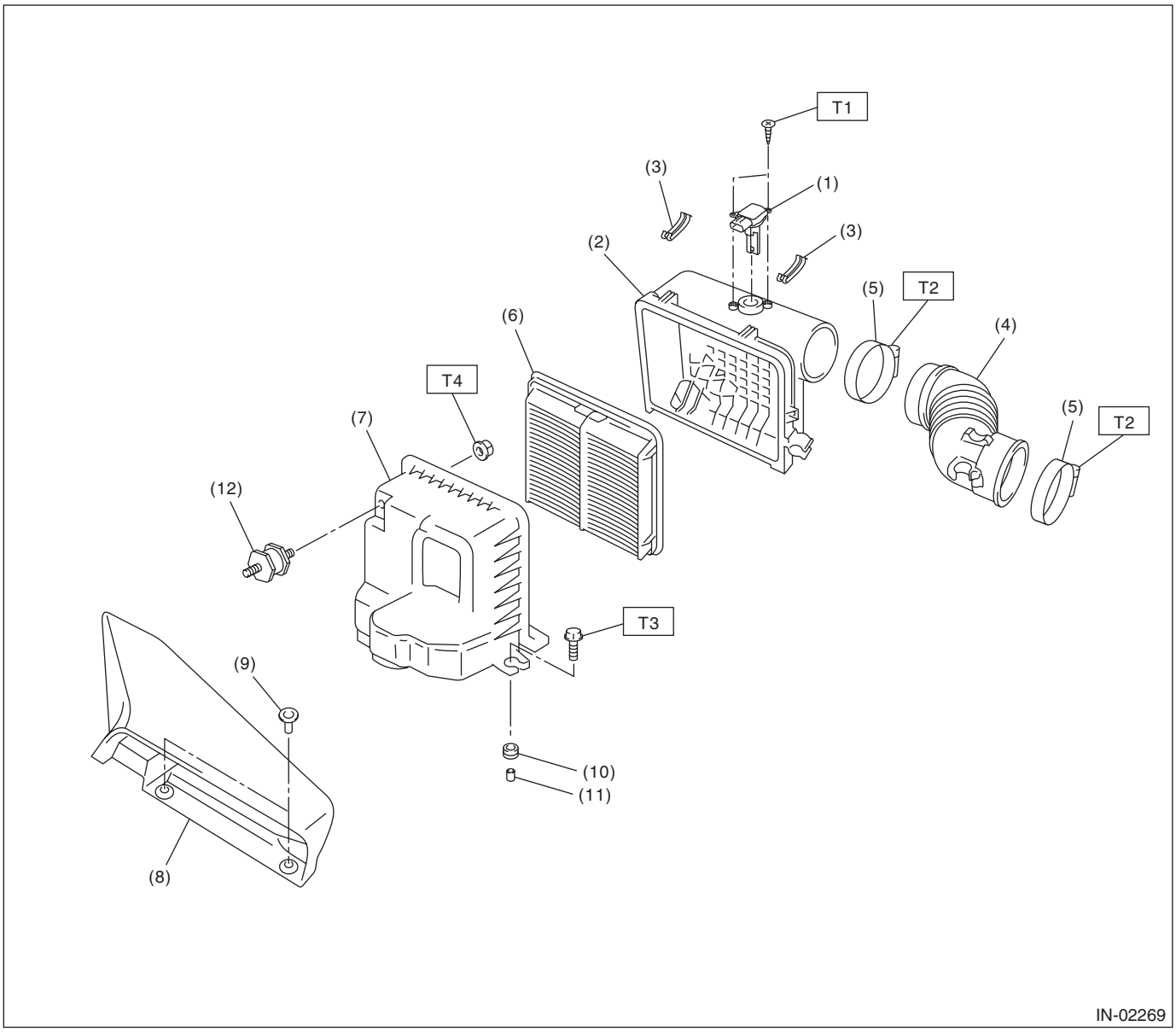
INTAKE (INDUCTION)

