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# INTAKE (INDUCTION)

# General Description

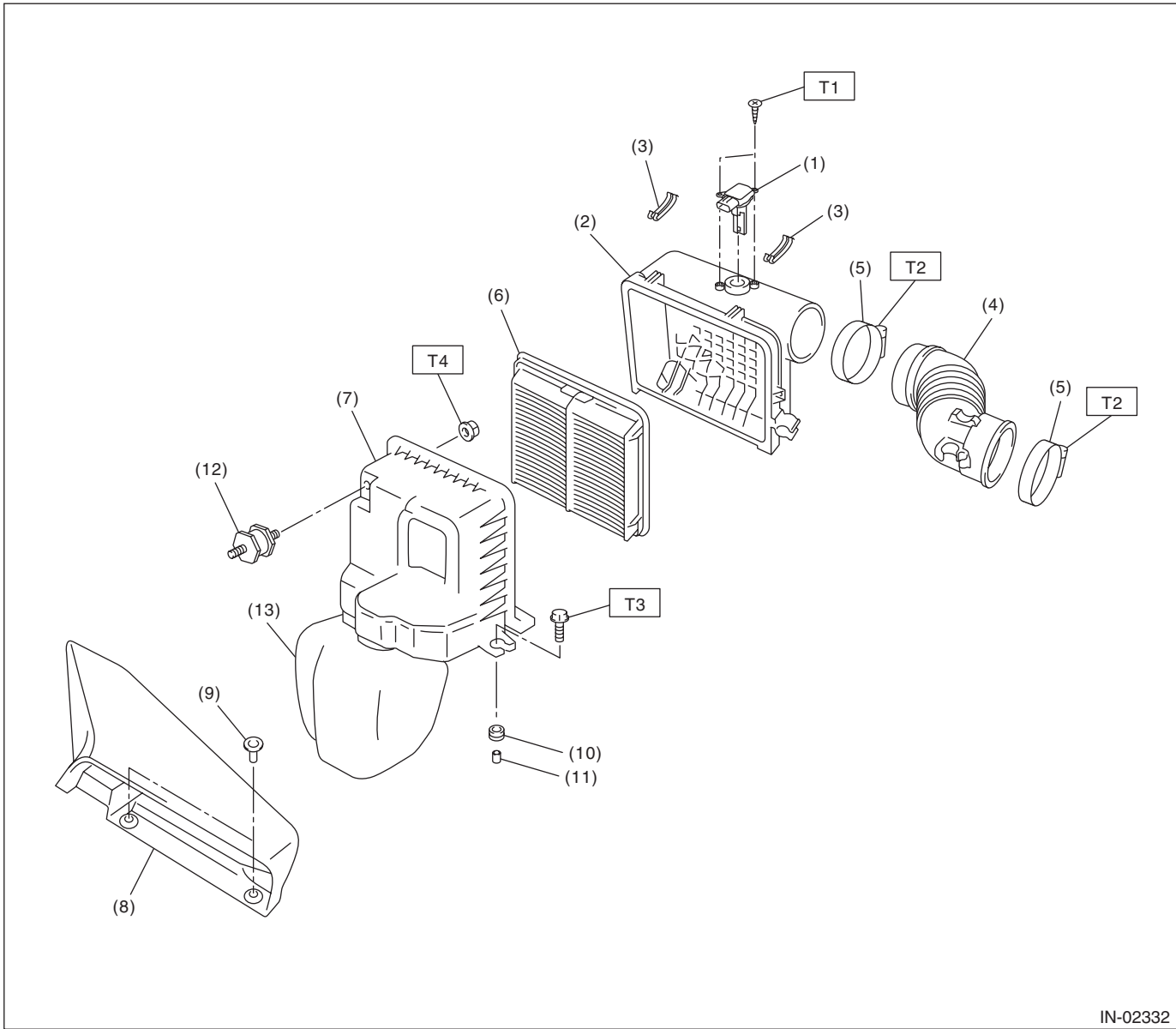
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INTAKE (INDUCTION)

## 1. General Description

### A: COMPONENT

#### 1. AIR CLEANER



IN-02332

- |   |                              |
|---|------------------------------|
| (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                 |
|   | (13) Resonator chamber       |

