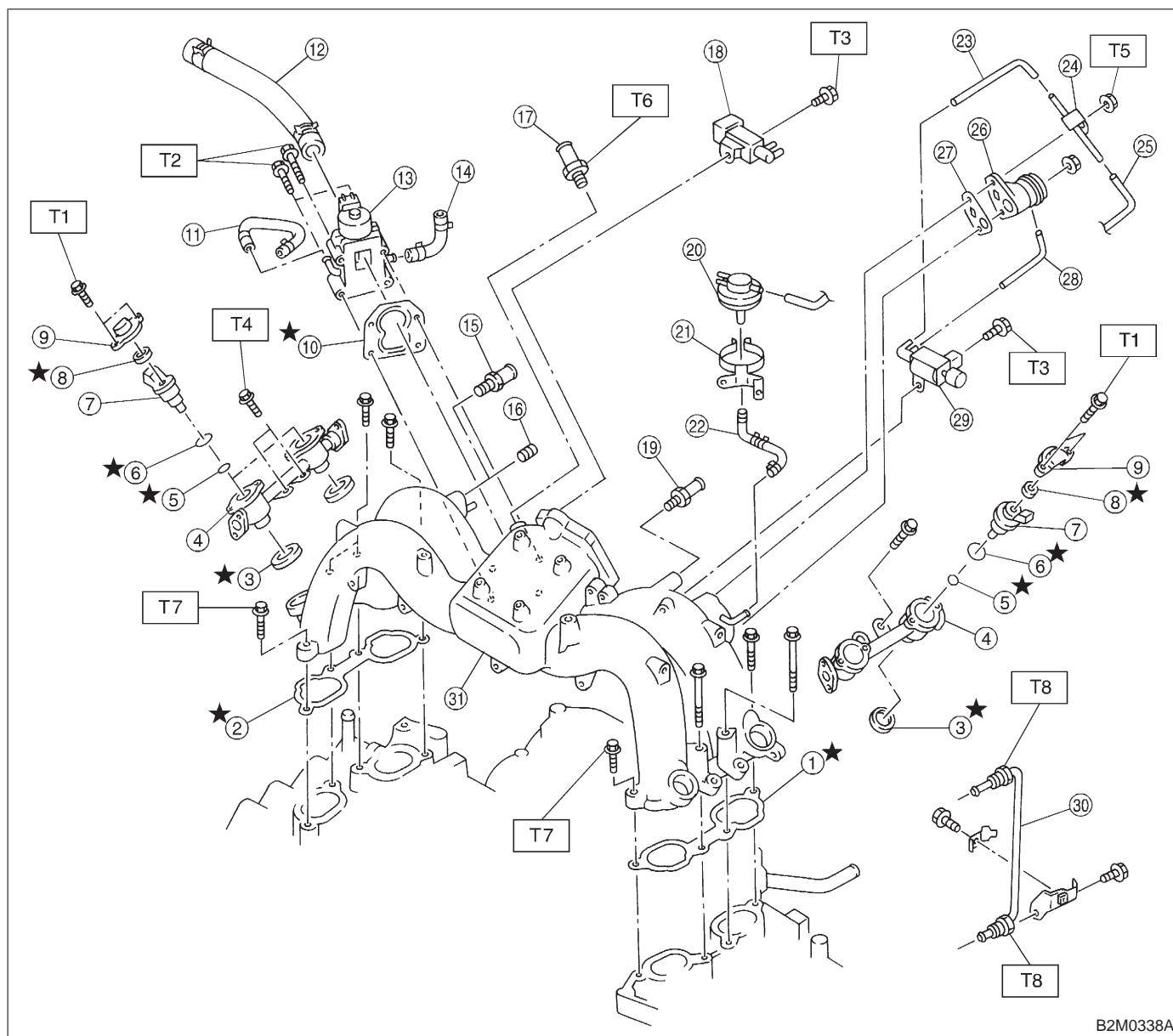


FUEL INJECTION SYSTEM

(2200 cc model) *2-7b*

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1. Intake Manifold

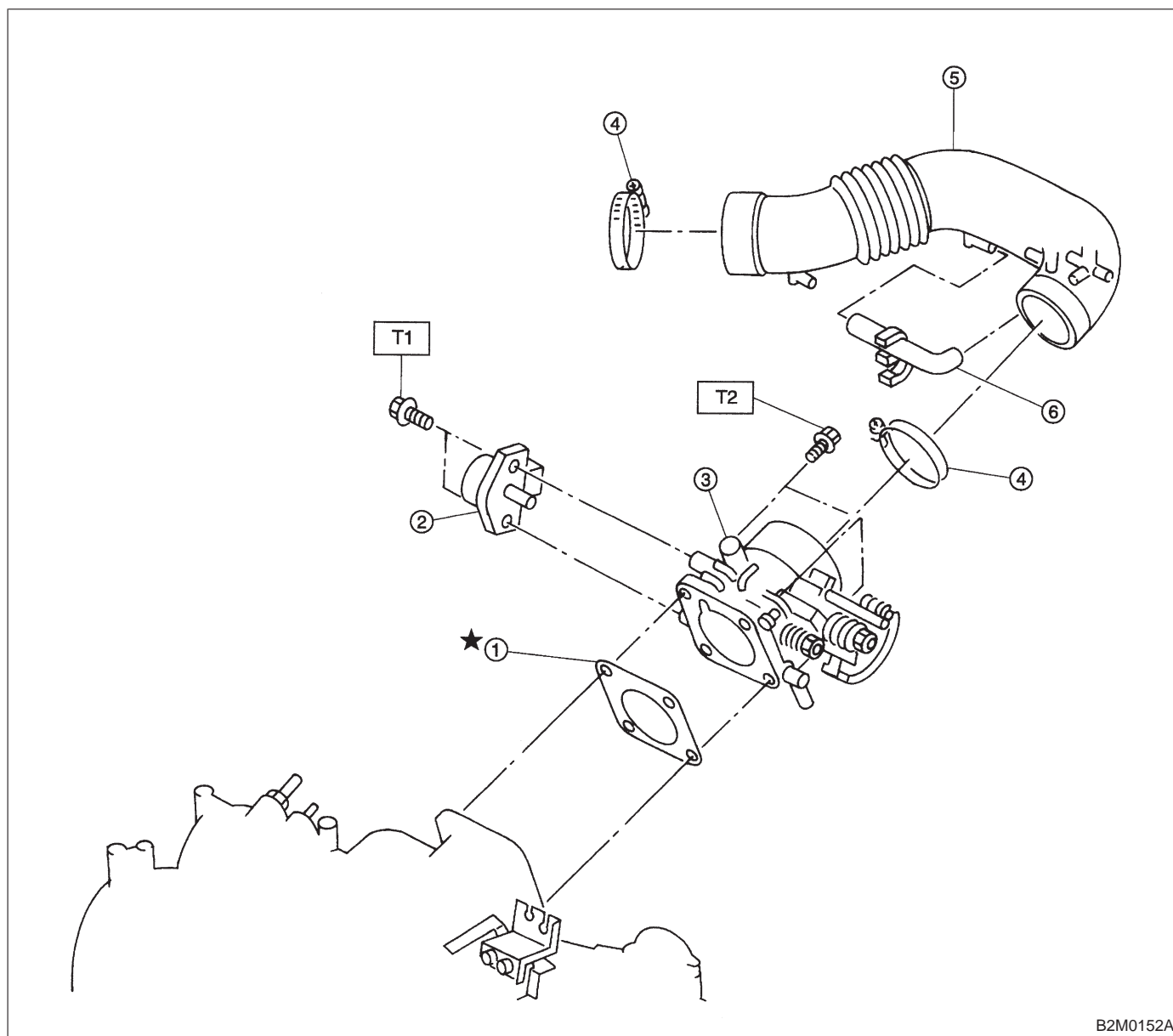


B2M0338A

- | | | |
|-----------------------------------|----------------------|----------------------|
| ① Intake manifold gasket RH | ⑮ Nipple | ⑳ EGR solenoid valve |
| ② Intake manifold gasket LH | ⑯ Plug | ㉑ EGR pipe |
| ③ Fuel injector pipe insulator | ⑰ PCV valve | ㉒ Intake manifold |
| ④ Fuel injector pipe | ⑱ Nipple | |
| ⑤ O-ring A | ㉑ BPT | |
| ⑥ O-ring B | ㉒ BPT holder bracket | |
| ⑦ Fuel injector | ㉓ Back pressure hose | |
| ⑧ Insulator | ㉔ EGR vacuum hose A | |
| ⑨ Fuel injector cap | ㉕ EGR vacuum pipe | |
| ⑩ Gasket | ㉖ EGR vacuum hose C | |
| ⑪ Engine coolant hose B | ㉗ EGR valve | |
| ⑫ Air by-pass hose | ㉘ Gasket | |
| ⑬ Idle air control solenoid valve | ㉙ EGR vacuum hose B | |
| ⑭ Engine coolant hose A | | |

Tightening torque: N·m (kg-m, ft-lb)**T1: 3.4±0.5 (0.35±0.05, 2.5±0.4)****T2: 6.4±0.5 (0.65±0.05, 4.7±0.4)****T3: 16±1.5 (1.6±0.15, 11.6±1.1)****T4: 19±1 (1.9±0.1, 13.7±0.7)****T5: 19±1.5 (1.9±0.15, 13.7±1.1)****T6: 23±3 (2.3±0.3, 16.6±2.2)****T7: 25±2 (2.5±0.2, 18.1±1.4)****T8: 34±2 (3.5±0.2, 25.3±1.4)**

2. Air Intake System



B2M0152A

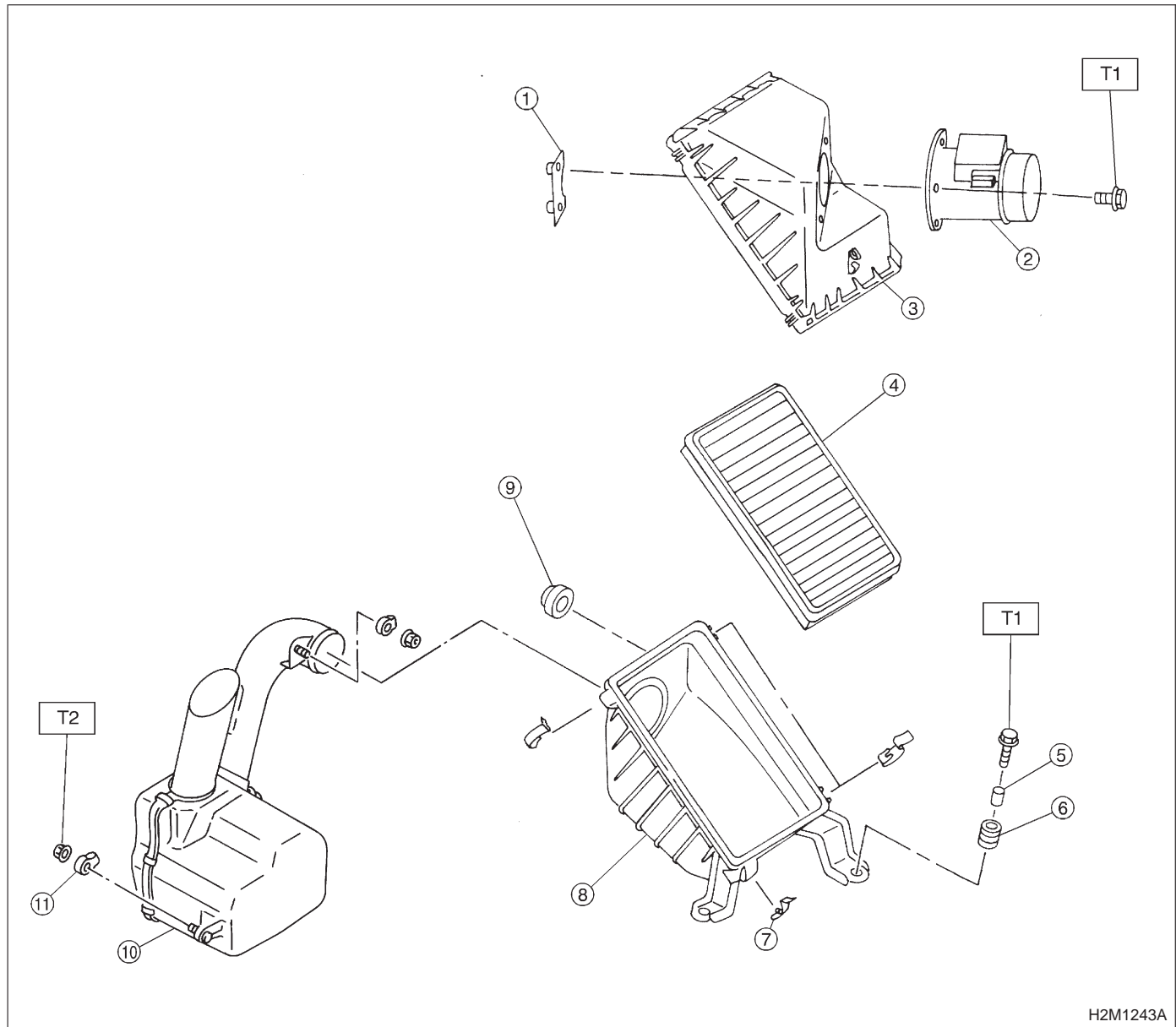
- ① Gasket
- ② Throttle position sensor
- ③ Throttle body
- ④ Clamp
- ⑤ Air intake duct
- ⑥ By-pass hose

