

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

4AT

AUTOMATIC TRANSMISSION
(DIAGNOSTICS)

4AT(diag)

MANUAL TRANSMISSION AND
DIFFERENTIAL

5MT

MANUAL TRANSMISSION AND
DIFFERENTIAL

6MT

MANUAL TRANSMISSION AND
DIFFERENTIAL (DIAGNOSTICS)

6MT(diag)

CLUTCH SYSTEM

CL

AUTOMATIC TRANSMISSION

4AT

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28. Transfer Clutch

A: REMOVAL

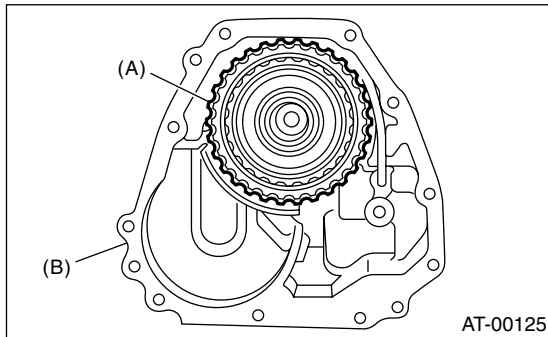
1) Remove the transmission assembly from vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>

2) Remove the extension case and remove the transfer clutch. <Ref. to 4AT-81, REMOVAL, Extension Case.> and <Ref. to 4AT-82, DISASSEMBLY, Extension Case.>

B: INSTALLATION

1) Select the thrust needle bearing. <Ref. to 4AT-88, ADJUSTMENT, Transfer Clutch.>

2) Install the transfer clutch assembly to the case.

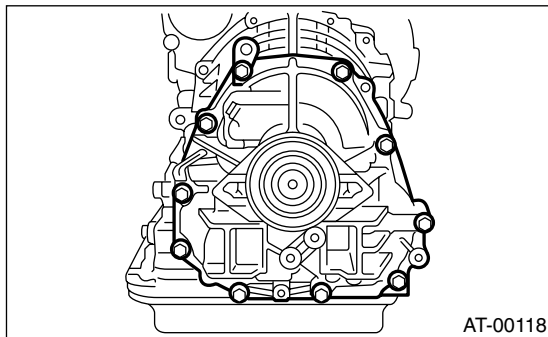


(A) Transfer clutch
(B) Extension case

3) Replace with a new gasket and tighten bolts to secure the case.

Tightening torque:

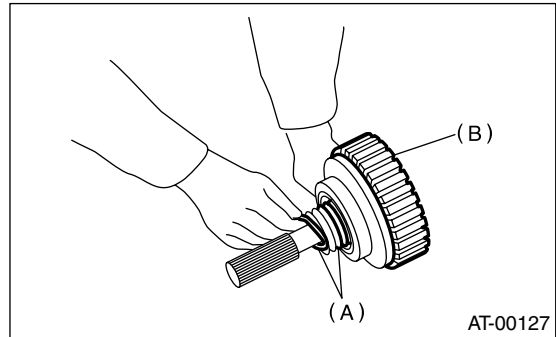
25 N·m (2.5 kgf·m, 18.1 ft·lb)



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

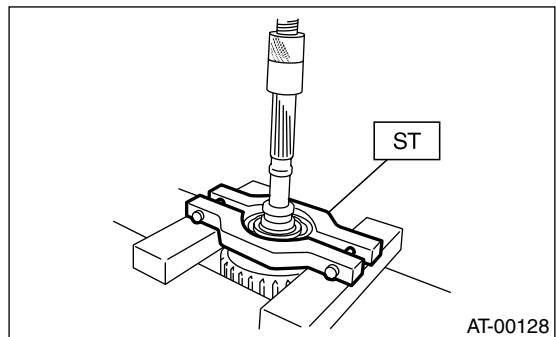
C: DISASSEMBLY

1) Remove the seal ring.

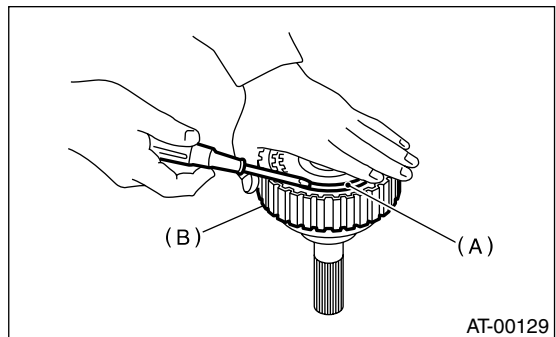


(A) Seal ring
(B) Transfer clutch

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.



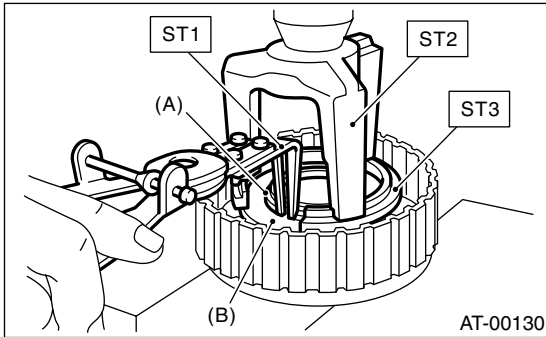
(A) Snap ring
(B) Transfer clutch

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

Transfer Clutch

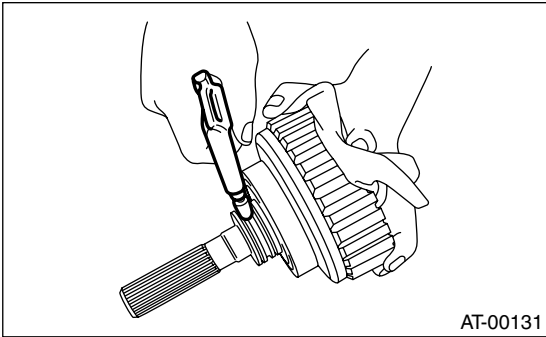
AUTOMATIC TRANSMISSION

ST1 399893600 PLIERS
ST2 398673600 COMPRESSOR
ST3 398623600 SEAT



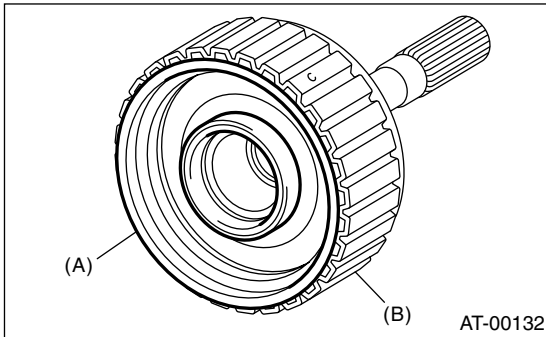
(A) Snap ring
(B) Transfer piston seal

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



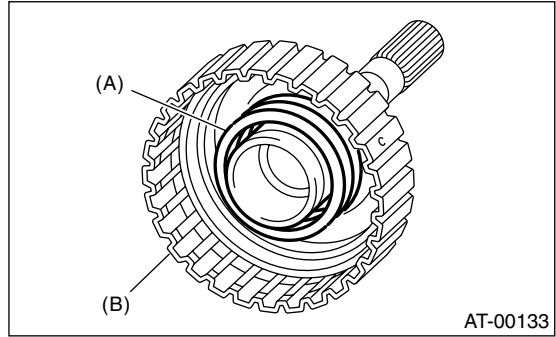
D: ASSEMBLY

1) Install the transfer clutch piston.



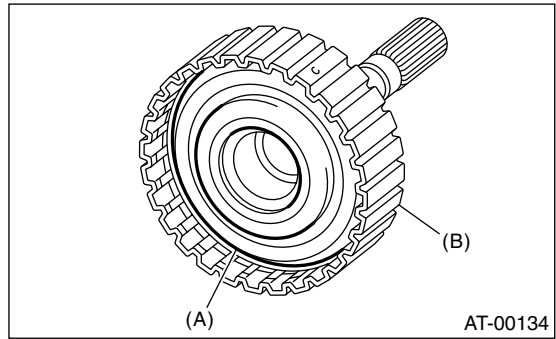
(A) Transfer clutch piston
(B) Rear drive shaft

2) Install return spring to transfer piston.



(A) Return spring
(B) Rear drive shaft

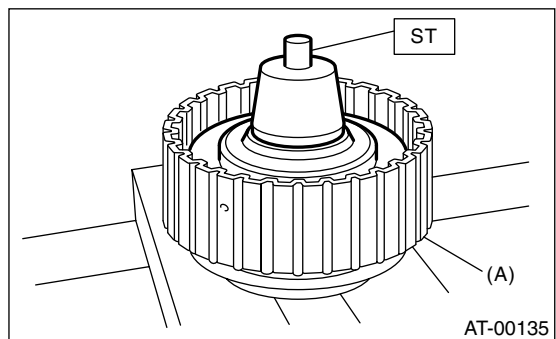
3) Apply ATF to the transfer clutch piston seal lip and install it.



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

4) Install ST to rear drive shaft.

