

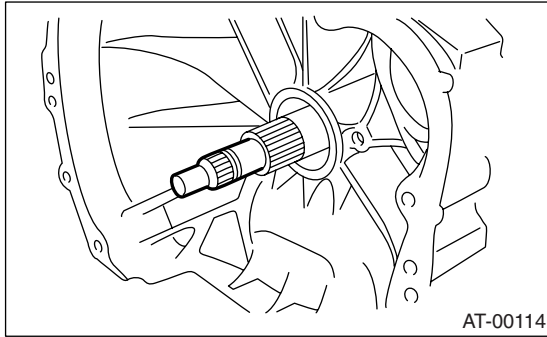
# Front Differential Assembly

AUTOMATIC TRANSMISSION

## 37. Front Differential Assembly

### A: REMOVAL

- 1) Remove the transmission assembly from vehicle body. <Ref. to 4AT-37, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter clutch assembly. <Ref. to 4AT-69, REMOVAL, Torque Converter Clutch Assembly.>
- 3) Remove the input shaft.



- 4) Lift-up the lever on the rear side of transmission harness connector, and then disconnect it from the stay.
- 5) Disconnect the inhibitor switch from the stay.
- 6) Remove the oil charger pipe. <Ref. to 4AT-68, REMOVAL, Oil Charger Pipe.>
- 7) Remove the ATF cooler inlet and outlet pipes. <Ref. to 4AT-65, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Separate the converter case from the transmission case. <Ref. to 4AT-89, REMOVAL, Converter Case.>
- 9) Remove the seal pipe.
- 10) Remove the differential side retainers using ST.

#### NOTE:

Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.

ST 499787000 WRENCH ASSY

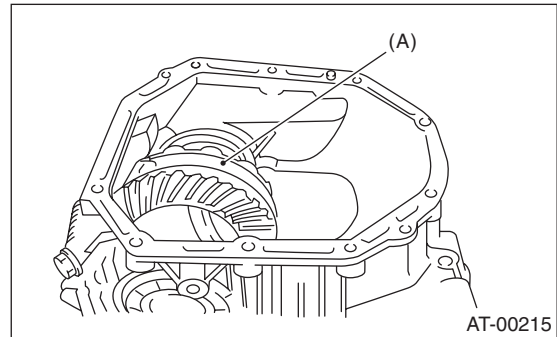
- 11) Remove the differential assembly while being careful not to damage the attachment part of retainer.

### B: INSTALLATION

- 1) Install the differential assembly to the torque converter clutch case.

#### CAUTION:

**Do not damage the inside of the torque converter clutch case (particularly the mating surface of the differential side retainer).**

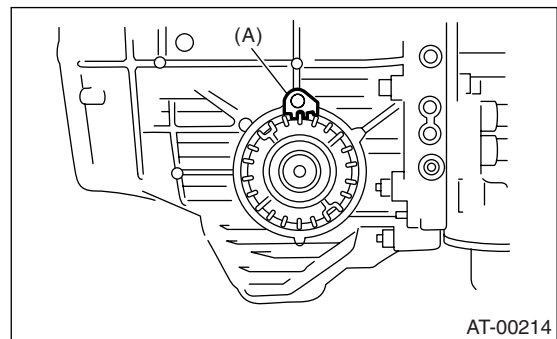


(A) Differential ASSY

- 2) Install the O-ring to the left and right side differential side retainer.
  - 3) Using the ST, install the side retainer. <Ref. to 4AT-102, INSTALLATION, Front Differential Assembly.>
- ST 499787000 WRENCH ASSY
- 4) Adjust the backlash of the front differential. <Ref. to 4AT-106, ADJUSTMENT, Front Differential Assembly.>
  - 5) Install the lock plate.