Tightening torque: N·m (kg-m, ft-lb)

T1: 2.2 ± 0.2 (0.22 ± 0.02 , 1.6 ± 0.1)

T2: 22 ± 2 (2.2 ± 0.2 , 15.9 ± 1.4)

3. Air Cleaner



H2M1243A

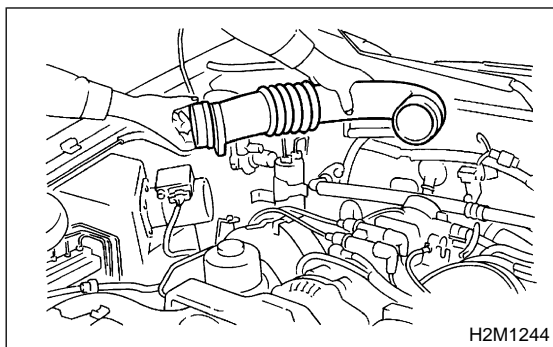
- ① Mass air flow sensor bracket
- ② Mass air flow sensor ASSY
- ③ Air cleaner upper cover
- ④ Air cleaner element
- ⑤ Spacer
- ⑥ Bush
- ⑦ Clip
- ⑧ Air cleaner case

- ⑨ Cushion rubber
- ⑩ Resonator chamber ASSY
- ⑪ Clip

Tightening torque: N·m (kg·m, ft·lb)

T1: 7.4±2.0 (0.75±0.2, 5.4±1.4)

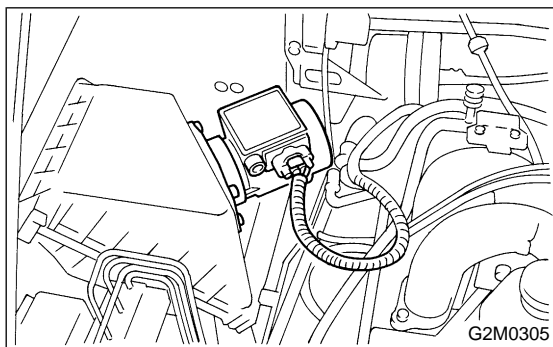
T2: 33±10 (3.4±1.0, 25±7)



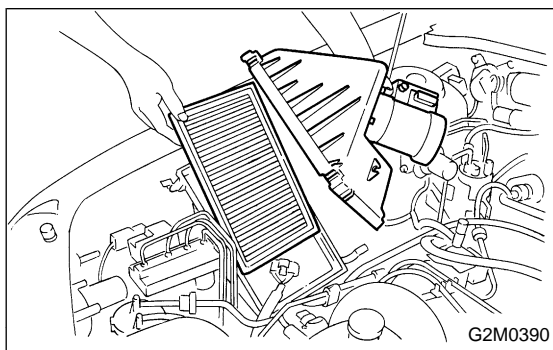
1. Air Cleaner and Air Intake Duct

A: REMOVAL AND INSTALLATION

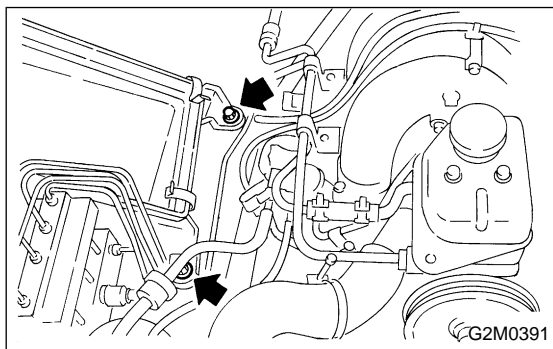
- 1) Loosen clamp which connect air intake duct to throttle body and mass air flow sensor.
- 2) Disconnect blow-by hose from air intake duct.
- 3) Remove air intake duct.



- 4) Disconnect connector from mass air flow sensor.

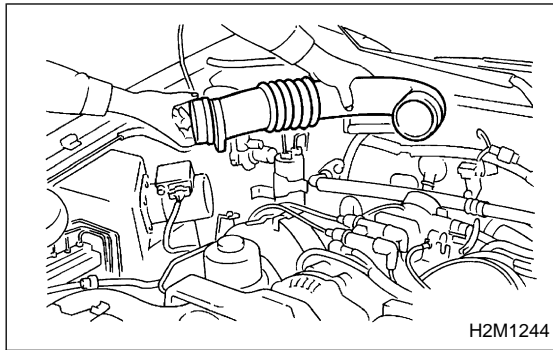


- 5) Remove clips of air cleaner upper cover.
- 6) Remove air cleaner element.



- 7) Remove air cleaner lower case.

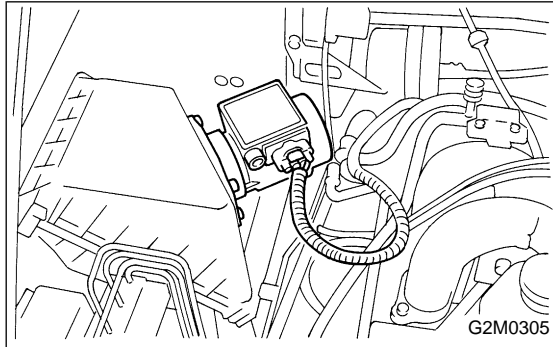
- 8) Installation is in the reverse order of removal.



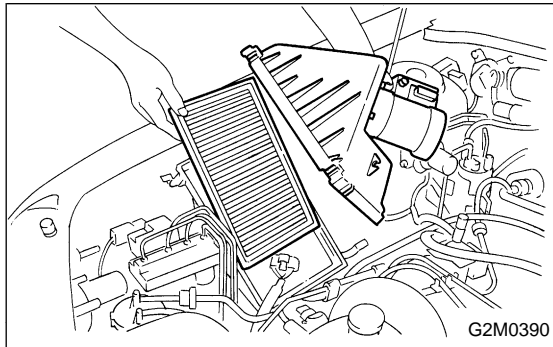
2. Mass Air Flow Sensor

A: REMOVAL AND INSTALLATION

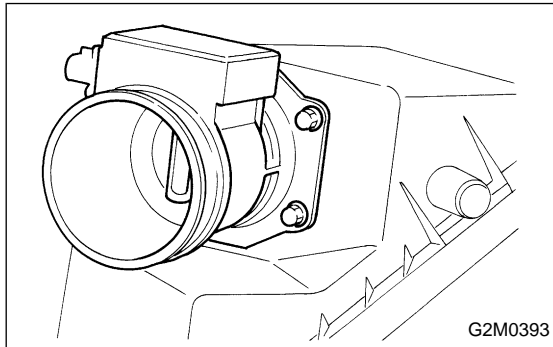
1) Remove air intake duct.



2) Disconnect connector from mass air flow sensor.



3) Remove air cleaner upper cover.

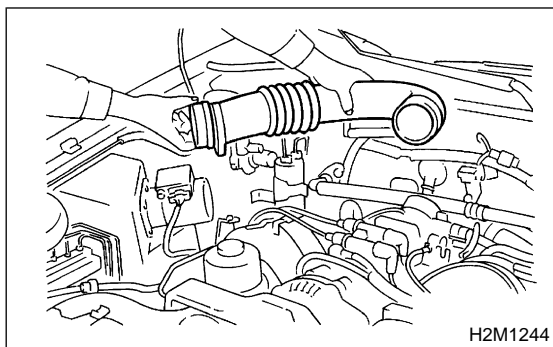


4) Remove mass air flow sensor from air cleaner upper cover.

5) Installation is in the reverse order of removal.

Tightening torque:

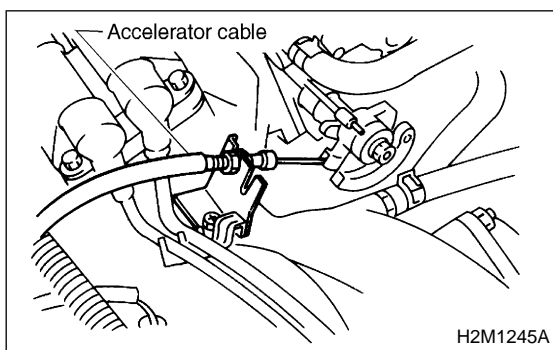
$7.4 \pm 2.0 \text{ N}\cdot\text{m}$ ($0.75 \pm 0.2 \text{ kg}\cdot\text{m}$, $5.4 \pm 1.4 \text{ ft}\cdot\text{lb}$)



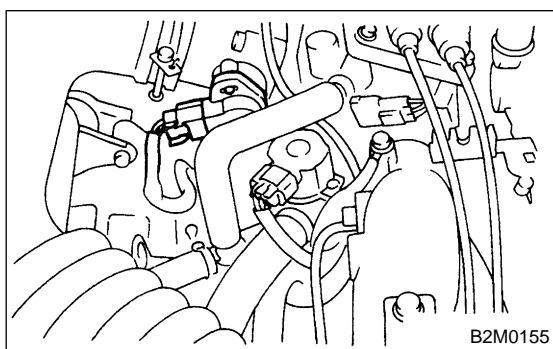
3. Throttle Body

A: REMOVAL AND INSTALLATION

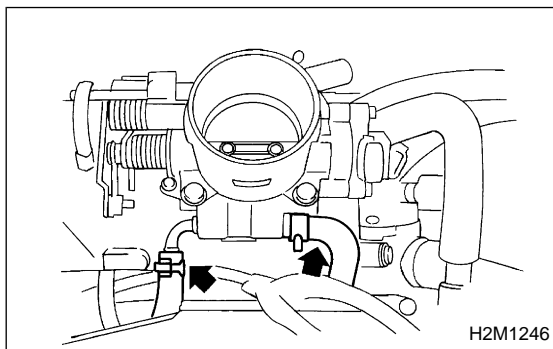
1) Remove air intake duct.



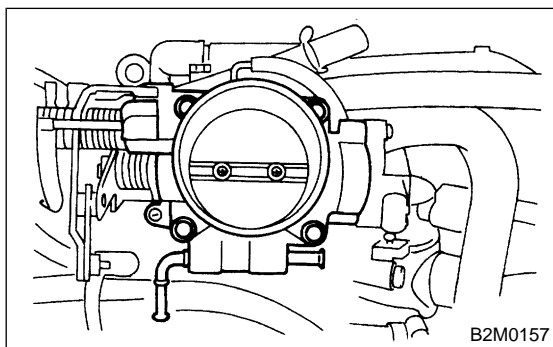
2) Disconnect accelerator cable.



3) Disconnect connector from throttle position sensor.



4) Disconnect engine coolant hoses from throttle body.



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

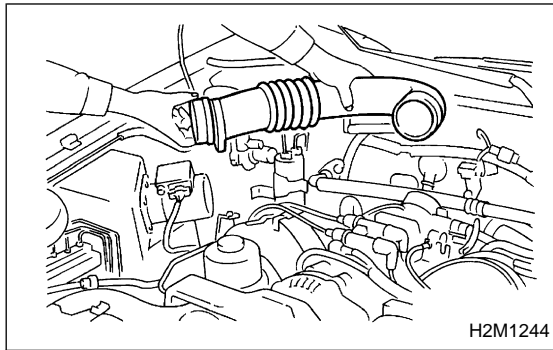
6) Installation is in the reverse order of removal.

