41.Drive Pinion Shaft Assembly

A: REMOVAL

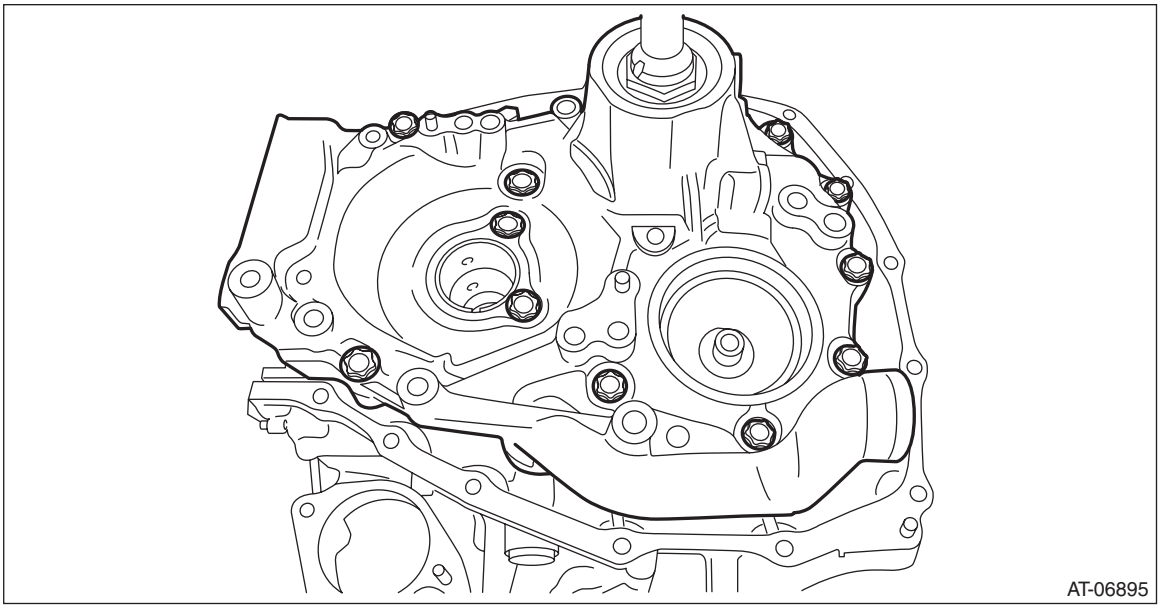
CAUTION:
The specifications of drive pinion retainer parts vary depending on transmission serial No..
When replacing the following parts, be sure to check the serial number before replacing.
- **Drive pinion retainer**

Transmission serial No.	96892 earlier 334608 earlier	96893 later 334609 later
Drive pinion retainer	32290AA020 32290AA021 can also be used.	32290AA021

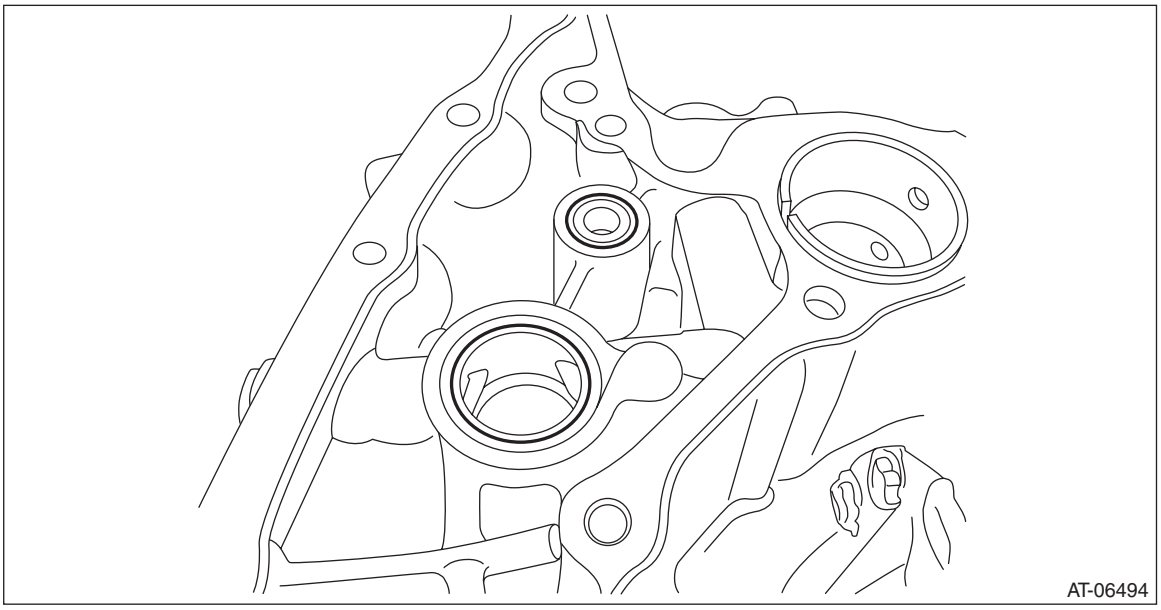
Transmission serial No.	96735 earlier	96736 later
Drive pinion retainer	32290AA030 32290AA031 can also be used.	32290AA031

1) Remove the transmission assembly from the vehicle. <Ref. to CVT-57, REMOVAL, Automatic Transmission Assembly.>
2) Remove the air breather hose. <Ref. to CVT-150, REMOVAL, Air Breather Hose.>
3) Remove the control valve body. <Ref. to CVT-114, REMOVAL, Control Valve Body.>
4) Remove the transmission harness. <Ref. to CVT-127, REMOVAL, Transmission Harness.>
5) Remove the turbine speed sensor. <Ref. to CVT-101, REMOVAL, Turbine Speed Sensor.>
6) Remove the secondary speed sensor. <Ref. to CVT-103, REMOVAL, Secondary Speed Sensor.>
7) Remove the primary speed sensor. <Ref. to CVT-105, REMOVAL, Primary Speed Sensor.>
8) Remove the inhibitor switch. <Ref. to CVT-97, REMOVAL, Inhibitor Switch.>
9) Remove the extension case. <Ref. to CVT-158, REMOVAL, Extension Case.>
10) Remove the transfer clutch assembly. <Ref. to CVT-162, REMOVAL, Transfer Clutch.>
11) Remove the transfer driven gear assembly. <Ref. to CVT-176, REMOVAL, Transfer Driven Gear.>
12) Remove the parking pawl. <Ref. to CVT-179, REMOVAL, Parking Pawl.>
13) Remove the reduction driven gear assembly. <Ref. to CVT-181, REMOVAL, Reduction Driven Gear.>
14) Remove the oil pan and oil strainer. <Ref. to CVT-110, REMOVAL, Oil Pan and Strainer.>
15) Remove the transmission control device. <Ref. to CVT-189, REMOVAL, Transmission Control Device.>
16) Remove the transmission case. <Ref. to CVT-195, REMOVAL, Transmission Case.>
17) Remove the reduction drive gear. <Ref. to CVT-207, REMOVAL, Reduction Drive Gear.>
18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT-211, REMOVAL, Primary Pulley and Secondary Pulley.>
19) Remove the reverse brake assembly. <Ref. to CVT-232, REMOVAL, Reverse Brake Assembly.>
20) Remove the forward clutch assembly. <Ref. to CVT-247, REMOVAL, Forward Clutch Assembly.>

21) Using the ST, remove the drive pinion retainer.
ST 18270KA020 SOCKET (E20)



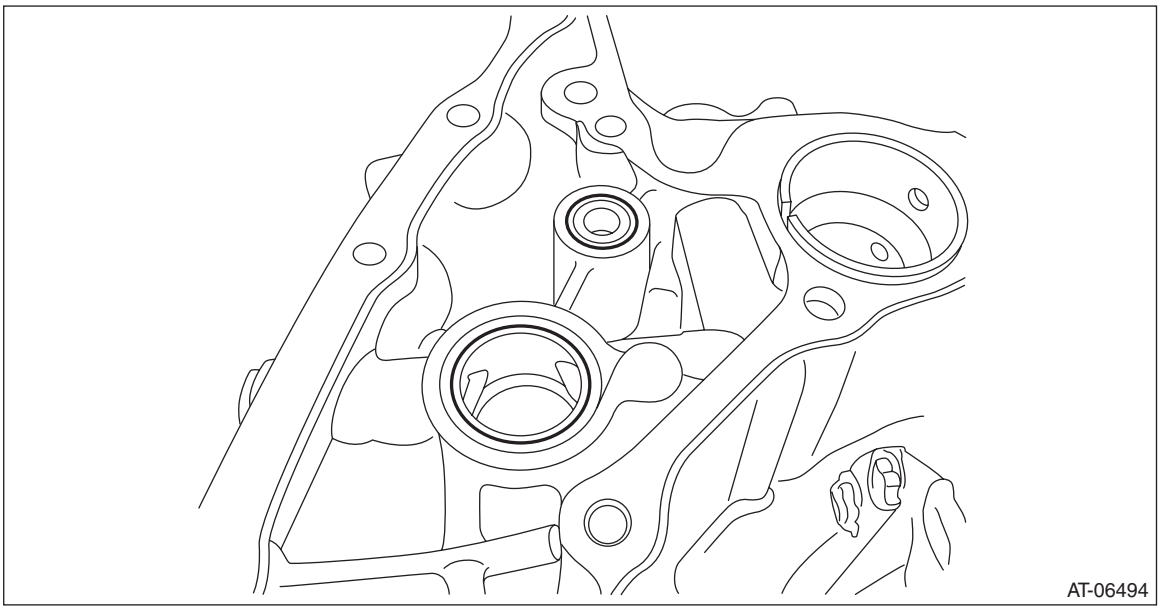
22) Remove the O-ring.



B: INSTALLATION

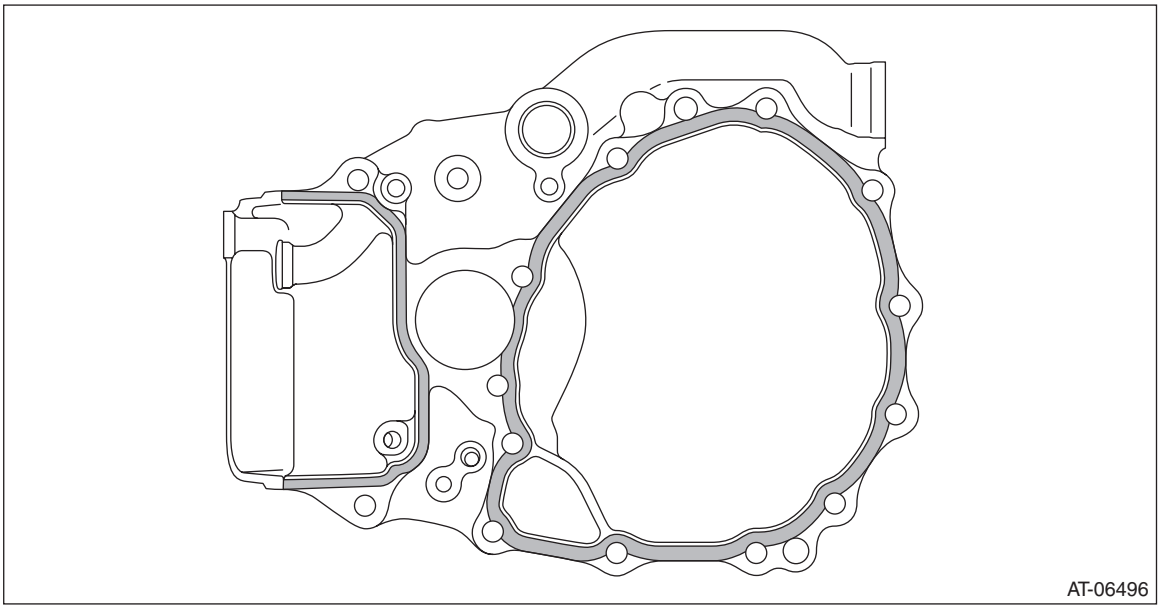
1) Clean the mating surface of drive pinion retainer and converter case.
2) Adjust the backlash and tooth contact between drive pinion shaft assembly and the front differential side gear. <Ref. to CVT-288, ADJUSTMENT, Drive Pinion Shaft Assembly.>
3) Install O-rings in two locations to the converter case.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



4) Apply liquid gasket seamlessly to the mating surface of drive pinion retainer.

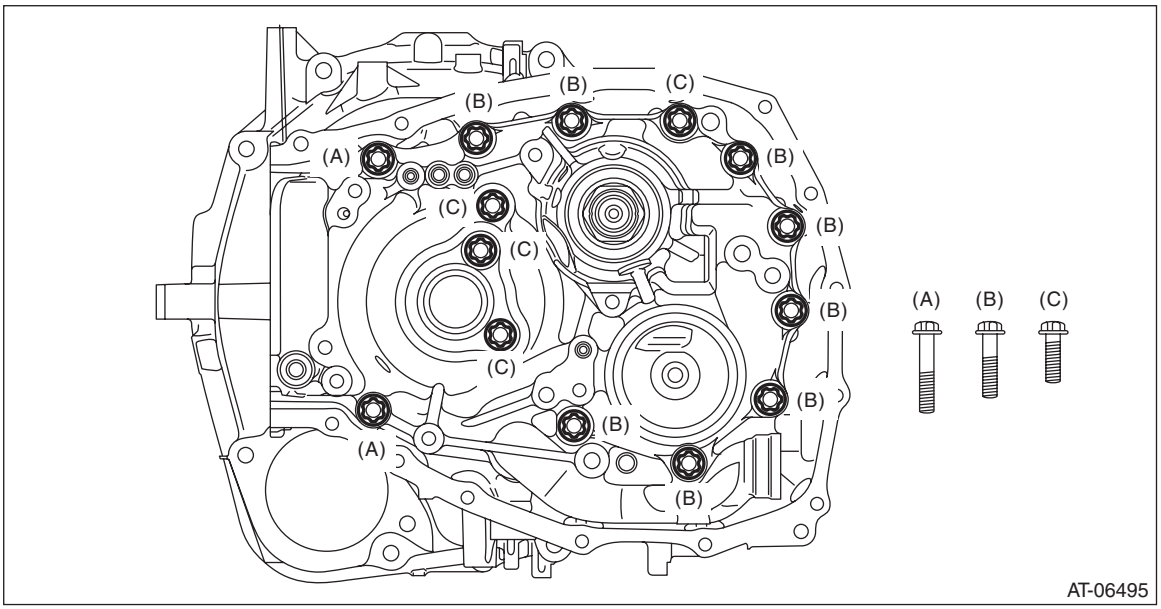
Liquid gasket:
THREE BOND 1215 (Part No. 004403007) or equivalent



5) Install the drive pinion retainer to converter case, and tighten the bolt using the ST.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

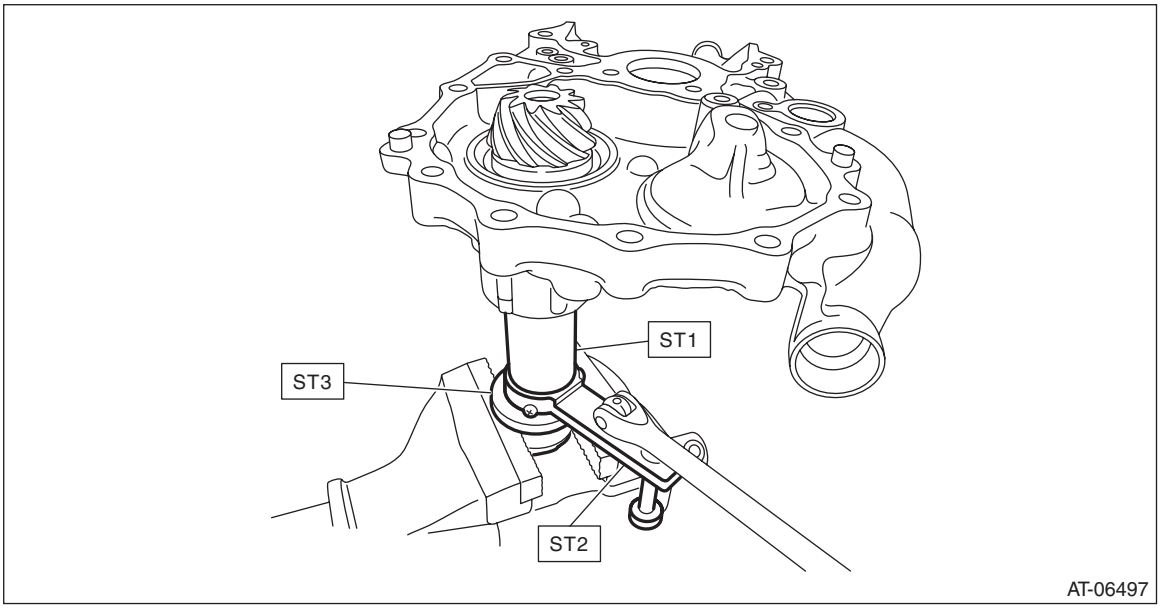
Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



