

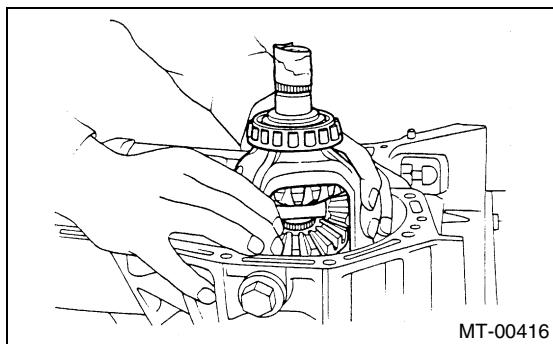
## 17. Front Differential Assembly

### A: REMOVAL

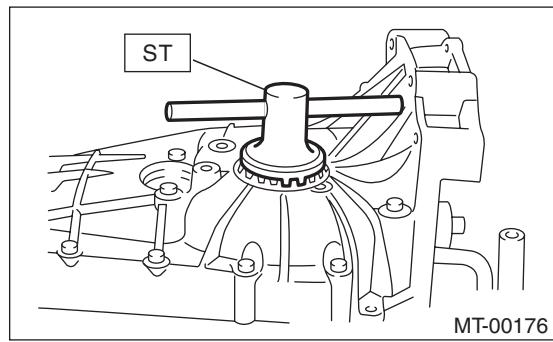
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-27, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-54, REMOVAL, Transmission Case.>
- 4) Removes the drive pinion shaft assembly. <Ref. to MT-63, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly. <Ref. to MT-57, REMOVAL, Main Shaft Assembly for Single-Range.>
- 6) Remove the differential assembly.

#### CAUTION:

- Be careful not to confuse right and left roller bearing outer races.
- Be careful not to damage retainer oil seal.



- 7) Remove the differential side retainers using ST. ST 499787000 WRENCH ASSY



### B: INSTALLATION

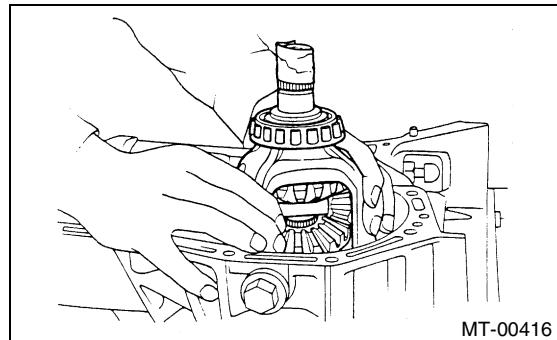
- 1) Install the differential side retainers using ST. ST 499787000 WRENCH ASSY
- 2) Install the differential assembly.

#### CAUTION:

Be careful not to fold the sealing lip of oil seal.

#### NOTE:

Wrap the left and right splines sections of axle shaft with vinyl tape to prevent scratches.



- 3) Install the main shaft assembly. <Ref. to MT-57, INSTALLATION, Main Shaft Assembly for Single-Range.>
- 4) Install the drive pinion assembly. <Ref. to MT-63, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the transmission case. <Ref. to MT-55, INSTALLATION, Transmission Case.>
- 6) Install the transfer case with extension case assembly. <Ref. to MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-30, INSTALLATION, Manual Transmission Assembly.>

# FRONT DIFFERENTIAL ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

### C: DISASSEMBLY

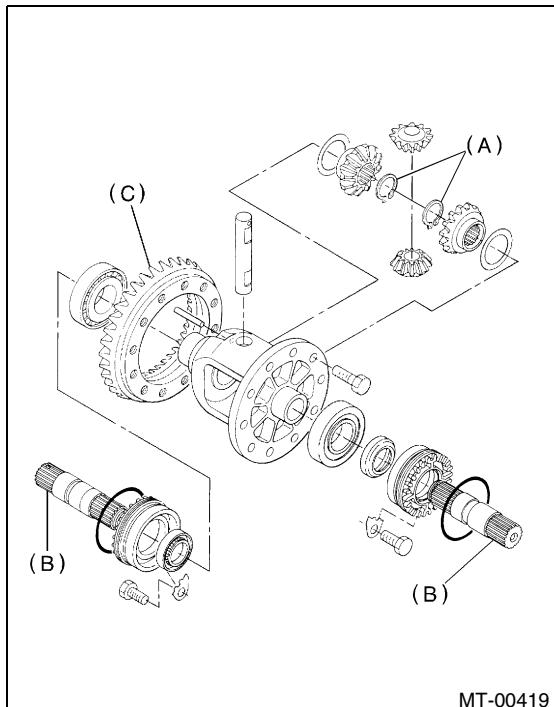
#### 1. DIFFERENTIAL CASE ASSEMBLY

1) Remove the right and left snap rings from differential, and then remove the two axle drive shafts.