CAUTION:

Always use a new gasket.

Tightening torque:

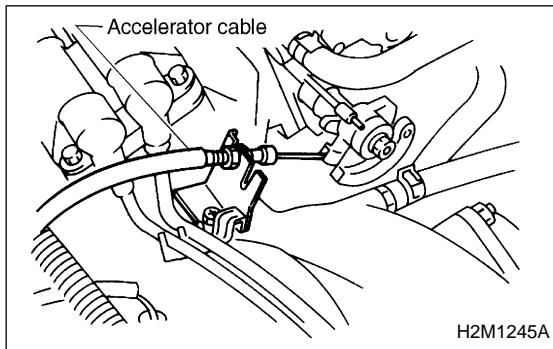
22 ± 2 N·m (2.2 ± 0.2 kg·m, 15.9 ± 1.4 ft·lb)



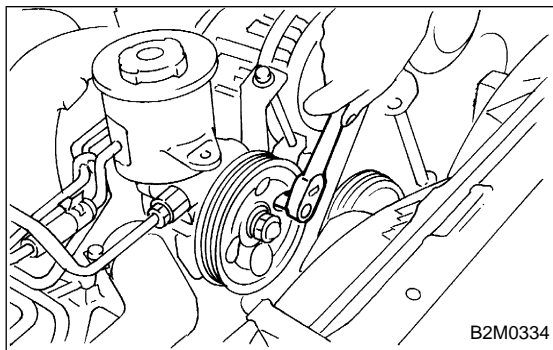
4. Intake Manifold

A: REMOVAL

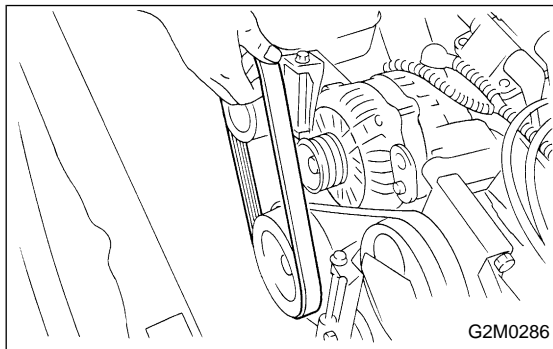
- 1) Release fuel pressure. <Ref. to 2-8 [W1A0].>
- 2) Disconnect connector from mass air flow sensor.
- 3) Remove air intake duct, air cleaner upper cover and air cleaner element.



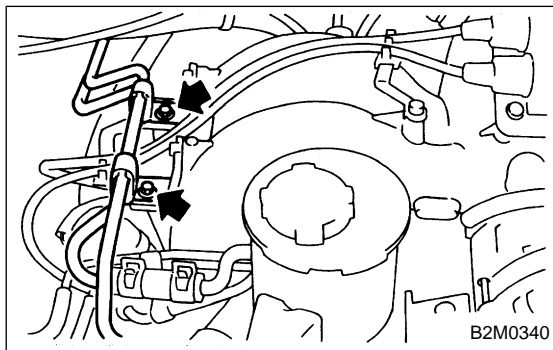
- 4) Disconnect accelerator cable.



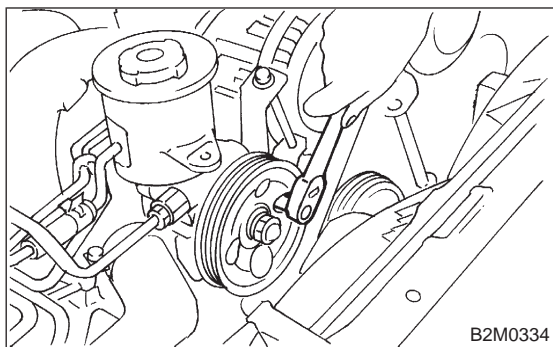
- 5) Disconnect hoses from pressure sources switching solenoid valve.



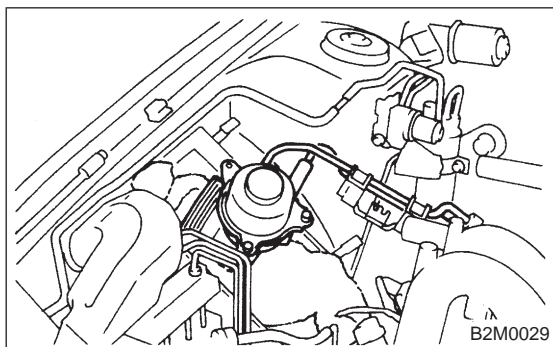
- 6) Remove power steering pump from bracket.
 - (1) Loosen lock bolt and slider bolt, and remove front side V-belt.



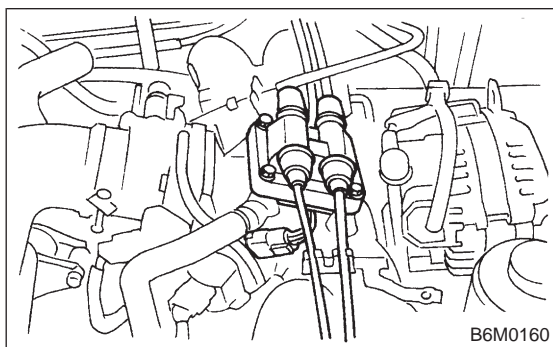
- (2) Remove pipe with bracket from intake manifold.



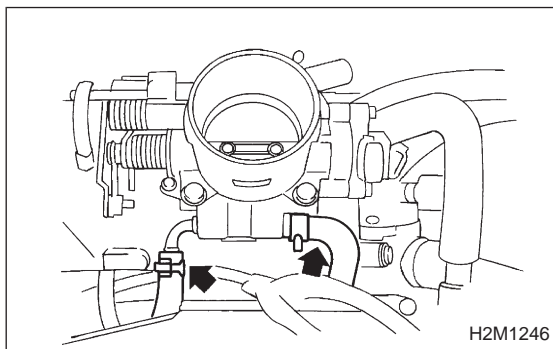
(3) Remove bolts which install power steering pump from bracket.



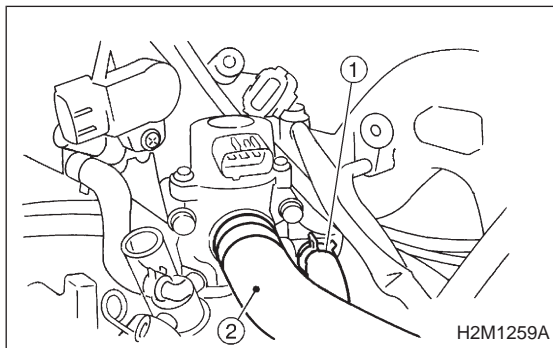
(4) Place power steering pump on the right side wheel apron.



7) Disconnect spark plug cords from ignition coil.

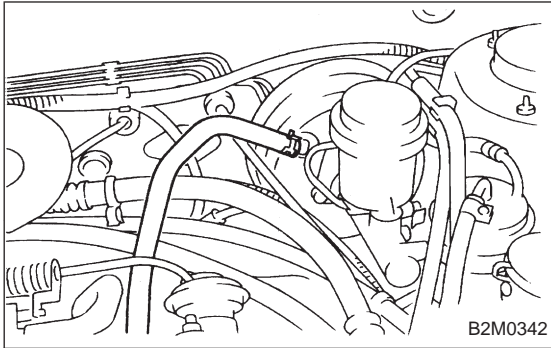


8) Disconnect engine coolant hose from throttle body.

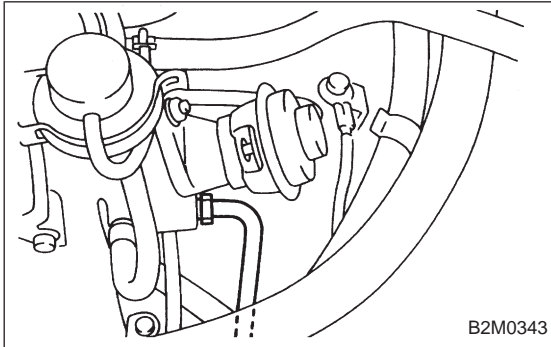


9) Disconnect engine coolant hose ① from idle air control solenoid valve.

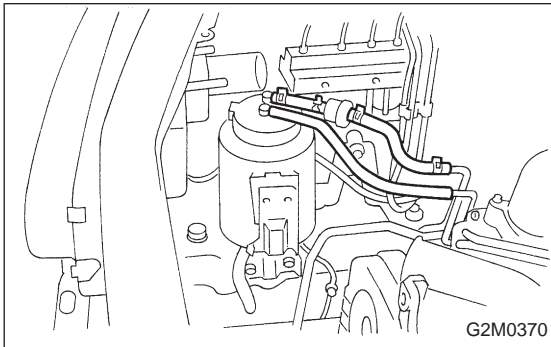
10) Disconnect air by-pass hose ② from idle air control solenoid valve.



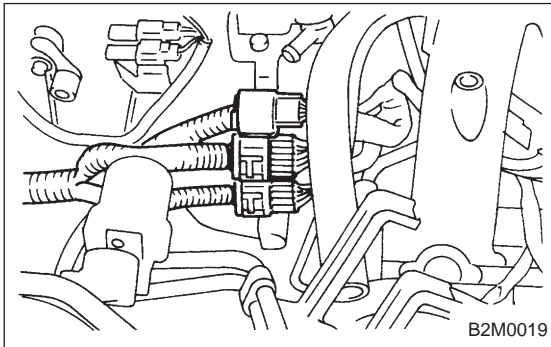
11) Disconnect brake booster hose from intake manifold.



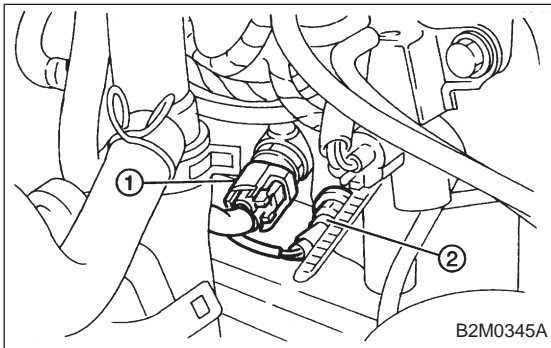
12) Remove EGR pipe.



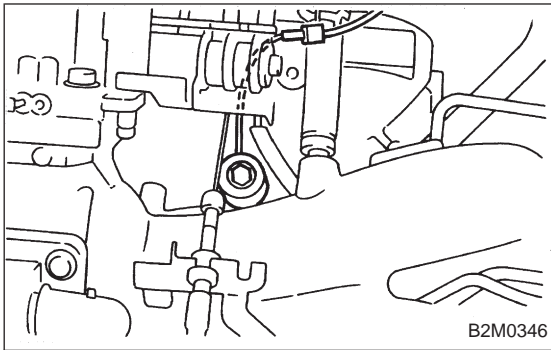
13) Disconnect canister hose from pipe.



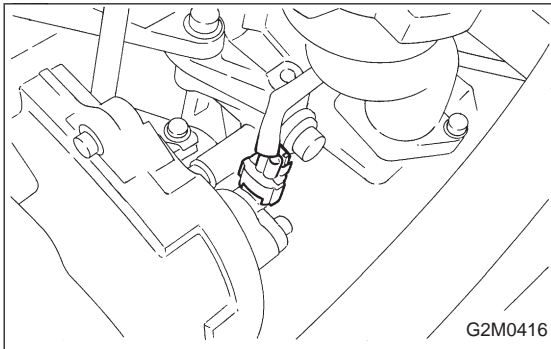
14) Disconnect engine harness connectors from bulkhead harness connectors.



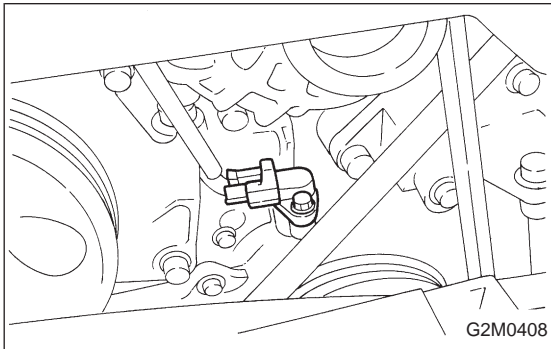
15) Disconnect connectors from engine coolant temperature sensor ① and thermometer ②.



