ENGINE2 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.
This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.
Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUJI HEAVY INDUSTRIES LTD.

FUEL INJECTION (FUEL SYSTEMS)	FU(SOHCw/oOBD)
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(SOHCw/oOBD)
EXHAUST	EX(SOHCw/oOBD)
IGNITION	IG(SOHCw/oOBD)
ENGINE (DIAGNOSTICS)	EN(SOHCw/oOBD)
FUEL INJECTION (FUEL SYSTEMS)	FU(DOHC TURBO)
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(DOHC TURBO)
INTAKE (INDUCTION)	IN(DOHC TURBO)
MECHANICAL	ME(DOHC TURBO)
EXHAUST	EX(DOHC TURBO)
IGNITION	IG(DOHC TURBO)
ENGINE (DIAGNOSTICS)	EN(DOHC TURBO)

FUEL INJECTION (FUEL SYSTEMS)

FU(SOHCw/oOBD)

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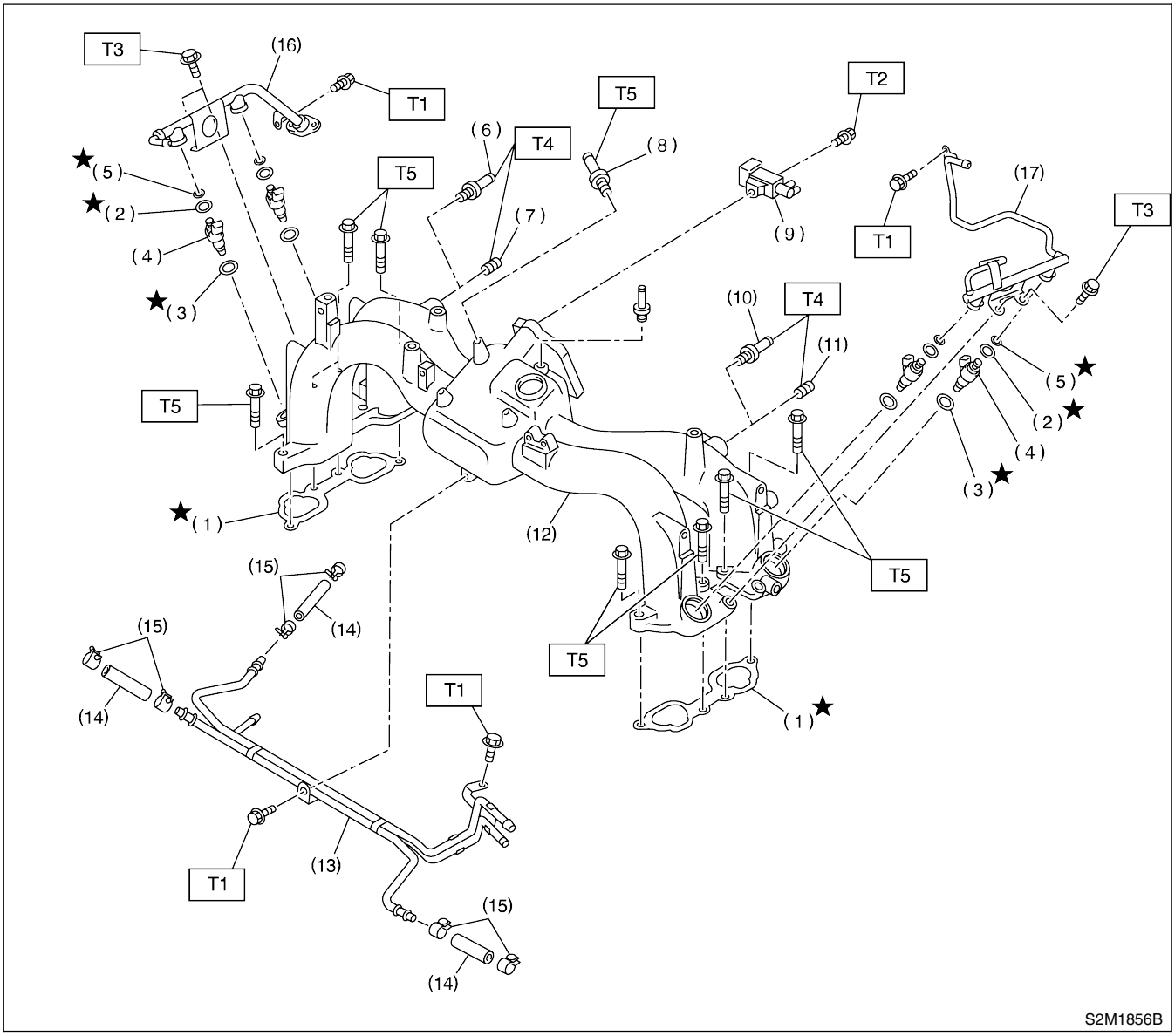
1. General Description S165001

A: SPECIFICATIONS S165001E49

Model		
Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	373 — 677 kPa (3.8 — 6.9 kg/cm^2, 54 — 98 psi)
	Discharge flow	More than 65 ℓ (17.2 US gal, 14.3 Imp gal)/h [12 V at 300 kPa (3.06 kg/cm^2, 43.5 psi)]
Fuel filter		Cartridge type

B: COMPONENT S165001A05

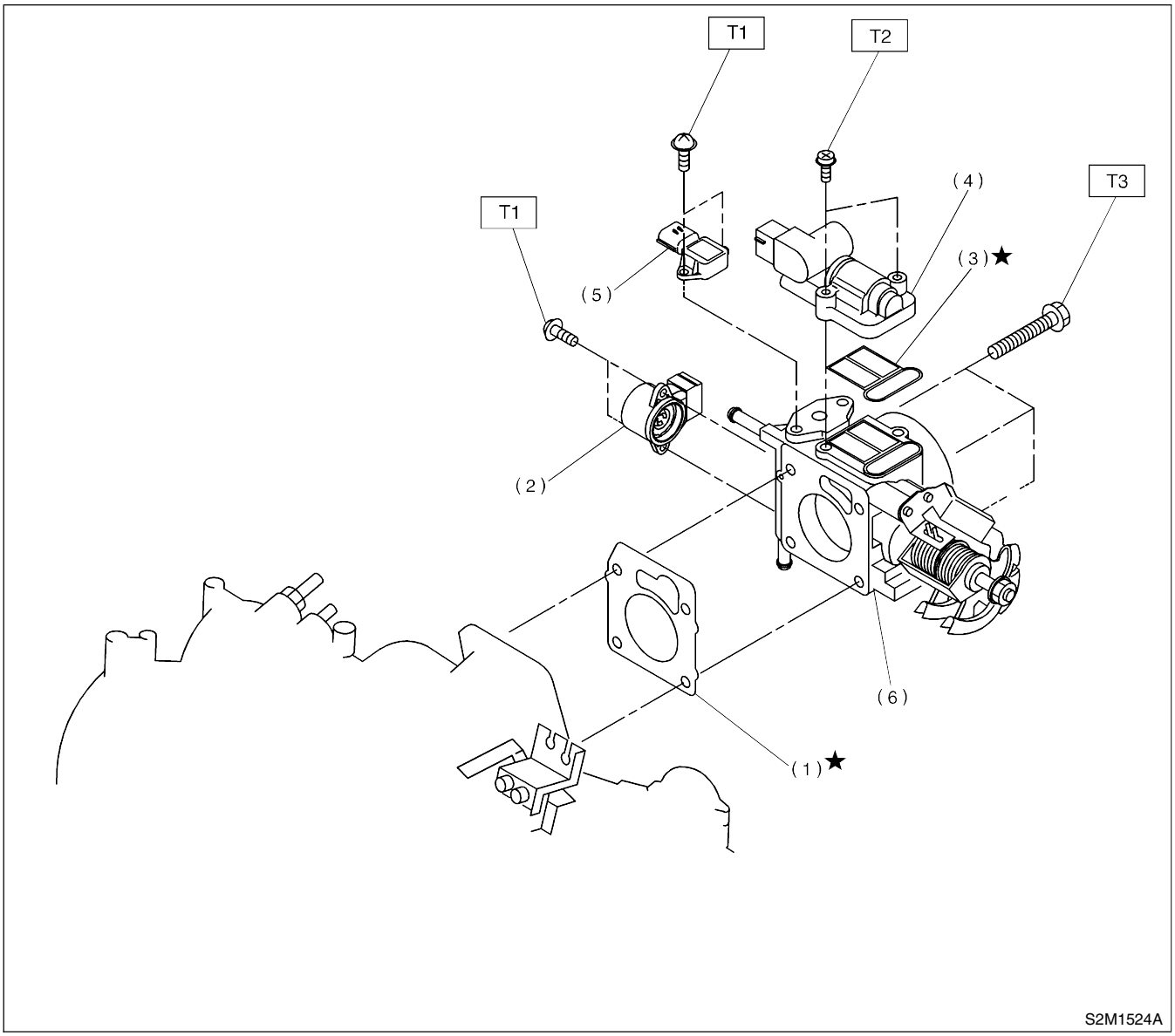
1. INTAKE MANIFOLD S165001A0501



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.9 (0.5, 3.6)
T2: 15.7 (1.6, 11.6)
T3: 19 (1.9, 13.7)
T4: 17 (1.7, 12)
T5: 25 (2.5, 18.1)

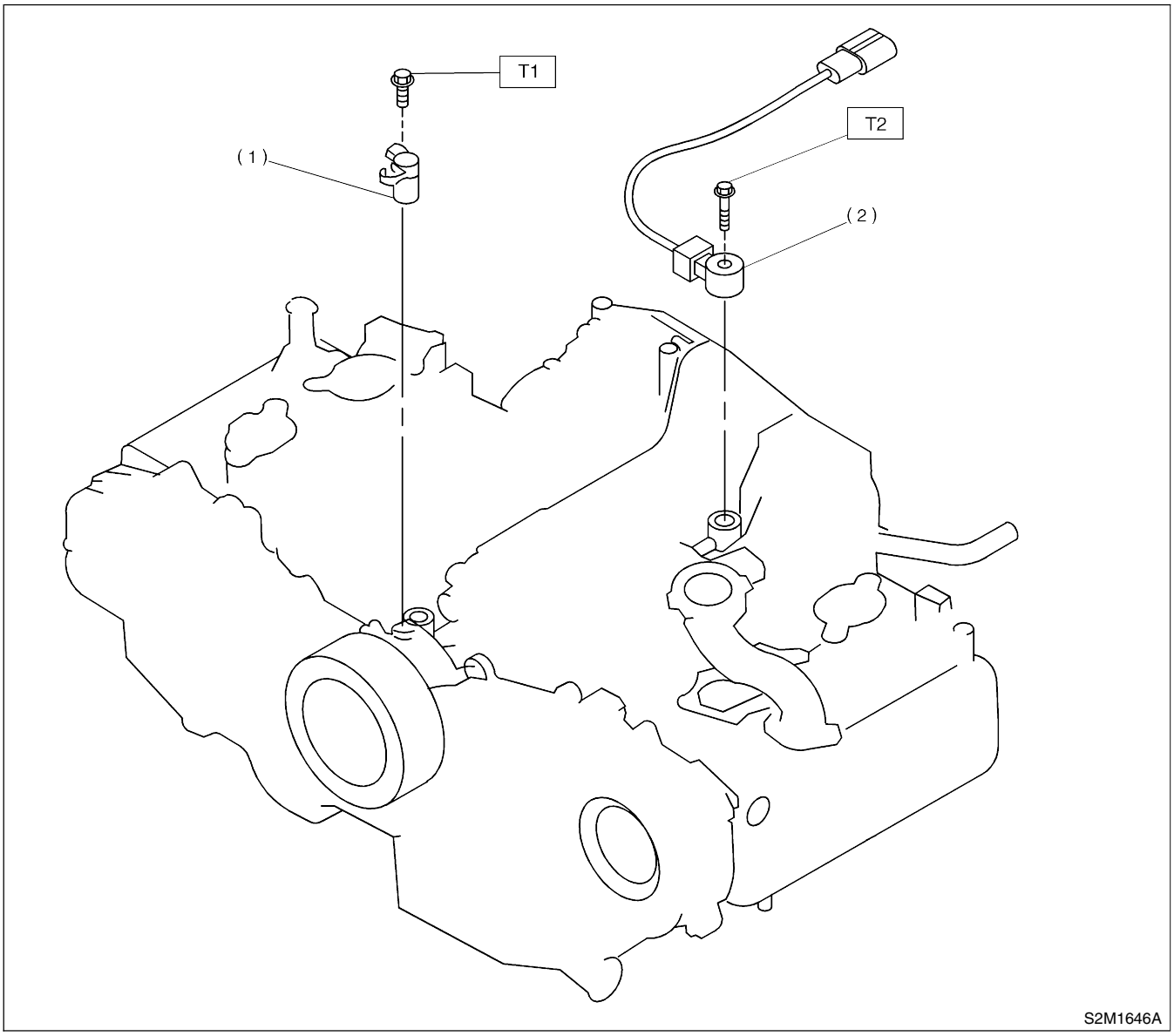
2. AIR INTAKE SYSTEM S165001A0502



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 2.0 (0.2, 1.4)
T2: 3.4 (0.35, 2.5)
T3: 22 (2.2, 15.9)

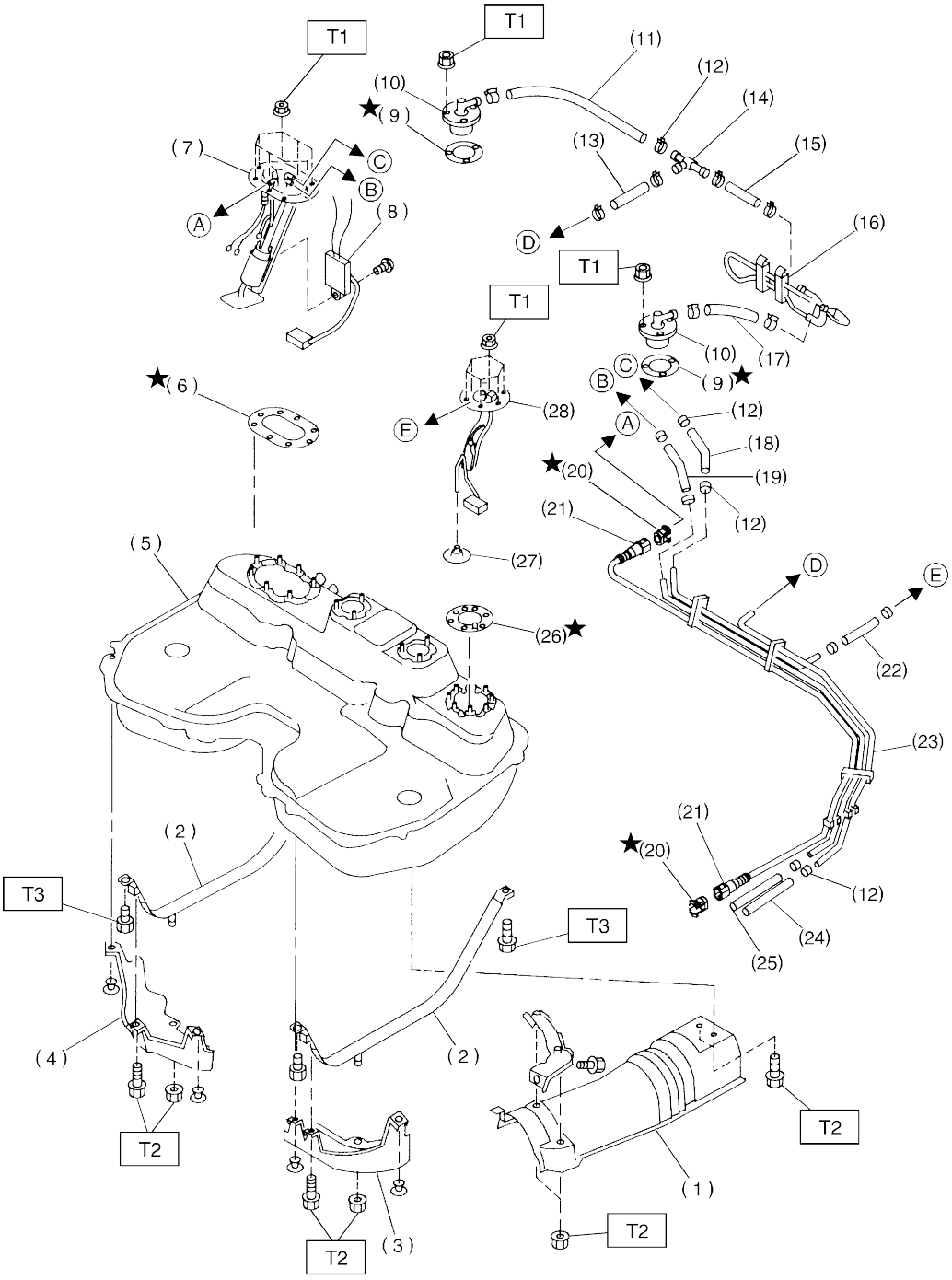
3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS S165001A0503



(1) Crankshaft position sensor
(2) Knock sensor

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 24 (2.4, 17)

4. FUEL TANK S165001A0504

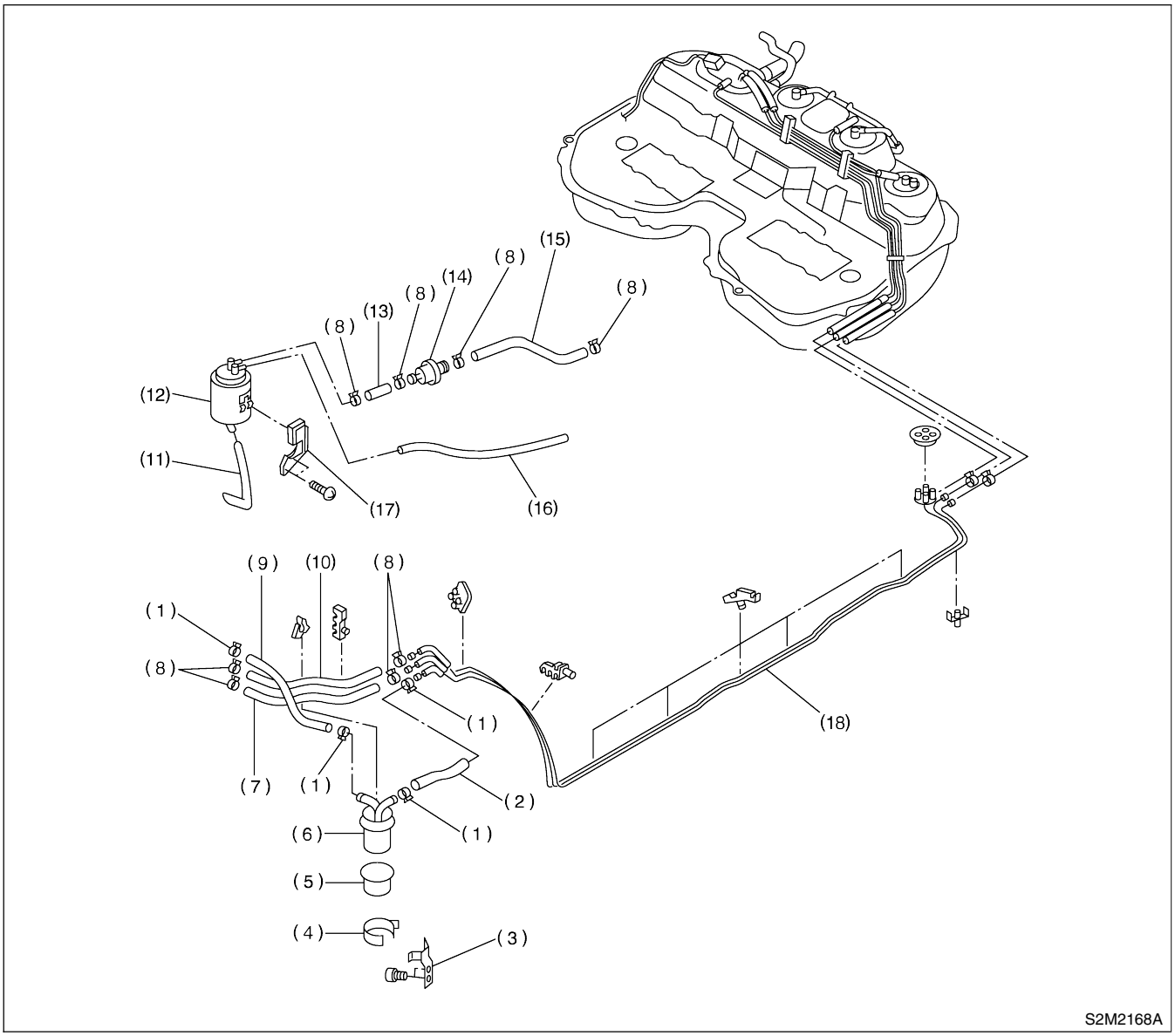


S2M0634A

(1) Heat sealed cover
(2) Fuel tank band
(3) Protector LH
(4) Protector RH
(5) Fuel tank
(6) Fuel pump gasket
(7) Fuel pump ASSY
(8) Fuel level sensor
(9) Fuel cut valve gasket
(10) Fuel cut valve
(11) Evaporation hose A
(12) Clip
(13) Evaporation hose C
(14) Joint pipe
(15) Evaporation hose B
(16) Evaporation pipe ASSY
(17) Evaporation hose D
(18) Jet pump hose A
(19) Fuel return tube
(20) Retainer
(21) Quick connector
(22) Jet pump hose B
(23) Fuel pipe ASSY
(24) Evaporation hose E
(25) Fuel return hose B
(26) Fuel sub level sensor gasket
(27) Jet pump filter
(28) Fuel sub level sensor

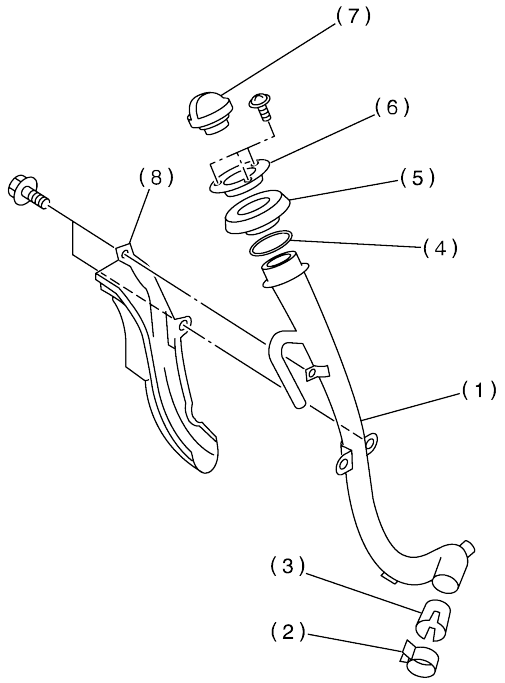
Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 7.4 (0.75, 5.4)
T3: 33 (3.4, 25)

5. FUEL LINE S165001A0505



(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) Air vent hose
(12) Canister
(13) Canister hose A
(14) Two-way valve
(15) Canister hose B
(16) Canister hose C
(17) Canister bracket
(18) Fuel pipe ASSY

6. FUEL FILLER PIPE S165001A0506



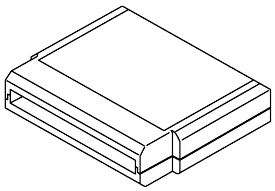
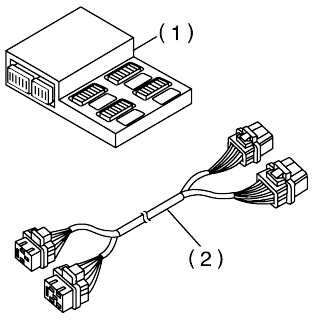
S2M2169A

(1) Fuel filler pipe ASSY
(2) Clamp
(3) Fuel filler valve
(4) Filler pipe packing
(5) Filler ring A
(6) Filler ring B
(7) Filler cap
(8) Filler pipe protector

C: CAUTION S165001A03

- 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.

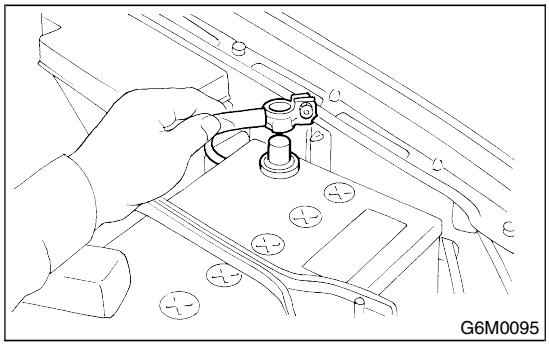
D: PREPARATION TOOL S165001A17

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA150 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)
 S2M2170A	498307600	CHECK BOARD KIT	Troubleshooting for engine electrical system. (1) CHECK BOARD: 498307610 (2) CHECK BOARD ADAPTER: 498307620

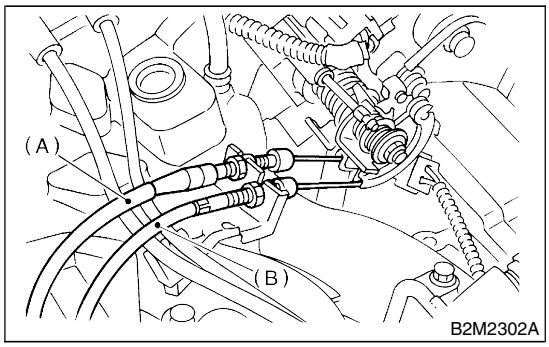
2. Throttle Body S165010

A: REMOVAL S165010A18

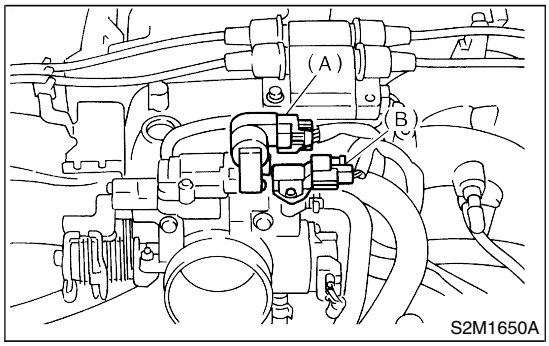
1) Disconnect battery ground cable.



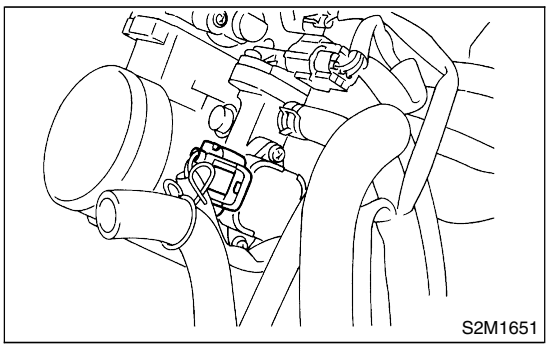
2) Remove air cleaner case. <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
3) Disconnect accelerator cable (A).
4) Disconnect cruise control cable (B). (With cruise control model)



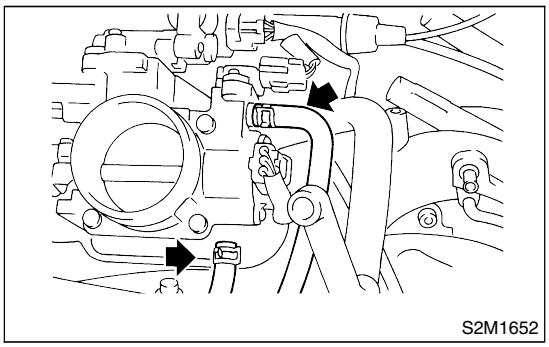
5) Disconnect connectors from idle air control solenoid valve (A) and intake manifold pressure sensor (B).



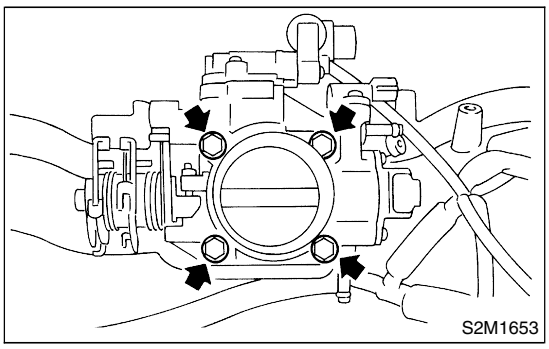
6) Disconnect connector from throttle position sensor.



7) Disconnect engine coolant hoses from throttle body.



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



B: INSTALLATION S165010A11

Install in the reverse order of removal.

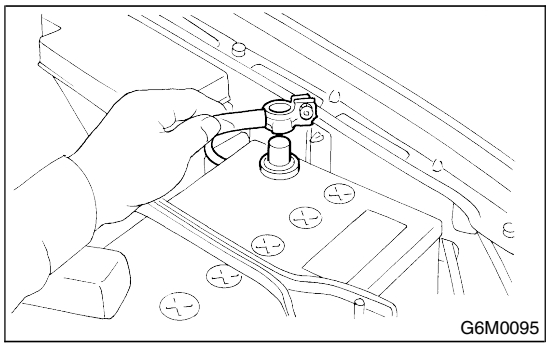
NOTE:
Always use a new gasket.

Tightening torque:
Throttle body;
22 N·m (2.2 kgf-m, 15.9 ft-lb)
Air cleaner case;
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

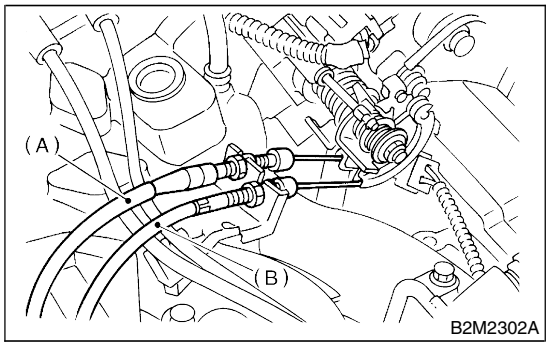
3. Intake Manifold S165034

A: REMOVAL S165034A18

1) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.
3) Disconnect battery ground cable.

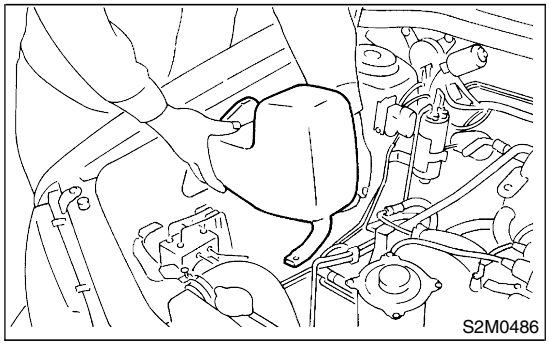

G6M0095

4) Remove air cleaner case and air intake duct. <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.> and <Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.>
5) Disconnect accelerator cable (A).
6) Disconnect cruise control cable (B). (With cruise control model)



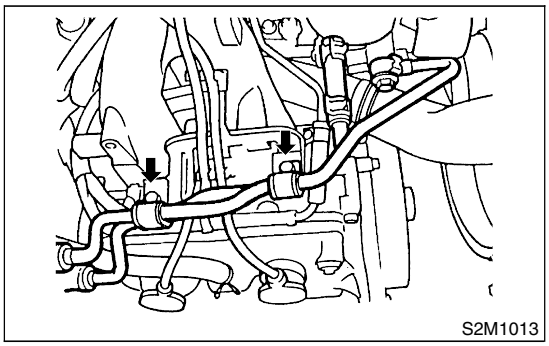
B2M2302A

7) Remove power steering pump from bracket.
(1) Remove resonator chamber.

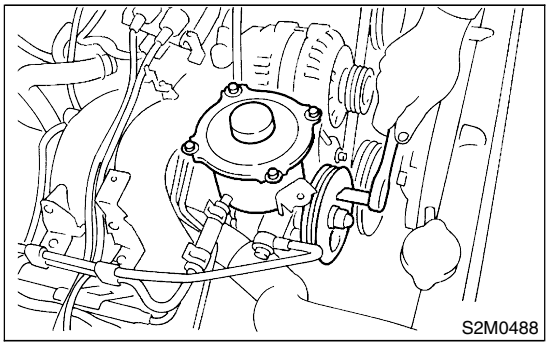

S2M0486

(2) Remove V-belts.
<Ref. to ME(SOHC)-42, REMOVAL, V-belt.>
(3) Remove bolts which secure power steering pipe brackets to intake manifold.

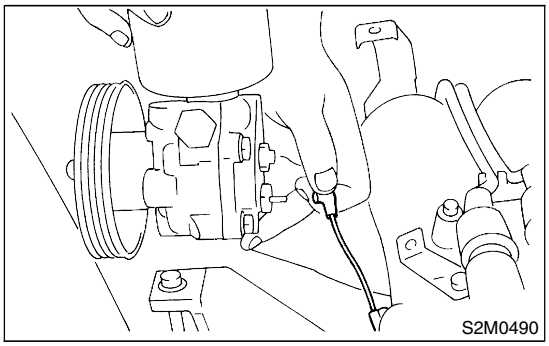
CAUTION:
Do not disconnect power steering hose.


S2M1013

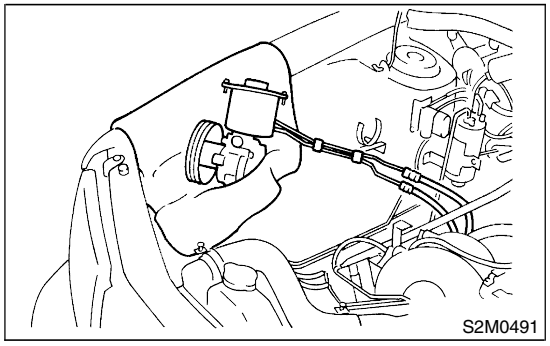
(4) Remove bolts which install power steering pump to bracket.


S2M0488

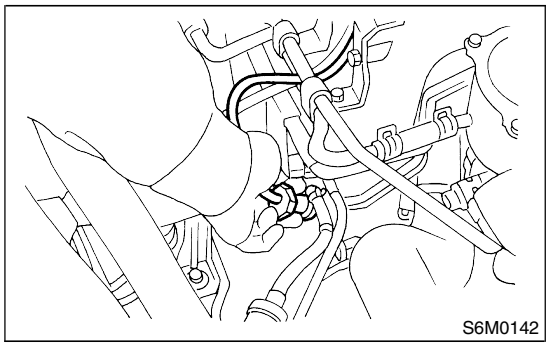
(5) Disconnect terminal from power steering pump switch.


S2M0490

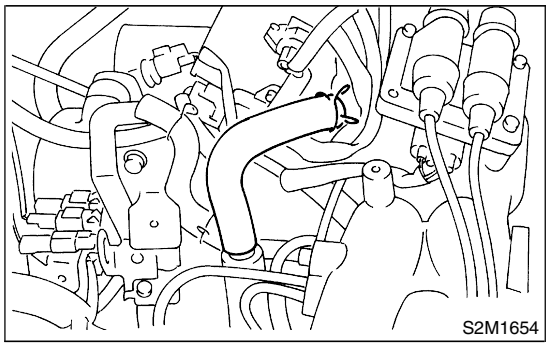
(6) Place power steering pump on the right side wheel apron.


S2M0491

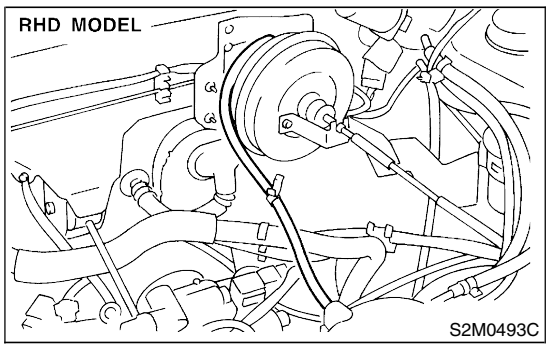
8) Disconnect spark plug cords from spark plugs.


S6M0142

9) Disconnect PCV hose from intake manifold.

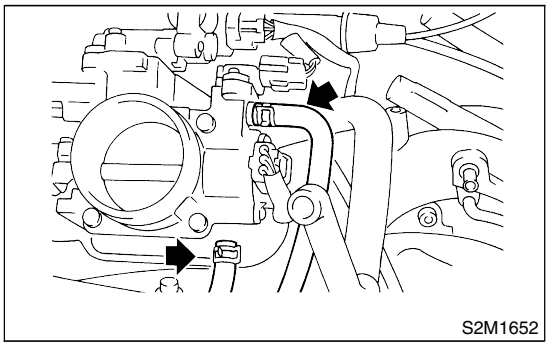

S2M1654

10) Disconnect vacuum hose to cruise control diaphragm. (With cruise control models)

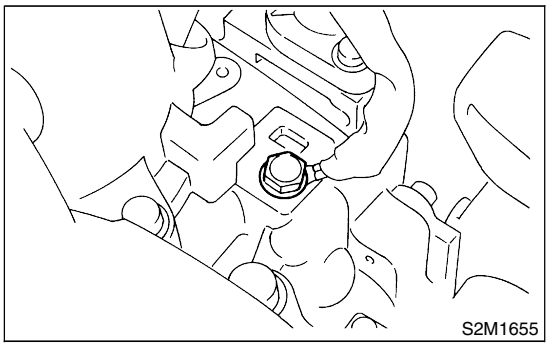


S2M0493C

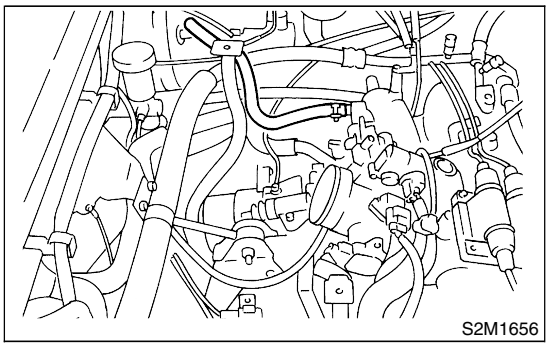
11) Disconnect engine coolant hose from throttle body.


S2M1652

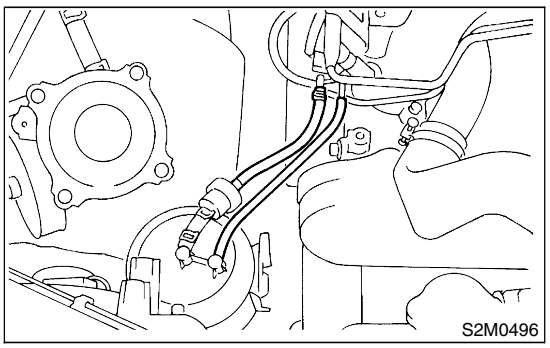
12) Remove bolt which installs ground terminal onto cylinder head.


S2M1655

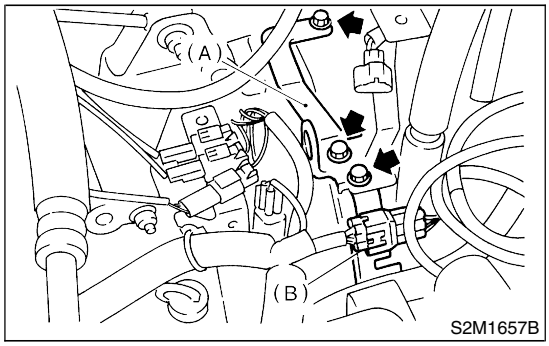
13) Disconnect brake booster hose.


S2M1656

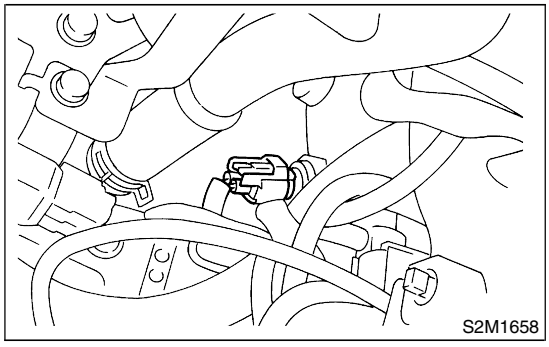
14) Disconnect canister hoses from pipes.


S2M0496

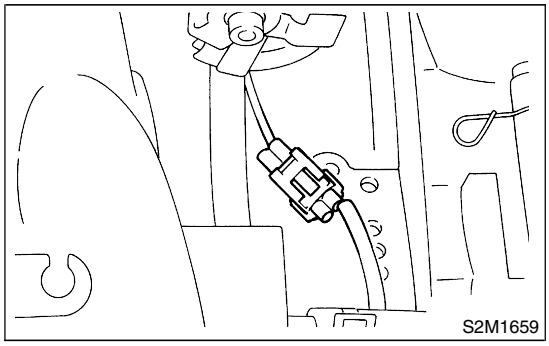
15) Remove air cleaner case stay RH and engine harness bracket (A), and disconnect engine harness connectors (B) from bulkhead harness connectors.
16) Pull out engine harness connector from bracket.



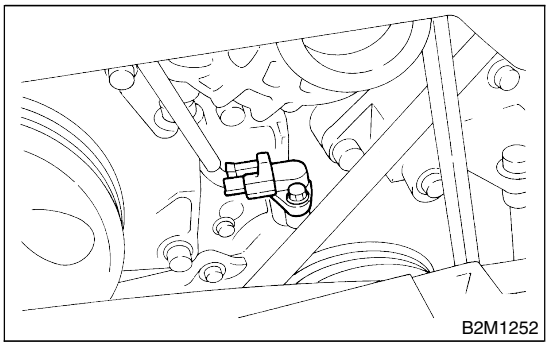
17) Disconnect connector from engine coolant temperature sensor.



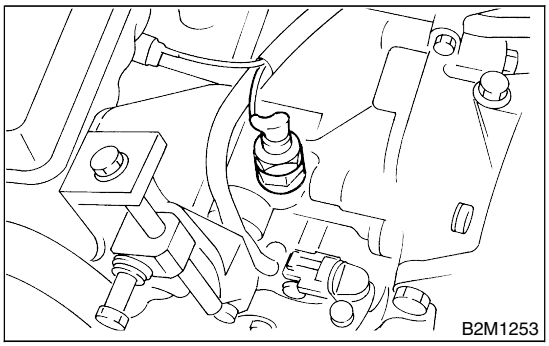
18) Disconnect knock sensor connector.



19) Disconnect connector from crankshaft position sensor.

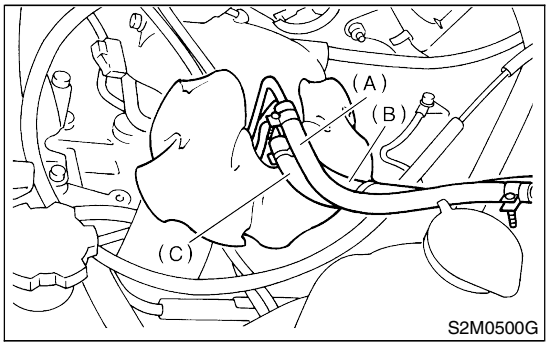


20) Disconnect connector from oil pressure switch.



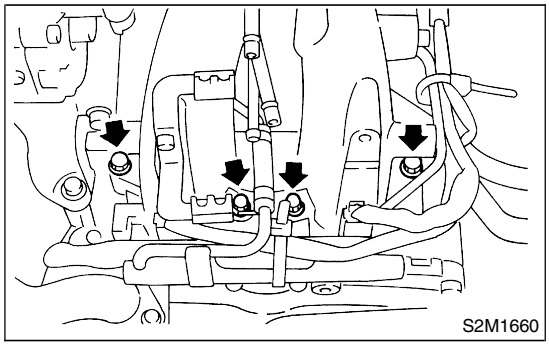
21) Disconnect fuel hoses from fuel pipes.

WARNING:
Catch fuel from hoses in a container.

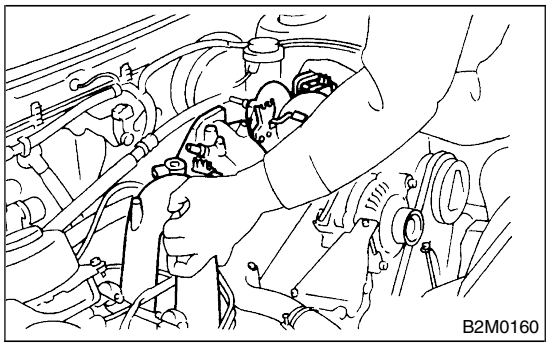


(A) Fuel delivery hose
(B) Return hose
(C) Evaporation hose

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


S2M1660

23) Remove intake manifold.

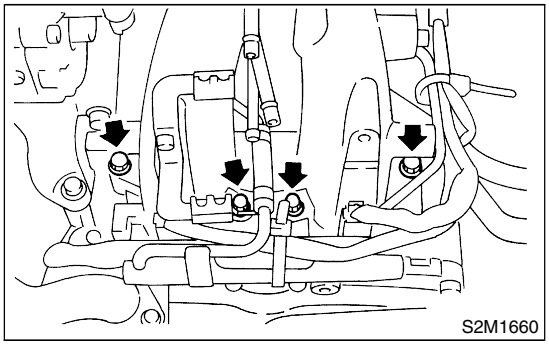

B2M0160

B: INSTALLATION S165034A11

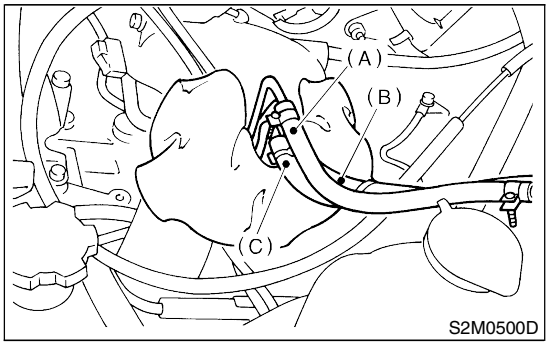
1) Install intake manifold onto cylinder heads.

NOTE:
Always use new gaskets.

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


S2M1660

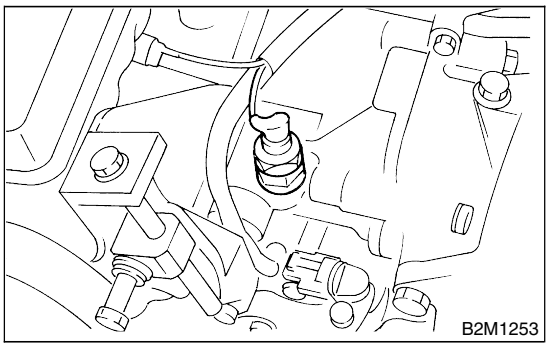
2) Connect fuel hoses.



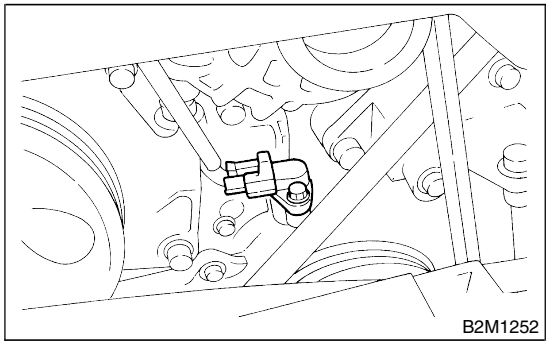
S2M0500D

(A) Fuel delivery hose
(B) Fuel return hose
(C Evaporation hose

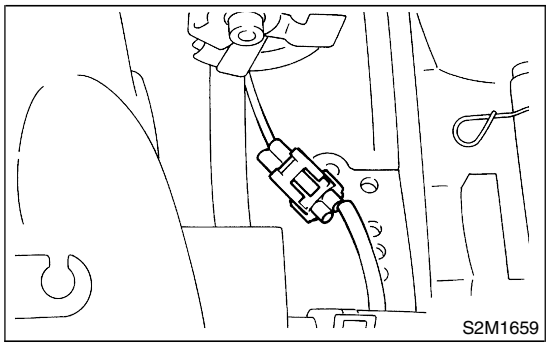
3) Connect connector to oil pressure switch.


B2M1253

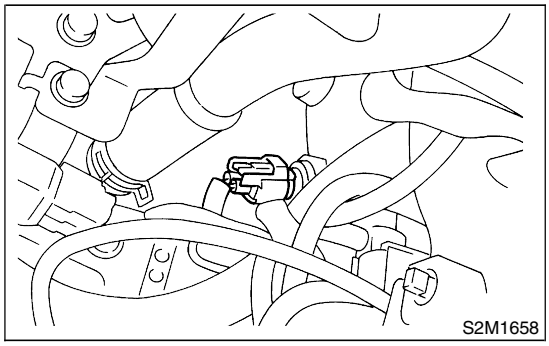
4) Connect connector to crankshaft position sensor.


B2M1252

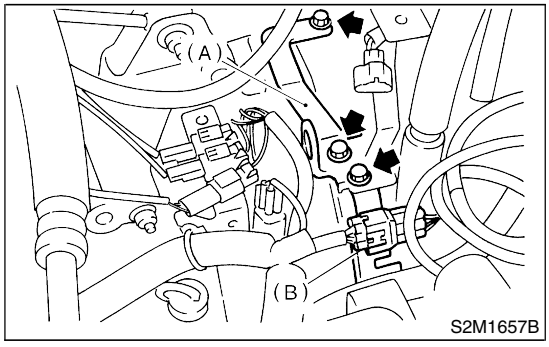
5) Connect knock sensor connector.


S2M1659

6) Connect connectors to engine coolant temperature sensor.

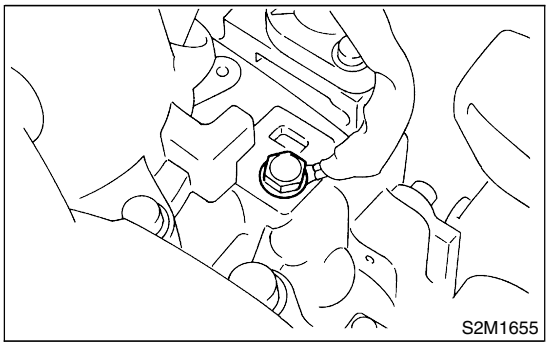

S2M1658

7) Hold engine harness connector onto bracket.
8) Install air cleaner case stay RH and engine harness bracket (A), and connect engine harness connectors (B) to bulkhead connectors.

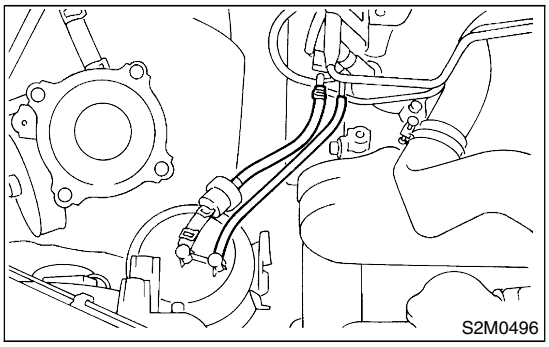


S2M1657B

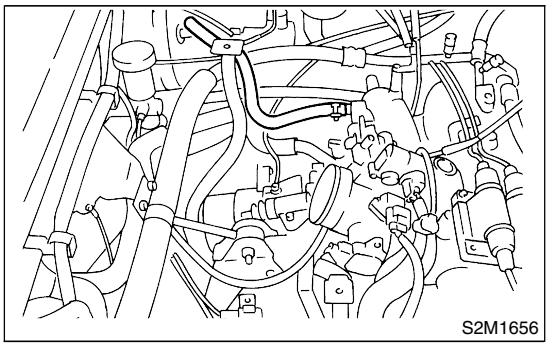
9) Tighten bolt which installs engine harness ground terminal.


S2M1655

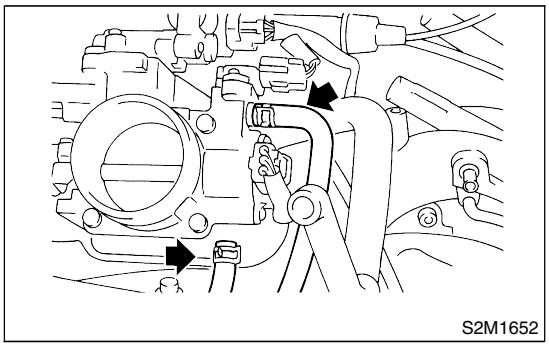
10) Connect canister hoses to pipes.


S2M0496

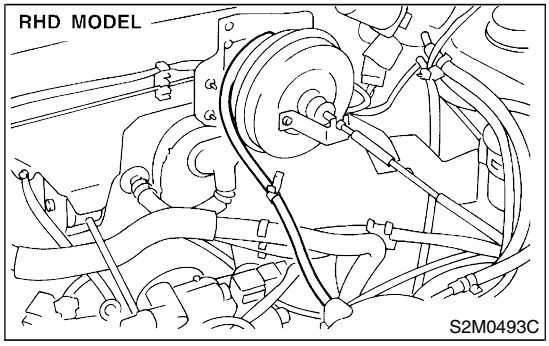
11) Connect brake booster hose.


S2M1656

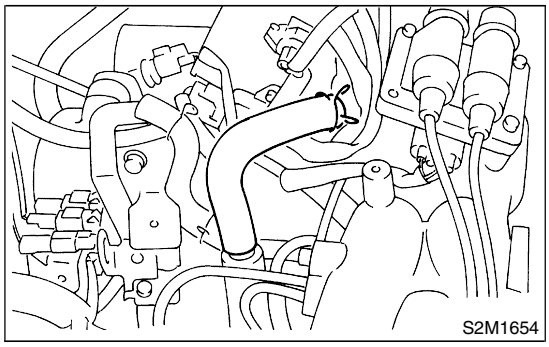
12) Connect engine coolant hose to throttle body.


S2M1652

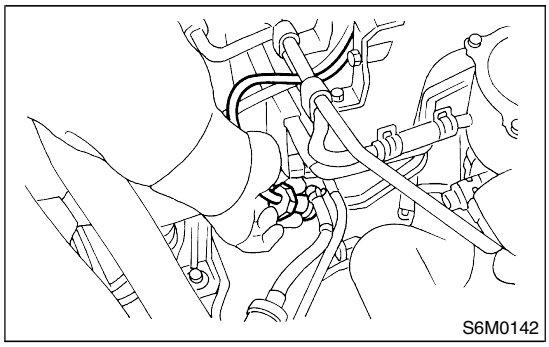
13) Connect vacuum hose to cruise control diaphragm. (With cruise control models)



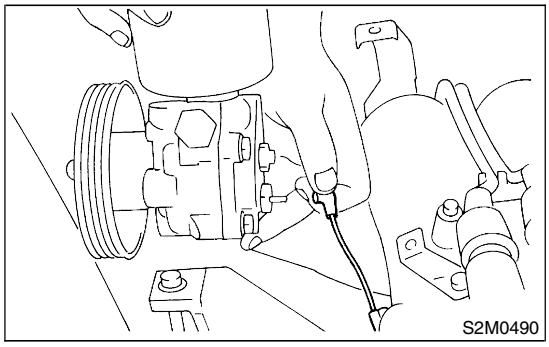
14) Connect PCV hose to intake manifold.



15) Connect spark plug cords to spark plugs.

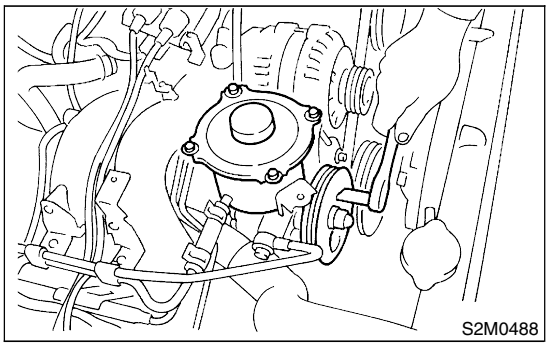


16) Install power steering pump on bracket.
(1) Connect terminal to power steering pump switch.

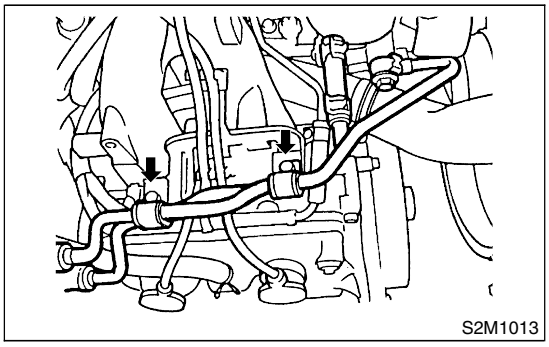


(2) Tighten bolts which install power steering pump on bracket.

Tightening torque:
20.1 N·m (2.05 kgf-m, 14.8 ft-lb)

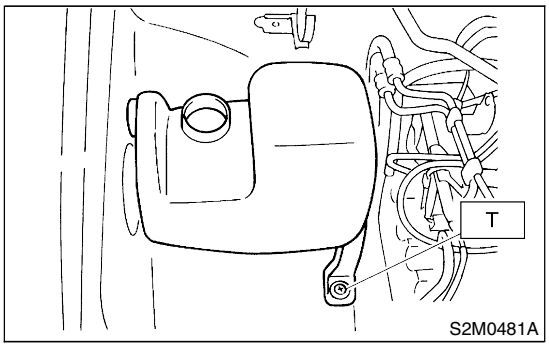


(3) Install power steering pipe brackets on right side intake manifold.

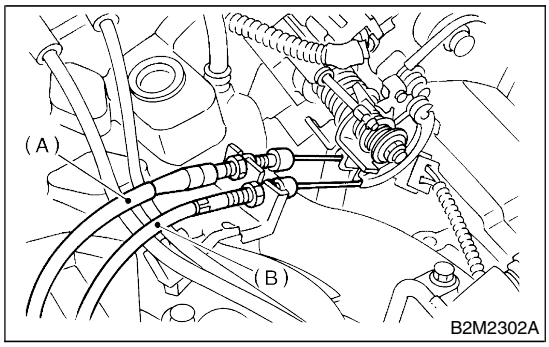


(4) Install power steering pump drive V-belt. <Ref. to ME(SOHC)-42, INSTALLATION, V-belt.>
(5) Install resonator chamber.

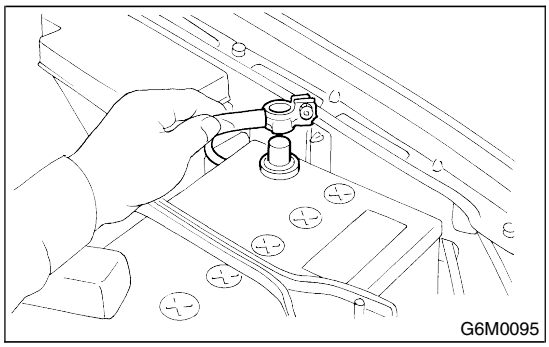
Tightening torque:
T: 33 N·m (3.4 kgf-m, 25 ft-lb)



17) Connect accelerator cable (A).
18) Connect cruise control cable (B). (With cruise control models)

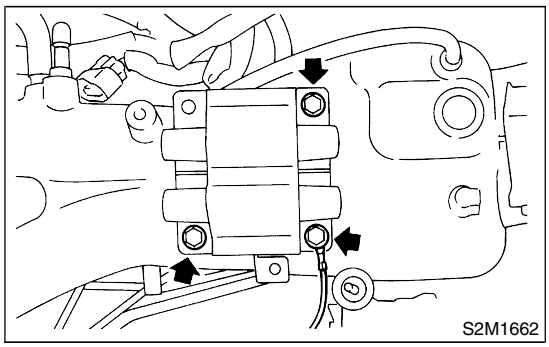


19) Install air cleaner case and air intake duct. <Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.> and <Ref. to N(SOHC)-8, INSTALLATION, Air Intake Duct.>
20) Connect connector to fuel pump relay. <Ref. to FU(SOHCw/oOBD)-40, INSTALLATION, Fuel Pump Relay.>
21) Connect battery ground cable.

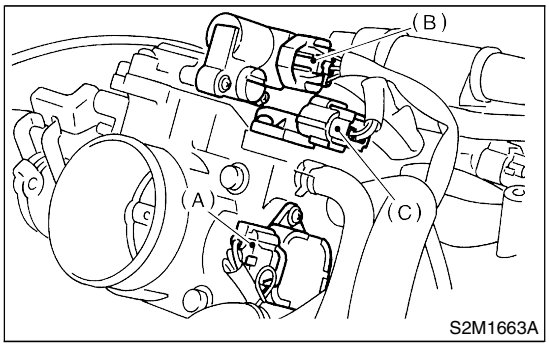


C: DISASSEMBLY S165034A06

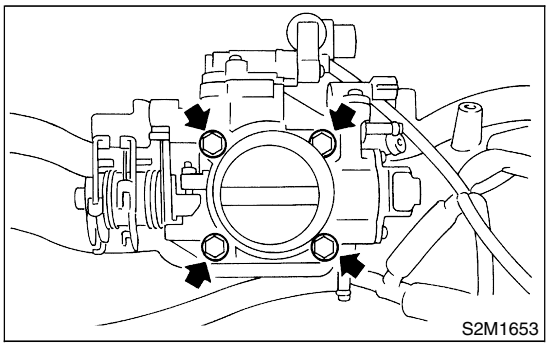
1) Disconnect connector from ignition coil and ignitor assembly.
2) Remove ignition coil and ignitor assembly.



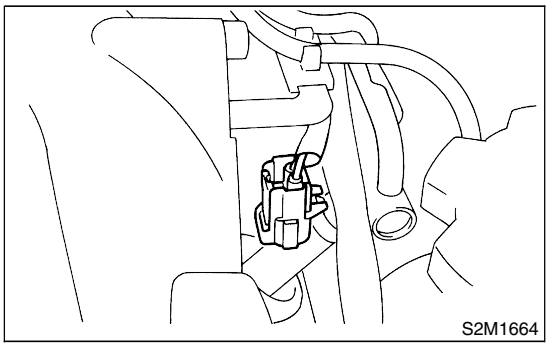
3) Disconnect connectors from throttle position sensor (A), idle air control solenoid valve (B) and pressure sensor (C).



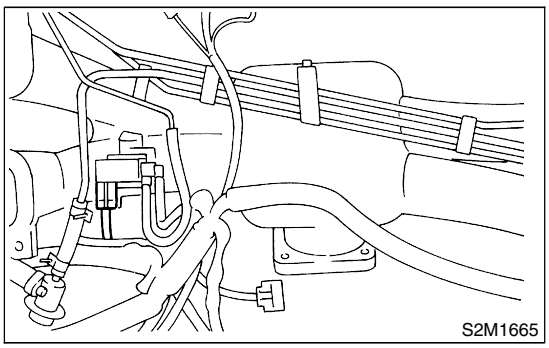
4) Remove throttle body.



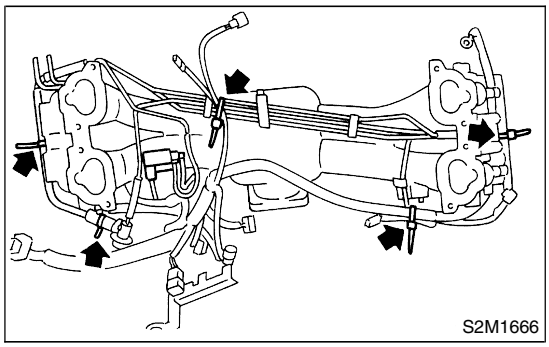
5) Disconnect connectors from fuel injectors.



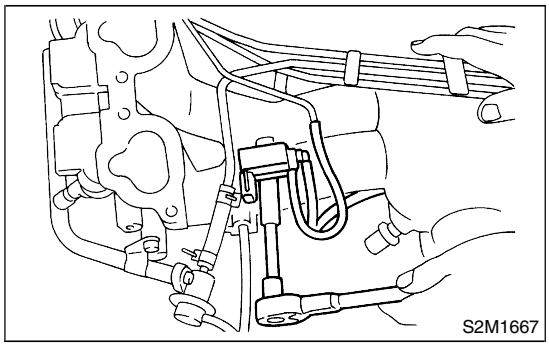
6) Disconnect connector from purge control solenoid valve.



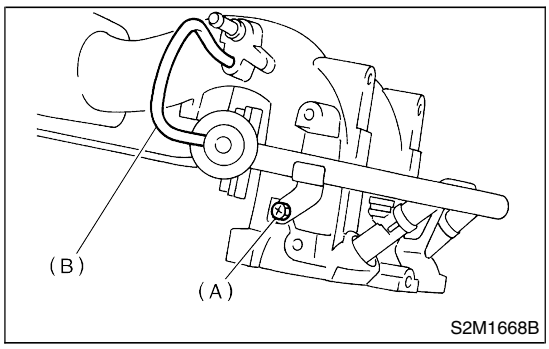
7) Remove harness bands which hold engine harness onto intake manifold.


S2M1666

8) Remove engine harness from intake manifold.
9) Remove purge control solenoid valve.

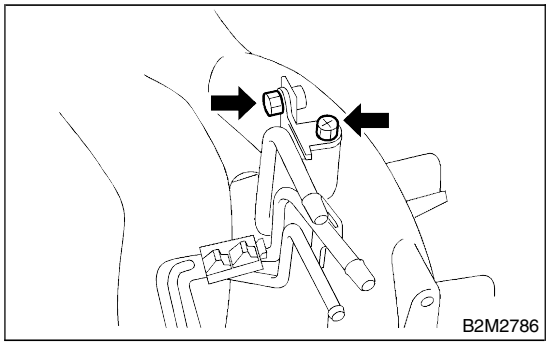

S2M1667

10) Disconnect pressure regulator vacuum hose (B) from intake manifold.
11) Remove bolt (A) which installs injector pipe on intake manifold.

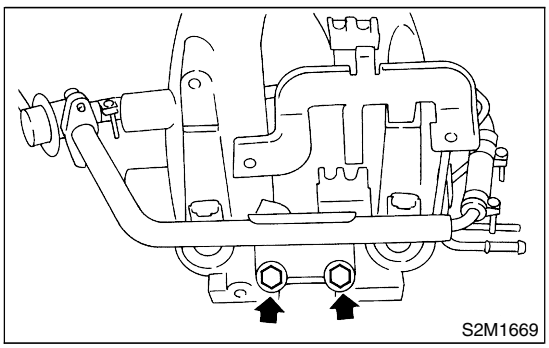


S2M1668B

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

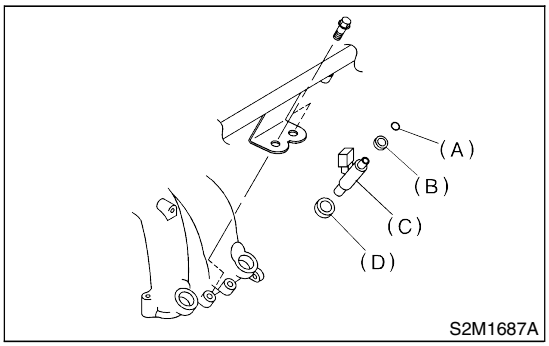

B2M2786

13) Remove the four bolts which install injector pipe on intake manifold.


S2M1669

14) Remove fuel injectors.

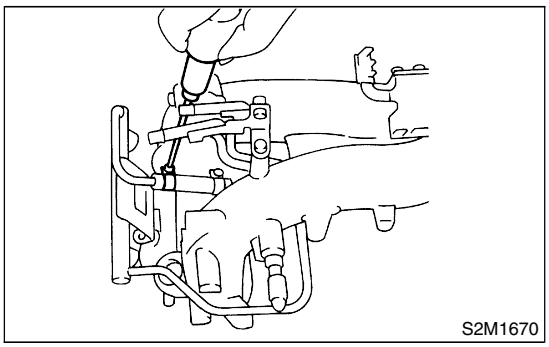
CAUTION:
Replace O-rings and insulators with new ones.



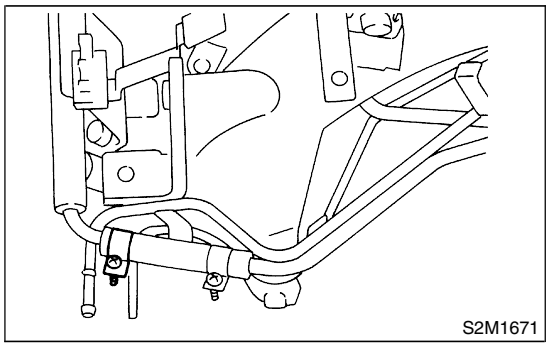
S2M1687A

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

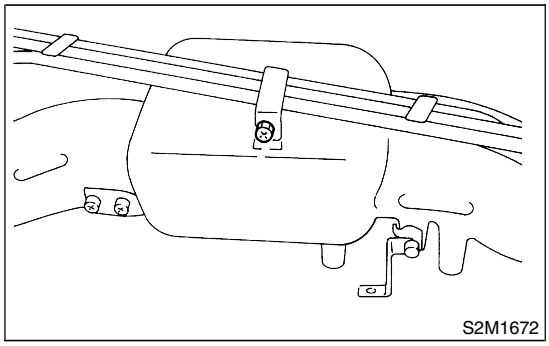
15) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.


S2M1670

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


S2M1671

17) Remove the bolt which installs fuel pipes on intake manifold.

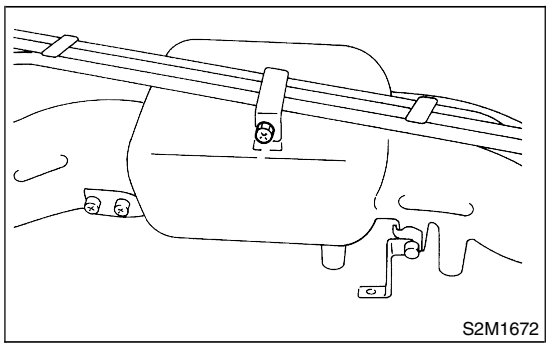

S2M1672

18) Remove fuel injector pipe.
19) Remove fuel pipe assembly, pressure regulator, etc. from intake manifold.

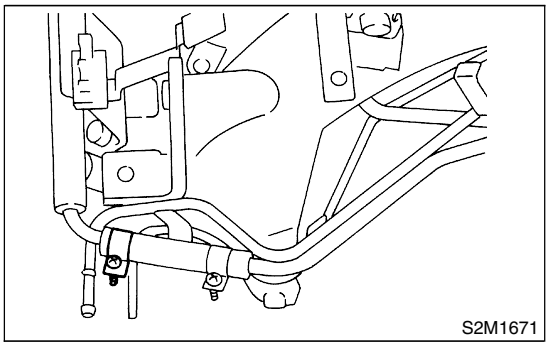
D: ASSEMBLY *S165034A02*

1) Install fuel pipe assembly, pressure regulator, etc. to intake manifold.
2) Install fuel injector pipe.
3) Tighten the bolt which installs fuel pipes on intake manifold.

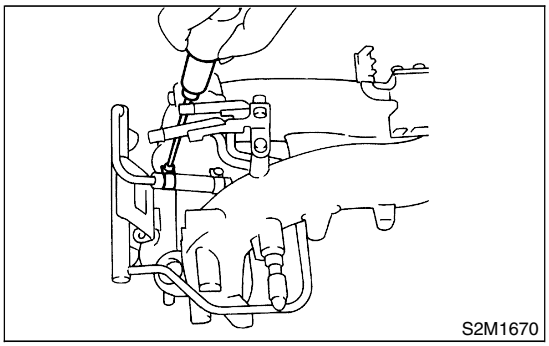
Tightening torque:
4.9 N·m (0.5 kgf-m, 3.6 ft-lb)


S2M1672

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

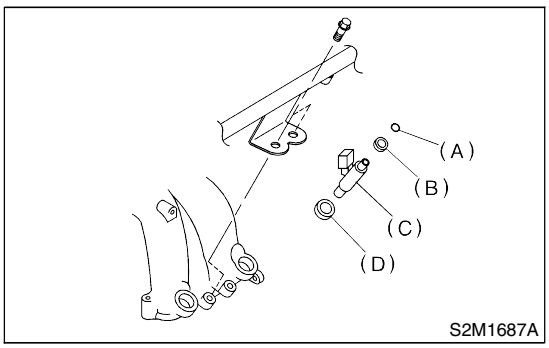

S2M1671

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


S2M1670

6) Install fuel injectors.

NOTE:
Always use new O-rings and insulators.

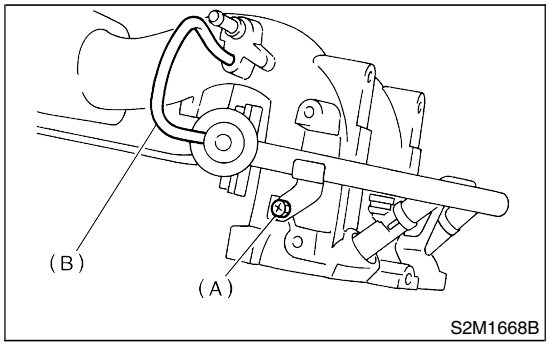


S2M1687A

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

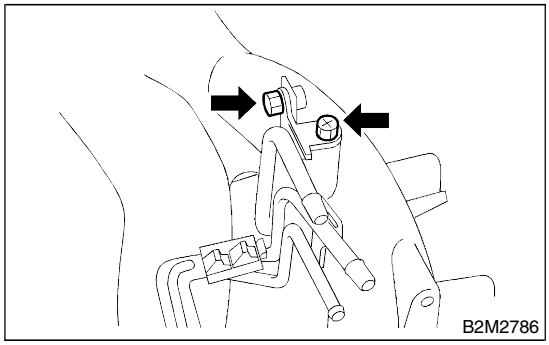
7) Tighten bolt (A) which installs injector pipe on intake manifold and connect pressure regulator vacuum hose (B).

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



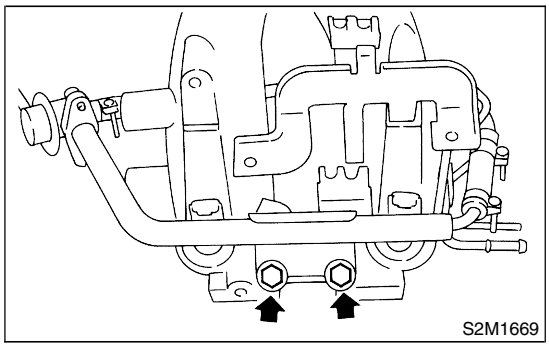
8) Tighten the two bolts which install fuel pipes on the left side of intake manifold.

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

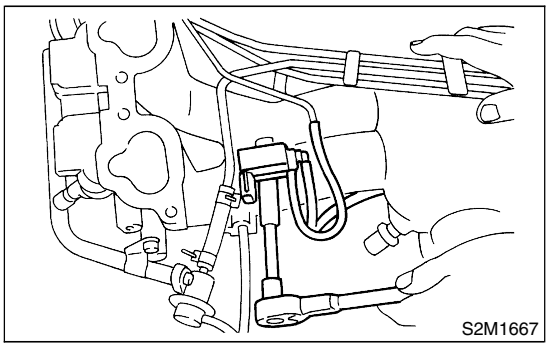


9) Tighten the four bolts which install injector pipe on intake manifold.

Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)

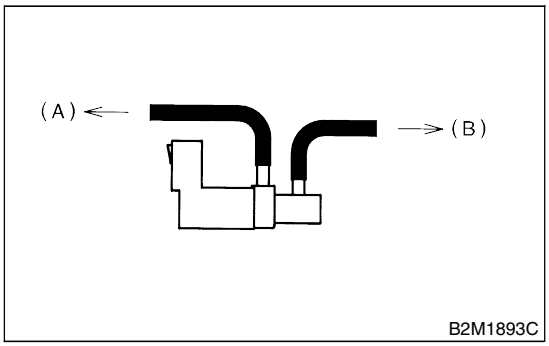


10) Install purge control solenoid valve.



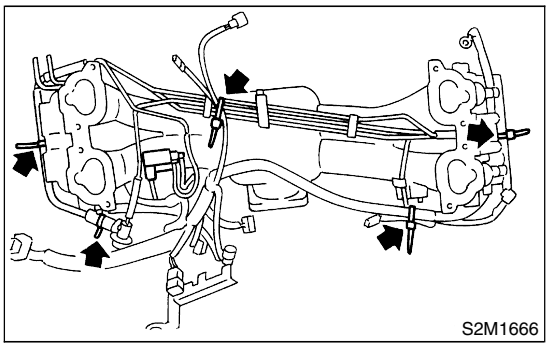
11) Connect hoses to purge control solenoid valve.

CAUTION:
Carefully connect the evaporation hoses.



(A) To fuel pipe
(B) To intake manifold

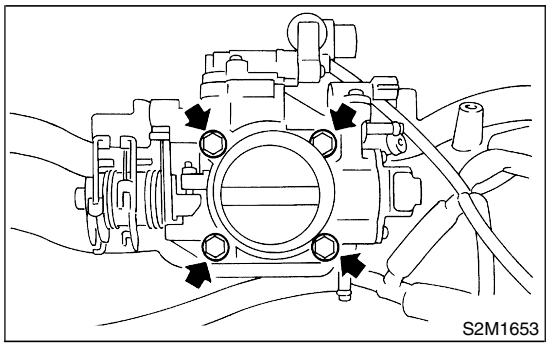
12) Install engine harness onto intake manifold.
13) Connect connectors and pipes to fuel injectors and purge control solenoid valve.
14) Hold engine harness by harness bands.



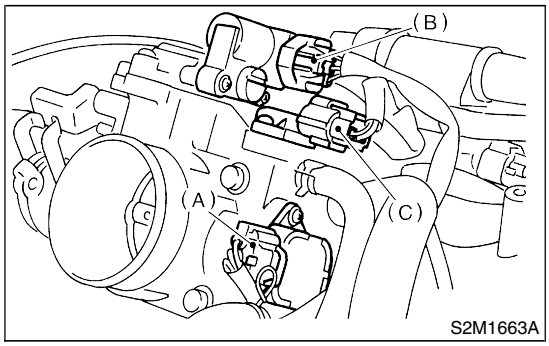
15) Assemble throttle body to intake manifold.

NOTE:
Replace gasket with a new one.

Tightening torque:
22 N·m (2.2 kgf-m, 15.9 ft-lb)



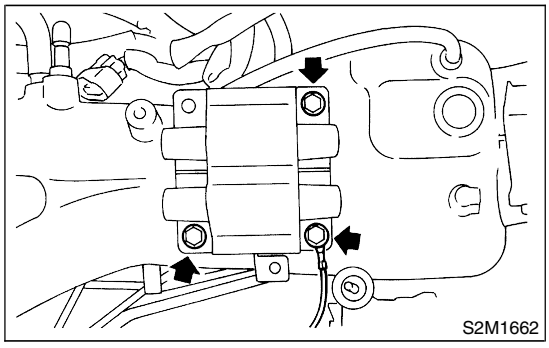
16) Connect connectors to throttle position sensor (A), idle air control solenoid valve (B) and pressure sensor (C).



17) Install ignition coil and ignitor assembly.

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

NOTE:
Do not forget to installs ground terminal on ignition coil and ignitor assembly.



18) Connect connector to ignition coil and ignitor assembly.

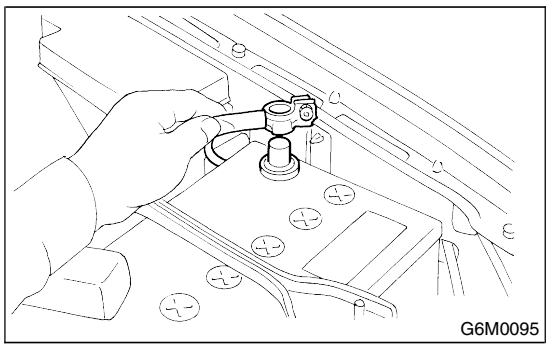
E: INSPECTION S165034A10

Make sure the fuel pipe and fuel hoses are not cracked and that connections are tight.

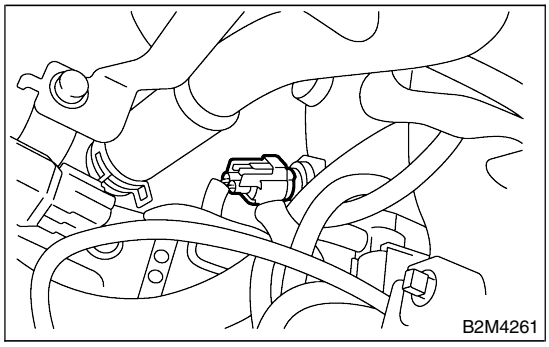
4. Engine Coolant Temperature Sensor S165047

A: REMOVAL S165047A18

1) Disconnect battery ground cable.


G6M0095

2) Remove air intake duct and air cleaner case. <Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
3) Disconnect connector from engine coolant temperature sensor.

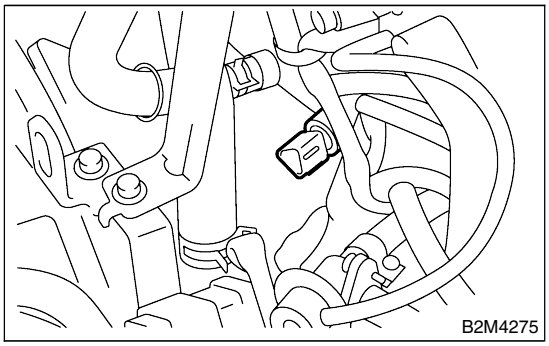

B2M4261

4) Remove engine coolant temperature sensor.

B: INSTALLATION S165047A11

Install in the reverse order of removal.

Tightening torque:
18 N·m (1.8 kgf-m, 13 ft-lb)

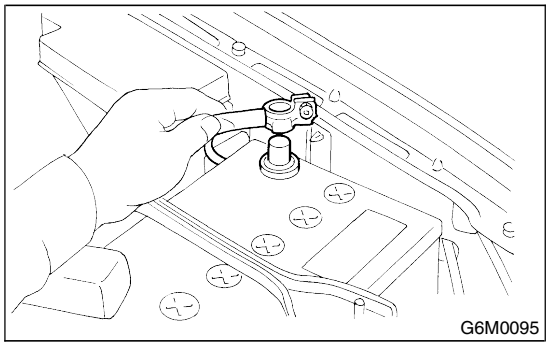

B2M4275

5. Crankshaft Position Sensor

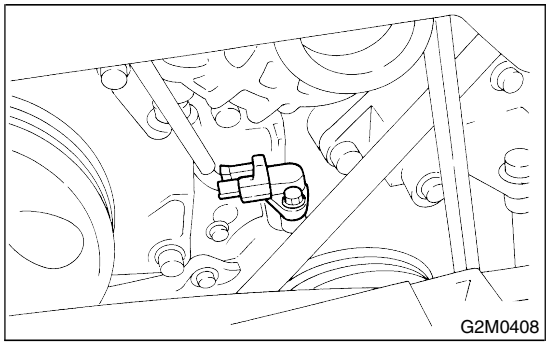
S165043

A: REMOVAL S165043A18

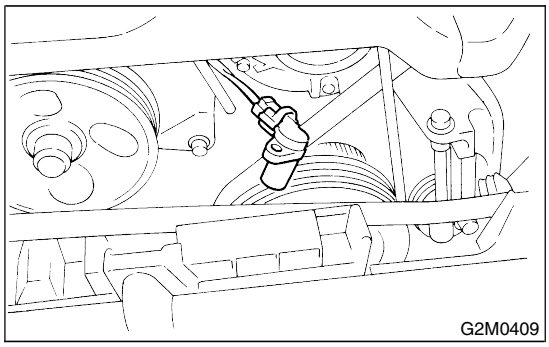
1) Disconnect battery ground cable.


G6M0095

2) Remove bolt which install crankshaft position sensor to cylinder block.


G2M0408

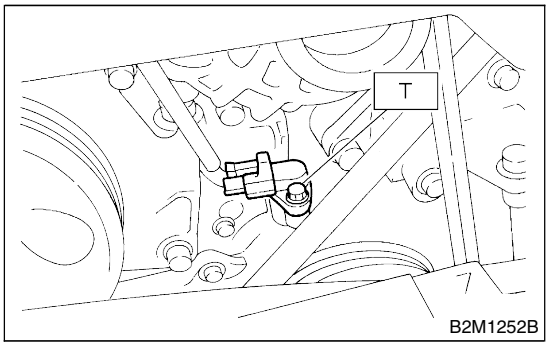
3) Remove crankshaft position sensor, and disconnect connector from it.


G2M0409

B: INSTALLATION S165043A11

Install in the reverse order of removal.

Tightening torque:
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

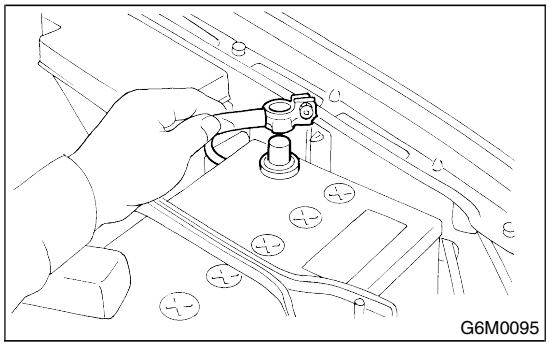


B2M1252B

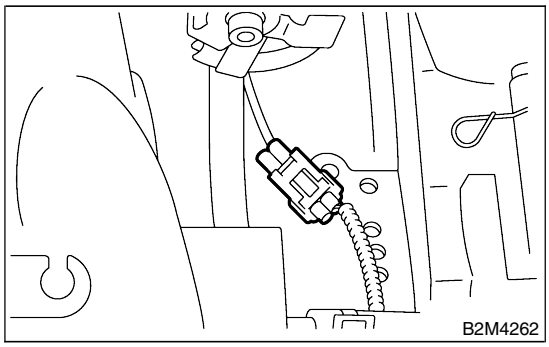
6. Knock Sensor S165042

A: REMOVAL S165042A18

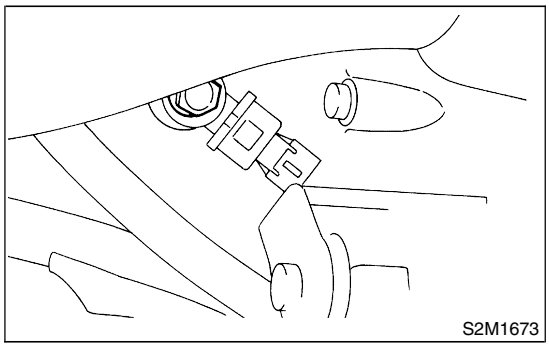
1) Disconnect battery ground cable from battery ground terminal.



2) Remove air cleaner case.
<Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
3) Disconnect knock sensor connector.



4) Remove knock sensor from cylinder block.

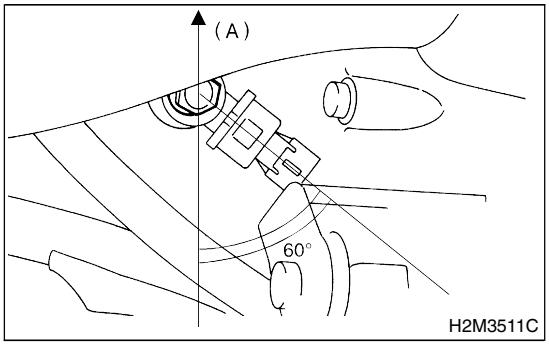


B: INSTALLATION S165042A11

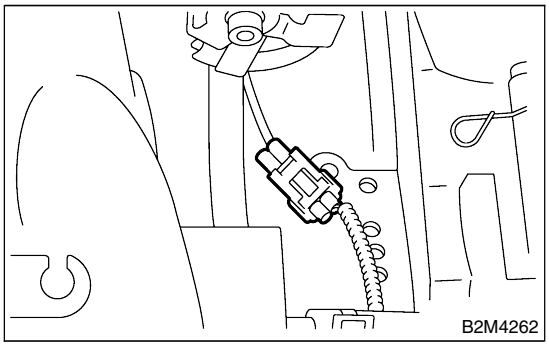
1) Install knock sensor to cylinder block.

Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)

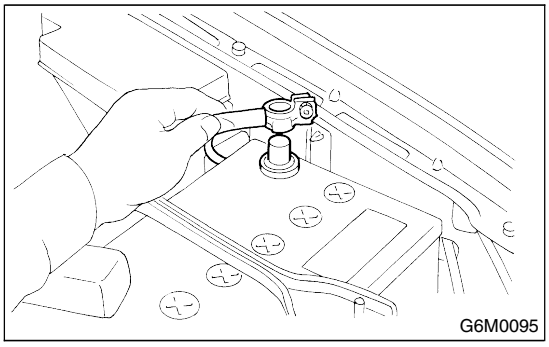
NOTE:
The extraction area of the knock sensor cord must be positioned at a 60° angle relative to the engine rear.



2) Connect knock sensor connector.



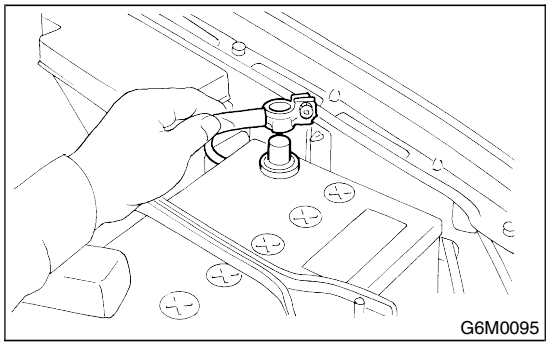
3) Install air cleaner case.
<Ref. to IN(SOHC)-7, INSTALLATION, Air Cleaner Case.>
4) Connect battery ground cable.



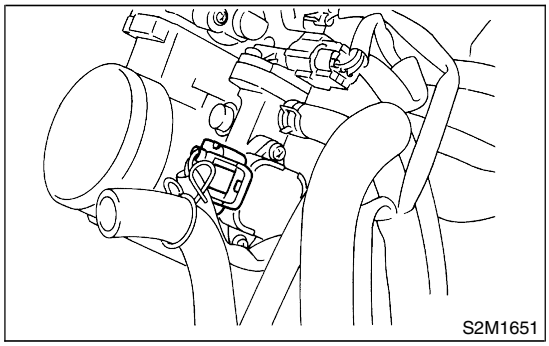
7. Throttle Position Sensor S165039

A: REMOVAL S165039A18

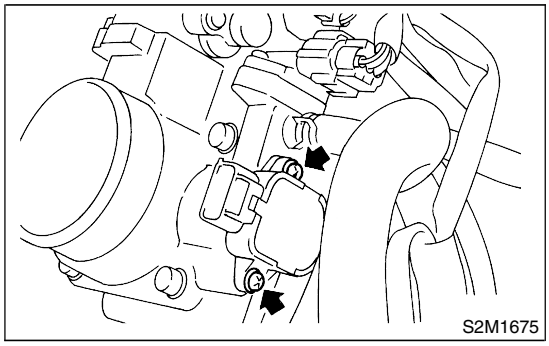
1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector from throttle position sensor.


S2M1651

3) Remove throttle position sensor holding screws, and remove it.

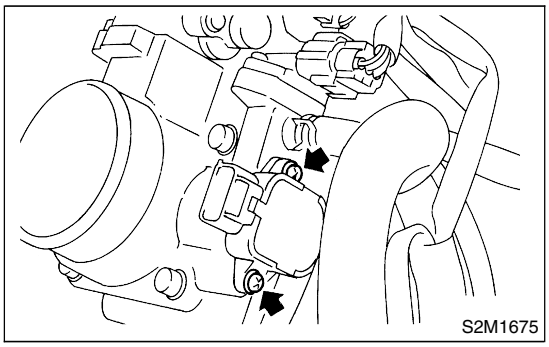

S2M1675

B: INSTALLATION S165039A11

Install in the reverse order of removal.

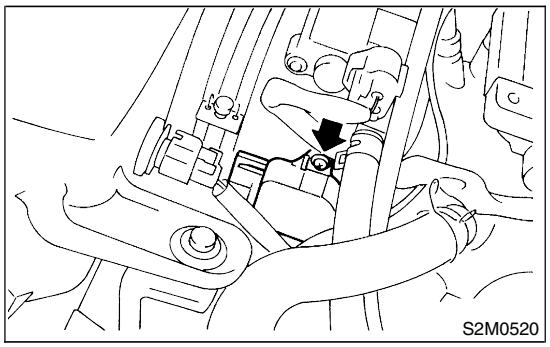
Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

CAUTION:
When installing throttle position sensor, adjust to the specified data.

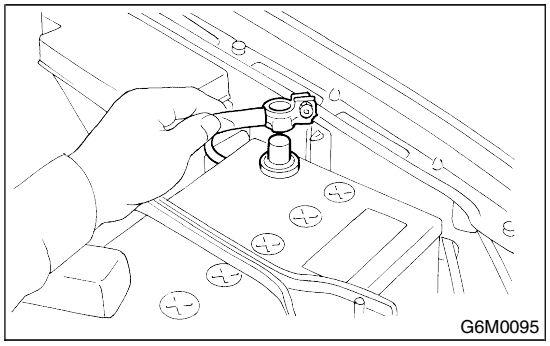

S2M1675

C: ADJUSTMENT S165039A01

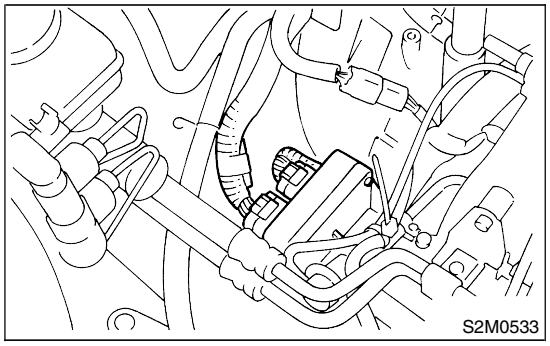
1) Turn ignition switch to OFF.
2) Loosen throttle position sensor holding screws.


S2M0520

3) When using voltage meter;
   (1) Disconnect battery ground cable.


G6M0095

   (2) Disconnect connectors from ECM.

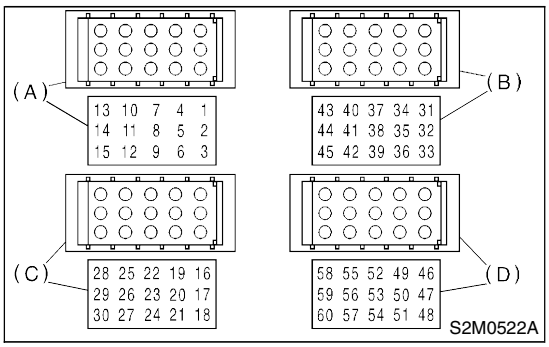

S2M0533

   (3) Set ST to ECM.

ST 498307600 CHECK BOARD KIT

   (4) Connect battery ground cable.
   (5) Turn ignition switch to ON.
   (6) Adjust throttle position sensor so that signal voltage on CHECK BOARD may be in specification.

Terminal / Specified voltage
(C) No. 23 — (C) No. 24 / 0.45 — 0.55 V
[Fully closed.]

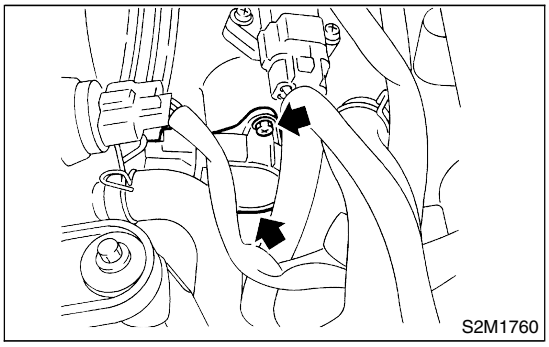


S2M0522A

   (7) Tighten throttle position sensor holding screws.

Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

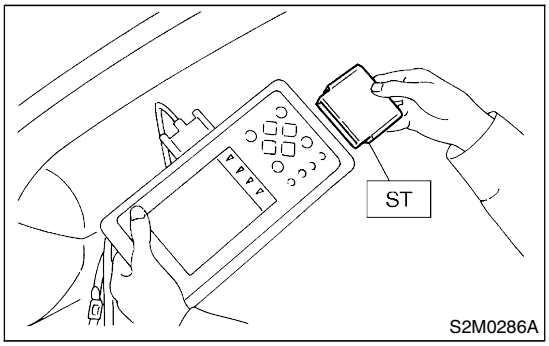
CAUTION:
When removing ST from ECM, disconnect battery ground cable.


S2M1760

4) When using Subaru Select Monitor;

NOTE:
For detailed operation procedures, refer to the Subaru Select Monitor Operation Manual.

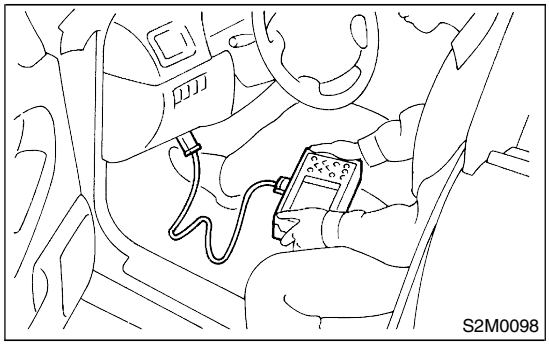
   (1) Insert the cartridge to Subaru Select Monitor. <Ref. to FU(SOHCw/oOBD)-10, PREPARATION, General Description.>



S2M0286A

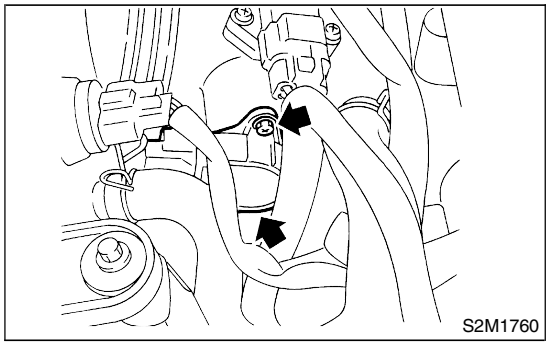
(2) Connect Subaru Select Monitor to the data link connector.
(3) Turn ignition switch to ON, and Subaru Select Monitor switch to ON.
(4) Select {2. Each System Check} in Main Menu.
(5) Select {Engine Control System} in Selection Menu.
(6) Select {1. Current Data Display & Save} in Engine Diagnosis.
(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


S2M0098

(9) Tighten throttle position sensor holding screws.

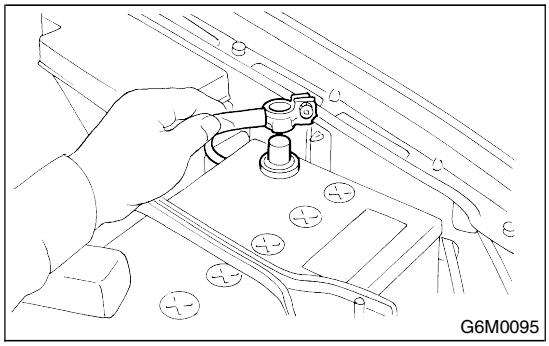
Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)


S2M1760

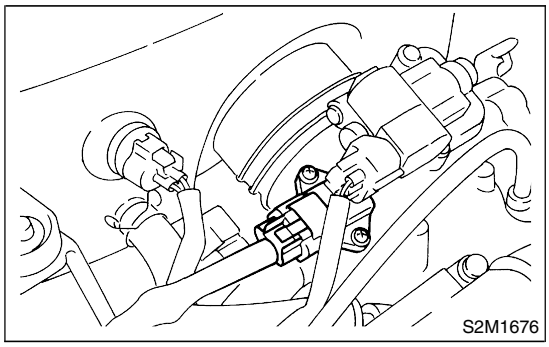
8. Pressure Sensor S165765

A: REMOVAL S165765A18

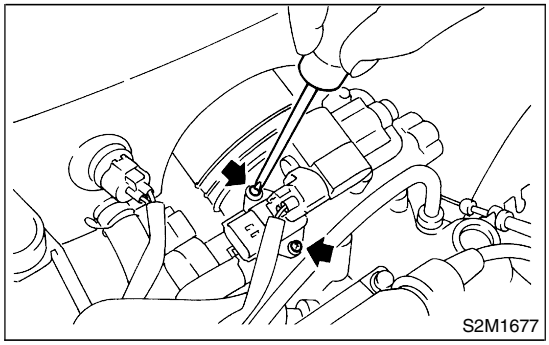
1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector from pressure sensor.


S2M1676

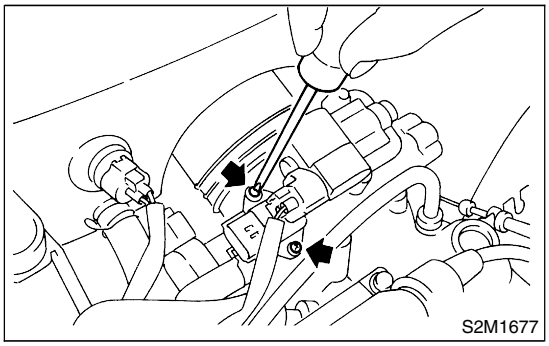
3) Remove pressure sensor from throttle body.


S2M1677

B: INSTALLATION S165765A11

Install in the reverse order of removal.

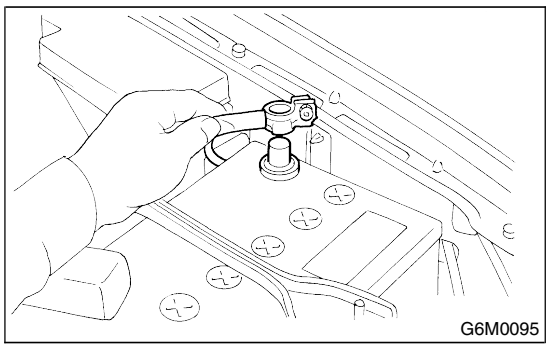
Tightening torque:
2.0 N·m (0.2 kgf-m, 1.4 ft-lb)


S2M1677

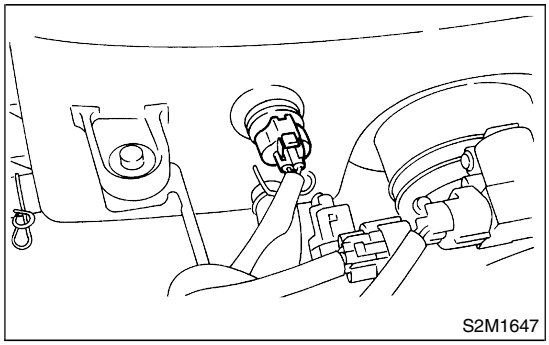
9. Intake Air Temperature Sensor S165569

A: REMOVAL S165569A18

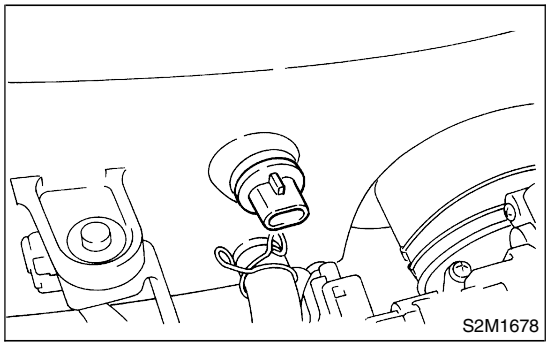
1) Disconnect battery ground cable.



2) Disconnect connector from intake air temperature sensor.

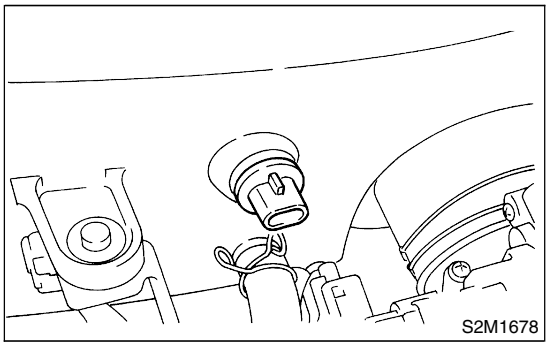


3) Remove intake air temperature sensor from air cleaner case.



B: INSTALLATION S165569A11

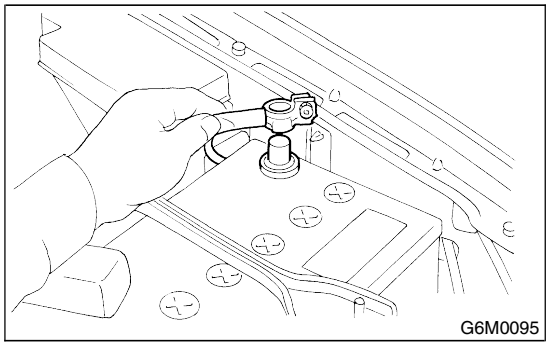
Install in the reverse order of removal.



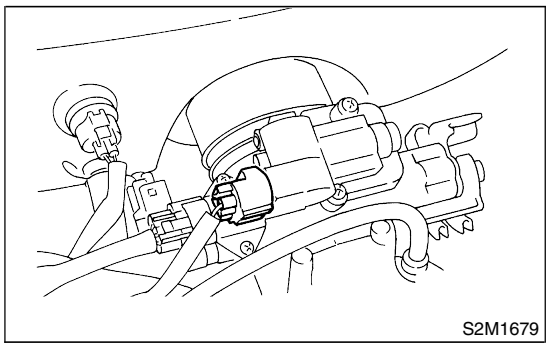
10. Idle Air Control Solenoid Valve S165056

A: REMOVAL S165056A18

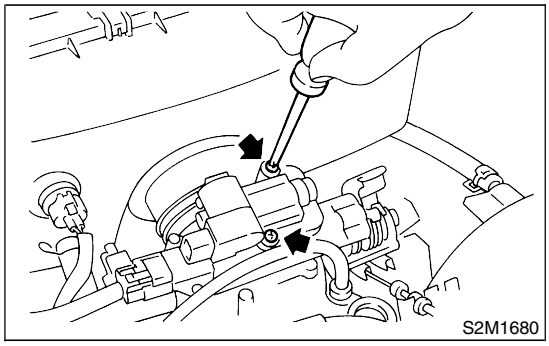
1) Disconnect battery ground cable.



2) Disconnect connector from idle air control solenoid valve.



3) Remove idle air control solenoid valve from throttle body.

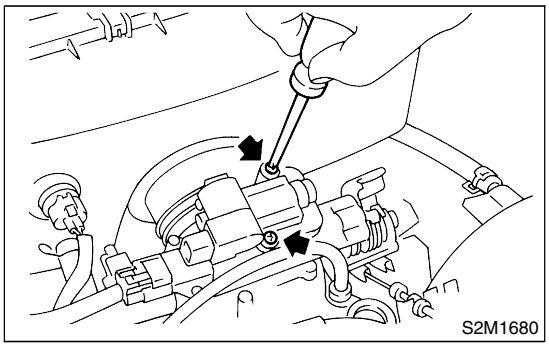


B: INSTALLATION S165056A11

Install in the reverse order of removal.

NOTE:
Always use new gasket.

Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

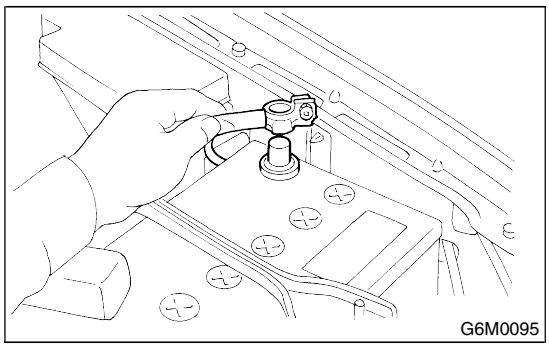


11. Fuel Injector S165051

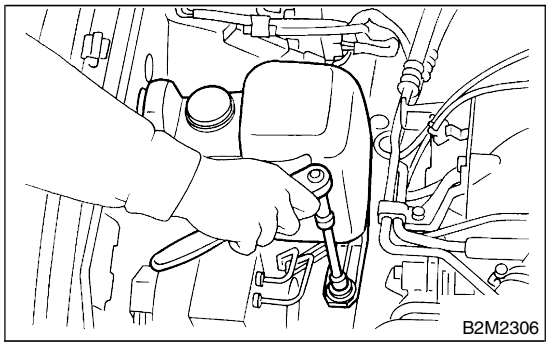
A: REMOVAL S165051A18

1. RH SIDE S165051A1801

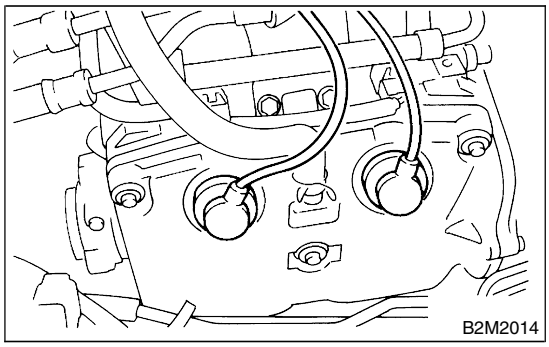
1) Release fuel pressure.
<Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.
3) Disconnect battery ground cable.


G6M0095

4) Remove air intake duct and air cleaner case. <Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.> and <Ref. to IN(SOHC)-7, REMOVAL, Air Cleaner Case.>
5) Remove resonator chamber.

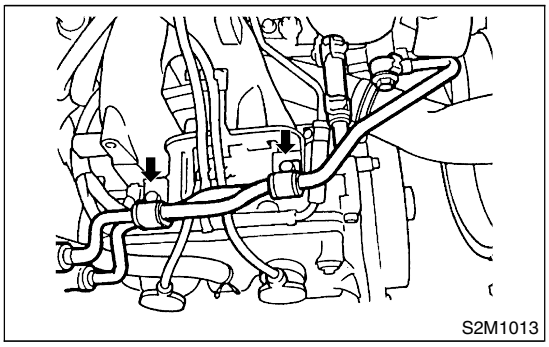

B2M2306

6) Remove spark plug cords from spark plugs (#1 and #3 cylinders).

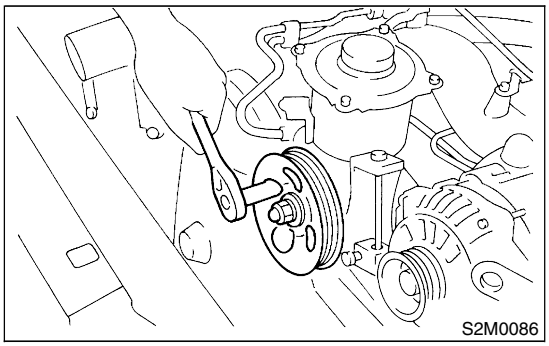

B2M2014

7) Remove power steering pump and tank from brackets.
(1) Remove V-belt.
<Ref. to ME(SOHC)-42, REMOVAL, V-belt.>

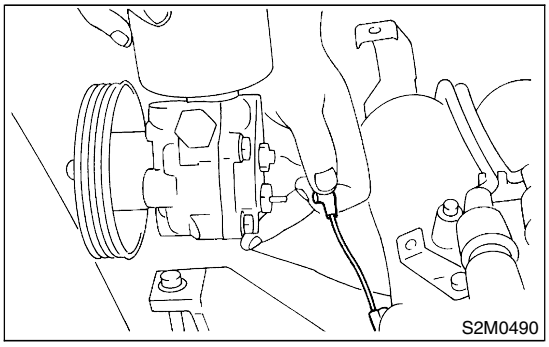
(2) Remove bolts which hold power steering pipe brackets to intake manifold.


S2M1013

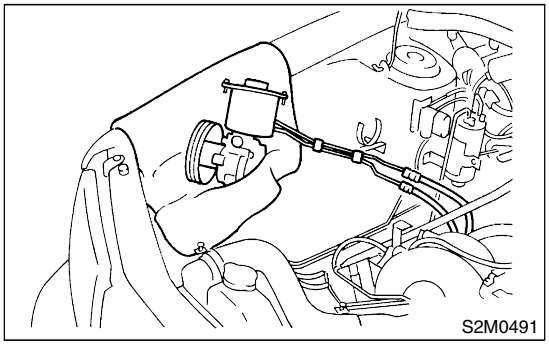
(3) Remove bolts which secure power steering pump to bracket.


S2M0086

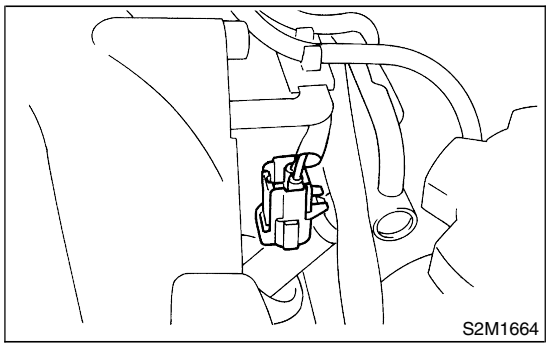
(4) Disconnect connector from power steering pump switch.


S2M0490

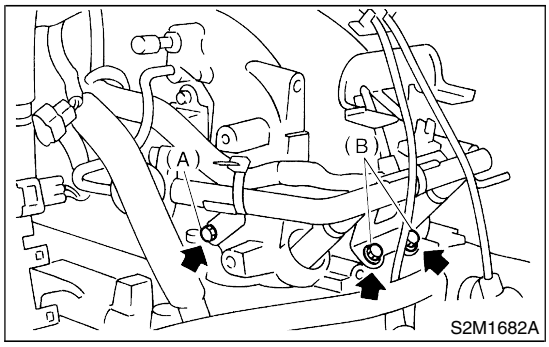
(5) Place power steering pump and tank on the right side wheel apron.


S2M0491

8) Disconnect connector from fuel injector.

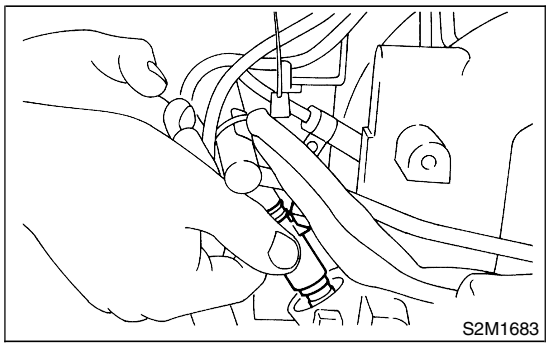

S2M1664

9) Remove bolts (A) and (B) which install injector pipe to intake manifold.



S2M1682A

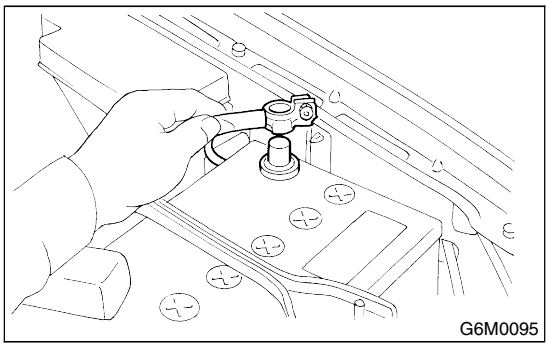
10) Pull up injector pipe, and remove fuel injectors from intake manifold.


S2M1683

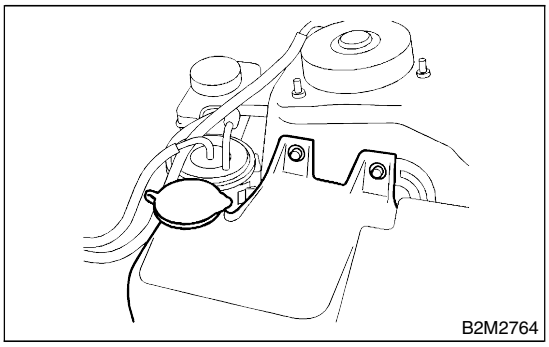
2. LH SIDE *S165051A1802*

1) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.

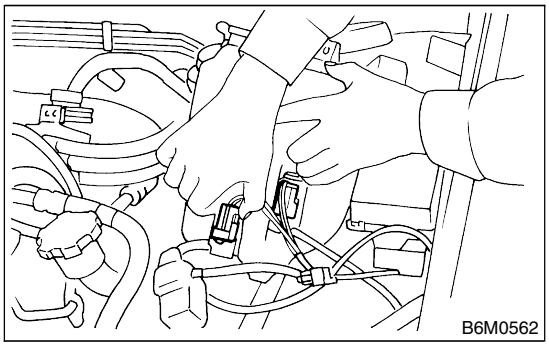
3) Disconnect battery ground cable.


G6M0095

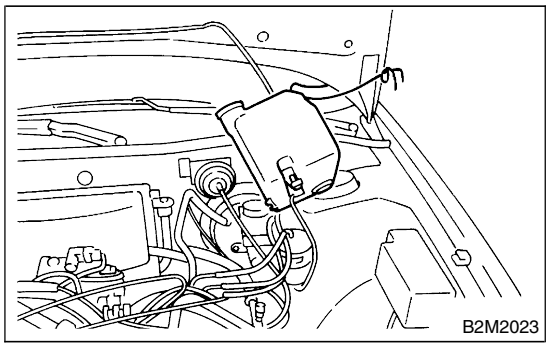
4) Remove two bolts which install washer tank on body.


B2M2764

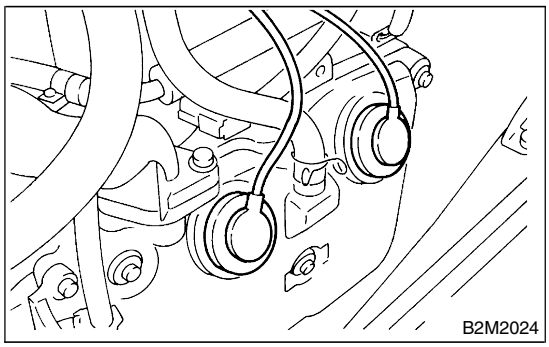
5) Disconnect connector from front window washer motor.
6) Disconnect connector from rear gate glass washer motor.


B6M0562

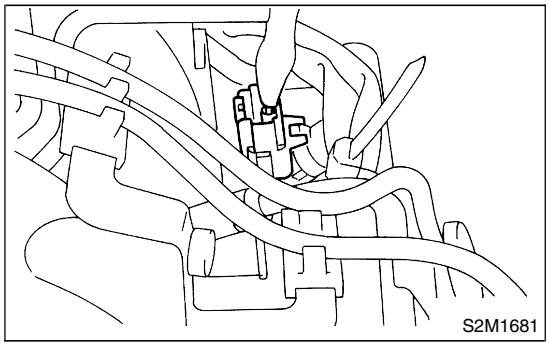
7) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.
8) Move washer tank, and secure it away from working area.


B2M2023

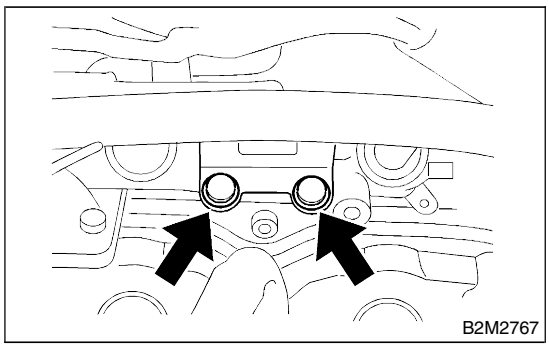
9) Remove spark plug cords from spark plugs (#2 and #4 cylinders).


B2M2024

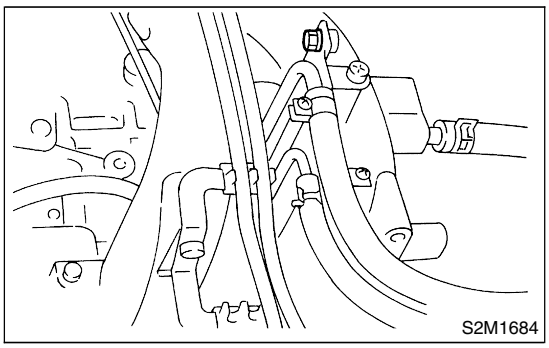
10) Disconnect connector from fuel injector.


S2M1681

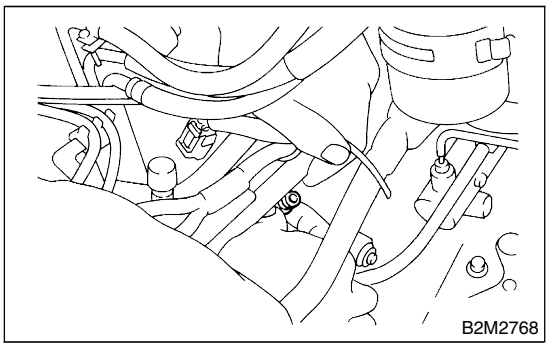
11) Remove bolt which installs injector pipe to intake manifold.


B2M2767

12) Remove bolt which holds fuel pipe on the left side intake manifold.


S2M1684

13) Pull up injector pipe, and remove fuel injectors from intake manifold.

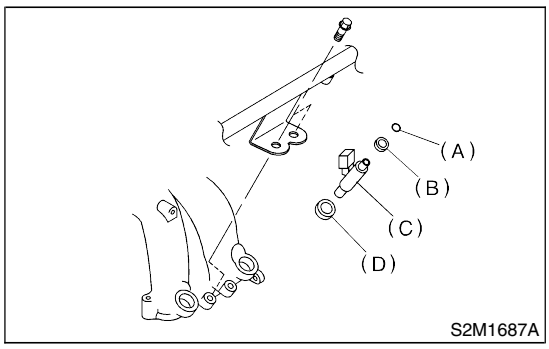

B2M2768

B: INSTALLATION S165051A11

1. RH SIDE S165051A1101

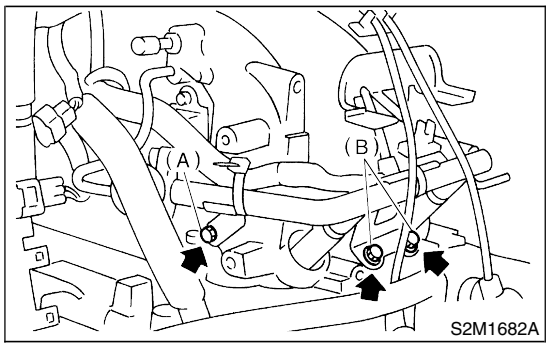
Install in the reverse order of removal.

NOTE:
Replace O-rings with new ones.

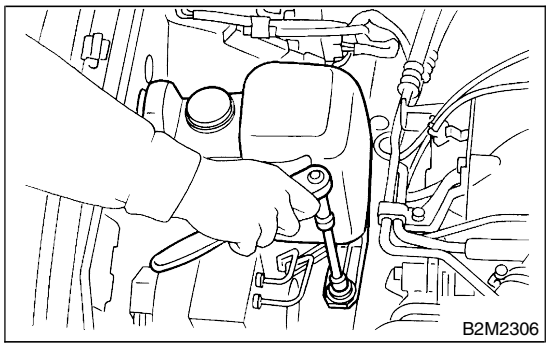


(A) O-ring
(B) Insulator A
(C) Fuel injector
(D) Insulator B

Tightening torque:
Bolt (A) 4.9 N·m (0.50 kgf-m, 3.6 ft-lb)
Bolt (B) 19 N·m (1.9 kgf-m, 13.7 ft-lb)



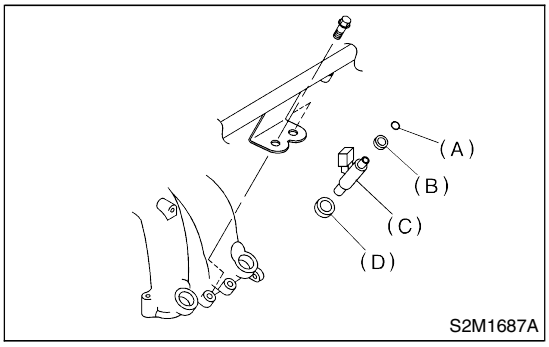
Tightening torque:
32 N·m (3.3 kgf-m, 23.9 ft-lb)



2. LH SIDE S165051A1102

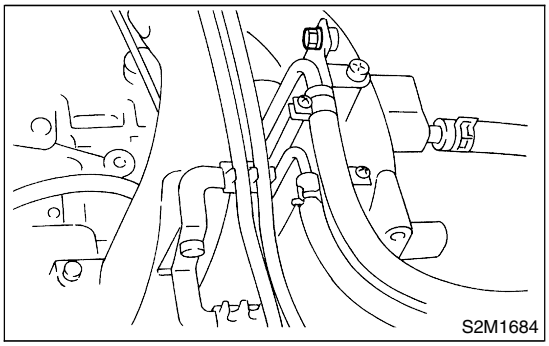
Install in the reverse order of removal.

NOTE:
Replace O-rings with new ones.

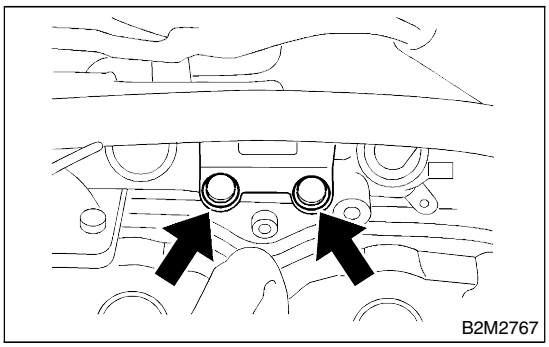


(A) O-ring
(B) Insulator A
(C) Fuel injector
(D) Insulator B

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



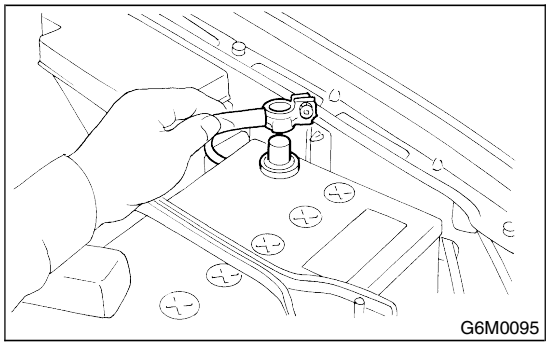
Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



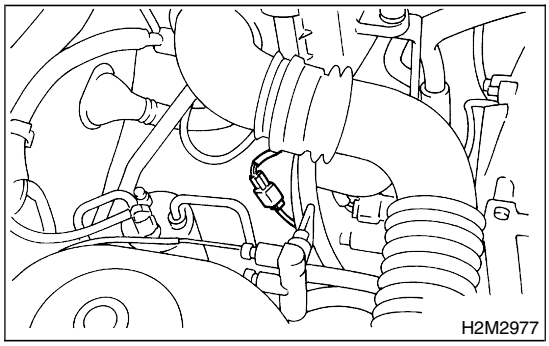
12. Oxygen Sensor S165712

A: REMOVAL S165712A18

1) Disconnect battery ground cable.



2) Disconnect connector from oxygen sensor.

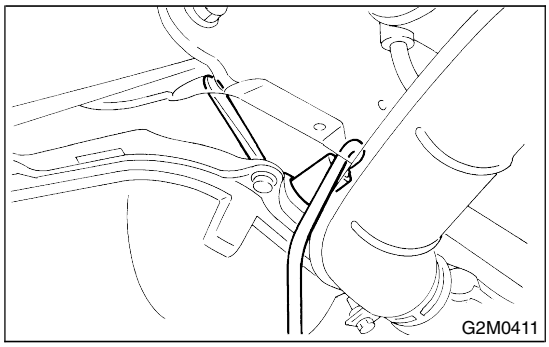


3) Lift-up the vehicle.
4) Apply SUBARU CRC or its equivalent to threaded portion of oxygen sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

5) Remove oxygen sensor.

CAUTION:
When removing the oxygen sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.

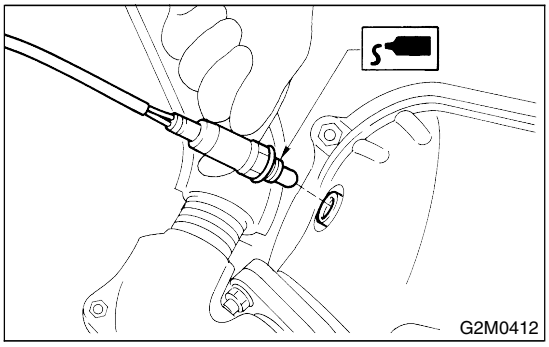


B: INSTALLATION S165712A11

1) Before installing oxygen sensor, apply anti-seize compound only to threaded portion of oxygen sensor to make the next removal easier.

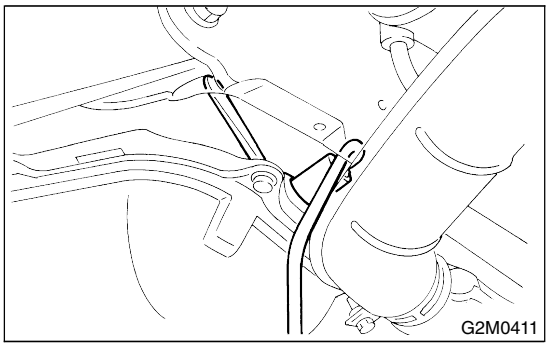
Anti-seize compound:
SS-30 by JET LUBE

CAUTION:
Never apply anti-seize compound to protector of oxygen sensor.

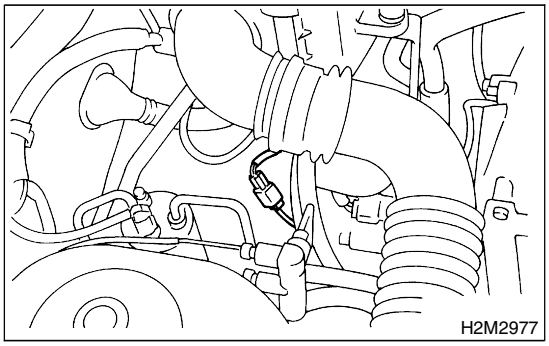


2) Install oxygen sensor.

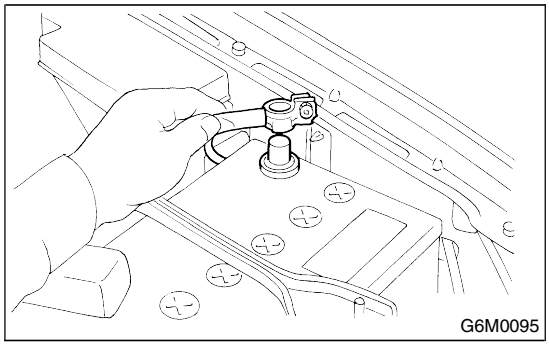
Tightening torque:
21 N·m (2.1 kgf-m, 15.2 ft-lb)



3) Lower the vehicle.
4) Connect connector of oxygen sensor.



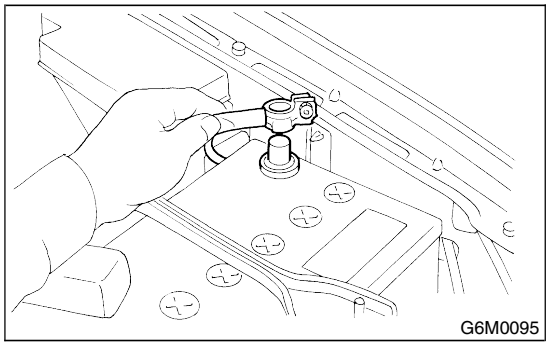
5) Connect battery ground cable.



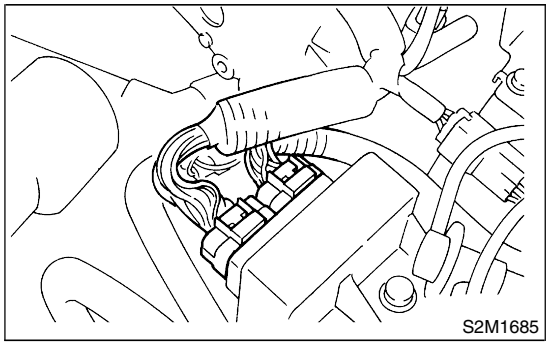
13. Engine Control Module S165049

A: REMOVAL S165049A18

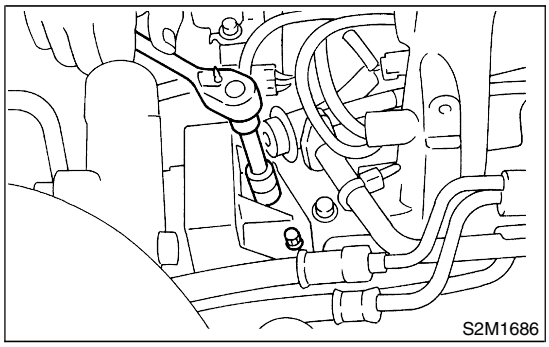
1) Disconnect battery ground cable.


G6M0095

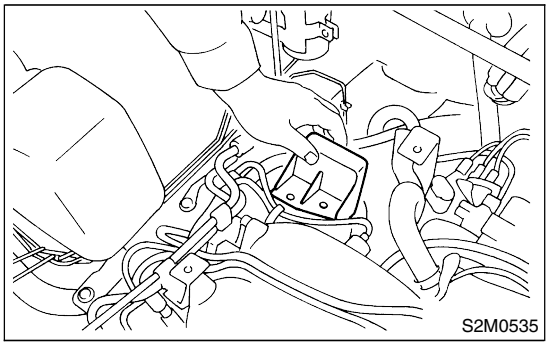
2) Remove air intake duct.
<Ref. to IN(SOHC)-8, REMOVAL, Air Intake Duct.>
3) Disconnect the two connectors from ECM.


S2M1685

4) Remove bolts which install ECM on right side cylinder head.


S2M1686

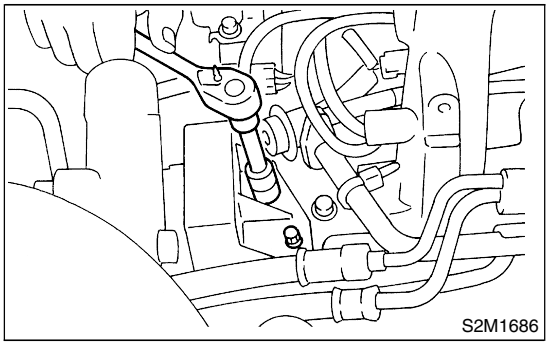
5) Take off ECM from engine compartment.


S2M0535

B: INSTALLATION S165049A11

Install in the reverse order of removal.

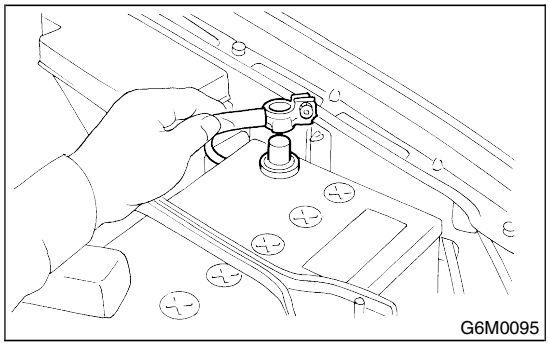
Tightening torque:
23 N·m (2.3 kgf-m, 16.6 ft-lb)


S2M1686

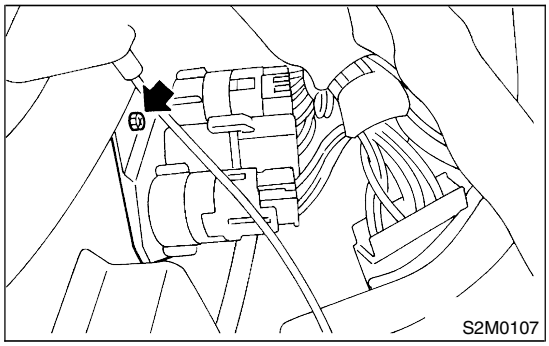
14. Main Relay S165050

A: REMOVAL S165050A18

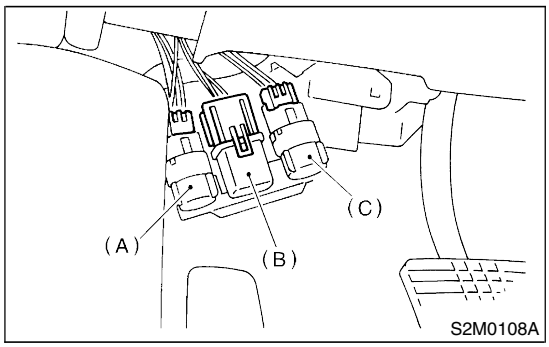
1) Disconnect battery ground cable.


G6M0095

2) Remove bolt which holds bracket of main relay and fuel pump relay.


S2M0107

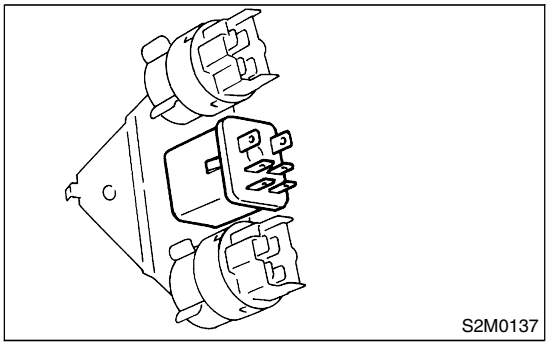
3) Disconnect connectors from relays.



S2M0108A

(A) Blower fan motor relay
(B) Main relay
(C) Fuel pump relay

4) Remove main relay from mounting bracket.


S2M0137

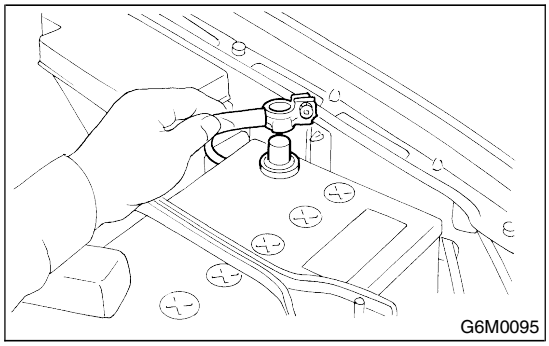
B: INSTALLATION S165050A11

Install in the reverse order of removal.

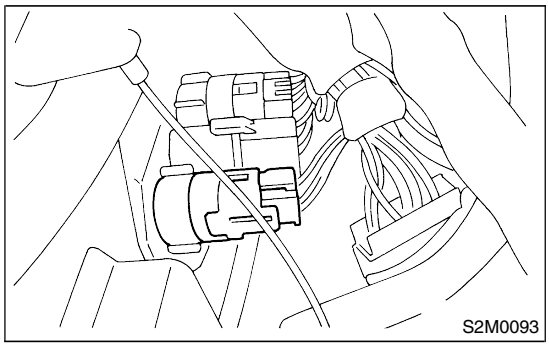
15. Fuel Pump Relay S165048

A: REMOVAL S165048A18

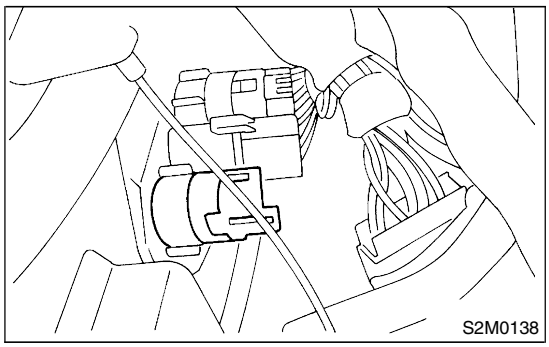
1) Disconnect battery ground cable.



2) Disconnect connector from fuel pump relay.



3) Remove fuel pump relay from mounting bracket.



B: INSTALLATION S165048A11

Install in the reverse order of removal.

16. Fuel S165052

A: OPERATION S165052A16

1. RELEASING OF FUEL PRESSURE

S165052A1601

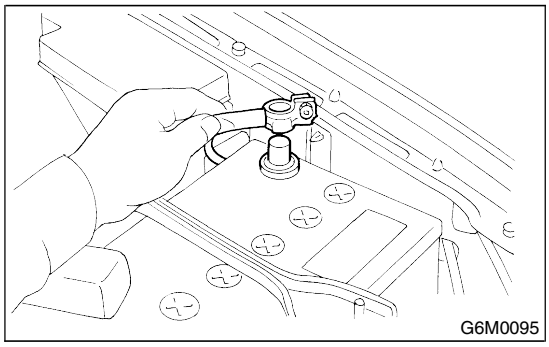
WARNING:
- **Place "No fire" signs near the working area.**
- **Disconnect ground terminal from battery.**

1) Disconnect connector from fuel pump relay. <Ref. to FU(SOHCw/oOBD)-40, REMOVAL, 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.

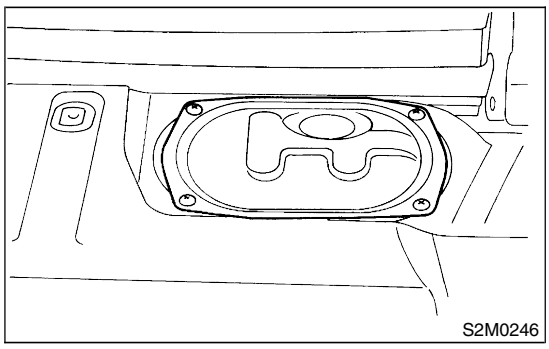
2. DRAINING OF FUEL S165052A1602

WARNING:
- **Place "No fire" signs near the working area.**
- **Be careful not to spill fuel on the floor.**

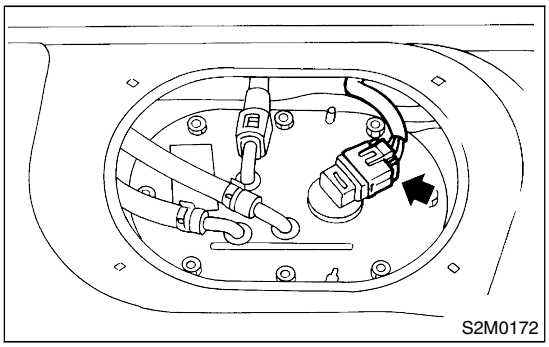
1) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.
3) Disconnect battery ground cable.


G6M0095

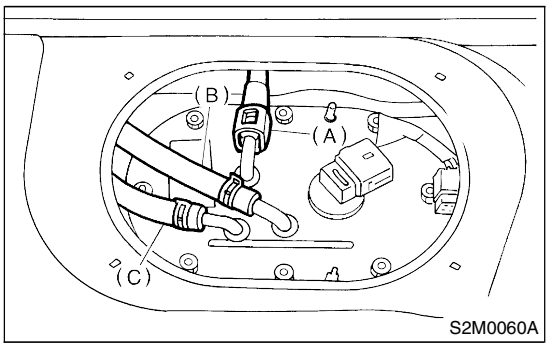
4) Remove the floor box located just behind the rear seats.
5) Remove access hole lid.


S2M0246

6) Disconnect connector from fuel pump.

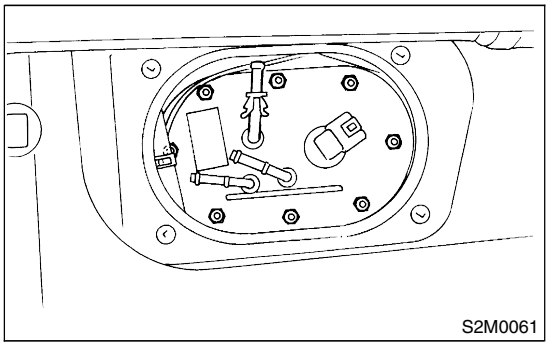

S2M0172

7) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU(SOHCw/oOBD)-56, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
8) Move clips, and then disconnect fuel return hose (B) and jet pump hose (C).

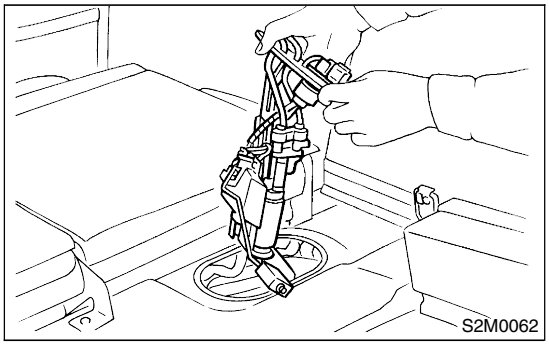


S2M0060A

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

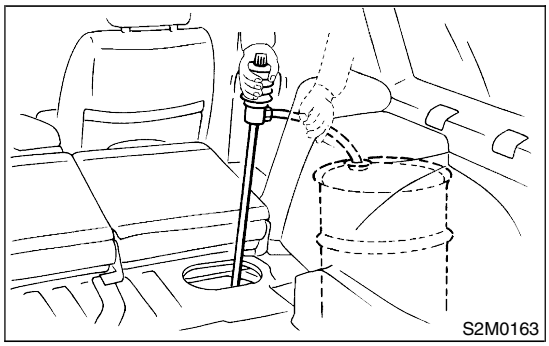

S2M0061

10) Take off fuel pump from fuel tank.

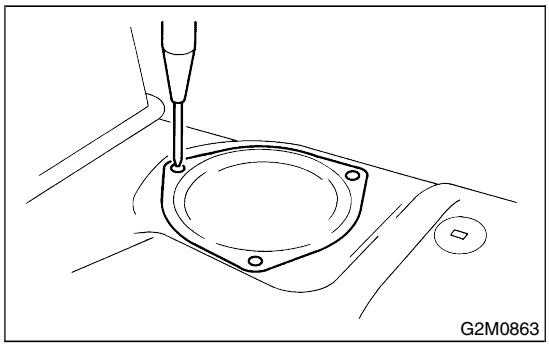

S2M0062

11) Drain fuel from fuel tank by using a hand pump.

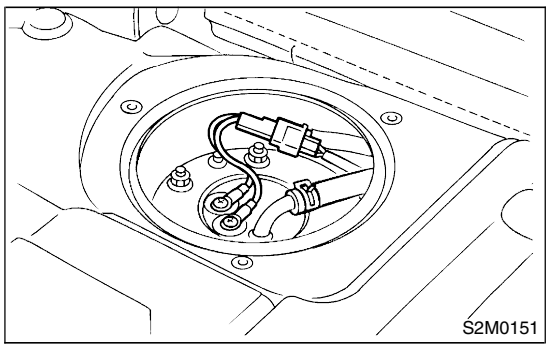
WARNING:
Do not use a motor pump when draining fuel.


S2M0163

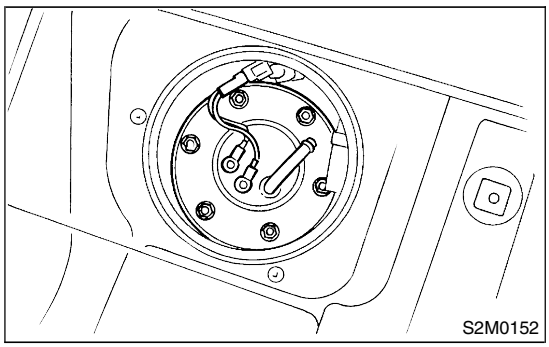
12) Remove service hole cover.


G2M0863

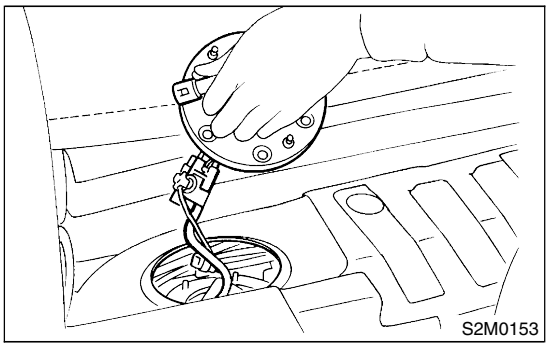
13) Disconnect connector from fuel sub meter.
14) Disconnect fuel jet pump hose.


S2M0151

15) Remove bolts which install fuel sub meter unit on fuel tank.

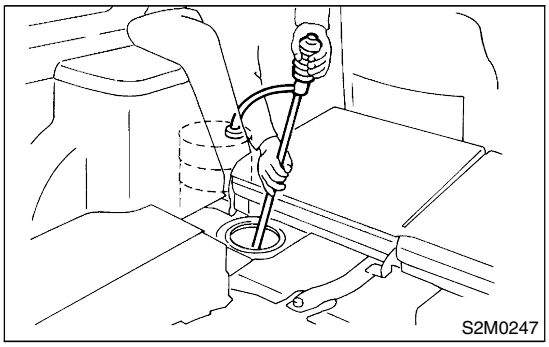

S2M0152

16) Remove fuel sub meter unit.


S2M0153

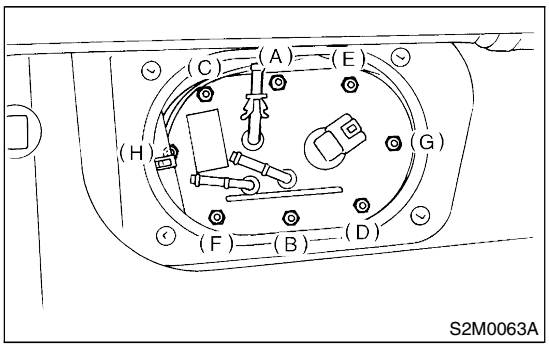
17) Drain fuel from there.

WARNING:
Do not use a motor pump when draining fuel.


S2M0247

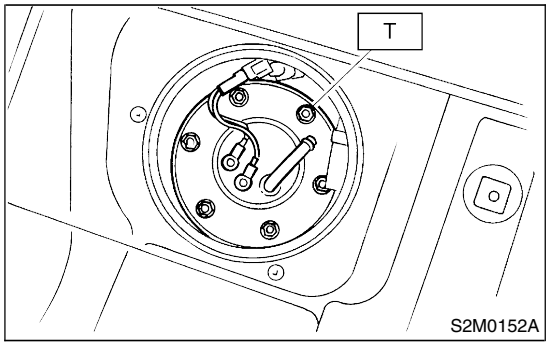
18) After draining fuel, reinstall fuel pump and fuel sub meter unit.
Tighten nuts of fuel pump in alphabetical sequence shown in figure to specified torque.

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



S2M0063A

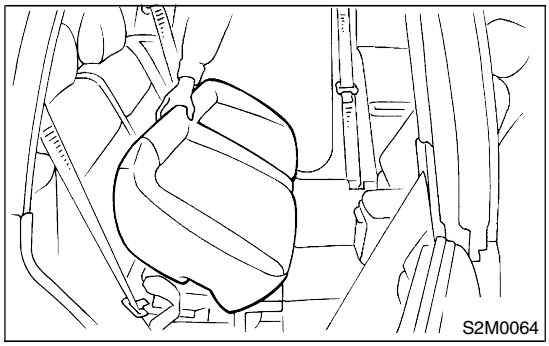
Tightening torque:
T: 4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



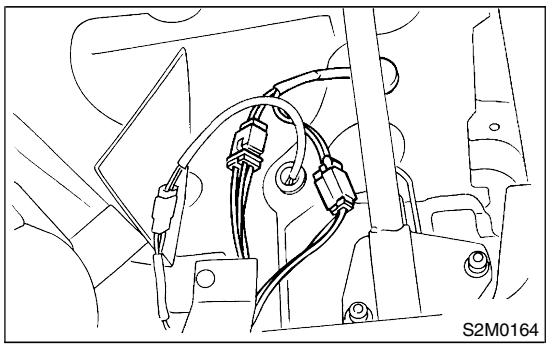
17. Fuel Tank S165053

A: REMOVAL S165053A18

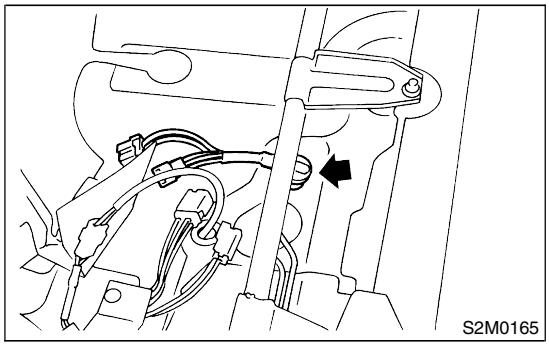
1) Set vehicle on the lift.
2) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
3) Drain fuel from fuel tank. <Ref. to FU(SOHCw/oOBD)-41, DRAINING OF FUEL, OPERATION, Fuel.>
4) Remove rear seat cushion, and turn up cover.


S2M0064

5) Disconnect connector of fuel tank cord from rear harness.


S2M0164

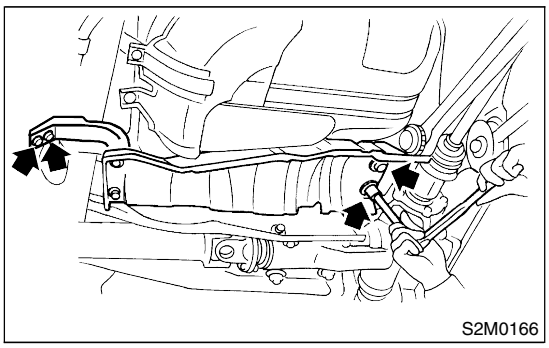
6) Push grommet which holds fuel tank cord on floor panel into under the body.


S2M0165

7) Lift-up the vehicle.
8) Remove rear exhaust pipe. <Ref. to EX(SOHCw/oOBD)-10, REMOVAL Rear Exhaust Pipe.>

NOTE:
To facilitate the removal of parts, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.
SUBARU CRC (Part No. 004301003)

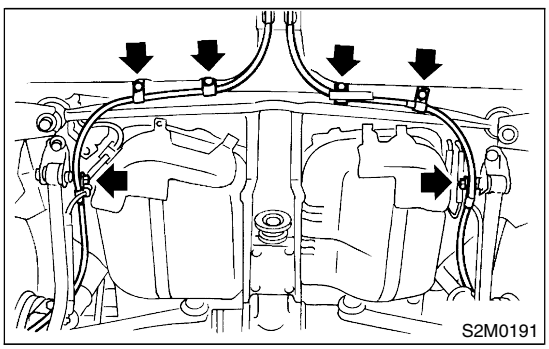
9) Remove heat sealed cover.


S2M0166

10) Remove muffler assembly.
<Ref. to EX(SOHCw/oOBD)-12, REMOVAL Muffler.>

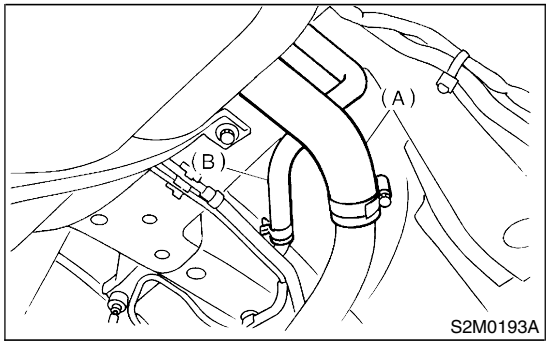
NOTE:
To facilitate the removal of parts, apply a coat of SUBARU CRC to matching area of rubber cushions in advance.
SUBARU CRC (Part No. 004301003)

11) Remove bolts which hold parking brake cable holding bracket.

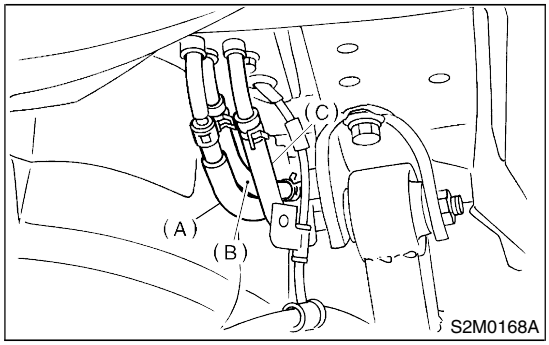

S2M0191

12) Remove rear differential assembly. <Ref. to DI-25, REMOVAL, Rear Differential for T-type.> and <Ref. to DI-42, REMOVAL, Rear Differential for VA-type.>
13) Remove rear crossmember. <Ref. to RS-20, REMOVAL, Rear Crossmember.>

14) Loosen clamp, and disconnect fuel filler hose (A) and air vent hose (B) from fuel filler pipe.

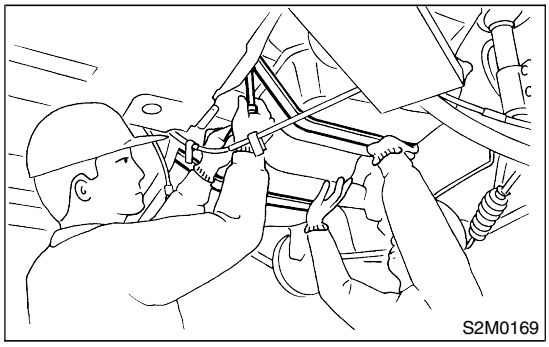


15) Move clips, and disconnect fuel return hose (B) and evaporation hose (C).
16) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU(SOHCw/oOBD)-56, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>



17) While holding fuel tank, remove bolts from bands and dismount fuel tank.

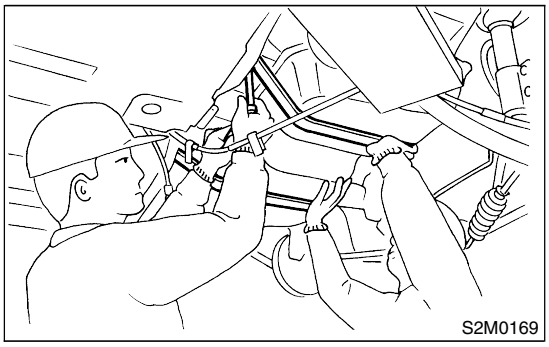
WARNING:
A helper is required to perform this work.



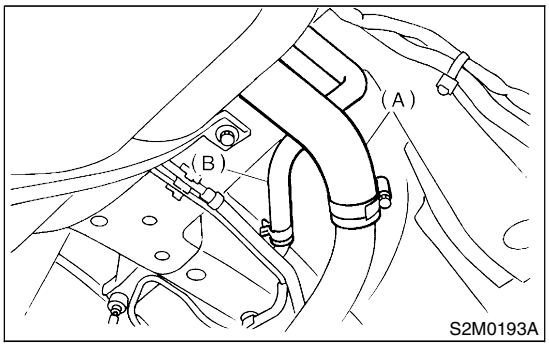
B: INSTALLATION S165053A11

1) While a helper holds fuel tank, push fuel tank harness into access hole with grommet.

2) Set fuel tank, and temporary tighten bolts for installing fuel tank bands.

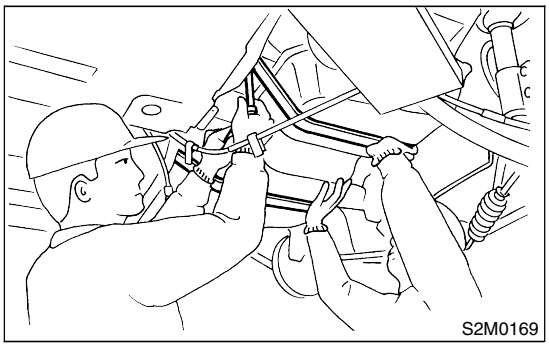


3) Connect fuel filler hose (A) and air vent hose (B).



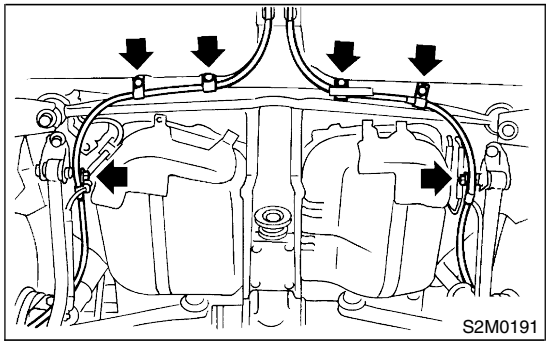
4) Connect fuel hoses, and hold them with clips and quick connector. <Ref. to FU(SOHCw/oOBD)-57, INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>
5) Tighten band mounting bolts.

Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)

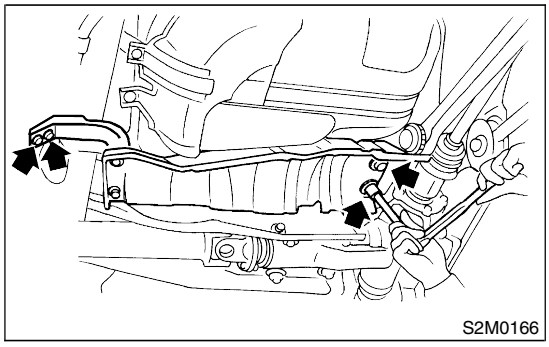


6) Install rear crossmember. <Ref. to RS-20, INSTALLATION, Rear Crossmember.>
7) Install rear differential assembly. <Ref. to DI-27, INSTALLATION, Rear Differential for T-type.> and <Ref. to DI-43, INSTALLATION Rear Differential for VA-type.>

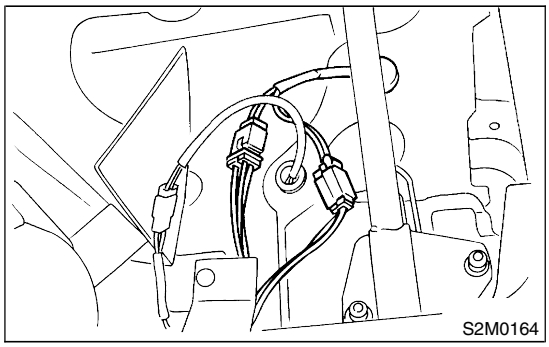
8) Install bolts which hold parking brake holding bracket.


S2M0191

9) Install muffler assembly. <Ref. to EX(SOHCw/oOBD)-12, INSTALLATION, Muffler.>
10) Install heat sealed cover.

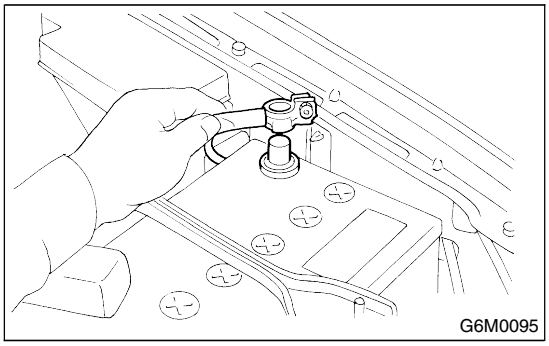

S2M0166

11) Install rear exhaust pipe. <Ref. to EX(SOHCw/oOBD)-10, INSTALLATION, Rear Exhaust Pipe.>
12) Lower the vehicle.
13) Connect connectors to fuel tank harness, and plug access hole with grommet.


S2M0164

14) Install rear seat cushion.
15) Install fuel filler cap.
16) Connect connector to fuel pump relay. <Ref. to FU(SOHCw/oOBD)-40, INSTALLATION, Fuel Pump Relay.>

17) Connect battery ground cable.


G6M0095

C: INSPECTION *S165053A10*

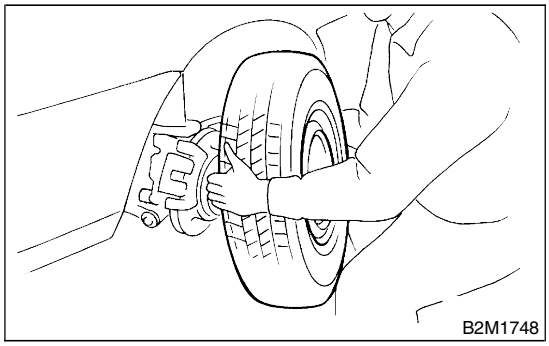
1) Make sure there are no cracks, holes, or other damage on the fuel tank.
2) Make sure that the fuel hoses and fuel pipes are not cracked and that connections are tight.

18. Fuel Filler Pipe S165022

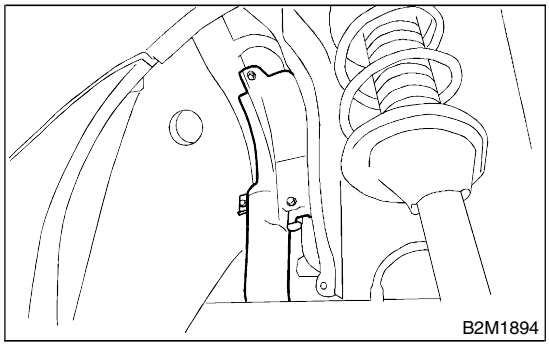
A: REMOVAL S165022A18

WARNING:
- **Place “No fire” signs near the working area.**
- **Be careful not to spill fuel on the floor.**

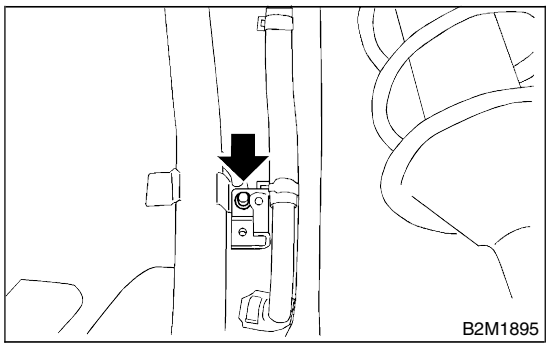
1) Set the vehicle on the lift.
2) Drain fuel from fuel tank. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
3) Remove screws holding packing in place.
4) Remove wheel nuts of rear right side.
5) Lift-up the vehicle.
6) Remove rear right side wheel.


B2M1748

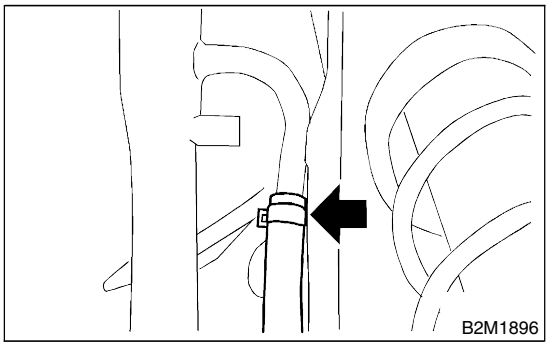
7) Remove fuel filler pipe protector.


B2M1894

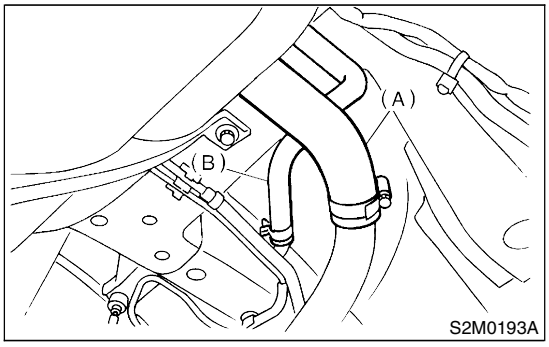
8) Remove bolts which hold fuel filler pipe bracket on body.


B2M1895

9) Move clip, and disconnect air vent hose from air vent pipe.

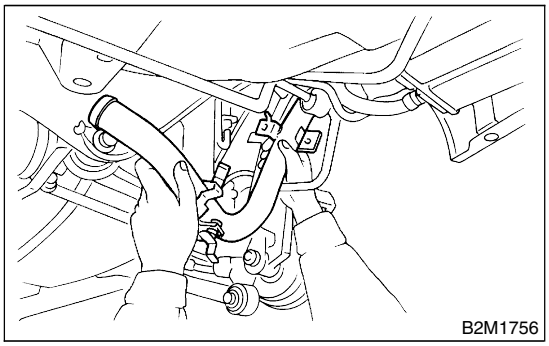

B2M1896

10) Loosen clamp, and separate fuel filler hose (A) from fuel filler pipe.
11) Move clip, and separate air vent hose (B).



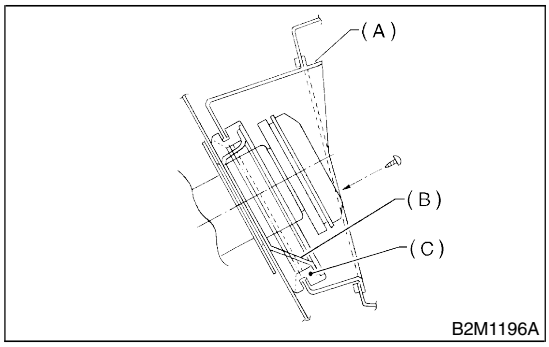
S2M0193A

12) Remove fuel filler pipe to under side of the vehicle.


B2M1756

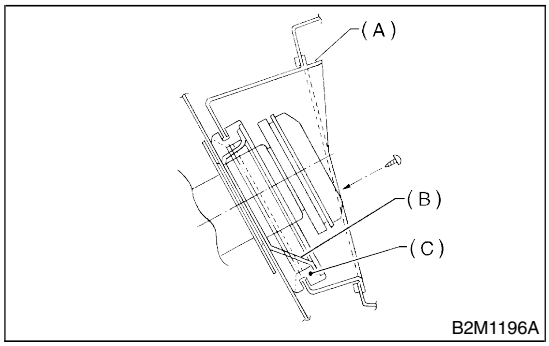
B: INSTALLATION S165022A11

1) Hold fuel filler flap open.
2) Set fuel saucer (A) with rubber packing (C), and insert fuel filler pipe into hole from the inner side of apron.



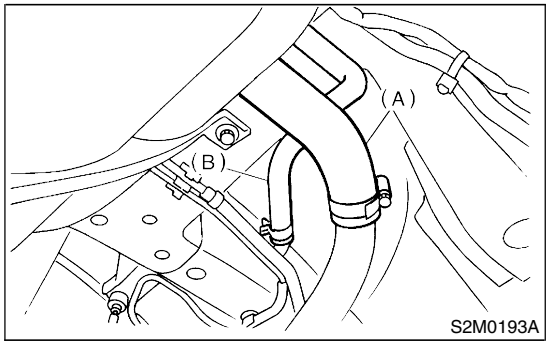
3) Align holes in fuel filler pipe neck and set cup (B), and tighten screws.

NOTE:
If edges of rubber packing are folded toward the inside, straighten it with a screwdriver.



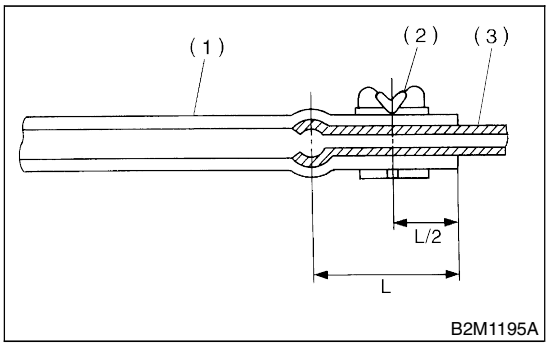
4) Insert fuel filler hose (A) approximately 25 to 30 mm (0.98 to 1.18 in) over the lower end of fuel filler pipe and tighten clamp.

CAUTION:
Do not allow clips to touch air vent hose (B) and rear suspension crossmember.



5) Insert air vent hose approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of air vent pipe and hold clip.

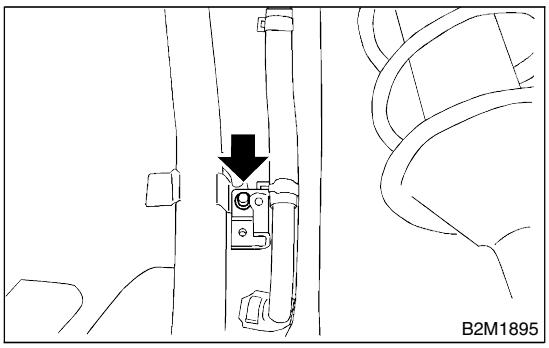
L = 27.5±2.5 mm (1.083±0.098 in)



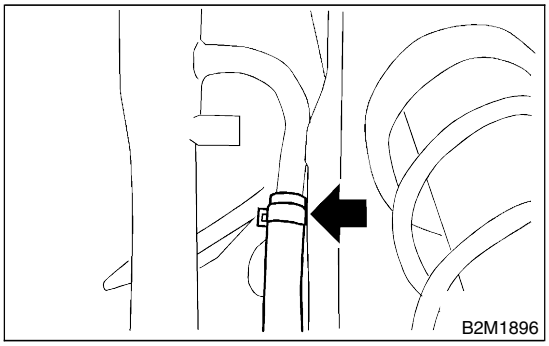
(1) Hose
(2) Clip
(3) Pipe

6) Tighten bolt which holds fuel filler pipe bracket on body.

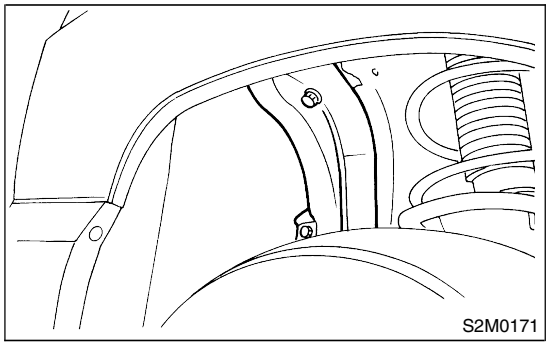
Tightening torque:
22.6 N·m (2.3 kgf-m, 16.6 ft-lb)



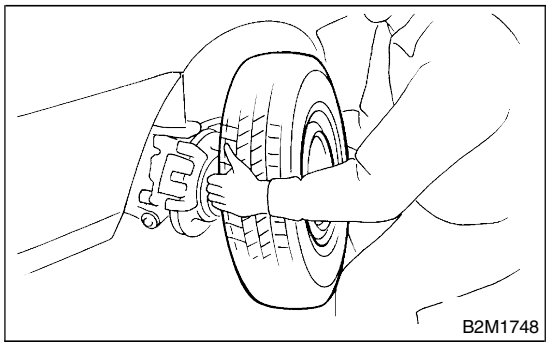
7) Connect air vent hose to air vent pipe.



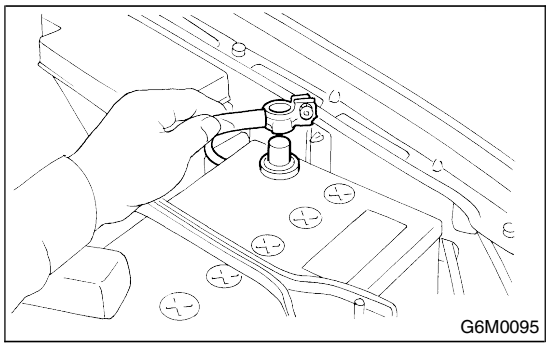
8) Install fuel filler pipe protector.



9) Install rear right wheel.



10) Lower the vehicle.
11) Tighten wheel nuts.
12) Connect connector to fuel pump relay.
<Ref. to FU(SOHCw/oOBD)-40, INSTALLATION, Fuel Pump Relay.>
13) Connect battery ground terminal.

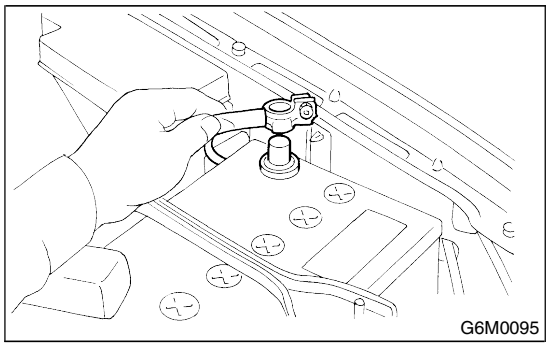


19. Fuel Pump S165025

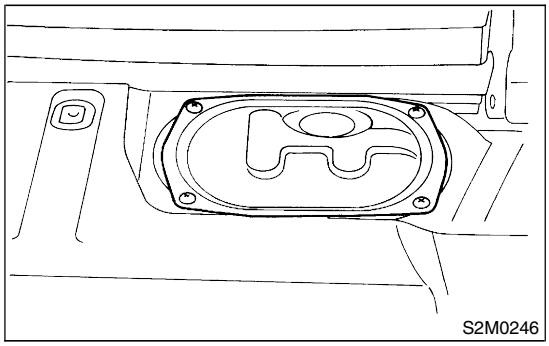
A: REMOVAL S165025A18

WARNING:
- **Place “No fire” signs near the working area.**
- **Be careful not to spill fuel on the floor.**

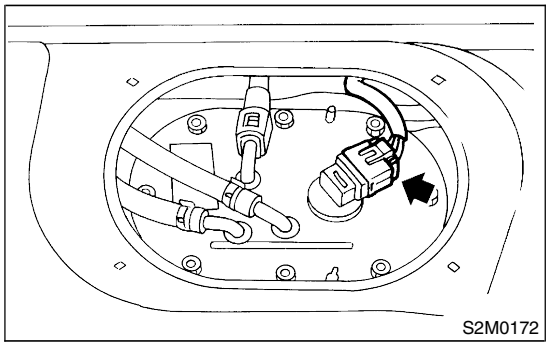
1) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel filler flap lid, and remove fuel filler cap.
3) Disconnect battery ground cable.


G6M0095

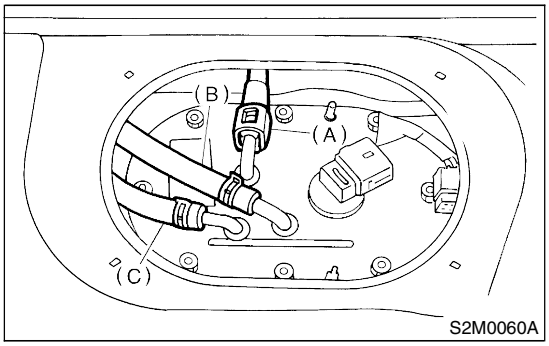
4) Remove the floor box located just behind the rear seats.
5) Remove access hole lid.


S2M0246

6) Disconnect connector from fuel pump.

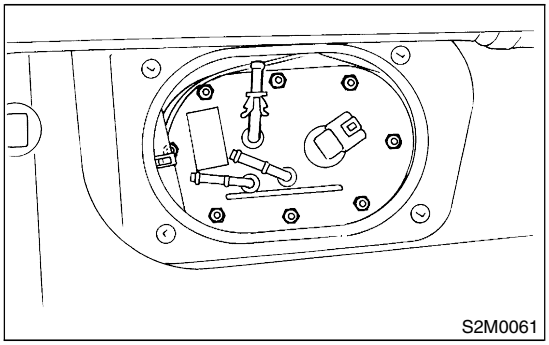

S2M0172

7) Move clips, and then disconnect fuel delivery hose (A), return hose (B) and jet pump hose (C).
8) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU(SOHCw/oOBD)-56, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

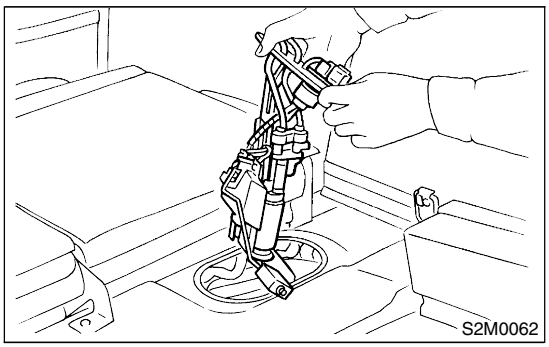


S2M0060A

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


S2M0061

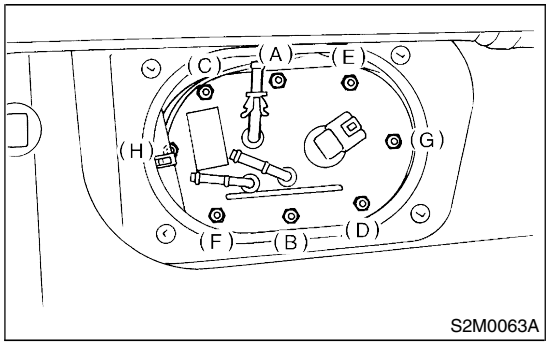
10) Take off fuel pump from fuel tank.


S2M0062

B: INSTALLATION S165025A11

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.

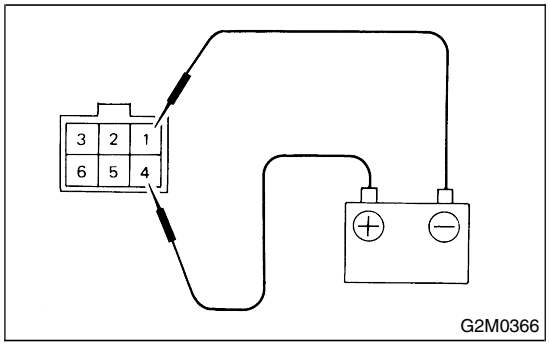
Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



C: INSPECTION S165025A10

Connect lead harness to connector terminal of fuel pump, and apply battery power supply to check whether the pump operate.

WARNING:
• Wipe off the fuel completely.
• Keep battery as far apart from fuel pump as possible.
• Be sure to turn the battery supply ON and OFF on the battery side.
• Do not run fuel pump for a long time under non-load condition.



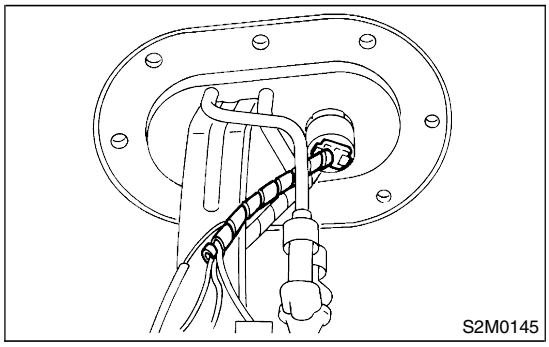
20. Fuel Level Sensor S165026

A: REMOVAL S165026A18

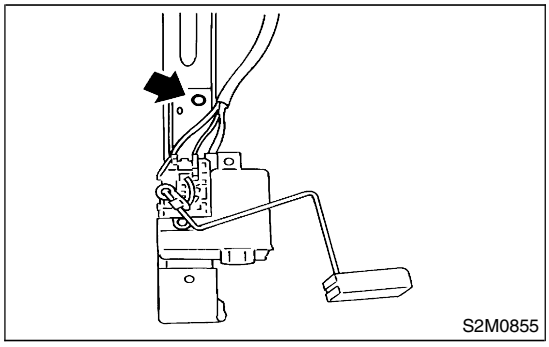
WARNING:
• Place “NO FIRE” signs near the working area.
• Be careful not to spill fuel on the floor.

NOTE:
Fuel level sensor is built in fuel pump assembly.

1) Remove fuel pump assembly. <Ref. to FU(SOHCw/oOBD)-50, REMOVAL, Fuel Pump.>
2) Disconnect connector from fuel pump bracket.


S2M0145

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


S2M0855

B: INSTALLATION S165026A11

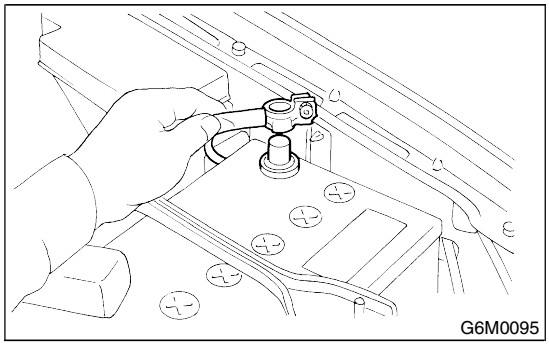
Install in the reverse order of removal.

21. Fuel Sub Level Sensor S165023

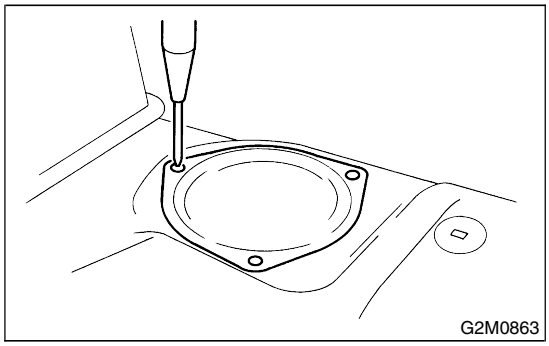
A: REMOVAL S165023A18

WARNING:
- **Place "NO FIRE" signs near the working area.**
- **Be careful not to spill fuel on the floor.**

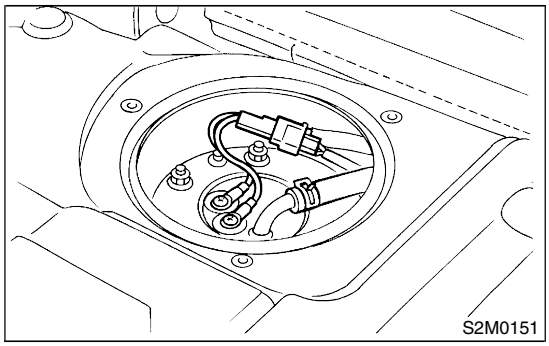
1) Disconnect battery ground cable.


G6M0095

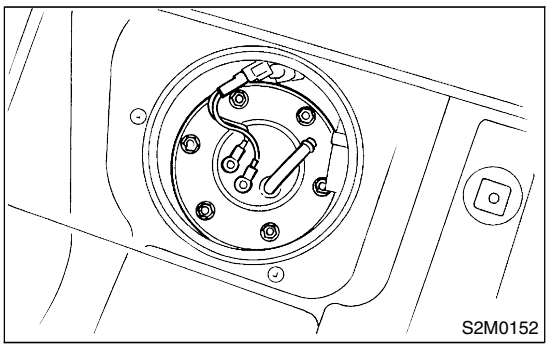
2) Remove the floor box located just behind the rear seats.
3) Remove service hole cover.


G2M0863

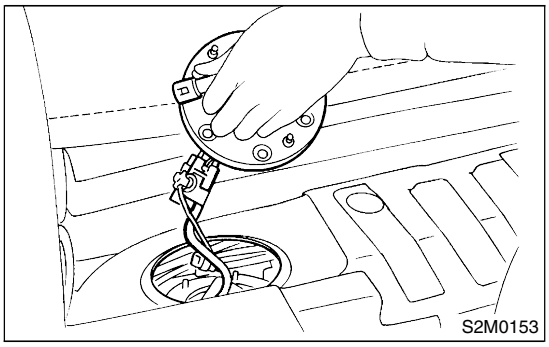
4) Disconnect connector from fuel sub meter.
5) Disconnect fuel jet pump hose.


S2M0151

6) Remove bolts which install fuel sub meter unit on fuel tank.


S2M0152

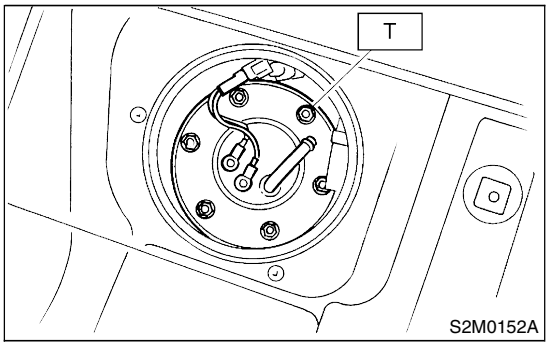
7) Remove fuel sub meter unit.


S2M0153

B: INSTALLATION S165023A11

Install in the reverse order of removal.

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



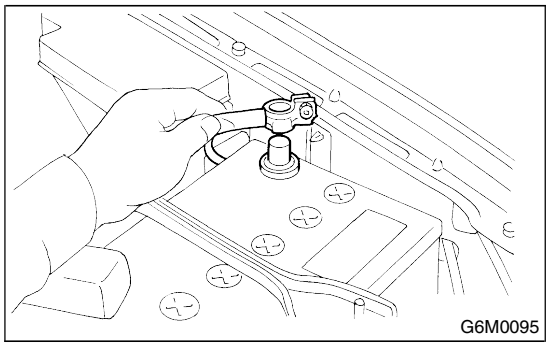
S2M0152A

22. Fuel Filter S165027

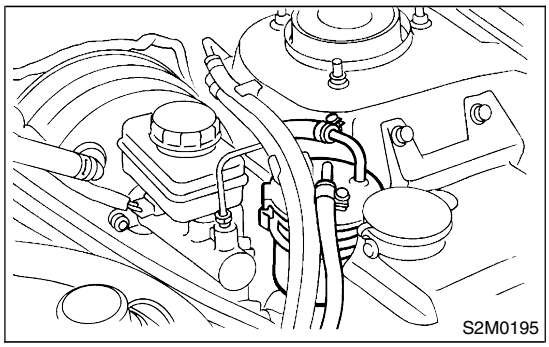
A: REMOVAL S165027A18

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(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.
3) Disconnect battery ground cable.


G6M0095

4) Disconnect fuel hoses from fuel filter.


S2M0195

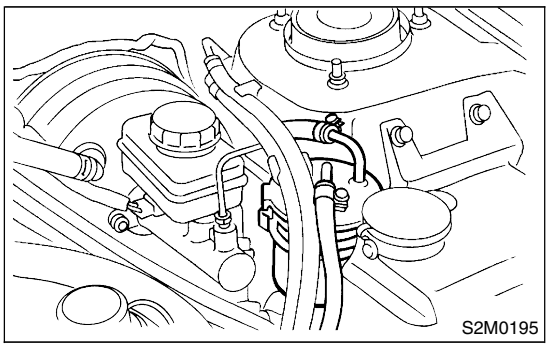
5) Remove filter from holder.

B: INSTALLATION S165027A11

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 N·m (0.1 kgf-m, 0.7 ft-lb)


S2M0195

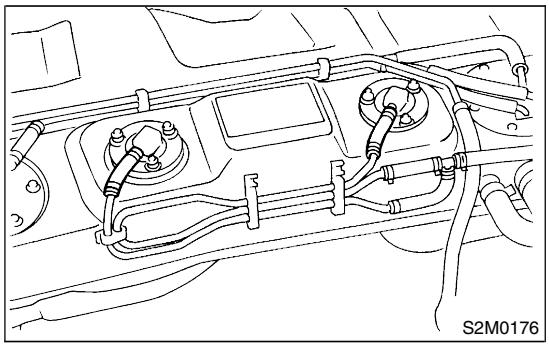
C: INSPECTION S165027A10

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.

23. Fuel Cut Valve S165021

A: REMOVAL S165021A18

1) Remove fuel tank. <Ref. to FU(SOHCw/oOBD)-44, REMOVAL, Fuel Tank.>
2) Move clip and disconnect evaporation hose from fuel cut valve.

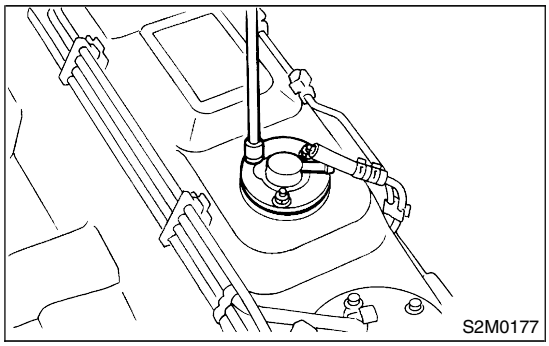


3) Remove bolts which install fuel cut valve.

B: INSTALLATION S165021A11

Install in the reverse order of removal.

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

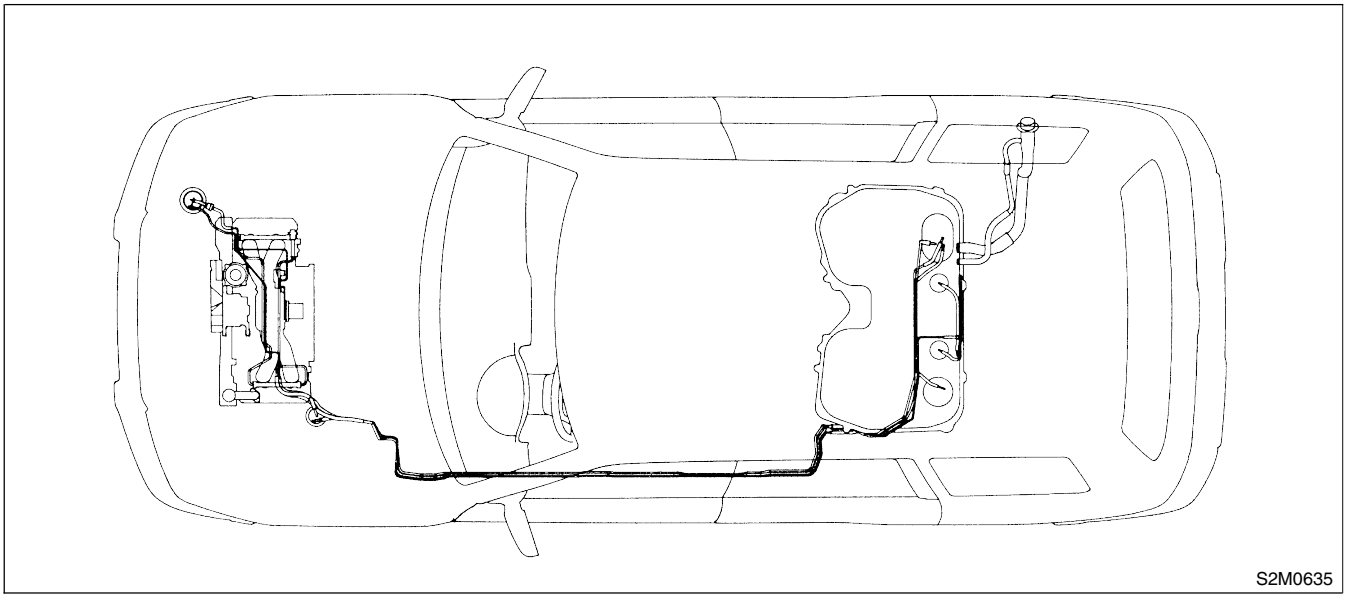


24. Fuel Delivery, Return and Evaporation Lines S165019

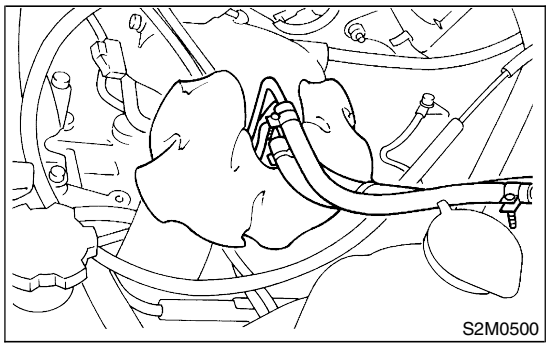
A: REMOVAL S165019A18

1) Release fuel pressure. <Ref. to FU(SOHCw/oOBD)-41, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>

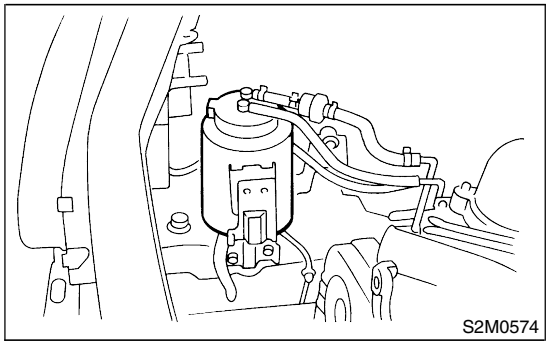
2) Open fuel filler flap lid and remove fuel filler cap.
3) Remove inner trim, insulator and rear seat.
4) Remove fuel delivery pipes and hoses, fuel return pipes and hoses, evaporation pipes and hoses.


S2M0635

5) In engine compartment, detach fuel delivery hoses, return hoses and evaporation hose.

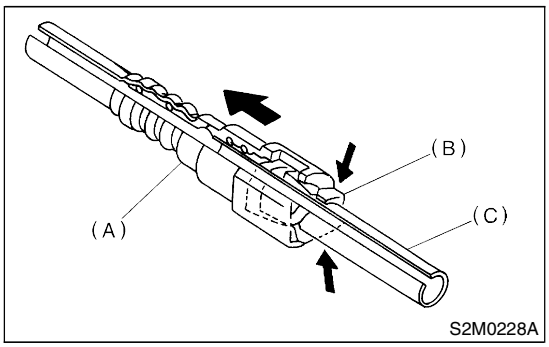

S2M0500

6) In the engine compartment, detach canister hose from canister.


S2M0574

7) Separate quick connector on fuel delivery and return 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.



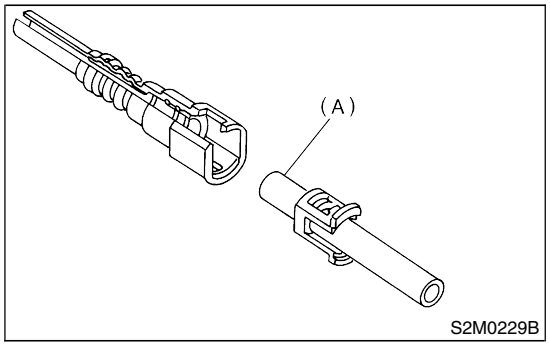
S2M0228A

(A) Connector
(B) Retainer
(C) Pipe

B: INSTALLATION S165019A11

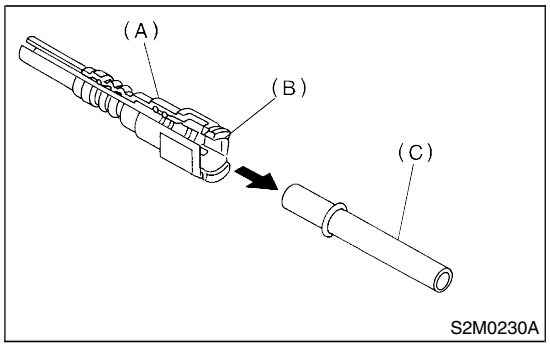
1) Connect quick connector on fuel delivery and return line.

CAUTION:
- **Always use a new retainer.**
- **Make sure that the connected portion is not damaged or has dust. If necessary, clean seal surface of pipe (A).**



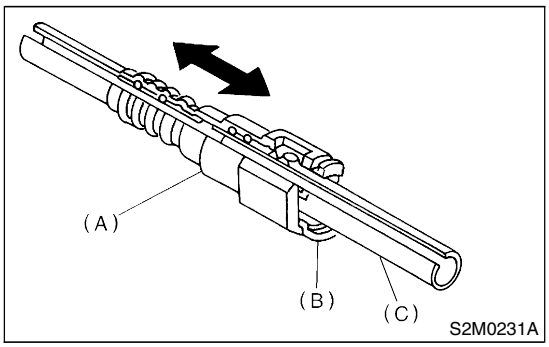
(1) Set new retainer (B) to connector (A).
(2) Push pipe into connector completely.

NOTE:
At this time, two clicking sounds are heard.



(A) Connector
(B) Retainer
(C) Pipe

CAUTION:
- **Pull the connector to ensure it is connected securely.**
- **Ensure the two retainer pawls are engaged in their mating positions in the connector.**
- **Be sure to inspect hoses and their connections for any leakage of fuel.**

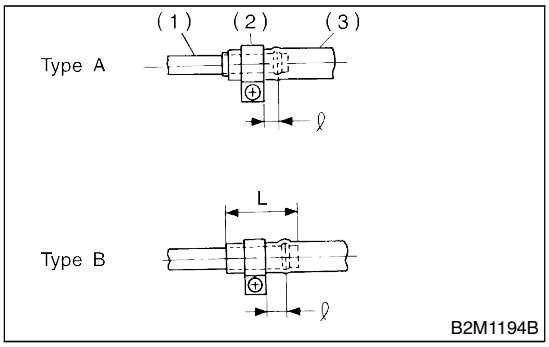


(A) Connector
(B) Retainer
(C) Pipe

2) Connect fuel delivery hose to pipe with an overlap of 20 to 25 mm (0.79 to 0.98 in).
Type A: When fitting length is specified.
Type B: When fitting length is not specified.

ℓ : 2.5±1.5 mm (0.098±0.059 in)

L: 22.5±2.5 mm (0.886±0.098 in)

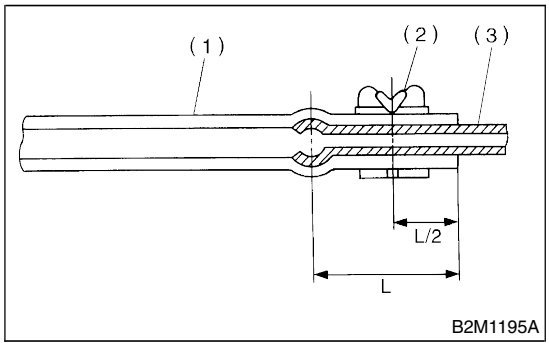


(1) Fitting
(2) Clamp
(3) Hose

3) Connect evaporation hose to pipe by approx. 15 mm (0.59 in) from hose end.

L = 17.5±2.5 mm (0.689±0.098 in)

CAUTION:
Be sure to inspect hoses and their connections for any leakage of fuel.



(1) Hose
(2) Clip
(3) Pipe

C: INSPECTION S165019A10

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.

25. Fuel System Trouble in General S165571

A: INSPECTION S165571A10

Trouble and possible cause			Corrective action
1. Insufficient fuel supply to the injector			
1)	Fuel pump will not operate.		
	○	Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	○	Trouble in electromagnetic or electronic circuit parts.	Replace fuel pump.
2)		Lowering of fuel pump function.	Replace fuel pump.
3)		Clogged dust or water in the fuel filter.	Replace fuel filter, clean or replace fuel tank.
4)		Clogged or bent fuel pipe or hose.	Clean, correct or replace fuel pipe or hose.
5)		Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)		Clogged or bent breather tube or pipe.	Clean, correct or replace air breather tube or pipe.
7)		Damaged diaphragm of pressure regulator.	Replace.
2. Leakage or blow out fuel			
1)		Loosened joints of the fuel pipe.	Retightening.
2)		Cracked fuel pipe, hose and fuel tank.	Replace.
3)		Defective welding part on the fuel tank.	Replace.
4)		Defective drain packing of the fuel tank.	Replace.
5)		Clogged or bent air breather tube or air vent tube.	Clean, correct or replace air breather tube or air vent tube.
3. Gasoline smell inside of compartment			
1)		Loose joints at air breather tube, air vent tube and fuel filler pipe.	Retightening.
2)		Defective packing air tightness on the fuel saucer.	Correct or replace packing.
3)		Cracked fuel separator.	Replace separator.
4)		Inoperative fuel pump modulator or circuit.	Replace.
4. Defective fuel meter indicator			
1)		Defective operation of fuel 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.
To prevent water condensation.
(1) Top off the fuel tank or drain the fuel completely.
(2) Drain water condensation from the fuel filter.
● Refilling the fuel tank.
Refill the fuel tank while there is still some fuel left in the tank.
● Protecting the fuel system against freezing and water condensation.
(1) Cold areas
In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F) throughout the winter season, use an anti-freeze solution in the cooling system. Refueling will also complement the effect of anti-freeze solution each time the fuel level drops to about one-half. After the winter season, drain water which may have accumulated in the fuel filter and fuel tank in the manner same as that described under Affected areas below.
(2) Affected areas
When water condensation is notched in the fuel filter, drain water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.
● Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.

MEMO:

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)

EC(SOHCw/oOBD)

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2. Front Catalytic Converter....3
3. Canister....6
4. Purge Control Solenoid Valve....7
5. Two-way Valve....8

1. General Description S160001

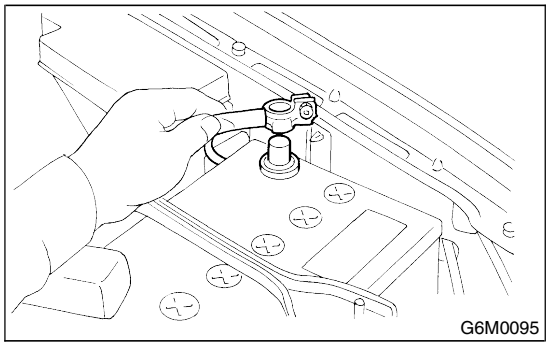
A: CAUTION S160001A03

- 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.

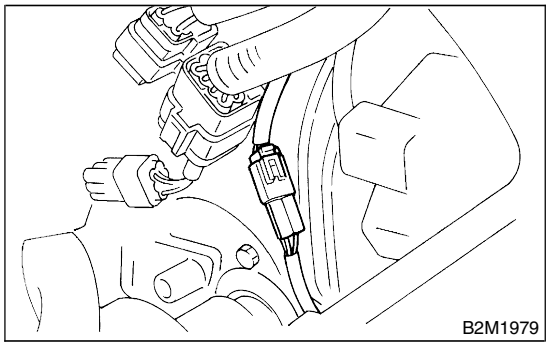
2. Front Catalytic Converter S160017

A: REMOVAL S160017A18

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

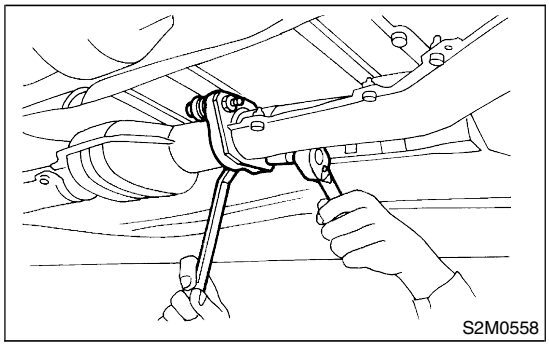

G6M0095

3) Disconnect front oxygen sensor connector.

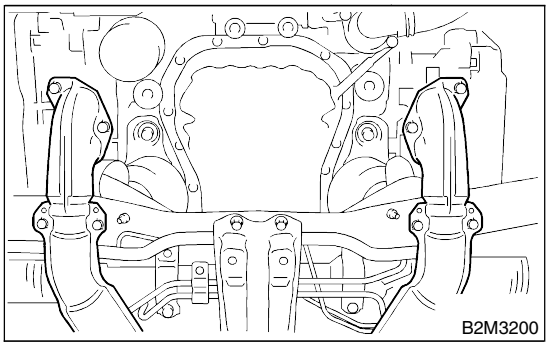

B2M1979

4) Lift-up the vehicle.
5) Remove under cover.
6) Separate center exhaust pipe from rear exhaust pipe.

CAUTION:
Be careful, exhaust pipe is hot.

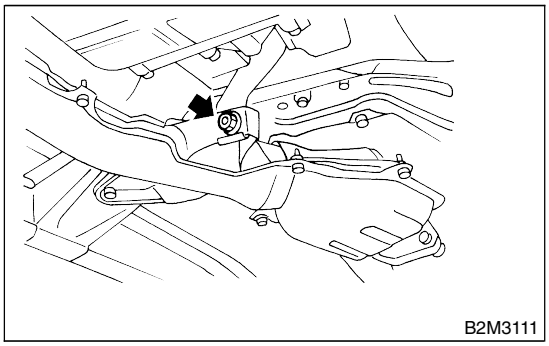

S2M0558

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

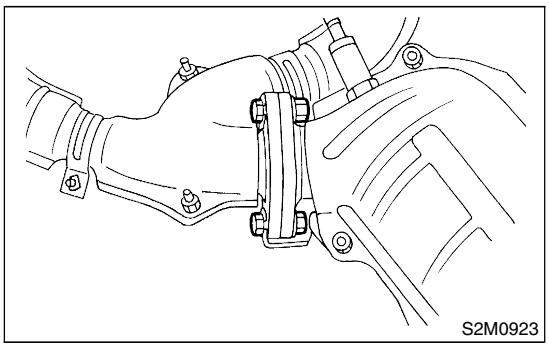

B2M3200

8) Remove front exhaust pipe and center exhaust pipe from hanger bracket.

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


B2M3111

9) Separate front catalytic converter from front exhaust pipe.

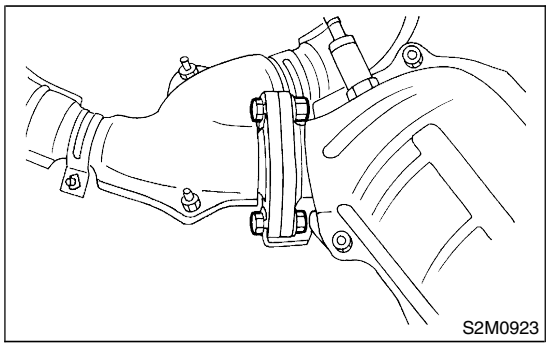

S2M0923

B: INSTALLATION S160017A11

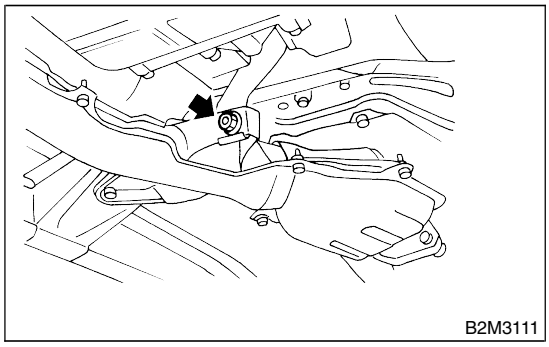
CAUTION:
Replace gaskets with new ones.

1) Install front catalytic converter to front exhaust pipe.

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

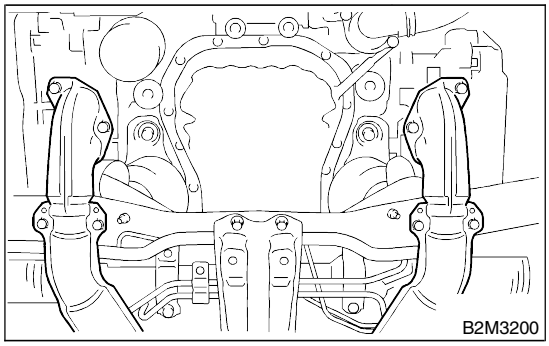

S2M0923

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


B2M3111

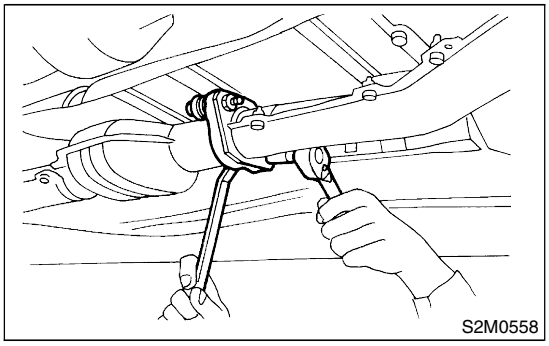
3) Tighten bolts which hold front exhaust pipe onto cylinder heads.

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


B2M3200

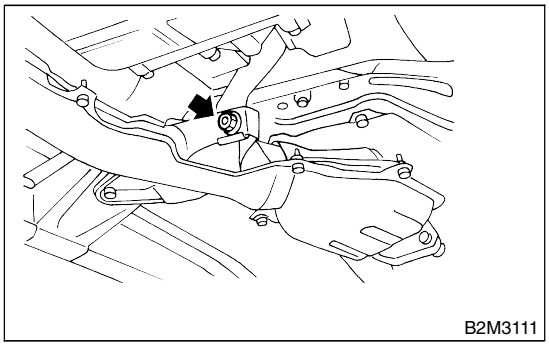
4) Install center exhaust pipe to rear exhaust pipe.

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

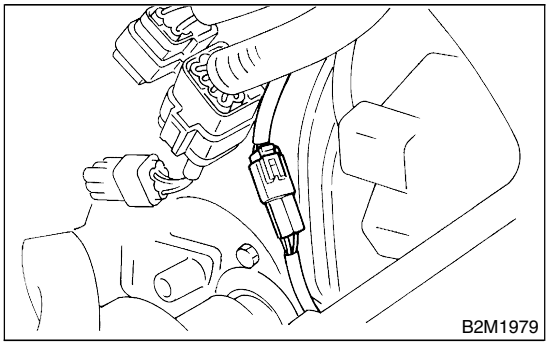

S2M0558

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

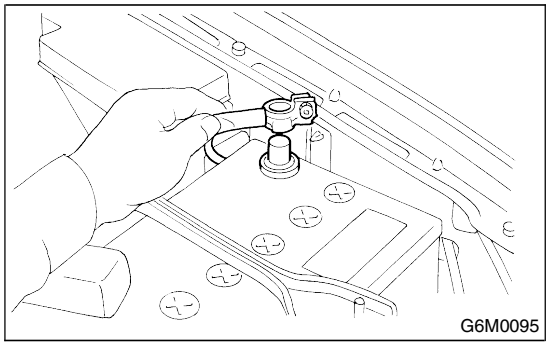
Tightening torque:
35 N·m (3.6 kgf-m, 26.0 ft-lb)


B2M3111

6) Install under cover.
7) Lower the vehicle.
8) Connect front oxygen sensor connector.


B2M1979

9) Connect battery ground cable.



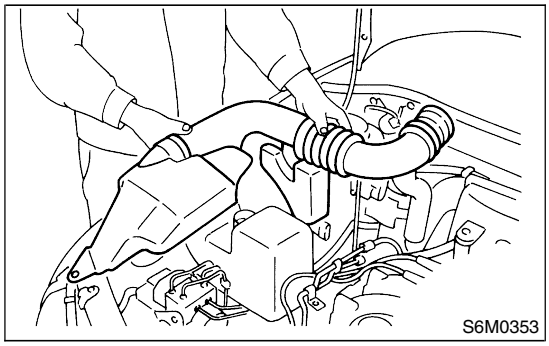
C: INSPECTION *S160017A10*

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

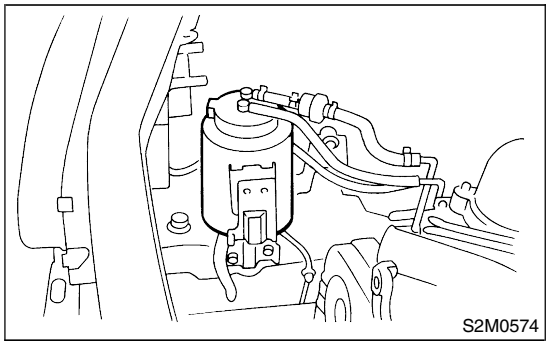
3. Canister S160037

A: REMOVAL S160037A18

1) Remove air intake duct as a unit.



2) Disconnect canister hoses from evaporation pipes.
3) Remove canister with bracket.



B: INSTALLATION S160037A11

Install in the reverse order of removal.

CAUTION:
Insert air vent hose of canister into the hole on body.

