

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 SYSTEMS**CS****AUTOMATIC TRANSMISSION****AT****AUTOMATIC TRANSMISSION
(DIAGNOSTICS)****AT****MANUAL TRANSMISSION AND
DIFFERENTIAL****MT****CLUTCH SYSTEM****CL**

AUTOMATIC TRANSMISSION

AT

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REAR VEHICLE SPEED SENSOR

AUTOMATIC TRANSMISSION

14.Rear Vehicle Speed Sensor

A: REMOVAL

When removing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor." <Ref. to AT-54, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

When installing the rear vehicle speed sensor, refer to "Front Vehicle Speed Sensor." <Ref. to AT-56, INSTALLATION, Front Vehicle Speed Sensor.>

15. Torque Converter Turbine Speed Sensor

A: REMOVAL

When removing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor."
<Ref. to AT-54, REMOVAL, Front Vehicle Speed Sensor.>

B: INSTALLATION

When installing the torque converter turbine speed sensor, refer to "Front Vehicle Speed Sensor."
<Ref. to AT-56, INSTALLATION, Front Vehicle Speed Sensor.>

CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

16. Control Valve Body

A: REMOVAL

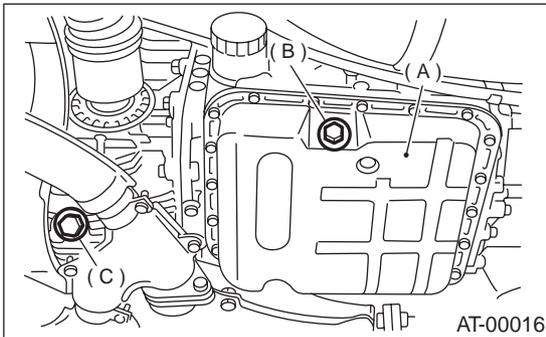
- 1) Lift-up the vehicle.
- 2) Clean the transmission exterior.
- 3) Drain the ATF completely.

NOTE:

- Tighten the ATF drain plug after draining the ATF.
- Replace the gasket with a new one.

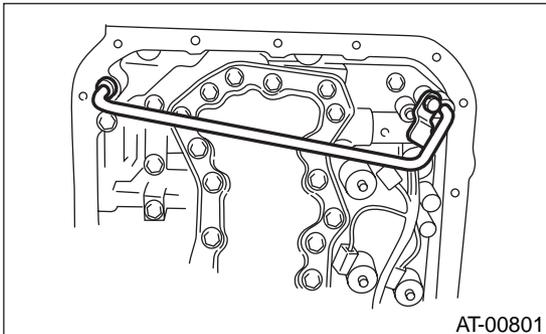
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

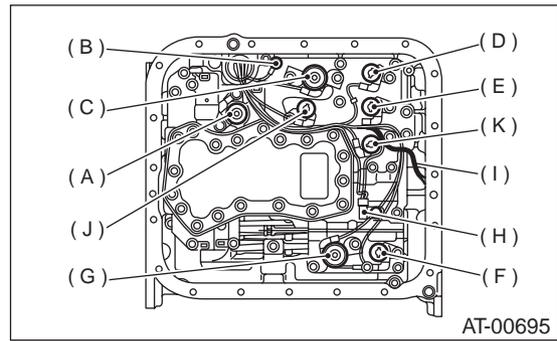


- (A) Oil pan
- (B) Drain plug
- (C) Differential oil drain plug

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



- 8) Disconnect each solenoid connector and remove ATF temperature sensor from control valve.

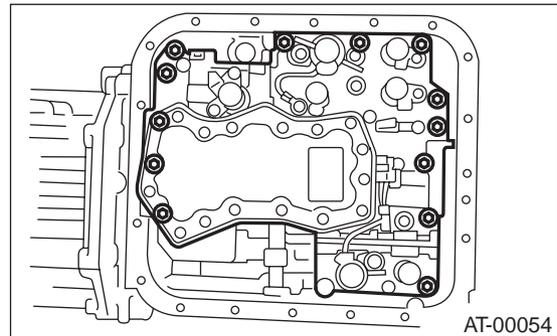


- (A) Lock-up duty solenoid (Blue)
- (B) Transmission ground
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty solenoid (Brown)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

- 9) Remove the control valve.

NOTE:

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

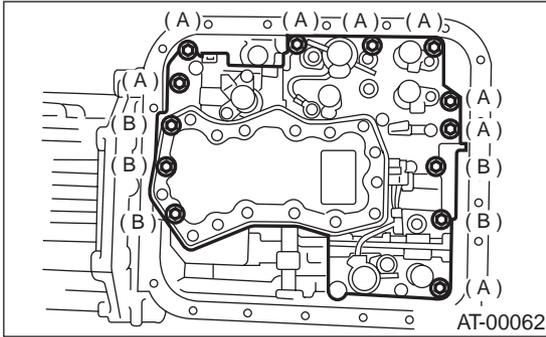


B: INSTALLATION

- 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)

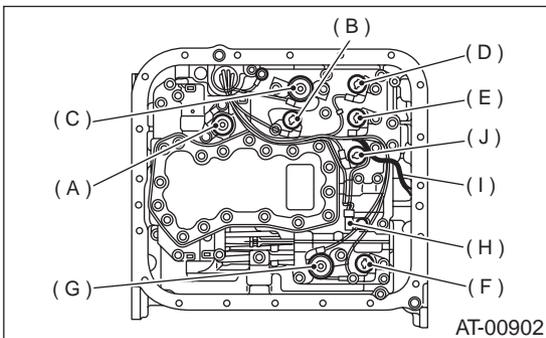


Bolt length mm (in)

(A) 30 (1.18)

(B) 55 (2.17)

- 3) Connect all connectors.

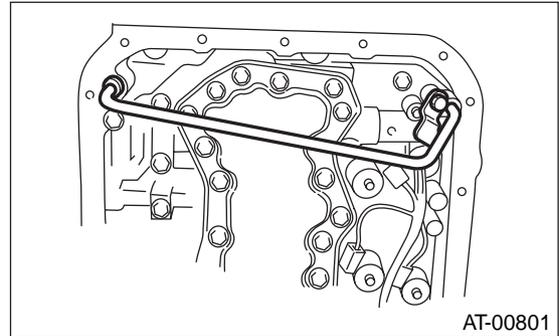


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) ATF temperature sensor
- (I) Transfer duty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

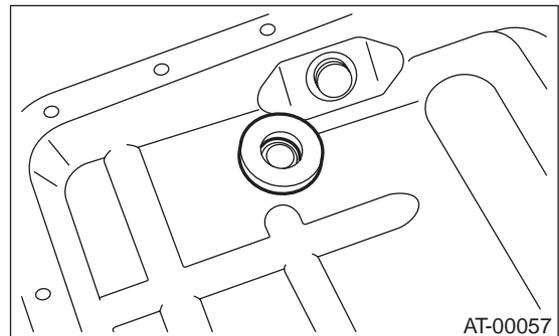
- 4) Install the pipe. (TURBO model)

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



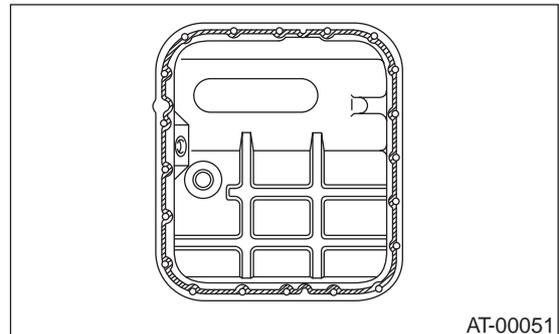
- 5) Attach the magnet at specified position.



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

Liquid gasket:

THREE BOND 1217B (Part No. K0877YA020)



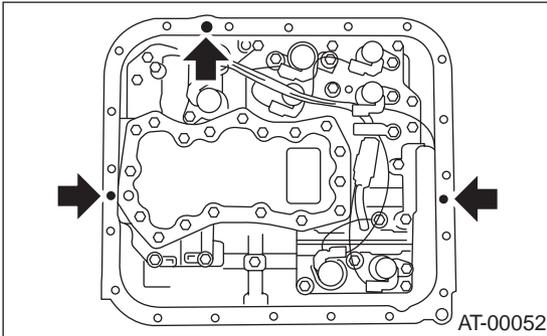
CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

7) Apply liquid gasket fully to three holes other than screw holes on transmission case.

Liquid gasket:

THREE BOND 1217B (Part No. K0877YA020)



8) Install the oil pan.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)

9) Pour ATF into the oil charge pipe.

Recommended fluid:

Dexron III type automatic transmission fluid

Fluid capacity:

Fill the same amount of fluid drained from drain plug hole.

10) Check the level of ATF.

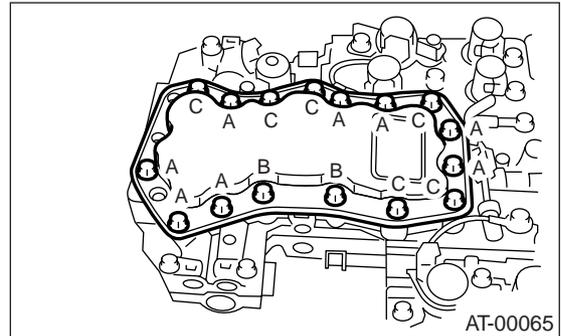
<Ref. to AT-30, Automatic Transmission Fluid.>

C: DISASSEMBLY

1) Remove oil strainer from lower control valve body.

NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolts length are different.

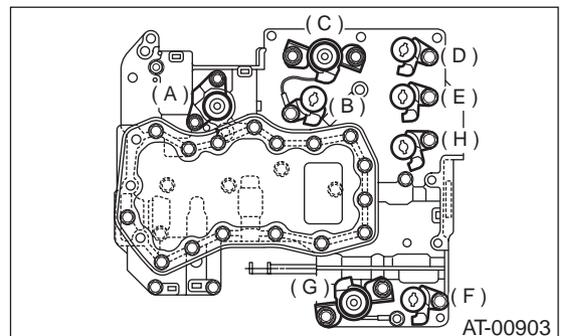


- (A) Short bolt
- (B) Middle bolt
- (C) Long bolt

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

NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolts length are different.



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

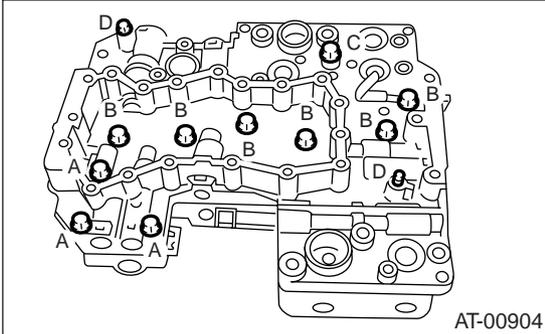
CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

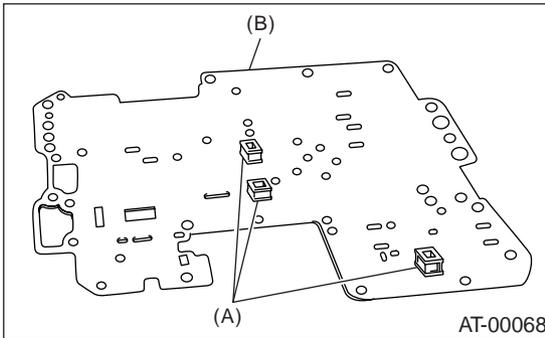
3) Remove the upper-lower valve body tightening bolts.

NOTE:

Arrange the removed bolts in good order to assemble in the same place as disassembly, because the bolts length are different.

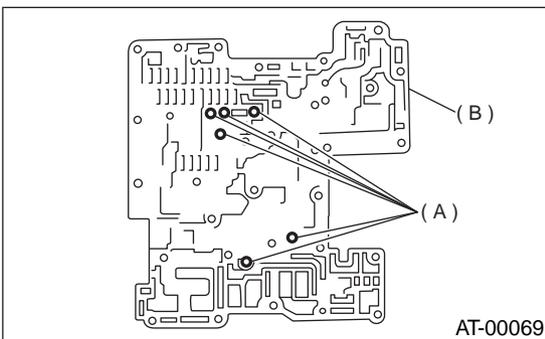


4) Remove the lower valve body.
5) Remove the oil filter and plate.



(A) Oil filter
(B) Plate

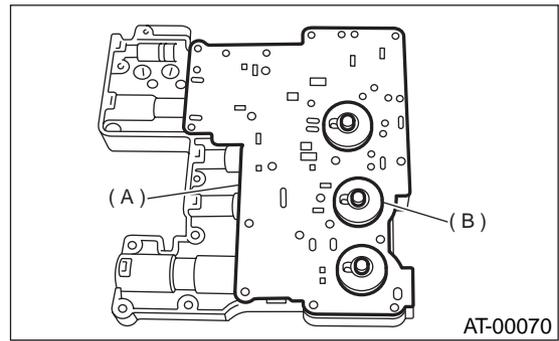
6) Remove six steel balls from middle valve body.



(A) Steel ball
(B) Middle valve body

7) Remove the middle valve body.

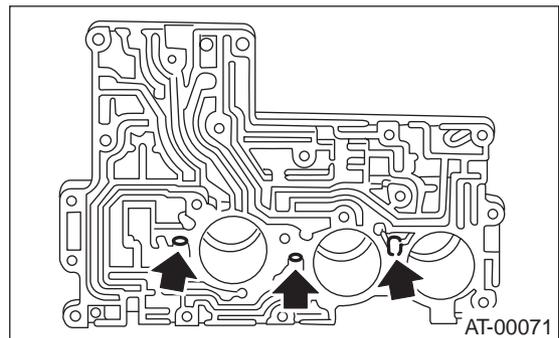
8) Remove upper separator plate from middle valve body.



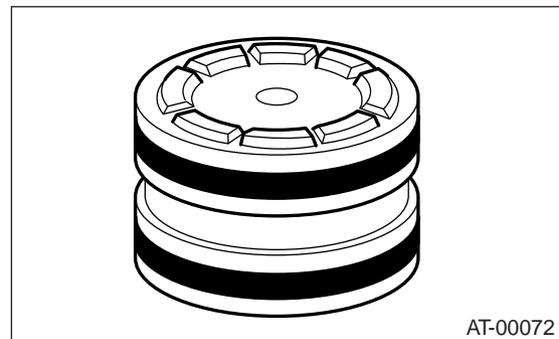
(A) Upper separator plate
(B) Side plate

9) Remove valve springs and four steel balls from upper valve body.

10) Place a shop cloth to the piston removal hole.
11) Using an air compressor, apply air slowly to each piston hole and remove the pistons.



12) Remove the seal ring from piston.

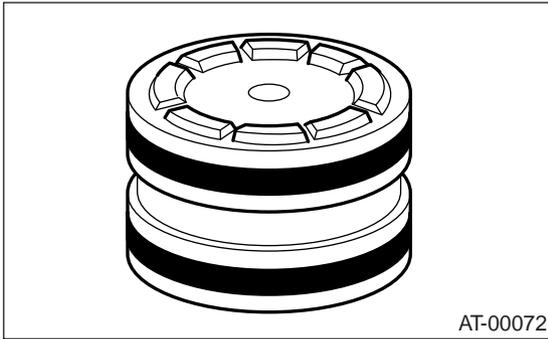


CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

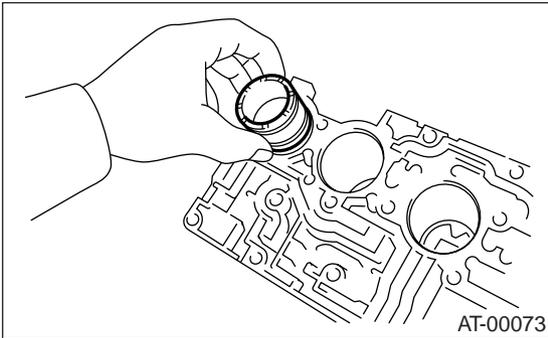
D: ASSEMBLY

1) Install a new seal ring to piston.

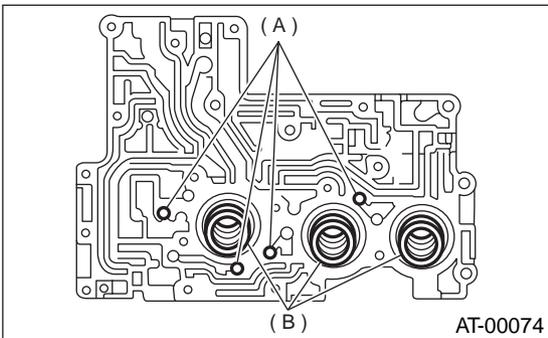


2) Apply ATF to the seal ring.

3) Insert the piston fully into upper valve body.



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

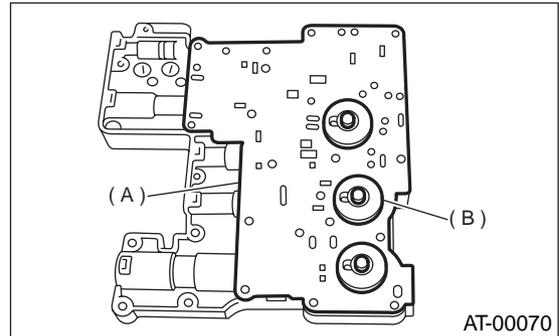


- (A) Steel ball
- (B) Spring

5) Align the hole in side plate with the hole in separator plate, and then install support plate and upper separator plate to middle valve body.

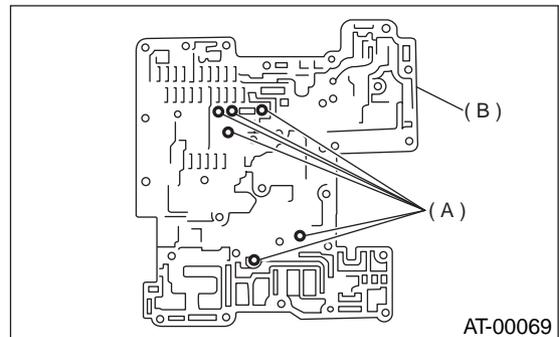
Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)



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

6) Insert six steel balls in their proper positions to middle valve body.

