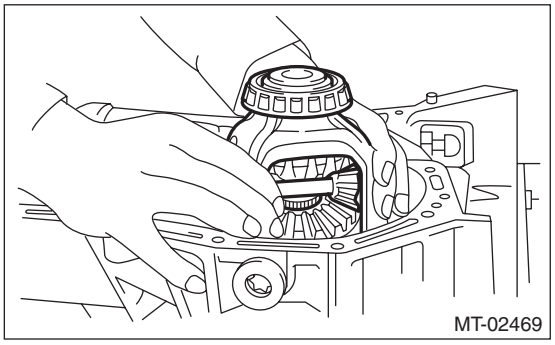
18.Front Differential Assembly

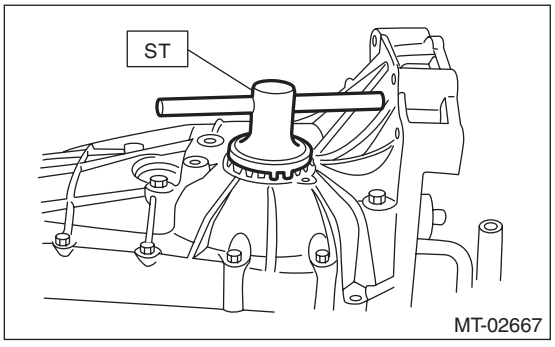
A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT(TY75)-25, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT(TY75)-51, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 6MT(TY75)-79, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 6MT(TY75)-92, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly. <Ref. to 6MT(TY75)-83, REMOVAL, Main Shaft Assembly for Single-Range.>
6) Remove the front differential assembly.

NOTE:
- Do not confuse the right and left taper roller bearing outer races.
- Be careful not to damage the oil seal of differential side retainer.


MT-02469

7) Remove the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER



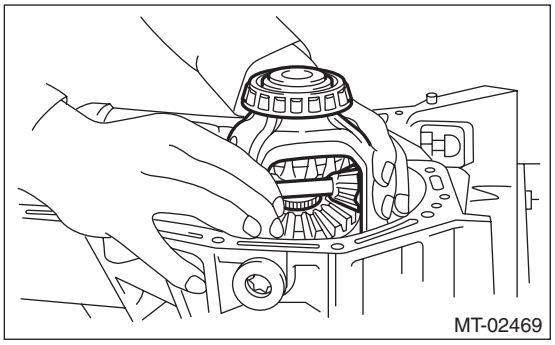
MT-02667

8) Remove the taper roller bearing outer race from the transmission case.
ST 398527700 PULLER ASSY

B: INSTALLATION

1) Install the differential side retainers using ST.
ST 18630AA010 WRENCH COMPL RETAINER
2) Install the taper roller bearing outer race to the transmission case.
3) Install the front differential assembly.

CAUTION:
Make sure the oil seal lip is not folded.

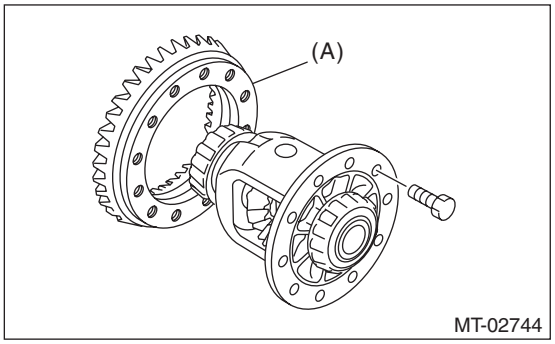


4) Install the main shaft assembly. <Ref. to 6MT(TY75)-83, INSTALLATION, Main Shaft Assembly for Single-Range.>
5) Install the drive pinion shaft assembly. <Ref. to 6MT(TY75)-92, INSTALLATION, Drive Pinion Shaft Assembly.>
6) Install the transmission case. <Ref. to 6MT(TY75)-80, INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension case assembly. <Ref. to 6MT(TY75)-53, INSTALLATION, Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the vehicle. <Ref. to 6MT(TY75)-30, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