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

**T1: 1 (0.1, 0.7)**

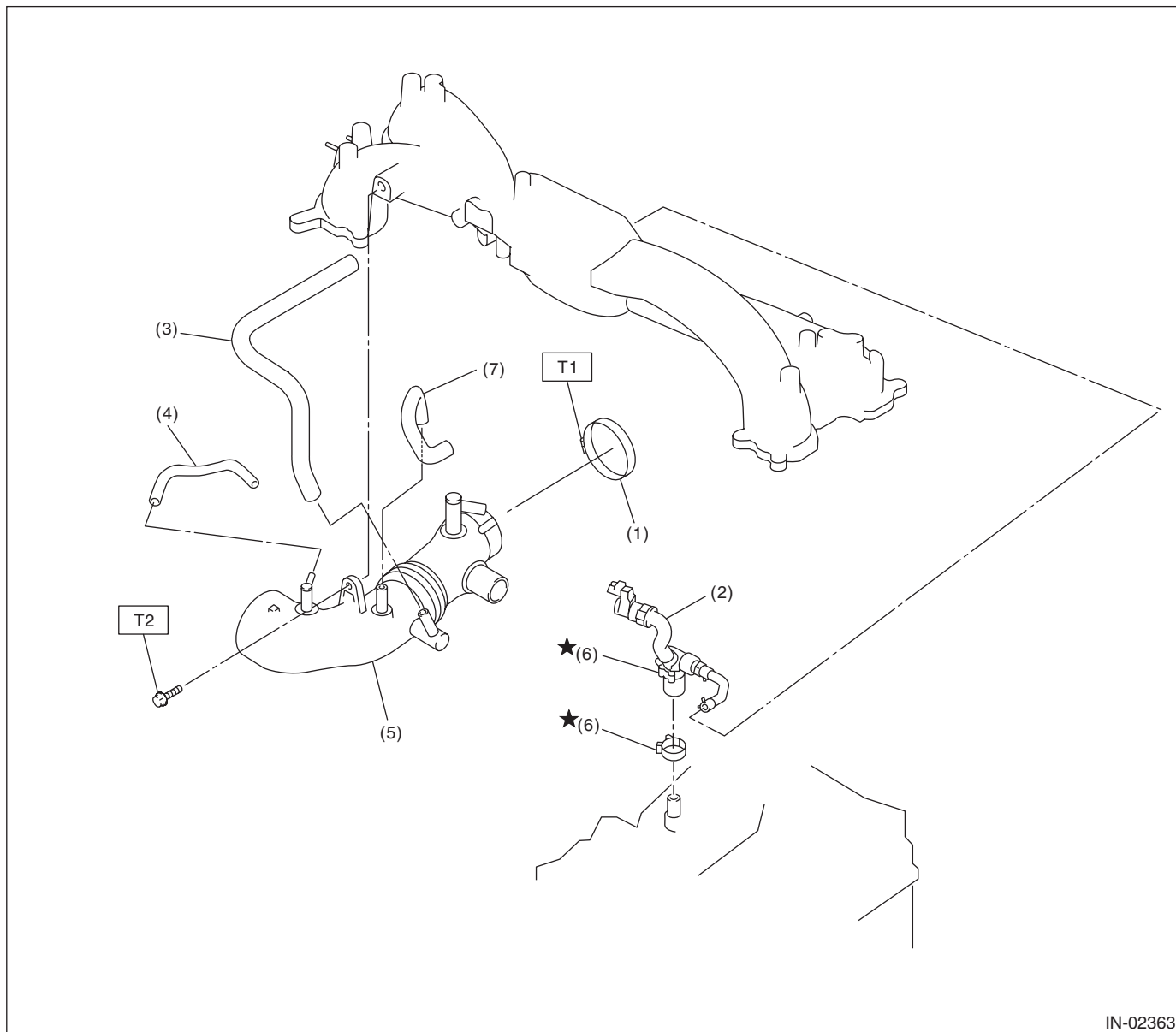
**T2: 2.5 (0.3, 1.8)**

**T3: 6 (0.6, 4.4)**

**T4: 7.5 (0.8, 5.5)**

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## 2. INTAKE DUCT



IN-02363

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

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

**T1: 3 (0.3, 2.2)**

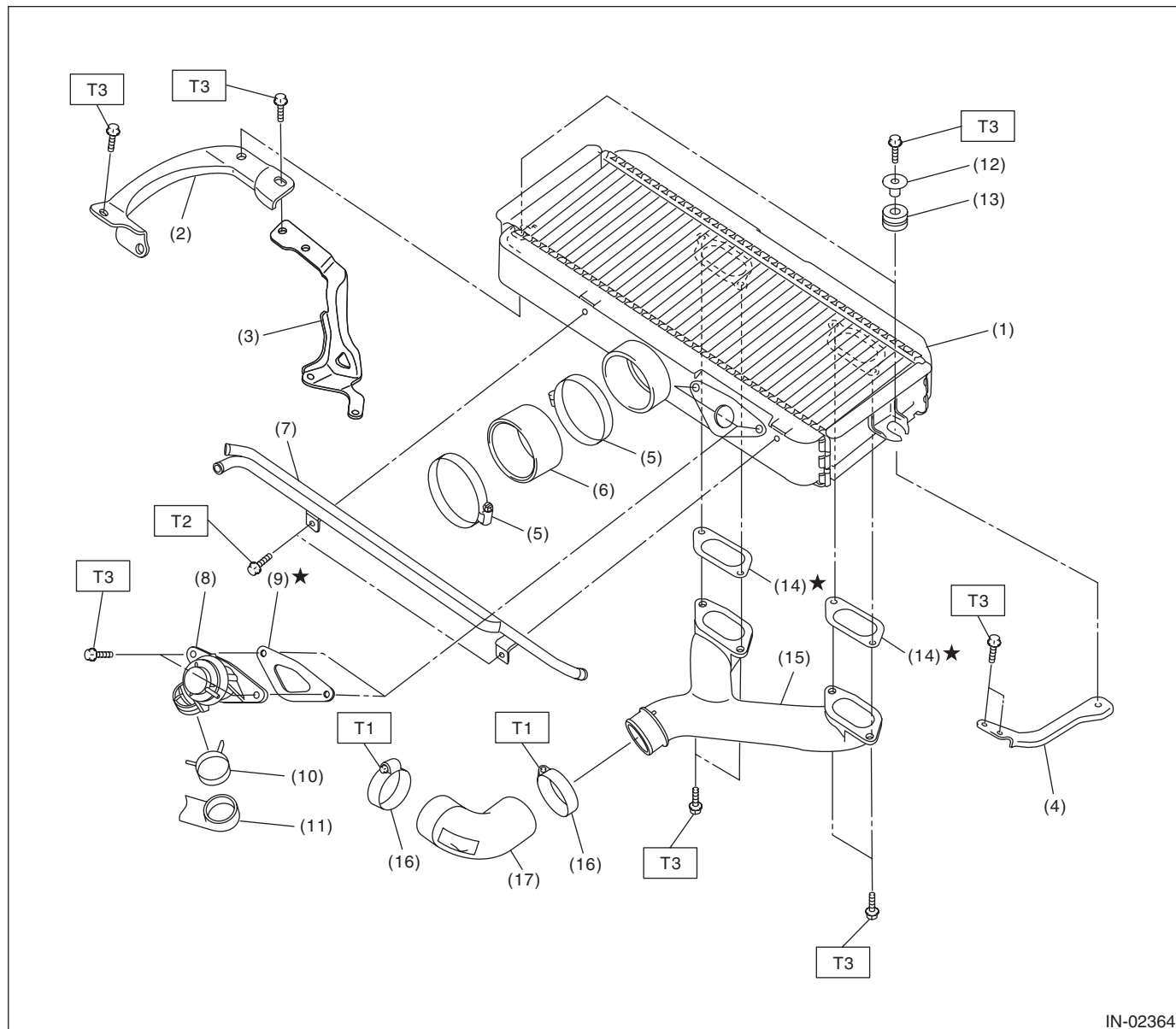
**T2: 19 (1.9, 14.0)**

# General Description

INTAKE (INDUCTION)

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## 3. INTERCOOLER



IN-02364

- |                        |                       |                      |
|------------------------|-----------------------|----------------------|
| (1) Intercooler        | (9) Gasket            | (16) Clamp           |
| (2) Intercooler stay A | (10) Clip             | (17) Air intake duct |
| (3) Intercooler stay B | (11) Air by-pass hose |                      |
| (4) Intercooler stay C | (12) Spacer           |                      |
| (5) Clamp              | (13) Cushion          |                      |
| (6) Air duct hose      | (14) Gasket           |                      |
| (7) PCV pipe           | (15) Intercooler duct |                      |
| (8) Air by-pass valve  |                       |                      |