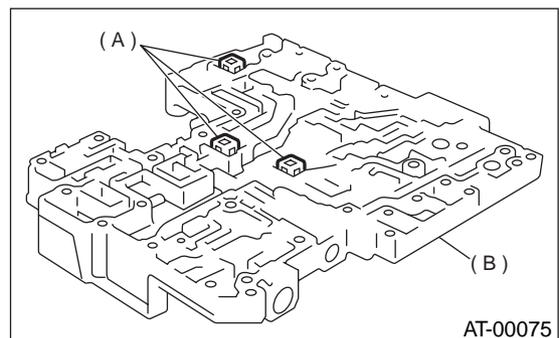


- (A) Steel ball
- (B) Middle valve body

7) Install three filters to lower valve body.

NOTE:

Pay attention to the location of filters.

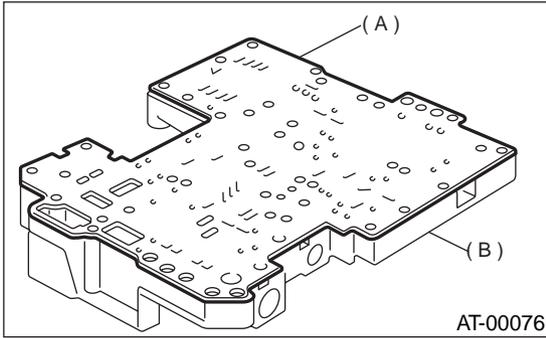


- (A) Strainer
- (B) Lower valve body

CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

8) Install lower separate plate to lower valve body.

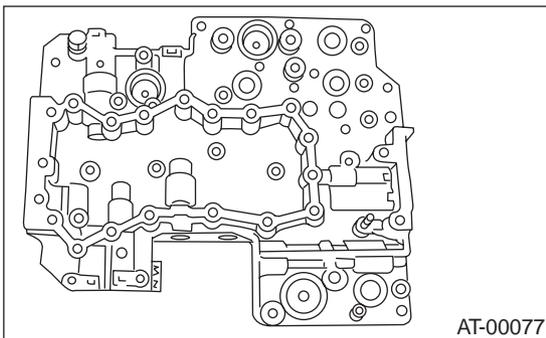


- (A) Lower separator plate
- (B) Lower valve body

9) Temporarily assemble valve body.

NOTE:

Be careful not to drop the middle valve body and upper body interior steel ball, or the lower body filter.



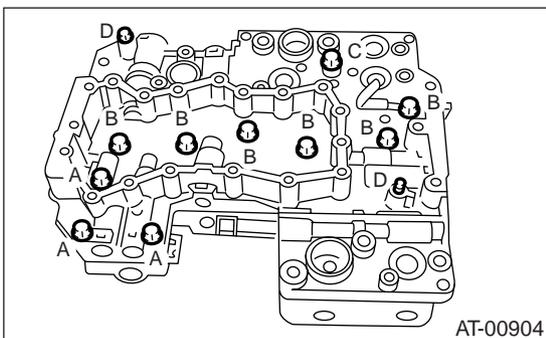
10) Tighten bolts.

NOTE:

Install the bolts (D) from upper valve body side.

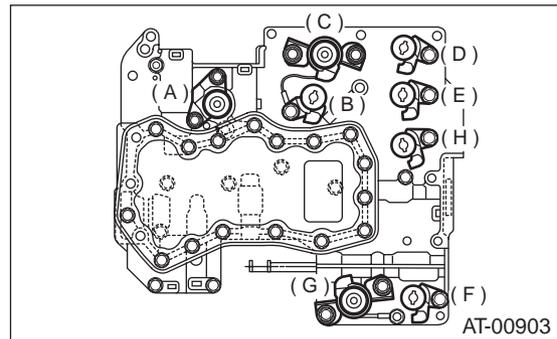
Tightening torque:

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) Install the sensor, solenoids and duty solenoids to specified positions.

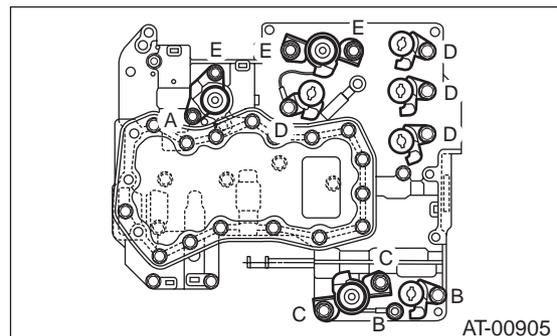


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 1 (Yellow)
- (E) Shift solenoid 2 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) SPORT shift solenoid (Beige) (if equipped)

12) Tighten the bolts and nuts.

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)

CONTROL VALVE BODY

AUTOMATIC TRANSMISSION

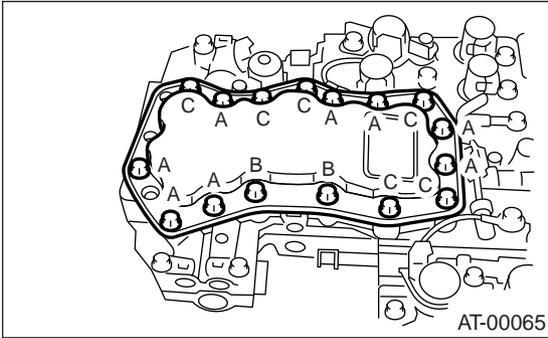
13) Install oil strainer to lower valve body.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

E: INSPECTION

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



Bolt length mm (in)

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

17. Shift Solenoids, Duty Solenoids and ATF Temperature Sensor

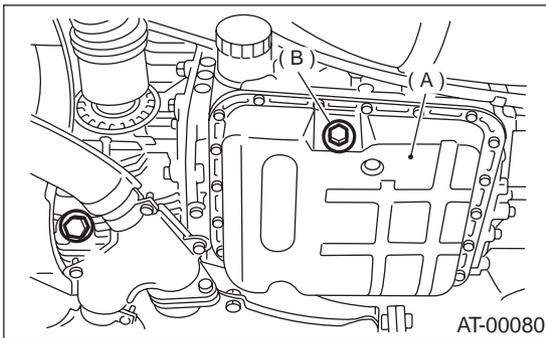
A: REMOVAL

1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

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

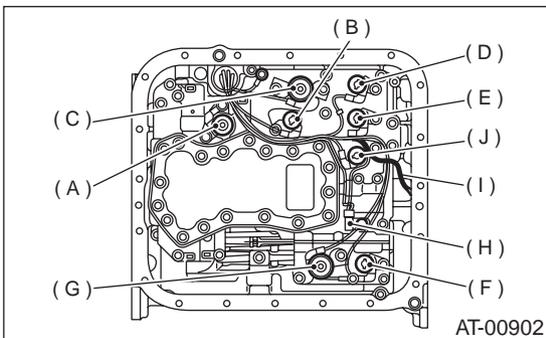
Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



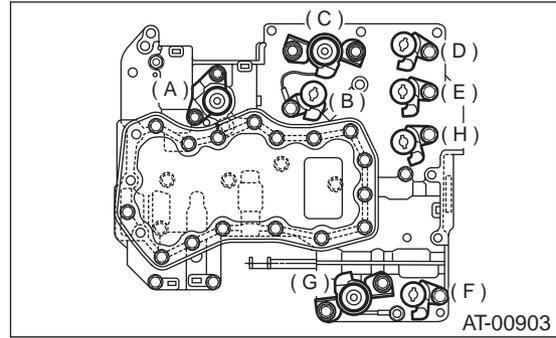
- (A) Oil pan
- (B) Drain plug

- 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) Sport shift solenoid (Beige) (if equipped)

- 7) Remove the solenoids and duty solenoids.



- (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) Sport shift solenoid (Beige) (if equipped)

2. ATF TEMPERATURE SENSOR

For removal of ATF temperature sensor, refer to "Front Vehicle Speed Sensor." <Ref. to AT-54, REMOVAL, Front Vehicle Speed Sensor.>

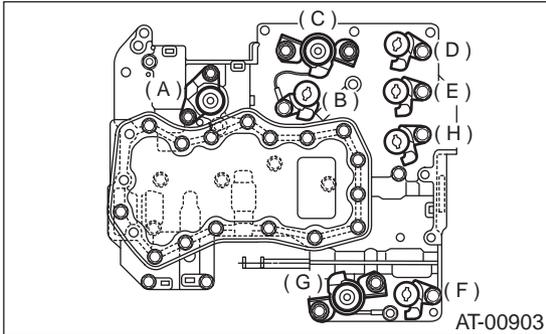
SHIFT SOLENOIDS, DUTY SOLENOIDS AND ATF TEMPERATURE SENSOR

AUTOMATIC TRANSMISSION

B: INSTALLATION

1. SHIFT SOLENOIDS AND DUTY SOLENOIDS

1) Insert solenoid and duty solenoid to specified position.

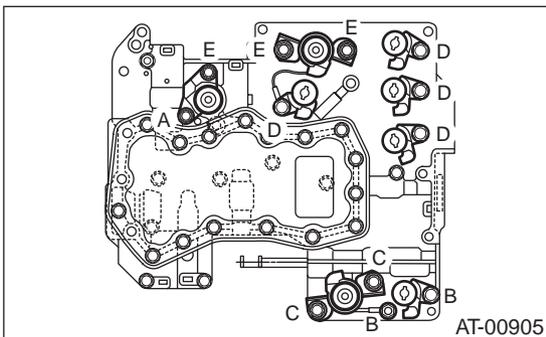


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) SPORT shift solenoid (Beige) (if equipped)

2) Tighten the bolts and nuts.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

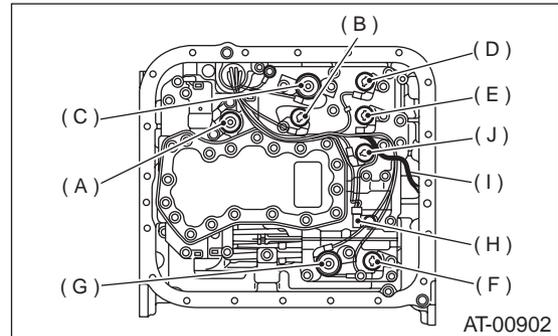


Bolt length mm (in)

- (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 secure the connectors to valve body using clips.

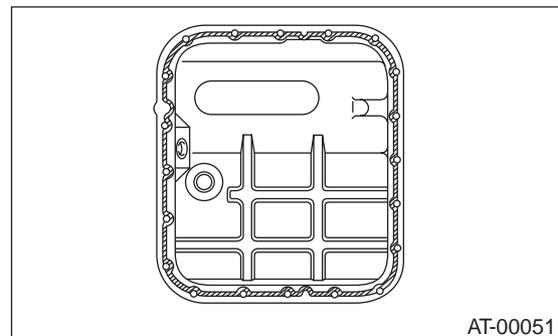


- (A) Lock-up duty solenoid (Blue)
- (B) Low clutch timing solenoid (Gray)
- (C) Line pressure duty solenoid (Red)
- (D) Shift solenoid 2 (Yellow)
- (E) Shift solenoid 1 (Green)
- (F) 2-4 brake timing solenoid (Black)
- (G) 2-4 brake duty solenoid (Red)
- (H) SPORT shift solenoid (Beige) (if equipped)

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

Fluid packing:

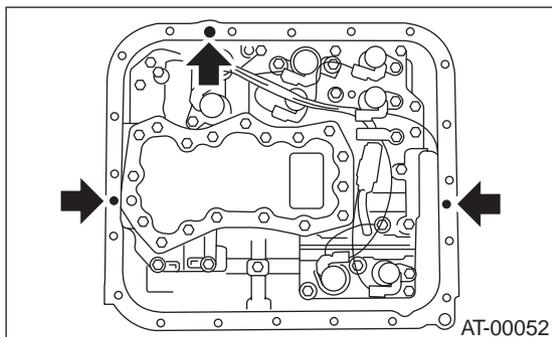
THREE BOND 1217B (Part No. K0877YA020)



5) Apply liquid gasket fully to three holes other than screw holes on transmission case.

Fluid packing:

THREE BOND 1217B (Part No. K0877YA020)



6) Install the oil pan.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)

7) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. <Ref. to AT-30, Automatic Transmission Fluid.>

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

2. ATF TEMPERATURE SENSOR

For installation of ATF temperature sensor, refer to "Front Vehicle Speed Sensor." <Ref. to AT-56, INSTALLATION, Front Vehicle Speed Sensor.>

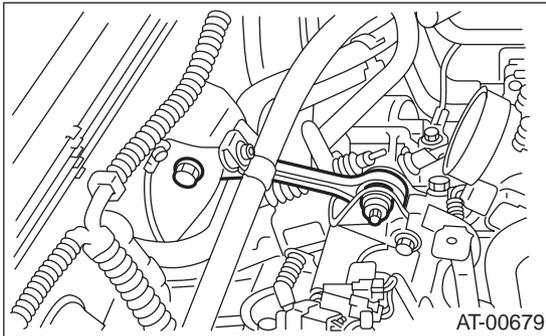
TRANSFER DUTY SOLENOID AND VALVE BODY

AUTOMATIC TRANSMISSION

18. 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. (2.0 L non-TURBO and 2.5 L models)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 4) Remove air intake chamber. (3.0 L model)
<Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 5) Remove intercooler. (TURBO model)
<Ref. to IN(H4DOSTC)-13, REMOVAL, Intercooler.>
- 6) Remove the pitching stopper.

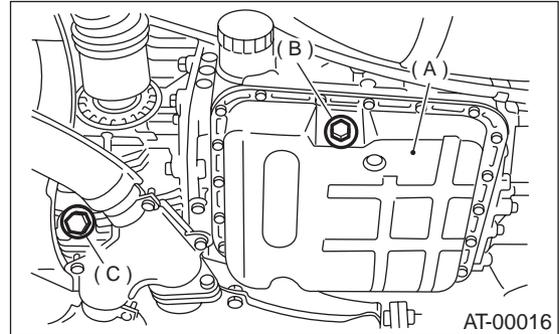


- 7) Remove the front exhaust pipe with center exhaust pipe. (Non-TURBO model)
2.0 L and 2.5 L with OBD models
<Ref. to EX(H4SO)-5, REMOVAL, Front Exhaust Pipe.>
2.0 L and 2.5 L without OBD models
<Ref. to EX(H4SOw/oOBD)-9, REMOVAL, Front Exhaust Pipe.>
3.0 L model
<Ref. to EX(H6DO)-5, REMOVAL, Front Exhaust Pipe.>
- 8) Remove center exhaust pipe. (TURBO model)
<Ref. to EX(H4DOSTC)-7, REMOVAL, Center Exhaust Pipe.>
- 9) Remove the rear exhaust pipe and muffler.
2.0 L non-TURBO and 2.5 L with OBD models
<Ref. to EX(H4SO)-9, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, REMOVAL, Muffler.>
2.0 L and 2.5 L without OBD models
<Ref. to EX(H4SOw/oOBD)-13, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4SOw/oOBD)-14, REMOVAL, Muffler.>
3.0 L model
<Ref. to EX(H6DO)-8, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H6DO)-9, REMOVAL, Muffler.>

TURBO model

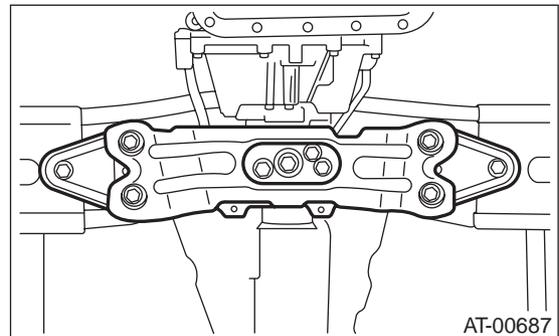
<Ref. to EX(H4DOSTC)-12, REMOVAL, Rear Exhaust Pipe.> and <Ref. to EX(H4DOSTC)-13, REMOVAL, Muffler.>

- 10) Raise the vehicle and drain the ATF.

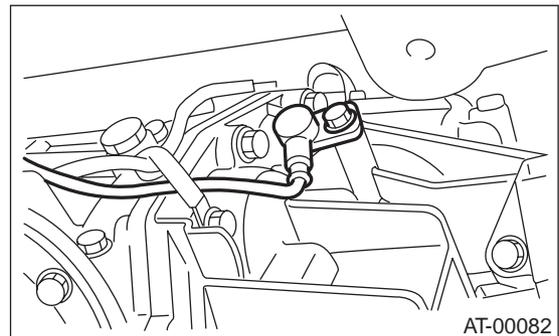


- (A) Oil pan
- (B) Drain plug
- (C) Deferential oil drain plug

- 11) Remove the heat shield cover. (If equipped)
- 12) Remove the propeller shaft. <Ref. to DS-14, REMOVAL, Propeller Shaft.>
- 13) 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.



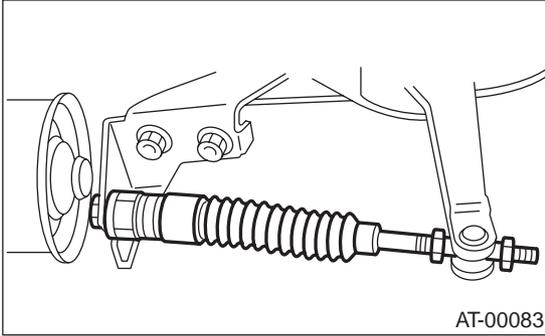
- 14) Remove the rear vehicle speed sensor.



TRANSFER DUTY SOLENOID AND VALVE BODY

AUTOMATIC TRANSMISSION

15) Remove the select cable nut.



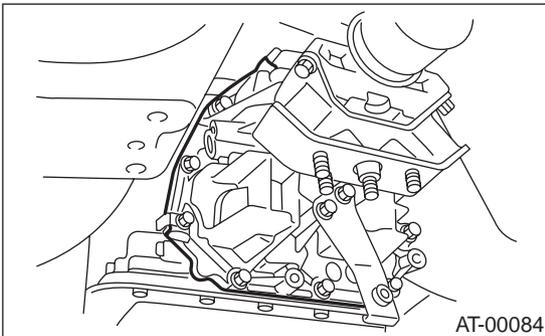
16) Move the gear select cable so that extension bolts can be removed.

17) Remove the bolts.

18) Remove the extension case.

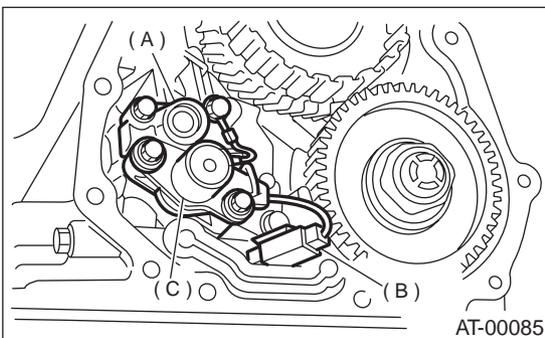
NOTE:

Use a container to catch oil flowing from extension.



