

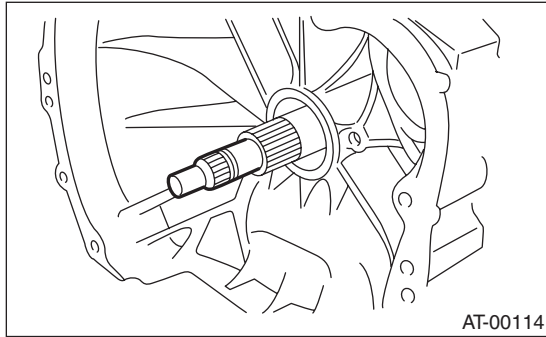
# Front Differential Assembly

## AUTOMATIC TRANSMISSION

### 34. Front Differential Assembly

#### A: REMOVAL

- 1) Remove the transmission assembly from the vehicle. <Ref. to 4AT-34, REMOVAL, Automatic Transmission Assembly.>
- 2) Pull out the torque converter clutch assembly. <Ref. to 4AT-66, 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 remove it from the stay.
- 5) Remove the inhibitor switch connector from the stay.
- 6) Remove the oil charge pipe. <Ref. to 4AT-65, REMOVAL, Oil Charge Pipe.>
- 7) Remove the ATF inlet and outlet pipes. <Ref. to 4AT-62, REMOVAL, ATF Cooler Pipe and Hose.>
- 8) Separate the converter case from the transmission case. <Ref. to 4AT-81, REMOVAL, Converter Case.>
- 9) Remove the seal pipe.
- 10) Remove the differential side retainers using ST. 18630AA010 WRENCH COMPL RETAINER

#### NOTE:

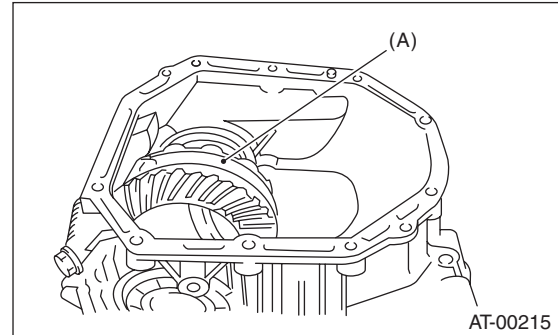
- ST WRENCH ASSY (499787000) can also be used.
  - Hold the differential case assembly by hand to avoid damaging the retainer mounting hole of the converter case.
- 11) Remove the front differential assembly while being careful not to damage the attachment part of the retainer.

#### B: INSTALLATION

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

#### NOTE:

Be careful not to damage the inside of the converter case (especially the mating surface of the differential side retainer).



(A) Front differential ASSY

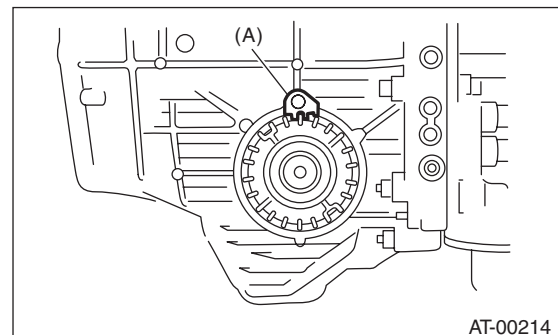
- 2) Install the O-ring to left and right side differential retainers.
  - 3) Install the differential side retainers using ST. <Ref. to 4AT-98, ADJUSTMENT, Front Differential Assembly.>
- ST 18630AA010 WRENCH COMPL RETAINER

#### NOTE:

- ST WRENCH ASSY (499787000) can also be used.
- 4) Adjust the backlash of the front differential. <Ref. to 4AT-98, ADJUSTMENT, Front Differential Assembly.>
  - 5) Install the lock plate.