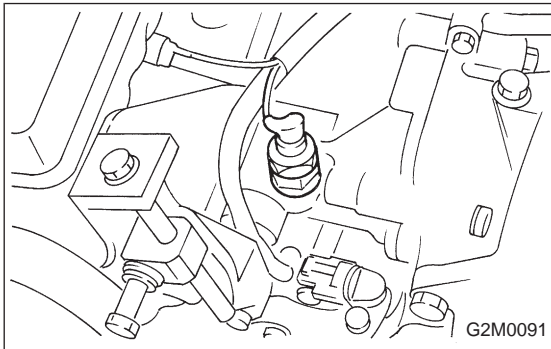
16) Disconnect connector from knock sensor.



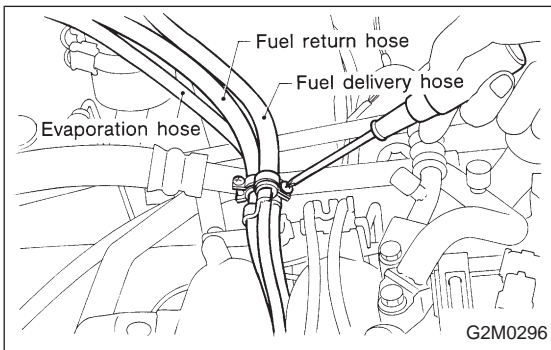
17) Disconnect connector from camshaft position sensor.



18) Disconnect connector from crankshaft position sensor.

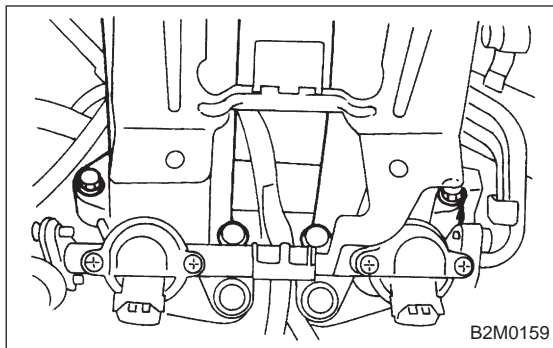


19) Disconnect connector from oil pressure switch.

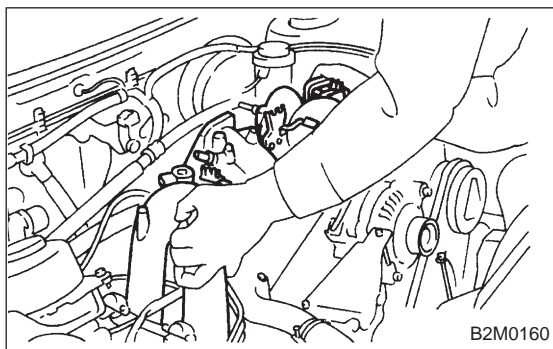


20) Disconnect fuel hoses from pipes.

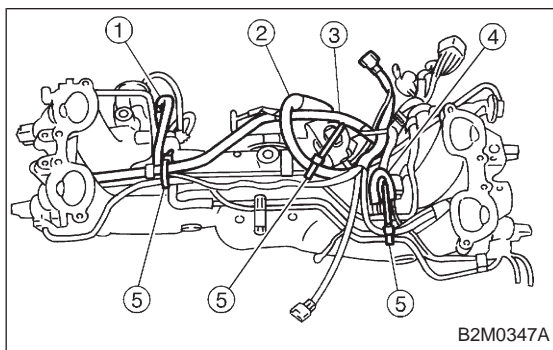
WARNING:
Catch fuel from hoses in a container.



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



22) Remove intake manifold.

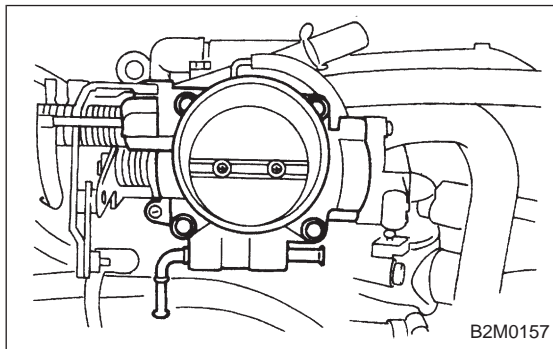


B: DISASSEMBLY

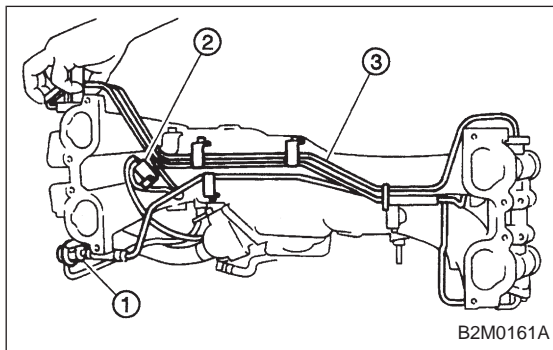
1) Disconnect connectors from throttle position sensor, ignition coil, fuel injectors, idle air control solenoid valve, purge control solenoid valve and EGR solenoid valve.

2) Remove engine harness from intake manifold.

- ① EGR solenoid valve
- ② Throttle position sensor
- ③ Idle air control solenoid valve
- ④ Purge control solenoid valve
- ⑤ Harness band

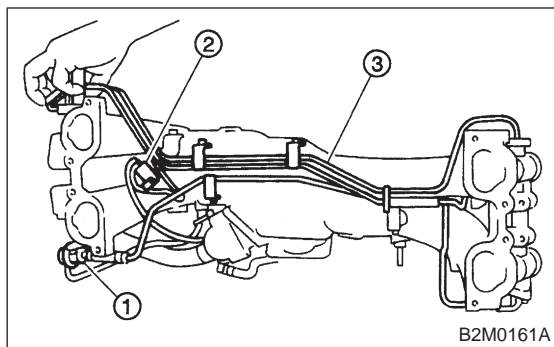


3) Remove throttle body from intake manifold.



4) Remove fuel pipes, etc. from intake manifold.

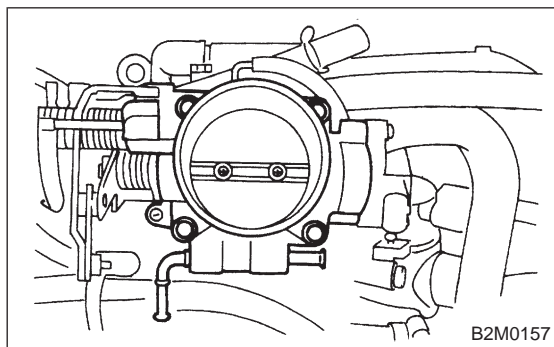
- ① Pressure regulator
- ② Purge control solenoid valve
- ③ Fuel pipe ASSY



C: ASSEMBLY

1) Assemble fuel pipes, etc. to intake manifold.

- ① Pressure regulator
- ② Purge control solenoid valve
- ③ Fuel pipe ASSY



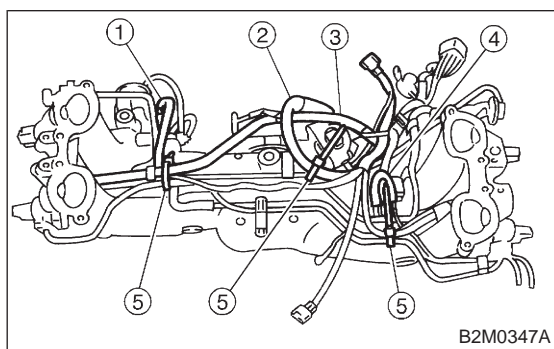
2) Assemble throttle body to intake manifold.

CAUTION:

Replace gasket with a new one.

Tightening torque:

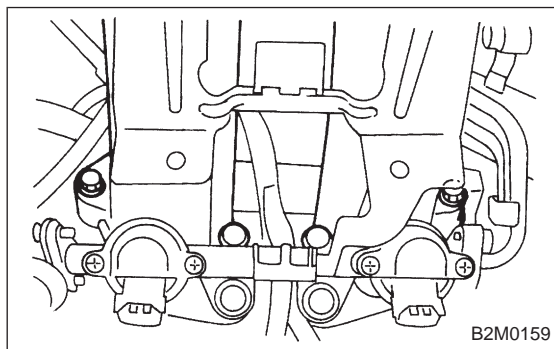
22 ± 2 N·m (2.2 ± 0.2 kg-m, 15.9 ± 1.4 ft-lb)



3) Install engine harness onto intake manifold.

4) Connect connectors to throttle position sensor, ignition coil, fuel injectors, idle air control solenoid valve, purge control solenoid valve and EGR solenoid valve.

- ① EGR solenoid valve
- ② Throttle position sensor
- ③ Idle air control solenoid valve
- ④ Purge control solenoid valve
- ⑤ Harness band



D: INSTALLATION

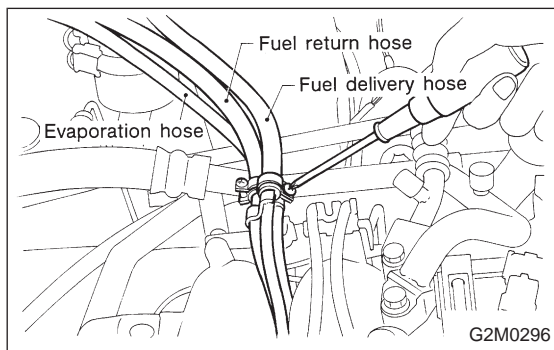
1) Install intake manifold onto cylinder heads.

CAUTION:

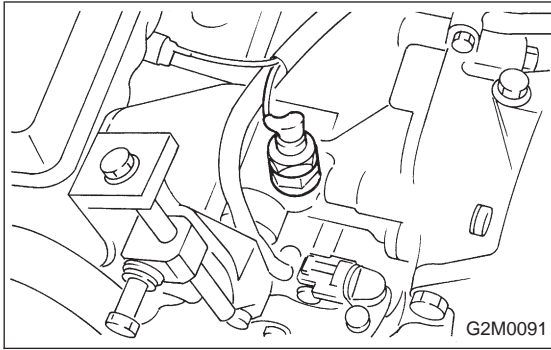
Always use new gaskets.

Tightening torque:

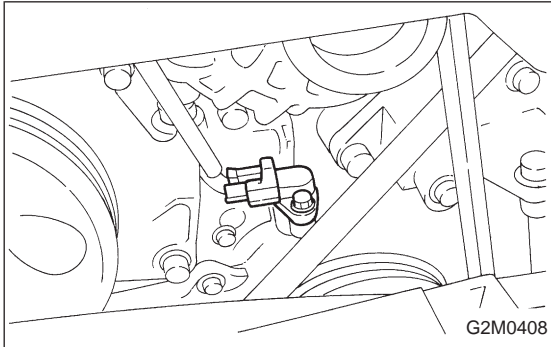
25 ± 2 N·m (2.5 ± 0.2 kg-m, 18.1 ± 1.4 ft-lb)



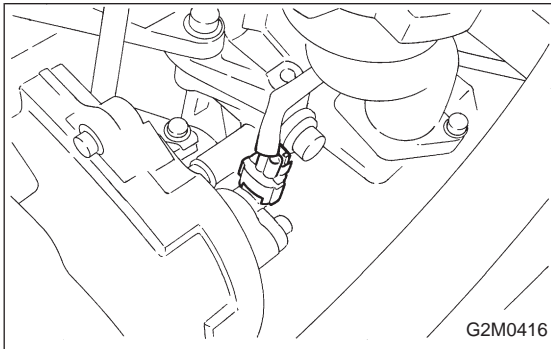
2) Connect fuel hoses.



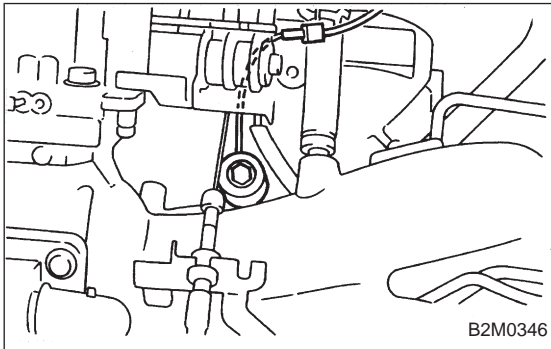
3) Connect connector to oil pressure switch.



