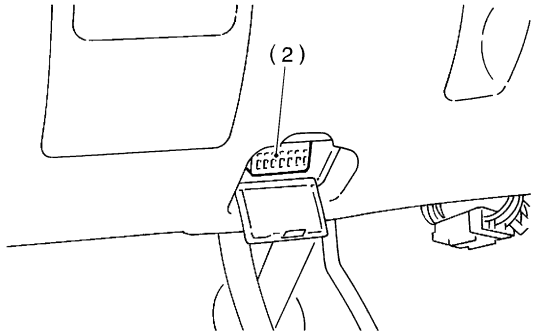
- **Module**



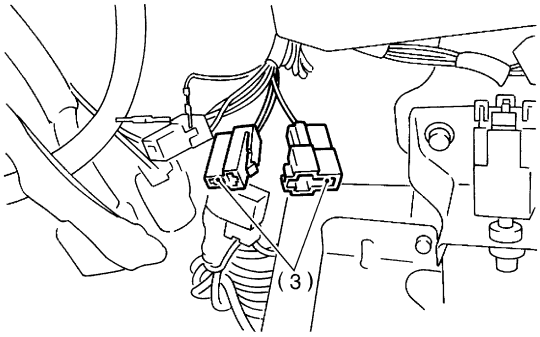
(1) Engine control module (ECM)
(2) Data link connector (for Subaru Select Monitor and OBD-II general scan tool)
(3) Test mode connector
(4) CHECK ENGINE malfunction indicator lamp (MIL)



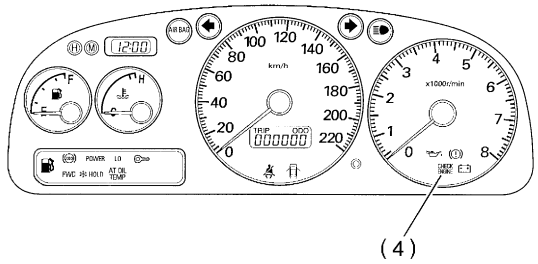
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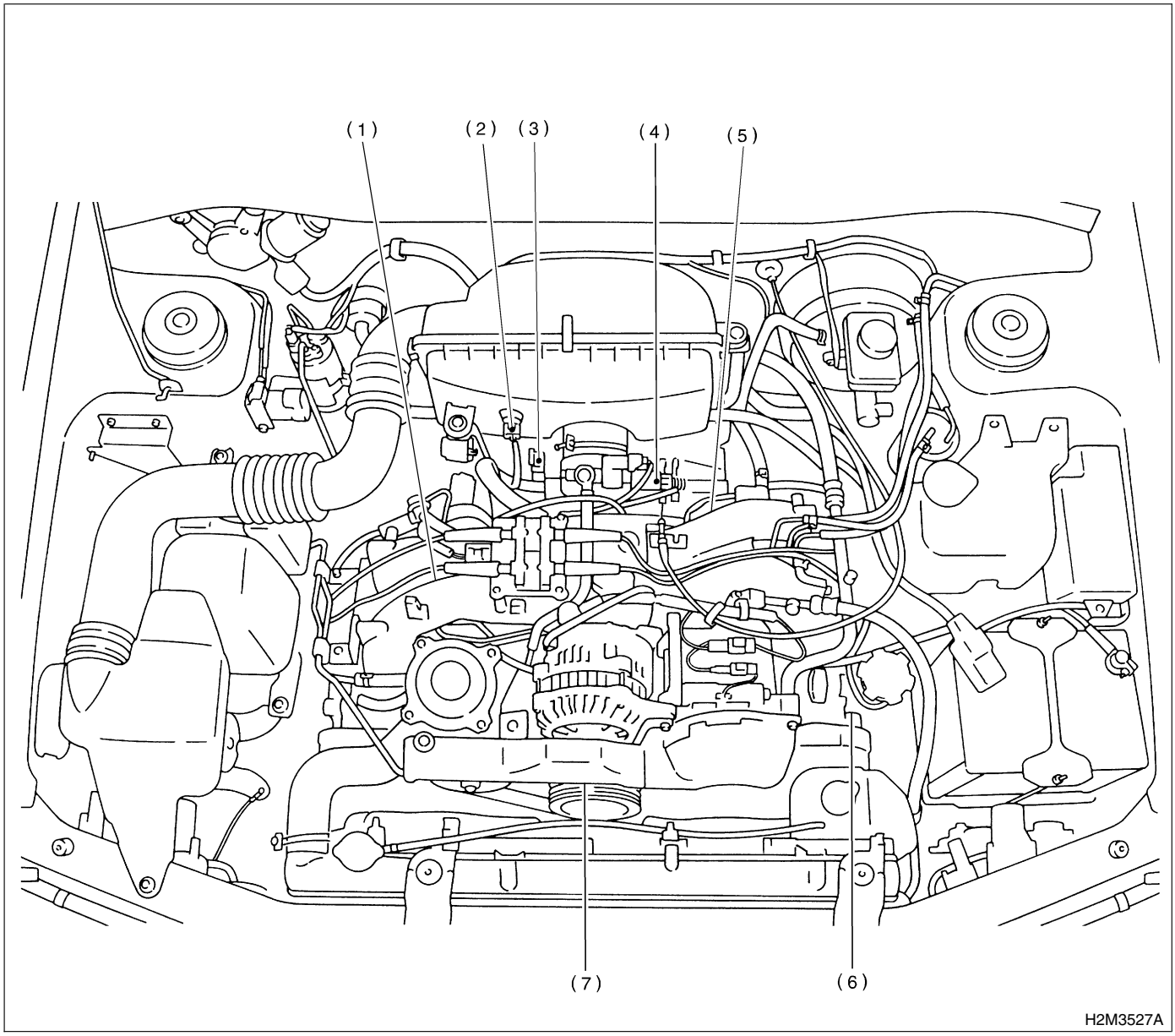


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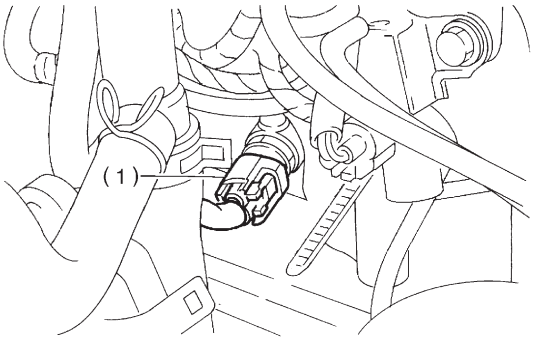


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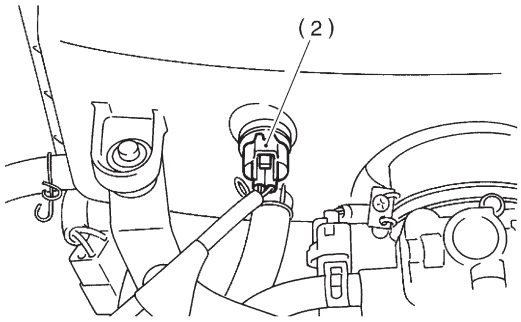
● Sensor



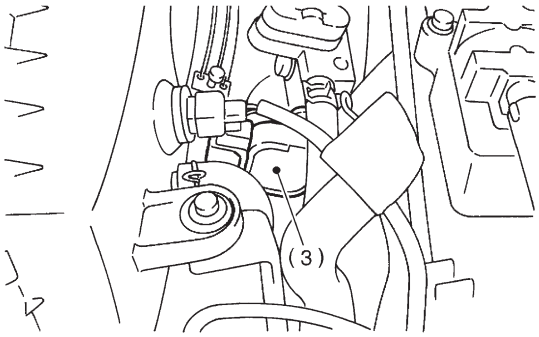
(1) Engine coolant temperature sensor
(2) Intake air temperature sensor
(3) Throttle position sensor
(4) Intake manifold pressure sensor
(5) Knock sensor
(6) Camshaft position sensor
(7) Crankshaft position sensor



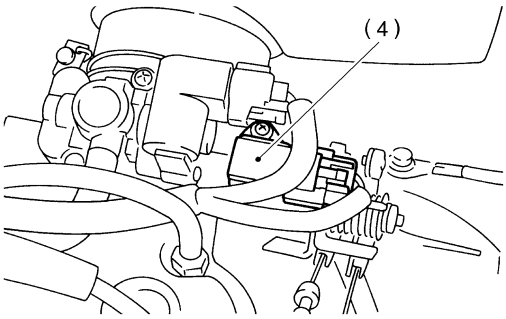
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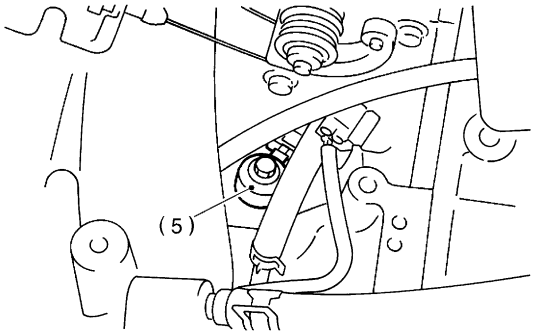
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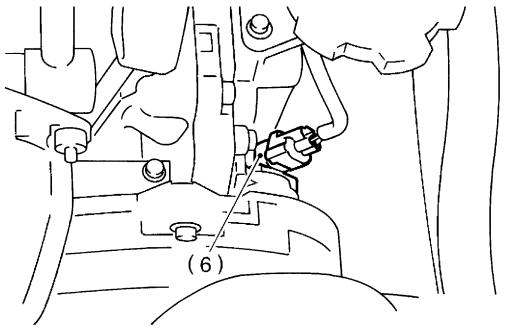
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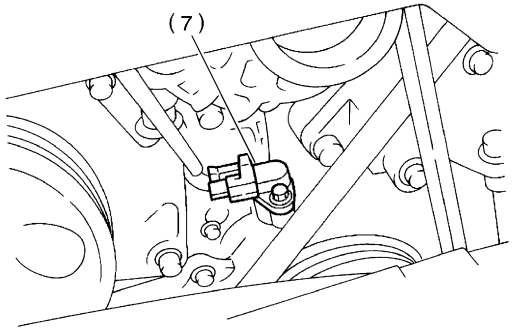
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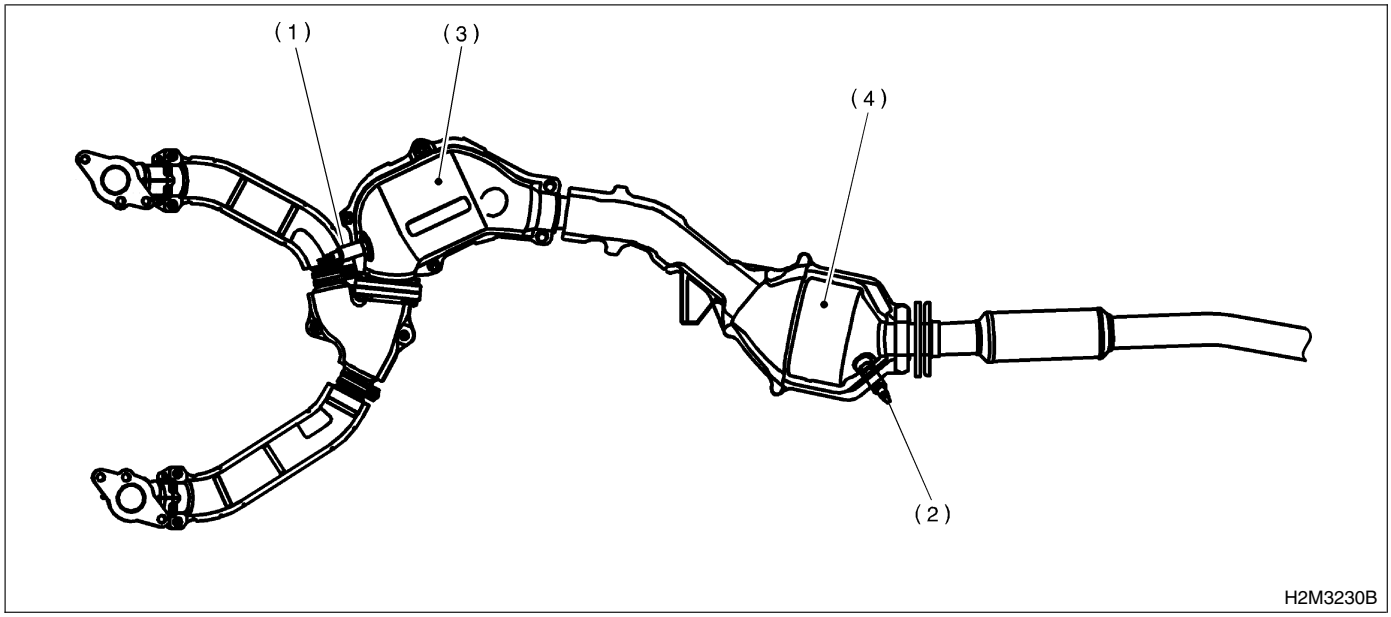
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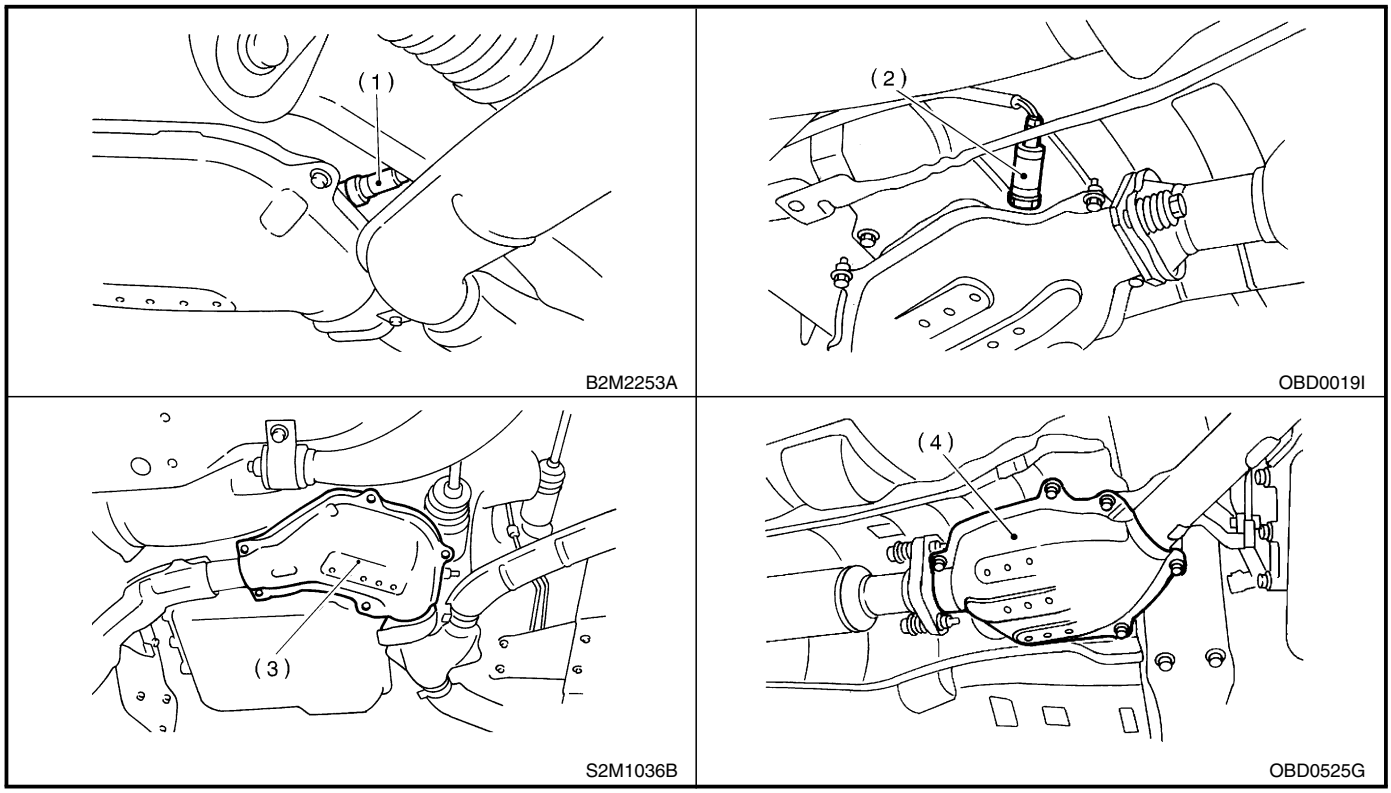
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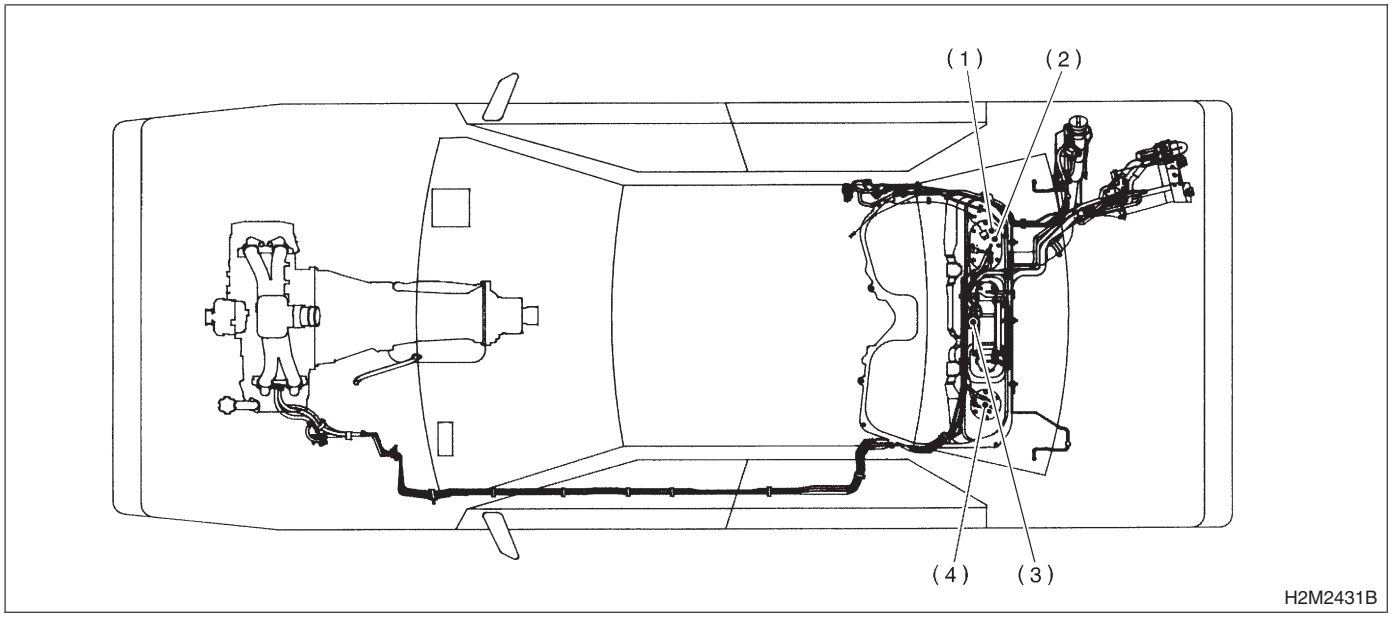


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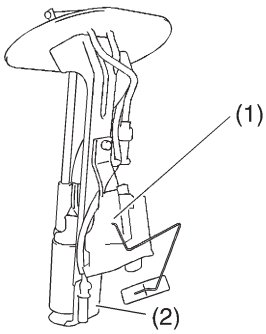


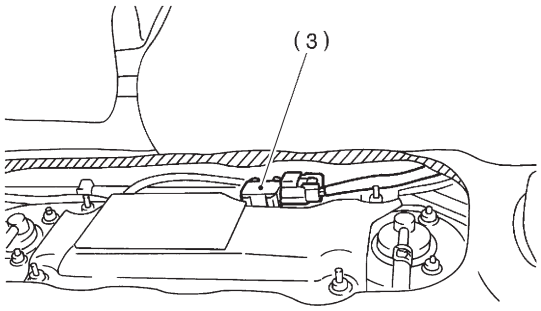
(1) Front oxygen (A/F) sensor
(2) Rear oxygen sensor
(3) Front catalytic converter
(4) Rear catalytic converter

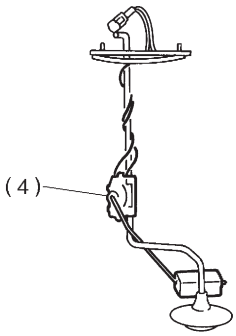




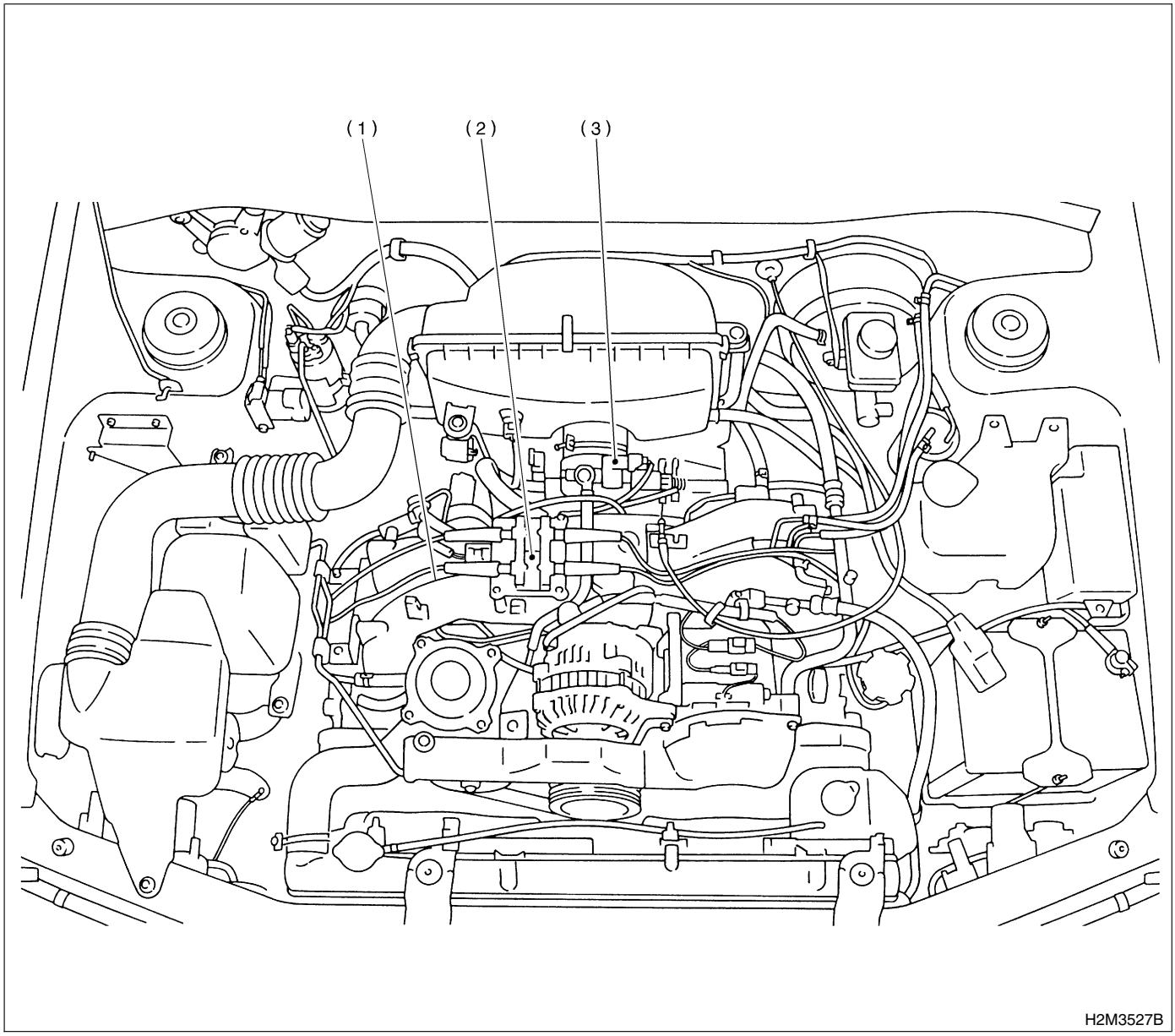
(1) Fuel level sensor
(2) Fuel temperature sensor
(3) Fuel tank pressure sensor
(4) Fuel sub level sensor



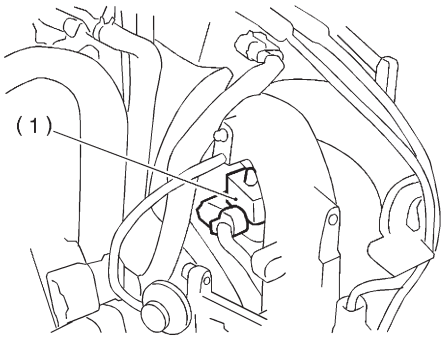




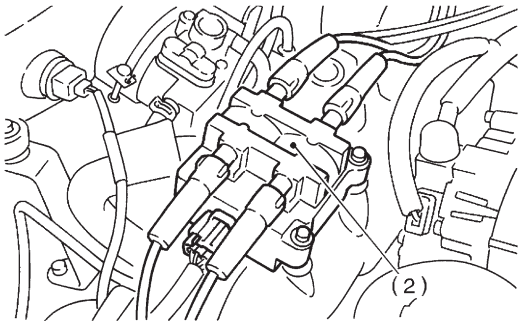
● Solenoid Valve, Emission Control System Parts And Ignition System Parts



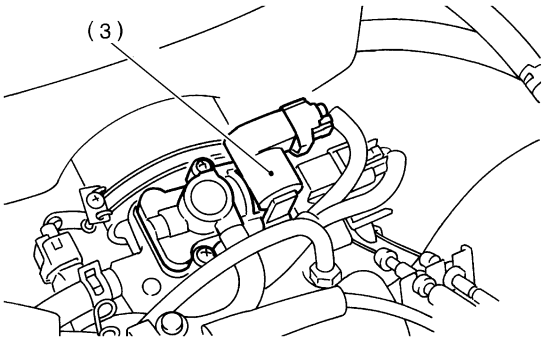
(1) Purge control solenoid valve
(2) Ignition coil & ignitor ASSY
(3) Idle air control solenoid valve



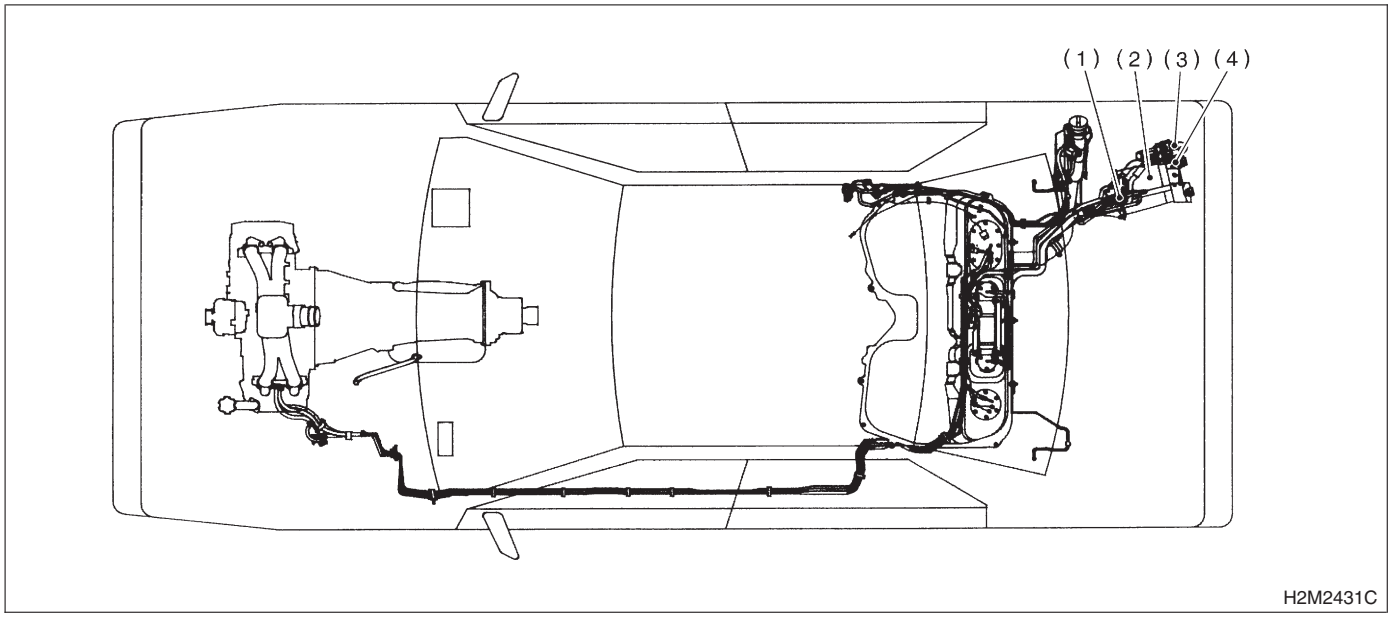
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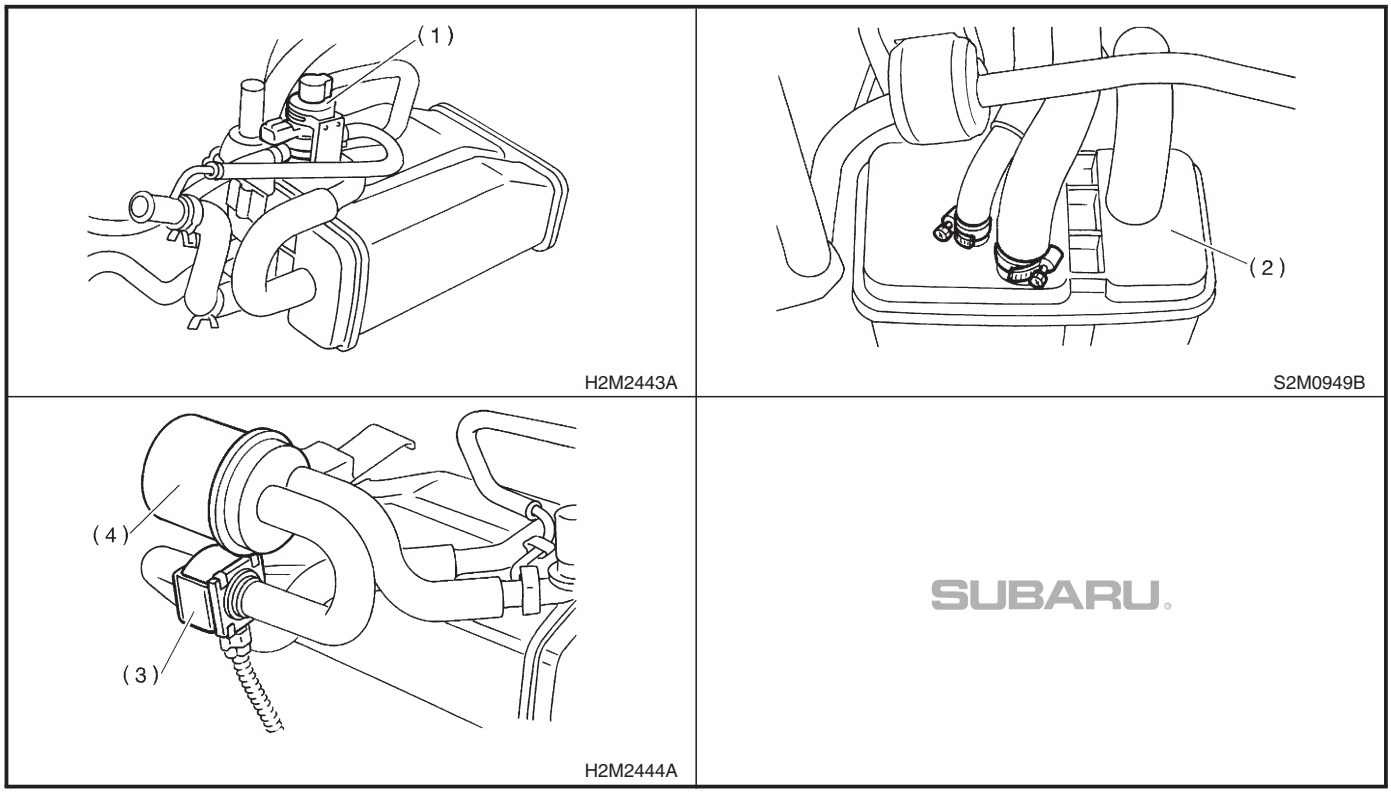
B2M2255A



B2M2256B

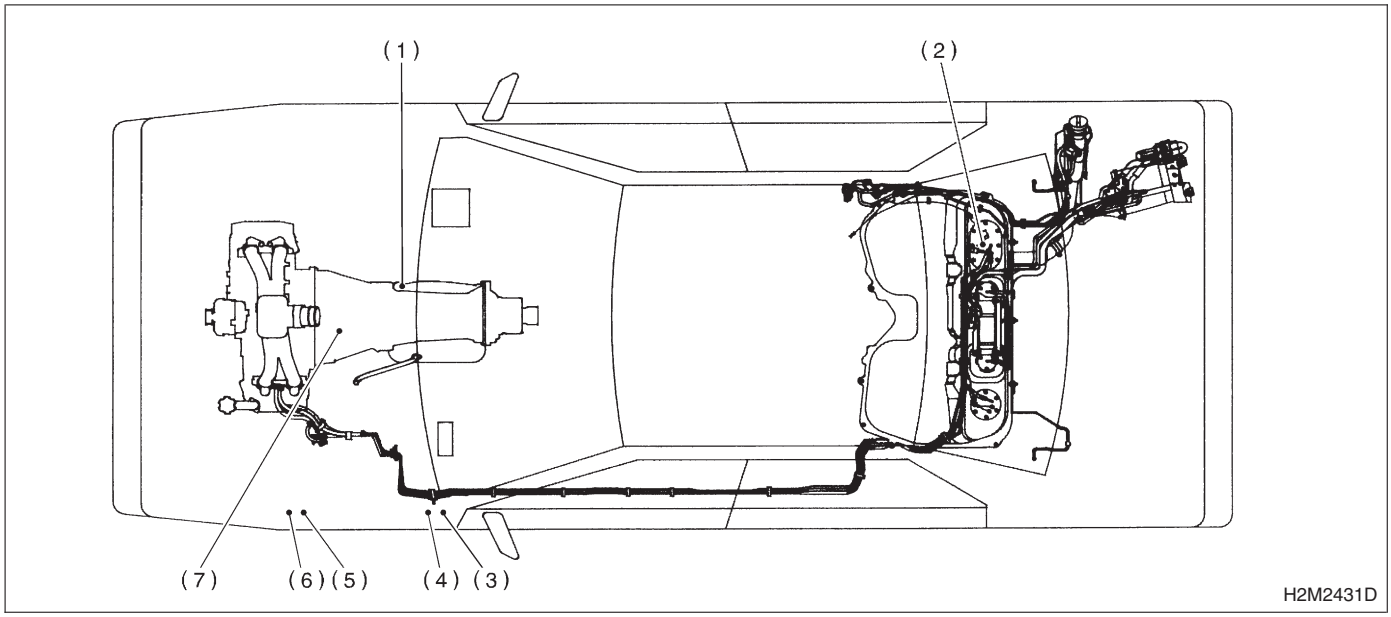


(1) Pressure control solenoid valve
(2) Canister
(3) Drain valve
(4) Drain filter

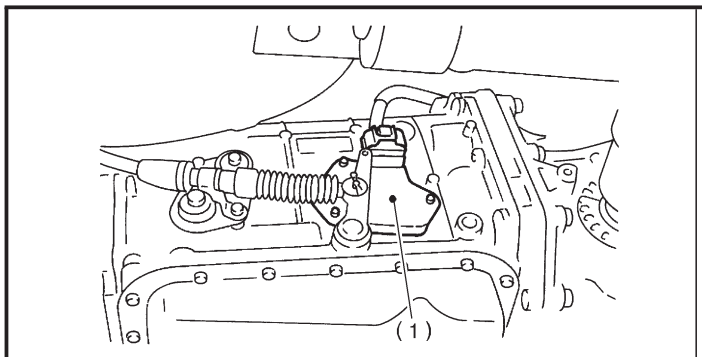


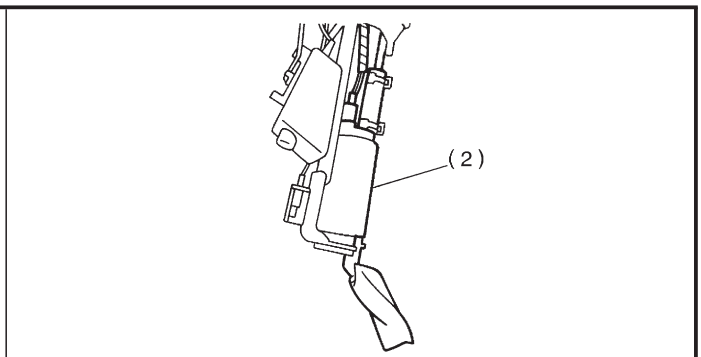
MEMO:

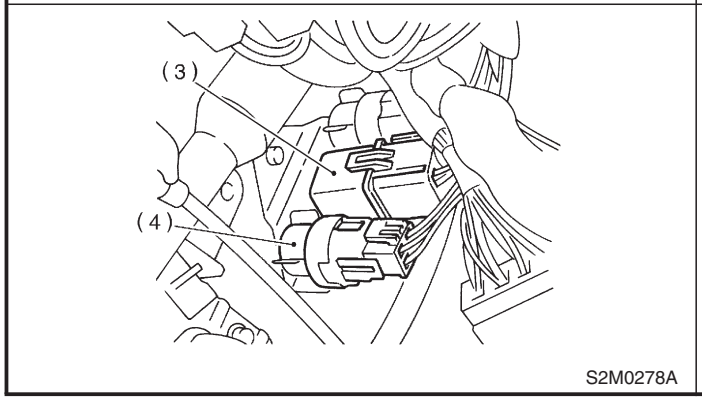
ELECTRICAL COMPONENTS LOCATION

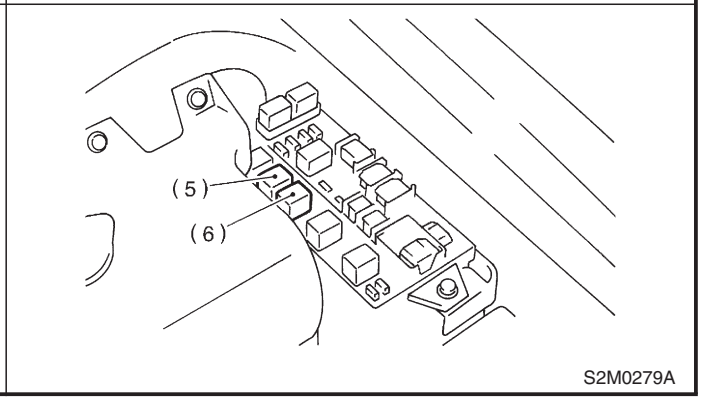


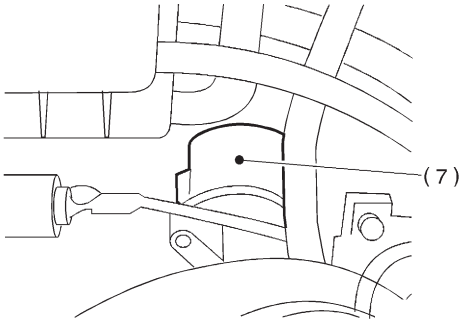
(1) Inhibitor switch (AT vehicles only)
(2) Fuel pump
(3) Main relay
(4) Fuel pump relay
(5) Radiator main fan relay
(6) Radiator sub fan relay
(7) Starter







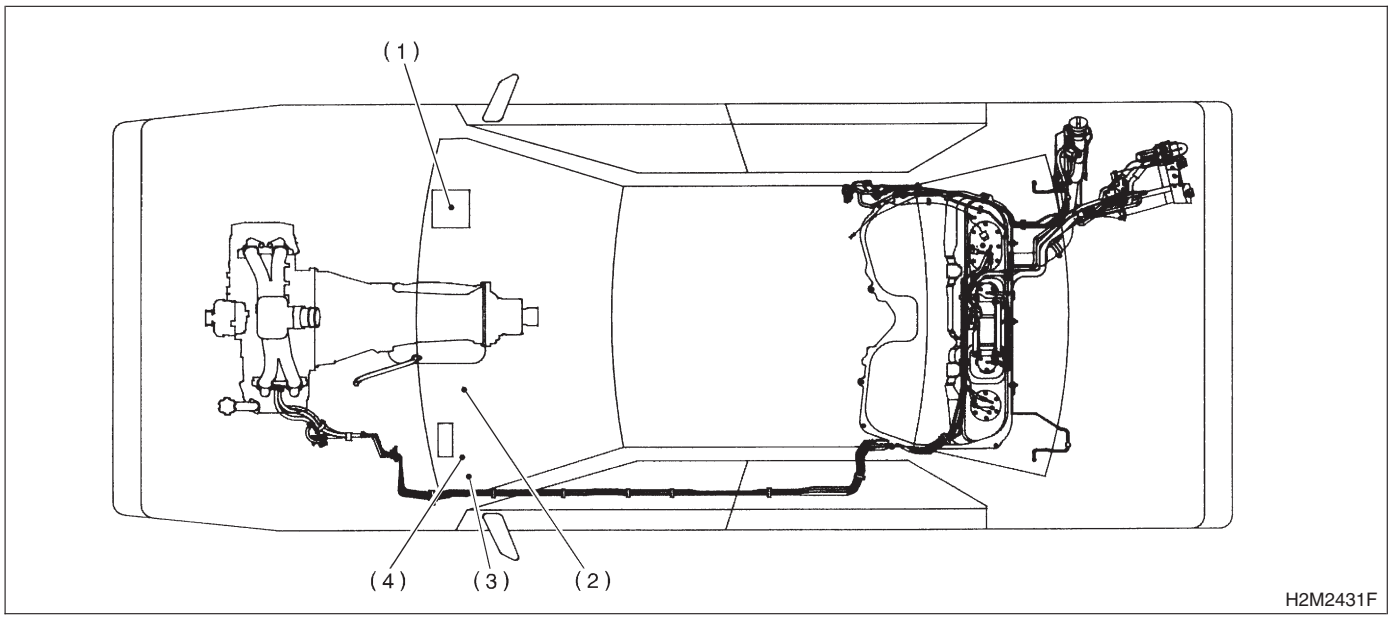




B2M2247B

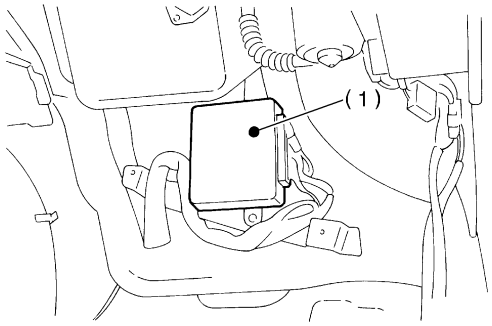
2. ENGINE (2500 cc MODELS) S008507A1306

● Module

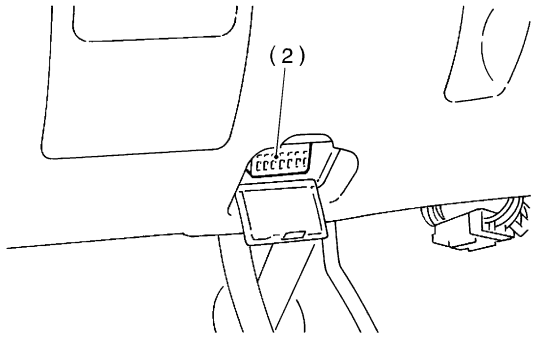


H2M2431F

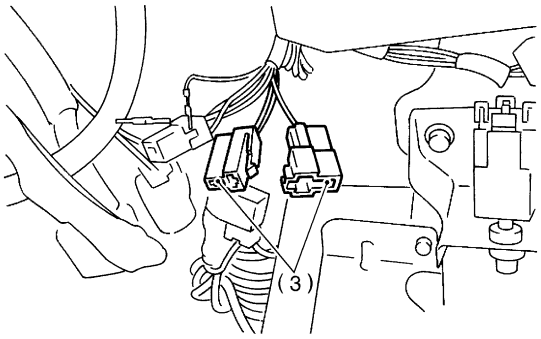
(1) Engine control module (ECM)
(2) Data link connector (for Subaru Select Monitor and OBD-II general scan tool)
(3) Test mode connector
(4) CHECK ENGINE malfunction indicator lamp (MIL)



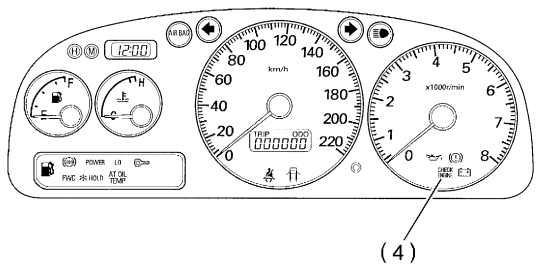
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S2M0258J



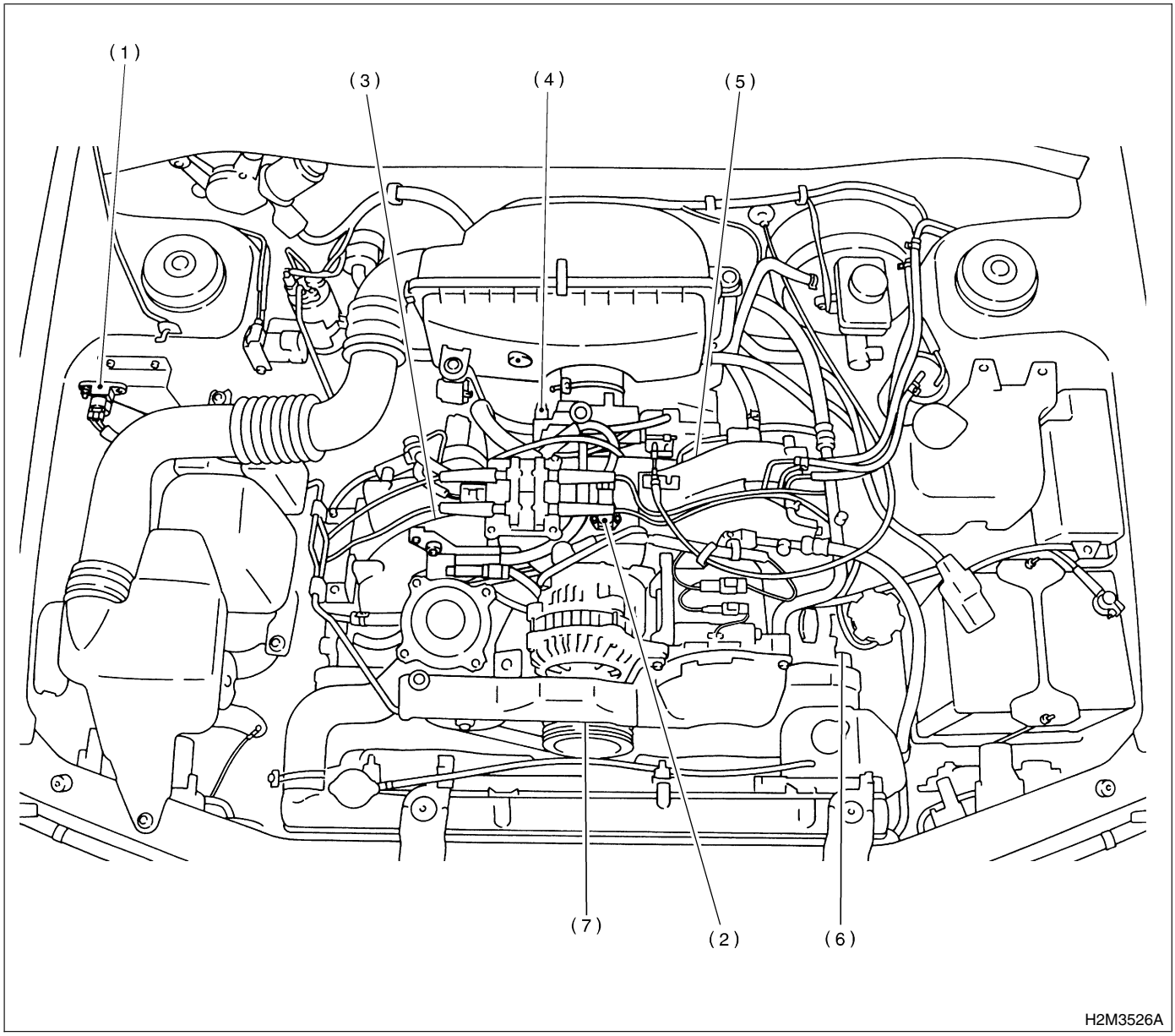
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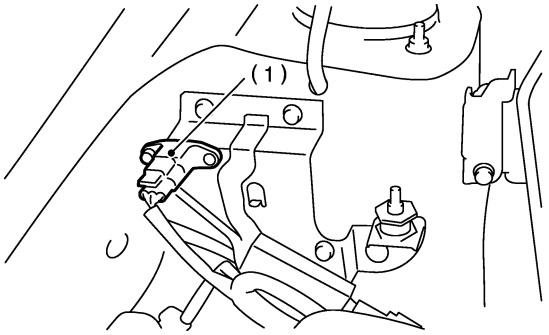
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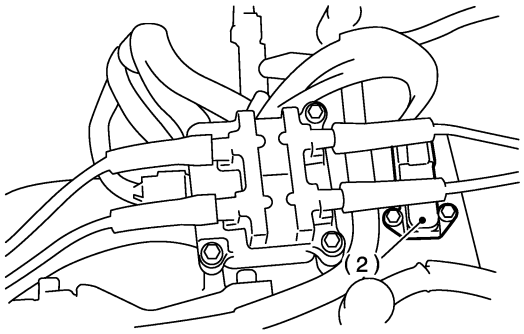
● Sensor



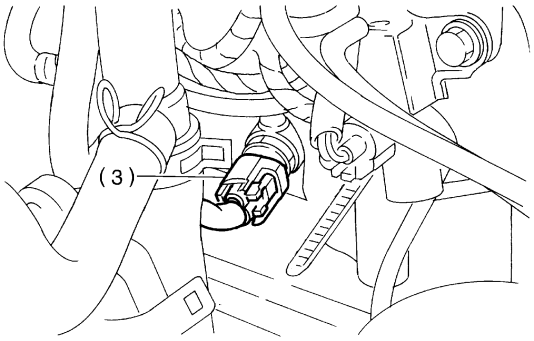
(1) Atmospheric pressure sensor
(2) Intake air temperature and pressure sensor
(3) Engine coolant temperature sensor
(4) Throttle position sensor
(5) Knock sensor
(6) Camshaft position sensor
(7) Crankshaft position sensor



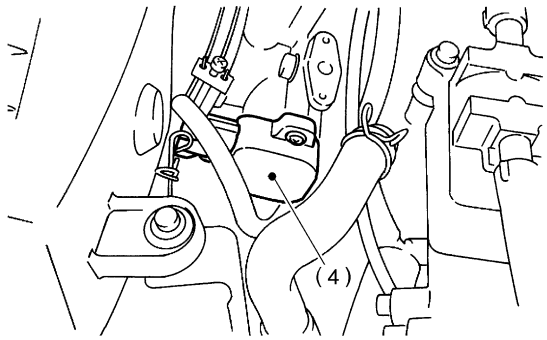
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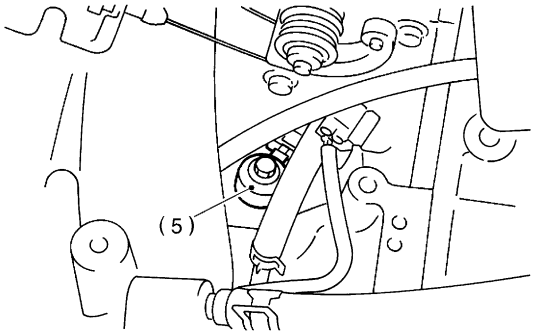
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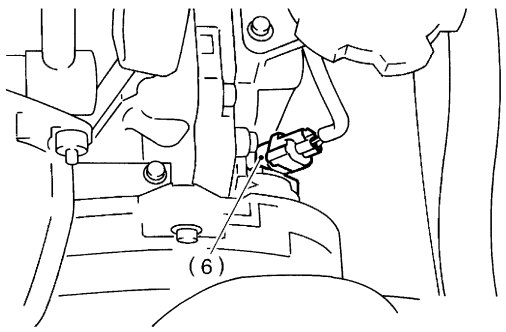
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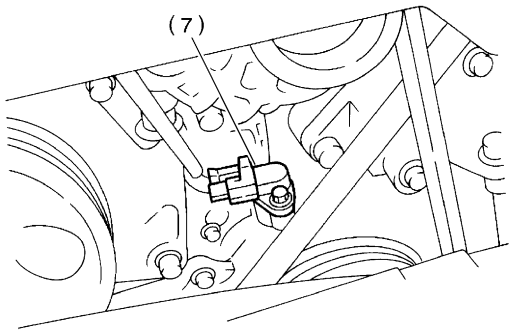
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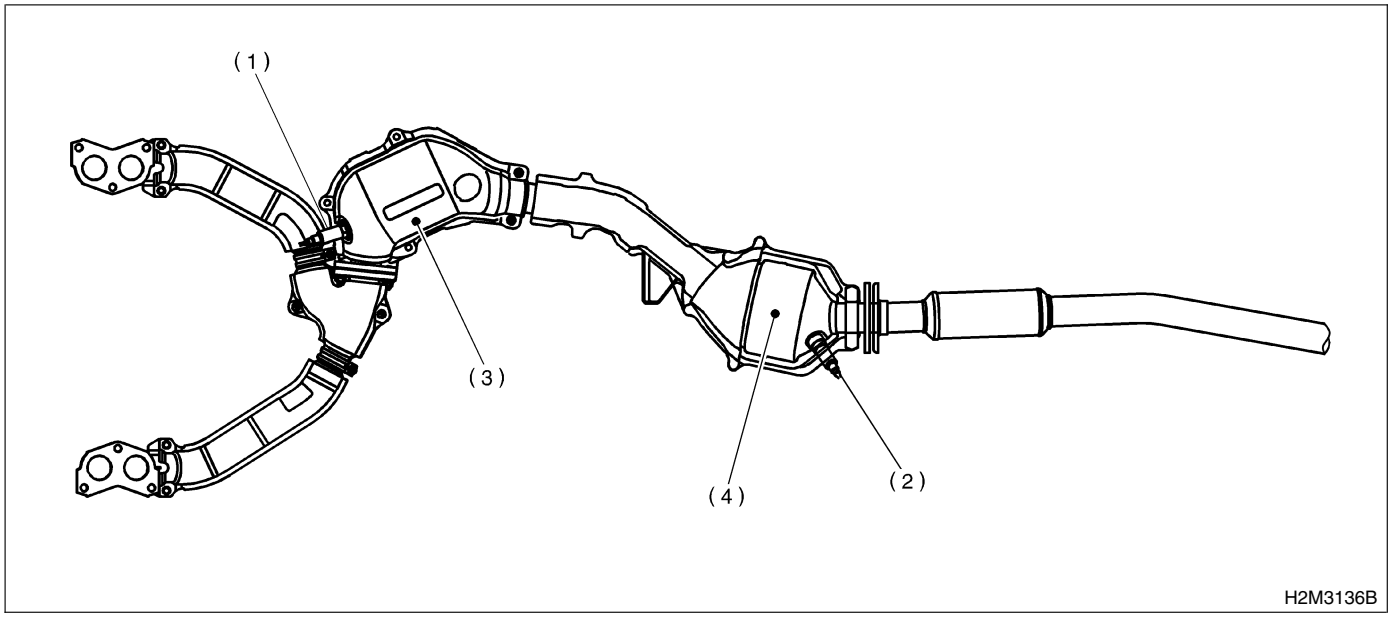
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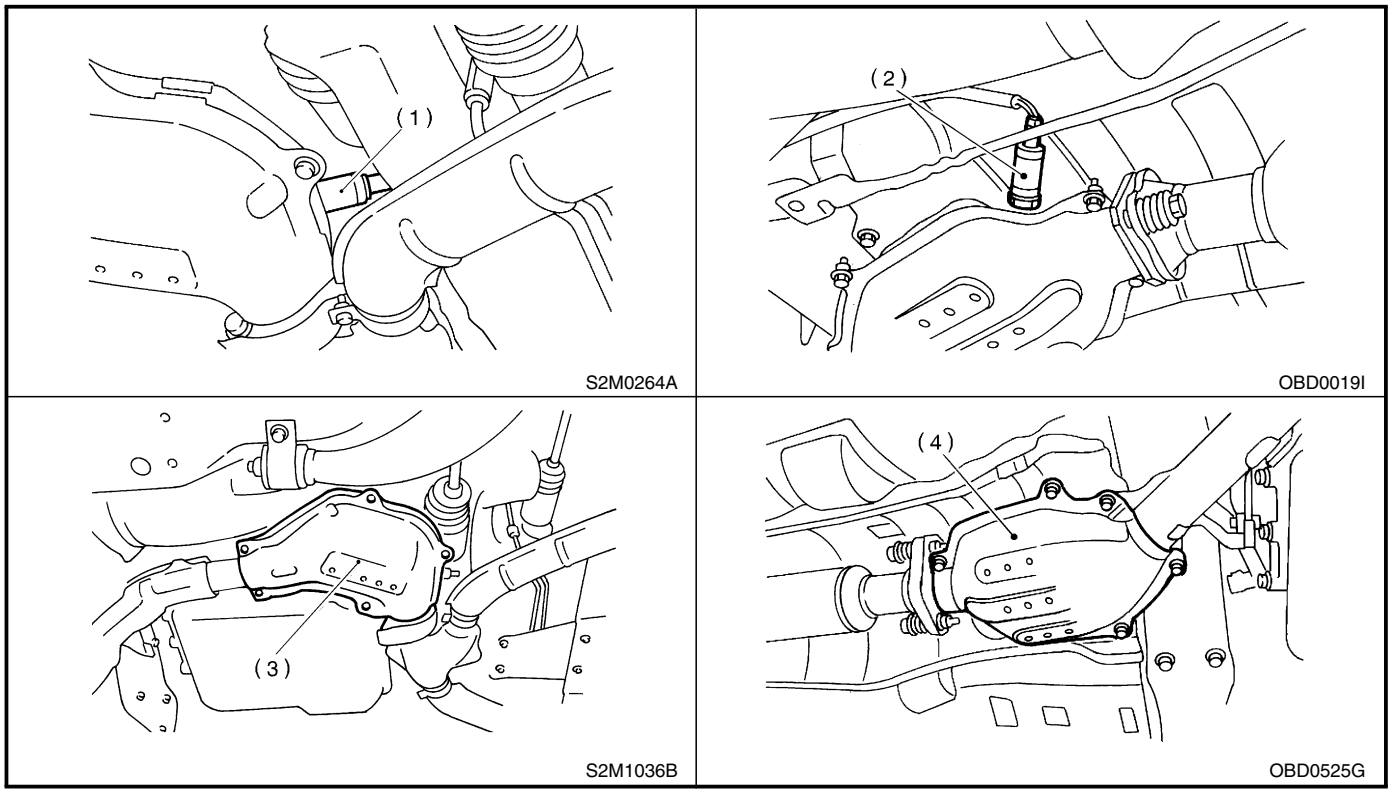
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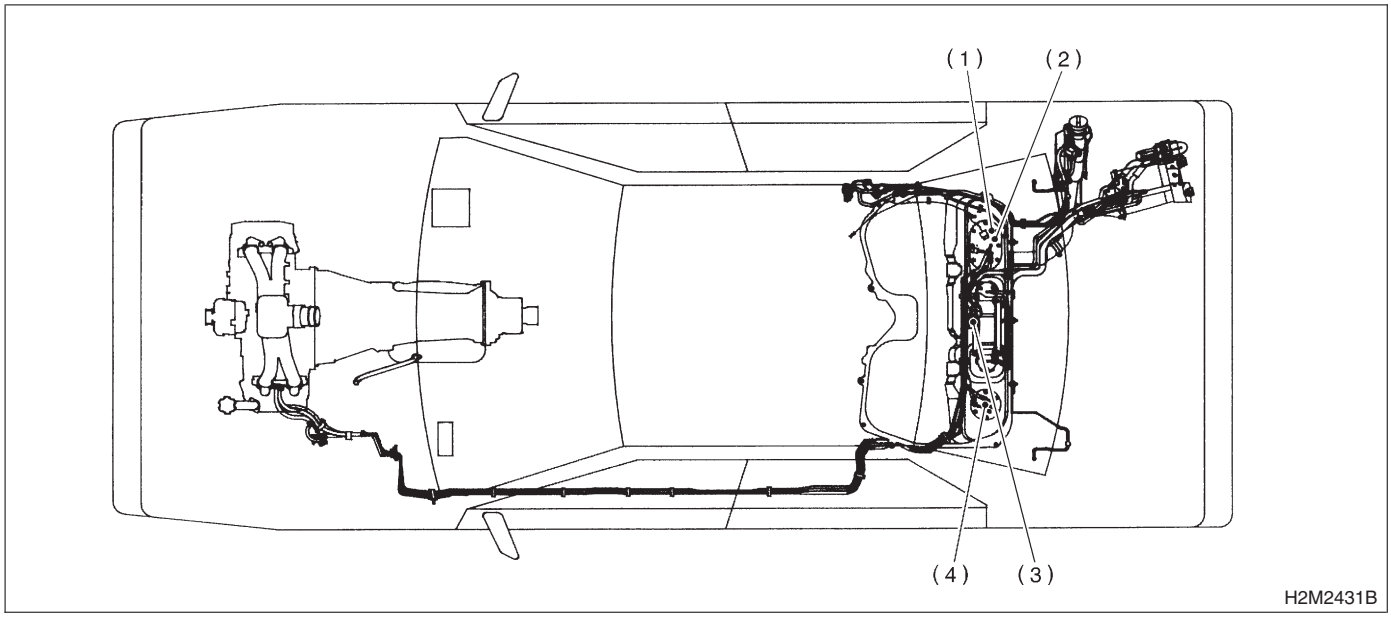


B2M0213J

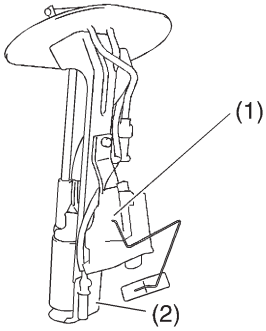


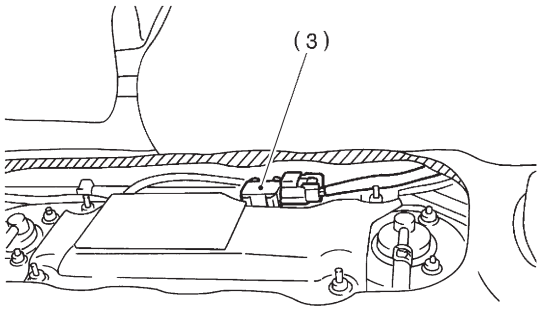
(1) Front oxygen (A/F) sensor
(2) Rear oxygen sensor
(3) Front catalytic converter
(4) Rear catalytic converter

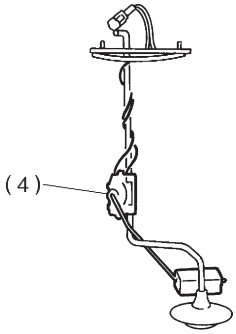




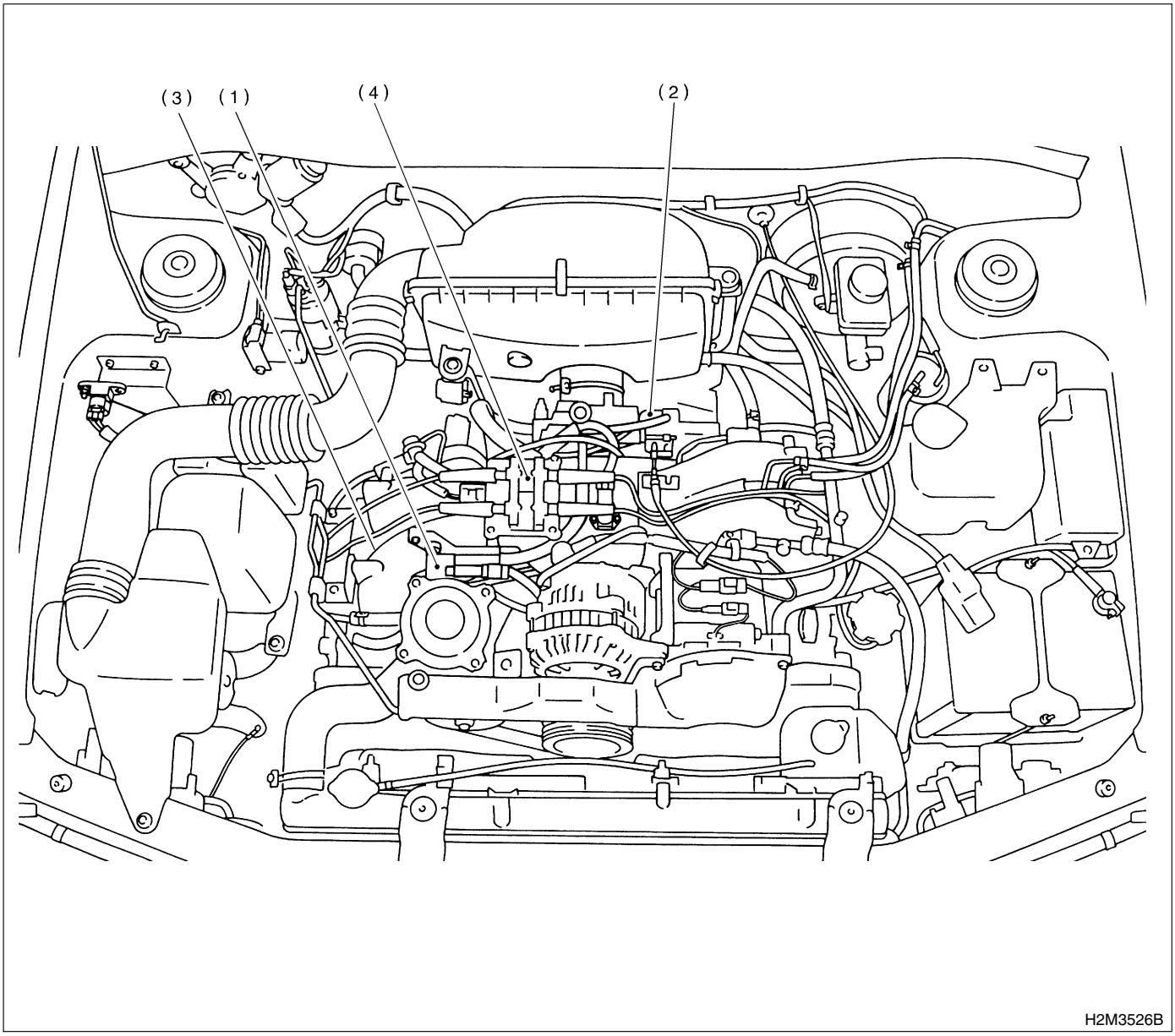
(1) Fuel level sensor
(2) Fuel temperature sensor
(3) Fuel tank pressure sensor
(4) Fuel sub level sensor



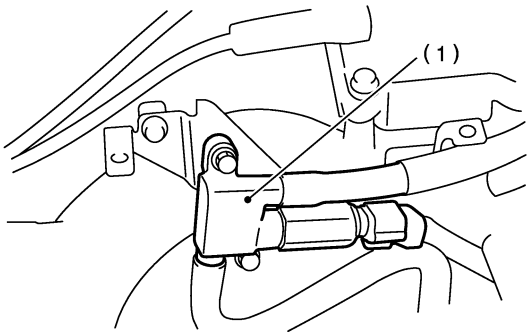




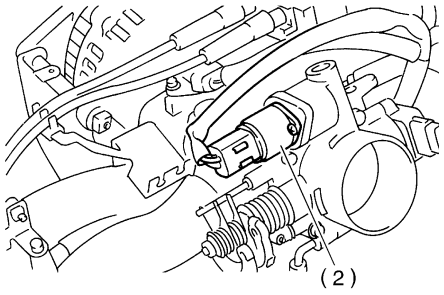
● Solenoid Valve, Emission Control System Parts And Ignition System Parts



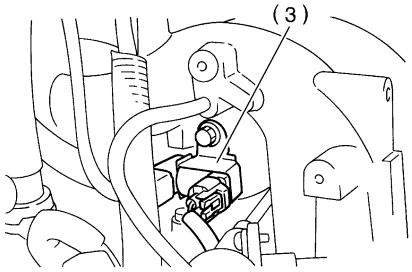
(1) Air assist injector solenoid valve
(2) Idle air control solenoid valve
(3) Purge control solenoid valve
(4) Ignition coil & ignitor ASSY



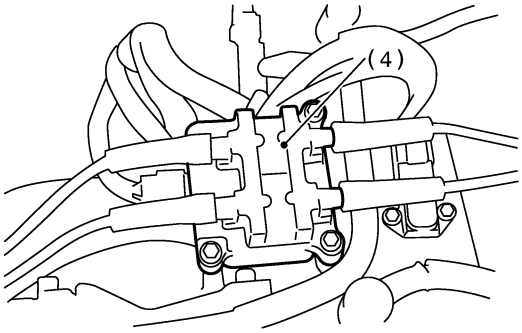
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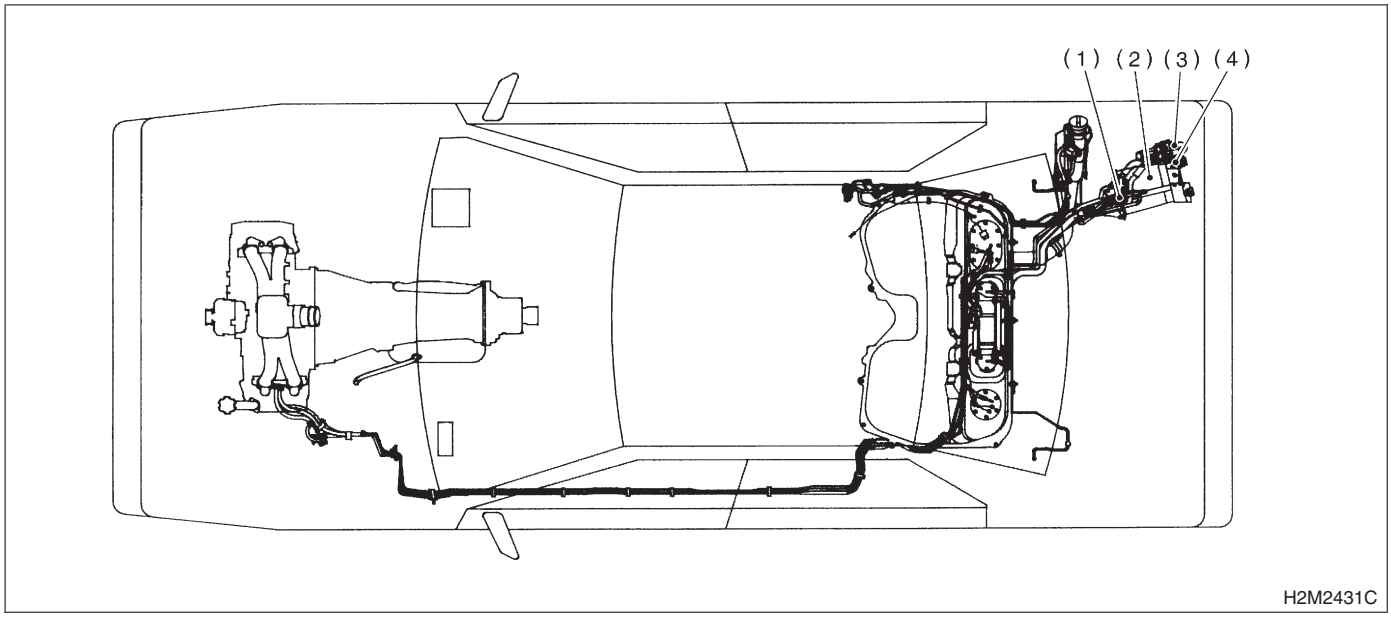
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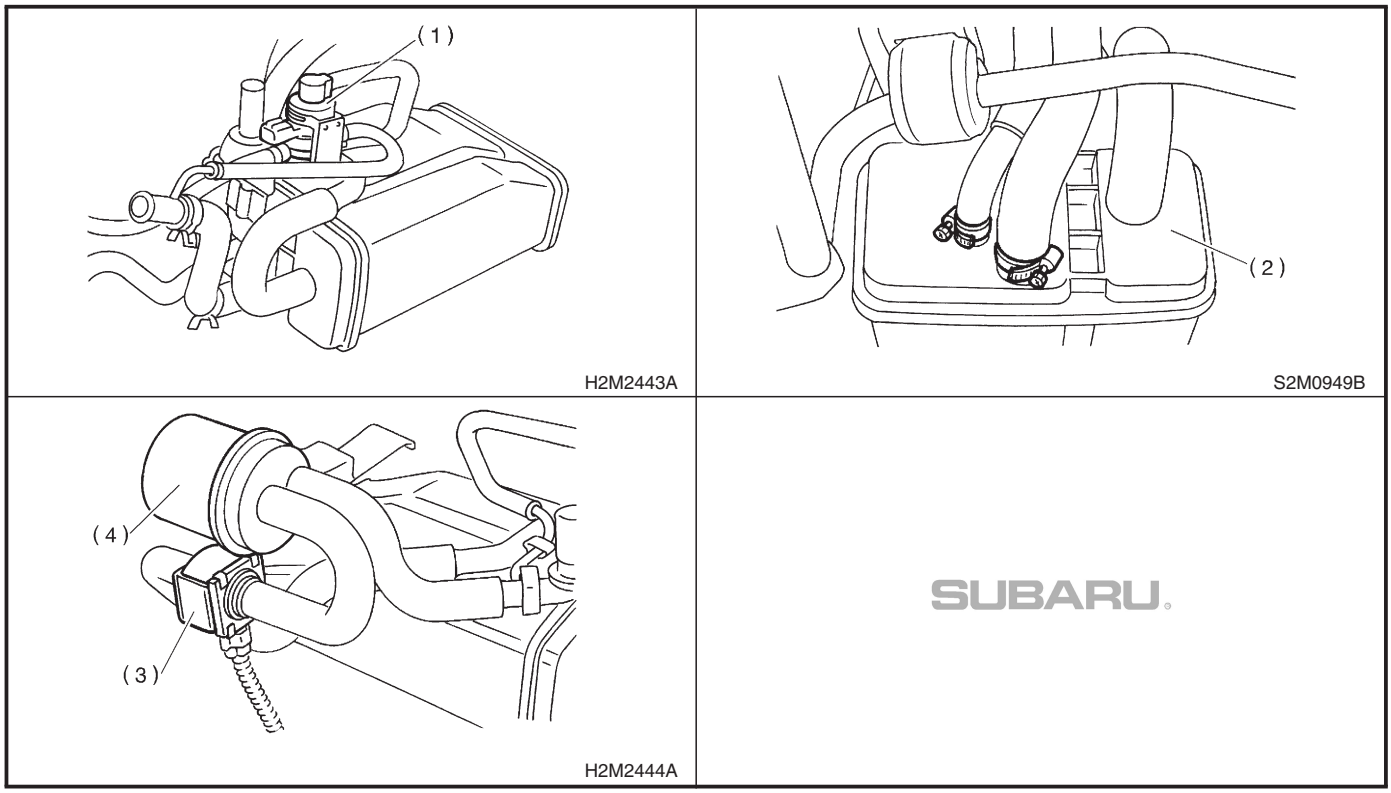
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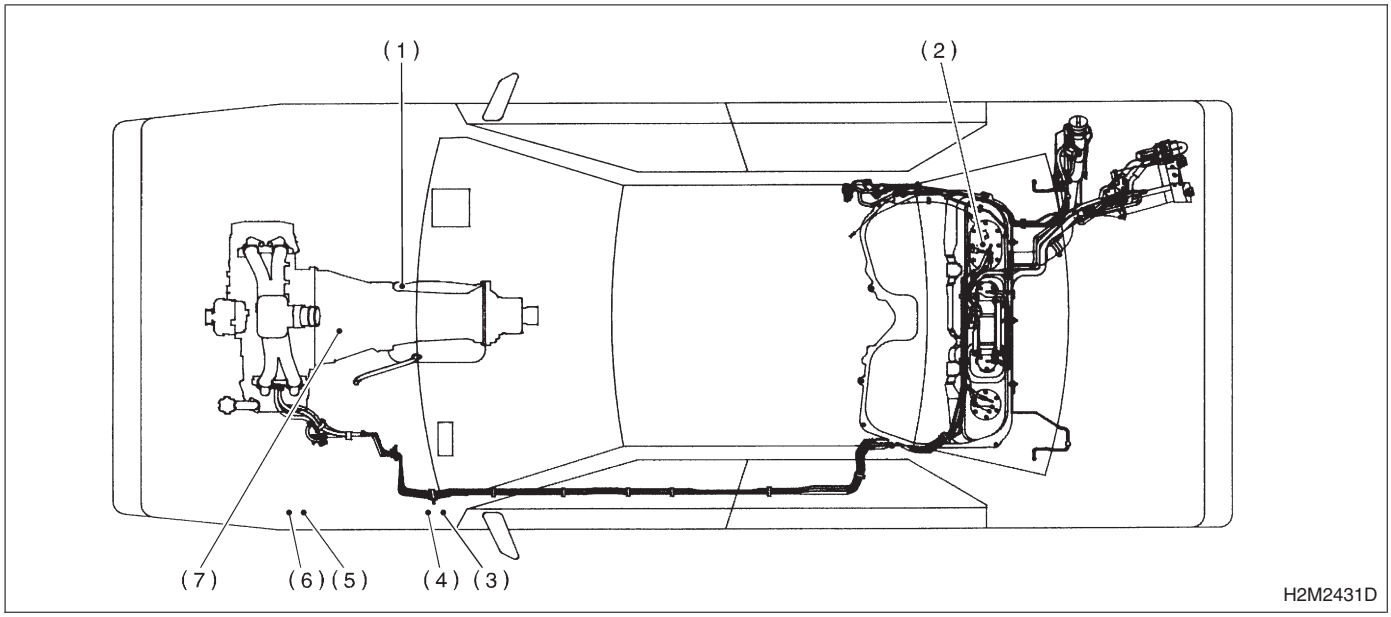


(1) Pressure control solenoid valve
(2) Canister
(3) Drain valve
(4) Drain filter

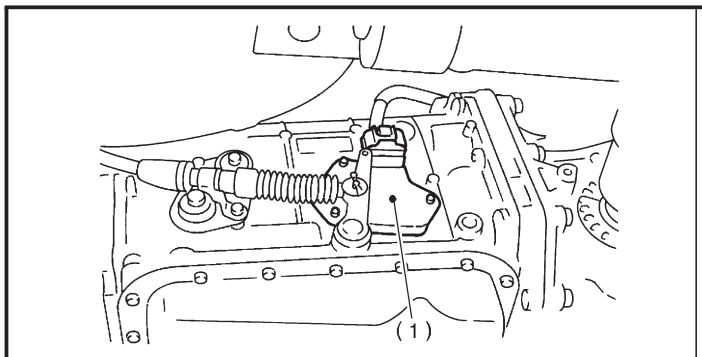


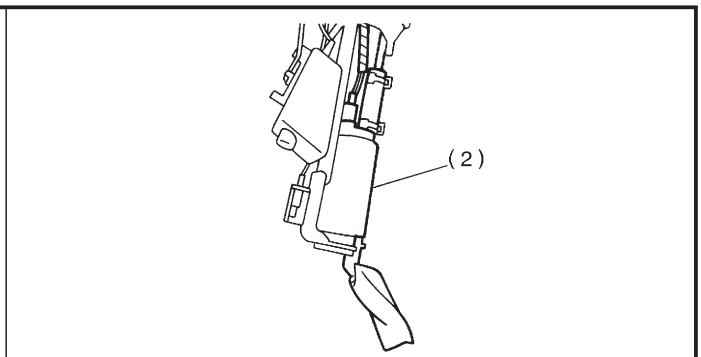
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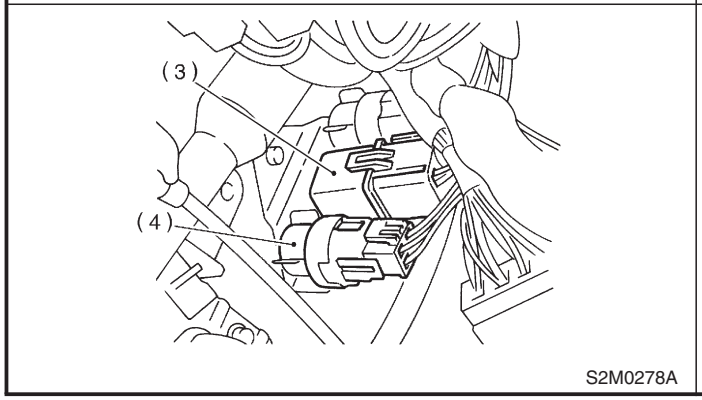
ELECTRICAL COMPONENTS LOCATION

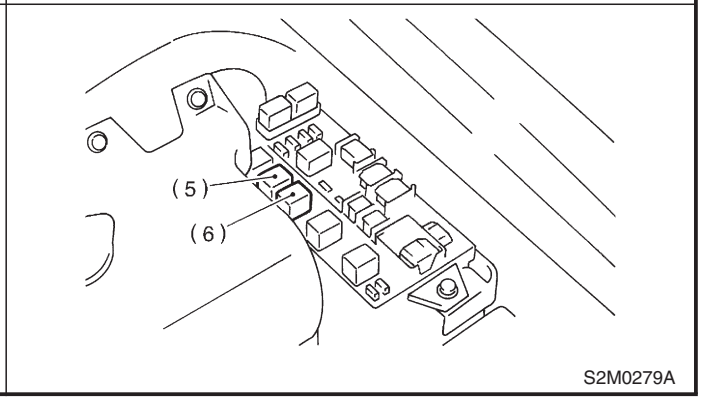


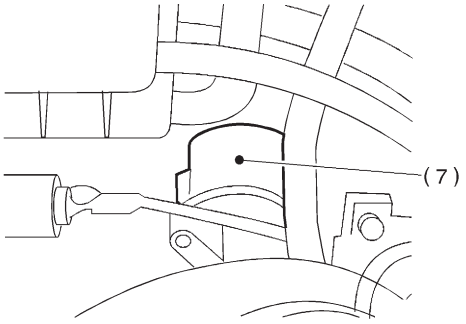
(1) Inhibitor switch (AT vehicles only)
(2) Fuel pump
(3) Main relay
(4) Fuel pump relay
(5) Radiator main fan relay
(6) Radiator sub fan relay
(7) Starter







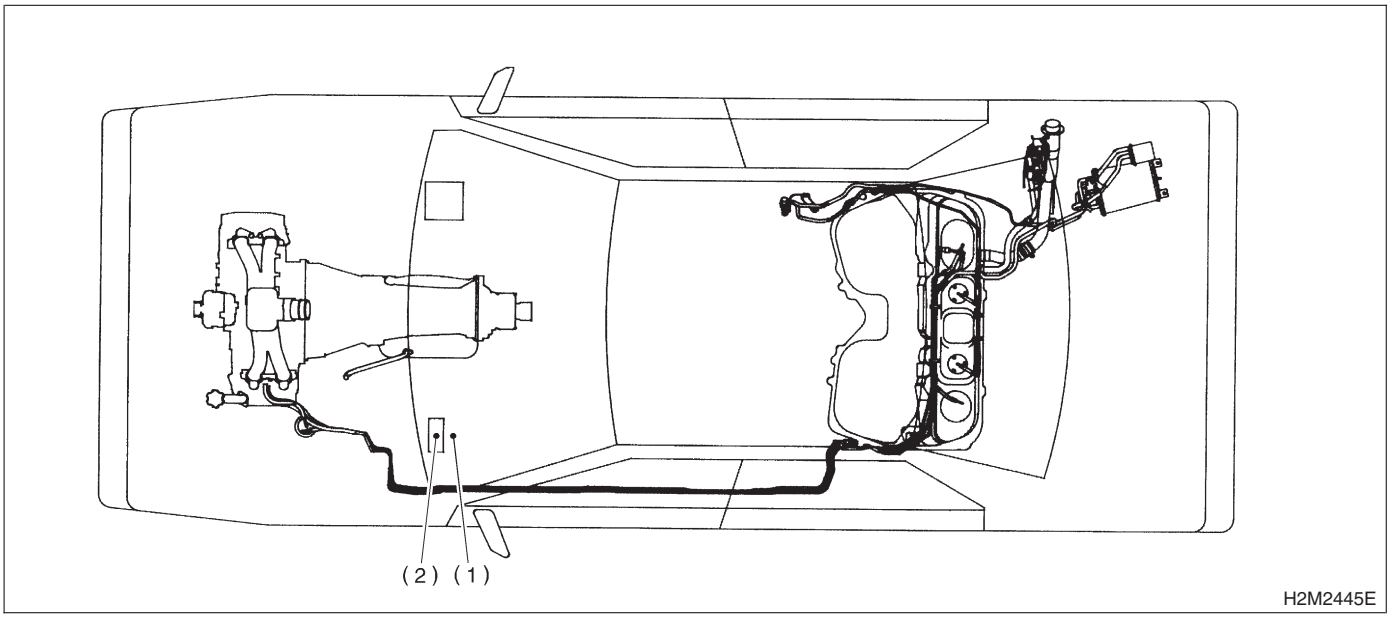




B2M2247B

3. TRANSMISSION S008507A1302

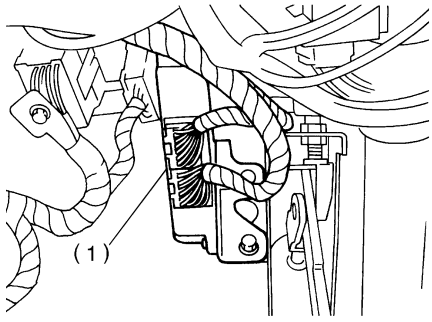
- **Module**



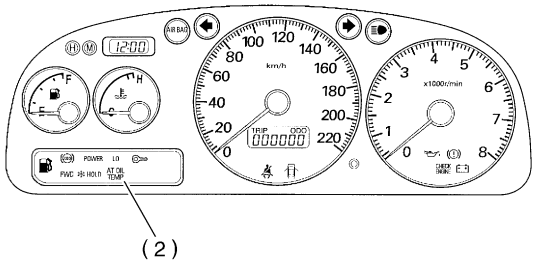
H2M2445E

(1) Transmission Control Module (TCM) (for AT vehicles)

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

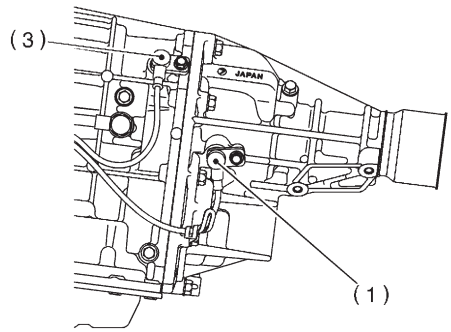


B3M1666D

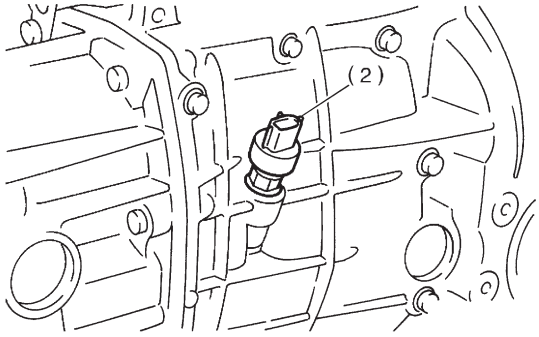


H2M2446E

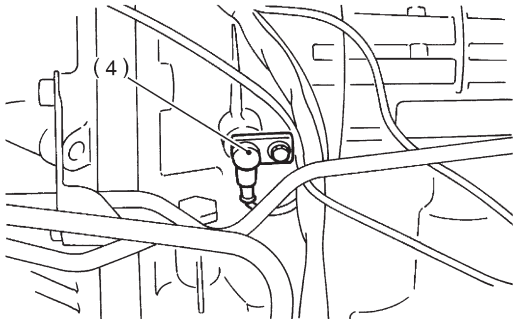
● Sensor



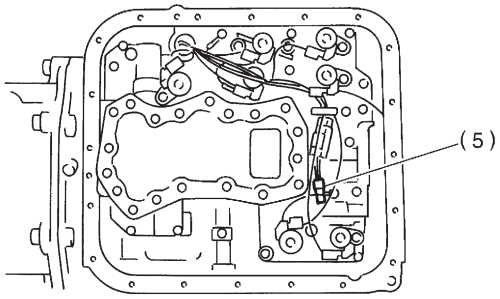
B2M2258A



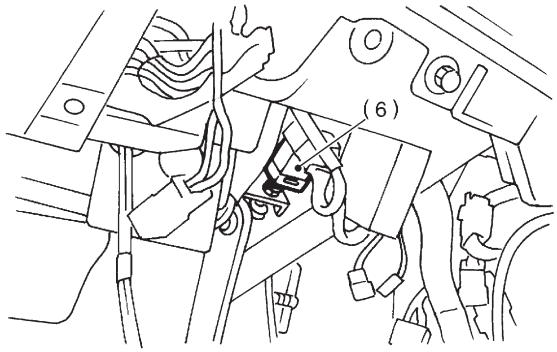
B2M2259A



B2M2260A



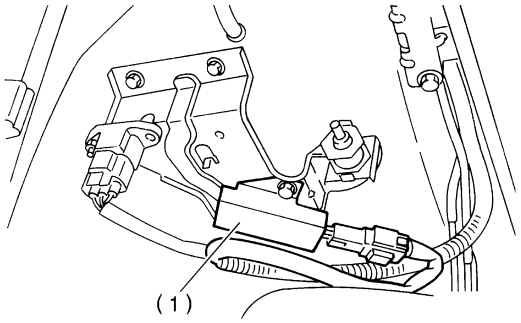
B2M2261A



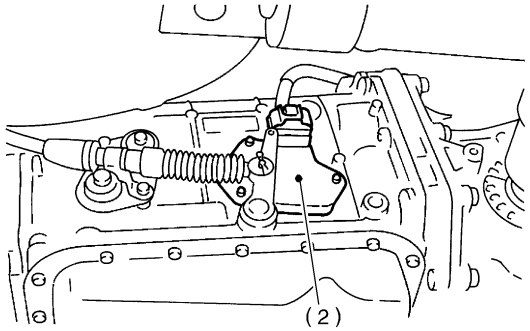
OBD0653B

(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

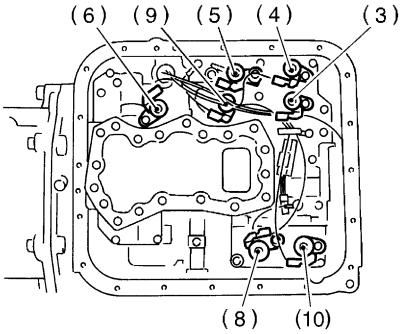
● Solenoid Valve And Switch (AT Vehicles)



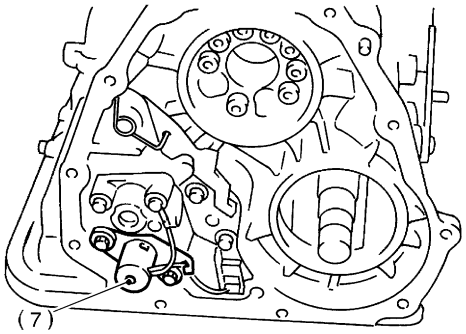
B3M1670C



B2M2246B



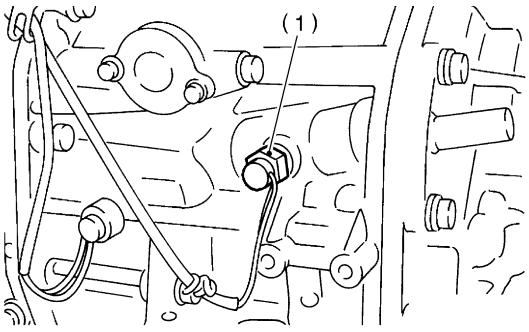
B2M2263A



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

● Solenoid Valve And Switch (MT Vehicles)



B2M2265A

(1) Neutral position switch

6. Engine Condition Data S008530

A: ELECTRICAL SPECIFICATION

S008530A08

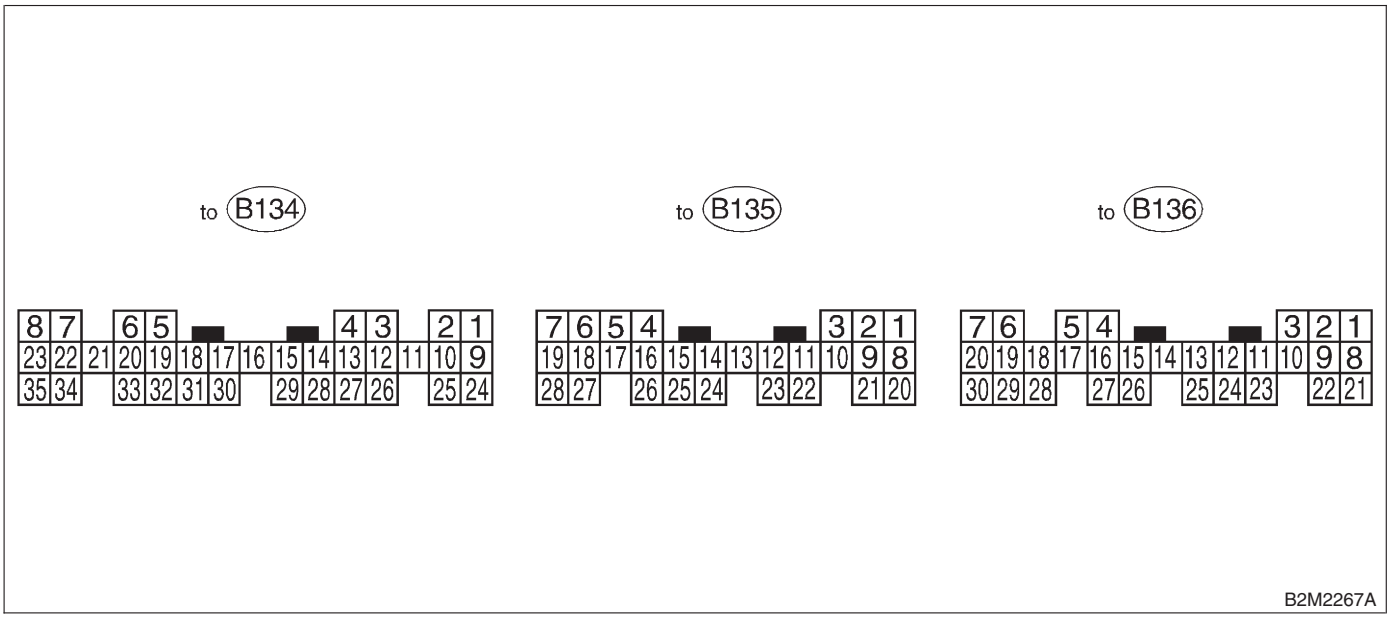
Content	Specified data
Engine load	1.6 — 2.9 (%): Idling
	6.4 — 12.8 (%): 2,500 rpm racing

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.

5. Engine Control Module (ECM) I/O Signal S008526

A: ELECTRICAL SPECIFICATION S008526A08

1. 2200 cc MODELS S008526A0803



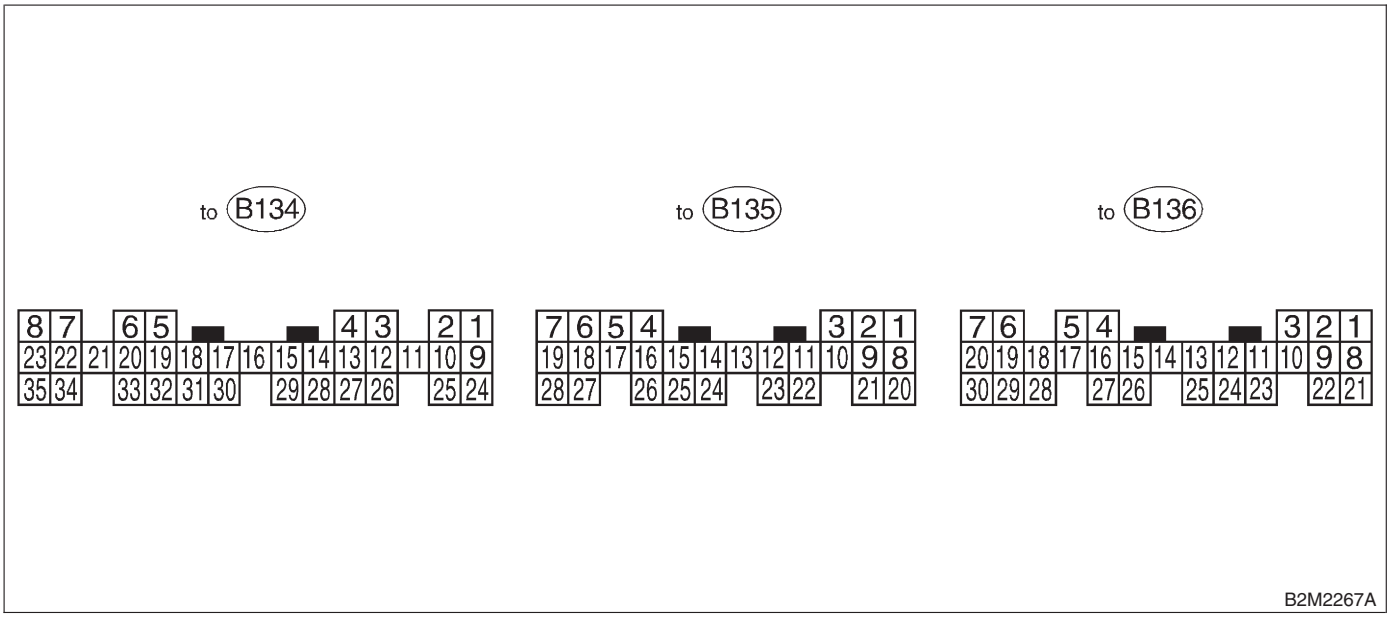
Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B135	1	0	–7 — +7	Sensor output waveform
	Signal (–)	B135	8	0	0	—
	Shield	B135	10	0	0	—
Camshaft position sensor	Signal (+)	B135	2	0	–7 — +7	Sensor output waveform
	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.

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
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	—
Neutral position switch (MT)		B135	26	ON: 12±0.5 OFF: 0		Switch is ON when gear is in neutral position.
Neutral position switch (AT)		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	2.5	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	—
AT diagnosis input signal		B135	4	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	Waveform
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	—

2. 2500 cc MODELS S008526A0804



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 (MT)		B135	26	ON: 12±0.5 OFF: 0		Switch is ON when gear is in neutral position.
Neutral position switch (AT)		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	2.8	—
	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 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	—

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

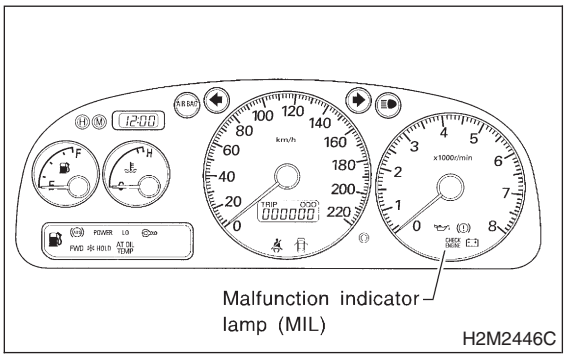
Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Fuel tank pressure sensor	Signal	B136	12	2.3 — 2.7	2.3 — 2.7	The value obtained after the fuel filler cap was removed once and recapped.
	Power supply	B136	15	5	5	—
	GND (sensor)	B136	16	0	0	—
Fuel 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	—

15. Engine Malfunction Indicator Lamp (MIL) Illumination Pattern S008529

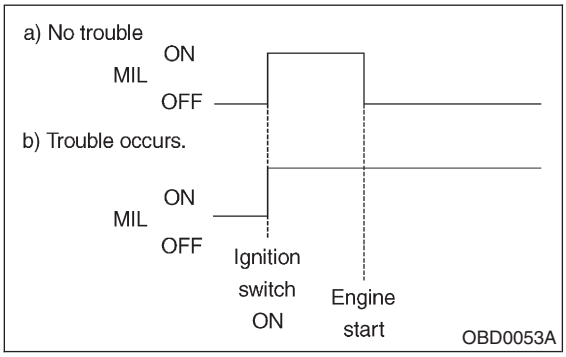
A: ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) S008529E89

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

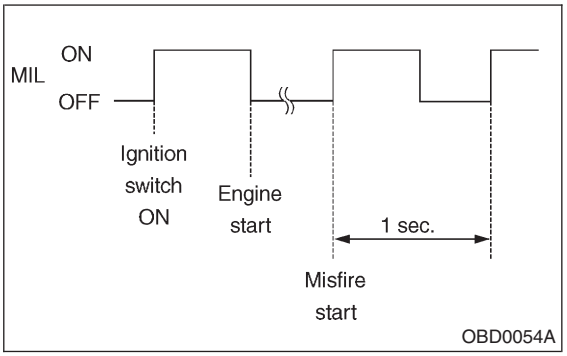
NOTE:
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Ref. to EN-64 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL) Illumination Pattern.>



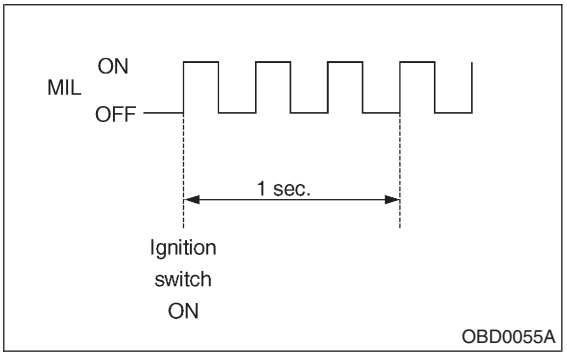
2) After starting the engine, the MIL goes out. If it does not, either the engine or the emission control system is malfunctioning.



3) If the diagnosis system senses a misfire which could damage the catalyzer, the MIL will blink at a cycle of 1 Hz.

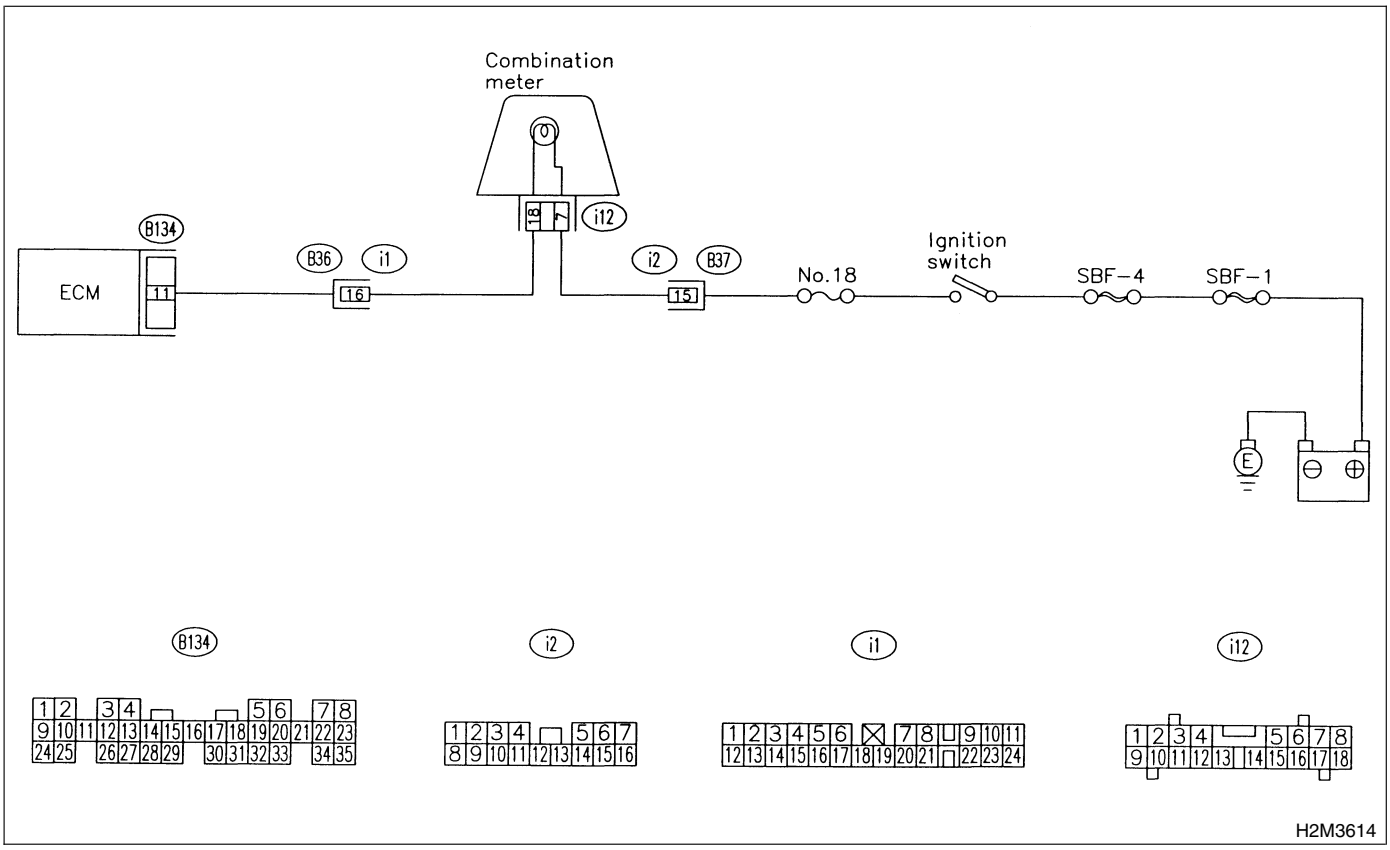


4) When ignition switch is turned to ON (engine off) or to “START” with the test mode connector connected, the MIL blinks at a cycle of 3 Hz.



B: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON. S008529E90

- **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:**

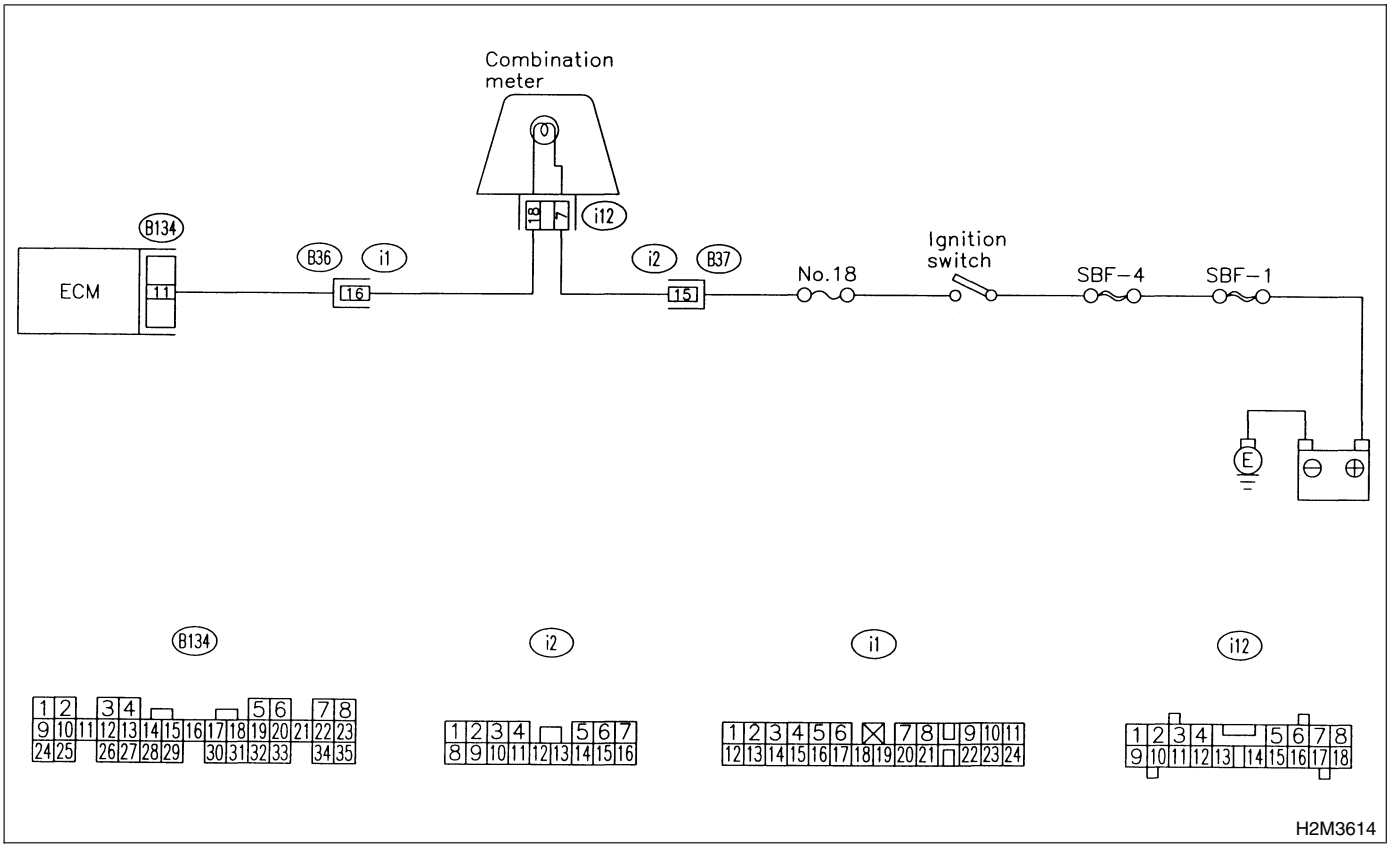


No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 11 (+) — Chassis ground (−):***	Is the voltage less than 1 V?	Go to step **4**.	Go to step **2**.
2	**CHECK POOR CONTACT.**	Does the MIL come on when shaking or pulling ECM connector and harness?	Repair poor contact in ECM connector.	Go to step **3**.
3	**CHECK ECM CONNECTOR.**	Is ECM connector correctly connected?	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>	Repair connection of ECM connector.

No.	Step	Check	Yes	No
4	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Remove combination meter. <Ref. to IDI-3 REMOVAL, Combination Meter Assembly.> 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. 18:***	Is resistance less than 1 Ω?	Go to step **5**.	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)
5	**CHECK POOR CONTACT.** Check poor contact in combination meter connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in combination meter connector?	Repair poor contact in combination meter connector.	Go to step **6**.
6	**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*** ***(i12) No. 7 (+) — Chassis ground (–):***	Is voltage more than 10 V?	Go to step **7**.	Check the following and repair if necessary. NOTE: ● Blown out fuse (No. 18). ● If replaced fuse (No. 18) blows easily, check the harness for short circuit of harness between fuse (No. 18) and combination meter connector. ● Open or short circuit in harness between fuse (No. 18) and battery terminal ● Open circuit in harness between combination meter connector ● Poor contact in ignition switch connector
7	**CHECK LAMP BULB.** Remove engine malfunction indicator lamp bulb.	Is lamp bulb condition OK?	Repair combination meter connector.	Replace lamp bulb.

C: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF. S008529E91

- **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:**

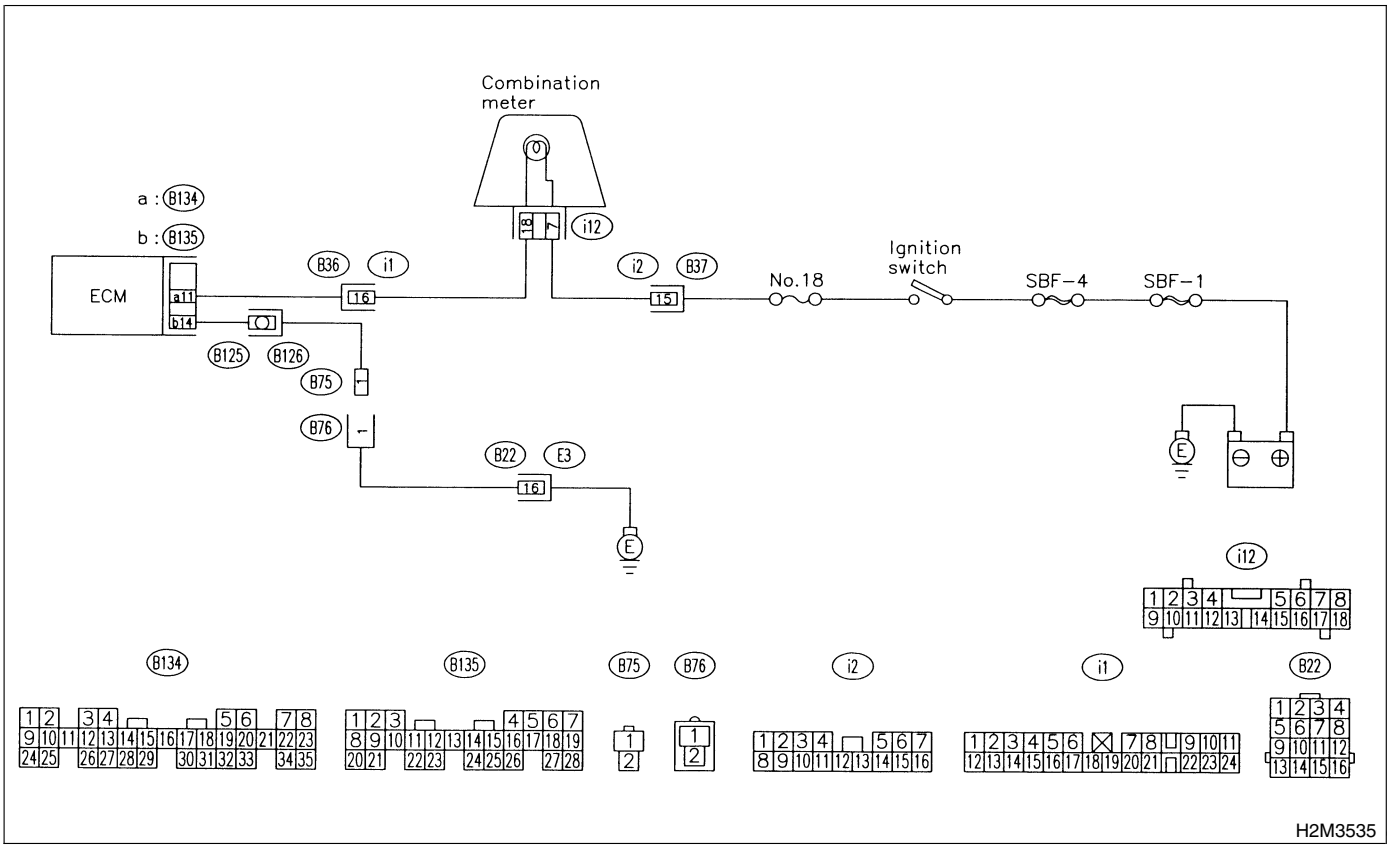


No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Turn ignition switch to ON.	Does the MIL come on?	Repair short circuit in harness between combination meter and ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

MEMO:

D: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 Hz. S008529E92

- **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:**

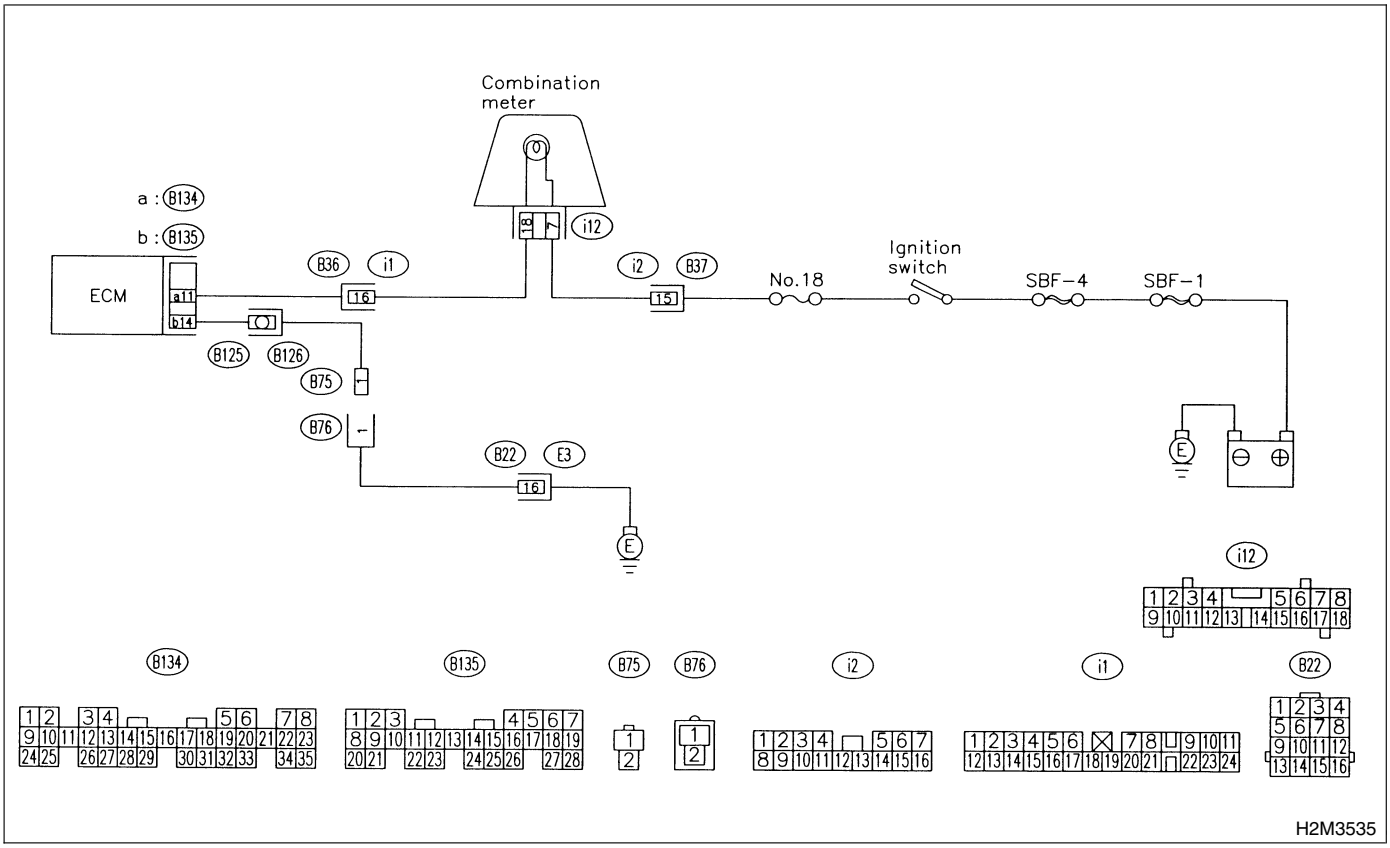


No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Turn ignition switch to OFF. 2) Disconnect test mode connector. 3) Turn ignition switch to ON. (engine OFF)	Does the MIL come on?	Go to step **2**.	Repair the MIL circuit. <Ref. to EN-64 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL) Illumination Pattern.>
2	**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.	Does the MIL come on?	Repair ground short circuit in harness between combination meter and ECM connector.	Go to step **3**.

No.	Step	Check	Yes	No
3	**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:***	Is resistance less than 1 Ω?	Go to step **4**.	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between test mode connector and chassis ground
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Go to step **5**.
5	**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:***	Is resistance less than 1 Ω?	Go to step **6**.	Repair open circuit in harness between ECM and test mode connector.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector. <Ref. to EN-6 CAUTION, General Description.>	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

E: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 Hz. S008529E93

- **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:**



No.	Step	Check	Yes	No
1	**CHECK TEST MODE CONNECTOR.** 1) Disconnect test mode connector. 2) Turn ignition switch to ON.	Does MIL flash on and off?	Go to step **2**.	System is in good order. NOTE: MIL blinks at a cycle of 3 Hz when test mode connector is connected.
2	**CHECK HARNESS BETWEEN ECM CONNECTOR AND ENGINE GROUNDING TERMINAL.** 1) Turn 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:***	Is resistance less than 5 Ω?	Repair short circuit in harness between ECM and test mode connector.	Replace ECM. <Ref. to FU-60 REMOVAL, Engine Control Module.>

3. General Description S008001

A: CAUTION S008001A03

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

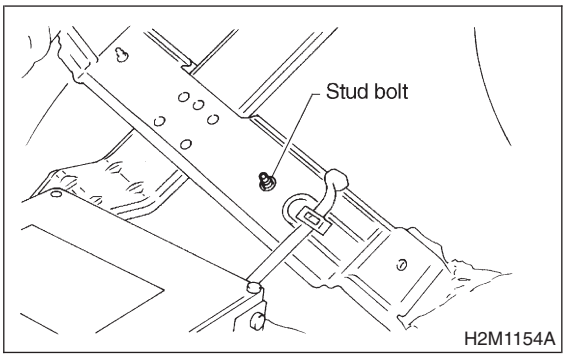
CAUTION:
● All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
● Be careful not to damage Airbag system wiring harness when servicing the engine control module (ECM), transmission control module (TCM), main relay and fuel pump relay.

2) Never connect the battery in reverse polarity.
● The ECM will be destroyed instantly.
● The fuel injector and other part will be damaged in just a few minutes more.
3) Do not disconnect the battery 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.
4) Before disconnecting the connectors of each sensor and the ECM, be sure to turn OFF the ignition switch.
5) Poor contact has been identified as a primary cause of this problem. To measure the voltage and/or resistance of individual sensors or all electrical control modules at the harness side connector, use a tapered pin with a diameter of less than 0.64 mm (0.025 in). Do not insert the pin more than 5 mm (0.20 in) into the part.
6) Before removing ECM from the located position, disconnect two cables on battery.
● Otherwise, the ECM may be damaged.

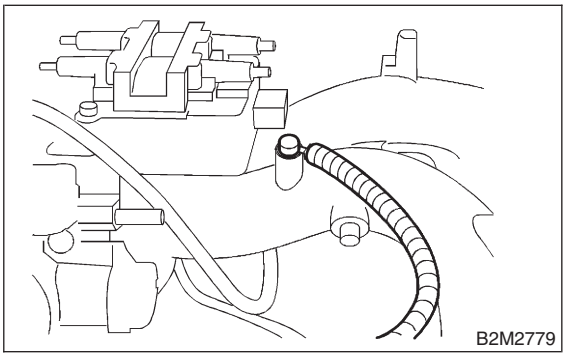
CAUTION:
When replacing ECM, be careful not to use the wrong spec. ECM to avoid any damage on fuel injection system.

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

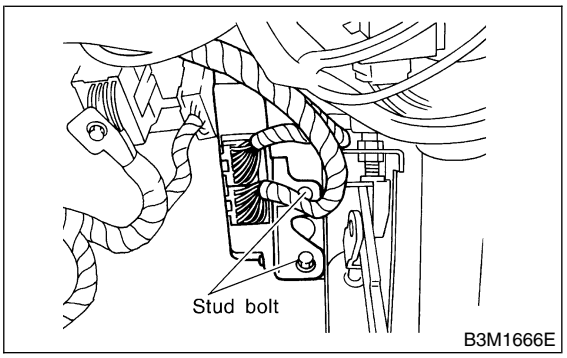
8) Use ECM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.



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



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



11) Every MFI-related part is a precision part. Do not drop them.
12) Observe the following cautions when installing a radio in MFI equipped models.

CAUTION:
● The antenna must be kept as far apart as possible from the control unit.
(The ECM is located under the steering column, inside of the instrument panel lower trim panel.)

• The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.
• Carefully adjust the antenna for correct matching.
• When mounting a large power type radio, pay special attention to the three items above mentioned.
• Incorrect installation of the radio may affect the operation of the ECM.

13) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for more than five seconds to release pressure in the fuel system. If engine starts during this operation, run it until it stops.
14) Problems in the electronic-controlled automatic transmission may be caused by failure of the engine, the electronic control system, the transmission proper, or by a combination of these. These three causes must be distinguished clearly when performing diagnostics.
15) Diagnostics should be conducted by rotating with simple, easy operations and proceeding to complicated, difficult operations. The most important thing in diagnostics is to understand the customer's complaint, and distinguish between the three causes.
16) 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).
17) 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.

B: INSPECTION S008001A10

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

1. BATTERY S008001A1001

1) Measure battery voltage and specific gravity of electrolyte.

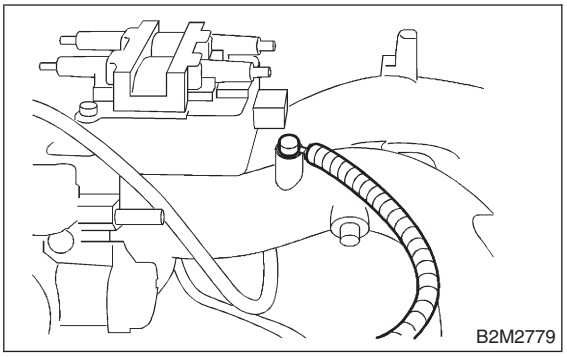
Standard voltage: 12 V

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 S008001A1002

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



C: NOTE S008001A15

1. DESCRIPTION S008001A1501

● 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.

2. ENGINE AND EMISSION CONTROL SYSTEM S008001A1502

● 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.

3. AUTOMATIC TRANSMISSION AND ELECTRONIC-HYDRAULIC CONTROL SYSTEM S008001A1503

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:

21. General Diagnostic Table

S008257

A: INSPECTION S008257A10

1. ENGINE S008257A1001

NOTE:
Malfunction of parts other than those listed is also possible. <Ref. to ME-97 INSPECTION, Engine Trouble in General.>

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)

Symptom	Problem parts
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
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.

2. AUTOMATIC TRANSMISSION S008257A1002

NOTE:
Check general diagnostics table with non-conformity symptom for automatic transmission. <Ref. to AT-93 INSPECTION, Symptom Related Diagnostic.>

MEMO:

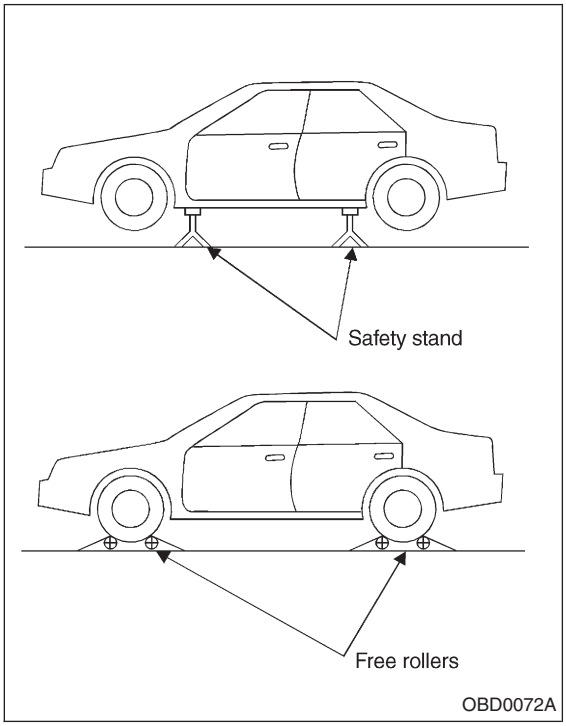
12. Inspection Mode S008510

A: OPERATION S008510A16

1. PREPARATIONS FOR THE INSPECTION MODE S008510A1601

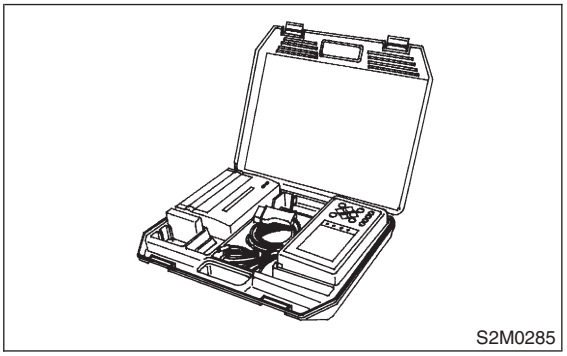
Raise the vehicle using a garage jack and place on safety stands or drive the vehicle onto free rollers.

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 runout 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.

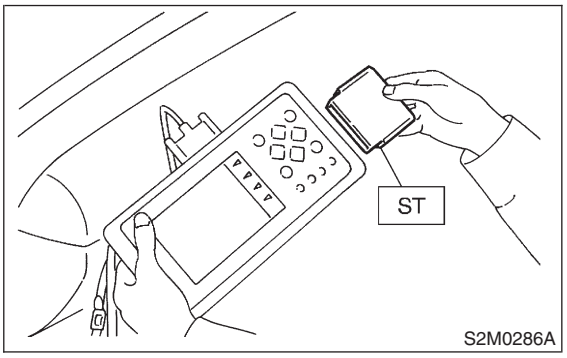


2. SUBARU SELECT MONITOR S008510A1602

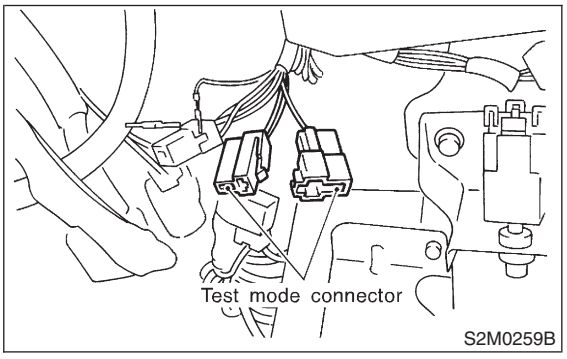
After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data.
1) Prepare Subaru Select Monitor kit.



2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor.

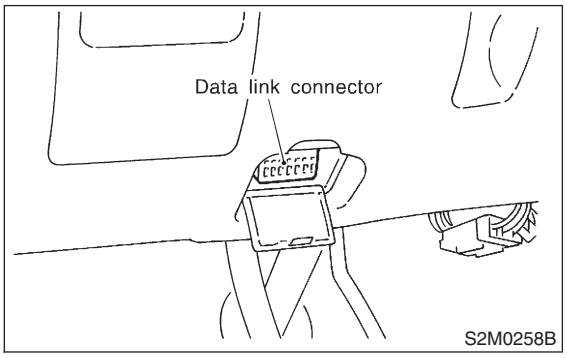


4) Connect test mode connector at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



5) Connect Subaru Select Monitor to data link connector.

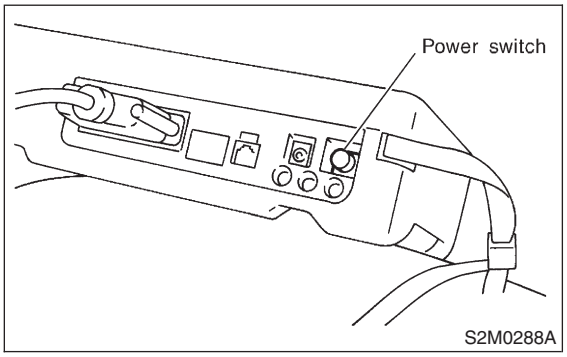
(1) Connect Subaru Select Monitor to data link connector located in the lower portion of the instrument panel (on the driver's side).



(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.

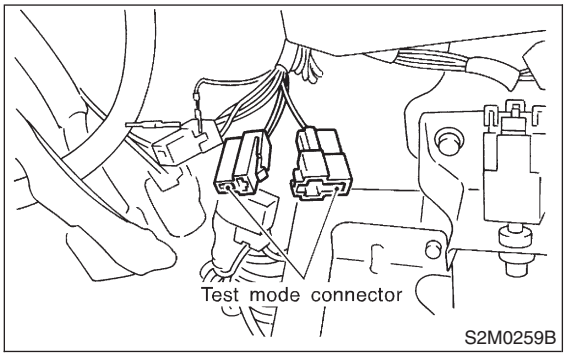
- If trouble still remains in the memory, the corresponding diagnostic trouble code (DTC) appears on the display screen.

NOTE:

- For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
- For detailed concerning diagnostic trouble codes, refer to the "List of Diagnostic Trouble Code (DTC)".
  - 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
  - 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>
- 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.

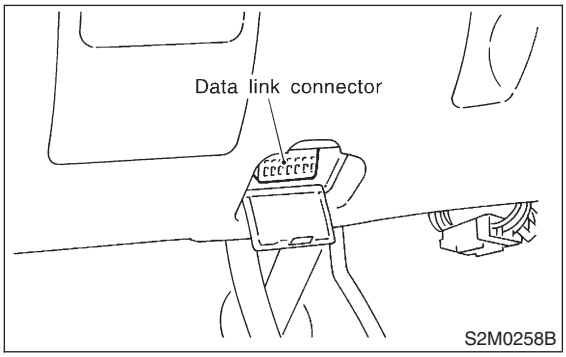
3. OBD-II GENERAL SCAN TOOL S008510A1603

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 "List of Diagnostic Trouble Code (DTC)".
  ● 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
  ● 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

17. List of Diagnostic Trouble Code (DTC) for 2200 cc Models S008635

A: LIST S008635A12

DTC No.	Item	Index
P0106	Intake manifold pressure sensor circuit range/ performance problem	<Ref. to EN-100 DTC P0106 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0107	Intake manifold pressure sensor circuit low input	<Ref. to EN-102 DTC P0107 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0108	Intake manifold pressure sensor circuit high input	<Ref. to EN-106 DTC P0108 — INTAKE MANIFOLD PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0111	Intake air temperature sensor circuit range/ performance problem	<Ref. to EN-110 DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0112	Intake air temperature sensor circuit low input	<Ref. to EN-112 DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0113	Intake air temperature sensor circuit high input	<Ref. to EN-114 DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0116	Engine coolant temperature sensor circuit low input	<Ref. to EN-118 DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0117	Engine coolant temperature sensor circuit high input	<Ref. to EN-120 DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0121	Throttle position sensor circuit range/ performance problem (high input)	<Ref. to EN-124 DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0122	Throttle position sensor circuit low input	<Ref. to EN-126 DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0123	Throttle position sensor circuit high input	<Ref. to EN-130 DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0125	Insufficient coolant temperature for closed loop fuel control	<Ref. to EN-132 DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0131	Front oxygen (A/F) sensor circuit range/ performance problem (low input)	<Ref. to EN-134 DTC P0131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0132	Front oxygen (A/F) sensor circuit range/ performance problem (high input)	<Ref. to EN-136 DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

LIST OF DIAGNOSTIC TROUBLE CODE (DTC) FOR 2200 CC MODELS

DTC No.	Item	Index
P0133	Front oxygen (A/F) sensor circuit slow response	<Ref. to EN-138 DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0136	Rear oxygen sensor circuit malfunction	<Ref. to EN-140 DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0139	Rear oxygen sensor circuit slow response	<Ref. to EN-142 DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0141	Rear oxygen sensor heater circuit low input	<Ref. to EN-144 DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0171	Fuel trim malfunction (A/F too lean)	<Ref. to EN-147 DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0172	Fuel trim malfunction (A/F too rich)	<Ref. to EN-148 DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0181	Fuel temperature sensor A circuit range/ performance problem	<Ref. to EN-151 DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0182	Fuel temperature sensor A circuit low input	<Ref. to EN-152 DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0183	Fuel temperature sensor A circuit high input	<Ref. to EN-154 DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0301	Cylinder 1 misfire detected	<Ref. to EN-156 DTC P0301 — CYLINDER 1 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0302	Cylinder 2 misfire detected	<Ref. to EN-156 DTC P0302 — CYLINDER 2 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0303	Cylinder 3 misfire detected	<Ref. to EN-156 DTC P0303 — CYLINDER 3 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0304	Cylinder 4 misfire detected	<Ref. to EN-158 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0325	Knock sensor circuit malfunction	<Ref. to EN-166 DTC P0325 — KNOCK SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0335	Crankshaft position sensor circuit malfunction	<Ref. to EN-168 DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0336	Crankshaft position sensor circuit range/ performance problem	<Ref. to EN-170 DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0340	Camshaft position sensor circuit malfunction	<Ref. to EN-172 DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0341	Camshaft position sensor circuit range/ performance problem	<Ref. to EN-174 DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

DTC No.	Item	Index
P0420	Catalyst system efficiency below threshold	<Ref. to EN-178 DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0440	Evaporative emission control system malfunction	<Ref. to EN-180 DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0443	Evaporative emission control system purge control valve circuit low input	<Ref. to EN-184 DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0446	Evaporative emission control system vent control low input	<Ref. to EN-186 DTC P0446 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0451	Evaporative emission control system pressure sensor range/performance problem	<Ref. to EN-190 DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0452	Evaporative emission control system pressure sensor low input	<Ref. to EN-192 DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0453	Evaporative emission control system pressure sensor high input	<Ref. to EN-196 DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0461	Fuel level sensor circuit range/performance problem	<Ref. to EN-199 DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0462	Fuel level sensor circuit low input	<Ref. to EN-200 DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0463	Fuel level sensor circuit high input	<Ref. to EN-204 DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0480	Cooling fan relay 1 circuit low input	<Ref. to EN-208 DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0483	Cooling fan function problem	<Ref. to EN-210 DTC P0483 — COOLING FAN FUNCTION PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0500	Vehicle speed sensor malfunction	<Ref. to EN-212 DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0505	Idle control system circuit low input	<Ref. to EN-214 DTC P0505 — IDLE CONTROL SYSTEM LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0506	Idle control system RPM lower than expected	<Ref. to EN-216 DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0507	Idle control system RPM higher than expected	<Ref. to EN-218 DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

DTC No.	Item	Index
P0601	Internal control module memory check sum error	<Ref. to EN-220 DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0703	Brake switch input malfunction	<Ref. to EN-222 DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0705	Transmission range sensor circuit malfunction	<Ref. to EN-224 DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0710	Transmission fluid temperature sensor circuit malfunction	<Ref. to EN-224 DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0715	Torque converter turbine speed sensor circuit malfunction	<Ref. to EN-224 DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0720	Output speed sensor (vehicle speed sensor 2) circuit malfunction	<Ref. to EN-225 DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0725	Engine speed input circuit malfunction	<Ref. to EN-225 DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0731	Gear 1 incorrect ratio	<Ref. to EN-225 DTC P0731 — GEAR 1 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0732	Gear 2 incorrect ratio	<Ref. to EN-225 DTC P0732 — GEAR 2 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0733	Gear 3 incorrect ratio	<Ref. to EN-225 DTC P0733 — GEAR 3 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0734	Gear 4 incorrect ratio	<Ref. to EN-226 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0740	Torque converter clutch system malfunction	<Ref. to EN-227 DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0743	Torque converter clutch system (lock-up duty solenoid) electrical	<Ref. to EN-229 DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0748	Pressure control solenoid (line pressure duty solenoid) electrical	<Ref. to EN-229 DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0753	Shift solenoid A (shift solenoid 1) electrical	<Ref. to EN-229 DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P0758	Shift solenoid B (shift solenoid 2) electrical	<Ref. to EN-230 DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1100	Starter switch circuit low input	<Ref. to EN-231 DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

DTC No.	Item	Index
P1101	Neutral position switch circuit low input [MT vehicles] or Neutral position switch circuit high input [AT vehicles]	<Ref. to EN-232 DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [AT VEHICLES] —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1103	Engine torque control signal 1 circuit malfunction	<Ref. to EN-236 DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1106	Engine torque control signal 2 circuit malfunction	<Ref. to EN-238 DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1110	Atmospheric pressure sensor circuit low input	<Ref. to EN-240 DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1111	Atmospheric pressure sensor circuit high input	<Ref. to EN-240 DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1112	Atmospheric pressure sensor circuit range/ performance problem	<Ref. to EN-241 DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1115	Engine torque control cut signal circuit high input	<Ref. to EN-242 DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1116	Engine torque control cut signal circuit low input	<Ref. to EN-243 DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1120	Starter switch circuit high input	<Ref. to EN-244 DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1121	Neutral position switch circuit high input [MT vehicles] or Neutral position switch circuit low input [AT vehicles]	<Ref. to EN-246 DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [AT VEHICLES] —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1130	Front oxygen (A/F) sensor circuit malfunction (open circuit)	<Ref. to EN-250 DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1131	Front oxygen (A/F) sensor circuit malfunction (short circuit)	<Ref. to EN-252 DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1132	Front oxygen (A/F) sensor heater circuit low input	<Ref. to EN-254 DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1133	Front oxygen (A/F) sensor heater circuit high input	<Ref. to EN-258 DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1134	Front oxygen (A/F) sensor micro-computer problem	<Ref. to EN-260 DTC P1134 — FRONT OXYGEN (A/F) SENSOR MICRO-COMPUTER PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

DTC No.	Item	Index
P1139	Front oxygen (A/F) sensor #1 heater circuit range/performance problem	<Ref. to EN-262 DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1142	Throttle position sensor circuit range/ performance problem (low input)	<Ref. to EN-264 DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1151	Rear oxygen sensor heater circuit high input	<Ref. to EN-266 DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1400	Fuel tank pressure control solenoid valve circuit low input	<Ref. to EN-268 DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1420	Fuel tank pressure control solenoid valve circuit high input	<Ref. to EN-272 DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1422	Evaporative emission control system purge control valve circuit high input	<Ref. to EN-274 DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1423	Evaporative emission control system vent control high input	<Ref. to EN-276 DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1443	Evaporative emission control system vent control function problem	<Ref. to EN-278 DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1505	Idle control system circuit high input	<Ref. to EN-280 DTC P1505 — IDLE CONTROL SYSTEM CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1507	Idle control system malfunction (fail-safe)	<Ref. to EN-282 DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1520	Cooling fan relay 1 circuit high input	<Ref. to EN-284 DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1560	Back-up voltage circuit malfunction	<Ref. to EN-286 DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1700	Throttle position sensor circuit malfunction for automatic transmission	<Ref. to EN-288 DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —, Diagnostic Procedur with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1701	Cruise control set signal circuit malfunction for automatic transmission	<Ref. to EN-290 DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1702	Automatic transmission diagnosis input signal circuit low input	<Ref. to EN-292 DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

DTC No.	Item	Index
P1703	Low clutch timing control solenoid valve circuit malfunction	<Ref. to EN-294 DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1704	2-4 brake timing control solenoid valve circuit malfunction	<Ref. to EN-294 DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1705	2-4 brake pressure control solenoid valve (2-4 brake duty solenoid) circuit malfunction	<Ref. to EN-294 DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1722	Automatic transmission diagnosis input signal circuit high input	<Ref. to EN-296 DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>
P1742	Automatic transmission diagnosis input signal circuit malfunction	<Ref. to EN-298 DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2200 cc Models.>

19. List of Diagnostic Trouble Code (DTC) for 2500 cc Models S008637

A: LIST S008637A12

DTC No.	Item	Index
P0106	Pressure sensor circuit range/performance problem	<Ref. to EN-308 DTC P0106 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0107	Pressure sensor circuit low input	<Ref. to EN-310 DTC P0107 — PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0108	Pressure sensor circuit high input	<Ref. to EN-314 DTC P0108 — PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0111	Intake air temperature sensor circuit range/performance problem	<Ref. to EN-318 DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0112	Intake air temperature sensor circuit low input	<Ref. to EN-320 DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0113	Intake air temperature sensor circuit high input	<Ref. to EN-322 DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0116	Engine coolant temperature sensor circuit low input	<Ref. to EN-326 DTC P0116 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0117	Engine coolant temperature sensor circuit high input	<Ref. to EN-328 DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0121	Throttle position sensor circuit range/performance problem (high input)	<Ref. to EN-332 DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0122	Throttle position sensor circuit low input	<Ref. to EN-334 DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0123	Throttle position sensor circuit high input	<Ref. to EN-338 DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0125	Insufficient coolant temperature for closed loop fuel control	<Ref. to EN-340 DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0130	Front oxygen (A/F) sensor circuit range/performance problem	<Ref. to EN-342 DTC P0130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0133	Front oxygen (A/F) sensor circuit slow response	<Ref. to EN-346 DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0136	Rear oxygen sensor circuit malfunction	<Ref. to EN-348 DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P0139	Rear oxygen sensor circuit slow response	<Ref. to EN-350 DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0141	Rear oxygen sensor heater circuit malfunction	<Ref. to EN-352 DTC P0141 — REAR OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0170	Fuel trim malfunction	<Ref. to EN-355 DTC P0170 — FUEL TRIM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0181	Fuel temperature sensor A circuit range/ performance problem	<Ref. to EN-358 DTC P0181 — FUEL TEMPERATURE SENSOR A CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0182	Fuel temperature sensor A circuit low input	<Ref. to EN-360 DTC P0182 — FUEL TEMPERATURE SENSOR A CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0183	Fuel temperature sensor A circuit high input	<Ref. to EN-362 DTC P0183 — FUEL TEMPERATURE SENSOR A CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0301	Cylinder 1 misfire detected	<Ref. to EN-364 DTC P0301 — CYLINDER 1 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0302	Cylinder 2 misfire detected	<Ref. to EN-364 DTC P0302 — CYLINDER 2 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0303	Cylinder 3 misfire detected	<Ref. to EN-364 DTC P0303 — CYLINDER 3 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0304	Cylinder 4 misfire detected	<Ref. to EN-366 DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0325	Knock sensor circuit high input	<Ref. to EN-374 DTC P0325 — KNOCK SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0335	Crankshaft position sensor circuit malfunction	<Ref. to EN-376 DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0336	Crankshaft position sensor circuit range/ performance problem	<Ref. to EN-378 DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0340	Camshaft position sensor circuit malfunction	<Ref. to EN-380 DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0341	Camshaft position sensor circuit range/ performance problem	<Ref. to EN-382 DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0420	Catalyst system efficiency below threshold	<Ref. to EN-386 DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0440	Evaporative emission control system malfunction	<Ref. to EN-388 DTC P0440 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P0442	Evaporative emission control system malfunction	<Ref. to EN-392 DTC P0442 — EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0443	Evaporative emission control system purge control valve circuit low input	<Ref. to EN-396 DTC P0443 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0446	Evaporative emission control system vent control low input	<Ref. to EN-398 DTC P0446 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0451	Evaporative emission control system pressure sensor range/performance problem	<Ref. to EN-402 DTC P0451 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR RANGE/ PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0452	Evaporative emission control system pressure sensor low input	<Ref. to EN-404 DTC P0452 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0453	Evaporative emission control system pressure sensor high input	<Ref. to EN-408 DTC P0453 — EVAPORATIVE EMISSION CONTROL SYSTEM PRESSURE SENSOR HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0461	Fuel level sensor circuit range/performance problem	<Ref. to EN-411 DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0462	Fuel level sensor circuit low input	<Ref. to EN-412 DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0463	Fuel level sensor circuit high input	<Ref. to EN-416 DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0480	Cooling fan relay 1 circuit low input	<Ref. to EN-420 DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0483	Cooling fan function problem	<Ref. to EN-422 DTC P0483 — COOLING FAN FUNCTION PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0500	Vehicle speed sensor malfunction	<Ref. to EN-424 DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0506	Idle control system RPM lower than expected	<Ref. to EN-426 DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0507	Idle control system RPM higher than expected	<Ref. to EN-428 DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0601	Internal control module memory check sum error	<Ref. to EN-430 DTC P0601 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0703	Brake switch input malfunction	<Ref. to EN-432 DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P0705	Transmission range sensor circuit malfunction	<Ref. to EN-434 DTC P0705 — TRANSMISSION RANGE SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0710	Transmission fluid temperature sensor circuit malfunction	<Ref. to EN-434 DTC P0710 — TRANSMISSION FLUID TEMPERATURE SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0715	Torque converter turbine speed sensor circuit malfunction	<Ref. to EN-434 DTC P0715 — TORQUE CONVERTER TURBINE SPEED SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0720	Output speed sensor (vehicle speed sensor 2) circuit malfunction	<Ref. to EN-435 DTC P0720 — OUTPUT SPEED SENSOR (VEHICLE SPEED SENSOR 2) CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0725	Engine speed input circuit malfunction	<Ref. to EN-435 DTC P0725 — ENGINE SPEED INPUT CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0731	Gear 1 incorrect ratio	<Ref. to EN-435 DTC P0731 — GEAR 1 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0732	Gear 2 incorrect ratio	<Ref. to EN-435 DTC P0732 — GEAR 2 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0733	Gear 3 incorrect ratio	<Ref. to EN-435 DTC P0733 — GEAR 3 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0734	Gear 4 incorrect ratio	<Ref. to EN-436 DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0740	Torque converter clutch system malfunction	<Ref. to EN-437 DTC P0740 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0743	Torque converter clutch system (lock-up duty solenoid) electrical	<Ref. to EN-439 DTC P0743 — TORQUE CONVERTER CLUTCH SYSTEM (LOCK-UP DUTY SOLENOID) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0748	Pressure control solenoid (line pressure duty solenoid) electrical	<Ref. to EN-439 DTC P0748 — PRESSURE CONTROL SOLENOID (LINE PRESSURE DUTY SOLENOID) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0753	Shift solenoid A (Shift solenoid 1) electrical	<Ref. to EN-439 DTC P0753 — SHIFT SOLENOID A (SHIFT SOLENOID 1) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P0758	Shift solenoid B (Shift solenoid 2) electrical	<Ref. to EN-440 DTC P0758 — SHIFT SOLENOID B (SHIFT SOLENOID 2) ELECTRICAL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1100	Starter switch circuit low input	<Ref. to EN-441 DTC P1100 — STARTER SWITCH CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1101	Neutral position switch circuit low input [MT vehicles] or Neutral position switch circuit high input [AT vehicles]	<Ref. to EN-442 DTC P1101 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [AT VEHICLES]—, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P1103	Engine torque control signal 1 circuit malfunction	<Ref. to EN-446 DTC P1103 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1106	Engine torque control signal 2 circuit malfunction	<Ref. to EN-448 DTC P1106 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1110	Atmospheric pressure sensor low input	<Ref. to EN-450 DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1111	Atmospheric pressure sensor high input	<Ref. to EN-454 DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1112	Atmospheric pressure sensor range/performance problem	<Ref. to EN-458 DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1115	Engine torque control cut signal circuit high input	<Ref. to EN-460 DTC P1115 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1116	Engine torque control cut signal circuit low input	<Ref. to EN-461 DTC P1116 — ENGINE TORQUE CONTROL CUT SIGNAL CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1120	Starter switch circuit high input	<Ref. to EN-462 DTC P1120 — STARTER SWITCH CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1121	Neutral position switch circuit high input [MT vehicles] or Neutral position switch circuit low input [AT vehicles]	<Ref. to EN-464 DTC P1121 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT [MT VEHICLES] OR NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT [AT VEHICLES]—, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1130	Front oxygen (A/F) sensor circuit malfunction (open circuit)	<Ref. to EN-468 DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1131	Front oxygen (A/F) sensor circuit malfunction (short circuit)	<Ref. to EN-470 DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1132	Front oxygen (A/F) sensor heater circuit low input	<Ref. to EN-472 DTC P1132 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1133	Front oxygen (A/F) sensor heater circuit high input	<Ref. to EN-476 DTC P1133 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1142	Throttle position sensor circuit range/ performance problem (low input)	<Ref. to EN-478 DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1151	Rear oxygen sensor heater circuit high input	<Ref. to EN-480 DTC P1151 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P1207	Air assist injector solenoid valve circuit low input	<Ref. to EN-482 DTC P1207 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1208	Air assist injector solenoid valve circuit high input	<Ref. to EN-484 DTC P1208 — AIR ASSIST INJECTOR SOLENOID VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1325	Knock sensor circuit low input	<Ref. to EN-486 DTC P1325 — KNOCK SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1400	Fuel tank pressure control solenoid valve circuit low input	<Ref. to EN-488 DTC P1400 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1420	Fuel tank pressure control solenoid valve circuit high input	<Ref. to EN-492 DTC P1420 — FUEL TANK PRESSURE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1422	Evaporative emission control system purge control valve circuit high input	<Ref. to EN-494 DTC P1422 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1423	Evaporative emission control system vent control high input	<Ref. to EN-496 DTC P1423 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1442	Fuel level sensor circuit range/performance problem 2	<Ref. to EN-498 DTC P1442 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM 2 —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1443	Evaporative emission control system vent control function problem	<Ref. to EN-500 DTC P1443 — EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL FUNCTION PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1445	Air assist injector solenoid valve malfunction	<Ref. to EN-502 DTC P1445 — AIR ASSIST INJECTOR SOLENOID VALVE MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1490	Thermostat malfunction	<Ref. to EN-504 DTC P1490 — THERMOSTAT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1507	Idle control system malfunction (fail-safe)	<Ref. to EN-506 DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1510	Idle air control solenoid valve signal 1 circuit low input	<Ref. to EN-508 DTC P1510 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1511	Idle air control solenoid valve signal 1 circuit high input	<Ref. to EN-508 DTC P1511 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 1 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1512	Idle air control solenoid valve signal 2 circuit low input	<Ref. to EN-508 DTC P1512 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

DTC No.	Item	Index
P1513	Idle air control solenoid valve signal 2 circuit high input	<Ref. to EN-508 DTC P1513 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 2 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1514	Idle air control solenoid valve signal 3 circuit low input	<Ref. to EN-508 DTC P1514 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1515	Idle air control solenoid valve signal 3 circuit high input	<Ref. to EN-508 DTC P1515 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 3 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1516	Idle air control solenoid valve signal 4 circuit low input	<Ref. to EN-510 DTC P1516 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1517	Idle air control solenoid valve signal 4 circuit high input	<Ref. to EN-512 DTC P1517 — IDLE AIR CONTROL SOLENOID VALVE SIGNAL 4 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1520	Cooling fan relay 1 circuit high input	<Ref. to EN-514 DTC P1520 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1540	Vehicle speed sensor malfunction 2	<Ref. to EN-516 DTC P1540 — VEHICLE SPEED SENSOR MALFUNCTION 2 —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1560	Back-up voltage circuit malfunction	<Ref. to EN-518 DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1700	Throttle position sensor circuit malfunction for automatic transmission	<Ref. to EN-520 DTC P1700 — THROTTLE POSITION SENSOR CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1701	Cruise control set signal circuit malfunction for automatic transmission	<Ref. to EN-522 DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1702	Automatic transmission diagnosis input signal circuit low input	<Ref. to EN-524 DTC P1702 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1703	Low clutch timing control solenoid valve circuit malfunction	<Ref. to EN-526 DTC P1703 — LOW CLUTCH TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1704	2-4 brake timing control solenoid valve circuit malfunction	<Ref. to EN-526 DTC P1704 — 2-4 BRAKE TIMING CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1705	2-4 brake pressure control solenoid valve (2-4 brake duty solenoid) circuit malfunction	<Ref. to EN-526 DTC P1705 — 2-4 BRAKE PRESSURE CONTROL SOLENOID VALVE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>
P1722	Automatic transmission diagnosis input signal circuit high input	<Ref. to EN-528 DTC P1722 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

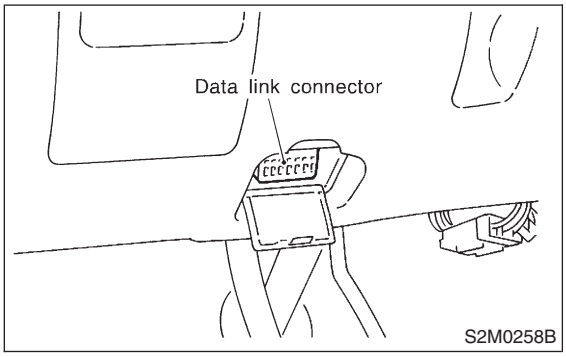
DTC No.	Item	Index
P1742	Automatic transmission diagnosis input signal circuit malfunction	<Ref. to EN-530 DTC P1742 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC) for 2500 cc Models.>

9. OBD-II General Scan Tool S008527

A: OPERATION S008527A16

1. HOW TO USE OBD-II GENERAL SCAN TOOL S008527A1601

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 "List of Diagnostic Trouble Code (DTC)".
● 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
● 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

2. MODE $01 (CURRENT POWERTRAIN DIAGNOSTIC DATA) S008527A1602

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).

3. MODE $02 (POWERTRAIN FREEZE FRAME DATA) S008527A1603

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).

4. MODE $03 (EMISSION-RELATED POWERTRAIN DIAGNOSTIC TROUBLE CODE) S008527A1604

Refer to Read Diagnostic Trouble Code for information about data denoting emission-related powertrain diagnostic trouble codes. <Ref. to EN-56 OPERATION, Read Diagnostic Trouble Code.>

5. MODE $04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION) S008527A1605

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).

11. Read Diagnostic Trouble Code S008508

A: OPERATION S008508A16

1. SUBARU SELECT MONITOR (NORMAL MODE) S008508A1601

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 “List of Diagnostic Trouble Code (DTC)”.
  ● 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
  ● 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

2. SUBARU SELECT MONITOR (OBD MODE) S008508A1602

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 “List of Diagnostic Trouble Code (DTC)”.
  ● 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
  ● 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

3. OBD-II GENERAL SCAN TOOL S008508A1603

Refers to data denoting emission-related powertrain diagnostic trouble codes.
For details concerning diagnostic trouble codes, refer to the “List of Diagnostic Trouble Code (DTC)”.
● 2200 cc models: <Ref. to EN-93 LIST, List of Diagnostic Trouble Code (DTC) for 2200 cc Models.>
● 2500 cc models: <Ref. to EN-300 LIST, List of Diagnostic Trouble Code (DTC) for 2500 cc Models.>

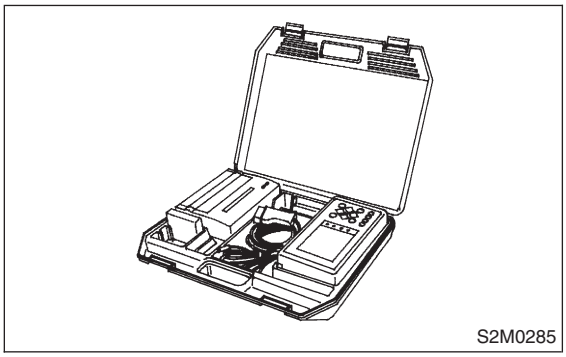
NOTE:
Refer to OBD-II general scan tool manufacturer’s instruction manual to access emission-related powertrain diagnostic trouble codes (MODE $03).

10. Subaru Select Monitor S008503

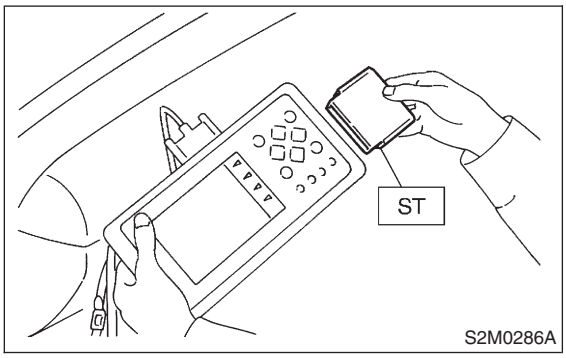
A: OPERATION S008503A16

1. HOW TO USE SUBARU SELECT MONITOR S008503A1601

1) Prepare Subaru Select Monitor kit.

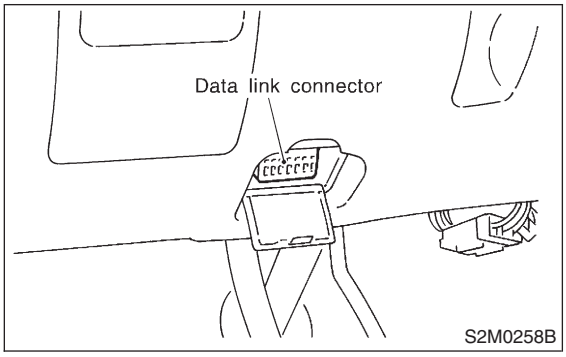

S2M0285

2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor.



S2M0286A

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).

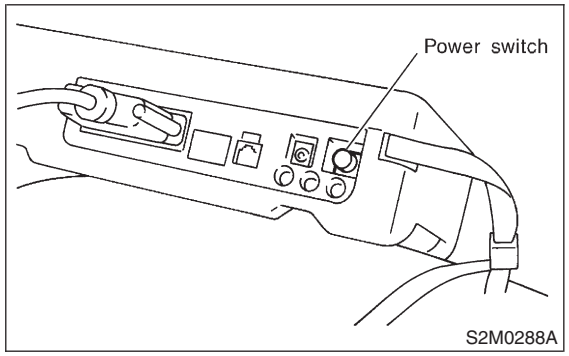


S2M0258B

(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.



S2M0288A

6) Using Subaru Select Monitor, call up diagnostic trouble code(s) and various data, then record them.

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

S008503A1610

Refer to Read Diagnostic Trouble Code for information about how to indicate DTC. <Ref. to EN-56 OPERATION, Read Diagnostic Trouble Code.>

3. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE. (OBD MODE) S008503A1611

Refer to Read Diagnostic Trouble Code for information about how to indicate DTC. <Ref. to EN-56 OPERATION, Read Diagnostic Trouble Code.>

4. READ CURRENT DATA FOR ENGINE. (NORMAL MODE) S008503A1604

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
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

Contents	Display	Unit of measure
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: 2500 cc models
*2: 2200 cc models

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

5. READ CURRENT DATA FOR ENGINE. (OBD MODE) S008503A1605

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 FOR ENGINE. (OBD MODE) S008503A1606

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 ps
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 FOR ENGINE. (OBD MODE) S008503A1607

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 S008503A1608

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 FOR AT. S008503A1612

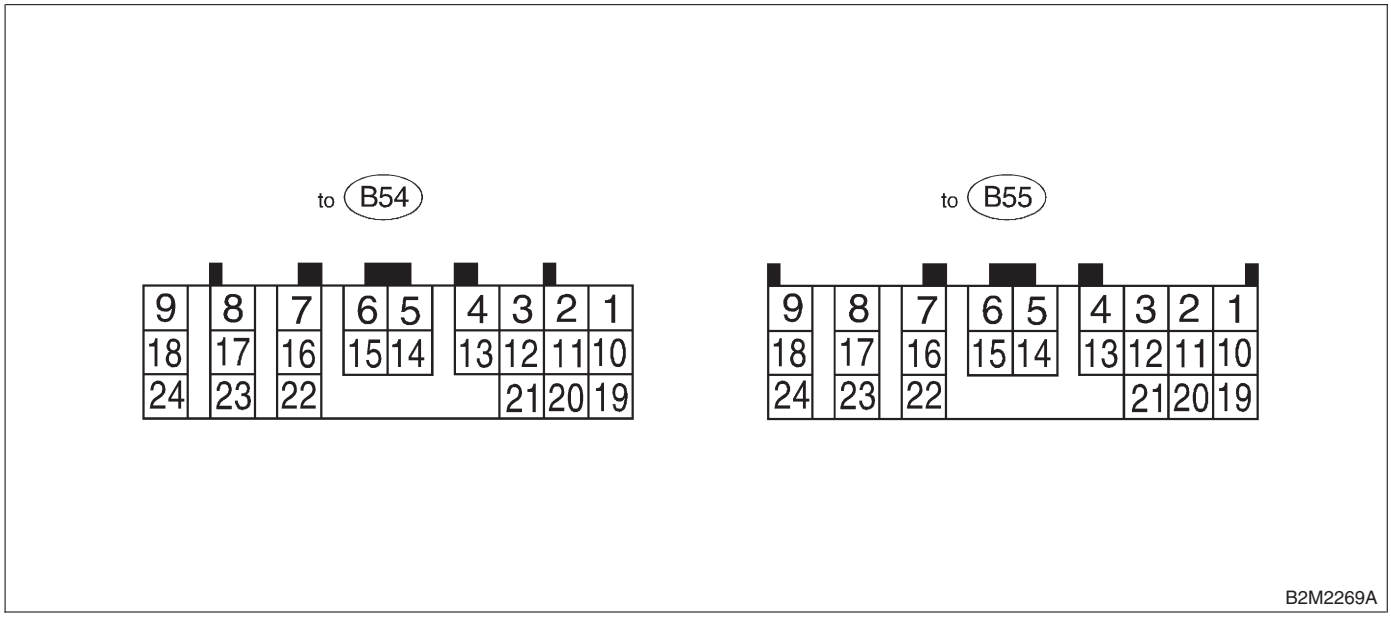
1) On the ⌜Main Menu⌟ display screen, select the {Each System Check} and press the [YES] key.
2) On the ⌜System Selection Menu⌟ display screen, select the {Transmission Control System} and press the [YES] key.
3) Press the [YES] key after displayed the information of transmission type.
4) On the ⌜Transmission 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.

7. Transmission Control Module (TCM) I/O Signal S008506

A: ELECTRICAL SPECIFICATION S008506A08



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	

TRANSMISSION CONTROL MODULE (TCM) I/O SIGNAL

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	—

3. Center Exhaust Pipe S102067

A: REMOVAL S102067A18

After removing the center and front exhaust pipes as one unit, separate them. Refer to the procedure for removing the front exhaust pipe.

B: INSTALLATION S102067A11

Install the center exhaust pipe and front exhaust pipe as one unit. Refer to the procedure for installing the front exhaust pipe.

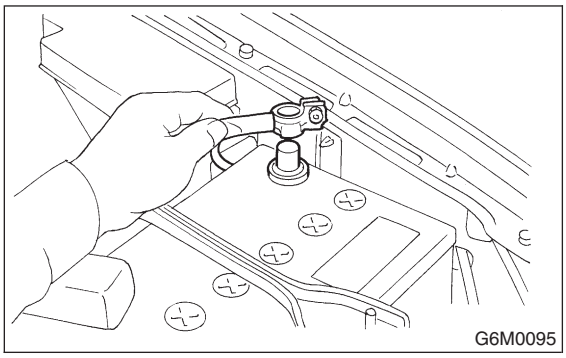
C: INSPECTION S102067A10

1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

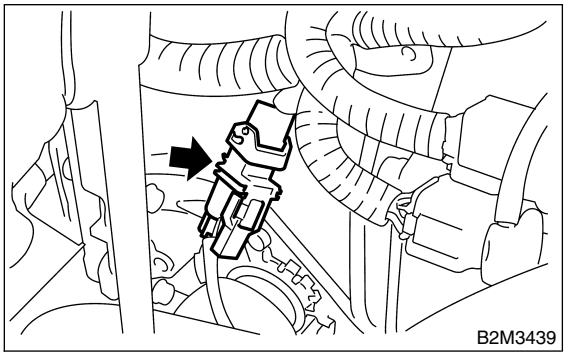
2. Front Exhaust Pipe S102065

A: REMOVAL S102065A18

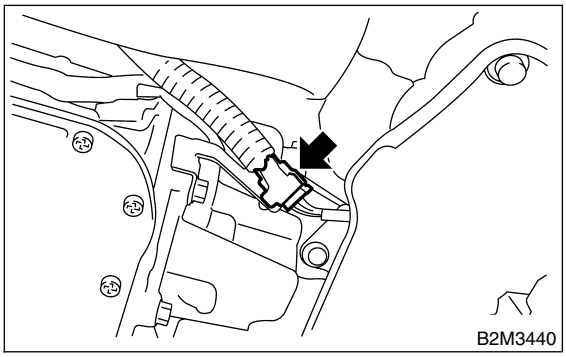
1) Disconnect battery ground cable.


G6M0095

2) Disconnect front oxygen (A/F) sensor connector.

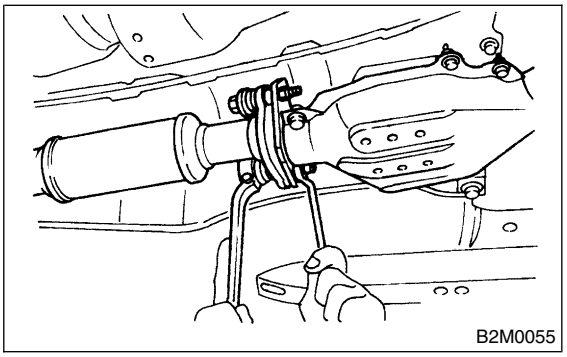

B2M3439

3) Lift-up the vehicle.
4) Disconnect rear oxygen sensor connector.


B2M3440

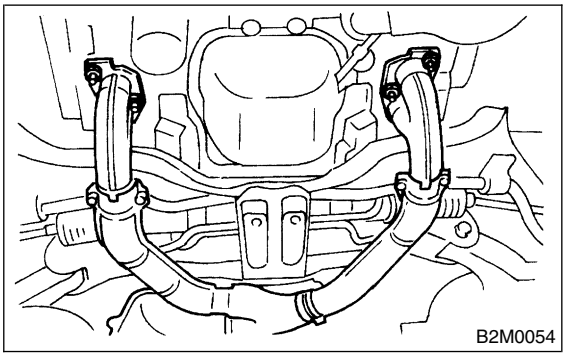
5) Separate front and center exhaust pipe assembly from rear exhaust pipe.

WARNING:
Be careful, exhaust pipe is hot.

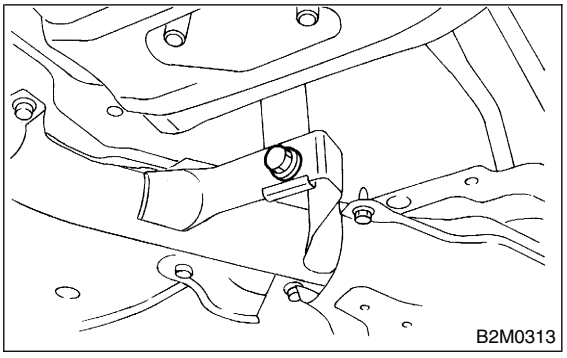

B2M0055

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

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


B2M0054

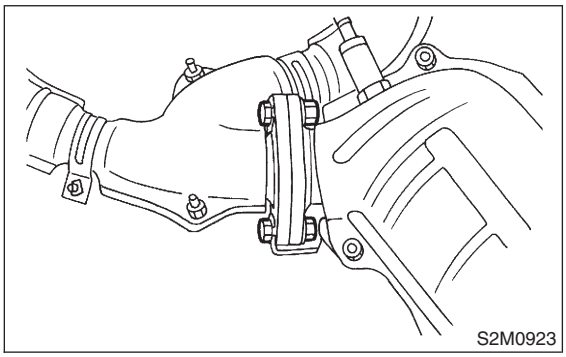
7) Remove bolt which installs front and center exhaust pipe assembly to hanger bracket.


B2M0313

8) 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.

9) Separate front exhaust pipe from front catalytic converter and center exhaust pipe assembly.

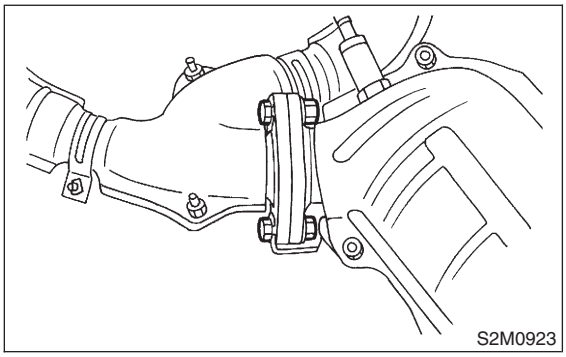

S2M0923

B: INSTALLATION S102065A11

1) Install front exhaust pipe to front catalytic converter and center exhaust pipe assembly.

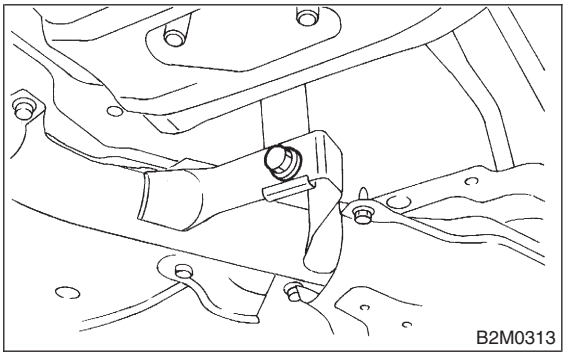
CAUTION:
Replace gaskets with new ones.

Tightening torque:
30 N·m (3.1 kgf-m, 22.4 ft-lb)


S2M0923

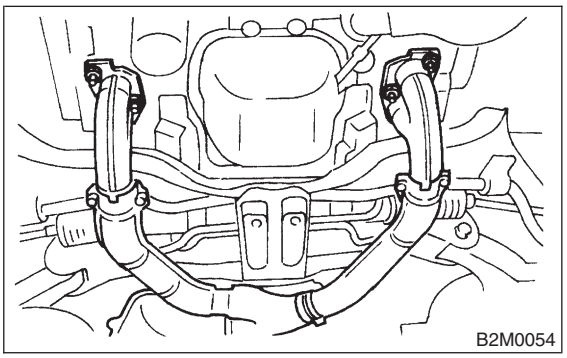
2) Install front and center exhaust pipe assembly to the vehicle.

3) Temporarily tighten bolt which installs front and center exhaust pipe assembly to hanger bracket.


B2M0313

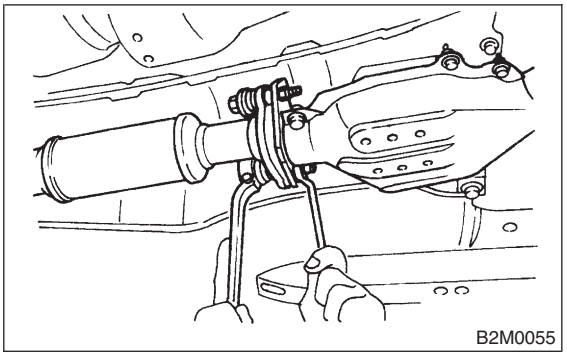
4) Tighten bolts which hold front exhaust pipe onto cylinder heads.

Tightening torque:
30 N·m (3.1 kgf-m, 22.4 ft-lb)


B2M0054

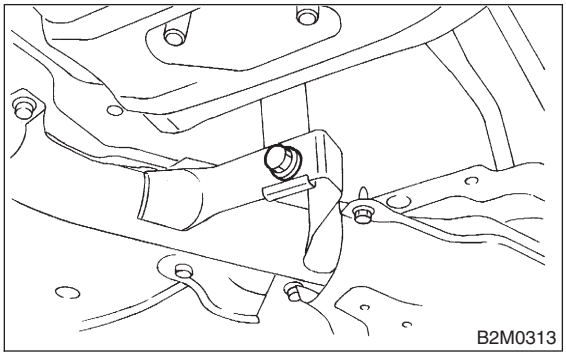
5) Tighten bolts which install front and center exhaust pipe assembly to rear exhaust pipe.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)

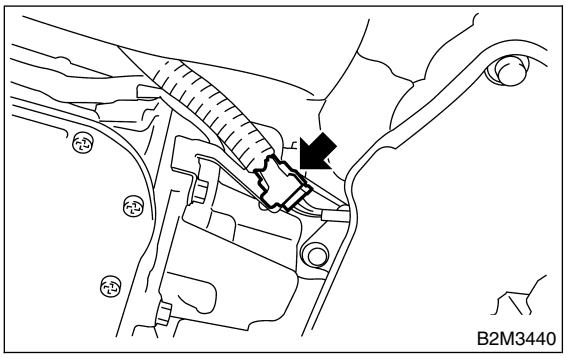

B2M0055

6) Tighten bolt which holds front and center exhaust pipe assembly to hanger bracket.

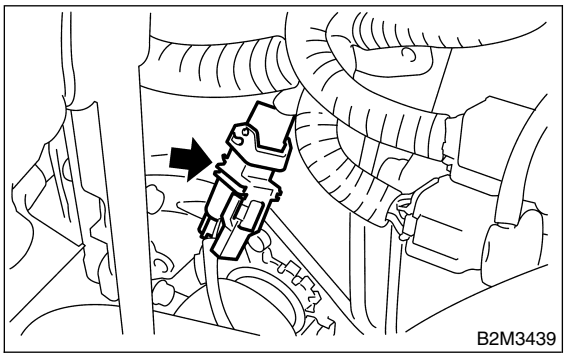
Tightening torque:
35 N·m (3.6 kgf-m, 26.0 ft-lb)



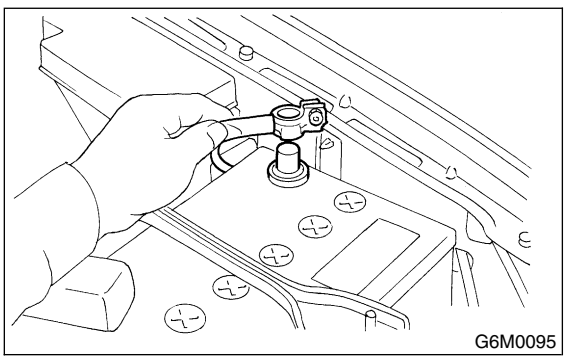
7) Connect rear oxygen sensor connector.



8) Lower the vehicle.
9) Connect front oxygen (A/F) sensor connector.



10) Connect battery ground cable.



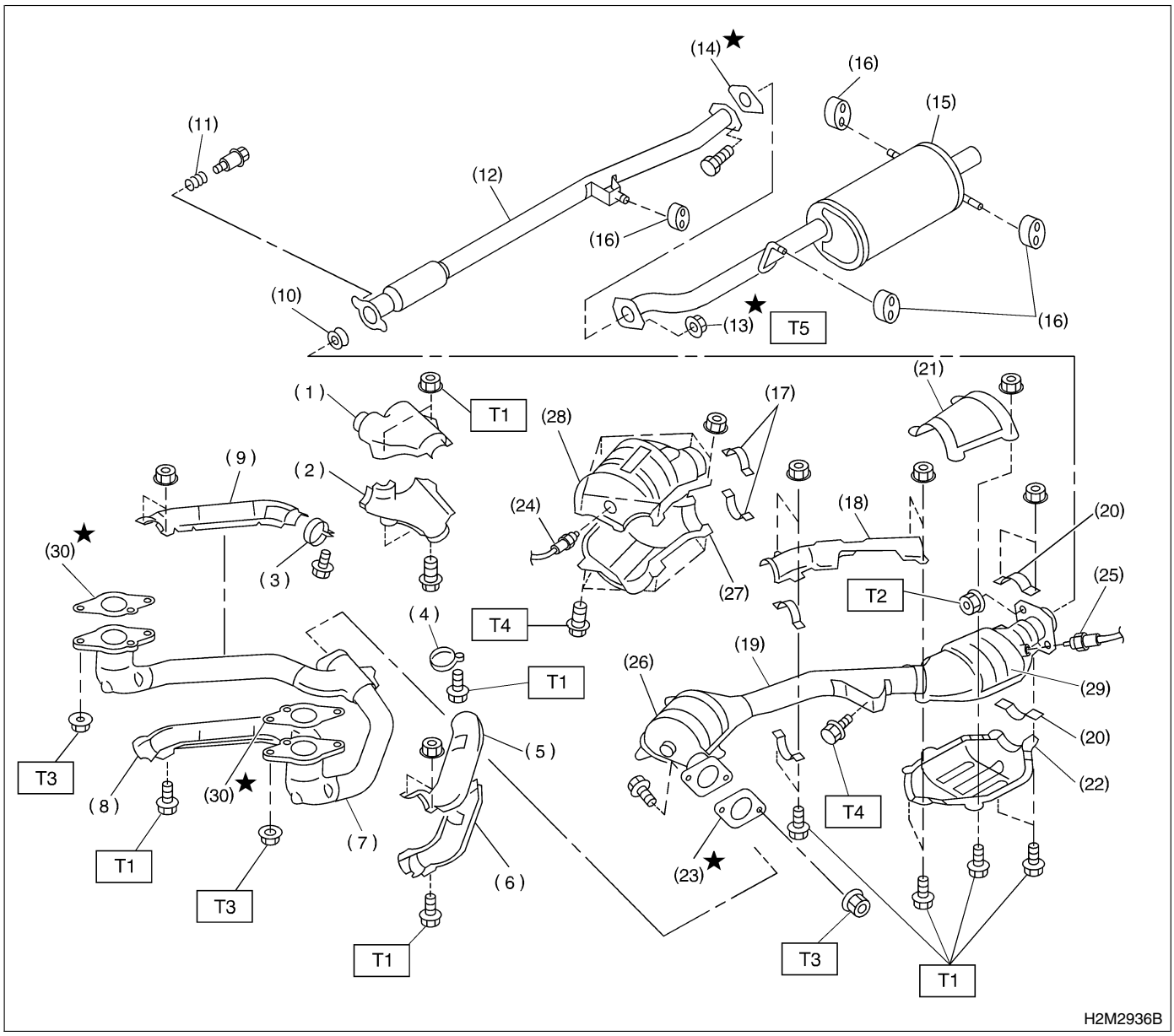
C: INSPECTION S102065A10

1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

1. General Description S102001

A: COMPONENT S102001A05

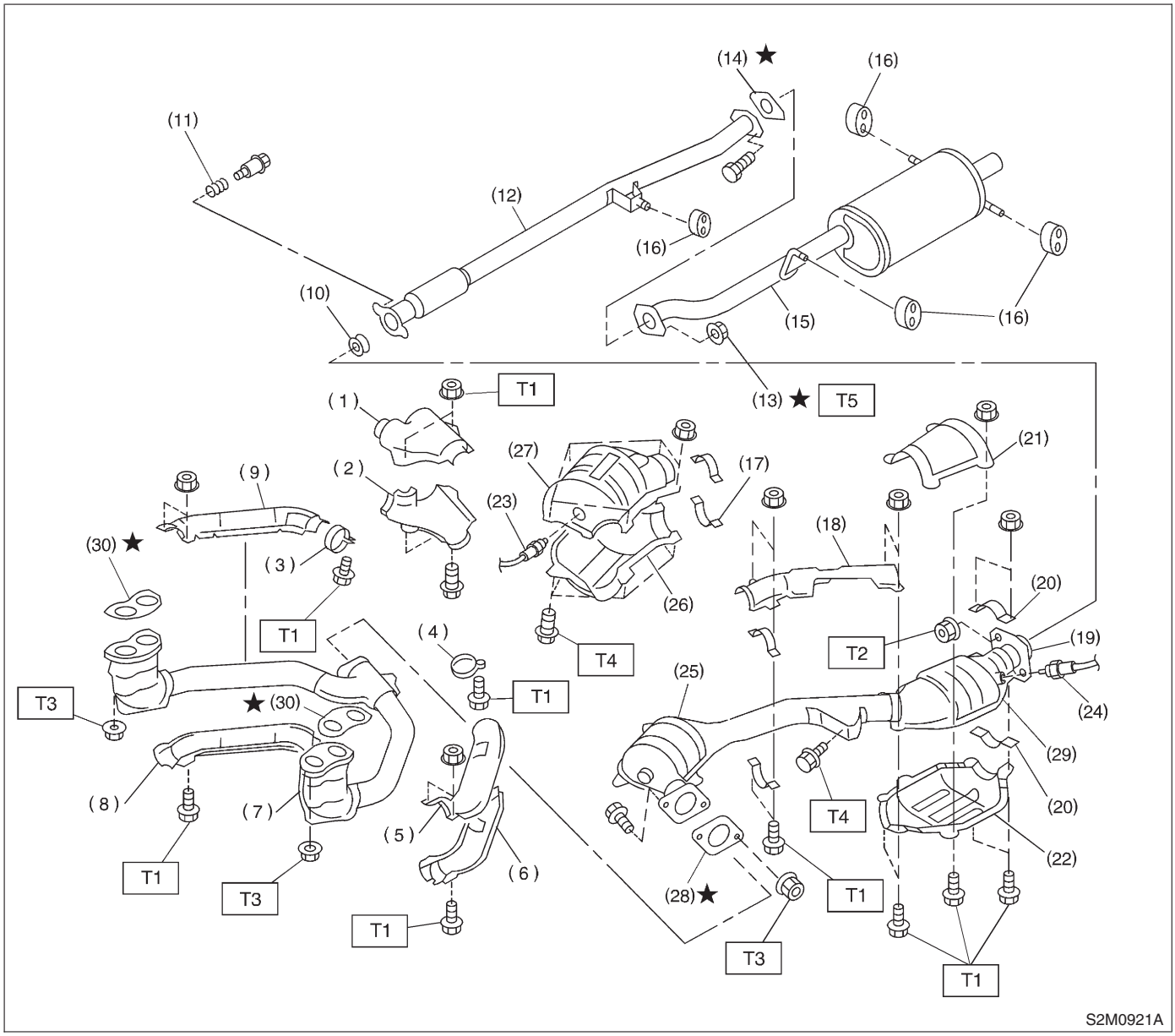
1. 2200 cc MODEL S102001A0501



(1) Upper front exhaust pipe cover CTR
(2) Lower front exhaust pipe cover CTR
(3) Band RH
(4) Band LH
(5) Upper front exhaust pipe cover LH
(6) Lower front exhaust pipe cover LH
(7) Front exhaust pipe
(8) Lower front exhaust pipe cover RH
(9) Upper front exhaust pipe cover RH
(10) Gasket
(11) Spring
(12) Rear exhaust pipe
(13) Self-locking nut
(14) Gasket
(15) Muffler
(16) Cushion rubber
(17) Clamp
(18) Upper center exhaust pipe cover
(19) Center exhaust pipe
(20) Clamp B
(21) Upper rear catalytic converter cover
(22) Lower rear catalytic converter cover
(23) Gasket
(24) Front oxygen (A/F) sensor
(25) Rear oxygen sensor
(26) Front catalytic converter
(27) Lower front catalytic converter cover
(28) Upper front catalytic converter cover
(29) Rear catalytic converter
(30) Gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 18 (1.8, 13.0)
T3: 30 (3.1, 22.4)
T4: 35 (3.6, 26.0)
T5: 48 (4.9, 35.4)

2. 2500 cc MODEL S102001A0502



(1) Upper front exhaust pipe cover CTR
(2) Lower front exhaust pipe cover CTR
(3) Band RH
(4) Band LH
(5) Upper front exhaust pipe cover LH
(6) Lower front exhaust pipe cover LH
(7) Front exhaust pipe
(8) Lower front exhaust pipe cover RH
(9) Upper front exhaust pipe cover RH
(10) Gasket
(11) Spring
(12) Rear exhaust pipe
(13) Self-locking nut
(14) Gasket
(15) Muffler
(16) Cushion rubber
(17) Clamp
(18) Upper center exhaust pipe cover
(19) Center exhaust pipe
(20) Clamp B
(21) Upper rear catalytic converter cover
(22) Lower rear catalytic converter cover
(23) Front oxygen (A/F) sensor
(24) Rear oxygen sensor
(25) Front catalytic converter
(26) Lower front catalytic converter cover
(27) Upper front catalytic converter cover
(28) Gasket
(29) Rear catalytic converter
(30) Gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 13 (1.3, 9.4)
T2: 18 (1.8, 13.0)
T3: 30 (3.1, 22.4)
T4: 35 (3.6, 26.0)
T5: 48 (4.9, 35.4)

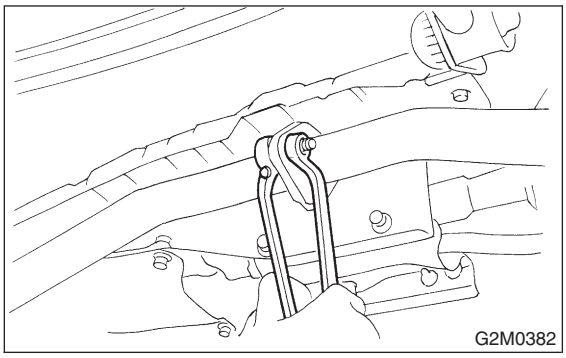
B: CAUTION S102001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

5. Muffler S102066

A: REMOVAL S102066A18

1) Separate muffler from rear exhaust pipe.

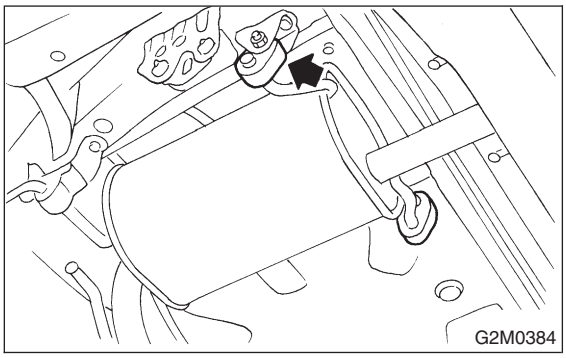


2) Remove left and right rubber cushions.

CAUTION:
Be careful not to pull down front exhaust pipe and front catalytic converter.

NOTE:
To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushions in advance.

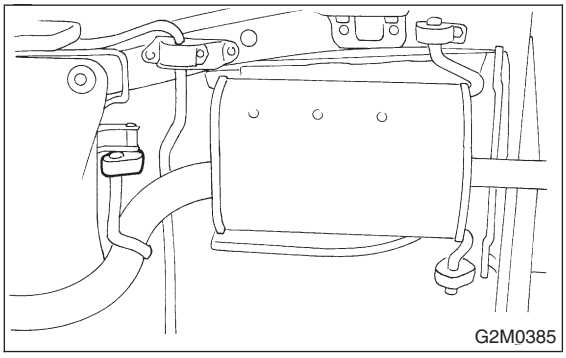
SUBARU CRC (Part No. 004301003)



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)

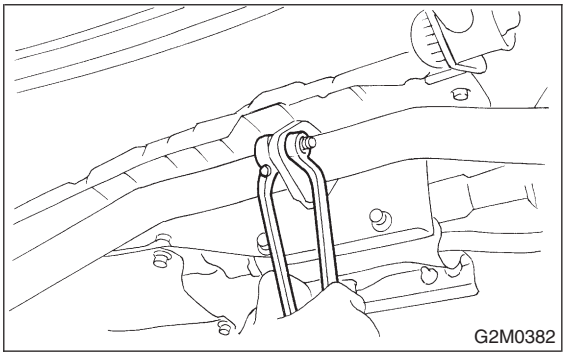


B: INSTALLATION S102066A11

Install in the reverse order of removal.

CAUTION:
Replace gasket with a new one.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)



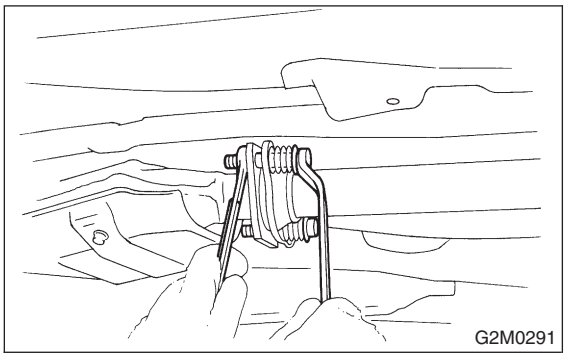
C: INSPECTIOIN S102066A10

1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.
3) Make sure the cushion rubber is not worn or cracked.

4. Rear Exhaust Pipe S102068

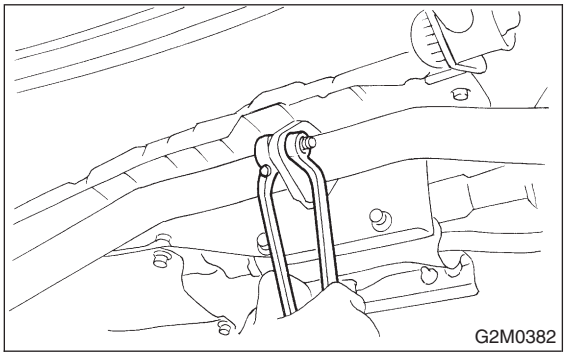
A: REMOVAL S102068A18

1) Separate rear exhaust pipe from front catalytic converter.



2) Separate rear exhaust pipe from muffler.

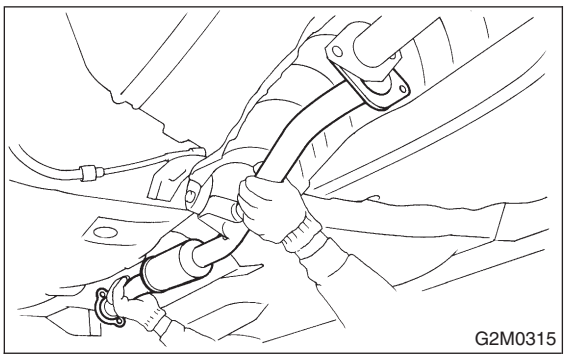
CAUTION:
Be careful not to pull down front exhaust pipe and front catalytic converter.



3) Remove rear exhaust pipe bracket from rubber cushion.

NOTE:
To facilitate removal, apply a coat of SUBARU CRC to pipe bracket in advance.

SUBARU CRC (Part No. 004301003)



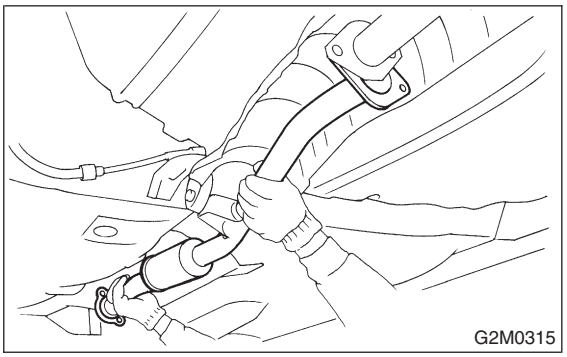
B: INSTALLATION S102068A11

CAUTION:
Replace gaskets with new ones.

1) Install rear exhaust pipe bracket to rubber cushion.

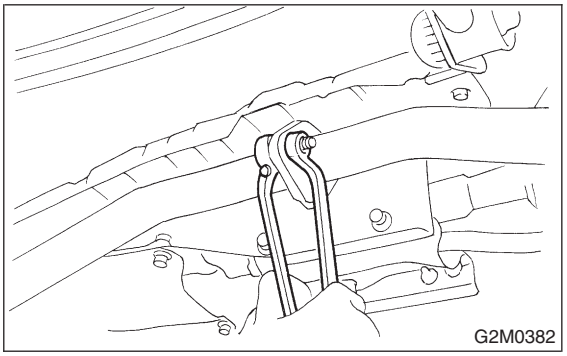
NOTE:
To facilitate installation, apply a coat of SUBARU CRC to mating area of rubber cushion in advance.

SUBARU CRC (Part No. 004301003)



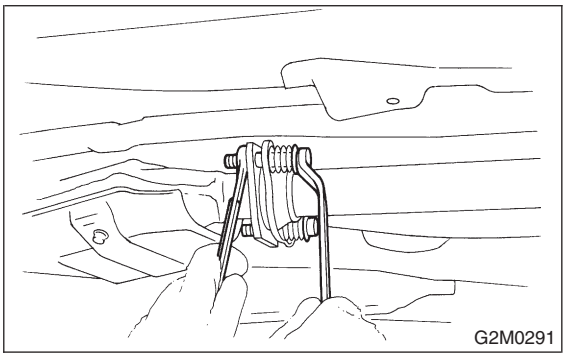
2) Install rear exhaust pipe to muffler.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)



3) Install rear exhaust pipe to front catalytic converter.

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



C: INSPECTION S102068A10

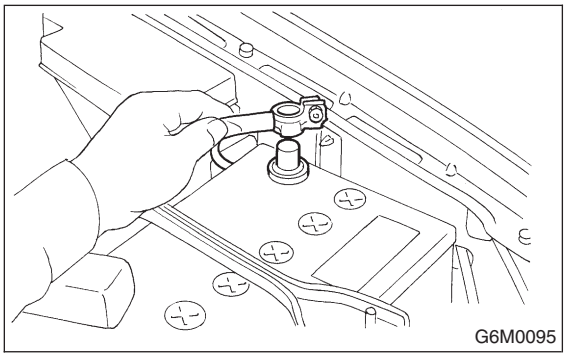
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.
3) Make sure the cushion rubber is not worn or cracked.

14. Air Assist Injector Solenoid Valve S105570

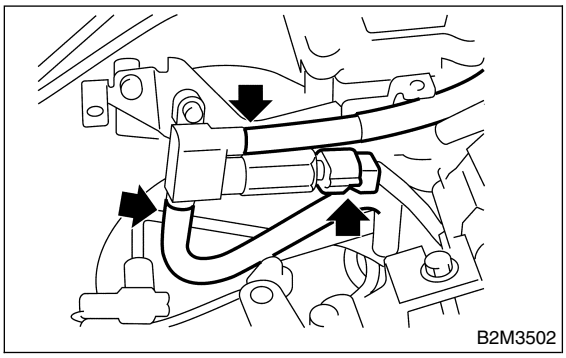
A: REMOVAL S105570A18

NOTE:
This sensor is installed on 2500 cc models only.

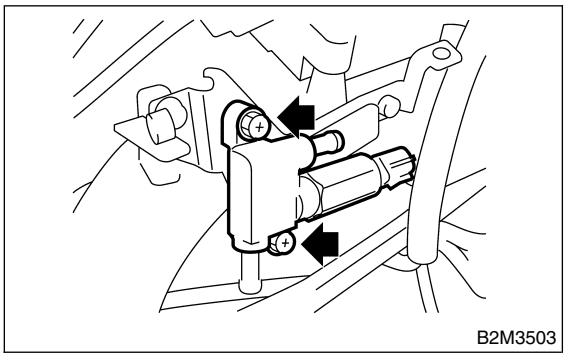
1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector from air assist injector solenoid valve and disconnect air by-pass hoses.


B2M3502

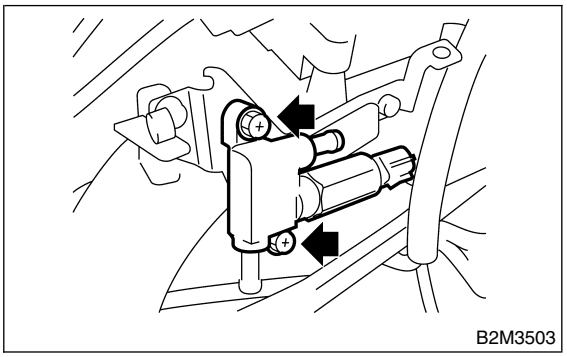
3) Remove air assist injector solenoid valve from intake manifold.


B2M3503

B: INSTALLATION S105570A11

Install in the reverse order of removal.

Tightening torque:
15.7 N·m (1.6 kgf-m, 11.6 ft-lb)

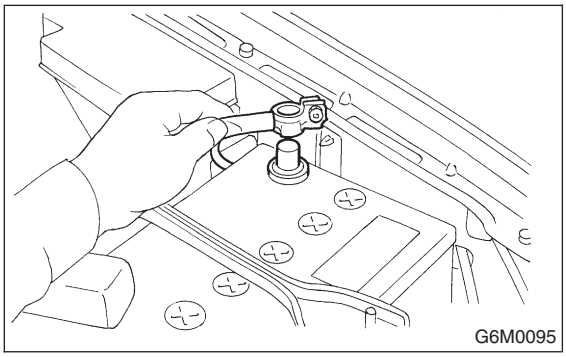

B2M3503

12. Atmospheric Pressure Sensor S105045

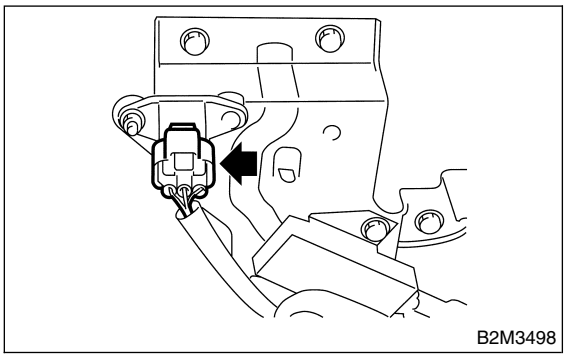
A: REMOVAL S105045A18

NOTE:
This sensor is installed on 2500 cc models only.

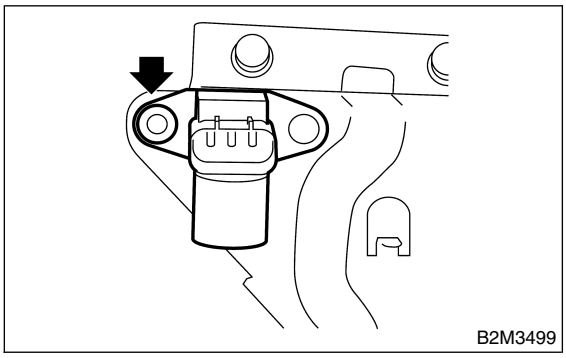
1) Disconnect battery ground cable.



2) Disconnect connector from atmospheric pressure sensor.



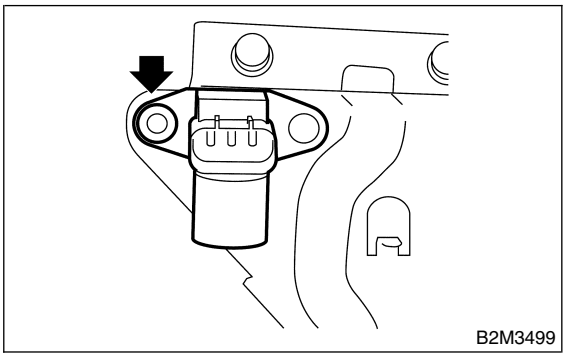
3) Remove atmospheric pressure sensor from bracket.



B: INSTALLATION S105045A11

Install in the reverse order of removal.

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

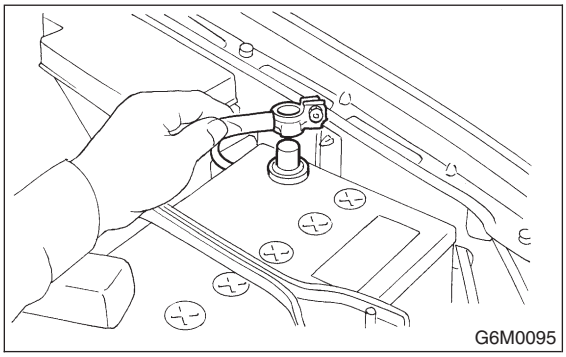


6. Camshaft Position Sensor

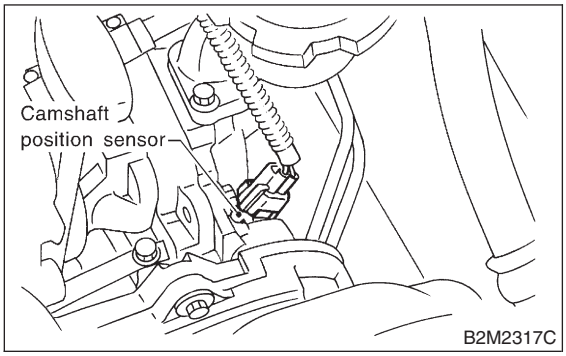
S105041

A: REMOVAL S105041A18

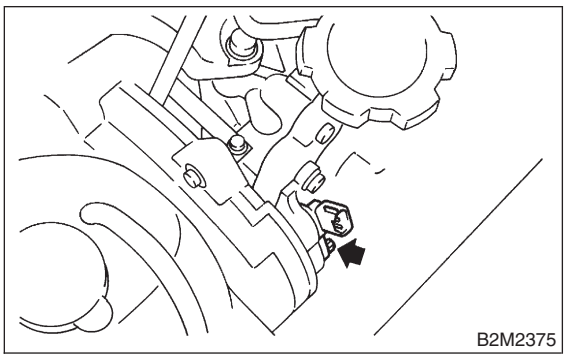
1) Disconnect battery ground cable.



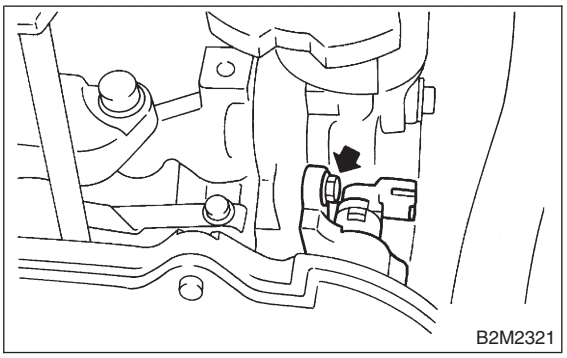
2) Disconnect connector from camshaft position sensor.



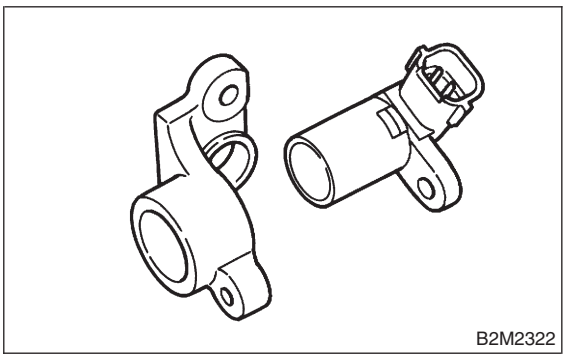
3) Remove bolt which installs camshaft position sensor to camshaft position sensor support.



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.



B: INSTALLATION S105041A11

Install in the reverse order of removal.

Tightening torque:

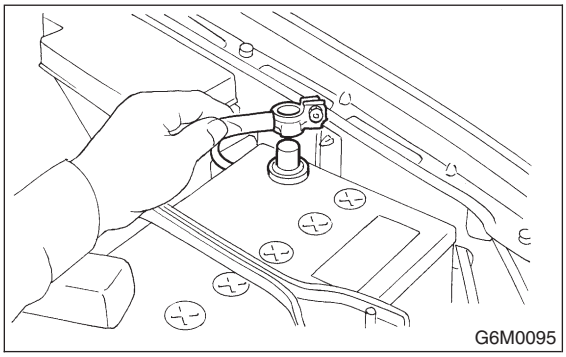
- ***Camshaft position sensor support; 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)***
- ***Camshaft position sensor; 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)***

5. Crankshaft Position Sensor

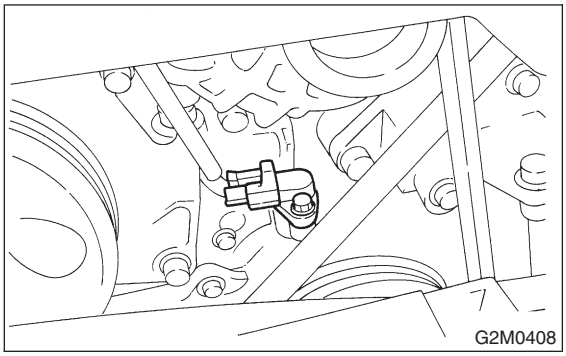
S105043

A: REMOVAL S105043A18

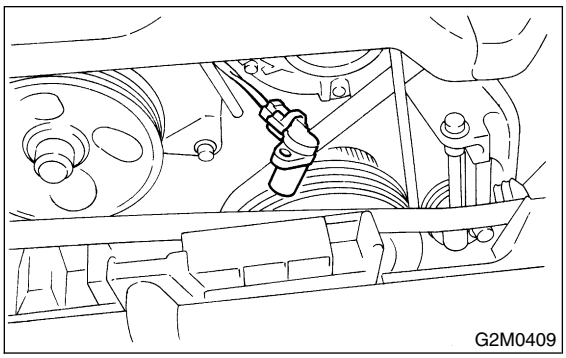
1) Disconnect battery ground cable.


G6M0095

2) Remove bolt which install crankshaft position sensor to cylinder block.


G2M0408

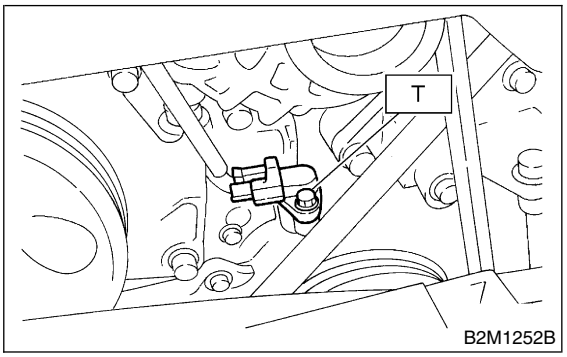
3) Remove crankshaft position sensor, and disconnect connector from it.


G2M0409

B: INSTALLATION S105043A11

Install in the reverse order of removal.

Tightening torque:
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

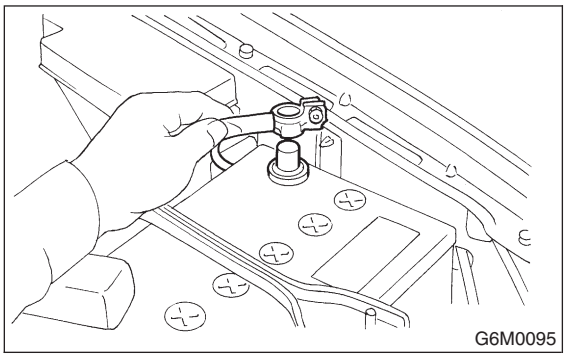


B2M1252B

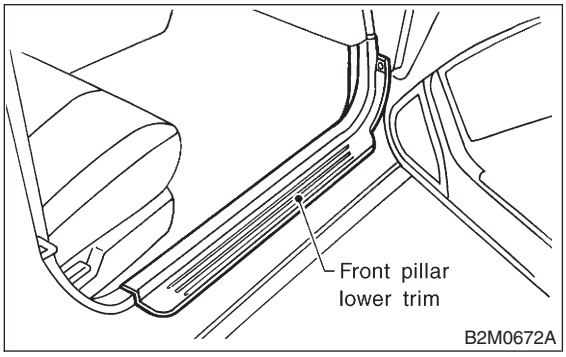
16. Engine Control Module S105049

A: REMOVAL S105049A18

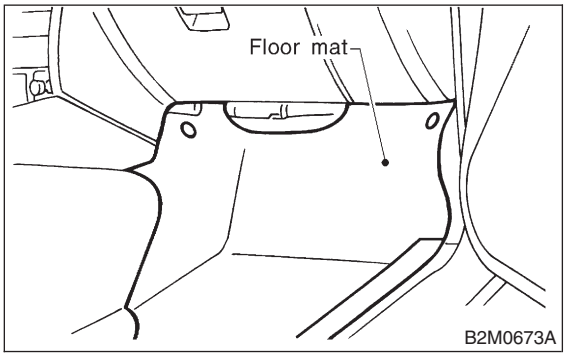
1) Disconnect battery ground cable.



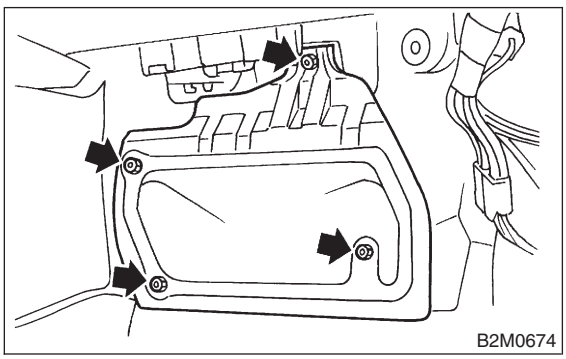
2) Remove side sill front cover.
<Ref. to.EI-33 REMOVAL, Floor Mat>



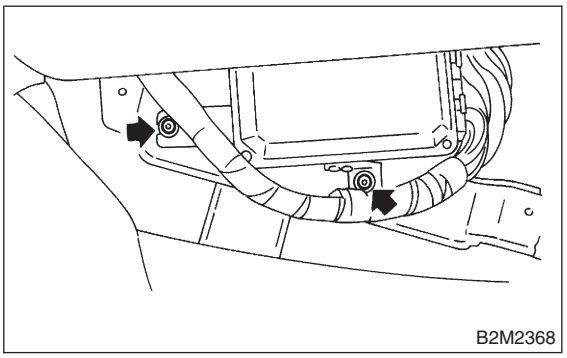
3) Detach floor mat of front passenger seat.



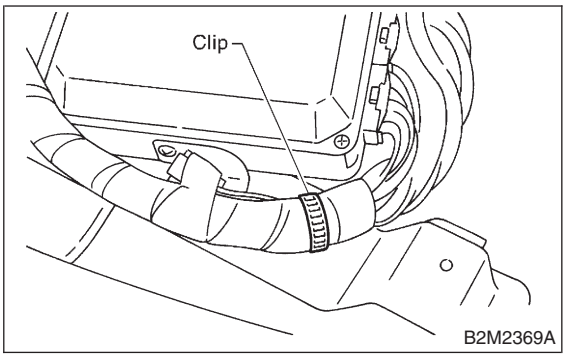
4) Remove protect cover.



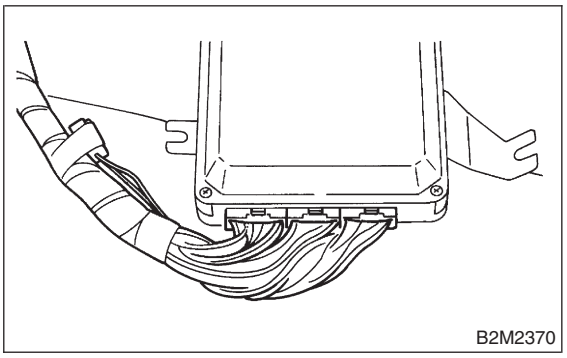
5) Remove nuts which hold ECM to bracket.



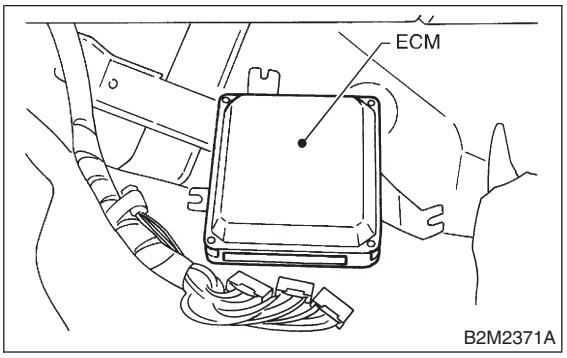
6) Remove clip from bracket.



7) Disconnect ECM connectors.



8) Take out ECM.



B: INSTALLATION S105049A11

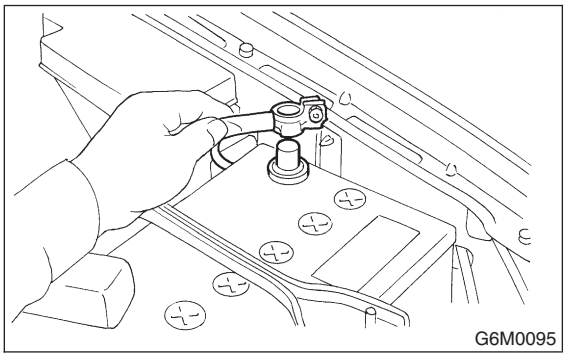
Install in the reverse order of removal.

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

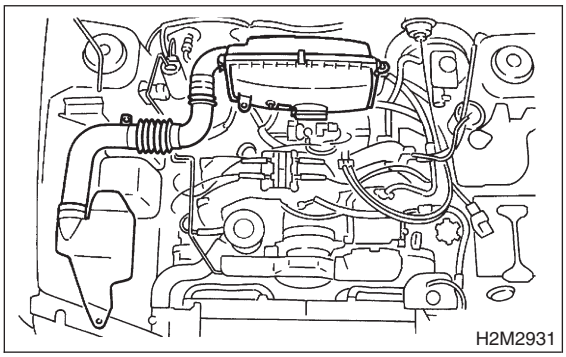
4. Engine Coolant Temperature Sensor S105047

A: REMOVAL S105047A18

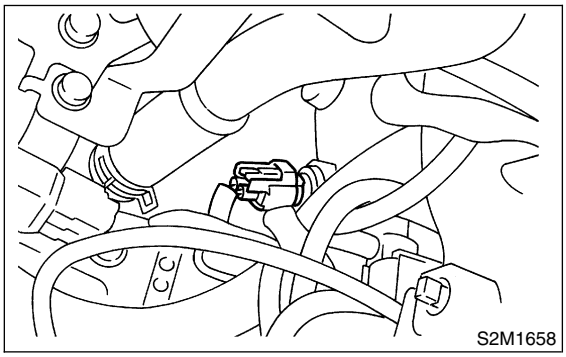
1) Disconnect battery ground cable.


G6M0095

2) Remove air intake duct <Ref. to IN-5 REMOVAL, Air Intake Duct.> and air cleaner assembly. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>


H2M2931

3) Disconnect connector from engine coolant temperature sensor.

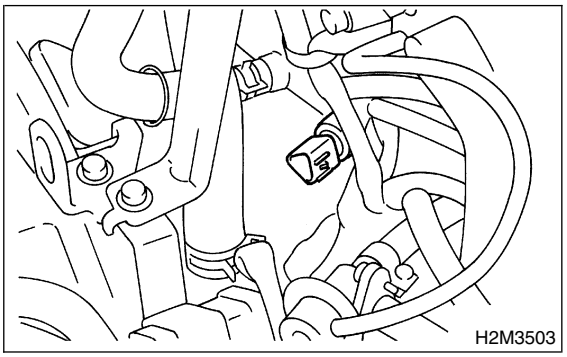

S2M1658

4) Remove engine coolant temperature sensor.

B: INSTALLATION S105047A11

Install in the reverse order of removal.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

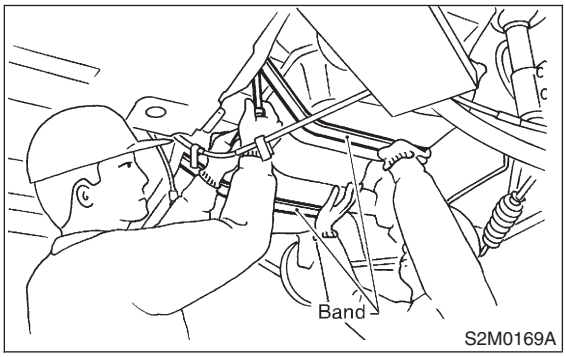

H2M3503

26. Fuel Cut Valve S105021

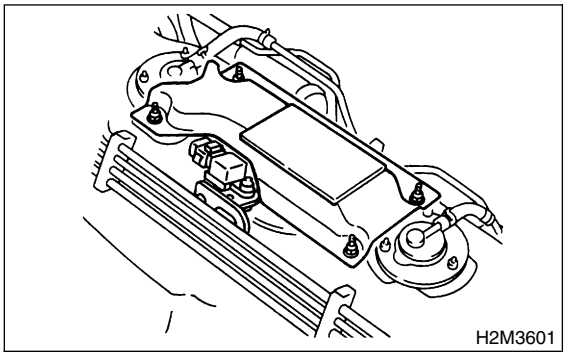
A: REMOVAL AND INSTALLATION

S105021A18

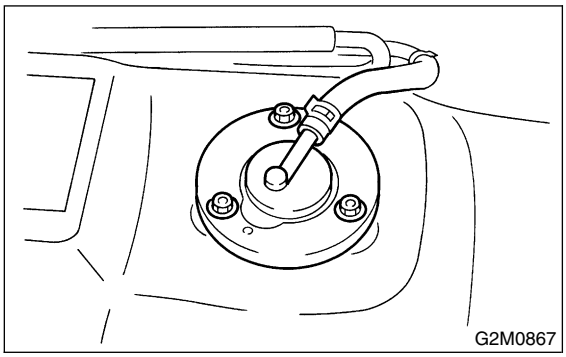
1) Remove fuel tank. <Ref. to FU-66 REMOVAL, Fuel Tank.>



2) Remove protect cover.



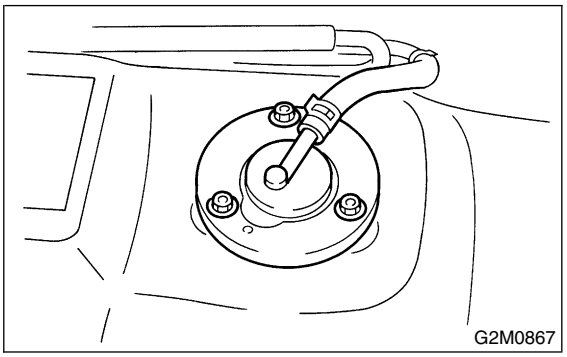
3) Disconnect evaporation hose from fuel cut valve.
4) Remove fuel cut valve.



B: INSTALLATION S105021A11

Install in the reverse order of removal.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)

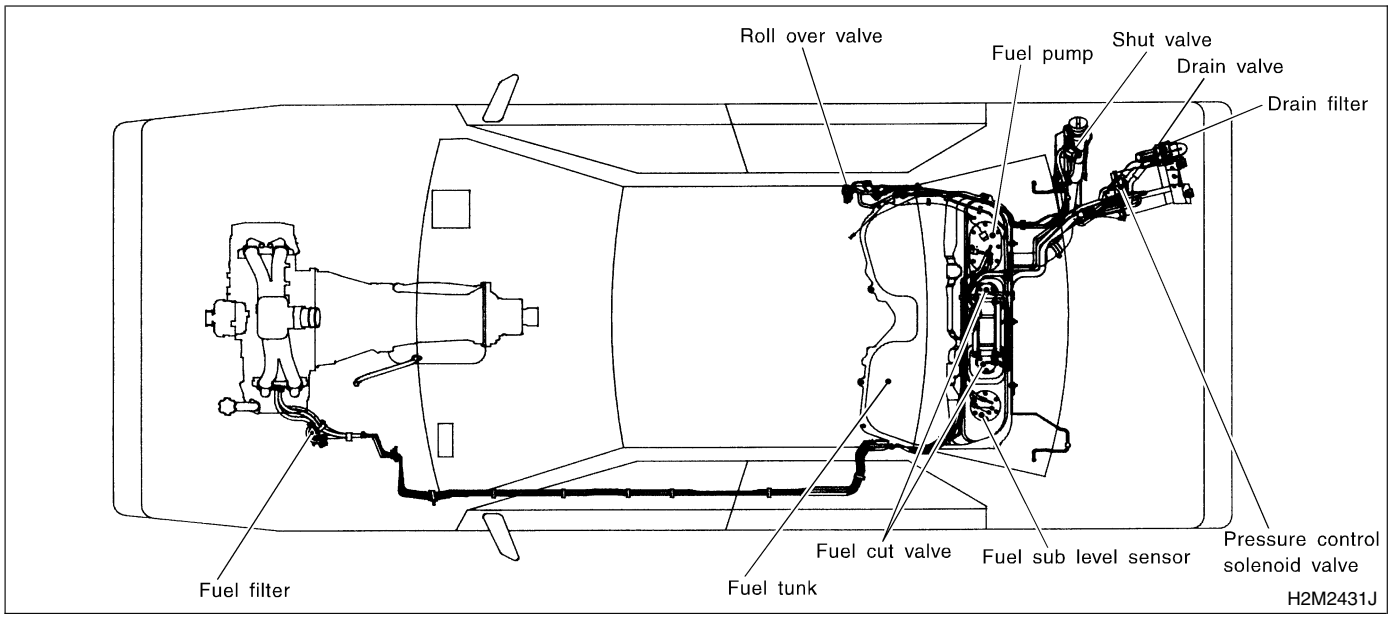


28. Fuel Delivery, Return and Evaporation Lines S105019

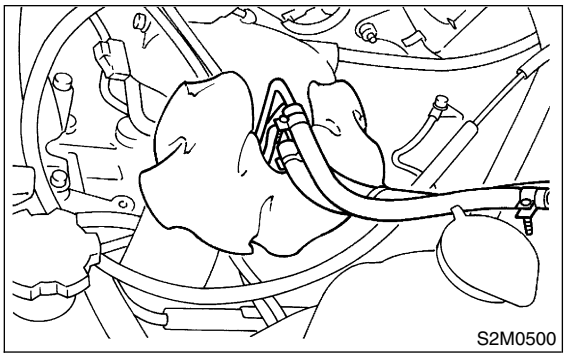
A: REMOVAL S105019A18

1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>

2) Open fuel flap lid, and remove fuel filler cap.
3) Remove inner trim, insulator and rear seat.
4) Remove fuel delivery pipes and hoses, fuel return pipes and hoses, and evaporation pipes and hoses.

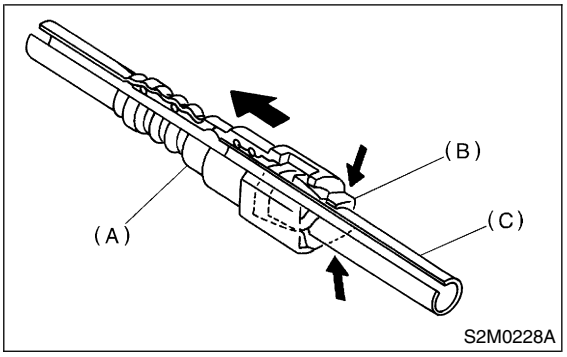


5) In engine compartment, detach fuel delivery hose, return hose and evaporation hose.



6) Separate quick connector on fuel deliverly 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.

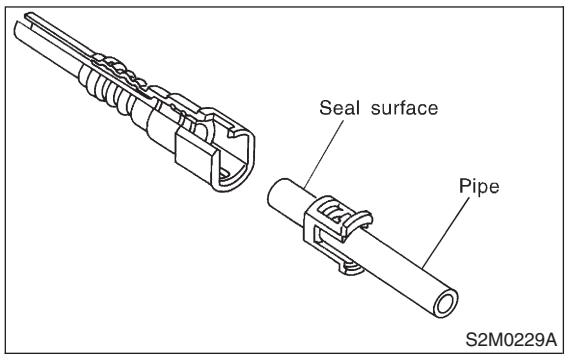


(A) Connector
(B) Retainer
(C) Pipe

B: INSTALLATION S105019A11

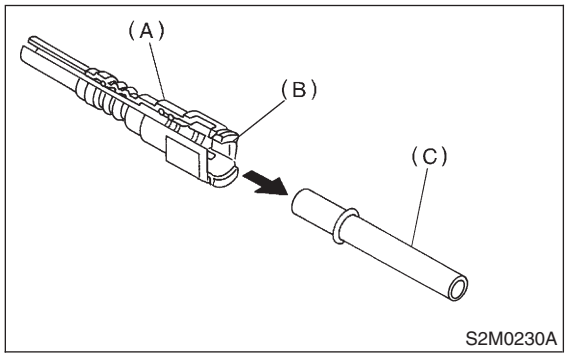
Install in the reverse order of removal.
1) Connect quick connector on fuel delivery line.

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.**



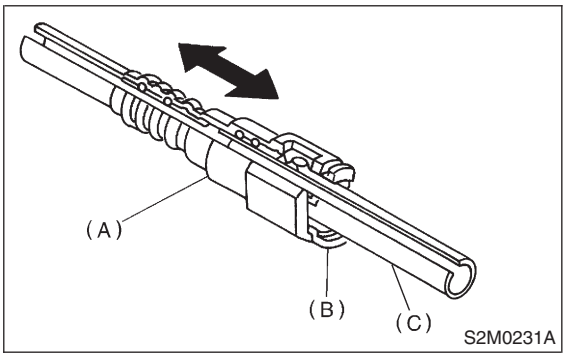
(1) Set new retainer (B) to connector (A).
(2) Push pipe into connector completely.

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.**

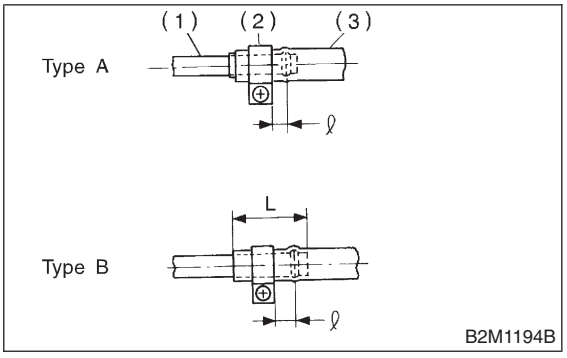


(A) Connector
(B) Retainer
(C) Pipe

2) Connect fuel delivery hose to pipe in engine compartment 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.

ℓ : 1.0 — 4.0 mm (0.039 — 0.157 in)

L: 20 — 25 mm (0.79 — 0.98 in)



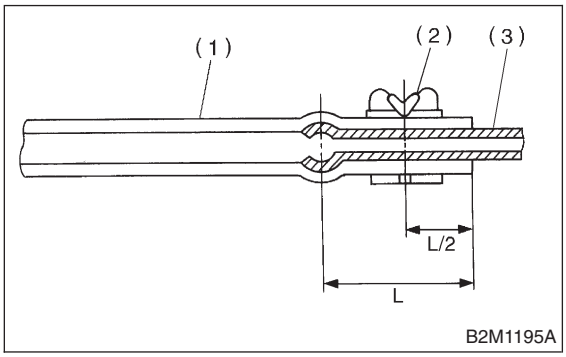
(1) Fitting
(2) Clamp
(3) Hose

3) Connect return hose and evaporation hose to pipe by approx. 15 mm (0.59 in) from hose end.

Fuel return hose:
L = 20 — 25 mm (0.79 — 0.98 in)

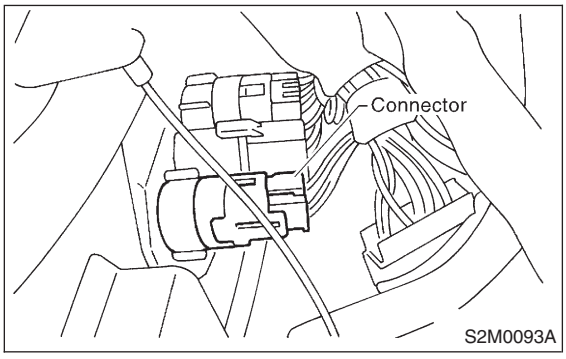
Fuel evaporation hose:
L = 15 — 20 mm (0.59 — 0.79 in)

CAUTION:
Be sure to inspect hoses and their connections for any leakage of fuel.



(1) Hose
(2) Clip
(3) Pipe

4) Connect connector to fuel pump relay.



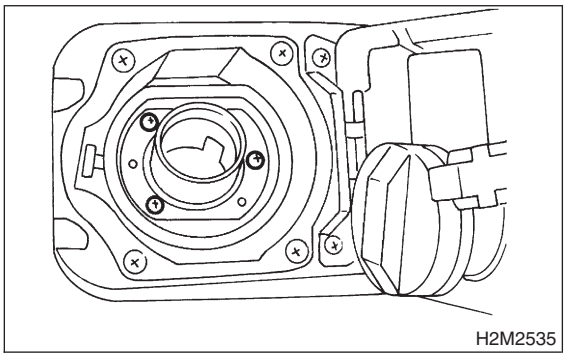
C: INSPECTION S105019A10

1) Make sure that there are no cracks on the fuel pipes and fuel hoses.
2) Make sure that the fuel pipe and fuel hose connections are tight.

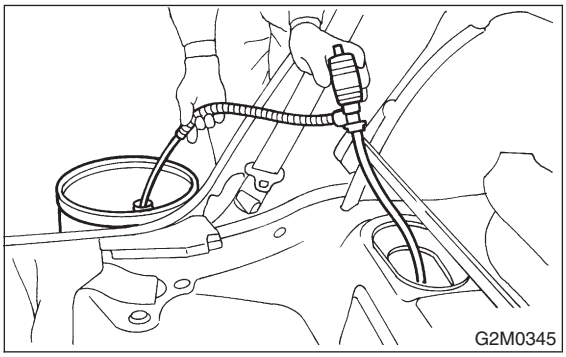
21. Fuel Filler Pipe S105022

A: REMOVAL S105022A18

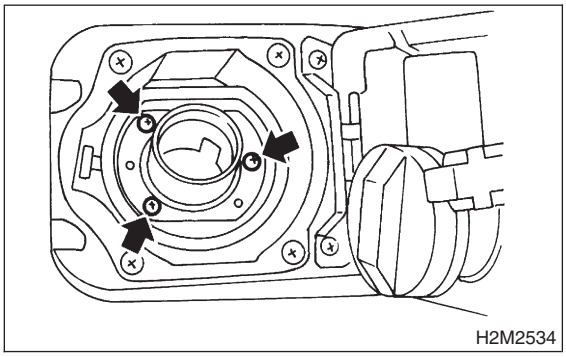
1) Set the vehicle on the lift.
2) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
3) Open fuel flap lid, and remove fuel filler cap.


H2M2535

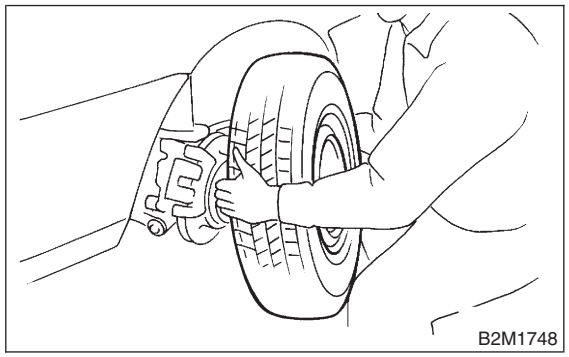
4) Drain fuel from fuel tank. <Ref. to FU-64 DRAINING FUEL, Fuel.>


G2M0345

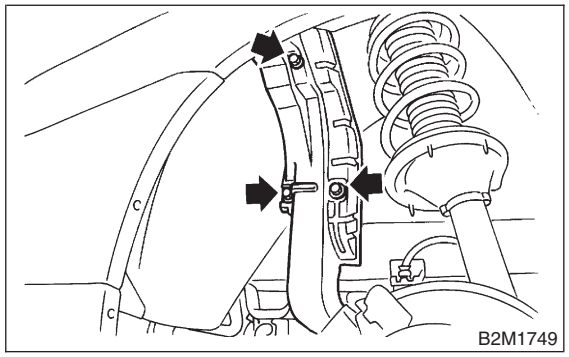
5) Remove screws which install fuel filler pipe on filler lid open.


H2M2534

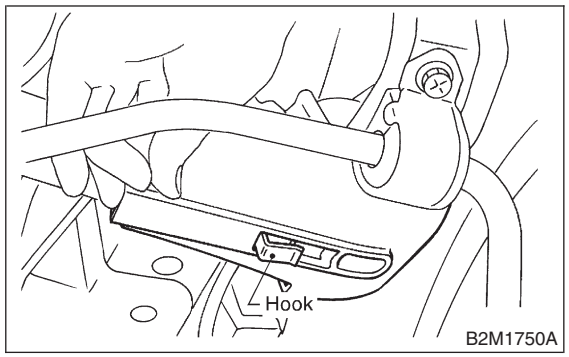
6) Remove wheel nuts of rear right side.
7) Lift-up the vehicle.
8) Remove rear right side wheel.


B2M1748

9) Remove bolts which install protector cover on body.

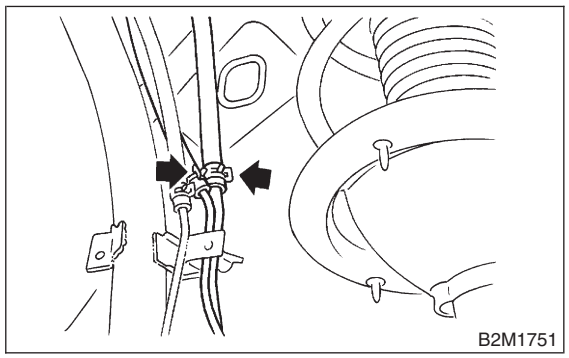

B2M1749

10) While releasing the under side of protector cover from hook, remove it.

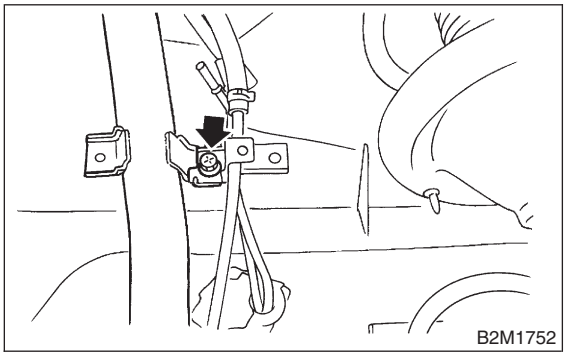


B2M1750A

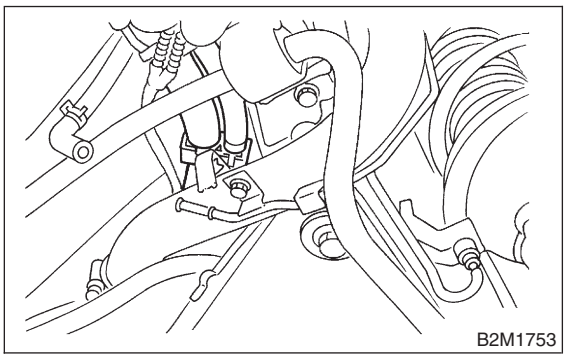
11) Disconnect evaporation hoses from pipes.


B2M1751

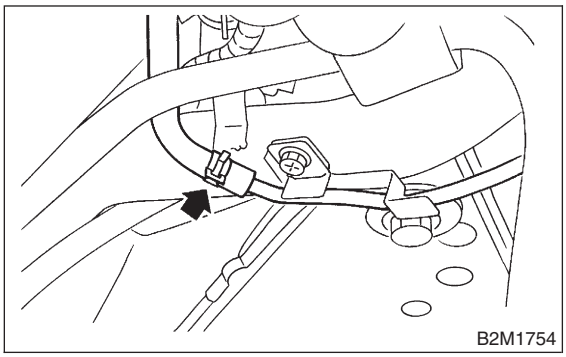
12) Remove bolts which hold fuel filler pipe bracket.


B2M1752

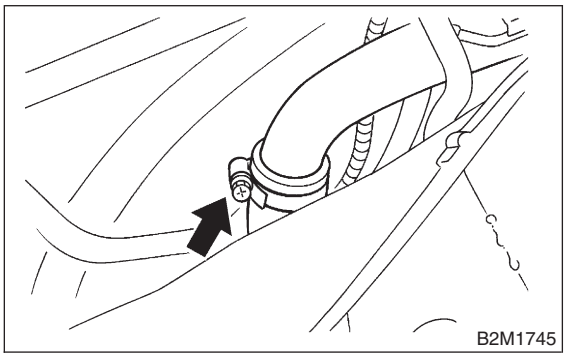
13) Lift-up the vehicle more.
14) Remove two evaporation hoses from clip.


B2M1753

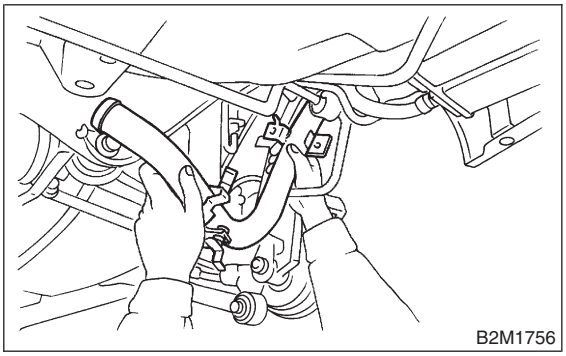
15) Disconnect evaporation hose from joint pipe.


B2M1754

16) Loosen clamp, and disconnect fuel filler hose from fuel filler pipe.

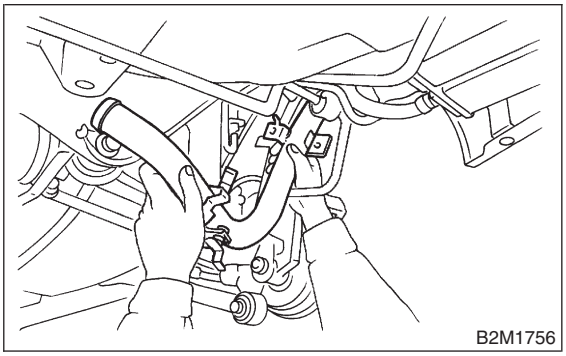

B2M1745

17) Remove fuel filler pipe to under side of vehicle.

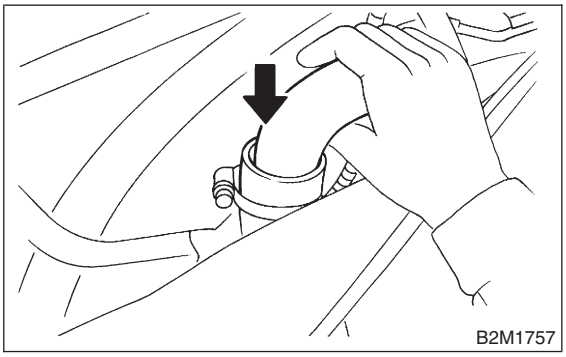

B2M1756

B: INSTALLATION S105022A11

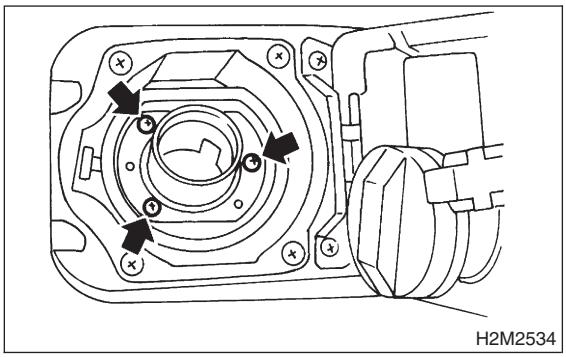
1) Set fuel filler pipe from under side of vehicle, and hold it on fuel filler flap open.


B2M1756

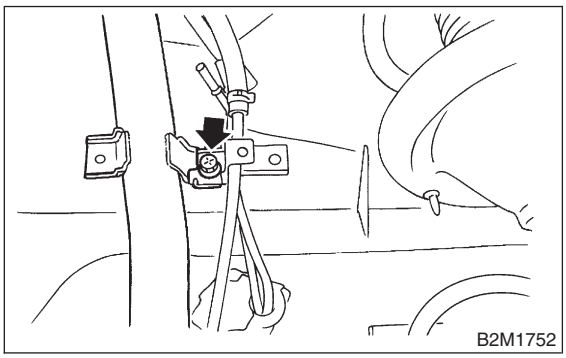
2) Connect fuel filler pipe into fuel filler hose.


B2M1757

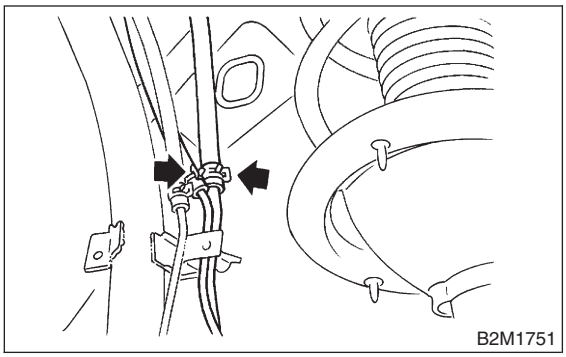
3) Lower the vehicle.
4) Temporarily tighten screws which install fuel filler pipe on filler lid open.


H2M2534

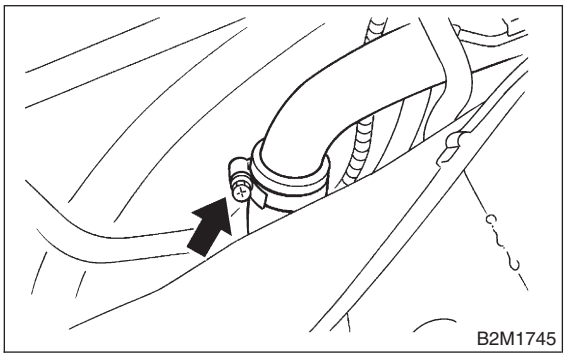
5) Tighten bolt which holds fuel filler pipe on body.


B2M1752

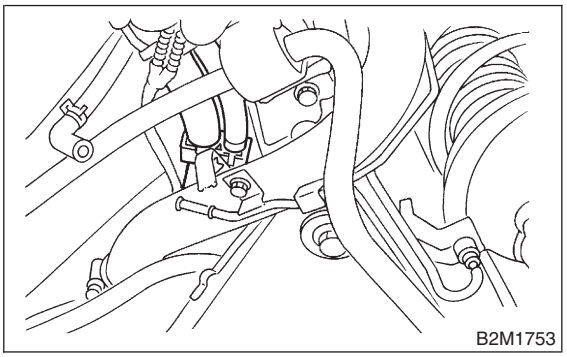
6) Connect evaporation hoses to pipes.


B2M1751

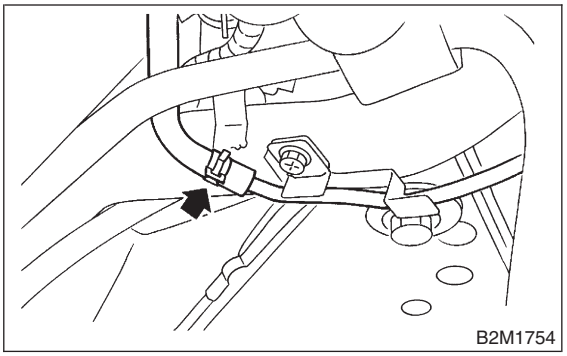
7) Lift-up the vehicle.
8) Tighten clamp bolt which holds fuel filler hose.


B2M1745

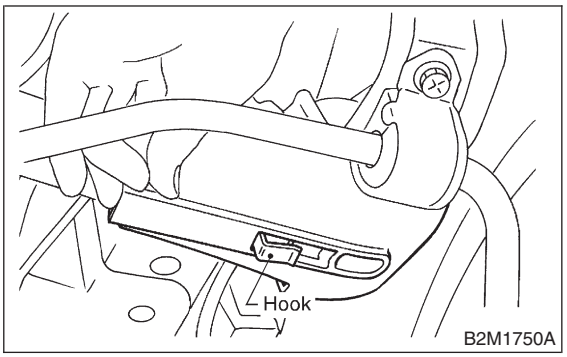
9) Install two evaporation hoses to clip.


B2M1753

10) Connect evaporation hose to joint pipe.

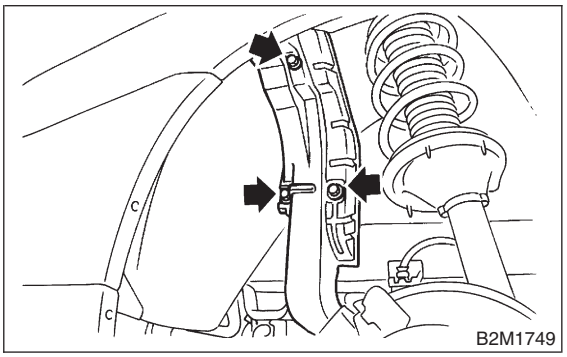

B2M1754

11) Lower the vehicle.
12) While holding the under side of protector cover on bracket, install it.

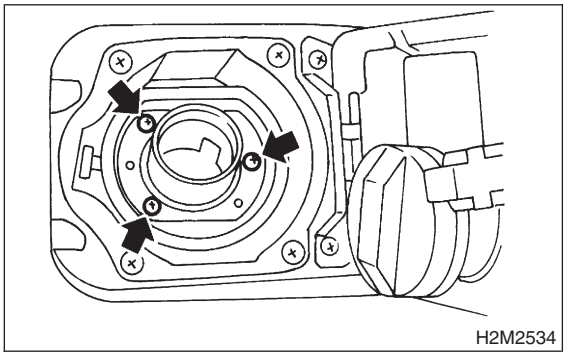


B2M1750A

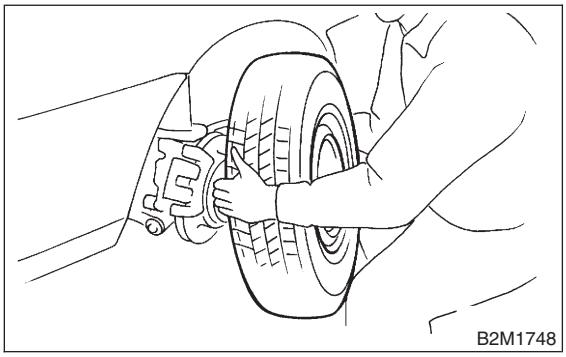
13) Tighten bolts which install protector cover on body.


B2M1749

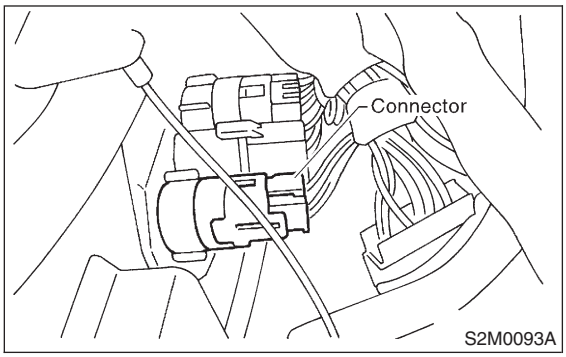
14) Tighten screws which install fuel filler pipe on filler lid open.


