

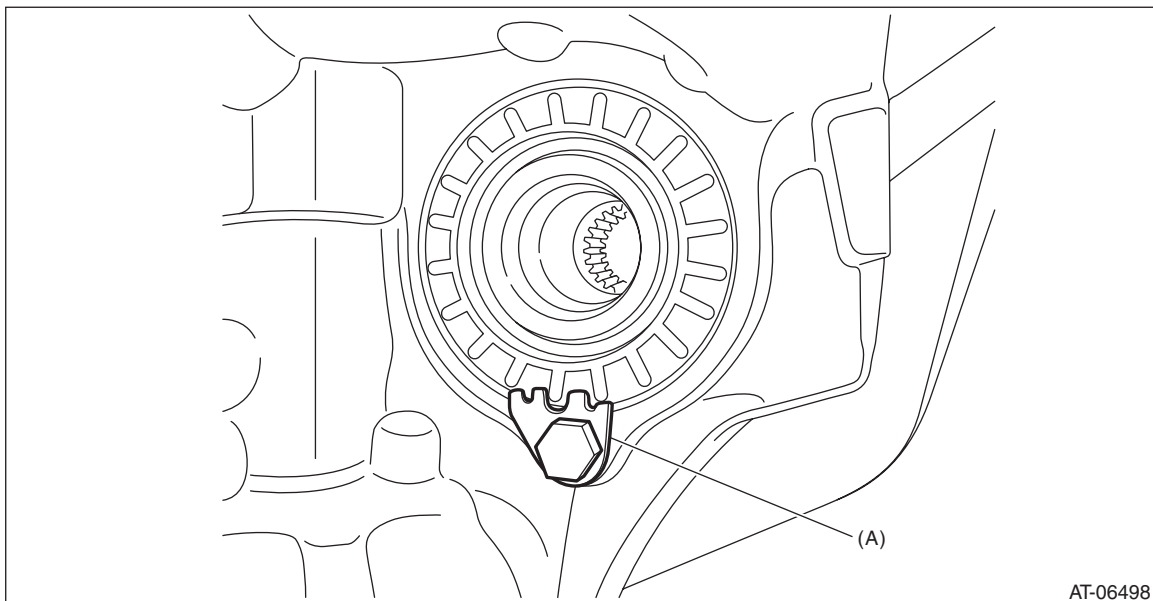
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

## 42. Front Differential Assembly

### A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to CVT-56, REMOVAL, Automatic Transmission Assembly.>
- 2) Remove the air breather hose. <Ref. to CVT-148, REMOVAL, Air Breather Hose.>
- 3) Remove the control valve body. <Ref. to CVT-110, REMOVAL, Control Valve Body.>
- 4) Remove the transmission harness. <Ref. to CVT-124, REMOVAL, Transmission Harness.>
- 5) Remove the turbine speed sensor. <Ref. to CVT-97, REMOVAL, Turbine Speed Sensor.>
- 6) Remove the secondary speed sensor. <Ref. to CVT-99, REMOVAL, Secondary Speed Sensor.>
- 7) Remove the primary speed sensor. <Ref. to CVT-101, REMOVAL, Primary Speed Sensor.>
- 8) Remove the inhibitor switch. <Ref. to CVT-93, REMOVAL, Inhibitor Switch.>
- 9) Remove the extension case. <Ref. to CVT-156, REMOVAL, Extension Case.>
- 10) Remove the transfer clutch assembly. <Ref. to CVT-160, REMOVAL, Transfer Clutch.>
- 11) Remove the transfer driven gear assembly. <Ref. to CVT-174, REMOVAL, Transfer Driven Gear.>
- 12) Remove the parking pawl. <Ref. to CVT-177, REMOVAL, Parking Pawl.>
- 13) Remove the reduction driven gear assembly. <Ref. to CVT-179, REMOVAL, Reduction Driven Gear.>
- 14) Remove the oil pan and oil strainer. <Ref. to CVT-106, REMOVAL, Oil Pan and Strainer.>
- 15) Remove the transmission control device. <Ref. to CVT-187, REMOVAL, Transmission Control Device.>
- 16) Remove the transmission case. <Ref. to CVT-193, REMOVAL, Transmission Case.>
- 17) Remove the reduction drive gear. <Ref. to CVT-206, REMOVAL, Reduction Drive Gear.>
- 18) Remove the primary pulley, secondary pulley and variator chain. <Ref. to CVT-210, REMOVAL, Primary Pulley and Secondary Pulley.>
- 19) Remove the reverse brake assembly. <Ref. to CVT-231, REMOVAL, Reverse Brake Assembly.>
- 20) Remove the forward clutch assembly. <Ref. to CVT-246, REMOVAL, Forward Clutch Assembly.>
- 21) Remove the drive pinion shaft assembly. <Ref. to CVT-265, REMOVAL, Drive Pinion Shaft Assembly.>
- 22) Remove the lock plates on both sides.



(A) Lock plate

# Front Differential Assembly

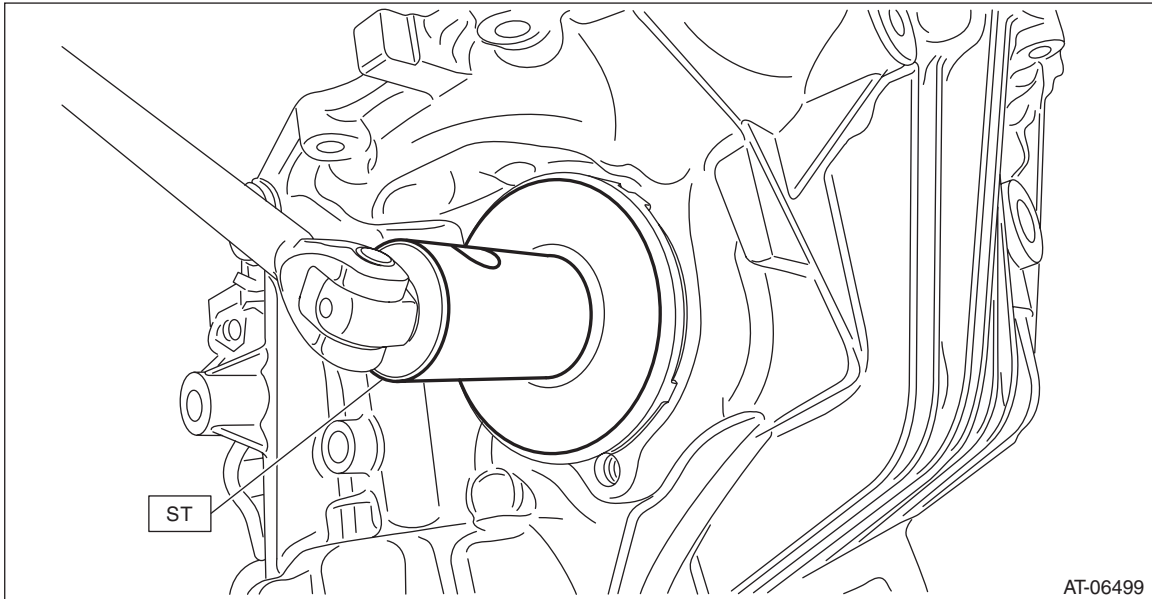
CONTINUOUSLY VARIABLE TRANSMISSION

23) Remove the differential side retainers using ST.

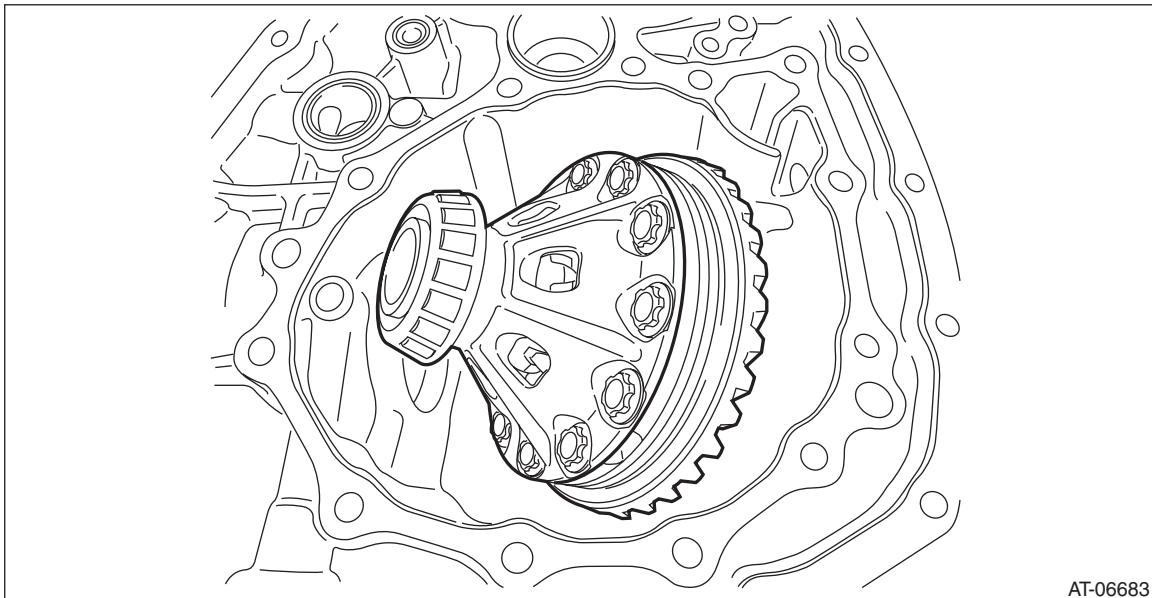
**NOTE:**

- When the wrench COMPL retainer interferes with the converter case, align the cutout portion with the interference part.
- Support the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
- Keep the left and right differential side retainers and left and right bearing outer races by attaching tags or in similar ways to make it possible to identify RH and LH sides.

ST 18658AA020 WRENCH COMPL RETAINER



24) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.