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

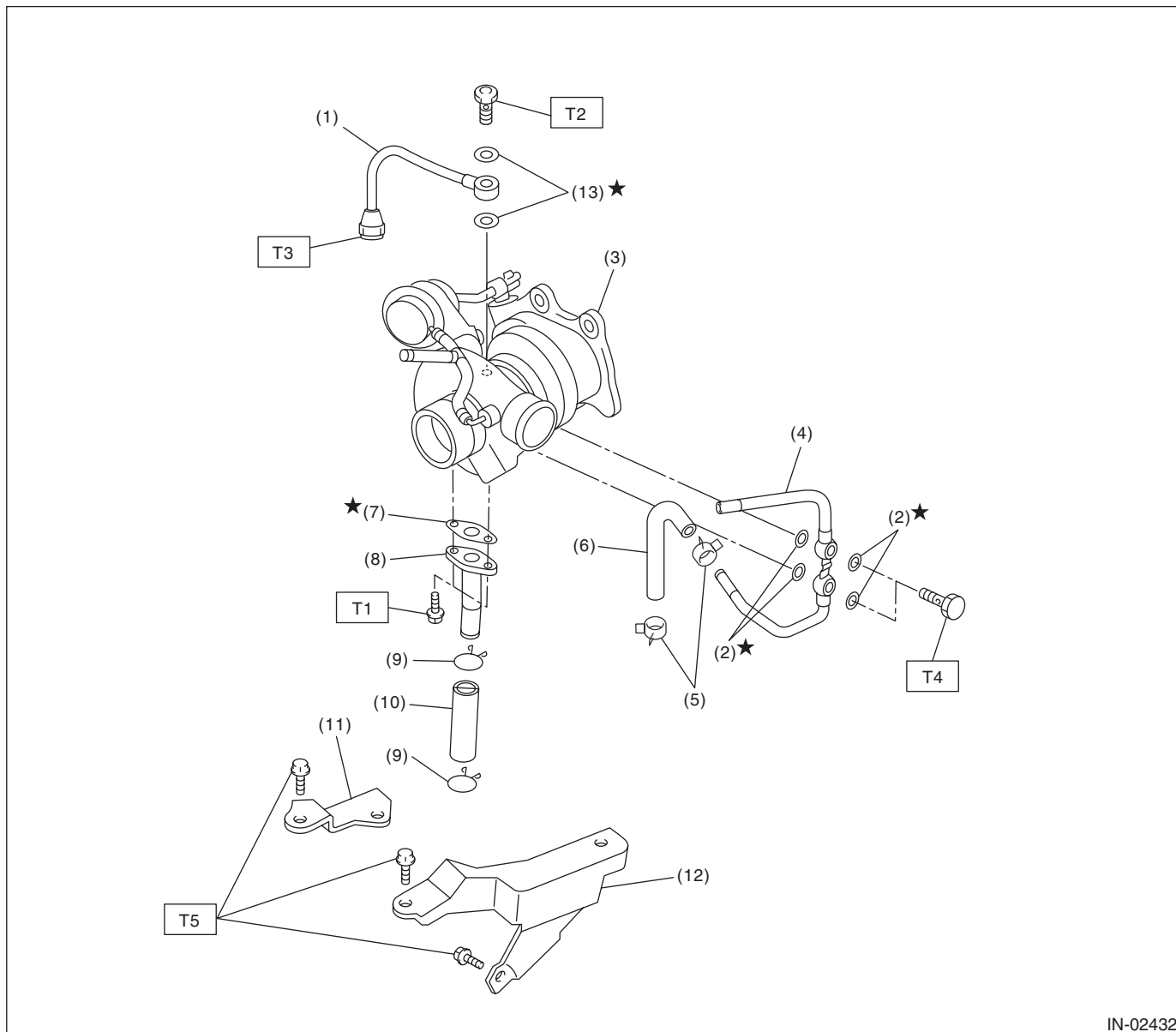
**T1: 3 (0.3, 2.2)**

**T2: 5.5 (0.6, 4.1)**

**T3: 16 (1.6, 11.8)**

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## 4. TURBOCHARGER



IN-02432

- |                         |                              |
|-------------------------|------------------------------|
| (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 | (13) Gasket                  |
| (7) Gasket              |                              |

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

- T1: 4.9 (0.5, 3.6)**  
**T2: 16 (1.6, 11.8)**  
**T3: 20 (2.0, 14.8)**  
**T4: 23 (2.3, 17.0)**  
**T5: 33 (3.4, 24.3)**

## B: PREPARATION TOOL

### 1. GENERAL TOOL

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

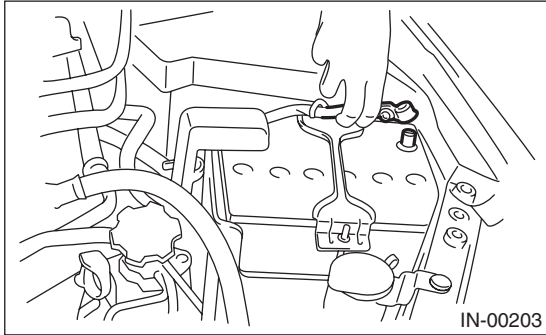
#### **C: CAUTION**

- 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.

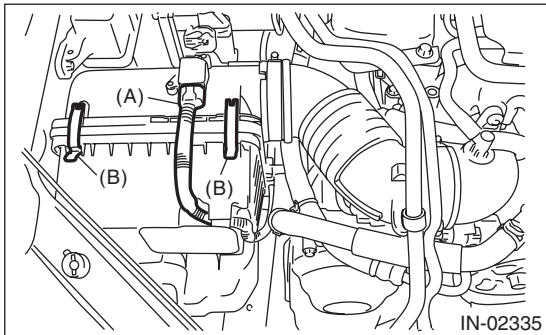
## 2. Air Cleaner Element

### A: REMOVAL

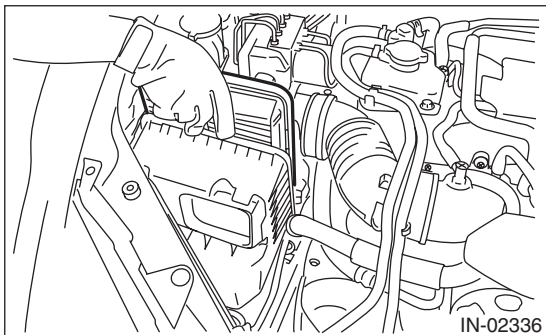
- 1) Disconnect the ground cable from the battery.



- 2) Remove the air intake duct. <Ref. to IN(STI)-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:

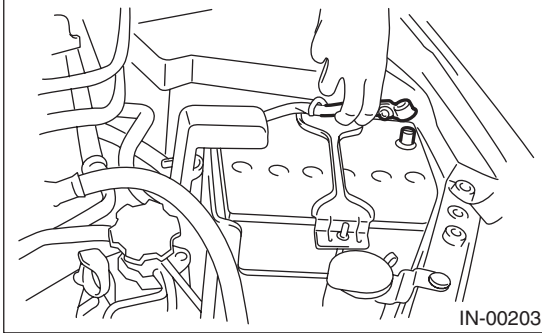
Check that there are no foreign objects in the air cleaner case.

## INTAKE (INDUCTION)

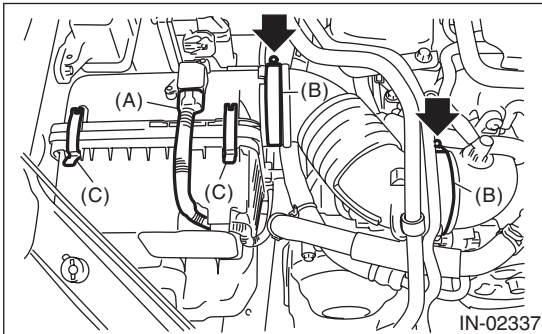
### 3. Air Cleaner Case

#### A: REMOVAL

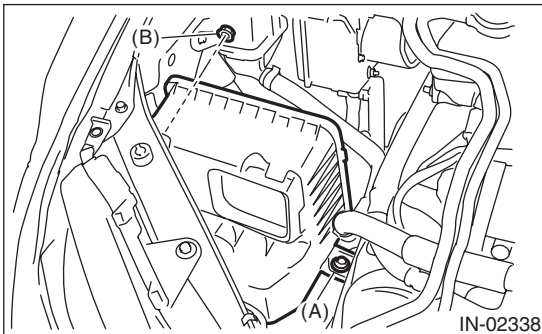
- 1) Disconnect the ground cable from the battery.



- 2) Remove the air intake duct. <Ref. to IN(STI)-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.



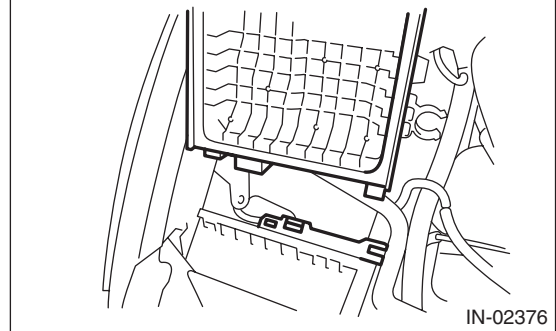
- 9) Remove the air cleaner case (front).