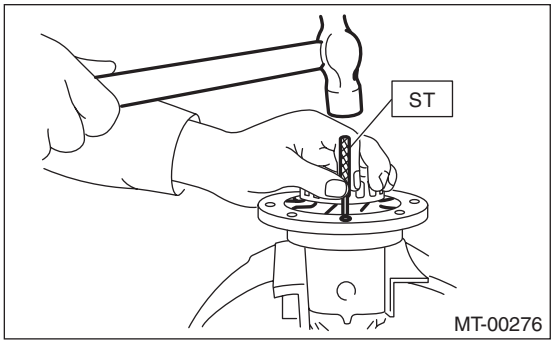
1. DIFFERENTIAL CASE ASSEMBLY

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

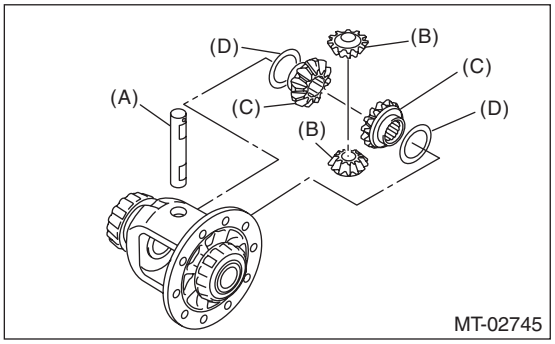


(A) Hypoid driven gear

2) Drive out the straight pin from differential assembly toward hypoid driven gear side.
ST 899904100 STRAIGHT PIN REMOVER

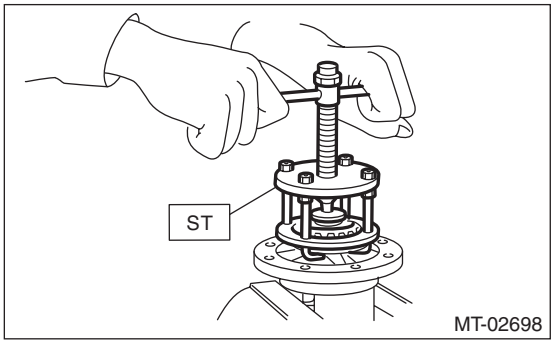


3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and adjusting washer.



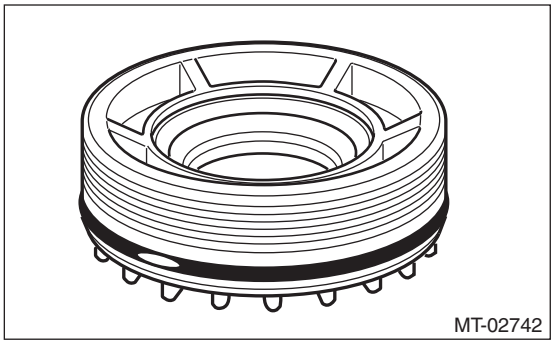
(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

4) Using the ST, remove the taper roller bearing inner race.
ST 899524100 PULLER SET



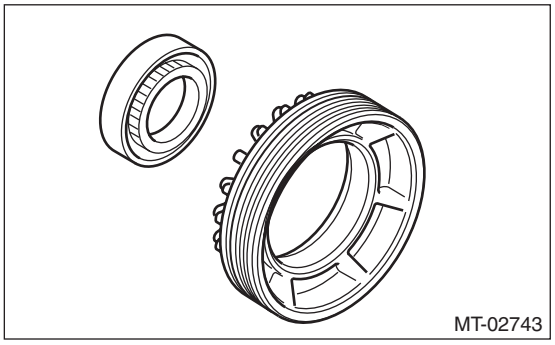
2. SIDE RETAINER

1) Remove the O-rings.



2) Remove the oil seal.

NOTE:
Remove using the flat tip screwdriver.

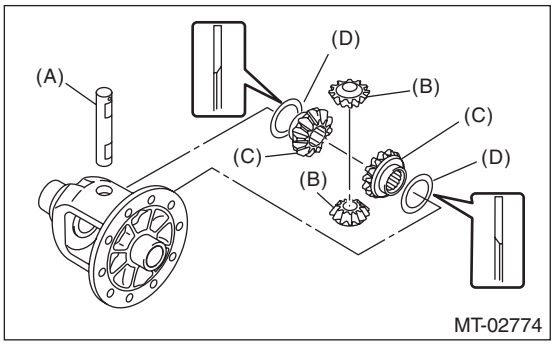


D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the differential bevel gear and differential bevel pinion together with adjusting washer, and insert the pinion shaft.