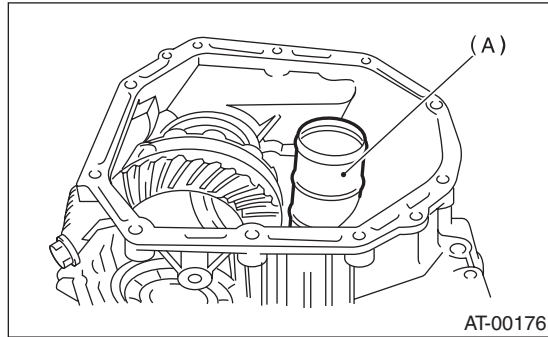
#### Tightening torque:

**25 N·m (2.5 kgf-m, 18.4 ft-lb)**



(A) Lock plate

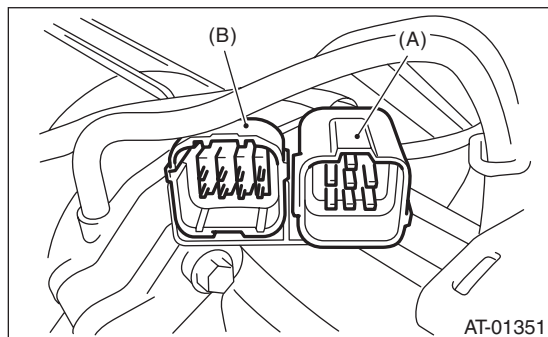
6) Install new seal pipe to converter case.



(A) Seal pipe

7) Install the converter case to the transmission case. <Ref. to 4AT-81, INSTALLATION, Converter Case.>

8) Insert the inhibitor switch connector and transmission harness connector onto the stay.



(A) Transmission harness connectors

(B) Inhibitor switch connector

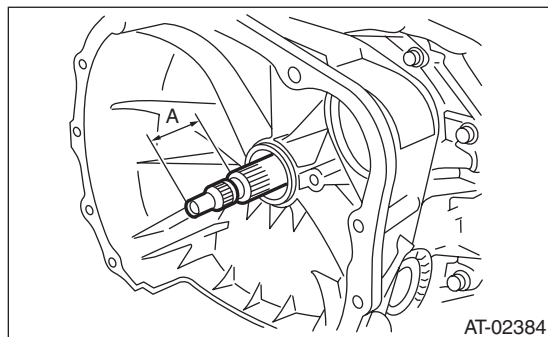
9) Install the ATF cooler pipe. <Ref. to 4AT-62, INSTALLATION, ATF Cooler Pipe and Hose.>

10) Install the oil charge pipe together with an O-ring. <Ref. to 4AT-65, INSTALLATION, Oil Charge 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)**



A Measured value

12) Install the torque converter clutch assembly. <Ref. to 4AT-66, INSTALLATION, Torque Converter Clutch Assembly.>

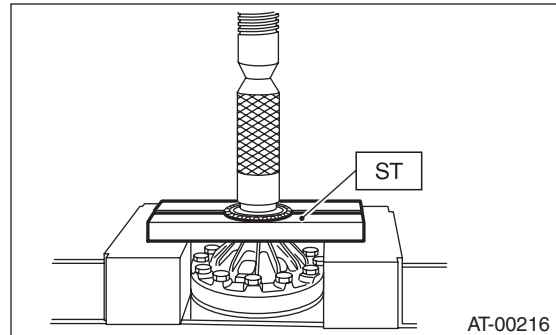
13) Install the transmission assembly to the vehicle. <Ref. to 4AT-37, INSTALLATION, Automatic Transmission Assembly.>