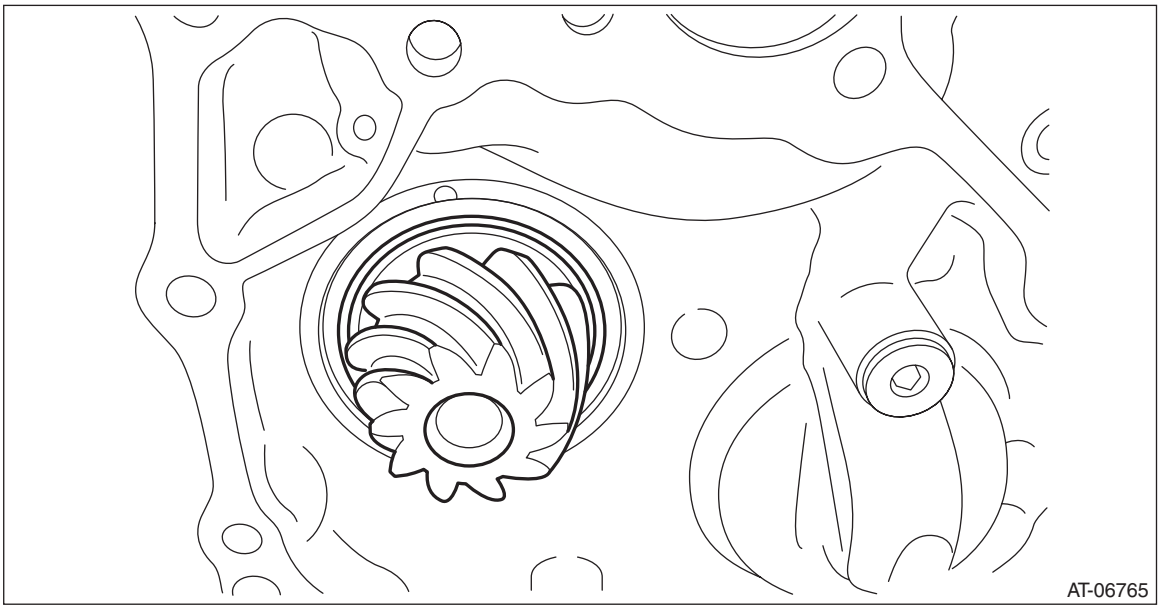
6) Install the forward clutch assembly. <Ref. to CVT-250, INSTALLATION, Forward Clutch Assembly.>
7) Install the reverse brake assembly. <Ref. to CVT-235, INSTALLATION, Reverse Brake Assembly.>
8) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT-218, INSTALLATION, Primary Pulley and Secondary Pulley.>
9) Install the reduction drive gear. <Ref. to CVT-208, INSTALLATION, Reduction Drive Gear.>
10) Install the transmission case. <Ref. to CVT-197, INSTALLATION, Transmission Case.>
11) Install the transmission control device. <Ref. to CVT-192, INSTALLATION, Transmission Control Device.>
12) Install the oil strainer and oil pan. <Ref. to CVT-111, INSTALLATION, Oil Pan and Strainer.>
13) Install the reduction driven gear assembly. <Ref. to CVT-181, INSTALLATION, Reduction Driven Gear.>
14) Install the transfer driven gear assembly. <Ref. to CVT-177, INSTALLATION, Transfer Driven Gear.>
15) Install the transfer clutch assembly. <Ref. to CVT-164, INSTALLATION, Transfer Clutch.>
16) Install the parking pawl. <Ref. to CVT-180, INSTALLATION, Parking Pawl.>
17) Install the extension case. <Ref. to CVT-159, INSTALLATION, Extension Case.>
18) Install the inhibitor switch. <Ref. to CVT-99, INSTALLATION, Inhibitor Switch.>
19) Install the secondary speed sensor. <Ref. to CVT-103, INSTALLATION, Secondary Speed Sensor.>
20) Install the primary speed sensor. <Ref. to CVT-106, INSTALLATION, Primary Speed Sensor.>
21) Install the turbine speed sensor. <Ref. to CVT-101, INSTALLATION, Turbine Speed Sensor.>
22) Install the transmission harness. <Ref. to CVT-132, INSTALLATION, Transmission Harness.>
23) Install the control valve body. <Ref. to CVT-119, INSTALLATION, Control Valve Body.>
24) Install the air breather hose. <Ref. to CVT-151, INSTALLATION, Air Breather Hose.>
25) Install the transmission assembly to the vehicle. <Ref. to CVT-71, INSTALLATION, Automatic Transmission Assembly.>

C: DISASSEMBLY

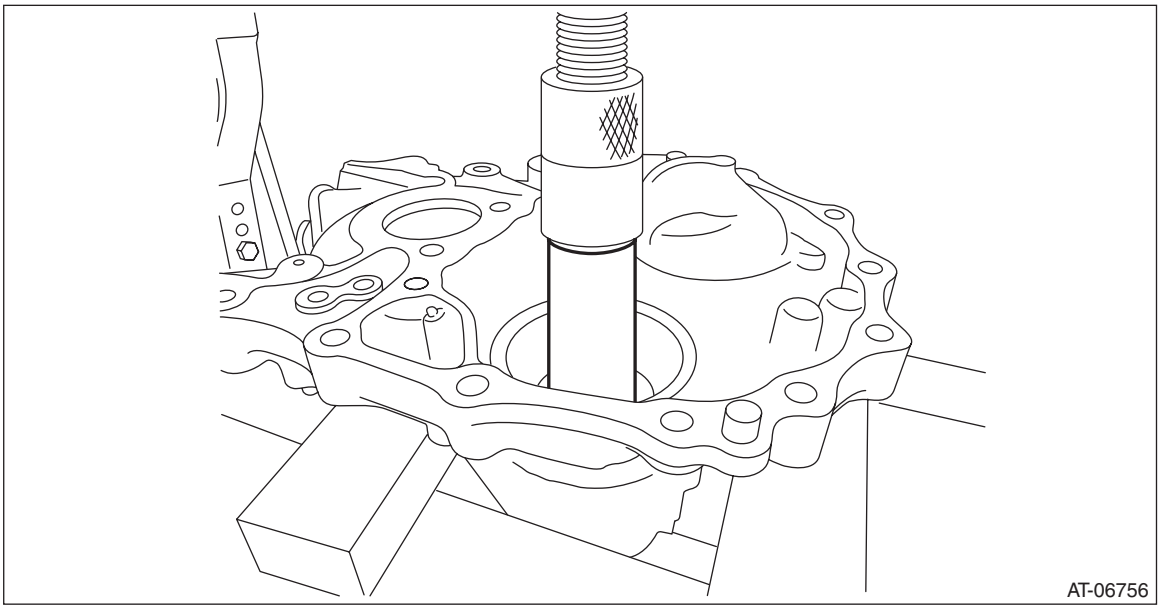
1) Flatten the tab of the lock nut.
2) Using ST1, ST2 and ST3, fix at the spline portion of drive pinion shaft to remove the lock nut.
ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER



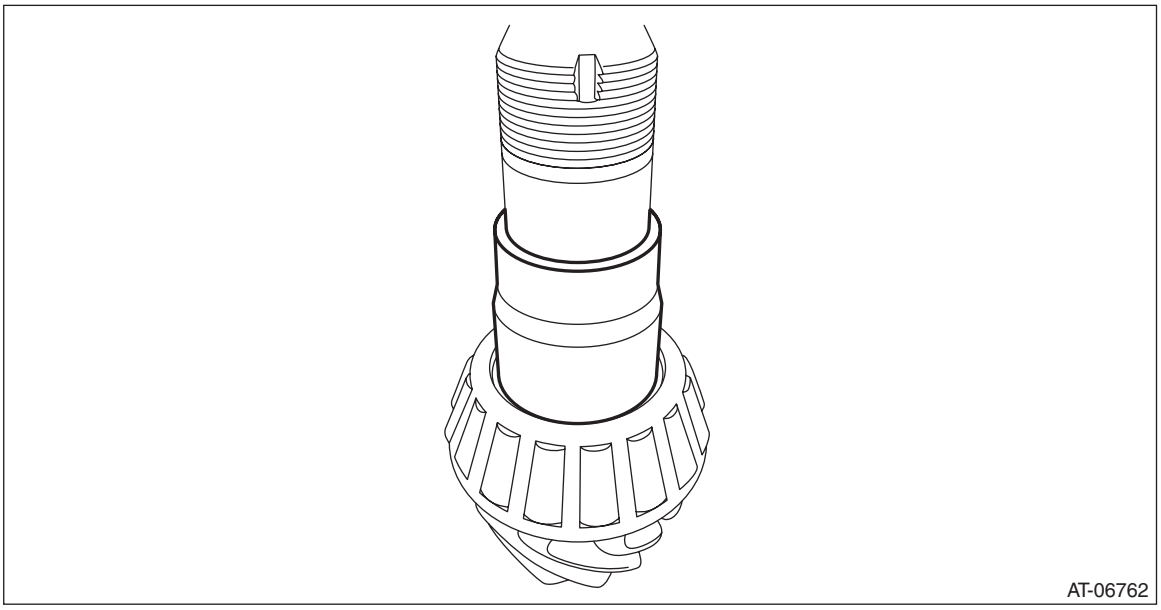
3) Remove the drive pinion shaft from the drive pinion retainer.



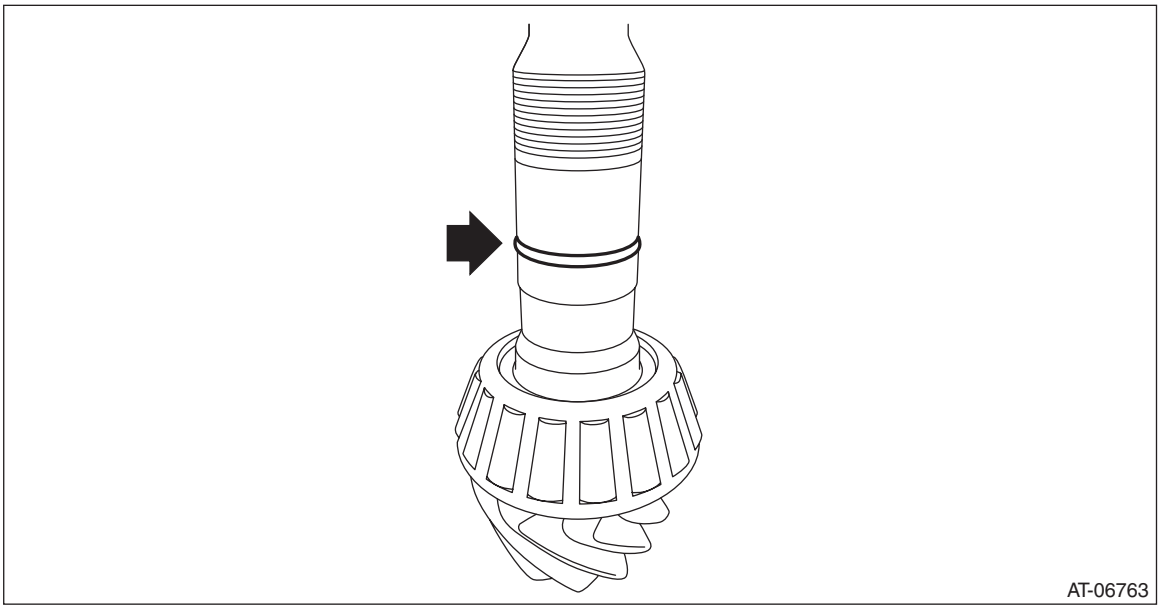
4) Using the round bar with diameter of 36 mm (1.42 in) or 37 mm (1.46 in), remove the bearing inner race and plug.



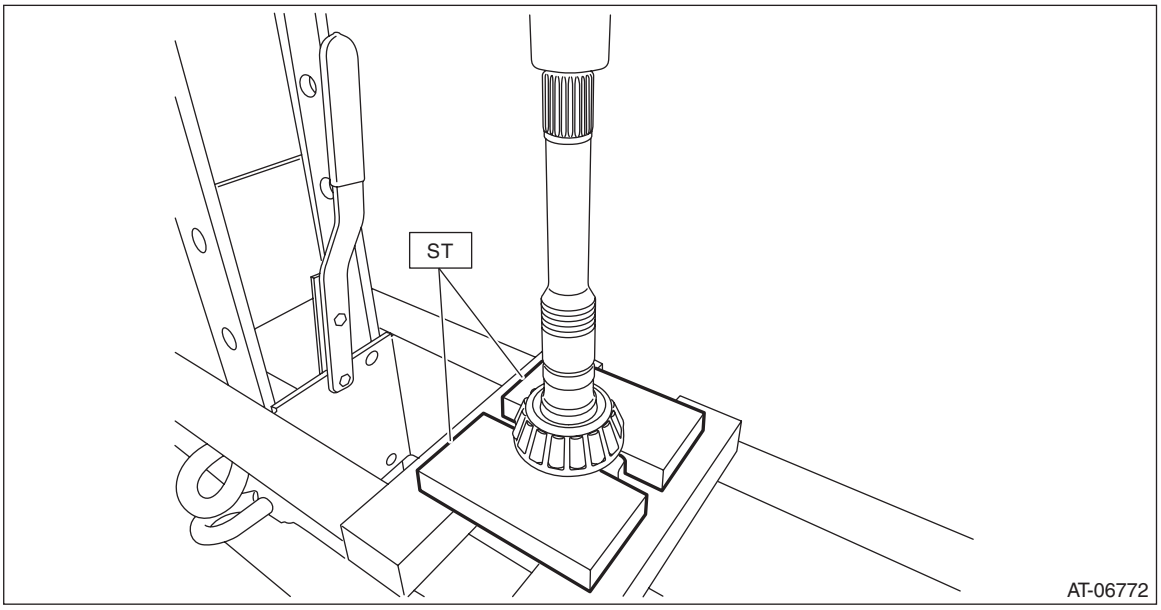
5) Remove the drive pinion washer.
6) Remove the drive pinion spacer.