NOTE:
Face the chamfered side of adjusting washer toward differential bevel gear.

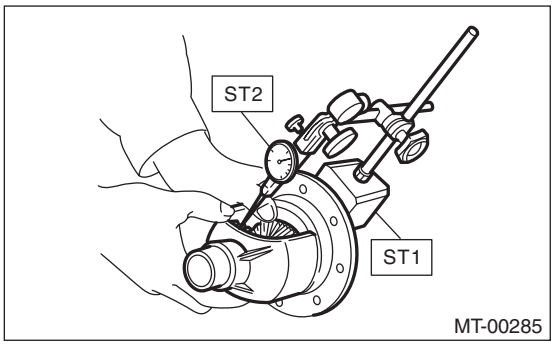


(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Adjusting washer

2) Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 6MT(TY75)-118, DIFFERENTIAL BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

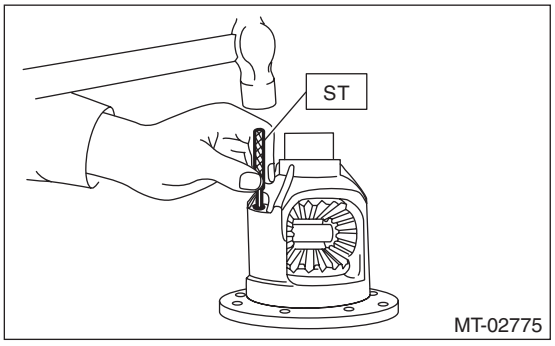
NOTE:
Be sure the differential bevel pinion gear teeth contact adjacent gear teeth during measurement.

Standard backlash
0.13 — 0.18 mm (0.0051 — 0.0071 in)
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE



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

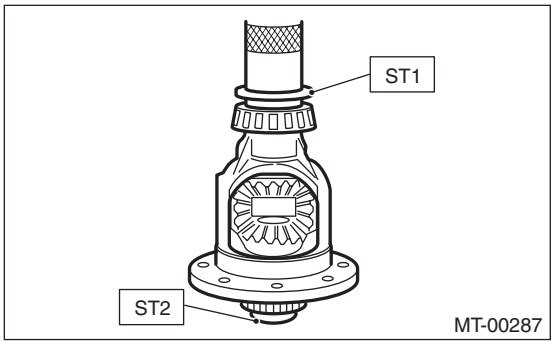
NOTE:
Use a new straight pin. After driving the straight pin, crimp the area around the hole in order to prevent the straight pin from coming out.
ST 899904100 STRAIGHT PIN REMOVER



4) Attach the taper roller bearing inner race.

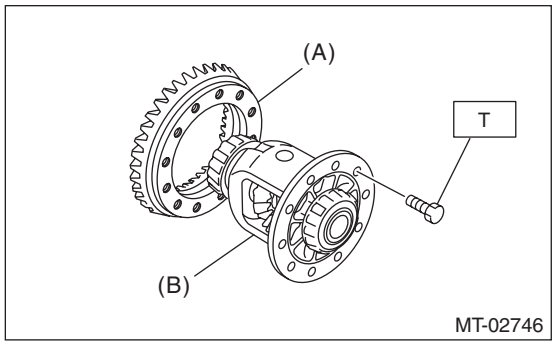
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Be careful when handling because the taper roller bearing and the outer race are used as a set.
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 398497701 ADAPTER



5) Install the hypoid driven gear using twelve bolts.

Tightening torque:
T: 62 N·m (6.3 kgf-m, 45.7 ft-lb)



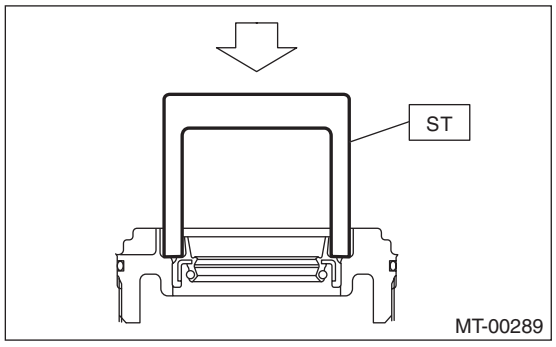
(A) Hypoid driven gear
(B) Differential case

2. DIFFERENTIAL SIDE RETAINER

1) Using the ST, install the oil seal by lightly tapping with a plastic hammer.