NOTE:

During reassembly, reinstall each axle drive shaft in the same place from which it was removed.

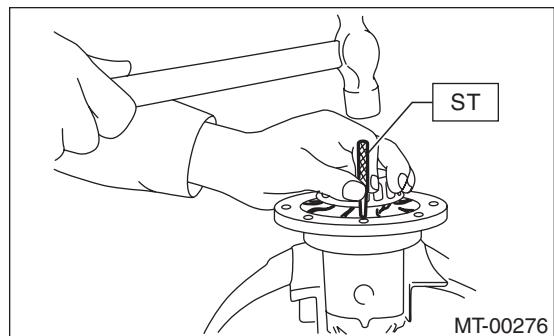
2) Loosen the twelve bolts and remove the hypoid driven gear.



- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid driven gear

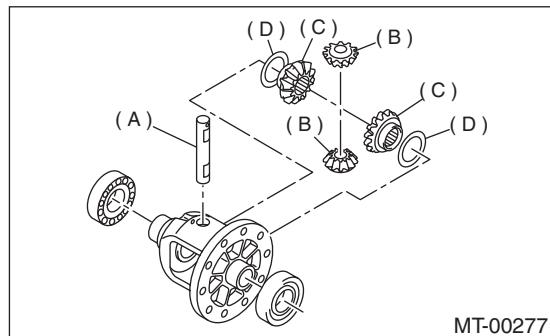
3) Drive out the straight pin from differential assembly toward hypoid driven gear.

ST 899904100 REMOVER



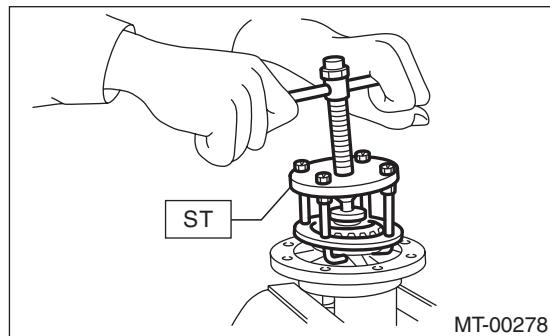
MT-72

4) Pull out the pinion shaft, and remove the differential bevel pinion and gear and washer.



- (A) Pinion shaft
- (B) Bevel pinion
- (C) Bevel gear
- (D) Washer

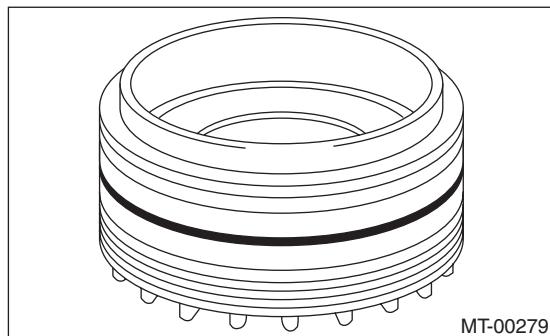
5) Remove the roller bearing using ST.  
ST 399527700 PULLER SET



MT-00278

#### 2. SIDE RETAINER

1) Remove the O-ring.



MT-00279

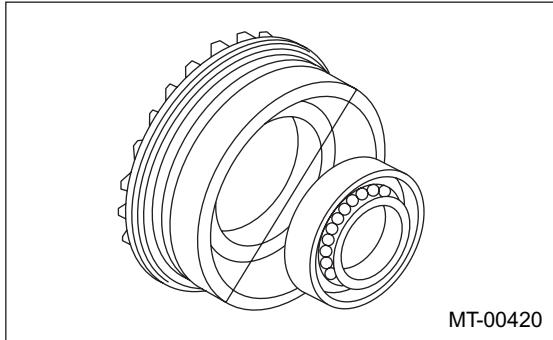
# FRONT DIFFERENTIAL ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

2) Remove the oil seal.

