

## TRANSMISSION SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

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

**CONTROL SYSTEM****CS****AUTOMATIC TRANSMISSION****4AT****AUTOMATIC TRANSMISSION  
(DIAGNOSTIC)****4AT(H4SO)****AUTOMATIC TRANSMISSION  
(DIAGNOSTIC)****4AT(H4DOTC)****AUTOMATIC TRANSMISSION  
(DIAGNOSTIC)****4AT(H4DOTC 2.5)****MANUAL TRANSMISSION AND  
DIFFERENTIAL****5MT****CLUTCH SYSTEM****CL**

## 11. Extension Case Oil Seal

### A: INSPECTION

Make sure that the ATF does not leak from the joint of transmission and propeller shaft. If so, replace the oil seal. <Ref. to 4AT-49, REPLACEMENT, Extension Case Oil Seal.>

### B: REPLACEMENT

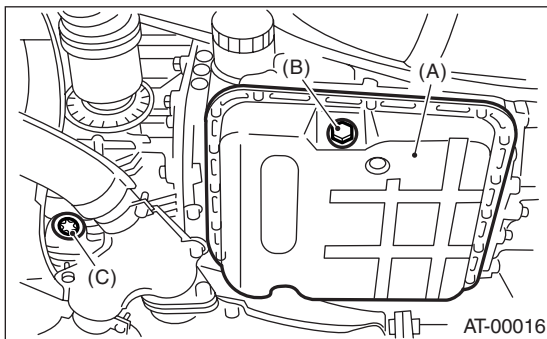
- 1) Clean the transmission exterior.
- 2) Drain the ATF completely.

**NOTE:**

Tighten the drain plug (ATF) after draining the ATF.

**Tightening torque:**

**25 N·m (2.5 kgf·m, 18.1 ft·lb)**



- (A) Oil pan
- (B) Drain plug (ATF)
- (C) Differential gear oil drain plug

- 3) Remove the rear exhaust pipe and muffler. (Non-turbo model). <Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.> (Turbo model) <Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>
- 4) Remove the heat shield cover. (If equipped)
- 5) Remove the propeller shaft. <Ref. to DS-15, REMOVAL, Propeller Shaft.>
- 6) Using ST, install the oil seal.  
ST 398527700 PULLER ASSY
- 7) Using the ST, install the oil seal.  
ST 498057300 INSTALLER
- 8) Install the propeller shaft. <Ref. to DS-16, INSTALLATION, Propeller Shaft.>
- 9) Install the heat shield cover. (If equipped)

- 10) Install the rear exhaust pipe and muffler. (Non-turbo model). <Ref. to EX(H4SO)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.> (Turbo model) <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>
- 11) Pour ATF and check the ATF level. <Ref. to 4AT-30, Automatic Transmission Fluid.>

## Differential Side Retainer Oil Seal

AUTOMATIC TRANSMISSION

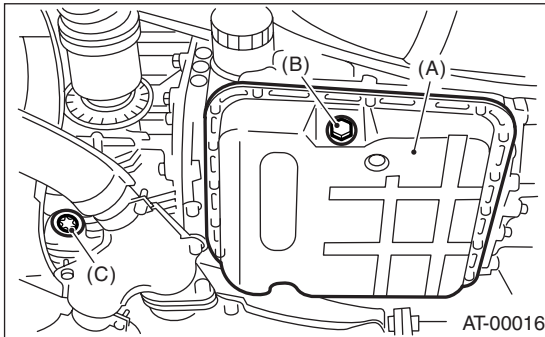
### 12. Differential Side Retainer Oil Seal

#### A: INSPECTION

Check the leakage of gear oil from differential side retainer oil seal part.  
If there is oil leakage, replace the oil seal.

#### B: REPLACEMENT

- 1) Lift-up the vehicle.
- 2) Remove the front exhaust pipe and center exhaust pipe.  
(Non-turbo model)  
<Ref. to EX(H4SO)-7, REMOVAL, Front Exhaust Pipe.>  
(Turbo model)  
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
- 3) Drain the differential gear by removing differential gear oil drain plug.



- (A) Oil pan
- (B) Drain plug (ATF)
- (C) Differential gear oil drain plug

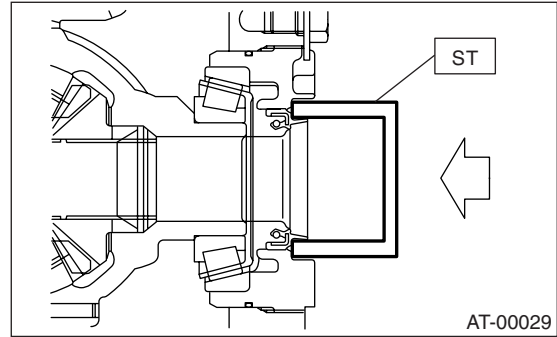
- 4) Replace new gasket and tighten the differential oil drain plug.

#### Tightening torque:

**44 N·m (4.5 kgf·m, 32.5 ft·lb)**

- 5) Separate the front drive shaft from transmission.  
<Ref. to DS-33, REMOVAL, Front Drive Shaft.>
- 6) Remove the differential side retainer oil seal using driver which wrapped with vinyl tape or etc.

- 7) Using ST, install the differential side retainer oil seal by slightly tapping with hammer.  
ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 8) Apply oil to the oil seal lips.
- 9) Using the ST, install the front drive shaft. <Ref. to DS-34, INSTALLATION, Front Drive Shaft.>  
ST 28399SA010 OIL SEAL PROTECTOR
- 10) Install the front exhaust pipe and center exhaust pipe.  
(Non-turbo model)  
<Ref. to EX(H4SO)-8, INSTALLATION, Front Exhaust Pipe.>  
(Turbo model)  
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>
- 11) Lower the vehicle.
- 12) Pour differential gear oil into the gauge hole.

#### Recommended gear oil:

**GL-5 (SAE: 75 W-90) or equivalent**

#### Differential gear oil capacity:

**1.1 — 1.3 ℓ (1.3 — 1.4 US qt, 1.0 — 1.1 Imp qt)**

- 13) Check the gear oil amount. <Ref. to 4AT-31, INSPECTION, Differential Gear Oil.>

## 13. Inhibitor Switch

### A: INSPECTION

When the driving condition or starter motor operation is erroneous, first check the shift linkage for improper operation. If the shift linkage is functioning properly, check the inhibitor switch.

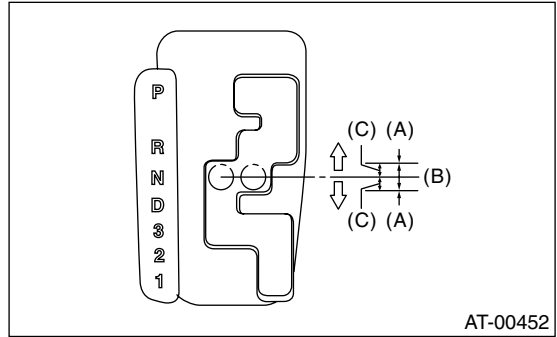
- 1) Disconnect the inhibitor switch connector.
- 2) Check continuity in inhibitor switch circuits with the select lever moved to each position.

**NOTE:**

- Also check that continuity in ignition circuit does not exist when the select lever is in “R”, “D”, “3”, “2” and “1” ranges.
- If the inhibitor switch is inoperative, check for poor contact of connector on transmission side.

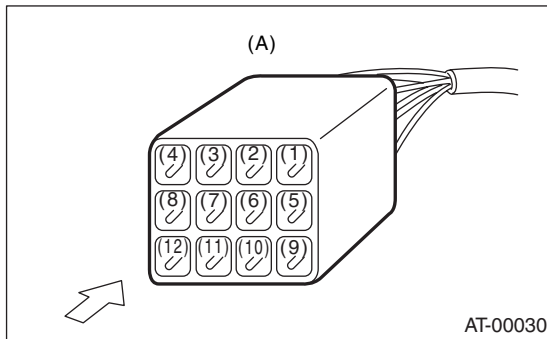
- 3) Check if there is continuity at equal points when the select lever is turned 1.5° in both directions from the “N” range to “R” range or “D” range  
If there is continuity in one direction and the continuity in the other or if there is continuity at unequal points, adjust the inhibitor switch. <Ref. to 4AT-52, ADJUSTMENT, Inhibitor Switch.>

	Range	Pin No.
Signal sent to TCM	P	4 — 3
	R	4 — 2
	N	4 — 1
	D	4 — 8
	3	4 — 7
	2	4 — 6
	1	4 — 5
Ignition circuit	P/N	12 — 11
Back-up light circuit	R	10 — 9



- (A) Continuity does not exist.
- (B) Continuity exists.
- (C) 1.5°

- 4) Repeat the above checks at other ranges. If there are abnormalities, adjust the select cable. <Ref. to CS-14, ADJUSTMENT, Select Cable.>



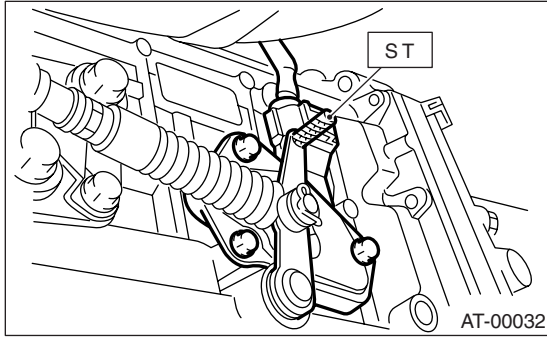
(A) Inhibitor switch connector

# Inhibitor Switch

## AUTOMATIC TRANSMISSION

### B: ADJUSTMENT

- 1) Shift the select lever to the "N" range.
- 2) Loosen the three inhibitor switch assembly securing bolts.
- 3) Insert the ST as vertical as possible into the holes in the inhibitor switch lever and switch body.  
ST 499267300 STOPPER PIN



- 4) Tighten the three inhibitor switch assembly securing bolts.

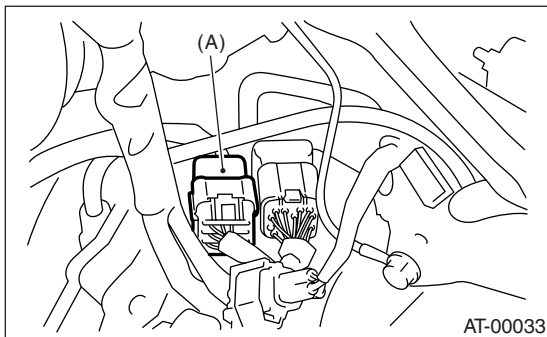
#### **Tightening torque:**

**3.4 N·m (0.35 kgf-m, 26 ft-lb)**

- 5) Repeat the check of inhibitor switch. If the inhibitor switch is determined to be "faulty", replace it.  
<Ref. to 4AT-51, INSPECTION, Inhibitor Switch.>

### C: REMOVAL

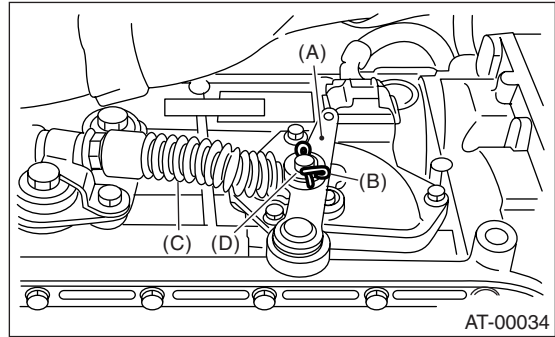
- 1) Set the vehicle on a lift.
- 2) Shift the select lever to "N" range.
- 3) Remove the air cleaner case (Non-turbo model).  
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler (Turbo model).  
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Disconnect the inhibitor switch connector.



(A) Inhibitor switch connector

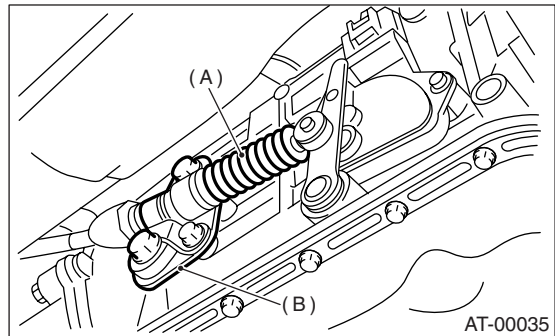
- 6) Remove the inhibitor switch connector from stay.
- 7) Lift-up the vehicle.

- 8) Remove the front and center exhaust pipe.  
(Non-turbo model)  
<Ref. to EX(H4SO)-7, REMOVAL, Front Exhaust Pipe.>  
(Turbo model)  
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
- 9) Remove the snap pin and washers from range select lever.



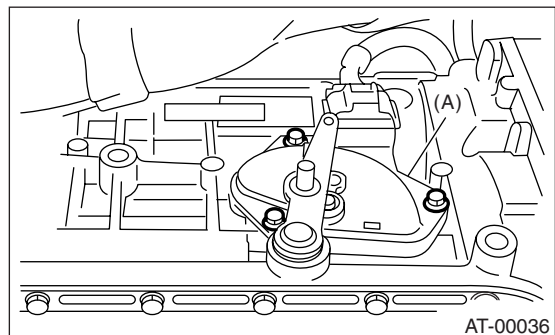
- (A) Range select lever
- (B) Snap pin
- (C) Select cable
- (D) Washer

- 10) Remove the plate assembly from transmission case.



- (A) Select cable
- (B) Plate ASSY

- 11) Remove the bolt.

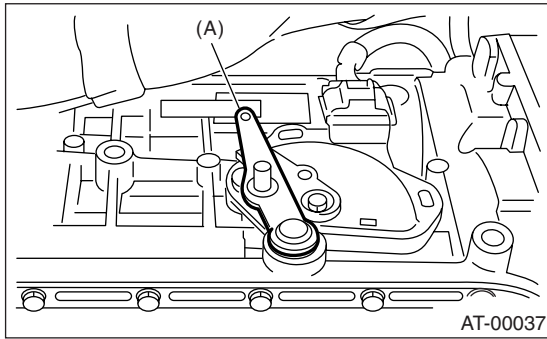


(A) Inhibitor switch ASSY

# Inhibitor Switch

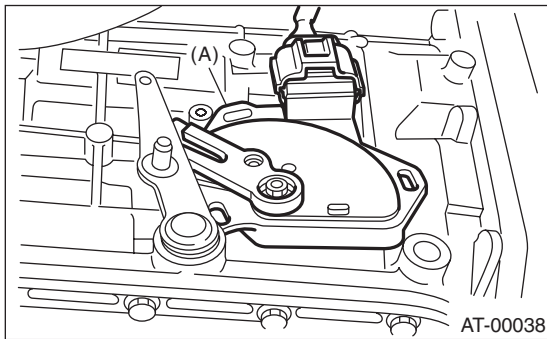
AUTOMATIC TRANSMISSION

12) Shift the range select lever to parking position (left side).



(A) Range select lever

13) Remove the inhibitor switch assembly from transmission.



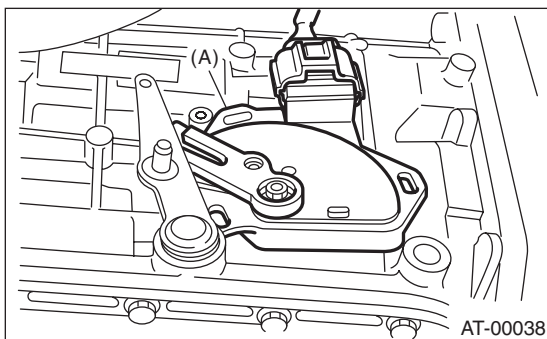
(A) Inhibitor switch ASSY

14) Disconnect the inhibitor switch harness connector from inhibitor switch.

## D: INSTALLATION

1) Connect the inhibitor switch harness connector to inhibitor switch.

2) Install the inhibitor switch assembly to transmission case.

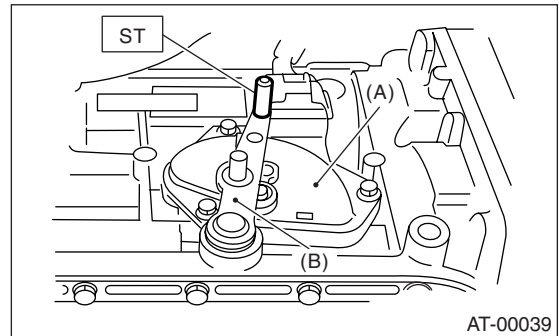


(A) Inhibitor switch ASSY

3) Move the range select lever to neutral position.

4) Using the ST, tighten bolts of inhibitor switch.  
ST 499267300 STOPPER PIN

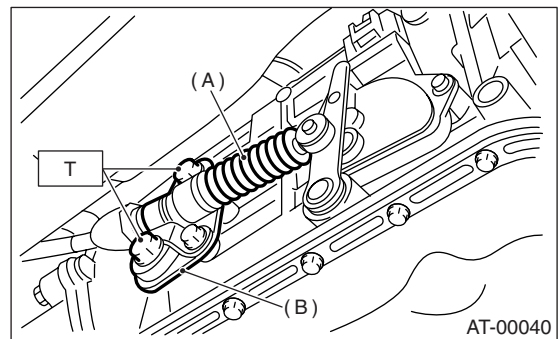
**Tightening torque:**  
**3.4 N·m (0.36 kgf-m, 2.6 ft-lb)**



(A) Inhibitor switch ASSY  
(B) Range select lever

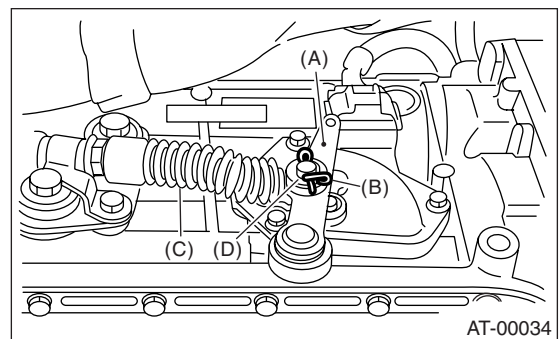
5) Install the select cable to range select lever.  
6) Install the plate assembly to transmission.

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



(A) Select cable  
(B) Plate ASSY

7) Install the washer and snap pin to range select lever.



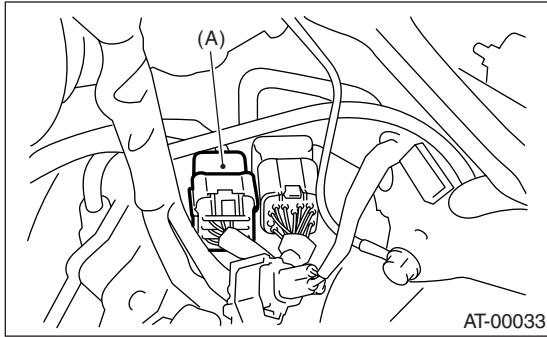
(A) Range select lever  
(B) Snap pin  
(C) Select cable  
(D) Washer

# Inhibitor Switch

## AUTOMATIC TRANSMISSION

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- 8) Install the front and center exhaust pipe. (Non-turbo model).  
<Ref. to EX(H4SO)-8, INSTALLATION, Front Exhaust Pipe.>
- 9) Install the center exhaust pipe. (Turbo model)  
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.>
- 10) Lower the vehicle.
- 11) Install the inhibitor switch connector to the stay.
- 12) Connect the inhibitor switch connector.



(A) Inhibitor switch connector

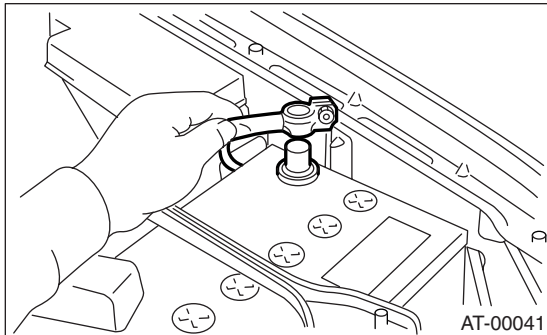
- 13) Install the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
- 14) Install the intercooler. (Turbo model)  
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
- 15) Inspect the inhibitor switch. <Ref. to 4AT-51, INSPECTION, Inhibitor Switch.>



## 14. Front Vehicle Speed Sensor

### A: REMOVAL

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



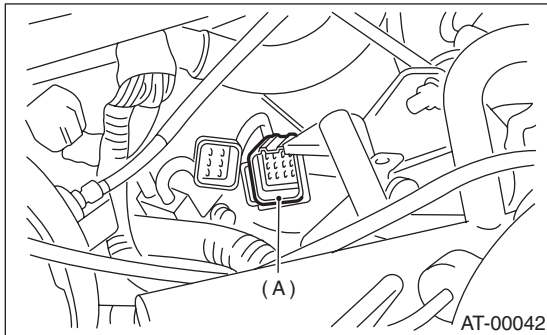
- 3) Remove the air cleaner case. (Non-turbo model).

<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

- 4) Remove the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>

- 5) Disconnect the transmission connector.