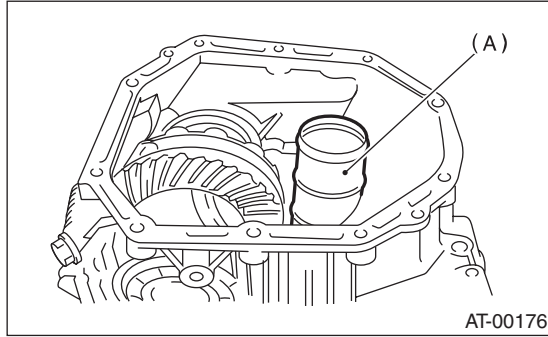
#### Tightening torque:

**25 N·m (2.5 kgf·m, 18.1 ft·lb)**



(A) Lock plate

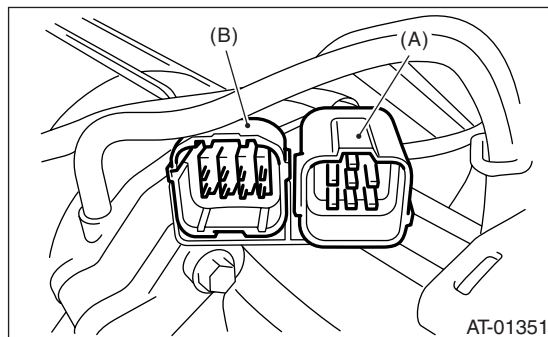
6) Install new seal pipe to converter case.



(A) Seal pipe

7) Install the converter case to the transmission case. <Ref. to 4AT-89, INSTALLATION, Converter Case.>

8) Insert the inhibitor switch and transmission connector to the stay.



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

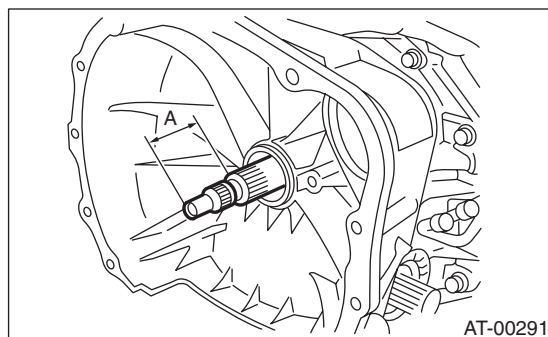
9) Install the ATF cooler pipe. <Ref. to 4AT-66, INSTALLATION, ATF Cooler Pipe and Hose.>

10) Install the oil charger pipe along with the O-ring. <Ref. to 4AT-68, INSTALLATION, Oil Charger Pipe.>

11) Insert the input shaft while rotating it lightly by hand, and then check the amount of protrusion.

**Normal protrusion A:**

**50 — 55 mm (1.97 — 2.17 in)**



12) Install the torque converter clutch assembly. <Ref. to 4AT-69, INSTALLATION, Torque Converter Clutch Assembly.>

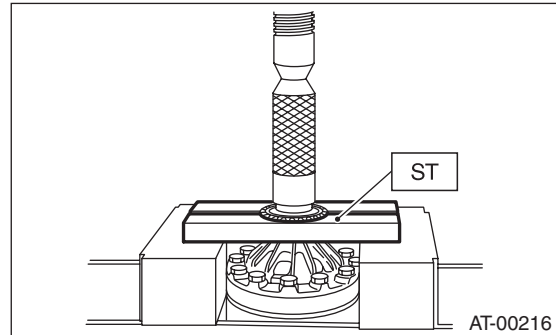
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-40, INSTALLATION, Automatic Transmission Assembly.>

**C: DISASSEMBLY**

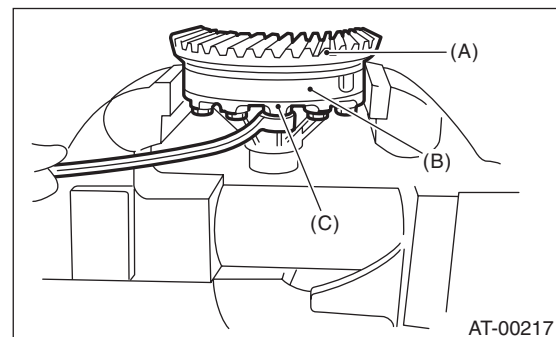
**1. DIFFERENTIAL CASE ASSEMBLY**

1) Remove the taper roller bearing using the ST and a press.

ST 498077000 REMOVER

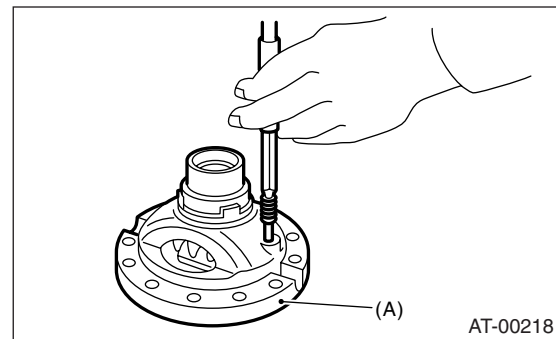


2) Secure the case in a vise and remove the hypoid driven gear tightening bolts. Then separate the hypoid driven gear into the differential case (RH) and the differential case (LH).