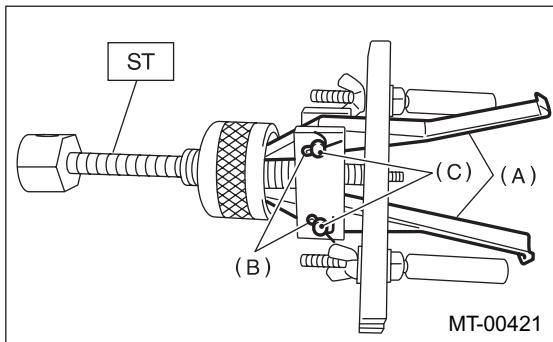
NOTE:

Do not reuse the oil seal. Prepare a new oil seal.



3) Remove either side of split pin and pin, and remove the claw.

ST 398527700 PULLER ASSY



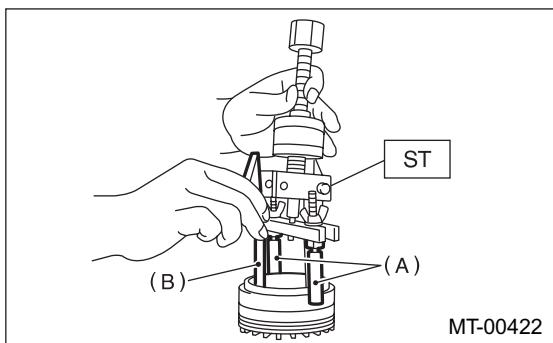
(A) Claw  
(B) Split pin  
(C) Pin

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

ST 398527700 PULLER ASSY

NOTE:

- Attach notch portions of the two shafts securely to side retainer.
- Restore the removed claws to original position, and install the pin and split pin.



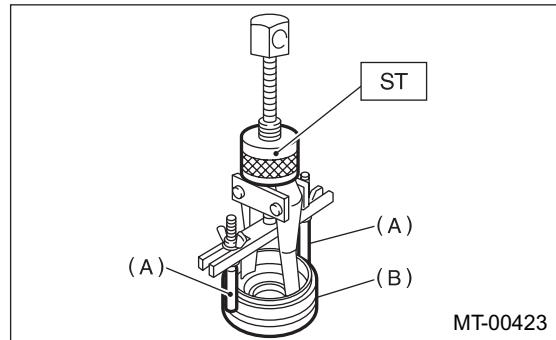
(A) Shaft  
(B) Claw

5) Remove the bearing outer race from side retainer.

ST 398527700 PULLER ASSY

NOTE:

- Fix the shaft of ST secure enough that it will not loosen and fall from side retainer.
- When replacing the bearing outer race, replace it with inner race as a set.



(A) Shaft  
(B) Side retainer

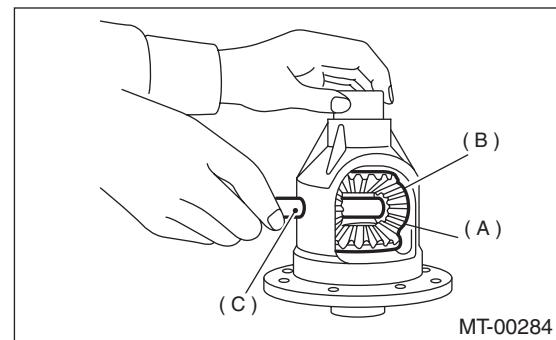
## D: ASSEMBLY

### 1. DIFFERENTIAL CASE ASSEMBLY

1) Install the bevel gear and bevel pinion together with washers, and insert pinion shaft.

NOTE:

Face the chamfered side of washer toward gear.



(A) Bevel pinion  
(B) Bevel gear  
(C) Pinion shaft

# FRONT DIFFERENTIAL ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

2) Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to MT-77, ADJUSTMENT, Front Differential Assembly.>

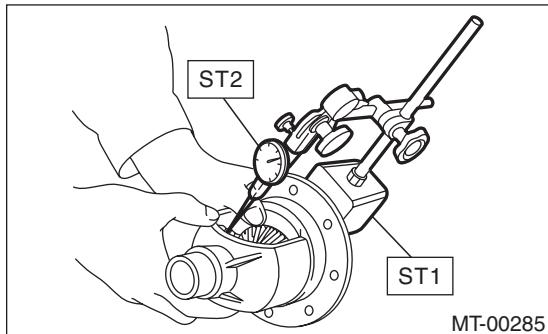
**NOTE:**

Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE  
ST2 498247100 DIAL GAUGE

**Standard backlash:**

0.13 — 0.18 mm (0.0051 — 0.0071 in)