(A) Transmission connector

- 6) Remove the pitching stopper. <Ref. to 4AT-47, REMOVAL, Transmission Mounting System.>

- 7) Remove the transmission connector from the stay.

- 8) Lift-up the vehicle.

- 9) Clean the transmission exterior.

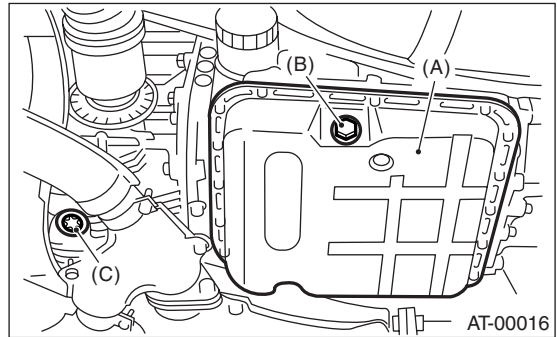
- 10) Drain the ATF completely.

**NOTE:**

Tighten the drain plug (ATF) after draining the ATF.

**Tightening torque:**

**25 N·m (2.5 kgf·m, 18.1 ft·lb)**



(A) Oil pan

(B) Drain plug (ATF)

(C) Differential gear oil drain plug

- 11) Remove the front, center, rear, exhaust pipes and muffler. (Non-turbo model).

<Ref. to EX(H4SO)-7, REMOVAL, Front Exhaust Pipe.> <Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>

- 12) Remove the center, rear exhaust pipe and muffler. (Turbo model)

<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>

- 13) Remove the heat shield cover. (If equipped)

- 14) Remove the propeller shaft.

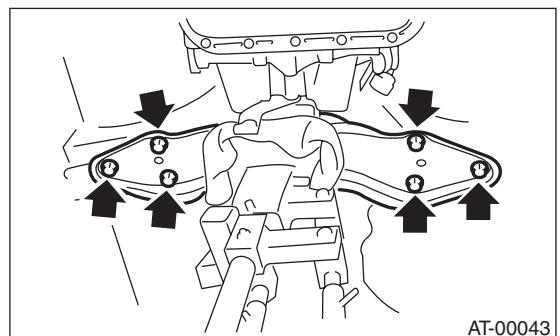
<Ref. to DS-15, REMOVAL, Propeller Shaft.>

- 15) Place the transmission jack under transmission.

**NOTE:**

Make sure that the support plate of transmission jack does not touch the oil pan.

- 16) Remove the transmission rear crossmember bolt.



AT-00043



# Front Vehicle Speed Sensor

## AUTOMATIC TRANSMISSION

17) Lower the transmission jack.

**NOTE:**

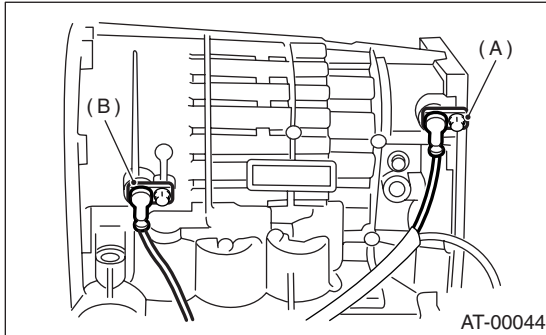
Do not separate the transmission jack and transmission.

18) Remove the ATF cooler inlet and outlet pipes.

**CAUTION:**

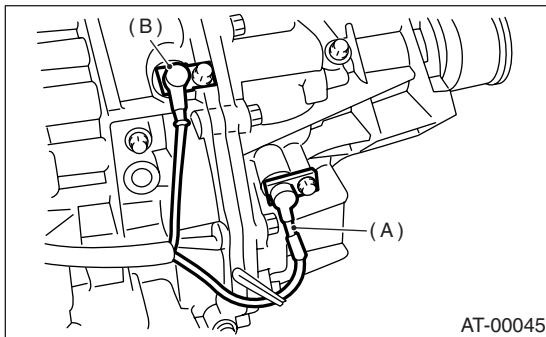
**When removing the outlet pipe, be careful not to lose the ball and spring used with retaining screw.**

19) Remove the front vehicle speed sensor and torque converter turbine speed sensor.



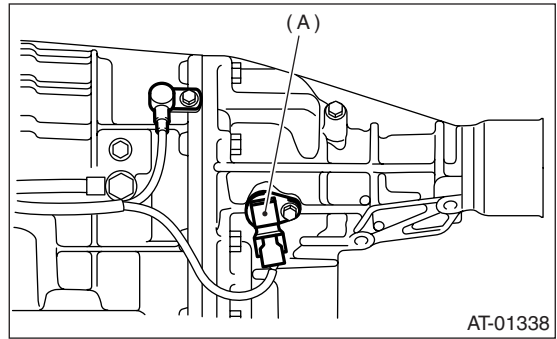
- (A) Front vehicle speed sensor
- (B) Torque converter turbine speed sensor

20) Remove the rear vehicle speed sensor. (Non-turbo model)



- (A) Rear vehicle speed sensor
- (B) Front vehicle speed sensor

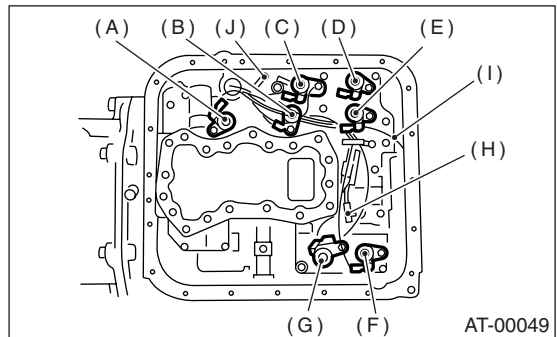
21) Disconnect the connector from rear vehicle speed sensor. (Turbo model)



- (A) Rear vehicle speed sensor

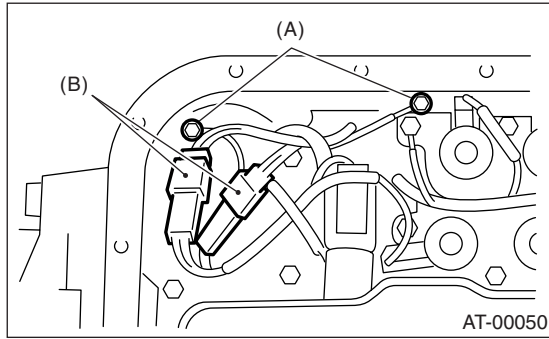
22) Remove the oil pan.

23) Remove the duty solenoid connector and ATF temperature sensor. Remove the connectors from clip and disconnect it.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

24) Disconnect the ground cable from control valve connector. (Turbo model)

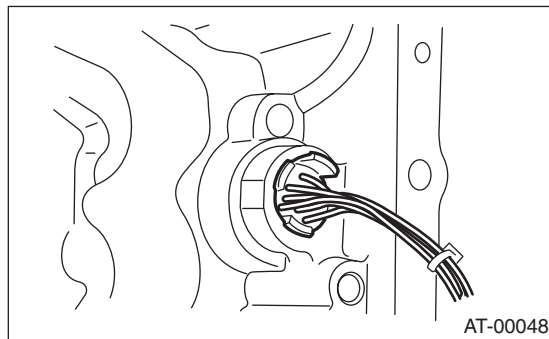


- (A) Transmission ground cable
- (B) Control valve connector

25) Remove the transmission harness assembly.

## B: INSTALLATION

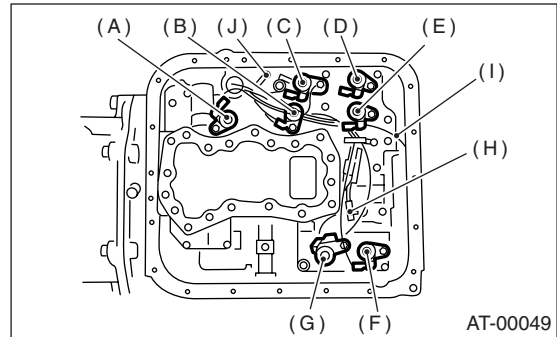
1) Pass the transmission harness assembly through the hole in the transmission case.



2) Connect the harness connectors. Connect the connectors of same color, and secure the connectors to valve body using clips. (Non-turbo model)

**Tightening torque (Transmission ground cable):**

**8 N·m (0.8 kgf·m, 5.8 ft·lb)**

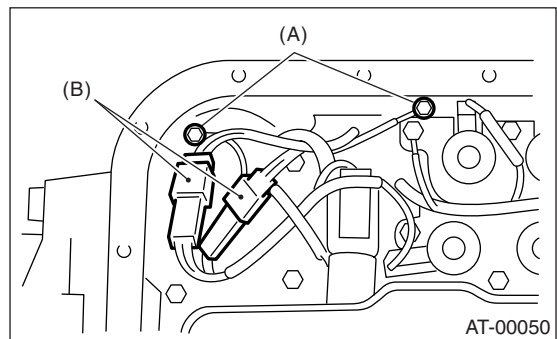


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

3) Connect the control valve connector, and then connect the ground cable. (Turbo model)

**Tightening torque:**

**8 N·m (0.8 kgf·m, 5.8 ft·lb)**



- (A) Transmission ground cable
- (B) Control valve connector

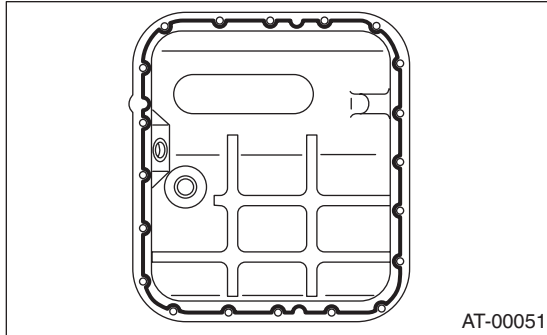
## Front Vehicle Speed Sensor

### AUTOMATIC TRANSMISSION

4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

**Liquid gasket:**

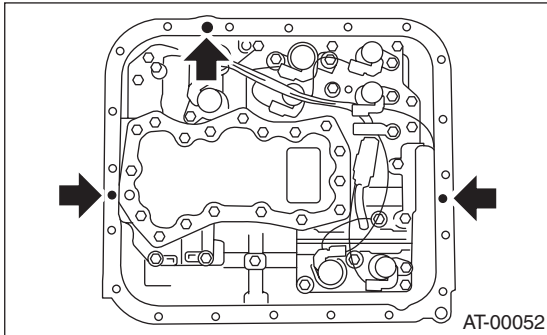
**THREE BOND 1217B (Part No. K0877YA020)**



5) Fill liquid gasket to holes except for bolt holes (three) of transmission case.

**Liquid gasket:**

**THREE BOND 1217B (Part No. K0877YA020)**



6) Install the oil pan with equally tighten the bolts.

**Tightening torque:**

**5 N·m (0.5 kgf-m, 3.6 ft-lb)**

7) Install the front vehicle speed sensor, rear vehicle speed sensor and torque converter turbine speed sensor.

**Tightening torque:**

**7 N·m (0.7 kgf-m, 5.1 ft-lb)**

8) Install the ATF cooler inlet and outlet pipes.

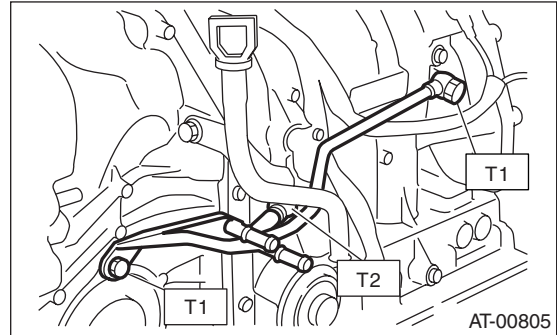
**NOTE:**

Use a new copper washer.

**Tightening torque:**

**T1: 25 N·m (2.5 kgf-m, 18.1 ft-lb)**

**T2: 45 N·m (4.6 kgf-m, 33.2 ft-lb)**



9) Install the transmission rear crossmember bolt.

**Tightening torque:**

**70 N·m (7.1 kgf-m, 51 ft-lb)**

10) Install the propeller shaft.

<Ref. to DS-16, INSTALLATION, Propeller Shaft.>

11) Install the heat shield cover. (If equipped)

12) Install the front, center, rear exhaust pipes and muffler. (Non-turbo model).

<Ref. to EX(H4SO)-8, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>

13) Install the center, rear exhaust pipe and muffler. (Turbo model)

<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>

14) Lower the vehicle.

15) Install the transmission connector to the stay.  
16) Install the pitching stopper. <Ref. to 4AT-47, INSTALLATION, Transmission Mounting System.>

17) Install the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

18) Install the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

## 15. Rear Vehicle Speed Sensor

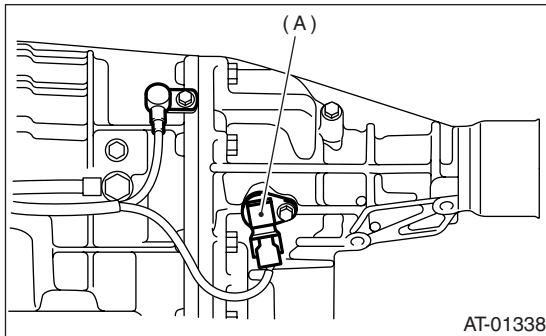
### A: REMOVAL

#### 1. NON-TURBO MODEL

When removing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor". <Ref. to 4AT-55, REMOVAL, Front Vehicle Speed Sensor.>

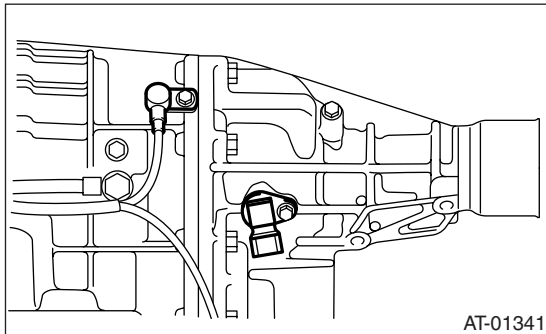
#### 2. TURBO MODEL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Lift-up the vehicle.
- 4) Disconnect the connector from rear vehicle speed sensor.



(A) Rear vehicle speed sensor

- 5) Remove the rear vehicle speed sensor.



### B: INSTALLATION

#### 1. NON-TURBO MODEL

When installing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor". <Ref. to 4AT-57, INSTALLATION, Front Vehicle Speed Sensor.>

#### 2. TURBO MODEL

Install in the reverse order of removal.

#### NOTE:

Replace O-ring with new one.

#### **Tightening torque:**

**7 N·m (0.7 kgf-m, 5.1 ft-lb)**

## 16. Torque Converter Turbine Speed Sensor

### A: REMOVAL

When removing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor".  
<Ref. to 4AT-55, REMOVAL, Front Vehicle Speed Sensor.>

### B: INSTALLATION

When installing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor".  
<Ref. to 4AT-57, INSTALLATION, Front Vehicle Speed Sensor.>

## 17. Control Valve Body

### A: REMOVAL

#### 1. NON-TURBO MODEL

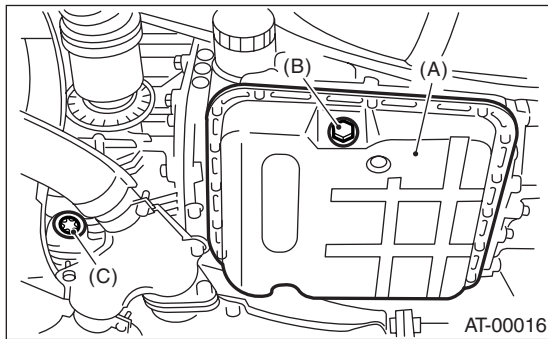
- 1) Lift-up the vehicle.
- 2) Clean the transmission exterior.
- 3) Drain the ATF completely.

**NOTE:**

- Tighten the drain plug (ATF) after draining the ATF.
- Always use new gasket.

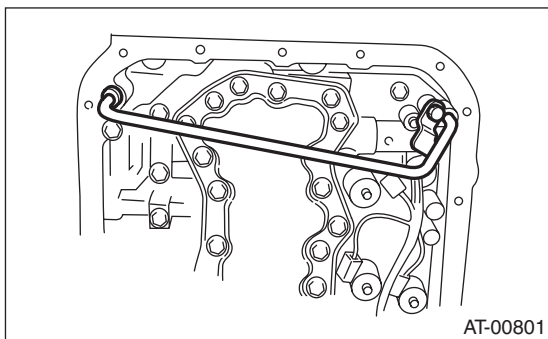
**Tightening torque:**

**25 N·m (2.5 kgf·m, 18.1 ft·lb)**

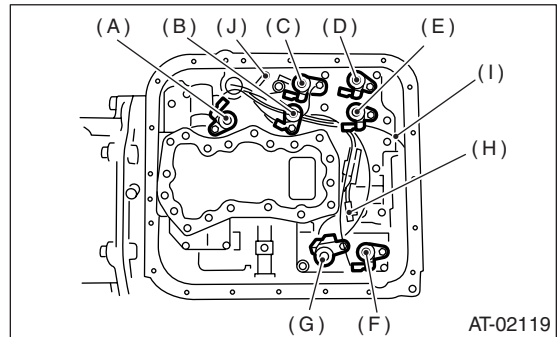


- (A) Oil pan
- (B) Drain plug (ATF)
- (C) Differential gear oil drain plug

- 4) Remove the oil pan.
- 5) Remove and clean the magnet.
- 6) Remove the old liquid gasket on the oil pan and transmission case completely.
- 7) Remove the pipe. (EC, EK model)



- 8) Disconnect the connectors of each solenoid, and then disconnect the ATF temperature sensor from control valve.

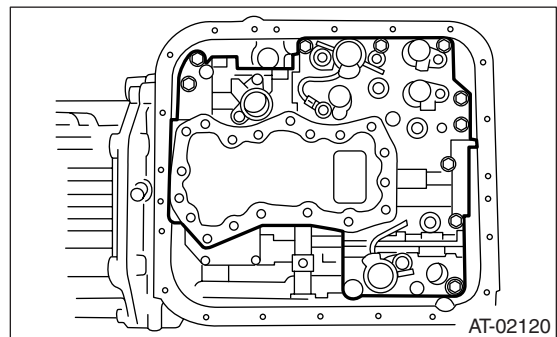


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)
- (J) Transmission ground

- 9) Remove the control valve body.

**NOTE:**

When removing the control valve body, be careful not to interfere with transfer duty solenoid wiring.



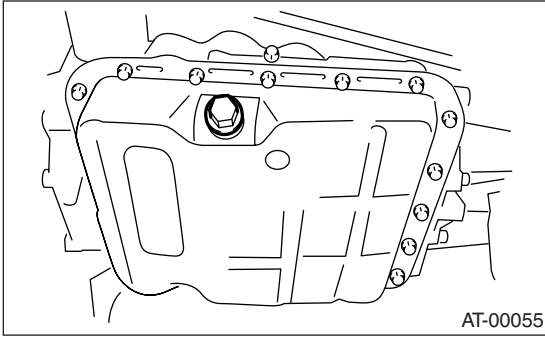
#### 2. TURBO MODEL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Lift-up the vehicle.
- 4) Clean the transmission exterior.

# Control Valve Body

## AUTOMATIC TRANSMISSION

5) Remove the drain plug (ATF) and gasket to drain ATF.



6) Replace the gasket with new one, and then tighten the drain plug (ATF).

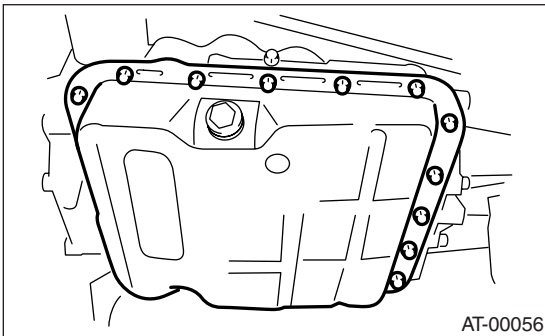
**Tightening torque:**

**25 N·m (2.5 kgf-m, 18.1 ft-lb)**

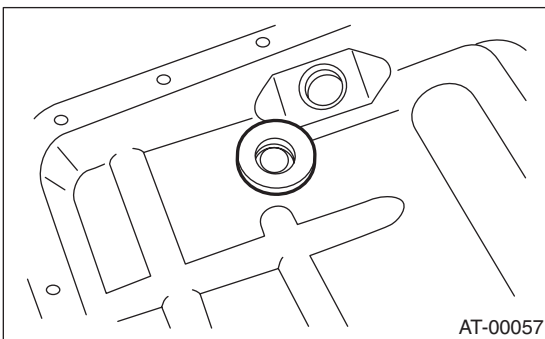
7) Remove the oil pan.