ST 499257300 SNAP RING OUTER GUIDE

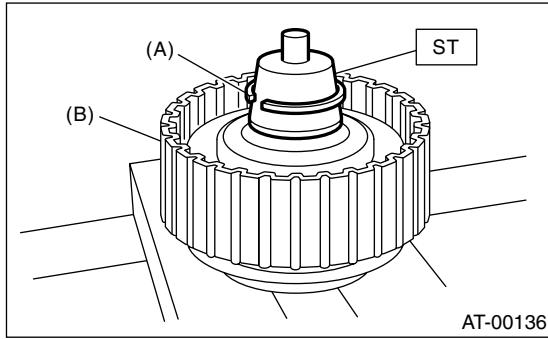


(A) Transfer clutch

Transfer Clutch

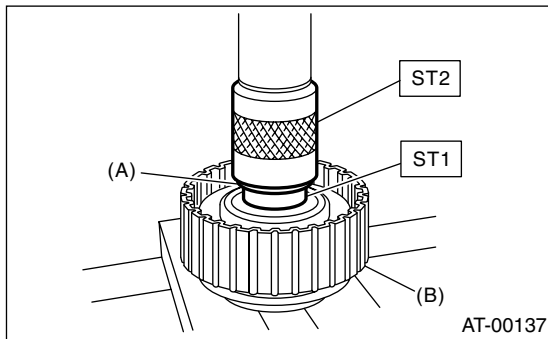
AUTOMATIC TRANSMISSION

5) Install snap ring to ST.
ST 499257300 SNAP RING OUTER GUIDE



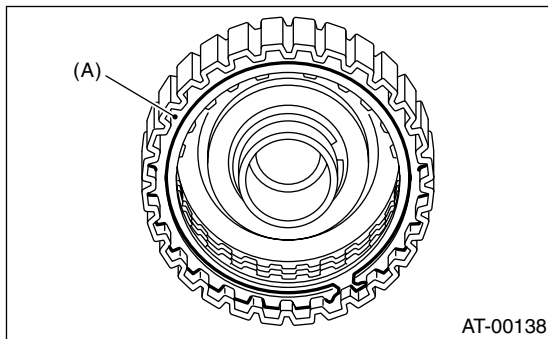
(A) Snap ring
(B) Transfer clutch

6) Using ST1 and ST2, install snap ring to rear drive shaft.
ST1 499257300 SNAP RING OUTER GUIDE
ST2 499247400 INSTALLER



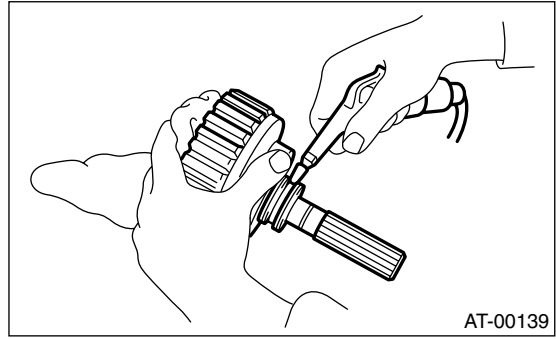
(A) Snap ring
(B) Transfer clutch

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



(A) Snap ring

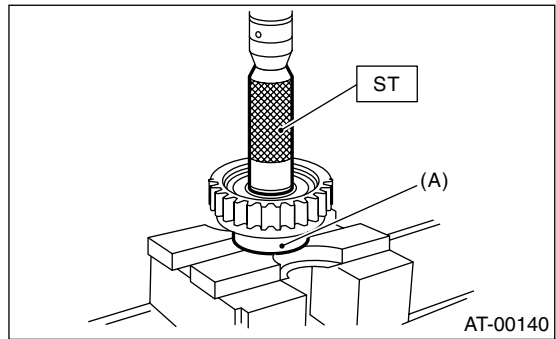
8) Apply compressed air to see if the assembled parts move smoothly.



AT-00139

9) Check clearance between snap ring and pressure plate. <Ref. to 4AT-88, INSPECTION, Transfer Clutch.>

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

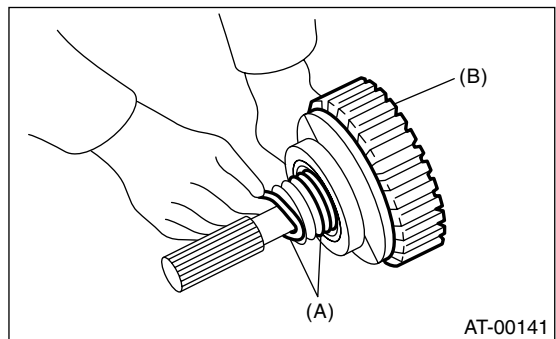


(A) Ball bearing

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.

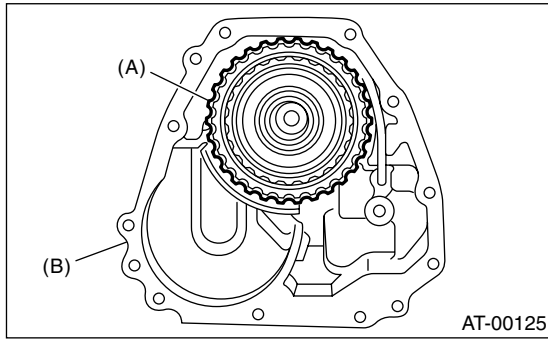


(A) Snap ring
(B) Transfer clutch

Transfer Clutch

AUTOMATIC TRANSMISSION

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



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

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 4AT-88, ADJUSTMENT, Transfer Clutch.>

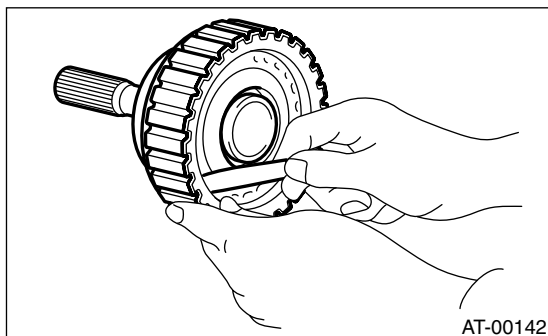
- 1) Inspect clearance between snap ring and pressure plate.
- 2) Before measuring clearance, place the same thickness of shim on both sides to prevent pressure plate from tilting.
- 3) If the clearance is not within specification, adjust it by selecting a suitable pressure plate on the transfer clutch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

Initial standard:

0.7 — 1.1 mm (0.028 — 0.043 in)

Limit thickness:

1.6 mm (0.063 in)



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.

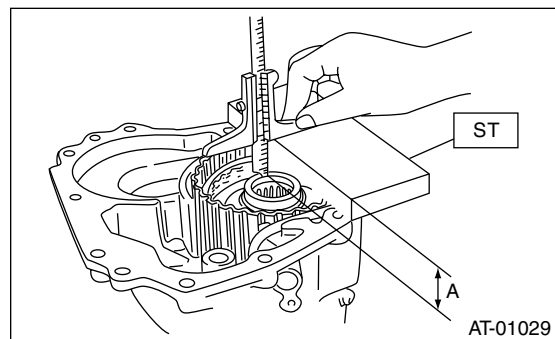
- (2) If the tight corner braking still persists, drive the vehicle again in a circle for several laps.

F: ADJUSTMENT

1. MPT MODEL

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

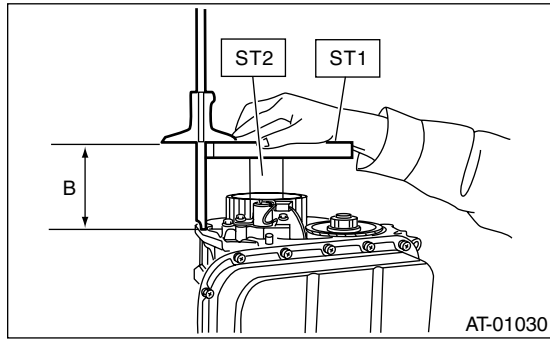
ST 398643600 GAUGE



A: Measured value

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

ST1 398643600 GAUGE
 ST2 499577000 GAUGE



B: Measured value

3) Calculation formula:

NOTE:

- Calculate "T":

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

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

T: Thrust needle bearing thickness

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

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

Example:

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

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

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

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

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

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

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

T: Thrust needle bearing thickness

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

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

α : Collar thickness used when measuring "A"

β : Collar thickness used when measuring "B"

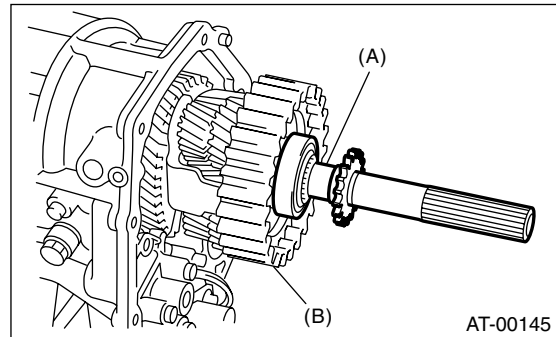
0.45: Gasket thickness (mm)

H: Shim clearance

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.

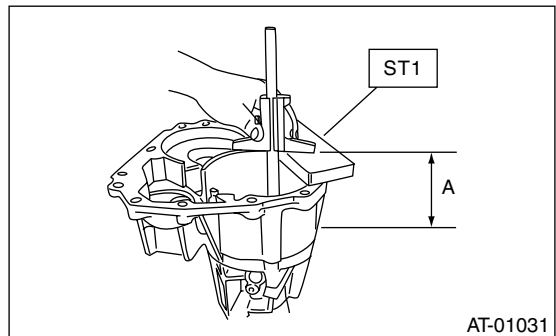


(A) Rear drive plate

(B) Center differential carrier

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

ST 398643600 GAUGE



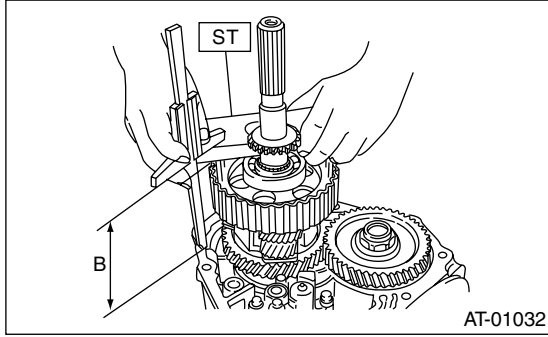
A: Measured value

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

Transfer Clutch

AUTOMATIC TRANSMISSION

ST 398643600 GAUGE



B: Measured value

H: Shim clearance

After calculation, the value of "T" 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)

4) Formula:

NOTE:

• Calculation of "T":

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

When clearances are 0.05 mm (0.0020 in)

$$T = A - B + 0.40 \text{ mm}$$

$$[T = A - B + 0.0157 \text{ in}]$$

When clearances are 0.25 mm (0.0098 in)

$$T = A - B + 0.20 \text{ mm}$$

$$[T = A - B + 0.0079 \text{ in}]$$

T: Shim clearance

A: Distance between extension case edge and rear driveshaft edge

B: Distance between transmission case edge and reduction drive gear edge

T: Shim thickness

0.05 — 0.25 mm (0.0020 — 0.0098 in)