#### 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.



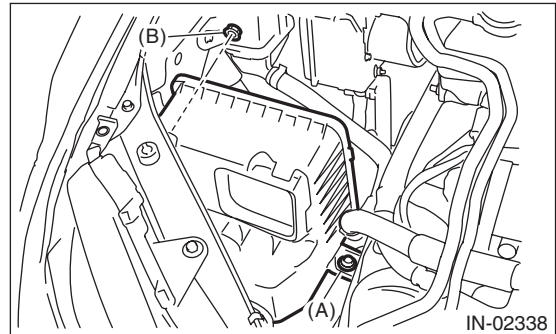
##### Tightening torque:

**Bolt (A)**

**6 N·m (0.6 kgf·m, 4.4 ft·lb)**

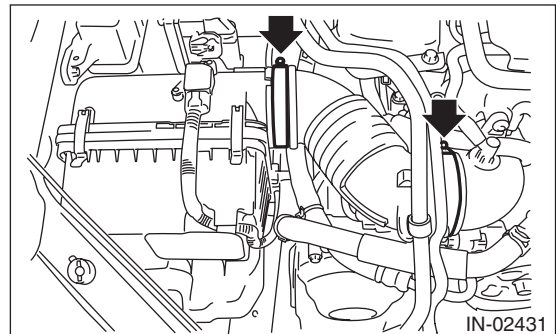
**Nut (B)**

**7.5 N·m (0.8 kgf·m, 5.5 ft·lb)**



##### Tightening torque:

**2.5 N·m (0.3 kgf·m, 1.8 ft·lb)**



#### C: INSPECTION

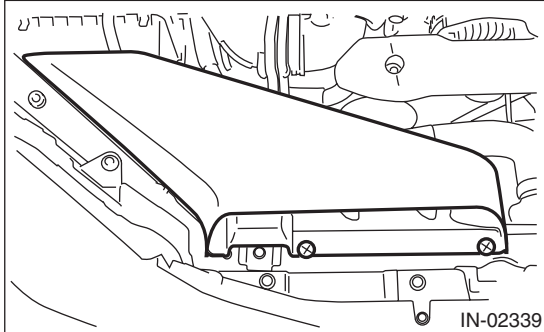
Check for cracks or loose connections.



## 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

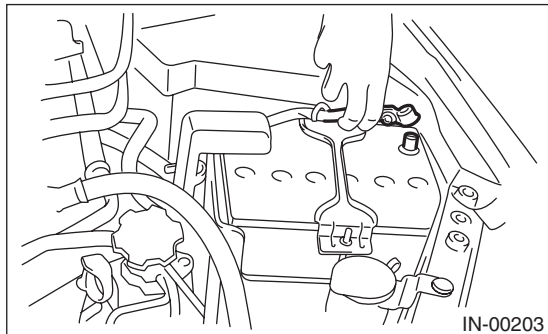
- 1) Check for cracks or loose connections.
- 2) Inspect that no foreign objects in the air intake duct.

## INTAKE (INDUCTION)

### 5. Intake Duct

#### A: REMOVAL

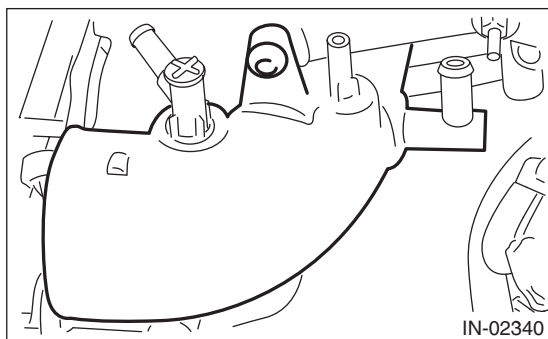
- 1) Disconnect the ground cable from the battery.



- 2) Remove the intake manifold. <Ref. to FU(STI)-15, REMOVAL, Intake Manifold.>

- 3) Remove the sensor, engine harness and fuel pipe attached to the intake manifold. <Ref. to FU(STI)-22, DISASSEMBLY, Intake Manifold.>

- 4) Remove the intake duct from intake manifold.

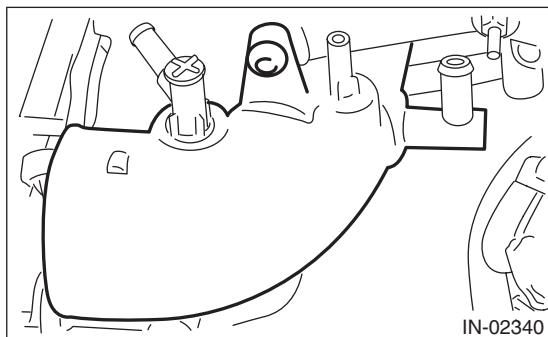


#### B: INSTALLATION

Install in the reverse order of removal.

**Tightening torque:**

**19 N·m (1.9 kgf·m, 14.0 ft·lb)**

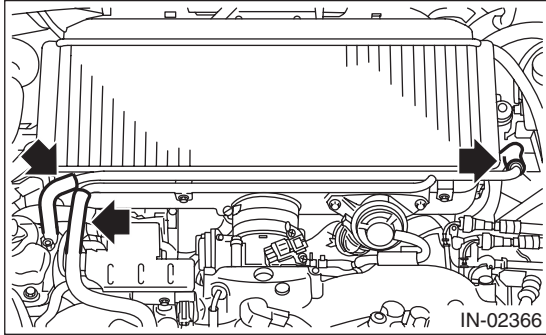


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## 6. Intercooler

### A: REMOVAL

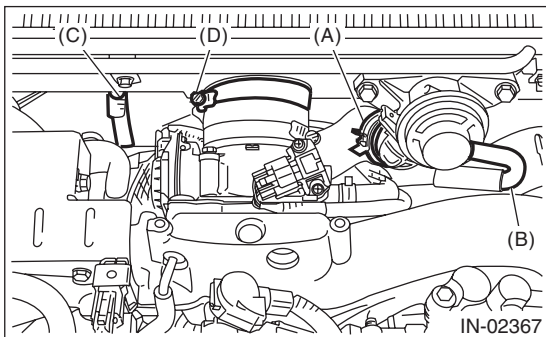
1) Disconnect the PCV hose from the PCV pipe.



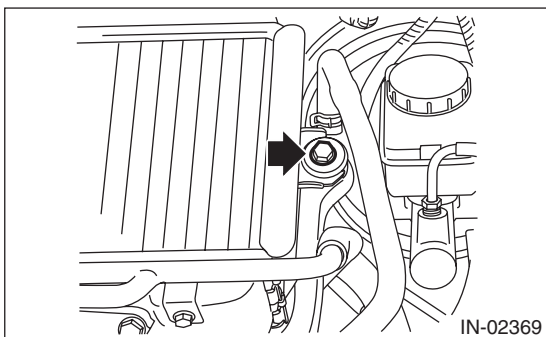
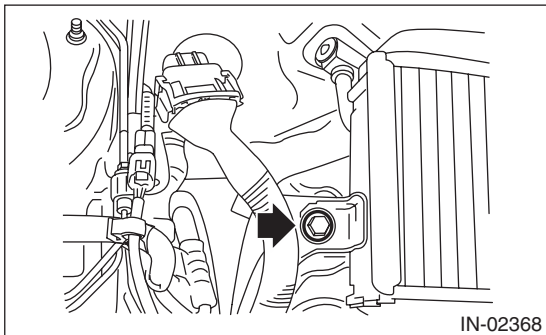
2) Remove the clips from the air by-pass hose (A) and disconnect the vacuum hose (B) from the air by-pass valve.