**CAUTION:**

**Be careful not to entering foreign matter into oil pan.**



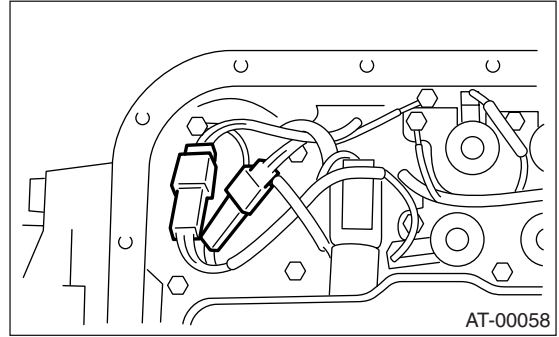
8) Remove the magnet.



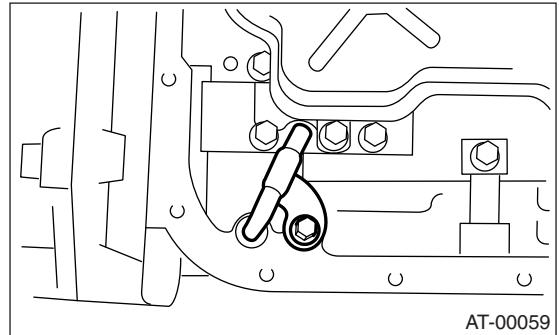
9) Clean the magnet.

10) Completely remove the remaining liquid gasket on transmission case and oil pan.

11) Remove the control valve connector.



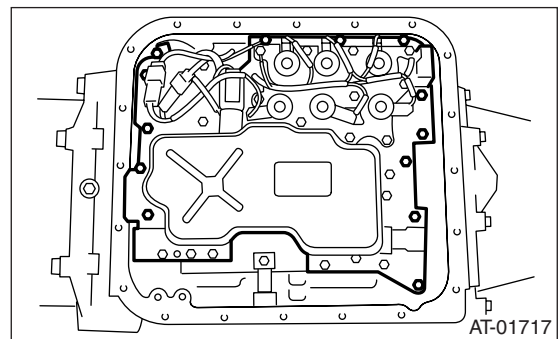
12) Remove the ATF cooler pipe.



13) Remove the control valve body.

**NOTE:**

Replace the control valve body as assembly, because it is non-disassemble part.





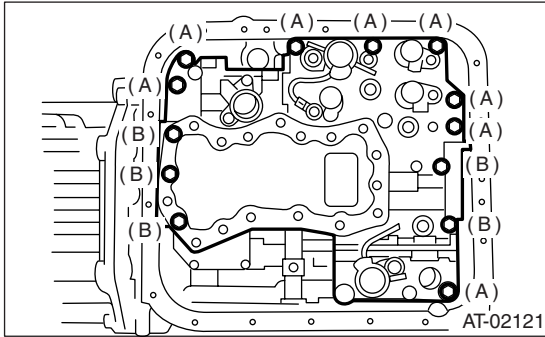
## B: INSTALLATION

### 1. NON-TURBO MODEL

- 1) Set the range select lever in "N" range.
- 2) Install the control valve, ATF temperature sensor and ground connectors.

**Tightening torque:**

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**

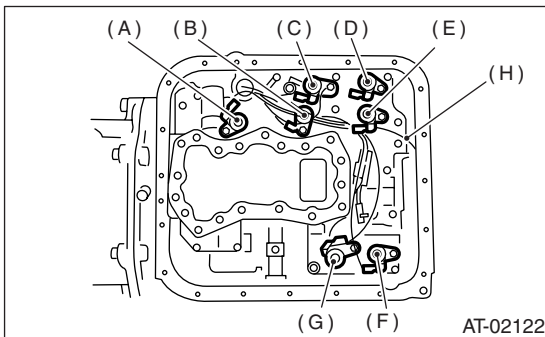


Bolt length mm (in)

(A) 30 (1.18)

(B) 55 (2.17)

- 3) Connect all connectors.

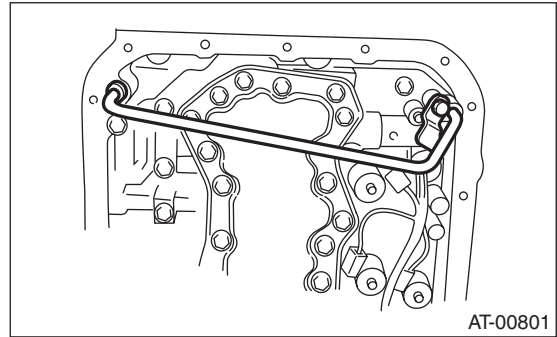


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

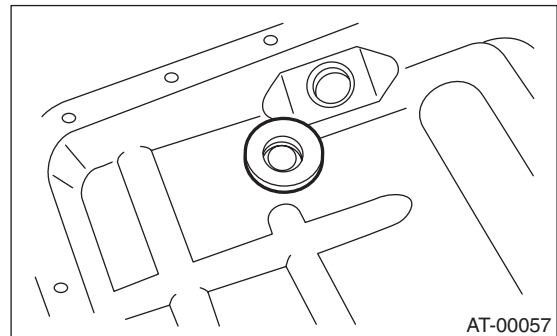
- 4) Install the pipe. (EC, EK model)

**Tightening torque:**

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**



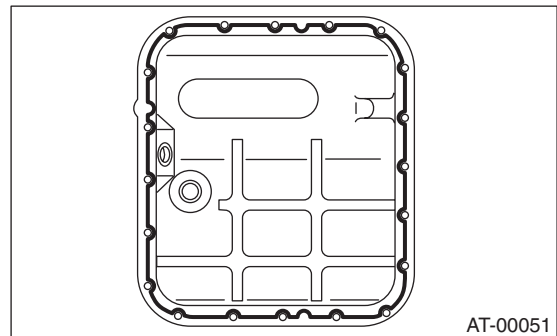
- 5) Attach the magnet at the specified position of oil pan.



- 6) Apply proper amount of liquid gasket to the entire oil pan mating surface.

**Liquid gasket:**

**THREE BOND 1217B (Part No. K0877YA020)**

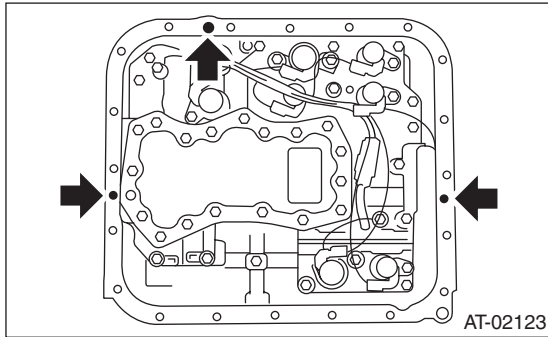


# Control Valve Body

## AUTOMATIC TRANSMISSION

7) Fill liquid gasket to holes except for bolt holes (three) of transmission case.

**Liquid gasket:**  
**THREE BOND 1217B (Part No. K0877YA020)**



8) Install the oil pan with equally tighten the bolts.

**Tightening torque:**  
**5 N-m (0.5 kgf-m, 3.6 ft-lb)**

9) Pour ATF from the ATF charge pipe.

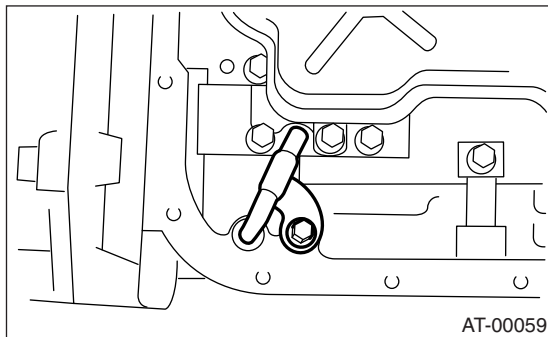
**Recommended fluid:**  
**DEXRON III type automatic transmission fluid**

**Capacity:**  
**Pour fluid as same amount as drained fluid from drain plug hole.**

10) Inspect the level of ATF.  
<Ref. to 4AT-30, Automatic Transmission Fluid.>

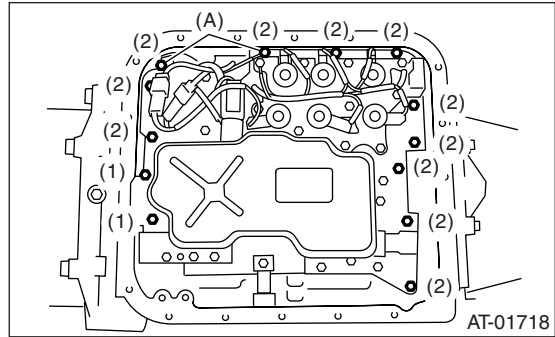
## 2. TURBO MODEL

- 1) Check that the dust and other foreign matters are not on control valve body.
- 2) Temporarily assemble the control valve body and the ground cable to transmission, and install oil cooler pipe.



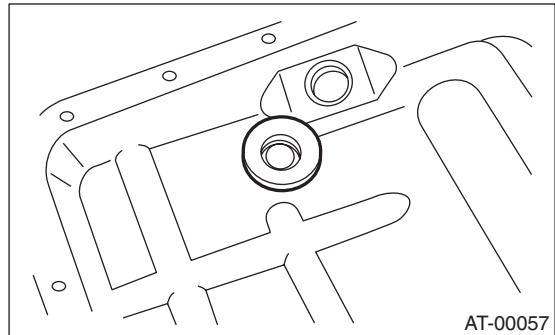
3) Equally tighten the bolts.

**Tightening torque:**  
**8 N-m (0.8 kgf-m, 5.8 ft-lb)**



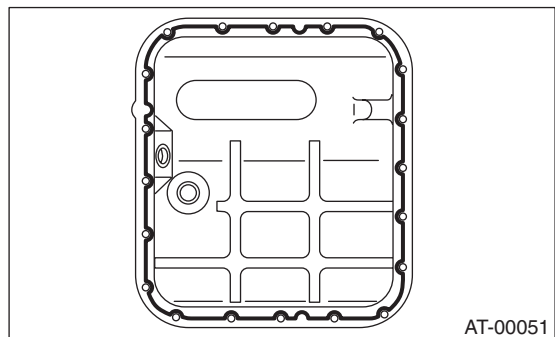
- (A) Transmission ground  
Bolt length mm (in)
- |     |           |
|-----|-----------|
| (1) | 35 (1.38) |
| (2) | 30 (1.18) |

4) Attach the magnet at the specified position of oil pan.



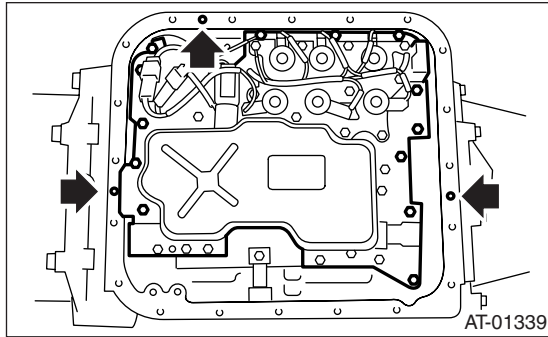
5) Apply proper amount of liquid gasket to the entire oil pan mating surface.

**Liquid gasket:**  
**THREE BOND 1217B (Part No. K0877YA020)**



6) Fill liquid gasket to holes except for bolt holes (three) of transmission case.

**Liquid gasket:**  
**THREE BOND 1217B (Part No. K0877YA020)**



7) Install the oil pan with equally tighten the bolts.

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

8) Pour ATF from the ATF charge pipe.

**Recommended fluid:**  
**DEXRON III type automatic transmission fluid**

**Capacity:**  
**Pour fluid as same amount as drained fluid from drain plug hole.**

9) Bleed the air of control valve. <Ref. to 4AT-70, Air Bleeding of Control Valve.>

10) Check the ATF level. <Ref. to 4AT-30, Automatic Transmission Fluid.>

11) Execute the learning control promotion. <Ref. to 4AT(H4DOTC)-17, FACILITATION OF LEARNING CONTROL, OPERATION, Subaru Select Monitor.>

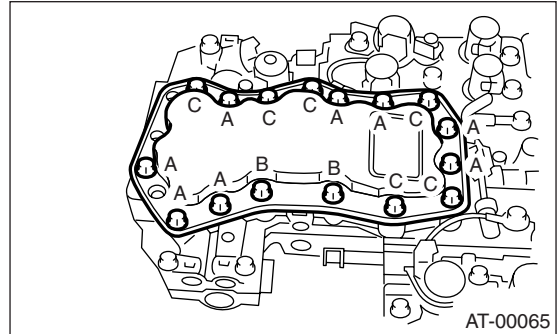
## C: DISASSEMBLY

Non-turbo model only

1) Remove the oil strainer from lower control valve body.

NOTE:

While assembling, safekeeping the bolt to identify bolt position, because the bolt length is different.

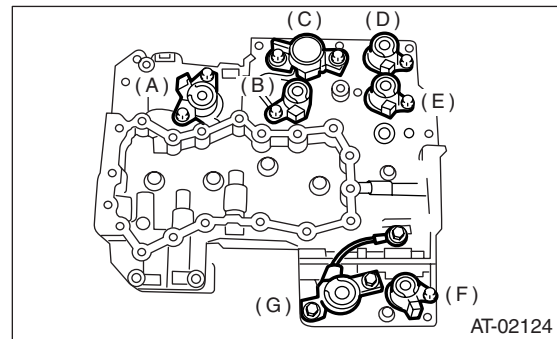


- (A) Short bolts
- (B) Middle bolt
- (C) Long bolts

2) Remove the duty solenoids, solenoids and sensor from lower control valve body.

NOTE:

While assembling, safekeeping the bolt to identify bolt position, because the bolt length is different.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

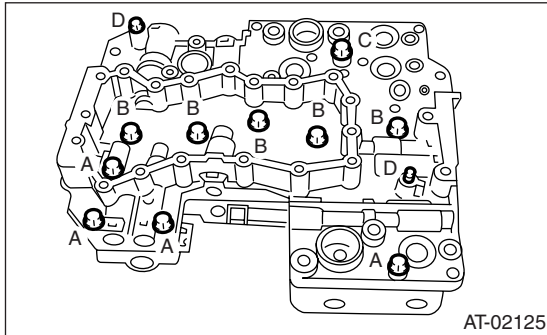
# Control Valve Body

## AUTOMATIC TRANSMISSION

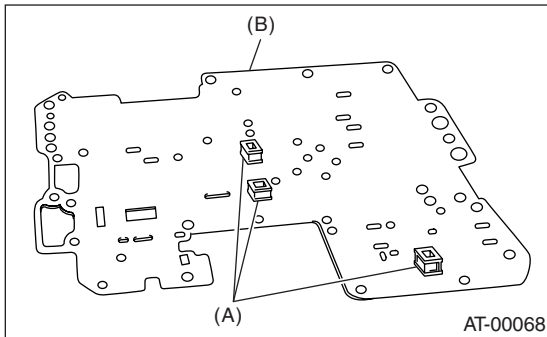
3) Remove the upper and lower control valve body installing bolt.

### NOTE:

While assembling, safekeeping the bolt to identify bolt position, because the bolt length is different.

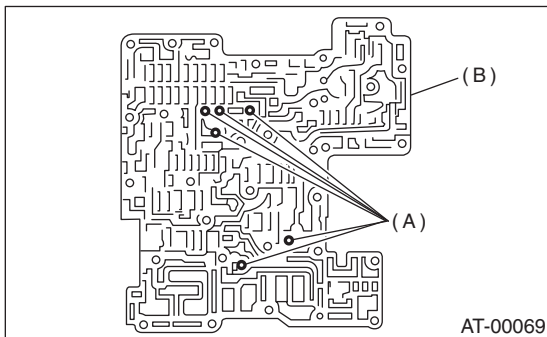


4) Remove the lower control valve body.  
5) Remove the oil filter and separate plate.



- (A) Oil filter
- (B) Separate plate

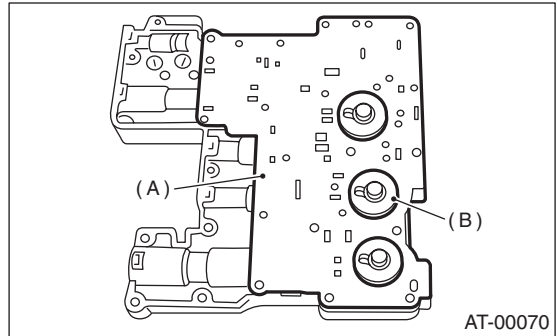
6) Remove the six steel balls from middle control valve body.



- (A) Steel ball
- (B) Middle control valve body

7) Remove the middle control valve body.

8) Remove the upper separator plate from middle control valve body.

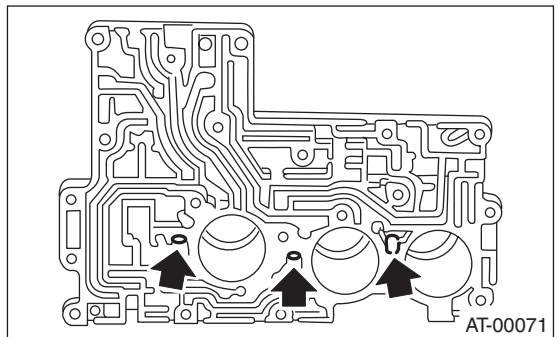


- (A) Upper separate plate
- (B) Side plate

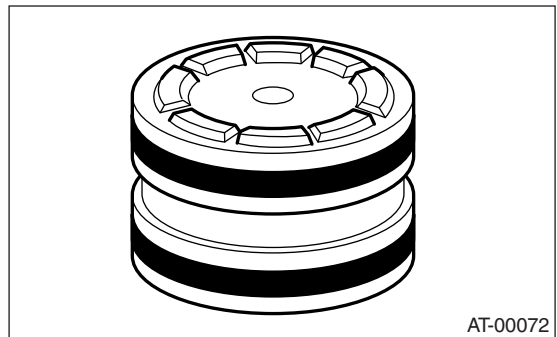
9) Remove the four steel balls and accumulator spring from upper control valve body.

10) Put the cloth to removing part of piston.

11) Remove the accumulator piston with slowly apply compressed air to each hole.

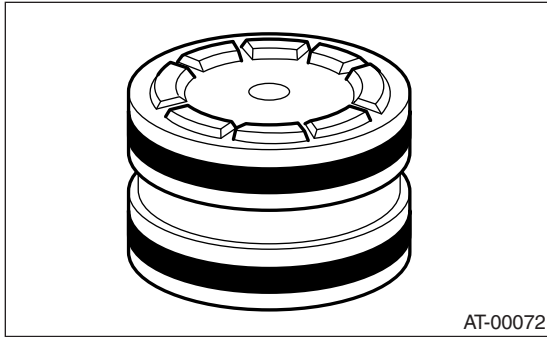


12) Remove the seal ring from accumulator piston.



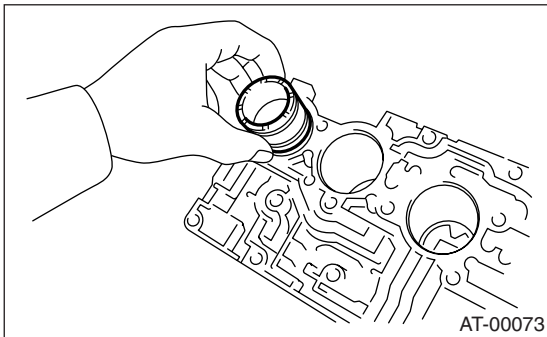
## D: ASSEMBLY

1) Install a new seal rings to accumulator piston.

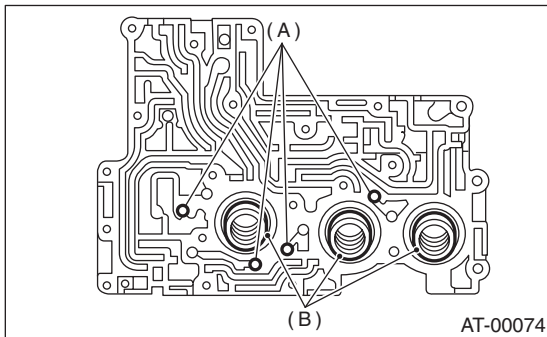


2) Apply ATF to the seal ring.

3) Insert the piston into the back of upper control valve body.



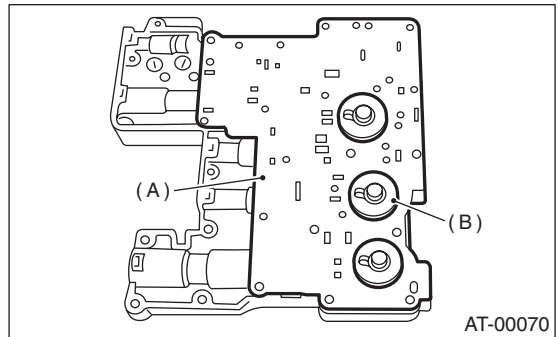
4) Install the accumulator spring and four steel balls to specified position of upper control valve body.