Example:

When, A = 90.50 mm (3.5630 in), B = 90.35 mm (3.5571 in)

Calculation for 0.05 mm (0.0020 in) of clearance

$$T = 90.50 - 90.35 + 0.4 = 0.55$$

$$[T = 3.5630 - 3.5571 + 0.0157 = 0.0216]$$

Calculation when clearance is 0.25 mm (0.0098 in)

$$T = 90.50 - 90.35 + 0.2 = 0.35$$

$$[T = 3.5630 - 3.5571 + 0.0079 = 0.0138]$$

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

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

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

T: Thrust needle bearing thickness

A: Distance from end of extension case to rear drive shaft ball bearing outer ring contact surface

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

α : Collar thickness used when measuring "A"

β : Collar thickness used when measuring "B"

0.45: Gasket thickness (mm)

29. Multi-plate Clutch

A: REMOVAL

Remove multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-81, REMOVAL, Extension Case.>

B: INSTALLATION

Install multi-plate clutch following the same instructions as for the extension case. <Ref. to 4AT-81, INSTALLATION, Extension Case.>

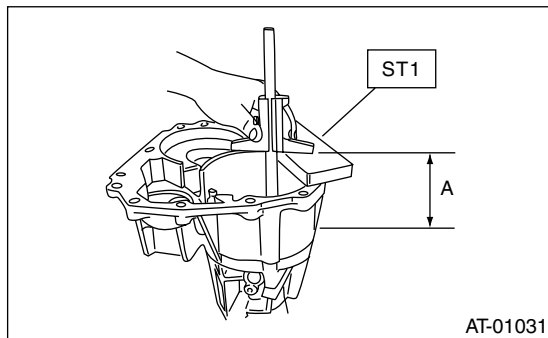
C: INSPECTION

- 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 4AT-91, ADJUSTMENT, Multi-plate Clutch.>

D: ADJUSTMENT

- 1) Remove drive plate and driven plate from center differential carrier.
- 2) Using the special tool, measure distance "A" from extension case joining surface to multi-plate clutch (LSD) piston.

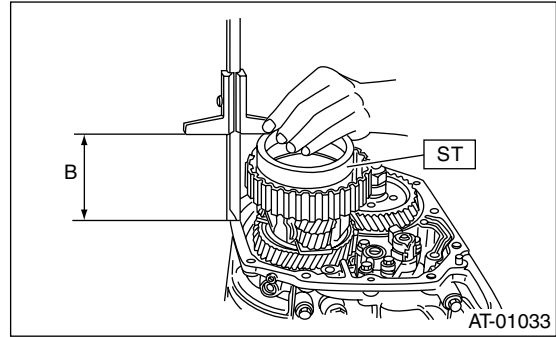
ST 398643600 GAUGE



A: Measured value

- 3) Using ST, measure height "B" from transmission case joining edge to center differential clutch drum edge.

ST 398744300 GAUGE



B: Measured value

4) Calculation formula

$$T = A - B + 0.45 \text{ mm}$$

$$[T = A - B + 0.0177 \text{ in}]$$

NOTE:

- Calculation formula for "T" is applied when measuring using ST (398643600 GAUGE, 398744300 GAUGE). When not using ST, apply

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

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

T: Thrust needle bearing thickness

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

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

α : Collar thickness used when measuring "A"

β : Collar thickness used when measuring "B"

0.45: Gasket thickness (mm)

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

Standard value:

$$0.2 - 0.6 \text{ mm } (0.008 - 0.024 \text{ in})$$

Limit value:

$$1.6 \text{ mm } (0.063 \text{ in})$$

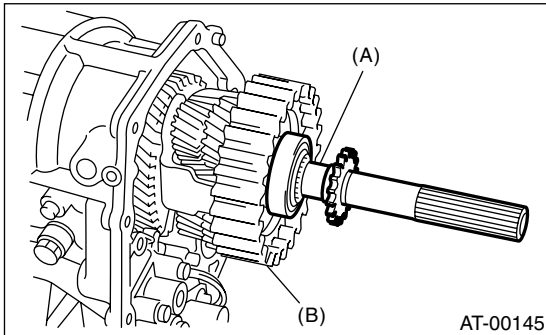
If outside the standard value, replace the plate set (drive and driven plate). Select a multi-plate clutch (LSD) piston side adjustment plate that will bring clearance within the standard value.

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)

30.Rear Drive Shaft

A: REMOVAL

- 1) Remove transmission assembly. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear wheel speed sensor and separate extension case from transmission case. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft from the center differential assembly.



(A) Rear driveshaft
(B) Center differential carrier

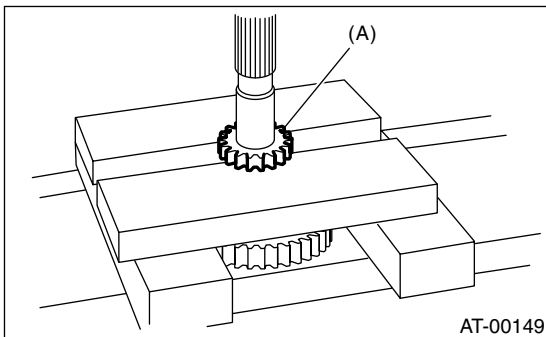
- 4) Remove drive plate and driven plate.

B: INSTALLATION

- 1) Select the appropriate shim. <Ref. to 4AT-89, 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 4AT-81, INSTALLATION, Extension Case.>
- 5) Install transmission assembly. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

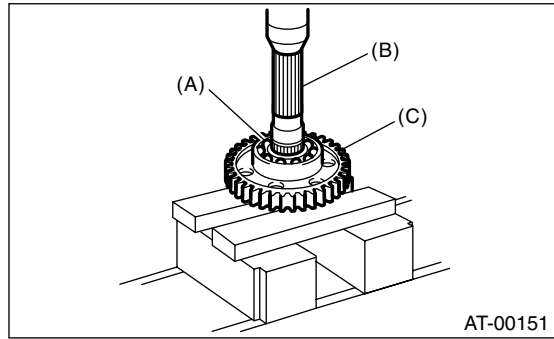
C: DISASSEMBLY

- 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.



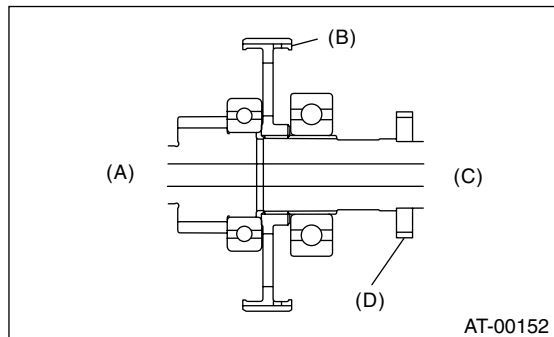
(A) Rear ball bearing
(B) Rear driveshaft
(C) Clutch hub

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.



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

E: INSPECTION

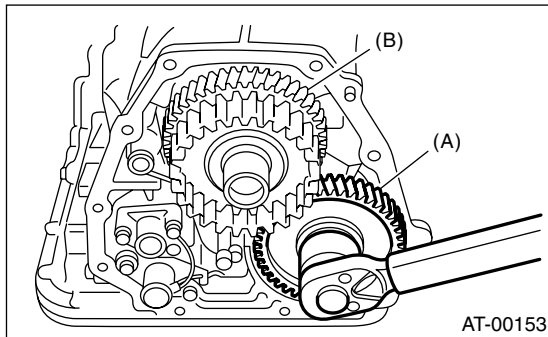
- Inspect parts to make sure there are no holes, cuts, and that they are not dusty.
- Inspect extension end play and adjust it to within the standard value. <Ref. to 4AT-89, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

31.Reduction Driven Gear

A: REMOVAL

1. MPT MODEL

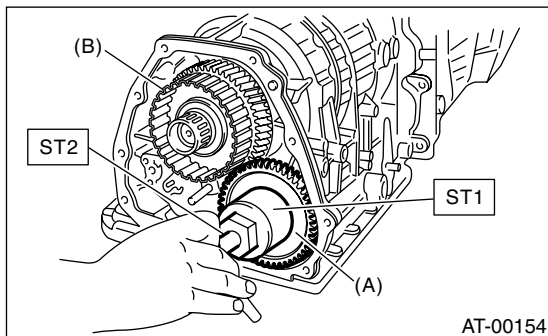
- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 3) Set the range select lever to "P".
- 4) Straighten 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

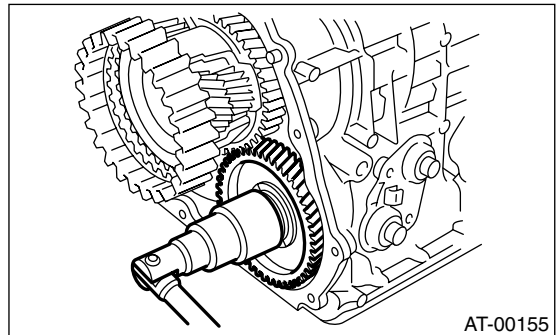


- (A) Reduction driven gear
- (B) Reduction drive gear

2. VTD MODEL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-81, REMOVAL, Extension Case.>

- 3) Remove the rear drive shaft. <Ref. to 4AT-92, REMOVAL, Rear Drive Shaft.>
- 4) Set the range select lever to "P".
- 5) Straighten the staked portion, and remove the lock nut.



