

ENGINE SECTION 2

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.

FUEL INJECTION (FUEL SYSTEM) FU(H4DOTC)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE) EC(H4DOTC)

INTAKE (INDUCTION) IN(H4DOTC)

MECHANICAL ME(H4DOTC)

EXHAUST EX(H4DOTC)

COOLING CO(H4DOTC)

LUBRICATION LU(H4DOTC)

SPEED CONTROL SYSTEM SP(H4DOTC)

IGNITION IG(H4DOTC)

STARTING/CHARGING SYSTEM SC(H4DOTC)

ENGINE (DIAGNOSTIC) EN(H4DOTC)

INTAKE (INDUCTION)

IN(H4DOTC)

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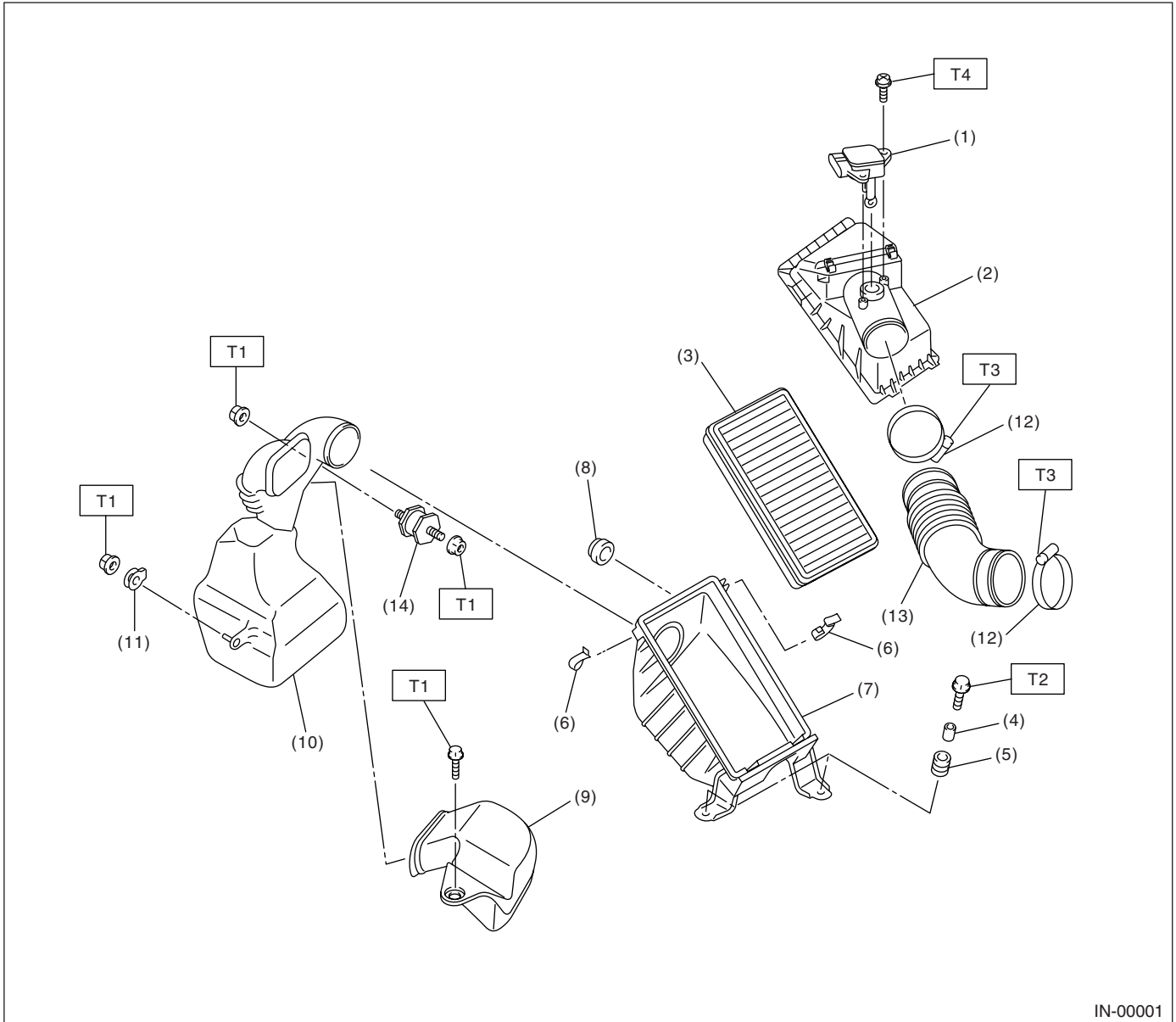
General Description

INTAKE (INDUCTION)