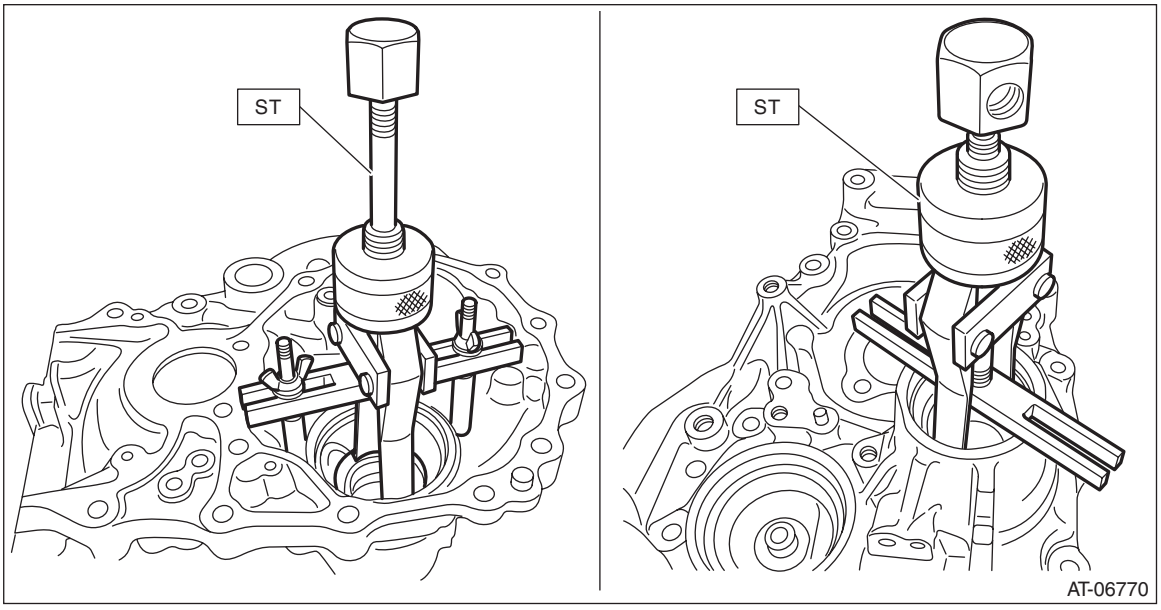
7) Remove the O-ring.



8) Remove the inner race and drive pinion shim from drive pinion shaft using ST.
ST 498515500 REMOVER

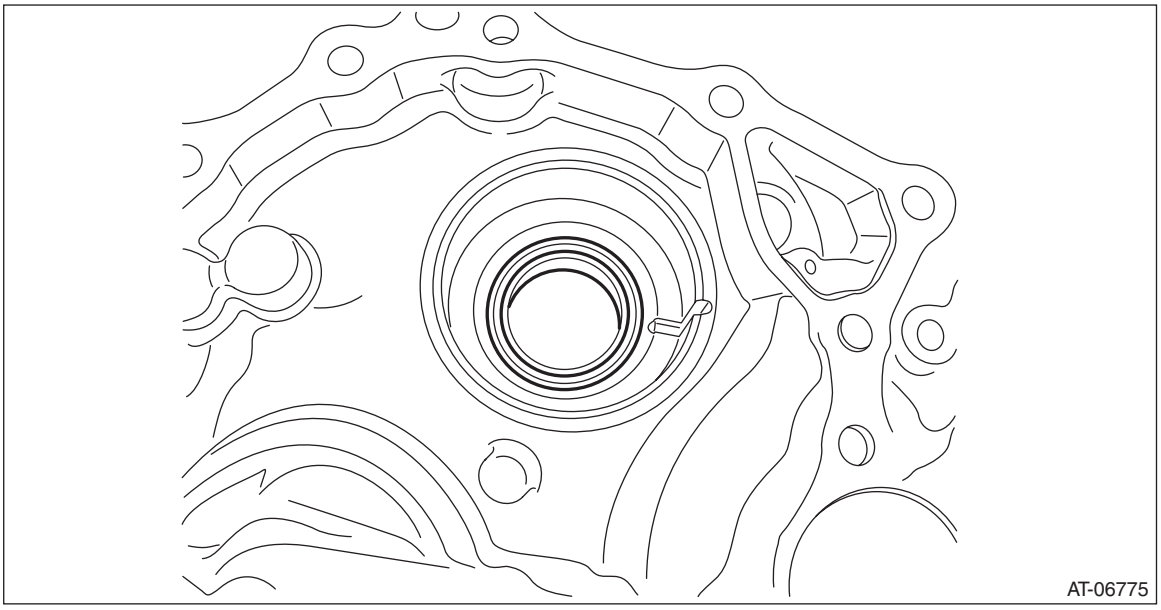


9) Using the ST, remove the outer race.
ST 398527700 PULLER ASSY

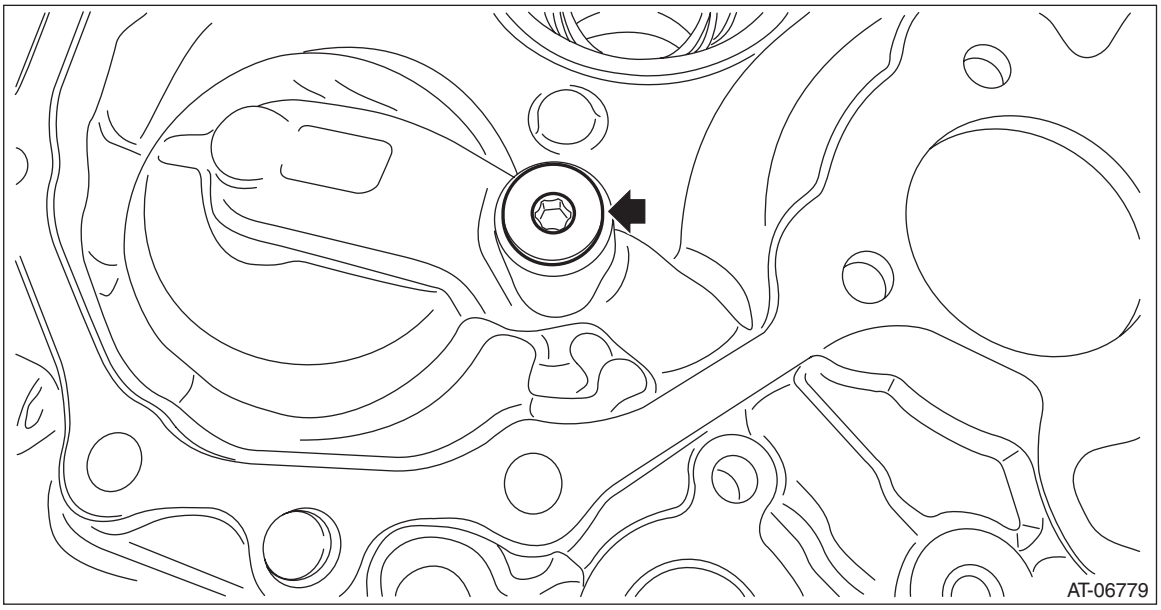


10) Remove the two oil seals using a screwdriver wrapped with cloth etc.

CAUTION:
Do not damage the fitting surface of oil seal.



11) Remove the plug from drive pinion retainer.

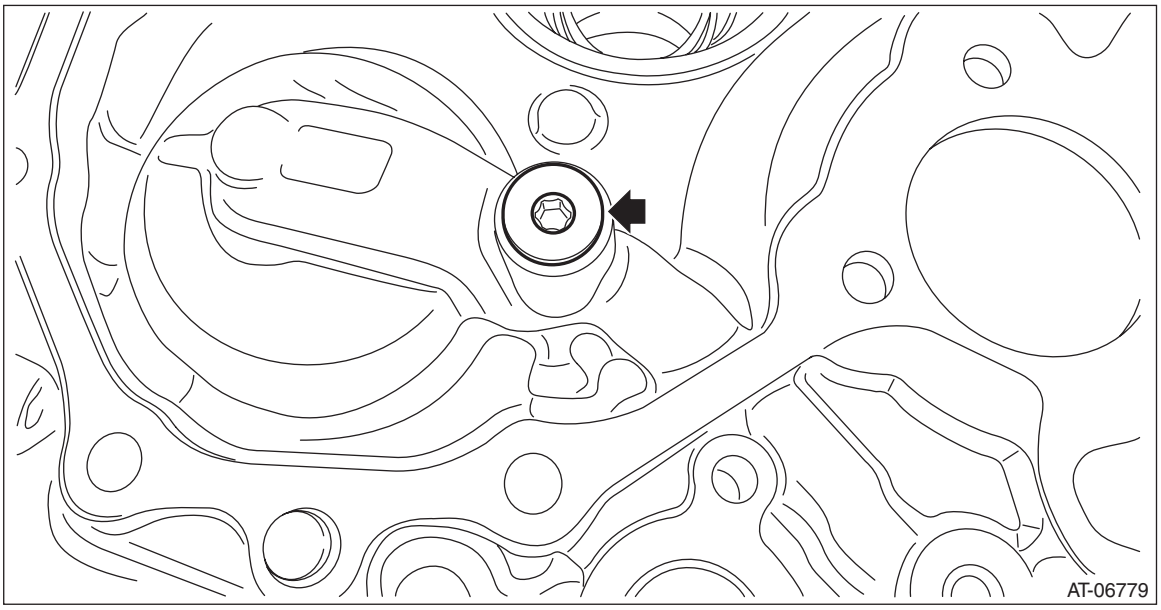


D: ASSEMBLY

1) Install the plug to drive pinion retainer.

NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.

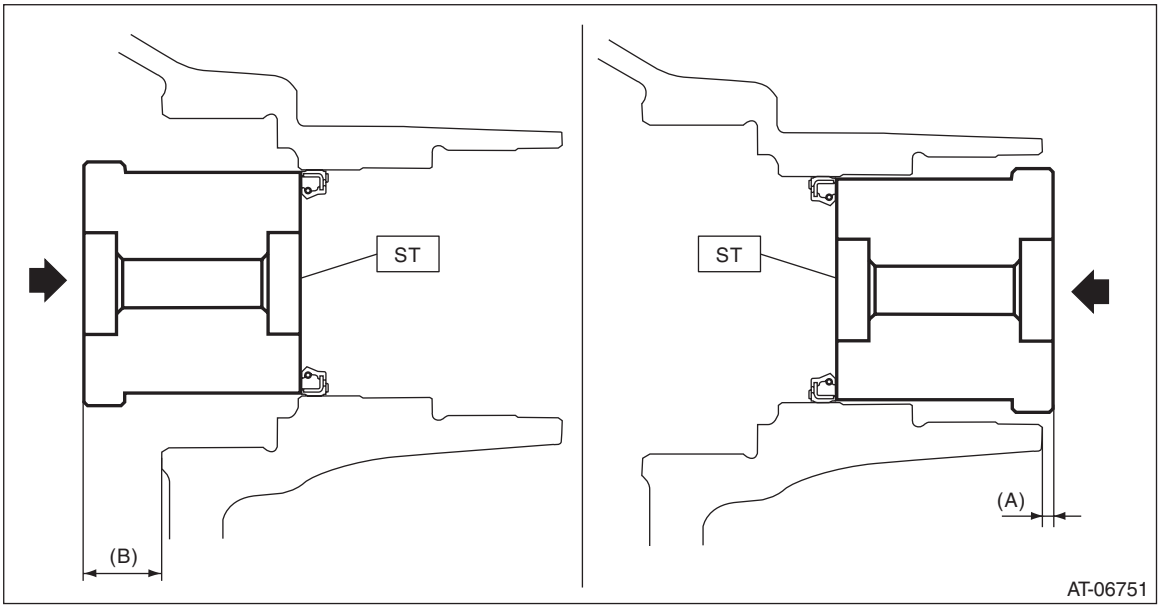
Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



2) Using the ST, install the oil seal to drive pinion retainer.

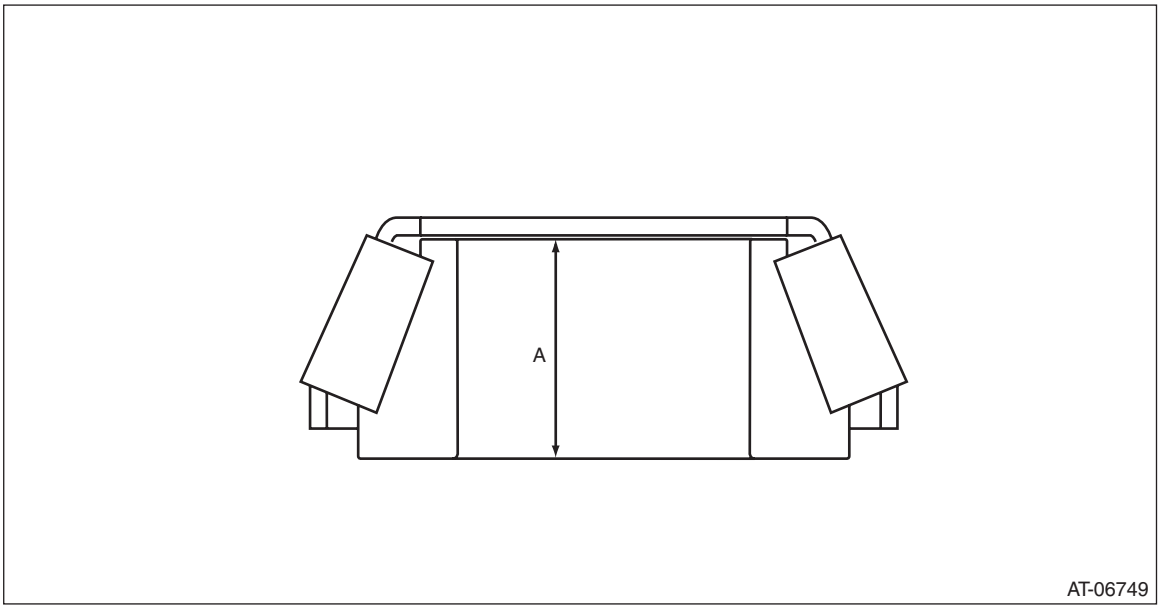
NOTE:
- Apply CVTF to the oil seal press-fitting surface and lip.
- Install the oil seal in the correct direction.

ST 927720000 HOUSING BUSHING INSTALLER AND REMOVER

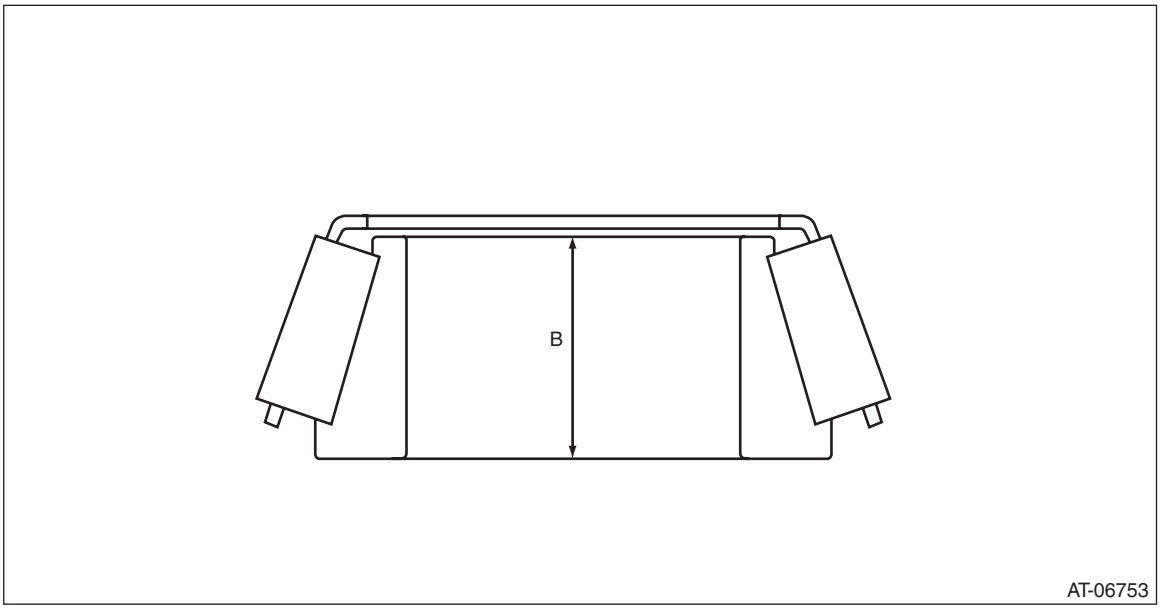


(A) 2.8 mm (0.11 in)
(B) 18.7 mm (0.74 in)

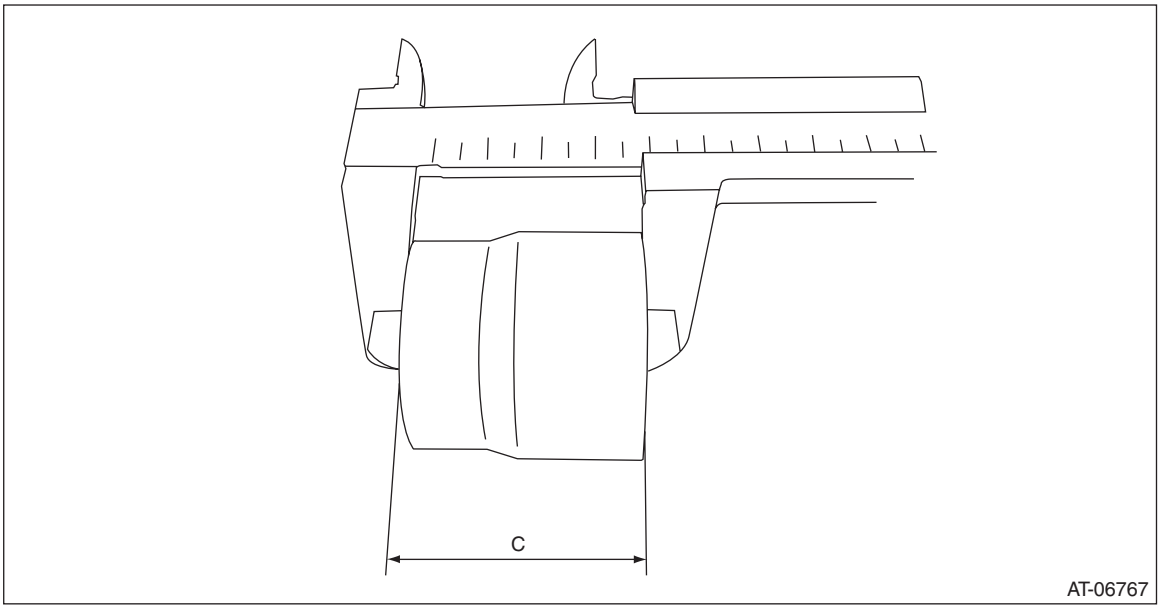
3) Select the drive pinion washer.
(1) Measure the roller bearing inner race width “A” on the front side.