19) Disconnect the transfer duty solenoid connector.

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



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

B: INSTALLATION

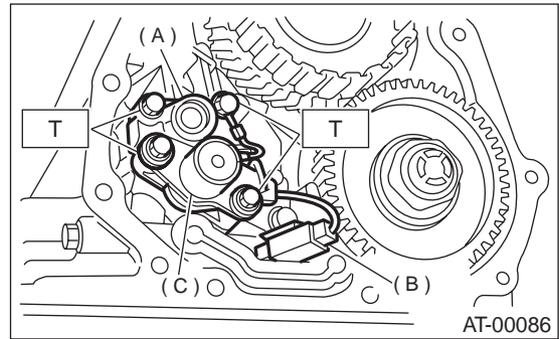
1) Install the transfer duty solenoid and transfer valve body.

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

Tightening torque:

T: 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) Install a new gasket and the extension case to transmission case.

(1) Tighten eleven bolts.

Tightening torque:

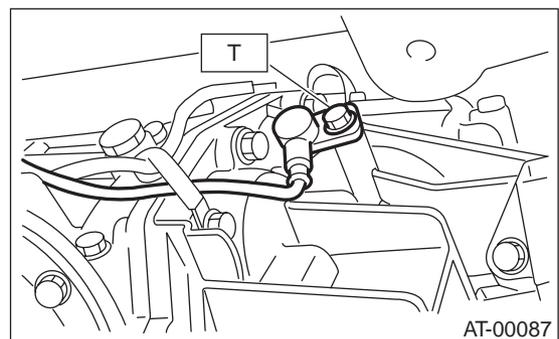
25 N·m (2.5 kgf-m, 18.1 ft-lb)

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

3) Install the rear vehicle speed sensor.

Tightening torque:

T: 7 N·m (0.7 kgf-m, 5.1 ft-lb)



TRANSFER DUTY SOLENOID AND VALVE BODY

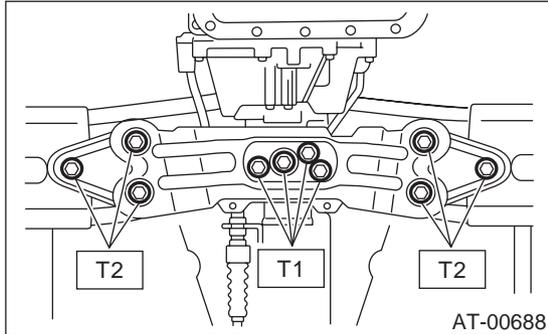
AUTOMATIC TRANSMISSION

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

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-15, INSTALLATION, Propeller Shaft.>

6) Install the front, center rear exhaust pipe and muffler. (Non-TURBO model)

2.0 L and 2.5 L with OBD models

<Ref. to EX(H4SO)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SO)-9, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SO)-10, INSTALLATION, Muffler.>

2.0 L and 2.5 L without OBD models

<Ref. to EX(H4SOw/oOBD)-10, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H4SOw/oOBD)-13, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4SOw/oOBD)-14, INSTALLATION, Muffler.>

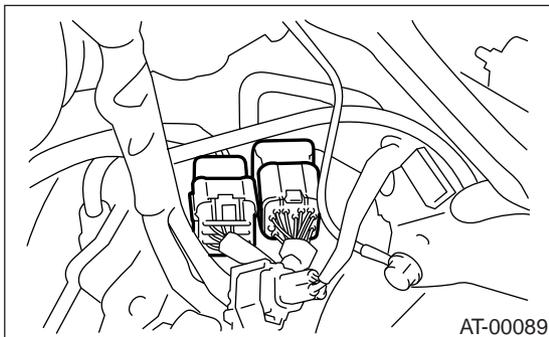
3.0 L model

<Ref. to EX(H6DO)-6, INSTALLATION, Front Exhaust Pipe.>, <Ref. to EX(H6DO)-8, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H6DO)-9, INSTALLATION, Muffler.>

7) Install center and rear exhaust pipes, and muffler. (TURBO model)

<Ref. to EX(H4DOSTC)-8, INSTALLATION, Center Exhaust Pipe.>, <Ref. to EX(H4DOSTC)-12, INSTALLATION, Rear Exhaust Pipe.> and <Ref. to EX(H4DOSTC)-13, INSTALLATION, Muffler.>

8) Connect the transmission harness connector.

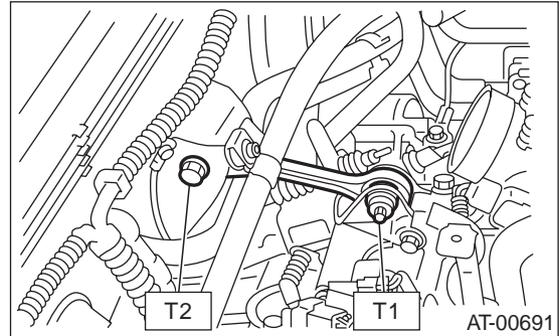


- 9) Install the pitching stopper.

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. (2.0 L non-TURBO and 2.5 L models)

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

11) Install air intake chamber. (3.0 L model)

<Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

12) Install intercooler. (TURBO model)

<Ref. to IN(H4DOSTC)-14, INSTALLATION, Intercooler.>

13) Fill ATF up to the middle of the "COLD" side on level gauge by using the gauge hole. <Ref. to AT-30, Automatic Transmission Fluid.>

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

19.ATF Filter

A: REMOVAL

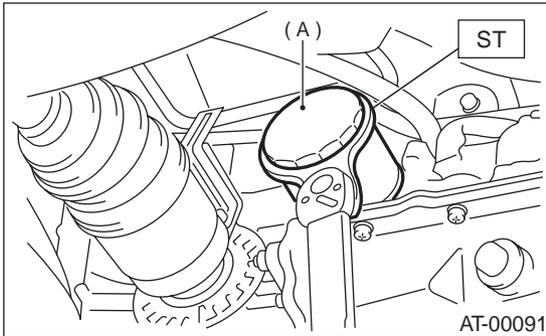
1. EXCEPT 3.0 L MODEL

NOTE:

The ATF filter is maintenance free.

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

ST 498545400 OIL FILTER WRENCH



(A) ATF filter

2. 3.0 L MODEL

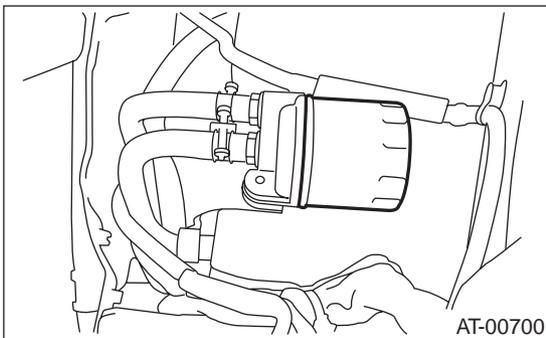
• ATF Filter

NOTE:

The ATF filter is maintenance free.

- 1) Lift-up the vehicle.
- 2) Remove front left mud guard.
<Ref. to EI-22, REMOVAL, Mud Guard.>
- 3) Using ST, remove ATF filter.

ST 498545400 OIL FILTER WRENCH



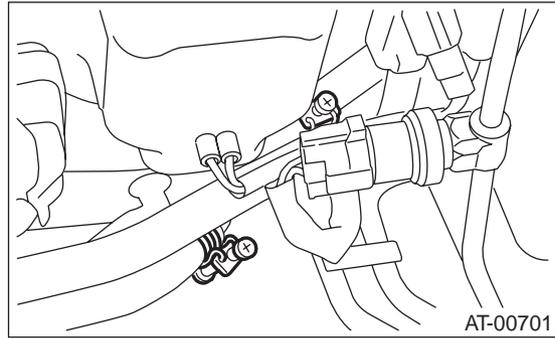
• ATF Filter Assembly

- 1) Remove battery.
- 2) Lift-up the vehicle.
- 3) Remove front left mud guard.
<Ref. to EI-22, REMOVAL, Mud Guard.>
- 4) Lower the vehicle.
- 5) Release clamp of IN, OUT of oil filter hose, and remove hose from pipe.

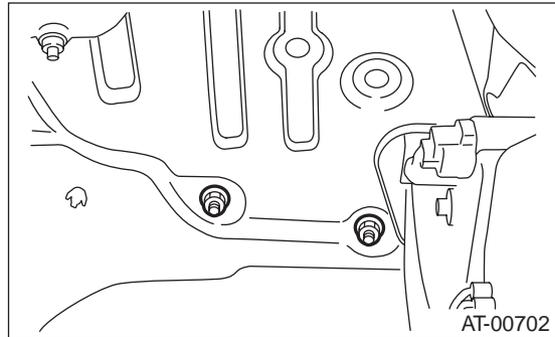
NOTE:

- Plug the pipe.

- Put a mark etc., to distinguish IN, OUT on pipe and hose.



- 6) Remove oil filter bracket installation nut.



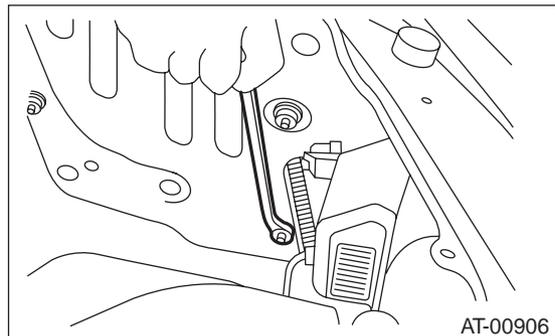
- 7) Remove ATF filter assembly.
- 8) Remove ATF filter with attachment to bracket.
- 9) Get new ATF filter and apply a thin coat of ATF to the oil seal.

3. TURBO MODEL

NOTE:

The ATF filter is maintenance free.

- 1) Set the vehicle on lift.
- 2) Remove the battery.
- 3) Remove oil filter bracket mounting bolts.



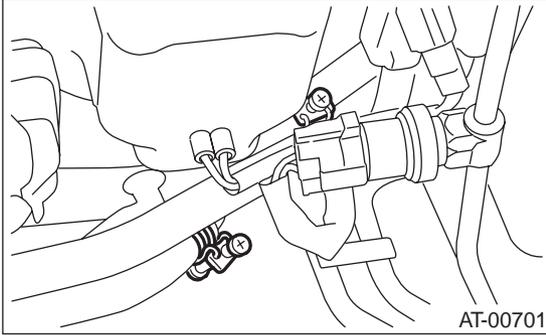
ATF FILTER

AUTOMATIC TRANSMISSION

4) Release clamp of IN, OUT of oil filter hose, and remove hose from pipe.

NOTE:

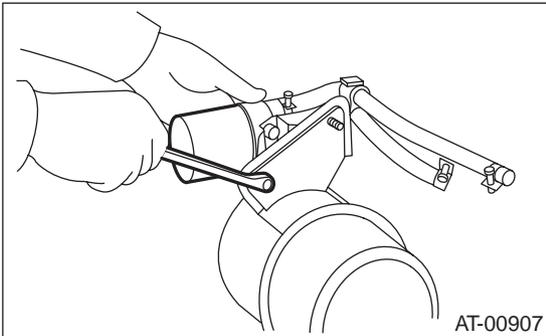
- Plug the pipe.
- Put a mark etc., to distinguish IN, OUT on pipe and hose.



5) Lift vehicle and remove front left mud guard.
<Ref. to EI-22, REMOVAL, Mud Guard.>

6) Remove the surge tank.
<Ref. to IN(H4DOSTC)-22, REMOVAL, Surge Tank.>

7) Remove oil filter assembly.



8) Secure oil filter assembly on a vise, etc and remove oil filter using Special Service Tool.
ST 498545400 OIL FILTER WRENCH

B: INSTALLATION

1. EXCEPT 3.0 L MODEL

1) Get new ATF filter and apply a thin coat of ATF to the oil seal.

2) Install ATF filter. Turn it by hand, being careful not to damage oil seal.

3) Using ST, tighten ATF filter.

Calculate ATF filter torque specifications using the 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 0.078 m (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)	10 (1.0, 7.2)

NOTE:

Align ST with torque wrench while tightening ATF filter.

ST 498545400 OIL FILTER WRENCH

4) Add ATF.

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

2. 3.0 L MODEL

• **ATF Filter**

1) Get new ATF filter and apply a thin coat of ATF to the oil seal.

2) Install AT oil filter. Turn it by hand, being careful not to damage oil seal.

3) Using ST, tighten AT oil filter.

Calculate AT filter torque specifications using the 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 0.078 m (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)	10 (1.0, 7.2)

NOTE:

Align ST with torque wrench while tightening AT oil filter.

ST 498545400 OIL FILTER WRENCH

4) Install front left mud guard. <Ref. to EI-22, INSTALLATION, Mud Guard.>

5) Add ATF.

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

• ATF Filter Assembly

1) Install ATF filter with attachment to bracket.

Tightening torque:

14 N·m (1.4 kgf-m, 10 ft-lb)

2) Install ATF filter assembly to vehicle.

Tightening torque:

16 N·m (1.6 kgf-m, 12 ft-lb)

3) Install AT oil filter. Turn it by hand, being careful not to damage oil seal.

4) Using ST, tighten AT oil filter.

Calculate AT filter torque specifications using the following formula.

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

T1: 14 N·m (1.4 kgf-m, 10.1 ft-lb)

[Required torque setting]

T2: Tightening torque

L1: ST length 0.078 m (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)	10 (1.0, 7.2)

NOTE:

Align ST with torque wrench while tightening AT oil filter.

ST 498545400 OIL FILTER WRENCH

5) Install hoses to pipe.

NOTE:

Install hoses to pipe aligning marks on them.

6) Install front left mud guard.

<Ref. to EI-22, INSTALLATION, Mud Guard.>

7) Add ATF.

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

3. TURBO MODEL

1) Get new ATF filter and apply a thin coat of ATF to the oil seal.

2) Install ATF filter. Turn it by hand, being careful not to damage oil seal.

3) Using ST, tighten ATF filter.

Calculate ATF filter torque specifications using the 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 0.078 m (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)	10 (1.0, 7.2)

NOTE:

Align ST with torque wrench while tightening ATF filter.

ST 498545400 OIL FILTER WRENCH

4) Install oil filter wrench assembly.

Tightening torque:

16 N·m (1.6 kgf-m, 10.1 ft-lb)

5) Install surge tank.

<Ref. to IN(H4DOSTC)-22, INSTALLATION, Surge Tank.>

6) Remove front left mud guard.

<Ref. to EI-22, INSTALLATION, Mud Guard.>

7) Tighten oil filter bracket mounting bolts.

Tightening torque:

16 N·m (1.6 kgf-m, 10.1 ft-lb)

8) Install hoses to pipe.

NOTE:

Align indicated matching marks between hose and pipe.

9) Install battery.

10) Inspect level of ATF. <Ref. to AT-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.

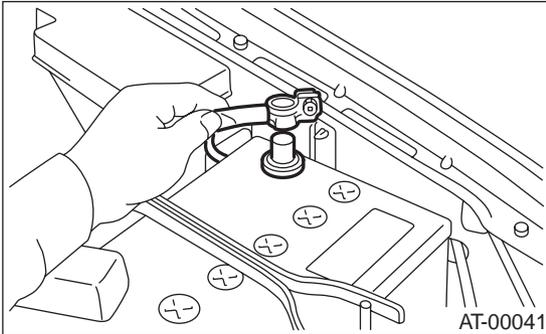
TRANSMISSION CONTROL MODULE (TCM)

AUTOMATIC TRANSMISSION

20. Transmission Control Module (TCM)

A: REMOVAL

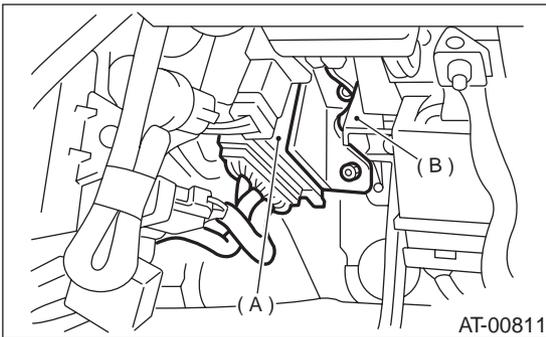
1) Disconnect the ground cable from battery.



2) Remove the lower cover and then disconnect the connector.

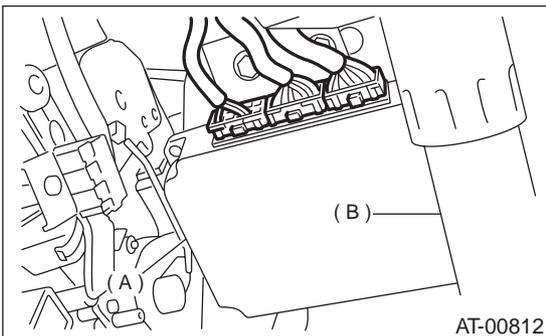
3) Disconnect the connectors from transmission control module.

LHD model



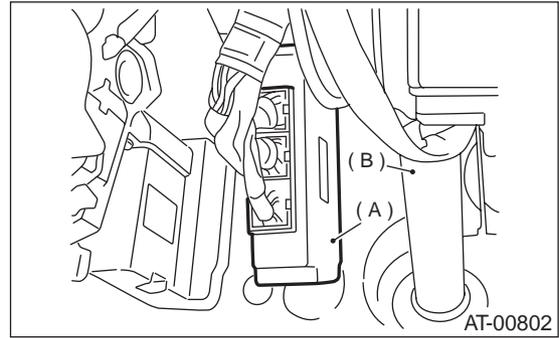
- (A) Transmission control module
- (B) Brake pedal

RHD model except for Europe



- (A) Transmission control module
- (B) Column shaft

RHD model for Europe



- (A) Transmission control module
- (B) Column shaft

4) Remove the transmission control module.