1. General Description

A: COMPONENT

1. AIR CLEANER



IN-00001

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

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

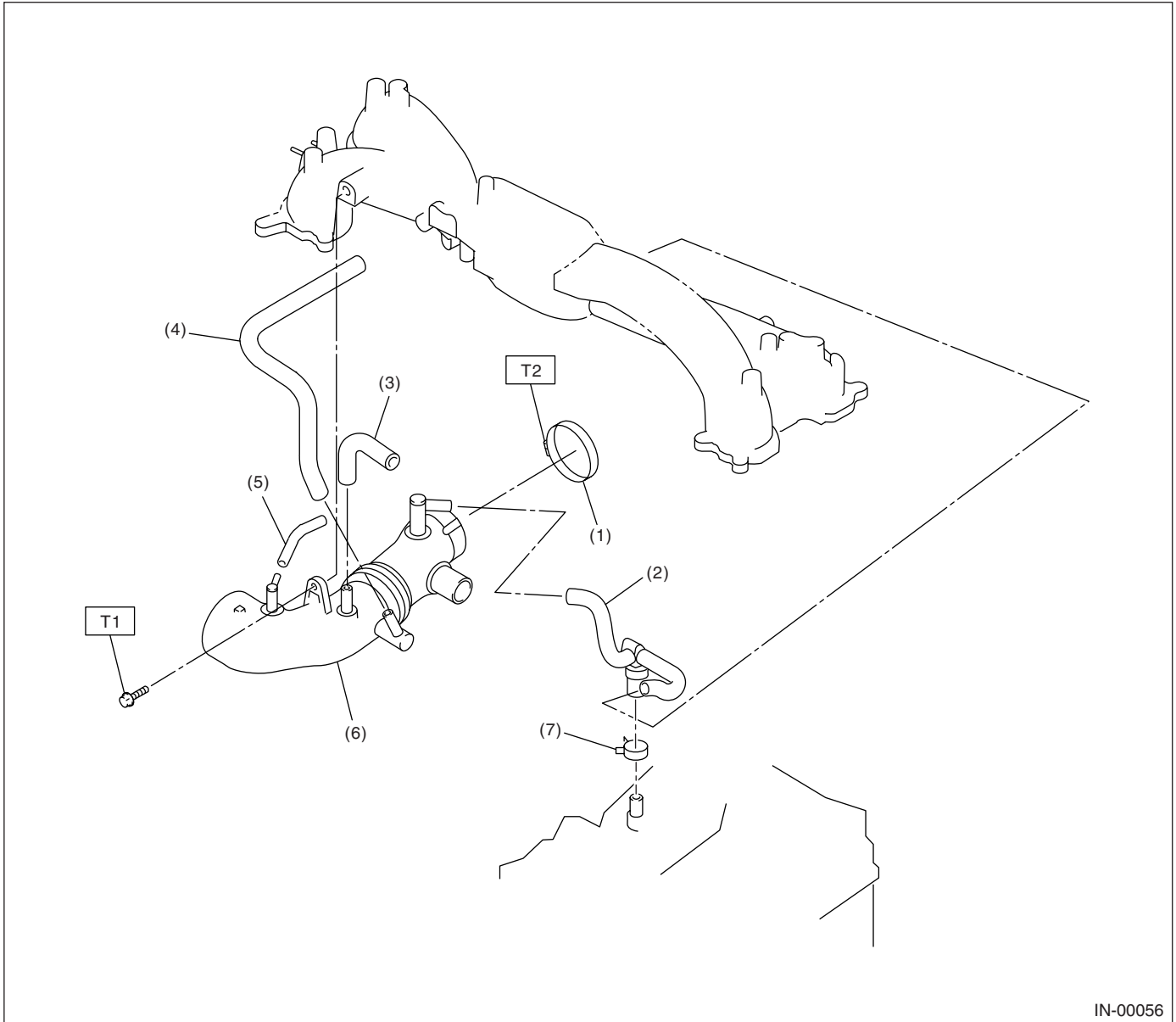
T1: 7.5 (0.76, 5.5)

T2: 33 (3.4, 24.6)

T3: 2.5 (0.25, 1.8)

T4: 1.7 (0.17, 1.2)

2. INTAKE DUCT



IN-00056

- | | |
|------------------------|------------------------|
| (1) Clamp | (5) Air by-pass hose C |
| (2) PCV hose ASSY | (6) Intake duct |
| (3) Air by-pass hose A | (7) Clamp |
| (4) Air by-pass hose B | |

Tightening torque: N·m (kgf·m, ft·lb)

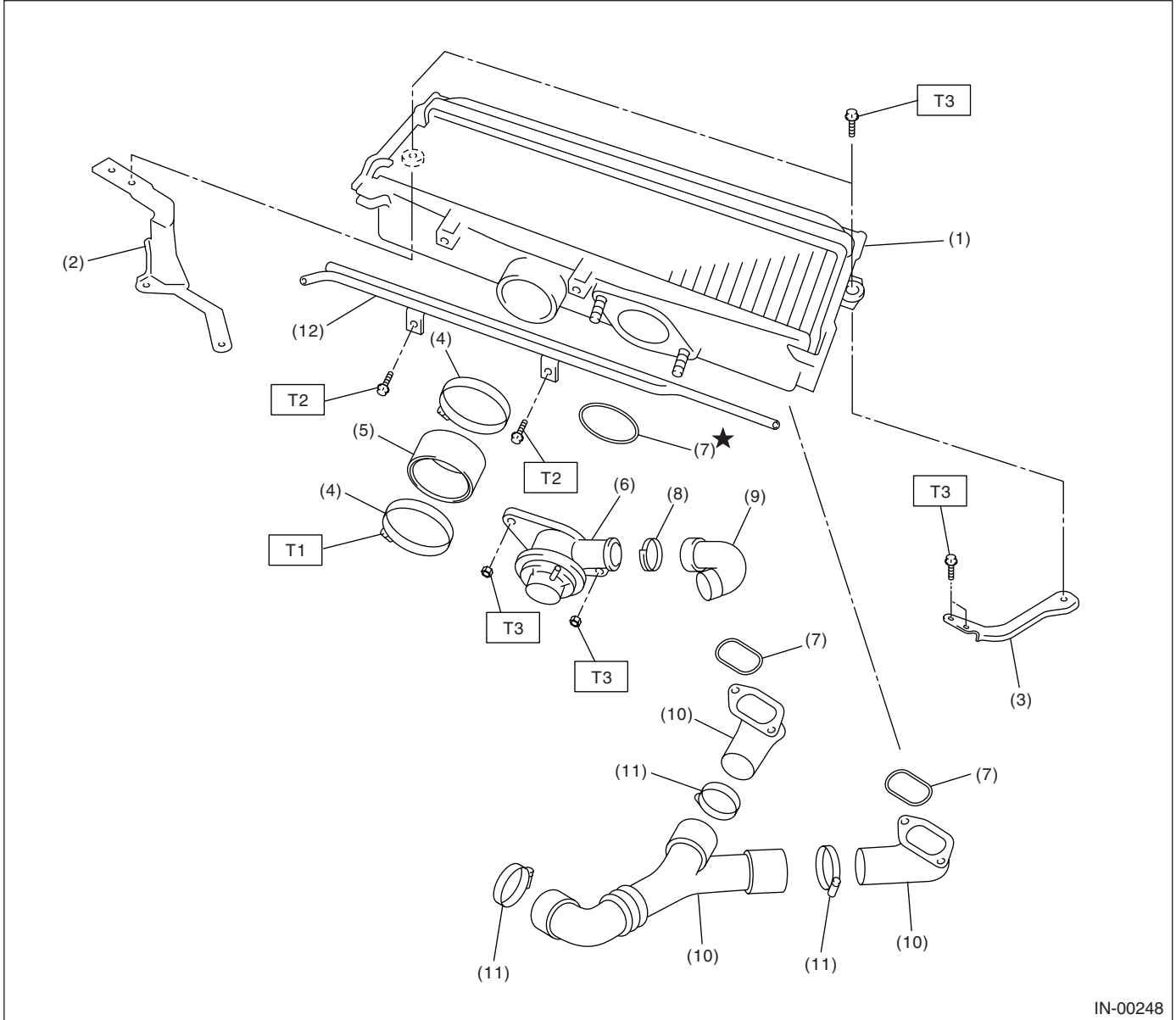
T1: 19 (1.9, 13.7)