25) Remove the oil seals and O-rings from both differential side retainers. <Ref. to CVT-301, SIDE RETAINER, DISASSEMBLY, Front Differential Assembly.>

# Front Differential Assembly

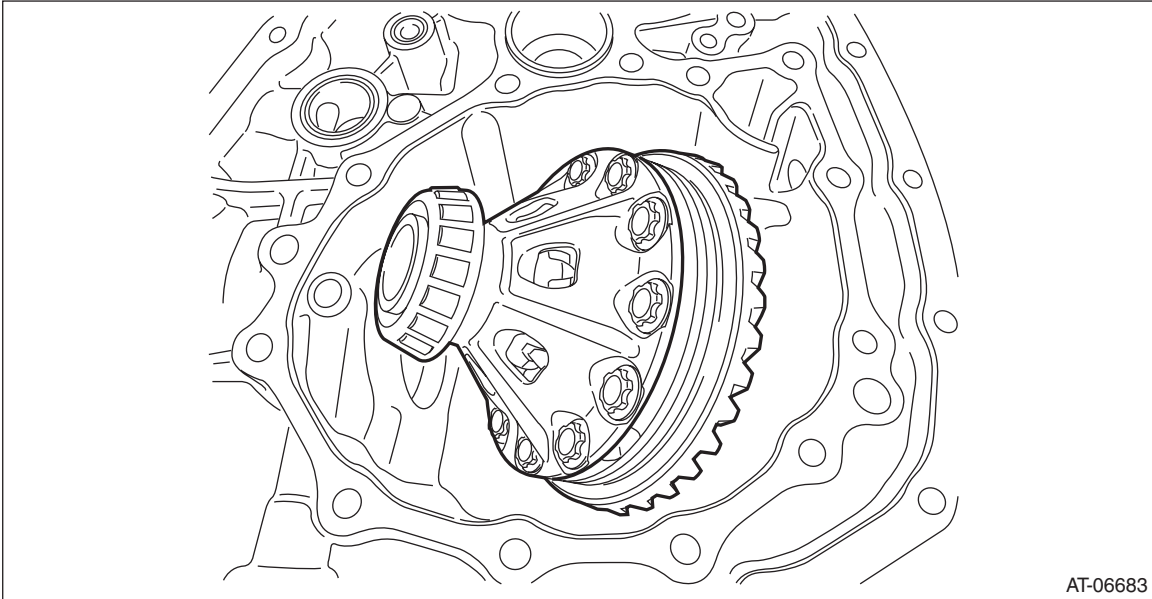
CONTINUOUSLY VARIABLE TRANSMISSION

## B: INSTALLATION

1) Install the front differential assembly to the converter case.

### NOTE:

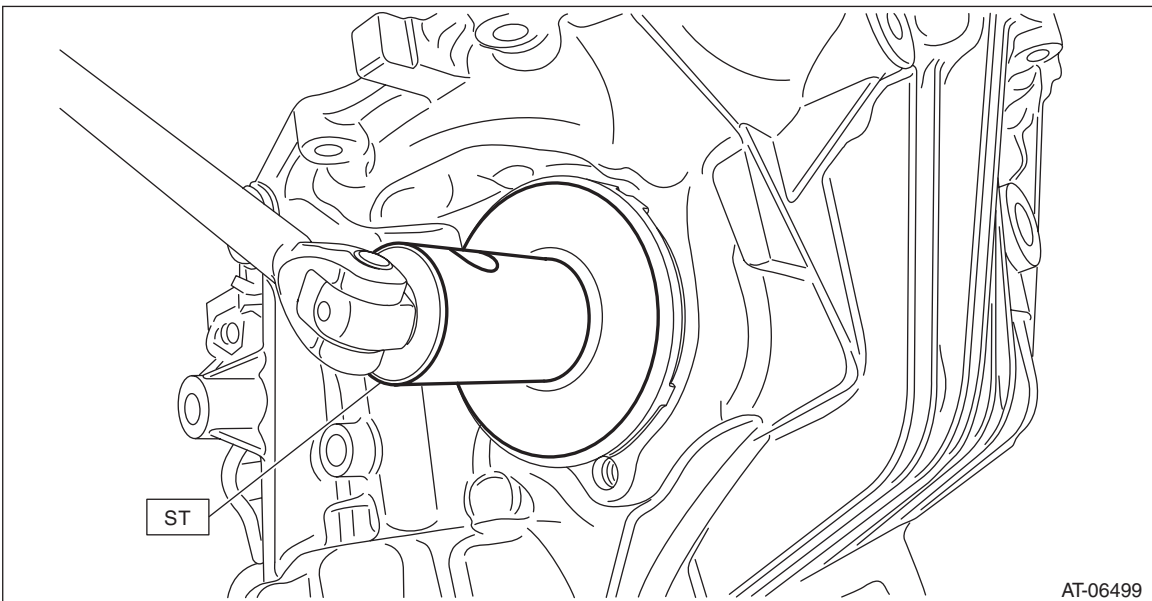
Be careful not to damage the inside of the case (especially the mounting surface of the differential side retainers).



2) Install the bearing outer race.

3) Temporarily install the differential side retainers using ST.

ST 18658AA020 WRENCH COMPL RETAINER



4) Adjust the backlash of the front differential. <Ref. to CVT-308, ADJUSTMENT, Front Differential Assembly.>

5) Inspect and adjust the tooth contact. <Ref. to CVT-287, ADJUSTMENT, Drive Pinion Shaft Assembly.>

# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

6) 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

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

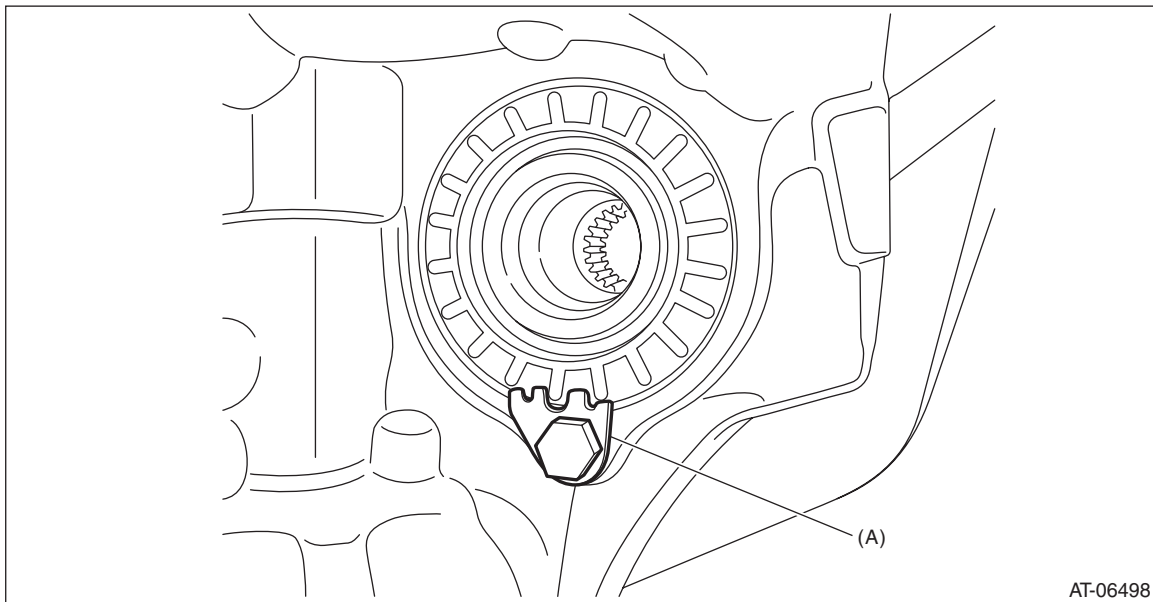
ST 18658AA020 WRENCH COMPL RETAINER

8) Install the oil seal to the differential side retainer. <Ref. to CVT-85, Differential Side Retainer Oil Seal.>

9) Install the lock plate.

## Tightening torque:

**25 N·m (2.5 kgf·m, 18.4 ft·lb)**



(A) Lock plate

10) Install the drive pinion shaft assembly. <Ref. to CVT-266, INSTALLATION, Drive Pinion Shaft Assembly.>

11) Install the forward clutch assembly. <Ref. to CVT-249, INSTALLATION, Forward Clutch Assembly.>

12) Install the reverse brake assembly. <Ref. to CVT-234, INSTALLATION, Reverse Brake Assembly.>

13) Install the primary pulley, secondary pulley and variator chain. <Ref. to CVT-217, INSTALLATION, Primary Pulley and Secondary Pulley.>

14) Install the reduction drive gear. <Ref. to CVT-207, INSTALLATION, Reduction Drive Gear.>

15) Install the transmission case. <Ref. to CVT-196, INSTALLATION, Transmission Case.>

16) Install the oil strainer and oil pan. <Ref. to CVT-107, INSTALLATION, Oil Pan and Strainer.>

17) Install the transmission control device. <Ref. to CVT-190, INSTALLATION, Transmission Control Device.>

18) Install the reduction driven gear assembly. <Ref. to CVT-179, INSTALLATION, Reduction Driven Gear.>

19) Install the transfer driven gear assembly. <Ref. to CVT-175, INSTALLATION, Transfer Driven Gear.>

20) Install the transfer clutch assembly. <Ref. to CVT-162, INSTALLATION, Transfer Clutch.>

21) Install the parking pawl. <Ref. to CVT-178, INSTALLATION, Parking Pawl.>

22) Install the extension case. <Ref. to CVT-157, INSTALLATION, Extension Case.>

23) Install the inhibitor switch. <Ref. to CVT-95, INSTALLATION, Inhibitor Switch.>

# Front Differential Assembly

## CONTINUOUSLY VARIABLE TRANSMISSION

- 24) Install the secondary speed sensor. <Ref. to CVT-99, INSTALLATION, Secondary Speed Sensor.>
- 25) Install the primary speed sensor. <Ref. to CVT-102, INSTALLATION, Primary Speed Sensor.>
- 26) Install the turbine speed sensor. <Ref. to CVT-97, INSTALLATION, Turbine Speed Sensor.>
- 27) Install the transmission harness. <Ref. to CVT-130, INSTALLATION, Transmission Harness.>
- 28) Install the control valve body. <Ref. to CVT-116, INSTALLATION, Control Valve Body.>
- 29) Install the air breather hose. <Ref. to CVT-149, INSTALLATION, Air Breather Hose.>
- 30) Install the transmission assembly to the vehicle. <Ref. to CVT-67, INSTALLATION, Automatic Transmission Assembly.>

## C: DISASSEMBLY

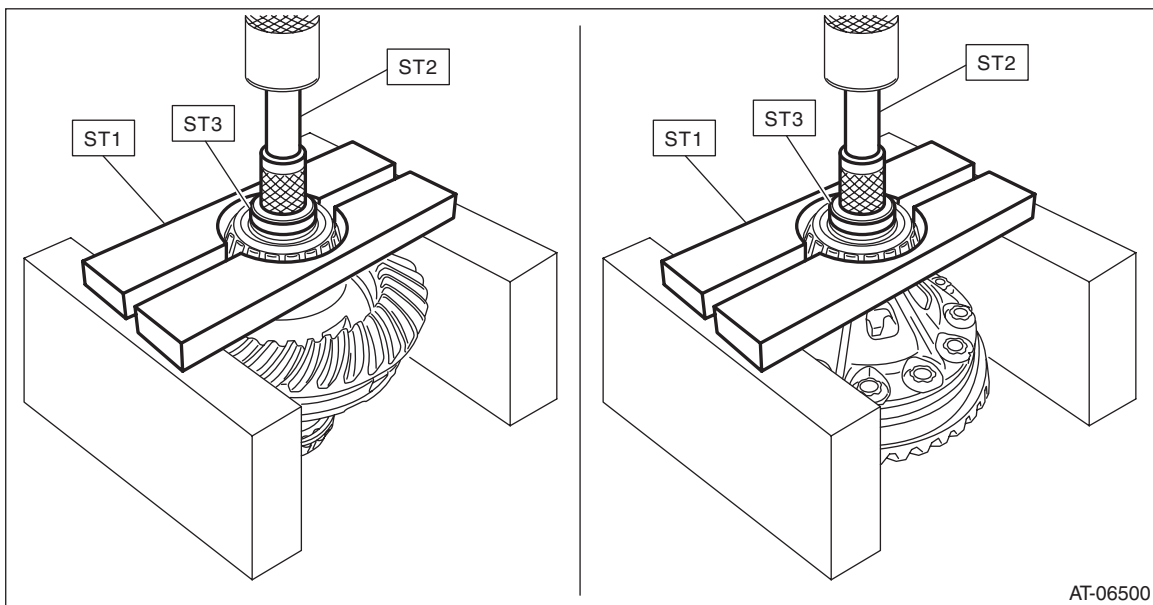
### 1. DIFFERENTIAL CASE ASSEMBLY

- 1) Remove the taper roller bearing using the ST.