- 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 4AT-97, REMOVAL, Center Differential Carrier.>

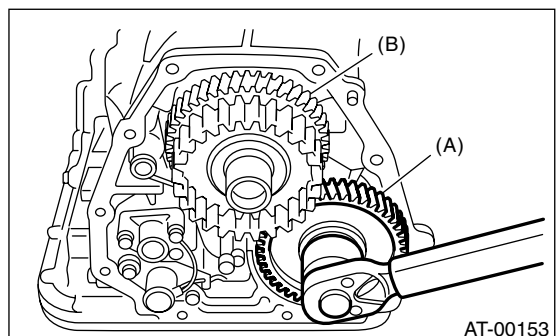
B: INSTALLATION

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 4AT-81, INSTALLATION, Extension Case.>
- 5) Install the transmission assembly to vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

Reduction Driven Gear

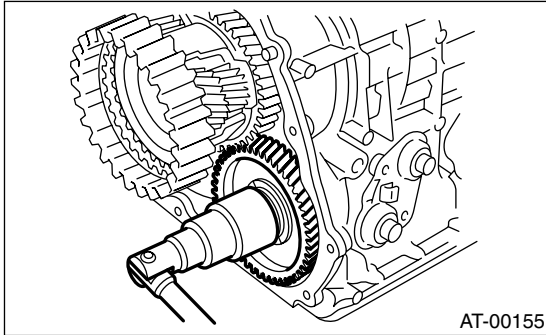
AUTOMATIC TRANSMISSION

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.

Tightening torque:

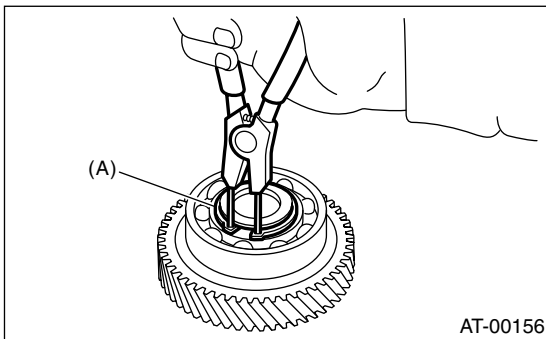
100 N·m (10.2 kgf·m, 73.8 ft·lb)



- 5) After tightening, stake the lock nut securely.
- 6) Insert the rear drive shaft assembly. <Ref. to 4AT-92, INSTALLATION, Rear Drive Shaft.>
- 7) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-81, INSTALLATION, Extension Case.>
- 8) Install the transmission assembly to vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

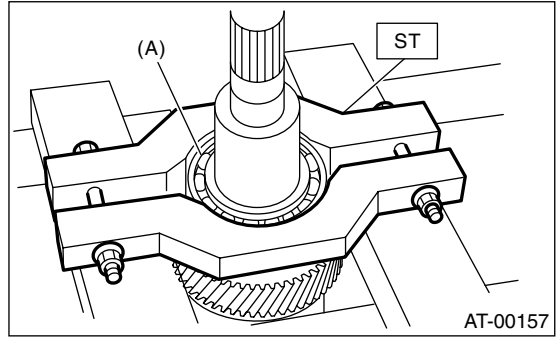
- 1) Remove snap ring from reduction driven gear.



(A) Snap ring

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

ST 498077600 REMOVER

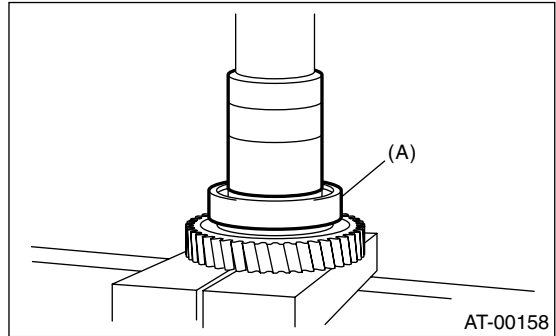


(A) Ball bearing

- 3) Remove snap ring reduction driven gear.

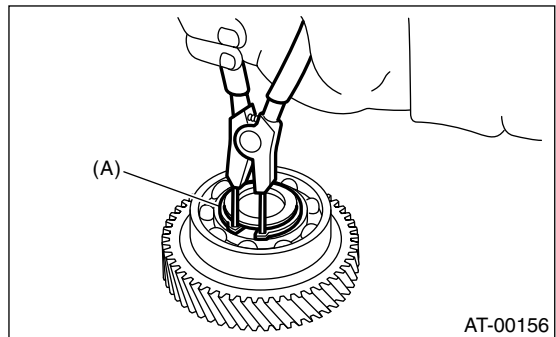
D: ASSEMBLY

- 1) Install snap ring to reduction driven gear.
- 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

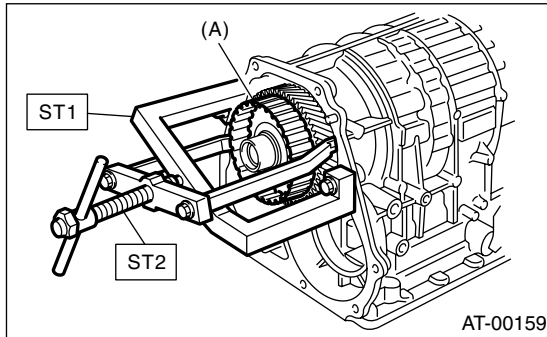
Check ball bearing and gear for dents or damage.

32.Reduction Drive Gear

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor, and separate the transmission case and extension case. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 3) Remove the reduction driven gear. <Ref. to 4AT-93, REMOVAL, Reduction Driven Gear.>
- 4) Using ST, extract the reduction drive gear.

ST1 499737100 PULLER
 ST2 899524100 PULLER SET



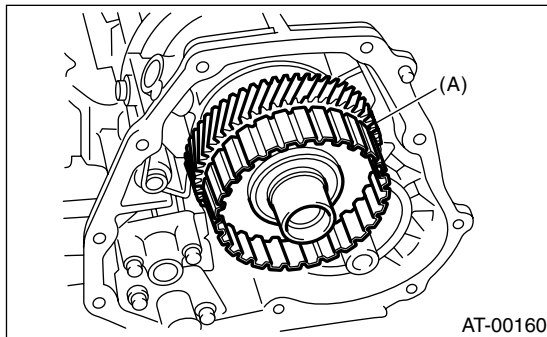
(A) Reduction drive gear

B: INSTALLATION

- 1) Install the reduction drive gear assembly.

NOTE:

Insert it fully into position until the bearing shoulder bottoms.

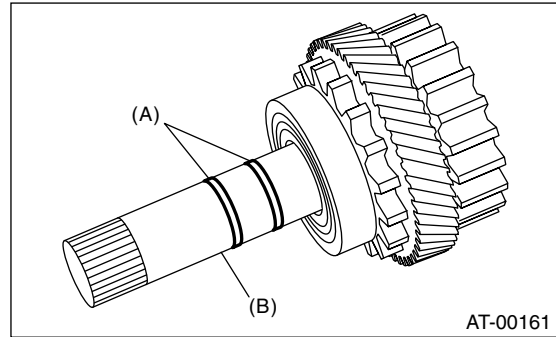


(A) Reduction drive gear

- 2) Install the reduction driven gear. <Ref. to 4AT-93, INSTALLATION, Reduction Driven Gear.>
- 3) Combine the transmission case with the extension case, and install rear vehicle speed sensor. <Ref. to 4AT-81, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly to the vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

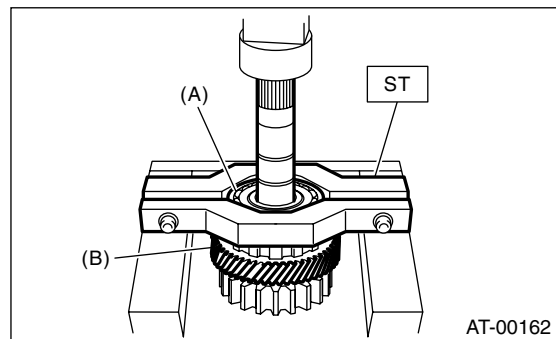
- 1) Take out the seal rings.



(A) Seal rings
 (B) Reduction drive shaft

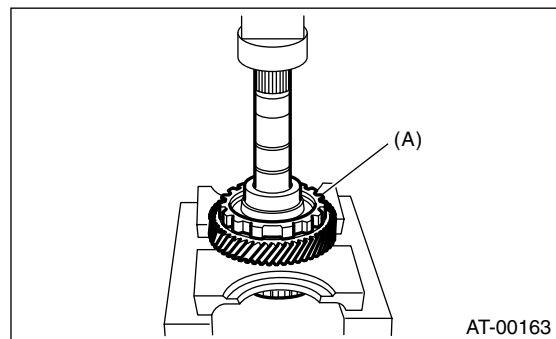
- 2) Using ST, remove the ball bearing.

ST 498077600 REMOVER



(A) Ball bearing
 (B) Reduction drive gear

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



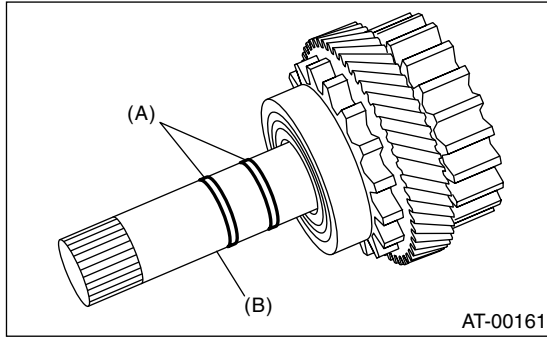
(A) Reduction drive gear

Reduction Drive Gear

AUTOMATIC TRANSMISSION

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) Apply ATF to new seal rings and attach them.



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

E: INSPECTION

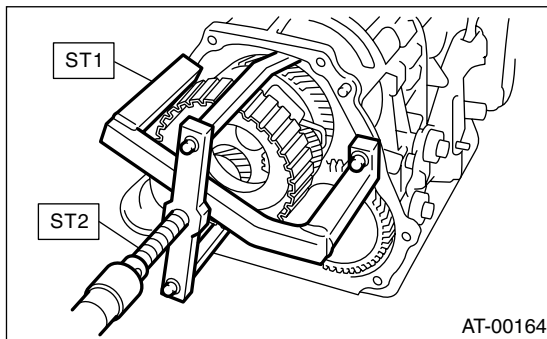
- Rotate bearing by hand, make sure it rotates smoothly.
- Make sure that each component is free of harmful gouges, cuts, or dust.
- Measure the extension end play and adjust it to within specifications. <Ref. to 4AT-88, ADJUSTMENT, Transfer Clutch.>

33.Center Differential Carrier

A: REMOVAL

- 1) Remove the transmission assembly from vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the rear wheel speed sensor, and separate the extension case from the transmission case. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 3) Pull out the rear driveshaft. <Ref. to 4AT-92, REMOVAL, Rear Drive Shaft.>
- 4) Using the special tools, pull out the center differential carrier assembly.