- (A) Steel ball
- (B) Accumulator spring

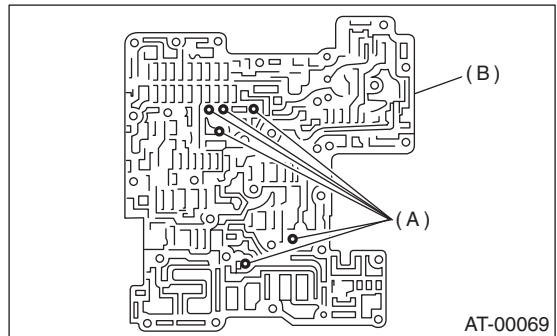
5) Align the hole of side plate and hole of upper separator plate, and then install the side plate and upper separator plate to middle control valve body.

**Tightening torque:**  
**8 N·m (0.8 kgf·m, 5.8 ft·lb)**



- (A) Upper separate plate
- (B) Side plate

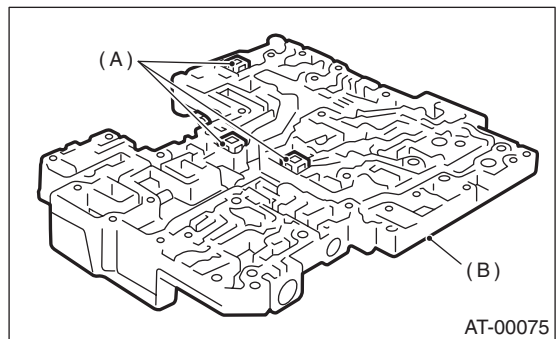
6) Insert the six steel balls to specified position of middle control valve body.



- (A) Steel ball
- (B) Middle control valve body

7) Install the three oil filter to lower valve body.

**NOTE:**  
 Pay attention to the oil filter position.

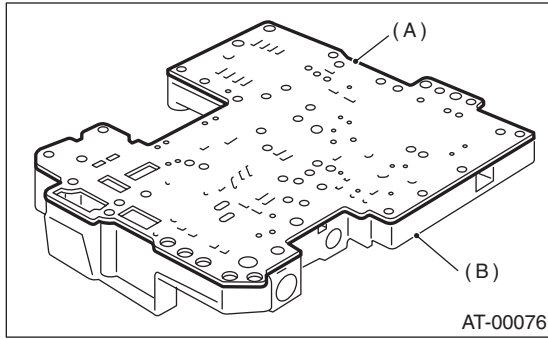


- (A) Oil filter
- (B) Lower control valve body

# Control Valve Body

## AUTOMATIC TRANSMISSION

8) Install the lower separate plate to lower control valve body.

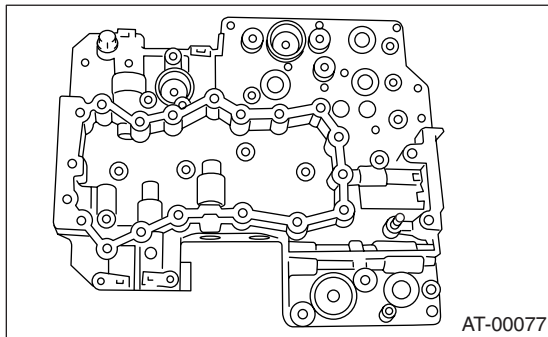


- (A) Lower separator plate
- (B) Lower control valve body

9) Temporarily assemble the valve body.

**NOTE:**

Be careful not to drop the oil filter of lower control valve body or steel balls in middle control valve body and upper control valve body.



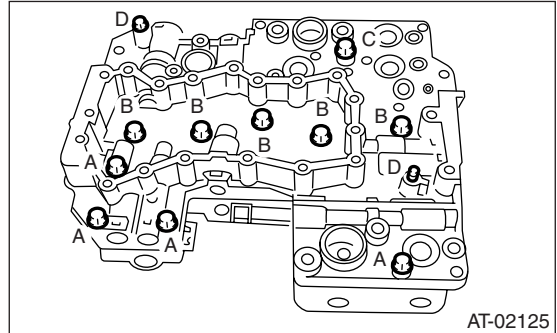
10) Tighten the bolt.

**NOTE:**

Install the bolt (D) from upper control valve body side.

**Tightening torque:**

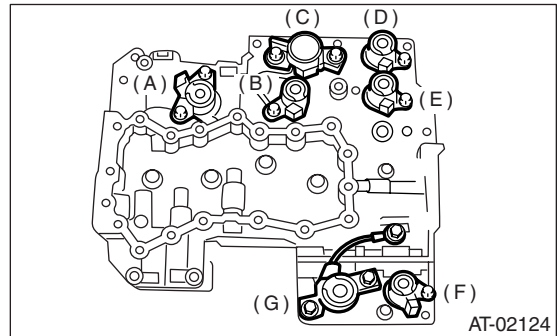
**8 N·m (0.8 kgf-m, 5.8 ft-lb)**



Bolt length mm (in)

- (A) 40 (1.57)
- (B) 62 (2.44)
- (C) 73 (2.87)
- (D) 79 (3.11)

11) Insert solenoid and duty solenoid into the specified position.

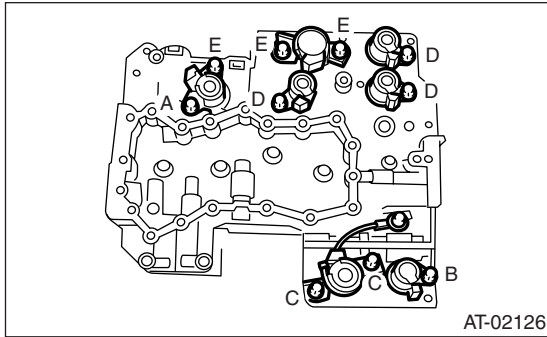


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

12) Tighten the bolt and nut.

**Tightening torque:**

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**



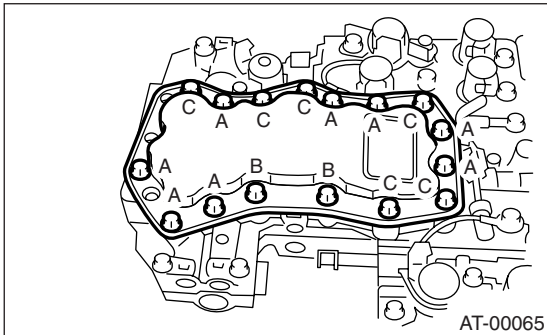
Bolt length mm (in)

- (A) 12 (0.47)
- (B) 40 (1.57)
- (C) 45 (1.77)
- (D) 62 (2.44)
- (E) 73 (2.87)

13) Install the oil strainer to lower control valve body.

**Tightening torque:**

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**



Bolt length mm (in)

- (A) 12 (0.47)
- (B) 62 (2.44)
- (C) 81 (3.19)

**E: INSPECTION**

Make sure that each component is free of harmful gouges, cuts or dust.



### 18. Air Bleeding of Control Valve

#### A: PROCEDURE

- 1) Lift-up the vehicle with shifting the select lever to "P" range and applying the parking brake.
- 2) Connect the Subaru Select Monitor to the vehicle.
- 3) Make sure there is no trouble code using Subaru Select Monitor.
- 4) Using Subaru Select Monitor, check that the ATF temperature is in less than 60°C (140°F). <Ref. to 4AT(H4SO)-2, PROCEDURE, Basic Diagnostic Procedure.>
- 5) Power OFF the Subaru Select Monitor.
- 6) Turn the ignition switch to "OFF".
- 7) Shift the select lever to "R" range.
- 8) Depress the brake pedal fully until the air bleeding is completed.
- 9) Turn the ignition switch to ON.
- 10) Shift the select lever to "P" range, and then wait for more than 3 seconds.
- 11) Shift the select lever to "R" range, and then wait for more than 3 seconds.
- 12) Shift the select lever to "N" range, and then wait for more than 3 seconds.
- 13) Shift the select lever to "D" range, and then wait for more than 3 seconds.
- 14) Shift the select lever to "N" range, and then wait for more than 3 seconds.
- 15) Slightly depress the accelerator pedal fully.
- 16) Slightly release the accelerator pedal fully.
- 17) Start the engine.
- 18) Shift the select lever to "D" range.
- 19) Turn the Subaru Select Monitor switch to ON.
- 20) Select {Each System Check} in «Main Menu» of Subaru Select Monitor.
- 21) On the «System Selection Menu» display screen, select the "Transmission". Air bleeding of control valve starts on transmission. At this time, the POWER indicator light in combination meter blinks at 2 Hz. When the POWER indicator light does not blink, repeat the procedures from step 4).
- 22) Air bleeding of control valve is finished when blinking of POWER indicator light in combination meter changes from 2 Hz to 0.5 Hz.

#### NOTE:

When blinking of POWER indicator light changes from 2 Hz to 4 Hz during air bleeding, repeat the procedure from step 4).

- 23) Shift the select lever to "N" range, and then turn the ignition switch to OFF.
- 24) Shift the select lever to the "P" range, and then finish the air bleeding.

## 19. Shift Solenoids, Duty Solenoids and ATF Temperature Sensor

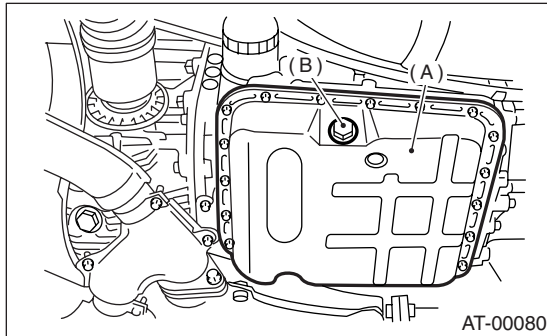
### A: REMOVAL

#### 1. SHIFT SOLENOID AND DUTY SOLENOID

- 1) Lift-up the vehicle.
- 2) Clean the transmission exterior.
- 3) Drain the ATF completely.
- 4) Replace the gasket with new one, and then tighten the drain plug (ATF).

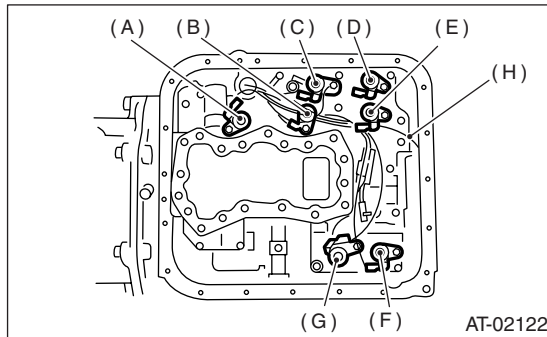
#### Tightening torque:

**25 N·m (2.5 kgf-m, 18.1 ft-lb)**



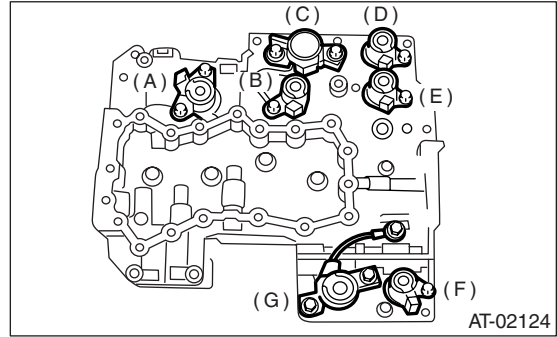
- (A) Oil pan
- (B) Drain plug (ATF)

- 5) Remove the oil pan.
- 6) Disconnect the solenoid and duty solenoid connectors.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

- 7) Remove the solenoid and duty solenoid.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

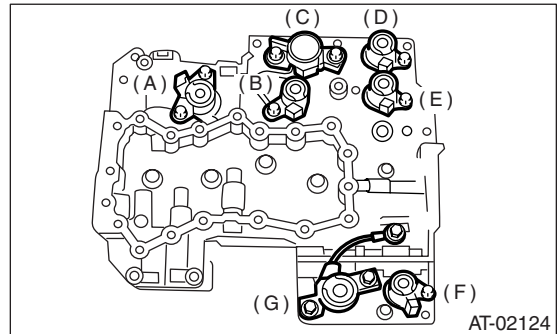
#### 2. ATF TEMPERATURE SENSOR

For removal procedure of the ATF temperature sensor, refer to "Front Vehicle Speed Sensor". <Ref. to 4AT-55, REMOVAL, Front Vehicle Speed Sensor.>

### B: INSTALLATION

#### 1. SHIFT SOLENOID AND DUTY SOLENOID

- 1) Insert the solenoid and duty solenoid into the specified position.



- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)

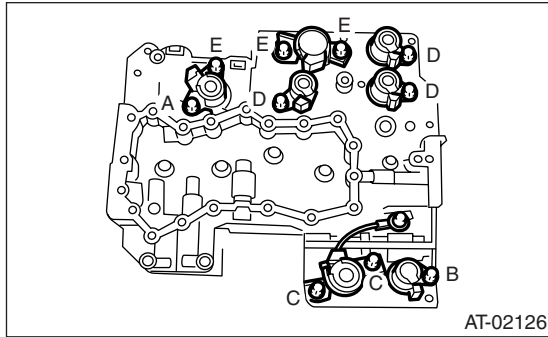
# Shift Solenoids, Duty Solenoids and ATF Temperature Sensor

## AUTOMATIC TRANSMISSION

2) Tighten the bolt and nut.

### Tightening torque:

**8 N·m (0.8 kgf·m, 5.8 ft·lb)**

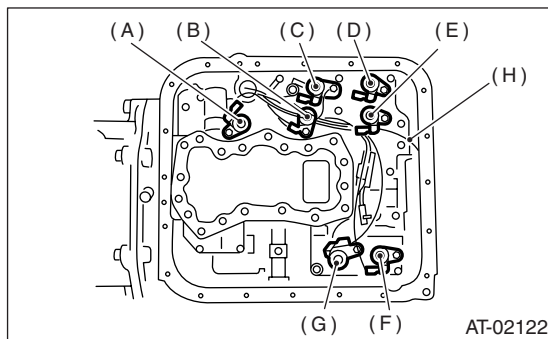


Bolt length mm (in)

- (A) 12 (0.47)
- (B) 40 (1.57)
- (C) 45 (1.77)
- (D) 62 (2.44)
- (E) 73 (2.87)

3) Connect the harness connectors.

Connect the connectors of same color, and connect the connectors to control valve body using clips.

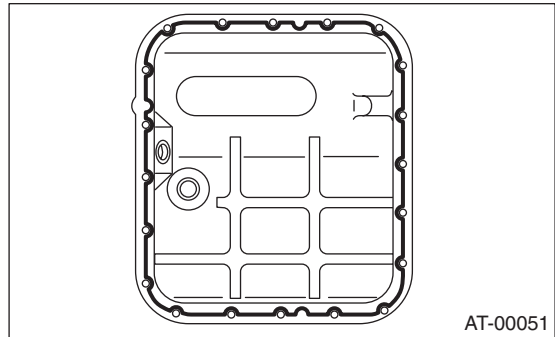


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) Transfer duty solenoid (Brown)

4) Apply proper amount of liquid gasket to the entire oil pan mating surface.

### Liquid gasket:

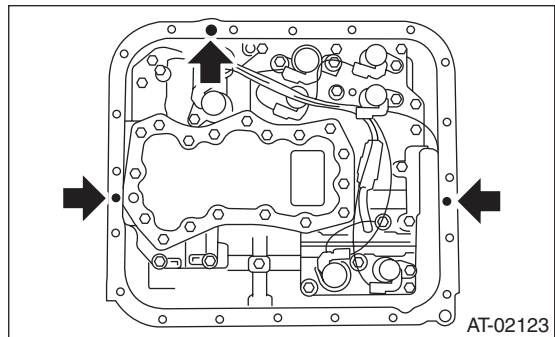
**THREE BOND 1217B (Part No. K0877YA020)**



5) Fill liquid gasket to holes except for bolt holes (three) of transmission case.

### Liquid gasket:

**THREE BOND 1217B (Part No. K0877YA020)**



6) Install the oil pan with equally tighten the bolts.

### Tightening torque:

**5 N·m (0.5 kgf·m, 3.6 ft·lb)**

7) Pour ATF from the ATF charge pipe. <Ref. to 4AT-30, Automatic Transmission Fluid.>

8) Check the ATF level. <Ref. to 4AT-30, Automatic Transmission Fluid.>

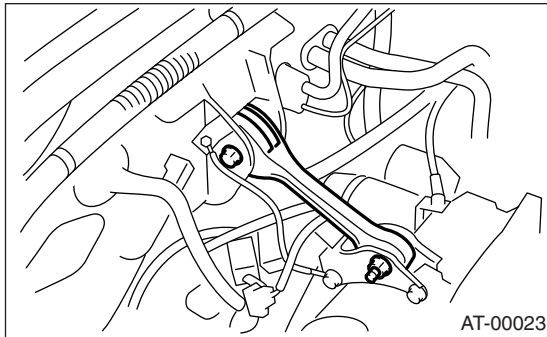
## 2. ATF TEMPERATURE SENSOR

For installation procedure of the ATF temperature sensor, refer to "Front Vehicle Speed Sensor". <Ref. to 4AT-57, INSTALLATION, Front Vehicle Speed Sensor.>

## 20. Transfer Duty Solenoid and Valve Body

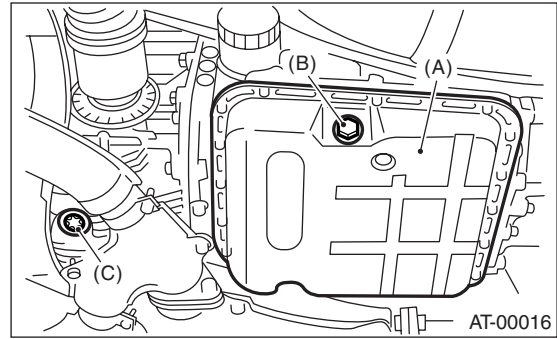
### A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.
- 3) Remove the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 4) Remove the intercooler. (Turbo model)  
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 5) Remove the pitching stopper.



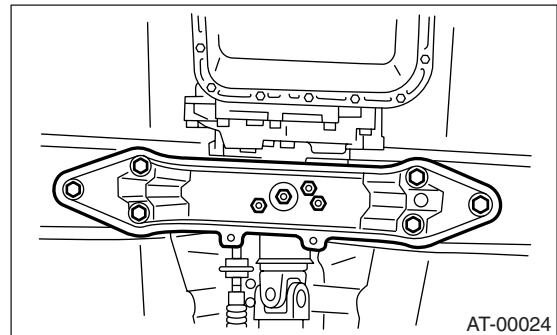
- 6) Remove the front exhaust pipe with center exhaust pipe. (Non-turbo model).  
<Ref. to EX(H4SO)-7, REMOVAL, Front Exhaust Pipe.>
- 7) Remove the center exhaust pipe. (Turbo model)  
<Ref. to EX(H4DOTC)-9, REMOVAL, Center Exhaust Pipe.>
- 8) Remove the rear exhaust pipe and muffler. (Non-turbo model).  
<Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, REMOVAL, Muffler.>
- (Turbo model)  
<Ref. to EX(H4DOTC)-14, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, REMOVAL, Muffler.>

- 9) Raise the vehicle and drain the ATF.

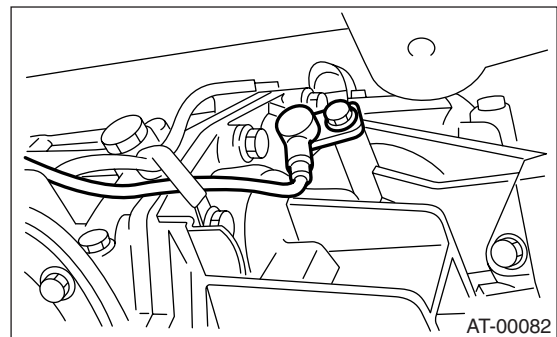


- (A) Oil pan
- (B) Drain plug (ATF)
- (C) Differential oil drain plug

- 10) Remove the heat shield cover. (If equipped)
- 11) Remove the propeller shaft.  
<Ref. to DS-15, REMOVAL, Propeller Shaft.>
- 12) Remove the transmission rear crossmember.
  - (1) Support the transmission using a transmission jack and raise slightly.
  - (2) Remove the bolts and nuts as shown in the figure.



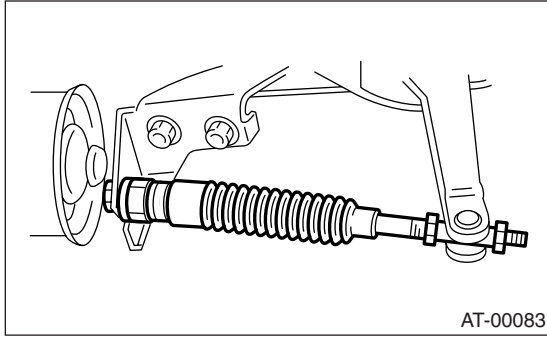
- 13) Remove the rear vehicle speed sensor.



# Transfer Duty Solenoid and Valve Body

## AUTOMATIC TRANSMISSION

14) Remove the select cable nut.