ST1 498077000 REMOVER

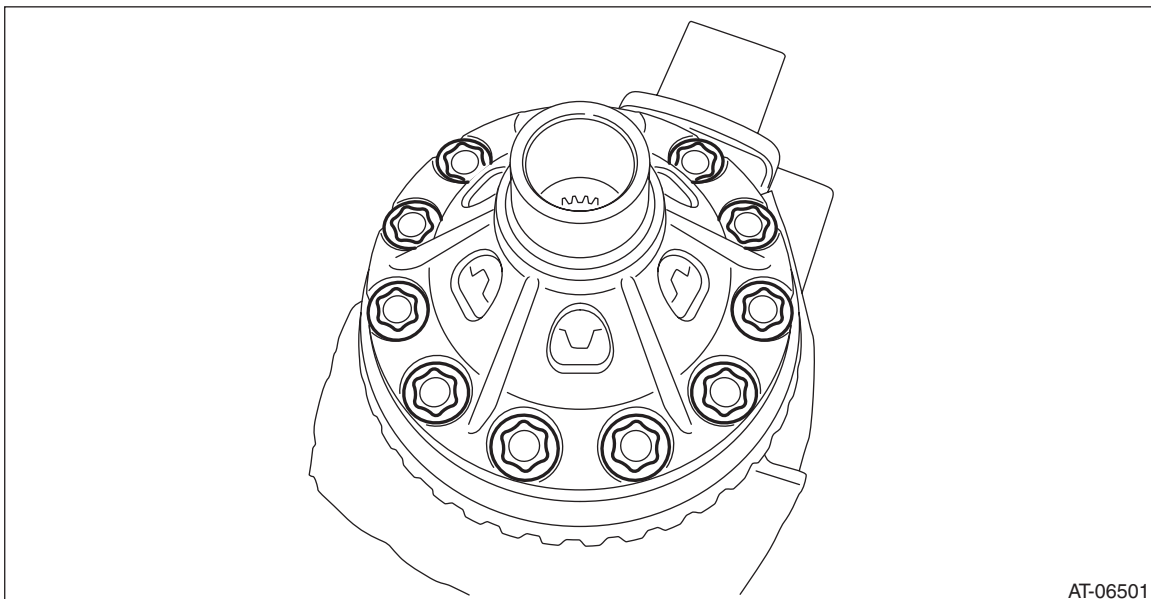
ST2 899864100 REMOVER

ST3 398497701 SEAT



- 2) Remove the hypoid driven gear mounting bolt using the ST.

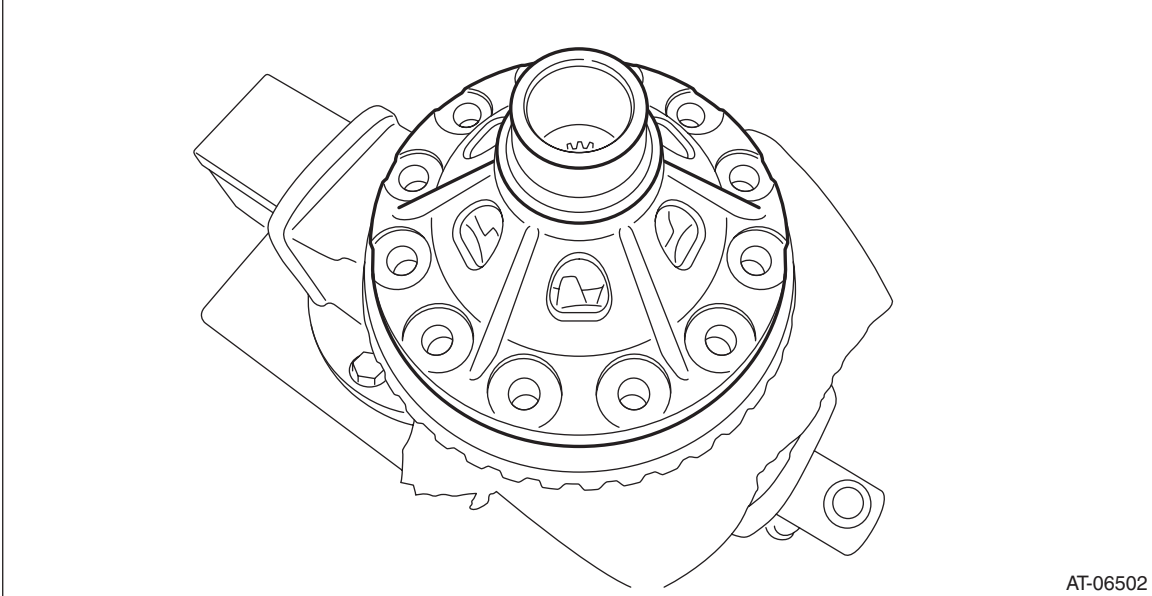
ST 18270KA020 SOCKET (E20)



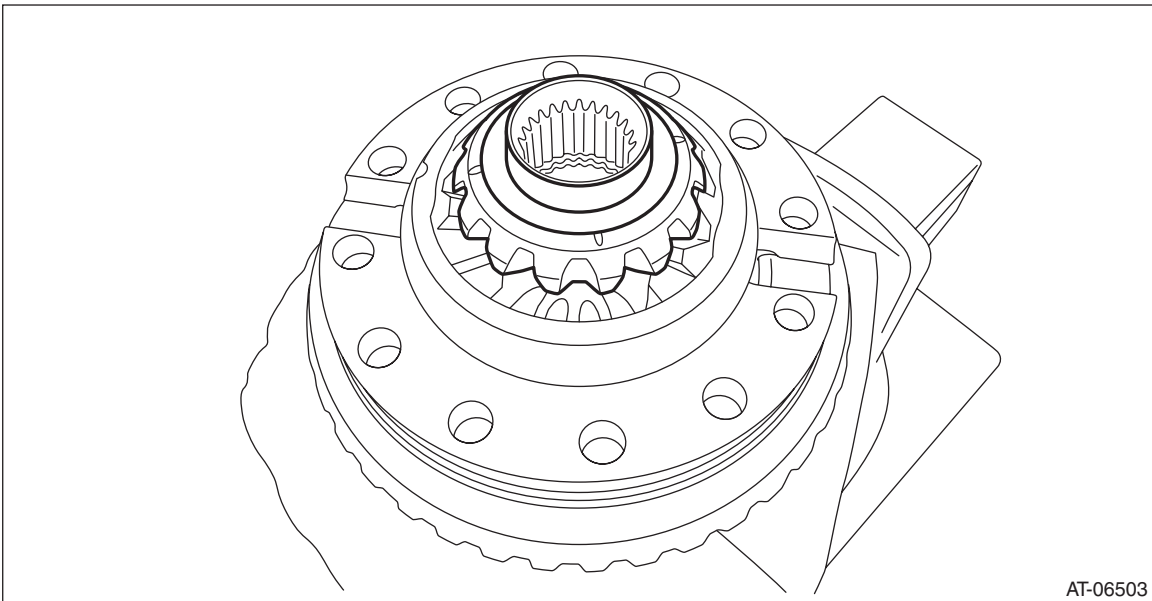
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Remove the differential case (LH).



4) Remove the differential bevel gear and washer from differential case.