T2: 3 (0.3, 2.2)

General Description

INTAKE (INDUCTION)

3. INTERCOOLER



IN-00248

- | | |
|----------------------------|------------------------|
| (1) Intercooler | (7) O-ring |
| (2) Intercooler bracket RH | (8) Clamp |
| (3) Intercooler bracket LH | (9) Air by-pass hose A |
| (4) Clamp | (10) Intercooler duct |
| (5) Air intake duct | (11) Clamp |
| (6) Air by-pass valve | (12) PCV pipe |

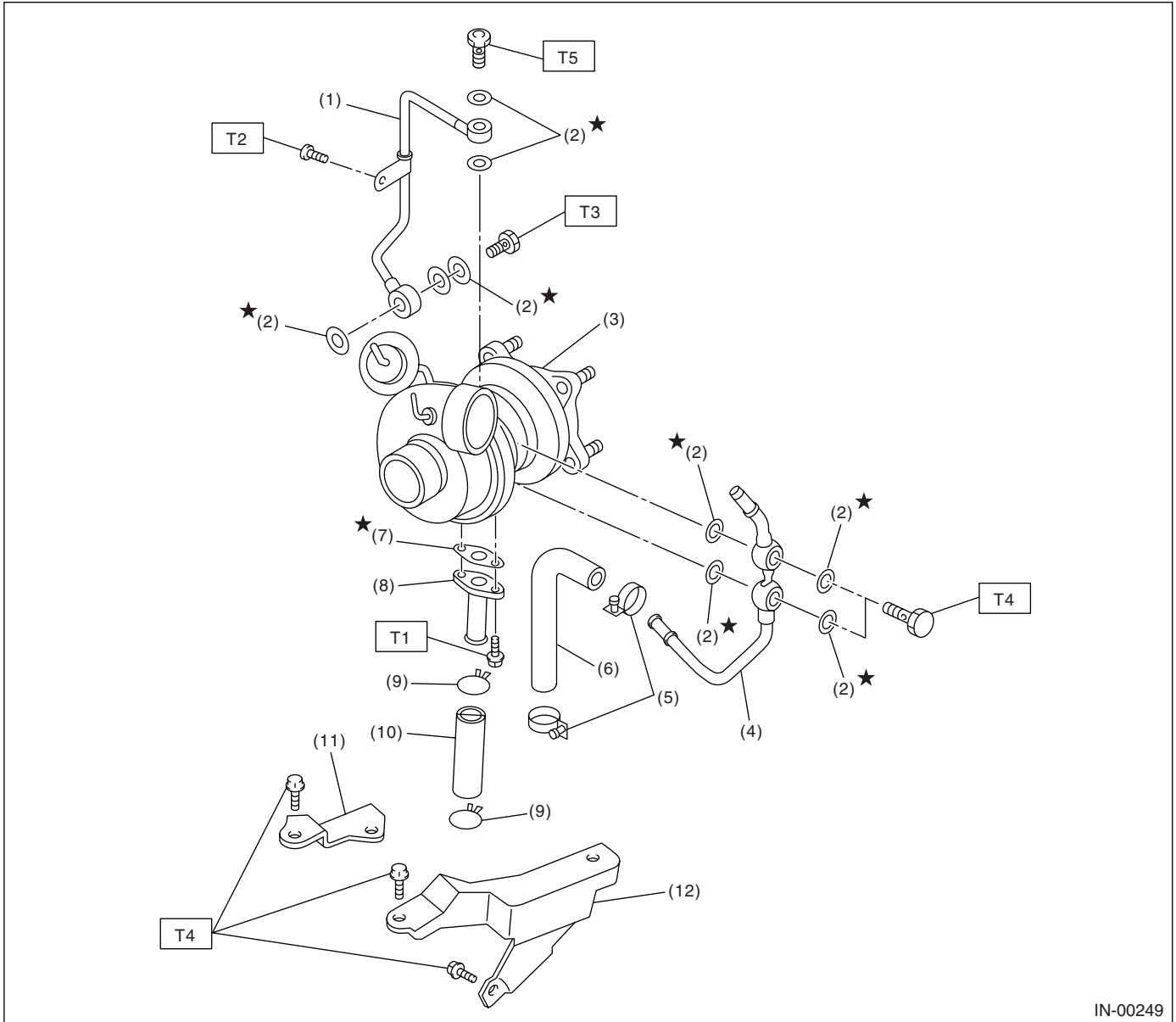
Tightening torque: N·m (kgf·m, ft·lb)

T1: 3 (0.3, 2.2)

T2: 6.1 (0.62, 4.5)

T3: 16 (1.6, 11.6)

4. TURBOCHARGER



IN-00249

- | | |
|-------------------------|------------------------------|
| (1) Oil inlet pipe | (7) Gasket |
| (2) Metal gasket | (8) Oil outlet pipe |
| (3) Turbocharger | (9) Clip |
| (4) Water pipe | (10) Oil outlet hose |
| (5) Clamp | (11) Turbocharger bracket RH |
| (6) Engine coolant hose | (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: 33 (3.4, 24.6)

T5: 16 (1.6, 11.6)

General Description

INTAKE (INDUCTION)

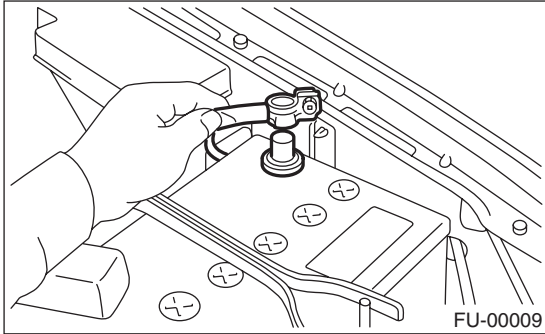
B: CAUTION

- 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 rigid racks at the specified points.
- Before disconnecting electrical connectors of sensor or units, be sure to disconnect the ground cable from battery.