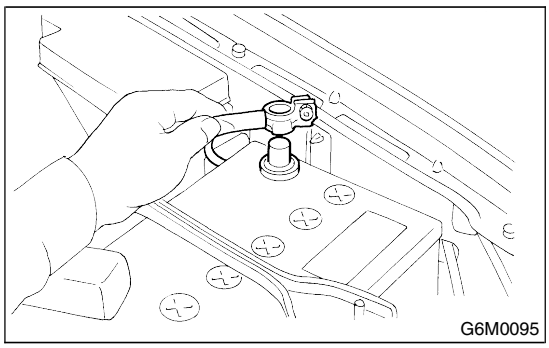
C: INSPECTION S160037A10

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

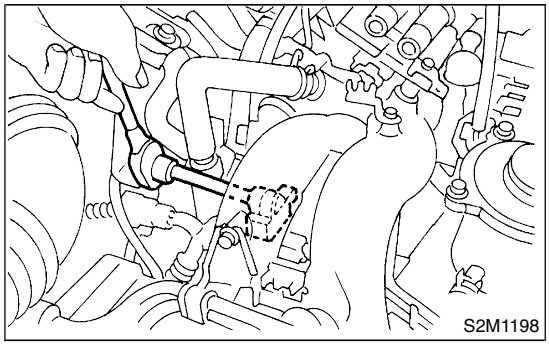
4. Purge Control Solenoid Valve S160035

A: REMOVAL S160035A18

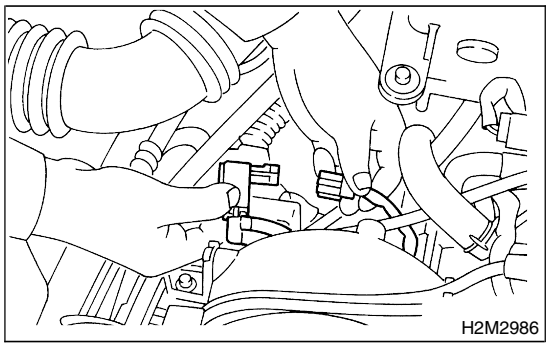
1) Disconnect battery ground cable.



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



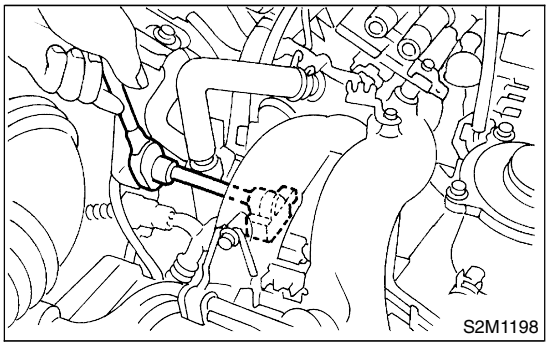
3) Take out purge control solenoid valve through the bottom of the intake manifold.
4) Disconnect connector and hoses from purge control solenoid valve.



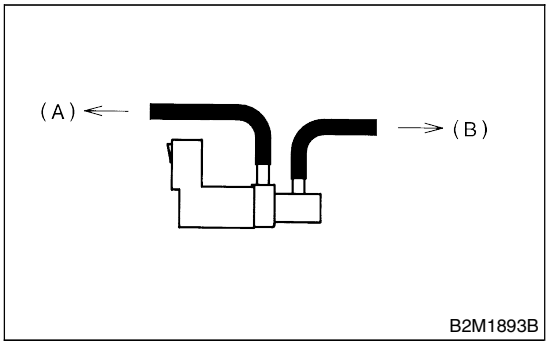
B: INSTALLATION S160035A11

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.



(A) To fuel pipe
(B) To intake manifold

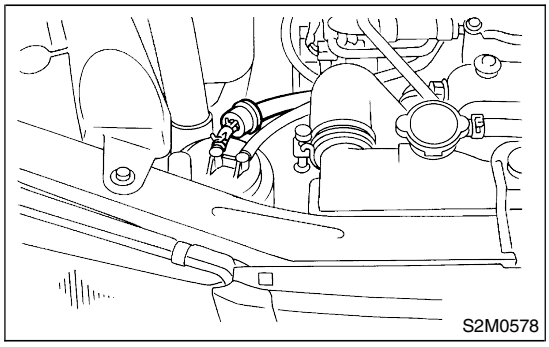
C: INSPECTION S160035A10

Make sure hoses are not cracked or loose.

5. Two-way Valve S160707

A: REMOVAL S160707A18

Disconnect hoses from two-way valve, and remove it.



B: INSTALLATION S160707A11

Install in the reverse order of removal.

C: INSPECTION S160707A10

Make sure that hoses are not cracked or loose.

EXHAUST

EX(SOHCw/oOBD)

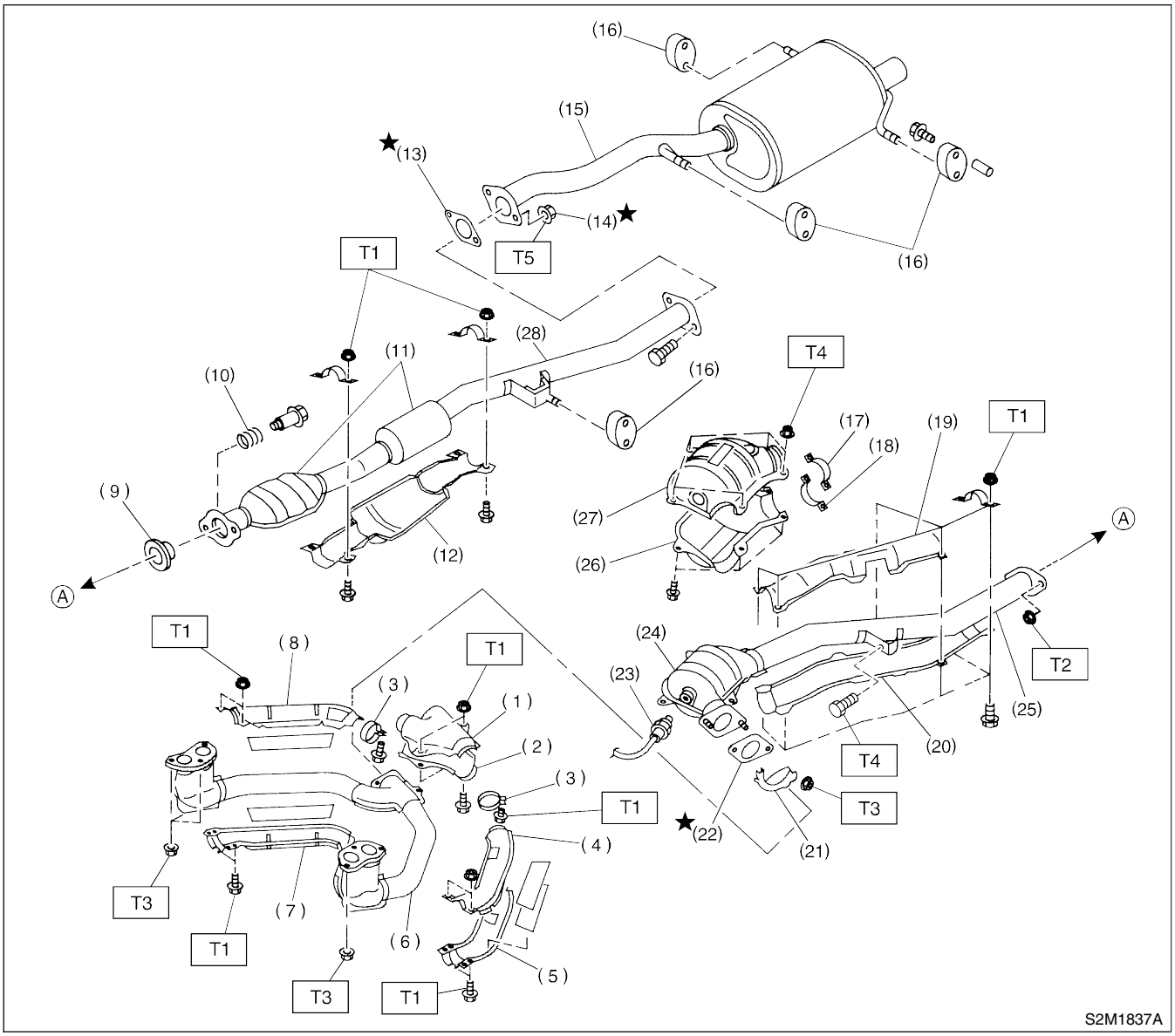
Page

1. General Description....2
2. Front Exhaust Pipe....6
3. Center Exhaust Pipe....9
4. Rear Exhaust Pipe....10
5. Muffler....12

1. General Description S162001

A: COMPONENT S162001A05

1. WITH CATALYTIC CONVERTER S162001A0504

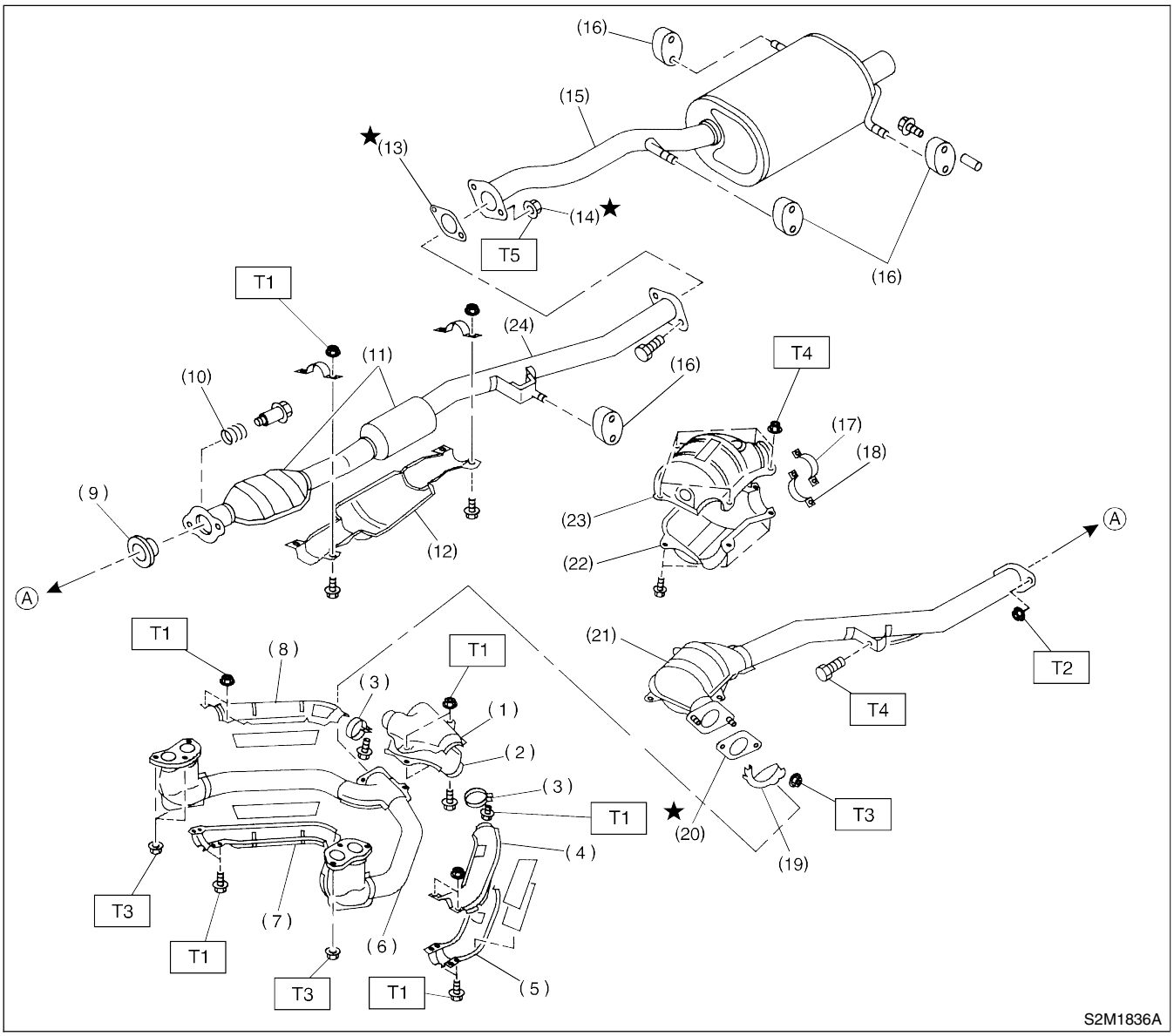


(1) Upper front exhaust pipe cover CTR
(2) Lower front exhaust pipe cover CTR
(3) Clamp
(4) Upper front exhaust pipe cover LH
(5) Lower front exhaust pipe cover LH
(6) Front exhaust pipe
(7) Lower front exhaust pipe cover RH
(8) Upper front exhaust pipe cover RH
(9) Gasket
(10) Spring
(11) Chamber
(12) Rear exhaust pipe cover
(13) Gasket
(14) Self-locking nut
(15) Muffler
(16) Cushion rubber
(17) Upper clamp
(18) Lower clamp
(19) Upper center exhaust pipe cover
(20) Lower center exhaust pipe cover
(21) Protector
(22) Gasket
(23) Oxygen sensor
(24) Front catalytic converter
(25) Center exhaust pipe
(26) Lower front catalytic converter cover
(27) Upper front catalytic converter cover
(28) Rear exhaust pipe

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. WITHOUT CATALYTIC CONVERTER

S162001A0503



(1) Upper front exhaust pipe cover CTR
(2) Lower front exhaust pipe cover CTR
(3) Clamp
(4) Upper front exhaust pipe cover LH
(5) Lower front exhaust pipe cover LH
(6) Front exhaust pipe
(7) Lower front exhaust pipe cover RH
(8) Upper front exhaust pipe cover RH
(9) Gasket
(10) Spring
(11) Chamber
(12) Rear exhaust pipe cover
(13) Gasket
(14) Self-locking nut
(15) Muffler
(16) Cushion rubber
(17) Upper clamp
(18) Lower clamp
(19) Protector
(20) Gasket
(21) Center exhaust pipe
(22) Lower front catalytic converter cover
(23) Upper front catalytic converter cover
(24) Rear exhaust pipe

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 (4.9.5, 35.4.6)

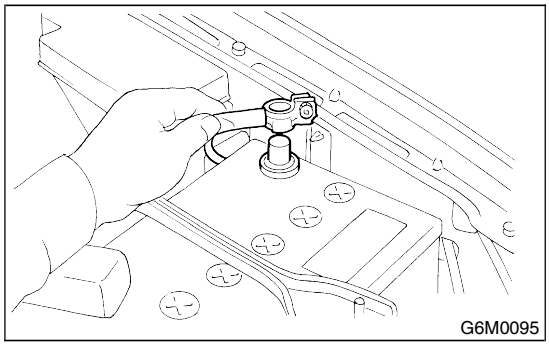
B: CAUTION S162001A03

- 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.

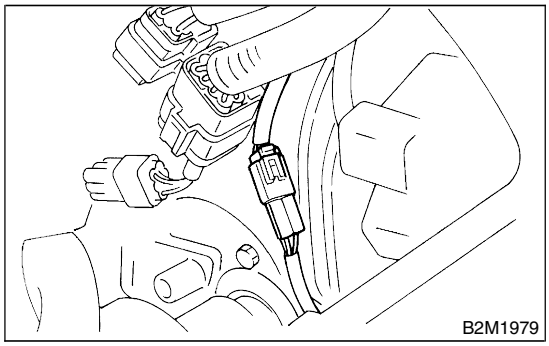
2. Front Exhaust Pipe S162065

A: REMOVAL S162065A18

1) Disconnect battery ground cable.

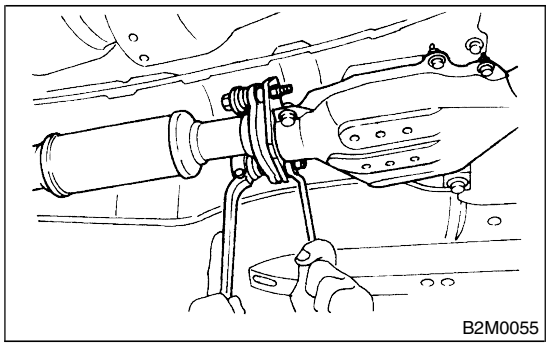

G6M0095

2) Disconnect front oxygen sensor connector. (With catalytic converter)


B2M1979

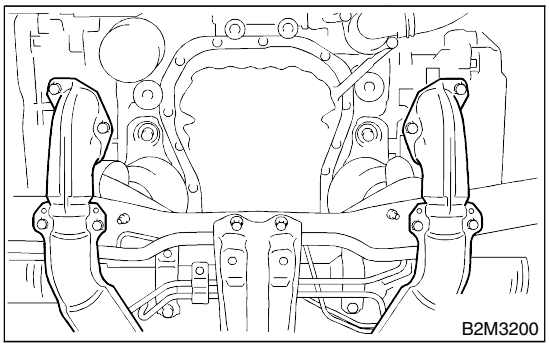
3) Lift-up the vehicle.
4) Remove under cover. <Ref. to EI-11, REMOVAL, Front Under Cover.>
5) Separate front and center exhaust pipe assembly from rear exhaust pipe.

WARNING:
Be careful, exhaust pipe is hot.

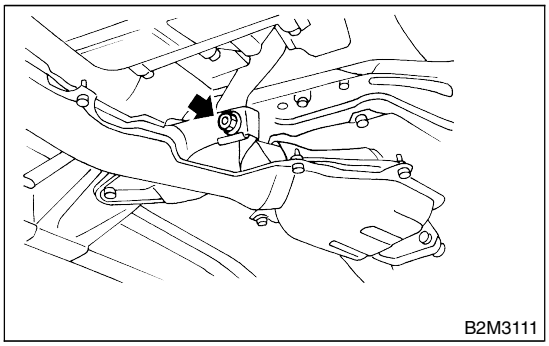

B2M0055

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

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


B2M3200

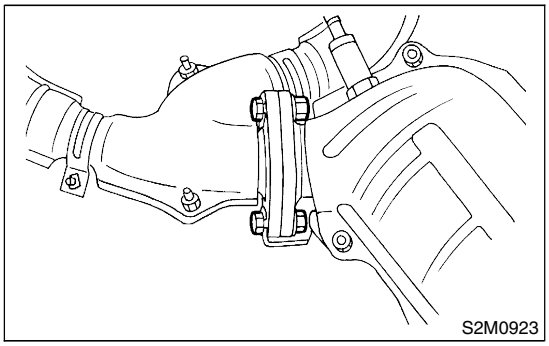
7) Remove bolt which installs front and center exhaust pipe assembly to hanger bracket.


B2M3111

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 center exhaust pipe.

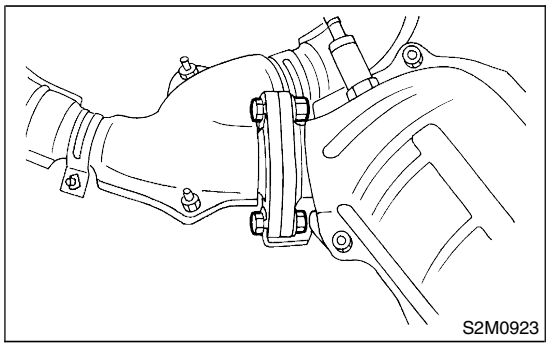

S2M0923

B: INSTALLATION S162065A11

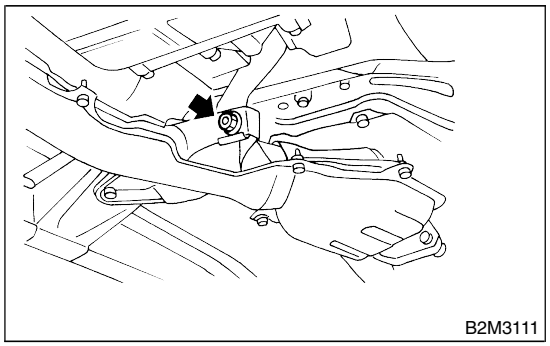
1) Install front exhaust pipe to center exhaust pipe.

CAUTION:
Replace gaskets with new ones.

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

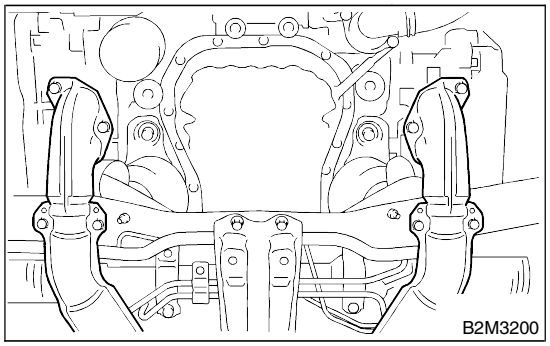

S2M0923

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.


B2M3111

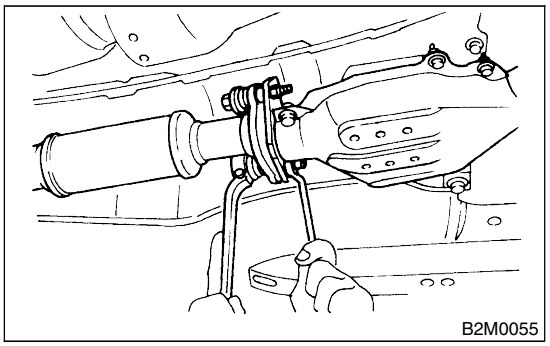
4) Tighten bolts which hold front exhaust pipe onto cylinder heads.

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


B2M3200

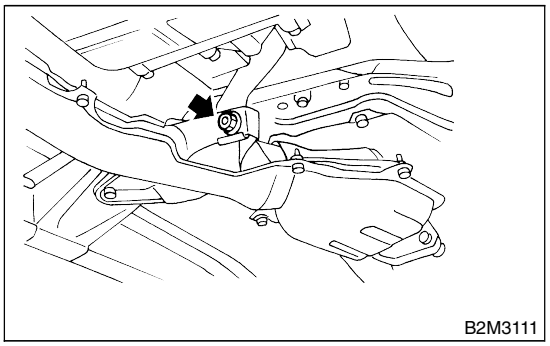
5) Tighten bolts which install front and center exhaust pipe assembly to rear exhaust pipe.

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

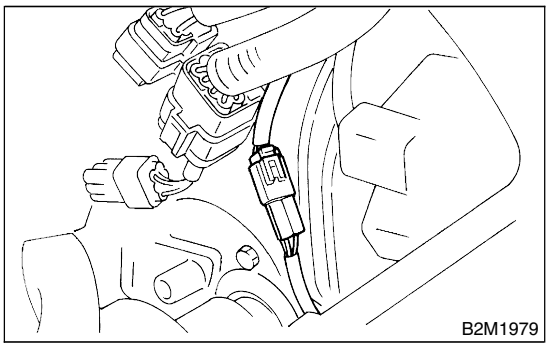

B2M0055

6) Tighten bolt which holds front and center exhaust pipe assembly to hanger bracket.

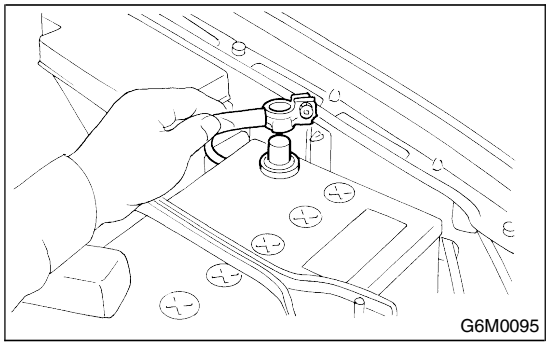
Tightening torque:
35 N·m (3.6 kgf-m, 26.0 ft-lb)


B2M3111

7) Install under cover. <Ref. to EI-11, INSTALLATION, Front Under Cover.>
8) Lower the vehicle.
9) Connect front oxygen sensor connector. (With catalytic converter)


B2M1979

10) Connect battery ground cable.



C: INSPECTION *S162065A10*

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

3. Center Exhaust Pipe S162067

A: REMOVAL S162067A18

After removing the center and front exhaust pipes as one unit, separate them. Refer to the procedure for removing the front exhaust pipe. <Ref. to EX(SOHCw/oOBD)-6 REMOVAL, Front Exhaust Pipe.>

B: INSTALLATION S162067A11

Install the center exhaust pipe and front exhaust pipe as one unit. Refer to the procedure for installing the front exhaust pipe. <Ref. to EX(SOHCw/oOBD)-7 INSTALLATION, Front Exhaust Pipe.>

C: INSPECTION S162067A10

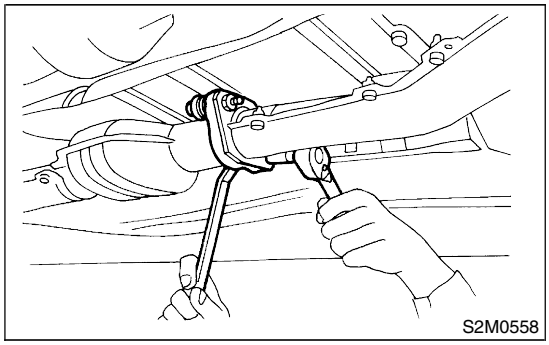
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

4. Rear Exhaust Pipe S162068

A: REMOVAL S162068A18

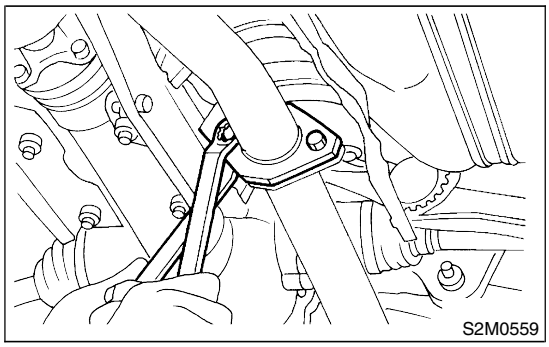
1) Separate rear exhaust pipe from center exhaust pipe.

CAUTION:
Be careful, exhaust pipe is hot.



2) Separate rear exhaust pipe from muffler.

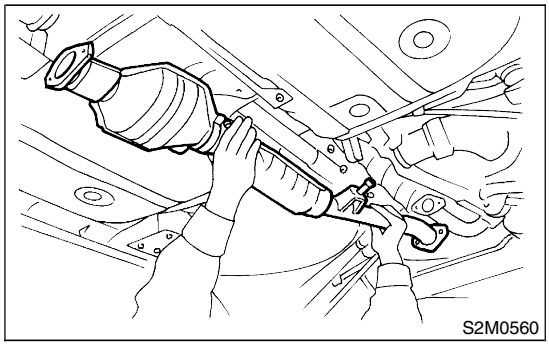
CAUTION:
Be careful not to pull down rear exhaust pipe.



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)



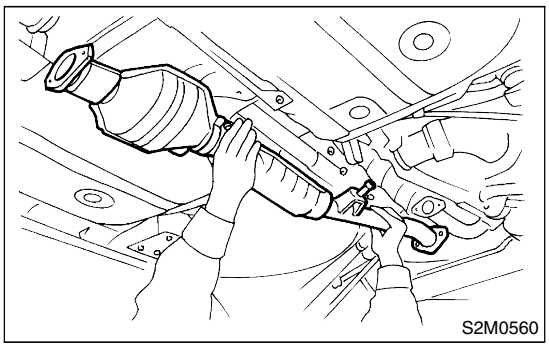
B: INSTALLATION S162068A11

CAUTION:
Replace gaskets with new ones.

1) Install rear exhaust pipe bracket to rubber cushion.

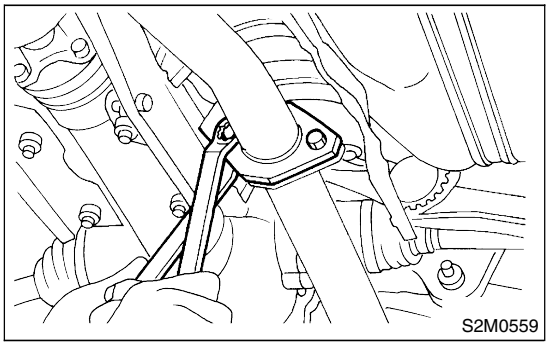
NOTE:
To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushion in advance.

SUBARU CRC (Part No. 004301003)



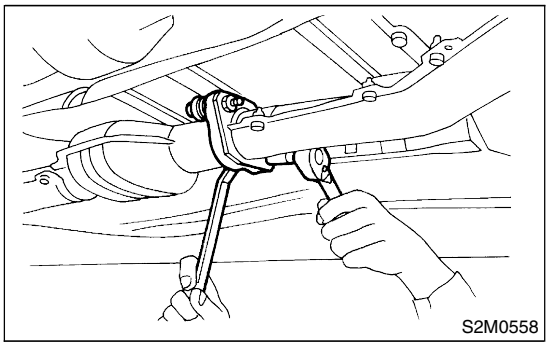
2) Install rear exhaust pipe to muffler.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)



3) Install rear exhaust pipe to center exhaust pipe.

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



C: INSPECTION S162068A10

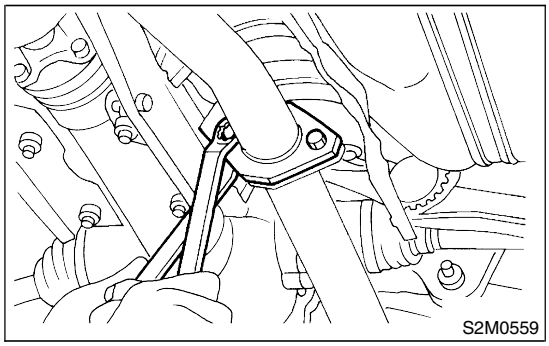
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.
3) Make sure the cushion rubber is not worn or cracked.

5. Muffler S162066

A: REMOVAL S162066A18

1) Separate muffler from rear exhaust pipe.

CAUTION:
Be careful, exhaust pipe is hot.

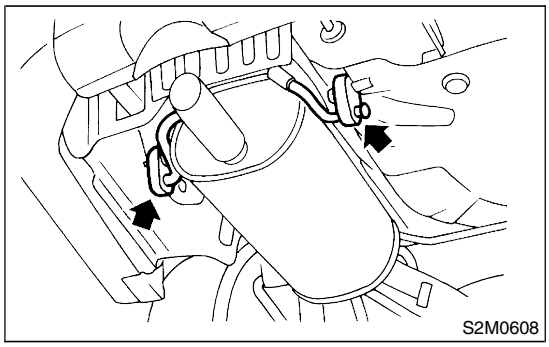

S2M0559

2) Remove left and right rubber cushions.

CAUTION:
Be careful not to drop the muffler during removal.

NOTE:
To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushions in advance.

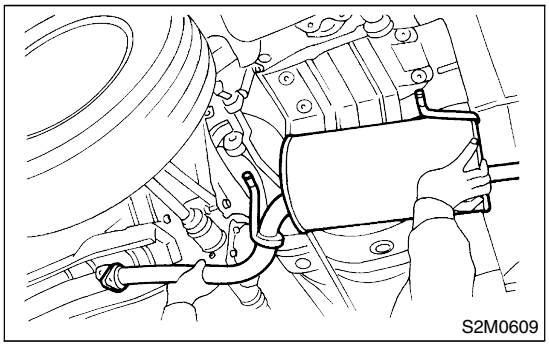
SUBARU CRC (Part No. 004301003)


S2M0608

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)

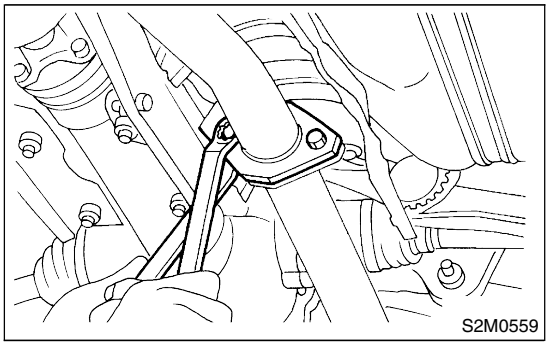

S2M0609

B: INSTALLATION S162066A11

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)


S2M0559

C: INSPECTION S162066A10

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.

IGNITION

IG(SOHCw/oOBD)

Page

1. General Description....2
2. Spark Plug....5
3. Ignition Coil and Ignitor Assembly....9
4. Spark Plug Cord....11

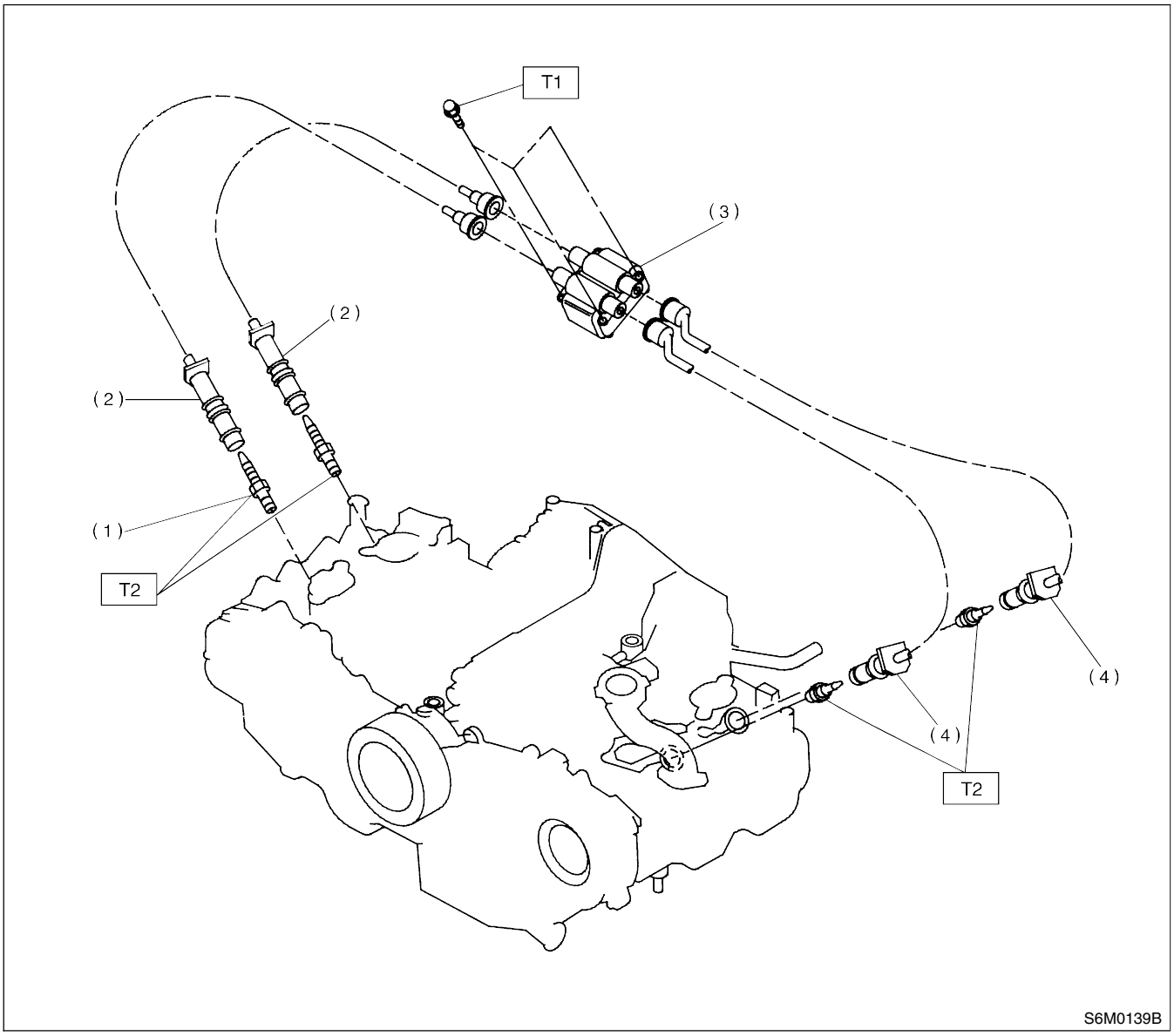
1. General Description S161001

A: SPECIFICATIONS S161001E49

Item		Designation
Ignition coil and ignitor assembly	Model	CM12–100B
	Manufacturer	HITACHI
	Primary coil resistance	0.7 Ω±10%
	Secondary coil resistance	13.0 kΩ±20%
	Insulation resistance between primary terminal and case	More than 10 MΩ
Spark plug	Type and manufacturer	BKR6E* ..... NGK RC10YC4** ..... CHAMPION BKR5E-11** ..... NGK (Alternate)
	Thread size mm	14, P = 1.25
	Spark gap mm (in)	0.7 — 0.8 mm (0.028 — 0.031 in)* 1.0 — 1.1 mm (0.039 — 0.043 in)**

*: Without catalytic converter
**: With catalytic converter

B: COMPONENT S161001A05



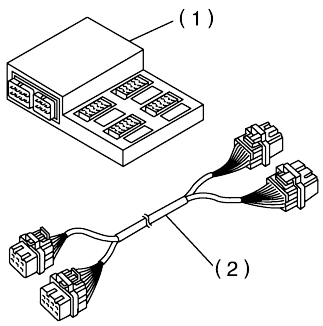
(1) Spark plug
(2) Spark plug cord (#1, #3)
(3) Ignition coil and ignitor ASSY
(4) Spark plug cord (#2, #4)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 21 (2.1, 15)

C: CAUTION S161001A03

- 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.

D: PREPARATION TOOL S161001A17

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 S2M2137A	498307600	CHECK BOARD KIT	Troubleshooting for engine electrical systems (1) CHECK BOARD: 498307610 (2) CHECK BOARD ADAPTER: 498307620

2. Spark Plug S161003

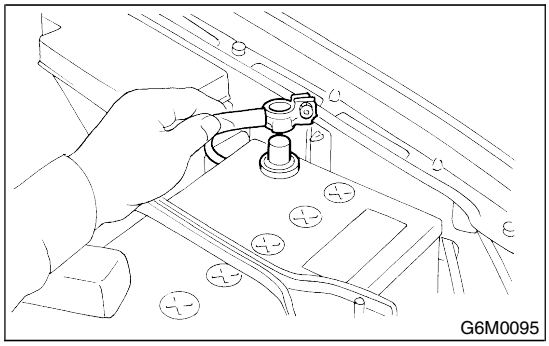
A: REMOVAL S161003A18

CAUTION:
All spark plugs installed on an engine, must be of the same heat range.

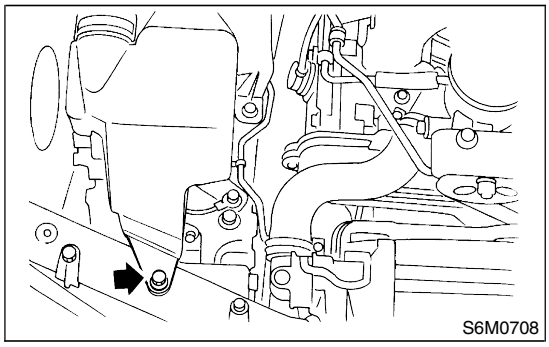
Spark plug:
With catalyst model: CHAMPION RC10YC4
Without catalyst model: NGK BKR6E

1. RH SIDE S161003A1805

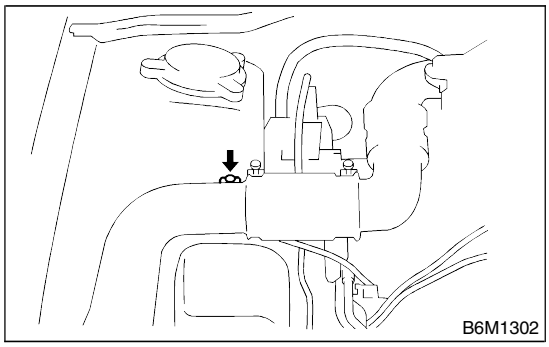
1) Disconnect battery ground cable.


G6M0095

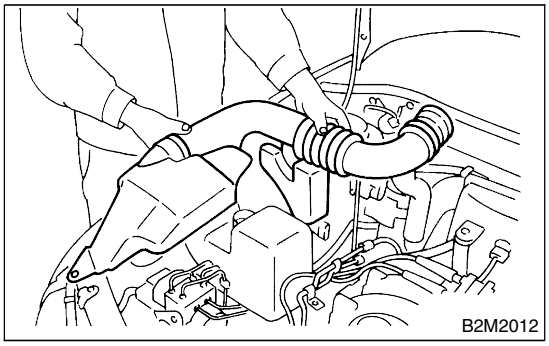
2) Remove air intake duct and resonator chamber.
(1) Remove bolt which installs air intake duct on the front side of body.


S6M0708

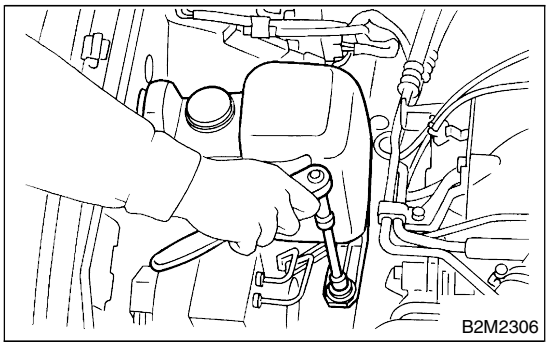
(2) Remove bolt which installs air intake duct on body.


B6M1302

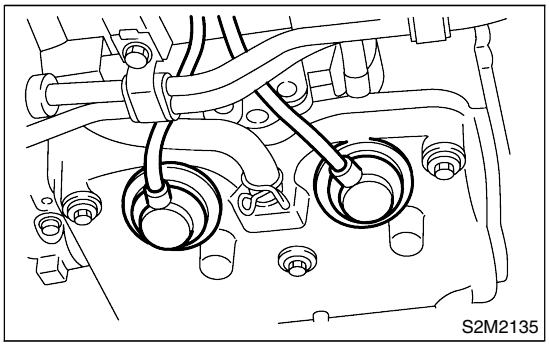
(3) Remove air intake duct as a unit.


B2M2012

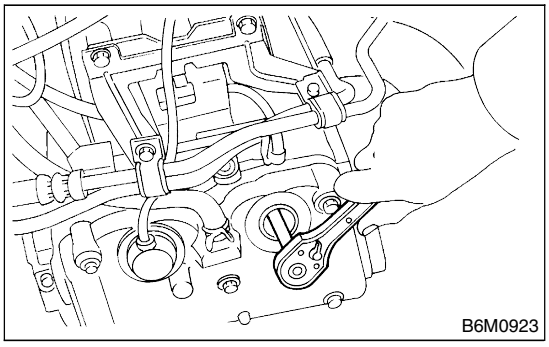
(4) Remove resonator chamber.


B2M2306

3) Remove spark plug cords by pulling boot, not cord itself.

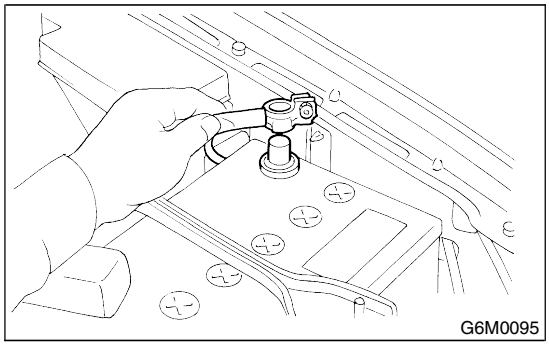

S2M2135

4) Remove spark plugs with the spark plug socket.

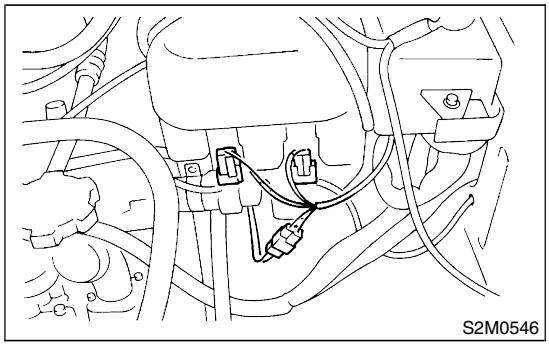

B6M0923

2. LH SIDE S161003A1806

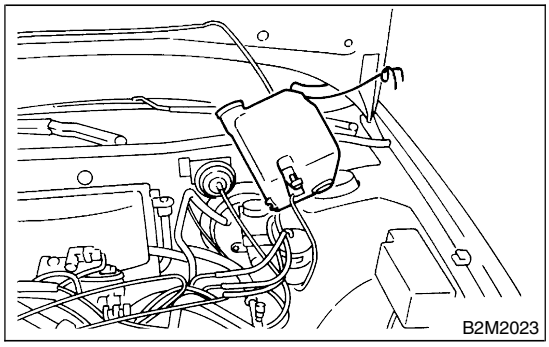
1) Disconnect battery ground cable.


G6M0095

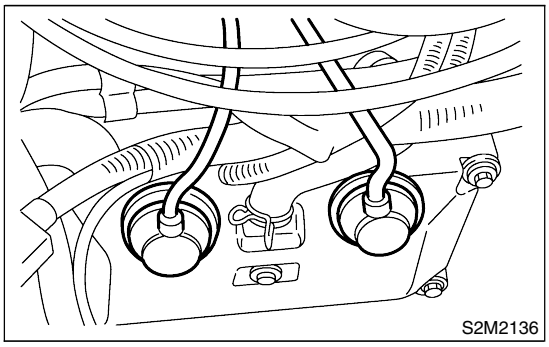
2) Disconnect washer motor connector.


S2M0546

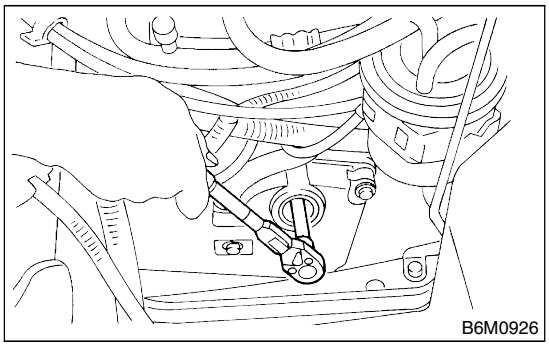
3) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.
4) Remove the two bolts which hold the washer tank, then take the tank away from the working area.


B2M2023

5) Remove spark plugs cord by pulling boot, not cord itself.


S2M2136

6) Remove spark plug with the spark plug socket.


B6M0926

B: INSTALLATION S161003A11

1. RH SIDE S161003A1105

Install in the reverse order of removal.

Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 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.

Tightening torque (Resonator chamber):
32 N·m (3.3 kgf-m, 24 ft-lb)

2. LH SIDE S161003A1106

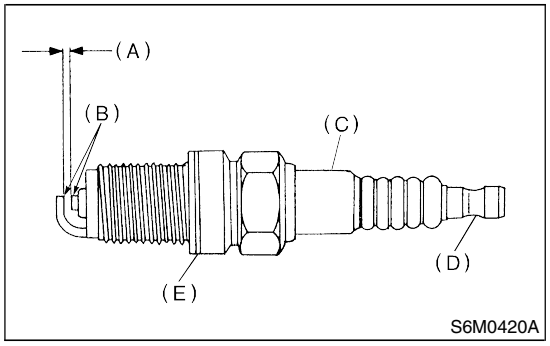
Install in the reverse order of removal.

Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 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.

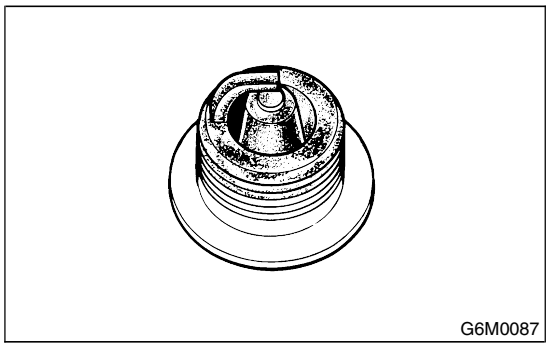
C: INSPECTION S161003A10

Check electrodes and inner and outer porcelain of plugs, noting the type of deposits and the degree of electrode erosion.

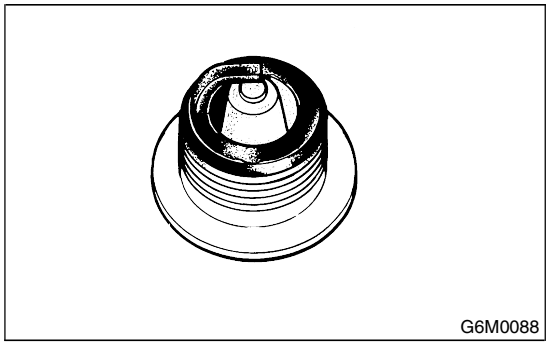


(A) Electrode gap
(B) Carbon accumulation or wear
(C) Cracks
(D) Damage
(E) Damaged gasket

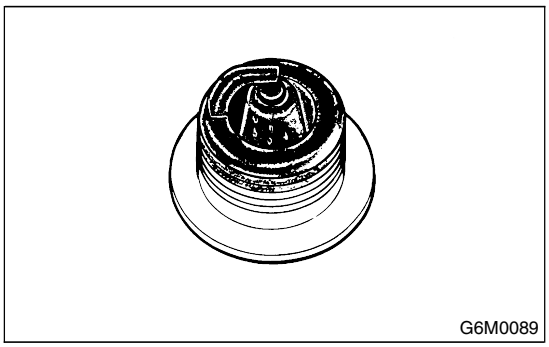
1) Normal
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.



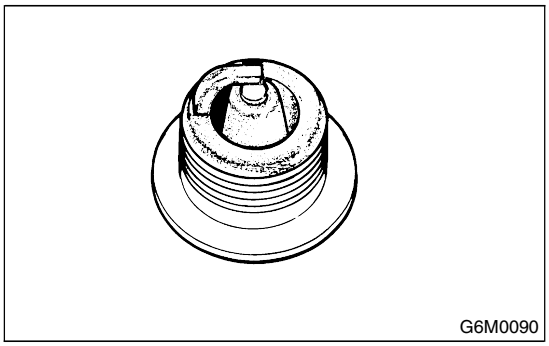
2) Carbon fouled
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.
It is advisable to replace with plugs having hotter heat range.



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.



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.



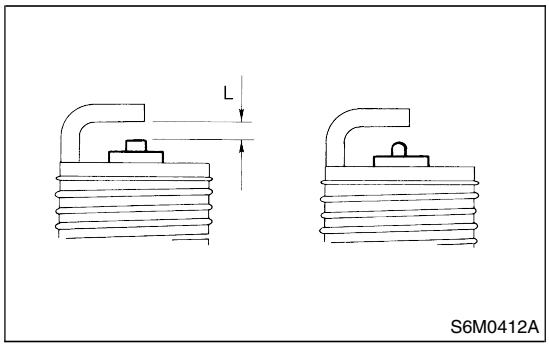
D: CLEANING S161003E56

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, replace plugs.

E: ADJUSTMENT S161003A01

Correct it if the spark plug gap is measured with a gap gauge, and it is necessary.

Spark plug gap: L
With catalyst:
1.0 — 1.1 mm (0.039 — 0.043 in)
Without catalyst:
0.7 — 0.8 mm (0.028 — 0.031 in)

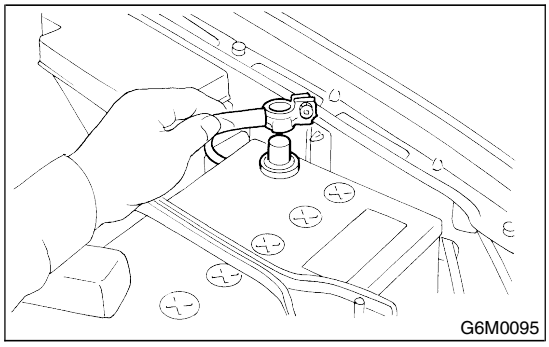


NOTE:
Replace with new spark plug if this area is worn to "ball" shape.

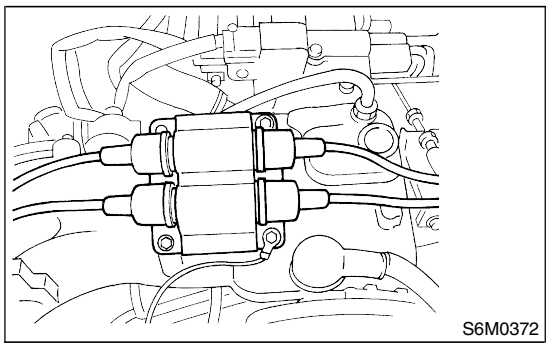
3. Ignition Coil and Ignitor Assembly S161015

A: REMOVAL S161015A18

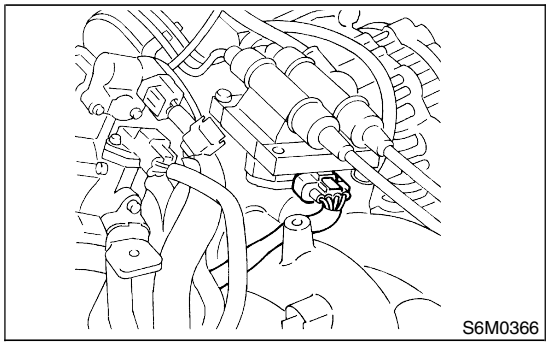
1) Disconnect battery ground cable.


G6M0095

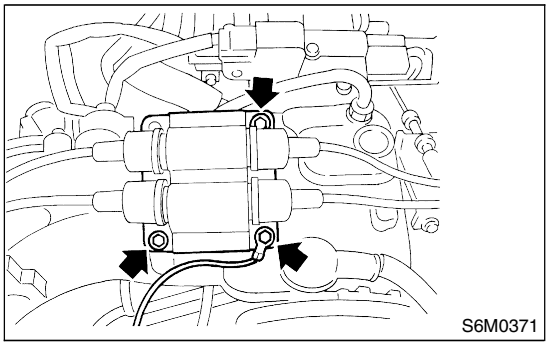
2) Disconnect spark plug cords from ignition coil and ignitor assembly.


S6M0372

3) Disconnect connector from ignition coil and ignitor assembly.


S6M0366

4) Remove ignition coil and ignitor assembly.

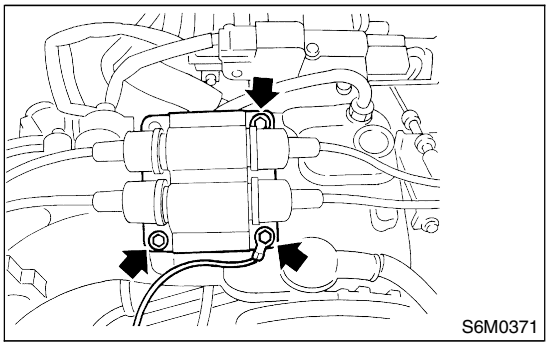

S6M0371

B: INSTALLATION S161015A11

Install in the reverse order of removal.

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

CAUTION:
Be sure to connect wires to their proper positions. Failure to do so will damage unit.

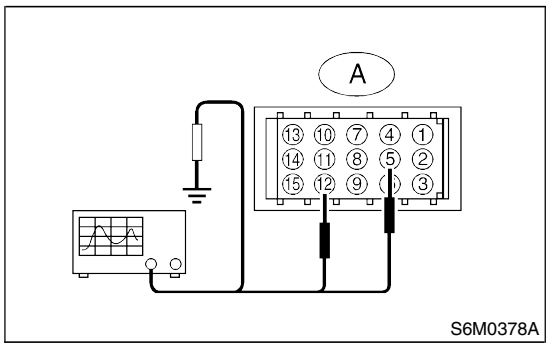

S6M0371

C: INSPECTION S161015A10

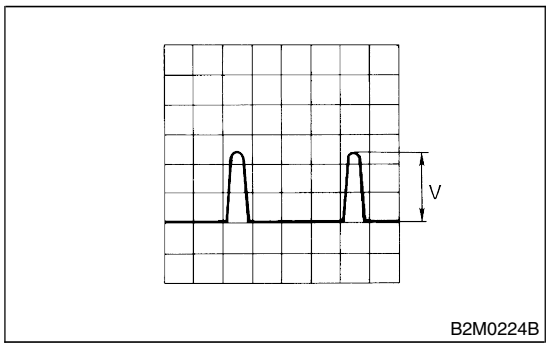
Using oscilloscope and accurate tester, inspect the following items, and replace if defective.
- Ignitor input signal
- Secondary coil resistance
- Poor contact in ignition coil and ignitor assembly connector

1) Turn ignition switch to OFF.
2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.>
ST 498307600 CHECK BOARD KIT
3) Turn ignition switch to ON.
4) Measure voltage between ignition coil and ignition assembly and body.

Connector & terminal:
(A) No. 5 — Engine ground
(A) No. 12 — Engine ground



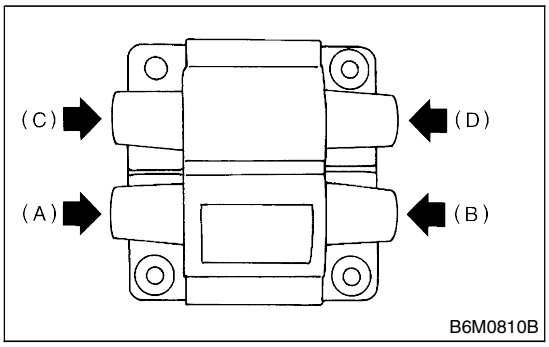
Specified voltage: 3 — 4 V



5) Turn ignition switch to OFF.
6) Disconnect connector from ignition coil and ignitor assembly.
7) Remove spark plug cords.
8) Measure resistance between spark plug cord contact portions to check secondary coil.

Terminals / Specified resistance:
(A) — (B) / 13.0 ±2.6 kΩ
(C) — (D) / 13.0 ±2.6 kΩ

CAUTION:
If the resistance is extremely low, this indicates the presence of a ground short circuit.



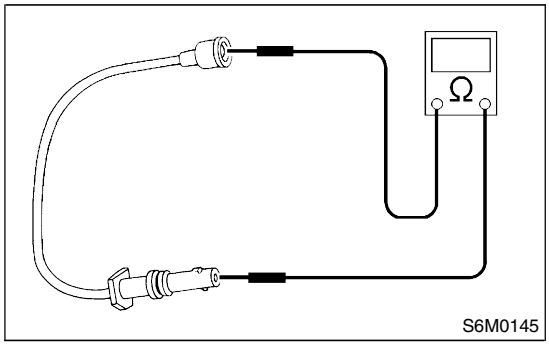
9) Check poor contact in ignition coil and ignitor assembly connector.

4. Spark Plug Cord S161014

A: INSPECTION S161014A10

Check for:
1) Damage to cords, deformation, burning or rust formation of terminals
2) Resistance values of cords

Resistance value:
5.24 — 12.23 kΩ



SPARK PLUG CORD

SPARK PLUG CORD

MEMO:

SPARK PLUG CORD

ENGINE (DIAGNOSTICS)

EN(SOHCw/oOBD)

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1.	Basic Diagnostic Procedure	2
2.	Check List for Interview	4
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4.	Electrical Components Location	10
5.	Engine Control Module (ECM) I/O Signal	20
6.	Subaru Select Monitor	24
7.	Read Diagnostic Trouble Code	27
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9.	Clear Memory Mode	31
10.	Compulsory Valve Operation Check Mode	32
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14.	Diagnostic Procedure with Diagnostic Trouble Code (DTC)	68
15.	General Diagnostic Table	113

1. Basic Diagnostic Procedure

S068501

A: PROCEDURE S068501E45

1. WITH SUBARU SELECT MONITOR S068501E4501

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(SOHCw/oOBD)-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(SOHCw/oOBD)-47 Diagnostics for Engine Starting Failure.>
2	**CHECK ILLUMINATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** <Ref. to EN(SOHCw/oOBD)-33 ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL).>	Does MIL illuminate?	Go to step **3**.	Inspection using “General Diagnostic Table”. <Ref. to EN(SOHCw/oOBD)-113 INSPECTION, General Diagnostic Table.>
3	**CHECK INDICATION OF DTC ON DISPLAY.** 1) Turn ignition switch to OFF. 2) Connect the Subaru Select Monitor to data link connector. 3) Turn ignition switch to ON and the Subaru Select Monitor switch to ON. 4) Read DTC on the Subaru Select Monitor. <Ref. to EN(SOHCw/oOBD)-27 WITH SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code.>	Does the Subaru Select Monitor indicate DTC? <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>	Record diagnostic trouble code. Repair the trouble cause. <Ref. to EN(SOHCw/oOBD)-68 Diagnostic Procedure with Diagnostic Trouble Code (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(SOHCw/oOBD)-33 Engine Malfunction Indicator Lamp (MIL).>
4	**PERFORM THE DIAGNOSIS.** 1) Perform the clear memory mode. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> 2) Perform the inspection mode. <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>	Does the Subaru Select Monitor indicate DTC? <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>	Record diagnostic trouble code. Repair the trouble cause. <Ref. to EN(SOHCw/oOBD)-68 Diagnostic Procedure with Diagnostic Trouble Code (DTC).> Go to step **4**.	Complete the diagnosis.

2. WITHOUT SUBARU SELECT MONITOR

S068501E4502

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

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(SOHCw/oOBD)-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(SOHCw/oOBD)-47 Diagnostics for Engine Starting Failure.>
2	**CHECK ILLUMINATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** <Ref. to EN(SOHCw/oOBD)-33 ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL).>	Does MIL illuminate?	Go to step **3**.	Inspection using "9. General Diagnostic Table". <Ref. to EN(SOHCw/oOBD)-113 INSPECTION, General Diagnostic Table.>
3	**CHECK INDICATION OF DTC ON MIL.** 1) Perform the read diagnostic trouble code (read memory mode). <Ref. to EN(SOHCw/oOBD)-27 WITHOUT SUBARU SELECT MONITOR, OPERATION, Read Diagnostic Trouble Code.> 2) Read DTC on MIL.	Does the MIL indicate DTC? <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>	Repair the trouble cause. Go to step **4**.	Repair the related parts. NOTE: If DTC is not shown on MIL although the MIL illuminates, perform diagnostics of MIL (CHECK ENGINE malfunction indicator lamp) circuit or combination meter. <Ref. to EN(SOHCw/oOBD)-33 Engine Malfunction Indicator Lamp (MIL).>
4	**PERFORM THE DIAGNOSIS.** 1) Perform the clear memory mode. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> 2) Perform the inspection mode. <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>	Does the MIL indicate DTC? <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>	Repair the trouble cause. Go to step **4**.	Complete the diagnosis.

2. Check List for Interview S068502

A: CHECK S068502A04

1. CHECK LIST NO. 1 S068502A0401

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 S068502A0402

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 ☐ 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

3. General Description S068001

A: CAUTION S068001A03

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

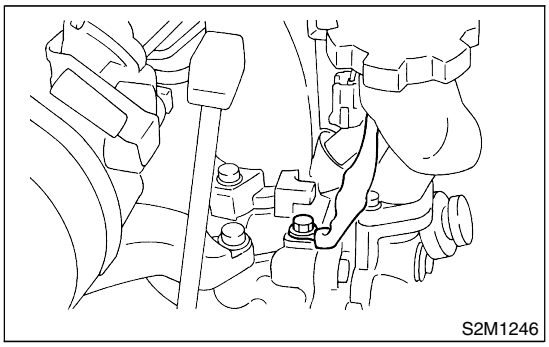
CAUTION:
• All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
• Be careful not to damage Airbag system wiring harness when servicing the engine control module (ECM), transmission control module (TCM), main relay and fuel pump relay.

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.

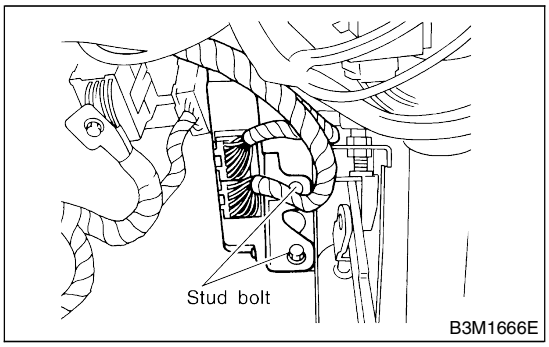
CAUTION:
When replacing ECM, be careful not to use the wrong spec. ECM to avoid any damage on fuel injection system.

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 engine grounding terminal or engine proper as the grounding point to the body when measuring voltage and resistance in the engine compartment.


S2M1246

9) Use TCM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.



B3M1666E

10) Every MFI-related part is a precision part. Do not drop them.
11) Observe the following cautions when installing a radio in MFI equipped models.

CAUTION:
• The antenna must be kept as far apart as possible from the control unit.
(The ECM is located in the engine compartment.)
• The antenna feeder must be placed as far apart as possible from the ECM and MFI harness.
• Carefully adjust the antenna for correct matching.
• When mounting a large power type radio, pay special attention to the three items above mentioned.
• Incorrect installation of the radio may affect the operation of the ECM.

12) Before disconnecting the fuel hose, disconnect the fuel pump connector and crank the engine for more than five seconds to release pressure in the fuel system. If engine starts during this operation, run it until it stops.
13) Problems in the electronic-controlled automatic transmission may be caused by failure of the

engine, the electronic control system, the transmission proper, or by a combination of these. These three causes must be distinguished clearly when performing diagnostics.
14) Diagnostics should be conducted by rotating with simple, easy operations and proceeding to complicated, difficult operations. The most important thing in diagnostics is to understand the customer's complaint, and distinguish between the three causes.
15) In AT vehicles, do not continue the stall for more than five seconds at a time (from closed throttle, fully open throttle to stall engine speed).
16) On ABS vehicle, when performing driving test in jacked-up or lifted-up position, sometimes the warning light may be lit, but this is not a malfunction of the system. The reason for this is the speed difference between the front and rear wheels. After diagnosis of engine control system, perform the ABS memory clearance procedure of self-diagnosis system.

B: INSPECTION S068001A10

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

1. BATTERY S068001A1001

1) Measure battery voltage and specific gravity of electrolyte.

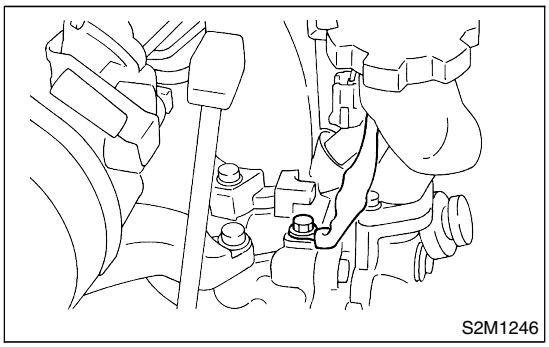
Standard voltage: 12 V

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 S068001A1002

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

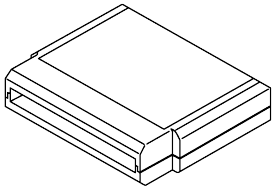

S2M1246

C: NOTE S068001A15

1. ENGINE AND EMISSION CONTROL SYSTEM S068001A1501

● 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.

D: PREPARATION TOOL S068001A17

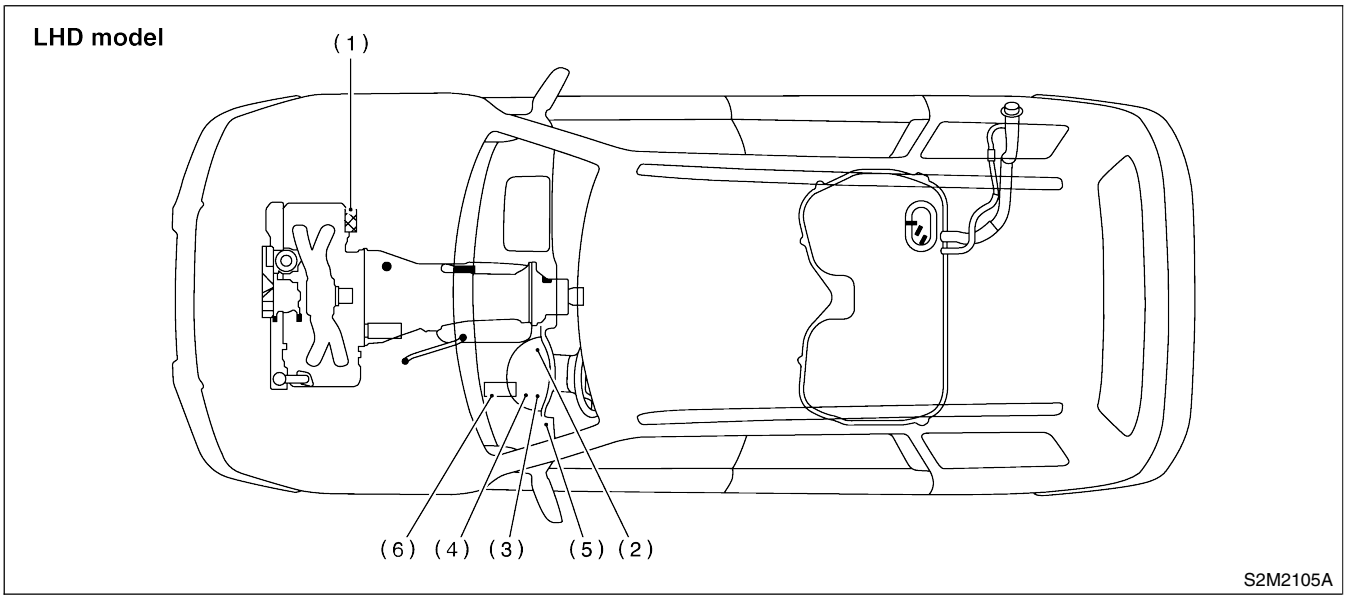
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA150 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

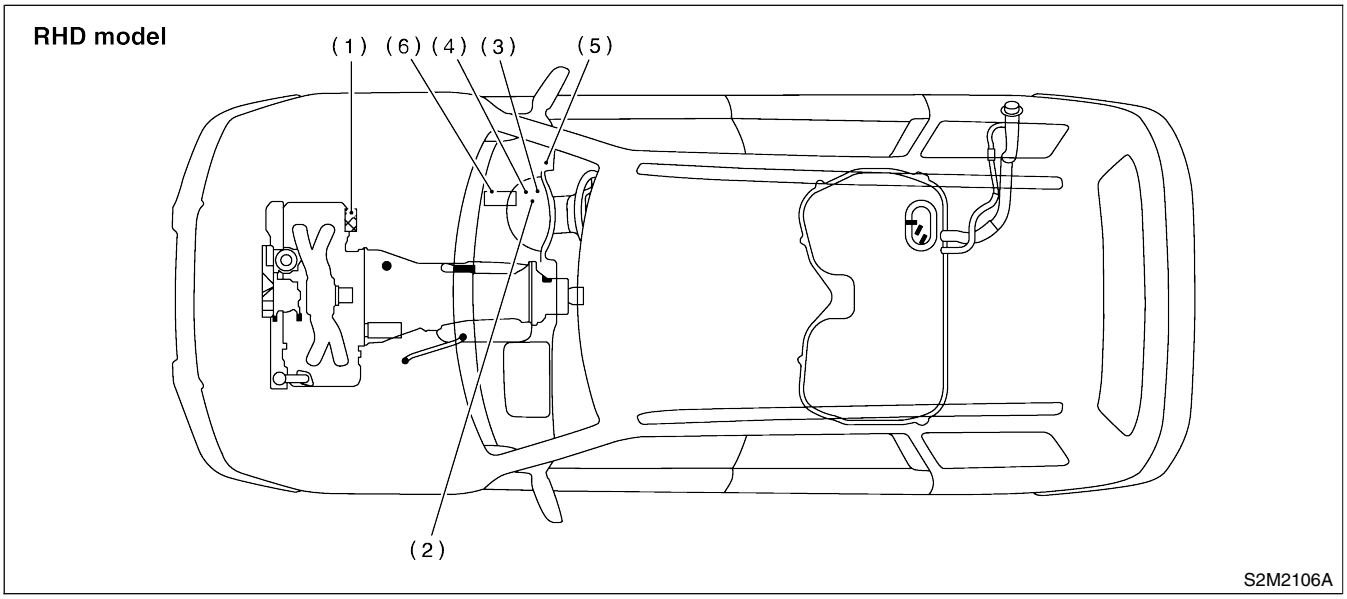
MEMO:

4. Electrical Components Location S068507

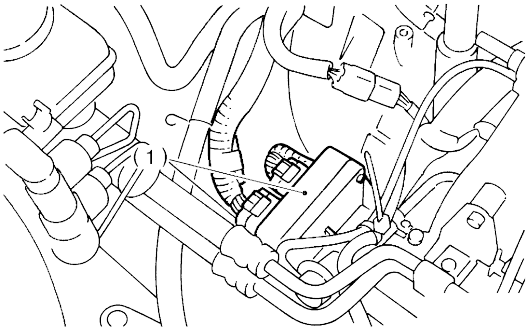
A: LOCATION S068507A13

1. MODULE S068507A1301

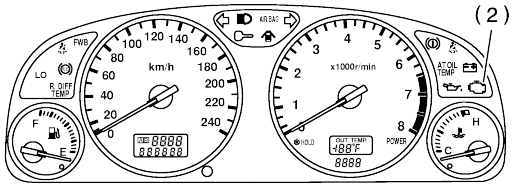




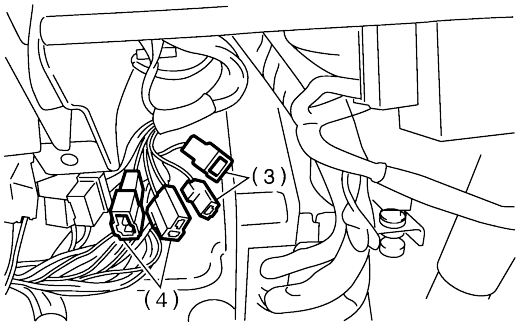
(1) Engine control module (ECM)
(2) CHECK ENGINE malfunction indicator lamp (MIL)
(3) Read memory connector
(4) Test mode connector
(5) Data link connector
(6) Transmission control module (TCM)



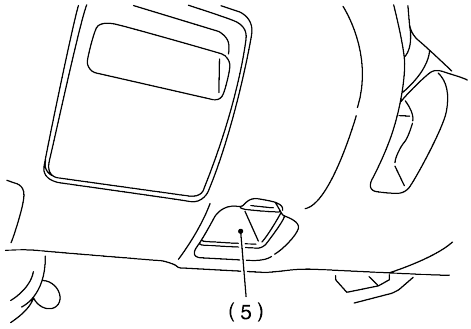
S2M0533D



S2M2107A

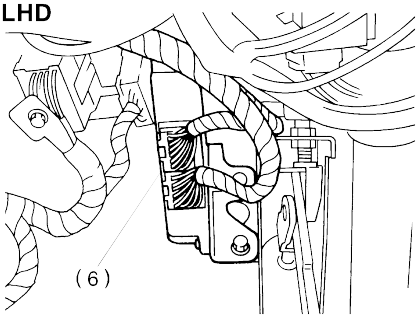


S2M2108A



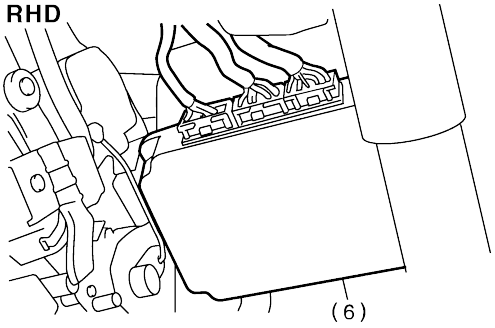
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LHD



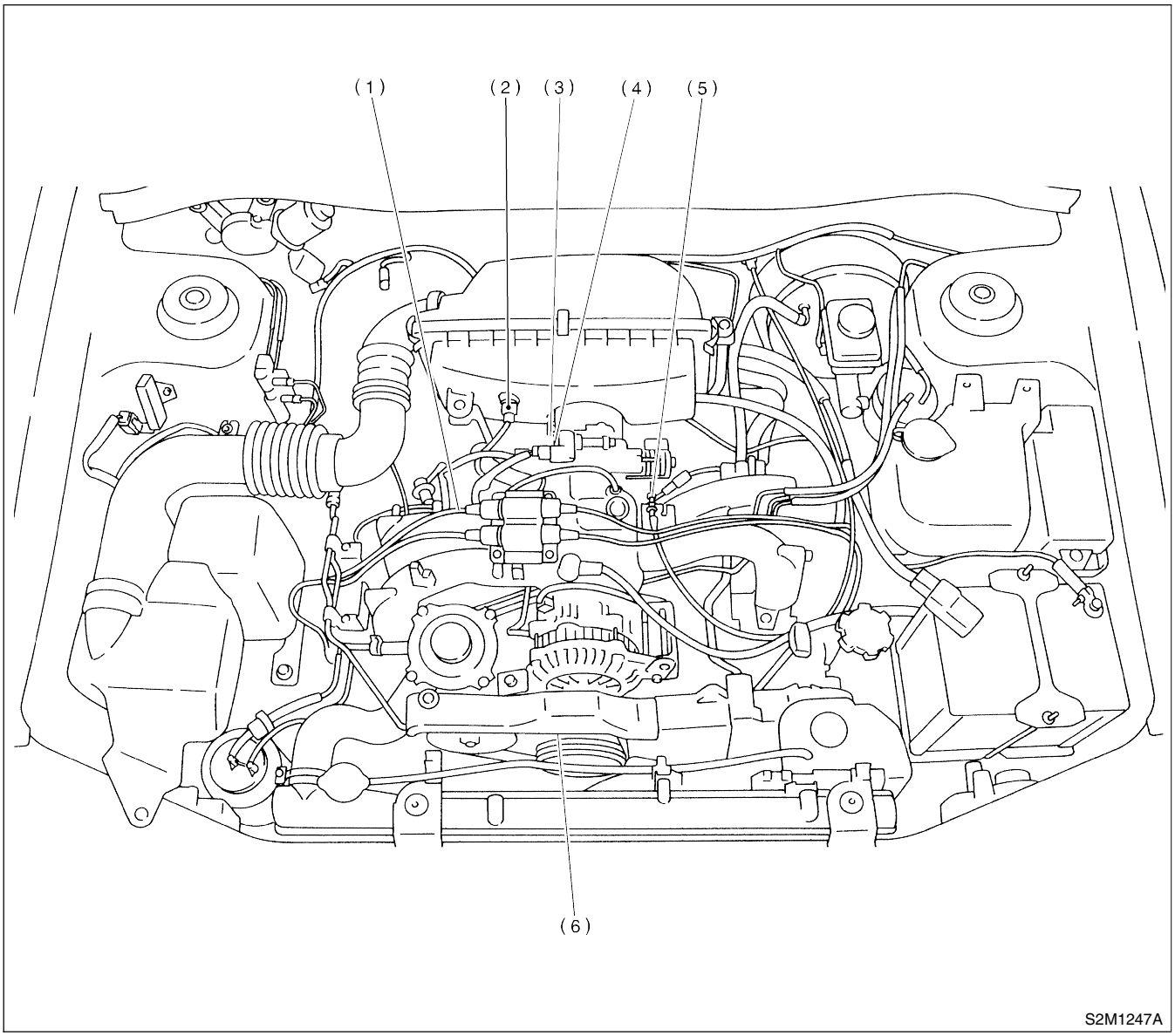
B3M1666H

RHD

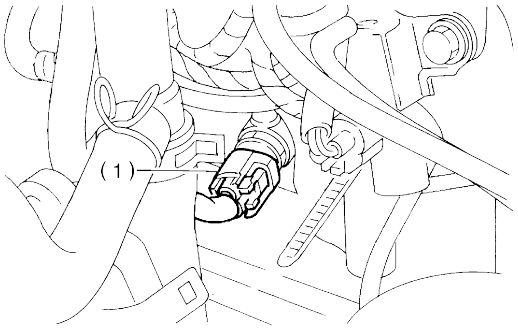


B3M1652C

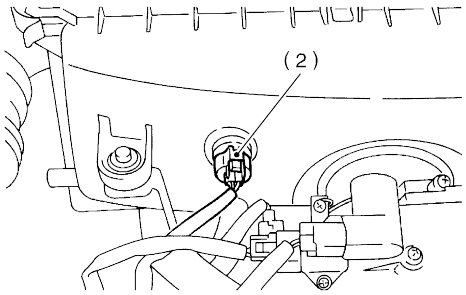
2. SENSOR S068507A1302



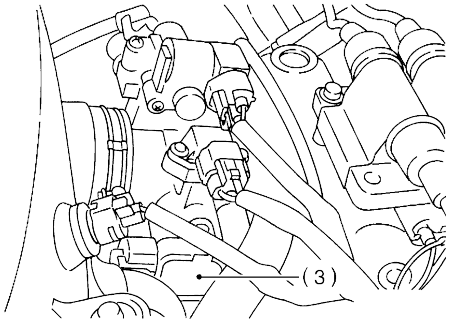
(1) Engine coolant temperature sensor
(2) Intake air temperature sensor
(3) Throttle position sensor
(4) Pressure sensor
(5) Knock sensor
(6) Crankshaft position sensor



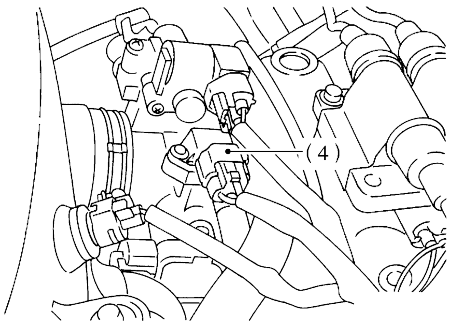
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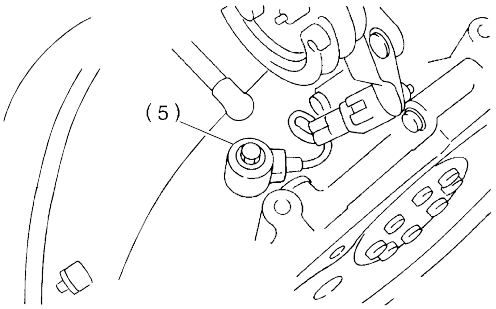
S2M1249A



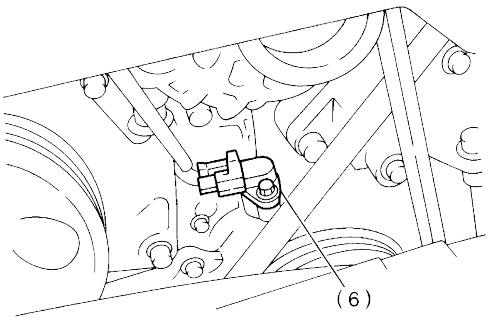
S2M1250A



S2M1250B



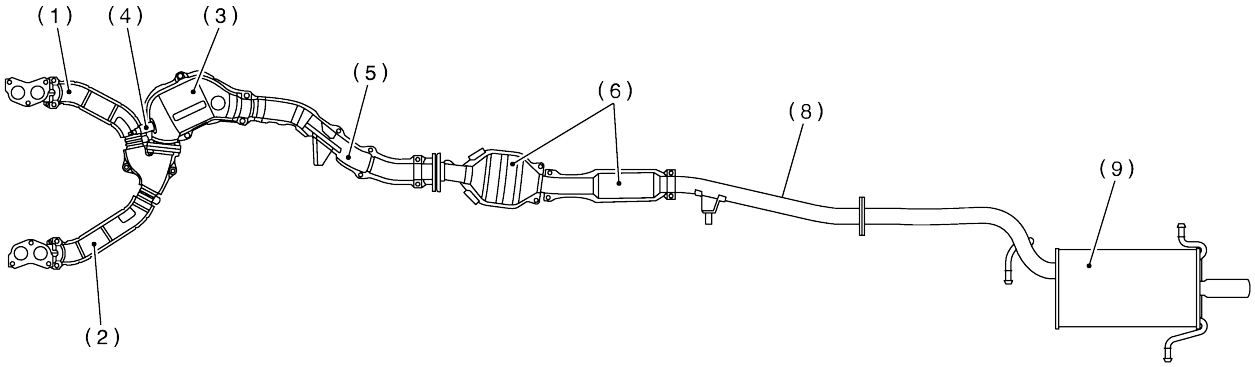
S2M0515B



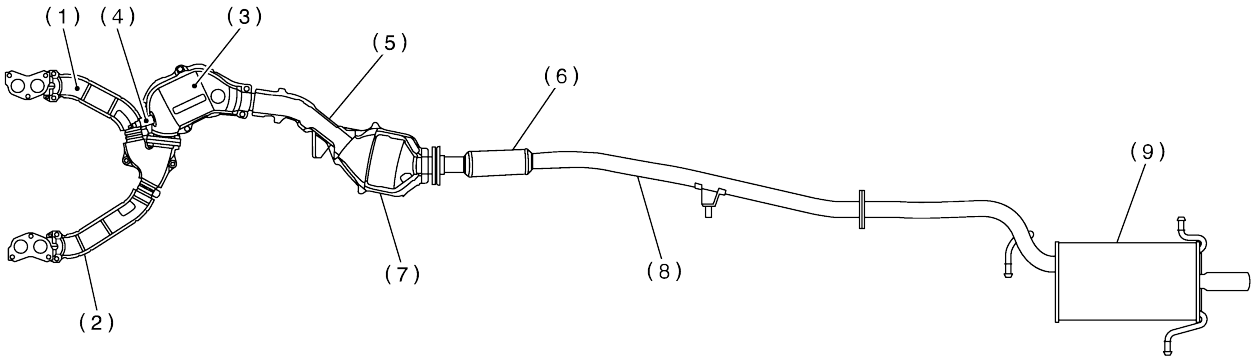
S2M0213K

ELECTRICAL COMPONENTS LOCATION

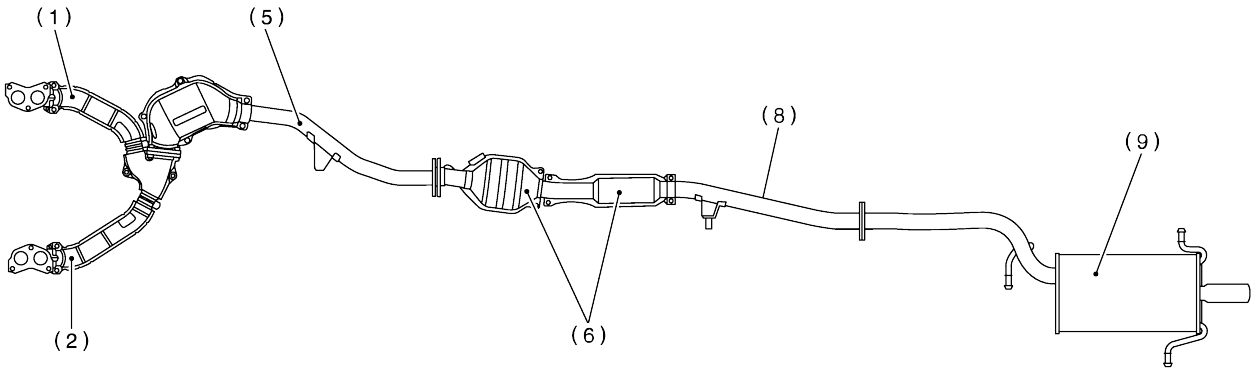
AUSTRALIA SPEC. VEHICLES



WITH CATALYTIC CONVERTER
(EXCEPT AUSTRALIA SPEC. VEHICLES)

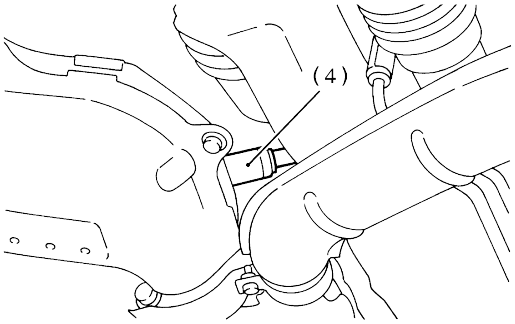


WITHOUT CATALYTIC CONVERTER

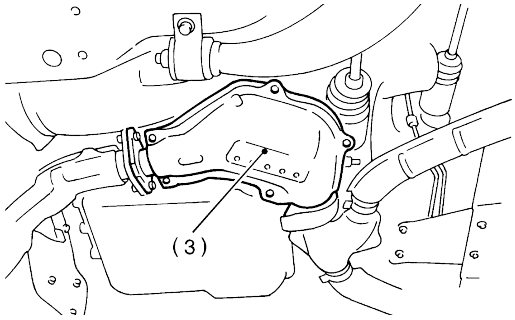


S2M2257A

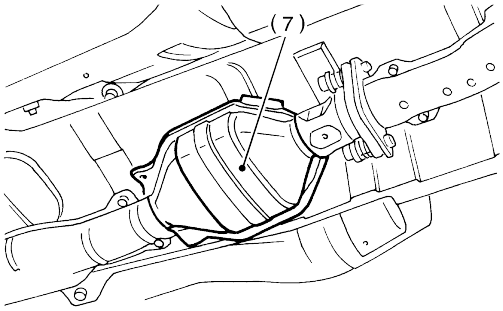
(1) Front exhaust pipe RH
(2) Front exhaust pipe LH
(3) Front catalytic converter
(4) Oxygen sensor
(5) Center exhaust pipe
(6) Resonance chamber
(7) Rear catalytic converter
(8) Rear exhaust pipe
(9) Muffler



S2M0264C

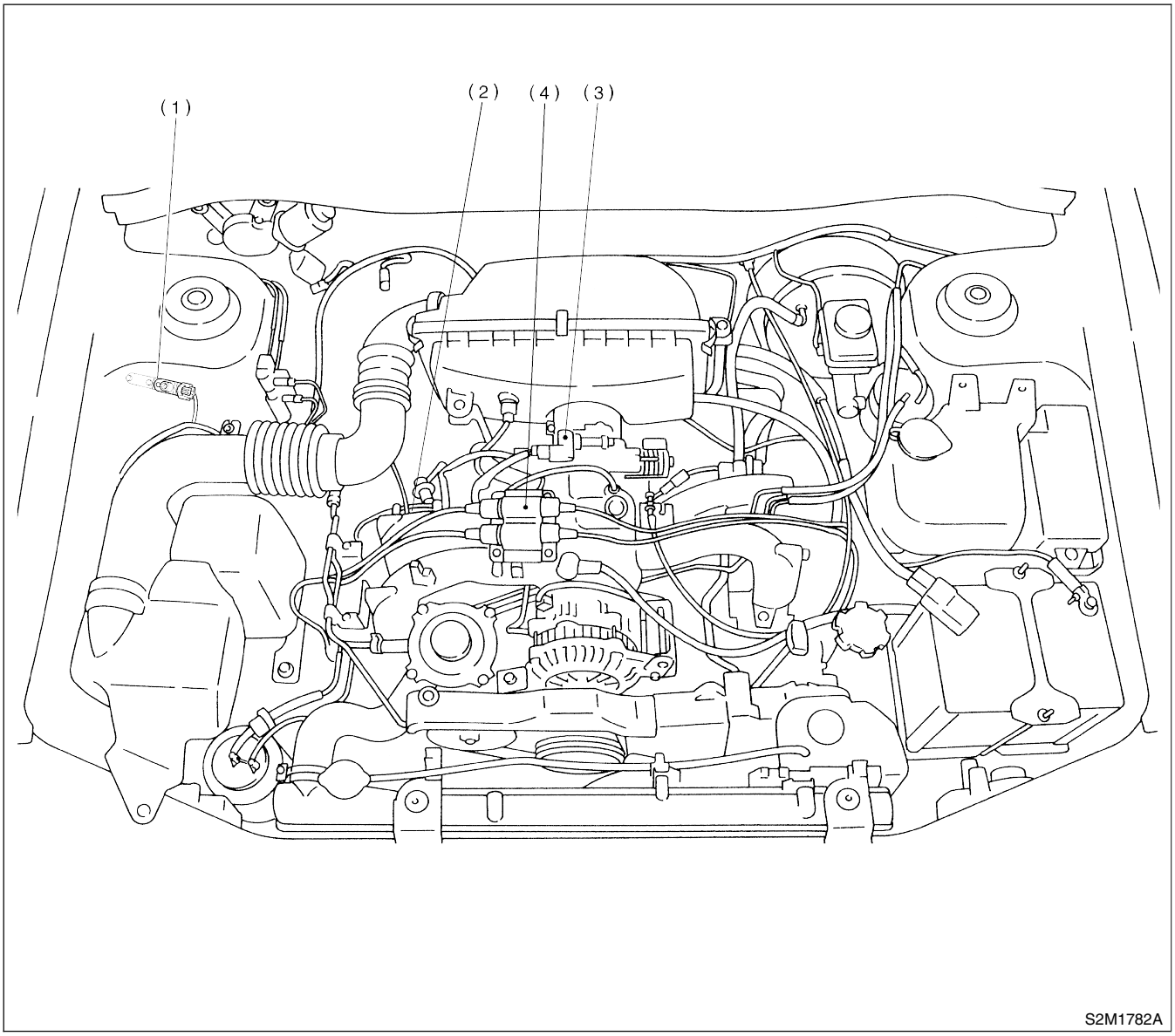


S2M0267C

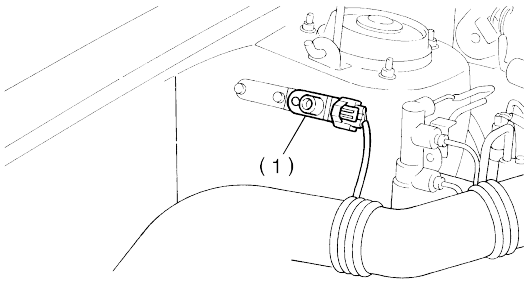


S2M0654C

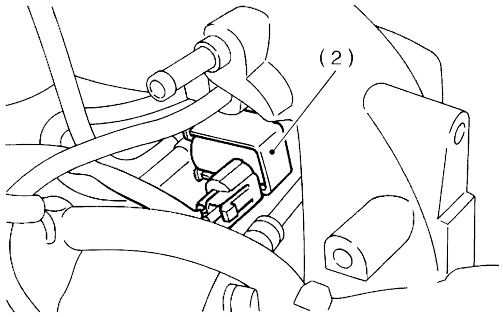
3. SOLENOID VALVE, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS *S068507A1303*



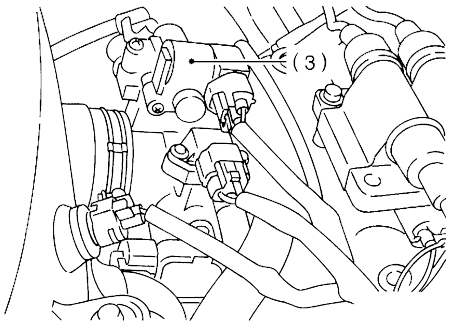
(1) CO resistor (General spec. vehicles)
(2) Purge control solenoid valve
(3) Idle air control solenoid valve
(4) Ignition coil and ignitor ASSY



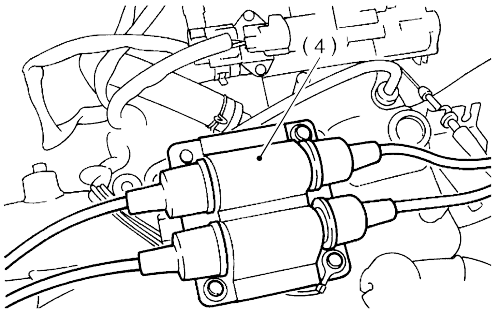
S2M1764A



S2M1252A



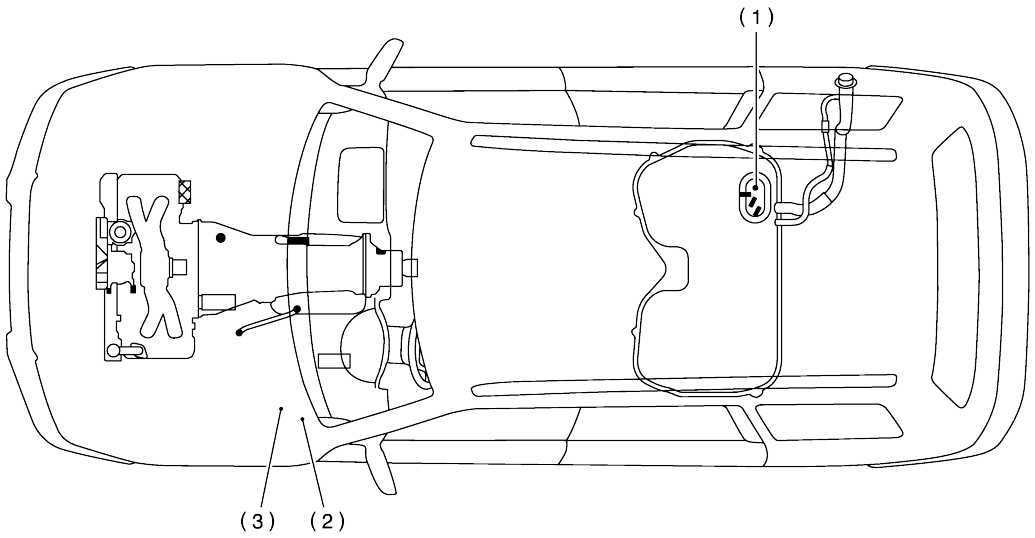
S2M1250C



S2M1253A

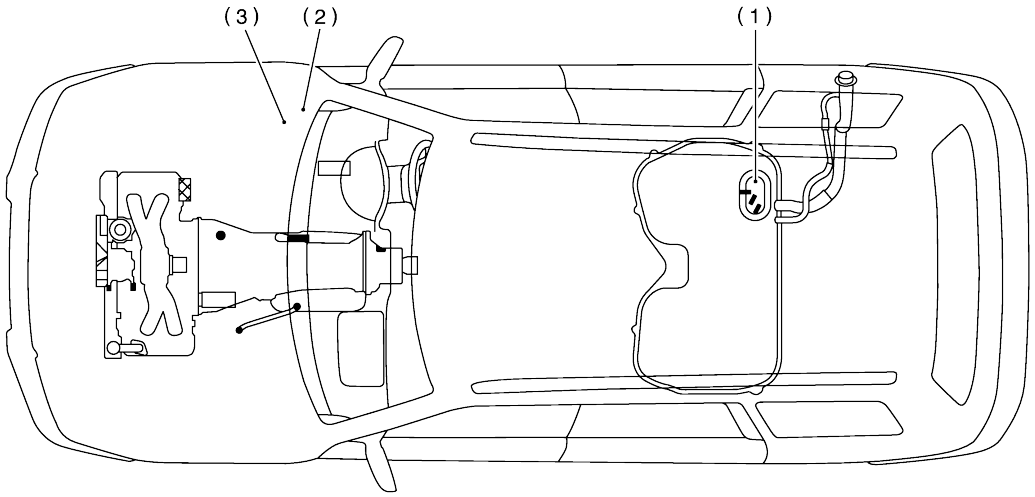
ELECTRICAL COMPONENTS LOCATION

LHD model



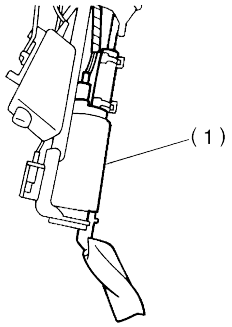
S2M2105B

RHD model

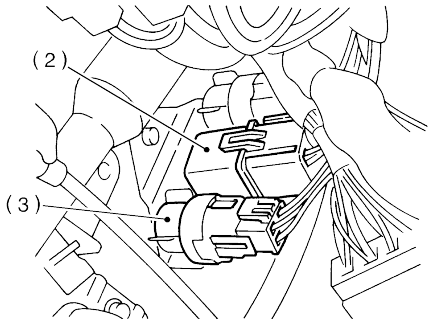


S2M2106B

(1) Fuel pump
(2) Main relay
(3) Fuel pump relay



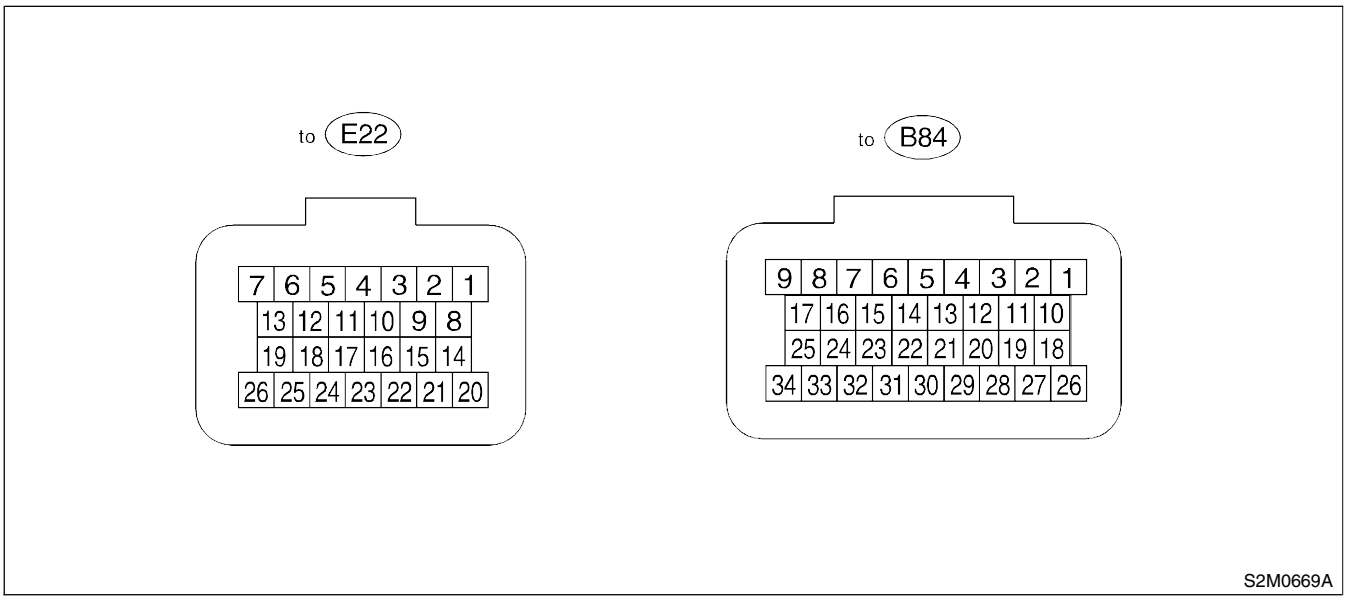
S2M0277B

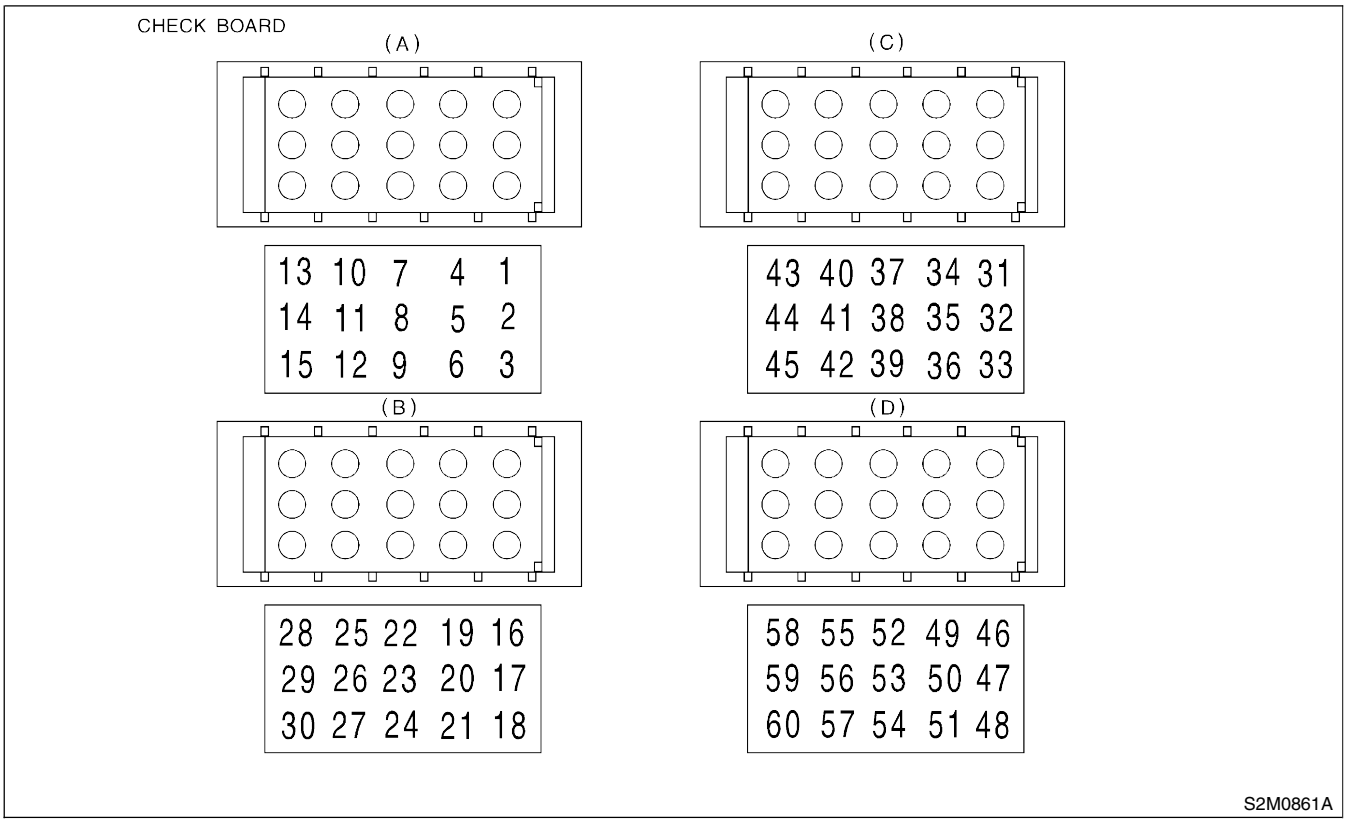


S2M0278C

5. Engine Control Module (ECM) I/O Signal S068526

A: ELECTRICAL SPECIFICATION S068526A08





ENGINE CONTROL MODULE (ECM) I/O SIGNAL

Content		ECM		CHECK BOARD		Signal (V)		Note
		Connector No.	Terminal No.	Connector No.	Terminal No.	Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	E22	20	B	26	0	−7 to +7	Sensor output waveform
	Signal (−)	E22	14	B	19	0	0	—
	Shield	E22	21	B	25	0	0	—
Pressure sensor	Signal	E22	18	A	15	3.4 — 3.6	1.2 — 1.8	—
	Power supply	E22	25	B	21	5	5	—
	GND	E22	22	B	24	0	0	—
Throttle position sensor	Signal	E22	23	B	23	Fully closed: 0.2 — 1.0 Fully open: 4.2 — 4.7		—
	Power supply	E22	25	B	21	5	5	—
	GND	E22	22	B	24	0	0	—
Oxygen sensor	Signal	B84	22	D	47	0.6, or less	0 — 0.9	—
	Shield	B84	15	C	38	0	0	—
Engine coolant temperature sensor		E22	24	B	22	0.4 — 2.4	0.4 — 2.4	After warm-up
Vehicle speed sensor		B84	33	D	53	0 or 5	0 or 5	“5” and “0” are repeatedly displayed when vehicle is driven.
Intake air temperature sensor		E22	17	B	16	2.3 — 2.5	1.4 — 1.6	After warm-up
A/C switch		B84	27	D	59	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B84	28* 19	D	58* 50	10 — 13	13 — 14	—
Neutral position switch (MT)		B84	26	D	60	ON: 10 — 13 OFF: 0		• On MT vehicles; switch is ON when gear is in neutral position.
Neutral position switch (AT)						ST: 10 — 13 ON: 0 OFF: 13 — 14		• On AT vehicles; switch is ON when shift is in “N” or “P” position
Knock sensor	Signal	E22	16	B	17	2.5	2.5	—
	Shield	E22	21	B	25	0	0	
Test mode connector		B84	19* 28	D	50* 58	10 — 13	13 — 14	When connected: 0
Read memory connector		B84	20	D	49	10 — 13	13 — 14	When connected: 0
Back-up power supply		B84	34	D	52	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control unit power supply		B84	9	B	27	10 — 13	13 — 14	—
			17	C	36			
Ignition control	# 1, # 2	E22	3	A	5	0	1 — 3.4	—
	# 3, # 4	E22	9	A	12	0	1 — 3.4	—
Fuel injector	# 1, # 2	E22	7	A	1	10 — 13	1 — 14	Waveform
	# 3, # 4	E22	6	A	2	10 — 13	1 — 14	Waveform

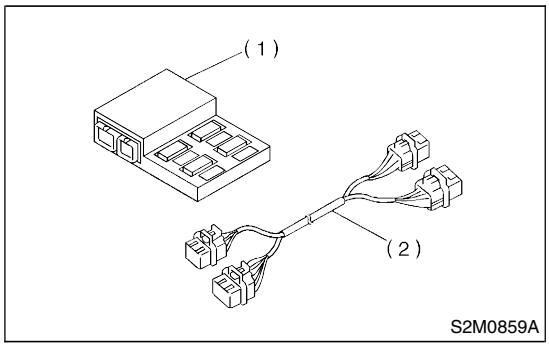
ENGINE CONTROL MODULE (ECM) I/O SIGNAL

Content	ECM		CHECK BOARD		Signal (V)		Note
	Connector No.	Terminal No.	Connector No.	Terminal No.	Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Idle air control solenoid valve	E22	4	A	4	—	1 — 13	Waveform
Fuel pump relay control	B84	3	C	33	ON: 0.5, or less OFF: 10 — 13	0.5, or less	—
A/C relay control	B84	11	C	42	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1	B84	2	C	34	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 2	B84	10	C	43	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only
Self-shutoff control	B84	5	C	31	10 — 13	13 — 14	—
Malfunction indicator lamp	B84	13	C	40	—	—	Light “ON”: 1, or less Light “OFF”: 10 — 14
Engine speed output	B84	6	B	30	—	0 — 13, or more	Waveform
Torque control signal	B84	18	D	51	8	8 — 9	—
VCC signal	B84	1	C	35	5	5	AT and without catalyst vehicles only
AT load signal	B84	29	D	57	3.4 — 3.6	1.2 — 1.8	—
Purge control solenoid valve	E22	5	A	3	ON: 1, or less OFF: 10 — 13	13 — 14	• Waveform • When connecting test mode connector
Power steering pressure switch	E22	26	B	20	10 — 13	ON: 0 OFF: 13 — 14	—
MT/AT identification	B84	16	C	37	MT: 0 AT: 5	MT: 0 AT: 5	—
Select monitor signal	B84	24	C	45	—	—	—
		32	D	54			
GND (ignition system)	E22	10	A	11	0	0	—
GND (power supply)	E22	11	A	10	0	0	—
		12		9			
GND (control systems)	E22	21	B	25	0	0	—
Immobilizer serial line	B84	23	D	46	—	—	—
		31		55			

*: RHD

B: HOW TO CHECK I/O SIGNAL FOR ECM S068526H57

● When checking I/O signal, connect ST between ECM and ECM connector.
1) Prepare the ST.
ST 498307600 CHECK BOARD KIT



(1) CHECK BOARD
(2) CHECK BOARD ADAPTER

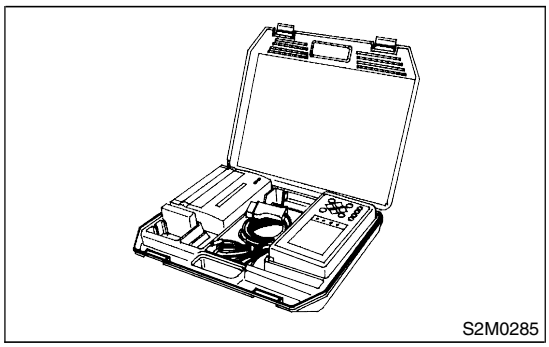
2) Turn ignition switch to OFF.
3) Disconnect connectors from ECM.
4) Connect connectors of CHECK BOARD ADAPTER to ECM and CHECK BOARD.
5) Connect engine harness and bulkhead harness connectors to CHECK BOARD.

6. Subaru Select Monitor S068503

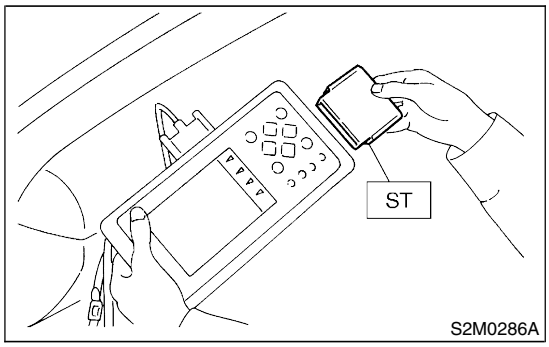
A: OPERATION S068503A16

1. HOW TO USE SUBARU SELECT MONITOR S068503A1601

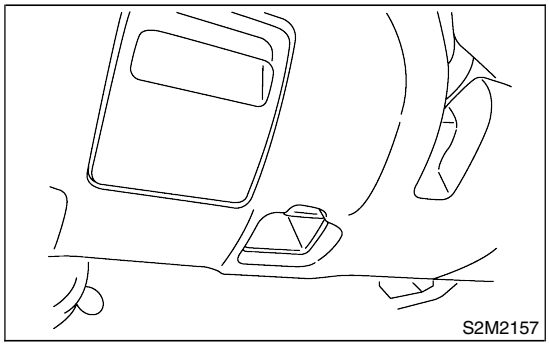
1) Prepare Subaru Select Monitor kit.



2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor.



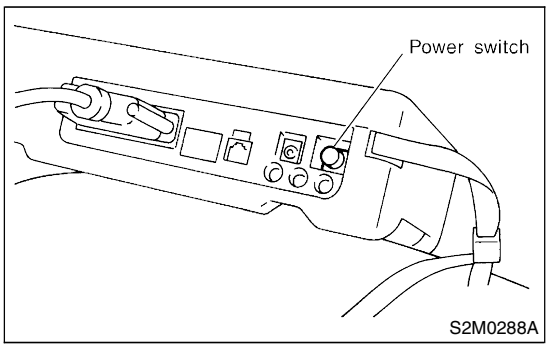
4) Connect Subaru Select Monitor to data link connector.
   (1) Data link connector located in the lower portion of the instrument panel (on the driver's side).



   (2) Connect diagnosis cable to data link connector.

CAUTION:
Do not connect scan tools except for Subaru Select Monitor.

5) Turn ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



6) Using Subaru Select Monitor, call up diagnostic trouble code(s) and various data, then record them.

2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE. S068503A1602

Refer to Read Diagnostic Trouble Code for information about how to indicate DTC. <Ref. to EN(SOHCw/oOBD)-27 Read Diagnostic Trouble Code.>

3. READ CURRENT DATA SHOWN ON DISPLAY. S068503A1603

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 {1. Current Data Display & Save} and press the [YES] key.
5) On the ≪Data Display Menu≫ display screen, select the {1. 12 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	Unit of measure
Battery voltage	V
Vehicle speed signal	km/h or MPH
Engine speed signal	rpm
Engine coolant temperature signal	°C or °F
Ignition timing signal	deg
Throttle position signal	%
Throttle position signal	V
Injection pulse width	ms
Idle air control signal	%
Engine load data	%
Front oxygen sensor output signal	V
A/F correction coefficient	%
Knock sensor signal	deg
CO resistor	V
Intake manifold absolute/relative pressure signal	mmHg or kPa or inHg
Intake air temperature signal	°C or °F
Canister purge control solenoid valve duty ratio	%
Idle air control solenoid valve current	mA
Ignition switch signal	ON or OFF
Test mode connector signal	ON or OFF
Neutral position switch signal	ON or OFF
Air conditioning switch signal	ON or OFF
Air conditioning relay signal	ON or OFF
Radiator main fan relay signal	ON or OFF
Fuel pump relay signal	ON or OFF
Knocking signal	ON or OFF
Radiator sub fan relay signal	ON or OFF
Engine torque control signal	ON or OFF
Front oxygen sensor rich signal	ON or OFF
Crankshaft position sensor signal	ON or OFF
Electrical load signal	ON or OFF
Read memory connector signal	ON or OFF
Power steering pressure signal	ON or OFF
AT vehicle ID signal	ON or OFF
Idle switch	ON or OFF
Canister purge control solenoid valve	ON or OFF
Torque permission signal	ON or OFF

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

4. LED OPERATION MODE FOR ENGINE S068503A1604

Contents	Message	LED “ON” requirements
Ignition switch signal	ON or OFF	When ignition switch is turned ON.
Test mode connector signal	ON or OFF	When test mode connector is connected.
Neutral position switch signal	ON or OFF	When neutral position signal is entered.
Air conditioning switch signal	ON or OFF	When air conditioning switch is turned ON.
Air conditioning relay signal	ON or OFF	When air conditioning relay is in function.
Radiator main fan relay signal	ON or OFF	When radiator main fan relay is in function.
Fuel pump relay signal	ON or OFF	When fuel pump relay is in function.
Knocking signal	ON or OFF	When knocking signal is entered.
Radiator sub fan relay signal	ON or OFF	When radiator sub fan relay is in function.
Engine torque control signal	ON or OFF	When engine torque control signal is entered.
Front oxygen sensor rich signal	ON or OFF	When front oxygen sensor mixture ratio is rich.
Crankshaft position sensor signal	ON or OFF	When crankshaft position sensor signal is entered.
Electrical load signal	ON or OFF	When the lighting switch, blower fan switch or rear defogger switch is turned ON.
Read memory connector signal	ON or OFF	When read memory connector is connected.
Power steering pressure signal	ON or OFF	When steering wheel is turned.
AT vehicle ID signal	ON or OFF	When AT identification signal is entered.
Idle switch	ON or OFF	When throttle sensor sends signal that throttle opening angle is in idle position.
Canister purge control solenoid valve	ON or OFF	When canister purge control solenoid valve is in function.
Torque permission signal	ON or OFF	When torque permission signal is entered.

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

7. Read Diagnostic Trouble Code S068508

A: OPERATION S068508A16

1. WITH SUBARU SELECT MONITOR S068508A1601

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). <Ref. to EN(SOHCw/oOBD)-65 LIST, LIST of Diagnostic Trouble Code (DTC).>

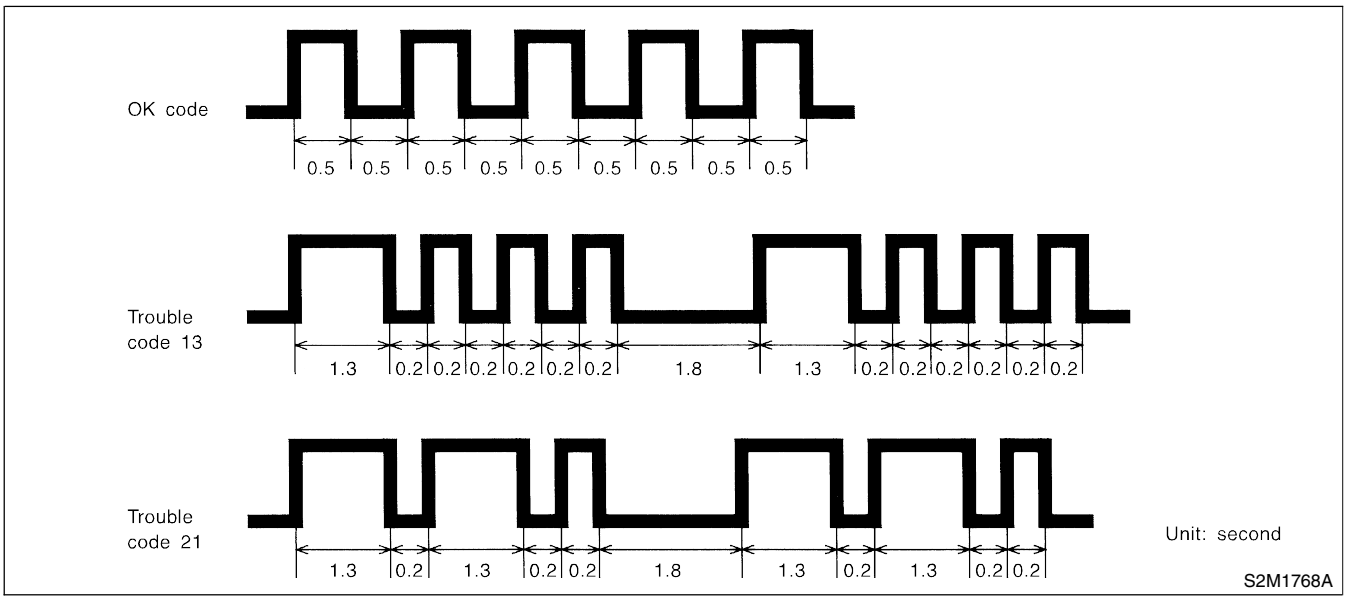
2. WITHOUT SUBARU SELECT MONITOR S068508A1602

No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Turn ignition switch to OFF. 2) Connect read memory connector. <Ref. to EN(SOHCw/oOBD)-10 LOCATION, Electrical Components Location.> 3) Turn ignition switch to ON.	Does the MIL come on?	Go to step **2**.	Check the following and repair if necessary. NOTE: ● Open or short circuit in engine control module power supply or ground line ● Open or short circuit in CHECK ENGINE malfunction indicator lamp
2	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).**	Does the MIL indicate diagnostic trouble code (DTC)?	Record diagnostic trouble code (DTC). Then turn ignition switch to OFF, disconnect read memory connector.	Complete read diagnostic trouble code. Turn ignition switch to OFF and disconnect read memory connector.

READ DIAGNOSTIC TROUBLE CODE

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

NOTE:
● For detailed concerning diagnostic trouble codes, refer to the List of Diagnostic Trouble Code (DTC). <Ref. to EN(SOHCw/oOBD)-65 LIST, LIST of Diagnostic Trouble Code (DTC).>



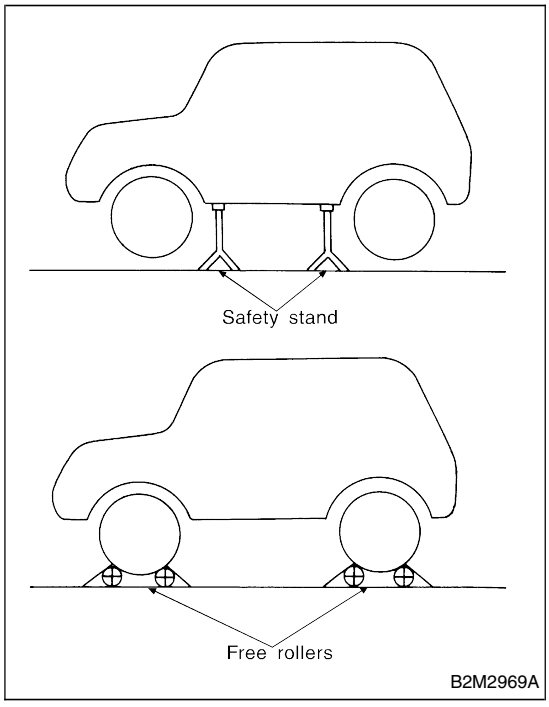
8. Inspection Mode S068510

A: OPERATION S068510A16

1. PREPARATIONS FOR THE INSPECTION MODE S068510A1601

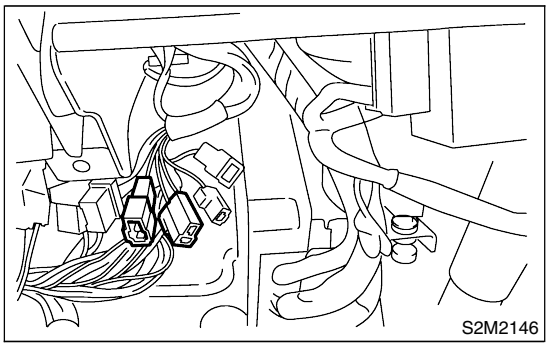
Raise the vehicle using a garage jack and place on safety stands or drive the vehicle onto free rollers.

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.

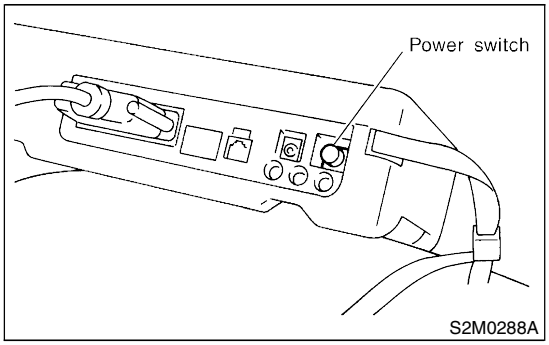


2. WITH SUBARU SELECT MONITOR S068510A1602

After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data.
1) Connect test mode connector (green).



2) Connect Subaru select monitor to data link connector. <Ref. to EN(SOHCw/oOBD)-10 LOCATION, Electrical Components Location.>
3) Turn ignition switch to ON (engine OFF) and Subaru select monitor switch to ON.



4) On the ≪Main Menu≫ display screen, select the {2. Each System Check} and press the [YES] key.
5) On the ≪System Selection Menu≫ display screen, select the {Engine Control System} and press the [YES] key.
6) Press the [YES] key after displayed the information of engine type.
7) On the ≪Engine Diagnosis≫ display screen, select the {6. Dealer Check Mode Procedure} and press the [YES] key.
8) When the “Perform Inspection (Dealer Check) Mode?” is shown on the display screen, press the [YES] key.
9) Perform subsequent procedures as instructed on the display screen.
• If trouble still remains in the memory, the corresponding diagnostic trouble code (DTC) appears on the display screen.

NOTE:
● For detailed operation procedure, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.
● For detailed concerning diagnostic trouble codes, refer to the DIAGNOSTIC TROUBLE CODE (DTC) LIST. <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>
● On AWD vehicles, 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. WITHOUT SUBARU SELECT MONITOR S068510A1603

No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Start and warm-up the engine. 2) Turn ignition switch to OFF. 3) Set shift lever to neutral position (MT vehicles), or set selector lever to “P” position (AT vehicles). 4) Connect test mode connector (green). 5) Turn ignition switch to ON.	Does the MIL come on?	Go to step **2**.	Check the following and repair if necessary. NOTE: ● Open or short circuit in engine control module power supply or ground line ● Open or short circuit in CHECK ENGINE malfunction indicator lamp
2	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).** 1) Set selector lever to “N” position, and then set selector lever to “P” position again (AT vehicles only). 2) Start the engine.	Does the MIL indicate diagnostic trouble code (DTC)?	Record diagnostic trouble code (DTC) and inspect using DTC. <Ref. to EN(SOHCw/oOBD)-68 Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).** 1) Drive vehicle at speed greater than 11 km/h (7 MPH) for at least one minute. 2) Warm-up engine above 2,000 rpm.	Does the MIL indicate diagnostic trouble code (DTC)?	Record diagnostic trouble code (DTC) and inspect using DTC. <Ref. to EN(SOHCw/oOBD)-68 Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Turn ignition switch to OFF. Disconnect test mode connector. Complete inspection mode. NOTE: When on-board diagnosis system indicates no trouble, the trouble is in a different symptom.

9. Clear Memory Mode S068513

A: OPERATION S068513A16

1. WITH SUBARU SELECT MONITOR S068513A1601

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

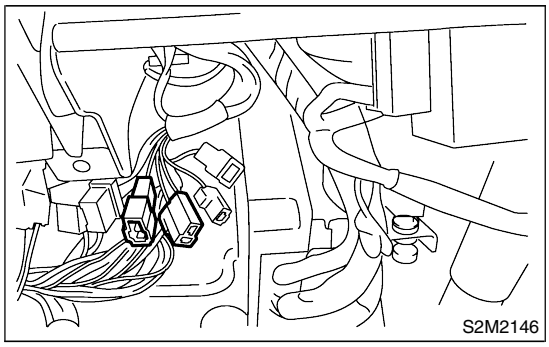
2. WITHOUT SUBARU SELECT MONITOR S068513A1602

No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Turn ignition switch to OFF. 2) Set shift lever to neutral position (MT vehicles), or set selector lever to "P" position (AT vehicles). 3) Connect test mode connector and read memory connector. 4) Turn ignition switch to ON.	Does the MIL come on?	Go to step **2**.	Check the following and repair if necessary. NOTE: ● Open or short circuit in engine control module power supply or ground line ● Open or short circuit in CHECK ENGINE malfunction indicator lamp
2	**CHECK DIAGNOSTIC TROUBLE CODE (DTC).** 1) Set selector lever to "N" position, and then set selector lever to "P" position again (AT vehicles only). 2) Start the engine. 3) Drive vehicle at speed greater than 11 km/h (7 MPH) for at least one minute. 4) Warm-up engine above 2,000 rpm.	Does the MIL indicate diagnostic trouble code (DTC)? <Ref. to EN(SOHCw/oOBD)-65 LIST, List of Diagnostic Trouble Code (DTC).>	Record diagnostic trouble code. Repair the trouble cause. <Ref. to EN(SOHCw/oOBD)-68 Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Turn ignition switch to OFF. Disconnect read memory connector and test mode connector. Complete clear memory mode.

10. Compulsory Valve Operation Check Mode S068528

A: OPERATION S068528A16

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



2) Each valve functions when ignition switch is turned to ON (engine OFF).
● A list of the support portion is shown in the following table.

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

11. Engine Malfunction Indicator Lamp (MIL) S068653

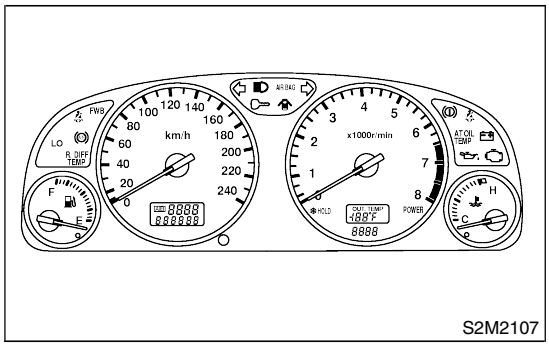
A: PROCEDURE S068653E45

1. Activation of check engine malfunction indicator lamp (MIL). <Ref. to EN(SOHCw/oOBD)-33 ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL).>
↓
2. Check engine malfunction indicator lamp (MIL) does not come on. <Ref. to EN(SOHCw/oOBD)-34 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL).>
↓
3. Check engine malfunction indicator lamp (MIL) does not go off. <Ref. to EN(SOHCw/oOBD)-38 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF., Engine Malfunction Indicator Lamp (MIL).>
↓
4. Check engine malfunction indicator lamp (MIL) does not blink at a cycle of 3 Hz. <Ref. to EN(SOHCw/oOBD)-40 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 HZ., Engine Malfunction Indicator Lamp (MIL).>
↓
5. Check engine malfunction indicator lamp (MIL) remains blinking at a cycle of 3 Hz. <Ref. to EN(SOHCw/oOBD)-44 CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 HZ., Engine Malfunction Indicator Lamp (MIL).>

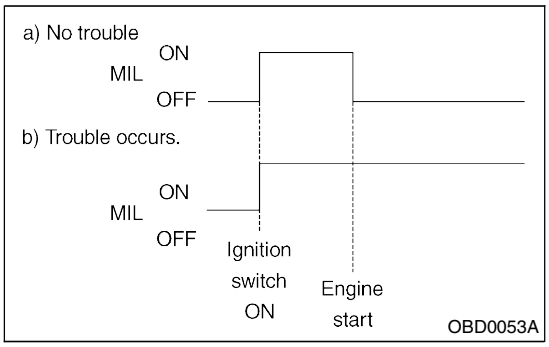
B: ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) S068653E89

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

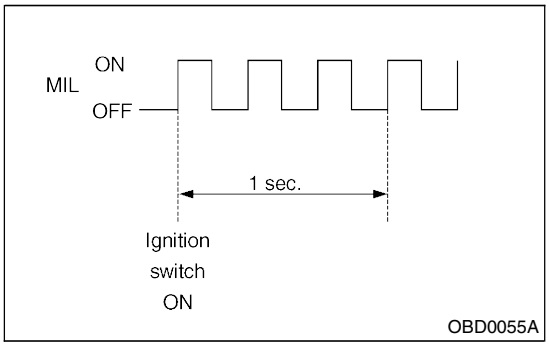
NOTE:
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Ref. to IDI-15 Combination Meter Assembly.>



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

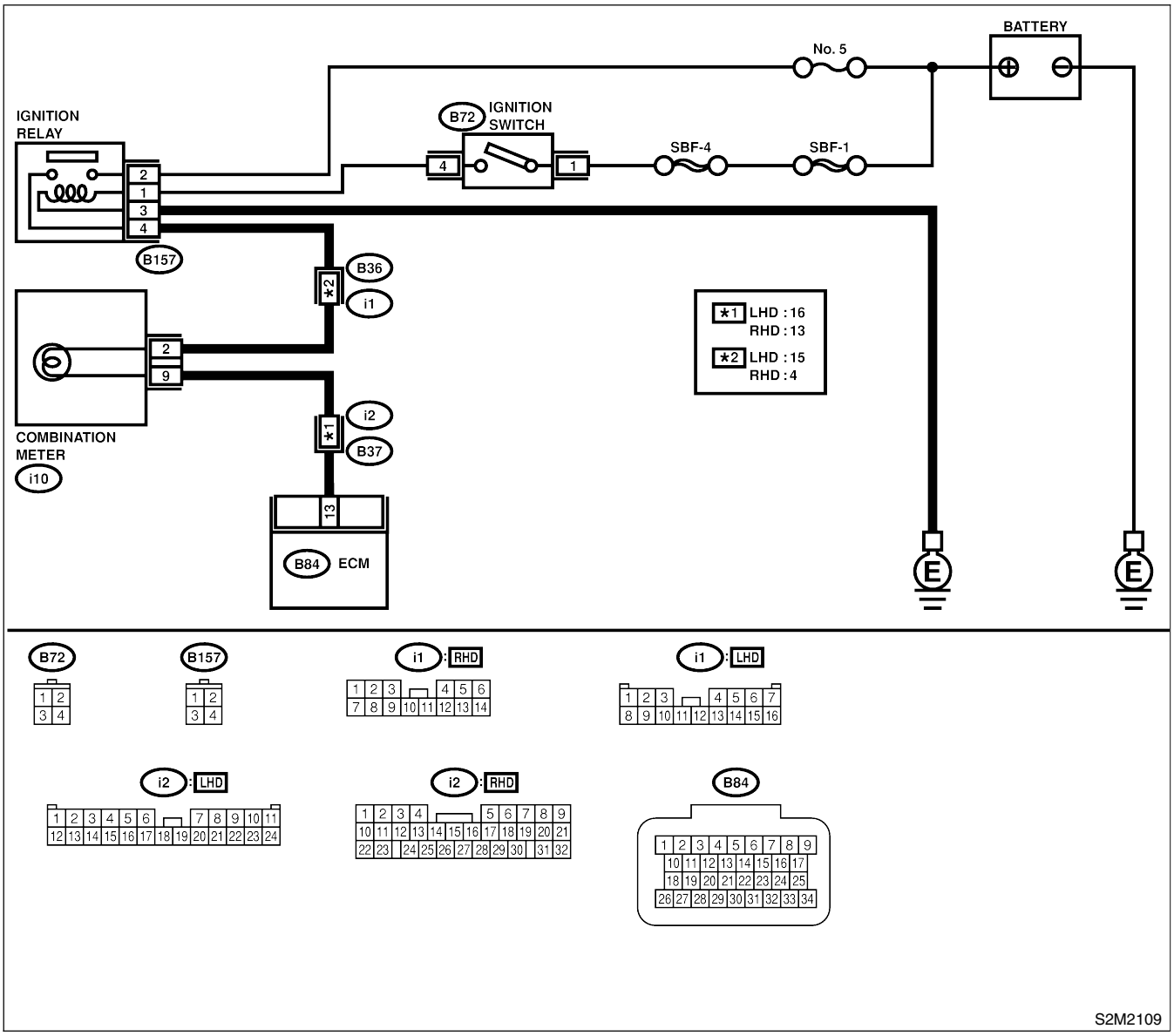


3) When ignition switch is turned to ON (engine off) or to “START” with the test mode connector connected, the MIL blinks at a cycle of 3 Hz.



C: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON. S068653E90

- **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:**



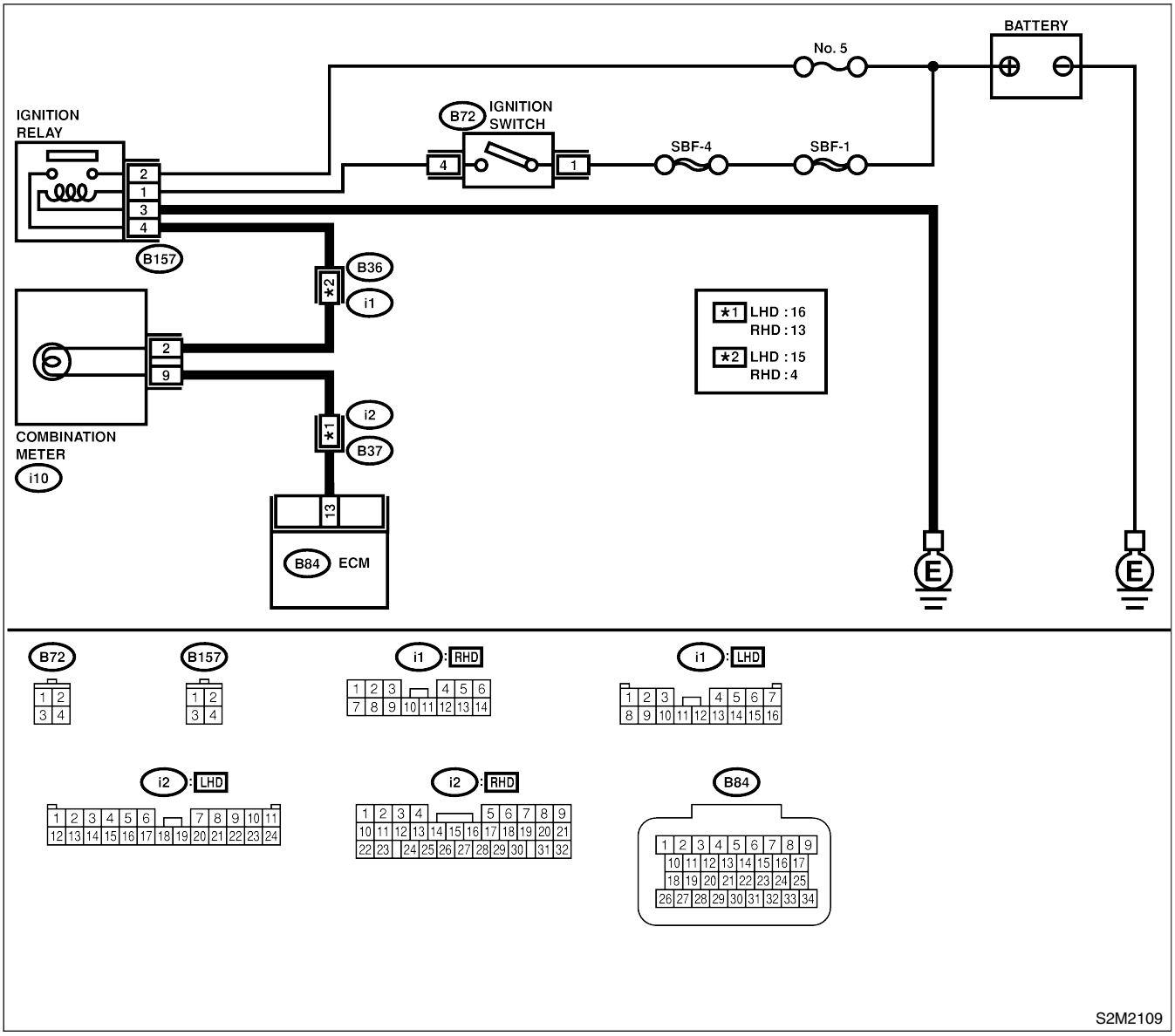
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Disconnect connector from ECM, then connect check board. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> 2) Turn ignition switch to ON. 3) Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(C) No. 40 (+) — Engine 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(SOHCw/oOBD)-38, Engine Control Module.>	Repair connection of ECM connector.
4	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Remove combination meter. <Ref. to IDI-15, Combination Meter Assembly.> 3) Disconnect connector from ECM and combination meter. 4) Measure resistance of harness between ECM and combination meter connector. ***Connector & terminal*** ***(B84) No. 13 — (i10) No. 9:***	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 (i2)
5	**CHECK POOR CONTACT.** Check poor contact in combination meter connector. <Ref. to IDI-15, Combination Meter Assembly.>	Is there poor contact in combination meter connector?	Repair poor contact in combination meter connector.	Go to step **6**.

No.	Step	Check	Yes	No
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*** ***(i10) No. 2 (+) — Chassis ground (–):***	Is voltage more than 10 V?	Go to step **7**.	Check the following and repair if necessary. NOTE: • Broken down ignition relay. • Blown out fuse (No. 5). • If replaced fuse (No. 5) blows easily, check the harness for short circuit of harness between fuse (No. 5) and ignition relay connector. • Open or short circuit in harness between fuse (No. 5) and battery terminal • Open circuit in harness between fuse (No. 5) and ignition relay connector • Poor contact in coupling connector (i1) • Poor contact in ignition relay connector • Poor contact in ignition switch connector
7	**CHECK POOR CONTACT.** Check poor contact in combination meter connector. <Ref. to IDI-15, Combination Meter Assembly.>	Is there poor contact in combination meter connector?	Repair poor contact in combination meter connector.	Replace bulb or combination meter.

MEMO:

D: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF. S068653E91

- **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:**



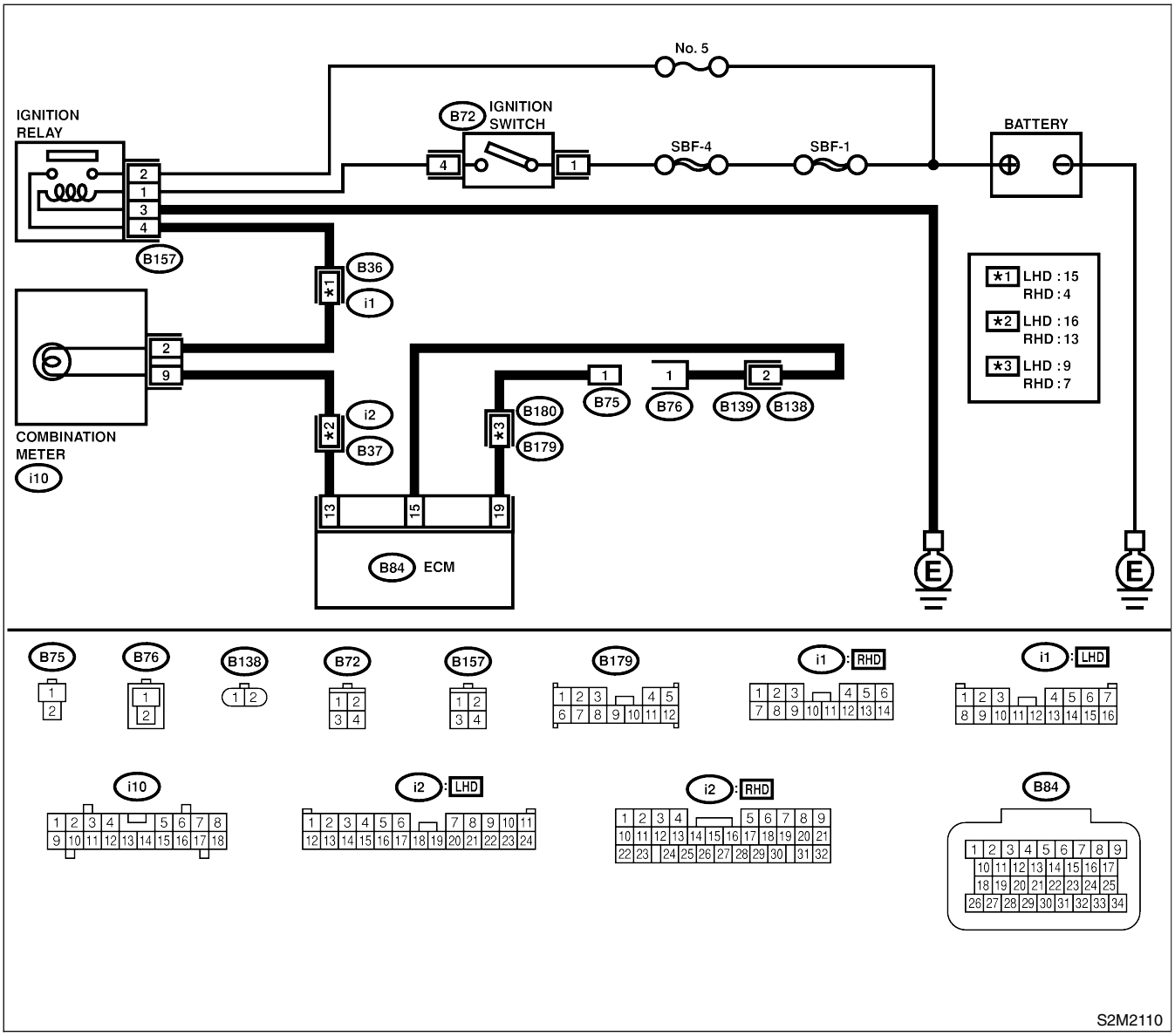
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Turn ignition switch to ON.	Does the MIL come on?	Repair short circuit in harness between combination meter and ECM connector.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>

MEMO:

E: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 Hz. S068653E92

- **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:**



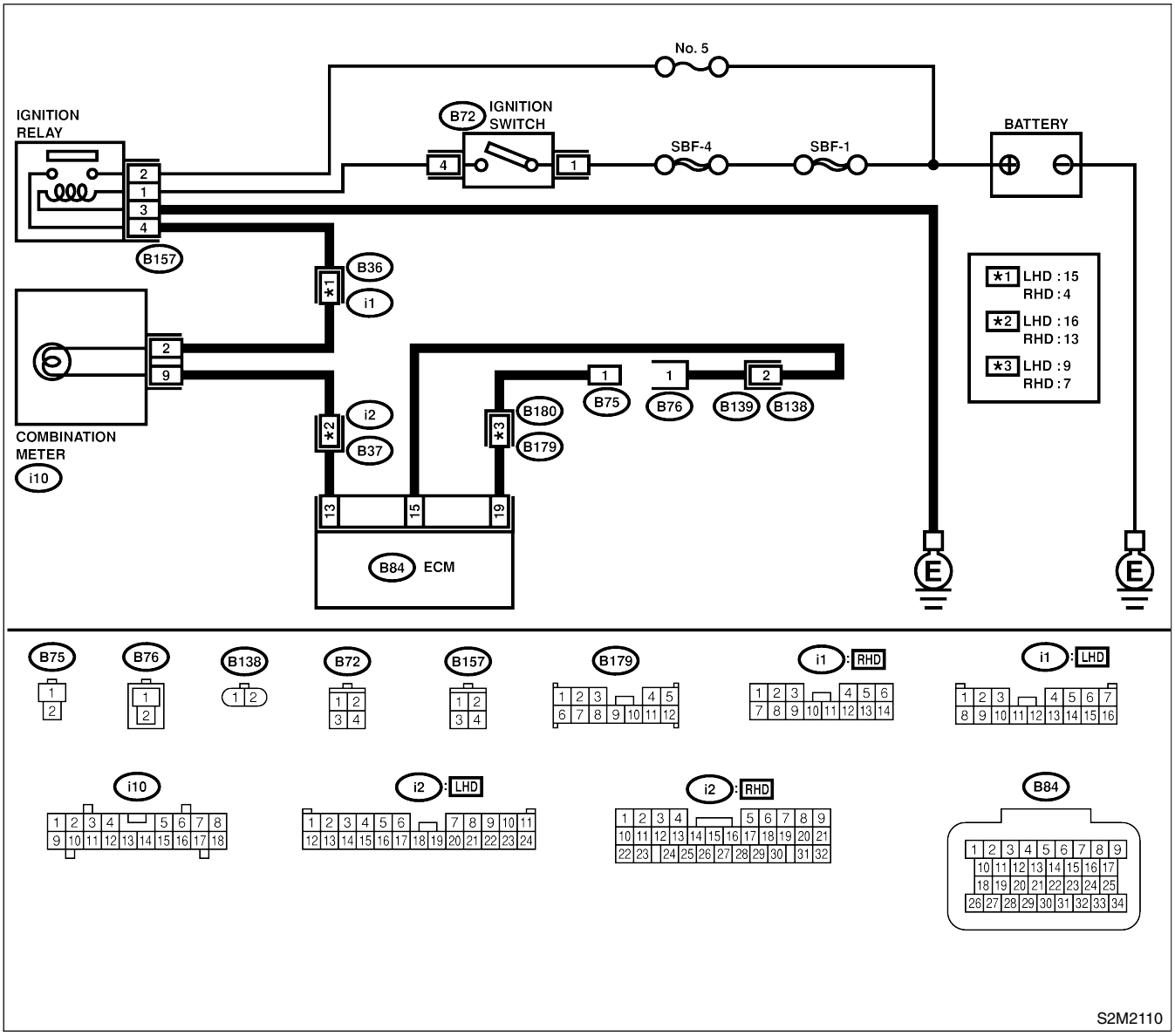
No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Turn ignition switch to OFF. 2) Disconnect test mode connector. 3) Turn ignition switch to ON.	Does the MIL come on?	Go to step **2**.	Repair the MIL circuit. <Ref. to EN(SOHCw/oOBD)-34, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL).>

No.	Step	Check	Yes	No
2	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between test mode connector and chassis ground. ***Connector & terminal*** ***(B75) No. 1 (+) — Chassis ground (–):***	Is voltage less than 1 V?	Go to step **3**.	Go to step **5**.
3	**CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Measure resistance of harness between ECM and test mode connector. ***Connector & terminal*** ***(B84) No. 19 — (B75) No. 1:***	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 ECM and test mode connector • Poor contact in coupling connector (B180)
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>
5	**CHECK HARNESS BETWEEN ECM AND TEST MODE CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Measure resistance of harness between ECM and test mode connector. ***Connector & terminal*** ***(B84) No. 15 — (B76) No. 1:***	Is 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 test mode connector • Poor contact in coupling connector (B138)
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>

MEMO:

F: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 Hz. S068653E93

- **DIAGNOSIS:**
  - Test mode connector circuit is shorted.
- **TROUBLE SYMPTOM:**
  - Even though test mode connector is disconnected, MIL blinks at a cycle of 3 Hz when ignition switch is turned to ON.
- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 engine ground. ***Connector & terminal*** ***(B84) No. 19 — Engine ground:***	Is resistance less than 5 Ω?	Repair short circuit in harness between ECM and test mode connector.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>

ENGINE MALFUNCTION INDICATOR LAMP (MIL)

MEMO:

12. Diagnostics for Engine Starting Failure S068533

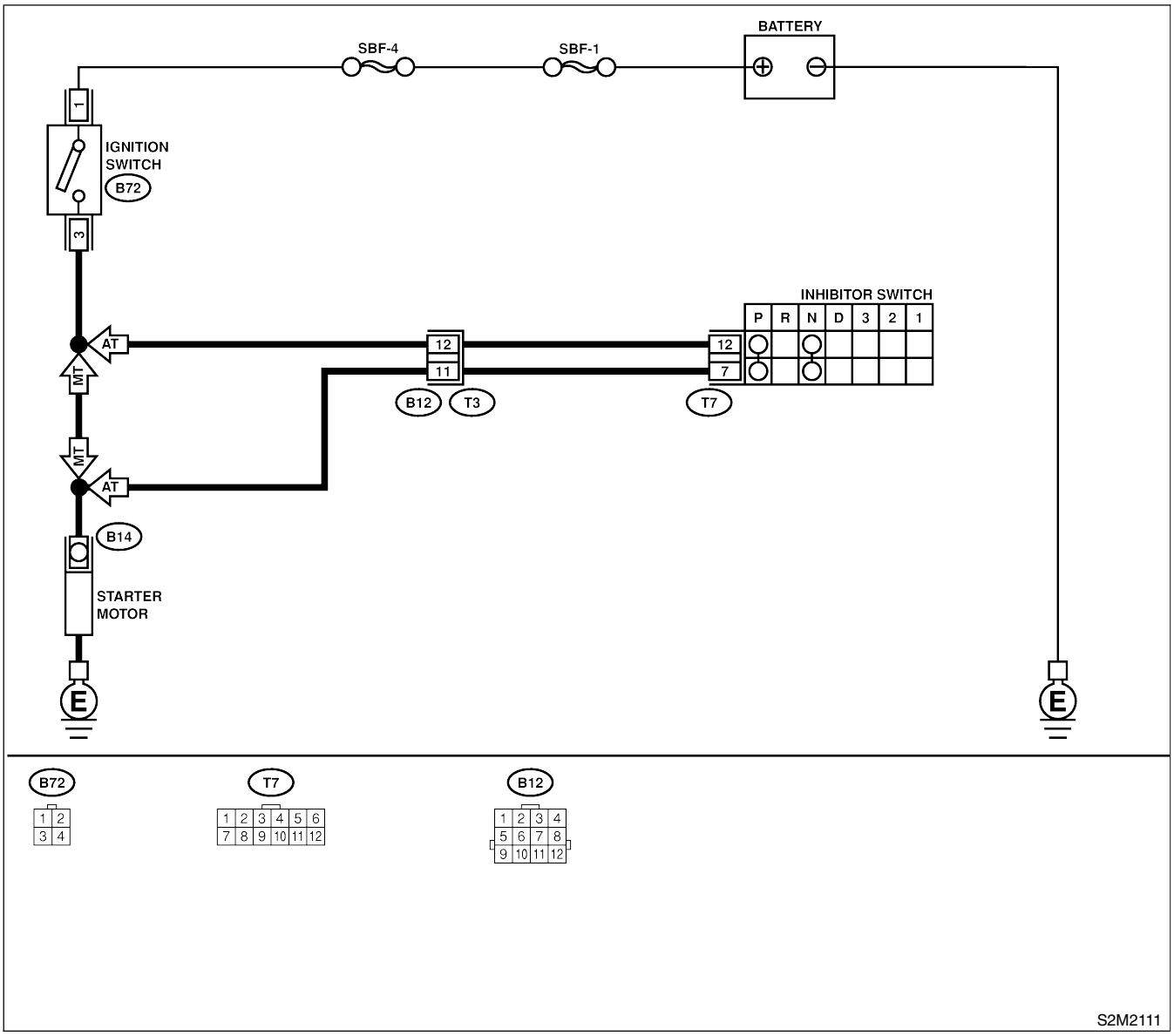
A: PROCEDURE S068533E45

1. Inspection of starter motor circuit. <Ref. to EN(SOHCw/oOBD)-48 STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
2. Inspection of ECM power supply and ground line. <Ref. to EN(SOHCw/oOBD)-52 CONTROL MODULE POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN(SOHCw/oOBD)-54 IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN(SOHCw/oOBD)-58 FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel injector circuit. <Ref. to EN(SOHCw/oOBD)-62 FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT S068533E94

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**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 select lever in the "P" or "N" position.	Is the voltage more than 10 V?	Go to step **2**.	Go to step **3**.
2	**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-8, INSPECTION, Starter.>	Repair open circuit of ground cable.
3	**CHECK HARNESS BETWEEN ECM AND STARTER MOTOR CIRCUIT.** 1) Turn ignition switch to OFF. 2) Measure resistance between starter motor and ECM. ***Connector & terminal*** ***(B14) No. 1 — Engine ground:***	Is resistance less than 1 Ω?	Repair ground short circuit.	Go to step **4**.
4	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Ignition switch to OFF. 2) Disconnect connector from ignition switch. 3) 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 **5**.	NOTE: Check the following and repair if necessary. • Blown out fuse (SBF-1, SBF-4) • If replaced fuse (SBF-1, SBF-4) blows easily, check the harness for short circuit of harness between fuse and ignition switch connector. • Open circuit in harness between ignition switch and battery
5	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Connect connector to ignition switch. 2) Turn ignition switch to START. 3) Measure voltage between ignition switch and chassis ground. ***Connector & terminal*** ***(B72) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **6**.	Replace ignition switch.
6	**CHECK TRANSMISSION TYPE.**	Is the vehicle AT?	Go to step **7**.	Repair open circuit between ignition switch and starter motor circuit.

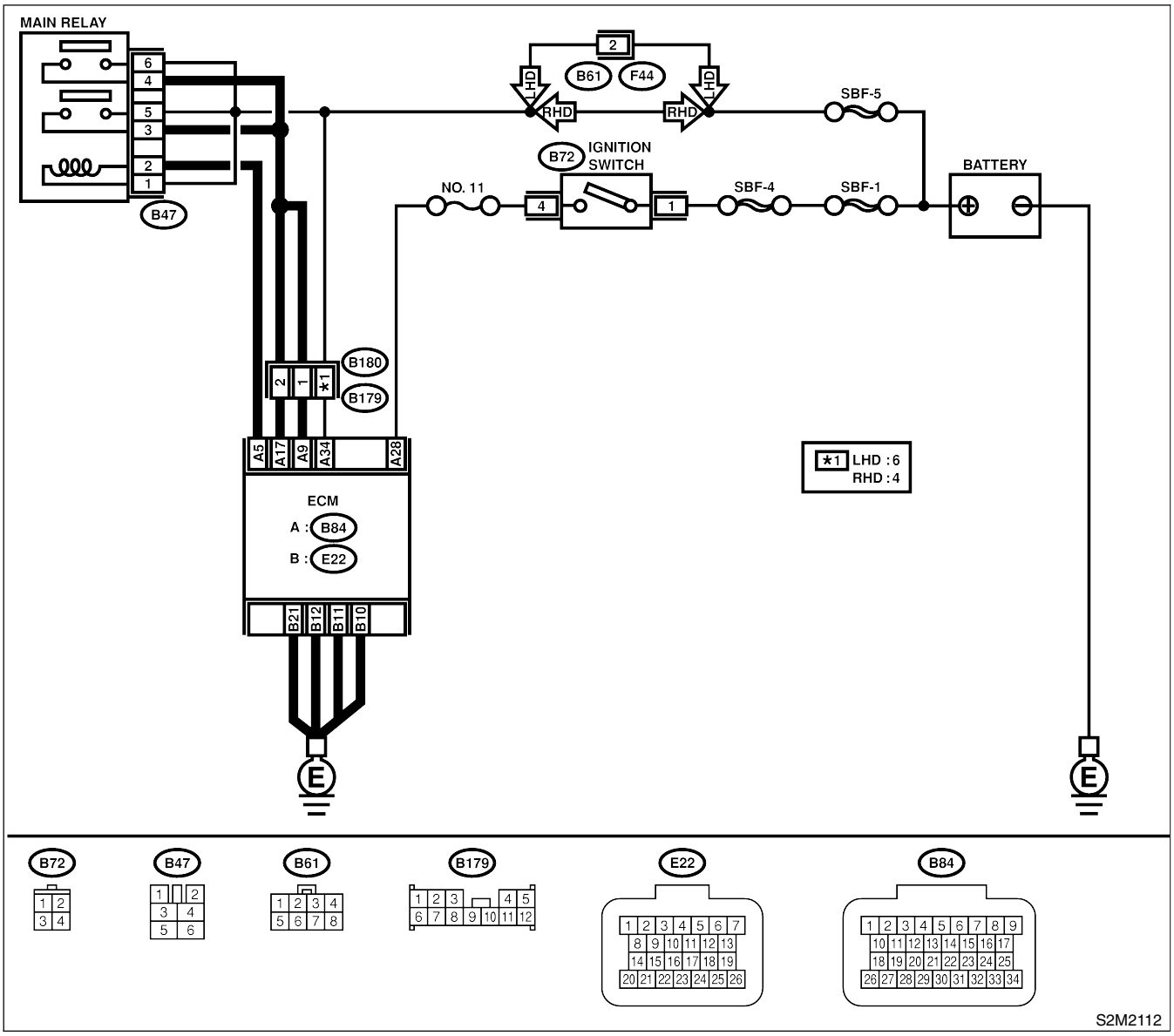
No.	Step	Check	Yes	No
7	**CHECK INHIBITOR SWITCH CIRCUIT.** 1) Turn ignition switch to OFF. 2) Place the select lever in the “P” or “N” position. 3) Separate transmission harness connector. 4) Measure resistance between transmission harness connector receptacle’s terminals. ***Connector & terminal*** ***(T3) No. 11 — No. 12:***	Is the resistance less than 1 Ω?	Repair open circuit in harness between starter motor and ignition switch connector.	Go to step **8**.
8	**CHECK TRANSMISSION HARNESS.** 1) Disconnect connector from inhibitor switch. 2) Measure resistance of harness between transmission harness and inhibitor switch connector. ***Connector & terminal*** ***(T3) No. 11 — (T7) No. 7:*** ***(T3) No. 12 — (T7) No. 12:***	Is the resistance less than 1 Ω?	Go to step **9**.	Repair open circuit in harness between transmission harness and inhibitor switch connector.
9	**CHECK POOR CONTACT.** Check poor contact in inhibitor switch connector.	Is there poor contact in inhibitor switch connector?	Repair poor contact in inhibitor switch connector.	Replace inhibitor switch.

MEMO:

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE S068533E37

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



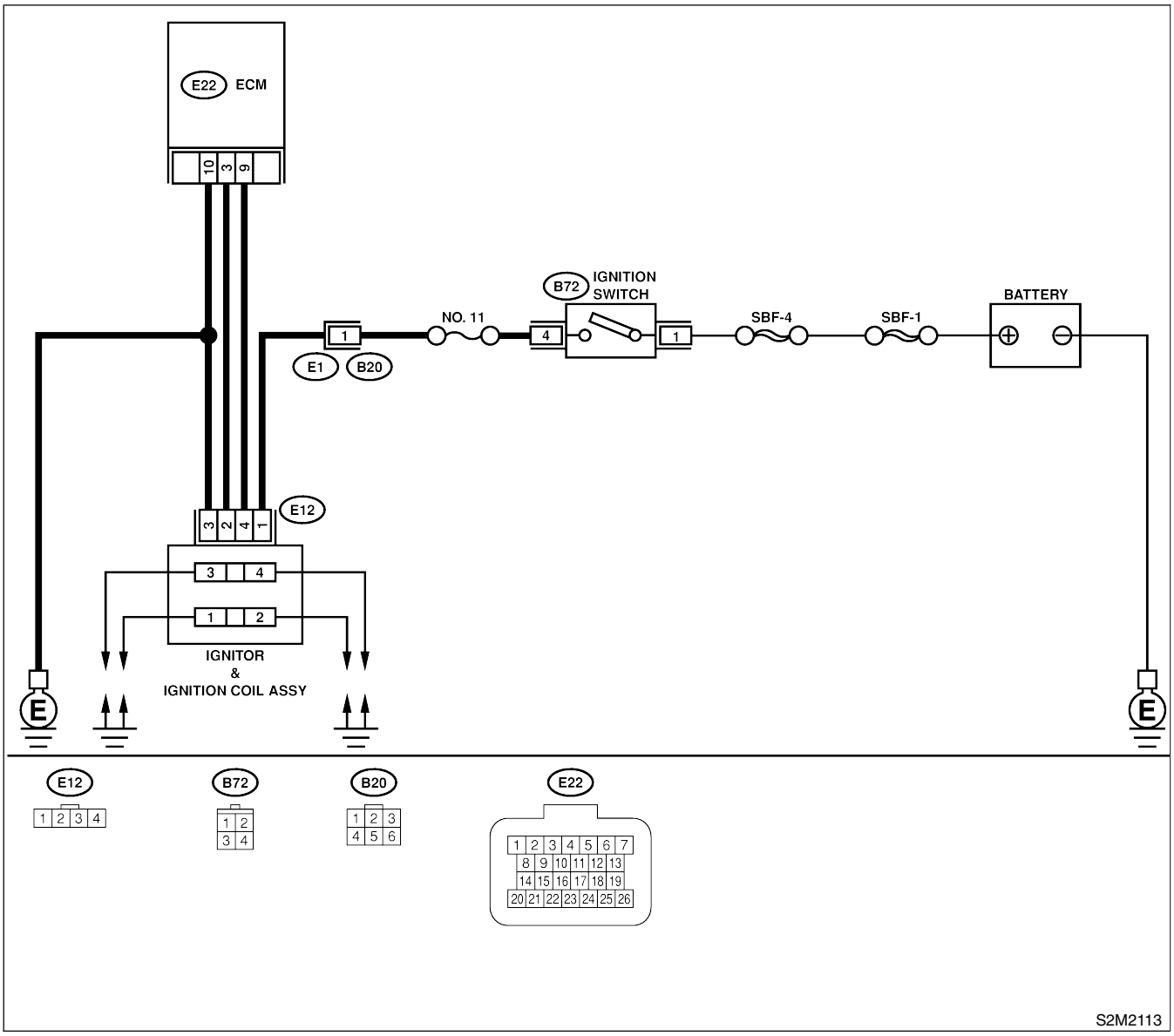
No.	Step	Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn ignition switch to OFF. 2) Remove main relay. 3) Connect battery to main relay terminals No. 1 and No. 2. 4) Measure resistance between main relay terminals. ***Terminals*** ***No. 3 — No. 5:***	Is the resistance less than 10 Ω?	Go to step **2**.	Replace main relay.

No.	Step	Check	Yes	No
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 connectors from ECM. 2) Measure resistance of harness between ECM and engine ground. ***Connector & terminal*** ***(E22) No. 10 — Engine ground:*** ***(E22) No. 11 — Engine ground:*** ***(E22) No. 12 — Engine ground:*** ***(E22) No. 21 — Engine 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 INPUT VOLTAGE OF ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 28 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **5**.	Repair open or ground short circuit of power supply circuit.
5	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 1 (+) — Chassis ground (–):*** ***(B47) No. 5 (+) — Chassis ground (–):*** ***(B47) No. 6 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **6**.	Repair open or ground short circuit of power supply circuit.
6	**CHECK INPUT VOLTAGE OF ECM.** Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 34 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **7**.	Repair open or ground short circuit of power supply circuit.
7	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn ignition switch to OFF. 2) Connect main relay connector. 3) Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 5 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **8**.	Repair open or ground short circuit between ECM connector and main relay connector.
8	**CHECK INPUT VOLTAGE OF ECM.** 1) Connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 2) Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B) No. 27 (+) — Engine ground (–):*** ***(C) No. 36 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Check ignition control system. <Ref. to EN(SOHCw/oOBD)-54, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair open or ground short circuit between ECM connector and main relay connector.

D: IGNITION CONTROL SYSTEM S068533E95

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 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(SOHCw/oOBD)-58, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.
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. 1 (+) — 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 connector (B20)
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:*** ***No. 3 — No. 4:***	Is the resistance between 10 and 15 Ω?	Go to step **5**.	Replace ignition coil & ignitor assembly. <Ref. to IG(SOHCw/oOBD)-9, Ignition Coil and Ignitor Assembly.>
5	**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. 2 (+) — Engine ground (–):*** ***(E12) No. 4 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **6**.	Replace ignition coil & ignitor assembly.

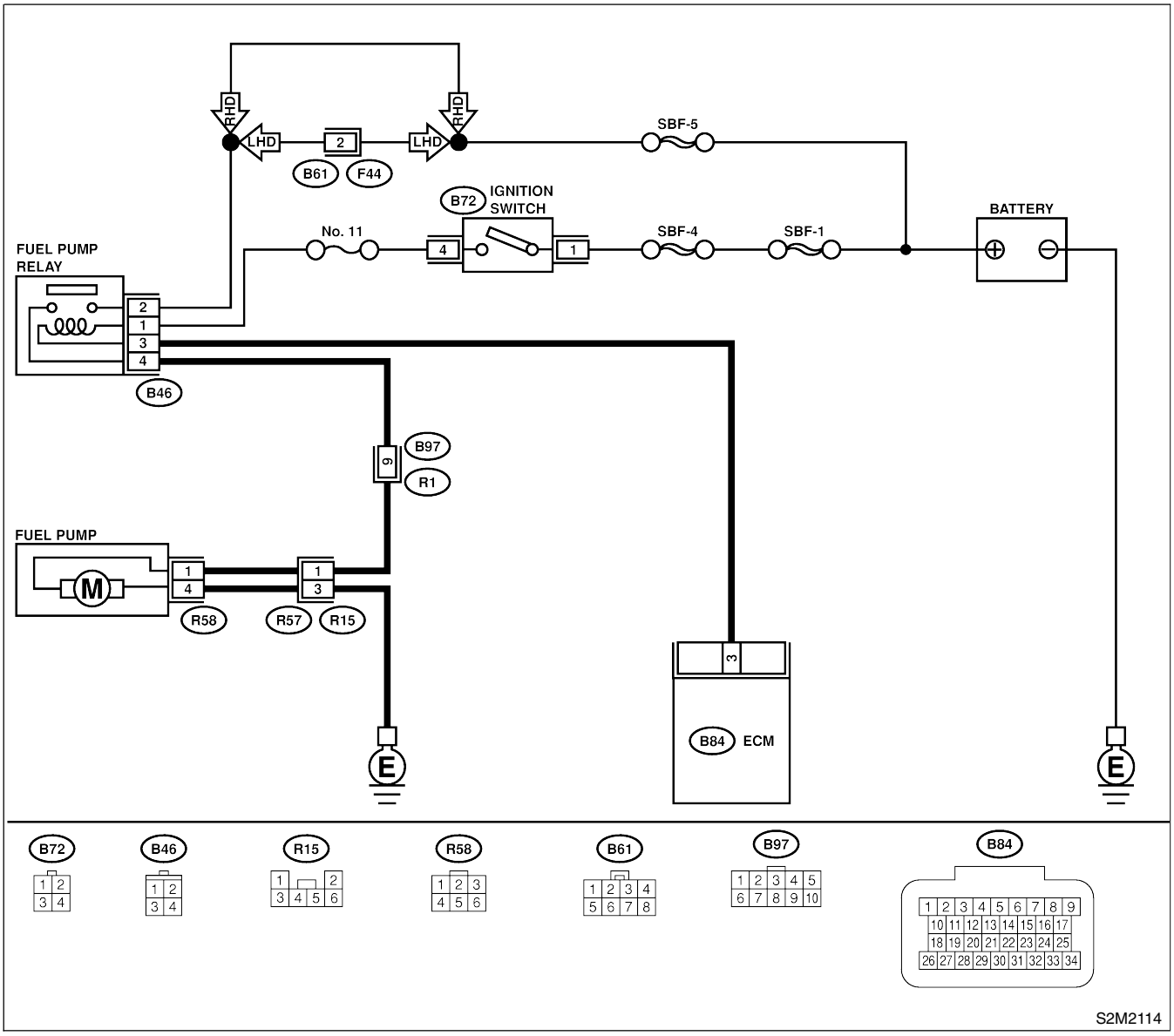
No.	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.** 1) Disconnect connector from ECM. 2) Measure resistance of harness between ECM and ignition coil & ignitor assembly connector. ***Connector & terminal*** ***(E22) No. 9 — (E12) No. 4:*** ***(E22) No. 3 — (E12) No. 2:*** ***(E22) No. 10 — (E12) No. 3:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair open circuit in harness between ECM and ignition coil & ignitor assembly connector.
7	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.** Measure resistance of harness between ECM and engine ground. ***Connector & terminal:*** ***(E22) No. 3 — Engine ground:*** ***(E22) No. 9 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.
8	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel pump circuit. <Ref. to EN(SOHCw/oOBD)-58, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>

MEMO:

E: FUEL PUMP CIRCUIT S068533E96

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



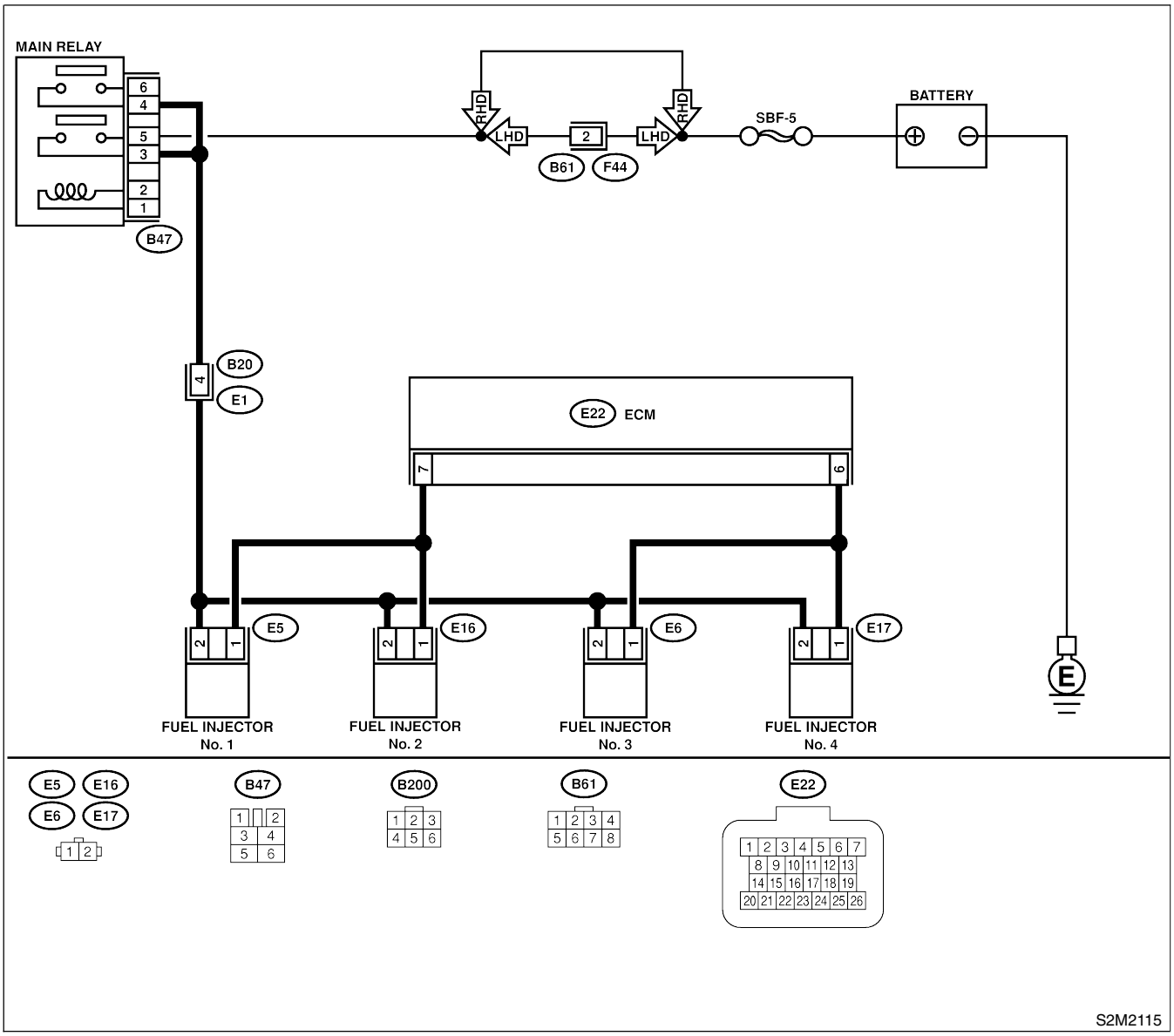
No.	Step	Check	Yes	No
1	**CHECK OPERATING SOUND OF FUEL PUMP.** 1) Connect test mode connector. 2) Turn ignition switch to ON. 3) Make sure that fuel pump is in operation. NOTE: For the procedure, refer to the "COMPULSORY VALVE OPERATION CHECK MODE". <Ref. to EN(SOHCw/oOBD)-32, Compulsory Valve Operation Check Mode.>	Does fuel pump produce operating sound?	Check fuel injector circuit. <Ref. to EN(SOHCw/oOBD)-62, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **2**.
2	**CHECK GROUND CIRCUIT OF FUEL PUMP.** 1) Turn ignition switch to OFF. 2) Remove fuel pump access hole lid located on the luggage compartment floor. 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 (R15)
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(SOHCw/oOBD)-50, 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 between fuel pump and fuel pump relay connector. ***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 and fuel pump relay connector • Poor contact in coupling connectors (R15) 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 ground short circuit in harness between fuel pump and fuel pump relay connector.

No.	Step	Check	Yes	No
6	**CHECK FUEL PUMP RELAY.** 1) Disconnect connector from fuel pump relay. 2) Remove fuel pump relay from 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(SOHCw/oOBD)-40, Fuel Pump Relay.>
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*** ***(B84) No. 3 — (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.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel injector circuit. <Ref. to EN(SOHCw/oOBD)-62, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

MEMO:

F: FUEL INJECTOR CIRCUIT S068533E97

CAUTION:
- **Check or repair only faulty parts.**
- **After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 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 ME(SOHC)-28, Fuel Pressure.>	Go to step **2**.

No.	Step	Check	Yes	No
2	**CHECK POWER SUPPLY TO EACH FUEL INJECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from 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 (–):*** ***#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?	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 (B20) • Poor contact in fuel injector connector
3	**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 11 and 12 Ω?	Go to step **4**.	Replace faulty fuel injector. <Ref. to FU(SOHCw/oOBD)-32, Fuel Injector.>
4	**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*** ***(E22) No. 7 — #1 (E5) No. 1:*** ***(E22) No. 7 — #2 (E16) No. 1:*** ***(E22) No. 6 — #3 (E6) No. 1:*** ***(E22) No. 6 — #4 (E17) No. 1:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and fuel injector connector.
5	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure resistance of harness between ECM and fuel injector connector. ***Connector & terminal*** ***(E22) No. 6 — Engine ground:*** ***(E22) No. 7 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair ground short in harness between ECM and fuel injector connector.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check crankshaft position sensor circuit. <Ref. to EN(SOHCw/oOBD)-64, CRANKSHAFT POSITION SENSOR CIRCUIT, Diagnostics for Engine Starting Failure.>

G: CRANKSHAFT POSITION SENSOR CIRCUIT S068533E98

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31, Clear Memory Mode.>, <Ref. to EN(SOHCw/oOBD)-29, Inspection Mode.>

NOTE:
Check crankshaft position sensor circuit. <Ref. to EN(SOHCw/oOBD)-68, DTC 11 CRANKSHAFT POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

13. List of Diagnostic Trouble Code (DTC) S068525

A: LIST S068525A12

DTC No.	Item	Contents of diagnosis	Index
11	Crankshaft position sensor	• No signal entered from crankshaft position sensor when ignition switch is ON. • The harness connector between ECM and crankshaft position sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-68, DTC 11 CRANKSHAFT POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
21	Engine coolant temperature sensor	• The engine coolant temperature sensor signal is abnormal. • The harness connector between ECM and engine coolant temperature sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-70, DTC 21 ENGINE COOLANT TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
22	Knock sensor	• The knock sensor signal is abnormal. • The harness connector between ECM and knock sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-74, DTC 22 KNOCK SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
45	Pressure sensor	• The pressure sensor signal is abnormal. • The harness connector between ECM and pressure sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-78, DTC 45 PRESSURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
24	Idle air control solenoid valve	• The idle air control solenoid valve is not in function. • The harness connector between ECM and idle air control solenoid valve is in short or open.	<Ref. to EN(SOHCw/oOBD)-80, DTC 24 IDLE AIR CONTROL SOLENOID VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
26	Intake air temperature sensor	• The intake air temperature sensor signal is abnormal. • The harness connector between ECM and intake air temperature sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-84, DTC 26 INTAKE AIR TEMPERATURE SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
31	Throttle position sensor	• The throttle position sensor signal is abnormal. • The throttle position sensor is installed abnormally. • The harness connector between ECM and throttle position sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-86, DTC 31 THROTTLE POSITION SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
32	Oxygen sensor (With catalyst vehicles)	• The oxygen sensor is not in function. • The harness connector between ECM and oxygen sensor is in short or open.	<Ref. to EN(SOHCw/oOBD)-90, DTC 32 OXYGEN SENSOR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

DTC No.	Item	Contents of diagnosis	Index
33	Vehicle speed signal	• The vehicle speed signal is abnormal. • The harness connector between ECM and combination meter is in short or open.	<Ref. to EN(SOHCw/oOBD)-94, DTC 33 VEHICLE SPEED SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
35	Purge control solenoid valve	• The purge control solenoid valve is not in function. • The harness connector between ECM and purge control solenoid valve is in short or open.	<Ref. to EN(SOHCw/oOBD)-96, DTC 35 PURGE CONTROL SOLENOID VALVE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
38	Torque control signal	• Abnormal signal entered from TCM. • The harness connector between ECM and TCM is in short.	<Ref. to EN(SOHCw/oOBD)-100, DTC 38 TORQUE CONTROL SIGNAL, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
46	CO resistor (General spec. vehicles)	• The CO resistor signal is abnormal. • The harness connector between ECM and CO resistor is in short or open. • The CO value is not adjusted to specifications.	<Ref. to EN(SOHCw/oOBD)-102, DTC 46 CO RESISTOR (GENERAL SPEC. VEHICLES), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
51	Neutral position switch	• The neutral position switch signal is abnormal. • The harness connector between ECM and neutral position switch is in short or open.	<Ref. to EN(SOHCw/oOBD)-104, DTC 51 NEUTRAL POSITION SWITCH, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
53	Immobiliser system	Faulty immobiliser system.	<Ref. to IM-2, Basic Diagnostic Procedure.>
54	Air intake system	Because the ducts and hoses on air intake line are loosened or damaged, the pressure sensor signal is abnormal.	<Ref. to EN(SOHCw/oOBD)-108, DTC 54 — AIR INTAKE SYSTEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
85	Charge system	Charge system is abnormal.	<Ref. to EN(SOHCw/oOBD)-111, DTC 85 CHARGE SYSTEM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

MEMO:

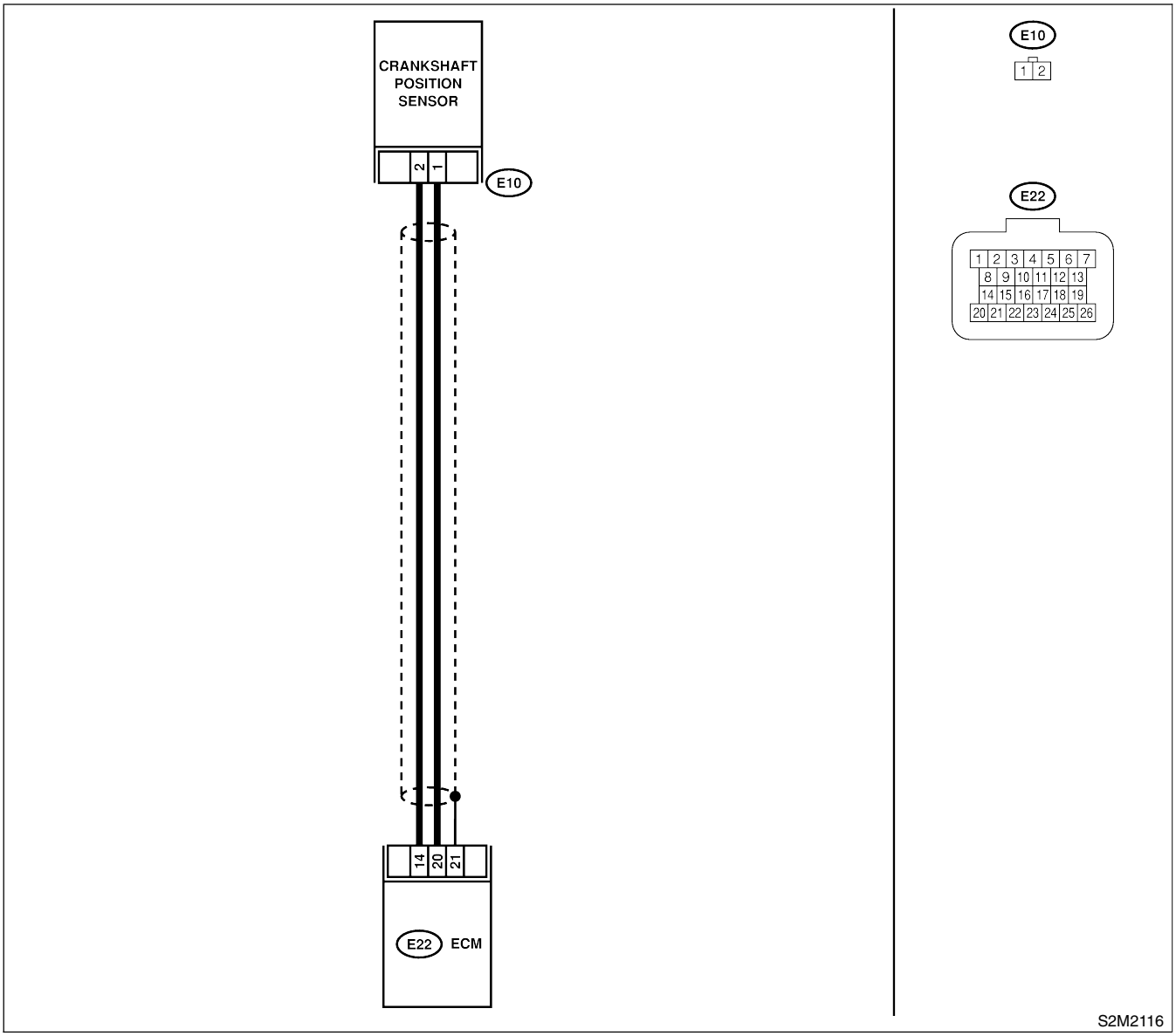
14. Diagnostic Procedure with Diagnostic Trouble Code (DTC) S068521

A: DTC 11 CRANKSHAFT POSITION SENSOR S068521G55

- **DIAGNOSIS:**
  - No signal entered from crankshaft position sensor when ignition switch is ON.
  - The harness connector between ECM and crankshaft position sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Engine stalls.
  - Restarting impossible

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



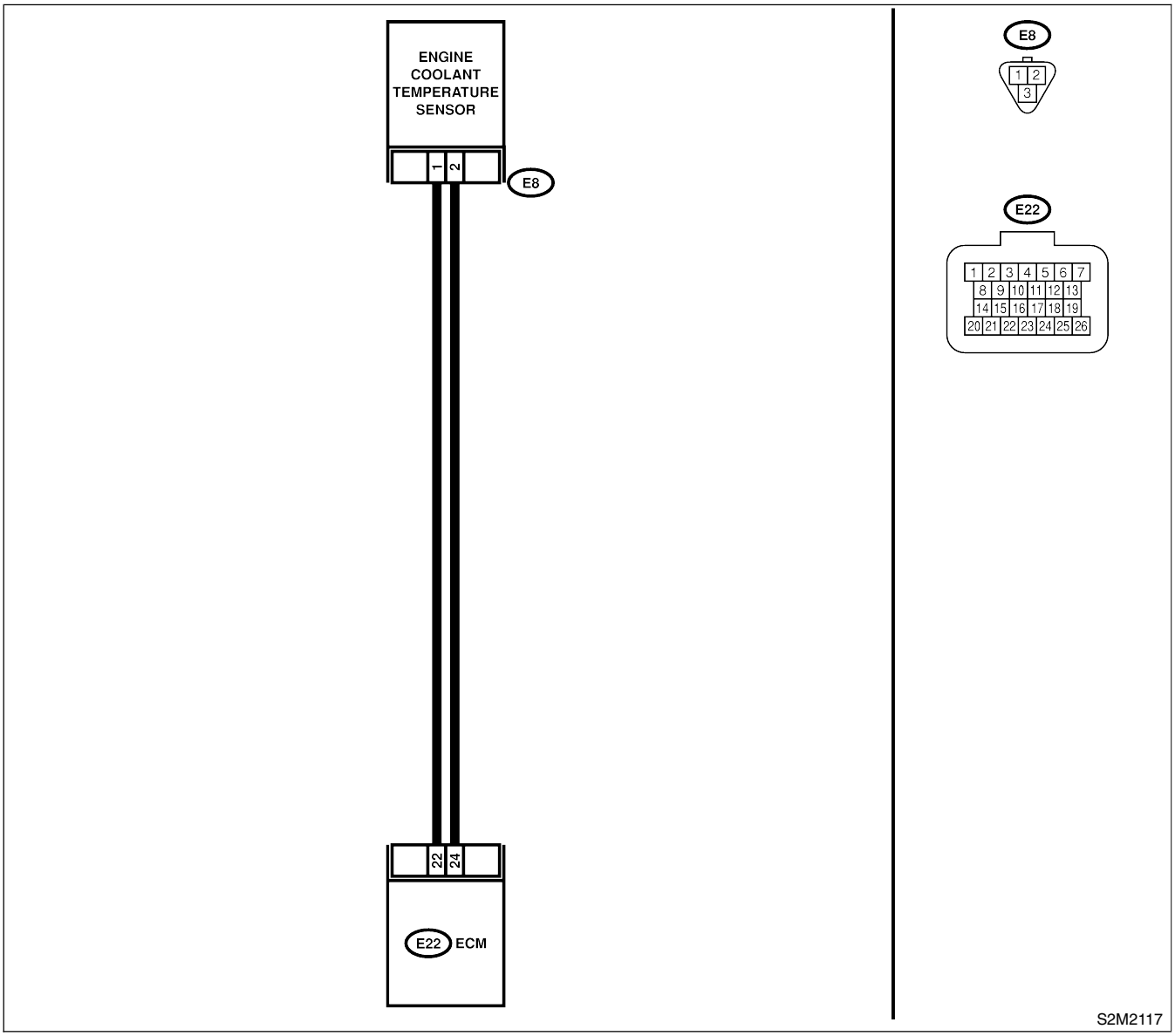
No.	Step	Check	Yes	No
1	**CHECK CONDITION OF CRANKSHAFT POSITION SENSOR INSTALLATION.**	Are the crankshaft position sensor installing bolts tightened securely?	Go to step **2**.	Tighten crankshaft position sensor installing bolts securely.
2	**CHECK CRANKSHAFT POSITION SENSOR.** 1) Remove crankshaft 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?	Go to step **3**.	Replace crankshaft position sensor.
3	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** 1) Connect connector to crankshaft position sensor. 2) Disconnect connector from ECM. 3) Measure resistance of harness between crankshaft position sensor connector and ECM. ***Connector & terminal*** ***(E22) No. 14 — (E22) No. 20:***	Is the resistance between 1 and 5 kΩ?	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
4	**CHECK HARNESS BETWEEN ECM AND CRANKSHAFT POSITION SENSOR CONNECTOR.** Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(E22) No. 20 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between crankshaft position sensor and ECM connector.	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Set the positive (+) probe and ground lead of oscilloscope at ECM connector terminals. 4) Measure voltage indicated on oscilloscope while cranking the engine. ***Connector & terminal*** ***(B) No. 26 (+) — (B) No. 19 (–):***	Is the voltage more than 400 mV?	Go to step **6**.	Replace crankshaft position sensor.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Go to step **7**.
7	**CHECK ECM.** 1) Connect all connectors. 2) Erase the memory. <Ref. to EN(SOHCw/oOBD)-31, Clear Memory Mode.> 3) Perform inspection mode. <Ref. to EN(SOHCw/oOBD)-29, Inspection Mode.> 4) Read out the trouble code. <Ref. to EN(SOHCw/oOBD)-27, Read Diagnostic Trouble Code.>	Is the same trouble code as in the current diagnosis still being output?	Replace generator.	Go to step **8**.
8	**CHECK ANY OTHER TROUBLE CODES APPEARANCE.**	Are other trouble codes being output?	Proceed with the diagnosis corresponding to the trouble code.	A temporary poor contact.

B: DTC 21 ENGINE COOLANT TEMPERATURE SENSOR S068521G58

- **DIAGNOSIS:**
  - The engine coolant temperature sensor signal is abnormal.
  - The harness connector between ECM and engine coolant temperature sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Hard to start
  - Erroneous idling
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ENGINE COOLANT TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Remove air intake duct and air cleaner assembly. 3) Disconnect connector from engine coolant temperature sensor. 4) Measure voltage between engine coolant temperature sensor connector and engine ground. ***Connector & terminal*** ***(E8) No. 2 (+) — 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 **2**.
2	**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. 2 (+) — 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.** Measure voltage between engine coolant temperature sensor connector and engine ground. ***Connector & terminal*** ***(E8) No. 2 (+) — Engine ground (–):***	Is the voltage more than 4 V?	Go to step **4**.	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
4	**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. 1 — 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 ECM and engine coolant temperature sensor connector • Poor contact in engine coolant temperature sensor connector • Poor contact in ECM connector

No.	Step	Check	Yes	No
5	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** Measure resistance between engine coolant temperature sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 2 and 3 kΩ at 20°C (68°F)?	Go to step **6**.	Replace engine coolant temperature sensor. <Ref. to FU(SOHCw/oOBD)-23, Engine Coolant Temperature Sensor.>
6	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** Measure resistance between engine coolant temperature sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 0.35 and 0.4 kΩ at 80°C (176°F)?	Go to step **7**.	Replace engine coolant temperature sensor. <Ref. to FU(SOHCw/oOBD)-23, Engine Coolant Temperature Sensor.>
7	**CHECK ENGINE COOLANT TEMPERATURE SENSOR.** Measure resistance between engine coolant temperature sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 0.2 and 0.3 kΩ at 90°C (194°F)?	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>	Replace engine coolant temperature sensor. <Ref. to FU(SOHCw/oOBD)-23, Engine Coolant Temperature Sensor.>

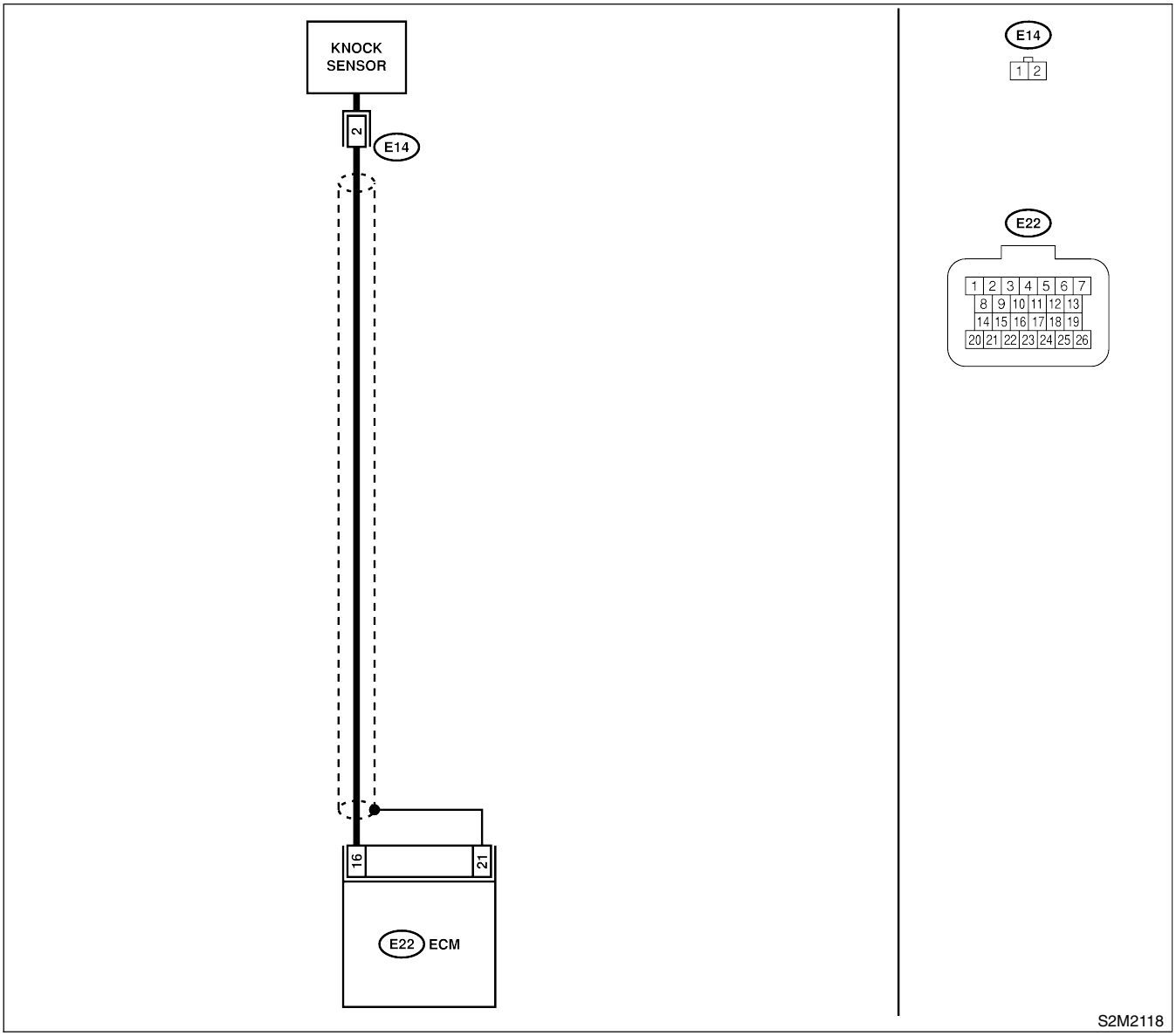
MEMO:

C: DTC 22 KNOCK SENSOR S068521G59

- **DIAGNOSIS:**
  - The knock sensor signal is abnormal.
  - The harness connector between ECM and knock sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 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 of harness between ECM connector and engine ground. ***Connector & terminal*** ***(E22) No. 16 — Engine 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 engine ground. ***Connector & terminal*** ***(E22) No. 16 — Engine ground:***	Is the resistance less than 400 kΩ?	Go to step **5**.	Go to step **6**.
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
4	**CHECK CONDITION OF KNOCK SENSOR INSTALLATION.**	Is the knock sensor installation bolt tightened securely?	Replace knock sensor. <Ref. to FU(SOHCw/oOBD)-25, 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.	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.

No.	Step	Check	Yes	No
6	**CHECK INPUT SIGNAL FOR ECM.** 1) Connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 2) Turn ignition switch to ON. 3) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(B) No. 17 (+) — Engine 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	Repair poor contact in ECM connector.

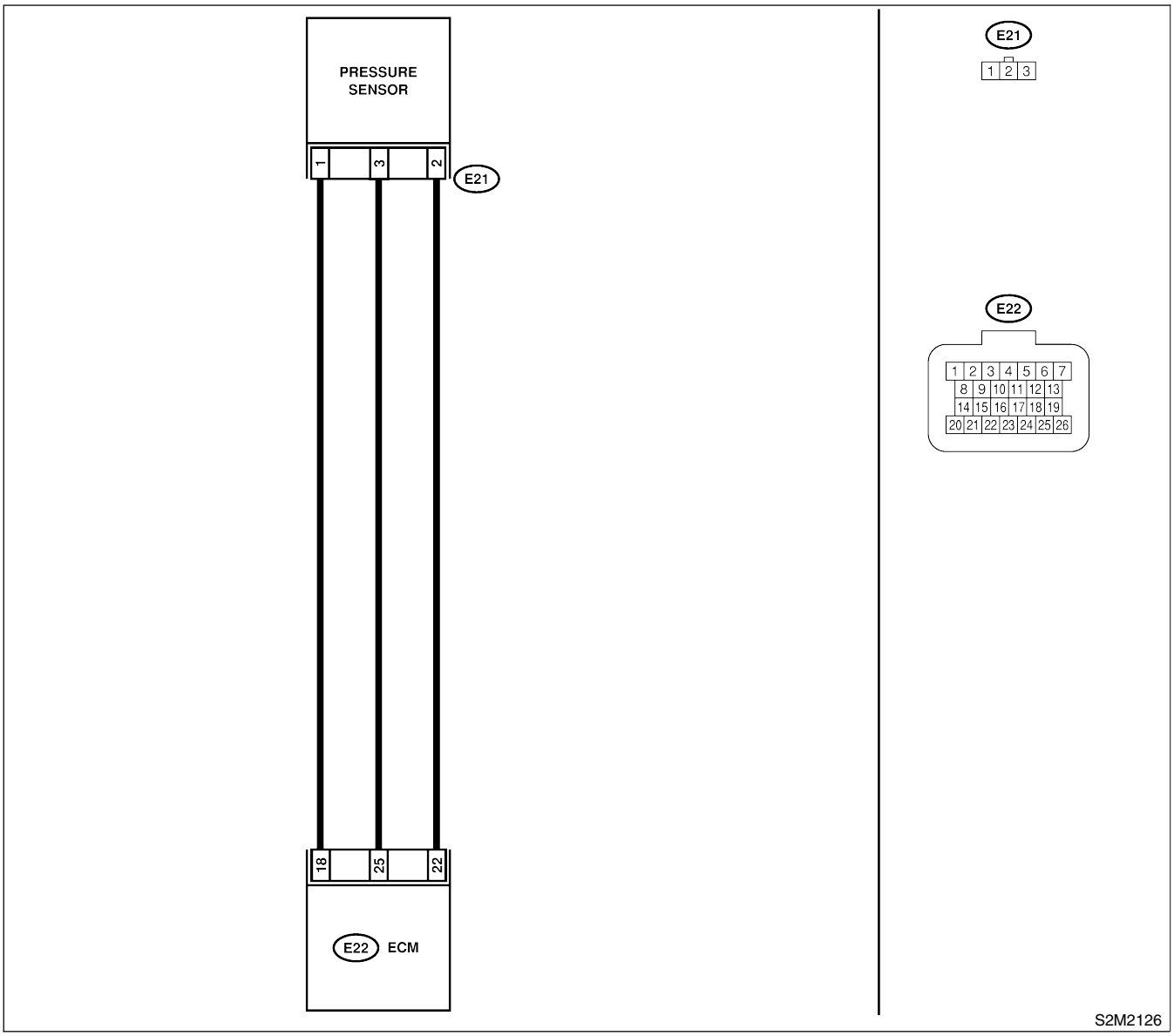
MEMO:

D: DTC 45 PRESSURE SENSOR S068521G67

- **DIAGNOSIS:**
  - The pressure sensor signal is abnormal.
  - The harness connector between ECM and pressure sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



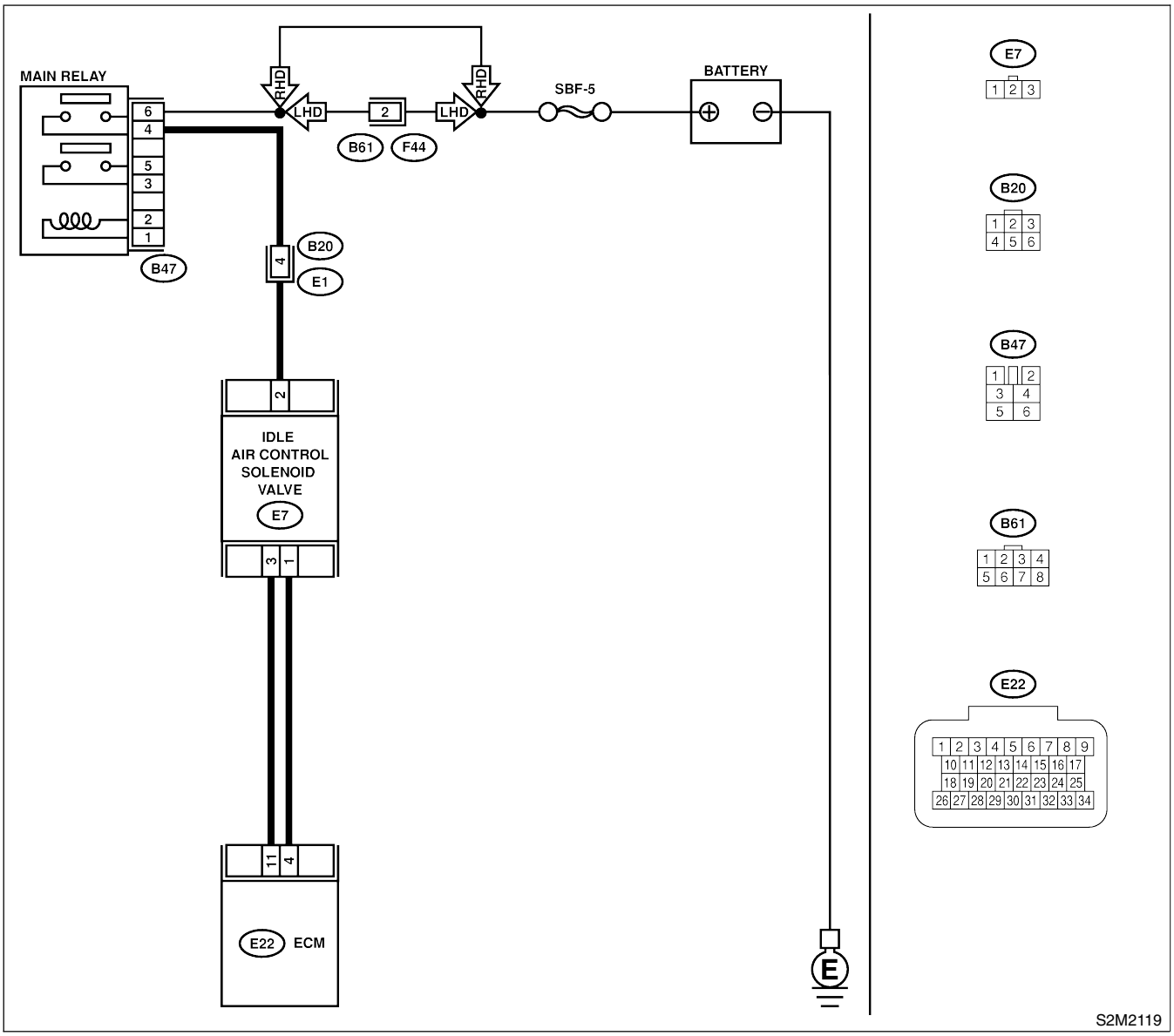
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** 1) Disconnect connector from pressure sensor. 2) Turn ignition switch to ON. 3) Measure voltage between pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 3 (+) — Engine ground (–):***	Is the voltage between 4.5 V and 5.5 V?	Go to step **2**.	Repair open circuit in harness between ECM and pressure sensor.
2	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** 1) Disconnect connector from ECM. 2) Measure resistance of harness between ECM and pressure sensor connector. ***Connector & terminal*** ***(E22) No. 22 — (E21) No. 2:*** ***(E22) No. 25 — (E21) No. 3:*** ***(E22) No. 18 — (E21) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between ECM and pressure sensor connector.
3	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(E22) No. 25 — Engine ground:*** ***(E22) No. 18 — Engine ground:*** ***(E22) No. 22 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Repair ground short circuit in harness between ECM and pressure sensor connector.
4	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Turn ignition switch to ON. 4) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(A) No. 15 (+) — Engine ground (–):***	Is the voltage between 2.3 V and 2.5 V?	Go to step **5**.	Replace pressure sensor. <Ref. to FU(SOHCw/oOBD)-29, Pressure Sensor.>
5	**CHECK INPUT SIGNAL FOR ECM.** 1) Start engine, and idle it. 2) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(A) No. 15 (+) — Engine ground (–):***	Is the voltage between 1.2 V and 1.8 V?	Go to step **6**.	Replace pressure sensor. <Ref. to FU(SOHCw/oOBD)-29, Pressure Sensor.>
6	**CHECK POOR CONTACT.** Check poor contact in pressure sensor connector.	Is there poor contact in pressure sensor connector?	Repair poor contact in pressure sensor connector.	Replace pressure sensor. <Ref. to FU(SOHCw/oOBD)-29, Pressure Sensor.>

E: DTC 24 IDLE AIR CONTROL SOLENOID VALVE S068521G60

- **DIAGNOSIS:**
  - The idle air control solenoid valve is not in function.
  - The harness connector between ECM and idle air control solenoid valve is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Hard to start
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK AIR INTAKE SYSTEM.** 1) Turn ignition switch to ON. 2) Start engine and idle it. 3) Check the following item. • 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 • Loose control connection and cracks of idle air control solenoid valve by-pass hose • Disconnection of vacuum hoses	Is there a fault in air intake system?	Repair or replace air intake system.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM and idle air control solenoid valve. 3) Measure resistance of harness between ECM and idle air control solenoid valve connector. ***Connector & terminal*** ***(E22) No. 4 — (E7) No. 1:***	Is the resistance less than 1 Ω?	Go to step **3**.	Repair open circuit in harness between ECM and idle air control solenoid valve connector.
3	**CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.** Measure resistance of harness between ECM and idle air control solenoid valve connector. ***Connector & terminal*** ***(E22) No. 11 — (E7) No. 3:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between ECM and idle air control solenoid valve connector.
4	**CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.** Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(E22) No. 11 — Engine ground:***	Is the resistance more than 1 MΩ?	Repair ground short in harness between ECM and idle air control solenoid valve.	Go to step **5**.
5	**CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.** Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(E22) No. 4 — Engine ground:***	Is the resistance more than 1 MΩ?	Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Go to step **7**.
7	**CHECK MAIN RELAY.** 1) Turn 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. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **8**.	Replace main relay.

No.	Step	Check	Yes	No
8	**CHECK POWER SUPPLY TO IDLE AIR CONTROL SOLENOID VALVE.** 1) Disconnect connector from idle air control solenoid valve. 2) Turn ignition switch to ON. 3) 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 **9**.	Repair harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between idle air control solenoid valve and battery • Poor contact in coupling connector (B20)
9	**CHECK POOR CONTACT.** Check poor contact in idle air control solenoid valve connector.	Is there poor contact in idle air control solenoid valve connector?	Repair poor contact in idle air control solenoid valve connector.	Contact your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

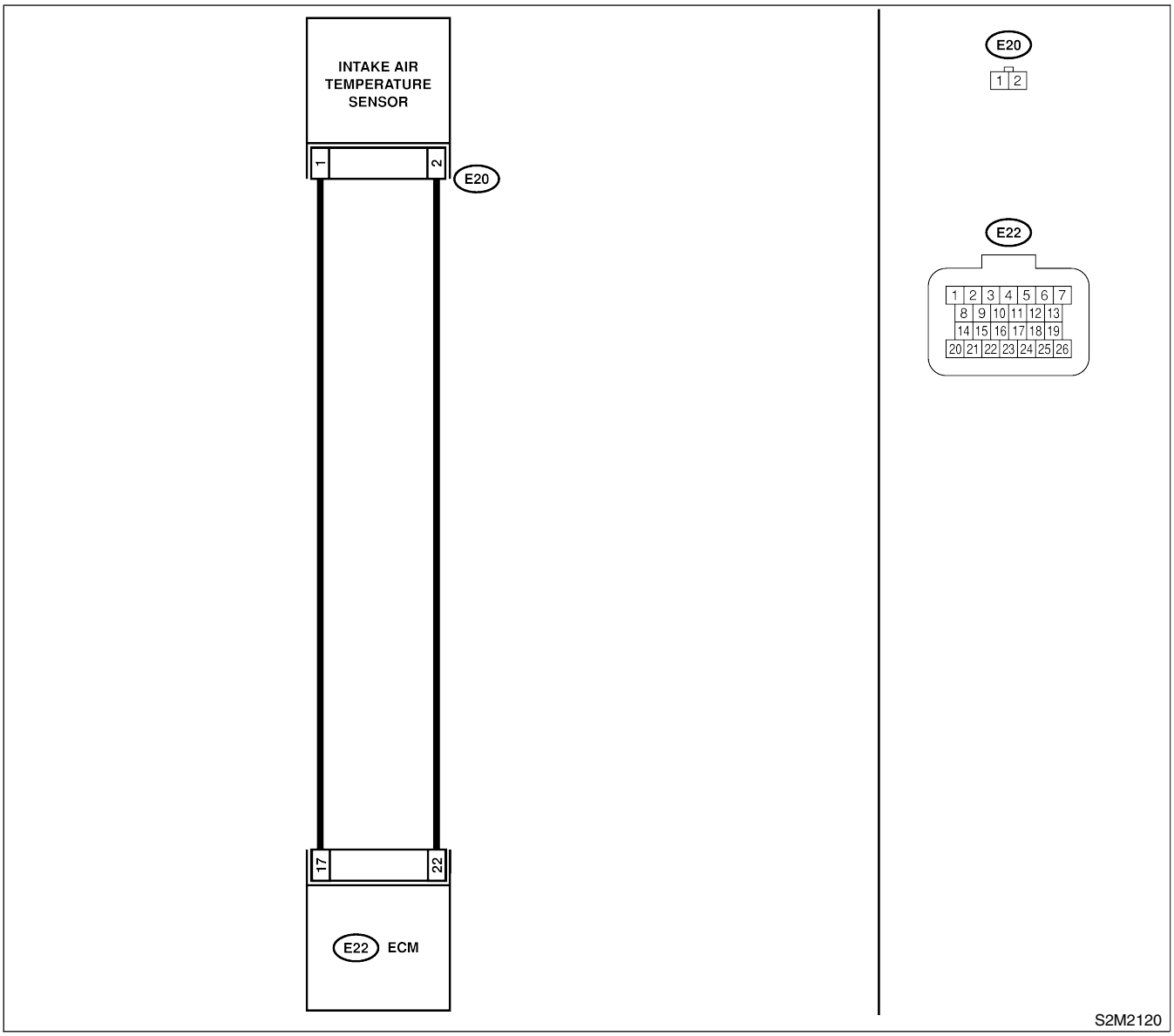
MEMO:

F: DTC 26 INTAKE AIR TEMPERATURE SENSOR S068521G61

- **DIAGNOSIS:**
  - The intake air temperature sensor signal is abnormal.
  - The harness connector between ECM and intake air temperature sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Hard to start
  - Erroneous idling
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



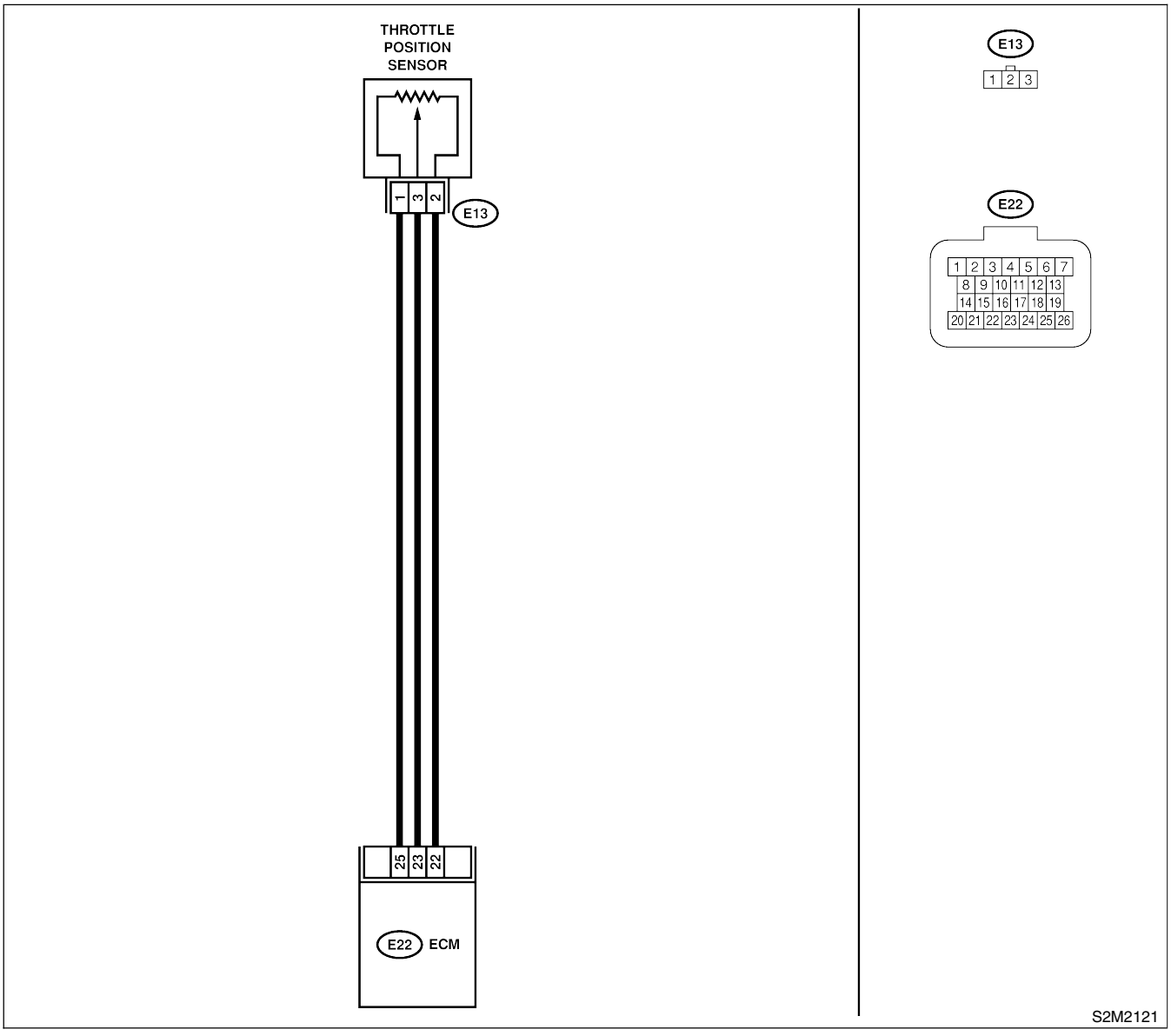
No.	Step	Check	Yes	No
1	**CHECK INTAKE AIR TEMPERATURE SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from intake air temperature sensor. 3) Measure resistance between intake air temperature sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 2 and 3 kΩ at 20°C (68°F)?	Go to step **2**.	Replace intake air temperature sensor. <Ref. to FU(SOHCw/oOBD)-30, Intake Air Temperature Sensor.>
2	**CHECK INTAKE AIR TEMPERATURE SENSOR.** Measure resistance between intake air temperature sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 2 and 3 kΩ at 50°C (122°F)?	Go to step **3**.	Replace intake air temperature sensor. <Ref. to FU(SOHCw/oOBD)-30, Intake Air Temperature Sensor.>
3	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** 1) Disconnect connector from ECM. 2) Measure resistance of harness connector between ECM and intake air temperature sensor connector. ***Connector & terminal*** ***(E22) No. 17 — (E20) No. 1:*** ***(E22) No. 22 — (E20) No. 2:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between ECM and intake air temperature sensor connector.
4	**CHECK HARNESS BETWEEN ECM AND INTAKE AIR TEMPERATURE SENSOR CONNECTOR.** Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(E22) No. 17 — Engine ground:*** ***(E22) No. 22 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Repair ground short circuit in harness between ECM and idle air control solenoid valve connector.
5	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

G: DTC 31 THROTTLE POSITION SENSOR S068521G62

- **DIAGNOSIS:**
  - The throttle position sensor signal is abnormal.
  - The throttle position sensor is installed abnormally.
  - The harness connector between ECM and throttle position sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Turn ignition switch to ON. 4) Measure voltage between ECM and engine ground while throttle valve is fully closed. ***Connector & terminal*** ***(B) No. 23 (+) — Engine ground (–):***	Is the voltage more than 4.5 V?	Go to step **3**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(B) No. 23 (+) — Engine 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 your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and engine ground. ***Connector & terminal*** ***(B) No. 24 (+) — Engine ground (–):***	Is the voltage less than 0.1 V?	Go to step **4**.	Repair poor contact in ECM connector.
4	**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. 3 (+) — Engine ground (–):***	Is the voltage more than 4.5 V?	Go to step **5**.	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
5	**CHECK HARNESS BETWEEN ECM AND THROTTLE POSITION SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect ECM connector from CHECK BOARD. 3) Measure resistance of harness between ECM and throttle position sensor connector. ***Connector & terminal*** ***(E22) No. 22 — (E13) No. 2:***	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 throttle position sensor and ECM connector • Poor contact in ECM connector • Poor contact in throttle position sensor connector

No.	Step	Check	Yes	No
6	**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. 2 — 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 **7**.
7	**CHECK POOR CONTACT.** Check poor contact in throttle position sensor connector.	Is there poor contact in throttle position sensor connector?	Repair poor contact in throttle position sensor connector.	Go to step **8**.
8	**CHECK CONDITION OF THROTTLE POSITION SENSOR INSTALLATION.**	Are the throttle position sensor installing screws tightened securely?	Replace throttle position sensor.	Adjust throttle position sensor and tighten throttle position sensor installing screws securely.