(2) Measure the roller bearing inner race width “B” on the rear side.

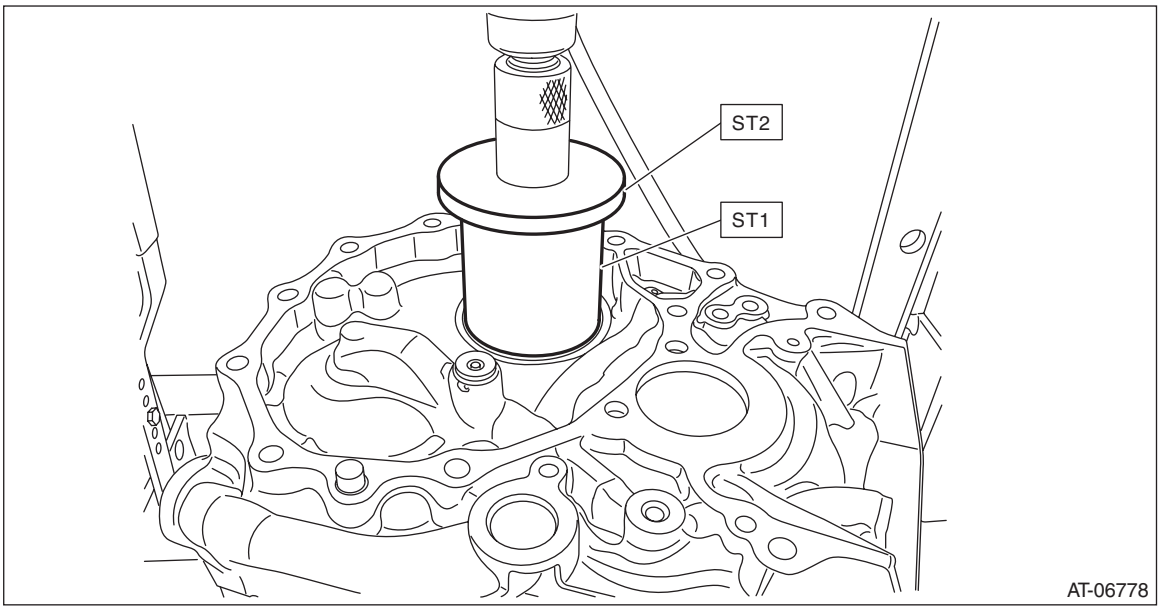


(3) Measure the spacer width “C”.



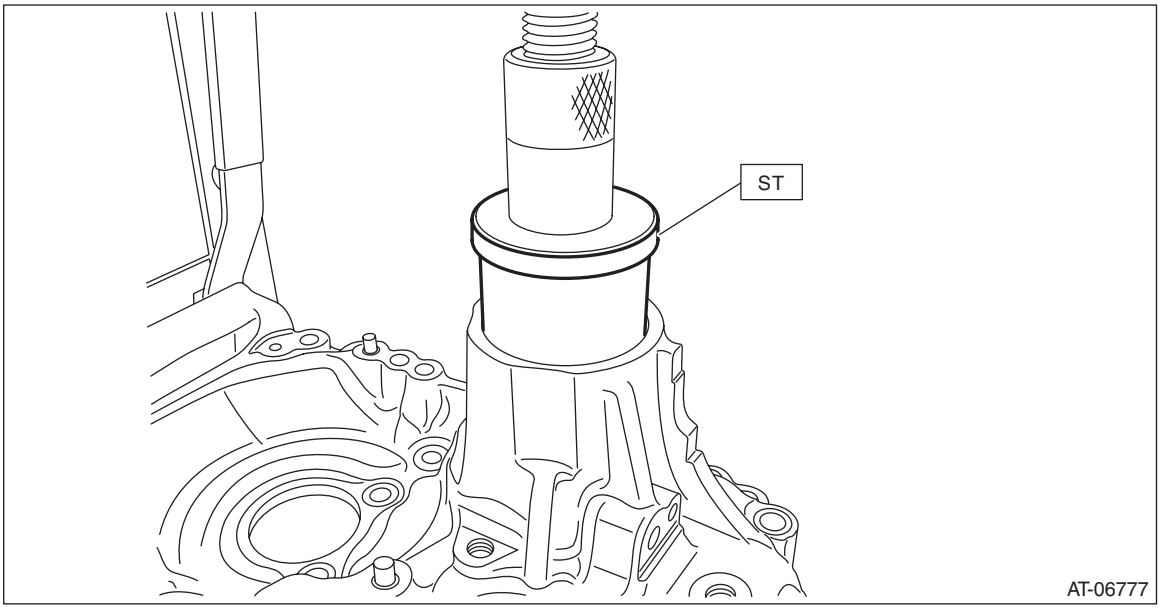
(4) Using the ST, install the front roller bearing outer race to the drive pinion retainer.

ST1 28499TC010 INSTALLER
ST2 398177700 INSTALLER



(5) Using the ST, install the rear roller bearing outer race to the drive pinion retainer.

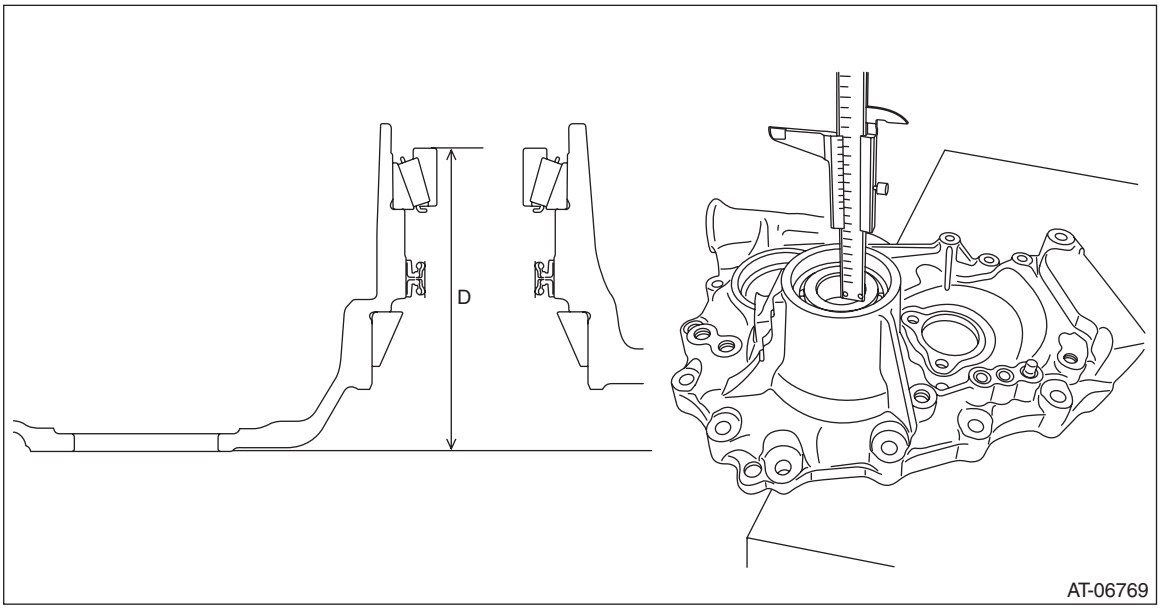
ST 20099AE020 INSTALLER



(6) Place the drive pinion retainer on the surface plate, and install the inner race to the rear roller bearing outer race.

NOTE:
Place the drive pinion retainer so that the mating surface of the drive pinion retainer (mating surface with the converter case) contacts the surface plate.

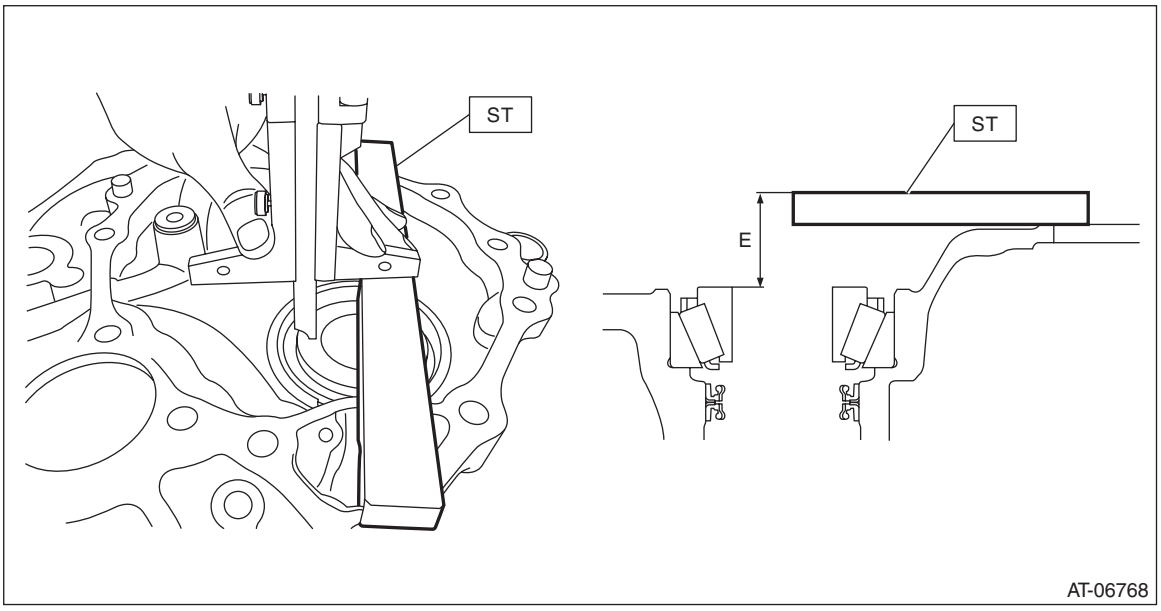
(7) Measure the height “D” from the end face of the rear roller bearing inner race to the surface plate.



(8) Install the inner race to the front roller bearing outer race.

(9) Measure the depth “E” from the end face of the front roller bearing inner race to the end face of the ST.

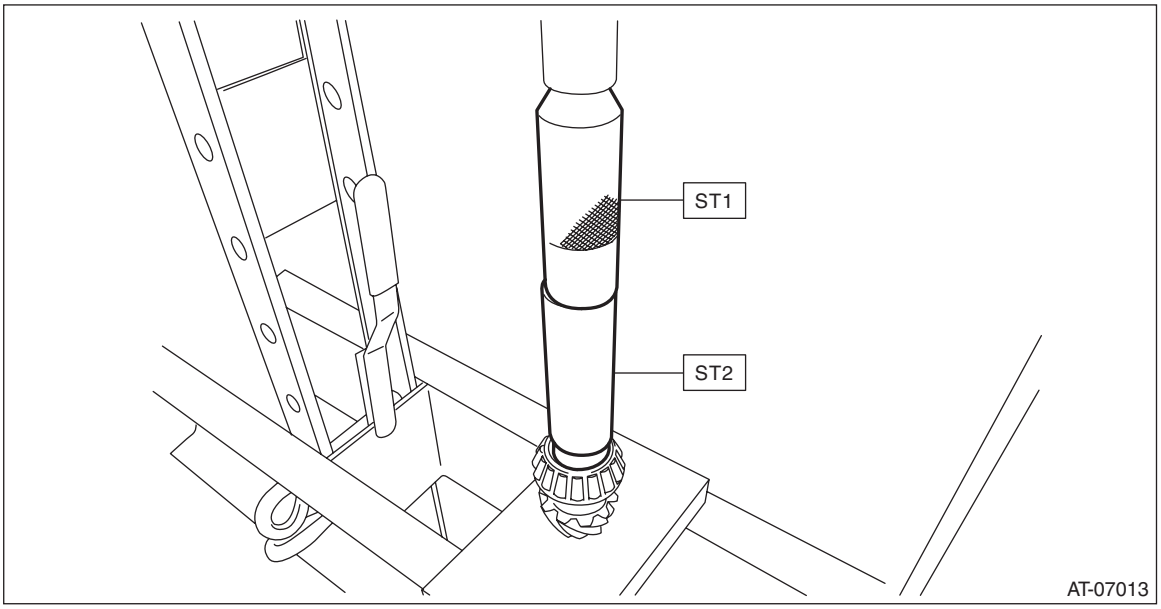
ST 499575400 GAUGE



(10) Using following formula, select one to three drive pinion washers.
T (mm) = D – (A + B + C + E – 15) – (0±0.0125)
[T (in) = D – (A + B + C + E – 0.591) – (0±0.0005)]
A: Front roller bearing width
B: Rear roller bearing width
C: Spacer width
D: Height from end face of rear roller bearing inner race to surface plate
E: Depth from end face of front roller bearing inner race to end face of ST
15 mm (0.591 in): Thickness of ST
T: Drive pinion washer thickness
0±0.0125 mm (0±0.0005 in): Clearance