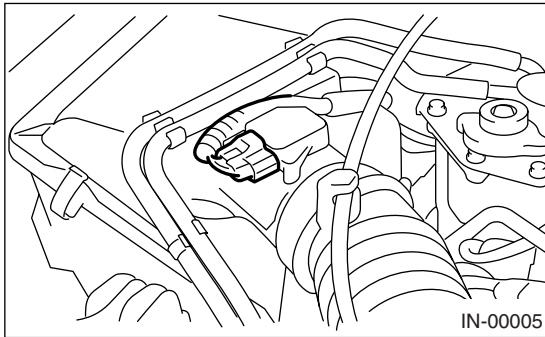
2. Air Cleaner

A: REMOVAL

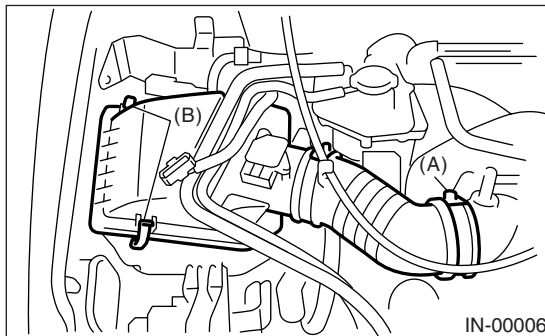
- 1) Disconnect the ground cable from battery.



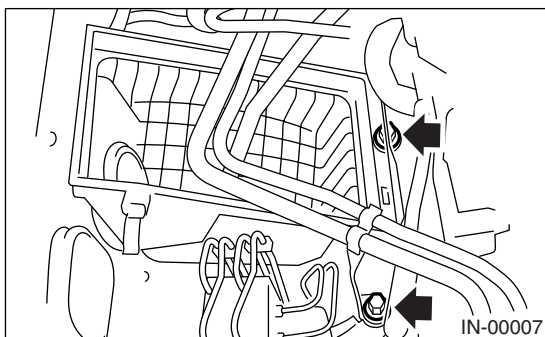
- 2) Disconnect the connector from mass air flow sensor.



- 3) Loosen the clamp (A) which connects air intake boot and intake duct.
- 4) Remove the clip (B) from air cleaner upper cover.



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

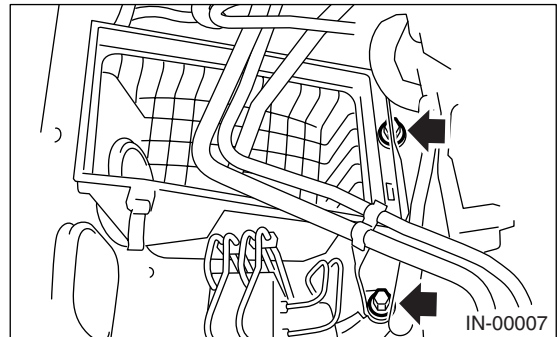


B: INSTALLATION

Install in the reverse order of removal.

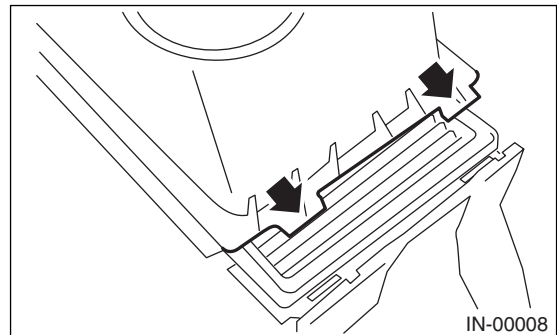
Tightening torque:

33 N·m (3.4 kgf-m, 24.6 ft-lb)



NOTE:

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



C: INSPECTION

Replace if excessively damaged or dirty.

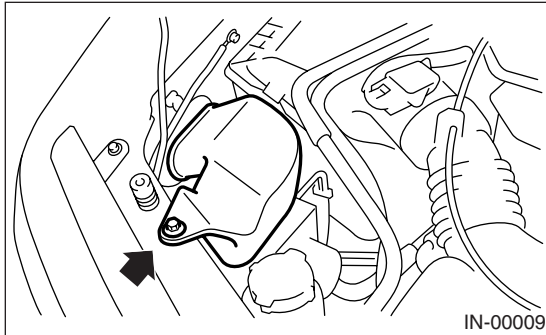
Air Intake Duct

INTAKE (INDUCTION)