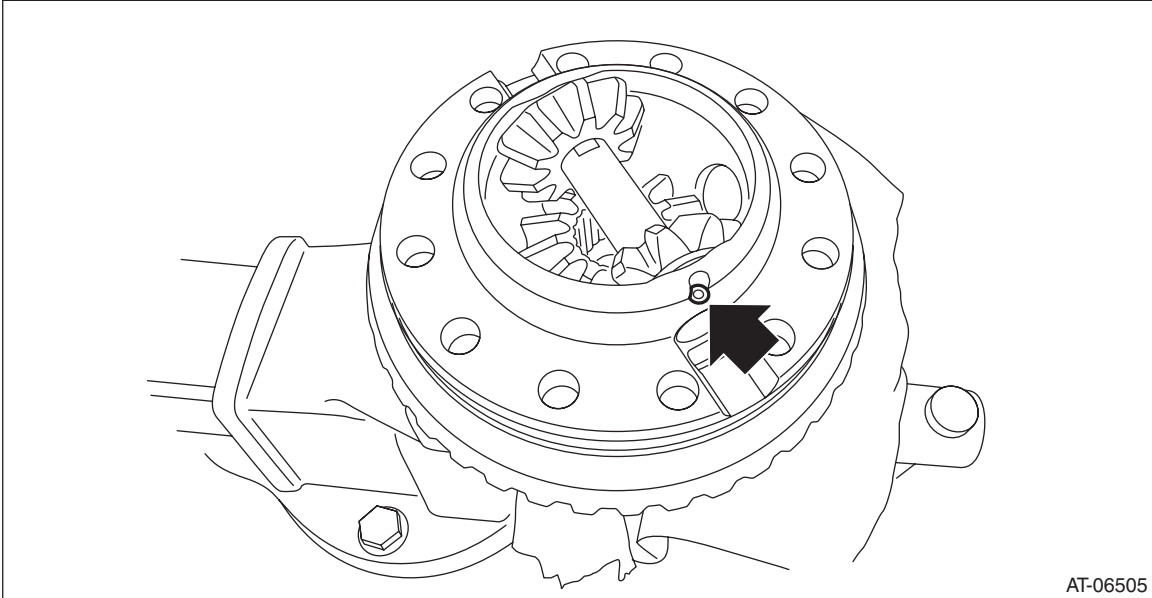




# Front Differential Assembly

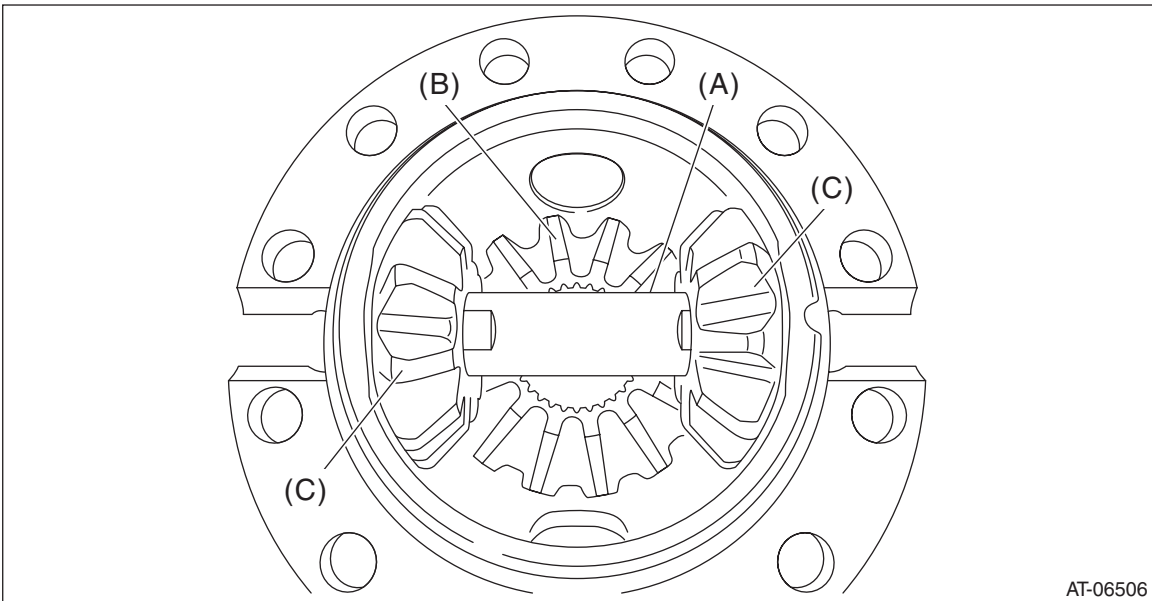
CONTINUOUSLY VARIABLE TRANSMISSION

5) Remove the straight pin.



AT-06505

6) Remove the pinion shaft, then remove the differential bevel gear, washer and differential bevel pinion.



AT-06506

- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

# Front Differential Assembly

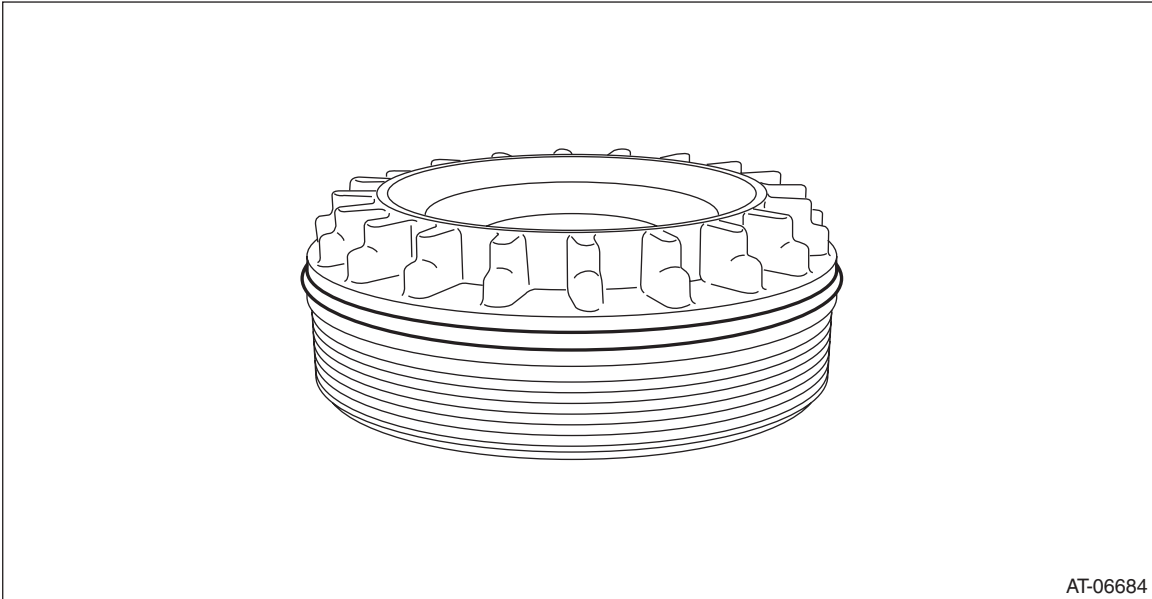
CONTINUOUSLY VARIABLE TRANSMISSION

## 2. SIDE RETAINER

NOTE:

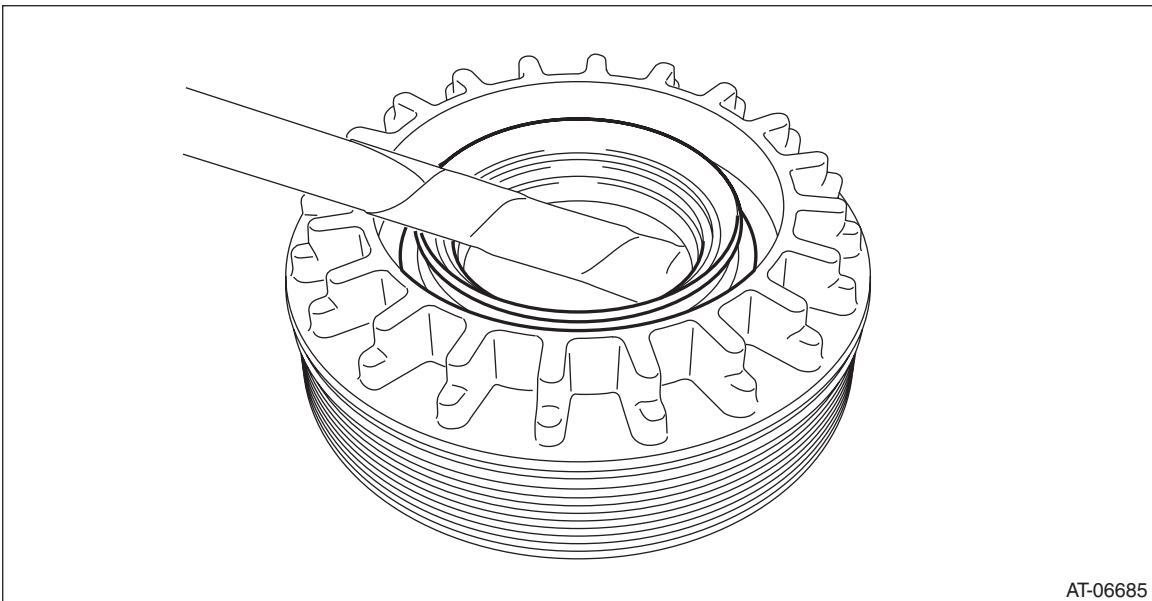
After adjusting the drive pinion backlash and tooth contact, replace the oil seal and O-ring with new parts.

1) Remove the O-ring.



AT-06684

2) Remove the oil seal.



AT-06685



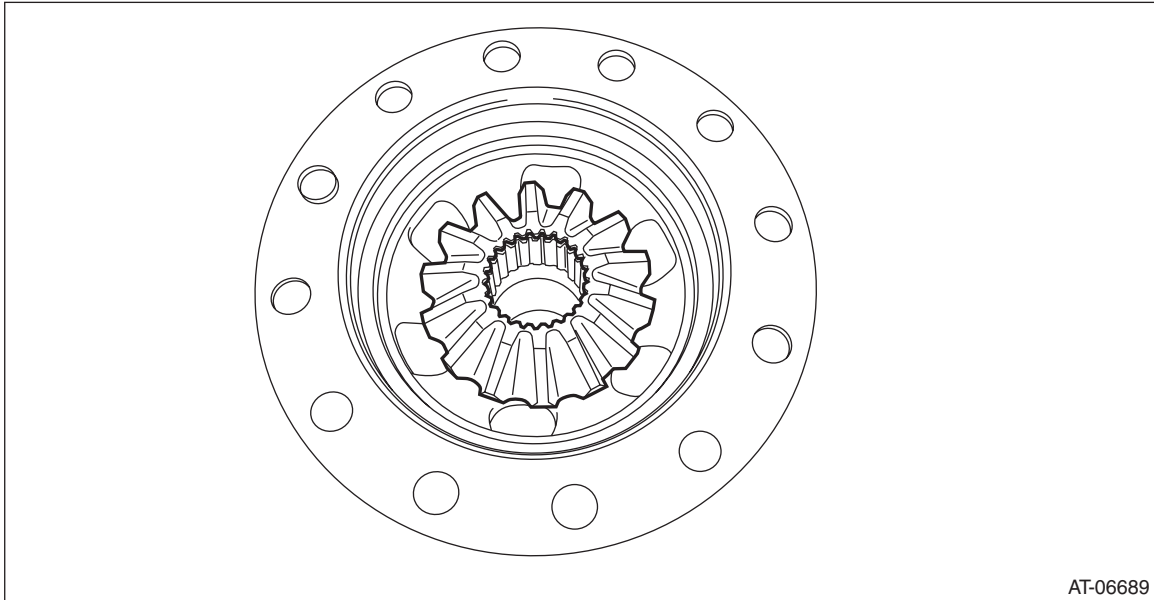
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

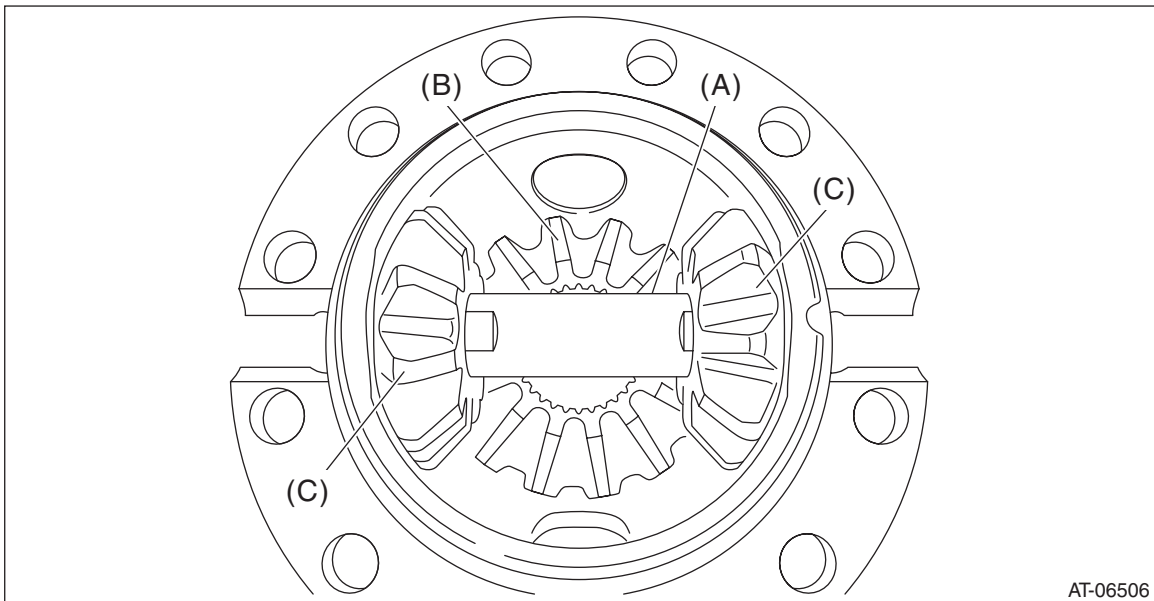
## D: ASSEMBLY

### 1. DIFFERENTIAL CASE ASSY

1) Install the washer and differential bevel gear into the differential case (RH).