ST1 499737100 PULLER
ST2 899524100 PULLER SET



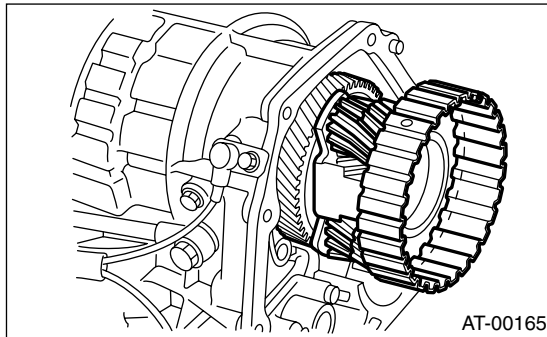
- 5) Pull out the shim(s) from transmission case.

B: INSTALLATION

- 1) Install the center differential assembly with the shim(s).

NOTE:

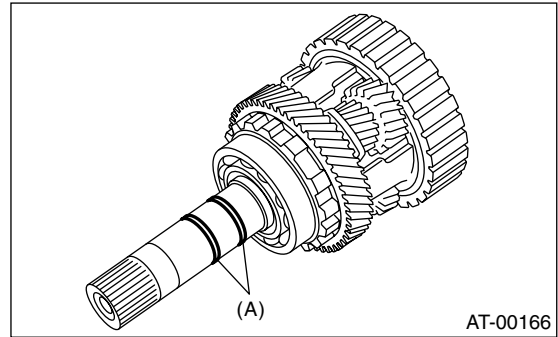
Insert the center differential assembly and shim(s) completely into the bearing shoulder bottom.



- 2) Insert the rear driveshaft. <Ref. to 4AT-92, INSTALLATION, Rear Drive Shaft.>
- 3) Connect the transmission case and extension case, and install the rear wheel speed sensor. <Ref. to 4AT-81, INSTALLATION, Extension Case.>
- 4) Install the transmission assembly onto vehicle. <Ref. to 4AT-43, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

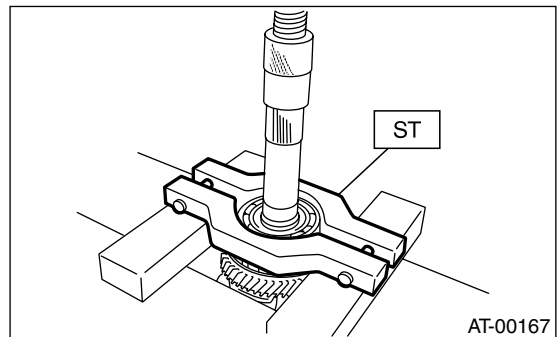
- 1) Remove the seal rings.



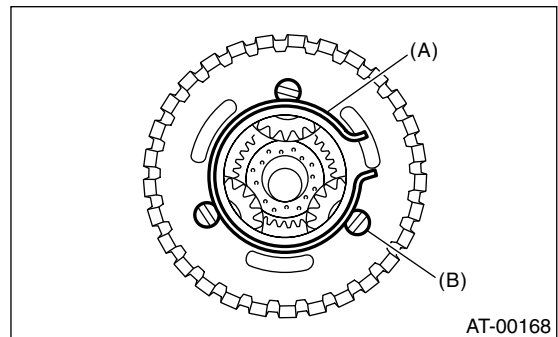
(A) Seal ring

- 2) Using a press and the special tool, remove the ball bearing.

ST 498077600 REMOVER



- 3) Remove the snap ring, and pull out the shaft from the center differential assembly.

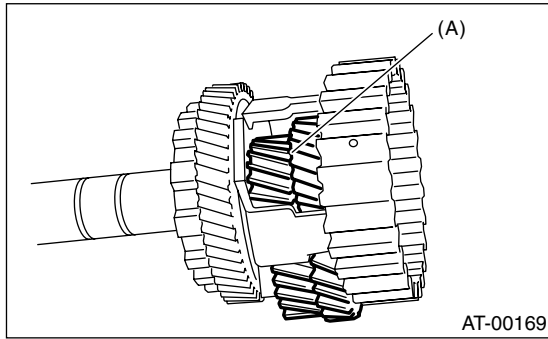


(A) Snap ring
(B) Shaft

Center Differential Carrier

AUTOMATIC TRANSMISSION

4) Remove the thrust washers, pinion gears, and washers from the center differential assembly.



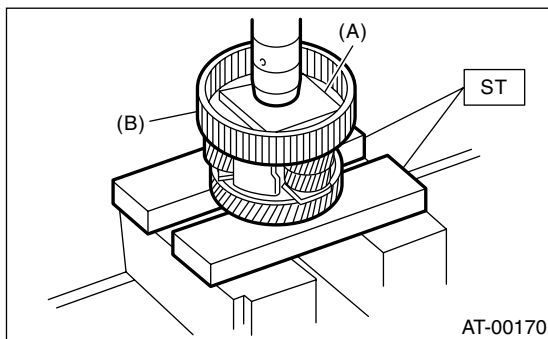
(A) Pinion gear

5) Pull out the intermediate shaft and thrust bearing.

D: ASSEMBLY

- 1) Install the thrust washer onto the intermediate shaft.
- 2) Install thrust bearing onto the intermediate shaft.
- 3) Install the pinion gears and washers.
- 4) Insert the shaft into the center differential assembly.
- 5) Install the snap ring.
- 6) Using a press, install a new ball bearing into the center differential assembly.

ST 498077000 REMOVER



(A) Plate

(B) Center differential carrier

7) Apply Vaseline onto the seal ring outer surface and shaft grooves.

8) Apply ATF to new seal rings and install them.

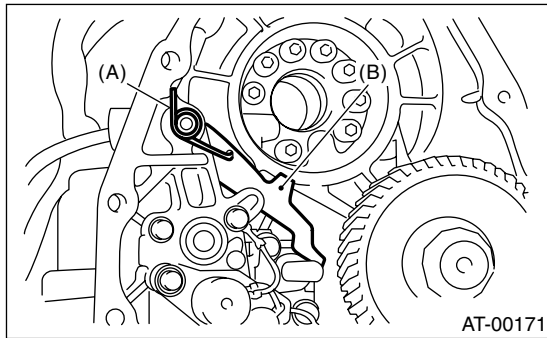
E: INSPECTION

- Check all parts for hole, score, or dirt.
- Check the play of the extension end, and if necessary, adjust it. <Ref. to 4AT-89, VTD MODEL, ADJUSTMENT, Transfer Clutch.>

34. Parking Pawl

A: REMOVAL

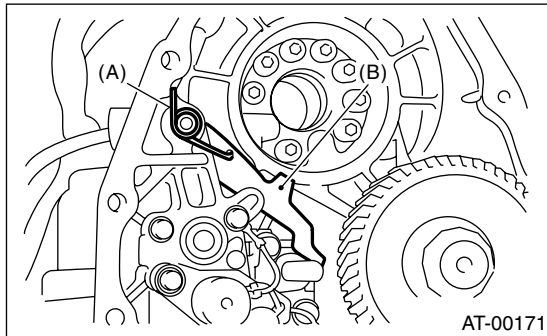
- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove rear vehicle speed sensor and separate transmission case and extension case sections. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 3) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-95, REMOVAL, Reduction Drive Gear.>
- 4) Remove the center differential carrier. (VTD model) <Ref. to 4AT-97, REMOVAL, Center Differential Carrier.>
- 5) Remove the parking pawl, return spring and shaft.



- (A) Return spring
- (B) Parking pawl

B: INSTALLATION

- 1) Install the parking pawl, shaft and return spring.



- (A) Return spring
- (B) Parking pawl

- 2) Install the reduction drive gear. <Ref. to 4AT-95, INSTALLATION, Reduction Drive Gear.>
- 3) Install the center differential carrier. (VTD model) <Ref. to 4AT-97, INSTALLATION, Center Differential Carrier.>
- 4) Install the rear vehicle speed sensor and extension case. <Ref. to 4AT-81, INSTALLATION, Extension Case.>

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

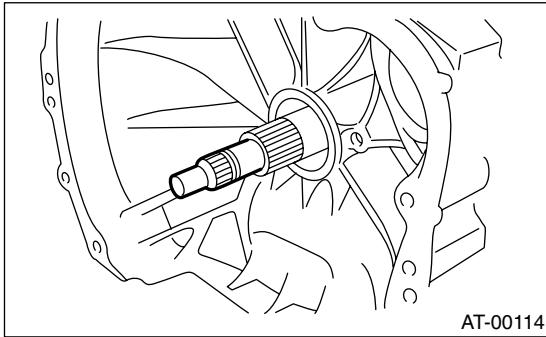
C: INSPECTION

Make sure that the tab of the packing pole on the reduction gear is not worn or otherwise damaged.

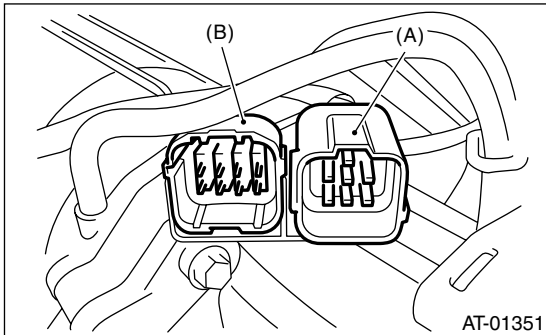
35. Converter Case

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-79, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up lever behind the connector and disconnect it from stay.
- 5) Disconnect inhibitor switch connector from stay.