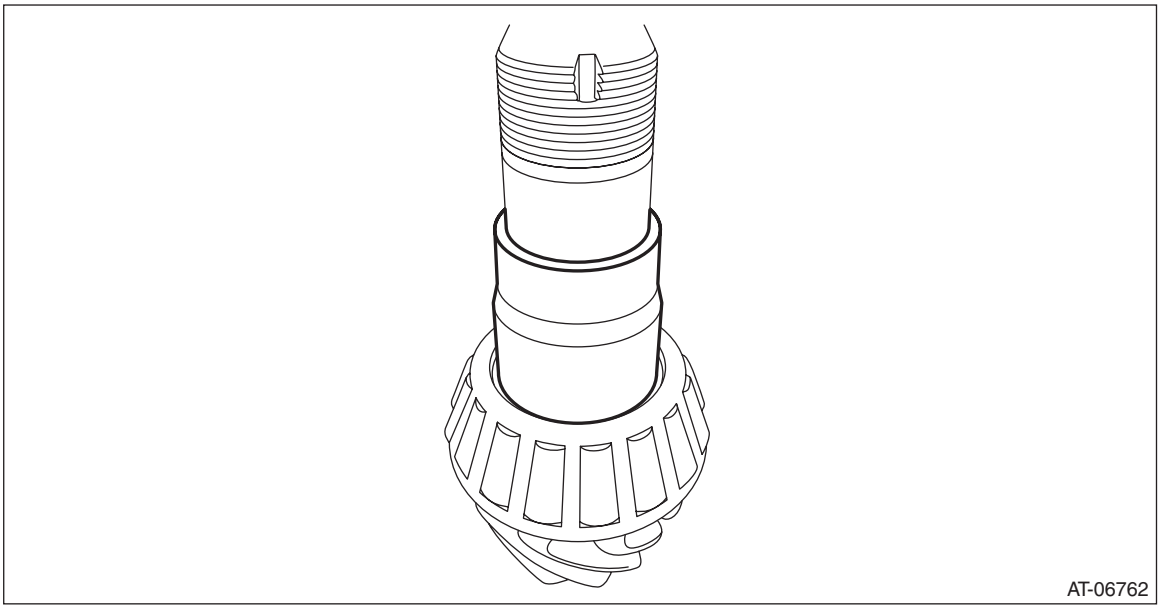
Drive pinion washer	
Part No.	Thickness mm (in)
38336AA750	0.150 (0.0059)
38336AA760	0.175 (0.0069)
38336AA770	0.200 (0.0079)
38336AA780	0.225 (0.0089)
38336AA790	0.250 (0.0098)
38336AA800	0.275 (0.0108)
38336AA810	0.300 (0.0118)
38336AA820	0.400 (0.0157)

4) Measure and record the drive pinion shim thickness to be reused.
5) Install the drive pinion shim that is reused for the drive pinion shaft.
6) Using the ST1 and ST2, press-fit the inner race to the drive pinion shaft.
ST1 899580100 INSTALLER
ST2 927130000 EXTENSION DRIVE SHAFT

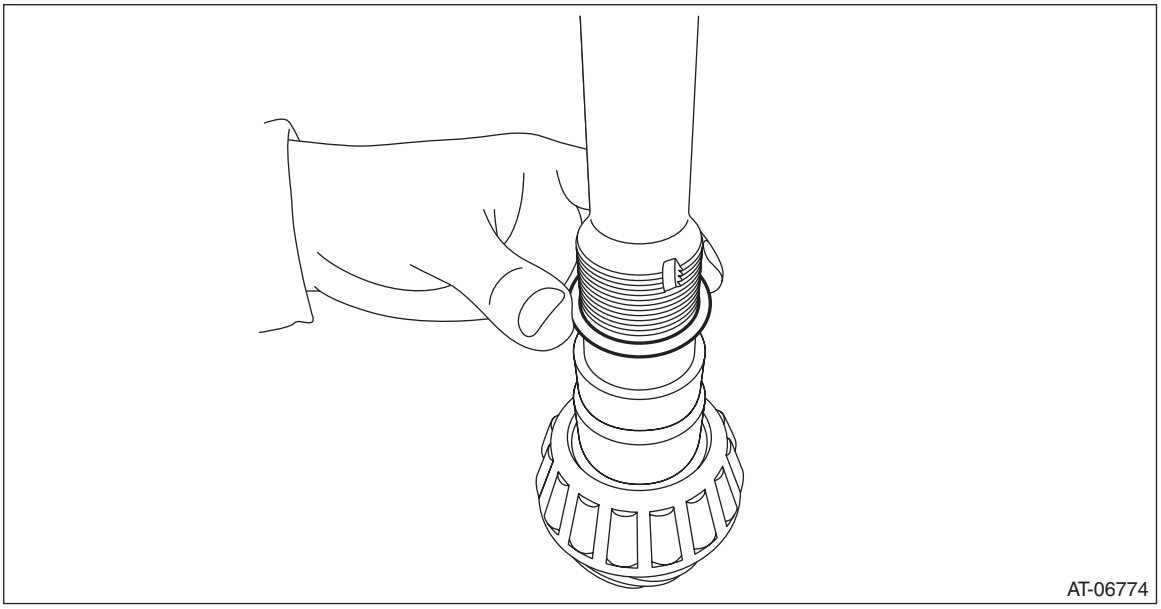


7) Install the drive pinion spacer.

NOTE:
Replace the O-ring with a new part after tooth contact inspection.



8) Install the selected drive pinion washer.

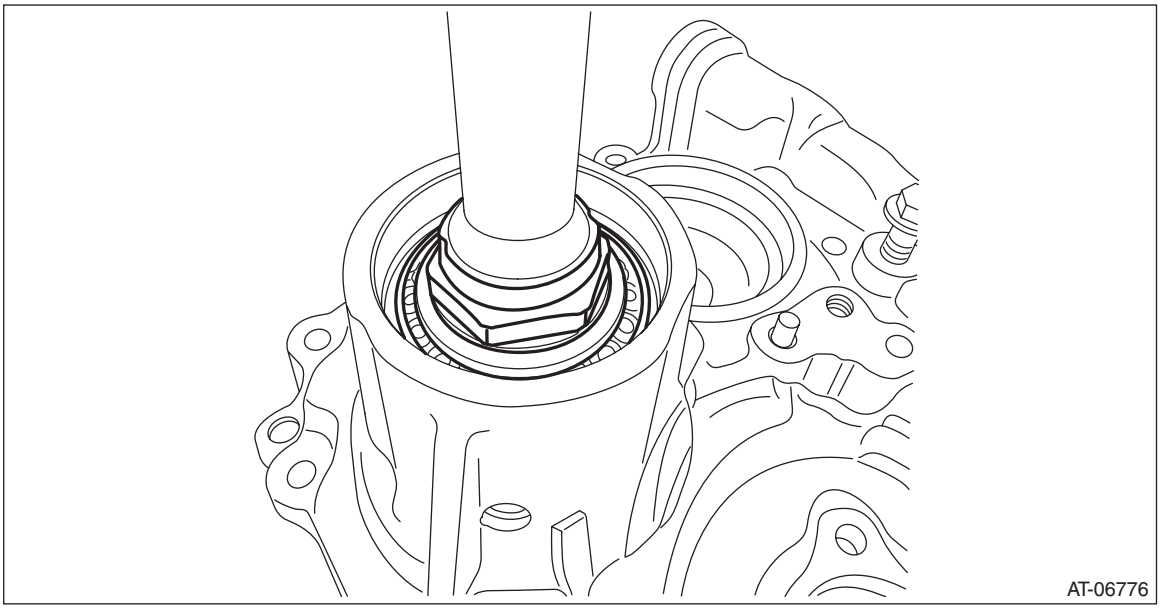


9) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.

10) Install the inner bearing and lock nut.

NOTE:
Use a new lock nut.



11) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

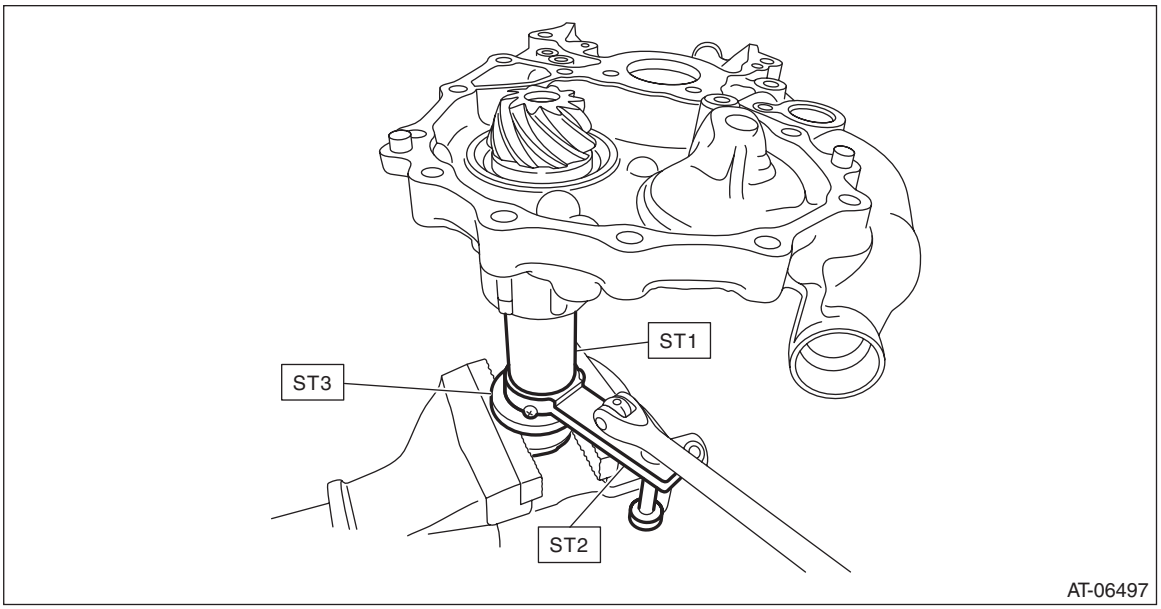
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

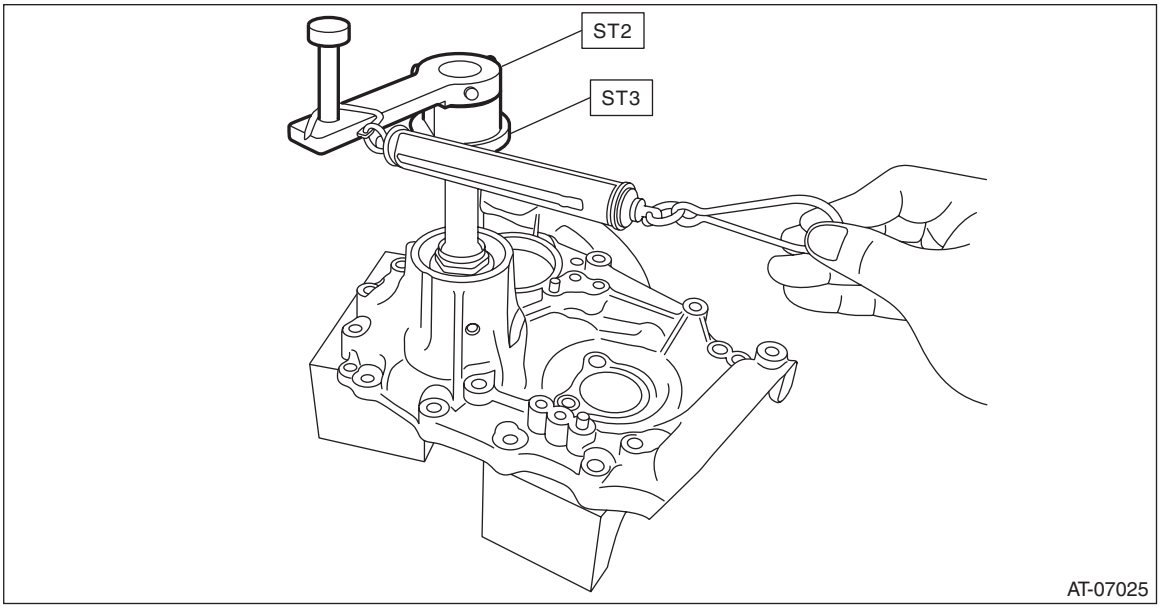
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)

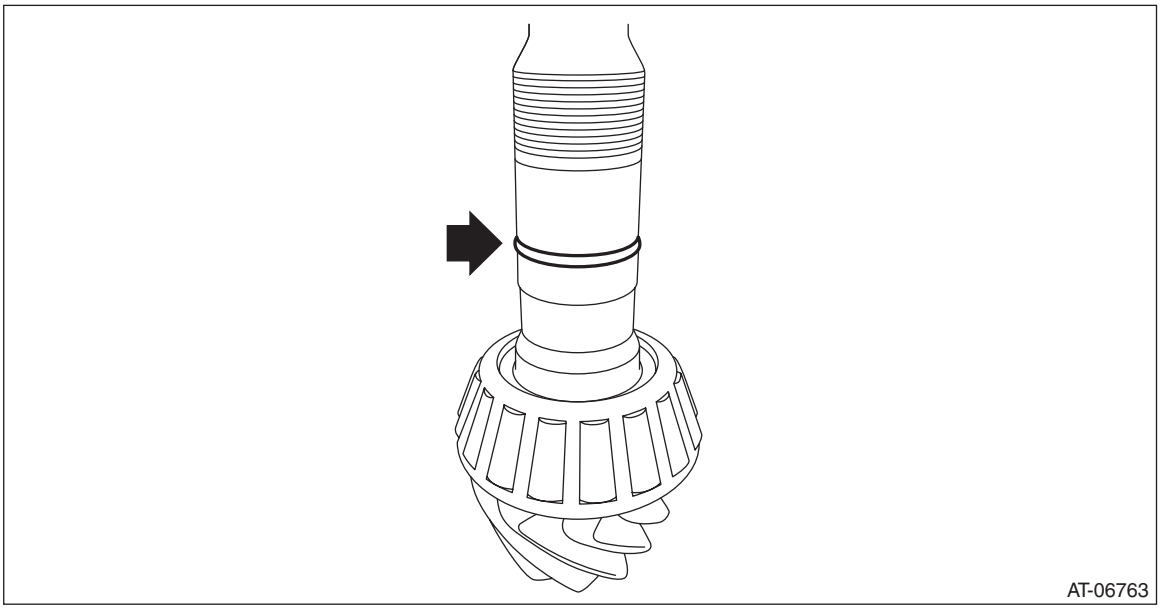




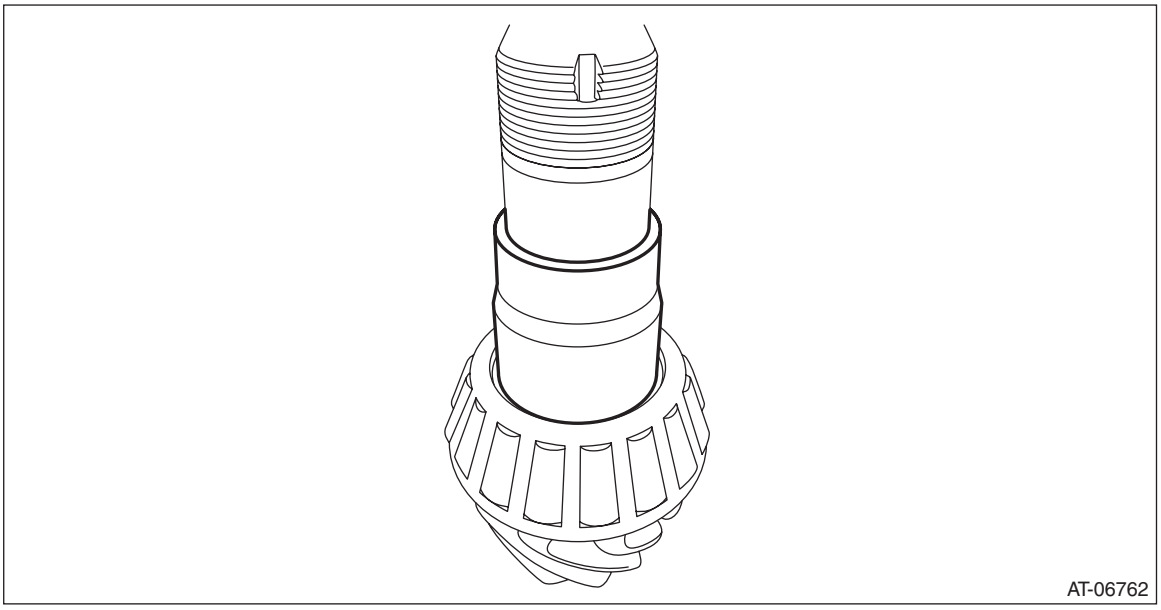
12) Install the drive pinion retainer to the converter case, and check the backlash and tooth contact. <Ref. to CVT-288, ADJUSTMENT, Drive Pinion Shaft Assembly.> <Ref. to CVT-308, ADJUSTMENT, Front Differential Assembly.>
13) Remove the drive pinion retainer from converter case. <Ref. to CVT-266, REMOVAL, Drive Pinion Shaft Assembly.>
14) Remove the drive pinion spacer from the drive pinion shaft. <Ref. to CVT-270, DISASSEMBLY, Drive Pinion Shaft Assembly.>

15) Install the O-ring to the drive pinion shaft.