1. General Description

A: COMPONENT

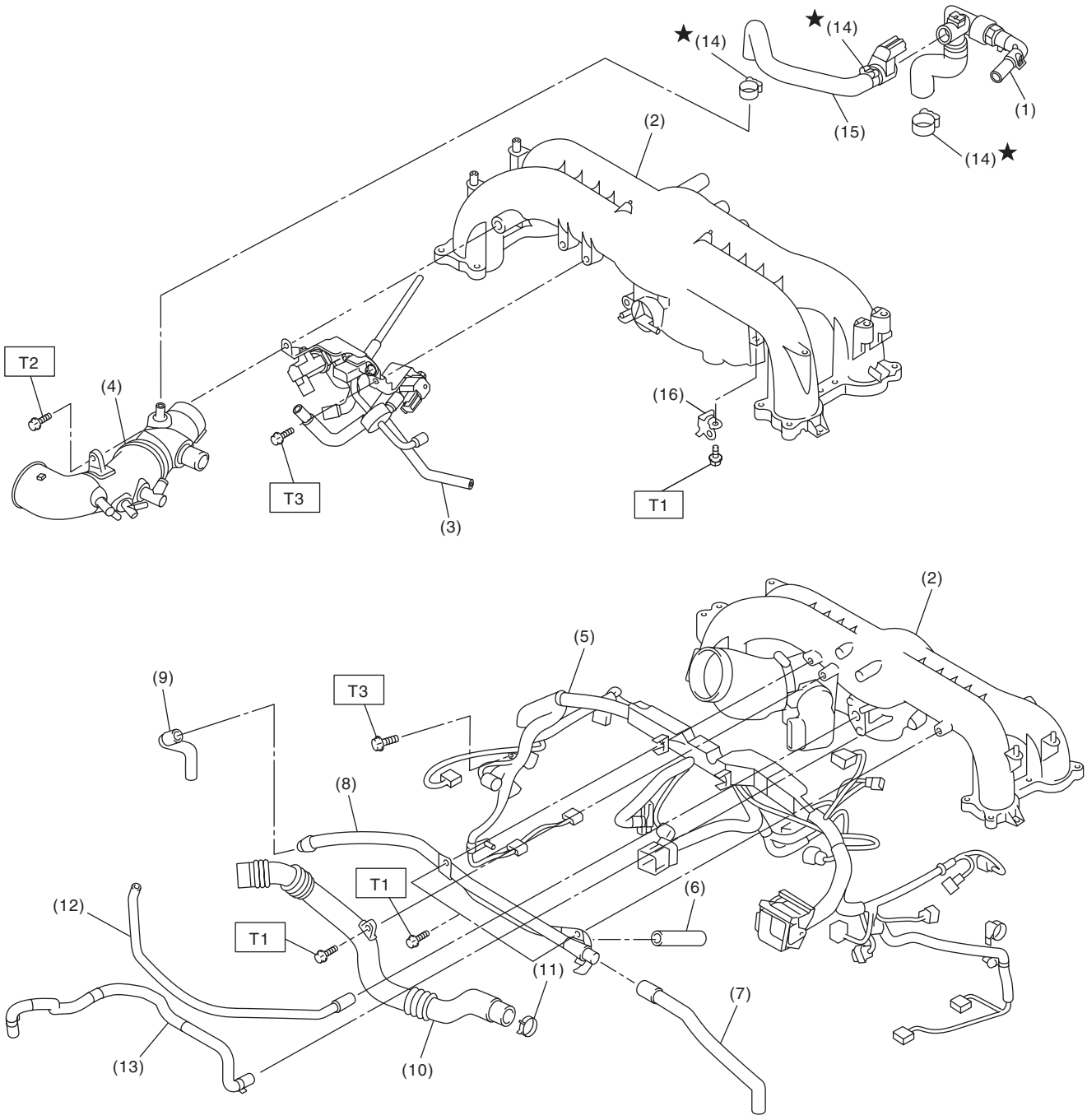
1. AIR CLEANER



(1)	Mass air flow and intake air temperature sensor	(7)	Air cleaner case (front)
(2)	Air cleaner case (rear)	(8)	Air intake duct
(3)	Clip	(9)	Clip
(4)	Air intake boot	(10)	Cushion
(5)	Clamp	(11)	Spacer
(6)	Air cleaner element	(12)	Cushion

Tightening torque:N·m (kgf-m, ft-lb)
T1: 1 (0.1, 0.7)
T2: 2.5 (0.25, 1.8)
T3: 6 (0.6, 4.4)
T4: 7.5 (0.76, 5.5)

2. INTAKE DUCT

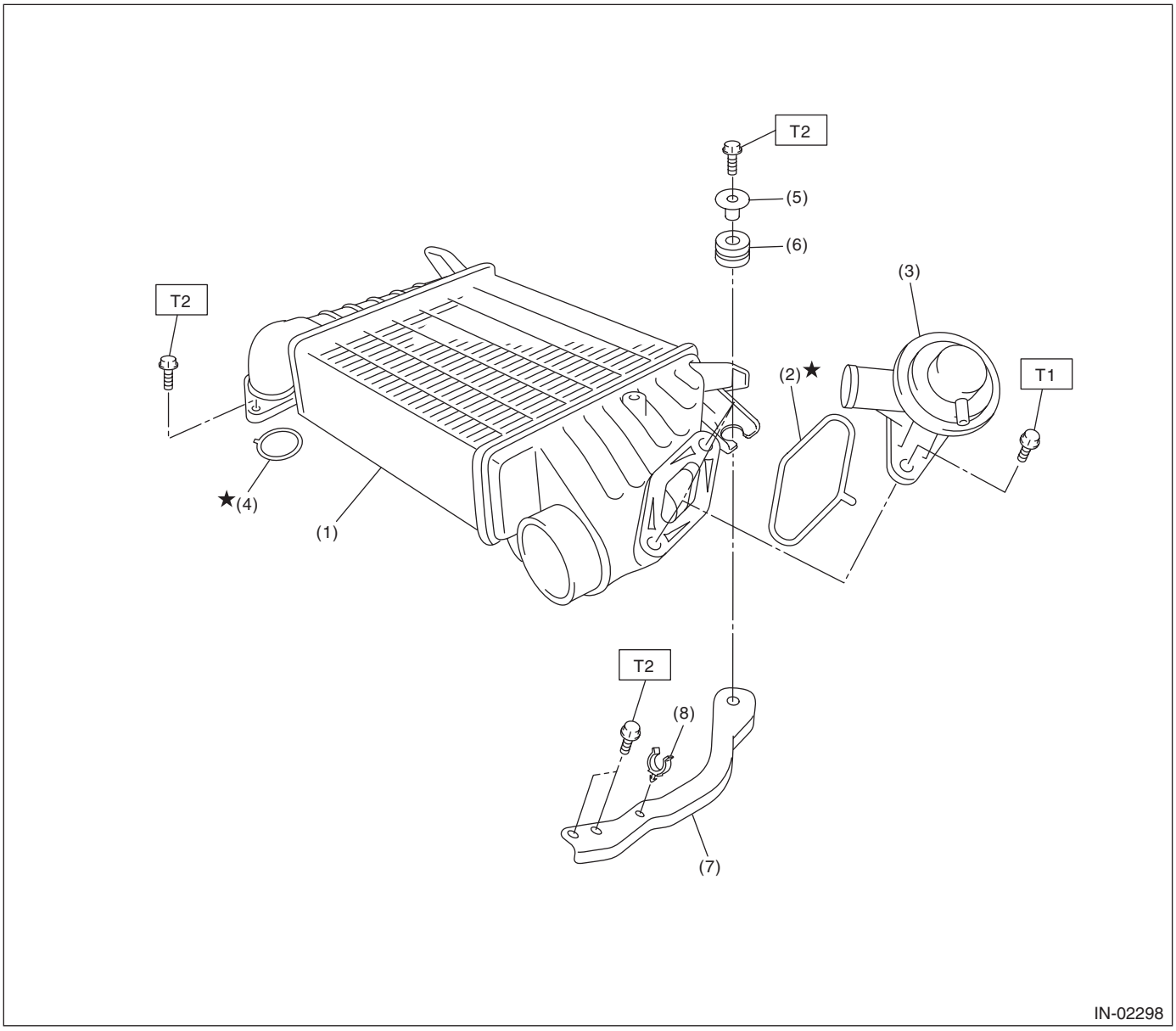


IN-02297

(1) PCV hose ASSY A
(2) Intake manifold
(3) Solenoid valve bracket ASSY
(4) Intake duct
(5) Engine harness ASSY
(6) Vacuum hose
(7) Vacuum hose
(8) PCV pipe
(9) Vacuum hose
(10) Air by-pass pipe
(11) Clamp
(12) Vacuum hose
(13) Brake booster vacuum hose
(14) Clamp
(15) PCV hose ASSY B
(16) Solenoid valve bracket

Tightening torque:N·m (kgf-m, ft-lb)
T1: 6.4 (0.65, 4.7)
T2: 17 (1.7, 12.5)
T3: 19 (1.9, 14.0)