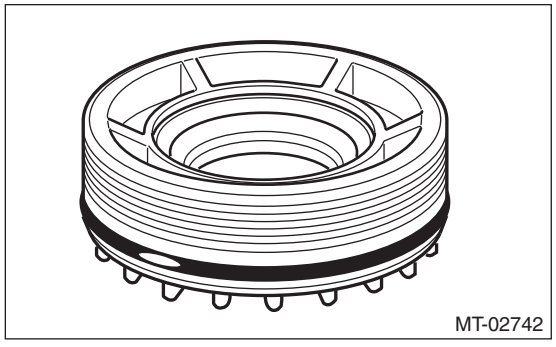
NOTE:
- Use a new oil seal.
- Apply transmission gear oil to the oil seal lips, and install the oil seal while being careful not to deform the lip.
- Check the identification marks (L, R), and attach the oil seals RH and LH.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER



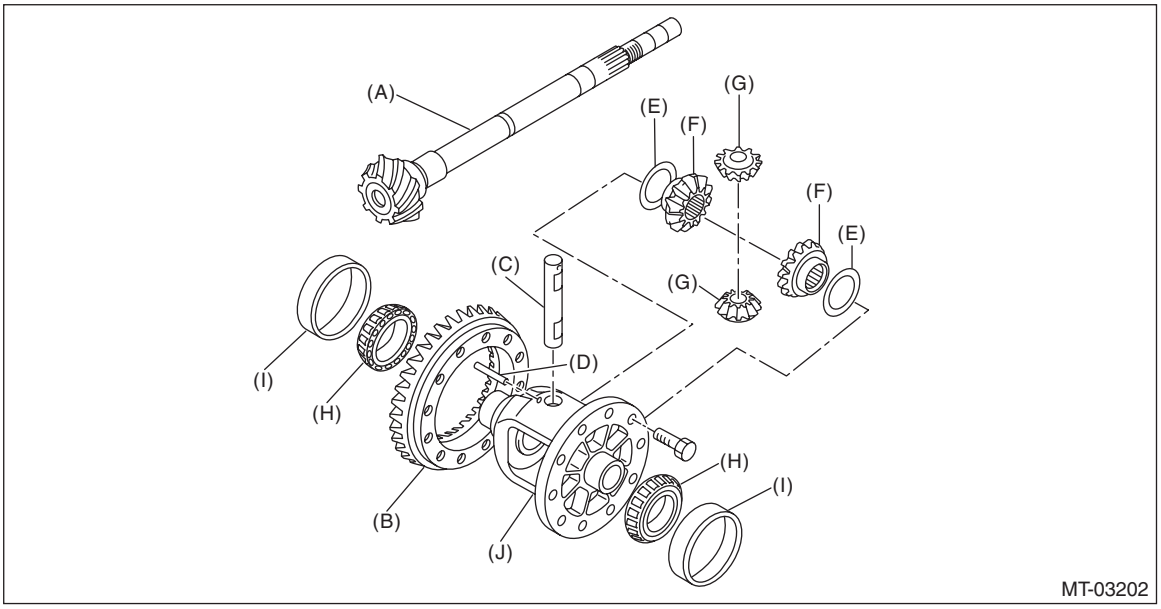
2) Install the O-rings.

NOTE:
- Use new O-rings.
- Apply gear oil to O-ring.
- Do not stretch or damage the O-ring.
- Install the O-ring after hypoid driven gear backlash adjustment and completion of tooth contact inspection.



E: INSPECTION

Repair or replace the differential gear in the following cases:
- When the hypoid driven gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
- When the roller bearing on the drive pinion shaft has a worn or damaged roller path.
- When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, adjusting washer, pinion shaft or straight pin.
- When the differential case sliding surfaces are worn or damaged.