3. Air Intake Duct

A: REMOVAL

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

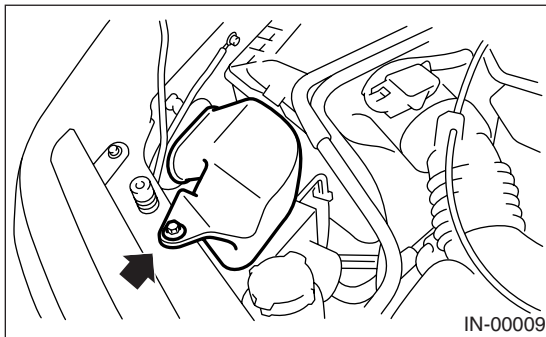


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

7.5 N·m (0.76 kgf-m, 55 ft-lb)



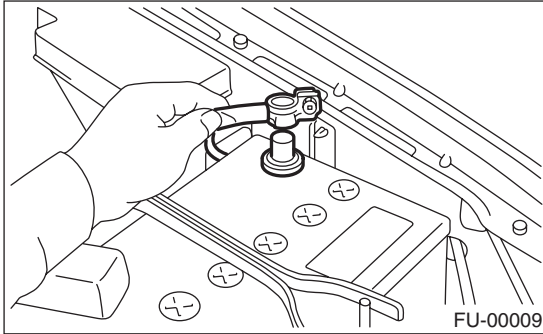
C: INSPECTION

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

4. Intake Duct

A: REMOVAL

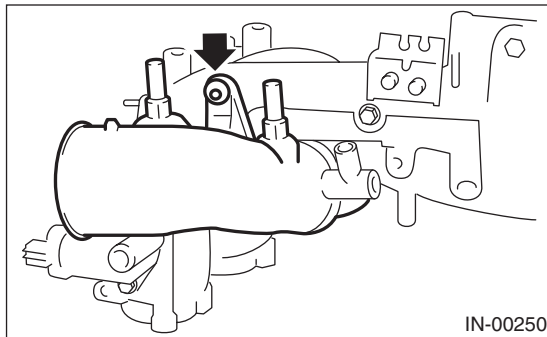
1) Disconnect the ground cable from battery.



2) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.> or <Ref. to FU(H4DOTC 2.5)-14, REMOVAL, Intake Manifold.>

3) Remove the sensor, engine harness, and fuel pipe attached to intake manifold. <Ref. to FU(H4DOTC)-21, DISASSEMBLY, Intake Manifold.> or <Ref. to FU(H4DOTC 2.5)-19, DISASSEMBLY, Intake Manifold.>

4) Remove the intake duct from intake manifold.

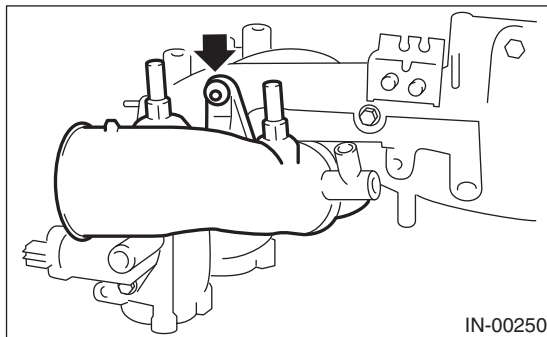


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

19 N·m (1.9 kgf·m, 13.7 ft·lb)



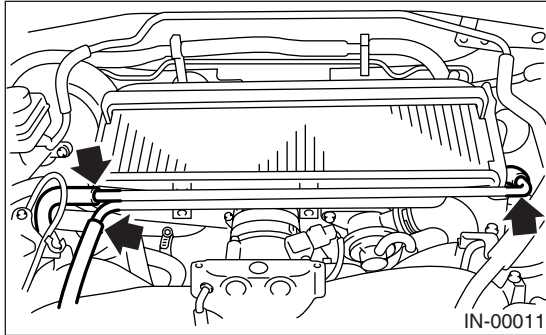
Intercooler

INTAKE (INDUCTION)

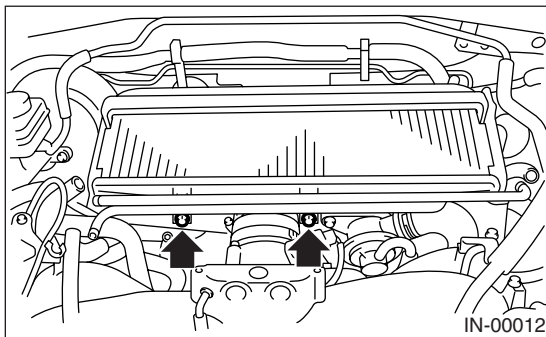
5. Intercooler

A: REMOVAL

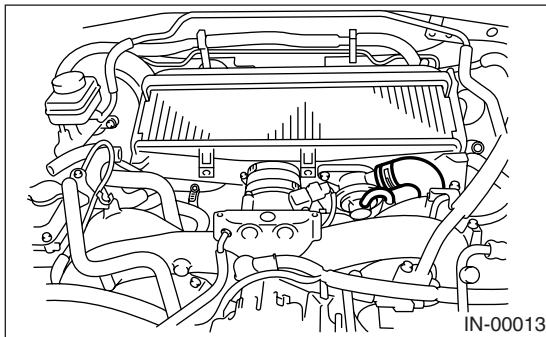
1) Disconnect the PCV hose from PCV pipe.



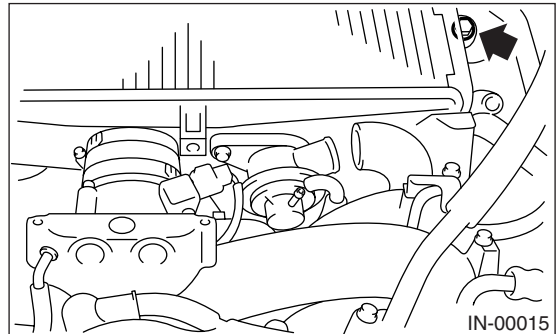
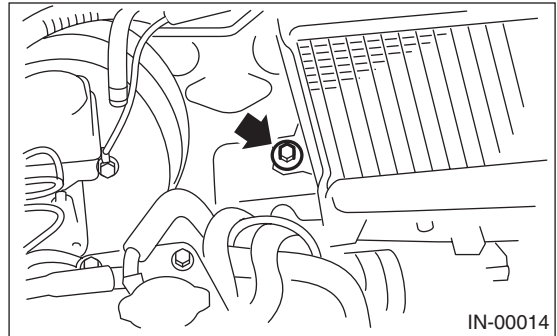
2) Remove the PCV pipe from intercooler.



3) Disconnect the hose from air by-pass valve.

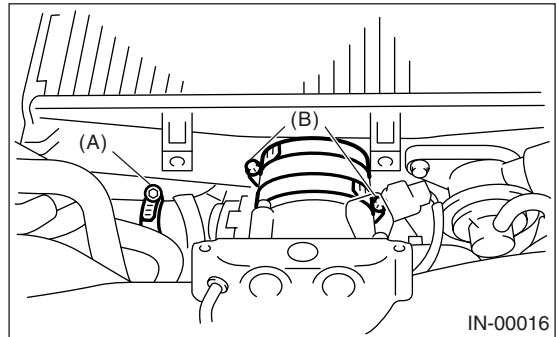


4) Remove the bolts which secure intercooler to bracket.