(A) Hypoid driven gear  
(B) Differential case (RH)  
(C) Differential case (LH)

3) Pull out the straight pin and pinion shaft, and then remove the differential bevel gear, washer and differential bevel pinion.



(A) Differential case (RH)

# Front Differential Assembly

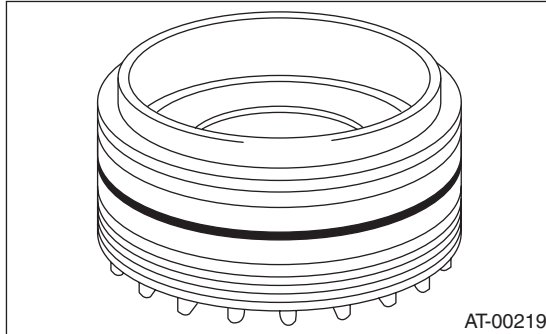
AUTOMATIC TRANSMISSION

## 2. DIFFERENTIAL SIDE RETAINER

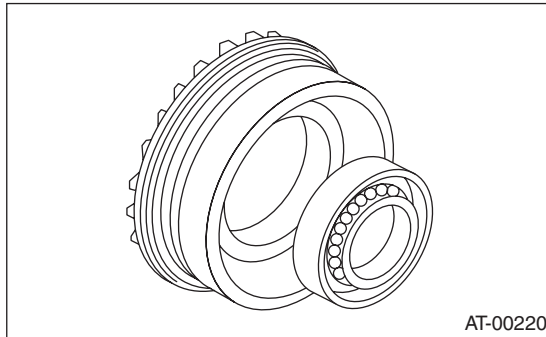
NOTE:

After adjusting the drive pinion backlash and tooth contact, remove and install the oil seal and O-ring.

1) Remove the O-ring.

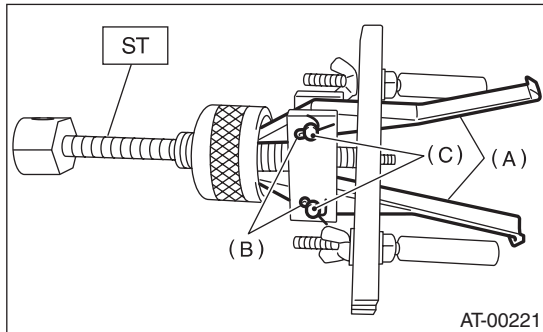


2) Remove the oil seal.



3) Remove the split pin, and then remove the claw.

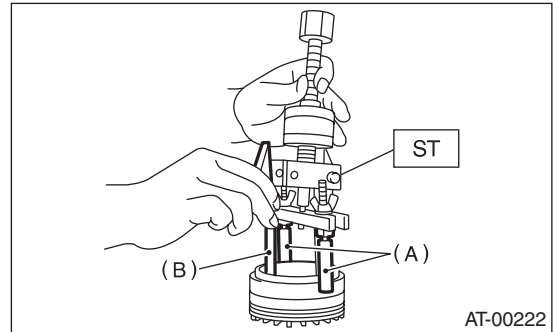
ST 398527700 PULLER ASSY



- (A) Claw
- (B) Split pin
- (C) Pin

4) Attach two claws to the outer race, and set the ST to the differential side retainer.

ST 398527700 PULLER ASSY



- (A) Shaft
- (B) Claw

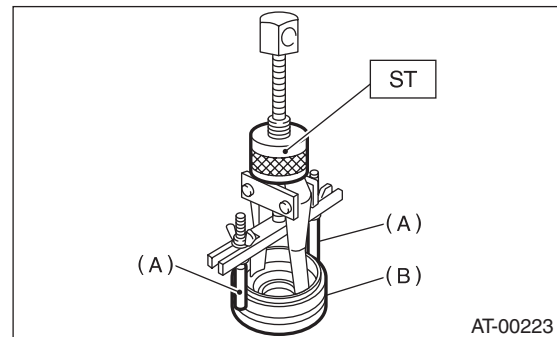
5) Restore the removed claws to original position, and install the pin and split pin.