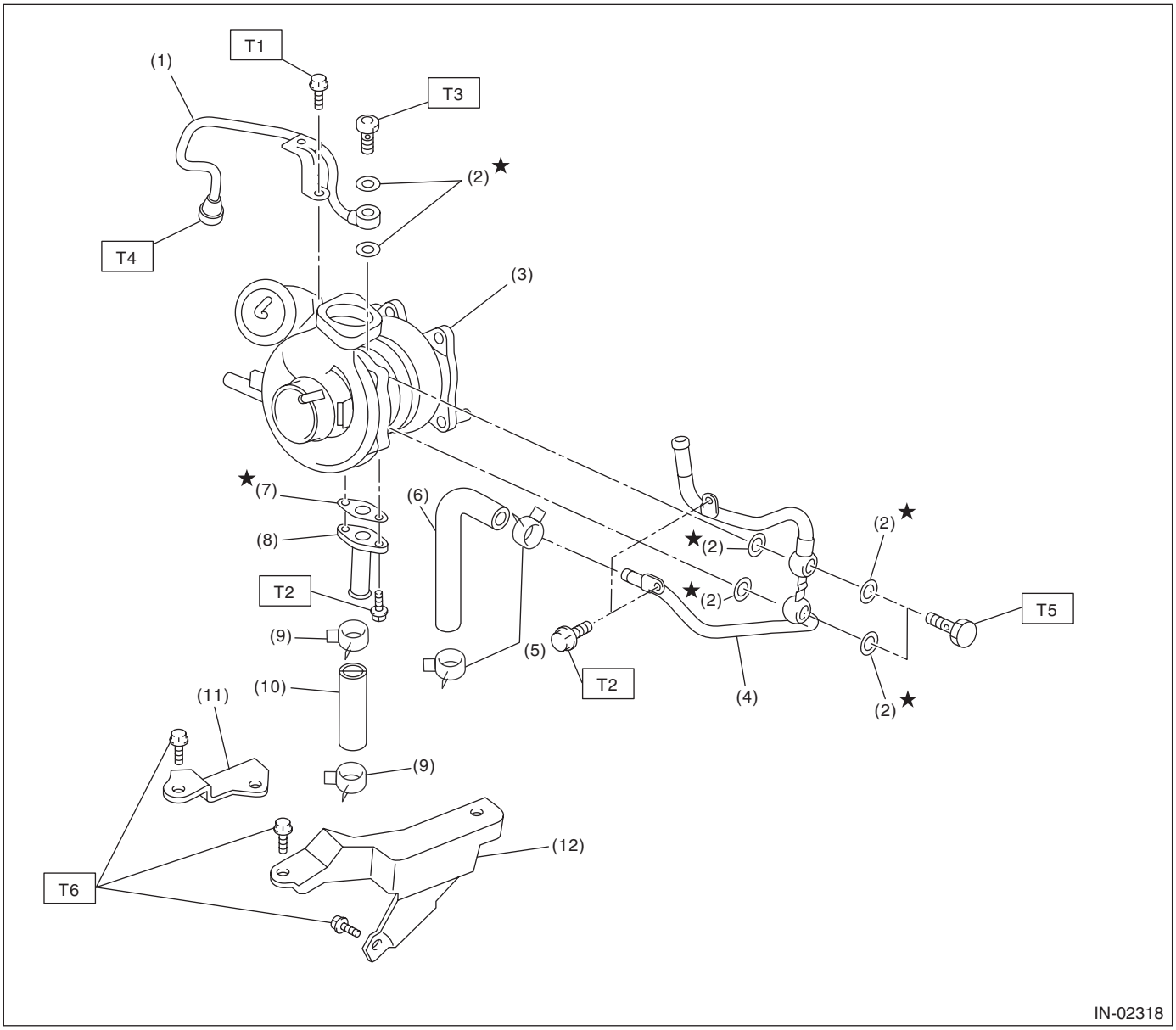
3. INTERCOOLER



(1)	Intercooler	(5)	Spacer
(2)	O-ring	(6)	Cushion
(3)	Air by-pass valve	(7)	Intercooler stay
(4)	O-ring	(8)	Brake booster vacuum hose clip

Tightening torque:N·m (kgf-m, ft-lb)
T1: 6.5 (0.66, 4.8)
T2: 16 (1.6, 11.8)

4. TURBOCHARGER



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

Tightening torque:N·m (kgf-m, ft-lb)

T1: 5 (0.5, 3.7)
T2: 7.8 (0.8, 5.8)
T3: 16 (1.6, 11.8)
T4: 20 (2.0, 14.8)
T5: 23 (2.3, 17.0)
T6: 33 (3.4, 24.3)

B: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Mighty Vac	Used to inspect the waste gate actuator.

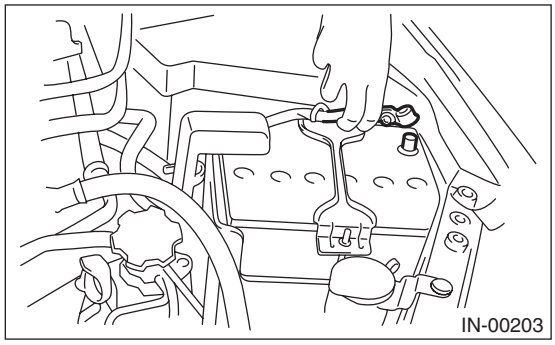
C: CAUTION

• Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
• Remove contamination including dirt and corrosion before removal, installation or disassembly.
• Keep the disassembled parts in order and protect them from dust and dirt.
• Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
• Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
• Be sure to tighten fasteners including bolts and nuts to the specified torque.
• Place shop jacks or rigid racks at the specified points.
• Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from the battery.

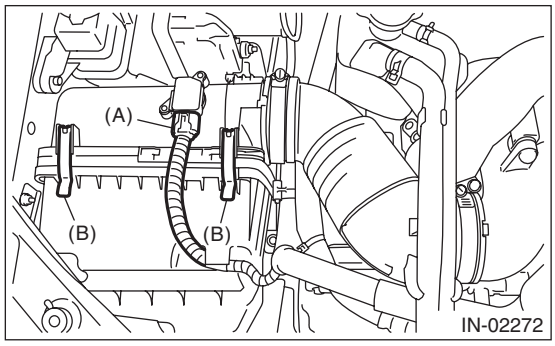
2. Air Cleaner Element

A: REMOVAL

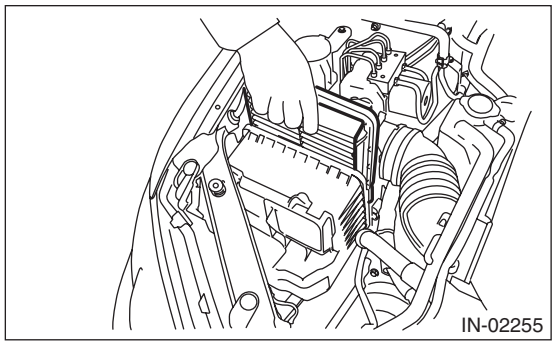
1) Disconnect the ground cable from battery.