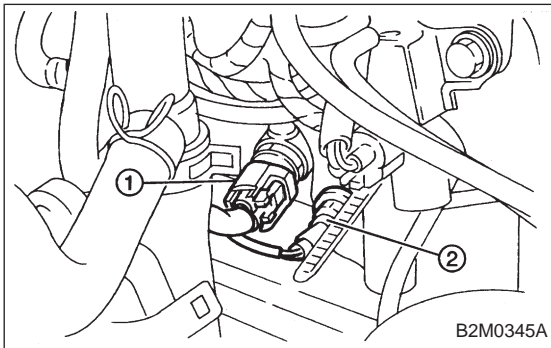
4) Connect connector to crankshaft position sensor.



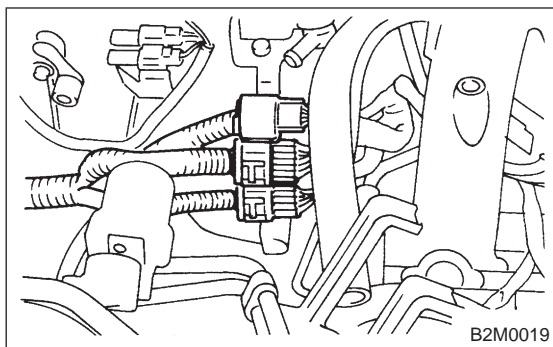
5) Connect connector to camshaft position sensor.



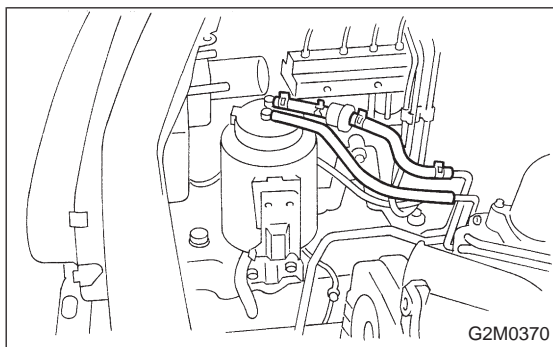
6) Connect connector to knock sensor.



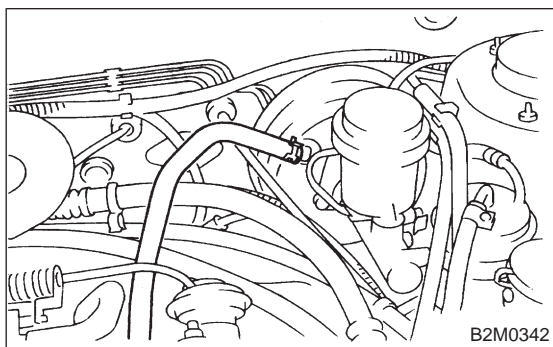
7) Connect connectors to engine coolant temperature sensor ① and thermometer ②.



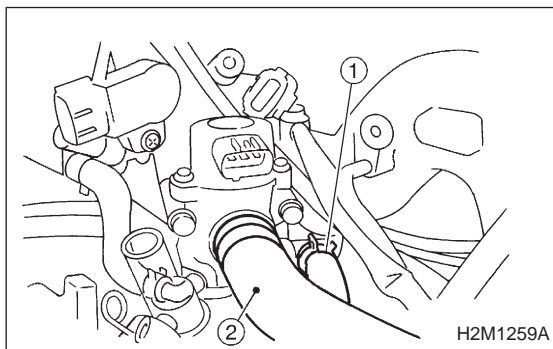
8) Connect engine harness connector to bulkhead harness connectors.



9) Connect canister hoses.

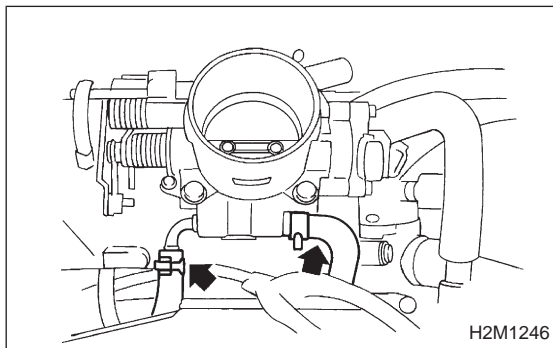


10) Connect brake booster vacuum hose to intake manifold.

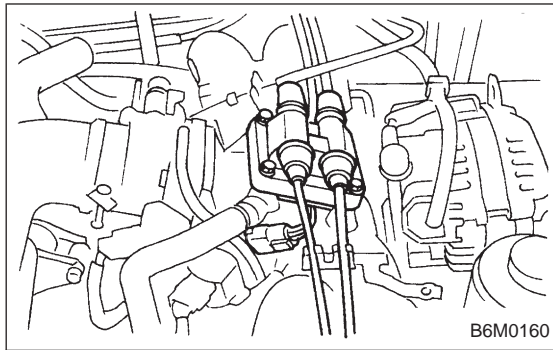


11) Connect engine coolant hose ① from idle air control solenoid valve.

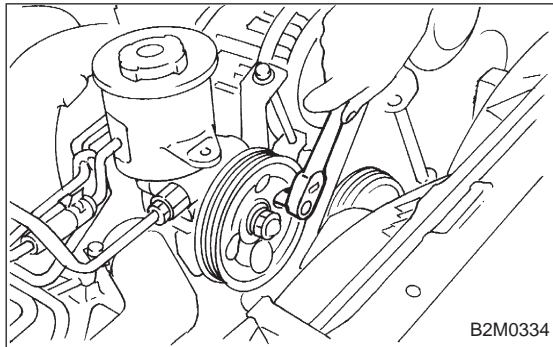
12) Connect air by-pass hose ② from idle air control solenoid valve.



13) Connect engine coolant hoses to throttle body.



14) Connect spark plug cords to ignition coil.

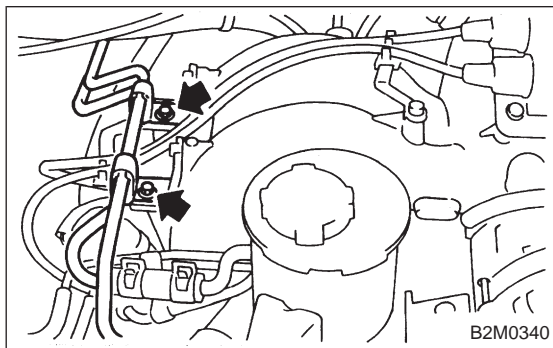


15) Install power steering pump on bracket.

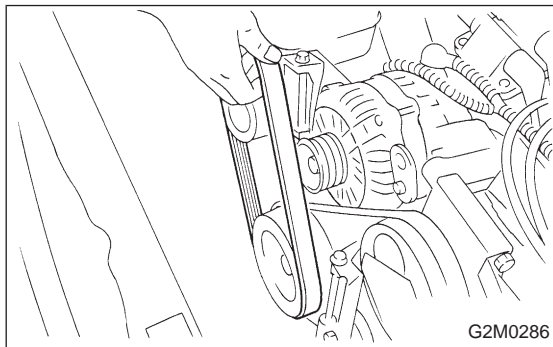
(1) Install power steering pump on bracket, and tighten bolts.

Tightening torque:

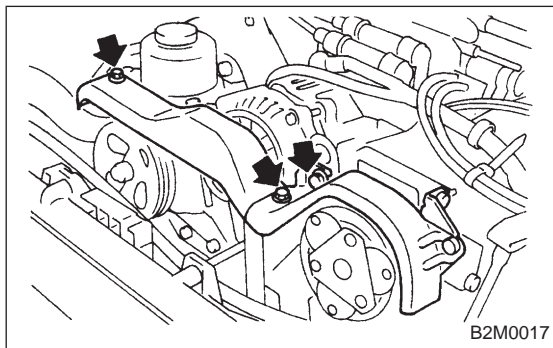
39 ± 10 N·m (4.0 ± 1.0 kg·m, 29 ± 7 ft·lb)



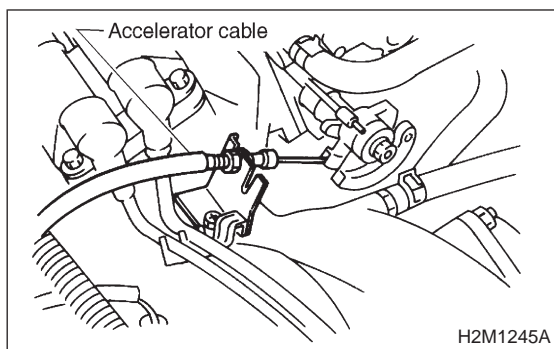
(2) Install power steering pipe bracket on right side intake manifold.



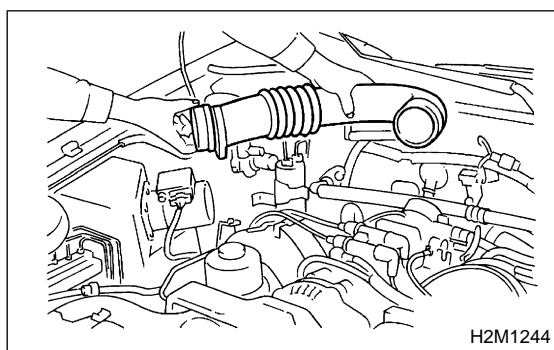
(3) Install front side V-belt, and adjust it.
<Ref. to 1-5 [01A0].>



(4) Install V-belt cover.

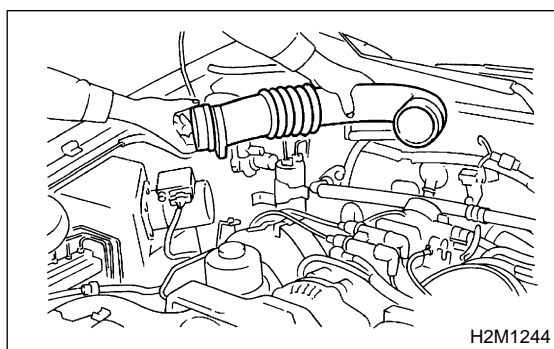


16) Connect accelerator cable.



17) Install air cleaner element, air cleaner upper cover and air intake duct.

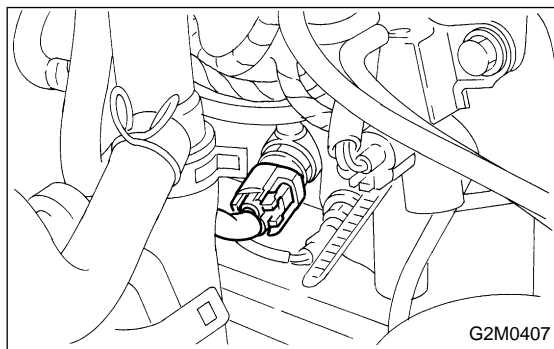
18) Connect connector to mass air flow sensor.



5. Engine Coolant Temperature Sensor

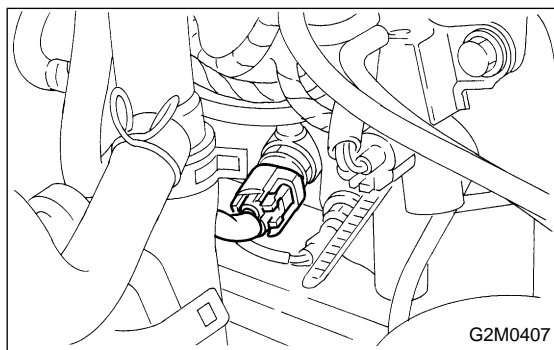
A: REMOVAL AND INSTALLATION

1) Remove air intake duct.



2) Disconnect connector from engine coolant temperature sensor.

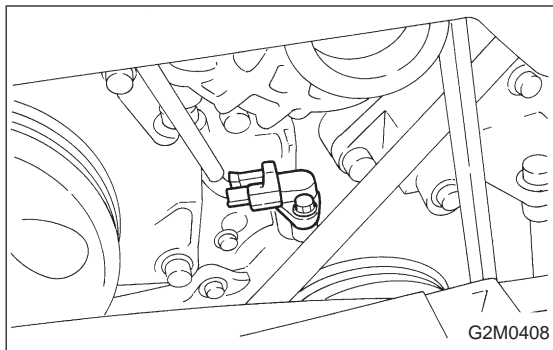
3) Remove engine coolant temperature sensor.