6) Hold the shaft of ST to avoid removing from differential side retainer, and then remove the bearing outer race.

ST 398527700 PULLER ASSY

NOTE:

Replace the bearing inner and outer races as a single unit.

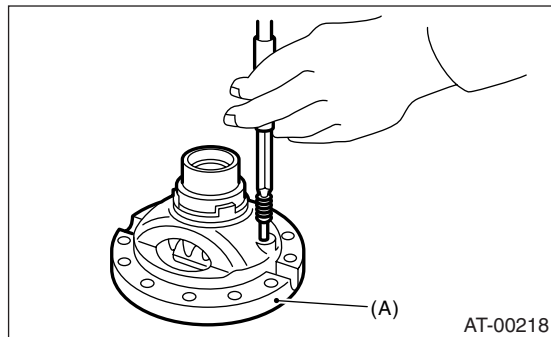


- (A) Shaft
- (B) Differential side retainer

## D: ASSEMBLY

### 1. DIFFERENTIAL CASE ASSEMBLY

- 1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft.
- 2) Attach the straight pin in the reverse direction.

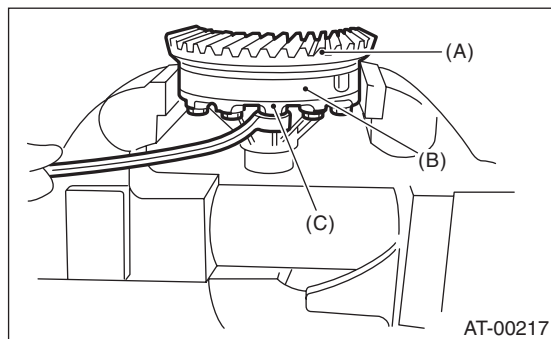


(A) Differential case (RH)

- 3) Install the washer and differential bevel gear to differential case (LH). Put the differential case (RH) on the case, and then assemble the two cases.
- 4) Install the hypoid driven gear and secure by tightening the bolt.

**Tightening torque:**

**62 N·m (6.3 kgf-m, 45.6 ft-lb)**



- (A) Hypoid driven gear
- (B) Differential case (RH)
- (C) Differential case (LH)

- 5) Measurement of backlash (Selection of washer)
  - (1) Install the SUBARU genuine axle shaft to differential case.

Part No. 38415AA070 Axle shaft

- (2) Measure the gear backlash using ST1 and ST2, and then insert ST2 from the access window of the case.

ST1 498247001 MAGNET BASE

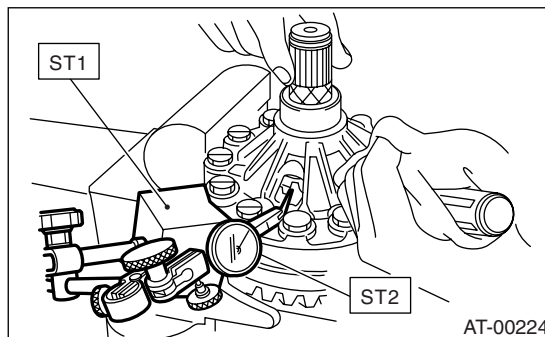
ST2 498247100 DIAL GAUGE

**NOTE:**

- Measure the backlash by placing the differential bevel pinion tooth against two differential bevel gear teeth.
- Fix the differential bevel pinion gear in place with a screwdriver or similar tool when measuring.

**Standard:**

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

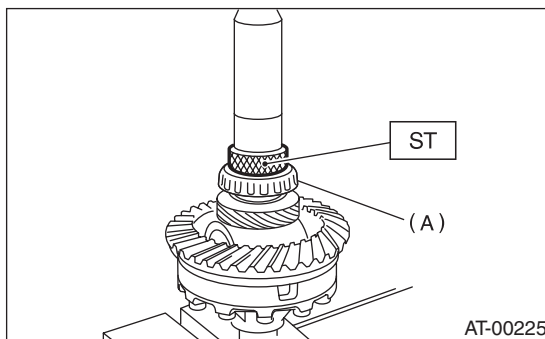


- (3) If the backlash is out of specification, select a washer from the table below.

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

- 6) Using the ST, install the taper roller bearing.