H2M2534

15) Install rear right wheel.

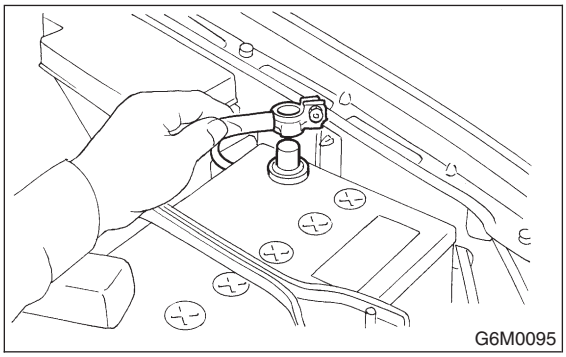

B2M1748

16) Install fuel filler cap.
17) Connect connector to fuel pump relay.



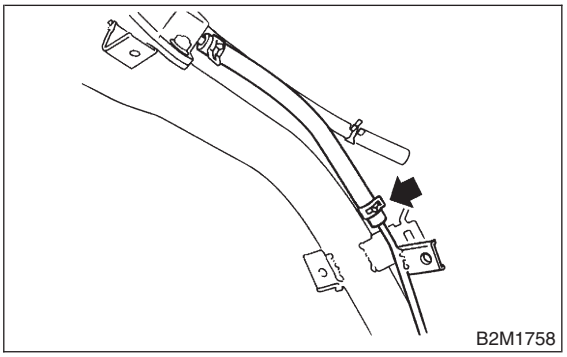
S2M0093A

18) Connect battery ground terminal.

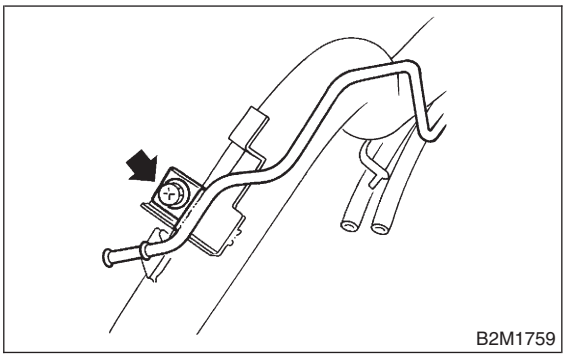

G6M0095

C: DISASSEMBLY S105022A06

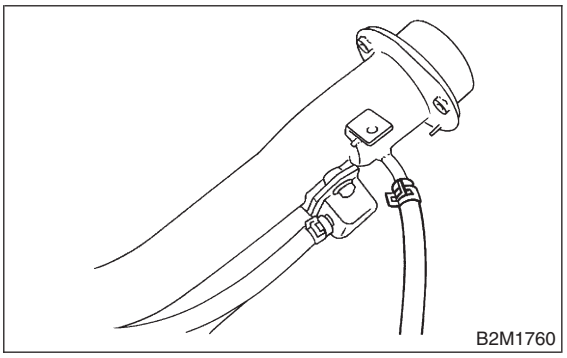
1) Move clip, and disconnect evaporation hose from joint pipe.


B2M1758

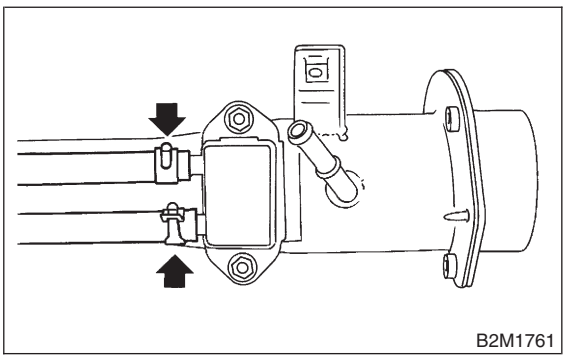
2) Remove bolt which installs joint pipe on fuel filler pipe.


B2M1759

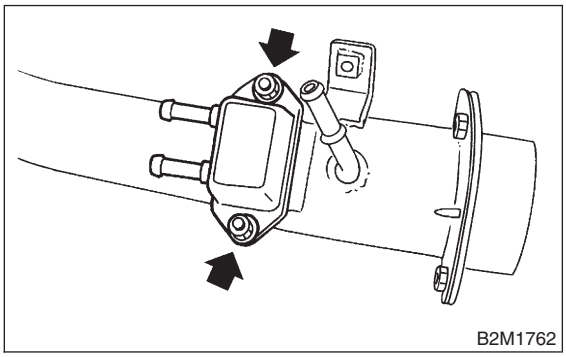
3) Disconnect evaporation hose from fuel filler pipe.


B2M1760

4) Disconnect evaporation hoses from shut valve.


B2M1761

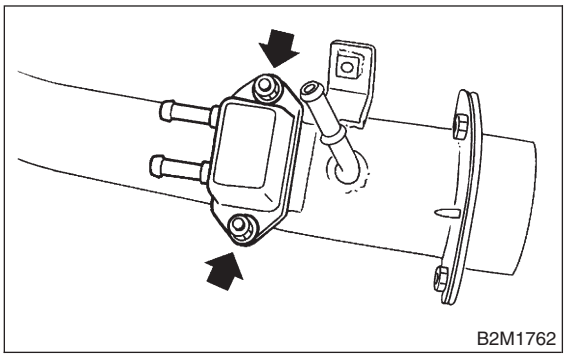
5) Remove shut valve from fuel filler pipe.



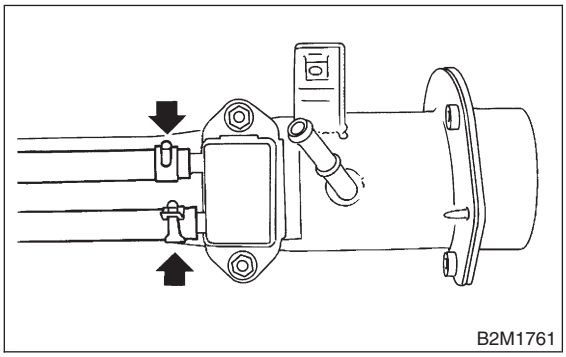
D: ASSEMBLY S105022A02

1) Install shut valve on fuel filler pipe.

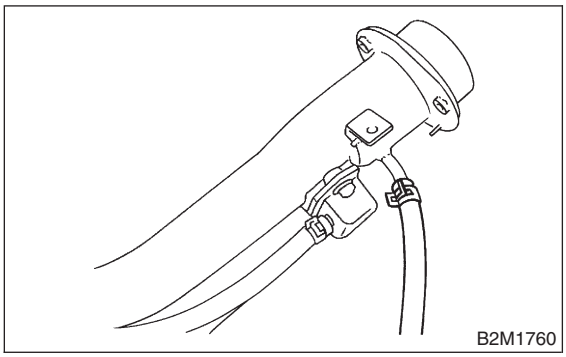
Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



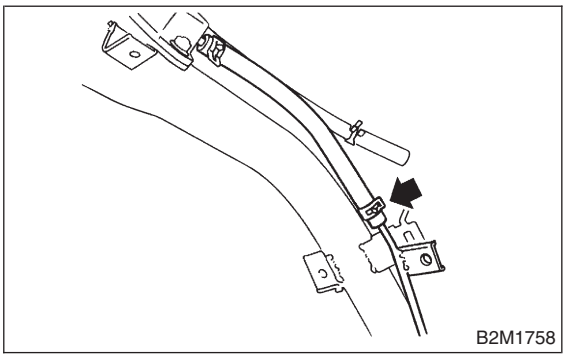
2) Connect evaporation hoses to shut valve.



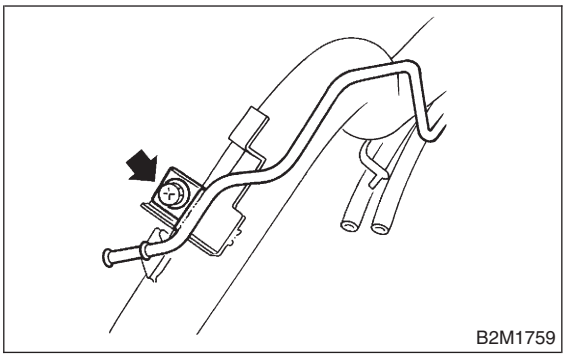
3) Connect evaporation hose to fuel filler pipe.



4) Connect evaporation hose to evaporation pipe.



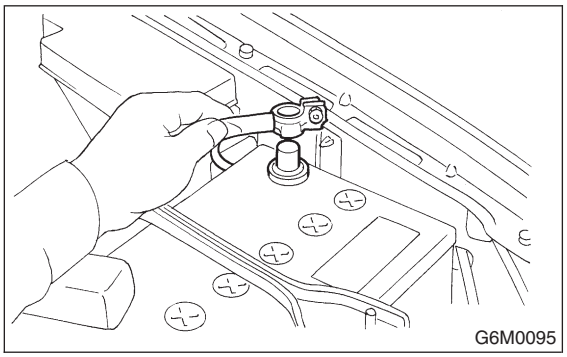
5) Install evaporation pipe to fuel filler pipe.



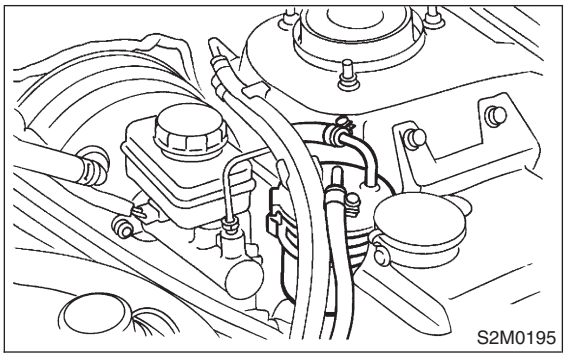
23. Fuel Filter S105027

A: REMOVAL S105027A18

1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Disconnect battery ground cable.


G6M0095

3) Disconnect fuel delivery hoses from fuel filter.


S2M0195

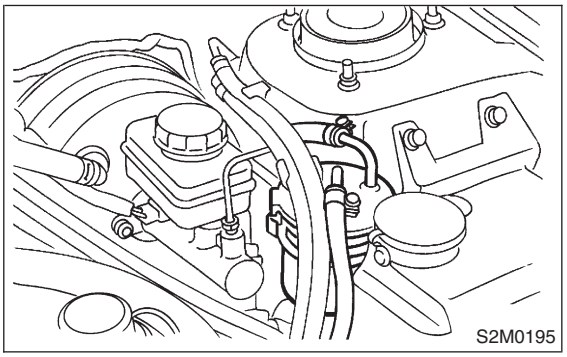
4) Remove filter from holder.

B: INSTALLATION S105027A11

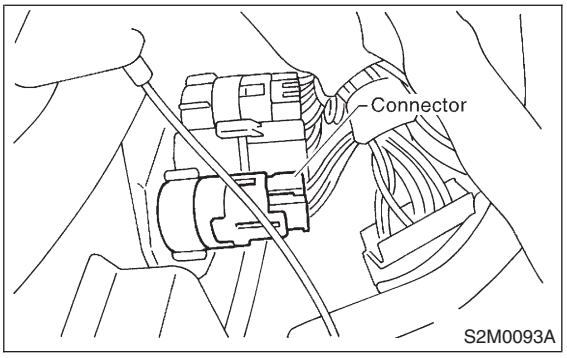
CAUTION:
• If fuel hoses are damaged at the connecting portion, replace it with a new one.
• If clamps are badly damaged, replace with new ones.

1) Install in the reverse order of removal.
2) Tighten hose clamp screws.

Tightening torque:
1.0 N·m (0.1 kgf-m, 0.7 ft-lb)


S2M0195

3) Connect connector to fuel pump relay.



S2M0093A

C: INSPECTION S105027A10

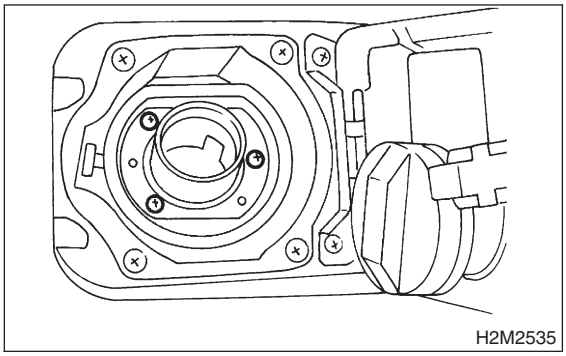
1) Check the inside of fuel filter for dirt and water sediment.
2) If it is clogged, or if replacement interval has been reached, replace it.
3) If water is found in it, shake and expel the water from inlet port.

15. Fuel Injector S105051

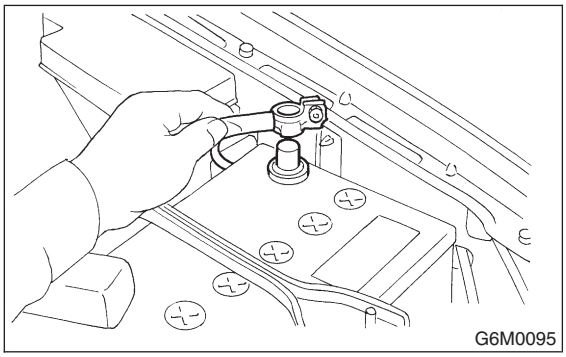
A: REMOVAL S105051A18

1. RH SIDE S105051A1801

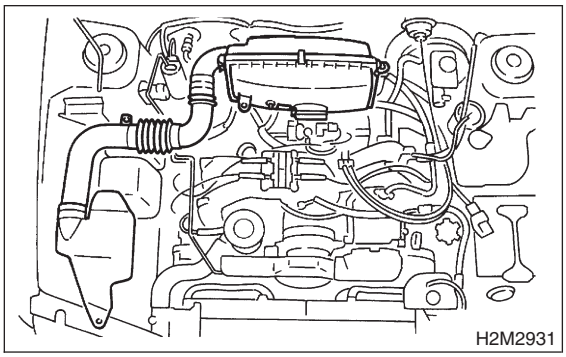
1) Release fuel pressure.
<Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

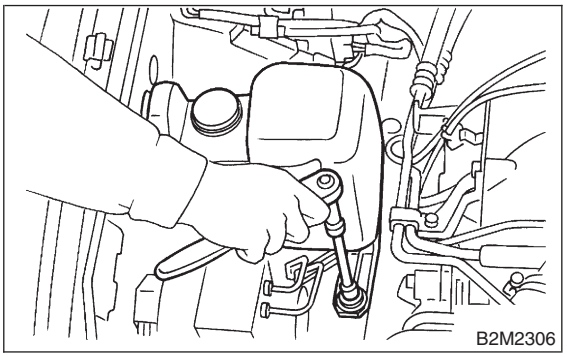
3) Disconnect battery ground cable.


G6M0095

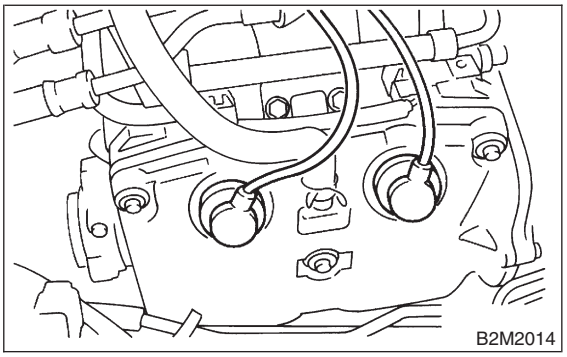
4) Remove air intake duct <Ref. to IN-5 REMOVAL, Air Intake Duct.> and air cleaner assembly. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>


H2M2931

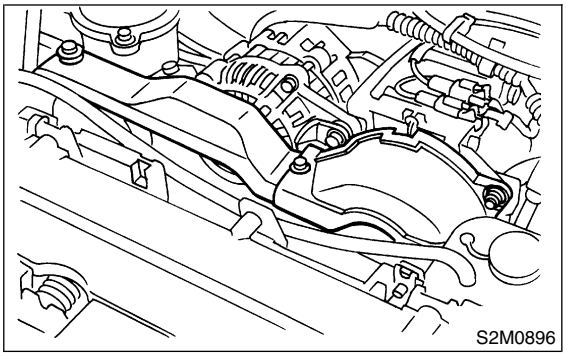
5) Remove resonator chamber.


B2M2306

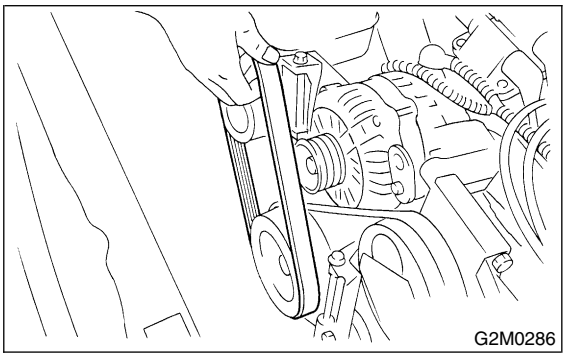
6) Remove spark plug cords from spark plugs (#1 and #3 cylinders).


B2M2014

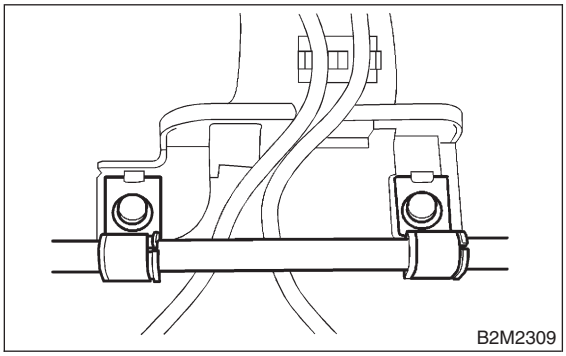
7) Remove power steering pump from bracket.
(1) Remove V-belt covers.


S2M0896

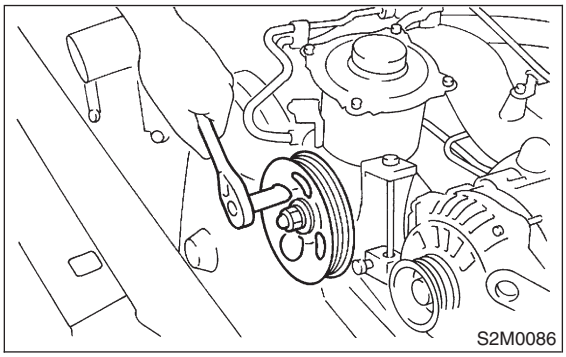
(2) Loosen lock bolt and slider bolt, and remove power steering pump drive V-belt.


G2M0286

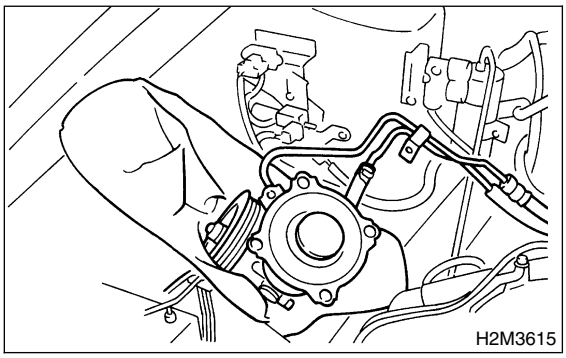
(3) Remove bolts which secure power steering pipes brackets to intake manifold.


B2M2309

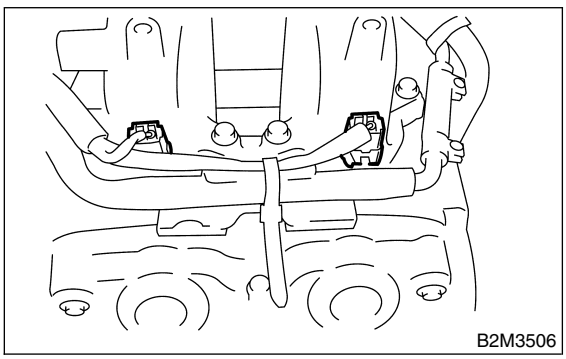
(4) Remove bolts which install power steering pump to bracket.


S2M0086

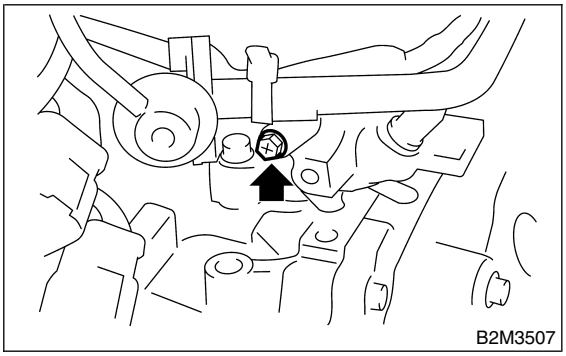
(5) Place power steering pump on the right side wheel apron.


H2M3615

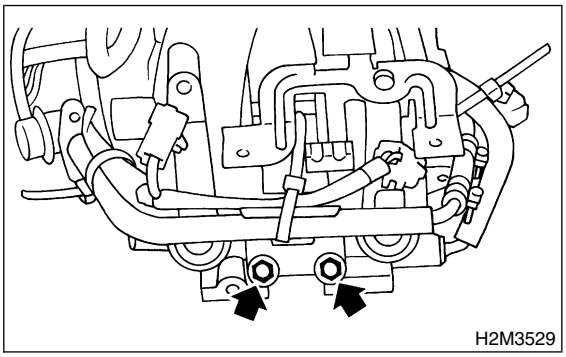
8) Disconnect connector from fuel injector.


B2M3506

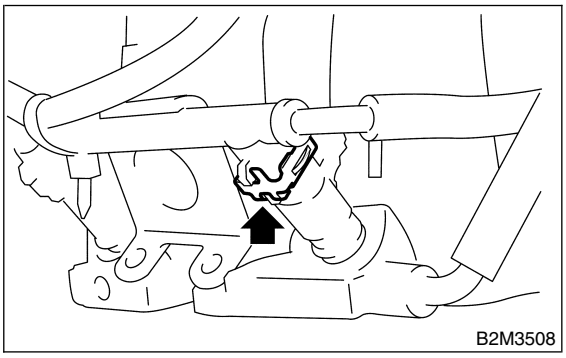
9) Remove bolt which install injector pipe to intake manifold.


B2M3507

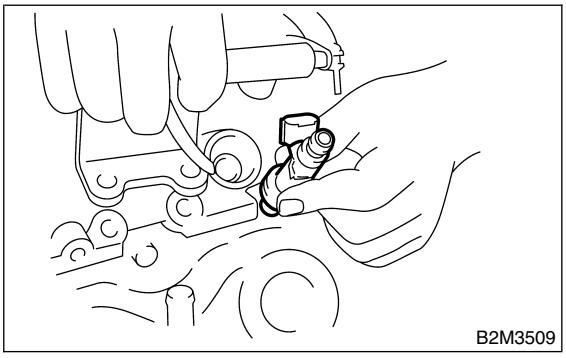
10) Remove bolt which installs injector pipe on intake manifold.


H2M3529

11) Remove fuel injector from intake manifold.
(1) Remove fuel injector securing clip. (2500 cc models)

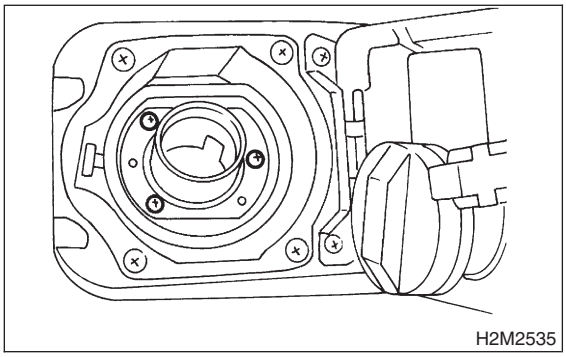

B2M3508

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

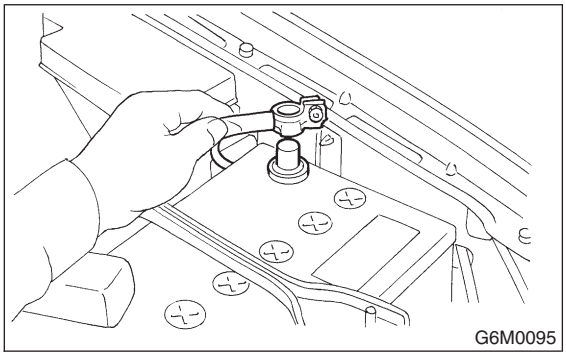

B2M3509

2. LH SIDE S105051A1802

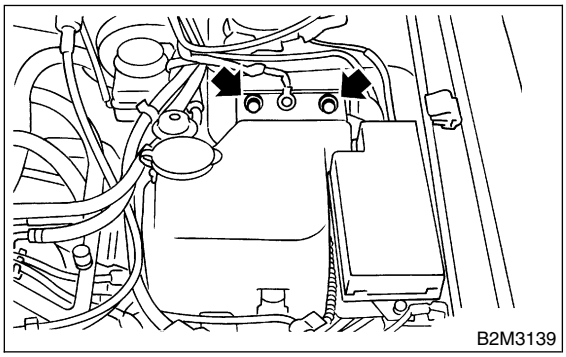
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

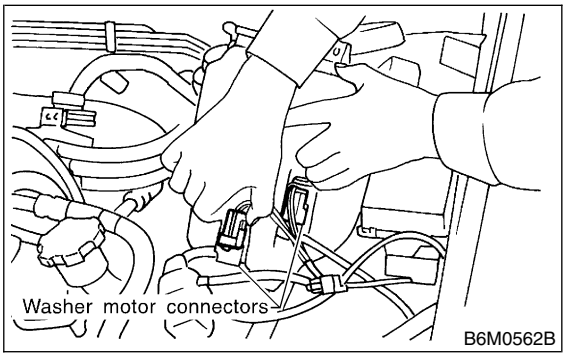
3) Disconnect battery ground cable.


G6M0095

4) Remove two bolts which install washer tank on body.

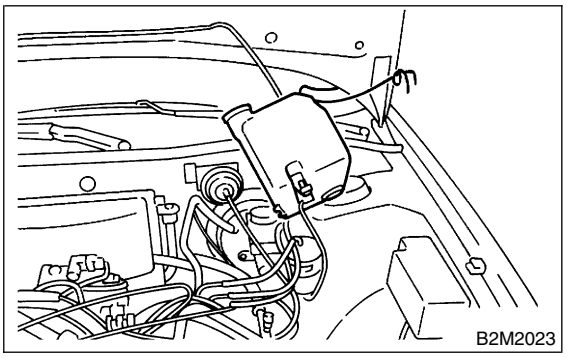

B2M3139

5) Disconnect connector from front window washer motor.
6) Disconnect connector from rear gate glass washer motor.

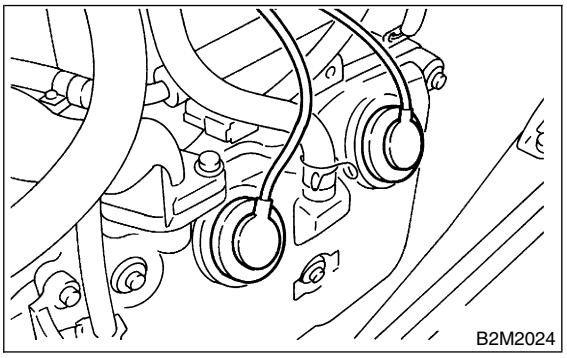


B6M0562B

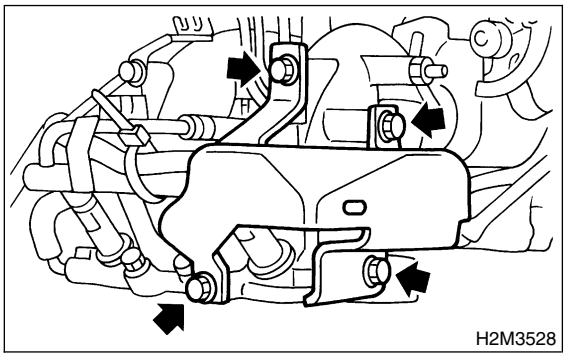
7) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.
8) Move washer tank, and secure it away from working area.


B2M2023

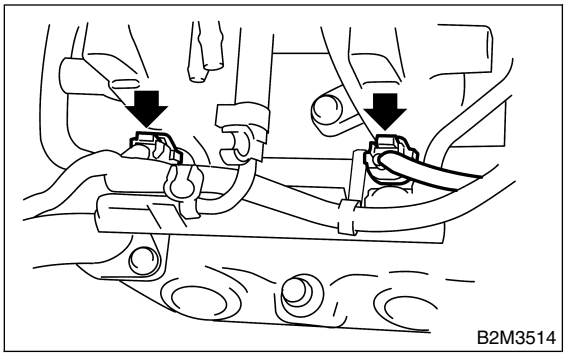
9) Remove spark plug cords from spark plugs (#2 and #4 cylinders).


B2M2024

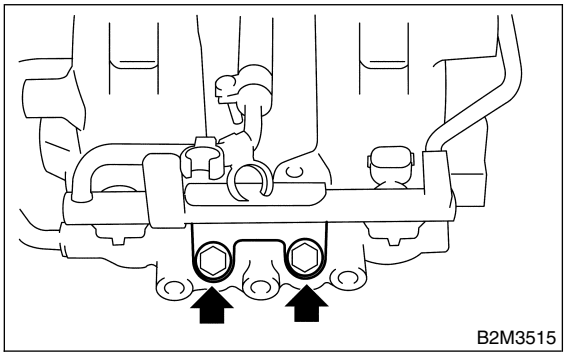
10) Remove fuel pipe protector LH.



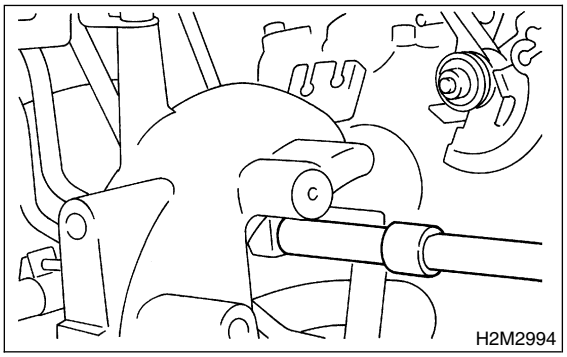
11) Disconnect connector from fuel injector.



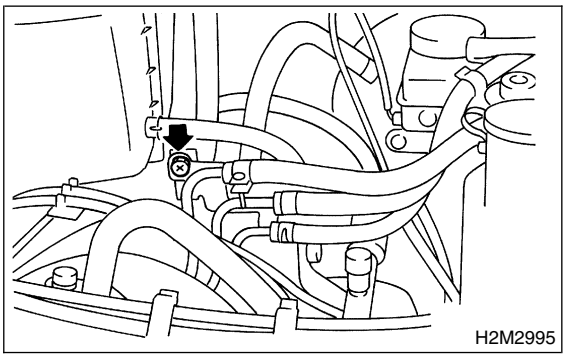
12) Remove bolt which holds injector pipe to intake manifold.



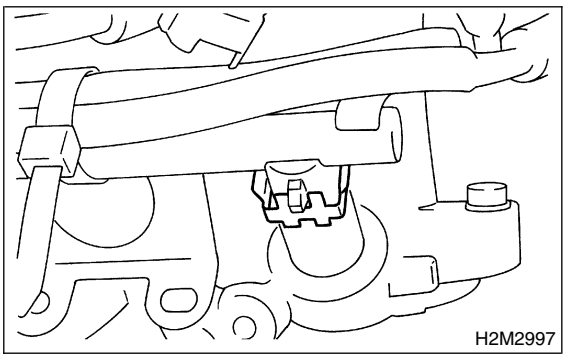
13) Remove bolt which installs injector pipe to intake manifold.



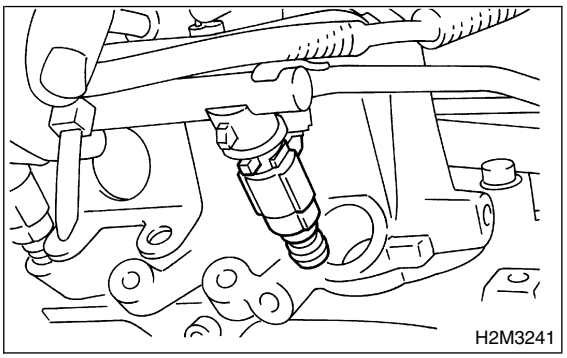
14) Remove bolt which holds fuel pipe on the left side intake manifold.



15) Remove fuel injector from intake manifold.
(1) Remove fuel injector securing clip. (2500 cc models)



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

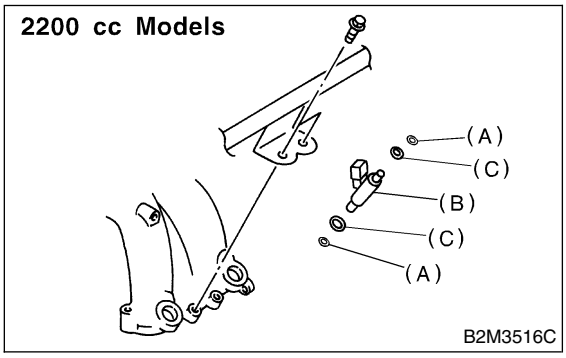


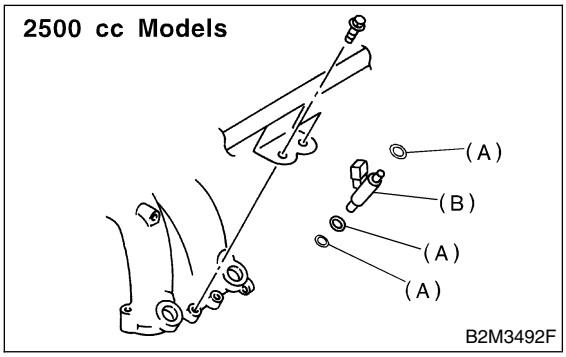
B: INSTALLATION S105051A11

1. RH SIDE S105051A1101

Install in the reverse order of removal.

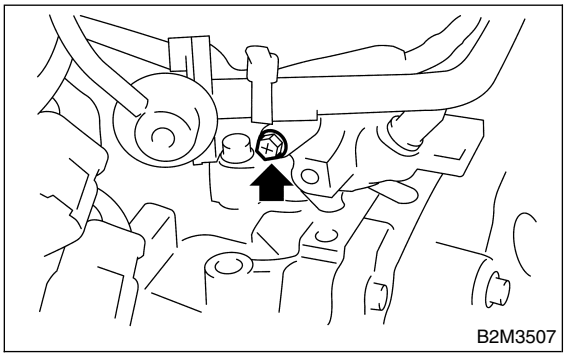
CAUTION:
Replace O-rings and insulator with new ones.



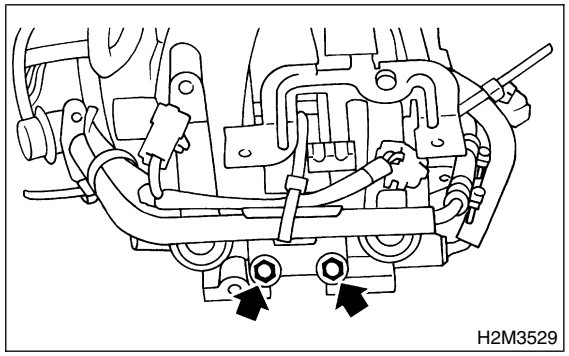


(A) O-ring
(B) Fuel injector
(C) Insulator

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)



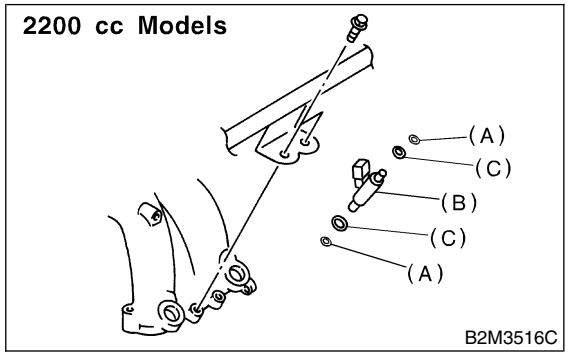
Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)

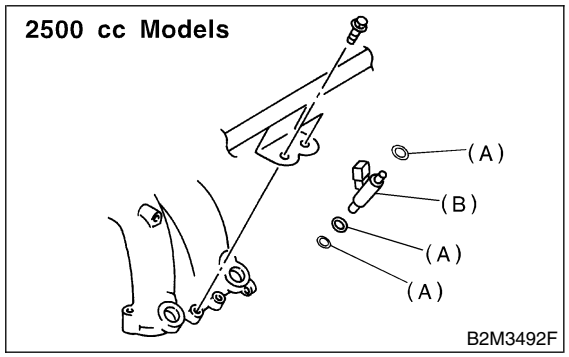


2. LH SIDE S105051A1102

Install in the reverse order of removal.

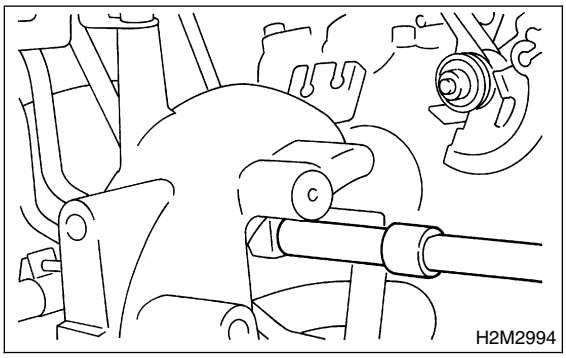
CAUTION:
Replace O-rings and insulator with new ones.



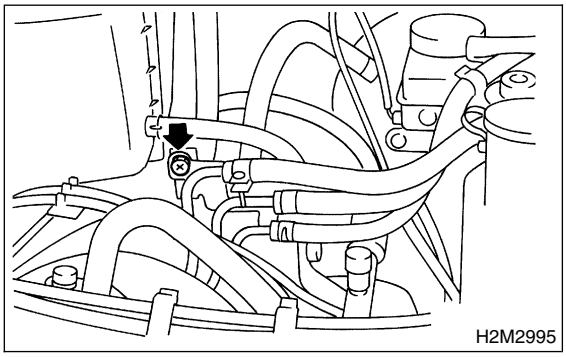


(A) O-ring
(B) Fuel injector
(C) Insulator

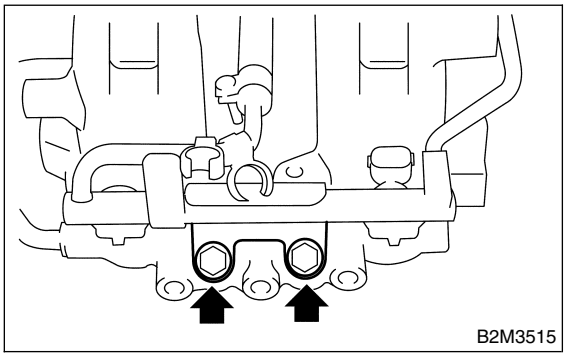
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



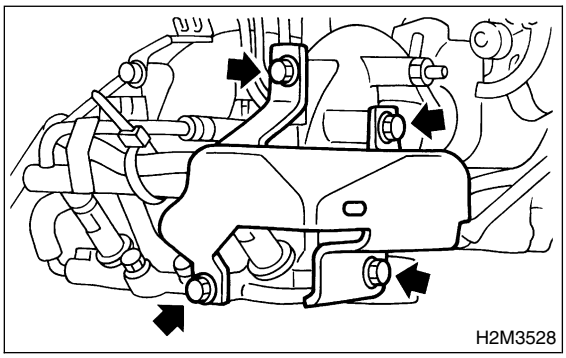
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)



Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)

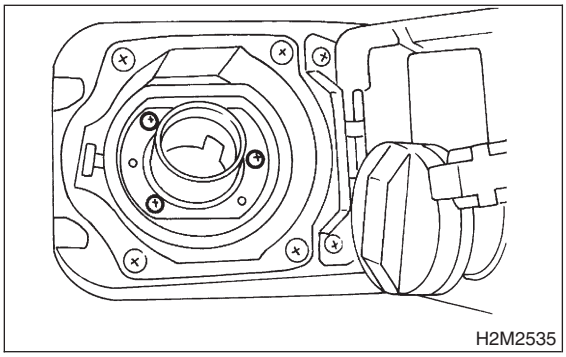


24. Fuel Level Sensor S105026

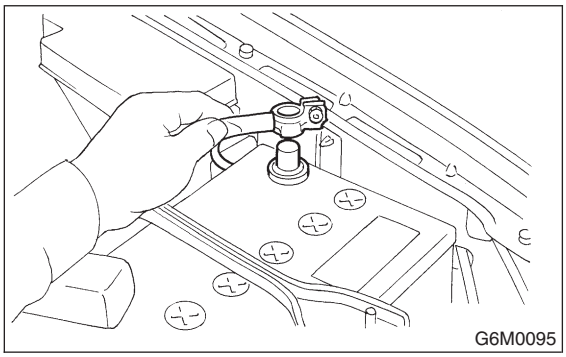
A: REMOVAL S105026A18

NOTE:
Fuel level sensor is built in fuel pump assembly.

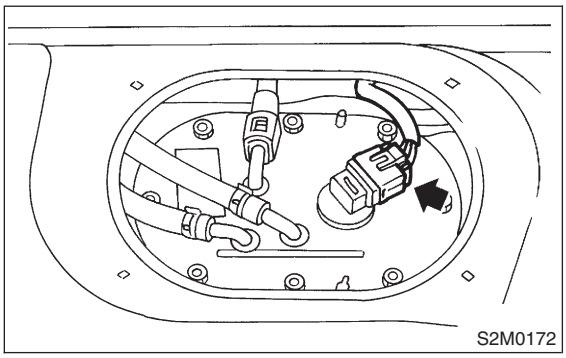
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

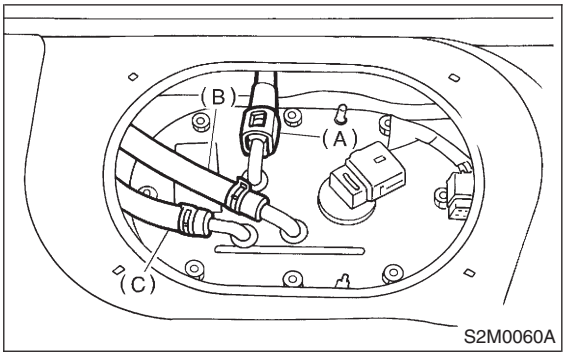
3) Disconnect battery ground cable.


G6M0095

4) Disconnect connector from fuel pump.

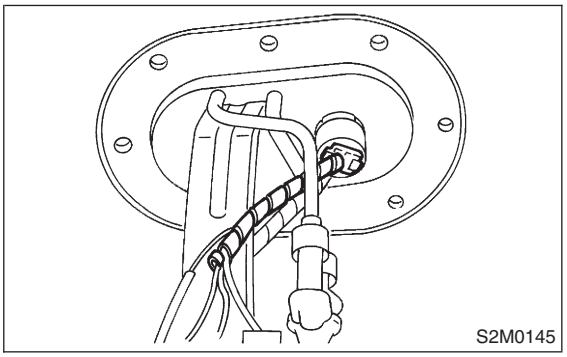

S2M0172

5) Move clips, and then disconnect fuel return hose (B) and jet pump hose (C).
6) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

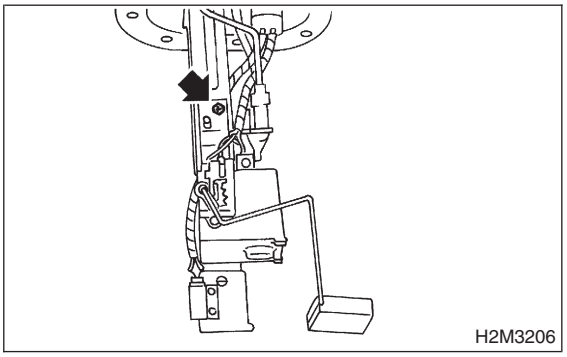


S2M0060A

7) Remove nuts which install fuel pump assembly onto fuel tank.
8) Take off fuel pump assembly.
9) Disconnect connector from fuel pump bracket.

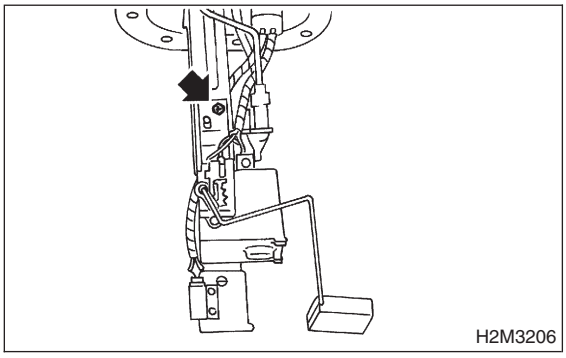

S2M0145

10) Remove bolt which installs fuel level sensor on mounting bracket.


H2M3206

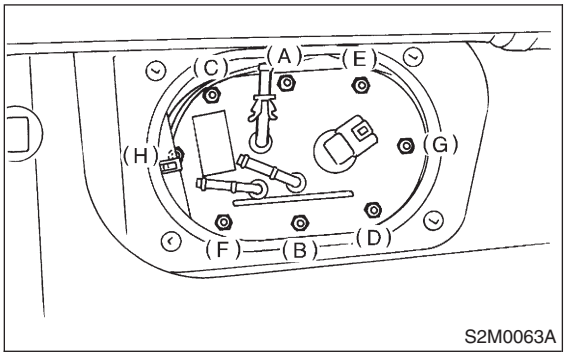
B: INSTALLATION S105026A11

Install in the reverse order of removal. Do the following:
(1) Install the fuel level sensor on mounting bracket.

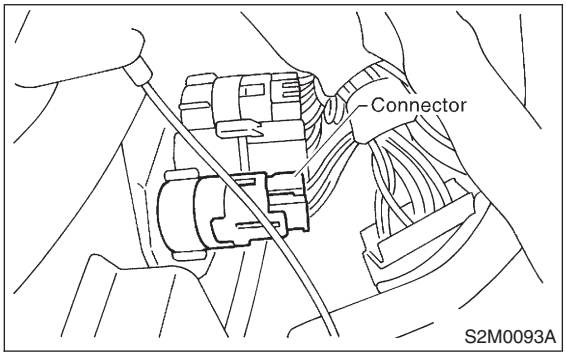


(2) Always use new gaskets.
(3) Ensure sealing portion is free from fuel or foreign particles before installation.
(4) Tighten nuts in alphabetical sequence shown in Figure to specified torque.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



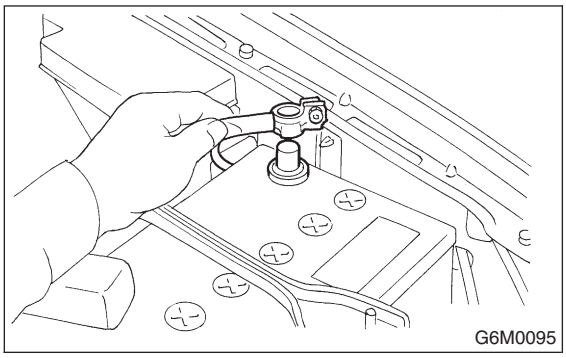
(5) Connect connector to fuel pump relay.



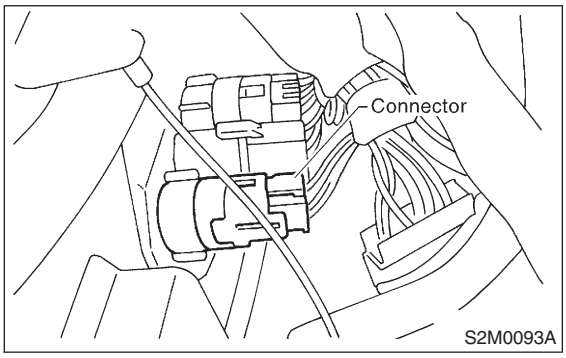
18. Fuel Pump Relay S105048

A: REMOVAL S105048A18

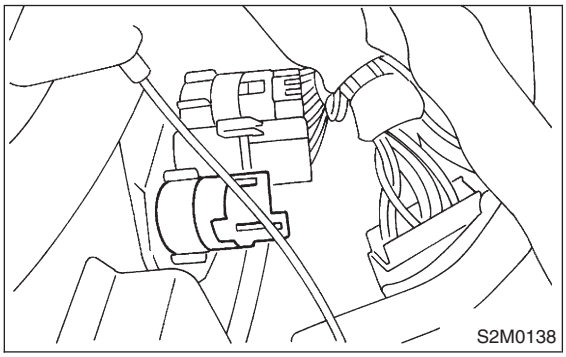
1) Disconnect battery ground cable.



2) Disconnect connector from fuel pump relay.



3) Remove fuel pump relay from mounting bracket.



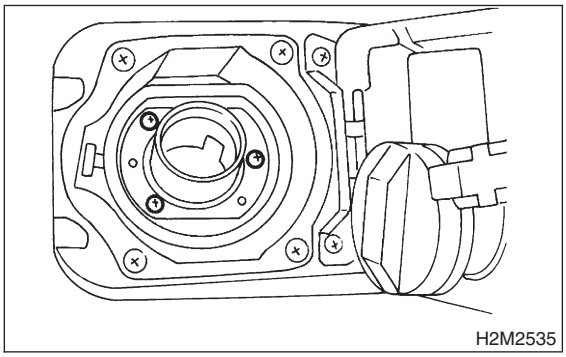
B: INSTALLATION S105048A11

Install in the reverse order of removal.

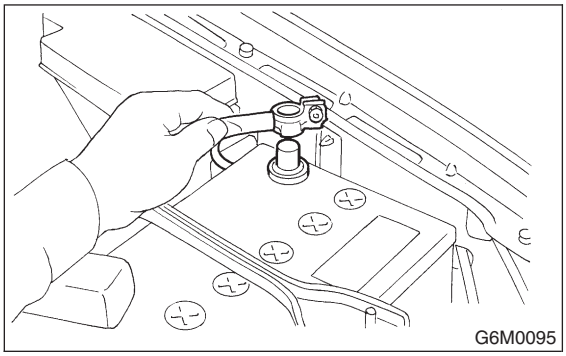
22. Fuel Pump S105025

A: REMOVAL S105025A18

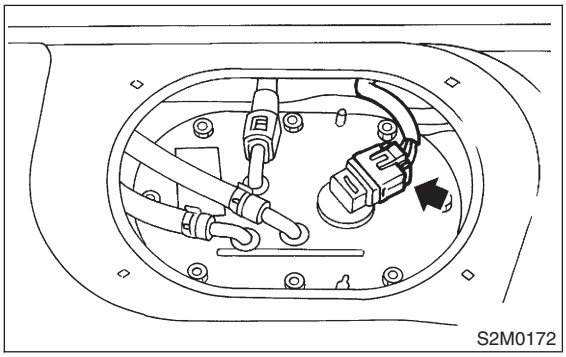
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

3) Disconnect battery ground cable.

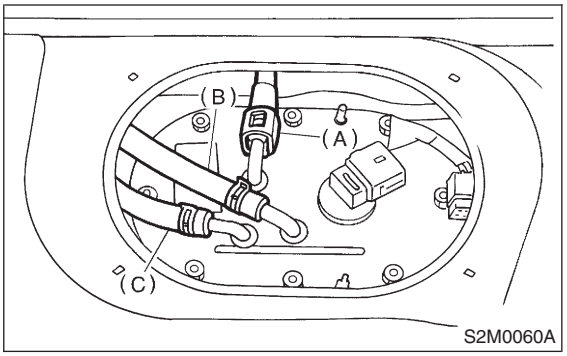

G6M0095

4) Disconnect connector from fuel pump.


S2M0172

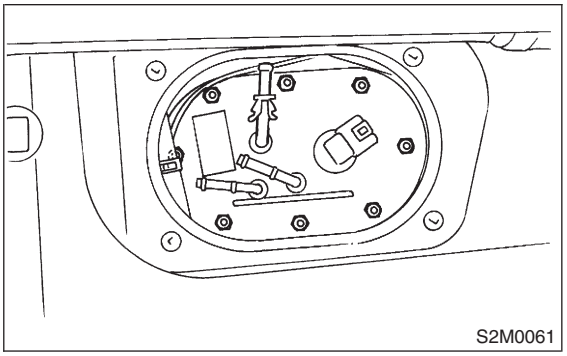
5) Move clips, and then disconnect fuel delivery hose (A), return hose (B) and jet pump hose (C).

6) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>



S2M0060A

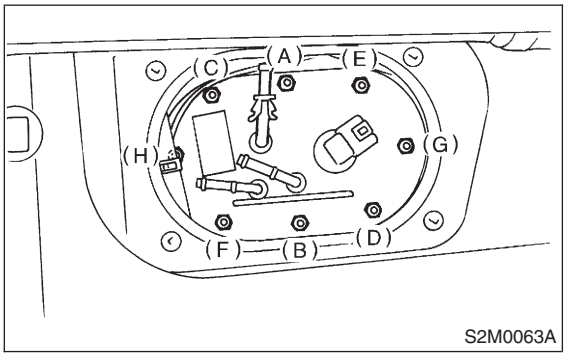
7) Remove nuts which install fuel pump assembly onto fuel tank.
8) Take off fuel pump from fuel tank.


S2M0061

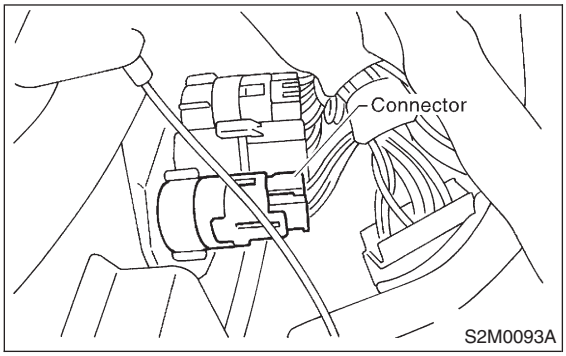
B: INSTALLATION S105025A11

Install 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 numerical sequence shown in Figure to specified torque.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



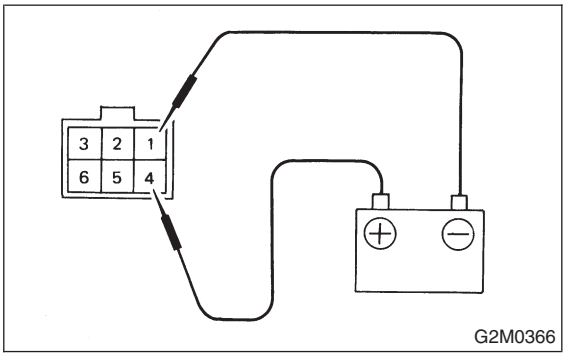
(4) Connect connector to fuel pump relay.



C: INSPECTION S105025A10

Connect lead harness to connector terminal of fuel pump, and apply battery power supply to check whether the pump operate.

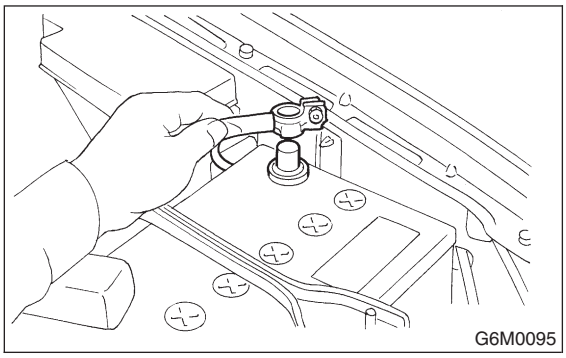
WARNING:
- **Wipe off the fuel completely.**
- **Be sure to turn the battery supply ON and OFF on the battery side.**
- **Do not run fuel pump for a long time under non-load condition.**



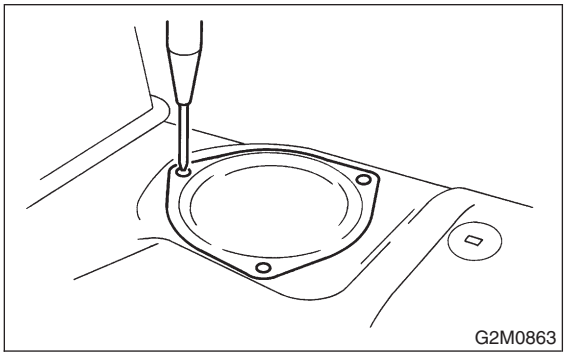
25. Fuel Sub Level Sensor S105023

A: REMOVAL S105023A18

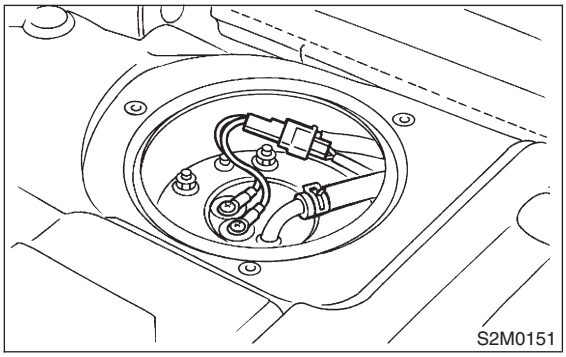
1) Disconnect battery ground cable.



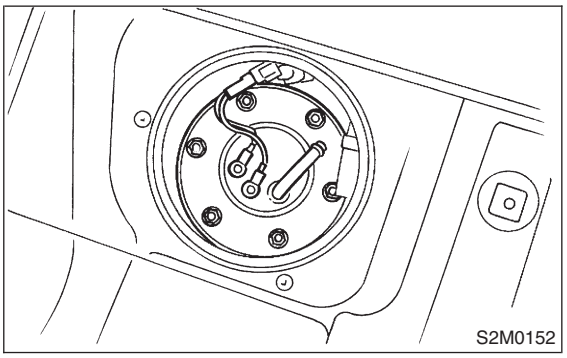
2) Remove fuel filler cap.
3) Remove service hole cover.



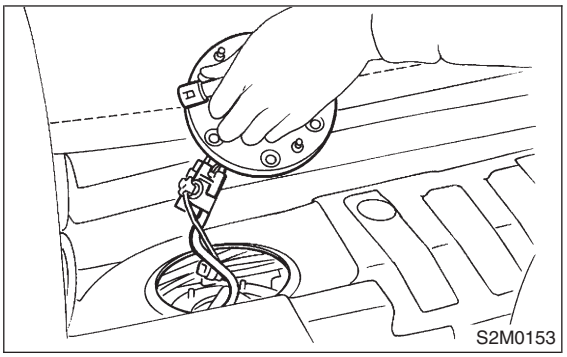
4) Disconnect connector from fuel sub level sensor, and disconnect jet pump hose.



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



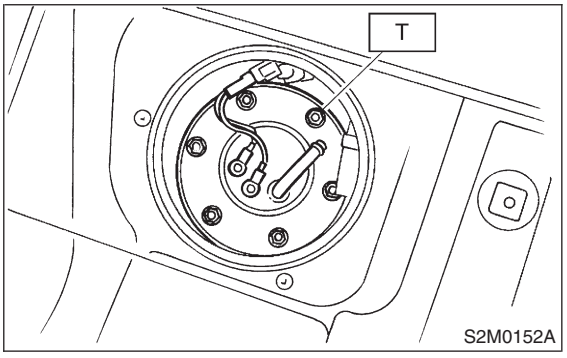
6) Remove fuel sub level sensor.



B: INSTALLATION S105023A11

Install in the reverse order of removal.

Tightening torque:
T: 4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



30. Fuel System Trouble in General S105571

A: INSPECTION S105571A10

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)		Inoperable fuel pump modulator or circuit.	Replace.
4. Defective fuel meter indicator			
1)		Defective operation of fuel level sensor.	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.
(1) To prevent water condensation:
- Top off the fuel tank or drain the fuel completely.
- Drain water condensation from the fuel filter.

(2) Refilling the fuel tank:
Refill the fuel tank while there is still some fuel left in the tank.
(3) Protecting the fuel system against freezing and water condensation:
- 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.
- Affected areas

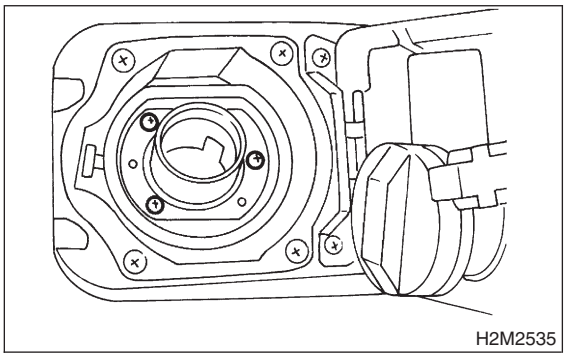
When water condensation is notched in the fuel filter, drain water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.

(4) Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.

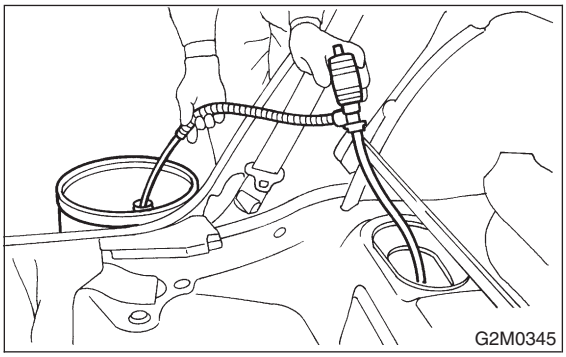
20. Fuel Tank S105053

A: REMOVAL S105053A18

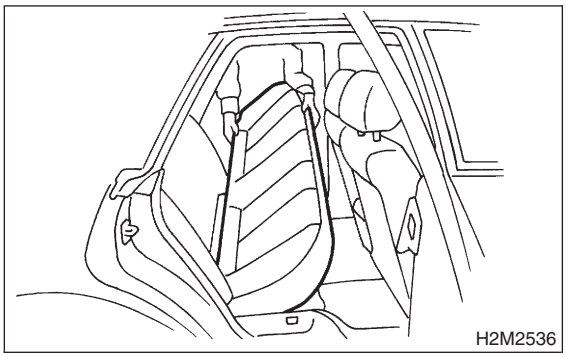
1) Set the vehicle on the lift.
2) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
3) Open fuel flap lid, and remove fuel filler cap.


H2M2535

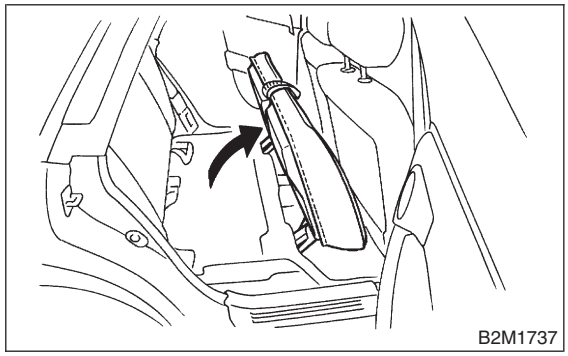
4) Drain fuel from fuel tank. <Ref. to FU-64 DRAINING FUEL, Fuel.>


G2M0345

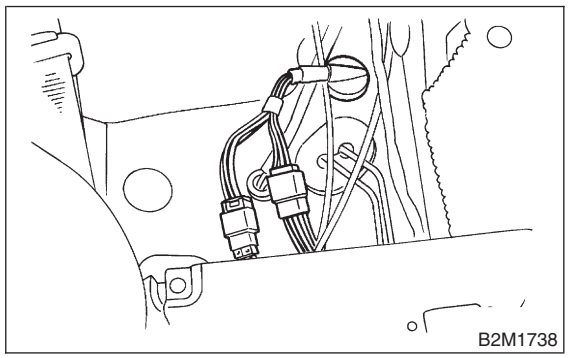
5) Remove rear seat cushion. (Sedan model)


H2M2536

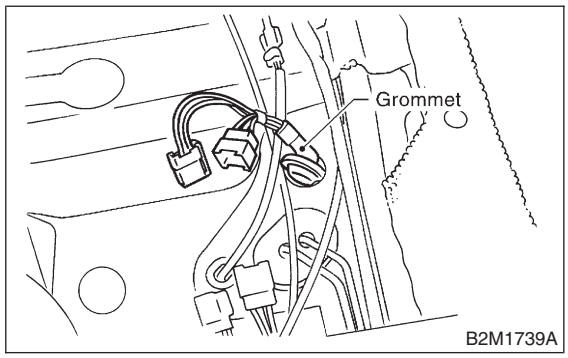
6) Move rear seat cushion forward. (Wagon model)


B2M1737

7) Disconnect connector of fuel tank cord from rear harness.


B2M1738

8) Push grommet which holds fuel tank cord on floor panel into the body side.

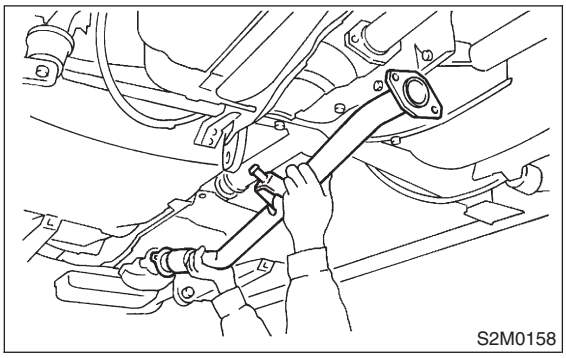


B2M1739A

9) Lift-up the vehicle.

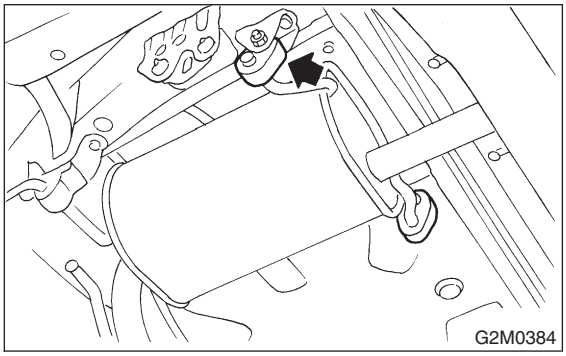
10) Remove rear exhaust pipe. <Ref. to EX-10 REMOVAL, Rear Exhaust Pipe.>

NOTE:
To facilitate the removal of parts, apply a coat of SUBARU CRC5-56 (Part No. 004301003).

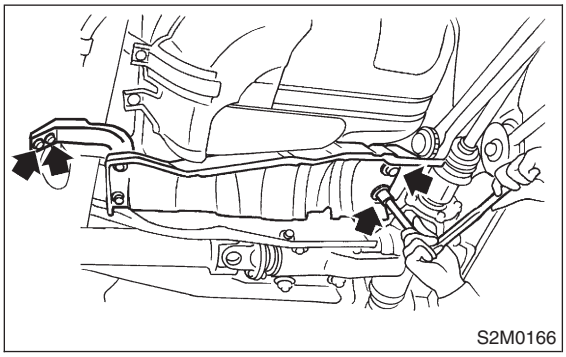

S2M0158

11) Remove muffler assembly.
<Ref. to EX-12 REMOVAL, Muffler.>

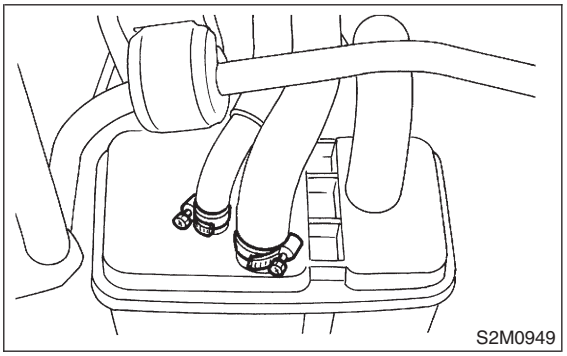
NOTE:
To facilitate the removal of parts, apply a coat of SUBARU CRC5-56 (Part No. 004301003).


G2M0384

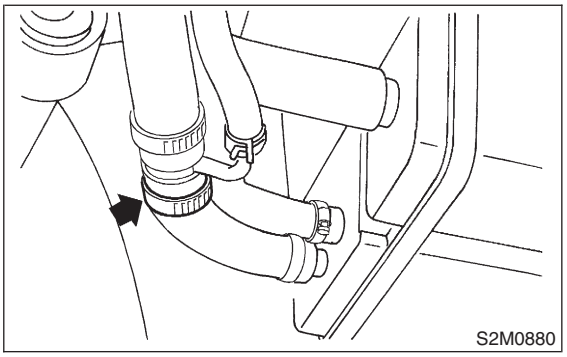
12) Remove heat sealed cover.


S2M0166

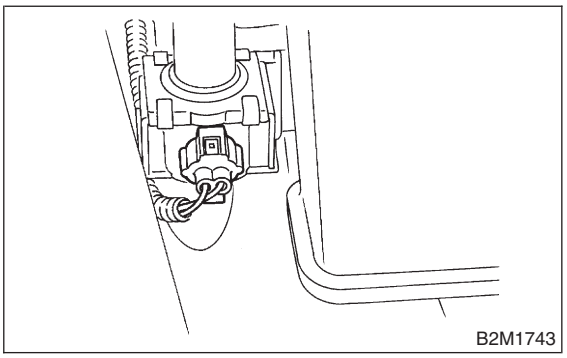
13) Move clamp, and disconnect evaporation hose from canister.


S2M0949

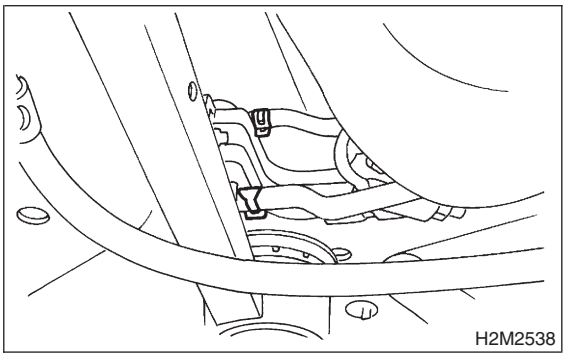
14) Disconnect hose from joint pipe.


S2M0880

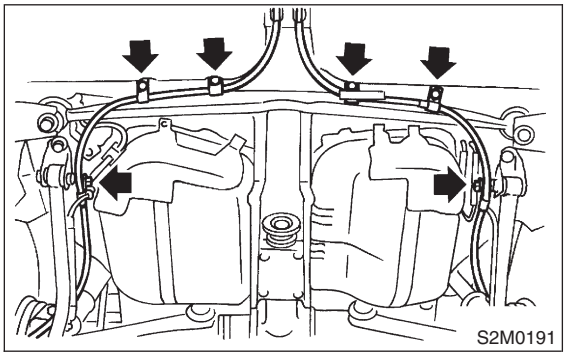
15) Disconnect connector from pressure control solenoid valve.
16) Disconnect connector from drain valve.


B2M1743

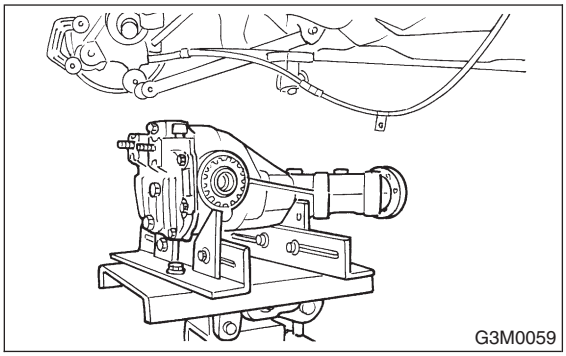
17) Disconnect hoses from roll over valve.


H2M2538

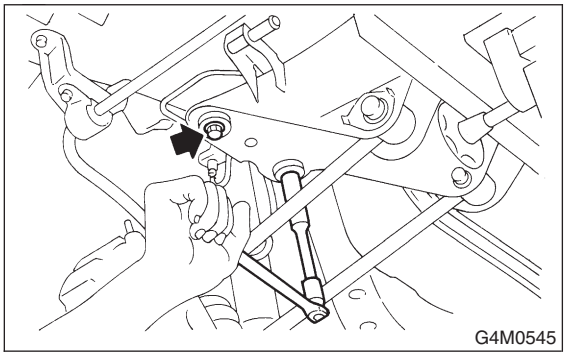
18) Remove bolts which hold parking brake cable holding bracket.



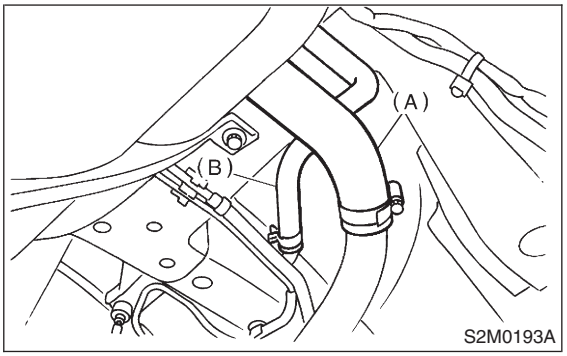
19) Remove rear differential assembly.
<Ref. to DI-23 REMOVAL, Rear Differential for T-type.> or <Ref. to DI-38 REMOVAL, Rear Differential for VA-type.>



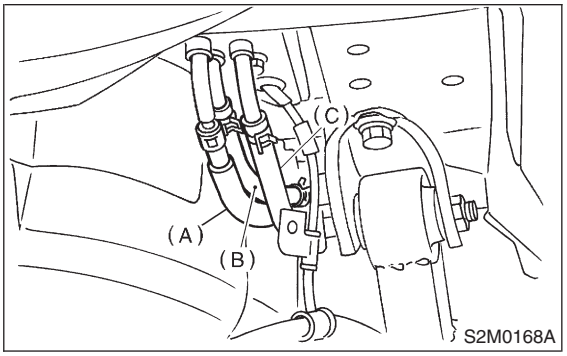
20) Remove rear crossmember.
<Ref. to RS-23 REMOVAL, Rear Crossmember.>



21) Loosen clamp, and disconnect fuel filler hose (A) and air vent hose (B) from fuel filler pipe and air vent pipe.

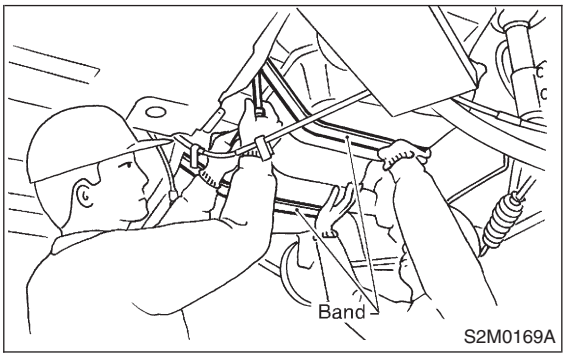


22) Move clips, and disconnect fuel return hose (B) and evaporation hose (C).
23) Disconnect quick connector, and then disconnect fuel delivery hose (A).



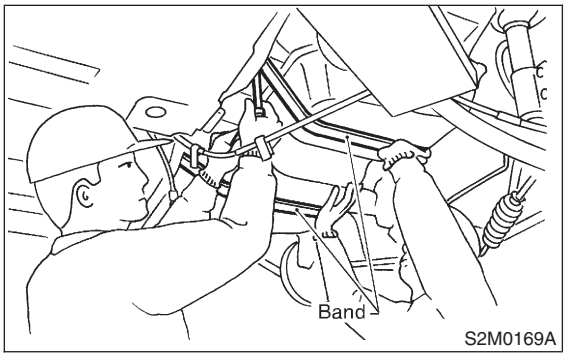
24) While holding fuel tank, remove bolts from bands and dismount fuel tank.

WARNING:
A helper is required to perform this work.

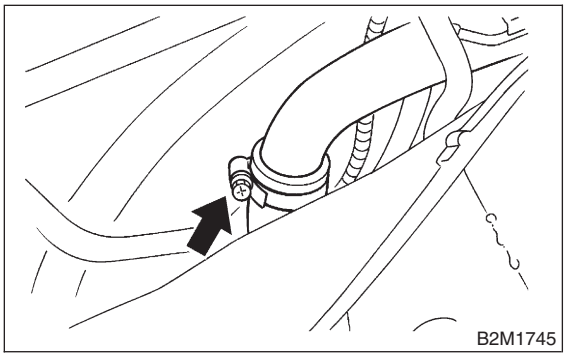


B: INSTALLATION S105053A11

1) While a helper holds fuel tank, push fuel tank harness into access hole with grommet.

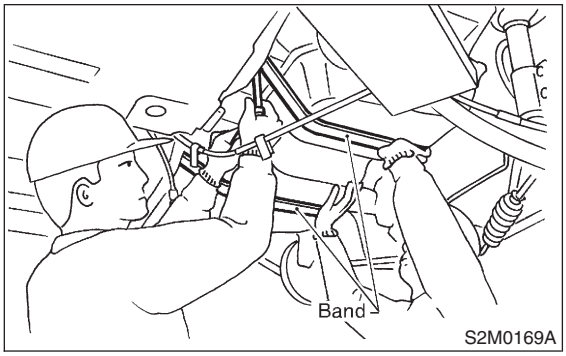


2) Set fuel tank, and temporary tighten bolts in order to install fuel tank bands.
3) Connect fuel filler hose, and tighten clamp.

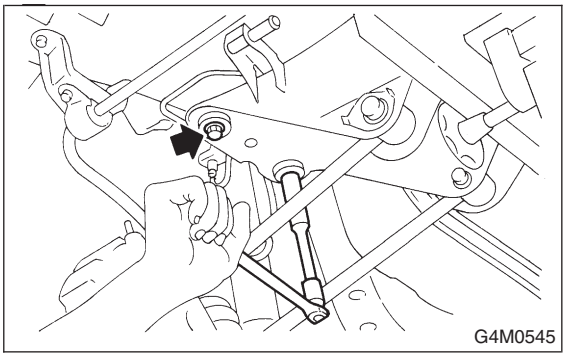


4) Connect fuel hoses, and hold then with clips and quick connector. <Ref. to FU-86 INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>
5) Tighten band mounting bolts.

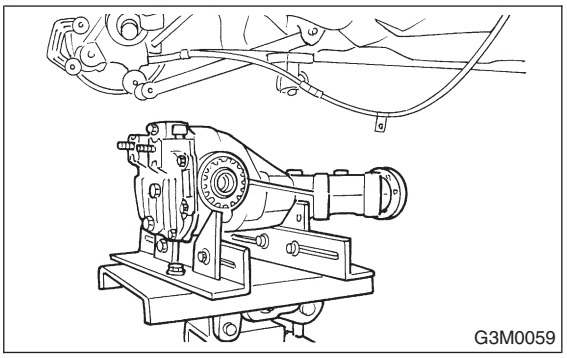
Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)



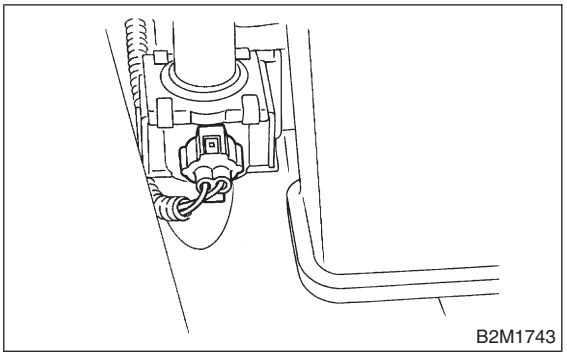
6) Install rear crossmember. <Ref. to RS-23 INSTALLATION, Rear Crossmember.>



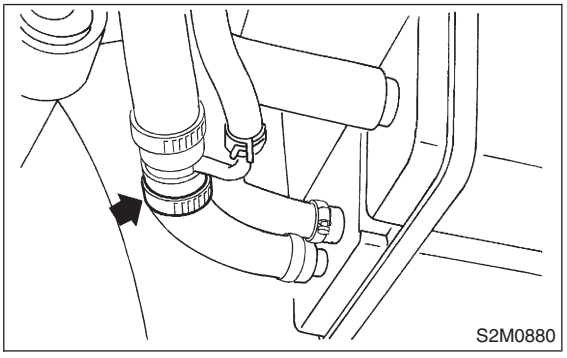
7) Install rear differential assembly. <Ref. to DI-25 INSTALLATION, Rear Differential for T-type.> and <Ref. to DI-40 INSTALLATION, Rear Differential for VA-type.>



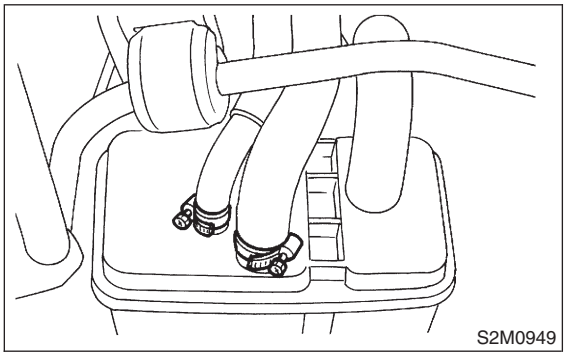
8) Connect connector to drain valve.



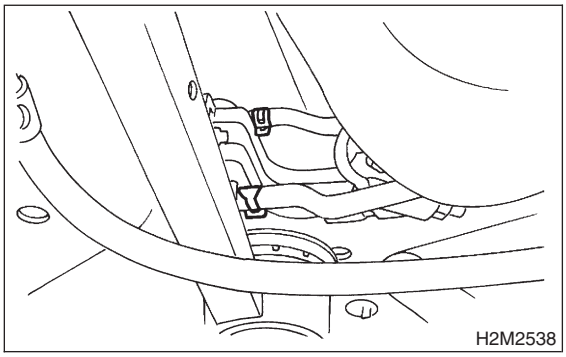
9) Connect connector to pressure control solenoid valve.
10) Connect hose to joint pipe.



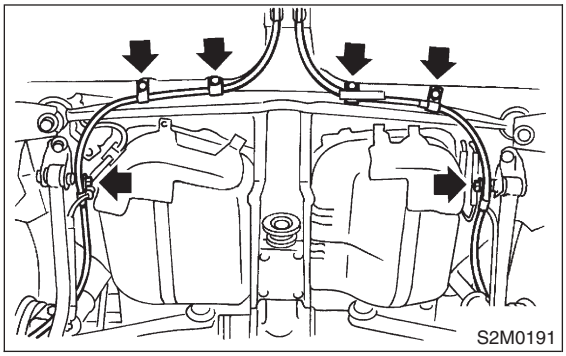
11) Connect evaporation hose to canister, and hold them with clamp.


S2M0949

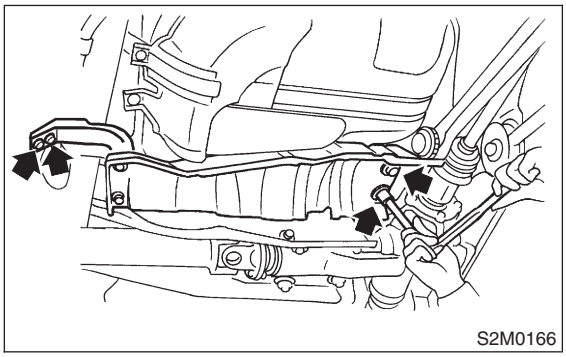
12) Connect hoses to roll over valve.


H2M2538

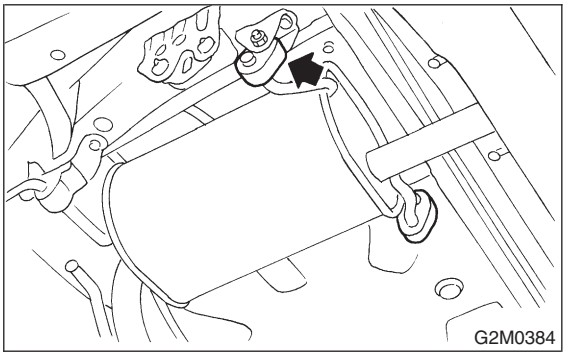
13) Install bolts which hold parking brake holding bracket.


S2M0191

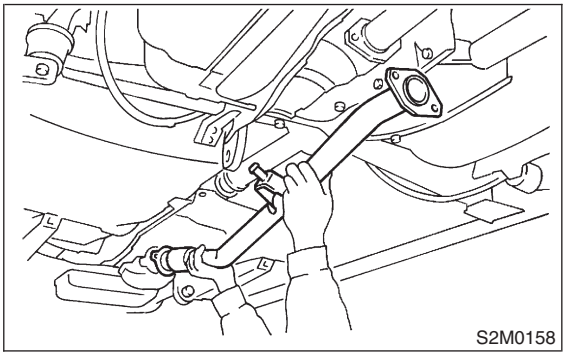
14) Install heat sealed cover.


S2M0166

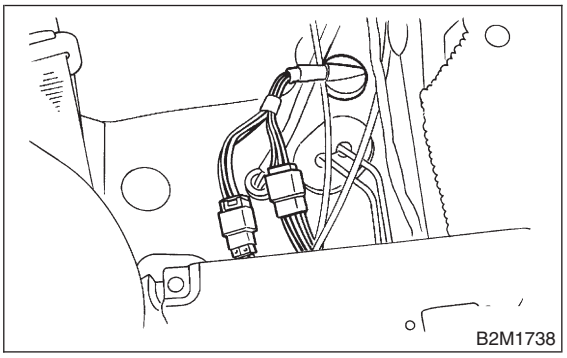
15) Install muffler assembly. <Ref. to EX-12 INSTALLATION, Muttler.>


G2M0384

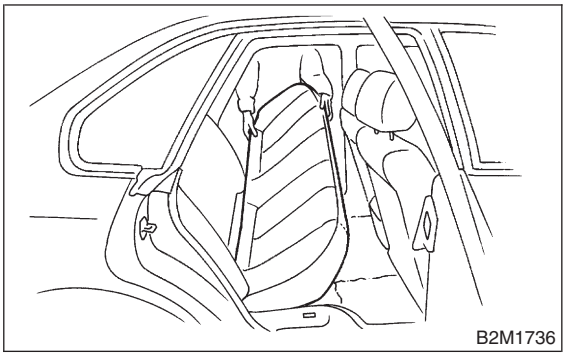
16) Install rear exhaust pipe. <Ref. to EX-10 INSTALLATION, Rear Exhaust Pipe.>


S2M0158

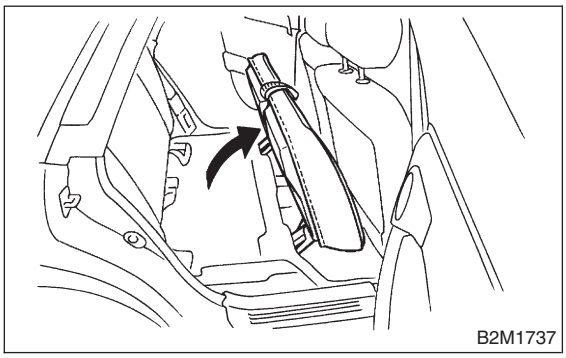
17) Lower the vehicle.
18) Connect connectors to fuel tank harness, and plug access hole with grommet.


B2M1738

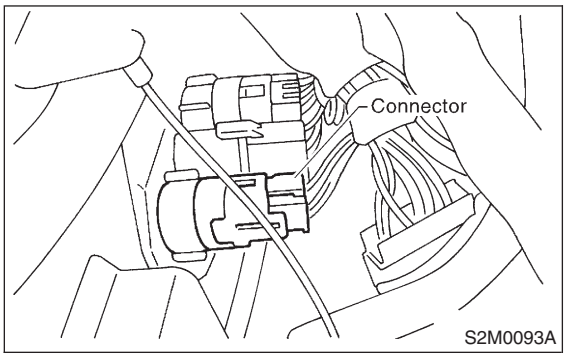
19) Install rear seat cushion. (Sedan model)


B2M1736

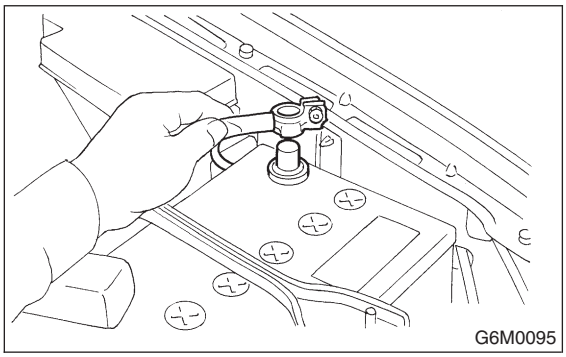
20) Set rear seat cushion. (Wagon model)



21) Install fuel filler cap.
22) Connect connector to fuel pump relay.



23) Connect battery ground cable.



C: INSPECTION S105053A10

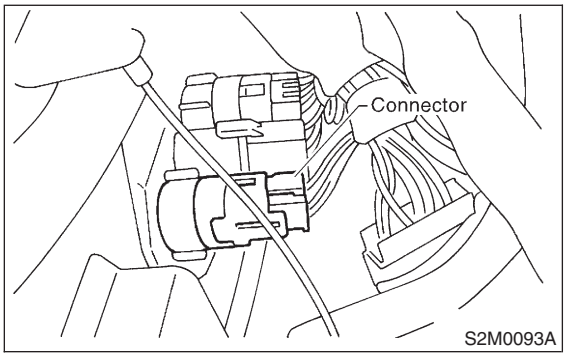
1) Make sure there are no cracks, holes, or other damage on the fuel tank.
2) Make sure that the fuel hoses and fuel pipes are not cracked and that connections are tight.

19. Fuel S105052

A: RELEASING OF FUEL PRESSURE S105052E57

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.

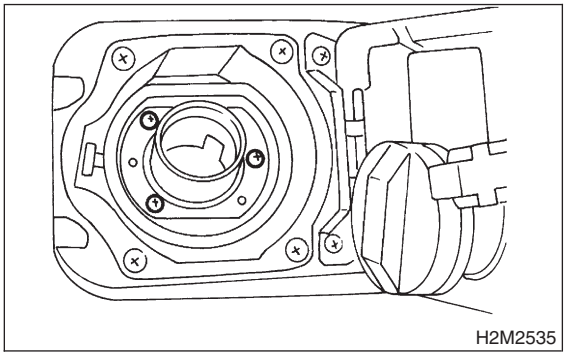


2) Start the engine, and run it until it stalls.
3) After the engine stalls, crank it for five more seconds.
4) Turn ignition switch OFF.

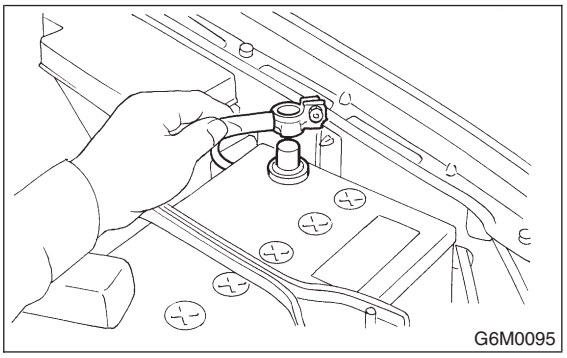
B: DRAINING FUEL S105052E58

WARNING:
- **Place "No fire" signs near the working area.**
- **Be careful not to spill fuel on the floor.**

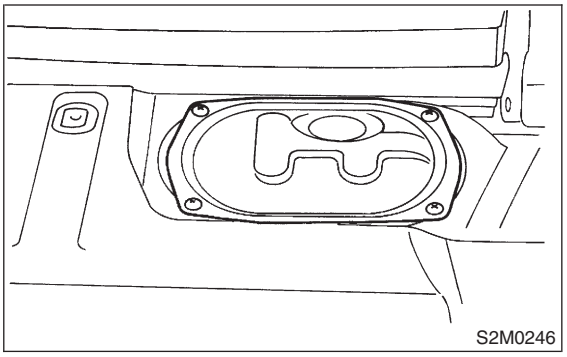
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.



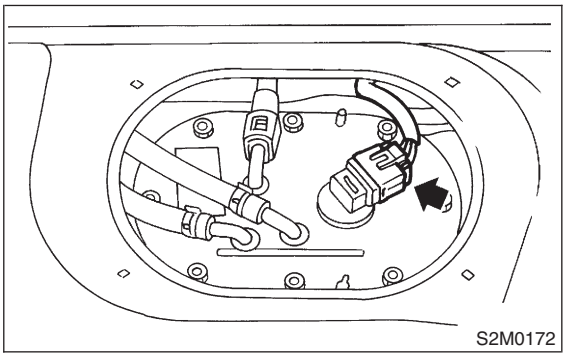
3) Disconnect battery ground cable.



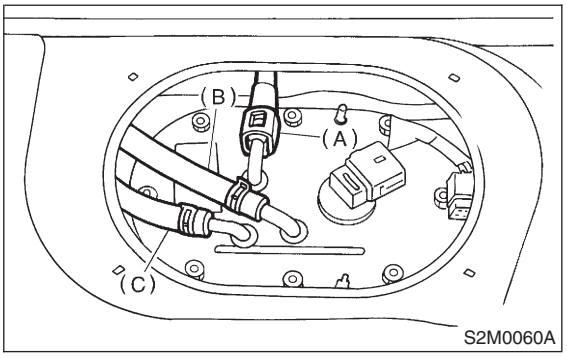
4) Remove access hole lid.



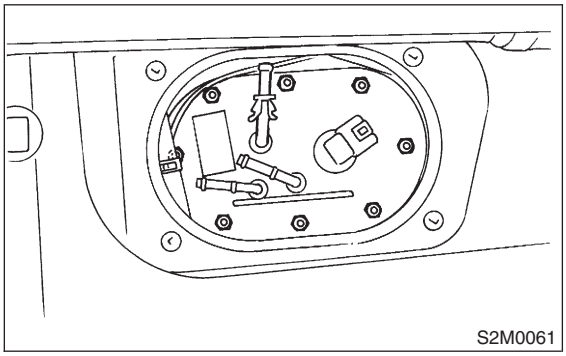
5) Disconnect connector from fuel pump.



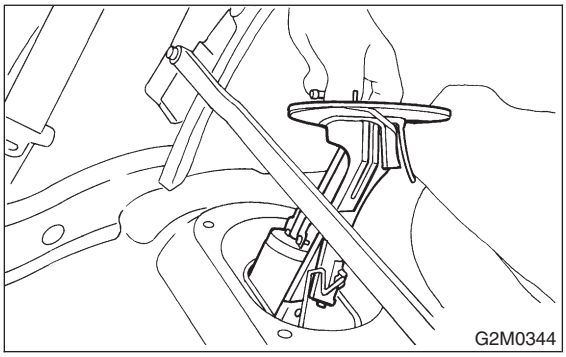
6) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU-85 REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
7) Move clips, and then disconnect fuel return hose (B) and jet pump hose (C).



8) Remove nuts which install fuel pump assembly onto fuel tank.

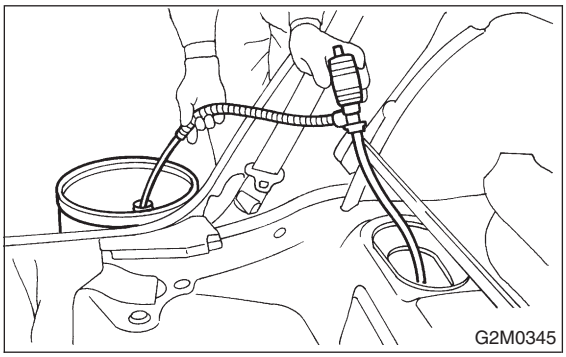

S2M0061

9) Take off fuel pump from fuel tank.

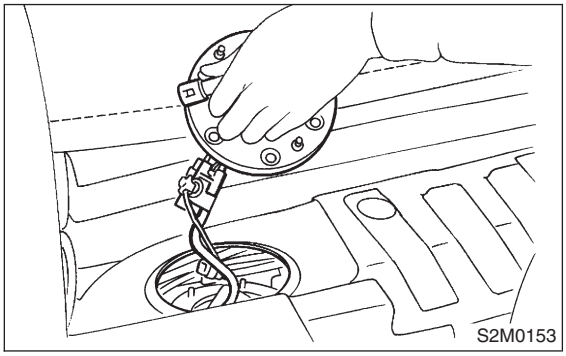

G2M0344

10) Drain fuel from fuel tank by using a hand pump.

WARNING:
Do not use a motor pump when draining fuel.

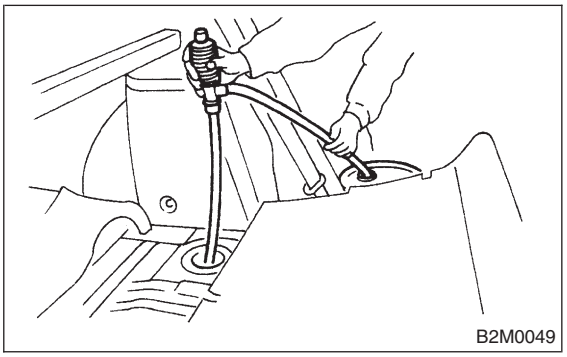

G2M0345

11) Remove fuel sub level sensor. <Ref. to FU-82 REMOVAL, Fuel Sub Level Sensor.>


S2M0153

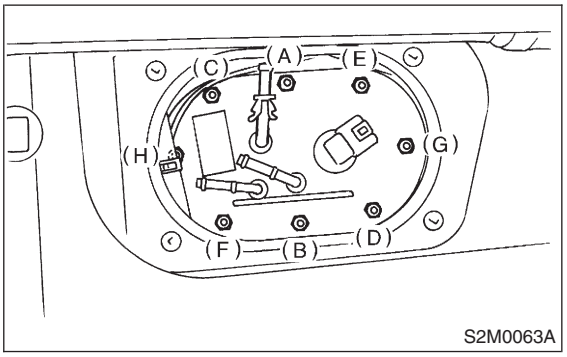
12) Drain fuel from there.

WARNING:
Do not use a motor pump when draining fuel.

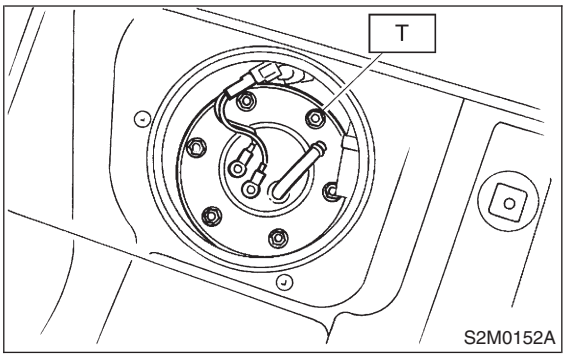

B2M0049

13) After draining fuel, reinstall fuel pump and fuel sub level sensor.
Tighten nuts of fuel pump in numerical sequence shown in figure to specified torque.

Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



S2M0063A



S2M0152A

1. General Description S105001

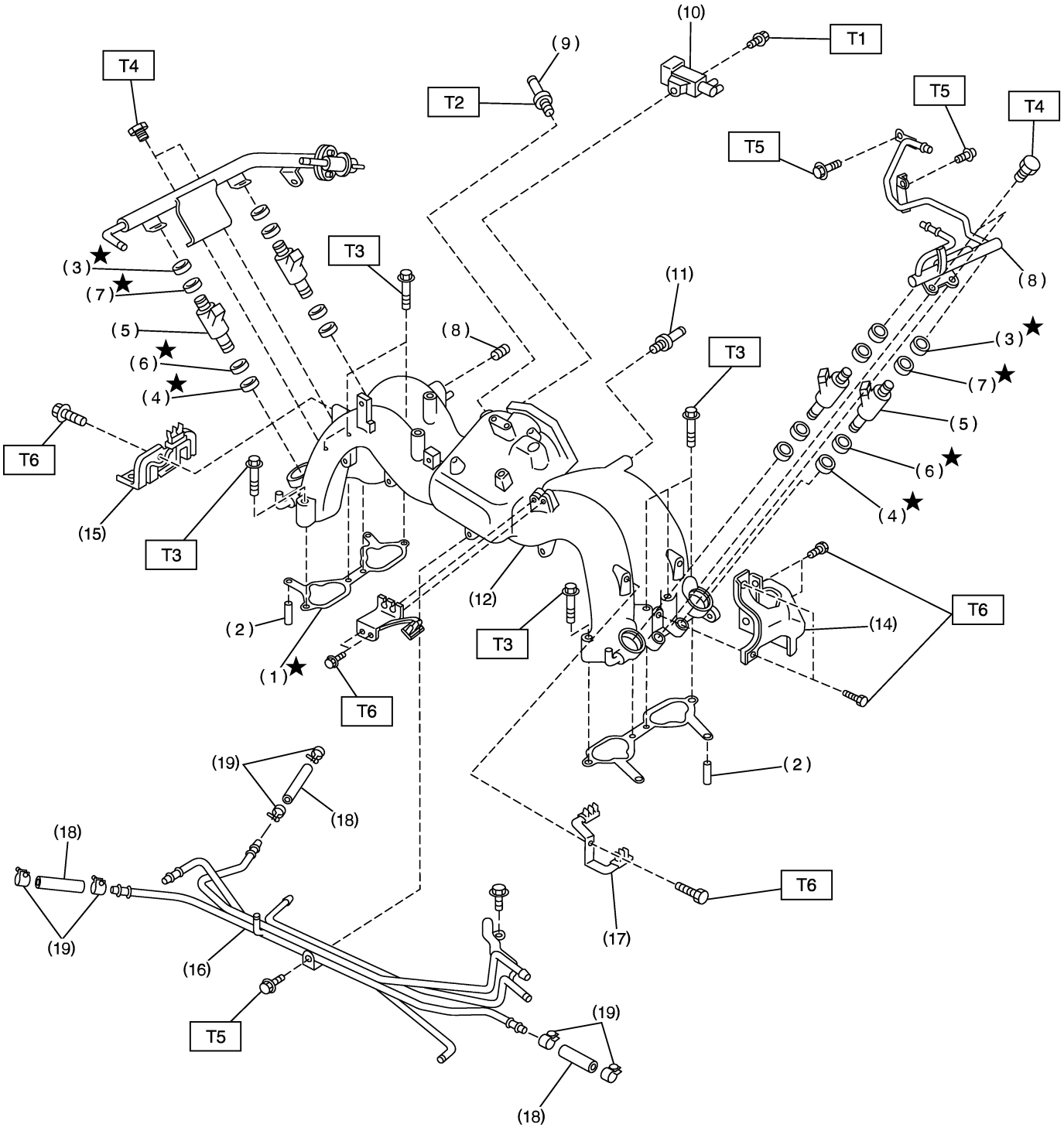
A: SPECIFICATIONS S105001E49

Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Discharge pressure	299.1 kPa (3.05 kg/cm^2, 43.4 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

B: COMPONENT S105001A05

1. INTAKE MANIFOLD S105001A0501

- **2200 cc models**

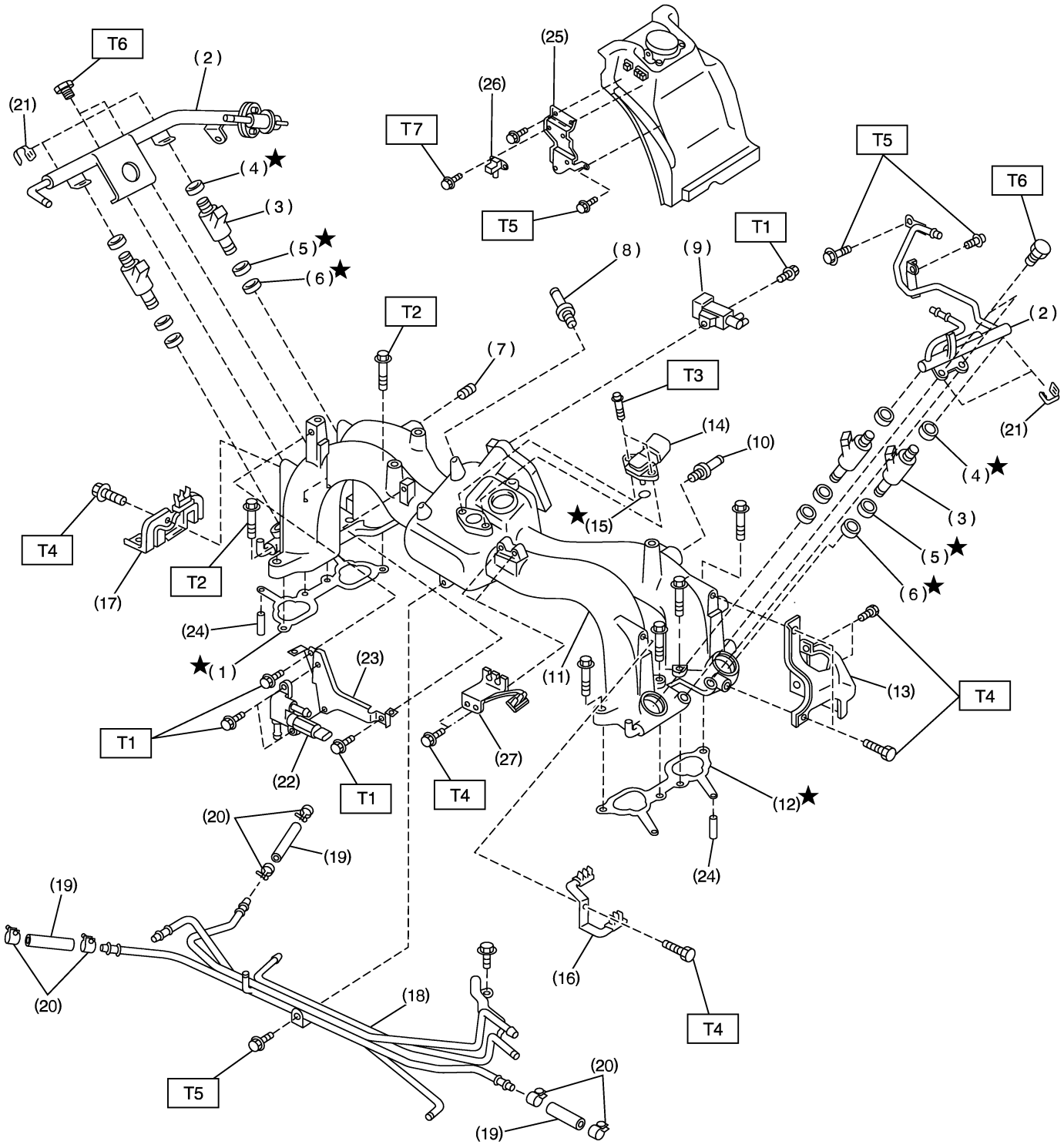


H2M3531A

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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.6)
T2: 23 (2.3, 16.6)
T3: 25 (2.5, 18.1)
T4: 3.4 (0.35, 2.5)
T5: 4.9 (0.5, 3.6)
T6: 18.6 (1.9, 13.7)

- **2500 cc models**



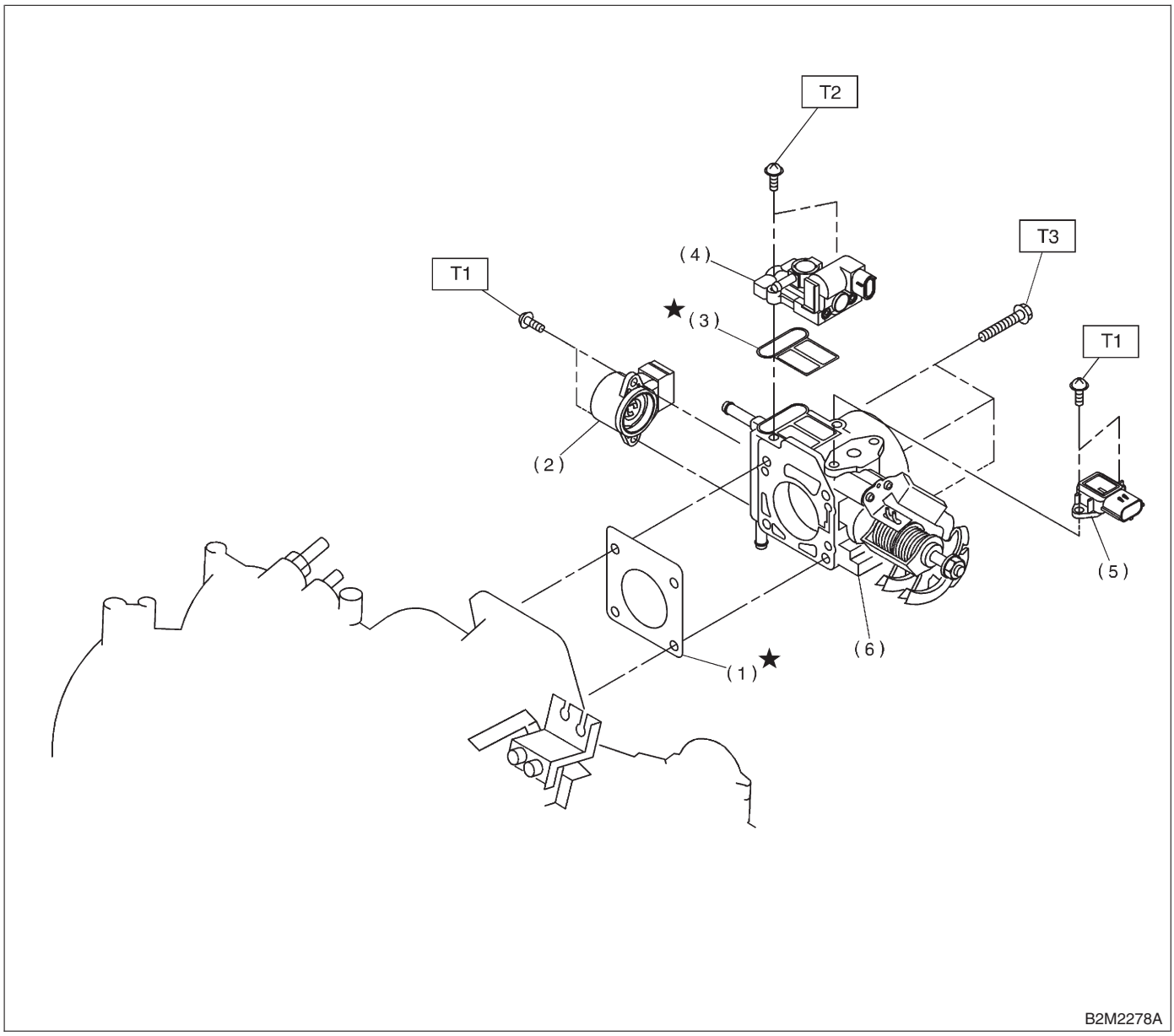
H2M3532A

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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 16 (1.6, 11.6)
T2: 25 (2.5, 18.1)
T3: 2.0 (0.2, 1.4)
T4: 18.6 (1.9, 13.7)
T5: 4.9 (0.5, 3.6)
T6: 3.4 (0.35, 2.5)
T7: 6.4 (0.65, 4.7)

2. AIR INTAKE SYSTEM S105001A0502

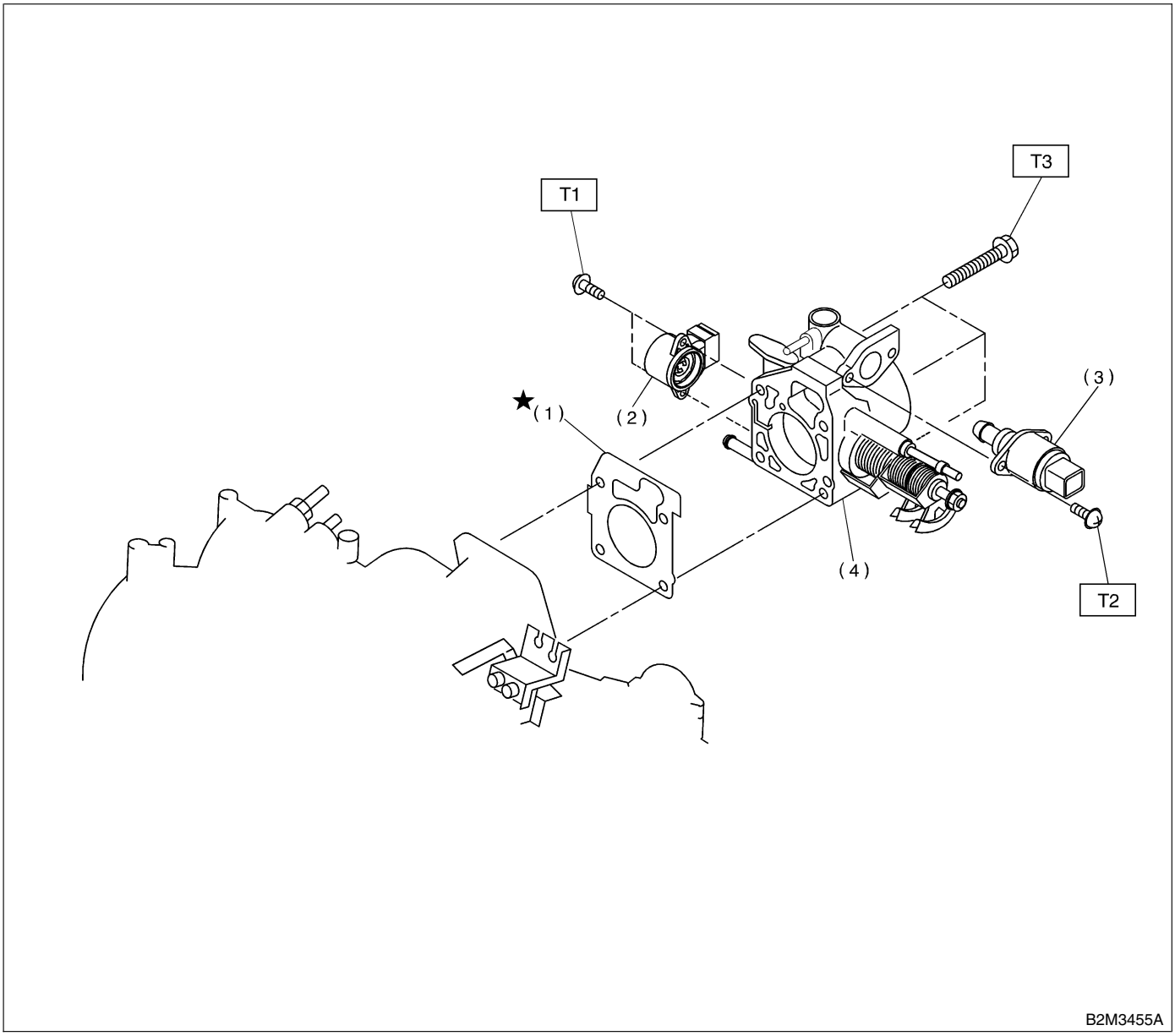
- **2200 cc models**



(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 (kgf-m, ft-lb)
T1: 2.2 (0.22, 1.6)
T2: 6.0 (0.61, 4.4)
T3: 22 (2.2, 15.9)

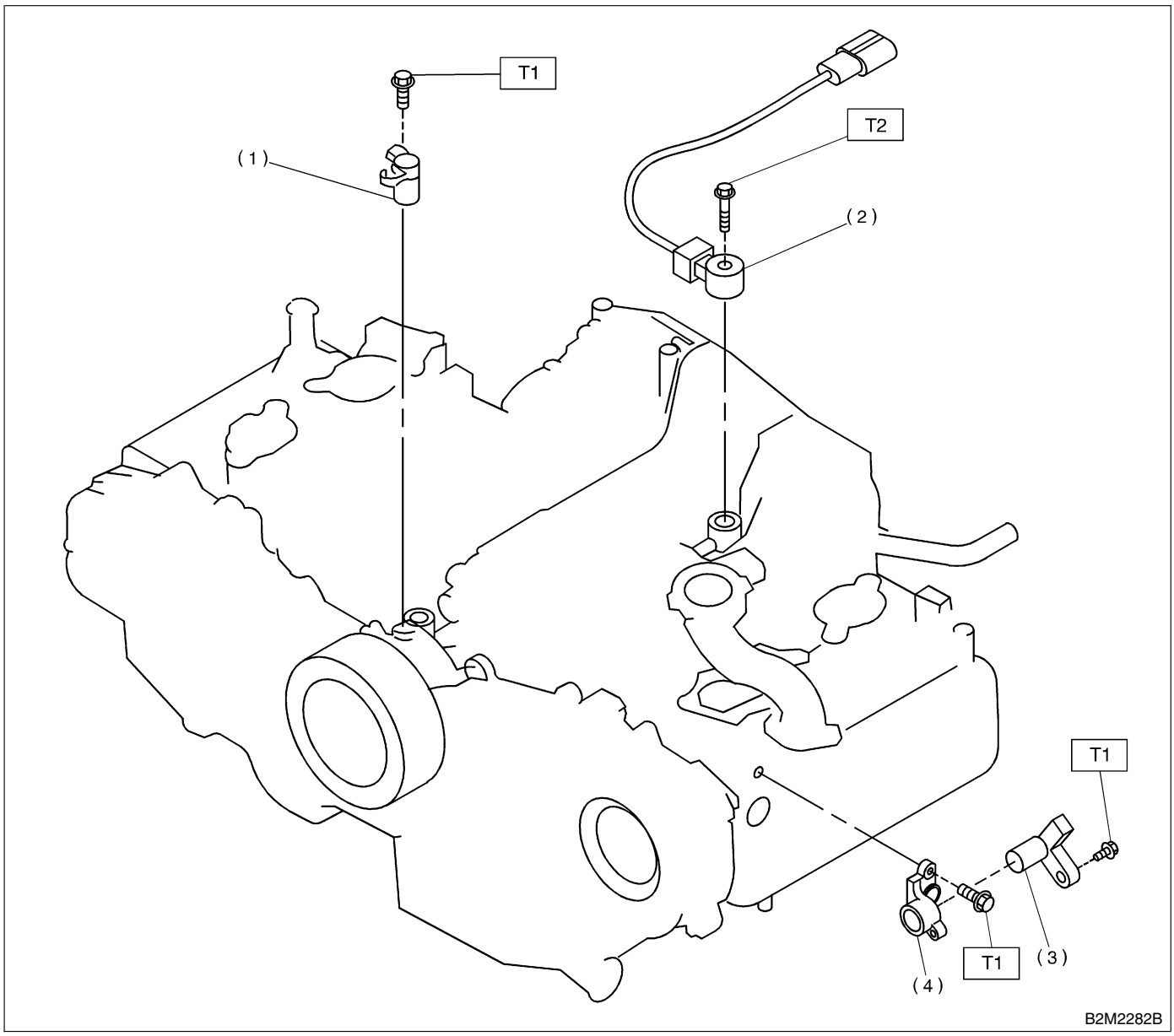
● 2500 cc models



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 2.0 (0.2, 1.4)
T2: 6.0 (0.61, 4.4)
T3: 19 (1.9, 13.7)

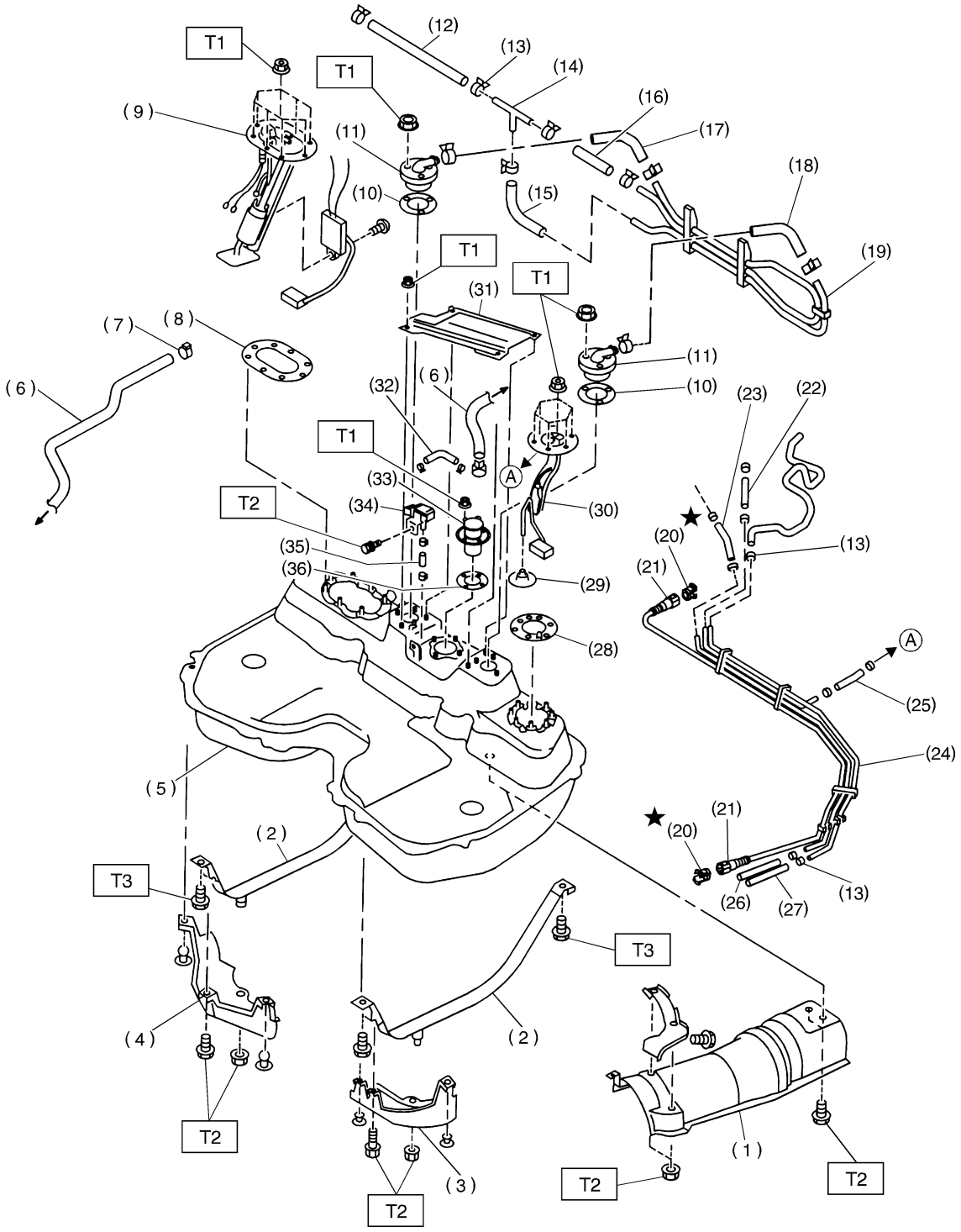
3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS S105001A0503



(1) Crankshaft position sensor
(2) Knock sensor
(3) Camshaft position sensor
(4) Camshaft position sensor support

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 23.5 (2.4, 17.4)

4. FUEL TANK S105001A0504

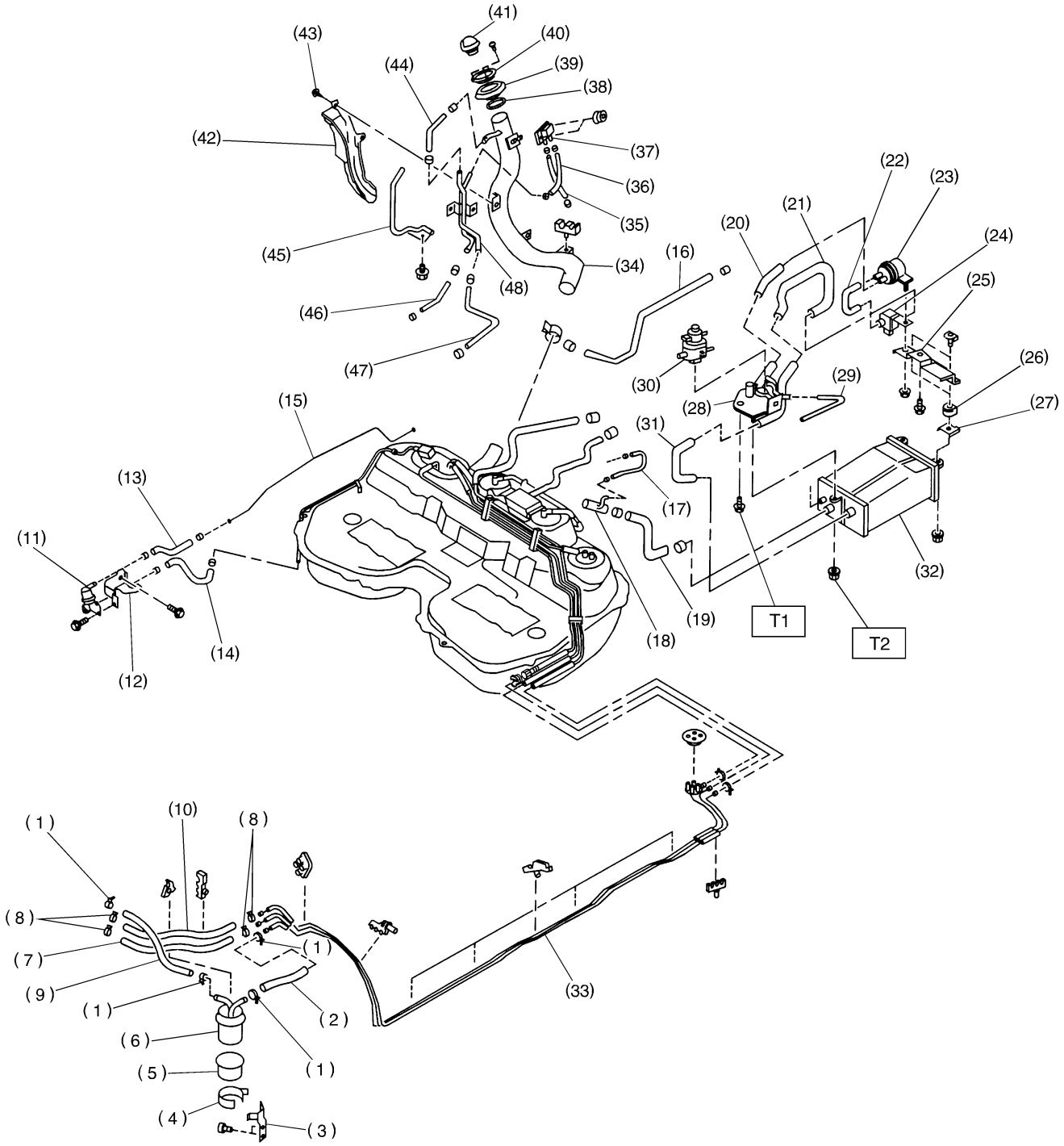


H2M3594A

(1) Heat sealed cover
(2) Fuel tank band
(3) Protector LH
(4) Protector RH
(5) Fuel tank
(6) Canister hose A
(7) Clamp
(8) Fuel pump gasket
(9) Fuel pump ASSY
(10) Fuel cut valve gasket
(11) Fuel cut valve
(12) Evaporation hose A
(13) Clip
(14) Joint pipe
(15) Evaporation hose C
(16) Evaporation hose B
(17) Evaporation hose D
(18) Evaporation hose E
(19) Evaporation pipe ASSY
(20) Retainer
(21) Quick connector
(22) Jet pump hose A
(23) Fuel return hose A
(24) Fuel pipe ASSY
(25) Jet pump hose B
(26) Fuel return hose B
(27) Evaporation hose F
(28) Fuel sub level sensor gasket
(29) Jet pump filter
(30) Fuel sub level sensor
(31) Protector cover
(32) Vent valve hose
(33) Vent valve
(34) Fuel tank pressure sensor
(35) Fuel tank pressure sensor hose
(36) Vent valve gasket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 7.4 (0.75, 5.4)
T3: 33 (3.4, 25)

5. FUEL LINE S105001A0505



H2M3595A

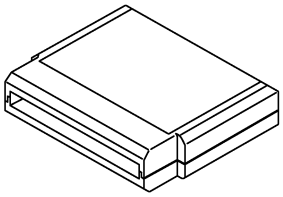
(1) Clamp
(2) Fuel delivery hose A
(3) Fuel filter bracket
(4) Fuel filter holder
(5) Fuel filter cup
(6) Fuel filter
(7) Evaporation hose
(8) Clip
(9) Fuel delivery hose B
(10) Fuel return hose
(11) Roll over valve
(12) Roll over valve bracket
(13) Evaporation hose H
(14) Evaporation hose I
(15) Evaporation pipe B
(16) Evaporation hose J
(17) Evaporation hose K
(18) Joint pipe
(19) Canister hose A
(20) Air filter hose A
(21) Drain valve hose
(22) Air filter hose B
(23) Drain filter
(24) Drain valve
(25) Canister upper bracket
(26) Cushion rubber
(27) Canister lower bracket
(28) Canister holder
(29) Evaporation hose L
(30) Pressure control solenoid valve
(31) Canister hose B
(32) Canister
(33) Fuel pipe ASSY
(34) Fuel filler pipe
(35) Evaporation hose M
(36) Evaporation hose N
(37) Shut valve
(38) Packing
(39) Ring A
(40) Ring B
(41) Fuel filler cap
(42) Fuel filler pipe protector
(43) Tapping screw
(44) Evaporation hose O
(45) Joint pipe
(46) Evaporation hose P
(47) Evaporation hose Q
(48) Evaporation pipe

Tightening torque: N·m (kgf-m, ft-lb)
T1: 17.7 (1.8, 13.0)
T2: 23 (2.3, 16.6)

C: CAUTION S105001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.
- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel on the floor.