2) Remove the air intake duct. <Ref. to IN(H4DOTC)-9, REMOVAL, Air Intake Duct.>
3) Disconnect the connector (A) from mass air flow and intake air temperature sensor.
4) Remove the clip (B) from the air cleaner case.



5) Open the air cleaner case, and remove the air cleaner element.



B: INSTALLATION

Install in the reverse order of removal.

CAUTION:
Be sure to use SUBARU genuine air cleaner element depending on the engine type when replacing the air cleaner elements. Otherwise engine performance may be damaged.

NOTE:
Check that there are no foreign objects in the air cleaner case.

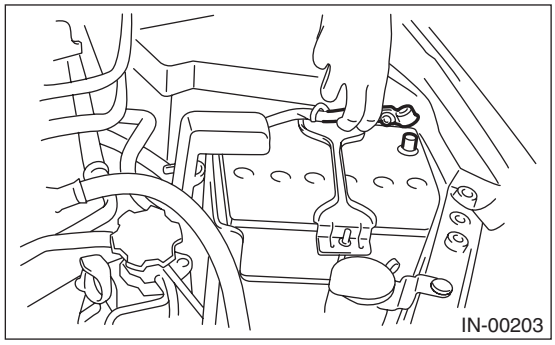
C: INSPECTION

Replace if excessively damaged or dirty.

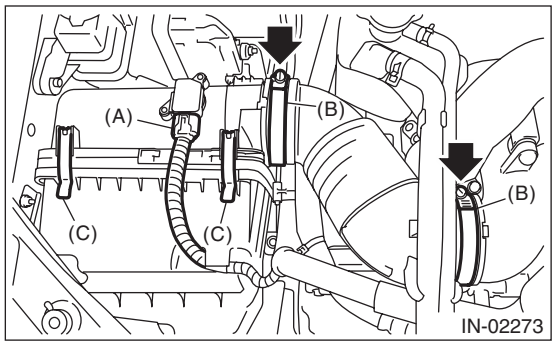
3. Air Cleaner Case

A: REMOVAL

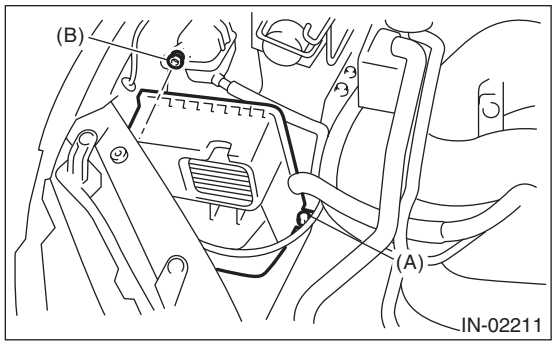
1) Disconnect the ground cable from the battery.



2) Remove the air intake duct. <Ref. to IN(H4DOTC)-9, REMOVAL, Air Intake Duct.>
3) Disconnect the connector (A) from mass air flow and intake air temperature sensor.
4) Loosen the clamp (B) which connects the air intake boot and intake duct.
5) Remove the clip (C) from the air cleaner case.



6) Remove the air cleaner case (rear) and air intake boot.
7) Remove the air cleaner element.
8) Remove the bolts (A) and nuts (B) which secure the air cleaner case (front) to the body.

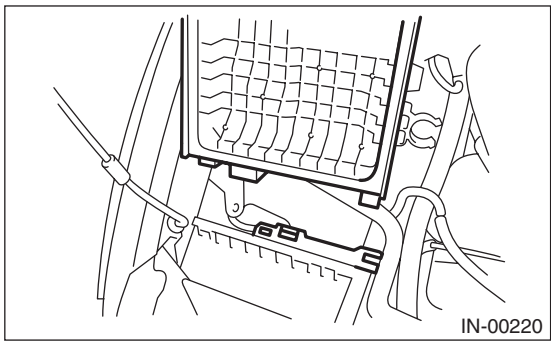


9) Remove the air cleaner case (front).

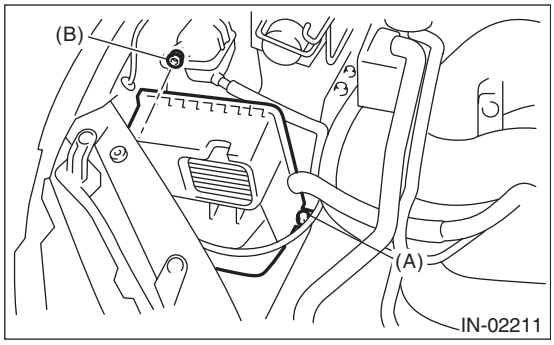
B: INSTALLATION

Install in the reverse order of removal.

NOTE:
When installing the air cleaner case (rear), align the protrusion of the air cleaner case (rear) to the hole on the air cleaner case (front) to install.



Tightening torque:
Bolt (A)
6 N·m (0.6 kgf-m, 4.4 ft-lb)
Nut (B)
7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



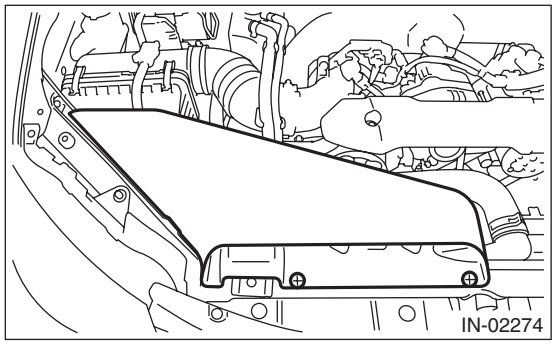
C: INSPECTION

Check for cracks or loose connections.

4. Air Intake Duct

A: REMOVAL

1) Remove the clip which installs the air intake duct on the front side of body.
2) Remove the air intake duct.



B: INSTALLATION

Install in the reverse order of removal.