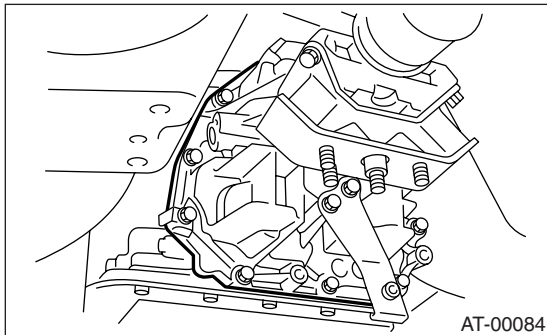
15) Move the gear select cable so that extension case securing bolts can be removed.

16) Remove the bolt.

17) Remove the extension case.

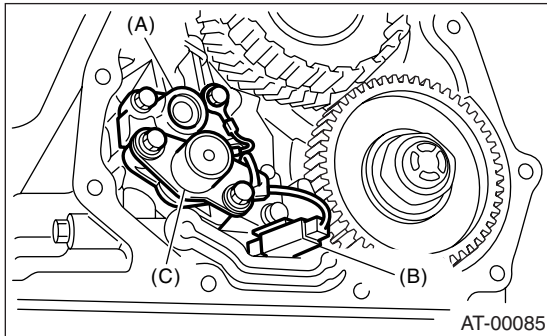
### NOTE:

Use a container to catch oil flowing from extension.



18) Disconnect the transfer duty solenoid connector.

19) Remove the transfer duty solenoid and transfer valve body.



- (A) Transfer valve body
- (B) Transfer duty solenoid connector
- (C) Transfer duty solenoid

## B: INSTALLATION

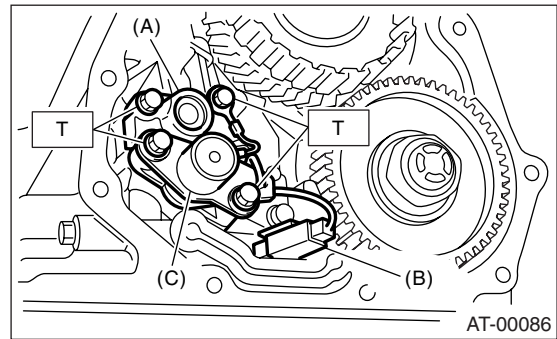
1) Install the transfer duty solenoid and transfer valve body.

(1) Install the transfer duty solenoid and transfer valve body.

### Tightening torque:

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**

(2) Connect the transfer duty solenoid connector.



- (A) Transfer valve body
- (B) Transfer duty solenoid connector
- (C) Transfer duty solenoid

2) Replace the gasket with a new one, and then install the extension case to transmission case.

(1) Tighten eleven bolts.

### Tightening torque:

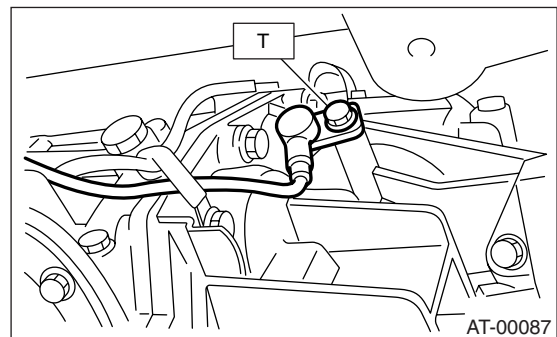
**25 N·m (2.5 kgf-m, 18.1 ft-lb)**

(2) Adjust the select cable. <Ref. to CS-14, ADJUSTMENT, Select Cable.>

3) Install the rear vehicle speed sensor.

### Tightening torque:

**7 N·m (0.7 kgf-m, 5.1 ft-lb)**



# Transfer Duty Solenoid and Valve Body

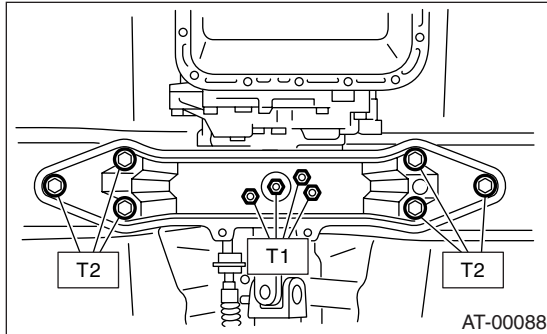
AUTOMATIC TRANSMISSION

- 4) Install the transmission rear crossmember.  
(1) Tighten the bolt.

**Tightening torque:**

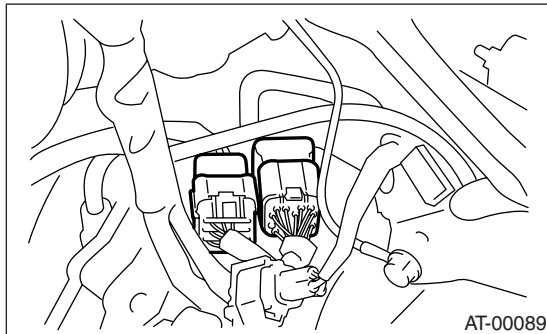
**T1: 35 N·m (3.6 kgf-m, 26 ft-lb)**

**T2: 70 N·m (7.1 kgf-m, 51 ft-lb)**



- (2) Remove the transmission jack.

- 5) Install the propeller shaft.  
<Ref. to DS-16, INSTALLATION, Propeller Shaft.>
- 6) Install the front, center, rear exhaust pipes and muffler. (Non-turbo model)  
<Ref. to EX(H4SO)-8, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO)-11, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
- 7) Install the center, rear exhaust pipe and muffler. (Turbo model)  
<Ref. to EX(H4DOTC)-10, INSTALLATION, Center Exhaust Pipe.> <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>
- 8) Connect the transmission harness connector.

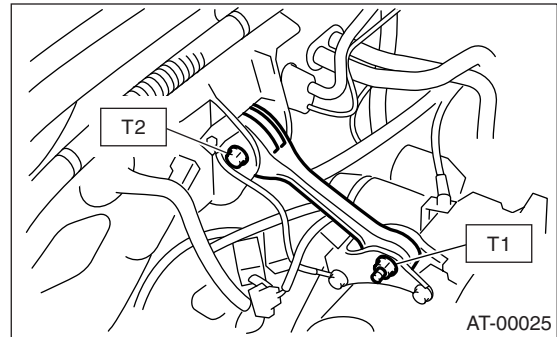


- 9) Install the pitching stopper.

**Tightening torque:**

**T1: 50 N·m (5.1 kgf-m, 37 ft-lb)**

**T2: 58 N·m (5.9 kgf-m, 43 ft-lb)**



- 10) Install the air cleaner case. (Non-turbo model)  
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
- 11) Install the intercooler. (Turbo model)  
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
- 12) Pour ATF from the ATF charge pipe. <Ref. to 4AT-30, Automatic Transmission Fluid.>
- 13) Check the ATF level. <Ref. to 4AT-30, Automatic Transmission Fluid.>

## 21. ATF Filter

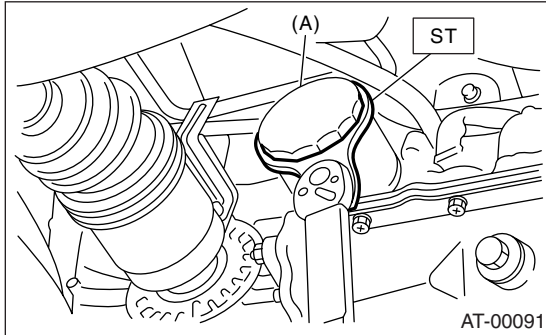
### A: REMOVAL

**NOTE:**

The ATF filter is maintenance free.

- 1) Lift-up the vehicle.
- 2) Using ST, remove the ATF filter.

ST 498545400 OIL FILTER WRENCH



(A) ATF filter

### B: INSTALLATION

- 1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
- 2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
- 3) Tighten the ATF filter using ST.

Calculate the ATF filter tightening torque using following formula.

$$T2 = L2 / (L1 + L2) \times T1$$

T1: 14 N·m (1.4 kgf·m, 10.1 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST length 78 mm (3.07 in)

L2: Torque wrench length

Example:

Torque wrench length mm (in)	Tightening torque N·m (kgf·m, ft·lb)
100 (3.94)	7.7 (0.79, 5.7)
150 (5.91)	9.0 (0.92, 6.7)
200 (7.87)	9.8 (1.0, 7.2)

**NOTE:**

Align the ST with torque wrench while tightening the ATF filter.

ST 498545400 OIL FILTER WRENCH

- 4) Fill ATF.
- 5) Check the level of the ATF. <Ref. to 4AT-30, Automatic Transmission Fluid.>

### C: INSPECTION

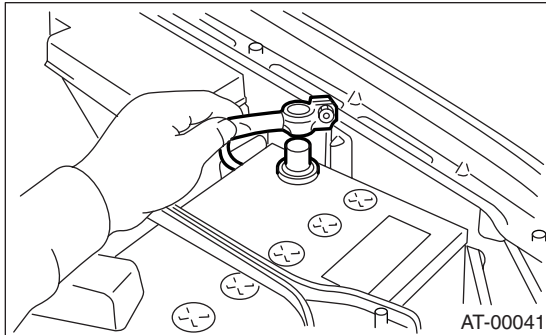
- Replace the part if any defect is found from the inspection.
- Check for rust, hole, ATF leaks and other damage.



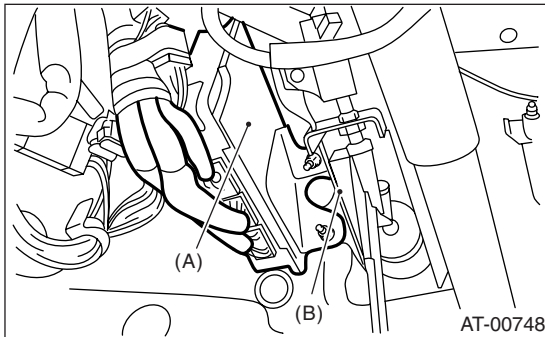
## 22. Transmission Control Module (TCM)

### A: REMOVAL

- 1) Disconnect the ground cable from battery.

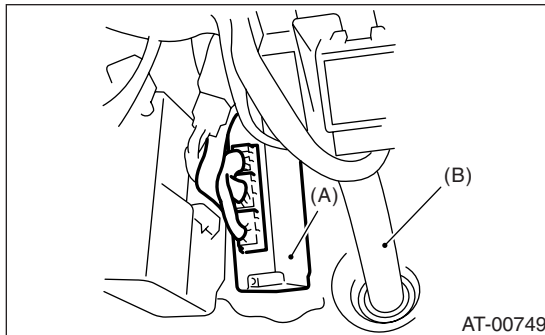


- 2) Remove the lower cover and then disconnect the connector.
  - 3) Disconnect the connectors from TCM.
- LHD model



- (A) Transmission control module (TCM)
- (B) Brake pedal

- RHD model



- (A) Transmission control module (TCM)
- (B) Steering column

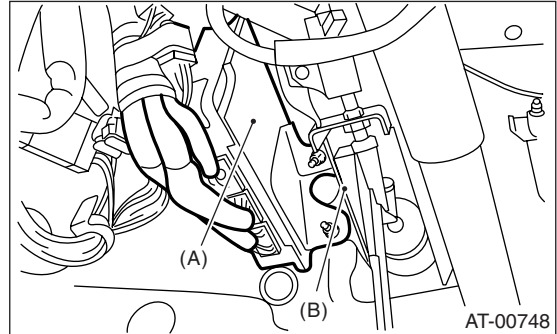
- 4) Remove the TCM.

### B: INSTALLATION

- 1) Install the TCM.
- LHD model

#### Tightening torque:

**25 N·m (2.5 kgf-m, 18.1 ft-lb)**

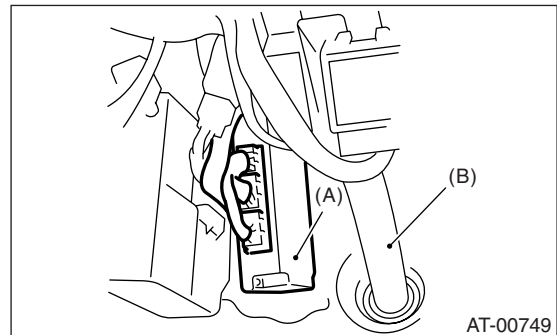


- (A) Transmission control module (TCM)
- (B) Brake pedal

- RHD model

#### Tightening torque:

**18 N·m (1.8 kgf-m, 13.0 ft-lb)**



- (A) Transmission control module (TCM)
- (B) Steering column

- 2) Connect the connectors to TCM.
- 3) Install in the reverse order of removal.

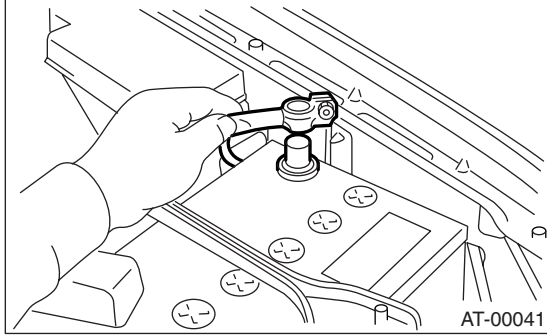
# Dropping Resistor

AUTOMATIC TRANSMISSION

## 23. Dropping Resistor

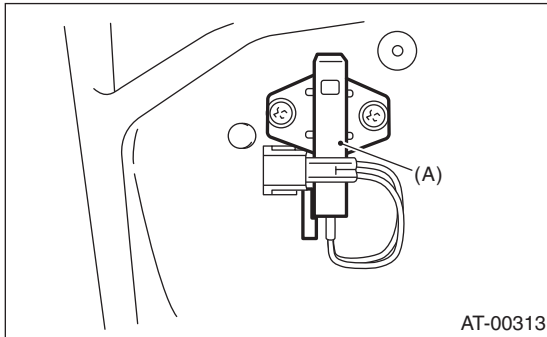
### A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector from dropping resistor.

3) Remove the dropping resistor.



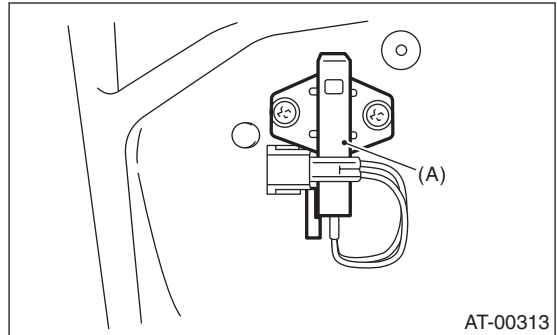
(A) Dropping resistor

### B: INSTALLATION

Install in the reverse order of removal.

**Tightening torque:**

**6.4 N·m (0.65 kgf·m, 4.7 ft-lb)**



(A) Dropping resistor

### C: INSPECTION

Step	Check	Yes	No
<b>1 CHECK RESISTOR.</b> 1) Turn the ignition switch to OFF. 2) Disconnect the connector from dropping resistor. 3) Measure the resistance between dropping resistors. <b>Terminals</b> <b>No. 1 — No. 2:</b>	Is the resistance 9 — 15 Ω?	Go to step 2.	Replace the dropping resistor. <Ref. to 4AT-78, Dropping Resistor.>
<b>2 CHECK RESISTOR.</b> Measure the resistance between dropping resistors. <b>Terminals</b> <b>No. 3 — No. 4:</b>	Is the resistance 9 — 15 Ω?	Dropping resistor is normal.	Replace the dropping resistor. <Ref. to 4AT-78, Dropping Resistor.>

## 24. ATF Cooler Pipe and Hose

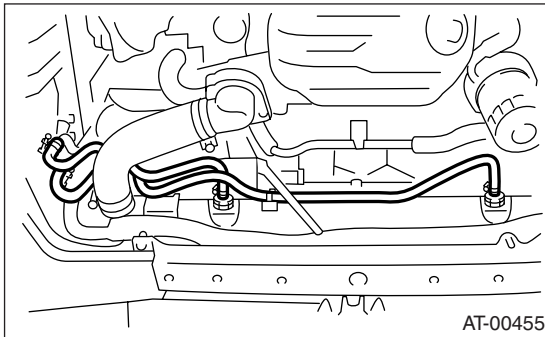
### A: REMOVAL

#### 1. EXCEPT WITH ATF COOLER MODEL (WITH WARMER FUNCTION)

- 1) Set the vehicle on a lift.
- 2) Remove the battery and washer tank.
- 3) Lift-up the vehicle.
- 4) Remove the under cover.
- 5) Disconnect the ATF cooler hose from radiator. (Turbo model)  
<Ref. to CO(H4SO)-29, TURBO MODEL, REMOVAL, Radiator.>
- 6) Disconnect the ATF cooler hose from radiator. (Non-turbo model)

**NOTE:**

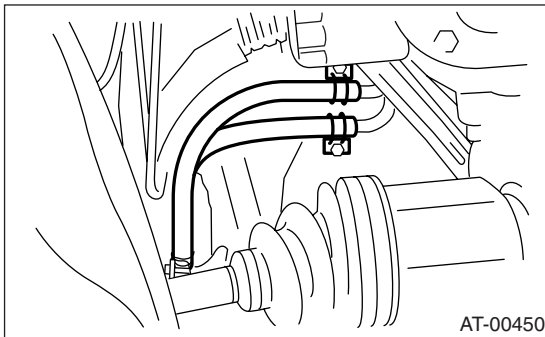
- Do not use a screwdriver or other pointed tools.
- When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.



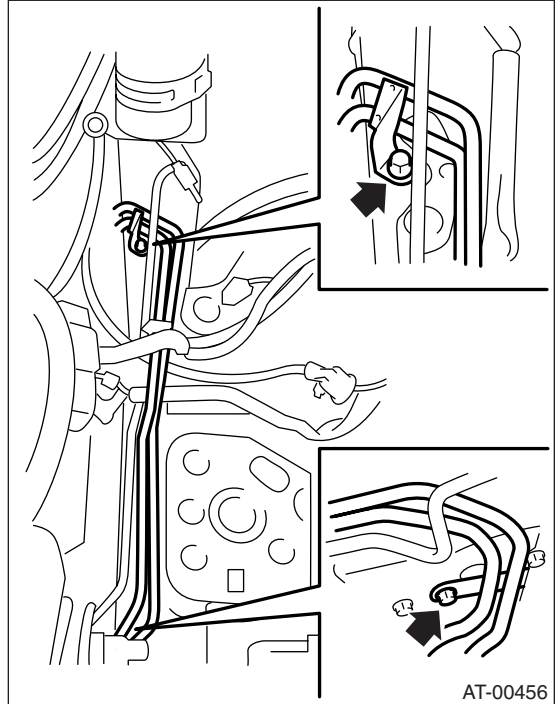
- 7) Disconnect the ATF cooler hoses from pipes.

**NOTE:**

- Do not use a screwdriver or other pointed tools.
- When hard to remove the hose, wrap the hose with cloth to prevent from damaging, and then turn with pliers and pull out with hand straightly.



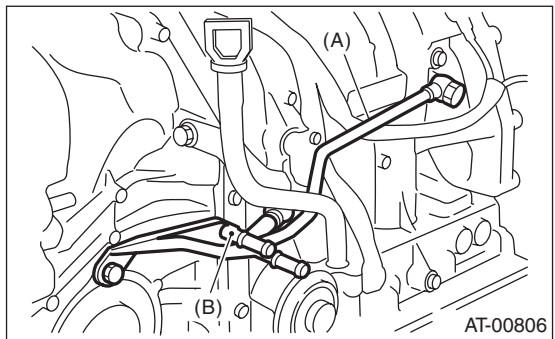
- 8) Disconnect the ATF cooler pipe from frame.



- 9) Remove the ATF cooler inlet and outlet pipes.

**CAUTION:**

When disconnecting the outlet pipe, be careful not to lose the ball and spring used with retaining screw.



- (A) ATF cooler inlet pipe
- (B) ATF cooler outlet pipe

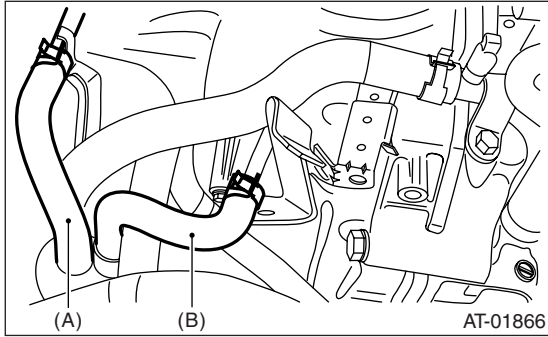
#### 2. WITH ATF COOLER MODEL (WITH WARMER FUNCTION)

- 1) Set the vehicle on a lift.
- 2) Remove the air cleaner case. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

# ATF Cooler Pipe and Hose

## AUTOMATIC TRANSMISSION

3) Remove the inlet and outlet hoses.