D: PREPARATION TOOL S105001A17

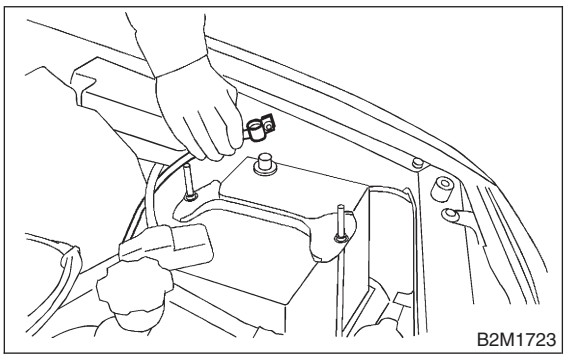
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA130	CARTRIDGE	
 B2M3877	22771AA020	SELECT MONITOR KIT	Troubleshooting for electrical systems. ● English: 22771AA020 (With printer) 22771AA030 (Without printer) ● German: 22771AA040 (With printer) 22771AA070 (Without printer) ● French: 22771AA050 (With printer) 22771AA080 (Without printer) ● Spanish: 22771AA060 (With printer) 22771AA090 (Without printer)

13. Idle Air Control Solenoid Valve S105056

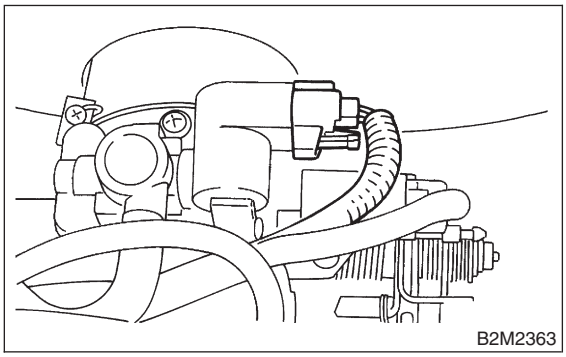
A: REMOVAL S105056A18

1. 2200 cc MODELS S105056A1803

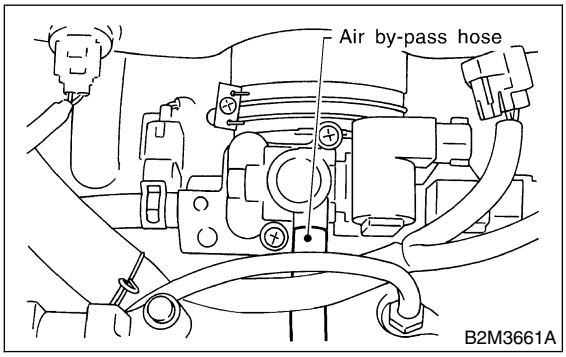
1) Disconnect battery ground cable.



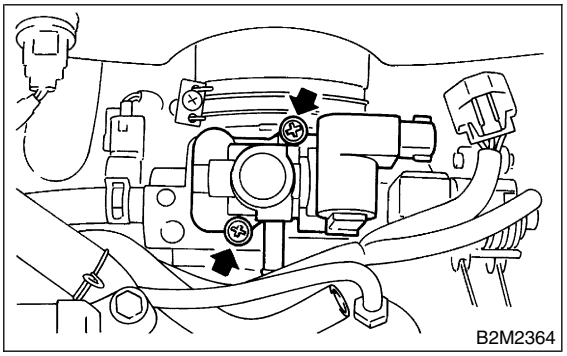
2) Disconnect connector from idle air control solenoid valve.



3) Disconnect air by-pass hose from idle air control solenoid valve.

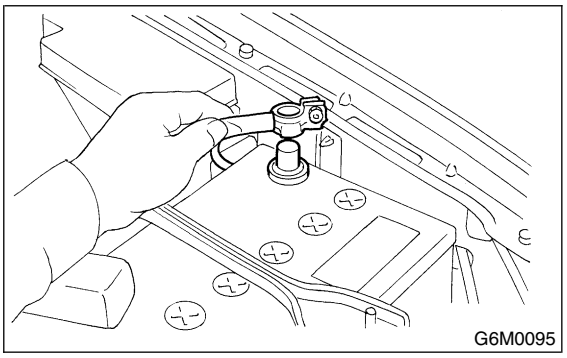


4) Remove idle air control solenoid valve from throttle body.

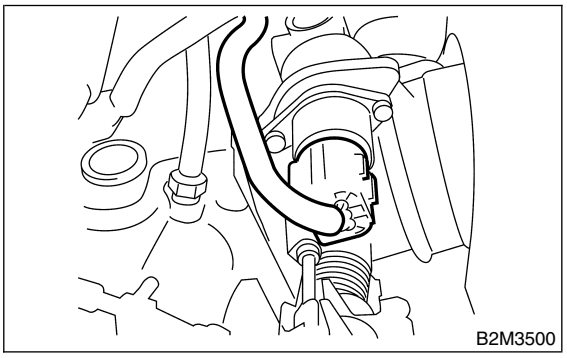


2. 2500 cc MODELS S105056A1804

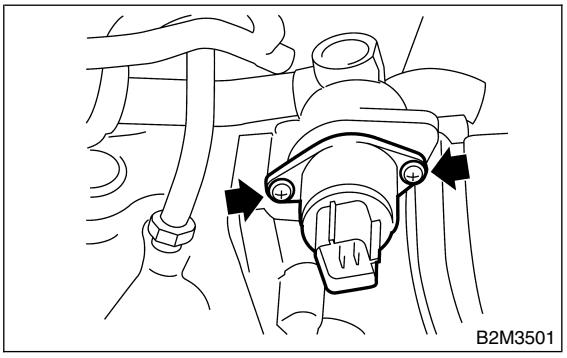
1) Disconnect battery ground cable.



2) Disconnect connector from idle air control solenoid valve.



3) Remove idle air control solenoid valve from throttle body.



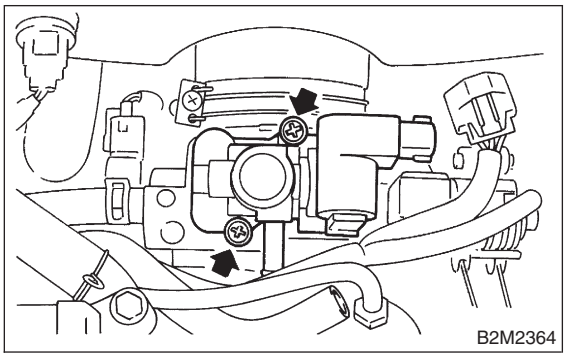
B: INSTALLATION S105056A11

1. 2200 cc MODELS S105056A1103

Install in the reverse order of removal.

CAUTION:
Replace gasket with a new one.

Tightening torque:
6.0 N·m (0.61 kgf-m, 4.4 ft-lb)

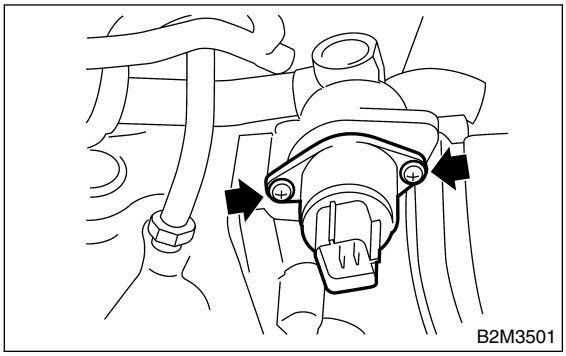


2. 2500 cc MODELS S105056A1104

Install in the reverse order of removal.

CAUTION:
Always use new gasket.

Tightening torque:
6.0 N·m (0.61 kgf-m, 4.4 ft-lb)

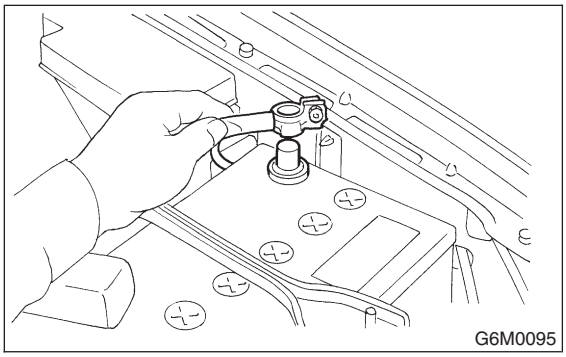


11. Intake Air Temperature and Pressure Sensor S105044

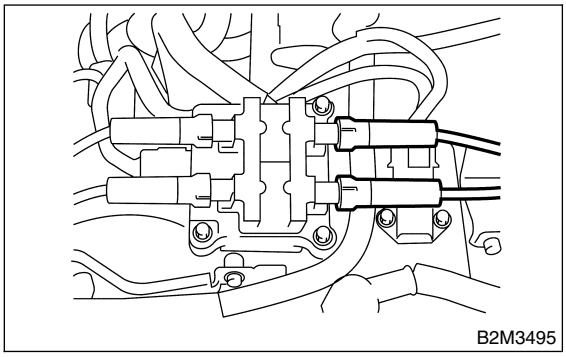
A: REMOVAL S105044A18

NOTE:
This sensor is installed on 2500 cc models only.

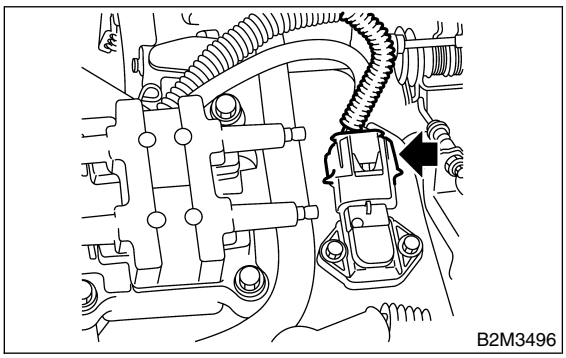
1) Disconnect battery ground cable.


G6M0095

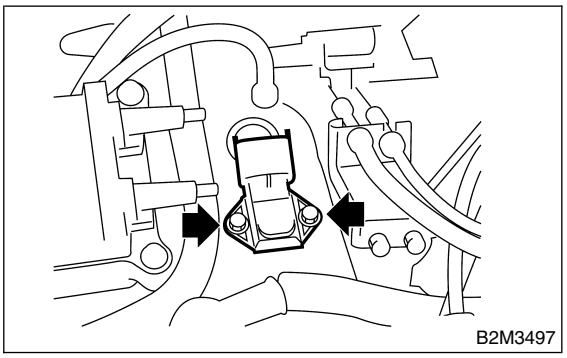
2) Disconnect spark plug cord from ignition coil and ignitor assembly.


B2M3495

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


B2M3496

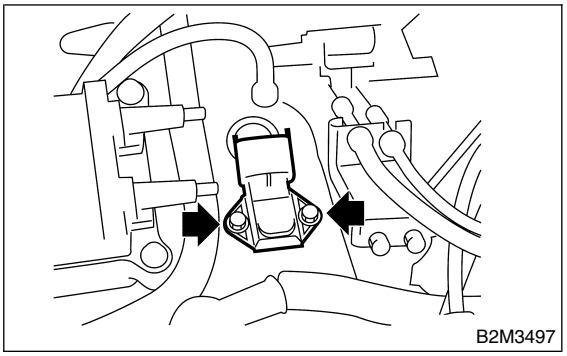
4) Remove intake air temperature and pressure sensor.


B2M3497

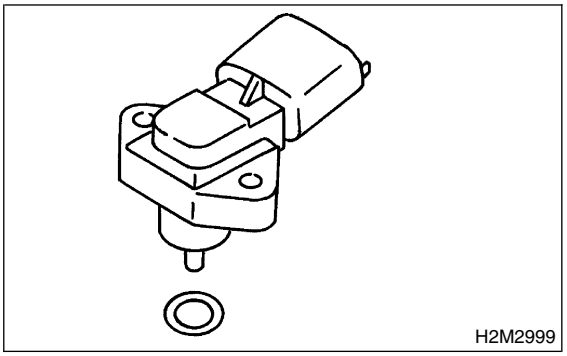
B: INSTALLATION S105044A11

Install in the reverse order of removal.

Tightening torque:
2.0 N·m (0.2 kgf-m, 1.4 ft-lb)


B2M3497

CAUTION:
Replace O-ring with new one.

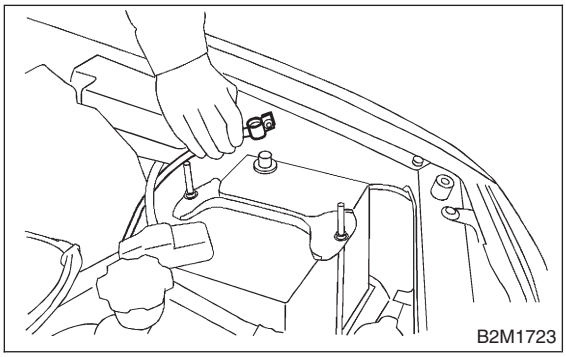

H2M2999

10. Intake Air Temperature Sensor S105569

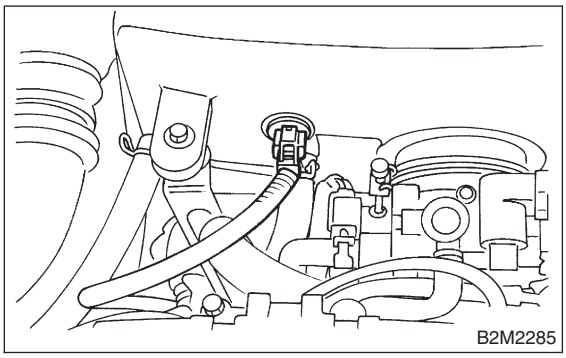
A: REMOVAL S105569A18

NOTE:
This sensor is installed on 2200 cc models only.

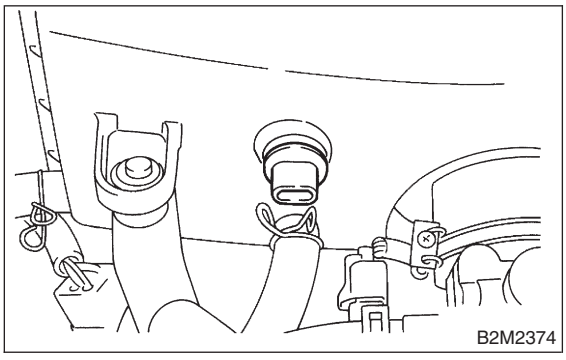
1) Disconnect battery ground cable.



2) Disconnect connector from intake air temperature sensor.



3) Remove intake air temperature sensor from air cleaner case.



B: INSTALLATION S105569A11

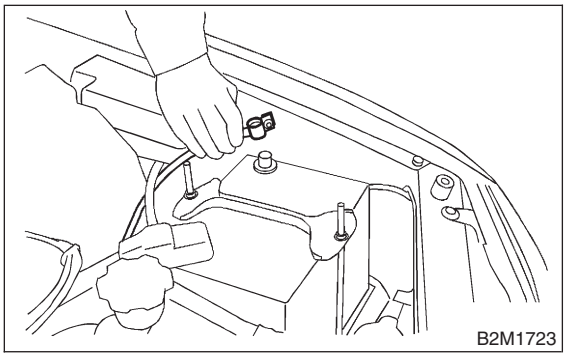
Install in the reverse order of removal.

9. Intake Manifold Pressure Sensor S105568

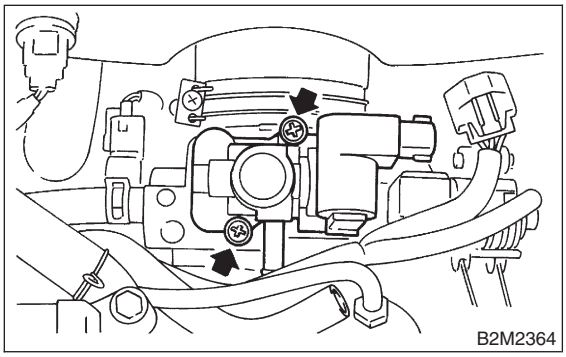
A: REMOVAL S105568A18

NOTE:
This sensor is installed on 2200 cc models only.

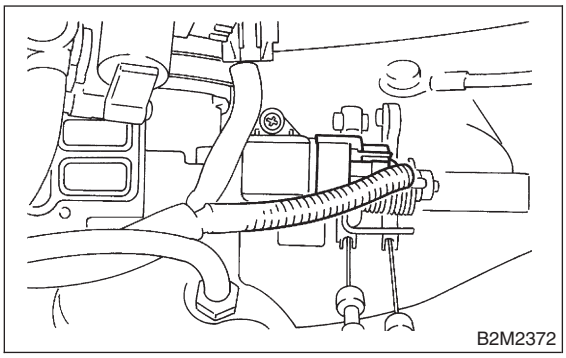
1) Disconnect battery ground cable.


B2M1723

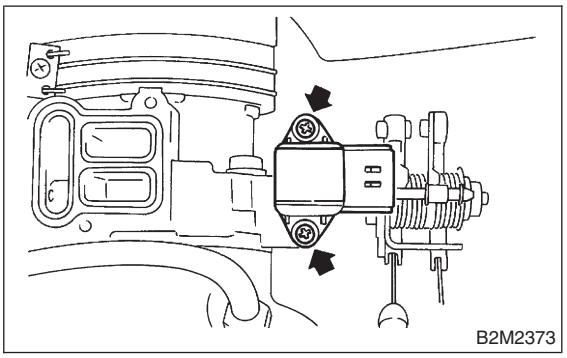
2) Remove idle air control solenoid valve. <Ref. to FU-51 REMOVAL, Idle Air Control Solenoid Valve.>


B2M2364

3) Disconnect connector from intake manifold pressure sensor.


B2M2372

4) Remove intake manifold pressure sensor from throttle body.

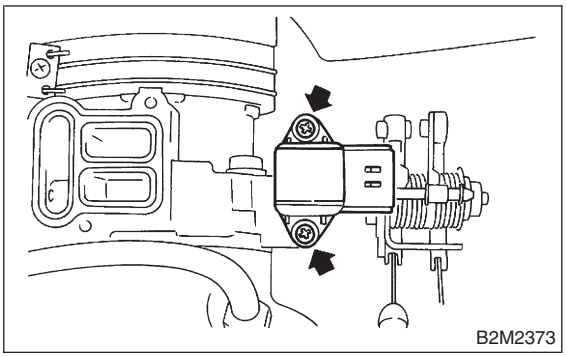

B2M2373

B: INSTALLATION S105568A11

Install in the reverse order of removal.

CAUTION:
Replace gaskets for intake air pressure sensor and idle air control solenoid valve with new ones.

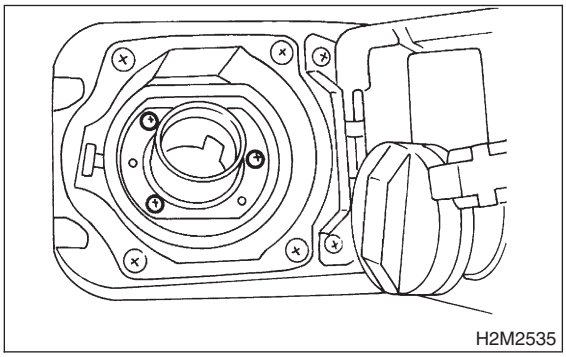
Tightening torque:
2.2 N·m (0.22 kgf-m, 1.6 ft-lb)


B2M2373

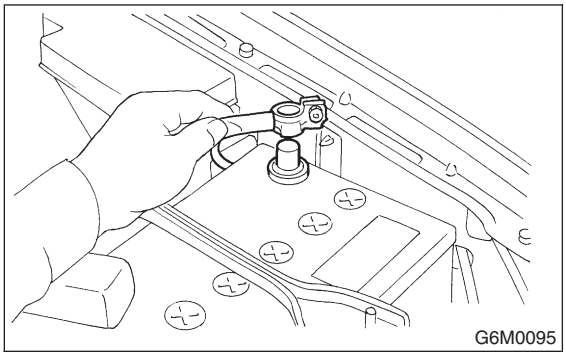
3. Intake Manifold S105034

A: REMOVAL S105034A18

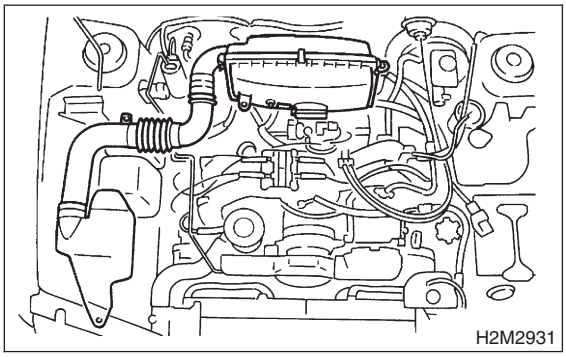
1) Release fuel pressure. <Ref. to FU-64 RELEASING OF FUEL PRESSURE, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


H2M2535

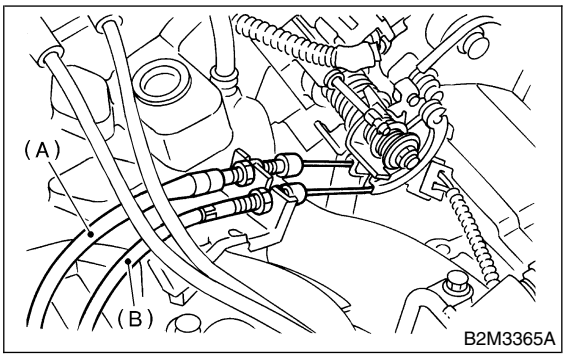
3) Disconnect battery ground cable.


G6M0095

4) Remove air intake duct <Ref. to IN-5 REMOVAL, Air Intake Duct.> and air cleaner assembly. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>

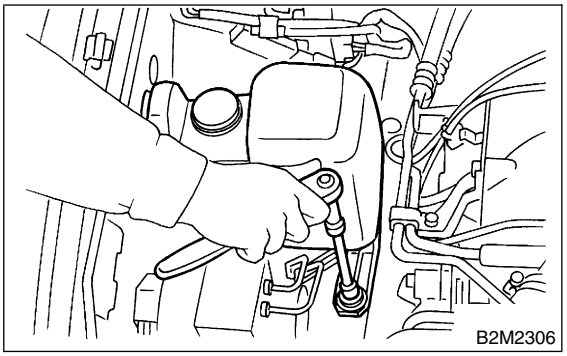

H2M2931

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

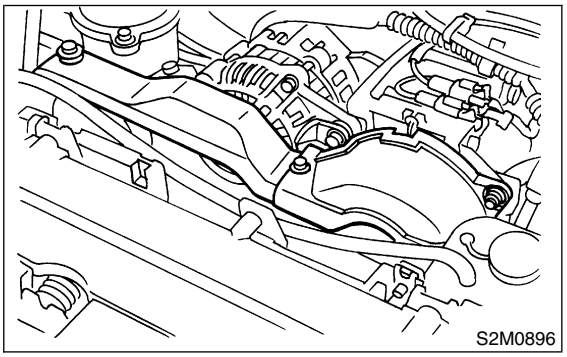


B2M3365A

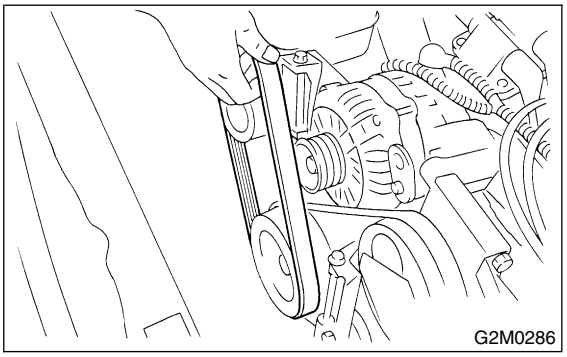
7) Remove power steering pump and tank from brackets.
(1) Remove resonator chamber.


B2M2306

(2) Remove V-belt covers.

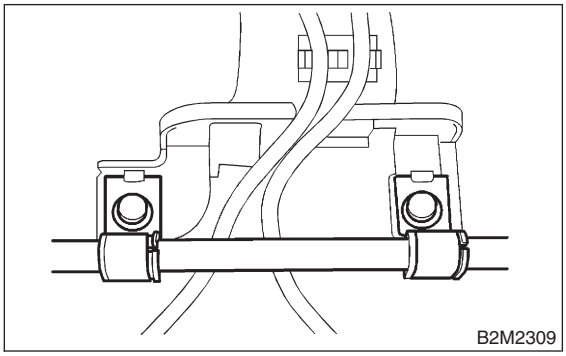

S2M0896

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

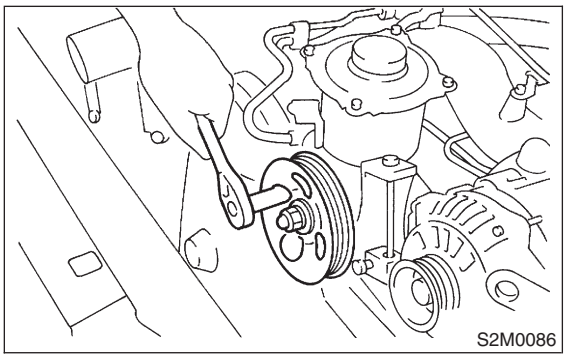

G2M0286

(4) Remove bolts which secure power steering pipe brackets to intake manifold.

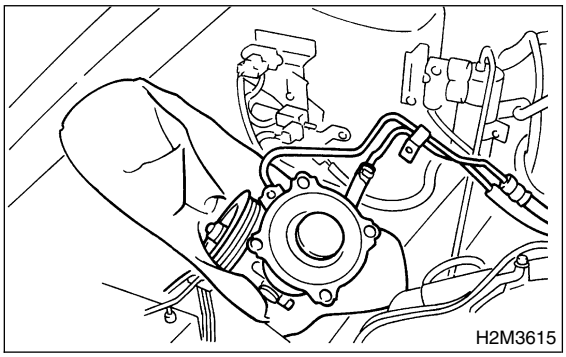
NOTE:
Do not disconnect power steering hose.


B2M2309

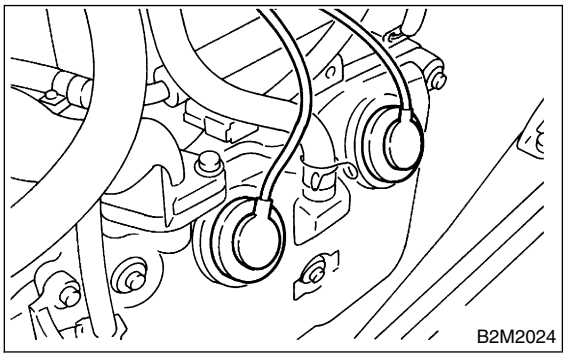
(5) Remove bolts which install power steering pump to bracket.


S2M0086

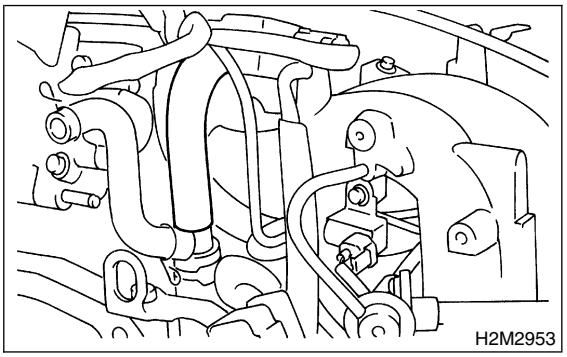
(6) Place power steering pump on the right side wheel apron.


H2M3615

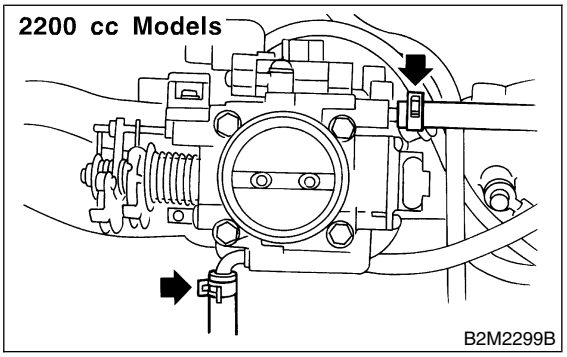
8) Disconnect spark plug cords from spark plugs.


B2M2024

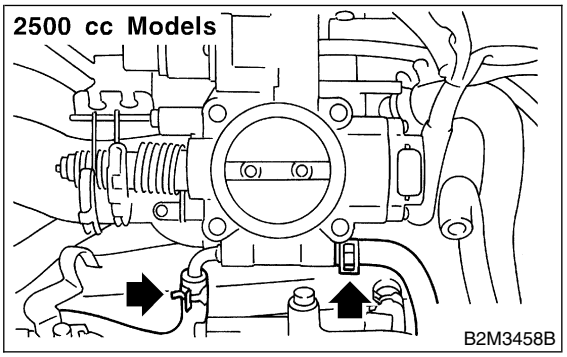
9) Disconnect PCV hose from intake manifold.


H2M2953

10) Disconnect engine coolant hose from throttle body.

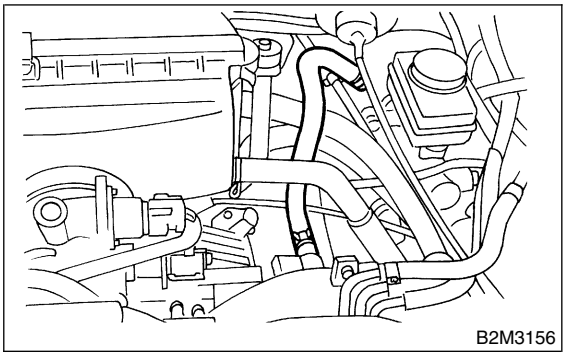


B2M2299B

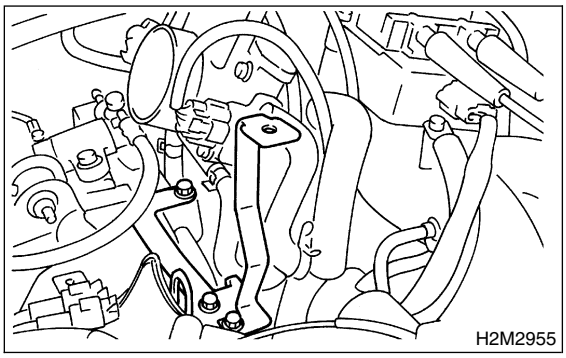


B2M3458B

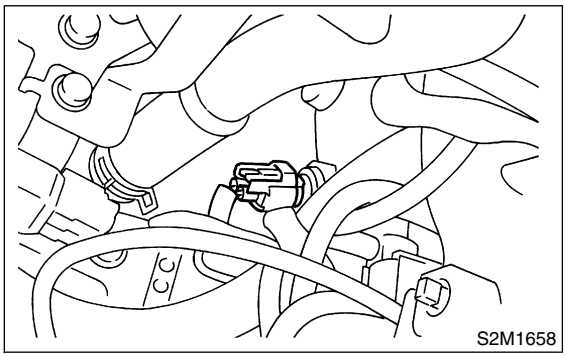
11) Disconnect brake booster hose.


B2M3156

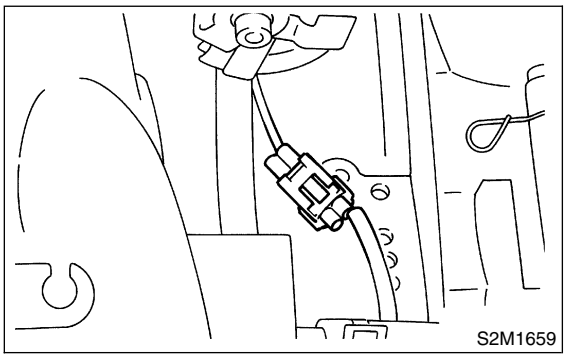
12) Remove air cleaner case stay RH and engine harness bracket, and disconnect engine harness connectors from bulkhead harness connectors.



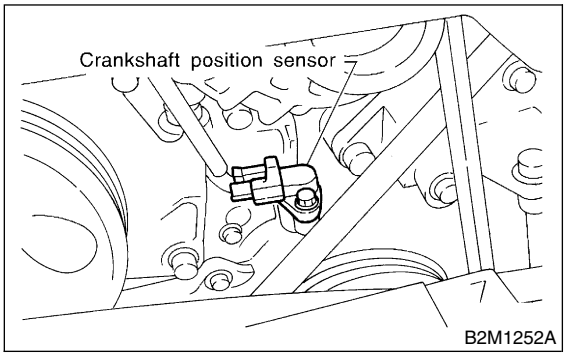
13) Disconnect connectors from engine coolant temperature sensor.



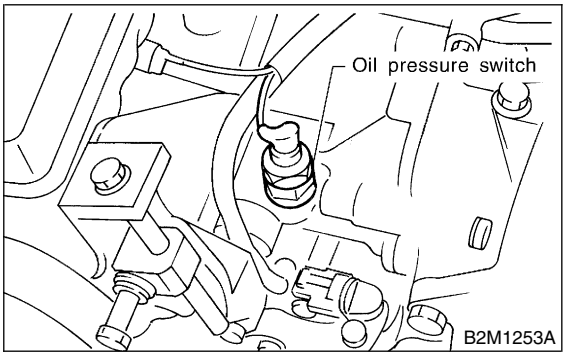
14) Disconnect knock sensor connector.



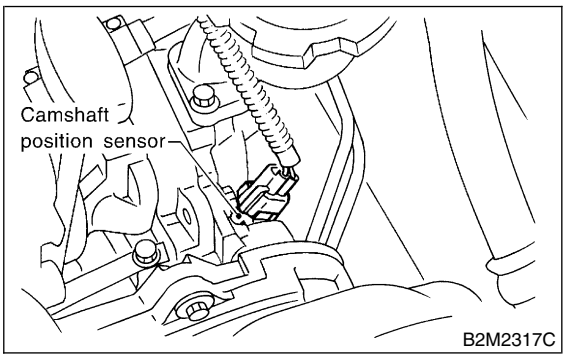
15) Disconnect connector from crankshaft position sensor.



16) Disconnect connector from oil pressure switch.

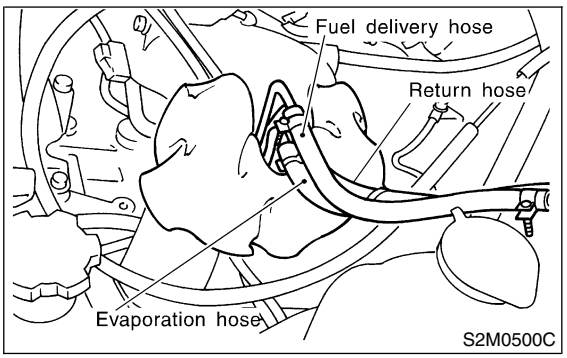


17) Disconnect connector from camshaft position sensor.

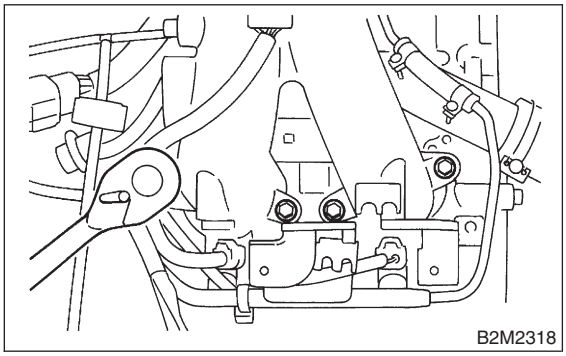


18) Disconnect fuel hoses from fuel pipes.

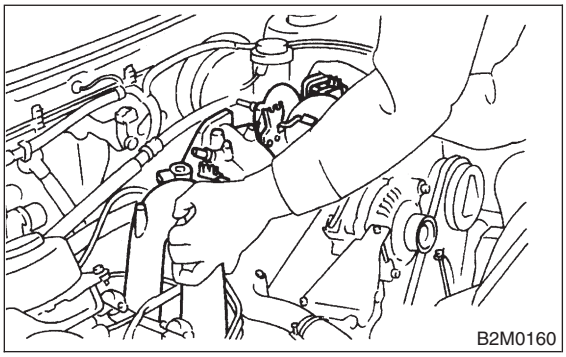
WARNING:
- **Do not spill fuel.**
- **Catch fuel from hoses in a container or cloth.**



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



20) Remove intake manifold.

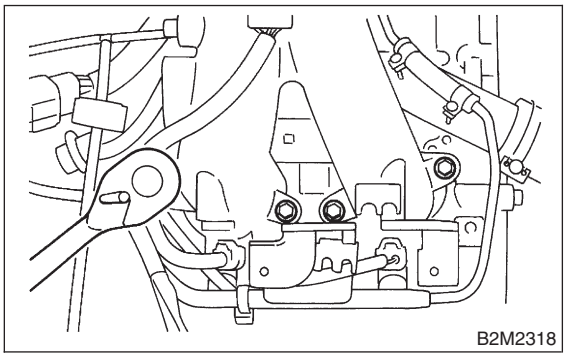


B: INSTALLATION S105034A11

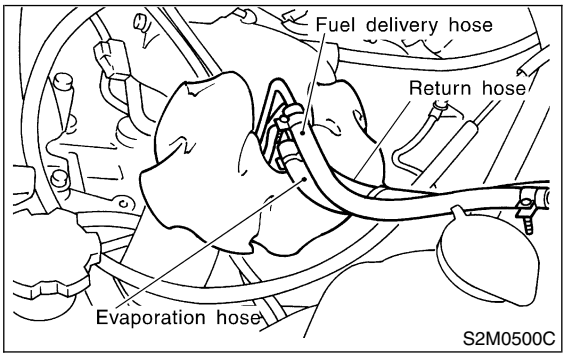
1) Install intake manifold onto cylinder heads.

CAUTION:
Always use new gaskets.

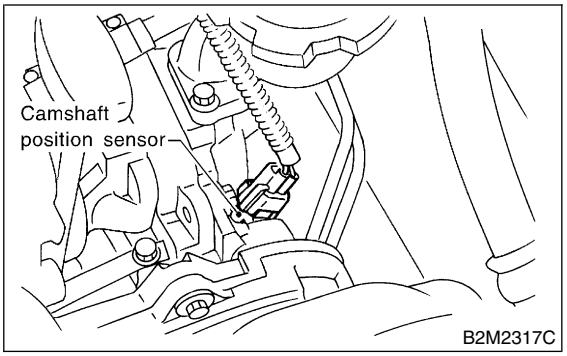
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



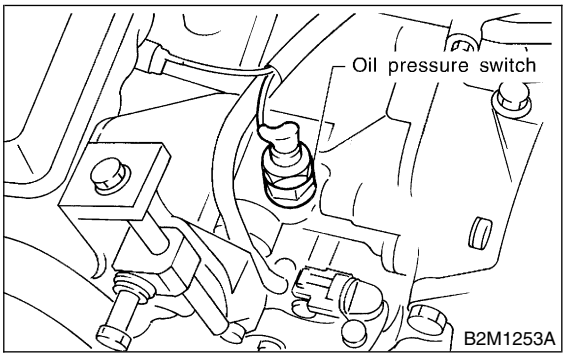
2) Connect fuel hoses.



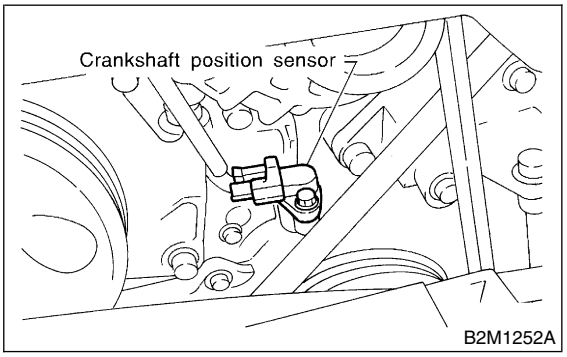
3) Connect connector to camshaft position sensor.



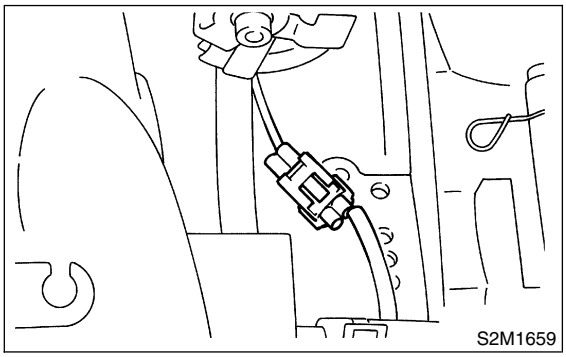
4) Connect connector to oil pressure switch.



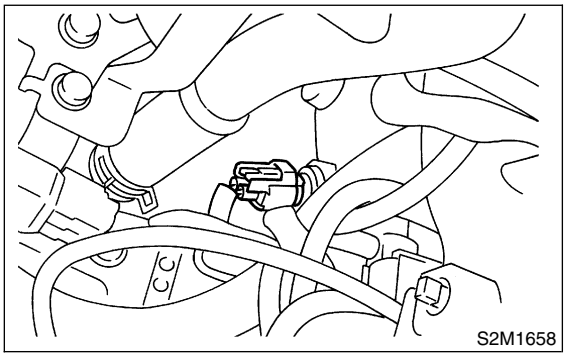
5) Connect connector to crankshaft position sensor.



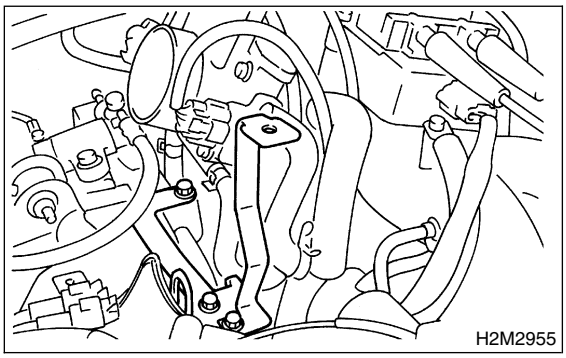
6) Connect knock sensor connector.



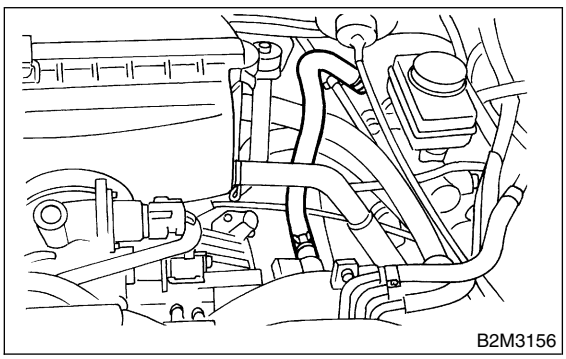
7) Connect connectors to engine coolant temperature sensor.



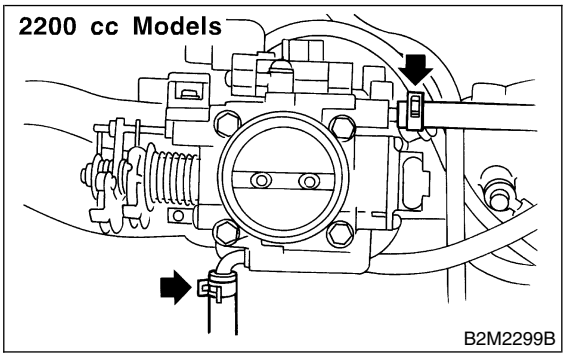
8) Install air cleaner case stay RH and engine harness bracket, and connect engine harness connectors to bulkhead connectors.

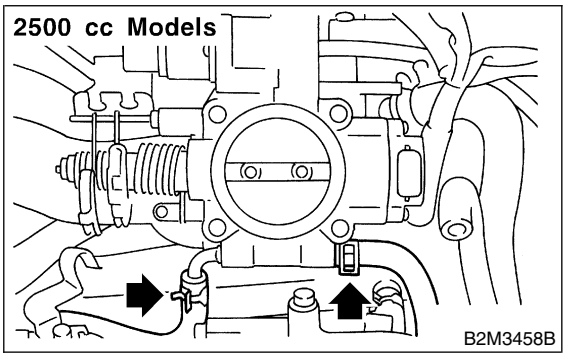


9) Connect brake booster hose.

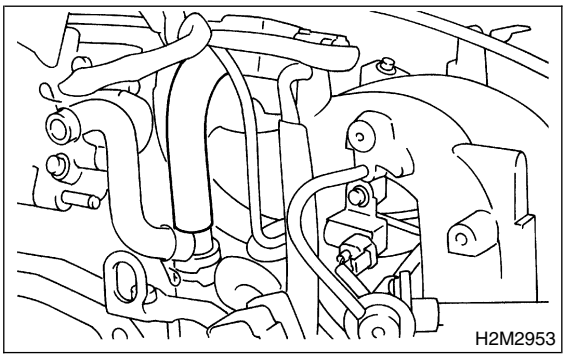


10) Connect engine coolant hose to throttle body.

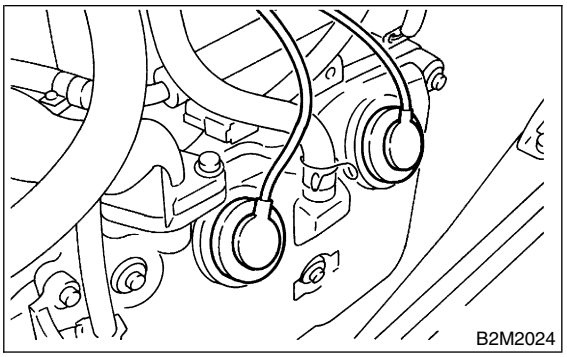




11) Connect PCV hose to intake manifold.

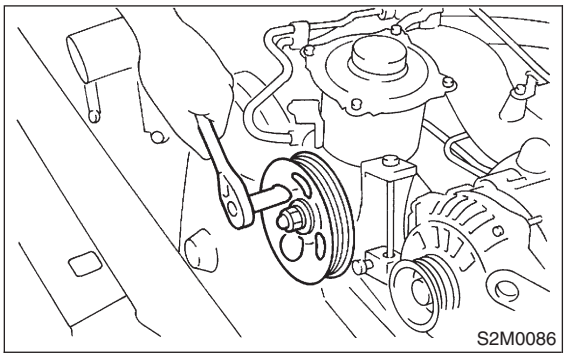


12) Connect spark plug cords to spark plugs.

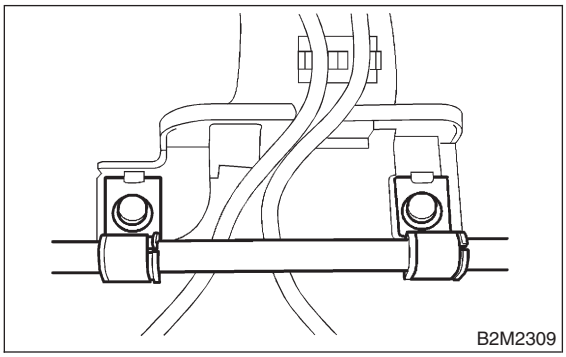


13) Install power steering pump on bracket.
(1) Tighten bolts which install power steering pump on bracket.

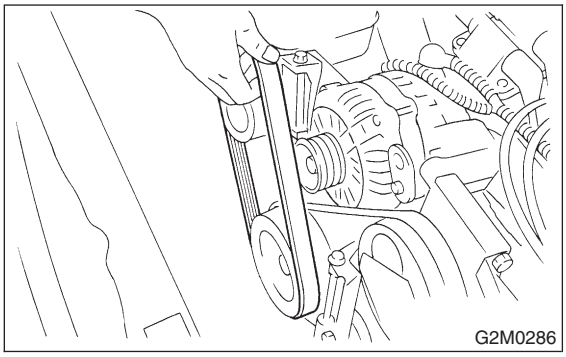
Tightening torque:
20.1 N·m (2.05 kgf-m, 14.8 ft-lb)


S2M0086

(2) Install power steering pipe brackets on the right side of intake manifold.

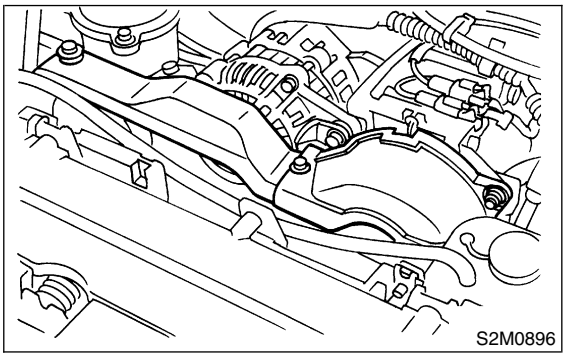

B2M2309

(3) Install power steering drive V-belt.


G2M0286

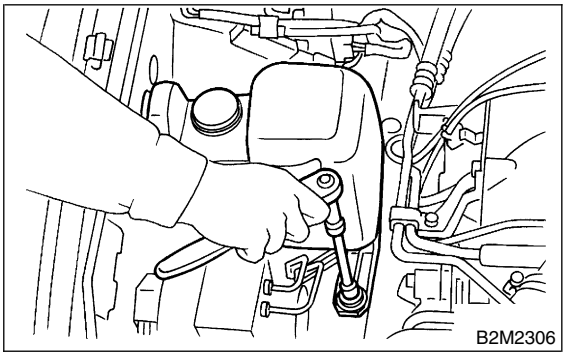
(4) Adjust V-belt. <Ref. to ME-48 INSPECTION, V-belt.>

(5) Install V-belt covers.

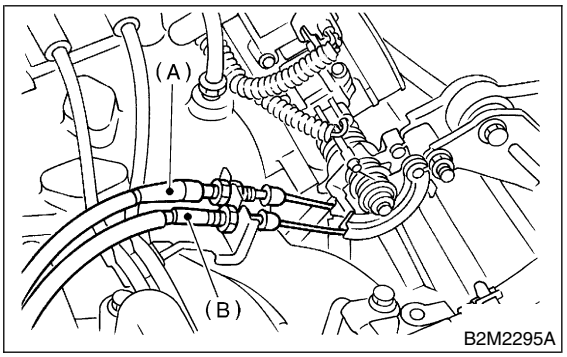

S2M0896

(6) Install resonator chamber.

Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)

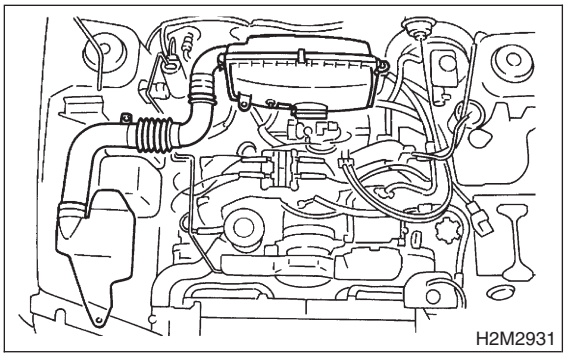

B2M2306

14) Connect accelerator cable (A).
15) Connect cruise control cable (B). (With cruise control models)

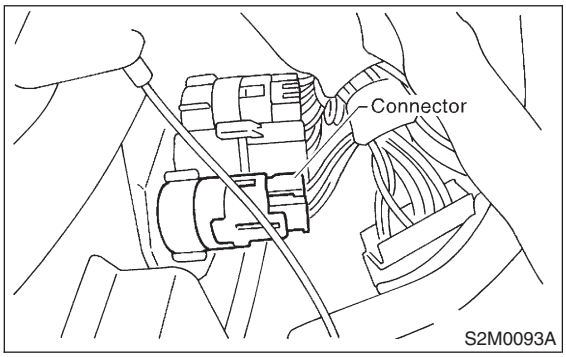


B2M2295A

16) Install air intake duct <Ref. to IN-5 INSTALLATION, Air Intake Duct.> and air cleaner assembly. <Ref. to IN-4 INSTALLATION, Air Cleaner Case.>

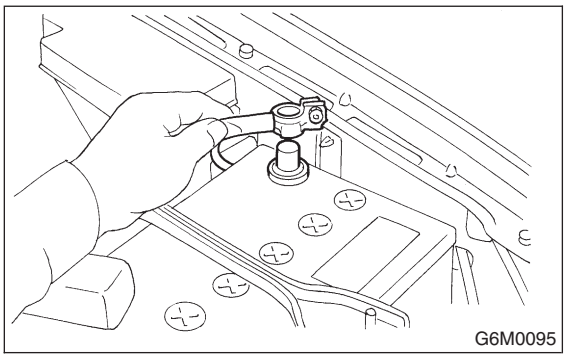

H2M2931

17) Connect connector to fuel pump relay.



S2M0093A

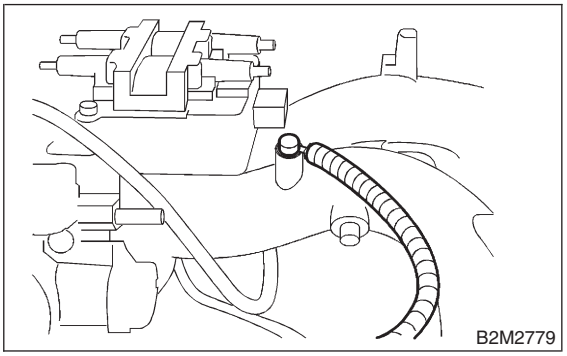
18) Connect battery ground cable.


G6M0095

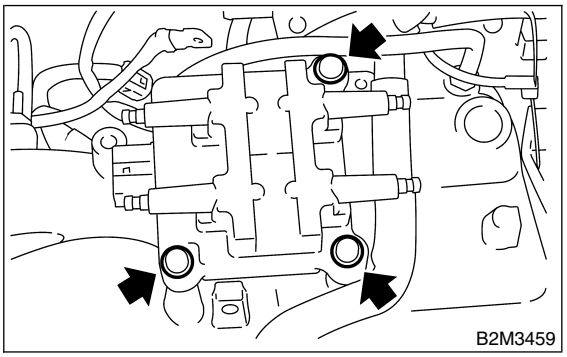
C: DISASSEMBLY S105034A06

1. 2200 cc MODELS S105034A0603

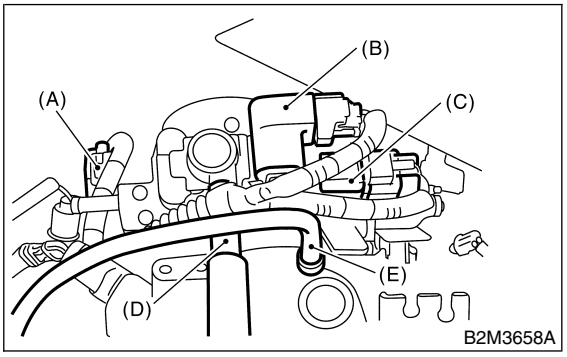
1) Disconnect engine ground terminal from intake manifold.


B2M2779

2) Disconnect connector from ignition coil and ignitor assembly.
3) Remove ignition coil and ignitor assembly.

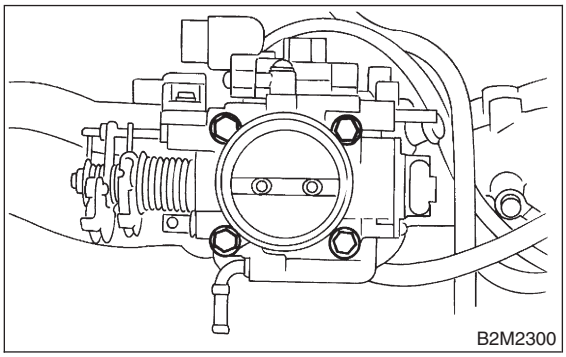

B2M3459

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.

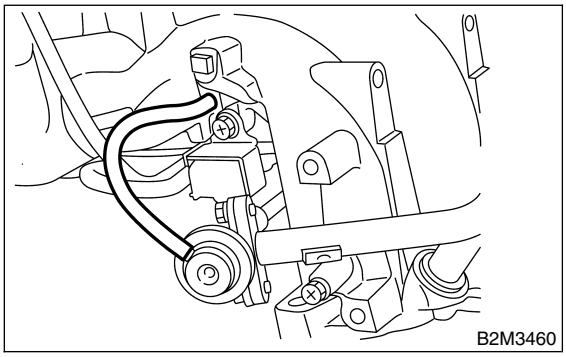


B2M3658A

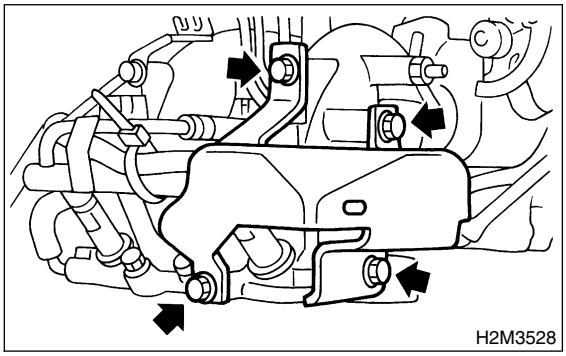
7) Remove throttle body.


B2M2300

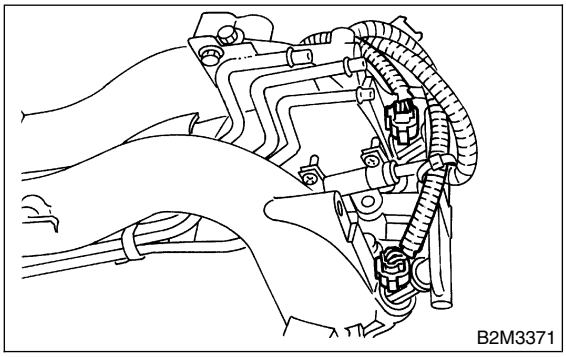
8) Disconnect pressure regulator vacuum hose from intake manifold.


B2M3460

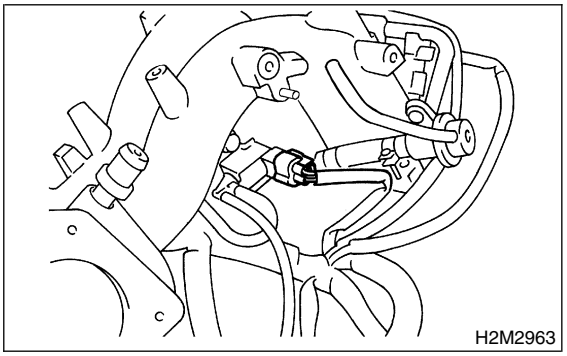
9) Remove fuel pipe protector LH.


H2M3528

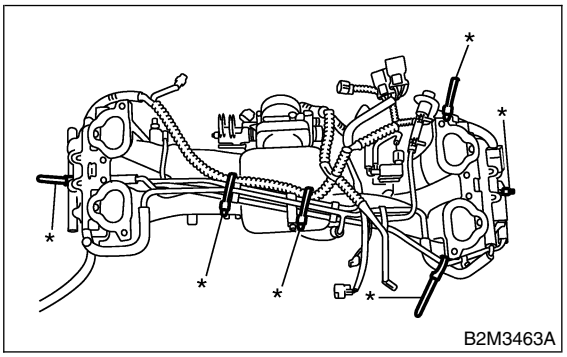
10) Disconnect connectors from fuel injectors.


B2M3371

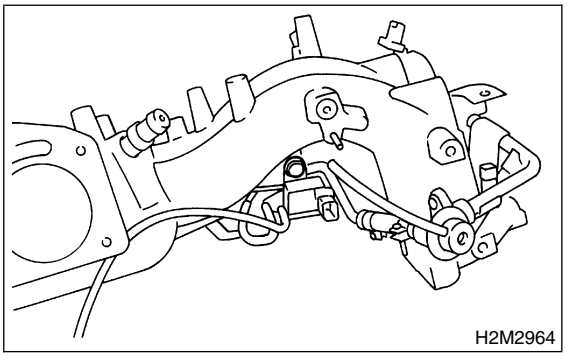
11) Disconnect connector from purge control solenoid valve.


H2M2963

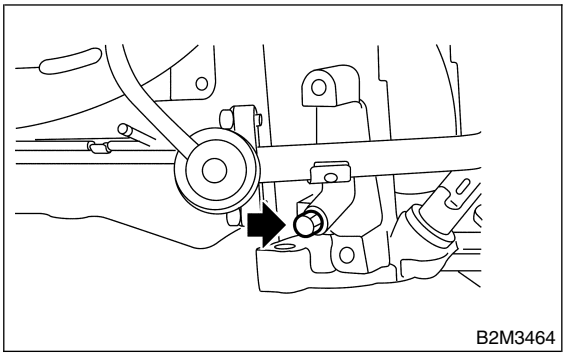
12) Remove harness bands (*) which hold engine harness onto intake manifold.


B2M3463A

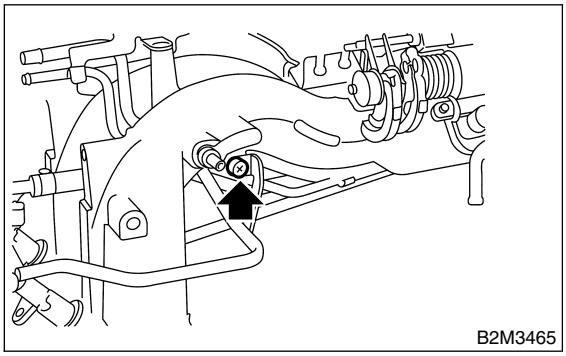
13) Remove engine harness from intake manifold.
14) Remove purge control solenoid valve.


H2M2964

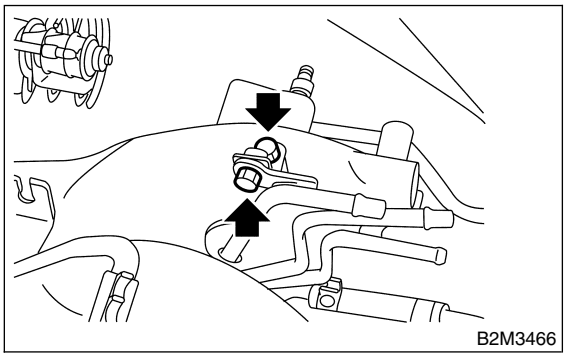
15) Remove bolt which installs injector pipe on intake manifold as shown in figure.


B2M3464

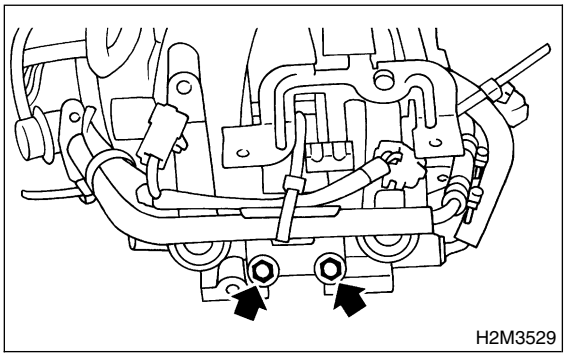
16) Remove bolt which installs injector pipe on intake manifold.



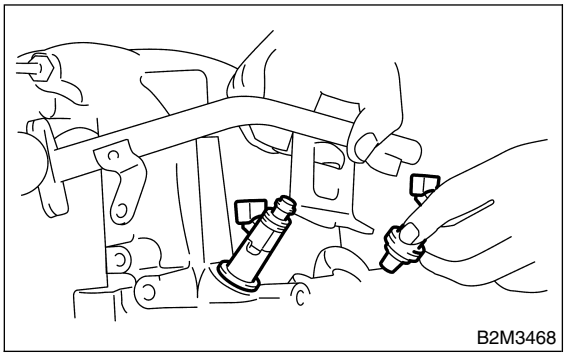
17) Remove two bolts which hold fuel pipes on the left side of intake manifold.



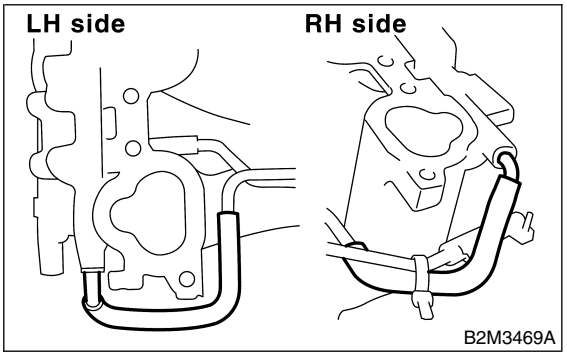
18) Remove bolt which installs injector pipe on intake manifold.



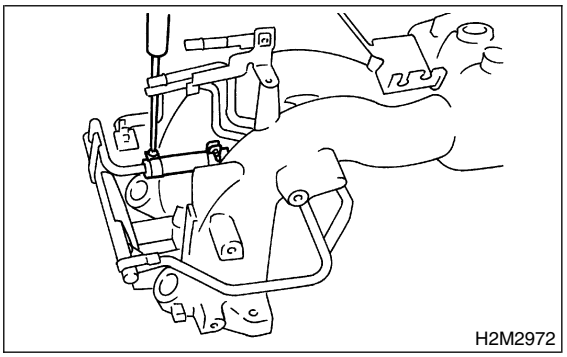
19) Remove fuel injector while lifting up fuel injector pipe.



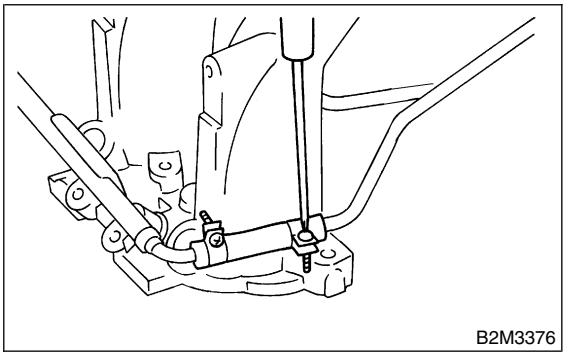
20) Disconnect air by-pass hoses from intake manifold.



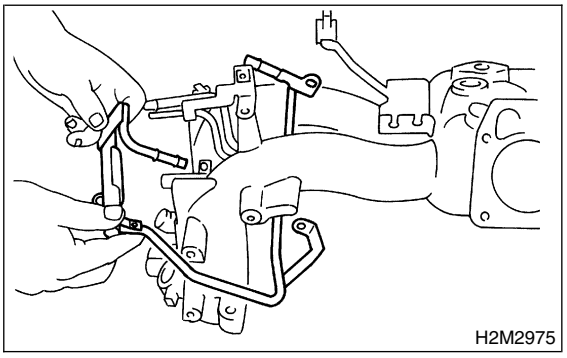
21) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.



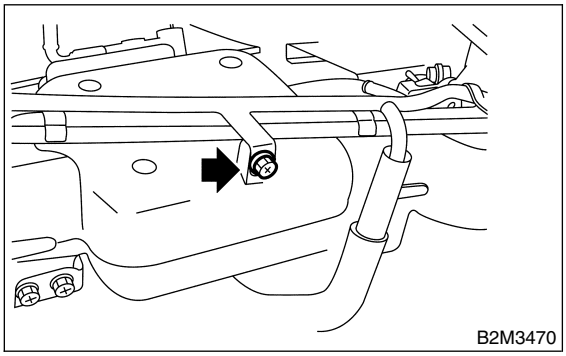
22) Loosen clamp which holds front right side fuel hose to injector pipe and remove the pipe from clamp.



23) Remove fuel injector pipe.



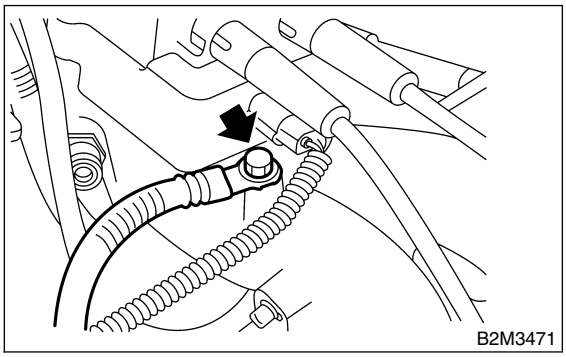
24) Remove bolt which installs fuel pipes on intake manifold.


B2M3470

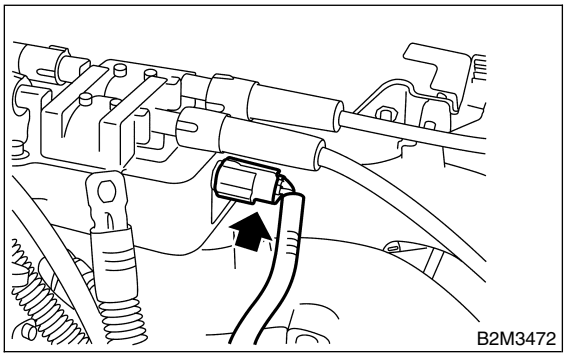
25) Remove fuel pipe assembly and pressure regulator, from intake manifold.

2. 2500 cc MODELS *S105034A0604*

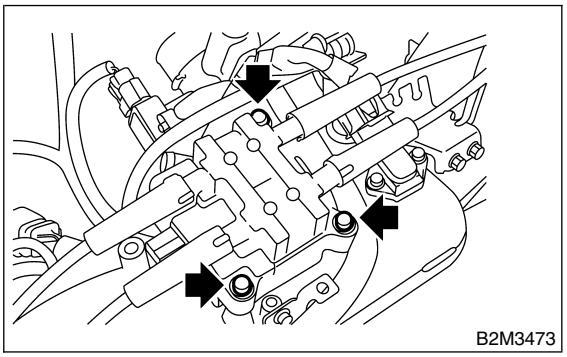
1) Disconnect engine ground terminal from intake manifold.


B2M3471

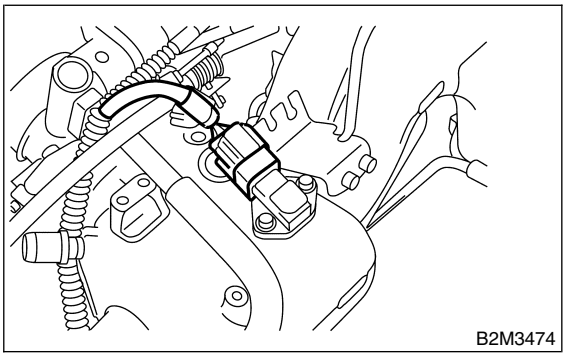
2) Disconnect connector from ignition coil and ignitor assembly.


B2M3472

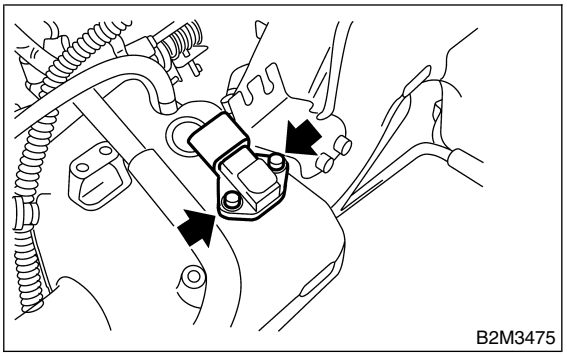
3) Remove ignition coil and ignitor assembly.


B2M3473

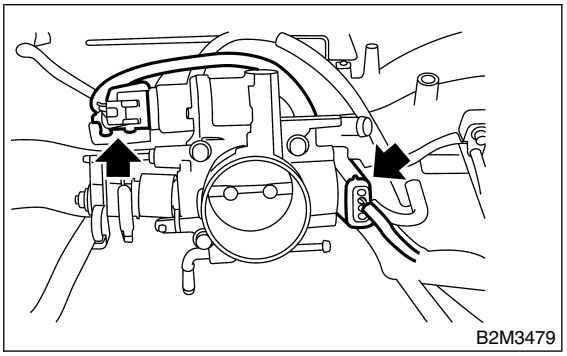
4) Disconnect connector from intake air temperature and pressure sensor.


B2M3474

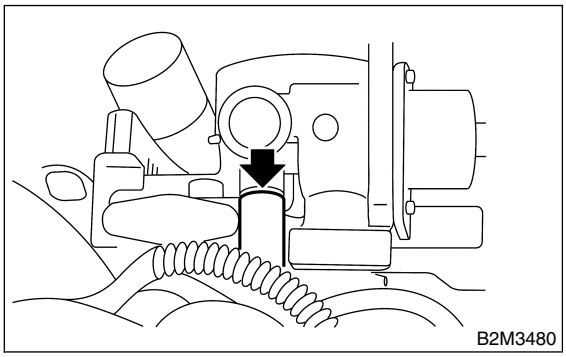
5) Remove intake air temperature and pressure sensor from intake manifold.


B2M3475

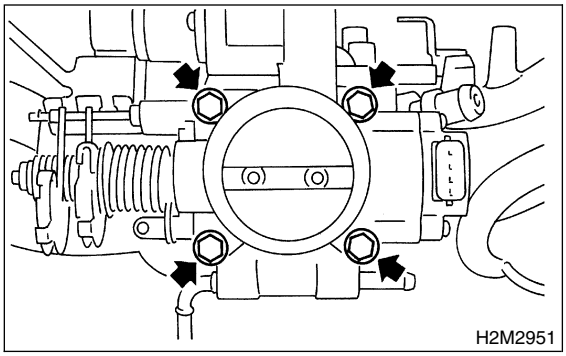
6) Disconnect connectors from throttle position sensor and idle air control solenoid valve.


B2M3479

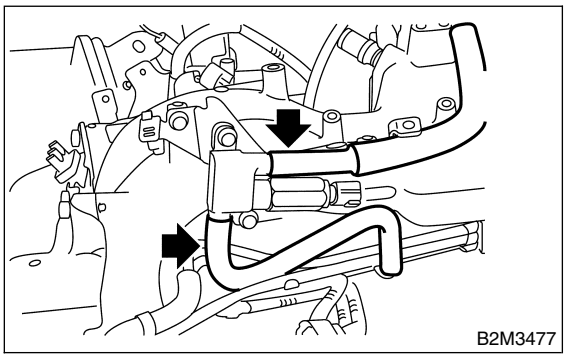
7) Disconnect air by-pass hose from throttle body.



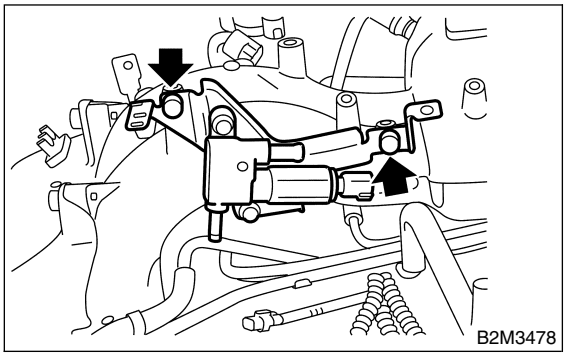
8) Remove throttle body.



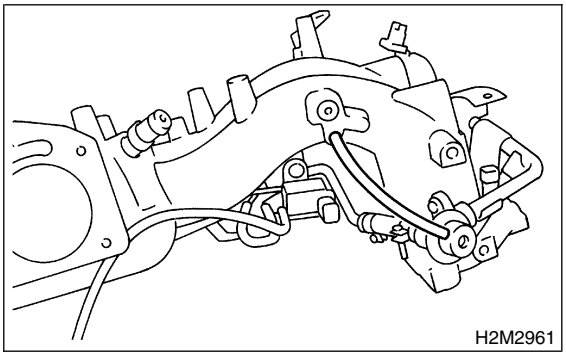
9) Disconnect connector from air assist injector solenoid valve.
10) Disconnect air by-pass hoses from air assist solenoid valve.



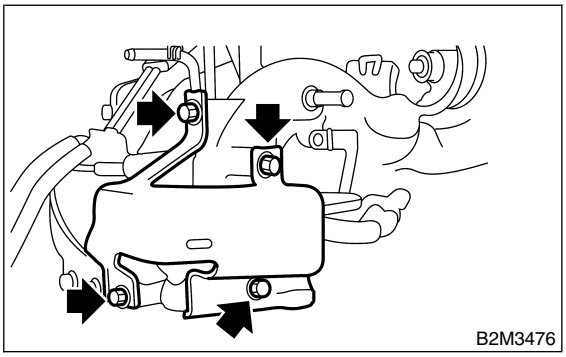
11) Remove air assist injector solenoid valve from intake manifold.



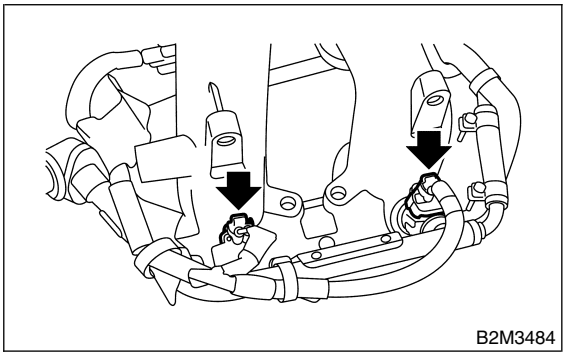
12) Disconnect pressure regulator vacuum hose from intake manifold.



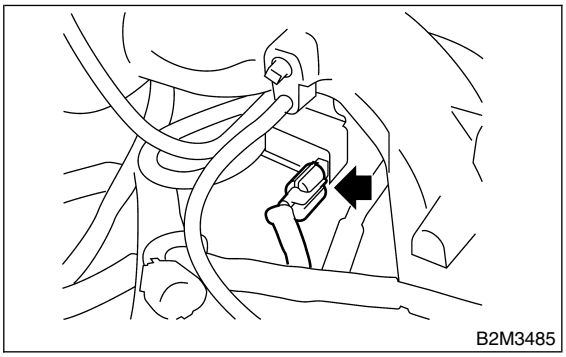
13) Remove fuel pipe protector LH.



14) Disconnect connectors from fuel injectors.



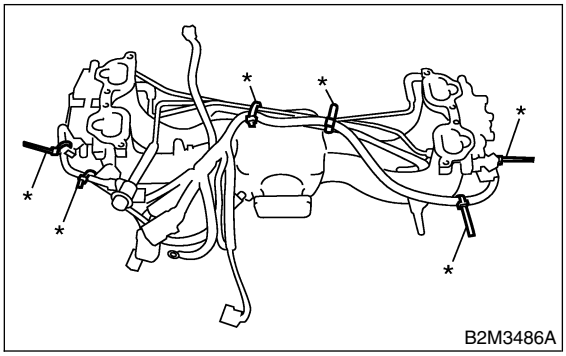
15) Disconnect connector from purge control solenoid valve.



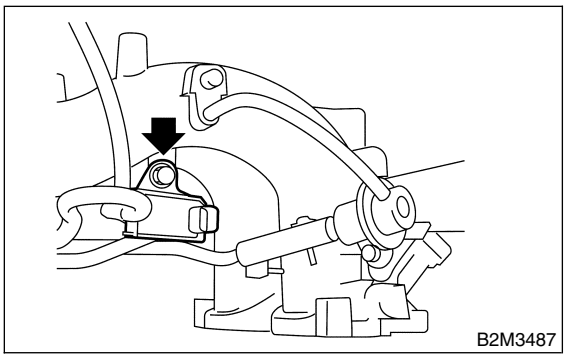
16) Disconnect air by-pass hose from purge control solenoid valve.

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

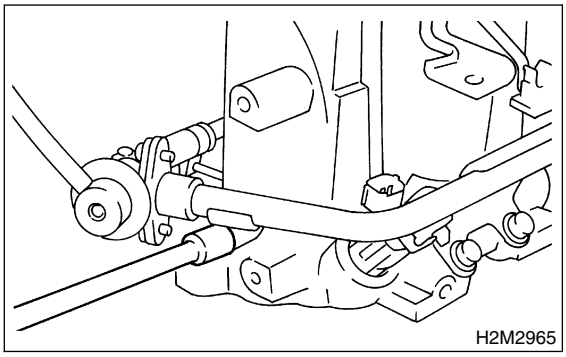
NOTE:
There is no harness band under the fuel protector.



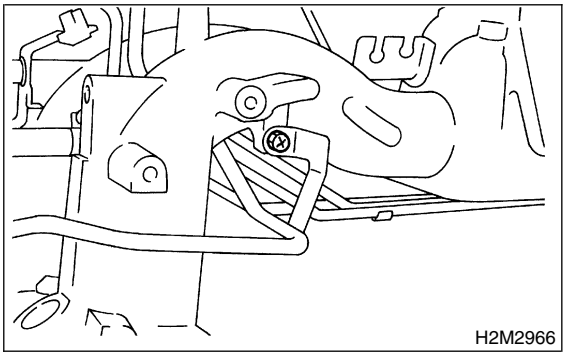
18) Remove engine harness from intake manifold.
19) Remove purge control solenoid valve.



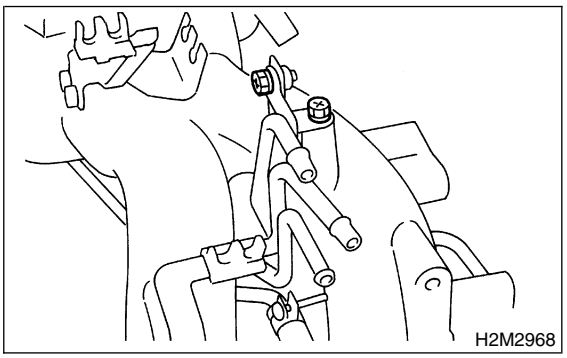
20) Remove bolt which installs injector pipe on intake manifold as shown in figure.



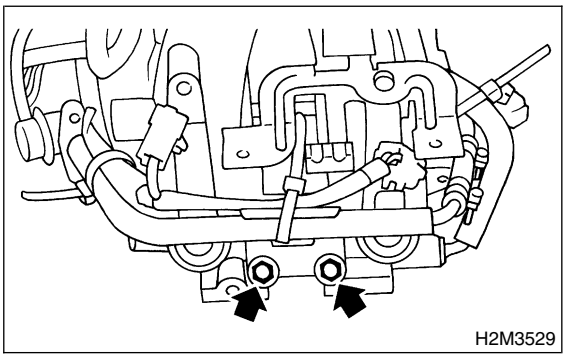
21) Remove bolt which installs injector pipe on intake manifold.



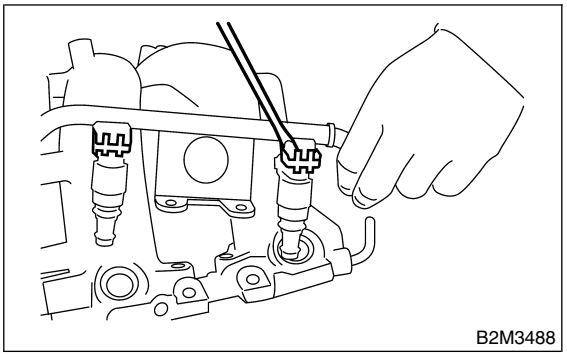
22) Remove two bolts which hold fuel pipes on the left side of intake manifold.



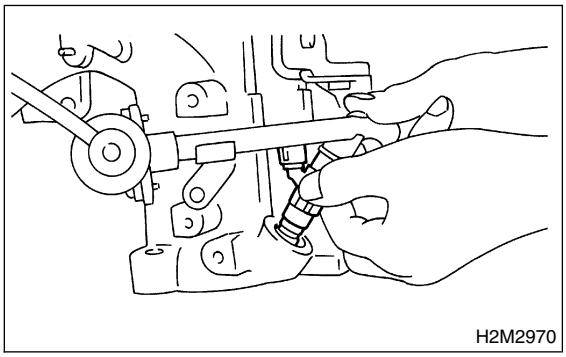
23) Remove bolt which installs injector pipe on intake manifold.



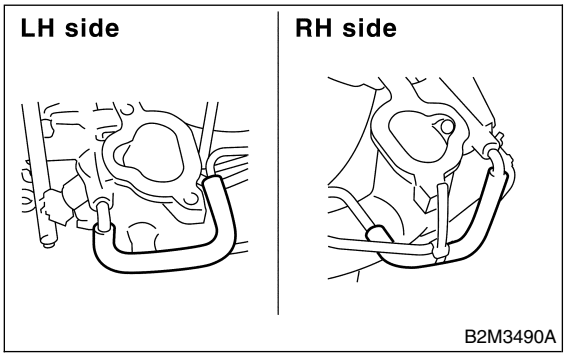
24) Remove fuel injectors.
(1) Remove fuel injector securing clip.



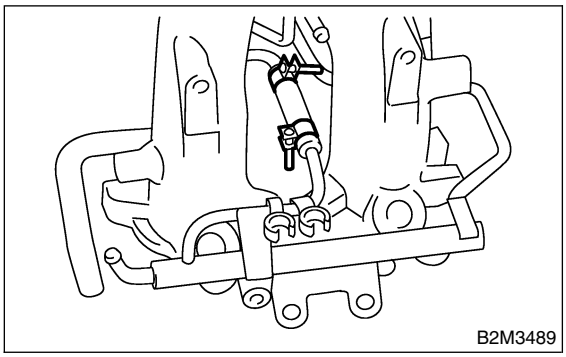
(2) Remove fuel injector while lifting up fuel injector pipe.



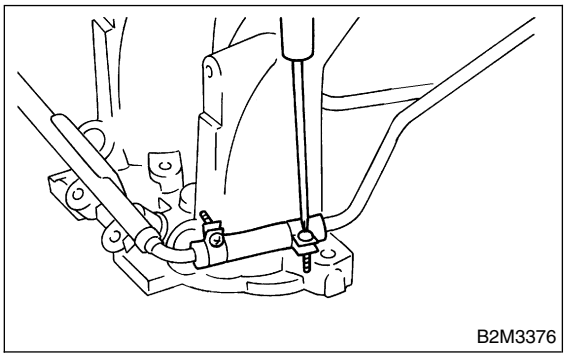
25) Disconnect air by-pass hoses from intake manifold.



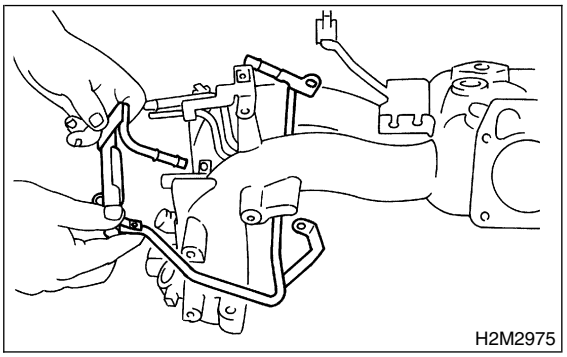
26) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.



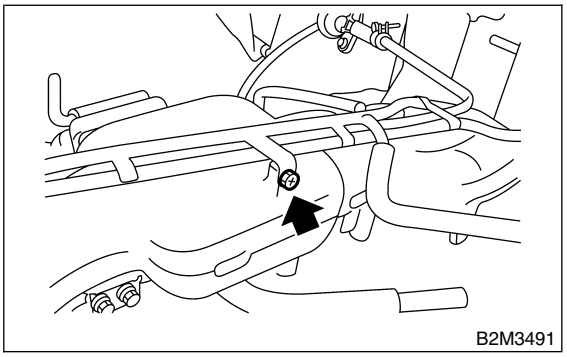
27) Loosen clamp which holds front right side fuel hose to injector pipe and remove the pipe from clamp.



28) Remove fuel injector pipe.



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



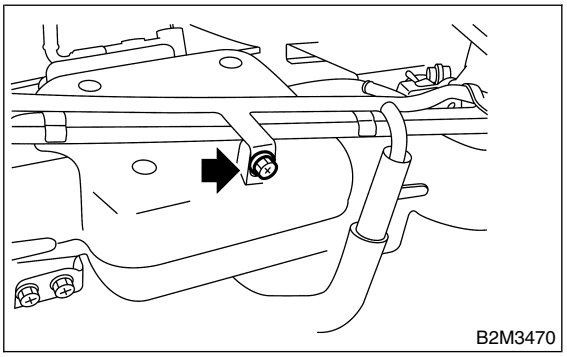
30) Remove fuel pipe assembly and pressure regulator, from intake manifold.

D: ASSEMBLY S105034A02

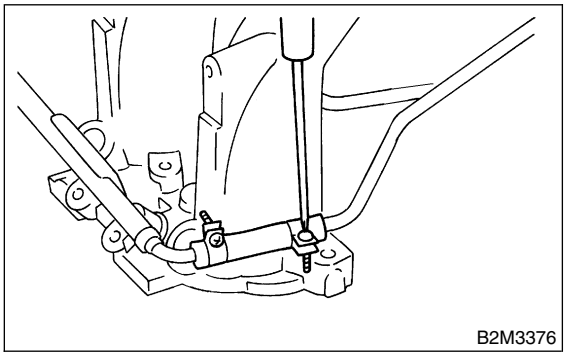
1. 2200 cc MODELS S105034A0203

1) Install fuel pipe assembly and pressure regulator, etc. to intake manifold.
2) Tighten bolt which installs fuel pipes on intake manifold.

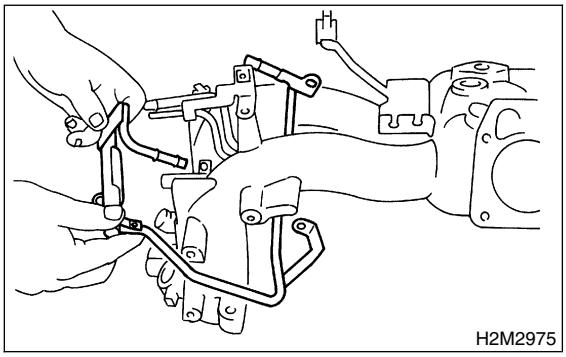
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



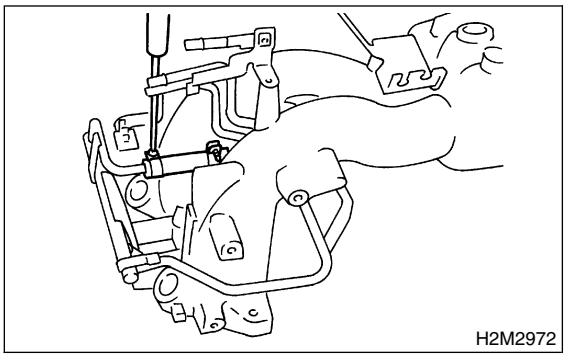
3) Connect right side fuel hose to injector pipe, and tighten clamp screw.


B2M3376

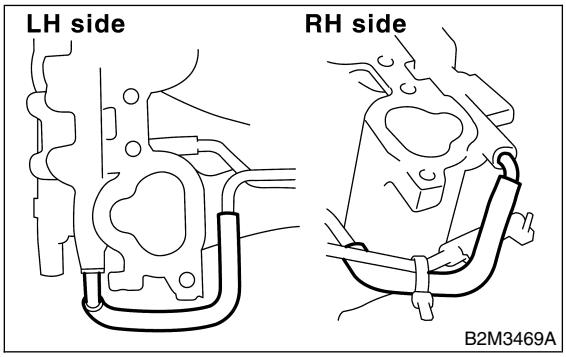
4) Install fuel injector pipe.


H2M2975

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


H2M2972

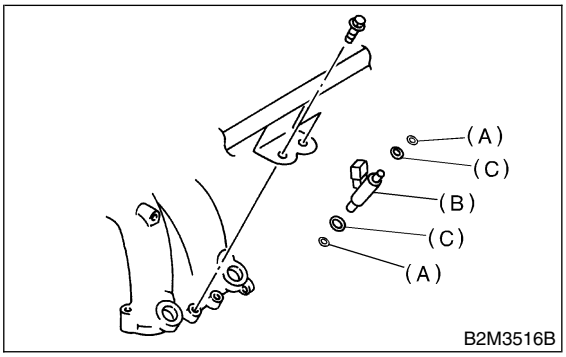
6) Connect air assist hoses.



B2M3469A

7) Install fuel injectors.

CAUTION:
Always use new o-rings and insulators.

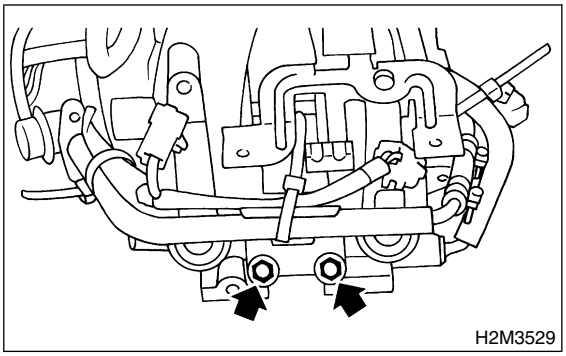


B2M3516B

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

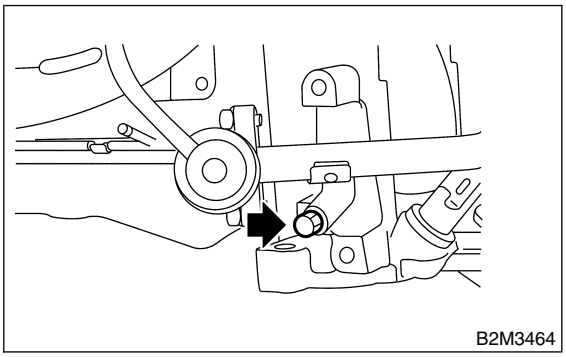
8) Tighten bolt which installs injector pipe on intake manifold.

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)


H2M3529

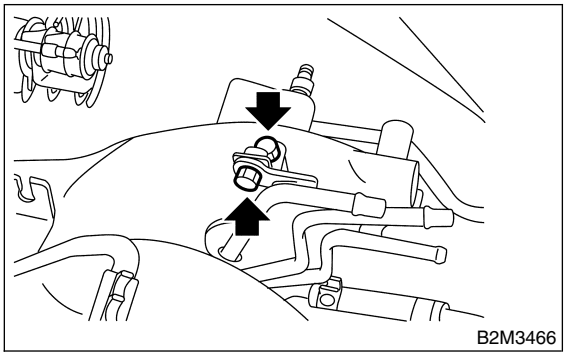
9) Tighten bolt which installs injectors pipe on intake manifold.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)


B2M3464

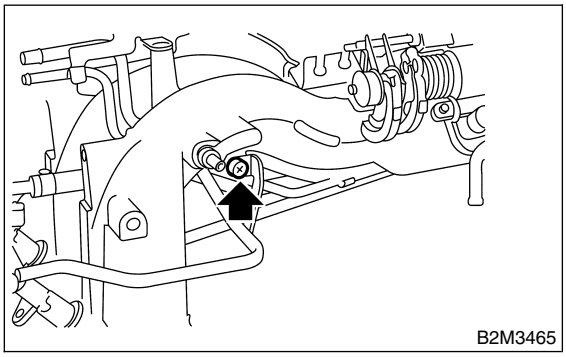
10) Tighten two bolts which install fuel pipes on the left side of intake manifold.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

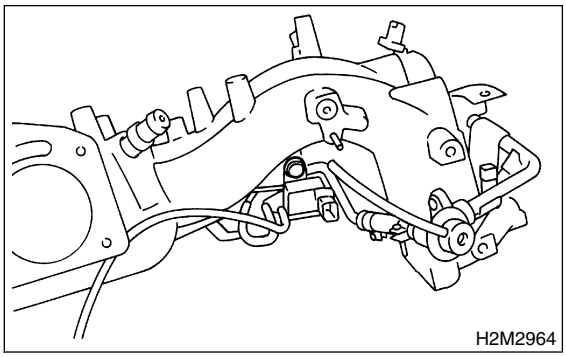

B2M3466

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

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

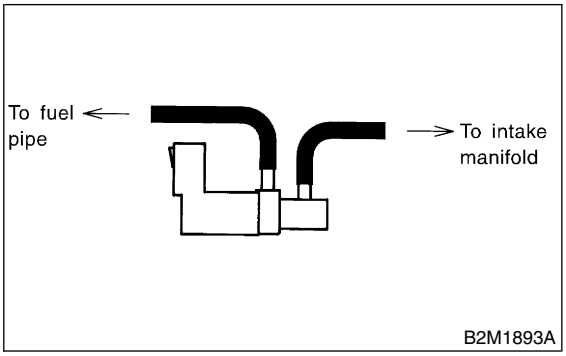

B2M3465

12) Install purge control solenoid valve.


H2M2964

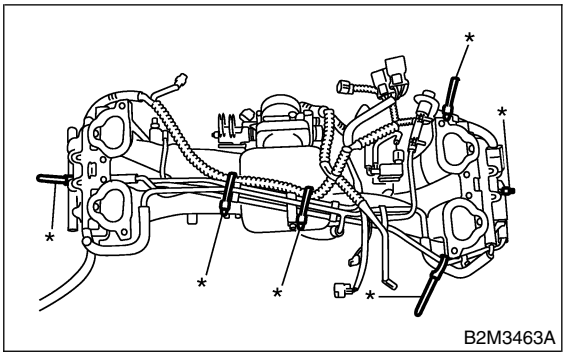
13) Connect hoses to purge control solenoid valve.

CAUTION:
Carefully connect the evaporation hoses.



B2M1893A

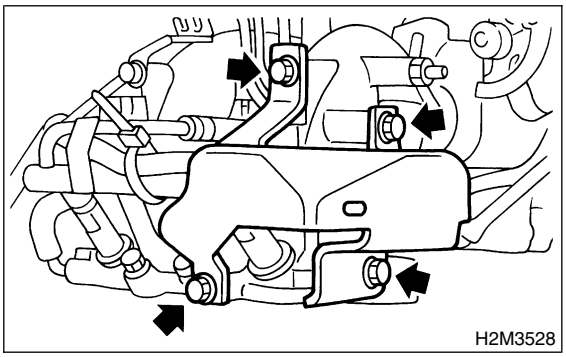
14) Install engine harness onto intake manifold.
15) Connect connectors to fuel injectors and purge control solenoid valve.
16) Hold engine harness by harness band (*).


B2M3463A

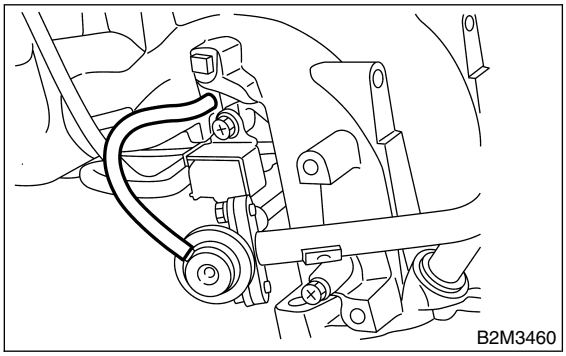
NOTE:
Do not use harness band on harnesses where they are supposed to be protected by the fuel pipe protector.

17) Install intake manifold protector LH.

Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)


H2M3528

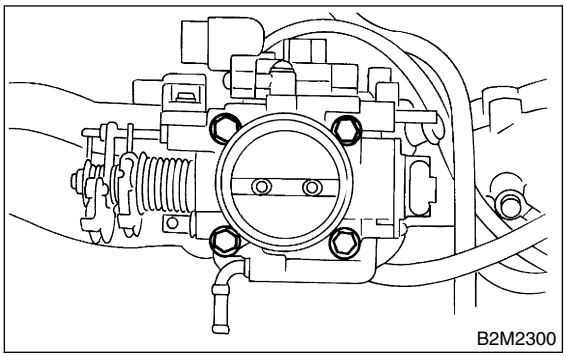
18) Connect pressure regulator vacuum hose to intake manifold.



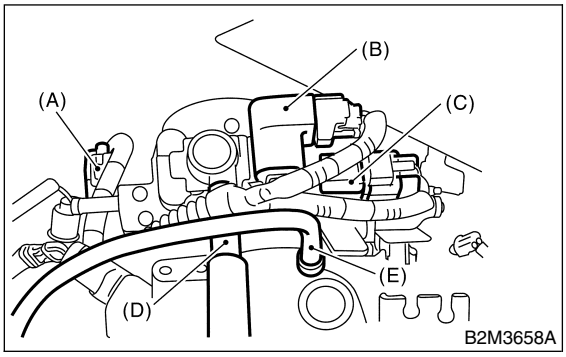
19) Install throttle body to intake manifold.

CAUTION:
Replace gasket with a new one.

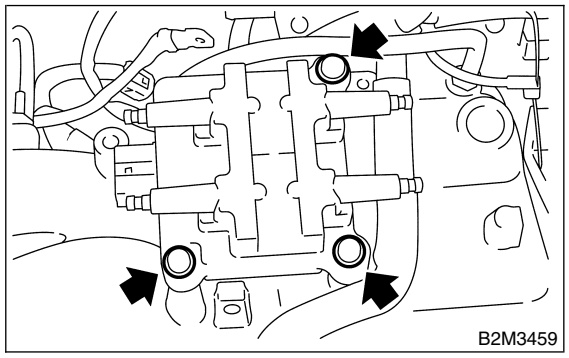
Tightening torque:
22 N·m (2.2 kgf-m, 15.9 ft-lb)



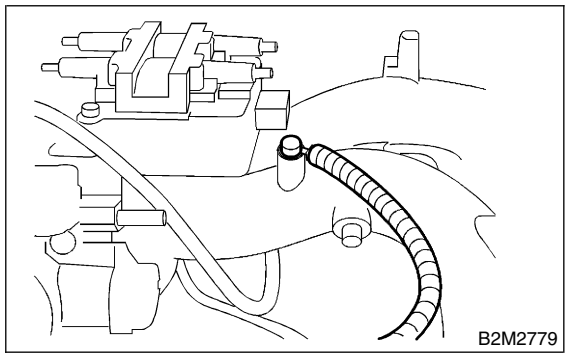
20) Connect connectors to throttle position sensor (A), idle air control solenoid valve (B) and intake manifold pressure sensor (C).
21) Connect air by-pass hose (D) to idle air control solenoid valve.
22) Connect air by-pass hose (E) to intake manifold.



23) Install ignition coil and ignitor assembly.



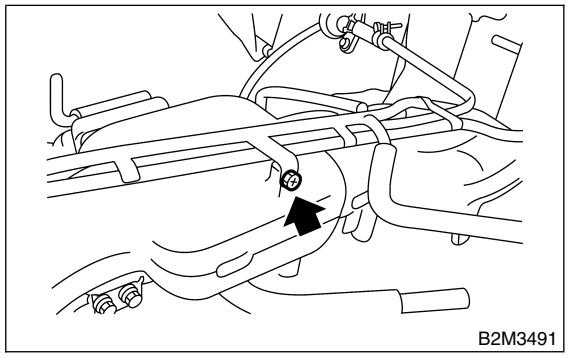
24) Connect connector to ignition coil and ignitor assembly.
25) Install engine ground terminal to intake manifold.



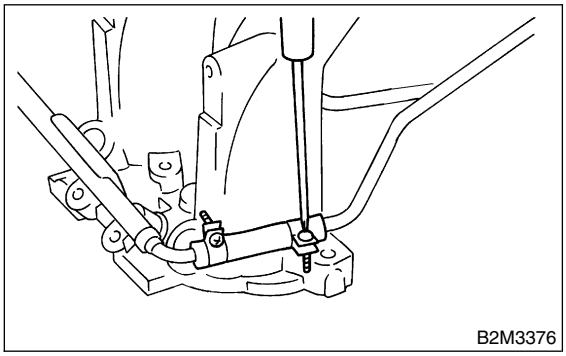
2. 2500 cc MODELS *S105034A0204*

1) Install fuel pipe assembly and pressure regulator, etc. to intake manifold.
2) Tighten bolt which installs fuel pipes on intake manifold.

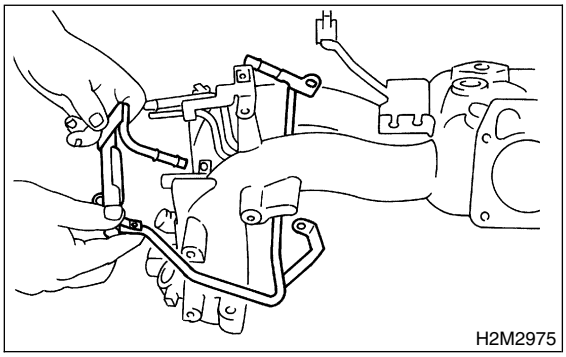
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



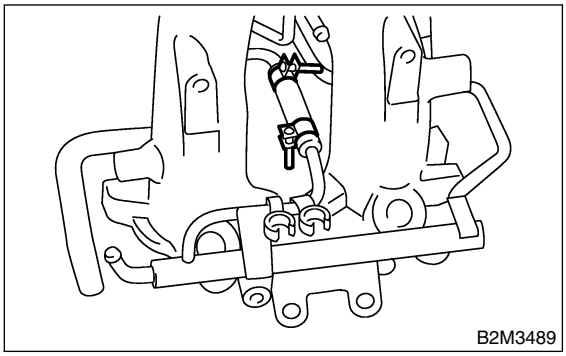
3) Connect right side fuel hose to injector pipe, and tighten clamp screw.


B2M3376

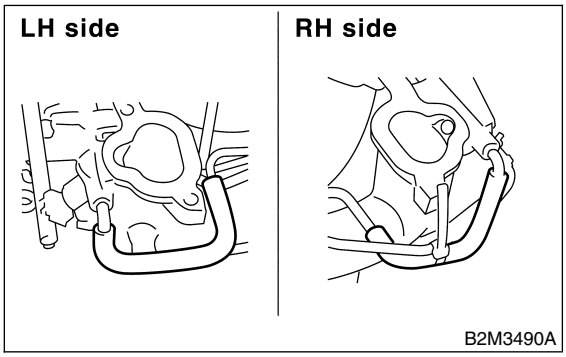
4) Install fuel injector pipe.


H2M2975

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


B2M3489

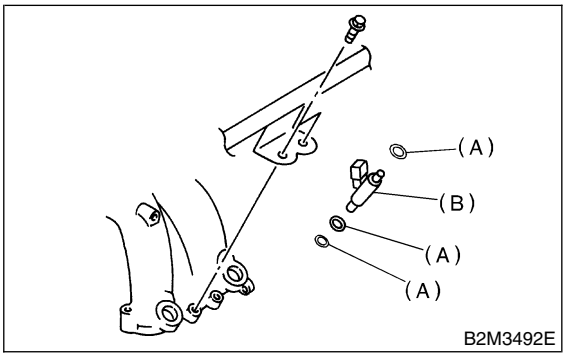
6) Connect air assist hoses.



B2M3490A

7) Install fuel injectors.

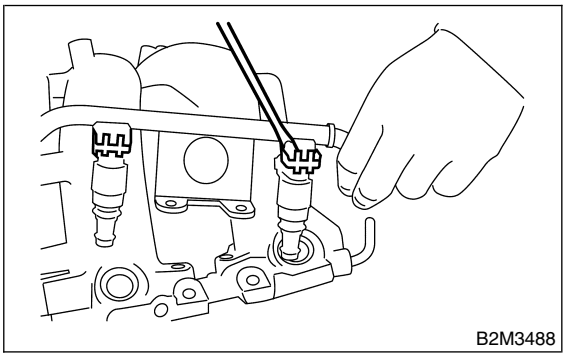
CAUTION:
Always use new o-rings.



B2M3492E

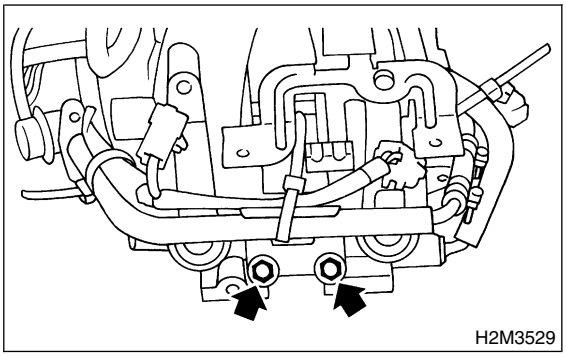
(A) O-ring
(B) Fuel injector

NOTE:
Do not forget to install the fuel injector securing clip.


B2M3488

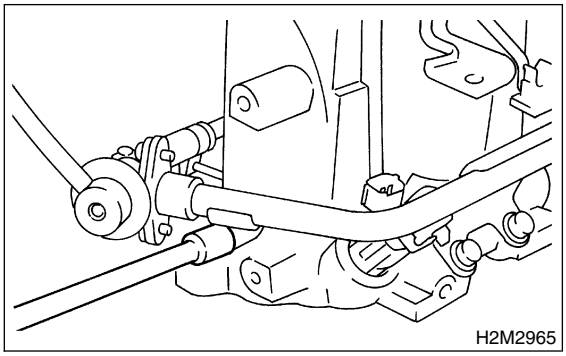
8) Tighten bolt which installs injector pipe on intake manifold.

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)


H2M3529

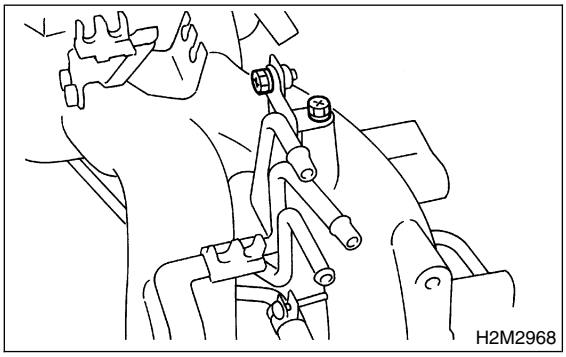
9) Tighten bolt which install injector pipe on intake manifold.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)



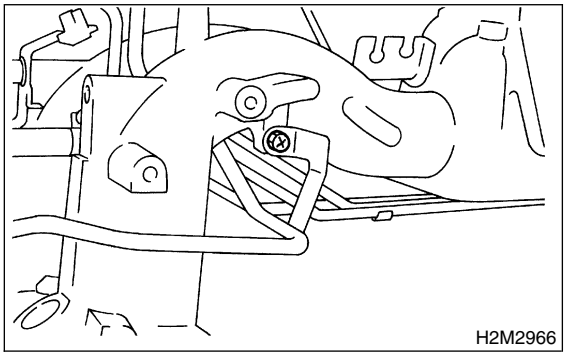
10) Tighten two bolts which install fuel pipes on the left side of intake manifold.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

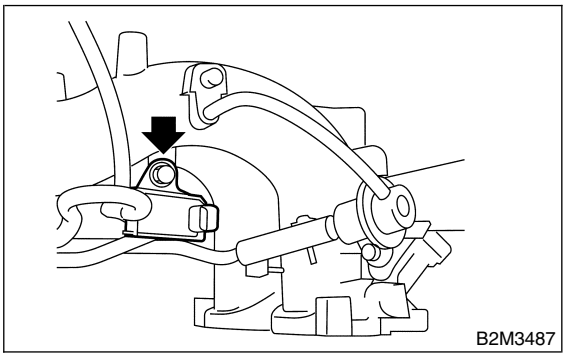


11) Tighten bolt which install injector pipe on intake manifold.

Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

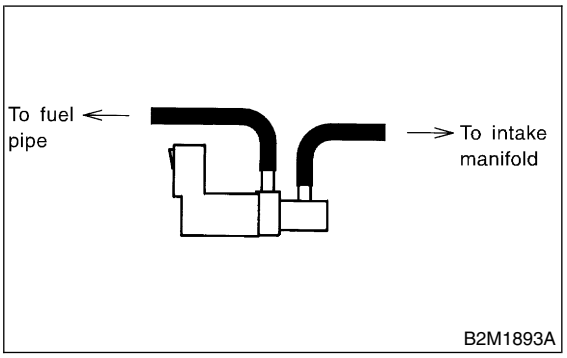


12) Install purge control solenoid valve.



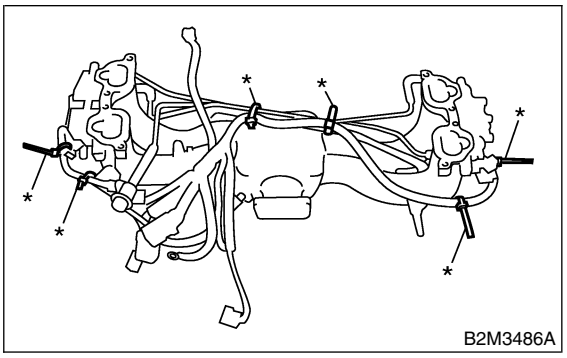
13) Connect hoses to purge control solenoid valve.

CAUTION:
Carefully connect the evaporation hoses.



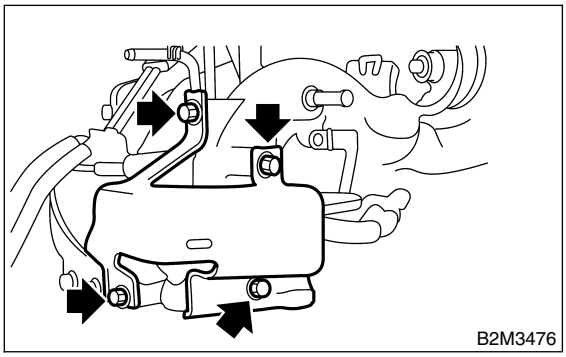
14) Install engine harness onto intake manifold.
15) Connect connectors to fuel injectors and purge control solenoid valve.
16) Hold engine harness by harness band (*).

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

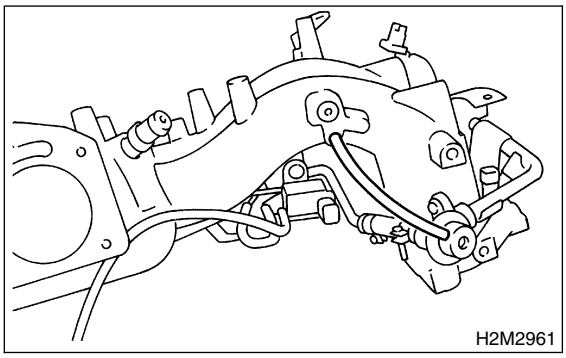


17) Install fuel pipe protector LH.

Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)

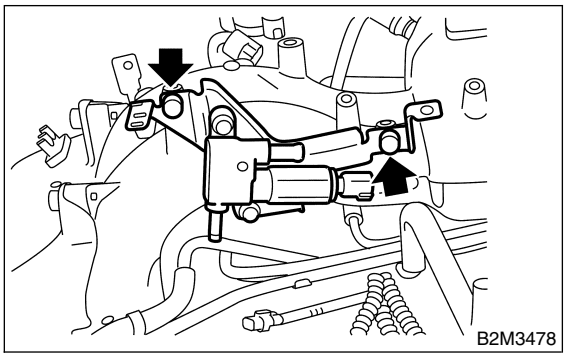


18) Connect pressure regulator vacuum hose to intake manifold.

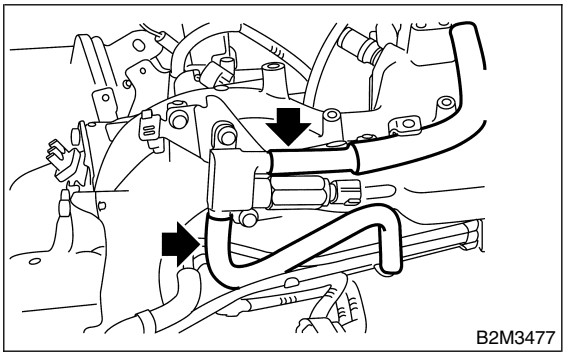


19) Install air assist injector solenoid valve to bracket.

Tightening torque:
16 N·m (1.6 kgf-m, 11.6 ft-lb)



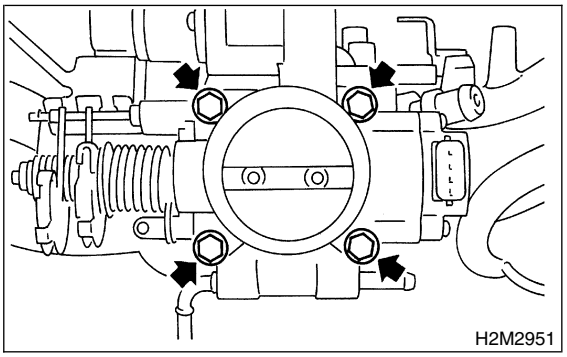
20) Connect air by-pass hoses to air assist solenoid valve.



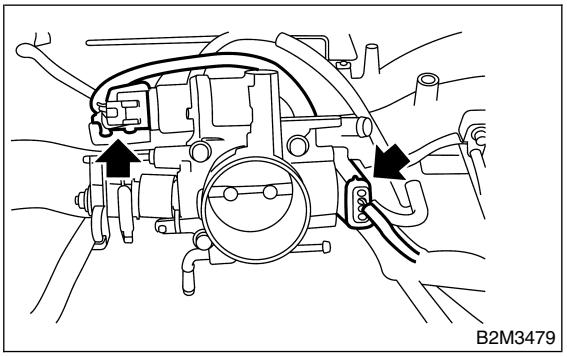
21) Connect connector to air assist solenoid valve.
22) Install throttle body to intake manifold.

CAUTION:
Replace gasket with a new one.

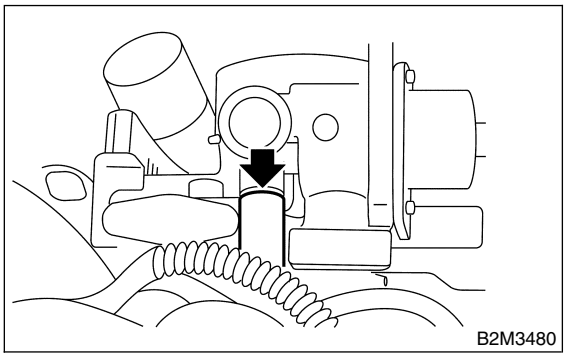
Tightening torque:
22 N·m (2.2 kgf-m, 15.9 ft-lb)



23) Connect connector to throttle position sensor and idle air control solenoid valve.

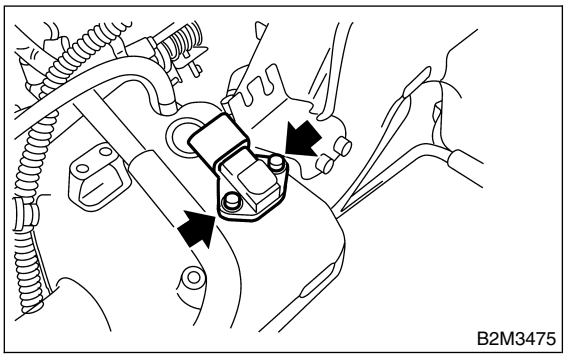


24) Connect air by-pass hose to throttle body.

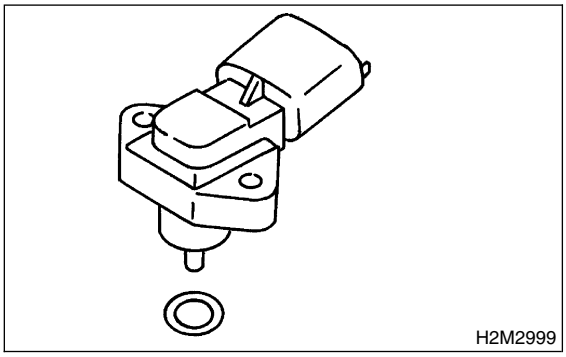


25) Install intake air temperature and pressure sensor.

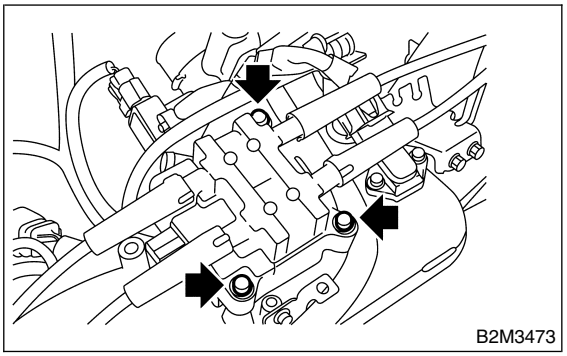
Tightening torque:
2.0 N·m (0.2 kgf-m, 1.4 ft-lb)



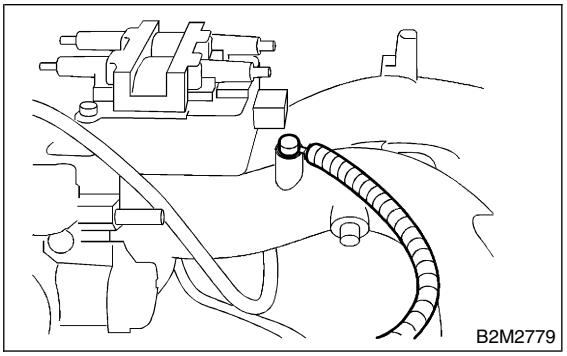
CAUTION:
Replace O-ring with new one.