TRANSMISSION CONTROL MODULE (TCM)

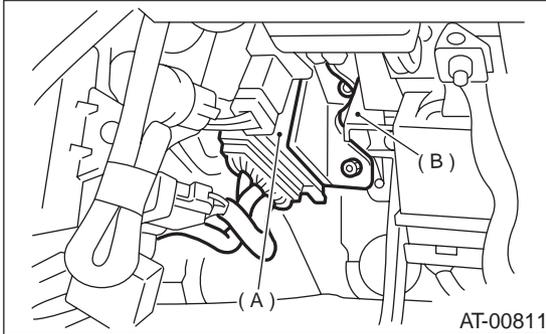
AUTOMATIC TRANSMISSION

B: INSTALLATION

1) Install the transmission control module.
LHD model

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

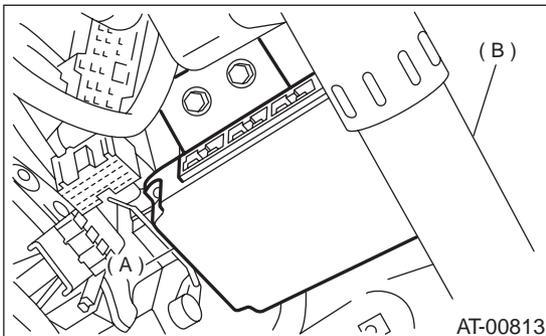


- (A) Transmission control module
- (B) Brake pedal

RHD model except for Europe

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)

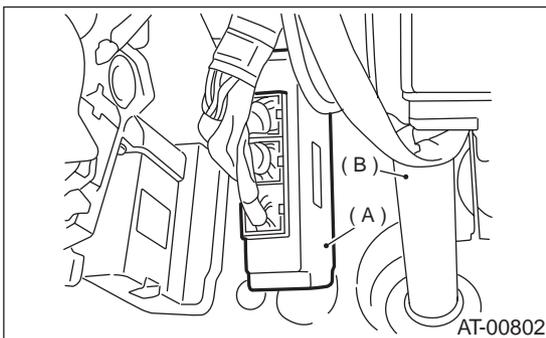


- (A) Transmission control module
- (B) Column shaft

RHD model for Europe

Tightening torque:

18 N·m (1.8 kgf-m, 13 ft-lb)



- (A) Transmission control module
- (B) Column shaft

2) Connect the connectors to transmission control module.

3) Install in the reverse order of removal.

ATF COOLER PIPE AND HOSE

AUTOMATIC TRANSMISSION

21. ATF Cooler Pipe and Hose

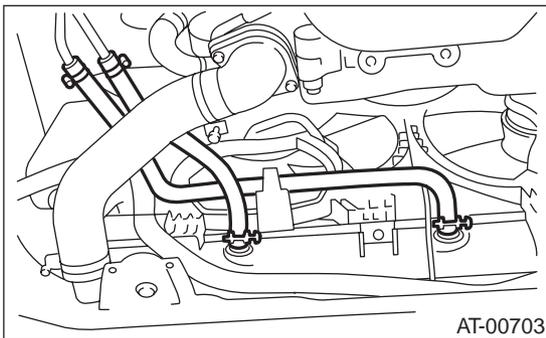
A: REMOVAL

1. EXCEPT 3.0 L MODEL

- 1) Set the vehicle on a lift.
- 2) Remove battery and washer tank.
- 3) Lift-up the vehicle.
- 4) Remove the under cover.
- 5) Disconnect ATF cooler hose from radiator.

NOTE:

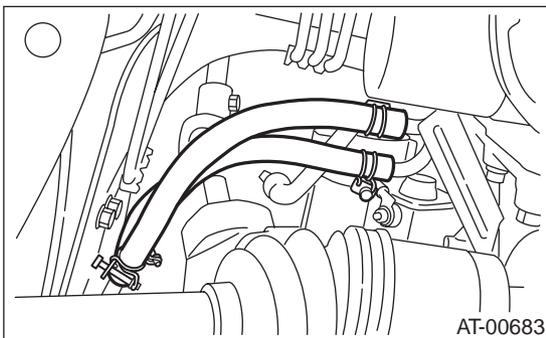
- Do not remove with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap a shop cloth around the hose to protect it. Turn it with pliers, and then pull directly out with your hand.



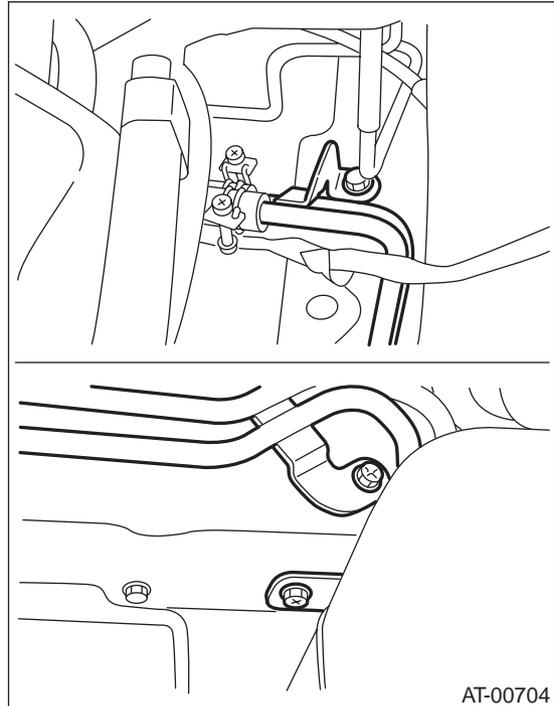
- 6) Disconnect ATF cooler hoses from pipes.

NOTE:

- Do not remove with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap a shop cloth around the hose to protect it. Turn it with pliers, and then pull directly out with your hand.



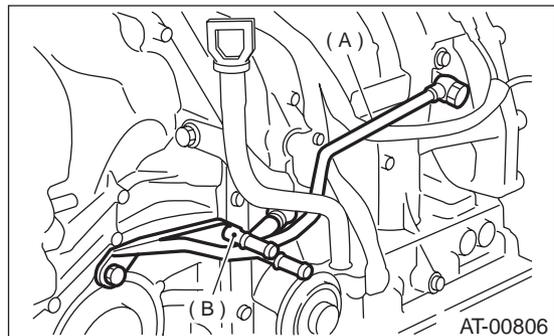
- 7) Remove ATF cooler pipe from frame.



- 8) Remove the oil cooler inlet and outlet pipes.

NOTE:

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



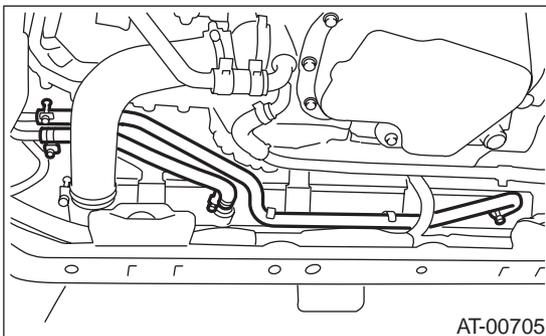
- (A) Inlet pipe
(B) Outlet pipe

2. 3.0 L MODEL

- 1) Set the vehicle on a lift.
- 2) Remove battery and washer tank.
- 3) Lift-up the vehicle.
- 4) Remove the under cover.
- 5) Disconnect ATF cooler hose from radiator.

NOTE:

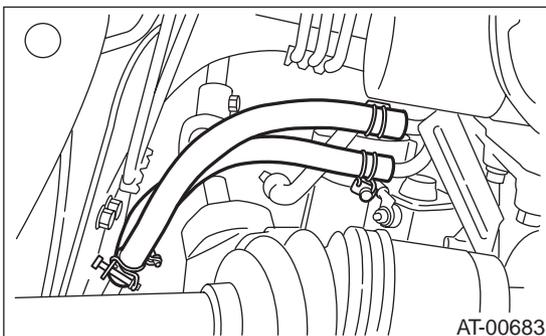
- Do not remove with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap a shop cloth around the hose to protect it. Turn it with pliers, and then pull directly out with your hand.



- 6) Disconnect ATF cooler hoses from transmission.

NOTE:

- Do not remove with a screwdriver or other pointed tools.
- When the hose is difficult to remove, wrap a shop cloth around the hose to protect it. Turn it with pliers, and then pull directly out with your hand.

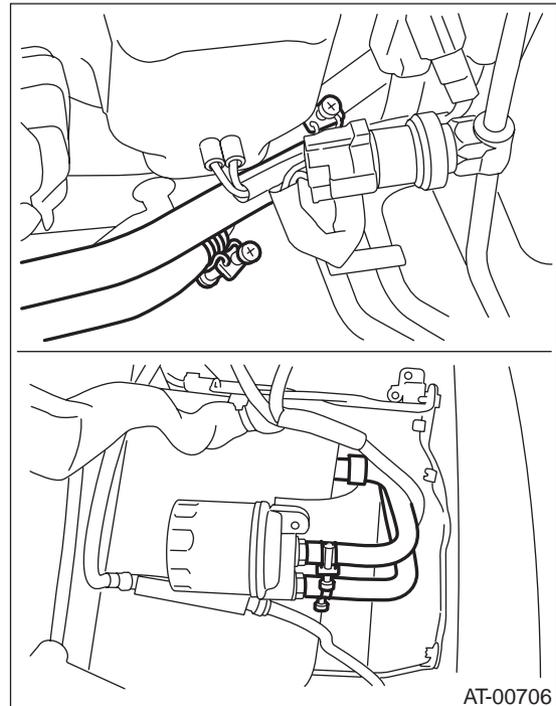


- 7) Remove front left mud guard.
<Ref. to EI-22, REMOVAL, Mud Guard.>
- 8) Disconnect ATF cooler hoses from ATF filter.

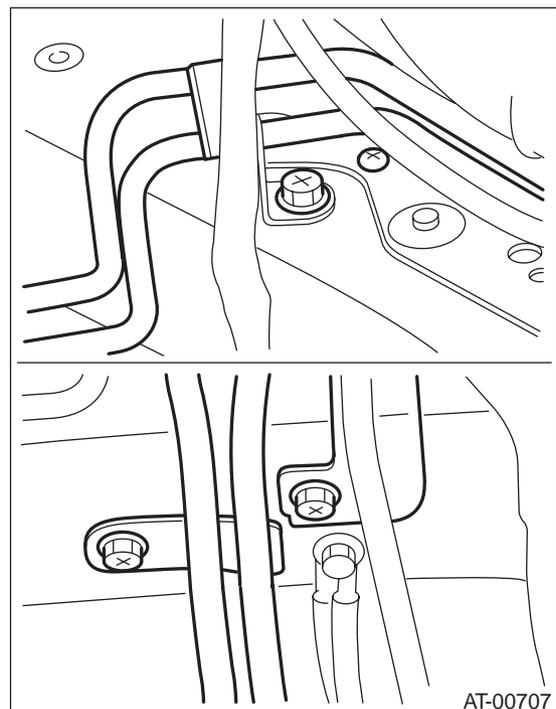
NOTE:

- Do not remove with a screwdriver or other pointed tools.

- When the hose is difficult to remove, wrap a shop cloth around the hose to protect it. Turn it with pliers, and then pull directly out with your hand.



- 9) Remove AT cooler pipe from frame.



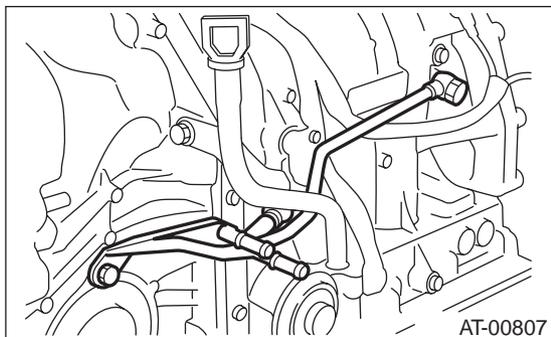
ATF COOLER PIPE AND HOSE

AUTOMATIC TRANSMISSION

10) Remove the oil cooler inlet and outlet pipes.

NOTE:

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



B: INSTALLATION

1. EXCEPT 3.0 L MODEL

1) Install the oil cooler outlet and inlet pipes.

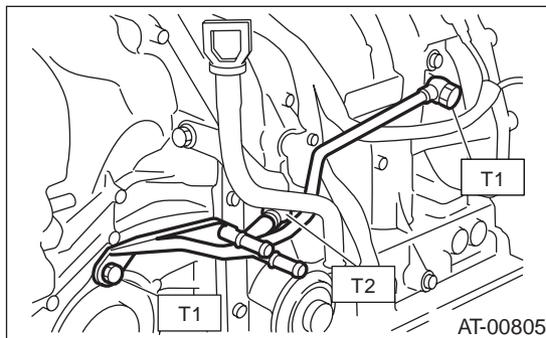
NOTE:

Be sure to use a new aluminum washer.

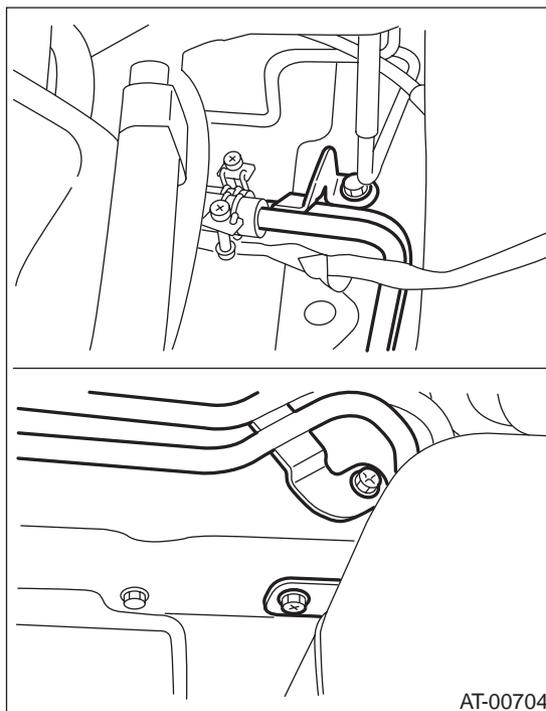
Tightening torque:

T1: 44 N·m (4.5 kgf-m, 32.5 ft-lb)

T2: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



2) Install ATF cooler pipe to frame.



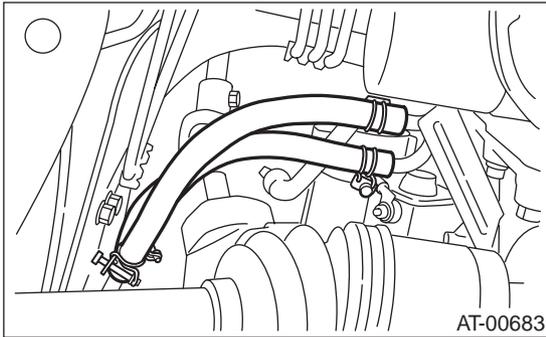
ATF COOLER PIPE AND HOSE

AUTOMATIC TRANSMISSION

3) Connect ATF cooler hose to pipe transmission side.

NOTE:

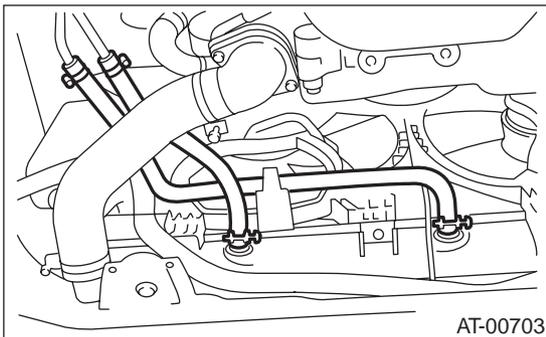
- Install so that the hose is not folded over, excessively bent, or twisted.
- Be careful to insert the hose to the specified position.



4) Connect ATF cooler hose to pipe of radiator 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.



5) Install the under cover.

6) Install battery and washer tank.

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

NOTE:

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

2. 3.0 L MODEL

1) Install the oil cooler outlet and inlet pipes.

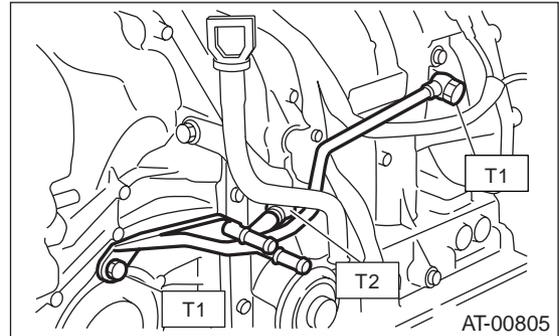
NOTE:

Be sure to use a new aluminum washer.

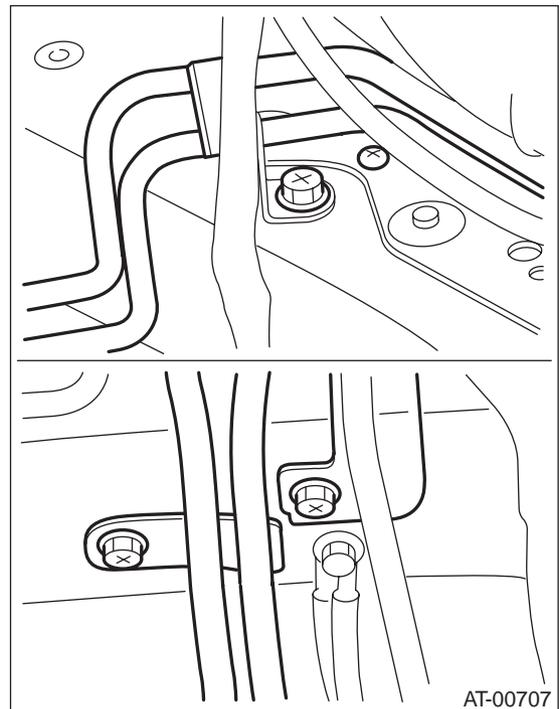
Tightening torque:

T1: 44 N·m (4.5 kgf·m, 32.5 ft·lb)

T2: 25 N·m (2.5 kgf·m, 18.1 ft·lb)



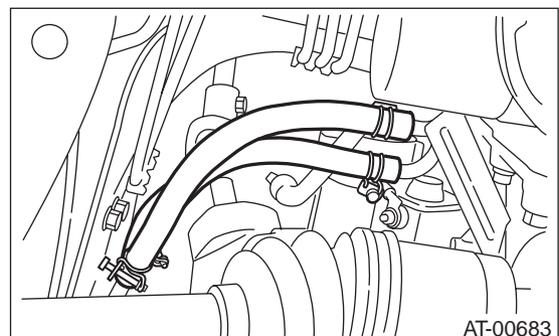
2) Install ATF cooler pipe to frame.