## C: DISASSEMBLY

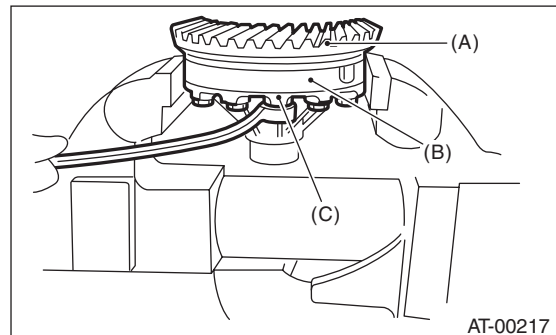
### 1. DIFFERENTIAL CASE ASSEMBLY

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

ST 498077000 REMOVER



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



(A) Hypoid driven gear

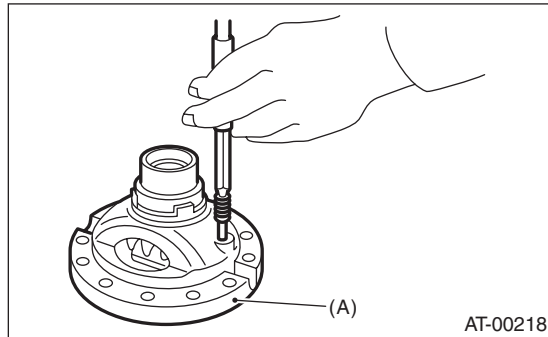
(B) Differential case (RH)

(C) Differential case (LH)

# Front Differential Assembly

## AUTOMATIC TRANSMISSION

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



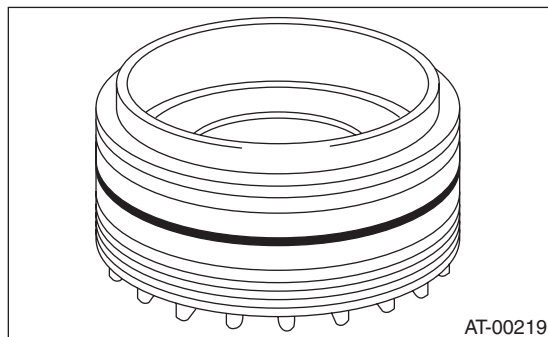
(A) Differential case (RH)

## 2. SIDE RETAINER

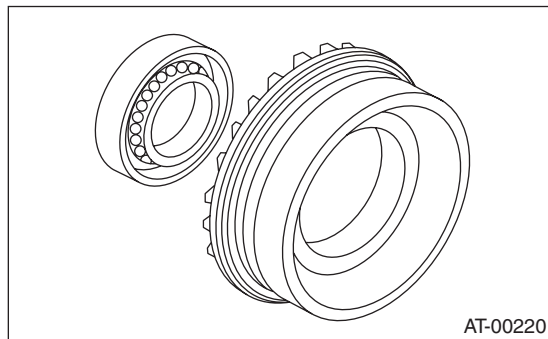
### NOTE:

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

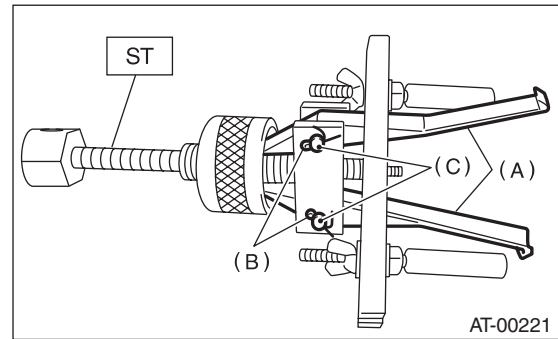
1) Remove the O-ring.



2) Remove the oil seal.



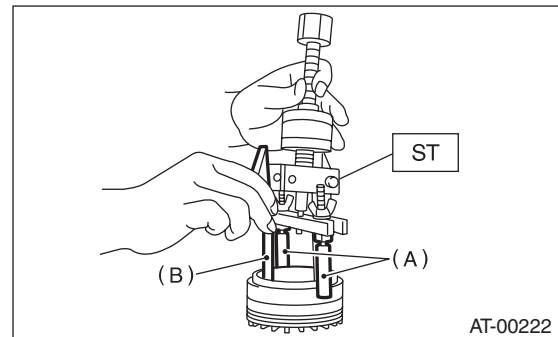
3) Remove the split pin, and then remove the claw.  
ST 398527700 PULLER ASSY



(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

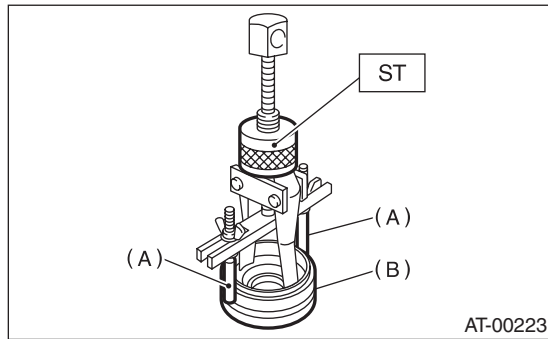
5) Restore the removed claws to original position, and install the pin and split pin.