26) Connect connector to intake air temperature and pressure sensor.
27) Install ignition coil and ignitor assembly.



28) Connect connector to ignition coil and ignitor assembly.
29) Install engine ground terminal to intake manifold.



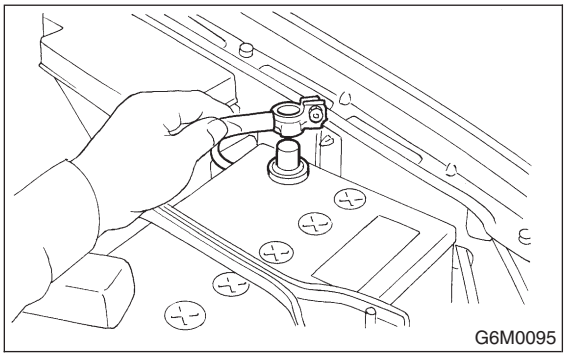
E: INSPECTION *S105034A10*

Make sure the fuel pipe and fuel hoses are not cracked and that connections are tight.

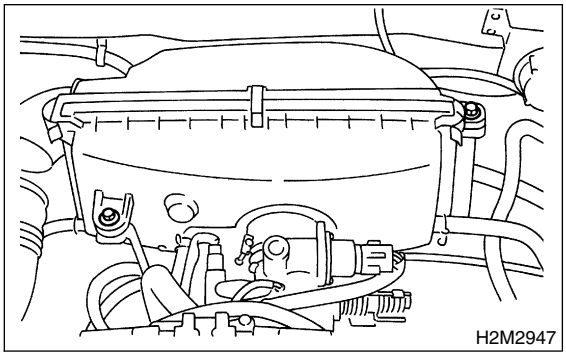
7. Knock Sensor S015042

A: REMOVAL S105042A18

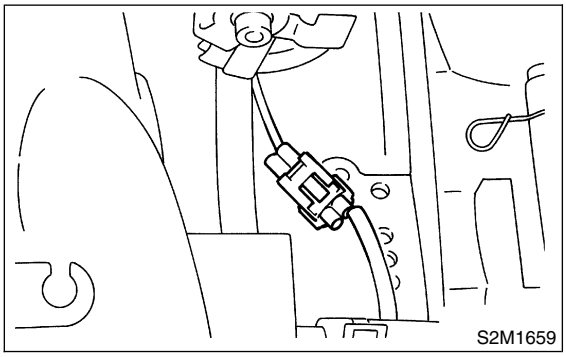
1) Disconnect battery ground cable from battery ground terminal.



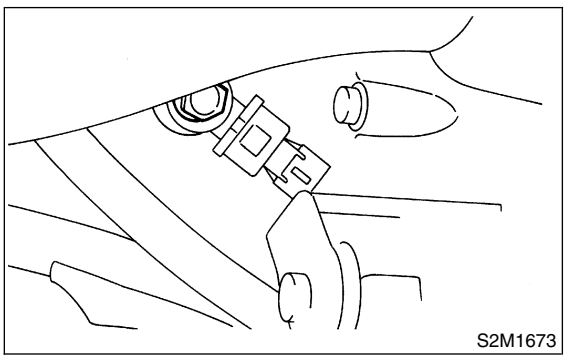
2) Remove air cleaner case.



3) Disconnect knock sensor connector.



4) Remove knock sensor from cylinder block.

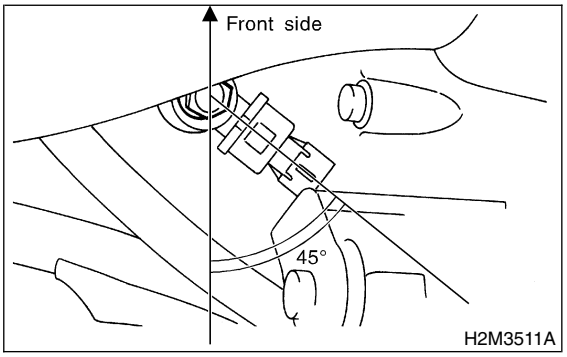


B: INSTALLATION S105042A11

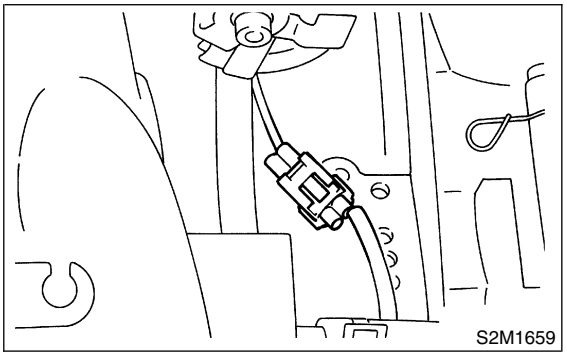
1) Install knock sensor to cylinder block.

Tightening torque:
23.5 N·m (2.4 kgf-m, 17.4 ft-lb)

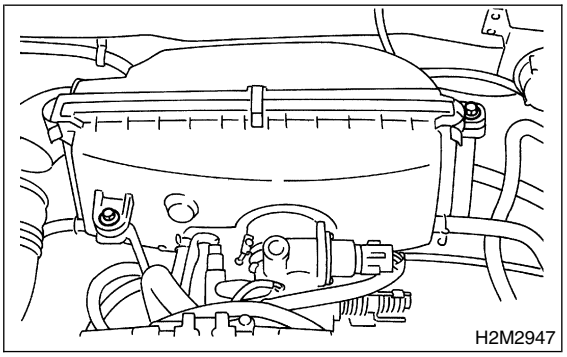
NOTE:
The extraction area of the knock sensor cord must be positioned at a 45° angle relative to the engine rear.



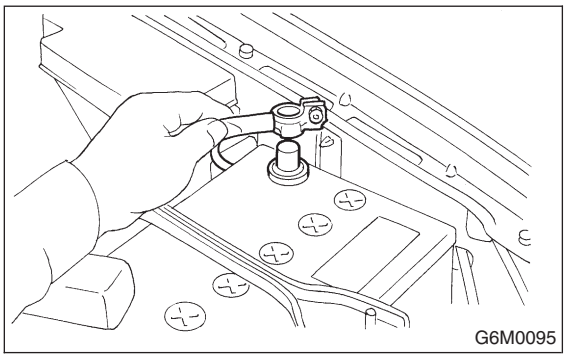
2) Connect knock sensor connector.



3) Install air cleaner case.



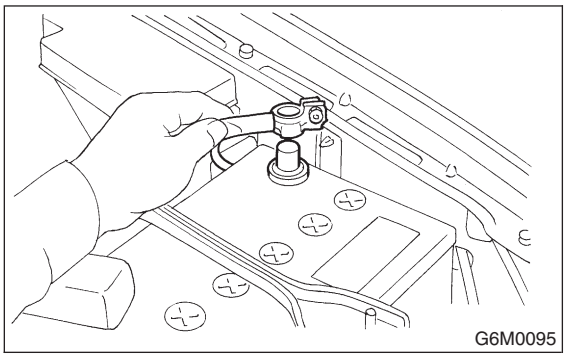
4) Connect battery ground cable.



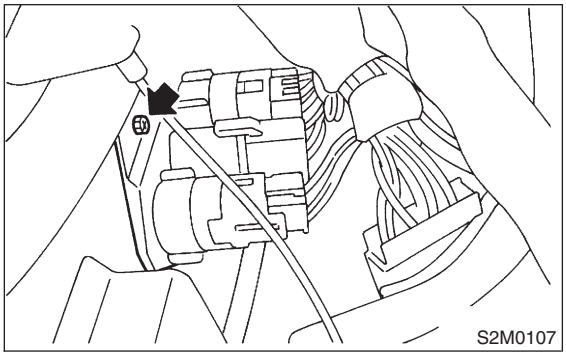
17. Main Relay S105050

A: REMOVAL S105050A18

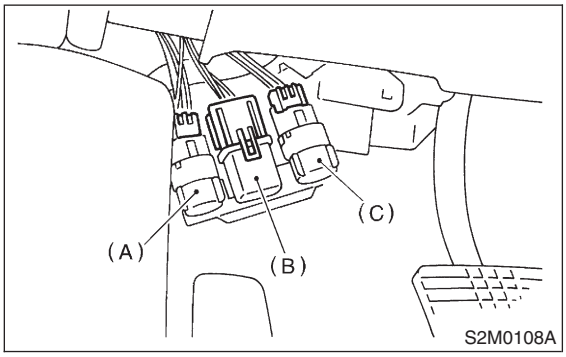
1) Disconnect battery ground cable.



2) Remove bolt which holds bracket of main relay and fuel pump relay.

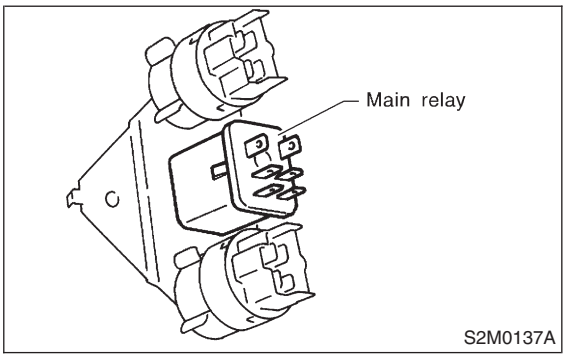


3) Disconnect connectors from relays.



(A) Rear accessory power supply relay
(B) Main relay
(C) Fuel pump relay

4) Remove main relay from mounting bracket.



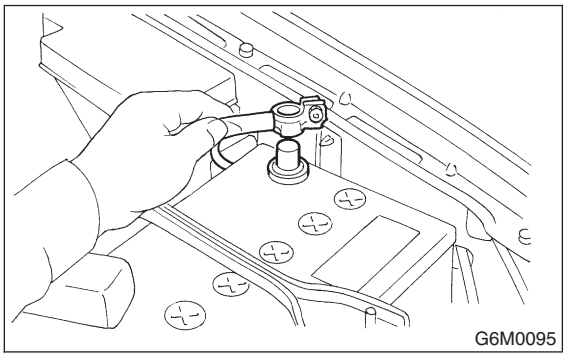
B: INSTALLATION S105050A11

Install in the reverse order of removal.

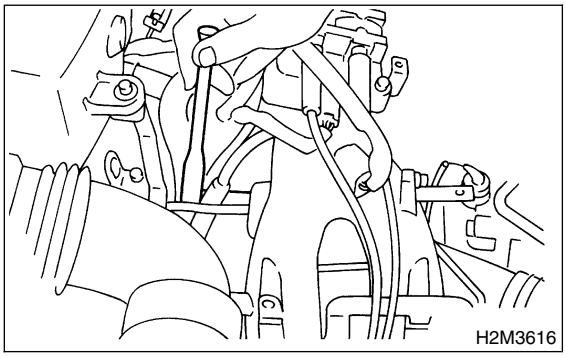
29. Purge Control Solenoid Valve S105606

A: REMOVAL S105606A18

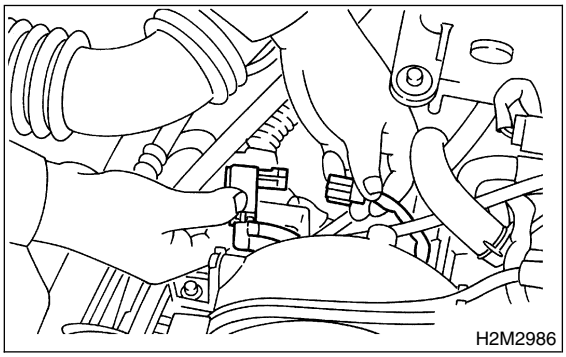
1) Disconnect battery ground cable.



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



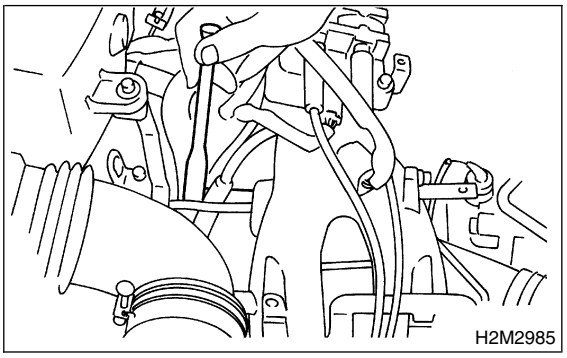
3) Take out purge control solenoid valve through the bottom of the intake manifold.
4) Disconnect connector and hoses from purge control solenoid valve.



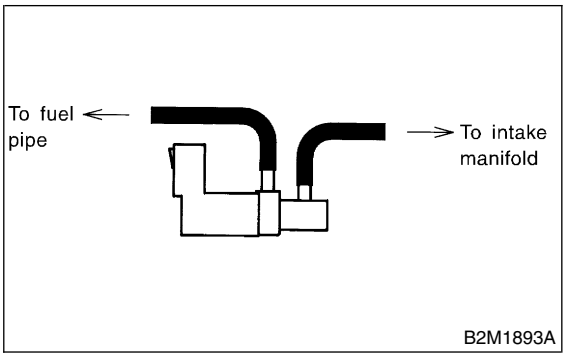
B: INSTALLATION S105606A11

Install in the reverse order of removal.

Tightening torque:
16 N·m (1.6 kgf-m, 11.6 ft-lb)



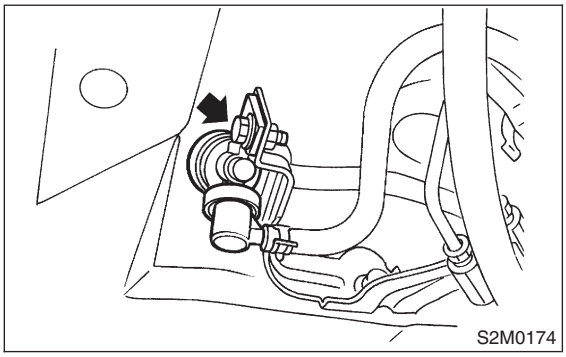
CAUTION:
Carefully connect the evaporation hoses.



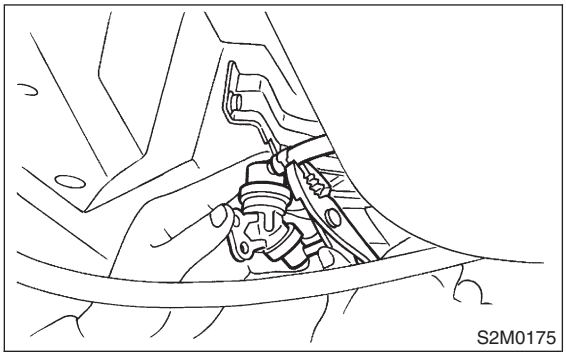
27. Roll Over Valve S105018

A: REMOVAL S105018A18

1) Lift-up the vehicle.
2) Remove roll over valve from bracket.



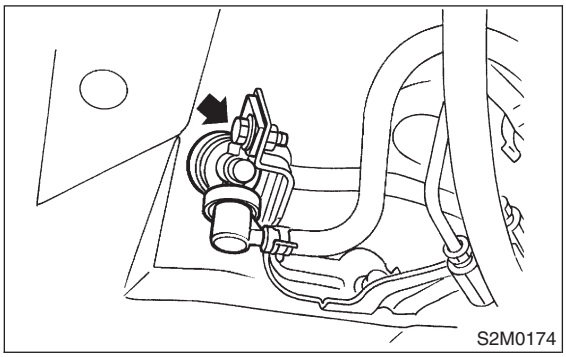
3) Disconnect hoses from roll over valve, and remove it from bracket.



B: INSTALLATION S105018A11

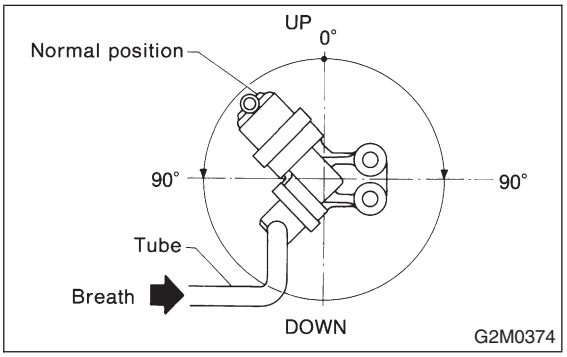
Install in the reverse order of removal.

CAUTION:
- **Do not install top side of valve down.**
- **Before installing bracket on body, securely fit concave part of bracket to hole in body.**



C: INSPECTION S105018A10

1) Connect hoses to roll over valve as shown in Figure.



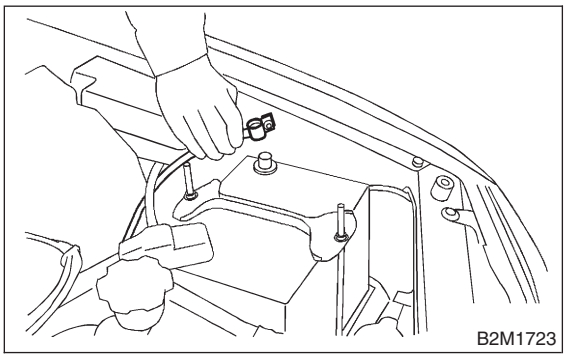
2) While blowing through open end of hose, tilt valve at least 90° left and right from normal position.
3) Ensure that there is no air flow when hose is tilted greater than 90°.

2. Throttle Body S105010

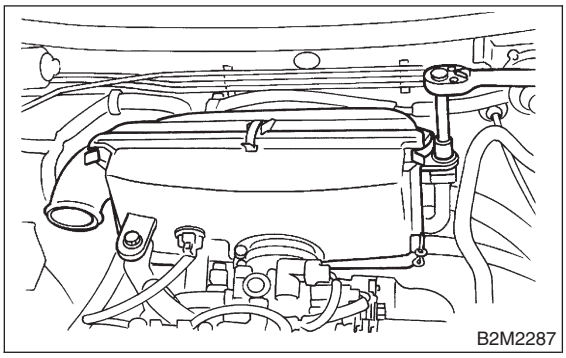
A: REMOVAL S105010A18

1. 2200 cc MODELS S105010A1803

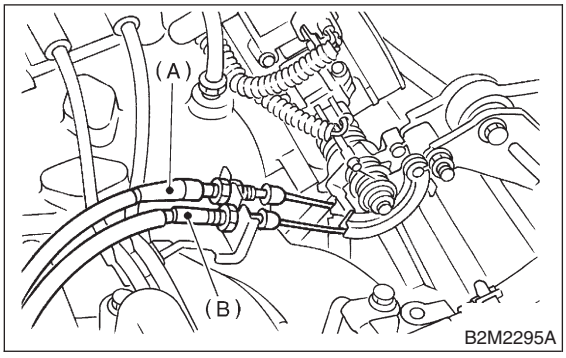
1) Disconnect battery ground cable.



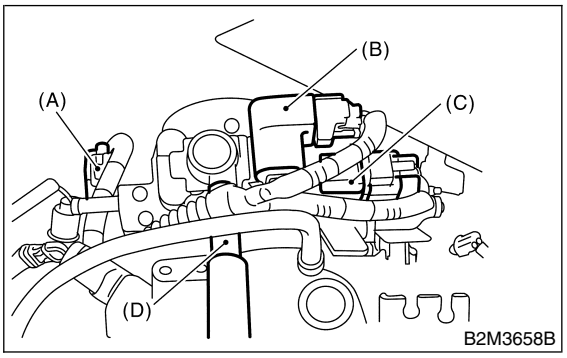
2) Remove air cleaner case. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>



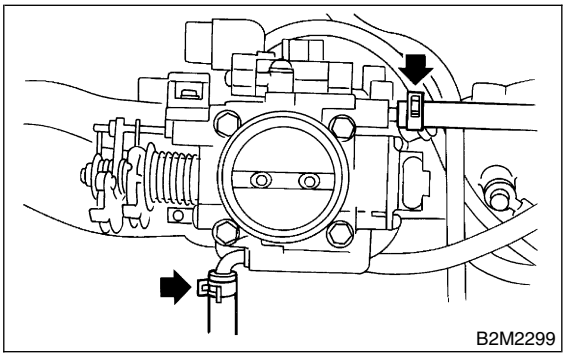
3) Disconnect accelerator cable (A).
4) Disconnect cruise control cable (B). (With cruise control model)



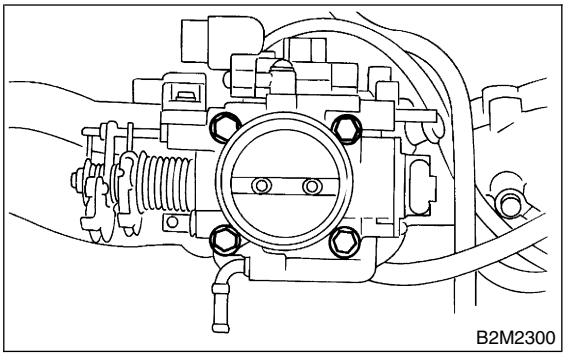
5) Disconnect connectors from throttle positioin sensor (A), idle air control solenoid valve (B) and intake manifold pressure sensor (C).
6) Disconnect air by-pass hose (D) from idle air control solenoid valve.



7) Disconnect engine coolant hoses from throttle body.

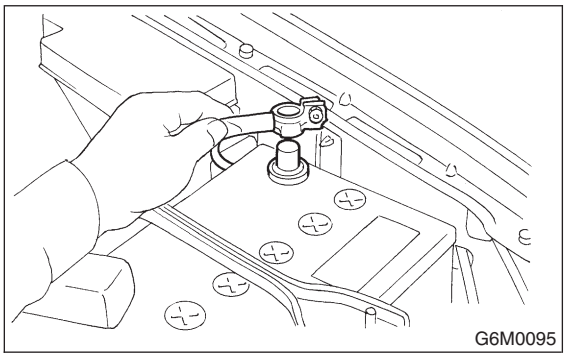


8) Remove bolts which install throttle body to intake manifold.

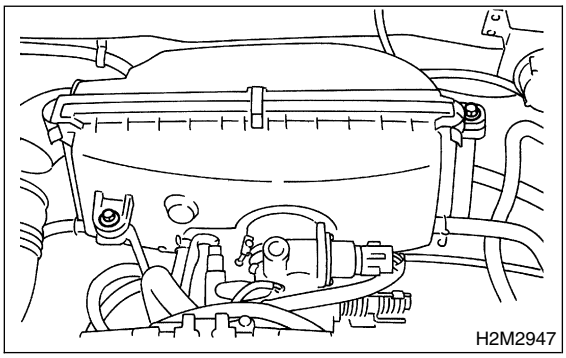


2. 2500 cc MODELS S105010A1804

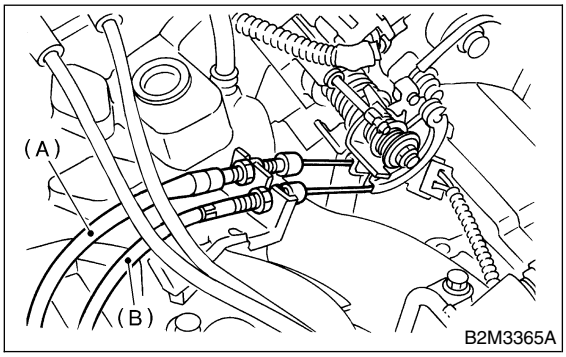
1) Disconnect battery ground cable.



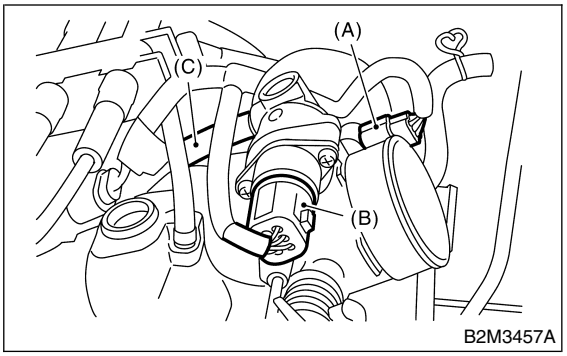
2) Remove air cleaner case.



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

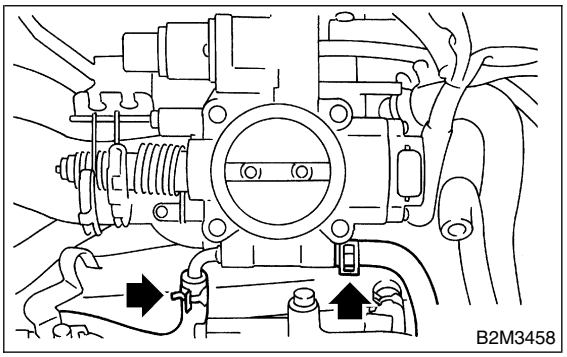


5) Disconnect connectors from idle air control solenoid valve, throttle position sensor.
6) Disconnect air by-pass hose from air assist injector solenoid valve.



(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.

B: INSTALLATION S105010A11

1. 2200 cc MODELS S105010A1103

Install in the reverse order of removal.

CAUTION:
Always use a new gasket.

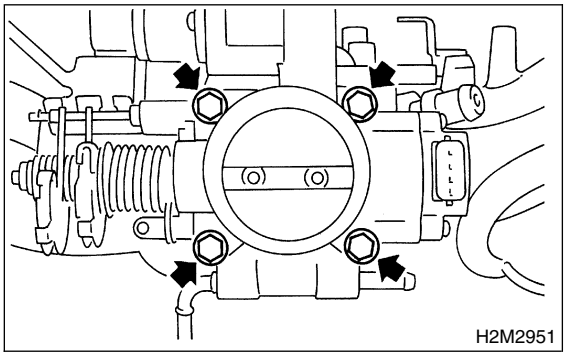
Tightening torque:
Throttle body:
22 N·m (2.2 kgf-m, 15.9 ft-lb)
Air cleaner case:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)

2. 2500 cc MODELS S105010A1104

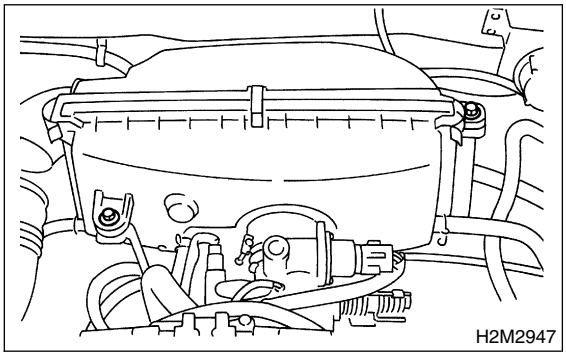
Install in the reverse order of removal.

CAUTION:
Always use a new gasket.

Tightening torque:
Throttle body;
22 N·m (2.2 kgf-m, 15.9 ft-lb)



Tightening torque:
Air cleaner case;
4.9 N·m (0.5 kgf-m, 3.6ft-lb)

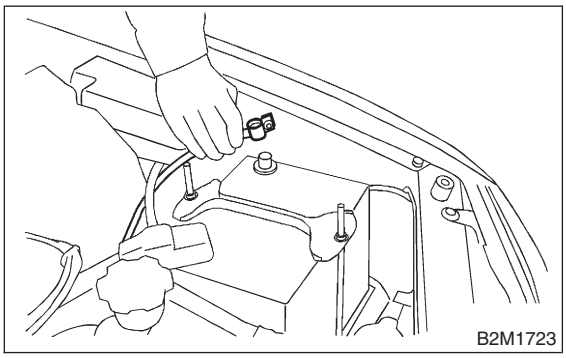


8. Throttle Position Sensor S105039

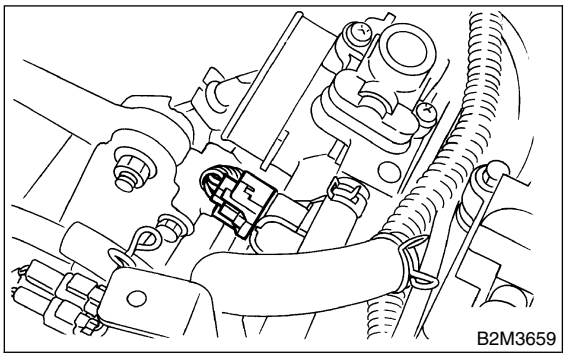
A: REMOVAL S105039A18

1. 2200 cc MODELS S105039A1803

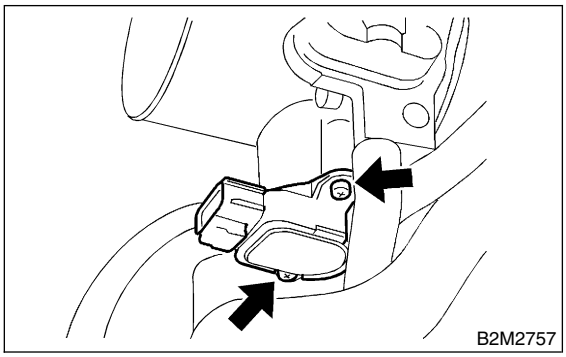
1) Disconnect battery ground cable.



2) Disconnect connector from throttle position sensor.

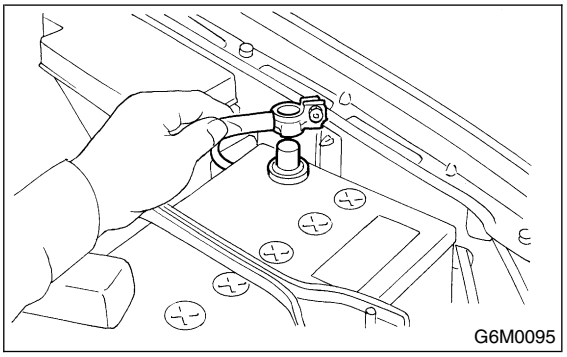


3) Remove throttle position sensor holding screws, and remove throttle position sensor itself.

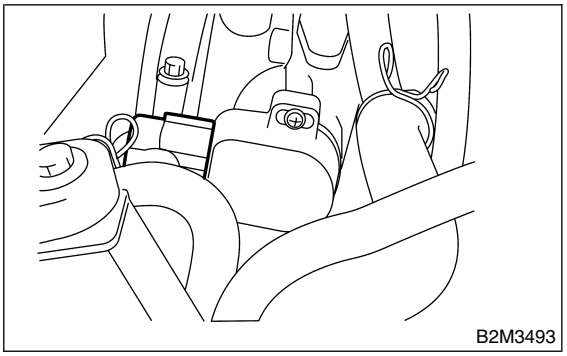


2. 2500 cc MODELS S105039A1804

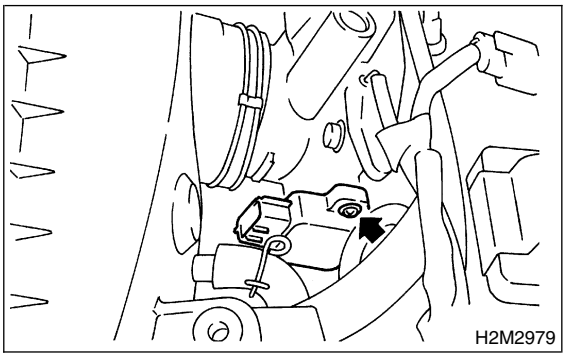
1) Disconnect battery ground cable.



2) Disconnect connector from throttle position sensor.



3) Remove throttle position sensor holding screws, and remove it.



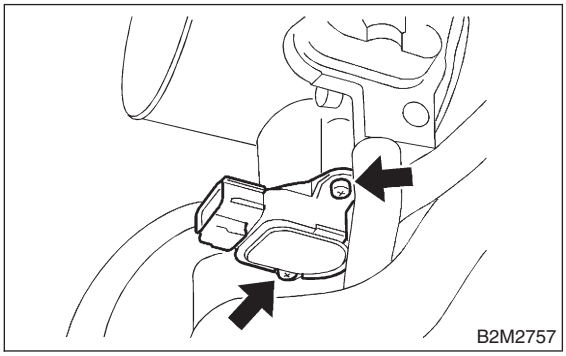
B: INSTALLATION S105039A11

1. 2200 cc MODELS S105039A1103

Install 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 N·m (0.22 kgf-m, 1.6 ft-lb)

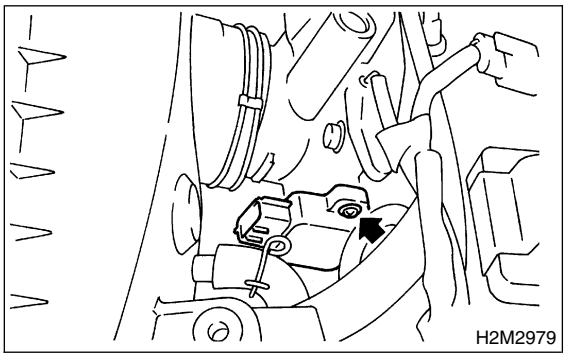


2. 2500 cc MODELS S105039A1104

Install in the reverse order of removal.

Tightening torque:
2.2 N·m (0.22 kgf-m, 1.6 ft-lb)

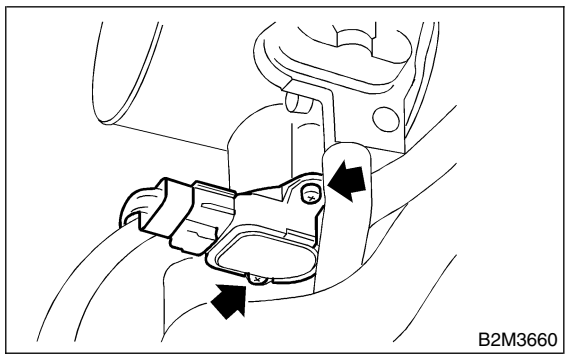
CAUTION:
When installing throttle position sensor, adjust to the specified data.



C: ADJUSTMENT S105039A01

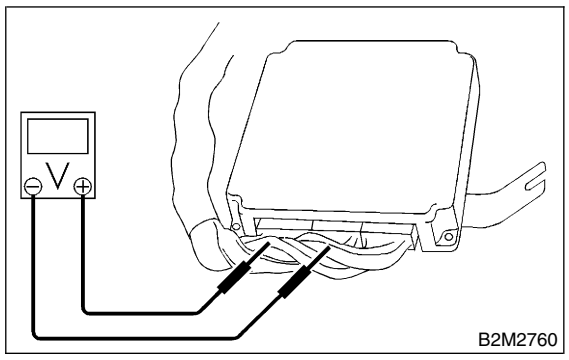
1. 2200 cc MODELS S105039A0103

2200 cc models
1) Turn ignition switch to OFF.
2) Loosen throttle position sensor holding screws.



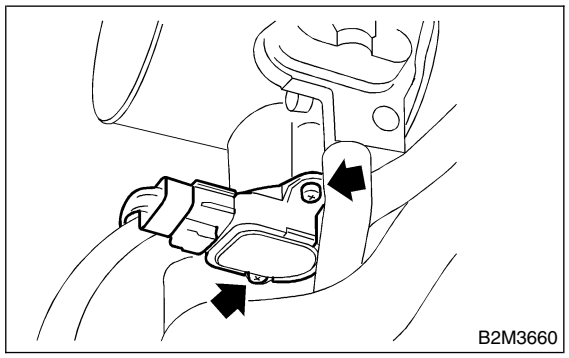
3) When using voltage meter;
   (1) Take out ECM.
   (2) Turn ignition switch to ON.
   (3) Adjust throttle position sensor to the proper position to allow the voltage signal to ECM to be in specification.

Connector & terminal / Specified voltage
(B136) No. 15 — (B136) No. 17 / 0.45 — 0.55 V
[Fully closed.]



(4) Tighten throttle position sensor holding screws.

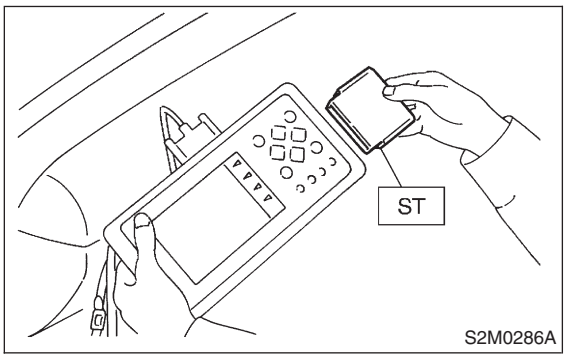
Tightening torque:
2.2 N·m (0.22 kgf-m, 1.6 ft-lb)



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.

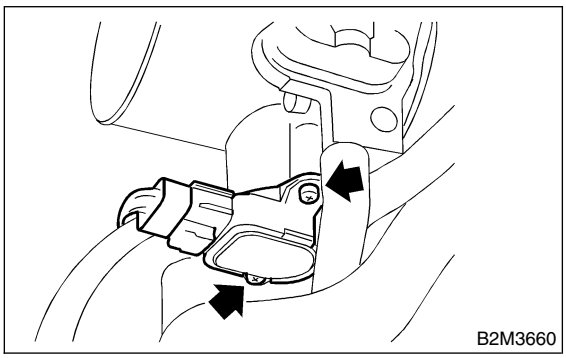


(2) Connect Subaru Select Monitor to the data link connector.
(3) Turn ignition switch to ON, and Subaru Select Monitor switch to ON.
(4) Select {2. Each System Check} in Main Menu.
(5) Select {Engine Control System} in Selection Menu.
(6) Select {1. Current Data Display & Save} in EGI/EMPI Diagnosis.
(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

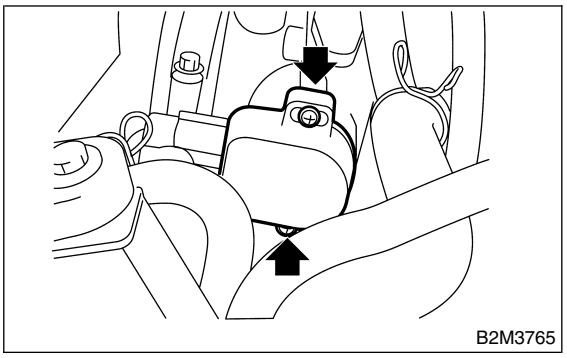
(9) Tighten throttle position sensor holding screws.

Tightening torque:
2.2 N·m (0.22 kgf-m, 1.6 ft-lb)



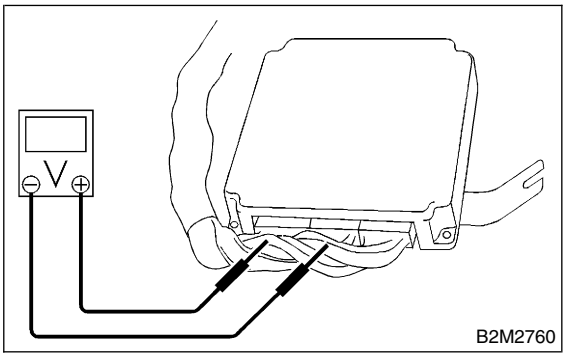
2. 2500 cc MODELS S105039A0104

2500 cc models
1) Turn ignition switch to OFF.
2) Loosen throttle position sensor holding screws.



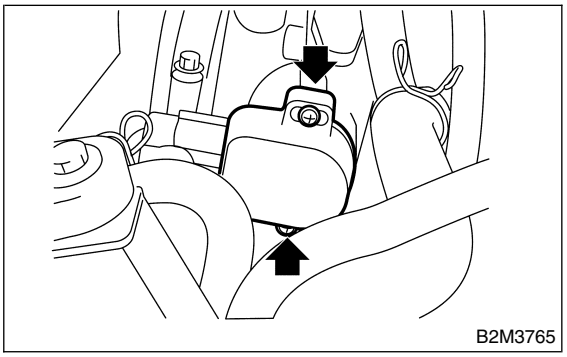
3) When using voltage meter;
(1) Take out ECM.
(2) Turn ignition switch to ON.
(3) Adjust throttle position sensor to the proper position to allow the voltage signal to ECM to be in specification.

Connector & terminal / Specified voltage
(B136) No. 15 — (B136) No. 17 / 0.45 — 0.55 V
[Fully closed.]



(4) Tighten throttle position sensor holding screws.

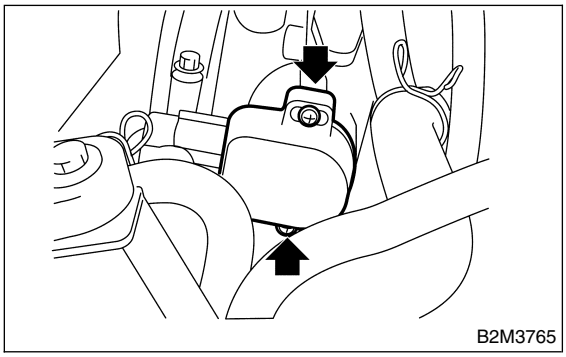
Tightening torque:
2.2 N·m (0.22 kgf-m, 1.6 ft-lb)



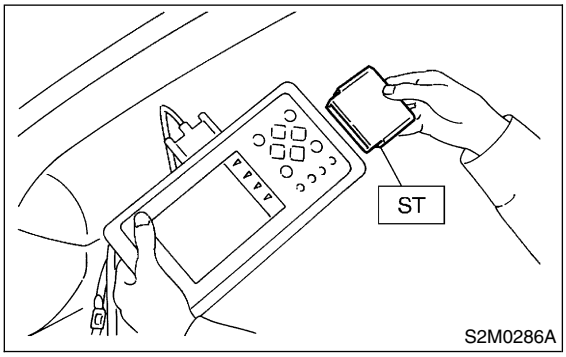
4) When using Subaru Select Monitor;

NOTE:
For detailed operation procedures, refer to the Subaru Select Monitor Operation Manual.

(1) Turn ignition switch to OFF.
(2) Loosen throttle position sensor holding screws.



(3) Insert the cartridge to Subaru Select Monitor.



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

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.

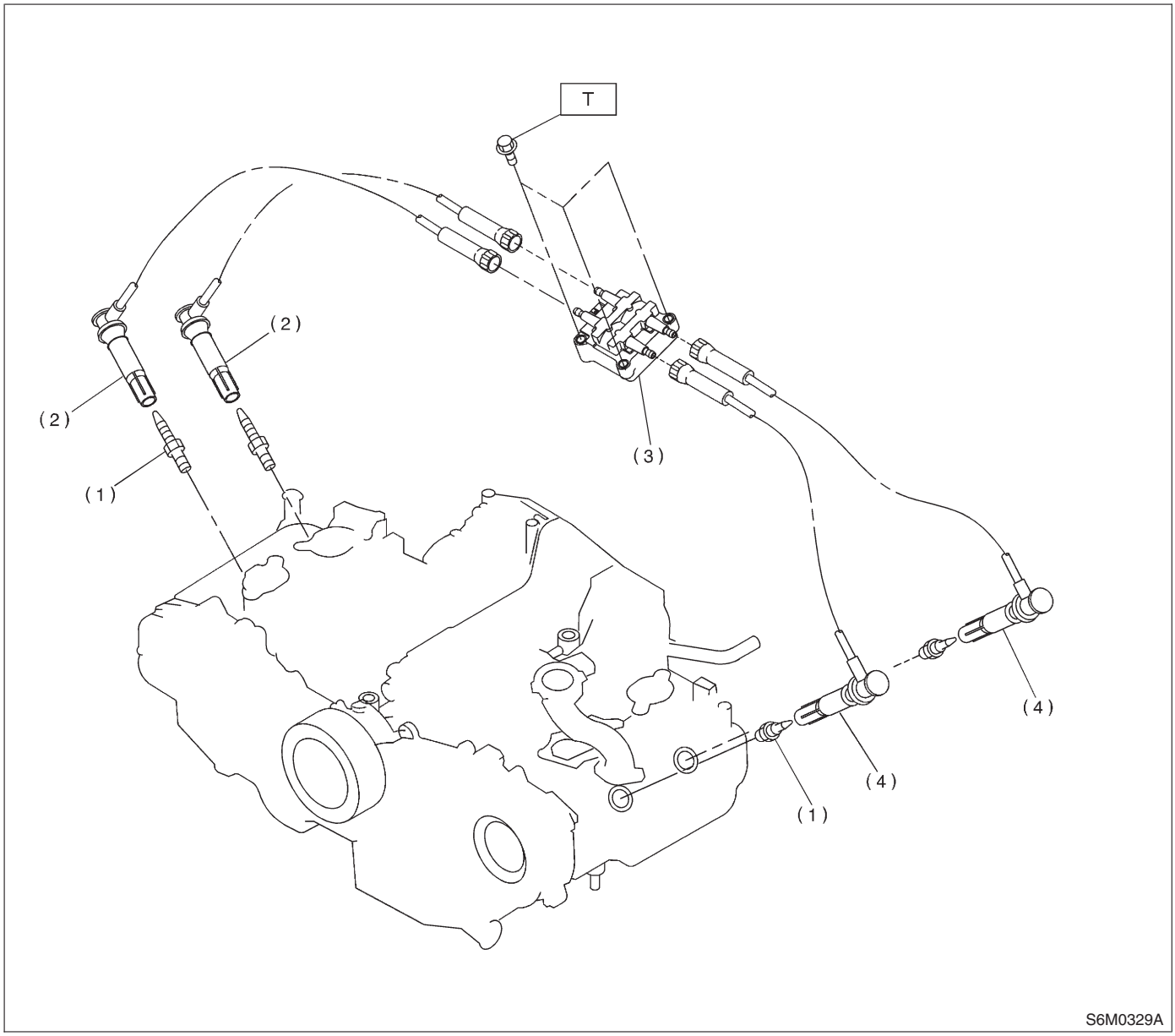
Condition: Throttle fully closed
Throttle opening angle 0.00%
Throttle sensor voltage 0.50 V

1. General Description S101001

A: SPECIFICATIONS S101001E49

Item			Designation
Ignition coil and ignitor assembly	Model		FH0137-01R
	Manufacturer		DEMCO
	Primary coil resistance		0.73 Ω±10%
	Secondary coil resistance		12.8 kΩ±15%
	Insulation resistance between primary terminal and case		More than 10 MΩ
Spark plug	Type and manufacturer	Standard	RC10YC4 ..... CHAMPION
		Alternate	RC8YC4 ..... CHAMPION BKR6E-11 ..... NGK K20PR-U11 ..... NIPPONDENSO
	Thread size mm		14, P = 1.25
	Spark gap mm (in)		1.0 — 1.1 (0.039 — 0.043)

B: COMPONENT S101001A05



(1) Spark plug
(2) Spark plug cord (#1, #3)
(3) Ignition coil and ignitor ASSY
(4) Spark plug cord (#2, #4)

Tightening torque: N·m (kgf-m, ft-lb)
T: 22 (2.2, 15.9)

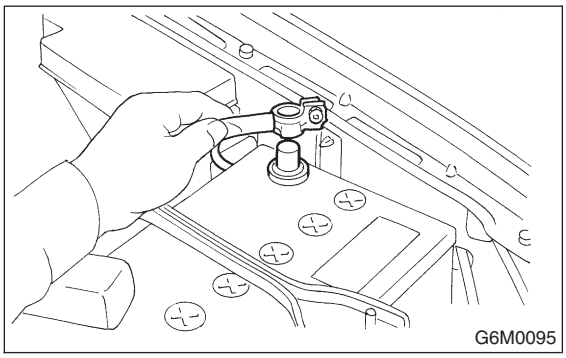
C: CAUTION S101001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

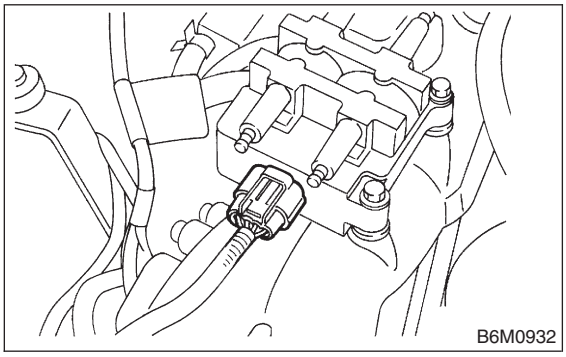
3. Ignition Coil and Ignitor Assembly S101015

A: REMOVAL S101015A18

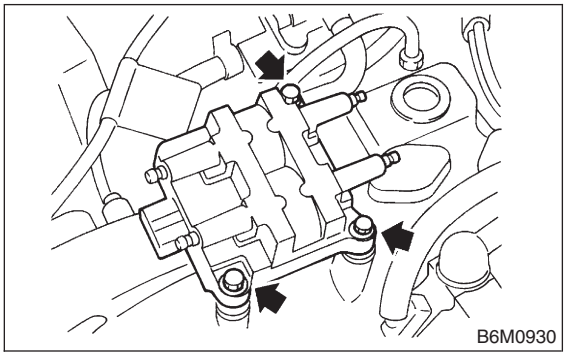
1) Disconnect battery ground cable.



2) Disconnect spark plug cords from ignition coil and ignitor assembly.
3) Disconnect connector from ignition coil and ignitor assembly.



4) Remove ignition coil and ignitor assembly.



B: INSTALLATION S101015A11

Install in the reverse order of removal.

CAUTION:
Be sure to connect wires to their proper positions. Failure to do so will damage unit.

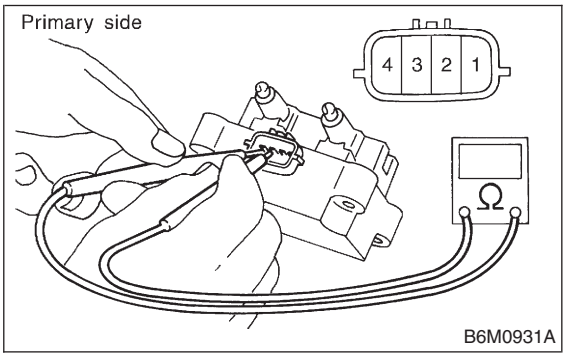
C: INSPECTION S101015A10

Using accurate tester, inspect the following items, and replace if defective.
1) Primary resistance
2) Secondary coil resistance

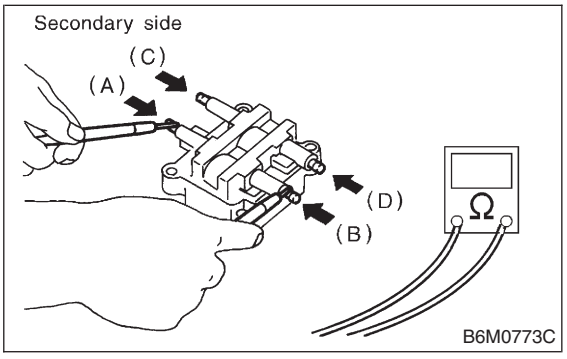
CAUTION:
If the resistance is extremely low, this indicates the presence of a short-circuit.

Specified resistance:

[Primary side]
Between terminal No. 1 and No. 2
0.73 Ω±10%
Between terminal No. 2 and No. 4
0.73 Ω±10%



[Secondary side]
Between (A) and (B)
12.8 kΩ±15%
Between (C) and (D)
12.8 kΩ±15%



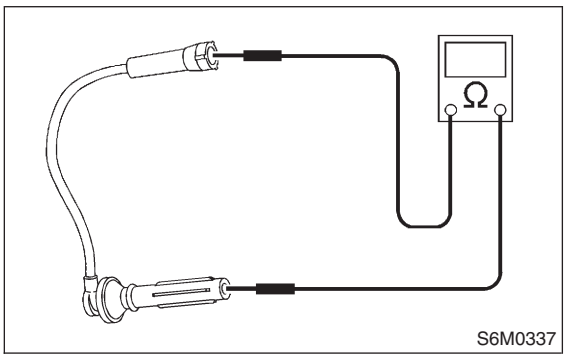
3) Insulation between primary terminal and case: 10 MΩ or more.

4. Spark Plug Cord S101014

A: INSPECTION S101014A10

Check for:
1) Damage to cords, deformation, burning or rust formation of terminals
2) Resistance values of cords

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



2. Spark Plug S101003

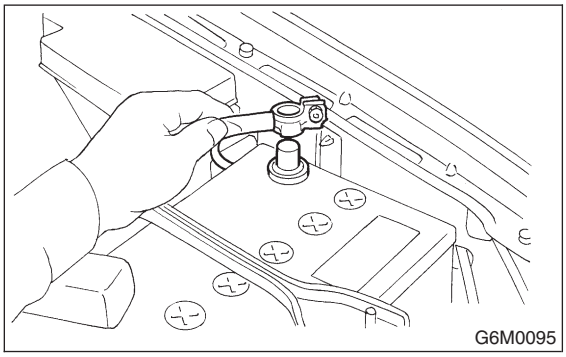
A: REMOVAL S101003A18

CAUTION:
All spark plugs installed on an engine, must be of the same heat range.

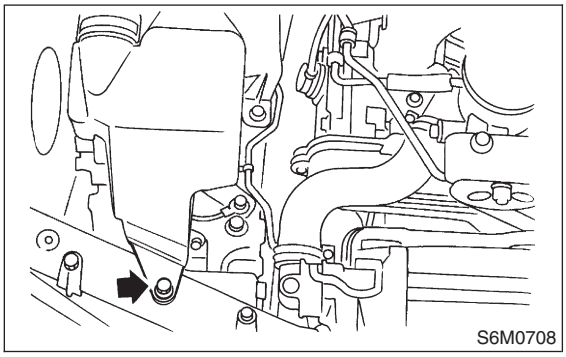
Spark plug:
CHAMPION: RC10YC4
(Alternate)
CHAMPION: RC8YC4
NGK: BKR6E-11
NIPPONDENSO: K20PR-U11

1. #1 SPARK PLUG S101003A1801

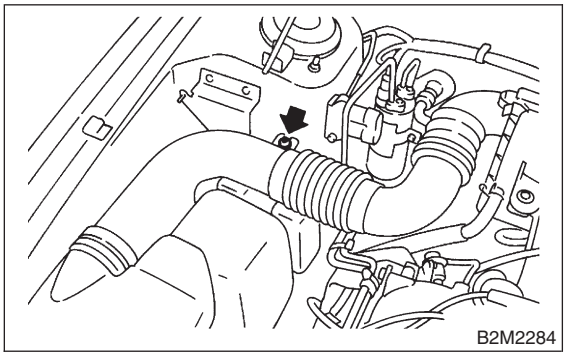
1) Disconnect battery ground cable.


G6M0095

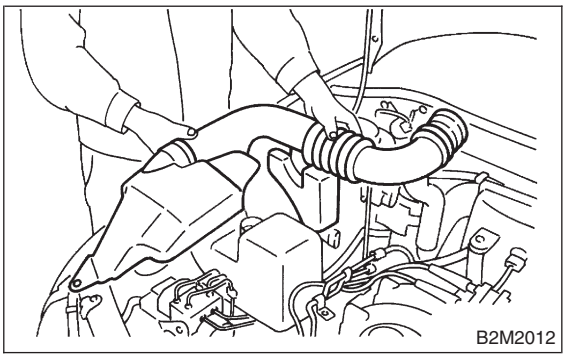
2) Remove air intake duct and resonator chamber.
(1) Remove bolt which installs air intake duct on the front side of body.


S6M0708

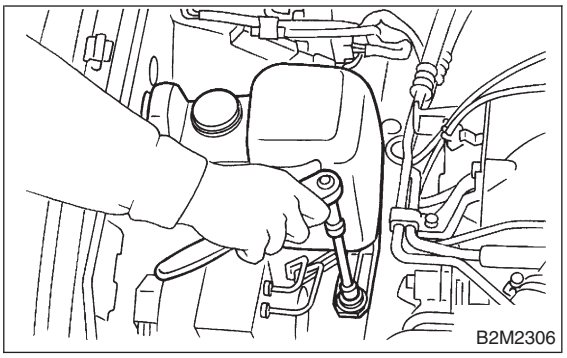
(2) Remove bolt which installs air intake duct on body.


B2M2284

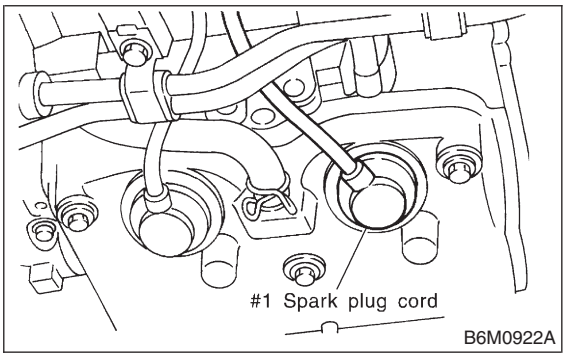
(3) Remove air intake duct as a unit.


B2M2012

(4) Remove resonator chamber.

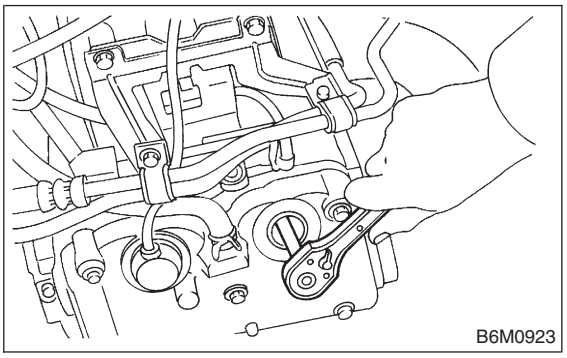

B2M2306

3) Remove #1 spark plug cord by pulling boot, not cord itself.



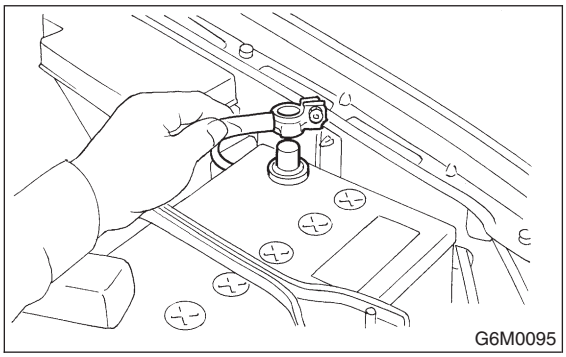
B6M0922A

4) Remove spark plug with the spark plug socket.

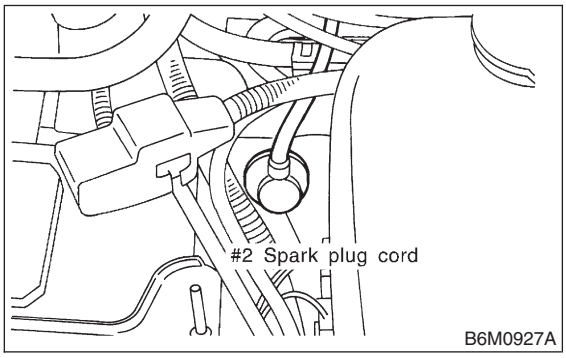

B6M0923

2. #2 SPARK PLUG S101003A1802

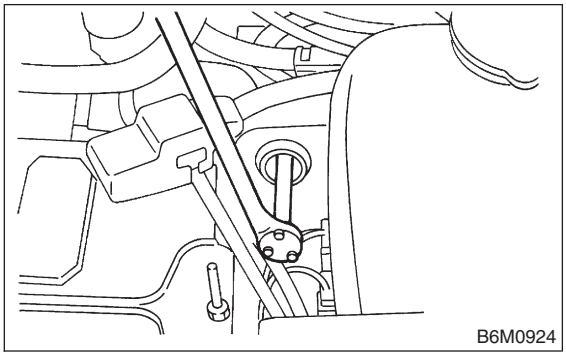
1) Disconnect battery ground cable.



2) Remove #2 spark plug cord by pulling boot, not cord itself.

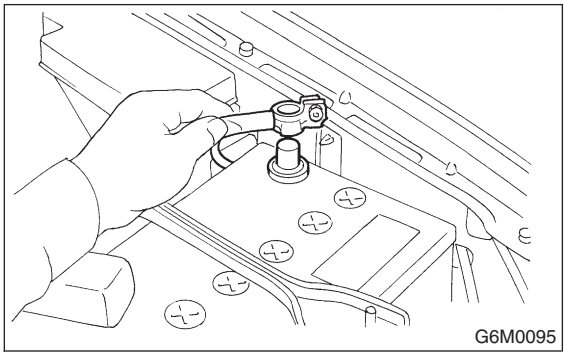


3) Remove spark plug with the spark plug socket.



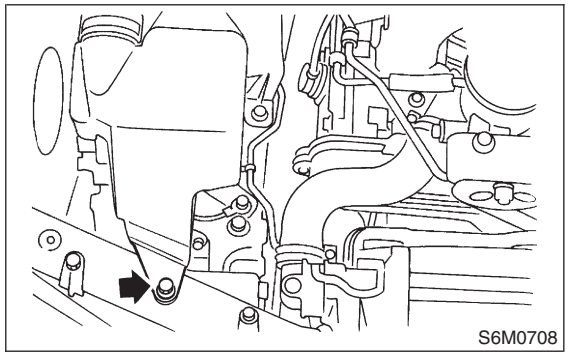
3. #3 SPARK PLUG S101003A1803

1) Disconnect battery ground cable.

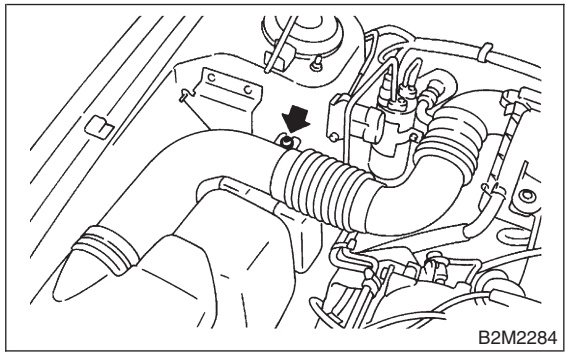


2) Remove air intake duct and resonator chamber.

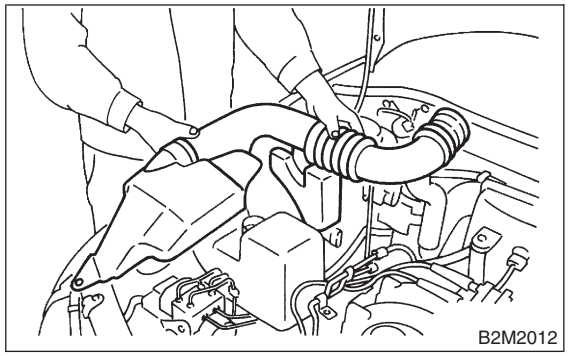
(1) Remove bolt which installs air intake duct on the front side of body.



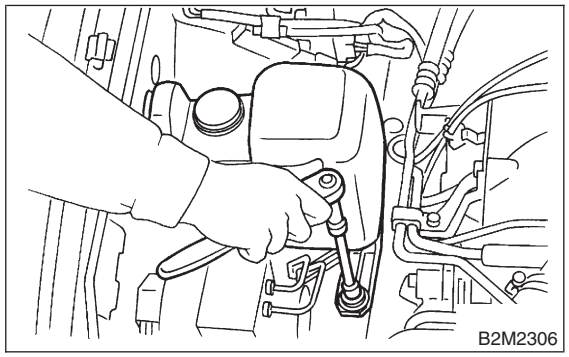
(2) Remove bolt which installs air intake duct on body.



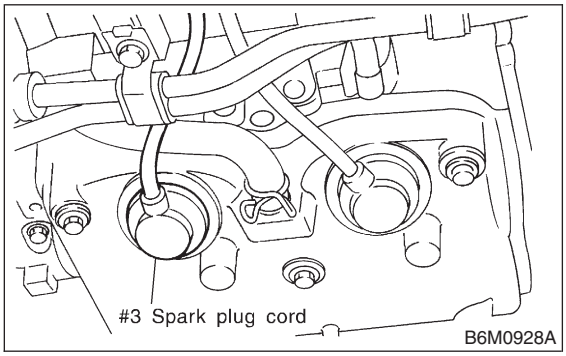
(3) Remove air intake duct as a unit.



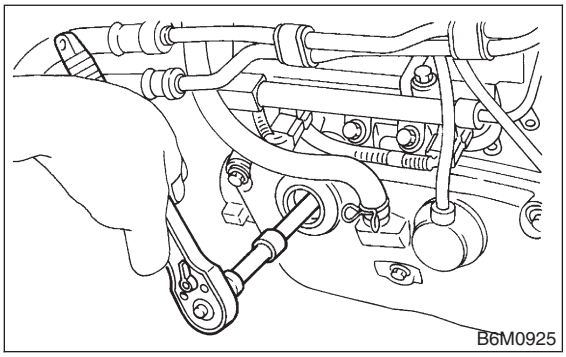
(4) Remove resonator chamber.



3) Remove #3 spark plug cord by pulling boot, not cord itself.

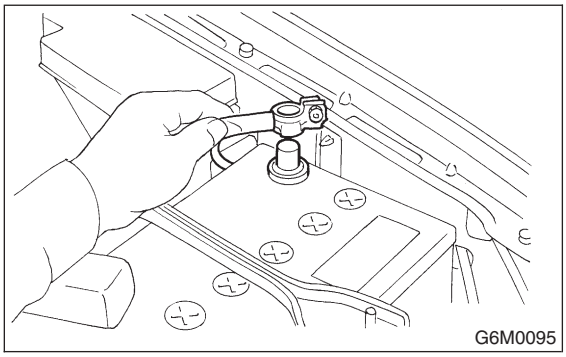


4) Remove spark plug with the spark plug socket.

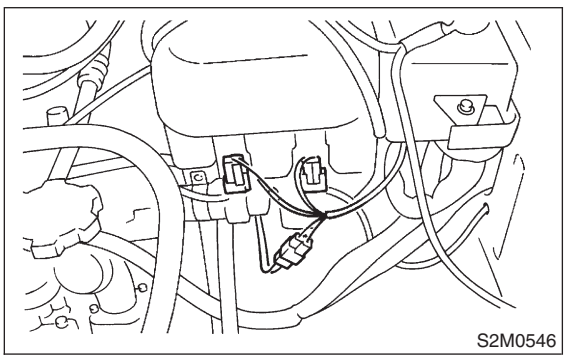


4. #4 SPARK PLUG *S101003A1804*

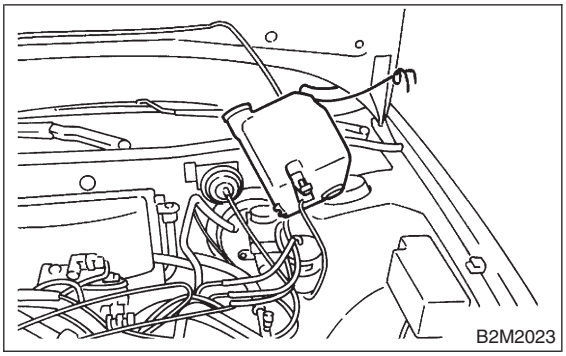
1) Disconnect battery ground cable.



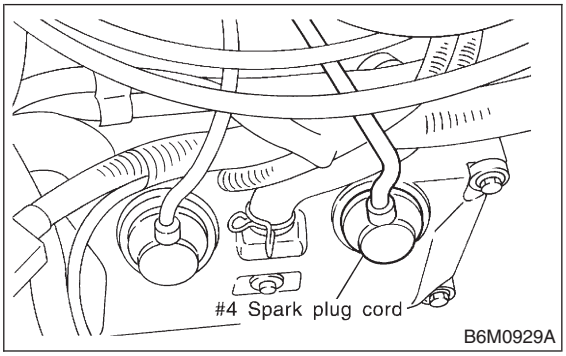
2) Disconnect washer motor connector.



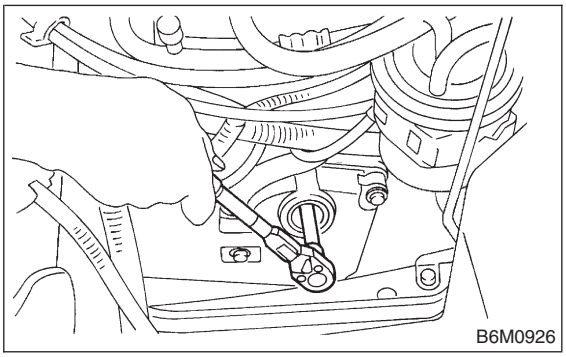
3) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.
4) Remove the two bolts which hold the washer tank, then take the tank away from the working area.



5) Remove #4 spark plug cord by pulling boot, not cord itself.



6) Remove spark plug with the spark plug socket.



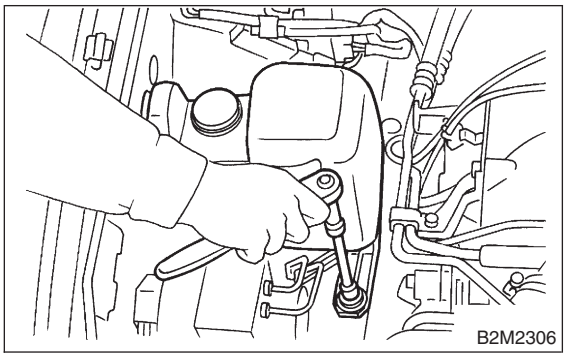
B: INSTALLATION S101003A11

1. #1 SPARK PLUG S101003A1101

Install in the reverse order of removal.

Tightening torque (Spark plug):
20.6 N·m (2.10 kgf-m, 15.19 ft-lb)

Tightening torque (Resonator chamber):
32 N·m (3.3 kgf-m, 24 ft-lb)



CAUTION:
The above torque should be only applied to new spark plugs without oil on their threads. In case their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid over-stressing.

2. #2 SPARK PLUG S101003A1102

Install in the reverse order of removal.

Tightening torque (Spark plug):
20.6 N·m (2.10 kgf-m, 15.19 ft-lb)

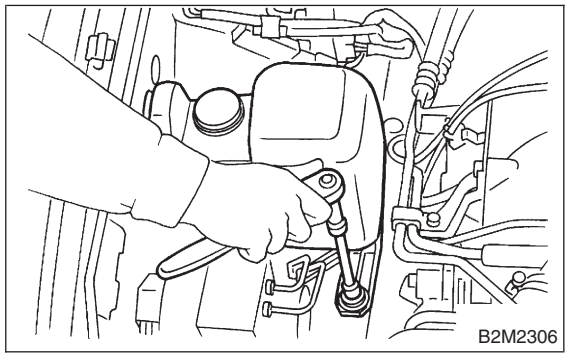
CAUTION:
The above torque should be only applied to new spark plugs without oil on their threads. In case their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid over-stressing.

3. #3 SPARK PLUG S101003A1103

Install in the reverse order of removal.

Tightening torque (Spark plug):
20.6 N·m (2.10 kgf-m, 15.19 ft-lb)

Tightening torque (Resonator chamber):
32 N·m (3.3 kgf-m, 24 ft-lb)



CAUTION:
The above torque should be only applied to new spark plugs without oil on their threads. In case their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid over-stressing.

4. #4 SPARK PLUG S101003A1104

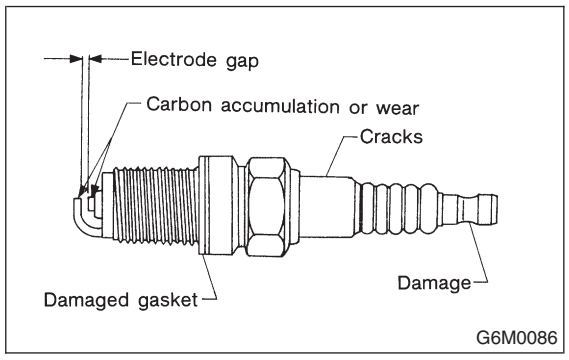
Install in the reverse order of removal.

Tightening torque (Spark plug):
20.6 N·m (2.10 kgf-m, 15.19 ft-lb)

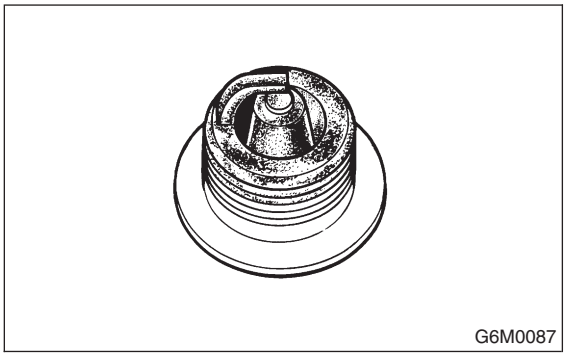
CAUTION:
The above torque should be only applied to new spark plugs without oil on their threads. In case their threads are lubricated, the torque should be reduced by approximately 1/3 of the specified torque in order to avoid over-stressing.

C: INSPECTION S101003A10

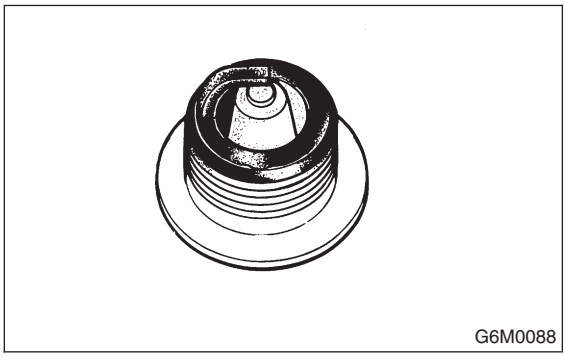
Check electrodes and inner and outer porcelain of plugs, noting the type of deposits and the degree of electrode erosion.



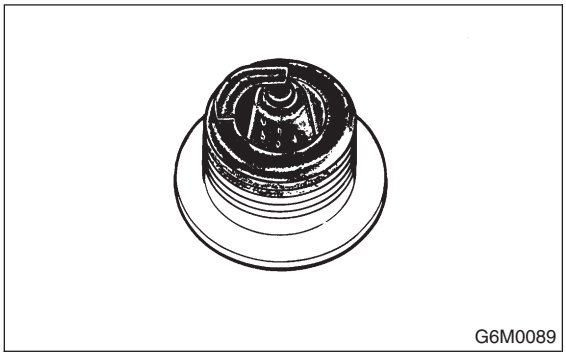
1) Normal
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.


G6M0087

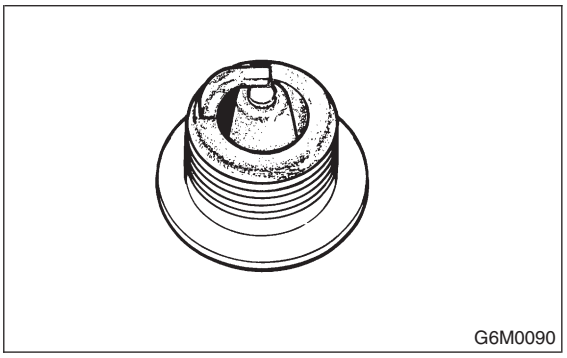
2) Carbon fouled
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.
It is advisable to replace with plugs having hotter heat range.


G6M0088

3) Oil fouled
Wet black deposits show excessive oil entrance into combustion chamber through worn rings and pistons or excessive clearance between valve guides and stems. If same condition remains after repair, use a hotter plug.


G6M0089

4) Overheating
White or light gray insulator with black or gray brown spots and bluish burnt electrodes indicate engine overheating. Moreover, the appearance results from incorrect ignition timing, loose spark plugs, wrong selection of fuel, hotter range plug, etc. It is advisable to replace with plugs having colder heat range.


G6M0090

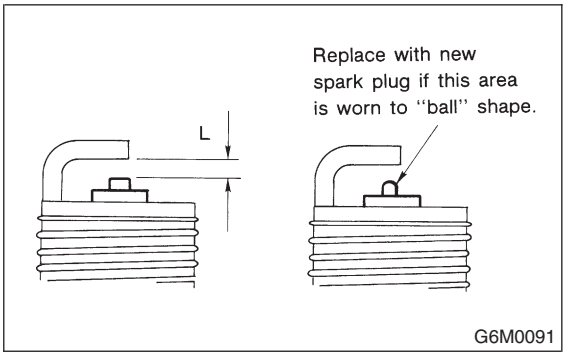
D: CLEANING S101003E56

Clean spark plugs in a sand blast type cleaner.
Avoid excessive blasting. Clean and remove carbon or oxide deposits, but do not wear away porcelain.
If deposits are too stubborn, discard plugs.

E: ADJUSTMENT S101003A01

After cleaning spark plugs, recondition firing surface of electrodes with file. Then correct the spark plug gap using a gap gauge.

Spark plug gap: L
1.0 — 1.1 mm (0.039 — 0.043 in)

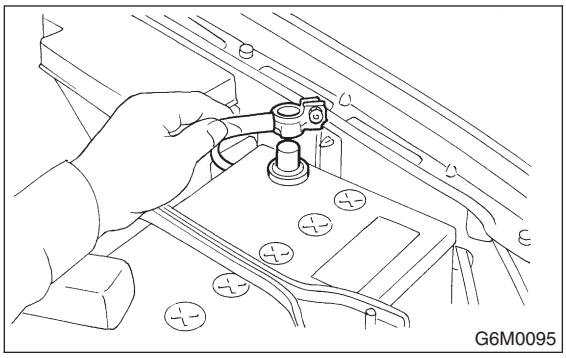


G6M0091

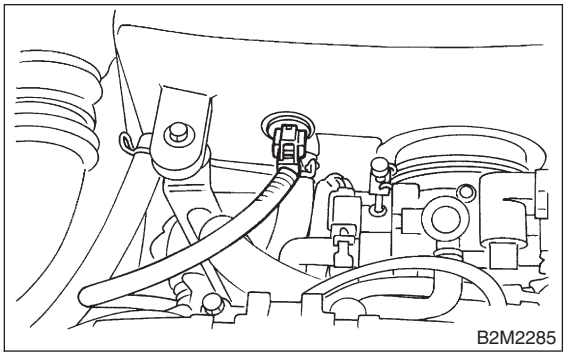
2. Air Cleaner Case S104089

A: REMOVAL S104089A18

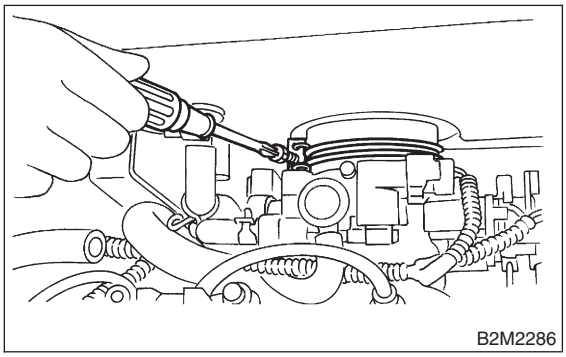
1) Disconnect battery ground cable.


G6M0095

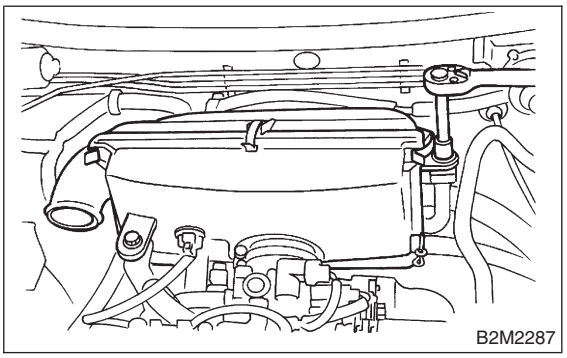
2) Disconnect connector from intake air temperature sensor. (2200 cc models)


B2M2285

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


B2M2286

4) Disconnect hoses from air cleaner case.
5) Remove bolts which install air cleaner case to stays.
6) Remove air cleaner case.


B2M2287

B: INSTALLATION S104089A11

Install in the reverse order of removal.

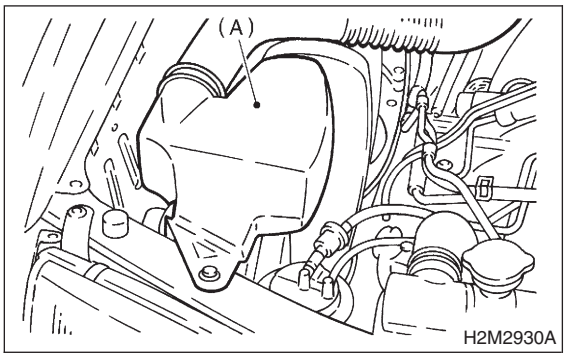
C: INSPECTION S104089A10

Inspect for cracks and loose connections.

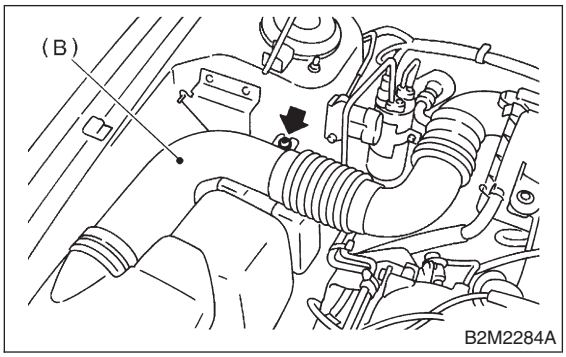
3. Air Intake Duct S104566

A: REMOVAL S104566A18

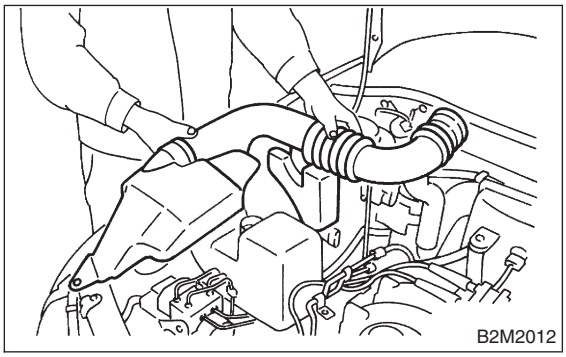
1) Remove bolt which installs air intake duct (A) on the front side of body.



2) Remove bolt which installs air intake duct (B) on body.



3) Remove air intake (A) and (B) as a unit.



B: INSTALLATION S104566A11

Install in the reverse order of removal.

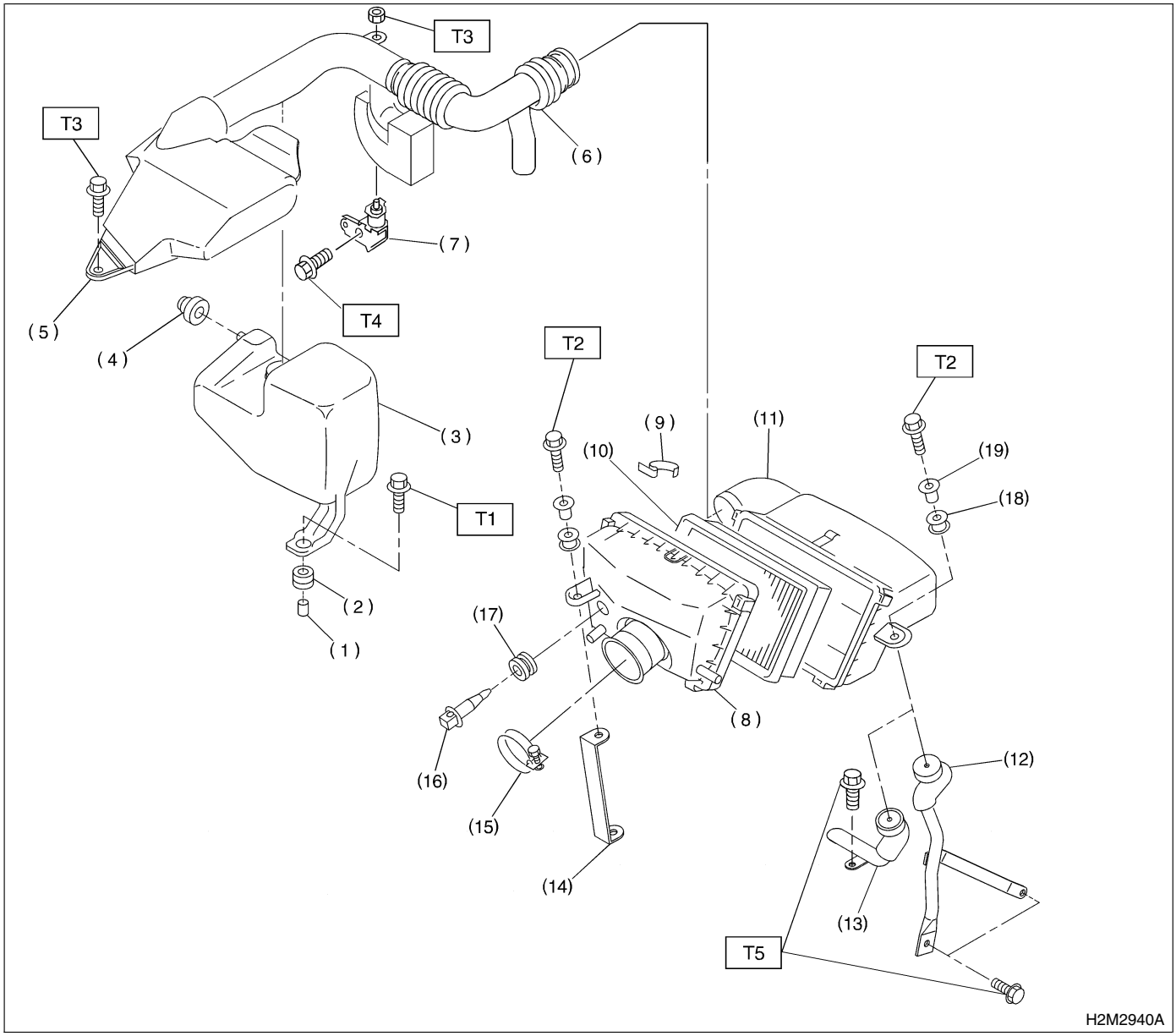
C: INSPECTION S104566A10

Inspect for cracks and loose connections.

MEMO:

1. General Description S104001

A: COMPONENT S104001A05



(1) Spacer
(2) Bush
(3) Air chamber
(4) Cushion rubber
(5) Air intake duct A
(6) Air intake duct B
(7) Holder
(8) Air cleaner case A
(9) Clip
(10) Air cleaner element
(11) Air cleaner case B
(12) Air cleaner case stay LH (MT vehicles)
(13) Air cleaner case stay LH (AT vehicles)
(14) Air cleaner case stay RH
(15) Clamp
(16) Intake air temperature sensor (2200 cc models)
(17) Rubber holder (2200 cc models)
(19) Bush
(18) Spacer

Tightening torque: N·m (kgf-m, ft-lb)
T1: 33 (3.4, 25)
T2: 6.4 (0.65, 4.7)
T3: 7.4 (0.75, 5.4)
T4: 14 (1.4, 10.1)
T5: 16 (1.6, 11.6)

B: CAUTION S104001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensor or units, be sure to disconnect negative terminal from battery.

5. Engine Lubrication System Trouble in General S108100

A: INSPECTION S108100A10

Before troubleshooting, 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)

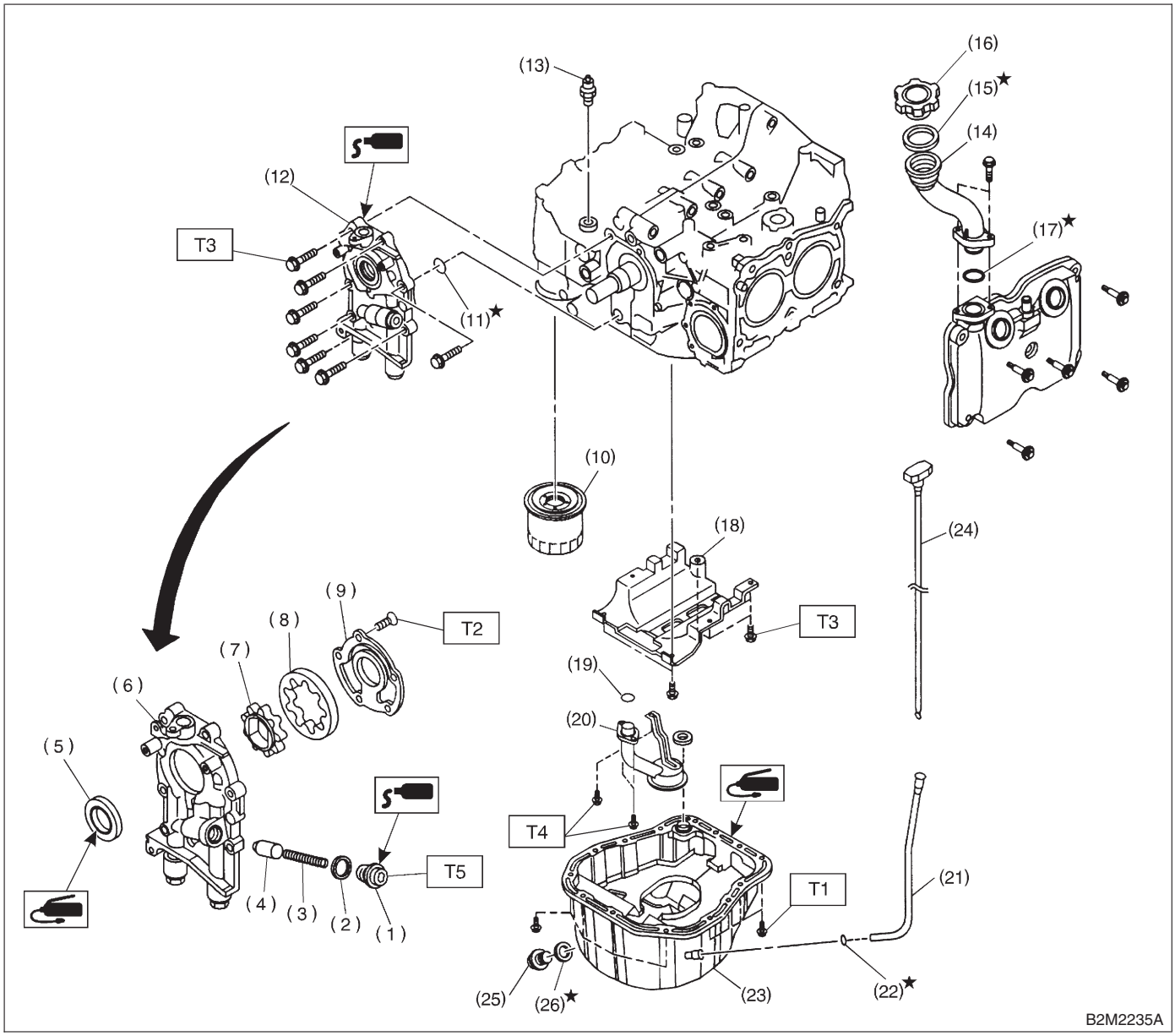
MEMO:

1. General Description S108001

A: SPECIFICATIONS S108001E49

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	0.15 mm (0.0059 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) or more
				- 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) or more
				- 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 (0.7 kg/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)

B: COMPONENT S108001A05



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 5 (0.5, 3.6)
T3: 6.4 (0.65, 4.7)
T4: 10 (1.0, 7.2)
T5: 44.1 (4.5, 32.5)

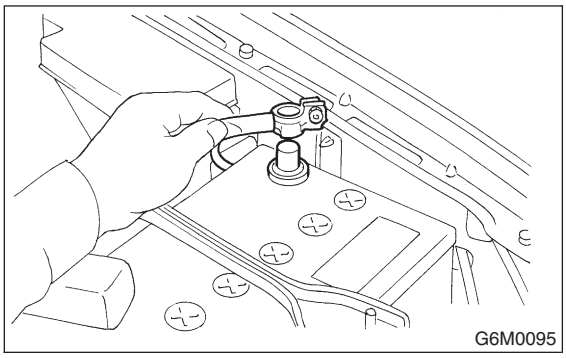
C: CAUTION S108001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

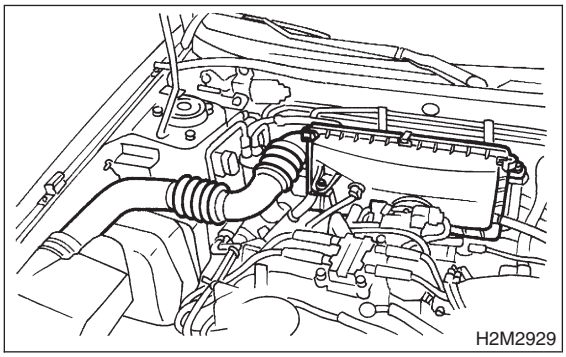
3. Oil Pan and Strainer S108071

A: REMOVAL S108071A18

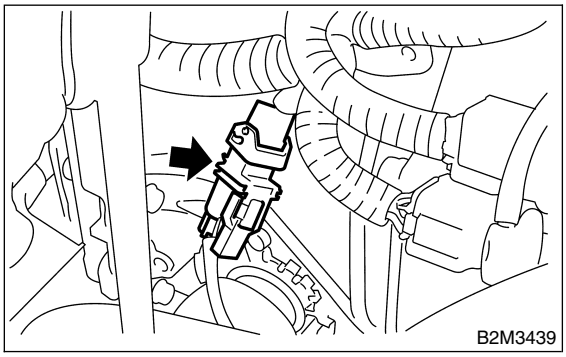
1) Disconnect battery ground cable.


G6M0095

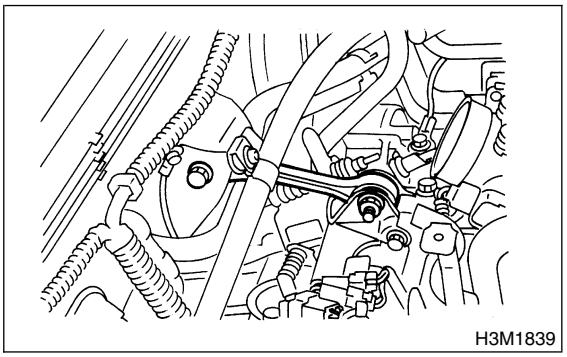
2) Remove front wheels.
3) Remove air intake duct <Ref. to IN-5 REMOVAL, Air Intake Duct.> and air cleaner assembly. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>


H2M2929

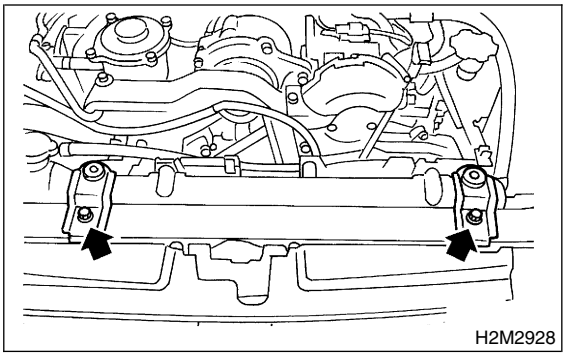
4) Disconnect front oxygen (A/F) sensor connector.


B2M3439

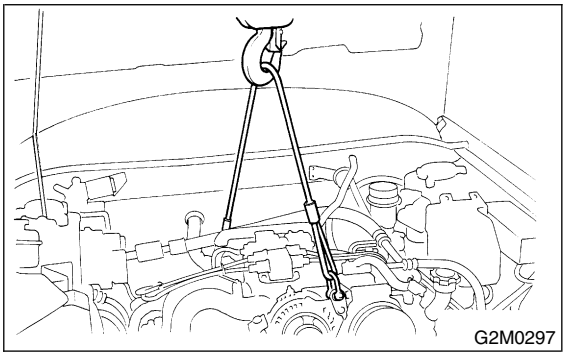
5) Remove pitching stopper.


H3M1839

6) Remove radiator upper bracket.


H2M2928

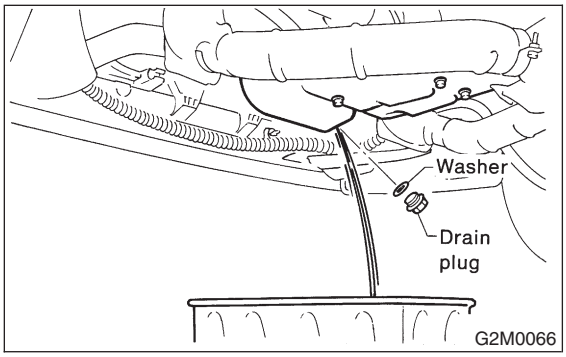
7) Support engine with a lifting device and wire ropes.


G2M0297

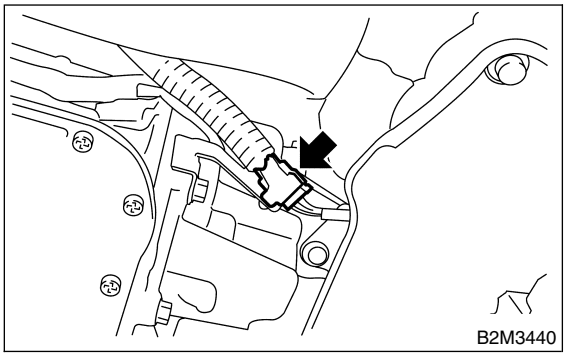
8) Lift-up the vehicle.

CAUTION:
At this time, raise up wire ropes.

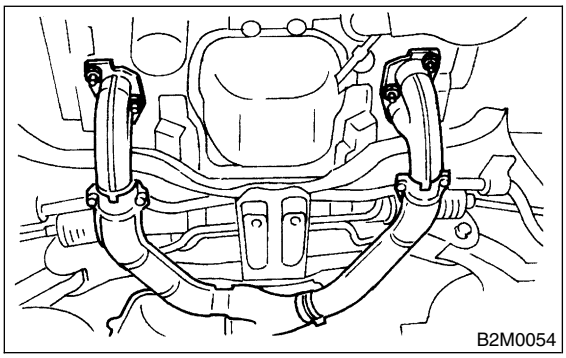
9) Remove under cover.
10) Drain engine oil.
Set container under the vehicle, and remove drain plug from oil pan.



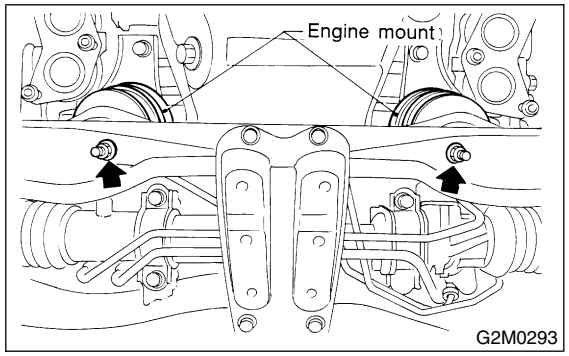
11) Disconnect connector from rear oxygen sensor.



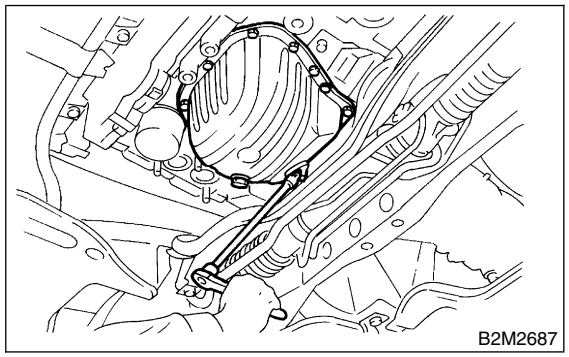
12) Remove front exhaust pipe <Ref. to EX-6 REMOVAL, Front Exhaust Pipe.> and center exhaust pipe. <Ref. to EX-9 REMOVAL, Center Exhaust Pipe.>



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



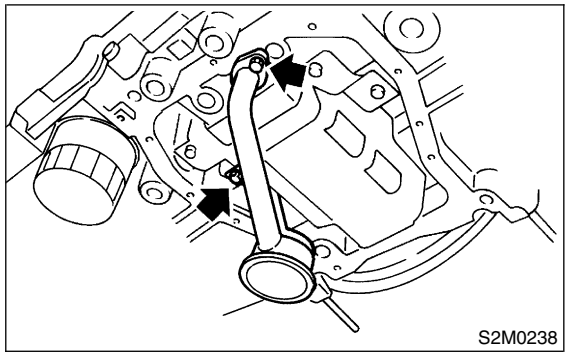
14) Remove bolts which install oil pan on cylinder block while raising up engine.



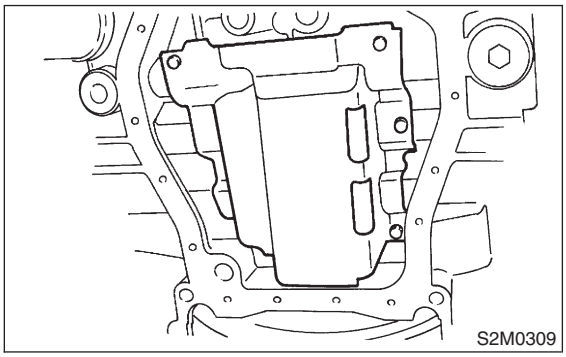
15) Insert oil pan cutter blade between cylinder block-to-oil pan clearance.

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

16) Remove oil strainer.



17) Remove baffle plate.

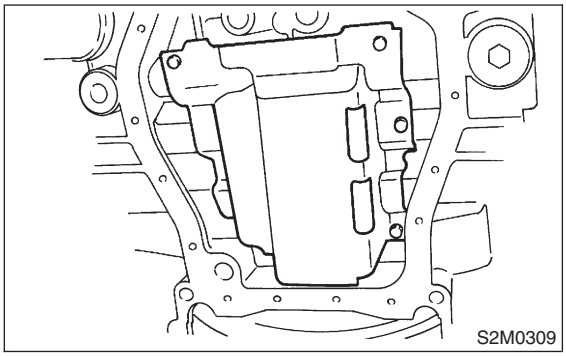


B: INSTALLATION S108071A11

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

1) Install baffle plate.

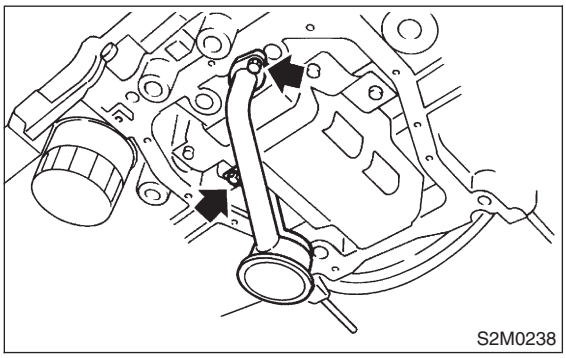
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



2) Install oil strainer onto baffle plate.

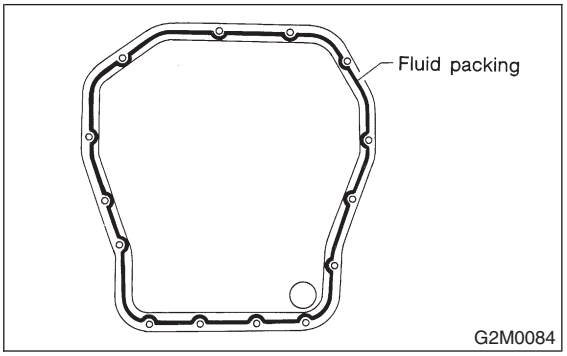
CAUTION:
Replace O-ring with a new one.

Tightening torque:
10 N·m (1.0 kgf-m, 7.2 ft-lb)



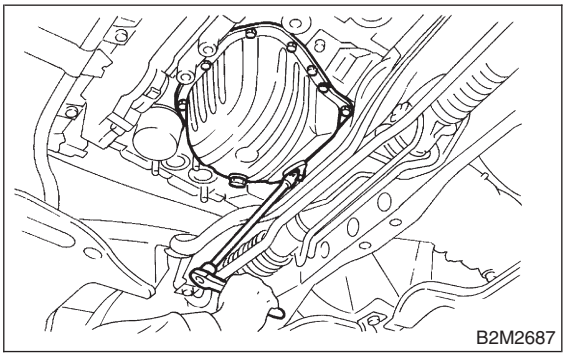
3) Apply fluid packing to mating surfaces and install oil pan.

Fluid packing:
THREE BOND 1215 or equivalent



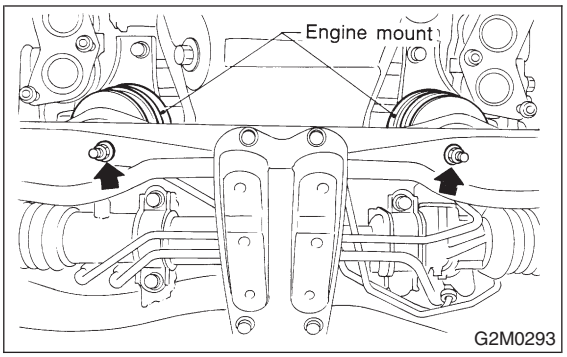
4) Tighten bolts which install oil pan onto engine block.

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



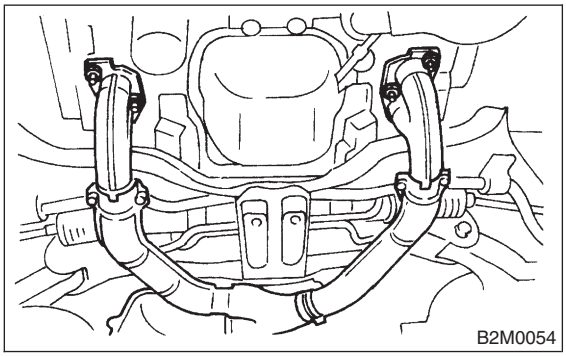
5) Lower engine onto front crossmember.
6) Tighten nuts which install front cushion rubber onto front crossmember.

Tightening torque:
69 N·m (7.0 kgf-m, 51 ft-lb)

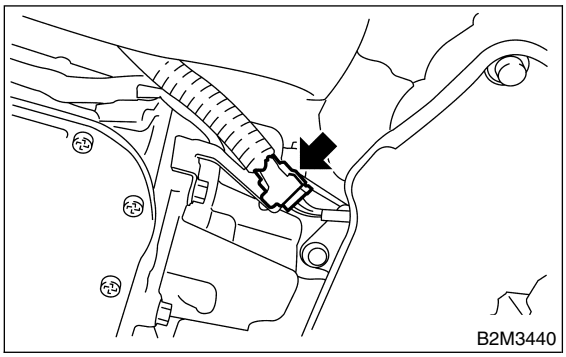


7) Install front exhaust pipe <Ref. to EX-7 INSTALLATION, Front Exhaust Pipe.> and center exhaust pipe assembly. <Ref. to EX-9 INSTALLATION, Center Exhaust Pipe.>

CAUTION:
Always use the new gaskets.


B2M0054

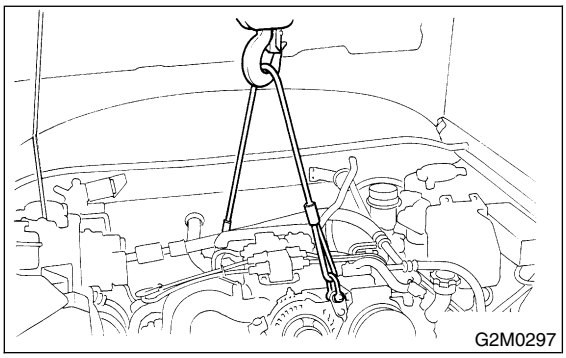
8) Connect connector to rear oxygen sensor.


B2M3440

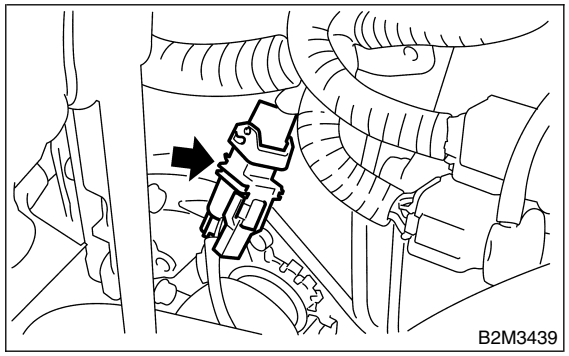
9) Install under cover.
10) Lower the vehicle.

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

11) Remove lifting device and steel cables.

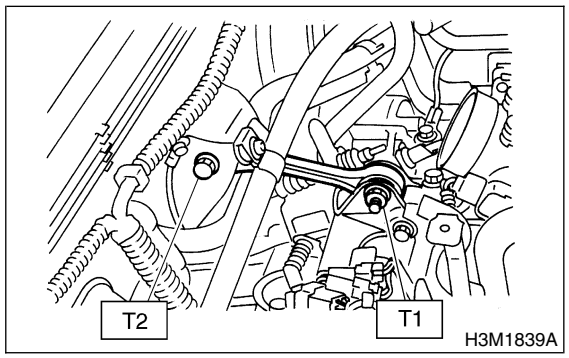

G2M0297

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


B2M3439

13) Install pitching stopper.

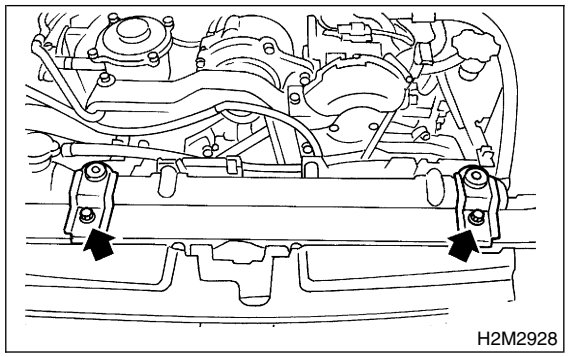
Tightening torque:
T1: 49 N·m (5.0 kgf-m, 36.2 ft-lb)
T2: 57 N·m (5.8 kgf-m, 42 ft-lb)



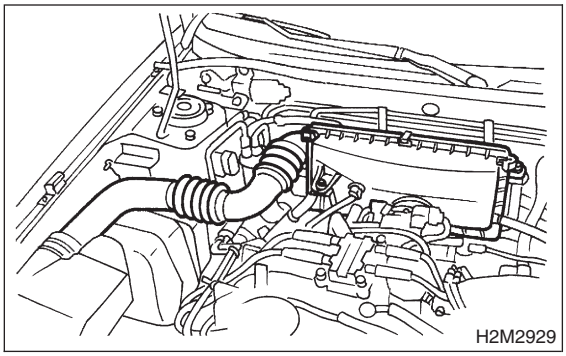
H3M1839A

14) Install radiator upper brackets.

Tightening torque:
185 N·m (1.8 kgf-m, 13 ft-lb)


H2M2928

15) Install air intake duct <Ref. to IN-5 INSTALLATION, Air Intake Dust.> and air cleaner assembly. <Ref. to IN-4 INSTALLATION, Air Cleaner Case.>



16) Fill engine oil through filler pipe up to upper point of level gauge.

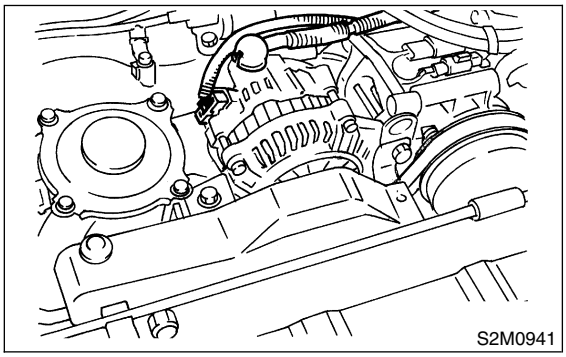
C: INSPECTION S108071A10

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

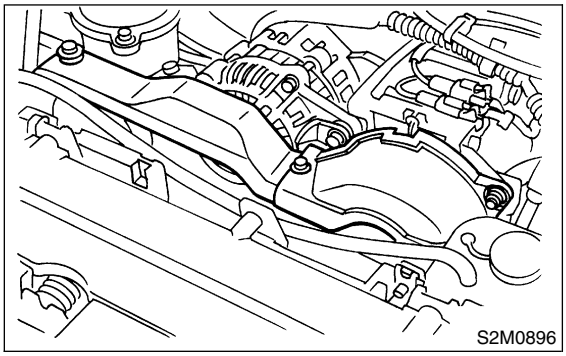
4. Oil Pressure Switch S108069

A: REMOVAL S108069A18

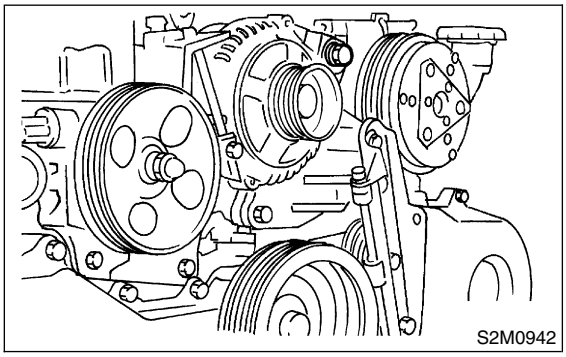
1) Remove alternator from bracket.
(1) Disconnect connector and terminal from generator.


S2M0941

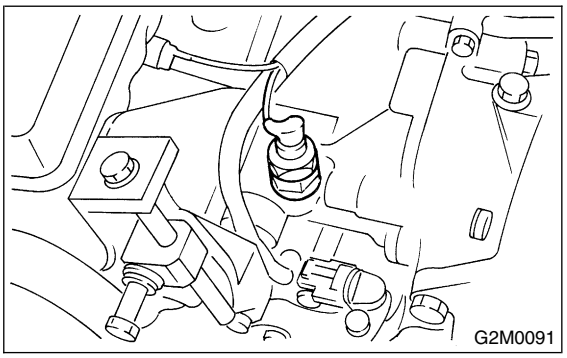
(2) Remove V-belt cover.


S2M0896

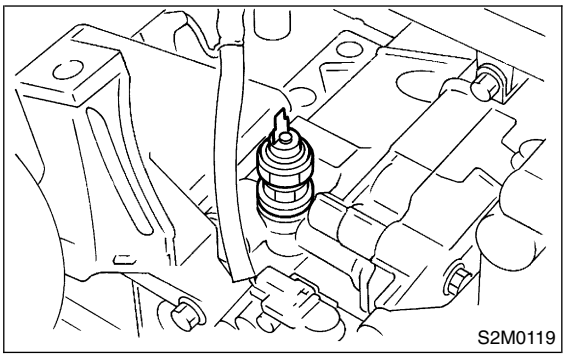
(3) Loosen lock bolt and slider bolt, and remove front side V-belt.
(4) Remove bolts which install generator on bracket.


S2M0942

2) Disconnect terminal from oil pressure switch.


G2M0091

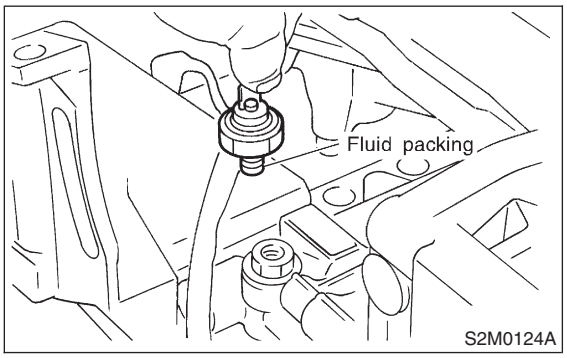
3) Remove oil pressure switch.


S2M0119

B: INSTALLATION S108069A11

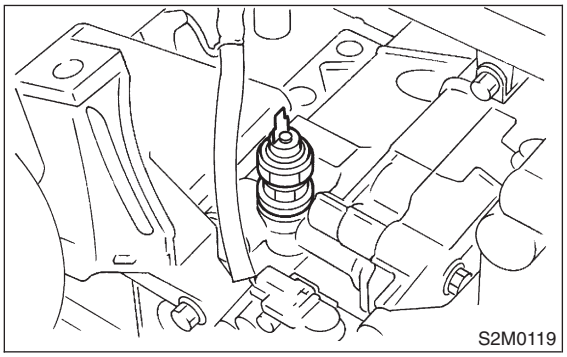
1) Apply fluid packing to oil pressure switch threads before installation.

Fluid packing:
THREE BOND 1215 or equivalent

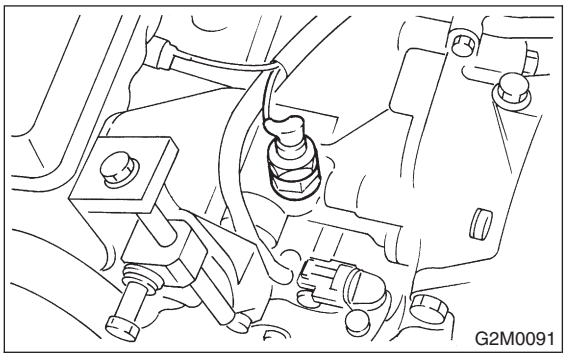


2) Install oil pressure switch onto engine block.

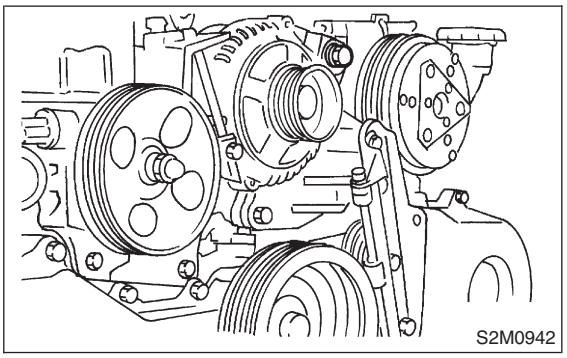
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



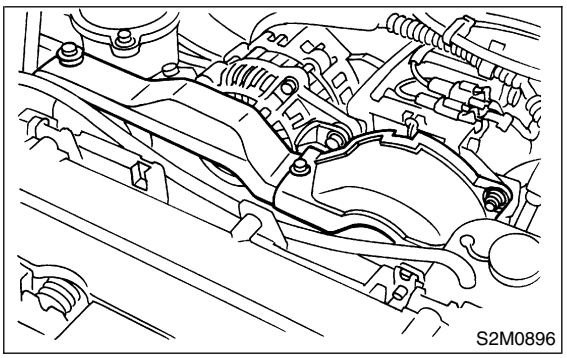
3) Connect terminal of oil pressure switch.



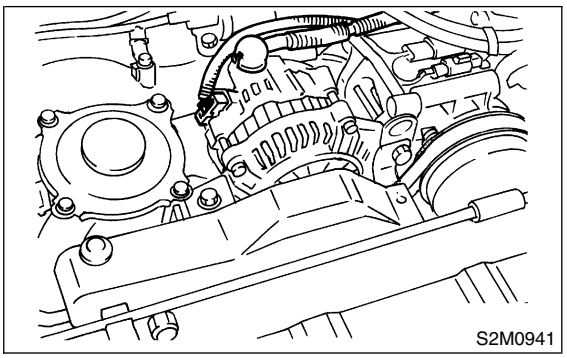
4) Install generator on bracket and temporary tighten installing bolts.



5) Install front side V-belt and adjust it. <Ref. to ME-48 INSTALLATION, V-belt.>
6) Install V-belt cover.



7) Connect connector and terminal to generator.



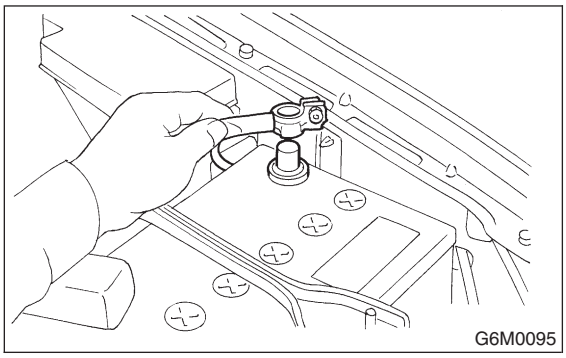
C: INSPECTION S108069A10

Make sure oil does not leak or seep from where the oil pressure switched in installed.

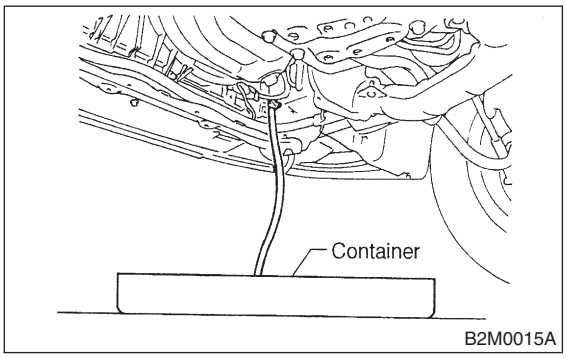
2. Oil Pump S108070

A: REMOVAL S108070A18

1) Disconnect battery ground cable.

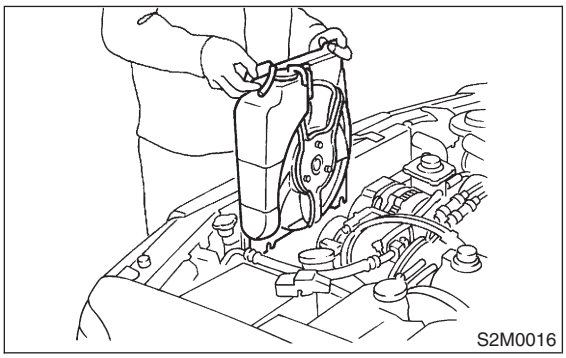

G6M0095

2) Lift-up the vehicle.
3) Remove under cover.
4) Drain coolant. <Ref. to CO-6 REPLACEMENT, Engine Coolant.>

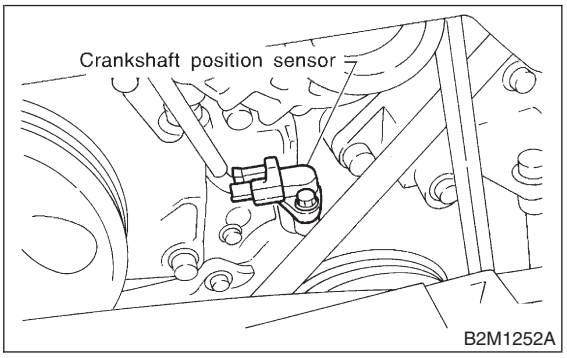


B2M0015A

5) Lower the vehicle.
6) Remove radiator main fan and sub fan assemblies. <Ref. to CO-20 REMOVAL, Radiator Main Fan and Fan Motor.>

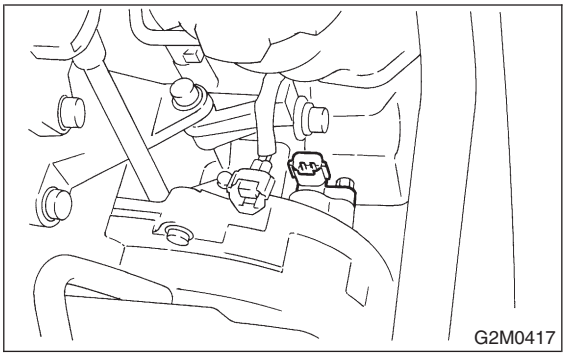

S2M0016

7) Remove crankshaft position sensor.

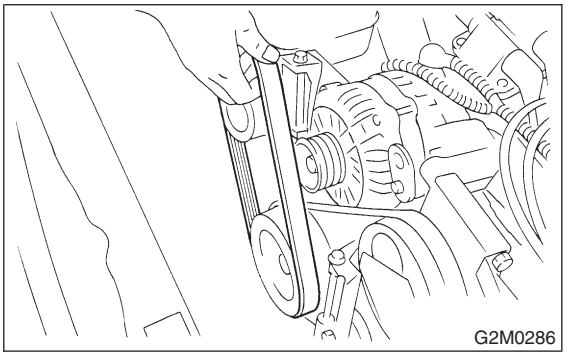


B2M1252A

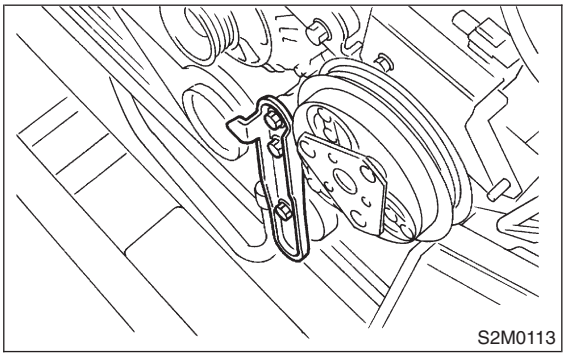
8) Remove camshaft position sensor.