3) Loosen the clamp (C) connecting the turbo-charger and intercooler duct.

4) Loosen the clamp (D) connecting the throttle body and intercooler.

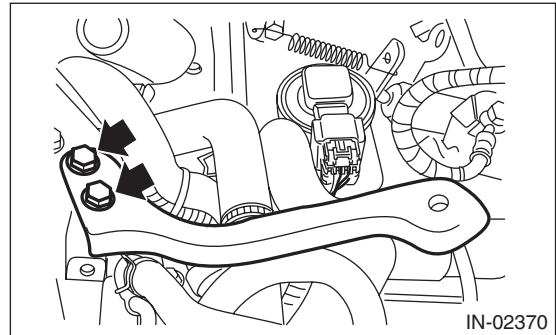
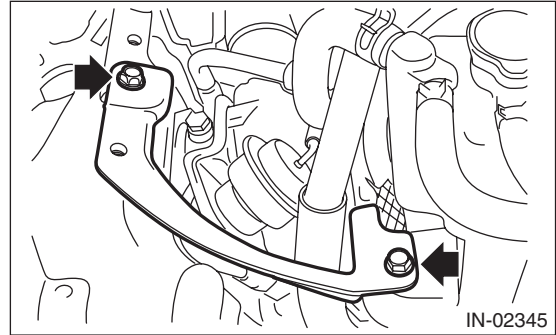


5) Remove the bolts securing the intercooler to the intercooler stay.



6) Remove the intercooler.

7) Remove the intercooler stay.



# Intercooler

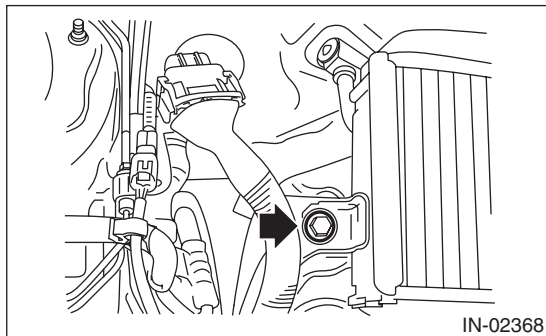
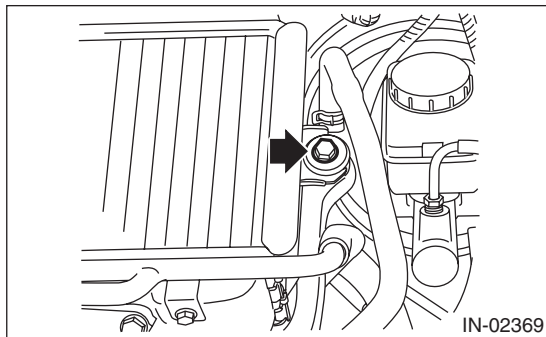
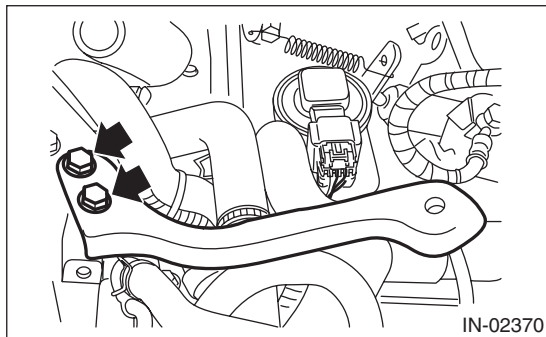
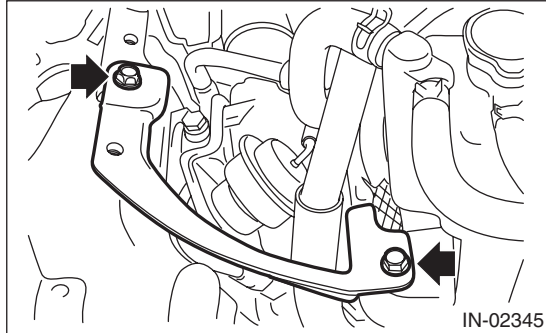
INTAKE (INDUCTION)

## B: INSTALLATION

Install in the reverse order of removal.

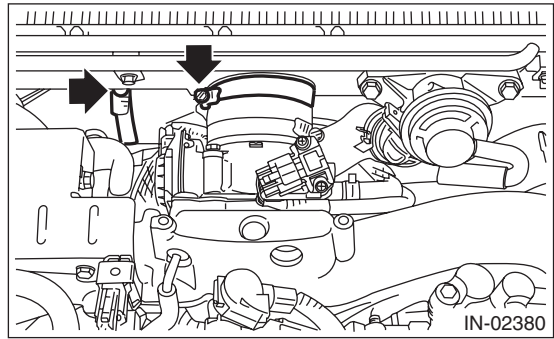
**Tightening torque:**

**16 N·m (1.6 kgf-m, 11.8 ft-lb)**



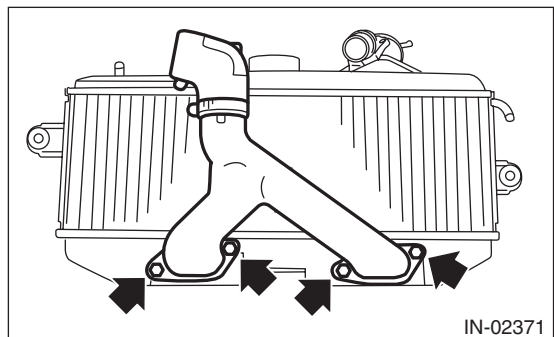
**Tightening torque:**

**3 N·m (0.3 kgf-m, 2.2 ft-lb)**

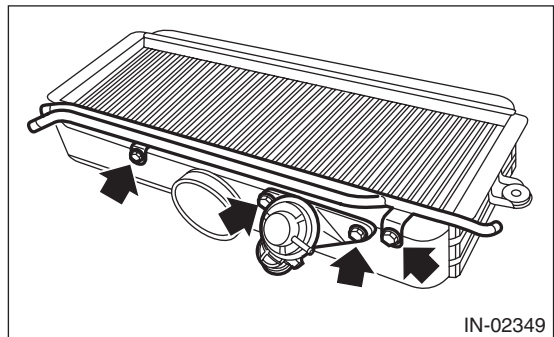


## C: DISASSEMBLY

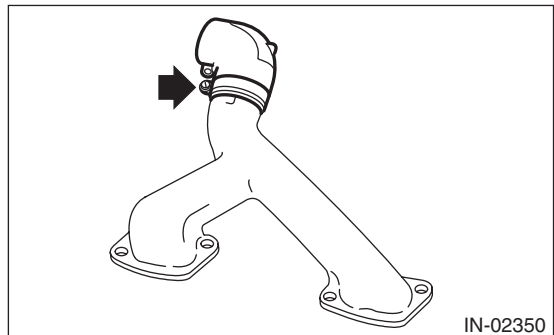
1) Remove the intercooler duct from the intercooler.



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



3) Separate the intake duct.