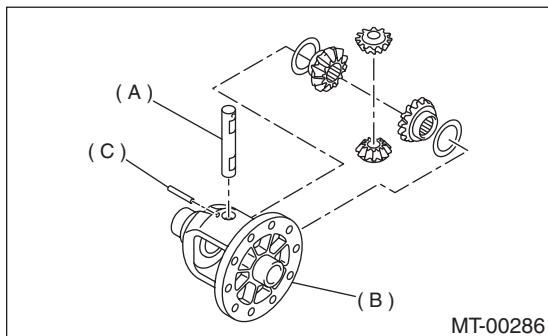
MT-00285

3) Align the pinion shaft and differential case at their holes, and drive the straight pin into holes from the hypoid driven gear side, using ST.

**NOTE:**

Lock the straight pin after installing.

ST 899904100 REMOVER



MT-00286

- (A) Pinion shaft
- (B) Differential case
- (C) Straight pin

4) Install the roller bearing to differential case.

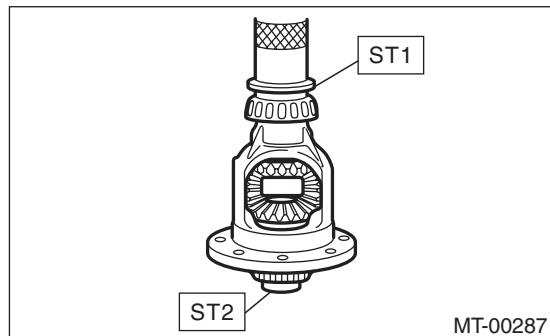
**CAUTION:**

**Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**

**NOTE:**

Be careful because the roller bearing outer races are used as a set.

ST1 499277100 BUSH 1-2 INSTALLER  
ST2 398497701 ADAPTER

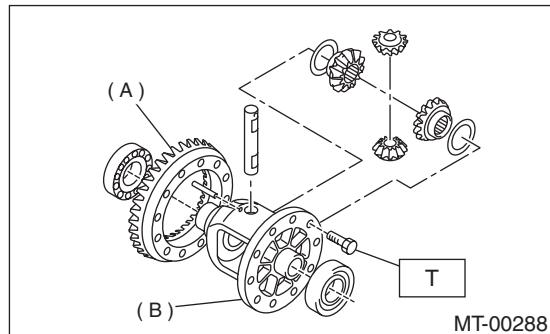


MT-00287

5) Install the hypoid driven gear to differential case using twelve bolts.

**Tightening torque:**

**T: 62 N·m (6.3 kgf-m, 45.6 ft-lb)**



MT-00288

- (A) Hypoid driven gear
- (B) Differential case

# FRONT DIFFERENTIAL ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

### 2. SIDE RETAINER

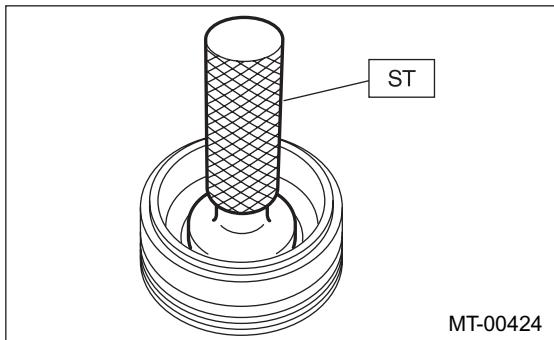
1) Install the bearing outer race to side retainer.

NOTE:

Press-in while being careful not to scratch the side retainer and bearing outer race.

2) Install a new oil seal.

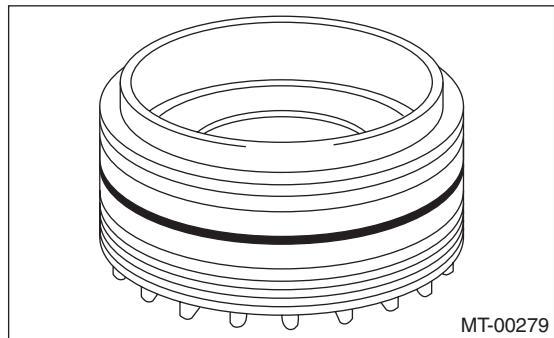
ST 49979700      INSTALLER



3) Install a new O-ring.

NOTE:

Do not stretch or damage the O-ring.