2) Install the differential bevel pinions into differential case (RH) and install the pinion shaft.

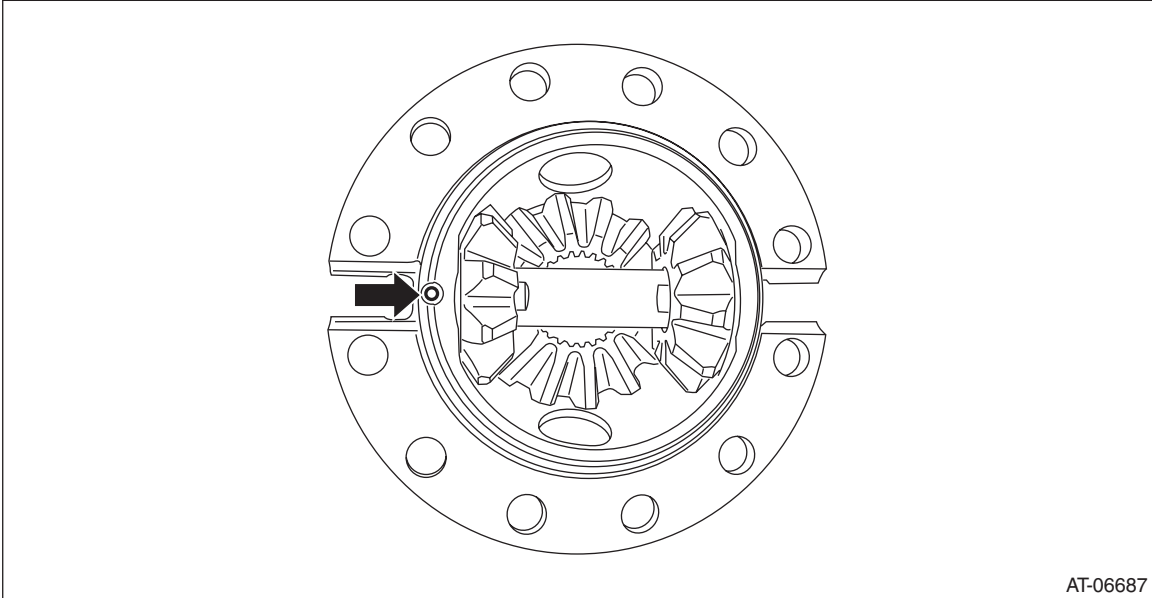


- (A) Pinion shaft
- (B) Differential bevel gear
- (C) Differential bevel pinion

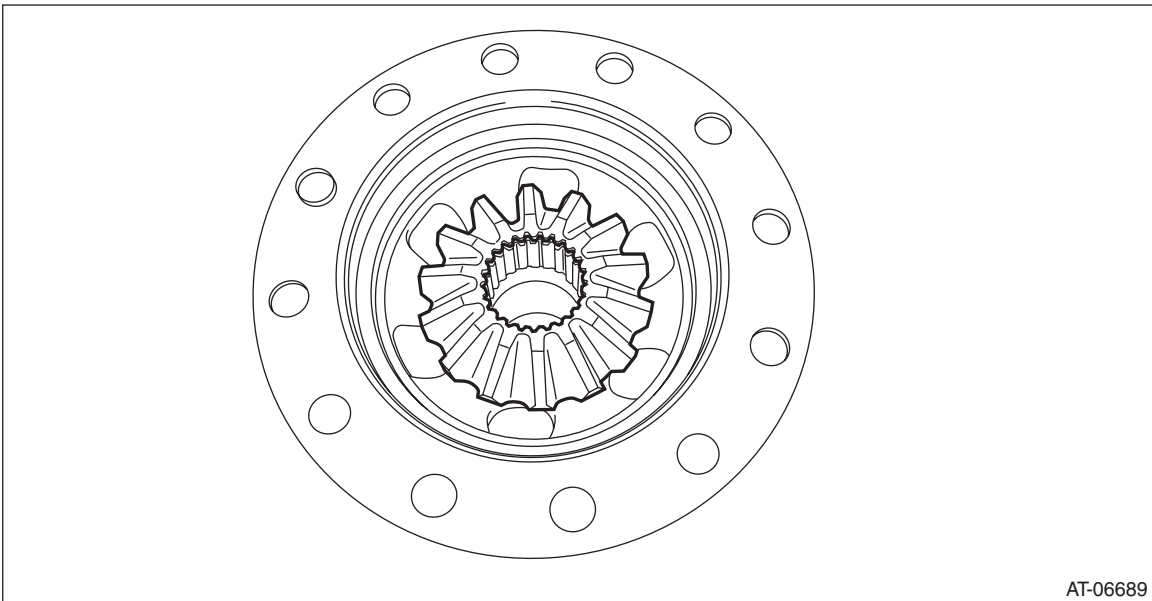
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

3) Install the straight pin.



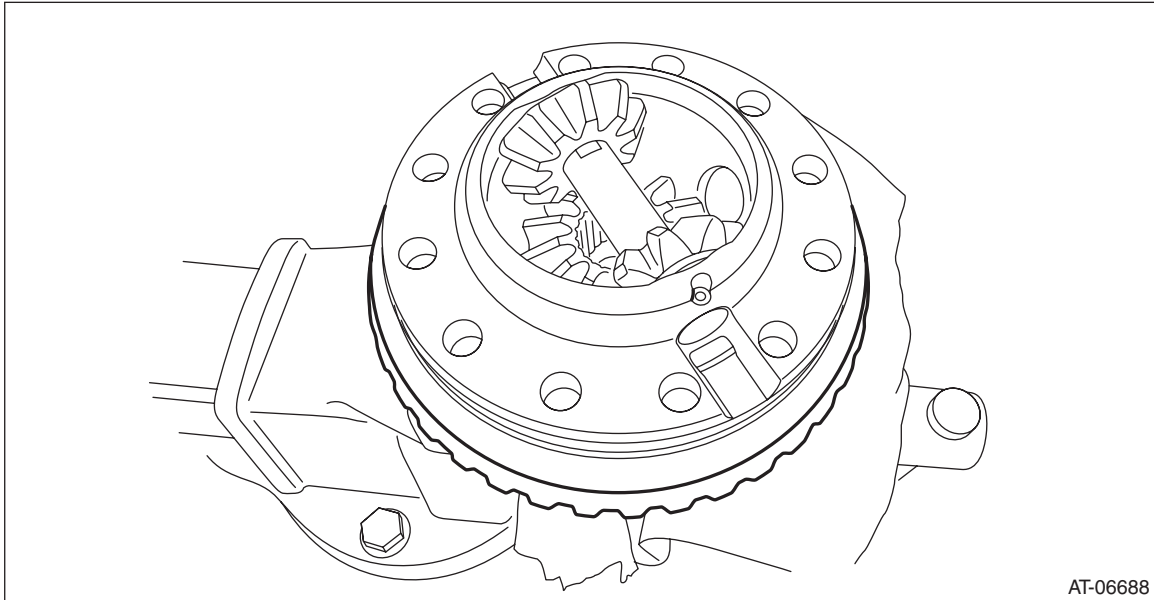
4) Install the washer and differential bevel gear to the differential case (LH).



# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

5) Install the differential case (RH) to the hypoid driven gear.

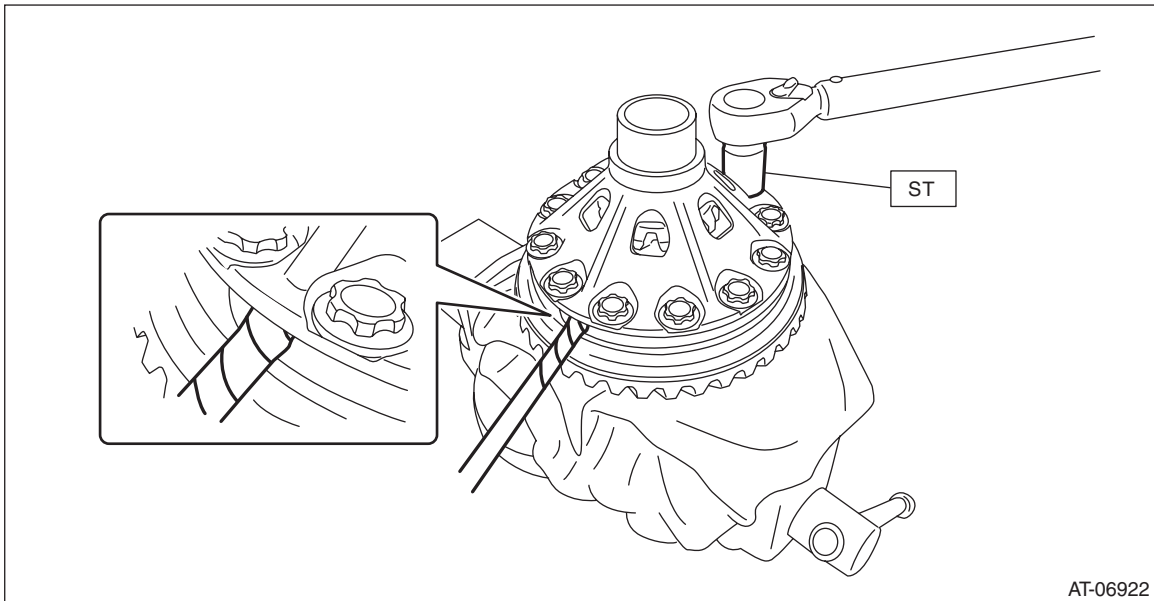


6) Install the differential case (LH) to the differential case (RH).