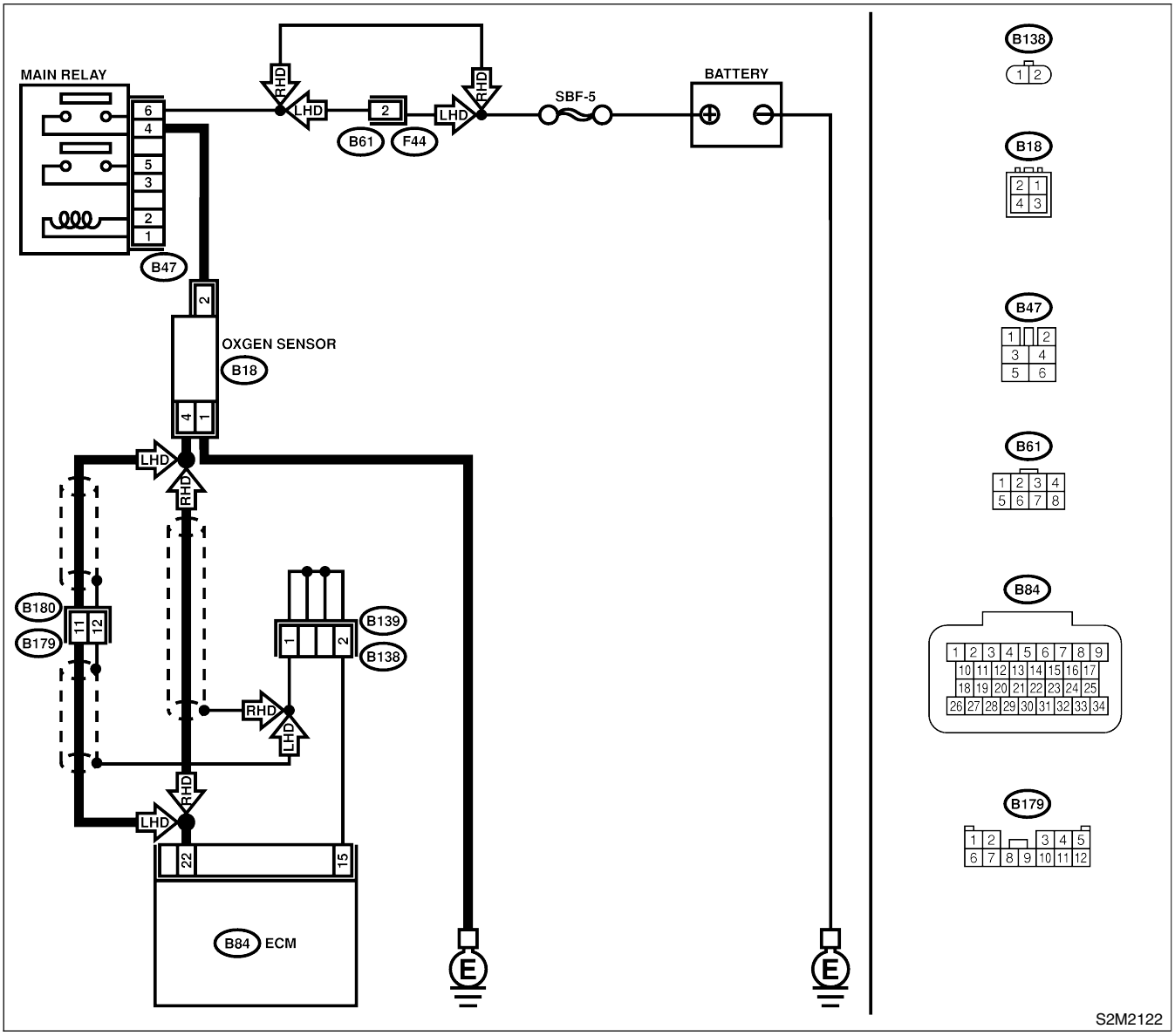
MEMO:

H: DTC 32 OXYGEN SENSOR S068521G63

- **DIAGNOSIS:**
  - The oxygen sensor is not in function.
  - The harness connector between ECM and oxygen sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Failure of engine to start
  - Erroneous idling
  - Poor driving performance
  - Engine stalls.
  - Idle mixture is out of specifications.

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK FOR OTHER CAUSES AFFECTING EXHAUST GAS.** NOTE: • Check for use of improper fuel. • Check if engine oil or coolant level is extremely low.	Is CO% more than 2% after engine warm-up?	Check fuel system.	Go to step **2**.
2	**CHECK EXHAUST SYSTEM.**	Is there a fault in exhaust system?	Repair exhaust system. NOTE: • Loose installation of front portion of exhaust pipe onto cylinder heads • Loose connection between front exhaust pipe and front catalytic converter • Damage of exhaust pipe resulting in hole	Go to step **3**.
3	**CHECK HARNESS BETWEEN OXYGEN SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from oxygen sensor. 3) Turn ignition switch to ON. 4) Measure voltage between front oxygen sensor harness connector and engine ground. ***Connector & terminal*** ***(B18) No. 4 (+) — Engine ground (–):***	Is the voltage more than 0.2 V?	Go to step **4**.	Repair harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and oxygen sensor connector • Poor contact in the ECM connector
4	**CHECK POOR CONTACT.** Check poor contact in oxygen sensor connector.	Is there poor contact in oxygen sensor connector?	Repair poor contact in oxygen sensor connector.	Go to step **5**.
5	**CHECK MAIN RELAY.** 1) Turn 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. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **6**.	Replace main relay.

No.	Step	Check	Yes	No
6	**CHECK POWER SUPPLY TO OXYGEN SENSOR.** 1) Turn ignition switch to ON. 2) Measure voltage between oxygen sensor connector. ***Connector & terminal*** ***(B18) 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 battery and oxygen sensor connector • Poor contact in oxygen sensor connector • Poor contact in main relay connector
7	**CHECK OXYGEN SENSOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between oxygen sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 30 Ω?	Repair poor contact. NOTE: In this case, repair the following: • Poor contact in ECM connector • Poor contact in oxygen sensor connector	Replace oxygen sensor. <Ref. to FU(SOHCw/oOBD)-36, Oxygen Sensor.>

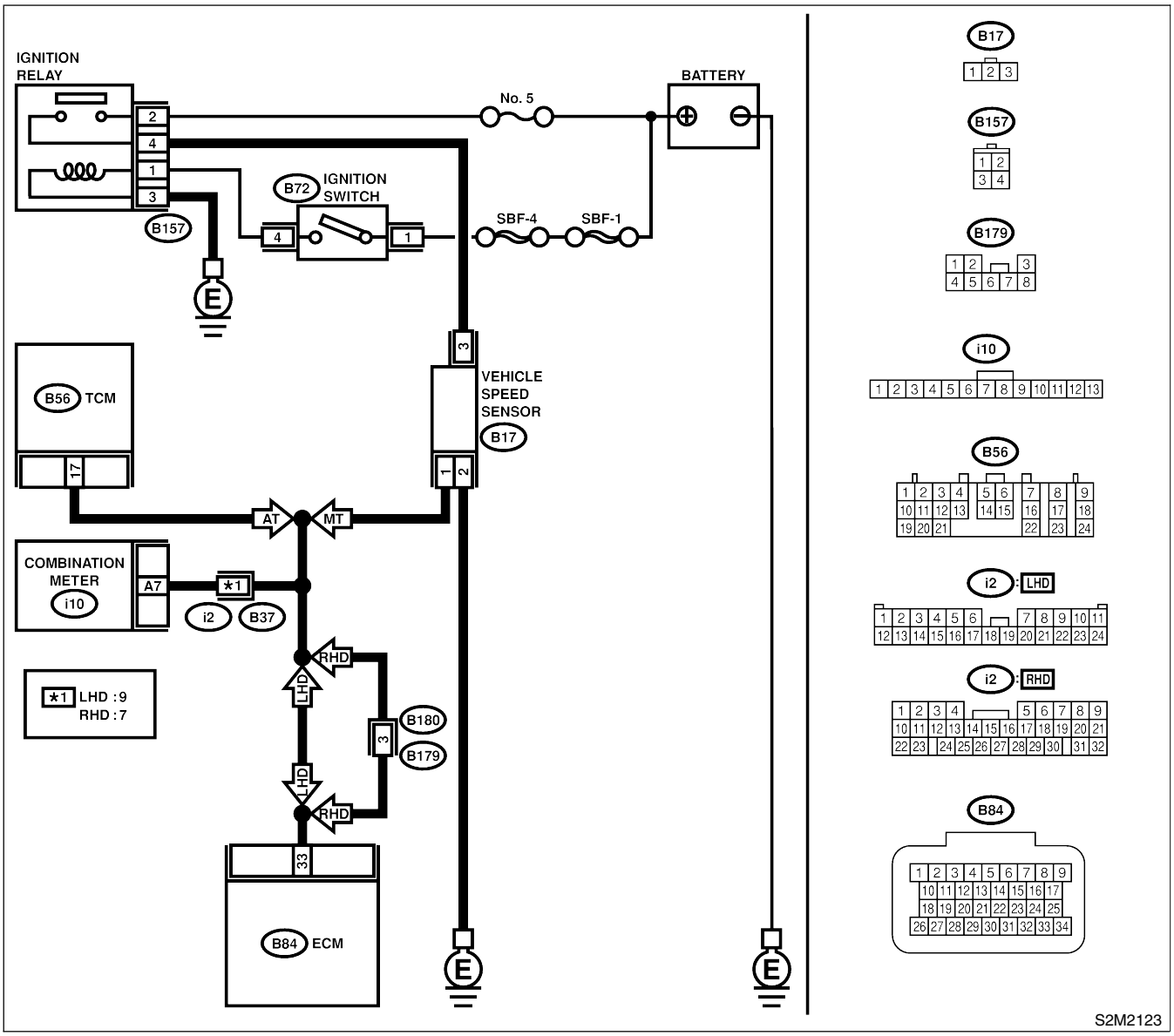
MEMO:

I: DTC 33 VEHICLE SPEED SIGNAL S068521G64

- **DIAGNOSIS:**
  - The vehicle speed signal is abnormal.
  - The harness connector between ECM and vehicle speed sensor is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



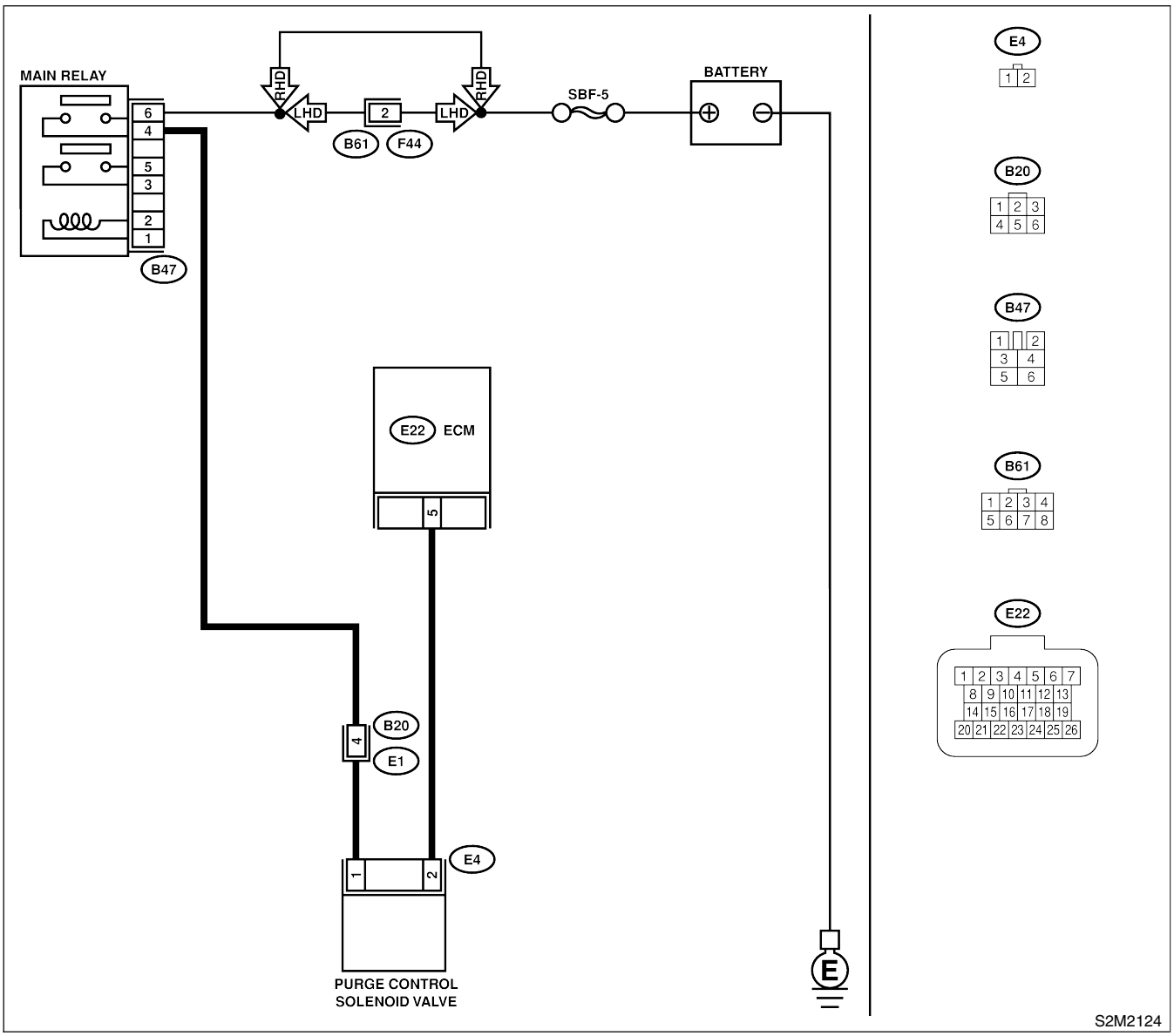
No.	Step	Check	Yes	No
1	**CHECK SPEEDOMETER OPERATION IN COMBINATION METER.**	Does speedometer operate normally?	Go to step **2**.	Check speedometer and vehicle speed sensor. <Ref. to IDI-7, INSPECTION, Combination Meter System.>
2	**CHECK INPUT SIGNAL FOR ECM.** 1) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 2) Lift-up the vehicle. 3) Set the positive (+) terminal and earth lead of the oscilloscope at ECM connector terminals. ***Connector & terminal*** ***(D) No. 53 — Engine ground:*** 4) Start the engine. 5) Shift the gear position, and travel at a constant speed. 6) Measure the signal voltage indicated on the oscilloscope.	Is the voltage more than 3 V?	Go to step **3**.	Go to step **4**.
3	**CHECK POOR CONTACT.** Check for poor contact at ECM connector.	Is there poor contact at the ECM connector?	Repair poor contact at ECM.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>
4	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.** Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 53 (+) — Engine ground (–):***	Is the voltage more than 2 V?	Repair harness and connector. NOTE: In this case, repair the following: • Battery short circuit in harness between ECM and combination meter connector	Go to step **5**.
5	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect check board. 3) Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 33 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and combination meter connector.	Go to step **6**.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>

J: DTC 35 PURGE CONTROL SOLENOID VALVE S068521G65

- **DIAGNOSIS:**
  - The purge control solenoid valve is not in function.
  - The harness connector between ECM and purge control solenoid valve is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION SOUND OF PURGE CONTROL SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Connect test mode connector. 3) Turn ignition switch to ON. 4) Make sure that the ON/OFF operating sound of purge control solenoid valve occurs at about 10 Hz.	Does purge control solenoid valve produce operating sound?	Go to step **2**.	Go to step **3**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>
3	**CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect test mode connector. 3) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 4) Disconnect connector from purge control solenoid valve. 5) Turn ignition switch to ON. 6) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(A) No. 3 (+) — Engine 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.	Go to step **4**.
4	**CHECK HARNESS BETWEEN PURGE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect ECM connector from CHECK BOARD. 3) Measure resistance of harness between ECM and purge control solenoid valve of harness connector. ***Connector & terminal*** ***(E22) No. 5 — (E4) No. 2:***	Is the resistance less than 1 Ω?	Go to step **5**.	Repair open circuit in harness between ECM and purge control solenoid valve connector.
5	**CHECK PURGE CONTROL SOLENOID VALVE.** 1) Remove purge control solenoid valve. 2) Measure resistance between purge control solenoid valve terminals. ***Terminal*** ***No. 1 — No. 2:***	Is the resistance between 23 and 27 Ω?	Go to step **6**.	Replace purge control solenoid valve. <Ref. to EC(SOHCw/oOBD)-7, Purge Control Solenoid Valve.>
6	**CHECK MAIN RELAY.** 1) Turn 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. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **7**.	Replace main relay.

No.	Step	Check	Yes	No
7	**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 **8**.	Repair harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between battery and purge control solenoid valve connector • Poor contact in main relay connector • Poor contact in coupling connector (B20)
8	**CHECK POOR CONTACT.** Check poor contact in purge control solenoid valve connector.	Is there poor contact in purge control solenoid valve connector?	Repair poor contact in purge control solenoid valve connector.	Contact your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

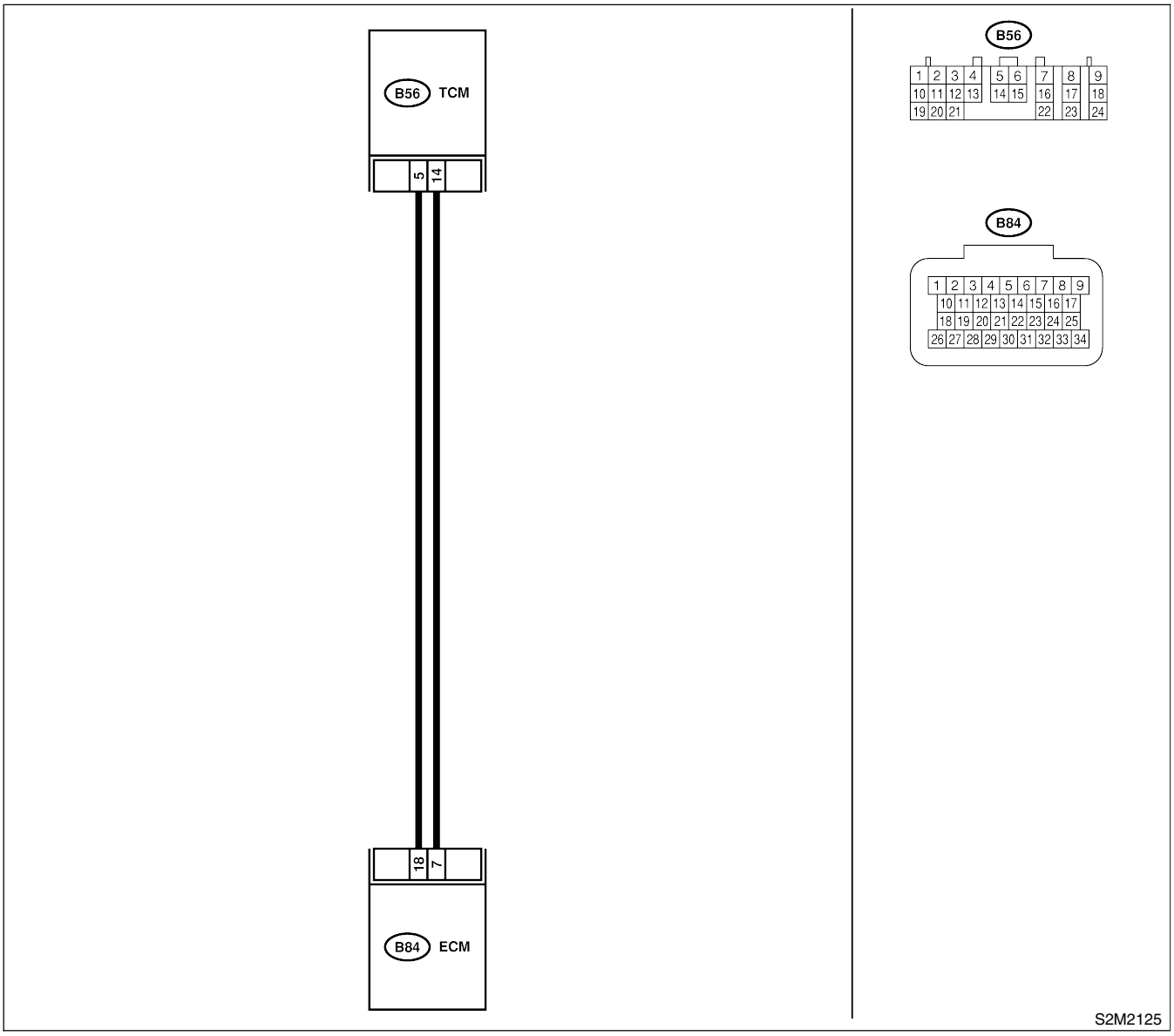
MEMO:

K: DTC 38 TORQUE CONTROL SIGNAL S068521G66

- **DIAGNOSIS:**
  - Abnormal signal entered from TCM
  - The harness connector between ECM and TCM is in short.

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



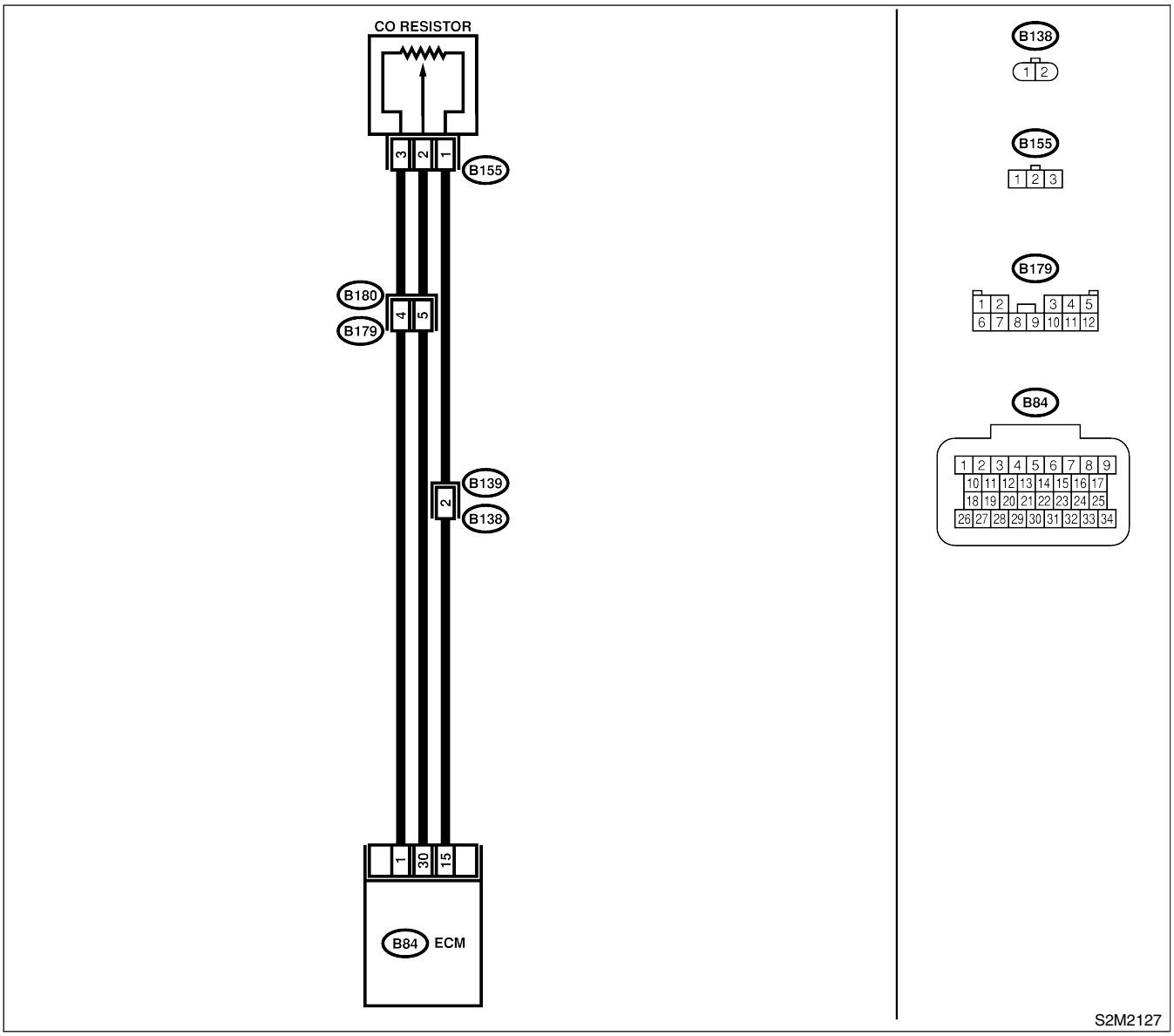
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Disconnect connectors from ECM and TCM. 2) Measure resistance of harness between ECM and engine ground. ***Connector & terminal*** ***(B84) No. 7 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure resistance of harness between ECM and engine ground. ***Connector & terminal*** ***(B84) No. 18 — Engine ground:***	Is there resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and TCM connector.	Replace TCM. <Ref. to AT-48 Transmission Control Module (TCM).>

L: DTC 46 CO RESISTOR (GENERAL SPEC. VEHICLES) S068521G68

- **DIAGNOSIS:**
  - The CO resistor signal is abnormal.
  - The harness connector between ECM and CO resistor is in short or open.
  - The CO value is not adjusted to specifications.
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Mixture ratio is too rich or too lean.

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



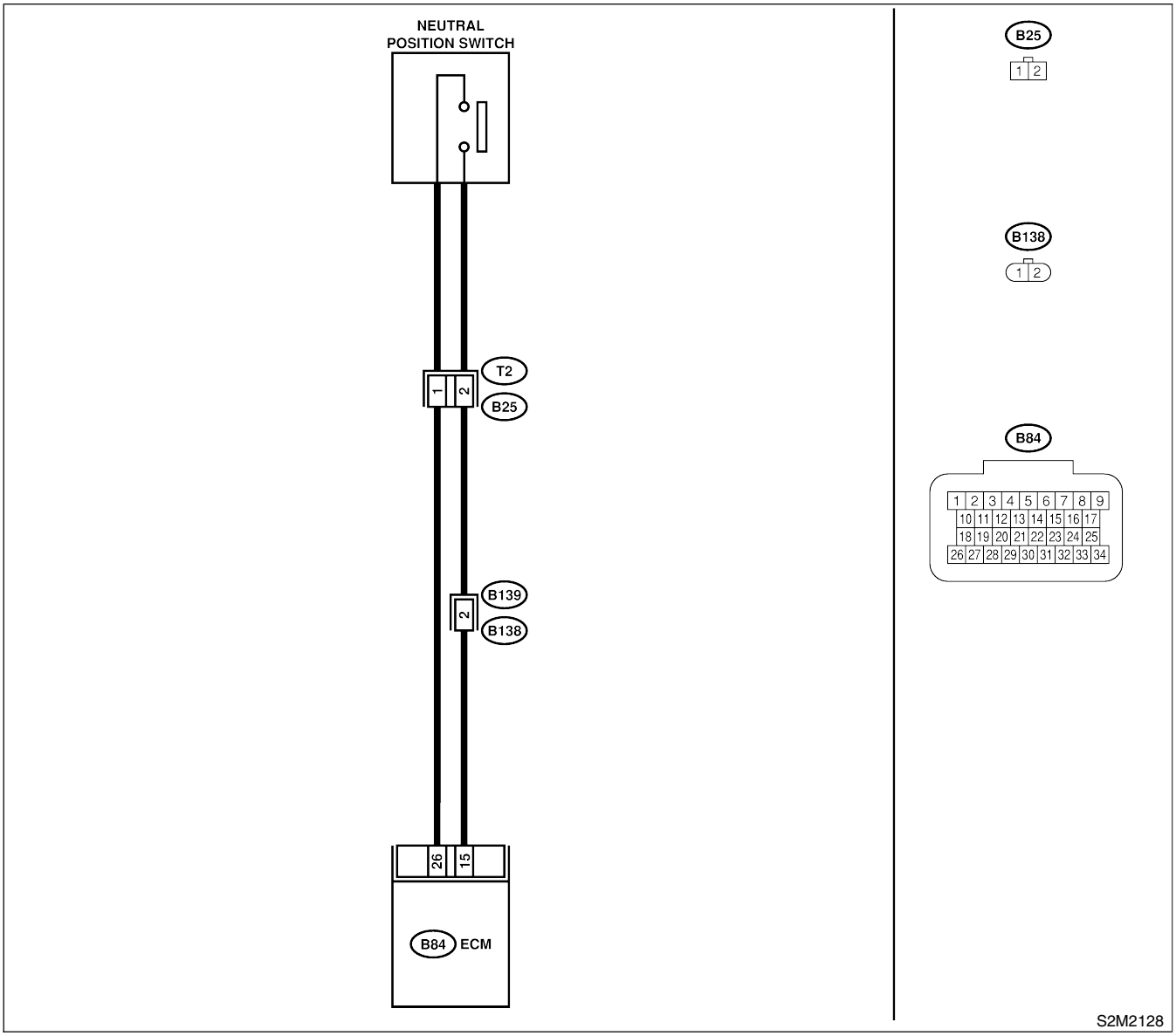
No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Turn ignition switch to ON. 4) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 56 (+) — Engine ground (–):***	Is the voltage between 0.5 V and 4.5 V?	Go to step **3**.	Go to step **2**.
2	**CHECK POOR CONTACT.**	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(SOHCw/oOBD)-38, Engine Control Module.>
3	**CHECK HARNESS BETWEEN CO RESISTOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM and CO resistor. 3) Measure resistance of harness between ECM and CO resistor connector. ***Connector & terminal*** ***(B84) No. 1 — (B155) No. 3:*** ***(B84) No. 30 — (B155) No. 2:*** ***(B84) No. 15 — (B155) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between ECM and CO resistor connector.
4	**CHECK HARNESS BETWEEN CO RESISTOR AND ECM CONNECTOR.** Measure resistance of harness between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 1 — Engine ground:*** ***(B84) No. 30 — Engine ground:*** ***(B84) No. 15 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Repair short circuit in harness between ECM and CO resistor connector.
5	**CHECK CO RESISTOR.** Measure resistance between CO resistor terminals. ***Terminals*** ***No. 1 — No. 3:***	Is the resistance between 4 and 6 kΩ?	Go to step **6**.	Replace CO resistor.
6	**CHECK CO RESISTOR.** Measure variable resistance between CO resistor terminals while rotating the screw of CO resistor. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 0 and 6 kΩ?	Replace ECM.	Replace CO resistor. NOTE: Ensure resistance varies in response to screw rotation.

M: DTC 51 NEUTRAL POSITION SWITCH S068521H58

- **DIAGNOSIS:**
  - The neutral position switch signal is abnormal.
  - The harness connector between ECM and neutral position switch is in short or open.
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Turn ignition switch to ON. 4) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 60 (+) — Engine ground (–):***	Is the voltage between 4.5 and 5.5 V in neutral position?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 60 (+) — Engine ground (–):***	Is the voltage less than 1 V in other positions?	Go to step **3**.	Go to step **4**.
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact your Subaru distributor.
4	**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 **5**.	Repair short circuit in transmission harness or replace neutral position switch.
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 ECM connector from CHECK BOARD. 2) Measure resistance of harness between ECM and transmission harness connector. ***Connector & terminal*** ***(B84) 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 between ECM connector and engine ground. ***Connector & terminal*** ***(B84) No. 26 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **8**.

No.	Step	Check	Yes	No
8	**CHECK NEUTRAL POSITION SWITCH GROUND CIRCUIT.** 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 **9**.	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 (B138)
9	**CHECK POOR CONTACT.** Check poor contact in transmission harness connector.	Is there poor contact in transmission harness connector?	Repair poor contact in transmission harness connector.	Contact your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

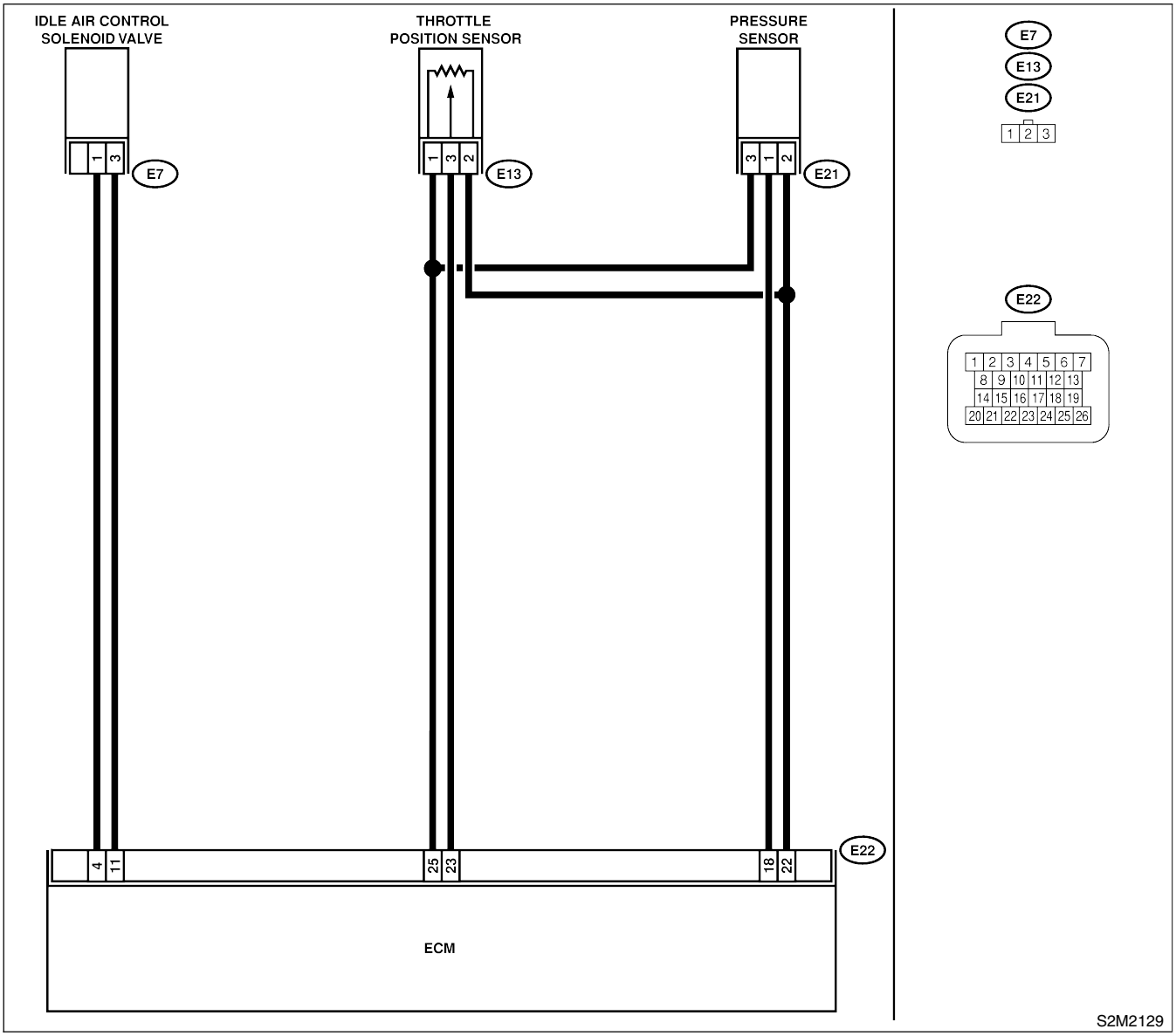
MEMO:

N: DTC 54 — AIR INTAKE SYSTEM — S068521H59

- **DIAGNOSIS:**
  - Intake duct, hose, nipple, etc., looseness, displacement, detachment
- **TROUBLE SYMPTOM:**
  - High idling revs
  - Poor engine pick up

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31, Clear Memory Mode.>, <Ref. to EN(SOHCw/oOBD)-29, Inspection Mode.>

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK AIR INTAKE SYSTEM.** 1) Turn ignition switch to ON. 2) Start engine, and idle it. 3) Check the following items: ● Cracks of air intake duct ● Disconnections of air intake duct ● Check for looseness, displacement of the intake manifold. ● Check that the intake manifold is connected in the instructed manner. (Gasket detachment, insufficient fastening torque of nuts and bolts) ● Check for looseness, detachment of hose, nipple etc.	Is there a fault in the air intake system?	Repair or replace air intake system.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition to OFF. 2) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 498307600 CHECK BOARD KIT 3) Turn ignition switch to ON. 4) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 51 (+) — Engine ground (–):***	Is the voltage between 3.4 V and 3.6 V?	Go to step **3**.	Replace pressure sensor.
3	**CHECK INPUT SIGNAL FOR ECM.** 1) Start engine, and idle it. 2) Measure voltage between ECM and engine ground. ***Connector & terminal*** ***(D) No. 51 (+) — Engine ground (–):***	Is the voltage between 1.2 V and 1.8 V?	Go to step **4**.	Replace pressure sensor. <Ref. to FU(SOHCw/oOBD)-29, Pressure Sensor.>
4	**CHECK INPUT SIGNAL FOR ECM.** 1) Stop engine, and turn ignition switch to ON. 2) Measure voltage between ECM terminals while throttle valve is fully closed. ***Terminal*** ***No. 23 (+) — No. 21 (–):***	Is the voltage between 0.2 V and 1.0 V?	Go to step **5**.	Replace throttle position sensor. <Ref. to FU(SOHCw/oOBD)-26, Throttle Position Sensor.>
5	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM terminals while throttle valve is fully opened. ***Terminal*** ***No. 23 (+) — No. 21 (–):***	Is the voltage between 4.2 V and 4.7 V?	Go to step **6**.	Replace throttle position sensor. <Ref. to FU(SOHCw/oOBD)-26, Throttle Position Sensor.>
6	**CHECK IDLE AIR CONTROL SOLENOID VALVE.** 1) Start engine, and idle it. 2) Disconnect connector from idle air control solenoid valve.	Does engine revolution change?	Go to step **7**.	Replace idle air control solenoid valve. <Ref. to FU(SOHCw/oOBD)-31, Idle Air Control Solenoid Valve.>

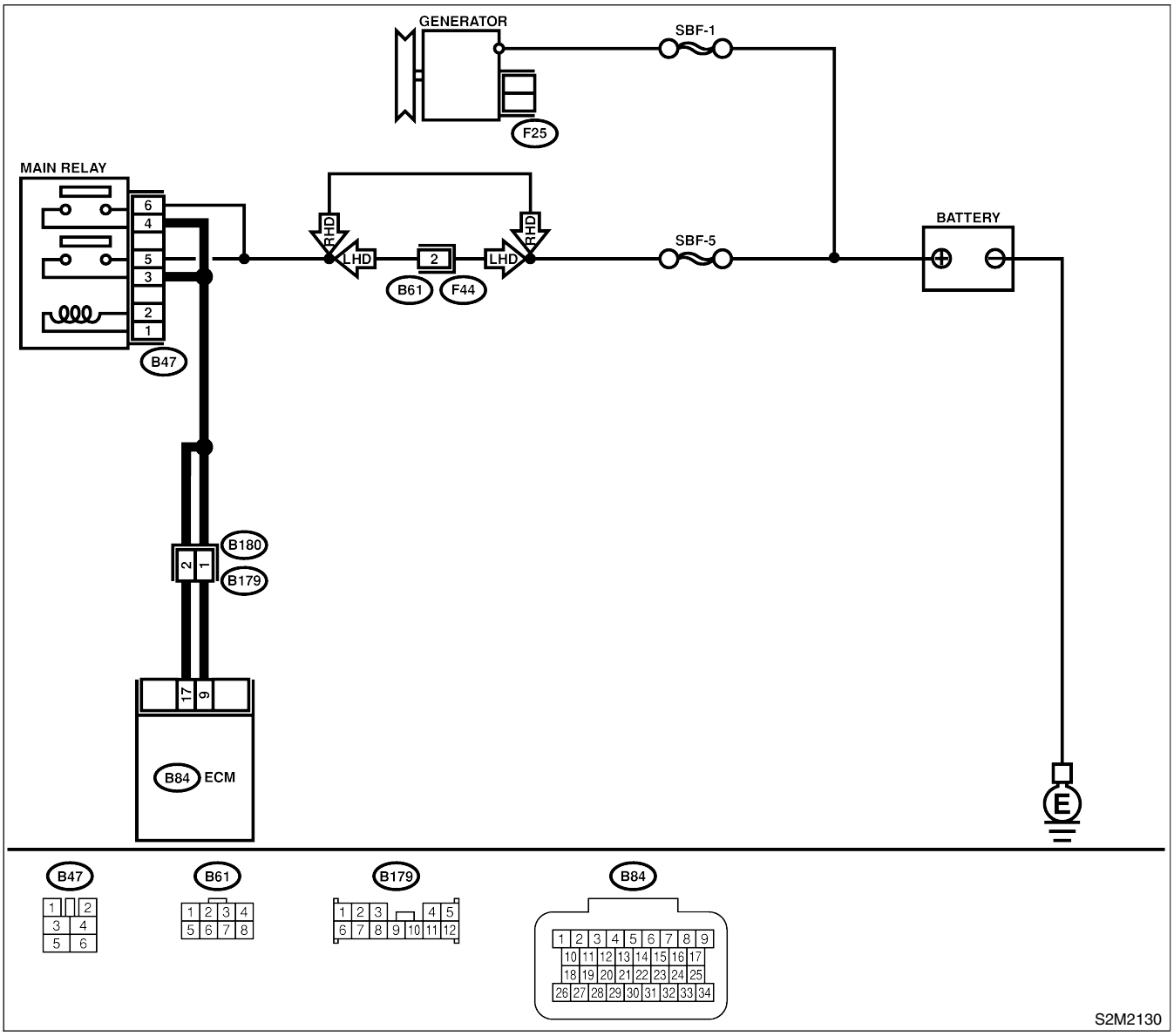
No.	Step	Check	Yes	No
7	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact your Subaru distributor. NOTE: Inspection by your Subaru distributor is required, because probable cause is deterioration of multiple parts.

O: DTC 85 CHARGE SYSTEM S068521G71

- **DIAGNOSIS:**
  - Power source voltage of the ECM is low or high.
- **TROUBLE SYMPTOM:**
  - Charge warning light comes on.

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY and INSPECTION MODES. <Ref. to EN(SOHCw/oOBD)-31 OPERATION, Clear Memory Mode.> and <Ref. to EN(SOHCw/oOBD)-29 OPERATION, Inspection Mode.>

- **WIRING DIAGRAM:**



DIAGNOSTIC PROCEDURE WITH DIAGNOSTIC TROUBLE CODE (DTC)

No.	Step	Check	Yes	No
1	**CHECK GENERATOR.** 1) Start engine. 2) Idling after warm-up. 3) Measure voltage between generator B terminal and chassis ground. ***Terminal*** ***Generator B terminal — Chassis ground:***	Is the voltage between 10.8 V and 16.2 V?	Go to step **2**.	Repair generator. <Ref. to SC-12, Generator.>
2	**CHECK GENERATOR.** 1) Run the engine at 5,000 rpm. 2) Measure voltage between generator B terminal and chassis ground. ***Terminal*** ***Generator B terminal (+) — Chassis ground (–):***	Is the voltage between 10.8 V and 16.2 V?	Go to step **3**.	Repair generator. <Ref. to SC-12, Generator.>
3	**CHECK BATTERY TERMINAL.** Turn ignition switch to OFF.	Are the positive and negative battery terminals tightly clamped?	Go to step **4**.	Tighten the clamp of terminal.
4	**CHECK INPUT VOLTAGE OF ECM.** 1) Disconnect connector from ECM, then connect ST. <Ref. to EN(SOHCw/oOBD)-23, HOW TO CHECK I/O SIGNAL FOR ECM, Engine Control Module (ECM) I/O Signal.> ST 4983907600 CHECK BOARD KIT 2) Run the engine at idle. 3) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B) No. 27 (+) — Chassis ground (–):*** ***(C) No. 36 (+) — Chassis ground (–):***	Is the voltage between 10.8 V and 16.2 V?	Go to step **5**.	Repair harness connector between battery, main relay and ECM.
5	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between generator, battery and ECM?	Repair connector.	Go to step **6**.
6	**CHECK ECM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the trouble code.	Is the same trouble code as in the current diagnosis still being output?	Replace generator.	Go to step **7**.
7	**CHECK ANY OTHER TROUBLE CODES APPEARANCE.**	Are other trouble codes being output?	Proceed with the diagnosis corresponding to the trouble code.	A temporary poor contact.

15. General Diagnostic Table S068257

A: INSPECTION S068257A10

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

Symptom	Problem parts	Priority
1. Engine does not start. (internal combustion does not occur.)	1) ECM power supply	A
	2) Engine ground terminal	A
	3) Crankshaft position sensor	B
	4) Fuel pump	B
	5) Pressure regulator	B
	6) Engine coolant temperature sensor	C
	7) Ignition coil & ignitor	C
	8) Spark plug	C
	9) Fuel injector	C
	10) Idle air control solenoid valve	C
2. Engine does not start. (internal combustion occurs.)	1) ECM power supply	A
	2) Spark plug	A
	3) Engine coolant temperature sensor	B
	4) Pressure regulator	B
	5) Pressure sensor	C
	6) Fuel pump	C
	7) Fuel injector	C
	8) Idle air control solenoid valve	C
3. Engine does not start. (engine stalls after internal combustion.)	1) ECM power supply	A
	2) Pressure sensor	A
	3) Engine coolant temperature sensor	B
	4) Spark plug	B
	5) Ignition coil	C
	6) Fuel pump	C
	7) Pressure regulator	C
	8) Fuel injector	C
	9) Idle air control solenoid valve	C
4. Engine stalls.	1) Pressure sensor	B
	2) Spark plug	B
	3) Accelerator cable is out of adjustment	B
	4) ECM power supply	C
	5) Throttle position sensor	C
	6) Crankshaft position sensor	C
	7) Vehicle speed sensor	C
	8) Ignition coil	C
	9) Fuel pump	C
	10) Idle air control solenoid valve	C
5. Rough idling	1) Spark plug	A
	2) Pressure sensor	B
	3) Engine coolant temperature sensor	B
	4) Pressure regulator	B
	5) Idle air control solenoid valve	B
	6) Air leak in air intake system	B
	7) ECM power supply	C
	8) Throttle position sensor	C
	9) Intake air temperature sensor	C
	10) Oxygen sensor	C
	11) Fuel pump	C
	12) Fuel injector	C
	13) Test mode or read memory connectors are connected.	C

GENERAL DIAGNOSTIC TABLE

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

A*: Including ECM ground circuit
B*: Check hoses.

FUEL INJECTION (FUEL SYSTEMS)

FU(DOHC TURBO)

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1. General Description S185001

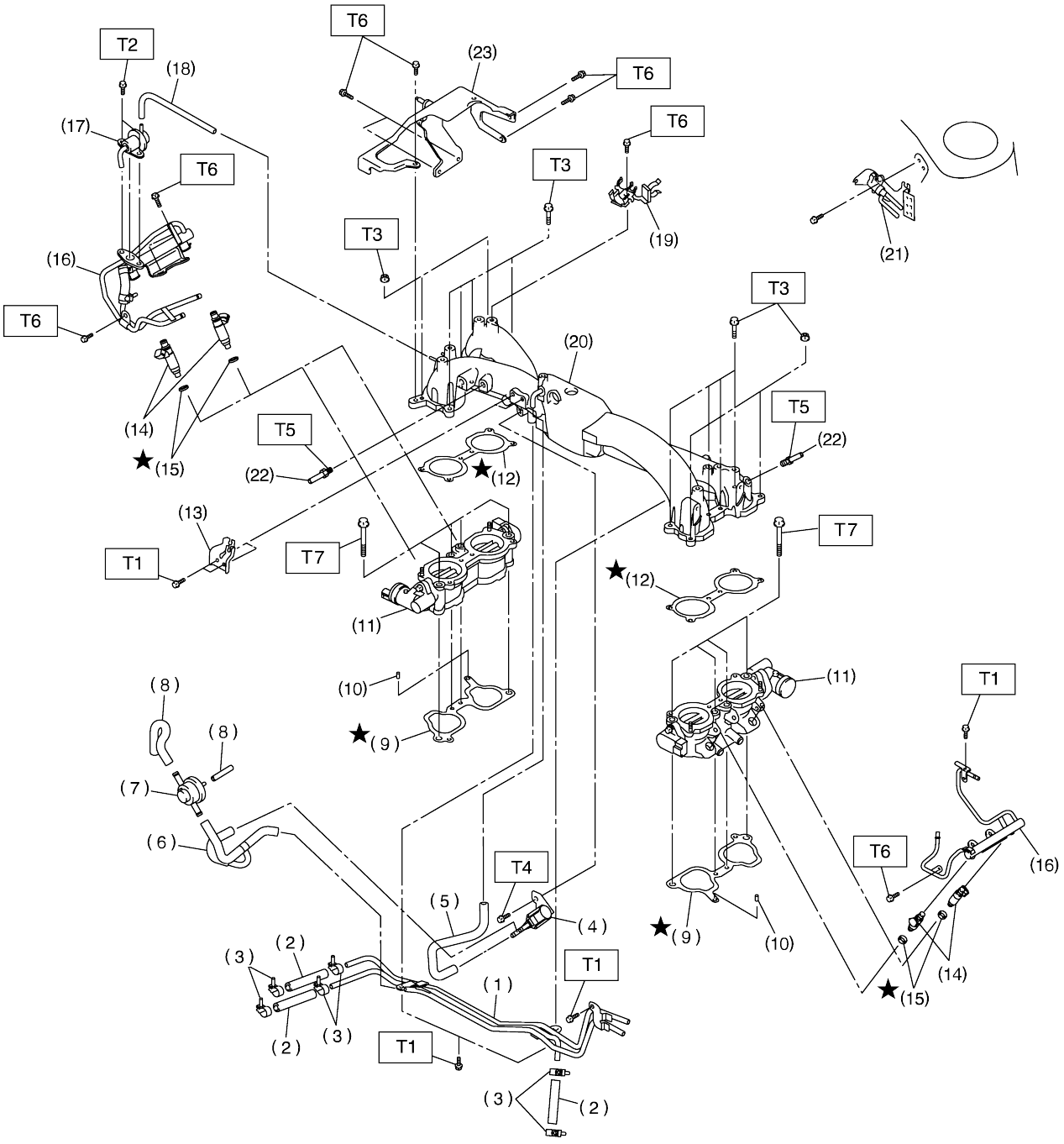
A: SPECIFICATIONS S185001E49

Model		
Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	450 — 677 kPa (4.59 — 6.9 kg/cm^2, 65.27 — 98.2 psi)
	Discharge flow	More than 130 ℓ (34.3 US gal, 28.6 Imp gal)/h [12 V at 300 kPa (3.06 kg/cm^2, 43.5 psi)]
Fuel filter		Cartridge type

MEMO:

B: COMPONENT S185001A05

1. INTAKE MANIFOLD S185001A0501



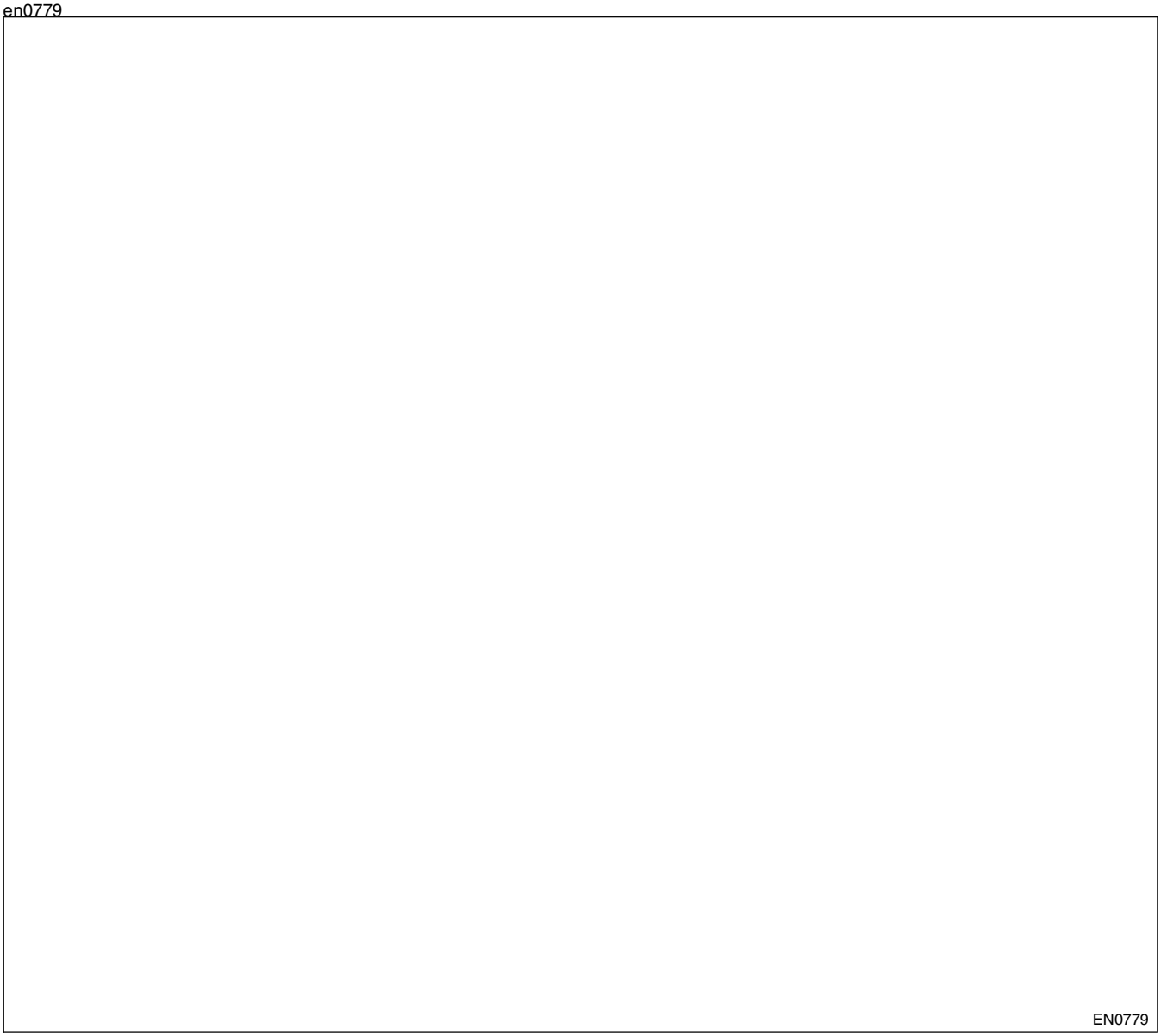
S2M2173A

(1) Fuel pipe ASSY
(2) Fuel hose
(3) Clip
(4) Purge control solenoid valve
(5) Vacuum hose
(6) Vacuum control hose
(7) Purge valve
(8) Purge hose
(9) Intake manifold gasket
(10) Guide pin
(11) Tumble generator valve ASSY
(12) Tumble generator valve gasket
(13) Accelerator cable bracket
(14) Fuel injector
(15) Insulator
(16) Fuel injector pipe
(17) Pressure regulator
(18) Pressure regulator hose
(19) Blow-by hose stay
(20) Intake manifold
(21) Wastegate control solenoid valve ASSY
(22) Nipple
(23) Fuel pipe protector

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.50, 3.7)
T2: 6.4 (0.65, 4.7)
T3: 8.25 (0.84, 6.1)
T4: 16 (1.63, 11.8)
T5: 17 (1.73, 12.5)
T6: 19 (1.94, 14.0)
T7: 25 (2.55, 18.4)

2. AIR INTAKE SYSTEM S185001A0502

en0779

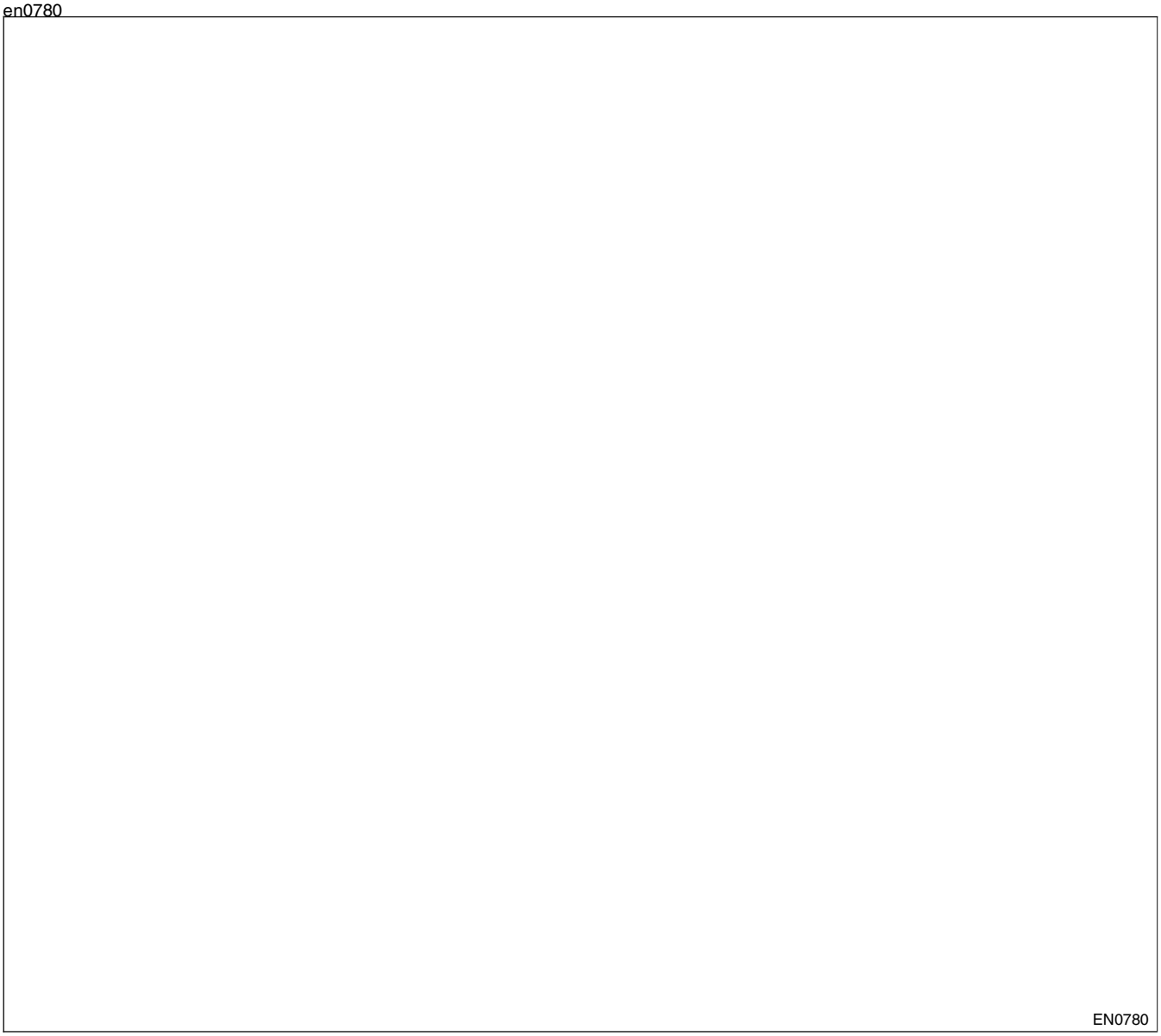


(1) Gasket
(2) Throttle position sensor
(3) Idle air control solenoid valve
(4) Throttle body
(5) Pressure sensor

Tightening torque: N·m (kgf-m, ft-lb)
T1: 1.6 (0.16, 1.2)
T2: 2.8 (0.29, 2.1)
T3: 22 (2.2, 16)

3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS S185001A0503

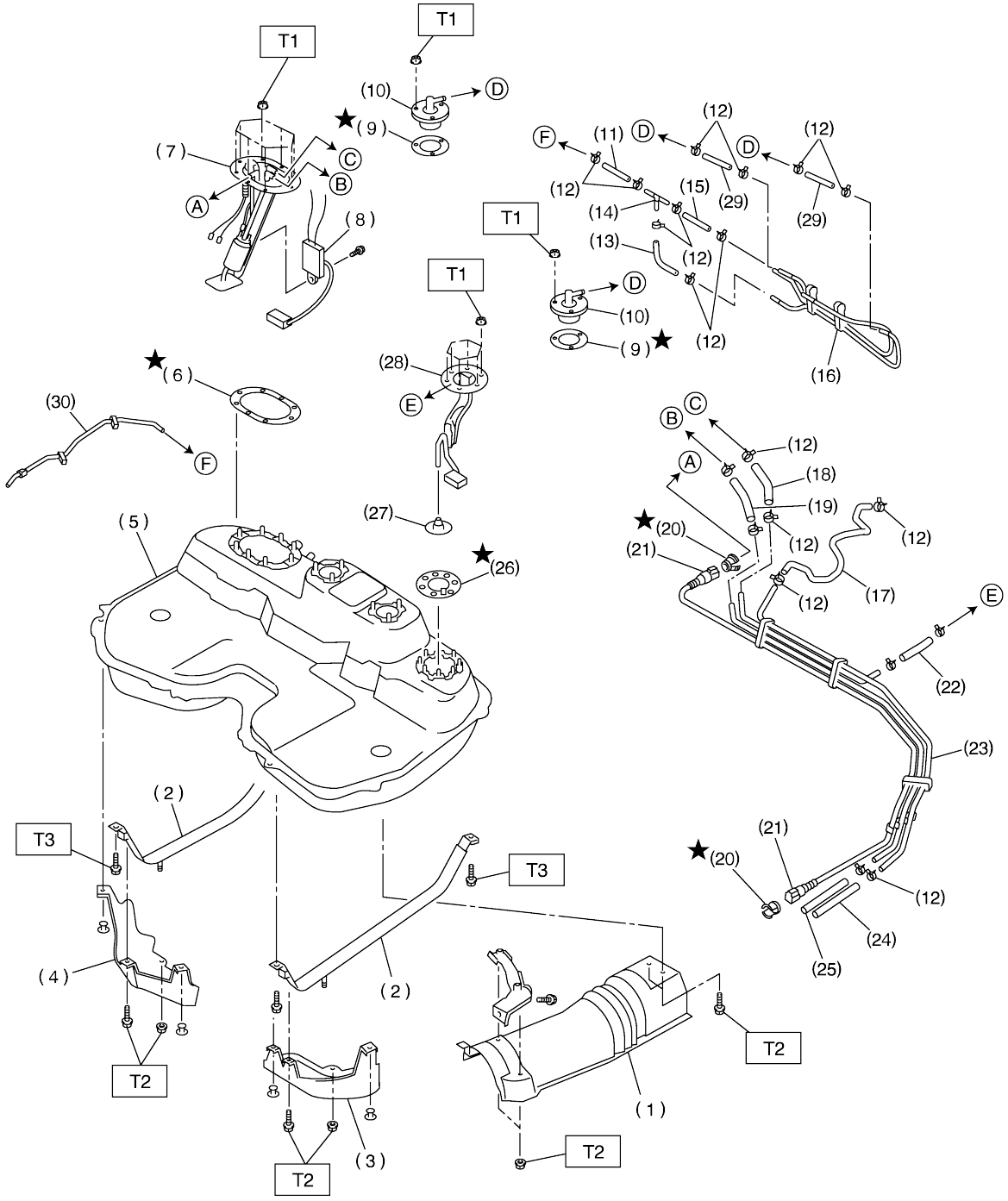
en0780



(1) Crankshaft position sensor
(2) Knock sensor
(3) Camshaft position sensor

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 24 (2.4, 17.4)

4. FUEL TANK S185001A0504

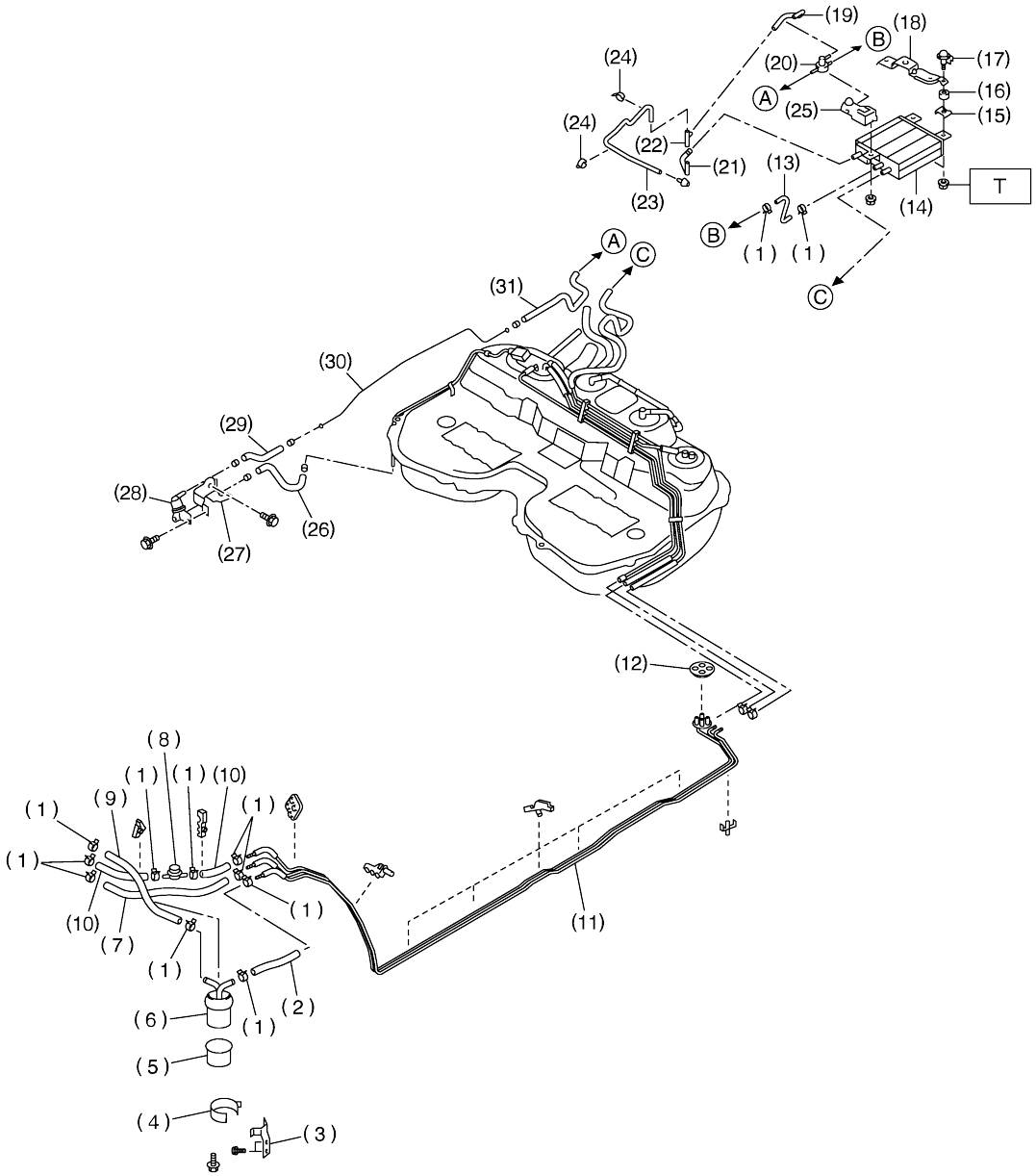


S2M2152A

(1) Heat sealed cover
(2) Fuel tank band
(3) Protector LH
(4) Protector RH
(5) Fuel tank
(6) Fuel pump gasket
(7) Fuel pump ASSY
(8) Fuel level snsor
(9) Fuel cut valve gasket
(10) Fuel cut valve
(11) Evaporation hose A
(12) Clip
(13) Evaporation hose B
(14) Joint pipe
(15) Evaporation hose C
(16) Evaporation pipe ASSY
(17) Evaporation hose D
(18) Evaporation hose E
(19) Fuel return hose A
(20) Retainer
(21) Quick connector
(22) Evaporation hose F
(23) Fuel pipe ASSY
(24) Evaporation hose G
(25) Fuel return hose B
(26) Fuel sub level sensor gasket
(27) Jet pump filter
(28) Fuel sub level sensor
(29) Evaporation hose H
(30) Evaporation hose I

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 S185001A0505

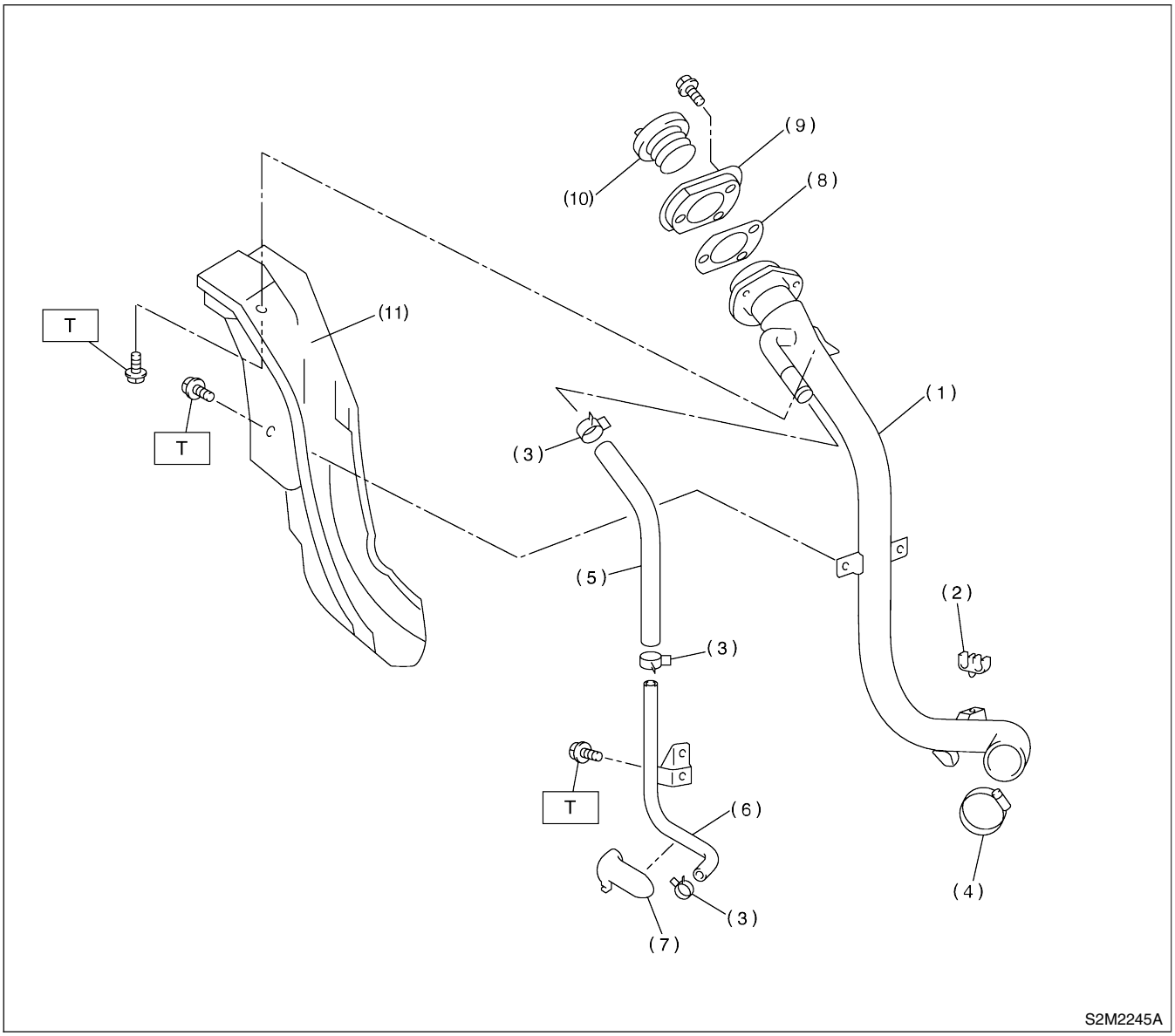


S2M2153A

(1) Clip
(2) Fuel delivery hose A
(3) Fuel filter bracket
(4) Fuel filter holder
(5) Fuel filter cup
(6) Fuel filter
(7) Evaporation hose A
(8) Fuel damper
(9) Fuel delivery hose B
(10) Fuel return hose
(11) Fuel pipe ASSY
(12) Grommet
(13) Canister hose A
(14) Canister
(15) Canister bracket plate
(16) Cushion
(17) Canister bracket spacer
(18) Rear canister bracket
(19) Two-way valve return hose
(20) Two-way valve
(21) Two-way valve drain hose A
(22) Connector
(23) Two-way valve drain hose B
(24) Clamp
(25) Front canister bracket
(26) Evaporation hose B
(27) Roll over valve bracket
(28) Roll over valve
(29) Evaporation hose C
(30) Evaporation pipe
(31) Canister hose B

Tightening torque: N·m (kgf-m, ft-lb)
T1: 23 (2.34, 17.0)

6. FUEL FILLER PIPE S185001A0506



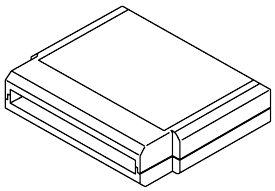
(1) Fuel filter pipe ASSY
(2) Evaporation hose holder
(3) Clamp
(4) Clamp
(5) Air vent hose
(6) Air vent pipe
(7) Air vent pipe holder
(8) Filler pipe packing
(9) Filler ring
(10) Filler cap
(11) Fuel pipe protector

Tightening torque: N·m (kgf-m, ft-lb)
T: 7.5 (0.76, 5.5)

C: CAUTION S185001A03

- 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.

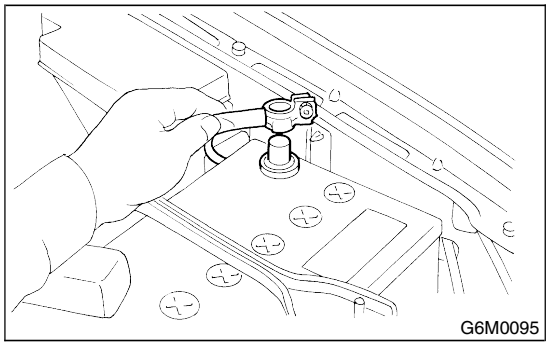
D: PREPARATION TOOL S185001A17

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA150 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. Throttle Body S185010

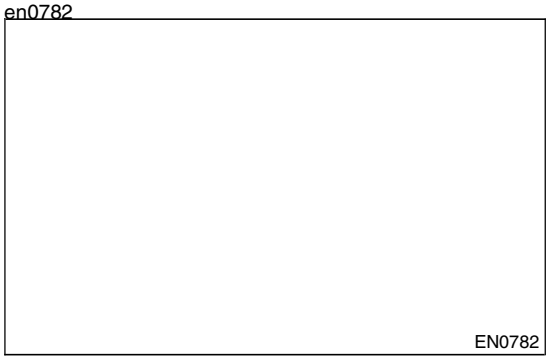
A: REMOVAL S185010A18

1) Disconnect battery ground cable.

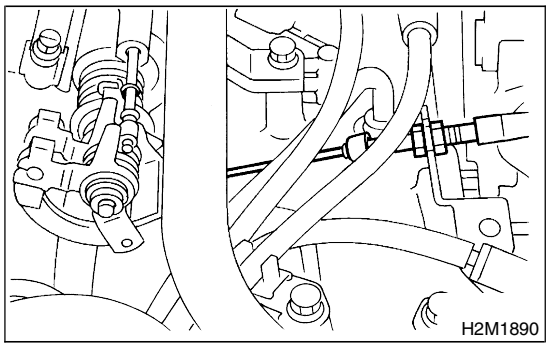

G6M0095

2) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect connector from throttle position sensor (A) and idle air control solenoid valve (B) and pressure sensor (C).

en0782

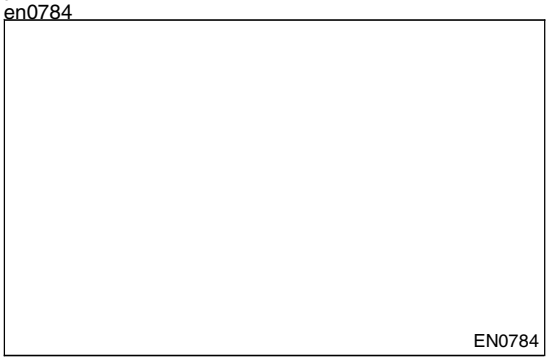

EN0782

4) Disconnect accelerator cable.


H2M1890

5) Disconnect engine coolant hoses from throttle body.

en0784


EN0784

6) Remove bolts which secure throttle body to intake manifold.

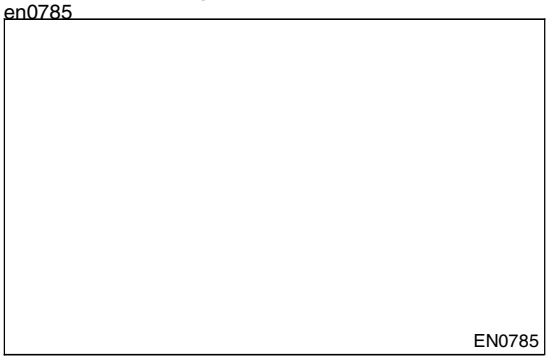
B: INSTALLATION S185010A11

Install in the reverse order of removal.

NOTE:
Always use new gaskets.

Tightening torque:
22 N·m (2.2 kgf-m, 15.9 ft-lb)

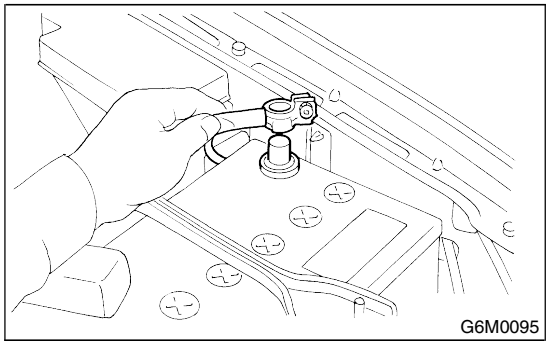
en0785


EN0785

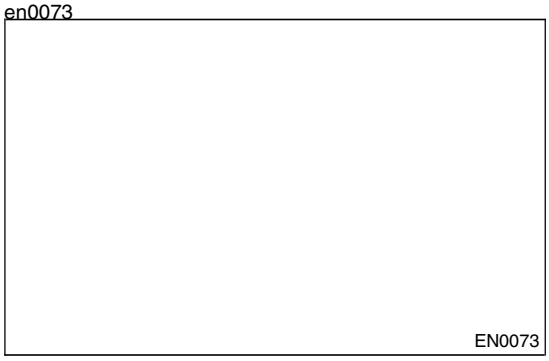
3. Intake Manifold S185034

A: REMOVAL S185034A18

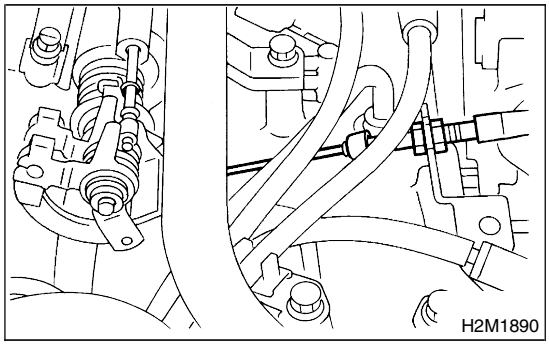
1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Disconnect battery ground cable.


G6M0095

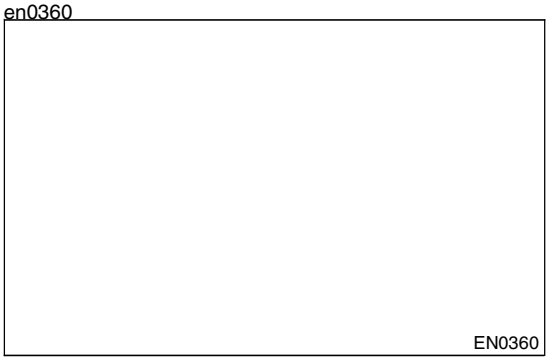
3) Lift up vehicle.
4) Remove under cover.
5) Drain coolant about 3.0 ℓ (3.2 US qt, 2.6 Imp qt).

en0073

EN0073

6) Remove air cleaner upper cover and air intake boot. <Ref. to IN(DOHC TURBO)-7, REMOVAL, Air Cleaner.>
7) Remove air cleaner element.
8) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
9) Disconnect accelerator cable.

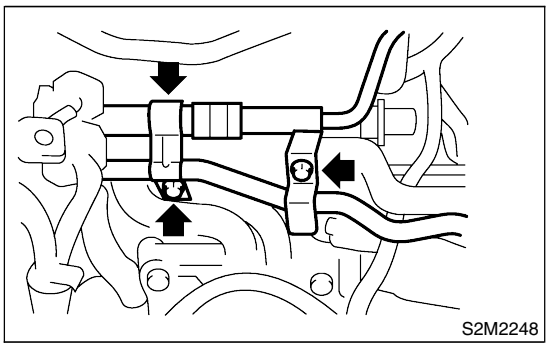

H2M1890

10) Remove coolant filler tank. <Ref. to CO-37, REMOVAL, Coolant Filler Tank.>
11) Remove power steering pump from bracket.
(1) Remove front side V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
(2) Disconnect the power steering switch connector.

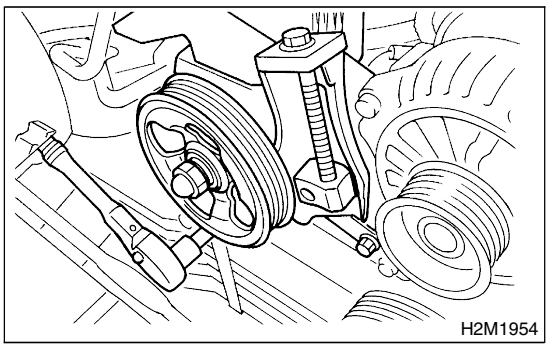
en0360

EN0360

(3) Remove bolts which secure power steering pipe brackets to intake manifold.

NOTE:
Do not disconnect power steering hose.

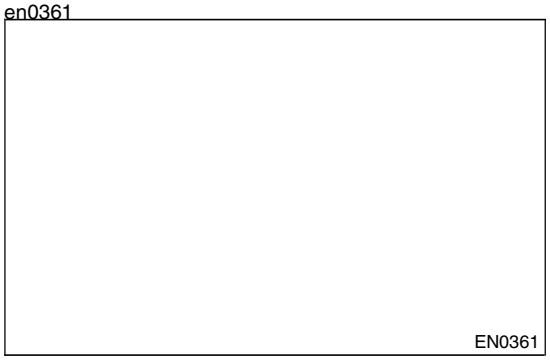

S2M2248

(4) Remove bolts which secure power steering pump.


H2M1954

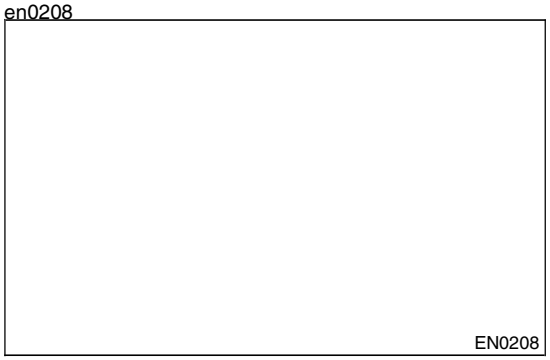
(5) Remove power steering tank from the bracket by pulling it upward.

en0361



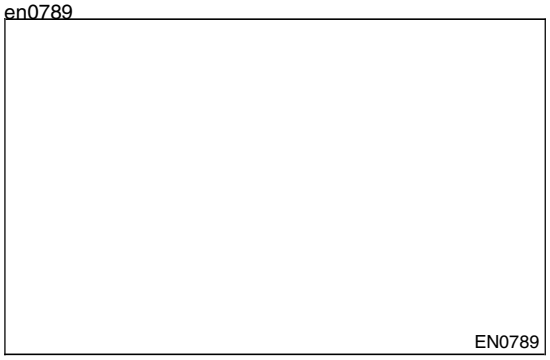
(6) Place power steering pump on the right side wheel apron.

en0208



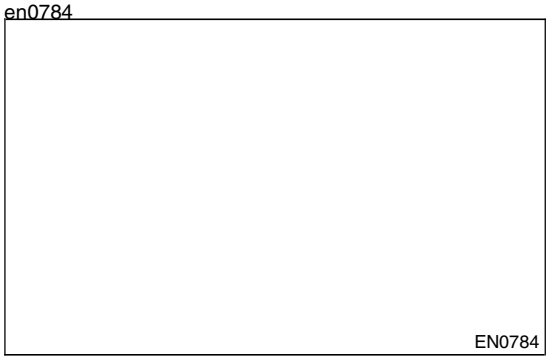
12) Disconnect emission hose from PCV valve.

en0789



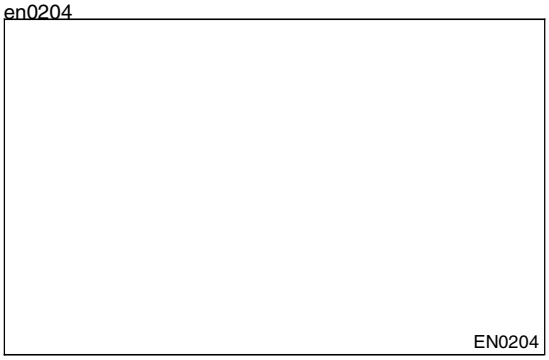
13) Disconnect engine coolant hoses from throttle body.

en0784



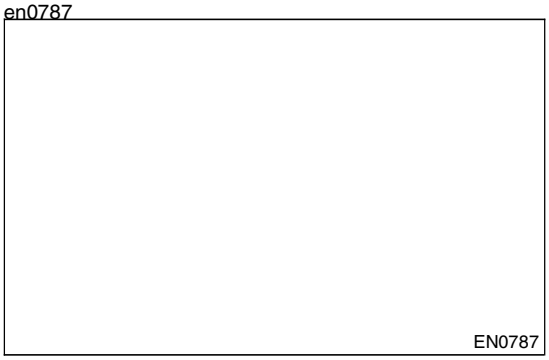
14) Disconnect brake booster hose.

en0204



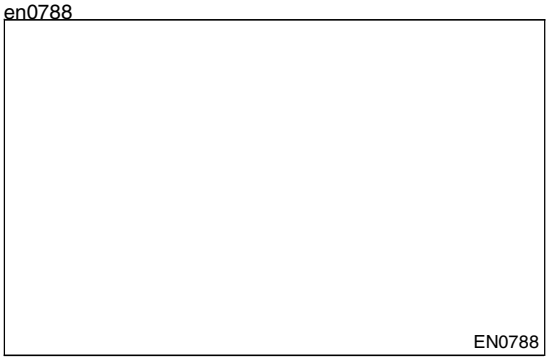
15) Disconnect Pressure hose from intake duct.

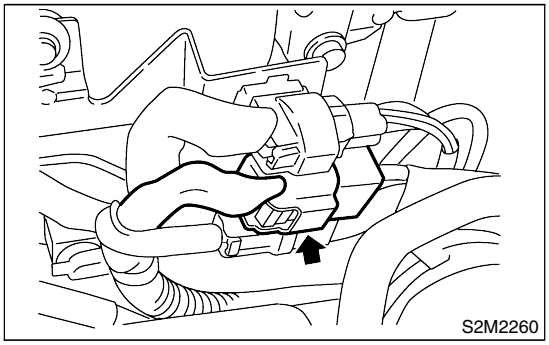
en0787



16) Disconnect engine harness connectors from bulkhead harness connectors.

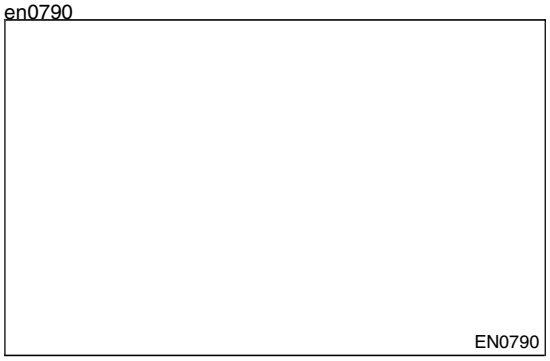
en0788



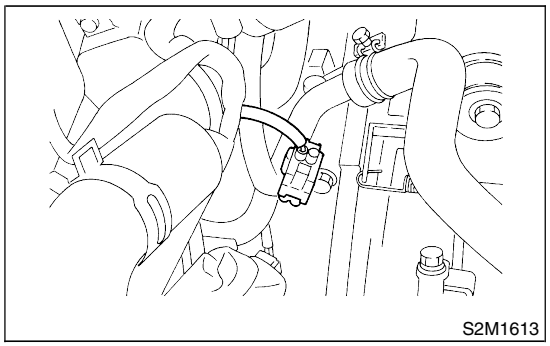


17) Disconnect connectors from engine coolant temperature sensor (A), oil pressure switch (B) and crankshaft position sensor (C).

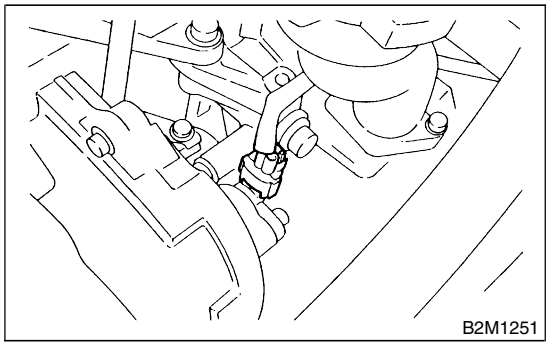
en0790



18) Disconnect knock sensor connector.

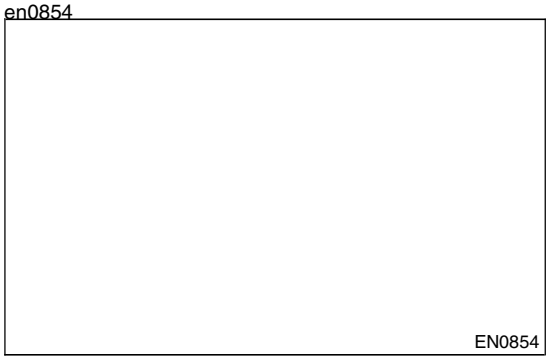


19) Disconnect connector from camshaft position sensor.

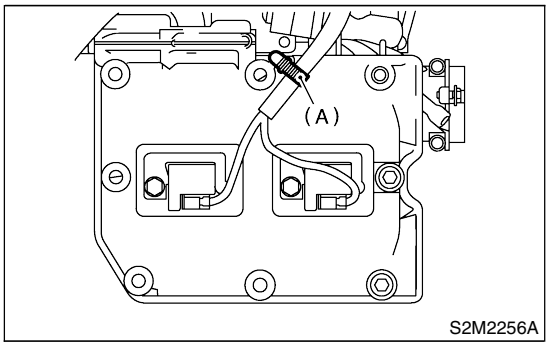


20) Disconnect connector from ignition coil.

en0854



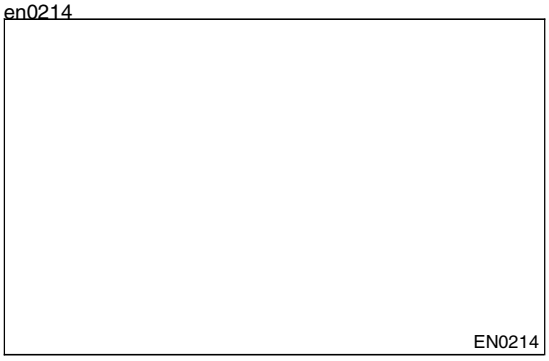
21) Remove harness secured by clip (A) from the bracket.



22) Disconnect fuel delivery hose, return hose and evaporation hose.

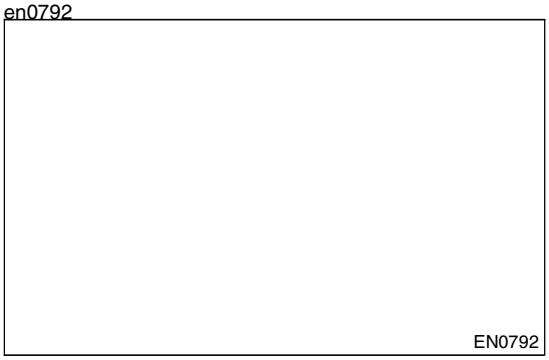
WARNING:
Catch fuel from hoses in a container.

en0214



23) Remove bolts which secure intake manifold to cylinder heads.

en0792



24) Remove intake manifold.

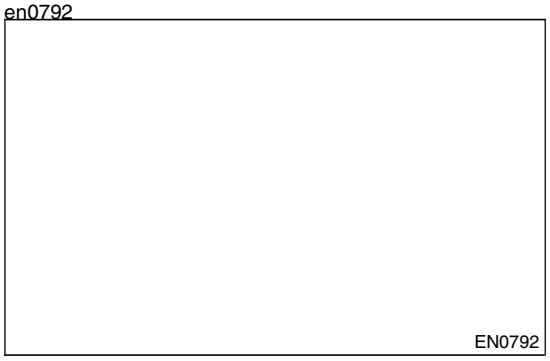
B: INSTALLATION *S185034A11*

1) Install intake manifold onto cylinder heads.

NOTE:
Always use new gaskets.

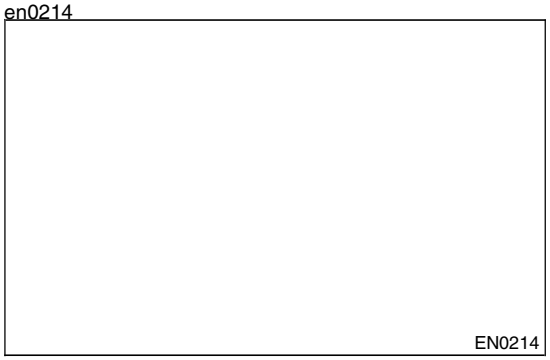
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

en0792



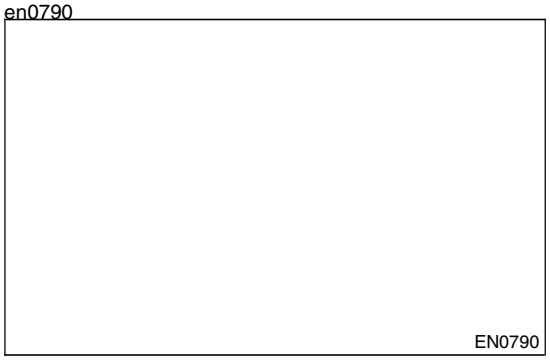
2) Connect fuel delivery hose, return hose, and evaporation hose.

en0214

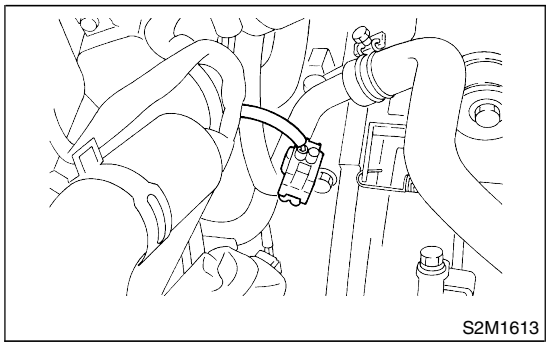


3) Connect connector to oil pressure switch (B), crankshaft position sensor (C) and engine coolant temperature sensor (A).

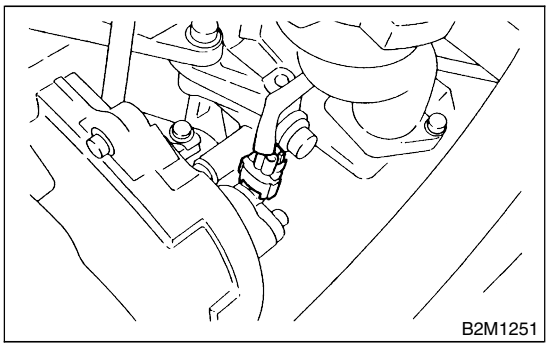
en0790



4) Connect connector to knock sensor.

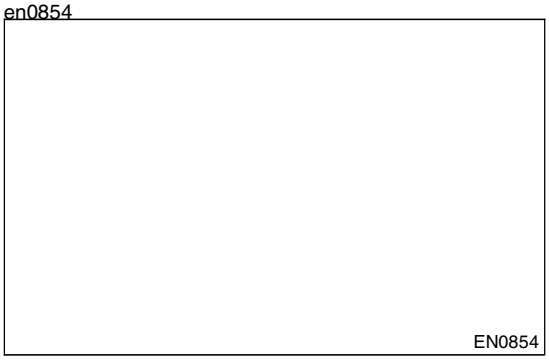


5) Connect connector to camshaft position sensor.

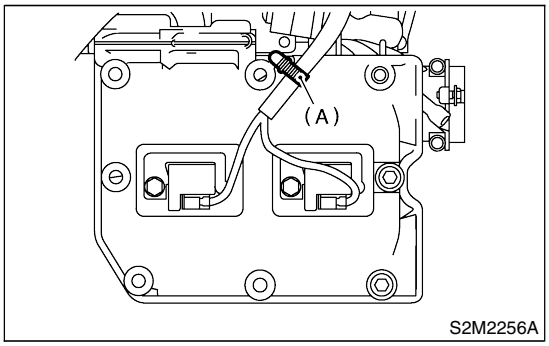


6) Connect connector to ignition coil.

en0854

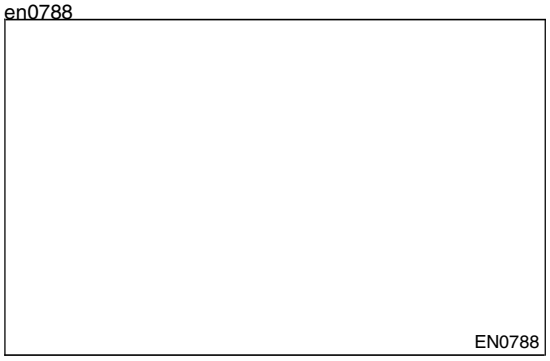


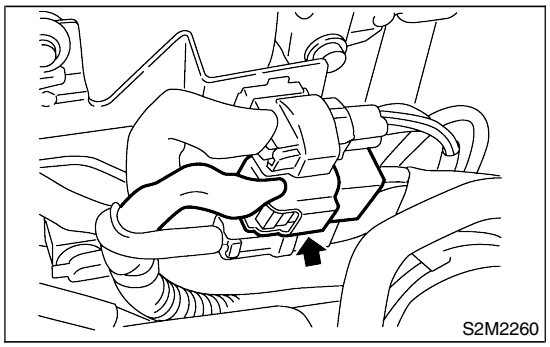
7) Secure harness to the bracket with clip (A).



8) Connect engine harness connector to bulkhead harness connectors.

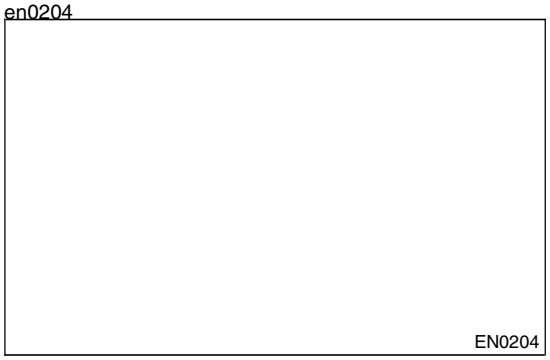
en0788





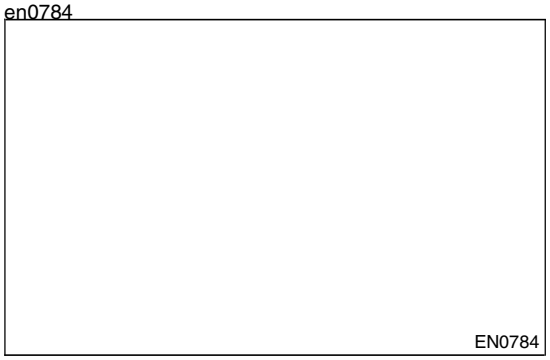
9) Connect brake booster vacuum hose.

en0204



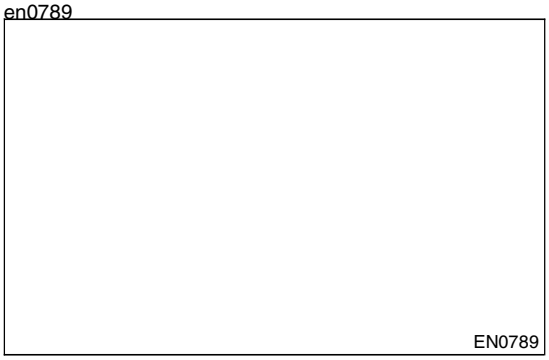
10) Connect engine coolant hoses to throttle body.

en0784



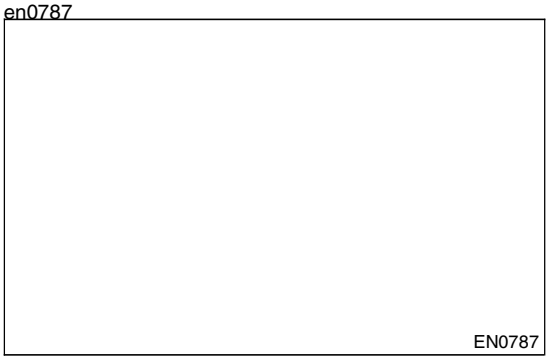
11) Connect emission hose to PCV valve.

en0789



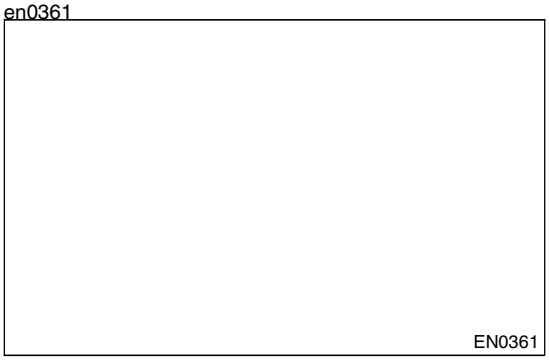
12) Connect pressure hose to intake duct.

en0787



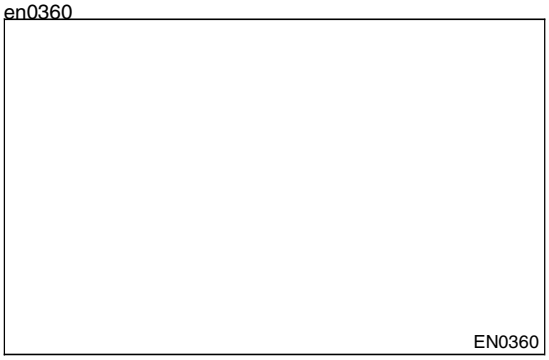
13) Install power steering pump on bracket.
(1) Install power steering tank on bracket.

en0361



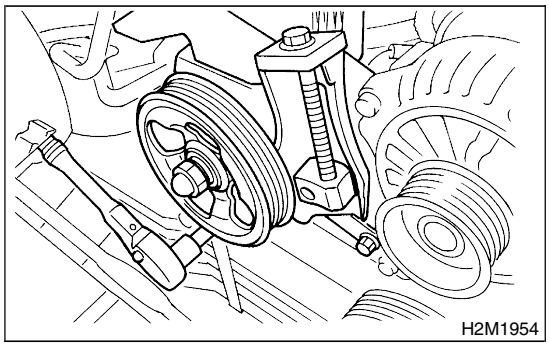
(2) Connect connector to power steering pump switch.

en0360

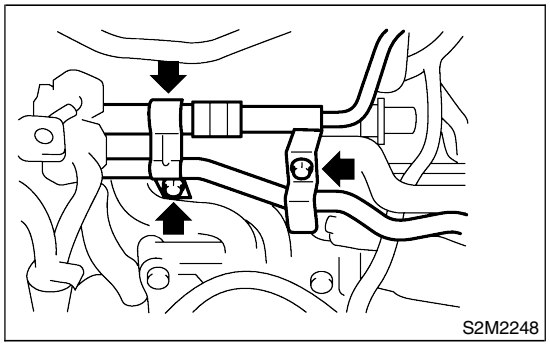


(3) Install power steering pump, and tighten bolts.

Tightening torque:
20.1 N·m (2.05 kgf-m, 14.8 ft-lb)

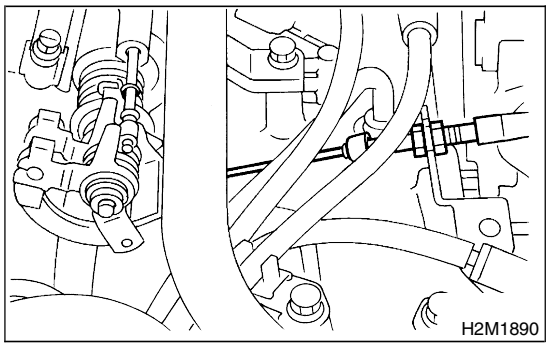

H2M1954

(4) Install power steering pipe brackets on right side intake manifold.

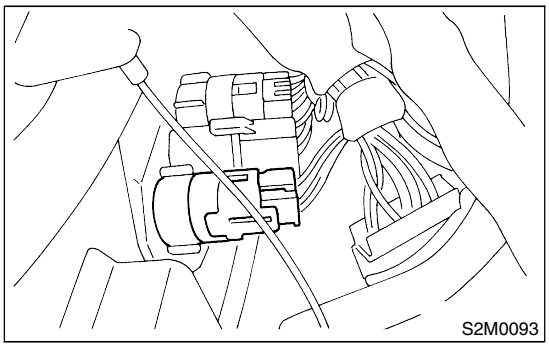

S2M2248

(5) Install front side V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>

14) Install coolant filler tank. <Ref. to CO-37, INSTALLATION, Coolant Filler Tank.>
15) Connect accelerator cable.


H2M1890

16) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
17) Install air cleaner element.
18) Install air cleaner upper cover and air intake duct as a unit. <Ref. to IN(DOHC TURBO)-7, INSTALLATION, Air Cleaner.>
19) Connect connector to fuel pump relay.

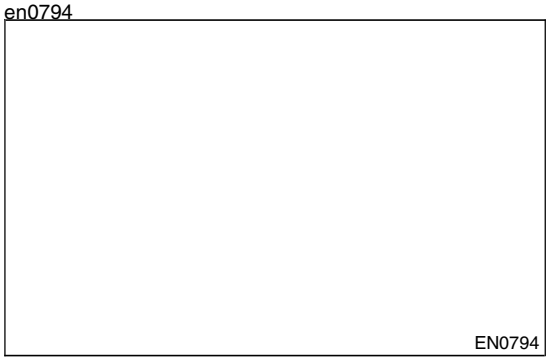

S2M0093

20) Connect battery ground cable.
21) Lift up vehicle.
22) Install under cover.
23) Fill coolant. <Ref. to CO-14, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

C: DISASSEMBLY S185034A06

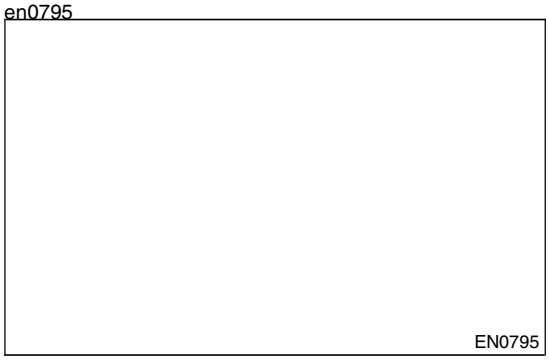
1) Remove fuel pipe protector.

en0794

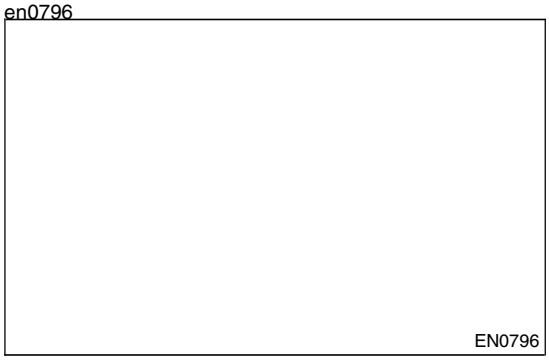


2) Remove engine ground terminal from intake manifold.

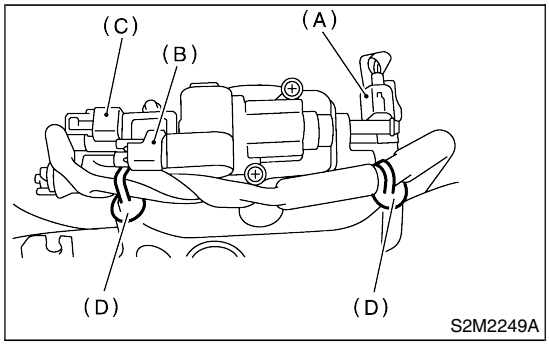
en0795



en0796

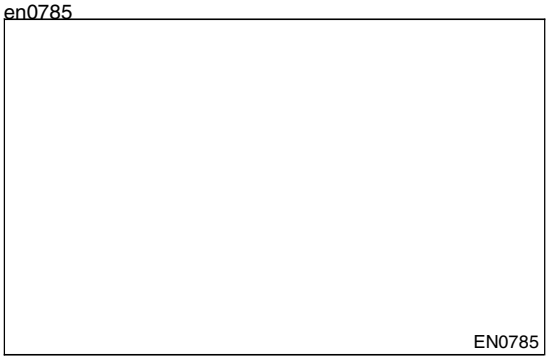


3) Disconnect connector from throttle position sensor (A), idle air control solenoid valve (B) and pressure sensor (C).
4) Separate engine harness secured to the intake manifold by clip (D).



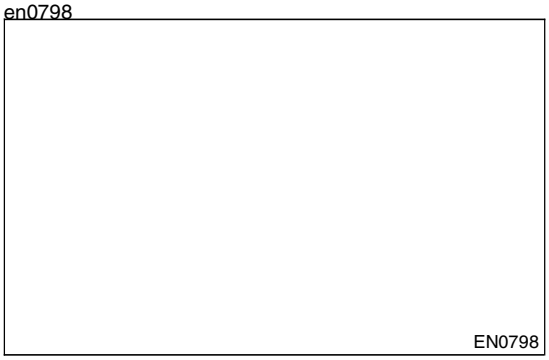
5) Remove throttle body from intake manifold.

en0785



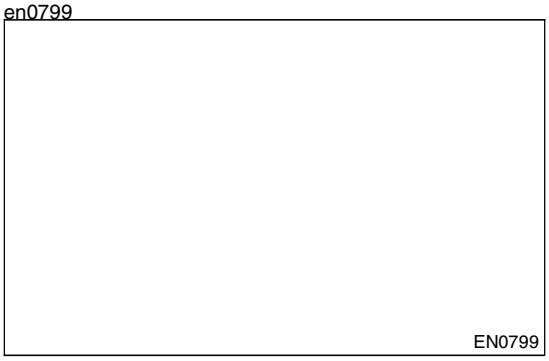
6) Disconnect connector from fuel injector.

en0798



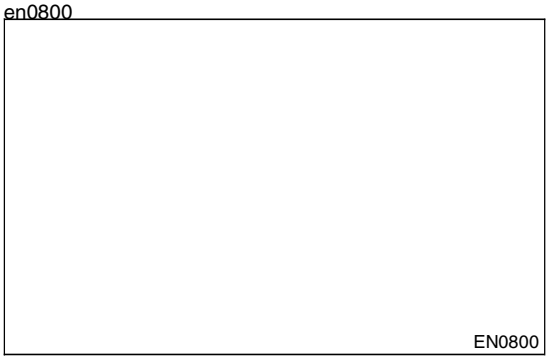
7) Disconnect connector from tumble generator valve actuator.

en0799



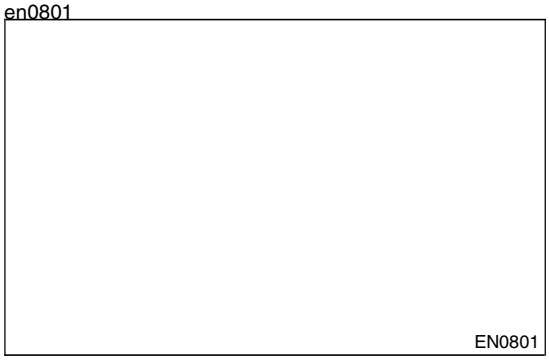
8) Disconnect connector from tumble generator valve sensor.

en0800



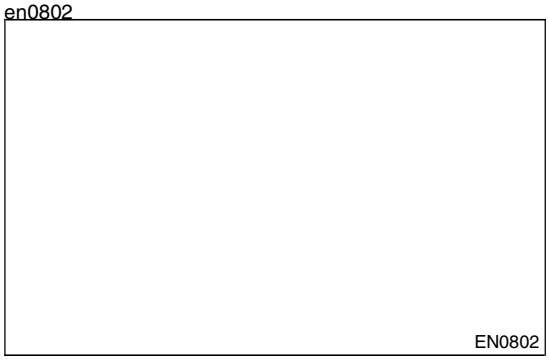
9) Disconnect connector from purge control solenoid valve.

en0801



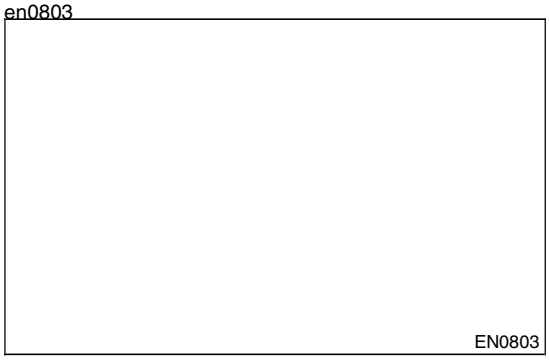
10) Remove purge control solenoid valve.

en0802



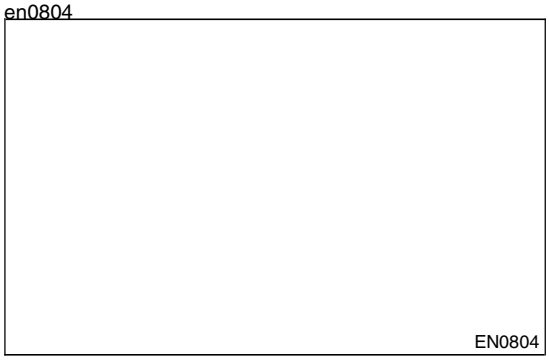
11) Disconnect evaporation hose from intake manifold.

en0803



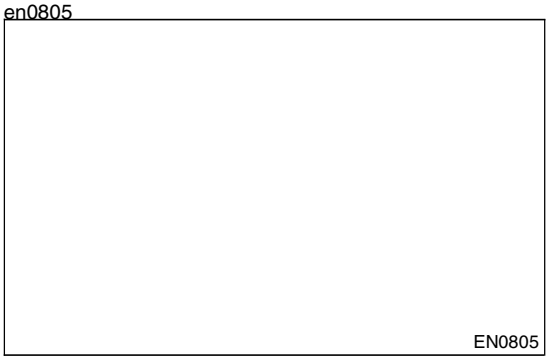
12) Disconnect evaporation hoses from purge valve.

en0804



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

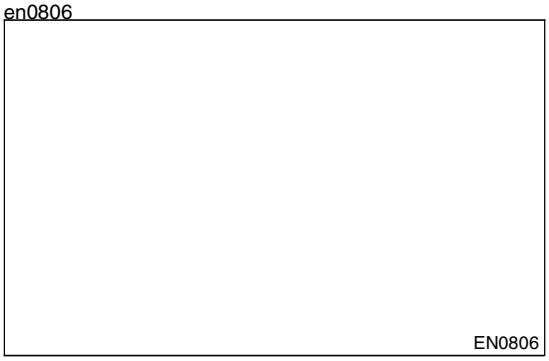
en0805



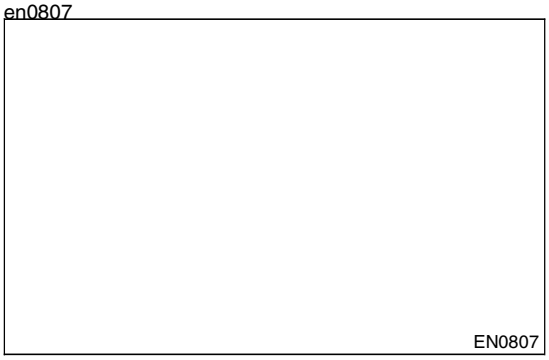
14) Remove bolt which hold fuel injector pipe onto intake manifold.

- LH SIDE

en0806

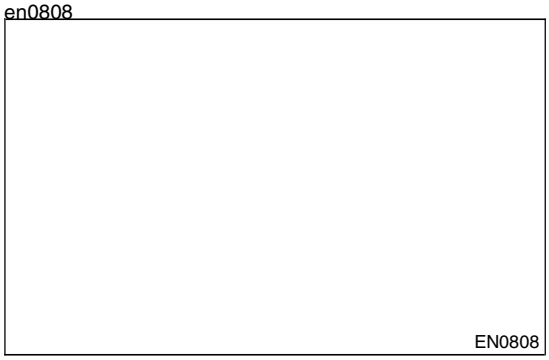


en0807

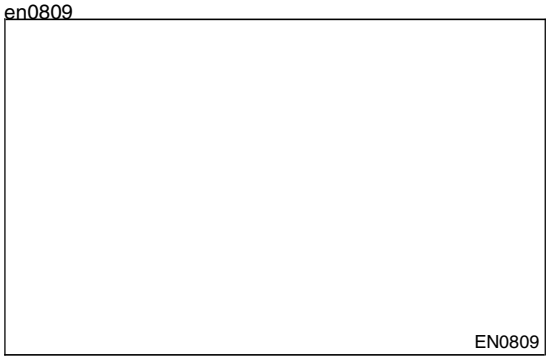


● RH SIDE

en0808

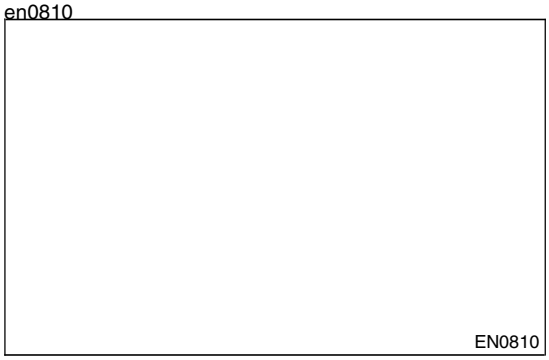


en0809



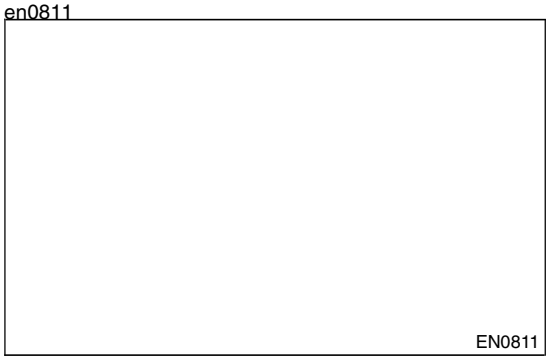
15) Remove fuel injector.

en0810



16) Remove harness bracket which hold engine harness onto intake manifold.

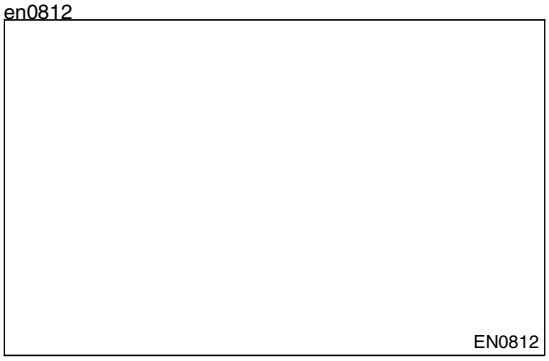
en0811



17) Remove engine harness from intake manifold.

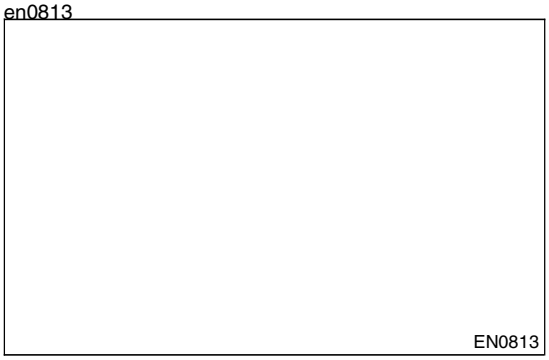
18) Loosen clamp which holds front left side fuel hose to injector pipe and remove the pipe from clamp.

en0812



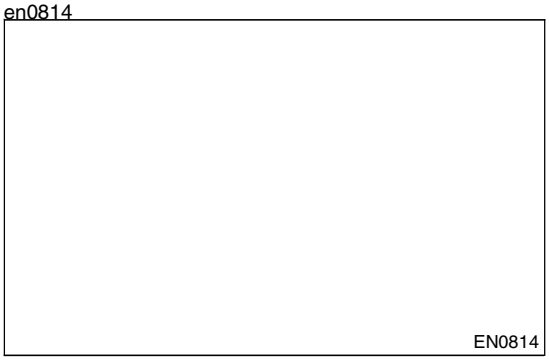
19) Remove fuel injector pipe LH.
20) Remove bolts which installs fuel pipe on intake manifold.

en0813



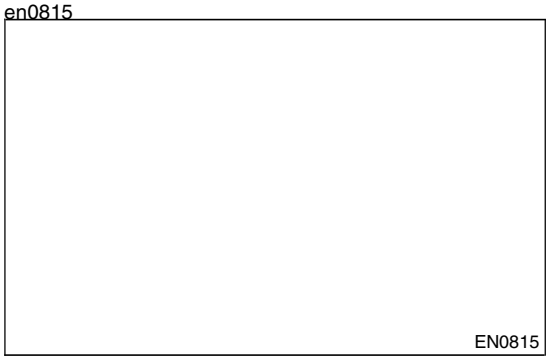
21) Remove fuel pipe assembly and pressure regulator, from intake manifold.
22) Remove intake duct from intake manifold.

en0814



23) Remove tumble generator valve assembly from intake manifold.

en0815



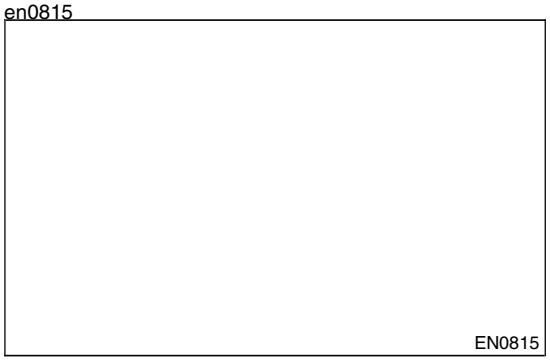
D: ASSEMBLY S185034A02

NOTE:
Replace gasket with a new one.

1) Install tumble generator valve assembly to intake manifold.

Tightening torque:
8.25 N·m (0.84 kgf-m, 6.08 ft-lb)

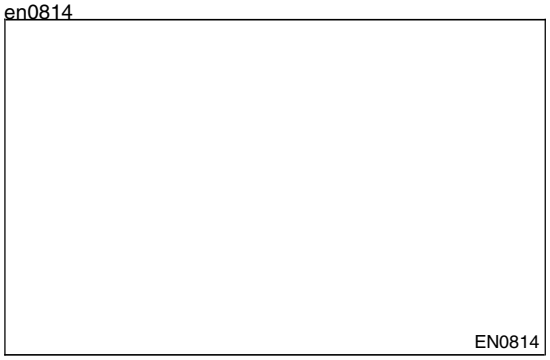
en0815



2) Install air intake duct to intake manifold.

Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

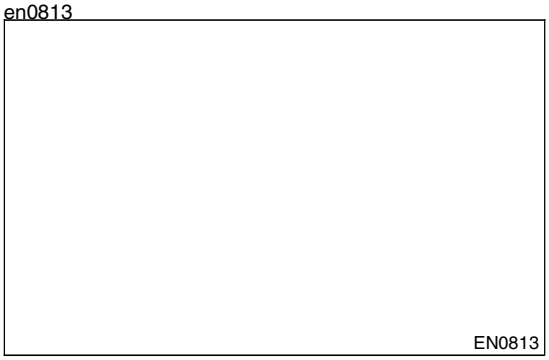
en0814



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

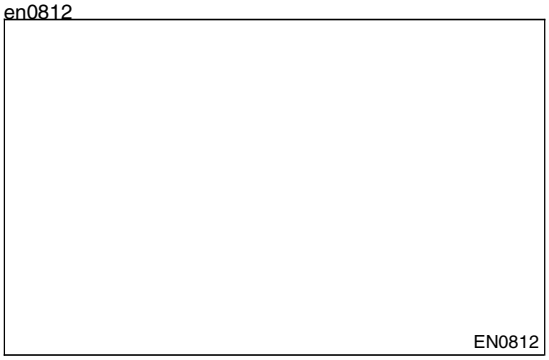
Tightening torque:
5 N·m (0.51 kgf-m, 3.69 ft-lb)

en0813



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

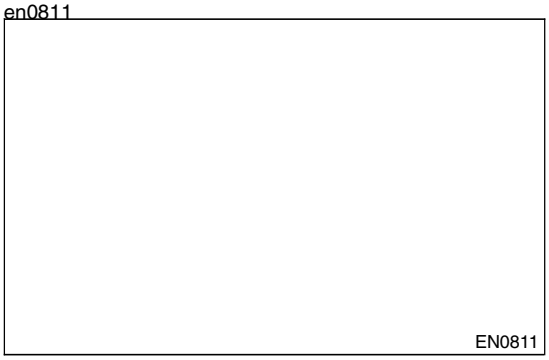
en0812



6) Install engine harness to intake manifold.
7) Install harness bracket which hold engine harness onto intake manifold.

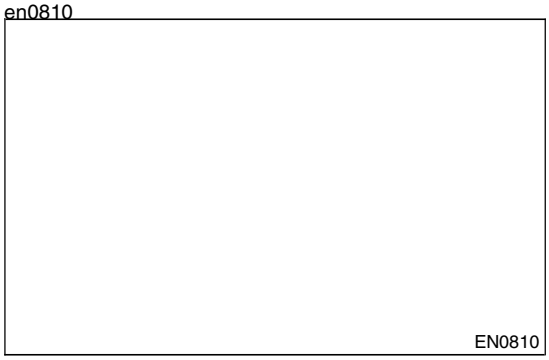
Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0811



8) Install fuel injector.

en0810

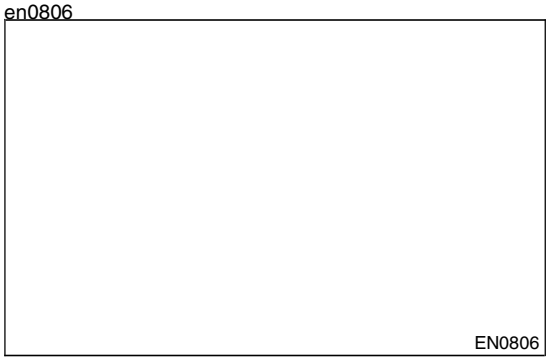


9) Tighten bolt which install fuel injector pipe onto intake manifold.

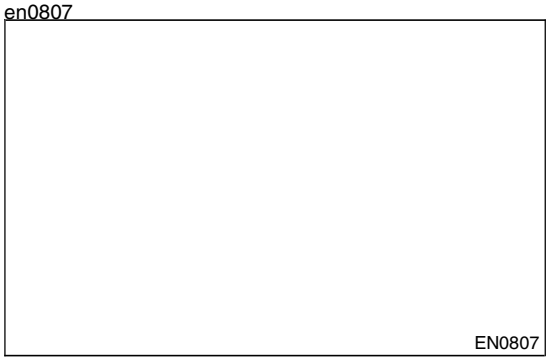
Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

- LH SIDE

en0806

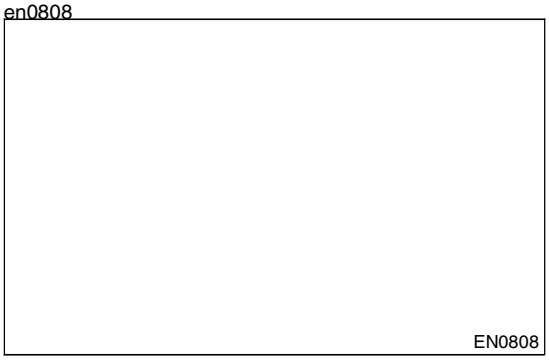


en0807

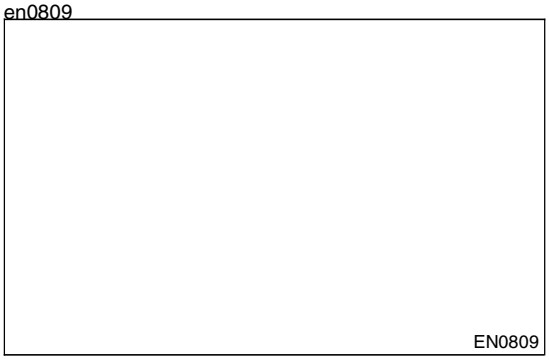


- RH SIDE

en0808



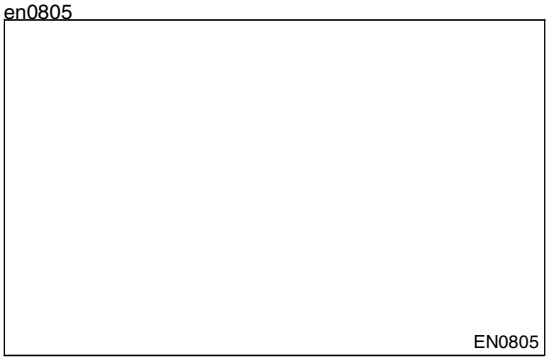
en0809



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

Tightening torque:
5 N·m (0.51 kgf-m, 3.69 ft-lb)

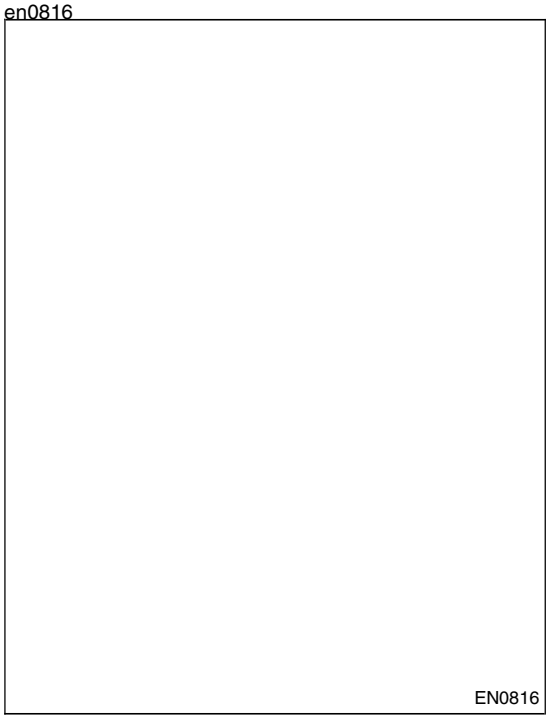
en0805



11) Connect evaporation hoses to purge valve.

CAUTION:
Carefully connect the evaporation hoses.

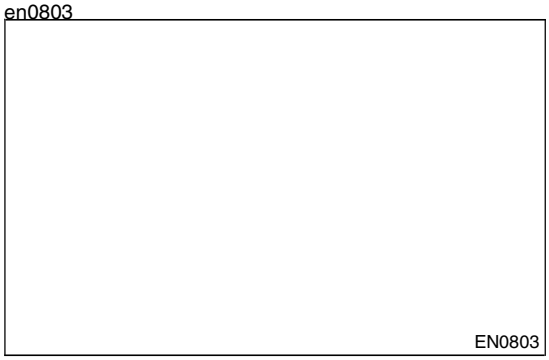
en0816



(A) To fuel pipe ASSY
(B) To intake duct
(C) To purge control solenoid valve
(D) To intake manifold

12) Connect evaporation hose to intake manifold.

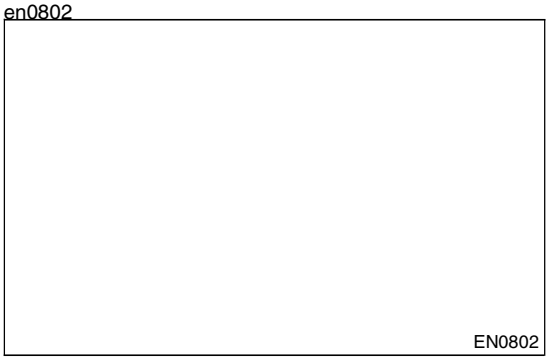
en0803



13) Install purge control solenoid valve.

Tightening torque:
16 N·m (0.16 kgf-m, 1.2 ft-lb)

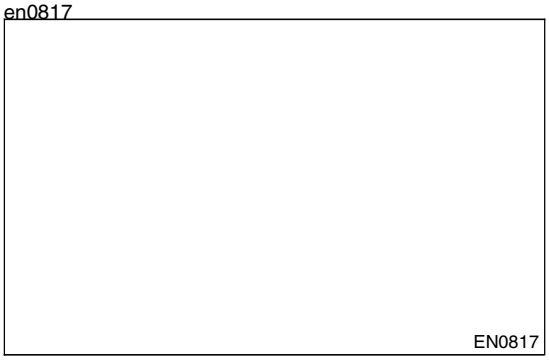
en0802



14) Connect hoses to purge control solenoid valve.

CAUTION:
Carefully connect the evaporation hoses.

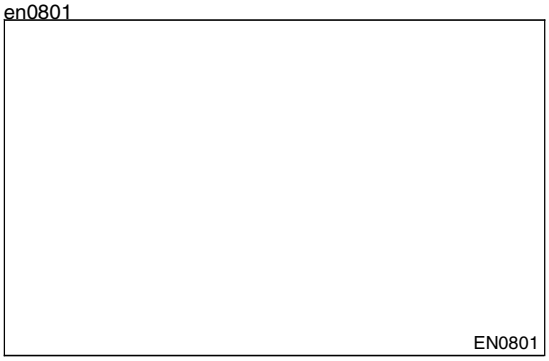
en0817



(A) To intake manifold
(B) To purge valve

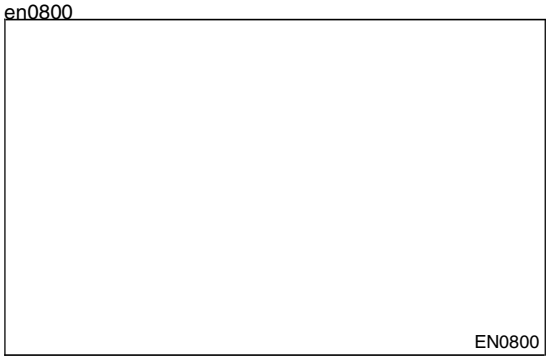
15) Connect connector to purge control solenoid valve.

en0801



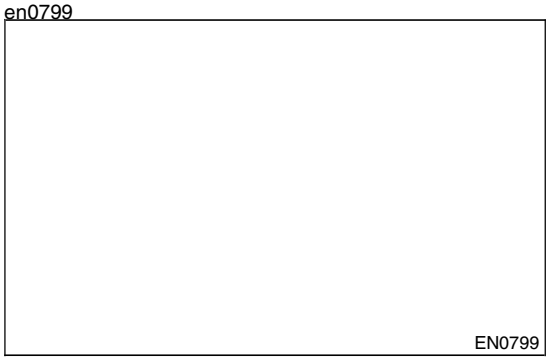
16) Connect connector to tumble generator valve sensor.

en0800



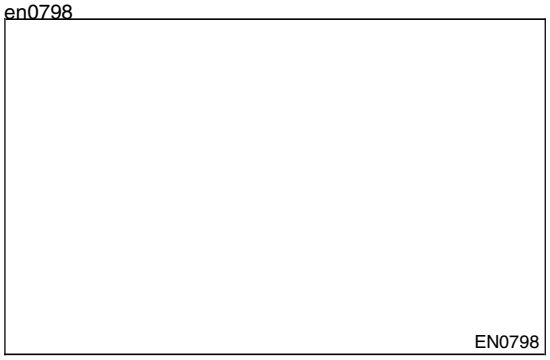
17) Connect connector to tumble generator valve actuator.

en0799



18) Connect connector to fuel injector.

en0798

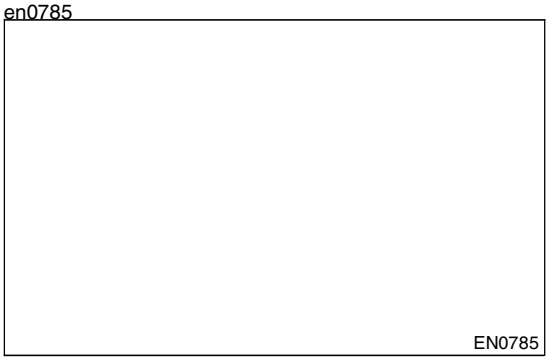


19) Install throttle body to intake manifold.

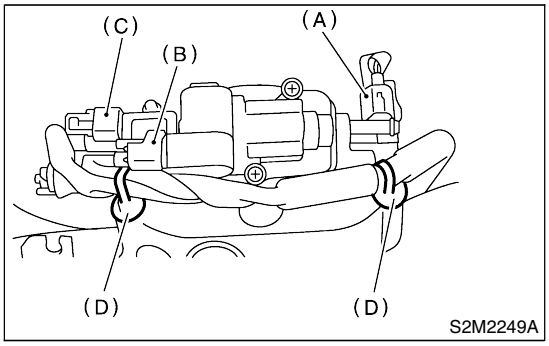
NOTE:
Replace gasket with a new one.

Tightening torque:
22 N·m (2.2 kgf-m, 16 ft-lb)

en0785



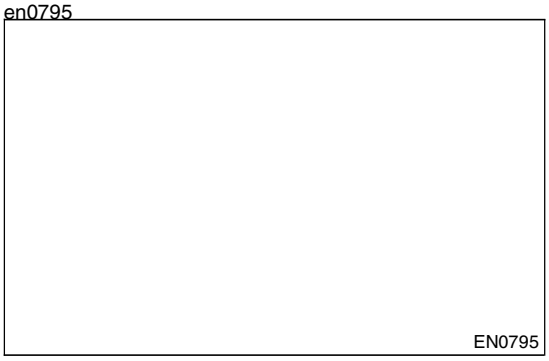
20) Connect connector to throttle position sensor (A), idle air control solenoid valve (B) and pressure sensor (C).
21) Secure engine harness to the intake manifold with clip (D).



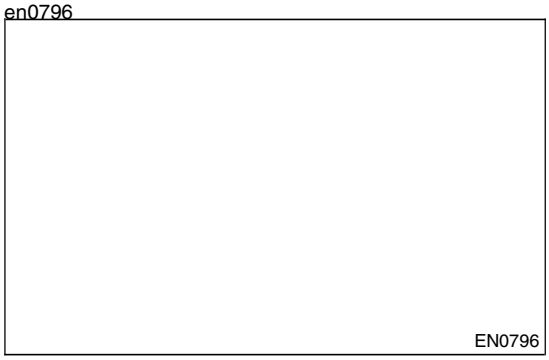
22) Install engine ground terminal to intake manifold.

Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0795



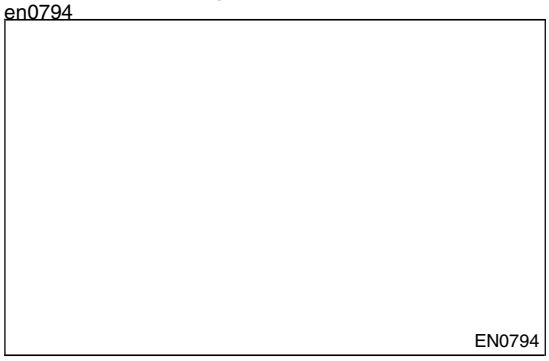
en0796



23) Install fuel pipe protector.

Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0794



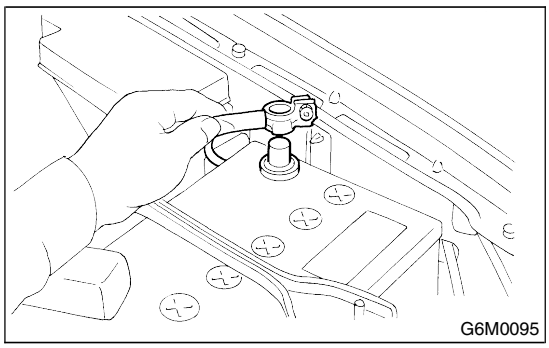
E: INSPECTION *S185034A10*

Make sure the fuel pipe and fuel hoses are not cracked and that connections are tight.

4. Engine Coolant Temperature Sensor S185047

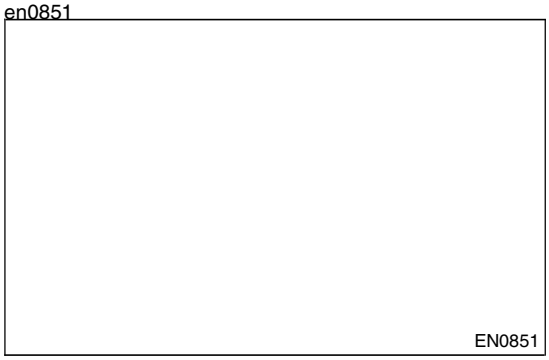
A: REMOVAL S185047A18

1) Disconnect battery ground cable.



2) Remove the generator <Ref. to SC-12, REMOVAL, Generator.>
3) Disconnect connector from engine coolant temperature sensor.

en0851



4) Remove engine coolant temperature sensor.

B: INSTALLATION S185047A11

Install in the reverse order of removal.

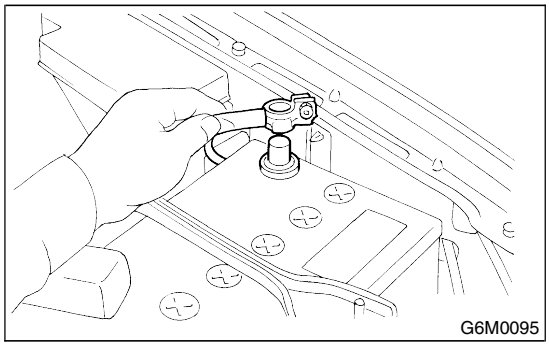
Tightening torque:
18 N·m (1.8 kgf-m, 13 ft-lb)

5. Crankshaft Position Sensor

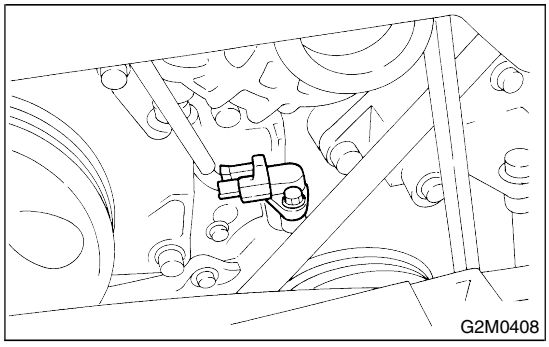
S185043

A: REMOVAL S185043A18

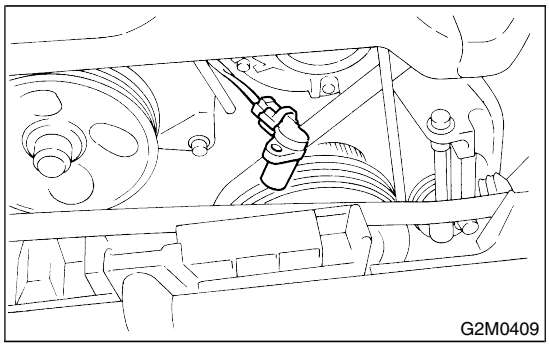
1) Disconnect battery ground cable.


G6M0095

2) Remove bolt which install crankshaft position sensor to cylinder block.


G2M0408

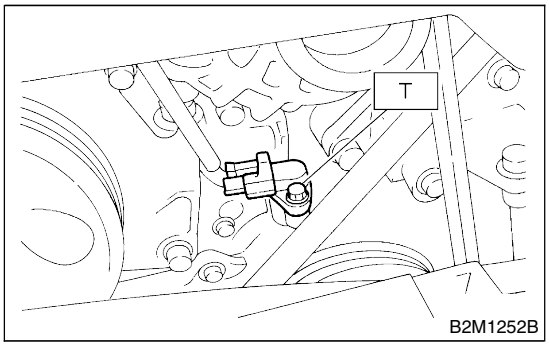
3) Remove crankshaft position sensor, and disconnect connector from it.


G2M0409

B: INSTALLATION S185043A11

Install in the reverse order of removal.

Tightening torque:
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



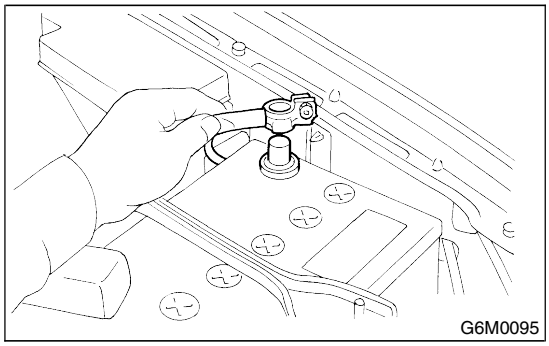
B2M1252B

6. Camshaft Position Sensor

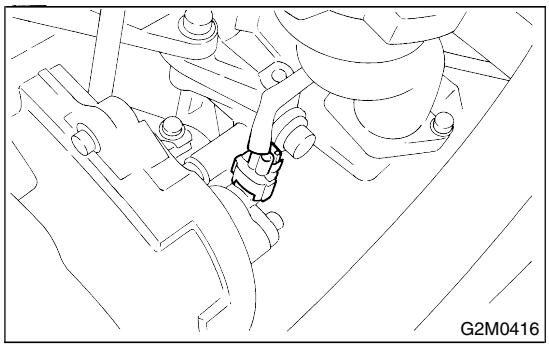
S185041

A: REMOVAL S185041A18

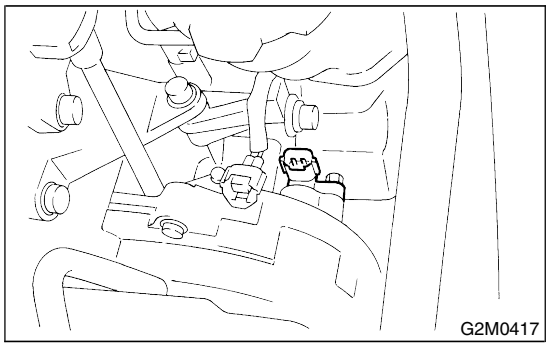
1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector from camshaft position sensor.


G2M0416

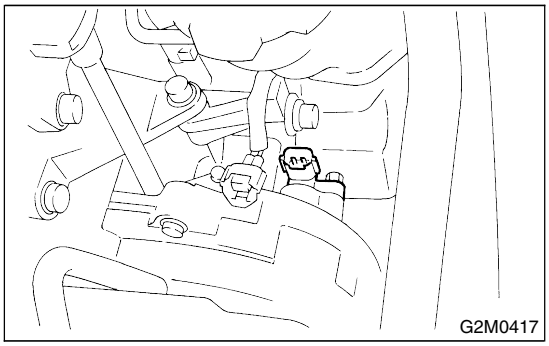
3) Remove camshaft position sensor from camshaft support LH.


G2M0417

B: INSTALLATION S185041A11

Install in the reverse order of removal.

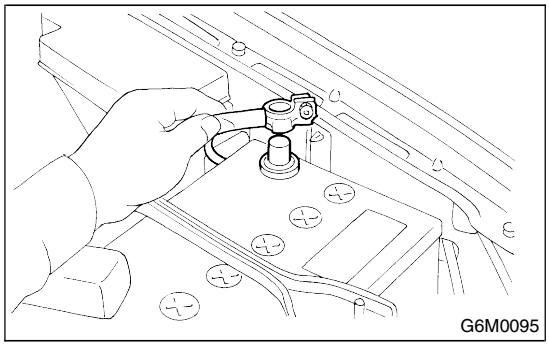
Tightening torque:
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)


G2M0417

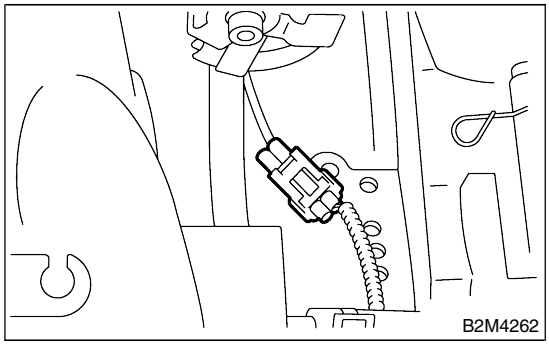
7. Knock Sensor S185042

A: REMOVAL S185042A18

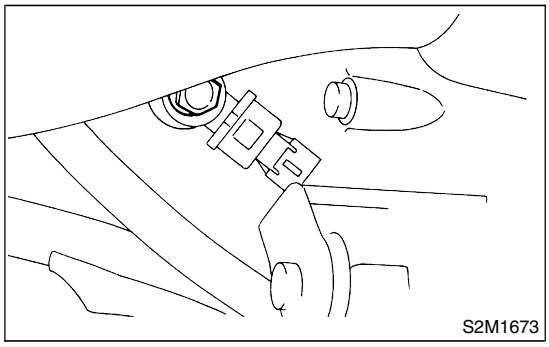
1) Disconnect battery ground cable from battery ground terminal.



2) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect knock sensor connector.



4) Remove knock sensor from cylinder block.

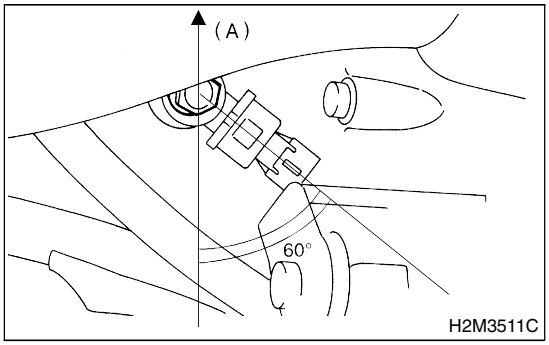


B: INSTALLATION S185042A11

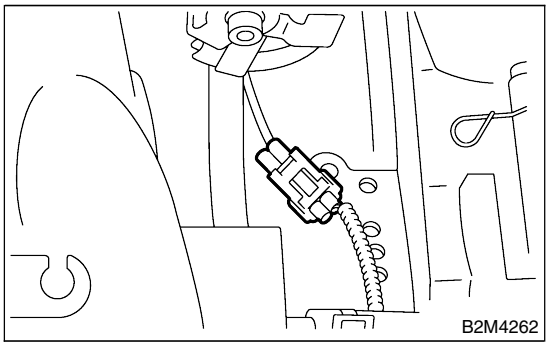
1) Install knock sensor to cylinder block.

Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)

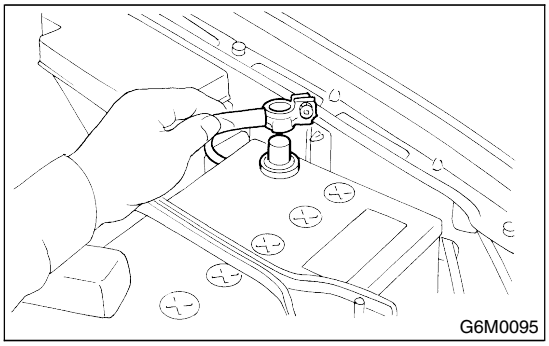
NOTE:
The extraction area of the knock sensor cord must be positioned at a 60° angle relative to the engine rear.



2) Connect knock sensor connector.



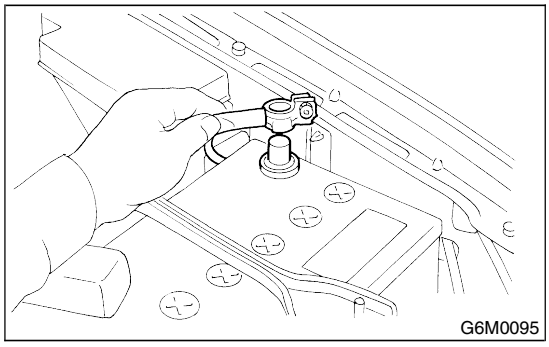
3) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
4) Connect battery ground cable.



8. Throttle Position Sensor S185039

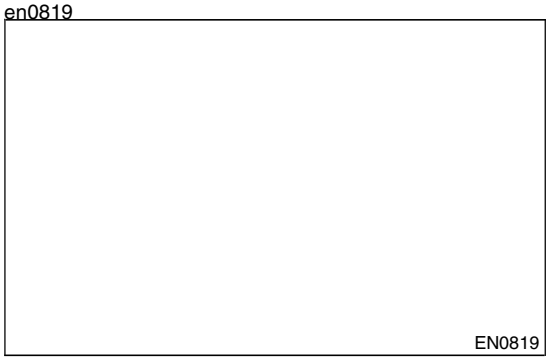
A: REMOVAL S185039A18

1) Disconnect battery ground cable.


G6M0095

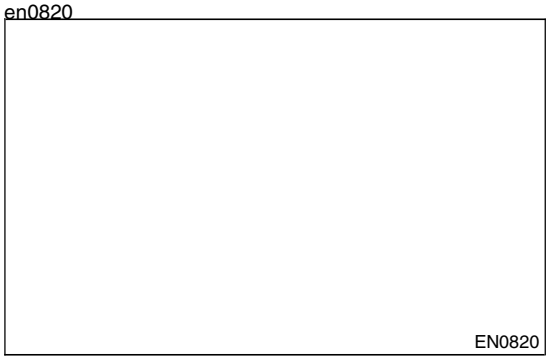
2) Remove inter cooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
3) Disconnect connector from throttle position sensor.

en0819


EN0819

4) Remove throttle position sensor holding screws, and remove it.

en0820

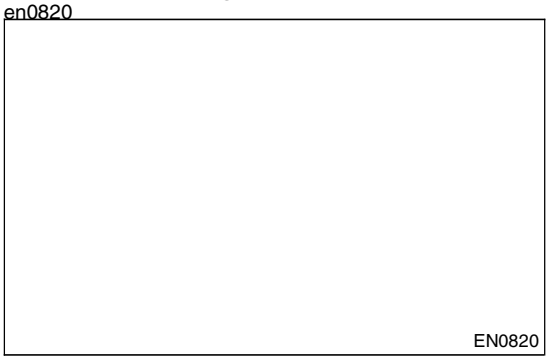

EN0820

B: INSTALLATION S185039A11

Install in the reverse order of removal.

Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

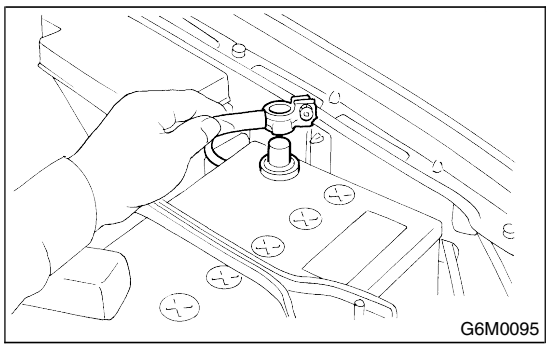
en0820


EN0820

9. Mass Air Flow and Intake Air Temperature Sensor S185770

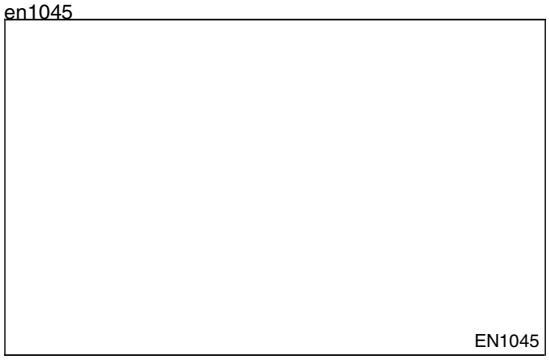
A: REMOVAL S185770A18

1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector mass air flow and intake air temperature sensor.
3) Remove mass air flow and intake air temperature sensor.

en1045


EN1045

B: INSTALLATION S185770A11

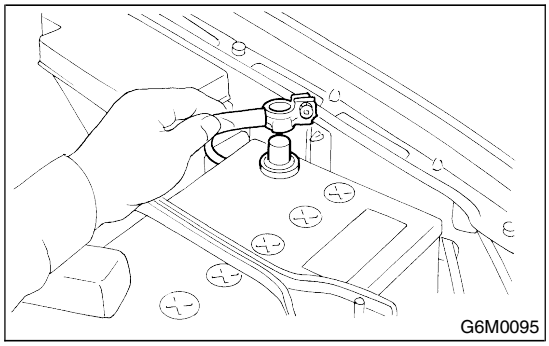
Install in the reverse order of removal.

Tightening torque:
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

10. Pressure Sensor S185765

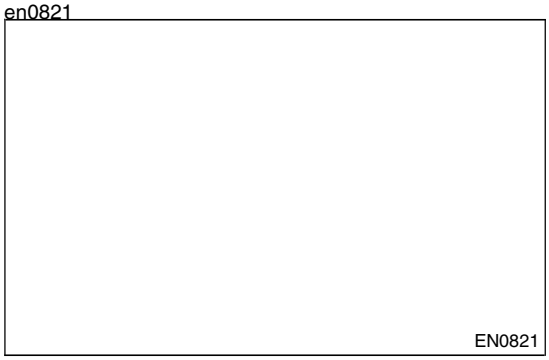
A: REMOVAL S185765A18

1) Disconnect battery ground cable.



2) Remove idle air control solenoid valve. <Ref. to FU(SOHC)-38, REMOVAL, Idle Air Control Solenoid Valve.>
3) Disconnect connectors from pressure sensor.

en0821



4) Remove pressure sensor from throttle body.

B: INSTALLATION S185765A11

Install in the reverse order of removal.

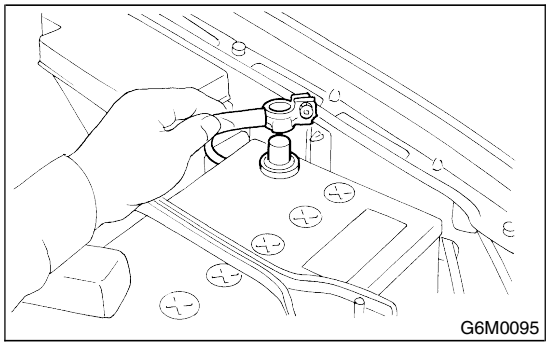
NOTE:
Replace gaskets for idle air control solenoid valve with new ones.

Tightening torque:
Pressure sensor
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)
Idler air control solenoid valve
2.8 N·m (0.29 kgf-m, 2.1 ft-lb)

11. Idle Air Control Solenoid Valve S185056

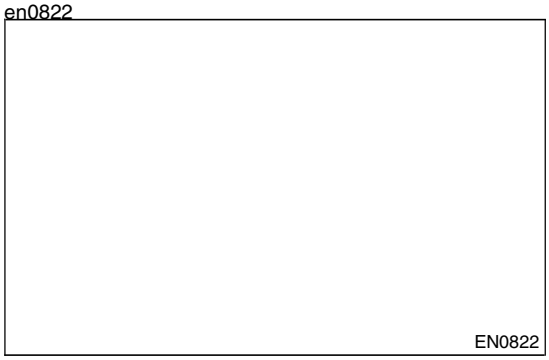
A: REMOVAL S185056A18

1) Disconnect battery ground cable.


G6M0095

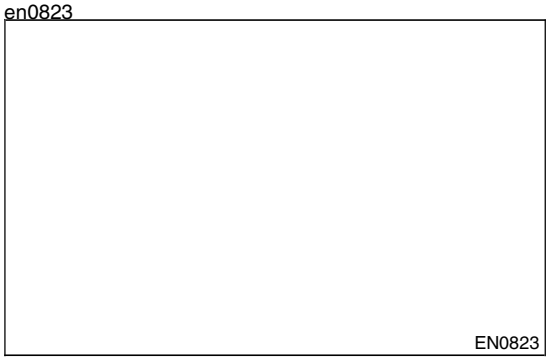
2) Disconnect connector from idle air control solenoid valve.

en0822


EN0822

3) Remove idle air control solenoid valve from throttle body.

en0823


EN0823

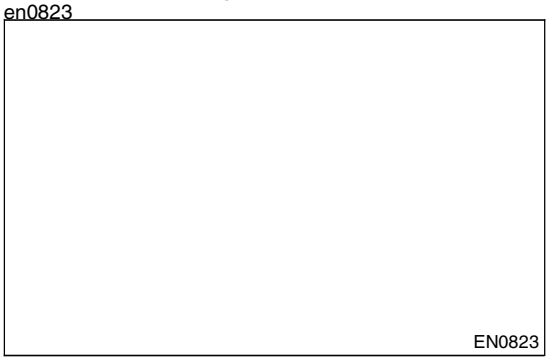
B: INSTALLATION S185056A11

Install in the reverse order of removal.

NOTE:
Always use new gasket.

Tightening torque:
2.8 N·m (0.29 kgf-m, 2.1 ft-lb)

en0823


EN0823

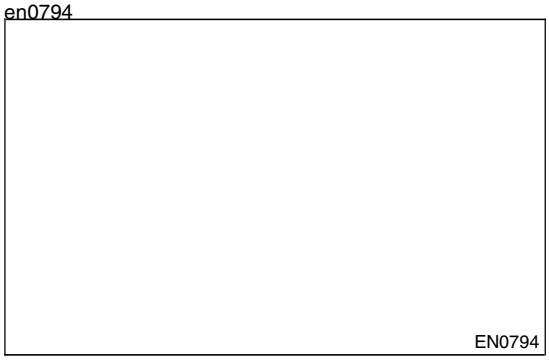
12. Fuel Injector S185051

A: REMOVAL S185051A18

1. RH SIDE S185051A1801

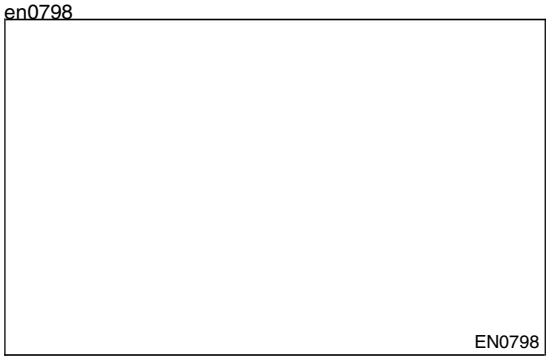
1) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
2) Remove fuel pipe protector.

en0794



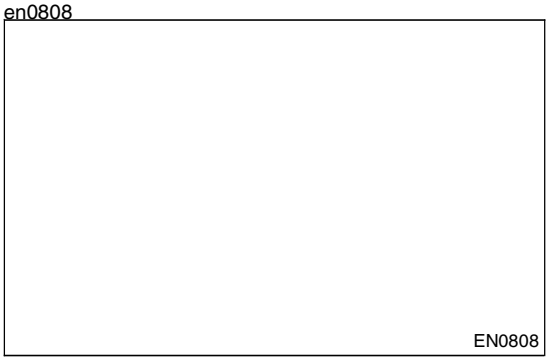
3) Disconnect connector from fuel injector.

en0798

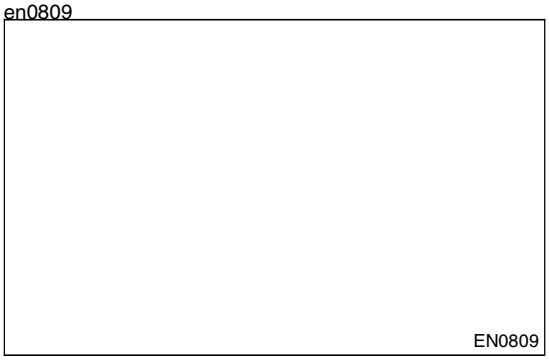


4) Remove bolts which hold injector pipe to intake manifold.

en0808

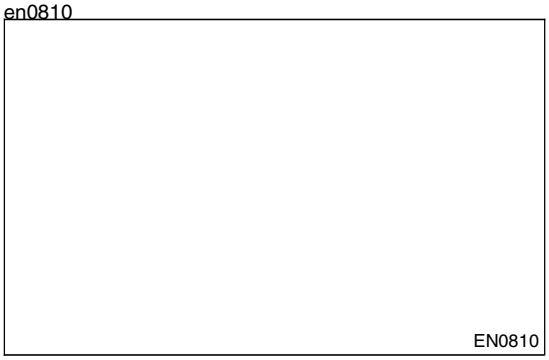


en0809



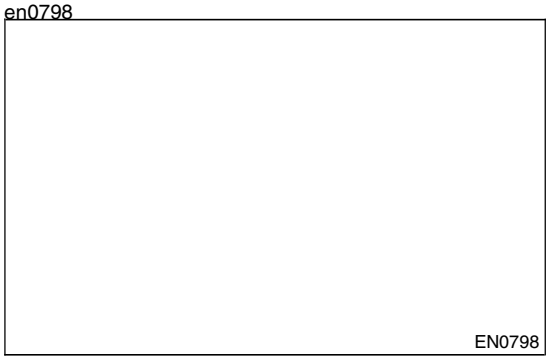
5) Remove fuel injector while lifting up fuel injector pipe.

en0810

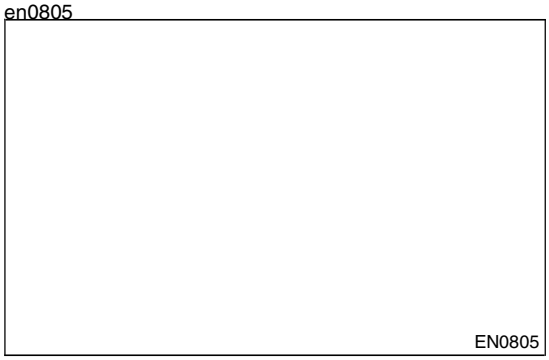


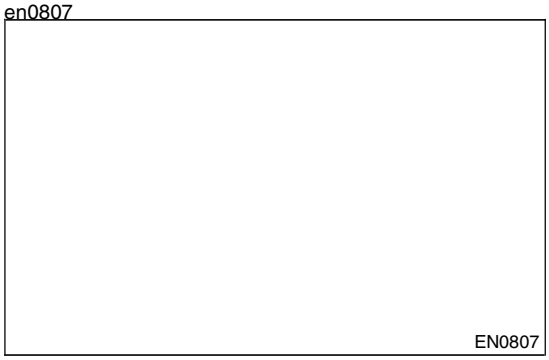
2. LH SIDE S185051A1802

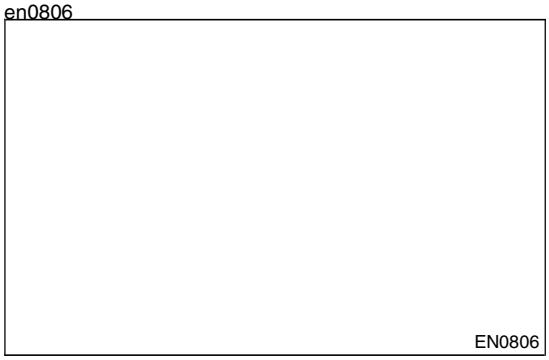
1) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
2) Disconnect connector from fuel injector.

en0798

EN0798

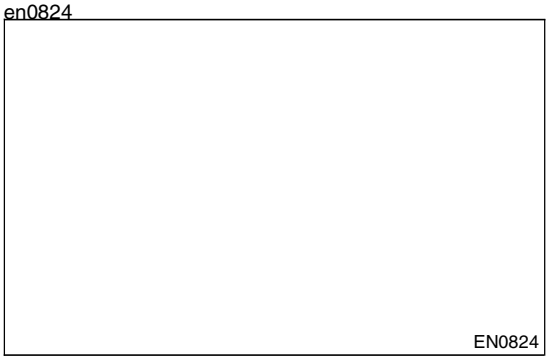
3) Remove bolts which hold injector pipe to intake manifold.

en0805

EN0805

en0807

EN0807

en0806

EN0806

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

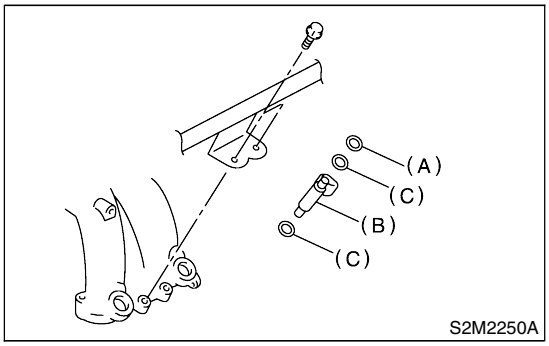
en0824

EN0824

B: INSTALLATION S185051A11

1. RH SIDE S185051A1101

Install in the reverse order of removal.

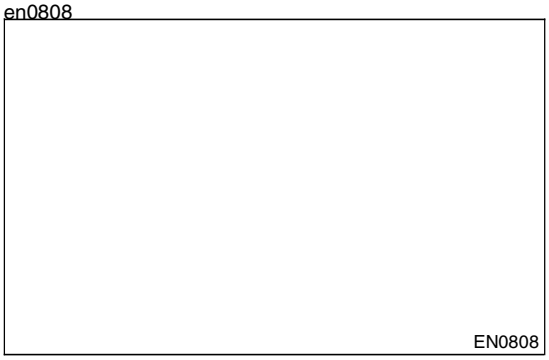
NOTE:
Replace O-ring and insulators with new ones.



S2M2250A

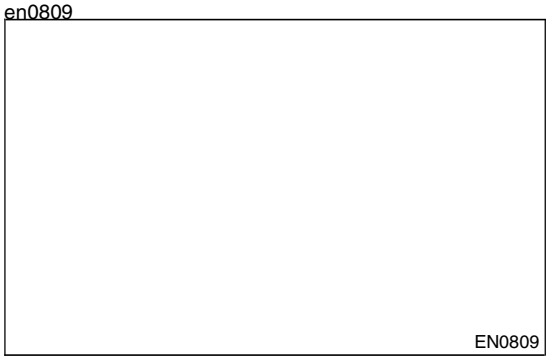
(A) O-ring
(B) Fuel injector
(C) Insulator

Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0808

EN0808

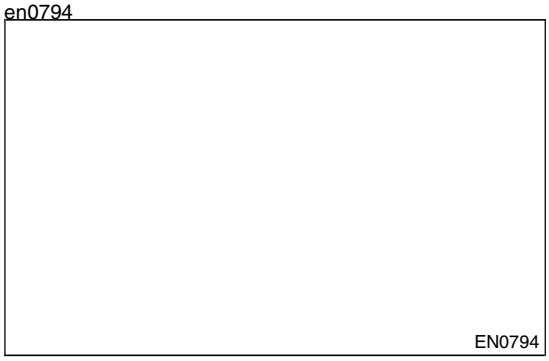
Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0809



Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

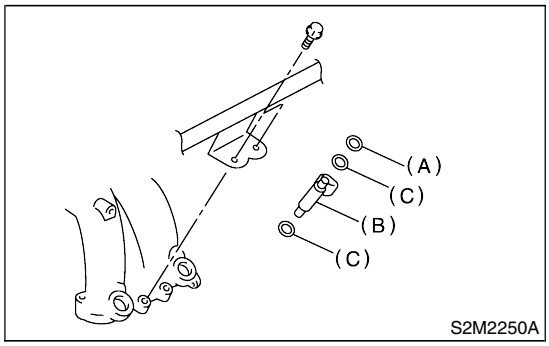
en0794



2. LH SIDE *S185051A1102*

Install in the reverse order of removal.

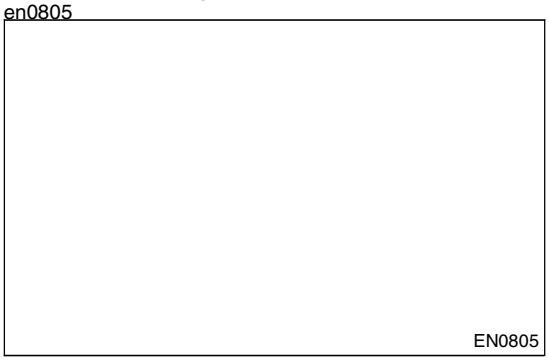
NOTE:
Replace O-ring and insulators with new ones.



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

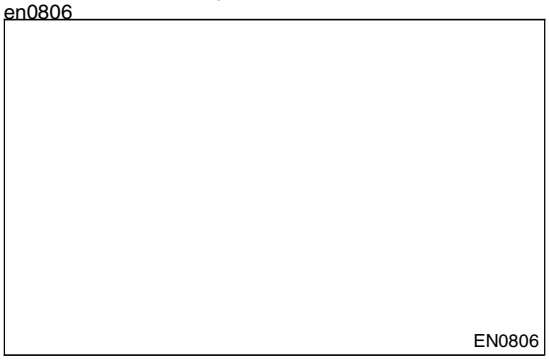
Tightening torque:
5 N·m (0.51 kgf-m, 3.69 ft-lb)

en0805



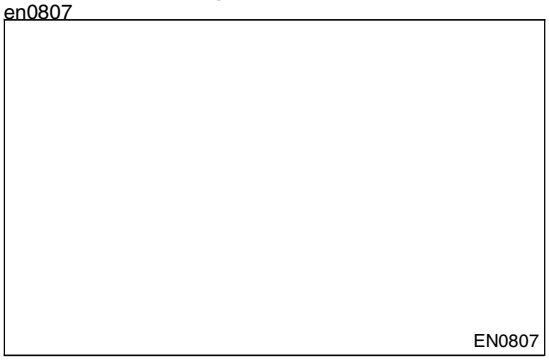
Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

en0806



Tightening torque:
19 N·m (1.94 kgf-m, 14.0 ft-lb)

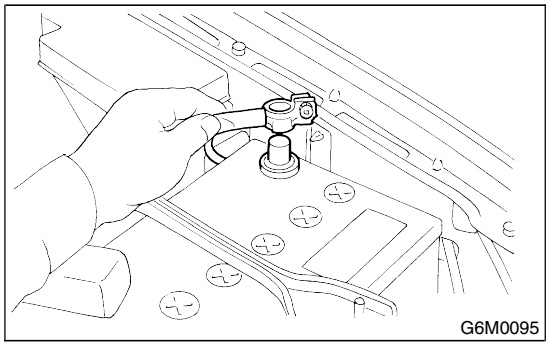
en0807



13. Tumble Generator Valve Assembly S185766

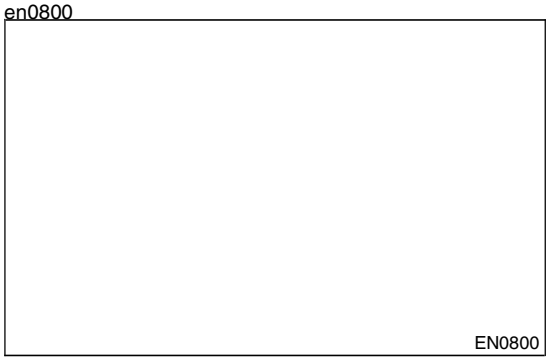
A: REMOVAL S185766A18

1) Disconnect battery ground cable.



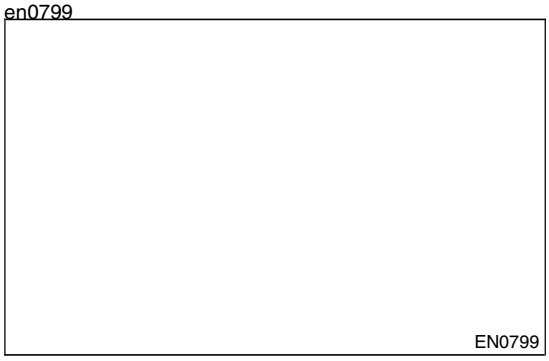
2) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
3) Disconnect connector from tumble generator valve sensor.

en0800



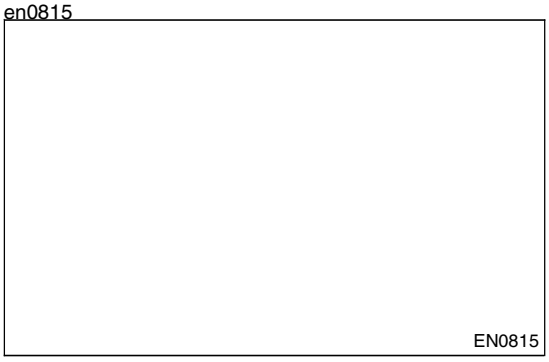
4) Disconnect connector from tumble generator valve actuator.

en0799



5) Remove fuel injector. <Ref. to FU(DOHC TURBO)-37, REMOVAL, Fuel Injector.>
6) Remove tumble generator valve body from intake manifold.

en0815



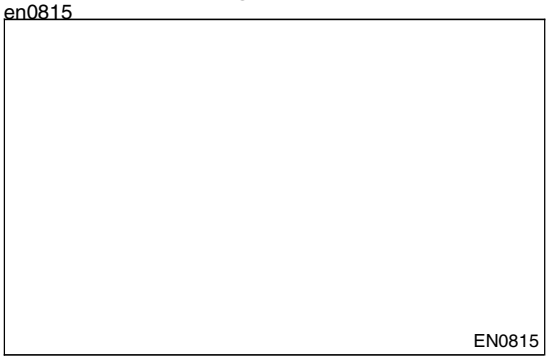
B: INSTALLATION S185766A11

Install in the reverse order of removal.

NOTE:
Always use new gaskets.

Tightening torque:
8.25 N·m (0.84 kgf-m, 6.1 ft-lb)

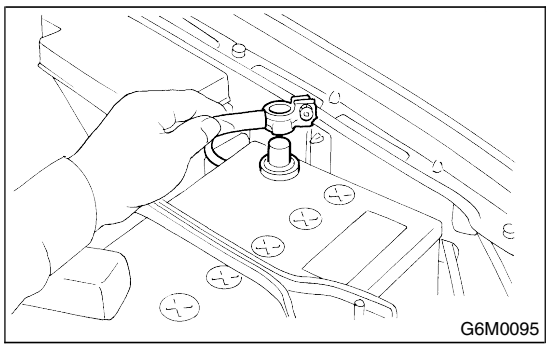
en0815



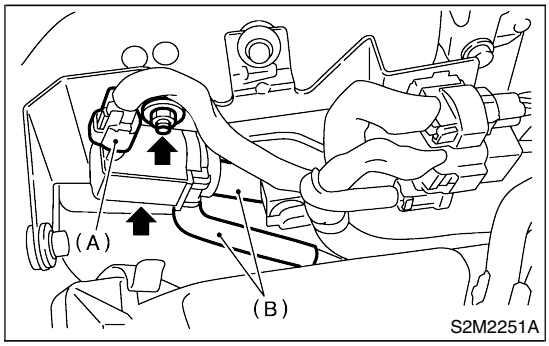
14. Wastegate Control Solenoid Valve S185057

A: REMOVAL S185057A18

1) Disconnect battery ground cable.



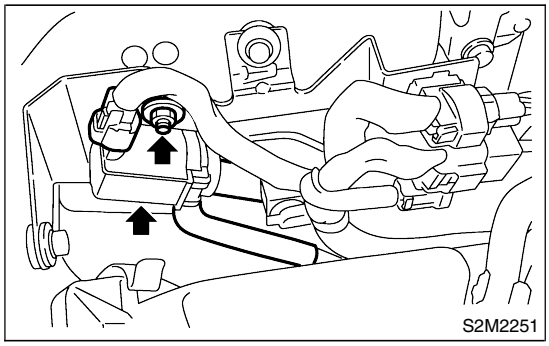
2) Disconnect connector (A) from wastegate control solenoid valve.
3) Disconnect pressure hoses (B) from wastegate control solenoid valve.
4) Remove wastegate control solenoid valve from bracket



B: INSTALLATION S185057A11

Install in the reverse order of removal.

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

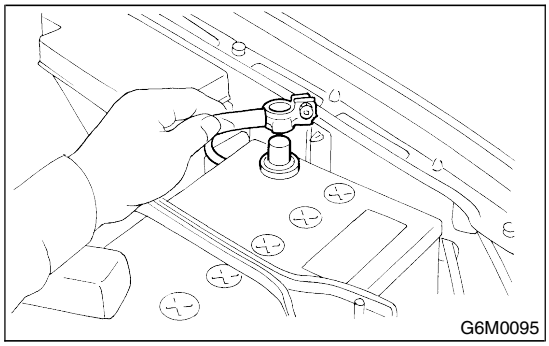


15. Front Oxygen (A/F) Sensor

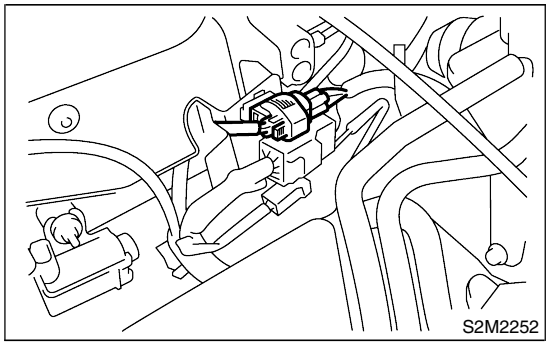
S185642

A: REMOVAL S185642A18

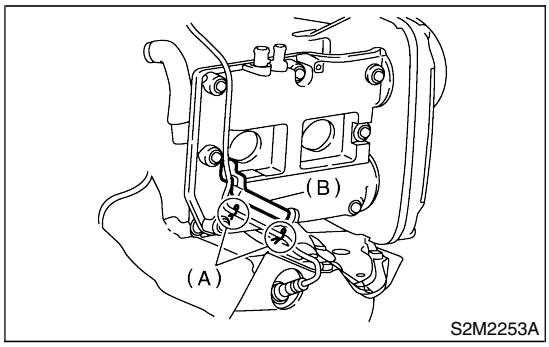
1) Disconnect battery ground cable.



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

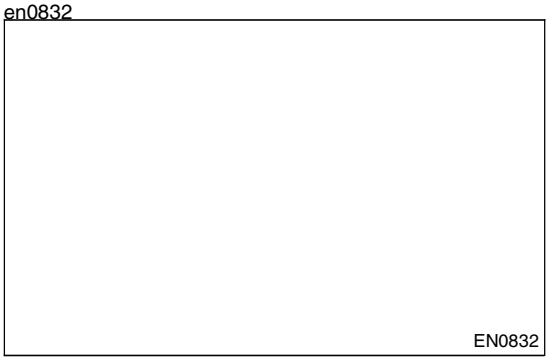


3) Remove harness secured by clip (A) from the bracket (B).



4) Remove front right side wheel.
5) Lift-up the vehicle.
6) Remove service hole cover.

en0832



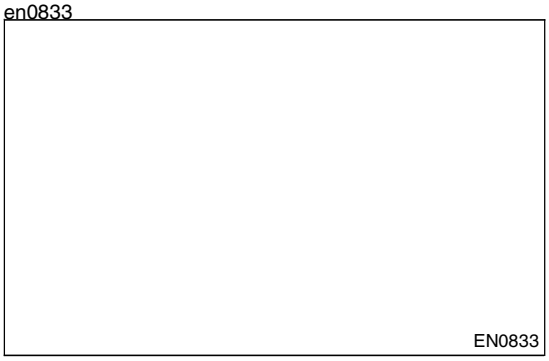
7) Apply SUBARU CRC or its equivalent to threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

8) Remove front oxygen (A/F) sensor.

CAUTION:
When removing the oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.

en0833



B: INSTALLATION S185642A11

1) Before installing front oxygen (A/F) sensor, apply anti-seize compound only to threaded portion of front oxygen (A/F) sensor to make the next removal easier.

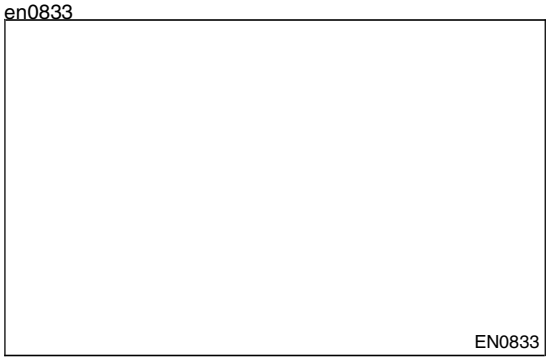
Anti-seize compound:
SS-30 by JET LUBE

CAUTION:
Never apply anti-seize compound to protector of front oxygen (A/F) sensor.

2) Install front oxygen (A/F) sensor.

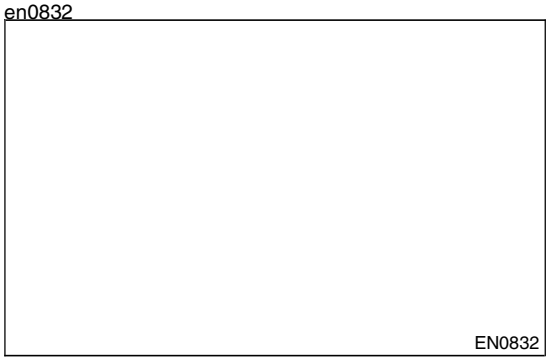
Tightening torque:
30N·m (3.1 kgf-m, 22 ft-lb)

en0833

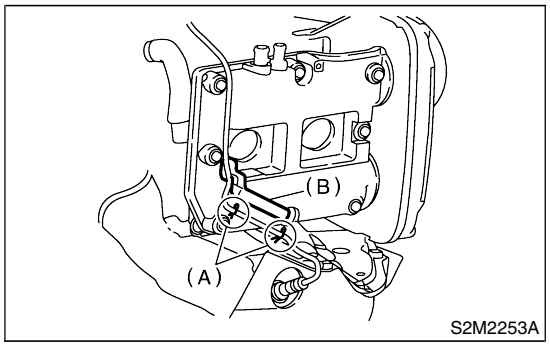


3) Install service hole cover.

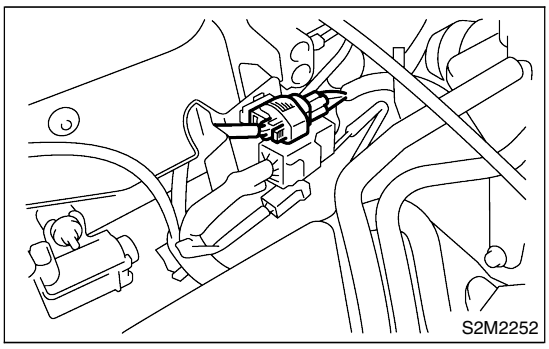
en0832



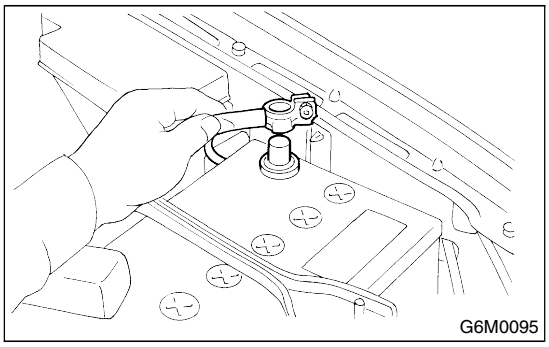
4) Lower the vehicle.
5) Install front right side wheel.
6) Secure a harness to bracket (B) by clip (A).



7) Connect connector of front oxygen (A/F) sensor.



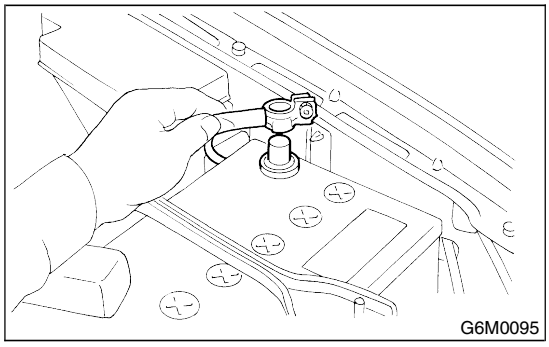
8) Connect battery ground cable.



16. Rear Oxygen Sensor S185657

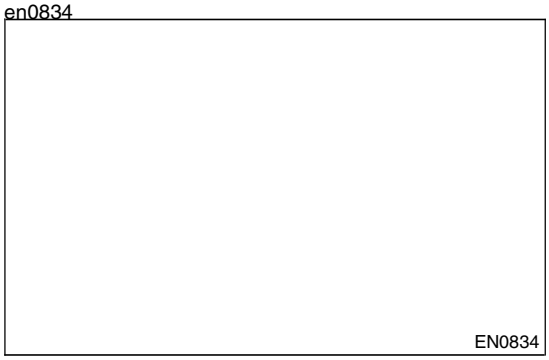
A: REMOVAL S185657A18

1) Disconnect battery ground cable.

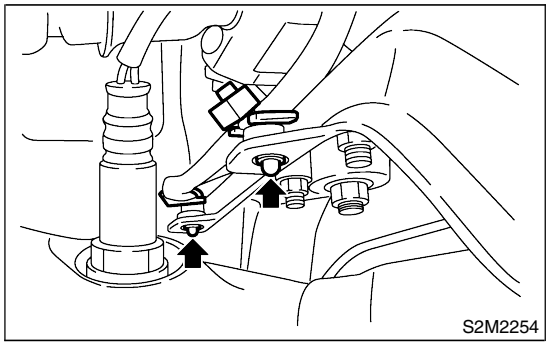

G6M0095

2) Lift-up the vehicle.
3) Disconnect connector from rear oxygen sensor.

en0834


EN0834

4) Vertically draw out clip (A) from crossmember (B).


S2M2254

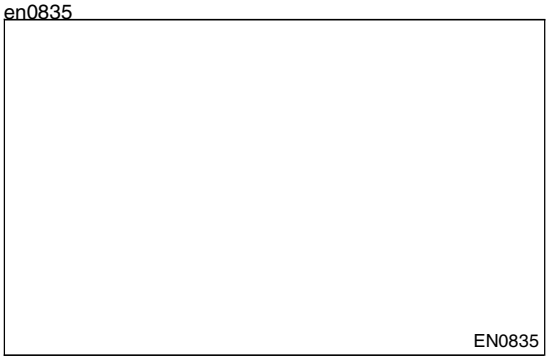
5) Apply SUBARU CRC or its equivalent to threaded portion of rear oxygen sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

6) Remove rear oxygen sensor.

CAUTION:
When removing the oxygen sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.

en0835


EN0835

B: INSTALLATION S185657A11

1) Before installing rear oxygen sensor, apply anti-seize compound only to threaded portion of rear oxygen sensor to make the next removal easier.

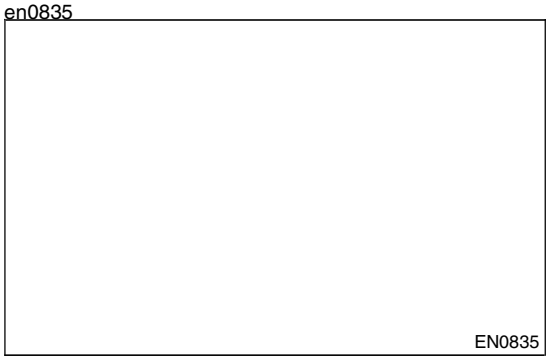
CAUTION:
Never apply anti-seize compound to protector of rear oxygen sensor.

Anti-seize compound:
SS-30 by JET LUBE

2) Install rear oxygen sensor.

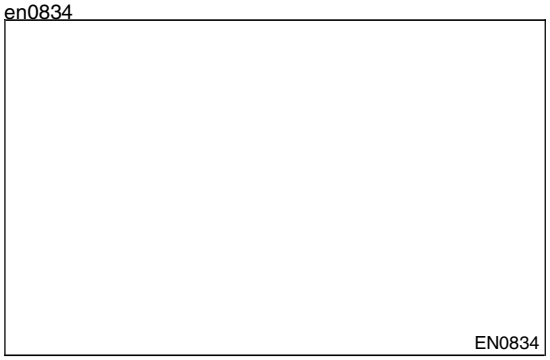
Tightening torque:
21 N·m (2.1 kgf-m, 15.2 ft-lb)

en0835

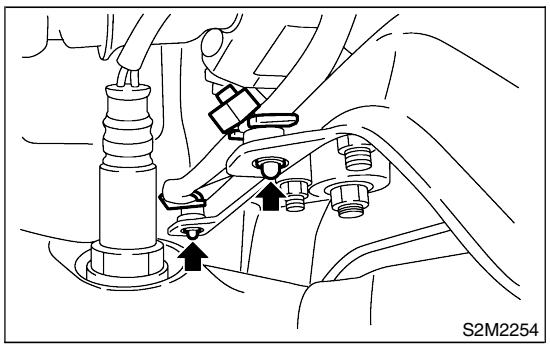


3) Connect connector to rear oxygen sensor.

en0834

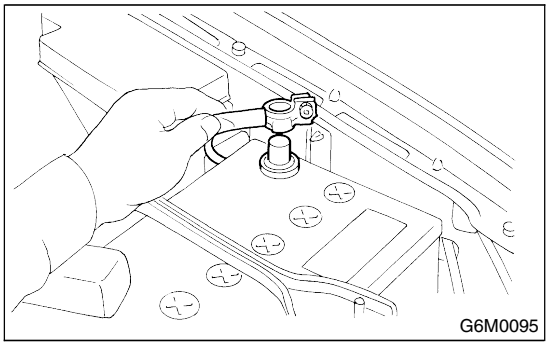


4) Secure clip (A) on the crossmember.



5) Lower the vehicle.

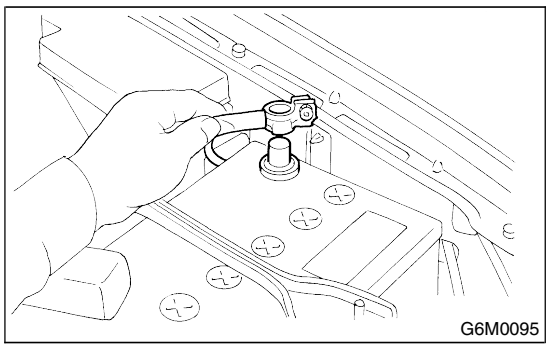
6) Connect battery ground cable.



17. Exhaust Temperature Sensor S185763

A: REMOVAL S185763A18

1) Disconnect battery ground cable.



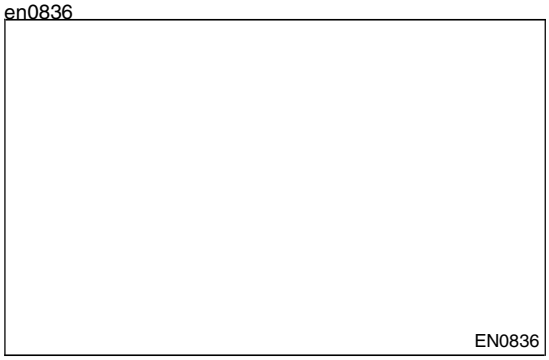
2) Remove joint pipe. <Ref. to EX(DOHC TURBO)-13, REMOVAL, Joint Pipe.>
3) Apply SUBARU CRC or its equivalent to threaded portion of exhaust temperature sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

4) Remove exhaust temperature sensor.

CAUTION:
When removing the oxygen sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.

en0836



B: INSTALLATION S185763A11

1) Before installing exhaust temperature sensor, apply anti-seize compound only to threaded portion of rear oxygen sensor to make the next removal easier.

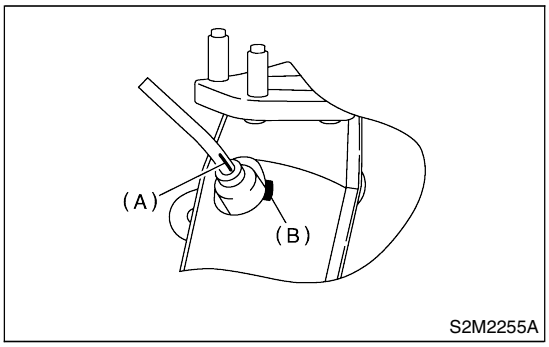
CAUTION:
Never apply anti-seize compound to protector of exhaust temperature sensor.

Anti-seize compound:
SS-30 by JET LUBE

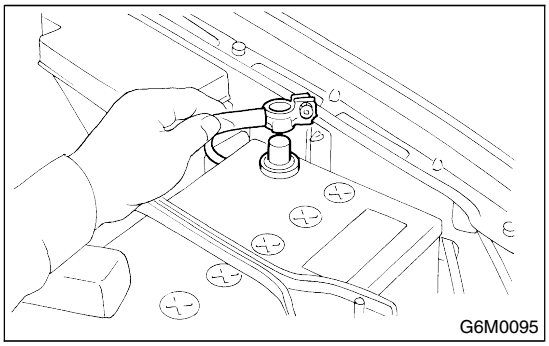
2) Install exhaust temperature sensor.

NOTE:
Align mark (A) on the exhaust temperature sensor side with the joint pipe side mark (B) and tighten.

Tightening torque:
21 N·m (2.1 kgf-m, 15.2 ft-lb)



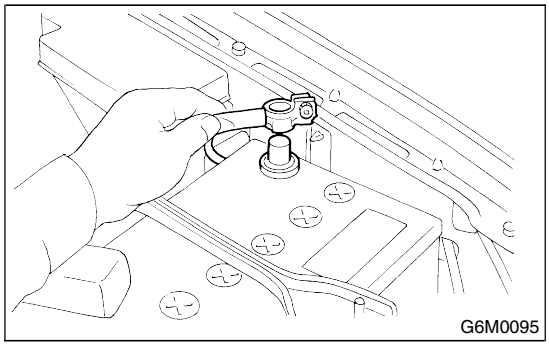
3) Install joint pipe <Ref. to EX(DOHC TURBO)-13, INSTALLATION, Joint Pipe.>.
4) Connect battery ground cable.



18. Engine Control Module S185049

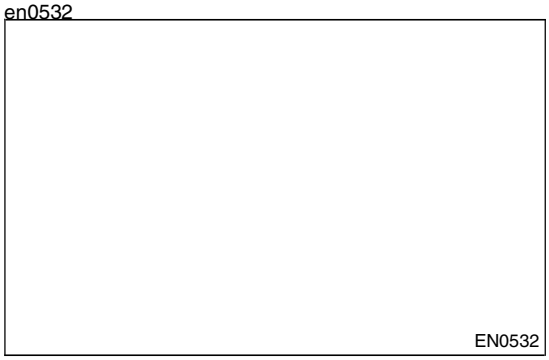
A: REMOVAL S185049A18

1) Disconnect battery ground cable.


G6M0095

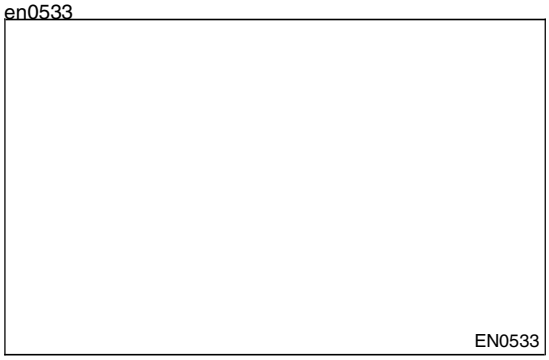
2) Remove lower inner trim of passenger side. <Ref. to EI-38, REMOVAL, Lower Inner Trim.>
3) Detach floor mat of front passenger seat.
4) Remove protect cover.

en0532


EN0532

5) Remove nuts (A) which hold ECM to bracket.
6) Remove clip (B) from bracket.

en0533


EN0533

7) Disconnect ECM connectors and take out ECM.

B: INSTALLATION S185049A11

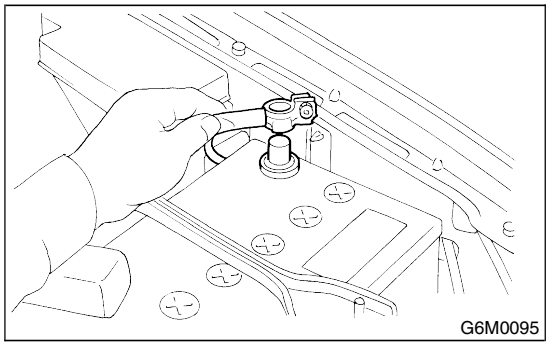
Install in the reverse order of removal.

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

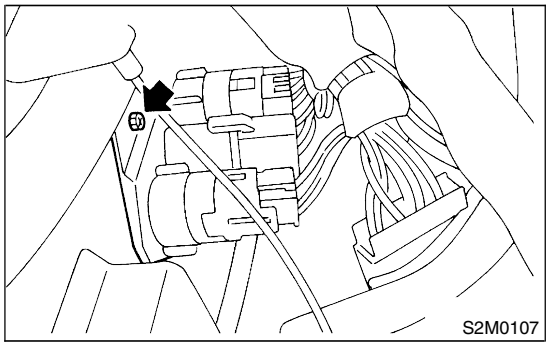
19. Main Relay S185050

A: REMOVAL S185050A18

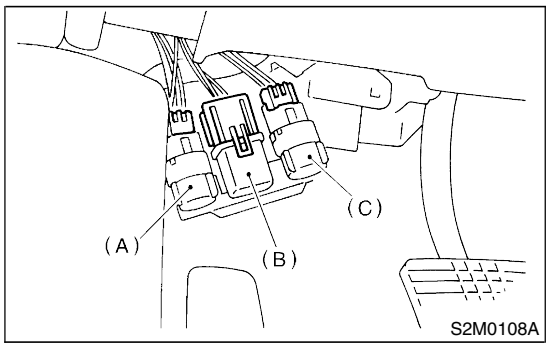
1) Disconnect battery ground cable.



2) Remove bolt which holds bracket of main relay and fuel pump relay.

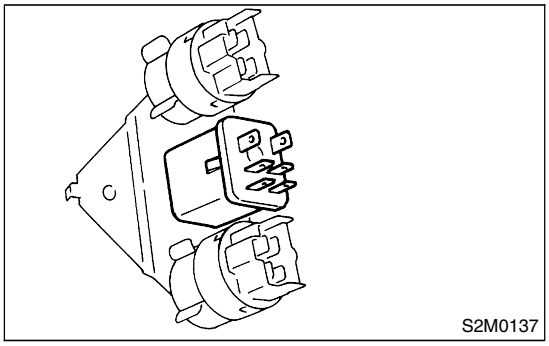


3) Disconnect connectors from relays.



(A) Blower fan motor relay
(B) Main relay
(C) Fuel pump relay

4) Remove main relay from mounting bracket.



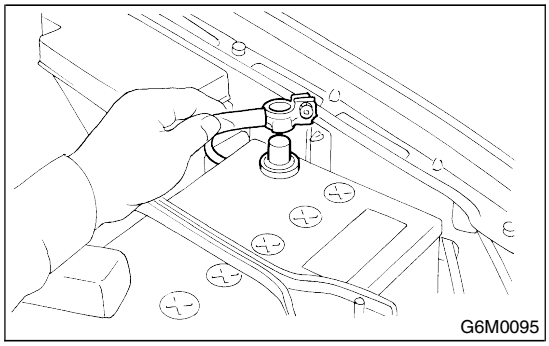
B: INSTALLATION S185050A11

Install in the reverse order of removal.

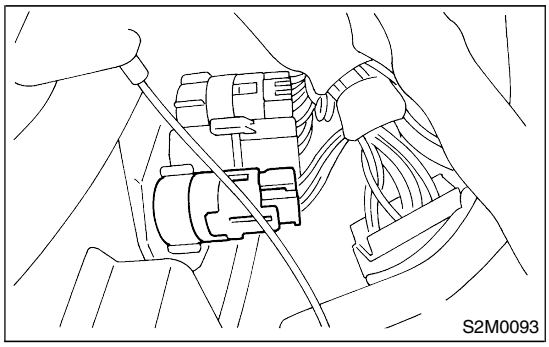
20. Fuel Pump Relay S185048

A: REMOVAL S185048A18

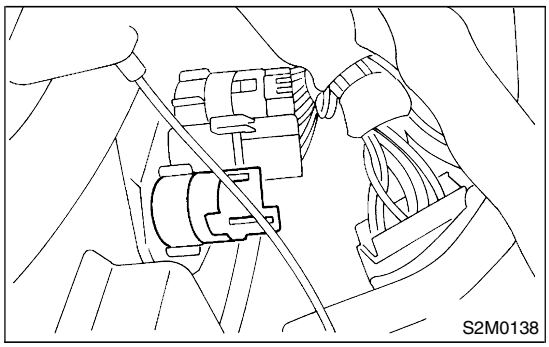
1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector from fuel pump relay.


S2M0093

3) Remove fuel pump relay from mounting bracket.


S2M0138

B: INSTALLATION S185048A11

Install in the reverse order of removal.

21. Fuel S185052

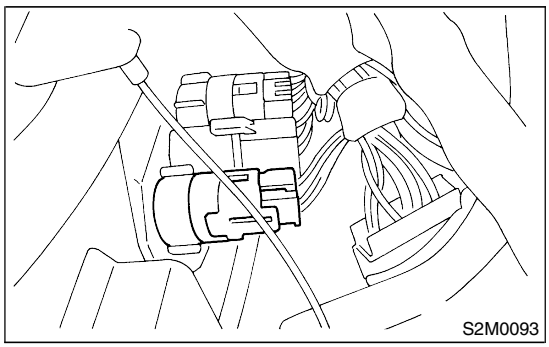
A: OPERATION S185052A16

1. RELEASING OF FUEL PRESSURE

S185052A1601

WARNING:
• Place "NO FIRE" signs near the working area.
• Disconnect ground terminal from battery.

1) Disconnect connector from fuel pump relay.

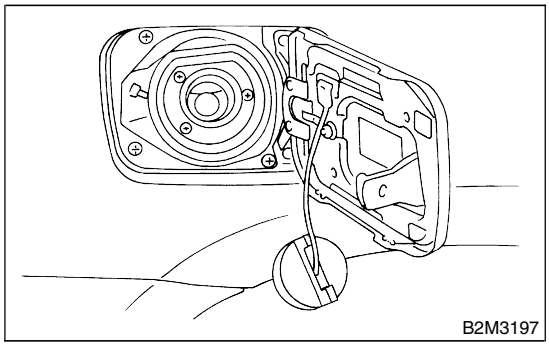

S2M0093

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.

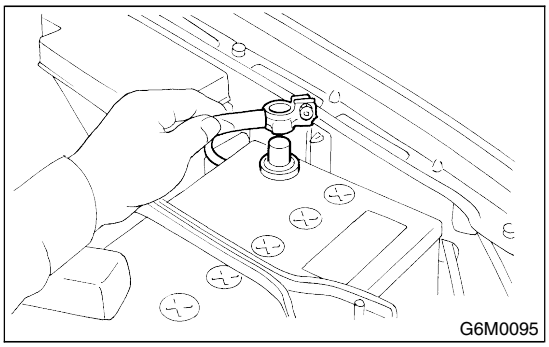
2. DRAINING OF FUEL S185052A1603

WARNING:
• Place "NO FIRE" signs near the working area.
• Be careful not to spill fuel on the floor.

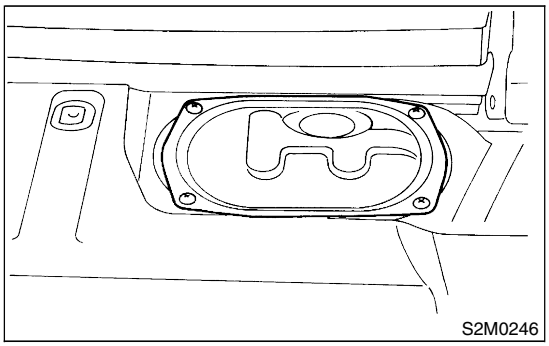
1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


B2M3197

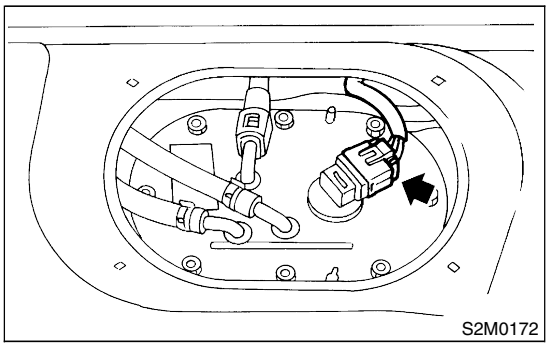
3) Disconnect battery ground cable.


G6M0095

4) Remove the floor box located just behind the rear seats.
5) Remove access hole lid.

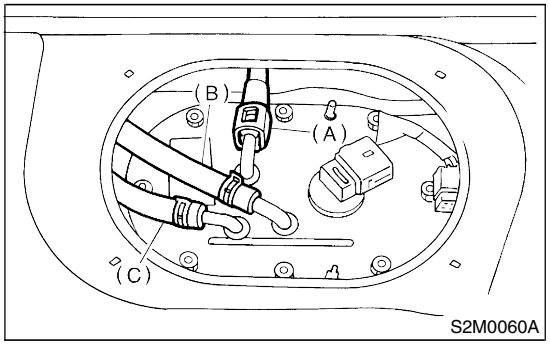

S2M0246

6) Disconnect connector from fuel pump.