3) Connect ATF cooler hose to transmission.

NOTE:

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



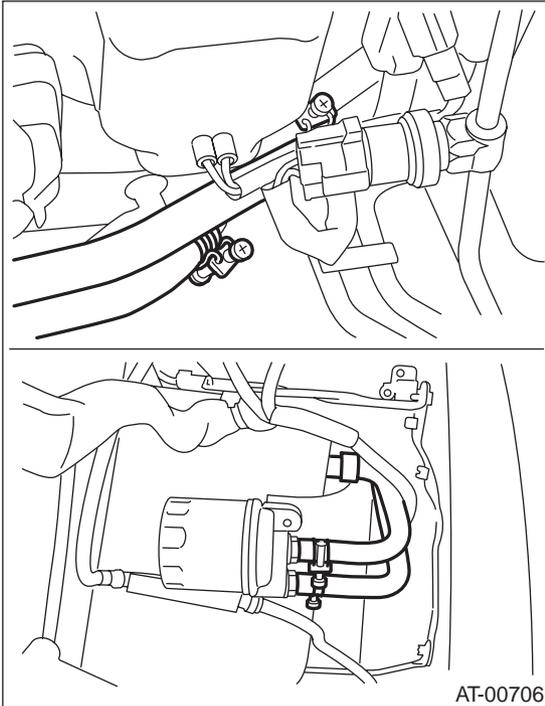
ATF COOLER PIPE AND HOSE

AUTOMATIC TRANSMISSION

4) Connect ATF cooler hoses from ATF filter.

NOTE:

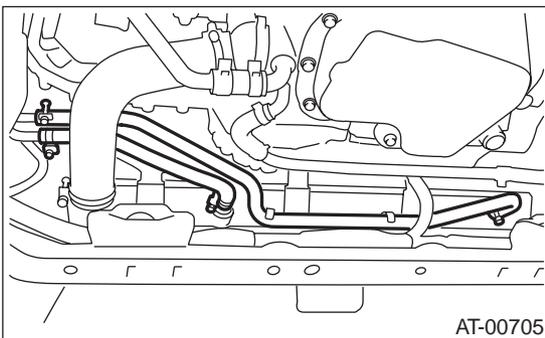
- Install so that the hose is not folded over, excessively bent, or twisted.
- Be careful to insert the hose to the specified position.



5) Connect ATF cooler hoses from radiator.

NOTE:

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



6) Install front left mud guard. <Ref. to EI-22, INSTALLATION, Mud Guard.>

7) Install the under cover.

8) Install battery and washer tank.

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

NOTE:

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

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 by pressing with your fingernail.
- 5) Check for peeling, cracks, and deformation at the tip of the hose.

22. Air Breather Hose

A: REMOVAL

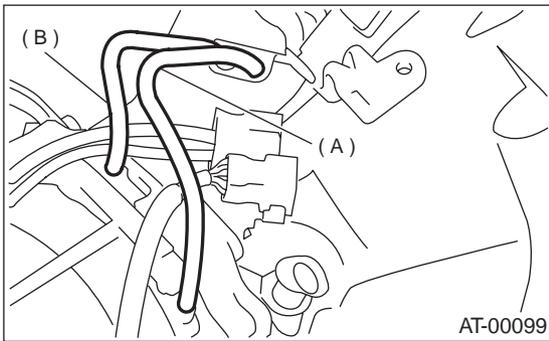
1) Remove the air cleaner case. (2.0 L non-TURBO and 2.5 L models)
 <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

2) Remove air intake chamber. (3.0 L model)
 <Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>

3) Remove intercooler. (TURBO model)
 <Ref. to IN(H4DOSTC)-13, REMOVAL, Intercooler.>

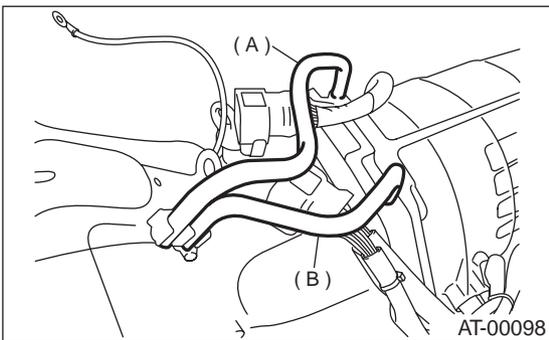
4) Disconnect the air breather hoses.

- Non-TURBO model



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

- TURBO model

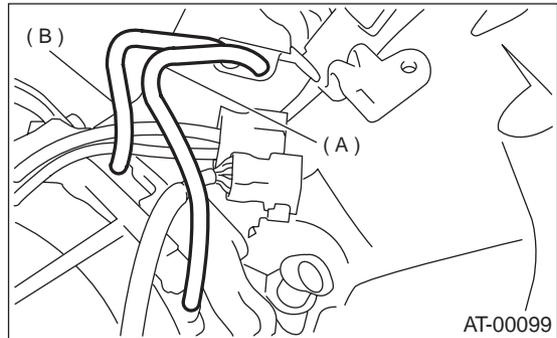


(A) Air breather hose (Transmission case)
 (B) Air breather hose (Oil pump housing)

B: INSTALLATION

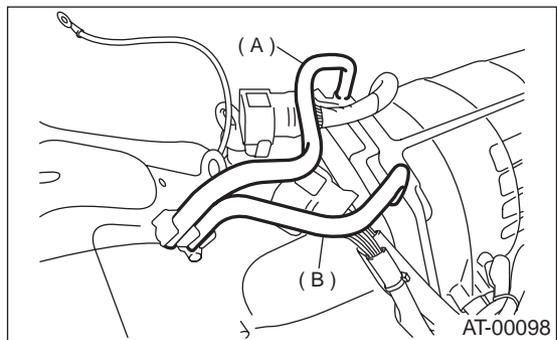
1) Install air breather hoses.

- 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. (2.0 L non-TURBO and 2.5 L models)
 <Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

3) Install air intake chamber. (3.0 L model)
 <Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>

4) Install intercooler. (TURBO model)
 <Ref. to IN(H4DOSTC)-14, INSTALLATION, Intercooler.>

C: INSPECTION

Make sure the hose is not cracked or clogged.

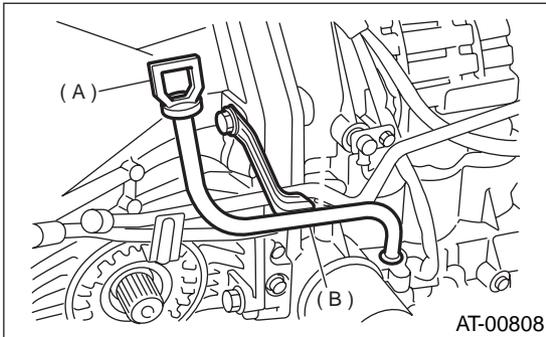
OIL CHARGER PIPE

AUTOMATIC TRANSMISSION

23. Oil Charger Pipe

A: REMOVAL

- 1) Remove the air cleaner case. (2.0 L non-TURBO and 2.5 L models)
<Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 2) Remove air intake chamber. (3.0 L model)
<Ref. to IN(H6DO)-6, REMOVAL, Air Intake Chamber.>
- 3) Remove intercooler. (TURBO model)
<Ref. to IN(H4DOSTC)-13, REMOVAL, Intercooler.>
- 4) Remove the oil charger pipe, and remove the O-ring from the flange face.



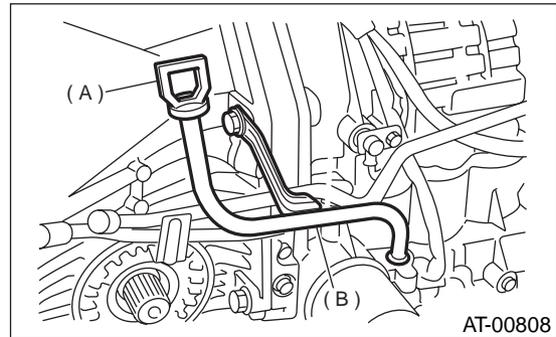
- (A) Oil level gauge
- (B) Oil charger pipe

B: INSTALLATION

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

Tightening torque:

41 N·m (4.2 kgf·m, 30.4 ft·lb)



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

- 2) Install the air cleaner case. (2.0 L non-TURBO and 2.5 L models)
<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>
- 3) Install air intake chamber. (3.0 L model)
<Ref. to IN(H6DO)-6, INSTALLATION, Air Intake Chamber.>
- 4) Install intercooler. (TURBO model)
<Ref. to IN(H4DOSTC)-14, INSTALLATION, Intercooler.>

C: INSPECTION

Make sure the oil charger pipe is not deformed or otherwise damaged.

24. Torque Converter Clutch Assembly

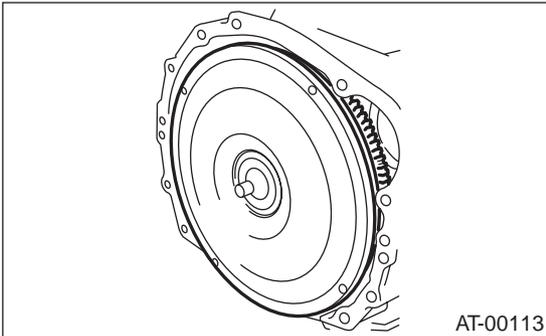
A: REMOVAL

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

2) Extract the torque converter clutch horizontally.

NOTE:

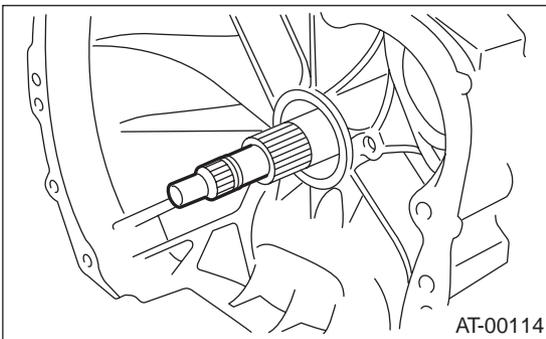
- Be careful not to scratch the bushing inside the oil pump shaft.
- Note that oil pump shaft also comes out.



3) Remove the input shaft.

NOTE:

When the torque converter clutch assembly is removed, the input shaft will come out.



4) Extract the oil pump shaft from torque converter clutch.

5) Remove the clip from torque converter clutch.

B: INSTALLATION

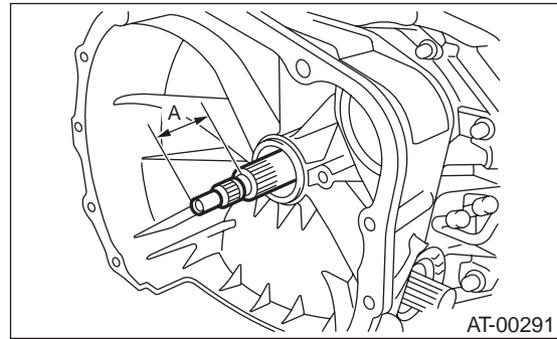
1) Install the clip to torque converter clutch.

2) Install the oil pump shaft to the torque converter clutch, and then check the clip fits securely in its groove.

3) Insert the input shaft while turning lightly by hand.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



4) Holding the torque converter clutch assembly by hand, carefully install it to the torque converter clutch case. Be careful not to damage the bushing. Also avoid undue contact between the oil pump shaft bushing and stator shaft portion of the oil pump cover.

5) Rotate the shaft lightly by hand to engage the splines securely.

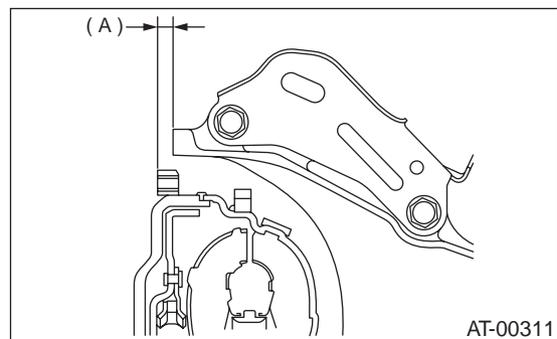
Dimension A:

2.0 L non-TURBO model

-1.3 — -1.1 mm (-0.051 — -0.043 in)

Except 2.0 L non-TURBO model

2.7 — 2.9 mm (0.106 — 0.114 in)



(A) Dimension A

6) Install the transmission assembly to vehicle. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: INSPECTION

Make sure the ring gear is not damaged and that the protrusion on the edge of the torque converter clutch is not deformed or otherwise damaged.

EXTENSION CASE

AUTOMATIC TRANSMISSION

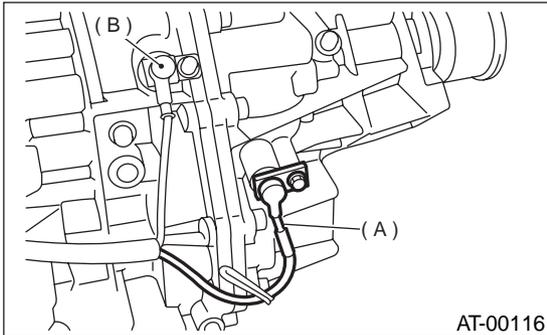
25.Extension Case

A: REMOVAL

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

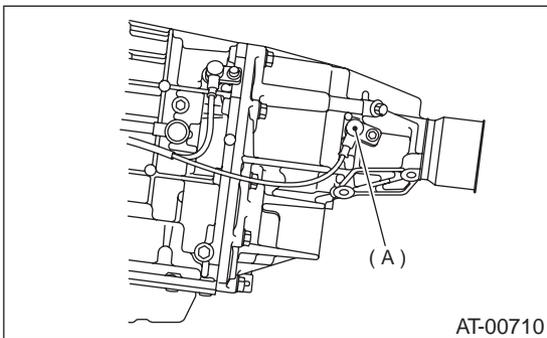
2) Remove rear vehicle speed sensor.

- MPT model



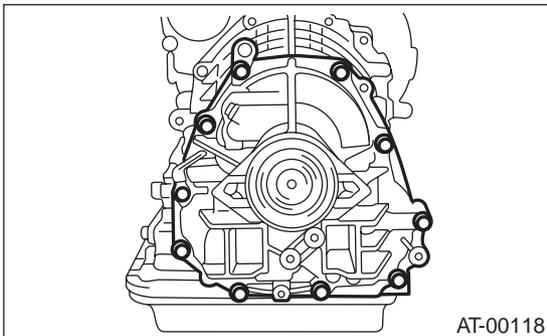
- (A) Rear vehicle speed sensor
- (B) Front vehicle speed sensor

- VTD model



- (A) Rear vehicle speed sensor

3) Separate transmission case and extension case sections.



B: INSTALLATION

1) Attach the selected thrust needle bearing to the end surface of reduction drive gear with vaseline.

NOTE:

Install thrust needle bearing in the correct direction.

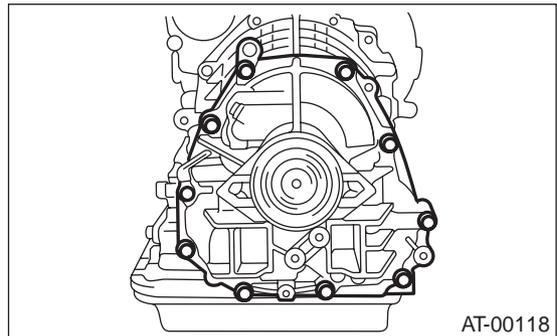
2) Install new gasket.

3) Install the extension case to the transmission case.

4) Tighten bolts to secure the case.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)

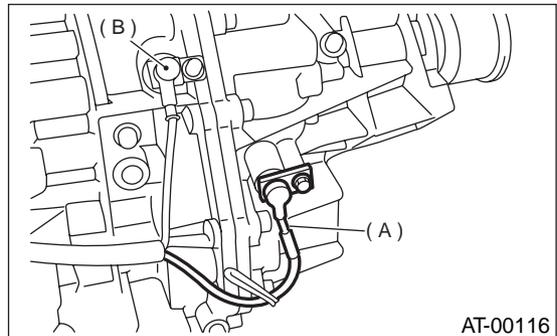


5) Install the rear vehicle speed sensor.

Tightening torque:

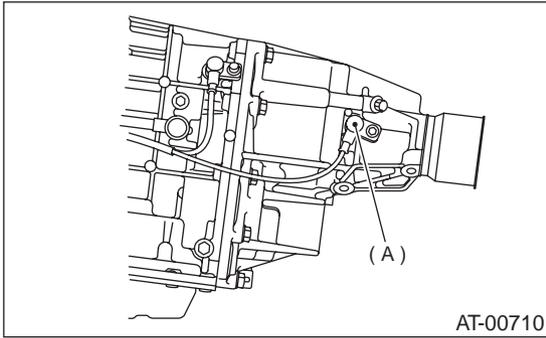
7 N·m (0.7 kgf-m, 5.1 ft-lb)

- MPT model



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

- VTD model



(A) Rear vehicle speed sensor

6) Install the transmission assembly. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

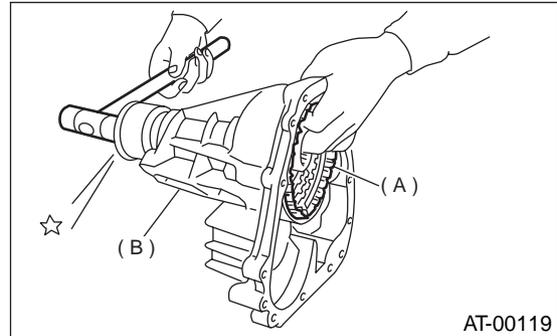
C: DISASSEMBLY

1. MPT MODEL

1) Take out the transfer clutch by lightly tapping the end of the rear drive shaft.

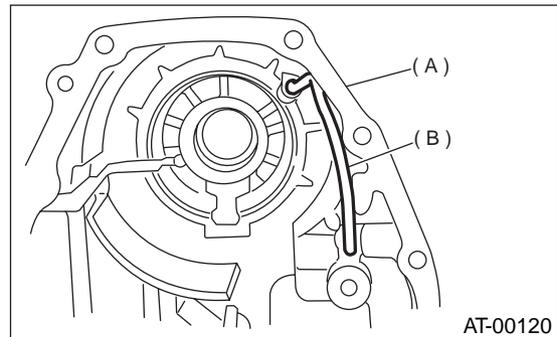
NOTE:

Be careful not to damage the oil seal in the extension.