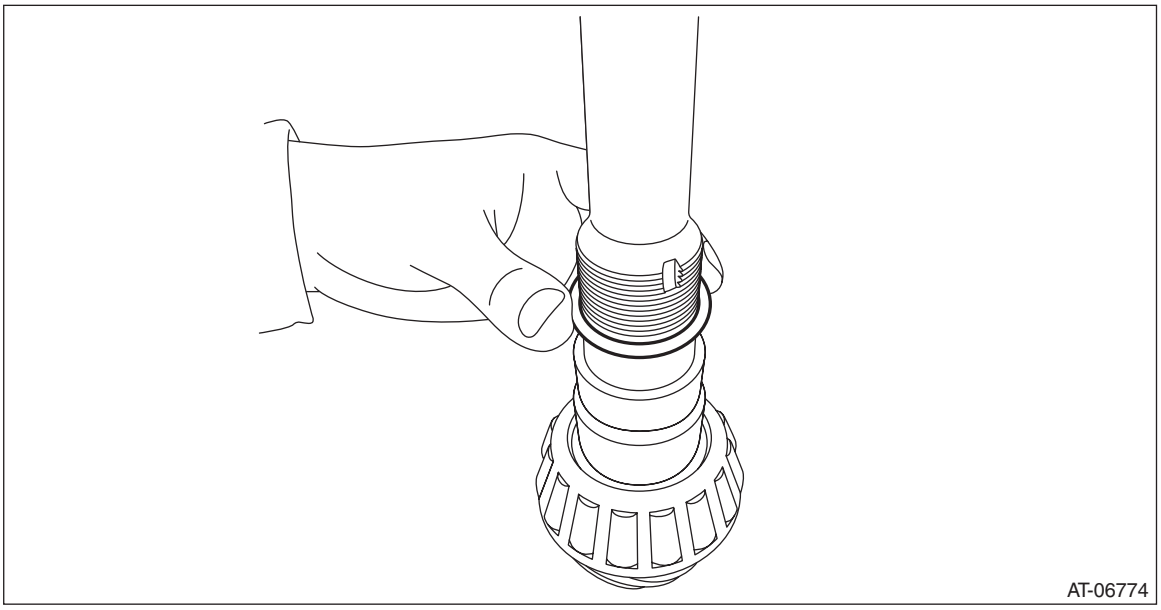
NOTE:
- Use new O-rings.
- Apply CVTF to the O-ring.



16) Install the drive pinion spacer to the drive pinion shaft.

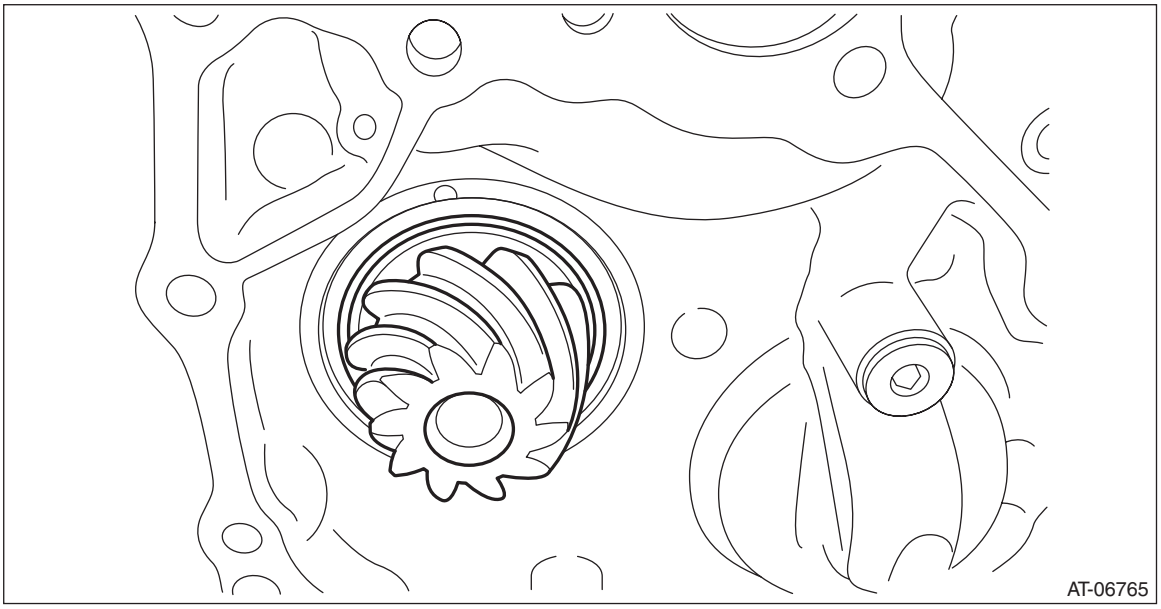


17) Install the drive pinion washer.

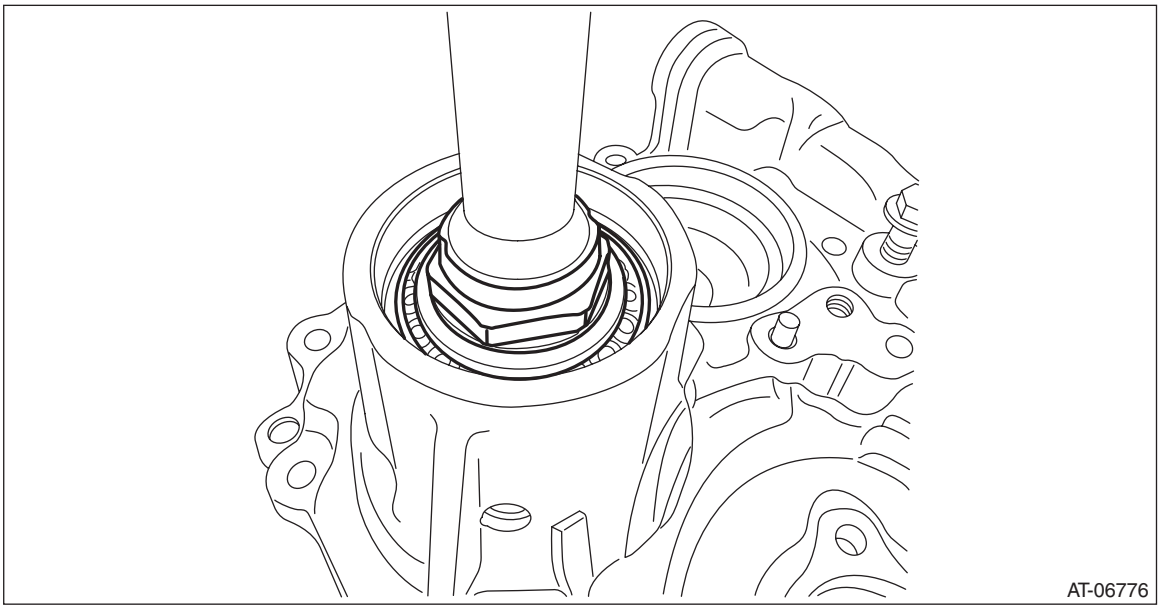


18) Insert the drive pinion shaft into the drive pinion retainer.

CAUTION:
Be careful not to damage the oil seal.



19) Install the inner bearing and lock nut.



20) Using the ST, tighten the lock nut to the specified torque so that the starting torque of the drive pinion shaft is within the specified range.

CAUTION:
Before inspecting the starting torque, apply differential gear oil to roller of bearing and rotate the bearing several times.

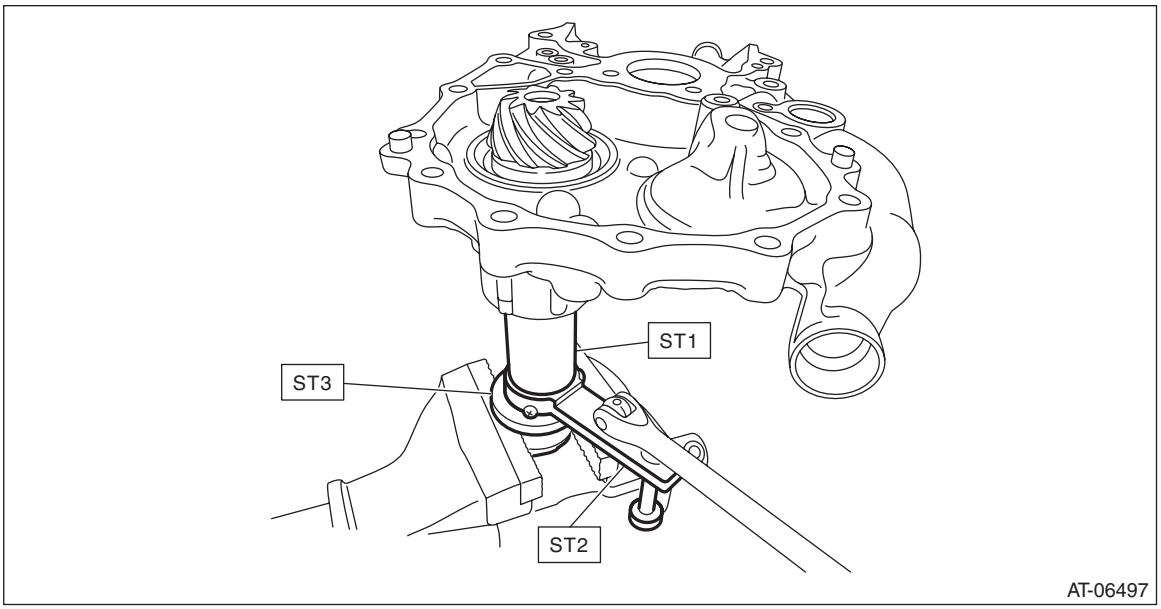
NOTE:
- Tighten the lock nut while directly aligning ST2 and torque wrench.
- If the starting torque is not within the specified range, select the drive pinion washer, and repeat the step until the starting torque is within the specified range.
- When a thicker drive pinion washer is selected, the starting torque decreases. When a thinner drive pinion washer is selected, the starting torque increases.

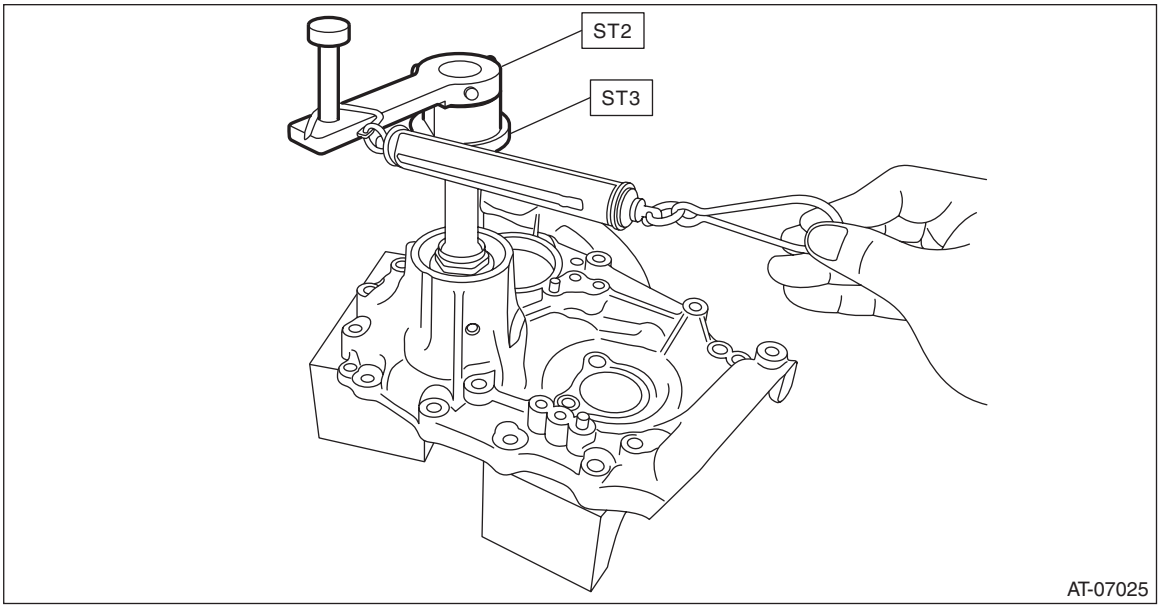
Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

ST1 499787500 ADAPTER
ST2 499787700 WRENCH
ST3 498937110 HOLDER

Using the following formula, calculate the tightening torque for a torque wrench.
$T2 = L2/(L1 + L2) \times T1$
T1: 170 — 250 N·m (17.3 — 25.5 kgf-m, 125.4 — 184.4 ft-lb) [Specified tightening torque range]
T2: Tightening torque
L1: ST1 length 0.072 m (2.83 in)
L2: Torque wrench length
Example:

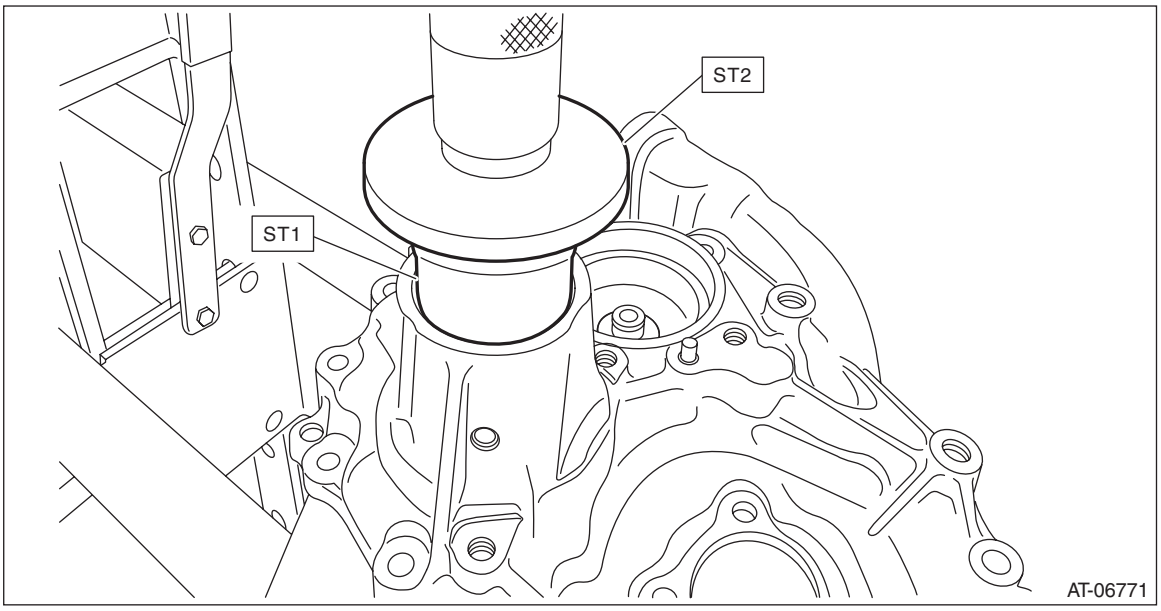
Torque wrench length m (in)	Tightening torque N·m (kgf-m, ft-lb)
0.4 (15.75)	144 — 211 (14.7 — 21.5, 106.2 — 155.6)
0.45 (17.72)	147 — 215 (15.0 — 21.9, 108.4 — 158.6)
0.5 (19.69)	149 — 218 (15.2 — 22.2, 109.9 — 160.8)
0.55 (21.65)	150 — 221 (15.3 — 22.5, 110.6 — 163.0)





21) Crimp the lock nut in 2 locations.