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

ST 398527700 PULLER ASSY

## NOTE:

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

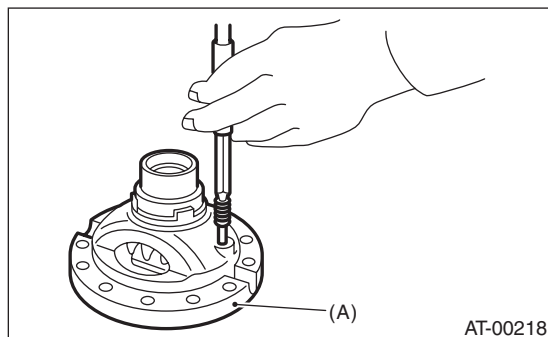


- (A) Shaft  
(B) Side retainer

## 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.

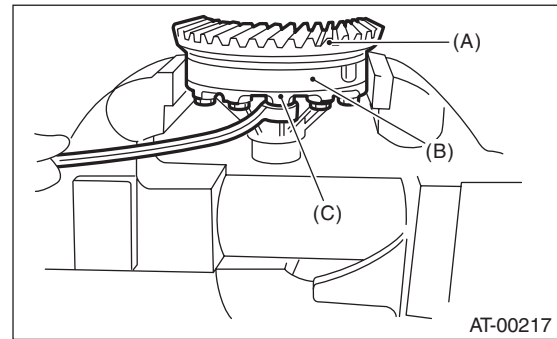


- (A) Differential case (RH)

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

## Tightening torque:

**62 N·m (6.3 kgf-m, 45.7 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 the ST2 through the access window of case.

ST1 498247001 MAGNET BASE

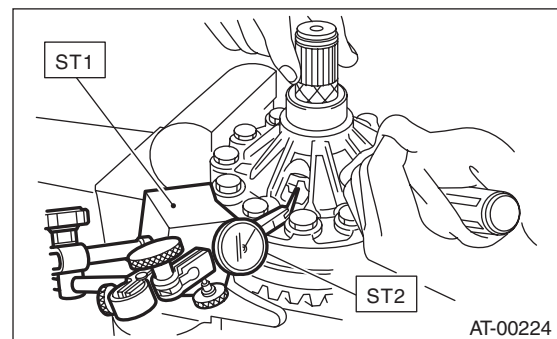
ST2 498247100 DIAL GAUGE

## 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.

## Specification:

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



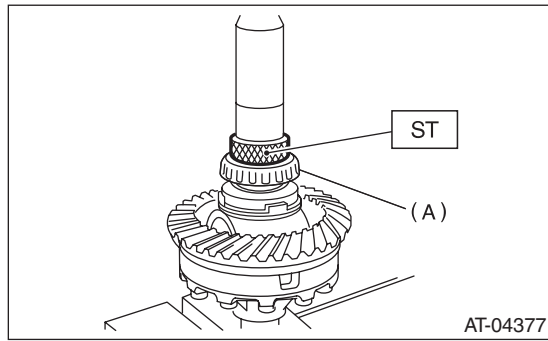
- (3) If the backlash is out of specification, select a washer from the table below.