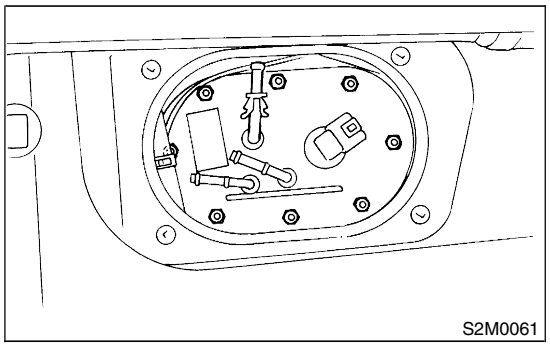

S2M0172

7) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU(DOHC TURBO)-67, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

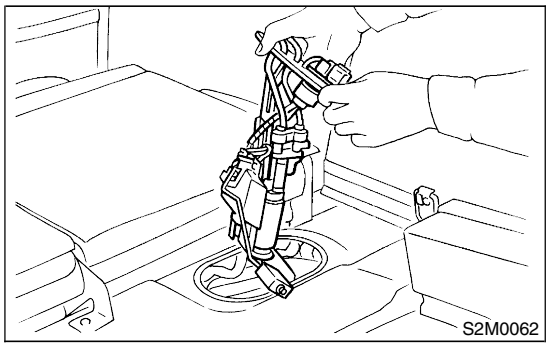
8) Move clips, and then disconnect fuel return hose (B) and jet pump hose (C).



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

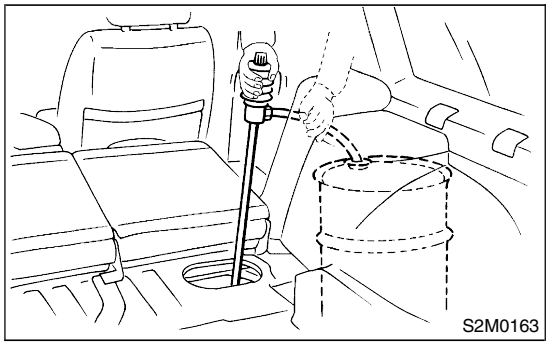


10) Take off fuel pump from fuel tank.

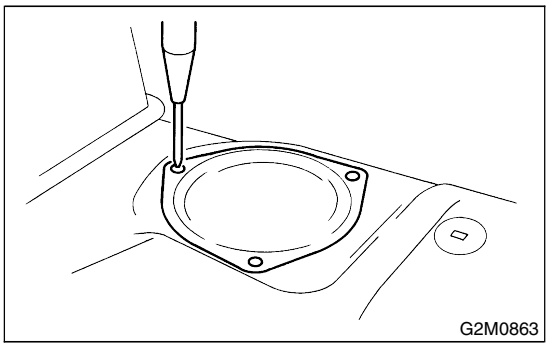


11) Drain fuel from fuel tank by using a hand pump.

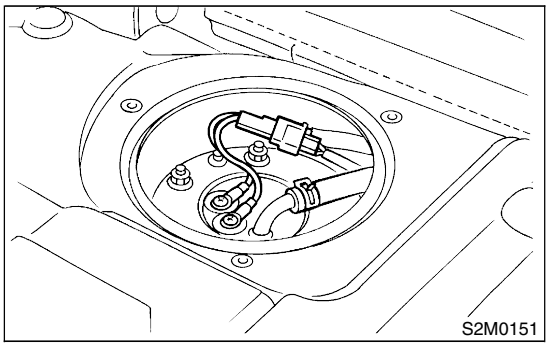
WARNING:
Do not use a motor pump when draining fuel.



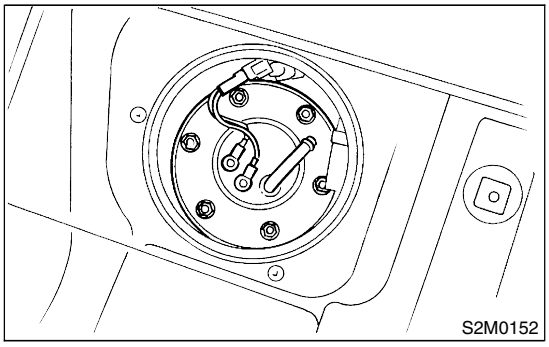
12) Remove service hole cover.



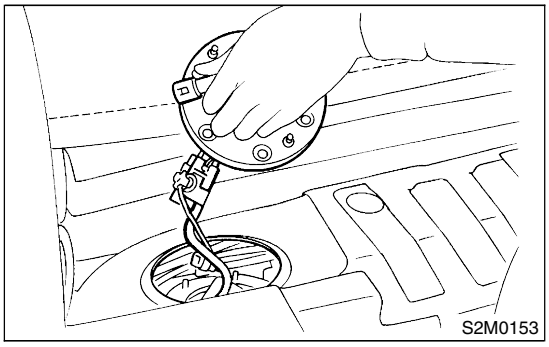
13) Disconnect connector from fuel sub level sensor.
14) Disconnect fuel jet pump hose.



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

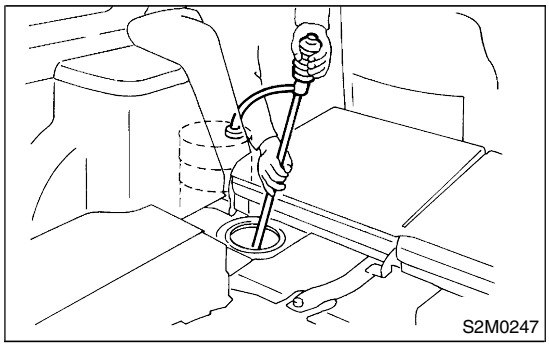


16) Remove fuel sub level sensor.



17) Drain fuel from there.

WARNING:
Do not use a motor pump when draining fuel.

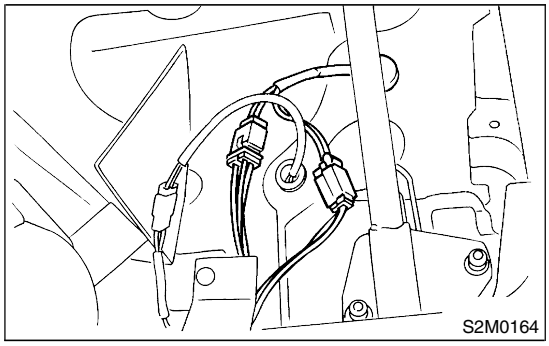


22. Fuel Tank S185053

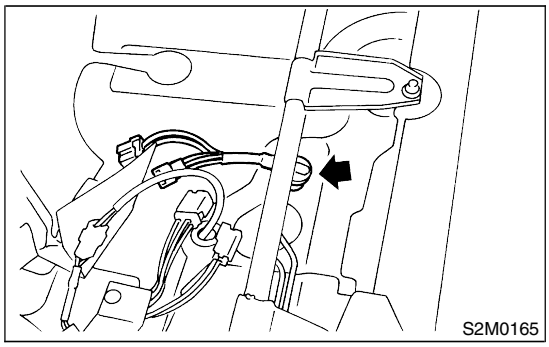
A: REMOVAL S185053A18

WARNING:
- **Place “NO FIRE” signs near the working area.**
- **Be careful not to spill fuel on the floor.**

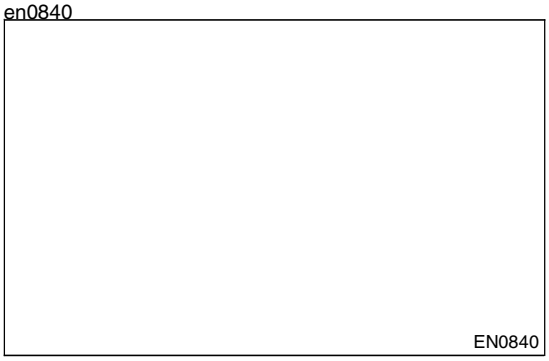
1) Set vehicle on the lift.
2) Release fuel pressure. <Ref. to FU(DOHC TURBO)-52, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
3) Drain fuel from fuel tank. <Ref. to FU(DOHC TURBO)-50, DRAINING FUEL, OPERATION, Fuel.>
4) Remove rear seat.
5) Disconnect connector of fuel tank cord to rear harness.


S2M0164

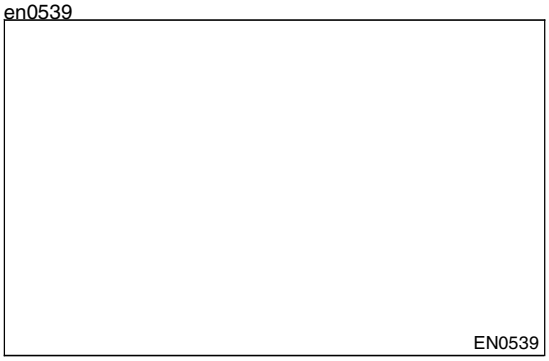
6) Push grommet which holds fuel tank cord on floor panel into under the body.


S2M0165

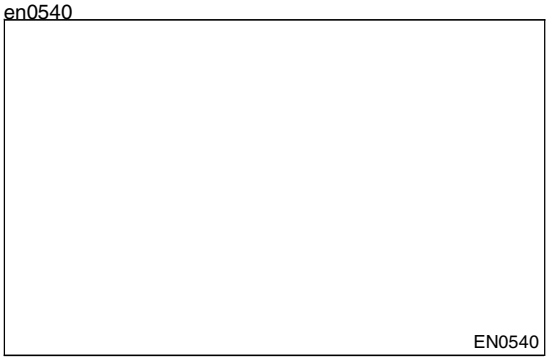
7) Remove rear crossmember. <Ref. to RS-20, REMOVAL, Rear Crossmember.>
8) Disconnect two-way valve hose (A) from two-way valve and disconnect canister hose (B) from canister.

en0840

EN0840

9) Loosen clamp and disconnect fuel filler hose (A) and air vent hose (B) from fuel filler pipe.

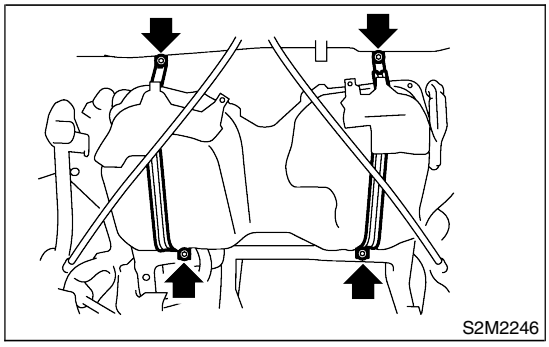
en0539

EN0539

10) Move clips, and disconnect quick connector. <Ref. to FU(DOHC TURBO)-67, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
11) Disconnect fuel hoses.

en0540

EN0540

12) Support fuel tank with transmission jack, remove bolts from bands and dismount fuel tank from the vehicle.

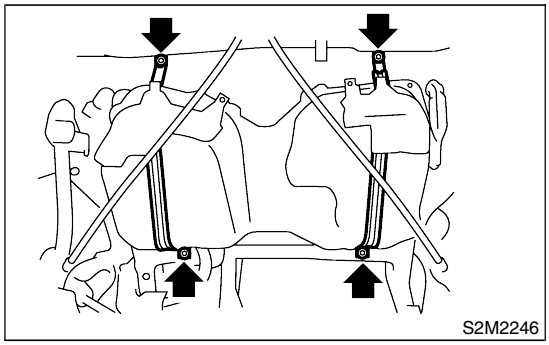
WARNING:
A helper is required to perform this work.



B: INSTALLATION *S185053A11*

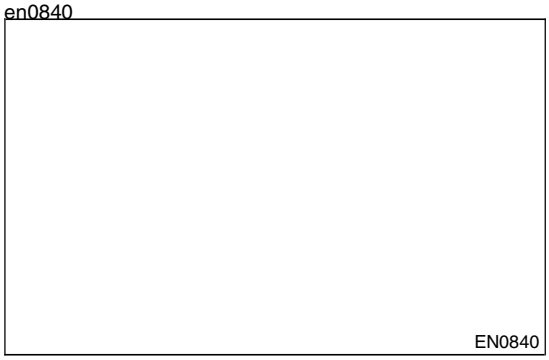
1) Support fuel tank with transmission jack and push fuel tank harness into access hole with grommet.
2) Set fuel tank and temporarily tighten bolts of fuel tank bands.

WARNING:
A helper is required to perform this work.



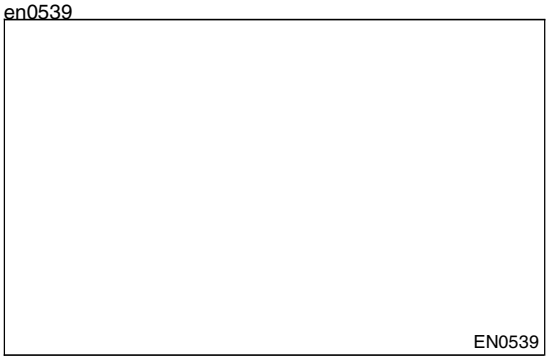
3) Connect two-way valve hose (A) to two-way valve and connect canister hose (B) to canister.

en0840



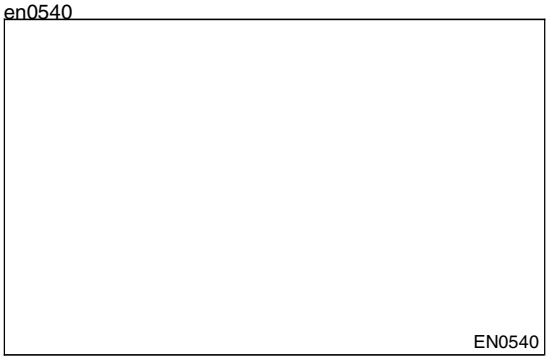
4) Connect fuel filler hose (A) and air vent hose (B).

en0539



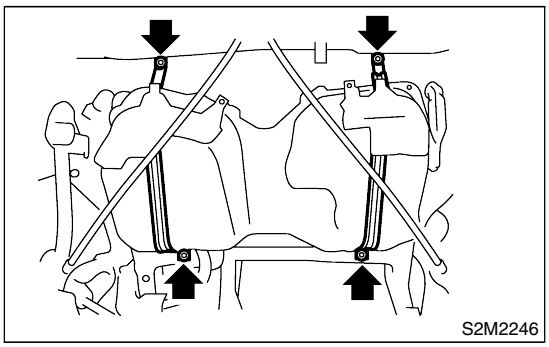
5) Connect fuel hoses, and hold then with clips and quick connector. <Ref. to FU(DOHC TURBO)-67, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

en0540



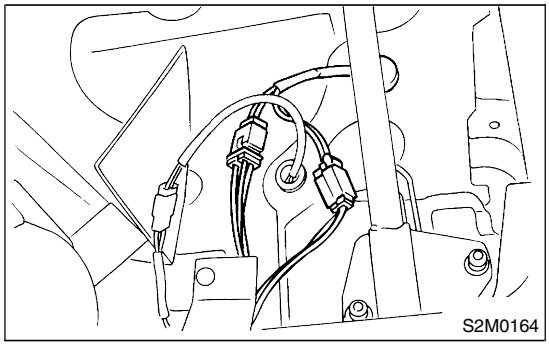
6) Tighten band mounting bolts.

Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)

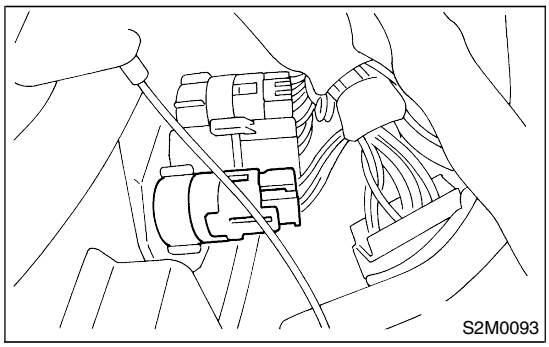


7) Install rear crossmember. <Ref. to RS-20, INSTALLATION, Rear Crossmember.>

8) Connect connectors to fuel tank cord and plug service hole with grommet.



9) Set rear seat and floor mat.
10) Connect connector to fuel pump relay.



C: INSPECTION S185053A10

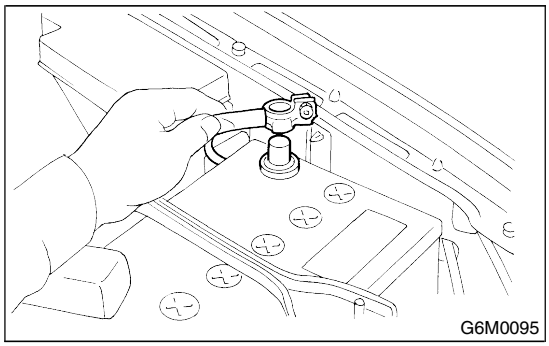
1) Make sure there are no cracks, holes, or other damage on the fuel tank.
2) Make sure that the fuel hoses and fuel pipes are not cracked and that connections are tight.

23. Fuel Filler Pipe S185022

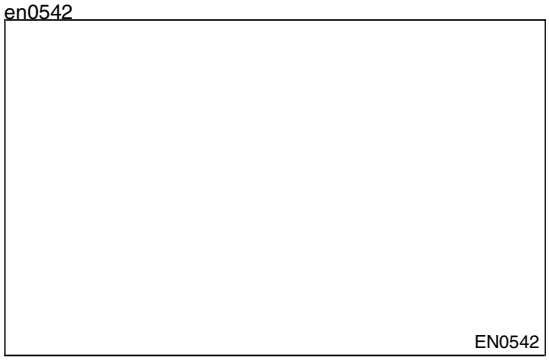
A: REMOVAL S185022A18

WARNING:
• Place "NO FIRE" signs near the working area.
• Be careful not to spill fuel on the floor.

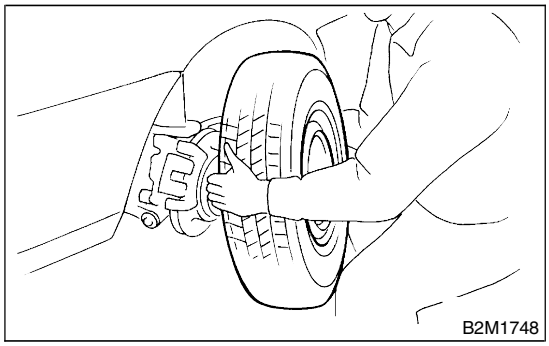
1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel filler flap lid and remove filler cap.
3) Disconnect battery ground cable.


G6M0095

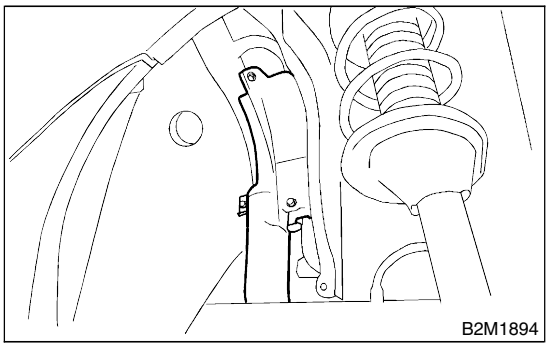
4) Remove screws holding packing in place.

en0542

EN0542

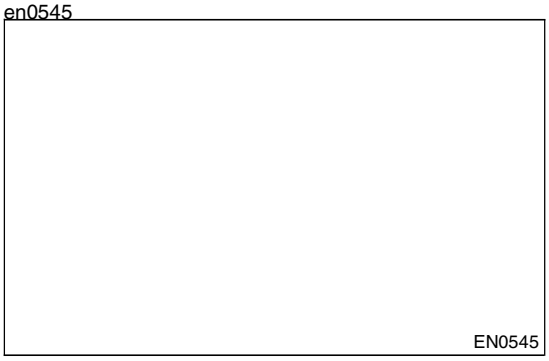
5) Lift-up the vehicle.
6) Remove rear right side wheel nuts.
7) Remove rear right side wheel.


B2M1748

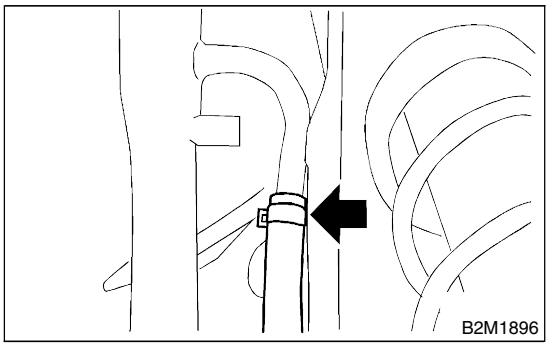
8) Remove fuel filler pipe protector.


B2M1894

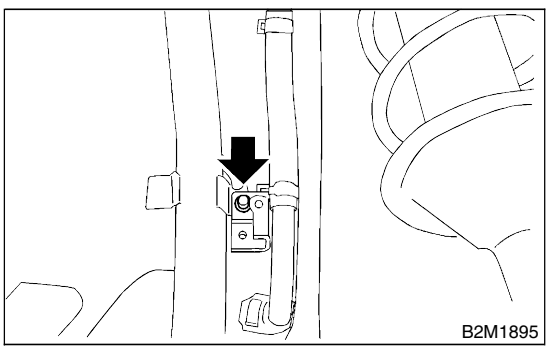
9) Separate evaporation hoses from clip of fuel filler pipe.

en0545

EN0545

10) Disconnect air vent hose from fuel filler pipe.

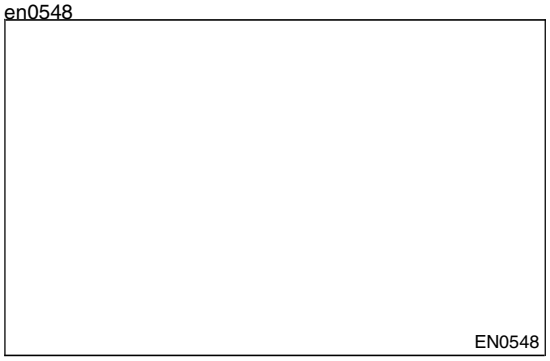

B2M1896

11) Remove bolts which hold fuel filler pipe bracket on body.


B2M1895

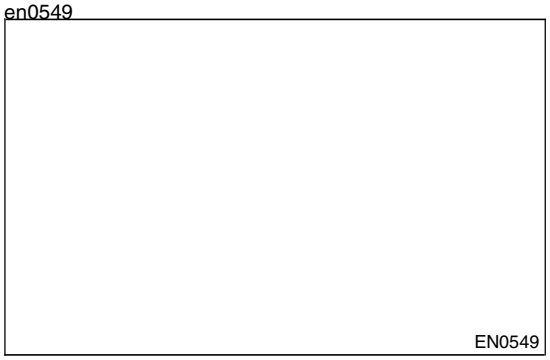
12) Loosen clamp and separate fuel filler hose (A) from fuel filler pipe.
13) Move clip and separate air vent hose (B).

en0548



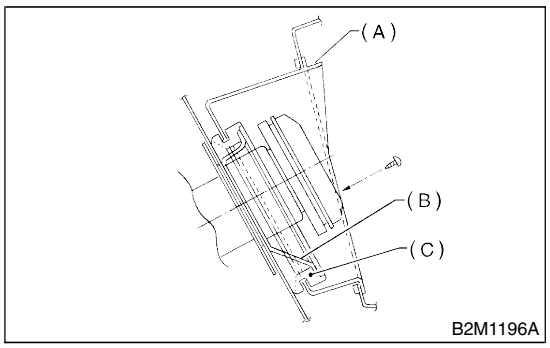
14) Remove fuel filler pipe to under side of the vehicle.
15) Remove air vent pipe together with clip from body.

en0549



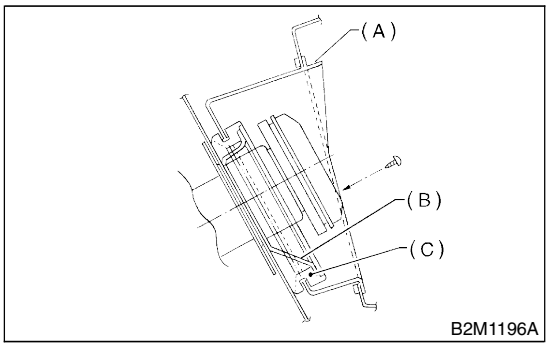
B: INSTALLATION S185022A11

1) Hold fuel filler flap open.
2) Set fuel saucer (A) with rubber packing (C) and insert fuel filler pipe into hole from the inner side of apron.



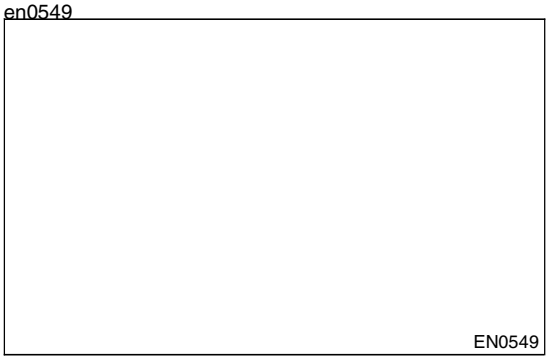
3) Align holes in fuel filler pipe neck and set cup (B), and tighten screws.

NOTE:
If edges of rubber packing are folded toward the inside, straighten it with a screwdriver.

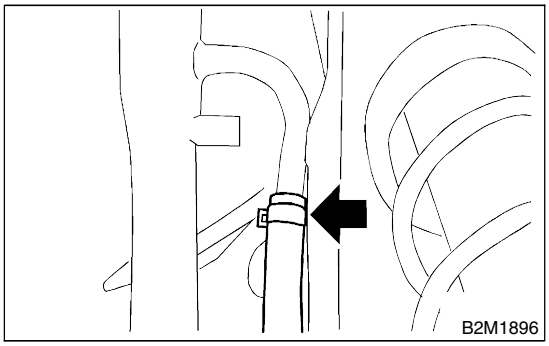


4) Install air vent pipe.

en0549



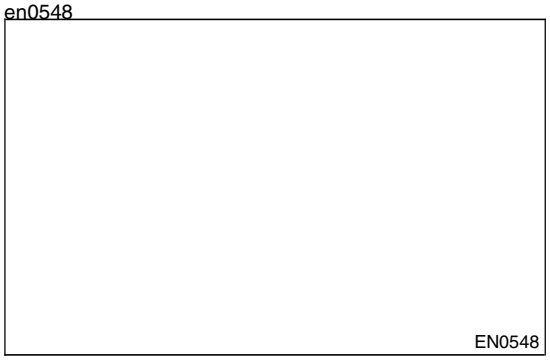
5) Connect air vent hose to fuel filler pipe.



6) Insert fuel filler hose (A) approximately 35 to 40 mm (1.38 to 1.57 in) over the lower end of fuel filler pipe and tighten clamp.

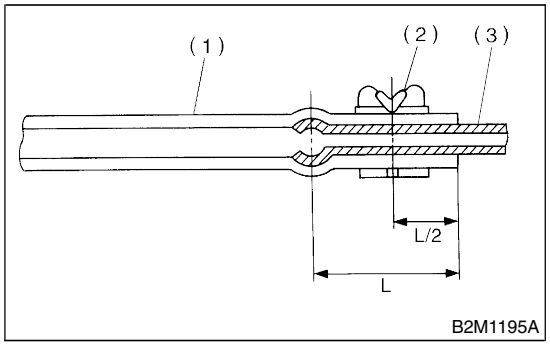
CAUTION:
Do not allow clips to touch air vent hose (B) and rear suspension crossmember.

en0548



7) Insert air vent hose approximately 25 to 30 mm (0.98 to 1.18 in) into the lower end of air vent pipe and hold clip.

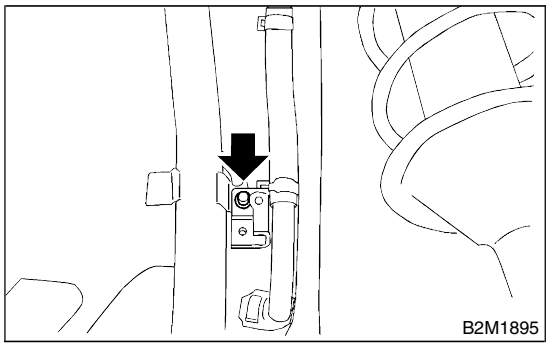
L = 27.5±2.5 mm (1.083±0.098 in)



(1) Hose
(2) Clip
(3) Pipe

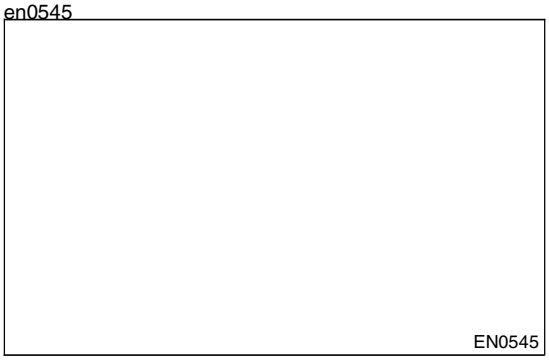
8) Tighten bolt which holds fuel filler pipe bracket on body.

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

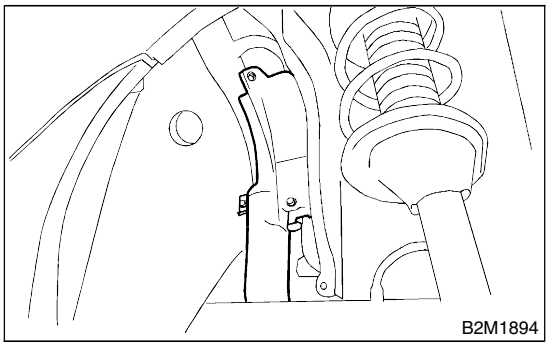


9) Tighten bolts which hold evaporation hoses onto clip of fuel filler pipe.

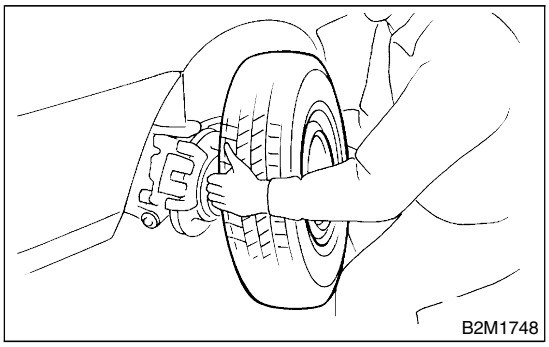
en0545



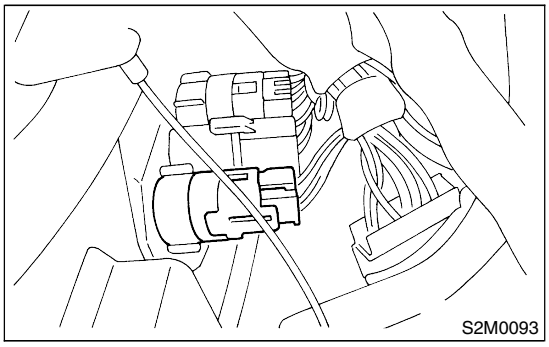
10) Install fuel filler pipe protector.



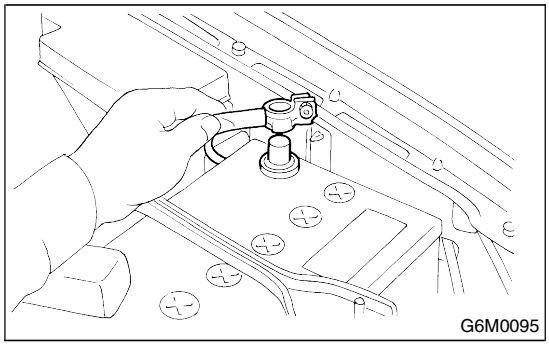
11) Install rear right wheel.



12) Lower the vehicle.
13) Tighten wheel nuts.
14) Connect connector to fuel pump relay.



15) Connect battery ground terminal.

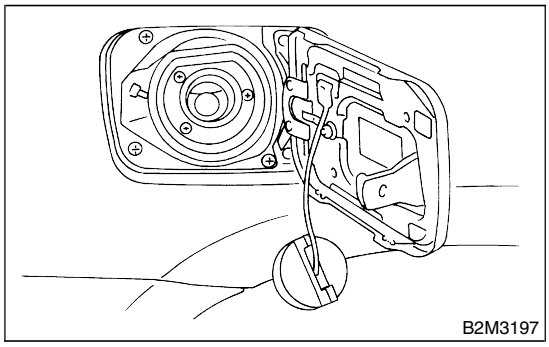


24. Fuel Pump S185025

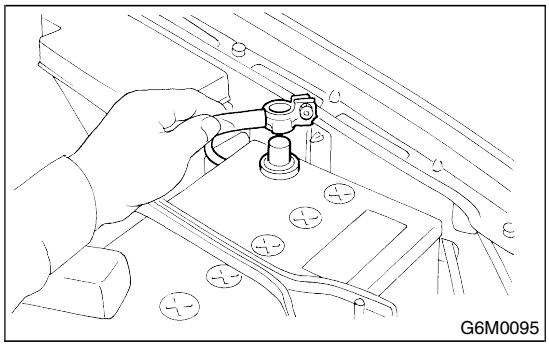
A: REMOVAL S185025A18

WARNING:
- **Place “No fire” signs near the working area.**
- **Be careful not to spill fuel on the floor.**

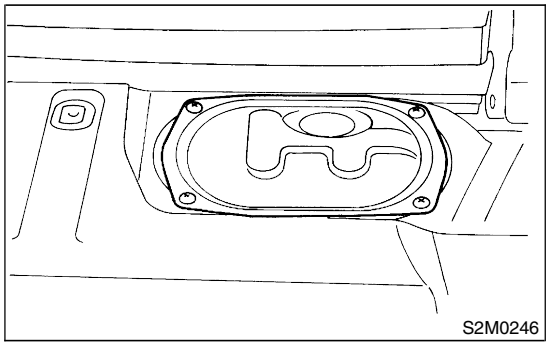
1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel filler flap lid, and remove fuel filler cap.


B2M3197

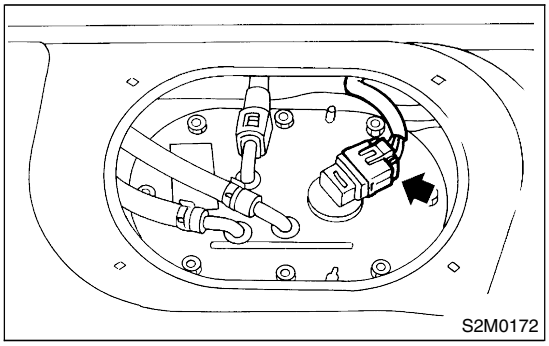
3) Disconnect battery ground cable.


G6M0095

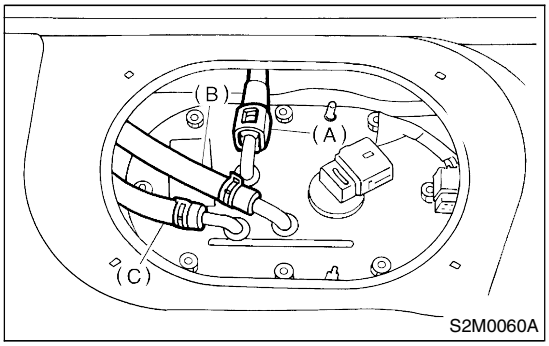
4) Remove the floor box located just behind the rear seats.
5) Remove access hole lid.


S2M0246

6) Disconnect connector from fuel pump.

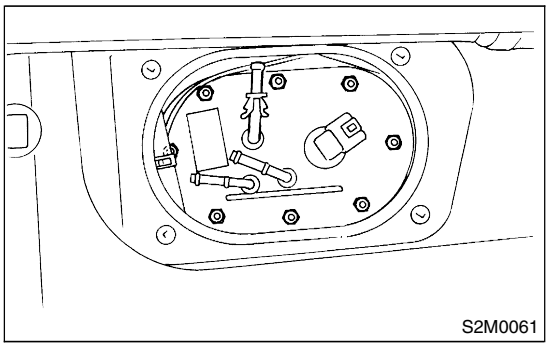

S2M0172

7) Move clips, and then disconnect fuel delivery hose (A), return hose (B) and jet pump hose (C).
8) Disconnect quick connector, and then disconnect fuel delivery hose (A). <Ref. to FU(DOHC TURBO)-67, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

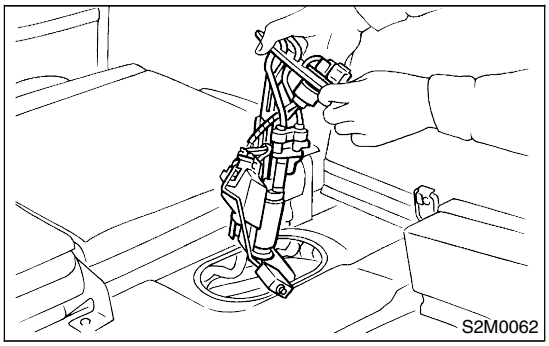


S2M0060A

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


S2M0061

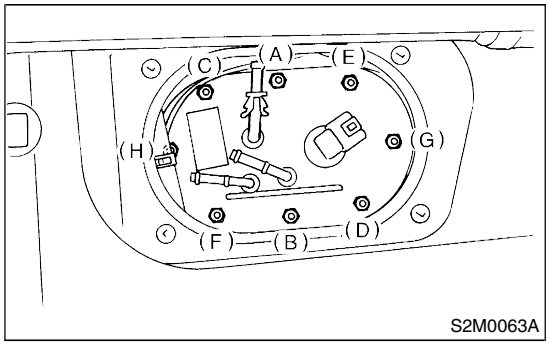
10) Take off fuel pump from fuel tank.


S2M0062

B: INSTALLATION S185025A11

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 the figure to specified torque.

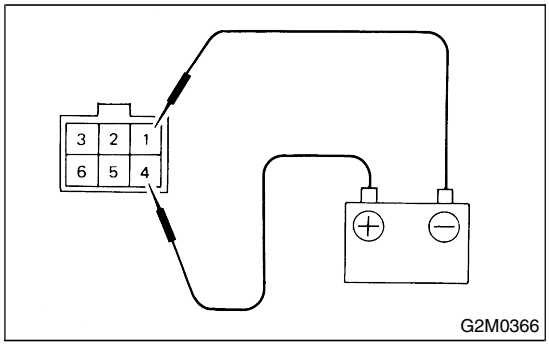
Tightening torque:
4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



C: INSPECTION S185025A10

Connect lead harness to connector terminal of fuel pump, and apply battery power supply to check whether the pump operate.

WARNING:
• Wipe off the fuel completely.
• Keep battery as far apart from fuel pump as possible.
• Be sure to turn the battery supply ON and OFF on the battery side.
• Do not run fuel pump for a long time under non-load condition.



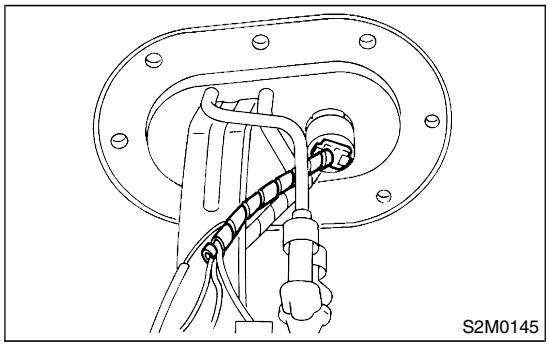
25. Fuel Level Sensor S185026

A: REMOVAL S185026A18

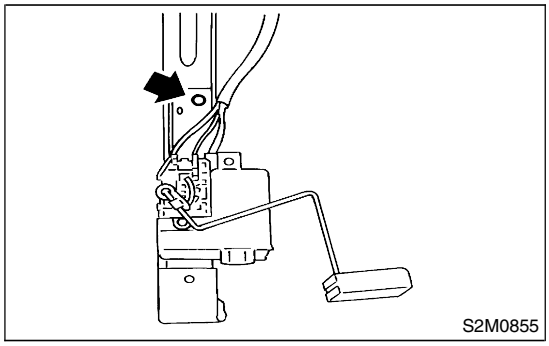
WARNING:
• Place “NO FIRE” signs near the working area.
• Be careful not to spill fuel on the floor.

NOTE:
Fuel level sensor is built in fuel pump assembly.

1) Remove fuel pump assembly. <Ref. to FU(DOHC TURBO)-60, REMOVAL , Fuel Pump.>
2) Disconnect connector from fuel pump bracket.



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



B: INSTALLATION S185026A11

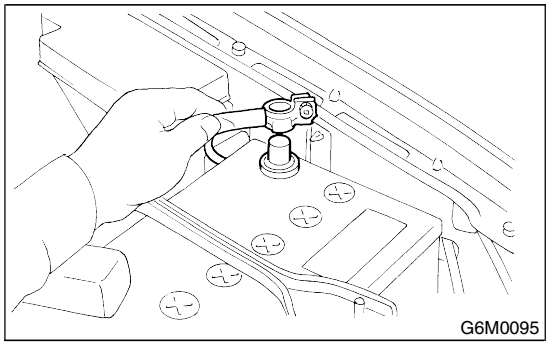
Install in the reverse order of removal.

26. Fuel Sub Level Sensor S185023

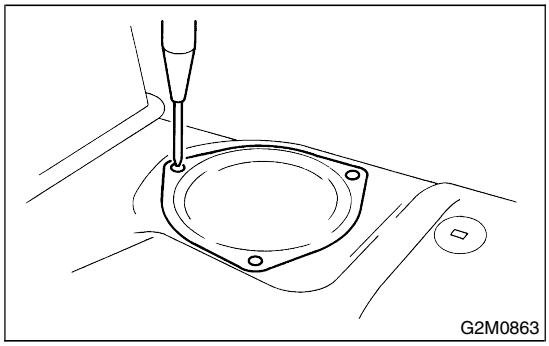
A: REMOVAL S185023A18

WARNING:
- **Place "NO FIRE" signs near the working area.**
- **Be careful not to spill fuel on the floor.**

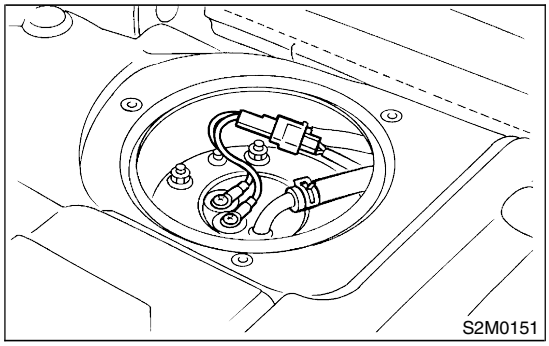
1) Disconnect battery ground cable.


G6M0095

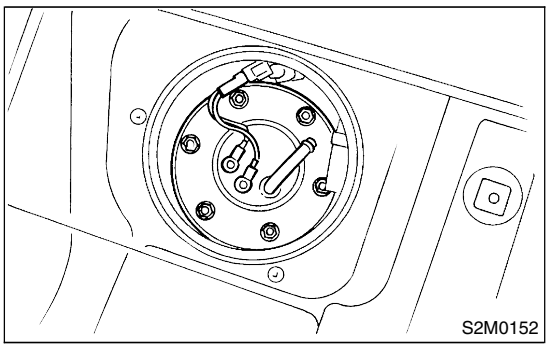
2) Remove the floor box located just behind the rear seats.
3) Remove service hole cover.


G2M0863

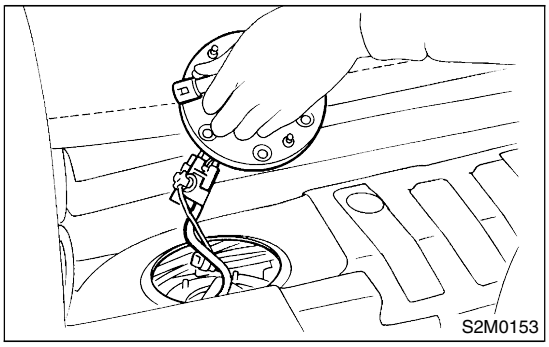
4) Disconnect connector from fuel sub level sensor.
5) Disconnect fuel jet pump hose.


S2M0151

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


S2M0152

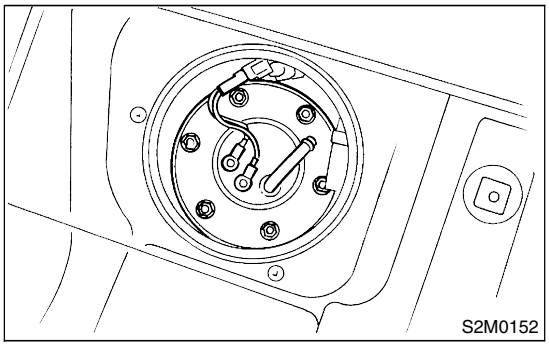
7) Remove fuel sub level sensor.


S2M0153

B: INSTALLATION S185023A11

Install in the reverse order of removal.

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

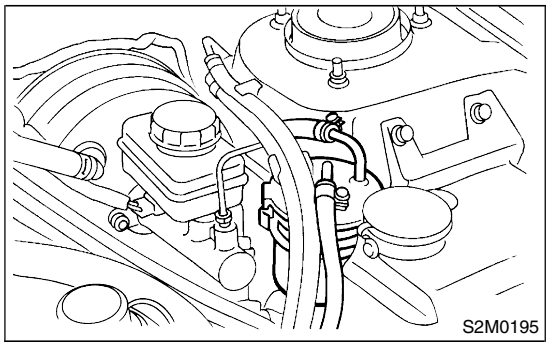

S2M0152

27. Fuel Filter S185027

A: REMOVAL S185027A18

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(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Disconnect fuel delivery hoses from fuel filter.



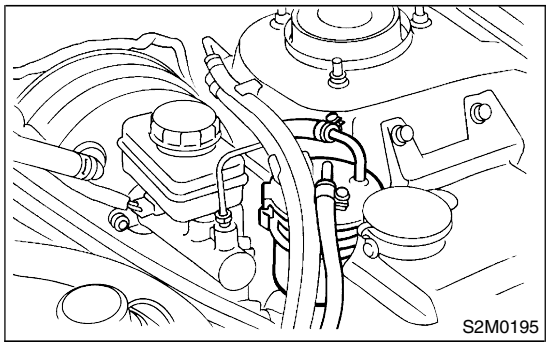
3) Remove filter from holder.

B: INSTALLATION S185027A11

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:
12.5 N·m (1.27 kgf-m, 9.22 ft-lb)



C: INSPECTION S185027A10

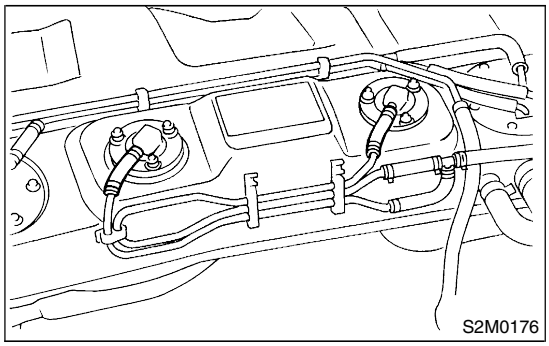
1) Check the inside of fuel filter for dirt and water sediment.
2) If it is clogged, or if replacement interval has been reached, replace it.
3) If water is found in it, shake and expel the water from inlet port.

28. Fuel Cut Valve S185021

A: REMOVAL S185021A18

WARNING:
• Place “NO FIRE” signs near the working area.
• Be careful not to spill fuel on the floor.

1) Remove fuel tank. <Ref. to FU(DOHC TURBO)-53, REMOVAL, Fuel Tank.>
2) Move clip and disconnect evaporation hose from fuel cut valve.

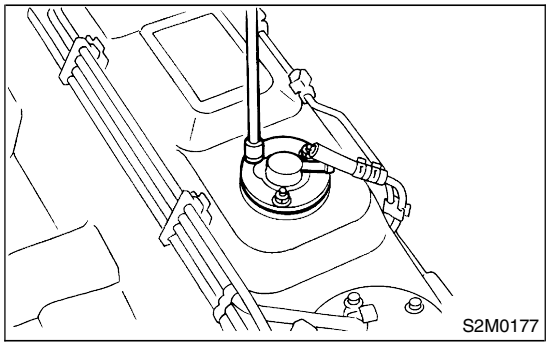

S2M0176

3) Remove bolts which install fuel cut valve.

B: INSTALLATION S185021A11

Install in the reverse order of removal.

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

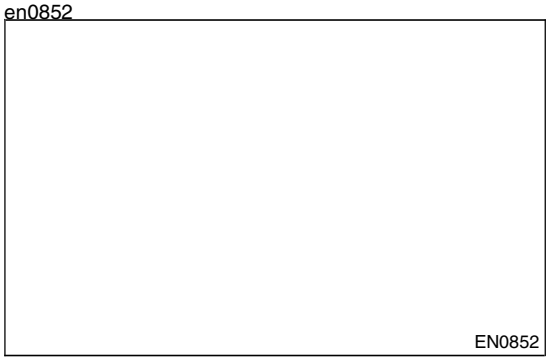

S2M0177

29. Fuel Damper Valve S185708

A: REMOVAL S185708A18

1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Remove fuel damper valve from fuel return line.

en0852



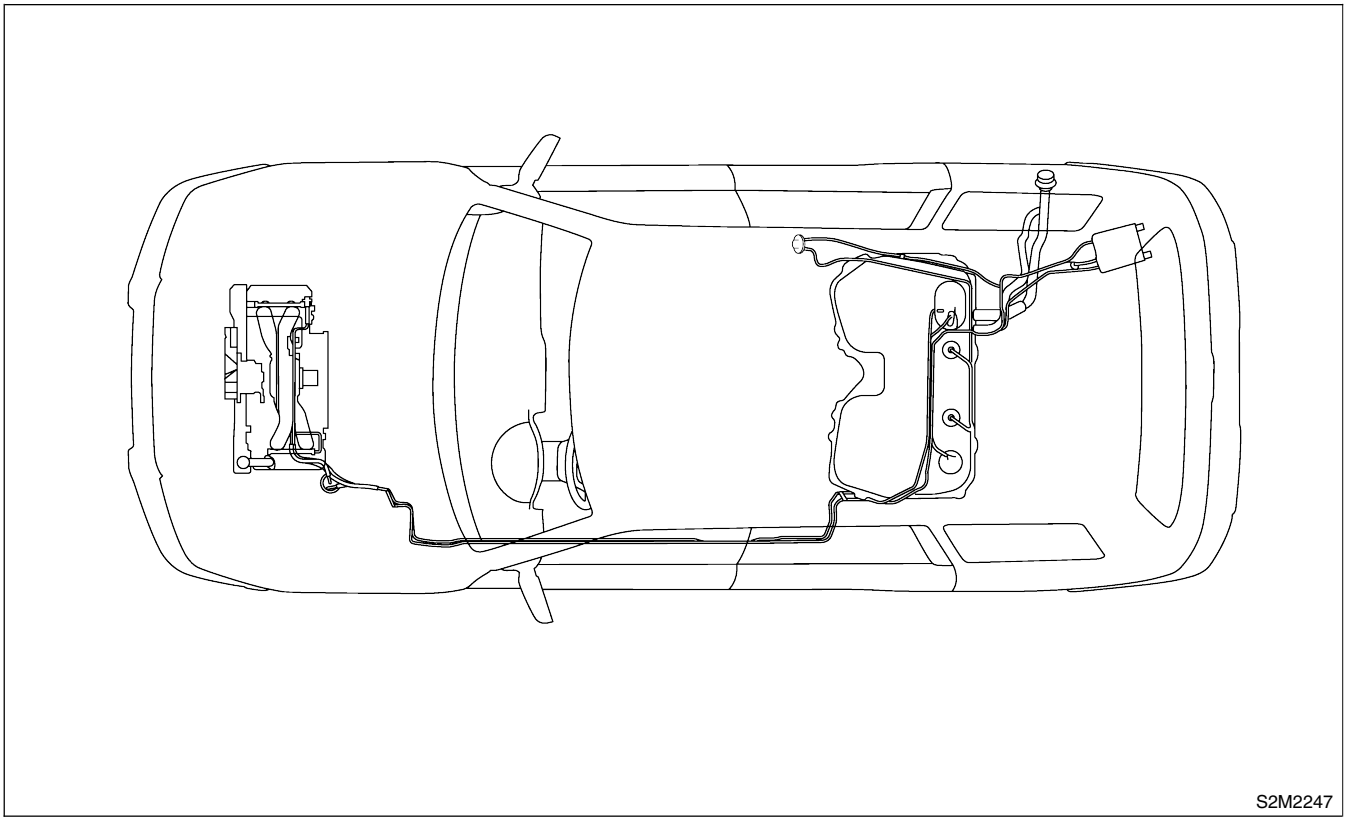
B: INSTALLATION S185708A11

Install in the reverse order of removal.

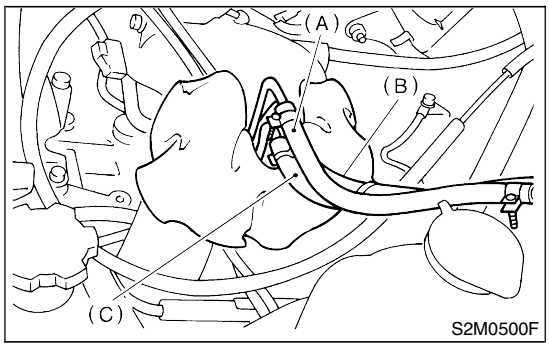
30. Fuel Delivery, Return and Evaporation Lines S185019

A: REMOVAL S185019A18

1) Set vehicle on the lift.
2) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
3) Open fuel filler flap lid and remove fuel filler cap.
4) Remove floor mat. <Ref. to EI-43, REMOVAL, Floor Mat.>
5) Remove fuel delivery pipes and hoses, fuel return pipes and hoses, evaporation pipes and hoses.


S2M2247

6) In engine compartment, detach fuel delivery hoses, return hoses and evaporation hose.



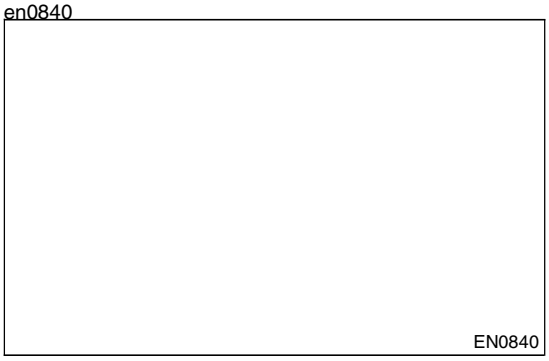
S2M0500F

(A) Fuel delivery hose
(B) Return hose
(C) Evaporation hose

7) Lift-up the vehicle.

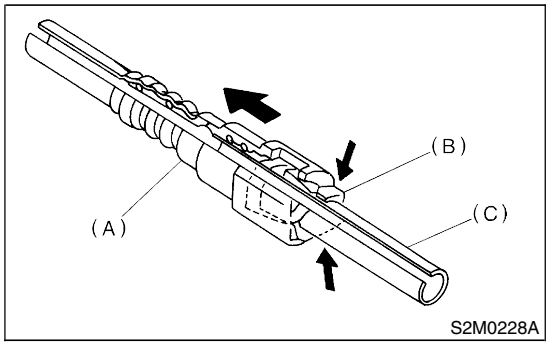
8) Disconnect two-way valve hose (A) from two-way valve and disconnect canister hose (B) from canister.

en0840


EN0840

9) Separate quick connector on fuel delivery and return 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 retainers with new ones.

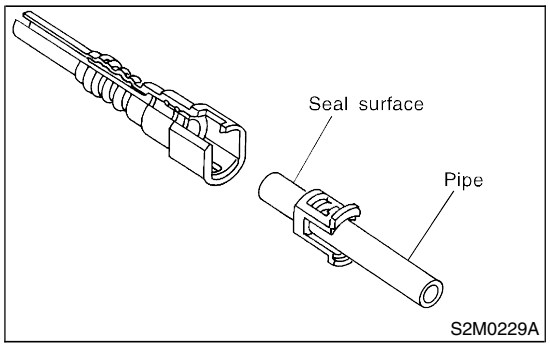


(A) Connector
(B) Retainer
(C) Pipe

B: INSTALLATION S185019A11

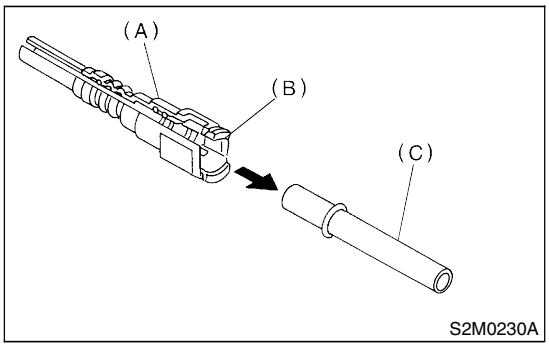
1) Connect quick connector on fuel delivery line.

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.



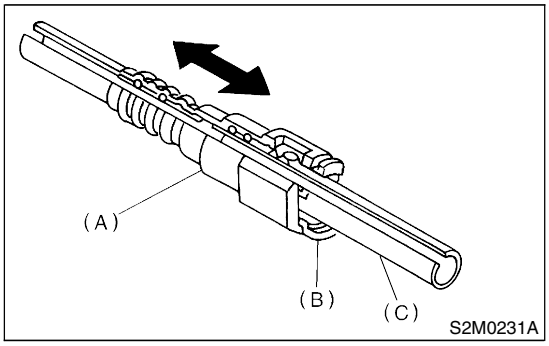
(1) Set new retainer (B) to connector (A).
(2) Push pipe into connector completely.

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.

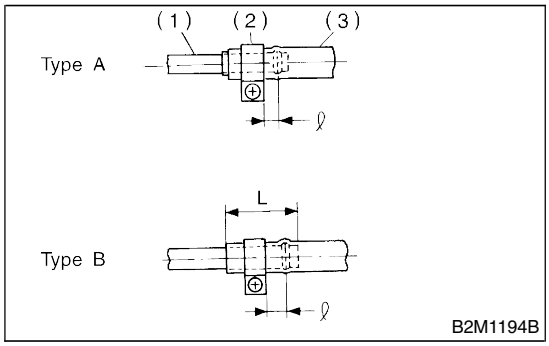


(A) Connector
(B) Retainer
(C) Pipe

2) Connect fuel delivery hose to pipe 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: 2.5±1.5 mm (0.098±0.059 in)

L: 22.5±2.5 mm (0.886±0.098 in)

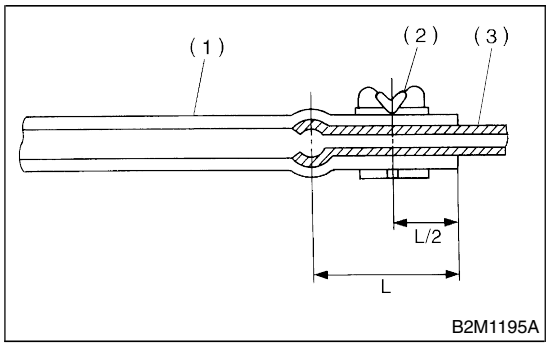


(1) Fitting
(2) Clamp
(3) Hose

3) Connect evaporation hose to pipe by approx. 15 mm (0.59 in) from hose end.

L = 17.5±2.5 mm (0.689±0.098 in)

CAUTION:
Be sure to inspect hoses and their connections for any leakage of fuel.



(1) Hose
(2) Clip
(3) Pipe

C: INSPECTION *S185019A10*

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.

31. Fuel System Trouble in General S185571

A: INSPECTION S185571A10

Trouble and possible cause		Corrective action
1. Insufficient fuel supply to the injector		
1)	Fuel pump will not operate.	
	◯ Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	◯ Trouble in electromagnetic or electronic circuit parts.	Replace fuel pump.
2)	Lowering of fuel pump function.	Replace fuel pump.
3)	Clogged dust or water in the fuel filter.	Replace fuel filter, clean or replace fuel tank.
4)	Clogged or bent fuel pipe or hose.	Clean, correct or replace fuel pipe or hose.
5)	Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)	Clogged or bent breather tube or pipe.	Clean, correct or replace air breather tube or pipe.
7)	Damaged diaphragm of pressure regulator.	Replace.
2. Leakage or blow out fuel		
1)	Loosened joints of the fuel pipe.	Retightening.
2)	Cracked fuel pipe, hose and fuel tank.	Replace.
3)	Defective welding part on the fuel tank.	Replace.
4)	Defective drain packing of the fuel tank.	Replace.
5)	Clogged or bent air breather tube or air vent tube.	Clean, correct or replace air breather tube or air vent tube.
3. Gasoline smell inside of compartment		
1)	Loose joints at air breather tube, air vent tube and fuel filler pipe.	Retightening.
2)	Defective packing air tightness on the fuel saucer.	Correct or replace packing.
3)	Cracked fuel separator.	Replace separator.
4)	Inoperative fuel pump modulator or circuit.	Replace.
4. Defective fuel meter indicator		
1)	Defective operation of fuel 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.
To prevent water condensation:
(1) Top off the fuel tank or drain the fuel completely.
(2) Drain water condensation from the fuel filter.
● Refilling the fuel tank.
Refill the fuel tank while there is still some fuel left in the tank.
● Protecting the fuel system against freezing and water condensation.
(1) Cold areas
In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F) throughout the winter season, use an anti-freeze solution in the cooling system. Refueling will also complement the effect of anti-freeze solution each time the fuel level drops to about one-half. After the winter season, drain water which may have accumulated in the fuel filter and fuel tank in the manner same as that described under Affected areas below.
(2) Affected areas
When water condensation is notched in the fuel filter, drain water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.
● Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)

EC(DOHC TURBO)

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2. Front Catalytic Converter....3
3. Rear Catalytic Converter....4
4. Precatalytic Converter....5
5. Canister....6
6. Purge Control Solenoid Valve....7
7. Two-way Valve....8

1. General Description S180001

A: CAUTION S180001A03

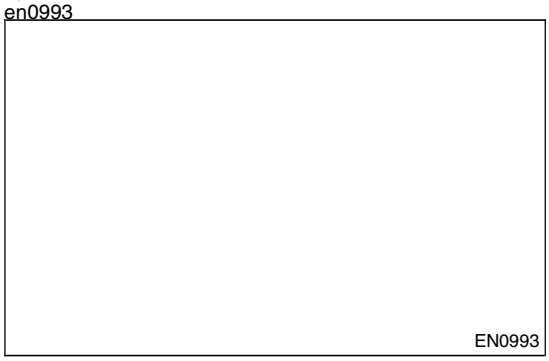
- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation 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.

2. Front Catalytic Converter S180017

A: REMOVAL S180017A18

1) Remove center exhaust pipe. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>
2) Separate front catalytic converter (A) from rear catalytic converter (B).

en0993



B: INSTALLATION S180017A11

NOTE:
Replace gaskets with new ones.
Install in the reverse order of removal.

C: INSPECTION S180017A10

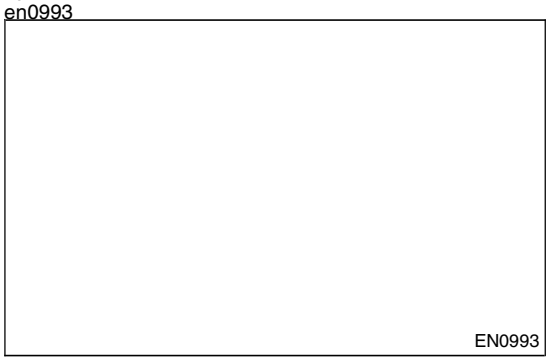
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

3. Rear Catalytic Converter S180036

A: REMOVAL S180036A18

1) Remove center exhaust pipe. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>
2) Separate rear catalytic converter (B) from front catalytic converter (A).

en0993



B: INSTALLATION S180036A11

NOTE:
Replace gaskets with new ones.
Install in the reverse order of removal.

C: INSPECTION S180036A10

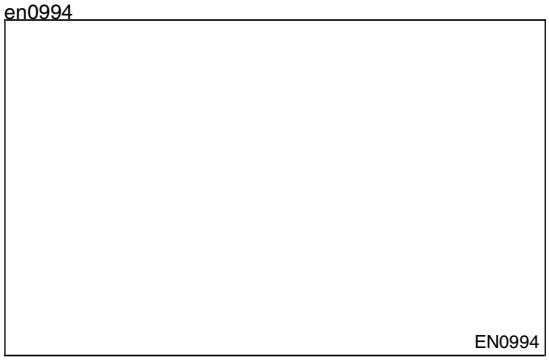
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

4. Precatalytic Converter S180767

A: REMOVAL S180767A18

Precatalytic converter (A) is built in joint pipe. Refer to removal of joint pipe for removal procedure. <Ref. to EX(DOHC TURBO)-13, REMOVAL, Joint Pipe.>

en0994



B: INSTALLATION S180767A11

Precatalytic converter is built in joint pipe. Refer to installation of joint pipe for installation procedure. <Ref. to EX(DOHC TURBO)-13, INSTALLATION, Joint Pipe.>

C: INSPECTION S180767A10

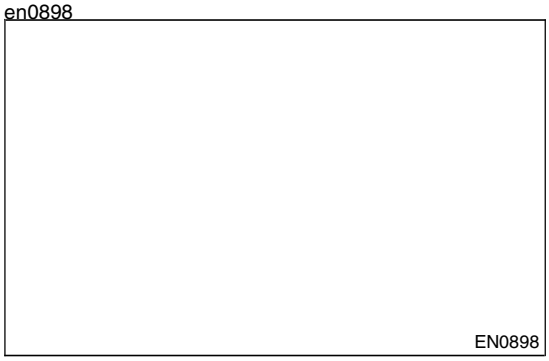
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.

5. Canister S180037

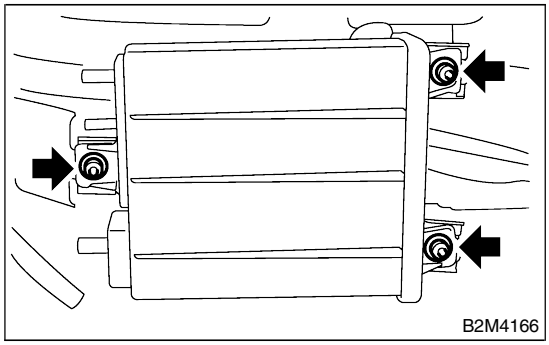
A: REMOVAL S180037A18

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

en0898



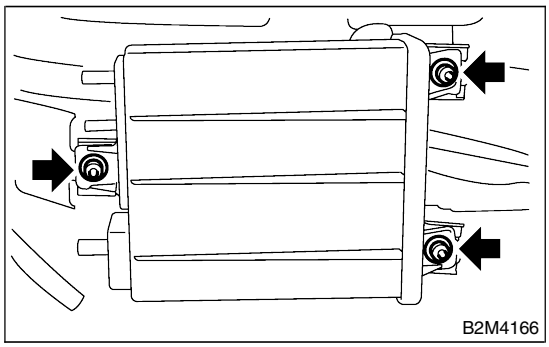
3) Remove canister from body.



B: INSTALLATION S180037A11

1) Install in the reverse order of removal.

Tightening torque:
23 N·m (2.3 kgf-m, 17 ft-lb)



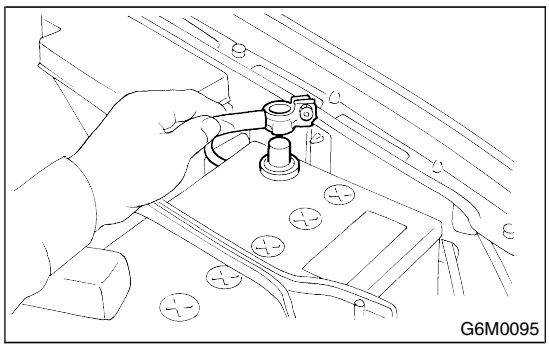
C: INSPECTION S180037A10

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

6. Purge Control Solenoid Valve S180035

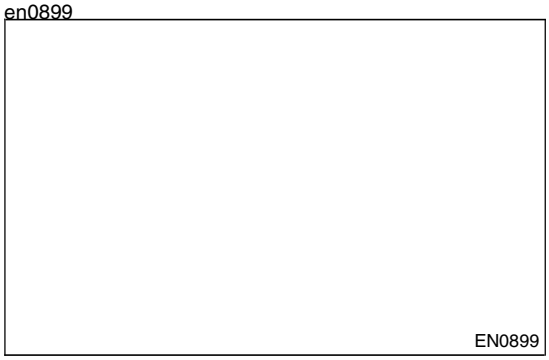
A: REMOVAL S180035A18

1) Disconnect battery ground cable.


G6M0095

2) Disconnect connector and hoses from purge control solenoid valve.
3) Remove bolt which installs purge control solenoid valve onto intake manifold.

en0899

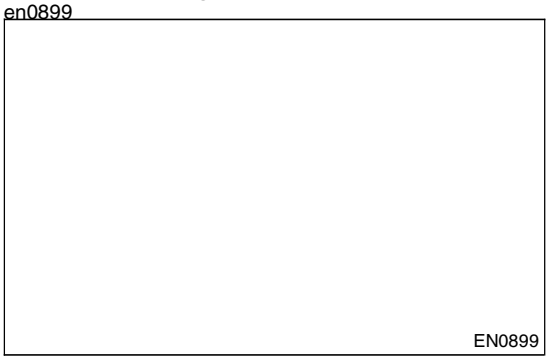

EN0899

B: INSTALLATION S180035A11

Install in the reverse order of removal.

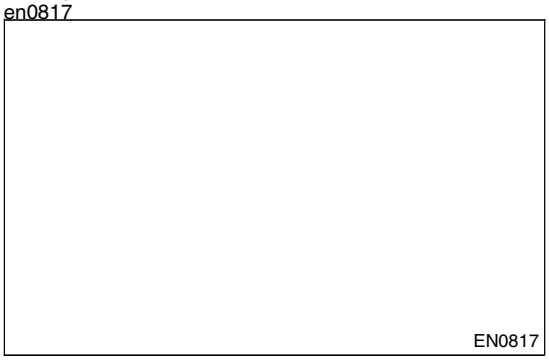
Tightening torque:
16 N·m (1.6 kgf-m, 11.6 ft-lb)

en0899


EN0899

CAUTION:
Carefully connect the evaporation hoses.

en0817


EN0817

(A) To intake manifold
(B) To purge value

C: INSPECTION S180035A10

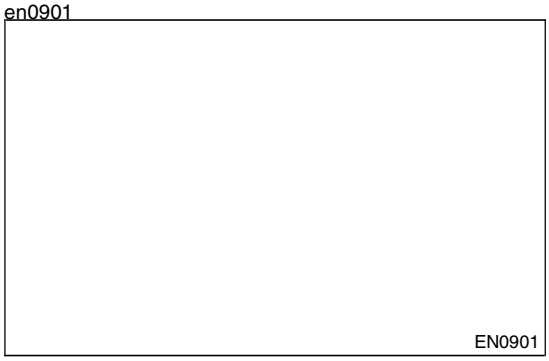
Make sure hoses are not cracked or loose.

7. Two-way Valve S180707

A: REMOVAL S180707A18

1) Lift-up the vehicle.
2) Remove canister from body. <Ref. to EC(DOHC TURBO)-6, REMOVAL, Canister.>
3) Remove two-way valve with bracket as a single unit from body.

en0901



4) Remove two-way valve from bracket.

B: INSTALLATION S180707A11

Install in the reverse order of removal.

C: INSPECTION S180707A10

Make sure that hoses are not cracked or loose.

INTAKE (INDUCTION)

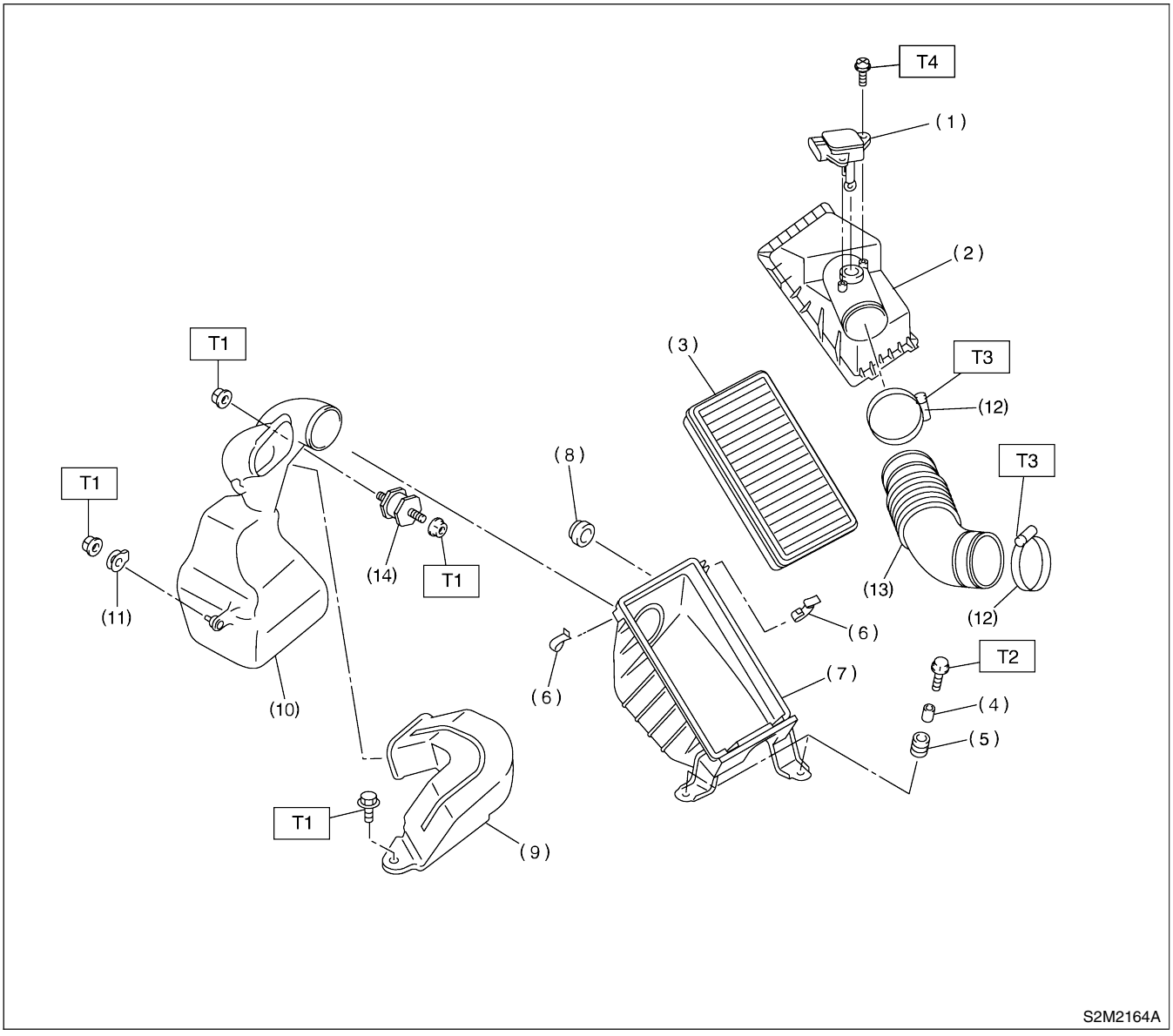
IN(DOHC TURBO)

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4.	Intake Duct	9
5.	Intercooler	10
6.	Turbocharger	12
7.	Air By-pass Valve	14

1. General Description S184001

A: COMPONENT S184001A05

1. AIR CLEANER S184001A0501

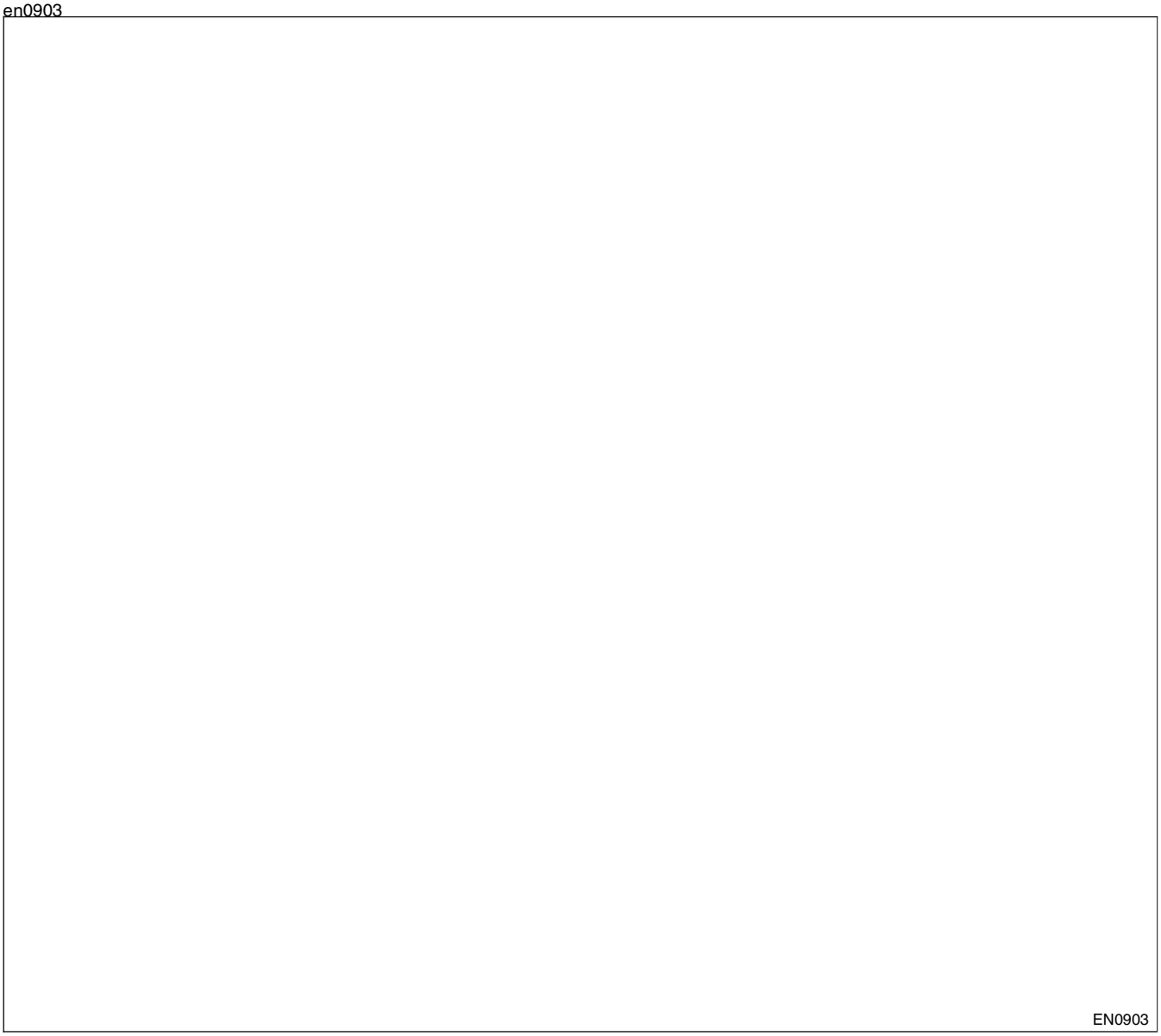


(1) Mass air flow sensor
(2) Air cleaner upper cover
(3) Air cleaner element
(4) Spacer
(5) Bushing
(6) Clip
(7) Air cleaner lower case
(8) Cushion rubber
(9) Air intake duct
(10) Resonator chamber ASSY
(11) Cushion rubber
(12) Clamp
(13) Air intake boot
(14) Cushion

Tightening torque: N·m (kgf-m, ft-lb)
T1: 7.5 (0.76, 5.5)
T2: 33 (3.4, 25)
T3: 2.5 (0.25, 1.8)
T4: 1.7 (0.17, 1.2)

2. INTAKE DUCT S184001A0502

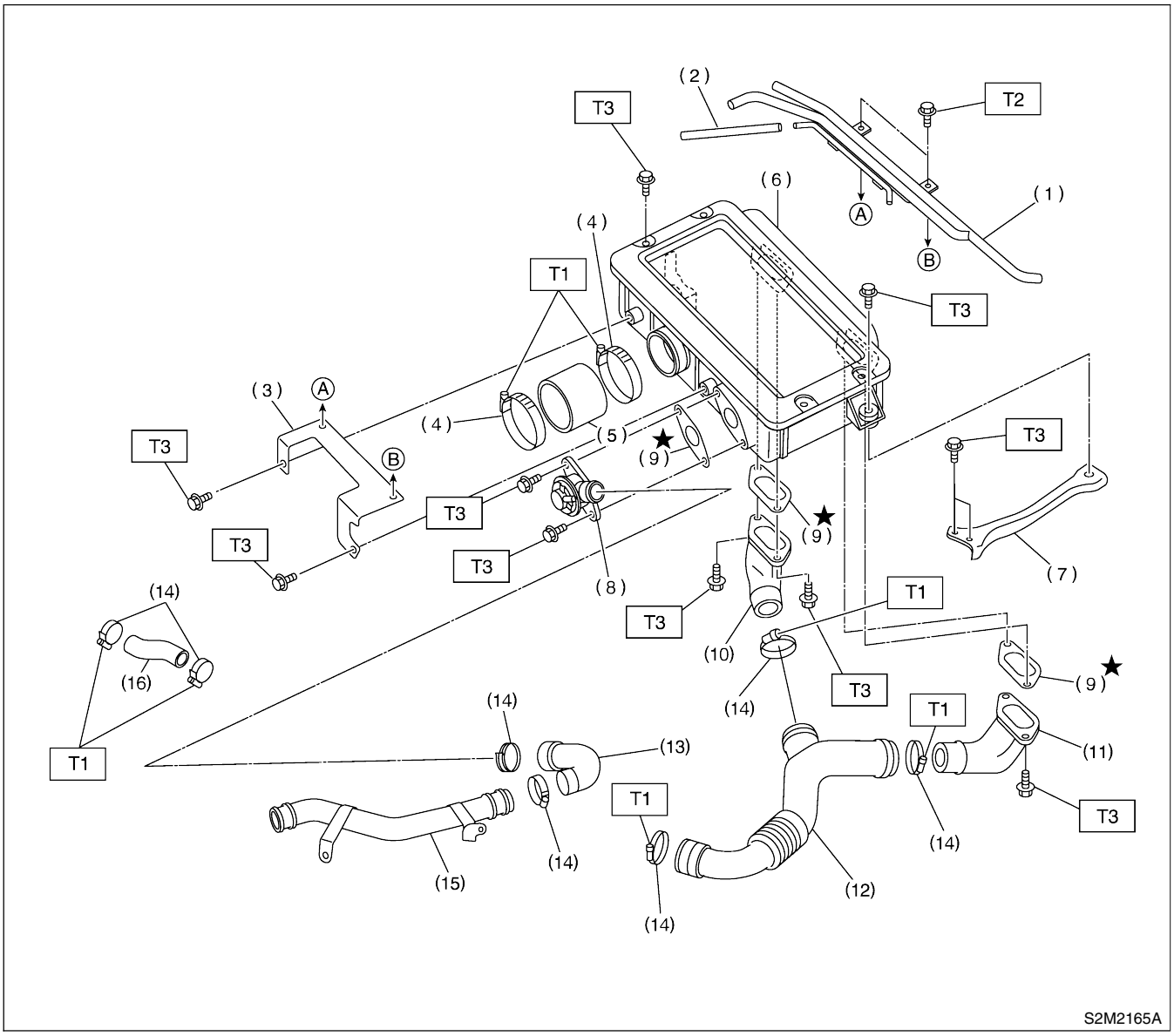
en0903



(1) Clamp
(2) Air by-pass hose A
(3) Air by-pass hose B
(4) Air by-pass hose C
(5) Air by-pass hose D
(6) Intake duct

Tightening torque: N·m (kgf-m, ft-lb)
T1: 15.7 (1.6, 11.6)

3. INTER COOLER S184001A0503

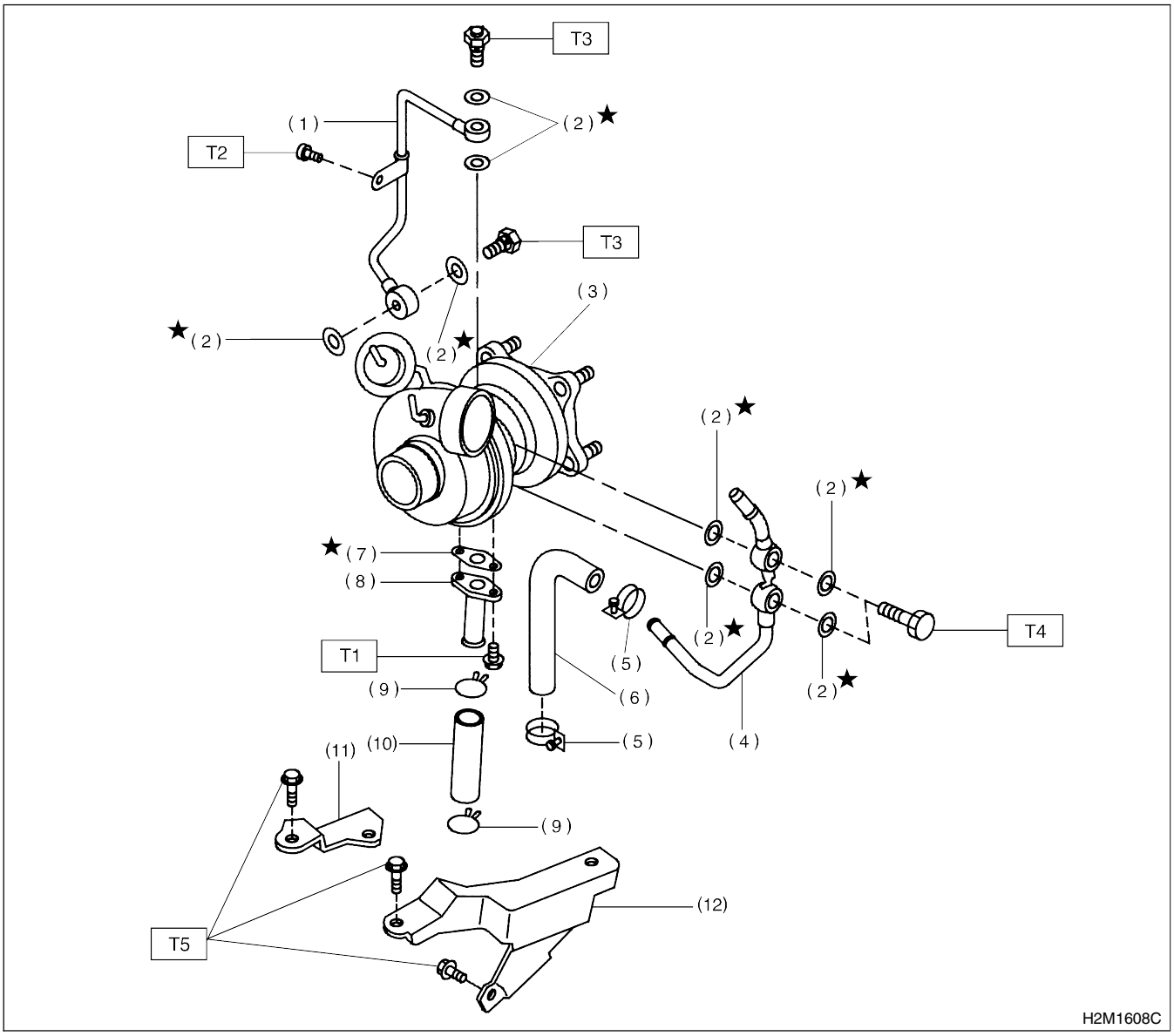


S2M2165A

(1) PVC pipe
(2) Air by-pass hose C
(3) Stay
(4) Clamp
(5) Air intake hose
(6) Intercooler
(7) Intercooler bracket
(8) Air by-pass valve
(9) Gasket
(10) Intercooler duct A
(11) Intercooler duct B
(12) Intercooler duct C
(13) Air by-pass hose A
(14) Clamp
(15) Air by-pass pipe
(16) Air by-pass hose B

Tightening torque: N·m (kgf-m, ft-lb)
T1: 3 (0.22, 1.6)
T2: 6.4 (0.65, 4.7)
T3: 16 (1.6, 11.7)

4. TURBOCHARGER S184001A0504



(1) Oil inlet pipe
(2) Metal gasket
(3) Turbocharger
(4) Water pipe
(5) Clamp
(6) Engine coolant hose
(7) Gasket
(8) Oil outlet pipe
(9) Clip
(10) Oil outlet hose
(11) Turbocharger bracket RH
(12) Turbocharger bracket LH

Tightening torque: N·m (kgf-m, ft-lb)
T1: 4.4 (0.45, 3.3)
T2: 4.9 (0.50, 3.6)
T3: 29 (3.0, 21.7)
T4: 30 (3.1, 22.4)
T5: 33 (3.4, 24.6)

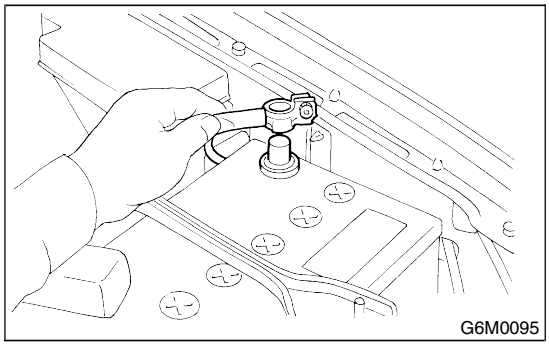
B: CAUTION S184001A03

- 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.

2. Air Cleaner S184087

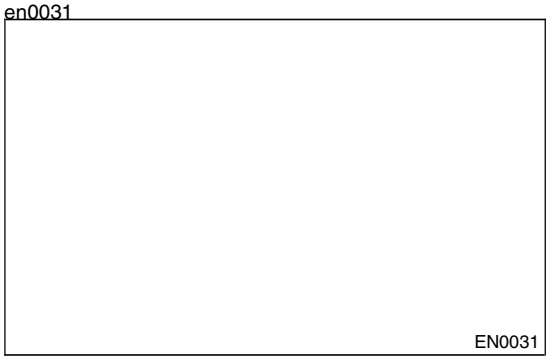
A: REMOVAL S184087A18

1) Disconnect connector battery ground cable.


G6M0095

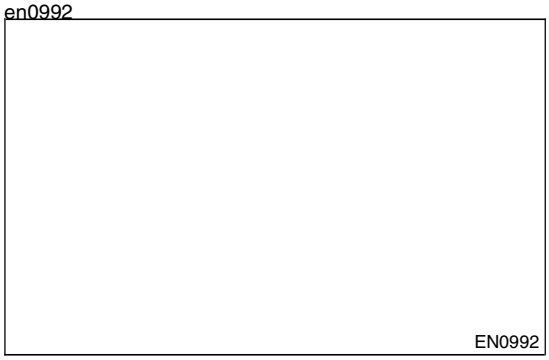
2) Disconnect connector from mass air flow sensor.

en0031


EN0031

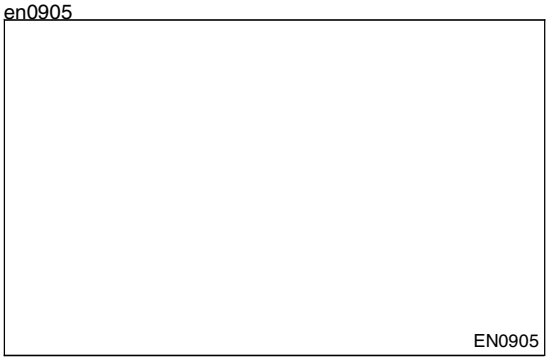
3) Loosen clamp (A) which connects air intake boot to intake duct.
4) Remove the two clips (B) from air cleaner upper cover.

en0992


EN0992

5) Remove air cleaner upper cover.
6) Remove air cleaner element.
7) Remove air cleaner lower case.

en0905

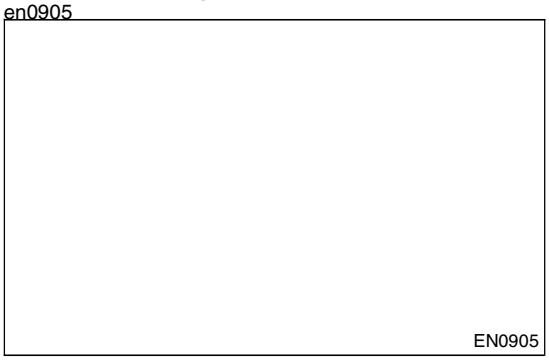

EN0905

B: INSTALLATION S184087A11

Install in the reverse order of removal.

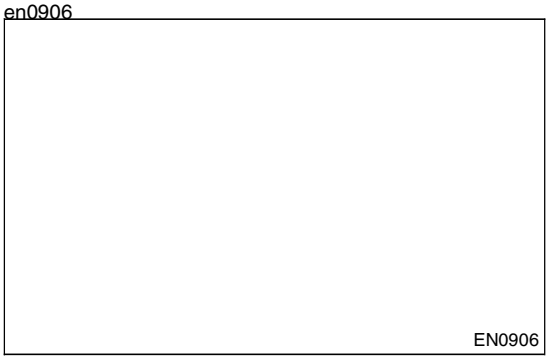
Tightening torque:
33 N·m (3.4 kgf-m, 25 ft-lb)

en0905


EN0905

CAUTION:
Before installing air cleaner upper cover, align holes with protruding portions of air cleaner lower case, then secure upper cover to lower case.

en0906


EN0906

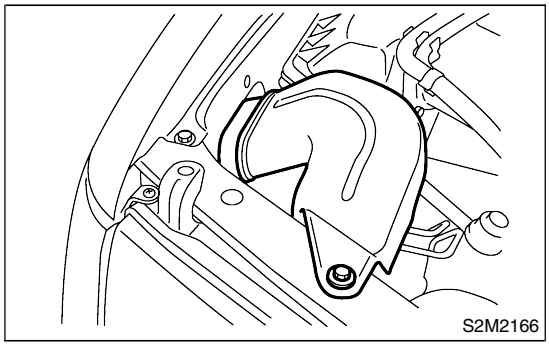
C: INSPECTION S184087A10

Replace if excessively damaged or dirty.

3. Air Intake Duct S184566

A: REMOVAL S184566A18

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



B: INSTALLATION S184566A11

Install in the reverse order of removal.

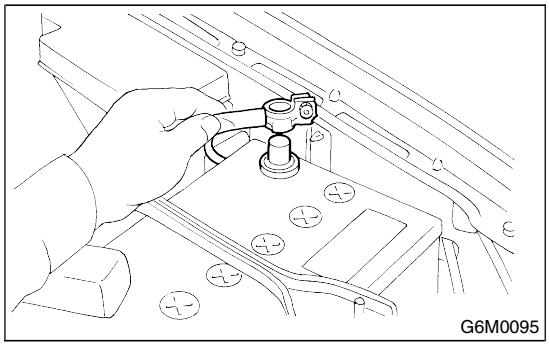
C: INSPECTION S184566A10

1) Inspect for cracks and loose connections.
2) Inspect that no foreign objects are mixed in the air intake duct.

4. Intake Duct S184760

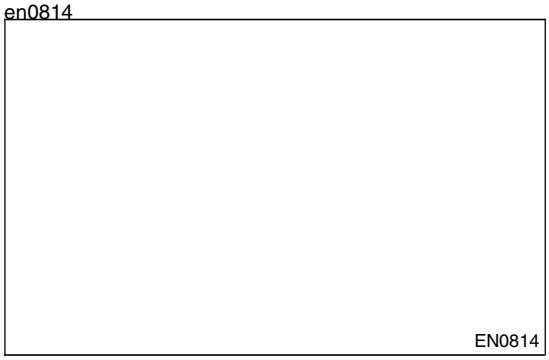
A: REMOVAL S184760A18

1) Disconnect battery ground cable.


G6M0095

2) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
3) Remove sensor, engine harness, and fuel pipe attached to the intake manifold. <Ref. to FU(DOHC TURBO)-21, DISASSEMBLY, Intake Manifold.>
4) Remove intake duct from intake manifold.

en0814


EN0814

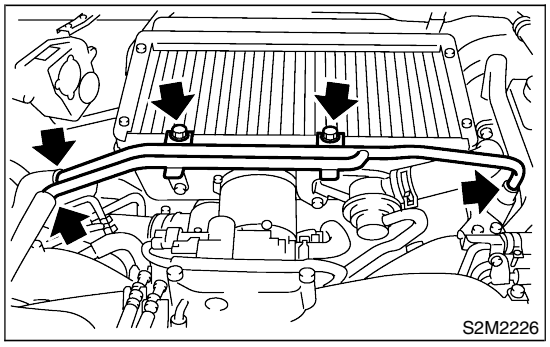
B: INSTALLATION S184760A11

Install in the reverse order of removal.

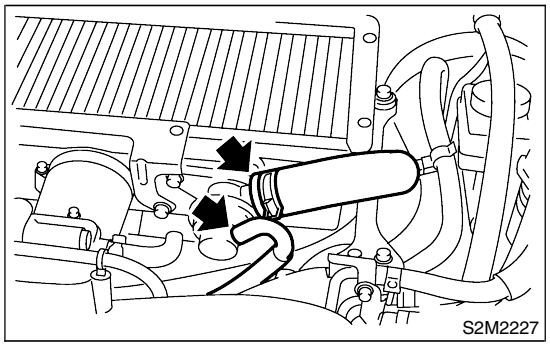
5. Intercooler S184761

A: REMOVAL S184761A18

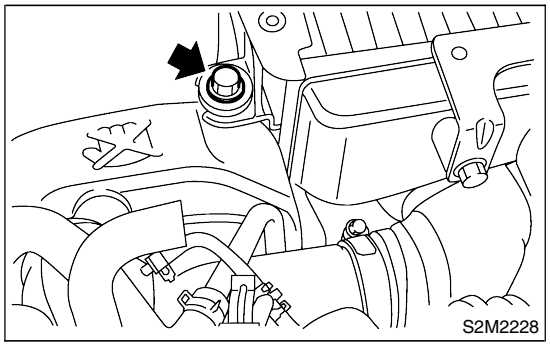
1) Remove air by-pass hoses from intercooler.

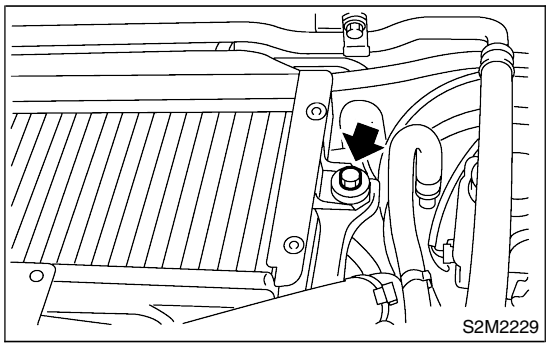

S2M2226

2) Loosen clamp, and remove hoses from air by-pass valve.


S2M2227

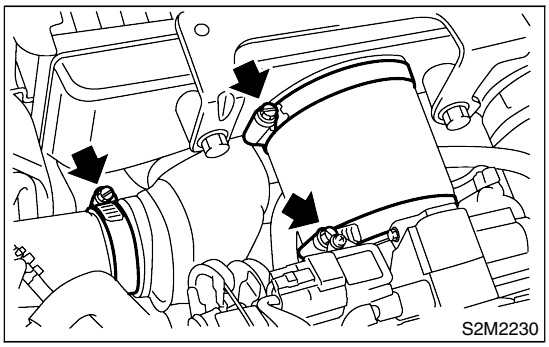
3) Remove bolts which secure intercooler to bracket.


S2M2228


S2M2229

4) Separate intercooler air duct from turbocharger.

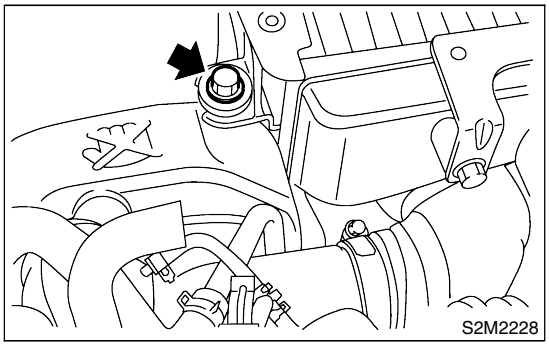
5) Separate intercooler from throttle body.

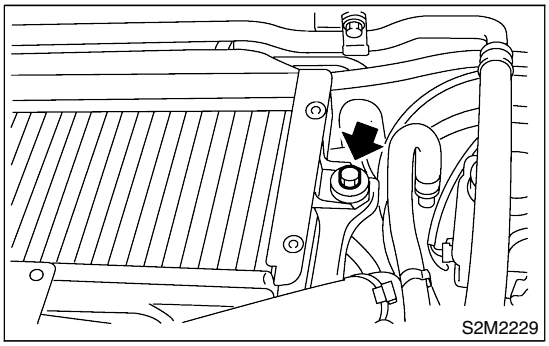

S2M2230

B: INSTALLATION S184761A11

Install in the reverse order of removal.

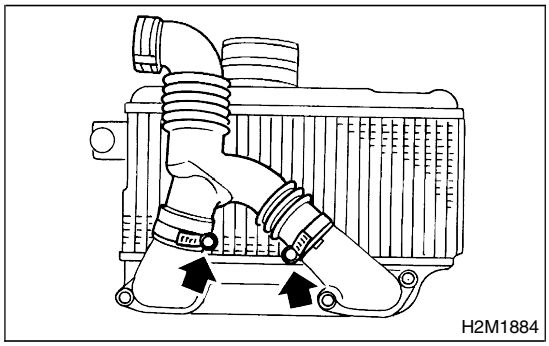
Tightening torque:
16 N·m (1.6 kgf-m, 11.7 ft-lb)


S2M2228

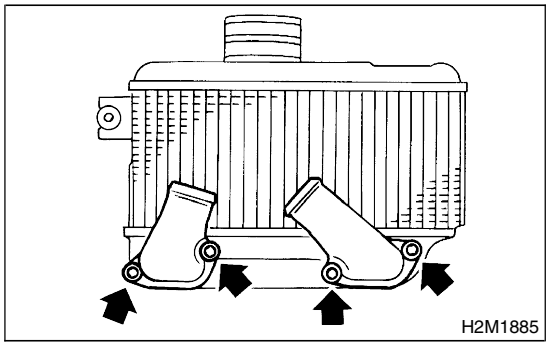

S2M2229

C: DISASSEMBLY S184761A06

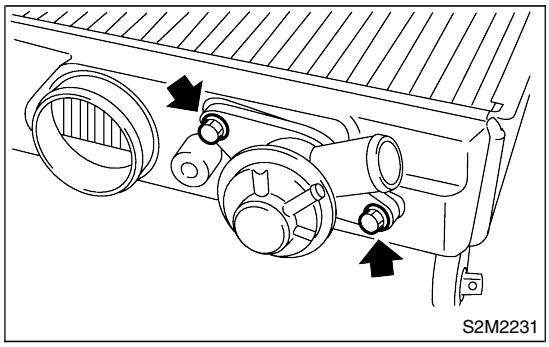
1) Loosen clamps, then remove intercooler duct.


H2M1884

2) Remove intercooler ducts from intercooler.


H2M1885

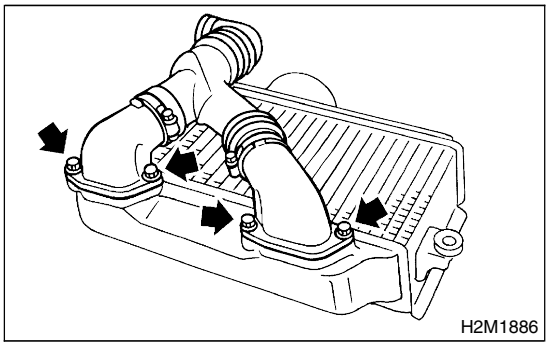
3) Remove air by-pass valve.

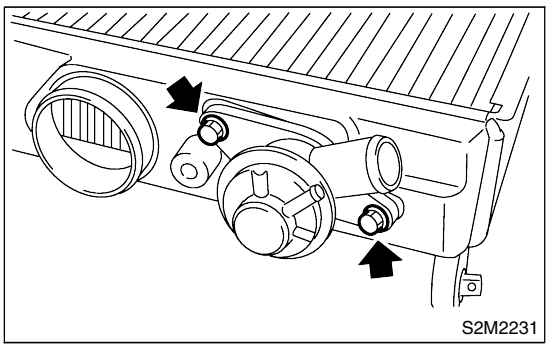

S2M2231

D: ASSEMBLY S184761A02

Assemble in the reverse order of disassembly.

Tightening torque:
16 N·m (1.6 kgf-m, 11.7 ft-lb)

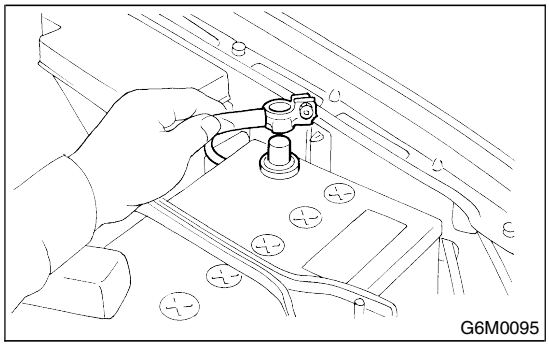

H2M1886


S2M2231

6. Turbocharger S184762

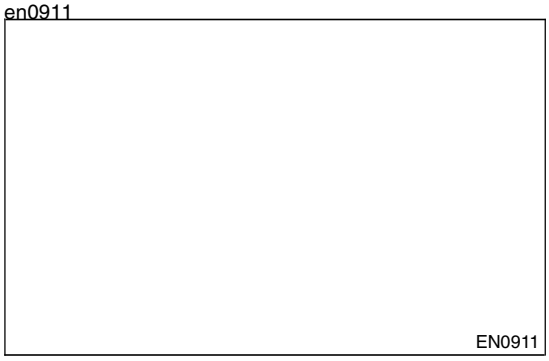
A: REMOVAL S184762A18

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


G6M0095

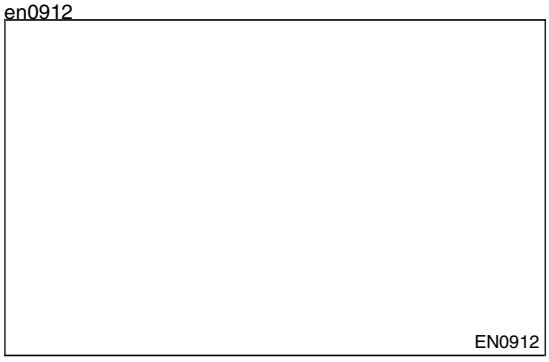
3) Remove center exhaust pipe. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>
4) Lower the vehicle.
5) Separate turbocharger joint pipe from turbocharger.

en0911

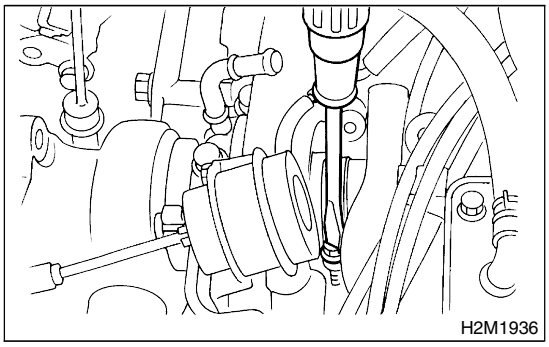

EN0911

6) Disconnect engine coolant hose which is connected to coolant filler tank.

en0912

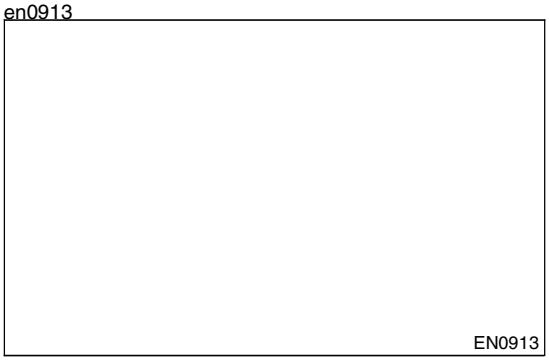

EN0912

7) Loosen clamp which secures turbocharger to air inlet duct.

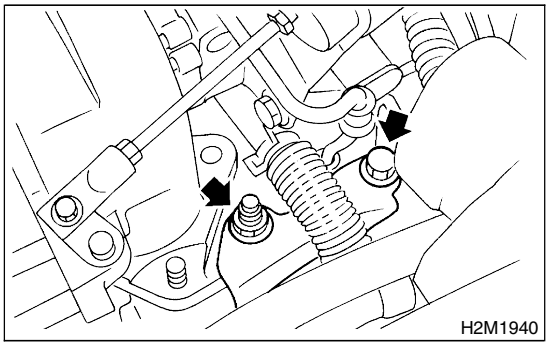

H2M1936

8) Remove bolt which secures bracket of oil pipe to turbocharger.
9) Remove oil pipe from turbocharger.

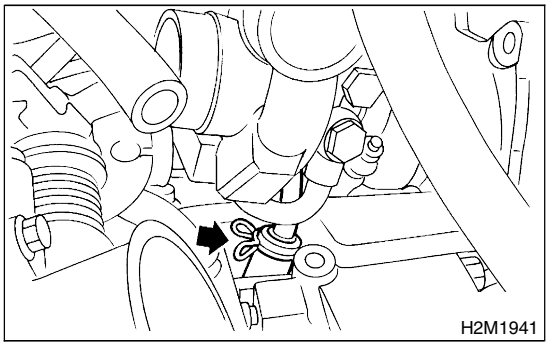
en0913


EN0913

10) Remove turbocharger bracket.


H2M1940

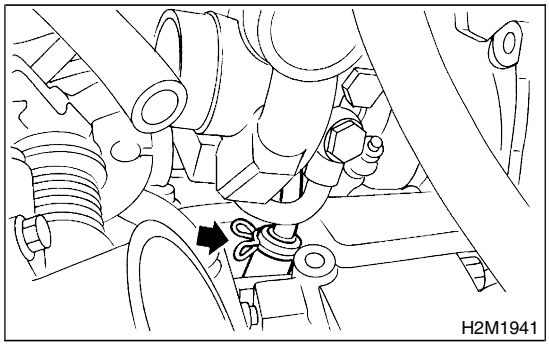
11) Disconnect oil outlet hose from pipe.


H2M1941

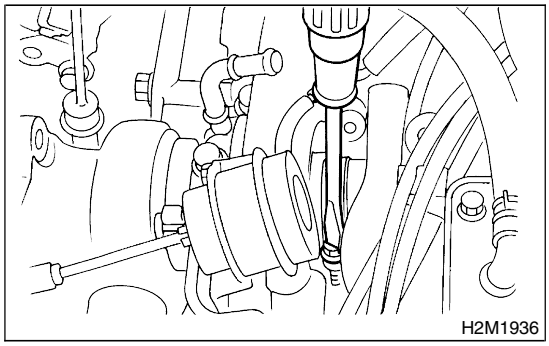
12) Take out turbocharger from engine compartment.

B: INSTALLATION S184762A11

1) Connect oil outlet hose to outlet pipe.

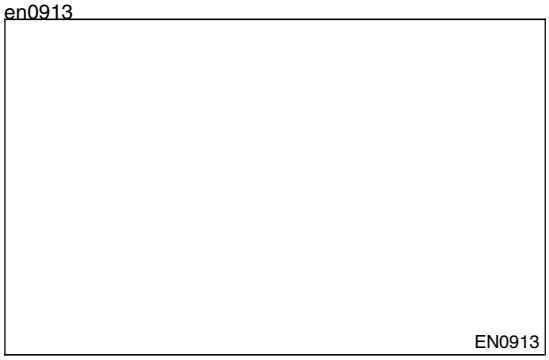


2) Install turbocharger to air intake duct.



3) Install oil pipe to turbocharger.

en0913

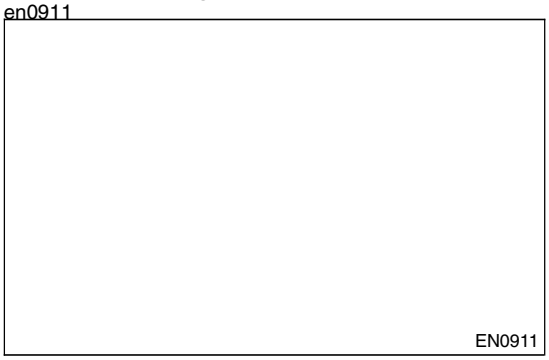


4) Install joint pipe to turbocharger.

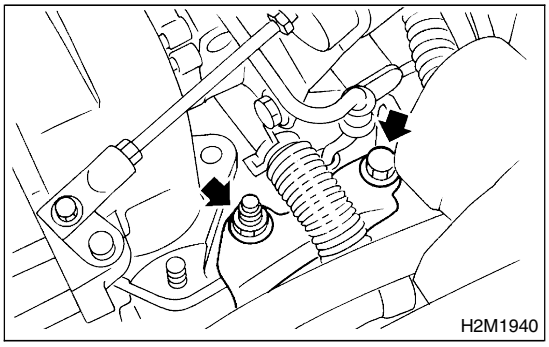
CAUTION:
Replace gasket with a new one.

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

en0911

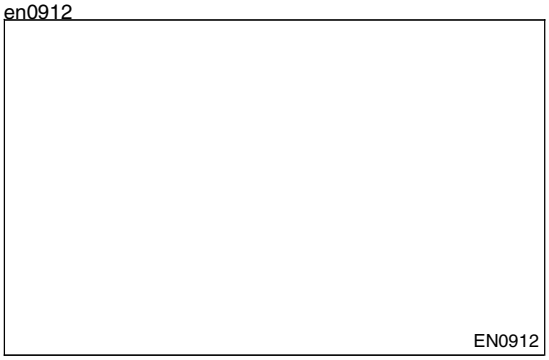


5) Install turbocharger bracket.



6) Connect engine coolant hose which is connected to coolant filler tank.

en0912

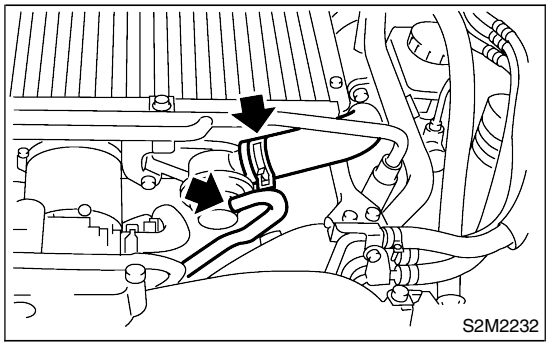


7) Lift-up the vehicle.
8) Install center exhaust pipe. <Ref. to EX(DOHC TURBO)-10, INSTALLATION, Center Exhaust Pipe.>

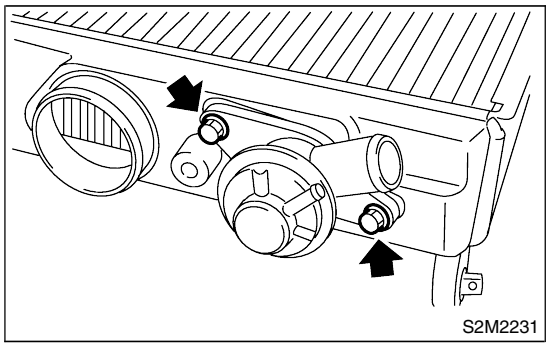
7. Air By-pass Valve S184016

A: REMOVAL S184016A18

1) Disconnect air by-pass hoses from air by-pass valve.



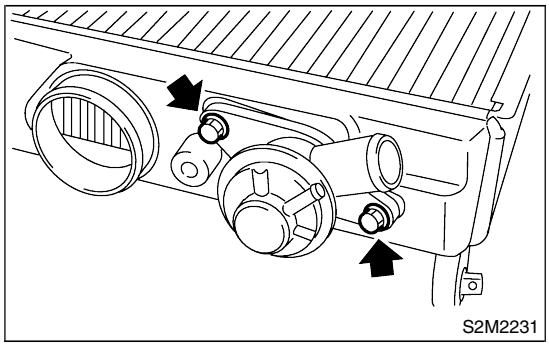
2) Remove air by-pass valve from intercooler.



B: INSTALLATION S184016A11

Install in the reverse order of removal.

Tightening torque:
16 N·m (1.6 kgf-m, 11.7 ft-lb)



MECHANICAL

ME(DOHC TURBO)

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1. General Description S183001

A: SPECIFICATIONS S183001E49

Engine	Type			Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine
	Valve arrangement			Belt driven, double overhead camshaft, 4-valve/cylinder
	Bore x Stroke		mm (in)	92 x 75 (3.62 x 2.95)
	Piston displacement		cm^3 (cu in)	1,994 (121.67)
	Compression ratio			8.0
	Compression pressure (at 200 — 300 rpm)		kPa (kg/cm^2, psi)	981 — 1,177 (10 — 12, 142 — 171)
	Number of piston rings			Pressure ring: 2, Oil ring: 1
	Intake valve timing	Opening		3° BTDC
		Closing		33° ABDC
	Exhaust valve timing	Opening		33° BBDC
		Closing		3° 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; “P” or “N” position on AT]		rpm	700±100 (No load) 800±150 (A/C switch ON)
	Firing order			1 → 3 → 2 → 4
	Ignition timing		BTDC/rpm	12°±10°/700 rpm

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

Belt tension 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.			18.0 — 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)
Camshaft	Bend limit			0.020 mm (0.0079 in)
	Thrust clearance		STD	0.015 — 0.070 mm (0.0006 — 0.0028 in)
			Limit	0.10 mm (0.0039 in)
	Cam lobe height	Intake	STD	44.75 — 44.85 mm (1.7618 — 1.7657 in)
			Limit	44.65 mm (1.759 in)
		Exhaust	STD	44.60 — 44.70 mm (1.7559 — 1.7598 in)
			Limit	44.50 mm (1.7520 in)
	Jounal O.D.	STD	Front	37.946 — 37.963 mm (1.4939 — 1.4946 in)
			Center rear	29.946 — 29.963 mm (1.1790 — 1.1796 in)
	Oil clearance		STD	0.037 — 0.072 mm (0.0015 — 0.0028 in)
			Limit	0.10 mm (0.0039 in)
Cylinder head	Surface warpage limit			0.05 mm (0.0020 in)
	Surface grinding limit			0.3 mm (0.012 in)
	Standard height			127.5 mm (5.02 in)
Valve seat	Refacing angle			90°
	Contacting width	Intake	STD	1.0 mm (0.039 in)
			Limit	1.7 mm (0.067 in)
		Exhaust	STD	1.5 mm (0.059 in)
			Limit	2.2 mm (0.087 in)
Valve guide	Inner diameter			6.000 — 6.015 mm (0.2362 — 0.2368 in)
	Protrusion above head			12.0 — 12.4 mm (0.472 — 0.488 in)
Valve	Head edge thickness	Intake	STD	1.2 mm (0.047 in)
			Limit	0.8 mm (0.031 in)
		Exhaust	STD	1.5 mm (0.059 in)
			Limit	0.8 mm (0.031 in)
	Stem diameter		Intake	5.950 — 5.965 mm (0.2343 — 0.2348 in)
			Exhaust	5.950 — 5.965 mm(0.2343 — 0.2348 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	104.4 mm (4.110 in)
			Exhaust	104.7 mm (4.122 in)
Valve spring	Free length			44.67 mm (1.7587 in)
	Squareness			2.5°, 2.0 mm (0.079 in)
	Tension/spring height			220.7±15.7 N (22.5±1.6 kgf, 49.6±3.5 lb)/36.0 mm (1.417 in) 510.9±25.5 N (52.1±2.6 kgf, 114.9±5.7 lb)/26.6 mm (1.0.47 in)

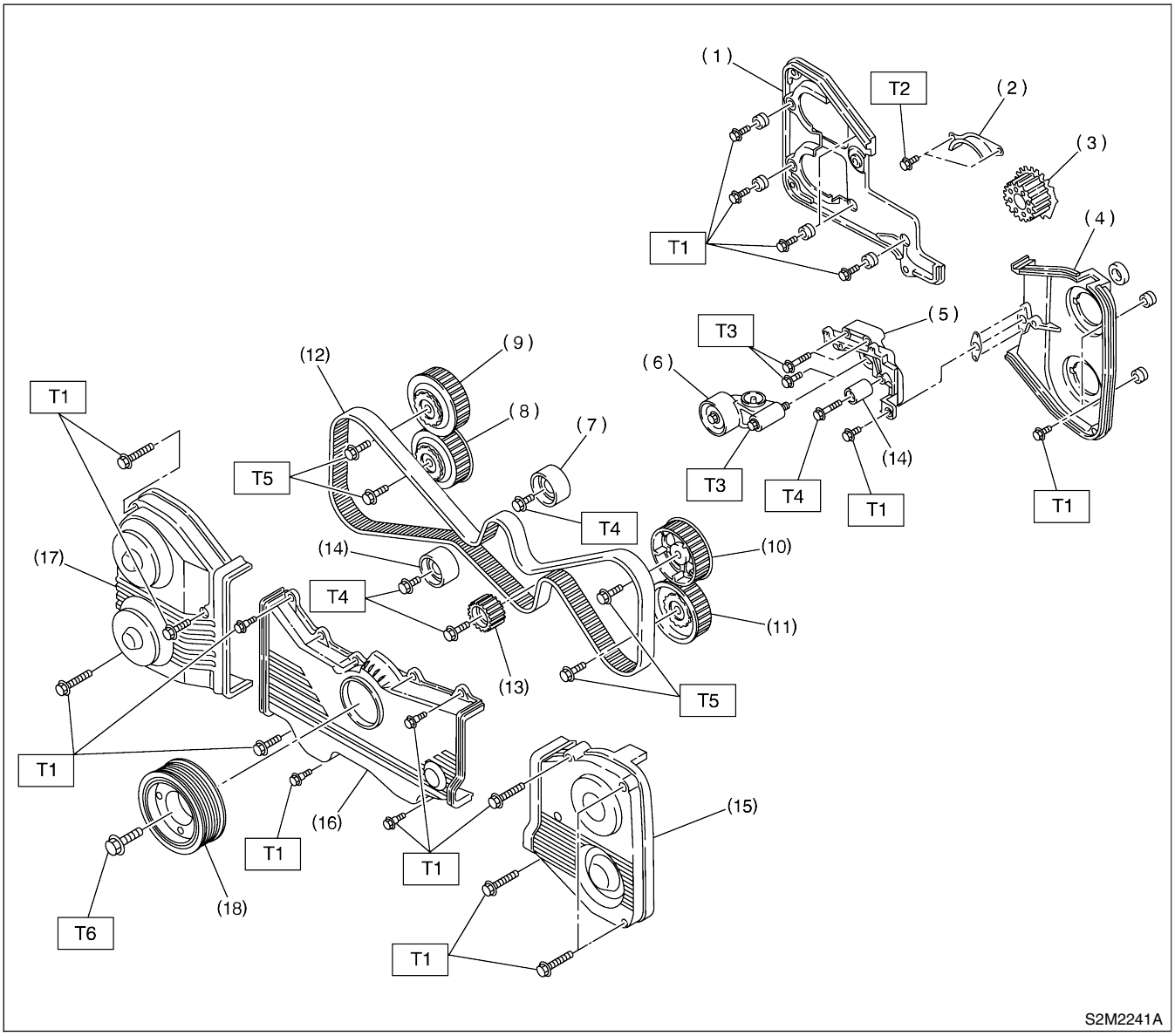
Cylinder block	Surface warpage limit (mating with cylinder head)			0.05 mm (0.0020 in)
	Surface grinding limit			0.1 mm (0.004 in)
	Cylinder bore	STD	A	92.005 — 92.015 mm (3.6222 — 3.6226 in)
			B	91.995 — 92.005 mm (3.6218 — 3.6222 in)
	Taper		STD	0.015 mm (0.0006 in)
			Limit	0.050 mm (0.0020 in)
	Out-of-roundness		STD	0.010 mm (0.0004 in)
			Limit	0.050 mm (0.0020 in)
	Piston clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)
			Limit	0.050 mm (0.0020 in)
	Enlarging (boring) limit			0.5 mm (0.020 in)
Piston	Outer diameter	STD	A	91.985 — 91.995 mm (3.6214 — 3.6218 in)
			B	91.975 — 91.985 mm (3.6211 — 3.6214 in)
		0.25 mm (0.0098 in) OS		92.225 — 92.235 mm (3.6309 — 3.6313 in)
		0.50 mm (0.0197 in) OS		92.475 — 92.485 mm (3.6407 — 3.6411 in)
Piston pin	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 — 0.26 mm (0.0079 — 0.0102 in)
			Limit	1.0 mm (0.039 in)
		Second ring	STD	0.35 — 0.50 mm (0.0138 — 0.0197 in)
			Limit	1.0 mm (0.039 in)
		Oil ring	STD	0.20 — 0.70 mm (0.0079 — 0.0276 in)
			Limit	1.5 mm (0.059 in)
	Clearance between piston ring and piston ring groove	Top ring	STD	0.040 — 0.080 mm (0.0016 — 0.0031 in)
			Limit	0.15 mm (0.0059 in)
		Second ring	STD	0.030 — 0.070 mm (0.0012 — 0.0028 in)
			Limit	0.15 mm (0.0059 in)
Connecting rod	Bend twist per 100 mm (3.94 in) in length		Limit	0.10 mm (0.0039 in)
	Side clearance		STD	0.070 — 0.330 mm (0.0028 — 0.0130 in)
			Limit	0.4 mm (0.016 in)
Connecting rod bearing	Oil clearance		STD	0.020 — 0.046 mm (0.0008 — 0.0018 in)
			Limit	0.05 mm (0.0020 in)
	Thickness at center portion		STD	1.492 — 1.501 mm (0.0587 — 0.0591 in)
			0.03 mm (0.0012 in) US	1.510 — 1.513 mm (0.0594 — 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)
Connecting rod bushing	Clearance between piston pin and bushing		STD	0 — 0.022 mm (0 — 0.0009 in)
			Limit	0.030 mm (0.0012 in)

Crankshaft	Bend limit			0.035 mm (0.0014 in)
	Crank pin and crank journal	Out-of-roundness		0.020 mm (0.0008 in) or less
		Grinding limit		0.25 mm (0.0098 in)
	Crank pin outer diameter		STD	51.984 — 52.000 mm (2.0466 — 2.0472 in)
			0.03 mm (0.0012 in) US	51.954 — 51.970 mm (2.0454 — 2.0461 in)
			0.05 mm (0.0020 in) US	51.934 — 51.950 mm (2.0466 — 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, #3, #5	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
		#2, #4	STD	59.992 — 60.008 mm (2.3619 — 2.3625 in)
			0.03 mm (0.0012 in) US	59.962 — 59.978 mm (2.3607 — 2.3613 in)
			0.05 mm (0.0020 in) US	59.942 — 59.958 mm (2.3599 — 2.3605 in)
			0.25 mm (0.0098 in) US	59.742 — 59.758 mm (2.3520 — 2.3527 in)
	Thrust clearance		STD	0.030 — 0.115 mm (0.0012 — 0.0045 in)
			Limit	0.25 mm (0.0098 in)
	Oil clearance		STD	0.010 — 0.030 mm (0.0004 — 0.0012 in)
			Limit	0.040 mm (0.0016 in)
Crankshaft bearing	Crankshaft bearing thickness	#1, #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)

MEMO:

B: COMPONENT S183001A05

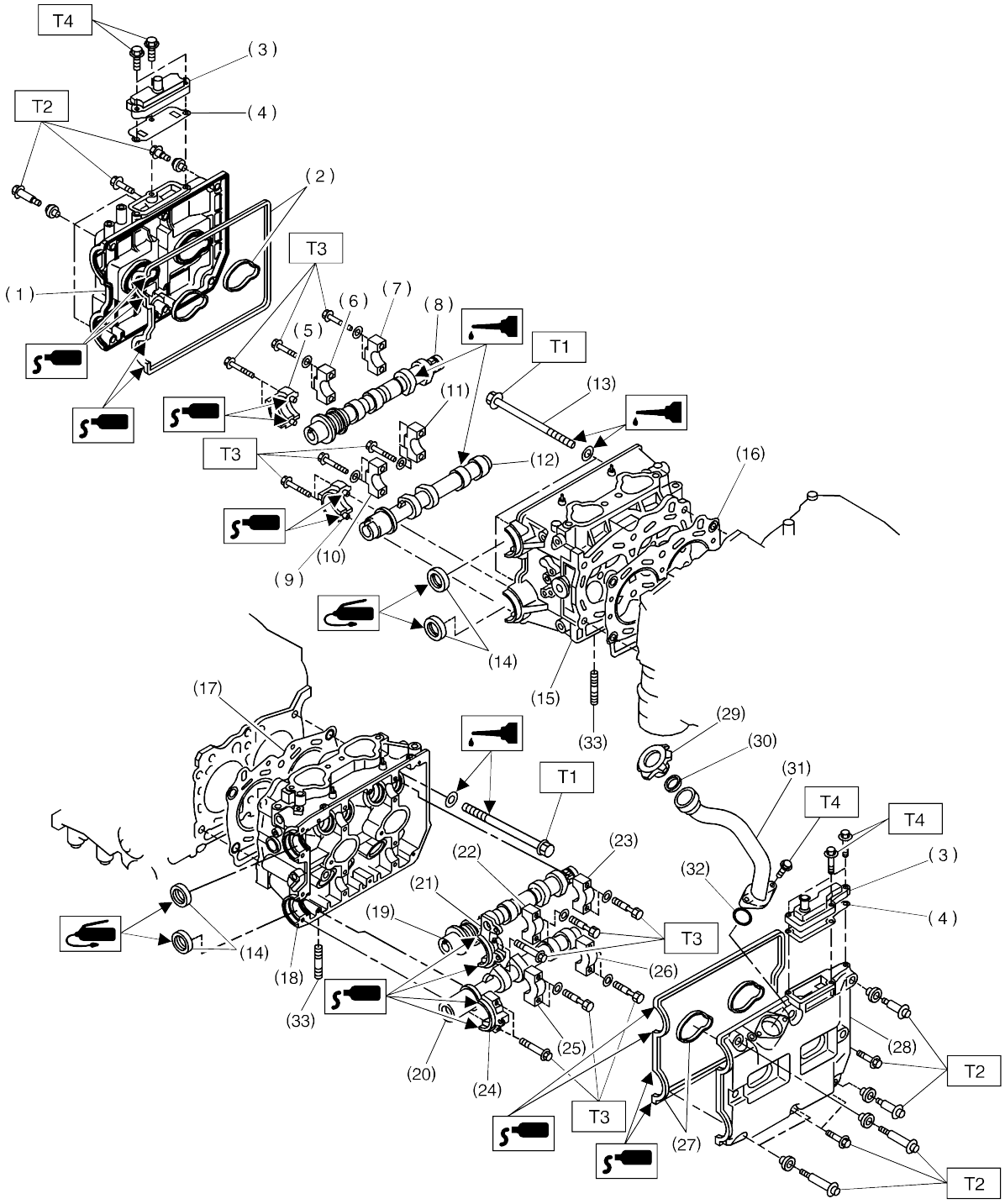
1. TIMING BELT S183001A0501



(1) Right-hand belt cover No. 2
(2) Timing belt guide (MT vehicles only)
(3) Crankshaft sprocket
(4) Left-hand belt cover No. 2
(5) Tensioner bracket
(6) Automatic belt tension adjuster ASSY
(7) Belt idler
(8) Right-hand exhaust camshaft sprocket
(9) Right-hand intake camshaft sprocket
(10) Left-hand intake camshaft sprocket
(11) Left-hand exhaust camshaft sprocket
(12) Timing belt
(13) Belt idler No. 2
(14) Belt idler
(15) Left-hand belt cover
(16) Front belt cover
(17) Right-hand belt cover
(18) Crankshaft pulley

Tightening torque: N·m (kgf-m, ft-lb)
T1: 5 (0.5, 3.6)
T2: 10 (1.0, 7)
T3: 25 (2.5, 18.1)
T4: 39 (4.0, 28.9)
T5: 98 (10, 72.4)
T6: 127 (13, 94.0)

2. CYLINDER HEAD AND CAMSHAFT S183001A0502

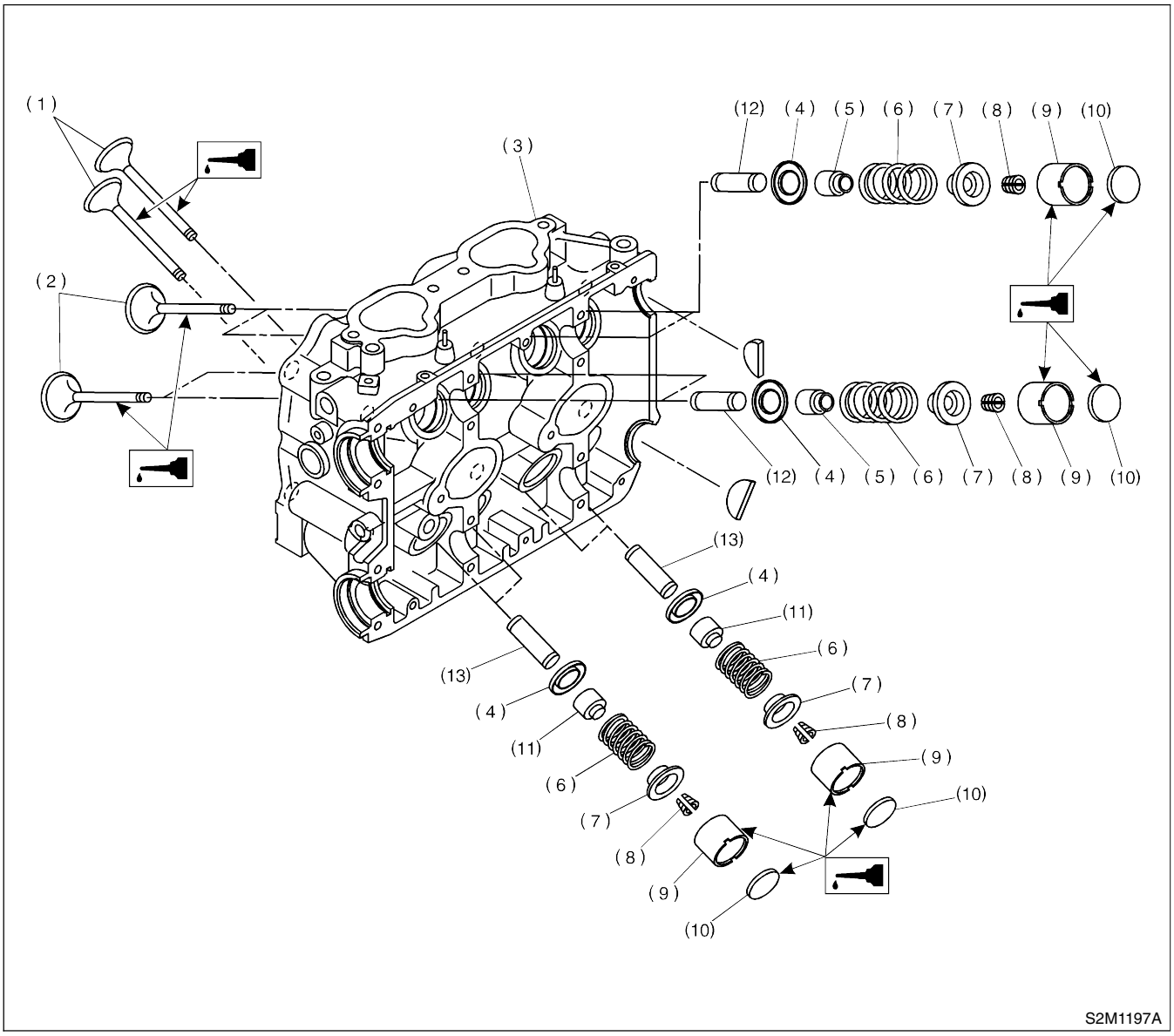


S2M1188A

(1) Rocker cover (RH)
(2) Rocker cover gasket (RH)
(3) Oil separator cover
(4) Gasket
(5) Intake camshaft cap (Front RH)
(6) Intake camshaft cap (Center RH)
(7) Intake camshaft cap (Rear RH)
(8) Intake camshaft (RH)
(9) Exhaust camshaft cap (Front RH)
(10) Exhaust camshaft cap (Center RH)
(11) Exhaust camshaft cap (Rear RH)
(12) Exhaust camshaft (RH)
(13) Cylinder head bolt
(14) Oil seal
(15) Cylinder head (RH)
(16) Cylinder head gasket (RH)
(17) Cylinder head gasket (LH)
(18) Cylinder head (LH)
(19) Intake camshaft (LH)
(20) Exhaust camshaft (LH)
(21) Intake camshaft cap (Front LH)
(22) Intake camshaft cap (Center LH)
(23) Intake camshaft cap (Rear LH)
(24) Exhaust camshaft (Front LH)
(25) Exhaust camshaft cap (Center LH)
(26) Exhaust camshaft cap (Rear LH)
(27) Rocker cover gasket (LH)
(28) Rocker cover (LH)
(29) Oil filler cap
(30) Gasket
(31) Oil filler duct
(32) O-ring
(33) Stud bolt

Tightening torque: N·m (kgf-m, ft-lb)
T1: <Ref. to ME(DOHC TURBO)-63, INSTALLATION, Cylinder Head Assembly.>
T2: 5 (0.5, 3.6)
T3: 10 (1.0, 7)
T4: 6.4 (0.65, 4.7)

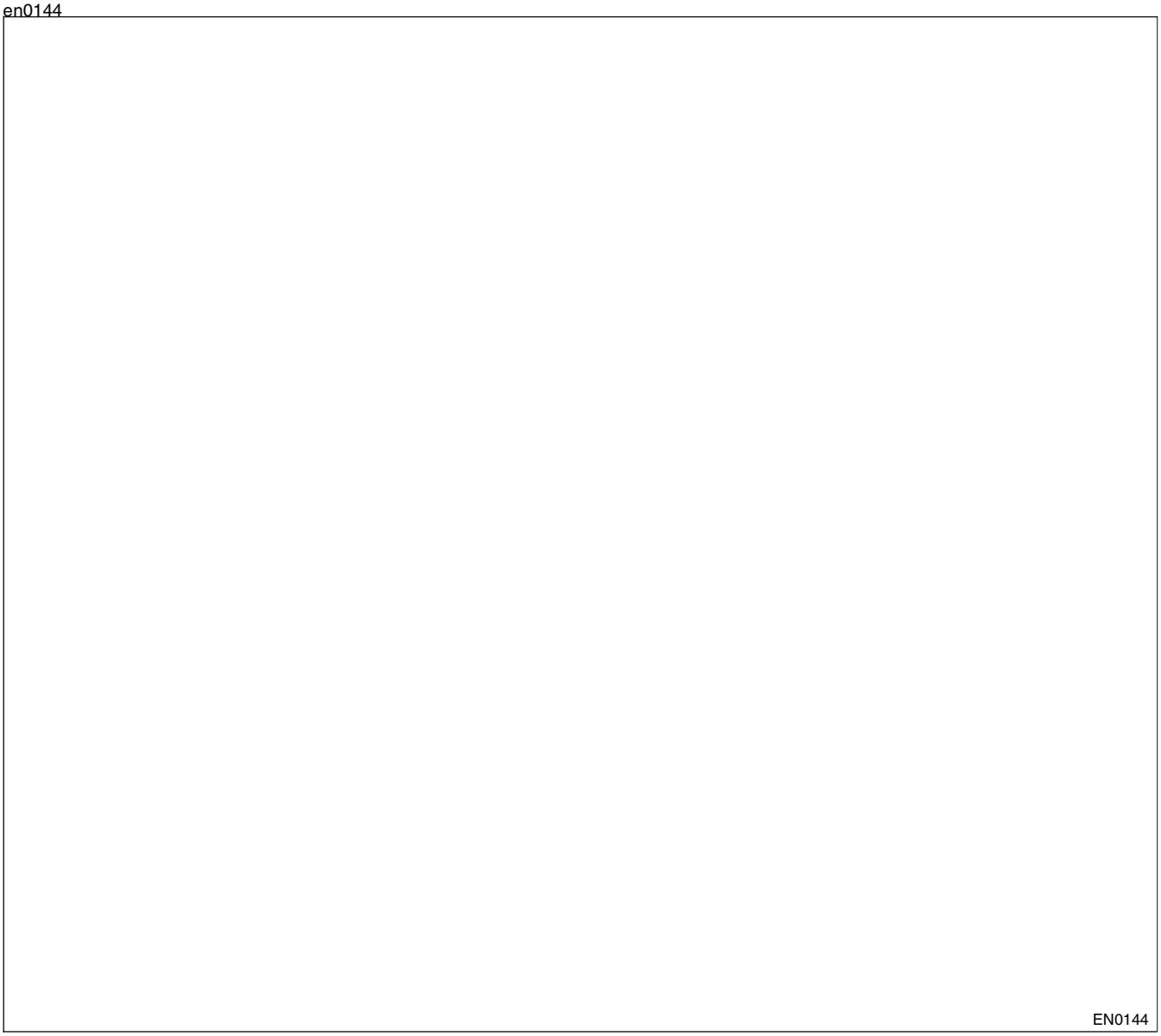
3. CYLINDER HEAD AND VALVE ASSEMBLY S183001A0503



(1) Exhaust valve
(2) Intake valve
(3) Cylinder head
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Retainer
(8) Retainer key
(9) Valve lifter
(10) Shim
(11) Exhaust valve oil seal
(12) Intake valve guide
(13) Exhaust valve guide

4. CYLINDER BLOCK S183001A0504

en0144

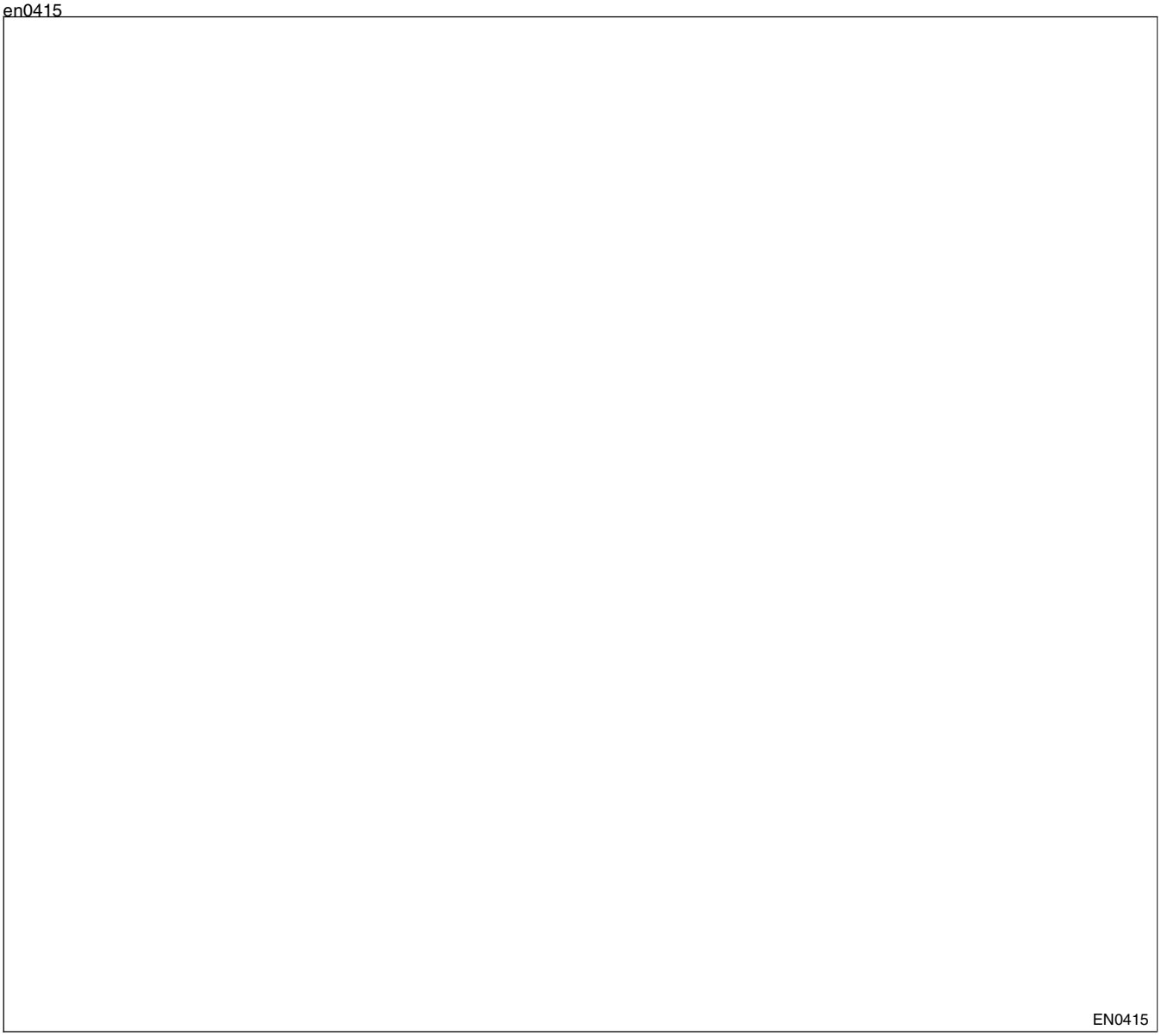


(1) Oil pressure switch
(2) Cylinder block (RH)
(3) Service hole plug
(4) Gasket
(5) Oil separator cover
(6) Water by-pass pipe
(7) Oil pump
(8) Front oil seal
(9) Rear oil seal
(10) O-ring
(11) Service hole cover
(12) Cylinder block (LH)
(13) Water pump
(14) Baffle plate
(15) Oil cooler
(16) Waster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

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: 55 (5.5, 40)

5. CRANKSHAFT AND PISTON S183001A0505

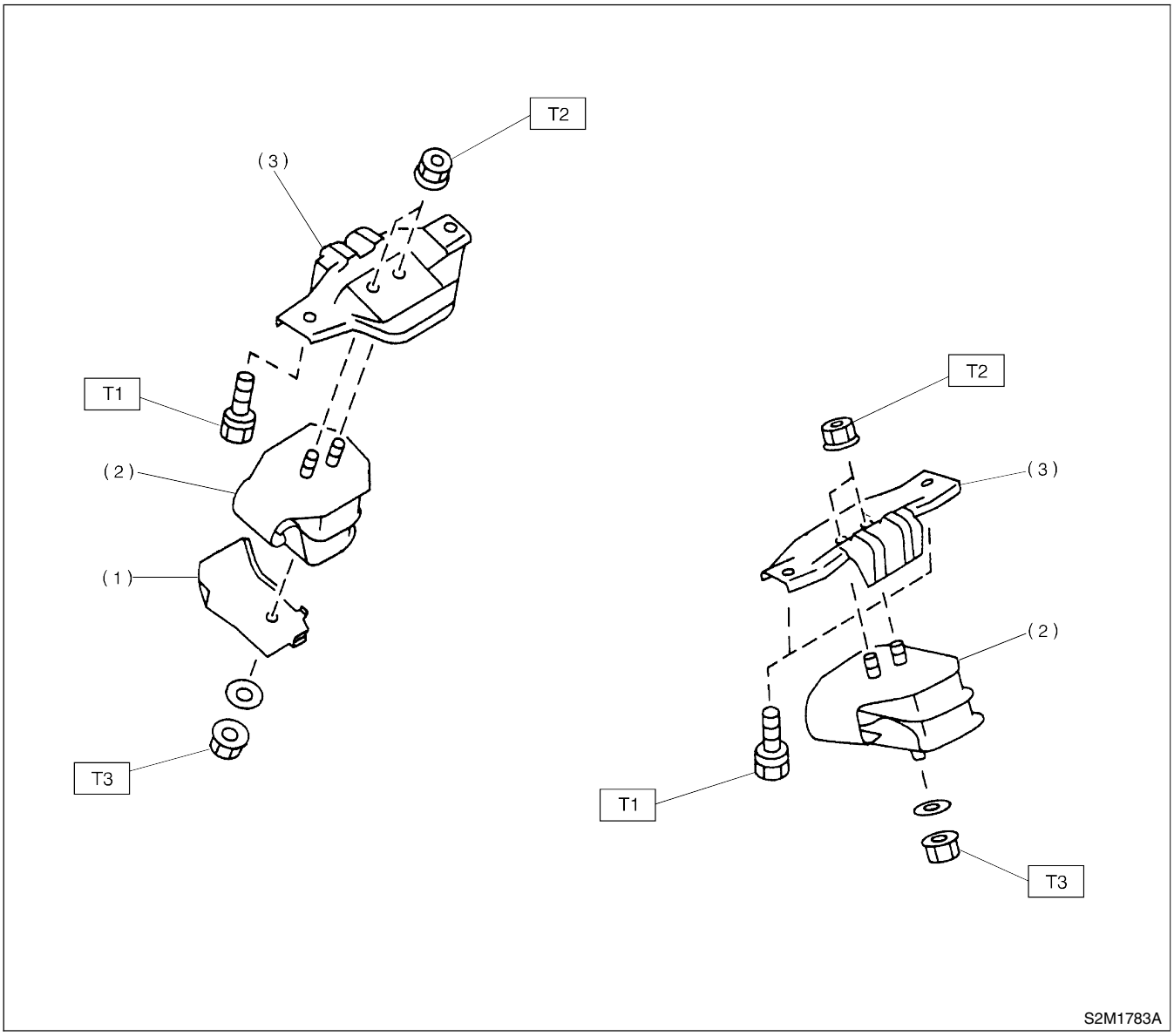
en0415



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

Tightening torque: N·m (kgf-m, ft-lb)
T1: 44.6 (4.55, 32.9)
T2: 72 (7.3, 52.8)

6. ENGINE MOUNTING S183001A0506



(1) Hear shield cover
(2) Front cushion rubber
(3) Front engine mounting bracket

Tightening torque: N·m (kgf-m, ft-lb)
T1: 35 (3.6, 25.8)
T2: 42 (4.3, 30.9)
T3: 85 (8.7, 62.7)

C: CAUTION S183001A03

- 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 S183001A17

1. SPECIAL TOOLS S183001A1701

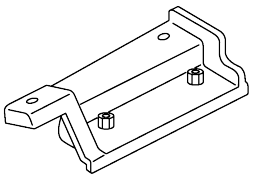
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
en0147 EN0147	498267600	CYLINDER HEAD TABLE	• Used for replacing valve guides. • Used for removing and installing valve springs.
 B2M3851	498457000	ENGINE STAND ADAPTER RH	Used with ENGINE STAND (499817000).

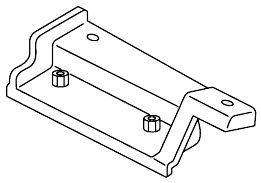
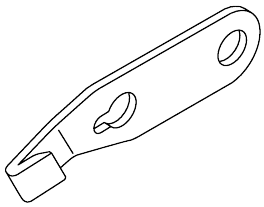
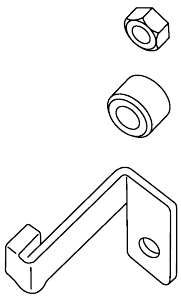
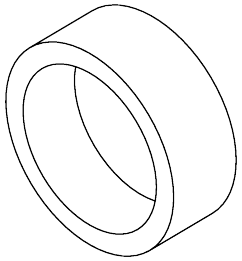
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3852	498457100	ENGINE STAND ADAPTER LH	Used with ENGINE STAND (499817000).
 B2M3853	498497100	CRANKSHAFT STOPPER	Used for stopping rotation of flywheel when loosening and tightening crankshaft pulley bolt, etc.
 B3M2043	498277200	STOPPER SET	Used for removing and installing automatic transmission assembly to engine
 B2M3854	398744300	PISTON GUIDE	Used for installing piston in cylinder.

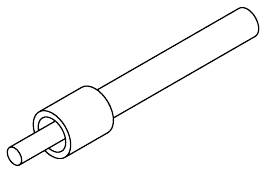
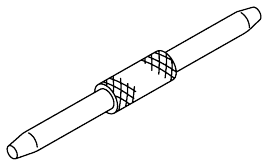
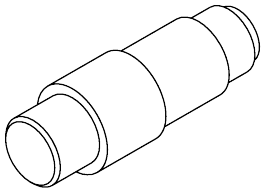
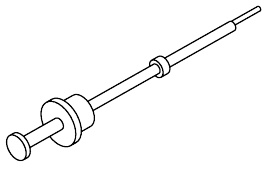
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3855	498857100	VALVE OIL SEAL GUIDE	Used for press-fitting of intake and exhaust valve guide oil seals.
 B2M3856	499017100	PISTON PIN GUIDE	Used for installing piston pin, piston and connecting rod.
 B2M3857	499037100	CONNECTING ROD BUSHING REMOVER & INSTALLER	Used for removing and installing connecting rod bushing.
 B2M3858	499097700	PISTON PIN REMOVER ASSY	Used for removing piston pin.

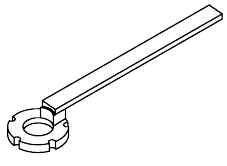
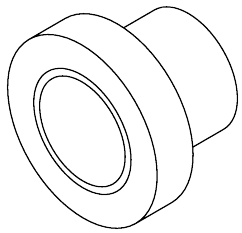
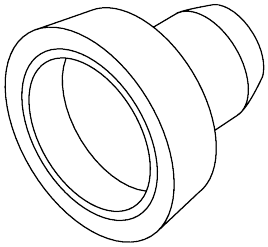
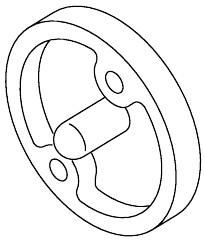
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M4158	499207400	CAMSHAFT SPROCKET WRENCH	Used for removing and installing camshaft sprocket.
 B2M3860	499587700	CAMSHAFT OIL SEAL INSTALLER	Used for installing cylinder head plug.
 B2M3861	499587200	CRANKSHAFT OIL SEAL INSTALLER	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL GUIDE (499597100).
 B2M3863	499597100	CRANKSHAFT OIL SEAL GUIDE	• Used for installing crankshaft oil seal. • Used with CRANKSHAFT OIL SEAL INSTALLER (499587200).

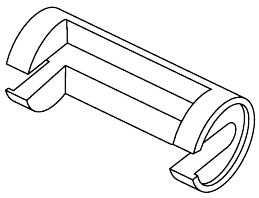
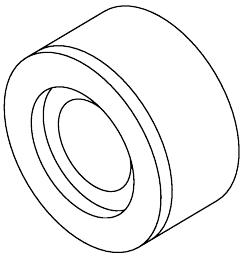
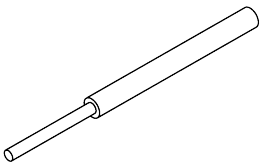
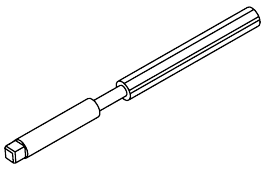
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3864	499718000	VALVE SPRING REMOVER	Used for removing and installing valve spring.
 B2M3865	498267700	VALVE GUIDE ADJUSTER	Used for installing intake and exhaust valve guides.
 B2M3867	499767200	VALVE GUIDE REMOVER	Used for removing valve guides.
 B2M3868	499767400	VALVE GUIDE REAMER	Used for reaming valve guides.

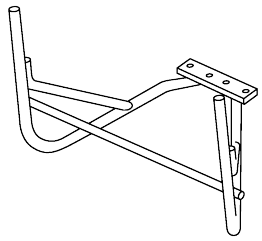
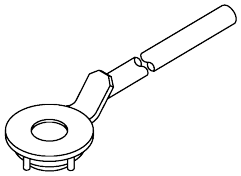
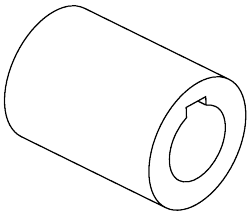
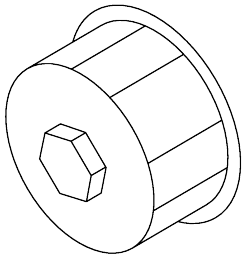
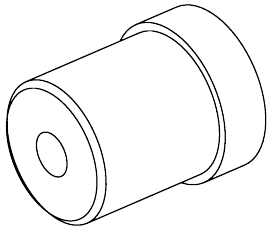
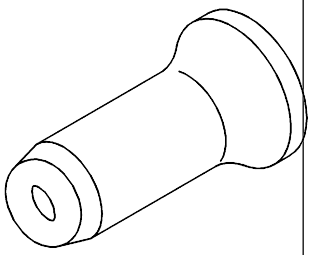
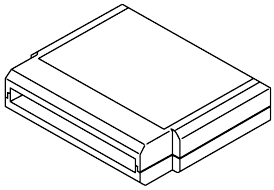
ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3869	499817000	ENGINE STAND	• Stand used for engine disassembly and assembly. • Used with ENGINE STAND ADAPTER RH (498457000) & LH (498457100).
 B2M4157	499977300	CRANK PULLEY WRENCH	Used for stopping rotation of crankshaft pulley when loosening and tightening crankshaft pulley bolts.
 B2M3871	499987500	CRANKSHAFT SOCKET	Used for rotating crankshaft.
 B2M3872	498547000	OIL FILTER WRENCH	Used for removing and installing oil filter.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3875	499587100	OIL SEAL INSTALLER	Used for installing oil pump oil seal.
 S1H0136	499587600	OIL SEAL GUIDE	Used for installing camshaft oil seal.
~~en0168~~ EN0168	499597200	OIL SEAL GUIDE	Used for installing camshaft oil seal. Used with OIL SEAL GUIDE (499587600).
~~en0169~~ EN0169	49818200	SHIM REPLACER	Used for correct valve clearance.
 B2M3876	24082AA150 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. GENERAL PURPOSE TOOLS *S183001A1702*

TOOL NAME	REMARKS
Compression Gauge	Used for measuring compression.
Timing Light	Used for measuring ignition timing.

E: PROCEDURE S183001E45

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.

- V-belt
- Timing Belt
- Camshaft
- Cylinder Head

2. Compression S183081

A: INSPECTION S183081A10

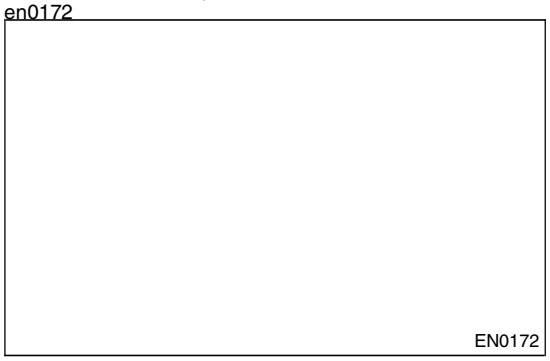
CAUTION:
After warming-up, engine becomes very hot. Be careful not to burn yourself during measurement.

1) After warming-up the engine, turn ignition switch to OFF.
2) Make sure that the battery is fully charged.
3) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
4) Remove all the spark plugs. <Ref. to IG(DOHC TURBO)-4, REMOVAL, Spark Plug.>
5) Fully open throttle valve.
6) Check the starter motor for satisfactory performance and operation.
7) Hold the compression gauge tight against the spark plug hole.

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

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

en0172



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

Compression (350 rpm and fully open throttle):
Standard;
981 — 1,177 kPa (10.0 — 12.0 kg/cm^2, 142 — 171 psi)
Limit;
981 kPa (10.0 kg/cm^2, 142 psi)
Difference between cylinders;
49 kPa (0.5 kg/cm^2, 7 psi)

3. Idle Speed S183082

A: INSPECTION S183082A10

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) Insert the cartridge to SUBARU SELECT MONITOR.
5) Connect SUBARU SELECT MONITOR to the data link connector.
6) Turn ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.
7) Select {2. Each System Check} in Main Menu.
8) Select {Engine Control System} in Selection Menu.
9) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.
10) Select {1.12 Data Display} in Data Display Menu.
11) Start the engine, and read engine idle speed.
12) 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 position (AT)]:
700±100 rpm

13) 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]:
800±150 rpm

CAUTION:
Never rotate idle adjusting screw. If idle speed is out of specifications, refer to General On-board Diagnosis Table under “Engine Control System”. <Ref. to EN(DOHC TURBO)-2, Basic Diagnostic Procedure.>

4. Ignition Timing S183086

A: INSPECTION S183086A10

1) Before checking ignition timing speed, check the following:
   (1) Ensure that air cleaner element is free from clogging, 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) Insert the cartridge to SUBARU SELECT MONITOR.
5) Connect SUBARU SELECT MONITOR to the data link connector.
6) Turn ignition switch to ON, and SUBARU SELECT MONITOR switch to ON.
7) Select {2. Each System Check} in Main Menu.
8) Select {Engine Control System} in Selection Menu.
9) Select {1. Current Data Display & Save} in Engine Control System Diagnosis.
10) Select {1.12 Data Display} in Data Display Menu.
11) Start the engine, at idle speed and check the ignition timing.

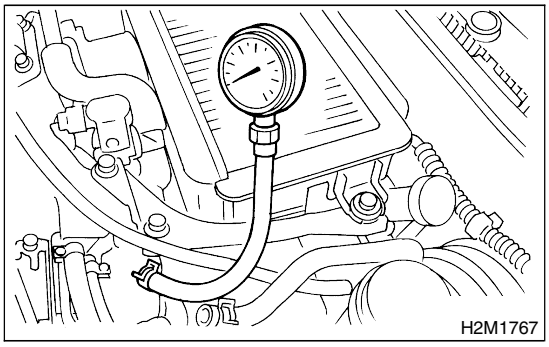
Ignition timing [BTDC/rpm]:
12°±10°/700

If the timing is not correct, check the ignition control system. Refer to Engine Control System. <Ref. to EN(DOHC TURBO)-2, Basic Diagnostic Procedure.>

5. Intake Manifold Vacuum S183654

A: INSPECTION S183654A10

1) Warm-up the engine.
2) Disconnect the brake vacuum hose and install the vacuum gauge to the hose fitting on the manifold.
3) Keep the engine at the idle speed and read the vacuum gauge indication.
By observing the gauge needle movement, the internal condition of the engine can be diagnosed as described below.



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

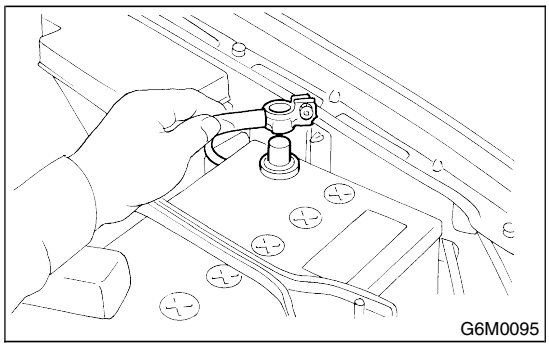
Diagnosis of engine condition by measurement of manifold vacuum	
Vacuum gauge indication	Possible engine condition
1. Needle is steady but lower than normal position. This tendency becomes more evident as engine temperature rises.	Leakage around intake manifold gasket or disconnection or damaged vacuum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

4) After measuring intake manifold vacuum, install brake vacuum hose.

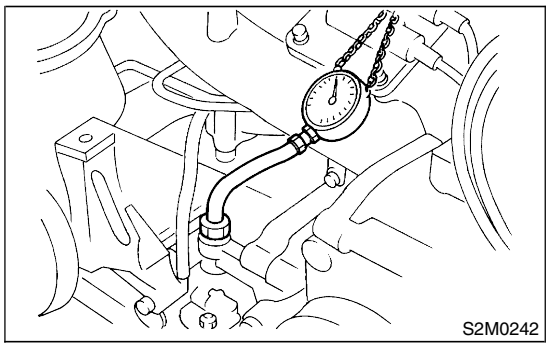
6. Engine Oil Pressure S183655

A: INSPECTION S183655A10

1) Remove oil pressure switch from engine cylinder block. <Ref. to LU-21, REMOVAL, Oil Pressure Switch.>
2) Connect oil pressure gauge hose to cylinder block.
3) Connect battery ground cable.


G6M0095

4) Start the engine, and measure oil pressure.


S2M0242

Oil pressure:
98 kPa (1.0 kg/cm^2, 14 psi) or more at 800 rpm
294 kPa (3.0 kg/cm^2, 43 psi) or more at 5,000 rpm

CAUTION:
• If oil pressure is out of specification, check oil pump, oil filter and lubrication line. <Ref. to LU-25, INSPECTION, Engine Lubrication System Trouble in General.>
• If oil pressure warning light is turned ON and oil pressure is in specification, replace oil pressure switch. <Ref. to LU-25, INSPECTION, Engine Lubrication System Trouble in General.>

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

5) After measuring oil pressure, install oil pressure switch. <Ref. to LU-21, INSTALLATION, Oil Pressure Switch.>

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

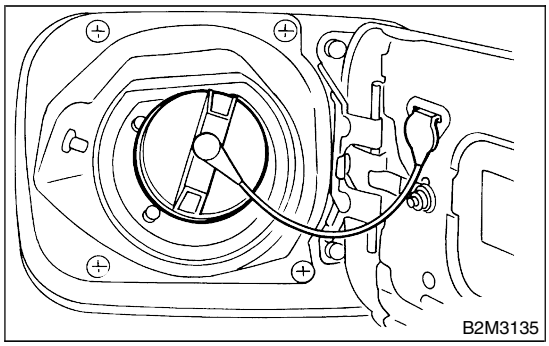
7. Fuel Pressure S183656

A: INSPECTION S183656A10

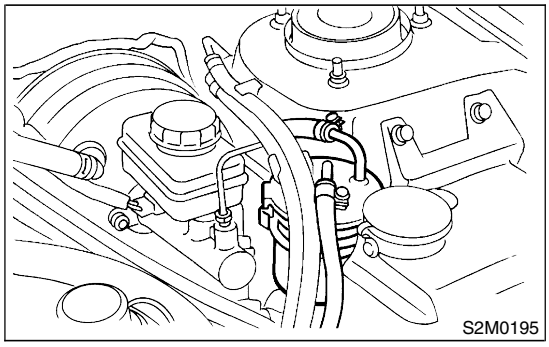
WARNING:
Before removing fuel pressure gauge, release fuel pressure.

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

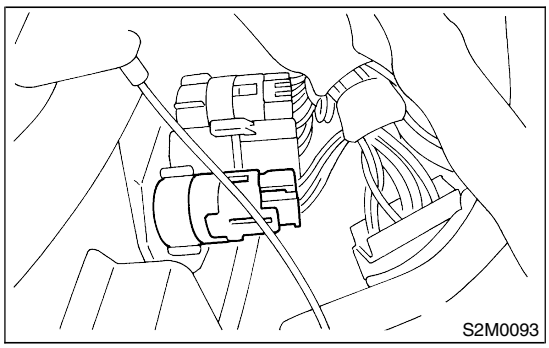
1) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
2) Open fuel flap lid, and remove fuel filler cap.


B2M3135

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

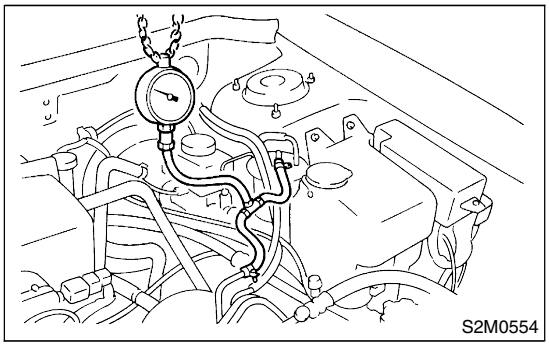

S2M0195

4) Connect connector of fuel pump relay.


S2M0093

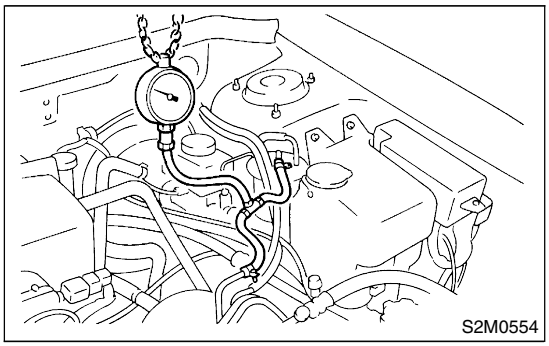
5) Start the engine.
6) Measure fuel pressure while disconnecting pressure regulator vacuum hose from intake manifold.

Fuel pressure:
Standard; 284 — 314 kPa (2.9 — 3.2 kg/cm^2, 41 — 46 psi)


S2M0554

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

Fuel pressure:
Standard; 230 — 260 kPa (2.35 — 2.65 kg/cm^2, 33 — 38 psi)


S2M0554

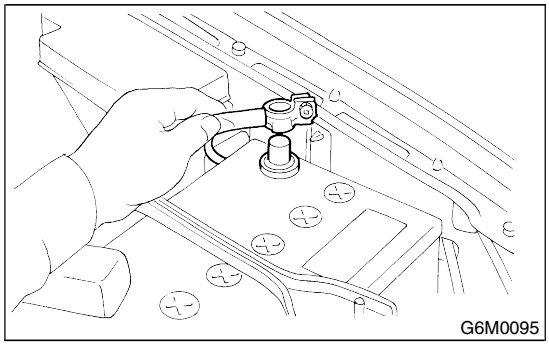
NOTE:
The fuel pressure gauge registers 10 to 20 kPa (0.1 to 0.2 kg/cm^2, 1 to 3 psi) higher than standard values during high-altitude operations.

8. Valve Clearance S183083

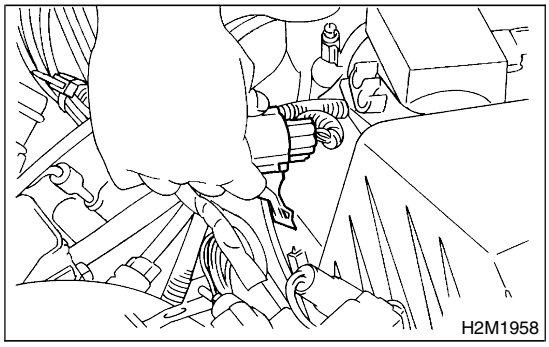
A: INSPECTION S183083A10

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.

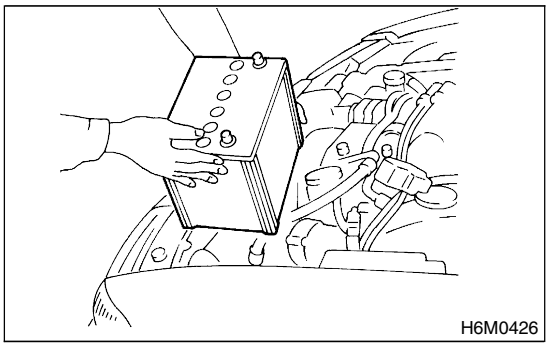

G6M0095

3) Remove air intake duct. <Ref. to IN(DOHC TURBO)-8, REMOVAL , Air Intake Duct.>
4) Remove one bolt which secures timing belt cover (RH).
5) Lift-up the vehicle.
6) Remove under cover.
7) Loosen remaining bolts which secure timing belt cover (RH), then remove belt cover.
8) Lower the vehicle.
9) When inspecting #1 and #3 cylinders:
(1) Pull out engine harness connector with bracket from air cleaner upper cover.

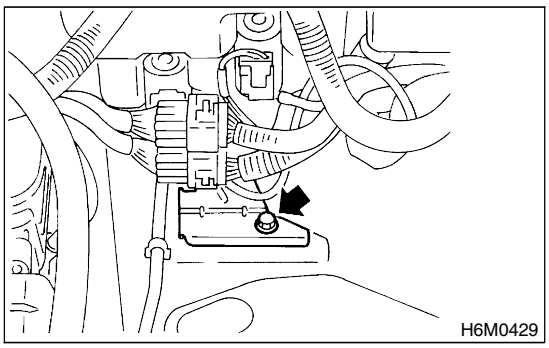

H2M1958

(2) Remove air cleaner case. <Ref. to IN(DOHC TURBO)-7, REMOVAL, Air Cleaner.>
(3) Disconnect spark plug cords from spark plugs (#1 and #3 cylinders).
(4) Place suitable container under the vehicle.
(5) Disconnect PCV hose from rocker cover (RH).
(6) Remove bolts, then remove rocker cover (RH).

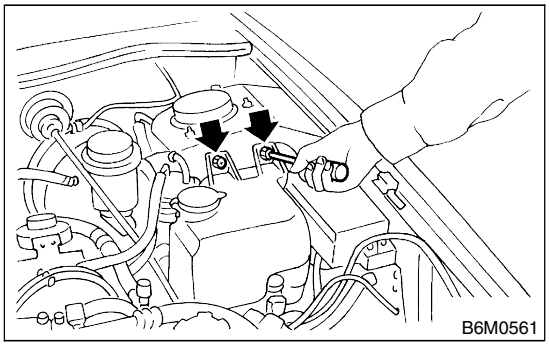
10) When inspecting #2 and #4 cylinders;
(1) Disconnect battery cables, and then remove battery and battery carrier.


H6M0426

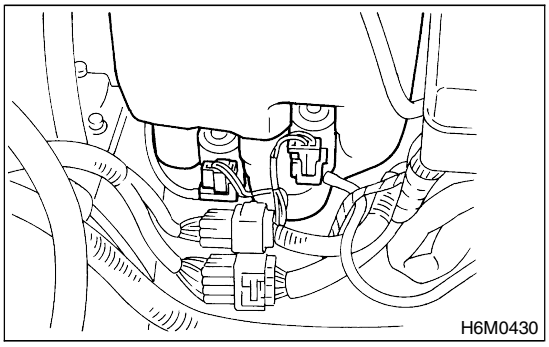
(2) Remove bolt which secures engine harness bracket onto body.


H6M0429

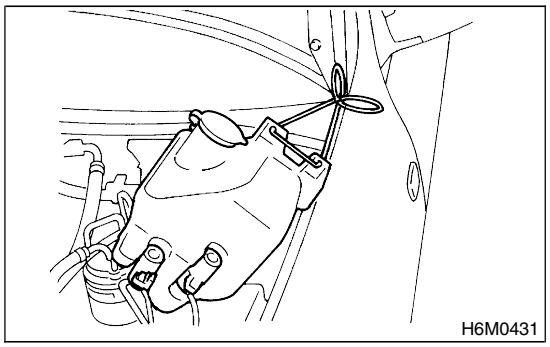
(3) Remove washer tank mounting bolts.


B6M0561

(4) Disconnect washer motor connectors.


H6M0430

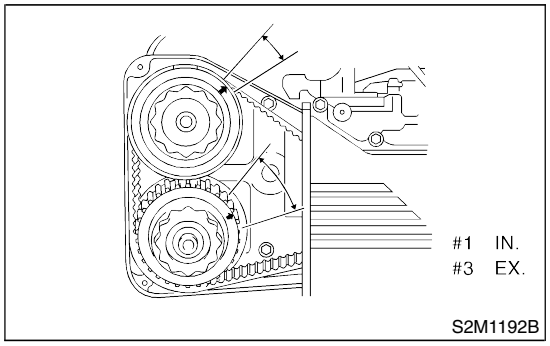
(5) Move washer tank upward.


H6M0431

(6) Disconnect spark plug cords from spark plugs (#2 and #4 cylinders).
(7) Place suitable container under the vehicle.
(8) Disconnect PCV hose from rocker cover (LH).
(9) Remove bolts, then remove rocker cover (LH).

11) Turn crankshaft pulley clockwise until arrow mark on camshaft sprocket is set to position shown in figure.

NOTE:
Turn crankshaft using ST.
ST 499987500 CRANKSHAFT SOCKET



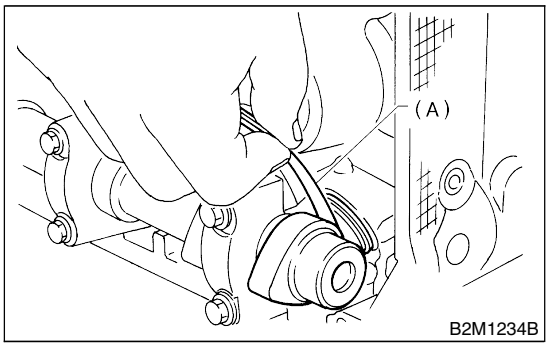
S2M1192B

12) Measure #1 cylinder intake valve and #3 cylinder exhaust valve clearance by using thickness gauge (A).

CAUTION:
● Insert the thickness gauge in as horizontal a direction as possible with respect to the shim.
● 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)

NOTE:
If the measured value is not within specification, take notes of the value in order to adjust the valve clearance later on.

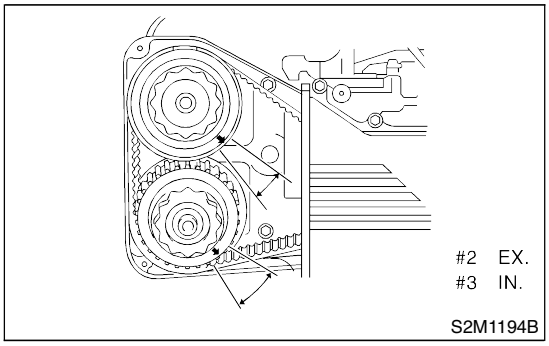


B2M1234B

13) If necessary, adjust the valve clearance. <Ref. to ME(DOHC TURBO)-30, ADJUSTMENT, Valve Clearance.>

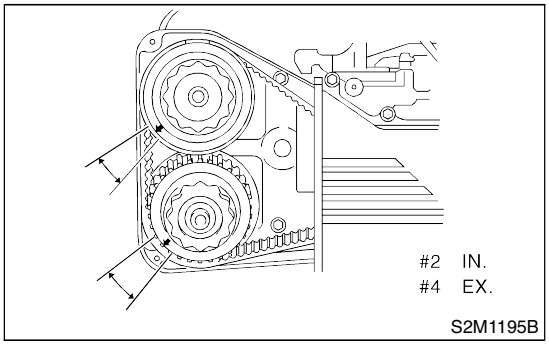
14) Further turn crankshaft pulley clockwise. Using the same procedures described previously, then measure valve clearances again.

(1) Set arrow mark on camshaft sprocket to position shown in figure, and measure #2 cylinder exhaust valve and #3 cylinder intake valve clearances.



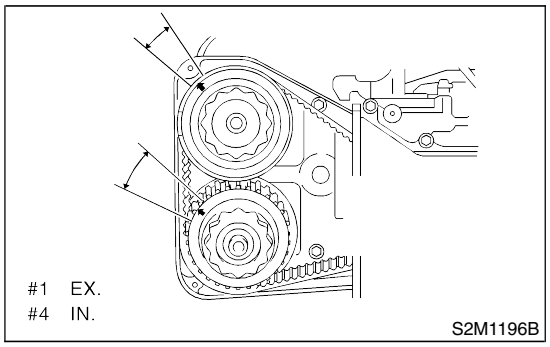
S2M1194B

(2) Set arrow mark on camshaft sprocket to position shown in figure, and measure #2 cylinder intake valve and #4 cylinder exhaust valve clearances.



S2M1195B

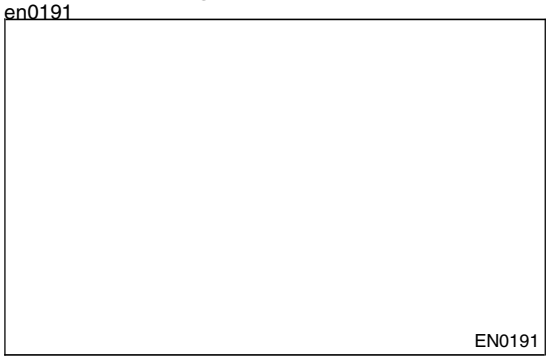
(3) Set arrow mark on camshaft sprocket to position shown in figure, and measure #1 cylinder exhaust valve and #4 cylinder intake valve clearances.



15) After inspection, install the related parts in the reverse order of removal.

Tightening torque:
32 N·m (3.3 kgf-m, 24 ft-lb)

en0191

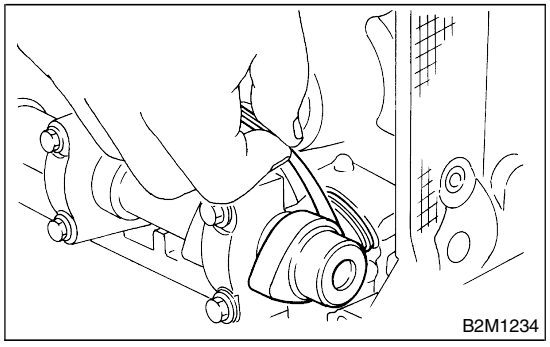


B: ADJUSTMENT *S183083A01*

CAUTION:
Adjustment of valve clearance should be performed while engine is cold.

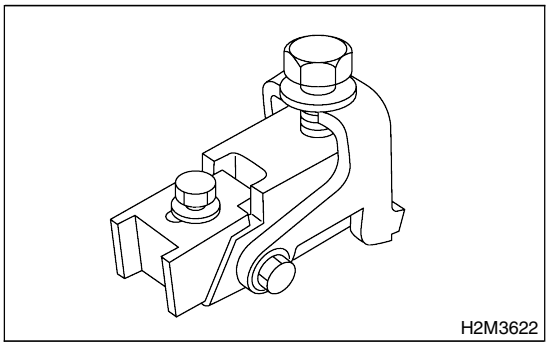
1) Measure all valve clearances. <Ref. to ME(DOHC TURBO)-28, INSPECTION, Valve Clearance.>

NOTE:
Record each valve clearance after it has been measured.

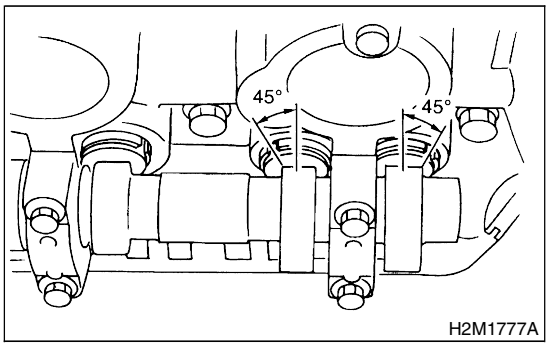


2) Remove shim from valve lifter.

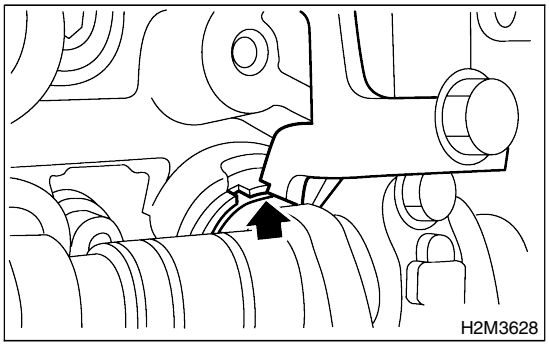
(1) Prepare the ST.
ST 498187200 SHIM REPLACER



(2) Rotate the notch of the valve lifter outward by 45.



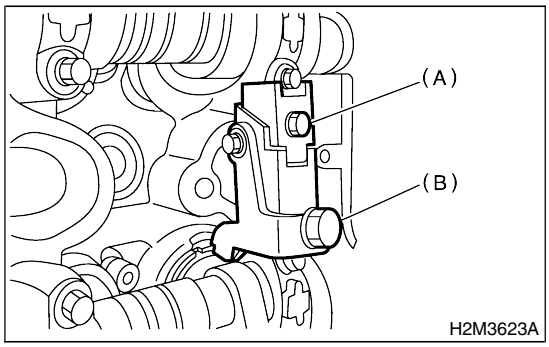
(3) Adjust SHIM REPLACER notch to valve lifter and set it.



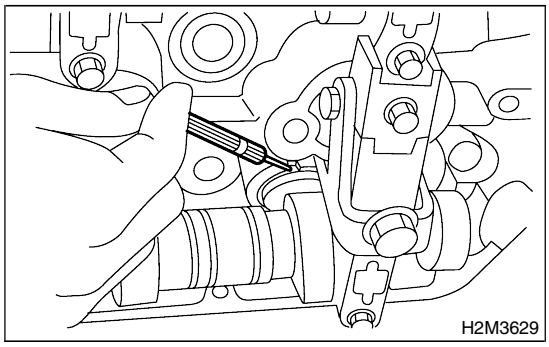
NOTE:
When setting, be careful SHIM REPLACER edge does not touch shim.

(4) Tighten bolt (A) and install it to the cylinder head.

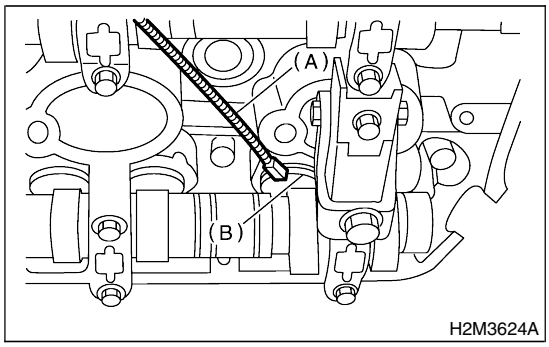
(5) Tighten bolt (B) and insert the valve lifter.



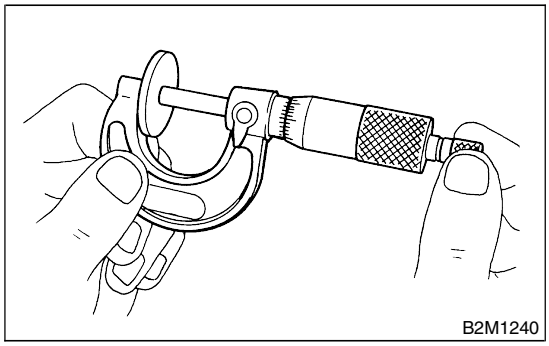
(6) Insert tweezers into the notch of the valve lifter, and take the shim out.



NOTE:
By using a magnet (A), the shim (B) can be taken out without dropping it.



3) Measure thickness of shim with micrometer.



4) Select a shim of suitable thickness using measured valve clearance and shim thickness, by referring to the following table.
5) Set suitable shim selected in step 4) to valve lifter.

Unit: mm
Intake valve:S =(V + T) - 0.20 Exhaust valve:S =(V + T) - 0.25
S: Shim thickness to be used V: Measured valve clearance T: Shim thickness required

Part No.	Thickness mm (in)
13218 AK010	2.00 (0.0787)
13218 AK020	2.02 (0.0795)
13218 AK030	2.04 (0.0803)
13218 AK040	2.06 (0.0811)
13218 AK050	2.08 (0.0819)
13218 AK060	2.10 (0.0827)
13218 AK070	2.12 (0.0835)
13218 AK080	2.14 (0.0843)
13218 AK090	2.16 (0.0850)
13218 AK100	2.18 (0.0858)
13218 AK110	2.20 (0.0866)
13218 AE710	2.22 (0.0874)
13218 AE730	2.24 (0.0882)
13218 AE750	2.26 (0.0890)
13218 AE770	2.28 (0.0898)
13218 AE790	2.30 (0.0906)
13218 AE810	2.32 (0.0913)
13218 AE830	2.34 (0.0921)
13218 AE850	2.36 (0.0929)
13218 AE870	2.38 (0.0937)
13218 AE890	2.40 (0.0945)
13218 AE910	2.42 (0.0953)
13218 AE920	2.43 (0.0957)
13218 AE930	2.44 (0.0961)
13218 AE940	2.45 (0.0965)
13218 AE950	2.46 (0.0969)
13218 AE960	2.47 (0.0972)
13218 AE970	2.48 (0.0976)
13218 AE980	2.49 (0.0980)
13218 AE990	2.50 (0.0984)
13218 AF000	2.51 (0.0988)
13218 AF010	2.52 (0.0992)
13218 AF020	2.53 (0.0996)
13218 AF030	2.54 (0.1000)
13218 AF040	2.55 (0.1004)
13218 AF050	2.56 (0.1008)
13218 AF060	2.57 (0.1012)
13218 AF070	2.58 (0.1016)
13218 AF090	2.60 (0.1024)
13218 AF110	2.62 (0.1031)

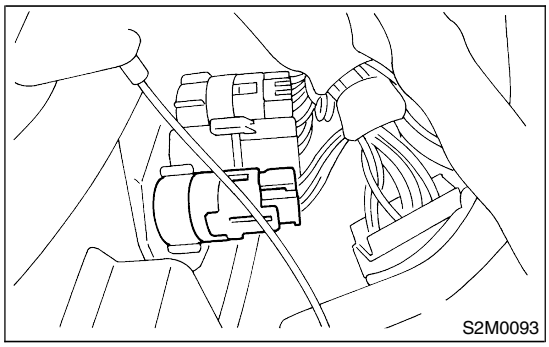
13218 AF130	2.64 (0.1039)
13218 AF150	2.66 (0.1047)
13218 AF170	2.68 (0.1055)
13218 AF190	2.70 (0.1063)

6) Inspect all valves for clearance again at this stage. If the valve clearance is not correct, repeat the procedure over again from the first step.
7) After inspection, install the related parts in the reverse order of removal.

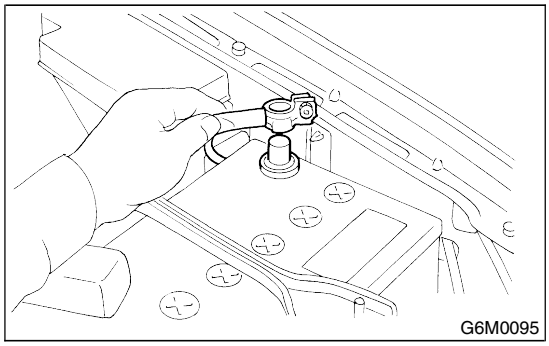
9. Engine Assembly S183079

A: REMOVAL S183079A18

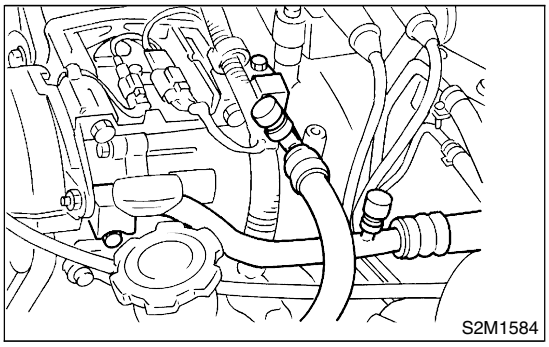
1) Set the vehicle on lift arms.
2) Open front hood fully and support with stay.
3) Raise rear seat, and turn floor mat up.
4) Release fuel pressure.
   (1) Disconnect fuel pump relay connector.


S2M0093

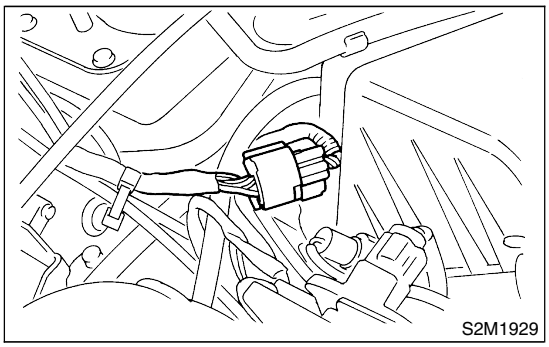
   (2) Start the engine, and run until stalls.
   (3) After the engine stalls, crank it for five seconds more.
   (4) Turn ignition switch to “OFF”.
5) Remove filler cap.
6) Disconnect battery ground terminal.


G6M0095

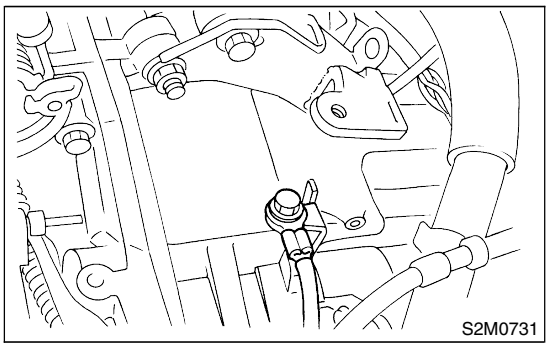
7) Remove radiator from vehicle. <Ref. to CO-25, REMOVAL, Radiator.>
8) Remove coolant filler tank. <Ref. to CO-37, REMOVAL, Coolant Filler Tank.>
9) Collect refrigerant, and remove pressure hoses.
   (1) Place and connect the attachment hose to the refrigerant recycle system.
   (2) Collect refrigerant from A/C system.
   (3) Disconnect A/C pressure hoses from A/C compressor.


S2M1584

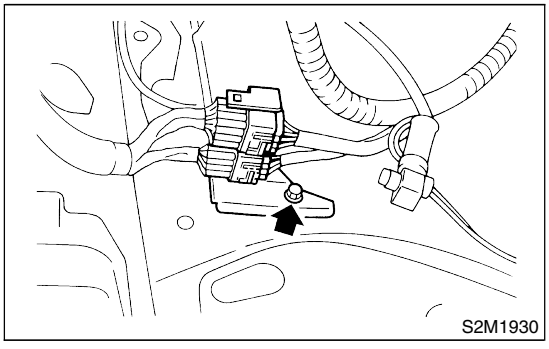
10) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
11) Disconnect the following connectors and cable.
   (1) Engine harness connector


S2M1929

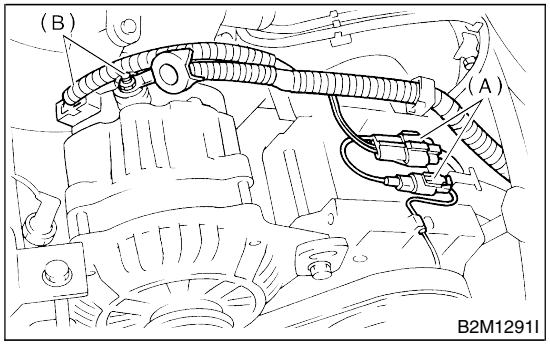
   (2) Engine ground terminal


S2M0731

   (3) Engine harness connector

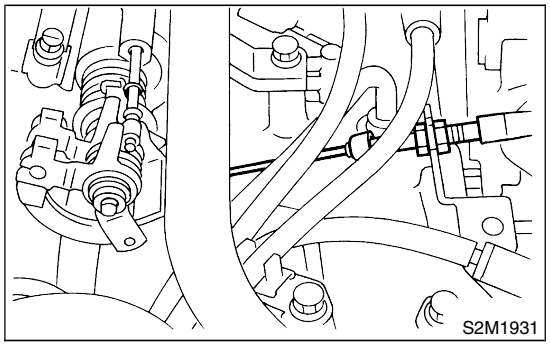

S2M1930

(4) Generator connector, terminal and A/C compressor connectors

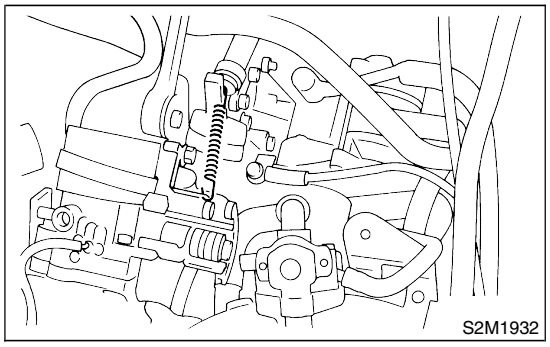


(A) A/C compressor connector
(B) Generator connector and terminal

(5) Accelerator cable

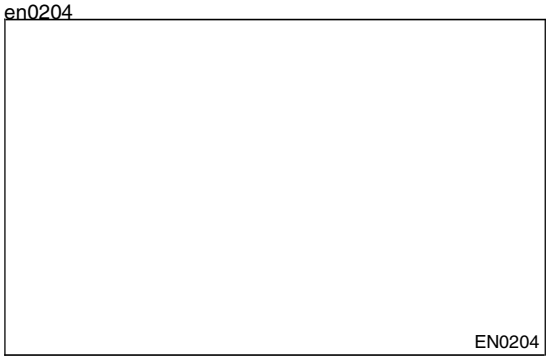


(6) Clutch release spring



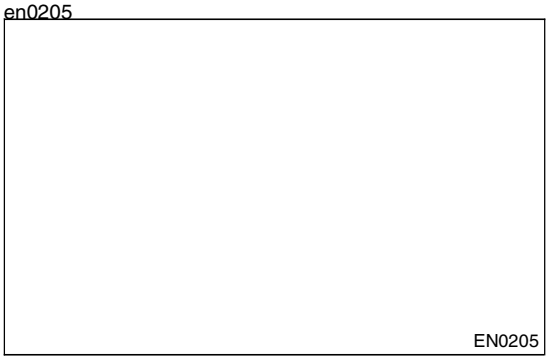
12) Disconnect the following hoses
(1) Brake booster vacuum hose

en0204



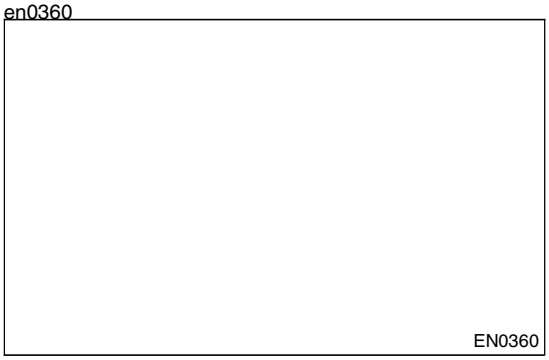
(2) Heater inlet outlet hose

en0205

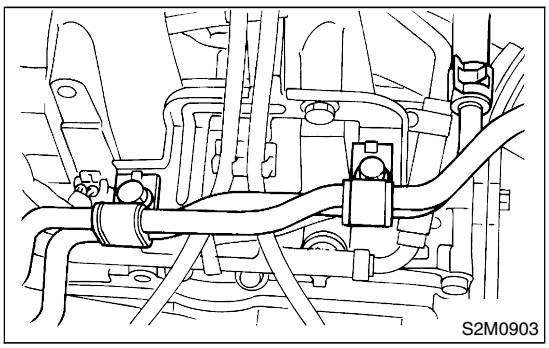


13) Remove power steering pump from bracket.
(1) Loosen lock bolt and slider bolt, and remove front side V-belt. <Ref. to ME(DOHC TURBO)-44, FRONT SIDE BELT, REMOVAL, V-belt.>
(2) Disconnect the power steering switch connector.

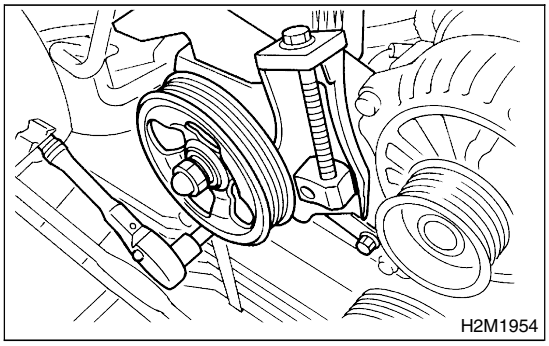
en0360



(3) Remove pipe with bracket from intake manifold.

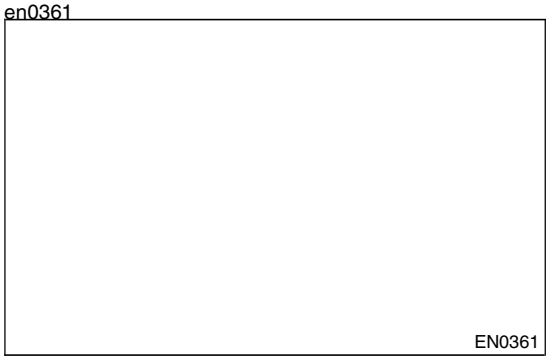


(4) Remove power steering pump from engine.



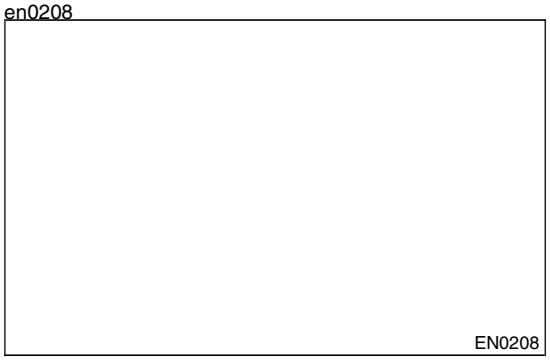
(5) Remove power steering tank from the bracket by pulling it upward.

en0361



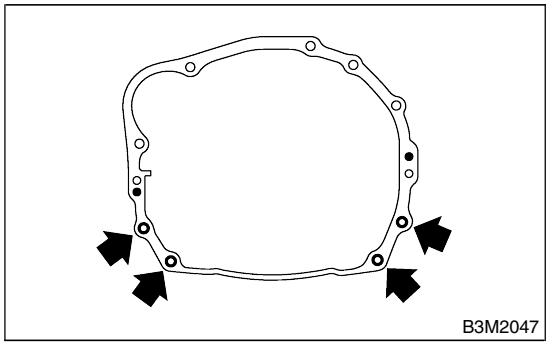
(6) Place power steering pump on the right side wheel apron.

en0208

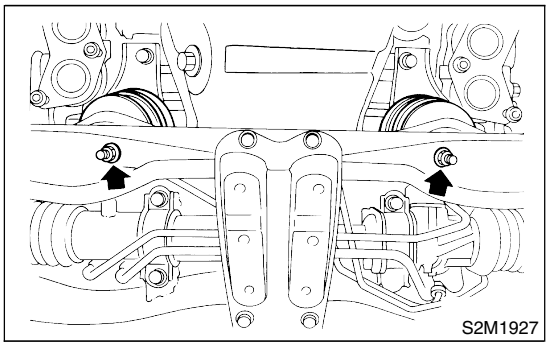


14) Remove center exhaust pipe. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>

15) Remove nuts which hold lower side of transmission to engine.



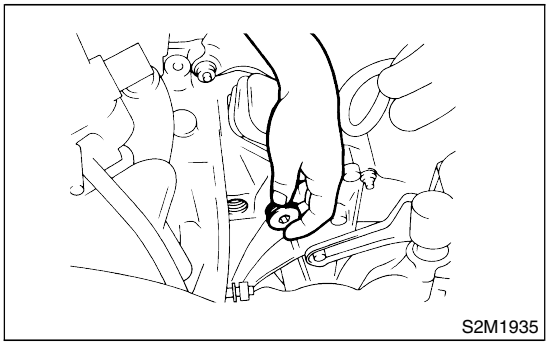
16) Remove nuts which install front cushion rubber onto front crossmember.



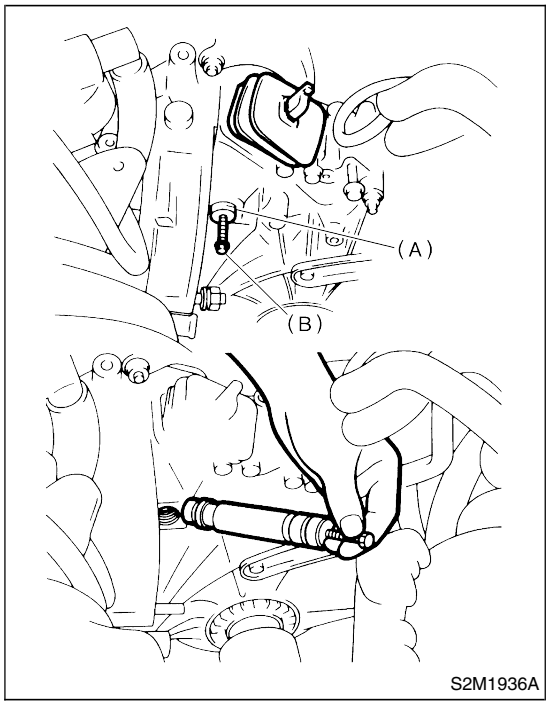
17) Separate clutch release fork from release bearing. (MT vehicles)

(1) Remove clutch operating cylinder from transmission.

(2) Remove plug using 10 mm hexagon wrench.



(3) Screw 6 mm dia. bolt into release fork shaft, and remove it.



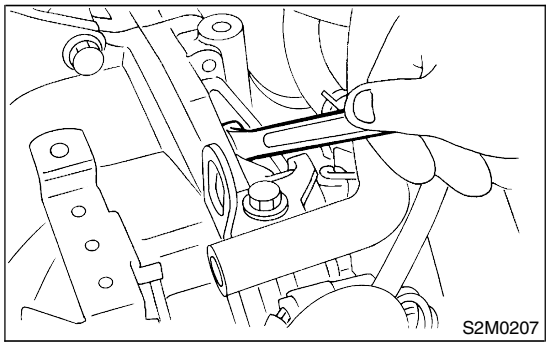
(A) Shaft
(B) Bolt

(4) Raise release fork and unfasten release bearing tabs to free release fork.

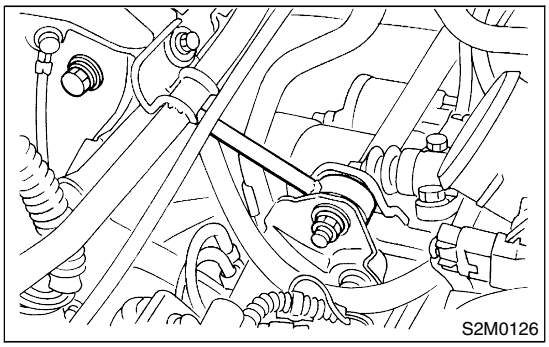
CAUTION:
Step (4) is required to prevent interference with engine when removing engine from transmission.

18) Select torque converter clutch from drive plate. (AT vehicles)
(1) Lower the vehicle.
(2) Remove service hole plug.
(3) Remove bolts which hold torque converter clutch to drive plate.
(4) Remove other bolts while rotating tha engine using ST.

ST 499977300 CRANK PULLEY WRENCH



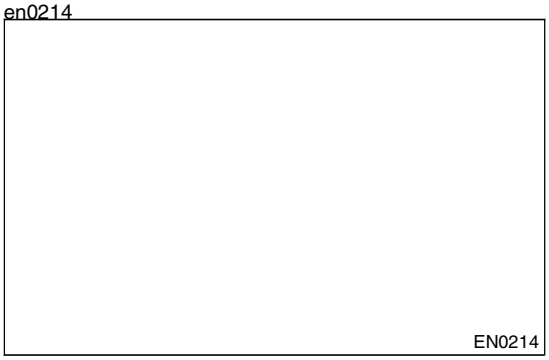
19) Remove pitching stopper.



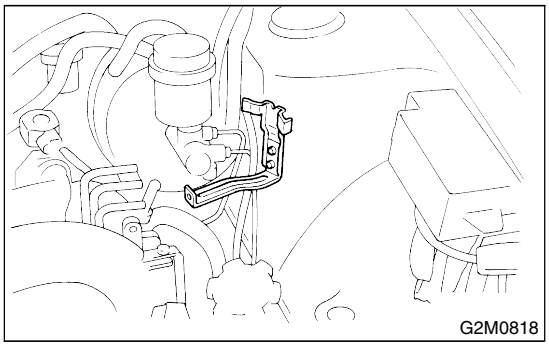
20) Disconnect fuel delivery hose, return hose and evaporation hose.

CAUTION:
- **Catch fuel from hose into container.**
- **Disconnect hose with its end wrapped with cloth to prevent fuel from splashing.**

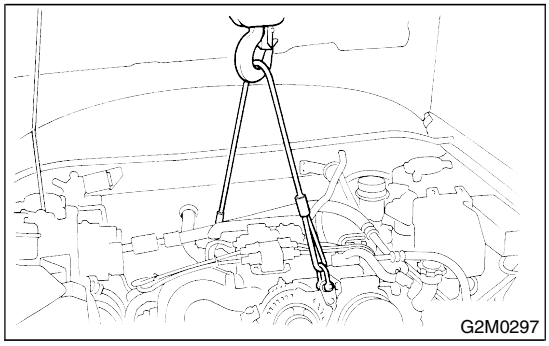
en0214



21) Remove fuel filter and bracket.

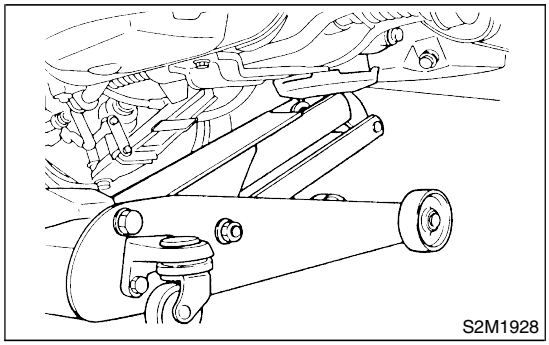


22) Support engine with a lifting device and wire ropes.



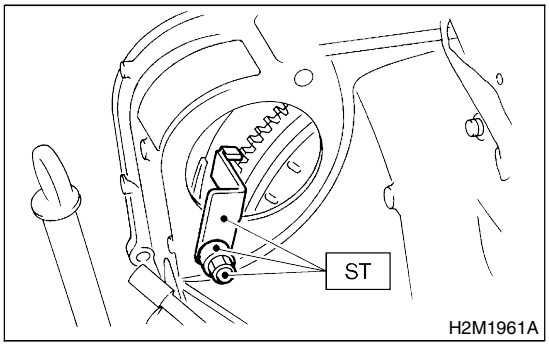
23) Support transmission with a garage jack.

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.

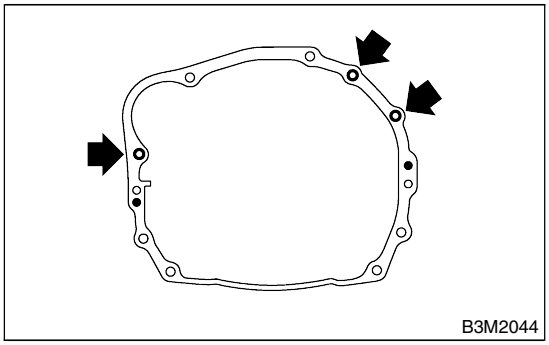


24) Separation of engine and transmission.
(1) Remove starter. <Ref. to SC-5, REMOVAL, Starter.>
(2) Install ST to torque converter clutch case. (AT vehicles)

ST 498277200 STOPPER SET



(3) Remove bolt which holds right upper side of transmission to engine.



25) 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.

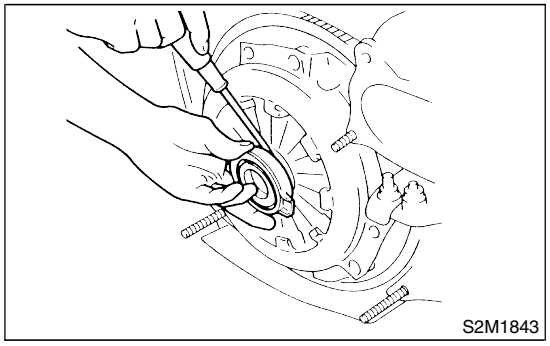
CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

26) Remove front cushion rubbers.

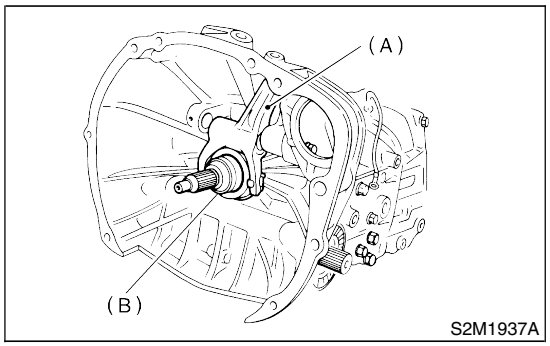
B: INSTALLATION S183079A11

1) Install clutch release fork and bearing onto transmission. (MT vehicles)

(1) Remove release bearing from clutch cover with flat type screw driver.

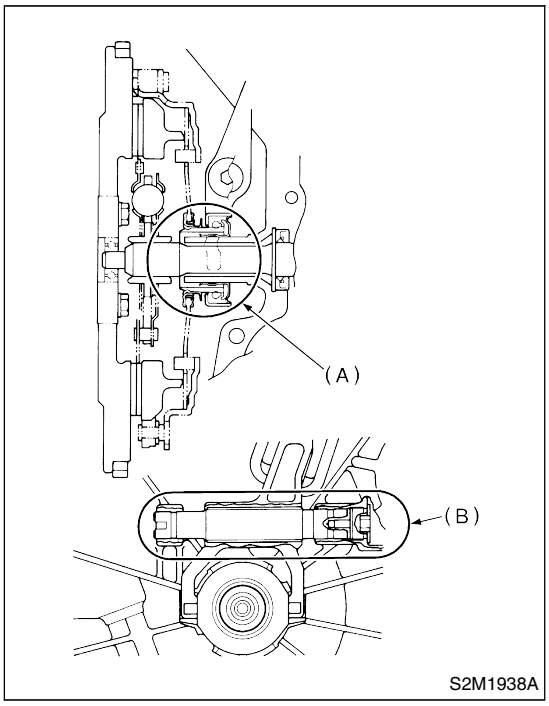


(2) Install release bearing on transmission.
(3) Install release fork into release bearing tab.



(A) Release fork
(B) Release bearing

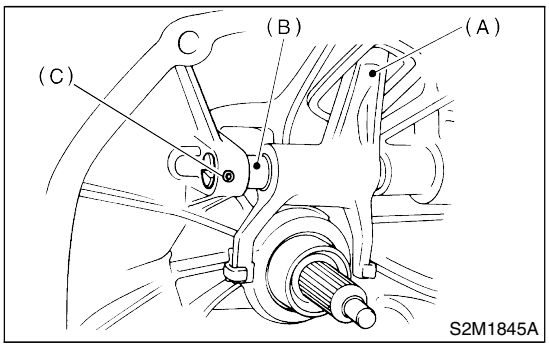
(4) Apply grease to specified points.
- Spline FX2200
- Shaft SUNLIGHT 2



(A) Spline (FX2200)
(B) Shaft (SUNLIGHT 2)

(5) Insert release fork shaft into release fork.

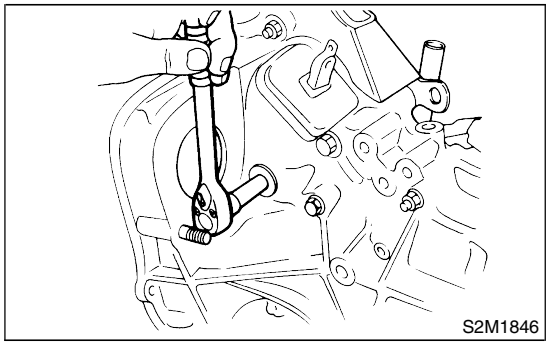
CAUTION:
Make sure the cutout portion of release fork shaft contacts spring pin.