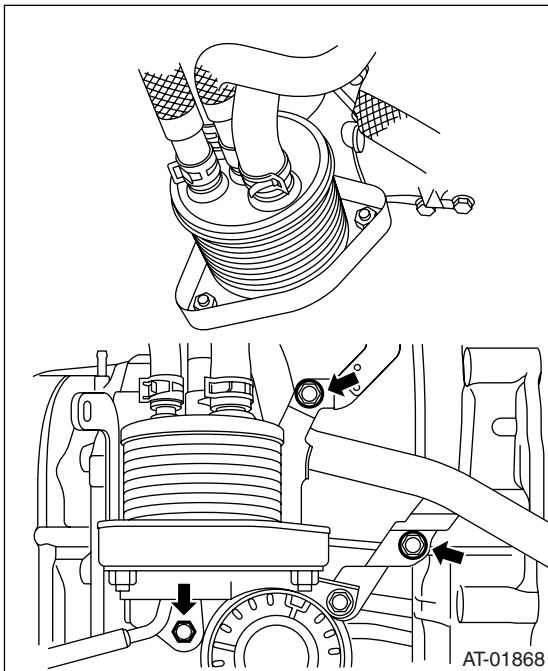


- (A) Inlet hose
- (B) Outlet hose

4) Disconnect the transmission harness connector and remove it from the stay.

5) Remove the oil charger pipe. <Ref. to 4AT-88, REMOVAL, Oil Charger Pipe.>

6) Remove the ATF cooler assembly and away from the transmission body.

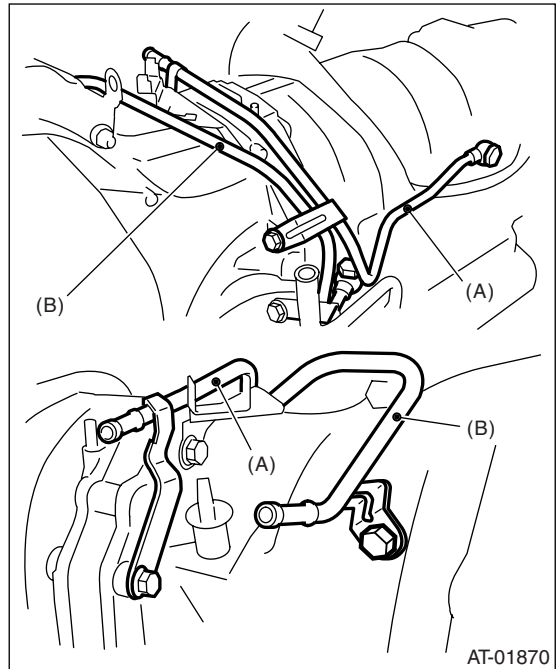


7) Remove the air breather hose. <Ref. to 4AT-87, REMOVAL, Air Breather Hose.>

8) Remove the oil cooler inlet and outlet pipes.

### CAUTION:

When disconnecting the outlet pipe, be careful not to lose the ball and spring used with retaining screw.



- (A) ATF cooler outlet pipe
- (B) ATF cooler inlet pipe

## B: INSTALLATION

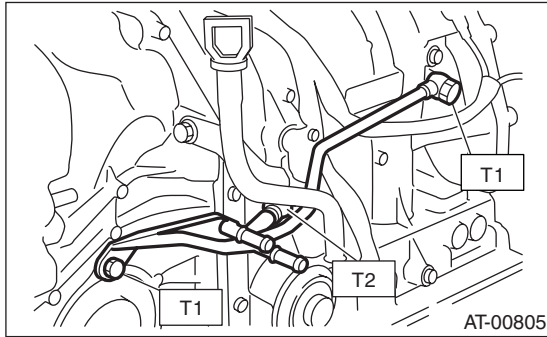
### 1. EXCEPT WITH ATF COOLER MODEL (WITH WARMER FUNCTION)

1) Install the ATF oil cooler inlet pipe and outlet pipe with new washer.

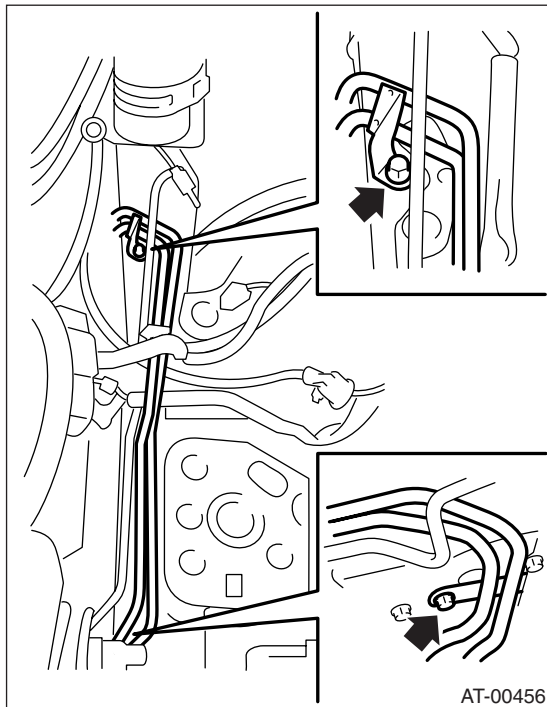
#### Tightening torque:

**T1: 25 N·m (2.5 kgf-m, 18.1 ft-lb)**

**T2: 45 N·m (4.6 kgf-m, 33.2 ft-lb)**



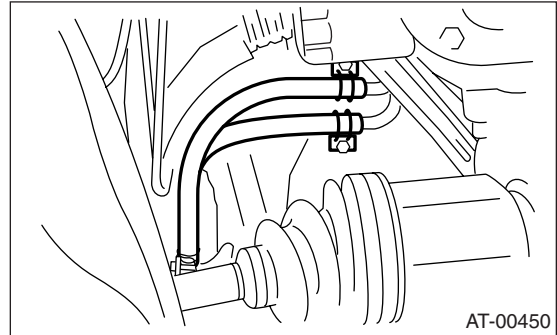
2) Install the ATF cooler pipe to frame.



3) Connect the ATF cooler hose to pipe on transmission side.

#### NOTE:

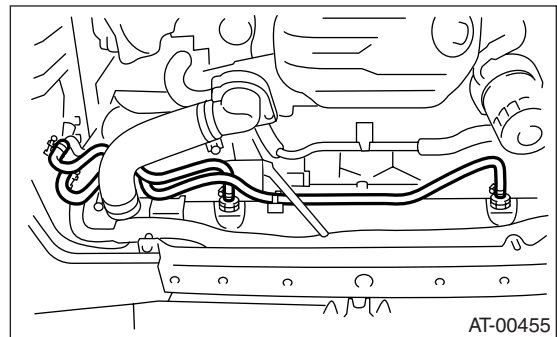
- Install so that the hose is not folded over, excessively bent, or twisted.
- Be careful to insert the hose to the specified position.



4) Connect the ATF cooler hose to pipe on radiator side. (Non-turbo model)

#### NOTE:

- Install so that the hose is not folded over, excessively bent, or twisted.
- Be careful to insert the hose to the specified position.



5) Connect the ATF cooler hose to pipe on radiator side. (Turbo model)

<Ref. to CO(H4SO)-32, TURBO MODEL, INSTALLATION, Radiator.>

6) Install the under cover.

7) Install the battery and washer tank.

8) Fill ATF. <Ref. to 4AT-30, Automatic Transmission Fluid.>

#### NOTE:

Make sure there are no ATF leaks in joints between the transmission, radiator, pipes, and hoses.

# ATF Cooler Pipe and Hose

## AUTOMATIC TRANSMISSION

### 2. WITH ATF COOLER MODEL (WITH WARMER FUNCTION)

1) Install the ATF cooler inlet and outlet pipe with new washer.

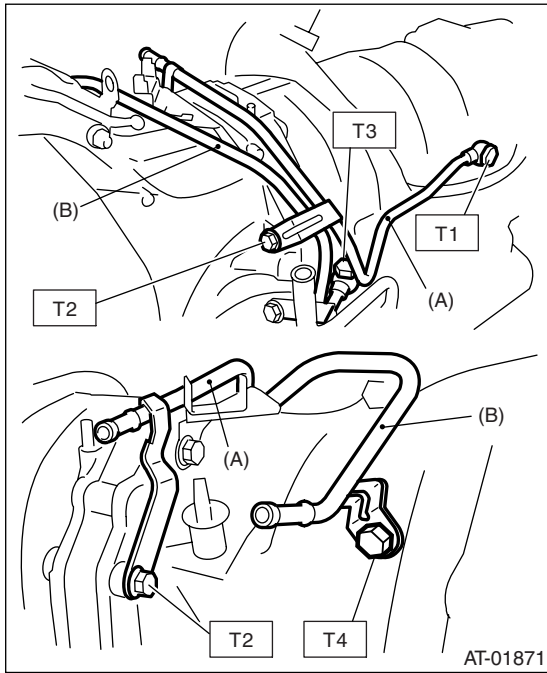
#### Tightening torque:

**T1: 25 N·m (2.5 kgf-m, 18.1 ft-lb)**

**T2: 41 N·m (4.2 kgf-m, 30.4 ft-lb)**

**T3: 45 N·m (4.6 kgf-m, 33.2 ft-lb)**

**T4: 21 N·m (2.1 kgf-m, 15.5 ft-lb)**



(A) ATF cooler outlet pipe

(B) ATF cooler inlet pipe

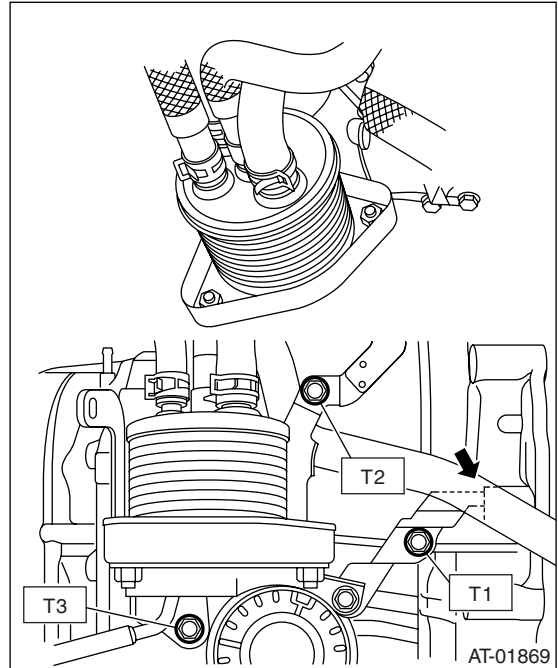
2) Install the ATF cooler assembly to transmission.

#### Tightening torque:

**T1: 21 N·m (2.1 kgf-m, 15.5 ft-lb)**

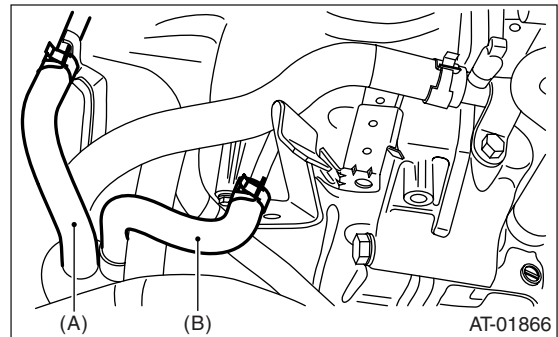
**T2: 23 N·m (2.3 kgf-m, 17.0 ft-lb)**

**T3: 33 N·m (3.4 kgf-m, 24.3 ft-lb)**



3) Install the oil charger pipe. <Ref. to 4AT-88, INSTALLATION, Oil Charger Pipe.>

4) Install the inlet and outlet hoses.



(A) Inlet hose

(B) Outlet hose

5) Install the inhibitor switch and transmission harness connector to the stay, and connect the harness connector.

6) Install the air breather hose. <Ref. to 4AT-87, INSTALLATION, Air Breather Hose.>

7) Install the air cleaner case. <Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

## **C: INSPECTION**

Repair or replace any defective hoses, pipes, clamps, and washers found from the inspection below.

- 1) Check for ATF leaks in joints between the transmission, radiator, pipes, and hoses.
- 2) Check for deformed clamps.
- 3) Lightly bend the hose and check for cracks in the surface and other damage.
- 4) Pinch the hose with your fingers and check for poor elasticity. Also check for poor elasticity in the parts where the clamp was installed by pressing with your fingernail.
- 5) Check for peeling, cracks, and deformation at the tip of the hose.



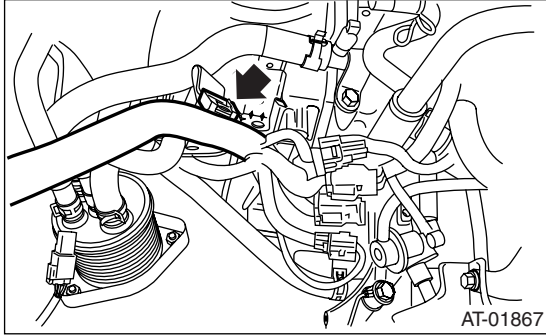
# ATF Cooler (With Warmer Function)

AUTOMATIC TRANSMISSION

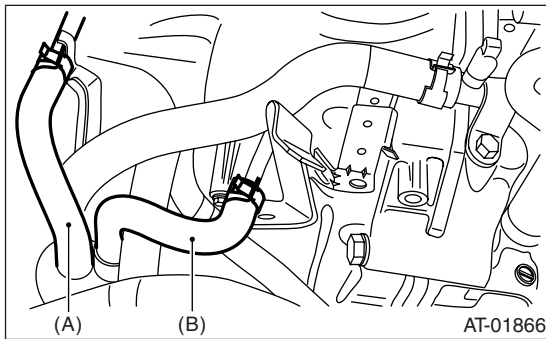
## 25. ATF Cooler (With Warmer Function)

### A: REMOVAL

- 1) Drain engine coolant. <Ref. to CO(H4SO)-19, REPLACEMENT, Engine Coolant.>
- 2) Remove the air cleaner case. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 3) Remove the harness from bracket.

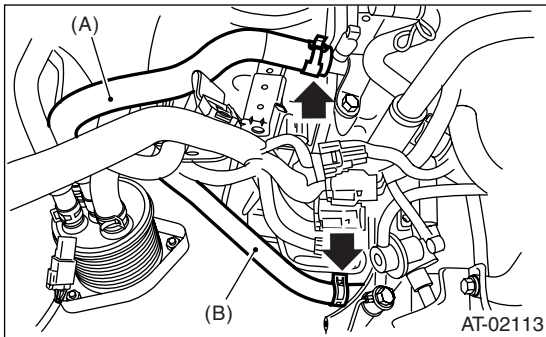


- 4) Disconnect the hose from pipe of transmission.



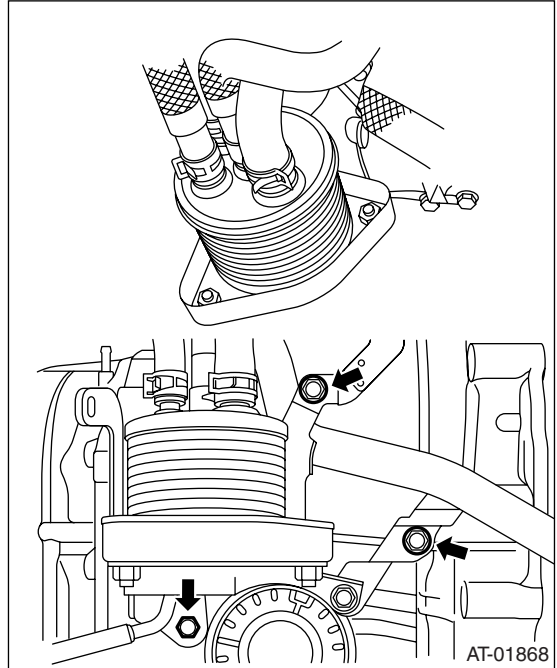
- (A) Inlet pipe
- (B) Outlet pipe

- 5) Disconnect the engine coolant inlet hose from cylinder block and the engine coolant outlet hose from upper side of engine.



- (A) Outlet hose
- (B) Inlet hose

- 6) Remove the ATF Cooler (with warmer function) from transmission body, and then disconnect the hose located lower of ATF cooler (with warmer function).



# ATF Cooler (With Warmer Function)

AUTOMATIC TRANSMISSION

## B: INSTALLATION

1) Connect the hose to lower side of ATF cooler (with warmer function), and then install the ATF cooler (with warmer function) to transmission body.

### NOTE:

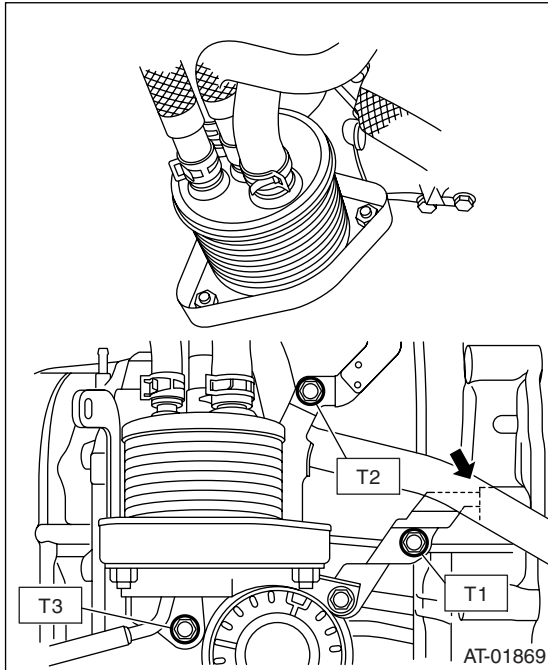
Insert the tip of ATF cooler bracket into hole of torque converter case.

### Tightening torque:

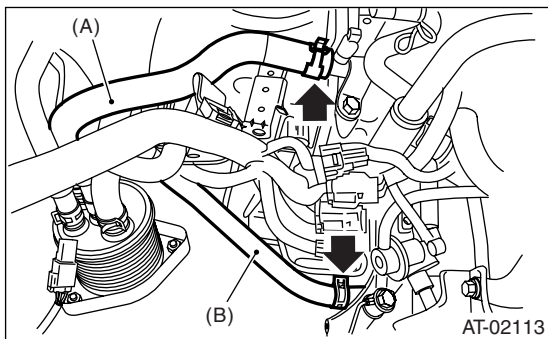
**T1: 21 N·m (2.1 kgf-m, 15.5 ft-lb)**

**T2: 23 N·m (2.3 kgf-m, 17.0 ft-lb)**

**T3: 33 N·m (3.4 kgf-m, 24.3 ft-lb)**



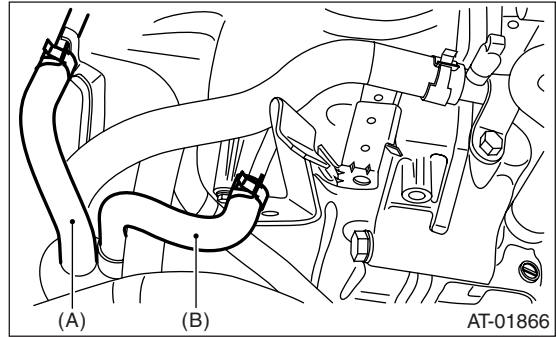
2) Connect the engine coolant inlet hose to cylinder block and the engine coolant outlet hose to upper side of engine.



(A) Outlet hose

(B) Inlet hose

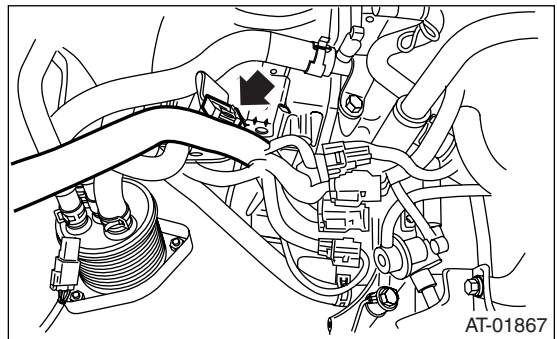
3) Connect the hose to pipe on transmission side.



(A) Inlet pipe

(B) Outlet pipe

4) Install the harness to bracket.



5) Install the air cleaner case. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

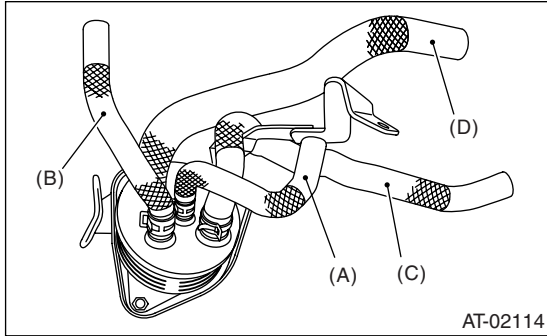
6) Fill with engine coolant. <Ref. to CO(H4SO)-19, REPLACEMENT, Engine Coolant.>

# ATF Cooler (With Warmer Function)

AUTOMATIC TRANSMISSION

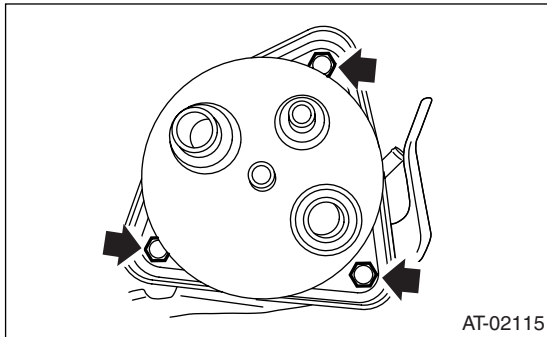
## C: DISASSEMBLY

1) Disconnect each connector from ATF cooler (with warmer function).