22) Using the ST, install the plug.
ST1 499755602 PRESS SNAP RING
ST2 398177700 INSTALLER

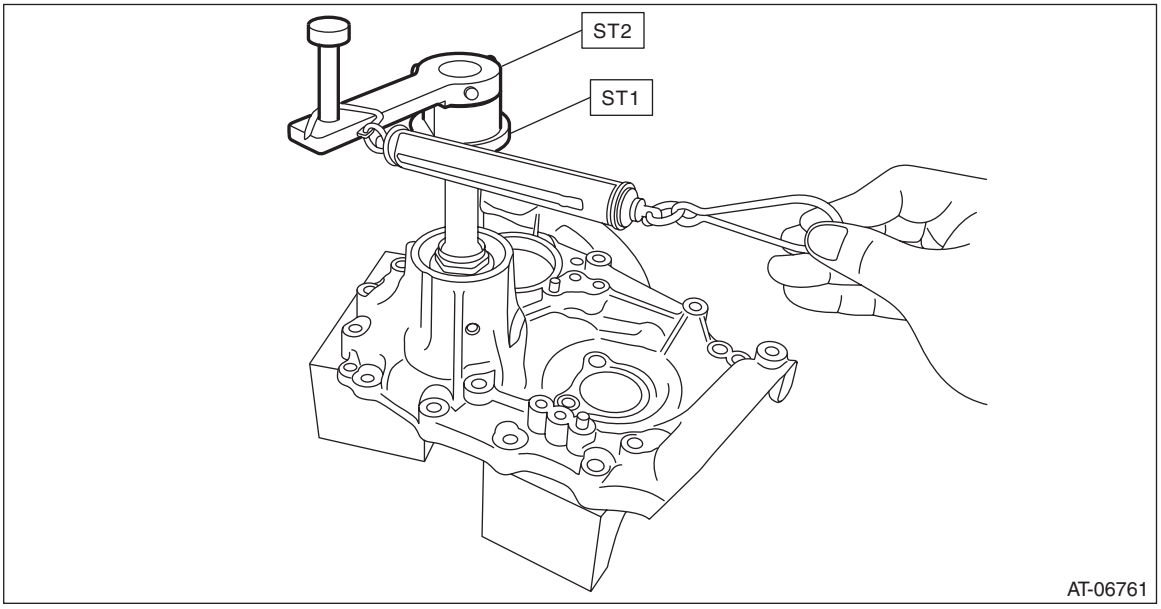


E: INSPECTION

- Make sure that all component parts are free of scratches, holes and other faults.
- Check the tooth contact. <Ref. to CVT-288, ADJUSTMENT, Drive Pinion Shaft Assembly.>
- Apply CVTF to bearing and rotate the bearing to check for noise or dragging etc.
- Check the starting torque of drive pinion shaft.

CAUTION:
Before measuring, apply differential gear oil to roller of bearing and rotate the bearing several times.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

Starting torque:
5.1 — 17.1 N (0.5 — 1.7 kgf, 1.1 — 3.8 lbf)

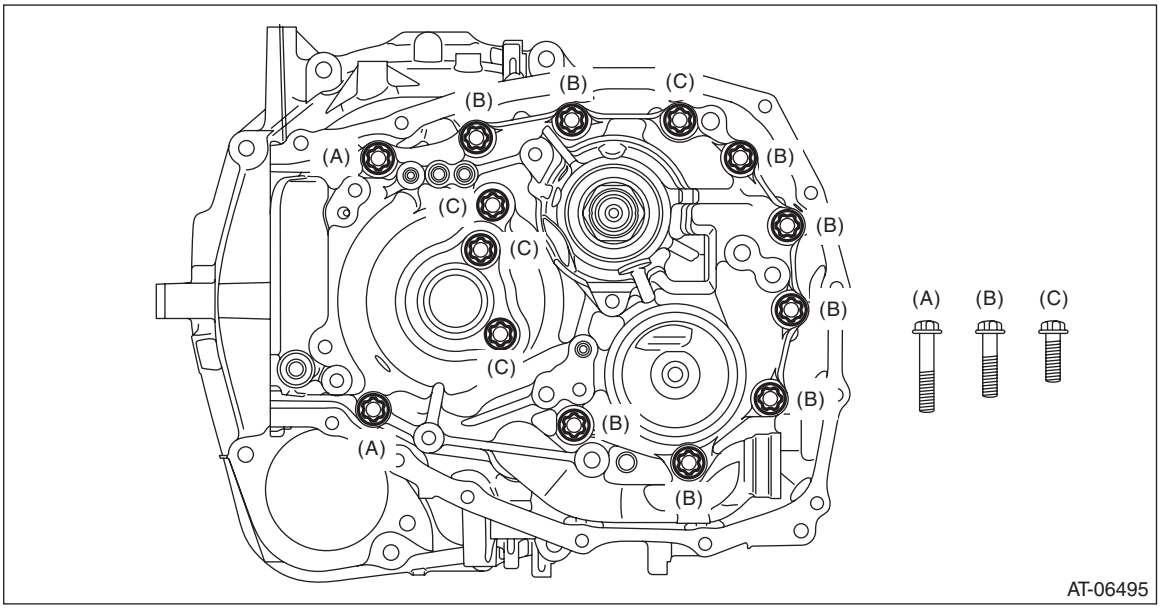


F: ADJUSTMENT

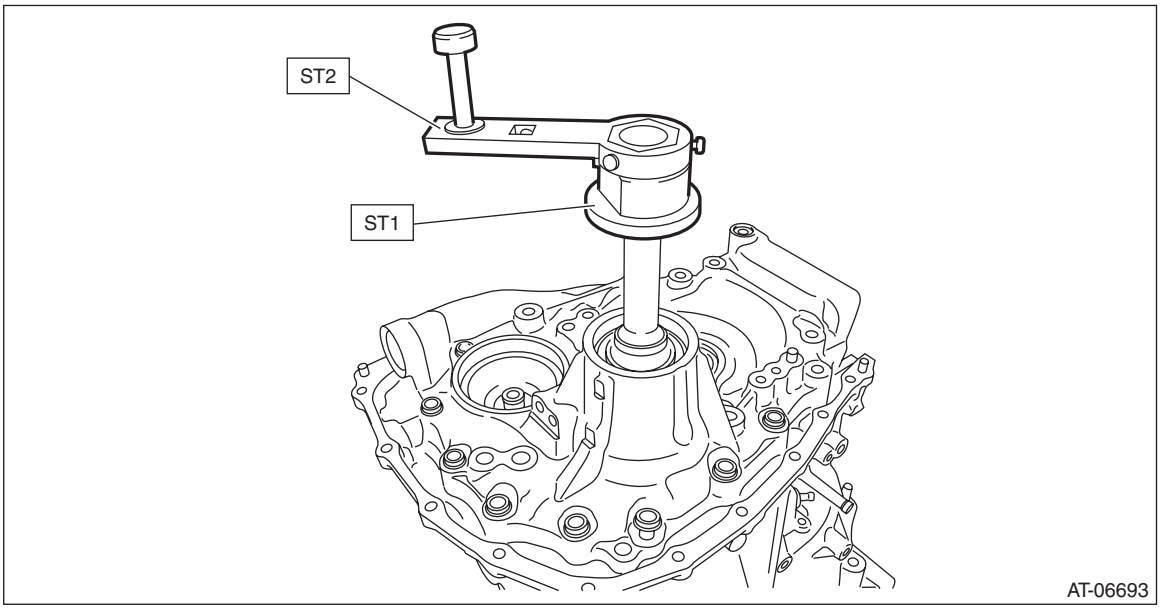
1) Remove the liquid gasket from the mating surface completely.
2) Using the ST, install the drive pinion retainer to converter case.
ST 18270KA020 SOCKET (E20)

NOTE:
Do not confuse the three different-length bolts when installing.

Tightening torque:
43 N·m (4.4 kgf-m, 31.7 ft-lb)



3) Rotate the drive pinion several times using ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH



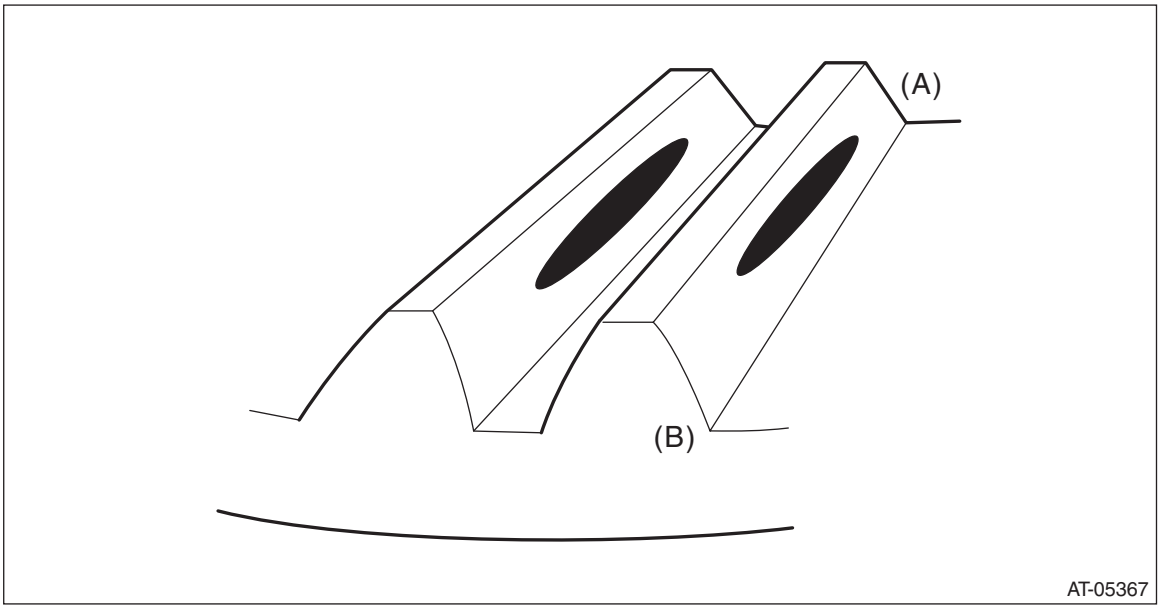
4) Adjust the drive pinion and hypoid driven gear backlash. <Ref. to CVT-308, ADJUSTMENT, Front Differential Assembly.>
5) Using the ST, remove the drive pinion retainer from converter case.
ST 18270KA020 SOCKET (E20)

6) Apply lead-free red dye evenly on the both sides of three to four teeth of the hypoid driven gear. Then install the drive pinion retainer and rotate the drive pinion in both directions several times. Remove the drive pinion retainer and check the tooth contact pattern.
If the teeth contact is inappropriate, adjust the backlash or thickness of the shim. <Ref. to CVT-308, ADJUSTMENT, Front Differential Assembly.>

NOTE:
After correction, wipe off the lead-free red dye.

- Correct tooth contact

Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

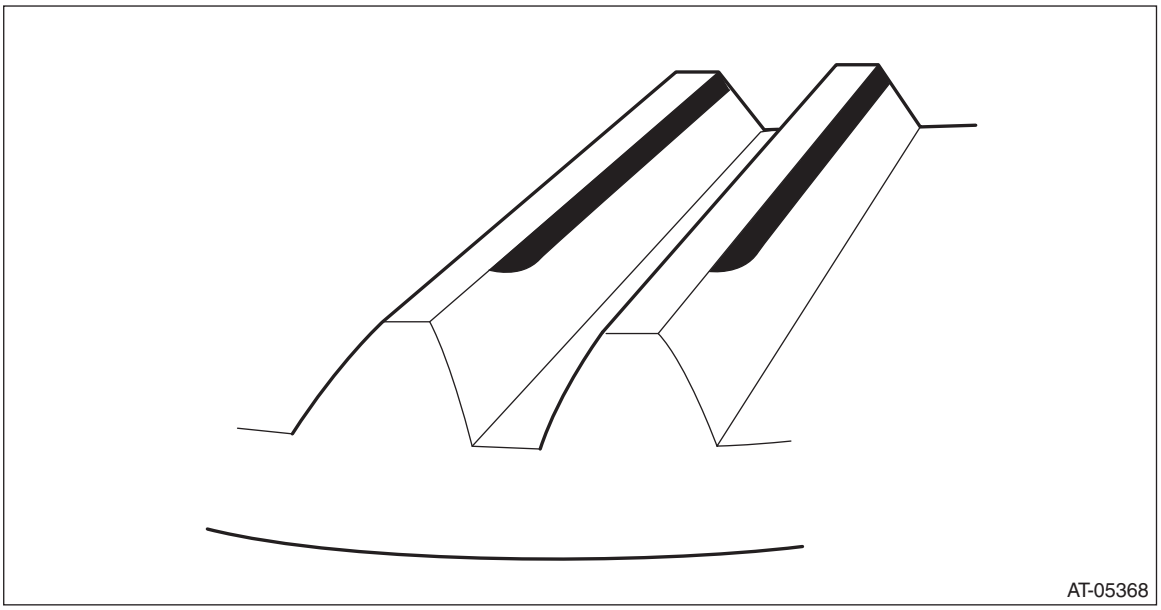


(A) Toe side
(B) Heel side

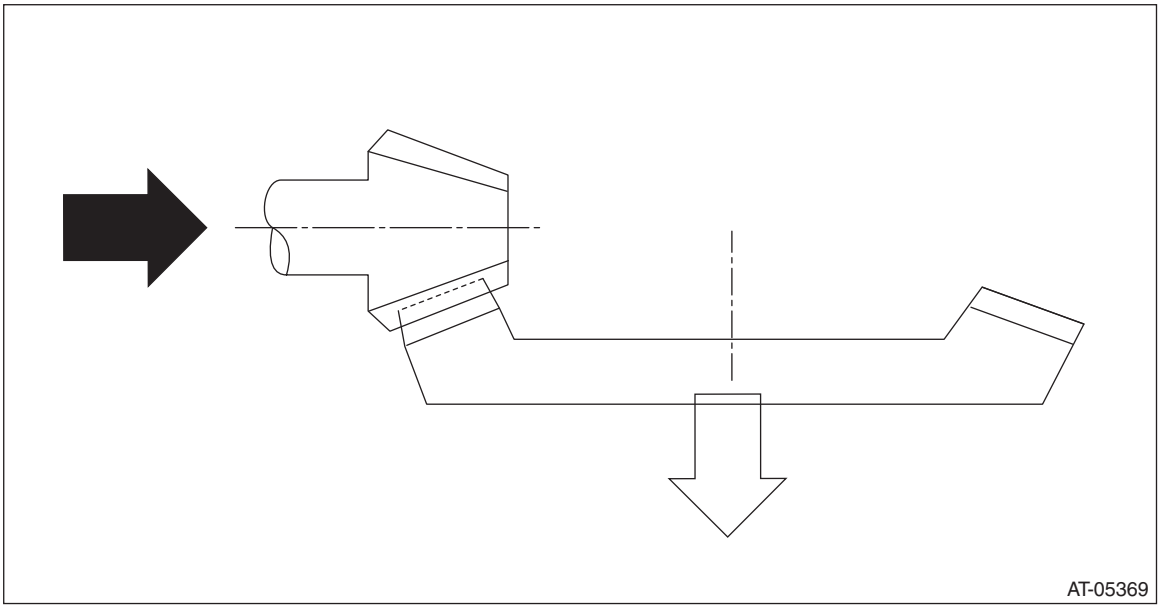
- Face contact

Check item: Backlash is too large.