ST 398487700 INSTALLER



(A) Taper roller bearing

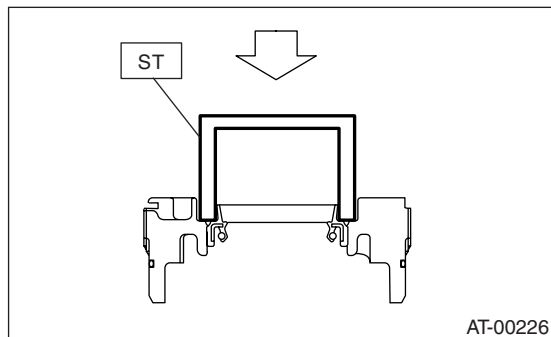
# Front Differential Assembly

AUTOMATIC TRANSMISSION

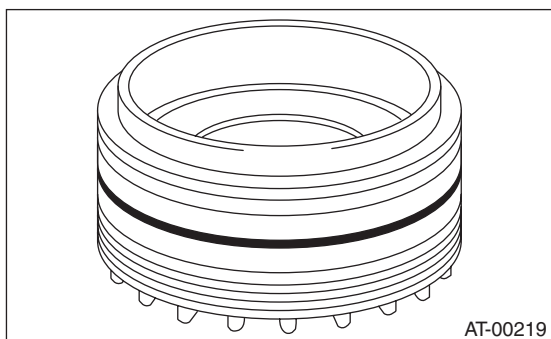
## 2. DIFFERENTIAL SIDE RETAINER

- 1) Install the bearing outer race to the differential side retainer.
- 2) Install a new oil seal using the ST and a plastic hammer.

ST 18675AA000 DIFFERENTIAL OIL SEAL INSTALLER



- 3) Install a new O-ring.



## E: INSPECTION

- Check each component for scratches, damage or other faults.
- Measure the backlash, and then adjust it to be within specification.

<Ref. to 4AT-106, ADJUSTMENT, Front Differential Assembly.>

## F: ADJUSTMENT

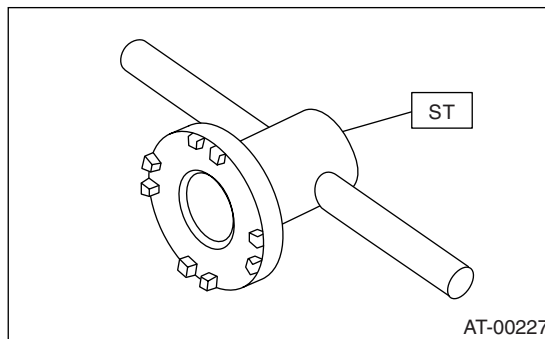
- 1) Using the ST, screw-in the differential side retainer until light contact is felt.

ST 499787000 WRENCH ASSY

NOTE:

- Screw-in the RH side slightly deeper than the LH side.

- WRENCH ASSEMBLY (18630AA010) can also be used.



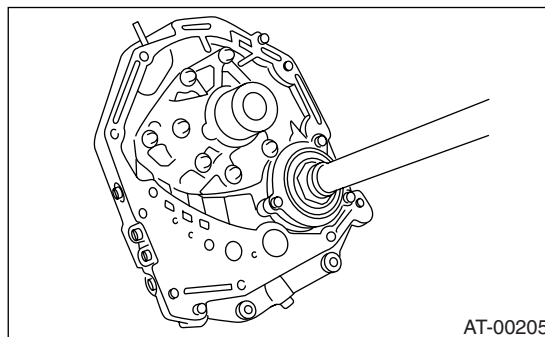
- 2) Remove the oil pump housing.
- 3) Remove the liquid gasket from the mating surface completely.
- 4) Install the oil pump housing assembly to the converter case, and secure them by tightening the four bolts evenly.

NOTE:

Use an old gasket or aluminum washer to prevent damaging the mating surface of the housing.

**Tightening torque:**

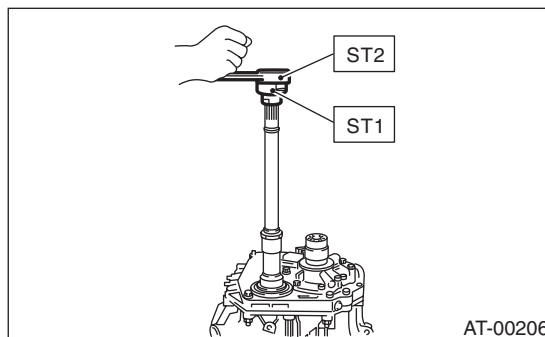
**41 N·m (4.2 kgf·m, 30.4 ft·lb)**



- 5) Rotate the drive pinion a few times using ST1 and ST2.