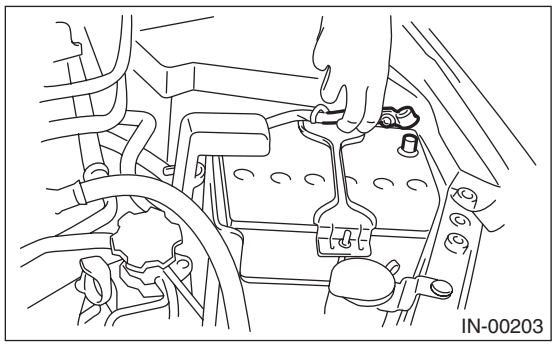
C: INSPECTION

1) Check for cracks or loose connections.
2) Inspect that no foreign objects in the air intake duct.

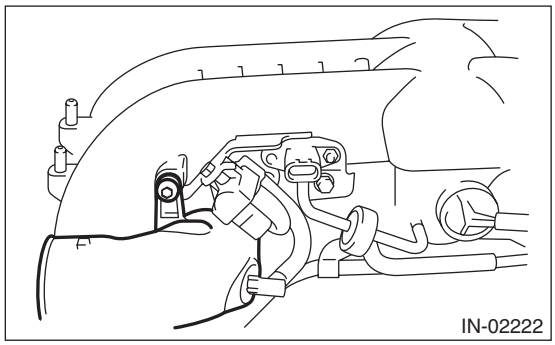
5. Intake Duct

A: REMOVAL

1) Disconnect the ground cable from the battery.



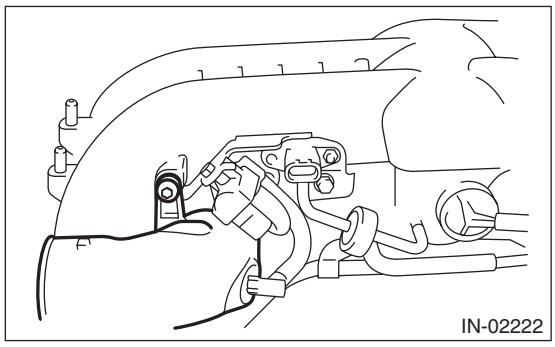
2) Remove the intake manifold. <Ref. to FU(H4DOTC)-15, REMOVAL, Intake Manifold.>
3) Remove the sensor, engine harness and fuel pipe attached to the intake manifold. <Ref. to FU(H4DOTC)-21, DISASSEMBLY, Intake Manifold.>
4) Remove the intake duct from intake manifold.



B: INSTALLATION

Install in the reverse order of removal.

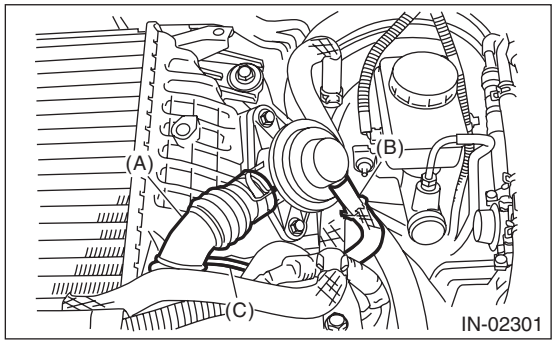
Tightening torque:
17 N·m (1.7 kgf-m, 12.5 ft-lb)



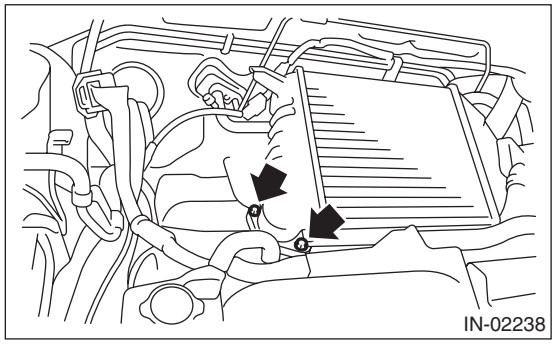
6. Intercooler

A: REMOVAL

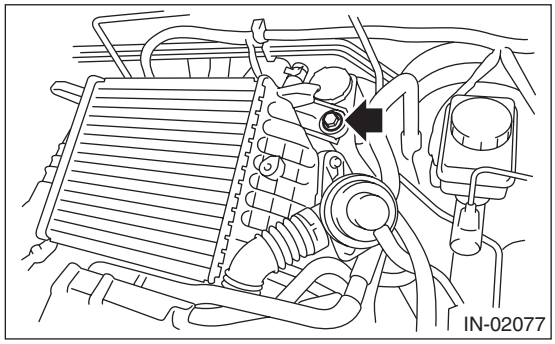
1) Loosen the clamp and remove the air by-pass pipe (A) and vacuum hose (B) from the air by-pass valve.
2) Loosen the clamp, and then remove intake duct (C) from the intercooler.



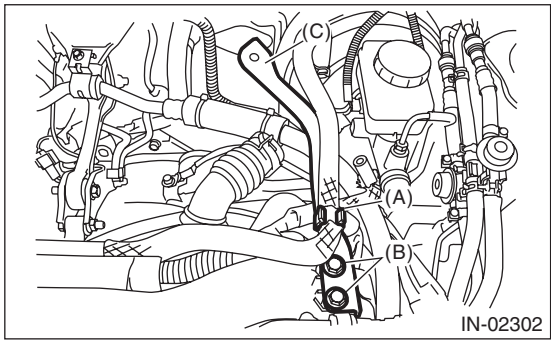
3) Remove the bolts which secure the intercooler to the turbocharger.



4) Remove the bolts which secure the intercooler to the intercooler stay, and remove the intercooler.



5) Remove the brake booster vacuum hose from the brake booster vacuum hose clip (A), and remove bolts (B), then remove the intercoolers stay (C).