(A) Extension case
(B) Transfer clutch

2) Remove the transmission clutch pipe without bending pipe.



(A) Extension case
(B) Transfer clutch pipe

2. VTD MODEL

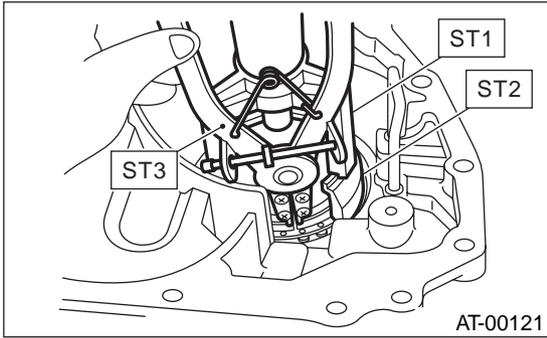
1) Remove snap ring using ST1, ST2, ST3 and a press.

ST1 398673600 COMPRESSOR
ST2 498627100 SHEAT

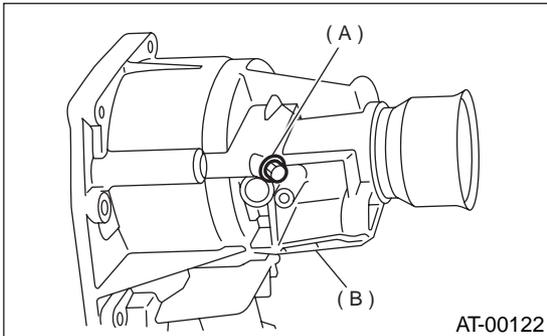
EXTENSION CASE

AUTOMATIC TRANSMISSION

ST3 398663600 PLYER

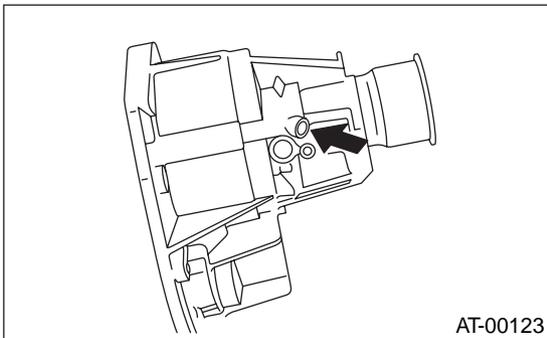


2) Remove test pulg.

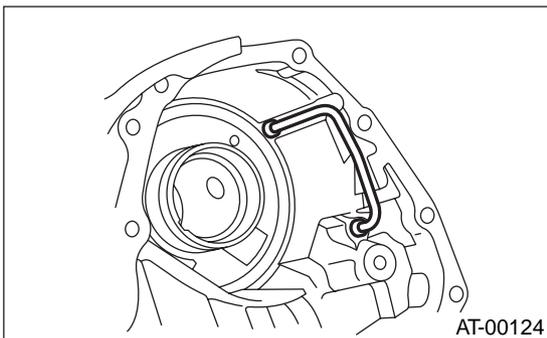


(A) Extension case
(B) Test plug

3) Remove clutch piston using compressed air.



4) Pay attention, not to bend pipe, and remove transfer clutch pipe.



5) Remove the dust cover from the extension case.
6) Remove the oil seal from the extension case.

D: ASSEMBLY

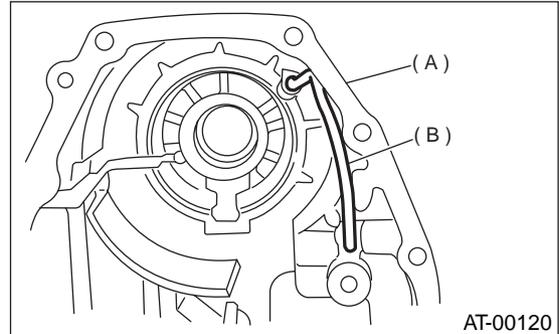
1. MPT MODEL

1) Using the ST and a press, press in a new oil seal.

ST 498057300 INSTALLER

2) Press in the dust cover.

3) Install the transfer clutch pipe to extension case without bending pipe.

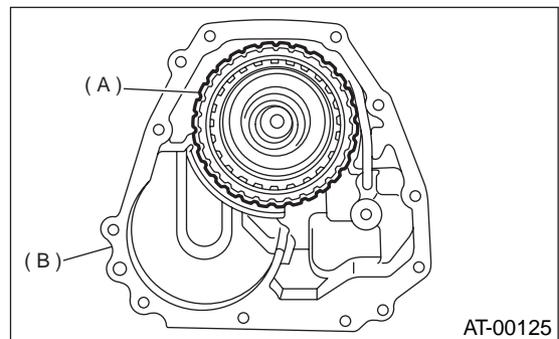


(A) Extension case
(B) Transfer clutch pipe

4) Install the transfer clutch assembly to the case.

NOTE:

- Be careful not to damage the seal rings.
- Insert the clutch assembly fully into position until the bearing shoulder bottoms.



(A) Transfer clutch
(B) Extension case

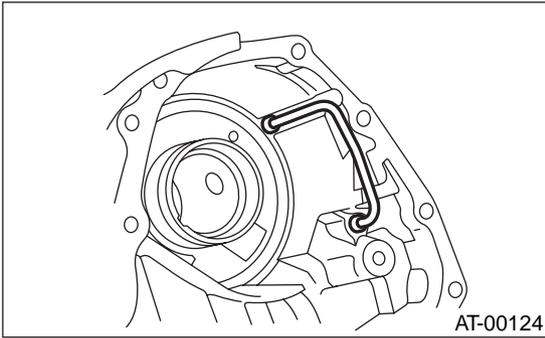
2. VTD MODEL

1) Press new oil seal using ST and a press.

ST 498057300 INSTALLER

2) Press dust cover.

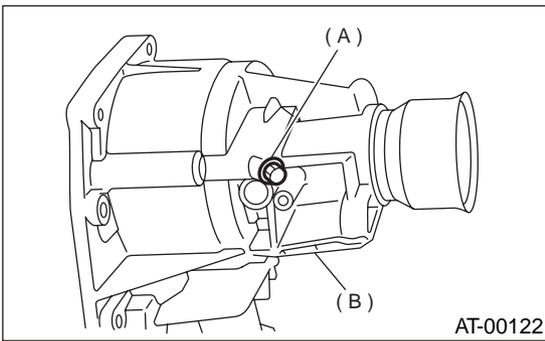
3) Install the transfer clutch pipe onto the extension case, taking care not to bend the pipe.



4) Install the test plug.

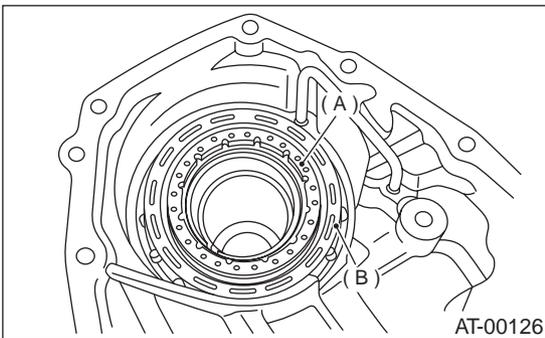
Tightening torque:

13 N·m (1.3 kgf-m, 9.4 ft-lb)



- (A) Test plug
- (B) Extension case

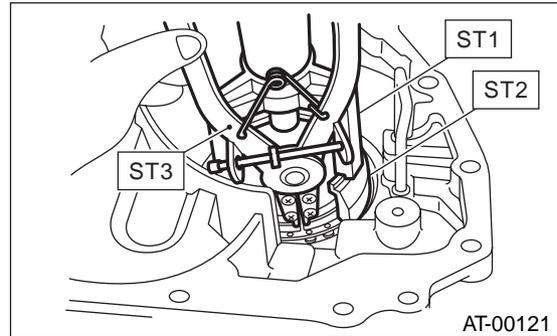
5) Insert the multi-plate clutch, drive plates, driven plates, and spring retainer.



- (A) Spring retainer
- (B) Multi-plate clutch (LSD) piston assembly

6) Install the snap ring using special tools 1, 2, and 3.

- ST1 398673600 COMPRESSOR
- ST2 498627100 SEAT
- ST3 398663600 PLIERS



E: INSPECTION

- Use forced air to make sure the transfer pipe and extension case routes are not clogged and do not leak.
 - Measure the extension end play and adjust it to within specifications.
- MPT model
 <Ref. to AT-94, MPT MODEL, ADJUSTMENT, Transfer Clutch.>
- VTD model
 <Ref. to AT-95, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

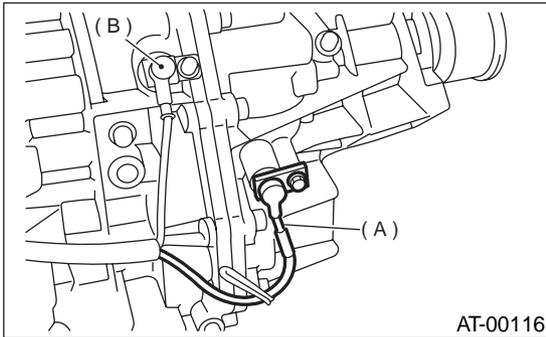
TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

26. Transfer Clutch

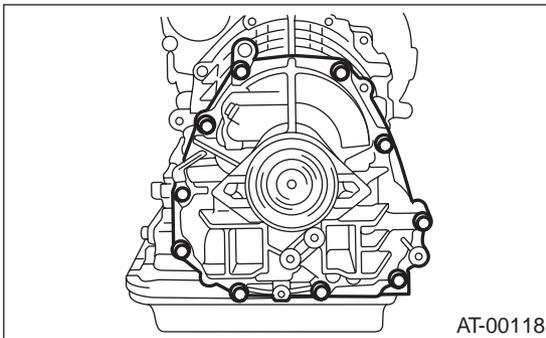
A: REMOVAL

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

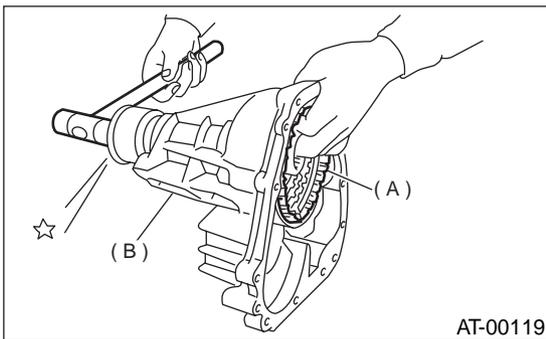


- (A) Rear vehicle speed sensor
- (B) Front vehicle speed sensor

- 3) Separate transmission case and extension case sections.



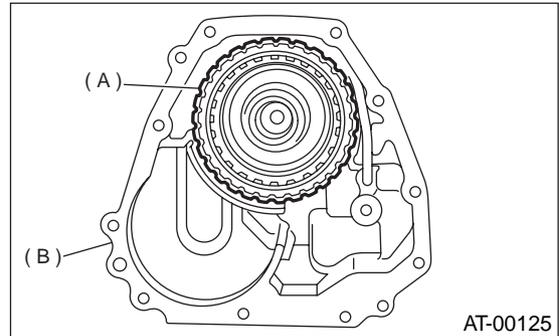
- 4) Take out the transfer clutch by lightly tapping the end of the rear drive shaft.



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

B: INSTALLATION

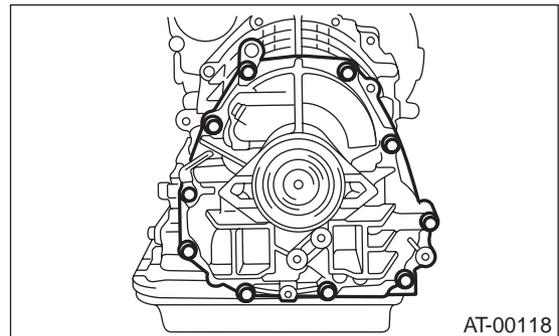
- 1) Select the thrust needle bearing.
- 2) Install the transfer clutch assembly to the case.



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

- 3) Tighten bolts to secure the case.

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



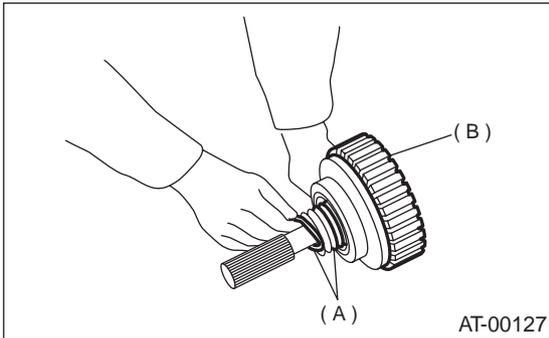
- 4) Install the transmission assembly to vehicle. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

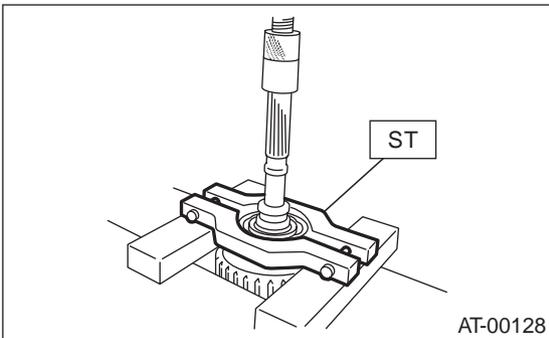
C: DISASSEMBLY

1) Remove the seal ring.

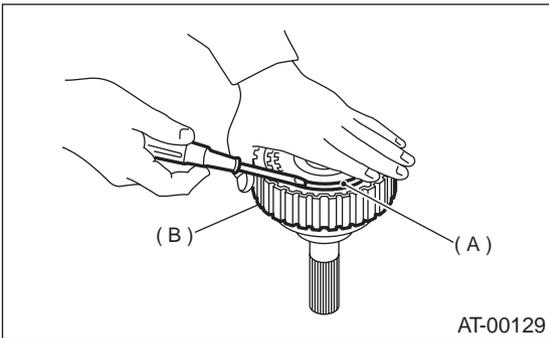


- (A) Seal ring
- (B) Transfer clutch

2) Using a press and ST, remove the ball bearing.
ST 498077600 REMOVER



3) Remove the snap ring, and take out the pressure plate, drive plates, and driven plates.

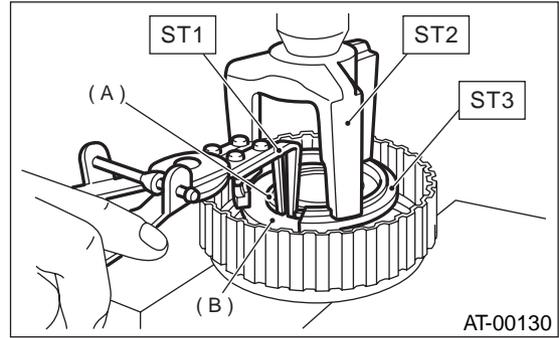


- (A) Snap ring
- (B) Transfer clutch

4) Remove the snap ring with ST1, ST2 and ST3, and take out the return spring and transfer clutch piston seal.

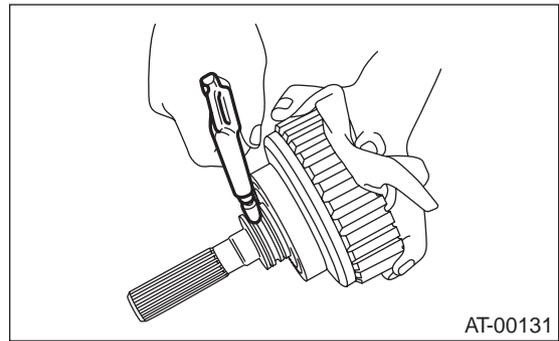
ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR

ST3 398623600 SEAT



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

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

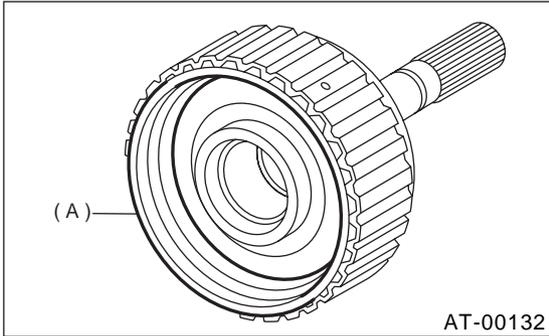


TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

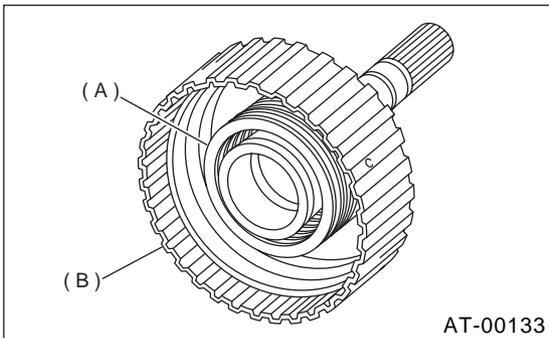
D: ASSEMBLY

1) Install the transfer clutch piston.



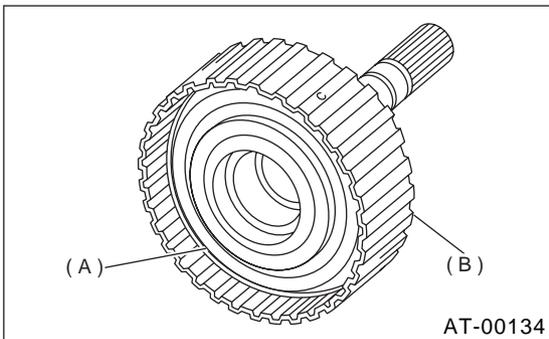
- (A) Transfer clutch piston
- (B) Rear drive shaft

2) Install return spring to transfer piston.



- (A) Return spring
- (B) Rear drive shaft

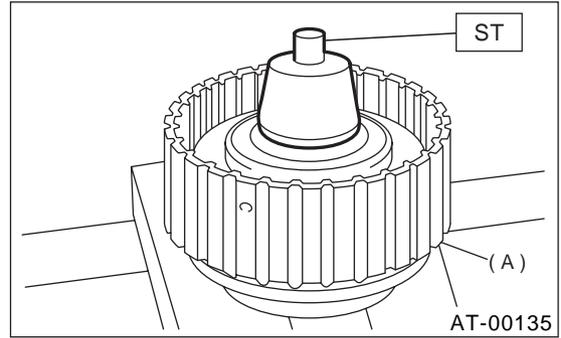
3) Install transfer clutch piston seal.