ST1 498937110 HOLDER

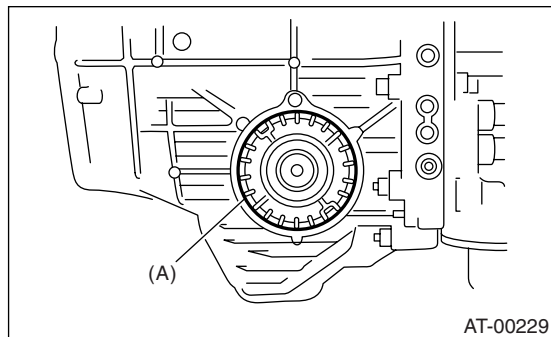
ST2 499787700 WRENCH



# Front Differential Assembly

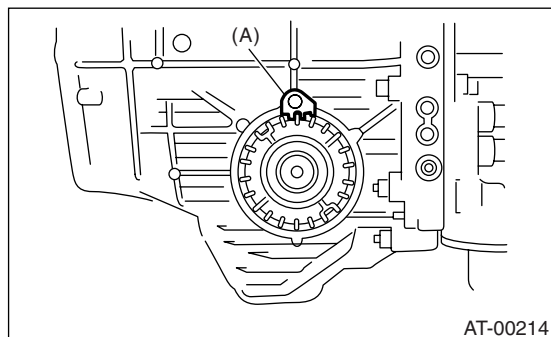
AUTOMATIC TRANSMISSION

6) Tighten the differential side retainer LH until contact is felt while rotating the shaft. Then loosen the differential side retainer RH. Keep tightening the differential side retainer LH, and loosening the retainer RH until the pinion shaft no longer turns. This is the "zero" state.



(A) Differential side retainer

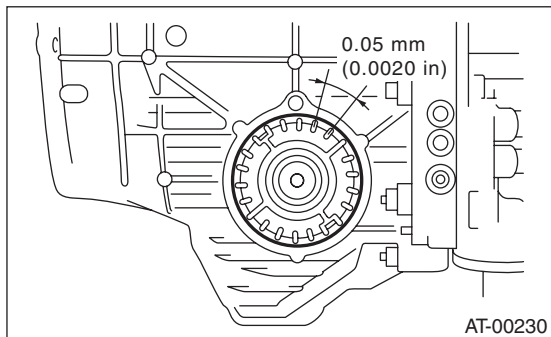
7) After the "zero" state is established, back off the differential side retainer LH 3 notches and secure it with the lock plate. Then back off the differential side retainer RH and retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the differential side retainer RH 1-3/4 notches further. This sets the preload. Finally, secure the differential side retainer with the lock plate.



(A) Lock plate

### NOTE:

Turning the differential side retainer by one notch changes the backlash about 0.05 mm (0.0020 in).

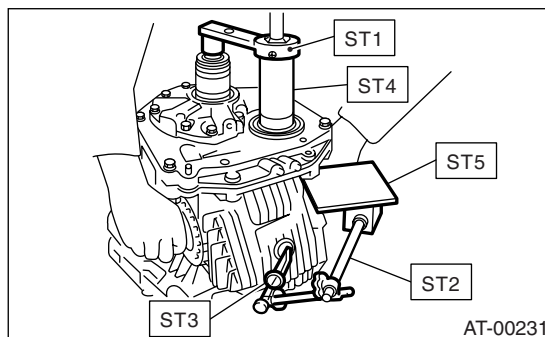


8) Turn the drive pinion a few times with ST1 and check to see if the backlash is within the specified value, using ST2, ST3, ST4 and ST5.

ST1	499787700	WRENCH
ST2	498247001	MAGNET BASE
ST3	498247100	DIAL GAUGE
ST4	499787500	ADAPTER
ST5	498255400	PLATE

### Backlash:

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



9) Adjust the teeth contact of the front differential and drive shaft. <Ref. to 4AT-100, ADJUSTMENT, Drive Pinion Shaft Assembly.>