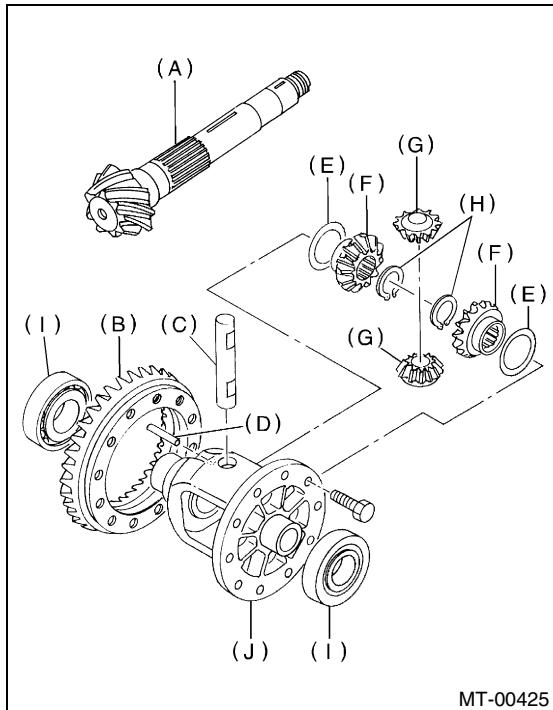
# FRONT DIFFERENTIAL ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

### E: INSPECTION

Repair or replace the differential gear in the following cases:

- The hypoid drive gear and drive pinion shaft tooth surface are damaged, excessively worn, or seized.
- The roller bearing on the drive pinion shaft has a worn or damaged roller path.
- There is damage, wear, or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft, and straight pin.
- The differential case has worn or damaged sliding surfaces.



- (A) Drive pinion shaft
- (B) Hypoid driven gear
- (C) Pinion shaft
- (D) Straight pin
- (E) Washer
- (F) Differential bevel gear
- (G) Differential bevel pinion
- (H) Snap ring
- (I) Roller bearing
- (J) Differential case

### 1. BEVEL PINION GEAR BACKLASH

Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it.

#### NOTE:

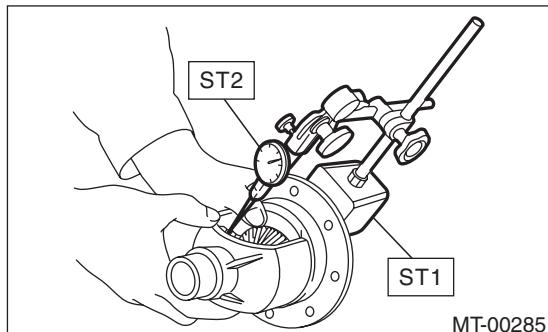
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

#### Standard backlash:

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



### 2. HYPOID GEAR BACKLASH

Set the ST1, ST2 and ST3. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle and check the backlash.

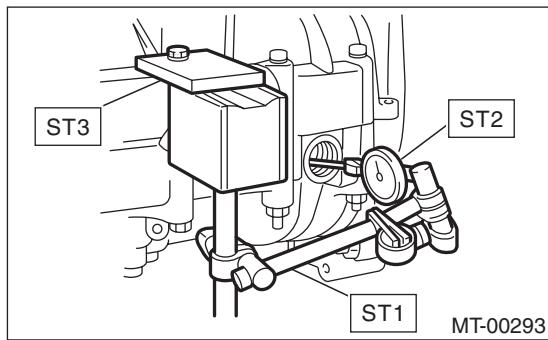
ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

ST3 498255400 PLATE

#### Backlash:

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



#### NOTE:

If the backlash is outside specified range, adjust it by turning holder in right side case.

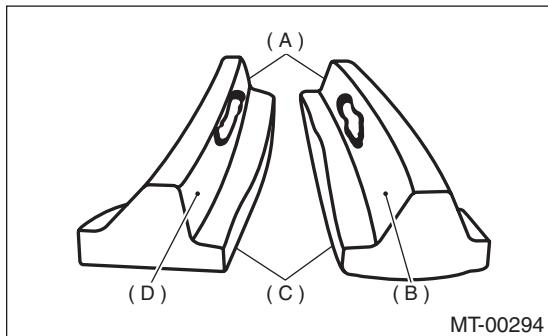
# FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

## 3. TOOTH CONTACT OF HYPOID GEAR

Check tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is inaccurate, make adjustment. *<Ref. to MT-77, ADJUSTMENT, Front Differential Assembly. >*

- Tooth contact is correct.