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

4) Install ST to rear drive shaft.

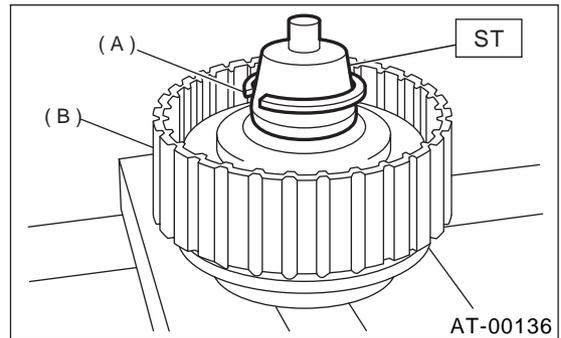
ST 499257300 SNAP RING OUTER GUIDE



- (A) Transfer clutch

5) Install snap ring to ST.

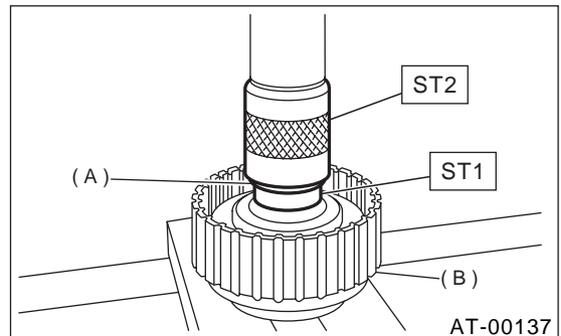
ST 499257300 SNAP RING OUTER GUIDE



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

6) Using ST1 and ST2, install snap ring to rear drive shaft.

ST1 499257300 SNAP RING OUTER GUIDE
ST2 499247400 INSTALLER

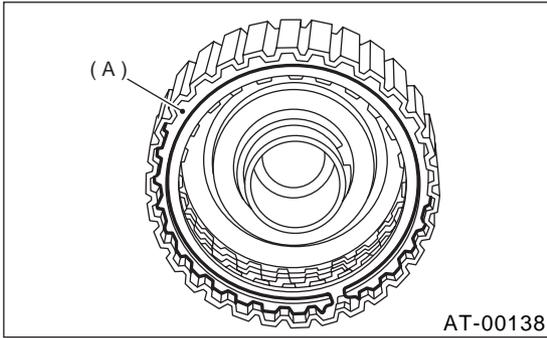


- (A) Snap ring
- (B) Transfer clutch

TRANSFER CLUTCH

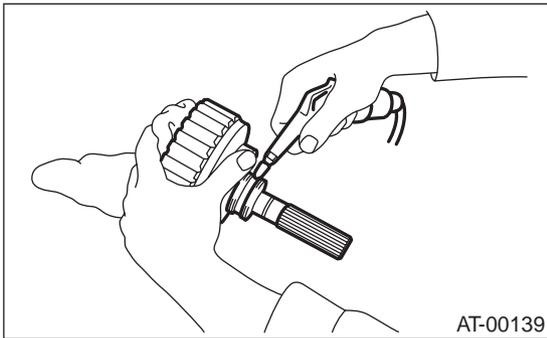
AUTOMATIC TRANSMISSION

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



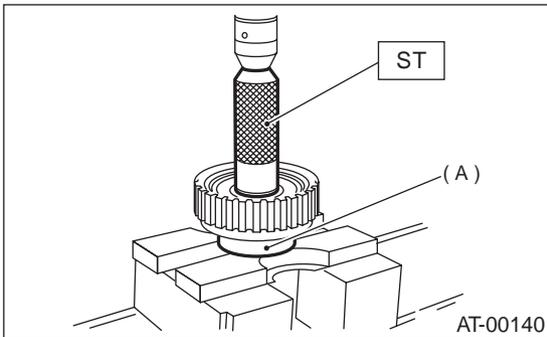
(A) Snap ring

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



9) Check clearance between snap ring and pressure plate. <Ref. to AT-94, INSPECTION, Transfer Clutch.>

10) Press-fit a new ball bearing with ST.
ST 899580100 INSTALLER

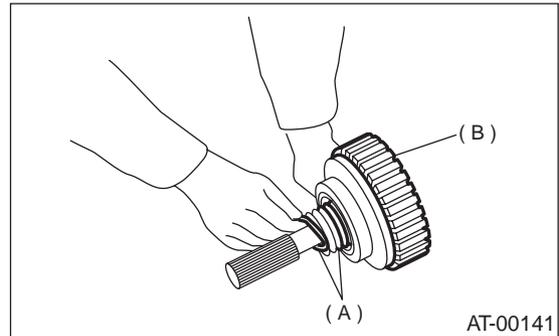


(A) Ball bearing

11) Coat a new seal ring with vaseline, and install it in the seal ring groove of the shaft.

NOTE:

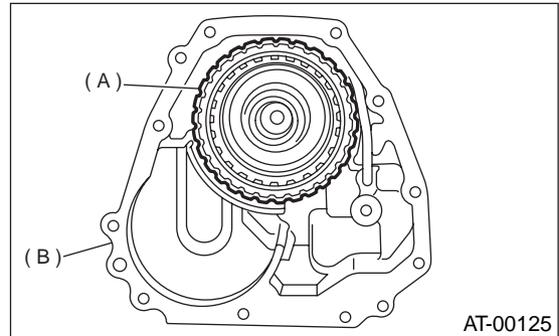
Do not expand the seal ring excessively when installing.



(A) Snap ring

(B) Transfer clutch

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



(A) Transfer clutch

(B) Extension case

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

E: INSPECTION

- Check the drive plate facing for wear and damage.
- Check the snap ring for wear, return spring for permanent set and breakage, and return spring for deformation.
- Check the D-ring for damage.
- Measure the extension end play and adjust it to within specifications.

<Ref. to AT-94, ADJUSTMENT, Transfer Clutch.>

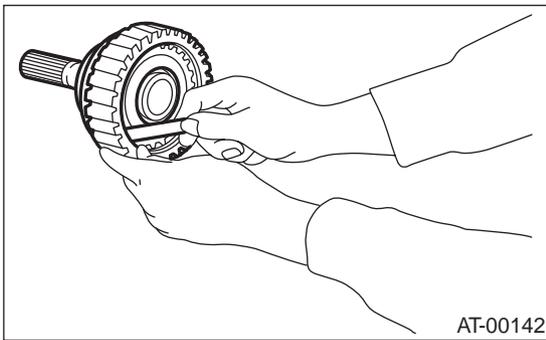
- 1) Inspect clearance between snap ring and pressure plate.
- 2) Before measuring clearance, place the same thickness of shim on both sides to prevent pressure plate from tilting.
- 3) If the clearance is not within specification, adjust it by selecting a suitable pressure plate on the transfer clutch piston side.

Standard value:

0.7 — 1.1 mm (0.028 — 0.043 in)

Allowable limit:

1.6 mm (0.063 in)



Available pressure plates	
Part No.	Thickness mm (in)
31593AA151	3.3 (0.130)
31593AA161	3.7 (0.146)
31593AA171	4.1 (0.161)
31593AA181	4.5 (0.177)

- 4) Check if 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

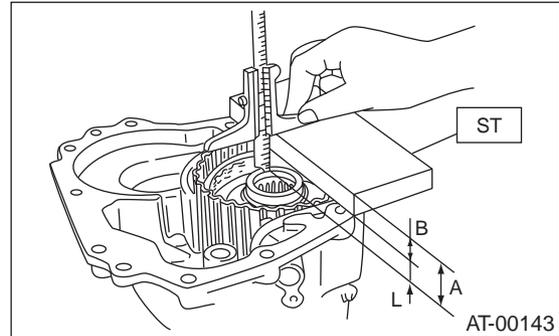
1. MPT MODEL

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

ST 398643600 GAUGE

L = Measured value – 15 mm

(L = Measured value – 0.59 in)



A: Measured value

B: ST thickness [15 mm (0.59 in)]

L: Distance from end of extension case to end of rear drive shaft

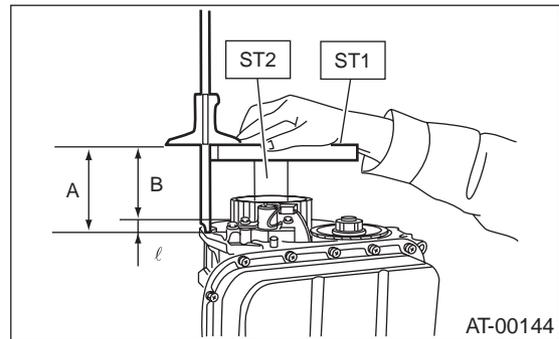
- 2) Measure the distance "ℓ" from the transmission case mating surface to the reduction drive gear end surface with ST1 and ST2.

ℓ = Measured value – 50 mm

(ℓ = Measured value – 1.97 in)

ST1 398643600 GAUGE

ST2 499577000 GAUGE



A: Measured value

B: ST thickness [50 mm (1.97 in)]

ℓ: Distance from end of transmission case to end of reduction drive gear

- 3) Calculation equation:

NOTE:

Calculate "H":

When clearance is at 0.05 mm (0.0020 in) and 0.25 mm (0.0098 in), then select a suitable thrust needle bearing from the table.

$H = (L + 0.45 \text{ mm}) - \ell - T$

[$H = (L + 0.0177 \text{ in}) - \ell - T$]

T: Thrust needle bearing thickness

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

L: Distance from end of extension case to end of rear drive shaft

0.45 mm (0.0177 in): Gasket thickness

\varnothing : Distance from end of transmission case to end of reduction drive gear

H: Shim clearance

0.05 — 0.25 mm (0.0020 — 0.0098 in)

Example:

When, L = 18.60 mm (0.7323 in), \varnothing = 15.05 mm (0.5925 in)

Calculation when clearance is 0.05 mm (0.0020 in)

$$H = (18.60 + 0.45) - 15.05 - 0.05 = 3.95$$

$$[H = (0.7323 + 0.0177) - 0.5925 - 0.0020 = 0.1555]$$

Calculation when clearance is 0.25 mm (0.0098 in)

$$H = (18.60 + 0.45) - 15.05 - 0.25 = 3.75$$

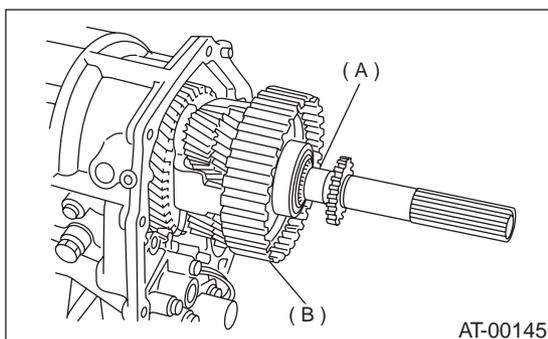
$$[H = (0.7323 + 0.0177) - 0.5925 - 0.0098 = 0.1476]$$

After calculation, the value of "H" becomes between 3.75 and 3.95, therefore select bearing thickness of 3.8.

Thrust needle bearing	
Part No.	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)

2. VTD MODEL

1) Insert the rear driveshaft into the reduction drive gear and center differential assembly.



(A) Rear drive plate

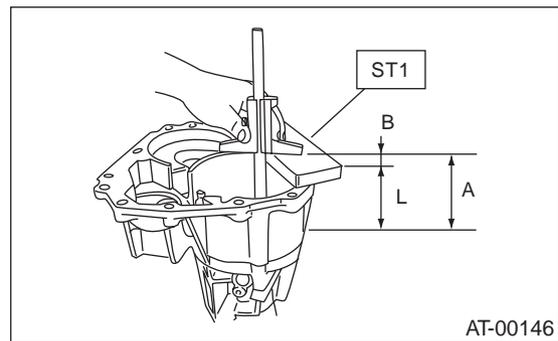
(B) Center differential carrier

2) Using the special tool, measure the distance "L" between the mating surface of extension case and multi-plate clutch (LSD) piston.

ST 398643600 GAUGE

L = Measured value – 15 mm

(L = Measured value – 0.59 in)



A: Measured value

B: Thickness of special tool [15 mm (0.59 in)]

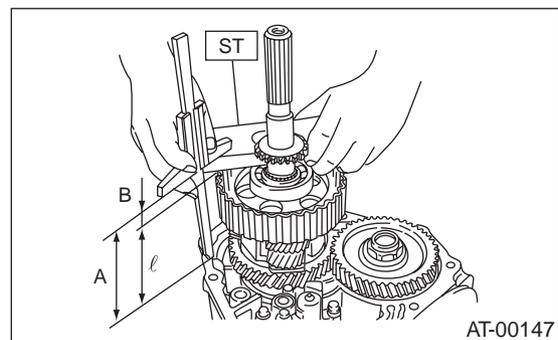
L: Distance between extension case edge and rear driveshaft edge

3) Using the special tool, measure the distance "Q" between the mating surface of transmission case and reduction drive gear edge.

\varnothing = Measured value – 15 mm

(\varnothing = Measured value – 0.59 in)

ST 398643600 GAUGE



A: Measured value

B: Thickness of special tool [15 mm (0.59 in)]

\varnothing : Distance between extension case edge and reduction drive gear edge

4) Formula:

NOTE:

Calculation of "H":

When clearances are 0.05 mm (0.0020 in) and 0.25 mm (0.0098 in), select up to four adjusting shims from the table, suitable for clearance value.

$$H = (L + 0.45 \text{ mm}) - \varnothing - T$$

$$[H = (L + 0.0177 \text{ in}) - \varnothing - T]$$

T: Shim clearance

L: Distance between extension case edge and rear driveshaft edge

0.45 mm (0.0177 in): Gasket thickness

\varnothing : Distance between transmission case edge and reduction drive gear edge

T: Shim thickness

0.05 — 0.25 mm (0.0020 — 0.0098 in)

Example:

TRANSFER CLUTCH

AUTOMATIC TRANSMISSION

When, $L = 90.50$ mm (3.5630 in), $\varnothing = 90.35$ mm (3.5571 in)

Calculation for 0.05 mm of clearance (0.0020 in)

$$H = (90.50 + 0.45) - 90.35 - 0.05 = 0.55$$

$$[H = (3.5630 + 0.0177) - 3.5571 - 0.0020 = 0.0217]$$

Calculation when clearance is 0.25 mm

(0.0098 in)

$$H = (90.50 + 0.45) - 90.35 - 0.25 = 0.35$$

$$[H = (3.5630 + 0.0177) - 3.5571 - 0.0098 = 0.0138]$$

After calculation, the value of "H" becomes between 0.35 mm (0.0138 in) and 0.55 mm (0.0216 in), therefore select two shims with thickness of 0.2 mm (0.010 in) or one shim with thickness of 0.5 mm (0.020 in).

Adjusting shim	
Part No.	Thickness mm (in)
33281AA001	0.2 (0.008)
33281AA011	0.5 (0.020)

27. Multi-plate Clutch

A: REMOVAL

Remove multi-plate clutch following the same instructions as for the extension case. <Ref. to AT-86, REMOVAL, Extension Case.>

B: INSTALLATION

Install multi-plate clutch following the same instructions as for the extension case. <Ref. to AT-86, INSTALLATION, Extension Case.>

C: INSPECTION

- Inspect drive plate facing for wear and damage.
- Make sure snap ring is not worn and return spring has no permanent distortion, damage, or deformation.
- Inspect D-ring for damage.
- Measure multi-plate clutch clearance and adjust it to within the specification range. <Ref. to AT-97, ADJUSTMENT, Multi-plate Clutch.>

D: ADJUSTMENT

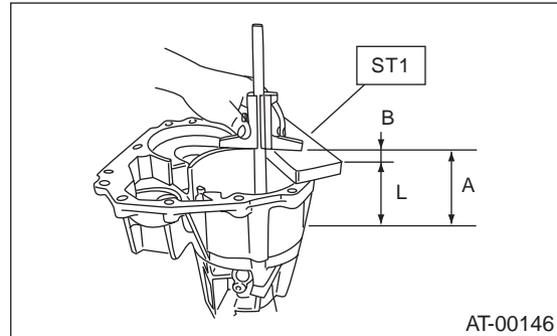
1) Remove drive plate and driven plate from center differential carrier.

2) Using the special tool, measure distance “L” from extension case joining surface to multi-plate clutch (LSD) piston.

ST 398643600 Gauge

L = Measured value – 15 mm

(L = Measured value – 0.59 in)



A: Measured value

B: Special tool thickness [15 mm (0.59 in)]

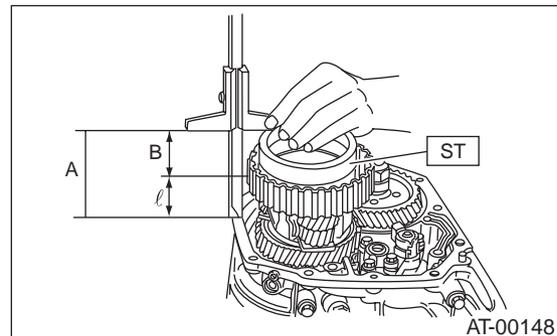
L: Distance from the extension case edge to the rear driveshaft edge.

3) Using ST, measure height “ \varnothing ” from transmission case joining edge to center differential clutch drum edge.

ST 398744300 GAUGE

\varnothing = Measurement value – 50 mm

(\varnothing = Measurement value – 1.97 in)



A: Measurement value

B: Special tool thickness [50 mm (1.97 in)]

\varnothing : Measure distance from transmission case joining surface to multi-plate clutch (LSD) piston.

4) Calculation formula

$$T = (L + 0.45 \text{ mm}) - \varnothing$$

$$[T = (L + 0.0177 \text{ in}) - \varnothing]$$

T: Measurement value between clutch drum and multi-plate clutch (LSD) piston

L: Distance from extension case joining surface to multi-plate clutch (LSD) piston

0.45: Gasket thickness

\varnothing : Distance from transmission case joining surface to center differential clutch drum edge

MULTI-PLATE CLUTCH

AUTOMATIC TRANSMISSION

NOTE:

Measure multi-plate clutch (LSD) driven and drive plate thickness to find the clearance between measurement value and “T”.