G2M0417

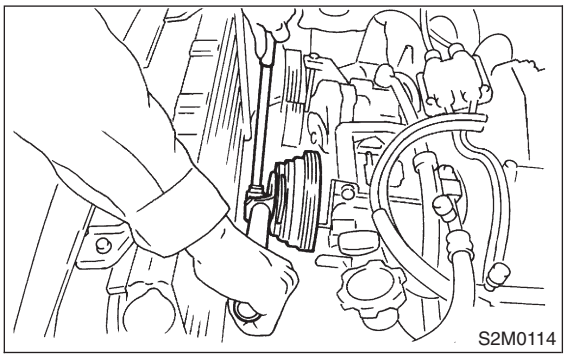
9) Remove V-belts. <Ref. to ME-48 REMOVAL, V-belt.>


G2M0286

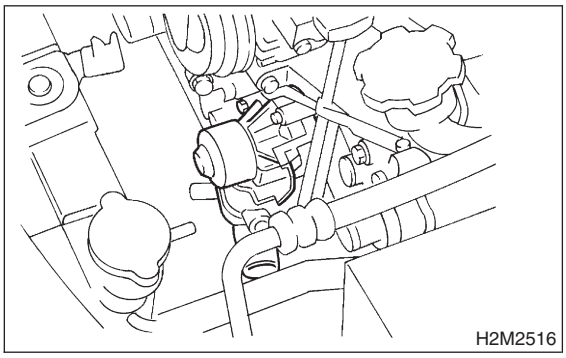
10) Remove rear side V-belt tensioner.


S2M0113

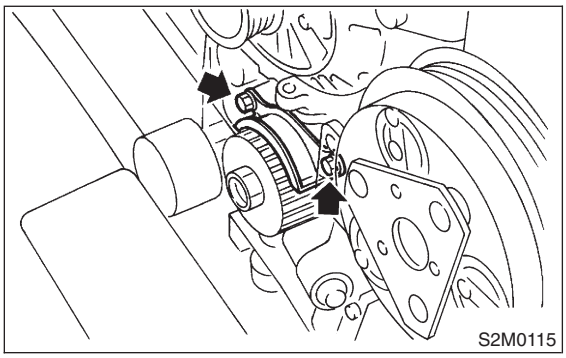
11) Remove crankshaft pulley by using ST.
2200 cc model:
ST 499977300 CRANKSHAFT PULLEY WRENCH
2500 cc model:
ST 499977100 CRANKSHAFT PULLEY WRENCH


S2M0114

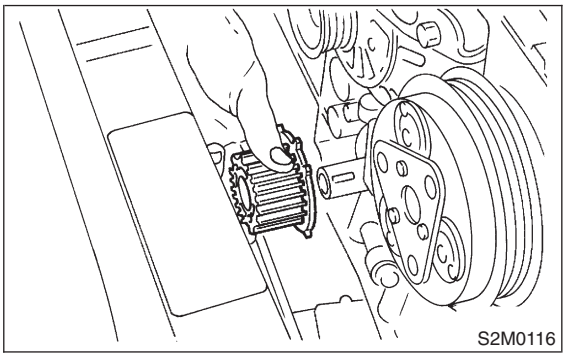
12) Remove water pump. <Ref. to CO-8 REMOVAL, Water Pump.>


H2M2516

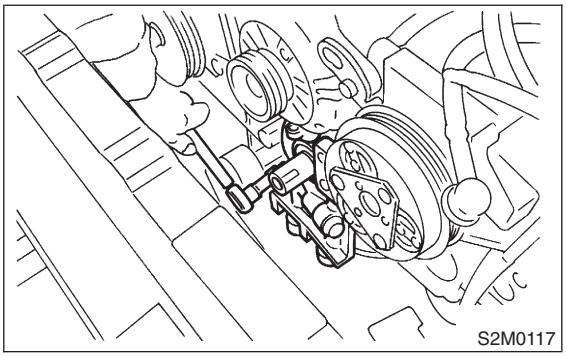
13) Remove timing belt guide. (MT vehicles only)


S2M0115

14) Remove crankshaft sprocket.

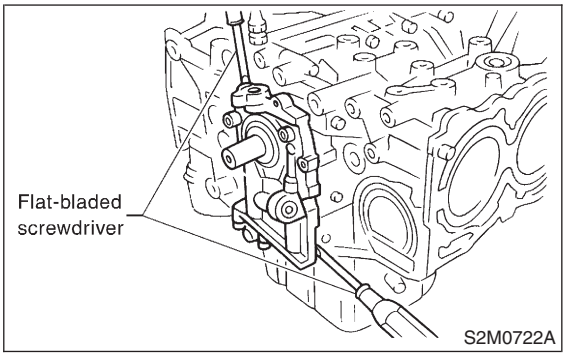

S2M0116

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


S2M0117

16) Remove oil pump by using flat bladed screwdriver.

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

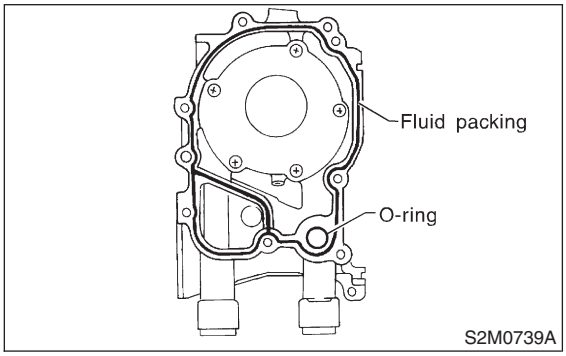


S2M0722A

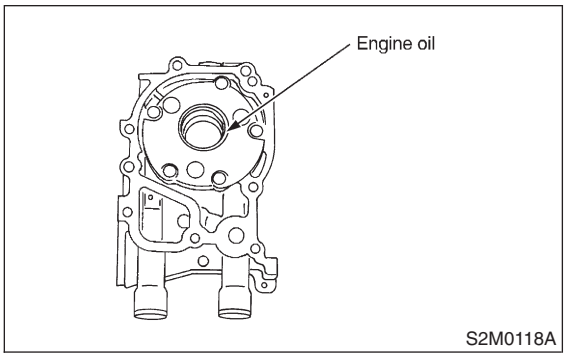
B: INSTALLATION S108070A11

Install in the reverse order of removal.
Observe 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.

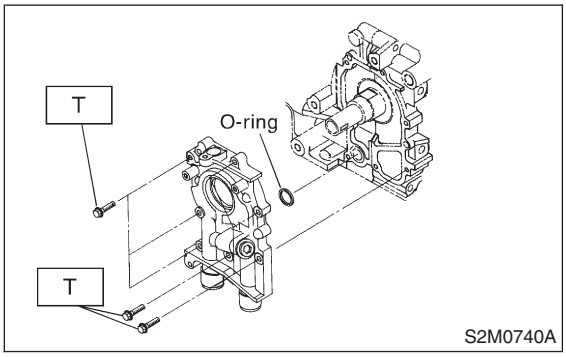


4) Be careful not to scratch oil seal when installing oil pump on cylinder block.
5) Position the oil pump, aligning the notched area with the crankshaft, and push the oil pump straight.

CAUTION:
Make sure the oil seal lip is not folded.

6) Install oil pump.

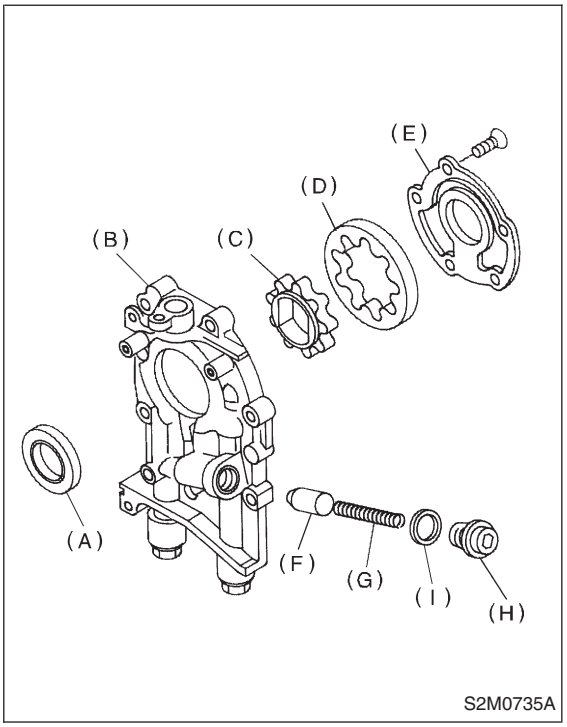
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



C: DISASSEMBLY S108070A06

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.

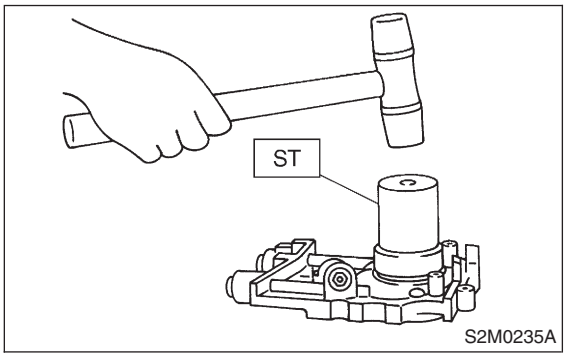


(A) Oil seal
(B) Pump case
(C) Inner rotor
(D) Outer rotor
(E) Pump cover
(F) Relief valve
(G) Relief spring
(H) Plug
(I) Washer

D: ASSEMBLY S108070A02

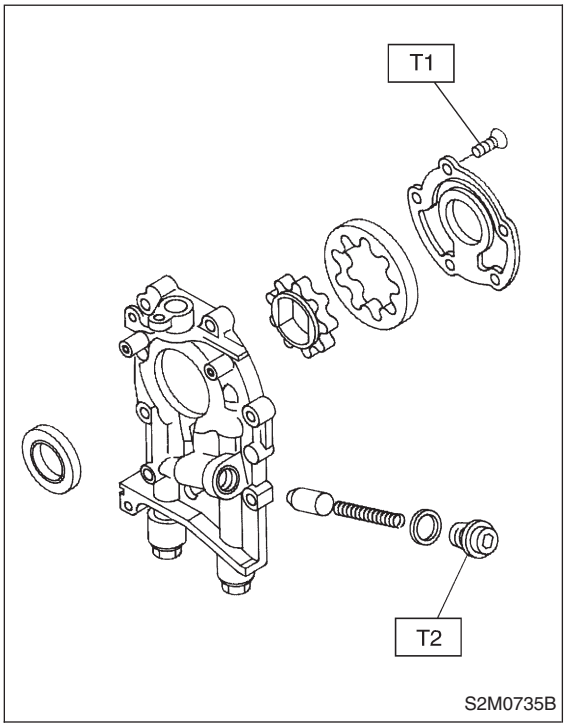
1) Install front oil seal by using ST.
ST 499587100 OIL SEAL INSTALLER

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 N·m (0.5 kgf-m, 3.6 ft-lb)
T2: 44.1 N·m (4.5 kgf-m, 32.5 ft-lb)

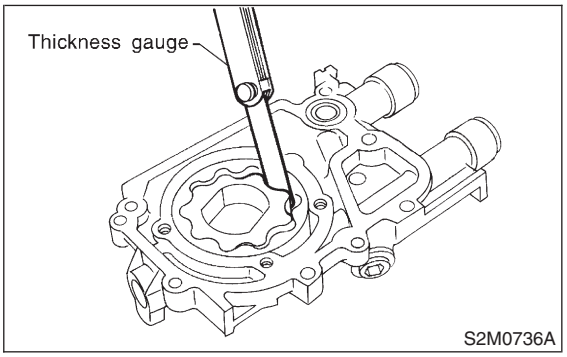


E: INSPECTION S108070A10

1. TIP CLEARANCE S108070A1001

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

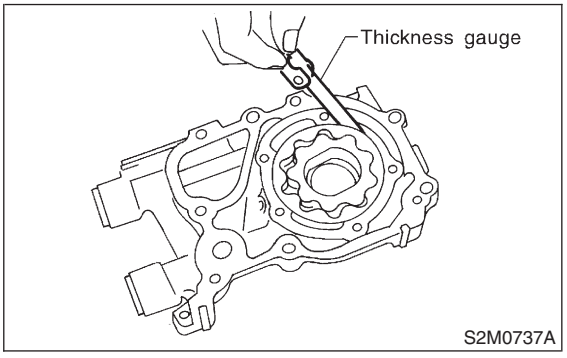
Tip clearance:
Standard
0.04 — 0.14 mm (0.0016 — 0.0055 in)
Limit
0.18 mm (0.0071 in)



2. CASE CLEARANCE S108070A1002

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

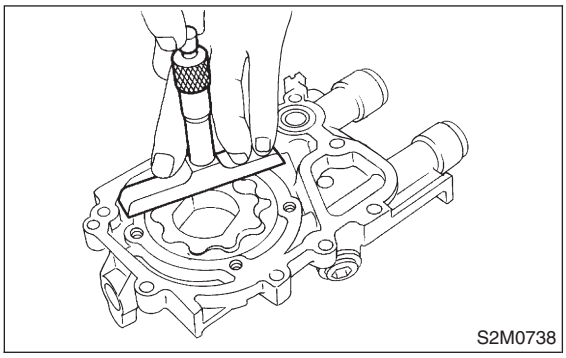
Case clearance:
Standard
0.10 — 0.175 mm (0.0039 — 0.0069 in)
Limit
0.20 mm (0.0079 in)



3. SIDE CLEARANCE S108070A1003

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)


S2M0738

4. OIL RELIEF VALVE S108070A1004

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 kgf, 17.33 lb)

5. OIL PUMP CASE S108070A1005

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

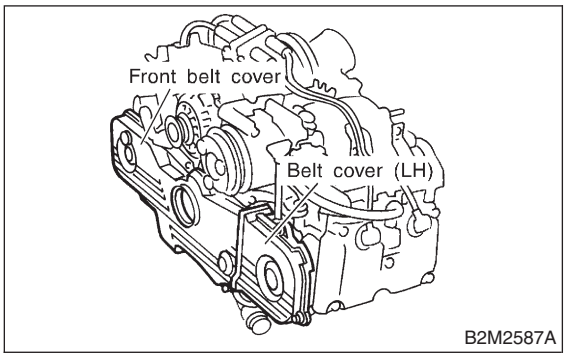
6. OIL SEAL S108070A1006

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

11. Belt Cover S103582

A: REMOVAL S103582A18

1) Remove belt cover (LH).
2) Remove front belt cover.



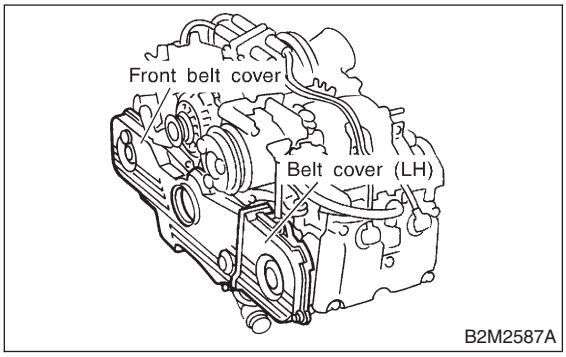
B: INSTALLATION S103582A11

1) Install front belt cover.

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

2) Install belt cover (LH).

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



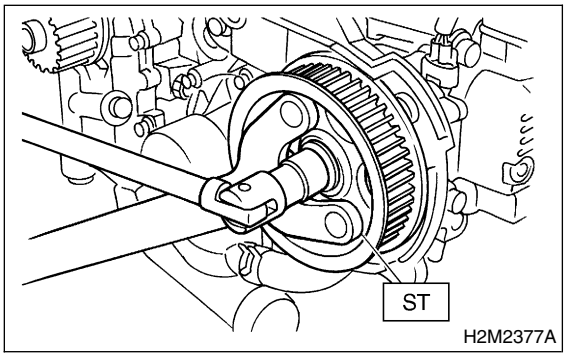
C: INSPECTION S103582A10

Make sure the cover is not damaged.

13. Camshaft Sprocket S103097

A: REMOVAL S103097A18

1) Remove V-belt. <Ref. to ME-48 REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME-49 REMOVAL, Crankshaft Pulley.>
3) Remove timing belt assembly. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>
4) Remove camshaft sprocket No. 1 and No. 2. To lock camshaft, use ST.
ST 499207100 CAMSHAFT SPROCKET WRENCH

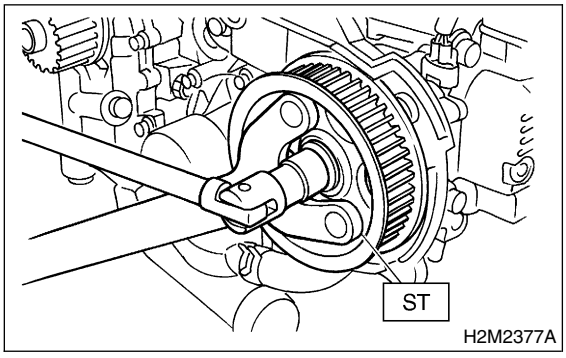


B: INSTALLATION S103097A11

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

Tightening torque:
78 N·m (8.0 kgf-m, 57.9 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) Install timing belt assembly. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>
3) Install crankshaft pulley. <Ref. to ME-49 INSTALLATION, Crankshaft Pulley.>
4) Install V-belt. <Ref. to ME-48 INSTALLATION, V-belt.>

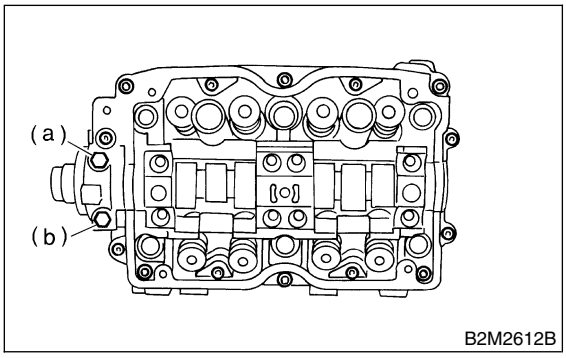
C: INSPECTION S103097A10

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.

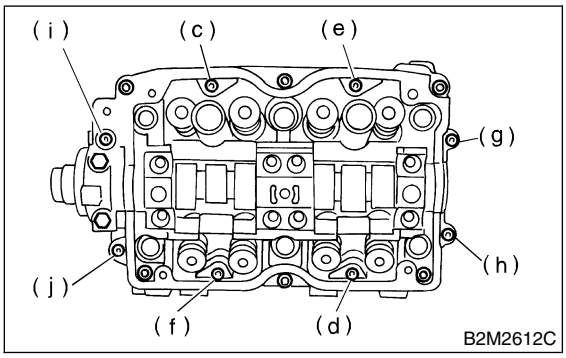
16. Camshaft S103092

A: REMOVAL S103092A18

1) Remove V-belt. <Ref. to ME-48 REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME-49 REMOVAL, Crankshaft Pulley.>
3) Remove timing belt assembly. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>
4) Remove camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>
5) Remove crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>
6) Remove camshaft position sensor support. (LH side only)
7) Remove oil level gauge guide. (LH side only)
8) Remove valve rocker assembly. <Ref. to ME-61 REMOVAL, Valve Rocker Assembly.>
9) Remove camshaft cap.
   (1) Remove bolts (a) through (b) in alphabetical sequence.

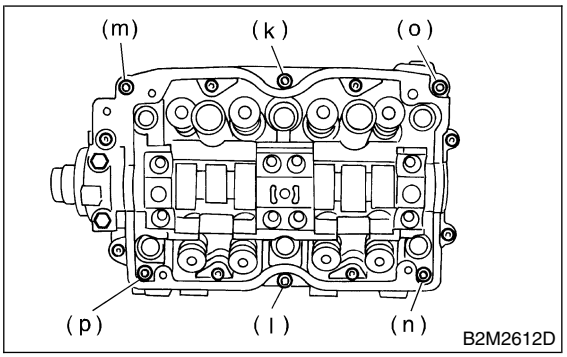


   (2) Equally loosen bolts (c) through (j) all the way in alphabetical sequence.

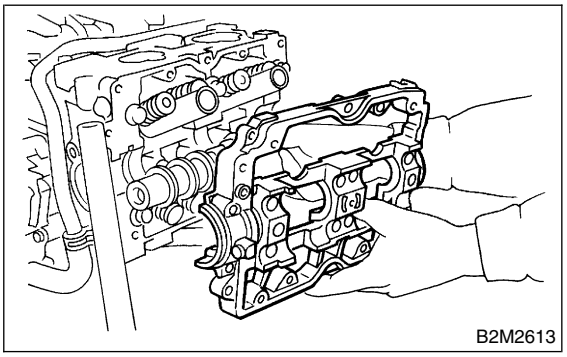


   (3) Remove bolts (k) through (p) in alphabetical sequence using ST.

ST 499497000 TORX PLUS



   (4) Remove camshaft cap.



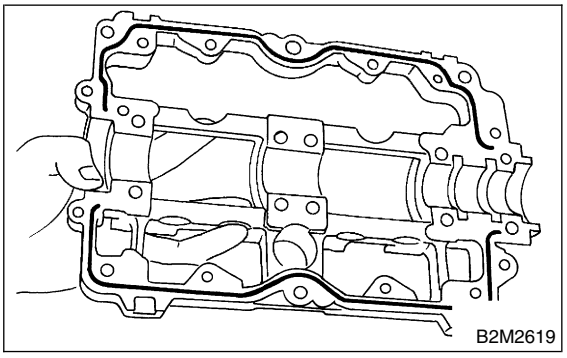
10) Remove camshaft.
11) Remove oil seal.
12) Remove plug from rear side of camshaft.

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

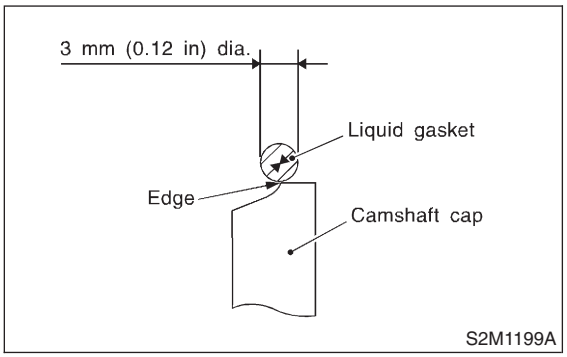
B: INSTALLATION S103092A11

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

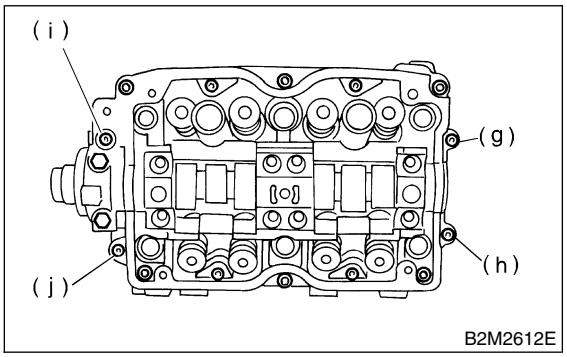
Liquid gasket:
THREE BOND 1280B
P/N K0877YA018



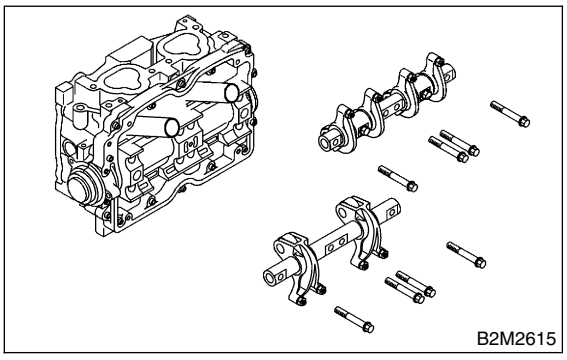
NOTE:
Apply a coat of 3 mm (0.12 in) dia. liquid gasket along edge of cam cap mating surface.



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

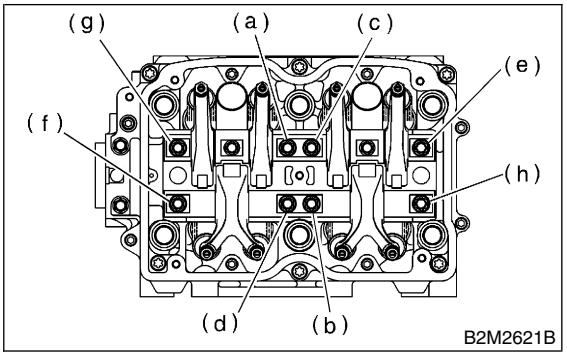


(3) Install valve rocker assembly.



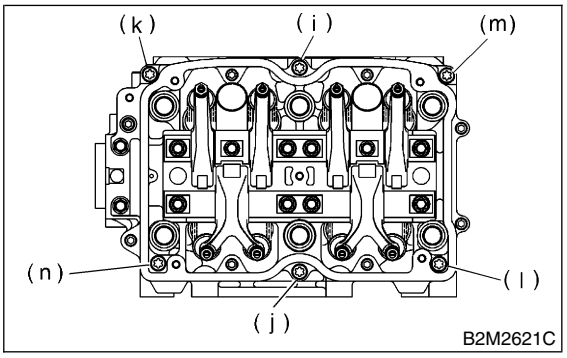
(4) Tighten bolts (a) through (h) in alphabetical sequence.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



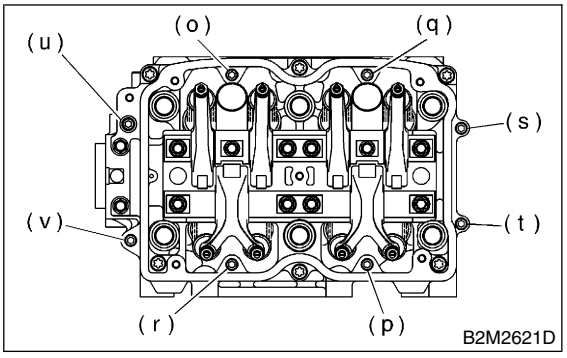
(5) Tighten TORX bolts (i) through (n) in alphabetical sequence using ST.
ST 499427000 TORX PLUS

Tightening torque:
18 N·m (1.8 kgf-m, 13.0 ft-lb)



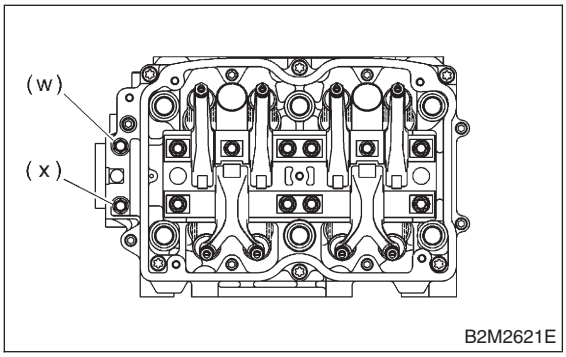
(6) Tighten bolts (o) through (v) in alphabetical sequence.

Tightening torque:
10 N·m (1.0 kgf-m, 7.2 ft-lb)



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

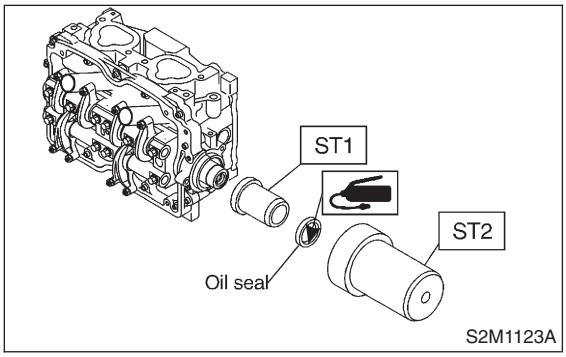
Tightening torque:
10 N·m (1.0 kgf-m, 7.2 ft-lb)



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



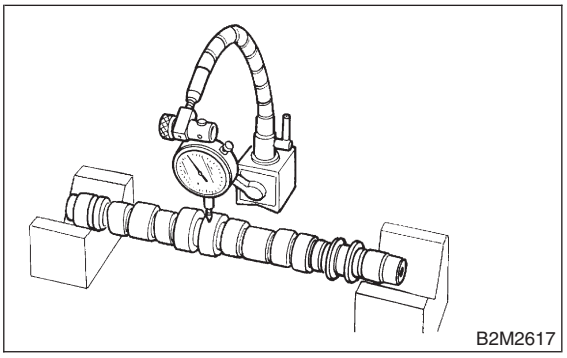
4) Install plug using ST.
ST 499587700 OIL SEAL INSTALLER
5) Adjust the valve clearance. <Ref. to ME-32 ADJUSTMENT, Valve Clearance.>
6) Install rocker cover and connect PCV hose.
7) Install oil level gauge guide. (LH side only)
8) Install camshaft position sensor support. (LH side only)
9) Install timing belt assembly. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>
10) Install crankshaft pulley. <Ref. to ME-49 INSTALLATION, Crankshaft Pulley.>
11) Install V-belt.

C: INSPECTION S103092A10

1. CAMSHAFT S103092A1001

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:

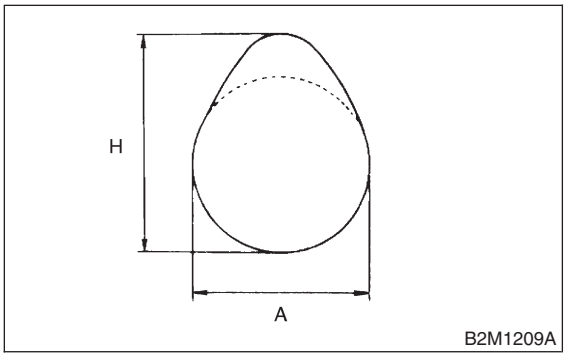
- **2200 cc**

		Unit: mm (in)
Item	Standard	Limit
Intake	38.732 — 38.832 (1.5249 — 1.5288)	38.632 (1.5209)
Exhaust	39.257 — 39.357 (1.5455 — 1.5495)	39.157 (1.5416)

- **2500 cc**

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

Cam base circle diameter A:
IN: 34.00 mm (1.3386 in)
EX: 34.00 mm (1.3386 in)

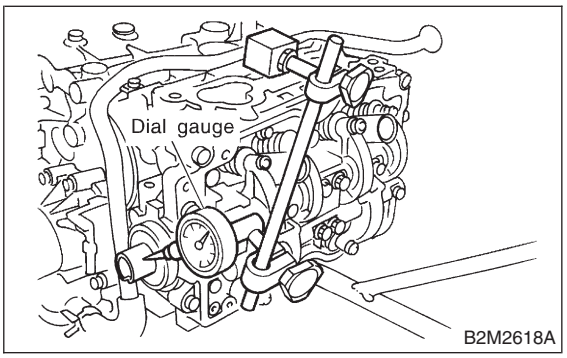


2. CAMSHAFT SUPPORT S103092A1002

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)



2. Compression S103081

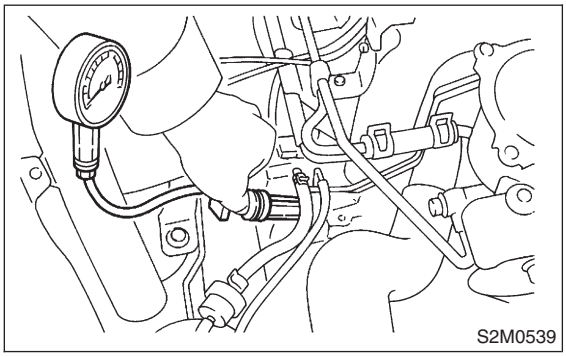
A: INSPECTION S103081A10

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) Disconnect battery ground cable.
4) Remove all the spark plugs. <Ref. to IG-4 REMOVAL, Spark Plug.>
5) Disconnect connectors from fuel injectors.
6) Connect battery ground cable.
7) Fully open throttle valve.
8) Check the starter motor for satisfactory performance and operation.
9) 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.

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


S2M0539

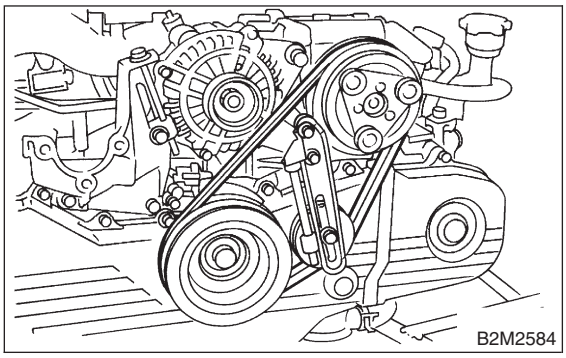
11) Perform at least two measurements per cylinder, and make sure that the values are correct.

Compression (350 rpm and fully open throttle):
Standard;
1,079 — 1,275 kPa (11.0 — 13.0 kg/cm^2, 156 — 185 psi)
Limit;
1,020 kPa (10.4 kg/cm^2, 148 psi)
Difference between cylinders;
49 kPa (0.5 kg/cm^2, 7 psi), or less

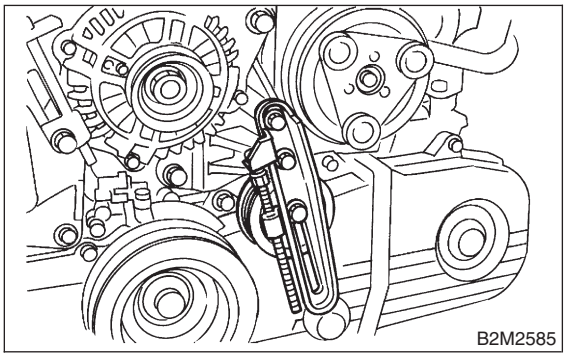
10. Crankshaft Pulley S103098

A: REMOVAL S103098A18

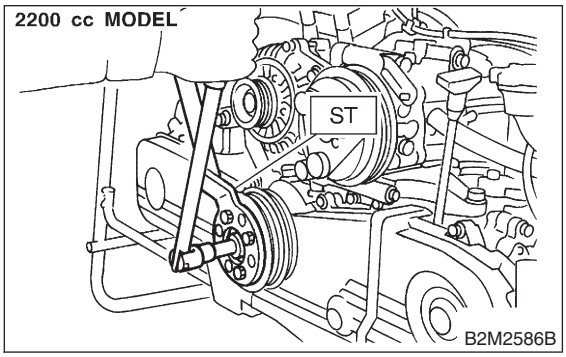
1) Remove A/C belt. (With A/C model)

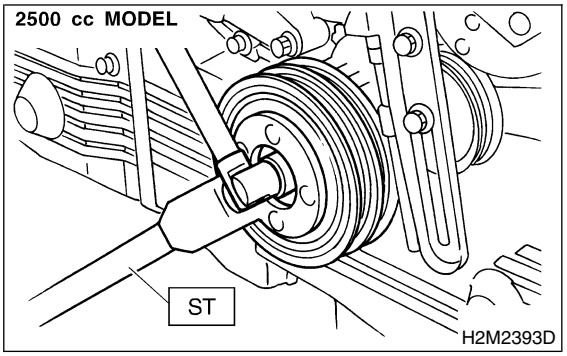


2) Remove A/C belt tensioner. (With A/C model)



3) Remove crankshaft pulley bolt. To lock crankshaft, use ST.
2200 cc model:
ST 499977300 CRANKSHAFT PULLEY WRENCH
2500 cc model:
ST 499977100 CRANKSHAFT PULLEY WRENCH





4) Remove crankshaft pulley.

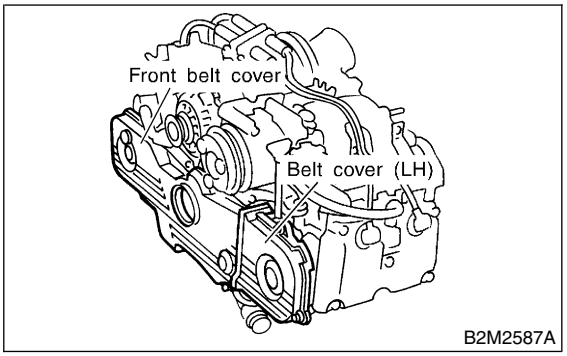
B: INSTALLATION S103098A11

1) Install front belt cover.

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

2) Install belt cover (LH).

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

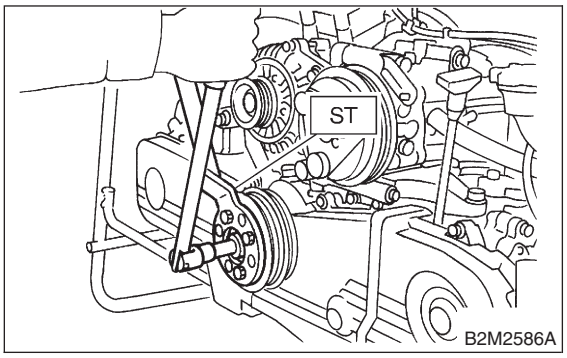


3) Install crankshaft pulley.

4) Install pulley bolt. (2200 cc model)
To lock crankshaft, use ST.
ST 499977000 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 kgf-m, 33 ft-lb).
(4) Tighten the crankshaft pulley bolts.

Tightening torque:
127 N·m (13.0 kgf-m, 94.0 ft-lb)



5) Confirm that the tightening angle of the crankshaft pulley bolt is 45 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

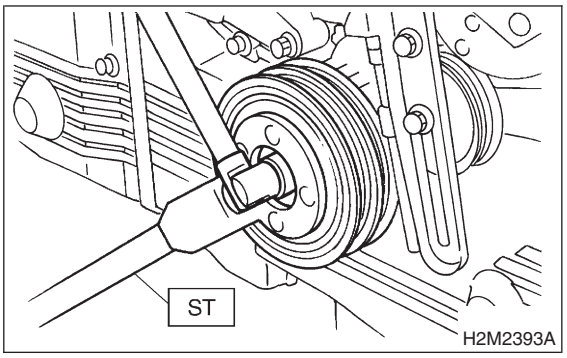
(2) Clean the crankshaft thread using an air gun.
(3) Tighten the bolts temporarily with tightening torque of 44 N·m (4.5 kgf-m, 33 ft-lb).
(4) Tighten the crankshaft pulley bolts keeping them in an angle between 45 degrees and 60 degrees.

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 pulley bolt. (2500 cc model)
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 kgf-m, 33 ft-lb).
(4) Tighten the crankshaft pulley bolts.

Tightening torque:
177 N·m (18.0 kgf-m, 130.2 ft-lb)



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

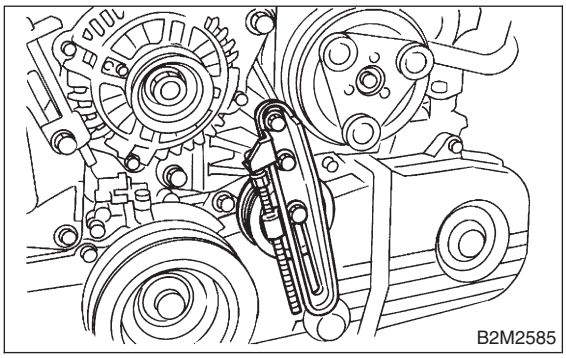
(1) Replace the crankshaft pulley bolts and clean them.

Crankshaft pulley bolt:
12369AA011

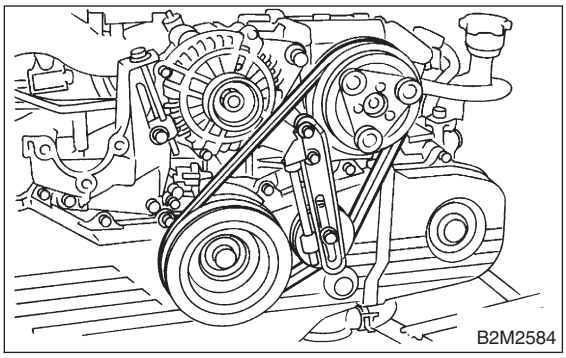
(2) Clean the crankshaft thread using an air gun.
(3) Tighten the bolts temporarily with tightening torque of 44 N·m (4.5 kgf-m, 33 ft-lb).
(4) Tighten the crankshaft pulley bolts keeping them in an angle between 65 degrees and 75 degrees.

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

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



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



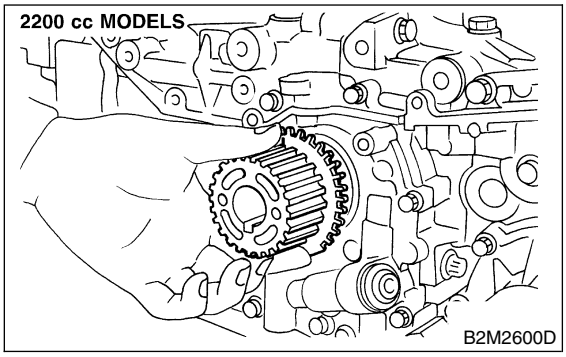
C: INSPECTION S103098A10

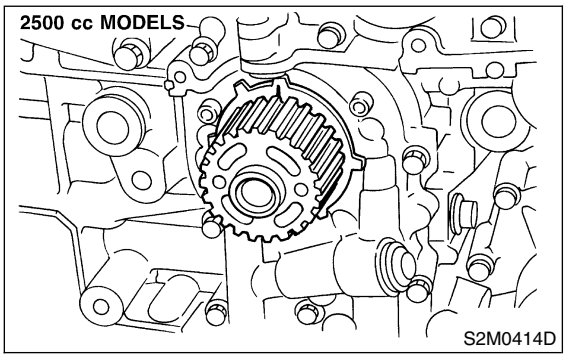
1) Make sure the V-belt is not worn or otherwise damaged.
2) Check the tension of the belt. <Ref. to ME-48 INSPECTION, V-belt.>

14. Crankshaft Sprocket S103101

A: REMOVAL S103101A18

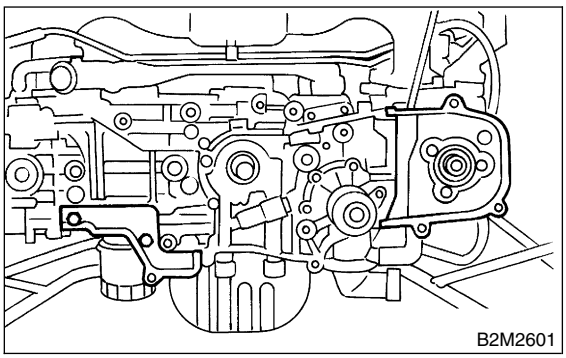
1) Remove V-belt. <Ref. to ME-48 REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME-49 REMOVAL, Crankshaft Pulley.>
3) Remove timing belt assembly. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>
4) Remove camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>
5) Remove crankshaft sprocket.



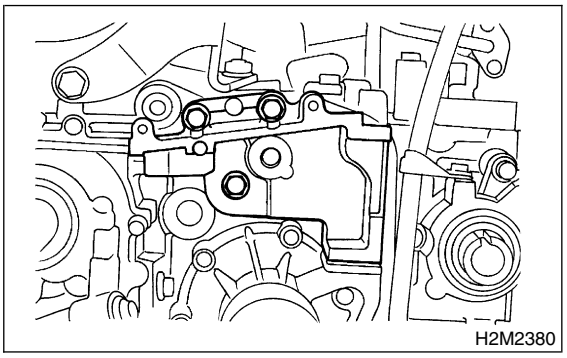


6) Remove belt cover No. 2 (LH).
7) Remove belt cover No. 2 (RH).

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



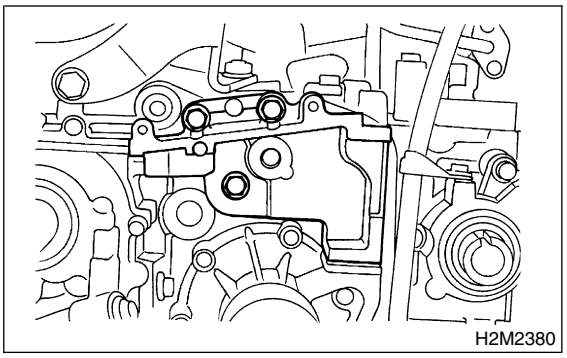
8) Remove tensioner bracket.



B: INSTALLATION S103101A11

1) Install tensioner bracket.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

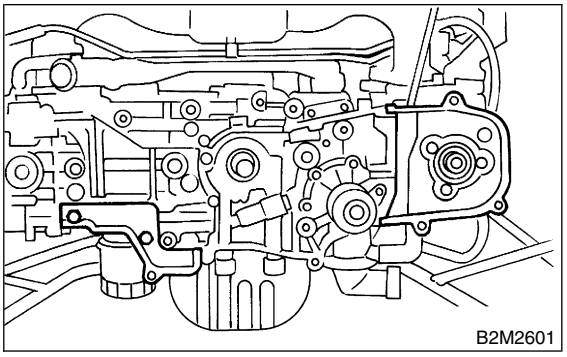


2) Install belt cover No. 2 (RH).

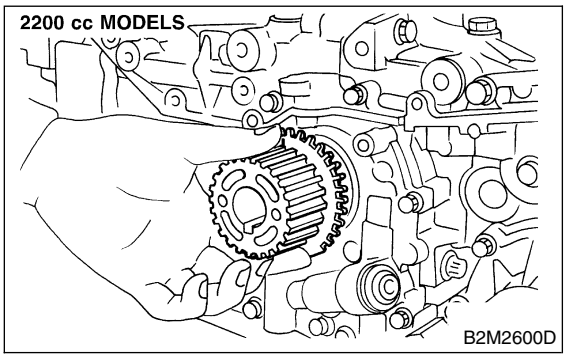
Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

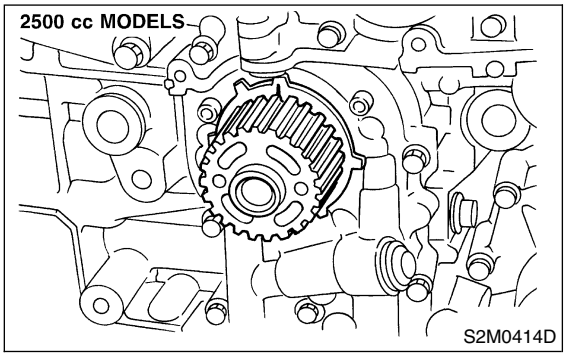
3) Install belt cover No. 2 (LH).

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



4) Install crankshaft sprocket.





5) Install camshaft sprocket. <Ref. to ME-58 INSTALLATION, Camshaft Sprocket.>
6) Install timing belt assembly. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>
7) Install crankshaft pulley. <Ref. to ME-49 INSTALLATION, Crankshaft Pulley.>
8) Install V-belt. <Ref. to ME-48 INSTALLAION, V-belt.>

C: INSPECTION *S103101A10*

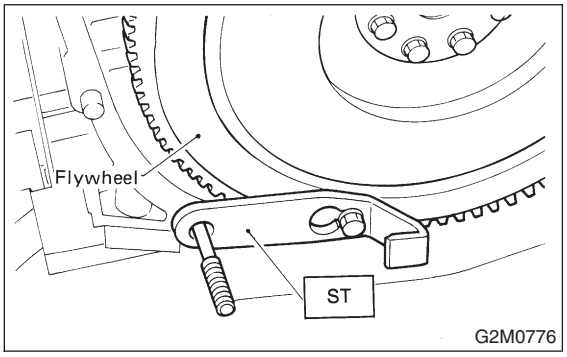
1) Check sprocket teeth for abnormal wear and scratches.
2) Make sure there is no free play between sprocket and key.
3) Check crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

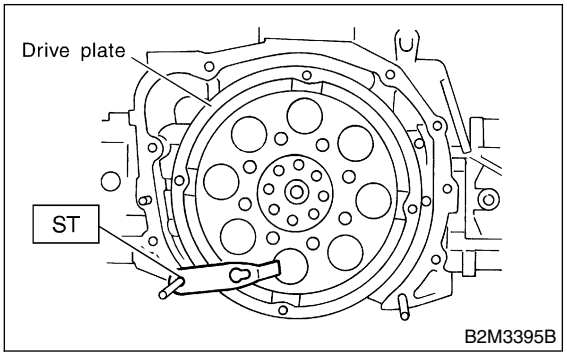
18. Cylinder Block S103090

A: REMOVAL S103090A18

NOTE:
Before conducting this procedure, drain engine oil completely if applicable.

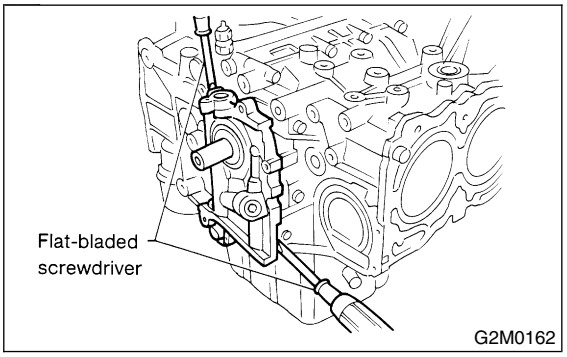
1) Remove intake manifold. <Ref. to FU-18 REMOVAL, Intake Manifold.>
2) Remove V-belt. <Ref. to ME-48 REMOVAL, V-belt.>
3) Remove crankshaft pulley. <Ref. to ME-49 REMOVAL, Crankshaft Pulley.>
4) Remove timing belt assembly. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>
5) Remove camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>
6) Remove crankshaft sprocket. <Ref. to ME-59 REMOVAL, Crankshaft Sprocket.>
7) Remove valve rocker assembly. <Ref. to ME-61 REMOVAL, Valve Rocker Assembly.>
8) Remove camshaft. <Ref. to ME-64 REMOVAL, Camshaft.>
9) Remove cylinder head assembly. <Ref. to ME-68 REMOVAL, Cylinder Head Assembly.>
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





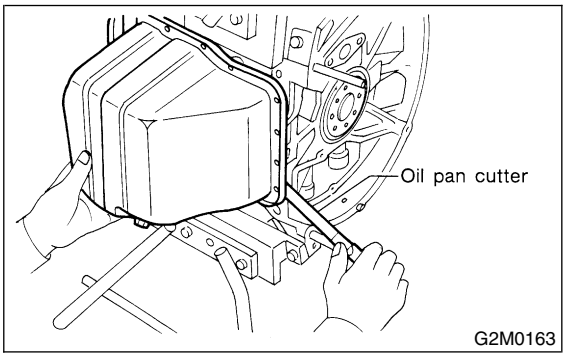
12) Remove oil separator cover.
13) Remove water by-pass pipe for heater.
14) Remove water pump.
15) Remove oil pump from cylinder block.
Use a flat-bladed screwdriver as shown in figure when removing oil pump.

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



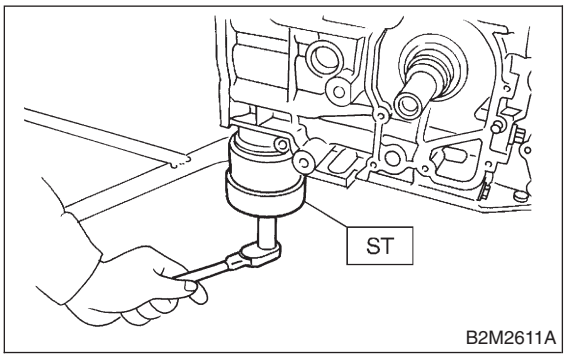
16) Removal of oil pan
(1) Turn cylinder block with #2 and #4 piston sides facing upward.
(2) Remove bolts which secure oil pan to cylinder block.
(3) Insert a oil pan cutter blade between cylinder block-to-oil pan clearance and remove oil pan.

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

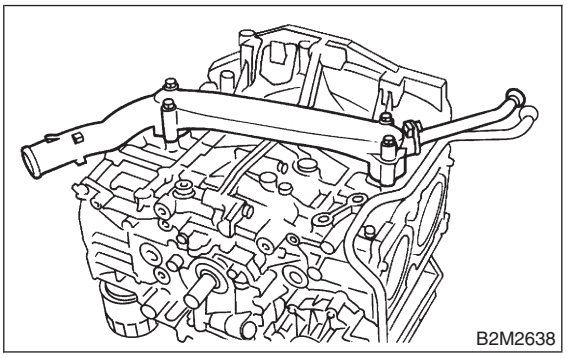


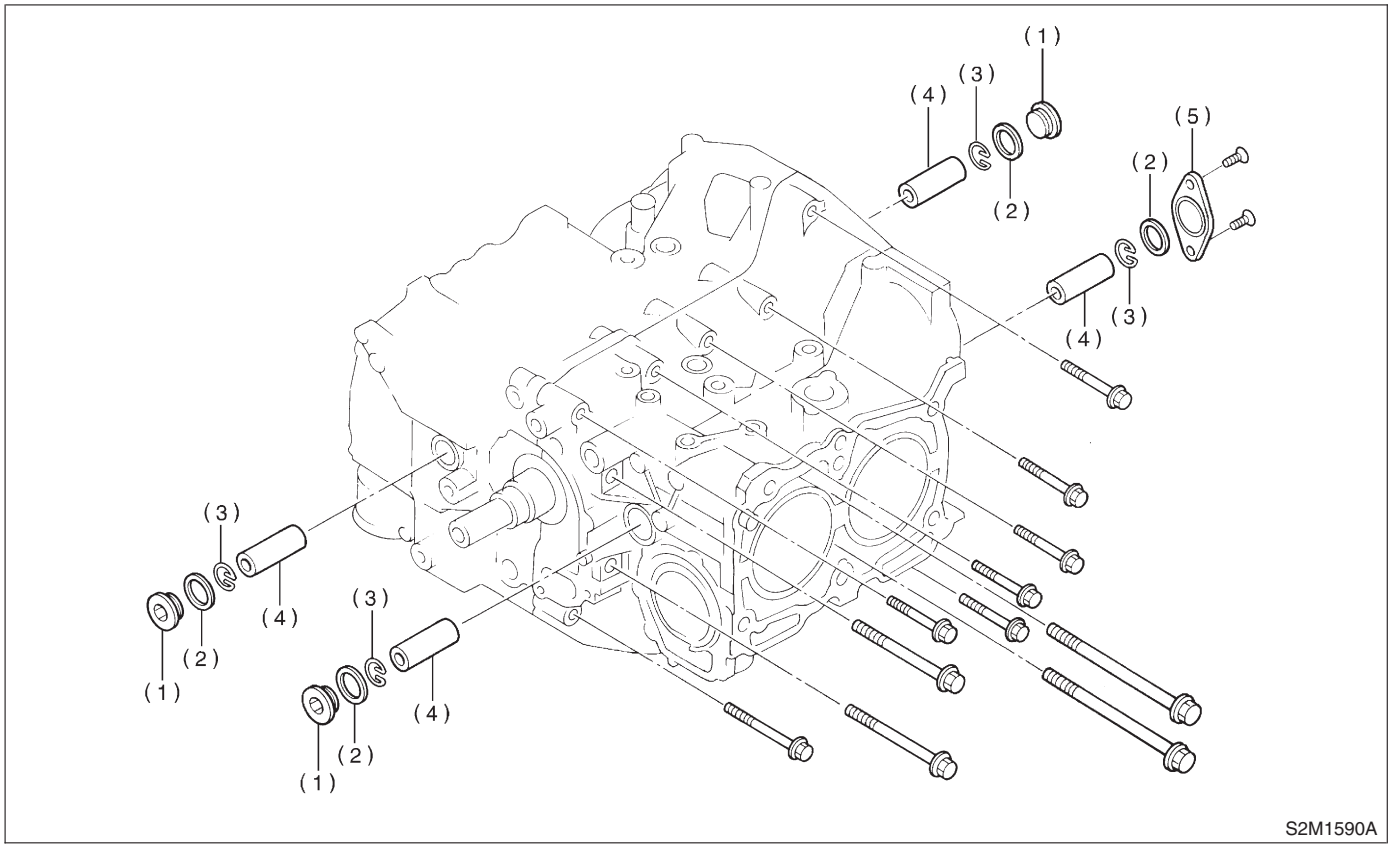
17) Remove oil strainer stay.
18) Remove oil strainer.
19) Remove baffle plate.

20) Remove oil filter using ST.
ST 498187300 OIL FILTER WRENCH



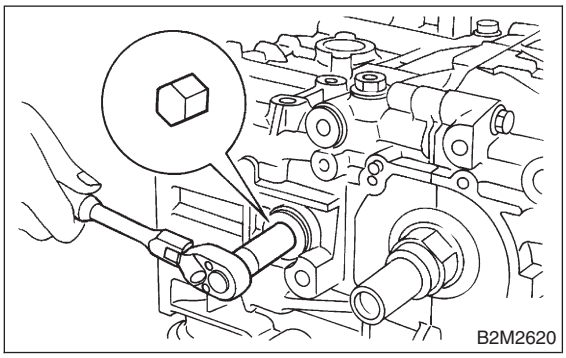
21) Remove water pipe.



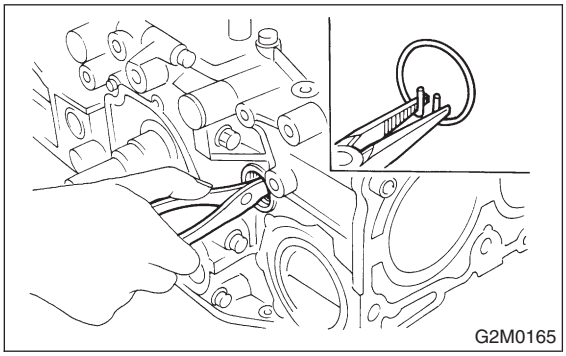


(1) Service hole plug
(2) Gasket
(3) Circlip
(4) Piston pin
(5) Service hole cover

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

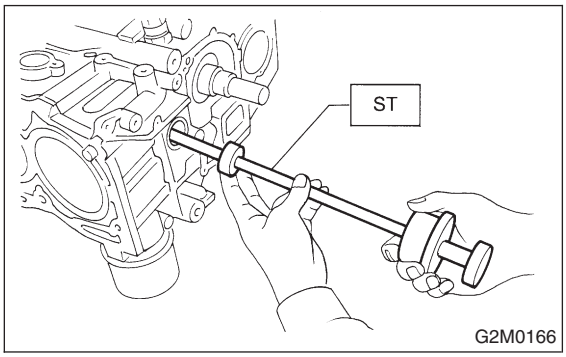


23) Rotate crankshaft to bring #1 and #2 pistons to bottom dead center position, then remove piston circlip through service hole of #1 and #2 cylinders.



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

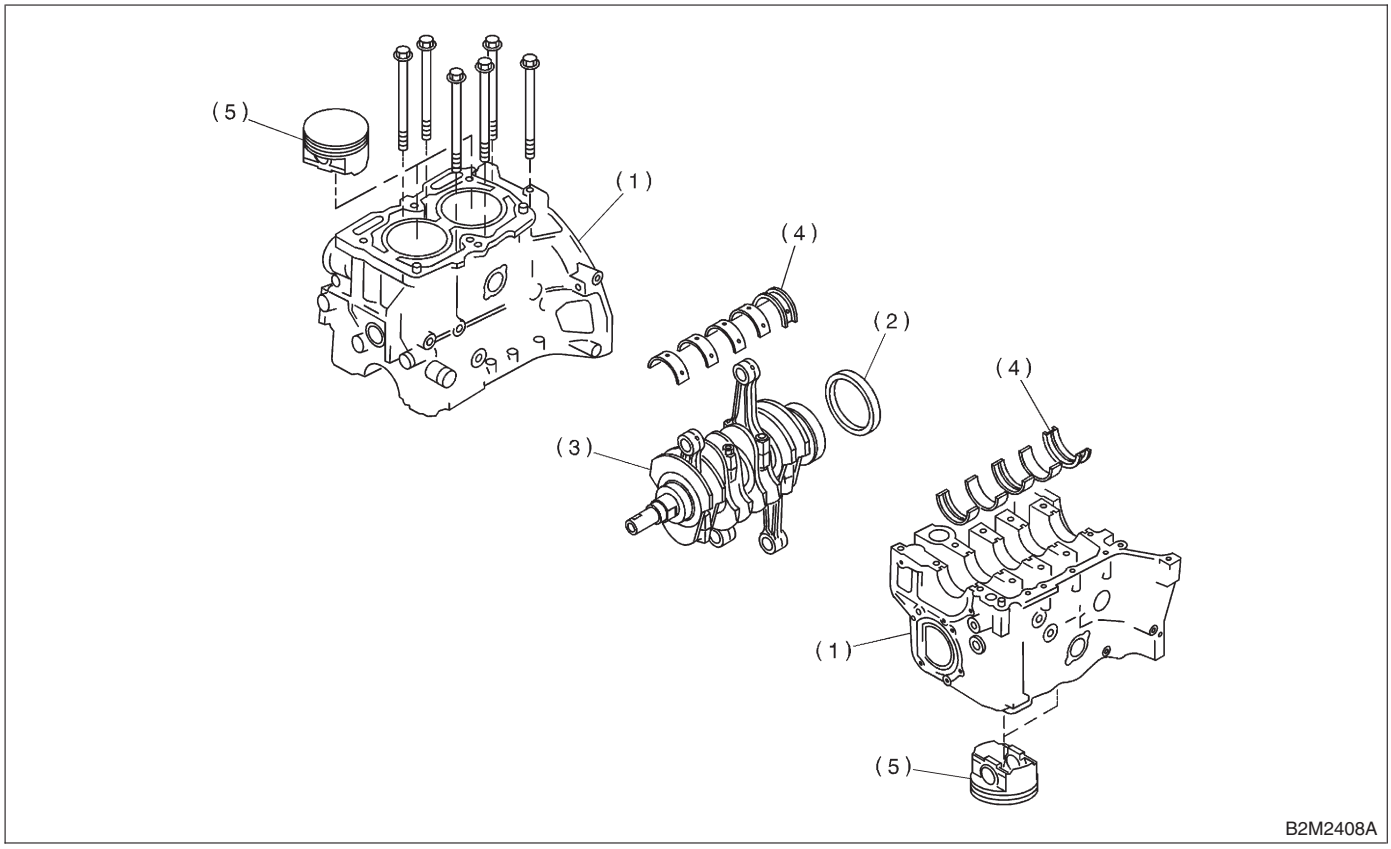
CAUTION:
Be careful not to confuse original combination of piston, piston pin and cylinder.



25) Similarly remove piston pins from #3 and #4 pistons.
26) Remove bolts which connect cylinder block on the side of #2 and #4 cylinders.
27) Back off bolts which connect cylinder block on the side of #1 and #3 cylinders two or three turns.
28) Set up cylinder block so that #1 and #3 cylinders are on the upper side, then remove cylinder block connecting bolts.

29) 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
(2) Rear oil seal
(3) Crankshaft
(4) Crankshaft bearing
(5) Piston

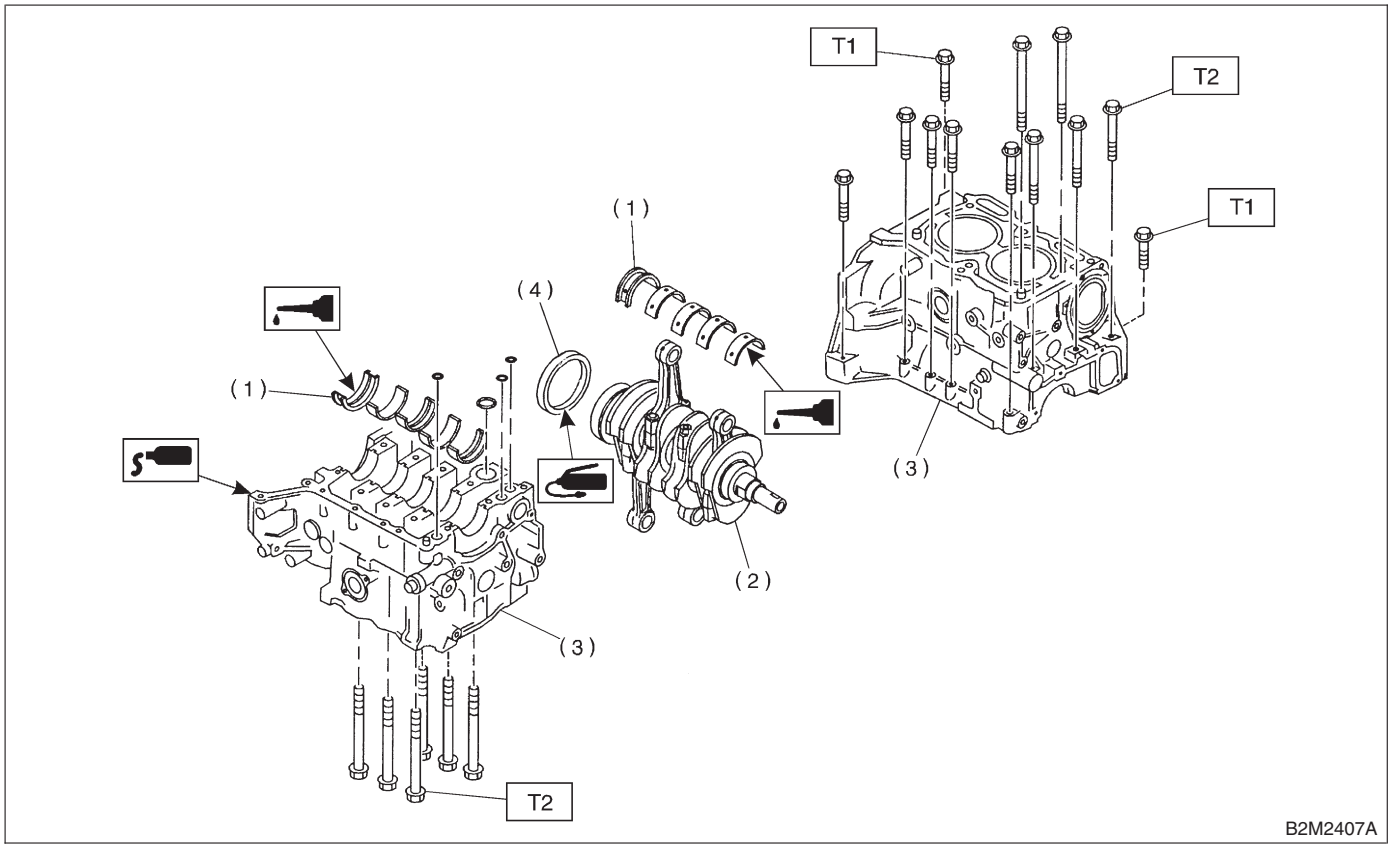
30) Remove rear oil seal.
31) Remove crankshaft together with connecting rod.
32) Remove crankshaft bearings from cylinder block using hammer handle.

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

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

CAUTION:
Do not confuse combination of piston and cylinder.

B: INSTALLATION S103090A11



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 47 (4.8, 34.7)

1) Install ST to cylinder block, then install crankshaft bearings.
ST 499817000 ENGINE STAND

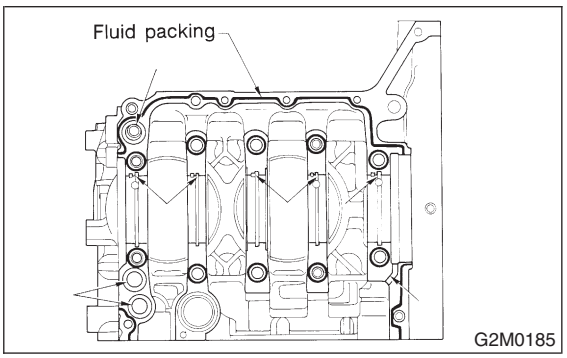
CAUTION:
Remove oil in the mating surface of bearing and cylinder block before installation. Also apply a coat of engine oil to crankshaft pins.

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

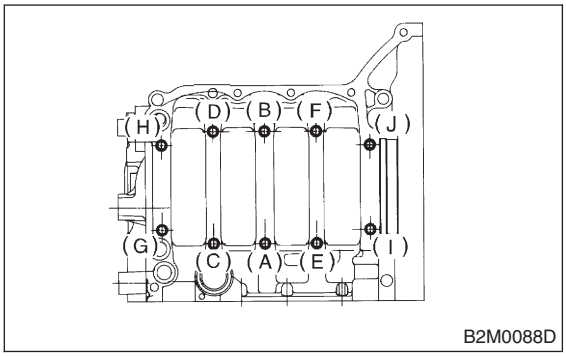
3) Apply fluid packing to the mating surface of #1 and #3 cylinder block, and position it on #2 and #4 cylinder block.

Fluid packing:
THREE BOND 1215 or equivalent

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

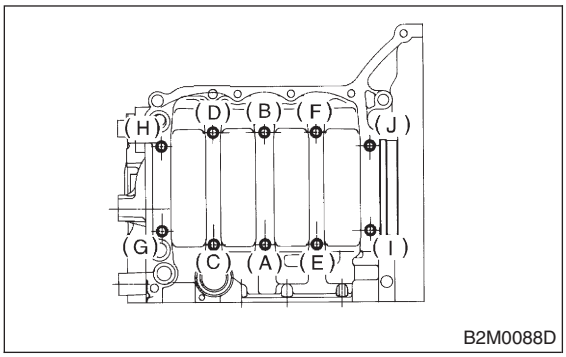


4) Temporarily tighten 10 mm cylinder block connecting bolts in alphabetical sequence shown in figure.



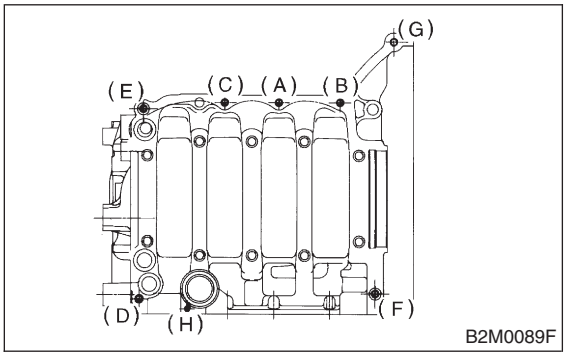
5) Tighten 10 mm cylinder block connecting bolts in alphabetical sequence.

Tightening torque:
47 N·m (4.8 kgf-m, 34.7 ft-lb)

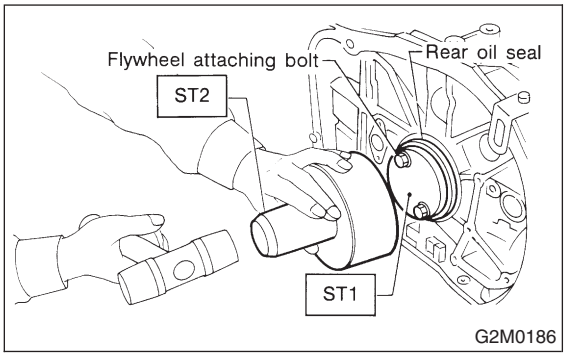


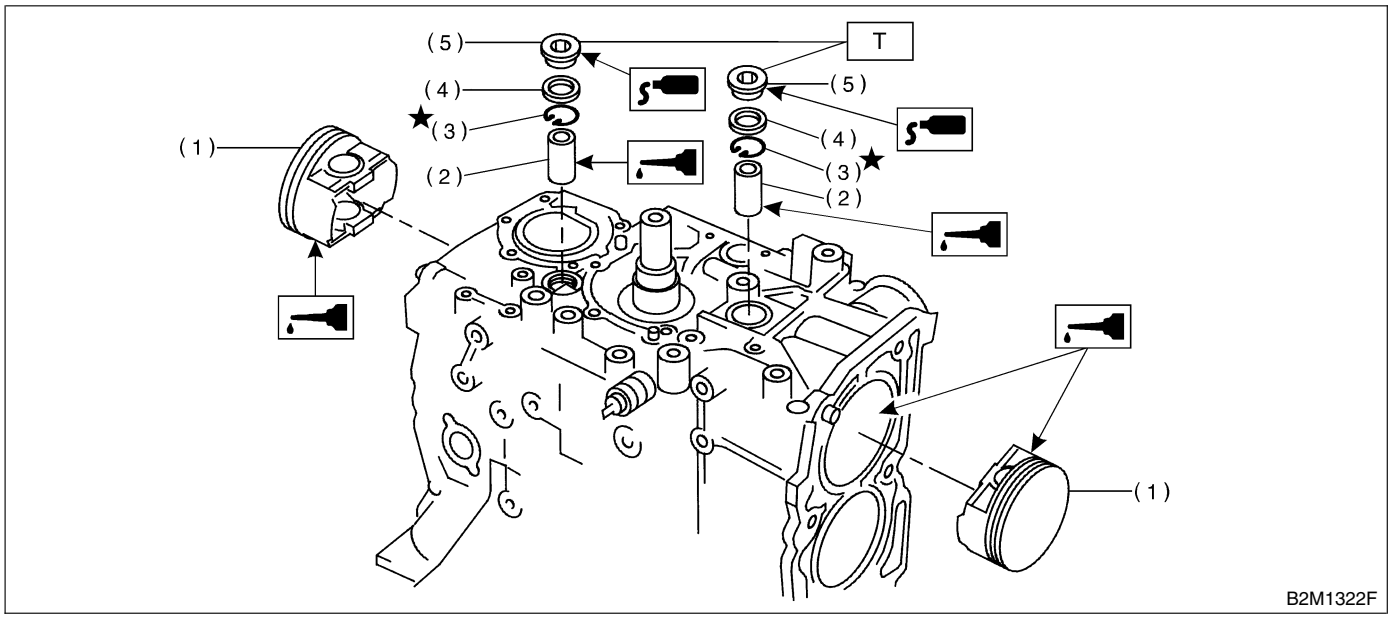
6) Tighten 8 mm and 6 mm cylinder block connecting bolts in alphabetical sequence shown in figure.

Tightening torque:
(A) — (G): 25 N·m (2.5 kgf-m, 18.1 ft-lb)
(H): 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



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





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

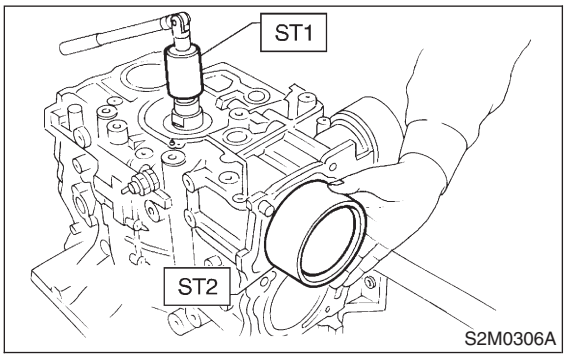
Tightening torque: N·m (kgf-m, ft-lb)
T: 69 (7.0, 50.6)

8) 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.

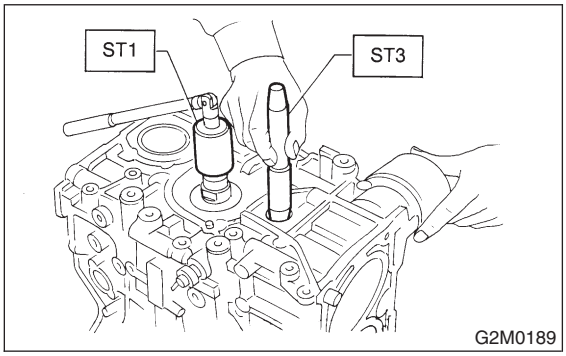
ST2 498747100 PISTON GUIDE



9) 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.

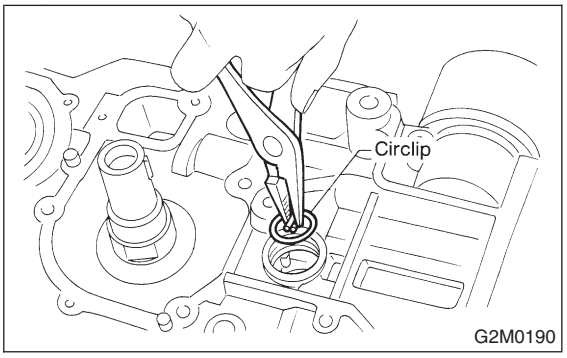
ST3 499017100 PISTON PIN GUIDE



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

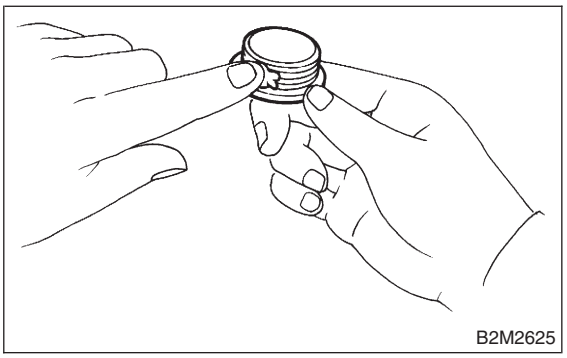
(3) Install circlip.

CAUTION:
Use new circlips.



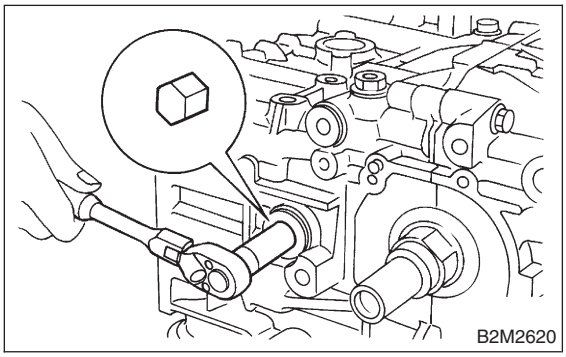
(4) Apply fluid packing around the service hole plug.

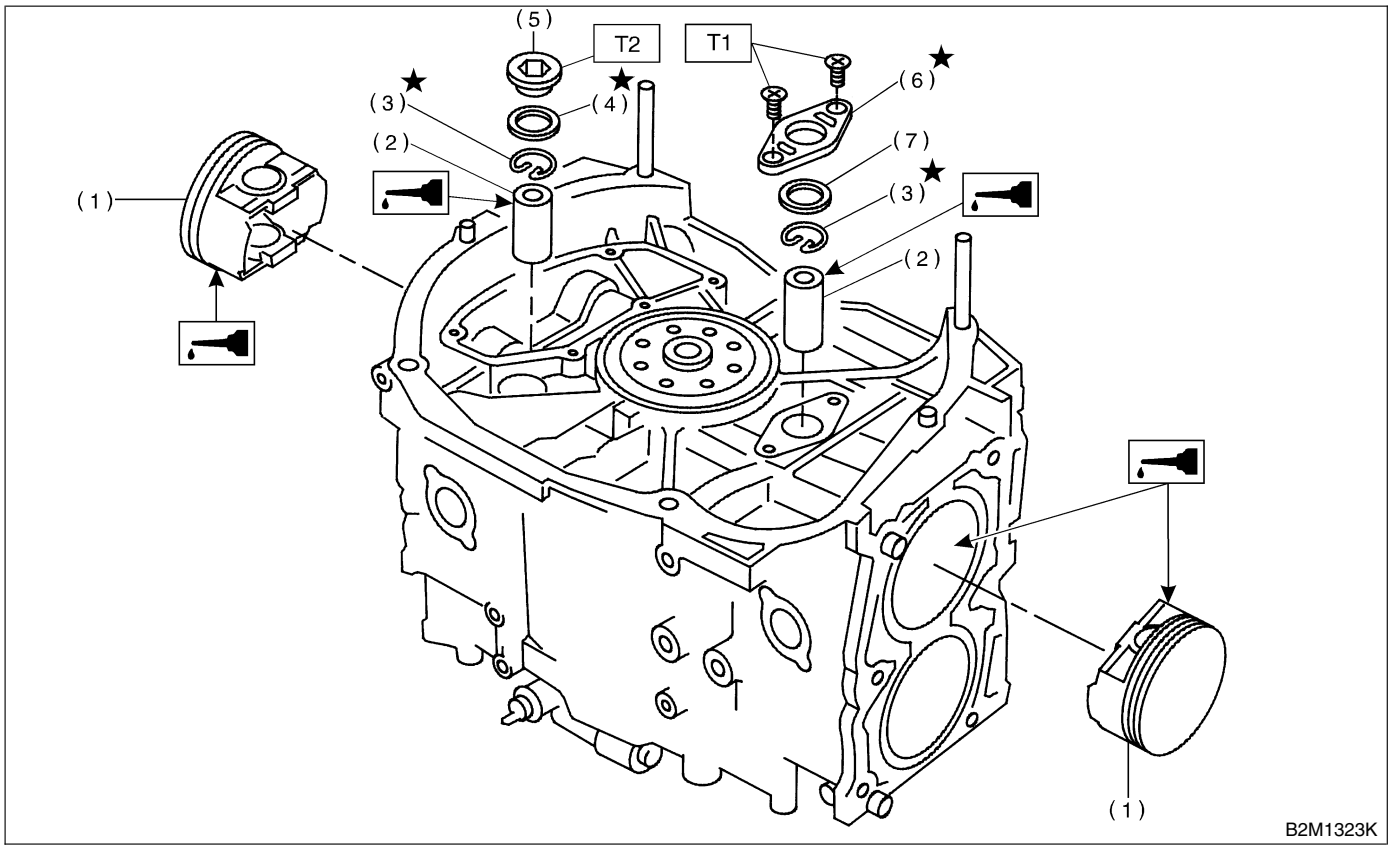
Fluid packing:
THREE BOND 1215 or equivalent



(5) Install service hole plug and gasket.

CAUTION:
Use a new gasket.

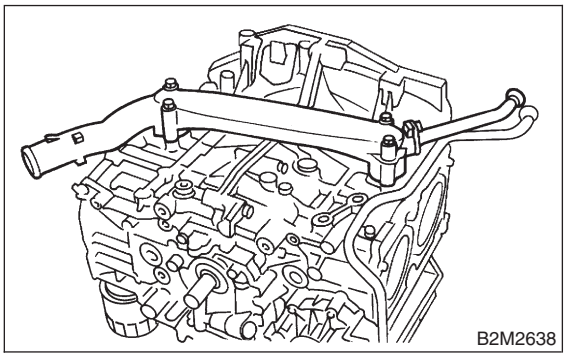




(1) Piston
(2) Piston pin
(3) Circlip
(4) Gasket
(5) Service hole plug
(6) Service hole cover

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 69 (7.0, 50.6)

10) Install water pipe.



11) Install baffle plate.

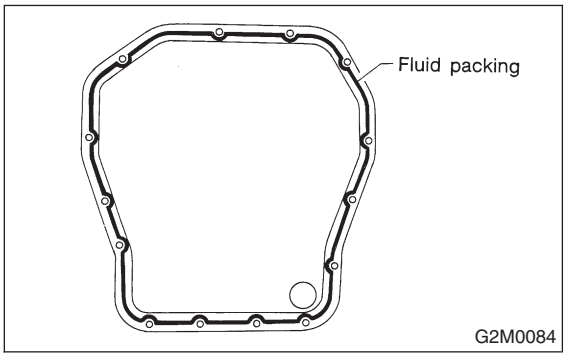
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

12) Install oil strainer and O-ring

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

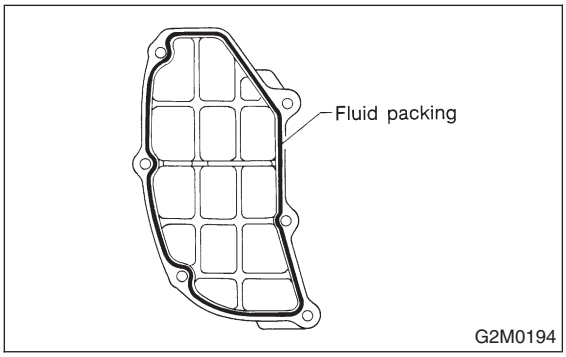
13) Install oil strainer stay.
14) Apply fluid packing to matching surfaces and install oil pan.

Fluid packing:
THREE BOND 1215 or equivalent



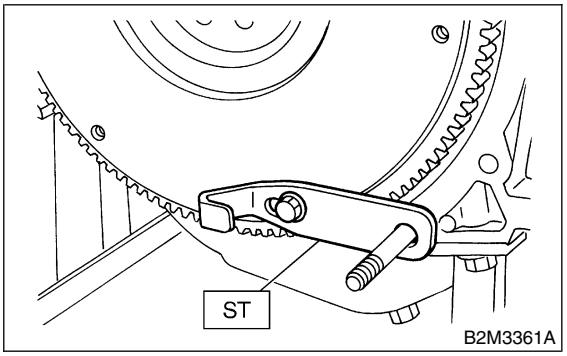
15) Apply fluid packing to matching surfaces and install oil separator cover.

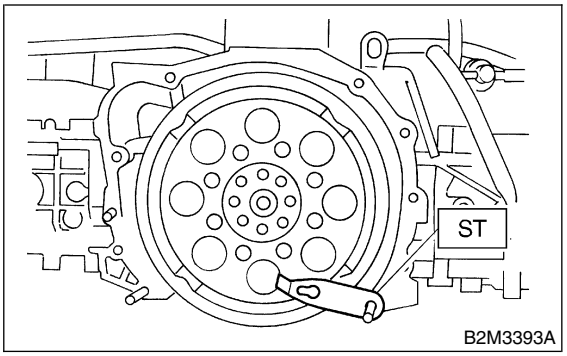
Fluid packing:
THREE BOND 1215 or equivalent



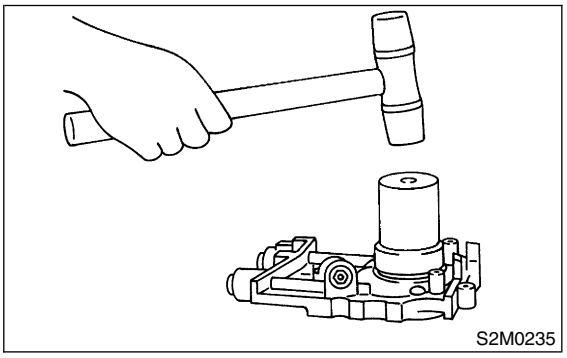
16) Install flywheel or drive plate.
To lock crankshaft, use ST.
ST 498497100 CRANKSHAFT STOPPER

Tightening torque:
72 N·m (7.3 kgf-m, 52.8 ft-lb)



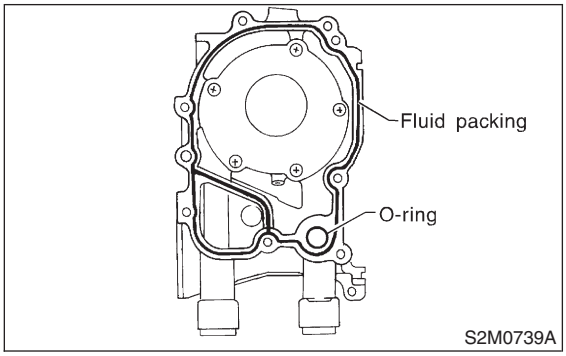


17) Install housing cover.
18) Installation of oil pump
(1) Discard front oil seal after removal. Replace with a new one using ST.
ST 499587100 OIL SEAL INSTALLER

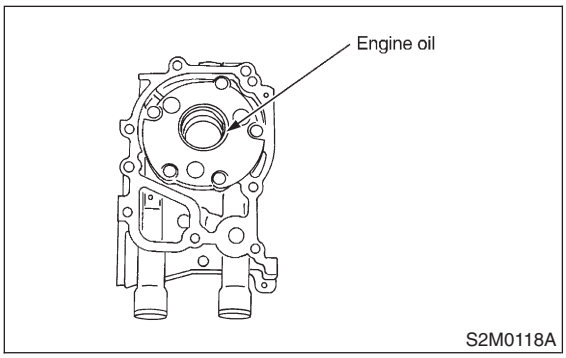


(2) Apply fluid packing to matching surface of oil pump.

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.

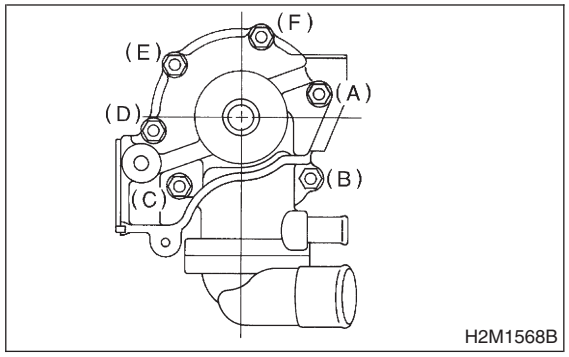
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

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.

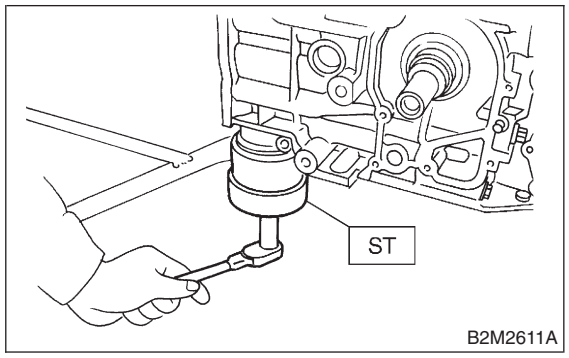
19) Install water pump and gasket.

Tightening torque:
First; 12 N·m (1.2 kgf-m, 8.7 ft-lb)
Second; 12 N·m (1.2 kgf-m, 8.7 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.

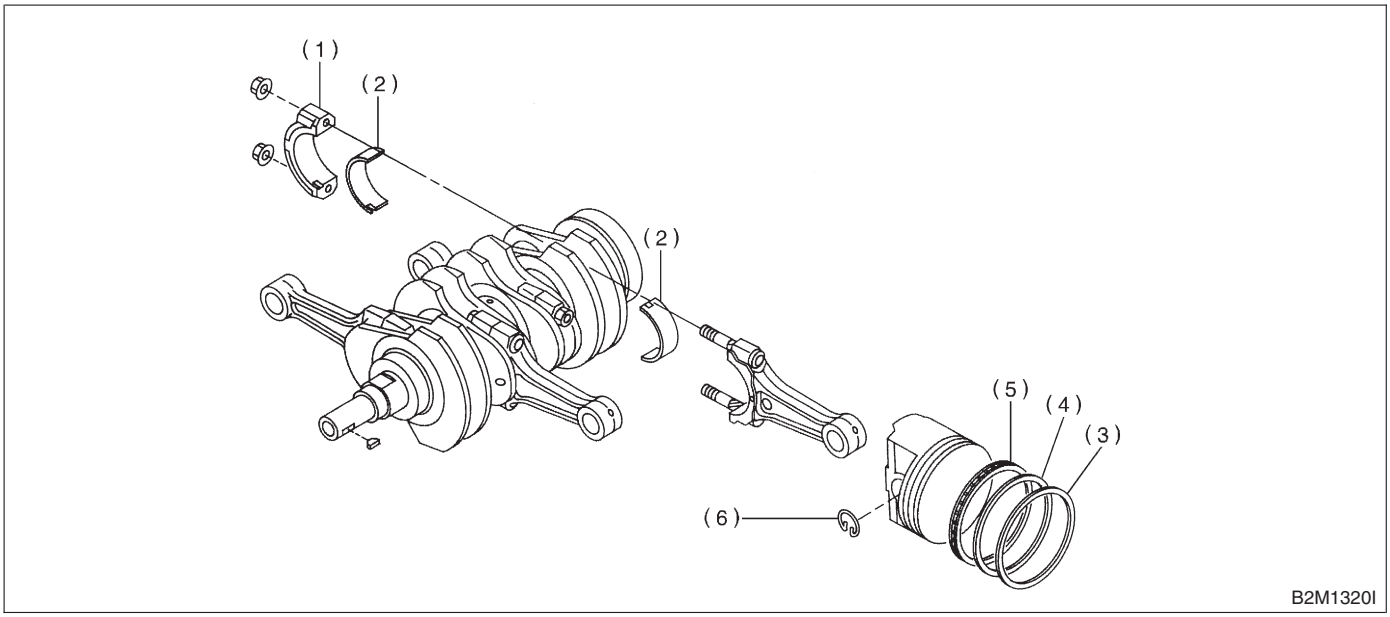


20) Install water by-pass pipe for heater.
21) Install oil filter using ST.
ST 498187300 OIL FILTER WRENCH



22) Install cylinder head assembly. <Ref. to ME-69 INSTALLATION, Cylinder Head Assembly.>
23) Install camshaft. <Ref. to ME-64 INSTALLATION, Camshaft.>
24) Install valve rocker assembly. <Ref. to ME-61 INSTALLATION, Valve Rocker Assembly.>
25) Install crankshaft sprocket. <Ref. to ME-59 INSTALLATION, Crankshaft Sprocket.>
26) Install camshaft sprocket. <Ref. to ME-58 INSTALLATION, Camshaft Sprocket.>
27) Install timing belt assembly. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>
28) Install crankshaft pulley. <Ref. to ME-49 INSTALLATION, Crankshaft Pulley.>
29) Install V-belt. <Ref. to ME-48 INSTALLATION, V-belt.>
30) Install intake manifold. <Ref. to FU-21 INSTALLATION, Intake Manifold.>

C: DISASSEMBLY S103090A06



(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.

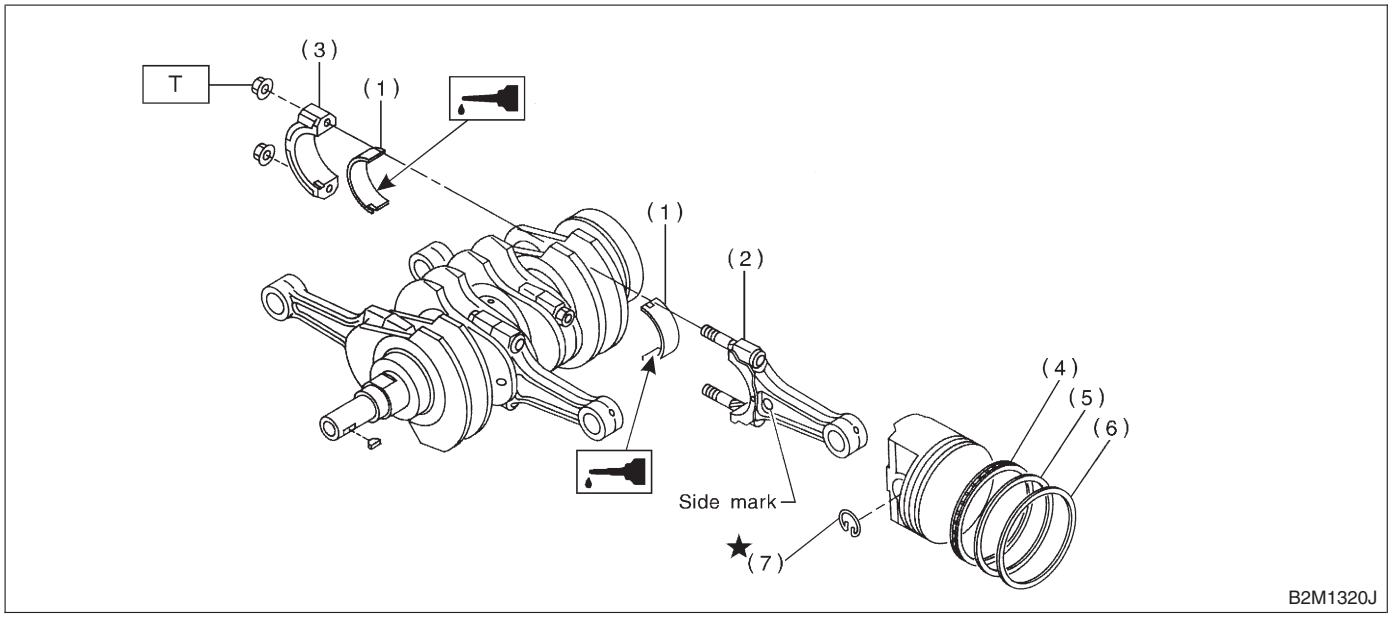
CAUTION:
Arrange removed connecting rod, connecting rod cap and bearing in order to prevent confusion.

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.

D: ASSEMBLY S103090A02



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 44.6 (4.55, 32.9)

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.

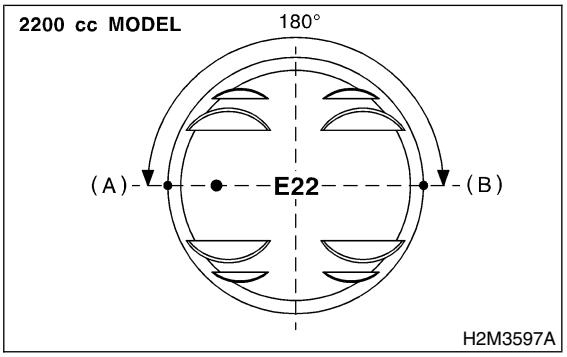
CAUTION:
Position each connecting rod with the side marked facing forward.

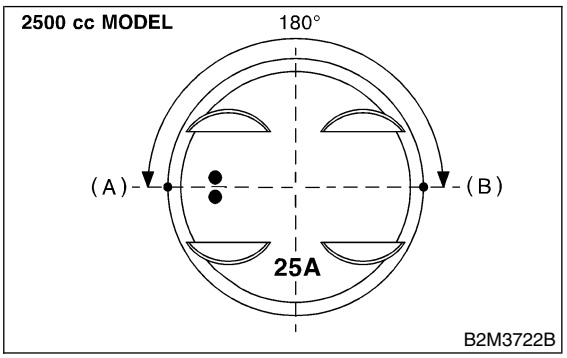
3) Install connecting rod cap with connecting rod nut.
Ensure the arrow on connecting rod cap faces the front during installation.

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.

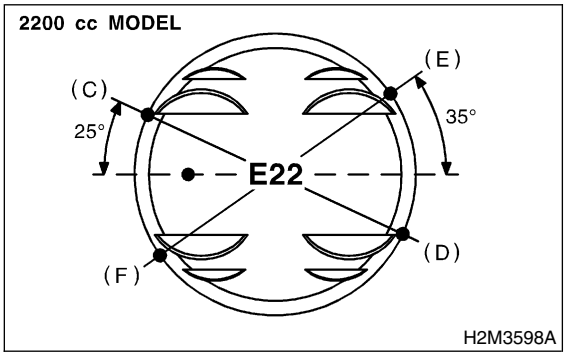
(2) Position the top ring gap at (A) or (B) in the figure.

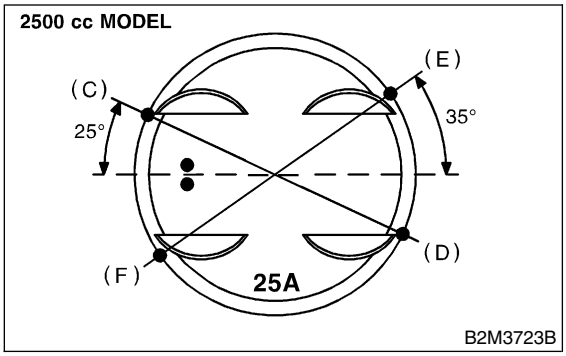




(3) Position the second ring gap at 180° on the reverse side for the top ring gap.

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

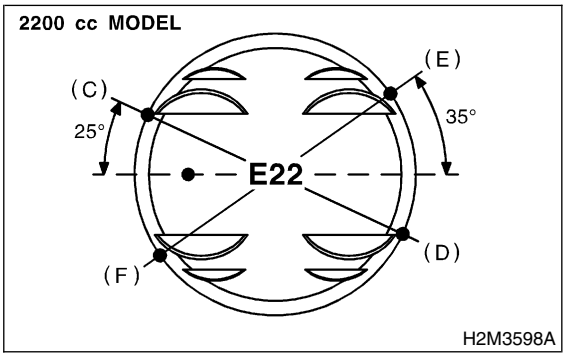


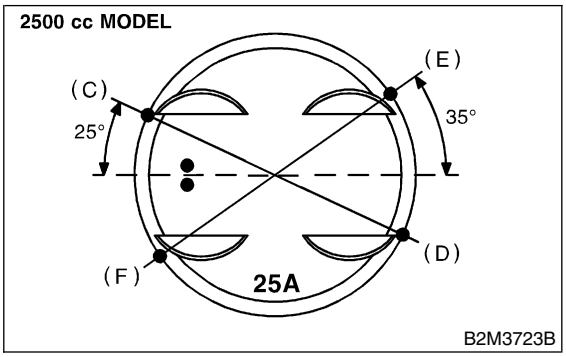


(5) Position the expander gap at 180° of the reverse side for the upper rail gap.

(6) Position the lower rail gap at (E) or (F) in the figure.

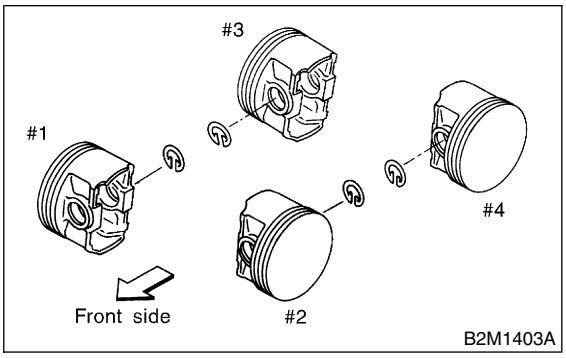
CAUTION:
• Ensure ring gaps do not face the same direction.
• Ensure ring gaps are not within the piston skirt area.



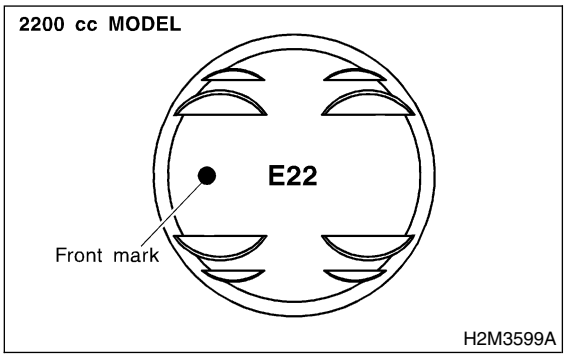


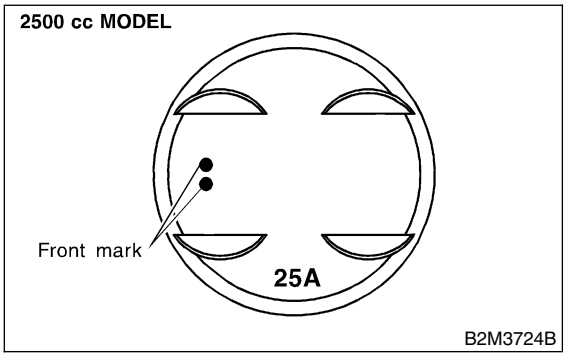
5) Install circlip.
Install circlips in piston holes located opposite service holes in cylinder block, when positioning all pistons in the corresponding cylinders.

CAUTION:
Use new circlips.



CAUTION:
Piston front mark faces towards the front of the engine.





E: INSPECTION S103090A10

1. CYLINDER BLOCK S103090A1002

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.

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)

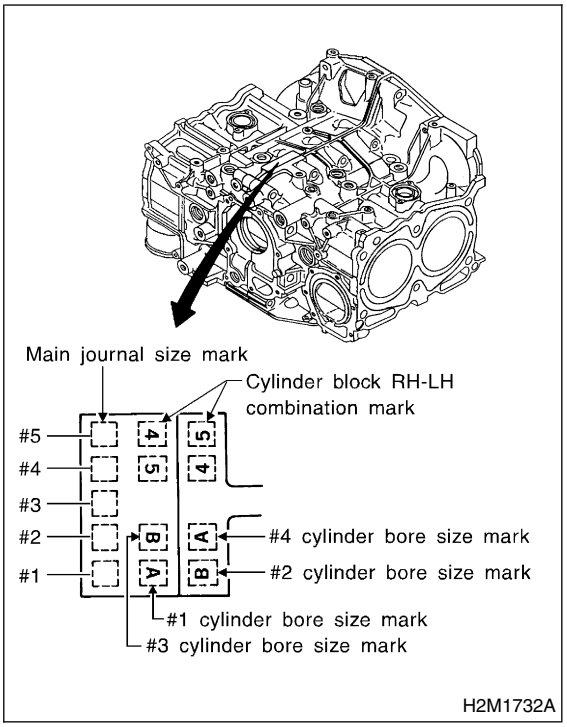
2. CYLINDER AND PISTON S103090A1003

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)

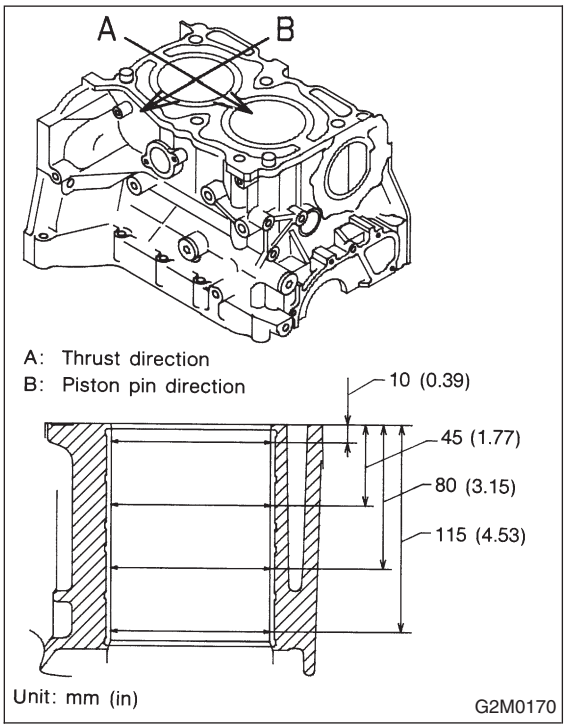


2) How to measure the inner diameter of each cylinder
Measure the inner diameter of each cylinder in both the thrust and piston pin directions at the heights shown in the figure, using a cylinder bore gauge.

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)

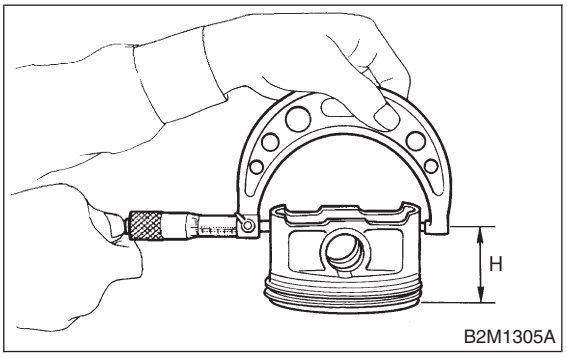
CAUTION:
Measurement should be performed at a temperature of 20°C (68°F).

Piston grade point H:
2200 cc
40.0 mm (1.575 in)
2500 cc
37.0 mm (1.457 in)

Piston outer diameter:

2200 cc:
Standard
A: 96.885 — 96.895 mm (3.8144 — 3.8148 in)
B: 96.875 — 96.885 mm (3.8140 — 3.8144 in)
0.25 mm (0.0098 in) oversize
97.125 — 97.135 mm (3.8238 — 3.8242 in)
0.50 mm (0.0197 in) oversize
97.375 — 97.385 mm (3.8337 — 3.8340 in)

2500 cc:
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, rebore 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.

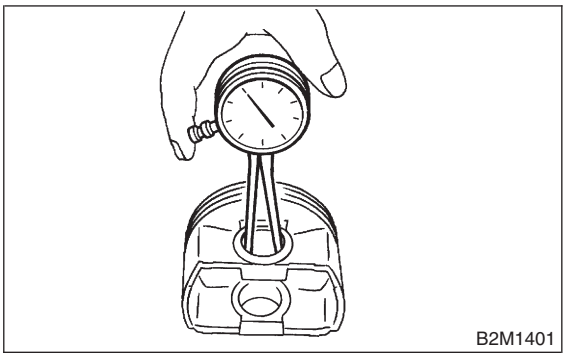
CAUTION:
Immediately after reboring, the cylinder diameter may differ from its real diameter due to temperature rise. Thus, pay attention to this when measuring the cylinder diameter.

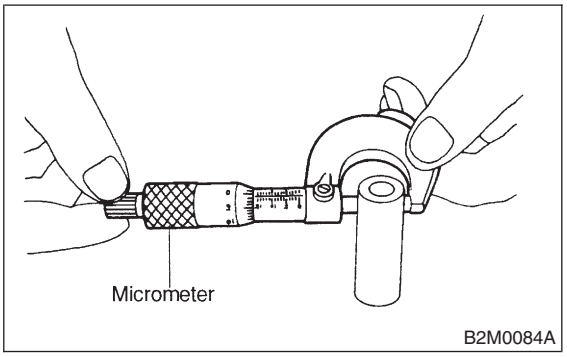
Limit of cylinder enlarging (boring):
0.5 mm (0.020 in)

3. PISTON AND PISTON PIN S103090A1004

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 ME-71 ADJUSTMENT, Cylinder Head Assembly.> 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.

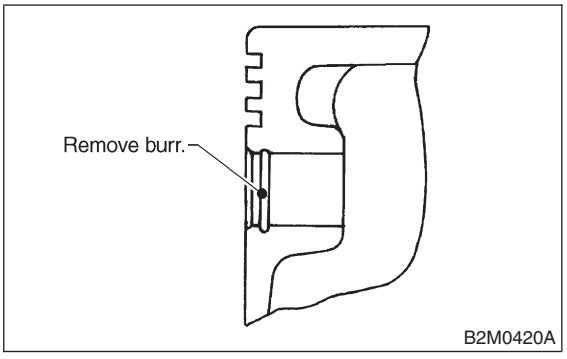
Standard clearance between piston pin and hole in piston:
Standard
0.004 — 0.008 mm (0.0002 — 0.0003 in)
Limit
0.020 mm (0.0008 in)


B2M1401



B2M0084A

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



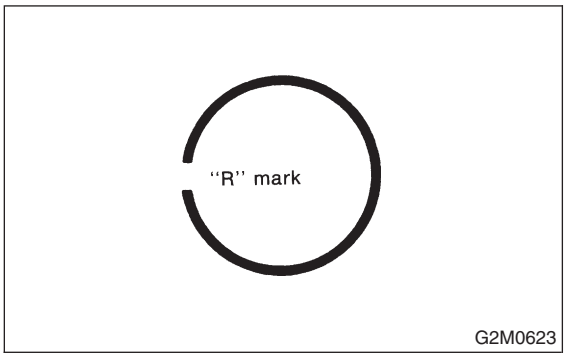
B2M0420A

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

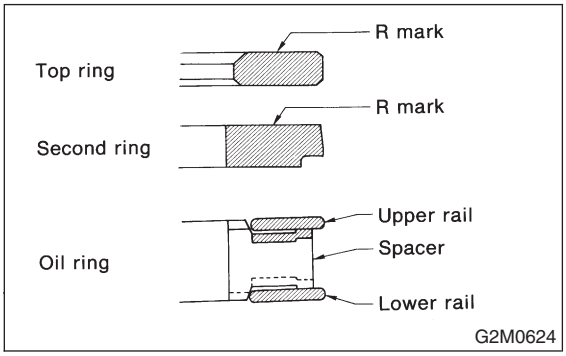
4. PISTON RING S103090A1005

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.



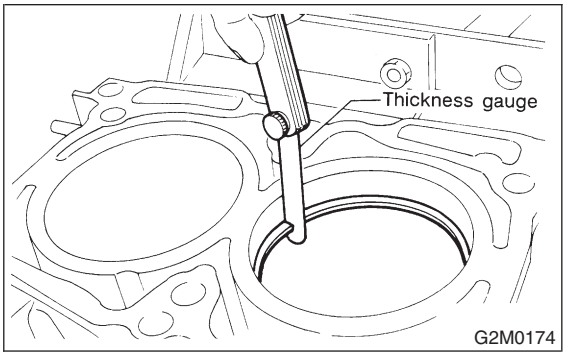
● The oil ring is a combined ring consisting of two rails and a spacer in between. When installing, be careful to assemble correctly.



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)

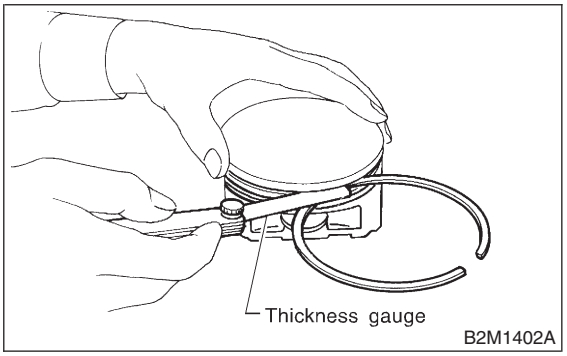


3) Measure the clearance between piston ring and piston ring groove with a thickness gauge.

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

Unit: mm (in)

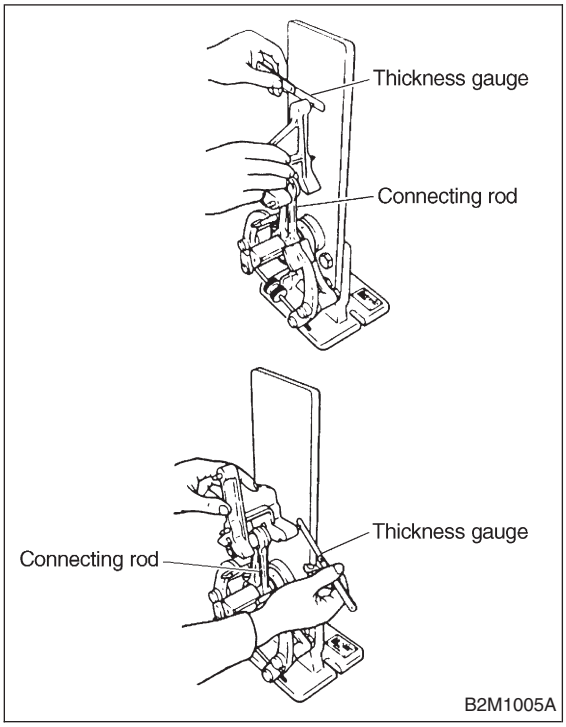
		Standard	Limit
Clearance between piston ring and piston ring groove	Top ring	0.040 — 0.080 (0.0016 — 0.0031)	0.15 (0.0059)
	Second ring	0.030 — 0.070 (0.0012 — 0.0028)	0.15 (0.0059)



5. CONNECTING ROD S103090A1006

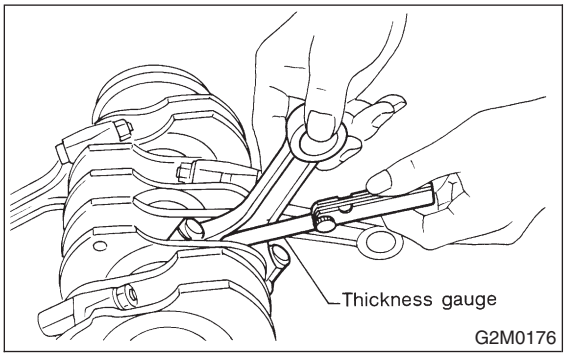
1) Replace connecting rod, if the large or small end thrust surface is damaged.
2) Check for bend or twist using a connecting rod aligner. Replace connecting rod if the bend or twist exceeds the limit.

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:

- ***2200 cc***
  Standard
  0.010 — 0.038 mm (0.0004 — 0.0015 in)
  Limit
  0.05 mm (0.0020 in)

Unit: mm (in)

Bearing	Bearing size (Thickness at center)	Outer diameter of crank pin
Standard	1.492 — 1.501 (0.0587 — 0.0591)	51.984 — 52.000 (2.0466 — 2.0472)
0.03 (0.0012) undersize	1.510 — 1.513 (0.0594 — 0.0596)	51.954 — 51.970 (2.0454 — 2.0461)
0.05 (0.0020) undersize	1.520 — 1.523 (0.0598 — 0.0600)	51.934 — 51.950 (2.0446 — 2.0453)
0.25 (0.0098) undersize	1.620 — 1.623 (0.0638 — 0.0639)	51.734 — 51.750 (2.0368 — 2.0374)

Connecting rod oil clearance:

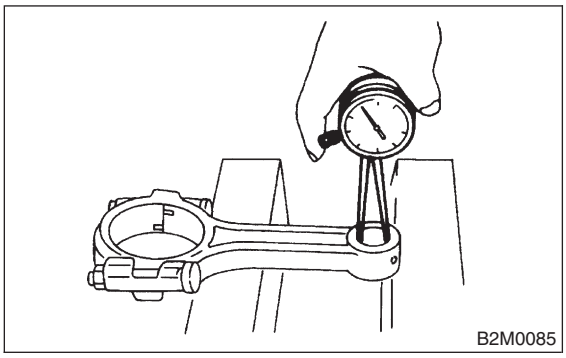
- ***2500 cc***
  Standard
  0.020 — 0.046 mm (0.0008 — 0.0018 in)
  Limit
  0.050 mm (0.0020 in)

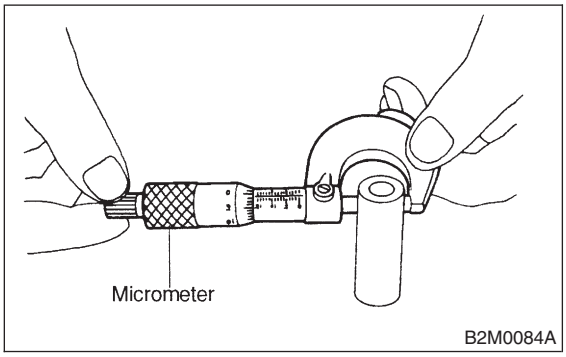
Unit: mm (in)

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)

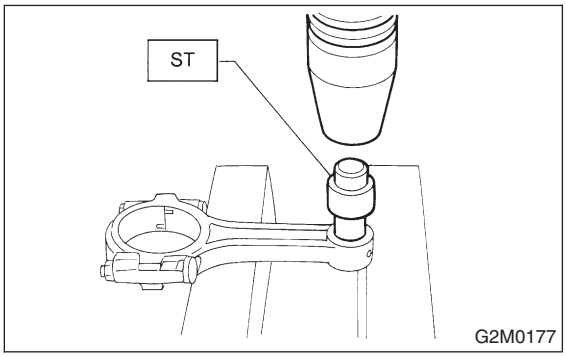

B2M0085



B2M0084A

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



G2M0177

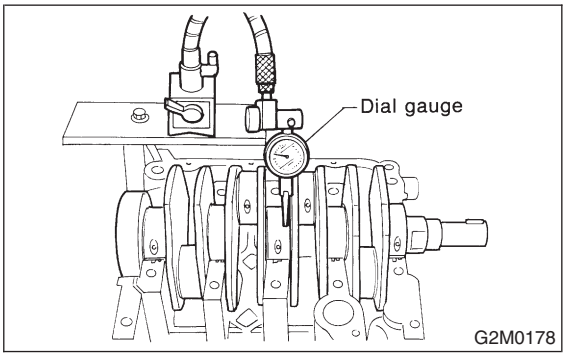
(3) Make two 3 mm (0.12 in) holes in bushing. Ream the inside of bushing.
(4) After completion of reaming, clean bushing to remove chips.

6. CRANKSHAFT AND CRANKSHAFT BEARING S103090A1007

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.

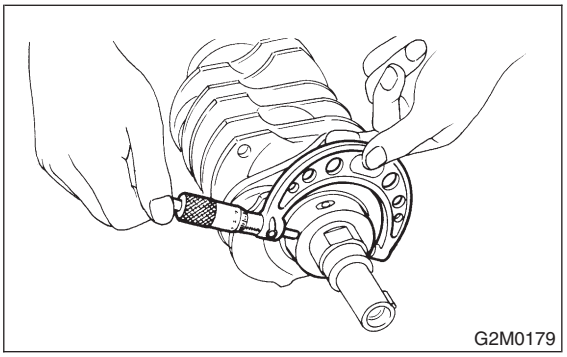
Crankshaft bend limit:
0.035 mm (0.0014 in)



G2M0178

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)


G2M0179

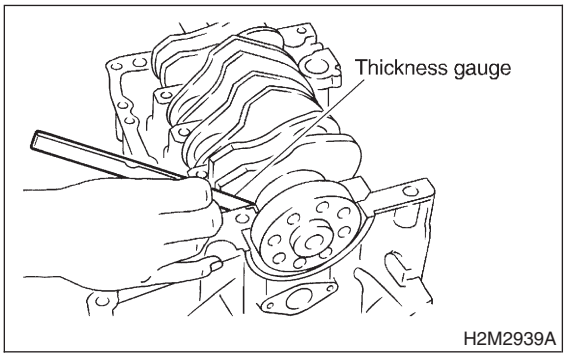
Unit: mm (in)

		Crank journal diameter		Crank pin diameter
		#1, #3	#2, #4, #5	
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)

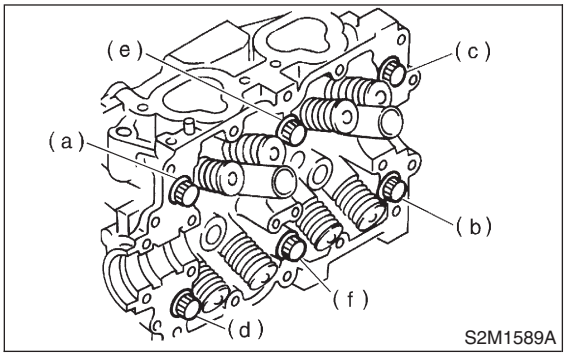
Crankshaft oil clearance	
Standard	0.010 — 0.030 (0.0004 — 0.0012)
Limit	0.040 (0.0016)

17. Cylinder Head Assembly S103093

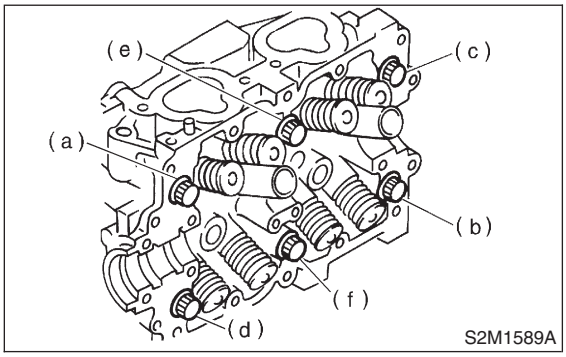
A: REMOVAL S103093A18

1) Remove V-belt. <Ref. to ME-48 REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME-49 REMOVAL, Crankshaft Pulley.>
3) Remove timing belt assembly. <Ref. to ME-53 REMOVAL, Timing Belt Assembly.>
4) Remove camshaft sprocket. <Ref. to ME-58 REMOVAL, Camshaft Sprocket.>
5) Remove crankshaft sprocket. <Ref to ME-59 REMOVAL, Crankshaft Sprocket.>
6) Remove intake manifold. <Ref. to FU-18 REMOVAL, Intake Manifold.>
7) Remove bolt which installs A/C compressor bracket on cylinder head.
8) Remove valve rocker assembly. <Ref. to ME-61 REMOVAL, Valve Rocker Assembly.>
9) Remove camshaft. <Ref. to ME-64 REMOVAL, Camshaft.>
10) 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.



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



13) Remove cylinder head gasket.

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

14) Similarly, remove right side cylinder head.

B: INSTALLATION S103093A11

1. CYLINDER HEAD S103093A1102

1) Install cylinder head and gaskets on cylinder block.

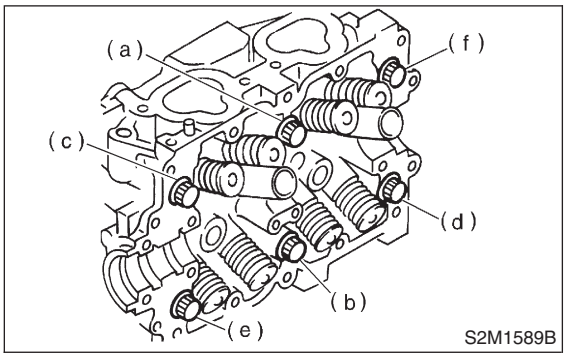
CAUTION:
- **Use new cylinder head gaskets.**
- **Be careful not to scratch the mating surface of cylinder block and oil pump.**

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 kgf-m, 22 ft-lb) in alphabetical sequence.
Then tighten all bolts to 69 N·m (7.0 kgf-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 kgf-m, 25 ft-lb).
(5) Tighten bolts (c), (d), (e) and (f) to 15 N·m (1.5 kgf-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 shown in figure below.