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

# Front Differential Assembly

## AUTOMATIC TRANSMISSION

- 6) Using the ST, install the taper roller bearing.  
ST 398487700 INSTALLER



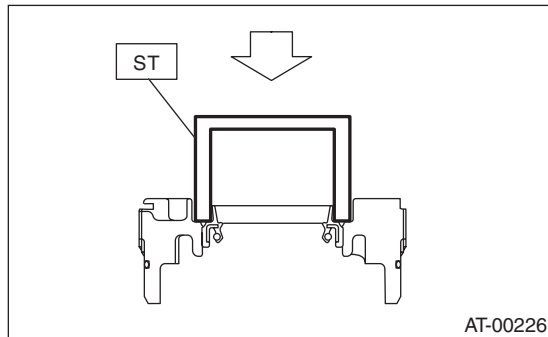
(A) Taper roller bearing

## 2. SIDE RETAINER

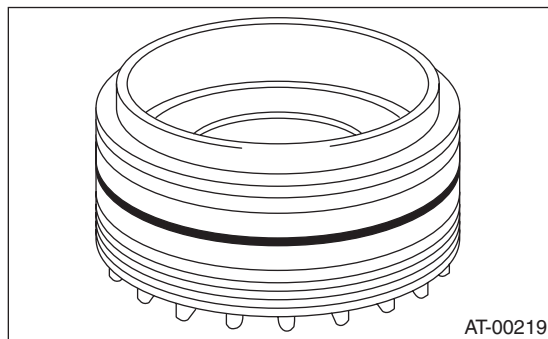
- 1) Install the bearing outer race to the differential side retainer.

- 2) Install a new oil seal using the ST and a hammer.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



- 3) Apply differential gear oil to a new O-ring and install.



## 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-98, ADJUSTMENT, Front Differential Assembly.>

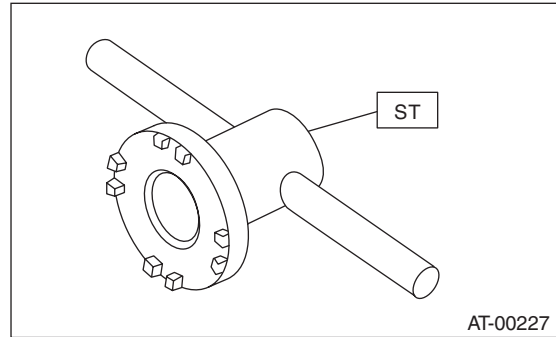
## F: ADJUSTMENT

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

ST 18630AA010 WRENCH COMPL RETAINER

### NOTE:

- Screw-in the RH side slightly deeper than the LH side.
- ST WRENCH ASSY (499787000) can also be used.



- 2) Remove the oil pump housing.

- 3) Remove the liquid gasket from the mating surface completely.

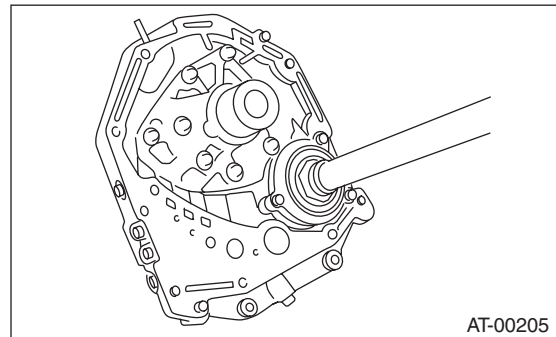
- 4) Install the oil pump housing assembly to the converter case, and secure them by tightening the four bolts evenly.