7) Using the ST, install the hypoid driven gear by tightening the installation bolt.  
ST 18270KA020 SOCKET (E20)

**Tightening torque:**

**64 N·m (6.5 kgf·m, 47.2 ft·lb)**



# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

8) Measure the backlash, and select the washer.

(1) Install the SUBARU genuine axle shaft to differential case.

Part No. 38415AA070 Axle shaft

(2) Using ST1 and ST2, insert the ST2 through the window of differential case. Measure the backlash of the gear.

NOTE:

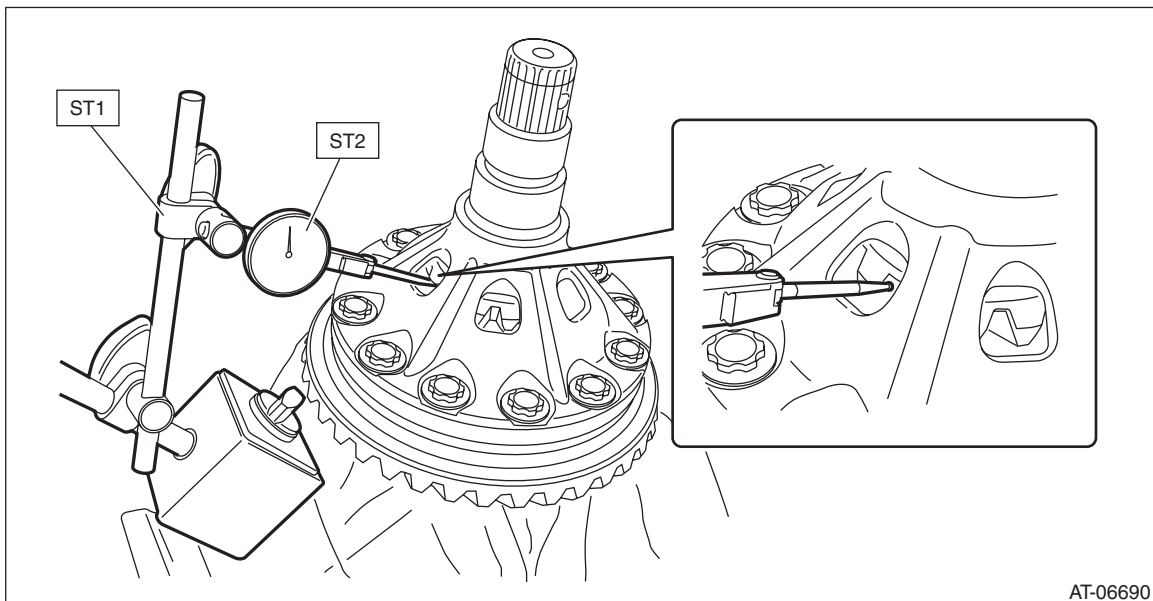
- Measure the backlash by applying a differential bevel pinion tooth between two differential bevel gear teeth.
- When measuring, fix the differential bevel pinion gear in place with a screwdriver covered with cloth, or a similar tool.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

**Specification:**

**0.13 — 0.18 mm (0.0051 — 0.0071 in)**



AT-06690

(3) If the backlash is not within specification, select a washer from the table below and replace.

Washer	
Part No.	Thickness mm (in)
803038021	0.95 (0.037)
803038022	1.00 (0.039)
803038023	1.05 (0.041)

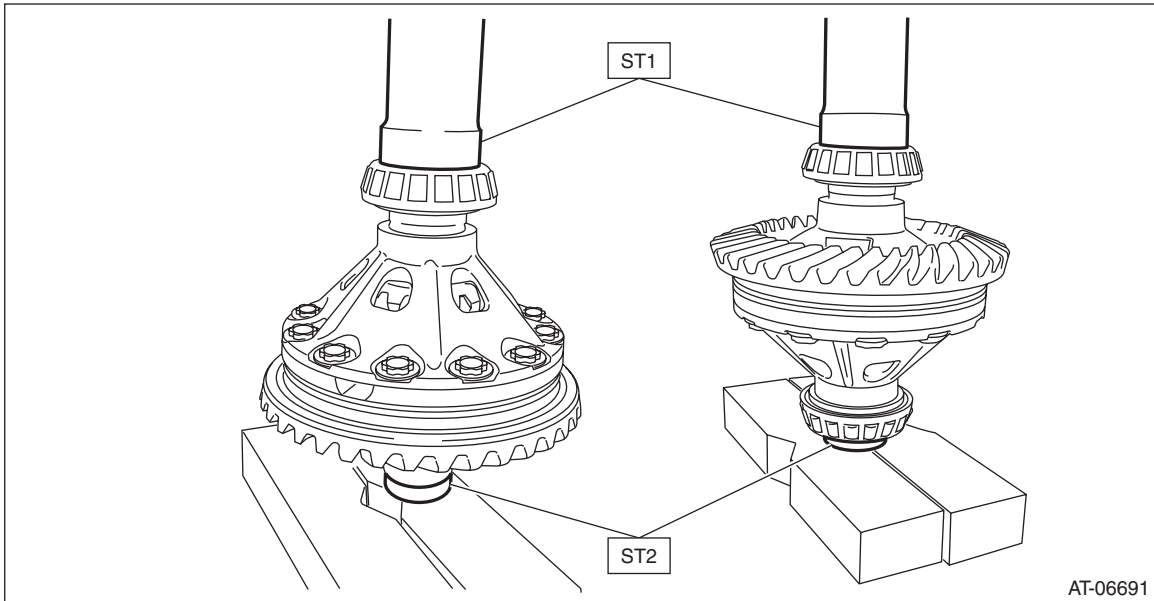
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

9) Using the ST, install the left and right taper roller bearings.

ST1 499277100 BUSHING 1-2 INSTALLER

ST2 398497701 SEAT



## 2. SIDE RETAINER

NOTE:

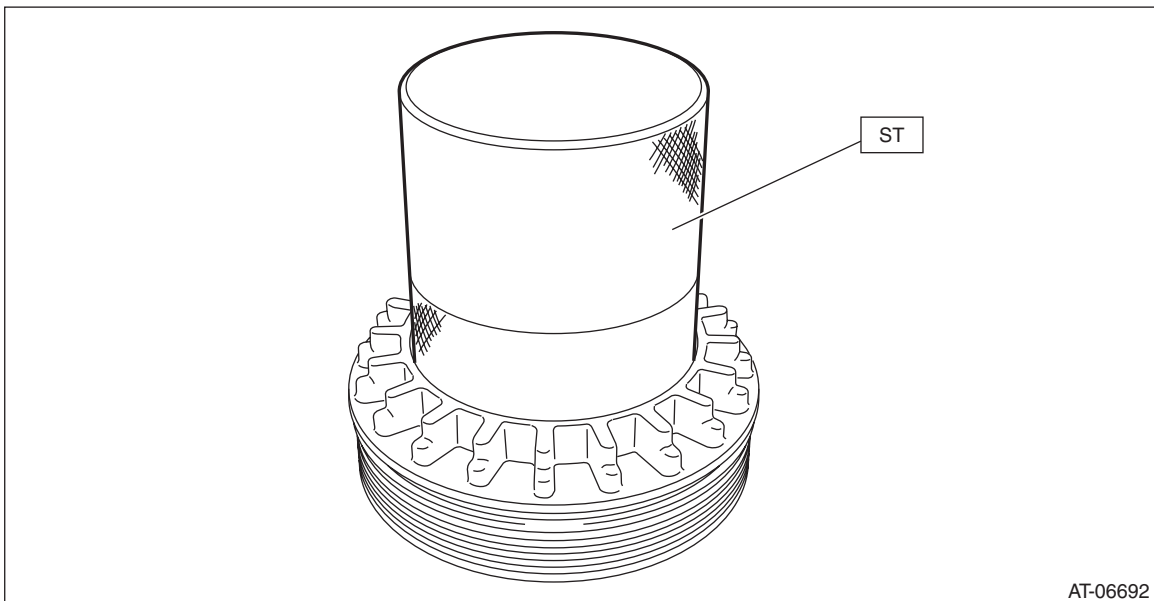
After adjusting the backlash and tooth contact, replace the oil seal and O-ring of side retainer with new parts.

1) Using the ST, install the oil seal.

NOTE:

- Use a new oil seal.
- Apply differential gear oil to the oil seal lip and press-fitting surface.
- Oil seal has an identification mark (R, L). When installing oil seals, do not confuse the left and right.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



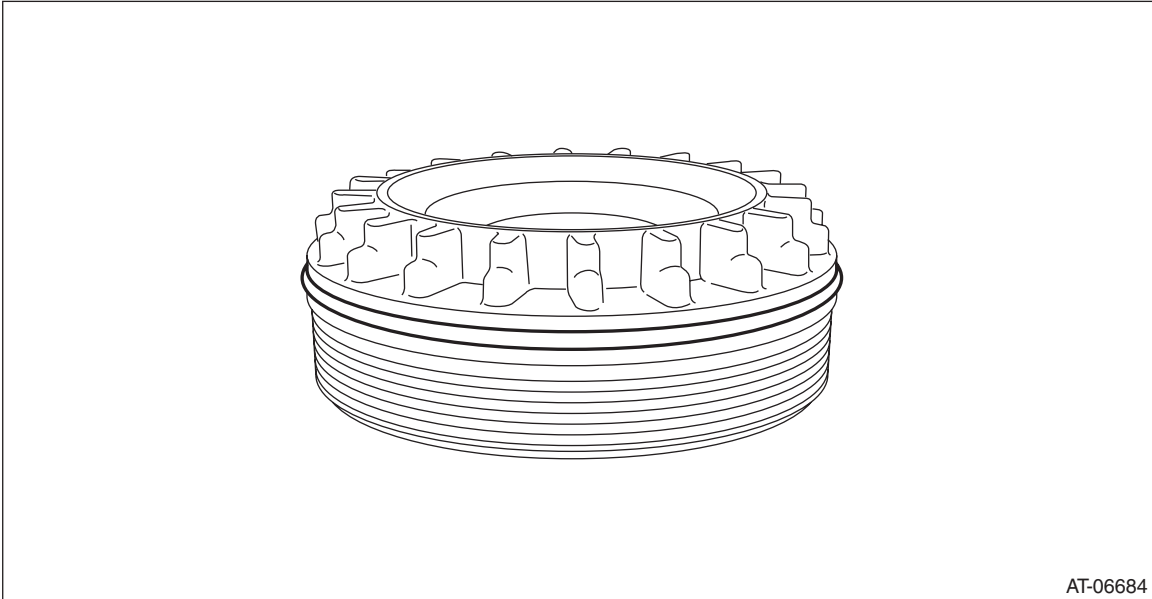
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

2) Install the O-ring.