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

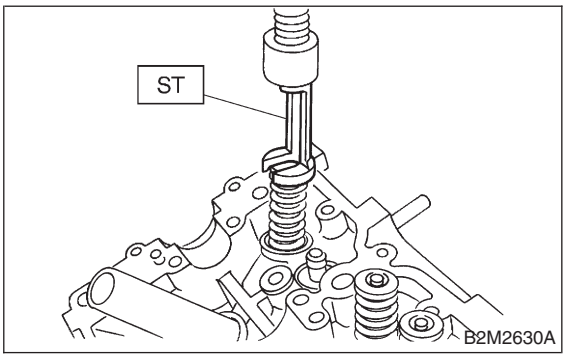


3) Install camshaft. <Ref. to ME-64 INSTALLATION, Camshaft.>
4) Install valve rocker assembly. <Ref. to ME-61 INSTALLATION, Valve Rocker Assembly.>
5) Install A/C compressor bracket on cylinder head.
6) Install intake manifold. <Ref. to FU-21 INSTALLATION, Intake Manifold.>
7) Install crankshaft sprocket. <Ref. to ME-59 INSTALLATION, Crankshaft Sprocket.>
8) Install camshaft sprocket. <Ref. to ME-58 INSTALLATION, Camshaft Sprocket.>
9) Install timing belt assembly. <Ref. to ME-54 INSTALLATION, Timing Belt Assembly.>
10) Install crankshaft pulley. <Ref. to ME-49 INSTALLATION, Crankshaft Pulley.>
11) Install V-belt. <Ref. to ME-48 INSTALLATION, V-belt.>

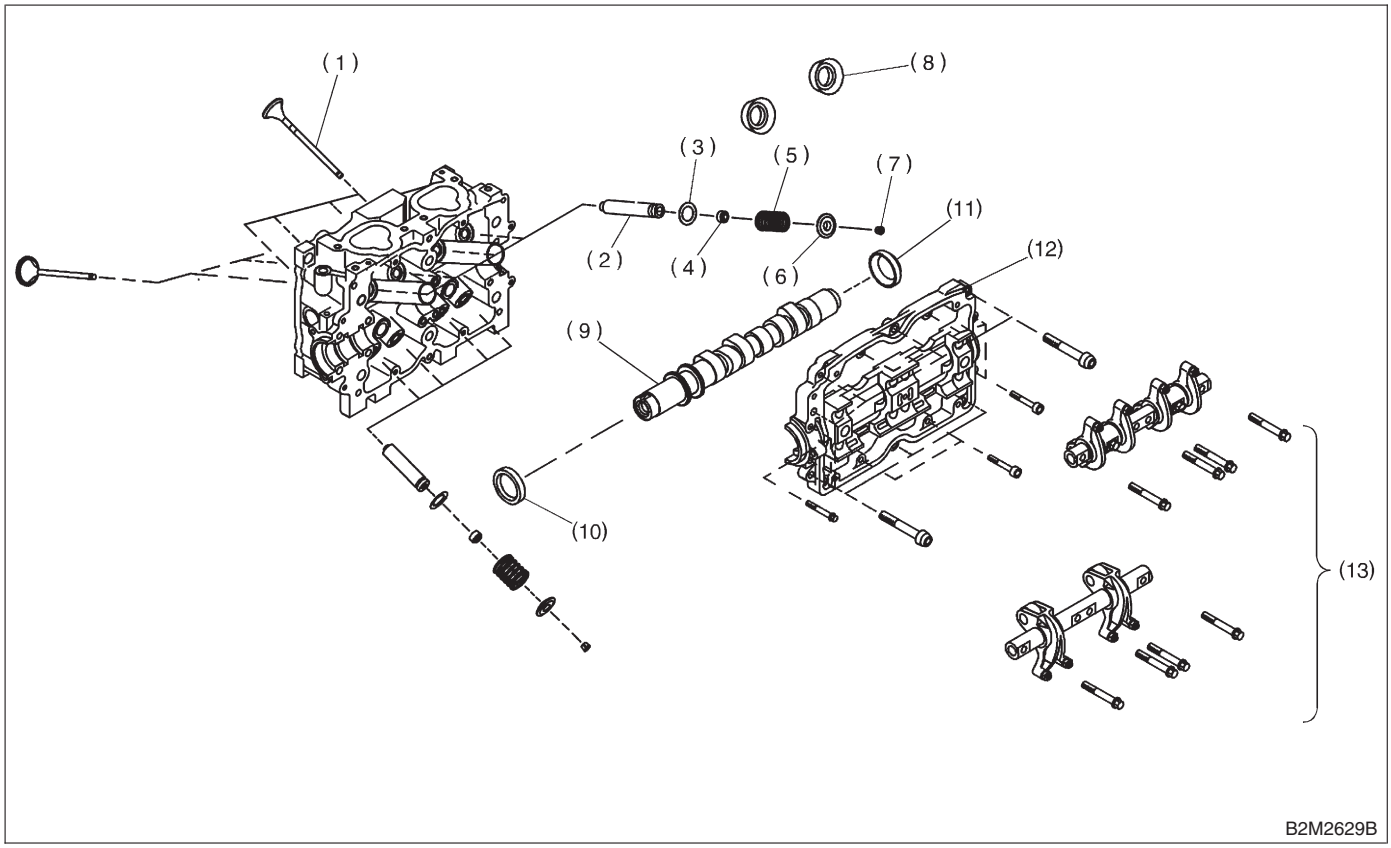
C: DISASSEMBLY S103093A06

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.**



D: ASSEMBLY S103093A02



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

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.

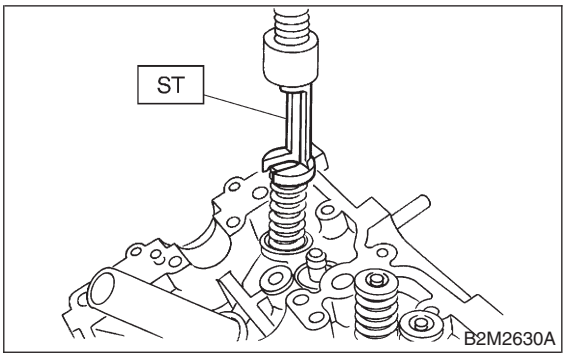
CAUTION:
When inserting valve into valve guide, use special care not to damage the oil seal lip.

(3) Install valve spring and retainer.

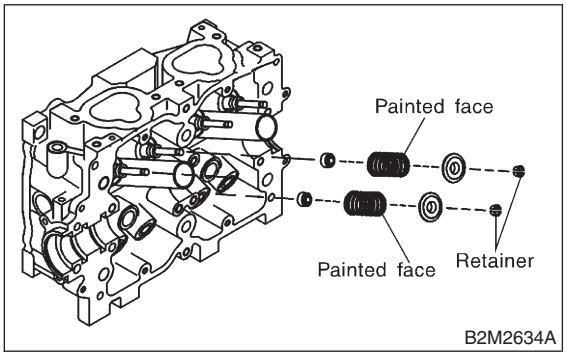
CAUTION:
Be sure to install the valve springs with their close-coiled end facing the seat on the cylinder head.

(4) Set ST on valve spring.

ST 499718000 VALVE SPRING REMOVER



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



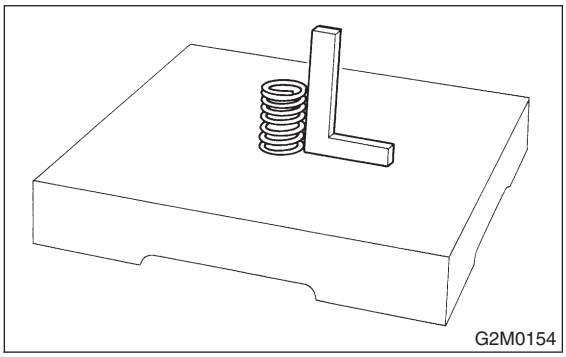
(6) After installing, tap valve spring retainers lightly with wooden hammer for better seating.

E: INSPECTION S103093A10

1. VALVE SPRING S103093A1002

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)



2. INTAKE AND EXHAUST VALVE OIL SEAL S103093A1003

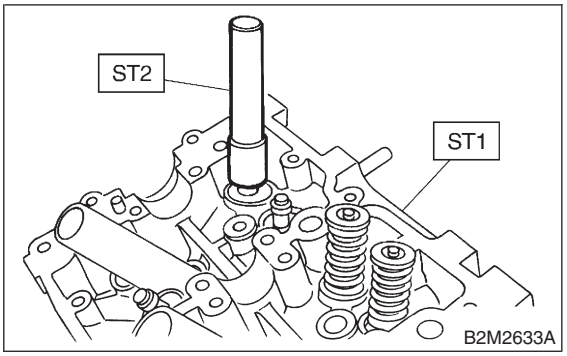
Replace oil seal with new one, if lip is damaged or spring out of place, or when the surfaces of intake valve and valve seat are reconditioned or intake valve guide is replaced. Use pliers to pinch and remove oil seal from valve.
1) Place cylinder head on ST1.
2) Press-fit oil seal to the specified dimension 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]



F: ADJUSTMENT S103093A01

1. CYLINDER HEAD S103093A0101

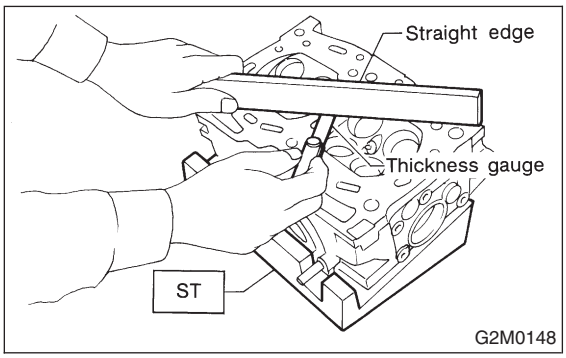
1) Make sure that no crack or other damage exists. In addition to visual inspection, inspect important areas by means of red lead check.
Also make sure that gasket installing surface shows no trace of gas and water leaks.
2) Place cylinder head on ST.
ST 498267800 CYLINDER HEAD TABLE
3) Measure the warping 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)

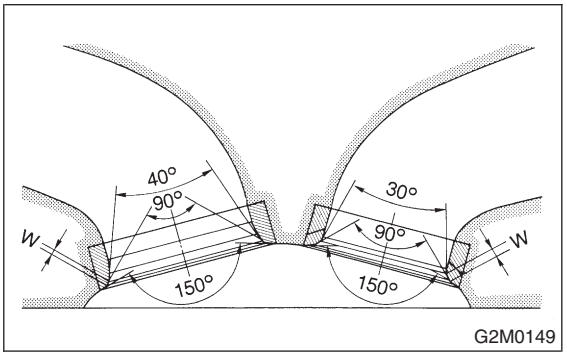
CAUTION:
Uneven torque for the cylinder head bolts can cause warping. When reassembling, pay special attention to the torque so as to tighten evenly.

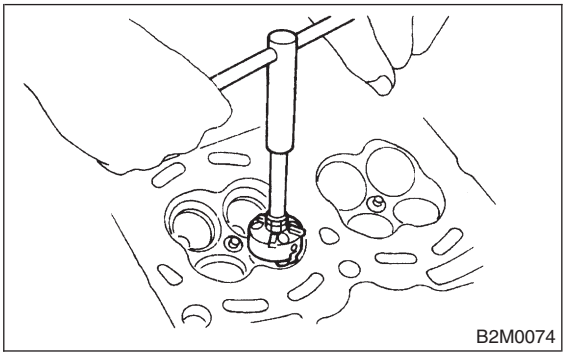


2. VALVE SEAT S103093A0102

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)

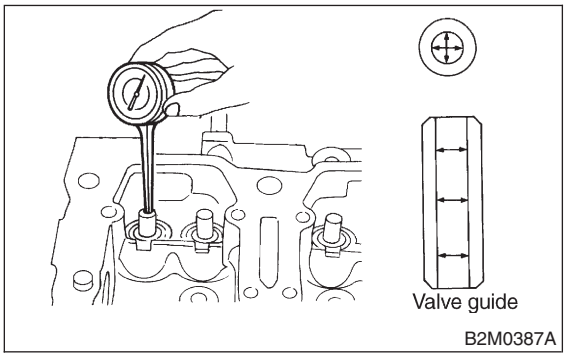


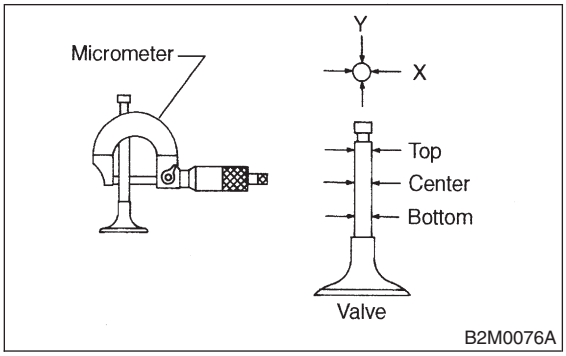


3. VALVE GUIDE S103093A0103

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)





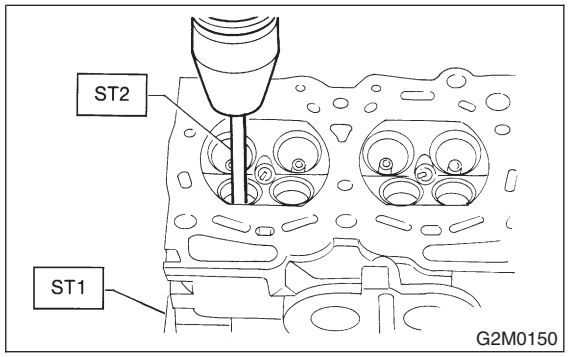
2) If the clearance between valve guide and stem exceeds the limit, replace valve guide or valve itself whichever shows greater amount of wear. See following procedure for valve guide replacement.

Valve guide inner diameter:
6.000 — 6.012 mm (0.2362 — 0.2367 in)

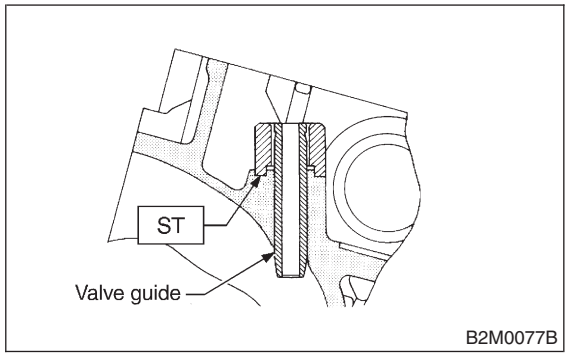
Valve stem outer diameters:
Intake
5.950 — 5.965 mm (0.2343 — 0.2348 in)
Exhaust
5.945 — 5.960 mm (0.2341 — 0.2346 in)

(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



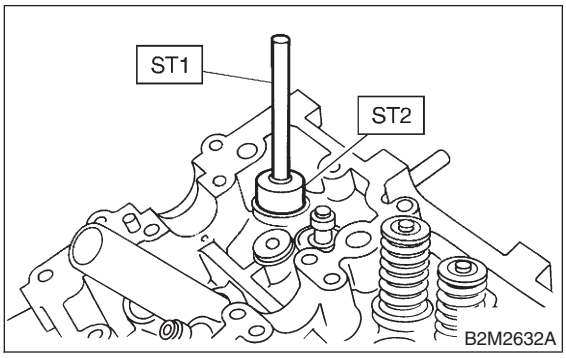
(3) Turn cylinder head upside down and place ST as shown in the figure.
Intake side:
ST 499767700 VALVE GUIDE ADJUSTER
Exhaust side:
ST 499767800 VALVE GUIDE ADJUSTER



(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.

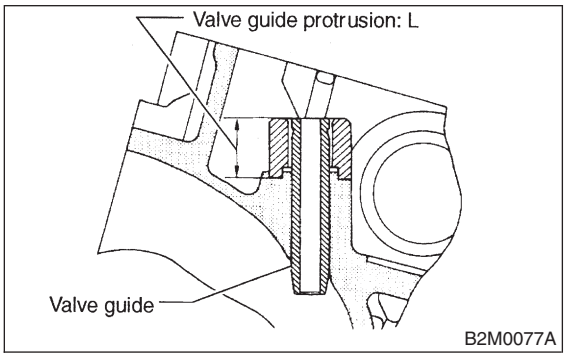
(5) Put new valve guide, coated with sufficient oil, in cylinder, and insert ST1 into valve guide. Press in until the valve guide upper end is flush with the upper surface of ST2.

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.

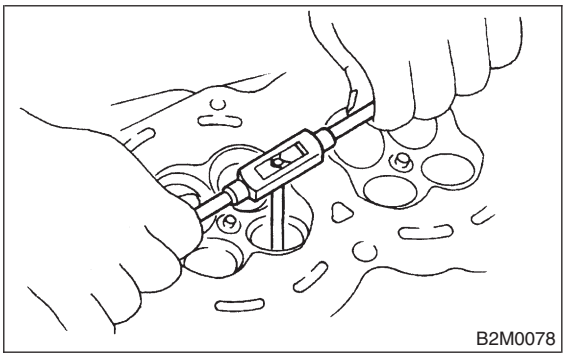
Valve guide protrusion: L
Intake
20.0 — 20.5 mm (0.787 — 0.807 in)
Exhaust
16.5 — 17.0 mm (0.650 — 0.669 in)



(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



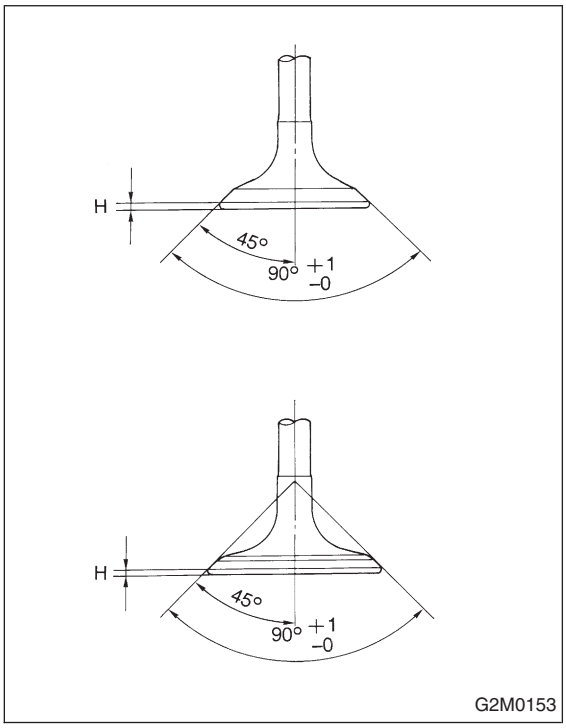
(8) Recheck the contact condition between valve and valve seat after replacing valve guide.

4. INTAKE AND EXHAUST VALVE S103093A0104

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)

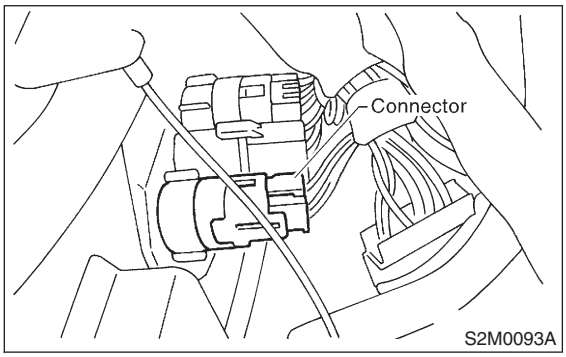


2) Put a small amount of grinding compound on the seat surface and lap the valve and seat surface. Refer to “2. VALVE SEAT”. Install a new intake valve oil seal after lapping.

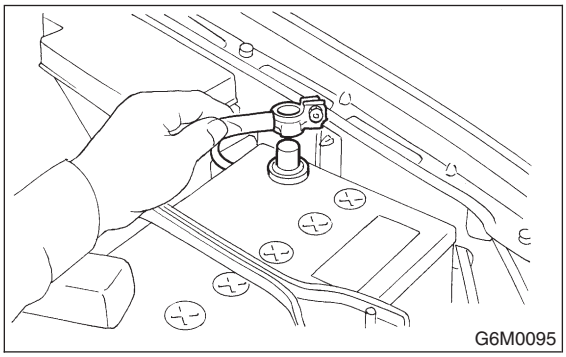
6. Engine Assembly S103079

A: REMOVAL S103079A18

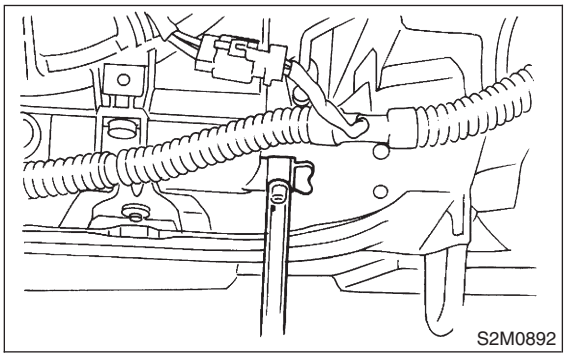
1) Set the vehicle on lift arms.
2) Open front hood fully and support with stay.
3) Release fuel pressure.
   (1) Disconnect fuel pump connector.



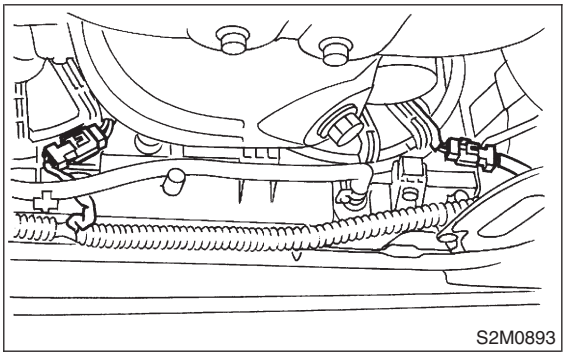
   (2) Start the engine, and run until it stalls.
   (3) After the engine stalls, crank it for five seconds more.
   (4) Turn ignition switch to “OFF”.
   (5) Remove filler cap.
4) Disconnect battery ground terminal.



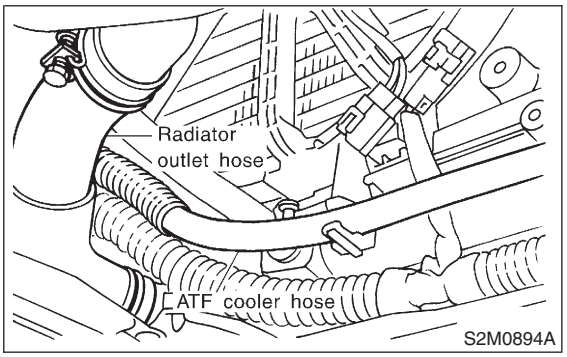
5) Drain coolant.
Set container under the vehicle, and remove drain cock from radiator.



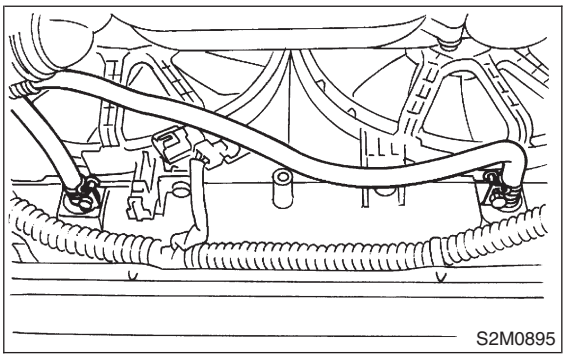
6) Remove cooling system.
   (1) Disconnect connectors from radiator main fan and sub fan motors.



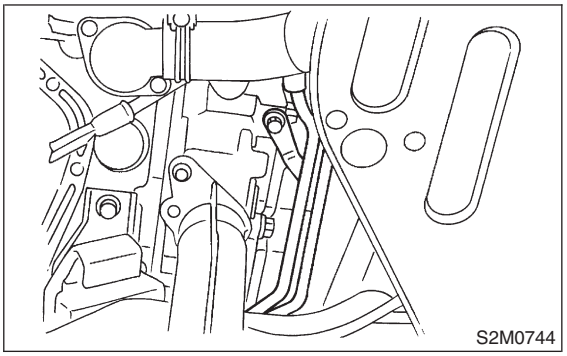
   (2) Disconnect radiator outlet hose from thermostat cover, and remove ATF cooler hose from clip of radiator.



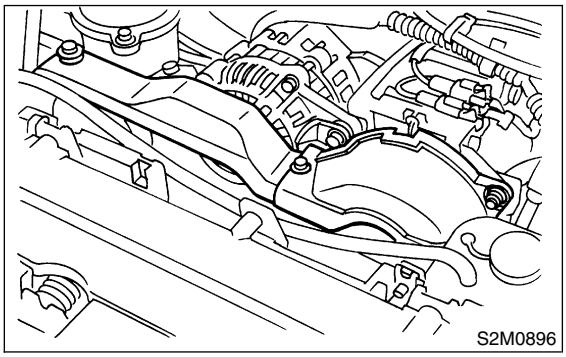
   (3) Disconnect ATF cooler hoses from radiator.



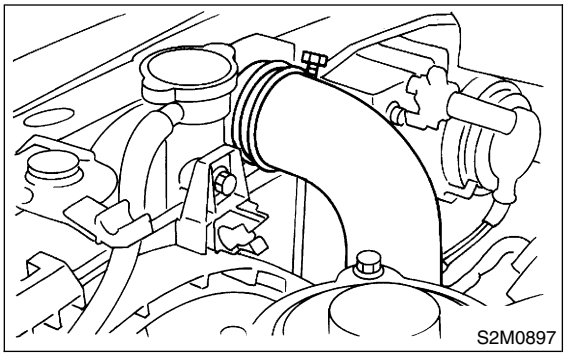
   (4) Remove ATF cooler pipe from cylinder head.



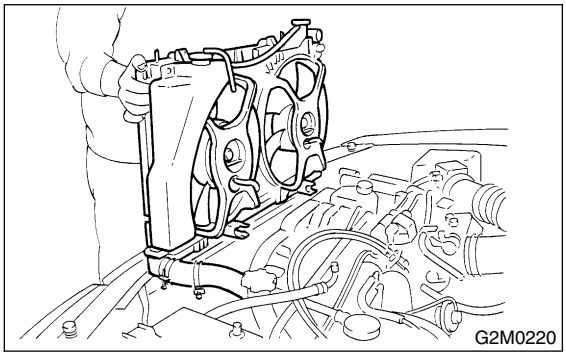
(5) Remove V-belt cover.


S2M0896

(6) Disconnect radiator inlet hose from radiator.


S2M0897

(7) Remove radiator upper bracket, and remove radiator assembly from vehicle.

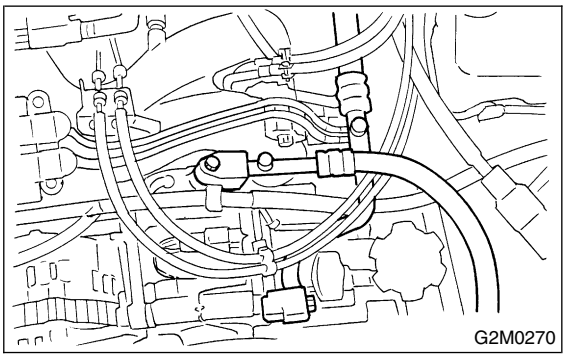

G2M0220

7) 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 flexible hoses from A/C compressor.

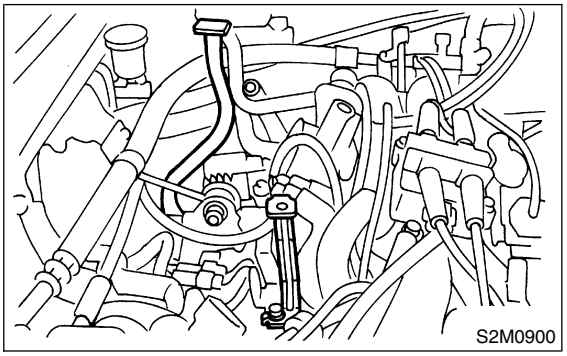

G2M0270

8) Remove air intake system.

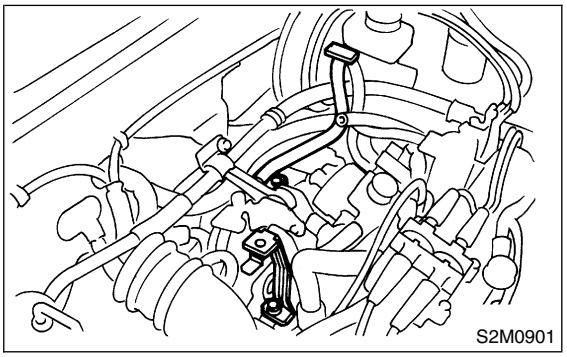
Remove air intake duct <Ref. to IN-5 REMOVAL, Air Intake Duct.> and air cleaner case. <Ref. to IN-4 REMOVAL, Air Cleaner Case.>

9) Remove air cleaner case stay.

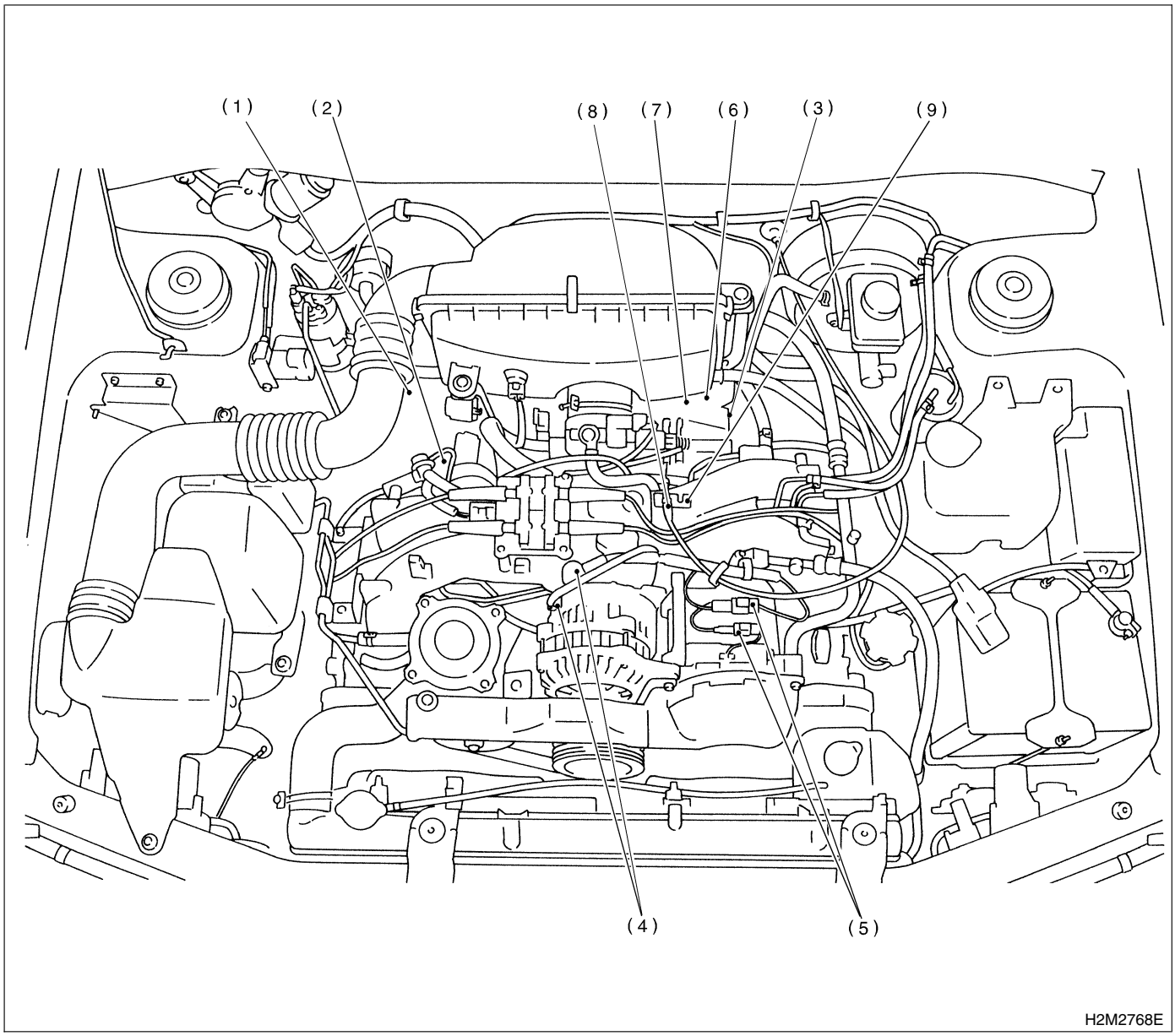
- **MT vehicles**


S2M0900

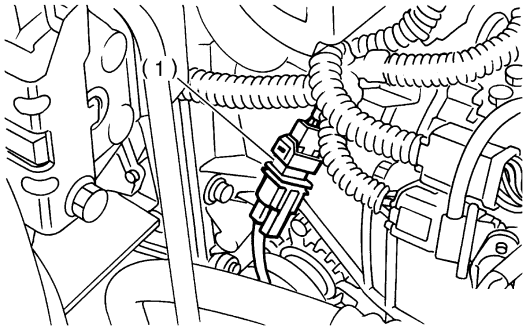
- **AT vehicles**


S2M0901

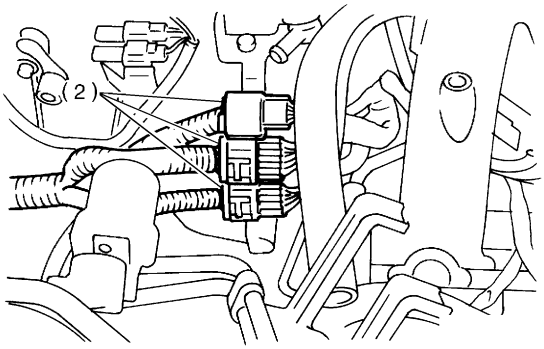
10) Disconnect connectors, cables and hoses.
(1) Disconnect the following connectors and cables.



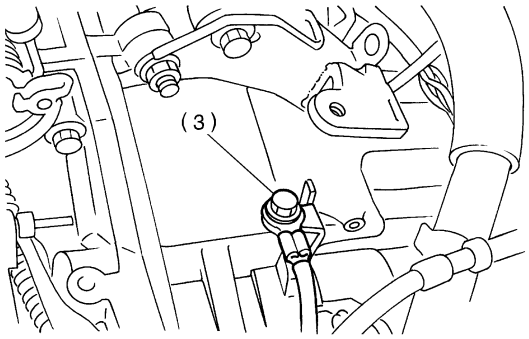
(1) Front oxygen sensor connector
(2) Engine harness connectors
(3) Engine ground terminal stay
(4) Alternator connector and terminal
(5) A/C compressor connectors (With A/C)
(6) Clutch release spring (2200 cc MT vehicle)
(7) Clutch cable (2200 cc MT vehicle)
(8) Accelerator cable
(9) Cruise control cable (With cruise control)



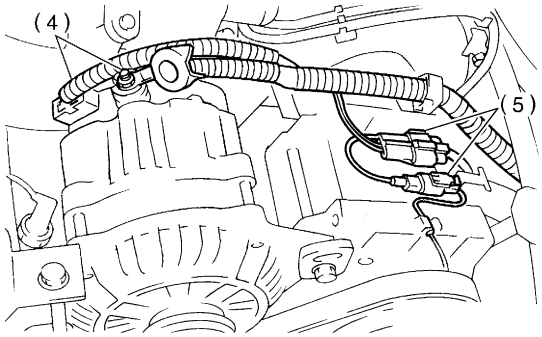
B2M3413A



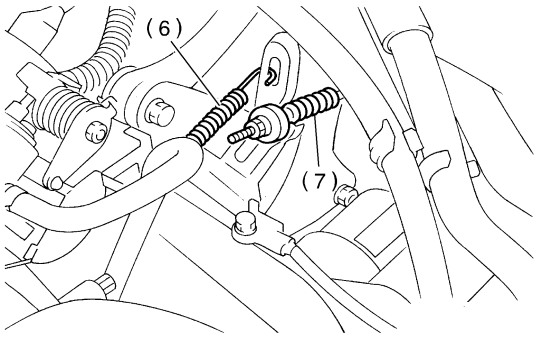
B2M0019F



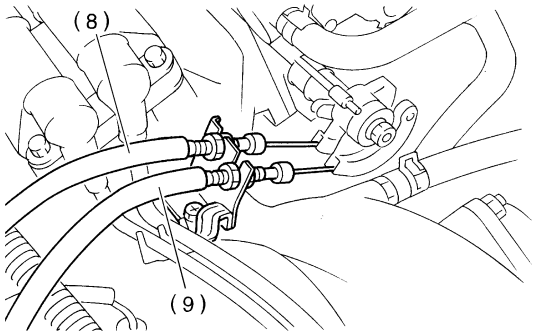
S2M0731D



B2M1291F

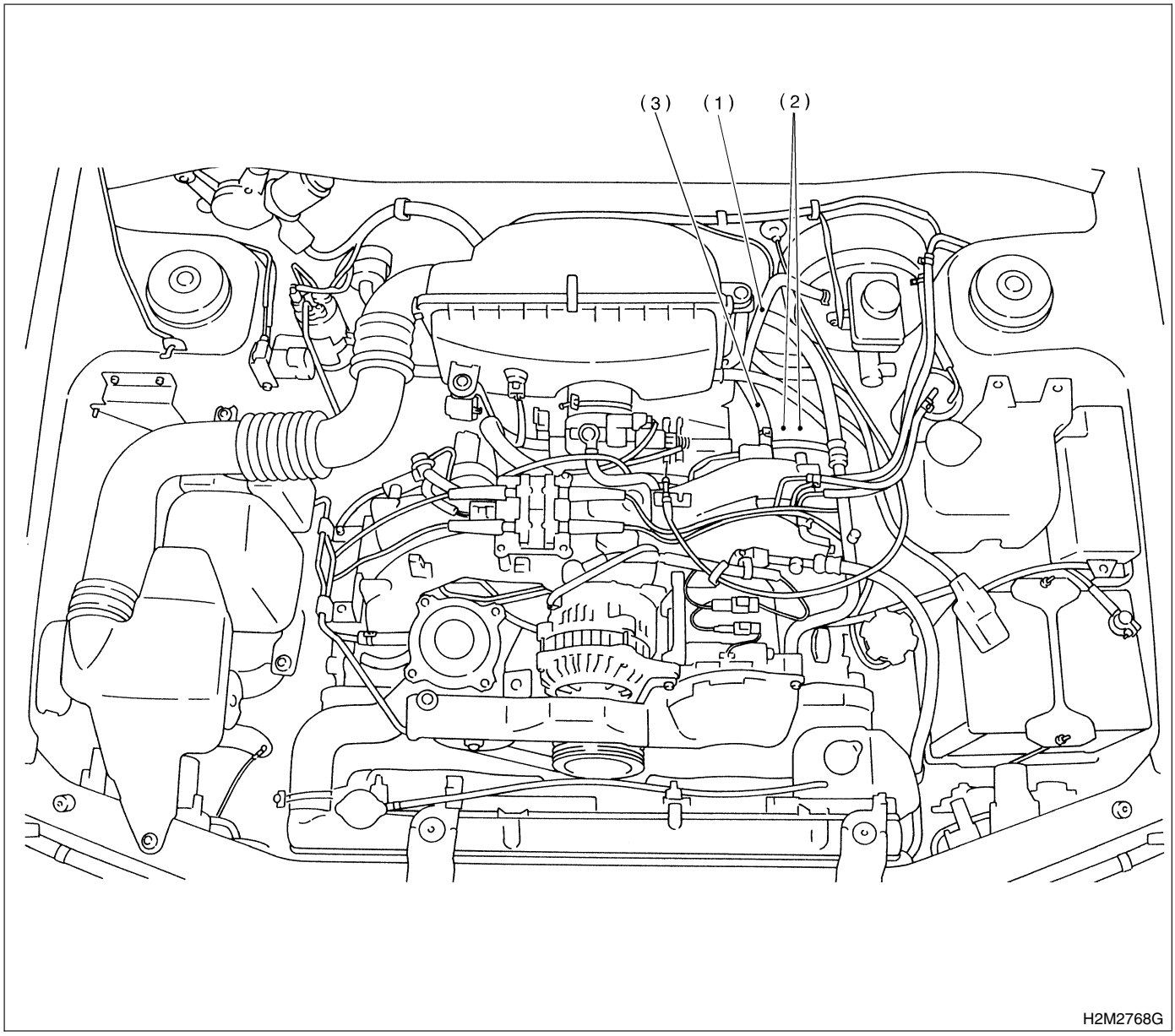


B2M1302E

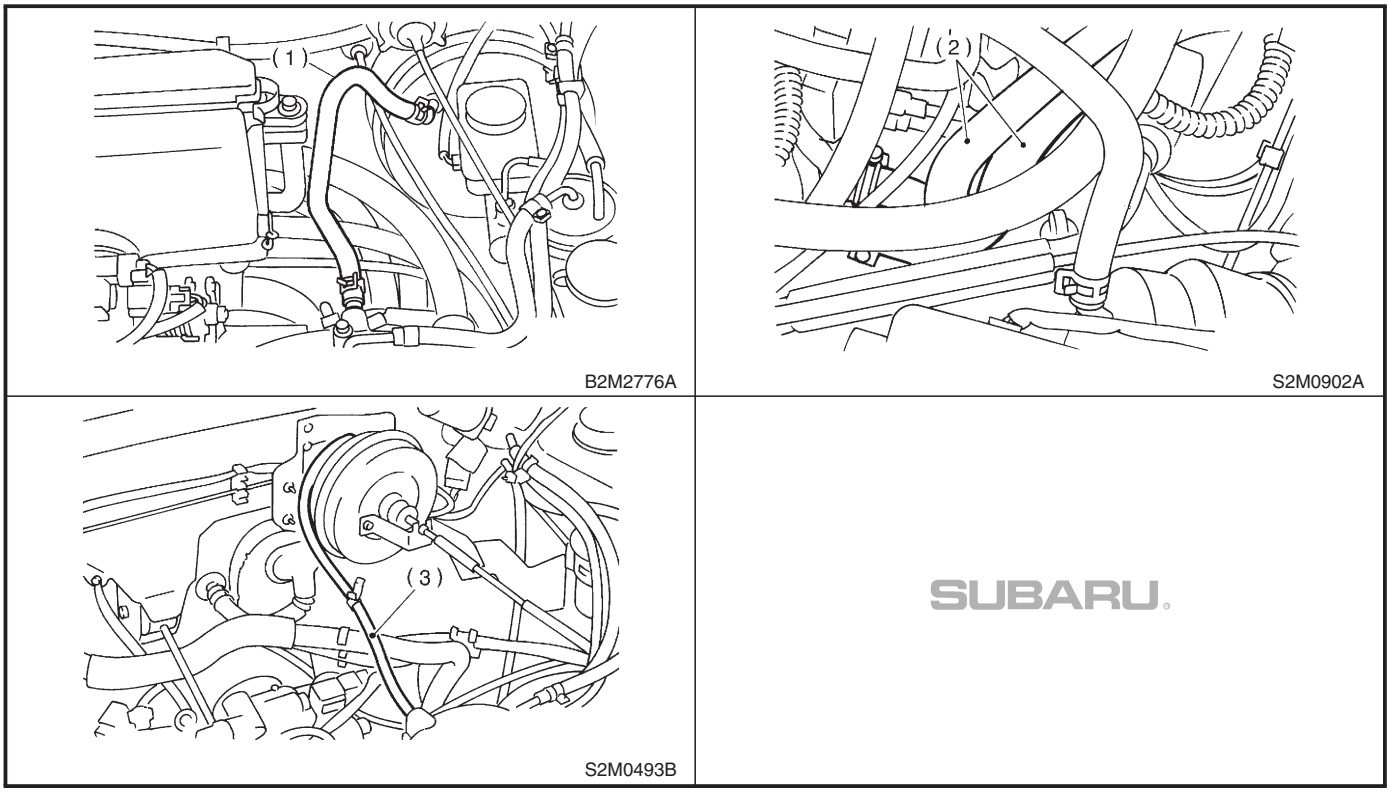


B2M1301F

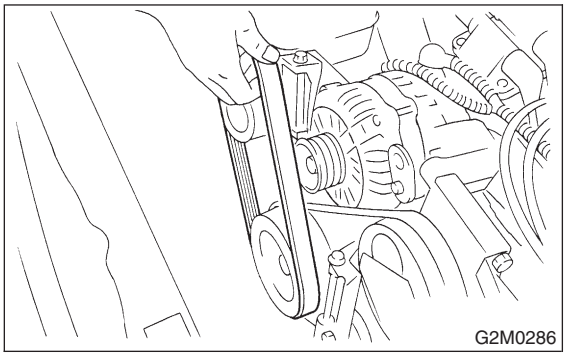
(2) Disconnect the following hoses.



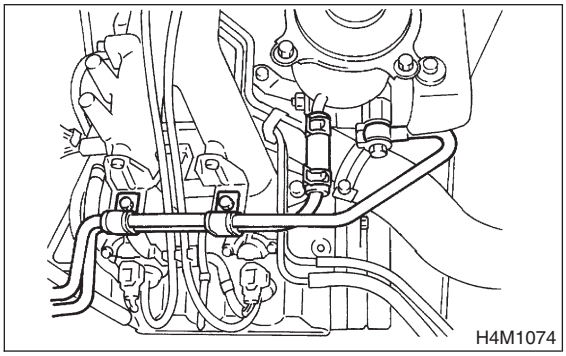
(1) Brake booster vacuum hose
(2) Heater inlet and outlet hoses
(3) Cruise control vacuum hose (With cruise control)



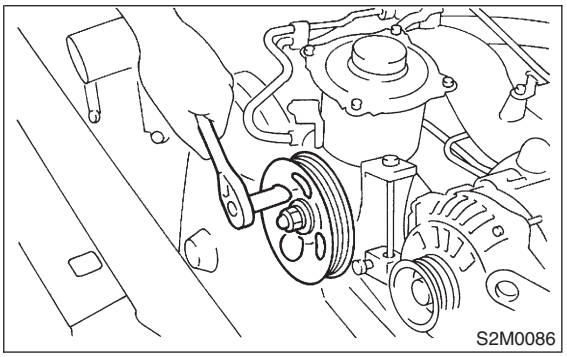
11) Remove power steering pump from bracket.
(1) Loosen lock bolt and slider bolt, and remove front side V-belt.



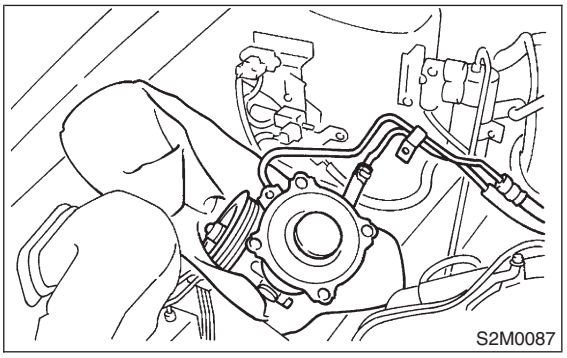
(2) Remove pipe with bracket from intake manifold.



(3) Remove bolts which install power steering pump from bracket.

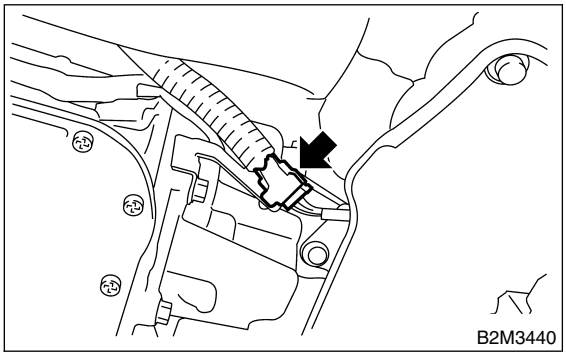


(4) Place power steering pump on the right side wheel apron.

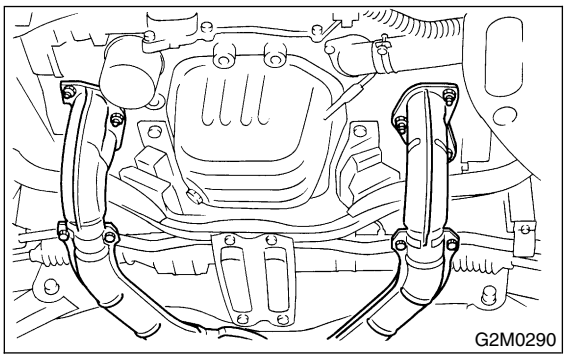


12) Remove front exhaust pipe and center exhaust pipe.
(1) Lift-up the vehicle.

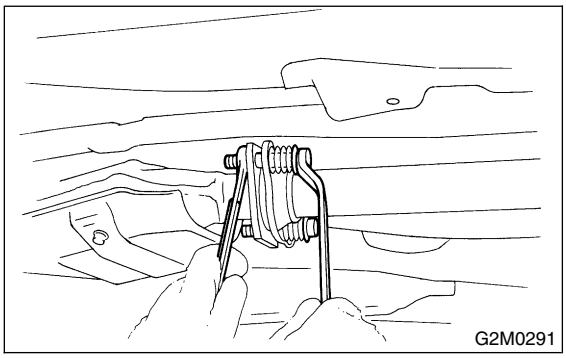
(2) Disconnect connector from rear oxygen sensor.



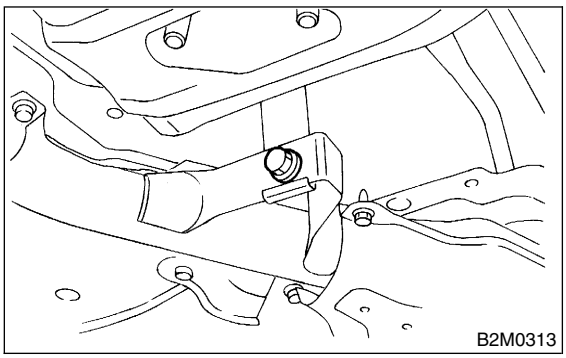
(3) Remove nuts which install front exhaust pipe onto engine.



(4) Separate center exhaust pipe from rear exhaust pipe.



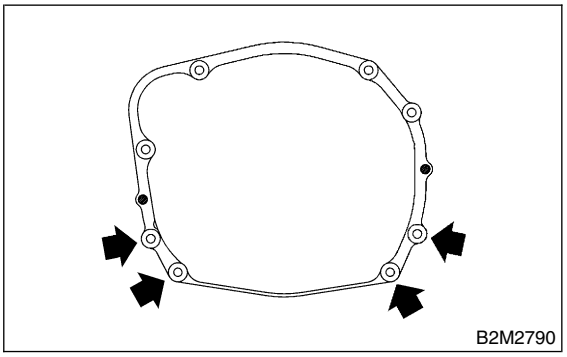
(5) Remove bolt which installs center exhaust pipe on hunger bracket.



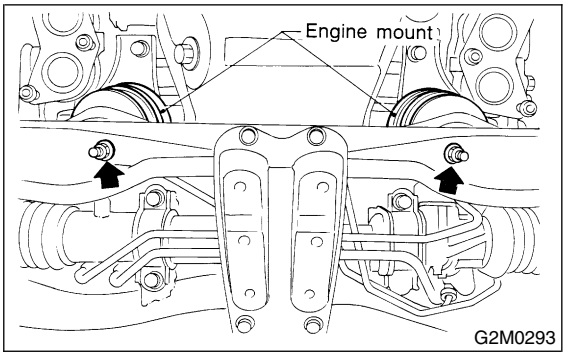
(6) Take off front and center exhaust pipes.

CAUTION:
Exhaust pipe will drop when all bolts are removed. So, hold it when removing the last bolt.

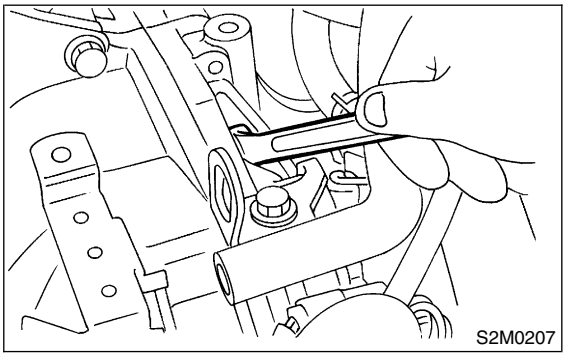
13) Remove nuts which hold lower side of transmission to engine.



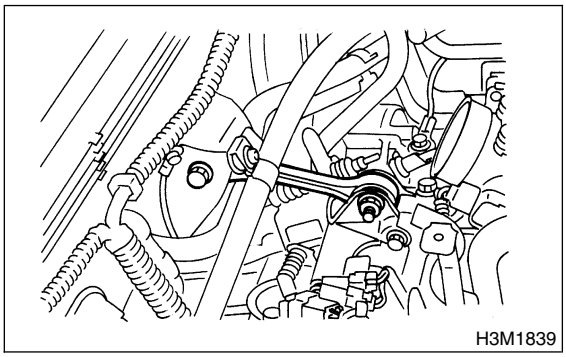
14) Remove nuts which install front cushion rubber onto front crossmember.



15) Separate torque converter from drive plate. (AT model)
(1) Lower the vehicle.
(2) Remove service hole plug.
(3) Remove bolts which hold torque converter to drive plate.
(4) Remove other bolts while rotating the engine using ST.
2200 cc vehicles:
ST 499977300 CRANK PULLEY WRENCH
2500 cc vehicles:
ST 499977100 CRANK PULLEY WRENCH

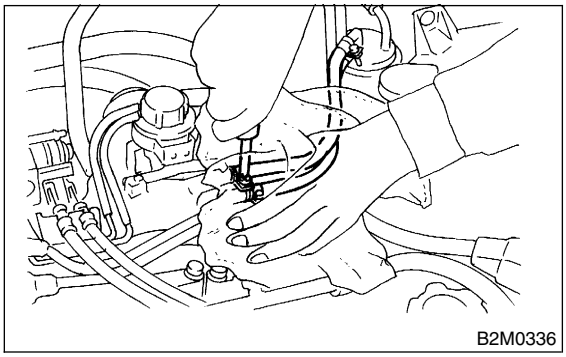


16) Remove pitching stopper.

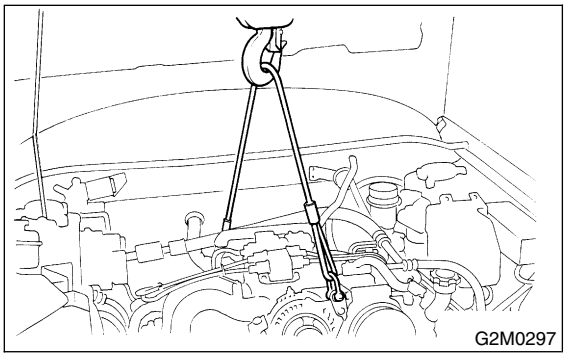

H3M1839

17) 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.

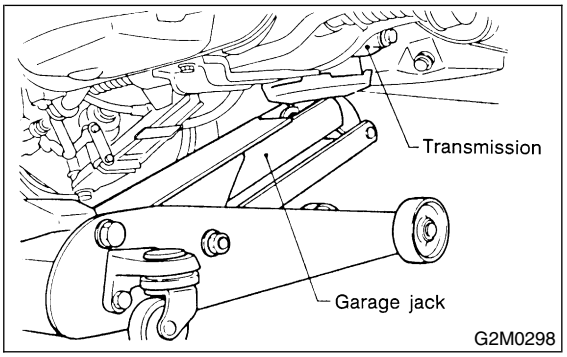

B2M0336

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


G2M0297

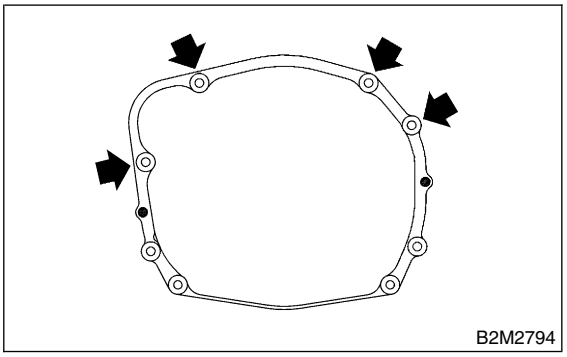
19) Support transmission with a garage jack.

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.



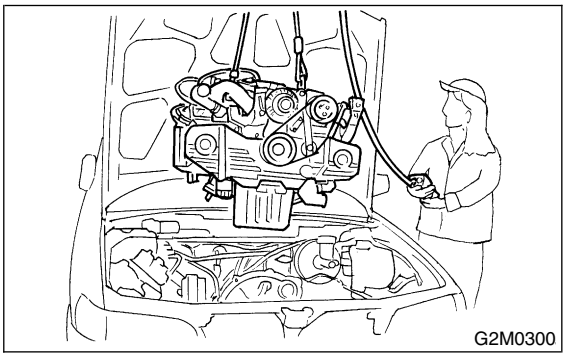
G2M0298

20) Remove bolts which holds upper side of transmission to engine.


B2M2794

21) Remove engine from vehicle.
(1) Slightly raise engine.
(2) Raise transmission with garage jack.
(3) Move engine horizontally until mainshaft is withdrawn from clutch cover.
(4) Slowly move engine away from engine compartment.

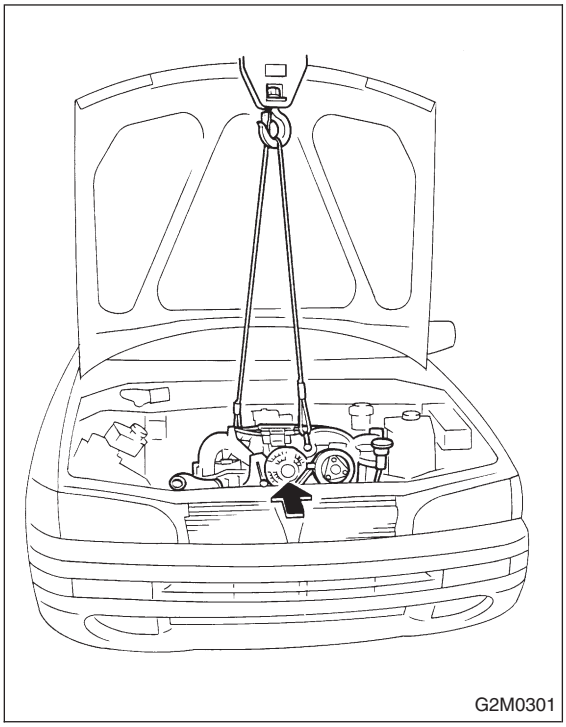
CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.


G2M0300

B: INSTALLATION S103079A11

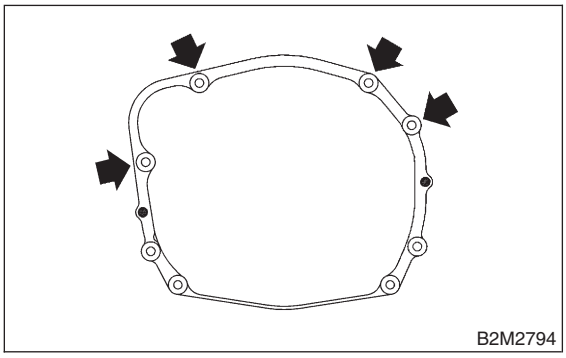
1) Install engine onto transmission.
   (1) Position engine in engine compartment and align it with transmission.

CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

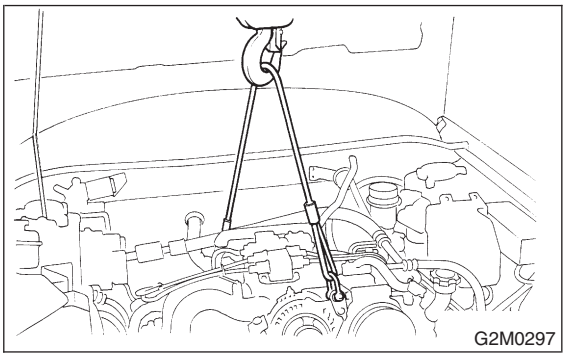

G2M0301

   (2) Apply a small amount of grease to splines of mainshaft.
2) Tighten bolts which hold upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)

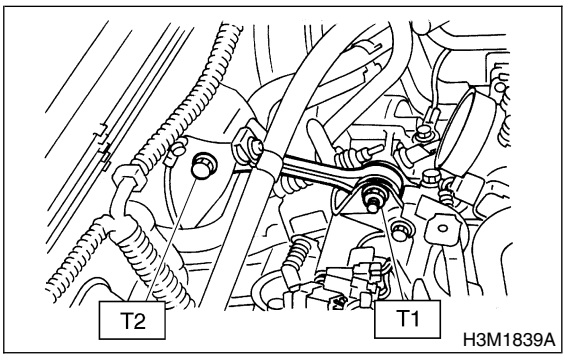

B2M2794

3) Remove lifting device and wire ropes.


G2M0297

4) Remove garage jack.
5) Install pitching stopper.

Tightening torque:
T1: 49 N·m (5.0 kgf-m, 36.2 ft-lb)
T2: 57 N·m (5.8 kgf-m, 42 ft-lb)

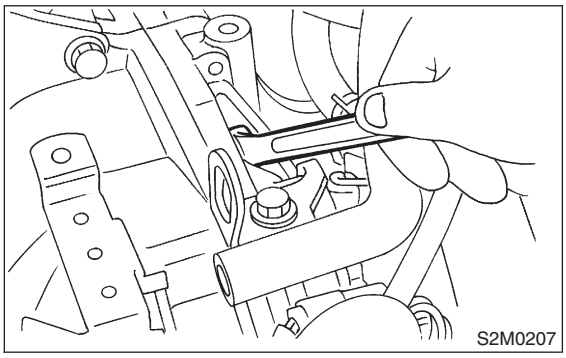


H3M1839A

6) Install torque converter onto drive plate. (AT model)
(1) Tighten bolts which hold torque converter to drive plate.
(2) Tighten other bolts while rotating the engine by using ST.
2200 cc vehicles:
ST 499977300 CRANK PULLEY WRENCH
2500 cc vehicles:
ST 499977100 CRANK PULLEY WRENCH

CAUTION:
Be careful not to drop bolts into torque converter housing.

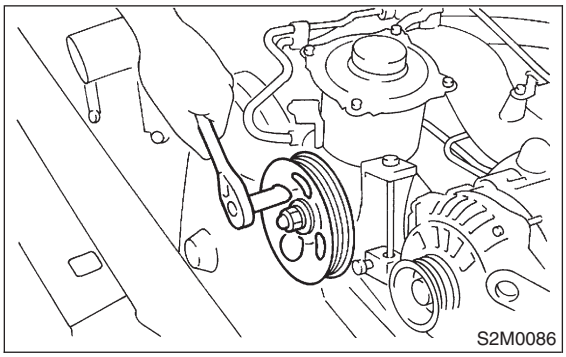
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)


S2M0207

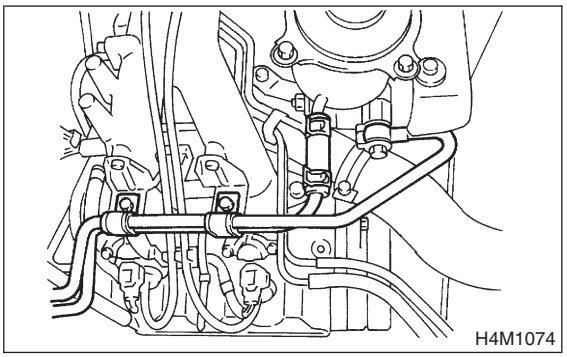
(3) Clog plug onto service hole.

7) Install power steering pump on bracket.
(1) Install power steering pump on bracket, and tighten bolts.

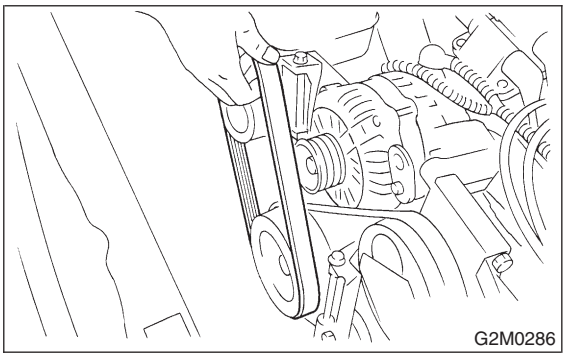
Tightening torque:
39 N·m (4.0 kgf-m, 29 ft-lb)


S2M0086

(2) Install power steering pipe bracket on right side intake manifold, and install spark plug codes.

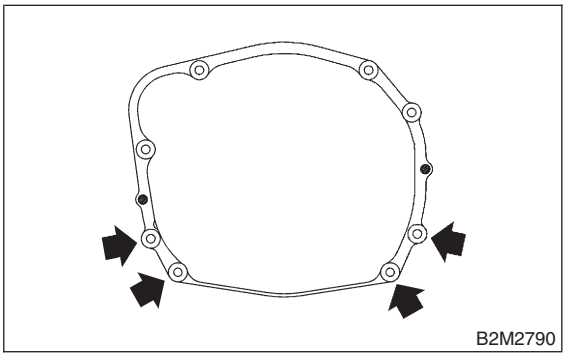

H4M1074

(3) Install front side V-belt, and adjust it. <Ref. to ME-48 INSTALLATION, V-belt.>


G2M0286

8) Tighten nuts which hold lower side of transmission to engine.

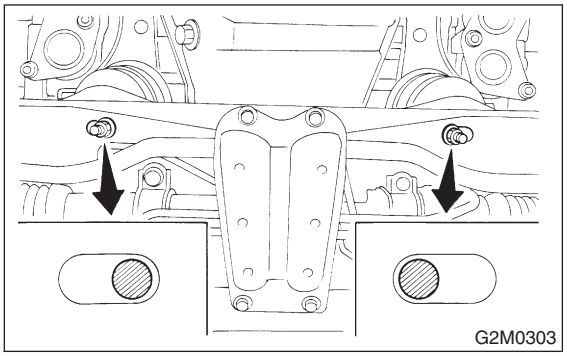
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


B2M2790

9) Tighten nuts which install front cushion rubber onto crossmember.

Tightening torque:
69 N·m (7.0 kgf-m, 51 ft-lb)

CAUTION:
Be sure to tighten front cushion rubber mounting bolts in the innermost elliptical hole in the front crossmember.


G2M0303

10) Install front exhaust pipe <Ref. to EX-7 INSTALLATION, Front Exhaust Pipe.> and center exhaust pipe. <Ref. to EX-9 INSTALLATION, Center Exhaust Pipe.>
11) Connect rear oxygen sensor connector.
12) Connect the following hoses.
(1) Fuel delivery hose, return hose and evaporation hose
(2) Heater inlet and outlet hoses
(3) Brake booster vacuum hose
(4) Cruise control vacuum hose (With cruise control)
13) Connect the following connectors.
(1) Engine ground terminal
(2) Engine harness connectors
(3) Front oxygen sensor connector
(4) Alternator connector and terminal
(5) A/C compressor connectors (With A/C)
14) Connect the following cables.
(1) Accelerator cable
(2) Cruise control cable (With cruie control)
(3) Clutch cable (2200 cc MT vehicle)
(4) Clutch release spring (2200 cc MT vehicle)

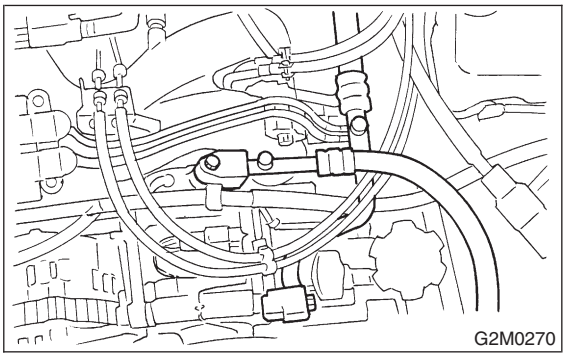
CAUTION:
After connecting each cable, adjust them.

15) Install air intake system.
(1) Install air cleaner element.
(2) Install air intake duct <Ref. to IN-5 INSTALLATION, Air Intake Duct.> and air cleaner case. <Ref. to IN-4 INSTALLATION, Air Cleaner Case.>

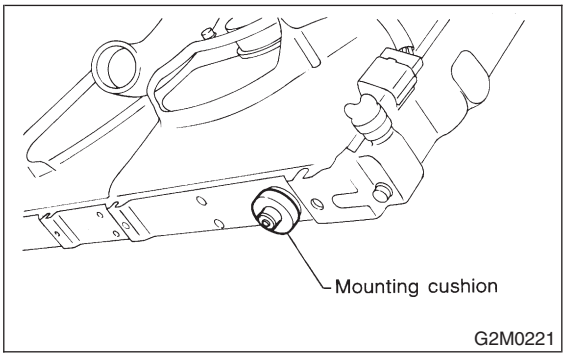
16) Install A/C flexible hoses. (With A/C)
<Ref. to AC-35 INSTALLATION, Flexible Hose.>

CAUTION:
Use new O-rings.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

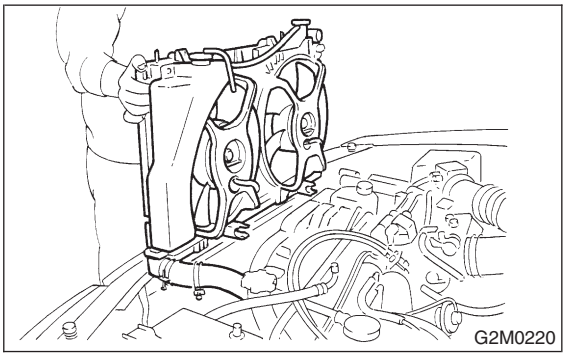

G2M0270

17) Install cooling system.
(1) Attach radiator mounting cushions to pins on lower side of radiator.



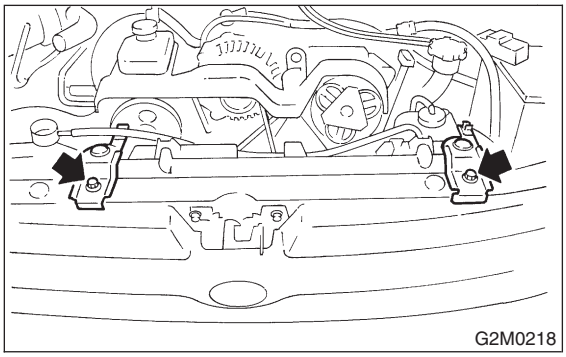
G2M0221

(2) Fit cushions on lower side of radiator, into holes on body side and install radiator.

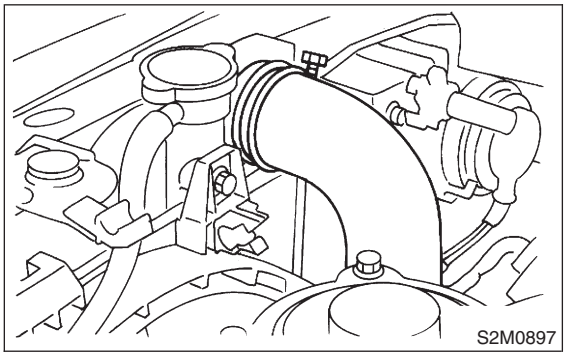

G2M0220

(3) Install radiator brackets and tighten bolts.

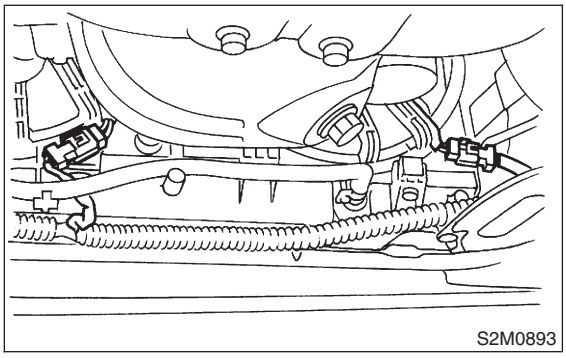
Tightening torque:
13.7 N·m (1.4 kgf-m, 10.1 ft-lb)


G2M0218

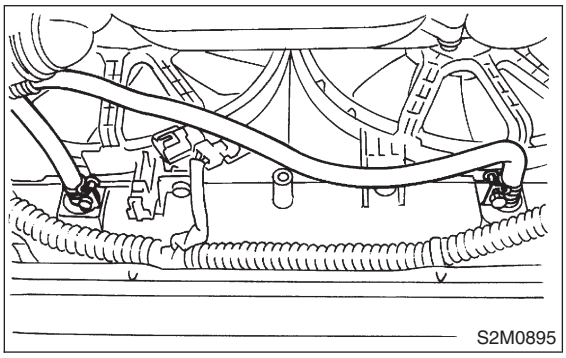
(4) Connect radiator inlet hose.


S2M0897

(5) Connect radiator fan motor connector.

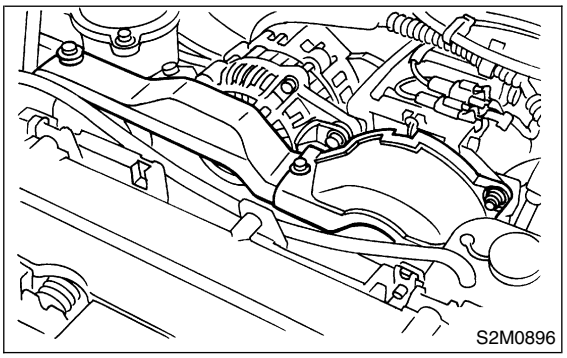

S2M0893

(6) Connect radiator outlet hose.
(7) Connect ATF cooler hoses. (AT vehicles)


S2M0895

(8) Install ATF cooler pipe to cylinder head. (2200 cc AT vehicle)

(9) Install V-belt cover.


S2M0896

18) Install battery in the vehicle, and connect cables.
19) Fill coolant.
<Ref. to CO-6 REPLACEMENT, Engine Coolant.>
20) Check ATF level and correct if necessary. (AT model)
<Ref. to AT-9 REPLACEMENT, Automatic Transmission Fluid.>
21) Charge A/C system with refrigerant.
<Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>
22) Remove front hood stay, and close front hood.
23) Remove the vehicle from lift arms.

C: INSPECTION *S103079A10*

1) Make sure pipes and hoses are installed correctly.
2) Make sure the engine coolant and ATF are at specified levels.

7. Engine Mounting S103085

A: REMOVAL S103085A18

1) Remove engine assembly. <Ref. to ME-34 REMOVAL, Engine Assembly.>
2) Remove engine mounting from engine assembly.

B: INSTALLATION S103085A11

Install in the reverse order of removal.

Tightening torque:
Engine mounting;
34 N·m (3.5 kgf-m, 25.3 ft-lb)

C: INSPECTION S103085A10

Make sure there are no cracks or other damage.

20. Engine Noise S103096

A: INSPECTION S103096A10

Type of sound	Condition	Possible cause
Regular clicking sound	Sound increases as engine speed increases.	• Valve mechanism is defective. • Incorrect valve clearance • Worn valve rocker • Worn camshaft • Broken valve spring
Heavy and dull clank	Oil pressure is low.	• Worn crankshaft main bearing • Worn connecting rod bearing (big end)
	Oil pressure is normal.	• Loose flywheel mounting bolts • Damaged engine mounting
High-pitched clank (Spark knock)	Sound is noticeable when accelerating with an overload.	• 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*)	• 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*)	• 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*)	• Unusually worn valve lifter • Worn cam gear • Worn camshaft journal bore in crankcase
Squeaky sound	—	• Insufficient generator lubrication
Rubbing sound	—	• Defective generator brush and rotor contact
Gear scream when starting engine	—	• Defective ignition starter switch • Worn gear and starter pinion
Sound like polishing glass with a dry cloth	—	• Loose drive belt • Defective engine coolant pump shaft
Hissing sound	—	• Loss of compression • Air leakage in air intake system, hoses, connections or manifolds
Timing belt noise	—	• Loose timing belt • Belt contacting case/adjacent part
Valve tappet noise	—	• 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 EN-60 OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN-57 OPERATION, Inspection Mode.> after connecting fuel injector connector.

MEMO:

19. Engine Trouble in General

S103095

A: INSPECTION S103095A10

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
	● “EN” section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
3) Initial combustion occur.	● "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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
4) Engine stalls after initial combustion.	● "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
2. Rough idle and engine stall	● “EN” section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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

TROUBLE	PROBLEM PARTS, ETC.	POSSIBLE CAUSE	RANK
3. Low output, hesitation and poor acceleration	● "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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	● "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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.	• "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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)	• "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		A
	• Cooling system	• Overheating	B
	• Others	• Malfunction of evaporative emission control system	B
7. After burning in exhaust system	• "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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	• "EN" section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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	● “EN” section <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>		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

1. General Description S103001

A: SPECIFICATIONS S103001E49

Engine	Model			2200 cc	2500 cc
	Type			Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine	
	Valve arrangement			Belt driven, single over-head camshaft, 4-valve/cylinder	
	Bore × Stroke		mm (in)	96.9 × 75.0 (3.815 × 2.953)	99.5 × 79.0 (3.917 × 3.110)
	Displacement		cm^3 (cu in)	2,212 (135)	2,457 (150)
	Compression ratio			10.0	
	Compression pressure (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		2° BTDC	1° BTDC
		Closing		50° ABDC	51° ABDC
	Exhaust valve timing	Opening		46° BBDC	50° BBDC
		Closing		6° ATDC	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±50 (A/C switch ON)	
	Firing order			1 → 3 → 2 → 4	
	Ignition timing		BTDC/rpm	14°±8°/700 (MT), 20°±8°/700 (AT)	

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

Belt tensioner adjuster	Protrusion of adjuster rod		5.2 — 6.2 mm (0.205 — 0.244 in)
Belt tensioner	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	0.2 — 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 (2200 cc)	Intake	STD	38.732 — 38.832 mm (1.5249 — 1.5288 in)
			Limit	38.632 mm (1.5209 in)
		Exhaust	STD	39.257 — 39.357 mm (1.5455 — 1.5495 in)
			Limit	39.157 mm (1.5416 in)
	Cam lobe height (2500 cc)	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 warpage limit			0.05 mm (0.0020 in)
	Surface grinding limit			0.1 mm (0.004 in)
	Standard height			98.3 mm (3.870 in)
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)
		Limit	—	0.15 mm (0.0059 in)
	Overall length		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 kgf, 48.3 — 55.3 lb)/45.0 mm (1.772 in) 526.6 — 581.6 N (53.7 — 59.3 kgf, 118.4 — 130.8 lb)/34.7 mm (1.366 in)

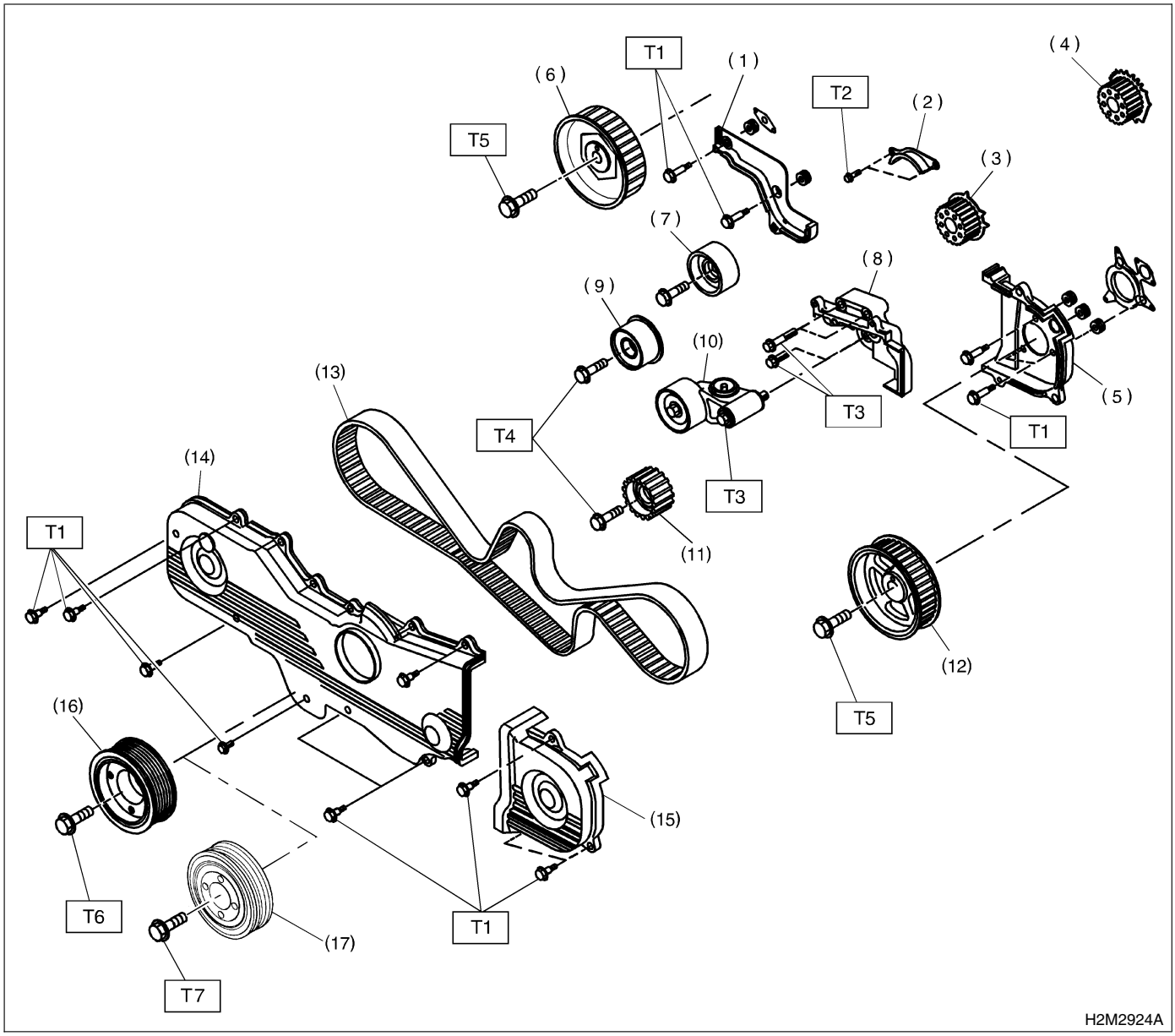
Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm (0.0020 in)
	Surface grinding limit			0.1 mm (0.004 in)
	Cylinder bore (2200 cc)	STD	A	96.905 — 96.915 mm (3.8151 — 3.8155 in)
			B	96.895 — 96.905 mm (3.8148 — 3.8151 in)
	Cylinder bore (2500 cc)	STD	A	99.505 — 99.515 mm (3.9175 — 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 (2200 cc)	STD	A	96.885 — 96.895 mm (3.8144 — 3.8148 in)
			B	96.875 — 96.885 mm (3.8140 — 3.8144 in)
		0.25 mm (0.0098 in) OS		97.125 — 97.135 mm (3.8238 — 3.8242 in)
		0.50 mm (0.0197 in) OS		97.375 — 97.385 mm (3.8337 — 3.8340 in)
	Outer diameter (2500 cc)	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	STD		0.004 — 0.008 mm (0.0002 — 0.0003 in)
		Limit		0.020 mm (0.0008 in)
	Degree of fit			Piston pin must be fitted into position with thumb at 20°C (68°F).
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 (0.0059 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 (2200 cc)		STD	0.010 — 0.038 mm (0.0004 — 0.0015 in)
			Limit	0.05 mm (0.0020 in)
	Oil clearance (2500 cc)		STD	0.020 — 0.046 mm (0.0004 — 0.0018 in)
			Limit	0.050 mm (0.0020 in)
	Thickness at center portion (2200 cc)		STD	1.492 — 1.501 mm (0.0587 — 0.0591 in)
			0.03 mm (0.0012 in) US	1.510 — 1.513 mm (0.0587 — 0.0596 in)
			0.05 mm (0.0020 in) US	1.520 — 1.523 mm (0.0598 — 0.0600 in)
			0.25 mm (0.0098 in) US	1.620 — 1.623 mm (0.0638 — 0.0639 in)
	Thickness at center portion (2500 cc)		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)
	Crankpin and crank journal		Out-of-roundness	0.020 mm (0.0008 in) or less
			Grinding limit	0.250 mm (0.0098 in)
	Crankpin 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)

Crank-shaft bearing	Crankshaft bearing thickness	#1, #3	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, #4, #5	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)

B: COMPONENT S103001A05

1. TIMING BELT S103001A0501

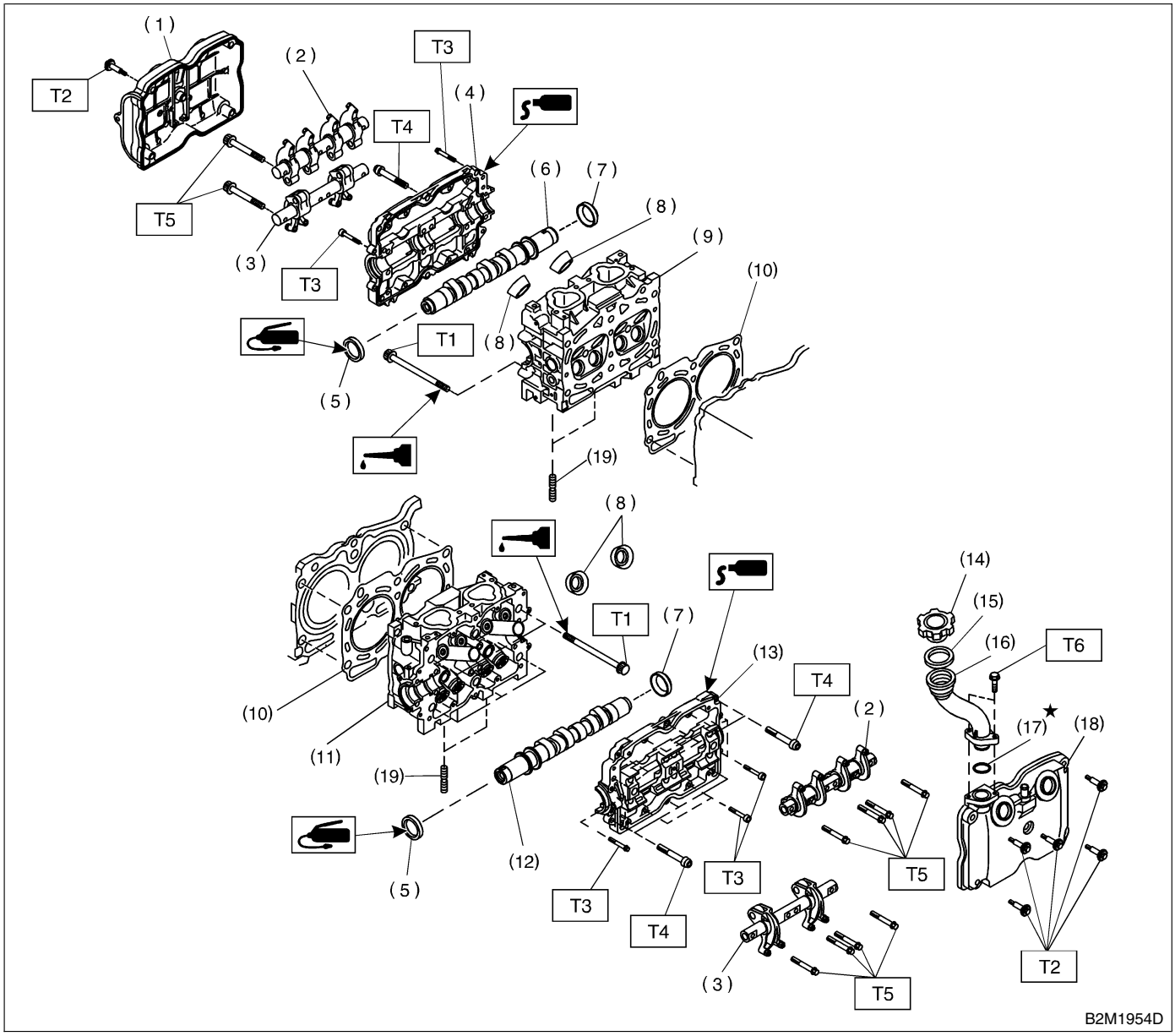


(1) Belt cover No. 2 (RH)
(2) Timing belt guide (MT vehicles only)
(3) Crankshaft sprocket (2500 cc models)
(4) Crankshaft sprocket (2200 cc models)
(5) Belt cover No. 2 (LH)
(6) Camshaft sprocket No. 1
(7) Belt idler (No. 1)
(8) Tensioner bracket
(9) Belt idler (No. 2)
(10) Automatic belt tension adjuster ASSY
(11) Belt idler No. 2
(12) Camshaft sprocket No. 2
(13) Timing belt
(14) Front belt cover
(15) Belt cover (LH)
(16) Crankshaft pulley (2200 cc model)
(17) Crankshaft pulley (2500 cc model)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 9.8 (1.0, 7.2)
T3: 25 (2.5, 18.1)
T4: 39 (4.0, 28.9)
T5: 78 (8.0, 57.9)
T6: 127 (13.0, 94)
T7: 177 (18.0, 130.2)

2. CYLINDER HEAD AND CAMSHAFT

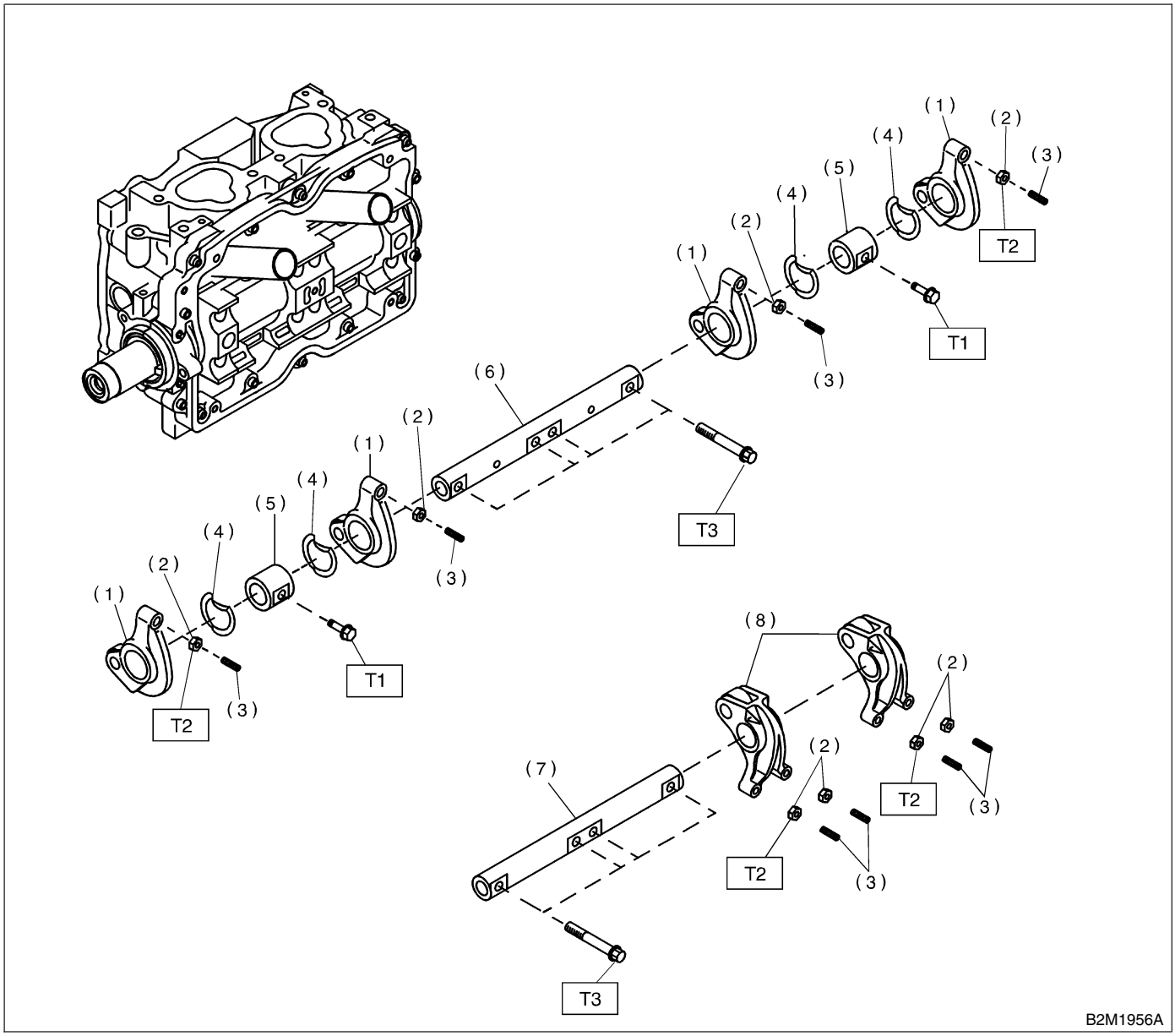
S103001A0502



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: <Ref. to ME-69 INSTALLATION, Cylinder Head Assembly.>
T2: 51 (0.5, 3.6)
T3: 10 (1.0, 7.2)
T4: 18 (1.8, 13.0)
T5: 25 (2.5, 18.1)
T6: 6.4 (0.65, 4.7)

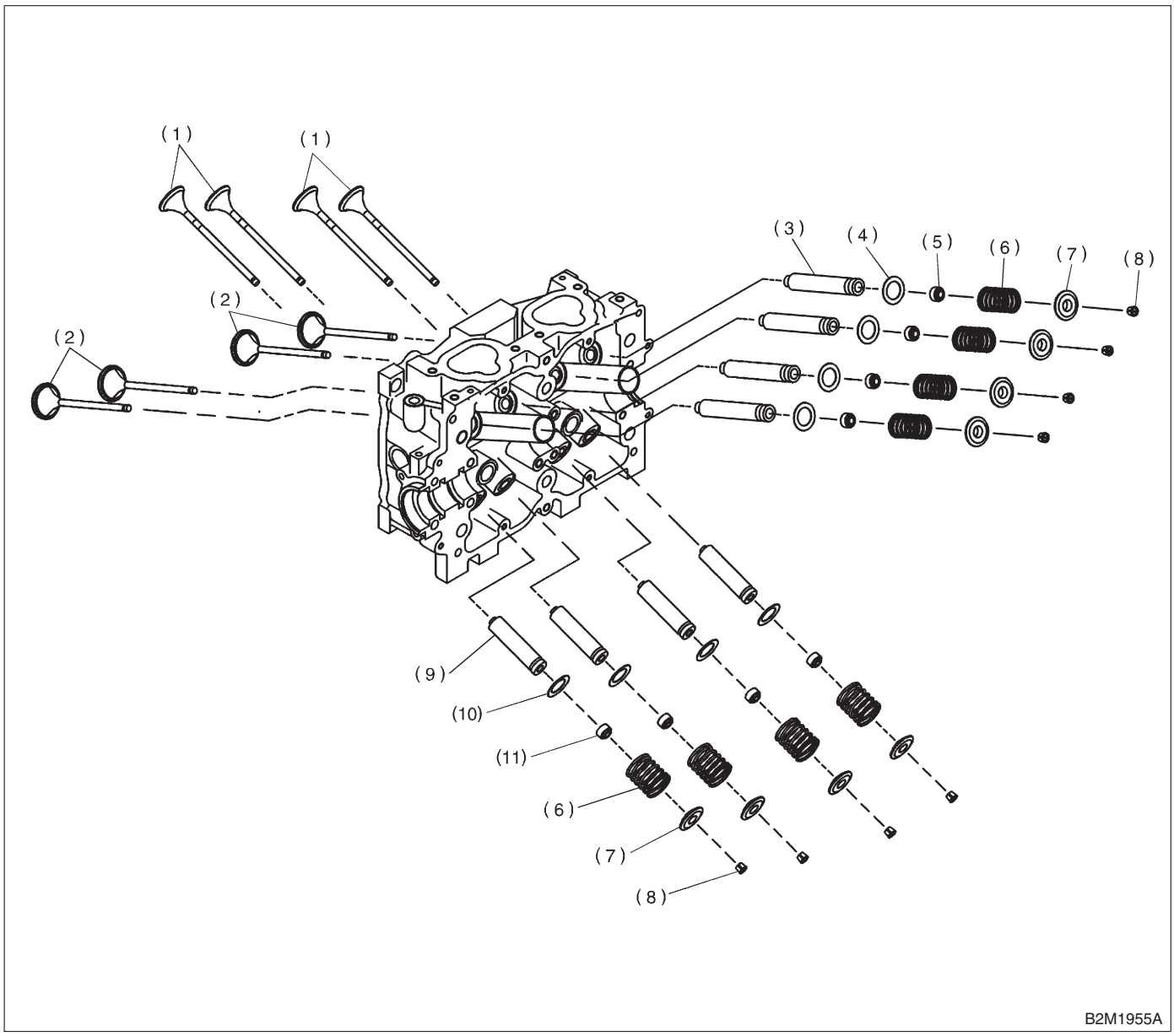
3. VALVE ROCKER ASSEMBLY S103001A0503



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

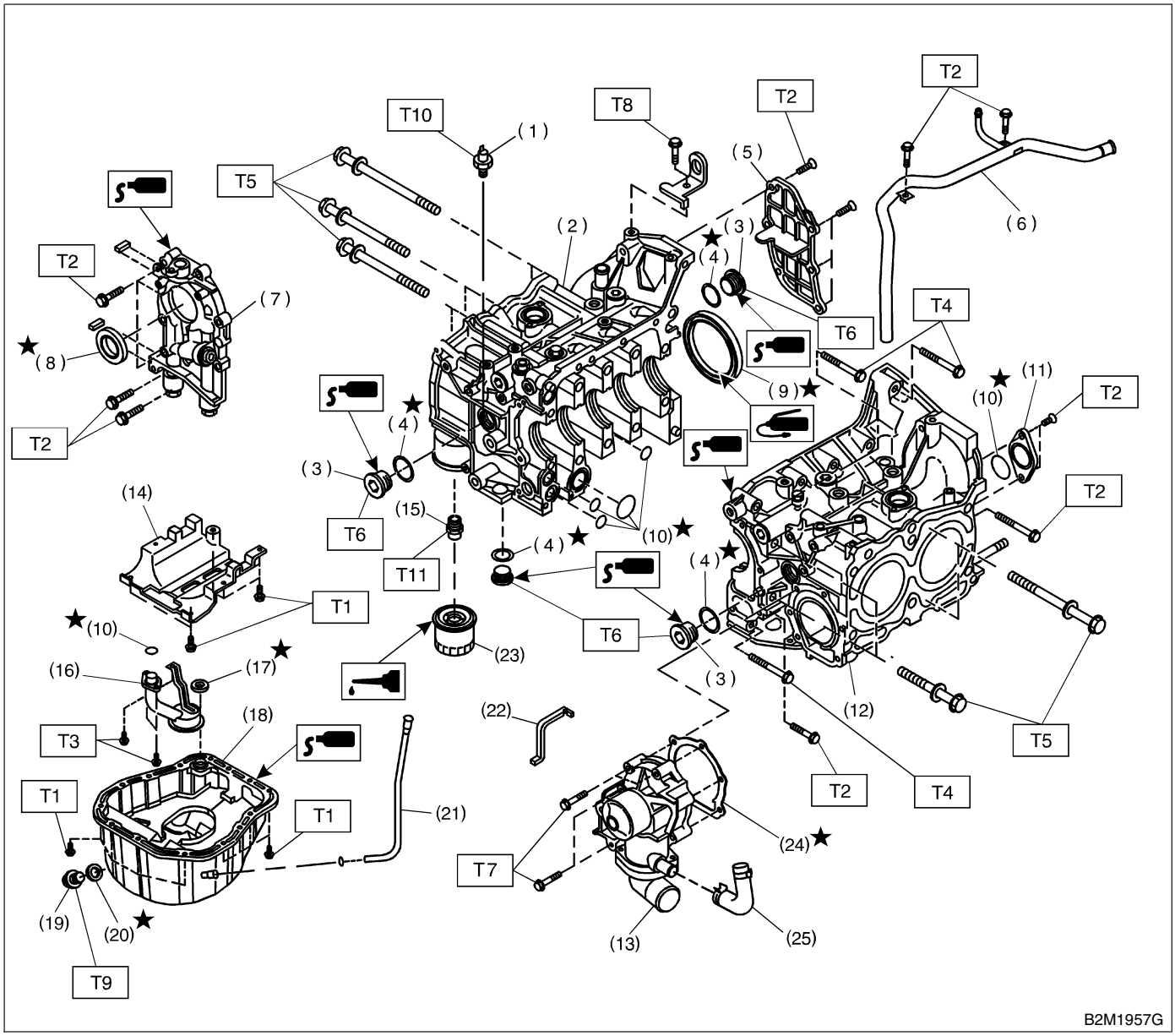
Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 10 (1.0, 7.2)
T3: 25 (2.5, 18.1)

4. CYLINDER HEAD AND VALVE ASSEMBLY S103001A0504



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

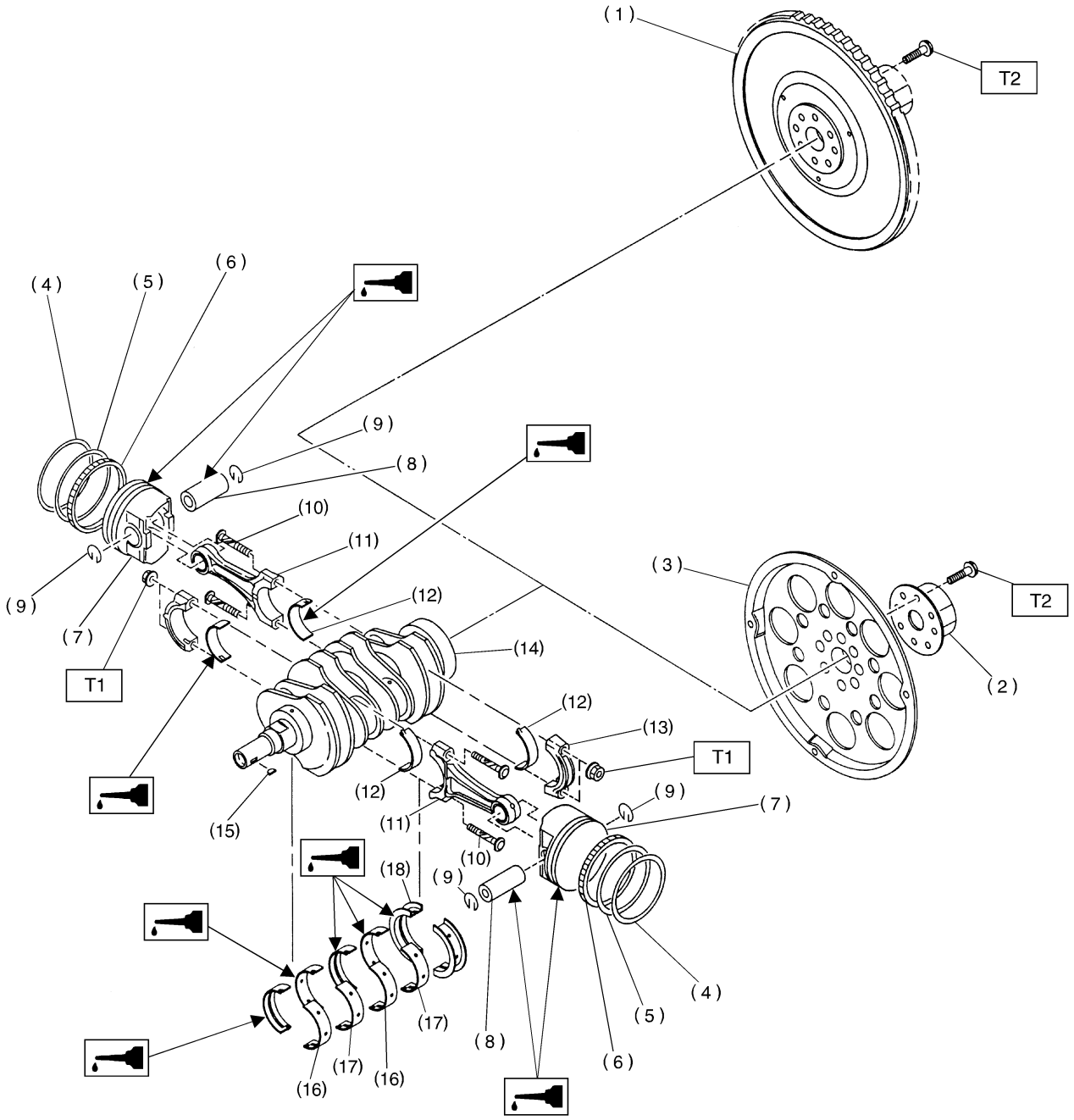
5. CYLINDER BLOCK S103001A0505



(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 (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 6.4 (0.65, 4.7)
T3: 10 (1.0, 7)
T4: 25 (2.5, 18.1)
T5: 47 (4.8, 34.7)
T6: 69 (7.0, 50.6)
T7: First 12 (1.2, 8.7)
Second 12 (1.2, 8.7)
T8: 16 (1.6, 11.6)
T9: 44 (4.5, 33)
T10: 25 (2.5, 18.1)
T11: 54 (5.5, 39.8)

6. CRANKSHAFT AND PISTON S103001A0506

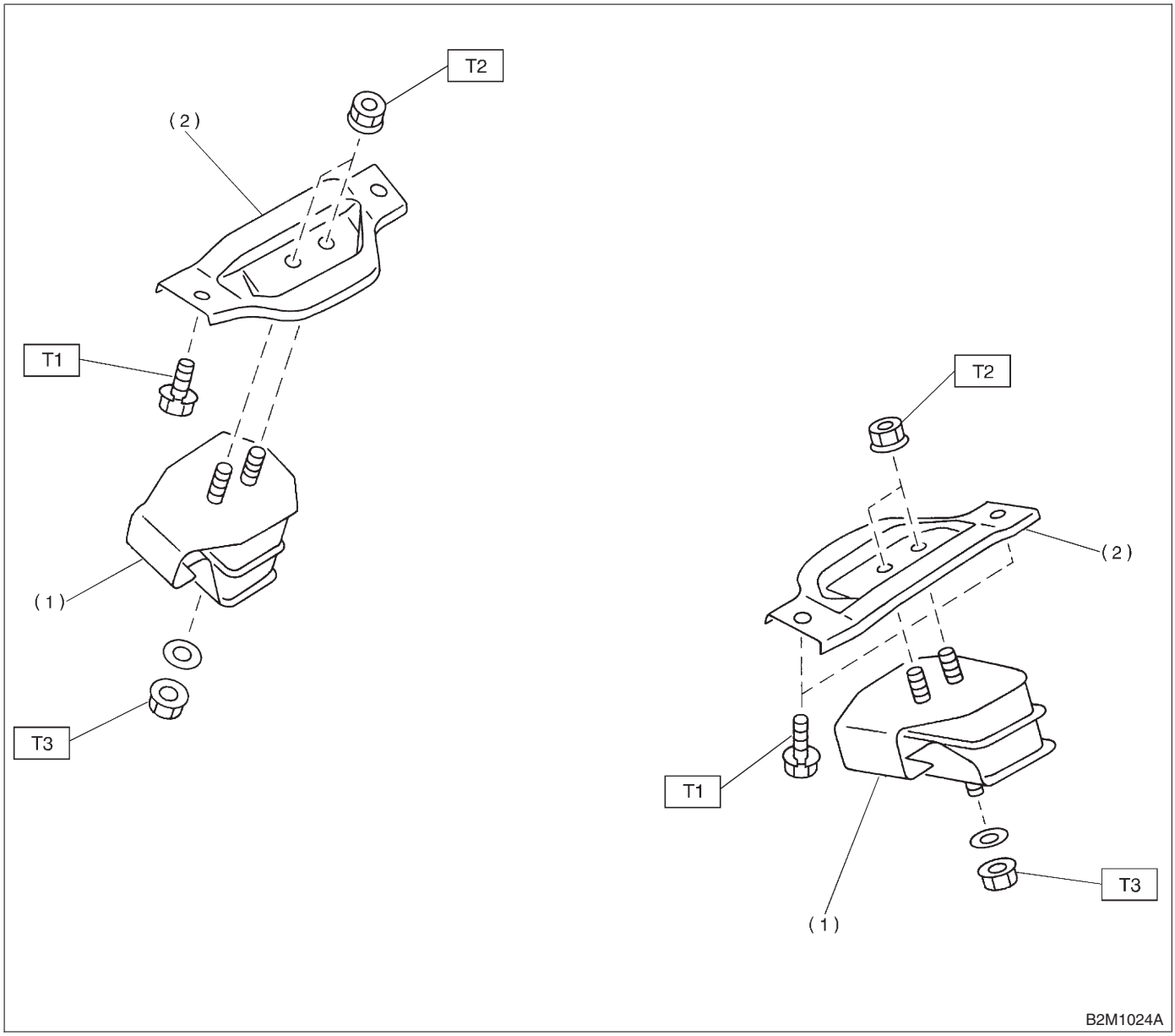


B2M3429A

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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 44.6 (4.55, 32.9)
T2: 72 (7.3, 52.8)

7. ENGINE MOUNTING S103001A0507



(1) Front cushion rubber
(2) Front engine mounting bracket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 34 (3.5, 25.3)
T2: 41 (4.2, 30)
T3: 83 (8.5, 61)

C: CAUTION S103001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.
- All parts should be thoroughly cleaned, paying special attention to the engine oil passages, pistons and bearings.
- Rotating parts and sliding parts such as piston, bearing and gear should be coated with oil prior to assembly.
- Be careful not to let oil, grease or coolant contact the timing belt, clutch disc and flywheel.
- All removed parts, if to be reused, should be reinstalled in the original positions and directions.
- Bolts, nuts and washers should be replaced with new ones as required.
- Even if necessary inspections have been made in advance, proceed with assembly work while making rechecks.
- Remove or install engine in an area where chain hoists, lifting devices, etc. are available for ready use.
- 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.
- Prior to starting work, prepare the following:
Service tools, clean cloth, containers to catch coolant and oil, wire ropes, chain hoist, transmission jacks, etc.
- Lift-up or lower the vehicle when necessary. Make sure to support the correct positions.

D: PREPARATION TOOL S103001A17

1. SPECIAL TOOLS S103001A1701

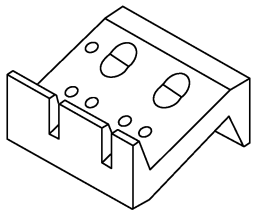
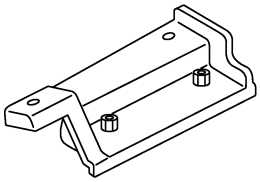
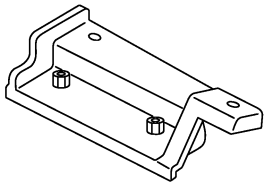
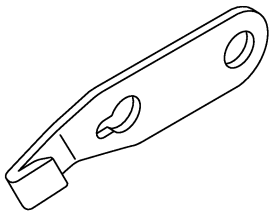
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3850	498267800	CYLINDER HEAD TABLE	• Used for replacing valve guides. • Used for removing and installing valve springs.
 B2M3851	498457000	ENGINE STAND ADAPTER RH	Used with ENGINE STAND (499817000).
 B2M3852	498457100	ENGINE STAND ADAPTER LH	Used with ENGINE STAND (499817000).
 B2M3853	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening and tightening crankshaft pulley bolt, etc.

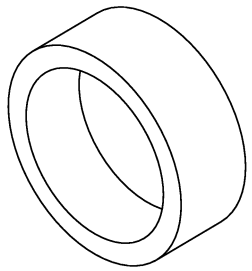
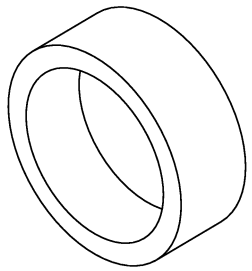
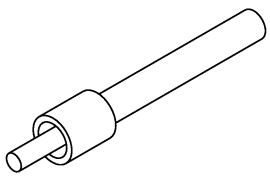
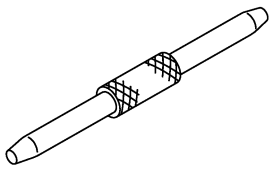
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3854	498747100	PISTON GUIDE	• Used for installing piston in cylinder. • For 2200 cc engine.
 B2M3854	498747300	PISTON GUIDE	• Used for installing piston in cylinder. • For 2500 cc engine.
 B2M3855	498857100	VALVE OIL SEAL GUIDE	Used for press-fitting of intake and exhaust valve guide oil seals.
 B2M3856	499017100	PISTON PIN GUIDE	Used for installing piston pin, piston and connecting rod.

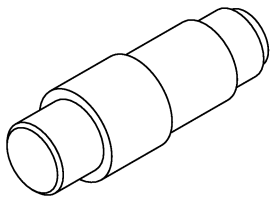
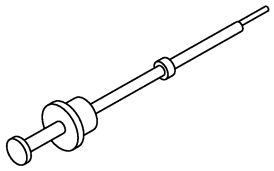
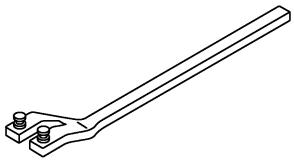
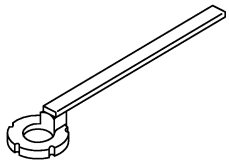
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3857	499037100	CONNECTING ROD BUSHING REMOVER & INSTALLER	Used for removing and installing connecting rod bushing.
 B2M3858	499097700	PISTON PIN REMOVER ASSY	Used for removing piston pin.
 B2M3859	499207100	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket (LH side).
 H5M0978	499207400	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket (RH side).

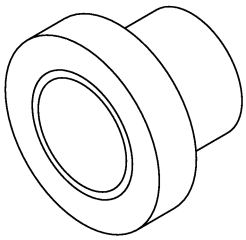
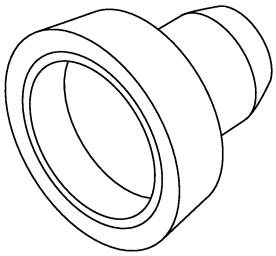
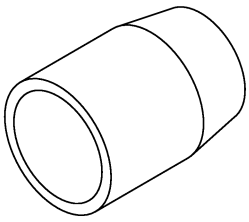
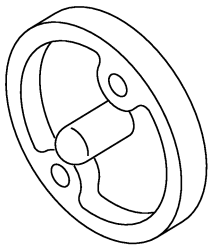
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3860	499587700	CAMSHAFT OIL SEAL INSTALLER	Used for installing cylinder head plug.
 B2M3861	499587200	CRANKSHAFT OIL SEAL INSTALLER	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL GUIDE (499597100).
 B2M3862	499597000	CAMSHAFT OIL SEAL GUIDE	• Used for installing camshaft oil seal. • Used with CAMSHAFT OIL SEAL INSTALLER (499587500).
 B2M3863	499597100	CRANKSHAFT OIL SEAL GUIDE	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL INSTALLER (499587200).

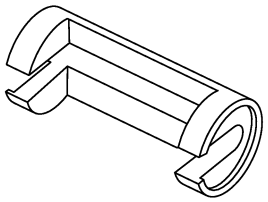
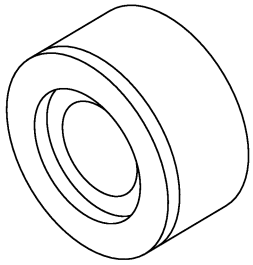
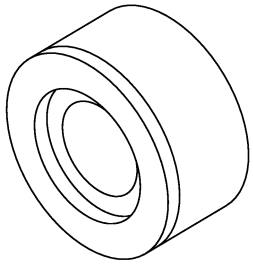
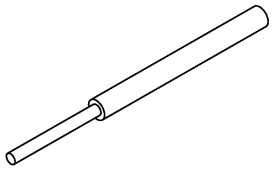
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3864	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.
 B2M3865	499767700	VALVE GUIDE ADJUSTER	Used for installing intake valve guides.
 B2M3865	499767800	VALVE GUIDE ADJUSTER	Used for installing exhaust valve guide.
 B2M3867	499767200	VALVE GUIDE REMOVER	Used for removing valve guides.

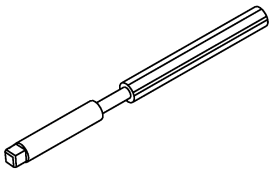
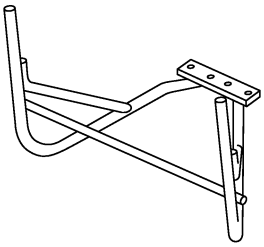
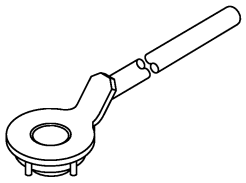
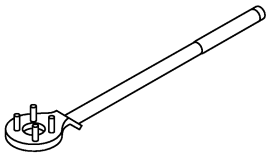
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3868	499767400	VALVE GUIDE REAMER	Used for reaming valve guides.
 B2M3869	499817100	ENGINE STAND	• Stand used for engine disassembly and assembly. • Used with ENGINE STAND ADAPTER RH (498457000) & LH (498457100).
 H5M0977	499977300	CRANK PULLEY WRENCH	• Used for stopping rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts. • For 2200 cc engine.
 B2M3870	499977100	CRANK PULLEY WRENCH	• Used for stopping rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts. • For 2500 cc engine

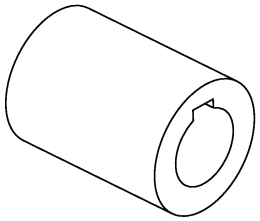
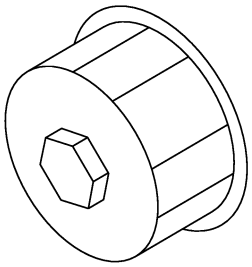
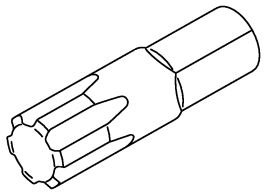
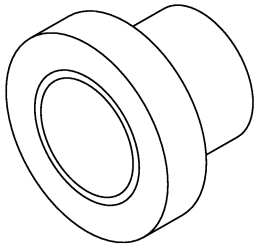
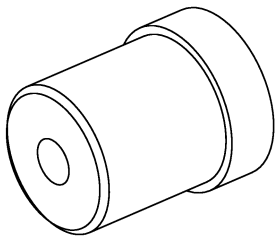
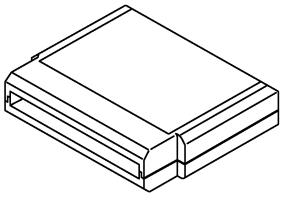
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3871	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 B2M3872	498547000	OIL FILTER WRENCH	Used for removing and installing oil filter.
 B2M3873	499497000	TORX PLUS	Used for removing and installing camshaft cap.
 B2M3874	499587500	OIL SEAL INSTALLER	Used for installing front camshaft oil seal.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3875	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.
 B2M3876	24082AA130	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA0202	SELECT MONITOR KIT	Troubleshooting for electrical systems. ● English: 22771AA020 (With printer) 22771AA030 (Without printer)

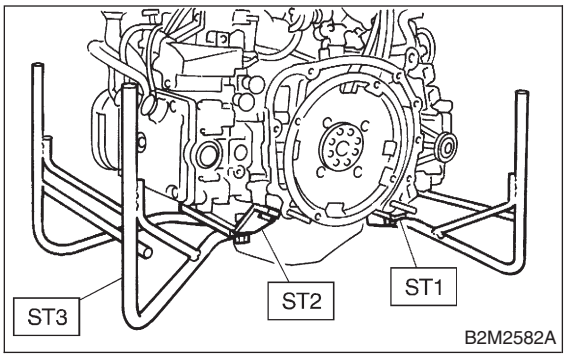
2. GENERAL PURPOSE TOOLS S103001A1702

TOOL NAME	REMARKS
Compression gauge	Used for measuring compression.
Tachometer (Secondary pick-up type)	Used for measuring idle speed.
Timing light	Used for measuring ignition timing.

E: PROCEDURE S103001E45

1) After removing the engine from the body, secure it in the ST shown below.

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

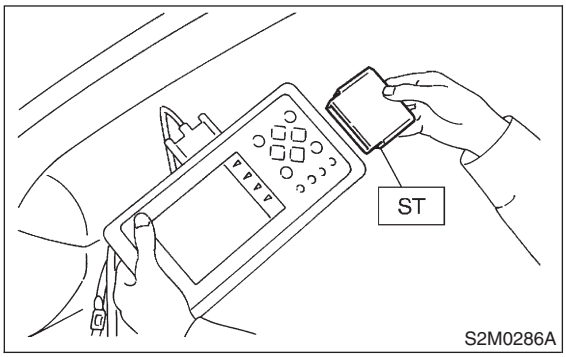
3. Idle Speed S103082

A: INSPECTION S103082A10

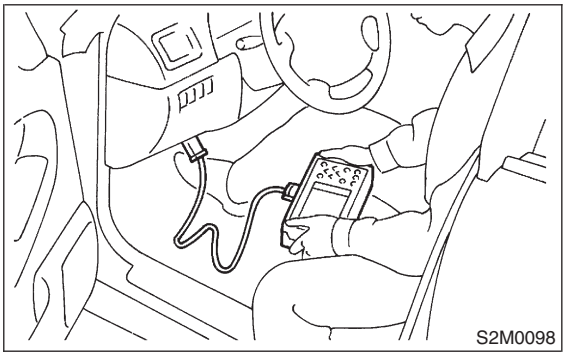
1) Before checking idle speed, check the following:
(1) Ensure that air cleaner element is free from clogging, ignition timing is correct, spark plugs are in good condition, and that hoses are connected properly.
(2) Ensure that malfunction indicator light (CHECK ENGINE light) does not illuminate.
2) Warm-up the engine.
3) Stop the engine, and turn ignition switch to OFF.
4) When using SUBARU SELECT MONITOR;

NOTE:
For detailed operation procedures, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

(1) Insert the cartridge to SUBARU SELECT MONITOR.

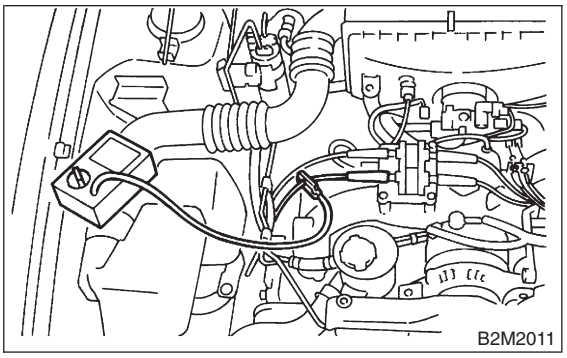


(2) Connect SUBARU SELECT MONITOR to the data link connector.
(3) Turn ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.
(4) Select {2. Each System Check} in Main Menu.
(5) Select {Engine Control System} in Selection Menu.
(6) Select {1. Current Data Display & Save} in Engine Control System 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):
650±100 rpm (MT model)
700±100 rpm (AT model)

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±50 rpm

CAUTION:
Never rotate idle adjusting screw. If idle speed is out of specifications, refer to General On-board Diagnosis Table under "EN" section. <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>

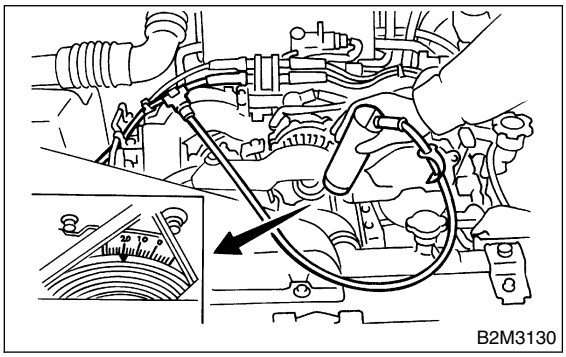
4. Ignition Timing S103086

A: INSPECTION S103086A10

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]:
10°±8°/650 (MT model)
15°±8°/700 (AT model)



If the timing is not correct, check the ignition control system.
Refer to “EN” section. <Ref. to EN-2 PROCEDURE, Basic Diagnostic Procedure.>

8. Preparation for Overhaul S103091

A: PROCEDURE S103091E45

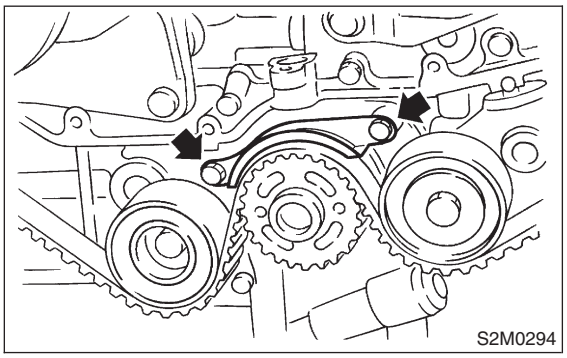
In this section the procedures described under each index are all connected and stated in order. It will be the complete procedure for overhauling of the engine itself when you go through all steps in the process.
Therefore, in this section, to conduct the particular procedure within the flow of a section, you need to go back and conduct the procedure described previously in order to do that particular procedure.