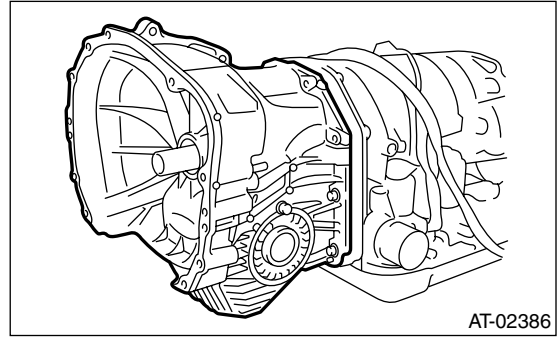
- (A) Transmission harness
- (B) Inhibitor switch harness

- 6) Remove the oil charge pipe. <Ref. to 4AT-78, REMOVAL, Oil Charge Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-75, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Lightly tapping the converter case with plastic hammer, separate the transmission case and converter case.

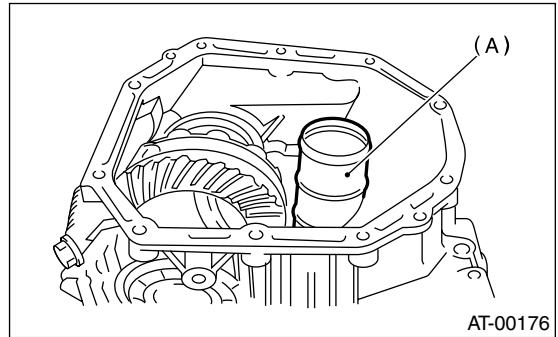
NOTE:

- Be careful not to damage the oil seal and bushing inside the converter case by the oil pump cover.

- Be careful not to lose the rubber seal.



- 9) Remove the seal pipe if it is attached. (Reusing is not allowed.)

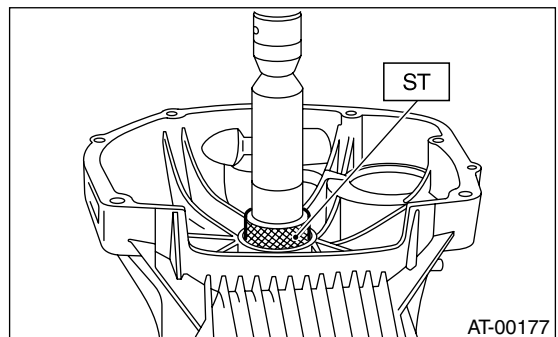


- (A) Seal pipe

- 10) Remove the differential assembly. <Ref. to 4AT-114, REMOVAL, Front Differential.>
- 11) Remove the oil seal from converter case.

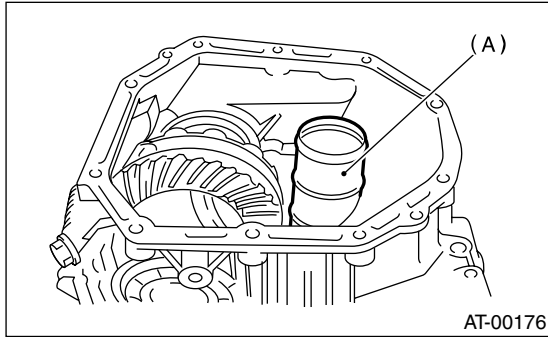
B: INSTALLATION

- 1) Check the appearance of each component and clean.
- 2) Force-fit the oil seal to the converter case with ST.
ST 398437700 DRIFT



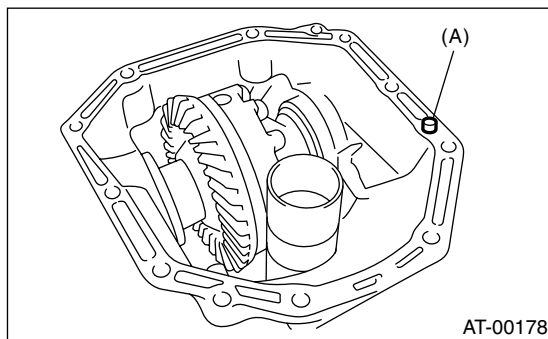
- 3) Install the differential assembly to the case. <Ref. to 4AT-114, INSTALLATION, Front Differential.>
- 4) Install the left and right side retainers. <Ref. to 4AT-118, ADJUSTMENT, Front Differential.>

5) Install the new seal pipe to the converter case.



(A) Seal pipe

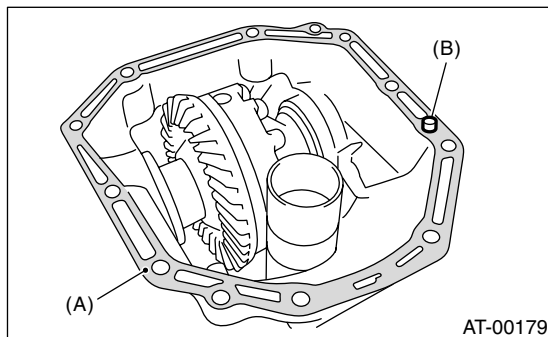
6) Install the rubber seal to the converter case.



(A) Rubber seal

7) Apply proper amount of liquid gasket to the entire converter case mating surface.

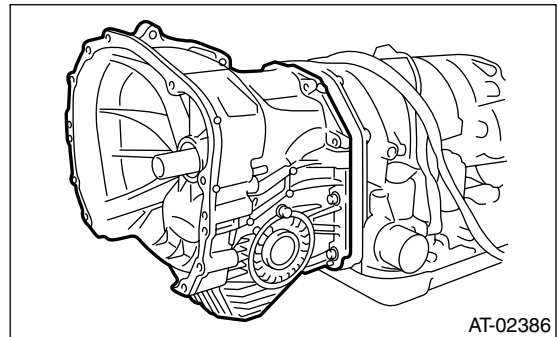
Liquid gasket:
THREE BOND 1215 (Part No. 004403007)



(A) THREE BOND 1215
(B) Rubber seal

8) Install the converter case assembly without damaging bush and oil seal and secure with six bolts and four nuts.

Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



AT-02386

9) Insert inhibitor switch and transmission connector into stay.

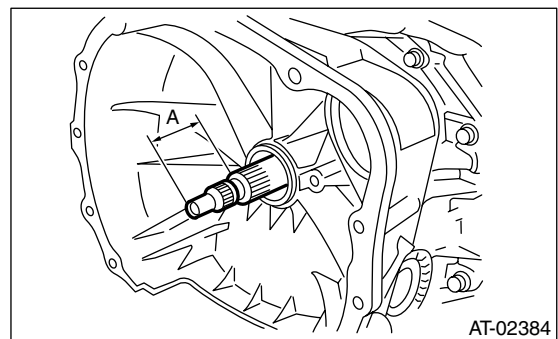
10) Install air breather hose. <Ref. to 4AT-77, INSTALLATION, Air Breather Hose.>

11) Install the oil cooler pipes. <Ref. to 4AT-76, INSTALLATION, ATF Cooler Pipe and Hose.>

12) Install the oil charge pipe with O-ring. <Ref. to 4AT-78, INSTALLATION, Oil Charge Pipe.>

13) Insert the input shaft while turning lightly by hand and verify the protrusion amount.

Normal protrusion A:
50 — 55 mm (1.97 — 2.17 in)



AT-02384

14) Install the torque converter clutch assembly. <Ref. to 4AT-79, INSTALLATION, Torque Converter Clutch Assembly.>

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

C: INSPECTION

Measure the backlash and adjust to within specifications. <Ref. to 4AT-111, ADJUSTMENT, Drive Pinion Shaft.>

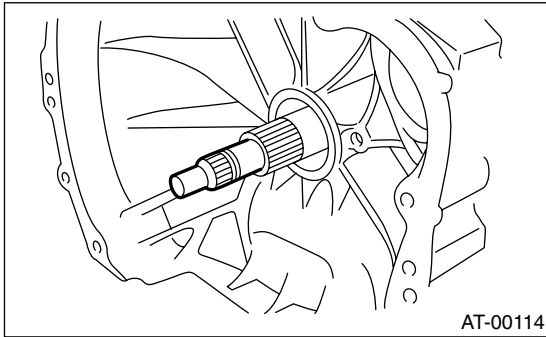
Oil Pump Housing

AUTOMATIC TRANSMISSION

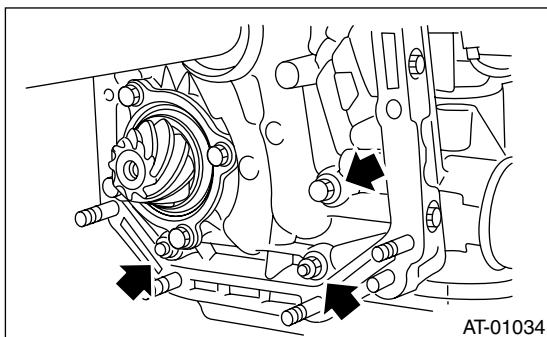
36. Oil Pump Housing

A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-41, REMOVAL, Automatic Transmission Assembly.>
- 2) Extract the torque converter clutch assembly. <Ref. to 4AT-79, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



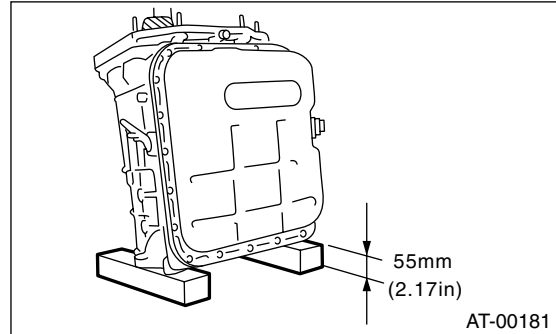
- 4) Lift-up lever behind the transmission harness connector and disconnect it from stay.
- 5) Disconnect inhibitor switch connector from stay.
- 6) Remove the oil charge pipe. <Ref. to 4AT-78, REMOVAL, Oil Charge Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to 4AT-75, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Separation of converter case and transmission case sections <Ref. to 4AT-100, REMOVAL, Converter Case.>
- 9) Separate transmission case and extension case sections. <Ref. to 4AT-81, REMOVAL, Extension Case.>
- 10) Remove the reduction drive gear. (MPT model) <Ref. to 4AT-95, REMOVAL, Reduction Drive Gear.>
- 11) Remove the center differential carrier. (VTD model) <Ref. to 4AT-97, REMOVAL, Center Differential Carrier.>
- 12) Remove the reduction driven gear. <Ref. to 4AT-93, REMOVAL, REMOVAL, Reduction Driven Gear.>
- 13) Loosen the oil pump housing mounting bolts.