5) Loosen the clamp (A) which connects turbo-charger and intercooler duct.

6) Loosen the clamp (B) which connects throttle body and intercooler.



7) Disconnect the intercooler duct from turbocharg-
er.

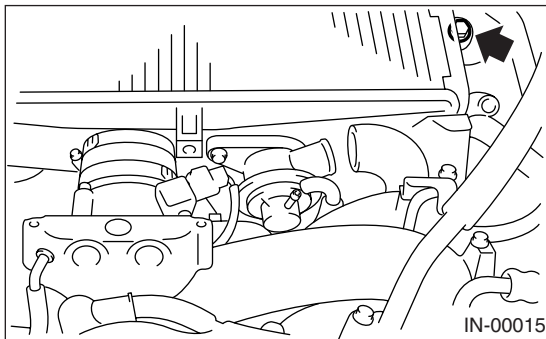
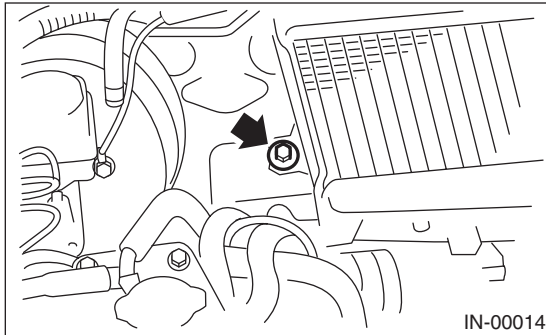
8) Remove the intercooler from throttle body.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

16 N·m (1.6 kgf·m, 11.6 ft·lb)

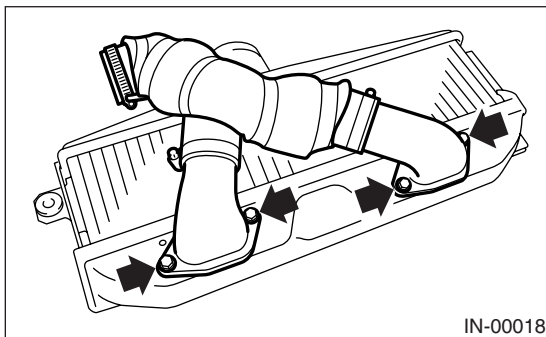


C: DISASSEMBLY

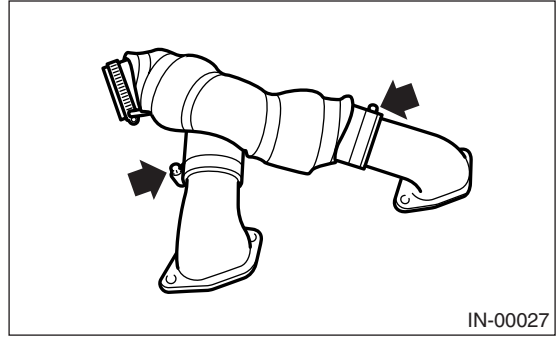
1) Remove the air by-pass valve from intercooler.



2) Remove the intercooler ducts from intercooler.



3) Separate the ducts.



D: ASSEMBLY

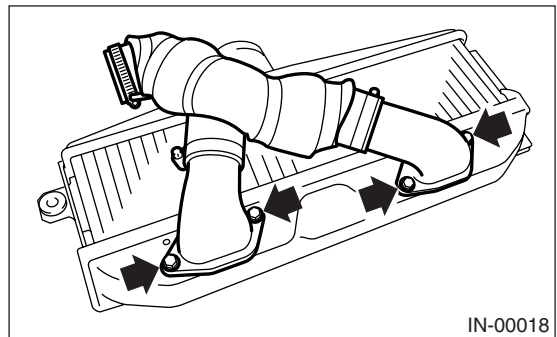
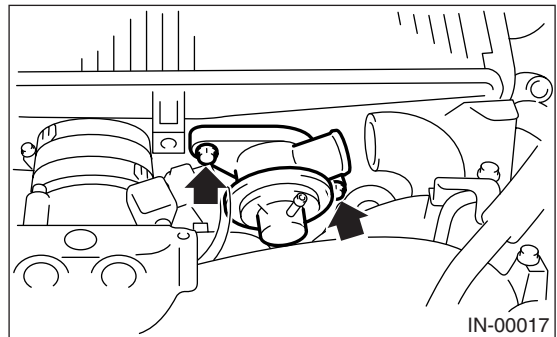
Assemble in the reverse order of disassembly.

NOTE:

Install the O-ring in proper position.

Tightening torque:

16 N·m (1.6 kgf·m, 11.6 ft·lb)



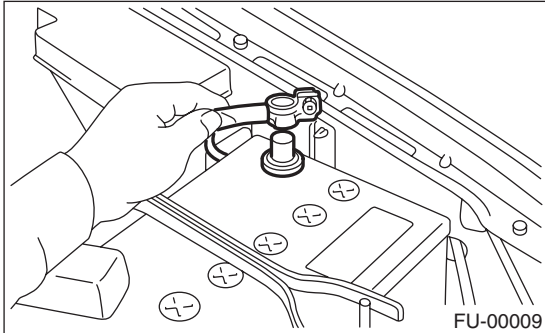
Turbocharger

INTAKE (INDUCTION)

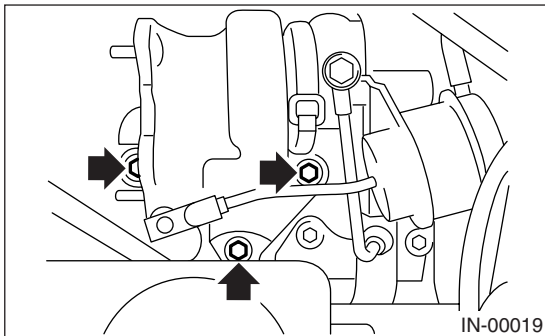
6. Turbocharger

A: REMOVAL

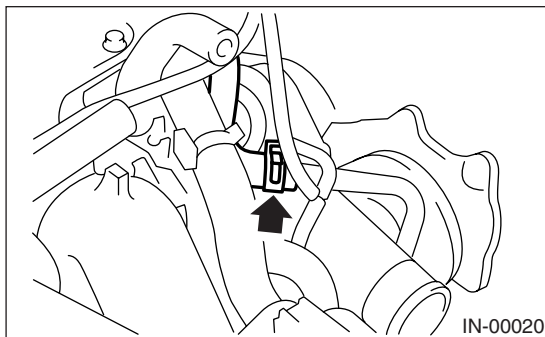
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