## NOTE:

- Use new O-rings.
- Apply the differential gear oil to O-ring.



AT-06684

## E: INSPECTION

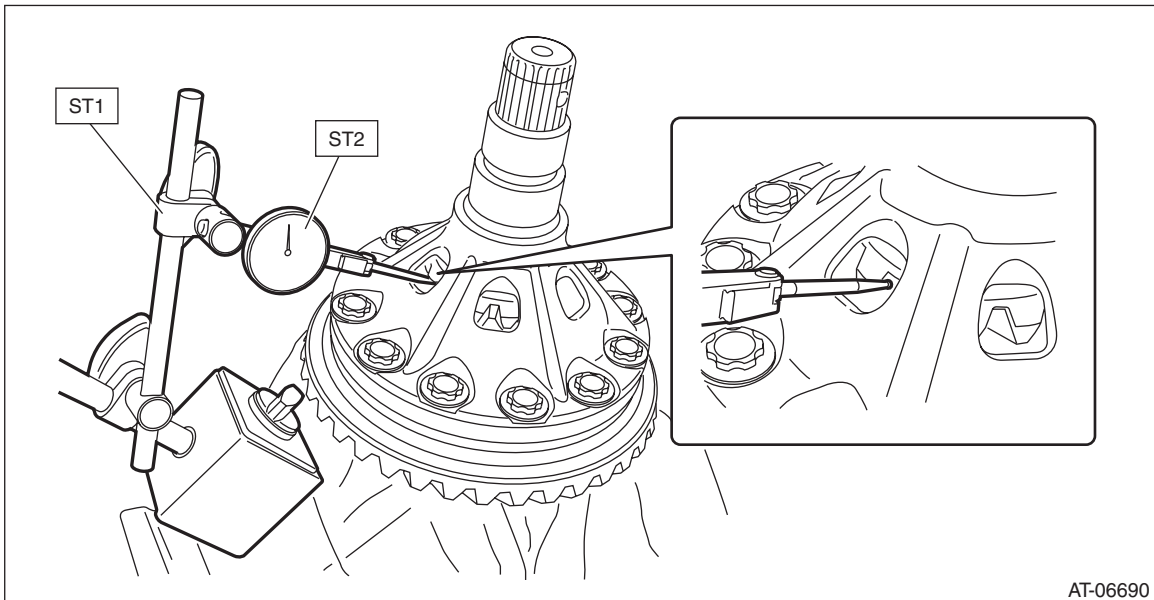
- Check each component for scratches, damage or other faults.
- Using the ST, check the backlash of pinion gear.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

### Specification:

**0.13 — 0.18 mm (0.0051 — 0.0071 in)**



AT-06690

- Measure the hypoid gear backlash, and then adjust it to be within specification. <Ref. to CVT-308, ADJUSTMENT, Front Differential Assembly.>

# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

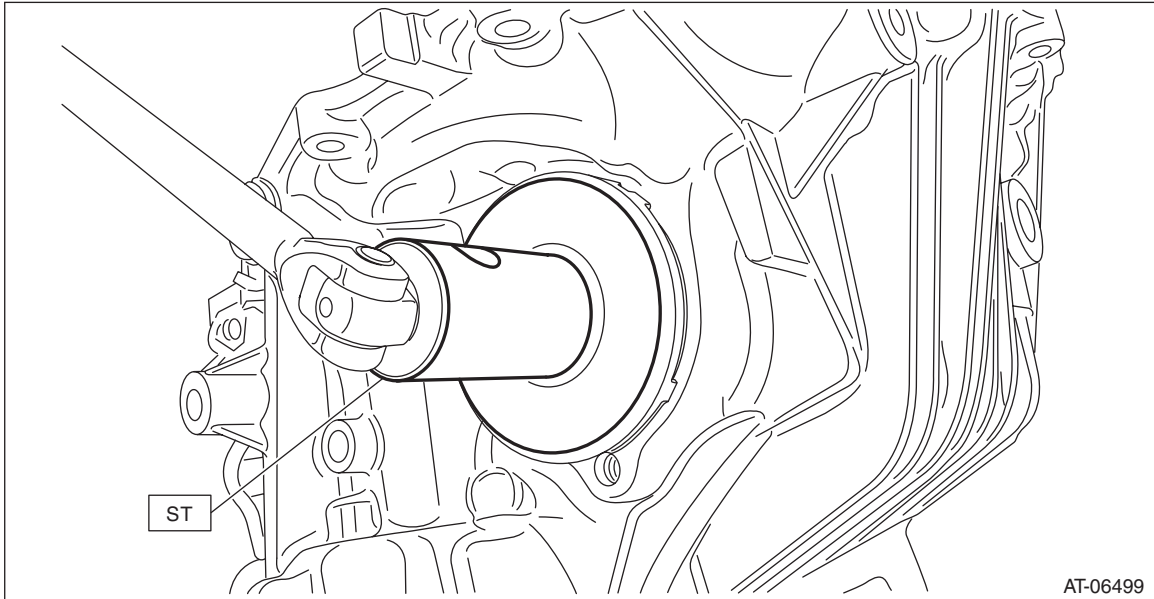
## F: ADJUSTMENT

1) Using the ST, screw-in the retainer until resistance is felt.

NOTE:

RH side should be screwed-in more than LH side.

ST 18658AA020 WRENCH COMPL RETAINER



AT-06499

2) Remove the remaining liquid gasket from the mating surface completely.

3) Using the ST, install the drive pinion assembly to converter case.

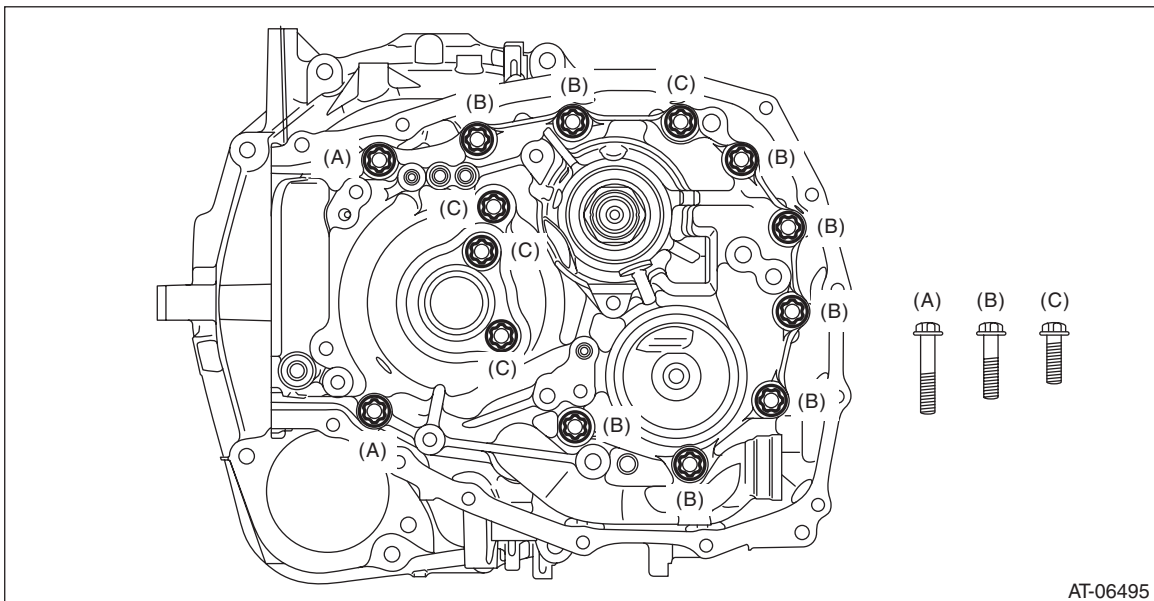
ST 18270KA020 SOCKET (E20)

NOTE:

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

**Tightening torque:**

**43 N·m (4.4 kgf·m, 31.7 ft·lb)**



AT-06495



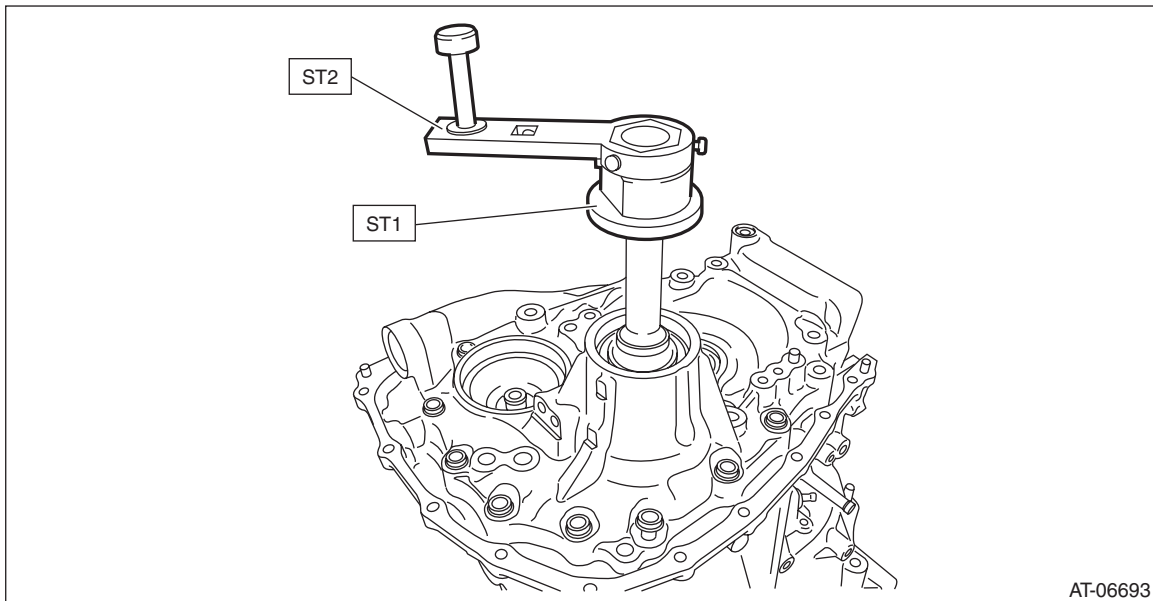
# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

4) Rotate the drive pinion shaft ten times or more using ST1 and ST2.