4) Installation is in the reverse order of removal.

Tightening torque:

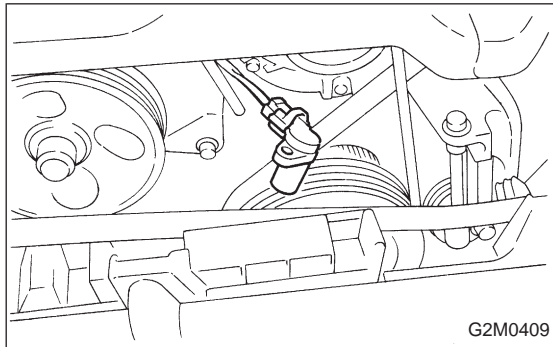
25±3 N·m (2.5±0.3 kg-m, 18.1±2.2 ft-lb)



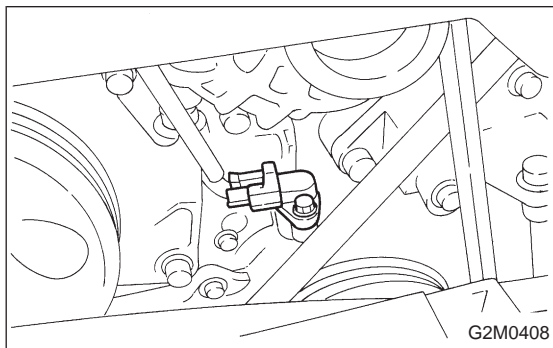
6. Crankshaft Position Sensor

A: REMOVAL AND INSTALLATION

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



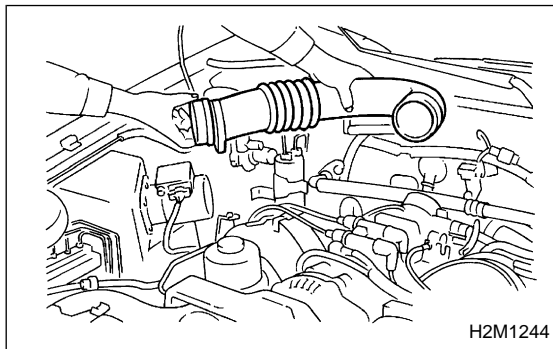
2) Remove crankshaft position sensor, and disconnect connector from it.



3) Installation is in the reverse order of removal.

Tightening torque:

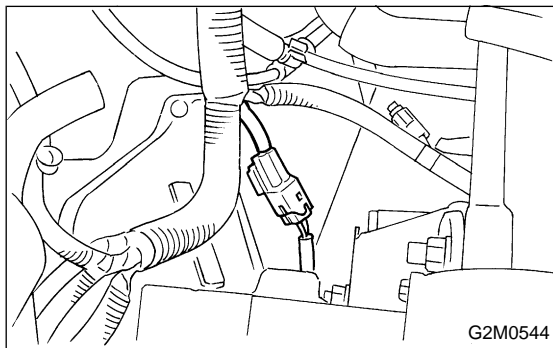
$6.4 \pm 0.5 \text{ N} \cdot \text{m}$ ($0.65 \pm 0.05 \text{ kg} \cdot \text{m}$, $4.7 \pm 0.4 \text{ ft} \cdot \text{lb}$)



7. Front Oxygen Sensor

A: REMOVAL

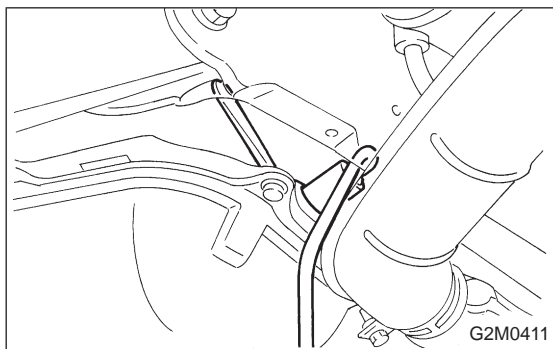
1) Remove air intake duct.



2) Disconnect connector from front oxygen sensor.

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

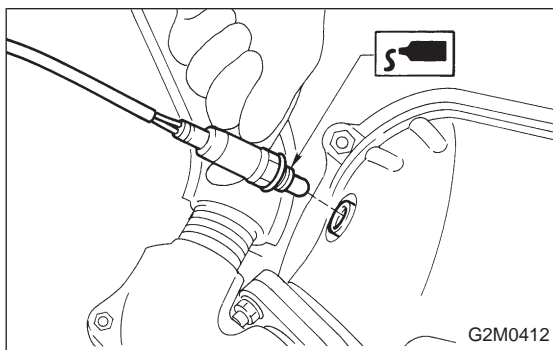
SUBARU CRC (Part No. 004301003)



- 5) Remove front oxygen sensor.

CAUTION:

When removing oxygen sensor, do not force oxygen sensor especially when exhaust pipe is cold, otherwise it will damage exhaust pipe.



B: INSTALLATION

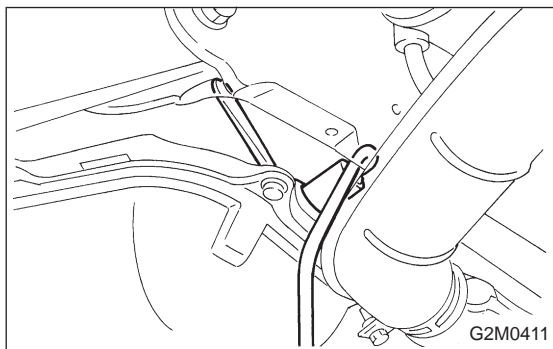
- 1) Before installing front oxygen sensor, apply anti-seize compound only to threaded portion of front oxygen sensor to make the next removal easier.

Anti-seize compound:

SS-30 by JET LUBE

CAUTION:

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

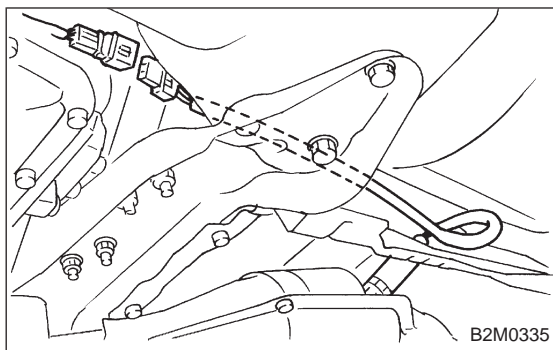


- 2) Install front oxygen sensor.

Tightening torque:

21 ± 3 N·m (2.1 ± 0.3 kg·m, 15.2 ± 2.2 ft·lb)

- 3) Lower the vehicle.
- 4) Connect connector of front oxygen sensor.
- 5) Install air intake duct.



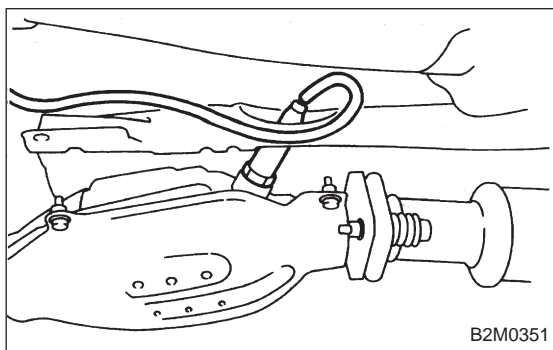
8. Rear Oxygen Sensor

A: REMOVAL

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

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

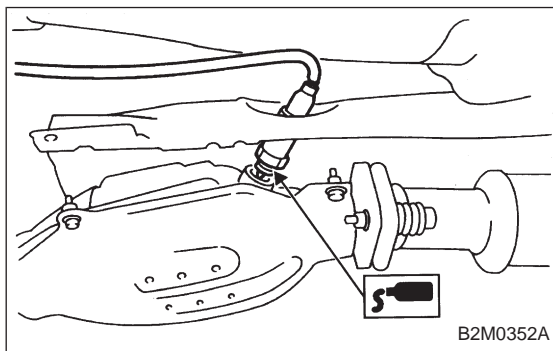
SUBARU CRC (Part No. 004301003)



- 4) Remove rear oxygen sensor.

CAUTION:

When removing rear oxygen sensor, do not force rear oxygen sensor especially when exhaust pipe is cold, otherwise it will damage exhaust pipe.



B: INSTALLATION

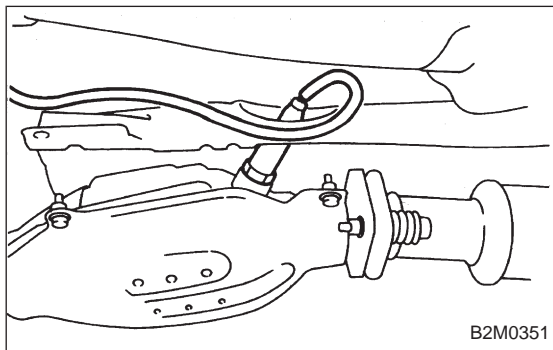
- 1) Before installing rear oxygen sensor, apply anti-seize compound only to threaded portion of rear oxygen sensor to make the next removal easier.

Anti-seize compound:

SS-30 by JET LUBE

CAUTION:

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

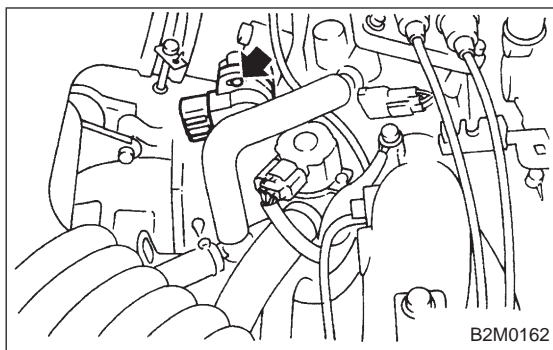


- 2) Install rear oxygen sensor.

Tightening torque:

21±3 N·m (2.1±0.3 kg-m, 15.2±2.2 ft-lb)

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



9. Throttle Position Sensor

A: REMOVAL AND INSTALLATION

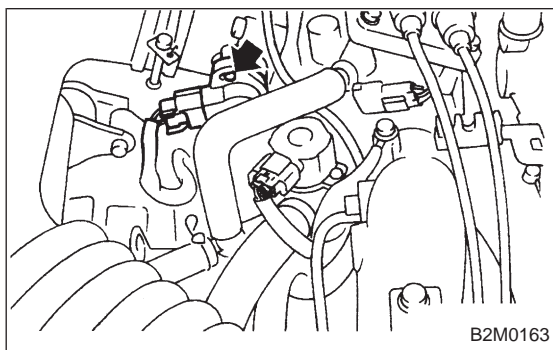
- 1) Disconnect connector from throttle position sensor.
- 2) Remove throttle position sensor holding screws, and remove it.
- 3) Installation is in the reverse order of removal.

Tightening torque:

$2.2 \pm 0.2 \text{ N} \cdot \text{m}$ ($0.22 \pm 0.02 \text{ kg} \cdot \text{m}$, $1.6 \pm 0.1 \text{ ft} \cdot \text{lb}$)

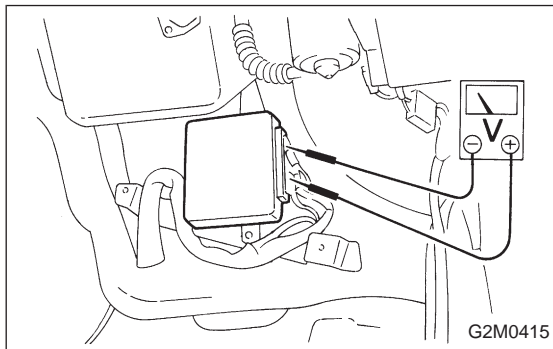
CAUTION:

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



B: ADJUSTMENT

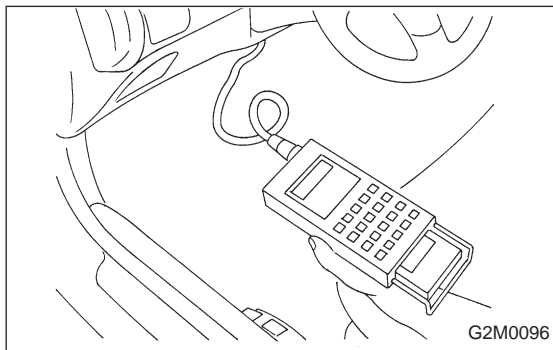
- 1) Turn ignition switch to OFF.
- 2) Loosen throttle position sensor holding screws.