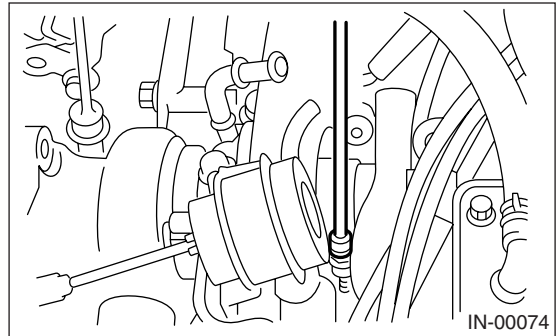
- 3) Remove the center exhaust pipe. <Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
- 4) Lower the vehicle.
- 5) Separate the turbocharger joint pipe from turbocharger.



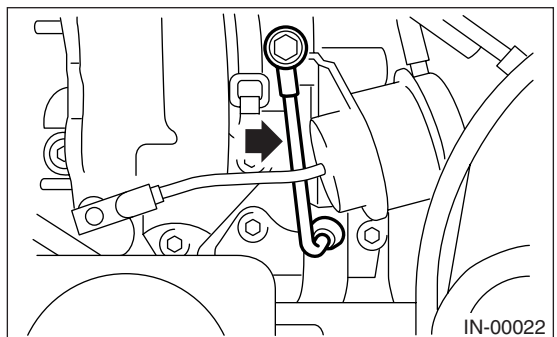
- 6) Disconnect the engine coolant hose which is connected to coolant filler tank.



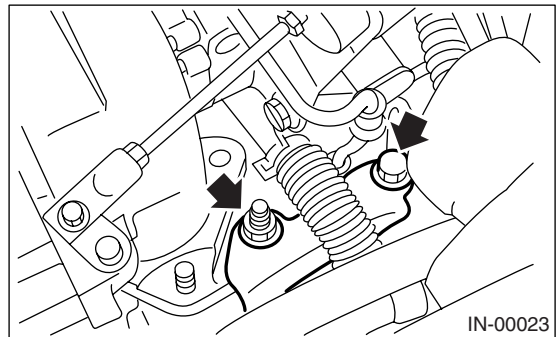
- 7) Loosen the clamp which secures turbocharger to intake duct.



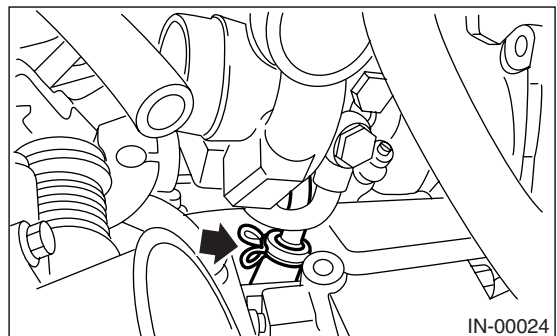
- 8) Remove the bolt which secures bracket of oil pipe to turbocharger.
- 9) Remove the oil pipe from turbocharger.



- 10) Remove the turbocharger bracket.



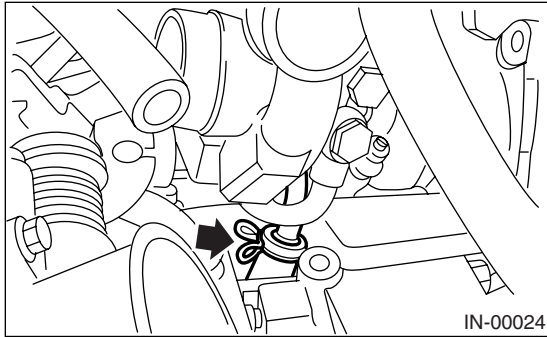
- 11) Disconnect the oil outlet hose from pipe.



- 12) Take out the turbocharger from engine compartment.

B: INSTALLATION

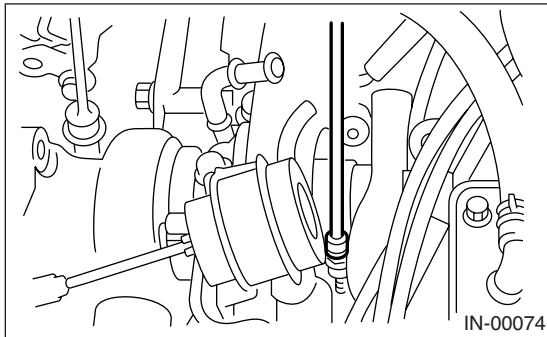
- 1) Connect the oil outlet hose to outlet pipe.



- 2) Install the turbocharger to intake duct.

Tightening torque:

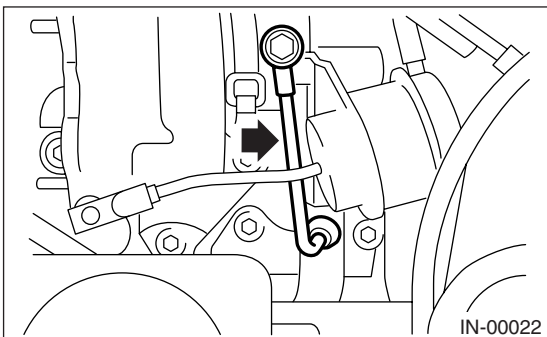
3 N·m (0.3 kgf·m, 2.2 ft·lb)



- 3) Install the oil pipe to turbocharger.