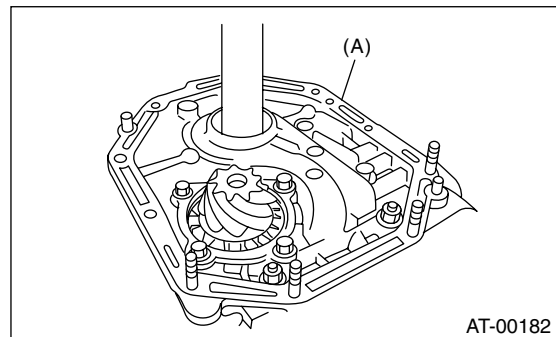
- 14) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

NOTE:

- Be careful not to scratch the rear mating surface of the transmission case.
- Note that the parking rod and drive pinion protrude from the mating surface.



- 15) Remove the oil pump housing and adjusting thrust washer.



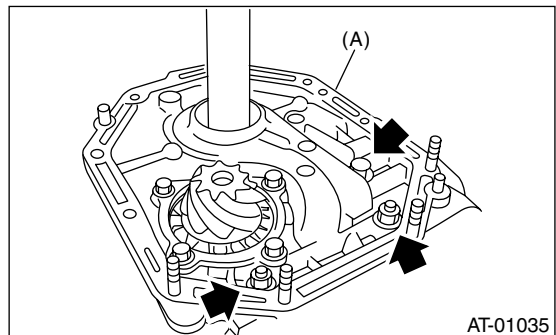
(A) Oil pump housing

B: INSTALLATION

- 1) Secure the oil pump housing with two nuts and the bolt.

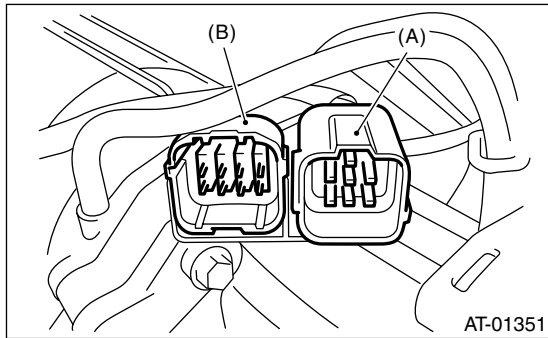
Tightening torque:

42 N·m (4.3 kgf-m, 31 ft-lb)



(A) Oil pump housing

- 2) Install the converter case assembly to the transmission case assembly. <Ref. to 4AT-79, INSTALLATION, Torque Converter Clutch Assembly.>
- 3) Install reduction driven gear. <Ref. to 4AT-93, INSTALLATION, Reduction Driven Gear.>
- 4) Install the reduction drive gear. (MPT model) <Ref. to 4AT-95, INSTALLATION, Reduction Drive Gear.>
- 5) Install the center differential carrier. (VTD model) <Ref. to 4AT-97, INSTALLATION, Center Differential Carrier.>
- 6) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to 4AT-81, INSTALLATION, Extension Case.>
- 7) Insert inhibitor switch and transmission connector into stay.

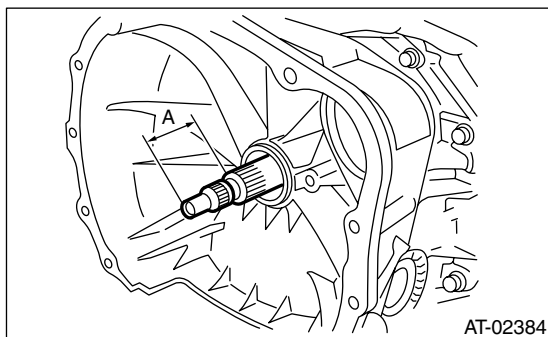


- (A) Transmission harness
- (B) Inhibitor switch harness

- 8) Install the oil cooler pipe. <Ref. to 4AT-76, INSTALLATION, ATF Cooler Pipe and Hose.>
- 9) Install the oil charge pipe with O-ring. <Ref. to 4AT-78, INSTALLATION, Oil Charge Pipe.>
- 10) Insert the input shaft while turning lightly by hand and verify the protrusion amount.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)



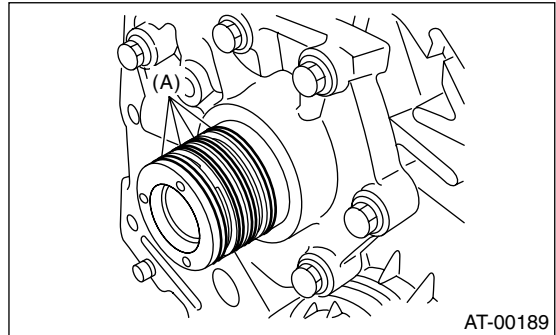
- 11) Install the torque converter clutch assembly. <Ref. to 4AT-79, INSTALLATION, Torque Converter Clutch Assembly.>

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

C: DISASSEMBLY

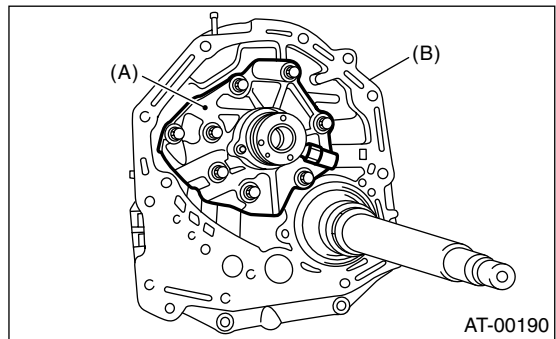
1. OIL PUMP COVER

- 1) Remove four seal rings.



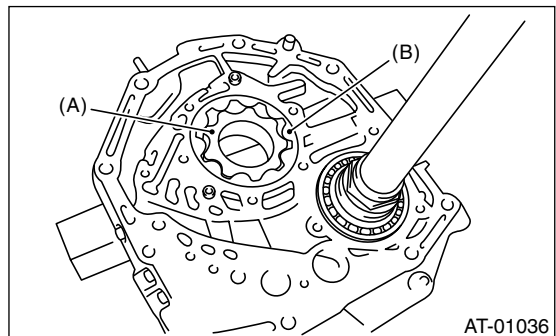
- (A) Seal rings

- 2) Lightly tap the end of the stator shaft to remove the cover.



- (A) Oil pump cover
- (B) Oil pump housing

- 3) Remove the inner and outer rotor.



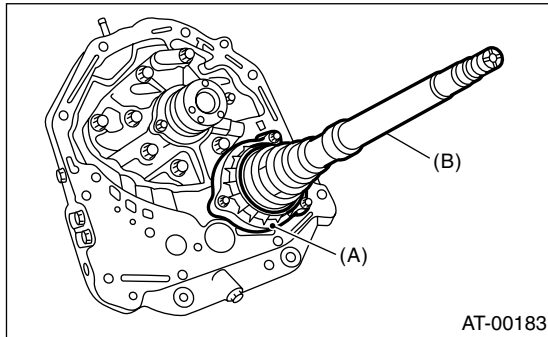
- (A) Inner rotor
- (B) Outer rotor

Oil Pump Housing

AUTOMATIC TRANSMISSION

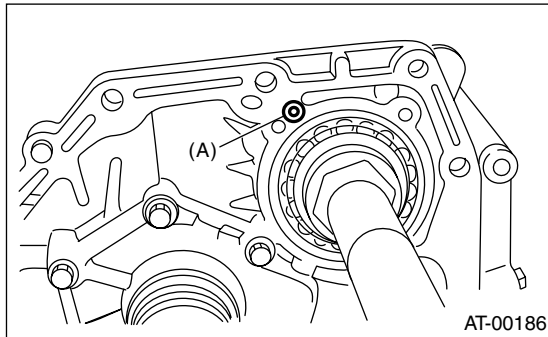
2. OIL SEAL RETAINER

1) Remove the oil seal retainer.



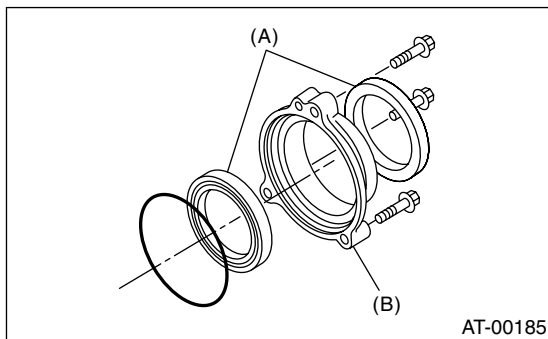
- (A) Oil seal retainer
- (B) Drive pinion shaft

2) Remove the O-ring.



- (A) O-ring

3) Remove the oil seal from oil seal retainer.

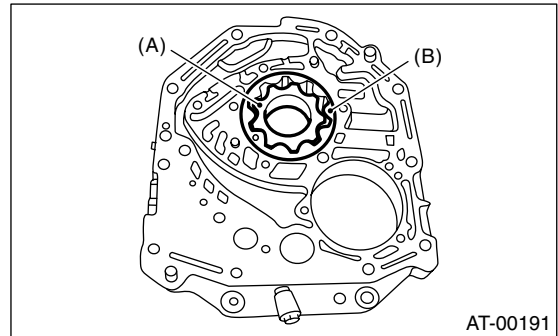


- (A) Oil seal
- (B) Oil seal retainer

D: ASSEMBLY

1. OIL PUMP COVER

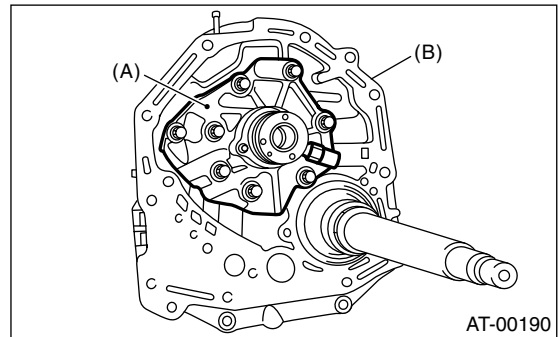
1) Install oil pump rotor assembly to oil pump housing.