(A) Release fork
(B) Release shaft
(C) Spring pin

(6) Tighten plug.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)


S2M1846

2) Install front cushion rubbers to engine.

Tightening torque:
34 N·m (3.5 kgf-m, 25.3 ft-lb)

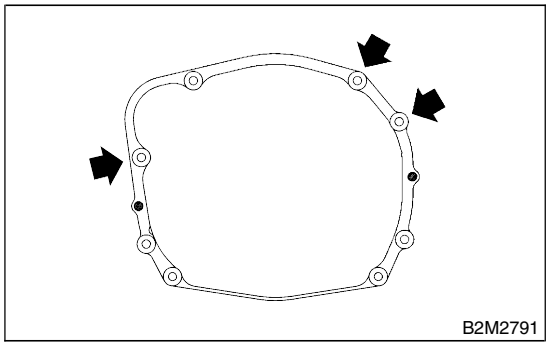
3) Install engine onto transmission.
(1) Position engine in engine compartment and align it with transmission.

CAUTION:
Be careful not to damage adjacent parts or body panels with crank pulley, oil pressure gauge, etc.

(2) Apply a small amount of grease to splines of mainshaft. (MT vehicles)

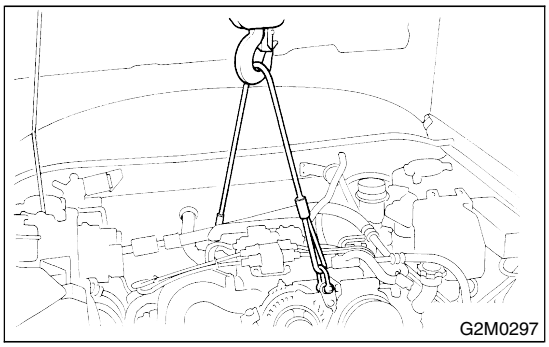
4) Tighten bolt which hold right upper side of transmission to engine.

Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)


B2M2791

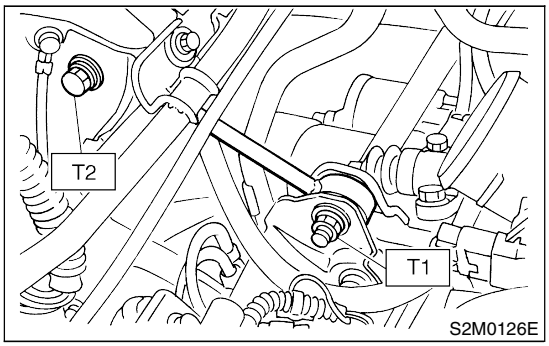
5) Remove lifting device and wire ropes.

6) Remove garage jack.


G2M0297

7) 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)



S2M0126E

8) Remove ST from torque converter clutch case. (AT vehicles)

NOTE:
Be careful not to drop the ST into the torque converter clutch case when removing ST.

ST 498277200 STOPPER SET

9) Install starter. <Ref. to SC-6, INSTALLATION, Starter.>

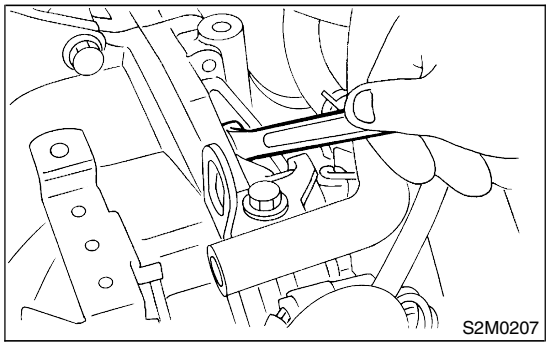
10) Install torque converter clutch onto drive plate. (AT vehicles)
(1) Tighten bolts which hold torque converter clutch to drive plate.

(2) Tighten other bolts while rotating the engine by using ST.

CAUTION:
Be careful not to drop bolts into torque converter clutch housing.

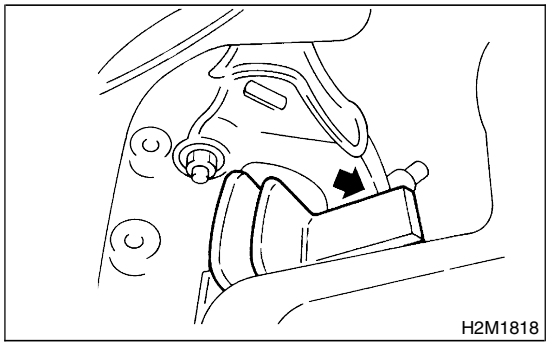
ST 499977300 CRANK PULLEY WRENCH

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

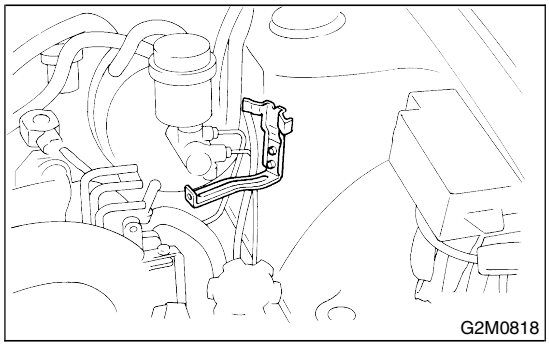

S2M0207

(3) Clog plug onto service hole.

11) Push clutch release lever to fit bearing into clutch cover.


H2M1818

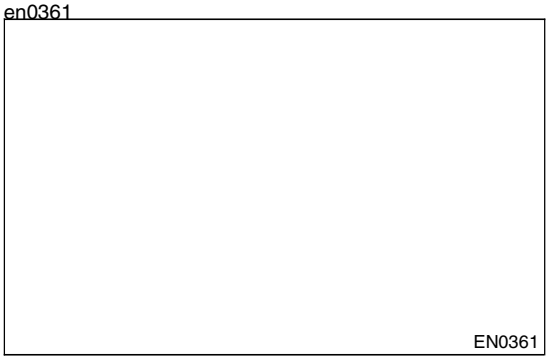
12) Install fuel filter and bracket.


G2M0818

13) Install power steering pump on bracket.

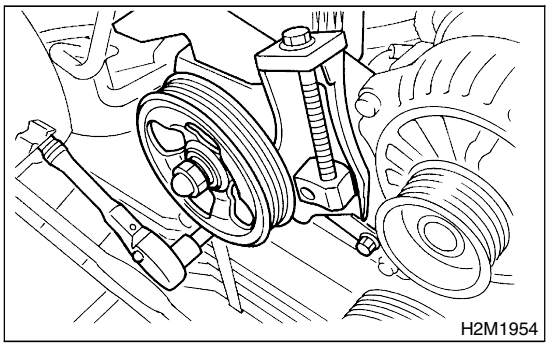
(1) Install the power steering tank on bracket.

en0361

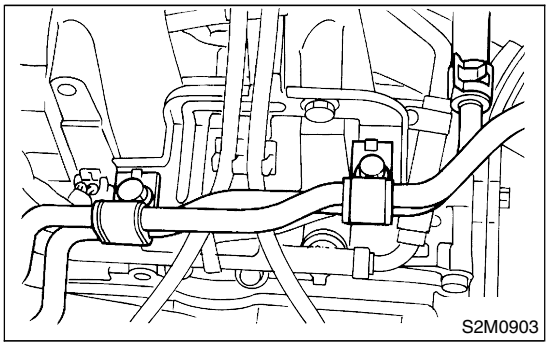

EN0361

(2) Install power steering pump on bracket, and tighten bolts.

Tightening torque:
20.1 N·m (2.05 kgf-m, 14.8 ft-lb)

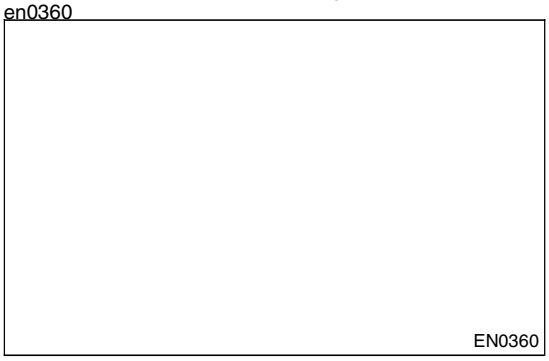

H2M1954

(3) Install power steering pipe bracket on right side intake manifold, and install spark plug codes.


S2M0903

(4) Connect power steering switch connector.

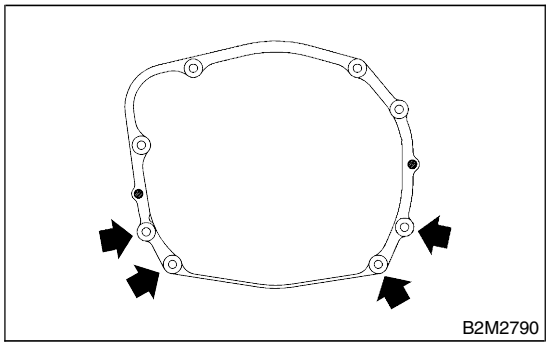
en0360


EN0360

(5) Install front side V-belt, and adjust it. <Ref. to ME(SOHC)-42, FRONT SIDE BELT, INSTALLATION, V-belt.>

14) Tighten nuts which hold lower side of transmission to engine.

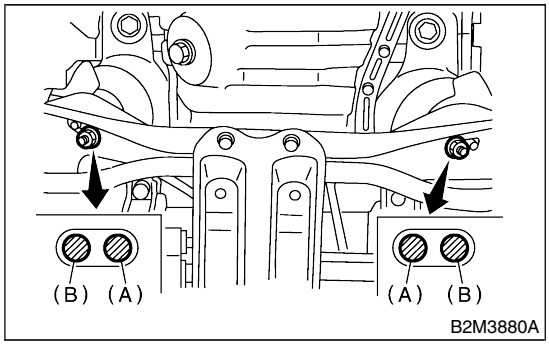
Tightening torque:
50 N·m (5.1 kgf-m, 36.9 ft-lb)



15) Tighten nuts which install front cushion rubber onto crossmember.

Tightening torque:
83 N·m (8.5 kgf-m, 61 ft-lb)

CAUTION:
Make sure the front cushion rubber mounting bolts (A) and locator (B) are securely installed.



16) Install center exhaust pipe.
<Ref. to EX(DOHC TURBO)-7, INSTALLATION, Front Exhaust Pipe.>

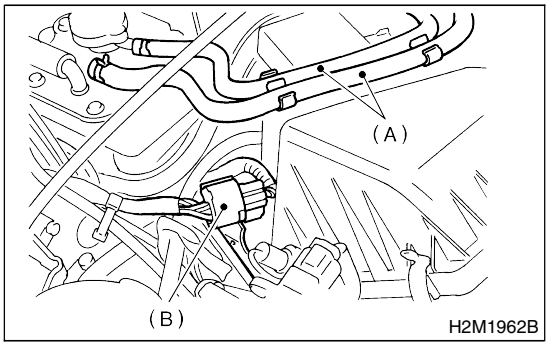
17) Connect the following hoses.
(1) Fuel delivery hose, return hose and evaporation hose
(2) Heater inlet and outlet hoses
(3) Brake booster vacuum hose

18) Connect the following connectors and terminals.
(1) Engine ground terminal
(2) Engine harness connectors
(3) Generator connector and terminal
(4) A/C compressor connectors (With A/C)

19) Connect the following cables.
(1) Accelerator cable
(2) Clutch release spring

CAUTION:
After connecting each cable, adjust them.

20) Install air intake system.
(1) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
(2) Install air cleaner element and air cleaner upper cover.
(3) Install engine harness connector bracket.
(4) Install filler hose to air cleaner case.

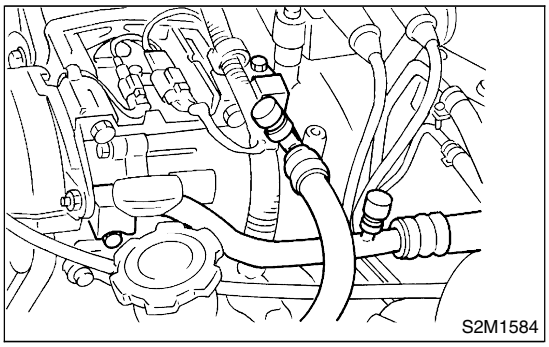


(A) Filler hose
(B) Connector bracket

21) Install A/C pressure hoses. (With A/C)

CAUTION:
Use new O-rings.

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



22) Install radiator. <Ref. to CO-27, INSTALLATION, Radiator.>
23) Install coolant filler tank. <Ref. to CO-27, INSTALLATION, Radiator.>
24) Install window washer tank.
25) Install battery in the vehicle, and connect cables.
26) Fill coolant.
<Ref. to CO-27, INSTALLATION, Radiator.>
27) Charge A/C system with refrigerant.
<Ref. to AC-20, OPERATION, Refrigerant Charging Procedure.>
28) Remove front hood stay, and close front hood.
29) Take off the vehicle from lift arms.

10. Engine Mounting S183085

A: REMOVAL S183085A18

1) Remove engine assembly. <Ref. to ME(DOHC TURBO)-33, REMOVAL, Engine Assembly.>
2) Remove engine mounting from engine assembly.

B: INSTALLATION S183085A11

Install in the reverse order of removal.

Tightening torque:
Engine mounting;
35 N·m (3.6 kgf-m, 25.8 ft-lb)

C: INSPECTION S183085A10

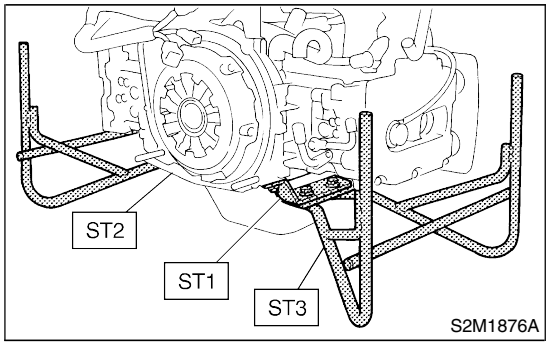
Make sure there are no cracks or other damage.

11. Preparation for Overhaul S183091

A: PROCEDURE S183091E45

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) 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.

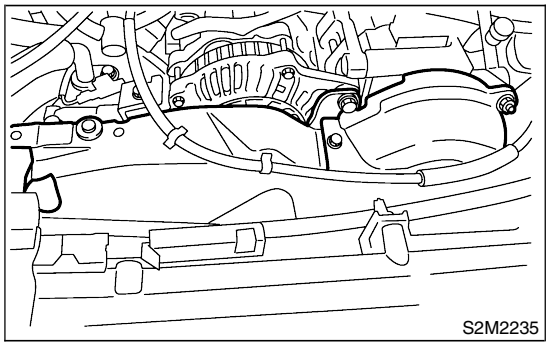
12. V-belt S183080

A: REMOVAL S183080A18

1. FRONT SIDE BELT S183080A1801

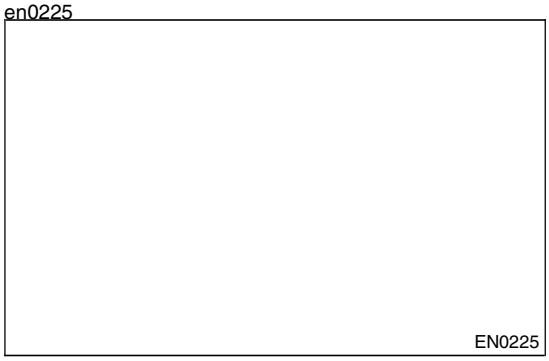
NOTE:
Perform the following procedures 1) to 4) with the engine installed to the body.

1) Remove V-belt cover.


S2M2235

2) Loosen the lock bolt (A).
3) Loosen the slider bolt (B).
4) Remove the front side belt (C).

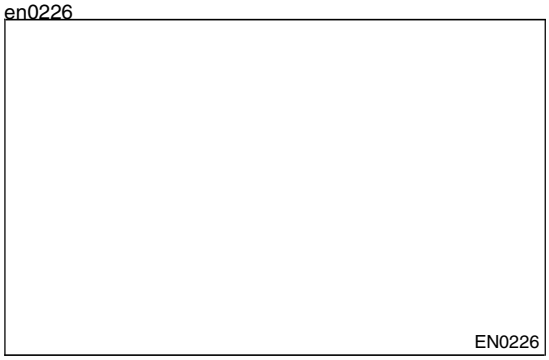
en0225


EN0225

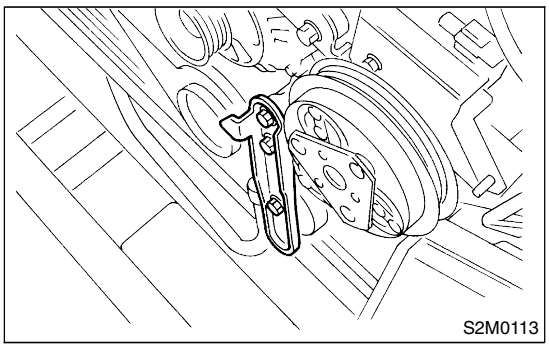
2. REAR SIDE BELT S183080A1802

1) Loosen the lock nut (A).
2) Loosen the slider bolt (B).

en0226


EN0226

3) Remove the A/C belt.
4) Remove the A/C belt tensioner.


S2M0113

B: INSTALLATION S183080A11

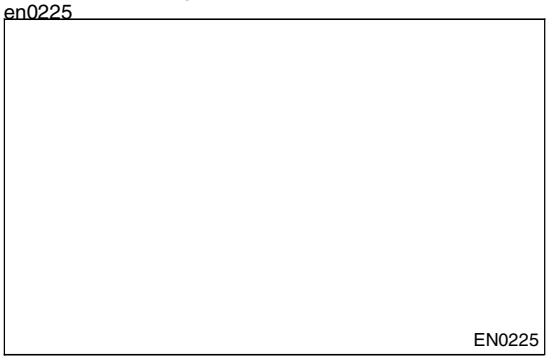
1. FRONT SIDE BELT S183080A1101

CAUTION:
Wipe off any oil or water on the belt and pulley.

1) Install a belt, and tighten the slider bolt so as to obtain the specified belt tension <Ref. to ME(DOHC TURBO)-45, INSPECTION, V-belt.>
2) Tighten the lock bolt (A)
3) Tighten slider bolt (B).

Tightening torque:
Lock bolt through bolt:
25 N·m (2.5 kgf-m, 18 ft-lb)
Slider bolt:
8 N·m (0.8 kgf-m, 5.5 ft-lb)

en0225

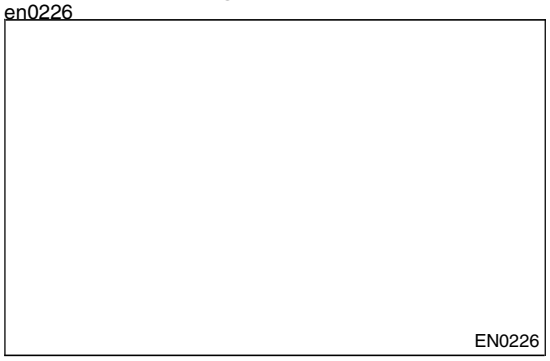

EN0225

2. REAR SIDE BELT S183080A1102

1) Install a belt, and tighten the slider bolt (B) so as to obtain the specified belt tension. <Ref. to ME(DOHC TURBO)-45, INSPECTION, V-belt.>
2) Tighten the lock nut (A).

Tightening torque:
Lock nut (A);
22.6 N·m (2.3 kgf-m, 16.6 ft-lb)

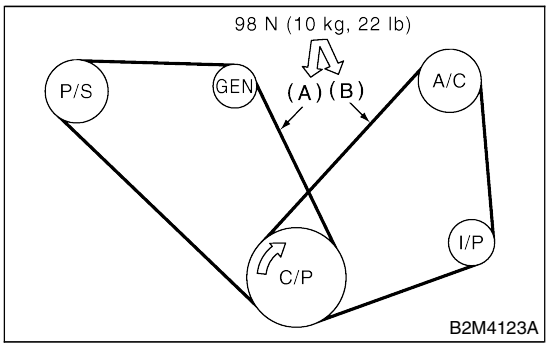
en0226



C: INSPECTION S183080A10

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)
****: With Air conditioner***

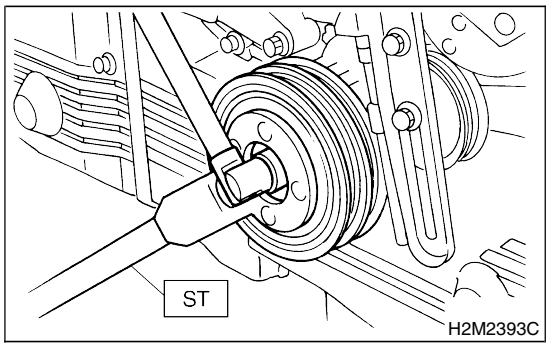


C/P Crankshaft pulley
GEN Generator
P/S Power steering oil pump pulley
A/C Air conditioning compressor pulley
I/P Idler pulley

13. Crankshaft Pulley S183098

A: REMOVAL S183098A18

1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley bolt. To lock crankshaft, use ST.
ST 499977300
CRANKSHAFT PULLEY WRENCH

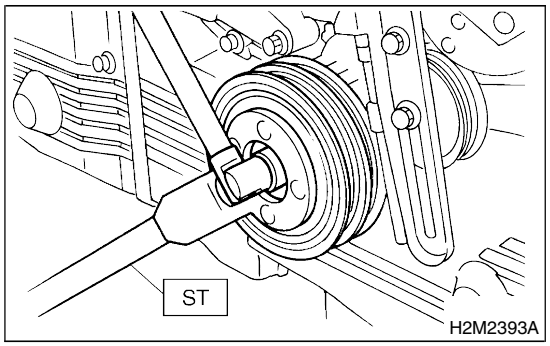


3) Remove crankshaft pulley.

B: INSTALLATION S183098A11

1) Install crankshaft pulley.
2) Install pulley bolt.
To lock crankshaft, use ST.
ST 499977300 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)



3) Confirm that the tightening angle of the crankshaft pulley bolt is 45 degrees or more. If not, conduct the following procedures (1) through (4).

CAUTION:
If the tightening angle of crankshaft pulley bolt is less than 45 degrees, the bolt should be damaged. In this case, the bolt must be replaced.

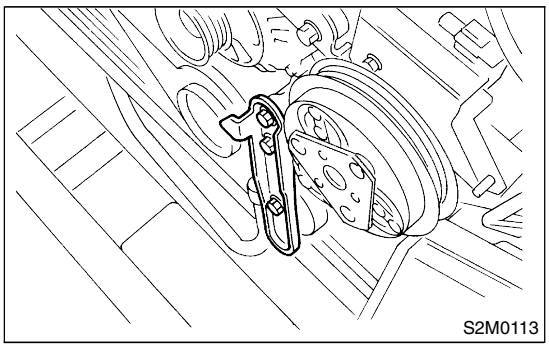
(1) Replace the crankshaft pulley bolts and clean them.

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.

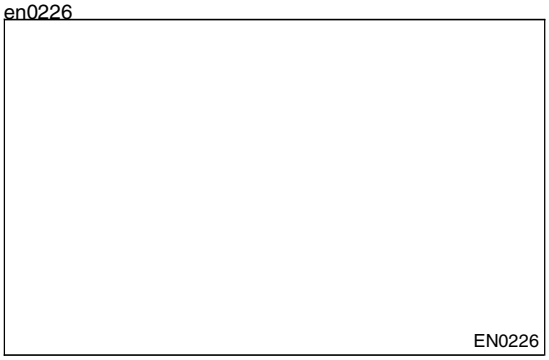
CAUTION:
Conduct the tightening procedures by confirming the turning angle of the crankshaft pulley bolt referring to the gauge indicated on the belt cover.

4) Install A/C belt tensioner.



5) Install A/C belt.

en0226



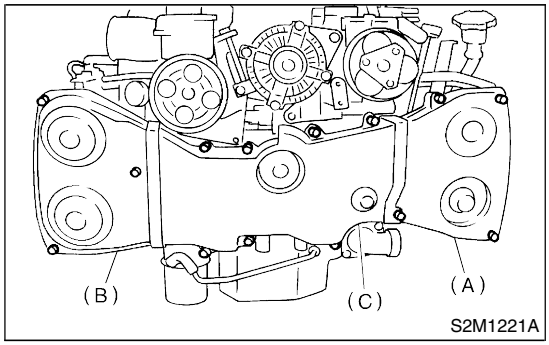
C: INSPECTION S183098A10

1) Make sure the V-belt is not worn or otherwise damaged.
2) Check the tension of the belt. <Ref. to ME(DOHC TURBO)-45, INSPECTION, V-belt.>

14. Belt Cover S183582

A: REMOVAL S183582A18

1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove left-hand belt cover (A).
4) Remove right-hand belt cover (B).
5) Remove front belt cover (C).



B: INSTALLATION S183582A11

1) Install front belt cover (C).

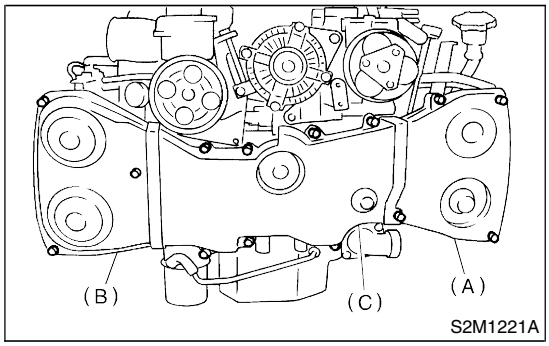
Tightening torque:
5 N·m (0.5 kgf-m, 3.6 ft-lb)

2) Install right-hand belt cover (B).

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

3) Install left-hand belt cover (A).

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



4) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
5) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

C: INSPECTION S183582A10

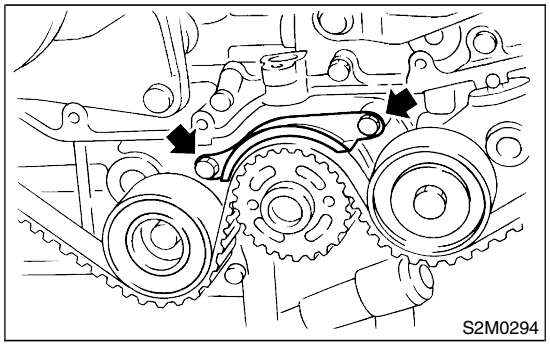
Make sure the cover is not damaged.

15. Timing Belt Assembly S183099

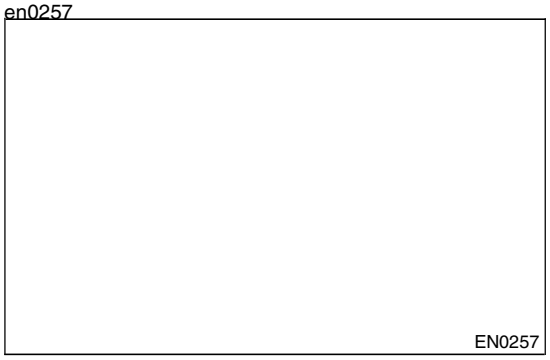
A: REMOVAL S183099A18

1. TIMING BELT S183099A1801

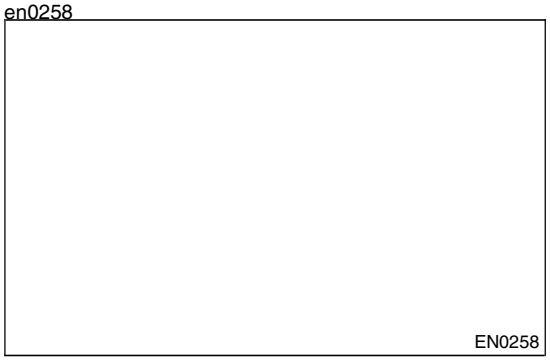
1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
4) Remove timing belt guides. (MT vehicle only)


S2M0294

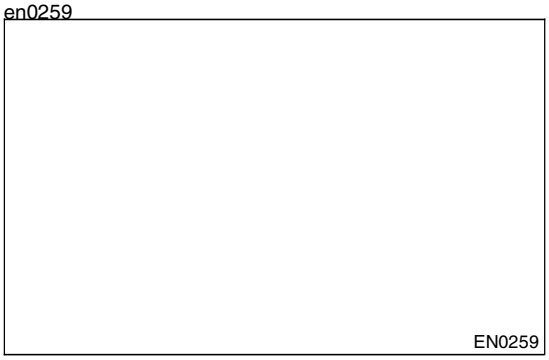
en0257


EN0257

en0258

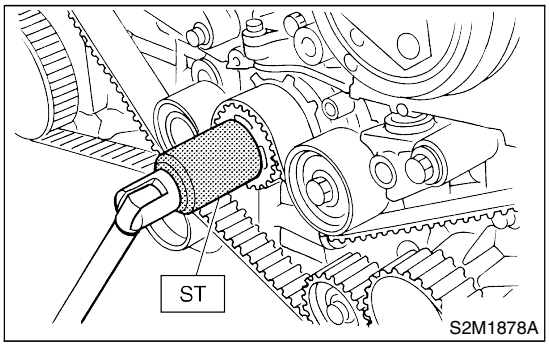

EN0258

en0259


EN0259

5) If alignment mark and/or arrow mark (which indicates rotation direction) on timing belt fade away, put new marks before removing timing belt as follows:
(1) Turn crankshaft using ST, and align alignment marks on crankshaft sprocket, left-hand intake camshaft sprocket, left-hand exhaust camshaft sprocket, right-hand intake camshaft sprocket and right hand exhaust camshaft sprocket with notches of belt cover and cylinder block.

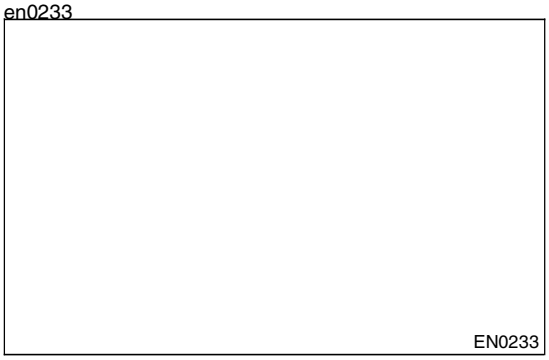
ST 499987500 CRANKSHAFT SOCKET

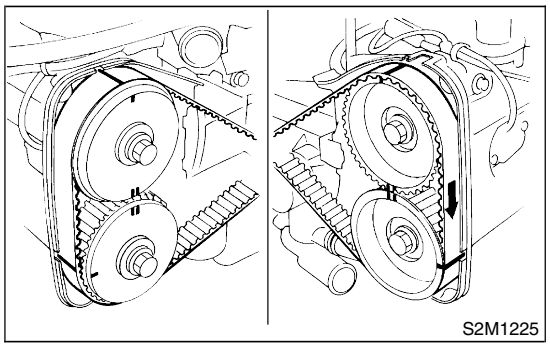


S2M1878A

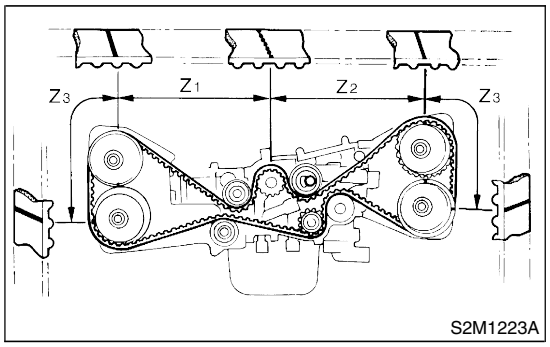
(2) Using white paint, put alignment and/or arrow marks on timing belts in relation to the sprockets.

en0233

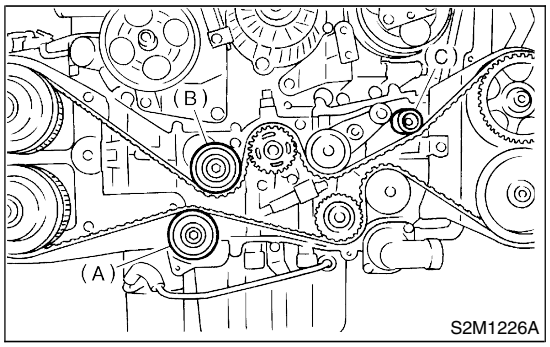

EN0233



Z_1: 54.5 tooth length
Z_2: 51 tooth length
Z_3: 28 tooth length



6) Remove belt idler (A).

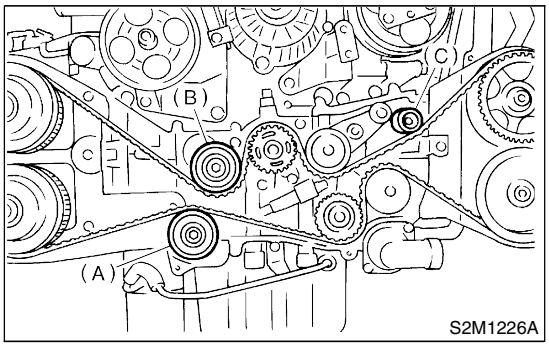


7) Remove timing belt.

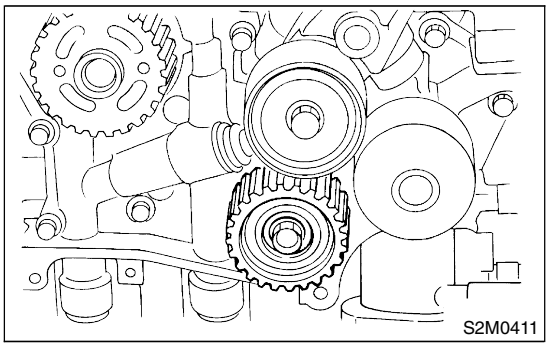
CAUTION:
After timing belt has been removed, never rotate intake and exhaust, camshaft sprocket. If camshaft sprocket is rotated, the intake and exhaust valve heads strike together and valve stems are bent.

2. BELT IDLER AND AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY *S183099A1802*

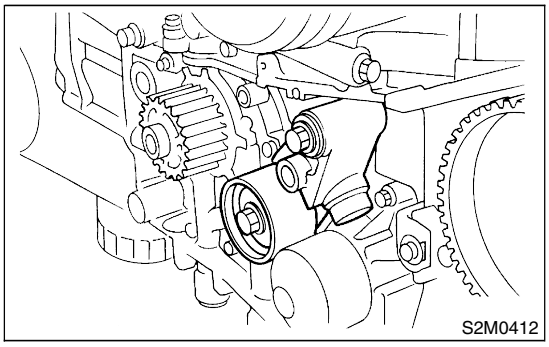
1) Remove belt idler (B) and (C).



2) Remove belt idler No. 2.



3) Remove automatic belt tension adjuster assembly.



B: INSTALLATION *S183099A11*

1. AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER

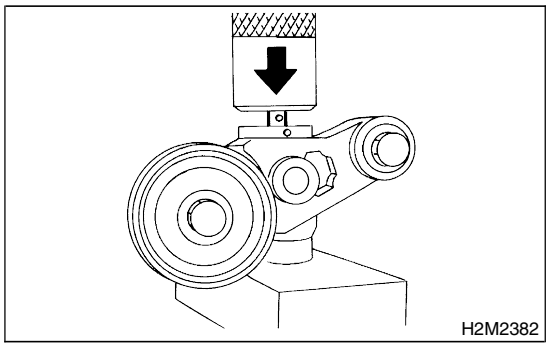
S183099A1101

1) Preparation for installation of automatic belt tension adjuster assembly:

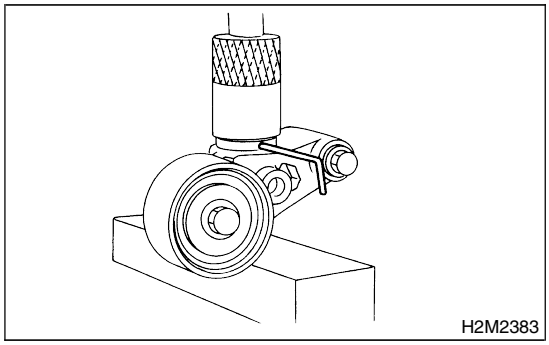
CAUTION:
- **Always use a vertical type pressing tool to move the adjuster rod down.**
- **Do not use a lateral type vise.**
- **Push adjuster rod vertically.**

● 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.

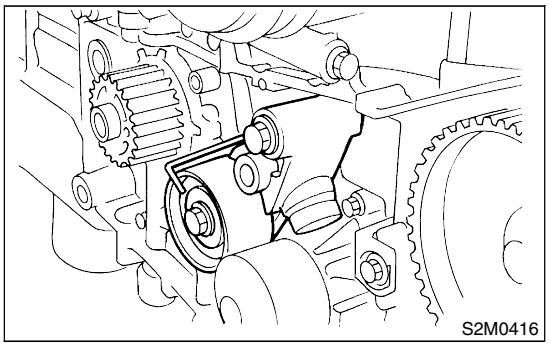

H2M2382

(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.


H2M2383

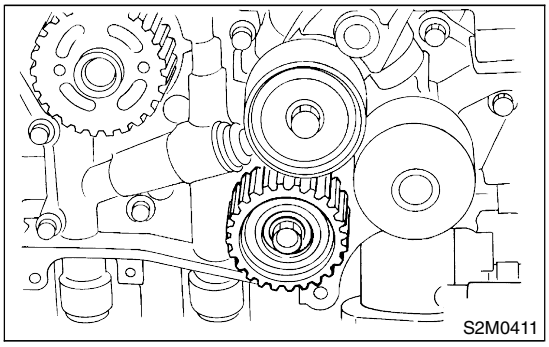
2) Install automatic belt tension adjuster assembly.

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


S2M0416

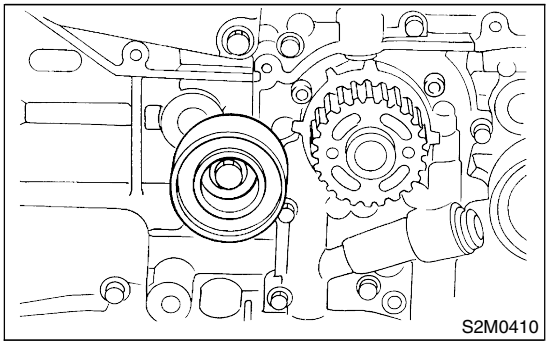
3) Install belt idler No. 2.

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


S2M0411

4) Install belt idler.

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

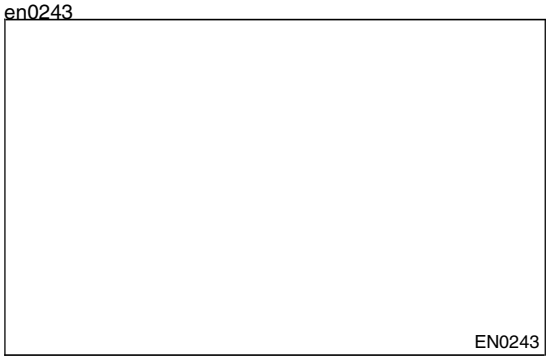

S2M0410

2. TIMING BELT *S183099A1102*

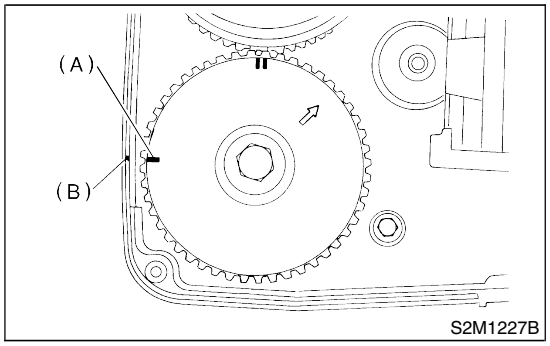
1) Preparation for installation of automatic belt tension adjuster assembly. <Ref. to ME(DOHC TURBO)-49, AUTOMATIC BELT TENSION ADJUSTER ASSEMBLY AND BELT IDLER, INSTALLATION, Timing Belt Assembly.>
2) Crankshaft and camshaft sprocket alignment.

(1) Align mark (A) on crankshaft sprocket with mark on the oil pump cover at cylinder block.

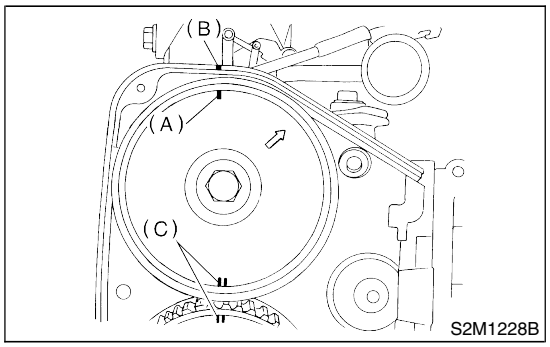
en0243



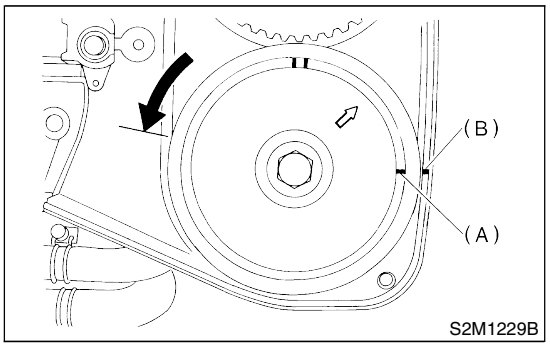
(2) Align single line mark (A) on right-hand exhaust camshaft sprocket with notch (B) on belt cover.



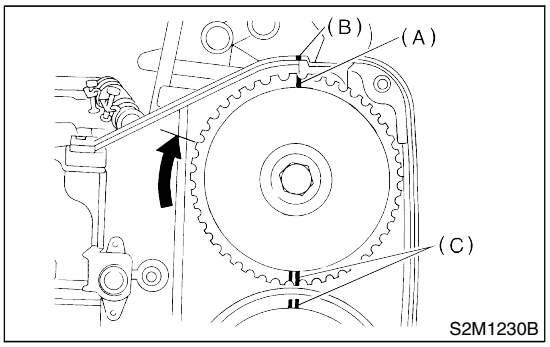
(3) Align single line mark (A) on right-hand intake camshaft sprocket with notch (B) on belt cover.
(Make sure double lines (C) on intake camshaft and exhaust camshaft sprockets are aligned.)



(4) Align single line mark (A) on left-hand exhaust camshaft sprocket with notch (B) on belt cover by turning sprocket counterclockwise (as viewed from front of engine).

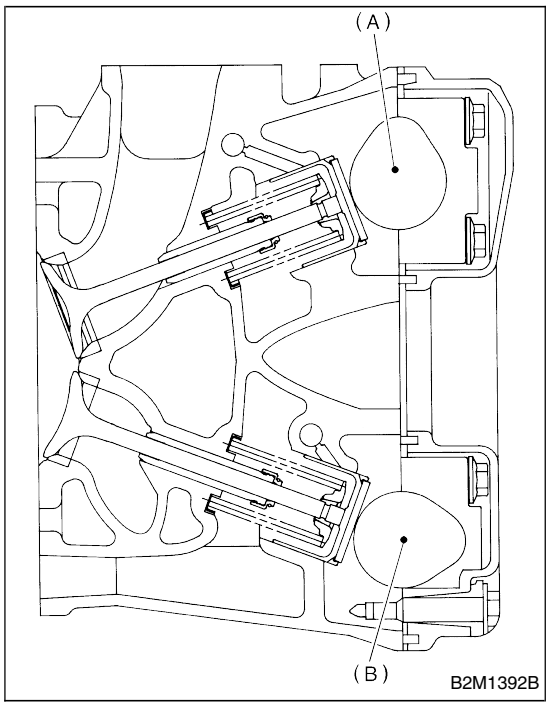


(5) Align single line mark (A) on left-hand intake camshaft sprocket with notch (B) on belt cover by turning sprocket clockwise (as viewed from front of engine).
Ensure double lines (C) on intake and exhaust camshaft sprockets are aligned.



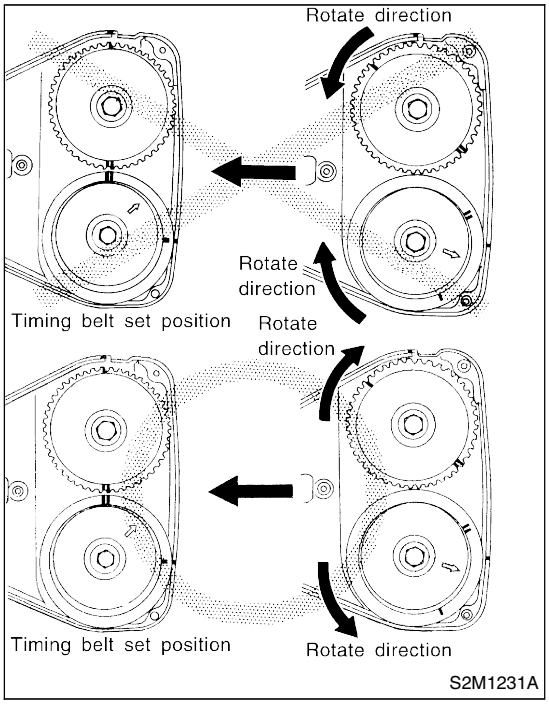
(6) Ensure camshaft and crankshaft sprockets are positioned properly.

CAUTION:
• Intake and exhaust camshafts for this DOHC engine can be independently rotated with timing belts removed. As can be seen from the figure, if intake and exhaust valves are lifted simultaneously, their heads will interfere with each other, resulting in bent valves.

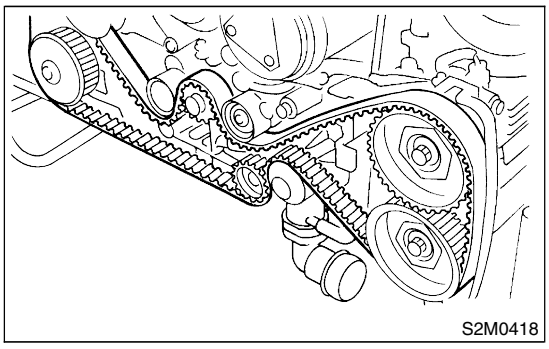


(A) Intake camshaft
(B) Exhaust camshaft

• When timing belts are not installed, four camshafts are held at the "zero-lift" position, where all cams on camshafts do not push intake and exhaust valves down. (Under this condition, all valves remain unlifted.)
• When camshafts are rotated to install timing belts, #2 intake and #4 exhaust cam of left-hand camshafts are held to push their corresponding valves down. (Under this condition, these valves are held lifted.) Right-side camshafts are held so that their cams do not push valves down.
• Left-hand camshafts must be rotated from the "zero-lift" position to the position where timing belt is to be installed at as small an angle as possible, in order to prevent mutual interference of intake and exhaust valve heads.
• Do not allow camshafts to rotate in the direction shown in the figure as this causes both intake and exhaust valves to lift simultaneously, resulting in interference with their heads.

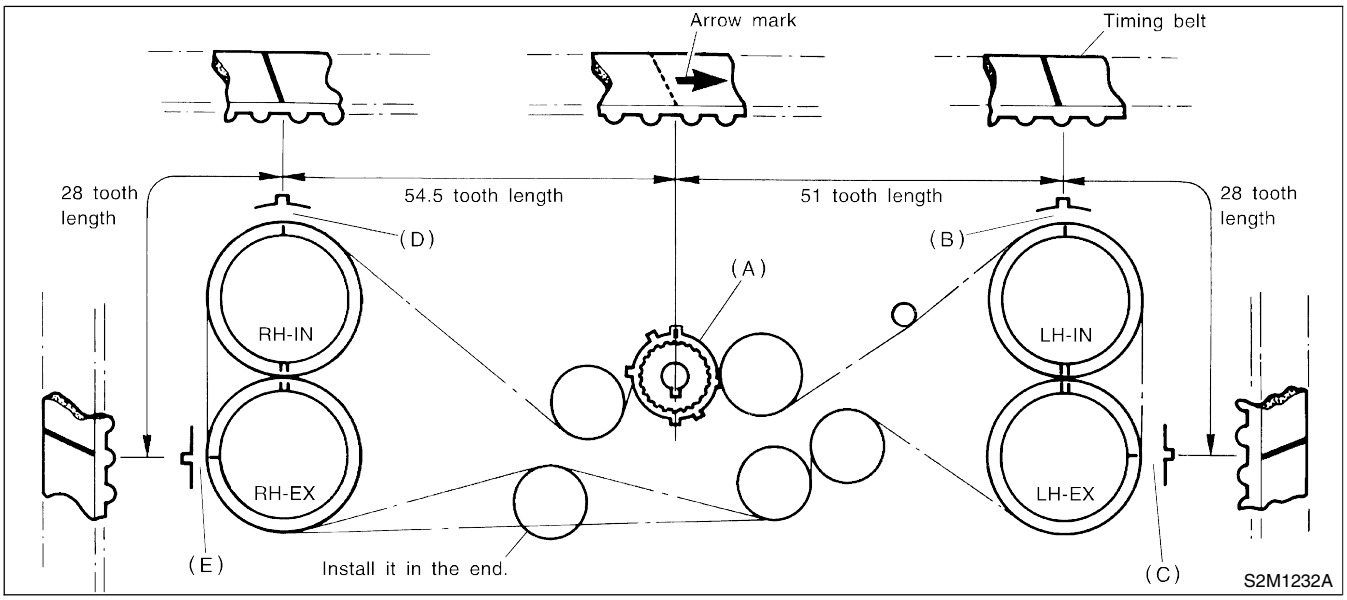


3) Installation of timing belt



Align alignment mark on timing belt with marks on sprockets in the alphabetical order shown in figure. While aligning marks, position timing belt properly.

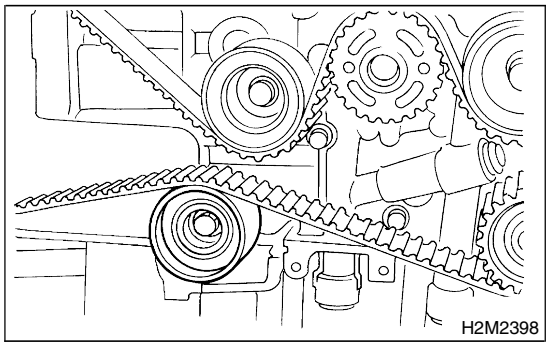
CAUTION:
• Disengagement of more than three timing belt teeth may result in interference between the valve and piston.
• Ensure belt's rotating direction is correct.



4) Install belt idlers.

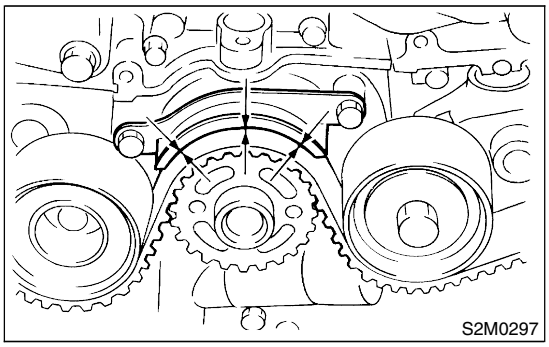
Tightening torque:
39 N·m (4.0 kgf-m, 28.9 ft-lb)

CAUTION:
Make sure that the marks on timing belt and sprockets are aligned.

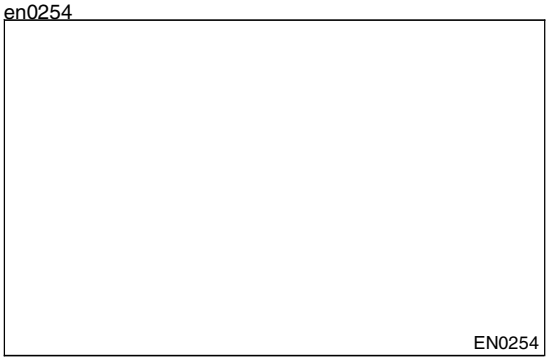


5) After ensuring that the marks on timing belt and sprockets are aligned, remove stopper pin from tensioner adjuster.
6) Install timing belt guide. (MT vehicle only)
(1) Temporarily tighten remaining bolts.
(2) Check and adjust clearance between timing belt and timing belt guide.

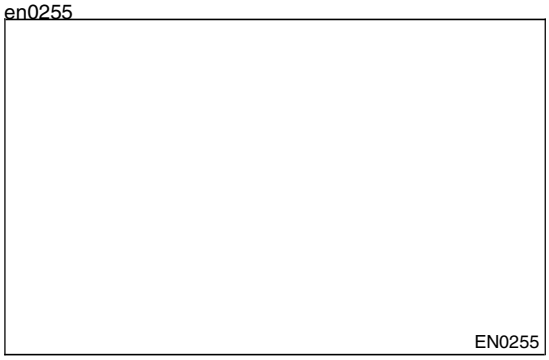
Clearance:
1.0±0.5 mm (0.039±0.020 in)



en0254

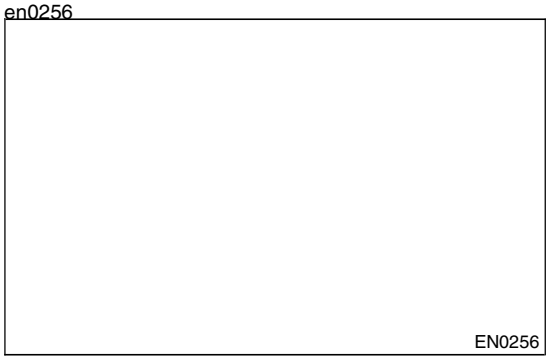


en0255



EN0255

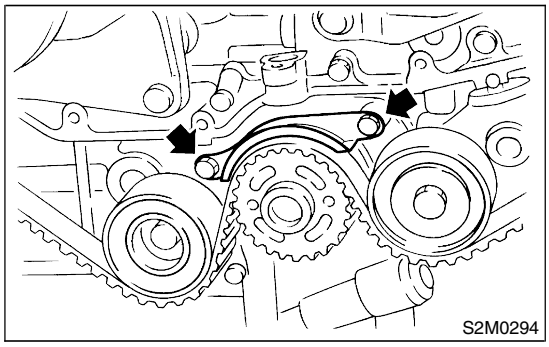
en0256



EN0256

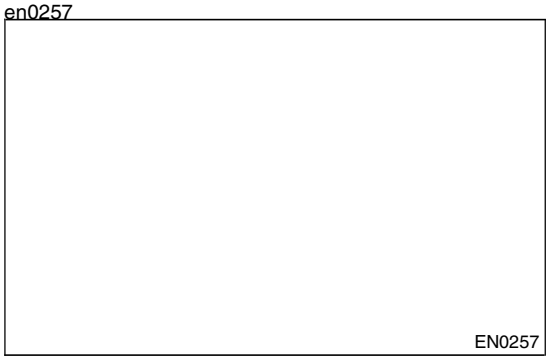
(3) Tighten remaining bolts.

Tightening torque:
9.8 N·m (1.0 kgf-m, 7.2 ft-lb)



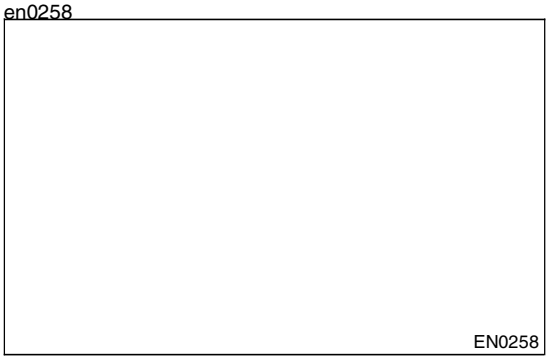
S2M0294

en0257



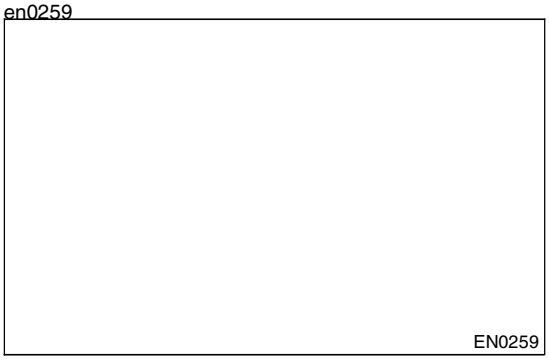
EN0257

en0258



EN0258

en0259



EN0259

7) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>
8) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
9) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

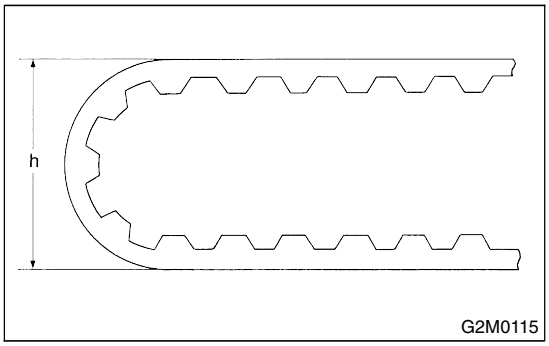
C: INSPECTION S183099A10

1. TIMING BELT S183099A1001

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



G2M0115

2. AUTOMATIC BELT TENSION ADJUSTER S183099A1002

1) Visually check oil seals for leaks, and rod ends for abnormal wear or scratches. If necessary, replace automatic belt tension adjuster assembly.

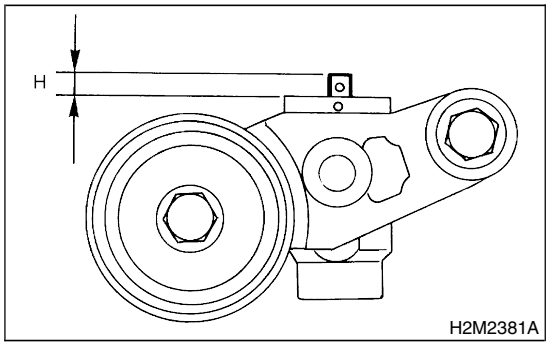
CAUTION:
Slight traces of oil at rod's oil seal does not indicate a problem.

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 S183099A1003

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

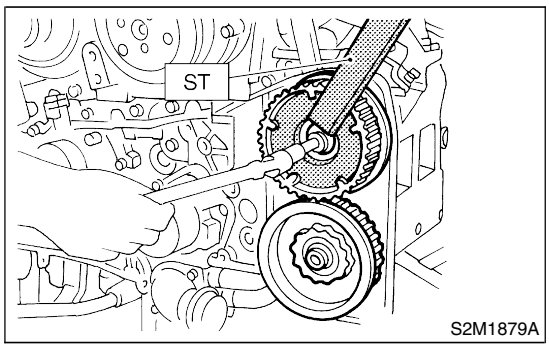
4. BELT IDLER S183099A1004

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

16. Camshaft Sprocket S183097

A: REMOVAL S183097A18

1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
4) Remove timing belt assembly. <Ref. to ME(DOHC TURBO)-48, REMOVAL, Timing Belt Assembly.>
5) Remove camshaft position sensor. <Ref. to FU(DOHC TURBO)-31, REMOVAL, Camshaft Position Sensor.>
6) Remove camshaft sprockets. To lock camshaft, use ST.
ST 499207400 CAMSHAFT SPROCKET WRENCH

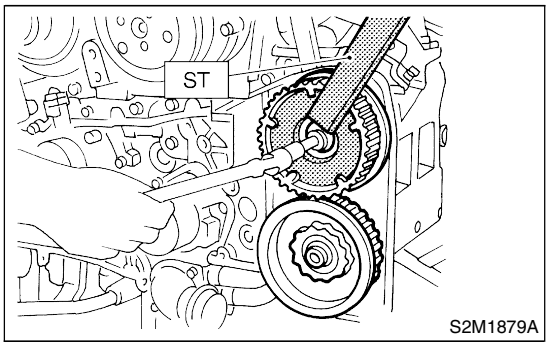


B: INSTALLATION S183097A11

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

Tightening torque:
98 N·m (10 kgf-m, 72.4 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 camshaft position sensor. <Ref. to FU(DOHC TURBO)-31, INSTALLATION, Camshaft Position Sensor.>
3) Install timing belt assembly. <Ref. to ME(DOHC TURBO)-49, INSTALLATION, Timing Belt Assembly.>
4) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>
5) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
6) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

C: INSPECTION S183097A10

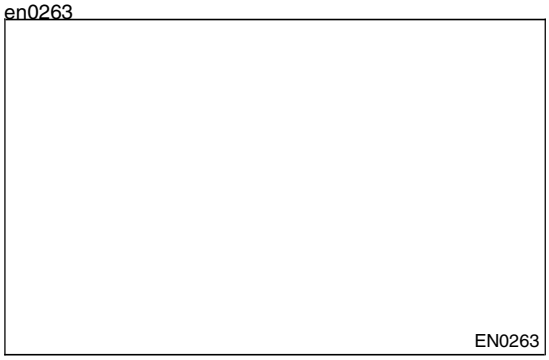
1) Check sprocket teeth for abnormal wear and scratches.
2) Make sure there is no free play between sprocket and key.
3) Check crankshaft sprocket notch for sensor for damage and contamination of foreign matter.

17. Crankshaft Sprocket S183101

A: REMOVAL S183101A18

1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
4) Remove timing belt assembly. <Ref. to ME(DOHC TURBO)-48, REMOVAL, Timing Belt Assembly.>
5) Remove camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, REMOVAL, Camshaft Sprocket.>
6) Remove crankshaft sprocket.

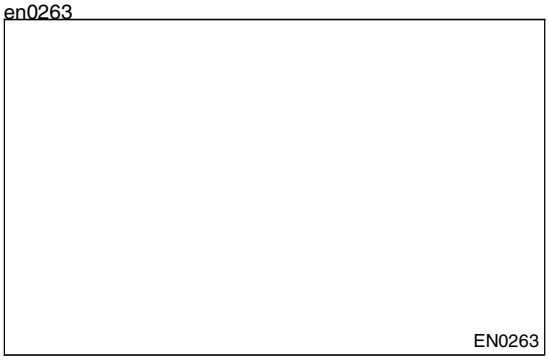
en0263



B: INSTALLATION S183101A11

1) Install crankshaft sprocket.

en0263



2) Install camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, INSTALLATION, Camshaft Sprocket.>
3) Install timing belt assembly. <Ref. to ME(DOHC TURBO)-49, INSTALLATION, Timing Belt Assembly.>
4) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>
5) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
6) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

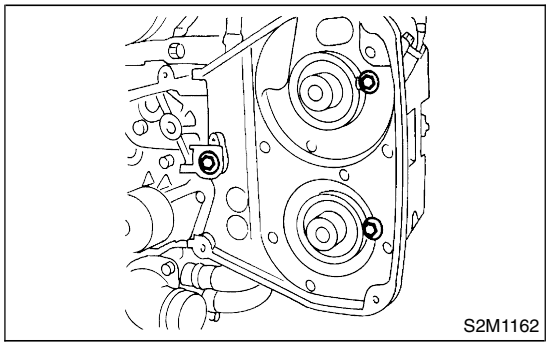
C: INSPECTION S183101A10

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.

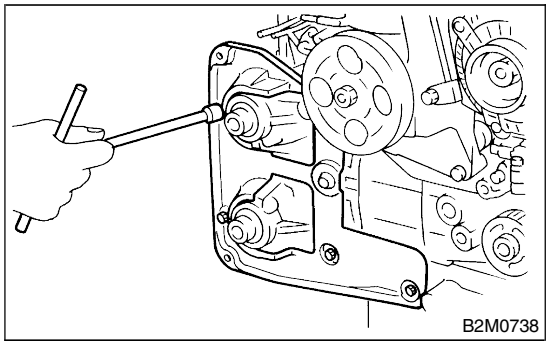
18. Camshaft S183092

A: REMOVAL S183092A18

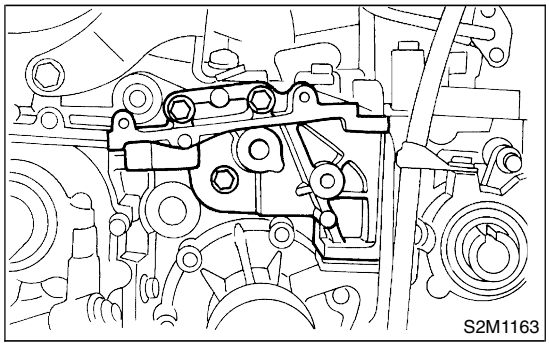
1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
4) Remove timing belt assembly. <Ref. to ME(DOHC TURBO)-48, REMOVAL, Timing Belt Assembly.>
5) Remove camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, REMOVAL, Camshaft Sprocket.>
6) Remove crankshaft sprocket. <Ref. to ME(DOHC TURBO)-57, REMOVAL, Crankshaft Sprocket.>
7) Remove left-hand belt cover No. 2.


S2M1162

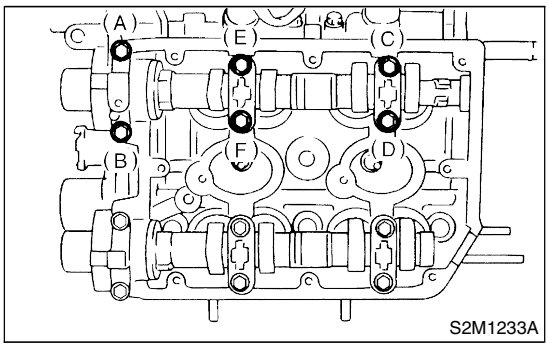
8) Remove right-hand belt cover No.2.


B2M0738

9) Remove tensioner bracket.

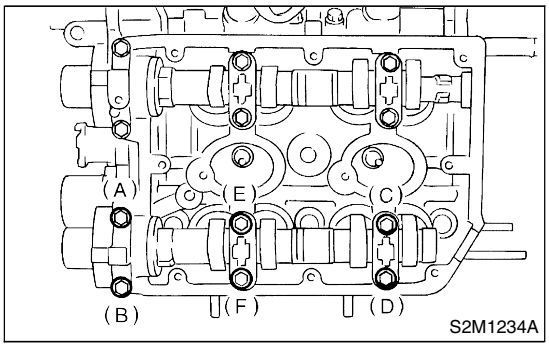

S2M1163

10) Remove oil level gauge guide. (LH side only)
11) Remove spark plug cord.
12) Remove rocker cover and gasket.
13) Loosen intake camshaft cap bolts equally, a little at a time in alphabetical sequence shown in figure.



S2M1233A

14) Remove camshaft caps and intake camshaft.
15) Loosen exhaust camshaft cap bolts equally, a little at a time in alphabetical sequence shown in figure.



S2M1234A

16) Remove camshaft caps and exhaust camshaft.

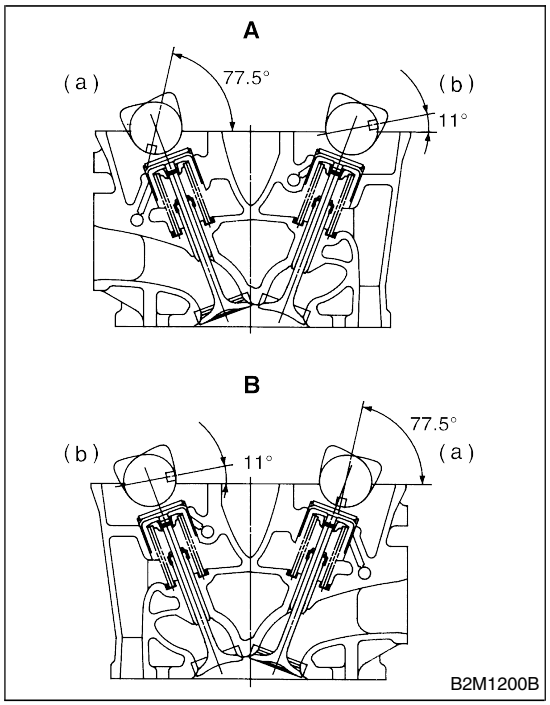
CAUTION:
Arrange camshaft caps in order so that they can be installed in their original positions.

17) Similarly, remove right-hand camshafts and related parts.

B: INSTALLATION S183092A11

1) Camshaft installation Apply engine oil to cylinder head at camshaft bear-ing location before installing camshaft. Install cam-shaft so that each valves is close to or in contact with “base circle” of cam lobe.

CAUTION:
• When camshafts are positioned as shown in figure, camshafts need to be rotated at a minimum to align with timing belt during installation.
• Right-hand camshaft need not be rotated when set at position shown in figure. Left-hand intake camshaft: Rotate 80° clock-wise.
Left-hand exhaust camshaft: Rotate 45° counterclockwise.

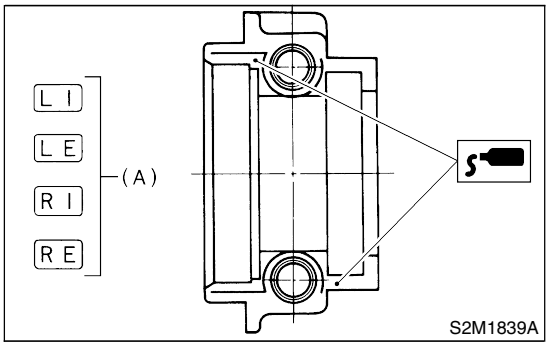


A Left side cylinder head
B Right side cylinder head
(a) Intake camshaft
(b) Exhaust camshaft

2) Camshaft cap installation
(1) Apply fluid packing sparingly to cap mating surface.

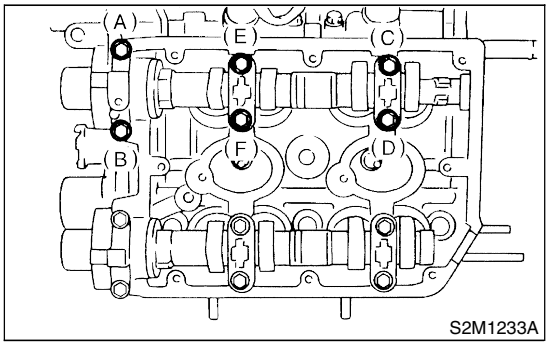
CAUTION:
Do not apply fluid packing excessively. Failure to do so may cause excess packing to come out and flow toward oil seal, resulting in oil leaks.

Fluid packing:
THREE BOND 1215 or equivalent



(2) Apply engine oil to cap bearing surface and install cap on camshaft as shown by identification mark (A).
(3) Gradually tighten cap in at least two stages in alphabetical sequence shown in figure, and then tighten to specified torque.

Tightening torque:
20 N·m (2.0 kgf-m, 14.5 ft-lb)



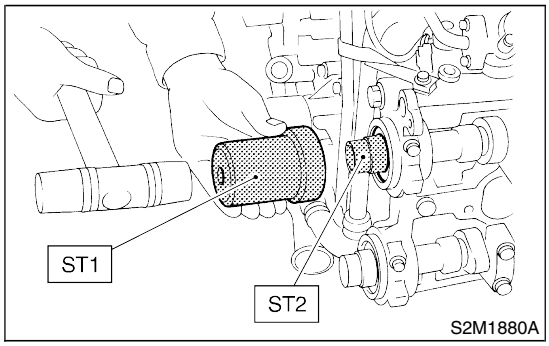
(4) Similarly, tighten cap on exhaust side. After tightening cap, ensure camshaft rotates only slightly while holding it at “base” circle.

Tightening torque:
20 N·m (2.0 kgf-m, 14.5 ft-lb)

3) Camshaft oil seal installation Apply grease to new oil seal lips and press onto front end of camshaft by using ST1 and ST2.

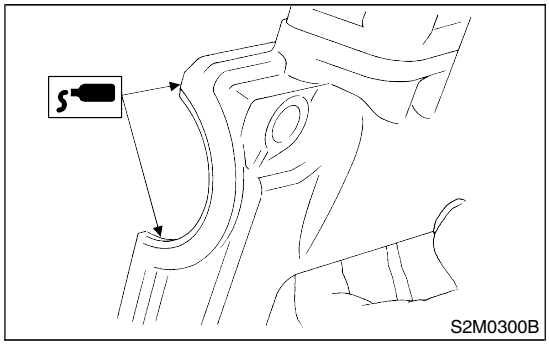
CAUTION:
Use a new oil seal.

ST1 499587600 OIL SEAL INSTALLER
ST2 499597200 OIL SEAL GUIDE



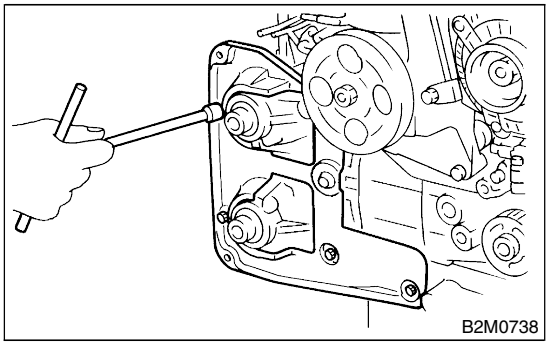
4) Rocker cover installation
(1) Install gasket on rocker cover. Install peripheral gasket and ignition coil gasket.
(2) Apply fluid packing to four front open edges of peripheral gasket.

Fluid packing:
THREE BOND 1215 or equivalent



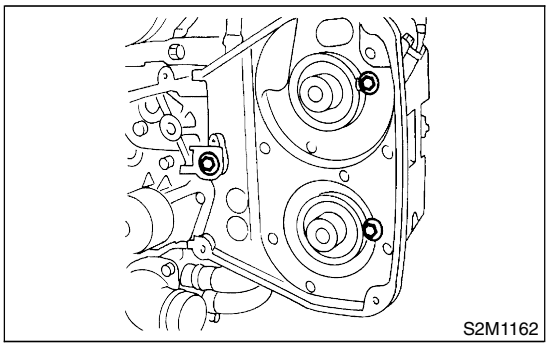
(3) Install rocker cover on cylinder head. Ensure gasket is properly positioned during installation.
5) Install spark plug cord.
6) Similarly, install parts on right-hand side.
7) Install right-hand belt cover No. 2.

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



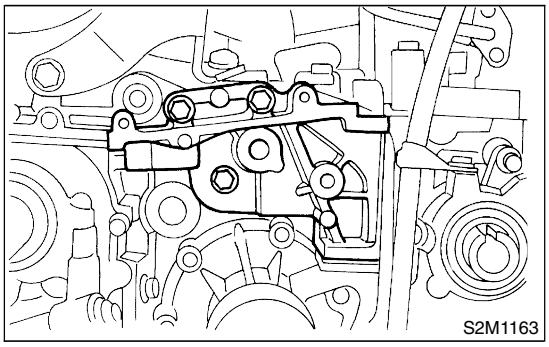
8) Install left-hand belt cover No. 2.

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



9) Install tensioner bracket.

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



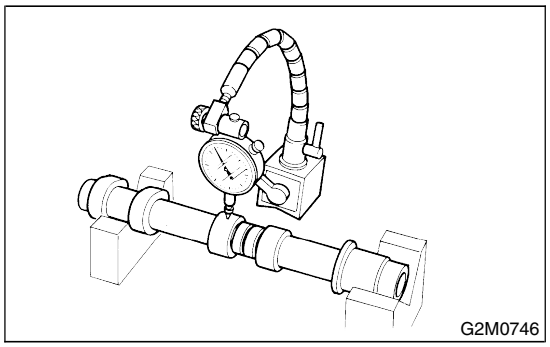
10) Install crankshaft sprocket. <Ref. to ME(DOHC TURBO)-56, INSTALLATION, Camshaft Sprocket.>
11) Install camshaft sprockets. <Ref. to ME(DOHC TURBO)-56, INSTALLATION, Camshaft Sprocket.>
12) Install timing belt assembly. <Ref. to ME(DOHC TURBO)-49, INSTALLATION, Timing Belt Assembly.>
13) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>

14) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
15) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

C: INSPECTION S183092A10

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

Limit:
0.020 mm (0.0008 in)

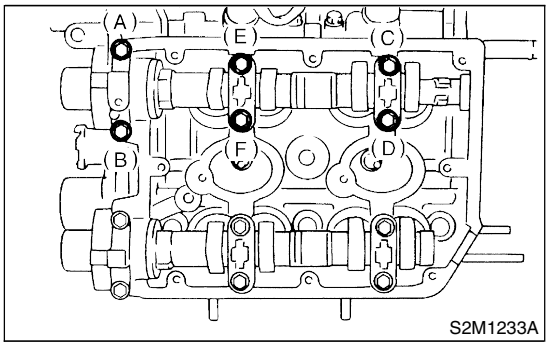


2) Check journal for damage and wear. Replace if faulty.
3) Measure outside diameter of camshaft journal. If the journal diameter is not as specified, check the oil clearance.

	Camshaft journal	
	Front	Center, rear
Standard	37.946 — 37.963 (1.4939 — 1.4946 in)	29.946 — 29.963 (1.1790 — 1.1796 in)

4) Measurement of the camshaft journal oil clearance
(1) Clean the bearing caps and camshaft journals.
(2) Place the camshafts on the cylinder head. (Without installing valve rocker.)
(3) Place plastigauge across each of the camshaft journals.
(4) Gradually tighten cap in at least two stages in alphabetical sequence shown in figure, and then tighten to specified torque.

Tightening torque:
20 N·m (2.0 kgf-m, 14.5 ft-lb)

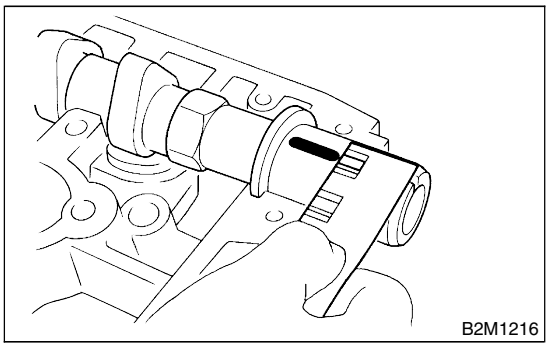


CAUTION:
Do not turn the camshaft.

(5) Remove the bearing caps.
(6) Measure the widest point of the plastigauge on each journal. If the oil clearance exceeds the limit, replace the camshaft. If necessary, replace the camshaft caps and cylinder head as a set.

Standard:
0.037 — 0.072 mm (0.0015 — 0.0028 in)

Limit:
0.10 mm (0.0039 in)

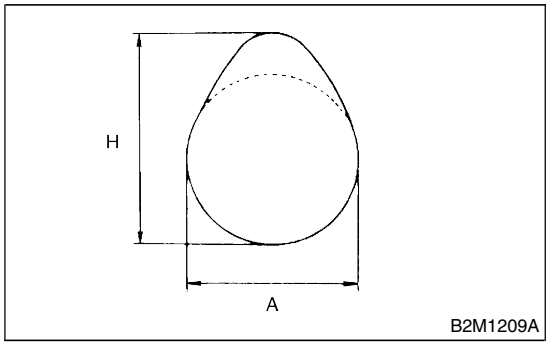


(7) Completely remove the plastigauge.
5) Check cam face condition; remove minor faults by grinding with oil stone. Measure the cam height H; replace if the limit has been exceeded.

Cam height: H Standard:
Intake:
44.75 — 44.85 mm (1.7618 — 1.7657 in)
Exhaust:
44.60 — 44.70 mm (1.7559 — 1.7598 in)

Limit:
Intake:
44.65 mm (1.7579 in)
Exhaust:
44.50 mm (1.7520 in)

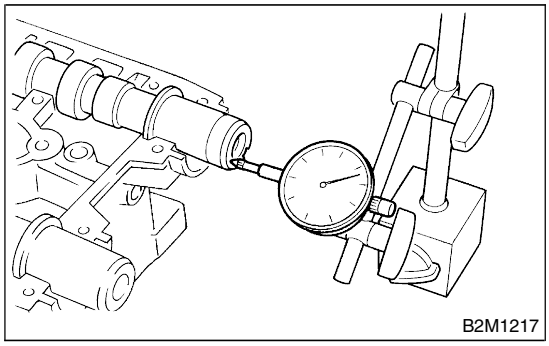
Cam base circle diameter A:
37.0 mm (1.457 in)



6) Measure the thrust clearance of camshaft with dial gauge. If the clearance exceeds the limit, replace caps and cylinder head as a set. If necessary replace camshaft.

Standard:
0.015 — 0.070 mm (0.0006 — 0.0028 in)

Limit:
0.1 mm (0.004 in)

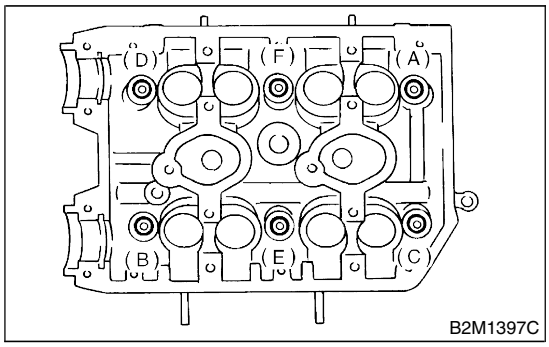


19. Cylinder Head Assembly S183093

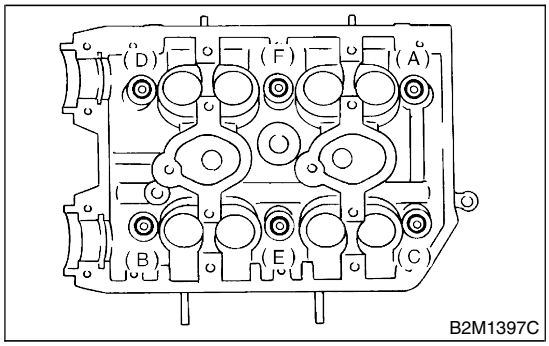
A: REMOVAL S183093A18

1) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
2) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
3) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
4) Remove timing belt assembly. <Ref. to ME(DOHC TURBO)-48, REMOVAL, Timing Belt Assembly.>
5) Remove camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, REMOVAL, Camshaft Sprocket.>
6) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
7) Remove bolt which installs A/C compressor bracket on cylinder head.
8) Remove camshaft. <Ref. to ME(DOHC TURBO)-58, REMOVAL, Camshaft.>
9) Remove cylinder head bolts in alphabetical sequence shown in figure.

CAUTION:
Leave bolts (A) and (D) engaged by three or four threads to prevent cylinder head from falling.



10) While tapping cylinder head with a plastic hammer, separate it from cylinder block. Remove bolts (A) and (D) to remove cylinder head.



11) Remove cylinder head gasket.

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

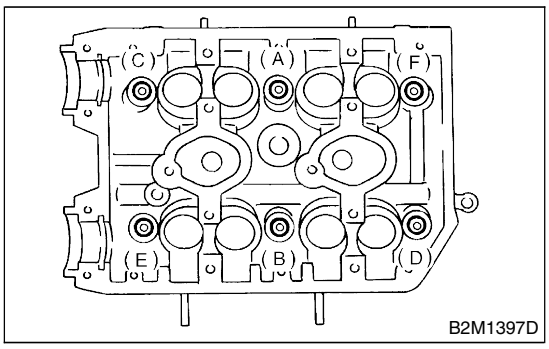
12) Similarly, remove right side cylinder head.

B: INSTALLATION S183093A11

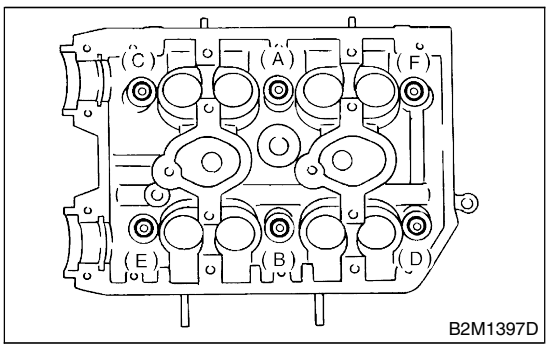
1) Install cylinder head and gaskets on cylinder block.

CAUTION:
- **Use new cylinder head gaskets.**
- **Be careful not to scratch the mating surface of cylinder head and cylinder block.**

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.

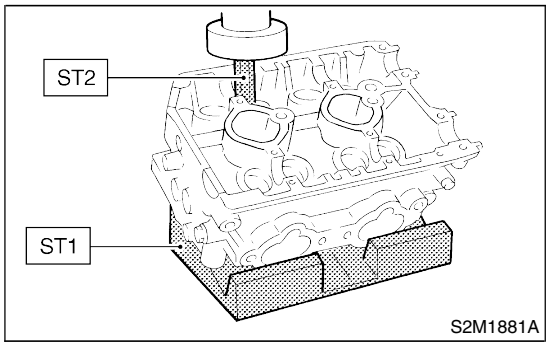
CAUTION:
Ensure that the total "re-tightening angle" [in the two previous steps] do not exceed 180°.

3) Install camshaft. <Ref. to ME(DOHC TURBO)-59, INSTALLATION, Camshaft.>
4) Install A/C compressor bracket on cylinder head.
5) Install intake manifold. <Ref. to ME(DOHC TURBO)-59, INSTALLATION, Camshaft.>
6) Install camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, INSTALLATION, Camshaft Sprocket.>
7) Install timing belt assembly. <Ref. to ME(DOHC TURBO)-49, INSTALLATION, Timing Belt Assembly.>
8) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>
9) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
10) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>

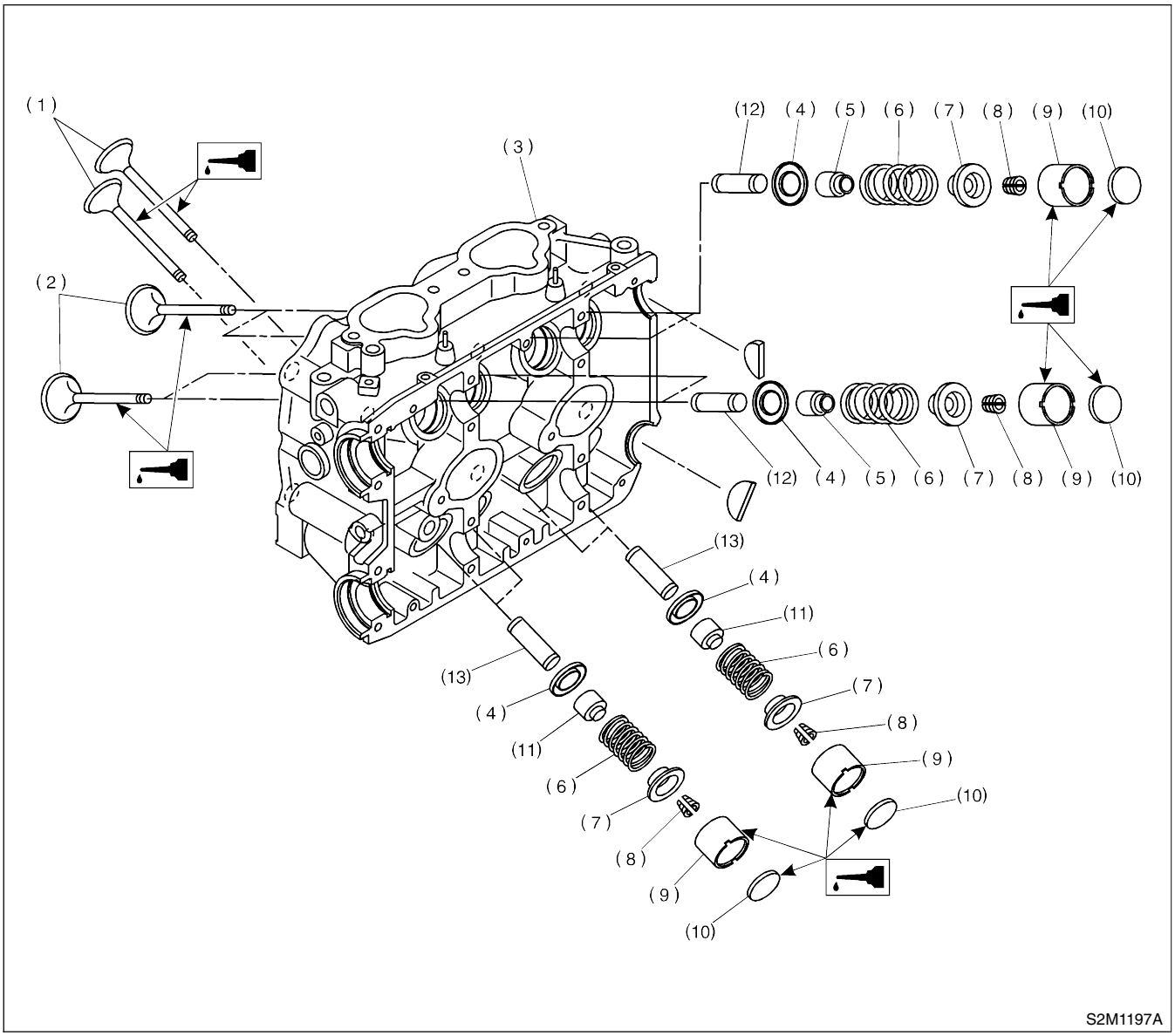
C: DISASSEMBLY S183093A06

1) Remove valve shims and valve lifters.
2) Compress the valve spring and remove the valve spring retainer key. Remove each valve and valve spring.
ST 498267600 CYLINDER HEAD TABLE
ST 499718000 VALVE SPRING REMOVER

CAUTION:
- **Keep removed parts in order for re-installing in their original positions.**
- **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 S183093A02



(1) Exhaust valve
(2) Intake valve
(3) Cylinder head
(4) Valve spring seat
(5) Intake valve oil seal
(6) Valve spring
(7) Retainer
(8) Retainer key
(9) Valve lifter
(10) Shim
(11) Exhaust valve oil seal
(12) Intake valve guide
(13) Exhaust valve guide

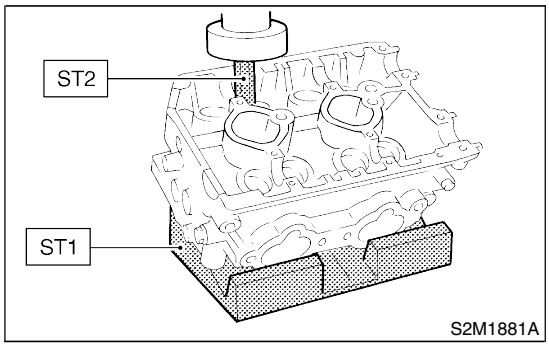
1) Installation of valve spring and valve
   (1) Coat stem of each valve with engine oil and insert valve into valve guide.

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

   (2) Set cylinder head on ST1.
   (3) Install valve spring and retainer using ST2.

ST 498267600 CYLINDER HEAD TABLE
ST 499718000 VALVE SPRING REMOVER

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



(4) Compress valve spring and fit valve spring retainer key.
(5) After installing, tap valve spring retainers lightly with wooden hammer for better seating.
2) Apply oil to the surface of the valve lifter and valve shim.
3) Install valve lifter and valve shim.

E: INSPECTION S183093A10

1. CYLINDER HEAD S183093A1001

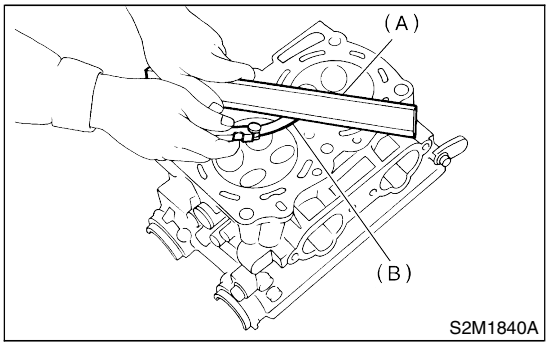
1) Make sure that no crack or other damage exists. In addition to visual inspection, inspect important areas by means of red check.
2) Measure the warping of the cylinder head surface that mates with crankcase by using a straight edge (A) and thickness gauge (B).
If the warping exceeds 0.05 mm (0.0020 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:
127.5 mm (5.02 in)

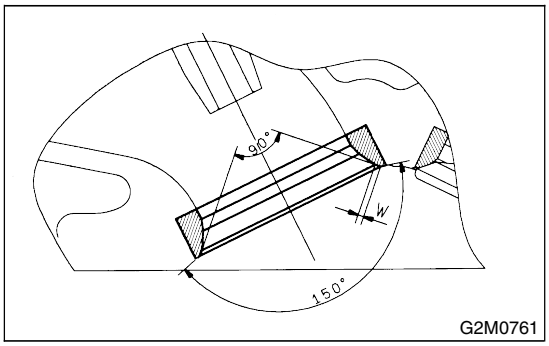
CAUTION:
Uneven torque for the cylinder head nuts can cause warping. When reassembling, pay special attention to the torque so as to tighten evenly.



2. VALVE SEAT S183093A1002

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 1.5 mm (0.059 in)
Limit 2.2 mm (0.087 in)



3. VALVE GUIDE S183093A1003

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)

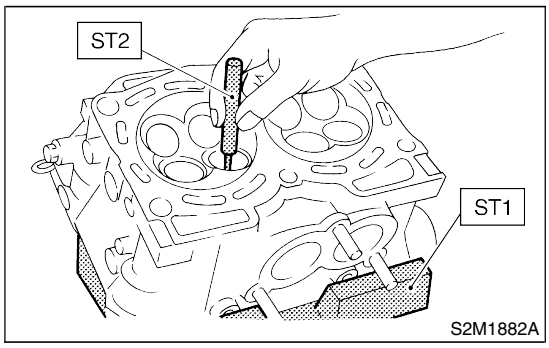
2) If the clearance between valve guide and stem exceeds the limit, replace valve guide or valve itself whichever shows greater amount of wear. See following procedure for valve guide replacement.

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)

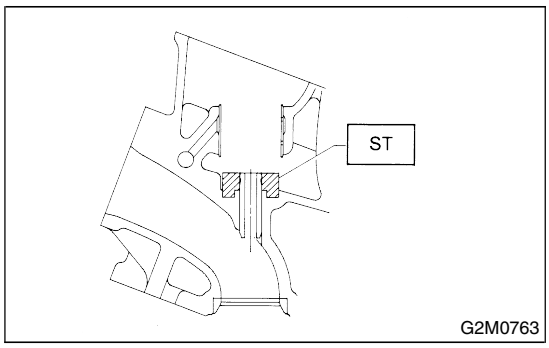
(1) Place cylinder head on ST1 with the combustion chamber upward so that valve guides enter the holes in ST1.
(2) Insert ST2 into valve guide and press it down to remove valve guide.

ST1 498267600 CYLINDER HEAD TABLE
ST2 499767200 VALVE GUIDE REMOVER



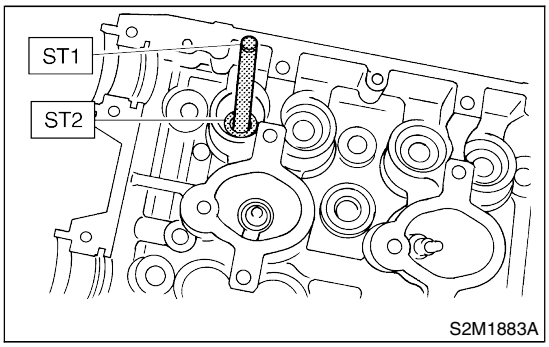
(3) Turn cylinder head upside down and place ST as shown in the figure.

ST 498767700 VALVE GUIDE ADJUSTER



(4) Before installing new 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 499767200 VALVE GUIDE REMOVER
ST2 498267700 VALVE GUIDE ADJUSTER



(6) Check the valve guide protrusion.

Valve guide protrusion: L
12.0 — 12.4 mm (0.472 — 0.488 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.

ST 499767400 VALVE GUIDE REAMER

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.

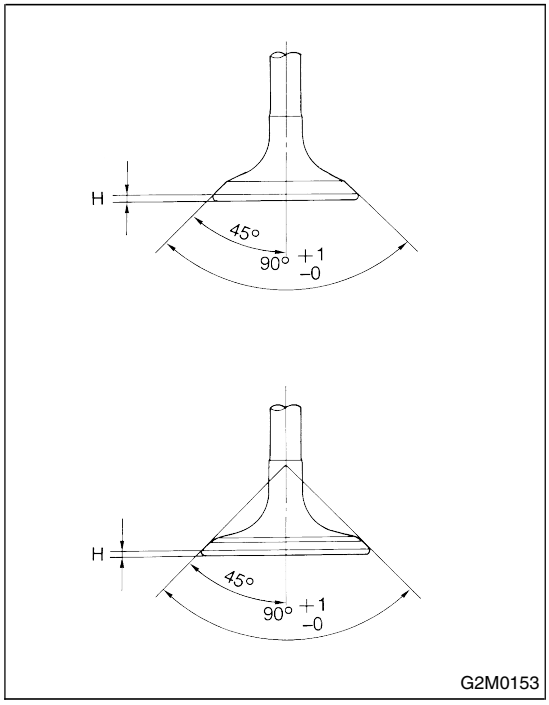
(8) Recheck the contact condition between valve and valve seat after replacing valve guide.

4. INTAKE AND EXHAUST VALVE S183093A1004

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 1.2 mm (0.047 in)
Limit 0.8 mm (0.031 in)
Exhaust
Standard 1.5 mm (0.059 in)
Limit 0.8 mm (0.031 in)

Valve overall length:
Intake
104.4 mm (4.110 in)
Exhaust
104.7 mm (4.122 in)

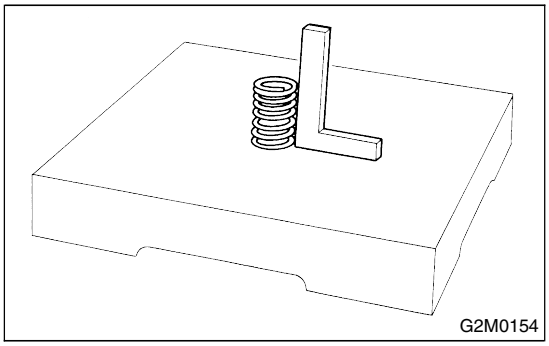


2) Put a small amount of grinding compound on the seat surface and lap the valve and seat surface. Install a new intake valve oil seal after lapping.

5. VALVE SPRINGS S183093A1005

1) Check valve springs for damage, free length, and tension. Replace valve spring if it is not to the specifications presented in the table.
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.

	Valve spring
Free length	44.67 mm (1.7587 in)
Tension/spring height	220.7±15.7 N (22.5±1.6 kgf, 49.6±3.5 lb)/36.0 mm (1.417 in)
	510.9±25.5 N (52.1±2.6 kgf, 114.9±5.7 lb)/26.6 mm (1.047 in)
Squareness	2.5°, 2.0 mm (0.079 in)



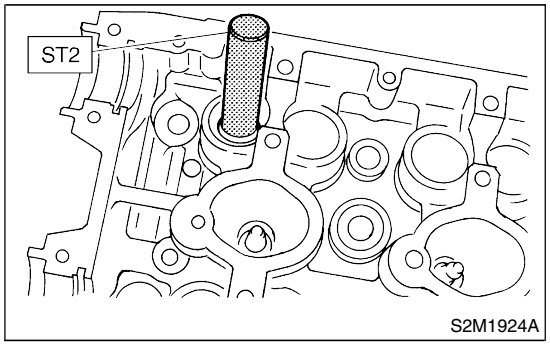
6. INTAKE AND EXHAUST VALVE OIL SEAL S183093A1006

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.
1) Place cylinder head on ST1.
2) Press in oil seal to the specified dimension indicated in the figure by using ST2.
ST1 498267600 CYLINDER HEAD TABLE
ST2 498857100 VALVE GUIDE REMOVER

CAUTION:
• Apply engine oil to oil seal before force-fitting.
• Differentiate between intake valve oil seal and exhaust valve oil seal by noting their difference in color.

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

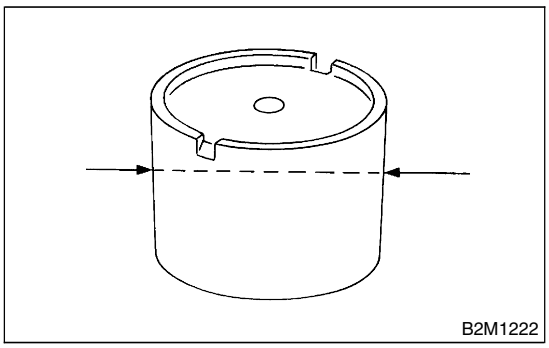
Color of spring part:
Intake [Silver]
Exhaust [Silver]



7. VALVE LIFTER S183093A1007

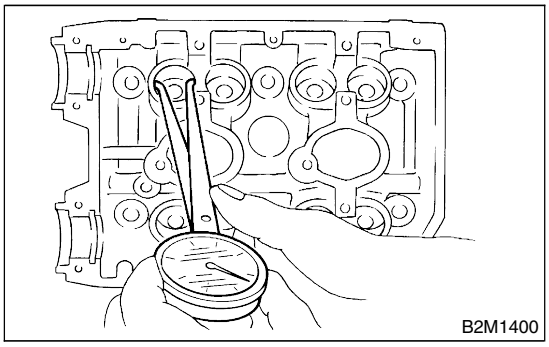
1) Check valve lifter visually.
2) Measure outer diameter of valve lifter.

Outer diameter:
34.959 — 34.975 mm (1.3763 — 1.3770 in)



3) Measure inner diameter of valve lifter mating part on cylinder head.

Inner diameter:
34.994 — 35.016 mm (1.3777 — 1.3786 in)



CAUTION:
If difference between outer diameter of valve lifter and inner diameter of valve lifter mating part is over the limit, replace cylinder head.

Standard:
0.019 — 0.057 mm (0.0007 — 0.0022 in)

Limit:
0.100 mm (0.0039 in)

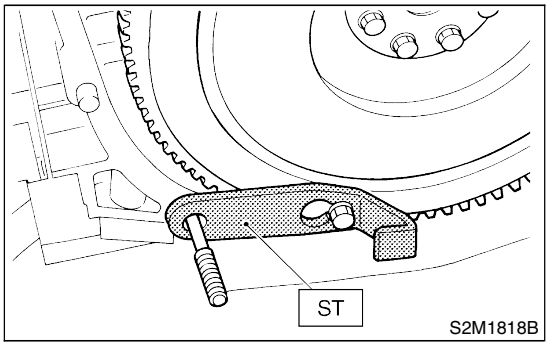
20. Cylinder Block S183090

A: REMOVAL S183090A18

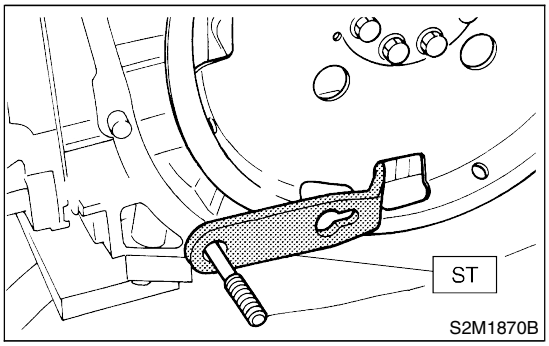
NOTE:
Before conducting this procedure, drain engine oil completely if applicable.

1) Remove intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>
2) Remove V-belt. <Ref. to ME(DOHC TURBO)-44, REMOVAL, V-belt.>
3) Remove crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, REMOVAL, Crankshaft Pulley.>
4) Remove belt cover. <Ref. to ME(DOHC TURBO)-47, REMOVAL, Belt Cover.>
5) Remove timing belt assembly. <Ref. to ME(DOHC TURBO)-48, REMOVAL, Timing Belt Assembly.>
6) Remove camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, REMOVAL, Camshaft Sprocket.>
7) Remove crankshaft sprocket. <Ref. to ME(DOHC TURBO)-57, REMOVAL, Crankshaft Sprocket.>
8) Remove generator and A/C compressor with their brackets.
9) Remove cylinder head assembly. <Ref. to ME(DOHC TURBO)-63, REMOVAL, Cylinder Head Assembly.>
10) Remove clutch housing cover. (MT vehicles only)
11) Remove flywheel (MT vehicle) or drive plate (AT vehicle).
Using ST, lock crankshaft.
ST 498497100 CRANKSHAFT STOPPER

- MT VEHICLES

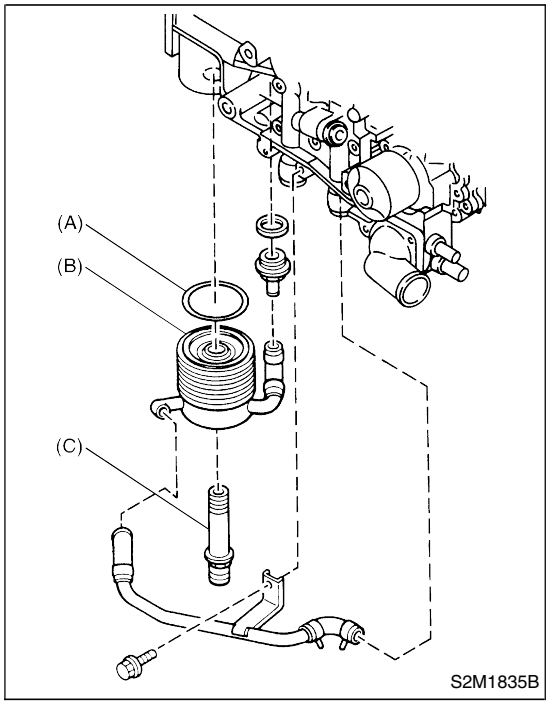


- AT VEHICLES



12) Remove oil separator cover.
13) Remove water by-pass pipe for heater.
14) Remove oil filter.

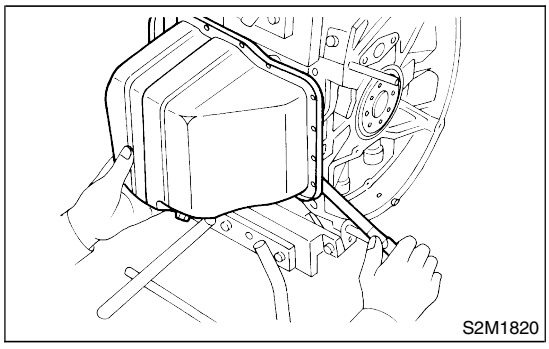
15) Remove oil cooler.



(A) Gasket
(B) Oil cooler
(C) Connector

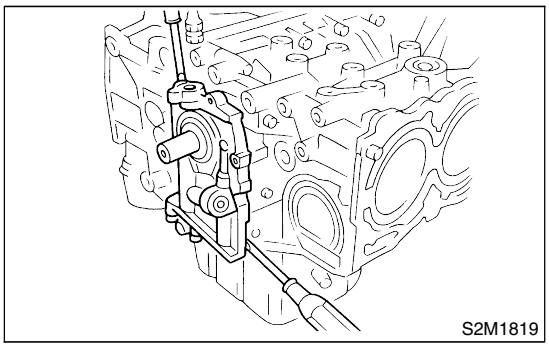
16) Removal of oil pan
(1) Turn cylinder block with #2 and #4 piston sides facing upward.
(2) Remove bolts which secure oil pan to cylinder block.
(3) Insert a oil pan cutter blade between cylinder block-to-oil pan clearance and remove oil pan.

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 water pips.
21) Remove water pump.
22) 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.

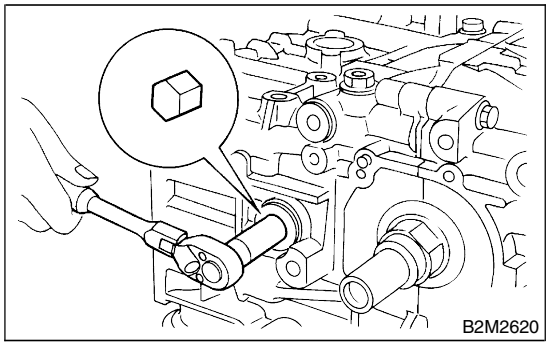


en0294

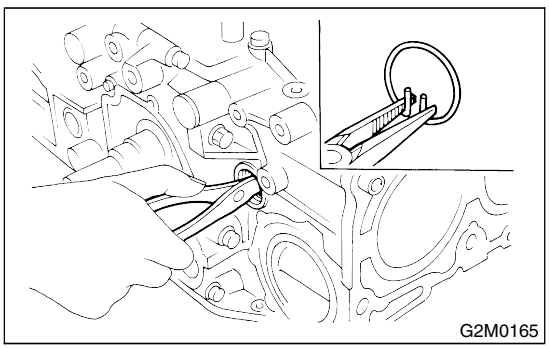
EN0294

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

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

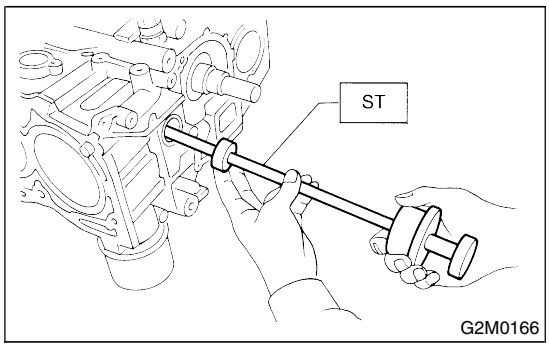

B2M2620

24) 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.


G2M0165

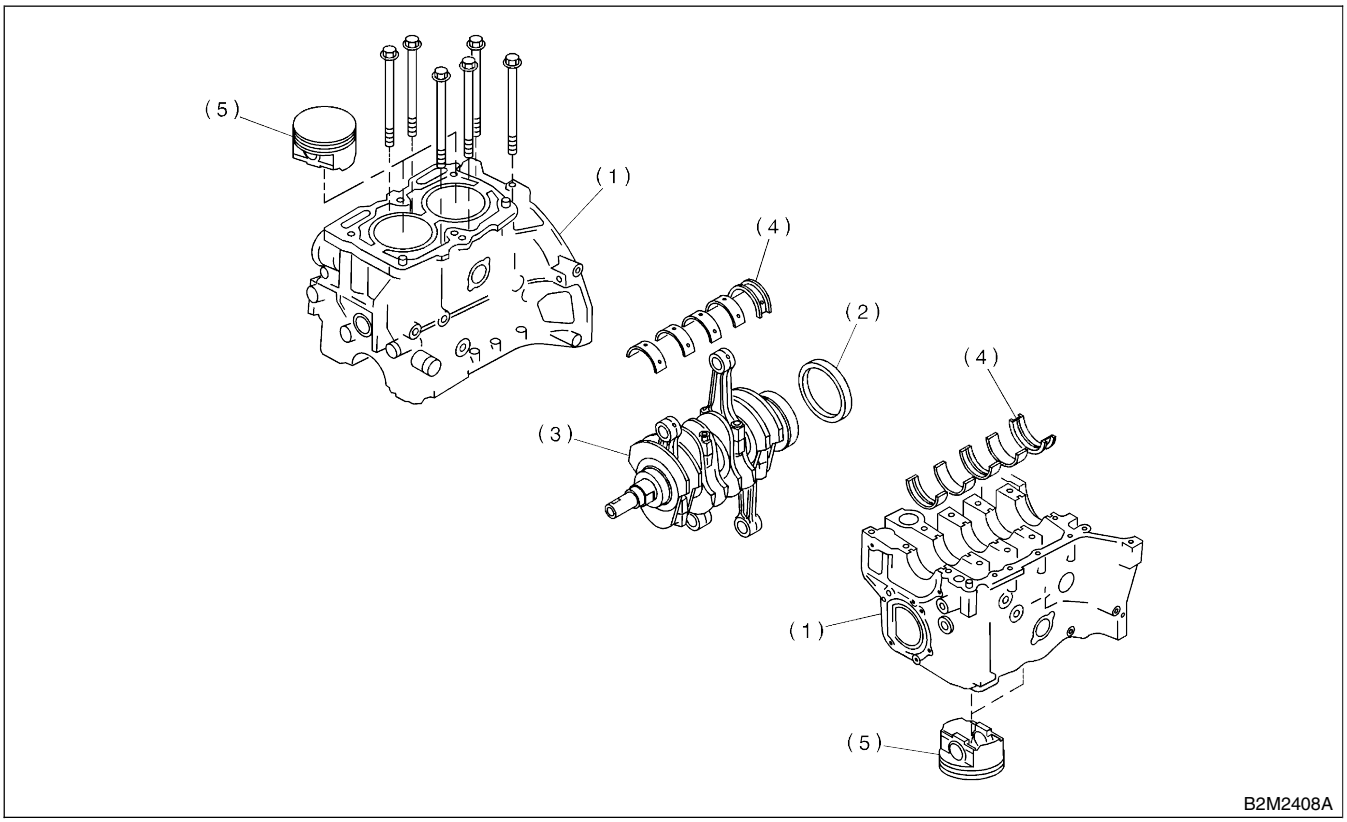
25) Draw out piston pin from #1 and #2 pistons using ST.
ST 499097700 PISTON PIN REMOVER

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



26) Similarly remove piston pins from #3 and #4 pistons.
27) Remove bolts which connect cylinder block on the side of #2 and #4 cylinders.
28) Back off bolts which connect cylinder block on the side of #1 and #3 cylinders two or three turns.
29) Set up cylinder block so that #1 and #3 cylinders are on the upper side, then remove cylinder block connecting bolts.
30) 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

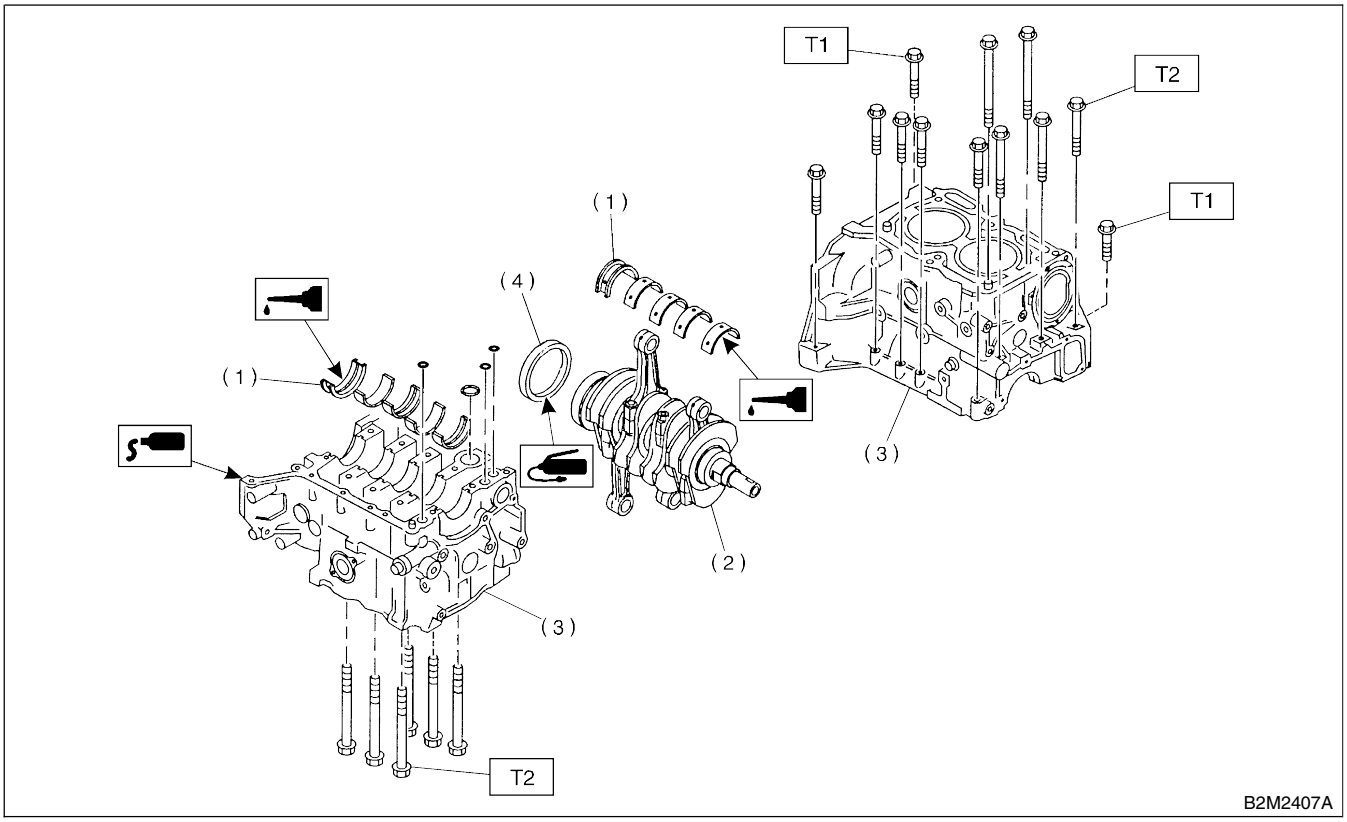
31) Remove rear oil seal.
32) Remove crankshaft together with connecting rod.
33) Remove crankshaft bearings from cylinder block using hammer handle.

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

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

CAUTION:
Do not confuse combination of piston and cylinder.

B: INSTALLATION S183090A11



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

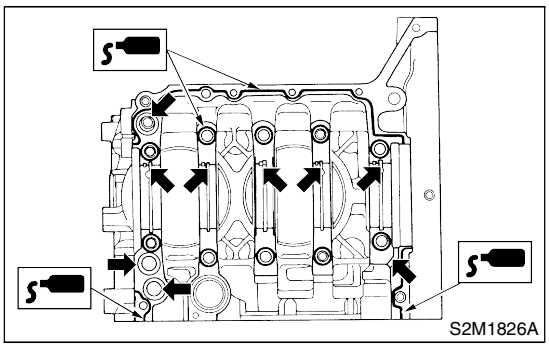
Tightening torque: N·m (kgf-m, ft-lb)
T1: 25 (2.5, 18.1)
T2: 47 (4.8, 34.7)

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

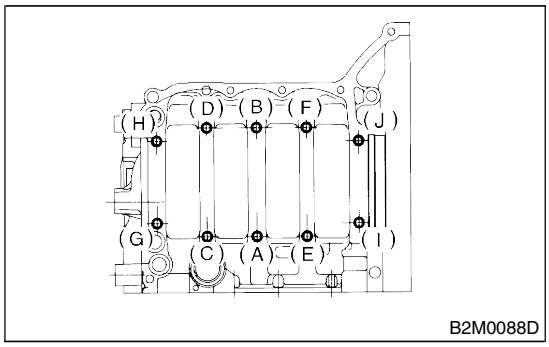
1) Position crankshaft on the #2 and #4 cylinder block.
2) Apply fluid packing to the mating surface of #1 and #3 cylinder block, and position it on #2 and #4 cylinder block.

Fluid packing:
THREE BOND 1215 or equivalent

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



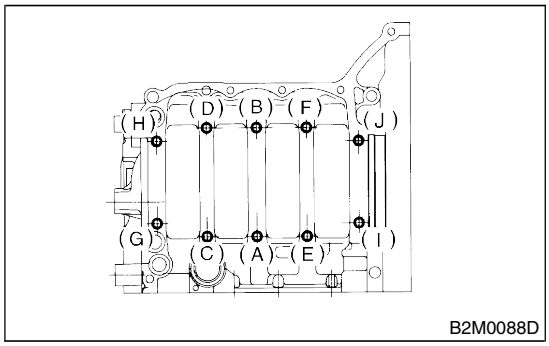
3) Temporarily tighten 10 mm cylinder block connecting bolts in alphabetical sequence shown in figure.



B2M0088D

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

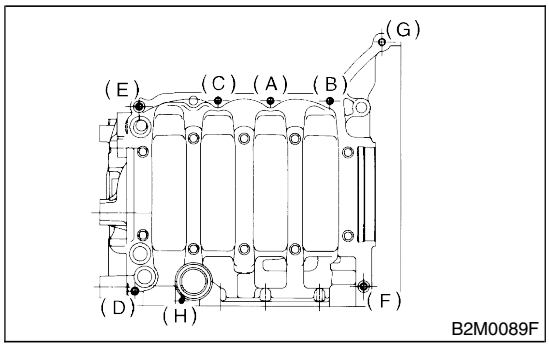
Tightening torque:
47 N·m (4.8 kgf-m, 34.7 ft-lb)



B2M0088D

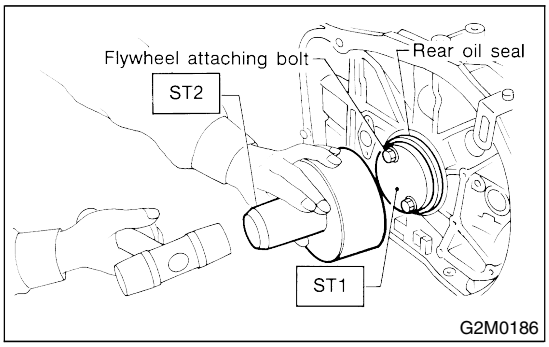
5) Tighten 8 mm and 6 mm cylinder block connecting bolts in alphabetical sequence shown in figure.

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)



B2M0089F

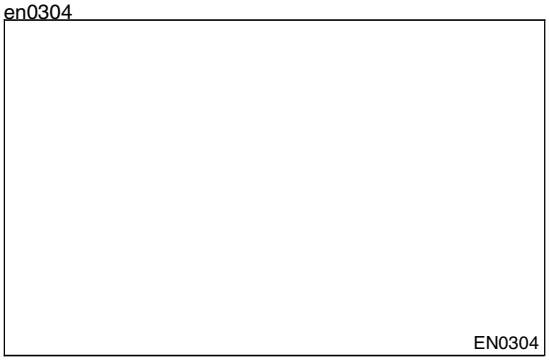
6) Install rear oil seal using ST1 and ST2.
ST1 499597100 OIL SEAL GUIDE
ST2 499587200 OIL SEAL INSTALLER



G2M0186

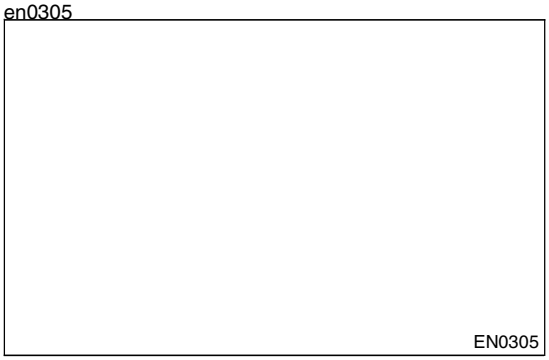
7) Position the top ring gap at (A) or (B) in the figure.

en0304


EN0304

8) Position the second ring gap at 180° on the reverse side for the top ring gap.
9) Position the upper rail gap at (C) or (D) in the figure.

en0305

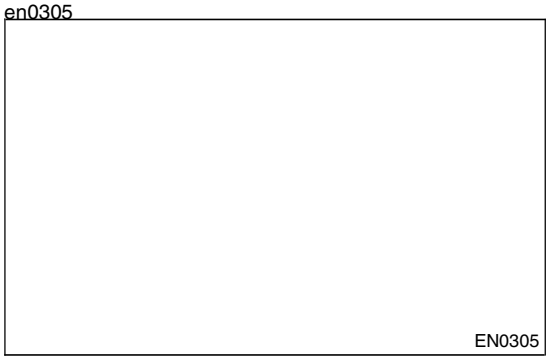

EN0305

10) Position the expander gap at 180° of the reverse side for the upper rail gap.

11) Position the lower rail gap at (E) or (F) in the figure.

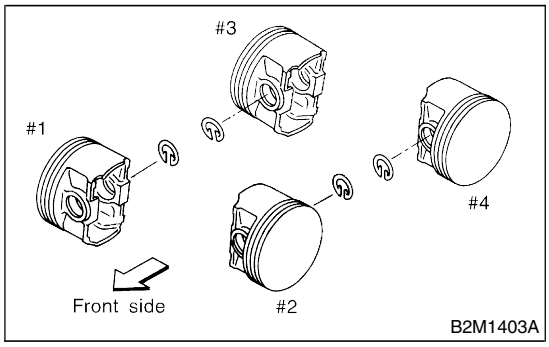
CAUTION:
• Ensure ring gaps do not face the same direction.
• Ensure ring gaps are not within the piston skirt area.

en0305



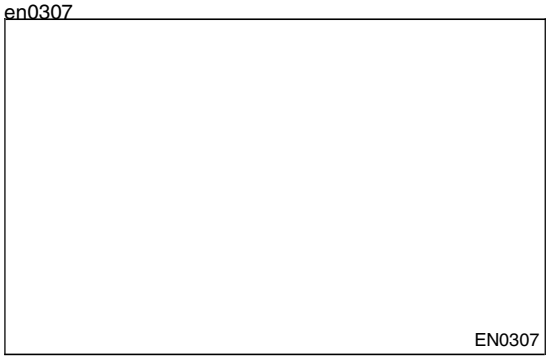
12) Install circlip.
Install circlips in piston holes located opposite service holes in cylinder block, when positioning all pistons in the corresponding cylinders.

CAUTION:
Use new circlips.

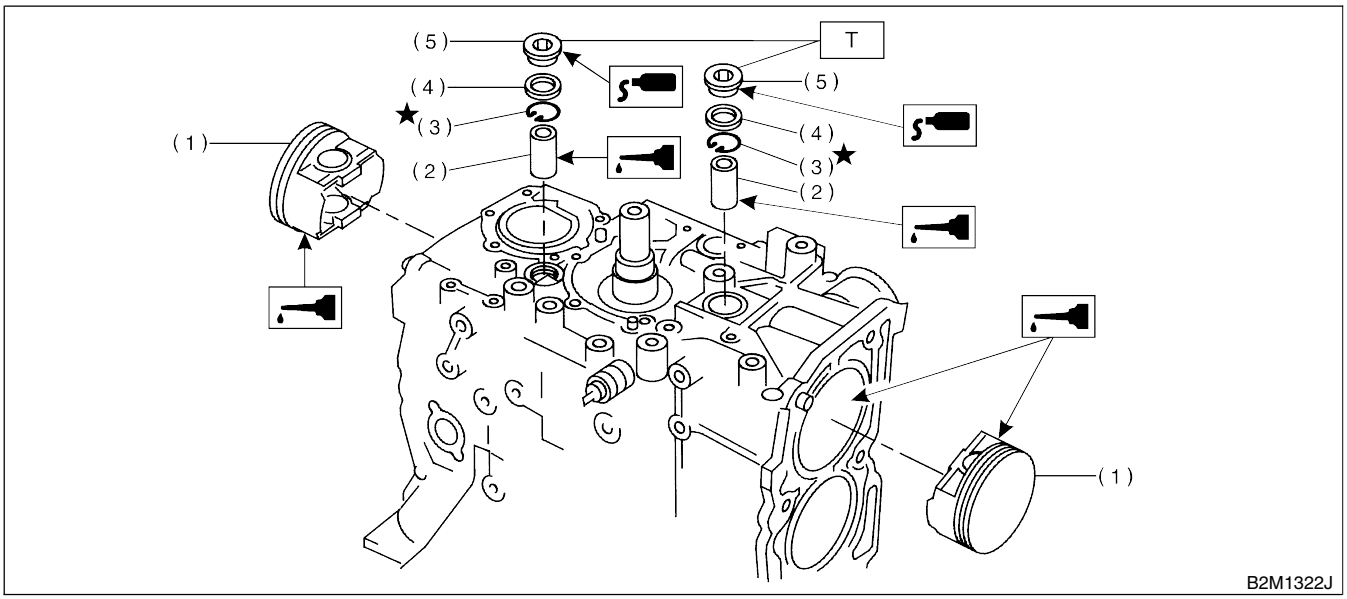


CAUTION:
Piston front mark faces towards the front of the engine.

en0307



(A) Front mark



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

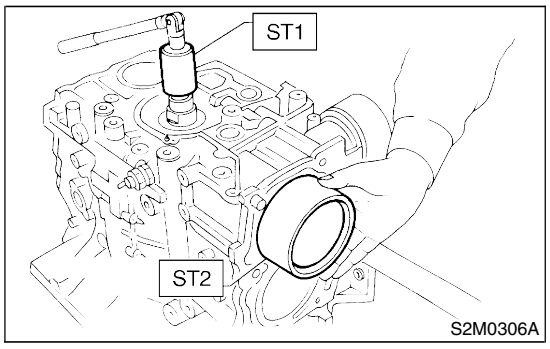
Tightening torque: N·m (kgf-m, ft-lb)
T: 69 (7.0, 50.6)

13) 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.

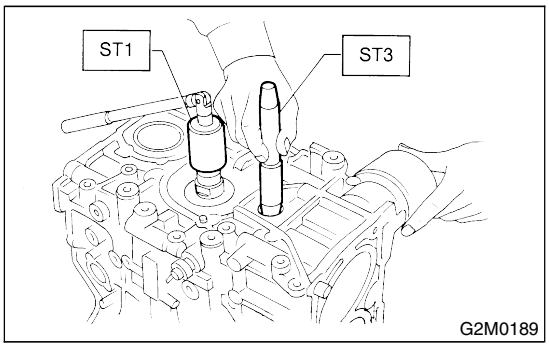
ST2 498744300 PISTON GUIDE



14) 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.

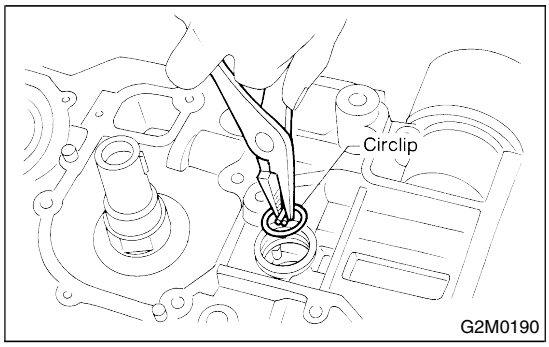
ST3 499017100 PISTON PIN GUIDE



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

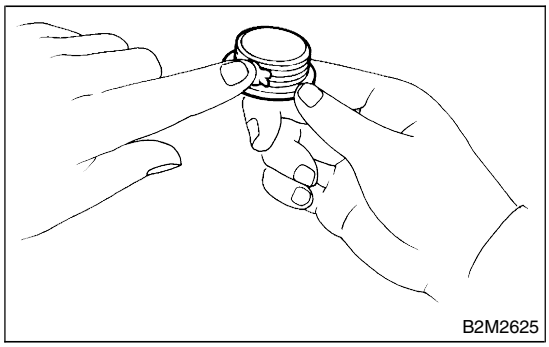
(3) Install circlip.

CAUTION:
Use new circlips.



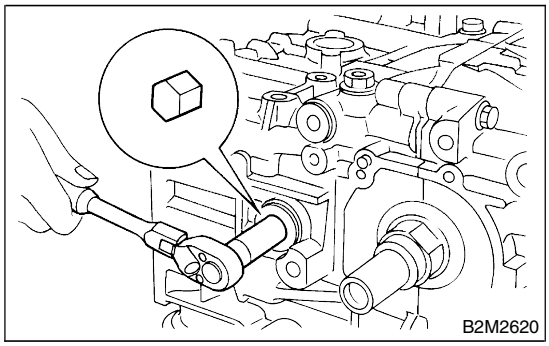
(4) Apply fluid packing around the service hole plug.

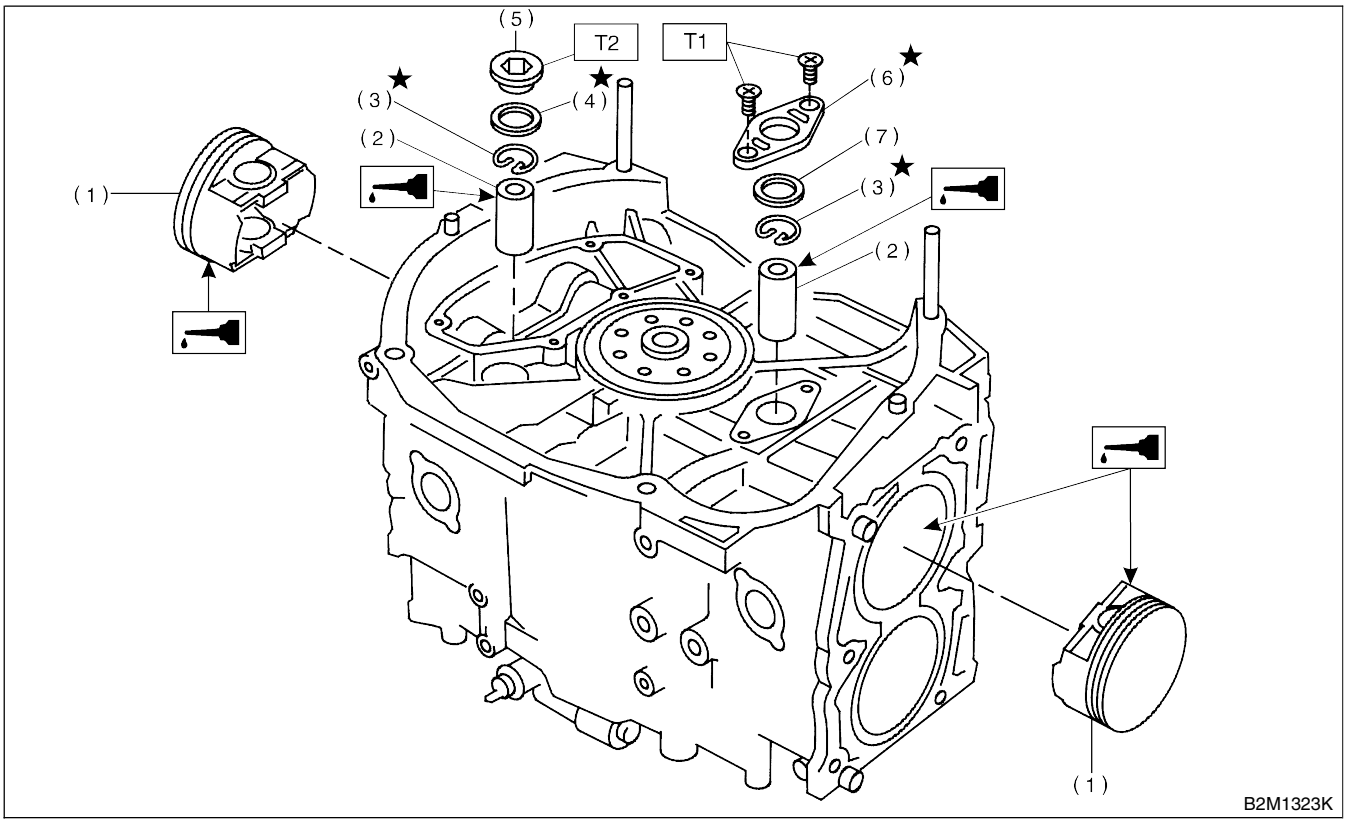
Fluid packing:
THREE BOND 1215 or equivalent



(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
(7) O-ring

Tightening torque: N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 69 (7.0, 50.6)

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

15) Install water pipe.
16) Install baffle plate.

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

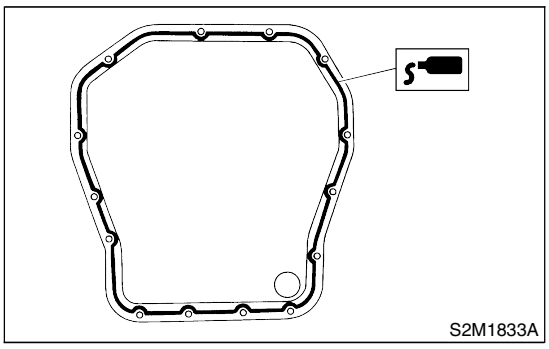
17) Install oil strainer and O-ring

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

18) Install oil strainer stay.

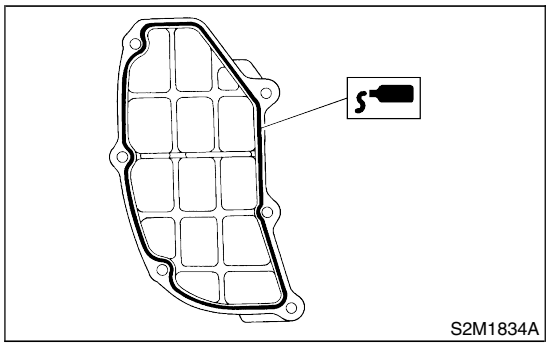
19) Apply fluid packing to matching surfaces and install oil pan.

Fluid packing:
THREE BOND 1215 or equivalent



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

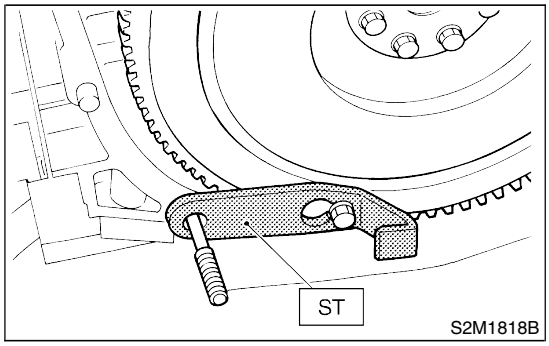
Fluid packing:
THREE BOND 1215 or equivalent



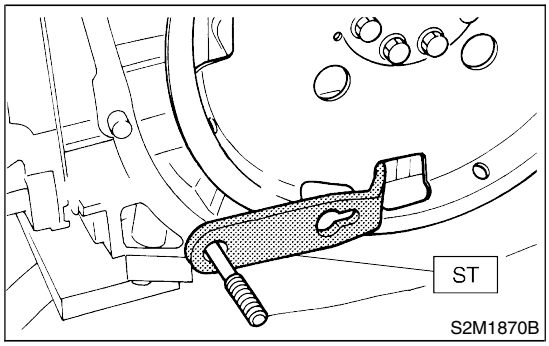
21) Install flywheel (MT vehicles) or drive plate (AT vehicles).
To lock crankshaft, use ST.
ST 498497100 CRANKSHAFT STOPPER

Tightening torque:
72 N·m (7.3 kgf-m, 52.8 ft-lb)

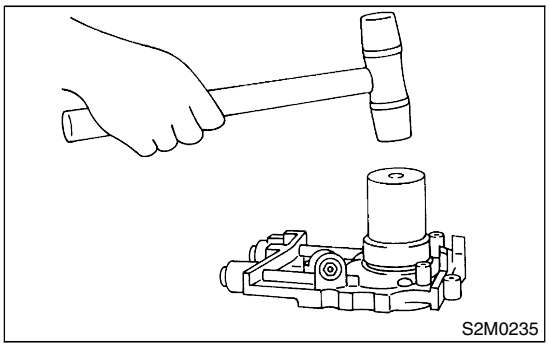
- MT VEHICLES



- AT VEHICLES

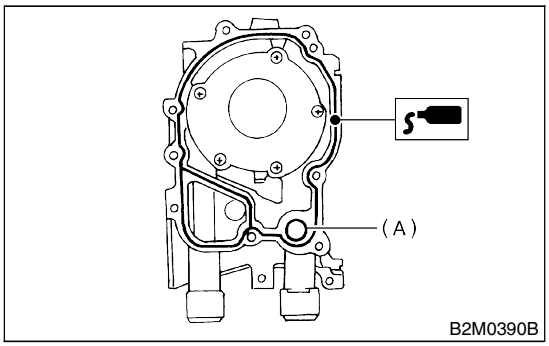


22) Install clutch housing cover.
23) Installation of oil pump
(1) Discard front oil seal after removal. Replace with a new one using ST.
ST 499587100 OIL SEAL INSTALLER



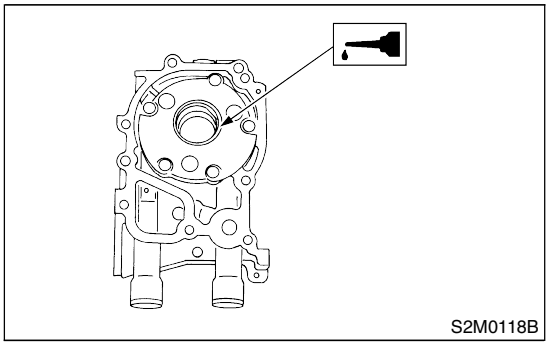
(2) Apply fluid packing to matching surface of oil pump.

Fluid packing:
THREE BOND 1215 or equivalent



(A) O-ring

(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.

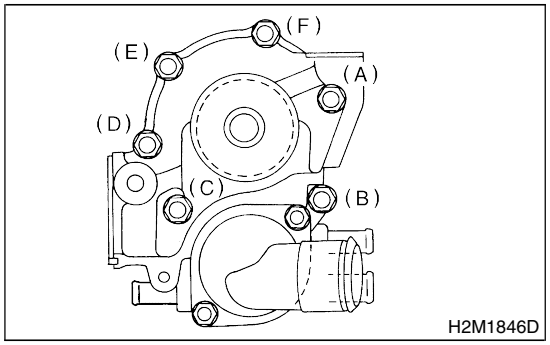
Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

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.

24) 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.

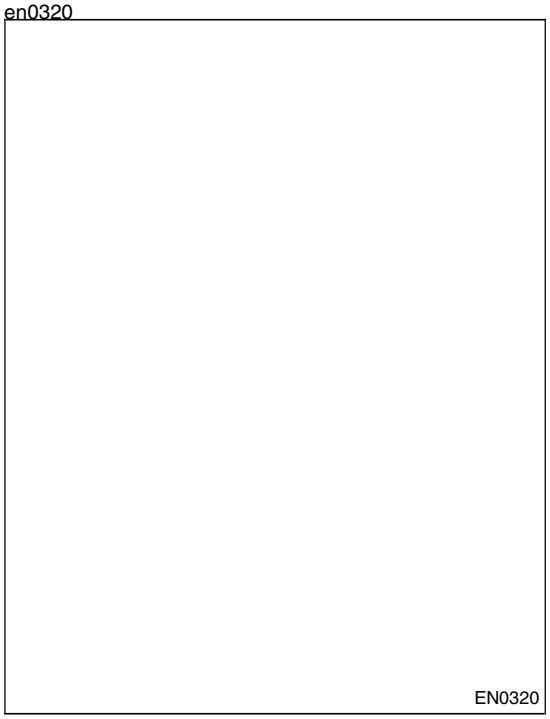


H2M1846D

25) Install water by-pass pipe for heater.
26) Install oil cooler.

Tightening torque:
T1: 55 N·m (5.5 kgf-m, 40 ft-lb)
T2: 69 N·m (7.0 kgf-m, 50.6 ft-lb)

en0320

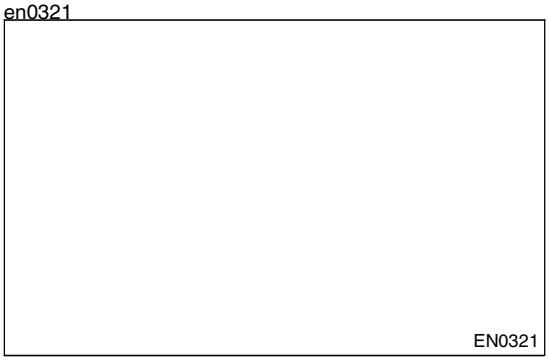

EN0320

(A) O-ring
(B) Oil cooler
(C) Connector

27) Install oil filter using ST.
ST 498547000 OIL FILTER WRENCH

28) Install water by-pass pipe between oil cooler and water pump.

en0321

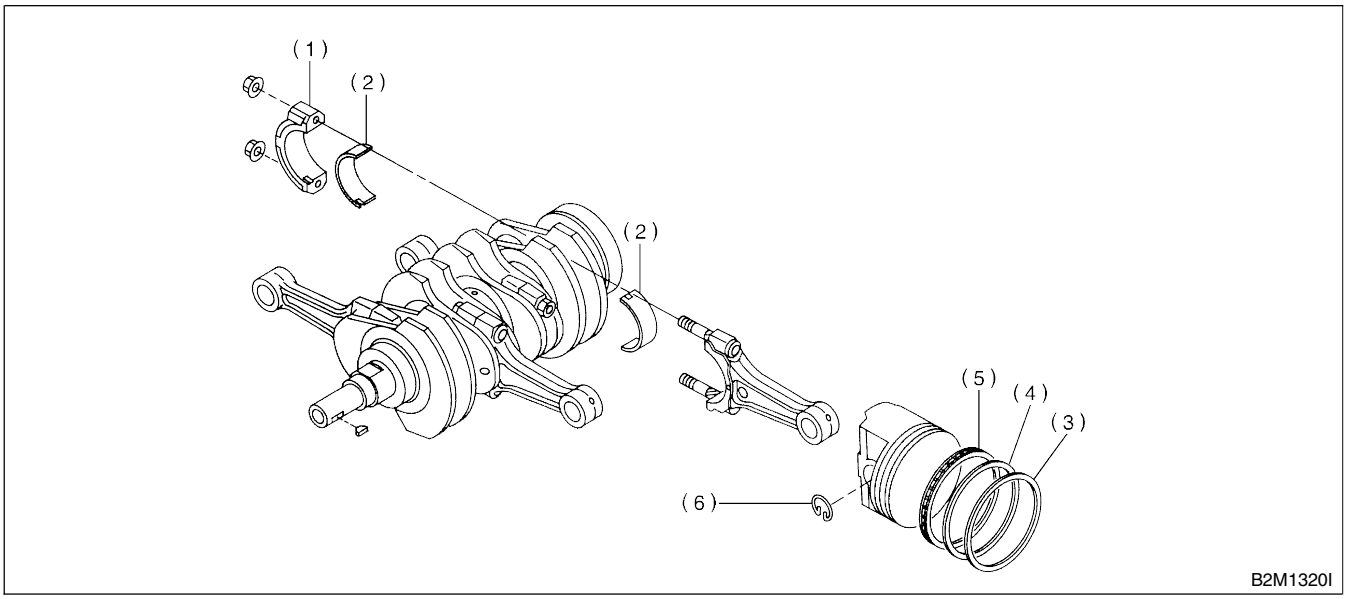

EN0321

29) Install water pipe.

CAUTION:
Always use a new O-ring.

30) Install cylinder head assembly. <Ref. to ME(DOHC TURBO)-63, INSTALLATION, Cylinder Head Assembly.>
31) Install oil level gauge guide and tighten attaching bolt (left side only).
32) Install rocker cover.
33) Install crankshaft sprocket. <Ref. to ME(DOHC TURBO)-57, INSTALLATION, Crankshaft Sprocket.>
34) Install camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, INSTALLATION, Camshaft Sprocket.>
35) Install timing belt assembly. <Ref. to ME(DOHC TURBO)-49, INSTALLATION, Timing Belt Assembly.>
36) Install belt cover. <Ref. to ME(DOHC TURBO)-47, INSTALLATION, Belt Cover.>
37) Install crankshaft pulley. <Ref. to ME(DOHC TURBO)-46, INSTALLATION, Crankshaft Pulley.>
38) Install generator and A/C compressor brackets on cylinder head.
39) Install V-belt. <Ref. to ME(DOHC TURBO)-44, INSTALLATION, V-belt.>
40) Install intake manifold. <Ref. to FU(DOHC TURBO)-15, REMOVAL, Intake Manifold.>

C: DISASSEMBLY S183090A06



(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.

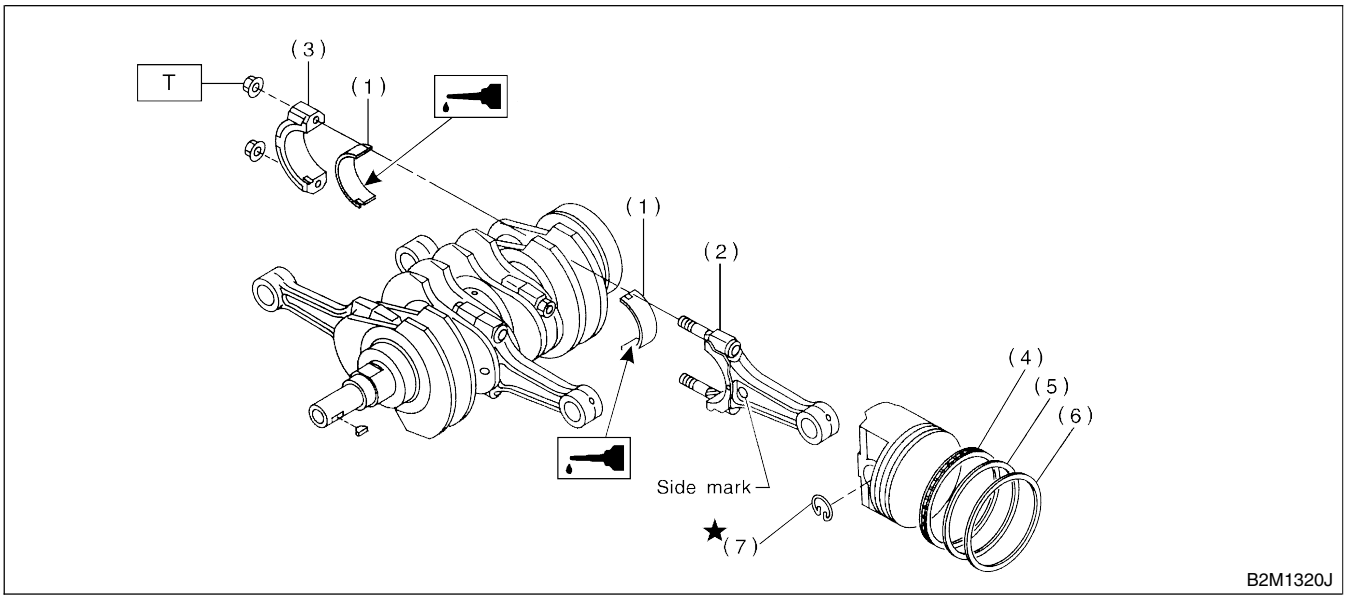
CAUTION:
Arrange removed connecting rod, connecting rod cap and bearing in order to prevent confusion.

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 S183090A02



(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) 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.

E: INSPECTION S183090A10

1. CYLINDER BLOCK S183090A1001

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)

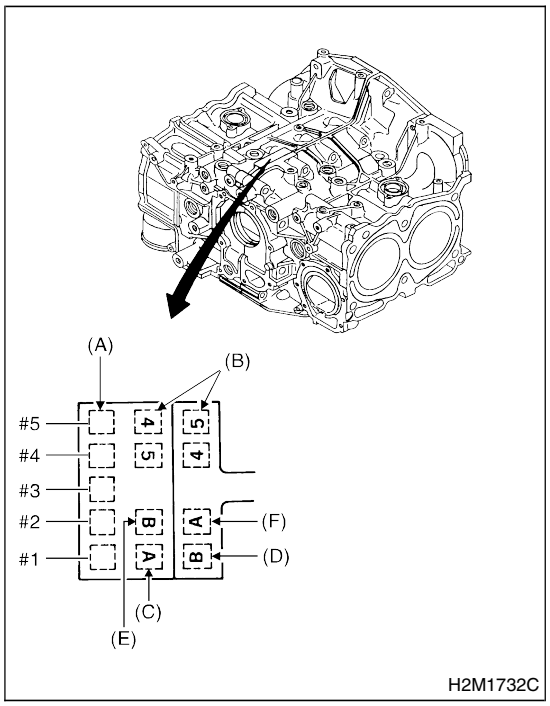
2. CYLINDER AND PISTON S183090A1002

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: 92.005 — 92.015 mm (3.6222 — 3.6226 in)
B: 91.995 — 92.005 mm (3.6218 — 3.6222 in)



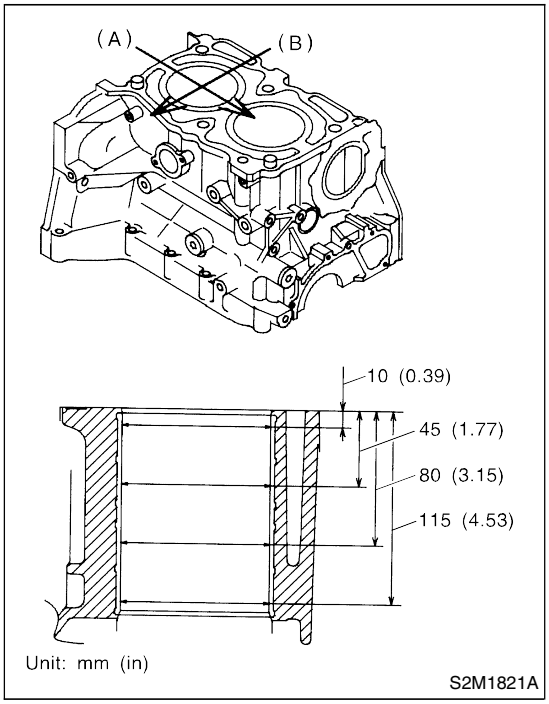
(A) Main jourual size mark
(B) Cylinder block RH-LH combination mark
(C) #1 cylinder bore size mark
(D) #2 cylinder bore size mark
(E) #3 cylinder bore size mark
(F) #4 cylinder bore size mark

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)



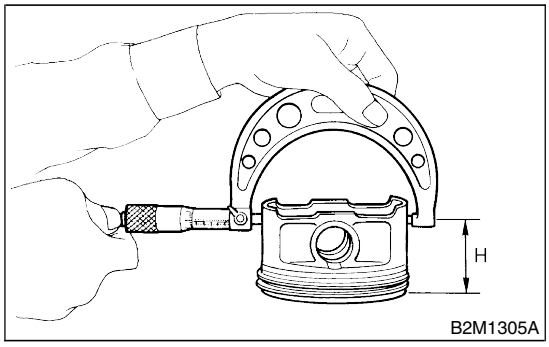
(A) Piston pin direction
(B) Thrust direction

3) When piston is to be replaced due to general or cylinder wear, determine a suitable sized piston by measuring the piston clearance.
4) How to measure the outer diameter of each piston
Measure the outer diameter of each piston at the height shown in the figure. (Thrust direction)

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

Piston grade point H:
37.0 mm (1.457 in)

Piston outer diameter:
Standard
A: 91.985 — 91.995 mm
(3.6214 — 3.6218 in)
B: 91.975 — 91.985 mm
(3.6211 — 3.6214 in)
0.25 mm (0.0098 in) oversize
92.225 — 92.235 mm
(3.6309 — 3.6313 in)
0.50 mm (0.0197 in) oversize
92.475 — 92.485 mm
(3.6407 — 3.6411 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.

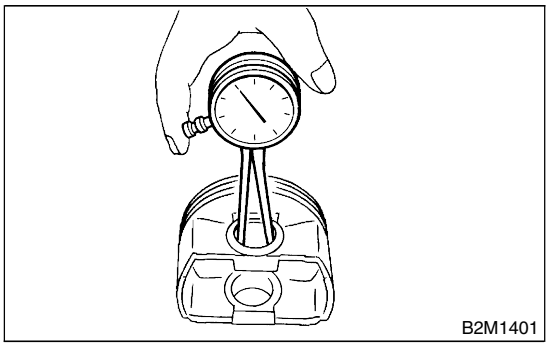
CAUTION:
Immediately after reboring, the cylinder diameter may differ from its real diameter due to temperature rise. Thus, pay attention to this when measuring the cylinder diameter.

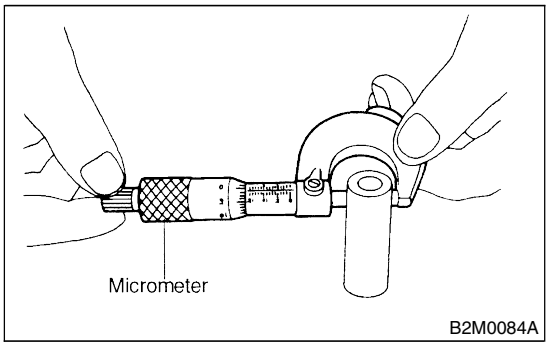
Limit of cylinder enlarging (boring):
0.5 mm (0.020 in)

3. PISTON AND PISTON PIN *S183090A1003*

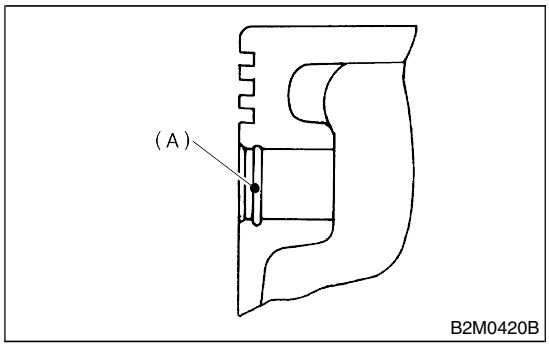
1) Check pistons and piston pins for damage, cracks, and wear and the piston ring grooves for wear and damage. Replace if defective.
2) Measure the piston-to-cylinder clearance at each cylinder. <Ref. to ME(DOHC TURBO)-84, CYLINDER AND PISTON, INSPECTION, Cylinder Block.> If any of the clearances is not to specification, replace the piston or bore the cylinder to use an oversize piston.
3) Make sure that piston pin can be inserted into the piston pin hole with a thumb at 20°C (68°F). Replace if defective.

Standard clearance between piston pin and hole in piston:
Standard
0.004 — 0.008 mm (0.0002 — 0.0003 in)
Limit
0.020 mm (0.0008 in)





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



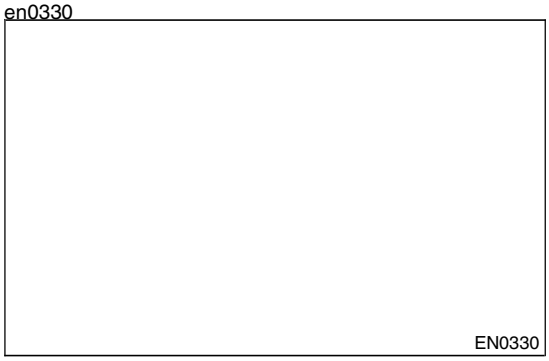
5) Check piston pin circlip for distortion, cracks and wear.

4. PISTON RING S183090A1004

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.

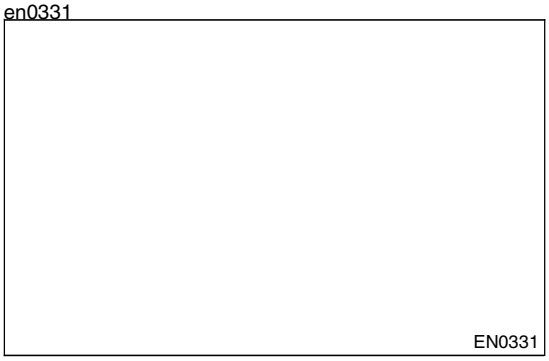
CAUTION:
• "N" is marked on the end of the top and second rings. When installing the rings to the piston, face this mark upward.

en0330



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

en0331

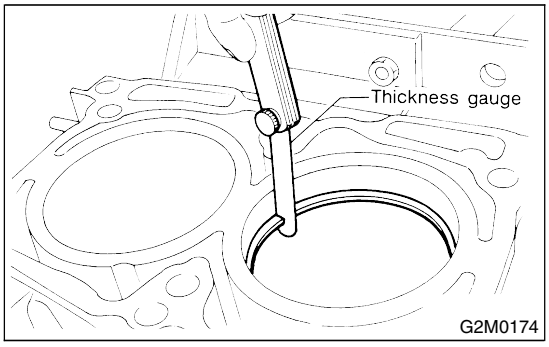


(A) Top ring
(B) Second ring
(C) Oil ring
(a) Upper rail
(b) Spacer
(c) Lower rail

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)

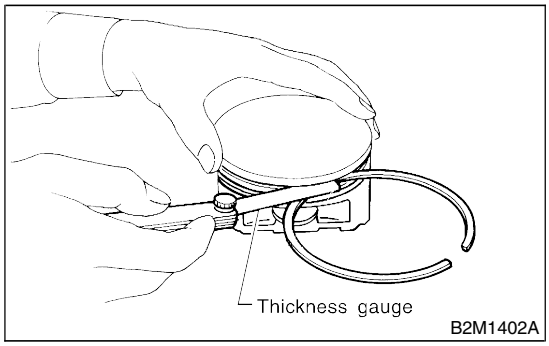


3) Measure the clearance between piston ring and piston ring groove with a thickness gauge.

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

Unit: mm (in)

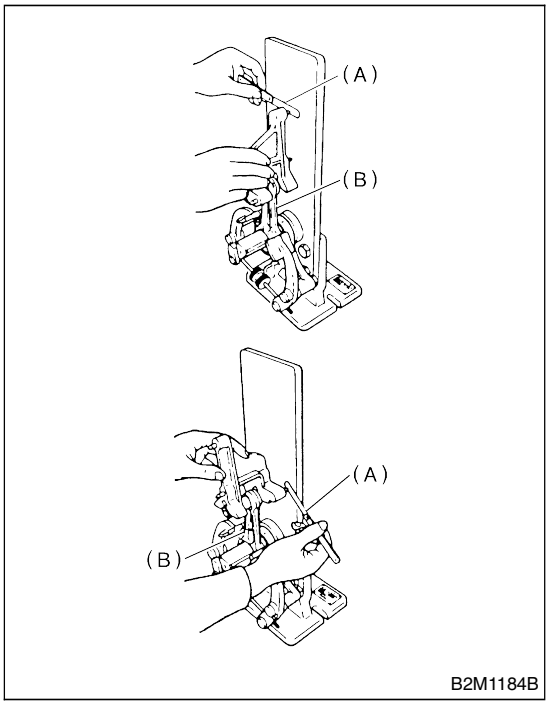
		Standard	Limit
Clearance between piston ring and piston ring groove	Top ring	0.040 — 0.080 (0.0016 — 0.0031)	0.15 (0.0059)
	Second ring	0.030 — 0.070 (0.0012 — 0.0028)	0.15 (0.0059)



5. CONNECTING ROD S183090A1005

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)

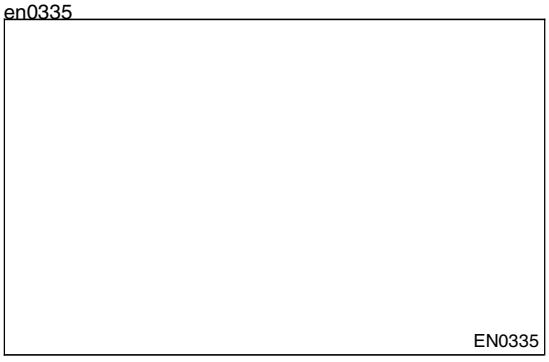


(A) Thickness gauge
(B) Connecting rod

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)

en0335



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

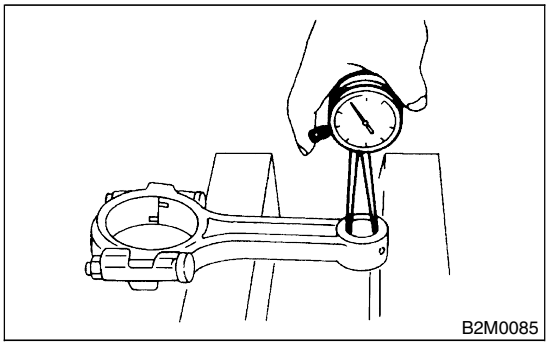
Connecting rod oil clearance:
Standard
0.020 — 0.046 mm (0.0008 — 0.0018 in)
Limit
0.05 mm (0.0020 in)

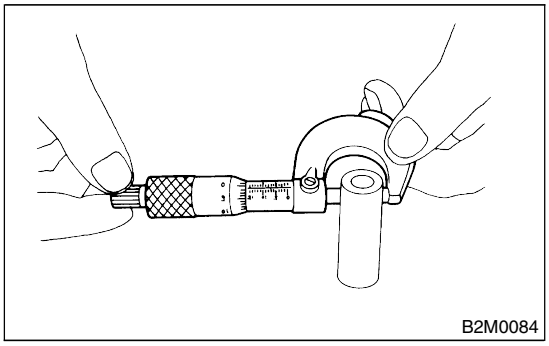
Unit: mm (in)

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)

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.

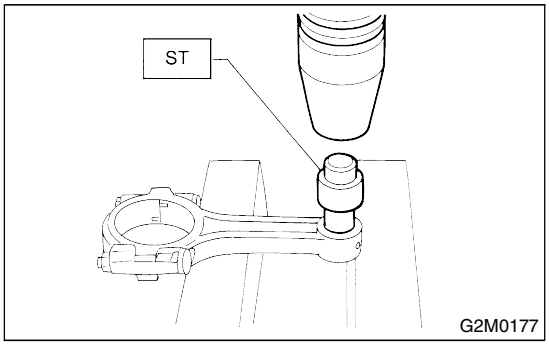
Clearance between piston pin and bushing:
Standard
0 — 0.022 mm (0 — 0.0009 in)
Limit
0.030 mm (0.0012 in)


B2M0085


B2M0084

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.

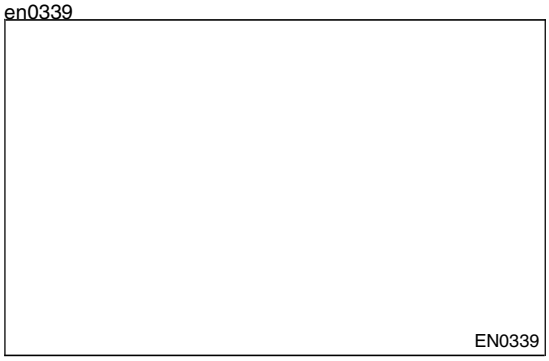
6. CRANKSHAFT AND CRANKSHAFT BEARING S183090A1006

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.

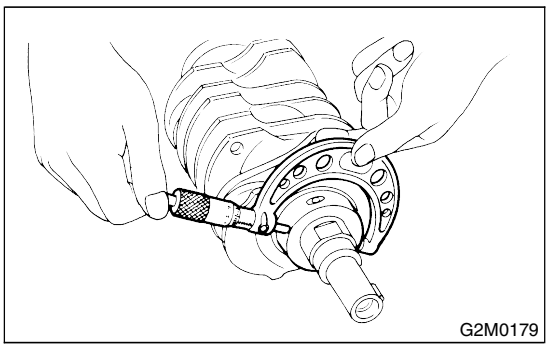
Crankshaft bend limit:
0.035 mm (0.0014 in)

en0339



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)



Unit: mm (in)

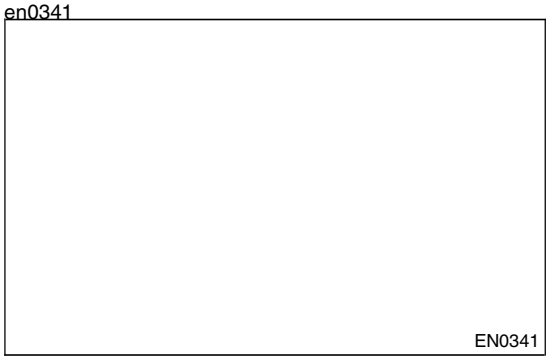
		Crank journal diameter		Crank pin diameter
		#1, #3, #5	#2, #4	
Standard	Journal O.D.	59.992 — 60.008 (2.3619 — 2.3625)	59.992 — 60.008 (2.3619 — 2.3625)	51.984 — 52.000 (2.0466 — 2.0472)
	Bearing size (Thickness at center)	1.998 — 2.011 (0.0787 — 0.0792)	2.000 — 2.013 (0.0787 — 0.0793)	1.492 — 1.510 (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 (20368 — 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)

en0341



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)

21. Engine Trouble in General S183095

A: INSPECTION S183095A10

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
	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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.	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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.	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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 filler 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	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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 filler 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	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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 filler 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.	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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)	• Engine control system <Ref. to EN(DOHC TURBO)-2, Basic Diagnostic Procedure.>		A
	• Cooling system	• Overheating	B
	• Others	• Malfunction of evaporative emission control system	B
7. After burning in exhaust system	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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	• Engine control system <Ref. to EN(DOHC TURBO)-2, Basic Diagnostic Procedure.>		A
	• Intake system	• Loosened oil filler 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 filler 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	• Engine control system <Ref. to EN(DOHC TURBO)-2, 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

22. Engine Noise S183096

A: INSPECTION S183096A10

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 water 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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(DOHC TURBO)-44, OPERATION, Inspection Mode.> after connecting fuel injector connector.

MEMO:

EXHAUST

EX(DOHC TURBO)

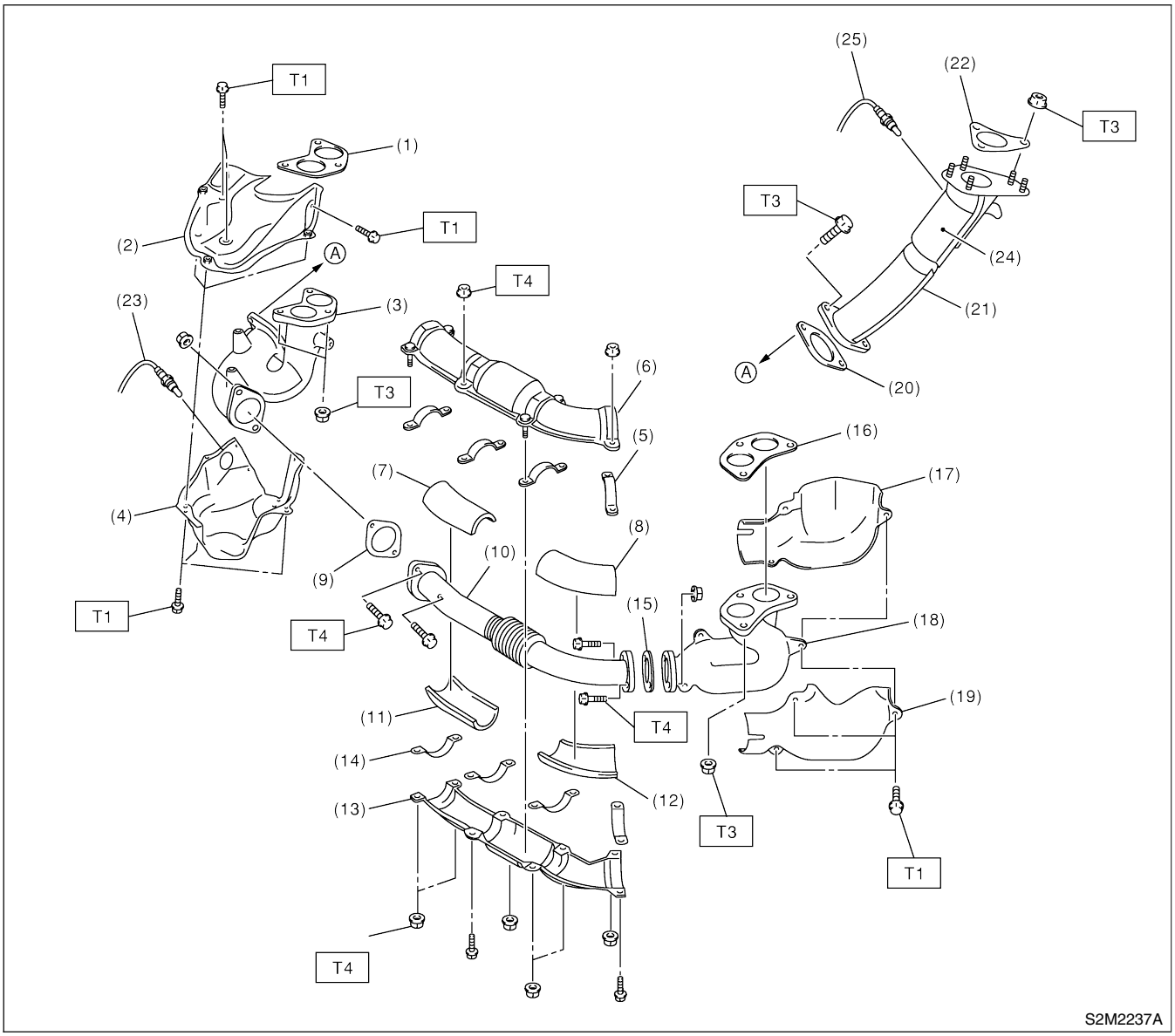
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2. Front Exhaust Pipe....7
3. Center Exhaust Pipe....9
4. Joint Pipe....13
5. Rear Exhaust Pipe....14
6. Muffler....15

1. General Description S182001

A: COMPONENT S182001A05

1. FRONT EXHAUST PIPE S182001A0501

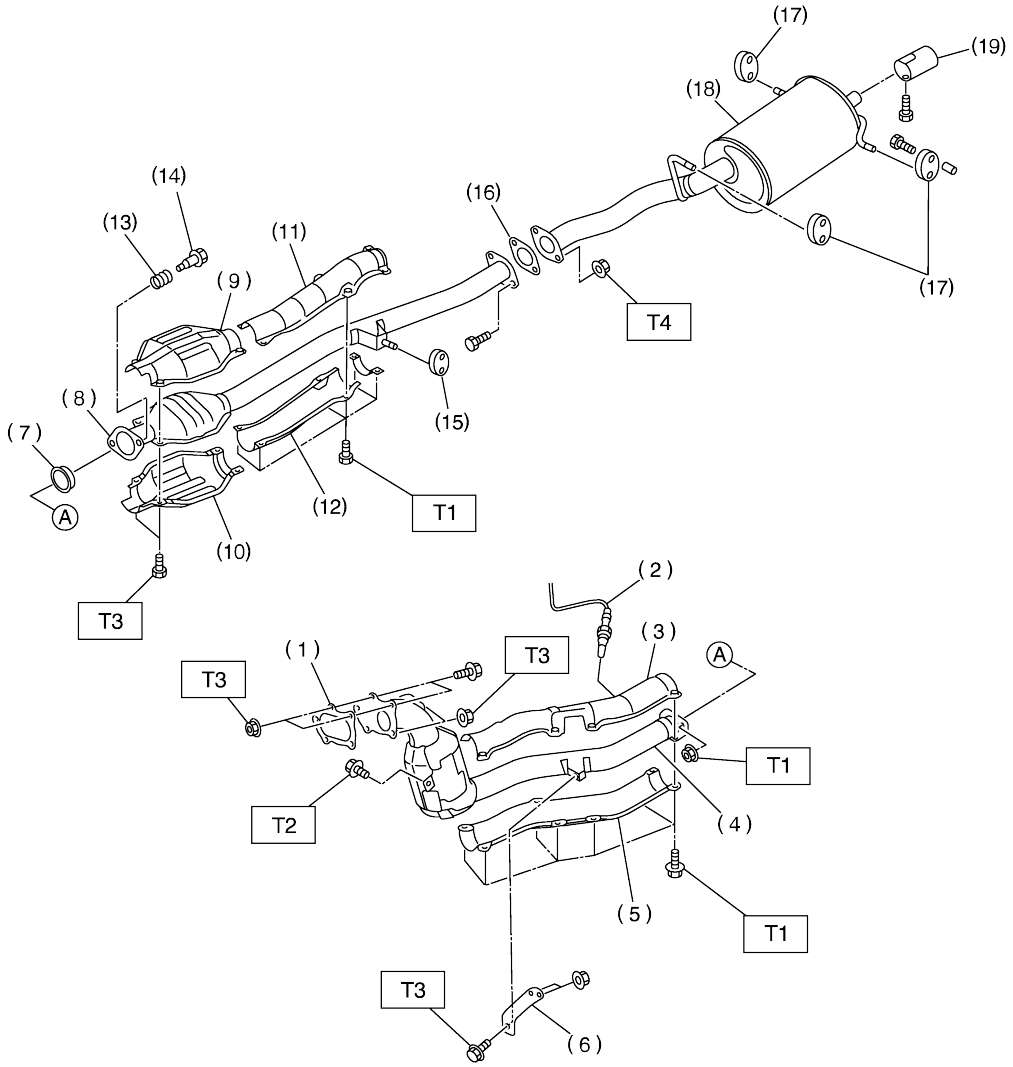


(1) Gasket
(2) Upper exhaust manifold cover (RH)
(3) Exhaust manifold (RH)
(4) Lower exhaust manifold cover (RH)
(5) Front exhaust pipe upper clamp
(6) Front exhaust pipe upper cover
(7) Front exhaust pipe upper insulator (RH)
(8) Front exhaust pipe upper insulator (LH)
(9) Gasket
(10) Front exhaust pipe
(11) Front exhaust pipe lower insulator (RH)
(12) Front exhaust pipe lower insulator (LH)
(13) Front exhaust pipe lower cover
(14) Front exhaust pipe lower clamp
(15) Gasket
(16) Gasket
(17) Upper exhaust manifold cover (LH)
(18) Exhaust manifold (LH)
(19) Lower exhaust manifold cover (LH)
(20) Gasket
(21) Turbocharger joint pipe
(22) Gasket
(23) Front oxygen (A/F) sensor
(24) Precatalytic converter
(25) Exhaust temperature sensor

Tightening torque: N·m (kgf-m, ft-lb)
T1: 18.6 (1.9, 13.7)
T2: 25 (2.5, 18.1)
T3: 35 (3.6, 26.0)
T4: 39 (4, 28.9)

2. CENTER AND REAR EXHAUST PIPE, AND MUFFLER S182001A0502

● AUSTRALIA SPEC. VEHICLES

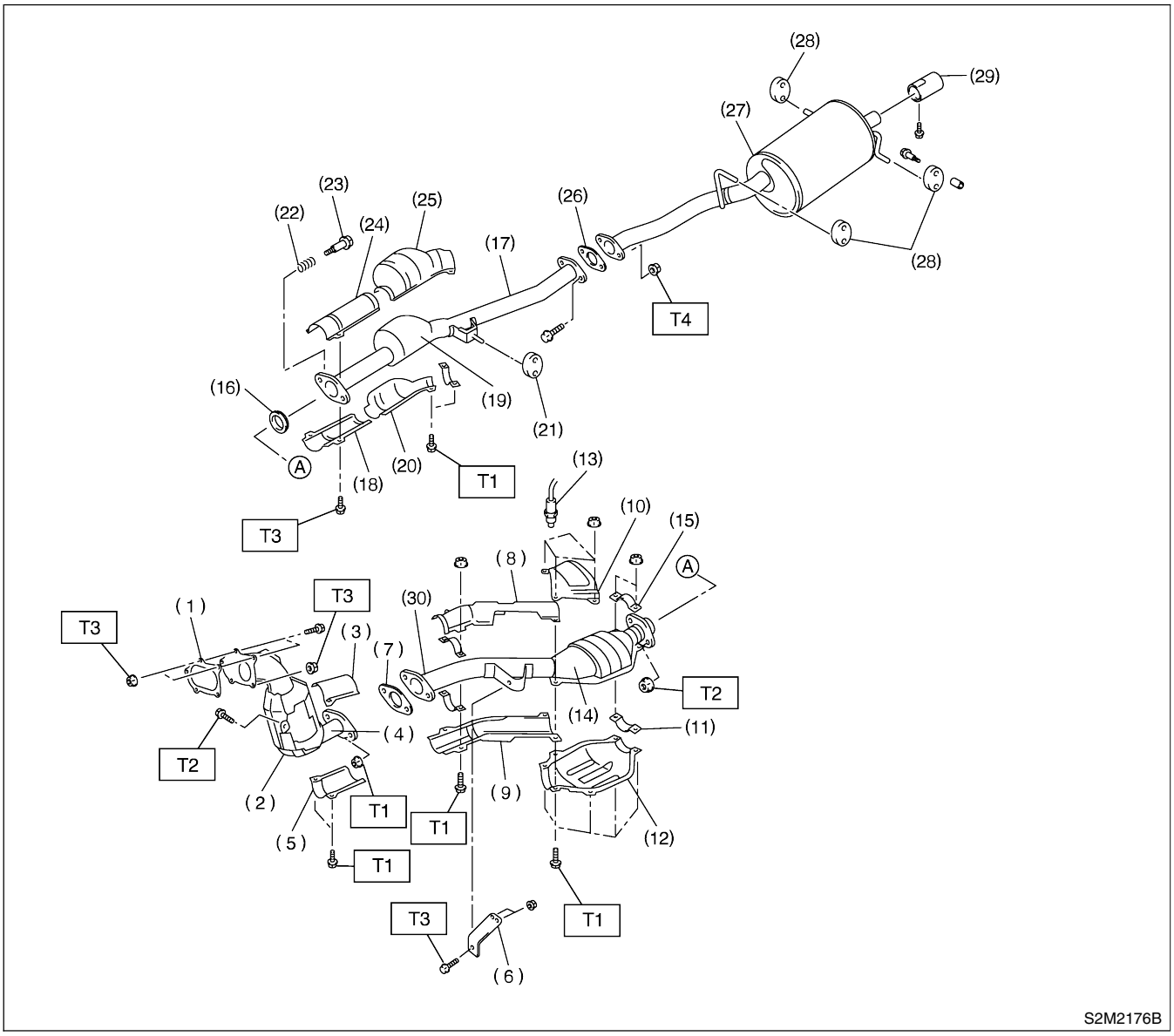


S2M2239A

(1) Gasket
(2) Rear oxygen converter
(3) Upper center pipe cover
(4) Center exhaust pipe
(5) Lower center pipe cover
(6) Bracket (MT)
(7) Gasket
(8) Rear exhaust pipe
(9) Upper cover
(10) Lower cover
(11) Upper cover A
(12) Lower cover A
(13) Spring
(14) Bolt
(15) Cushion
(16) Gasket
(17) Cushion
(18) Muffler
(19) Muffler cutter

Tightening torque: N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.0)
T2: 30 (3.1, 22.4)
T3: 35 (3.6, 26.0)
T4: 48 (4.9, 35.4)

• EXCEPT AUSTRALIA SPEC. VEHICLES



(1) Gasket
(2) Front catalytic converter
(3) Upper center pipe cover (Front)
(4) Center exhaust pipe (Front)
(5) Lower center pipe cover (Front)
(6) Bracket
(7) Gasket
(8) Upper center pipe cover (Rear)
(9) Lower center pipe cover (Rear)
(10) Upper rear catalytic converter cover
(11) Lower clamp
(12) Lower rear catalytic converter cover
(13) Rear oxygen sensor
(14) Rear catalytic converter
(15) Upper clamp
(16) Gasket
(17) Rear exhaust pipe
(18) Lower rear exhaust pipe cover (Front)
(19) Chamber
(20) Lower rear exhaust pipe cover (Rear)
(21) Cushion
(22) Spring
(23) Bolt
(24) Upper rear exhaust pipe cover (Front)
(25) Upper rear exhaust pipe cover (Rear)
(26) Gasket
(27) Muffler
(28) Cushion
(29) Muffler cutter
(30) Center exhaust pipe (Rear)

Tightening torque: N·m (kgf-m, ft-lb)
T1: 18 (1.8, 13.0)
T2: 30 (3.1, 22.4)
T3: 35 (3.6, 26.0)
T4: 48 (4.9, 35.4)

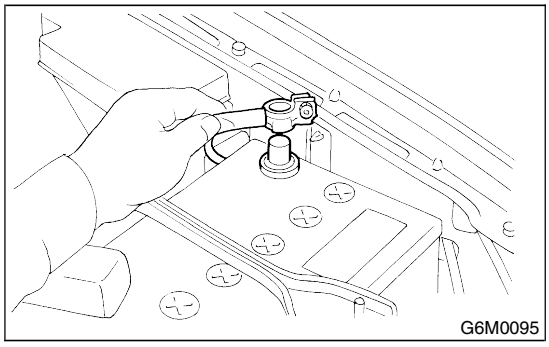
B: CAUTION S182001A03

- 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.

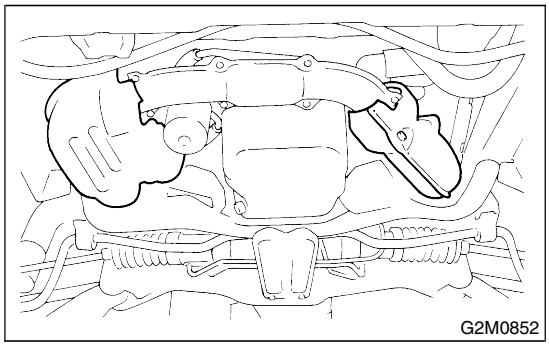
2. Front Exhaust Pipe S182065

A: REMOVAL S182065A18

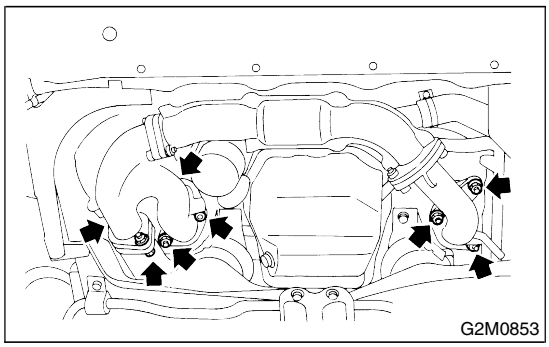
1) Disconnect battery ground cable.


G6M0095

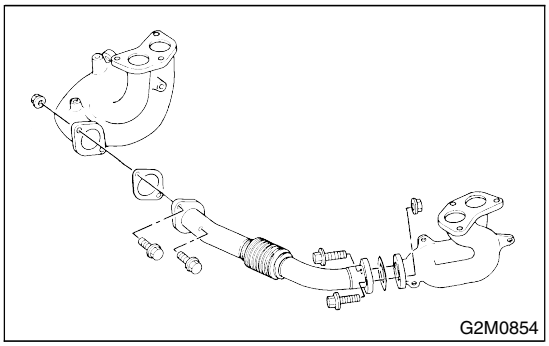
2) Remove front oxygen (A/F) sensor. <Ref. to FU(DOHC TURBO)-42, REMOVAL, Front Oxygen (A/F) Sensor.>
3) Remove under cover.
4) Remove lower exhaust manifold cover (RH).
5) Remove lower and upper exhaust manifold covers (LH).


G2M0852

6) Remove bolts and nuts which hold front exhaust pipe assembly to turbocharger joint pipe.
7) While holding front exhaust pipe assembly with one hand, remove nuts which hold front exhaust pipe assembly to cylinder head exhaust port.


G2M0853

8) Remove front exhaust pipe assembly.
9) Remove covers from exhaust manifold and front exhaust pipe.
10) Separate front exhaust pipe from exhaust mani-folds.

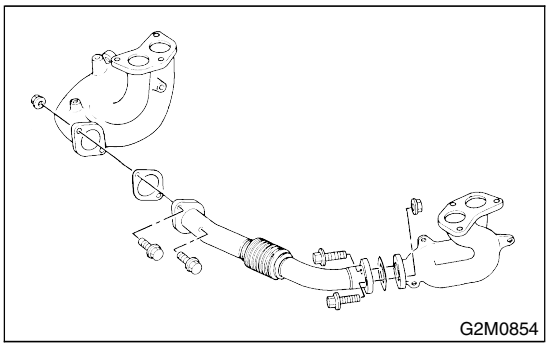

G2M0854

B: INSTALLATION S182065A11

CAUTION:
Replace gaskets with new ones.

1) Assemble front exhaust pipe and exhaust mani-folds.

Tightening torque:
39 N·m (4 kgf-m, 28.9 ft-lb)


G2M0854

2) Install front exhaust pipe covers.

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

3) Install upper exhaust manifold cover (RH).

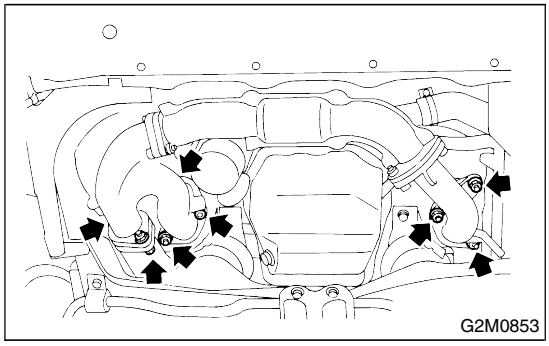
Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)

4) Install front exhaust pipe assembly.

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

5) Connect exhaust manifold (RH) to turbocharger joint pipe.

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

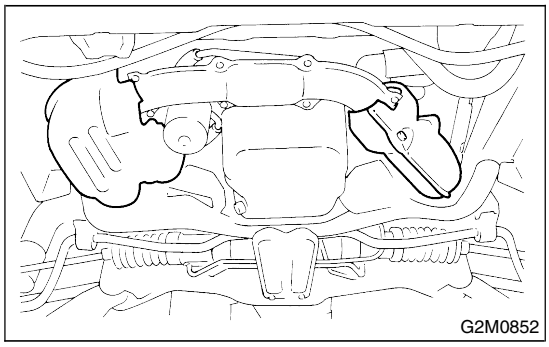

G2M0853

6) Install upper and lower exhaust manifold covers (LH).

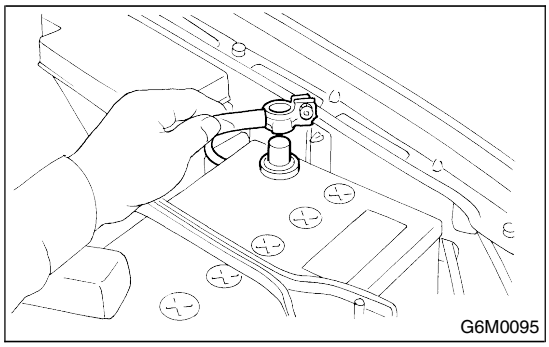
Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)

7) Install lower exhaust manifold cover (RH).

Tightening torque:
18.6 N·m (1.9 kgf-m, 13.7 ft-lb)


G2M0852

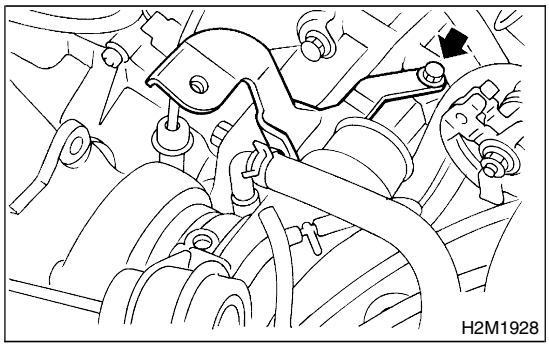
8) Install front oxygen (A/F) sensor. <Ref. to FU(DOHC TURBO)-43, INSTALLATION, Front Oxygen (A/F) Sensor.>
9) Install under cover.
10) Connect battery ground cable.


G6M0095

3. Center Exhaust Pipe S182067

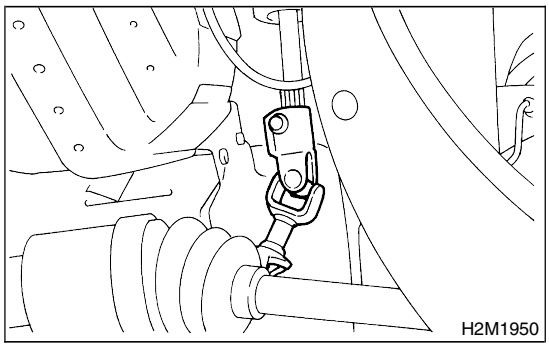
A: REMOVAL S182067A18

1) Set the vehicle on the lift.
2) Disconnect battery ground cable.
3) Remove intercooler. <Ref. to IN(DOHC TURBO)-10, REMOVAL, Intercooler.>
4) Remove intercooler bracket.


H2M1928

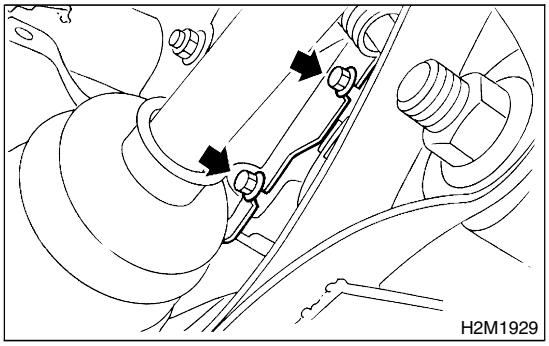
5) Lift-up the vehicle.
6) Remove under cover.
7) Remove universal joint bolts and then remove universal joint (RHD model only).

CAUTION:
Scribe alignment marks on universal joint so that it can be reassembled at the original serration.

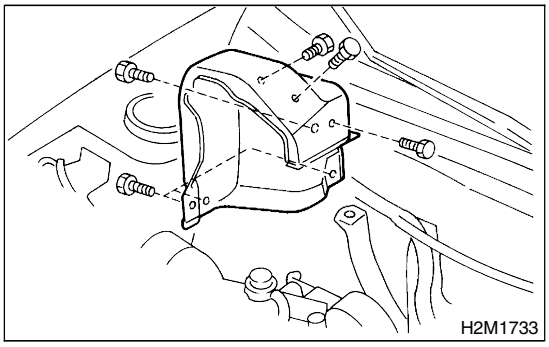

H2M1950

8) Remove bolts which install the lower side of turbocharger upper cover.

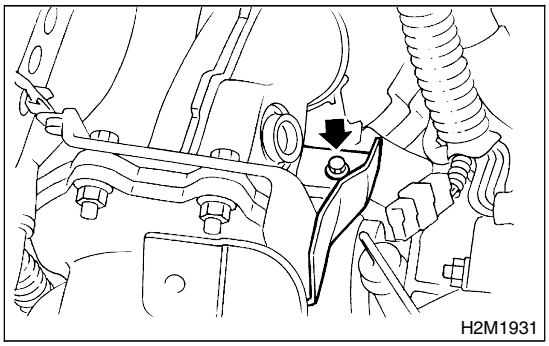
CAUTION:
Be careful, turbocharger and exhaust pipe are hot.


H2M1929

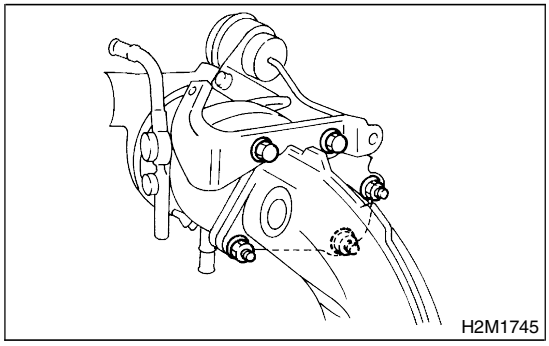
9) Lower the vehicle.
10) Remove turbocharger upper cover.


H2M1733

11) Remove bolts which install the upper side of turbocharger lower cover, and remove it.

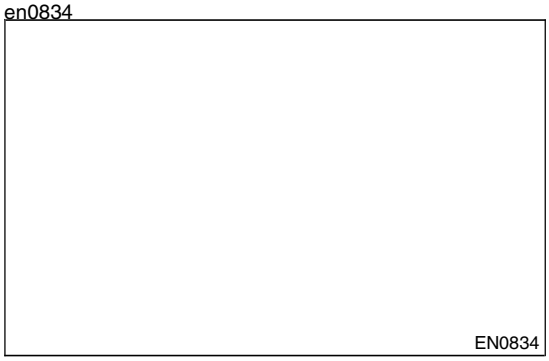

H2M1931

12) Separate center exhaust pipe from turbocharger.

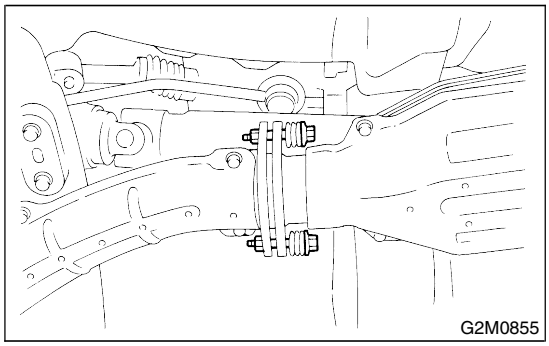

H2M1745

13) Lift-up the vehicle.
14) Disconnect connector from rear oxygen sensor.

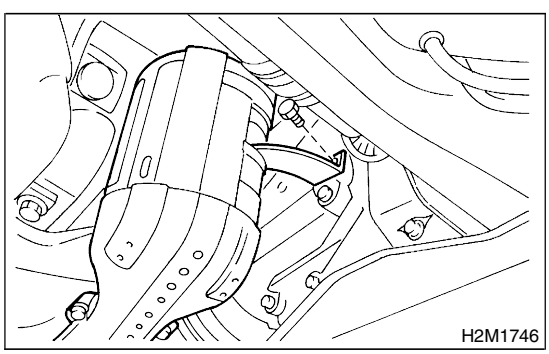
en0834


EN0834

15) Separate center exhaust pipe from rear exhaust pipe.

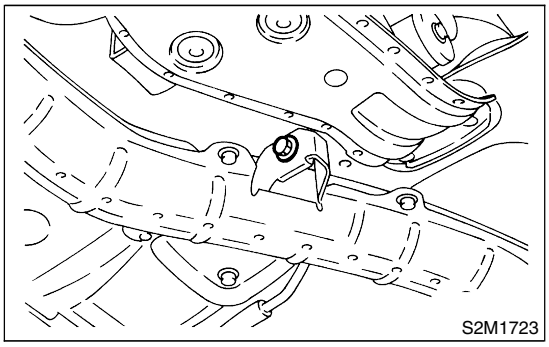

G2M0855

16) Remove bolt which holds center exhaust pipe bracket to transmission.

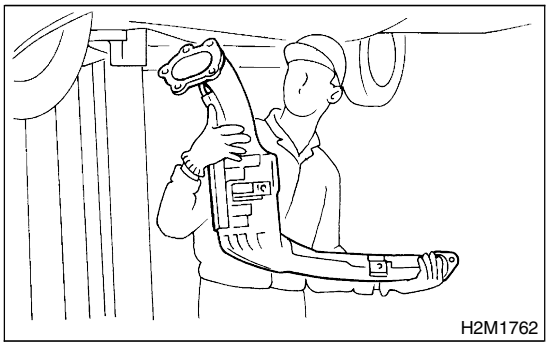

H2M1746

17) Remove intercooler bracket.
18) Remove bolt which holds center exhaust pipe to hanger bracket.

CAUTION:
Be careful not to pull down center exhaust pipe.


S2M1723

19) Remove center exhaust pipe.

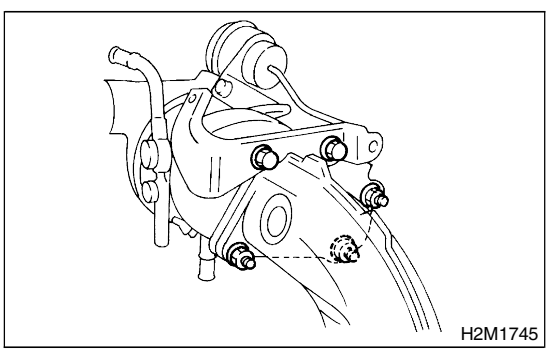

H2M1762

B: INSTALLATION S182067A11

CAUTION:
Replace gaskets with new ones.

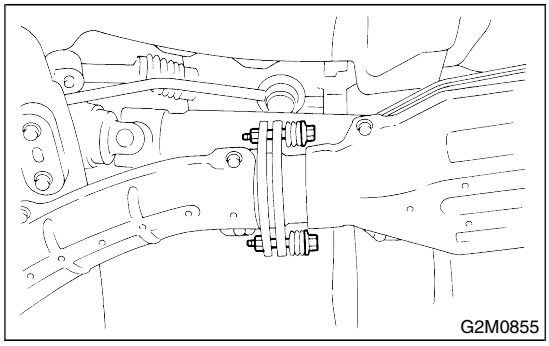
1) Install center exhaust pipe and temporarily tighten bolt which holds center exhaust pipe to hanger bracket.
2) Temporarily tighten bolt which holds center pipe to transmission.
3) Connect center exhaust pipe to turbocharger.

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


H2M1745

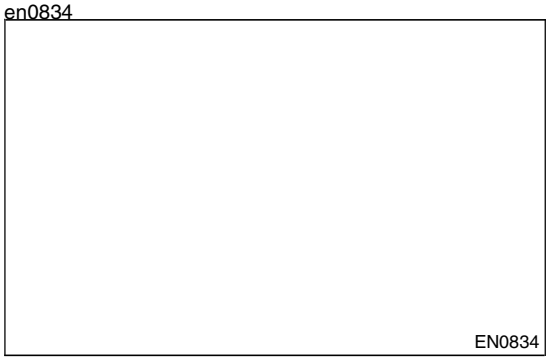
4) Install center exhaust pipe to rear exhaust pipe.

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


G2M0855

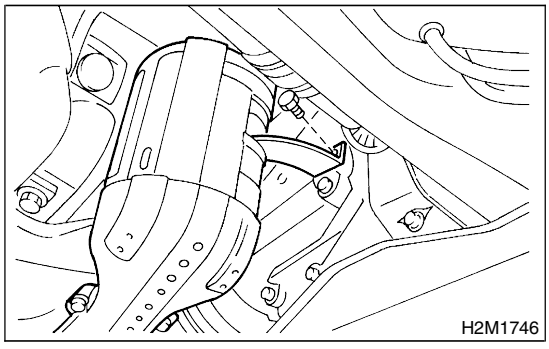
5) Connect connector to rear oxygen sensor.

en0834


EN0834

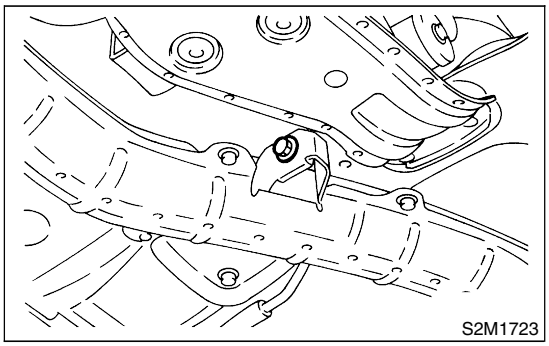
6) Tighten bolt which holds center exhaust pipe bracket to transmission.

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


H2M1746

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

Tightening torque:
35 N·m (3.6 kgf-m, 26 ft-lb)


S2M1723

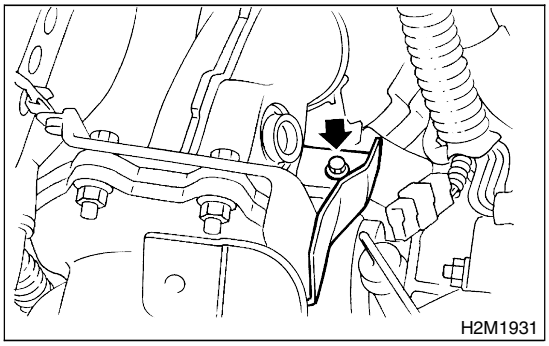
8) Tighten bolts which hold intercooler bracket.

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

9) Lower the vehicle.

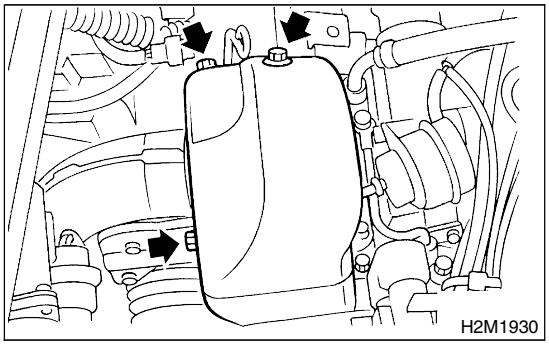
10) Place turbocharger lower cover, and tighten bolts which install the upper side of lower cover.

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


H2M1931

11) Place turbocharger upper cover, and tighten bolts which install the upper side of upper cover.

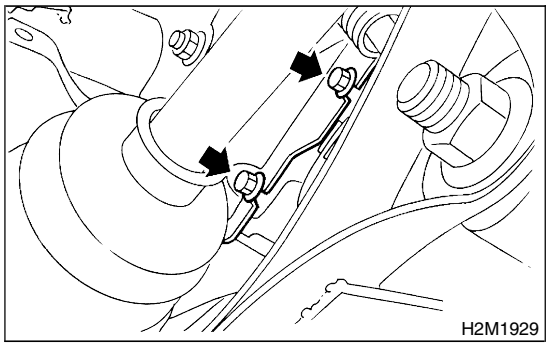
Tightening torque:
7.4 N·m (0.75 kgf-m, 5.4 ft-lb)


H2M1930

12) Lift-up the vehicle.

13) Tighten bolts which install the under side of turbocharger upper cover.

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

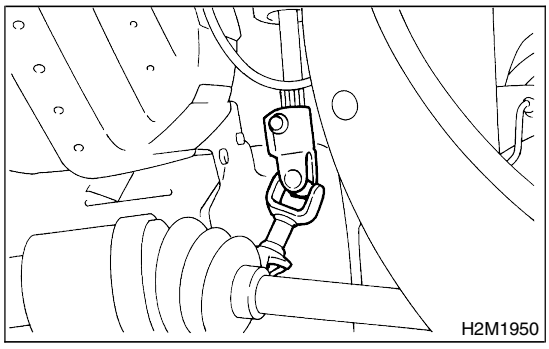


14) Install universal joint (RHD model only).
(1) Align bolt hole on the long yoke side of universal joint with the cutout at the serrated section of shaft end, and insert universal joint.
(2) Align bolt hole on the short yoke side of universal joint with the cutout at the serrated section of gearbox assembly. Lower universal joint completely.
(3) Temporarily tighten bolt on the short yoke side. Raise universal joint to make sure the bolt is properly passing through the cutout at the serrated section.
(4) Tighten bolt on the long yoke side, then that on the short yoke side.

Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)

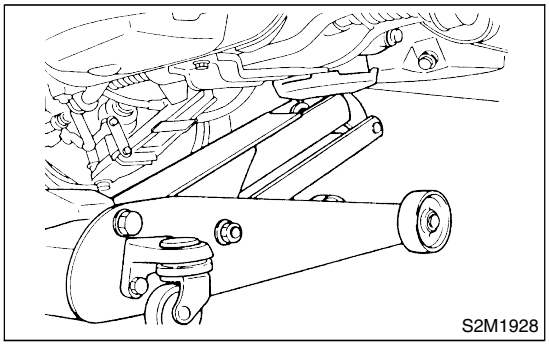
CAUTION:
• Make sure that universal joint bolts are tightened through notches in shaft serration.
• Excessively large tightening torque of universal joint bolts may lead to heavy steering wheel operation.

Standard clearance between gearbox to DOJ:
Over 15 mm (0.59 in)



15) Install under cover.
16) Lower the vehicle.

17) Install intercooler bracket.

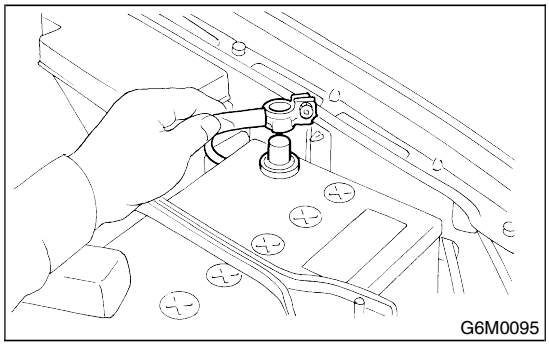


18) Install intercooler. <Ref. to IN(DOHC TURBO)-10, INSTALLATION, Intercooler.>
19) Align center of roll connector. (With airbag model) <Ref. to AB-11, ROLL CONNECTOR, INSPECTION, Inspection Locations After a Collision.>

4. Joint Pipe S182771

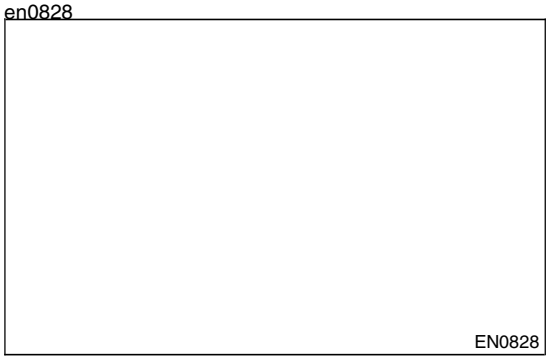
A: REMOVAL S182771A18

1) Disconnect battery ground cable.


G6M0095

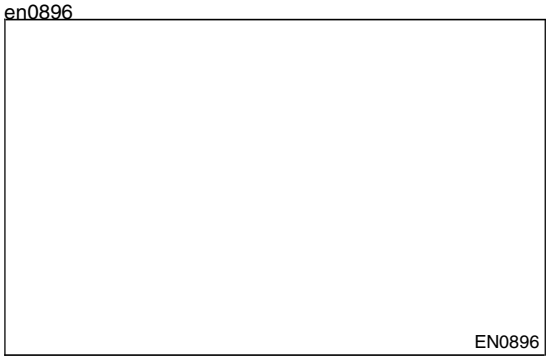
2) Remove solenoid valve cover.

en0828

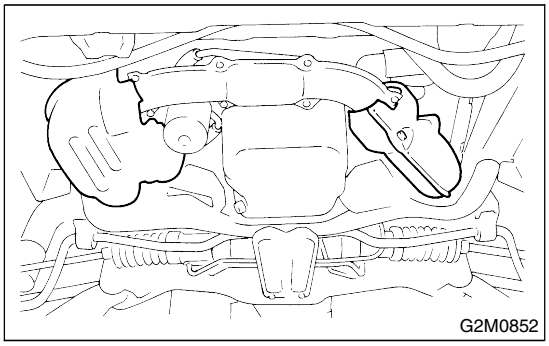

EN0828

3) Disconnect from exhaust temperature sensor connector.

en0896

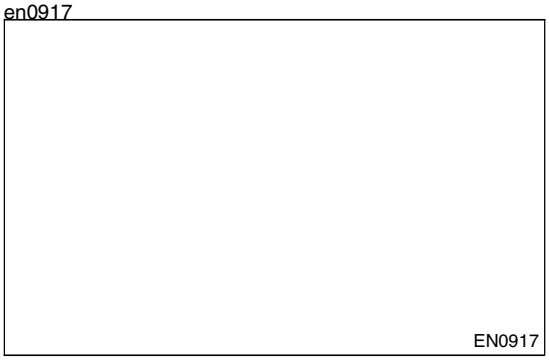

EN0896

4) Remove front oxygen (A/F) sensor. <Ref. to FU(DOHC TURBO)-42, REMOVAL, Front Oxygen (A/F) Sensor.>
5) Remove under cover.
6) Remove lower exhaust manifold cover (RH).


G2M0852

7) Remove nuts. Which hold front exhaust manifold to joint pipe.

en0917

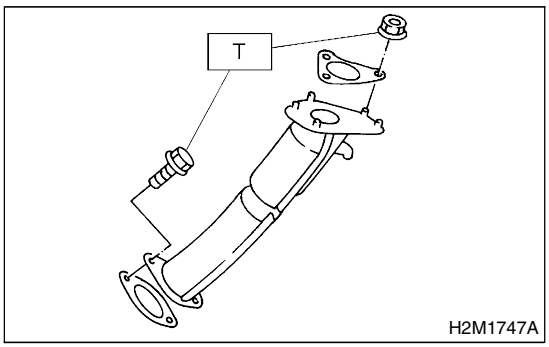

EN0917

8) Remove center exhaust pipe. <Ref. to EX(DOHC TURBO)-9, REMOVAL, Center Exhaust Pipe.>
9) Remove turbocharger. <Ref. to IN(DOHC TURBO)-12, REMOVAL, Turbocharger.>
10) Take off joint pipe in the upward direction.

B: INSTALLATION S182771A11

Install in the reverse order of removal.

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

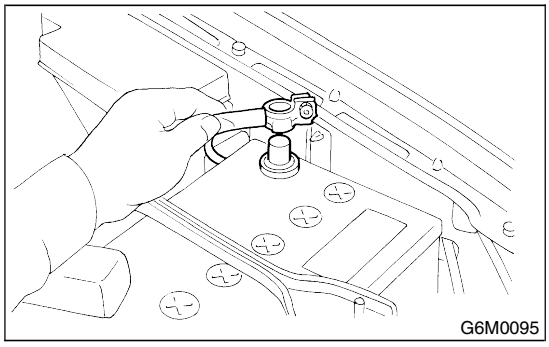


H2M1747A

5. Rear Exhaust Pipe S182068

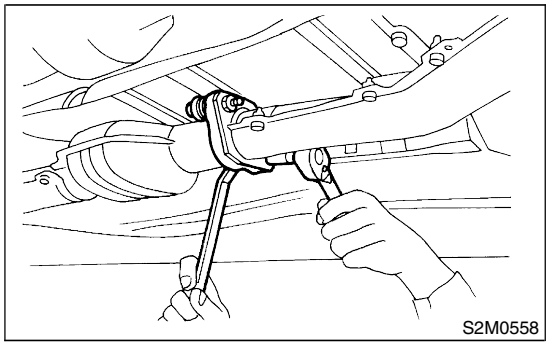
A: REMOVAL S182068A18

1) Disconnect battery ground cable.



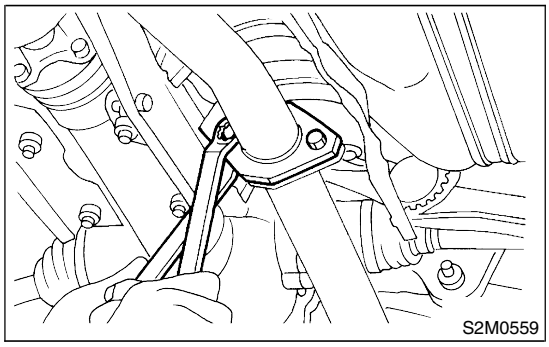
2) Lift up the vehicle.
3) Separate rear exhaust pipe from center exhaust pipe.

CAUTION:
Be careful, exhaust pipe is hot.



4) Separate rear exhaust pipe from muffler.

CAUTION:
Be careful not to pull down rear exhaust pipe.



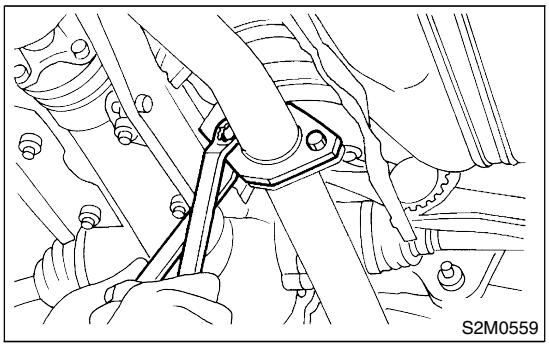
5) Remove rear exhaust pipe.

B: INSTALLATION S182068A11

CAUTION:
Replace gaskets with new ones.

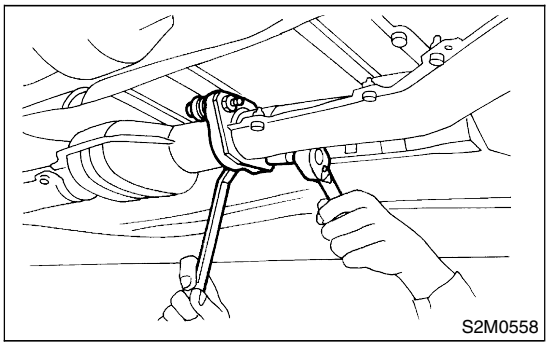
1) Install rear exhaust pipe to muffler.