Tightening torque:

16 N·m (1.6 kgf·m, 11.6 ft·lb)



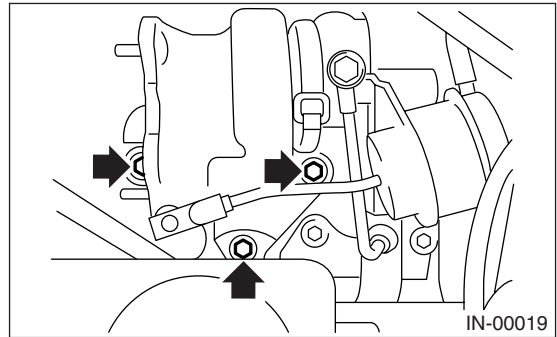
- 4) Install the joint pipe to turbocharger.

NOTE:

Replace the gasket with a new one.

Tightening torque:

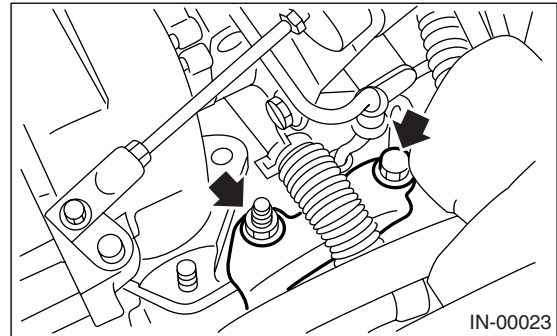
35 N·m (3.6 kgf·m, 26.0 ft·lb)



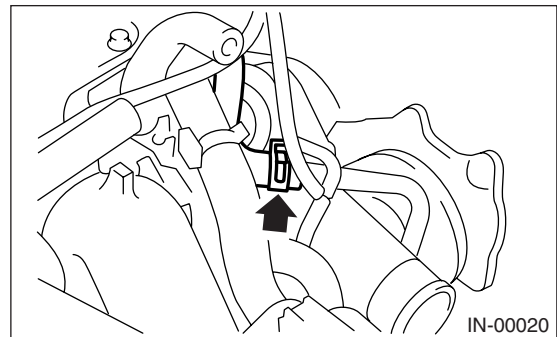
- 5) Install the turbocharger bracket.

Tightening torque:

33 N·m (3.4 kgf·m, 24.6 ft·lb)



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



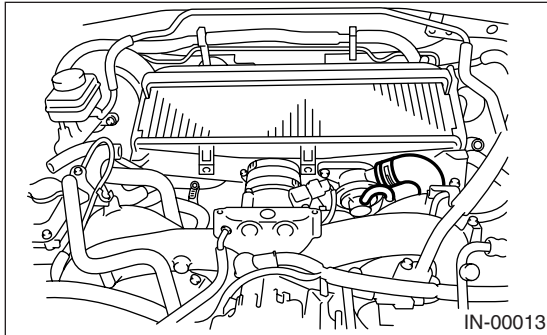
- 7) Lift-up the vehicle.

- 8) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>

7. Air By-pass Valve

A: REMOVAL

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



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



B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Install the O-ring in proper position.

Tightening torque:

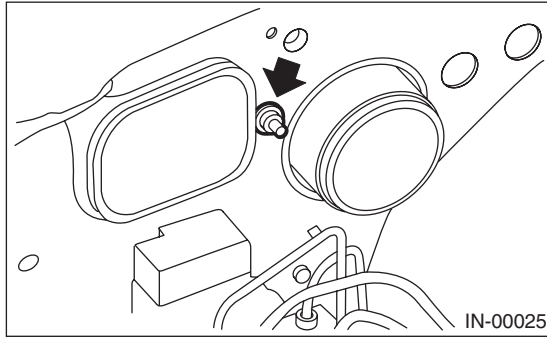
16 N·m (1.6 kgf·m, 11.6 ft·lb)



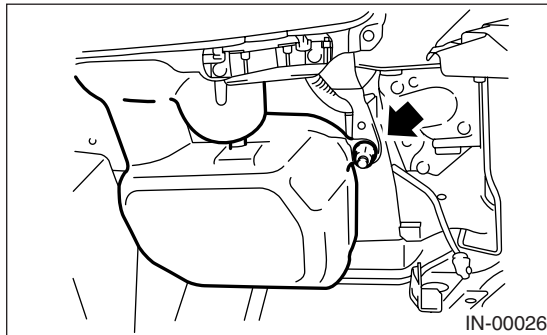
8. Resonator Chamber

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Remove the air intake duct. <Ref. to IN(H4DOTC)-8, REMOVAL, Air Intake Duct.>
- 3) Remove the air cleaner lower case. <Ref. to IN(H4DOTC)-7, REMOVAL, Air Cleaner.>
- 4) Remove the resonator chamber mounting bolt on the right of engine compartment.



- 5) Remove the front right tire, and lift the vehicle.
- 6) Remove the front mudguard RH.
- 7) Remove the resonator chamber from the inside front fender.

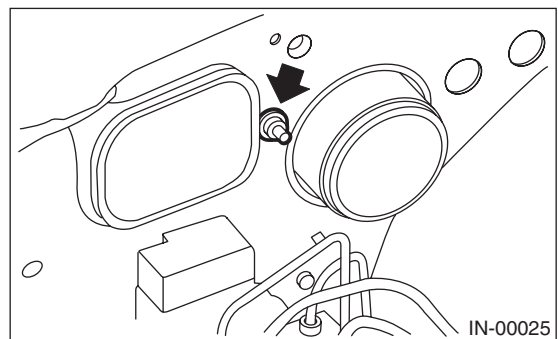
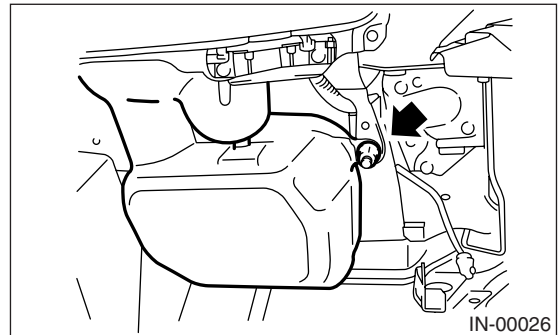


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



C: INSPECTION

Inspect for cracks and loose connections. Check that no foreign objects are mixed in the resonator chamber.

Resonator Chamber

INTAKE (INDUCTION)