(A) Drive pinion shaft
(B) Hypoid driven gear
(C) Pinion shaft
(D) Straight pin
(E) Adjusting washer
(F) Differential bevel gear
(G) Differential bevel pinion
(H) Taper roller bearing inner race
(I) Taper roller bearing outer race
(J) Differential case

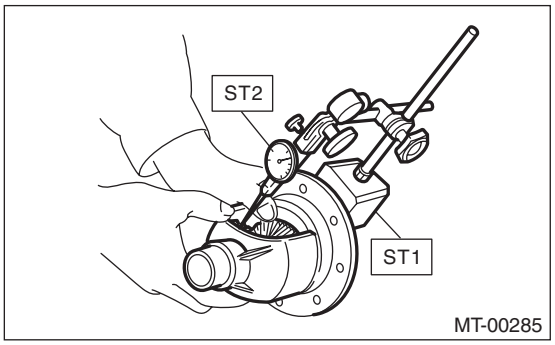
1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

Measure the backlash between the differential bevel gear and differential bevel pinion. Adjust the backlash if not within specified limit. <Ref. to 6MT(TY75)-119, ADJUSTMENT, Front Differential Assembly.>

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE



2. HYPOID DRIVEN GEAR BACKLASH

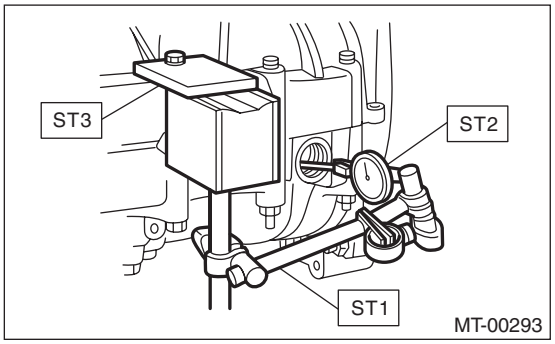
1) Set the ST1, ST2 and ST3. Insert the dial gauge probe through drain plug hole so that the probe comes in contact with the tooth surface on the right corner, and check the backlash.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE
2) Install SUBARU genuine axle shafts to both sides, rotate in the inversion direction so that the gauge contacts the tooth surface, and read the dial gauge.

NOTE:
If the backlash is outside the specified range, adjust it by turning the differential side retainers on the left and right side.

Backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

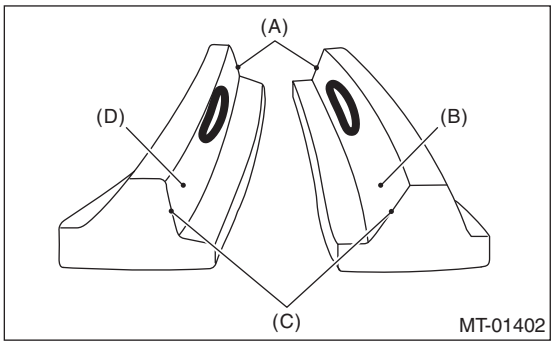
Part No. 38415AA100 Axle shaft



3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

Check tooth contact of hypoid driven gear as follows: Apply a thin uniform coat of red lead on both teeth surfaces on 3 or 4 teeth of the hypoid gear. Move the hypoid driven gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on the hypoid driven gear, and judge whether face contact is correct. When the contact pattern is not correct, adjust. <Ref. to 6MT(TY75)-119, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



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

F: ADJUSTMENT

1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential assembly. <Ref. to 6MT(TY75)-112, DISASSEMBLY, Front Differential Assembly.>
2) Select the adjusting washer from the table and install.

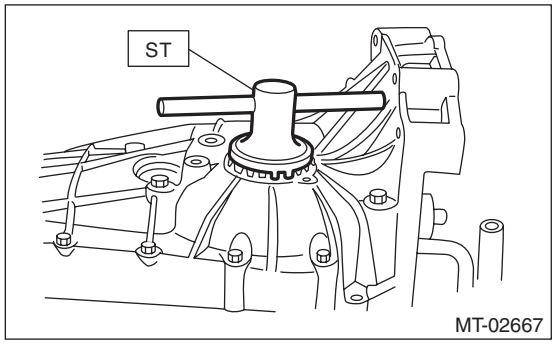
Adjusting washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) Adjust until the standard value is obtained.