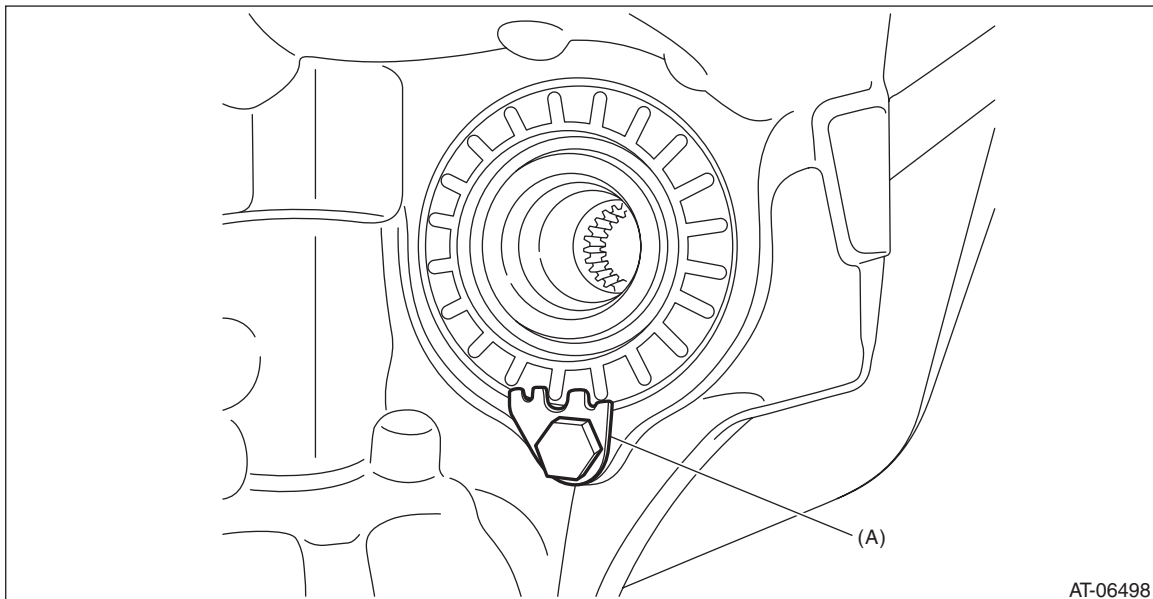
ST1 18667AA010 HOLDER

ST2 499787700 WRENCH



5) While rotating the pinion shaft, tighten the retainer LH and loosen the retainer RH until the shaft can't be turned anymore. The backlash is "zero" when the pinion shaft comes to the point where it doesn't rotate.

6) After the "zero" state is established, loosen the retainer LH by 3 notches and secure it with the lock plate. Retighten the retainer RH until it stops. Rotate the drive pinion 2 or 3 times. Tighten the retainer RH further 1-3/4 notches. This sets the preload. Finally, secure the retainer with its lock plate.



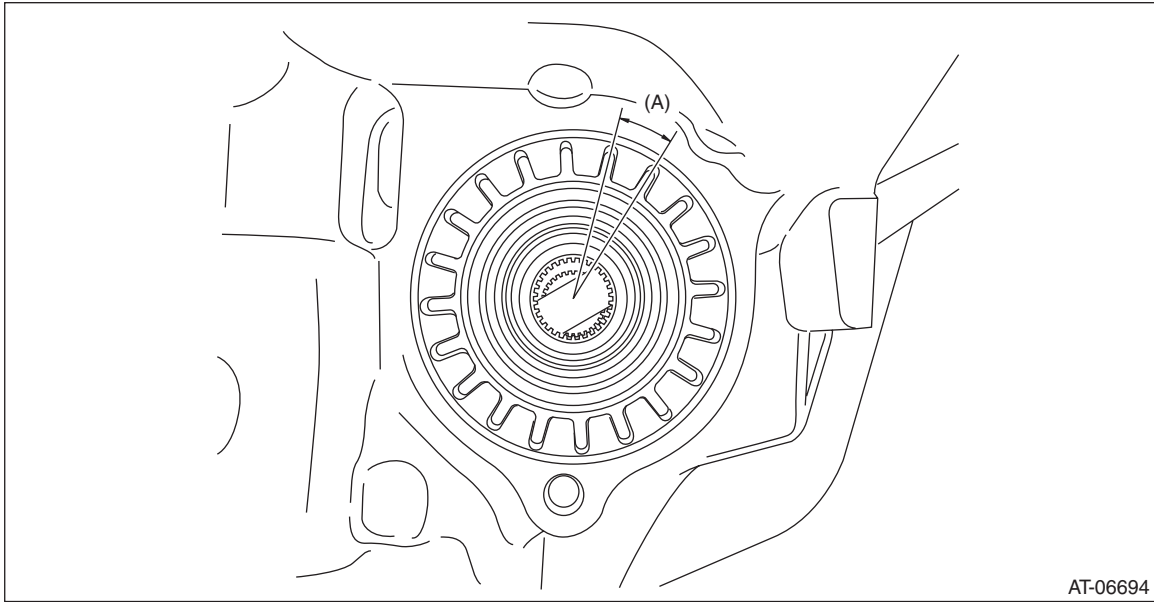
(A) Lock plate

# Front Differential Assembly

CONTINUOUSLY VARIABLE TRANSMISSION

## NOTE:

Turning the retainer by every one tooth changes the backlash approx. 0.05 mm (0.0020 in).



AT-06694

(A) 1 tooth

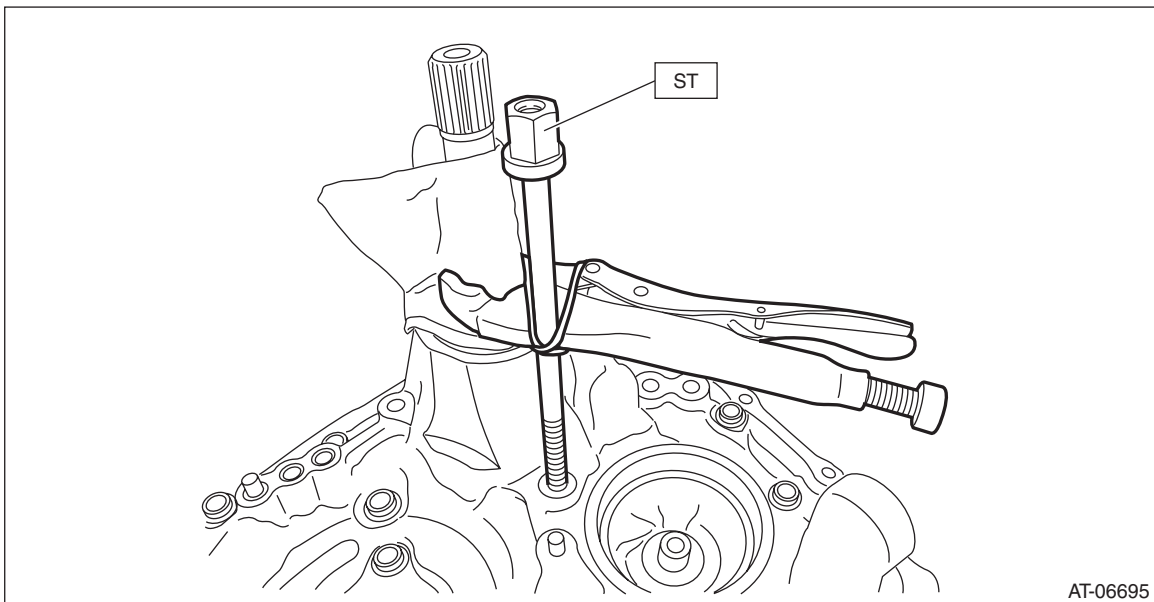
7) Insert the two SUBARU genuine axle shafts into differential case.

Part No. 38415AA070 Axle shaft

8) Install the ST to the drive pinion retainer, and wrap the drive pinion shaft with cloth and pinch with vise pliers. Using a tie-wrap or a wire, fix the vise pliers to the ST.

Make sure the drive pinion shaft does not move.

ST 18763AA000 COMPRESSOR SHAFT



AT-06695

# Front Differential Assembly

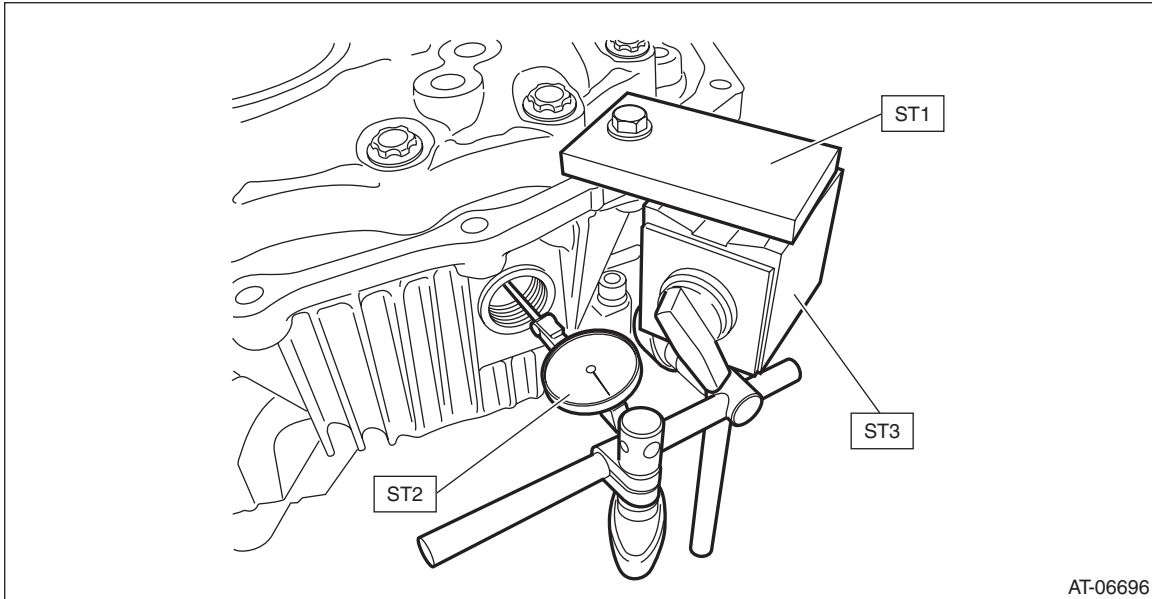
CONTINUOUSLY VARIABLE TRANSMISSION

9) Check the backlash is within specification using ST1, ST2 and ST3.

ST1 498255400 PLATE  
ST2 498247100 DIAL GAUGE  
ST3 498247001 MAGNET BASE

**Backlash:**

**0.13 — 0.18 mm (0.005 — 0.007 in)**



10) Adjust the teeth contact of the front differential and drive shaft. <Ref. to CVT-287, ADJUSTMENT, Drive Pinion Shaft Assembly.>