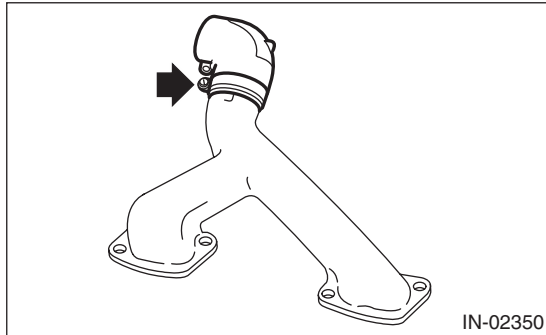
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## D: ASSEMBLY

1) Connect the intercooler duct.

**Tightening torque:**

**3 N·m (0.3 kgf·m, 2.2 ft·lb)**



2) Install the air by-pass valve and the PCV pipe to the intercooler.

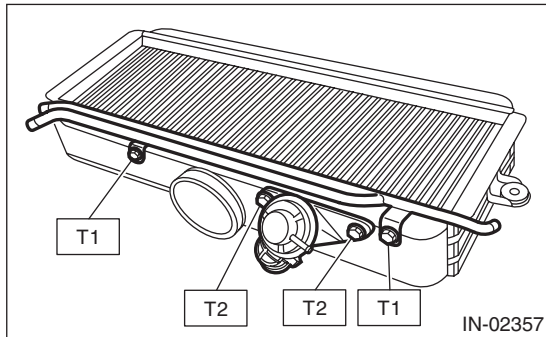
**NOTE:**

Use a new gasket.

**Tightening torque:**

**T1: 5.5 N·m (0.6 kgf·m, 4.1 ft·lb)**

**T2: 16 N·m (1.6 kgf·m, 11.8 ft·lb)**



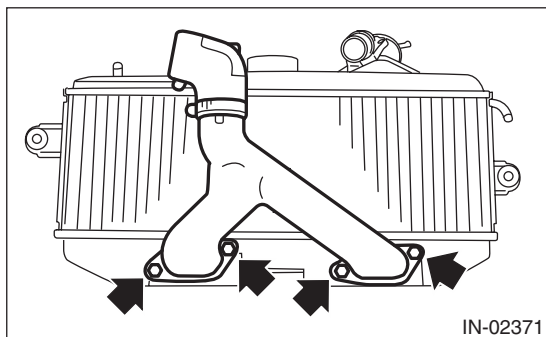
3) Install the intercooler duct to the intercooler.

**NOTE:**

Use a new gasket.

**Tightening torque:**

**16 N·m (1.6 kgf·m, 11.8 ft·lb)**



## E: INSPECTION

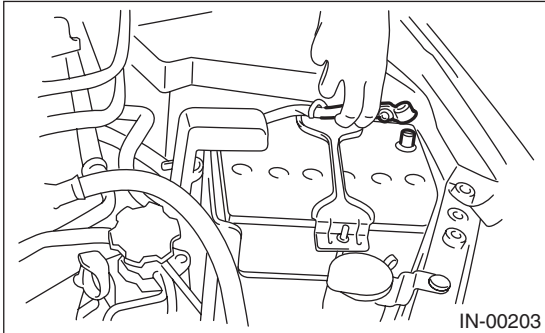
Check for cracks or loose connections.

## INTAKE (INDUCTION)

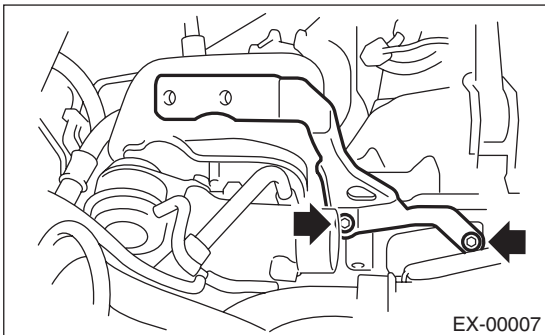
### 7. Turbocharger

#### A: REMOVAL

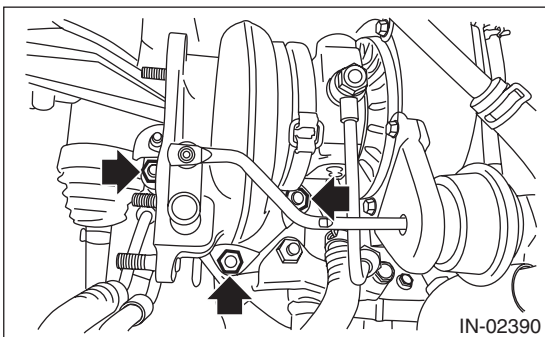
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from the battery.



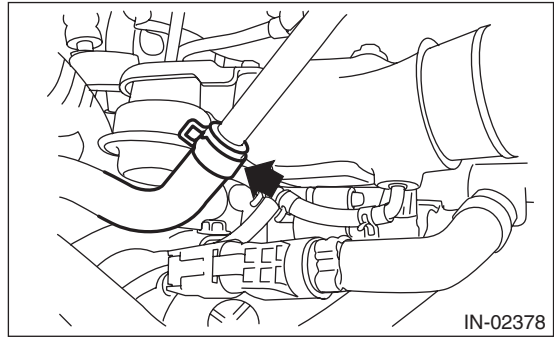
- 3) Lift up the vehicle.
- 4) Drain approximately 3.0 ℓ (3.2 US qt, 2.6 Imp qt) of coolant. <Ref. to CO(STI)-13, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
- 5) Lower the vehicle.
- 6) Remove the intercooler. <Ref. to IN(STI)-11, REMOVAL, Intercooler.>
- 7) Remove the intercooler stay.



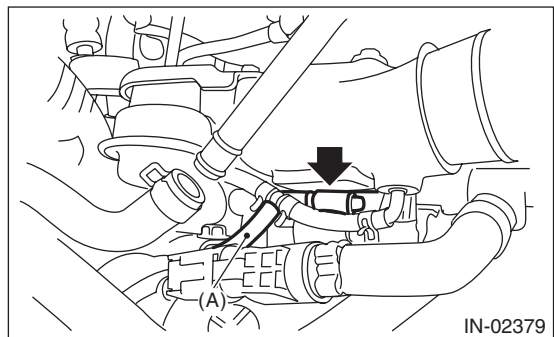
- 8) Remove the center exhaust pipe. <Ref. to EX(STI)-7, REMOVAL, Center Exhaust Pipe.>
- 9) Lower the vehicle.
- 10) Remove the nuts securing the turbocharger to the joint pipe.



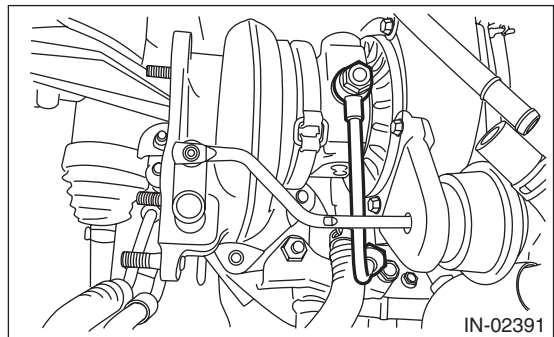
- 11) Disconnect the engine coolant hose from the upper side of the water pipe.