Standard value:

0.2 — 0.6 mm (0.008 — 0.024 in)

Limit value:

1.6 mm (0.063 in)

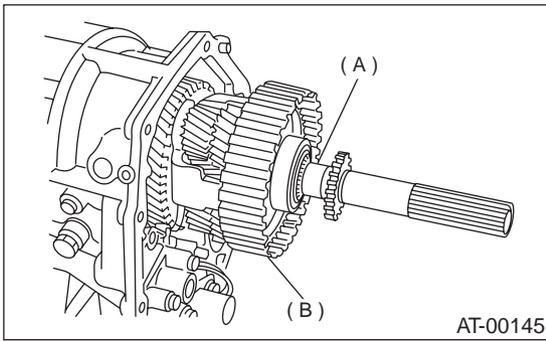
If outside the standard value, replace the plate set (drive and driven plate). Select a multi-plate clutch (LSD) piston side adjustment plate that will bring clearance within the standard value.

Obtainable driven plates	
Part No.	Thickness mm (in)
31589AA041	1.6 (0.063)
31589AA050	2.0 (0.079)
31589AA060	2.4 (0.094)
31589AA070	2.8 (0.110)

28.Rear Drive Shaft

A: REMOVAL

- 1) Remove transmission assembly. <Ref. to AT-39, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear wheel speed sensor and separate extension case from transmission case. <Ref. to AT-86, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft from the center differential assembly.



- (A) Rear driveshaft
- (B) Center differential carrier

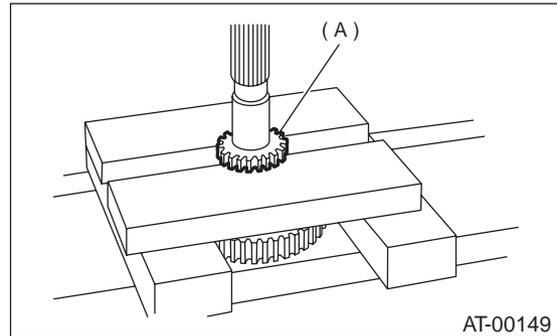
- 4) Remove drive plate and driven plate.

B: INSTALLATION

- 1) Select the appropriate shim. <Ref. to AT-95, VTD MODEL, ADJUSTMENT, Transfer Clutch.>
- 2) Install drive plate and driven plate.
- 3) Insert rear driveshaft into the center differential assembly.
- 4) Join transmission case and extension case. Install rear wheel speed sensor. <Ref. to AT-86, INSTALLATION, Extension Case.>
- 5) Install transmission assembly. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

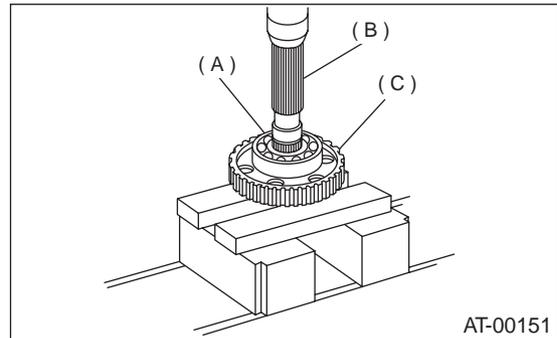
C: DISASSEMBLY

- 1) Using a press, remove revolution gear.



- (A) Revolution gear

- 2) Using a press, remove the front and rear side ball bearings and clutch hub.



- (A) Rear ball bearing
- (B) Rear driveshaft
- (C) Clutch hub

REAR DRIVE SHAFT

AUTOMATIC TRANSMISSION

D: ASSEMBLY

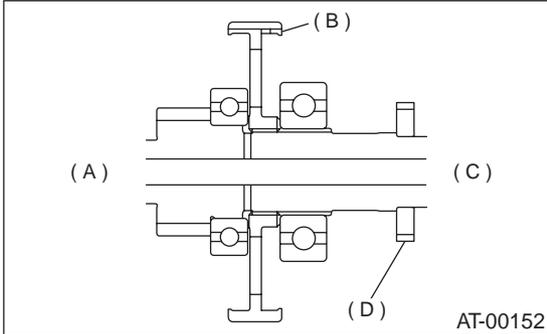
Assemble in the reverse order of disassembly.

NOTE:

- Use a new revolution gear and ball bearings.
- Make sure the clutch hub is oriented in the correct direction.

E: INSPECTION

- Inspect parts to make sure there are no holes, cuts, and that they are not dusty.
- Inspect extension end play and adjust it to within the standard value. <Ref. to AT-95, VTD MODEL, ADJUSTMENT, Transfer Clutch.>



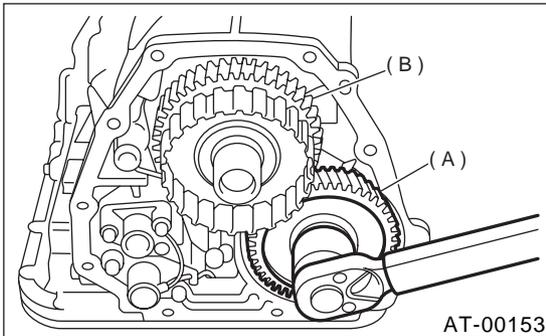
- (A) Front side
- (B) Clutch hub
- (C) Rear side
- (D) Revolution gear

29.Reduction Driven Gear

A: REMOVAL

1. MPT MODEL

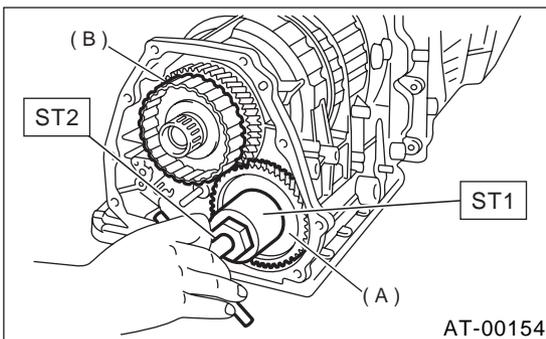
- 1) Remove the transmission assembly from the vehicle. <Ref. to AT-39, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to AT-86, REMOVAL, Extension Case.>
- 3) Set the range select lever to "P".
- 4) Straighten the staked portion, and remove the lock nut.



- (A) Reduction driven gear
- (B) Reduction drive gear

- 5) Using the ST1 and ST2, extract the reduction driven gear.

ST1 499737000 PULLER
ST2 899524100 PULLER SET

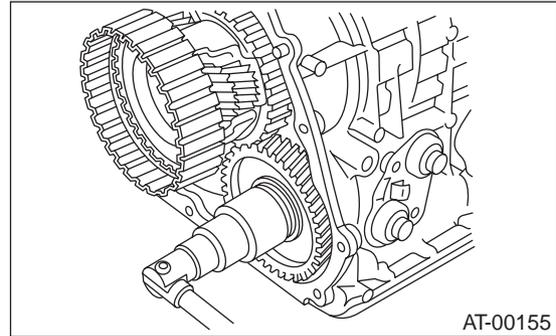


- (A) Reduction driven gear
- (B) Reduction drive gear

2. VTD MODEL

- 1) Remove the transmission assembly from the vehicle. <Ref. to AT-39, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to AT-86, REMOVAL, Extension Case.>
- 3) Remove the rear drive shaft. <Ref. to AT-99, REMOVAL, Rear Drive Shaft.>

- 4) Set the range select lever to "P".
- 5) Straighten the staked portion, and remove the lock nut.



- (A) Reduction driven gear
- (B) Reduction drive gear

- 6) Using the ST1 and ST2, extract the reduction driven gear.

ST1 499737000 PULLER
ST2 899524100 PULLER SET

- 7) Pull out the center differential assembly. <Ref. to AT-106, REMOVAL, Center Differential Carrier.>

REDUCTION DRIVEN GEAR

AUTOMATIC TRANSMISSION

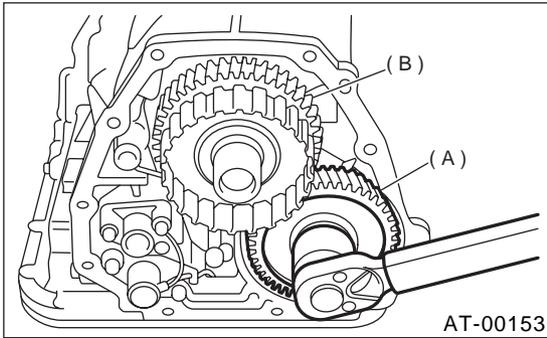
B: INSTALLATION

1. MPT MODEL

- 1) Set the select lever to "P" range.
- 2) Using a plastic hammer, install reduction driven gear assembly and new washer, and tighten new drive pinion lock nut.

Tightening torque:

100 N·m (10.2 kgf·m, 73.8 ft·lb)



- (A) Reduction driven gear
- (B) Reduction drive gear

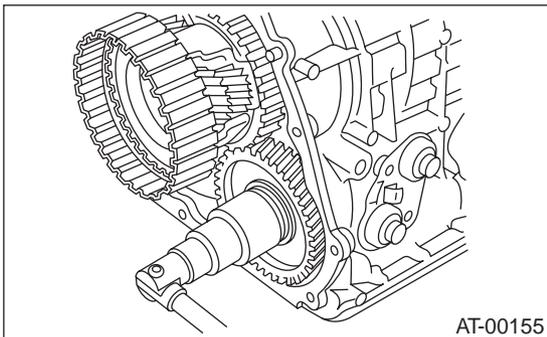
- 3) After tightening, stake the lock nut securely.
- 4) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to AT-86, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to vehicle. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

2. VTD MODEL

- 1) Set the select lever to "P" range.
- 2) Using a plastic hammer, install reduction driven gear assembly.
- 3) Using a plastic hammer, install the center differential assembly.
- 4) Install a new self-lock nut and a washer.

Tighting torque:

100 N·m (10.2 kgf·m, 73.8 ft·lb)

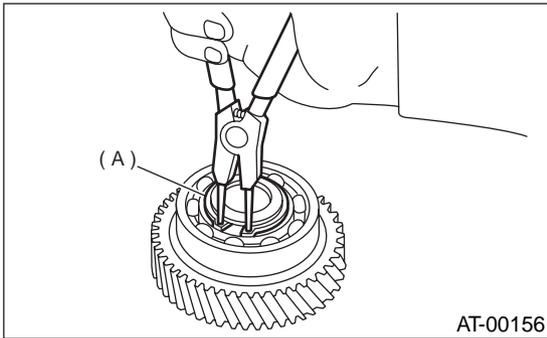


- (A) Reduction driven gear
- (B) Reduction drive gear

- 5) After tightening, stake the lock nut securely.
- 6) Insert the rear drive shaft assembly. <Ref. to AT-99, INSTALLATION, Rear Drive Shaft.>
- 7) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to AT-86, INSTALLATION, Extension Case.>
- 8) Install the transmission assembly to vehicle. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

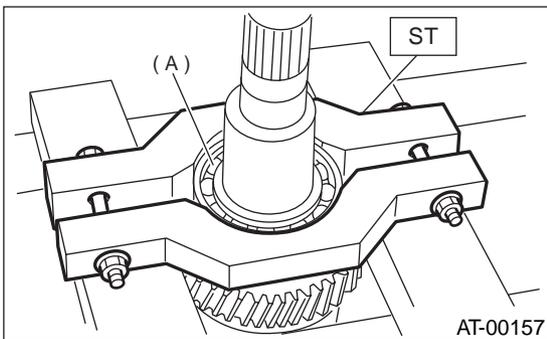
1) Remove snap ring from reduction driven gear.



(A) Snap ring

2) Using ST, remove ball bearing from reduction driven gear.

ST 498077600 REMOVER



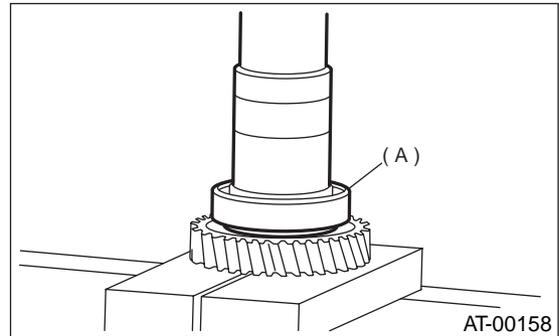
(A) Ball bearing

3) Remove snap ring reduction driven gear. (3.0 L model)

D: ASSEMBLY

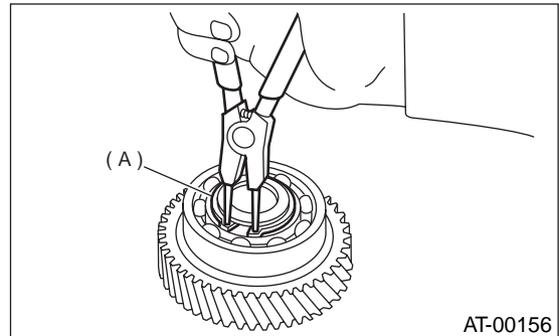
1) Install snap ring to reduction driven gear. (3.0 L model)

2) Using a press, install a new ball bearing to reduction driven gear.



(A) Ball bearing

3) Install snap ring to reduction driven gear.



(A) Snap ring

E: INSPECTION

Check ball bearing and gear for dents or damage.

REDUCTION DRIVE GEAR

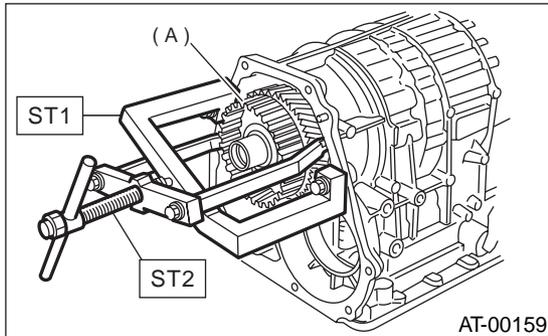
AUTOMATIC TRANSMISSION

30.Reduction Drive Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to AT-39, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to AT-86, REMOVAL, Extension Case.>
- 3) Remove the reduction driven gear. <Ref. to AT-101, REMOVAL, Reduction Driven Gear.>
- 4) Using ST, extract the reduction drive gear.

ST1 499737100 PULLER
ST2 899524100 PULLER SET



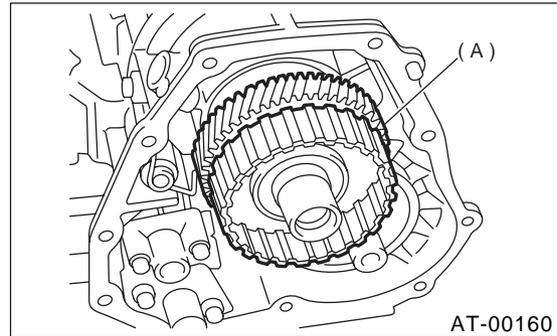
(A) Reduction drive gear

B: INSTALLATION

- 1) Install the reduction drive gear assembly.

NOTE:

Insert it fully into position until the bearing shoulder bottoms.

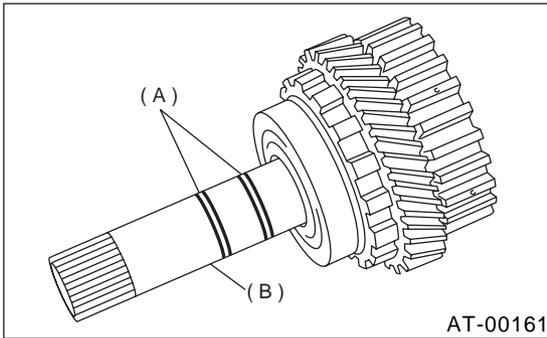


(A) Reduction drive gear

- 2) Install the reduction driven gear. <Ref. to AT-102, INSTALLATION, Reduction Driven Gear.>
- 3) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to AT-86, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to AT-42, INSTALLATION, Automatic Transmission Assembly.>

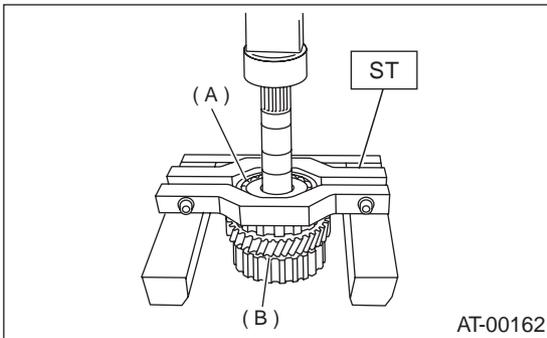
C: DISASSEMBLY

1) Take out the seal rings.



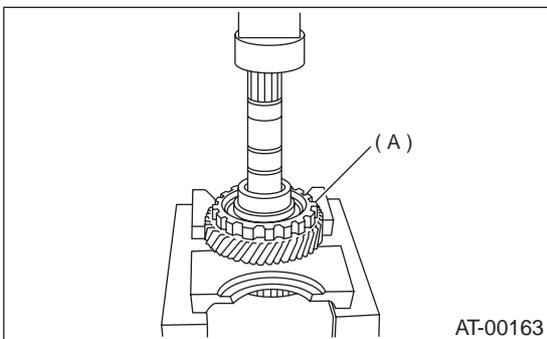
- (A) Seal rings
- (B) Reduction drive shaft

2) Using ST, remove the ball bearing.
ST 498077600 REMOVER



- (A) Ball bearing
- (B) Reduction drive gear

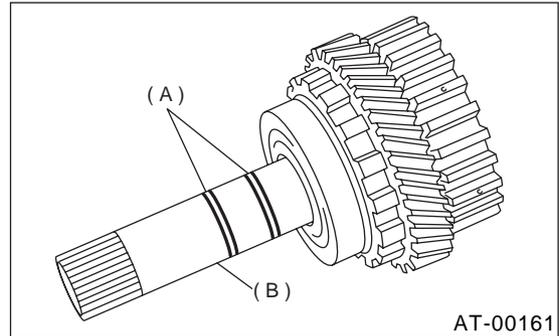
3) Using a press, remove the reduction drive gear.



- (A) Reduction drive gear

D: ASSEMBLY

- 1) Press-fit the reduction drive gear to the shaft.
- 2) Press-fit the a new ball bearing to the reduction drive gear.
- 3) Apply vaseline to outer surface of seal ring and shaft groove.
- 4) Attach new seal rings.



- (A) Seal rings
- (B) Reduction drive shaft

E: INSPECTION

- Rotate bearing by hand, make sure it rotates smoothly.
- Make sure that each component is free of harmful gouges, cuts, or dust.
- Measure the extension end play and adjust it to within specifications.<Ref. to AT-94, ADJUSTMENT, Transfer Clutch.>