Tightening torque:
48 N·m (4.9 kgf-m, 35.4 ft-lb)

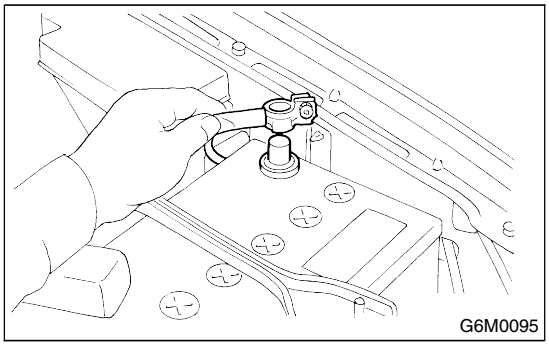


2) Install rear exhaust pipe to center exhaust pipe.

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



3) Lower the vehicle.
4) Connect battery ground cable.



C: INSPECTION S182068A10

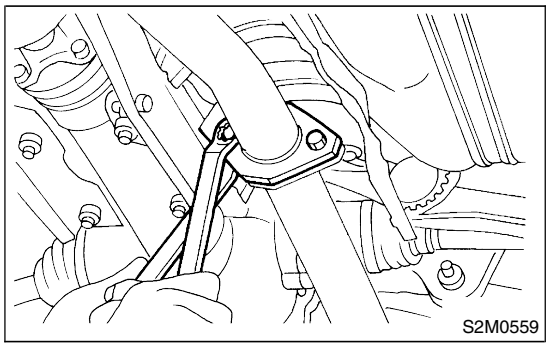
1) Make sure there are no exhaust leaks from connections and welds.
2) Make sure there are no holes or rusting.
3) Make sure the cushion rubber is not worn or cracked.

6. Muffler S182066

A: REMOVAL S182066A18

1) Separate muffler from rear exhaust pipe.

CAUTION:
Be careful, exhaust pipe is hot.

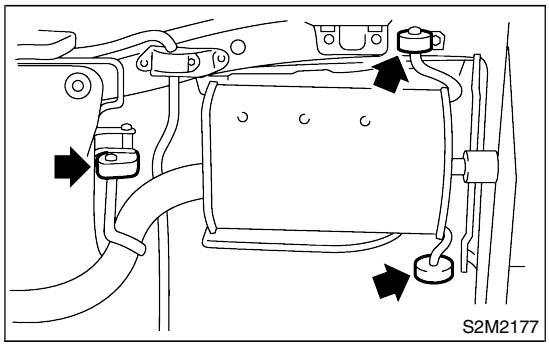


2) Remove rubber cushions, and detach muffler.

CAUTION:
Be careful not to drop the muffler during removal.

NOTE:
To facilitate removal, apply a coat of SUBARU CRC to mating area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)

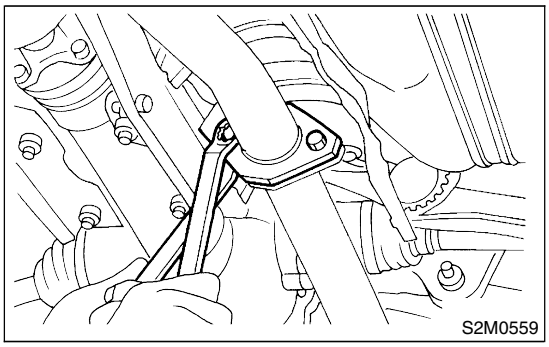


B: INSTALLATION S182066A11

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: INSPECTION S182066A10

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.

MUFFLER

MEMO:

IGNITION

IG(DOHC TURBO)

Page

1. General Description....2
2. Spark Plug....4
3. Ignition Coil and Ignitor Assembly....8

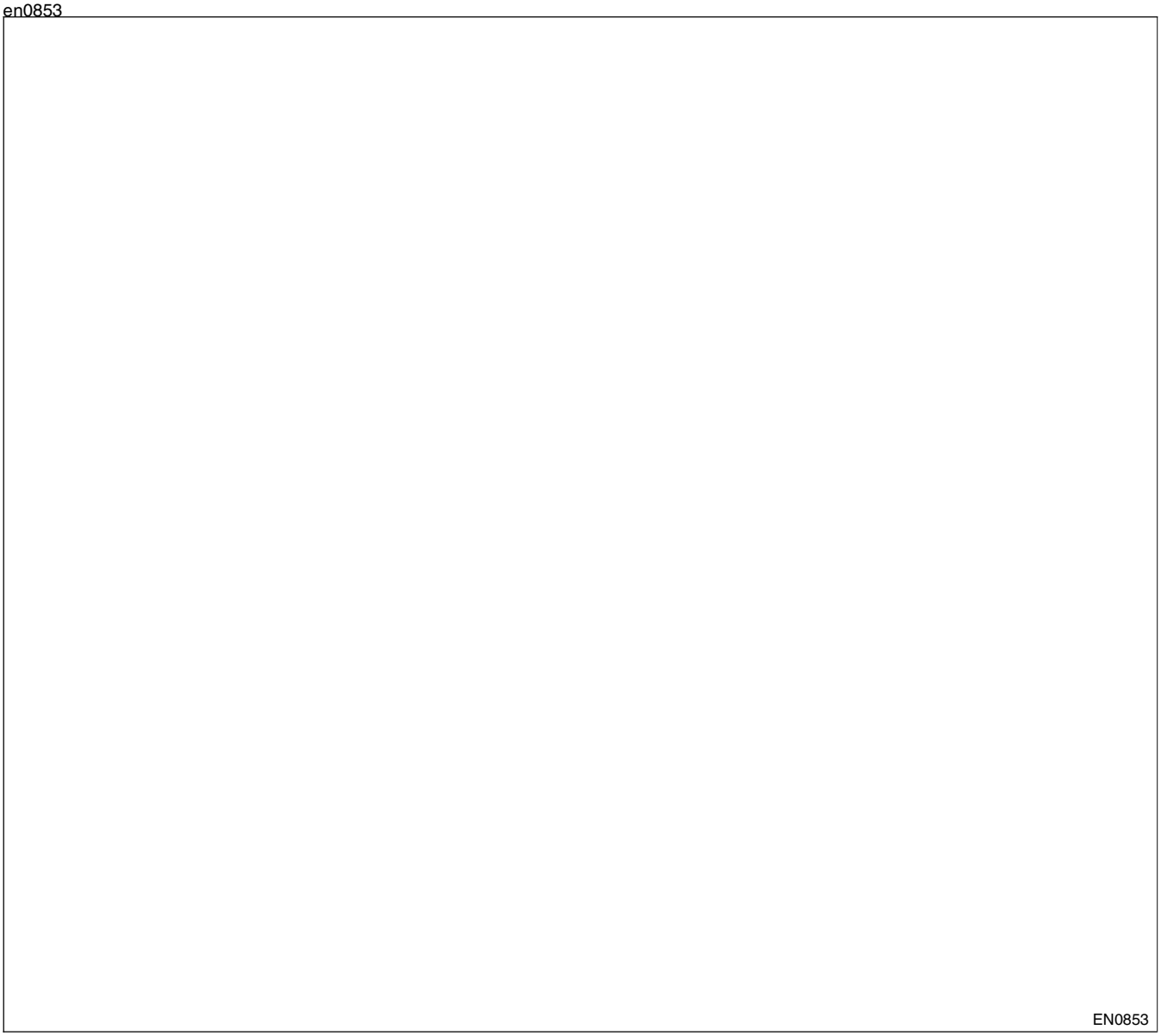
1. General Description S181001

A: SPECIFICATIONS S181001E49

Item		Designation
Ignition coil and ignitor assembly	Model	FK0140
	Manufacturer	DIAMOND
Spark plug	Type and manufacturer	PFR6G ..... NGK
	Thread size mm	14, P = 1.25
	Spark gap mm (in)	0.7 — 0.8 (0.028 — 0.031)

B: COMPONENT S181001A05

en0853



(1) Spark plug
(2) Ignition coil and ignitor ASSY

Tightening torque: N·m (kgf-m, ft-lb)
T1: 21 (2.1, 15)
T2: 16 (1.6, 11.7)

C: CAUTION S181001A03

- 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.

2. Spark Plug S181003

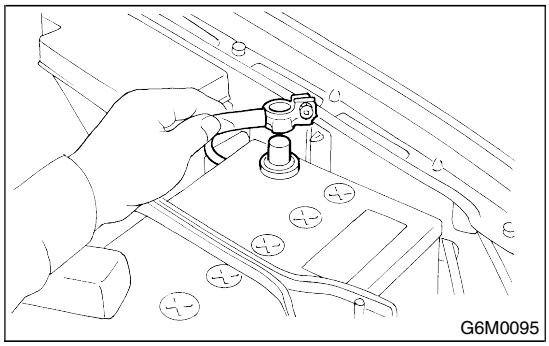
A: REMOVAL S181003A18

CAUTION:
All spark plugs installed on an engine, must be of the same heat range.

Spark plug:
NGK: PFR6G

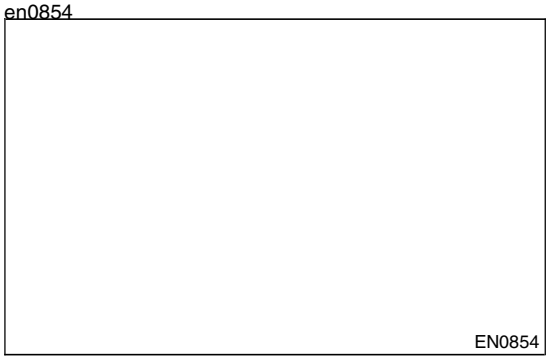
1. RH SIDE S181003A1801

1) Disconnect battery ground cable.


G6M0095

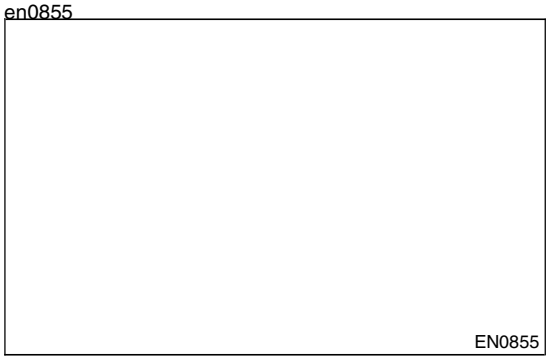
2) Remove air cleaner lower case. <Ref. to IN(DOHC TURBO)-7, REMOVAL, Air Cleaner.>
3) Disconnect connector from ignition coil.

en0854


EN0854

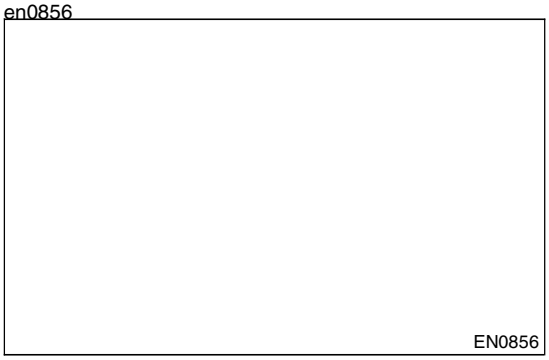
4) Remove ignition coil.

en0855


EN0855

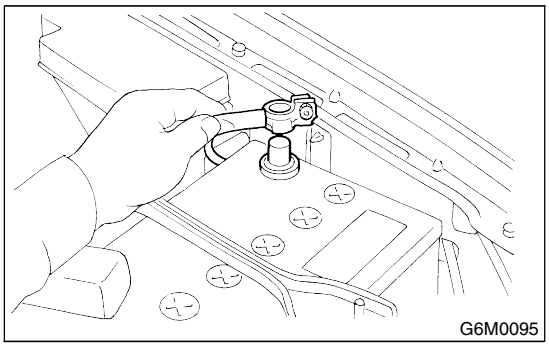
5) Remove spark plugs with the spark plug socket.

en0856

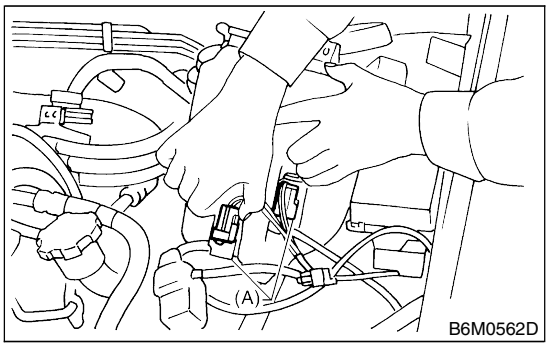

EN0856

2. LH SIDE S181003A1802

1) Disconnect battery cables, and then remove battery and battery carrier.


G6M0095

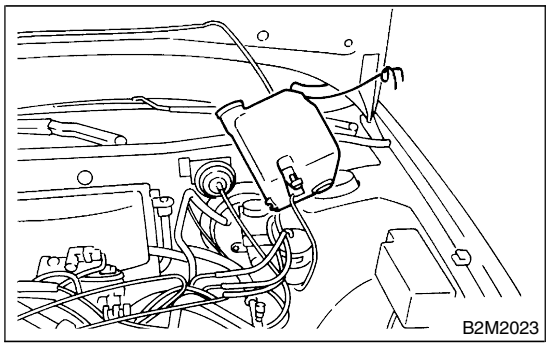
2) Disconnect washer motor connector (A).



B6M0562D

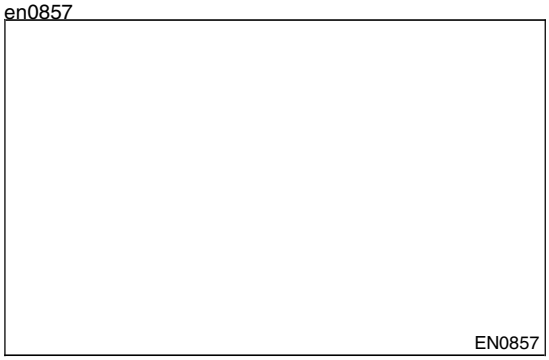
3) Disconnect rear window glass washer hose from washer motor, then plug connection with a suitable cap.

4) Remove the two bolts which hold the washer tank, then take the tank away from the working area.


B2M2023

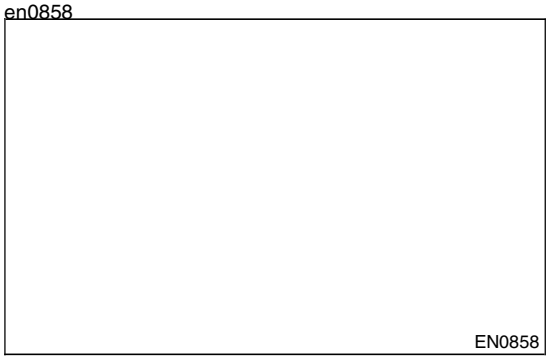
5) Disconnect connector from ignition coil.

en0857


EN0857

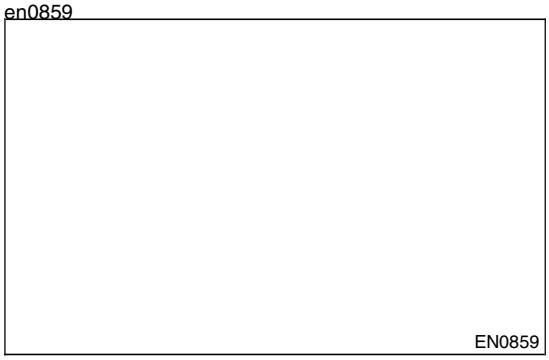
6) Remove ignition coil.

en0858


EN0858

7) Remove spark plug with the spark plugs socket.

en0859


EN0859

B: INSTALLATION S181003A11

1. RH SIDE S181003A1101

1) Install in the reverse order of removal.

Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 ft-lb)

Tightening torque (Ignition coil):
16 N·m (1.63 kgf-m, 11.8 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. LH SIDE S181003A1102

1) Install in the reverse order of removal.

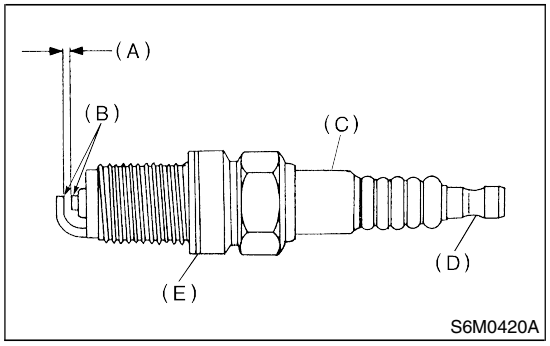
Tightening torque (Spark plug):
21 N·m (2.1 kgf-m, 15 ft-lb)

Tightening torque (Ignition coil):
16 N·m (1.63 kgf-m, 11.8 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 S181003A10

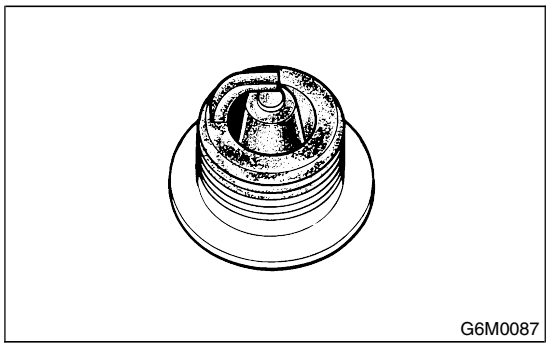
Check electrodes and inner and outer porcelain of plugs, noting the type of deposits and the degree of electrode erosion.



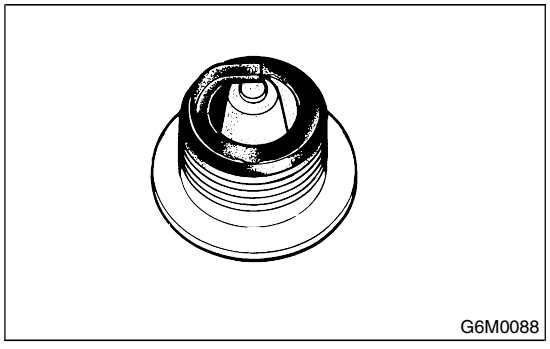
S6M0420A

(A) Electrode gap
(B) Carbon accumulation or wear
(C) Cracks
(D) Damage
(E) Damaged gasket

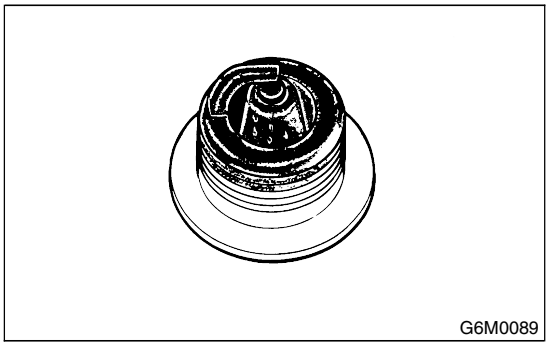
1) Normal
Brown to grayish-tan deposits and slight electrode wear indicate correct spark plug heat range.


G6M0087

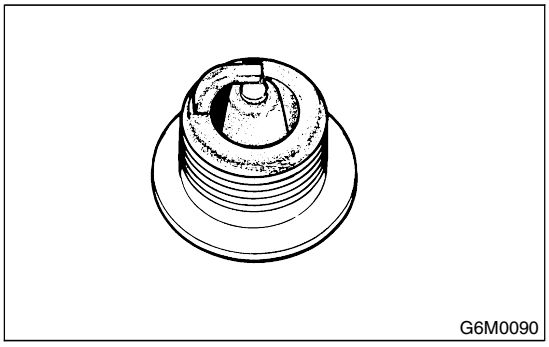
2) Carbon fouled
Dry fluffy carbon deposits on insulator and electrode are mostly caused by slow speed driving in city, weak ignition, too rich fuel mixture, dirty air cleaner, etc.
It is advisable to replace with plugs having hotter heat range.


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

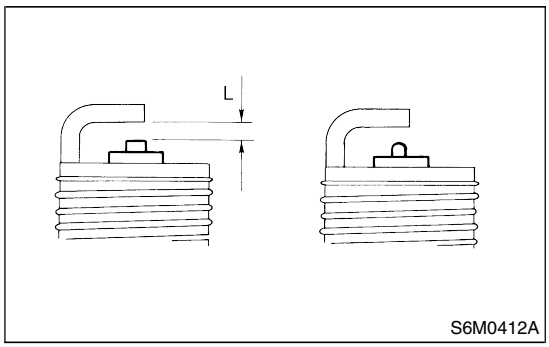
4) Overheating
White or light gray insulator with black or gray brown spots and bluish burnt electrodes indicate engine overheating. Moreover, the appearance results from incorrect ignition timing, loose spark plugs, wrong selection of fuel, hotter range plug, etc. It is advisable to replace with plugs having colder heat range.


G6M0090

D: ADJUSTMENT S181003A01

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, replace plugs.
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
0.7 — 0.8 mm (0.028 — 0.031 in)



NOTE:
Replace with new spark plug if this area is worn to “ball” shape.

3. Ignition Coil and Ignitor Assembly S181015

A: REMOVAL S181015A18

Direct ignition type has been adopted. Refer to the “Spark Plug Removal” for removal procedure. <Ref. to IG(DOHC TURBO)-4, REMOVAL, Spark Plug.>

B: INSTALLATION S181015A11

Install in the reverse order of removal.

Tightening torque:
16 N·m (1.63 kgf-m, 11.8 ft-lb)

C: INSPECTION S181015A10

Because ignition coil is a direct ignition type, the resistance cannot be measured in a single unit. For inspection procedure of ignition system, refer to the following. <Ref. to EN(DOHC TURBO)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>

ENGINE (DIAGNOSTICS)

EN(DOHC TURBO)

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1. Basic Diagnostic Procedure

S088501

A: PROCEDURE S088501E45

1. ENGINE S088501E4501

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(DOHC TURBO)-4, CHECK, Check List for Interview.> 2) Start the engine.	Does the engine start?	Go to step **2**.	Inspection using “Diagnostics for Engine Start Failure”. <Ref. to EN(DOHC TURBO)-63, 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 Diagnostics Table”. <Ref. to EN(DOHC TURBO)-344, 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?	Record diagnostic trouble code. Repair the trouble cause. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (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(DOHC TURBO)-50, Engine Malfunction Indicator Lamp (MIL).>
4	**PERFORM THE DIAGNOSIS.** 1) Perform the clear memory mode. <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> 2) Perform the inspection mode. <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC?	Inspect using “Diagnostics Procedure with Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-90, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Complete the diagnosis.

2. AUTOMATIC TRANSMISSION S088501E4502

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, Automatic Transmission Fluid.>
2) Differential gear oil level check <Ref. to AT-11, Differential Gear Oil.>
3) ATF leak check <Ref. to AT-9, Automatic Transmission Fluid.>
4) Differential gear oil leak check <Ref. to AT-11, Differential Gear Oil.>
5) Stall test <Ref. to AT-11, Differential Gear Oil.>
6) Line pressure test <Ref. to AT-16, Line Pressure Test.>
7) Transfer clutch pressure test <Ref. to AT-18, Transfer Clutch Pressure Test.>
8) Time lag test <Ref. to AT-15, Time Lag Test.>
9) Road test <Ref. to AT-12, Road Test.>
10) Shift characteristics <Ref. to AT-18, Transfer Clutch Pressure Test.>

2. Check List for Interview S088502

A: CHECK S088502A04

1. CHECK LIST NO. 1 S088502A0401

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	°C (°F)		
	☐ 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 S088502A0402

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 ☐ 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

3. General Description S088001

A: CAUTION S088001A03

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

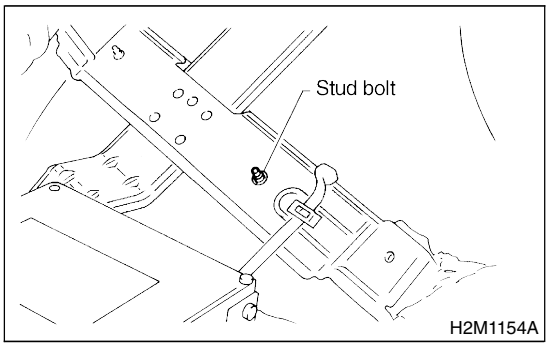
CAUTION:
• All Airbag system wiring harness and connectors are colored yellow. Do not use electrical test equipment on these circuit.
• Be careful not to damage Airbag system wiring harness when servicing the engine control module (ECM), transmission control module (TCM), main relay and fuel pump relay.

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.

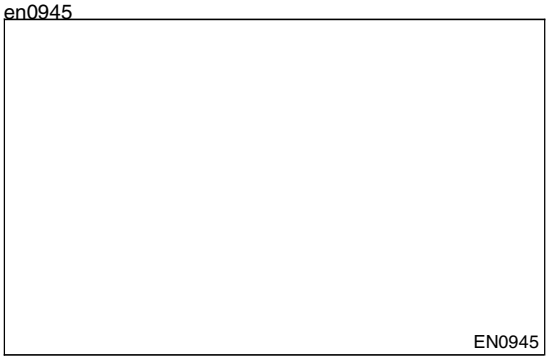
7) The connectors to each sensor in the engine compartment and the harness connectors on the engine side and body side are all designed to be waterproof. However, it is still necessary to take care not to allow water to get into the connectors when washing the vehicle, or when servicing the vehicle on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

8) Use ECM mounting stud bolts at the body head grounding point when measuring voltage and resistance inside the passenger compartment.

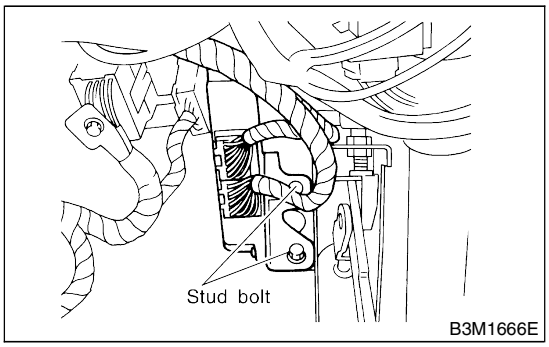


9) Use engine grounding terminal or engine proper as the grounding point to the body when measuring voltage and resistance in the engine compartment.

en0945



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) 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 S088001A10

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

1. BATTERY S088001A1001

1) Measure battery voltage and specific gravity of electrolyte.

Standard voltage: 12 V

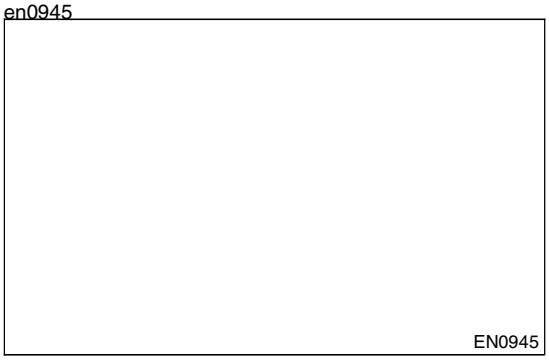
Specific gravity: Above 1.260

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

2. ENGINE GROUNDING S088001A1002

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

en0945



C: NOTE S088001A15

1. DESCRIPTION S088001A1501

• 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 S088001A1502

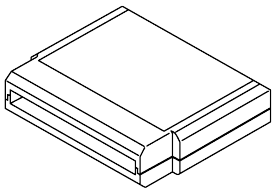
● The Multipoint Fuel Injection (MFI) system is a system that supplies the optimum air-fuel mixture to the engine for all the various operating conditions through the use of the latest electronic technology.
With this system fuel, which is pressurized at a constant pressure, is injected into the intake 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 S088001A1503

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).

D: PREPARATION TOOL S088001A17

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 B2M3876	24082AA150 (New adopted tool)	CARTRIDGE	Troubleshooting for electrical systems.
 B2M3877	22771AA030	SELECT MONITOR KIT	Troubleshooting for electrical systems. ● English: 22771AA030 (Without printer) ● German: 22771AA070 (Without printer) ● French: 22771AA080 (Without printer) ● Spanish: 22771AA090 (Without printer)

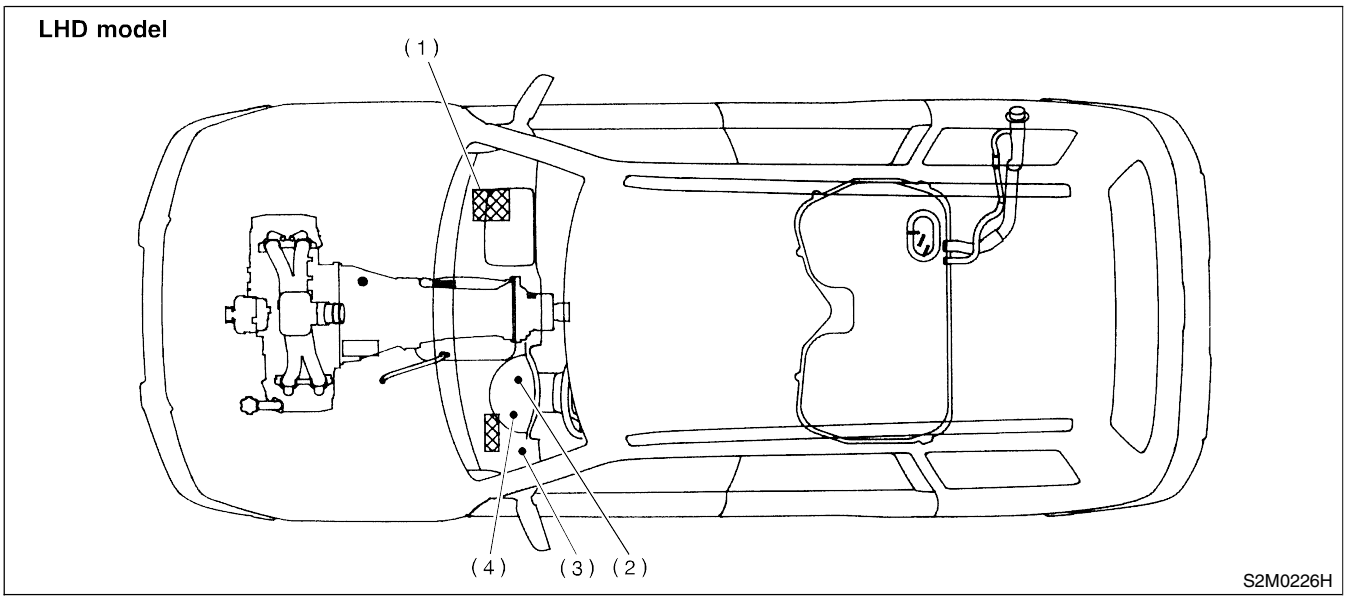
MEMO:

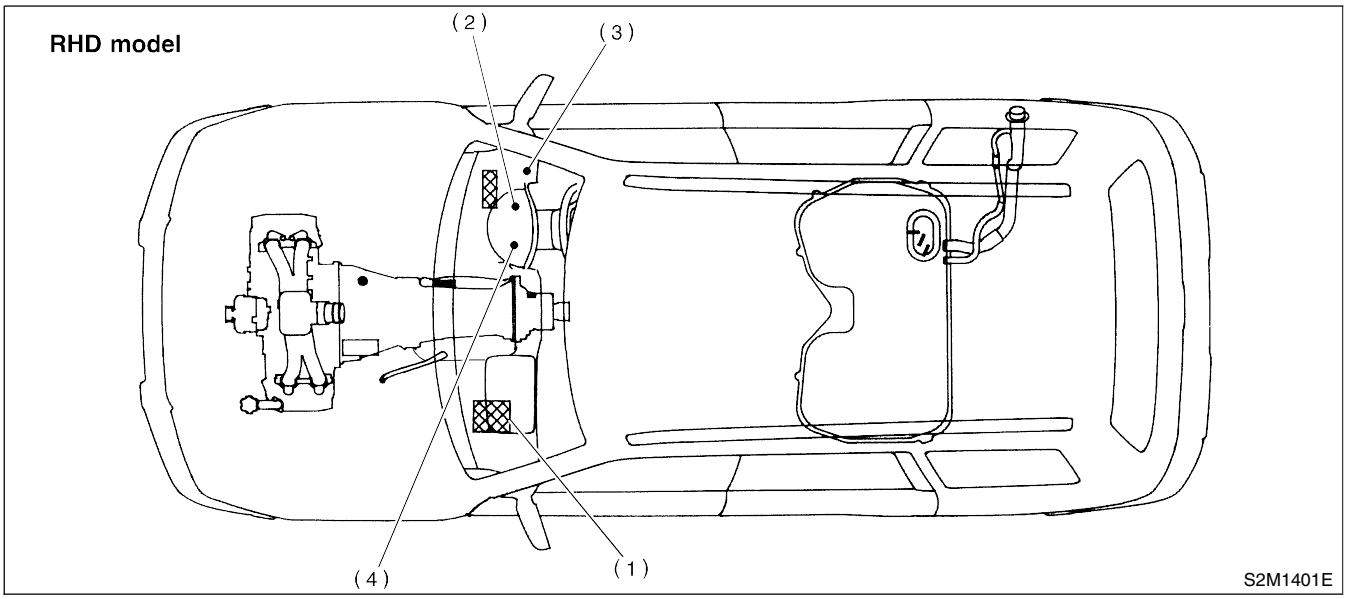
4. Electrical Components Location S088507

A: LOCATION S088507A13

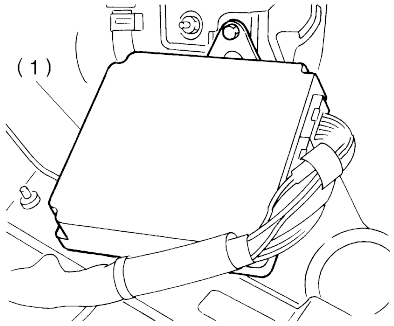
1. ENGINE S088507A1301

- **MODULE**

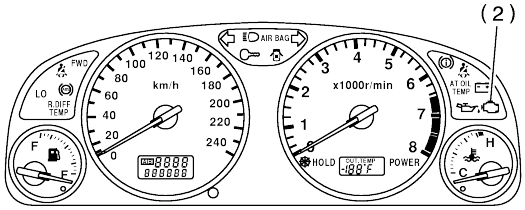




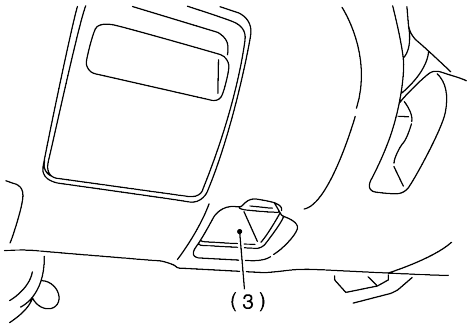
(1) Engine control module (ECM)
(2) CHECK ENGINE malfunction indicator lamp (MIL)
(3) Data link connector
(4) Test mode connector



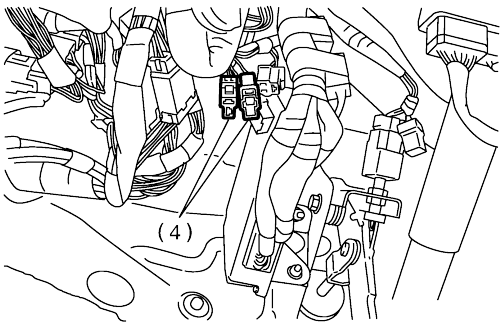
B3M1575A



S2M2215A

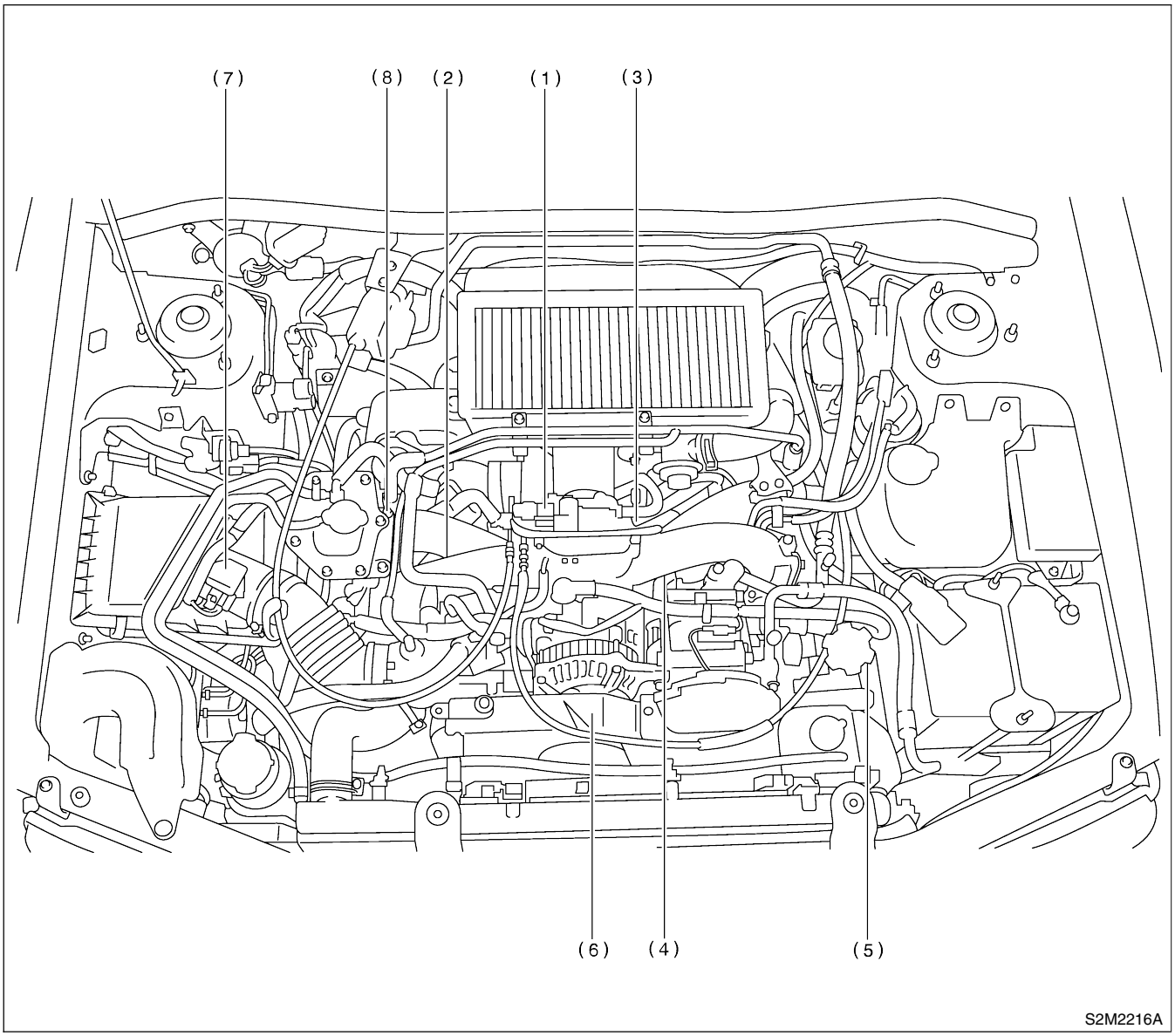


S2M2157A



S2M2244B

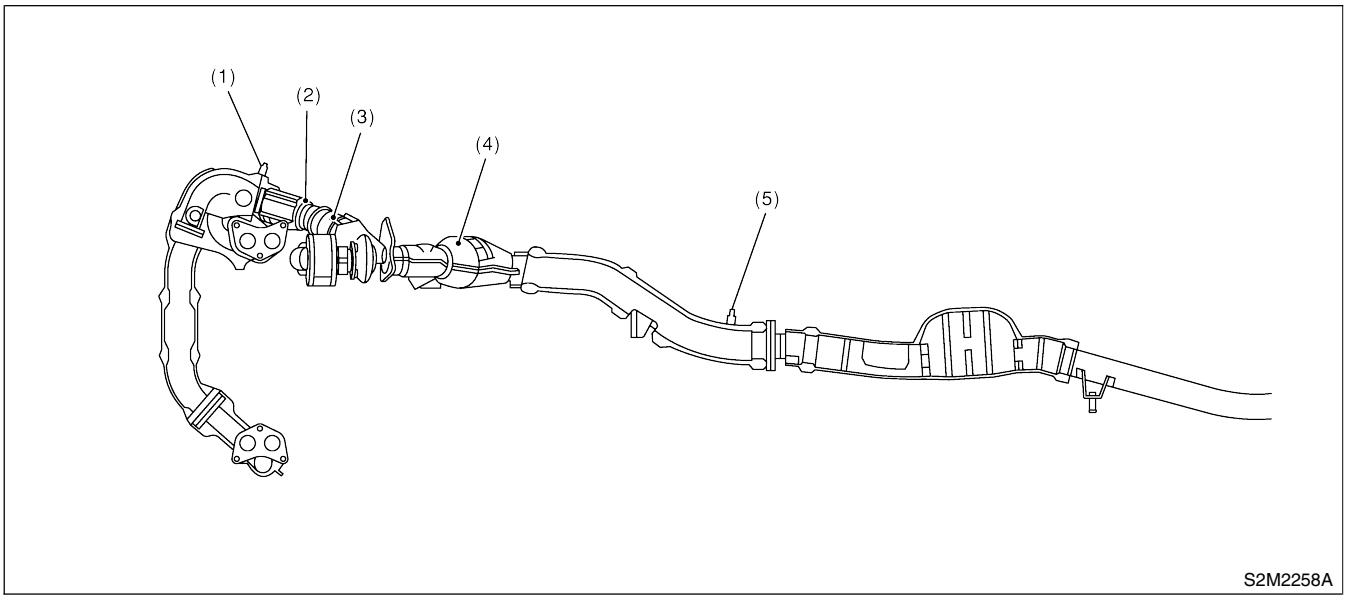
● SENSOR



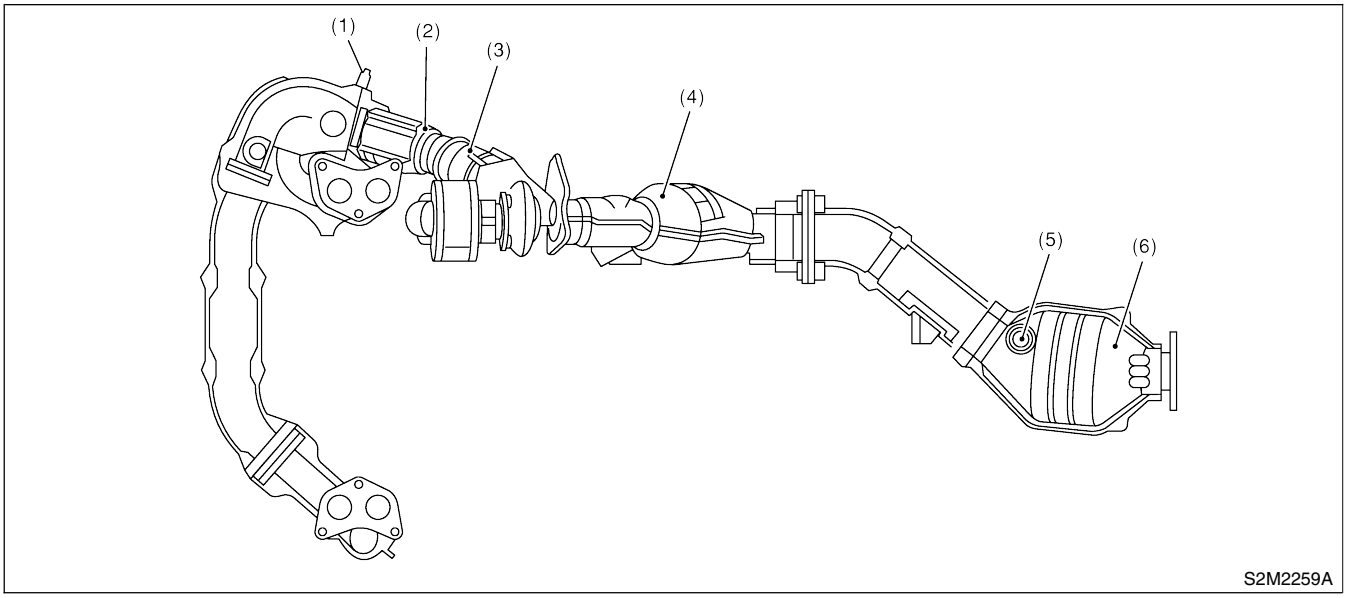
(1) Pressure sensor
(2) Engine coolant temperature sensor
(3) Throttle position sensor
(4) Knock sensor
(5) Camshaft position sensor
(6) Crankshaft position sensor
(7) Mass air flow and intake air temperature sensor
(8) Tumble generator valve position sensor

en1008 EN1008	en1009 EN1009
en1010 EN1010	en1011 EN1011
en1012 EN1012	en1013 EN1013
en1014 EN1014	en1015 EN1015

● Australia Model



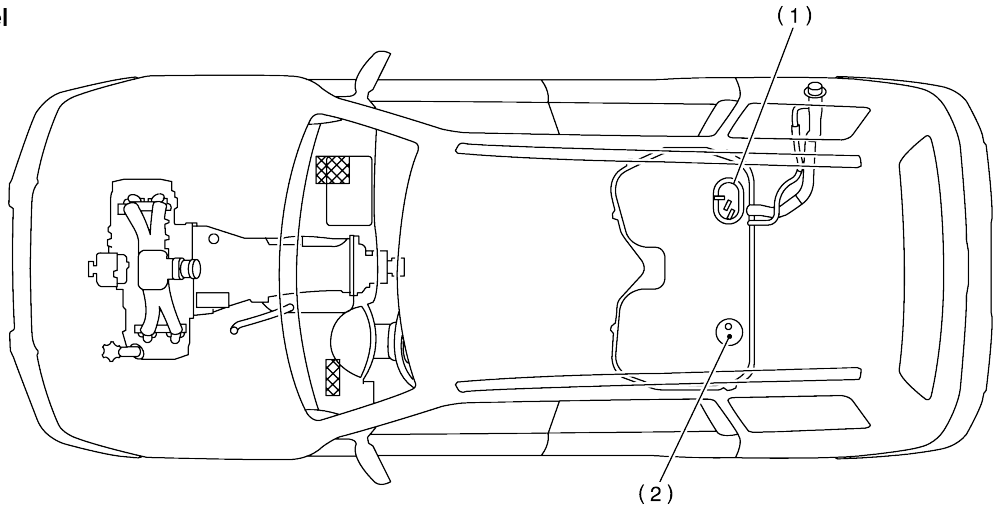
● Except Australia Model



(1) Front oxygen (A/F) sensor
(2) Precatalytic converter
(3) Exhaust temperature sensor
(4) Front catalytic converter
(5) Rear oxygen sensor
(6) Rear catalytic converter (Except Australia model)

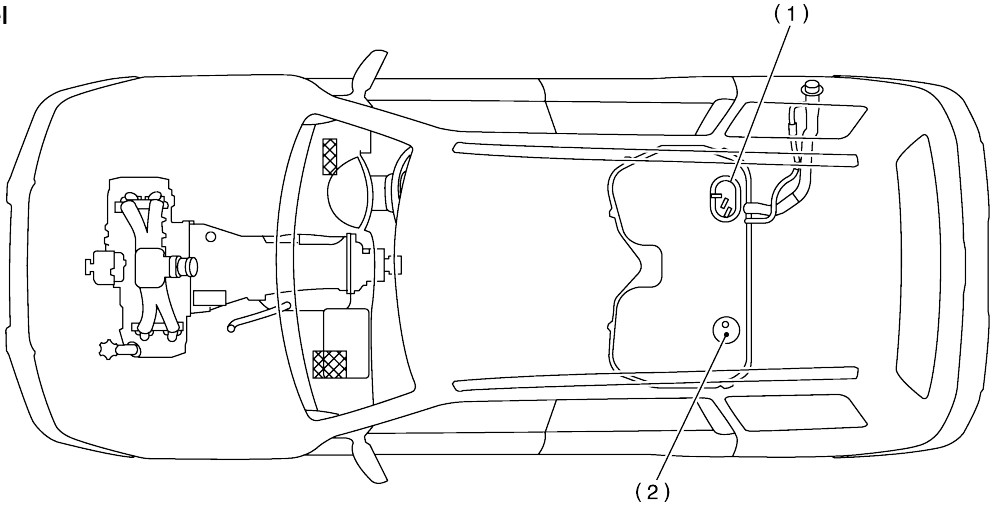
en1016 EN1016	en1017 EN1017
en0949 EN0949	en1018 EN1018
en0950 EN0950	SUBARU.

LHD model



S2M2217A

RHD model



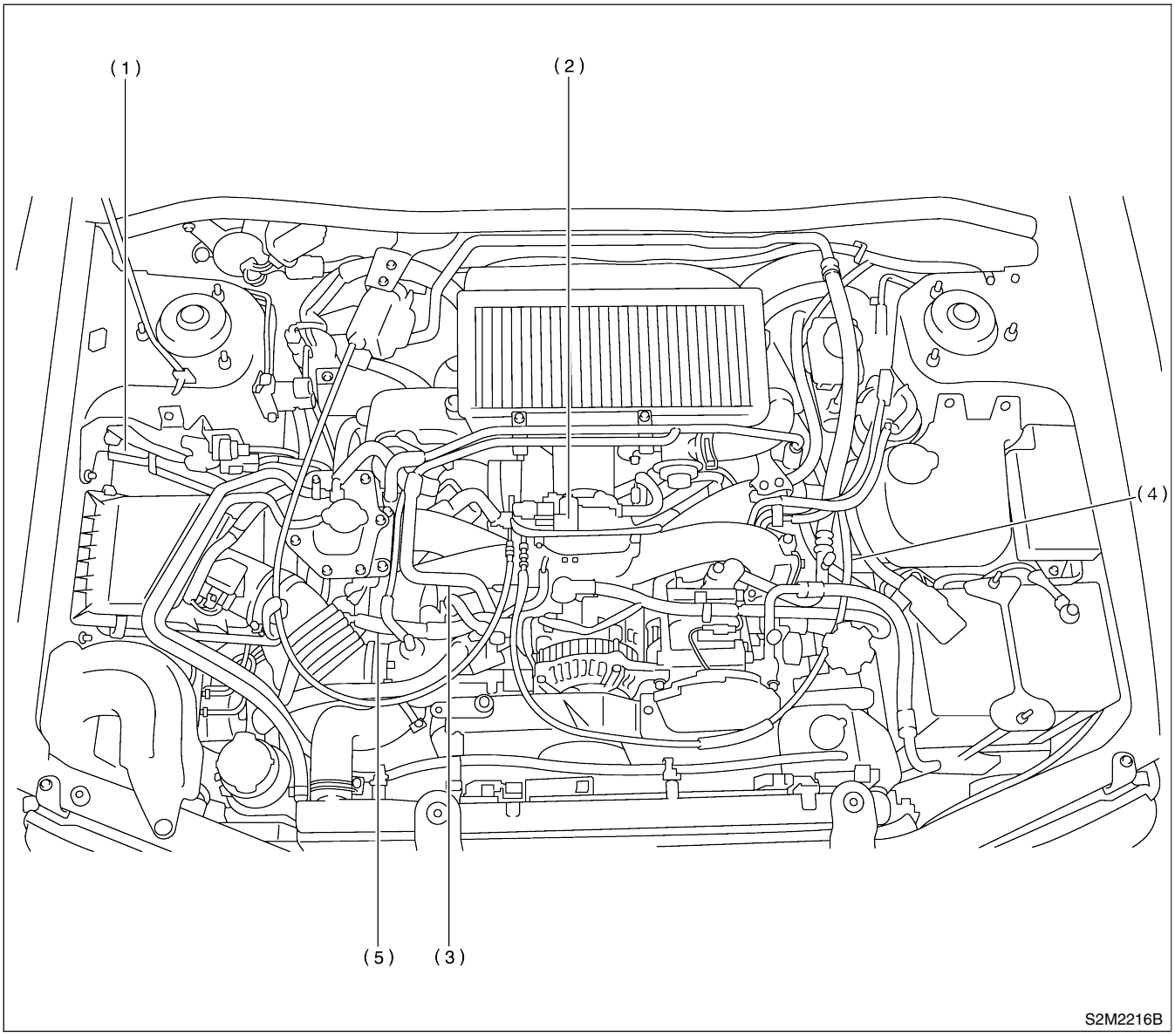
S2M2218A

(1) Fuel level sensor (2) Fuel sub level sensor

en1036	en1037
EN1036	EN1037

MEMO:

● SOLENOID VALVE, ACTUATOR, EMISSION CONTROL SYSTEM PARTS AND IGNITION SYSTEM PARTS

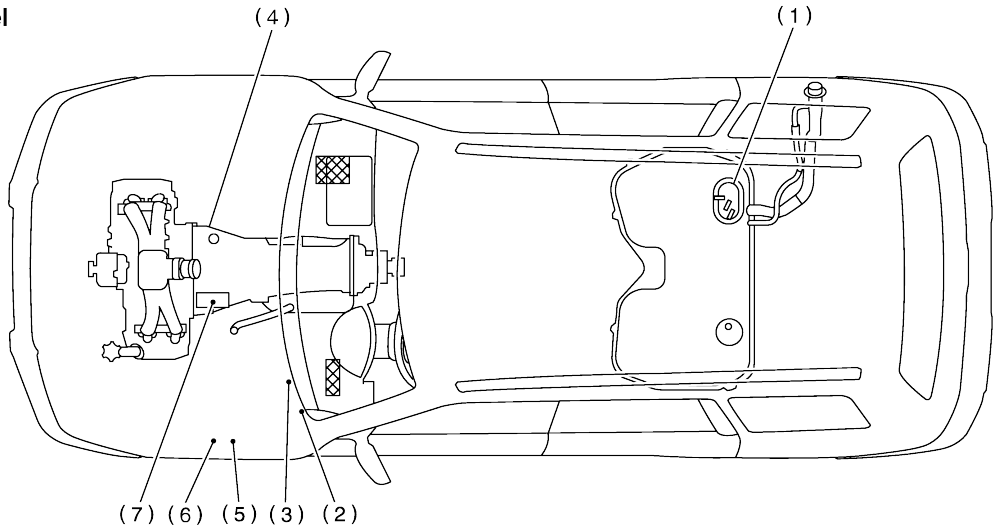


(1) Wastegate control solenoid valve
(2) Idle air control solenoid valve
(3) Purge control solenoid valve
(4) Ignition coil
(5) Tumble generator valve actuator

en1021 EN1021	en1022 EN1022
en1023 EN1023	en1024 EN1024
en0952 EN0952	SUBARU.

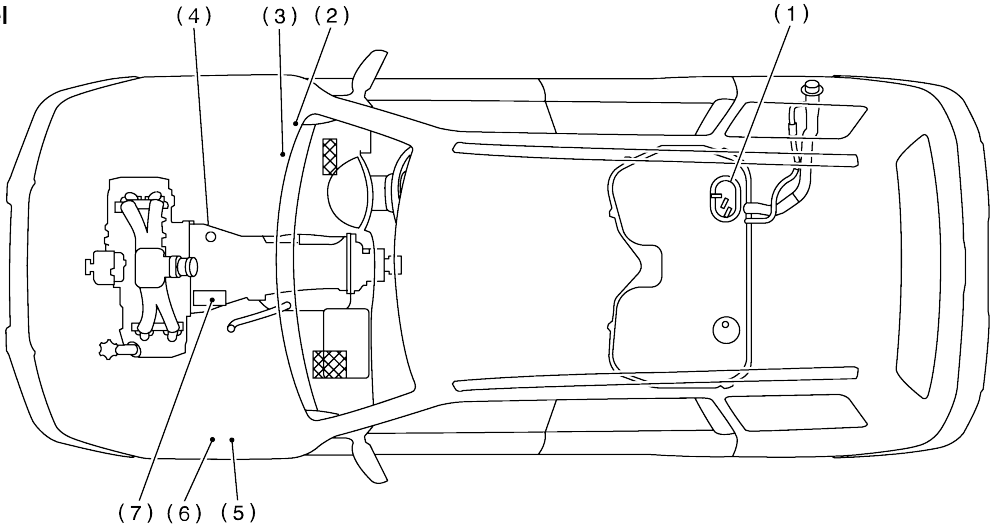
ELECTRICAL COMPONENTS LOCATION

LHD model



S2M2217B

RHD model



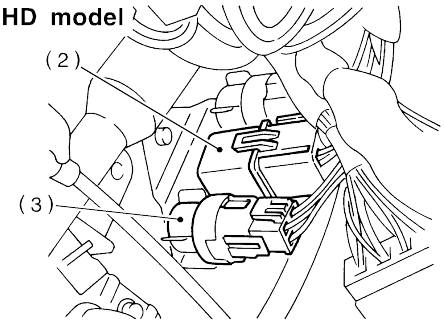
S2M2218B

(1) Fuel pump
(2) Main relay
(3) Fuel pump relay
(4) Inhibitor switch
(5) Radiator main fan relay
(6) Radiator sub fan relay
(7) Starter

en0953

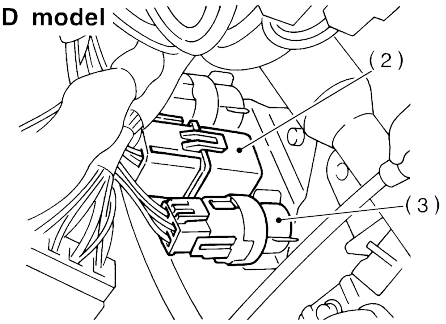
EN0953

LHD model



S2M0278B

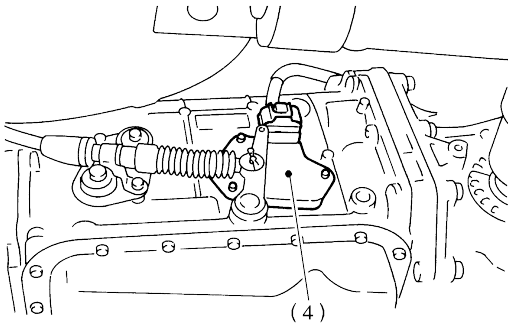
RHD model



S2M0663A

en0746

EN0746



B2M2246G

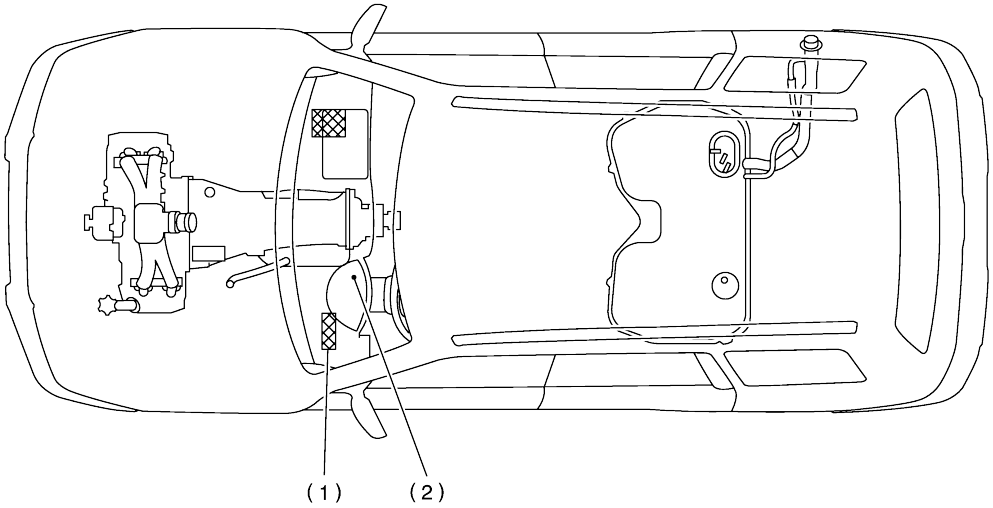
en1030

EN1030

2. TRANSMISSION S088507A1302

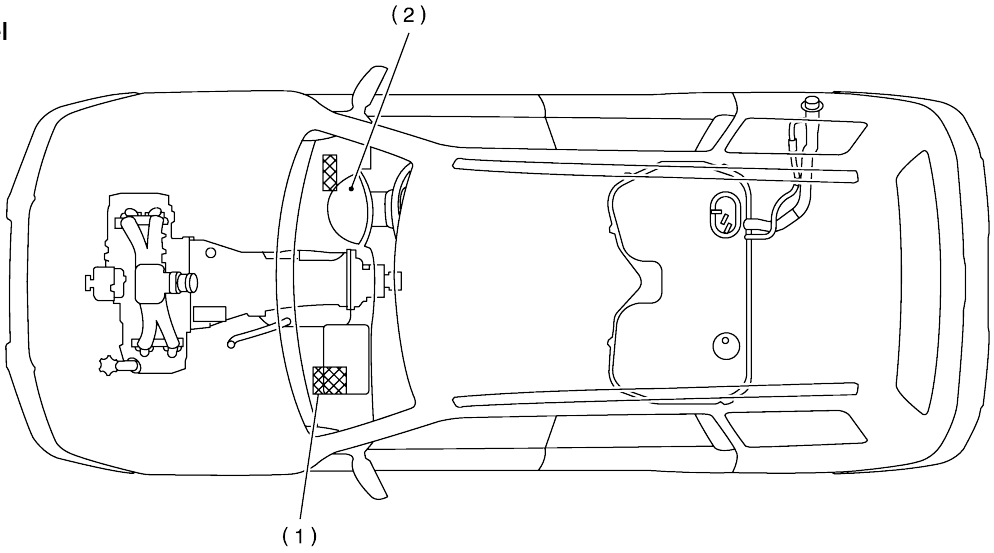
● MODULE

LHD model



S2M2217C

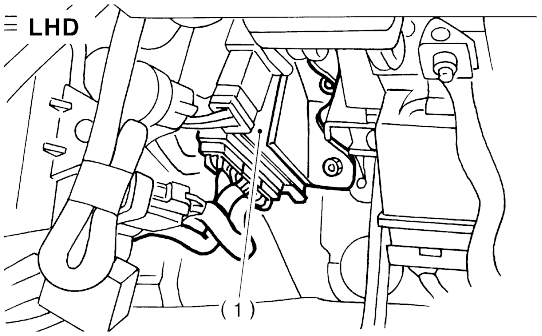
RHD model



S2M2218C

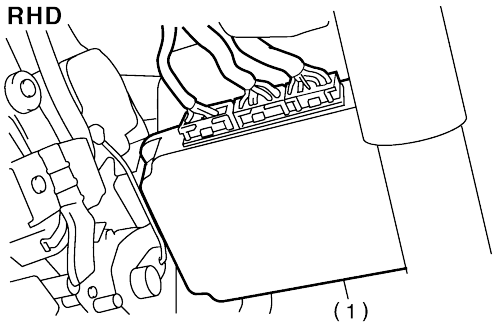
(1) Transmission Control Module (TCM) (for AT vehicles)
(2) AT diagnostic indicator light (for AT vehicles)

LHD

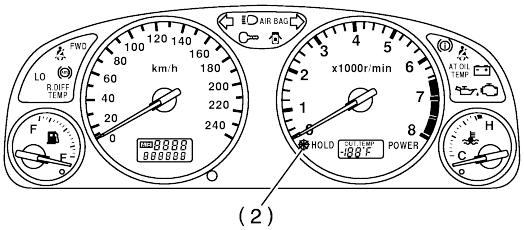


B3M1592D

RHD

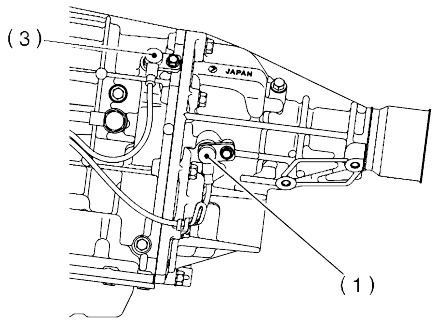


B3M1652B

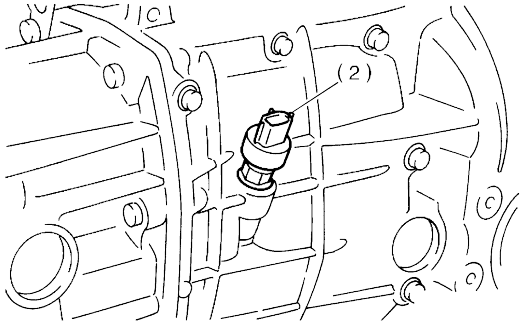


S2M2215B

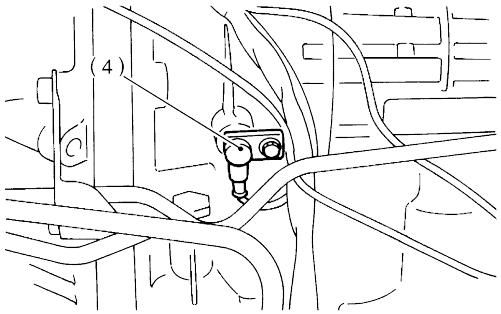
● SENSOR



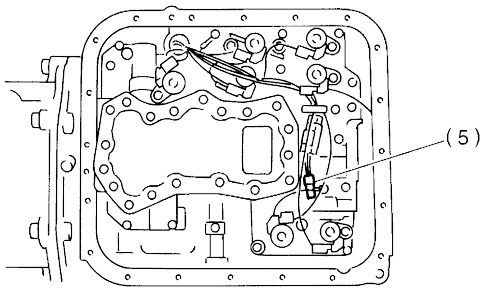
B2M2258A



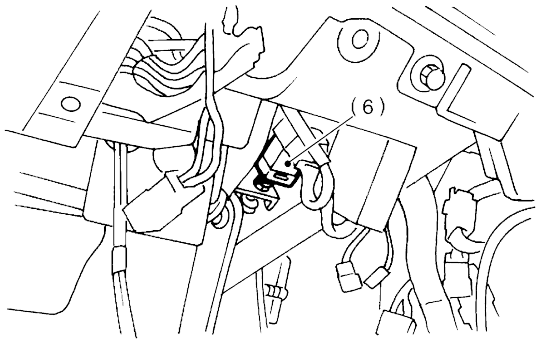
B2M2259A



B2M2260A



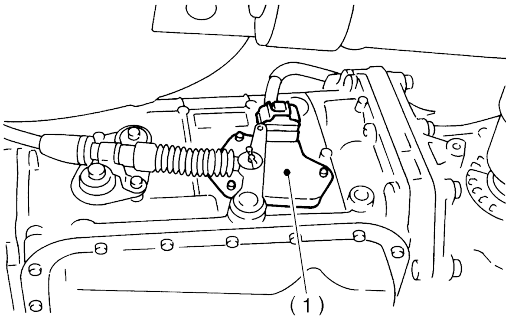
B2M2261A



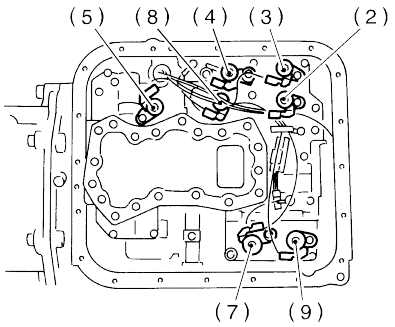
OBD0653B

(1) Rear vehicle speed sensor (for AT vehicles)
(2) Front vehicle speed sensor (for MT vehicles)
(3) Front vehicle speed sensor (for AT vehicles)
(4) Torque converter turbine speed sensor
(5) ATF temperature sensor (for AT vehicles)
(6) Brake light switch

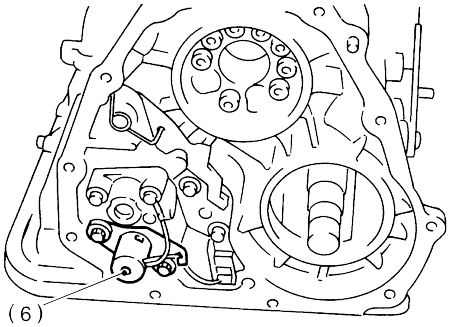
• SOLENOID VALVE AND SWITCH (AT VEHICLES)



B2M2246F



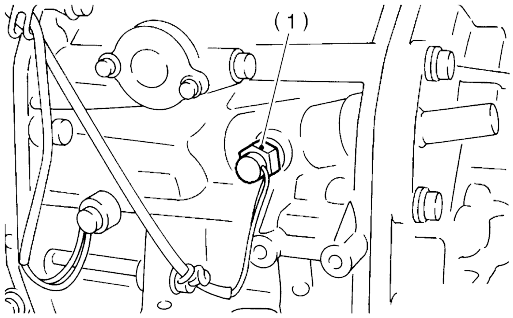
B2M2263K



B2M2264F

(1) Inhibitor switch
(2) Shift solenoid valve 1
(3) Shift solenoid valve 2
(4) Line pressure duty solenoid
(5) Lock-up duty solenoid
(6) Transfer duty solenoid
(7) 2-4 brake duty solenoid
(8) Low clutch timing solenoid valve
(9) 2-4 brake timing solenoid valve

• SOLENOID VALVE AND SWITCH (MT VEHICLES)



B2M2265A

(1) Neutral position switch

5. Engine Control Module (ECM) I/O Signal S088526

A: ELECTRICAL SPECIFICATION S088526A08

en0955



Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Crankshaft position sensor	Signal (+)	B135	2	0	–7 — +7	Sensor output waveform
	Signal (–)	B135	11	0	0	—
	Shield	B135	21	0	0	—
Camshaft position sensor	Signal (+)	B135	1	0	–7 — +7	Sensor output waveform
	Signal (–)	B135	10	0	0	—
	Shield	B135	21	0	0	—
Throttle position sensor	Signal	B135	7	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Rear oxygen sensor	Signal	B135	17	0	0 — 0.9	—
	Shield	B135	26	0	0	—
	GND (sensor)	B135	19	0	0	—
Front oxygen (A/F) sensor heater	Signal 1	B137	4	0 — 1.0	0 — 1.0	—
	Signal 2	B137	5	0 — 1.0	0 — 1.0	—
Rear oxygen sensor heater signal		B136	13	0 — 1.0	0 — 1.0	—
Engine coolant temperature sensor	Signal	B135	18	1.0 — 1.4	1.0 — 1.4	After warm-up the engine.
	GND (sensor)	B135	19	0	0	After warm-up the engine.
Vehicle speed signal		B134	1	0 or 5	0 or 5	“5” and “0” are repeatedly displayed when vehicle is driven.

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Mass air flow sensor	Signal	B84	13	—	0.3 — 4.5	—
	Shield	B84	8	0	0	—
	GND	B84	7	0	0	—
Intake air temperature sensor signal		B135	27	—	—	—
Exhaust gas temperature sensor	Signal	B135	16	—	—	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve position sensor RH	Signal	B84	23	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve position sensor LH	Signal	B84	13	Fully closed: 0.2 — 1.0 Fully opened: 4.2 — 4.7		—
	Power supply	B135	9	5	5	—
	GND (sensor)	B135	19	0	0	—
Tumble generator valve RH (open)		B84	4	0 or 5	0 or 5	—
Tumble generator valve RH (close)		B84	5	0 or 5	0 or 5	—
Tumble generator valve LH (open)		B84	11	0 or 5	0 or 5	—
Tumble generator valve LH (close)		B84	10	0 or 5	0 or 5	—
Wastegate control solenoid valve		B137	24	10 — 13	13 — 14	—
Starter switch		B134	16	0	0	Cranking: 8 — 14
A/C switch		B134	6	ON: 10 — 13 OFF: 0	ON: 13 — 14 OFF: 0	—
Ignition switch		B134	14	10 — 13	13 — 14	—
Neutral position switch	MT	B135	8	ON: 12±0.5 OFF: 0		Switch is ON when gear is in neutral position.
	AT	B135	8	ON: 0 OFF: 12±0.5		Switch is ON when shift is in “N” or “P” position.
Test mode connector		B134	5	5	5	When connected: 0
Knock sensor	Signal	B135	4	2.8	2.8	—
	Shield	B135	22	0	0	—
Back-up power supply		B137	10	10 — 13	13 — 14	Ignition switch “OFF”: 10 — 13
Control unit power supply		B137	2	10 — 13	13 — 14	—
		B137	3	10 — 13	13 — 14	—
Sensor power supply		B135	9	5	5	—
Line end check 1		B134	10	0	0	—
Ignition control	#1	B136	24	0	13 — 14	Waveform
	#2	B136	23	0	13 — 14	Waveform
	#3	B136	22	0	13 — 14	Waveform
	#4	B136	21	0	13 — 14	Waveform

ENGINE CONTROL MODULE (ECM) I/O SIGNAL

Content		Connector No.	Terminal No.	Signal (V)		Note
				Ignition SW ON (Engine OFF)	Engine ON (Idling)	
Fuel injector	#1	B137	1	10 — 13	1 — 14	Waveform
	#2	B136	6	10 — 13	1 — 14	Waveform
	#3	B136	5	10 — 13	1 — 14	Waveform
	#4	B136	4	10 — 13	1 — 14	Waveform
Idle air control solenoid valve	Signal	B136	10	0 or 13 — 14	0 or 13 — 14	Waveform
A/C relay control		B137	27	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 1 control		B137	17	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	—
Radiator fan relay 2 control		B137	28	ON: 0.5, or less OFF: 10 — 13	ON: 0.5, or less OFF: 13 — 14	With A/C vehicles only
Malfunction indicator lamp		B137	15	—	—	Light “ON”: 1, or less Light “OFF”: 10 — 14
Engine speed output		B136	9	—	0 — 13, or more	Waveform
Purge control solenoid valve		B137	16	ON: 1, or less OFF: 10 — 13	ON: 1, or less OFF: 13 — 14	—
Pressure sensor	Signal	B135	8	1.7 — 2.4	1.1 — 1.6	—
	Power supply	B135	9	5	5	
	GND (sensor)	B135	19	0	0	
Fuel level sensor		B135	25	0.12 — 4.75	0.12 — 4.75	—
Small light switch		B134	17	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Blower fan switch		B134	9	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Rear defogger switch		B134	3	ON: 0 OFF: 10 — 13	ON: 0 OFF: 13 — 14	—
Power steering oil pressure switch		B135	24	10 — 13	ON: 0 OFF: 13 — 14	—
Front oxygen (A/F) sensor signal (+)		B137	19	2.8 — 3.2	2.8 — 3.2	—
Front oxygen (A/F) sensor signal (–)		B137	29	2.4 — 2.7	2.4 — 2.7	—
Front oxygen (A/F) sensor shield		B136	7	0	0	—
SSM/GST communication line		B134	21	Less than 1 ←→ More than 4	Less than 1 ←→ More than 4	—
GND (sensors)		B135	19	0	0	—
GND (injectors)		B136	8	0	0	—
GND (ignition system)		B136	18	0	0	—
GND (power supply)		B136	17	0	0	—
		B134	22	0	0	—
GND (control systems)		B134	7	0	0	—
		B134	15	0	0	—
GND (oxygen sensor heater 1)		B137	9	0	0	—
GND (oxygen sensor heater 2)		B137	8	0	0	—

6. Engine Condition Data S088530

A: ELECTRICAL SPECIFICATION

S088530A08

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 neutral position.
- A/C is turned OFF.
- All accessory switches are turned OFF.

7. Engine Condition Data S088506

A: ELECTRICAL SPECIFICATION S088506A08

tr0532



Check with ignition switch ON.						
Content		Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Back-up power supply		B56	1	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	1	Select lever in “P” range	Less than 1	—
				Select lever in any other than “P” range (except “N” range)	More than 8	
	“N” range switch	B55	14	Select lever in “N” range	Less than 1	—
				Select lever in any other than “N” range (except “P” range)	More than 8	
	“R” range switch	B55	3	Select lever in “R” range	Less than 1	—
				Select lever in any other than “R” range	More than 8	
	“D” range switch	B55	4	Select lever in “D” range	Less than 1	—
				Select lever in any other than “D” range	More than 8	
	“3” range switch	B55	5	Select lever in “3” range	Less than 1	—
				Select lever in any other than “3” range	More than 8	
	“2” range switch	B55	6	Select lever in “2” range	Less than 1	—
				Select lever in any other than “2” range	More than 8	
	“1” range switch	B55	7	Select lever in “1” range	Less than 1	—
				Select lever in any other than “1” range	More than 8	
Brake switch		B55	12	Brake pedal depressed.	More than 10.5	—
				Brake pedal released.	Less than 1	

Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
ABS signal	B55	21	ABS switch ON	Less than 1	—
			ABS switch OFF	6.5 — 15	
Hold switch	B55	16	Hold switch ON	Less than 1	—
			Hold switch OFF	More than 8	
Power switch	B55	23	Power switch ON	Less than 1	—
			Power switch OFF	More than 10	
Kick-down switch	B55	11	Throttle fully opened.	Less than 1	—
			Throttle fully closed.	More than 6.5	
POWER indicator light	B56	11	Light ON	Less than 1	—
			Light OFF	More than 9	
AT OIL TEMP indicator light	B56	10	Light ON	Less than 1	—
			Light OFF	More than 9	
Throttle position sensor	B54	3	Throttle fully closed.	0.3 — 0.7	—
			Throttle fully open.	4.0 — 4.6	
Throttle position sensor power supply	B54	2	Ignition switch ON (With engine OFF)	4.8 — 5.3	—
ATF temperature sensor	B54	11	ATF temperature 20°C (68°F)	1.6 — 2.0	2.1 — 2.9 k
			ATF temperature 80°C (176°F)	0.4 — 0.9	275 — 375
Rear vehicle speed sensor	B55	24	Vehicle stopped.	0	450 — 650
			Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	
Front vehicle speed sensor	B55	18	Vehicle speed at least 20 km/h (12 MPH)	More than 1 (AC range)	450 — 650
Torque converter turbine speed sensor	B55	8	Engine idling after warm-up. (D range)	0	450 — 650
			Engine idling after warm-up. (N range)	More than 1 (AC range)	
Vehicle speed output signal	B56	17	Vehicle speed at most 10 km/h (6 MPH)	Less than 1← →More than 4	—
Engine speed signal	B55	17	Ignition switch ON (with engine OFF)	More than 10.5	—
			Ignition switch ON (with engine ON)	8 — 11	
Cruise set signal	B55	22	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 signal 1	B56	5	Ignition switch ON (with engine ON)	4	—
Torque control signal 2	B56	14	Ignition switch ON (with engine ON)	4	—
Torque control cut signal	B55	10	Ignition switch ON	8	—
Mass air flow signal	B54	1	Engine idling after warm-up.	0.5 — 1.2	—
Shift solenoid 1	B54	22	1st or 4th gear	More than 9	10 — 16
			2nd or 3rd gear	Less than 1	
Shift solenoid 2	B54	5	1st or 2nd gear	More than 9	10 — 16
			3rd or 4th gear	Less than 1	

ENGINE CONDITION DATA

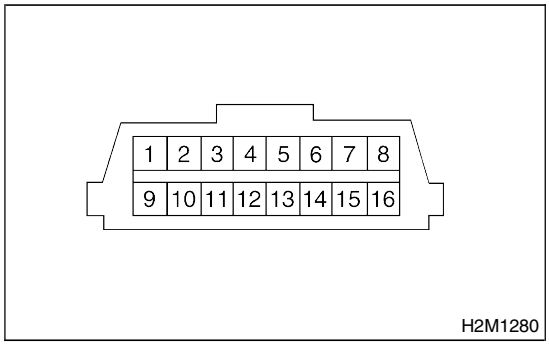
Check with ignition switch ON.					
Content	Connector No.	Terminal No.	Measuring conditions	Voltage (V)	Resistance to body (ohms)
Line pressure duty solenoid	B54	9	Ignition switch ON (with engine OFF) Throttle fully closed after warm-up.	1.5 — 4.0	2.0 — 4.5
			Ignition switch ON (with engine OFF) Throttle fully open after warm-up.	Less than 0.5	
Lock-up duty solenoid	B54	7	When lock up occurs.	More than 8.5	10 — 17
			When lock up is released.	Less than 0.5	
Transfer duty solenoid	B54	6	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	
2-4 brake duty solenoid	B54	18	Ignition switch ON (with engine OFF) Throttle fully closed after warm-up.	1.5 — 4.0	2.0 — 4.5
			Ignition switch ON (with engine OFF) Throttle fully open after warm-up.	Less than 0.5	
2-4 brake timing solenoid	B54	16	1st gear	Less than 1	10 — 16
			3rd gear	More than 9	
Low clutch timing solenoid	B54	15	2nd gear	Less than 1	10 — 16
			4th gear	More than 9	
Sensor ground line 1	B54	20	—	0	Less than 1
Sensor ground line 2	B55	9	—	0	Less than 1
Sensor ground line 3	B54	10	—	0	Less than 1
Sensor ground line 4	B54	19	—	0	Less than 1
System ground line	B56	19	—	0	Less than 1
	B54	21			
FWD switch	B55	20	Fuse removed.	6 — 9.1	—
			Fuse installed.	Less than 1	
FWD indicator light	B56	2	Fuse ONFWD switch	Less than 1	—
			Fuse removed from FWD switch	More than 9	
Data link signal (Subaru Select Monitor)	B56	15	—	—	—
		6	—	—	

8. Data Link Connector S088505

A: NOTE S088505A15

This connector is used both for OBD-II general scan tools and the Subaru Select Monitor.

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.



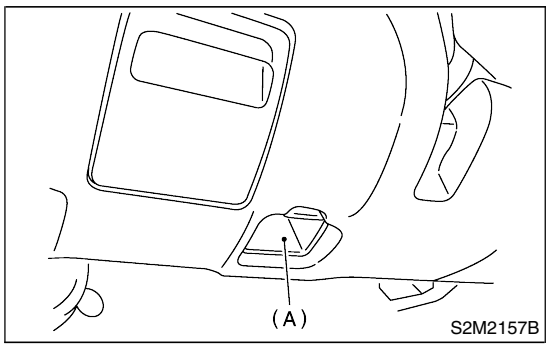
Terminal No.	Contents	Terminal No.	Contents
1	Power supply	9	Blank
2	Blank	10	K line of ISO 9141 CARB
3	Blank	11	Blank
4	Blank	12	Ground
5	Blank	13	Ground
6	Line end check signal 1	14	Blank
7	Blank	15	Blank
8	Line end check signal 2	16	Blank

9. OBD-II General Scan Tool S088527

A: OPERATION S088527A16

1. HOW TO USE OBD-II GENERAL SCAN TOOL S088527A1601

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 (A) 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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

2. MODE $01 (CURRENT POWERTRAIN DIAGNOSTIC DATA) S088527A1602

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	°
0F	Intake air temperature	°C
10	Air flow rate from pressure sensor	g/sec
11	Throttle valve opening angle	%
13	Check whether oxygen sensor is installed.	—
15	Oxygen sensor output voltage and short term fuel trim associated with oxygen sensor—bank 2	V and %
24	A/F sensor 1 output voltage and short term fuel trim associated with A/F sensor 1	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) S088527A1603

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) S088527A1604

Refer to Read Diagnostic Trouble Code for information about data denoting emission-related powertrain diagnostic trouble codes. <Ref. to EN(DOHC TURBO)-43, Read Diagnostic Trouble Code.>

5. MODE $04 (CLEAR/RESET EMISSION-RELATED DIAGNOSTIC INFORMATION) S088527A1605

Refers to the mode used to clear or reset emission-related diagnostic information (OBD-II trouble diagnostic information).

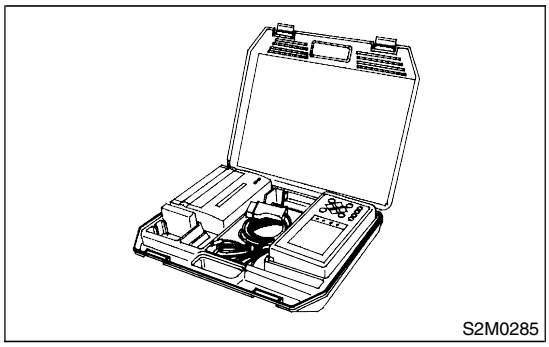
NOTE:
Refer to OBD-II general scan tool manufacturer's instruction manual to clear or reset emission-related diagnostic information (MODE $04).

10. Subaru Select Monitor S088503

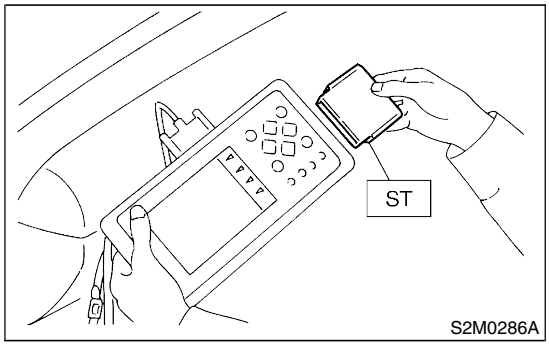
A: OPERATION S088503A16

1. HOW TO USE SUBARU SELECT MONITOR S088503A1601

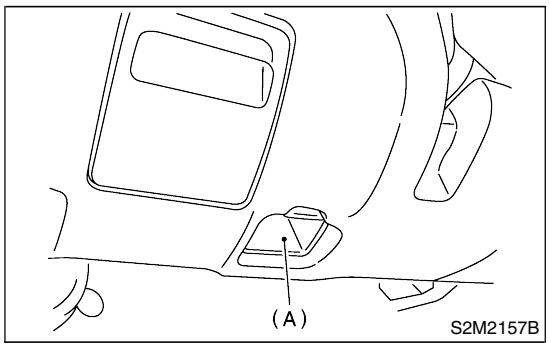
1) Prepare Subaru Select Monitor kit. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>



2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>



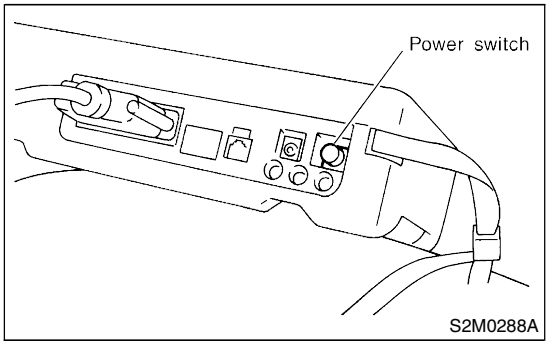
4) Connect Subaru Select Monitor to data link connector.
(1) Data link connector located (A) in the lower portion of the instrument panel (on the driver's side).



(2) Connect diagnosis cable to data link connector.

CAUTION:
Do not connect scan tools except for Subaru Select Monitor and OBD-II general scan tool.

5) Turn ignition switch to ON (engine OFF) and Subaru Select Monitor switch to ON.



6) Using Subaru Select Monitor, call up diagnostic trouble code(s) and various data, then record them.

2. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE. (NORMAL MODE)

S088503A1602

Refer to Read Diagnostic Trouble Code for information about how to indicate DTC. <Ref. to EN(DOHC TURBO)-43, Read Diagnostic Trouble Code.>

3. READ DIAGNOSTIC TROUBLE CODE (DTC) FOR ENGINE. (OBD MODE) S088503A1603

Refer to Read Diagnostic Trouble Code for information about how to indicate DTC. <Ref. to EN(DOHC TURBO)-43, Read Diagnostic Trouble Code.>

4. READ CURRENT DATA FOR ENGINE. (NORMAL MODE) S088503A1604

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	ISC Valve Duty Ratio	%
Alternator duty control signal	ALT Duty	%
Fuel pump duty control signal	Fuel Pump Duty	%
A/F sensor current	A/F Sensor #1 Current	mA
A/F sensor resistance	A/F Sensor #1 Resistance	Ω
Front oxygen (A/F) sensor output signal	A/F Sensor #1	—
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 Current 1	A
Rear oxygen sensor heater voltage	Rear O2 Heater Voltage	V
Canister purge control solenoid valve duty ratio	CPC Valve Duty Ratio	%
Primary supercharged pressure control signal	Primary Control	%
Tumble generator valve position sensor signal (right side)	TGV Position Sensor R	V
Tumble generator valve position sensor signal (left side)	TGV Position Sensor L	V
Tumble generator valve drive signal	TGV Drive	OPEN or CLOSE
Fuel level signal	Fuel Level	V
Intake air temperature signal	Intake Air Temp.	°C or °F
Learned ignition timing	Learned Ignition Timing	deg
Mass air flow sensor signal	Mass Air Flow	g/s
Mass air flow sensor signal	Air Flow Sensor Voltage	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 signal	A/C Compressor Signal	ON or OFF

Contents	Display	Unit of measure
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
Power steering switch signal	P/S Switch	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 Permission Signal	ON or OFF
Rear oxygen sensor rich signal	Rear O2 Rich Signal	ON or OFF
Starter switch signal	Starter Switch	ON or OFF
Idle switch signal	Idle Switch	ON or OFF
Crankshaft position sensor signal	Crankshaft Position Sig.	ON or OFF
Camshaft position sensor signal	Camshaft Position Sig.	ON or OFF
Rear defogger switch signal	Rear Defogger SW	ON or OFF
Blower fan switch signal	Blower Fan SW	ON or OFF
Small light switch signal	Light Switch	ON or OFF
Tumble generator valve output signal	TGV Output	ON or OFF

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

5. READ CURRENT DATA FOR ENGINE. (OBD MODE) S088503A1605

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	MI (MIL)	Complete or incomplete
Monitoring test of misfire	Misfire monitoring	Complete or incomplete
Monitoring test of fuel system	Fuel system monitoring	Complete or incomplete
Monitoring test of comprehensive component	Component monitoring	Complete or incomplete
Test of catalyst	Catalyst Diagnosis	No support
Test of heated catalyst	Heated catalyst	No support
Test of evaporative emission purge control system	Evaporative purge system	No support
Test of secondary air system	Secondary air system	No support
Test of air conditioning system refrigerant	A/C system refrigerant	No support
Test of oxygen sensor	Oxygen sensor	Complete or incomplete
Test of oxygen sensor heater	O2 Heater Diagnosis	Complete or incomplete
Test of EGR system	EGR system	No support
Air fuel ratio control system for bank 1	Fuel System for Bank 1	—
Engine load data	Calculated load value	%
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
Intake air amount	Mass Air Flow	g/s
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) S088503A1606

1) On the ≪Main Menu≫ display screen, select the {Each System Check} and press the [YES] key.
2) On the ≪System Selection Menu≫ display screen, select the {Engine Control System} and press the [YES] key.
3) Press the [YES] key after displayed the information of engine type.
4) On the ≪Engine Diagnosis≫ display screen, select the {OBD System} and press the [YES] key.
5) On the ≪OBD Menu≫ display screen, select the {Freeze Frame Data} and press the [YES] key.
● A list of the support data is shown in the following table.

Contents	Display	Unit of measure
Diagnostic trouble code (DTC) for freeze frame data	Freeze frame data	DTC
Air fuel ratio control system for bank 1	Fuel system for Bank1	ON or OFF
Engine load data	Engine Load	%
Engine coolant temperature signal	Coolant Temp.	°C or °F
Short term fuel trim by front oxygen (A/F) sensor	Short term fuel trim B1	%
Long term fuel trim by front oxygen (A/F) sensor	Long term fuel trim B1	%
Intake manifold absolute pressure signal	Mani. Absolute Pressure	mmHg or kPa or inHg or psi
Engine speed signal	Engine Speed	rpm
Vehicle speed signal	Vehicle Speed	km/h or MPH

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

7. READ OXYGEN SENSOR MONITORING TEST RESULTS DATA FOR ENGINE. (OBD MODE) S088503A1607

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 S088503A1608

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 SW	ON or OFF	When neutral position signal is entered.
Air conditioning switch signal	A/C SW	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.
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.
Rear oxygen sensor rich signal	Rear O2 Rich Signal	ON or OFF	When rear oxygen sensor mixture ratio is rich.
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.
Power steering switch signal	P/S SW	ON or OFF	When power steering switch is entered.
Rear defogger switch signal	Rear Defogger SW	ON or OFF	When rear defogger switch is turned ON.
Blower fan switch signal	Blower Fan SW	ON or OFF	When blower fan switch is turned ON.
Light switch signal	Light SW	ON or OFF	When small light switch is turned ON.
Tumble generator valve actuator signal	TGV Signal	ON or OFF	When TGV actuator signal is entered.
Tumble generator valve drive signal	TGV Drive	ON or OFF	When TGV moves and valve opens.

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

9. READ CURRENT DATA FOR AT. S088503A1609

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
Rear vehicle speed sensor signal	Vehicle Speed #1	km/h or MPH
Front vehicle speed sensor 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.

11. Read Diagnostic Trouble Code S088508

A: OPERATION S088508A16

1. SUBARU SELECT MONITOR (NORMAL MODE) S088508A1601

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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

2. SUBARU SELECT MONITOR (OBD MODE) S088508A1602

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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

3. OBD-II GENERAL SCAN TOOL S088508A1603

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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

NOTE:
Refer to OBD-II general scan tool manufacturer's instruction manual to access emission-related powertrain diagnostic trouble codes (MODE $03).

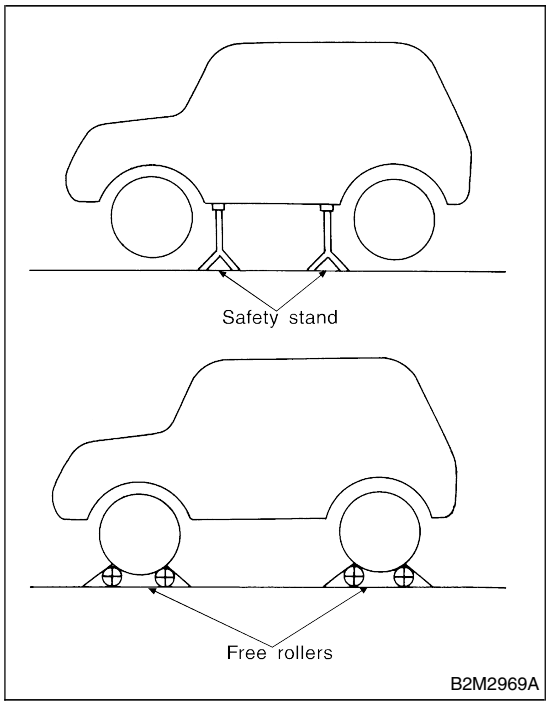
12. Inspection Mode S088510

A: OPERATION S088510A16

1. PREPARATION FOR THE INSPECTION MODE S088510A1601

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

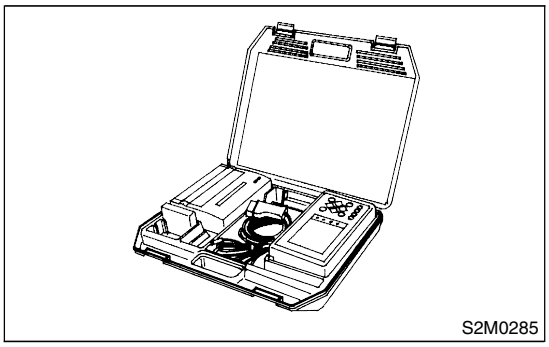
WARNING:
• Before raising the vehicle, ensure parking brakes are applied.
• Do not use a pantograph jack in place of a safety stand.
• Secure a rope or wire to the front and rear towing or tie-down hooks to prevent the lateral runout of front wheels.
• Do not abruptly depress/release clutch pedal or 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.



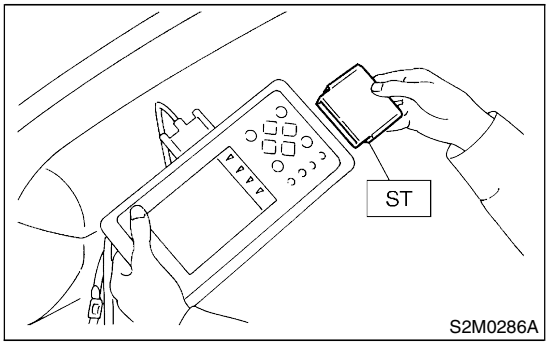
2. SUBARU SELECT MONITOR S088510A1602

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

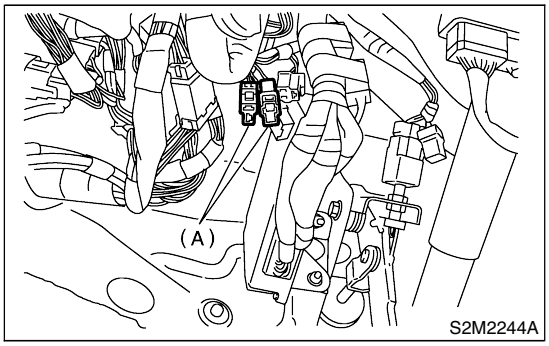
1) Prepare Subaru Select Monitor kit. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>



2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>

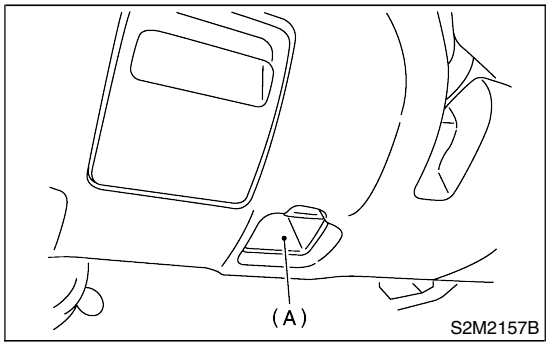


4) Connect test mode connector (A) at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



5) Connect Subaru Select Monitor to data link connector.

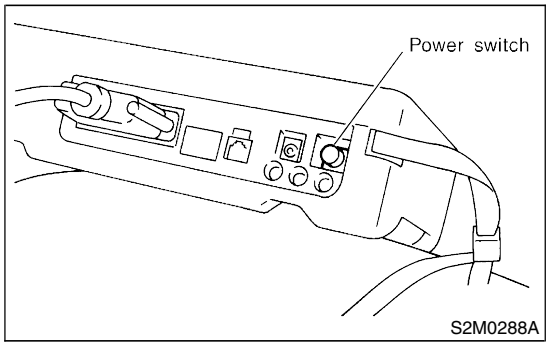
(1) Connect Subaru Select Monitor to data link connector (A) located in the lower portion of the instrument panel (on the driver's side).



(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.

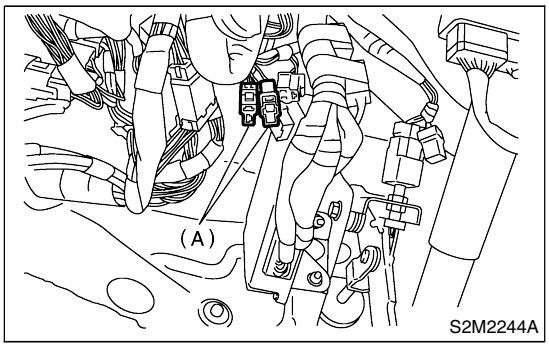


7) On the ≪Main Menu≫ display screen, select the {2. Each System Check} and press the [YES] key.
8) On the ≪System Selection Menu≫ display screen, select the {Engine Control System} and press the [YES] key.
9) Press the [YES] key after displayed the information of engine type.
10) On the ≪Engine Diagnosis≫ 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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>
● 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.

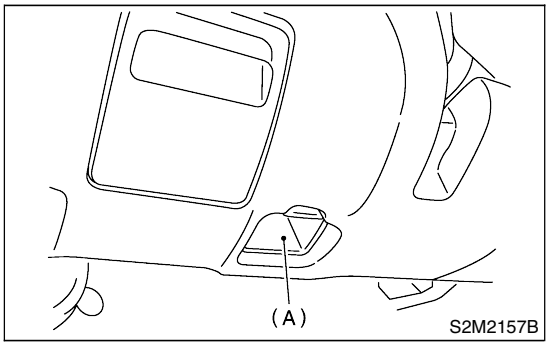
3. OBD-II GENERAL SCAN TOOL *S088510A1603*

After performing diagnostics and clearing the memory, check for any remaining unresolved trouble data:
1) Connect test mode connector (A) 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 (A) 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). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

13. Clear Memory Mode S088513

A: OPERATION S088513A16

1. SUBARU SELECT MONITOR (NORMAL MODE) S088513A1601

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

2. SUBARU SELECT MONITOR (OBD MODE) S088513A1602

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

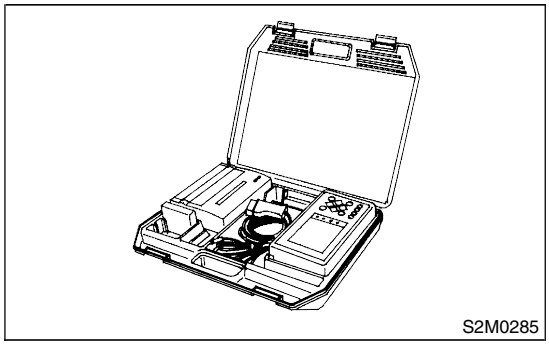
3. OBD-II GENERAL SCAN TOOL S088513A1603

For clear memory procedures using the OBD-II general scan tool, refer to the OBD-II General Scan Tool Instruction Manual.

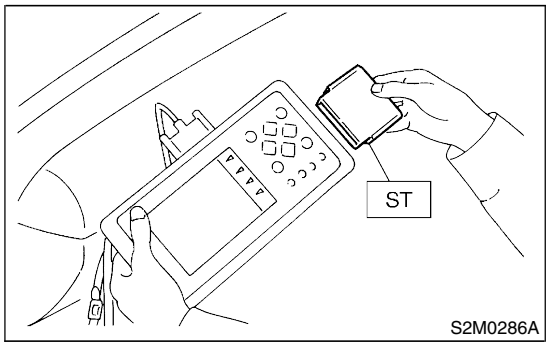
14. Compulsory Valve Operation Check Mode S088528

A: OPERATION S088528A16

1) Prepare Subaru Select Monitor kit. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>

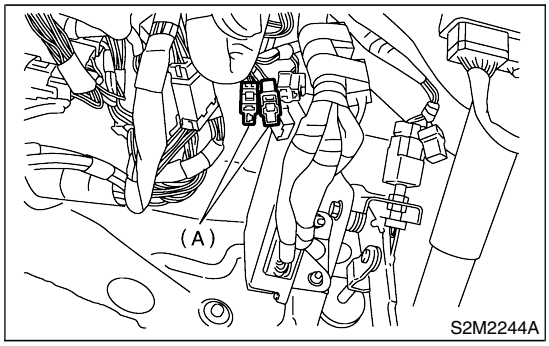

S2M0285

2) Connect diagnosis cable to Subaru Select Monitor.
3) Insert cartridge into Subaru Select Monitor. <Ref. to EN(DOHC TURBO)-8, PREPARATION TOOL, General Description.>



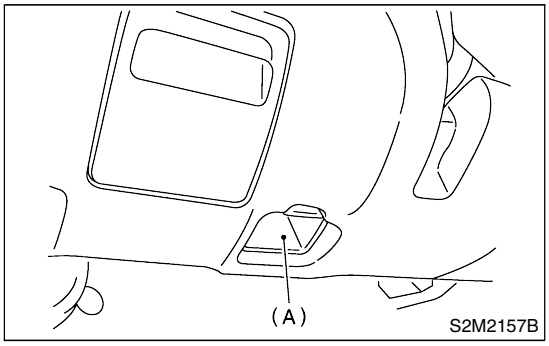
S2M0286A

4) Connect test mode connector (A) at the lower portion of instrument panel (on the driver's side), to the side of the center console box.



S2M2244A

5) Connect Subaru Select Monitor to data link connector.
(1) Connect Subaru Select Monitor to data link connector (A) located in the lower portion of the instrument panel (on the driver's side).

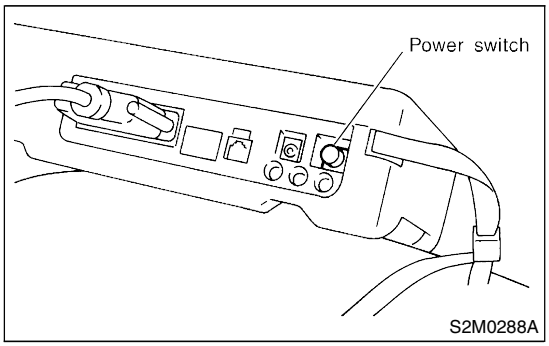


S2M2157B

(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.



S2M0288A

7) On the ≪Main Menu≫ display screen, select the {2. Each System Check} and press the [YES] key.
8) On the ≪System Selection Menu≫ display screen, select the {Engine Control System} and press the [YES] key.
9) Press the [YES] key after displayed the information of engine type.
10) On the ≪Engine Diagnosis≫ display screen, select the {System Operation Check Mode} and press the [YES] key.
11) On the ≪System Operation Check Mode≫ display screen, select the {Actuator ON/OFF Operation} and press the [YES] key.
12) Select the desired compulsory actuator on the ≪Actuator ON/OFF Operation≫ display screen and press the [YES] key.
13) Pressing the [NO] key completes the compulsory operation check mode. The display will then return to the ≪Actuator ON/OFF Operation≫ screen.

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

Contents	Display
Compulsory fuel pump relay operation check	Fuel Pump Relay
Compulsory radiator fan relay operation check	Radiator Fan Relay
Compulsory air conditioning relay operation check	A/C Compressor Relay
Compulsory purge control solenoid valve operation check	CPC Solenoid Valve

NOTE:
- The following parts will be displayed but not functional because they are not installed on the vehicle.

Display
EGR Solenoid Valve
ASV Solenoid Valve
PCV Solenoid Valve
Vent Control Solenoid Valve
FICD Solenoid
Pressure Switching Sol. 1
Pressure Switching Sol. 2
AAI Solenoid Valve
Fuel Tank Sensor Control Valve

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

15. Engine Malfunction Indicator Lamp (MIL) S088653

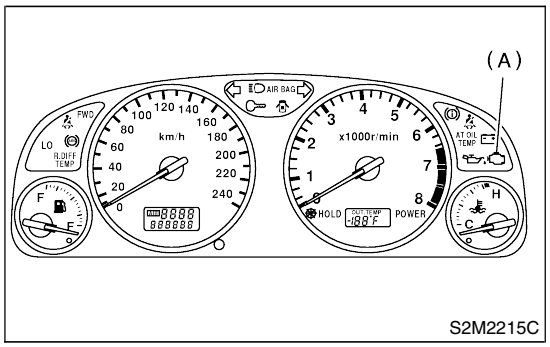
A: PROCEDURE S088653E45

1. Activation of check engine malfunction indicator lamp (MIL). <Ref. to EN(DOHC TURBO)-51, ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL), Engine Malfunction Indicator Lamp (MIL).>
↓
2. Check engine malfunction indicator lamp (MIL) does not come on. <Ref. to EN(DOHC TURBO)-52, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL).>
↓
3. Check engine malfunction indicator lamp (MIL) does not go off. <Ref. to EN(DOHC TURBO)-55, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF., Engine Malfunction Indicator Lamp (MIL).>
↓
4. Check engine malfunction indicator lamp (MIL) does not blink at a cycle of 3 Hz. <Ref. to EN(DOHC TURBO)-56, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 HZ., Engine Malfunction Indicator Lamp (MIL).>
↓
5. Check engine malfunction indicator lamp (MIL) remains blinking at a cycle of 3 Hz. <Ref. to EN(DOHC TURBO)-60, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 HZ., Engine Malfunction Indicator Lamp (MIL).>

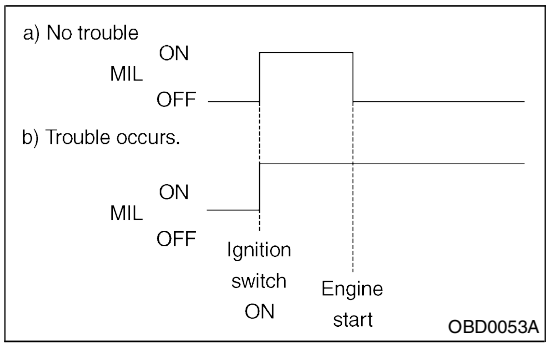
B: ACTIVATION OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) S088653E89

1) When ignition switch is turned to ON (engine off), the CHECK ENGINE malfunction indicator lamp (MIL) (A) in the combination meter illuminates.

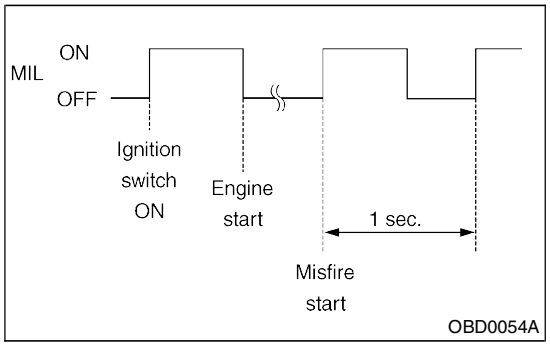
NOTE:
If the MIL does not illuminate, perform diagnostics of the CHECK ENGINE light circuit or the combination meter circuit. <Ref. to EN(DOHC TURBO)-52, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL).>



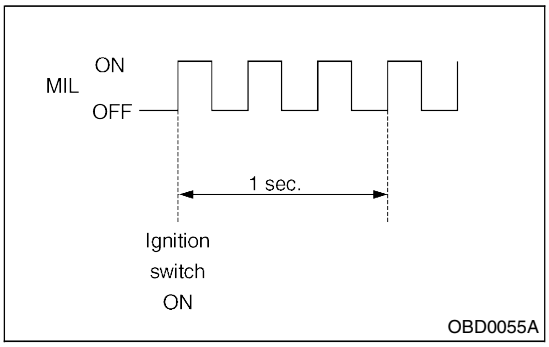
2) After starting the engine, the MIL goes out. If it does not, either the engine or the emission control system is malfunctioning.



3) If the diagnosis system senses a misfire which could damage the catalyzer, the MIL will blink at a cycle of 1 Hz.

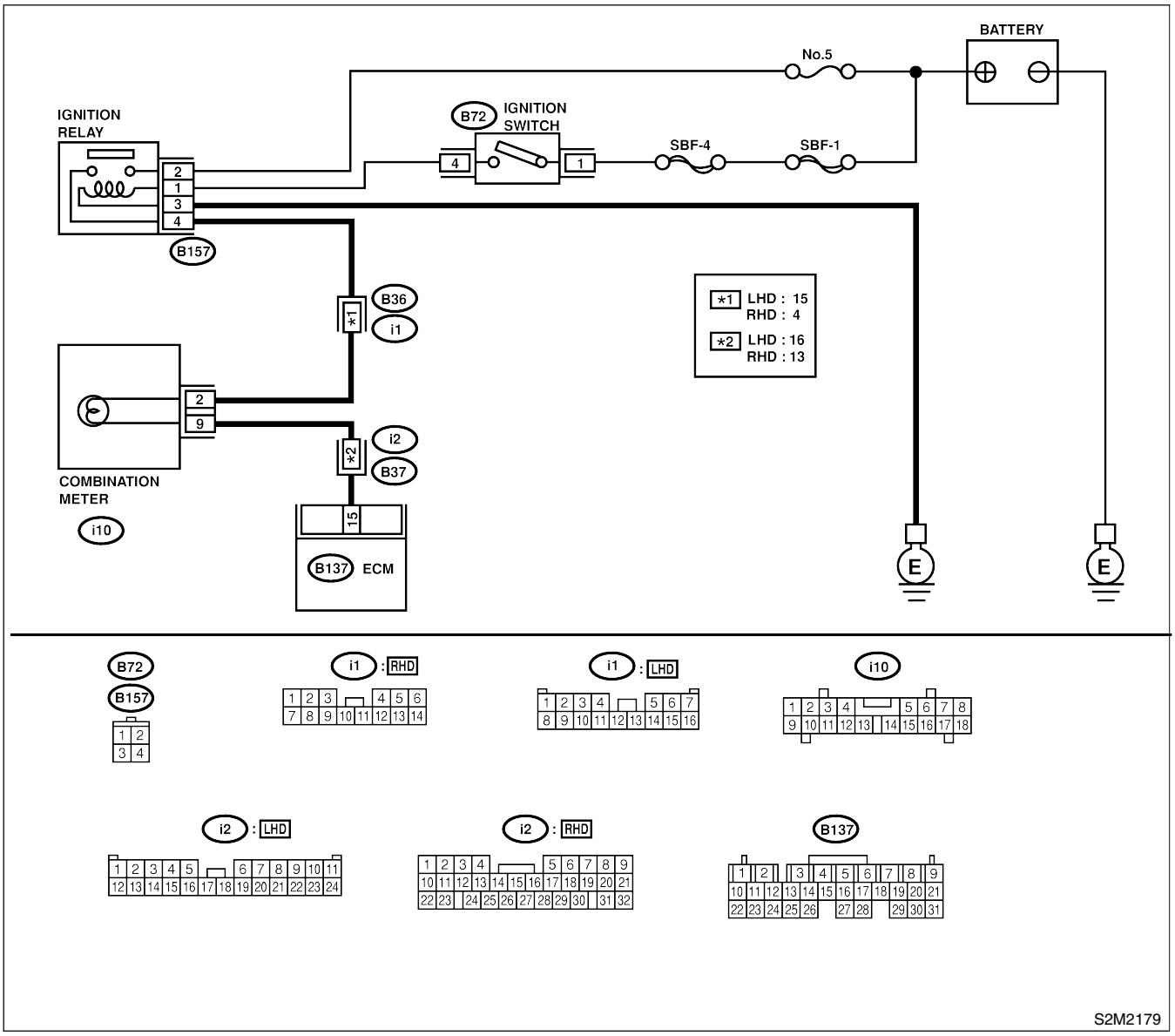


4) When ignition switch is turned to ON (engine off) or to “START” with the test mode connector connected, the MIL blinks at a cycle of 3 Hz.



C: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON. S088653E90

- **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:**

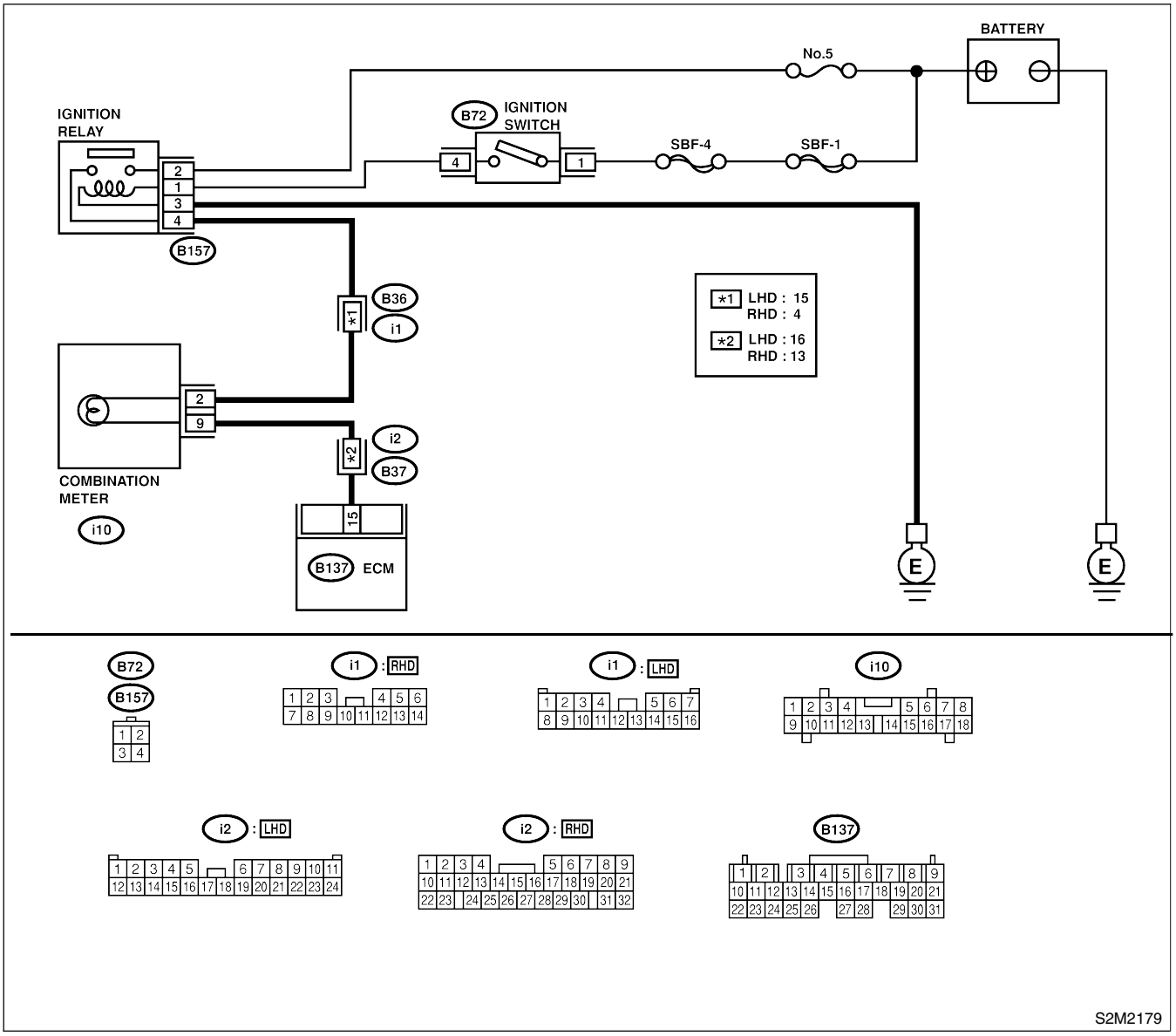


No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 15 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Go to step **2**.
2	**CHECK POOR 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(DOHC TURBO)-47, Engine Control Module.>	Repair connection of ECM connector.
4	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Remove combination meter. <Ref. to IDI-15, Combination Meter Assembly.> 3) Disconnect connector from ECM and combination meter. 4) Measure resistance of harness between ECM and combination meter connector. ***Connector & terminal*** ***(B137) No. 15 — (i10) No. 9:***	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
5	**CHECK POOR CONTACT.** Check poor contact in combination meter connector.	Is there poor contact in combination meter connector?	Repair poor contact in combination meter connector.	Go to step **6**.

No.	Step	Check	Yes	No
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*** ***(i10) No. 2 (+) — Chassis ground (–):***	Is voltage more than 10 V?	Go to step **7**.	Check the following and repair if necessary. NOTE: • Broken down ignition relay. • Blown out fuse (No. 5). • If replaced fuse (No. 5) blows easily, check the harness for short circuit of harness between fuse (No. 5) and ignition relay connector. • Open or short circuit in harness between fuse (No. 5) and battery terminal • Open circuit in harness between fuse (No. 5) and ignition relay connector • Poor contact in ignition relay connector • Poor contact in ignition switch connector
7	**CHECK LAMP BULB.** Remove engine malfunction indicator lamp bulb.	Is lamp bulb condition OK?	Repair combination meter connector.	Replace lamp bulb.

D: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT GO OFF. S088653E91

- **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:**

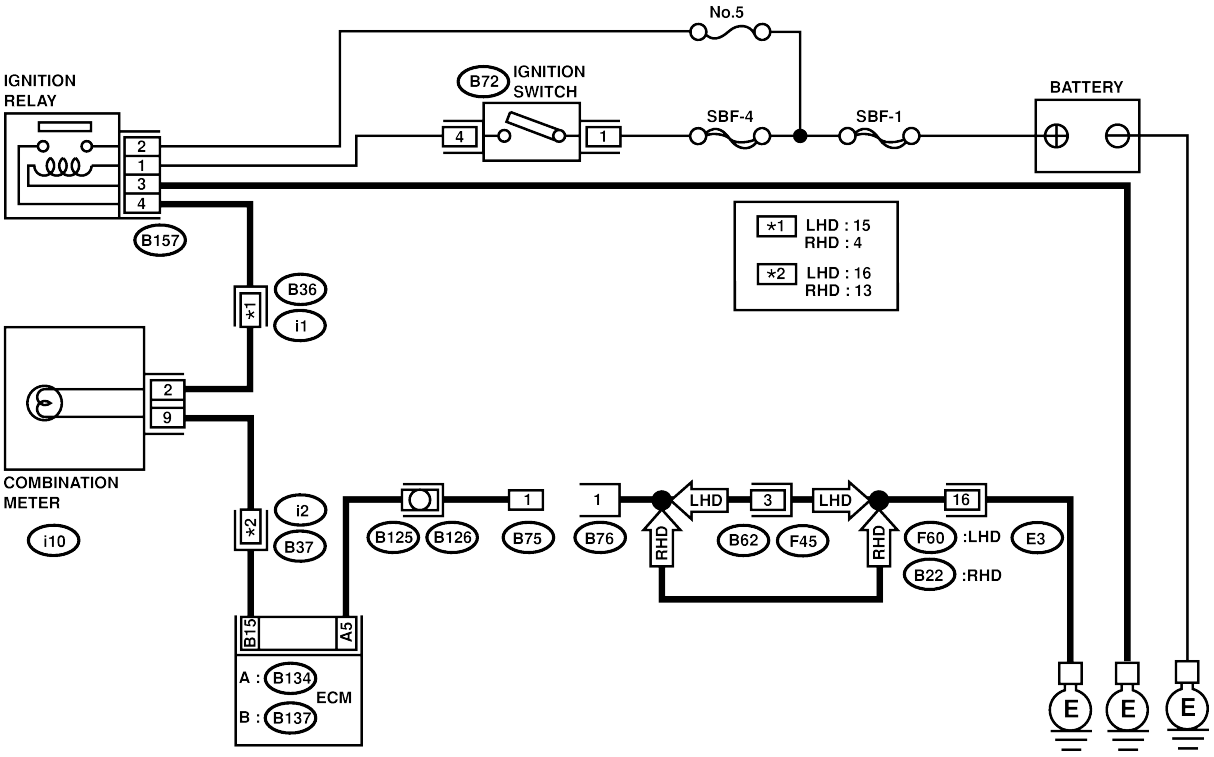


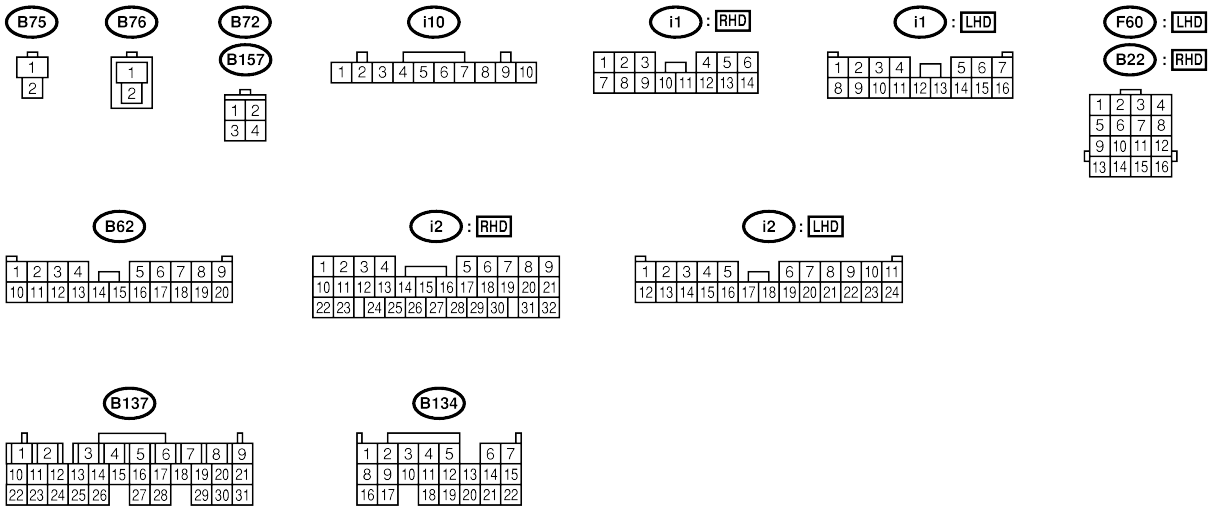
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN COMBINATION METER AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Turn ignition switch to ON.	Does the MIL come on?	Repair short circuit in harness between combination meter and ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

E: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT BLINK AT A CYCLE OF 3 Hz. S088653E92

- **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:**





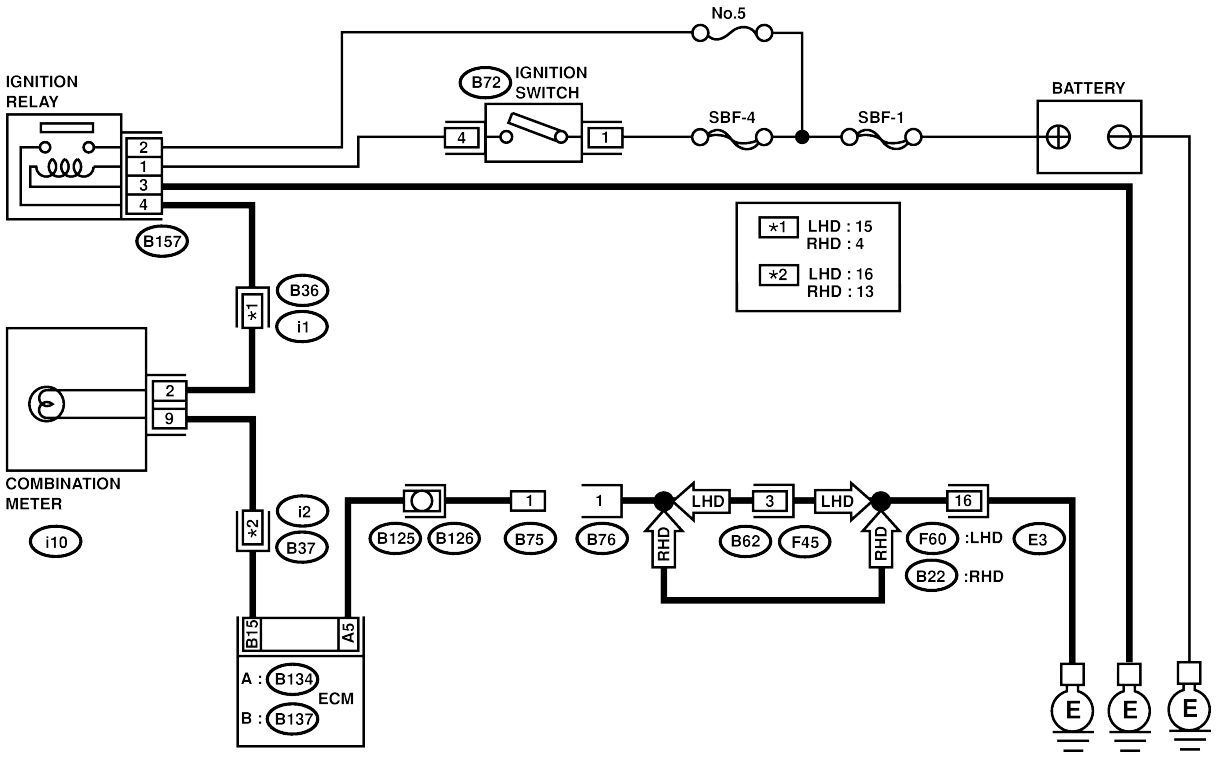
S2M2180

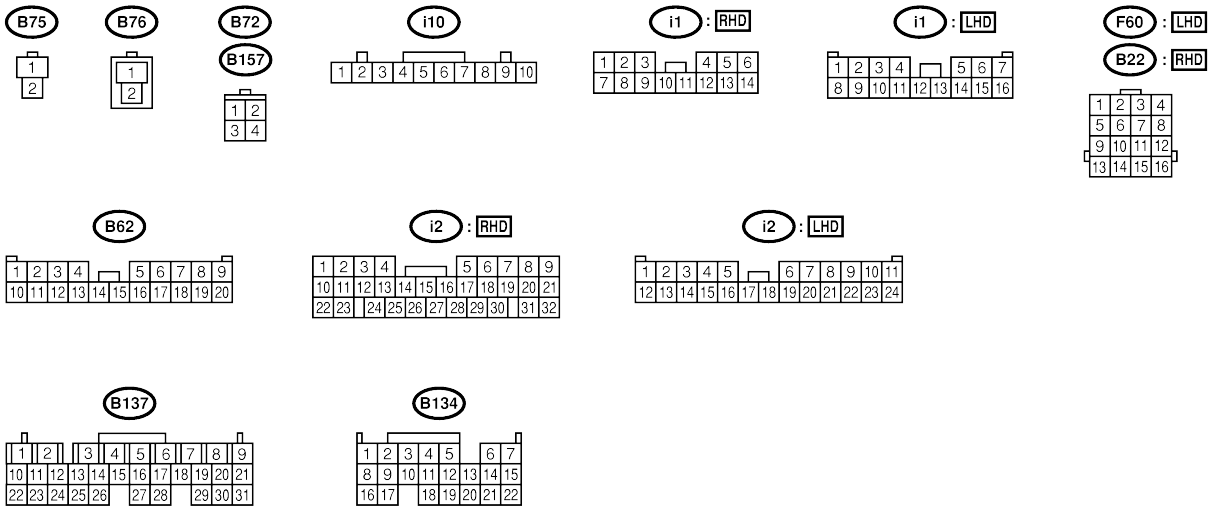
No.	Step	Check	Yes	No
1	**CHECK STATUS OF CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL).** 1) Turn ignition switch to OFF. 2) Disconnect test mode connector. 3) Turn ignition switch to ON. (engine OFF)	Does the MIL come on?	Go to step **2**.	Repair the MIL circuit. <Ref. to EN(DOHC TURBO)-52, CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) DOES NOT COME ON., Engine Malfunction Indicator Lamp (MIL).>
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**.
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.	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*** ***(B134) No. 5 — 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.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

MEMO:

F: CHECK ENGINE MALFUNCTION INDICATOR LAMP (MIL) REMAINS BLINKING AT A CYCLE OF 3 Hz. S088653E93

- **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:**





S2M2180

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*** ***(B134) No. 5 — Chassis ground:***	Is resistance less than 5 Ω?	Repair short circuit in harness between ECM and test mode connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

MEMO:

16. Diagnostics for Engine Starting Failure S088533

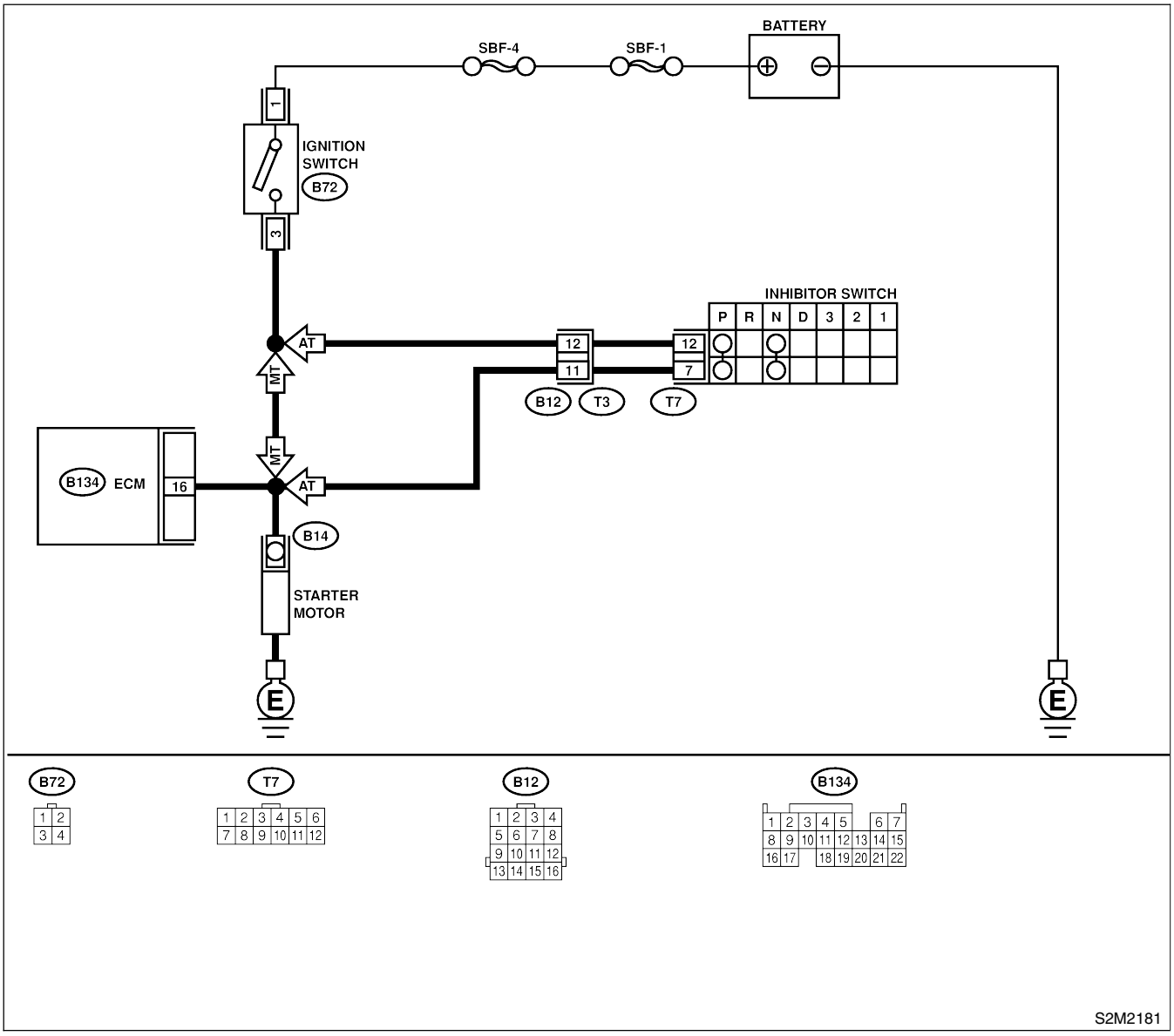
A: PROCEDURE S088533E45

1. Inspection of starter motor circuit. <Ref. to EN(DOHC TURBO)-64, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
2. Inspection of ECM power supply and ground line. <Ref. to EN(DOHC TURBO)-68, CONTROL MODULE POWER SUPPLY AND GROUND LINE, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ignition control system. <Ref. to EN(DOHC TURBO)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
4. Inspection of fuel pump circuit. <Ref. to EN(DOHC TURBO)-76, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel injector circuit. <Ref. to EN(DOHC TURBO)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT S088533E94

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.**	Does starter motor operate when the switch starts?	Go to step **2**.	Go to step **3**.
2	**CHECK DTC.** <Ref. to EN(DOHC TURBO)-43, OPERATION, Read Diagnostic Trouble Code.>	Is the trouble code stored in memory? <Ref. to EN(DOHC TURBO)-82, LIST, List of Diagnostic Trouble Code (DTC).>	Record DTC. Repair the trouble case. <Ref. to EN(DOHC TURBO)-90, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Go to step **3**.
3	**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.	Is the voltage more than 10 V?	Go to step **4**.	Go to step **5**.
4	**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-5, Starter.>	Repair open circuit of ground cable.
5	**CHECK HARNESS BETWEEN ECM AND STARTER MOTOR CIRCUIT.** 1) Turn ignition switch to OFF. 2) Measure resistance between starter motor and ECM. ***Connector & terminal*** ***(B14) No. 1 — Engine ground:***	Is resistance less than 1 Ω?	Repair ground short circuit.	Go to step **6**.
6	**CHECK HARNESS BETWEEN ECM AND STARTER MOTOR CIRCUIT.** 1) Turn ignition switch to START. 2) Measure resistance of fuse. ***Connector & terminal*** ***(B14) No. 1 — Engine ground:***	Is resistance less than 1 Ω?	Go to step **7**.	Repair ground short circuit.
7	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Ignition switch to OFF. 2) Disconnect connector from ignition switch. 3) 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 **8**.	Repair open circuit in harness between ignition switch and battery.
8	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Connect connector to ignition switch. 2) Turn ignition switch to START. 3) Measure voltage between ignition switch and chassis ground. ***Connector & terminal*** ***(B72) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **9**.	Replace ignition switch.

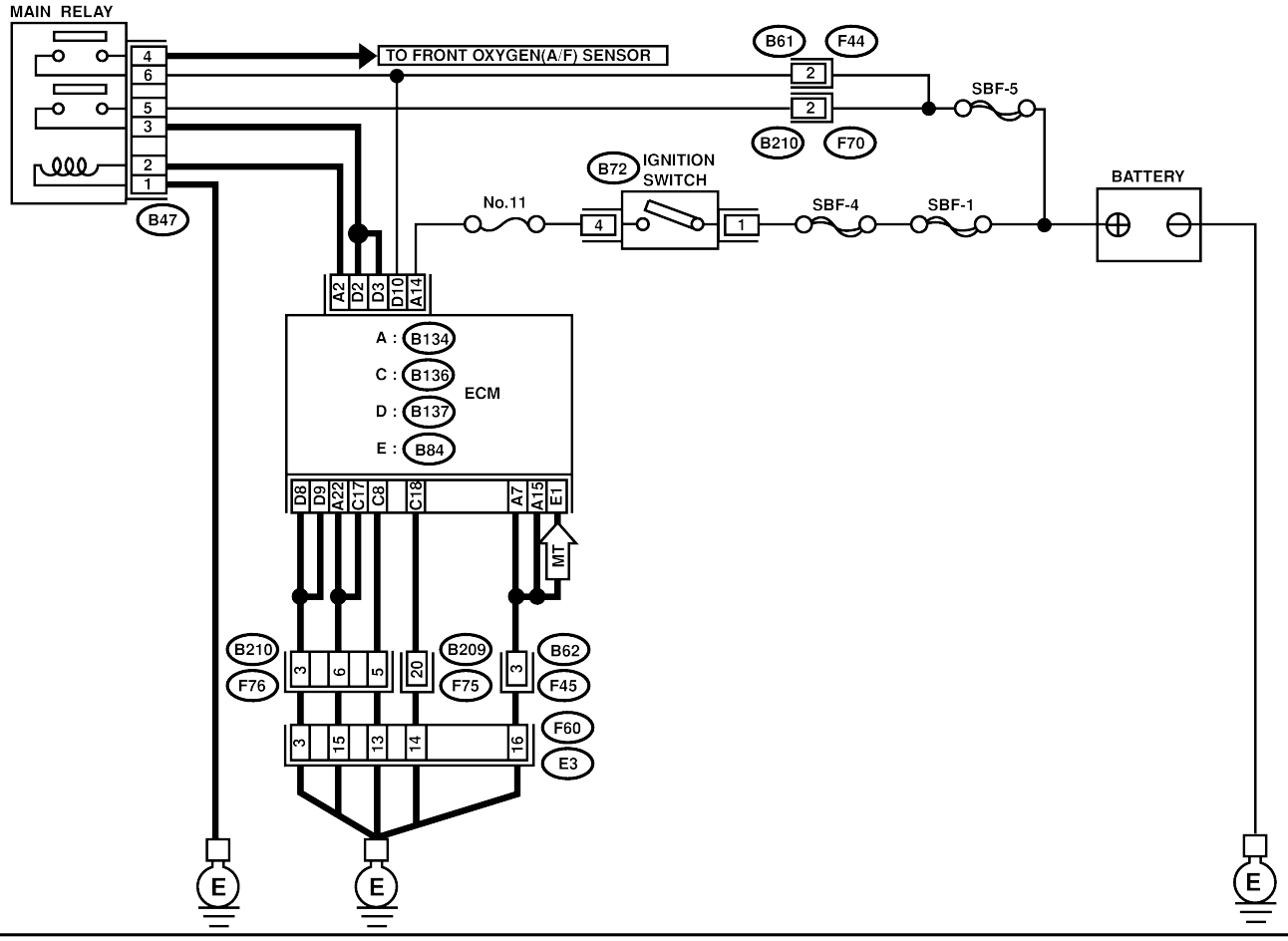
No.	Step	Check	Yes	No
9	**CHECK TRANSMISSION TYPE.**	Is the vehicle AT?	Go to step **10**.	Repair open circuit between ignition switch and starter motor circuit.
10	**CHECK INHIBITOR SWITCH CIRCUIT.** 1) Turn ignition switch to OFF. 2) Place the selector lever in the "P" or "N" position. 3) Separate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

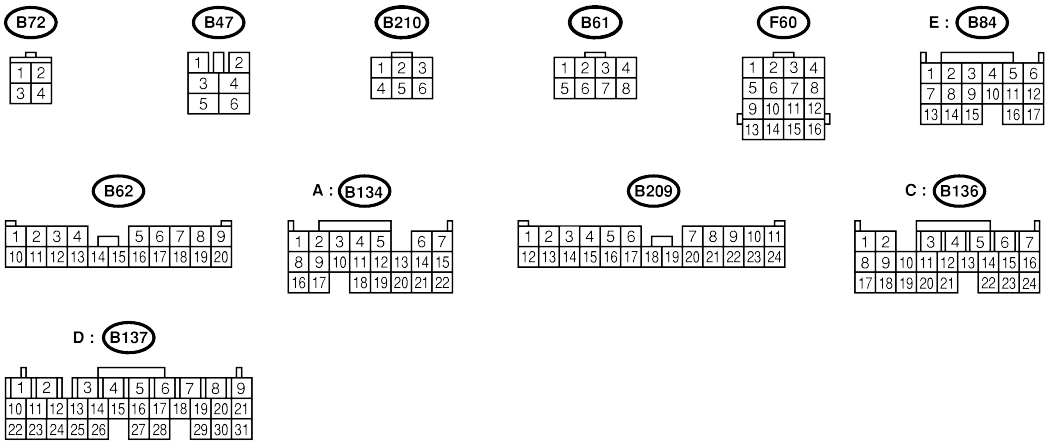
MEMO:

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE S088533E37

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> and INSPECTION MODE. <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>

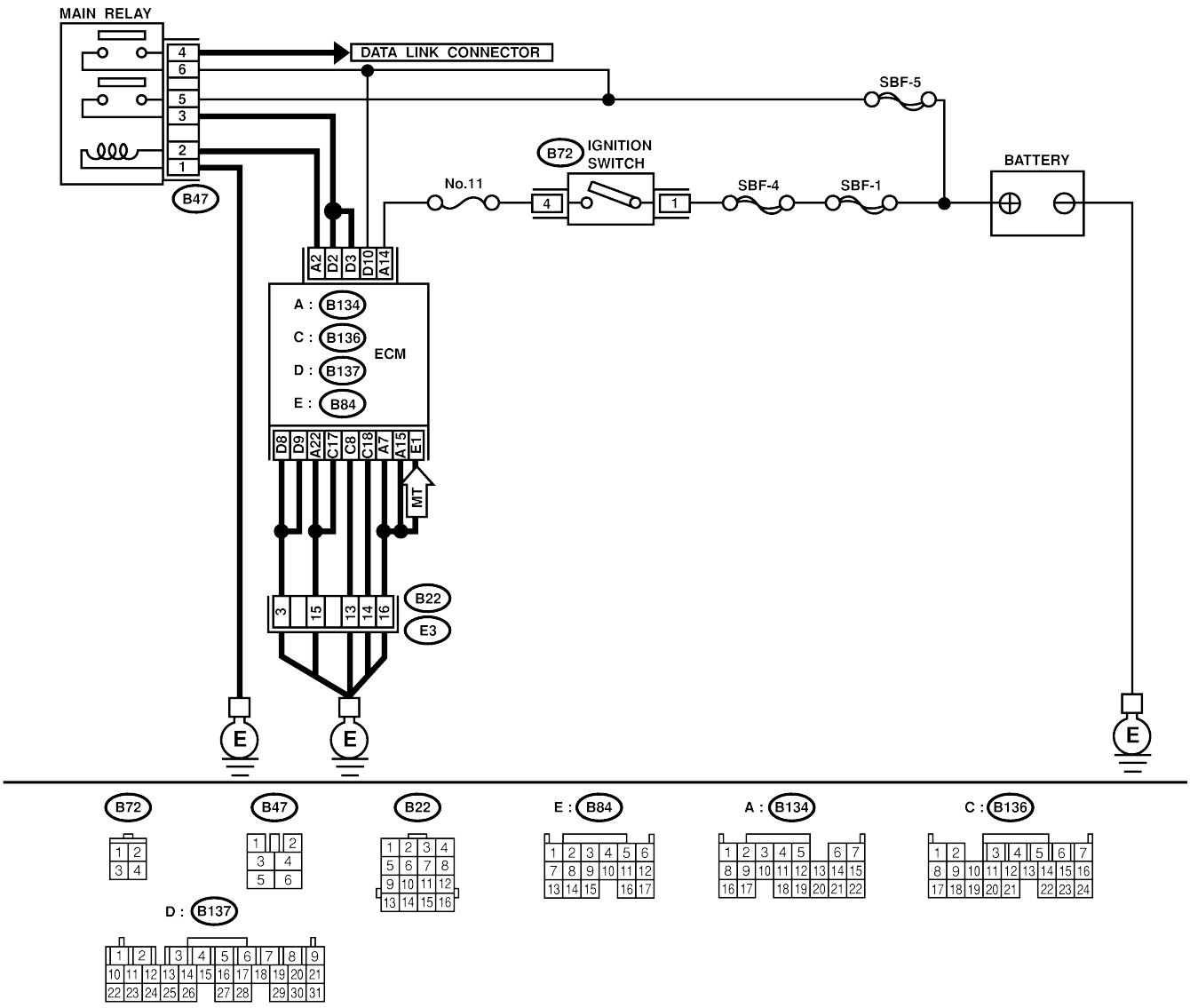
- **WIRING DIAGRAM:**
- **LHD MODEL**





S2M2182

- **RHD MODEL**



S2M2183

DIAGNOSTICS FOR ENGINE STARTING FAILURE

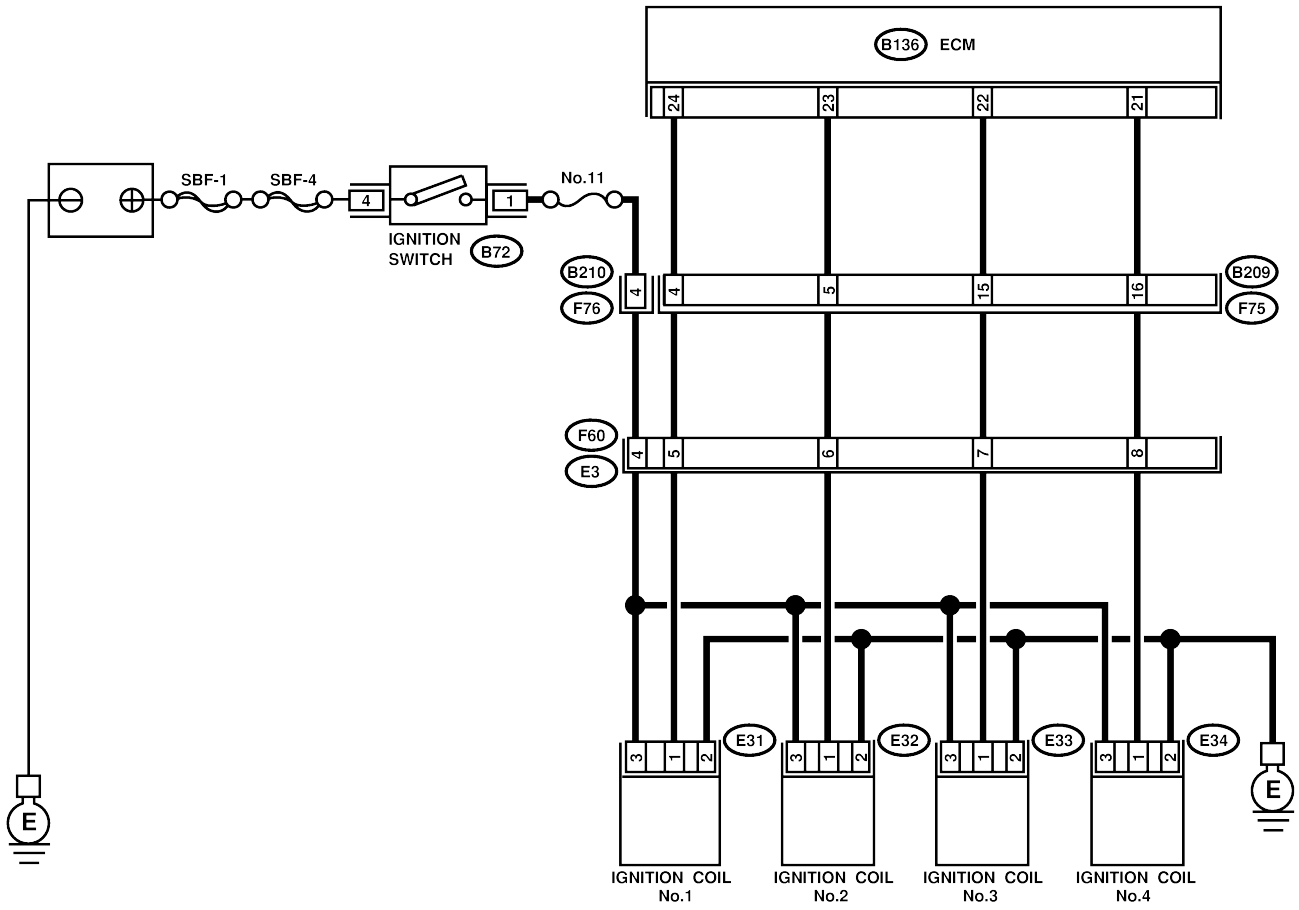
No.	Step	Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove main relay. 3) Connect battery to main relay terminals No. 1 and No. 2. 4) Measure resistance between main relay terminals. ***Terminals*** ***No. 3 — No. 5:*** ***No. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **2**.	Replace main relay.
2	**CHECK GROUND CIRCUIT OF ECM.** 1) Disconnect connector from ECM. 2) Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 7 — Chassis ground:*** ***(B134) No. 15 — Chassis ground:*** ***(B134) No. 22 — Chassis ground:*** ***(B136) No. 8 — Chassis ground:*** ***(B136) No. 17 — Chassis ground:*** ***(B136) No. 18 — Chassis ground:*** ***(B137) No. 8 — Chassis ground:*** ***(B137) No. 9 — Chassis ground:*** ***(B84) No. 1 — Chassis ground: (MT model)***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair open circuit in harness between ECM connector and engine grounding terminal.
3	**CHECK INPUT VOLTAGE OF ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 10 (+) — Chassis ground (–):*** ***(B134) No. 14 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **4**.	Repair open or ground short circuit of power supply circuit.
4	**CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Repair ground short circuit in harness between ECM connector and main relay connector, then replace ECM.
5	**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*** ***(B134) No. 2 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **6**.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>
6	**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 **7**.	Repair open circuit in harness between ECM connector and main relay connector.
7	**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 **8**.	Repair open circuit between main relay and chassis ground.

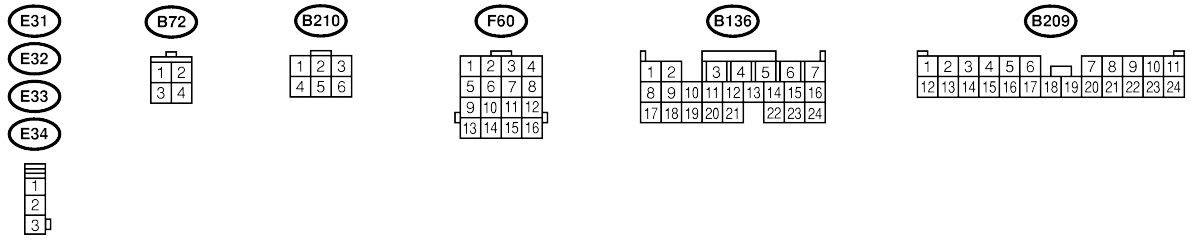
No.	Step	Check	Yes	No
8	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 5 (+) — Chassis ground (–):*** ***(B47) No. 6 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **9**.	Repair open or ground short circuit in harness of power supply circuit.
9	**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*** ***(B137) No. 2 (+) — Chassis ground (–):*** ***(B137) No. 3 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Check ignition control system. <Ref. to EN(DOHC TURBO)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair open or ground short circuit in harness between ECM connector and main relay connector.

D: IGNITION CONTROL SYSTEM S088533E95

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**

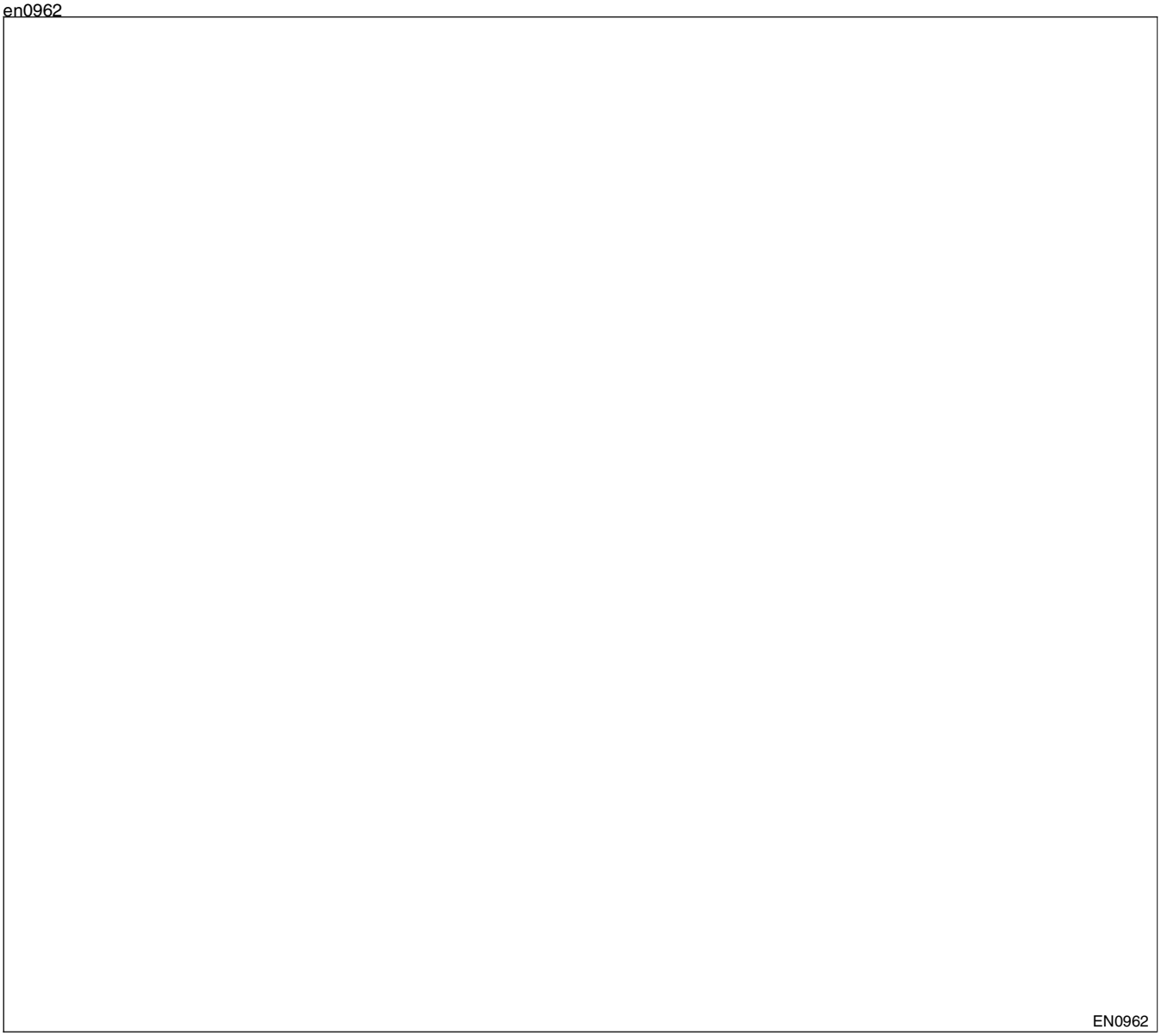




S2M2184

● **RHD MODEL**

en0962



No.	Step	Check	Yes	No
1	**CHECK SPARK PLUG CONDITION.** 1) Remove spark plug. <Ref. to IG(DOHC TURBO)-4, Spark Plug.> 2) Check spark plug condition. <Ref. to IG(DOHC TURBO)-4, Spark Plug.>	Is spark plug's status OK?	Go to step **2**.	Replace spark plug
2	**CHECK IGNITION SYSTEM FOR SPARKS.** 1) Connect spark plug to ignition coil. 2) Release fuel pressure. <Ref. to FU(DOHC TURBO)-50, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.> 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(DOHC TURBO)-76, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **3**.

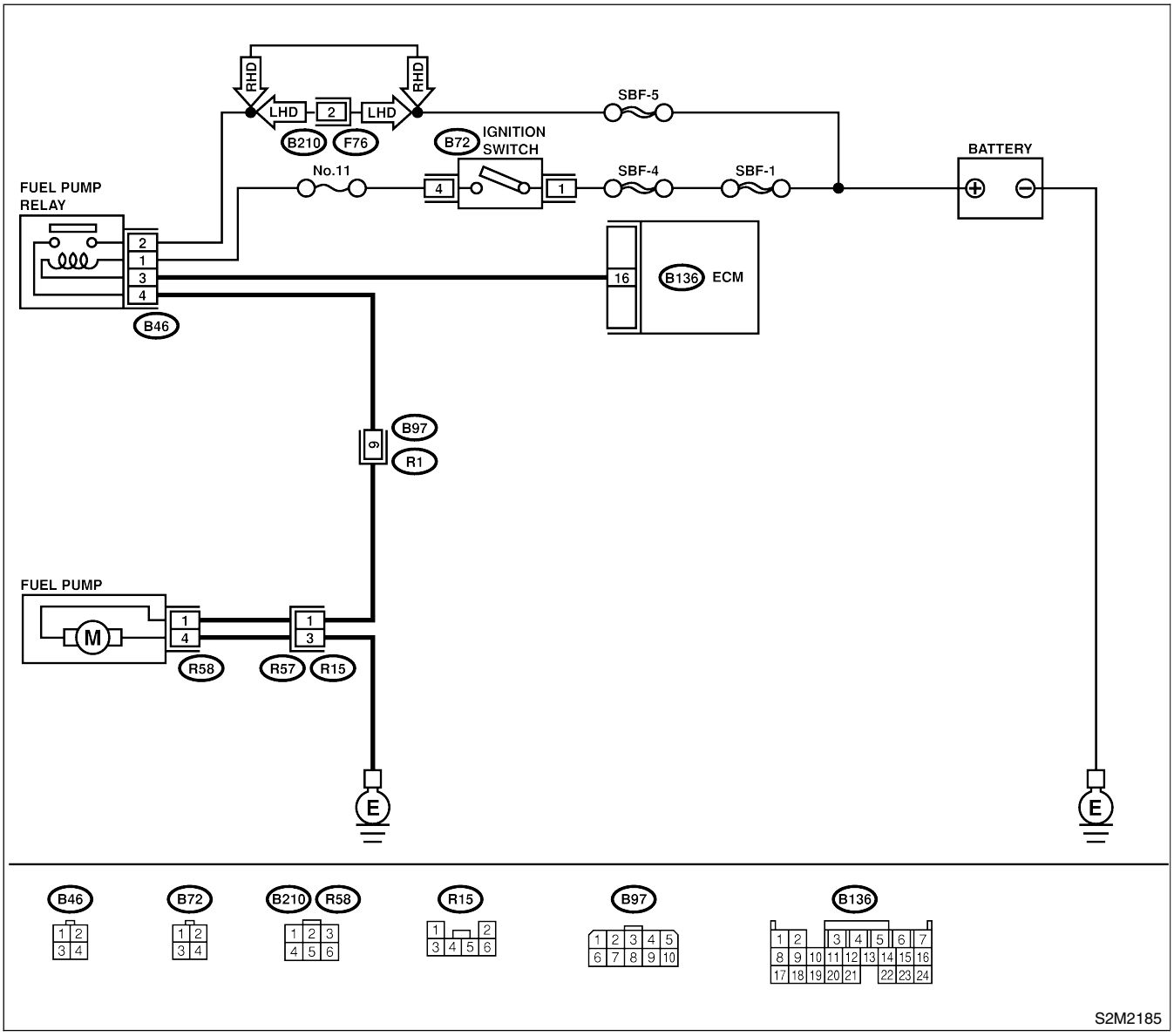
No.	Step	Check	Yes	No
3	**CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL & IGNITOR ASSEMBLY.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ignition coil & ignitor assembly. 3) Turn ignition switch to ON. 4) Measure power supply voltage between ignition coil & ignitor assembly connector and engine ground. ***Connector & terminal*** ***(E31) No. 3 (+) — Engine ground (–):*** ***(E32) No. 3 (+) — Engine ground (–):*** ***(E33) No. 3 (+) — Engine ground (–):*** ***(E34) No. 3 (+) — 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 ignition coil & ignitor assembly, and ignition switch connector • Poor contact in coupling connectors
4	**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*** ***(E31) No. 2 — Engine ground:*** ***(E32) No. 2 — Engine ground:*** ***(E33) No. 2 — Engine ground:*** ***(E34) No. 2 — Engine ground:***	Is the resistance between less than 5 Ω?	Go to step **5**.	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
5	**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*** ***(B136) No. 21 — (E34) No. 1:*** ***(B136) No. 22 — (E33) No. 1:*** ***(B136) No. 23 — (E32) No. 1:*** ***(B136) No. 24 — (E31) No. 1:***	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 ignition coil & ignitor assembly connector • Poor contact in coupling connector
6	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR.** Measure resistance of harness between ECM and engine ground. ***Connector & terminal:*** ***(B136) No. 21 — Engine ground:*** ***(B136) No. 22 — Engine ground:*** ***(B136) No. 23 — Engine ground:*** ***(B136) No. 24 — Engine ground:***	Is the resistance more than 1 MΩ?	Go to step **7**.	Repair ground short circuit in harness between ECM and ignition coil & ignitor assembly connector.
7	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ignition coil and ignitor assembly.

MEMO:

E: FUEL PUMP CIRCUIT S088533E96

CAUTION:
After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

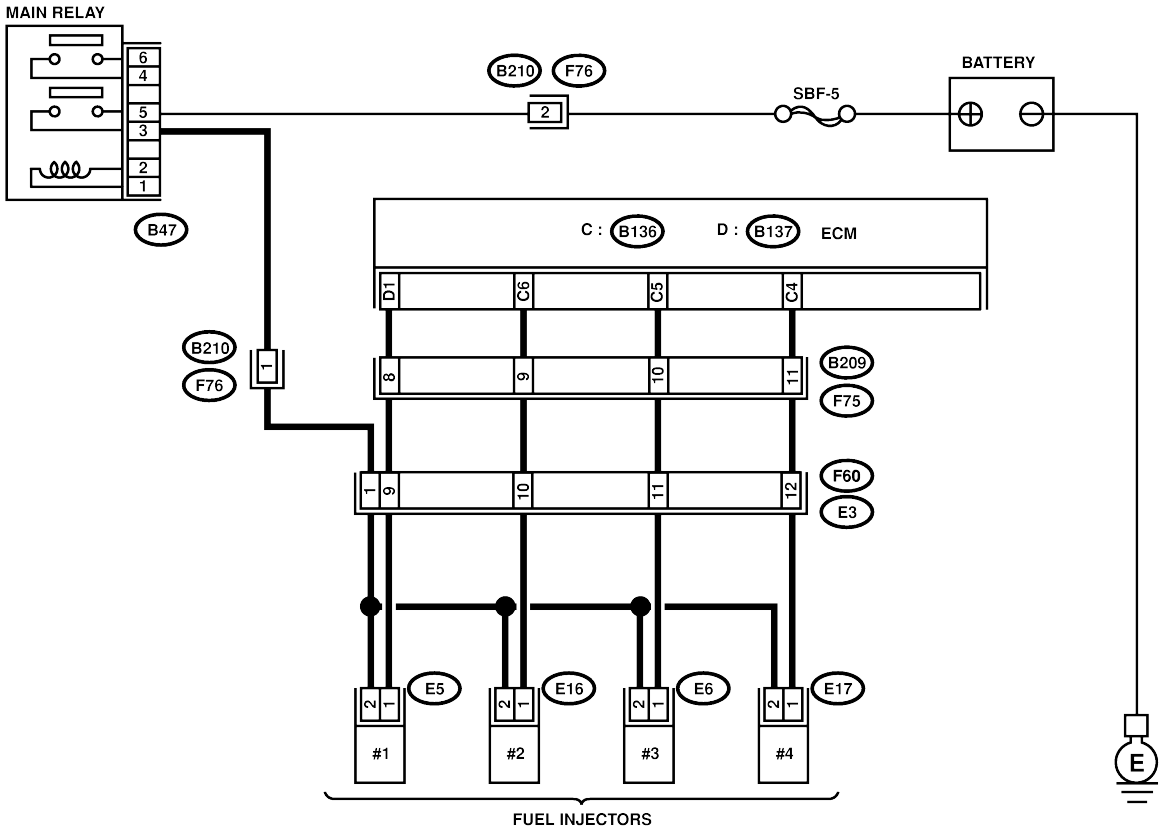


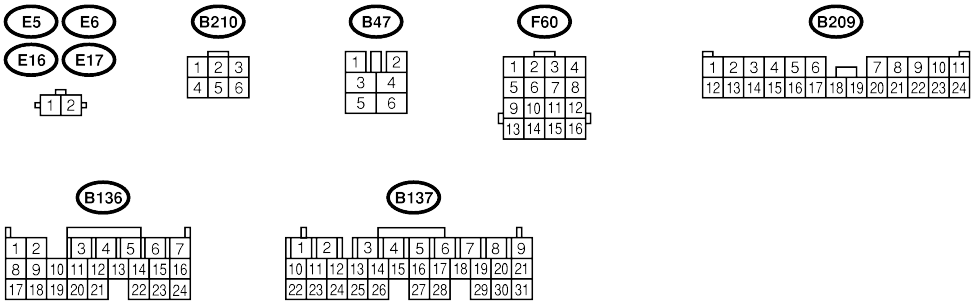
No.	Step	Check	Yes	No
1	**CHECK OPERATING SOUND OF FUEL PUMP.** Make sure that fuel pump is in operation for two seconds when turning ignition switch to ON. NOTE: Fuel pump operation can also be executed using Subaru Select Monitor (Function mode: FD01). For the procedure, refer to “Compulsory Valve Operation Check Mode”. <Ref. to EN(DOHC TURBO)-48, Compulsory Valve Operation Check Mode.>	Does fuel pump produce operating sound?	Check fuel injector circuit. <Ref. to EN(DOHC TURBO)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Record DTC. Repair the trouble case. <Ref. to EN(DOHC TURBO)-90, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

F: FUEL INJECTOR CIRCUIT S088533E97

CAUTION:
• Check or repair only faulty parts.
• After repair or replacement of faulty parts, conduct CLEAR MEMORY MODE <Ref. to EN(DOHC TURBO)-47, Clear Memory Mode.> and INSPECTION MODE. <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>

- **WIRING DIAGRAM:**
- **LHD MODEL**

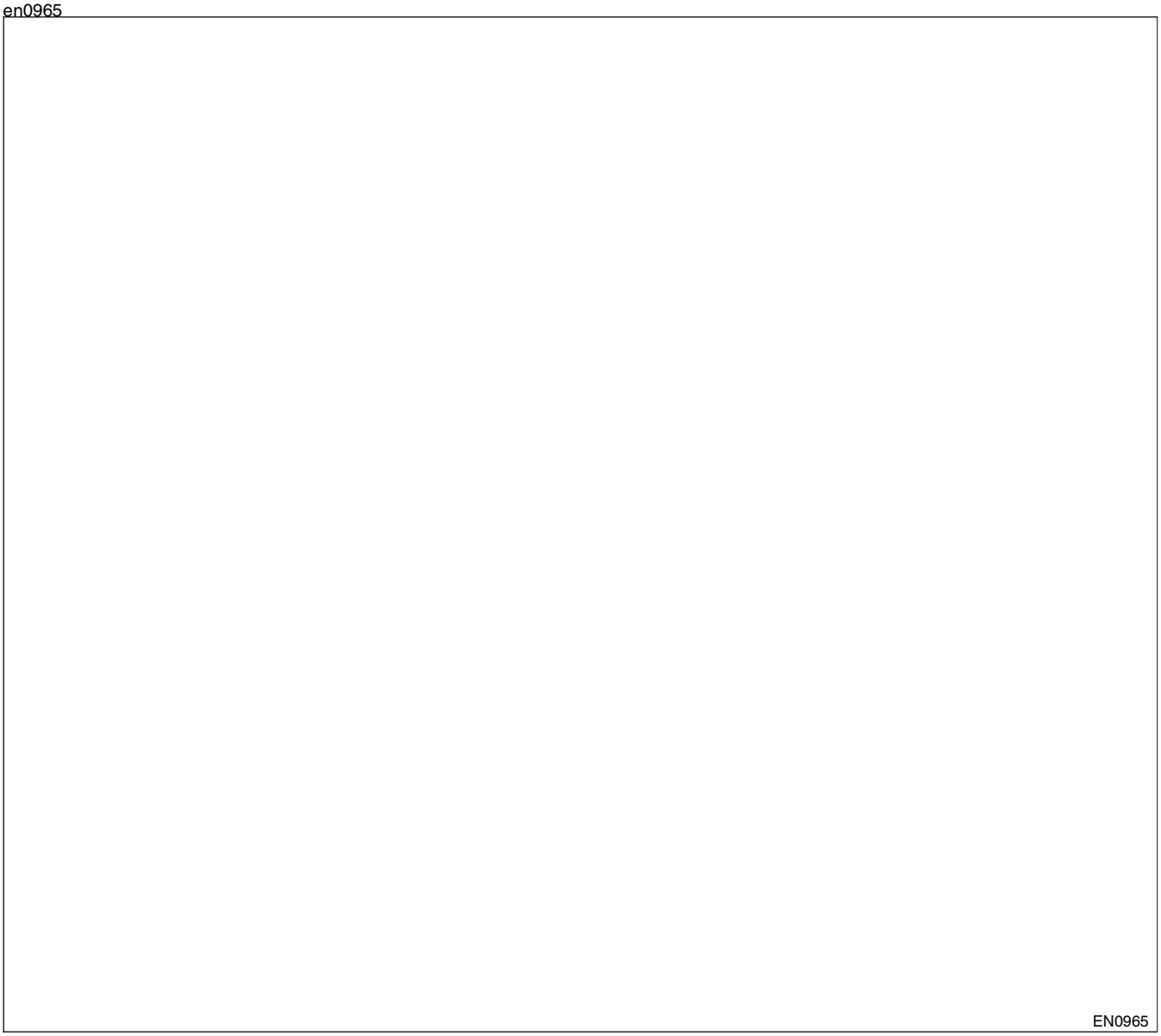




S2M2186

● **RHD MODEL**

en0965



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 ME(DOHC TURBO)-27, INSPECTION, Fuel Pressure.>	Go to step **2**.

No.	Step	Check	Yes	No
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 (–):*** ***#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?	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 • Poor contact in fuel injector connector
3	**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*** ***(B137) No. 1 — (E5) No. 1:*** ***(B136) No. 6 — (E16) No. 1:*** ***(B136) No. 5 — (E6) No. 1:*** ***(B136) No. 4 — (E6) 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 fuel injector connector • Poor contact in coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure resistance of harness between ECM and fuel injector connector. ***Connector & terminal*** ***(B137) No. 1 — Chassis ground:*** ***(B136) No. 6 — Chassis ground:*** ***(B136) No. 5 — Chassis ground:*** ***(B136) 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 **5**.
5	**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 **6**.	Replace faulty fuel injector.
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Inspection using “General Diagnostic Table”. <Ref. to EN(DOHC TURBO)-344, INSPECTION, General Diagnostic Table.>

17. List of Diagnostic Trouble Code (DTC) S088525

A: LIST S088525A12

DTC No.	Item	Index
P0031	Front oxygen (A/F) sensor heater circuit low input	<Ref. to EN(DOHC TURBO)-90, DTC P0031 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0032	Front oxygen (A/F) sensor heater circuit high input	<Ref. to EN(DOHC TURBO)-94, DTC P0032 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0037	Rear oxygen sensor heater circuit malfunction	<Ref. to EN(DOHC TURBO)-96, DTC P0037 — REAR OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0038	Rear oxygen sensor heater circuit high input	<Ref. to EN(DOHC TURBO)-100, DTC P0038 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0101	Mass air flow sensor circuit range/performance problem (high input)	<Ref. to EN(DOHC TURBO)-102, DTC P0101 — MASS AIR FLOW SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0102	Mass air flow sensor circuit low input	<Ref. to EN(DOHC TURBO)-104, DTC P0102 — MASS AIR FLOW SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0103	Mass air flow sensor circuit high input	<Ref. to EN(DOHC TURBO)-108, DTC P0103 — MASS AIR FLOW SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0106	Pressure sensor circuit range/performance problem (low input)	<Ref. to EN(DOHC TURBO)-110, DTC P0106 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0107	Pressure sensor circuit low input	<Ref. to EN(DOHC TURBO)-114, DTC P0107 — PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0108	Pressure sensor circuit high input	<Ref. to EN(DOHC TURBO)-118, DTC P0108 — PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0111	Intake air temperature sensor circuit range/performance problem	<Ref. to EN(DOHC TURBO)-122, DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0112	Intake air temperature sensor circuit low input	<Ref. to EN(DOHC TURBO)-124, DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0113	Intake air temperature sensor circuit high input	<Ref. to EN(DOHC TURBO)-126, DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0117	Engine coolant temperature sensor circuit low input	<Ref. to EN(DOHC TURBO)-130, DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0118	Engine coolant temperature sensor circuit high input	<Ref. to EN(DOHC TURBO)-132, DTC P0118 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0121	Throttle position sensor circuit range/performance problem (high input)	<Ref. to EN(DOHC TURBO)-136, DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0122	Throttle position sensor circuit low input	<Ref. to EN(DOHC TURBO)-138, DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC No.	Item	Index
P0123	Throttle position sensor circuit high input	<Ref. to EN(DOHC TURBO)-142, DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0125	Insufficient coolant temperature for closed loop fuel control	<Ref. to EN(DOHC TURBO)-146, DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0131	Front oxygen (A/F) sensor circuit range/performance problem (low input)	<Ref. to EN(DOHC TURBO)-148, DTC P0131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0132	Front oxygen (A/F) sensor circuit range/performance problem (high input)	<Ref. to EN(DOHC TURBO)-150, DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0133	Front oxygen (A/F) sensor circuit slow response	<Ref. to EN(DOHC TURBO)-152, DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0136	Rear oxygen sensor circuit malfunction	<Ref. to EN(DOHC TURBO)-154, DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0139	Rear oxygen sensor circuit slow response	<Ref. to EN(DOHC TURBO)-158, DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0171	Fuel trim malfunction (A/F too lean)	<Ref. to EN(DOHC TURBO)-160, DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0172	Fuel trim malfunction (A/F too rich)	<Ref. to EN(DOHC TURBO)-161, DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0244	Wastegate control solenoid valve malfunction (high input)	<Ref. to EN(DOHC TURBO)-164, DTC P0244 — WASTEGATE CONTROL SOLENOID VALVE MALFUNCTION (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0245	Wastegate control solenoid valve circuit low input	<Ref. to EN(DOHC TURBO)-166, DTC P0245 — WASTEGATE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0246	Wastegate control solenoid valve circuit high input	<Ref. to EN(DOHC TURBO)-170, DTC P0246 — WASTEGATE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0301	Cylinder 1 misfire detected	<Ref. to EN(DOHC TURBO)-172, DTC P0301 — CYLINDER 1 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0302	Cylinder 2 misfire detected	<Ref. to EN(DOHC TURBO)-172, DTC P0302 — CYLINDER 2 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0303	Cylinder 3 misfire detected	<Ref. to EN(DOHC TURBO)-172, DTC P0303 — CYLINDER 3 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0304	Cylinder 4 misfire detected	<Ref. to EN(DOHC TURBO)-172, DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0327	Knock sensor circuit low input	<Ref. to EN(DOHC TURBO)-182, DTC P0327 — KNOCK SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0328	Knock sensor circuit high input	<Ref. to EN(DOHC TURBO)-184, DTC P0328 — KNOCK SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0335	Crankshaft position sensor circuit malfunction	<Ref. to EN(DOHC TURBO)-186, DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

DTC No.	Item	Index
P0336	Crankshaft position sensor circuit range/performance problem	<Ref. to EN(DOHC TURBO)-188, DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0340	Camshaft position sensor circuit malfunction	<Ref. to EN(DOHC TURBO)-190, DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0341	Camshaft position sensor circuit range/performance problem	<Ref. to EN(DOHC TURBO)-192, DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0420	Catalyst system efficiency below threshold	<Ref. to EN(DOHC TURBO)-196, DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0444	Evaporative emission control system purge control valve circuit low input	<Ref. to EN(DOHC TURBO)-198, DTC P0444 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0445	Evaporative emission control system purge control valve circuit high input	<Ref. to EN(DOHC TURBO)-202, DTC P0445 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0461	Fuel level sensor circuit range/ performance problem	<Ref. to EN(DOHC TURBO)-206, DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0462	Fuel level sensor circuit low input	<Ref. to EN(DOHC TURBO)-210, DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0463	Fuel level sensor circuit high input	<Ref. to EN(DOHC TURBO)-214, DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0464	Fuel level sensor intermittent input	<Ref. to EN(DOHC TURBO)-218, DTC P0464 — FUEL LEVEL SENSOR INTERMITTENT INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0480	Cooling fan relay 1 circuit low input	<Ref. to EN(DOHC TURBO)-222, DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0483	Cooling fan function problem	<Ref. to EN(DOHC TURBO)-226, DTC P0483 — COOLING FAN FUNCTION PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0500	Vehicle speed sensor malfunction	<Ref. to EN(DOHC TURBO)-230, DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0506	Idle control system RPM lower than expected	<Ref. to EN(DOHC TURBO)-232, DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0507	Idle control system RPM higher than expected	<Ref. to EN(DOHC TURBO)-234, DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0508	Idle control system circuit low input	<Ref. to EN(DOHC TURBO)-236, DTC P0508 — IDLE CONTROL SYSTEM CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0509	Idle control system circuit high input	<Ref. to EN(DOHC TURBO)-238, DTC P0509 — IDLE CONTROL SYSTEM CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0512	Starter switch circuit high input	<Ref. to EN(DOHC TURBO)-240, DTC P0512 — STARTER SWITCH CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0513	Incorrect immobilizer key	<Ref. to IM-34, DTC P0153 — INCORRECT IMMOBILIZER KEY (USE OF UNREGISTERED KEY) —, Diagnostics Chart with Trouble Code.>

DTC No.	Item	Index
P0545	Exhaust gas temperature sensor circuit low input	<Ref. to EN(DOHC TURBO)-242, DTC P0545 — EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0546	Exhaust gas temperature sensor circuit high input	<Ref. to EN(DOHC TURBO)-244, DTC P0546 — EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0604	Internal control module memory check sum error	<Ref. to EN(DOHC TURBO)-248, DTC P0604 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0703	Brake switch input malfunction	<Ref. to EN(DOHC TURBO)-252, DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0705	Transmission range sensor circuit malfunction	<Ref. to AT-122, CHECK INHIBITOR SWITCH., Diagnostic Procedure for No-trouble Code.>
P0710	Transmission fluid temperature sensor circuit malfunction	<Ref. to AT-46, TROUBLE CODE 27 — ATF TEMPERATURE SENSOR —, Diagnostic Procedure with Trouble Code.>
P0715	Torque converter turbine speed sensor circuit malfunction	<Ref. to AT-64, TROUBLE CODE 36 — TORQUE CONVERTER TURBINE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>
P0720	Output speed sensor (vehicle speed sensor 2) circuit malfunction	<Ref. to AT-58, TROUBLE CODE 33 — FRONT VEHICLE SPEED SENSOR —, Diagnostic Procedure with Trouble Code.>
P0725	Engine speed input circuit malfunction	<Ref. to AT-42, TROUBLE CODE 11 — ENGINE SPEED SIGNAL —, Diagnostic Procedure with Trouble Code.>
P0731	Gear 1 incorrect ratio	<Ref. to EN(DOHC TURBO)-254, DTC P0731 — GEAR 1 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0732	Gear 2 incorrect ratio	<Ref. to EN(DOHC TURBO)-254, DTC P0732 — GEAR 2 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0733	Gear 3 incorrect ratio	<Ref. to EN(DOHC TURBO)-254, DTC P0733 — GEAR 3 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0734	Gear 4 incorrect ratio	<Ref. to EN(DOHC TURBO)-255, DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0741	Torque converter clutch system malfunction	<Ref. to EN(DOHC TURBO)-256, DTC P0741 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P0743	Torque converter clutch system (Lock-up duty solenoid) electrical	<Ref. to AT-96, TROUBLE CODE 77 — LOCK-UP DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>
P0748	Pressure control solenoid (Line pressure duty solenoid) electrical	<Ref. to AT-88, TROUBLE CODE 75 — LINE PRESSURE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>
P0753	Shift solenoid A (Shift solenoid 1) electrical	<Ref. to AT-72, TROUBLE CODE 71 — SHIFT SOLENOID 1 —, Diagnostic Procedure with Trouble Code.>
P0758	Shift solenoid B (Shift solenoid 2) electrical	<Ref. to AT-76, TROUBLE CODE 72 — SHIFT SOLENOID 2 —, Diagnostic Procedure with Trouble Code.>
P0778	2-4 brake pressure control solenoid valve circuit malfunction	<Ref. to AT-92, TROUBLE CODE 76 — 2- BRAKE DUTY SOLENOID —, Diagnostic Procedure with Trouble Code.>
P0785	2-4 brake timing control solenoid valve circuit malfunction	<Ref. to AT-84, TROUBLE CODE 74 — 2-4 BRAKE TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>
P1086	Tumble generator valve #2 (LH) position sensor circuit low input	<Ref. to EN(DOHC TURBO)-258, DTC P1086 — TUMBLE GENERATOR VALVE #2 (LH) POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1087	Tumble generator valve #2 (LH) position sensor circuit high input	<Ref. to EN(DOHC TURBO)-262, DTC P1087 — TUMBLE GENERATOR VALVE #2 (LH) POSITION SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1088	Tumble generator valve #1 (RH) position sensor circuit low input	<Ref. to EN(DOHC TURBO)-266, DTC P1088 — TUMBLE GENERATOR VALVE #1 (RH) POSITION SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

DTC No.	Item	Index
P1089	Tumble generator valve #1 (RH) position sensor circuit high input	<Ref. to EN(DOHC TURBO)-270, DTC P1089 — TUMBLE GENERATOR VALVE #1 (RH) POSITION SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1090	Tumble generator valve #1(RH) malfunction (stuck open)	<Ref. to EN(DOHC TURBO)-273, DTC P1090 — TUMBLE GENERATOR VALVE SYSTEM #1 (RH) MALFUNCTION (STUCK OPEN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1091	Tumble generator valve #1(RH) malfunction (stuck close)	<Ref. to EN(DOHC TURBO)-274, DTC P1091 — TUMBLE GENERATOR VALVE SYSTEM #1 (RH) MALFUNCTION (STUCK CLOSE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1092	Tumble generator valve #2(LH) malfunction (stuck open)	<Ref. to EN(DOHC TURBO)-275, DTC P1092 — TUMBLE GENERATOR VALVE SYSTEM #2 (LH) MALFUNCTION (STUCK OPEN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1093	Tumble generator valve #2(LH) malfunction (stuck close)	<Ref. to EN(DOHC TURBO)-276, DTC P1093 — TUMBLE GENERATOR VALVE SYSTEM #2 (LH) MALFUNCTION (STUCK CLOSE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1094	Tumble generator valve circuit #1 (opencircuit)	<Ref. to EN(DOHC TURBO)-278, DTC P1094 — TUMBLE GENERATOR VALVE CIRCUIT #1 (OPEN CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1095	Tumble generator valve circuit #1 (overcurrent)	<Ref. to EN(DOHC TURBO)-280, DTC P1095 — TUMBLE GENERATOR VALVE CIRCUIT #1 (OVERCURRENT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1096	Tumble generator valve circuit #2 (opencircuit)	<Ref. to EN(DOHC TURBO)-282, DTC P1096 — TUMBLE GENERATOR VALVE CIRCUIT #2 (OPEN CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1097	Tumble generator valve circuit #2 (overcurrent)	<Ref. to EN(DOHC TURBO)-284, DTC P1097 — TUMBLE GENERATOR VALVE CIRCUIT #2 (OVERCURRENT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1110	Atmospheric pressure sensor low input	<Ref. to EN(DOHC TURBO)-286, DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1111	Atmospheric pressure sensor high input	<Ref. to EN(DOHC TURBO)-286, DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1112	Atmospheric pressure sensor range/performance problem	<Ref. to EN(DOHC TURBO)-287, DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1130	Front oxygen sensor circuit malfunction (open circuit)	<Ref. to EN(DOHC TURBO)-288, DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1131	Front oxygen sensor circuit malfunction (short circuit)	<Ref. to EN(DOHC TURBO)-290, DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1134	Front oxygen (A/F) sensor micro-computer problem	<Ref. to EN(DOHC TURBO)-292, DTC P1134 — FRONT OXYGEN (A/F) SENSOR MICRO-COMPUTER PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1139	Front oxygen (A/F) sensor #1 heater circuit perfomance/range problem	<Ref. to EN(DOHC TURBO)-294, DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1141	Mass air flow sensor circuit range/perfomance problem (low input)	<Ref. to EN(DOHC TURBO)-296, DTC P1141 — MASS AIR FLOW SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1142	Throttle position sensor circuit range/performance problem (low input)	<Ref. to EN(DOHC TURBO)-298, DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1146	Pressure sensor circuit range/performance problem (high input)	<Ref. to EN(DOHC TURBO)-300, DTC P1146 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

DTC No.	Item	Index
P1230	Fuel pump control unit maifunction	<Ref. to EN(DOHC TURBO)-xx, DTC P1230 — FUEL PUMP CONTROLLER MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1244	Wastegate control solenoid valve malfunction (low input)	<Ref. to EN(DOHC TURBO)-304, DTC P1244 — WASTEGATE CONTROL SOLENOID VALVE RANGE/PERFORMANCE PROBLEM (LOW INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1245	Wastegate control solenoid valve malfunction (fail-safe)	<Ref. to EN(DOHC TURBO)-306, DTC P1245 — WASTEGATE CONTROL SOLENOID VALVE MALFUNCTION (FAIL-SAFE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1301	Fire due to increased exhaust temperature	<Ref. to EN(DOHC TURBO)-308, DTC P1301 — FIRE DUE TO INCREASED EXHAUST TEMPERATURE —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1312	Exhaust temperature sensor malfunction	<Ref. to EN(DOHC TURBO)-310, DTC P1312 — EXHAUST GAS TEMPERATURE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1480	Cooling fan relay 1 circuit high input	<Ref. to EN(DOHC TURBO)-312, DTC P1480 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1507	Idle control system malfunction (fail-safe)	<Ref. to EN(DOHC TURBO)-316, DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1518	Starter switch circuit low input	<Ref. to EN(DOHC TURBO)-318, DTC P1518 — STARTER SWITCH CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1544	High exhaust temperature detected	<Ref. to EN(DOHC TURBO)-320, DTC P1544 — HIGH EXHAUST TEMPERATURE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1560	Back-up voltage circuit malfunction	<Ref. to EN(DOHC TURBO)-322, DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1570	Antennna	<Ref. to IM-35, DTC P1570 — ANTENNA —, Diagnostics Chart with Trouble Code.>
P1571	Reference code incompatibility	<Ref. to IM-26, DTC P1571 — REFERENCE CODE INCOMPATIBILITY —, Diagnostics Chart with Trouble Code.>
P1572	IMM circuit failure except antenna circuit	<Ref. to IM-27, DTC P1572 — IMM CIRCUIT FAILURE (EXCEPT ANTENNA CIRCUIT) —, Diagnostics Chart with Trouble Code.>
P1574	Key communication failure	<Ref. to IM-33, DTC P1574 — KEY COMMUNICATION FAILURE —, Diagnostics Chart with Trouble Code.>
P1576	EGI control module EEPROM	<Ref. to IM-34, DTC P1576 — EGI CONTROL MODULE EEPROM —, Diagnostics Chart with Trouble Code.>
P1577	IMM control module EEPROM	<Ref. to IM-34, DTC P1577 — IMM CONTROL MODULE EEPROM —, Diagnostics Chart with Trouble Code.>
P1590	Neutral position switch circuit high input (AT model)	<Ref. to EN(DOHC TURBO)-326, DTC P1590 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT (AT MODEL) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1591	Neutral position switch circuit low input (AT model)	<Ref. to EN(DOHC TURBO)-330, DTC P1591 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT (AT MODEL) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1594	Automatic transmission diagnosis input signal circuit malfunction	<Ref. to EN(DOHC TURBO)-332, DTC P1594 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1595	Automatic transmission diagnosis input signal circuit low input	<Ref. to EN(DOHC TURBO)-334, DTC P1595 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

LIST OF DIAGNOSTIC TROUBLE CODE (DTC)

DTC No.	Item	Index
P1596	Automatic transmission diagnosis input signal circuit high input	<Ref. to EN(DOHC TURBO)-336, DTC P1596 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1700	Throttle position sensor circuit malfunction for automatic transmission	<Ref. to AT-50, TROUBLE CODE 31 — THROTTLE POSITION SENSOR —, Diagnostic Procedure with Trouble Code.>
P1701	Cruise control set signal circuit malfunction for automatic transmission	<Ref. to EN(DOHC TURBO)-338, DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1703	Low clutch timing control solenoid valve circuit malfunction	<Ref. to AT-80, TROUBLE CODE 73 — LOW CLUTCH TIMING SOLENOID —, Diagnostic Procedure with Trouble Code.>
P1711	Engine torque control signal 1 circuit malfunction	<Ref. to EN(DOHC TURBO)-340, DTC P1711 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
P1712	Engine torque control signal 2 circuit malfunction	<Ref. to EN(DOHC TURBO)-342, DTC P1712 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

MEMO:

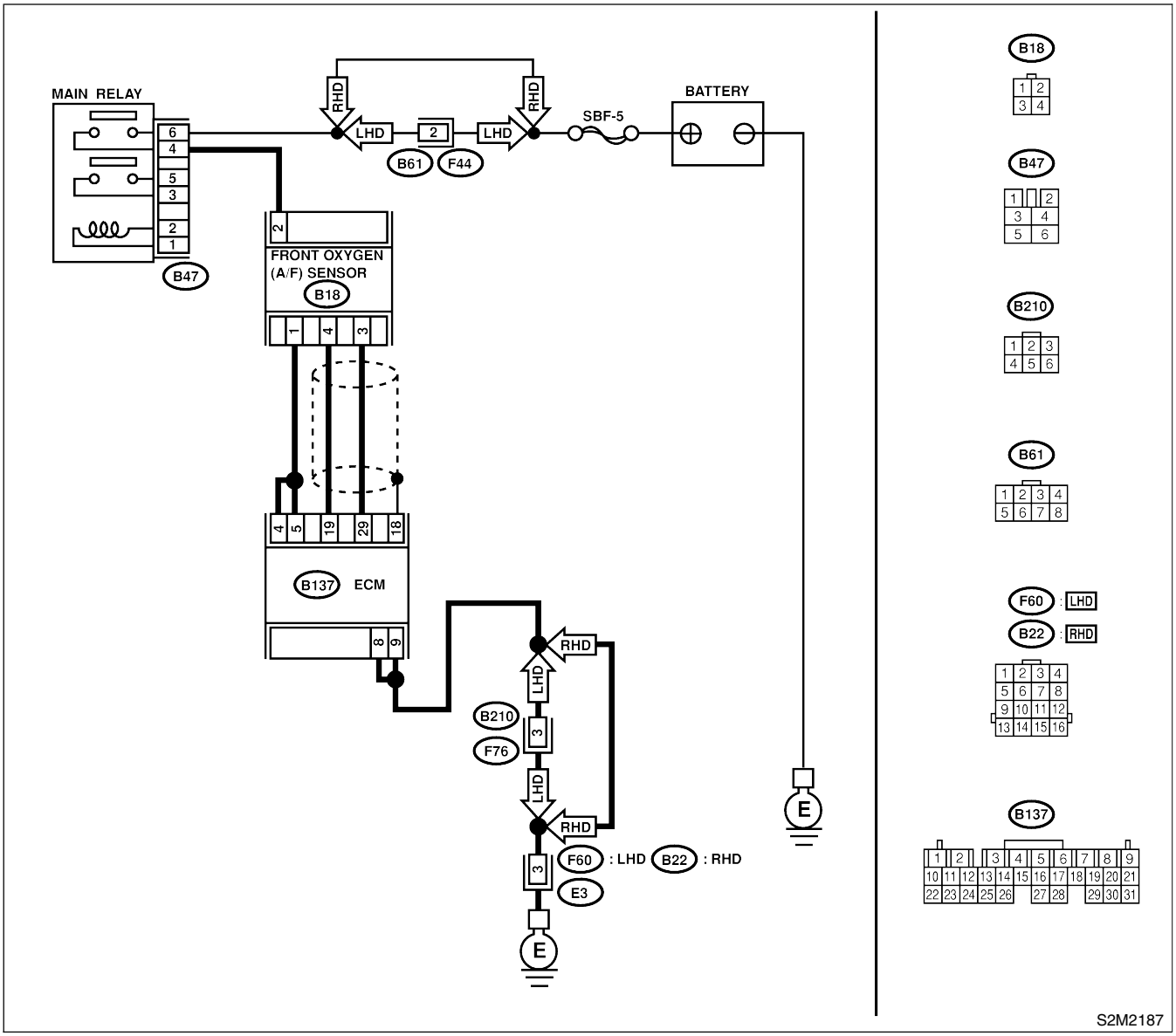
18. Diagnostic Procedure with Diagnostic Trouble Code (DTC) S088521

A: DTC P0031 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT LOW INPUT — S088521F83

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P0031 and P0037 at the same time?	Go to step **2**.	Go to step **5**.
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*** ***(B18) 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*** ***(B137) No. 8 — Chassis ground:*** ***(B137) No. 9 — 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
4	**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(DOHC TURBO)-36, 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 **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start and idle the engine. 2) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 4 (+) — Chassis ground (–):*** ***(B137) No. 5 (+) — Chassis ground (–):***	Is the voltage less than 1.0 V?	Go to step **7**.	Go to step **6**.

No.	Step	Check	Yes	No
6	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 4 (+) — Chassis ground (–):*** ***(B137) No. 5 (+) — 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 **7**.
7	**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. 1:***	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 FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>

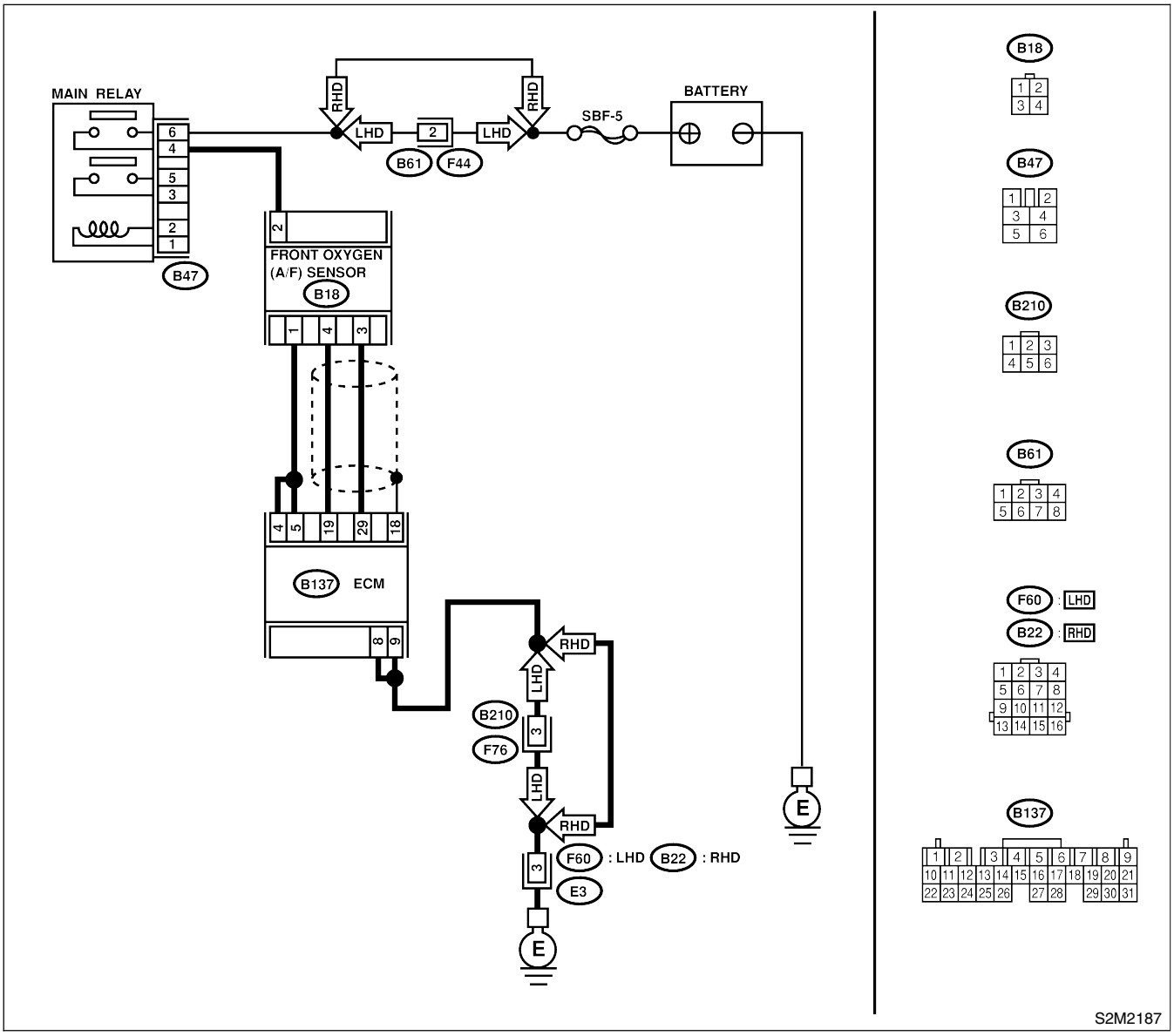
MEMO:

B: DTC P0032 — FRONT OXYGEN (A/F) SENSOR HEATER CIRCUIT HIGH INPUT — S088521F84

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B137) No. 4 (+) — Chassis ground (–):*** ***(B137) No. 5 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **3**.	Go to step **2**.
2	**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(DOHC TURBO)-36, 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(DOHC TURBO)-47, Engine Control Module.>	END
3	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 4 (+) — Chassis ground (–):*** ***(B137) No. 5 (+) — 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

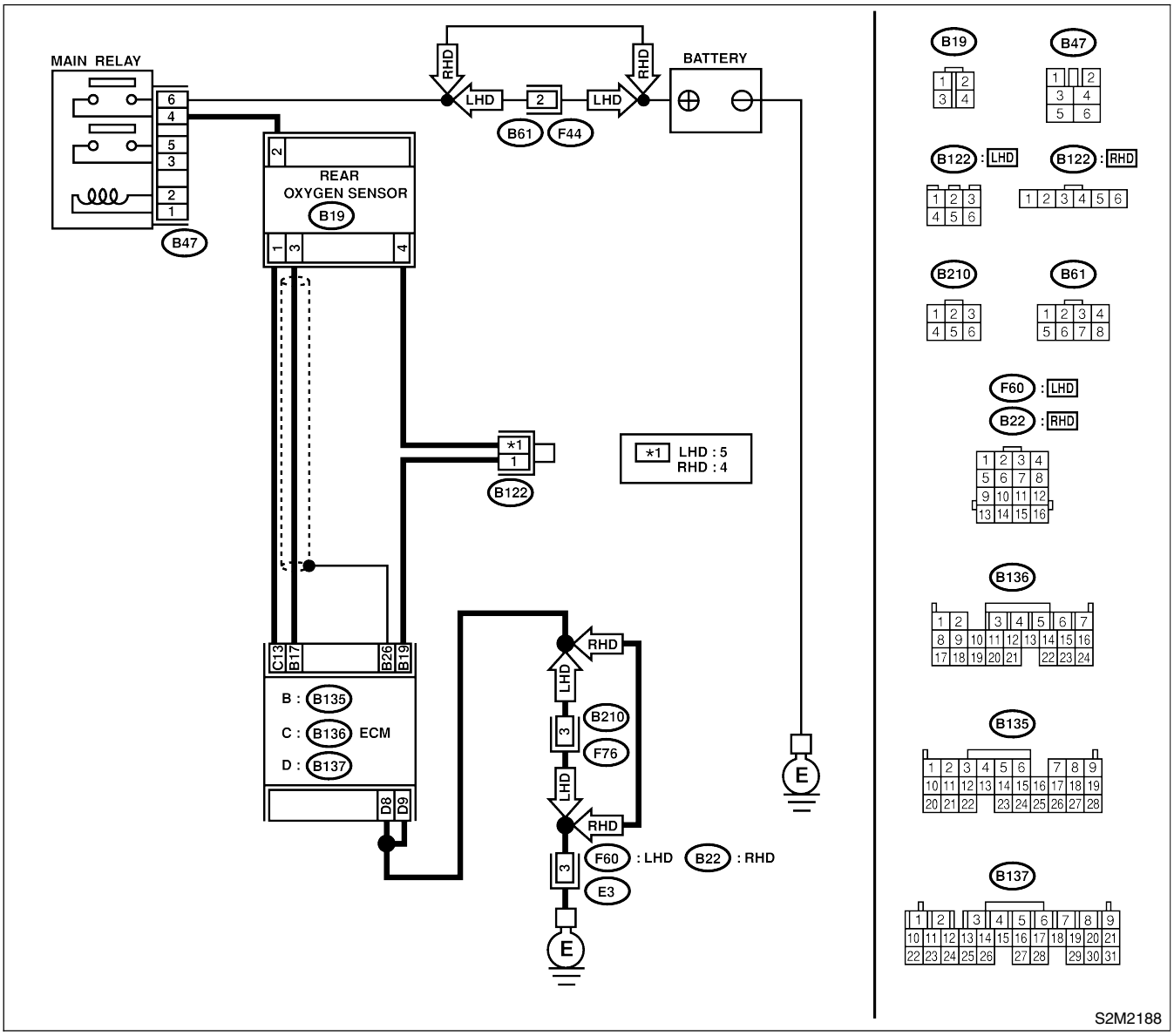
C: DTC P0037 — REAR OXYGEN SENSOR HEATER CIRCUIT MALFUNCTION

S088521F85

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B137) No. 8 — Chassis ground:*** ***(B137) No. 9 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **2**.	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
2	**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(DOHC TURBO)-36, 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 **3**.
3	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Start and idle the engine. 2) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 13 (+) — Chassis ground (–):***	Is the voltage less than 1.0 V?	Go to step **6**.	Go to step **4**.
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 13 (+) — 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 **5**.
5	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Disconnect connector from rear oxygen sensor. 2) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 13 (+) — Chassis ground (–):***	Is the voltage less than 1.0 V?	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Repair battery short circuit in harness between ECM and rear oxygen sensor connector. After repair, replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

No.	Step	Check	Yes	No
6	**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*** ***(B19) No. 2 (+) — Chassis 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
7	**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	Replace rear oxygen sensor. <Ref. to FU(DOHC TURBO)-44, Rear Oxygen Sensor.>

MEMO:

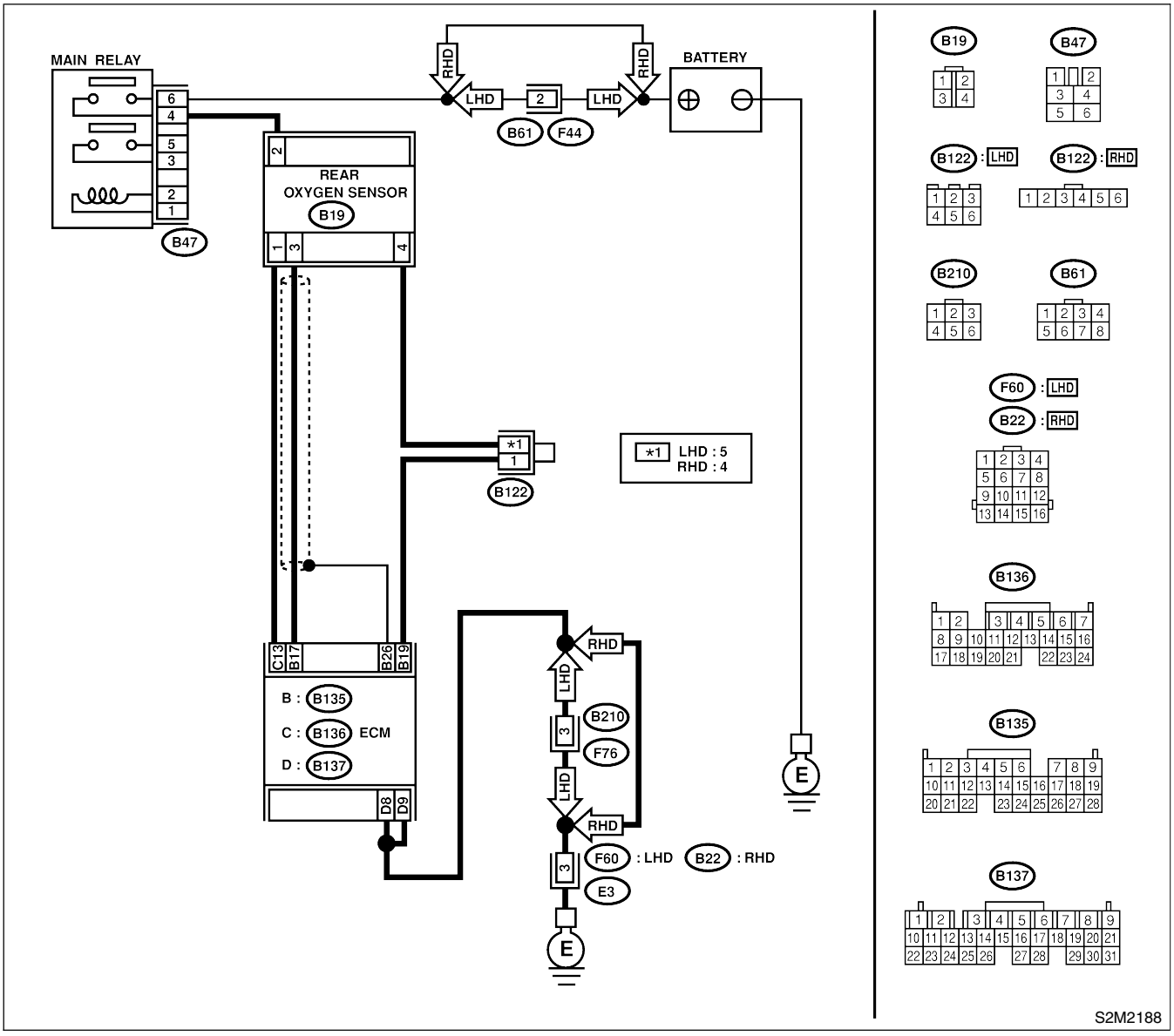
D: DTC P0038 — REAR OXYGEN SENSOR HEATER CIRCUIT HIGH INPUT —

S088521F86

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B136) No. 13 (+) — Chassis ground (–):***	Is the voltage more than 8 V?	Go to step **2**.	Go to step **3**.
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(DOHC TURBO)-36, 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(DOHC TURBO)-47, Engine Control Module.>	END
3	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	END

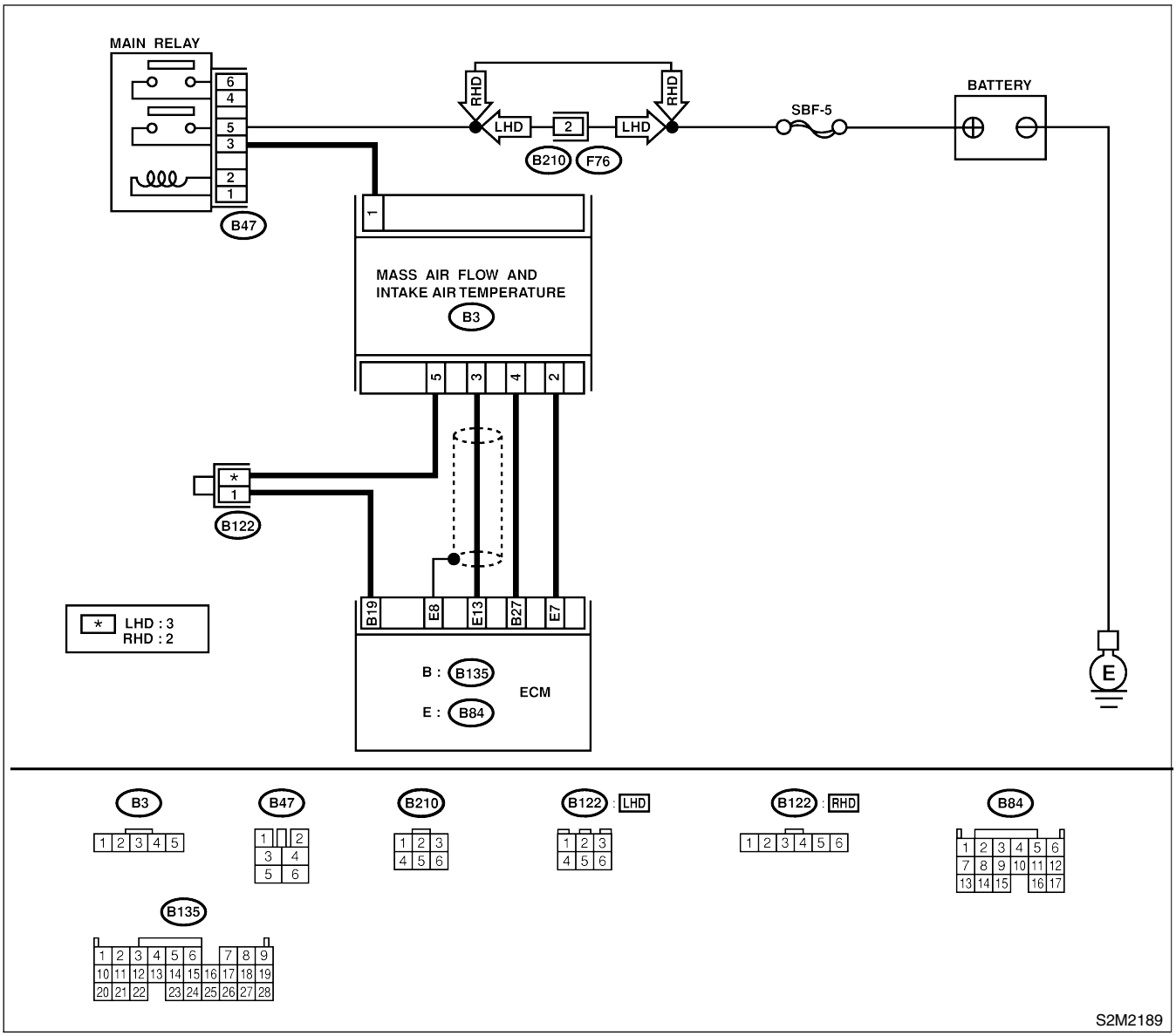
E: DTC P0101 — MASS AIR FLOW SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S088521B08

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



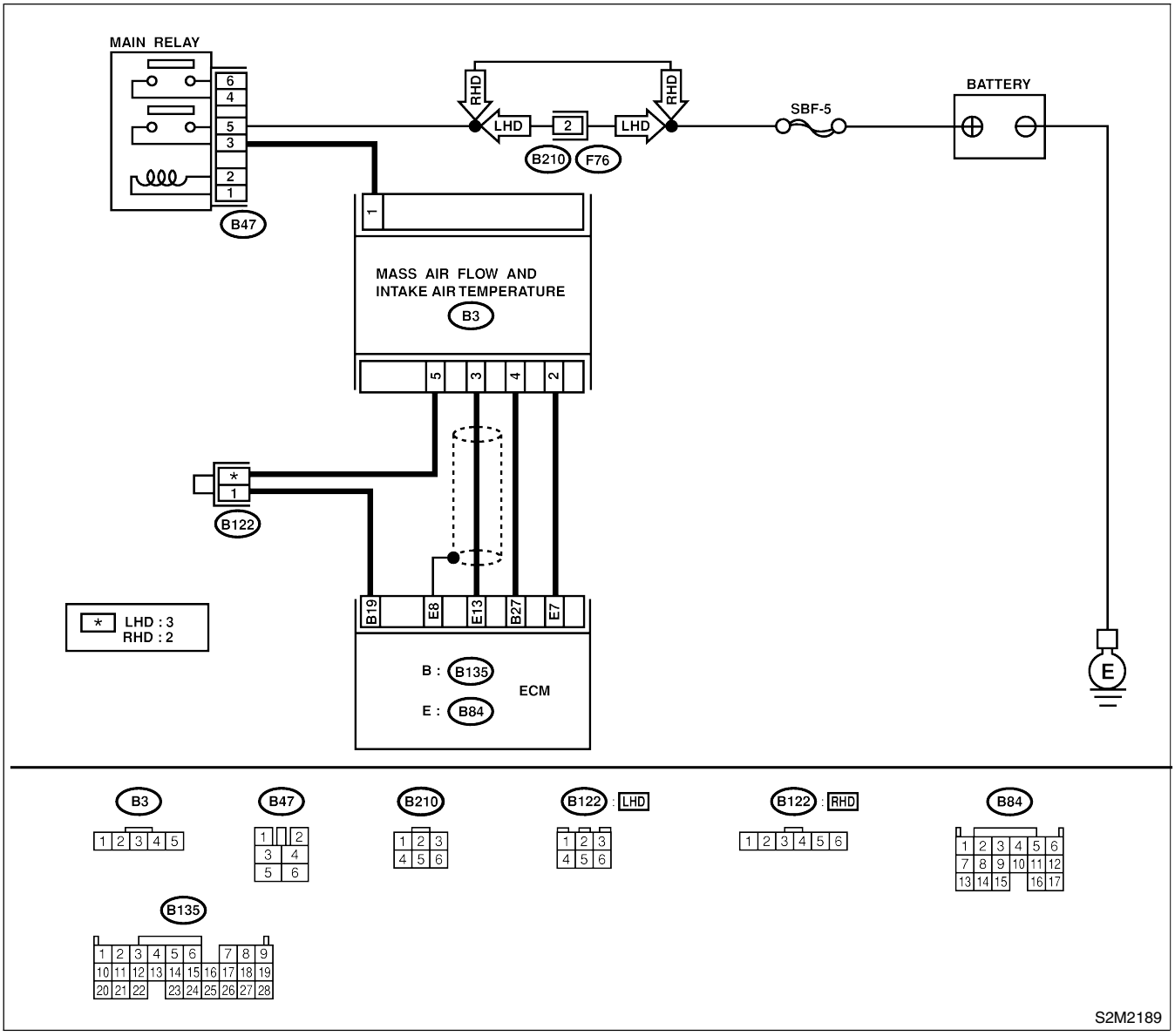
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0102 or P0113?	Inspect DTC P0102 or P0103 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0101.	Replace mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>

F: DTC P0102 — MASS AIR FLOW SENSOR CIRCUIT LOW INPUT — S088521B09

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

- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.** 1) Turn ignition switch to OFF. 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector. 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON. 4) Start engine. 5) Read data of mass air flow 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(DOHC TURBO)-36, 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 1.3 g/sec (0.172 lb/min) or 0.3 V and equal to or less than 240 g/sec (32 lb/min) or 4.58 V?	Even if MIL lights up, the circuit has returned to a normal condition at this time. A temporary poor contact of the connector or harness may be the cause. Repair harness or connector in the mass air flow sensor. NOTE: In this case, repair the following: • Open or ground short circuit in harness between mass air flow sensor and ECM connector • Poor contact in mass air flow sensor or ECM connector	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground while engine is idling. ***Connector & terminal*** ***(B84) No. 13 (+) — Chassis ground (–):***	Is the voltage less than 0.2 V?	Go to step **4**.	Go to step **3**.
3	**CHECK INPUT SIGNAL FOR ECM (USING SUBARU SELECT MONITOR).** Measure voltage between ECM connector and chassis ground while engine is idling.	Does the voltage change more than 0.2 V by shaking harness and connector of ECM while monitoring the value with Subaru select monitor?	Repair poor contact in ECM connector.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
4	**CHECK POWER SUPPLY TO MASS AIR FLOW SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from mass air flow sensor. 3) Turn ignition switch to ON. 4) Measure voltage between mass air flow sensor connector and chassis ground. ***Connector & terminal*** ***(B3) No. 1 (+) — Chassis ground (–):***	Is the voltage more than 10V?	Go to step **5**.	Repair open circuit between mass air flow sensor and main relay

No.	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Measure resistance of harness between ECM and mass air flow sensor connector. ***Connector & terminal*** ***(B84) No. 13 — (B3) No. 3:*** ***(B135) No. 27 — (B3) No. 4:*** ***(B135) No. 19 — (B3) No. 5:***	Is the resistance less than 1Ω?	Go to step **6**.	Repair open circuit between ECM and mass air flow sensor connector.
6	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW SENSOR CONNECTOR** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B84) No. 13 — Chassis ground:*** ***(B135) No. 27 — Chassis ground:*** ***(B135) No. 19 — Chassis ground:***	Is the resistance more than 1MΩ?	Go to step **7**.	Repair ground short circuit between ECM and mass air flow sensor connector.
7	**CHECK POOR CONTACT** Check poor contact in mass air flow sensor connector.	Is there poor contact in mass air flow sensor connector?	Repair poor contact in mass air flow sensor connector.	Replace mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>

MEMO:

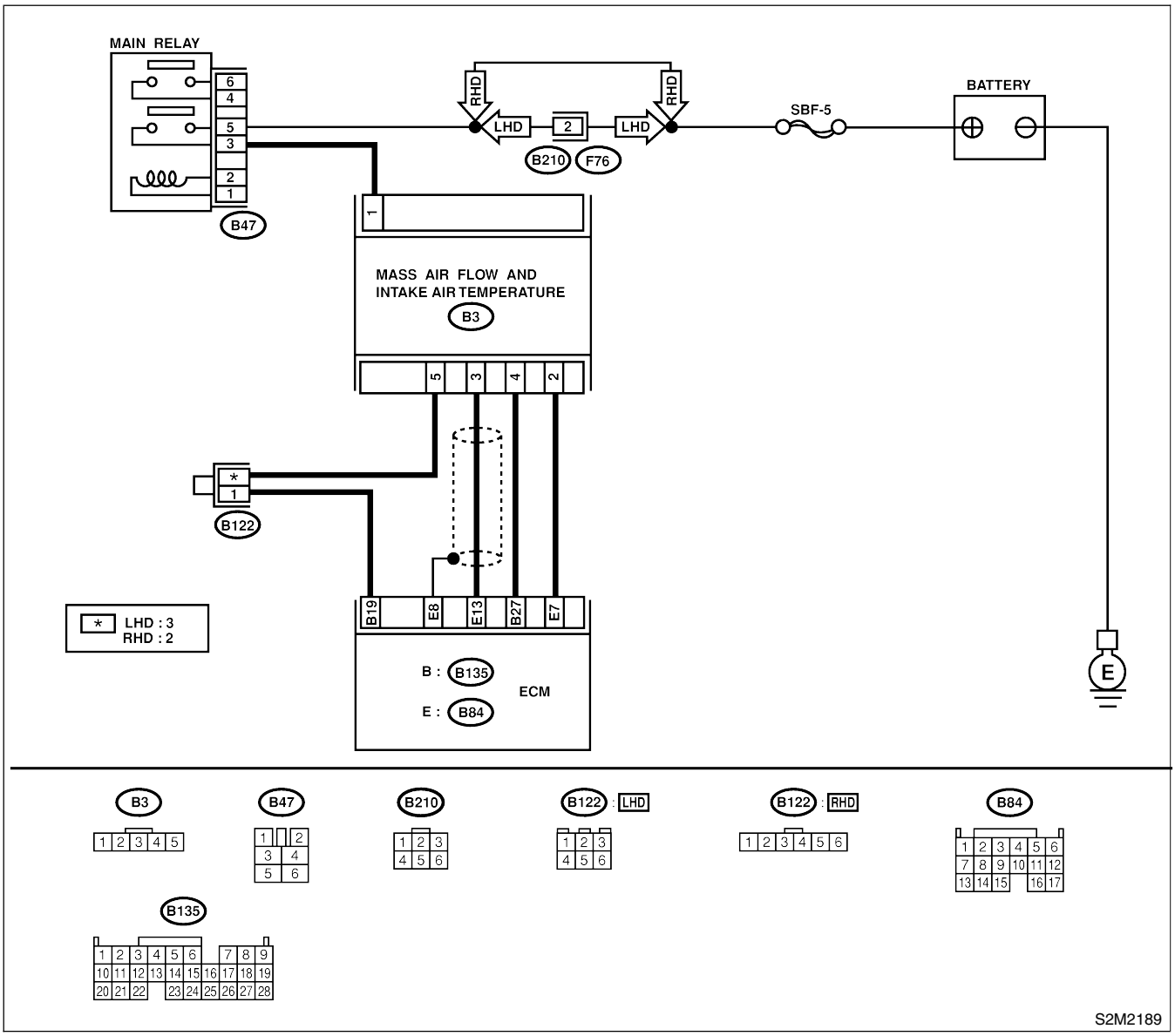
G: DTC P0103 — MASS AIR FLOW SENSOR CIRCUIT HIGH INPUT — S088521B10

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



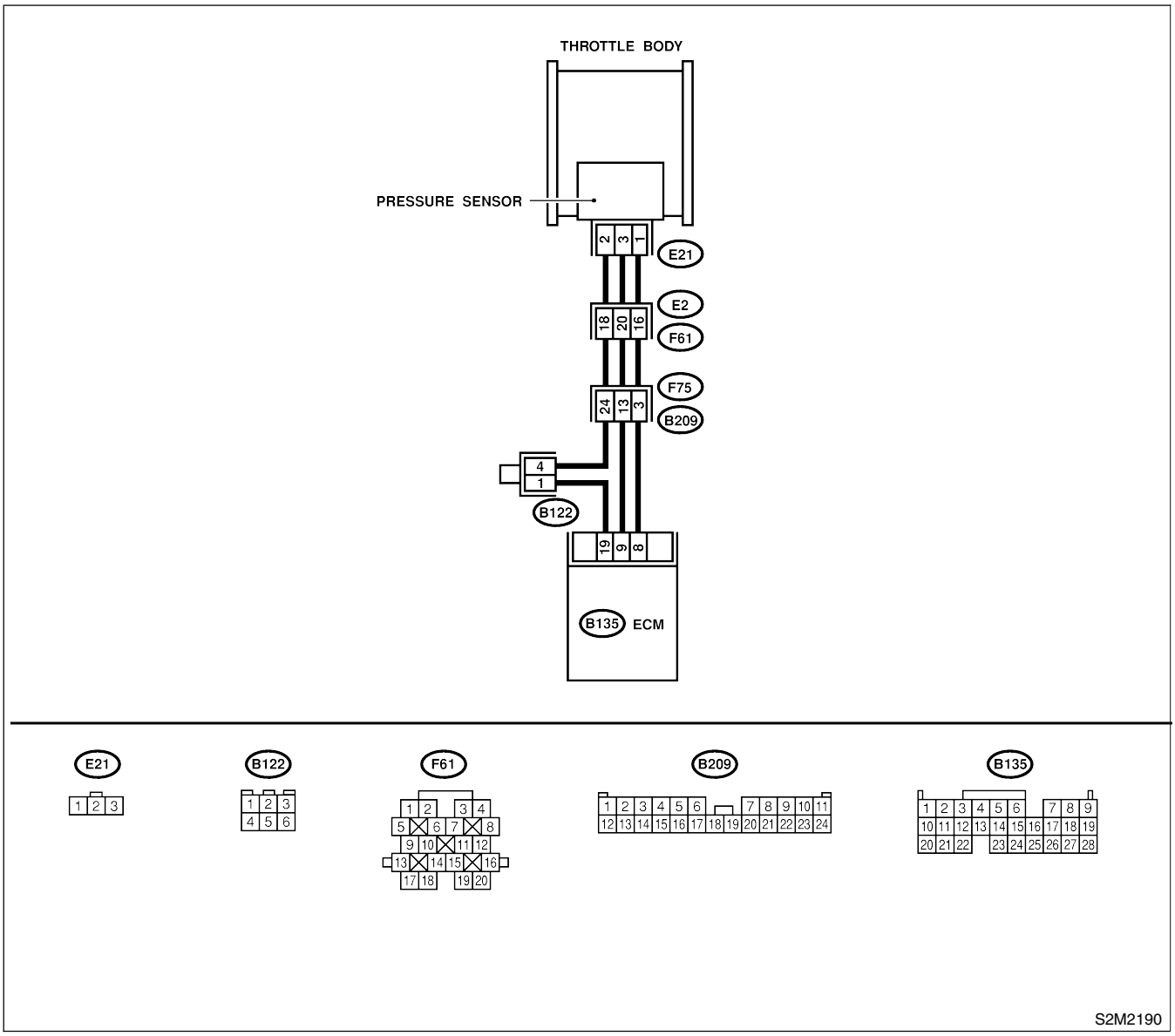
No.	Step	Check	Yes	No
1	**CONNECT SUBARU SELECT MONITOR OR THE OBD-II GENERAL SCAN TOOL, AND READ DATA.** 1) Turn ignition switch to OFF. 2) Connect Subaru Select Monitor or the OBD-II general scan tool to data link connector. 3) Turn ignition switch to ON and Subaru Select Monitor or the OBD-II general scan tool switch to ON. 4) Start engine. 5) Read data of mass air flow 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(DOHC TURBO)-36, 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 1.3 g/sec (0.172 lb/min) or 0.3 V and equal to or less than 240 g/sec (32 lb/min) or 4.58 V?	Even if MIL lights up, the circuit has returned to a normal condition at this time.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND MASS AIR FLOW 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 mass air flow 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 mass air flow 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(DOHC TURBO)-36, 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 240 g/sec (32 lb/min) or 4.58 V in function mode F06?	Repair battery short circuit in harness between mass air flow sensor and ECM connector. After repair, replace ECM.	Replace mass air flow sensor.