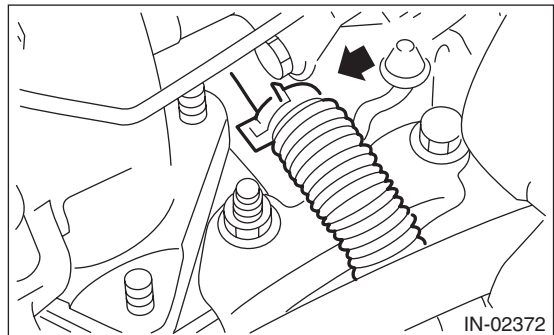
- 12) Disconnect the air control hose (A), and loosen the clamp holding the turbocharger to the intake duct.



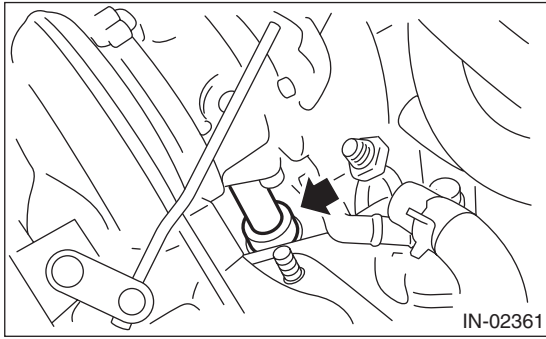
- 13) Remove the oil inlet pipe from the turbocharger.



- 14) Disconnect the engine coolant hose from the lower side of the water pipe.

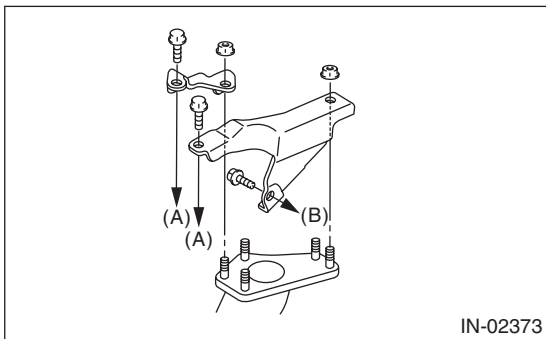


15) Disconnect the oil outlet hose from the oil outlet pipe.



16) Take out the turbocharger from engine compartment.

17) Remove the turbocharger stay.



- (A) To the cylinder head RH
- (B) To the cylinder block RH

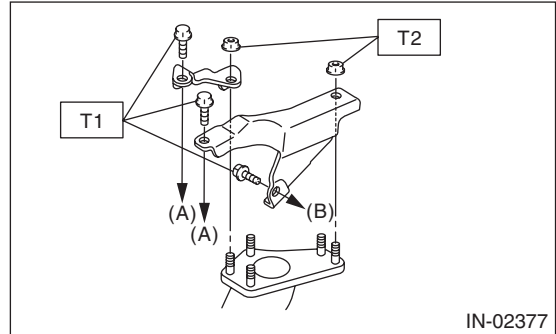
## B: INSTALLATION

1) Install the turbocharger stay.

**Tightening torque:**

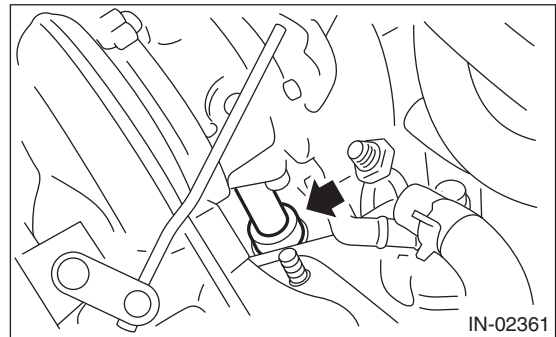
**T1: 33 N·m (3.4 kgf-m, 24.3 ft-lb)**

**T2: 42.5 N·m (4.3 kgf-m, 31.3 ft-lb)**



- (A) To the cylinder head RH
- (B) To the cylinder block RH

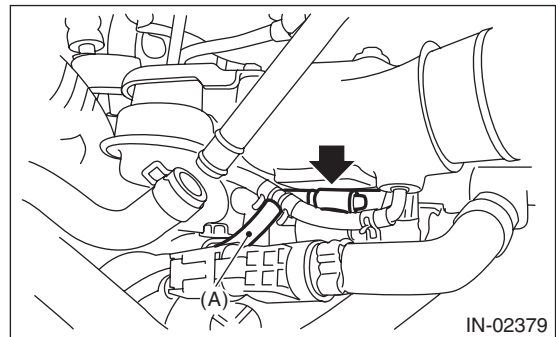
2) Connect the oil outlet hose to the oil outlet pipe.



3) Connect the air control hose (A) and install the turbocharger to the intake duct.

**Tightening torque:**

**3 N·m (0.3 kgf-m, 2.2 ft-lb)**



# Turbocharger

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4) Temporarily tighten the oil inlet pipe and then tighten to the specified torque.

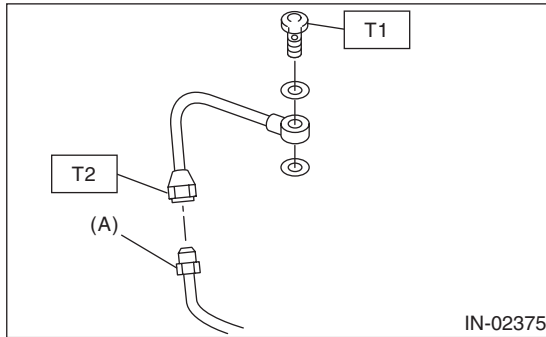
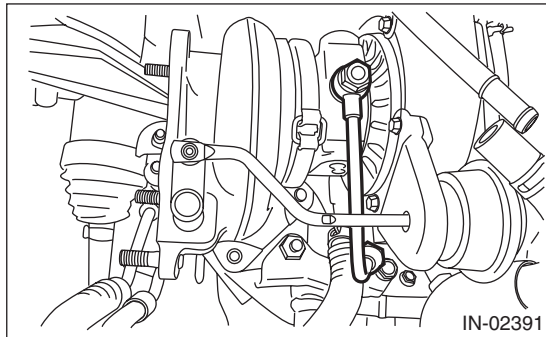
### NOTE:

- Use a new gasket.
- When tightening, never rotate the part indicated as (A) in the figure.

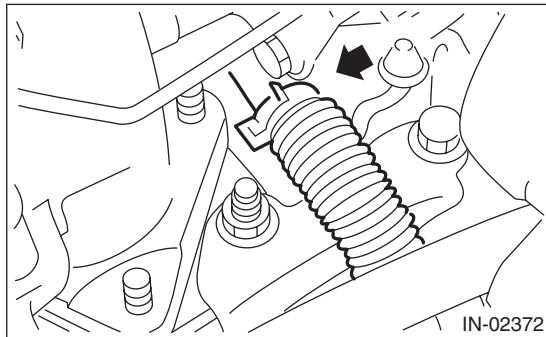
### Tightening torque:

**T1: 16 N·m (1.6 kgf-m, 11.8 ft-lb)**

**T2: 20 N·m (2.0 kgf-m, 14.8 ft-lb)**



5) Connect the engine coolant hose to the lower side of the water pipe.



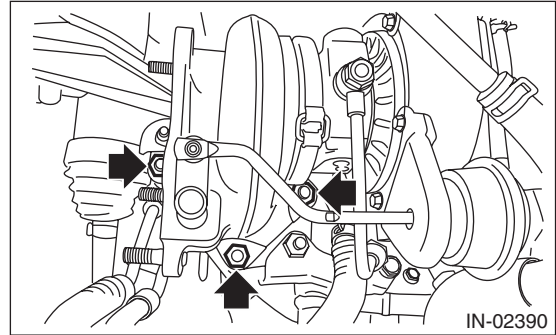
6) Install the nuts securing the turbocharger to the joint pipe.