- (A) Toe
- (B) Coast side
- (C) Heel
- (D) Drive side

## F: ADJUSTMENT

### 1. BEVEL PINION GEAR BACKLASH

- 1) Disassemble the front differential. *<Ref. to MT-71, REMOVAL, Front Differential Assembly. >*
- 2) Select a different washer from the table and install.

Washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

- 3) Adjust until the specified value is obtained.

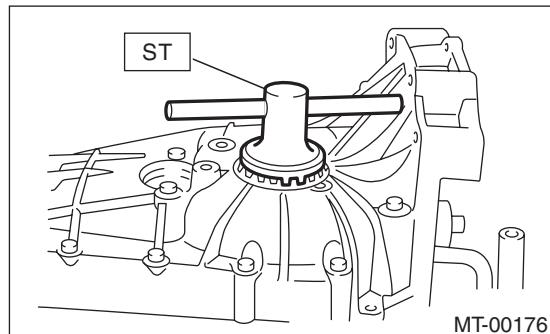
**Standard backlash:**

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

## 2. HYPOID GEAR BACKLASH

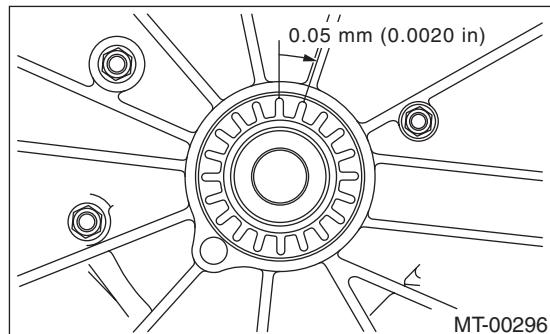
Adjust the backlash by turning holder in right side case.

ST 499787000 WRENCH ASSY



### NOTE:

Each time holder rotates one tooth, backlash changes by 0.05 mm (0.020 in).



# FRONT DIFFERENTIAL ASSEMBLY

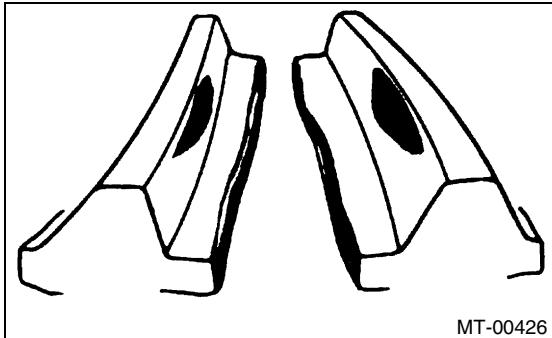
## MANUAL TRANSMISSION AND DIFFERENTIAL

### 3. TOOTH CONTACT OF HYPOID GEAR

Adjust until the teeth contact is correct.

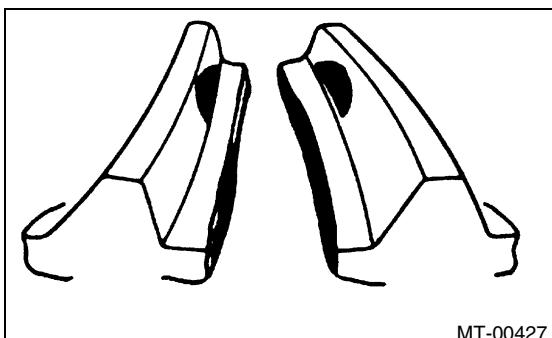
- Backlash is excessive.

To reduce backlash, loosen holder on the upper side (case right side) and turn in the holder on the lower side (case left side) by the same amount.



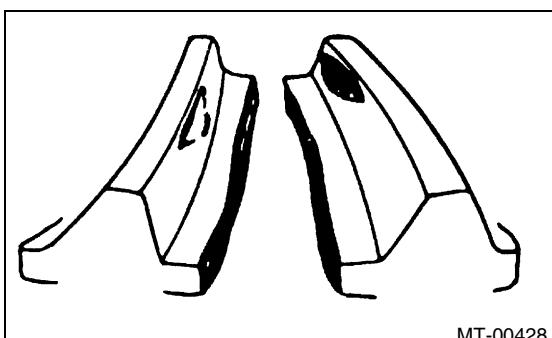
- Backlash is insufficient.

To increase backlash, loosen holder on the lower side (case left side) and turn in the holder on the upper side (case right side) by the same amount.



- The drive pinion shim selected before is too thick.

Reduce its thickness.



- The drive pinion shim selected before is too thin. Increase its thickness.