H: DTC P0106 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S088521F90

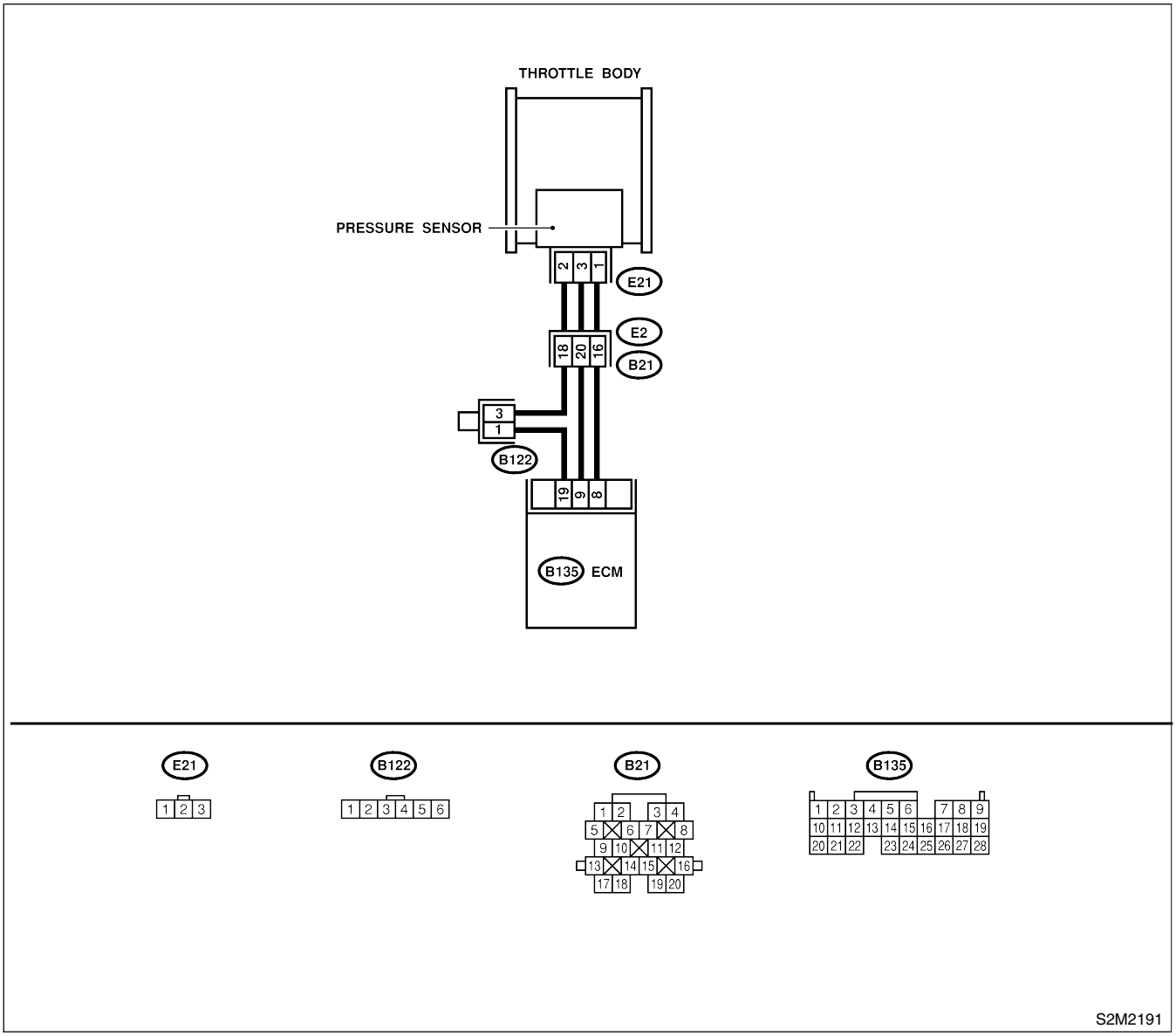
- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- TROUBLE SYMPTOM**:**
  - Failure of engine to start

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **LHD MODEL:**



- **RHD MODEL:**


THROTTLE BODY
PRESSURE SENSOR
2
3
1
E21
E2
18
20
16
B21
3
1
B122
19
9
8
B135
ECM
E21
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2191

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(DOHC TURBO)-36, Subaru Select Monitor.>	Does the LED of {Idle Switch Signal} come on?	Go to step **2**.	Check throttle position sensor circuit. <Ref. to EN(DOHC TURBO)-136, DTC P0121 - THROTTLE POSITION SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM (HIGH INPUT) -, Diagnostic Procedure with Diagnostic Trouble Code (DTC).> 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 "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> 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 pressure sensor installation bolt tightened securely?	Go to step **4**.	Tighten pressure sensor installation bolt securely.
4	**CHECK CONDITION OF THROTTLE BODY.**	Is the throttle body installation bolt tightened securely?	Replace pressure sensor. <Ref. to FU(DOHC TURBO)-35, Pressure Sensor.>	Tighten throttle body installation bolt securely.

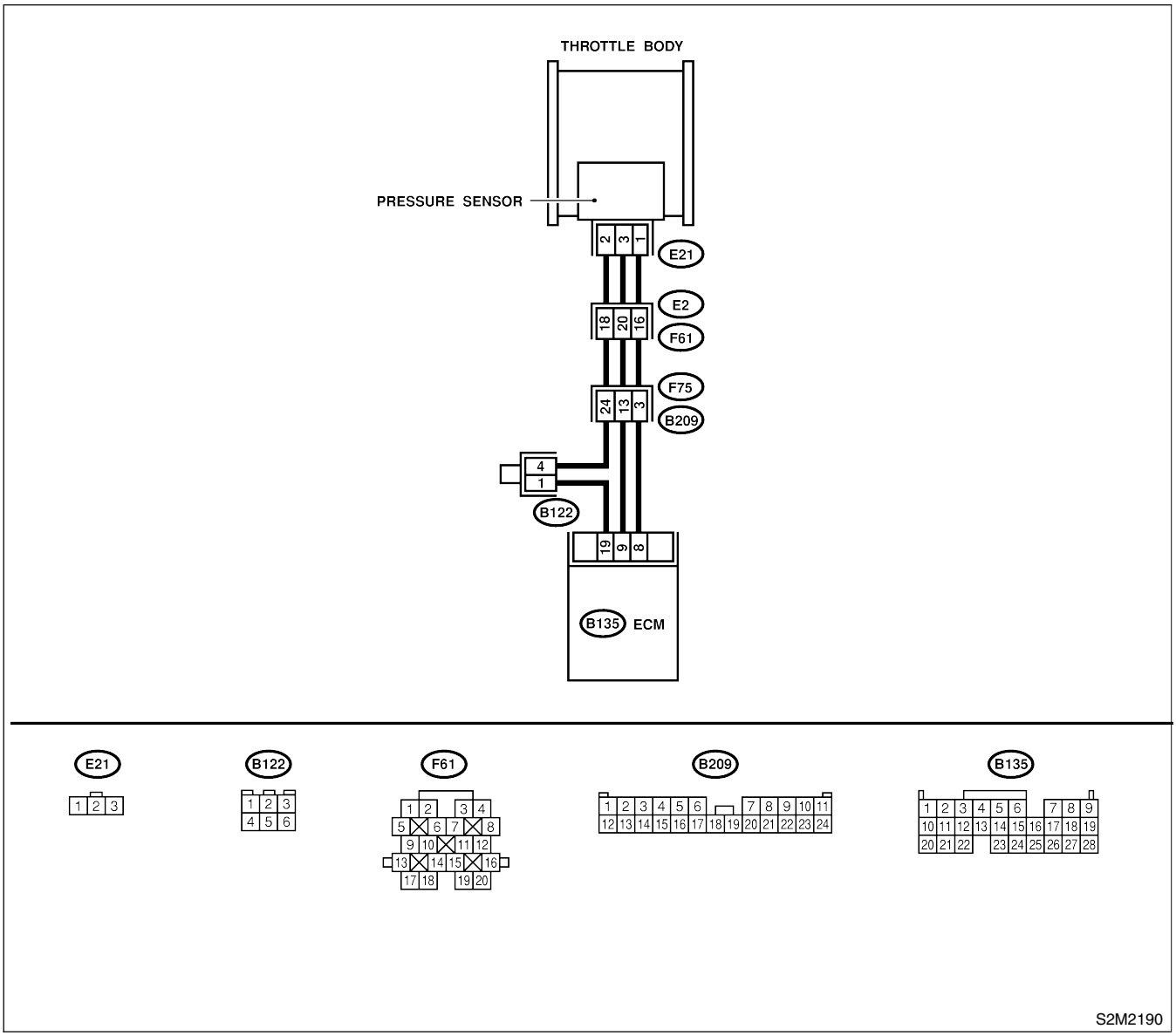
MEMO:

I: DTC P0107 — PRESSURE SENSOR CIRCUIT LOW INPUT — S088521B12

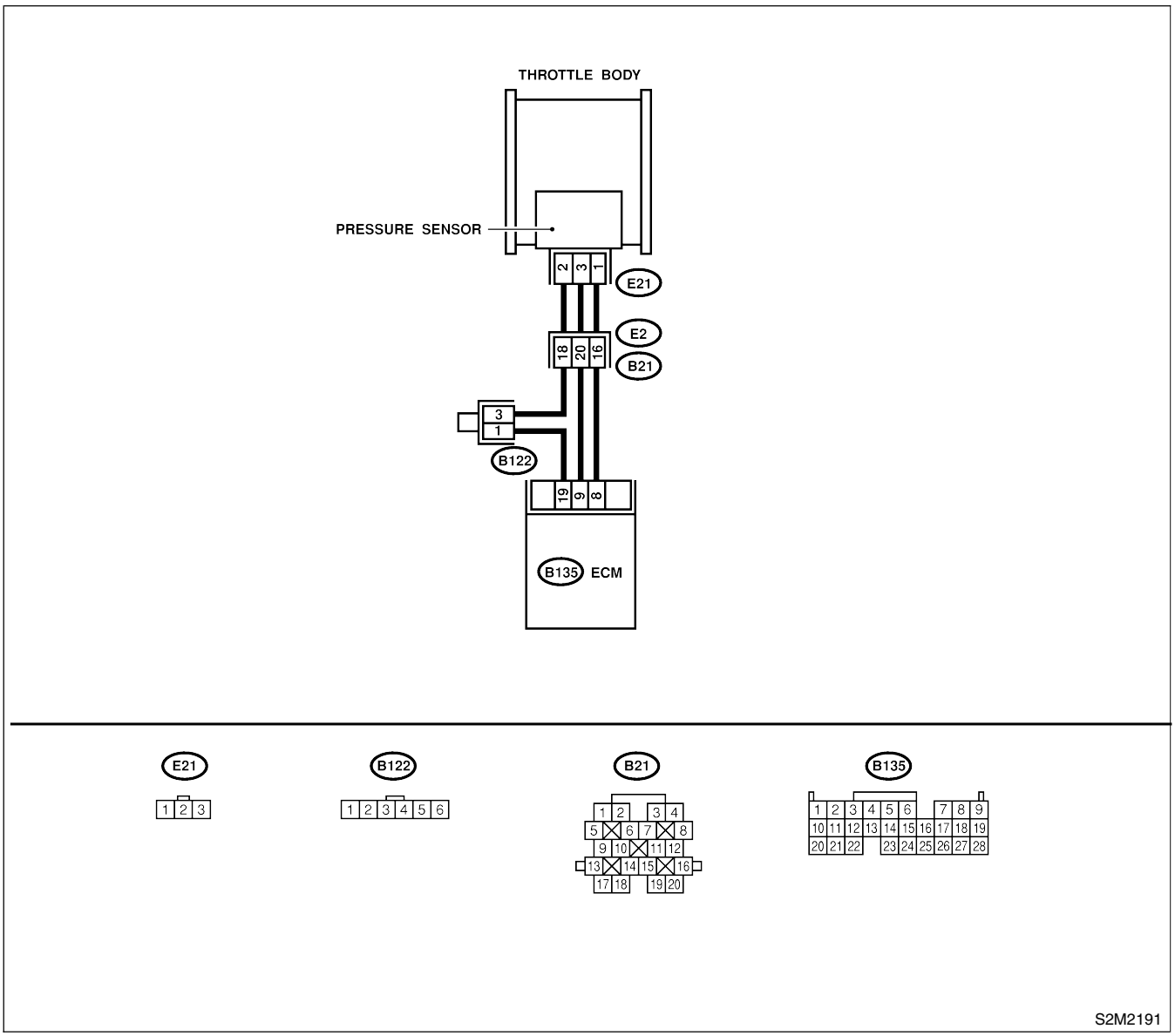
- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


THROTTLE BODY
PRESSURE SENSOR
2
3
1
E21
E2
18
20
16
B21
3
1
B122
19
9
8
B135
ECM
E21
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2191

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(DOHC TURBO)-36, 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 –7.2 kPa (–54 mmHg, –2.1 inHg)?	Go to step **3**.	Go to step **2**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM and pressure sensor connector.	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*** ***(B135) No. 9 (+) — 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*** ***(B135) No. 9 (+) — 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 your Subaru distributor. 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*** ***(B135) No. 8 (+) — Chassis ground (–):***	Is the voltage less than 0.7 V?	Go to step **6**.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
6	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from pressure sensor. 3) Turn ignition switch to ON. 4) Measure voltage between 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.

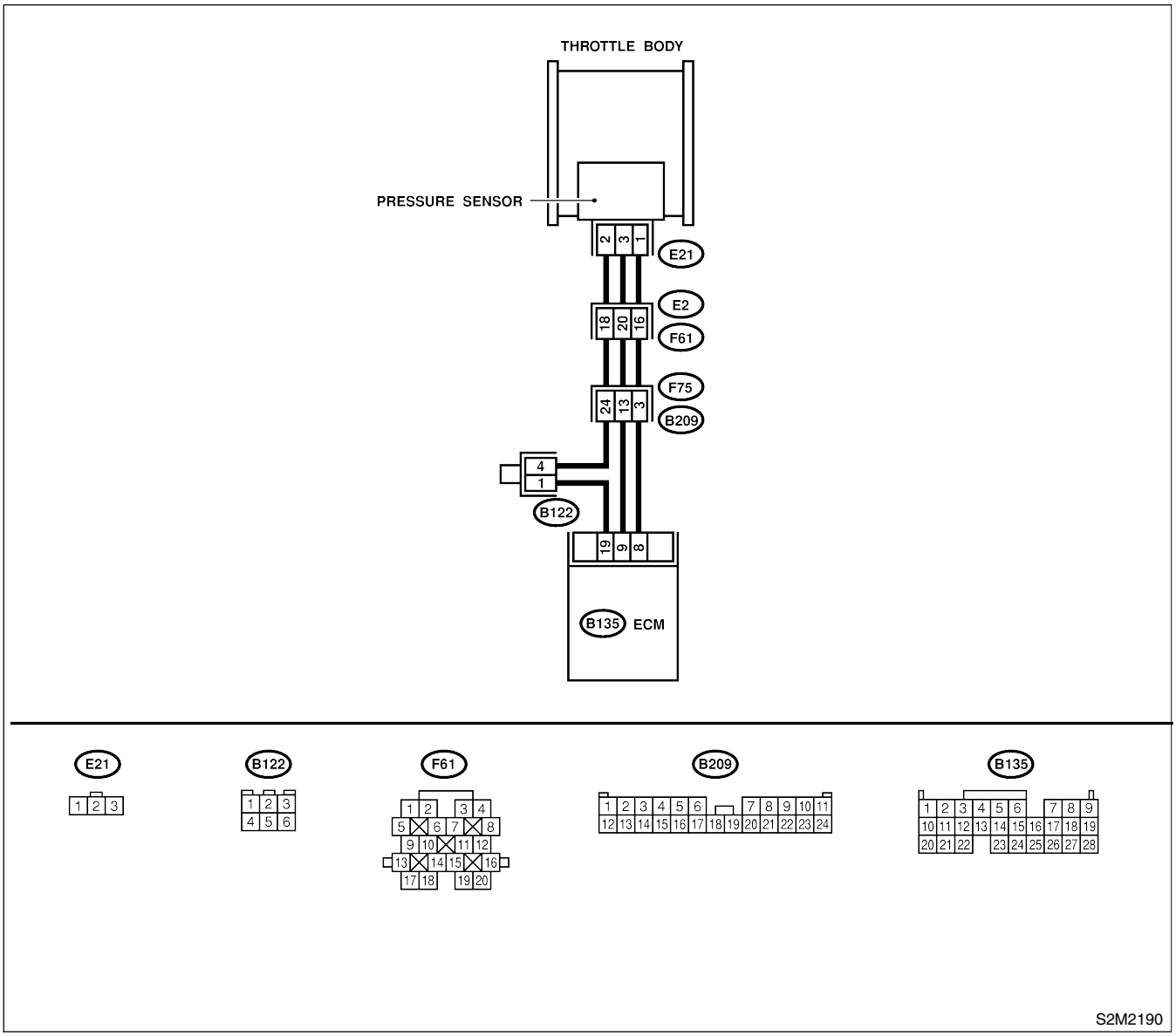
No.	Step	Check	Yes	No
7	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Measure resistance of harness between ECM and intake manifold pressure sensor connector. ***Connector & terminal*** ***(B135) No. 19 — (E21) No. 2:***	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 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 1 MΩ?	Go to step **9**.	Repair ground short circuit in harness between ECM and intake manifold pressure sensor connector.
9	**CHECK POOR CONTACT.** Check poor contact in pressure sensor connector.	Is there poor contact in pressure sensor connector?	Repair poor contact in pressure sensor connector.	Replace pressure sensor. <Ref. to FU(DOHC TURBO)-35, Pressure Sensor.>

J: DTC P0108 — PRESSURE SENSOR CIRCUIT HIGH INPUT — S088521B13

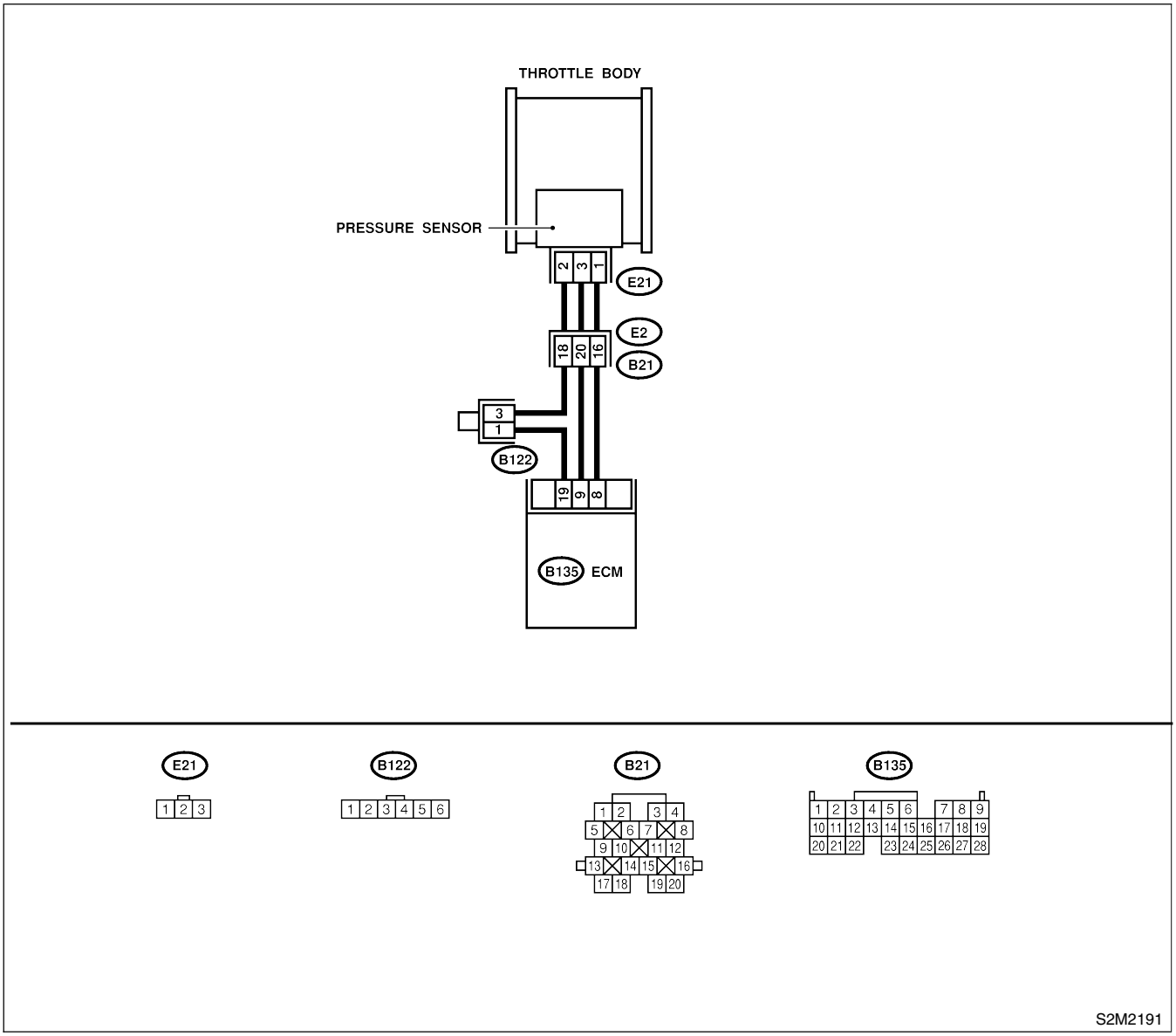
- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


THROTTLE BODY
PRESSURE SENSOR
2
3
1
E21
E2
18
20
16
B21
3
1
B122
19
9
8
B135
ECM
E21
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2191

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(DOHC TURBO)-36, 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 282 kPa (2,121 mmHg, 83.50 inHg)?	Go to step **9**.	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 9 (+) — 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*** ***(B135) No. 9 (+) — 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 your Subaru distributor. 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*** ***(B135) No. 8 (+) — Chassis ground (–):***	Is the voltage less than 0.7 V?	Go to step **5**.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.
5	**CHECK HARNESS BETWEEN ECM AND PRESSURE SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from pressure sensor. 3) Turn ignition switch to ON. 4) Measure voltage between pressure sensor connector and engine ground. ***Connector & terminal*** ***(E21) No. 3 (+) — Engine ground (–):***	Is the voltage more than 4.5 V?	Go to step **6**.	Repair open circuit in harness between ECM and pressure sensor connector.
6	**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*** ***(B135) No. 8 — (E21) No. 1:***	Is the resistance less than 1 Ω?	Go to step **7**.	Repair open circuit in harness between ECM and pressure sensor connector.

No.	Step	Check	Yes	No
7	**CHECK HARNESS BETWEEN ECM AND INTAKE MANIFOLD PRESSURE SENSOR CONNECTOR.** Measure resistance of harness between ECM and pressure sensor connector. ***Connector & terminal*** ***(B135) No. 19 — (E21) No. 2:***	Is the resistance less than 1 Ω?	Go to step **8**.	Repair open circuit in harness between ECM and pressure sensor connector.
8	**CHECK POOR CONTACT.** Check poor contact in pressure sensor connector.	Is there poor contact in pressure sensor connector?	Repair poor contact in pressure sensor connector.	Replace intake manifold pressure sensor. <Ref. to FU(DOHC TURBO)-35, Pressure Sensor.>
9	**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(DOHC TURBO)-36, 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 282 kPa (2,121 mmHg, 83.50 inHg)?	Repair battery short circuit in harness between ECM and pressure sensor connector.	Replace pressure sensor. <Ref. to FU(DOHC TURBO)-35, Pressure Sensor.>

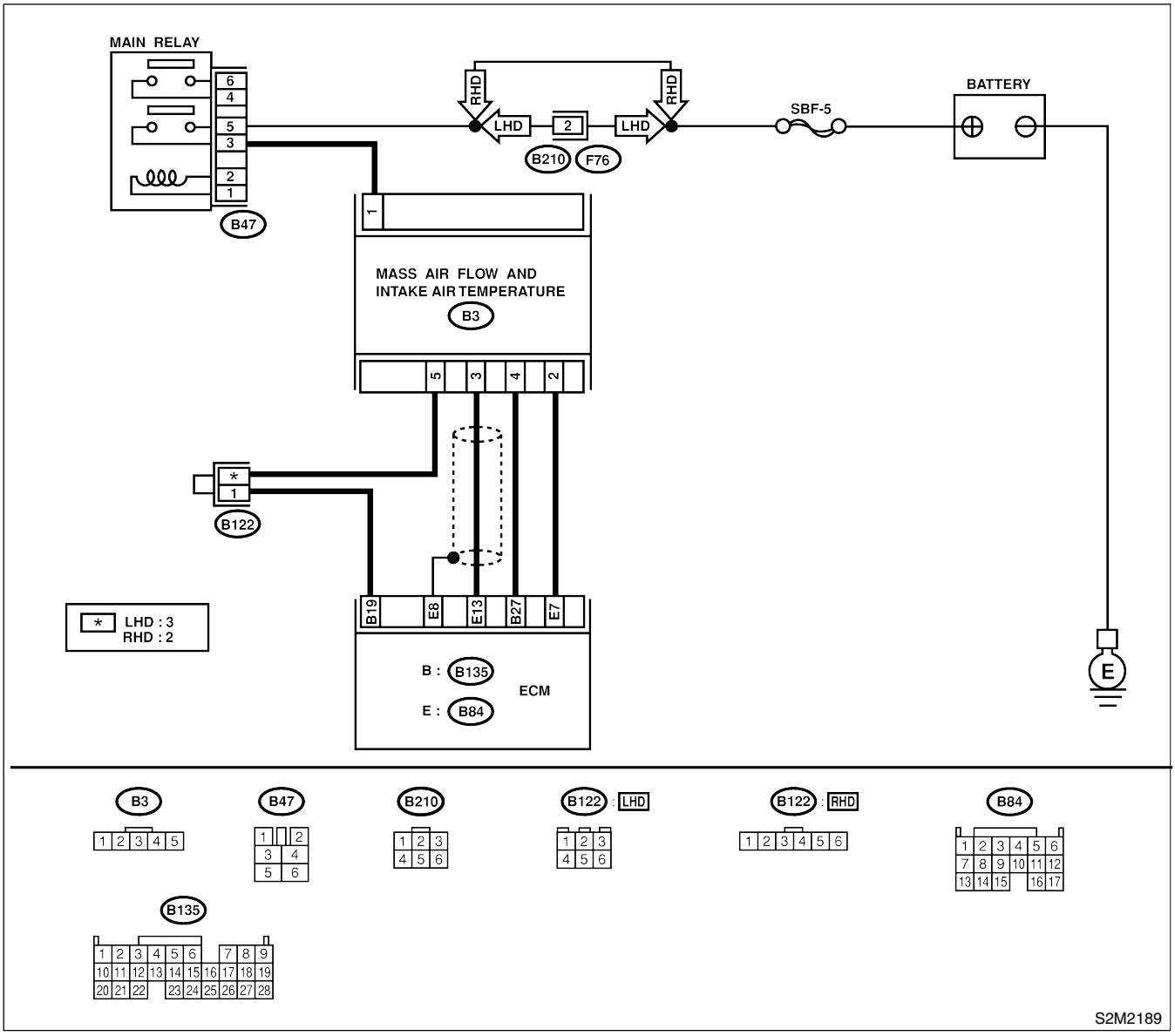
K: DTC P0111 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S088521B14

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

- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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, P0117, P0118 or P0125?	Inspect DTC P0112, P0113, P0117, P0118 or P0125 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> 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(DOHC TURBO)-36, 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 mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>	Inspect DTC P0125 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>

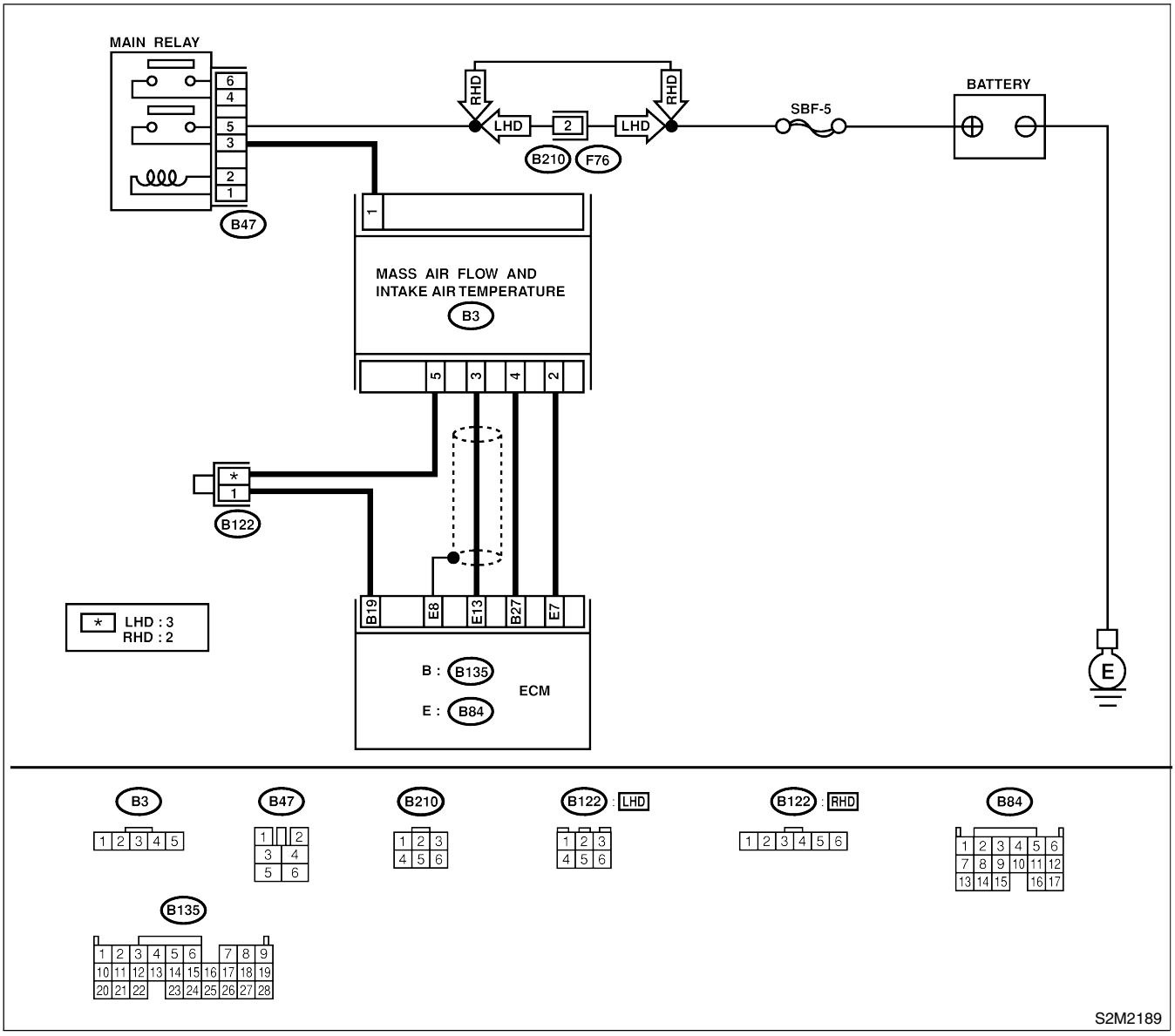
L: DTC P0112 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW INPUT

S088521B15

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-36, 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 55°C (131°F)?	Go to step **2**.	Repair poor contact. NOTE: In this case, repair the following: ● Poor contact mass air flow and intake air temperature sensor ● Poor contact in ECM ● Poor contact in joint connector
2	**CHECK HARNESS BETWEEN MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from mass air flow and 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(DOHC TURBO)-36, 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 –36°C (–33°F)?	Replace mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>	Repair ground short circuit in harness between mass air flow and intake air temperature sensor and ECM connector.

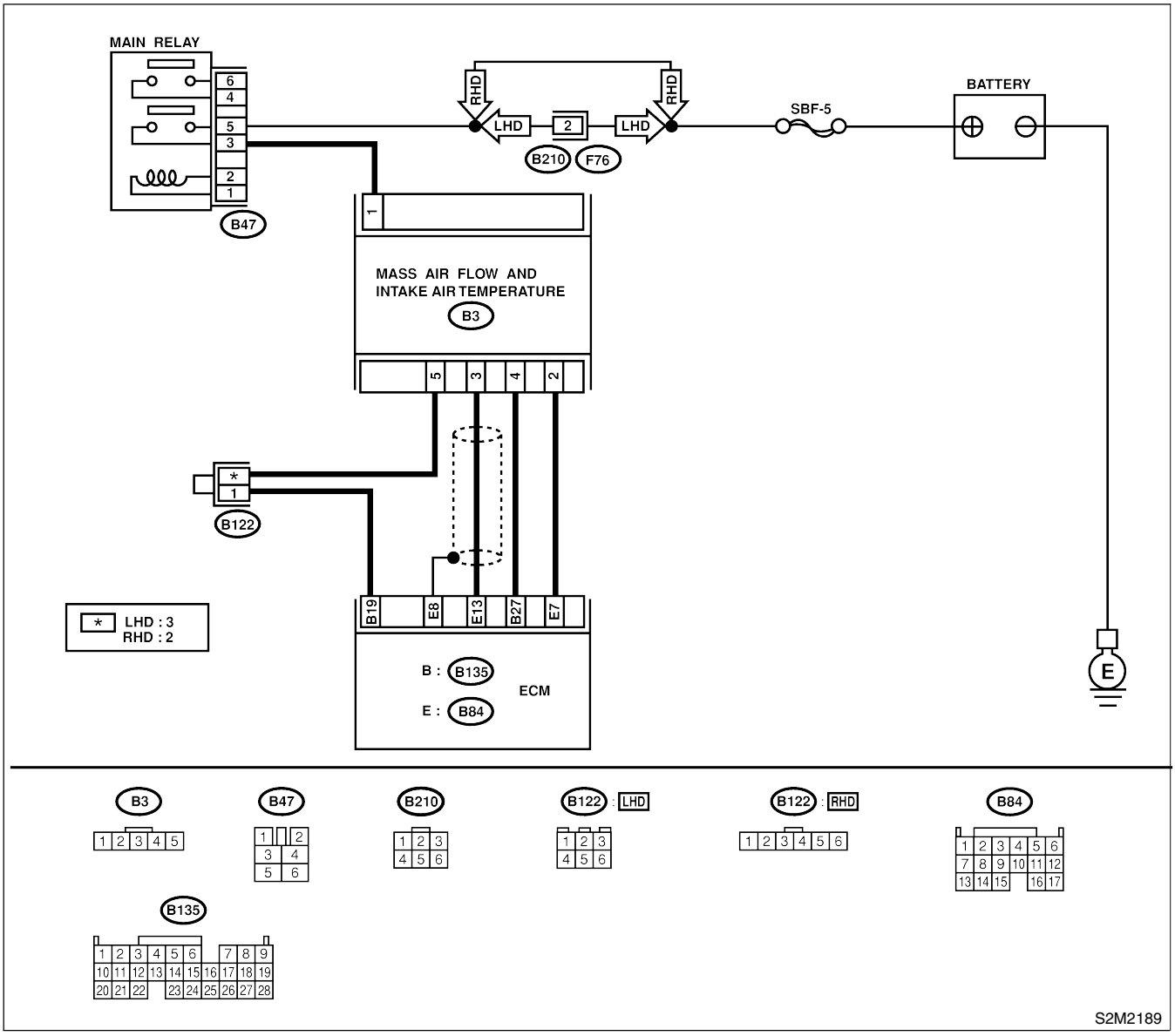
M: DTC P0113 — INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH INPUT — S088521B16

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-36, 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 –36°C (–33°F)?	Go to step **2**.	Repair poor contact. NOTE: In this case, repair the following: ● Poor contact in mass air flow and intake air temperature sensor ● Poor contact in ECM ● Poor contact in joint connector
2	**CHECK HARNESS BETWEEN MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from mass air flow and intake air temperature sensor. 3) Measure voltage between mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between mass air flow and intake air temperature 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 mass air flow and intake air temperature sensor connector and engine ground. ***Connector & terminal*** ***(B3) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between mass air flow and intake air temperature sensor and ECM connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.** Measure voltage between mass air flow and intake air temperature sensor and pressure sensor connector and engine ground. ***Connector & terminal*** ***(B3) 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 mass air flow and intake air temperature sensor and ECM connector ● Poor contact in mass air flow and intake air temperature sensor ● Poor contact in ECM ● Poor contact in joint connector

No.	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN MASS AIR FLOW AND INTAKE AIR TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance of harness between mass air flow and intake air temperature sensor and engine ground. ***Connector & terminal*** ***(B3) No. 5 — Engine ground:***	Is the resistance less than 5 Ω?	Replace mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between mass air flow and intake air temperature sensor and ECM connector ● Poor contact in mass air flow and intake air temperature sensor ● Poor contact in ECM ● Poor contact in joint connector

MEMO:

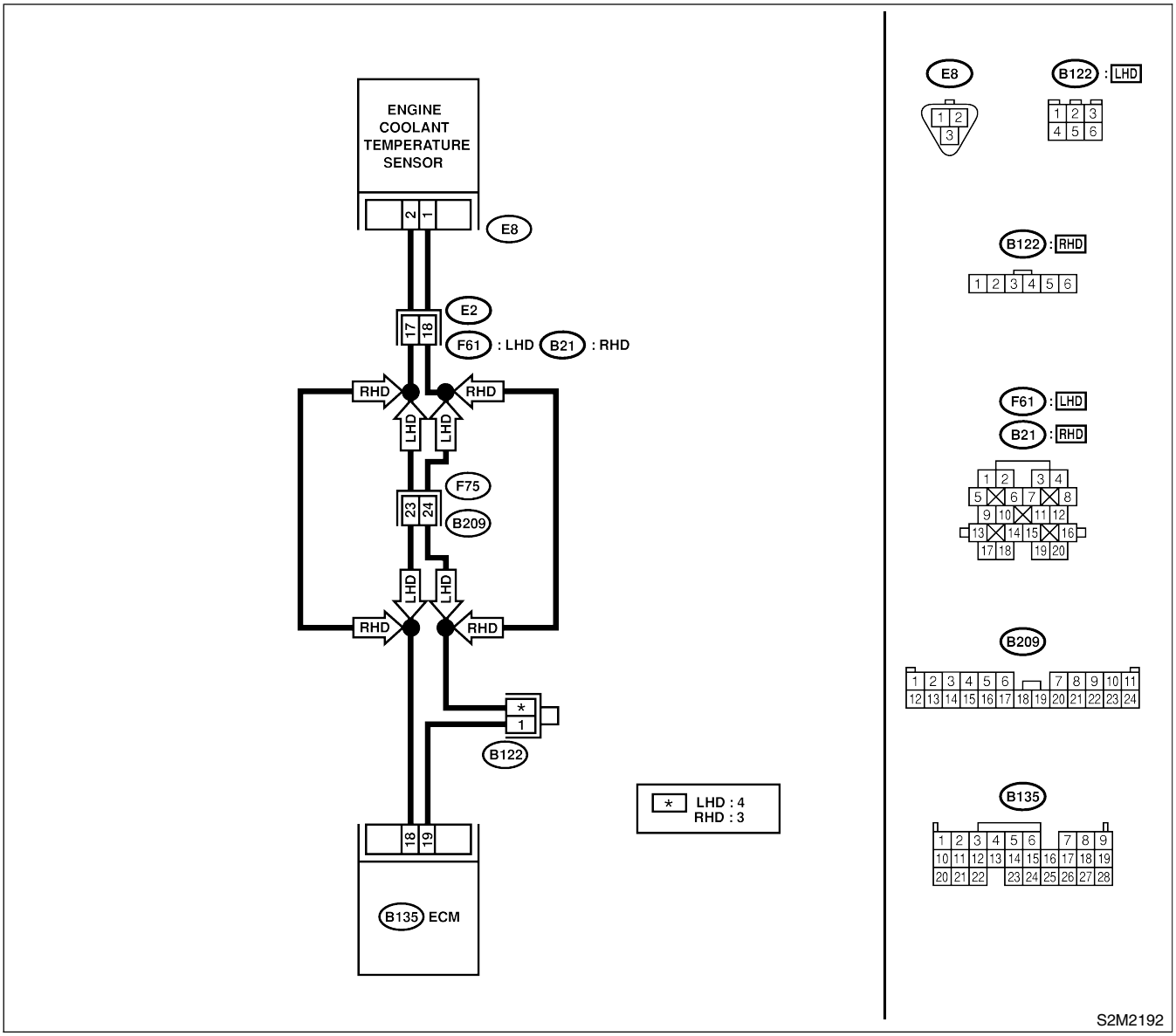
N: DTC P0117 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW INPUT — S088521F91

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



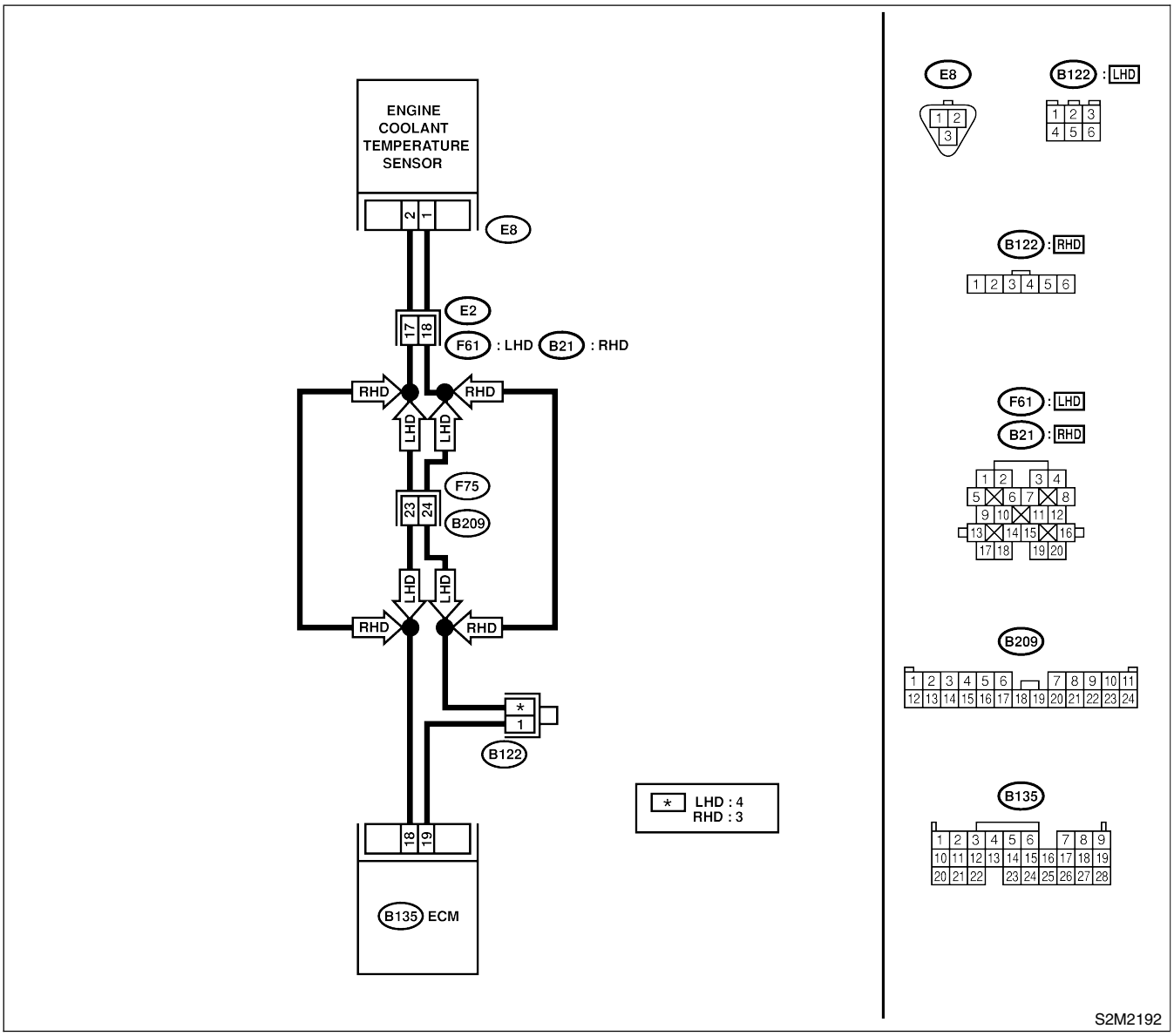
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of engine coolant temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(DOHC TURBO)-36, 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 ● Poor contact in joint connector
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(DOHC TURBO)-36, 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(DOHC TURBO)-29, Engine Coolant Temperature Sensor.>	Repair ground short circuit in harness between engine coolant temperature sensor and ECM connector.

O: DTC P0118 — ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH INPUT — S088521F92

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-36, 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 ● Poor contact in joint connector
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. 2 (+) — 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. 2 (+) — 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**.
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. 2 (+) — 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 ● Poor contact in joint connector

No.	Step	Check	Yes	No
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. 1 — Engine ground:***	Is the resistance less than 5 Ω?	Replace engine coolant temperature sensor. <Ref. to FU(DOHC TURBO)-29, 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 • Poor contact in joint connector

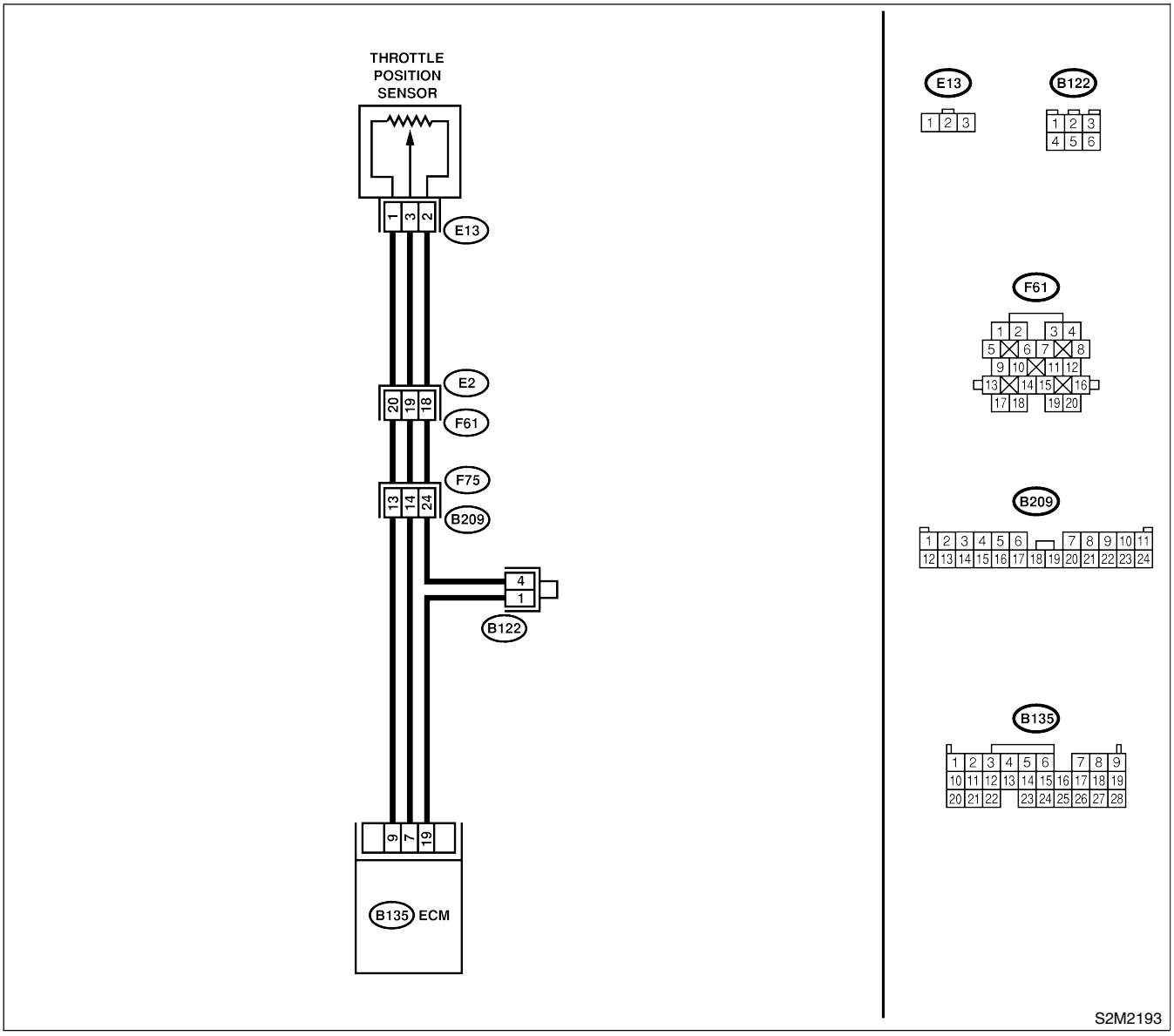
MEMO:

P: DTC P0121 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S088521B19

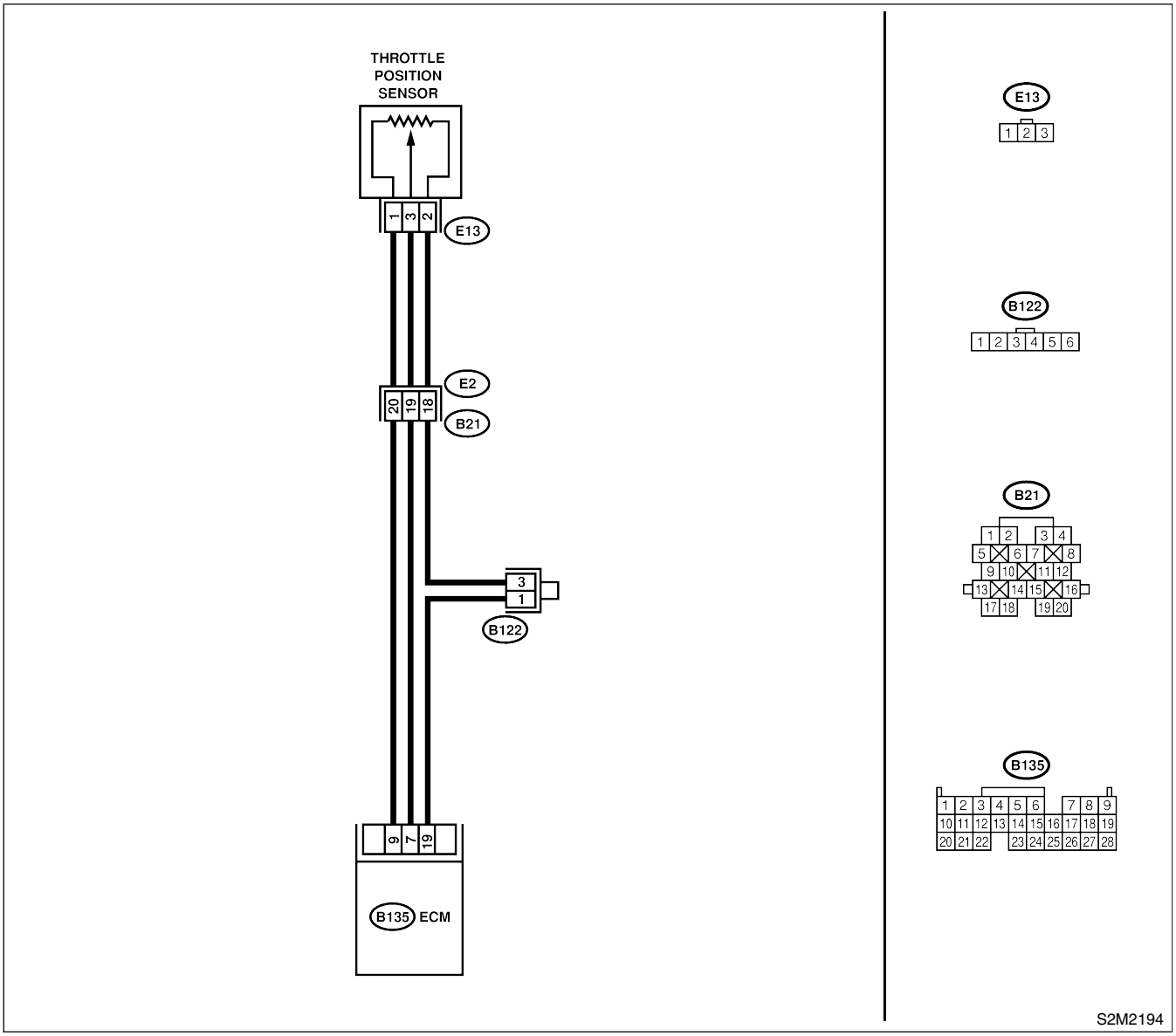
- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance
  - Fuel is cut.

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode < Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**



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, P0123 or P1507?	Inspect DTC P0122, P0123 or P1507 using " List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0121.	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>

Q: DTC P0122 — THROTTLE POSITION SENSOR CIRCUIT LOW INPUT —

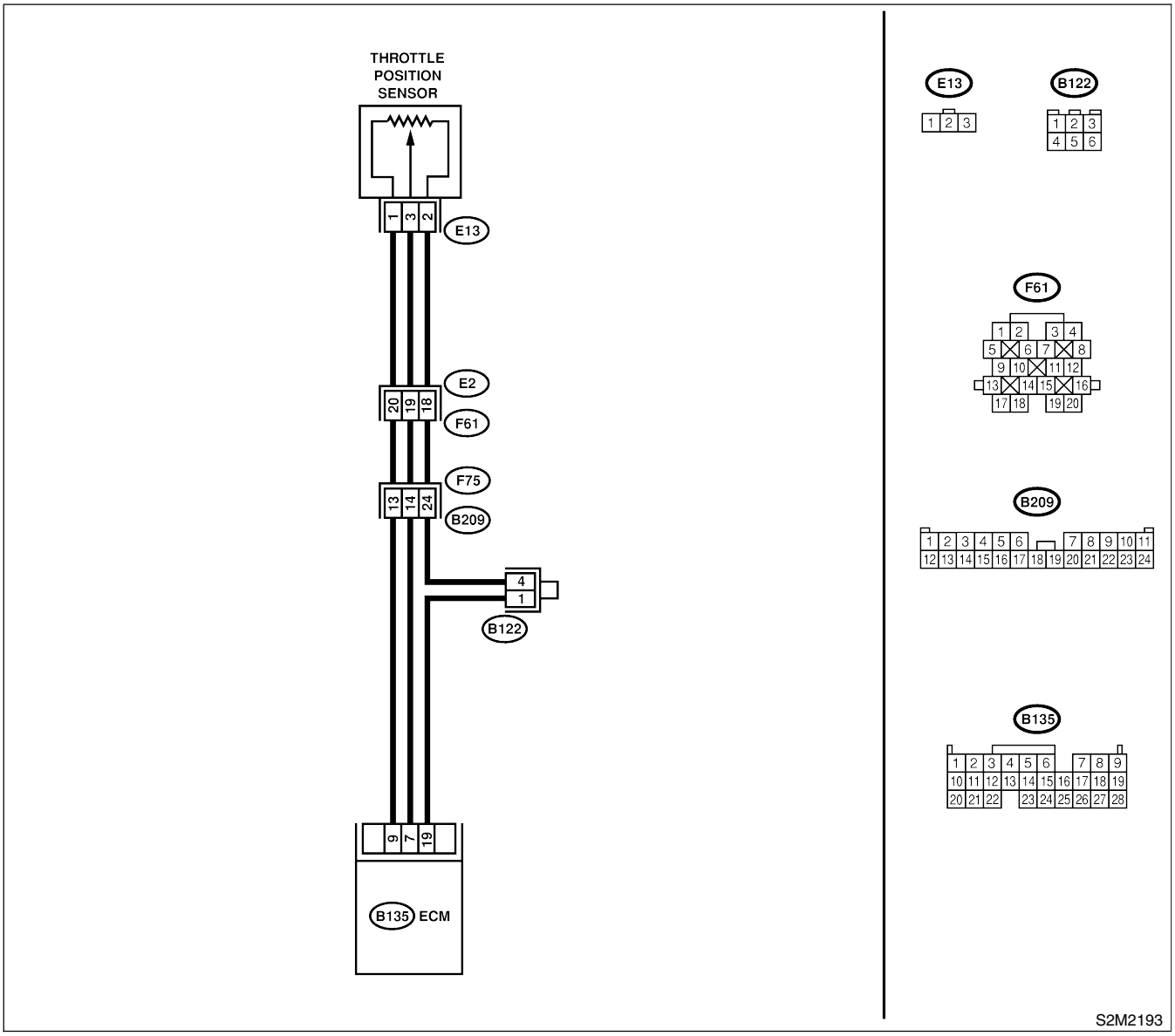
S088521B20

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

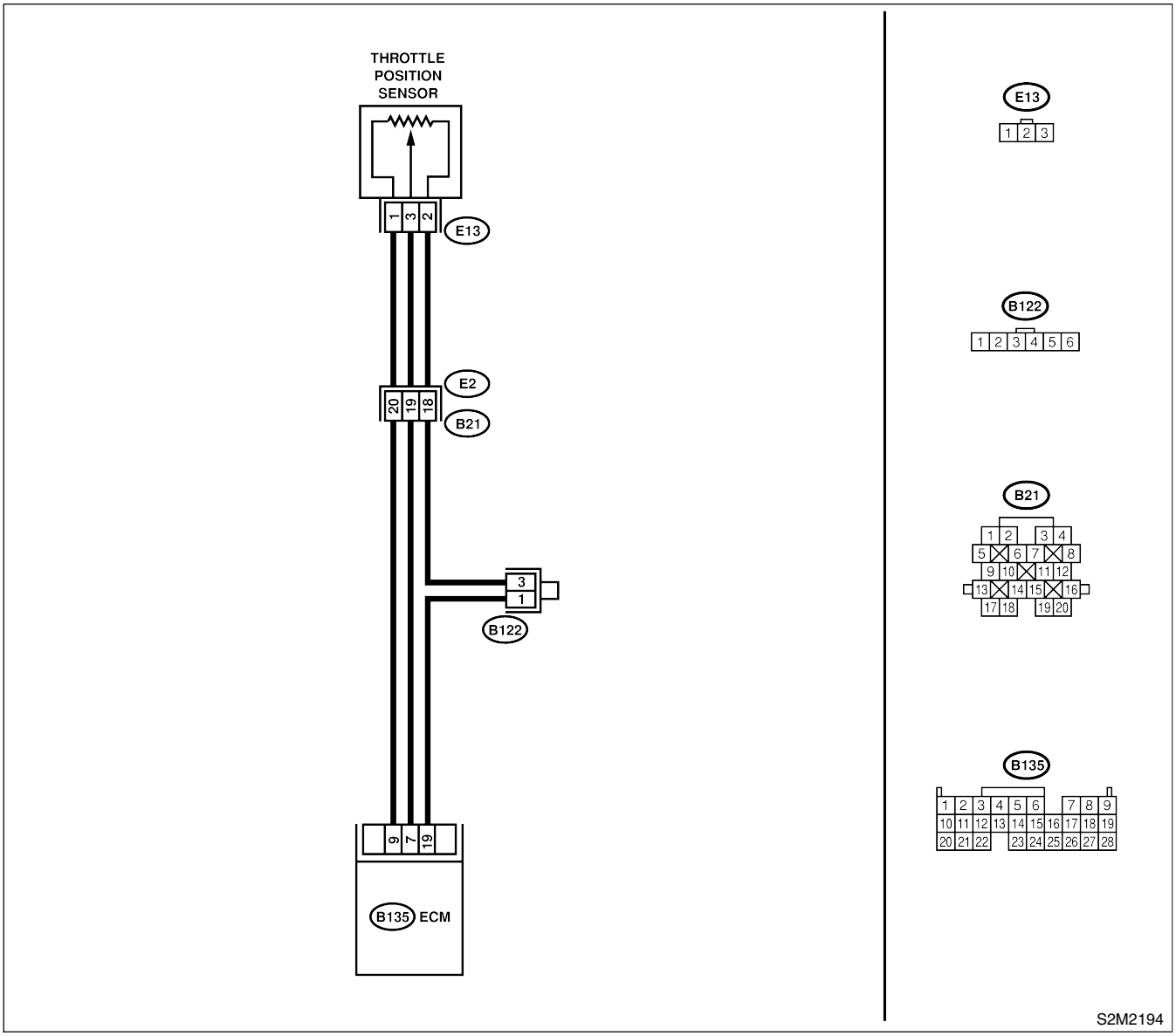
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


THROTTLE
POSITION
SENSOR
1
3
2
E13
E2
20
19
18
B21
3
1
B122
9
7
19
B135
ECM
E13
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2194

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(DOHC TURBO)-36, 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
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground while throttle valve is fully closed. ***Connector & terminal*** ***(B135) No. 9 (+) — 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*** ***(B135) No. 9 (+) — 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 your Subaru distributor. 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*** ***(B135) No. 7 (+) — 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 • Poor contact in joint connector
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*** ***(B135) No. 7 — (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
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.	Is there poor contact in throttle position sensor connector?	Repair poor contact in throttle position sensor connector.	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>

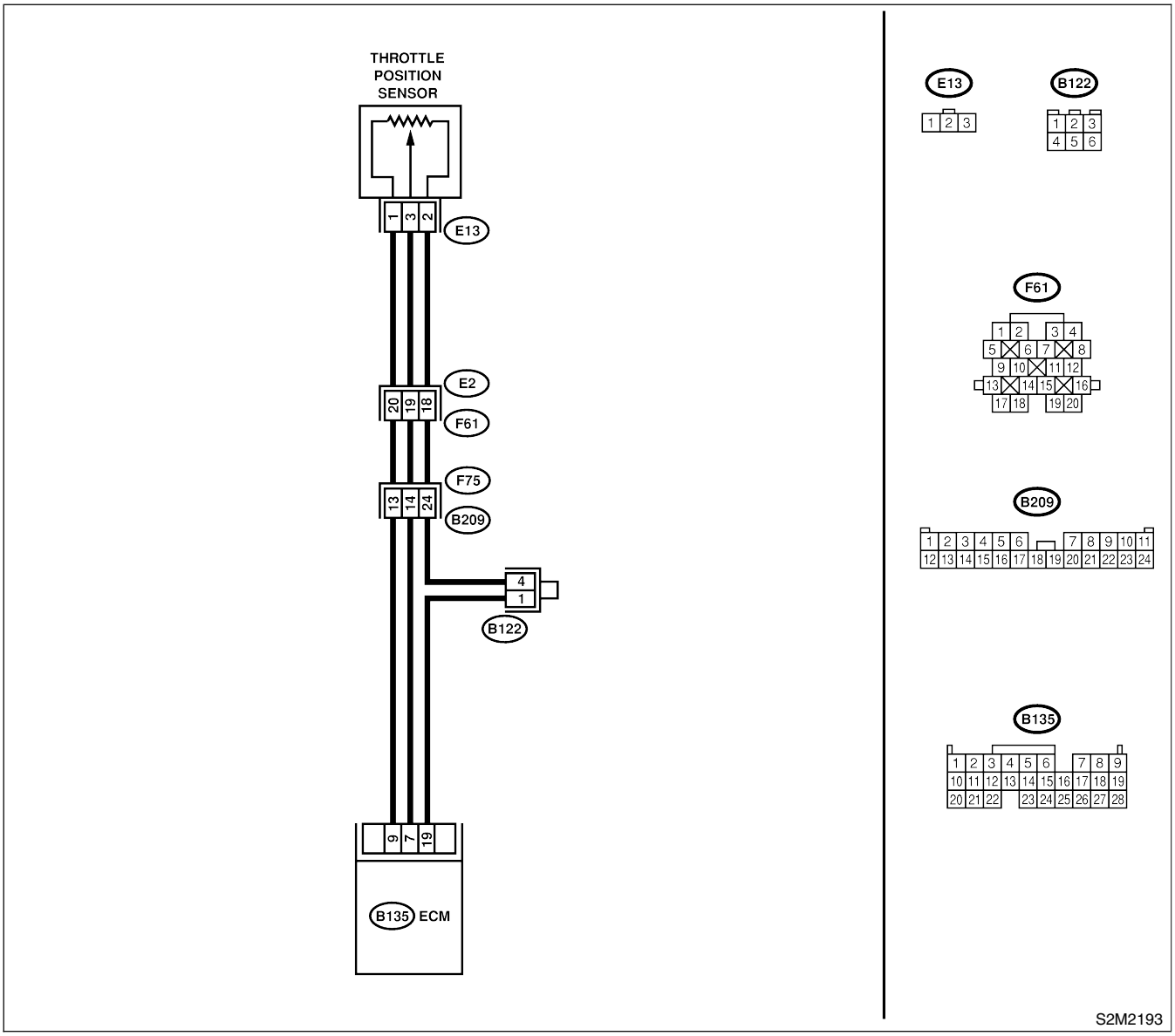
R: DTC P0123 — THROTTLE POSITION SENSOR CIRCUIT HIGH INPUT — S088521B21

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

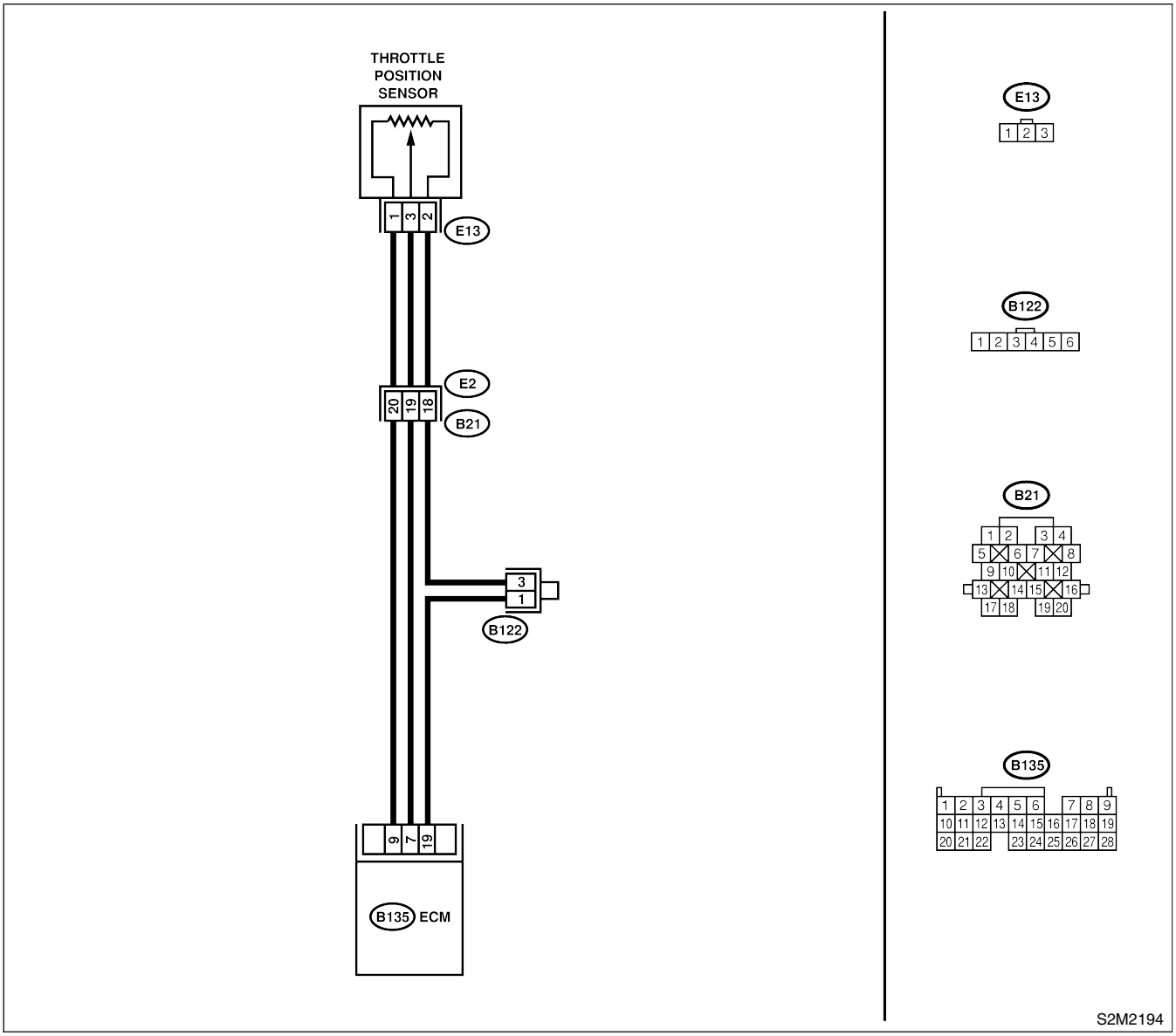
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


THROTTLE
POSITION
SENSOR
1
3
2
E13
E2
20
19
18
B21
3
1
B122
9
7
19
B135
ECM
E13
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2194

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(DOHC TURBO)-36, 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
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 ● Poor contact in joint connector
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(DOHC TURBO)-47, Engine Control Module.>	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>

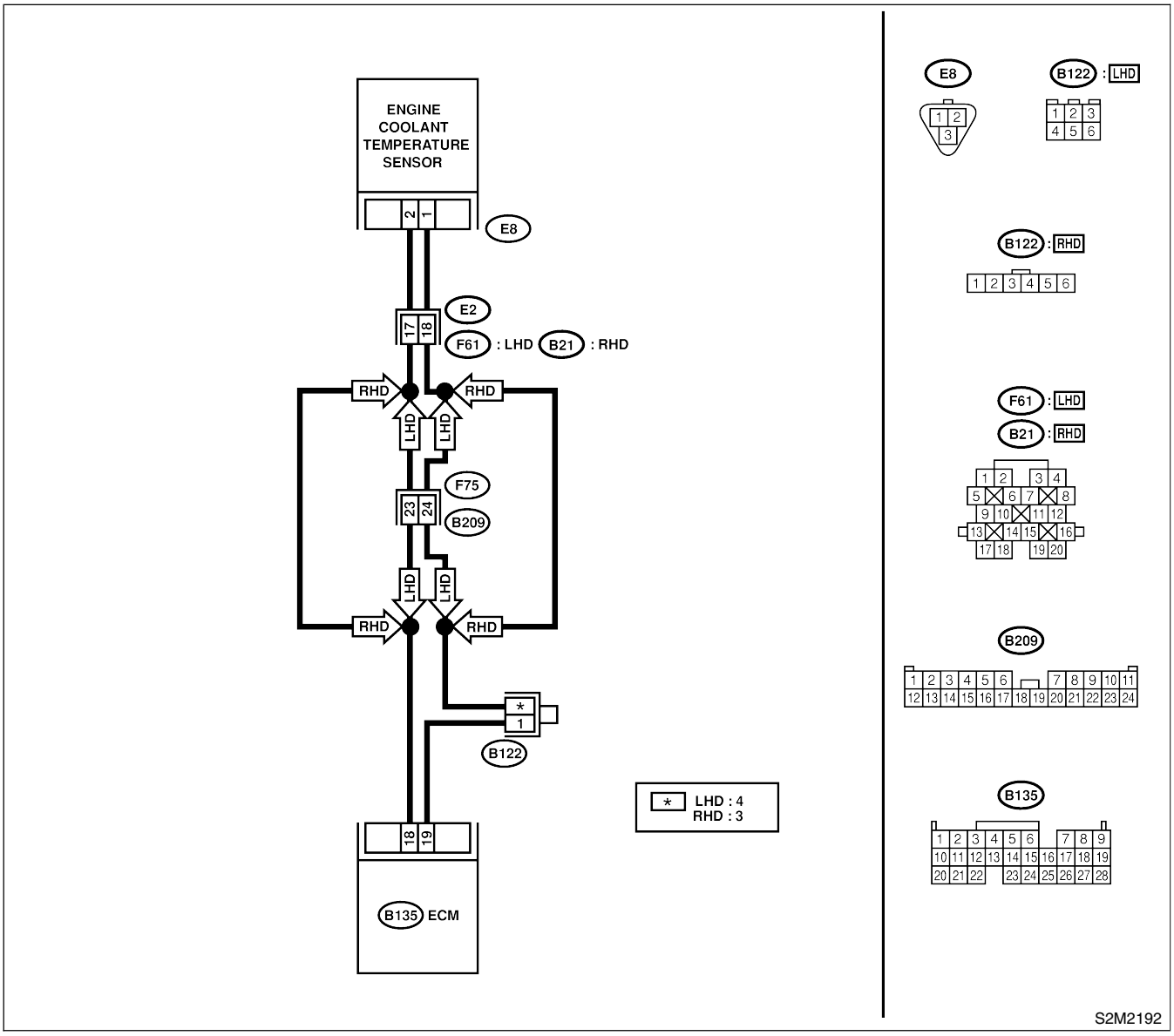
MEMO:

S: DTC P0125 — INSUFFICIENT COOLANT TEMPERATURE FOR CLOSED LOOP FUEL CONTROL — S088521B22

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P0117 or P0118?	Inspect DTC P0117 or P0118 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0125.	Go to step **2**.
2	**CHECK ENGINE COOLING SYSTEM.** NOTE: Check the following items. ● Thermostat open stuck ● Coolant level ● Coolant freeze ● Tire diameter	Is there a fault in engine cooling system?	Replace thermostat. <Ref. to CO-23, Thermostat.>	Replace engine coolant temperature sensor. <Ref. to FU(DOHC TURBO)-29, Engine Coolant Temperature Sensor.>

T: DTC P0131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S088521B24

NOTE:
For the diagnostic procedure, refer to DTC P0132. <Ref. to EN(DOHC TURBO)-150, DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

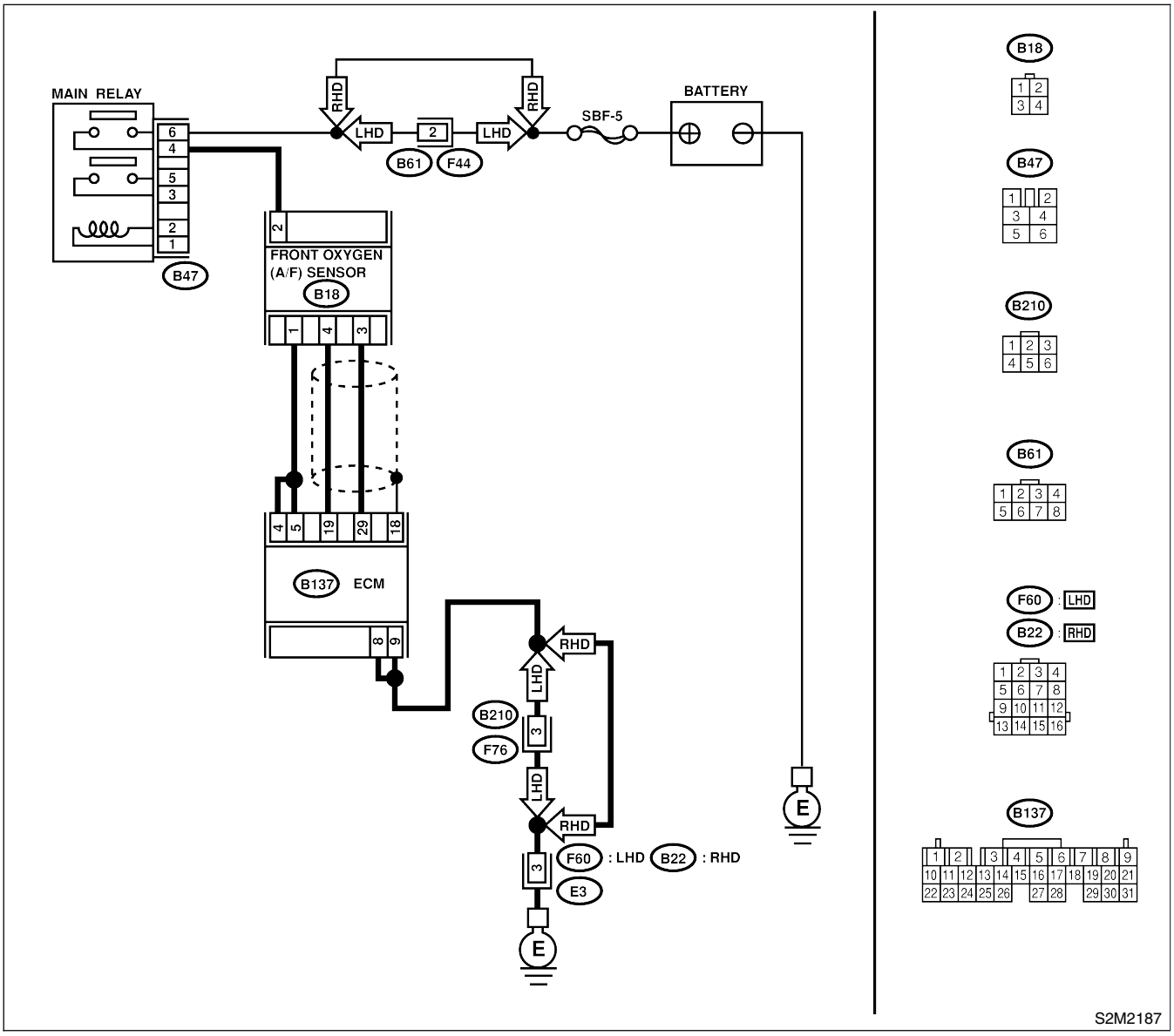
MEMO:

U: DTC P0132 — FRONT OXYGEN (A/F) SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S088521B25

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



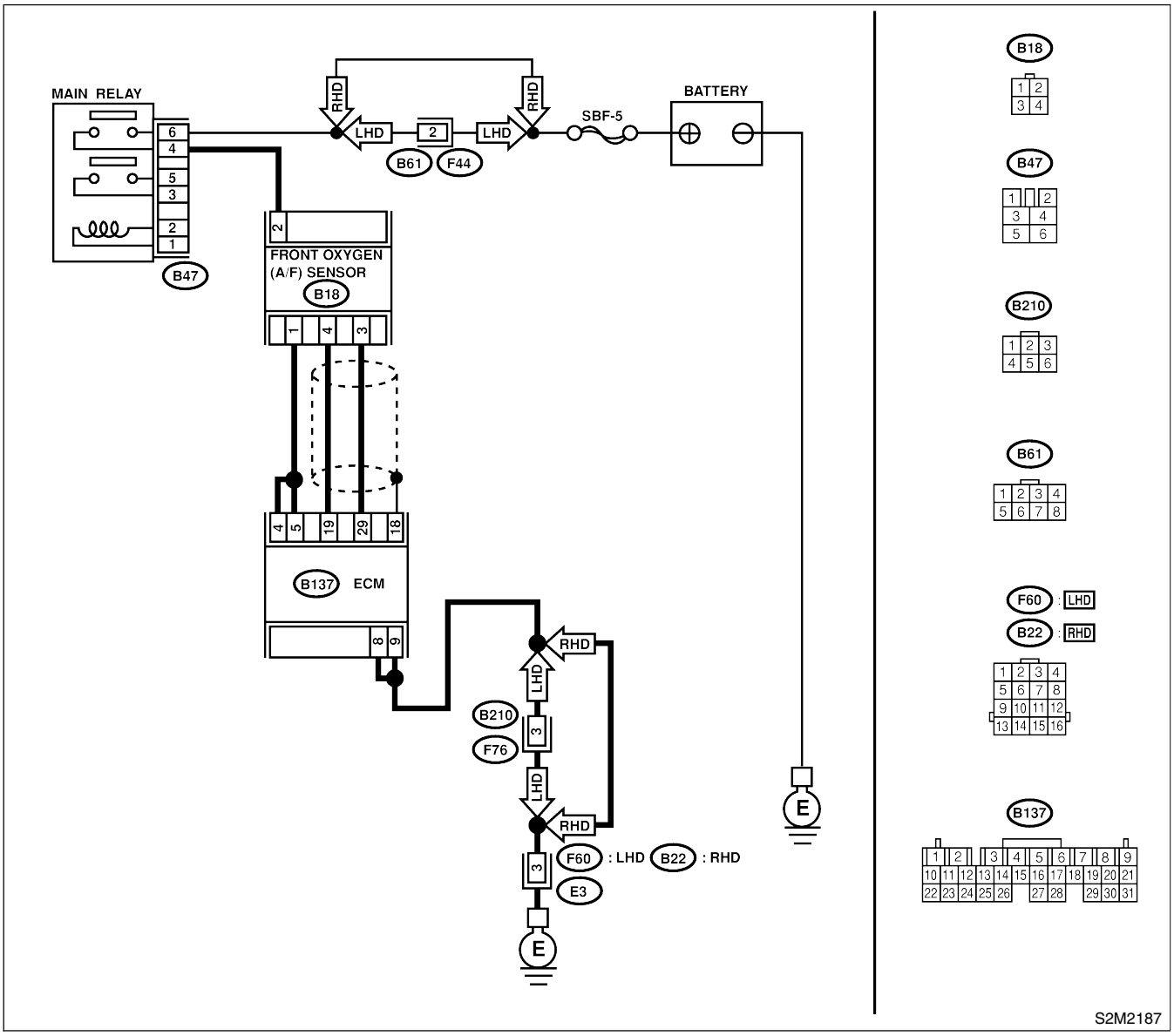
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0031, P0032, P1131, P1134 or P1139?	Inspect DTC P0031, P0032, P1131, P1134 or P1139 using "List of Diagnostic Trouble Code (DTC)".<Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
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 FOR ENGINE". <Ref. to EN(DOHC TURBO)-36, 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(DOHC TURBO)-36, 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 FU(DOHC TURBO)-44, Rear Oxygen Sensor.>
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 FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>

V: DTC P0133 — FRONT OXYGEN (A/F) SENSOR CIRCUIT SLOW RESPONSE — S088521B26

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



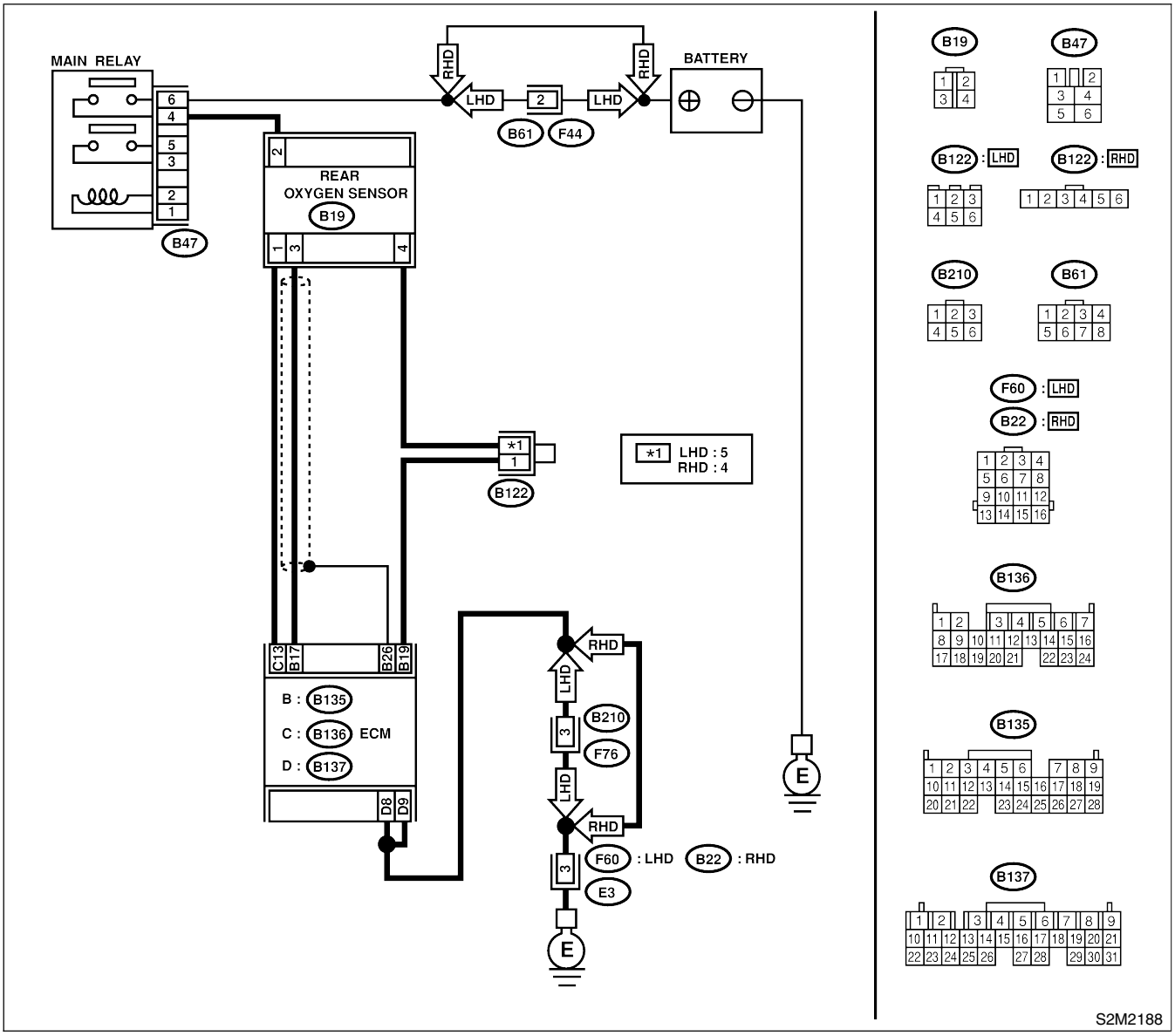
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0031, P0032, P0131, P0132, P1130, P1131, P1134 or P1139?	Inspect DTC P0031, P0032, P0131, P0132, P1130, P1131, P1134 or P1139 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0133.	Go to step **2**.
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 FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>

W: DTC P0136 — REAR OXYGEN SENSOR CIRCUIT MALFUNCTION — S088521B28

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 or P0132?	Go to step **2**.	Go to step **3**.
2	**CHECK FAILURE CAUSE OF P0131 or P0132.** Inspect DTC P0131 or P0132 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Is the failure cause of P0131 or P0132 in the fuel system?	Check fuel system. NOTE: In this case, it is not necessary to inspect DTC P0136.	Go to step **3**.
3	**CHECK REAR OXYGEN SENSOR DATA.** 1) Warm-up the engine until engine coolant temperature is above 70°C (158°F), and keep the engine speed at 2,000 rpm to 3,000 rpm for two minutes. 2) Read data of rear oxygen sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: • Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA SHOWN ON DISPLAY FOR ENGINE". <Ref. to EN(DOHC TURBO)-36, 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 FU(DOHC TURBO)-44, Rear Oxygen Sensor.>
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*** ***(B135) No. 26 — (B19) No. 4:***	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*** ***(B19) No. 3 (+) — Engine ground (–):***	Is the voltage more than 0.2 V?	Replace rear oxygen sensor. <Ref. to FU(DOHC TURBO)-44, Rear Oxygen Sensor.>	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

No.	Step	Check	Yes	No
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 FU(DOHC TURBO)-44, Rear Oxygen Sensor.>

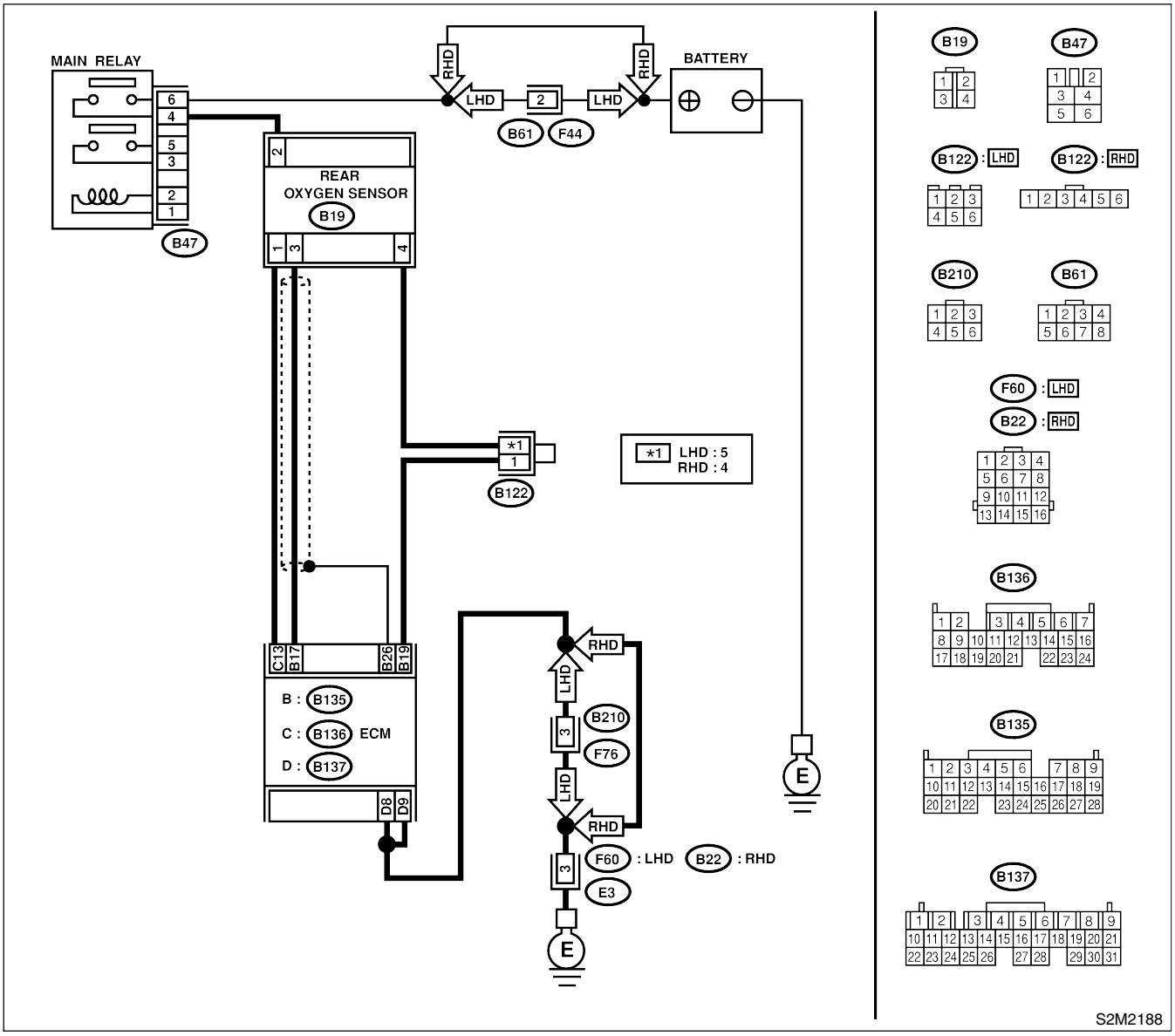
MEMO:

X: DTC P0139 — REAR OXYGEN SENSOR CIRCUIT SLOW RESPONSE — S088521B29

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0139.	Replace rear oxygen sensor. <Ref. to FU(DOHC TURBO)-44, Rear Oxygen Sensor.>

Y: DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) — S088521B33

NOTE:
For the diagnostic procedure, refer to DTC P0172. <Ref. to EN(DOHC TURBO)-161, DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

Z: DTC P0172 — FUEL TRIM MALFUNCTION (A/F TOO RICH) — S088521B32

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-36, 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(DOHC TURBO)-29, 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(DOHC TURBO)-36, 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 ***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 mass air flow and intake manifold pressure sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>

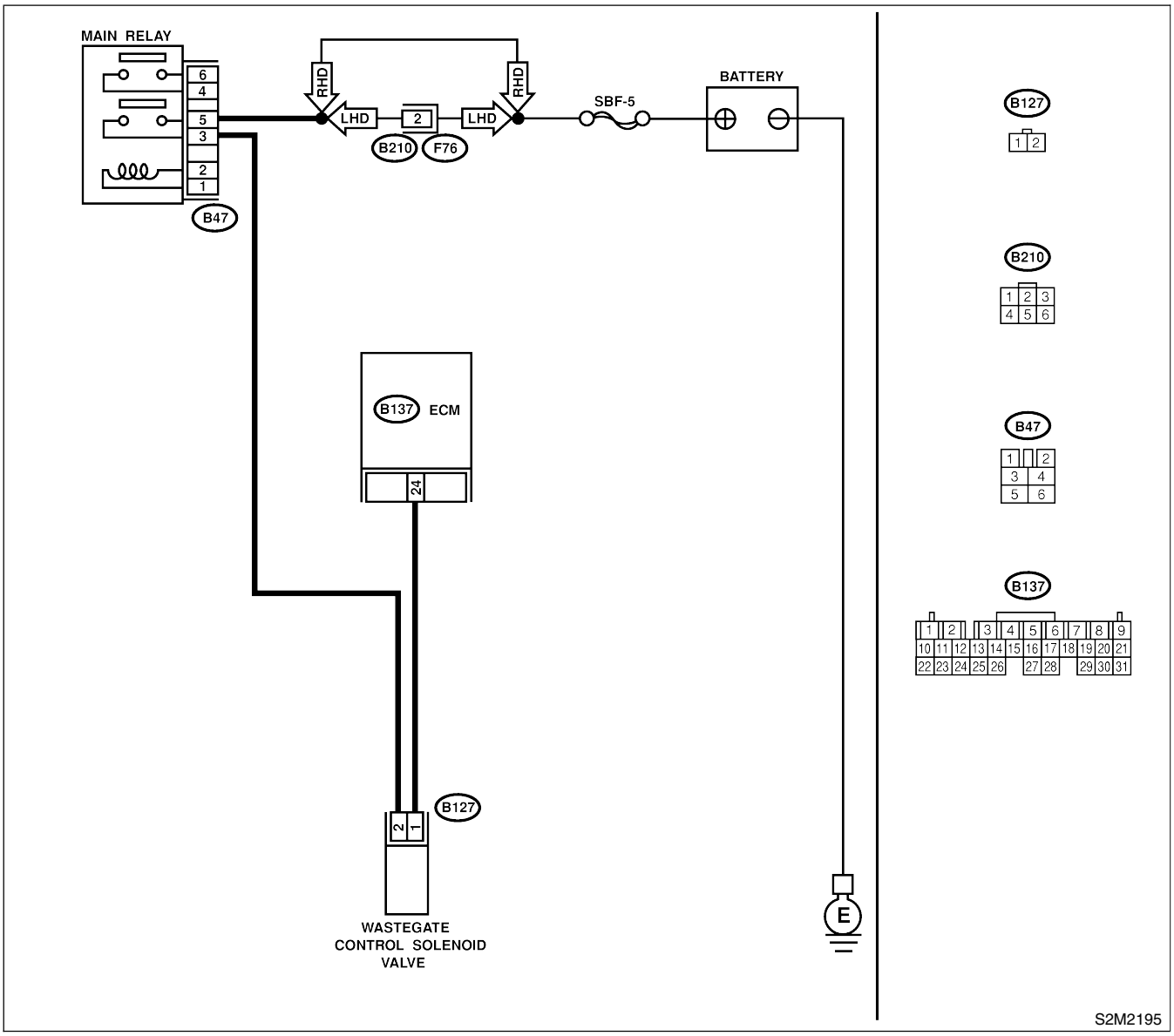
No.	Step	Check	Yes	No
7	**CHECK INTAKE AIR TEMPERATURE SENSOR.** 1) Start the engine and warm-up engine until coolant temperature is greater than 60°C (140°F). 2) Place the shift lever in neutral position. 3) Turn A/C switch to OFF. 4) Turn all accessory switches to OFF. 5) Open front hood. 6) Measure 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(DOHC TURBO)-36, 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 your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Check mass air flow and intake air temperature sensor. <Ref. to FU(DOHC TURBO)-34, Mass Air Flow and Intake Air Temperature Sensor.>

AA: DTC P0244 — WASTEGATE CONTROL SOLENOID VALVE MALFUNCTION (HIGH INPUT) — S088521H65

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



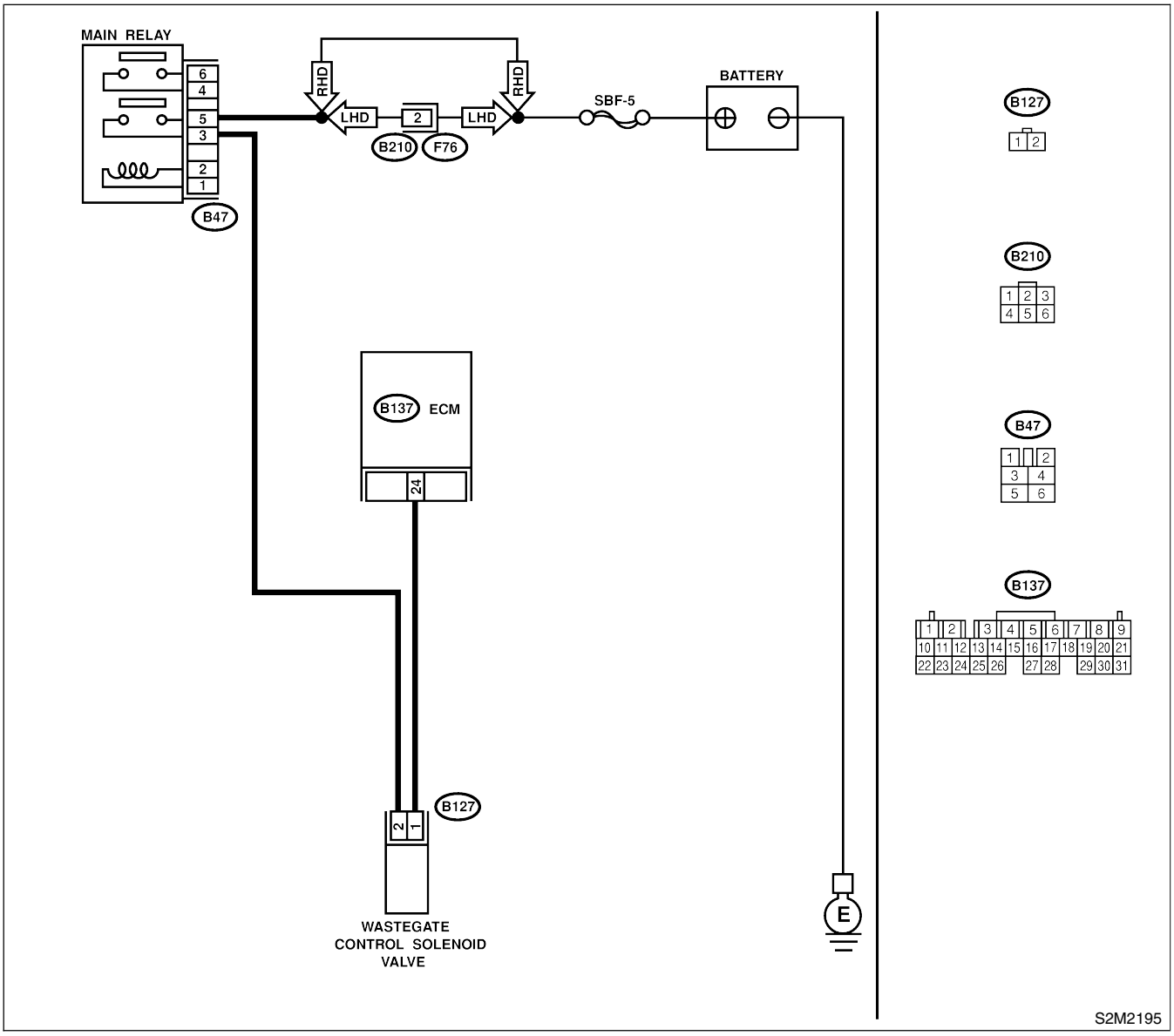
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0245 or P0246?	Inspect DTC P0245 or P0246 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0121.	Replace waste-gate control sole-noid valve. <Ref. to FU(DOHC TURBO)-41, Wastegate Control Solenoid Valve.>

AB: DTC P0245 — WASTEGATE CONTROL SOLENOID VALVE CIRCUIT LOW INPUT — S088521H66

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B137) No. 24 (+) — 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 your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Go to step **2**.
2	**CHECK HARNESS BETWEEN WASTEGATE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from wastegate control solenoid valve and ECM. 3) Measure resistance of harness between wastegate control solenoid valve connector and engine ground. ***Connector & terminal*** ***(B127) No. 1 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and wastegate control solenoid valve connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN WASTEGATE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** Measure resistance of harness between ECM and wastegate control solenoid valve of harness connector. ***Connector & terminal*** ***(B137) No. 24 — (B127) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair open circuit in harness between ECM and wastegate control solenoid valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and wastegate control solenoid valve connector
4	**CHECK WASTEGATE CONTROL SOLENOID VALVE.** 1) Remove wastegate control solenoid valve. 2) Measure resistance between purge control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance between 30 and 34 Ω?	Go to step **5**.	Replace wastegate control solenoid valve. <Ref. to FU(DOHC TURBO)-41, Wastegate Control Solenoid Valve.>
5	**CHECK POWER SUPPLY TO WASTEGATE CONTROL SOLENOID VALVE.** 1) Turn ignition switch to ON. 2) Measure voltage between wastegate control solenoid valve and engine ground. ***Connector & terminal*** ***(B127) No. 2 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Go to step **6**.	Repair open circuit in harness between main relay and wastegate control solenoid valve connector.

No.	Step	Check	Yes	No
6	**CHECK POOR CONTACT.** Check poor contact in wastegate control solenoid valve connector.	Is there poor contact in wastegate control solenoid valve connector?	Repair poor contact in wastegate control solenoid valve connector.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

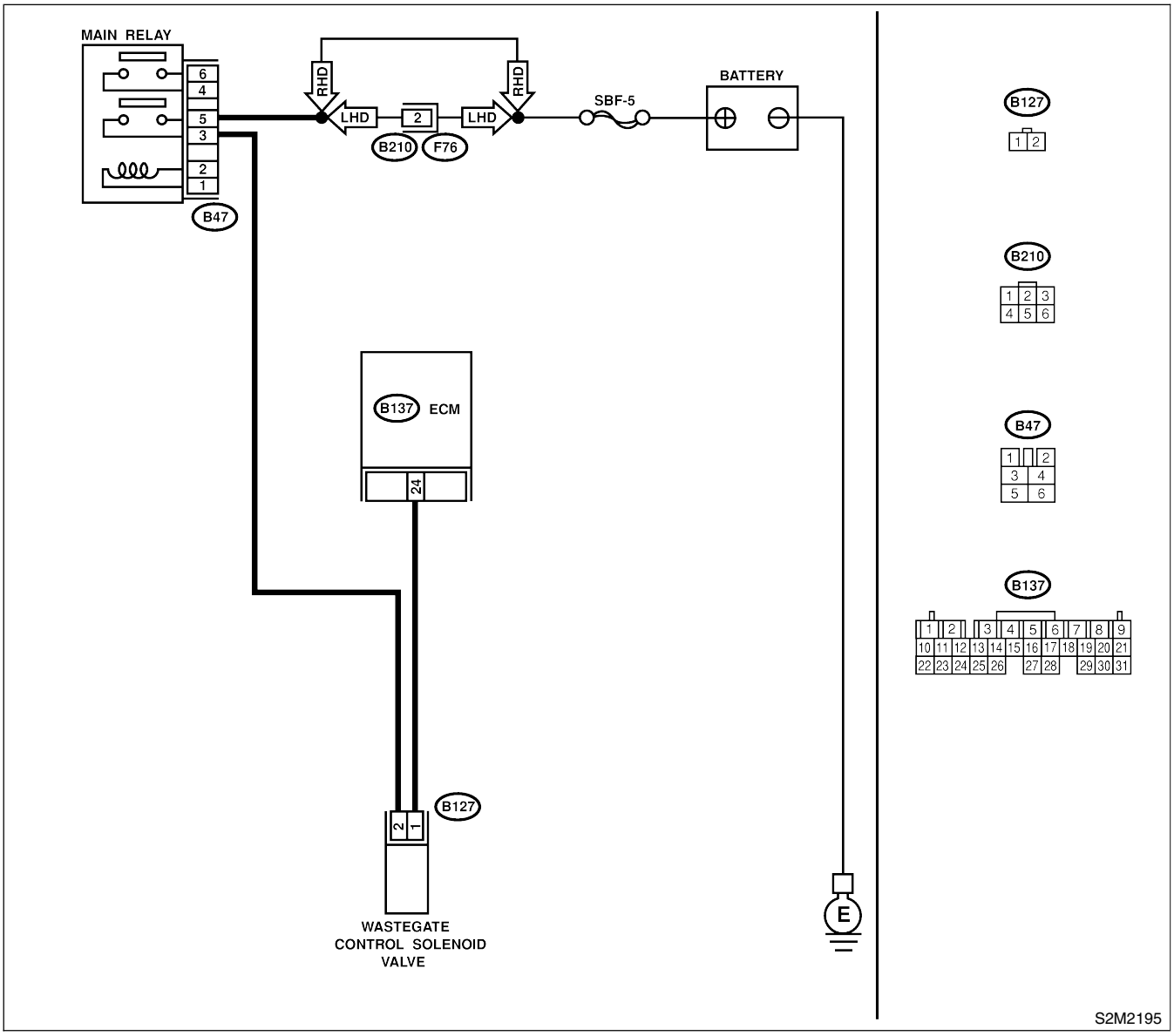
MEMO:

AC: DTC P0246 — WASTEGATE CONTROL SOLENOID VALVE CIRCUIT HIGH INPUT — S088521H67

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Erroneous idling

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B137) No. 24 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **3**.	Go to step **2**.
2	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>
3	**CHECK HARNESS BETWEEN WASTEGATE CONTROL SOLENOID VALVE AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from wastegate control solenoid valve. 3) Turn ignition switch to ON. 4) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B137) No. 24 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and wastegate control solenoid valve connector. After repair, replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Go to step **4**.
4	**CHECK WASTEGATE CONTROL SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Measure resistance between wastegate control solenoid valve terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance less than 1 Ω?	Replace wastegate control solenoid valve <Ref. to FU(DOHC TURBO)-41, Wastegate Control Solenoid Valve.> and ECM <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Go to step **5**.
5	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

AD: DTC P0301 — CYLINDER 1 MISFIRE DETECTED — S088521B37

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(DOHC TURBO)-172, DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AE: DTC P0302 — CYLINDER 2 MISFIRE DETECTED — S088521B38

NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(DOHC TURBO)-172, DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

AF: DTC P0303 — CYLINDER 3 MISFIRE DETECTED — S088521B39

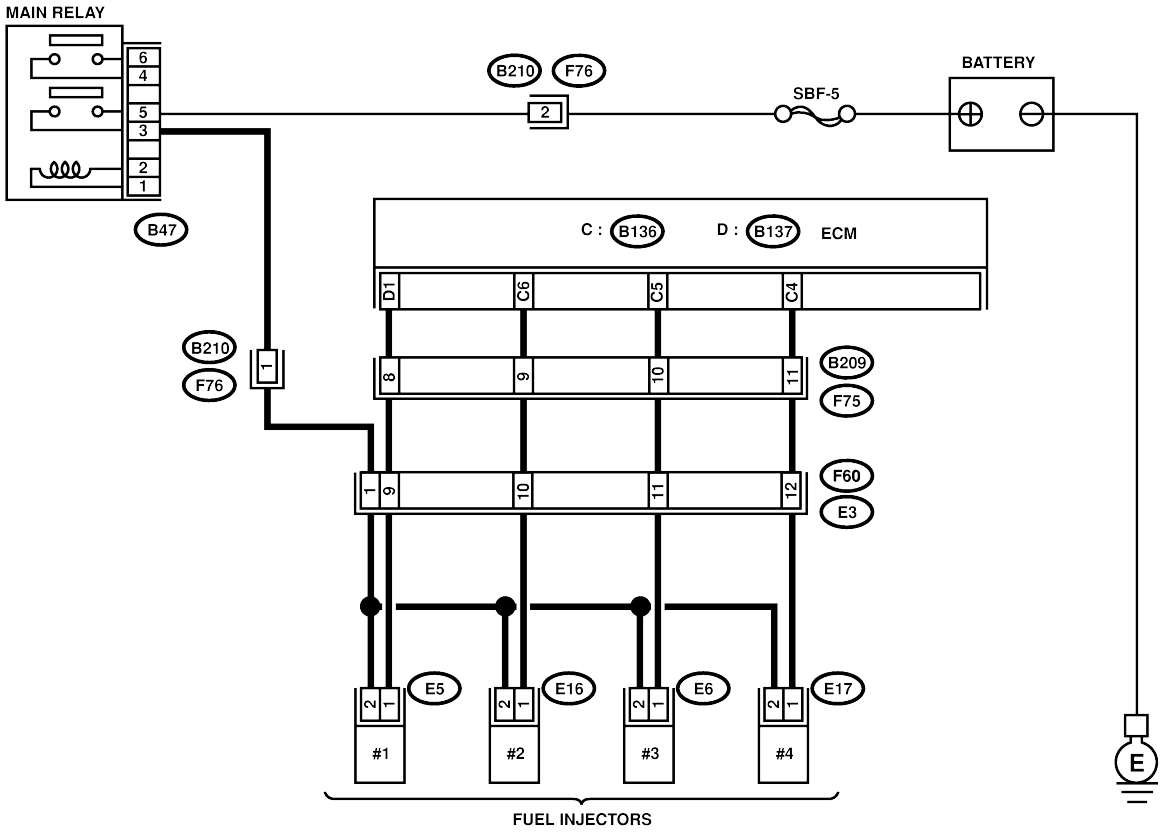
NOTE:
For the diagnostic procedure, refer to DTC P0304. <Ref. to EN(DOHC TURBO)-172, DTC P0304 — CYLINDER 4 MISFIRE DETECTED —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

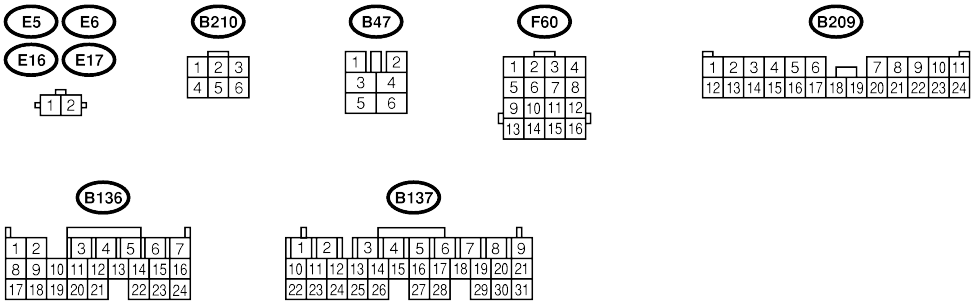
AG: DTC P0304 — CYLINDER 4 MISFIRE DETECTED — S088521B40

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**

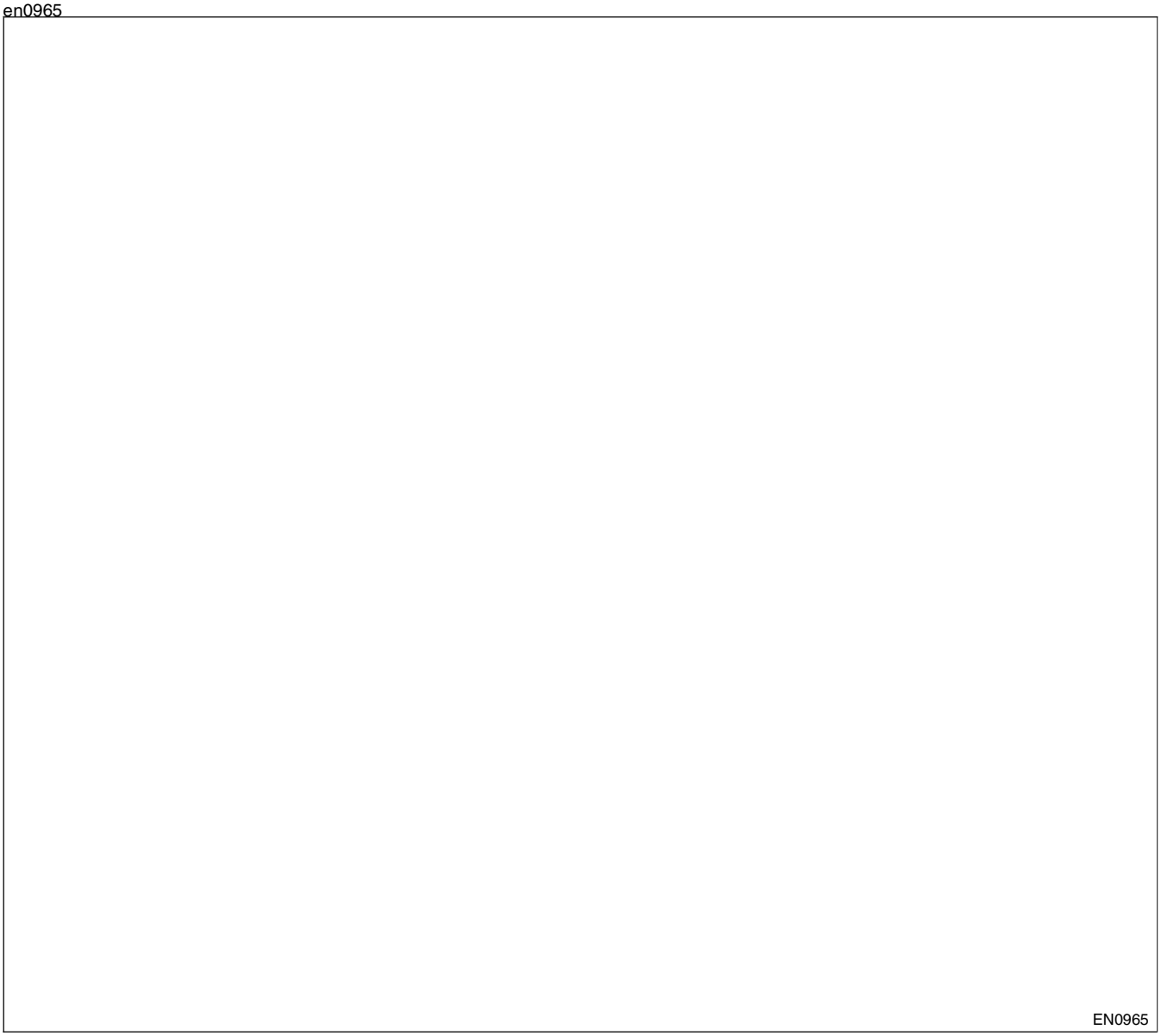




S2M2186

- **RHD MODEL**

en0965



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, P0117, P0118 or P0125?	Inspect DTC P0106, P0107, P0108, P0117, P0118 or P0125 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> 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 (B137) No. 1 (+) — Chassis ground (–):*** ***#2 (B136) No. 6 (+) — Chassis ground (–):*** ***#3 (B136) No. 5 (+) — Chassis ground (–):*** ***#4 (B136) No. 4 (+) — 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) Disconnect connector from ECM. 4) 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 (B137) No. 1 — (E5) No. 1:*** ***#2 (B136) No. 6 — (E16) No. 1:*** ***#3 (B136) No. 5 — (E6) No. 1:*** ***#4 (B136) No. 4 — (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

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(DOHC TURBO)-37, 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 • 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 (B137) No. 1 (+) — Chassis ground (–):*** ***#2 (B136) No. 6 (+) — Chassis ground (–):*** ***#3 (B136) No. 5 (+) — Chassis ground (–):*** ***#4 (B136) No. 4 (+) — 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(DOHC TURBO)-47, 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(DOHC TURBO)-37, Fuel Injector.> and ECM <Ref. to FU(DOHC TURBO)-47, 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(DOHC TURBO)-57, 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(DOHC TURBO)-48, 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(DOHC TURBO)-47, 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

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(DOHC TURBO)-36, Subaru Select Monitor.> ● 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 ● Fuel injector ● Compression ratio	Go to DTC P0171 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 - FUEL TRIM MALFUNCTION (A/F TOO LEAN) -, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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 “IGNITION CONTROL SYSTEM” of #1 and #2 cylinders side. <Ref. to EN(DOHC TURBO)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 - FUEL TRIM MALFUNCTION (A/F TOO LEAN) -, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
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 “16. D: IGNITION CONTROL SYSTEM” of #3 and #4 cylinders side. <Ref. to EN(DOHC TURBO)-72, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Go to DTC P0171 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 - FUEL TRIM MALFUNCTION (A/F TOO LEAN) -, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
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 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

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 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
26	**CYLINDER AT RANDOM**	Is the engine idle rough?	Go to DTC P0171 and P0172. <Ref. to EN(DOHC TURBO)-160, DTC P0171 — FUEL TRIM MALFUNCTION (A/F TOO LEAN) —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>	Repair or replace faulty parts. NOTE: Check the following items. • Spark plugs • Fuel injectors • Compression ratio

MEMO:

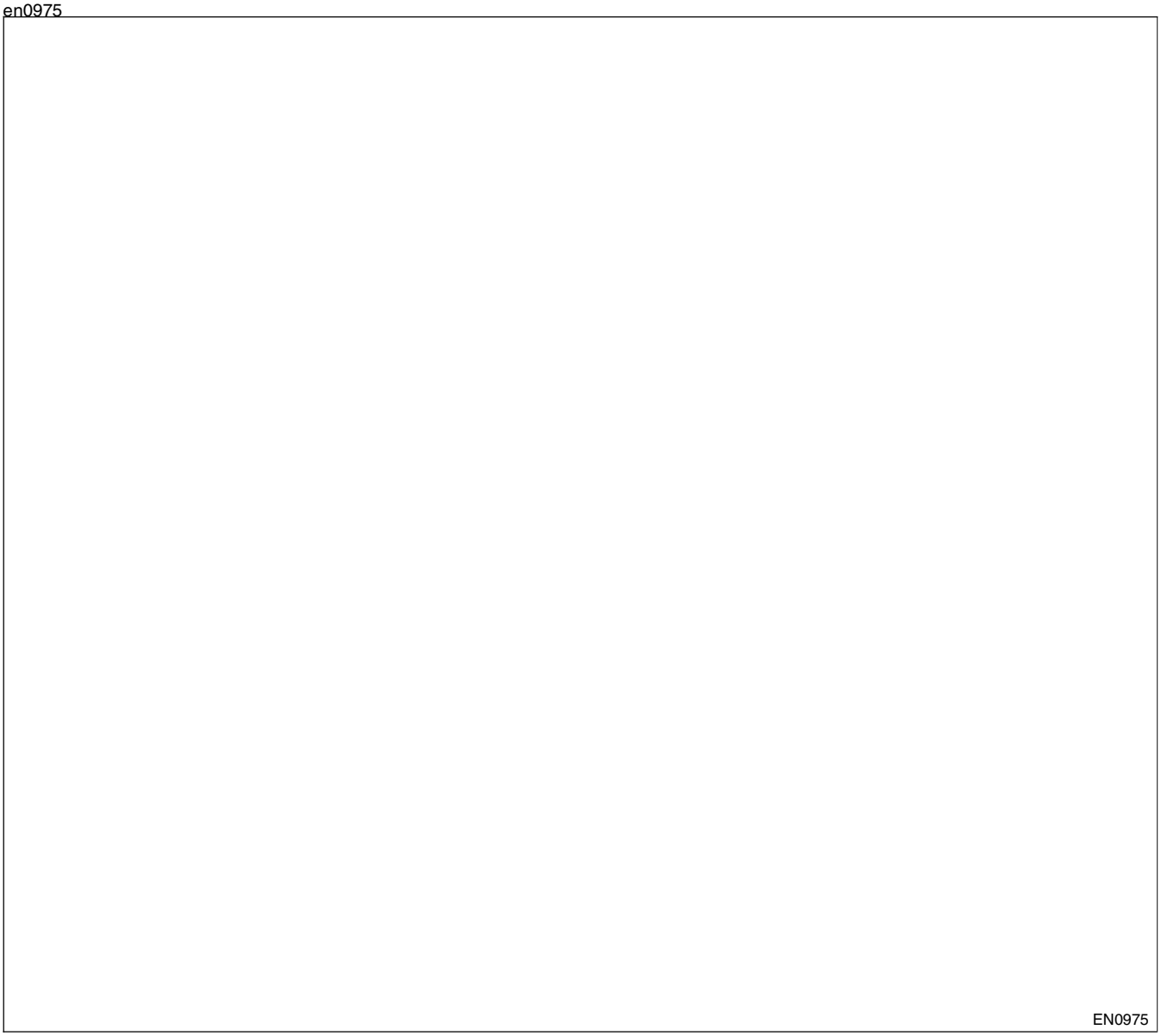
AH: DTC P0327 — KNOCK SENSOR CIRCUIT LOW INPUT — S088521F94

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0975



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*** ***(B135) No. 4 — Chassis ground:***	Is the resistance more than 700 kΩ?	Go to step **2**.	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
2	**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 **3**.	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
3	**CHECK CONDITION OF KNOCK SENSOR INSTALLATION.**	Is the knock sensor installation bolt tightened securely?	Replace knock sensor. <Ref. to FU(DOHC TURBO)-32, Knock Sensor.>	Tighten knock sensor installation bolt securely.

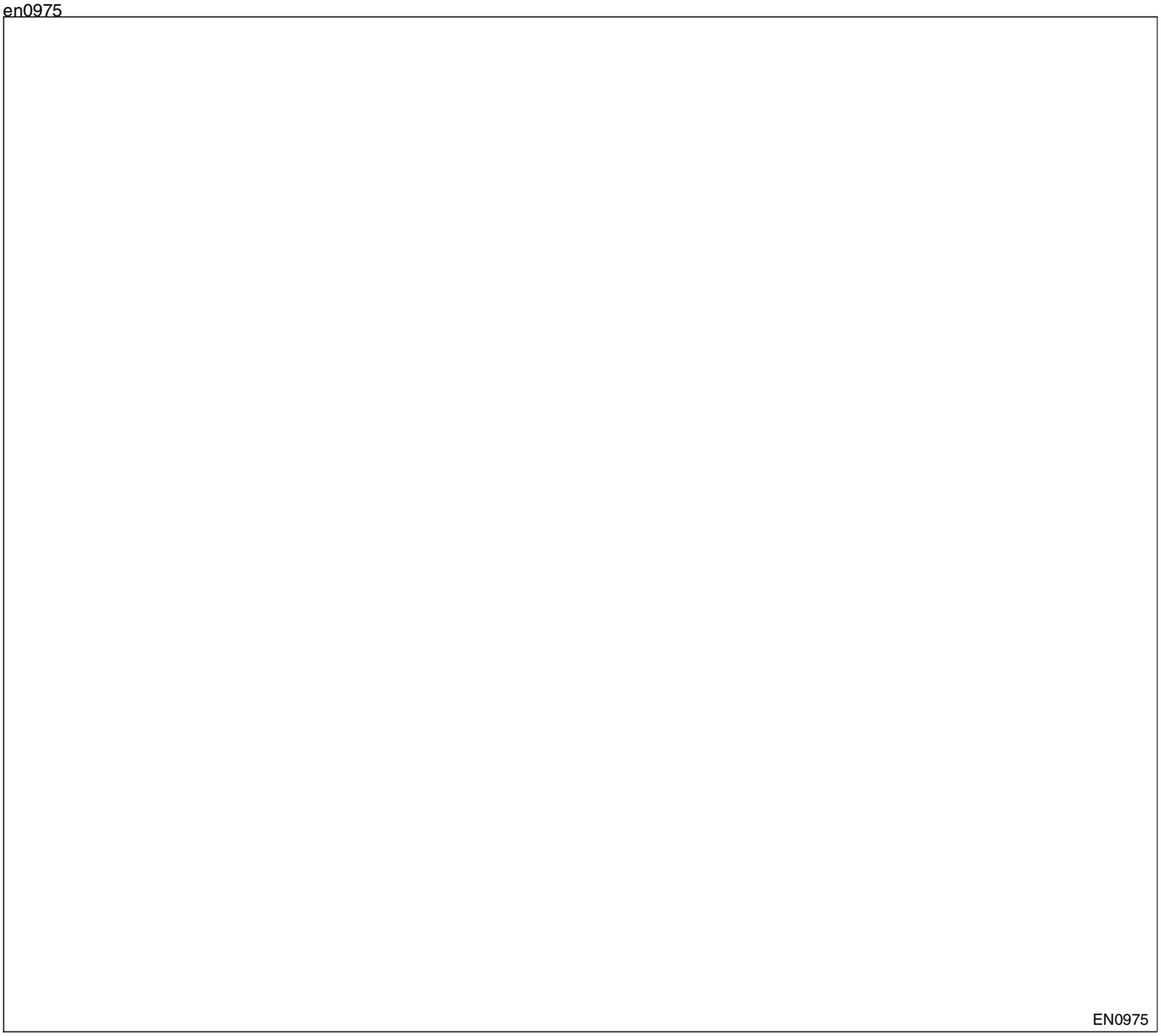
AI: DTC P0328 — KNOCK SENSOR CIRCUIT HIGH INPUT — S088521F95

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0975



No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN KNOCK SENSOR AND ECM CONNECTOR.** Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 4 — Chassis ground:***	Is the resistance less than 400 kΩ?	Go to step **2**.	Go to step **3**.
2	**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(DOHC TURBO)-32, 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.
3	**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*** ***(B135) 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	Repair poor contact in ECM connector.

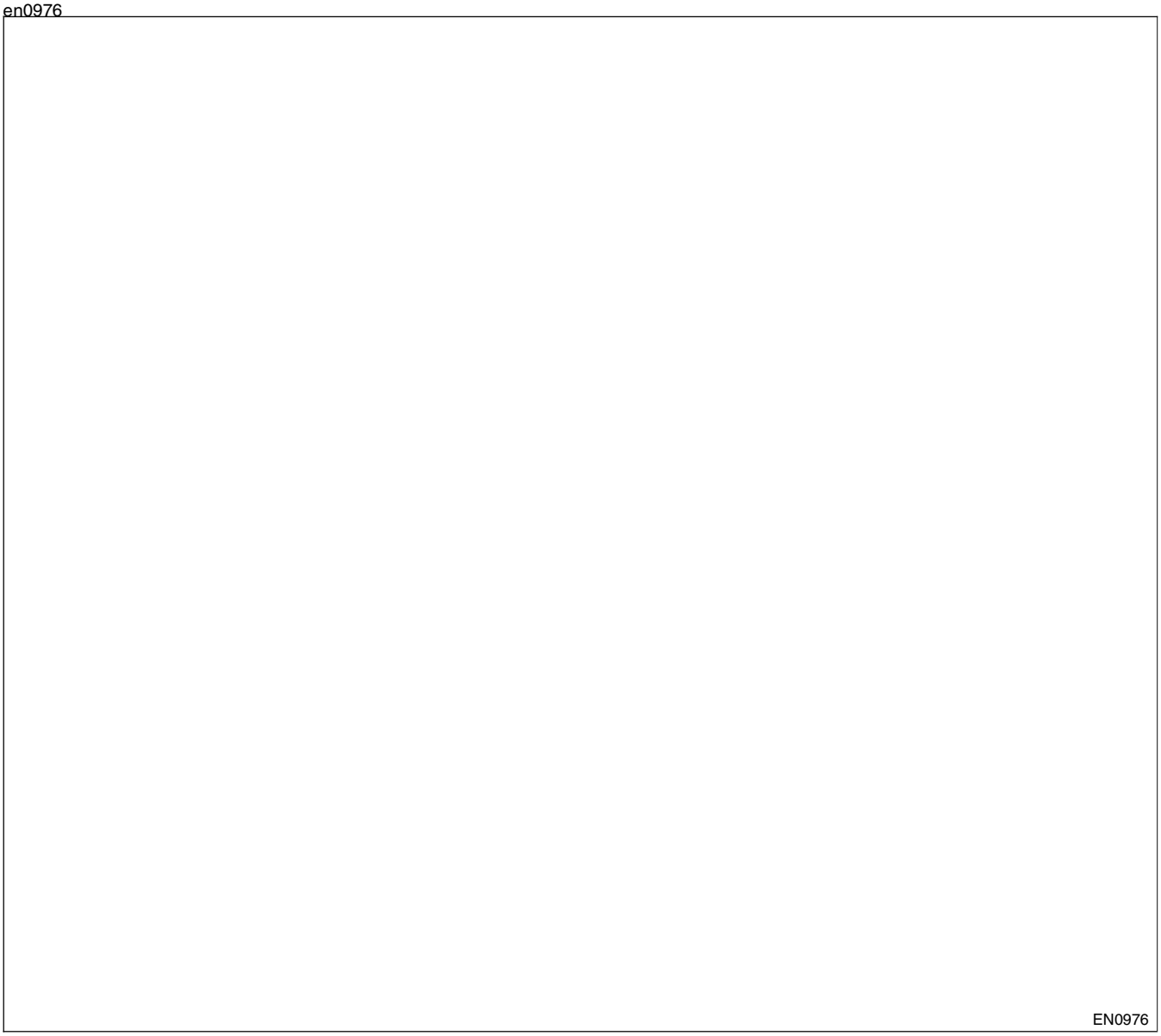
AJ: DTC P0335 — CRANKSHAFT POSITION SENSOR CIRCUIT MALFUNCTION — S088521B42

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0976



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	Go to step **2**.
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
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(DOHC TURBO)-30, Crankshaft Position Sensor.>

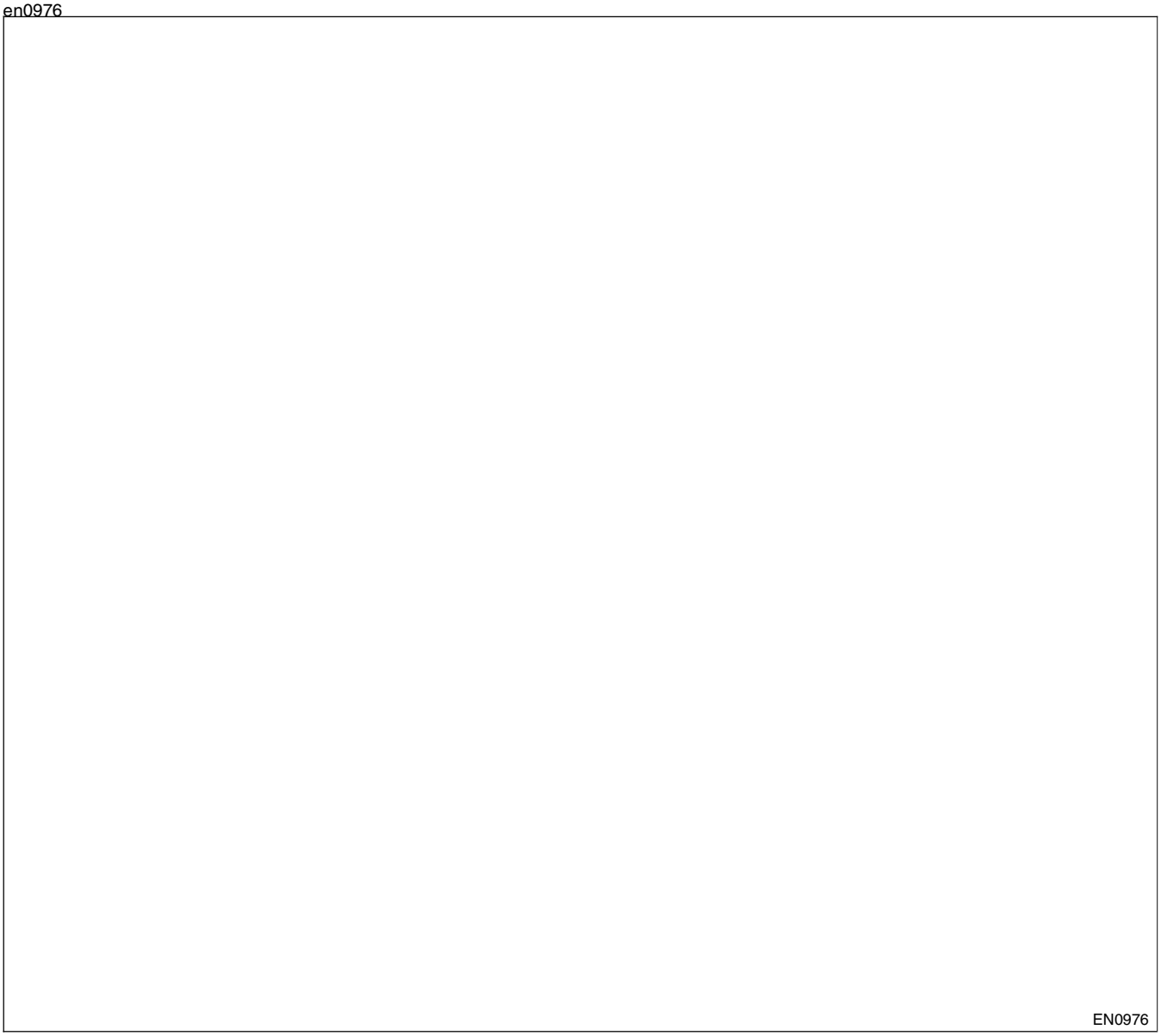
AK: DTC P0336 — CRANKSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S088521B43

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0976



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 "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	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.
3	**CHECK CRANKSHAFT SPROCKET.** Remove front belt cover.	Are crankshaft sprocket teeth cracked or damaged?	Replace crankshaft sprocket. <Ref. to FU(DOHC TURBO)-30, Crankshaft Position Sensor.>	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(DOHC TURBO)-48, Timing Belt Assembly.>	Replace crankshaft position sensor. <Ref. to FU(DOHC TURBO)-30, Crankshaft Position Sensor.>

AL: DTC P0340 — CAMSHAFT POSITION SENSOR CIRCUIT MALFUNCTION

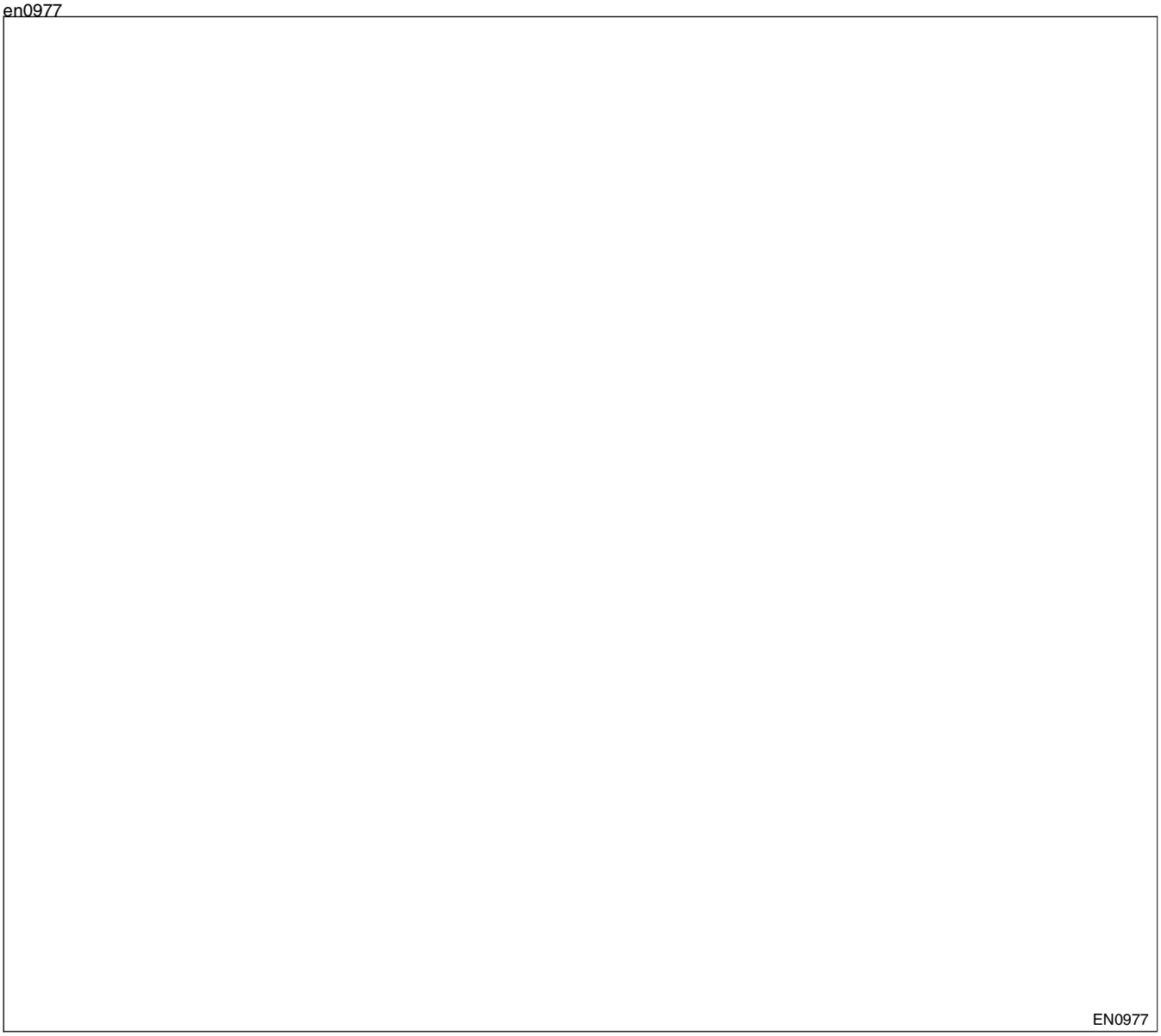
S088521B44

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0977



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	Go to step **2**.
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
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(DOHC TURBO)-31, Camshaft Position Sensor.>

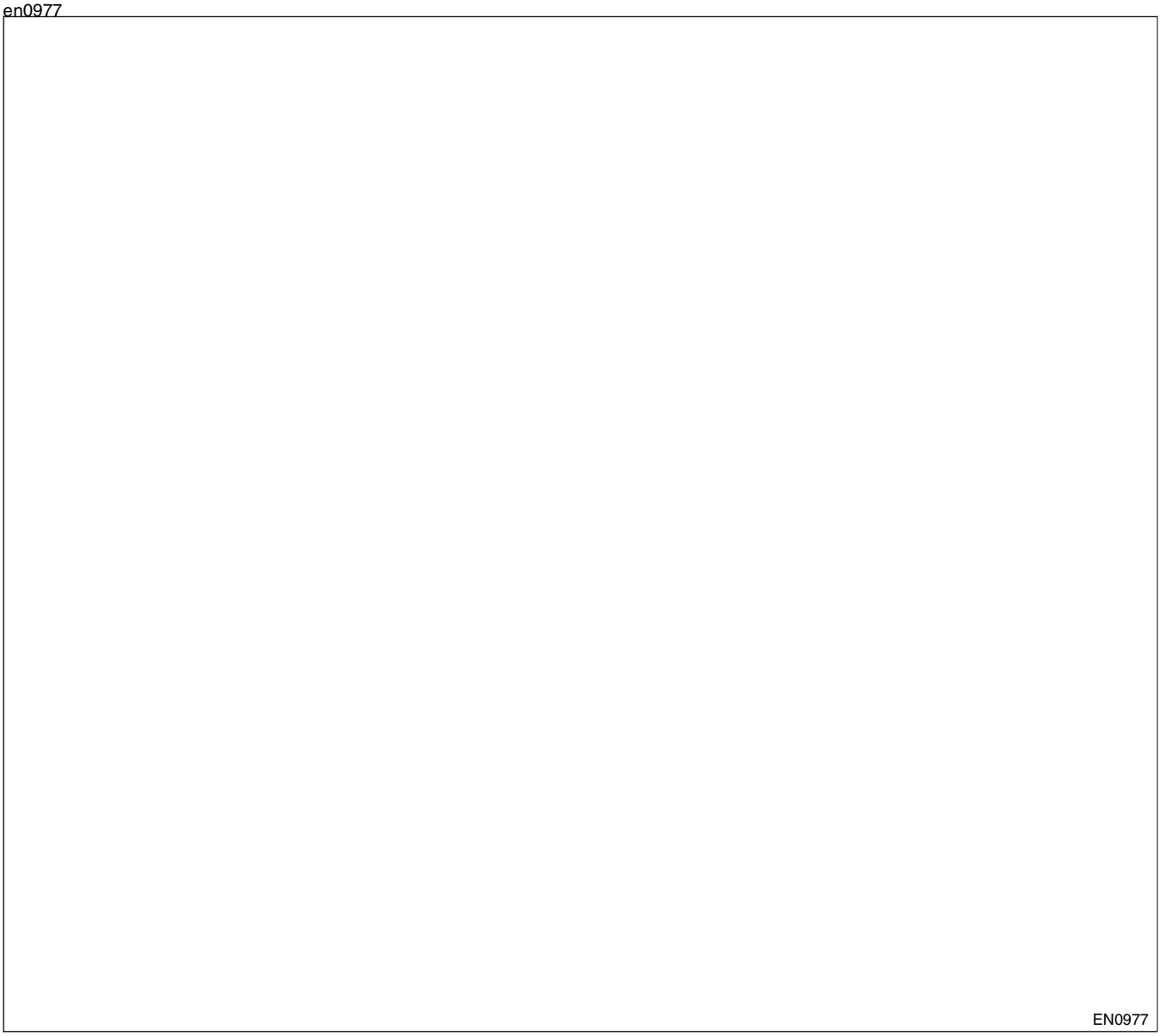
AM: DTC P0341 — CAMSHAFT POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S088521B45

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**

en0977



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 "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
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	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

No.	Step	Check	Yes	No
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(DOHC TURBO)-31, Camshaft Position Sensor.>
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(DOHC TURBO)-47, Belt Cover.>	Are camshaft sprocket teeth cracked or damaged?	Replace camshaft sprocket. <Ref. to ME(DOHC TURBO)-56, 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 499207400 CAMSHAFT SPROCKET WRENCH	Is timing belt dislocated from its proper position?	Repair installation condition of timing belt. <Ref. to ME(DOHC TURBO)-48, Timing Belt Assembly.>	Replace camshaft position sensor. <Ref. to FU(DOHC TURBO)-31, Camshaft Position Sensor.>

MEMO:

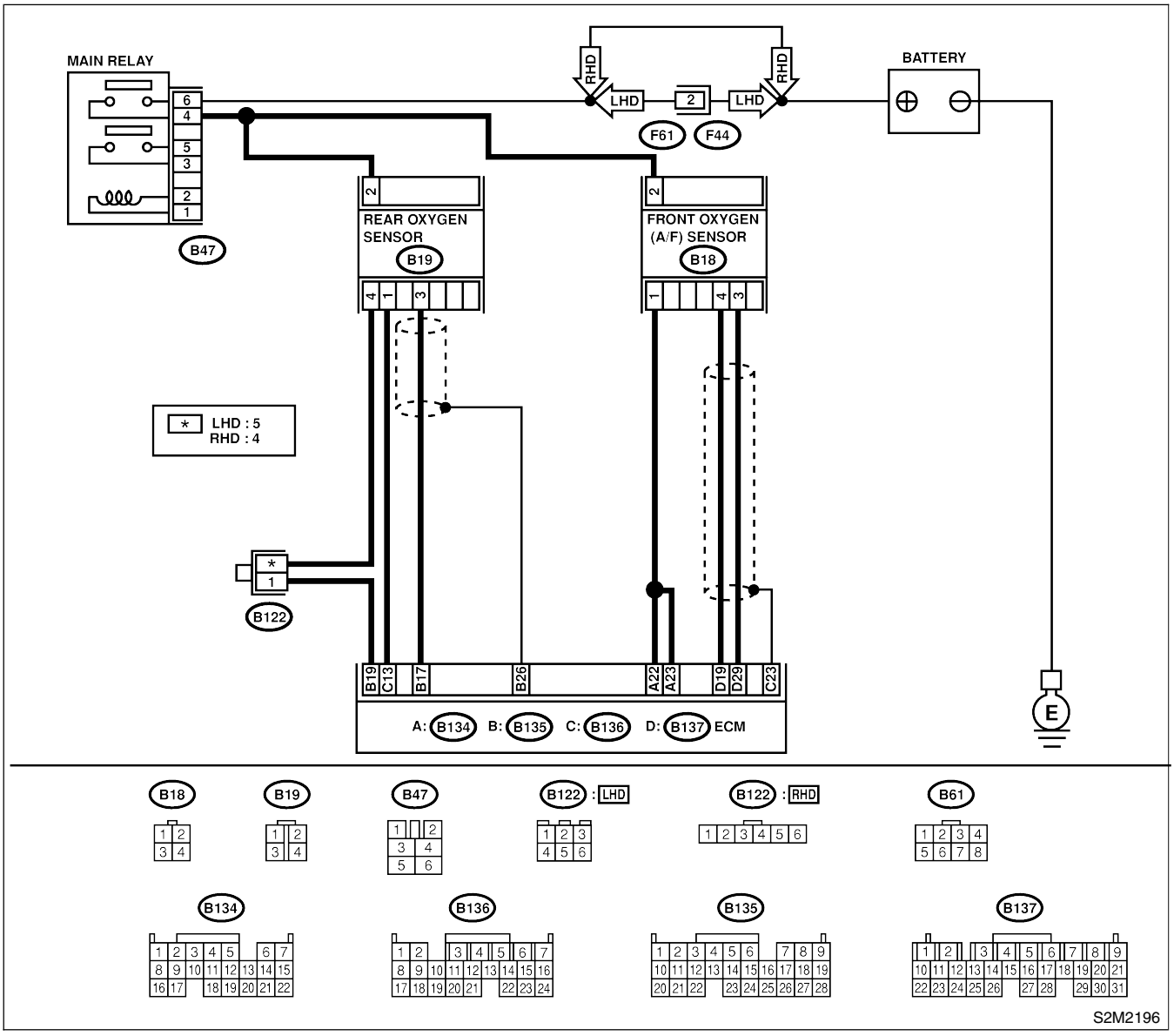
AN: DTC P0420 — CATALYST SYSTEM EFFICIENCY BELOW THRESHOLD

S088521B46

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



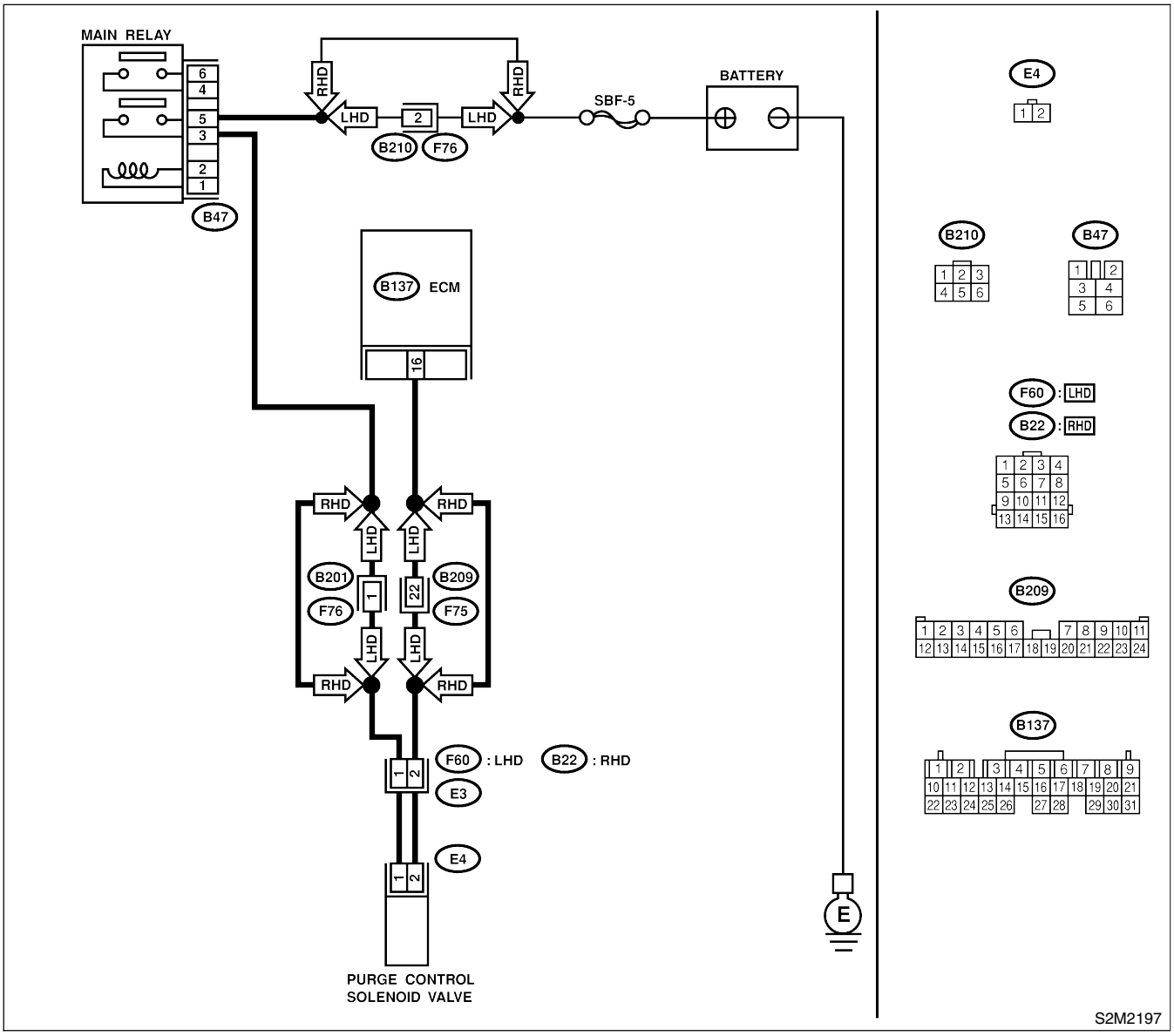
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0031, P0032, P0131, P0132, P0133, P1130, P1131, P1134, P1139, P0037, P0038, P0136 and P0139?	Inspect the relevant DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0420.	Go to step **2**.
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(DOHC TURBO)-2, General Description.>	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(DOHC TURBO)-3, Front Catalytic Converter.> and rear catalytic converter. <Ref. to EC(DOHC TURBO)-4, 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(DOHC TURBO)-3, Front Catalytic Converter.>	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

AO: DTC P0444 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT LOW INPUT — S088521G47

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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*** ***(B137) No. 16 (+) — 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 your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.	Go to step **2**.
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*** ***(B137) No. 16 — (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
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 EC(DOHC TURBO)-7, 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.

No.	Step	Check	Yes	No
6	**CHECK POOR CONTACT.** Check poor contact in purge control solenoid valve connector.	Is there poor contact in purge control solenoid valve connector?	Repair poor contact in purge control solenoid valve connector.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

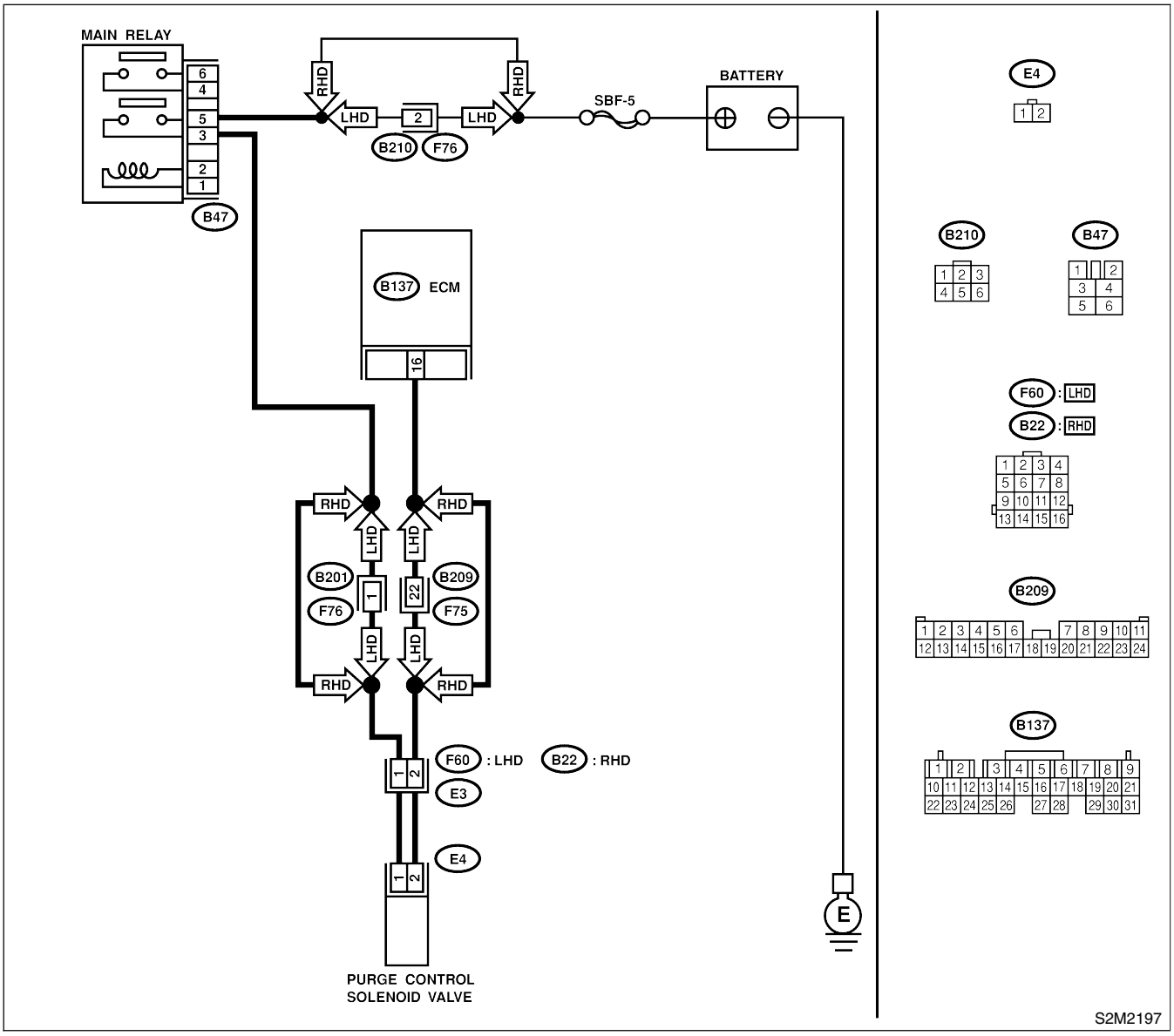
MEMO:

AP: DTC P0445 — EVAPORATIVE EMISSION CONTROL SYSTEM PURGE CONTROL VALVE CIRCUIT HIGH INPUT — S088521G48

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-48, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B137) No. 16 (+) — 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*** ***(B137) No. 16 (+) — 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.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, 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*** ***(B137) No. 16 (+) — 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(DOHC TURBO)-47, 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 EC(DOHC TURBO)-7, Purge Control Solenoid Valve.> and ECM <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Go to step **6**.

No.	Step	Check	Yes	No
6	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

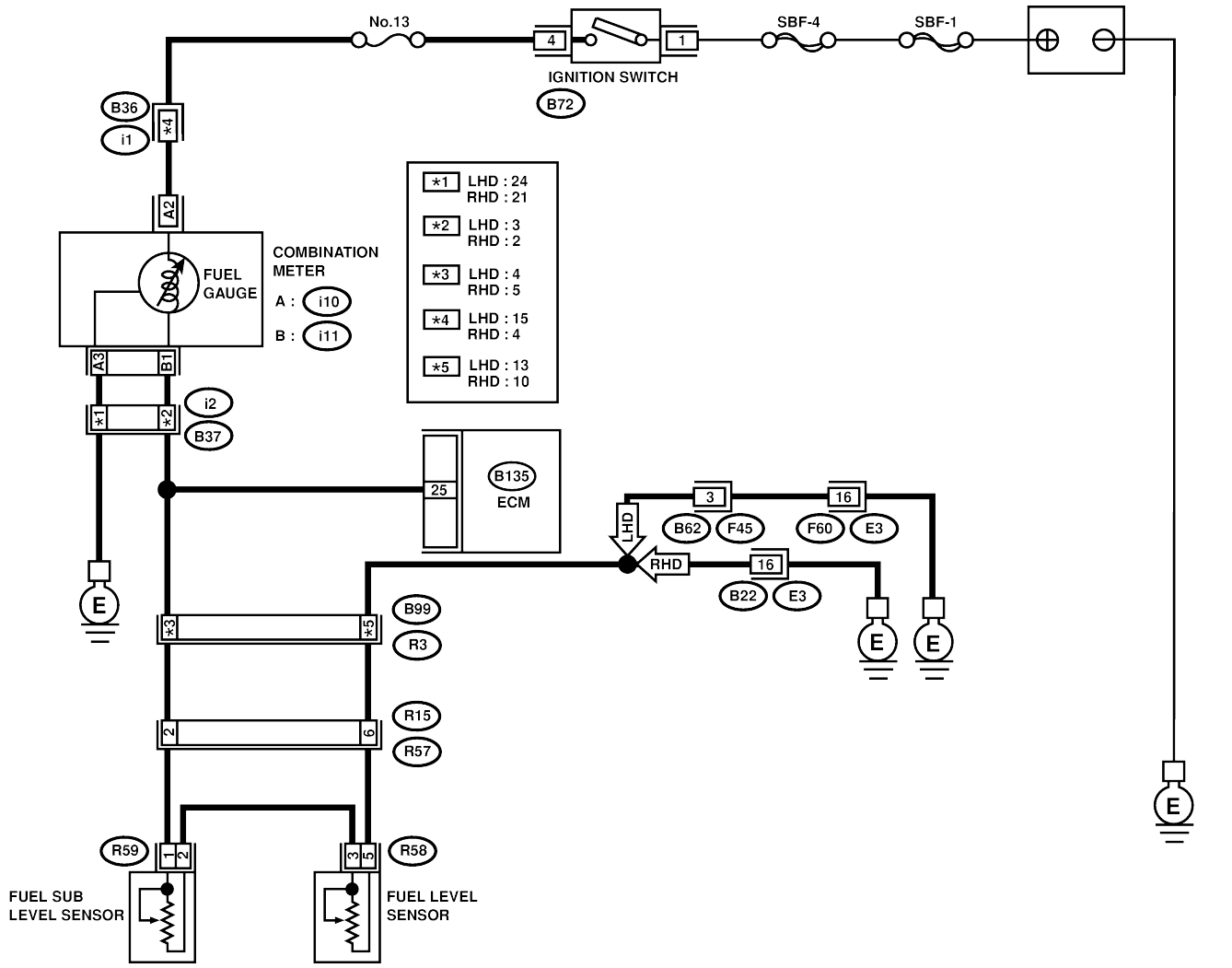
MEMO:

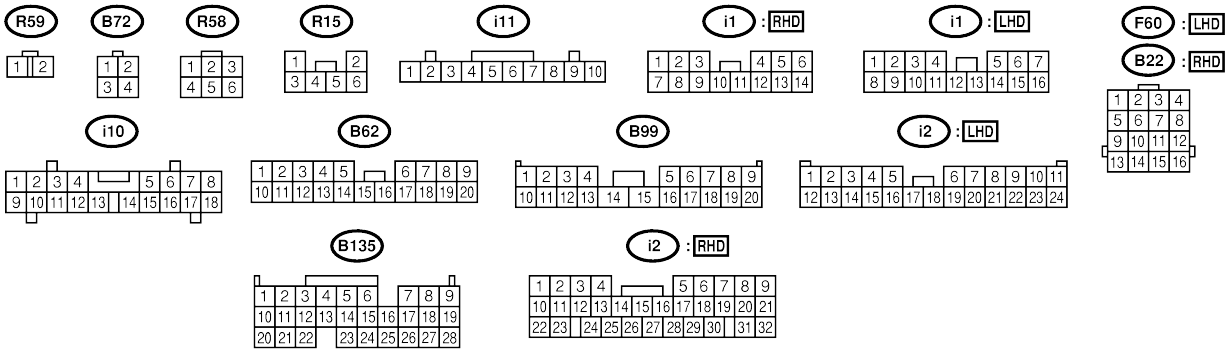
AQ: DTC P0461 — FUEL LEVEL SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM — S088521B54

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**





S2M2198

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 “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect this trouble.	Replace fuel level sensor <Ref. to FU(DOHC TURBO)-62, Fuel Level Sensor.> and fuel sub level sensor <Ref. to FU(DOHC TURBO)-63, Fuel Sub Level Sensor.>

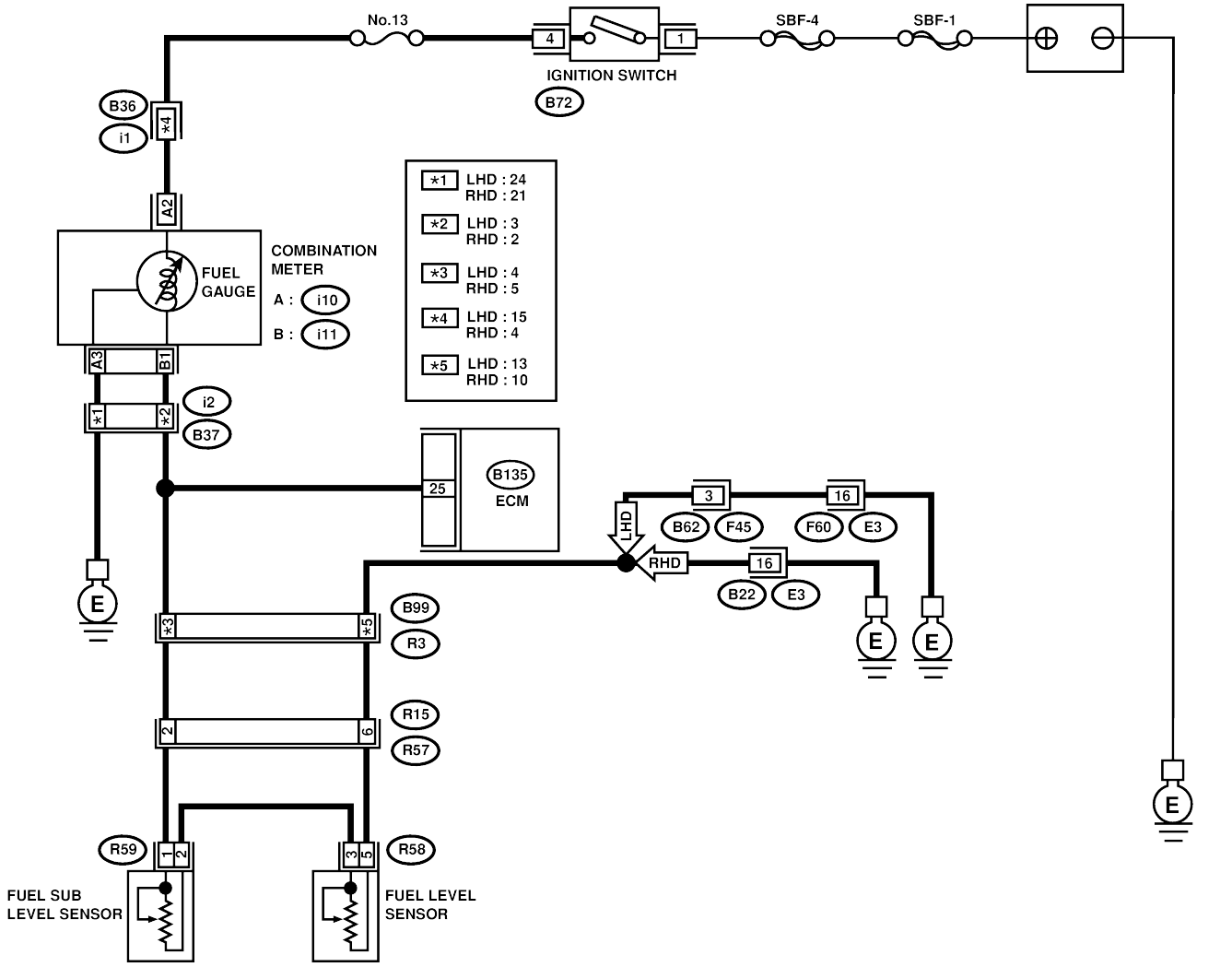
MEMO:

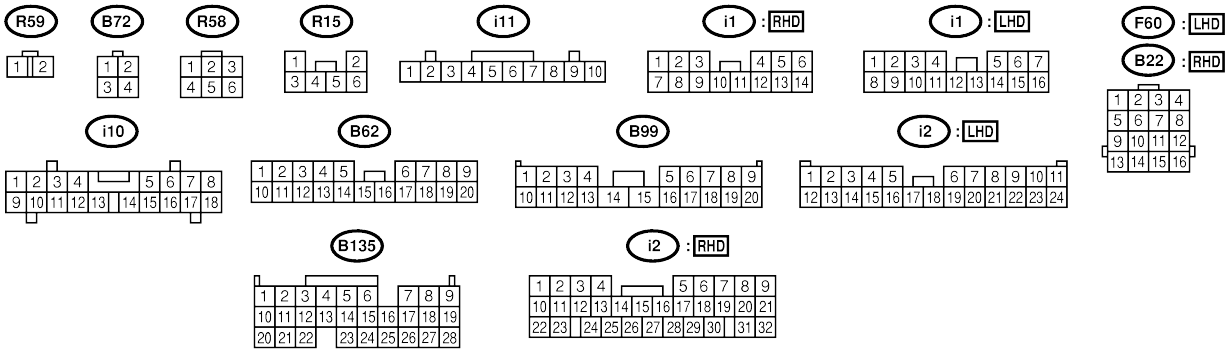
AR: DTC P0462 — FUEL LEVEL SENSOR CIRCUIT LOW INPUT — S088521B55

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**





S2M2198

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-4, Combination Meter System.>
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*** ***(B135) No. 25 (+) — Chassis ground (–):***	Is the voltage less than 0.12 V?	Go to step **6**.	Go to step **3**.
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(DOHC TURBO)-36, 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
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*** ***(B135) No. 25 (+) — 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), (i12) and ECM connector. 3) Measure resistance between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 25 — 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.

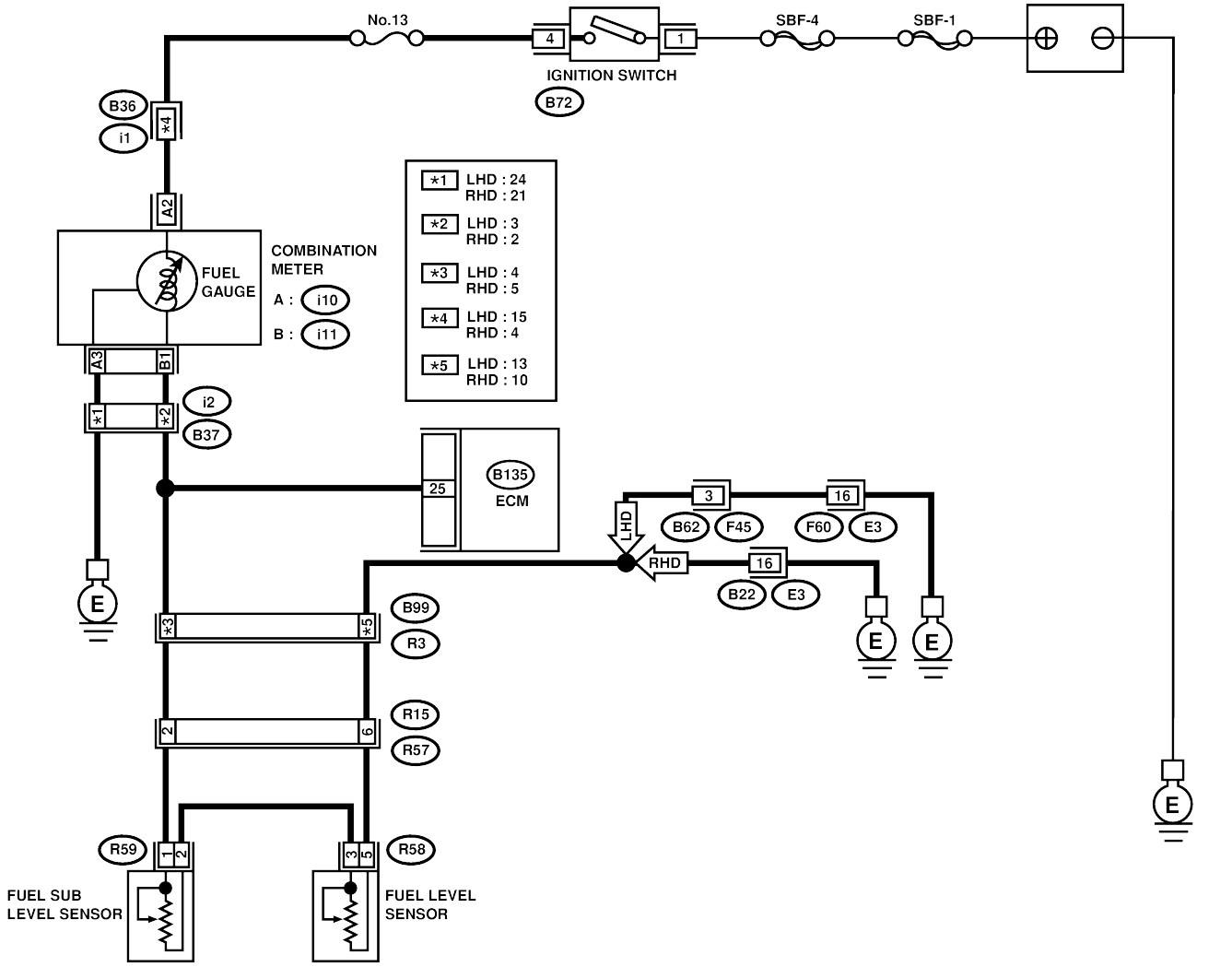
No.	Step	Check	Yes	No
6	**CHECK HARNESS BETWEEN ECM AND COMBINATION METER.** Measure resistance between ECM and combination meter connector. ***Connector & terminal*** ***(B135) No. 25 — (i11) No. 1:***	Is the resistance less than 10 Ω?	Repair or replace combination meter. <Ref. to IDI-4, Combination Meter System.>	Repair open circuit between ECM and combination meter connector. NOTE: In this case, repair the following: Poor contact in coupling connector
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.
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.** 1) Remove fuel pump assembly. <Ref. to FU(DOHC TURBO)-60, Fuel Pump.> 2) Measure resistance between fuel level sensor and terminals with its float set to the full position. ***Terminals*** ***No. 3 — No. 5:***	Is the resistance between 0.5 and 2.5 Ω?	Go to step **10**.	Replace fuel level sensor.
10	**CHECK FUEL SUB LEVEL SENSOR.** 1) Remove fuel sub level sensor. <Ref. to FU(DOHC TURBO)-63, Fuel Sub 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.

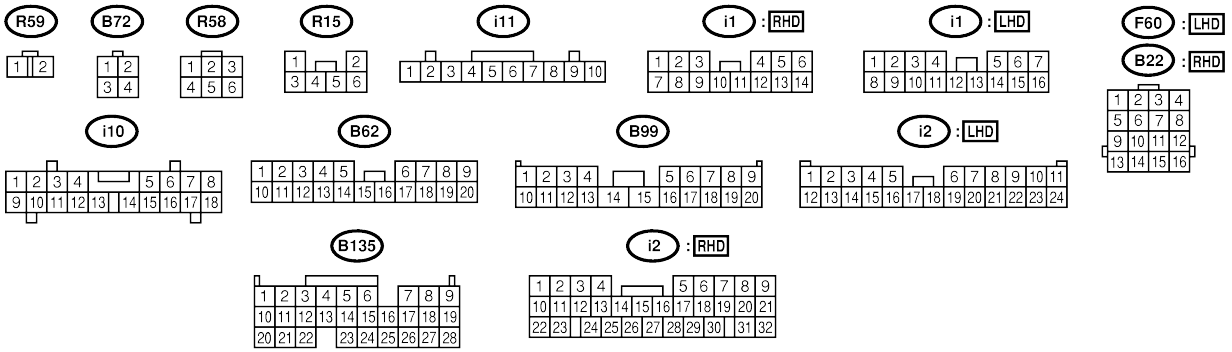
AS: DTC P0463 — FUEL LEVEL SENSOR CIRCUIT HIGH INPUT — S088521B56

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode<Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**





S2M2198

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-4, Combination Meter System.>
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*** ***(B135) No. 25 (+) — 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
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*** ***(B135) No. 25 (+) — 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*** ***(B135) No. 25 — (R15) No. 2:***	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. 6 — 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

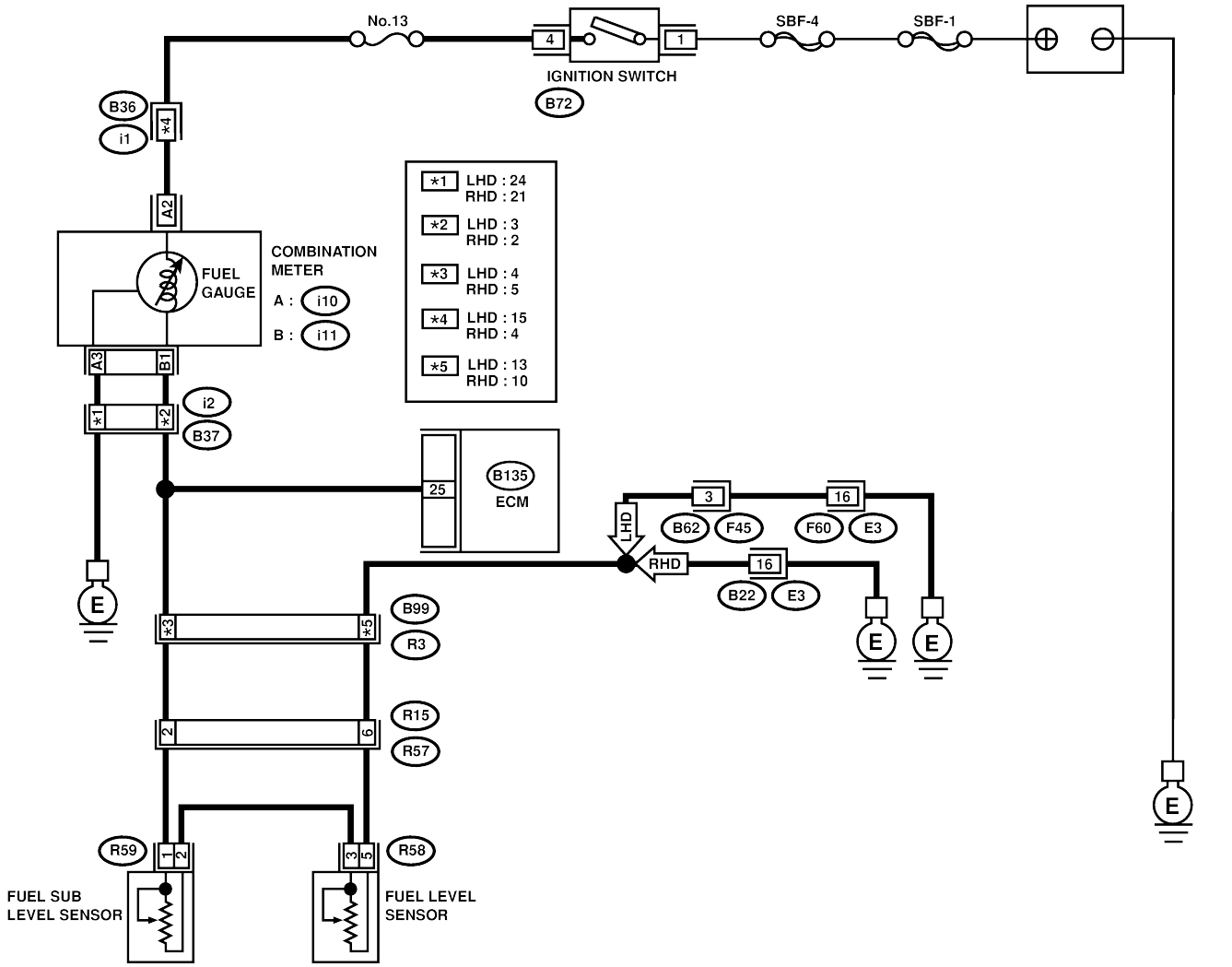
No.	Step	Check	Yes	No
6	**CHECK FUEL TANK CORD.** 1) Disconnect connector from fuel level sensor. 2) Measure resistance between fuel level sensor and coupling connector. ***Connector & terminal*** ***(R57) No. 6 — (R58) No. 5:***	Is the resistance less than 10 Ω?	Go to step **7**.	Repair open circuit between coupling connector and fuel level sensor.
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. 2 — (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.** 1) Remove fuel pump assembly. <Ref. to FU(DOHC TURBO)-60, Fuel Pump.> 2) While moving fuel level sensor float up and down, measure resistance between fuel level sensor terminals. ***Terminals*** ***No. 3 — No. 5:***	Is the resistance more than 53 Ω?	Replace fuel level sensor. <Ref. to FU(DOHC TURBO)-62, Fuel Level Sensor.>	Go to step **10**.
10	**CHECK FUEL SUB LEVEL SENSOR.** 1) Remove fuel sub level sensor. <Ref. to FU(DOHC TURBO)-63, Fuel Sub Level Sensor.> 2) While moving fuel sub level sensor float up and down, measure resistance between fuel sub level sensor terminals. ***Terminals*** ***No. 1 — No. 2:***	Is the resistance more than 45 Ω?	Replace fuel sub level sensor. <Ref. to FU(DOHC TURBO)-63, Fuel Sub Level Sensor.>	Replace combination meter. <Ref. to IDI-15, Combination Meter Assembly.>

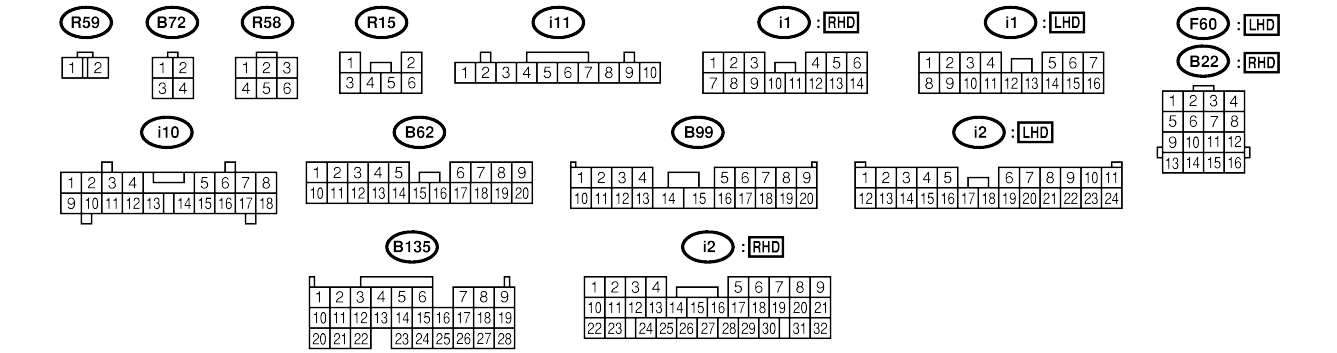
AT: DTC P0464 — FUEL LEVEL SENSOR INTERMITTENT INPUT— S088521G01

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode < Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**





S2M2198

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 "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK FUEL LEVEL SENSOR.** 1) Remove fuel pump assembly. <Ref. to FU(DOHC TURBO)-60, Fuel Pump.> 2) While moving fuel level sensor float up and down, make sure that the resistance between fuel level sensor terminals changes smoothly. ***Terminals*** ***No. 3 — No. 5:***	Does the resistance change smoothly between approx. 0.5 Ω and approx. 52 Ω?	Go to step **3**.	Replace fuel level sensor. <Ref. to FU(DOHC TURBO)-62, Fuel Level Sensor.>
3	**CHECK FUEL SUB LEVEL SENSOR.** 1) Remove fuel sub level sensor. <Ref. to FU(DOHC TURBO)-63, Fuel Sub Level Sensor.> 2) While moving fuel sub level sensor float up and down, make sure that the resistance between fuel level sensor terminals changes smoothly. ***Terminals*** ***No. 1 — No. 2:***	Does the resistance change smoothly between approx. 0.5 Ω and approx. 44 Ω?	Repair poor contact in ECM, combination meter and coupling connectors.	Replace fuel sub level sensor. <Ref. to FU(DOHC TURBO)-63, Fuel Sub Level Sensor.>

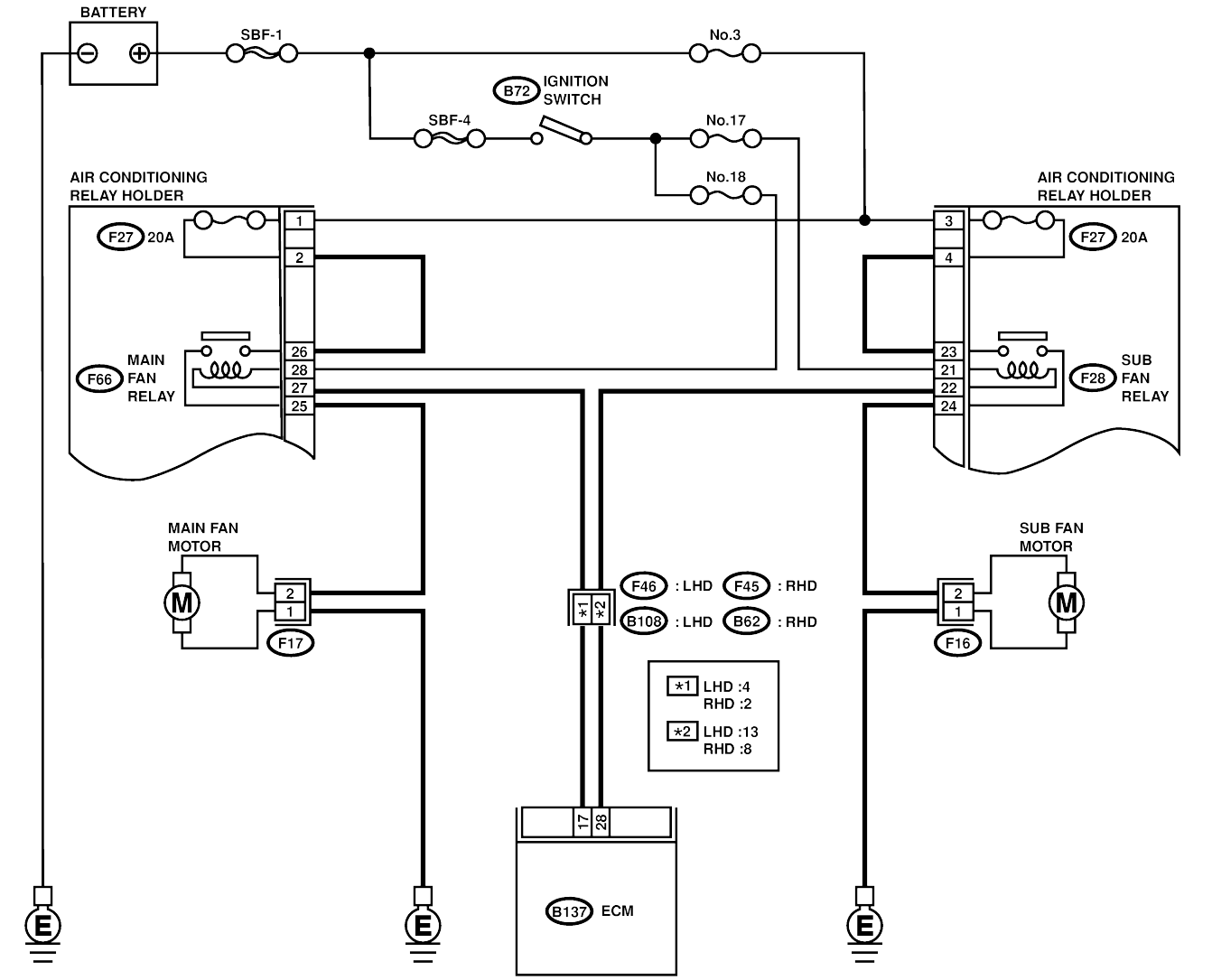
MEMO:

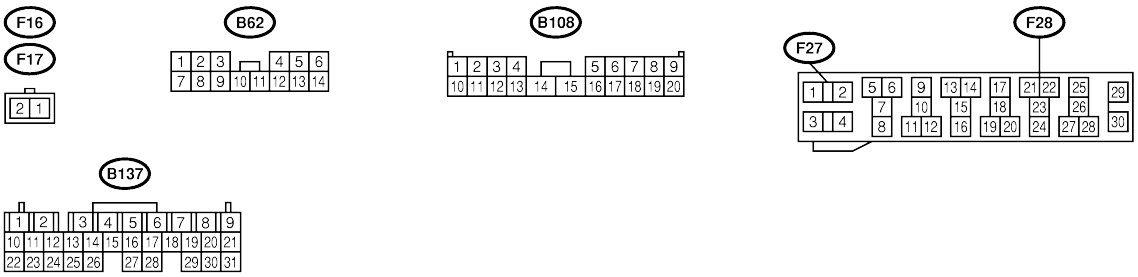
AU: DTC P0480 — COOLING FAN RELAY 1 CIRCUIT LOW INPUT — S088521B57

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

• WIRING DIAGRAM:





S2M2199

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(DOHC TURBO)-36, Subaru Select Monitor.> ***Connector & terminal*** ***(B137) No. 17 (+) — 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 MAIN 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*** ***(B137) No. 17 — 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. 27 (+) — 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) Remove main fan relay. 3) Measure resistance of main fan relay. ***Terminal*** ***No. 26 — No. 25:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Replace main fan relay.
5	**CHECK MAIN FAN RELAY.** 1) Connect battery to terminals No. 27 and No. 28 of main fan relay. 2) Measure resistance of main fan relay. ***Terminal*** ***No. 26 — No. 25:***	Is the resistance less than 1 Ω?	Go to step **6**.	Replace main fan relay.
6	**CHECK OPEN CIRCUIT IN MAIN FAN RELAY CONTROL CIRCUIT.** Measure resistance of harness between ECM and main fan relay connector. ***Connector & terminal*** ***(B137) No. 17 — (F66) No. 27:***	Is the resistance less than 1 Ω?	Go to step **7**.	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

No.	Step	Check	Yes	No
7	**CHECK POOR CONTACT.** Check poor contact in ECM or main fan relay connector.	Is there poor contact in ECM or main fan relay connector?	Repair poor contact in ECM or main fan relay connector.	Contact your Subaru distributor.

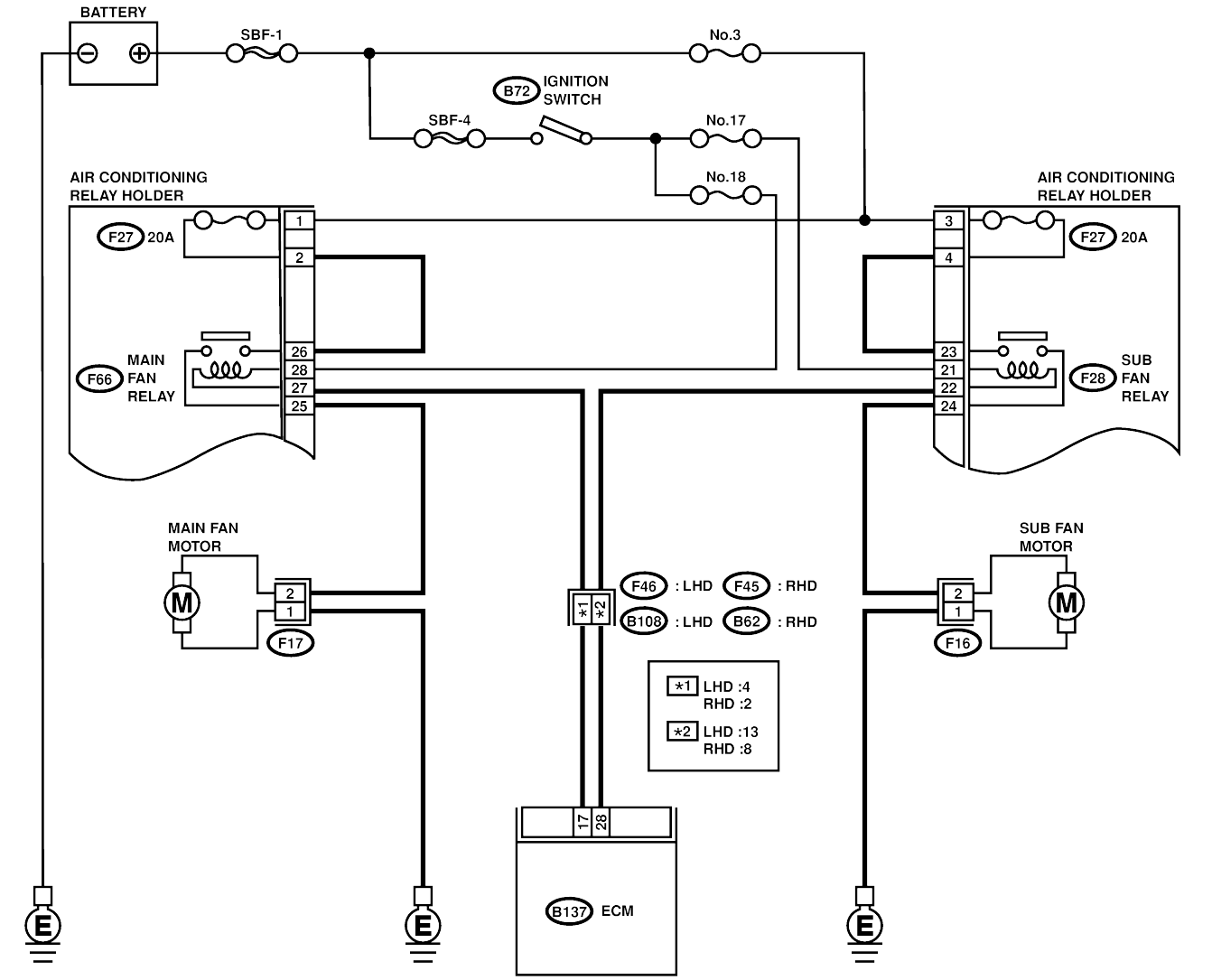
AV: DTC P0483 — COOLING FAN FUNCTION PROBLEM — S088521B58

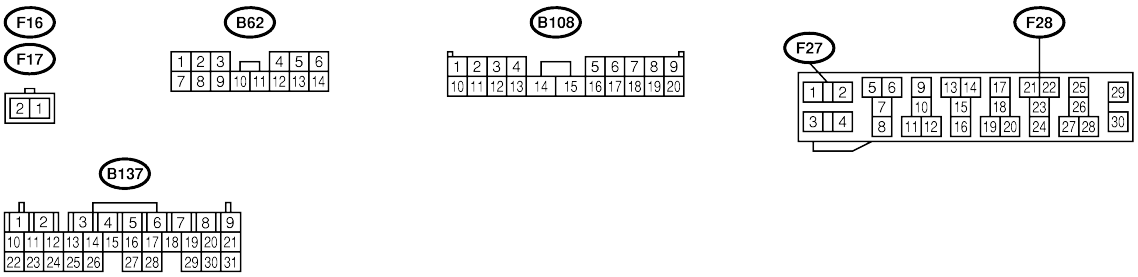
- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Occurrence of noise
  - Overheating

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode < Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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:





S2M2199

No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Is there any other DTC on display?	Inspect the relevant DTC using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Check radiator fan, fan motor and thermostat. <Ref. to CO-8, Radiator Main Fan System.> and <Ref. to CO-11, Radiator Sub Fan System.> If thermostat is stuck, replace thermostat.

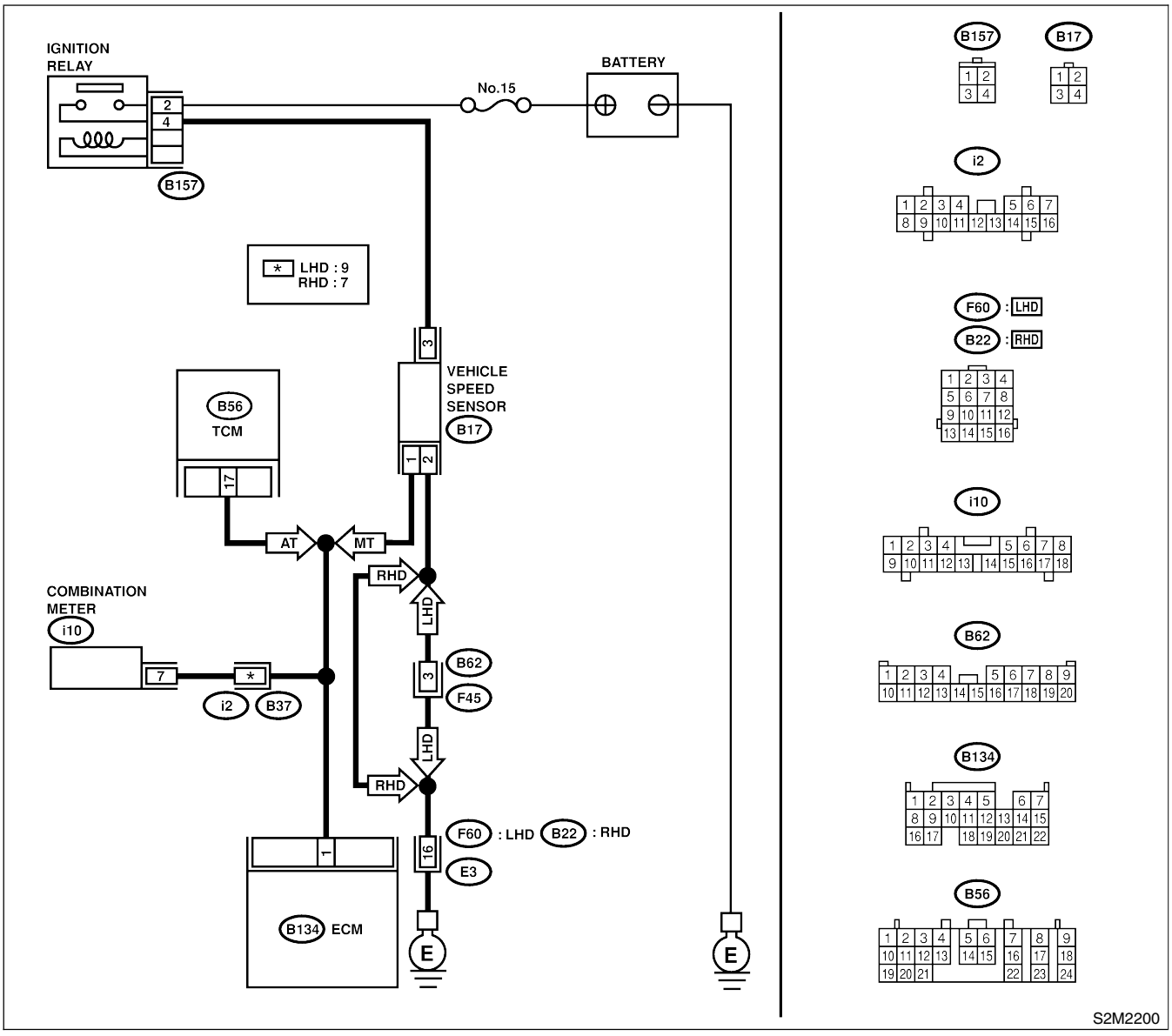
MEMO:

AW: DTC P0500 — VEHICLE SPEED SENSOR MALFUNCTION — S088521B59

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK TRANSMISSION TYPE.**	Is the transmission type AT?	Go to step **2**.	Go to step **3**.