### NOTE:

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

### Tightening torque:

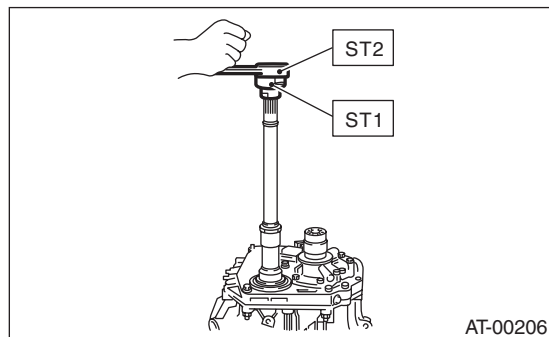
**41 N·m (4.2 kgf-m, 30.2 ft-lb)**



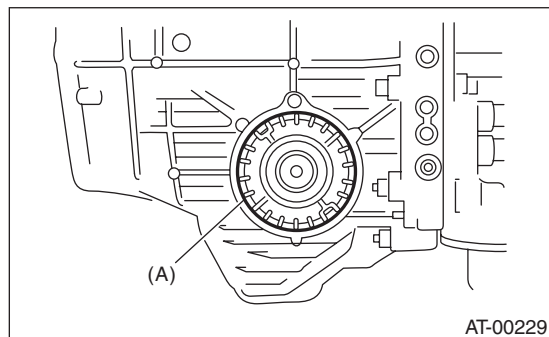
5) Rotate the drive pinion a few times using ST1 and ST2.

ST1 498937110 HOLDER

ST2 499787700 WRENCH

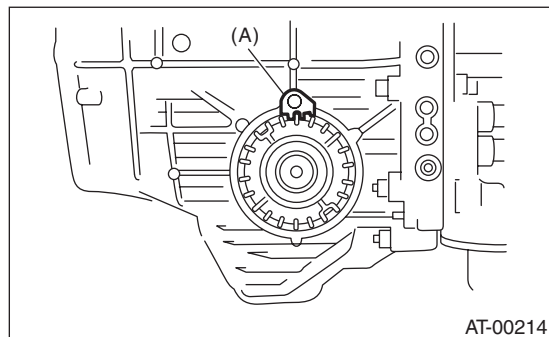


6) Tighten the LH differential side retainer by rotating the shaft until resistance is felt. Then loosen the RH side differential side retainer. Tighten the LH differential side retainer until the pinion shaft no longer turns, and continue to loosen the RH side. This is the “zero” state.



(A) Differential side retainer

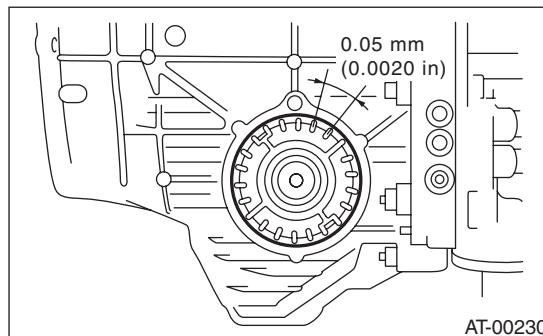
7) After reaching the “zero” state, loosen the LH differential side retainer by 3 notches and secure it with the lock plate. Then after returning the RH differential side retainer, retighten until it stops. Rotate the drive pinion 2 or 3 times. Tighten the RH differential side retainer further by 1-3/4 notches. 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 approx. 0.05 mm (0.0020 in).



8) Install the Subaru genuine axle shafts to the right and left sides of the front differential.

Install the axle shaft to both sides of the front differential section.

Part No. 38415AA000 AXLE SHAFT

9) Turn the drive pinion several times using ST1, and check to see if the backlash is within the specification using ST2, ST3, ST4 and ST5.

ST1 499787700 WRENCH

ST2 498247001 MAGNET BASE

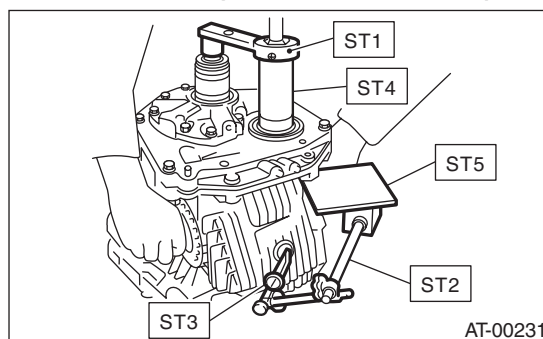
ST3 498247100 DIAL GAUGE

ST4 499787500 ADAPTER

ST5 498255400 PLATE

## Backlash:

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



10) Adjust the teeth contact of the front differential and drive pinion shaft. <Ref. to 4AT-92, ADJUSTMENT, Drive Pinion Shaft Assembly.>