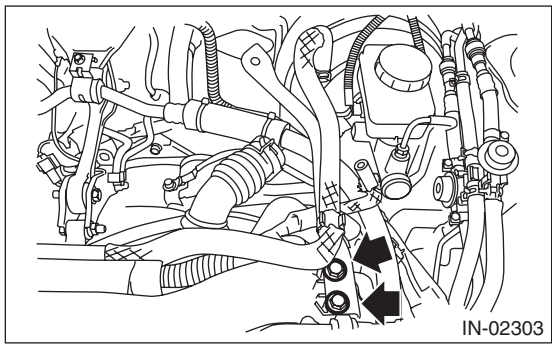


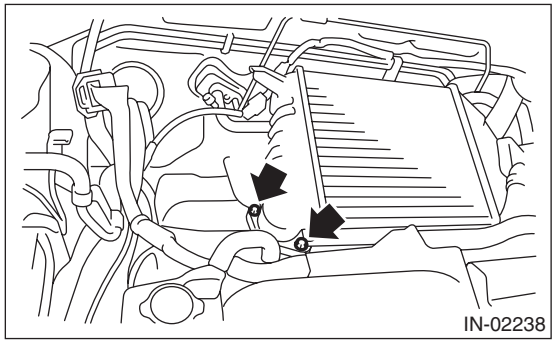
B: INSTALLATION

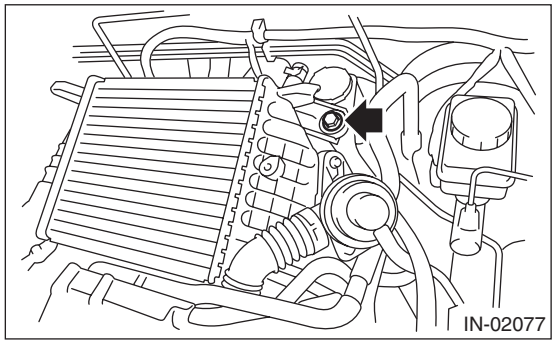
Install in the reverse order of removal.

NOTE:
- Use new O-rings.
- Be careful not to pinch the O-ring.

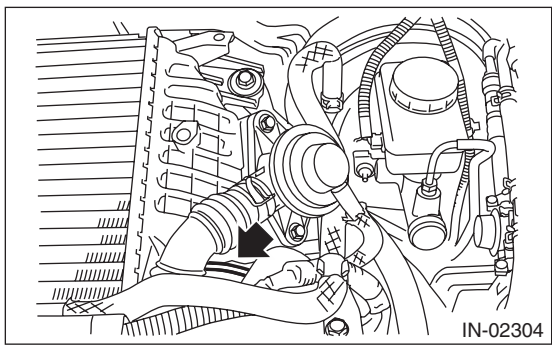
Tightening torque:
16 N·m (1.6 kgf-m, 11.8 ft-lb)


IN-02303


IN-02238

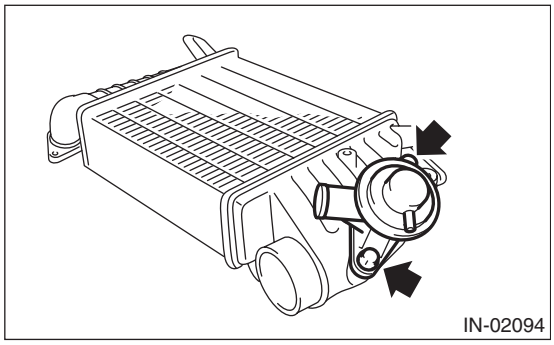

IN-02077

Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)


IN-02304

C: DISASSEMBLY

1) Remove the air by-pass valve from intercooler.

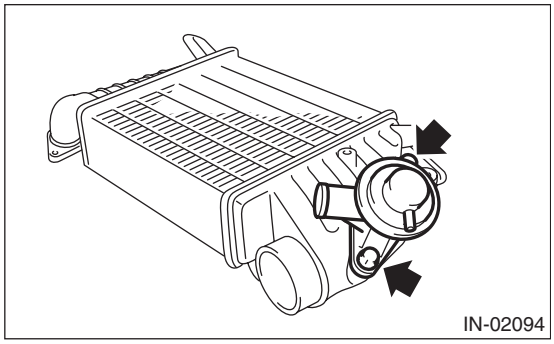

IN-02094

D: ASSEMBLY

Assemble in the reverse order of disassembly.

NOTE:
- Use new O-rings.
- Be careful not to pinch the O-ring.

Tightening torque:
6.5 N·m (0.66 kgf-m, 4.8 ft-lb)


IN-02094

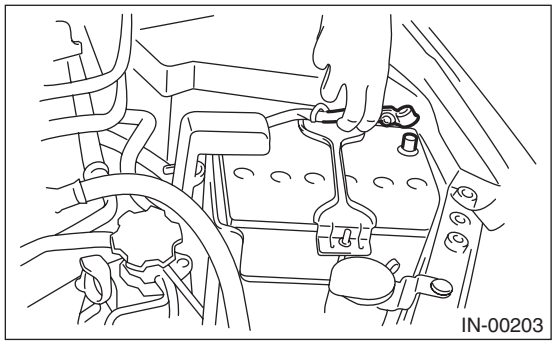
E: INSPECTION

Check for cracks or loose connections.

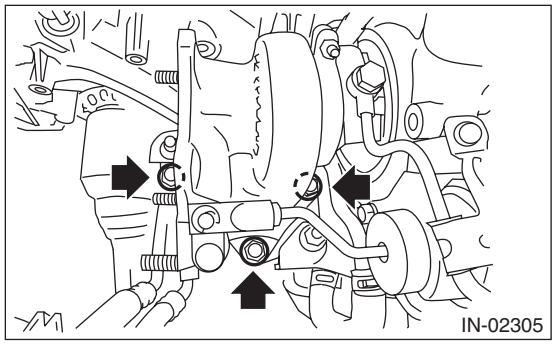
7. Turbocharger

A: REMOVAL

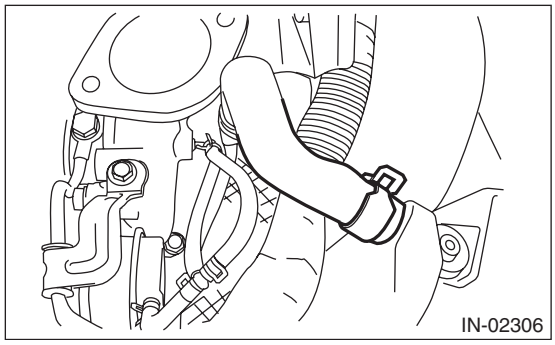
1) Set the vehicle on a lift.
2) Disconnect the ground cable from the battery.


IN-00203

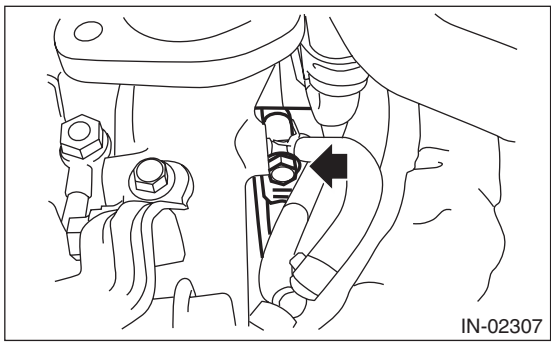
3) Lift up the vehicle.
4) Drain engine coolant. <Ref. to CO(H4DOTC)-13, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
5) Lower the vehicle.
6) Remove the intercooler. <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
7) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
8) Lower the vehicle.
9) Separate the turbocharger joint pipe from turbocharger.