No.	Step	Check	Yes	No
2	**CHECK DTC P0720 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0720?	Check front vehicle speed sensor signal circuit. <Ref. to AT-58, TROUBLE CODE 33 — FRONT VEHICLE SPEED SENSOR —, 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-17, Speedometer.> and <Ref. to AT-32, Front Vehicle Speed Sensor.> and <Ref. to AT-36, Rear Vehicle Speed Sensor.> and <Ref. to AT-37, Torque Converter Turbine Speed Sensor.>
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 — (i10) No. 7:***	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

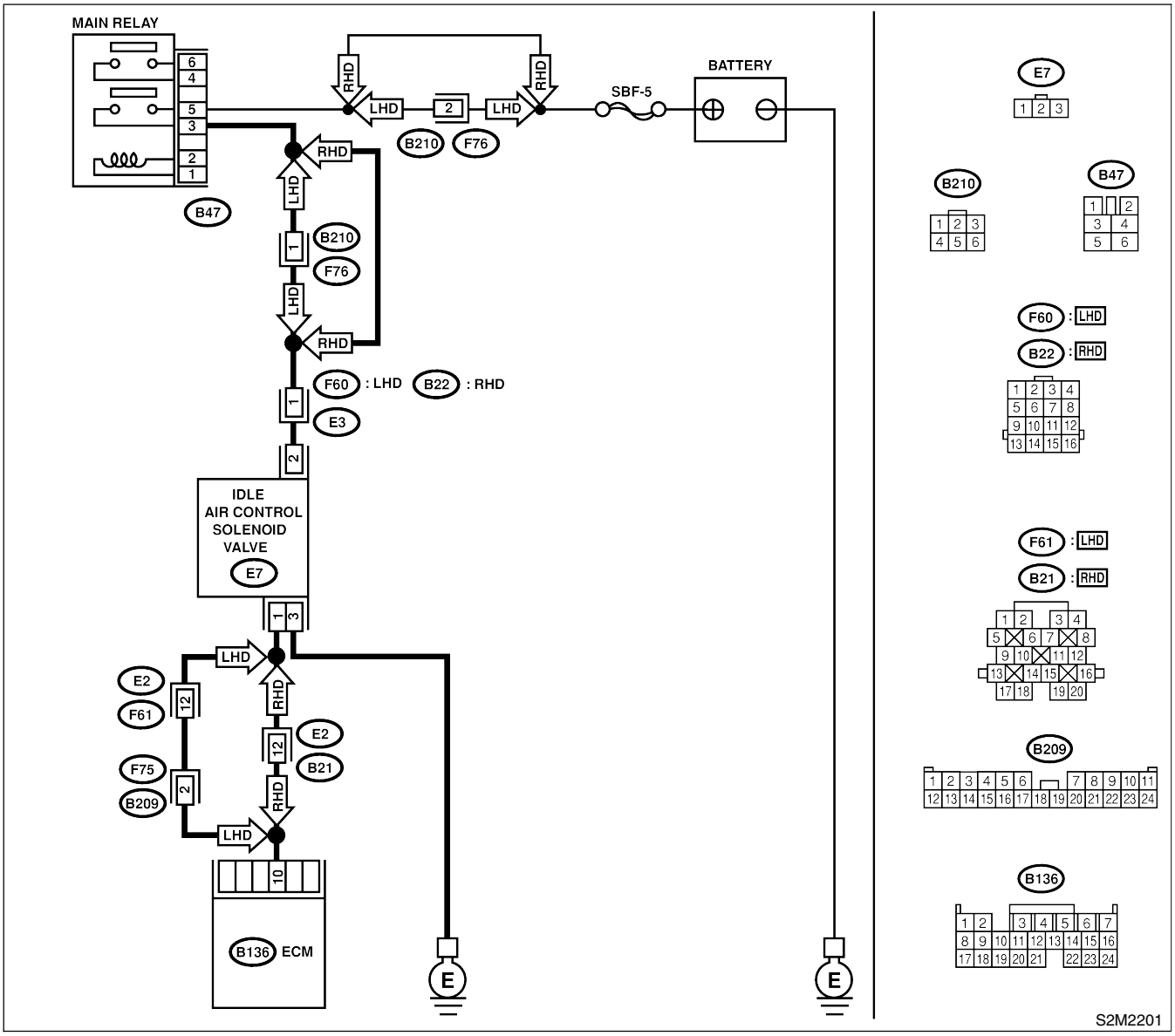
AX: DTC P0506 — IDLE CONTROL SYSTEM RPM LOWER THAN EXPECTED

S088521B61

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P0508 or P509?	Inspect DTC P0505 or P1505 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> 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(DOHC TURBO)-36, 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(DOHC TURBO)-36, 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(DOHC TURBO)-36, 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(DOHC TURBO)-36, REMOVAL, Idle Air Control Solenoid Valve.> 3) Remove throttle body to intake manifold. <Ref. to FU(DOHC TURBO)-14, REMOVAL, Throttle Body.> 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(DOHC TURBO)-36, Idle Air Control Solenoid Valve.>	Replace throttle body. <Ref. to FU(DOHC TURBO)-14, Throttle Body.>

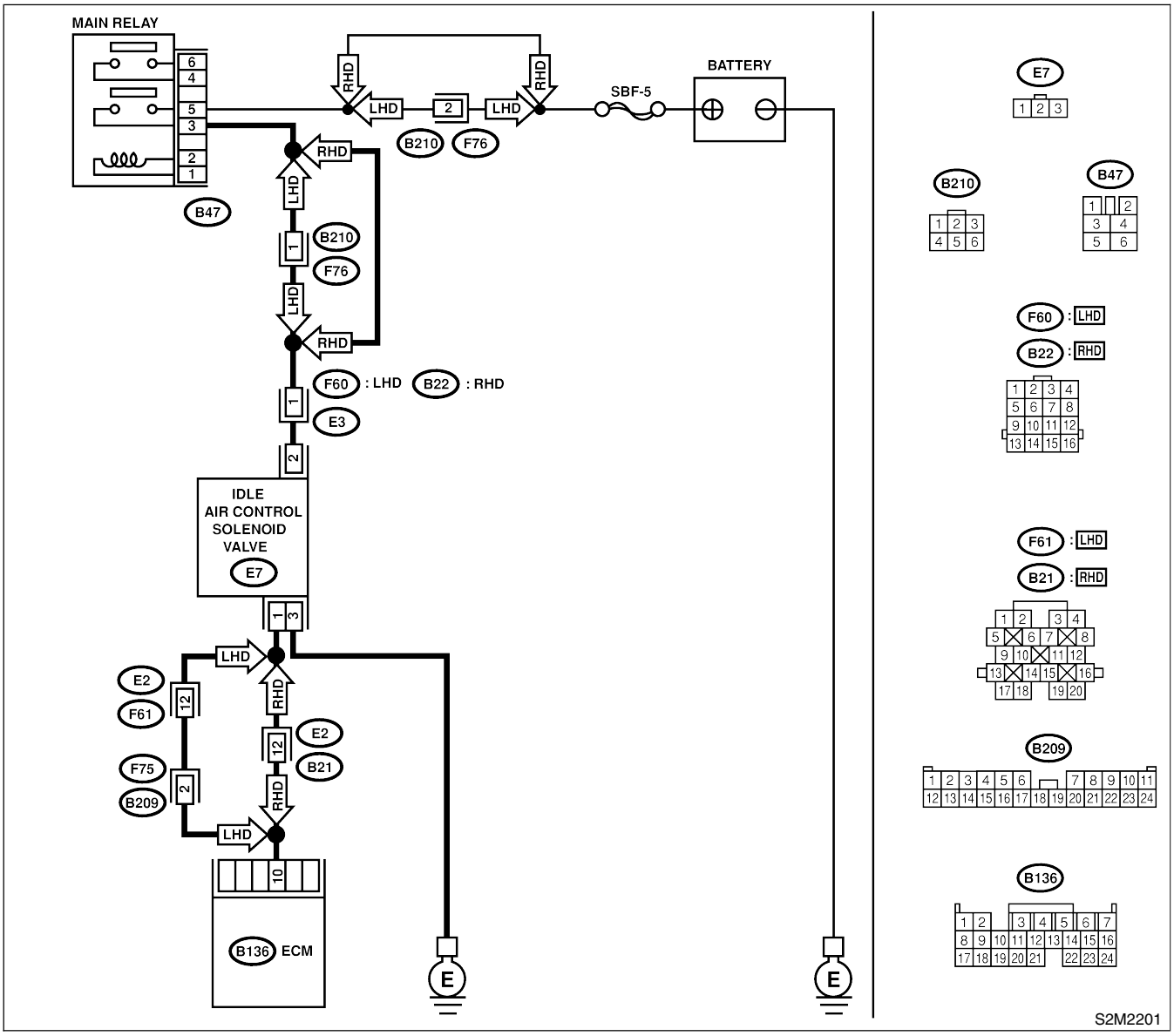
AY: DTC P0507 — IDLE CONTROL SYSTEM RPM HIGHER THAN EXPECTED

S088521B62

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



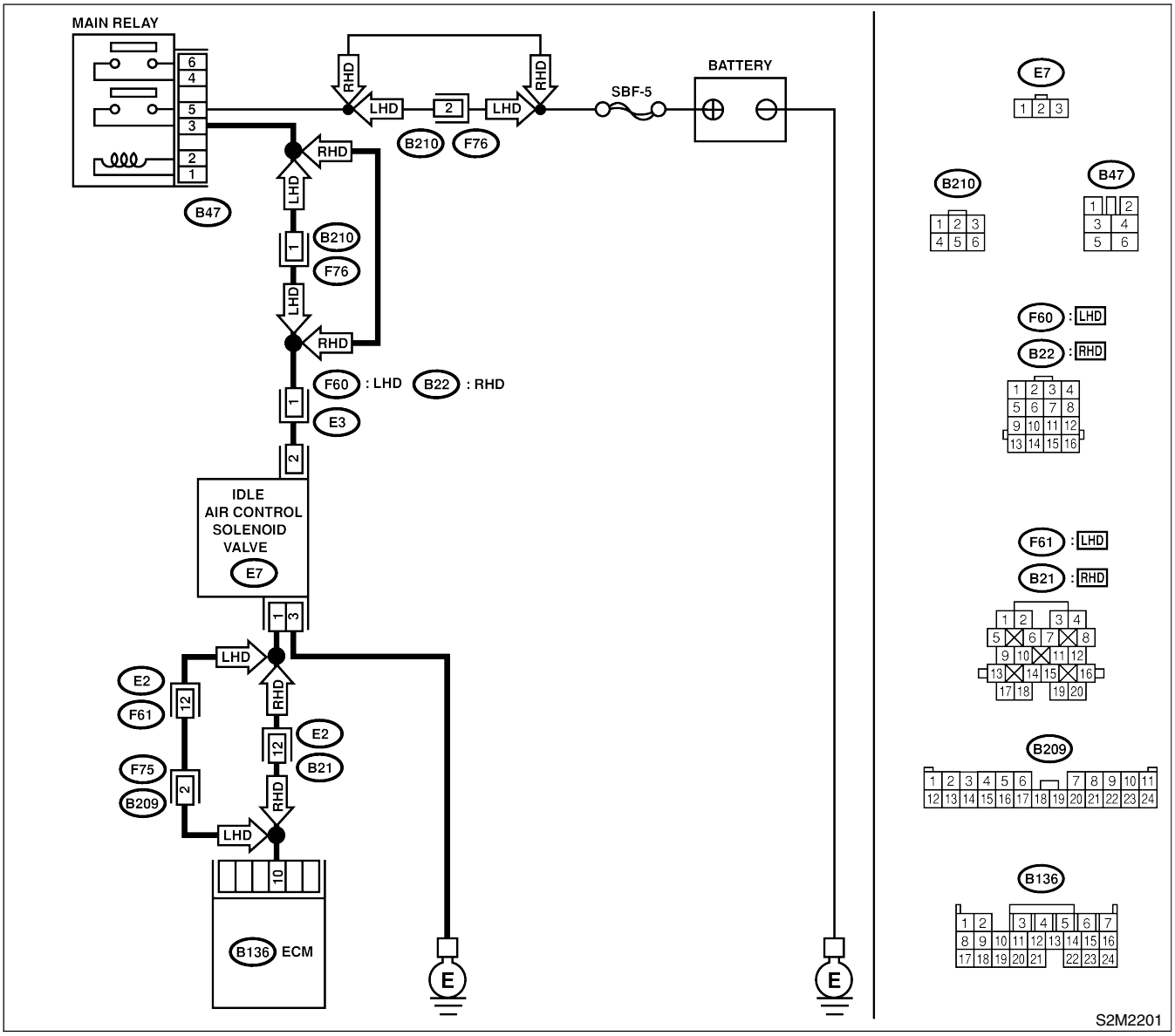
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0508 or P509?	Inspect DTC P0505 or P1505 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0507.	Go to step **2**.
2	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **3**.	Adjust throttle cable. <Ref. to SP-12, INSTALLATION, Accelerator Control 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(DOHC TURBO)-36, Idle Air Control Solenoid Valve.>

AZ: DTC P0508 — IDLE CONTROL SYSTEM CIRCUIT LOW INPUT — S088521H68

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



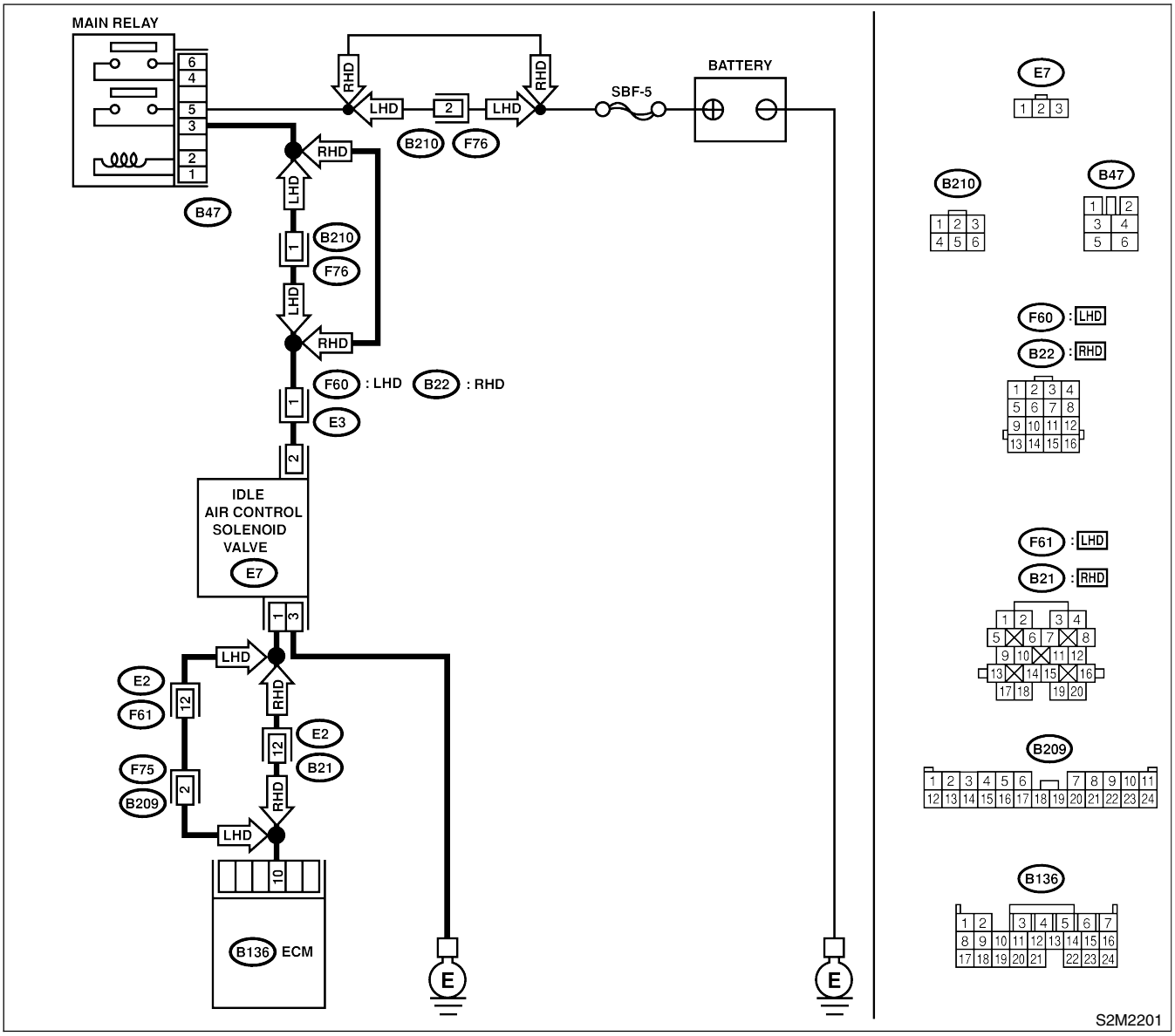
No.	Step	Check	Yes	No
1	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 3 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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
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*** ***(B136) No. 10 — (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
4	**CHECK HARNESS BETWEEN ECM AND IDLE AIR CONTROL SOLENOID VALVE CONNECTOR.** Measure resistance of harness between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 10 — 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.	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(DOHC TURBO)-36, Idle Air Control Solenoid Valve.>

BA: DTC P0509 — IDLE CONTROL SYSTEM CIRCUIT HIGH INPUT — S088521H10

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



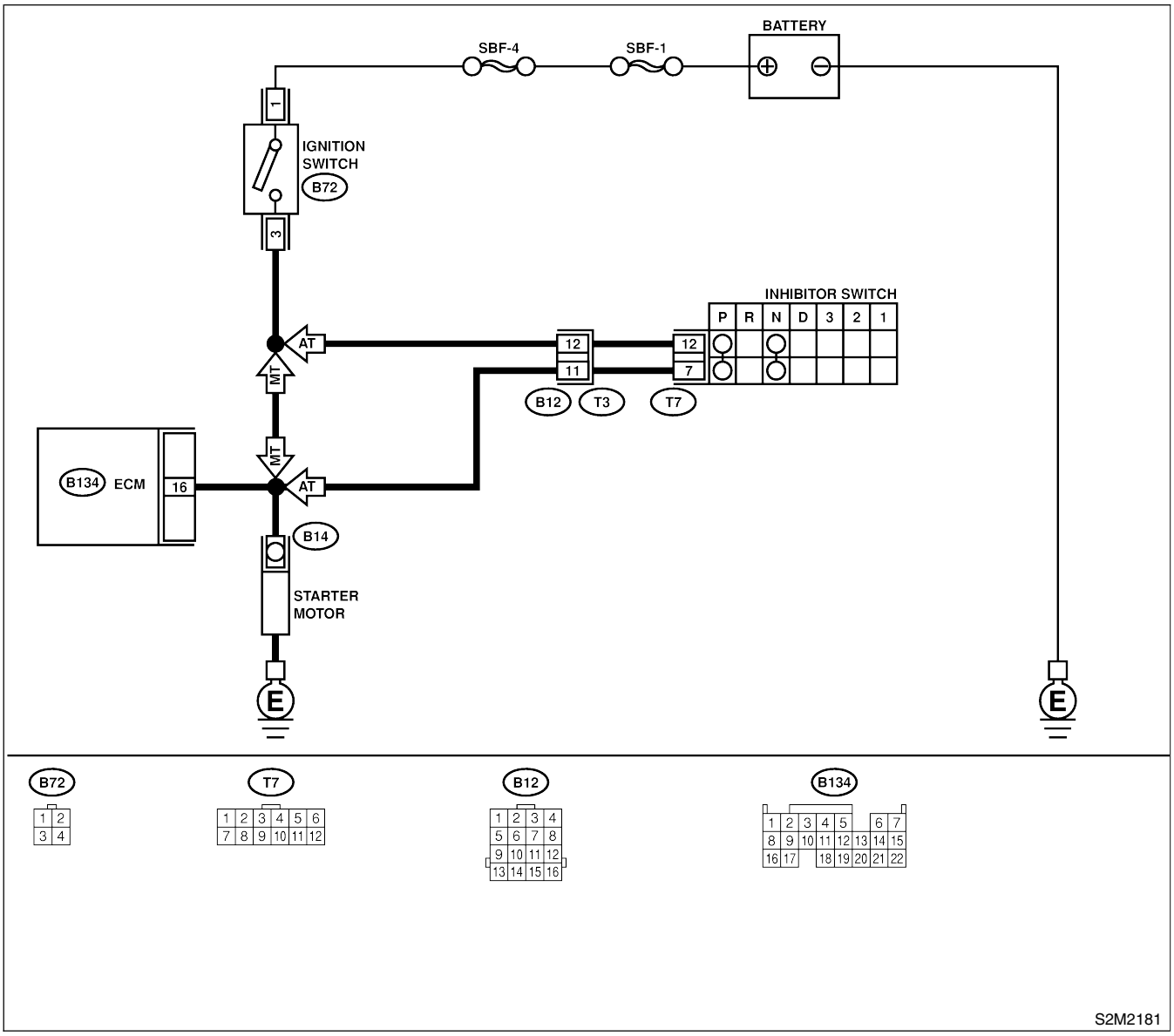
No.	Step	Check	Yes	No
1	**CHECK THROTTLE CABLE.**	Does throttle cable have play for adjustment?	Go to step **2**.	Adjust throttle cable. <Ref. to SP-12, INSTALLATION, Accelerator Control Cable.>
2	**CHECK OUTPUT SIGNAL FROM ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Go to step **3**.	Go to step **4**.
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*** ***(B136) No. 10 (+) — 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(DOHC TURBO)-47, Engine Control Module.>	Replace idle air control solenoid valve <Ref. to FU(DOHC TURBO)-36, Idle Air Control Solenoid Valve.> and ECM <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>.
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B136) No. 10 (+) — 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(DOHC TURBO)-47, Engine Control Module.>	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

BB: DTC P0512 — STARTER SWITCH CIRCUIT HIGH INPUT — S088521G02

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: Place the inhibitor switch in each position. (AT model)	Does starter motor operate when ignition switch to "ON"?	Repair battery short circuit in starter motor circuit.	Check starter motor circuit. <Ref. to EN(DOHC TURBO)-64, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

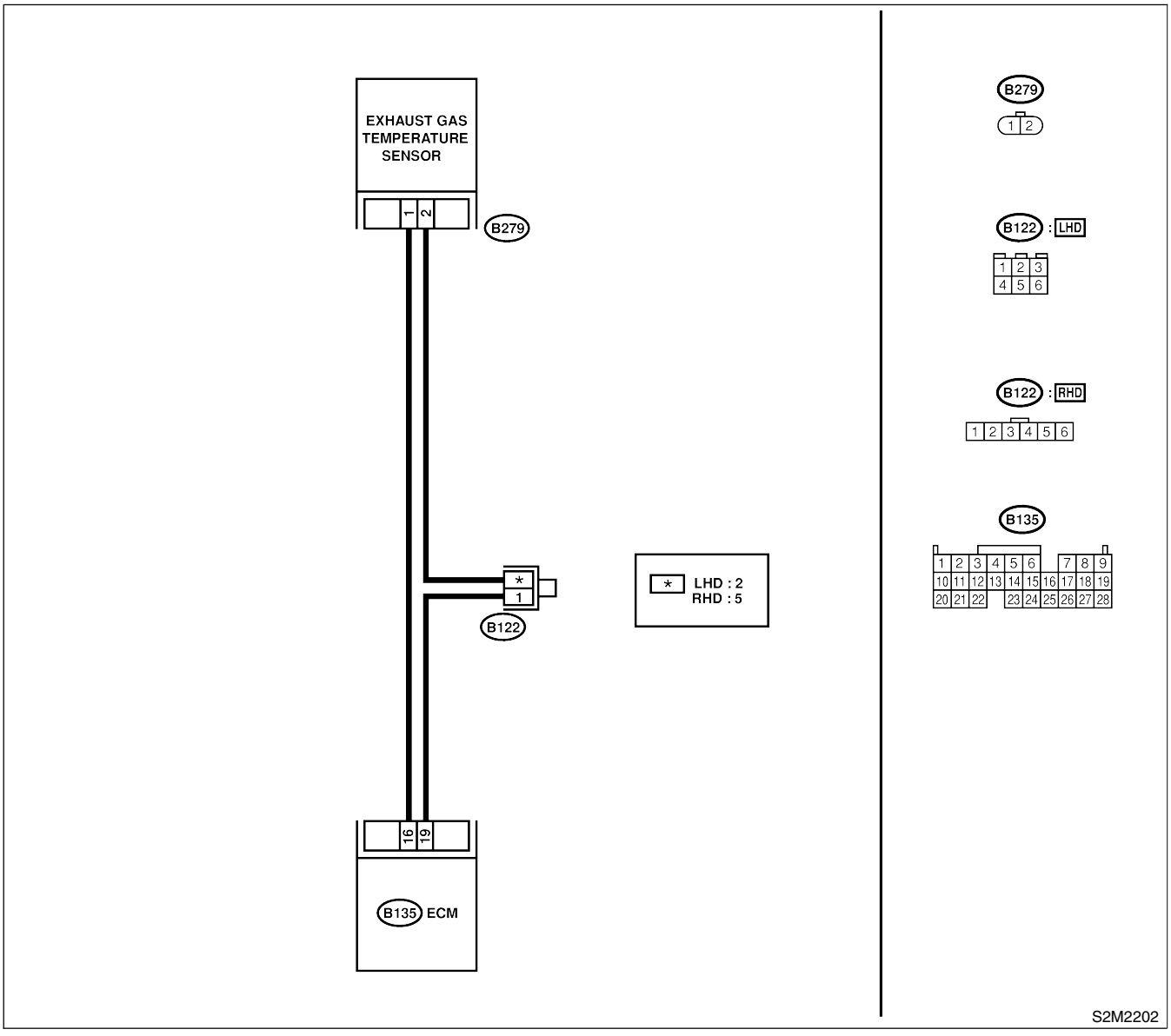
BC: DTC P0545 — EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW INPUT — S088521H69

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



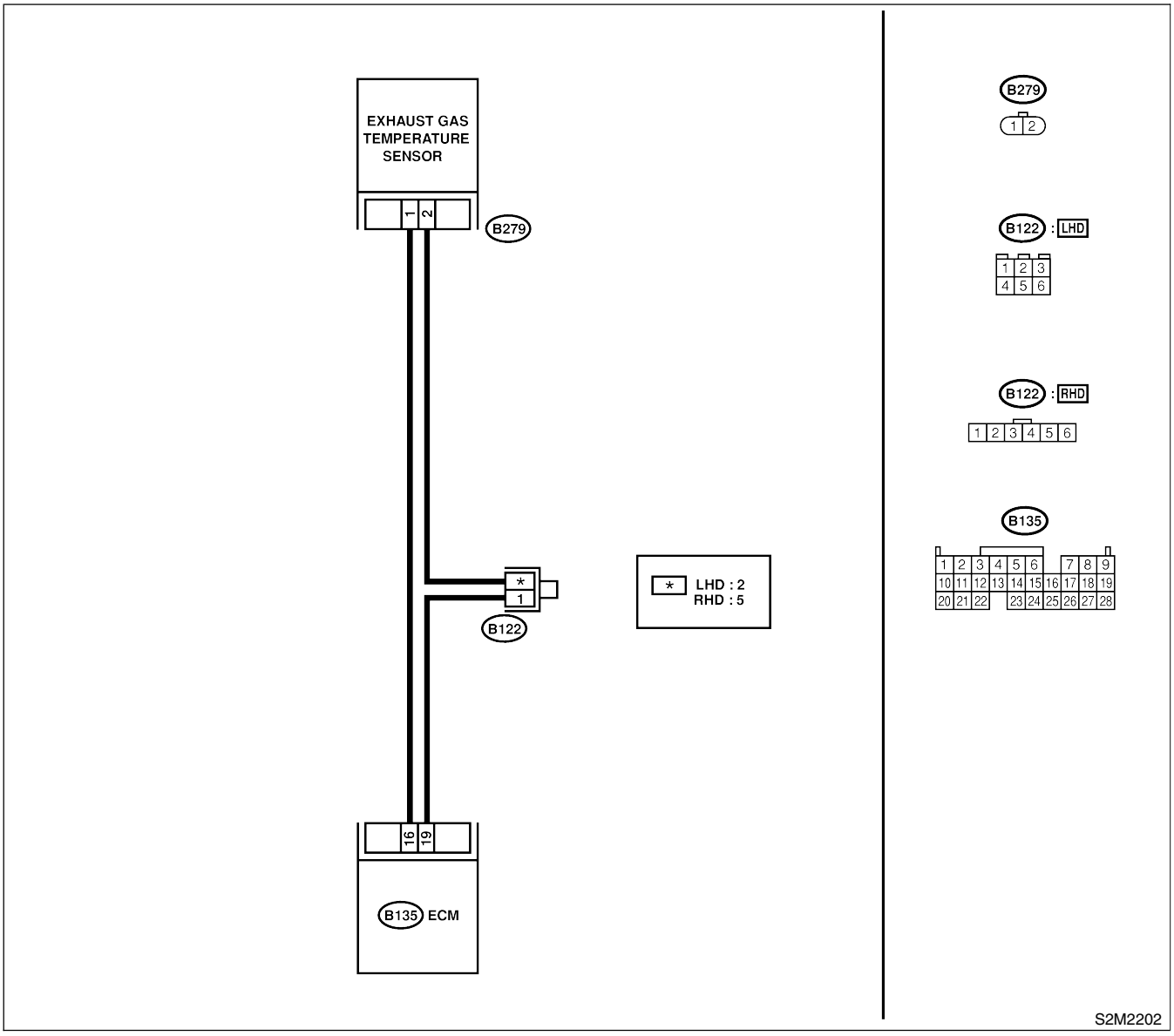
No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of exhaust gas temperature sensor signal using Subaru Select Monitor or OBD-II general scan tool. NOTE: ● Subaru Select Monitor For detailed operation procedure, refer to the "READ CURRENT DATA FOR ENGINE". <Ref. to EN(DOHC TURBO)-36, 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 1200°C (2192°F)?	Go to step **2**.	Repair poor contact. NOTE: In this case, repair the following: ● Poor contact in exhaust gas temperature sensor ● Poor contact in ECM ● Poor contact in joint connector
2	**CHECK HARNESS BETWEEN EXHAUST GAS TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from exhaust gas temperature sensor. 3) Turn ignition switch to ON. 4) Read data of exhaust gas 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(DOHC TURBO)-36, 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 372°C (702°F)?	Replace exhaust gas temperature sensor. <Ref. to FU(DOHC TURBO)-46, Exhaust Temperature Sensor.>	Repair ground short circuit in harness between exhaust gas temperature sensor and ECM connector.

BD: DTC P0546 — EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH INPUT — S088521H70

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of exhaust gas 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(DOHC TURBO)-36, 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 372°C (702°F)?	Go to step **2**.	Repair poor contact. NOTE: In this case, repair the following: ● Poor contact in exhaust gas temperature sensor ● Poor contact in ECM ● Poor contact in joint connector
2	**CHECK HARNESS BETWEEN EXHAUST GAS TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from exhaust gas temperature sensor. 3) Measure voltage between exhaust gas temperature sensor connector and engine ground. ***Connector & terminal*** ***(B279) No. 1 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and exhaust gas temperature sensor connector.	Go to step **3**.
3	**CHECK HARNESS BETWEEN EXHAUST GAS TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to ON. 2) Measure voltage between exhaust gas temperature sensor connector and engine ground. ***Connector & terminal*** ***(B279) No. 1 (+) — Engine ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and exhaust gas temperature sensor connector.	Go to step **4**.
4	**CHECK HARNESS BETWEEN EXHAUST GAS TEMPERATURE SENSOR AND ECM CONNECTOR.** Measure voltage between exhaust gas temperature sensor connector and engine ground. ***Connector & terminal*** ***(B279) 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 exhaust gas temperature sensor connector ● Poor contact in exhaust gas temperature sensor connector ● Poor contact in ECM connector ● Poor contact in joint connector

No.	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN EXHAUST GAS TEMPERATURE SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance of harness between exhaust gas temperature sensor connector and engine ground. ***Connector & terminal*** ***(B279) No. 2 — Engine ground:***	Is the resistance less than 5 Ω?	Replace exhaust gas temperature sensor. <Ref. to FU(DOHC TURBO)-46, Exhaust Temperature Sensor.>	Repair harness and connector. NOTE: In this case, repair the following: ● Open circuit in harness between ECM and exhaust gas temperature sensor connector ● Poor contact in exhaust gas temperature sensor connector ● Poor contact in ECM connector ● Poor contact in joint connector

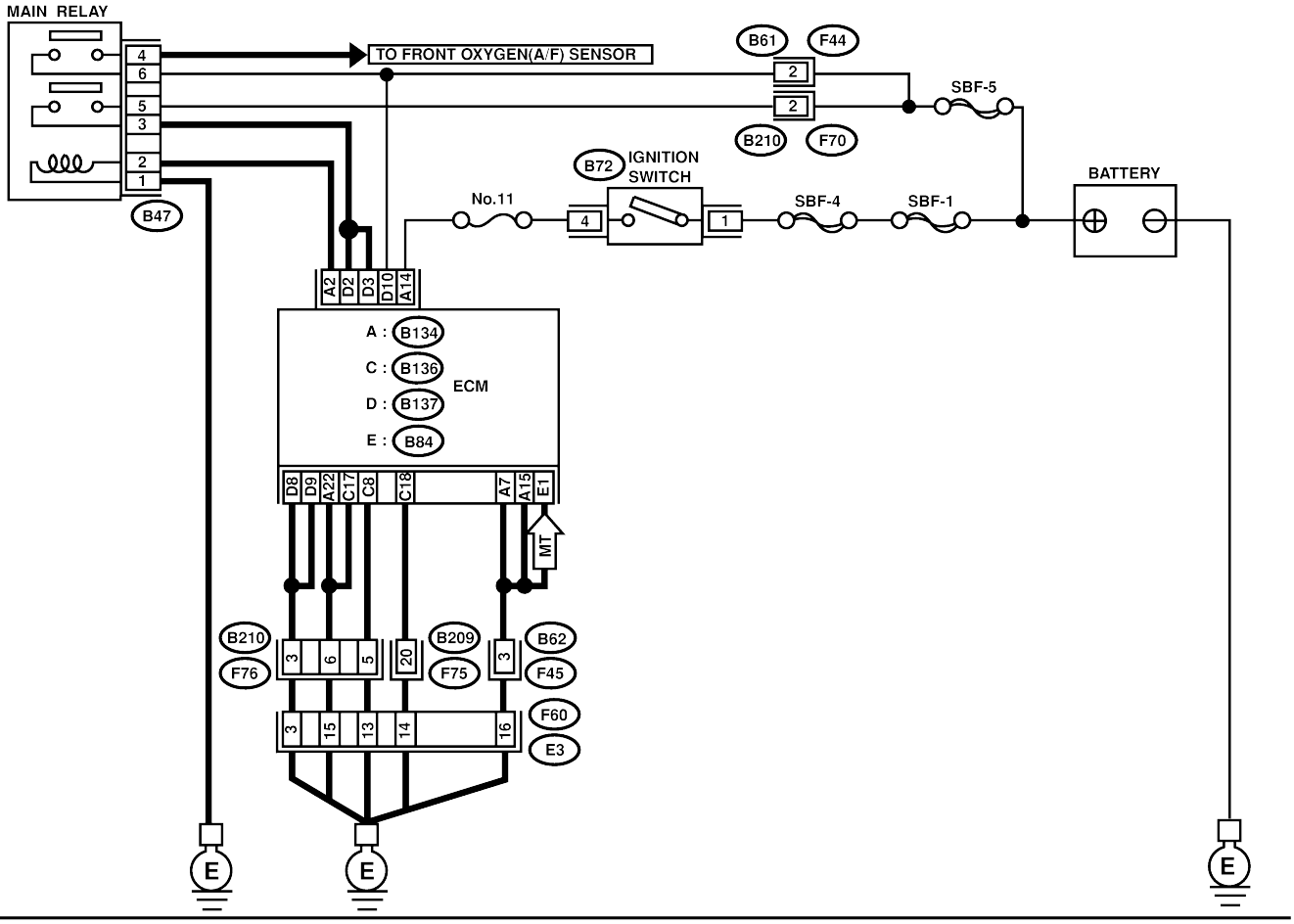
MEMO:

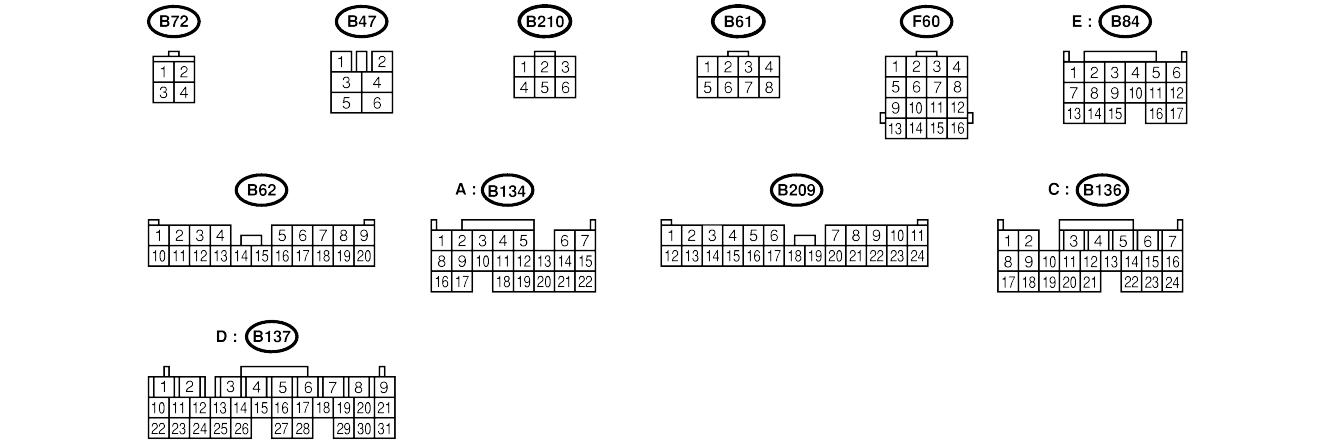
BE: DTC P0604 — INTERNAL CONTROL MODULE MEMORY CHECK SUM ERROR — S088521G03

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine does not start.
  - Engine stalls.

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

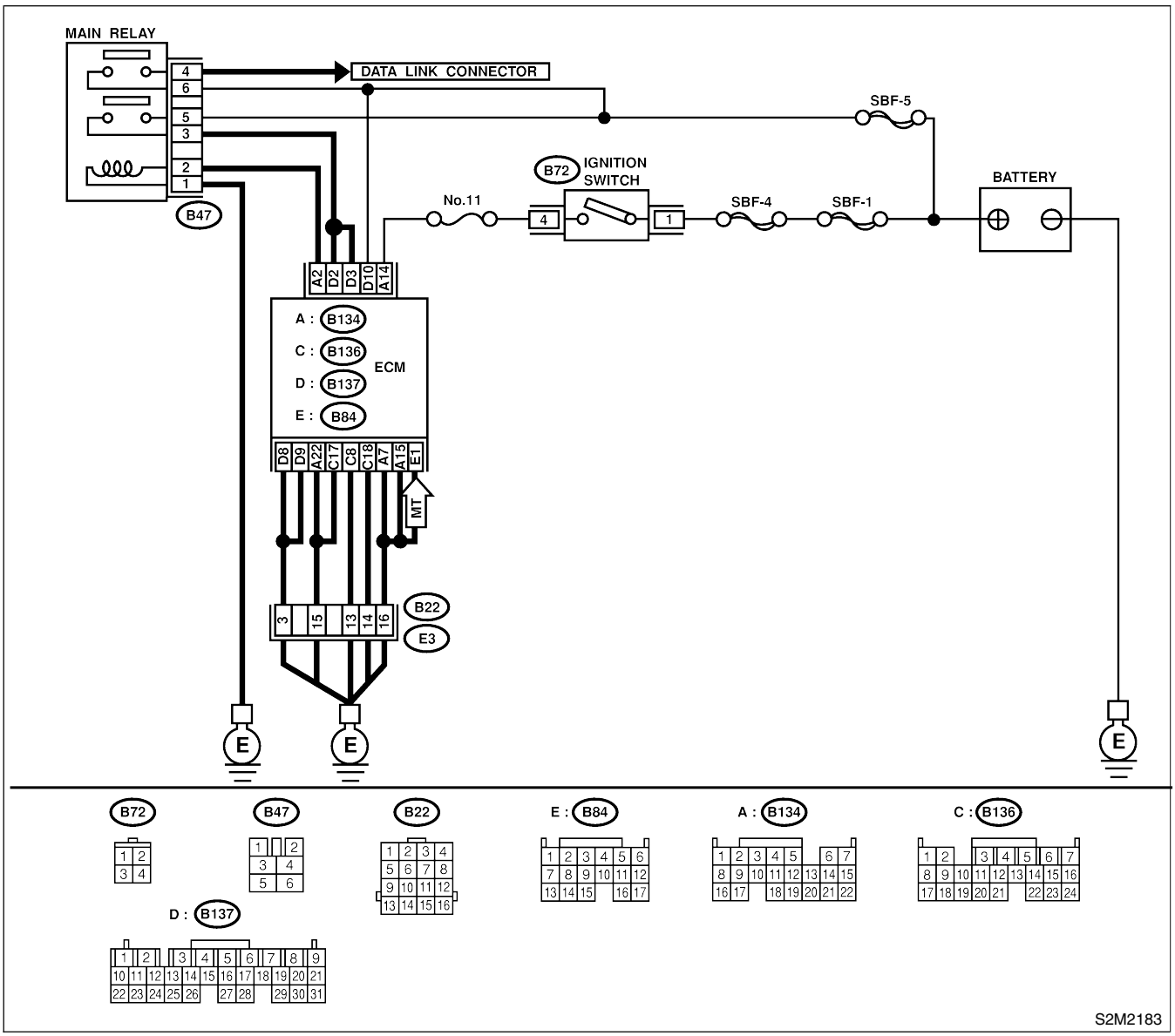
- **WIRING DIAGRAM:**
- **LHD MODEL**





S2M2182

• RHD MODEL



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 P0604?	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	It is not necessary to inspect DTC P0604.

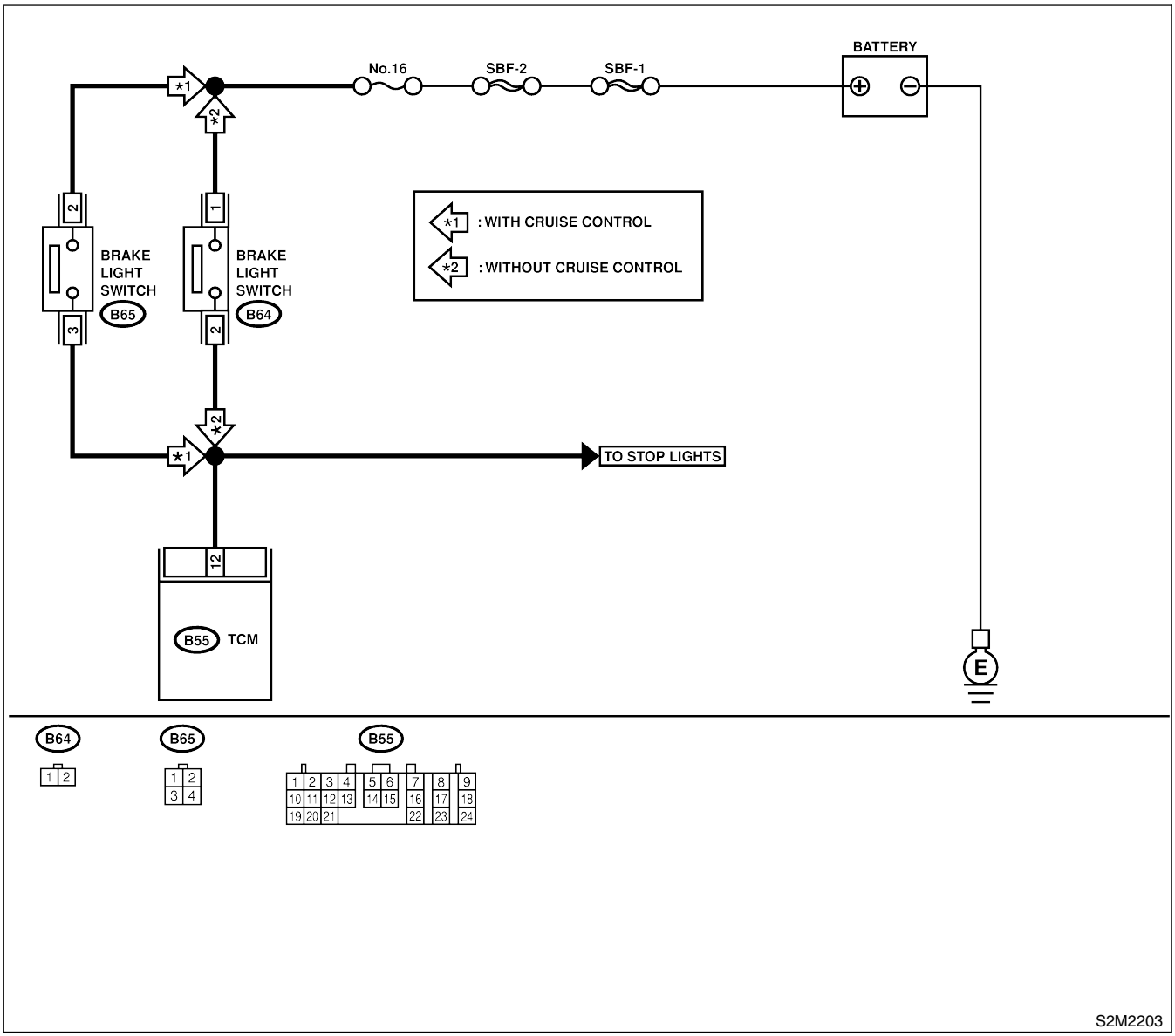
MEMO:

BF: DTC P0703 — BRAKE SWITCH INPUT MALFUNCTION — S088521B64

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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.

No.	Step	Check	Yes	No
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*** ***Without cruise control*** ***(B55) No. 12 — (B64) No. 2:*** ***With cruise control*** ***(B55) No. 12 — (B65) No. 3:***	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
3	**CHECK HARNESS BETWEEN TCM AND BRAKE LIGHT SWITCH CONNECTOR.** Measure resistance of harness between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 12 — 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. 12 (+) — 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 LI-31, STOP LIGHT SWITCH, INSPECTION, Stop Light System.>
5	**CHECK INPUT SIGNAL FOR TCM.** Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 12 (+) — 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 LI-31, STOP LIGHT SWITCH, INSPECTION, Stop Light System.>
6	**CHECK POOR CONTACT.** Check poor contact in TCM connector.	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

BG: DTC P0731 — GEAR 1 INCORRECT RATIO — S088521B70

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN(DOHC TURBO)-255, DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BH: DTC P0732 — GEAR 2 INCORRECT RATIO — S088521B71

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN(DOHC TURBO)-255, DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BI: DTC P0733 — GEAR 3 INCORRECT RATIO — S088521B72

NOTE:
For the diagnostic procedure, refer to DTC P0734. <Ref. to EN(DOHC TURBO)-255, DTC P0734 — GEAR 4 INCORRECT RATIO —, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

BJ: DTC P0734 — GEAR 4 INCORRECT RATIO — S088521B73

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 relevant DTC using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK THROTTLE POSITION SENSOR CIRCUIT.** Check throttle position sensor circuit. <Ref. to AT-50, 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 FRONT VEHICLE SPEED SENSOR CIRCUIT.** Check front vehicle speed sensor circuit. <Ref. to AT-58, TROUBLE CODE 33 — FRONT VEHICLE SPEED SENSOR —, 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-64, 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.	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-12, INSPECTION, Road Test.>	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

BK: DTC P0741 — TORQUE CONVERTER CLUTCH SYSTEM MALFUNCTION

— S088521G04

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK LOCK-UP DUTY SOLENOID CIRCUIT.** Check lock-up duty solenoid circuit. <Ref. to AT-96, 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-50, 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-64, 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-42, 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-122, 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-111, 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-46, 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.	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-12, INSPECTION, Road Test.>	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

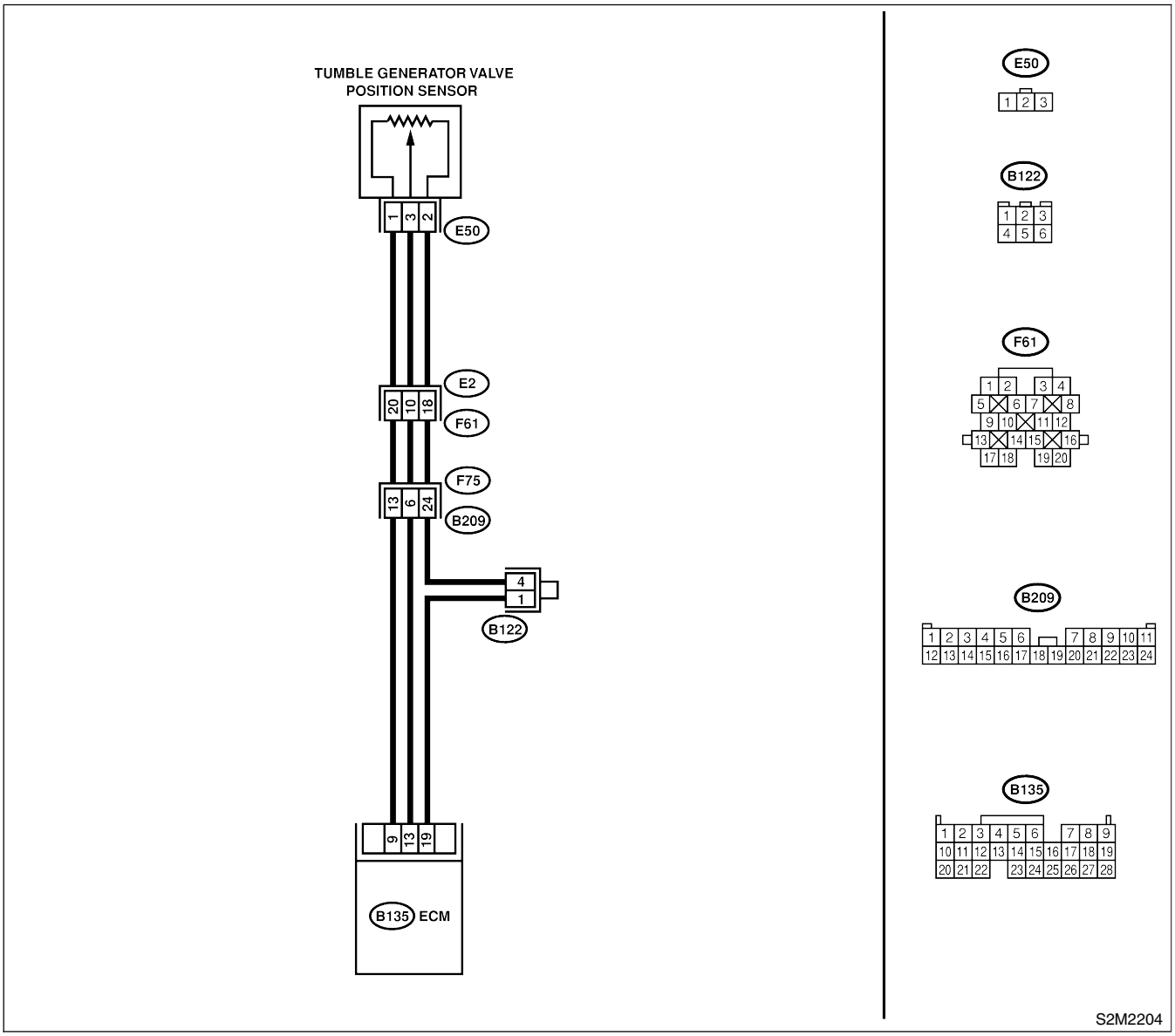
BL: DTC P1086 — TUMBLE GENERATOR VALVE #2 (LH) POSITION SENSOR CIRCUIT LOW INPUT — S088521H71

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

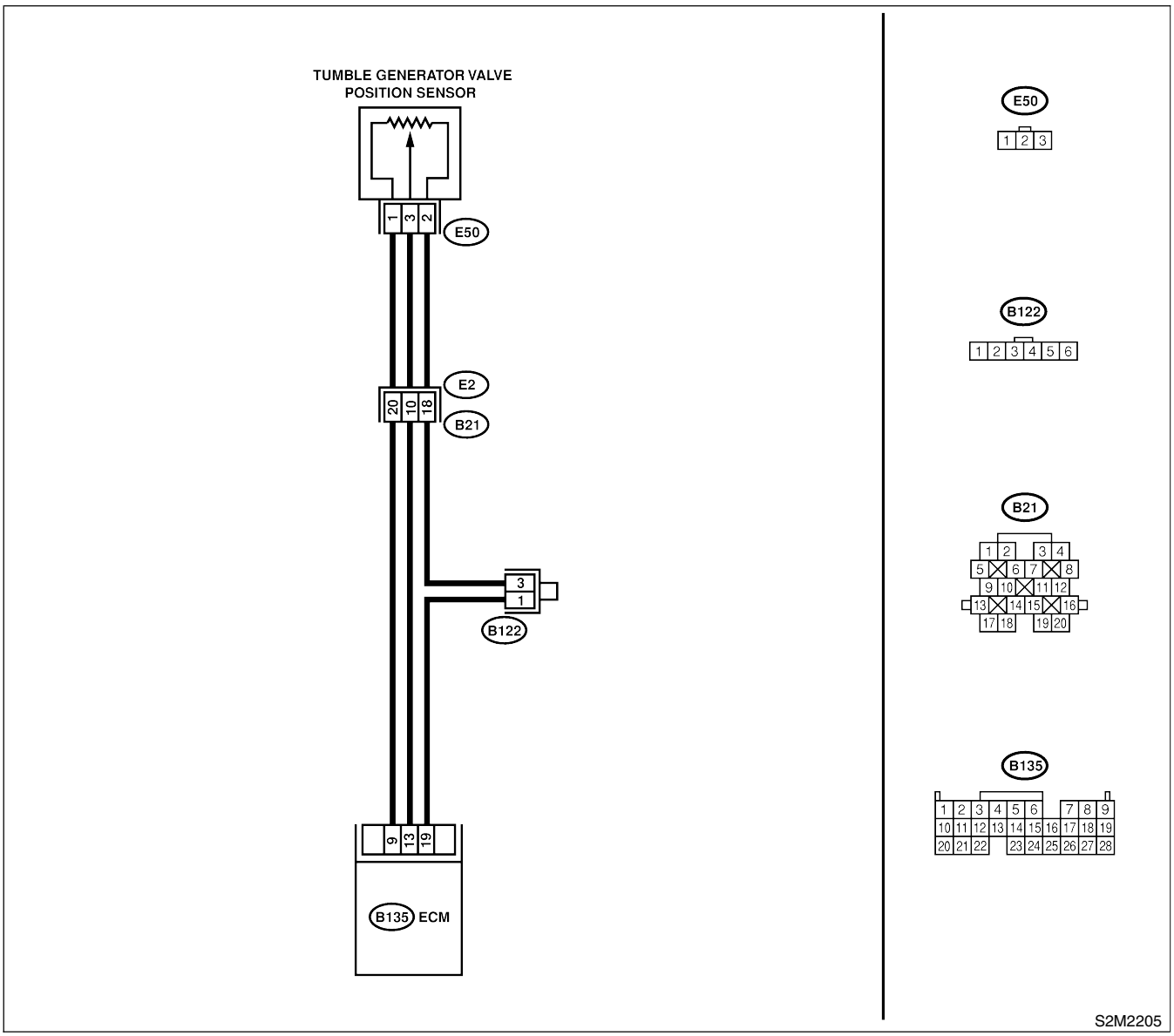
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


TUMBLE GENERATOR VALVE
POSITION SENSOR
1
3
2
E50
E2
20
10
18
B21
3
1
B122
9
13
19
B135
ECM
E50
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2205

No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of tumble generator valve 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(DOHC TURBO)-36, 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
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground while tumble generator valve is fully closed. ***Connector & terminal*** ***(B135) No. 9 (+) — 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*** ***(B135) No. 9 (+) — 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 your Subaru distributor. 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*** ***(B135) No. 13 (+) — 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 TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from tumble generator valve position sensor. 3) Turn ignition switch to ON. 4) Measure voltage between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E50) 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 tumble generator valve position sensor and ECM connector • Poor contact in tumble generator valve position sensor connector • Poor contact in ECM connector • Poor contact in coupling connector • Poor contact in joint connector
7	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance of harness between ECM connector and tumble generator valve position sensor connector. ***Connector & terminal*** ***(B135) No. 13 — (E50) 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 tumble generator valve position sensor and ECM connector • Poor contact in ECM connector • Poor contact in tumble generator valve position sensor connector • Poor contact in coupling connector
8	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** Measure resistance of harness between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E50) No. 3 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between tumble generator valve position sensor and ECM connector.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in tumble generator valve position sensor connector.	Is there poor contact in tumble generator valve position sensor connector?	Repair poor contact in tumble generator valve position sensor connector.	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

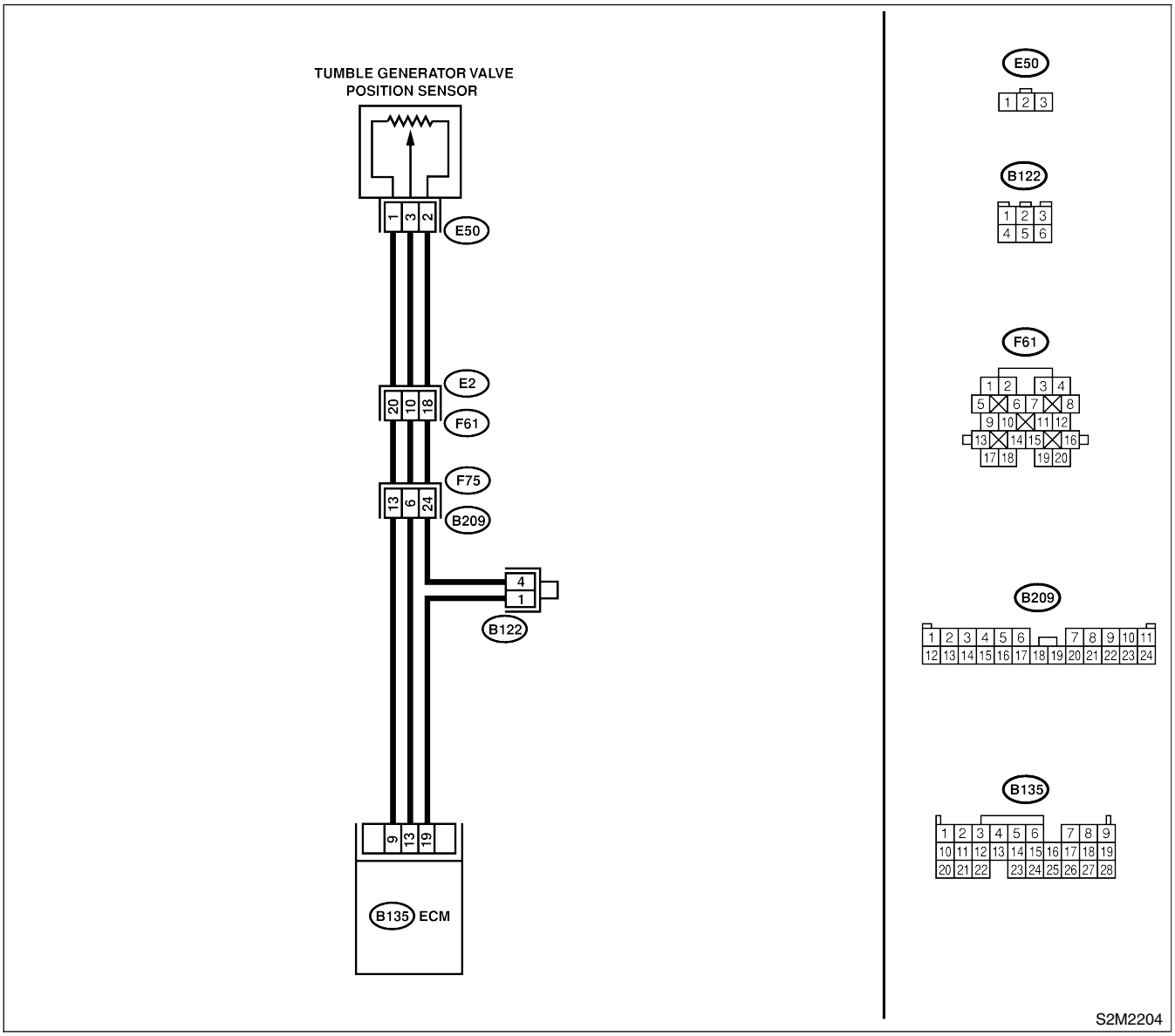
BM: DTC P1087 — TUMBLE GENERATOR VALVE #2 (LH) POSITION SENSOR CIRCUIT HIGH INPUT — S088521H72

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

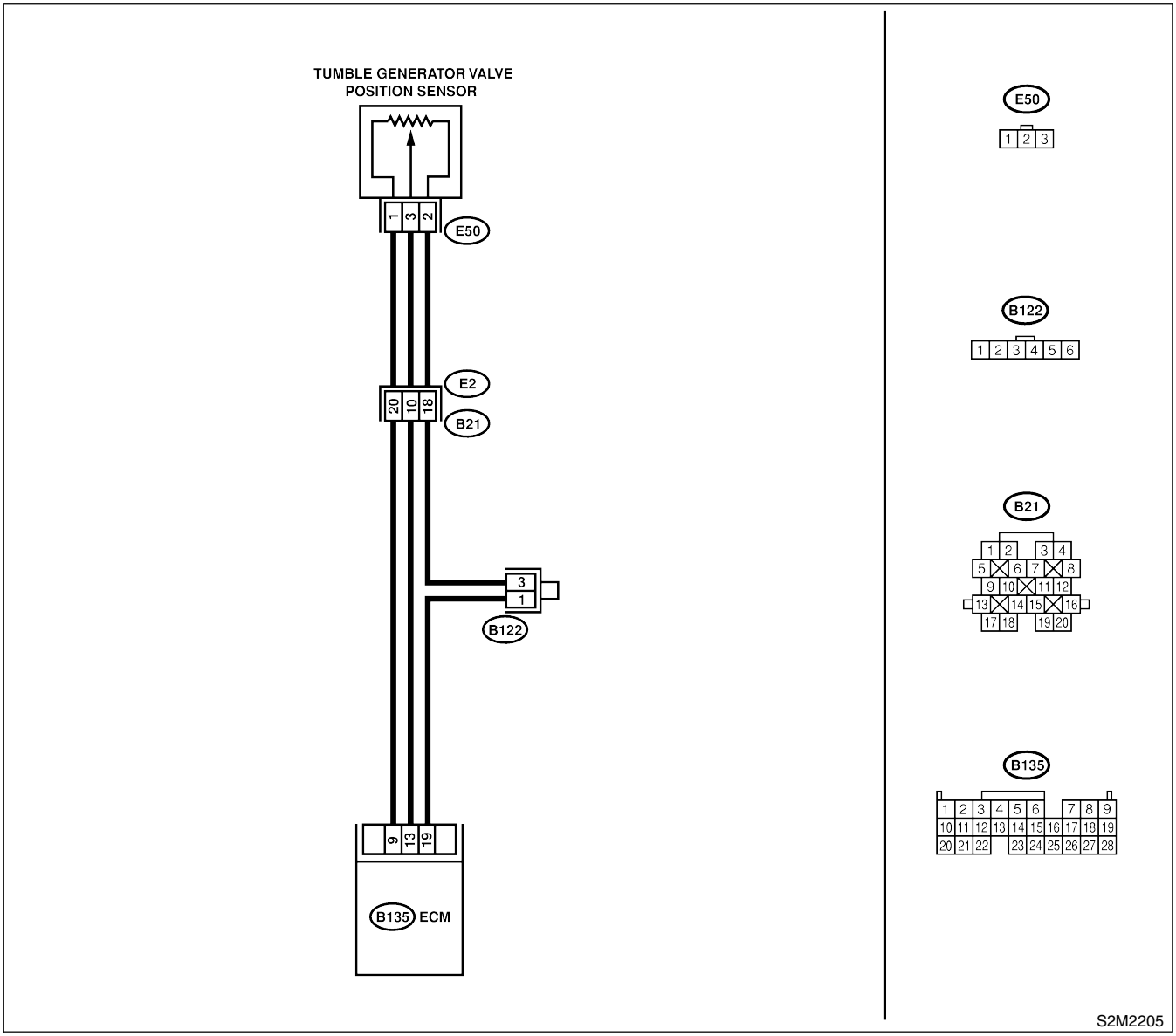
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


TUMBLE GENERATOR VALVE
POSITION SENSOR
1
3
2
E50
E2
20
10
18
B21
3
1
B122
9
13
19
B135
ECM
E50
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2205

No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of tumble generator valve 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(DOHC TURBO)-36, 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 tumble generator valve position sensor connector ● Poor contact in ECM connector ● Poor contact in coupling connector
2	**CHECK HARNESS BETWEEN TUMBLE GENERATOR VALVE POSITION SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve position sensor. 3) Measure resistance of harness between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E50) 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 tumble generator valve position sensor and ECM connector ● Poor contact in coupling connector ● Poor contact in joint connector
3	**CHECK HARNESS BETWEEN TUMBLE GENERATOR VALVE POSITION SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to ON. 2) Measure voltage between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E50) No. 3 (+) — Engine ground (–):***	Is the voltage more than 4.9 V?	Repair battery short circuit in harness between tumble generator valve position sensor and ECM connector. After repair, replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

MEMO:

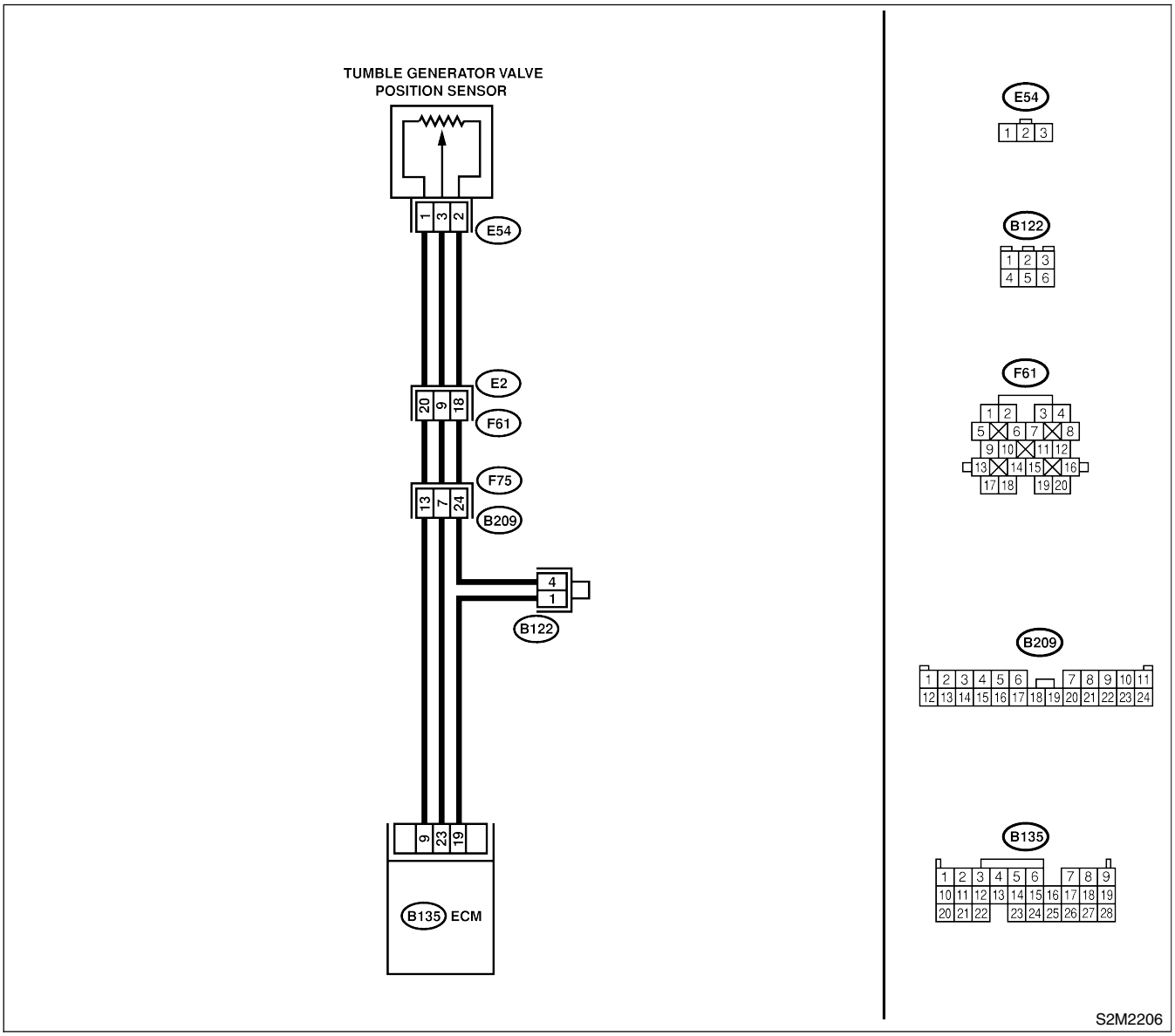
BN: DTC P1088 — TUMBLE GENERATOR VALVE #1 (RH) POSITION SENSOR CIRCUIT LOW INPUT — S088521H75

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

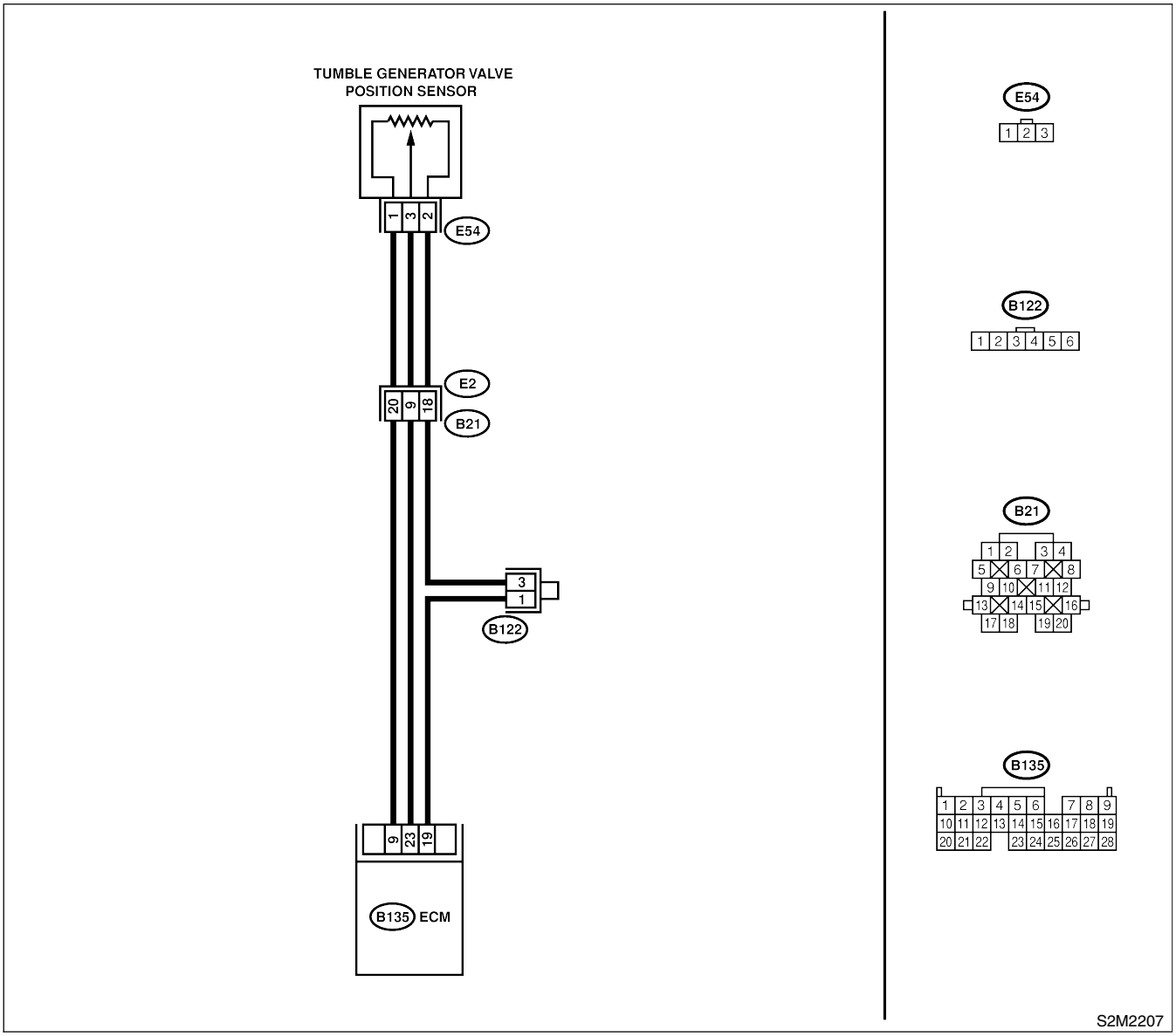
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


TUMBLE GENERATOR VALVE
POSITION SENSOR
1
3
2
E54
E2
20
9
18
B21
3
1
B122
9
23
19
B135
ECM
E54
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2207

No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of tumble generator valve 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(DOHC TURBO)-36, 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 tumble generator valve position sensor connector • Poor contact in ECM connector • Poor contact in coupling connector
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground while throttle valve is fully closed. ***Connector & terminal*** ***(B135) No. 9 (+) — 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*** ***(B135) No. 9 (+) — 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 your Subaru distributor. 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*** ***(B135) No. 23 (+) — 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 TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from tumble generator valve position sensor. 3) Turn ignition switch to ON. 4) Measure voltage between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E54) 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 tumble generator valve position sensor and ECM connector • Poor contact in throttle position sensor connector • Poor contact in ECM connector • Poor contact in coupling connector • Poor contact in joint connector
7	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Measure resistance of harness between ECM connector and tumble generator valve position sensor connector. ***Connector & terminal*** ***(B135) No. 23 — (E54) 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 tumble generator valve position sensor and ECM connector • Poor contact in ECM connector • Poor contact in tumble generator valve position sensor connector • Poor contact in coupling connector
8	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE POSITION SENSOR CONNECTOR.** Measure resistance of harness between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E54) No. 3 — Engine ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between tumble generator valve position sensor and ECM connector.	Go to step **9**.
9	**CHECK POOR CONTACT.** Check poor contact in tumble generator valve position sensor connector.	Is there poor contact in tumble generator valve position sensor connector?	Repair poor contact in tumble generator valve position sensor connector.	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

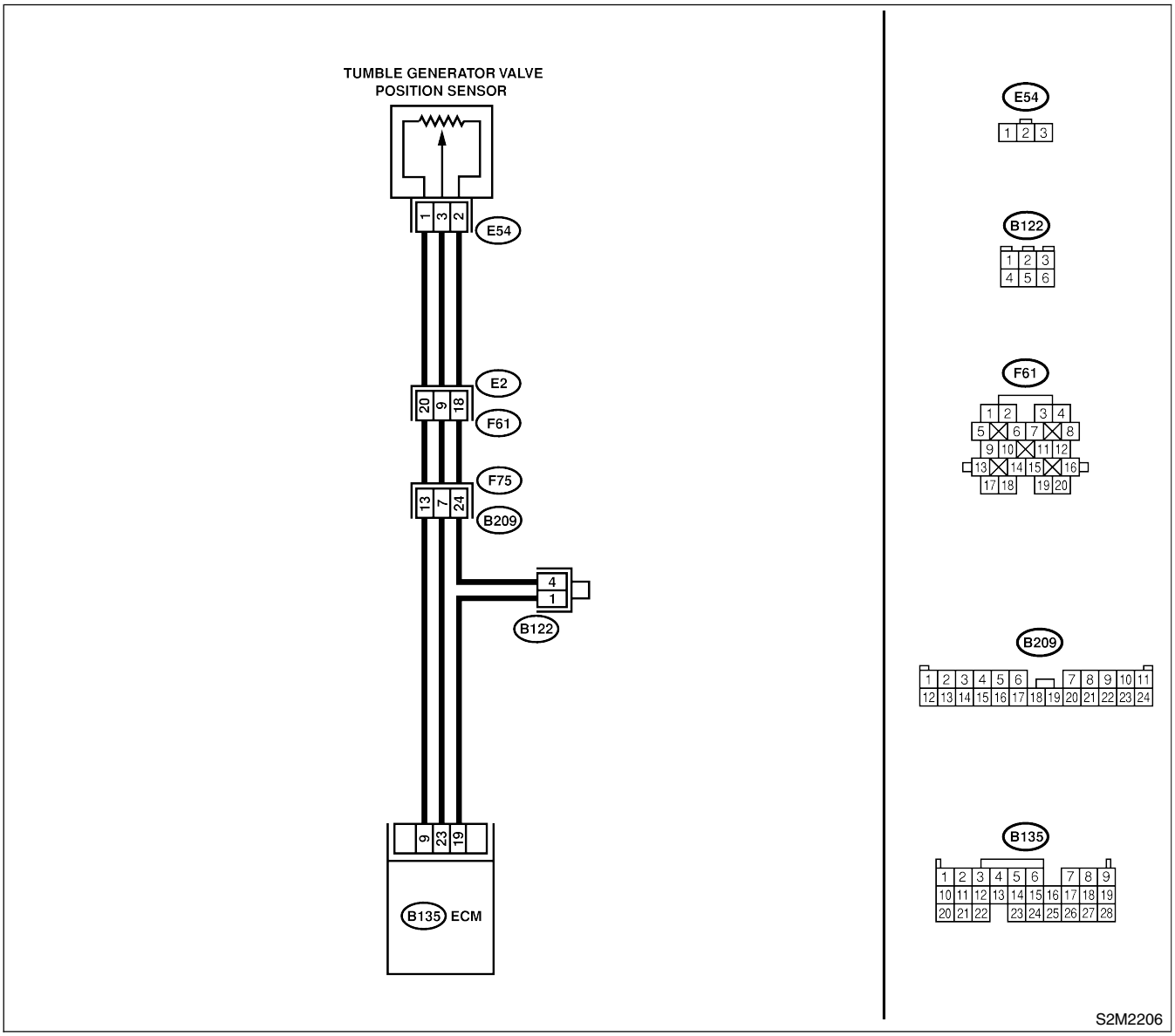
BO: DTC P1089 — TUMBLE GENERATOR VALVE #1 (RH) POSITION SENSOR CIRCUIT HIGH INPUT — S088521H76

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

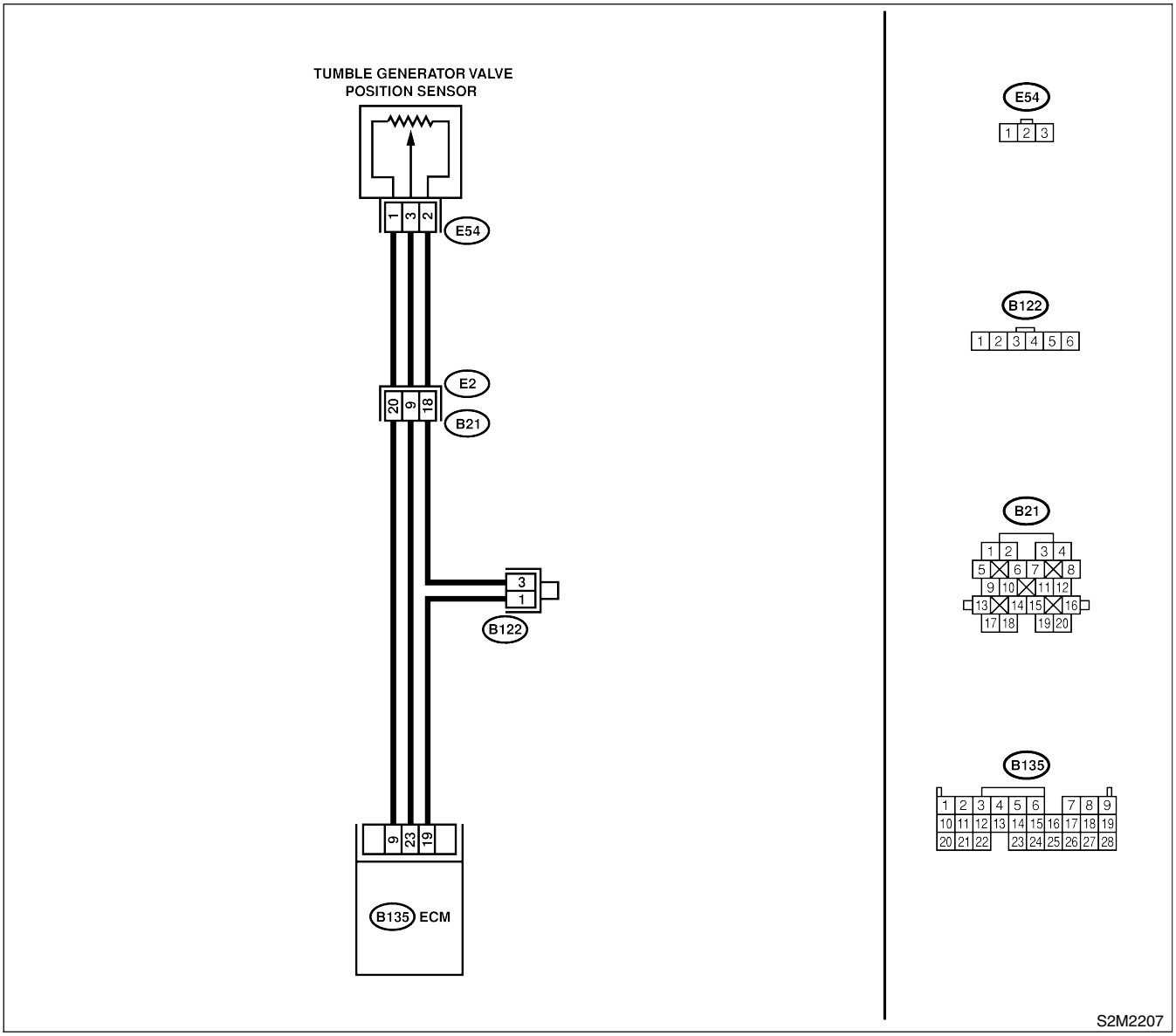
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**


TUMBLE GENERATOR VALVE
POSITION SENSOR
1
3
2
E54
E2
20
9
18
B21
3
1
B122
9
23
19
B135
ECM
E54
1 2 3
B122
1 2 3 4 5 6
B21
1 2 3 4
5 6 7 8
9 10 11 12
13 14 15 16
17 18 19 20
B135
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28
S2M2207

No.	Step	Check	Yes	No
1	**CHECK CURRENT DATA.** 1) Start engine. 2) Read data of tumble generator valve 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(DOHC TURBO)-36, 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 tumble generator valve position sensor connector ● Poor contact in ECM connector ● Poor contact in coupling connector
2	**CHECK HARNESS BETWEEN TUMBLE GENERATOR VALVE POSITION SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve position sensor. 3) Measure resistance of harness between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E54) 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 tumble generator valve position sensor and ECM connector ● Poor contact in coupling connector ● Poor contact in joint connector
3	**CHECK HARNESS BETWEEN TUMBLE GENERATOR VALVE POSITION SENSOR AND ECM CONNECTOR.** 1) Turn ignition switch to ON. 2) Measure voltage between tumble generator valve position sensor connector and engine ground. ***Connector & terminal*** ***(E54) No. 3 (+) — Engine ground (–):***	Is the voltage more than 4.9 V?	Repair battery short circuit in harness between tumble generator valve position sensor and ECM connector. After repair, replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

BP: DTC P1090 — TUMBLE GENERATOR VALVE SYSTEM #1 (RH) MALFUNCTION (STUCK OPEN) — S088521H77

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P1088, P1089, P1094 or P1095?	Inspect DTC P1088, P1089, P1094 or P1095 using List of Diagnostic Trouble Code (DTC) <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH** 1) Remove tumble generator valve assembly. 2) Check tumble generator valve body.	Does tumble generator valve move smoothly? (No dirt or foreign materials clogged)	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Clean tumble generator valve.

BQ: DTC P1091 — TUMBLE GENERATOR VALVE SYSTEM #1 (RH) MALFUNCTION (STUCK CLOSE) — S088521H78

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P1088, P1089, P1094 or P1095?	Inspect DTC P1088, P1089, P1094 or P1095 using List of Diagnostic Trouble Code (DTC) <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH** 1) Remove tumble generator valve assembly. 2) Check tumble generator valve body.	Does tumble generator valve move smoothly? (No dirt or foreign materials clogged)	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Clean tumble generator valve.

BR: DTC P1092 — TUMBLE GENERATOR VALVE SYSTEM #2 (LH) MALFUNCTION (STUCK OPEN) — S088521H79

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P1086, P1087, P1096 or P1097?	Inspect DTC P1086, P1087, P1096 or P1097 using List of Diagnostic Trouble Code (DTC) <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH** 1) Remove tumble generator valve assembly. 2) Check tumble generator valve body.	Does tumble generator valve move smoothly? (No dirt or foreign materials clogged)	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Clean tumble generator valve.

BS: DTC P1093 — TUMBLE GENERATOR VALVE SYSTEM #2 (LH) MALFUNCTION (STUCK CLOSE) — S088521H80

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P1086, P1087, P1096 or P1097?	Inspect DTC P1086, P1087, P1096 or P1097 using List of Diagnostic Trouble Code (DTC) <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK TUMBLE GENERATOR VALVE RH** 1) Remove tumble generator valve assembly. 2) Check tumble generator valve body.	Does tumble generator valve move smoothly? (No dirt or foreign materials clogged)	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Clean tumble generator valve.

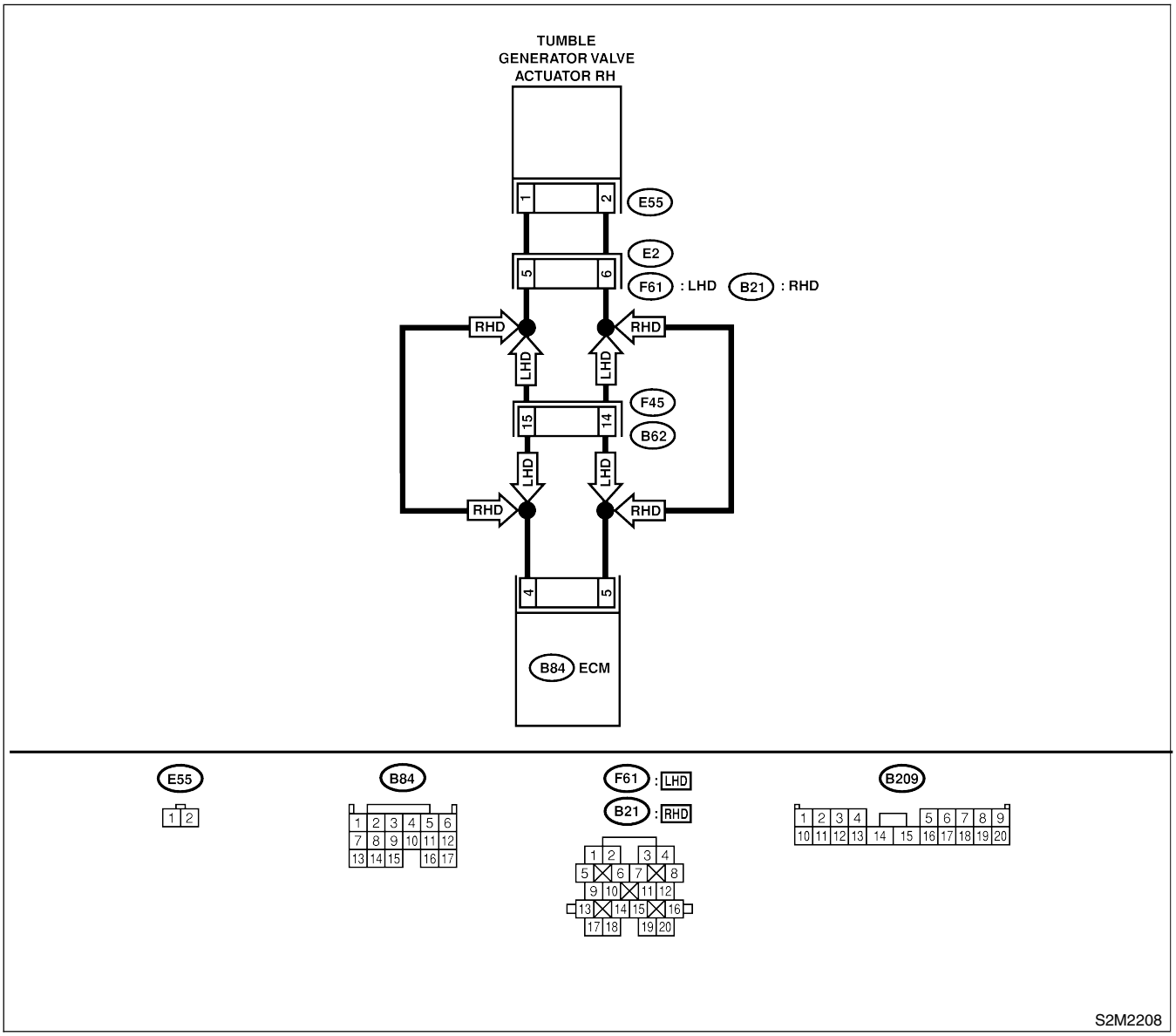
MEMO:

BT: DTC P1094 — TUMBLE GENERATOR VALVE CIRCUIT #1 (OPEN CIRCUIT) — S088521H81

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



S2M2208

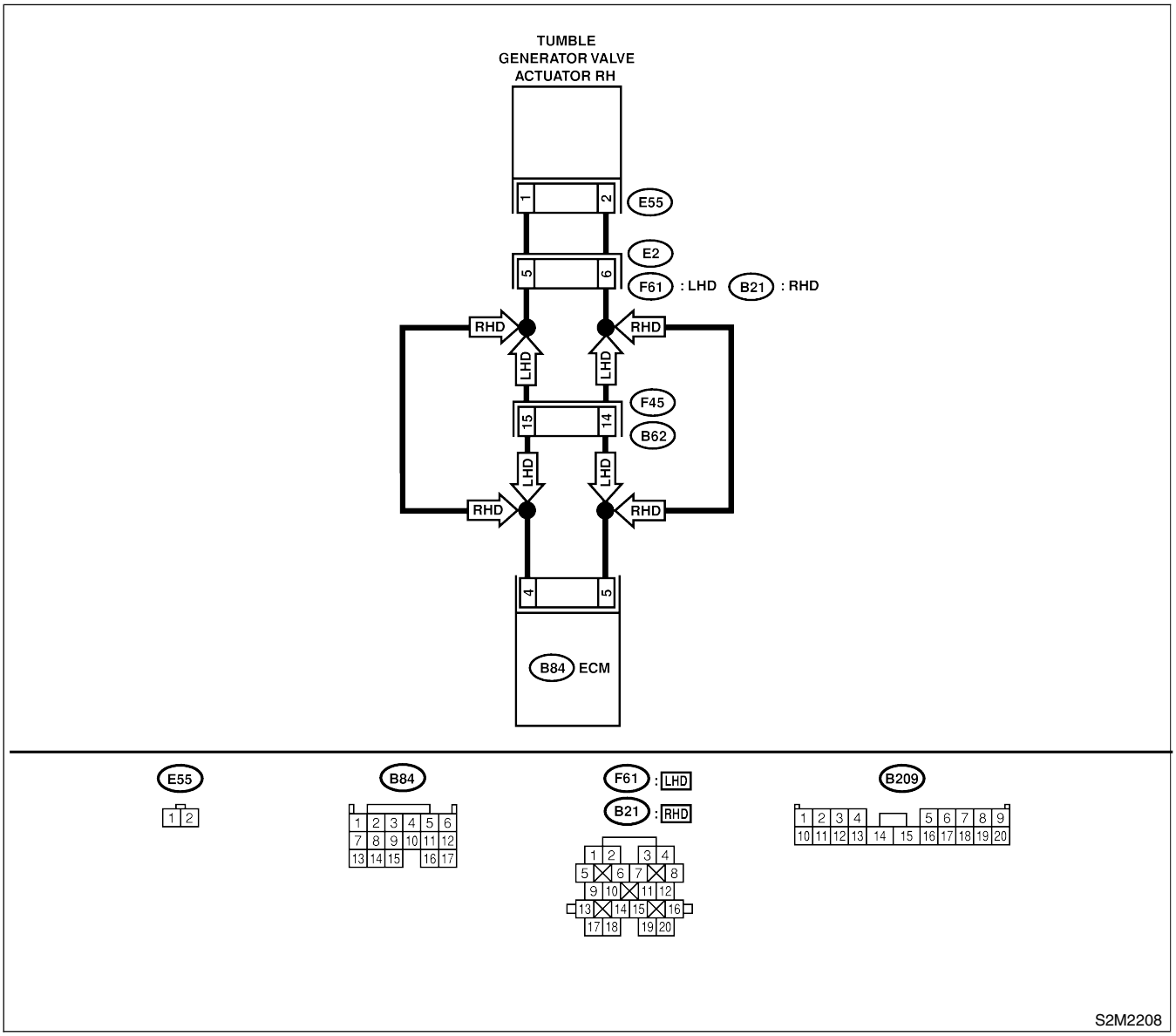
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve actuator and ECM connector. 3) Measure resistance between tumble generator valve actuator and ECM connector. ***Connector & terminal*** ***(E55) No. 1 — (B84) No. 4:*** ***(E55) No. 2 — (B84) No. 5:***	Is the resistance less than 1Ω?	Go to step **2**.	Repair open circuit between ECM and tumble generator valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and tumble generator valve actuator connector. • Poor contact in coupling connector.
2	**CHECK POOR CONTACT.** Check poor contact in tumble generator valve actuator connector.	Is there poor contact in tumble generator valve actuator connector.	Repair poor contact in tumble generator valve actuator connector.	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

BU: DTC P1095 — TUMBLE GENERATOR VALVE CIRCUIT #1 (OVERCURRENT) — S088521H82

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



S2M2208

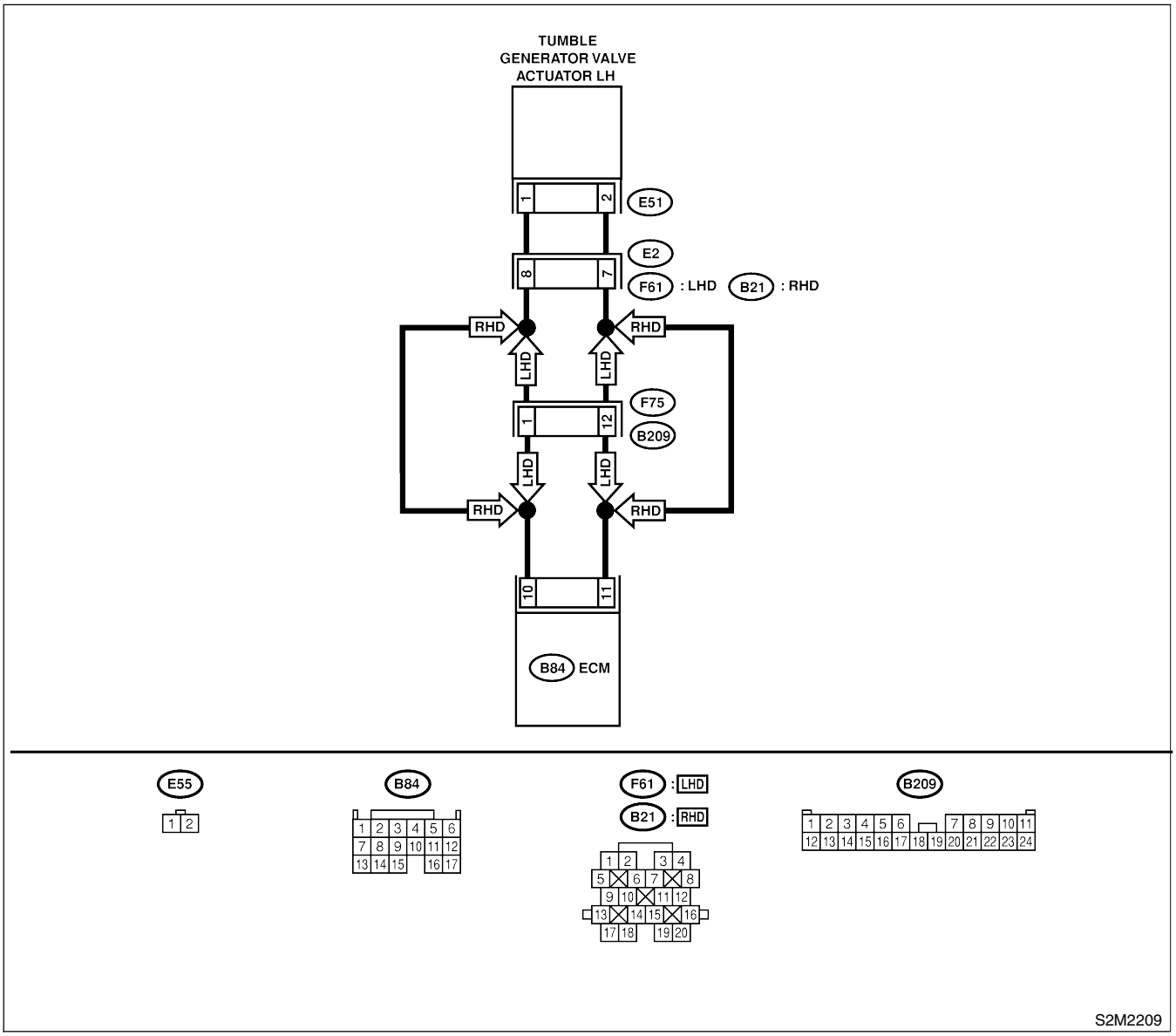
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve connector. 3) Measure voltage between tumble generator valve actuator and chassis ground. ***Connector & terminal*** ***(E55) No. 1 (+) — Chassis ground (–):*** ***(E55) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 5V?	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Repair battery short circuit between ECM and tumble generator valve actuator.

BV: DTC P1096 — TUMBLE GENERATOR VALVE CIRCUIT #2 (OPEN CIRCUIT) — S088521H83

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



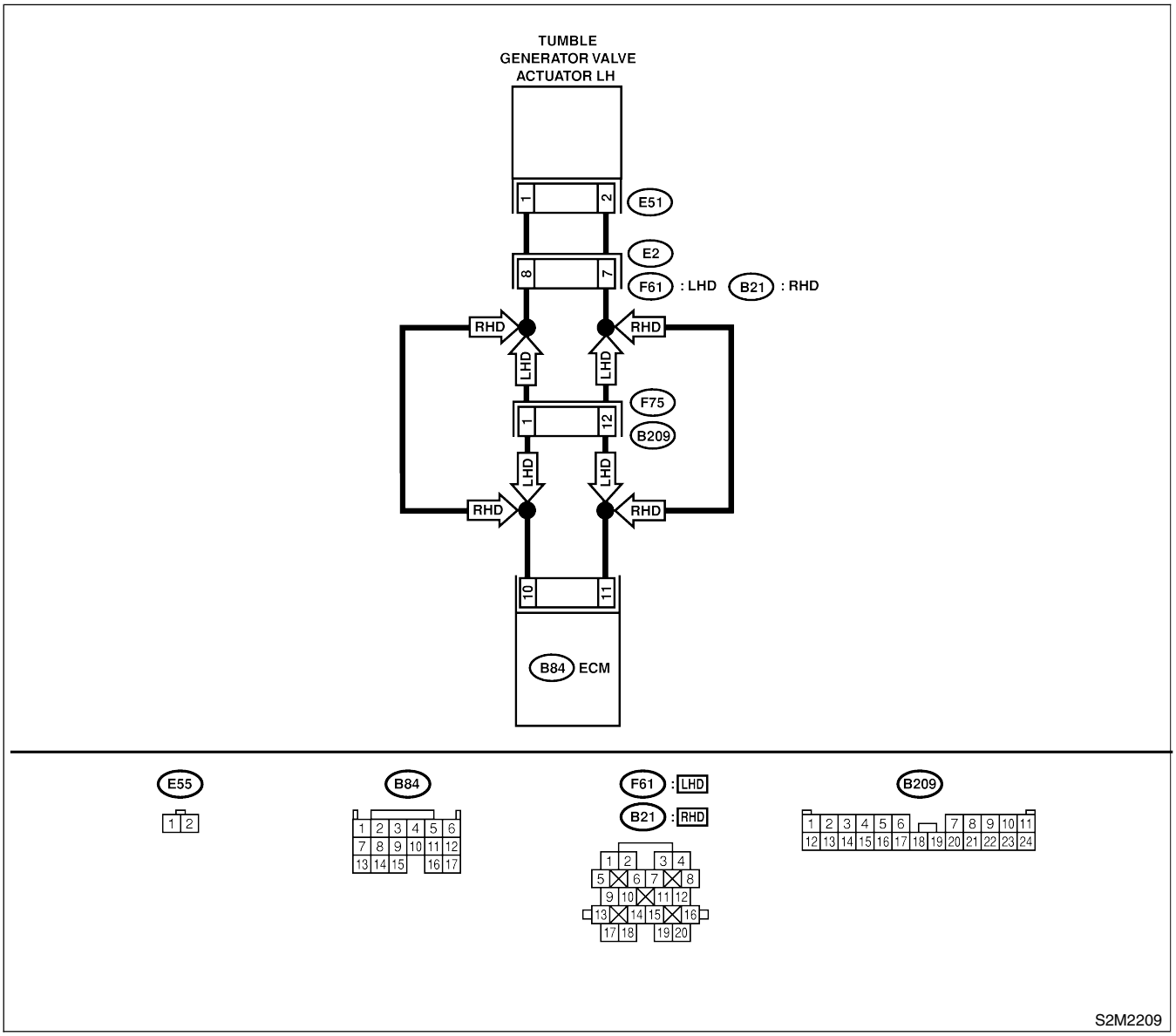
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve and ECM connector. 3) Measure resistance between tumble generator valve actuator and ECM connector. ***Connector & terminal*** ***(E51) No. 1 — (B84) No. 10:*** ***(E51) No. 2 — (B84) No. 11:***	Is the resistance less than 1Ω?	Go to step **2**.	Repair open circuit between ECM and tumble generator valve connector. NOTE: In this case, repair the following: • Open circuit in harness between ECM and tumble generator valve actuator connector. • Poor contact in coupling connector.
2	**CHECK POOR CONTACT.** Check poor contact in tumble generator valve actuator connector.	Is there poor contact in tumble generator valve actuator connector.	Repair poor contact in tumble generator valve actuator connector.	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>

BW: DTC P1097 — TUMBLE GENERATOR VALVE CIRCUIT #2 (OVERCURRENT) — S088521H84

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TUMBLE GENERATOR VALVE ACTUATOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from tumble generator valve connector. 3) Measure voltage between tumble generator valve actuator and chassis ground. ***Connector & terminal*** ***(E51) No. 1 (+) — Chassis ground (–):*** ***(E51) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 5V?	Replace tumble generator valve assembly. <Ref. to FU(DOHC TURBO)-40, Tumble Generator Valve Assembly.>	Repair battery short circuit between ECM and tumble generator valve actuator.

BX: DTC P1110 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT LOW INPUT — S088521B84

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-47, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.	It is not necessary to inspect DTC P1110.

BY: DTC P1111 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT HIGH INPUT — S088521B85

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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(DOHC TURBO)-47, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.	It is not necessary to inspect DTC P1111.

BZ: DTC P1112 — ATMOSPHERIC PRESSURE SENSOR CIRCUIT RANGE/ PERFORMANCE PROBLEM — S088521B86

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

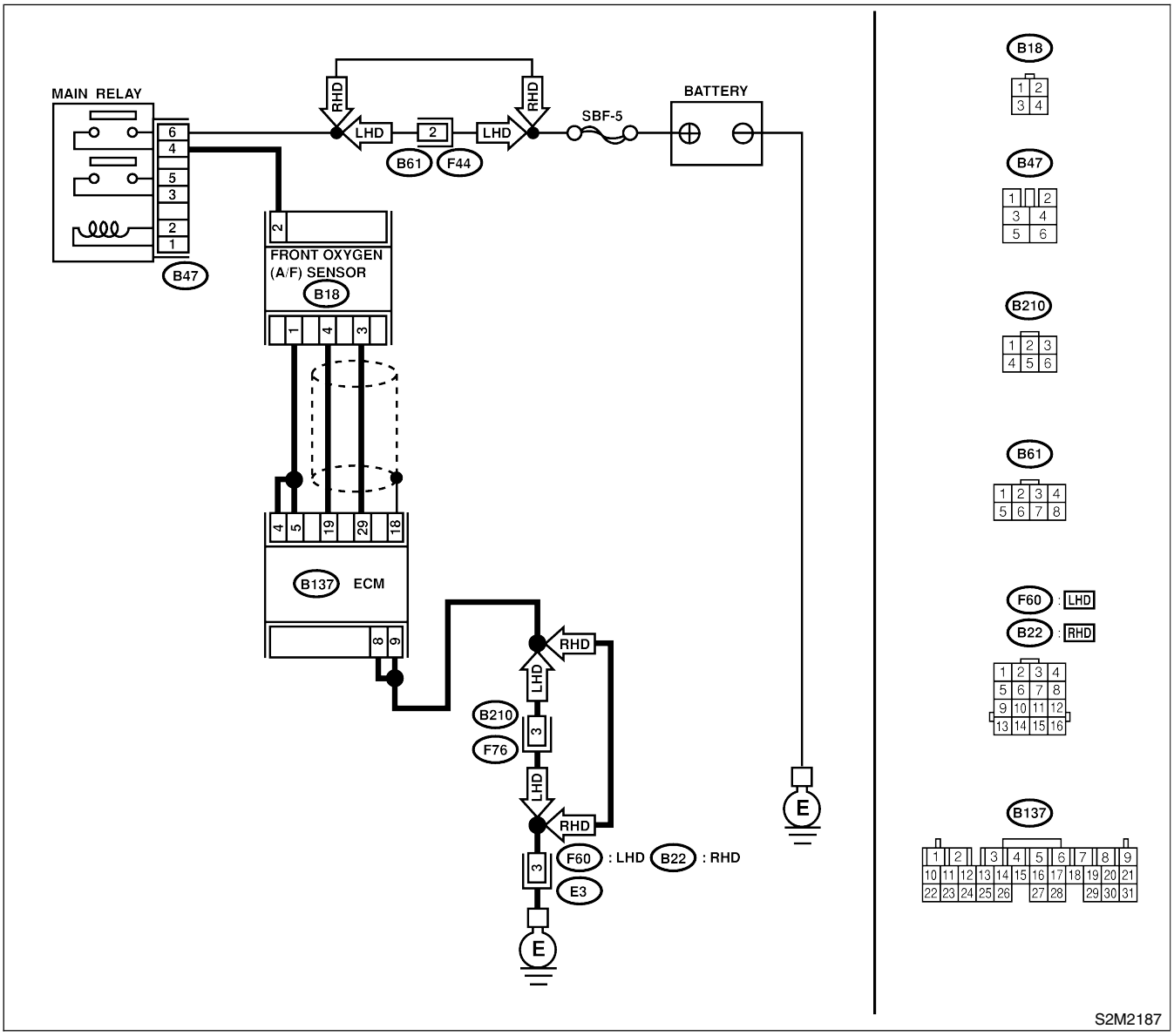
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0106, P0107, P0108, P1110 or P1111?	Inspect DTC P0106, P0107, P0108, P1110 or P1111 using “List of Diagnostic Trouble Code (DTC)”.<Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.> NOTE: Atmospheric pressure sensor is built into ECM.

CA: DTC P1130 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (OPEN CIRCUIT) — S088521B92

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



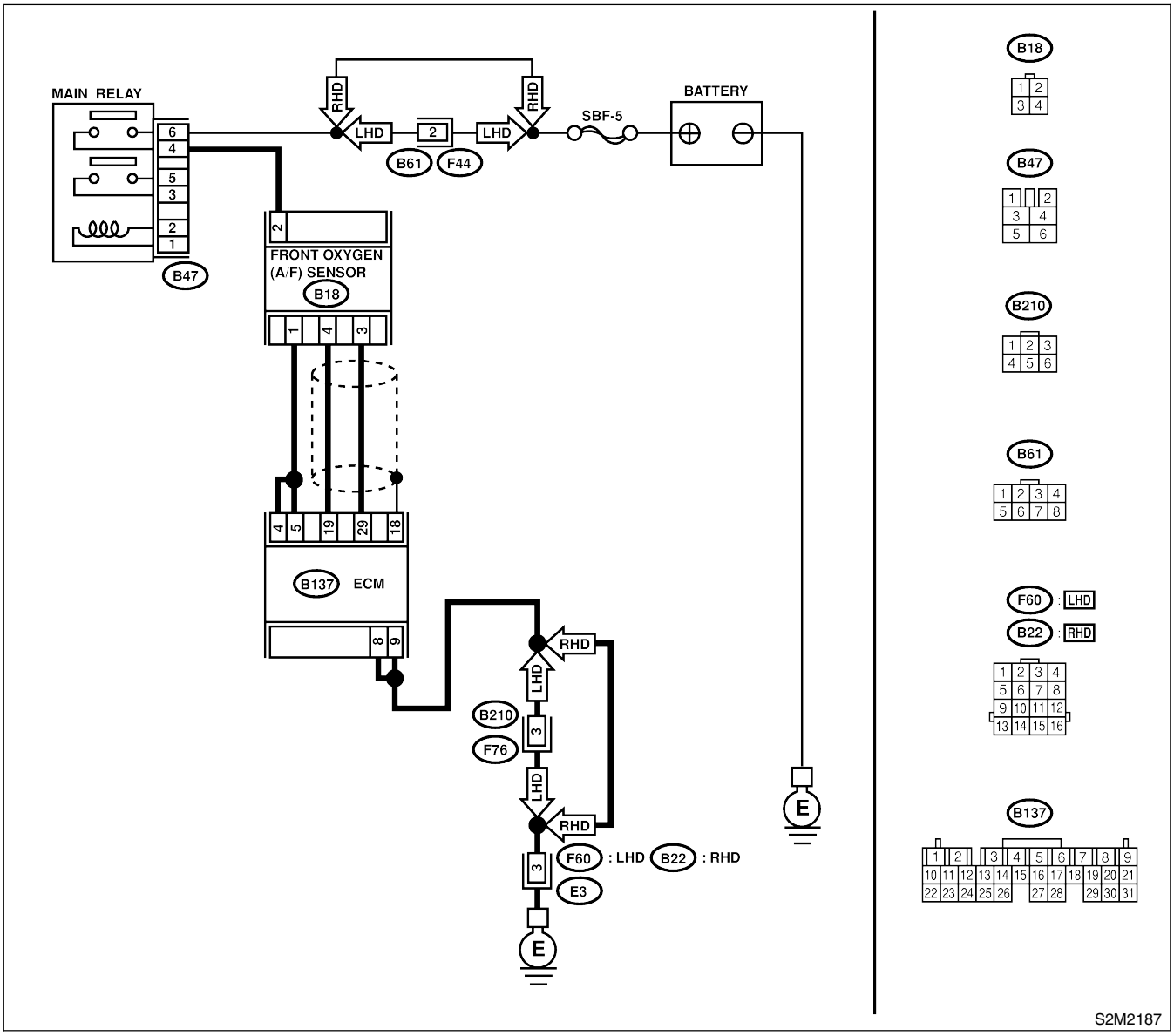
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from ECM and front oxygen (A/F) sensor connector. 3) Measure resistance of harness between ECM and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B137) No. 29 — (B18) No. 3:*** ***(B137) No. 19 — (B18) 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
2	**CHECK POOR CONTACT.** Check poor contact in front oxygen (A/F) sensor connector.	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 FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>

CB: DTC P1131 — FRONT OXYGEN (A/F) SENSOR CIRCUIT MALFUNCTION (SHORT CIRCUIT) — S088521B93

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



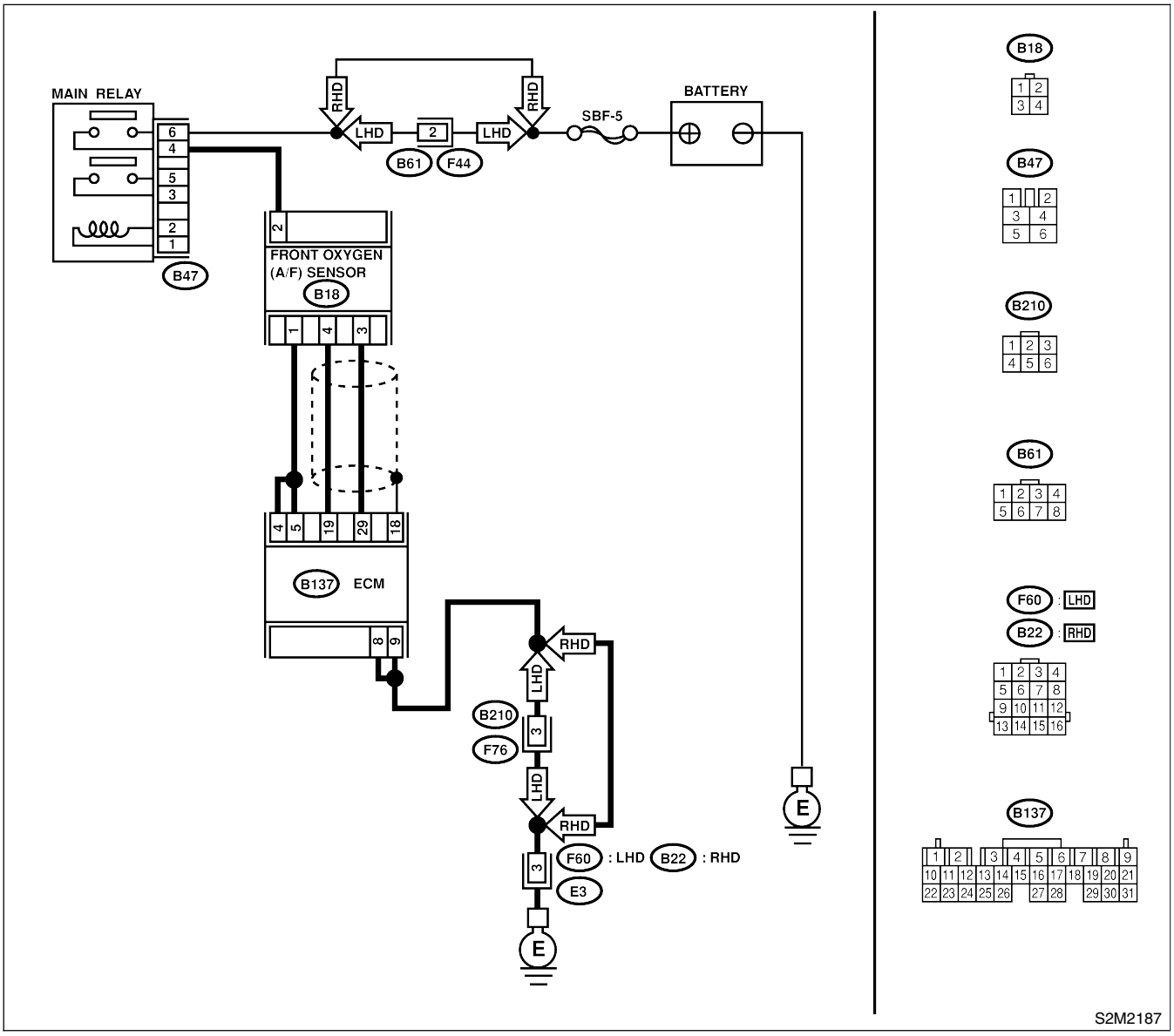
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Measure resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 19 — Chassis ground:***	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*** ***(B137) No. 29 — 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.
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*** ***(B137) No. 19 (+) — 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*** ***(B137) No. 19 (+) — 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(DOHC TURBO)-47, 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*** ***(B137) No. 29 (+) — Chassis ground (–):***	Is the voltage more than 4.95 V?	Go to step **6**.	Replace front oxygen (A/F) sensor. <Ref. to FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>
6	**CHECK OUTPUT SIGNAL FOR ECM.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B137) No. 29 (+) — 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(DOHC TURBO)-47, Engine Control Module.>	Repair poor contact in ECM connector.

CC: DTC P1134 — FRONT OXYGEN (A/F) SENSOR MICRO-COMPUTER PROBLEM — S088521B96

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



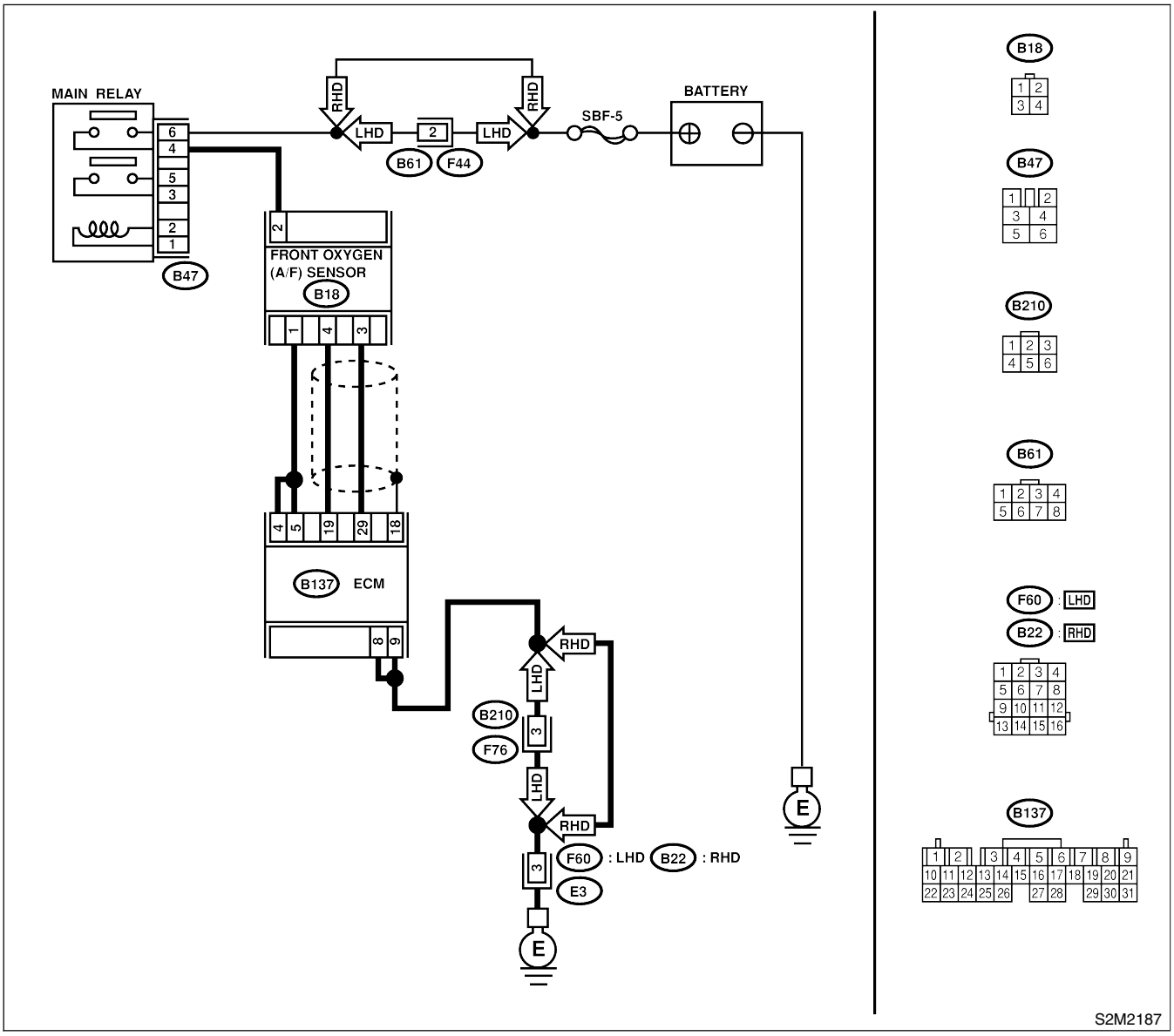
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P1134?	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>	It is not necessary to inspect DTC P1134.

CD: DTC P1139 — FRONT OXYGEN (A/F) SENSOR #1 HEATER CIRCUIT RANGE/PERFORMANCE PROBLEM — S088521B97

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



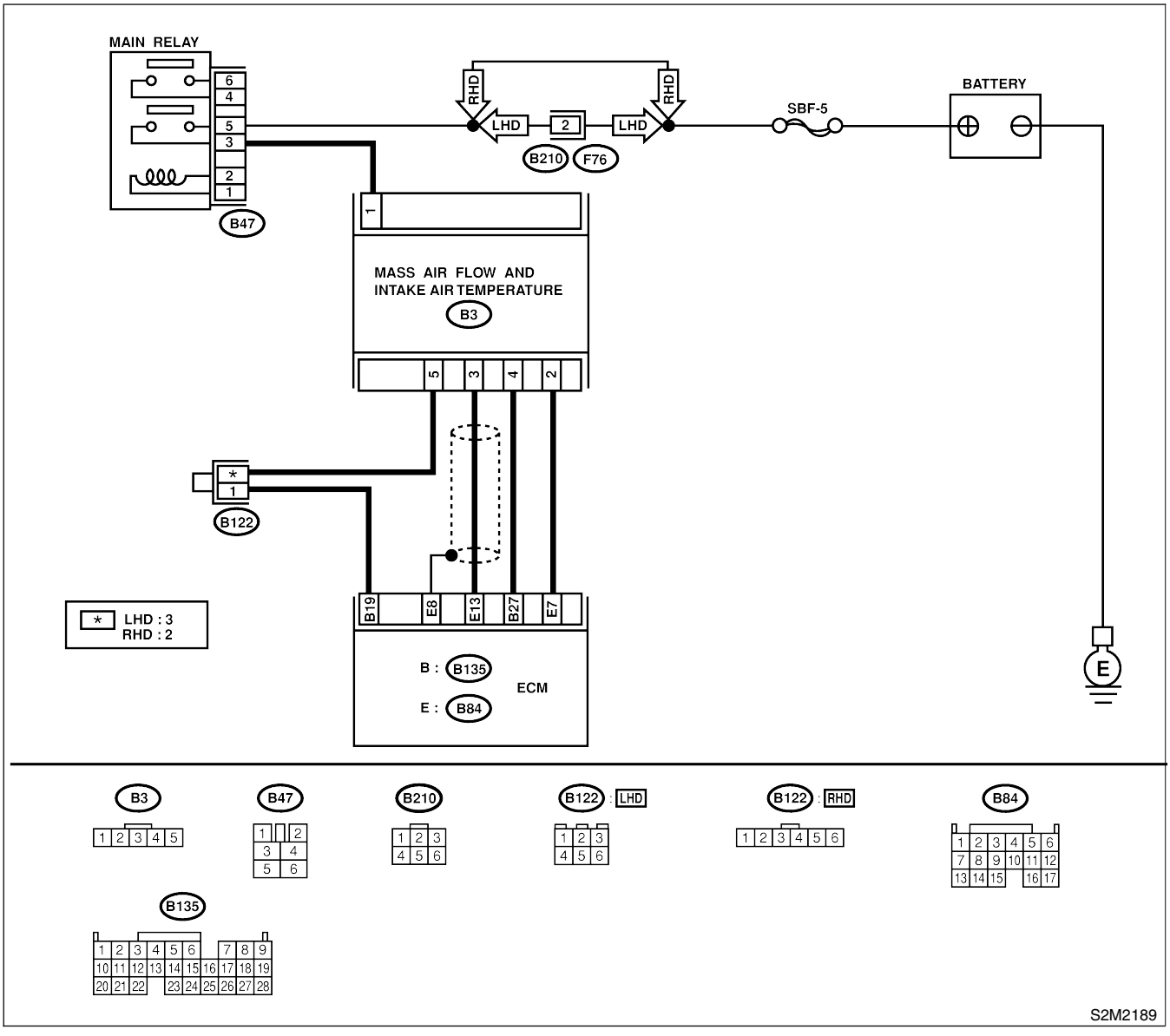
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND FRONT OXYGEN (A/F) SENSOR CONNECTOR.** 1) Start engine, and warm-up the engine. 2) Turn ignition switch to OFF. 3) Disconnect connectors from ECM and front oxygen (A/F) sensor. 4) Measure resistance of harness between ECM and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B137) No. 5 — (B18) No. 1:*** ***(B137) No. 4 — (B18) No. 1:***	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.
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*** ***(B137) No. 19 — (B18) No. 4:*** ***(B137) No. 29 — (B18) No. 3:***	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 main relay and front oxygen (A/F) sensor connector. ***Connector & terminal*** ***(B47) No. 4 — (B18) No. 2:***	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 FRONT OXYGEN (A/F) SENSOR.** Measure resistance between front oxygen (A/F) sensor connector terminals. ***Terminals*** ***No. 2 — No. 1:***	Is the resistance less than 5 Ω?	Go to step **5**.	Replace front oxygen (A/F) sensor. <Ref. to FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>
5	**CHECK POOR CONTACT.** Check poor contact in ECM and front oxygen (A/F) sensor connector.	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 FU(DOHC TURBO)-42, Front Oxygen (A/F) Sensor.>

CE: DTC P1141 — MASS AIR FLOW SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S088521B98

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



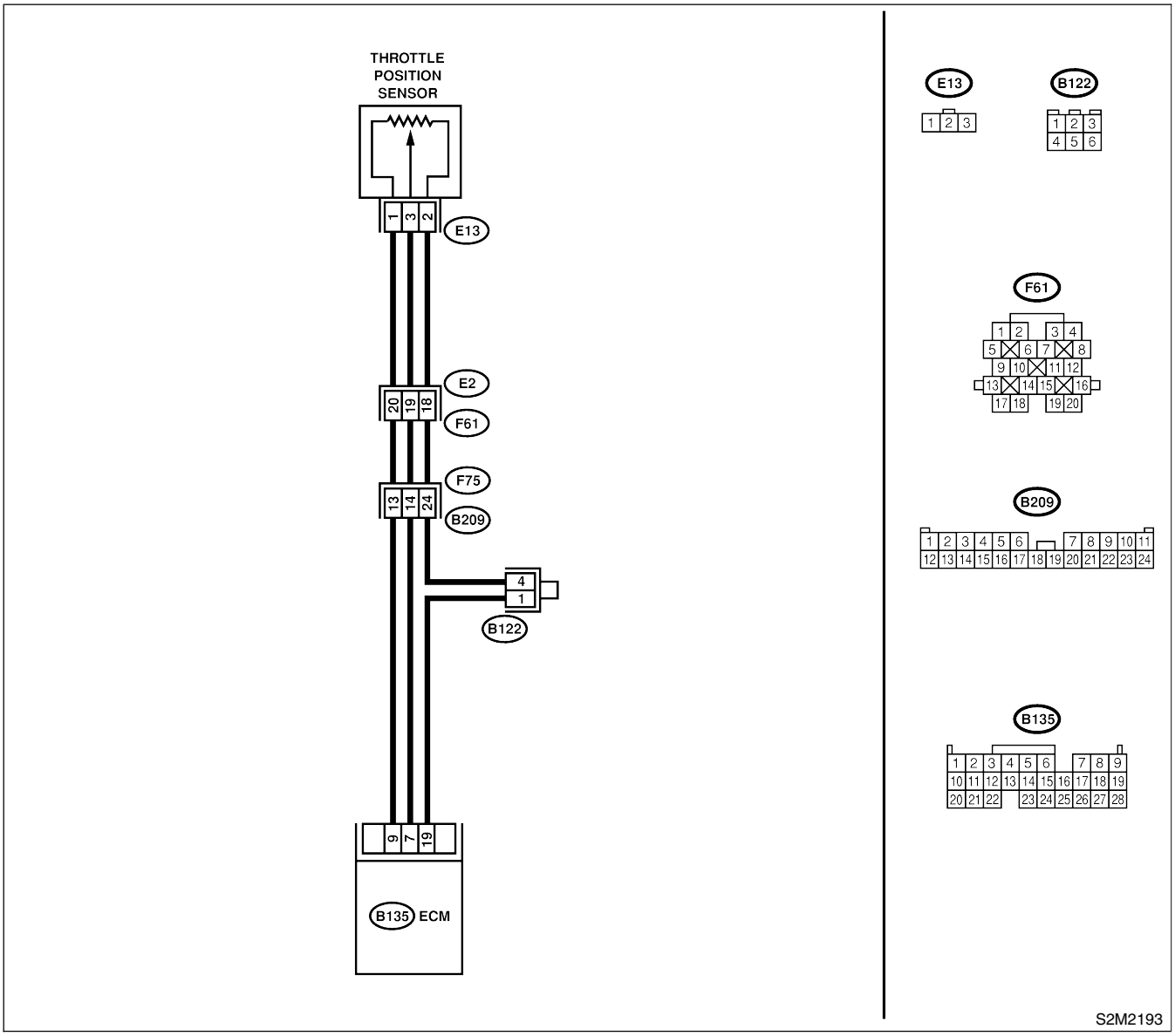
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does Subaru select monitor or OBD-II general scan tool indicate DTC P0102 or P0103?	Inspect DTC P0102 or P0103 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P1141.	Replace mass air flow and intake air temperature sensor.

CF: DTC P1142 — THROTTLE POSITION SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S088521B99

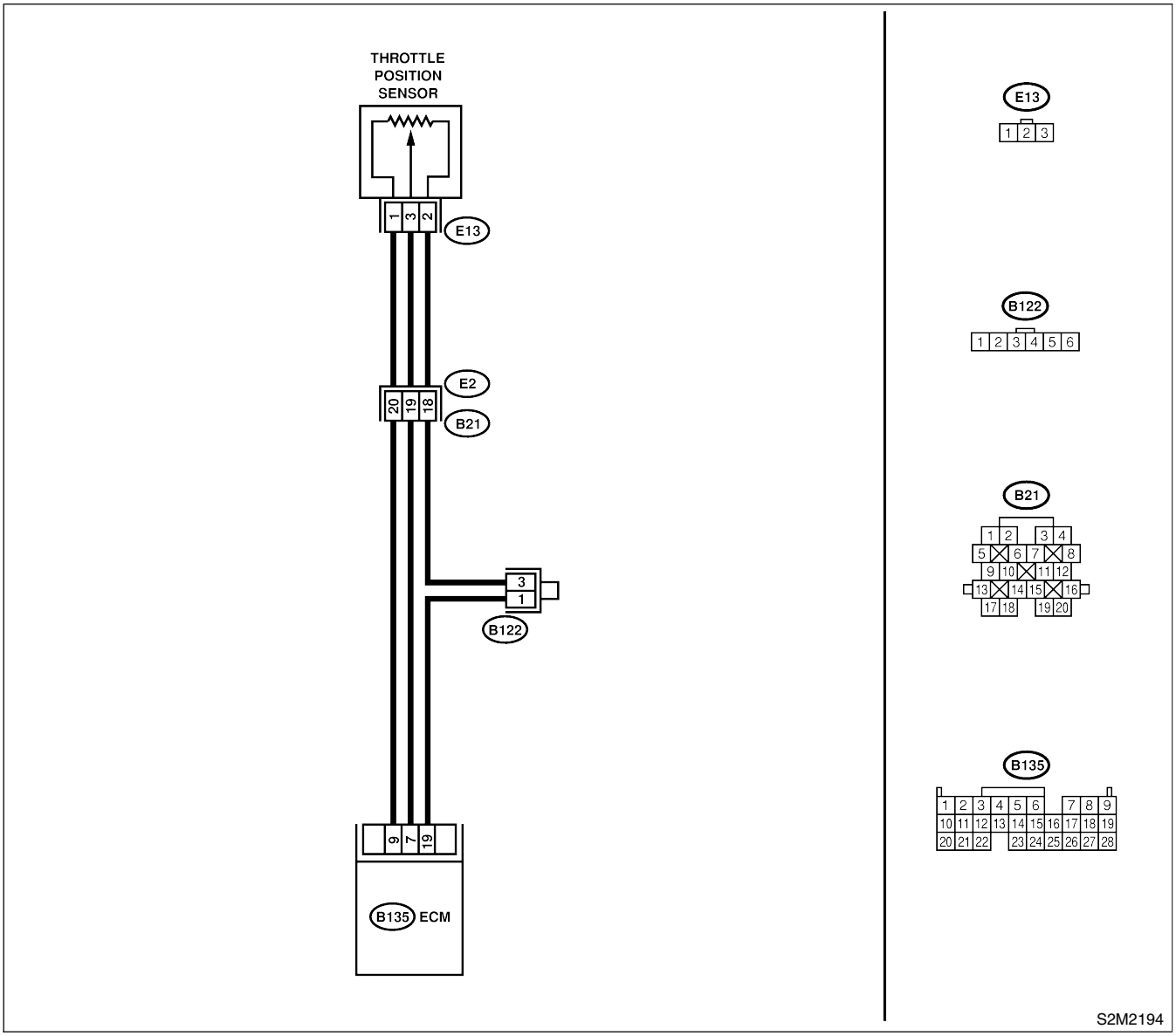
- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault
- **TROUBLE SYMPTOM:**
  - Erroneous idling
  - Engine stalls.
  - Poor driving performance

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**



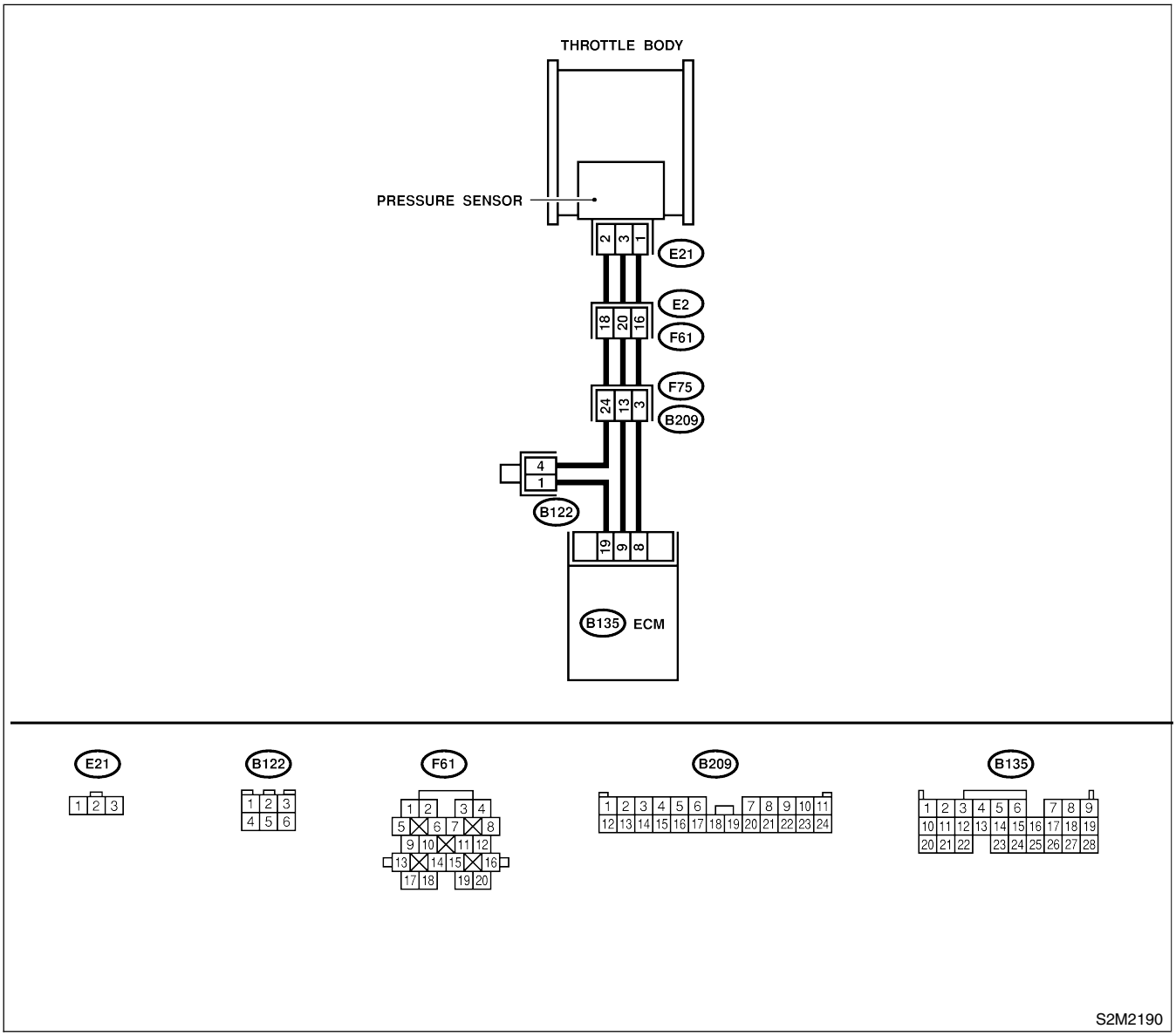
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0122 or P0123?	Inspect DTC P0122 or P0123 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P1142.	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>

CG: DTC P1146 — PRESSURE SENSOR CIRCUIT RANGE/PERFORMANCE PROBLEM (HIGH INPUT) — S088521G07

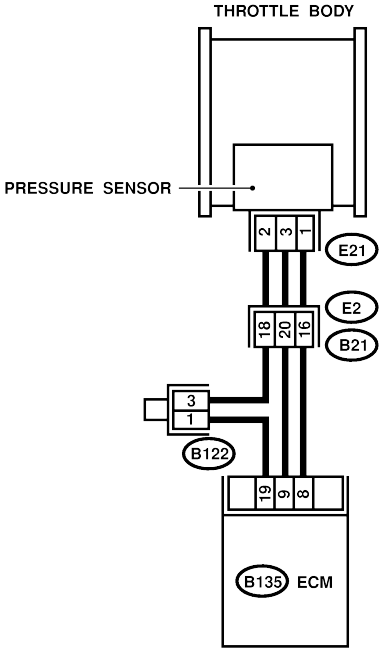
- **DTC DETECTING CONDITION:**
  - Two consecutive driving cycles with fault

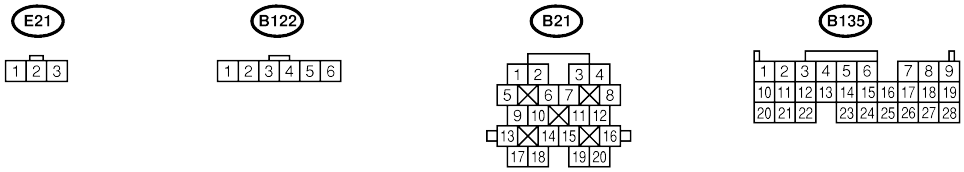
CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



- **RHD MODEL**





S2M2191

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 “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	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**.

No.	Step	Check	Yes	No
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(DOHC TURBO)-36, 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 ***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 pressure sensor. <Ref. to FU(DOHC TURBO)-35, 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(DOHC TURBO)-36, 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**.	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>
5	**CHECK THROTTLE POSITION.**	Is throttle positioning ratio equal to or more than 85% when throttle is fully open?	Replace pressure sensor. <Ref. to FU(DOHC TURBO)-35, Pressure Sensor.>	Replace throttle position sensor. <Ref. to FU(DOHC TURBO)-33, Throttle Position Sensor.>

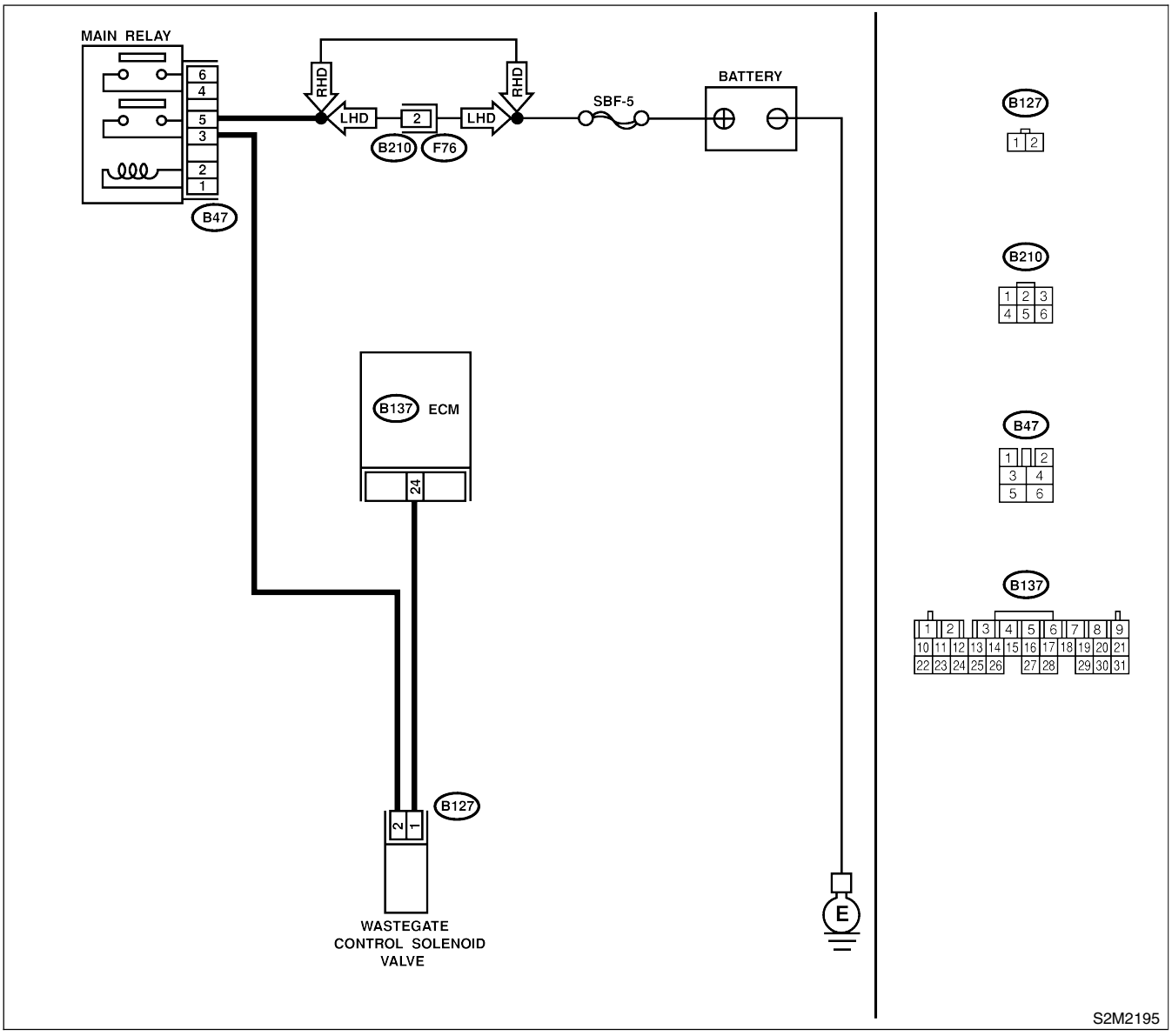
MEMO:

CH: DTC P1244 — WASTEGATE CONTROL SOLENOID VALVE RANGE/PERFORMANCE PROBLEM (LOW INPUT) — S088521H86

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



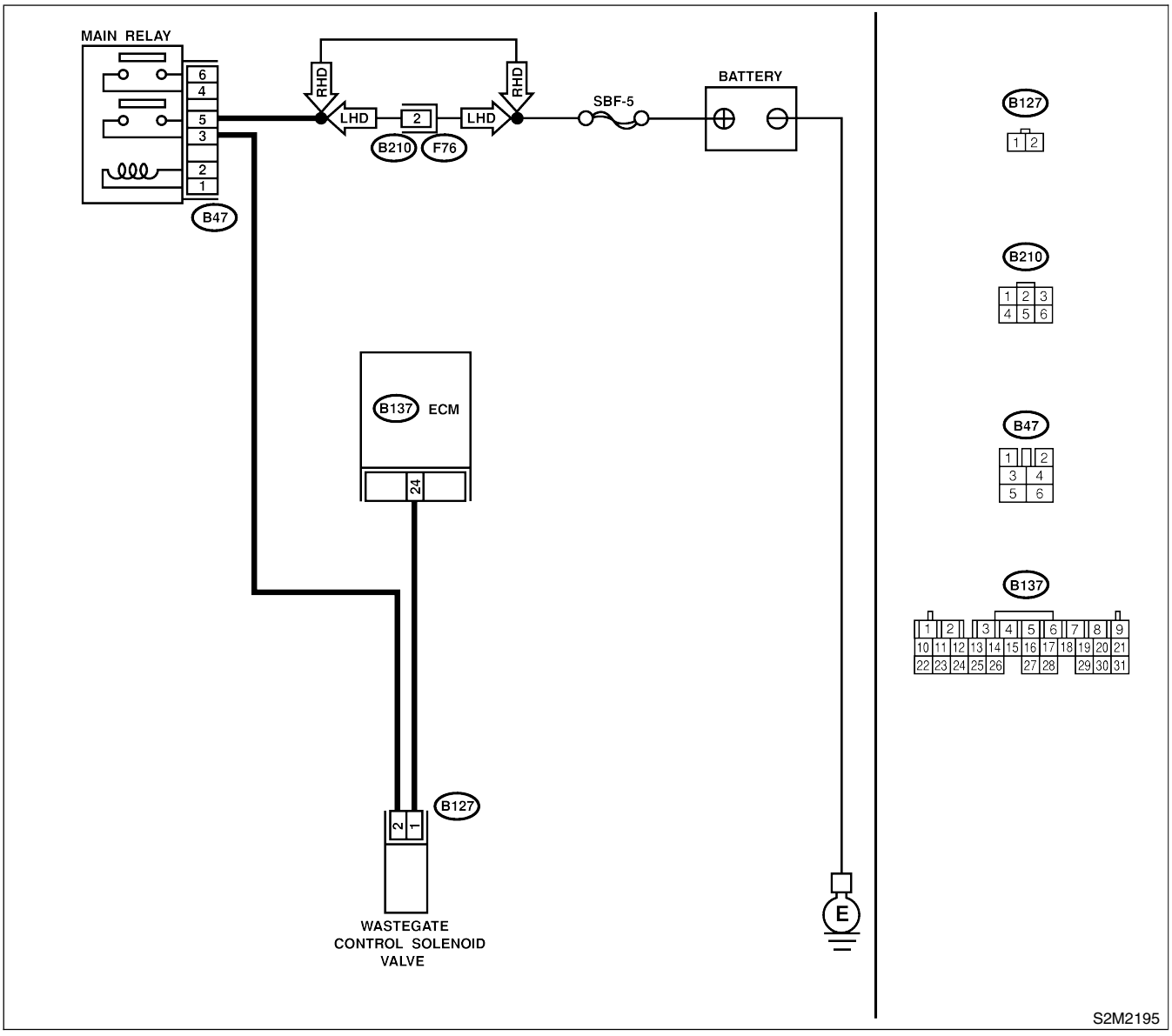
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0245 or P0246?	Inspect DTC P0245 or P0246 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P1142.	Replace waste-gate control sole-noid valve. <Ref. to FU(DOHC TURBO)-41, Wastegate Control Solenoid Valve.>

CI: DTC P1245 — WASTEGATE CONTROL SOLENOID VALVE MALFUNCTION (FAIL-SAFE) — S088521H87

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, 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 P0244, P0245, P0246 or P1244?	Inspect DTC P0244, P0245, P0246 or P1244 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P0507.	Replace waste-gate control sole-noid valve. <Ref. to FU(DOHC TURBO)-41, Wastegate Control Solenoid Valve.>

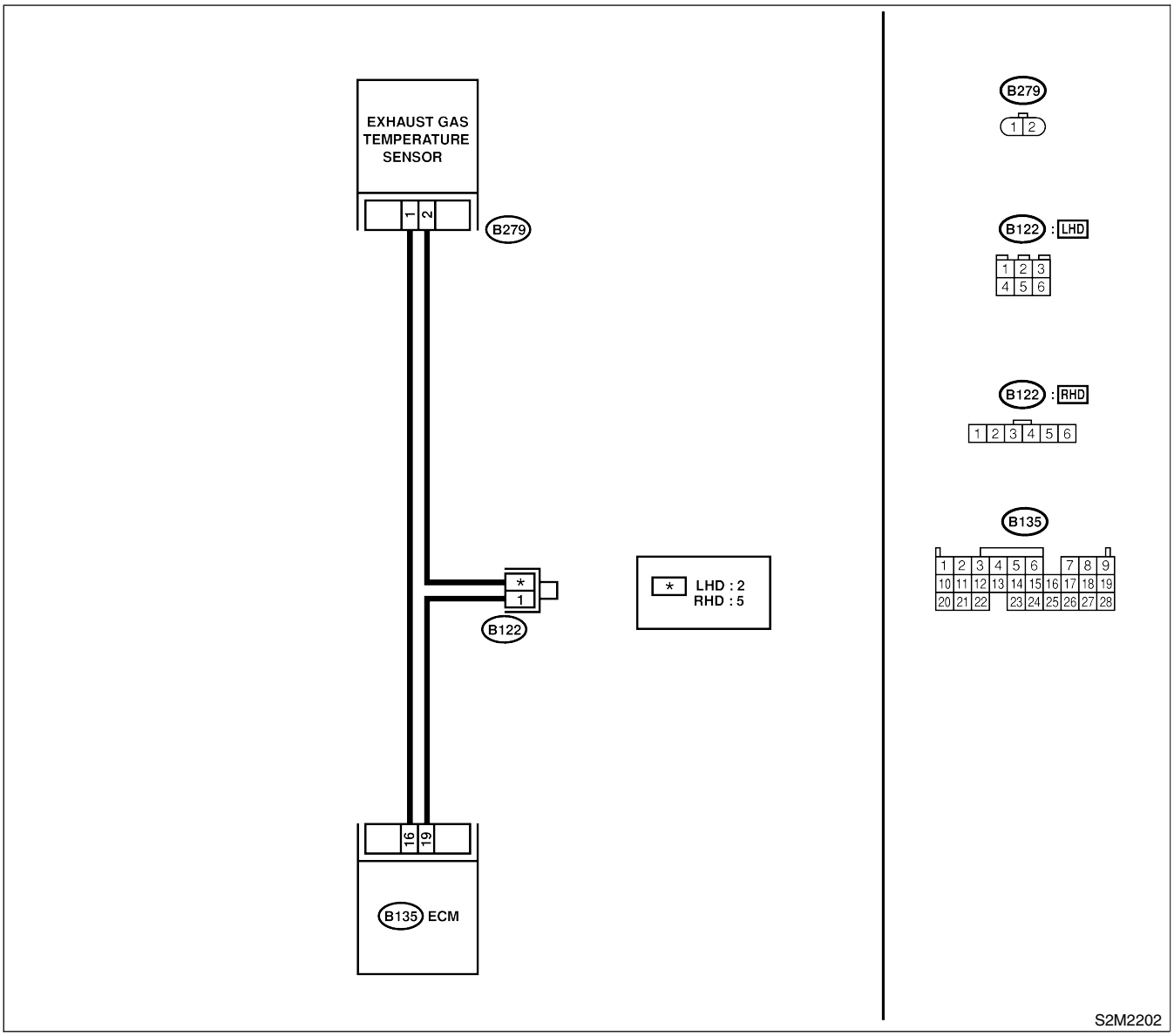
CJ: DTC P1301 — FIRE DUE TO INCREASED EXHAUST TEMPERATURE —

S088521H88

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC.** Conduct troubleshooting for all DTC P0301, P0302, P0303 and P0304. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).>	Does failure for repair or replacement exist?	Repair or replace failure, then replace precatalytic converter.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

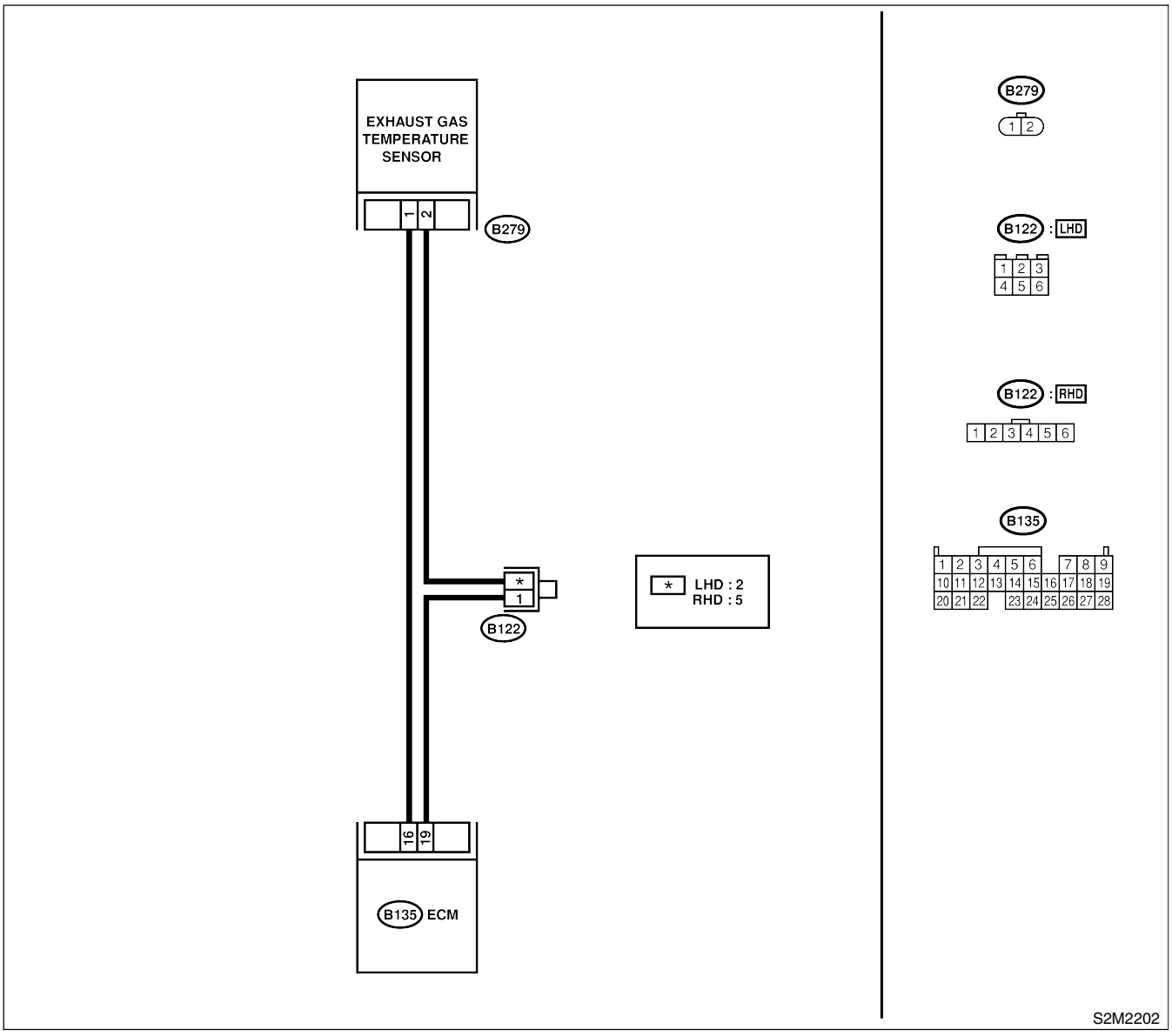
CK: DTC P1312 — EXHAUST GAS TEMPERATURE CIRCUIT MALFUNCTION

S088521H89

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



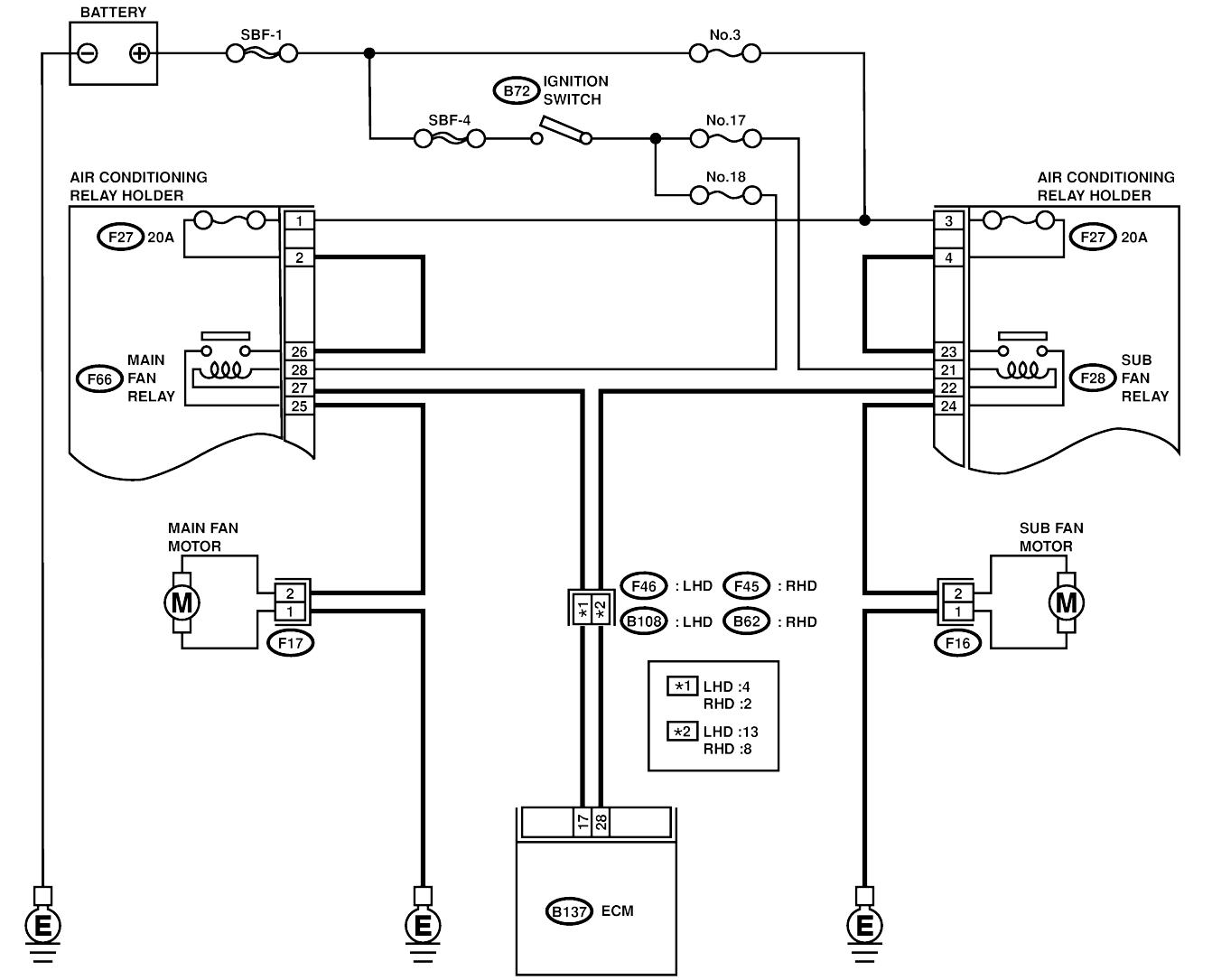
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0545, P0546 or P1544?	Inspect DTC P0545, P0546 or P1544 using “List of Diagnostic Trouble Code (DTC)”. <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P1312.	Replace exhaust gas temperature sensor. <Ref. to FU(DOHC TURBO)-46, Exhaust Temperature Sensor.>

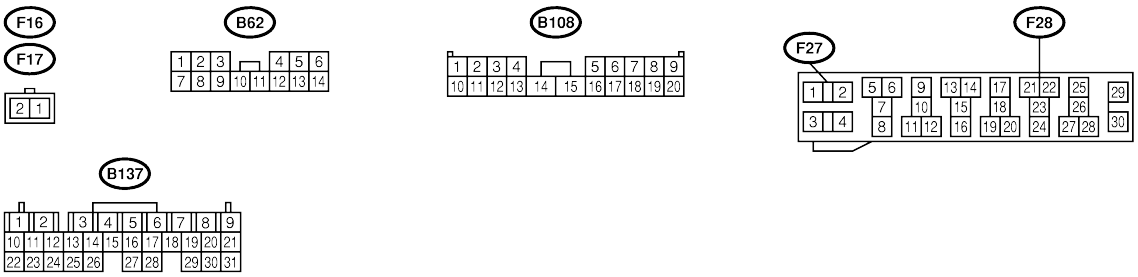
CL: DTC P1480 — COOLING FAN RELAY 1 CIRCUIT HIGH INPUT — S088521G08

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

• WIRING DIAGRAM:





S2M2199

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(DOHC TURBO)-48, Compulsory Valve Operation Check Mode.> ***Connector & terminal*** ***(B137) No. 17 (+) — Chassis ground (–):*** ***(B137) No. 28 (+) — 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**.
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*** ***(B137) No. 17 (+) — Chassis ground (–):*** ***(B137) No. 28 (+) — 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(DOHC TURBO)-47, 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 of main fan relay. ***Terminal*** ***No. 26 — No. 25:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Replace main fan relay and ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>
4	**CHECK MAIN FAN RELAY.** 1) Connect battery to terminals No. 27 and No. 28 of main fan relay. 2) Measure resistance of main fan relay. ***Terminal*** ***No. 26 — No. 25:***	Is the resistance less than 1 Ω?	Go to step **5**.	Replace main fan relay and ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>
5	**CHECK SUB FAN RELAY.** 1) Turn ignition switch to OFF. 2) Measure resistance of main fan relay. ***Terminal*** ***No. 17 — No. 18:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Replace sub fan relay and ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

No.	Step	Check	Yes	No
6	**CHECK SUB FAN RELAY.** 1) Connect battery to terminals No. 20 and No. 19 of sub fan relay. 2) Measure resistance of main fan relay. ***Terminal*** ***No. 17— No. 18:***	Is the resistance less than 1 Ω?	Go to step **7**.	Replace sub fan relay and ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>
7	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-47, Engine Control Module.>

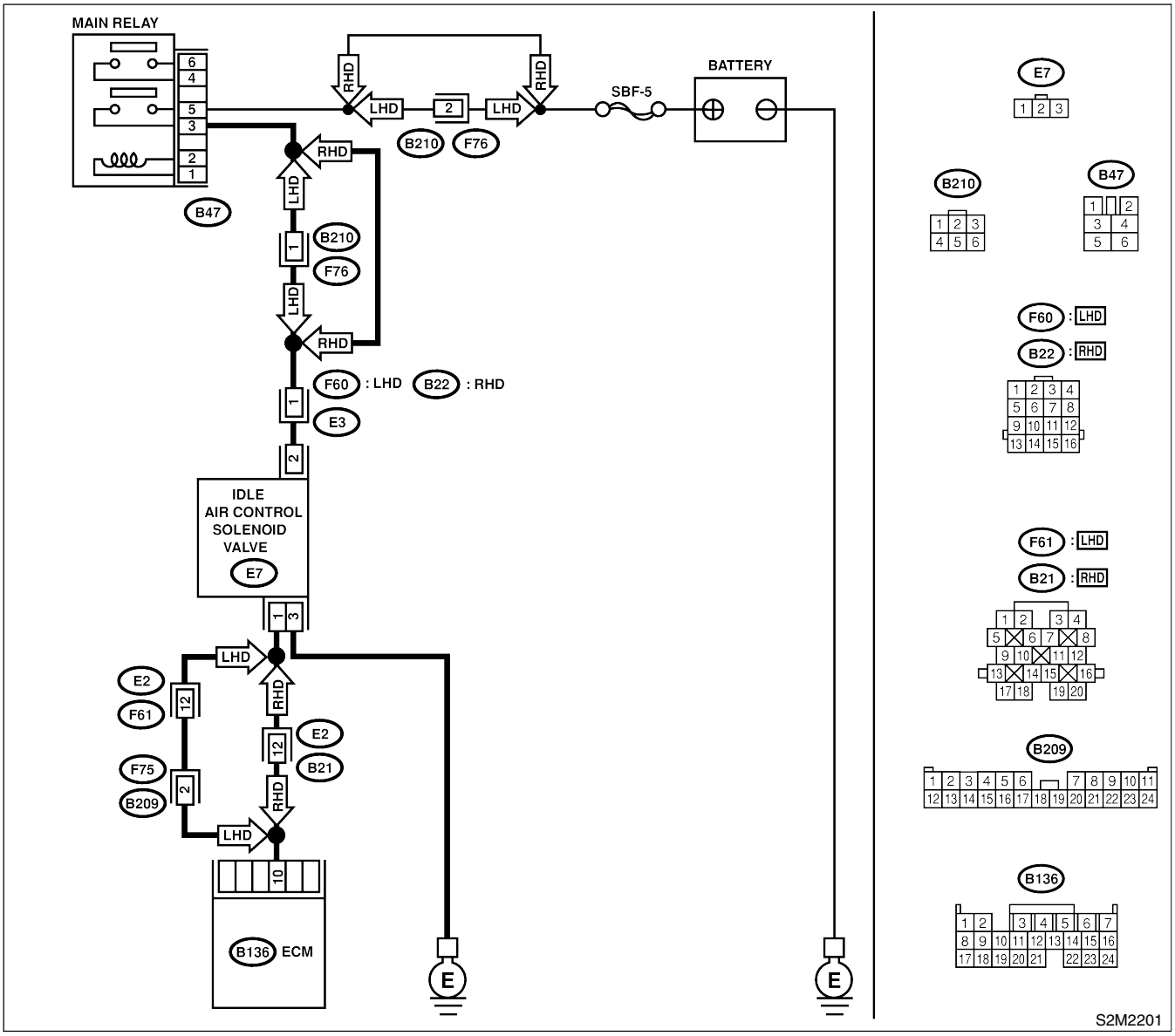
CM: DTC P1507 — IDLE CONTROL SYSTEM MALFUNCTION (FAIL-SAFE) —

S088521C16

- **DTC DETECTING CONDITION:**
  - Immediately at fault recognition
- **TROUBLE SYMPTOM:**
  - Engine keeps running at higher revolution than specified idling revolution.
  - Fuel is cut according to fail-safe function.

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



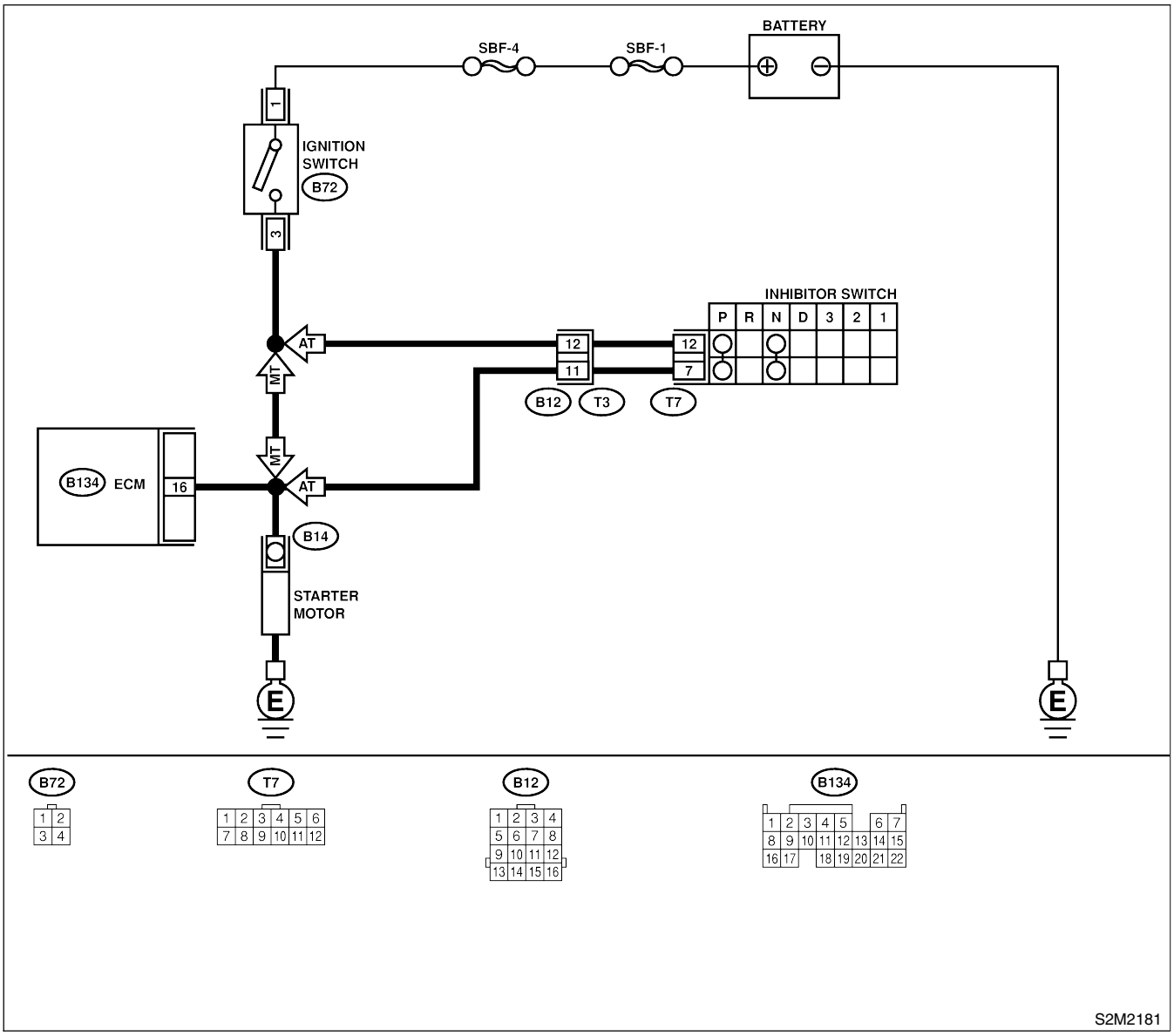
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0506, P0507, P0508, P0509 or P1142?	Inspect DTC P0506, P0507, P0508, P0509 or P1142 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> 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-12, Accelerator Control 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(DOHC TURBO)-36, 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(DOHC TURBO)-36, Idle Air Control Solenoid Valve.>

CN: DTC P1518 — STARTER SWITCH CIRCUIT LOW INPUT — S088521G09

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



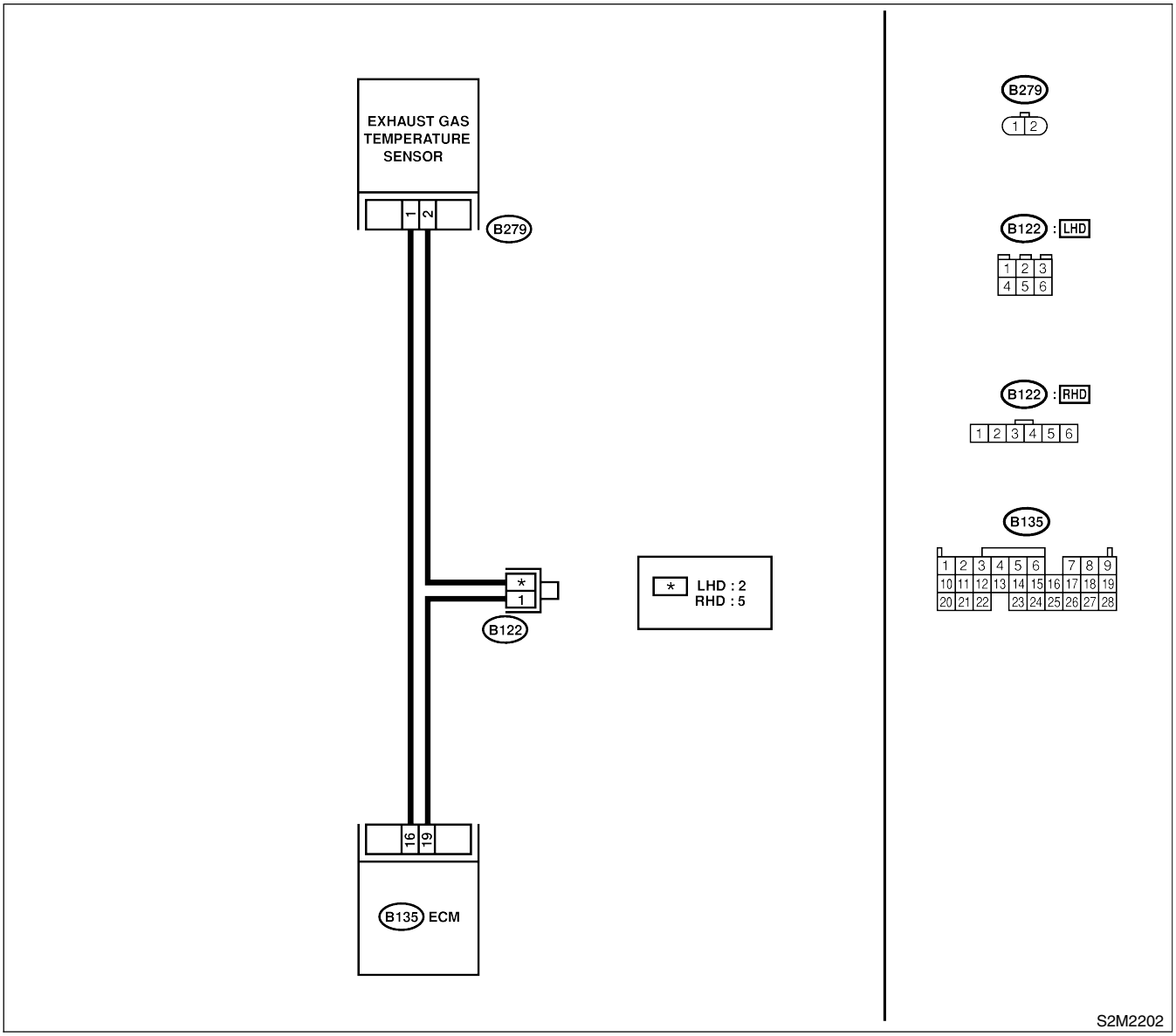
No.	Step	Check	Yes	No
1	**CHECK OPERATION OF STARTER MOTOR.** NOTE: Place the inhibitor switch in the “P” or “N” position (AT model).	Does starter motor operate when ignition switch to “ST”?	Repair harness and connector. NOTE: In this case, repair the following: ● Open or ground short circuit in harness between ECM and starter motor connector. ● Poor contact in ECM connector.	Check starter motor circuit. <Ref. to EN(DOHC TURBO)-64, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

CO: DTC P1544 — HIGH EXHAUST TEMPERATURE DETECTED — S088521H90

- **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(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**



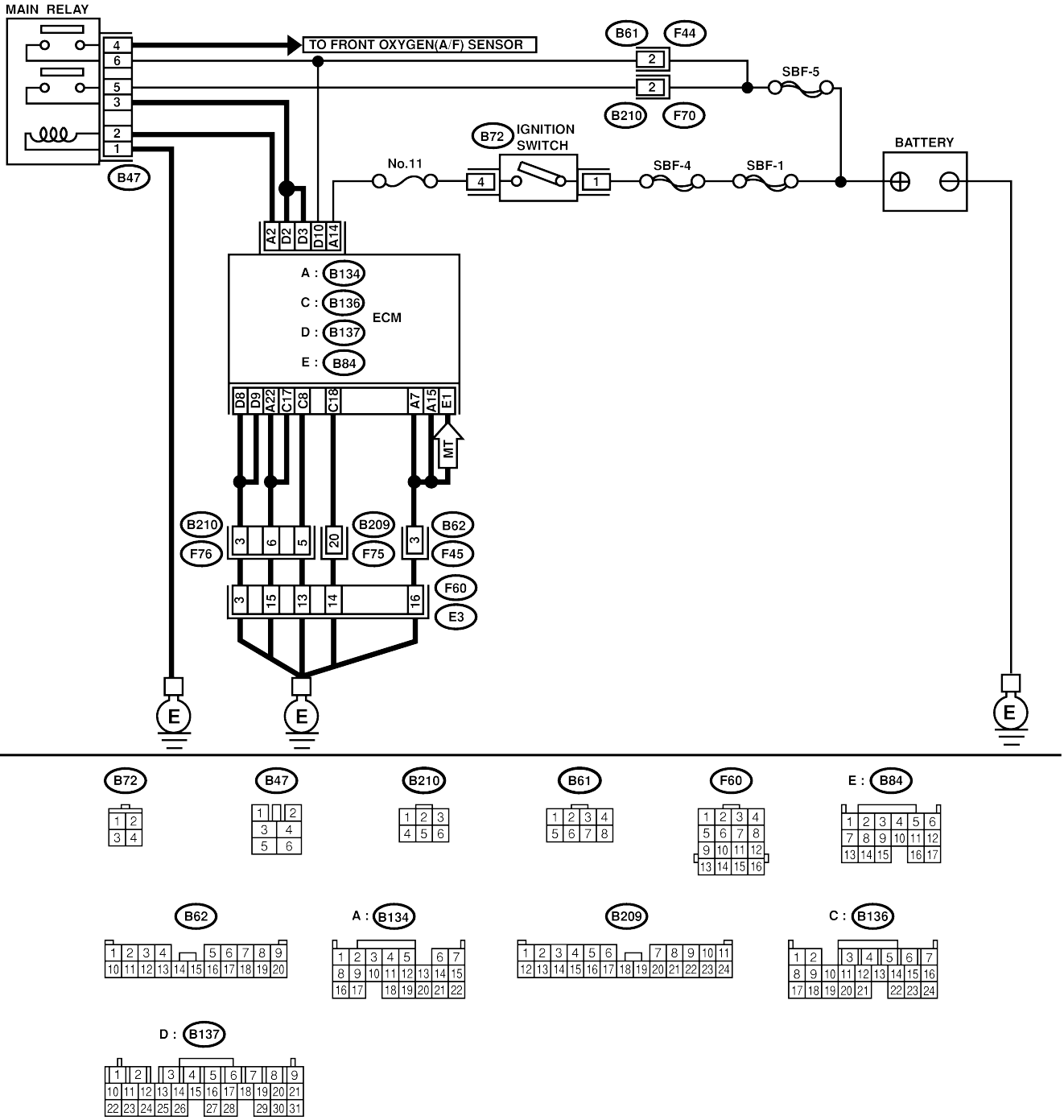
No.	Step	Check	Yes	No
1	**CHECK ANY OTHER DTC ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0335, P0336, P0340, P0341, P0545, P0546, P1312, P0102, P0103, P0101, P1141, P0301, P0302, P0303, P0304, P1301, P0171, P0133, P1134, P0131, P0132, P1130, P1131, P1139, P0031, P0032, P0139, P0136, P0039 or P0037?	Inspect DTC P0335, P0336, P0340, P0341, P0545, P0546, P1312, P0102, P0103, P0101, P1141, P0301, P0302, P0303, P0304, P1301, P0171, P0133, P1134, P0131, P0132, P1130, P1131, P1139, P0031, P0032, P0139, P0136, P0039 or P0037 using List of Diagnostic Trouble Code (DTC). <Ref. to EN(DOHC TURBO)-82, List of Diagnostic Trouble Code (DTC).> NOTE: In this case, it is not necessary to inspect DTC P1544.	Go to step **2**.
2	**CHECK EXHAUST SYSTEM.** Check exhaust system parts. NOTE: Check the following items. • Loose installation of exhaust manifold • Cracks or hole of exhaust manifold • Loose installation of front oxygen (A/F) sensor	Is there a fault in exhaust system?	Repair or replace failure, then replace precatalytic converter.	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

CP: DTC P1560 — BACK-UP VOLTAGE CIRCUIT MALFUNCTION — S088521C27

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

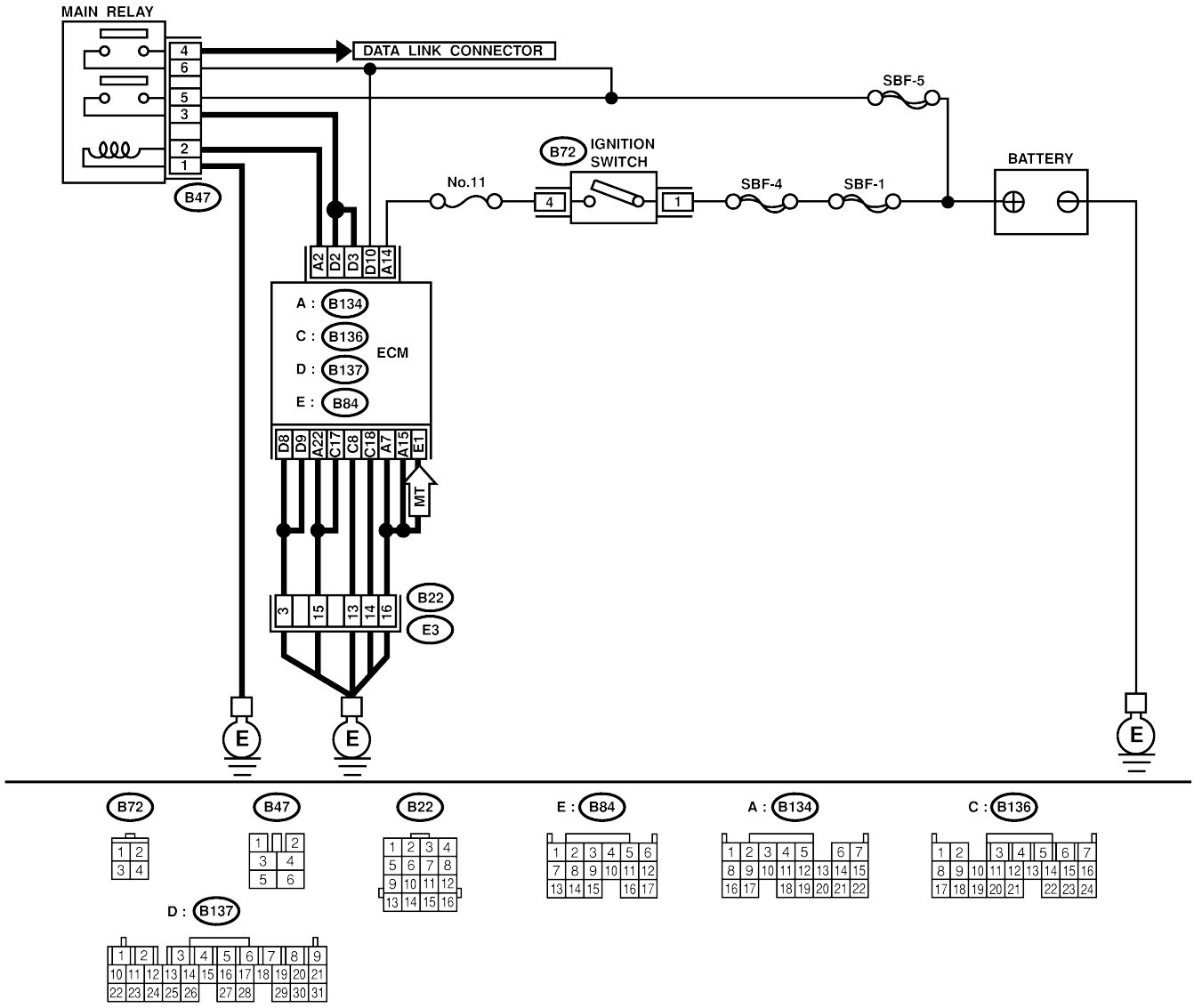
CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(DOHC TURBO)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(DOHC TURBO)-44, Inspection Mode.>.

- **WIRING DIAGRAM:**
- **LHD MODEL**



S2M2182

- **RHD MODEL**



S2M2183

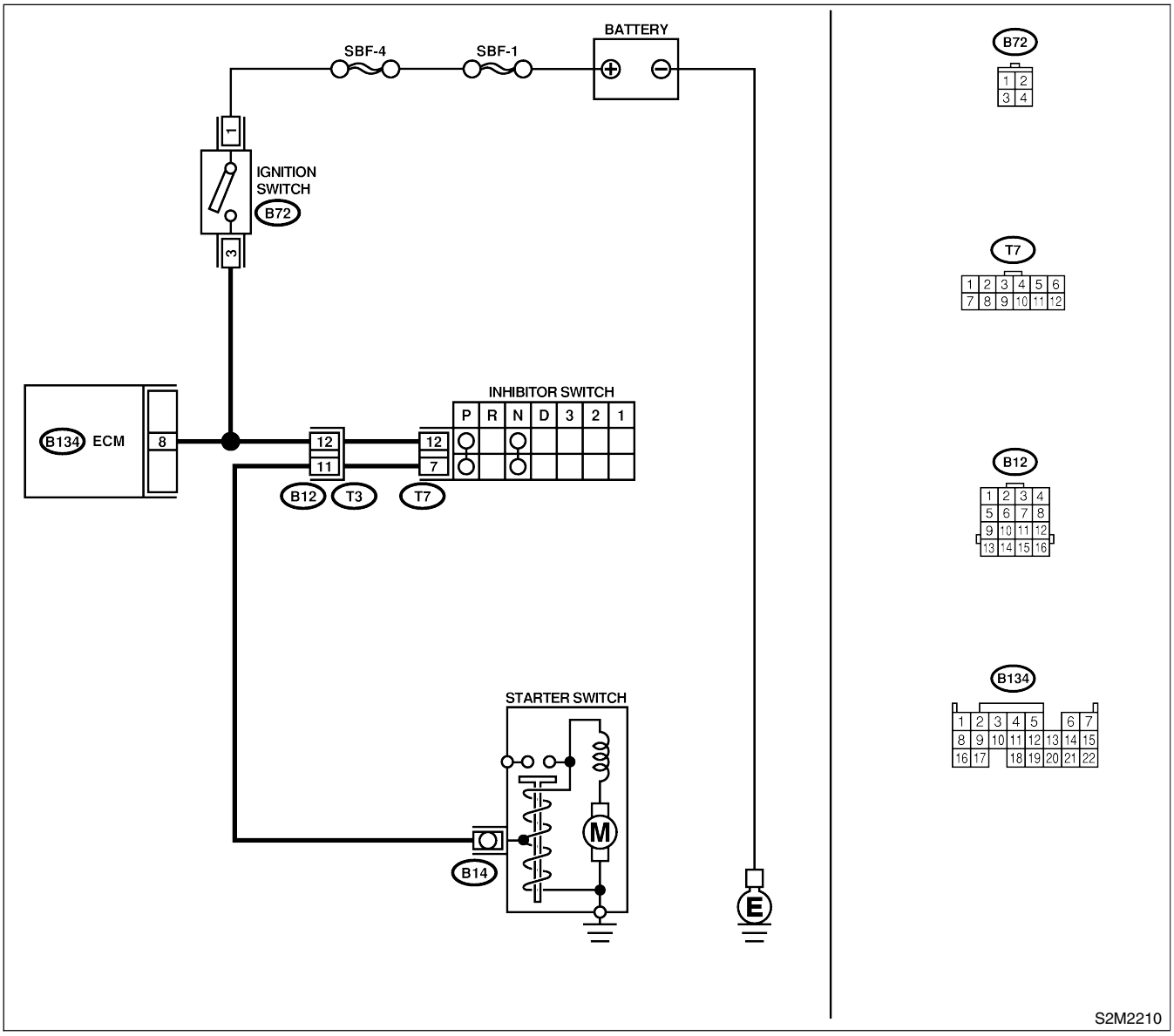
No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to OFF. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B137) No. 10 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair poor contact in ECM connector.	Go to step **2**.
2	**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*** ***(B137) No. 10 — 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**.
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 ECM connector • Poor contact in battery terminal

CQ: DTC P1590 — NEUTRAL POSITION SWITCH CIRCUIT HIGH INPUT (AT MODEL) — S088521G83

- **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(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



No.	Step	Check	Yes	No
1	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(SOHC)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**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*** ***(B134) No. 8 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **3**.	Go to step **5**.
3	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground in selector lever except for "N" and "P" positions. ***Connector & terminal*** ***(B134) No. 8 (+) — Chassis ground (–):***	Is the voltage between 4.5 and 5.5 V?	Go to step **4**.	Go to step **5**.
4	**CHECK POOR CONTACT.** Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Contact your Subaru distributor. 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*** ***(B134) No. 8 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and inhibitor switch connector.	Go to step **6**.
6	**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*** ***(B134) No. 8 — (T7) No. 12:***	Is the resistance less than 1 Ω?	Go to step **7**.	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 • Poor contact in inhibitor switch connector • Poor contact in ECM connector

No.	Step	Check	Yes	No
7	**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 **8**.	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
8	**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 **9**.	Replace inhibitor switch. <Ref. to AT-28, Inhibitor Switch.>
9	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-10, Select Cable.>	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

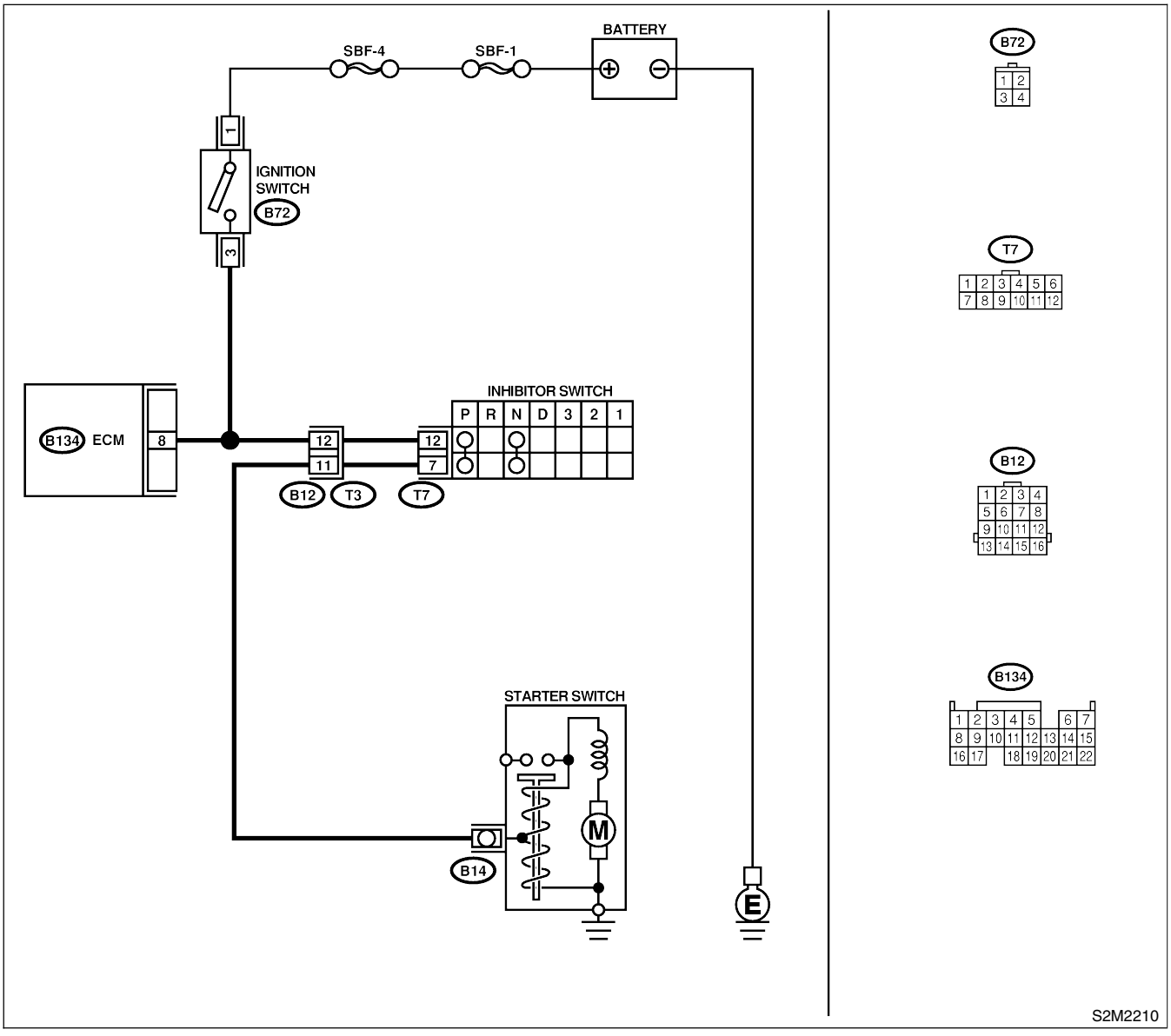
MEMO:

CR: DTC P1591 — NEUTRAL POSITION SWITCH CIRCUIT LOW INPUT (AT MODEL) — S088521G84

- **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(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



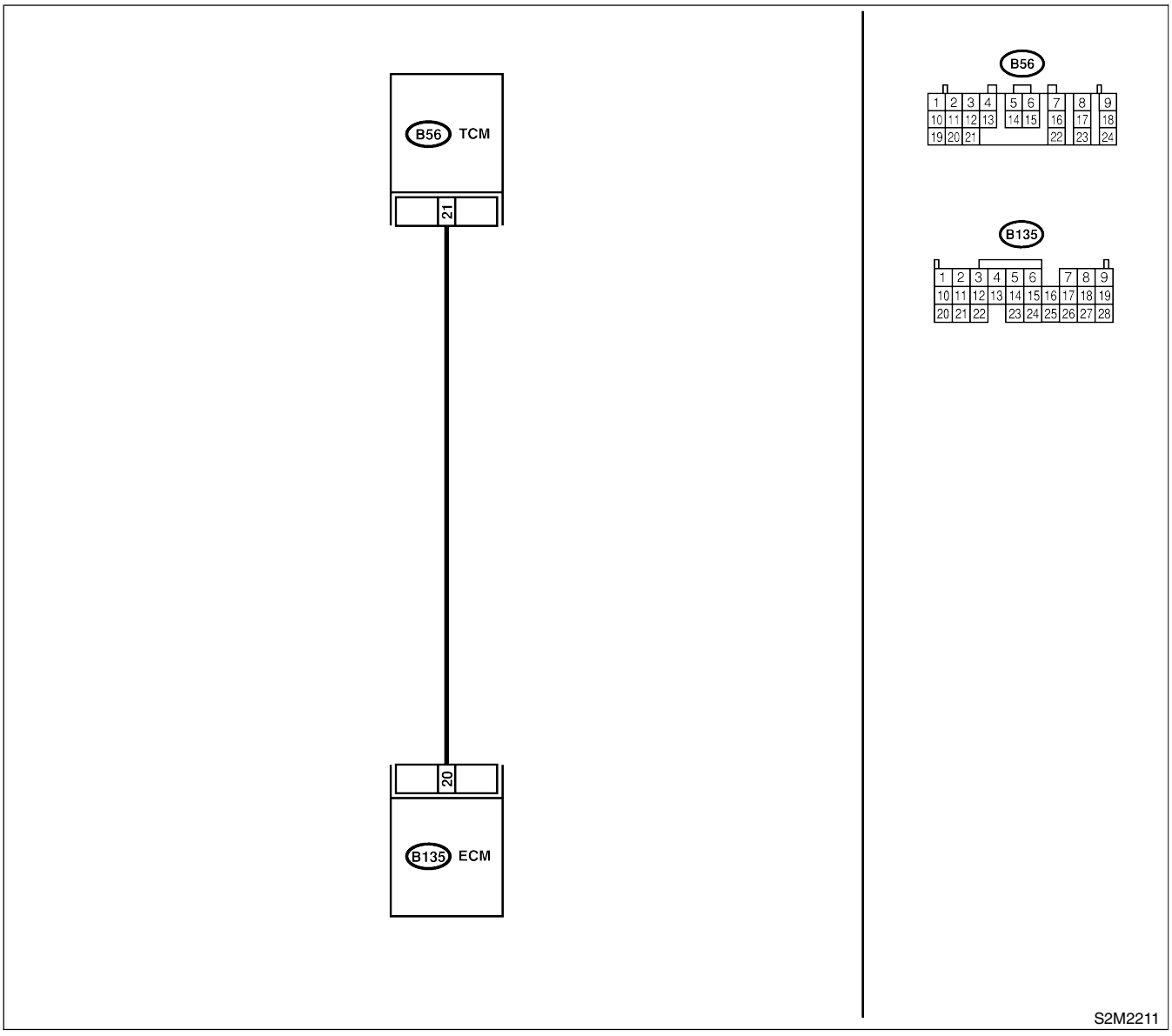
No.	Step	Check	Yes	No
1	**CHECK DTC P0705 ON DISPLAY.**	Does the Subaru Select Monitor or OBD-II general scan tool indicate DTC P0705?	Inspect DTC P0705 using "List of Diagnostic Trouble Code (DTC)". <Ref. to EN(SOHC)-82, List of Diagnostic Trouble Code (DTC).>	Go to step **2**.
2	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 8 (+) — 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 **3**.
3	**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*** ***(B134) No. 8 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair ground short circuit in harness between ECM and transmission harness connector.	Go to step **4**.
4	**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 **5**.
5	**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 **6**.	Replace inhibitor switch. <Ref. to AT-28, Inhibitor Switch.>
6	**CHECK SELECTOR CABLE CONNECTION.**	Is there any fault in selector cable connection to inhibitor switch?	Repair selector cable connection. <Ref. to CS-10, Select Cable.>	Contact your Subaru distributor. NOTE: Inspection by DTM is required, because probable cause is deterioration of multiple parts.

CS: DTC P1594 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT MALFUNCTION — S088521G12

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, 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-48, Transmission Control Module (TCM).>

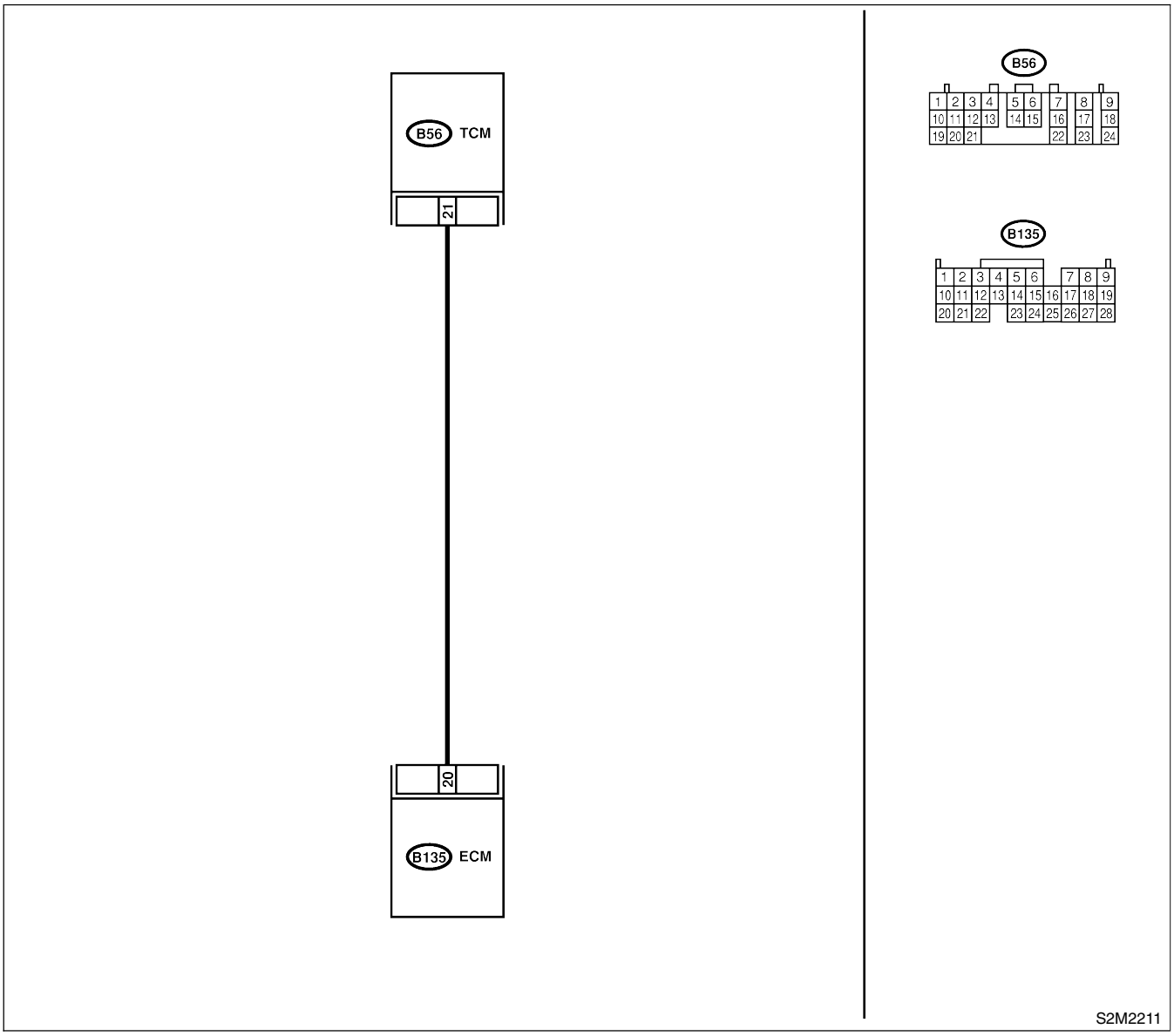
No.	Step	Check	Yes	No
2	**CHECK ACCESSORY.**	Are car phone and/or CB installed on vehicle?	Repair grounding line of car phone or CB system.	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

CT: DTC P1595 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT LOW INPUT — S088521G13

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



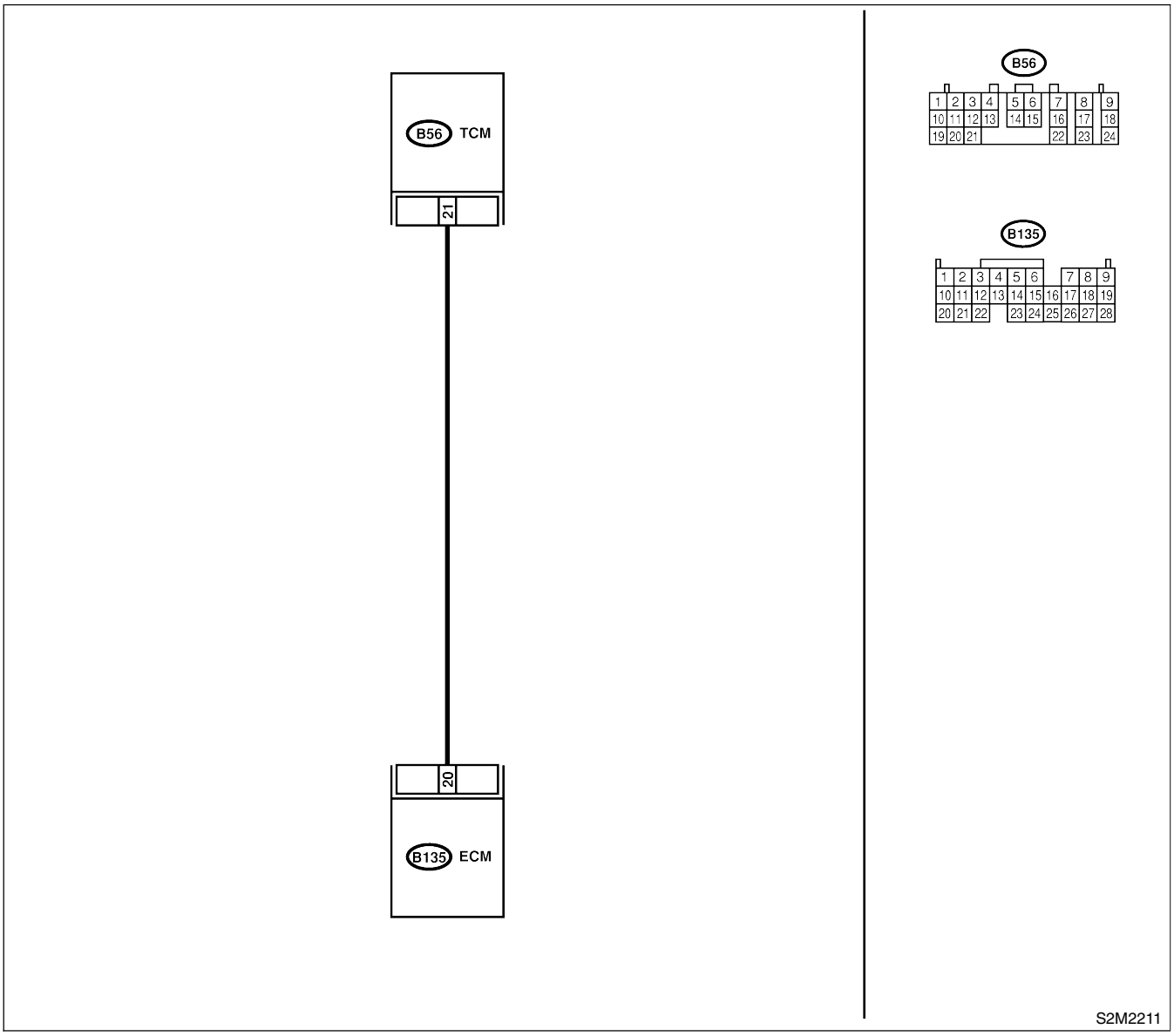
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 20 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **2**.	Even if MIL lights up, the 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. 20 — 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 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. 20 (+) — 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-22, Read Diagnostic Trouble Code.>	Does trouble code appear for automatic transmission?	Inspect trouble code for automatic transmission. <Ref. to AT-42, Diagnostic Procedure with Trouble Code.>	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

CU: DTC P1596 — AUTOMATIC TRANSMISSION DIAGNOSIS INPUT SIGNAL CIRCUIT HIGH INPUT — S088521G14

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



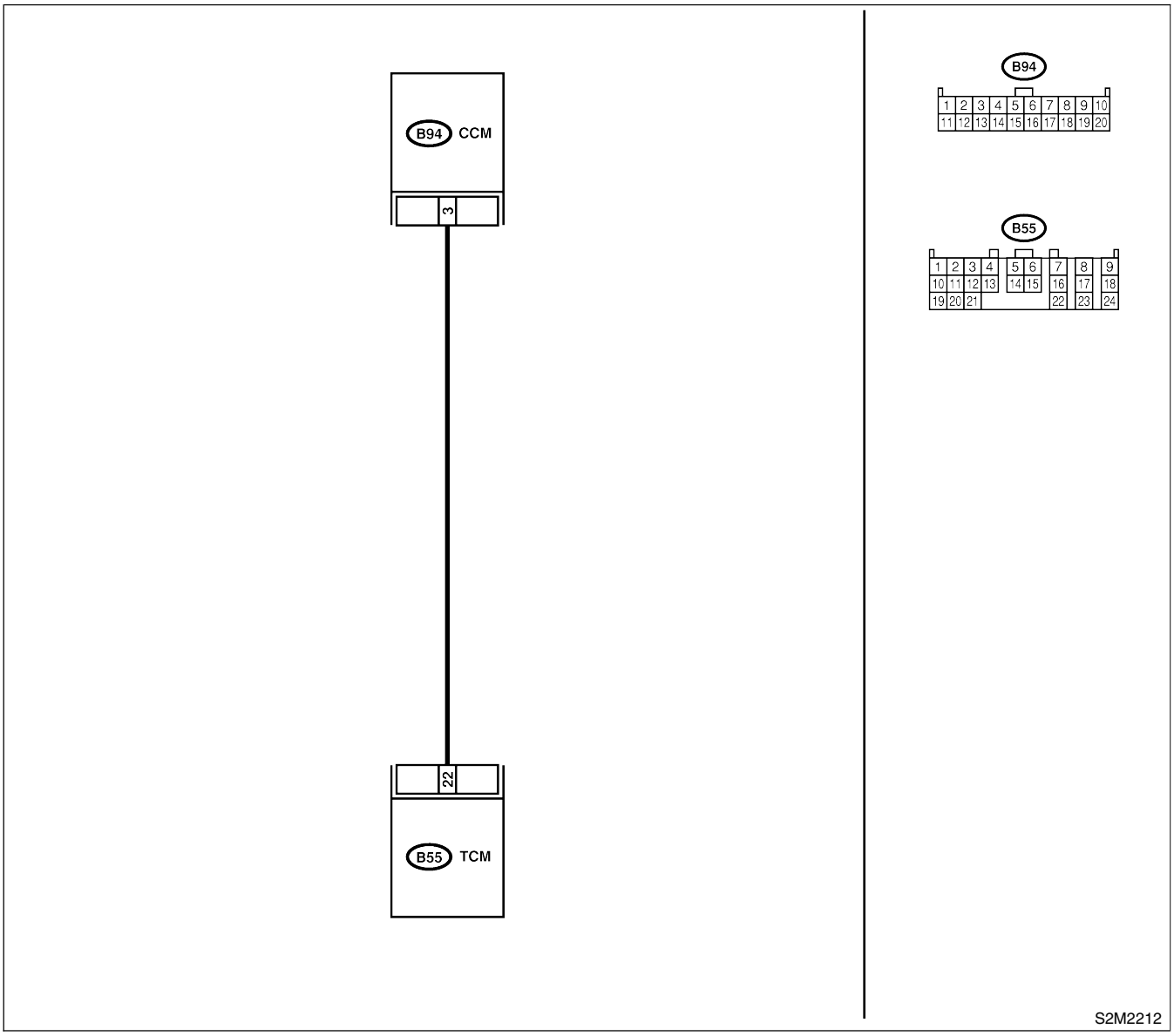
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 20 (+) — Chassis ground (–):***	Is the voltage more than 10 V?	Repair battery short circuit in harness between ECM and TCM connector.	Go to step **2**.
2	**CHECK HARNESS BETWEEN ECM AND TCM CONNECTOR.** Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 20 (+) — 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. 20 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Repair poor contact in ECM connector.	Go to step **4**.
4	**CHECK OUTPUT SIGNAL FROM ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B135) No. 20 (+) — 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 your Subaru distributor. 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*** ***(B56) No. 21 (+) — 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.	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Check TCM power supply line and grounding line.

CV: DTC P1701 — CRUISE CONTROL SET SIGNAL CIRCUIT MALFUNCTION FOR AUTOMATIC TRANSMISSION — S088521C29

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

CAUTION:
After repair or replacement of faulty parts, conduct Clear Memory Mode <Ref. to EN(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



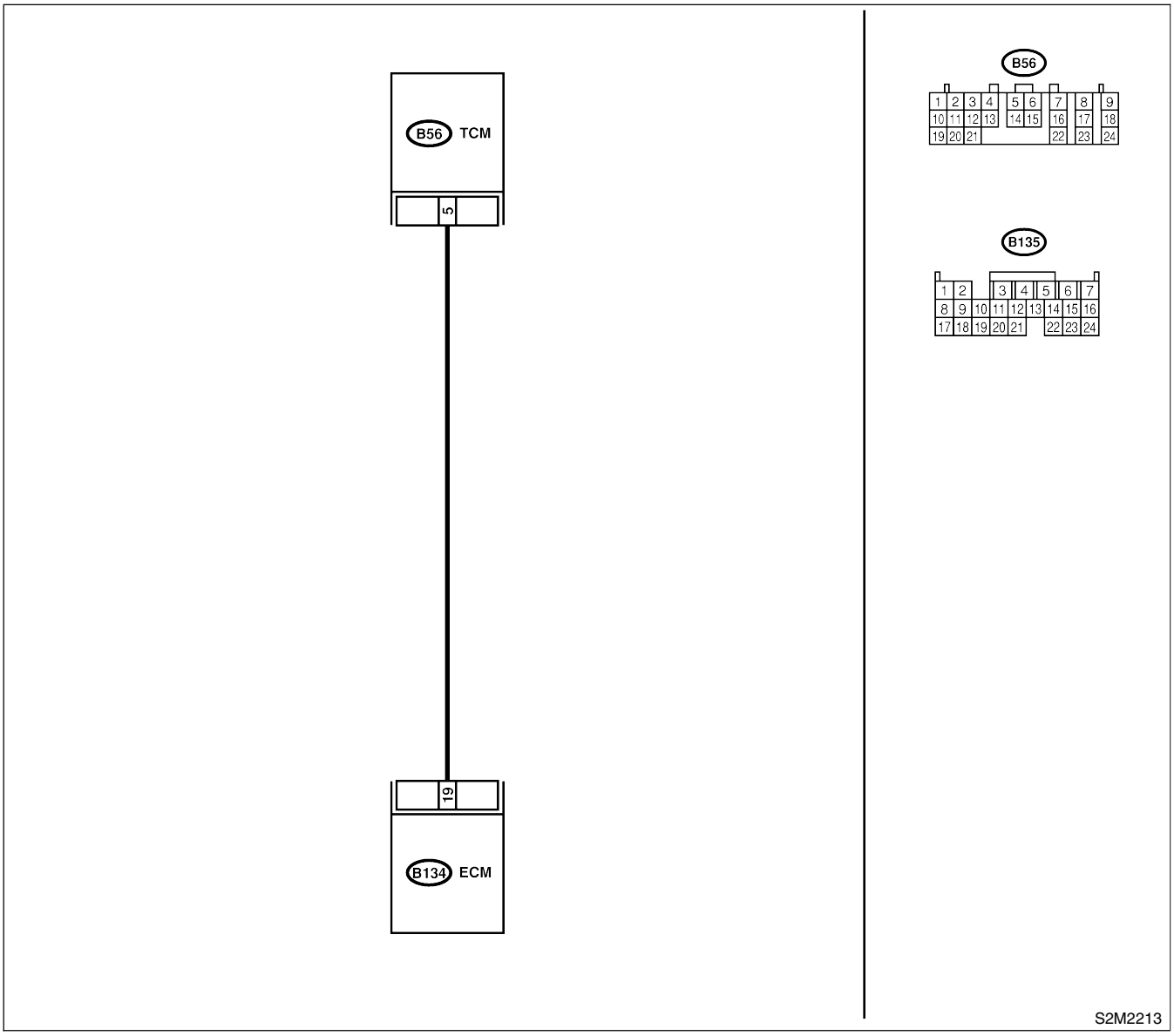
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN TCM AND CCM CONNECTOR.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from TCM and CCM. 3) Measure resistance of harness between TCM and CCM connector. ***Connector & terminal*** ***(B55) No. 22 — (B94) No. 3:***	Is the resistance less than 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*** ***(B55) No. 22 — Chassis ground:***	Is the resistance less than 10 Ω?	Repair short circuit in harness between TCM and CCM connector.	Go to step **3**.
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 command switch to ON. 7) Measure voltage between TCM and chassis ground. ***Connector & terminal*** ***(B55) No. 22 (+) — Chassis ground (–):***	Is the resistance less than 1 V?	Go to step **4**.	Check cruise control command switch circuit. <Ref. to CC-10, Cruise Control Command Switch.>
4	**CHECK POOR CONTACT.** Check poor contact in TCM connector.	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

CW: DTC P1711 — ENGINE TORQUE CONTROL SIGNAL 1 CIRCUIT MALFUNCTION — S088521G17

- **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(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, OPERATION, Inspection Mode.>.

- **WIRING DIAGRAM:**



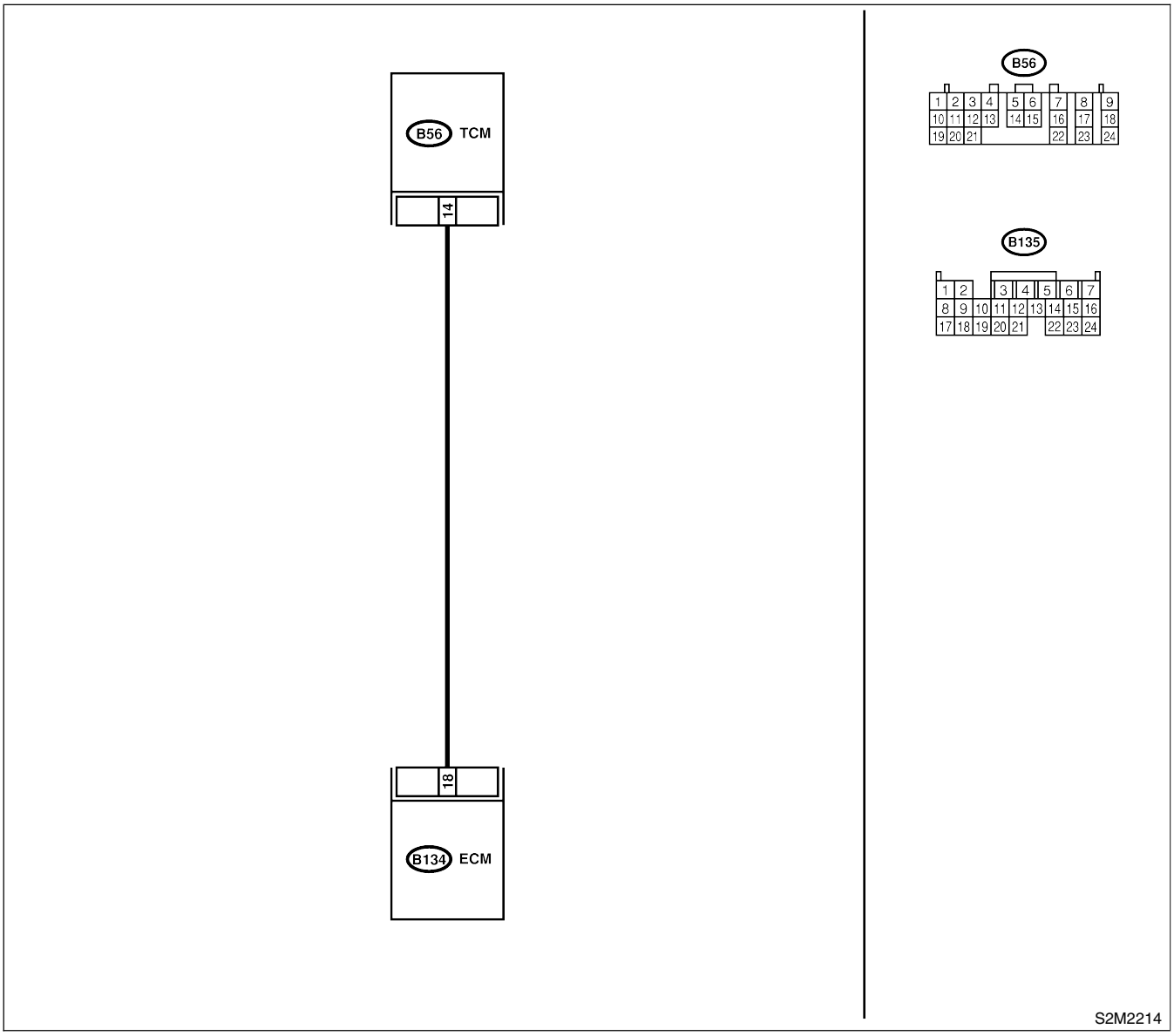
No.	Step	Check	Yes	No
1	**CHECK INPUT SIGNAL FOR ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 19 (+) — Chassis ground (–):***	Is the voltage more than 4.5 V?	Go to step **2**.	Go to step **4**.
2	**CHECK INPUT SIGNAL FOR ECM.** Measure voltage between ECM and chassis ground. ***Connector & terminal*** ***(B134) No. 19 (+) — 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.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-49, Engine Control Module.>
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*** ***(B134) No. 19 — (B56) No. 5:***	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*** ***(B134) No. 19 — 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.	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

CX: DTC P1712 — ENGINE TORQUE CONTROL SIGNAL 2 CIRCUIT MALFUNCTION — S088521G18

- **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(SOHC)-47, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(SOHC)-44, 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*** ***(B134) No. 18 (+) — 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*** ***(B134) No. 18 (+) — 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.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Replace ECM. <Ref. to FU(DOHC TURBO)-49, Engine Control Module.>
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*** ***(B134) No. 18 — (B56) No. 14:***	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*** ***(B134) No. 18 — 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.	Is there poor contact in TCM connector?	Repair poor contact in TCM connector.	Replace TCM. <Ref. to AT-48, Transmission Control Module (TCM).>

19. General Diagnostic Table S088257

A: INSPECTION S088257A10

1. ENGINE S088257A1001

NOTE:
Malfunction of parts other than those listed is also possible. <Ref. to ME(DOHC TURBO)-91, Engine Trouble in General.>

Symptom	Problem parts
1. Engine stalls during idling.	1) Idle air control solenoid valve 2) Pressure sensor 3) Mass air flow and intake temperature sensor 4) Ignition parts (*1) 5) Engine coolant temperature sensor (*2) 6) Crankshaft position sensor (*3) 7) Camshaft position sensor (*3) 8) Fuel injection parts (*4)
2. Rough idling	1) Idle air control solenoid valve 2) Pressure sensor 3) Mass air flow and intake temperature sensor 4) Engine coolant temperature sensor (*2) 5) Ignition parts (*1) 6) Air intake system (*5) 7) Fuel injection parts (*4) 8) Throttle position sensor 9) Crankshaft position sensor (*3) 10) Camshaft position sensor (*3) 11) Oxygen sensor 12) 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) Pressure sensor 6) Mass air flow and intake air temperature sensor
4. Poor acceleration	1) Pressure sensor 2) Mass air flow and intake temperature sensor 3) Throttle position sensor 4) Fuel injection parts (*4) 5) Fuel pump and fuel pump relay 6) Engine coolant temperature sensor (*2) 7) Crankshaft position sensor (*3) 8) Camshaft position sensor (*3) 9) A/C switch and A/C cut relay 10) Engine torque control signal circuit 11) Ignition parts (*1)
5. Engine stalls or engine sags or hesitates at acceleration.	1) Pressure sensor 2) Mass air flow and intake temperature sensor 3) Engine coolant temperature sensor (*2) 4) Crankshaft position sensor (*3) 5) Camshaft position sensor (*3) 6) Purge control solenoid valve 7) Fuel injection parts (*4) 8) Throttle position sensor 9) Fuel pump and fuel pump relay