Contact pattern



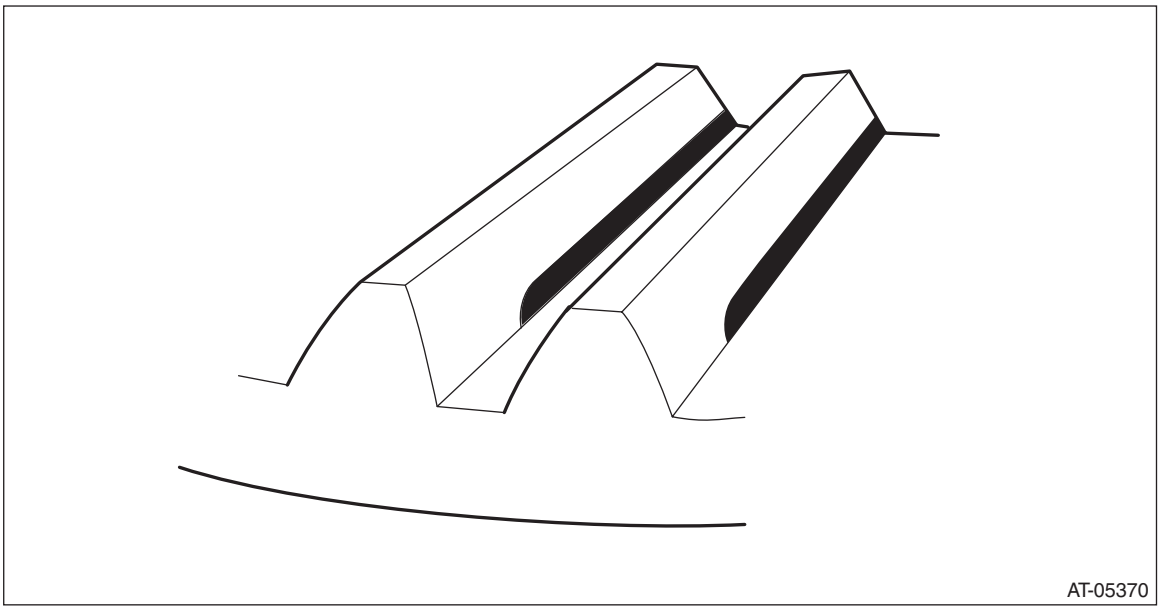
Corrective action: Increase thickness of drive pinion shim according to the procedures for moving the drive pinion close to hypoid driven gear.



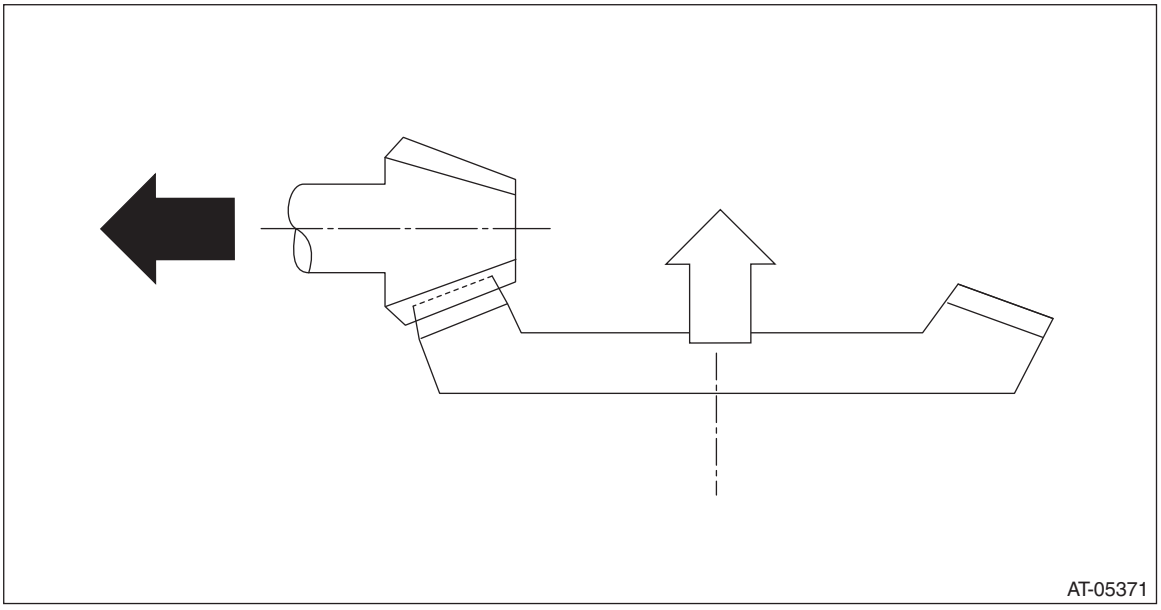
- Flank contact

Check item: Backlash is too small.

Contact pattern



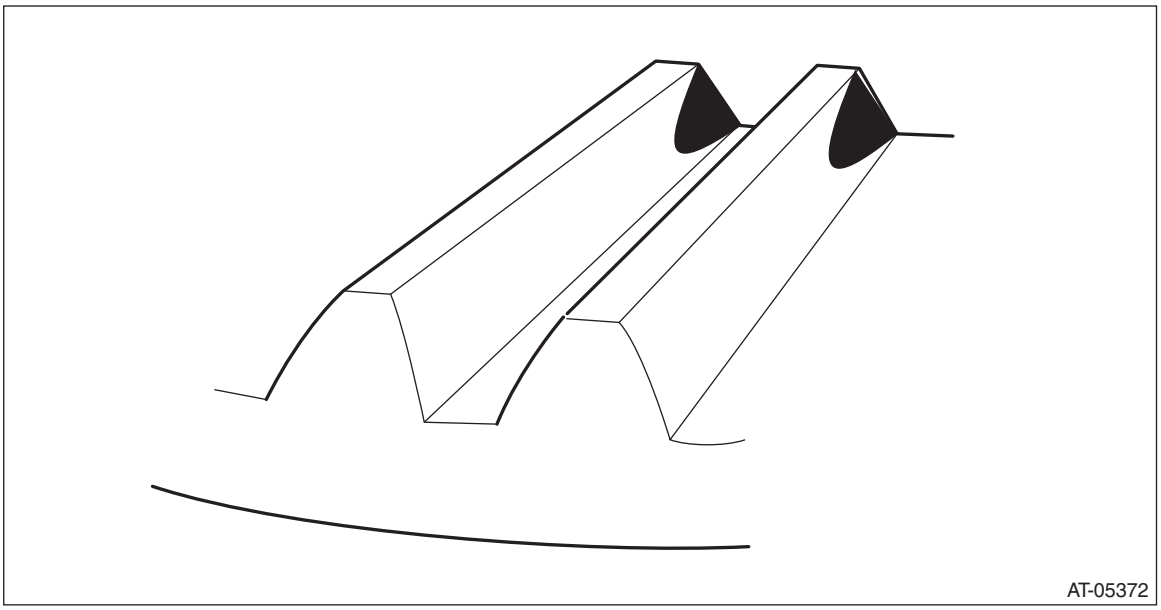
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear.



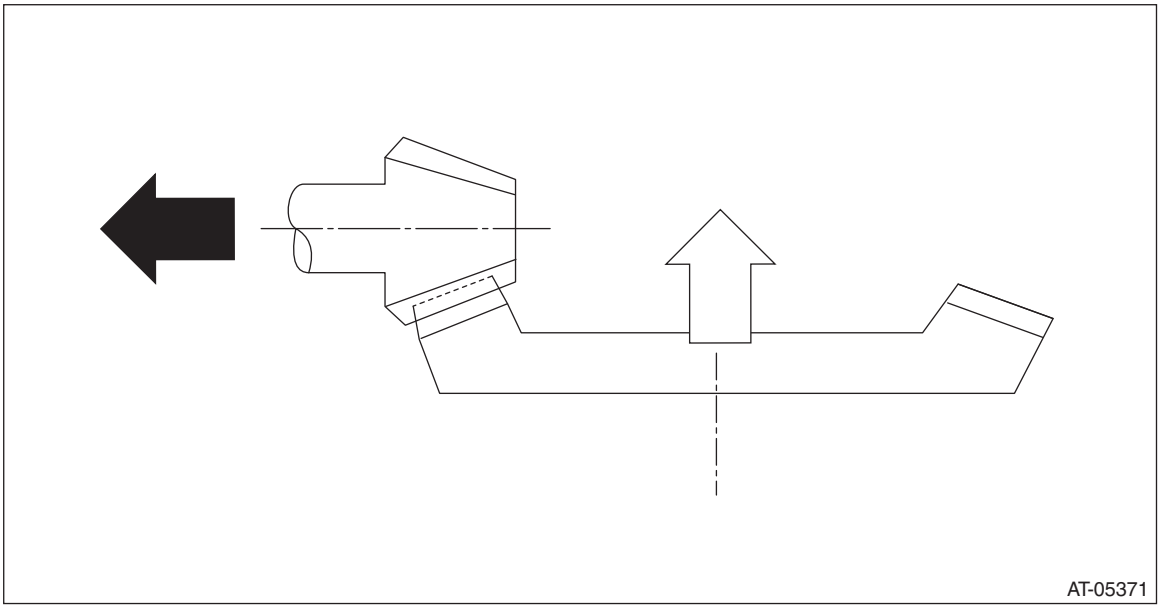
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



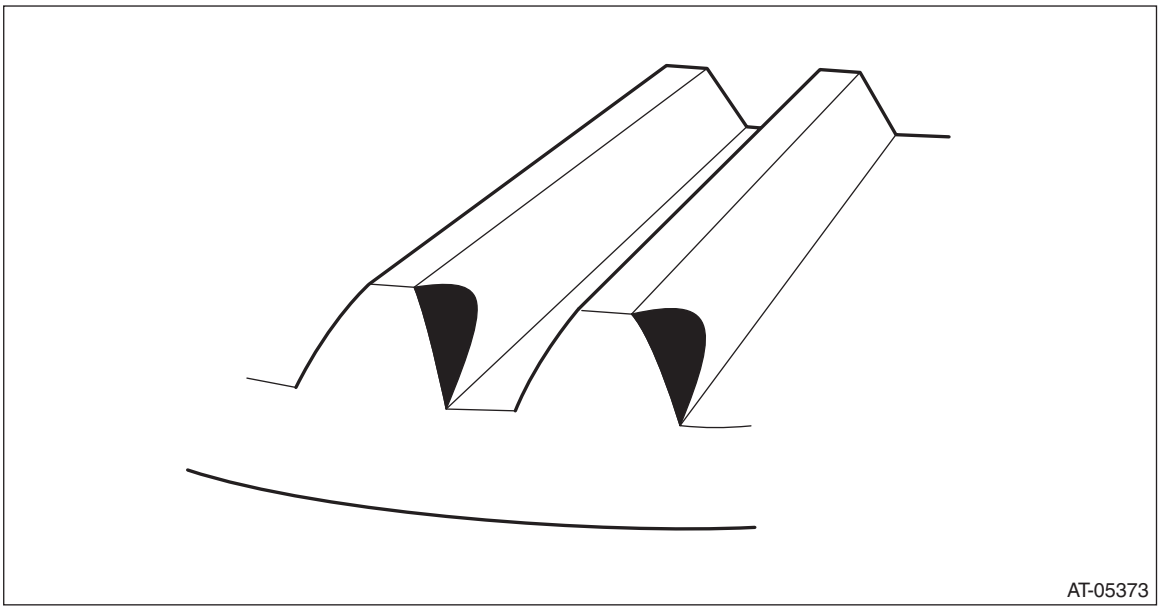
Corrective action: Reduce the thickness of the drive pinion shim according to the procedures for moving the drive pinion away from the hypoid driven gear side.



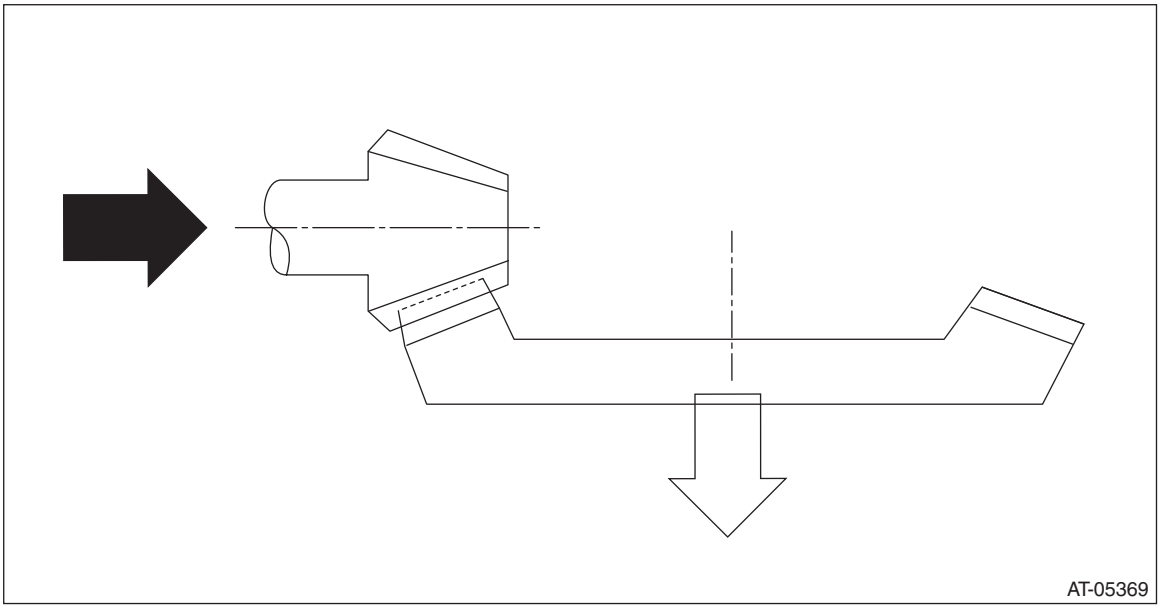
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Increase the thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the hypoid driven gear.



7) Using the ST, loosen the differential side retainer until the mounting groove of the O-ring appears, and then install the O-ring.

NOTE:
- When loosening the differential side retainer, record the number of the turns made.
- Perform this for both left and right differential side retainers.
- Use new O-rings.
- Apply the differential gear oil to O-ring.

ST 18658AA020 WRENCH COMPL RETAINER

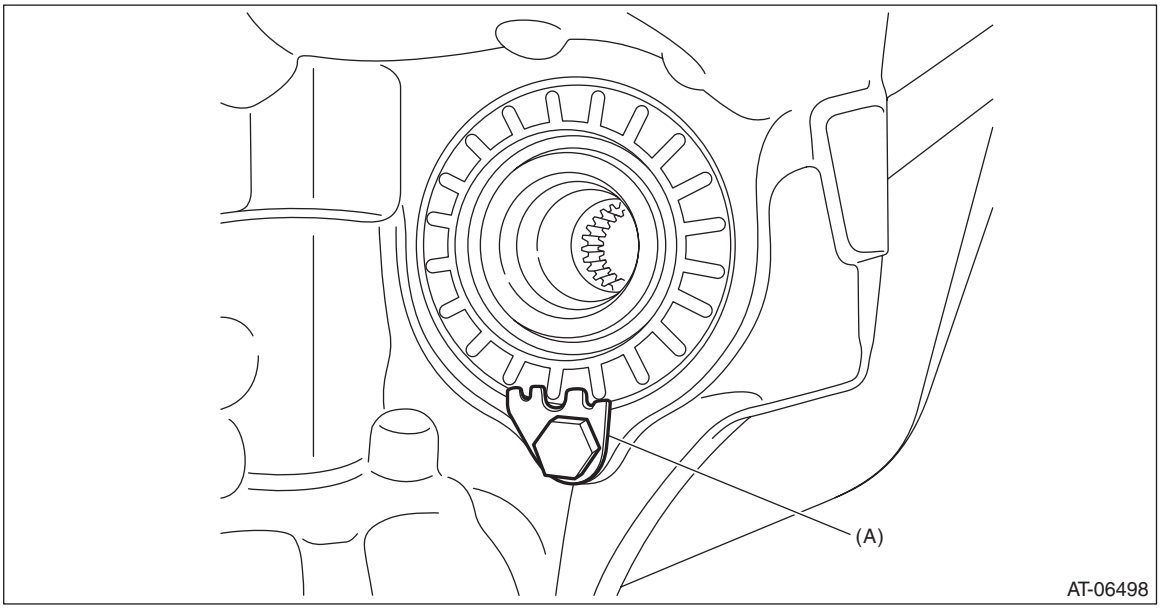
8) Using the ST, tighten the retainer to the position before it is loosened.

ST 18658AA020 WRENCH COMPL RETAINER

9) Replace the differential side retainer oil seal with a new part. <Ref. to CVT-90, Differential Side Retainer Oil Seal.>

10) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)



(A) Lock plate