IN-02305

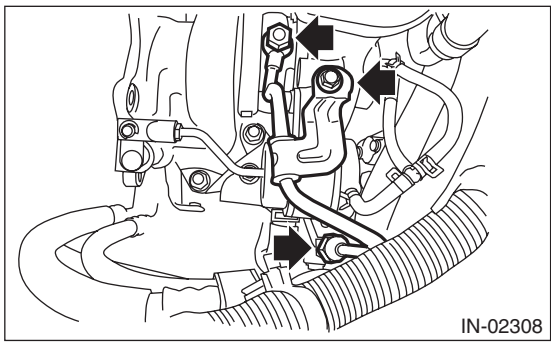
10) Disconnect the engine coolant hose which is connected to coolant filler tank.


IN-02306

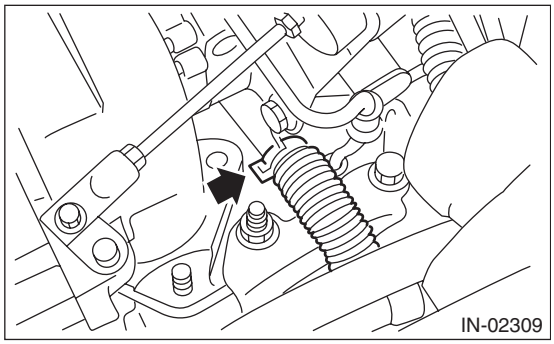
11) Loosen the clamp which secures turbocharger to intake duct.


IN-02307

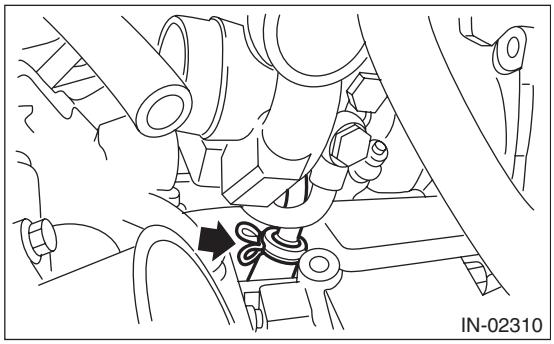
12) Remove the oil inlet pipe from the turbocharger.


IN-02308

13) Disconnect the engine coolant hose from the water pipe.


IN-02309

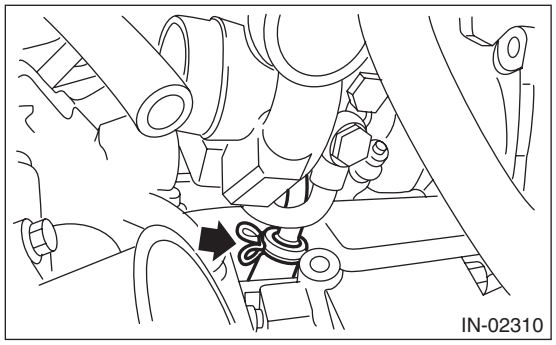
14) Disconnect the oil outlet hose from the oil outlet pipe.


IN-02310

15) Take out the turbocharger from engine compartment.

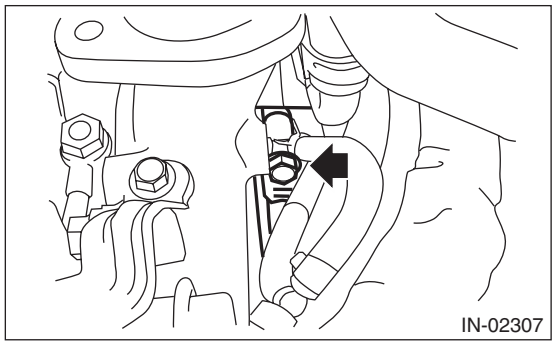
B: INSTALLATION

1) Connect the oil outlet hose to the oil outlet pipe.



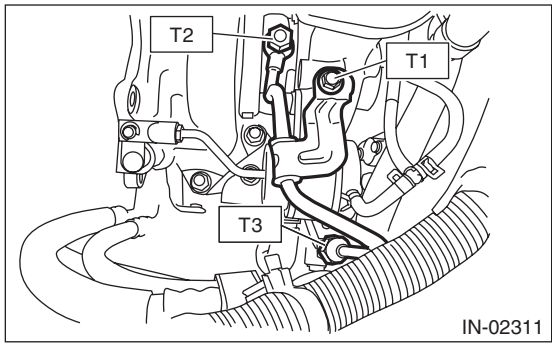
2) Install the turbocharger to intake duct.

Tightening torque:
3 N·m (0.3 kgf-m, 2.2 ft-lb)

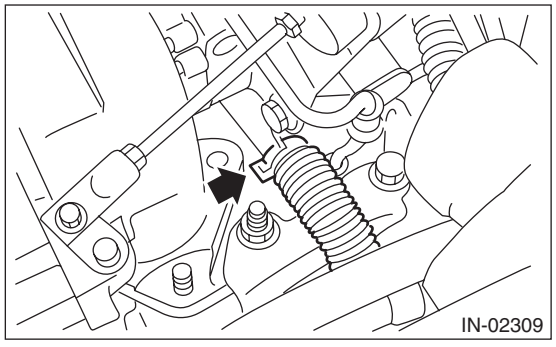


3) Install the oil inlet pipe to the turbocharger.

Tightening torque:
T1: 5 N·m (0.5 kgf-m, 3.7 ft-lb)
T2: 16 N·m (1.6 kgf-m, 11.8 ft-lb)
T3: 20 N·m (2.0 kgf-m, 14.5 ft-lb)



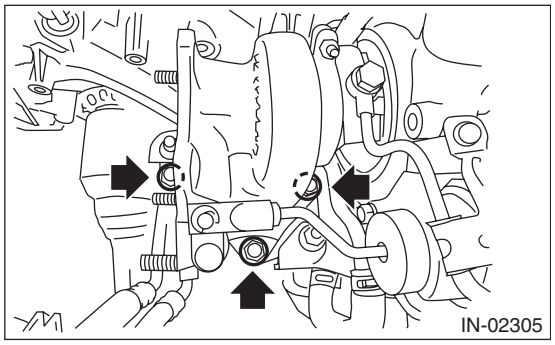
4) Connect the engine coolant hoses to the water pipe.