- (A) Inner rotor
- (B) Outer rotor

2) Align both pivots with the pivot holes of the cover, and install the oil pump cover being careful not to apply undue force to the pivots.

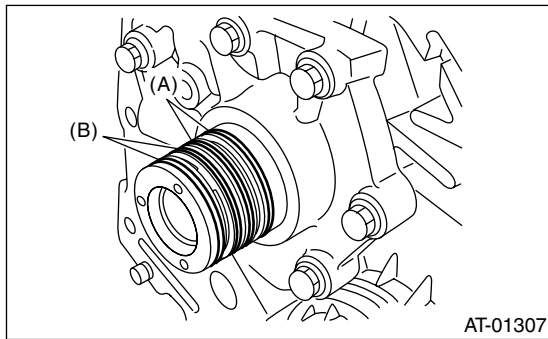
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)



- (A) Oil pump cover
- (B) Oil pump housing

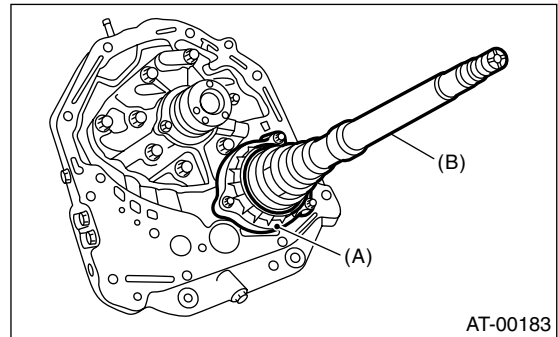
3) After assembling, turn the oil pump shaft to check for smooth rotation of the rotor.

4) Install the oil seal retainer and new seal rings. After adjusting the drive pinion backlash and tooth contact. <Ref. to 4AT-106, ADJUSTMENT, Oil Pump Housing.>



- (A) Seal rings (Black)
- (B) Seal rings (Brown)

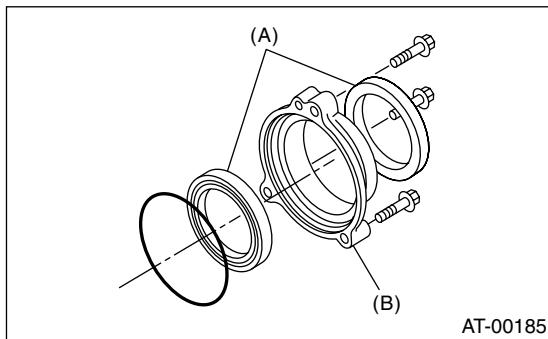
Tightening torque:
7 N·m (0.7 kgf·m, 5.1 ft·lb)



- (A) Oil seal retainer
- (B) Drive pinion shaft

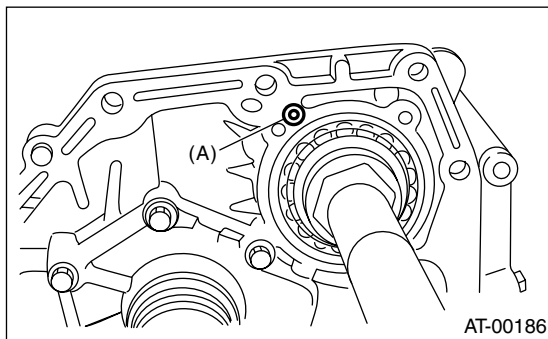
2. OIL SEAL RETAINER

1) Install two new oil seals to the oil seal retainer in proper position using ST.
 ST 499247300 INSTALLER



- (A) Oil seal
- (B) Oil seal retainer

2) Install a new O-ring to the oil seal retainer using vaseline. Install the seal to oil pump housing bore.



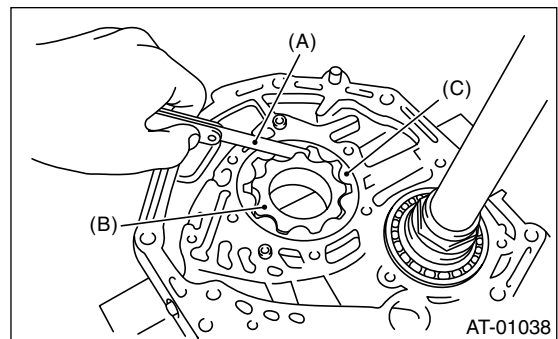
- (A) O-ring

3) Install the oil seal and secure it using three bolts being careful not to damage oil seal lip.

E: INSPECTION

- 1) Check seal ring and O-ring oil seal for breaks or damage.
- 2) Check other parts for dents or abnormalities.
- 3) Selection of oil pump rotor assembly
 - (1) Tip clearance
 Install inner rotor and outer rotor to oil pump. With rotor gears facing each other, measure crest-to-crest clearance.

Tip clearance:
0.02 — 0.15 mm (0.0008 — 0.0059 in)



- (A) Thickness gauge
- (B) Inner rotor
- (C) Outer rotor

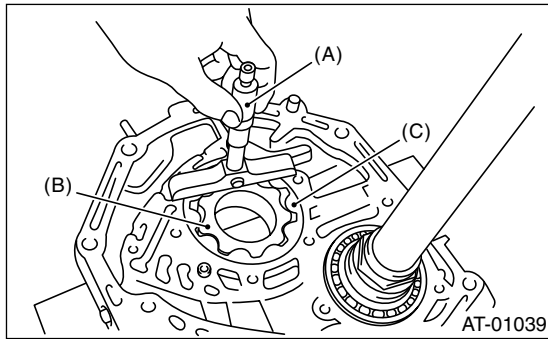
(2) Side clearance
 Set a depth gauge to oil pump housing, then measure oil pump housing-to-rotor clearances.

Oil Pump Housing

AUTOMATIC TRANSMISSION

Side clearance:

0.02 — 0.04 mm (0.0008 — 0.0016 in)



- (A) Depth gauge
- (B) Inner rotor
- (C) Outer rotor

(3) If depth and/or side clearances are outside specifications, replace rotor assembly.

Non-turbo model:

Oil pump rotor assembly	
Part No.	Thickness mm (in)
15008AA060	11.37 — 11.38 (0.4476 — 0.4480)
15008AA070	11.38 — 11.39 (0.4480 — 0.4484)
15008AA080	11.39 — 11.40 (0.4484 — 0.4488)

Turbo model:

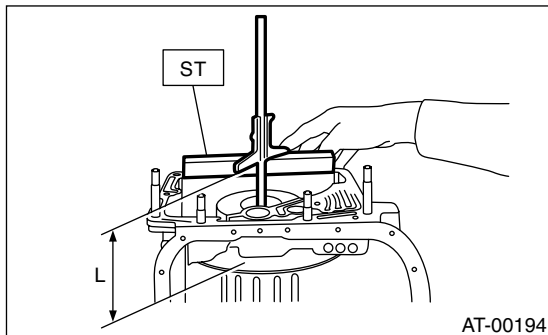
Oil pump rotor assembly	
Part No.	Thickness mm (in)
15008AA100	14.87 — 14.88 (0.5067 — 0.5071)
15008AA110	14.88 — 14.89 (0.5071 — 0.5075)
15008AA120	14.89 — 14.90 (0.5075 — 0.5079)

Measure the total end play and adjust to within specifications. <Ref. to 4AT-106, ADJUSTMENT, Oil Pump Housing.>

F: ADJUSTMENT

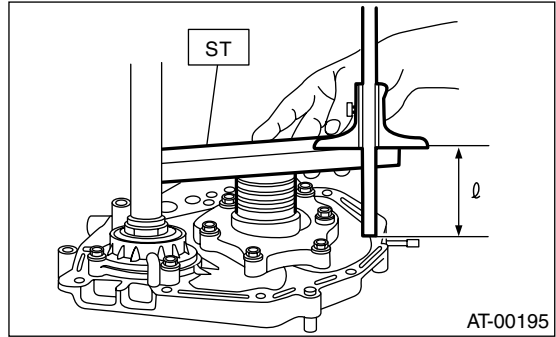
1) Using ST, measure the distance from the transmission case mating surface to the recessed portion of the high clutch drum "L".

ST 398643600 GAUGE



2) Using ST, measure the distance from the oil pump housing mating surface to the top surface of the oil pump cover with thrust needle bearing.

ST 398643600 GAUGE

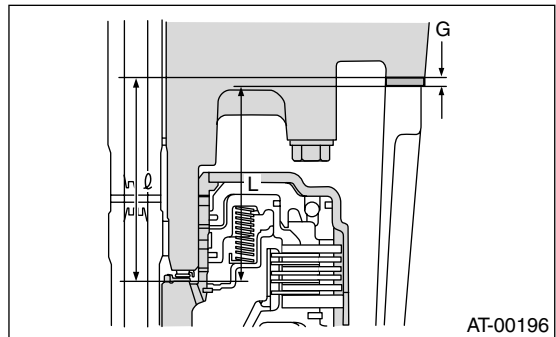


3) Calculation of total end play

Select suitable bearing race from among those listed in this table so that clearance C is in the 0.25 to 0.55 mm (0.0098 to 0.0217 in) range.

$$C = (L + G) - l$$

C	Clearance between concave portion of high clutch and end of clutch drum support
L	Length from case mating surface to concave portion of high clutch
G	Gasket thickness [0.28 mm (0.0110 in)]
l	Height from housing mating surface to upper surface of clutch drum support



Thrust needle bearing	
Part No.	Thickness mm (in)
806528050	4.1 (0.161)
806528060	4.3 (0.169)
806528070	4.5 (0.177)
806528080	4.7 (0.185)
806528090	4.9 (0.193)
806528100	5.1 (0.201)

4) After completing end play adjustment, insert the bearing race in the recess of the high clutch. Attach the thrust needle bearing to the oil pump cover with vaseline.

- 5) After correctly installing the new gasket to the case mating surface, carefully install the oil pump housing assembly. Be careful to avoid hitting the drive pinion against the inside of the case.
- 6) Install both parts with dowel pins aligned. Make sure no clearance exists at the mating surface.