- 3) When using voltage meter;
 - (1) Take out ECM.
 - (2) Turn ignition switch to ON.
 - (3) Adjust throttle position sensor so that signal voltage to ECM may be in specification.

Connector & Terminal / Specified voltage
(B84) No. 24 — (B84) No. 25 / $0.45 - 0.55 \text{ V}$
[Fully closed.]

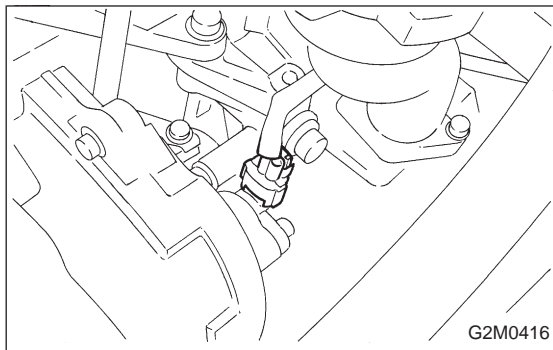
- (4) Tighten throttle position sensor holding screws.



- 4) When using Subaru Select Monitor;
 - (1) Connect Subaru Select Monitor to the data link connector.
 - (2) Turn ignition switch to ON and SSM switch to ON.
 - (3) Select mode "F10".
 - (4) Adjust throttle position sensor to specified data.

Condition / Specified data.
Throttle fully closed / 0.50 V

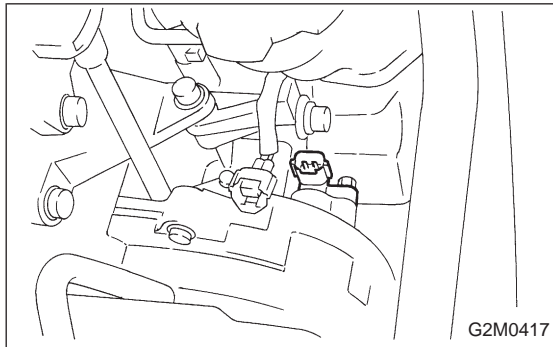
- (5) Tighten throttle position sensor holding screws.



10. Camshaft Position Sensor

A: REMOVAL AND INSTALLATION

- 1) Disconnect connector from camshaft position sensor.

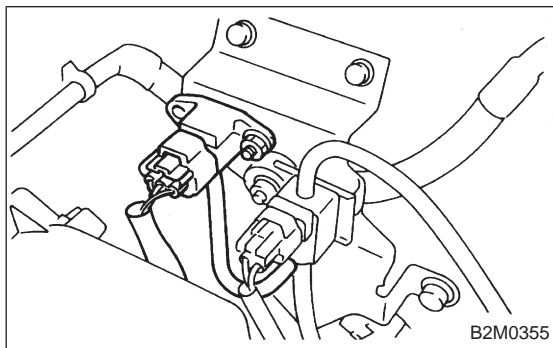


- 2) Remove camshaft position sensor from camshaft support LH.

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

Tightening torque:

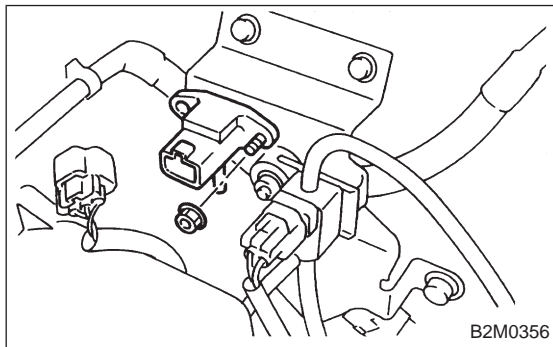
$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)



11. Pressure Sensor

A: REMOVAL AND INSTALLATION

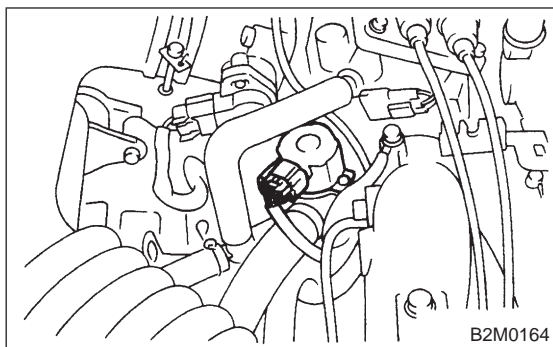
- 1) Disconnect connector from pressure sensor.
- 2) Disconnect hose from pressure sensor.



- 3) Remove pressure sensor from bracket.
- 4) Installation is in the reverse order of removal.

Tightening torque:

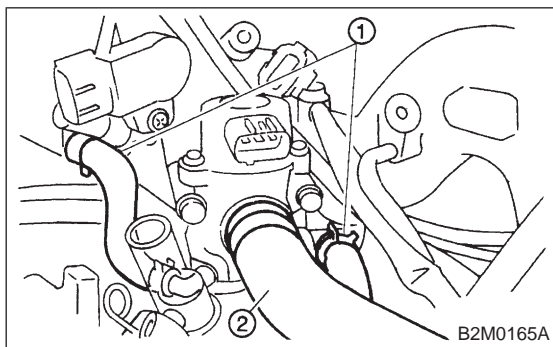
$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)



12. Idle Air Control Solenoid Valve

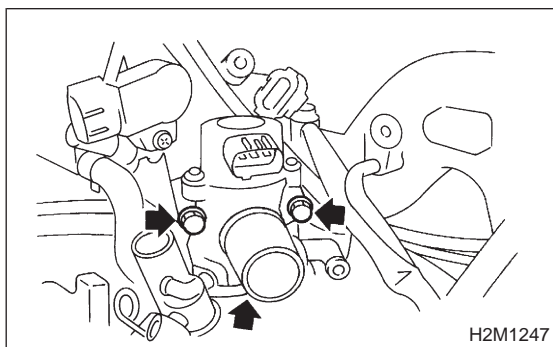
A: REMOVAL AND INSTALLATION

1) Disconnect connector from idle air control solenoid valve.



2) Disconnect engine coolant hoses ① from idle air control solenoid valve.

3) Disconnect air by-pass hose ② from idle air control solenoid valve.



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

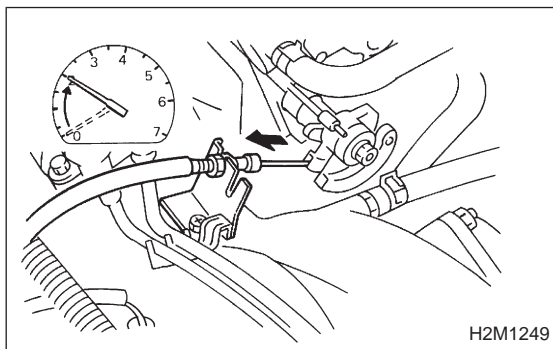
5) Installation is in the reverse order of removal.

CAUTION:

Replace gasket with a new one.

Tightening torque:

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



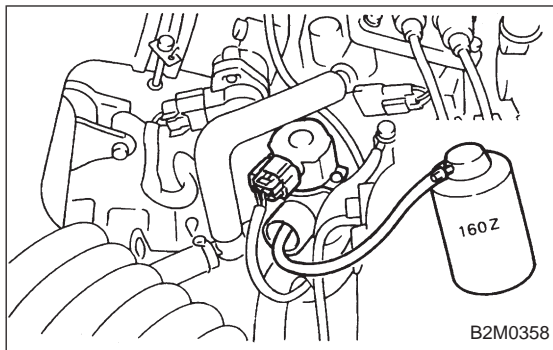
B: CLEANING

1) Start and warm-up the engine until radiator fan operates.

2) Hold throttle valve so that engine speed is at 2,000 rpm.



3) Disconnect by-pass hose from idle air control solenoid valve.



4) Slowly pour one can (16 oz) of cleaner into by-pass air hole.

Cleaner:

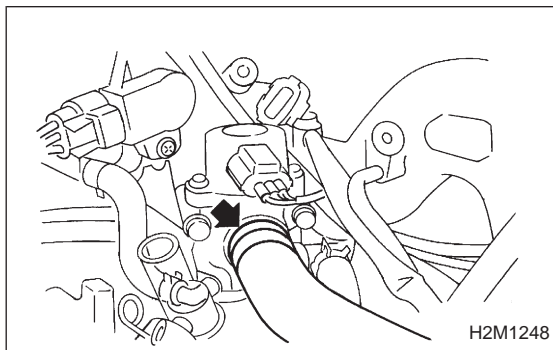
- **Part No. 1050002 GM Top Engine Cleaner**
- **Part No. X66-A AC Delco Carburetor Tune-up Conditioner**

5) Leave the engine running for five minutes.

NOTE:

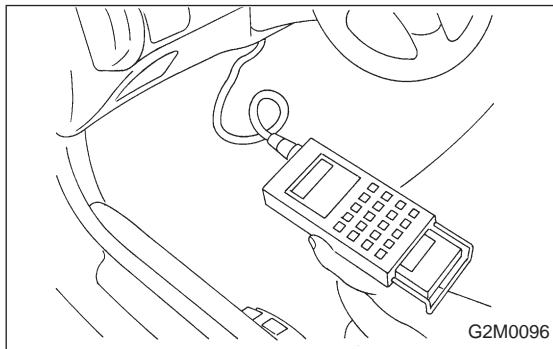
White smoke comes out of the muffler until the cleaner is used up.

6) Stop the engine.



7) Release the throttle valve.

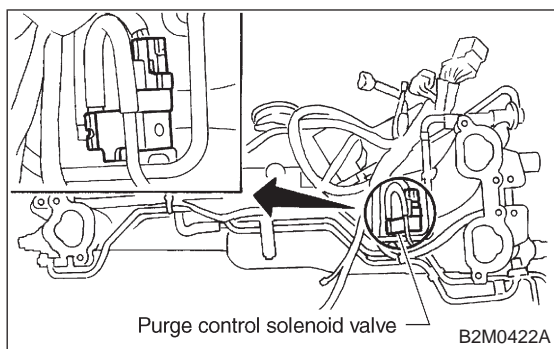
8) Connect by-pass hose to idle air control solenoid valve.



9) Check duty ratio of idle air control solenoid valve with Subaru Select Monitor.

- (1) Connect Subaru Select Monitor to the data link connector.
- (2) Start the engine and turn Subaru Select Monitor switch to ON.
- (3) Select mode "F12".
- (4) Make sure duty ratio on radiator fan and electric load is OFF.

Specified data: 25 — 40%



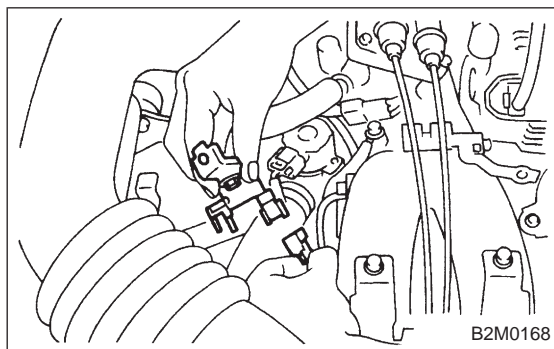
13. Purge Control Solenoid Valve

A: REMOVAL AND INSTALLATION

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

NOTE:

This figure shows the intake manifold detached from the cylinder heads.

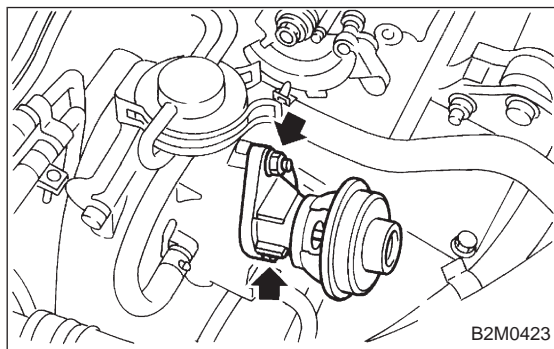


- 2) Take out purge control solenoid valve through the bottom of the intake manifold.
- 3) Disconnect connector and hoses from purge control solenoid valve.