### NOTE:

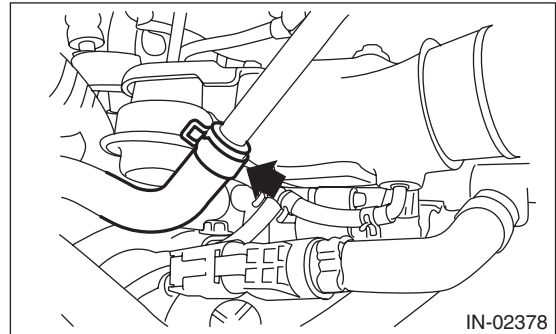
Use a new gasket.

### Tightening torque:

**42.5 N·m (4.3 kgf-m, 31.3 ft-lb)**



7) Connect the engine coolant hoses to the upper side of the water pipe.



8) Lift up the vehicle.

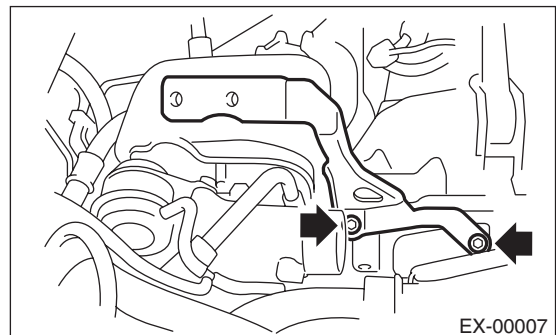
9) Install the center exhaust pipe. <Ref. to EX(STI)-8, INSTALLATION, Center Exhaust Pipe.>

10) Lower the vehicle.

11) Install the intercooler stay.

### Tightening torque:

**16 N·m (1.6 kgf-m, 11.8 ft-lb)**

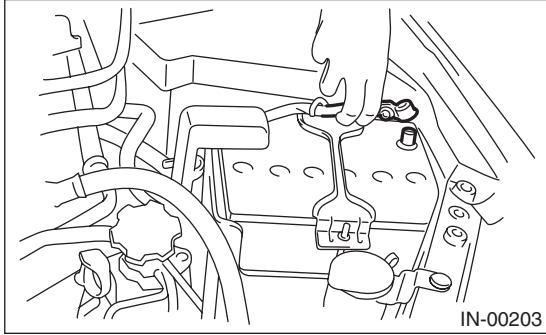


12) Install the intercooler. <Ref. to IN(STI)-12, INSTALLATION, Intercooler.>



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13) Connect the ground cable to the battery.

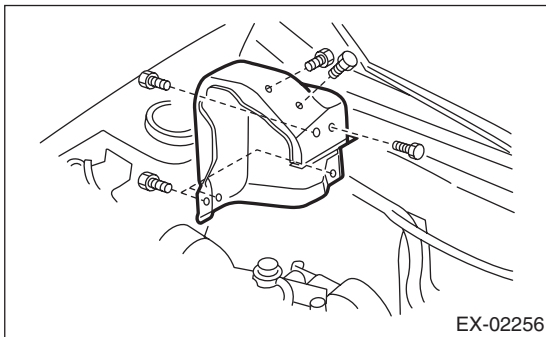


14) Fill engine coolant. <Ref. to CO(STI)-13, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

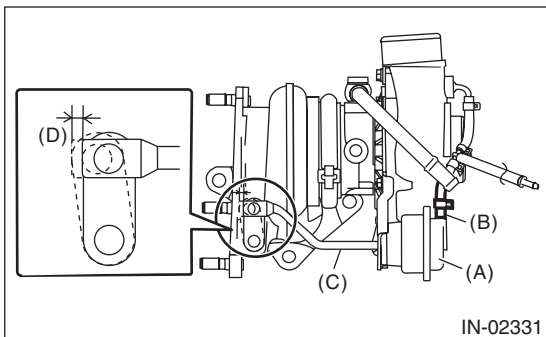
## C: INSPECTION

### 1. WASTE GATE ACTUATOR

- 1) Remove the intercooler. <Ref. to IN(STI)-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 89.9 kPa (0.92 kgf/cm<sup>2</sup>, 13.0 psi) to prevent damaging the waste gate actuator.

**Control pressure (Control rod stroke 2 mm (0.08 in)):**

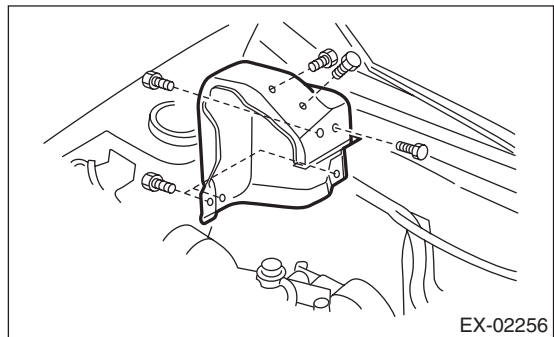
#### Standard value

74.7 — 80.8 kPa (0.76 — 0.82 kgf/cm<sup>2</sup>, 10.8 — 11.7 psi)

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

#### Tightening torque:

7.5 N·m (0.8 kgf·m, 5.5 ft·lb)



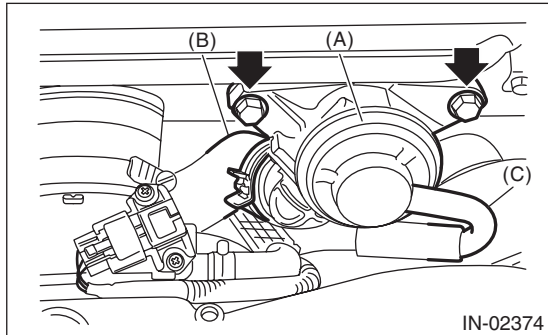
### 2. OIL PIPE AND WATER PIPE

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



### B: INSTALLATION

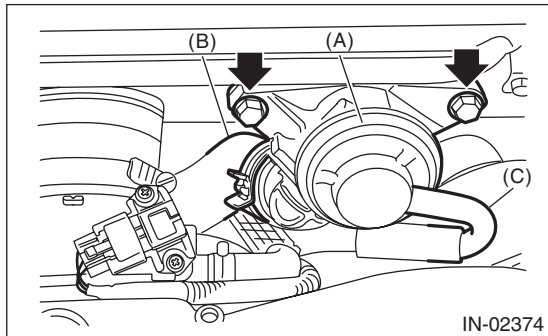
Install in the reverse order of removal.

#### NOTE:

Use a new gasket.

#### Tightening torque:

**16 N·m (1.6 kgf·m, 11.8 ft·lb)**



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

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## 9. Resonator Chamber

### A: REMOVAL

The resonator chamber and air cleaner case are integrated into one unit; therefore, refer to Air Cleaner Case for the removal procedure. <Ref. to IN(STI)-8, REMOVAL, Air Cleaner Case.>

### B: INSTALLATION

The resonator chamber and air cleaner case are integrated into one unit; therefore, refer to Air Cleaner Case for installation procedure. <Ref. to IN(STI)-8, INSTALLATION, Air Cleaner Case.>

### C: INSPECTION

Check for cracks or loose connections.

# Resonator Chamber

INTAKE (INDUCTION)

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