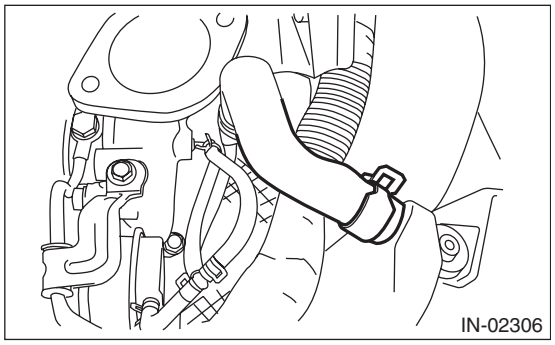
5) Install the joint pipe to turbocharger.

NOTE:
Replace the gasket with a new part.

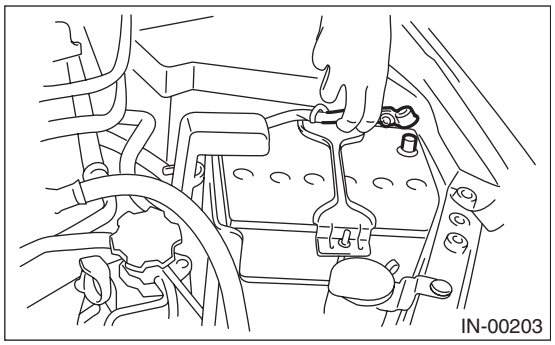
Tightening torque:
35 N·m (3.6 kgf-m, 25.8 ft-lb)



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



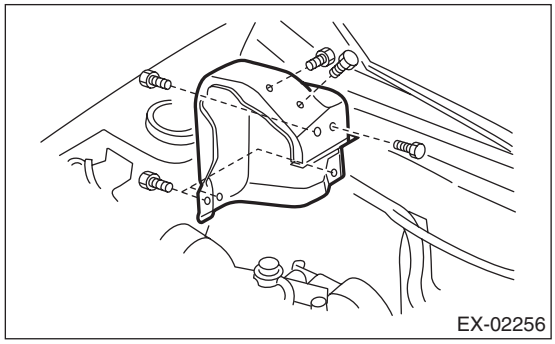
7) Lift up the vehicle.
8) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
9) Lower the vehicle.
10) Install the intercooler. <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
11) Fill engine coolant. <Ref. to CO(H4DOTC)-13, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
12) Connect the ground cable to battery.



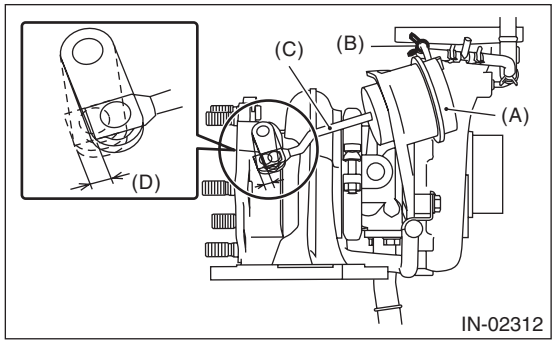
C: INSPECTION

1. WASTE GATE ACTUATOR

1) Remove the intercooler. <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
2) Remove the turbocharger upper cover.



3) Remove the boost hose (B) from the waste gate actuator (A) of the turbo charger, and connect the Mighty Vac to the waste gate actuator (A).



(A) Waste gate actuator
(B) Boost hose
(C) Control rod
(D) Control rod stroke

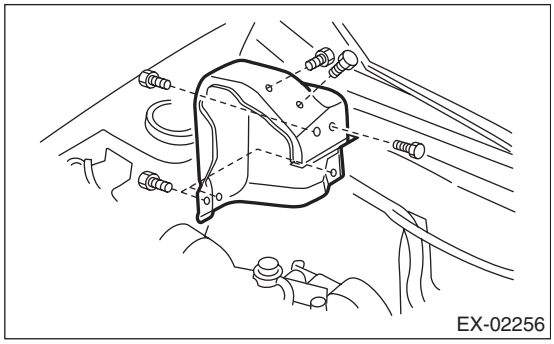
4) Pressurize slowly with the Mighty Vac, and measure the pressure when the control rod stroke (D) becomes 2 mm (0.08 in). If it is not within the standard, replace the turbocharger assembly.

CAUTION:
Do not pressurize over 89.8 kPa (0.92 kgf/cm^2, 13.0 psi) to prevent damaging the waste gate actuator.

Control pressure (Control rod stroke 2 mm (0.08 in)):
Standard value
74.6 — 80.8 kPa (0.76 — 0.82 kgf/cm^2, 10.8 — 11.7 psi)

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

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



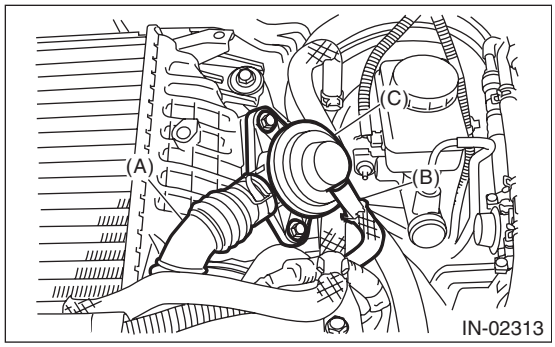
2. OIL PIPE AND WATER PIPE

- Check that there are no oil leaks or water leaks from the pipe attachment section.
- Check for cracks or loose connections.

8. Air By-pass Valve

A: REMOVAL

1) Disconnect the air by-pass valve (A) and vacuum hose (B) from the air by-pass valve (C).
2) Remove the air by-pass valve (C) from the intercooler.

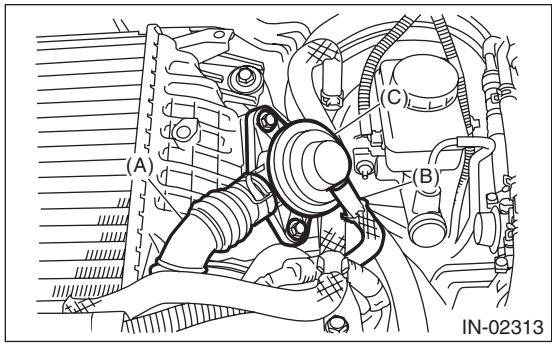


B: INSTALLATION

Install in the reverse order of removal.

NOTE:
- Use new O-rings.
- Be careful not to pinch the O-ring.

Tightening torque:
6.5 N·m (0.66 kgf-m, 4.8 ft-lb)



(A) Air by-pass pipe
(B) Vacuum hose
(C) Air by-pass valve