12. Timing Belt Assembly S103099

A: REMOVAL S103099A18

1. TIMING BELT S103099A1802

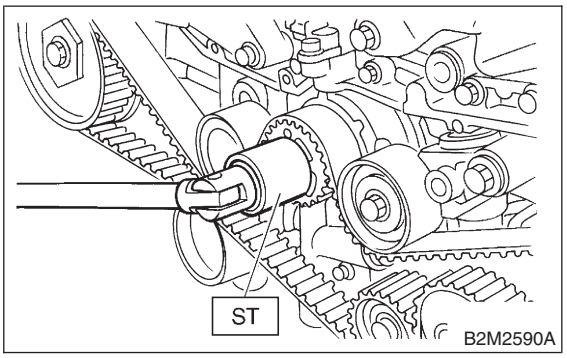
1) Remove timing belt guide. (MT vehicles only)

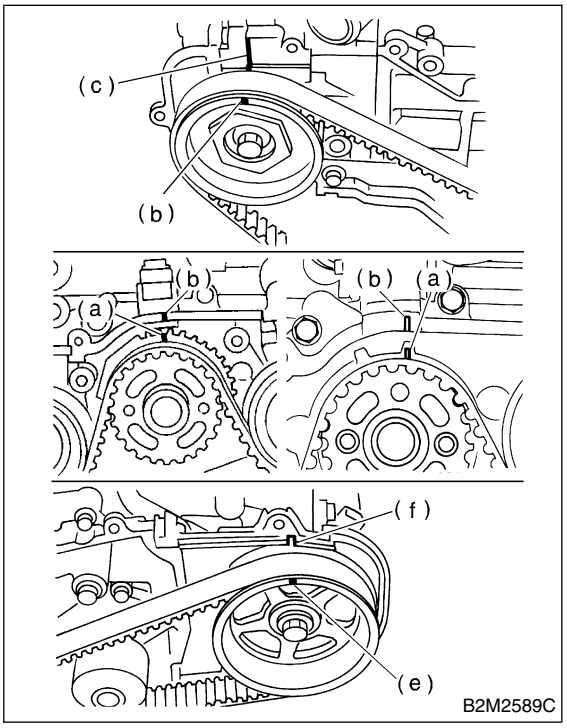


2) If alignment mark (a) and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as shown in procedures below.

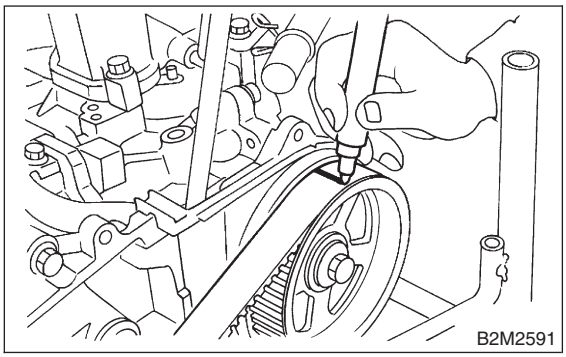
(1) Turn crankshaft using ST. Align mark (a) of sprocket to cylinder block notch (b) and ensure that right side cam sprocket mark (c), cam cap and cylinder head matching surface (d) and/or left side cam sprocket mark (e) and belt cover notch (f) are properly adjusted.

ST 499987500 CRANKSHAFT SOCKET

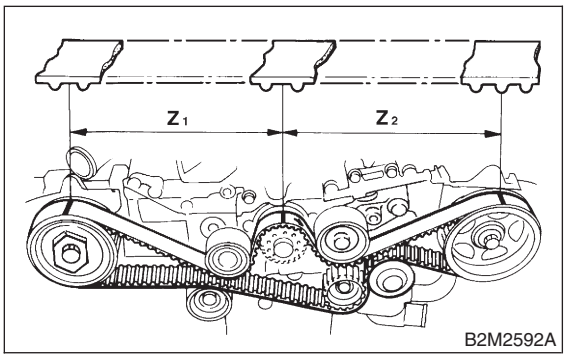




(2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the crank sprocket and cam sprockets.

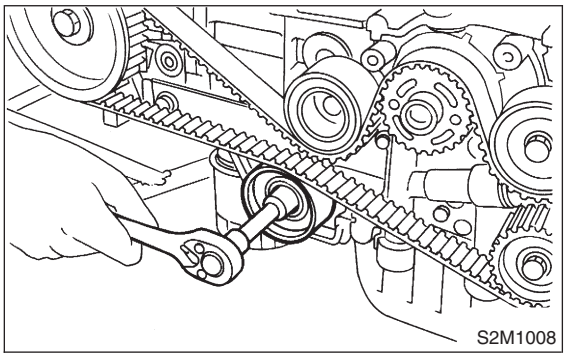

B2M2591

Specified data:
Z_1: 44 tooth length
Z_2: 40.5 tooth

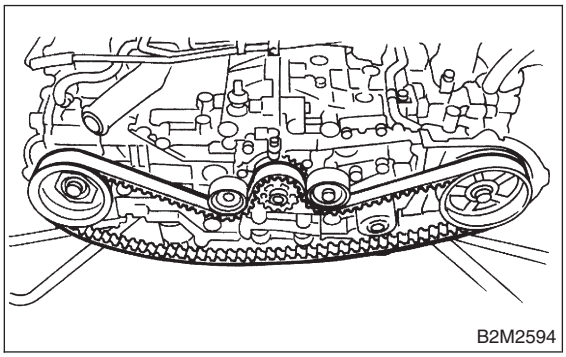


B2M2592A

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

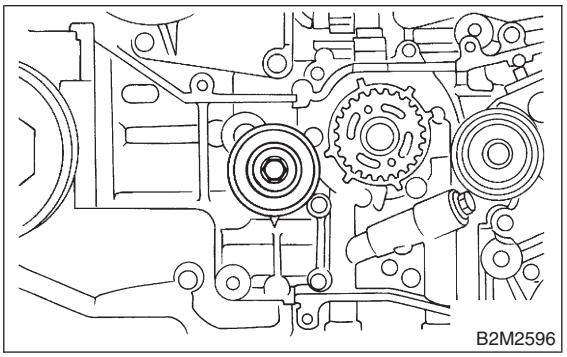

S2M1008

5) Remove timing belt.

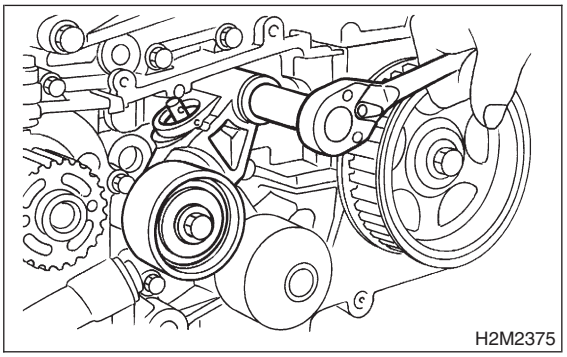

B2M2594

2. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY S103099A1803

1) Remove belt idler (No. 1).


B2M2596

2) Remove automatic belt tension adjuster assembly.


H2M2375

B: INSTALLATION S103099A11

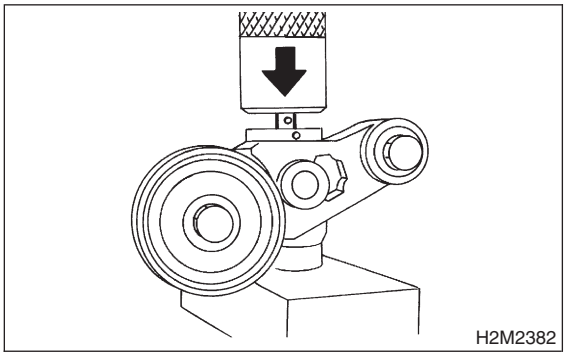
1. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER

S103099A1102

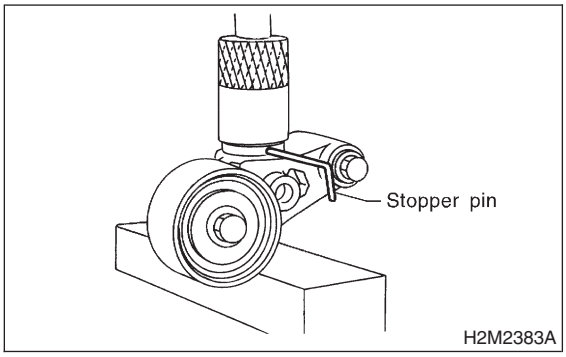
1) Preparation for installation of automatic belt tension adjuster assembly;

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 kgf, 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 kgf, 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 kgf, 66 lb) until the adjuster rod is aligned with the stopper pin hole in the cylinder.

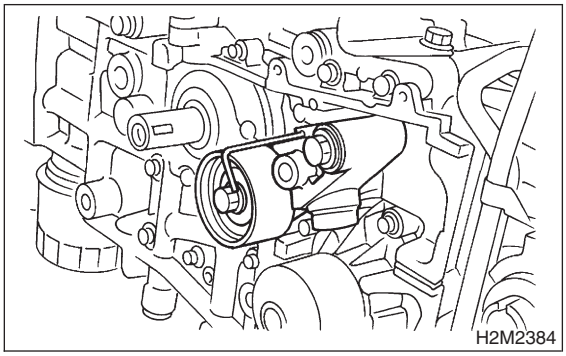


(3) With a 2 mm (0.08 in) dia. stopper pin or a 2 mm (0.08 in) (nominal) dia. hex bar wrench inserted into the stopper pin hole in the cylinder, secure the adjuster rod.



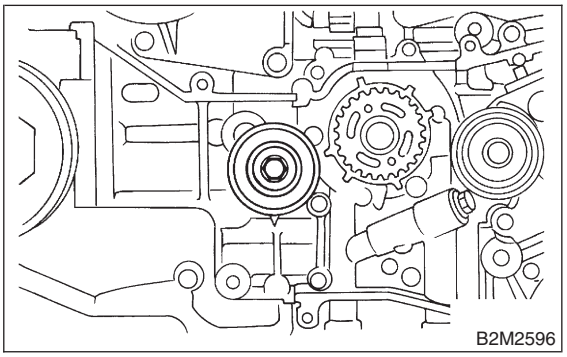
2) Install automatic belt tension adjuster assembly.

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)



3) Install belt idler (No. 1).

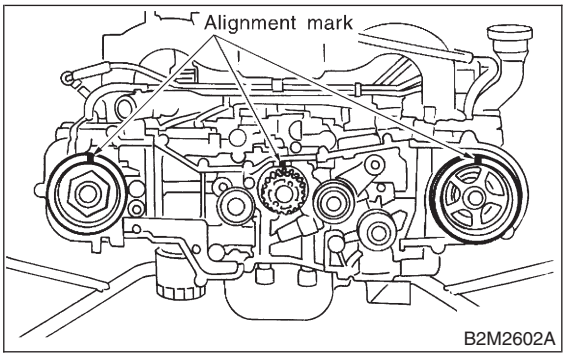
Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)



2. TIMING BELT S103099A1103

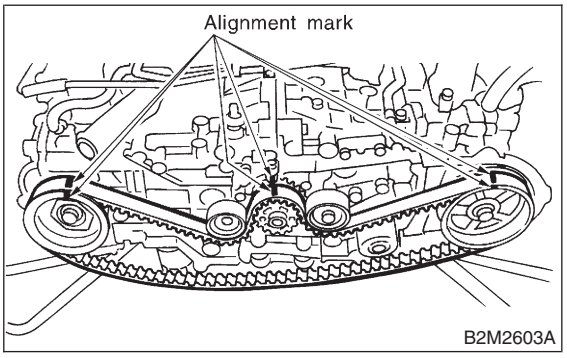
1) Installation of timing belt
(1) Turn camshaft sprocket No. 2 using ST1, and turn camshaft sprocket No. 1 using ST2 so that their alignment marks come to top positions.

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.

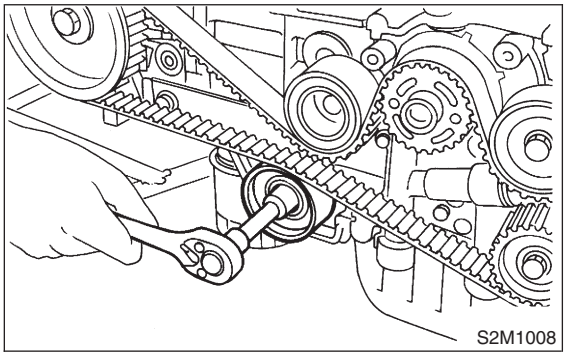


2) Install belt idler No. 2.

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

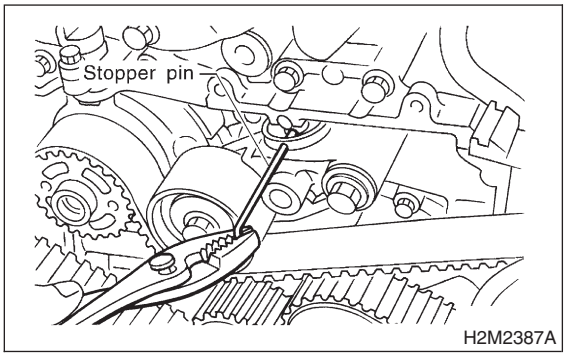
3) Install belt idler (No. 2).

Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

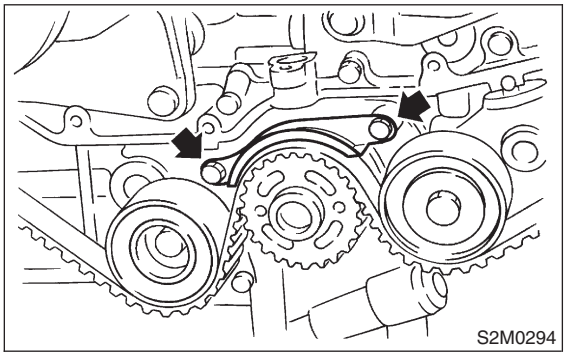


4) After ensuring that the marks on timing belt and camshaft sprockets are aligned, remove stopper pin from belt tensioner adjuster.

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

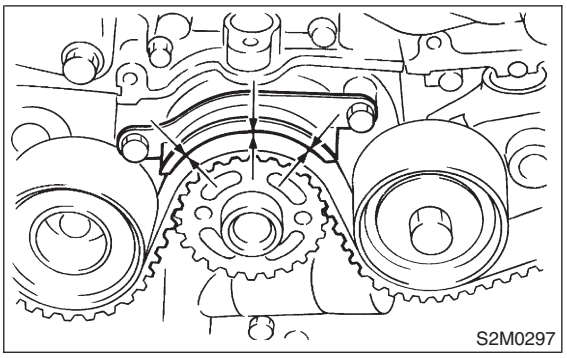


5) Install timing belt guide. (MT vehicles only)
(1) Temporarily tighten remaining bolts.



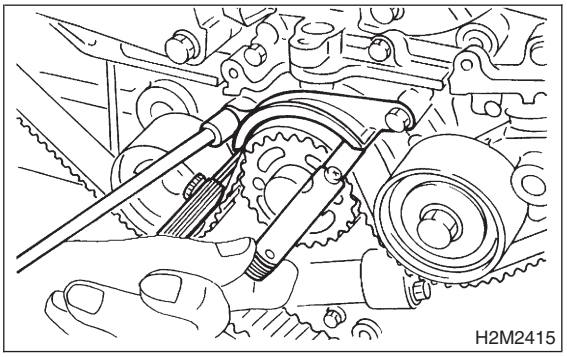
(2) Check and adjust clearance between timing belt and timing belt guide by using thickness gauge.

Clearance:
1.0±0.5 mm (0.039±0.020 in)



(3) Tighten remaining bolts.

Tightening torque:
9.8 N·m (1.0 kgf-m, 7.2 ft-lb)



C: INSPECTION S103099A10

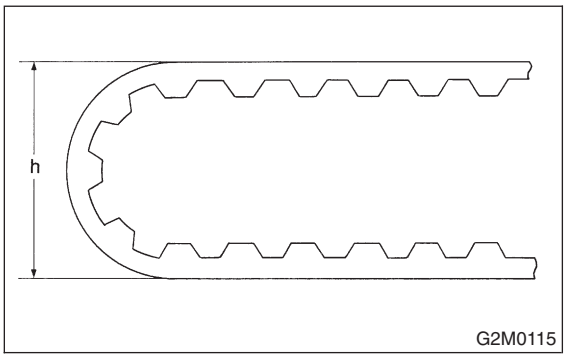
1. TIMING BELT S103099A1001

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 S103099A1002

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

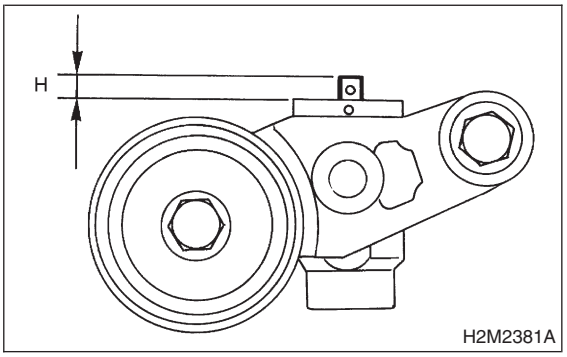
CAUTION:
Slight traces of oil at rod's oil seal does not indicate a problem.

2) Check that the adjuster rod does not move when a pressure of 294 N (30 kgf, 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 kgf, 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 kgf, 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 kgf, 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 S103099A1003

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.

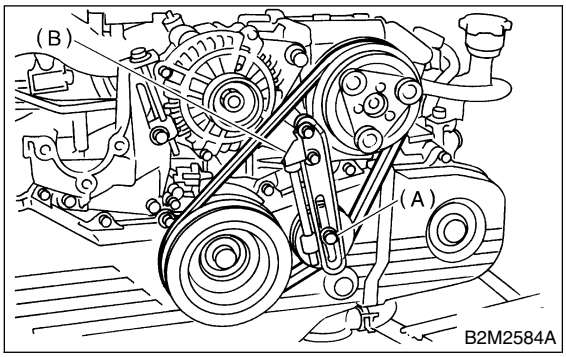
4. BELT IDLER S103099A1004

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.

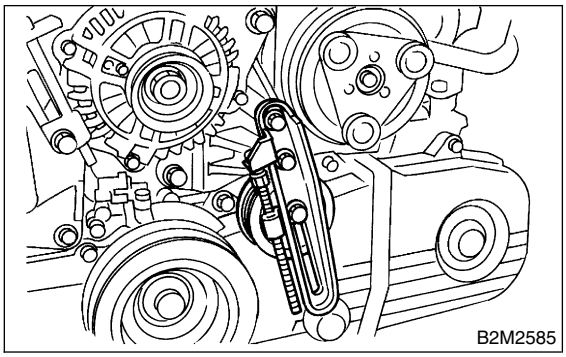
9. V-belt S103080

A: REMOVAL S103080A18

1) Loosen the lock nut (A).
2) Loosen the slider bolt (B).



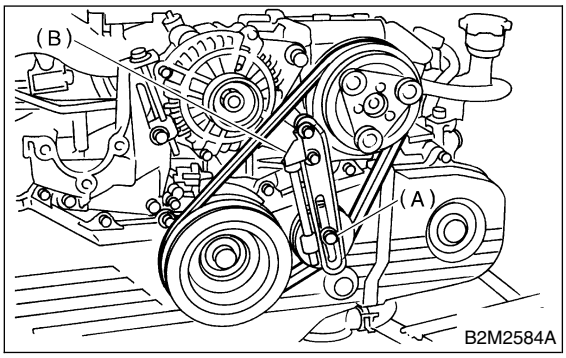
3) Remove the A/C belt.
4) Remove the A/C belt tensioner.



B: INSTALLATION S103080A11

1) Install a new belt, and tighten the slider bolt so as to obtain the specified belt tension. <Ref. to. ME-48 INSPECTION, V-belt.>
2) Tighten the slider bolt (B).
3) Tighten the lock nut (A).

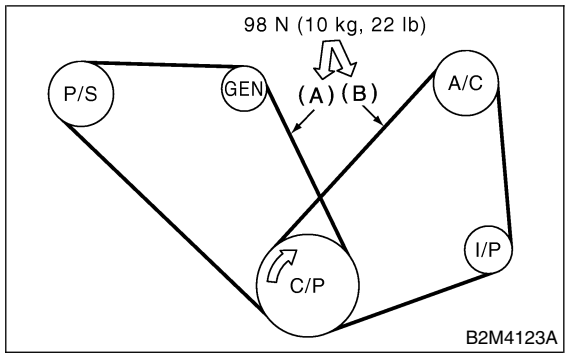
Tightening torque:
Lock nut (A);
22.6 N·m (2.3 kgf-m, 16.6 ft-lb)



C: INSPECTION S103080A10

1) Replace belts, if cracks, fraying or wear is found.
2) Check drive belt tension and adjust it if necessary by changing generator installing position and/or idler pulley installing position.

Belt tension
(A)
replaced: 7 — 9 mm (0.276 — 0.354 in)
reused: 9 — 11 mm (0.354 — 0.433 in)
(B)*
replaced: 7.5 — 8.5 mm (0.295 — 0.335 in)
reused: 9.0 — 10.0 mm (0.354 — 0.394 in)



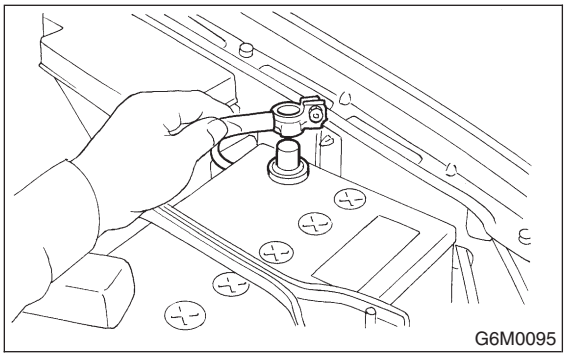
C/P Crankshaft pulley
GEN Generator
P/S Power steering oil pump pulley
A/C Air conditioning compressor pulley
I/P Idler pulley

5. Valve Clearance S103083

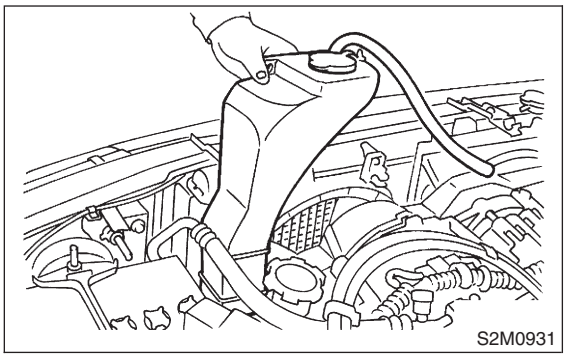
A: INSPECTION S103083A10

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

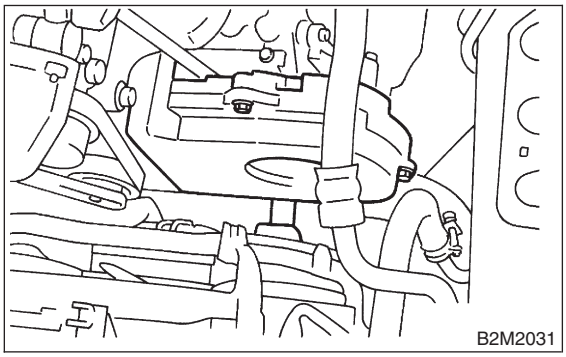
1) Set the vehicle onto the lift.
2) Disconnect battery ground cable.


G6M0095

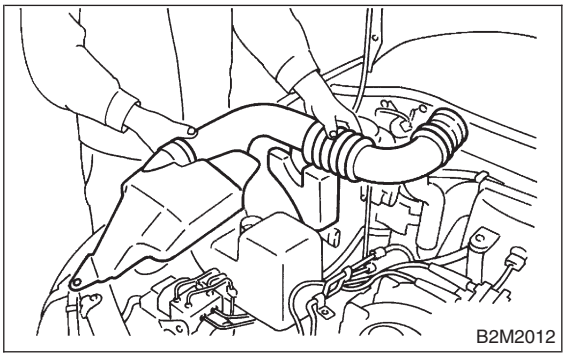
3) Remove engine coolant reservoir tank.
<Ref. to CO-25 REMOVAL, Reservoir Tank.>


S2M0931

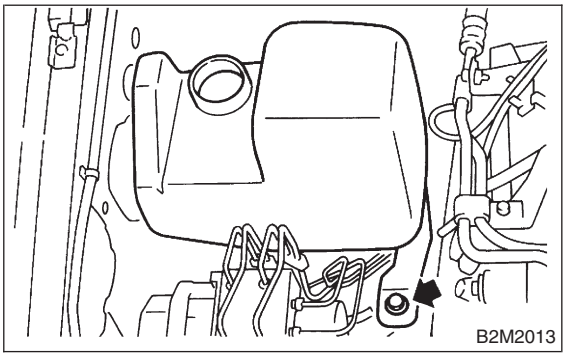
4) Remove timing belt cover (LH).


B2M2031

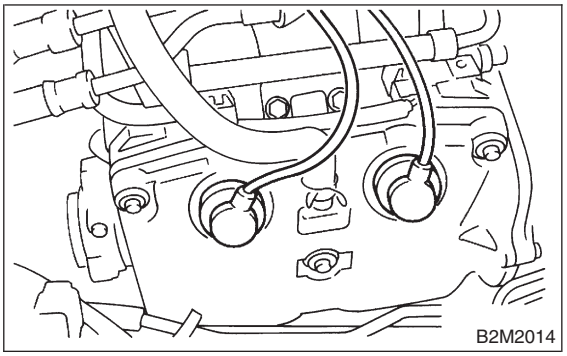
5) Remove rocker cover.
6) When inspecting #1 and #3 cylinders:
(1) Remove air intake duct as a unit.


B2M2012

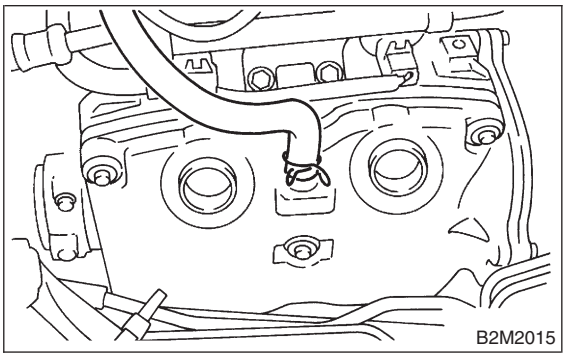
(2) Remove resonator chamber.


B2M2013

(3) Disconnect spark plug cords from spark plugs (#1 and #3 cylinders).

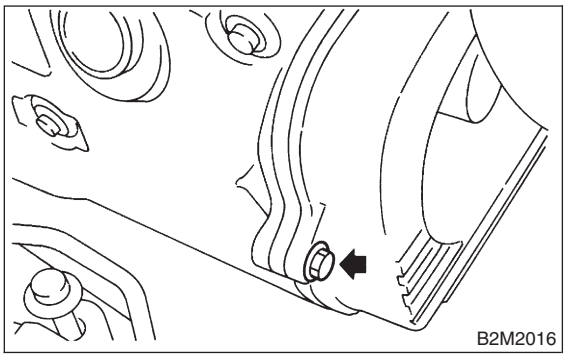

B2M2014

(4) Disconnect blow-by hose from rocker cover (RH).

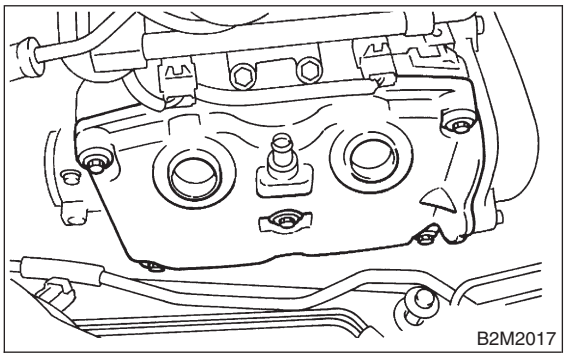

B2M2015

(5) Lift-up the vehicle.
(6) Remove under cover.

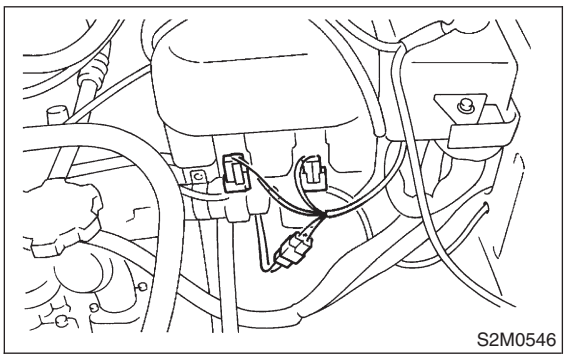
(7) Place suitable container under the vehicle.
(8) Lower the vehicle.
(9) Remove the timing belt cover (RH) bolt.


B2M2016

(10) Remove rocker cover bolts, then remove rocker cover (RH).

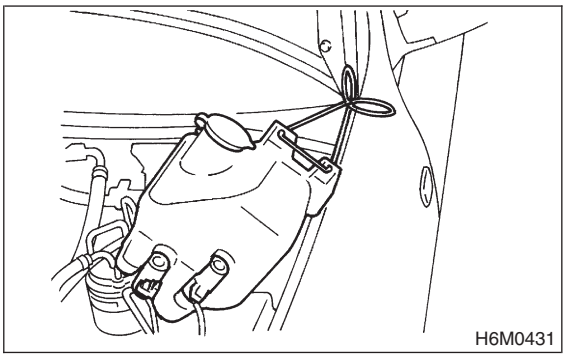

B2M2017

7) When inspecting #2 and #4 cylinders:
(1) Disconnect battery cables, and then remove battery and battery carrier.
(2) Disconnect front window washer motor connector.
(3) Disconnect rear gate glass washer motor connector. (Wagon only)

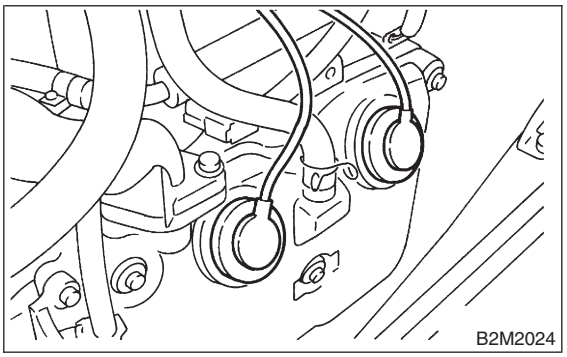

S2M0546

(4) Disconnect rear gate glass washer hose from washer motor, then plug connection with a suitable cap. (Wagon only)

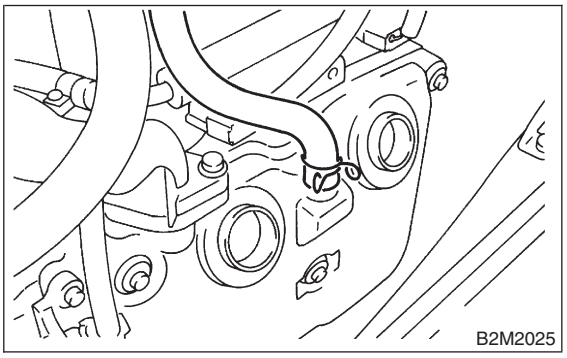
(5) Remove the two bolts which hold washer tank, then secure the tank away from working area.


H6M0431

(6) Disconnect spark plug cords from spark plugs (#2 and #4 cylinders).

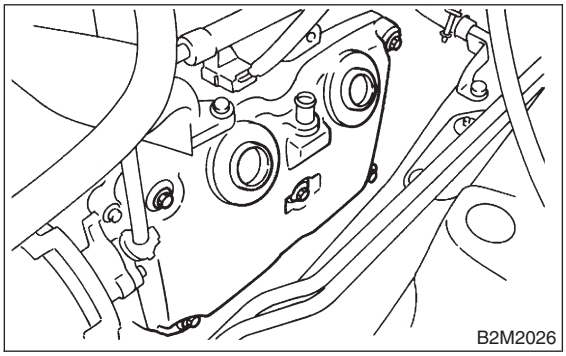

B2M2024

(7) Disconnect blow-by hose form rocker cover (LH).


B2M2025

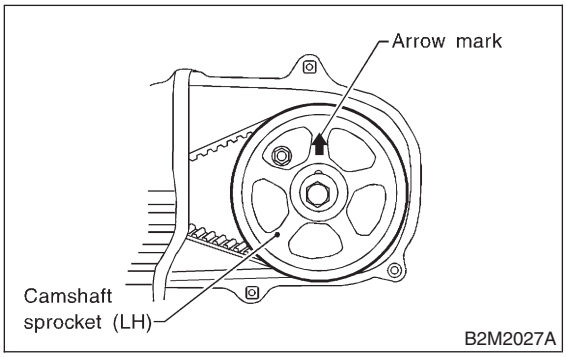
(8) Lift-up the vehicle.
(9) Remove under cover.
(10) Place suitable container under the vehicle.

(11) Remove rocker cover bolts, then remove rocker cover (LH).



8) Set #1 cylinder piston to top dead center of compression stroke by rotating crankshaft pulley clockwise.

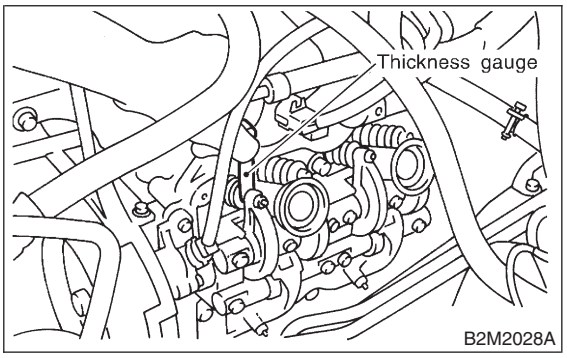
NOTE:
When arrow mark on camshaft sprocket (LH) comes exactly to the top, #1 cylinder piston is brought to the top dead center of the compression stroke.



9) Measure #1 cylinder valve clearance by using thickness gauge.

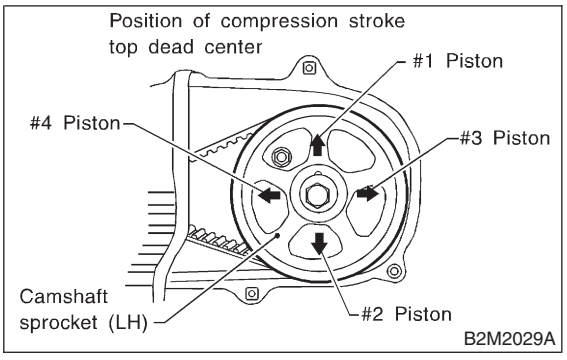
CAUTION:
● Insert the thickness gauge in at as horizontal a direction as a possible with respect to the valve stem end face.
● Measure exhaust valve clearances while lifting-up the vehicle.

Valve clearance:
Intake: 0.20±0.02 mm (0.0079±0.0008 in)
Exhaust: 0.25±0.02 mm (0.0098±0.0008 in)



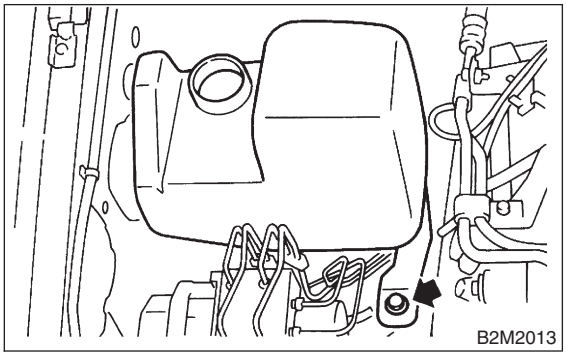
10) If necessary, adjust the valve clearance. <Ref. to ME-32 ADJUSTMENT, Valve Clearance.>
11) Similar to measurement procedures used for #1 cylinder, measure #2, #3 and #4 cylinder valve clearances.

NOTE:
● Be sure to set cylinder pistons to their respective top dead centers on the compression stroke before measuring valve clearances.
● To set #3, #2 and #4 cylinder pistons to their top dead centers on the compression stroke, turn crankshaft pulley clockwise 90° at a time starting with arrow mark on left-hand camshaft sprocket facing up.



12) After inspection, install the related parts in the reverse order of removal.

Tightening torque:
32 N·m (3.3 kgf-m, 24 ft-lb)

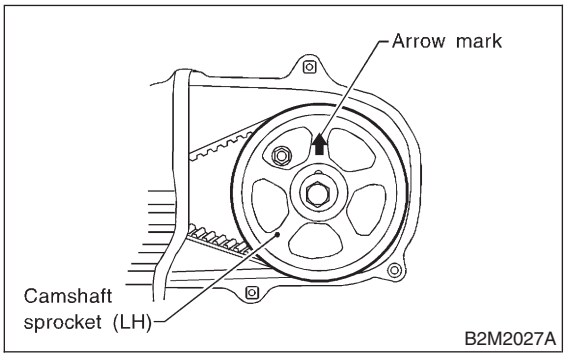


B: ADJUSTMENT S103083A01

CAUTION:
Adjustment of valve clearance should be performed while engine is cold.

1) Set #1 cylinder piston to top dead center of compression stroke by rotating crankshaft pulley clockwise.

NOTE:
When arrow mark on camshaft sprocket (LH) comes exactly to the top, #1 cylinder piston is brought to the top dead center of the compression stroke.

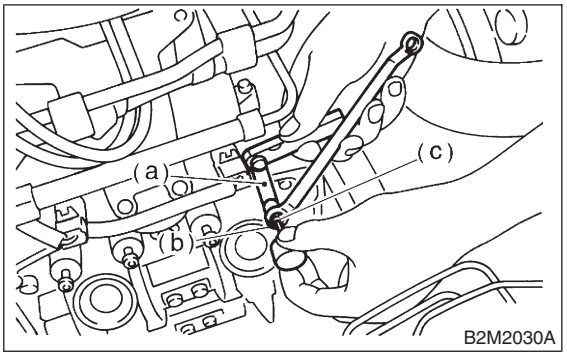


2) Adjust the #1 cylinder valve clearance.
(1) Loosen the valve rocker nut and screw.
(2) Place suitable thickness gauge.
(3) While noting valve clearance, tighten valve rocker adjust screw.
(4) When specified valve clearance is obtained, tighten valve rocker nut.

Tightening torque:
10 N·m (1.0 kgf-m, 7.2 ft-lb)

CAUTION:
• Insert the thickness gauge in at as horizontal a direction as possible with respect to the valve stem end face.
• Adjust exhaust valve clearances while lifting-up the vehicle.

Valve clearance:
Intake: 0.20±0.02 mm (0.0079±0.0008 in)
Exhaust: 0.25±0.02 mm (0.0098±0.0008 in)

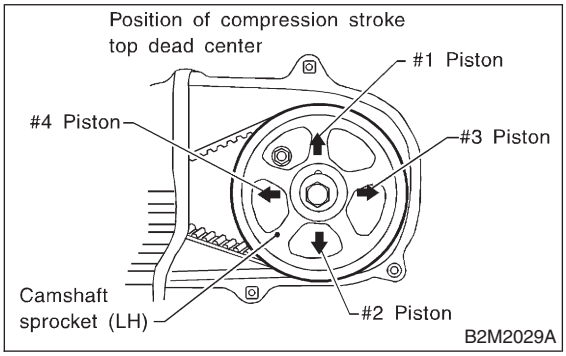


(a) Thickness gauge
(b) Valve rocker nut
(c) Valve rocker screw

3) Ensure that valve clearances are within specifications.
4) Turn crankshaft two complete rotations until #1 cylinder piston is again set to top dead center on compression stroke.
5) Ensure that valve clearances are within specifications. If necessary, re-adjust valve clearances.

6) Similar to adjustment procedures used for #1 cylinder, adjust #2, #3 and #4 cylinder valve clearances.

NOTE:
● Be sure to set cylinder pistons to their respective top dead centers on the compression stroke before adjusting valve clearances.
● To set #3, #2 and #4 cylinder pistons to their top dead centers on the compression stroke, turn crankshaft pulley clockwise 90° at a time starting with arrow mark on left-hand camshaft sprocket facing up.

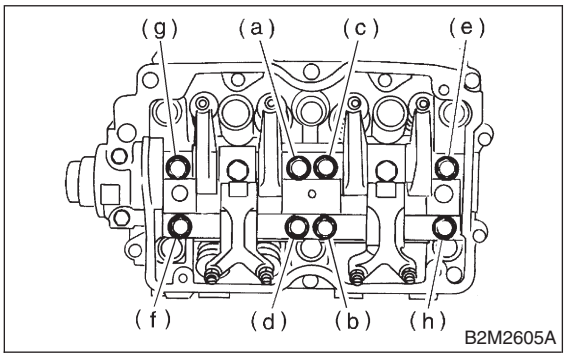


15. Valve Rocker Assembly S103094

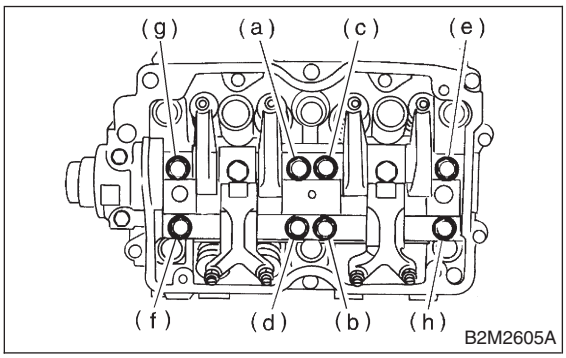
A: REMOVAL S103094A18

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

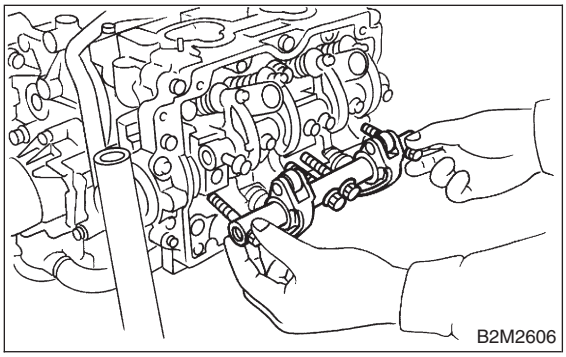
CAUTION:
Leave two or three threads of bolt (a) engaged to retain valve rocker assembly.



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



(3) Remove valve rocker assembly.



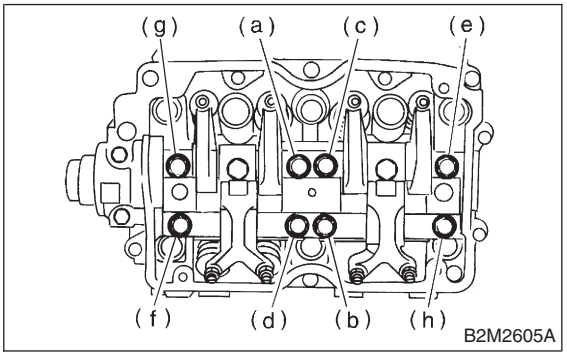
B: INSTALLATION S103094A11

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 N·m (2.5 kgf-m, 18.1 ft-lb)



2) Adjust the valve clearances. <Ref. to ME-32 ADJUSTMENT, Valve Clearance.>
3) Install rocker cover and connect PCV hose.

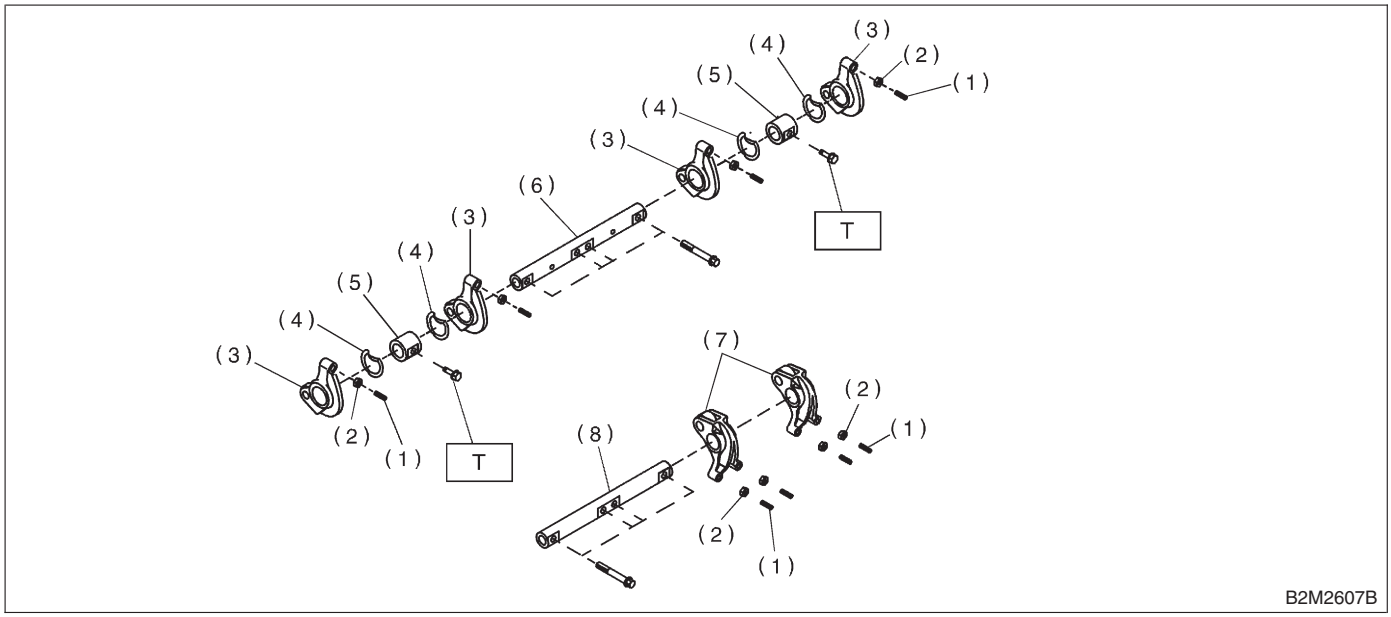
C: DISASSEMBLY S103094A06

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.

D: ASSEMBLY S103094A02



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

Tightening torque: N·m (kgf-m, ft-lb)
T: 5 (0.5, 3.6)

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 N·m (0.5 kgf-m, 3.6 ft-lb)

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

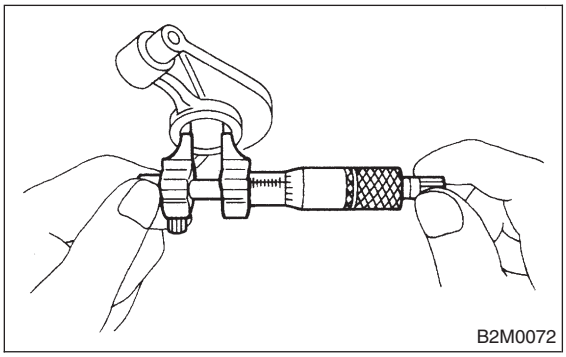
3) Install valve rocker shaft securing bolts.

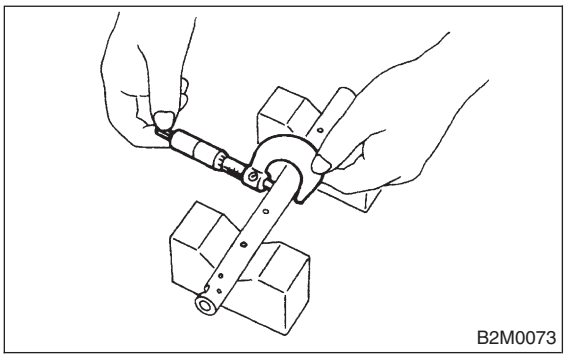
E: INSPECTION S103094A10

1. VALVE ROCKER ARM S103094A1002

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)


B2M0072


B2M0073

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.

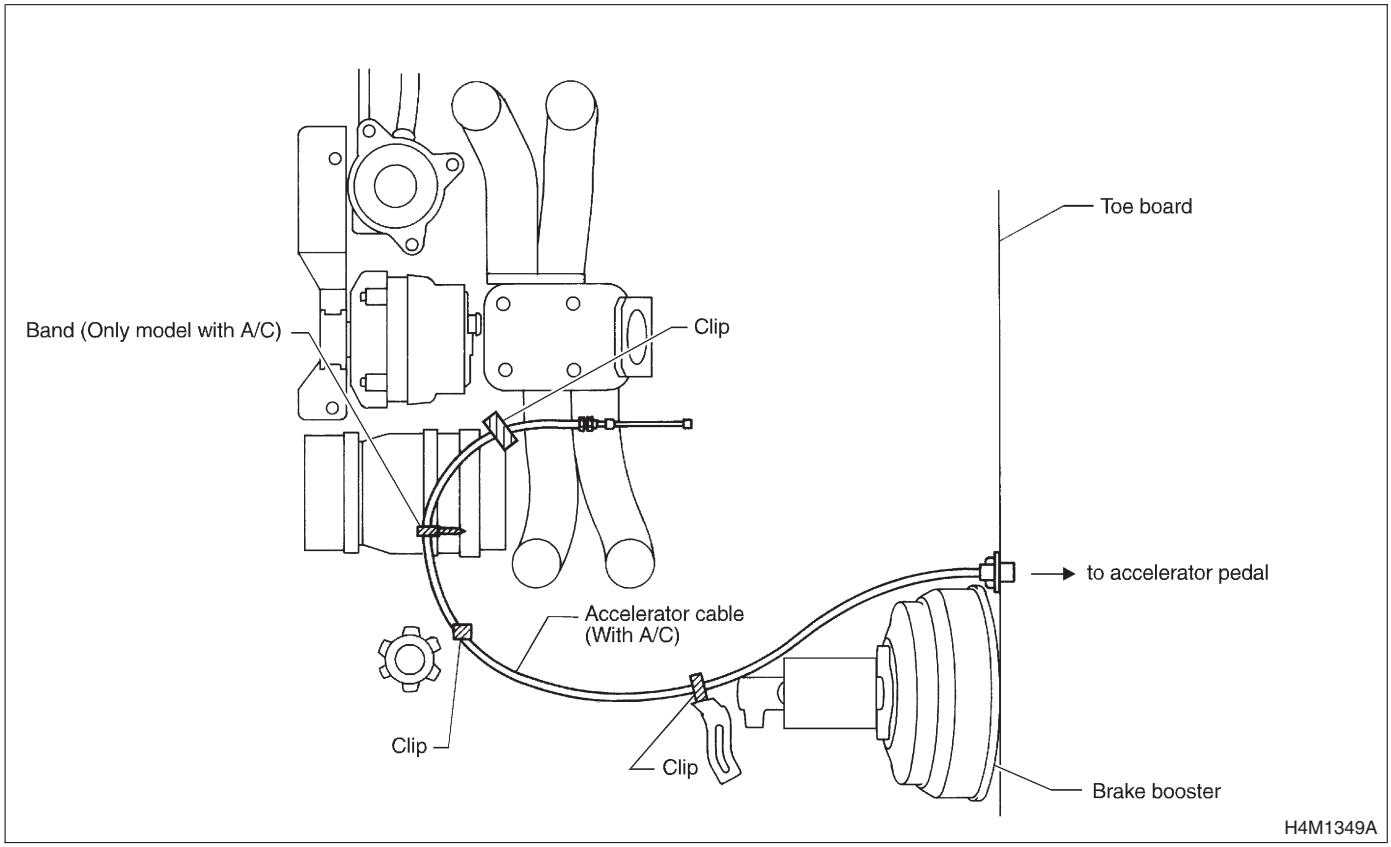
2. INTAKE AND EXHAUST VALVE ROCKER SHAFT S103094A1003

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

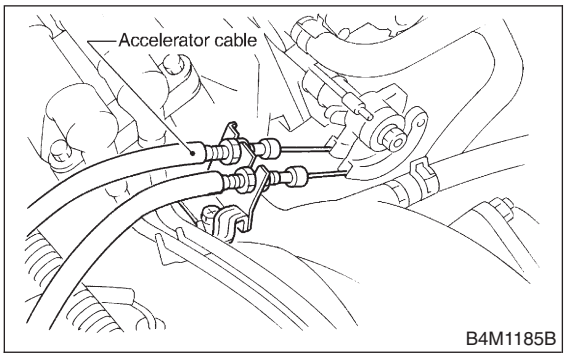
CAUTION:
Repair or replace valve rocker shaft as necessary.

3. Accelerator Pedal Cable S107007

A: REMOVAL S107007A18



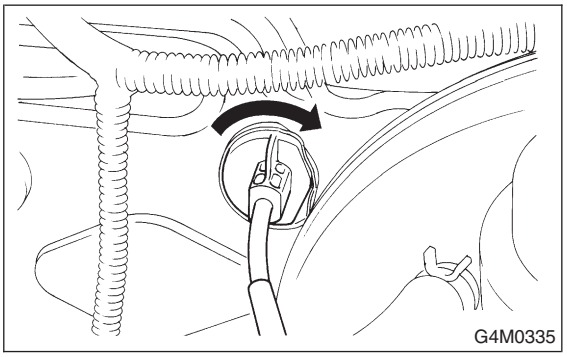
1) Disconnect accelerator cable from connector inside engine compartment first.
2) Remove lock nut from accelerator cable bracket.
3) Separate accelerator cable from bracket, then unlock inner cable.



4) Remove cable end from throttle cam using your fingertips.

CAUTION:
Be careful not to bend inner cable.

5) Disconnect cable end from accelerator cable bracket inside driver compartment.
6) Remove clip inside engine compartment.
7) Working inside engine compartment, remove cable connection by turning toe board clockwise.

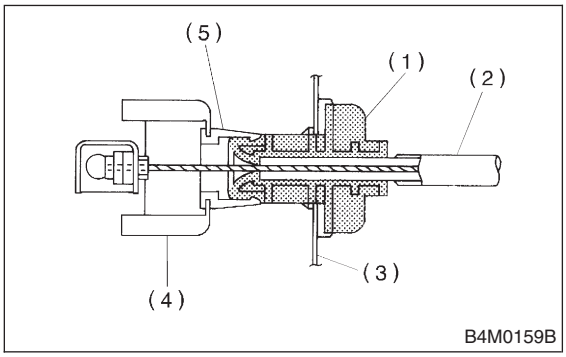


8) Pull out the cable from the toe board hole.

B: INSTALLATION S107007A11

1) Install in the reverse order of removal.

CAUTION:
- **Be careful not to kink accelerator cable.**
- **Make sure that holder and casing cap are securely connected.**



(1) Casing cap
(2) Accelerator cable
(3) Toe board
(4) Accelerator pedal bracket
(5) Holder

2) Inspect after cable installation. <Ref. to SP-6 INSPECTION, Accelerator Pedal Cable.>

C: INSPECTION S107007A10

1) Make sure the inner cable is not twisted or frayed.
2) Make sure the outer cable is not cracked.

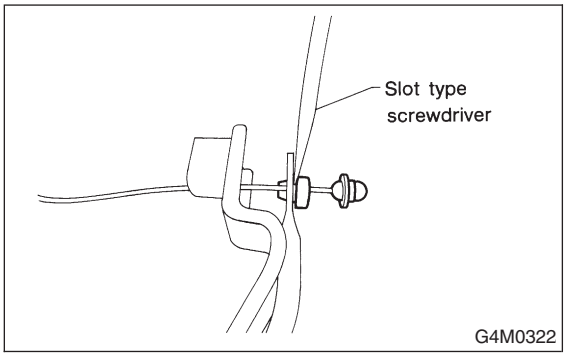
2. Accelerator Pedal S107005

A: REMOVAL S107005A18

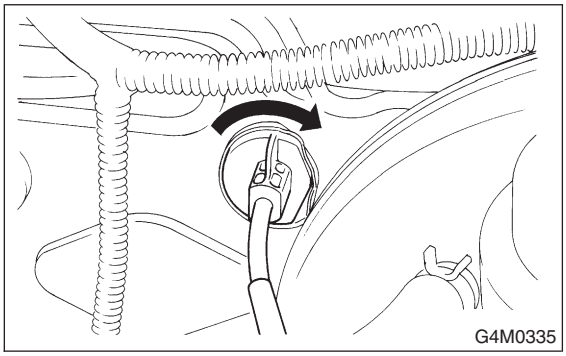
1) Disconnect ground cable from battery.
2) Disconnect accelerator cable from throttle body.

CAUTION:
Be careful not to kink accelerator cable.

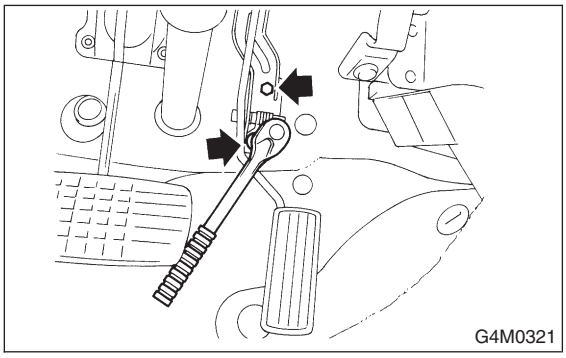
3) Remove instrument panel lower cover from instrument panel, and connector.
4) Disconnect accelerator cable from accelerator pedal lever.



5) Working inside engine compartment, remove casing cap out of the toe board by turning it clockwise.



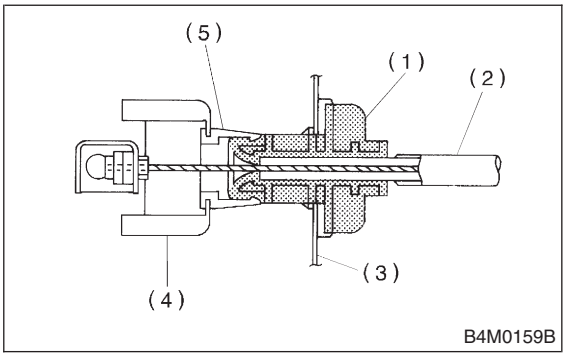
6) Pull out the cable from the toe board hole.
7) Remove accelerator pedal connecting bolt from accelerator pedal bracket.



B: INSTALLATION S107005A11

1) Install in the reverse order of removal.

CAUTION:
● Be careful not to bend clutch cable too much.
● Never fail to cover outer cable end with boot.
● Be careful not to kink accelerator cable.
● Make sure that holder and casing cap are securely connected.

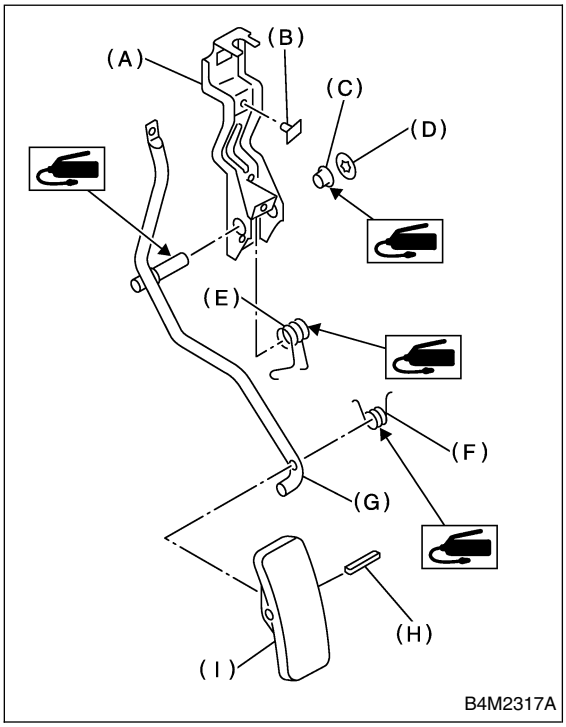


(1) Casing cap
(2) Accelerator cable
(3) Toe board
(4) Accelerator pedal bracket
(5) Holder

2) Adjust clutch pedal (2500 cc model) <Ref. to CL-24 ADJUSTMENT, Clutch Pedal.>
3) Inspect after pedal installation <Ref. to SP-4 INSPECTION, Accelerator Pedal.>

C: DISASSEMBLY S107005A06

1) Remove the clip, and then remove the accelerator pedal from the bracket.
2) Pull out the spring pin, and then remove the accelerator pedal from the accelerator pedal lever.



(A) Bracket
(B) Stopper
(C) Bushing
(D) Clip
(E) Accelerator spring
(F) Accelerator pedal spring
(G) Accelerator pedal lever
(H) Spring pin
(I) Accelerator pedal

D: ASSEMBLY S107005A02

Assemble in the reverse order of disassembly.

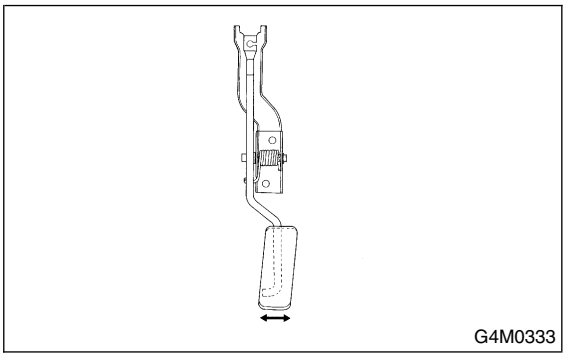
CAUTION:
Clean and apply grease to spacer and inside bore of a accelerator pedal.

E: INSPECTION S107005A10

Lightly move pedal pad in lateral the direction to ensure pedal deflection is in specified range.

CAUTION:
If excessive deflection is noted, replace bushing and clip with new ones.

Deflection of accelerator pedal:
Service limit
5.0 mm (0.197 in) or less

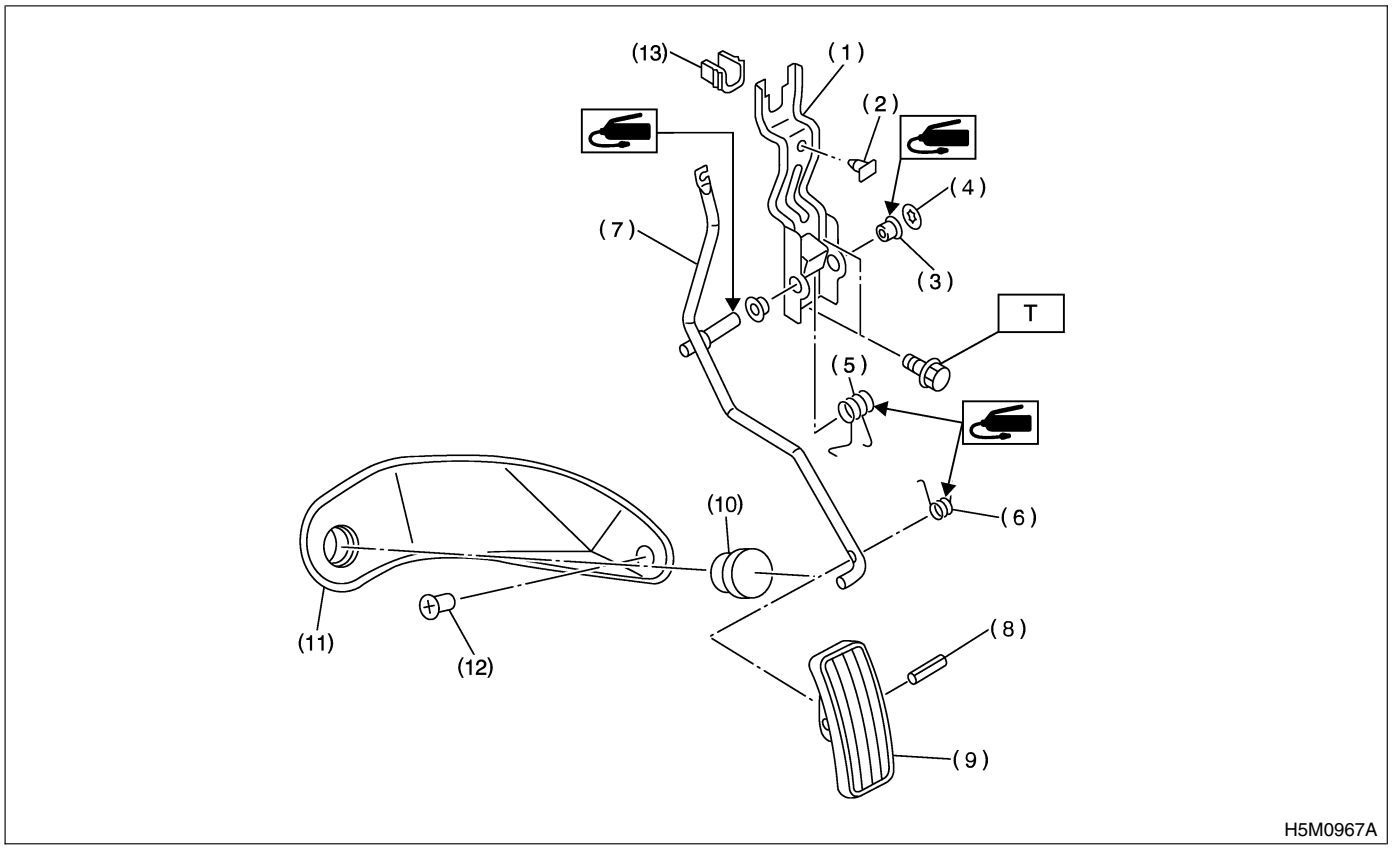


1. General Description S107001

A: SPECIFICATIONS S107001E49

Accelerator pedal	Free play	At pedal pad	1 — 4 mm (0.04 — 0.16 in)
	Stroke	At pedal pad	50 — 55 mm (1.97 — 2.17 in)

B: COMPONENT S107001A05



(1) Accelerator bracket
(2) Stopper
(3) Bushing
(4) Clip
(5) Accelerator spring
(6) Accelerator pedal spring
(7) Accelerator pedal lever
(8) Spring pin
(9) Accelerator pedal
(10) Accelerator stopper
(11) Accelerator plate
(12) Clip
(13) Holder

Tightening torque: N·m (kgf-m, ft-lb)
T: 18 (1.8, 13.0)

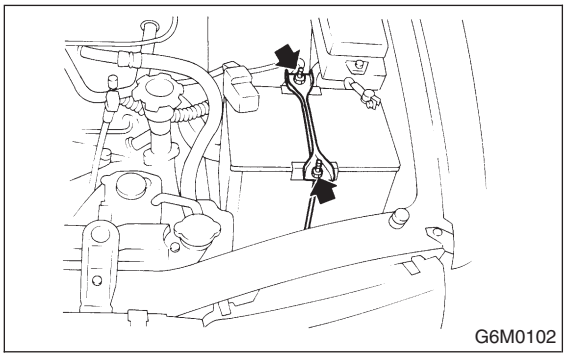
C: CAUTION S107001A03

- Wear work clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination, including dirt and corrosion, before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

4. Battery S109011

A: REMOVAL S109011A18

1) Disconnect the positive (+) terminal after disconnecting the negative (–) terminal of battery.
2) Remove flange nuts from battery rods and take off battery holder.


G6M0102

3) Remove battery.

B: INSTALLATION S109011A11

Install in the reverse order of removal.

Tightening torque:
3.4 N·m (0.35 kgf-m, 2.5 ft-lb)

NOTE:
● Clean battery cable terminals and apply grease to retard the formation of corrosion.
● Connect the positive (+) terminal of battery and then the negative (–) terminal of the battery.

C: INSPECTION S109011A10

WARNING:
● Electrolyte has toxicity; be careful handling the fluid.
● Avoid contact with skin, eyes or clothing. Especially at contact with eyes, blush with water for 15 minutes and get prompt medical attention.
● Batteries produce explosive gasses. Keep sparks, flame, cigarettes away.
● Ventilate when charging or using in enclosed space.
● For safety, in case an explosion does occur, wear eye protection or shield your eyes when working near any battery. Never lean over a battery.
● Do not let battery fluid contact eyes, skin, fabrics, or paint-work because battery fluid is corrosive acid.
● To lessen the risk of sparks, remove rings, metal watch-bands, and other metal jewelry. Never allow metal tools to contact the positive battery terminal and anything connected to it while you are at the same time in contact with any other metallic portion of the vehicle because a short circuit will be caused.

1. EXTERNAL PARTS S109011A1001

Check for the existence of dirt or cracks on the battery case, top cover, vent plugs, and terminal posts. If necessary, clean with water and wipe with a dry cloth. Apply a thin coat of grease on the terminal posts to prevent corrosion.

2. ELECTROLYTE LEVEL S109011A1002

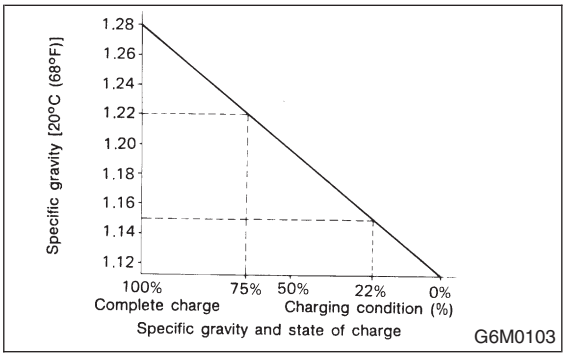
Check the electrolyte level in each cell. If the level is below MIN LEVEL, bring the level to MAX LEVEL by pouring distilled water into the battery cell. Do not fill beyond MAX LEVEL.

3. SPECIFIC GRAVITY OF ELECTROLYTE

S109011A1003

1) Measure specific gravity of electrolyte using a hydrometer and a thermometer. Specific gravity varies with temperature of electrolyte so that it must be corrected at 20°C (68°F) using the following Equation:

S_{20} = St + 0.0007 x (t – 20)
S_{20}:Specific gravity corrected at electrolyte temperature of 20°C
St :Measured specific gravity
t :Measured temperature (°C)
Determine whether or not battery must be charged, according to corrected specific gravity.
Standard specific gravity: 1.220 — 1.290 [at 20°C (68°F)]



G6M0103

2) Measuring the specific gravity of the electrolyte in the battery will disclose the state of charge of the battery. The relation between the specific gravity and the state of charge is as shown in figure.

D: MEASUREMENT S109011A14

WARNING:
• Do not bring an open flame close to the battery at this time.

CAUTION:
• Prior to charging, corroded terminals should be cleaned with a brush and common baking soda solution.
• Be careful since battery electrolyte overflows while charging the battery.
• Observe instructions when handling battery charger.
• Before charging the battery on vehicle, disconnect battery ground terminal. Failure to follow this rule may damage alternator's diodes or other electrical units.

1. JUDGMENT OF BATTERY IN CHARGED CONDITION S109011A1401

1) Specific gravity of electrolyte is held at a specific value in a range from 1.250 to 1.290 for more than one hour.
2) Voltage per battery cell is held at a specific value in a range from 2.5 to 2.8 volts for more than one hour.

2. CHECK HYDROMETER FOR STATE OF CHARGE S109011A1402

Hydrometer indicator	State of charge	Required action
Green dot	Above 65%	Load test
Dark dot	Below 65%	Charge battery
Clear dot	Low electrolyte	Replace battery* (If cranking complaint)
*: Check electrical system before replacement.		

3. NORMAL CHARGING S109011A1403

Charge the battery at current value specified by manufacturer or at approximately 1/10 of battery's ampere-hour rating.

4. QUICK CHARGING S109011A1404

Quick charging is a method in which the battery is charged in a short period of time with a relatively large current by using a quick charger. Since a large current flow raises electrolyte temperature, the battery is subject to damage if the large current is used for prolonged time. For this reason, the quick charging must be carried out within a current range that will not increase the electrolyte temperature above 40°C (104°F). It should be also remembered that the quick charging is a temporary means to bring battery voltage up to a fair value and, as a rule, a battery should be charged slowly with a low current.

CAUTION:
• Observe the items in 1. NORMAL CHARGING.
• Never use more than 10 amperes when charging the battery because that will shorten battery life.

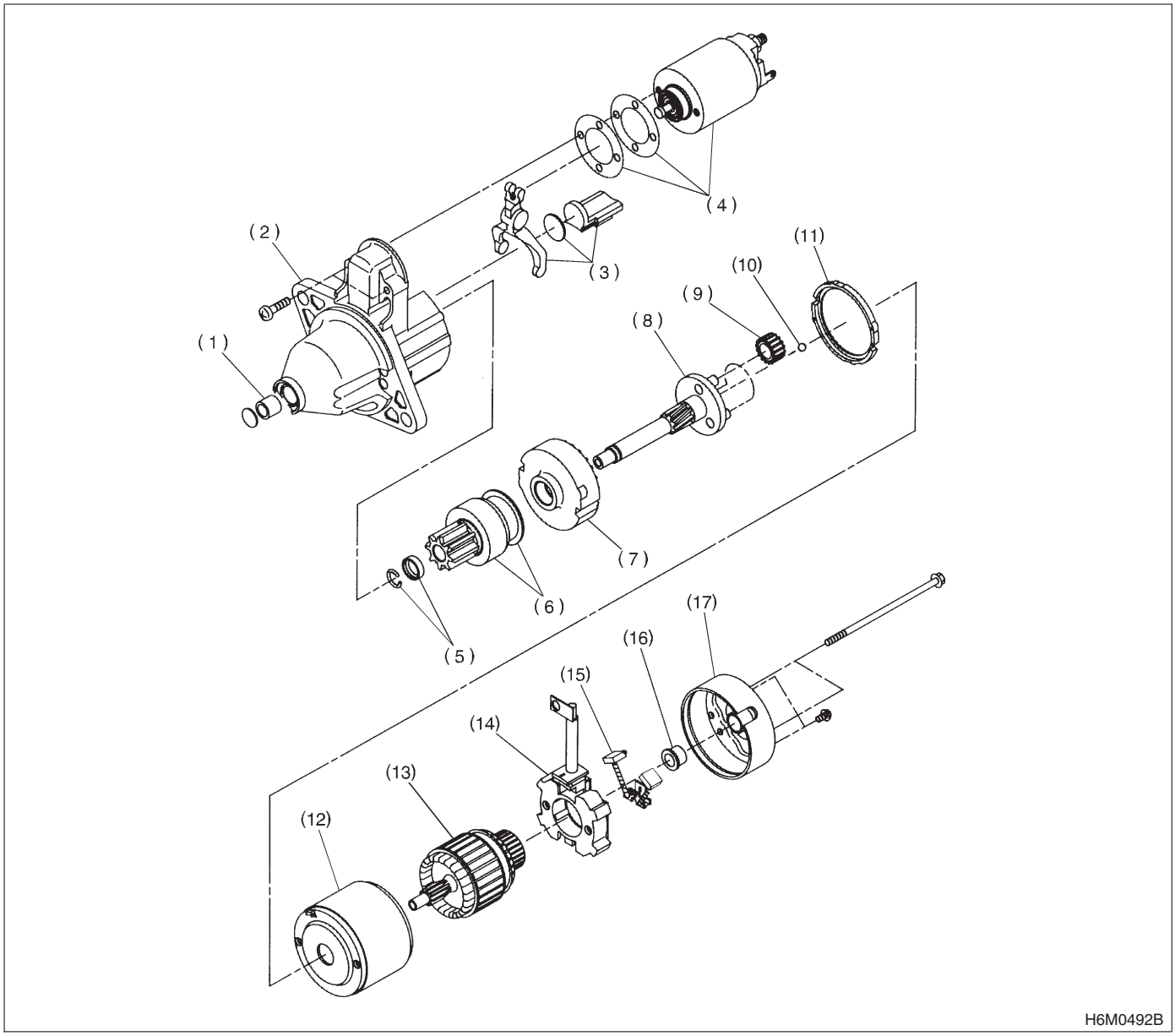
1. General Description S109001

A: SPECIFICATIONS S109001E49

Item			Designation	
Starter	Type		Reduction type	
	Model		MT M000T81681	AT M001T84481
	Manufacturer		MITSUBISHI	
	Voltage and output		12 V — 1.0 kW	12 V — 1.4 kW
	Direction of rotation		Counterclockwise (when observed from pinion)	
	Number of pinion teeth		8	9
	No-load characteristics	Voltage	11 V	
		Current	90 A or less	
		Rotating speed	3,000 rpm or more	
	Load characteristics	Voltage	8 V	7.7 V
		Current	280 A or less	300 A or less
		Torque	8.5 N·m (0.87 kgf-m, 6.27 ft-lb)	9.8 N·m (1.00 kgf-m, 7.24 ft-lb)
		Rotating speed	980 rpm or more	1,000 rpm or more
	Lock characteristics	Voltage	4 V	
		Current	780 A or less	980 A or less
		Torque	17.6 N·m (1.80 kgf-m, 13.0 ft-lb) or more	23 N·m (2.3 kgf-m, 17 ft-lb) or more
Generator	Type		Rotating-field three-phase type, Voltage regulator built-in type	
	Model		A2TB2991	
	Manufacturer		MITSUBISHI	
	Voltage and output		12 V — 75 A	
	Polarity on ground side		Negative	
	Rotating direction		Clockwise (when observed from pulley side)	
	Armature connection		3-phase Y-type	
	Output current		1,500 rpm — 30 A or more 2,500 rpm — 64 A or more 5,000 rpm — 76 A or more	
	Regulated voltage		$14.5^{+0.3}/_{-0.4}$ V [20°C (68°F)]	

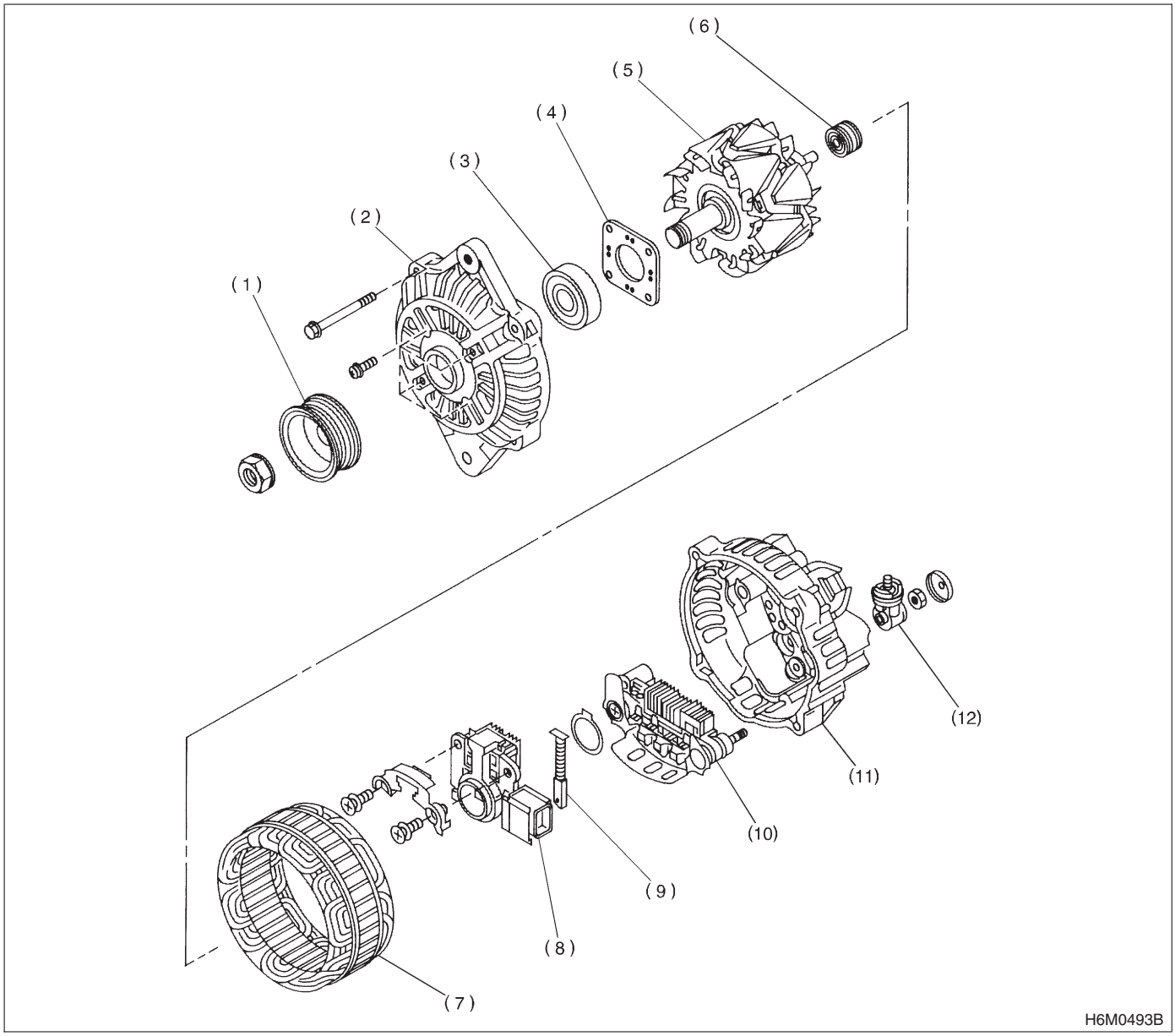
B: COMPONENT S109001A05

1. STARTER S109001A0501



(1) Sleeve bearing
(2) Front bracket
(3) Lever set
(4) Magnet switch ASSY
(5) Stopper set
(6) Over running clutch
(7) Internal gear ASSY
(8) Shaft ASSY
(9) Gear ASSY
(10) Ball
(11) Packing
(12) Yoke
(13) Armature
(14) Brush holder
(15) Brush
(16) Sleeve bearing
(17) Rear bracket

2. GENERATOR S109001A0502



(1) Pulley
(2) Front cover
(3) Ball bearing
(4) Bearing retainer
(5) Rotor
(6) Bearing
(7) Stator coil
(8) IC regulator with brush
(9) Brush
(10) Rectifier
(11) Rear cover
(12) Terminal

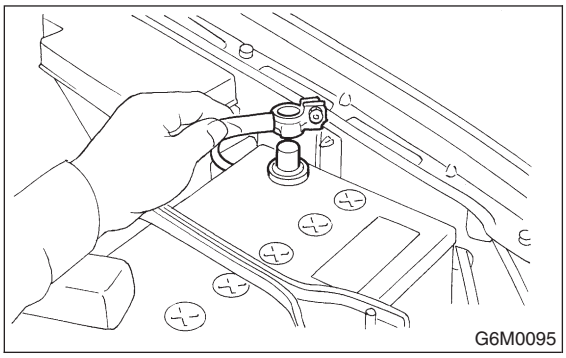
C: CAUTION S109001A03

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part in the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.

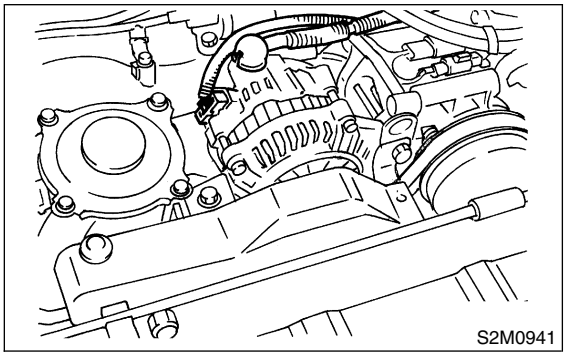
3. Generator S109008

A: REMOVAL S109008A18

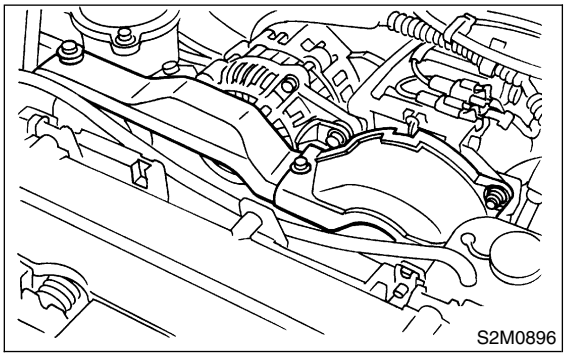
1) Disconnect battery ground cable.


G6M0095

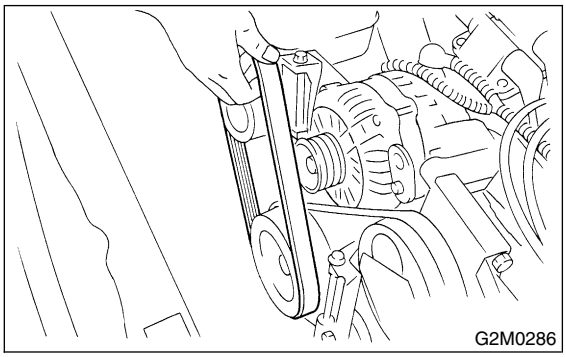
2) Disconnect connector and terminal from generator.


S2M0941

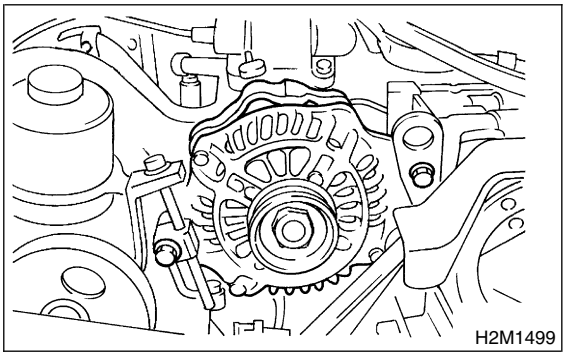
3) Remove V-belt cover.


S2M0896

4) Remove front side V-belt.


G2M0286

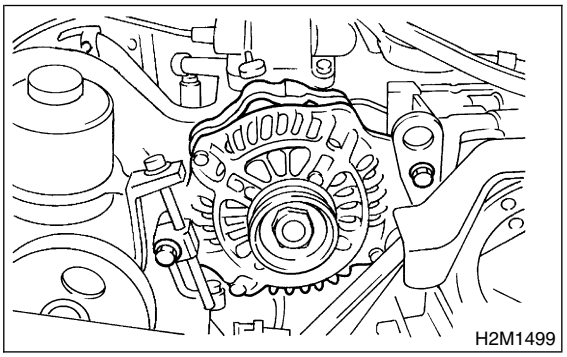
5) Remove bolts which install generator onto bracket.


H2M1499

B: INSTALLATION S109008A11

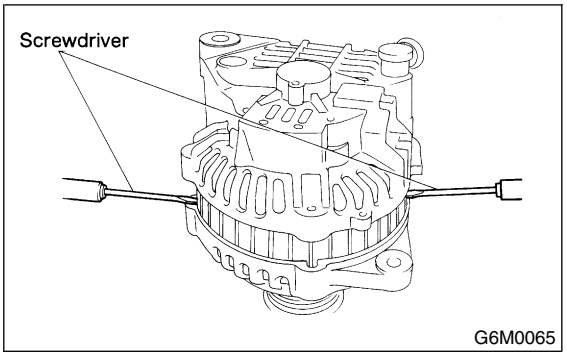
Install in the reverse order of removal.

CAUTION:
Check and adjust V-belt tension. <Ref. to ME-48 INSPECTION, V-belt.>


H2M1499

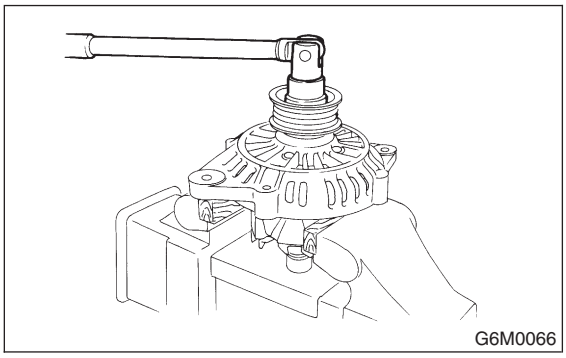
C: DISASSEMBLY S109008A06

1) Remove the four through bolts. Then insert the tip of a flat-head screwdriver into the gap between the stator core and front bracket. Pry then apart to disassemble.

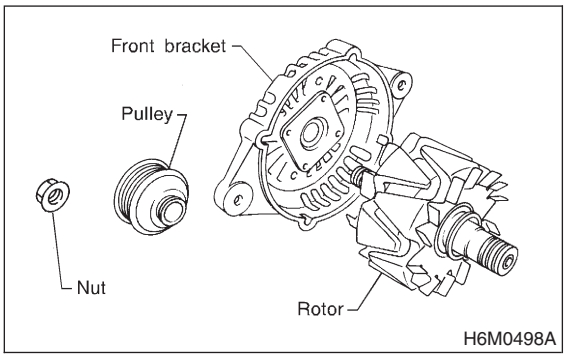


G6M0065

2) Hold rotor with a vise and remove pulley nut.


G6M0066

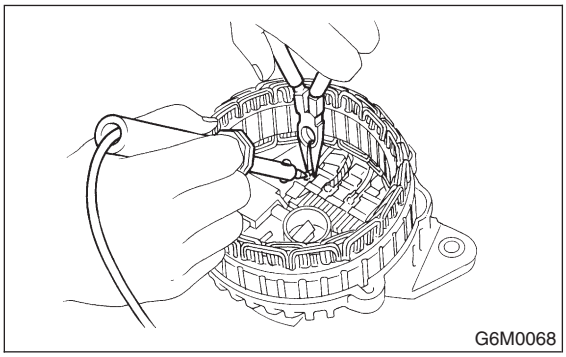
CAUTION:
When holding rotor with vise, insert aluminum plates or wood pieces on the contact surfaces of the vise to prevent rotor from damage.



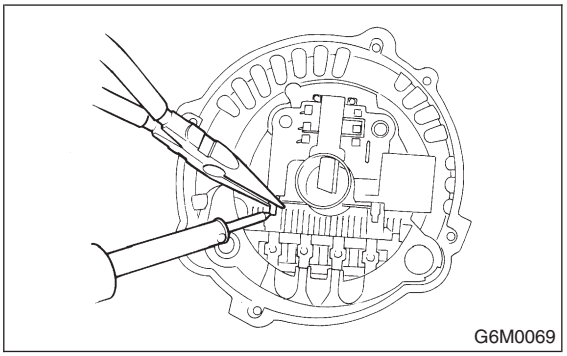
H6M0498A

3) Unsolder connection between rectifier and stator coil to remove stator coil.

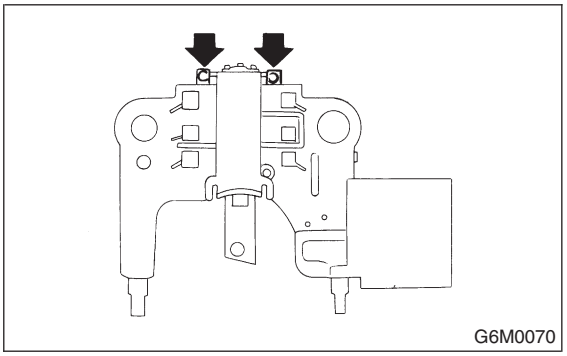
CAUTION:
Finish the work rapidly (less than three seconds) because the rectifier cannot withstand heat very well.


G6M0068

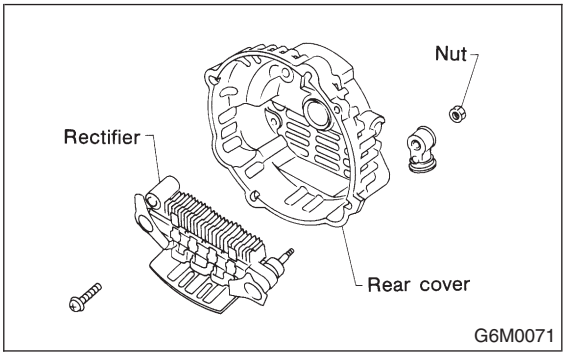
4) Remove screws which secure IC regulator to rear cover, and unsolder connection between IC regulator and rectifier to remove IC regulator.


G6M0069

5) Remove the brushes by unsoldering at the pigtails.


G6M0070

6) Remove the nut and insulating bushing at terminal B. Remove rectifier.

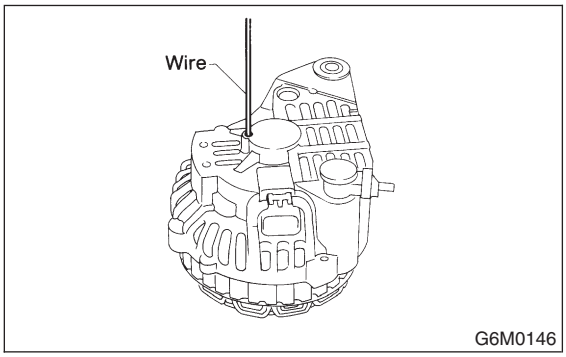


G6M0071

D: ASSEMBLY S109008A02

Assemble in the reverse order of disassembly.
1) Pulling up brush
Before assembling, press the brush down into the brush holder with your finger and secure in that position by passing a [2 mm (0.08 in) dia. length 4 to 5 cm (1.6 to 2.0 in)] wire through the hole shown in the figure.

CAUTION:
Be sure to remove the wire after reassembly.



2) Heat the rear bracket [50 to 60°C (122 to 140°F)] and press the rear bearing into the rear bracket. Then lubricate the rear bracket.

CAUTION:
Grease should not be applied for the rear bearing.
Remove oil completely if it is found on the bearing box.

3) After reassembly, turn the pulley by hand to check that the rotor turns smoothly.

E: INSPECTION S109008A10

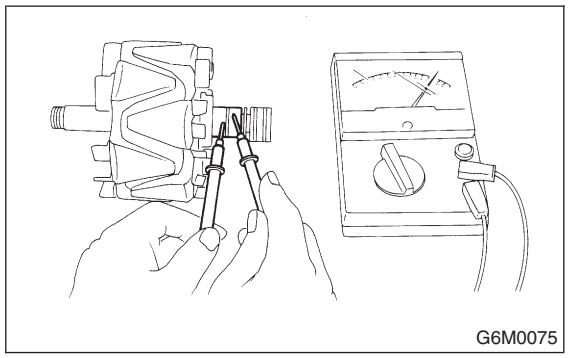
1. ROTOR S109008A1001

1) Slip ring surface
Inspect slip rings for contamination or any roughness of the sliding surface. Repair slip ring surface using a lathe or sand paper.
2) Slip ring outer diameter
Measure slip ring outer diameter. If slip ring is worn replace rotor assembly.

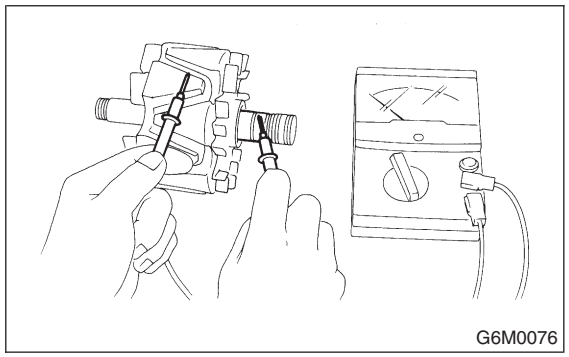
Slip ring outer diameter:
Standard
22.7 mm (0.894 in)
Limit
22.1 mm (0.870 in)

3) Continuity test
Check resistance between slip rings using circuit tester. If the resistance is not within specification, replace rotor assembly.

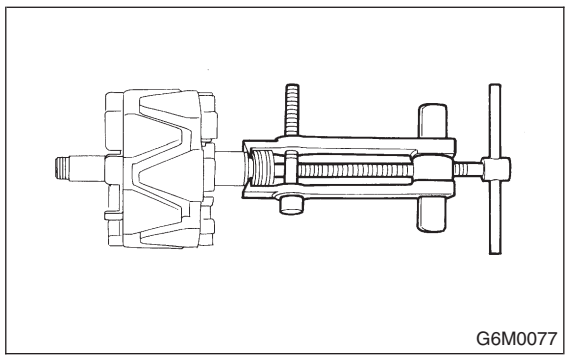
Specified resistance:
Approx. 2.7 — 3.2 Ω



4) Insulation test
Check continuity between slip ring and rotor core or shaft. If continuity exists, the rotor coil is short-circuited, and so replace rotor assembly.

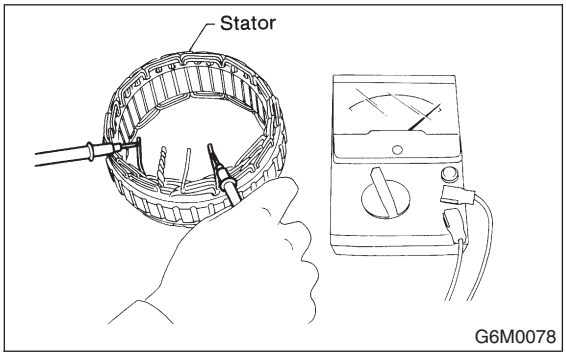


5) Ball bearing (rear side)
(1) Check rear ball bearing. Replace if it is noisy or if rotor does not turn smoothly.
(2) The rear bearing can be removed by using common bearing puller.

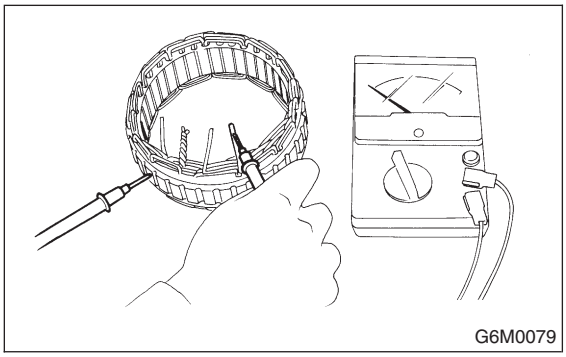


2. STATOR S109008A1002

1) Continuity test
Inspect stator coil for continuity between each end of the lead wires. If there is no continuity between individual lead wires, the lead wire is broken, and so replace stator assembly.



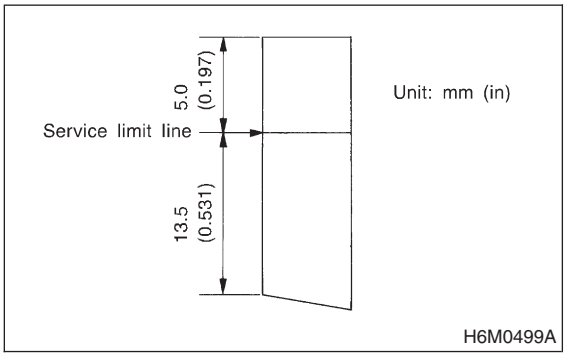
2) Insulation test
Inspect stator coil for continuity between stator core and each end of the lead wire. If there is continuity, the stator coil is short-circuited, and so replace stator assembly.



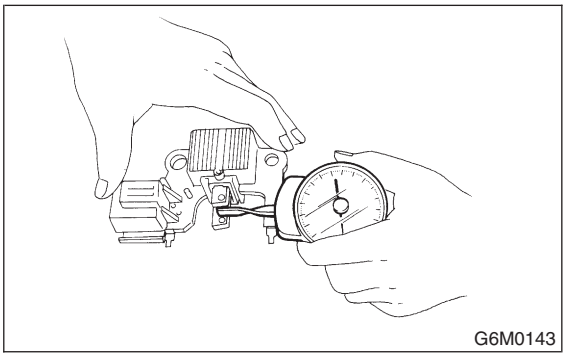
3. BRUSH S109008A1003

1) Measure the length of each brush. If wear exceeds the service limit, replace the brush. Each brush has the service limit mark on it.

Brush length:
Standard
18.5 mm (0.728 in)
Service limit
5.0 mm (0.197 in)



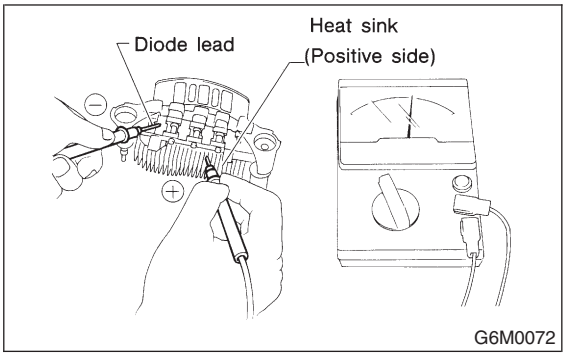
2) Checking brush spring for proper pressure
Using a spring pressure indicator, push the brush into the brush holder until its tip protrudes 2 mm (0.08 in). Then measure the pressure of the brush spring. If the pressure is less than 2.648 N (270 g, 9.52 oz), replace the brush spring with a new one. The new spring must have a pressure of 4.609 to 5.786 N (470 to 590 g, 16.58 to 20.81 oz).



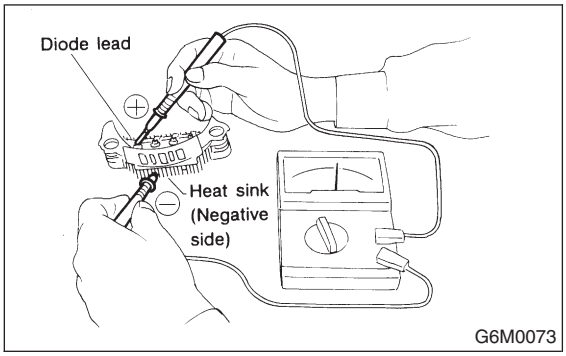
4. DIODE ASSEMBLY S109008A1004

CAUTION:
Never use a megger tester (measuring use for high voltage) or any other similar measure for this test; otherwise, the diodes may be damaged.

1) Checking positive diode
Check for continuity between the diode lead and the positive side heat sink. The positive diode is in good condition if continuity exists only in the direction from the diode lead to the heat sink.

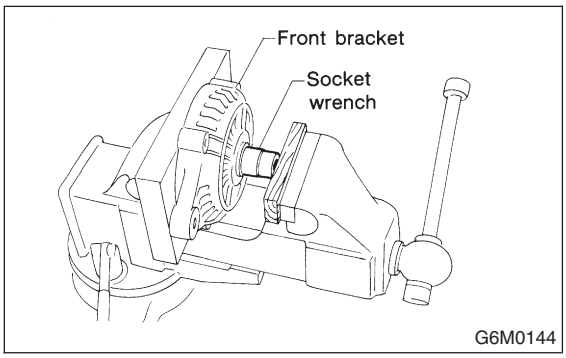


2) Checking negative diode
Check for continuity between the negative side heat sink and diode lead. The negative diode is in good condition if continuity exists only in the direction from the heat sink to the diode lead.

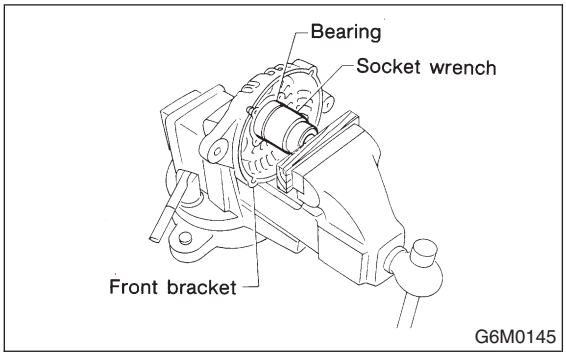


5. BEARING (FRONT SIDE) S109008A1006

1) Check front ball bearing. If resistance is felt while rotating, or if abnormal noise is heard, replace the ball bearing.
2) Replacing front bearing
   (1) Remove front bearing retainer.
   (2) Closely install a fit tool on the bearing inner race. Press the bearing down out of front bracket with a hand press or vise. A socket wrench can serve as the tool.



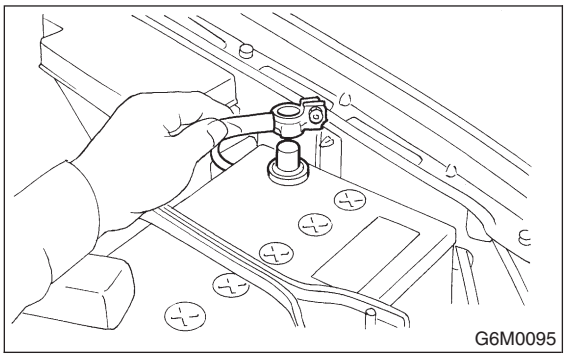
   (3) Set a new bearing and closely install a fit tool on the bearing outer race. Press the bearing down into place with a hand press or vise. A socket wrench can serve as the tool.
   (4) Install front bearing retainer.



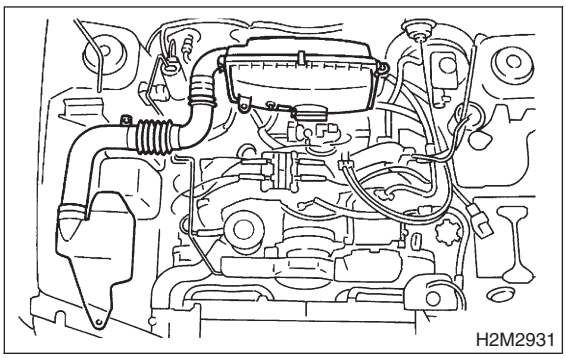
2. Starter S109012

A: REMOVAL S109012A18

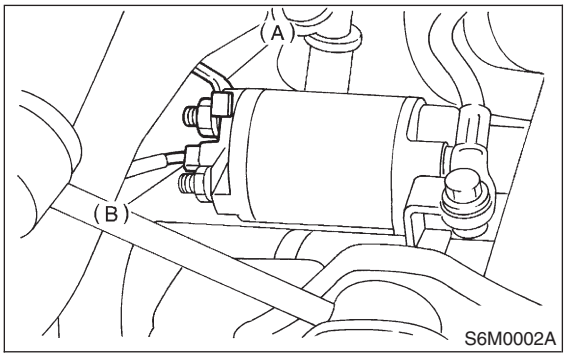
1) Disconnect battery ground cable.


G6M0095

2) Remove air cleaner case <Ref. to IN-4 REMOVAL, Air Cleaner Case.> and air intake duct. <Ref. to IN-5 REMOVAL, Air Intake Duct.>


H2M2931

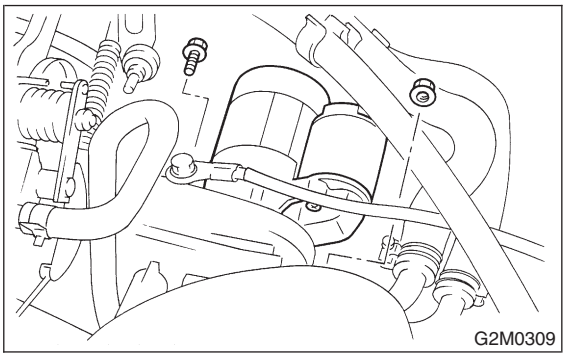
3) Disconnect connector and terminal from starter.



S6M0002A

(A) Terminal
(B) Connector

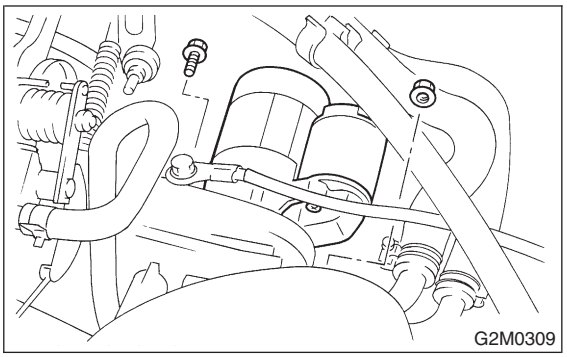
4) Remove starter from transmission.


G2M0309

B: INSTALLATION S109012A11

Install in the reverse order of removal.

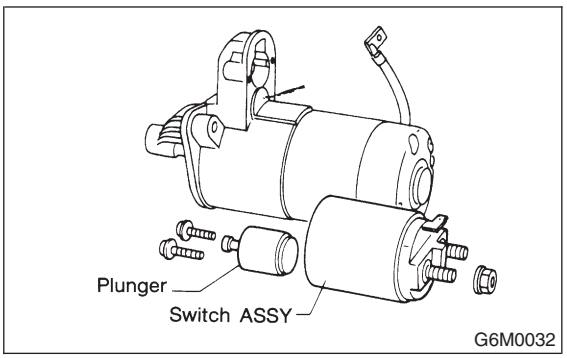
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


G2M0309

C: DISASSEMBLY S109012A06

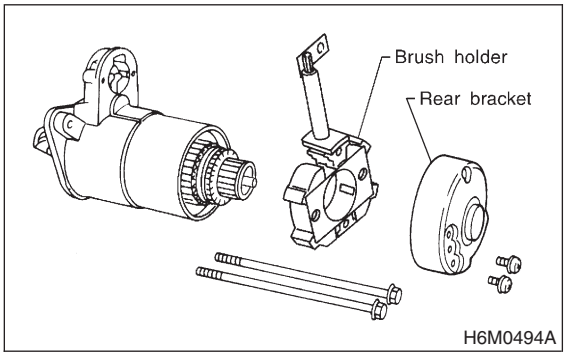
1) Loosen nut which holds terminal M of switch assembly, and disconnect connector.
2) Remove bolts which hold switch assembly, and remove switch assembly, plunger and plunger spring from starter as a unit.

CAUTION:
Be careful because pinion gap adjustment washer may sometimes be used on the mounting surface of switch assembly.



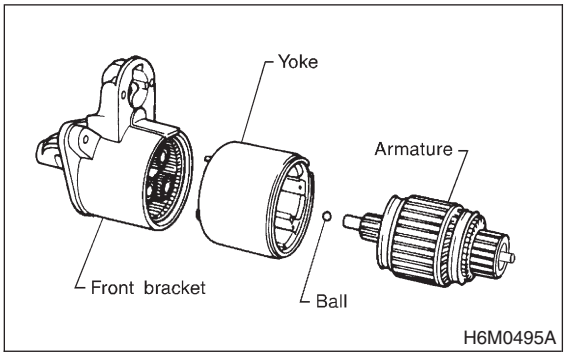
G6M0032

3) Remove both through-bolts and brush holder screws, and detach rear bracket and brush holder.

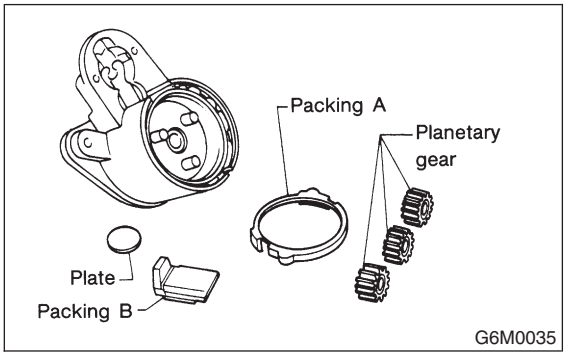


4) Remove armature and yoke. Ball used as a bearing will then be removed from the end of armature.

CAUTION:
Be sure to mark an alignment mark on yoke and front bracket before removing yoke.

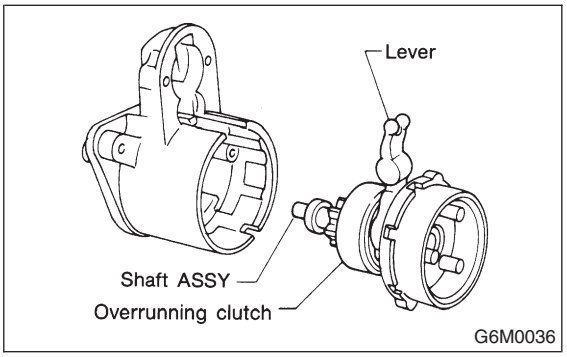


5) Remove packing A, three planetary gears, packing B and plate.

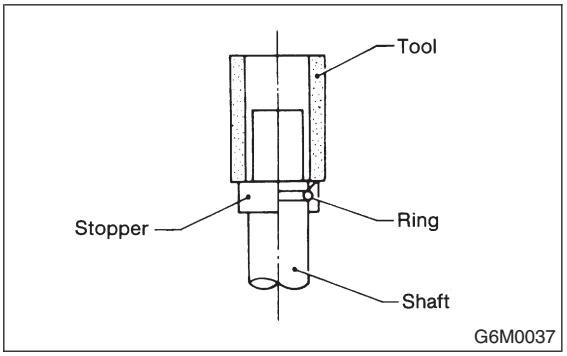


6) Remove shaft assembly and overrunning clutch as a unit.

CAUTION:
Record the direction of lever before removing.

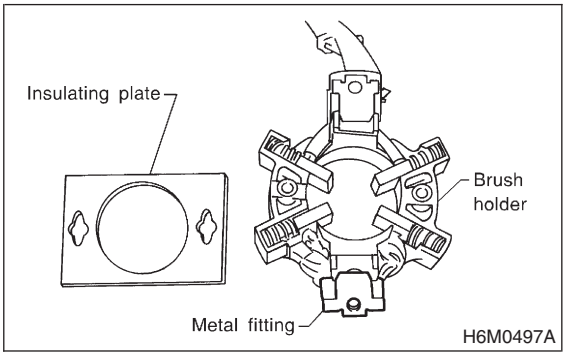


7) Remove overrunning clutch from shaft assembly as follows:
(1) Remove stopper from ring by lightly tapping a fit tool placed on stopper.
(2) Remove ring, stopper and clutch from shaft.



8) Slightly open the metal fitting holding the insulating plate to the brush holder. Remove the insulating plate.

NOTE:
The brush and spring can be easily removed from the brush holder at this time.



D: ASSEMBLY S109012A02

Assembe is in the reverse order of disassembly. Observe the following:
1) Carefully assemble all parts in the order of assembly and occasionally inspect nothing has been overlooked.
2) Apply grease to the following parts during assembly.
- Front bracket sleeve bearing
- Armature shaft gear
- Outer periphery of plunger
- Mating surface of plunger and lever
- Gear shaft splines
- Mating surface of lever and clutch
- Ball at the armature shaft end
- Internal and planetary gears

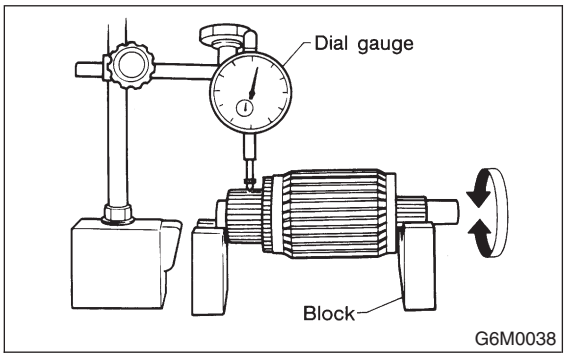
3) After assembling parts correctly, check to be sure starter operates properly.

E: INSPECTION S109012A10

1. ARMATURE S109012A1001

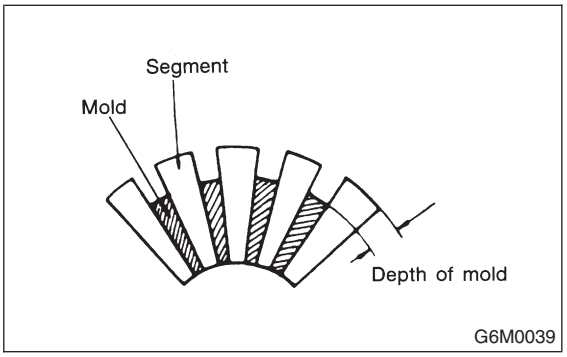
1) Check commutator for any sign of burns of rough surfaces or stepped wear. If wear is of a minor nature, correct it by using sand paper.
2) Run-out test
Check the commutator run-out and replace if it exceeds the limit.

Commutator run-out:
Standard
0.05 mm (0.0020 in)
Service limit
Less than 0.10 mm (0.0039 in)

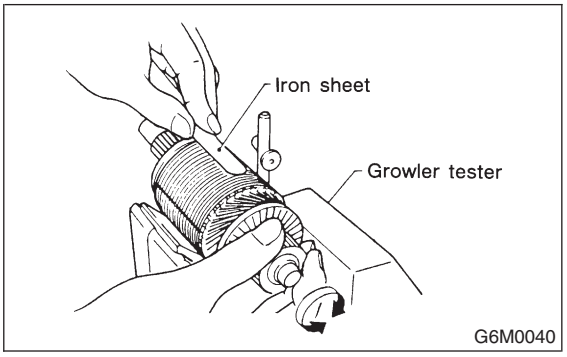


3) Depth of segment mold
Check the depth of segment mold.

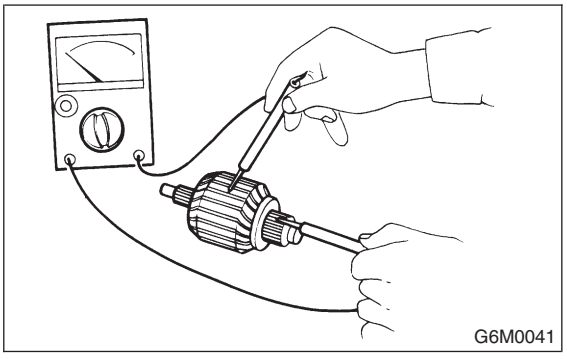
Depth of segment mold:
0.5 mm (0.020 in)



4) Armature short-circuit test
Check armature for short-circuit by placing it on growler tester. Hold a hacksaw blade against armature core while slowly rotating armature. A short-circuited armature will cause the blade to vibrate and to be attracted to core. If the hacksaw blade is attracted or vibrates, the armature, which is short-circuited, must be replaced or repaired.



5) Armature ground test
Using circuit tester, touch one probe to the commutator segment and the other to shaft. There should be no continuity. If there is a continuity, armature is grounded.
Replace armature if it is grounded.



2. YOKE S109012A1002

Make sure pole is set in position.

3. OVERRUNNING CLUTCH S109012A1003

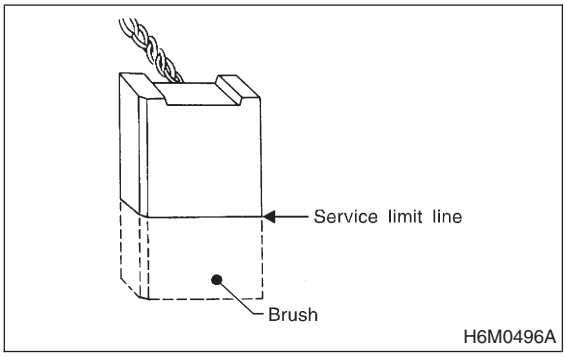
Inspect teeth of pinion for wear and damage. Replace if it damaged. Rotate pinion in direction of rotation (clockwise). It should rotate smoothly. But in opposite direction, it should be locked.

CAUTION:
Do not clean overrunning clutch with oil to prevent grease from flowing out.

4. BRUSH AND BRUSH HOLDER S109012A1004

1) Brush length
Measure the brush length and replace if it exceeds the service limit.
Replace if abnormal wear or cracks are noticed.

Brush length:
Standard 17.0 mm (0.669 in)
Service limit 11.5 mm (0.453 in)



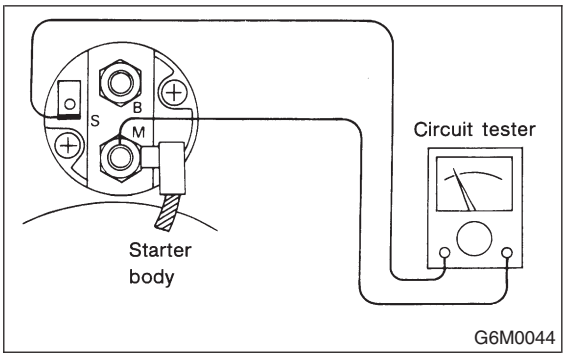
2) Brush movement
Be sure brush moves smoothly inside brush holder.
3) Brush spring force
Measure brush spring force with a spring scale. If it is less than the service limit, replace brush spring.

Brush spring force:
Standard
21.6 N (2.2 kgf, 4.9 lb) (when new)
Service limit
5.9 N (0.6 kgf, 1.3 lb)

5. SWITCH ASSEMBLY S109012A1008

Be sure there is continuity between terminals S and M, and between terminal S and ground. Use a circuit tester (set in “ohm”).
Also check to be sure there is no continuity between terminal M and B.

Terminal / Specified resistance:
S—M / Continuity
S—Ground / Continuity
M—B / No continuity



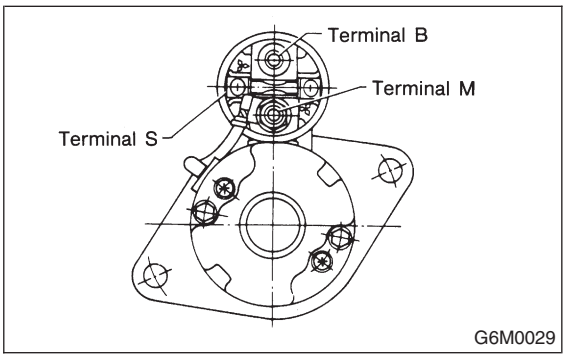
6. SWITCH ASSEMBLY OPERATION

S109012A1009

1) Connect terminal S of switch assembly to positive terminal of battery with a lead wire, and starter body to ground terminal of battery. Pinion should be forced endwise on shaft.

CAUTION:
With pinion forced endwise on shaft, starter motor can sometimes rotate because current flows, through pull-in coil, to motor. This is not a problem.

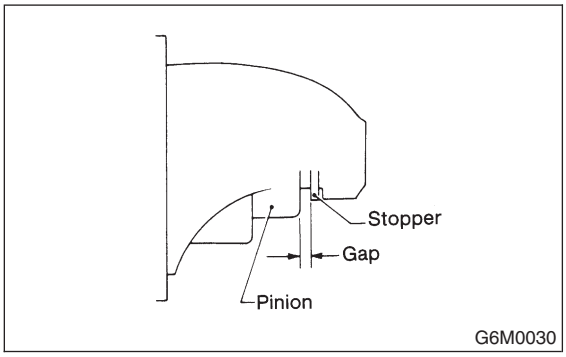
2) Disconnect connector from terminal M, and connect positive terminal of battery and terminal M using a lead wire and ground terminal to starter body.
In this test set up, pinion should return to its original position even when it is pulled out with a screwdriver.



7. PINION GAP S109012A1010

1) With pinion forced endwise on shaft, as outlined in step 1) before <Ref. to SC-7 INSPECTION, Starter.>, measure pinion gap.

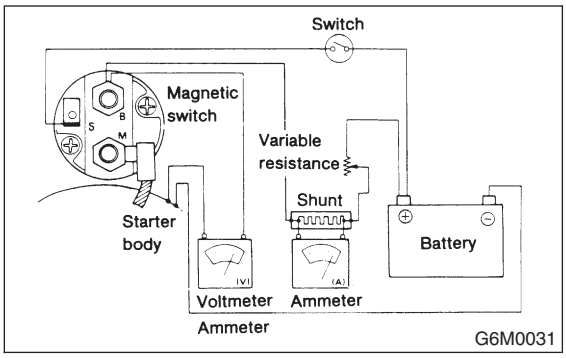
Pinion gap:
0.5 — 2.0 mm (0.020 — 0.079 in)



2) If motor is running with the pinion forced endwise on the shaft, disconnect connector from terminal M of switch assembly and connect terminal M to ground terminal (–) of battery with a lead wire. Next, gently push pinion back with your fingertips and measure pinion gap.
3) If pinion gap is outside specified range, remove or add number of adjustment washers used on the mounting surface of switch assembly until correct pinion gap is obtained.

8. PERFORMANCE TEST S109012A1007

The starter should be submitted to performance tests whenever it has been overhauled, to assure its satisfactory performance when installed on the engine.
Three performance tests, no-load test, load test, and lock test, are presented here; however, if the load test and lock test cannot be performed, carry out at least the no-load test.
For these performance tests, use the circuit shown in figure.



1) No-load test
With switch on, adjust the variable resistance to obtain 11 V, take the ammeter reading and measure the starter speed. Compare these values with the specifications.

No-load test (Standard):
Voltage / Current
11 V / 90 A or less
Rotating speed
- ***MT vehicles 2,800 rpm or more***
- ***AT vehicles 2,400 rpm or more***

2) Load test
Apply the specified braking torque to starter. The condition is satisfactory if the current draw and starter speed are within specifications.

Load test (Standard):

- ***MT vehicles***
  Voltage / Load
  7.5 V / 8.73 N·m (0.89 kgf-m, 6.4 ft-lb)
  Current / Speed
  300 A / 890 rpm or more
- ***AT vehicles***
  Voltage / Load
  7.7 V / 16.00 N·m (1.63 kgf-m, 11.8 ft-lb)
  Current / Speed
  400 A max. / 740 rpm or more

3) Lock test
With starter stalled, or not rotating, measure the torque developed and current draw when the voltage is adjusted to the specified voltage.

Lock test (Standard):

- ***MT vehicles***
  Voltage / Load
  4 V / 780 A or less
  Torque
  15.7 N·m (1.60 kgf-m, 11.6 ft-lb) or more
- ***AT vehicles***
  Voltage / Current
  3.5 V / 940 A or less
  Torque
  28.9 N·m (2.95 kgf-m, 21.3 ft-lb) or more