- (A) ATF Outlet hose
- (B) ATF Inlet hose
- (C) Engine coolant inlet hose
- (D) Engine coolant outlet hose

2) Remove the ATF cooler (with warmer function) from bracket.



## D: ASSEMBLY

Assemble in the reverse order of disassembly.

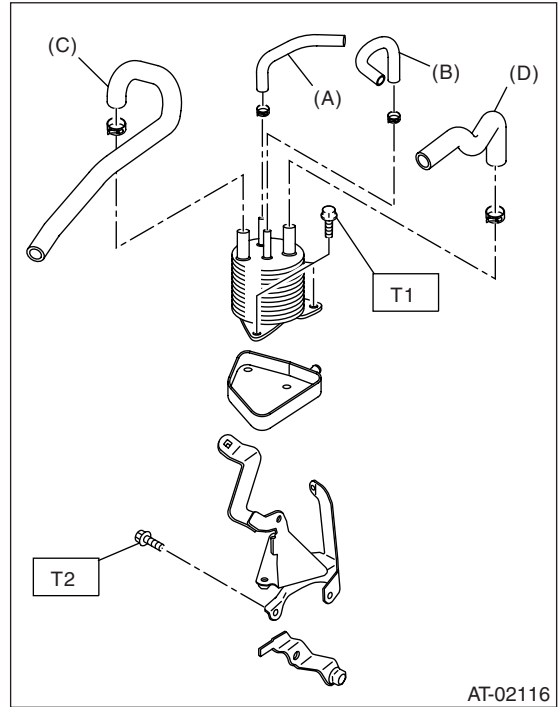
### CAUTION:

When connecting hose, be careful of its direction.

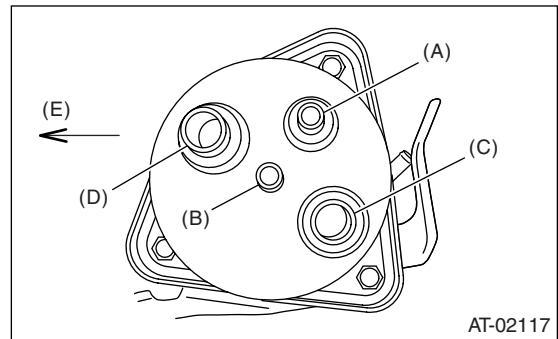
**Tightening torque:**

**T1: 23 N·m (2.3 kgf·m, 17.0 ft·lb)**

**T2: 33 N·m (3.4 kgf·m, 24.3 ft·lb)**



- (A) ATF Inlet hose
- (B) ATF Outlet hose
- (C) Engine coolant outlet hose
- (D) Engine coolant inlet hose



- (A) ATF Inlet
- (B) ATF Outlet
- (C) Engine coolant outlet
- (D) Engine coolant inlet
- (E) Forward

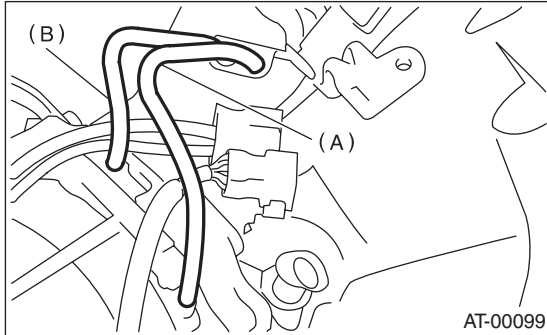
## E: INSPECTION

Check the ATF cooler (with warmer function) for damage.

## 26. Air Breather Hose

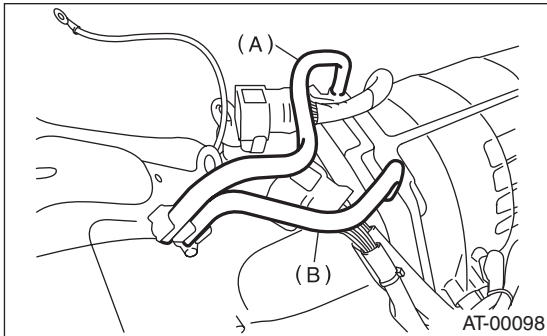
### A: REMOVAL

- 1) Remove the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 2) Remove the intercooler. (Turbo model)  
<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Disconnect the air breather hose.
  - Non-turbo model



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

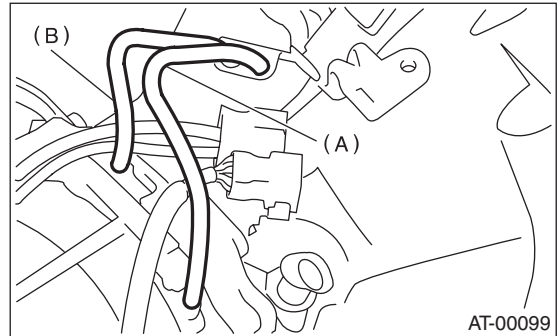
- Turbo model



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

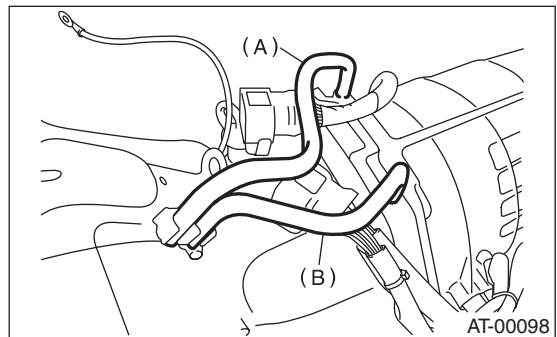
### B: INSTALLATION

- 1) Install the air breather hose.
  - Non-turbo model



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

- Turbo model



- (A) Air breather hose (Transmission case)
- (B) Air breather hose (Oil pump housing)

- 2) Install the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
- 3) Install the intercooler. (Turbo model)  
<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

### C: INSPECTION

Make sure the hose is not cracked or clogged.

# Oil Charger Pipe

AUTOMATIC TRANSMISSION

## 27.Oil Charger Pipe

### A: REMOVAL

1) Remove the air cleaner case. (Non-turbo model).

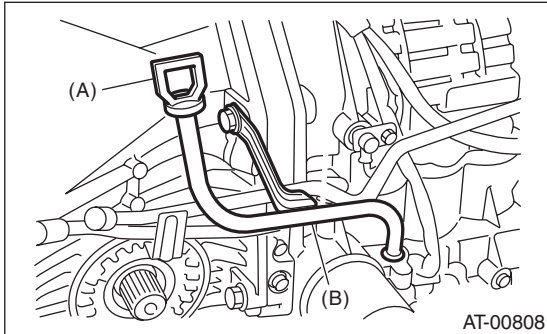
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

2) Remove the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>

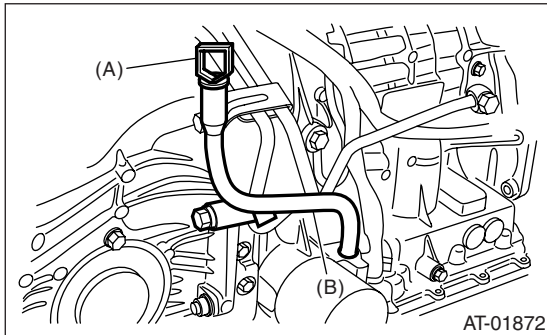
3) Remove the ATF charger pipe, and then remove the O-ring from flange side.

- Model without ATF warmer



- (A) ATF level gauge
- (B) ATF charger pipe

- Model with ATF warmer



- (A) ATF level gauge
- (B) ATF charger pipe

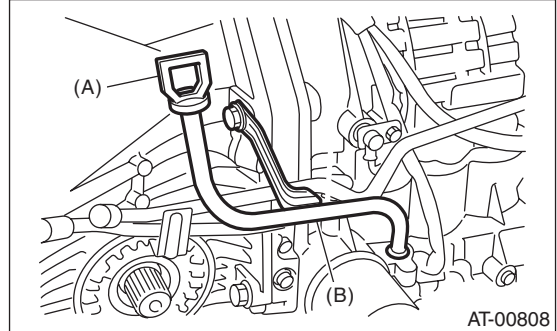
### B: INSTALLATION

1) Install the ATF charger pipe with a new O-ring.

**Tightening torque:**

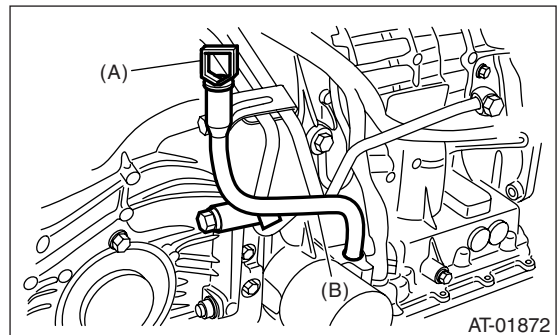
**41 N·m (4.2 kgf-m, 30.4 ft-lb)**

- Model without ATF warmer



- (A) ATF level gauge
- (B) ATF charger pipe

- Model with ATF warmer



- (A) ATF level gauge
- (B) ATF charger pipe

2) Install the air cleaner case. (Non-turbo model).  
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

3) Install the intercooler. (Turbo model)

<Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

### C: INSPECTION

Make sure the ATF charger pipe is not deformed or damaged.

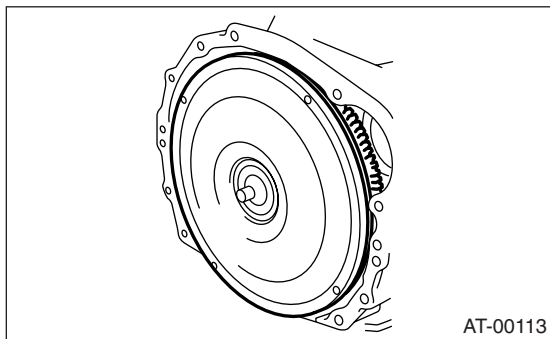
## 28. Torque Converter Clutch Assembly

### A: REMOVAL

- 1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter clutch assembly and oil pump shaft horizontally.

#### CAUTION:

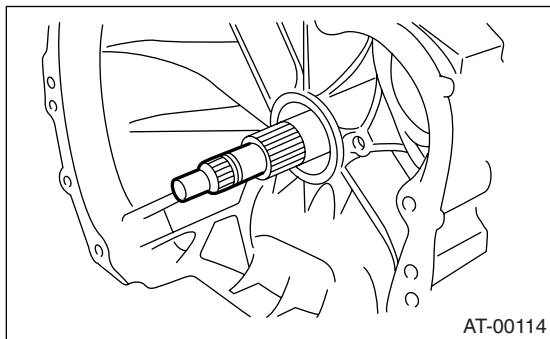
Be sure not to scratch the inside of bush in oil pump shaft.



- 3) Remove the input shaft.

#### NOTE:

When the torque converter clutch assembly is removed, the input shaft is also removed.



- 4) Remove the clips from torque converter clutch assembly.

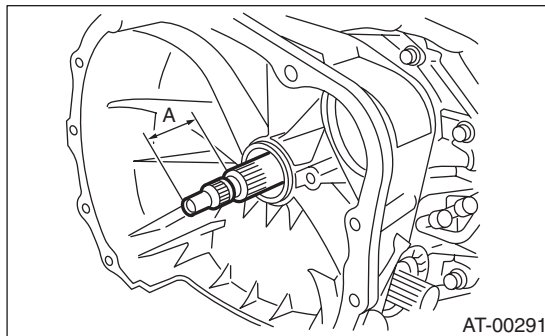
### B: INSTALLATION

- 1) Install the clip to torque converter clutch case.
- 2) Install the oil pump shaft to torque converter clutch assembly, and then make sure that the clip is secured on groove.

- 3) Insert the input shaft with rotating it by hand lightly, and then check the protrusion amount.

#### Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



- 4) With holding the torque converter clutch assembly by hands, carefully install to the torque converter clutch case. Take care not to damage the bushing. Not to contact the oil pump shaft bush and starter shaft part of oil pump cover inappropriately.
- 5) Lightly rotating the oil pump shaft by hands to engage the spline securely, and then check the dimension A of torque converter clutch case and torque converter clutch assembly.

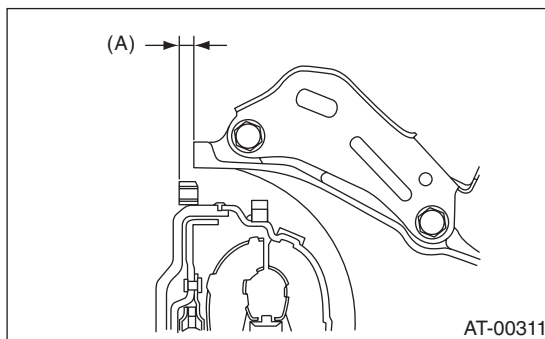
#### Dimension A:

**2.0 L NON-TURBO MODEL**

-1.3 — -1.1 mm (-0.015 — -0.043 in)

**EXCEPT FOR 2.0 L NON-TURBO MODEL**

2.7 — 2.9 mm (0.106 — 0.114 in)



(A) Dimension A

- 6) Install the transmission assembly into the vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

### C: INSPECTION

Make sure the ring gear and protrusion of torque converter clutch end is not deformed or damaged.



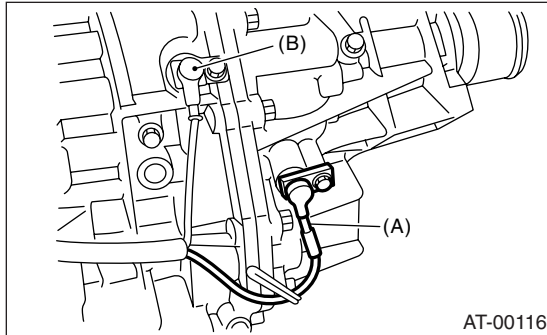
## 29.Extension Case

### A: REMOVAL

1) Remove the transmission assembly.  
 <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>

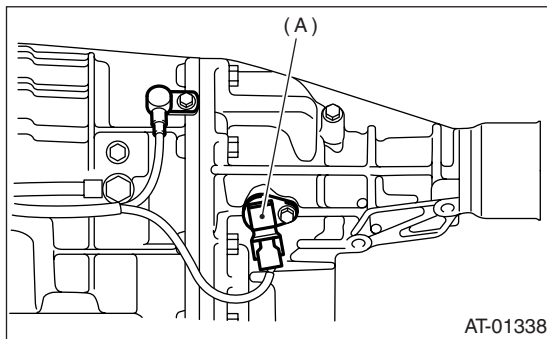
2) Remove the rear vehicle speed sensor.

- Non-turbo model



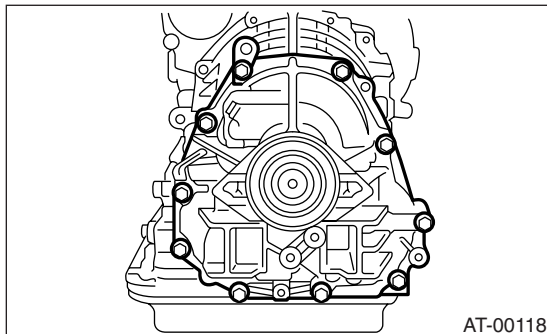
(A) Rear vehicle speed sensor  
 (B) Front vehicle speed sensor

- Turbo model



(A) Rear vehicle speed sensor

3) Separate the transmission case and extension case part.



### B: INSTALLATION

1) Apply the vaseline to selected thrust needle bearing and attach it to the end surface of reduction driven gear. <Ref. to 4AT-95, ADJUSTMENT, Transfer Clutch.>

NOTE:

Install the thrust needle bearing in correct direction.

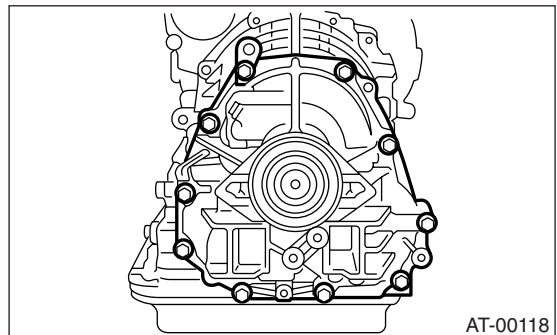
2) Install a new gasket.

3) Install the extension case to transmission case.

4) Tighten bolts to secure the extension case.

**Tightening torque:**

**25 N·m (2.5 kgf·m, 18.1 ft-lb)**

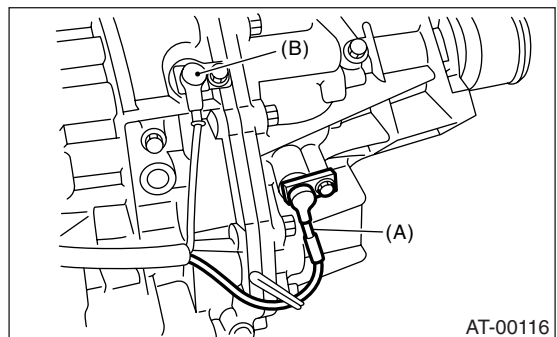


5) Install the rear vehicle speed sensor.

**Tightening torque:**

**7 N·m (0.7 kgf·m, 5.1 ft-lb)**

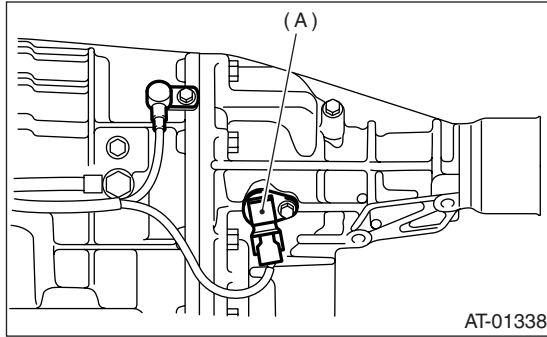
- Non-turbo model



(A) Rear vehicle speed sensor  
 (B) Front vehicle speed sensor



- Turbo model



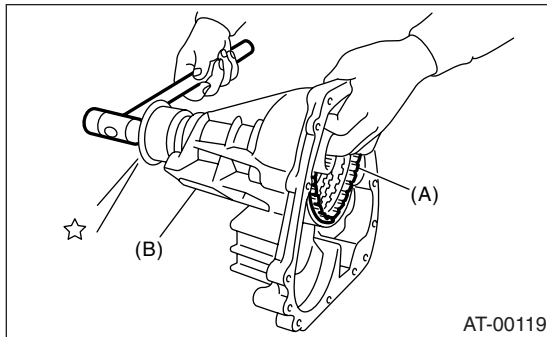
(A) Rear vehicle speed sensor

6) Install the transmission assembly.  
 <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

### C: DISASSEMBLY

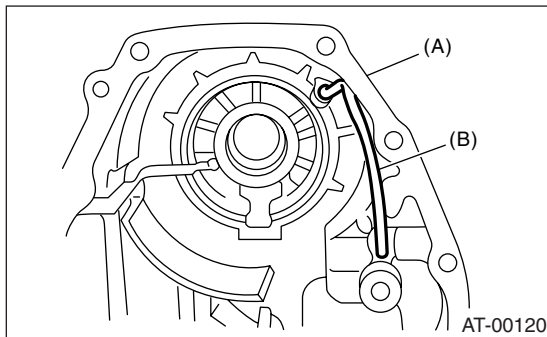
1) Take out the transfer clutch assembly by lightly tapping the end of rear drive shaft using plastic hammer and etc.

**NOTE:**  
 Be careful not to damage the oil seal of extension.



(A) Extension case  
 (B) Transfer clutch ASSY

2) Remove the transfer clutch pipe without bending the pipe.



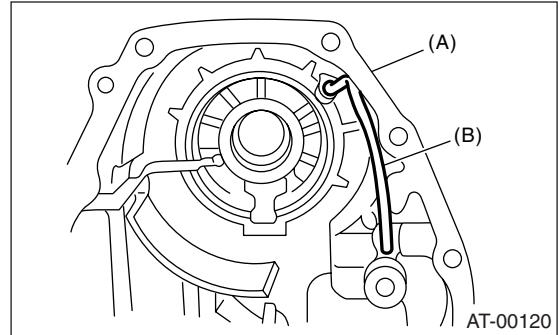
(A) Extension case  
 (B) Transfer clutch pipe

3) Remove the dust cover from extension case.

4) Remove the oil seal from the extension case.