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

Tightening torque:

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



14. EGR Valve

A: REMOVAL AND INSTALLATION

- 1) Disconnect vacuum hose from EGR valve.
- 2) Remove bolts which install EGR valve onto intake manifold.

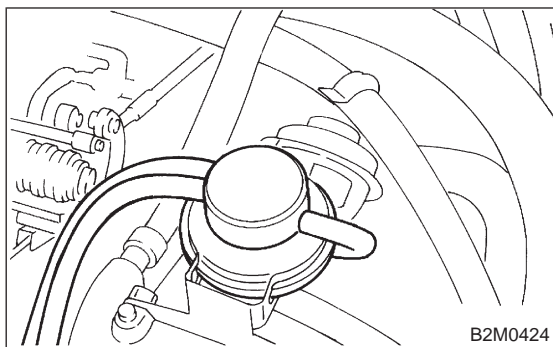
- 3) Installation is in the reverse order of removal.

CAUTION:

Replace gasket with a new one.

Tightening torque:

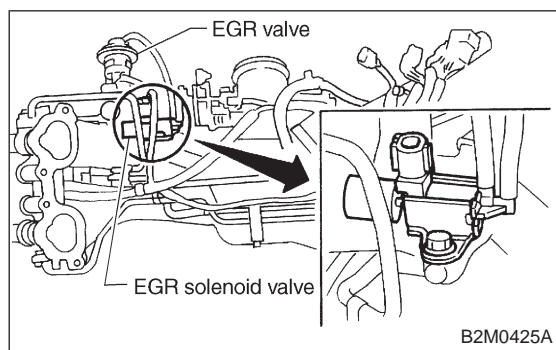
$19 \pm 1.5 \text{ N} \cdot \text{m}$ ($1.9 \pm 0.15 \text{ kg} \cdot \text{m}$, $13.7 \pm 1.1 \text{ ft} \cdot \text{lb}$)



15. Back-Pressure Transducer (BPT)

A: REMOVAL AND INSTALLATION

- 1) Disconnect vacuum hoses from BPT.
- 2) Remove BPT from bracket.
- 3) Installation is in the reverse order of removal.



16. EGR Solenoid Valve

A: REMOVAL AND INSTALLATION

- 1) Remove bolt which installs EGR solenoid valve onto intake manifold.
- 2) Disconnect hoses and connector from EGR solenoid valve.

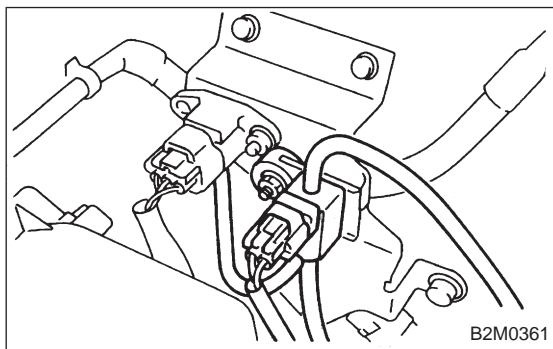
NOTE:

This figure shows the intake manifold detached from cylinder heads.

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

Tightening torque:

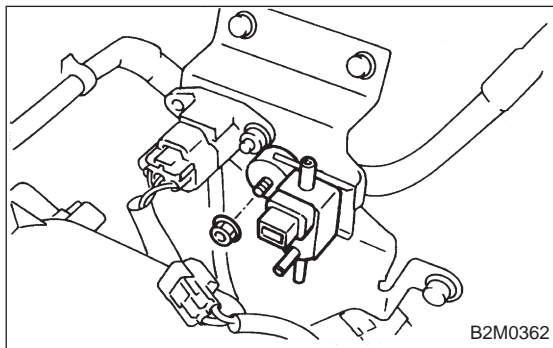
$16 \pm 1.5 \text{ N}\cdot\text{m}$ ($1.6 \pm 0.15 \text{ kg}\cdot\text{m}$, $11.6 \pm 1.1 \text{ ft}\cdot\text{lb}$)



17. Pressure Sources Switching Solenoid Valve

A: REMOVAL AND INSTALLATION

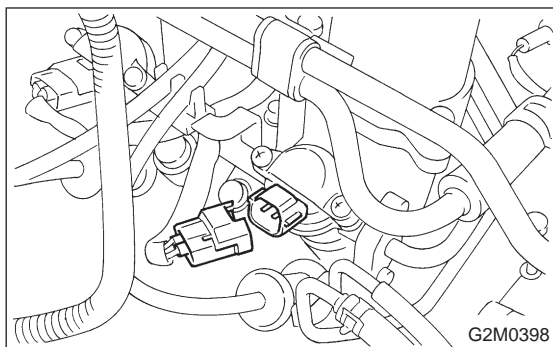
- 1) Disconnect connector from pressure sources switching solenoid valve.
- 2) Disconnect hoses from pressure sources switching solenoid valve.



- 3) Remove pressure sources switching solenoid valve from bracket.
- 4) Installation is in the reverse order of removal.

Tightening torque:

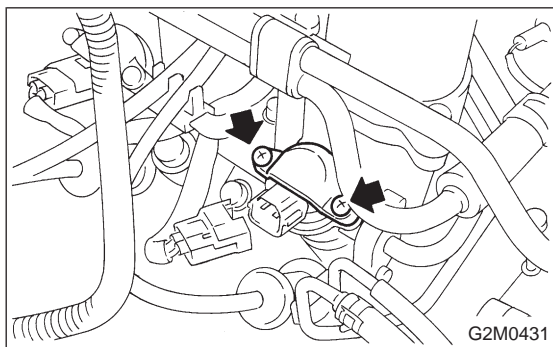
$6.4 \pm 0.5 \text{ N}\cdot\text{m}$ ($0.65 \pm 0.05 \text{ kg}\cdot\text{m}$, $4.7 \pm 0.4 \text{ ft}\cdot\text{lb}$)



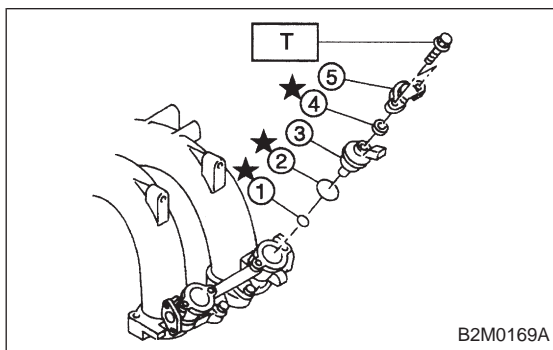
18. Fuel Injector

A: REMOVAL AND INSTALLATION

- 1) Release fuel pressure.
<Ref. to 2-8 [W1A0].>
- 2) Disconnect connector from fuel injector.



- 3) Remove fuel injector from fuel pipe assembly.



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

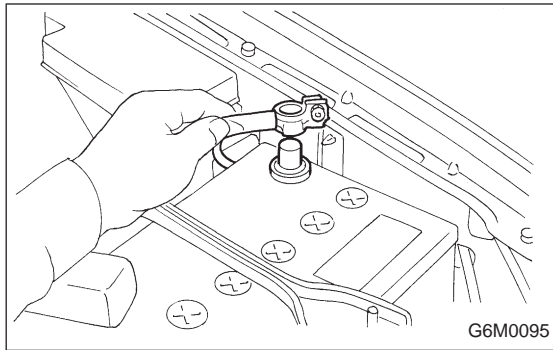
CAUTION:

Replace O-rings and insulator.

Tightening torque:

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

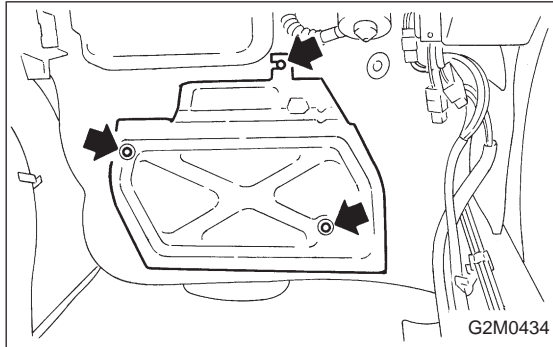
- ① O-ring B
- ② O-ring A
- ③ Fuel injector
- ④ Insulator
- ⑤ Fuel injector cup



19. Engine Control Module

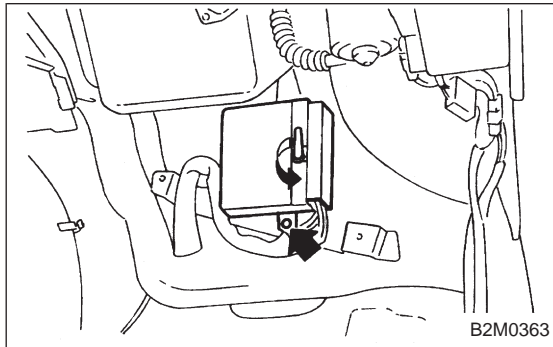
A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.



2) Detach floor mat of front passenger seat.

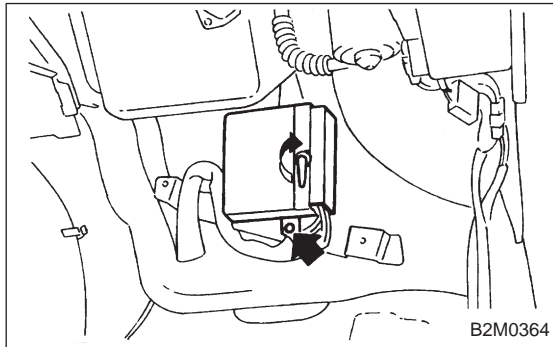
3) Remove protect cover.



4) Release the lock of ECM connector and disconnect it.

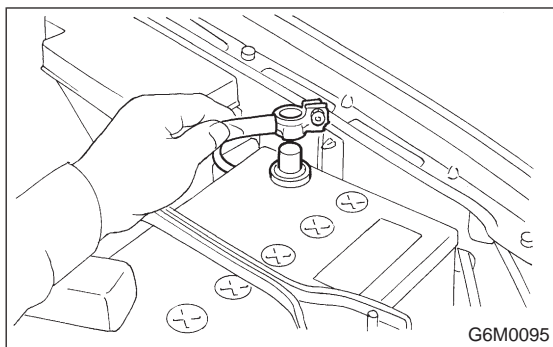
5) Remove nuts which install ECM onto body.

6) Take out ECM.



7) Connect ECM connector and lock it.

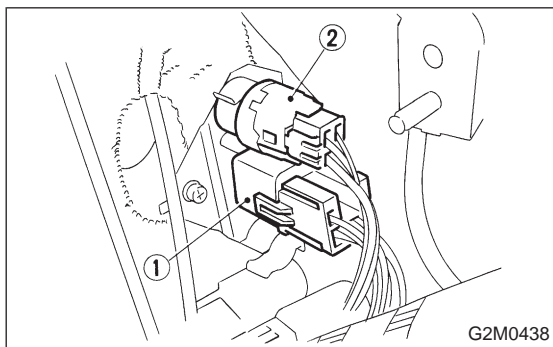
8) Installation is in the reverse order of removal.



20. Main Relay and Fuel Pump Relay

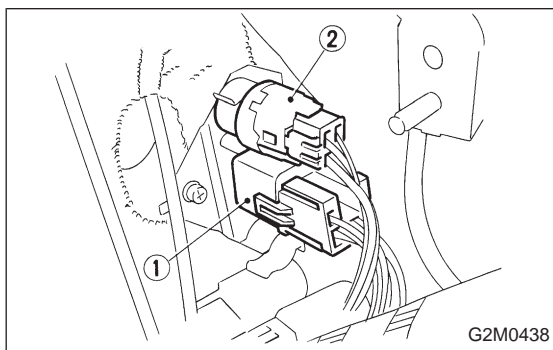
A: REMOVAL AND INSTALLATION

1) Disconnect battery ground cable.



2) Remove screw which installs bracket of main relay ① and fuel pump relay ②.

3) Disconnect connectors from main relay and fuel pump relay.



4) Installation is in the reverse order of removal.

① Main relay

② Fuel pump relay