### D: ASSEMBLY

- 1) Press-fit new oil seal using ST and press.  
 ST 498057300 INSTALLER
- 2) Press-fit the dust cover.
- 3) Install the transfer clutch pipe to extension case without bending the pipe.

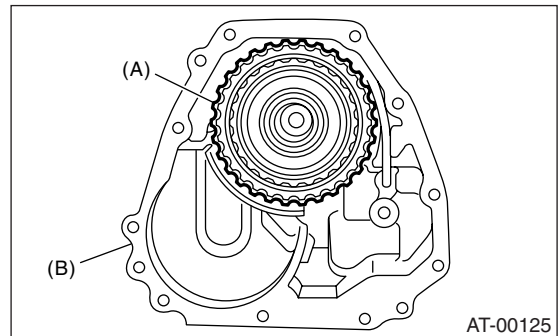


(A) Extension case  
 (B) Transfer clutch pipe

4) Install the transfer clutch assembly to the case.

**NOTE:**

- Be careful not to damage the seal ring.
- Press-fit the transfer clutch assembly to bottom of bearing shoulder completely.



(A) Transfer clutch ASSY  
 (B) Extension case

### E: INSPECTION

- Use compressed air to make sure the transfer pipe and extension case routes are not clogged and not leaks.
- Measure the extension end play and adjust it to within specifications. <Ref. to 4AT-95, ADJUSTMENT, Transfer Clutch.>

# Transfer Clutch

## AUTOMATIC TRANSMISSION

### 30. Transfer Clutch

#### A: REMOVAL

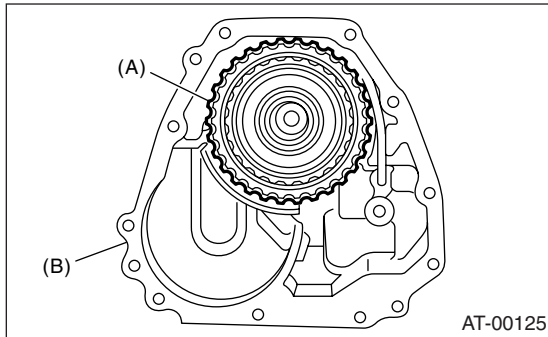
1) Remove the transmission assembly from vehicle. <Ref. to 4AT-39, REMOVAL, Automatic Transmission Assembly.>

2) Remove the extension case, and then remove the transfer clutch assembly. <Ref. to 4AT-90, REMOVAL, Extension Case.> <Ref. to 4AT-91, DISASSEMBLY, Extension Case.>

#### B: INSTALLATION

1) Select the thrust needle bearing. <Ref. to 4AT-95, ADJUSTMENT, Transfer Clutch.>

2) Install the transfer clutch assembly to the case.

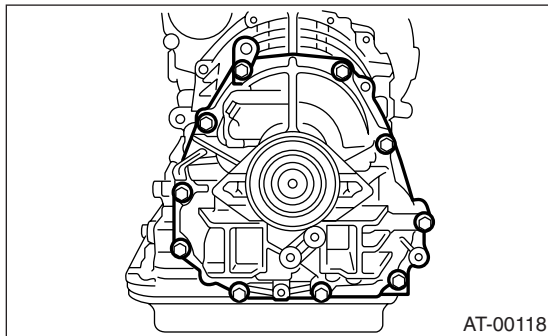


(A) Transfer clutch ASSY  
(B) Extension case

3) Tighten bolts to secure the case.

#### Tightening torque:

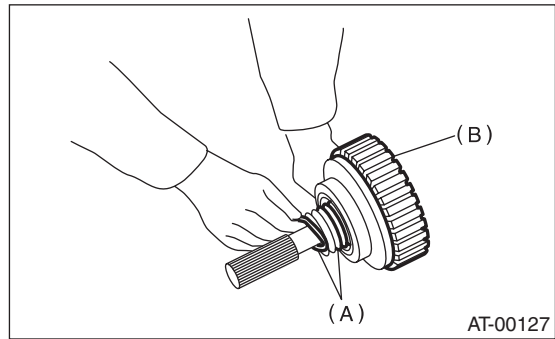
**25 N·m (2.5 kgf·m, 18.1 ft·lb)**



4) Install the transmission assembly into the vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

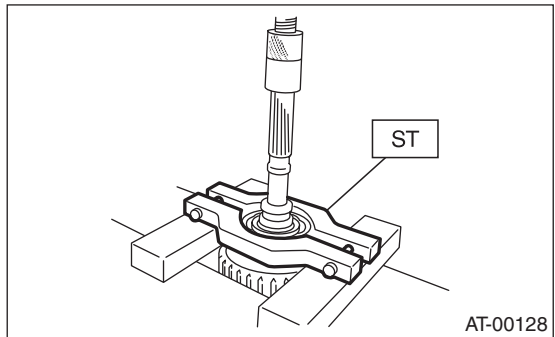
#### C: DISASSEMBLY

1) Remove the seal ring.

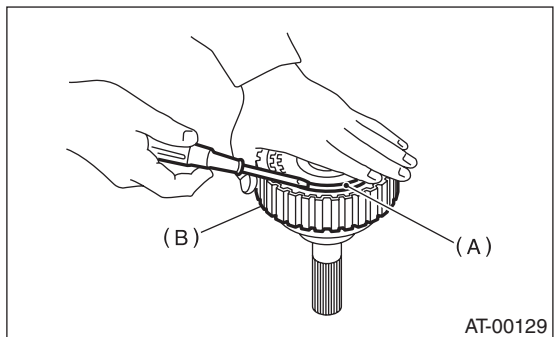


(A) Seal ring  
(B) Rear drive shaft

2) Remove ball bearing using ST and press. ST 498077600 REMOVER



3) Remove the snap ring, and then take out the pressure plate, drive plate and driven plate using flat tip screw driver and etc.



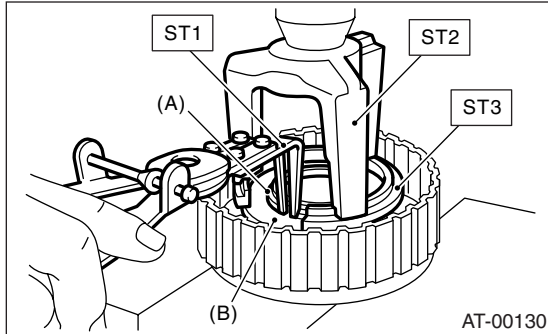
(A) Snap ring  
(B) Rear drive shaft

# Transfer Clutch

AUTOMATIC TRANSMISSION

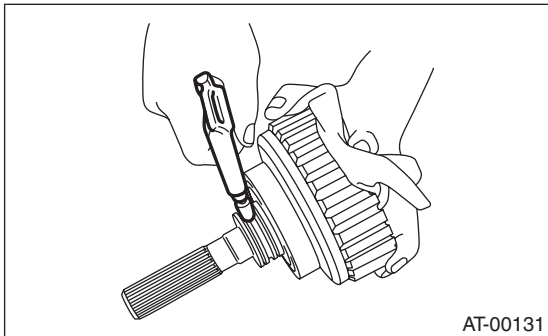
4) Using ST1, ST2 and ST3, remove the snap ring, and then take out the return spring and transfer clutch piston seal.

ST1 399893600 PLIERS  
ST2 398673600 COMPRESSOR  
ST3 398623600 SEAT



(A) Snap ring  
(B) Transfer clutch piston seal

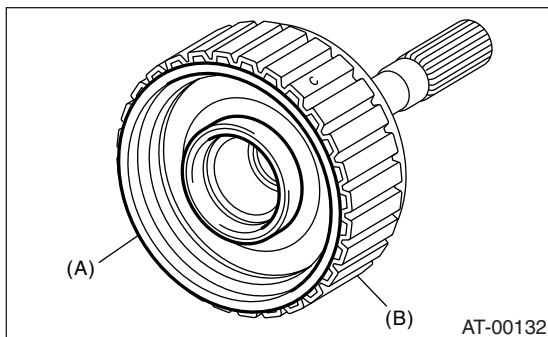
5) Apply compressed air to the rear drive shaft to remove the transfer clutch piston.



AT-00131

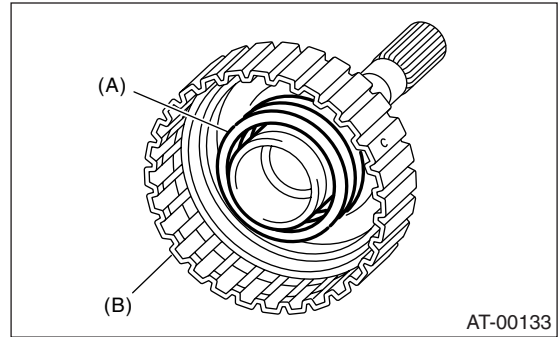
## D: ASSEMBLY

1) Install the transfer clutch piston.



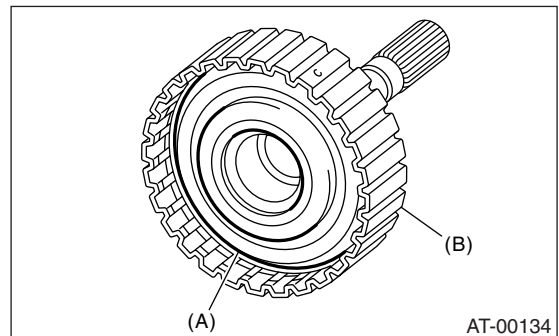
(A) Transfer clutch piston  
(B) Rear drive shaft

2) Install the return spring to transfer clutch piston.



(A) Return spring  
(B) Rear drive shaft

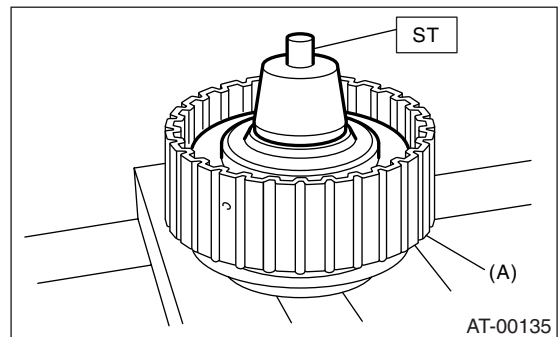
3) Install the transfer clutch piston seal.



(A) Transfer clutch piston seal  
(B) Rear drive shaft

4) Install ST to the rear drive shaft.

ST 499257300 SNAP RING OUTER GUIDE



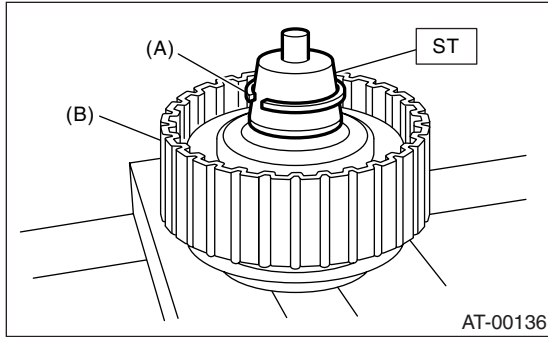
(A) Rear drive shaft

# Transfer Clutch

## AUTOMATIC TRANSMISSION

5) Install the snap ring to ST.

ST 499257300 SNAP RING OUTER GUIDE

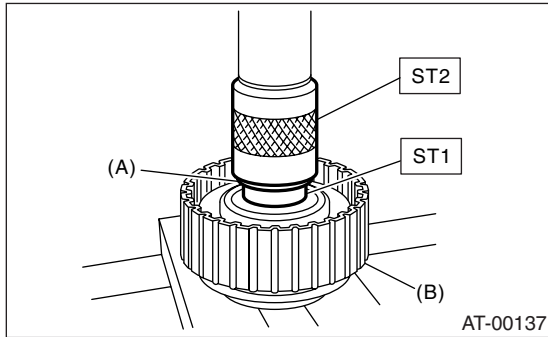


- (A) Snap ring
- (B) Transfer clutch

6) Install the snap ring to rear drive shaft using ST1 and ST2.

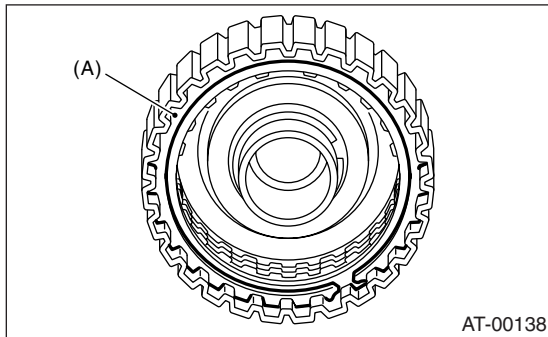
ST1 499257300 SNAP RING OUTER GUIDE

ST2 499247400 INSTALLER



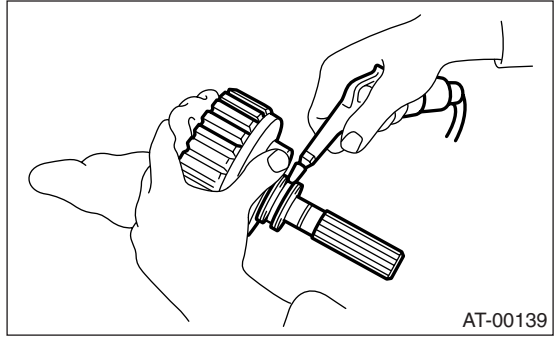
- (A) Snap ring
- (B) Transfer clutch

7) Install the driven plate, drive plate, pressure plate, retaining plate and snap ring.



- (A) Snap ring

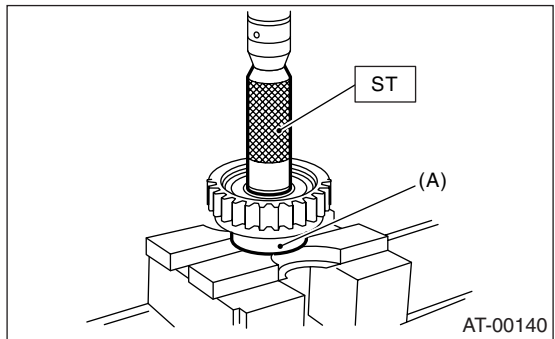
8) Apply compressed air to see if the assembled parts move smoothly.



9) Check clearance between snap ring and pressure plate. <Ref. to 4AT-95, INSPECTION, Transfer Clutch.>

10) Press-fit new ball bearing using ST.

ST 899580100 INSTALLER

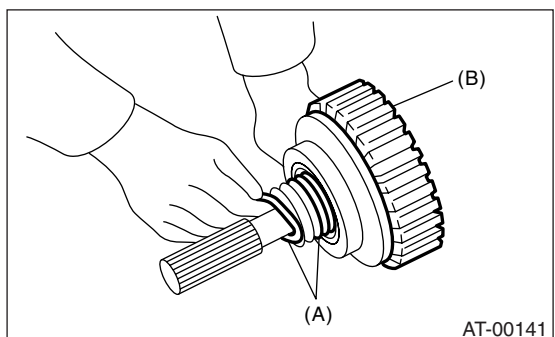


- (A) Ball bearing

11) Apply vaseline to seal ring and attach to seal ring groove of rear drive shaft.

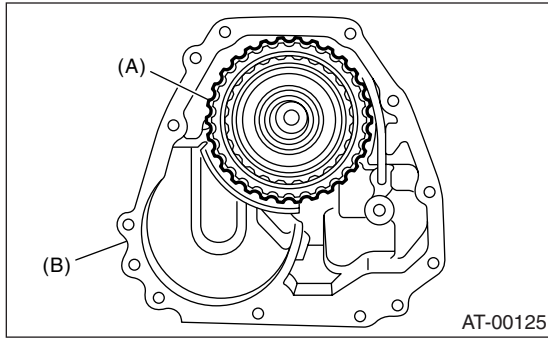
NOTE:

While installing the seal ring, not to expand the seal ring excessively.



- (A) Seal ring
- (B) Rear drive shaft

12) Install the transfer clutch assembly without damaging seal ring.



- (A) Transfer clutch ASSY
- (B) Extension case

## E: INSPECTION

- Inspect the drive plate facing for wear and damage.
- Inspect the snap ring for wear; return spring for permanent distortion, breakage and deformation.
- Inspect the damage for D-ring.
- Measure the extension end play and adjust it to within specifications. <Ref. to 4AT-95, ADJUSTMENT, Transfer Clutch.>

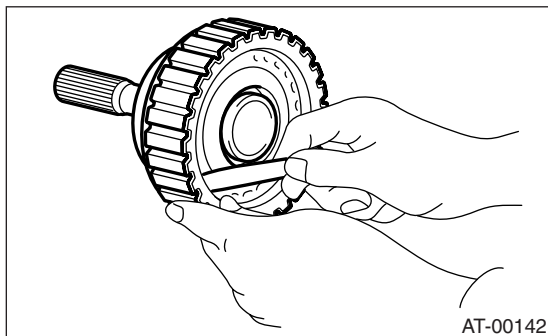
- 1) Check clearance between snap ring and pressure plate.
- 2) Before measuring clearance, place the same thickness of shim on both sides to prevent pressure plate from tilting.
- 3) If the clearance is out of specification, select a suitable retaining plate and adjust it.

### Standard value:

**0.7 — 1.1 mm (0.028 — 0.043 in)**

### Service limit:

**1.6 mm (0.063 in)**

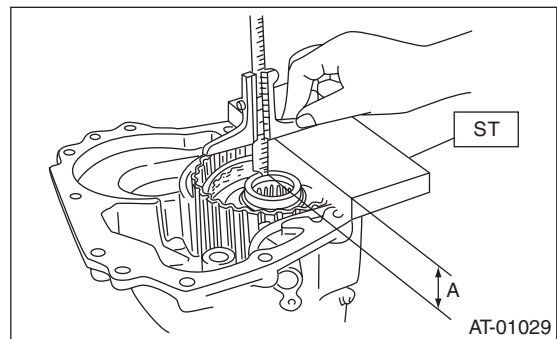


4) Check that the tight corner braking does not occur when the vehicle is started with steering wheel held at fully turned position. If tight corner braking occurs, perform the following procedures.

- (1) With the steering wheel held at fully turned position, drive the vehicle in "D" range and with vehicle speed at approx. 5 km/h (3 MPH) in both clockwise and counterclockwise directions for approx. ten times each, while repeating acceleration and braking intermittently.
- (2) If the tight corner braking still persists, drive the vehicle again in a circle for several laps.

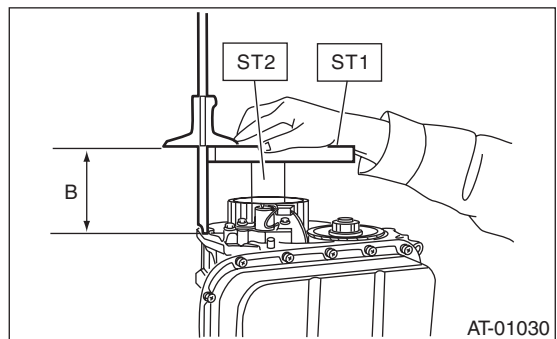
## F: ADJUSTMENT

- 1) Measure distance "A" from end of extension case and rear drive shaft with ST.
- ST 398643600 GAUGE



- 2) Measure the distance "B" from the transmission case end to reduction drive gear end surface with ST1 and ST2.

- ST1 398643600 GAUGE  
ST2 499577000 GAUGE



Retaining plate	
TOOL NUMBER	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

# Transfer Clutch

## AUTOMATIC TRANSMISSION

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3) Calculation formula:

NOTE:

Calculation of "T":

$$T = A - B + 35.4 \text{ mm}$$

$$[T = A - B + 1.3937 \text{ in}]$$

T: Thrust needle bearing thickness

A: Distance from the end of extension case to end of rear drive shaft

B: Distance from the end of transmission case to end of reduction drive gear

Example:

When A = 33.6 mm (1.3228 in), B = 65.05 mm (2.5610 in)

$$T = 33.6 - 65.05 + 35.4 = 3.95$$

$$[T = 1.3228 - 2.5610 + 1.3937 = 0.1555]$$

After calculation, the value of "T" becomes 3.95, therefore select bearing thickness of 3.8.

NOTE:

Calculation formula for "T" is applied when measuring using ST (398643600 GAUGE, 499577000 GAUGE). When not using ST, apply

$$T = (A - \alpha + 0.45 \text{ mm}) - (B - \beta) - H$$

$$[T = (A - \alpha + 0.0177 \text{ in}) - (B - \beta) - H]$$

T: Thrust needle bearing thickness

A: Distance from the end of extension case to end of reduction drive shaft

B: Distance from the end of transmission case to end of rear drive shaft

$\alpha$ : Collar thickness used when measuring "A"

$\beta$ : Collar thickness used when measuring "B"

0.45: Gasket thickness (mm)

H: Shim clearance

Thrust needle bearing	
TOOL NUMBER	Thickness mm (in)
806536020	3.8 (0.150)
806535030	4.0 (0.157)
806535040	4.2 (0.165)
806535050	4.4 (0.173)
806535060	4.6 (0.181)
806535070	4.8 (0.189)
806535090	5.0 (0.197)