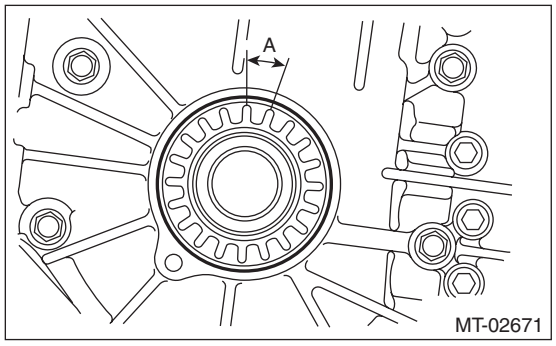
Backlash:
Standard
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID DRIVEN GEAR BACKLASH

Adjust the backlash by turning the differential side retainers on the left and right side.
ST 18630AA010 WRENCH COMPL RETAINER



NOTE:
Each time the differential side retainer rotates by one notch (A), the backlash changes by 0.05 mm (0.0020 in).

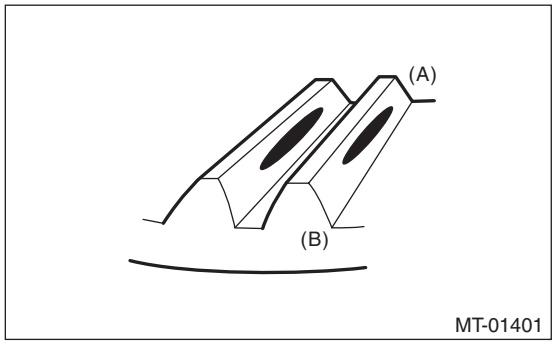


3. TOOTH CONTACT OF HYPOID DRIVEN GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact, and perform the adjustment as follows.

- 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.)

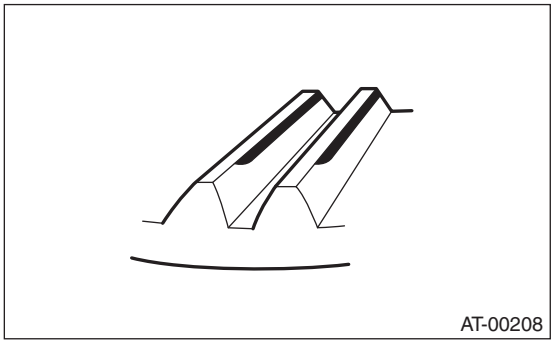


(A) Toe side
(B) Heel side

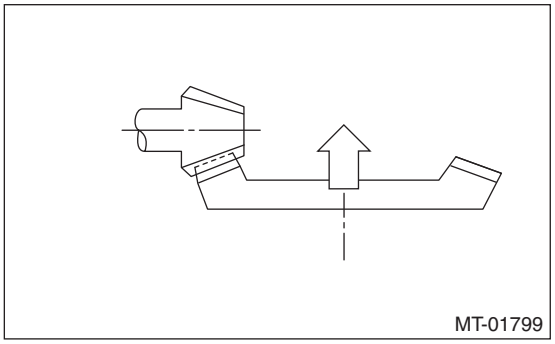
- Face contact

Check item: Backlash is too large.

Contact pattern



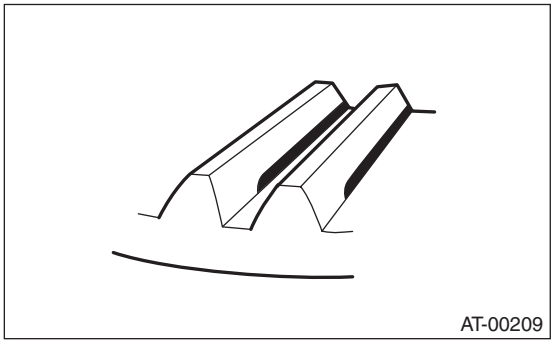
Corrective action: Tighten the differential side retainer to move the hypoid driven gear closer to the drive pinion shaft.



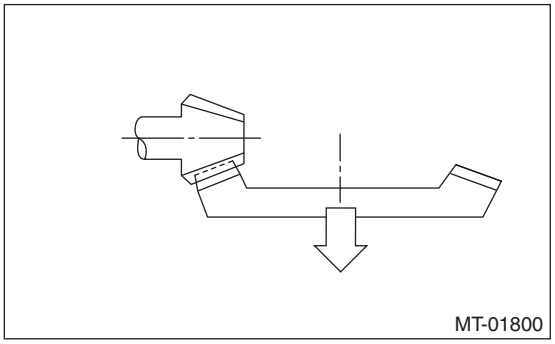
- Flank contact

Check item: Backlash is too small.

Contact pattern



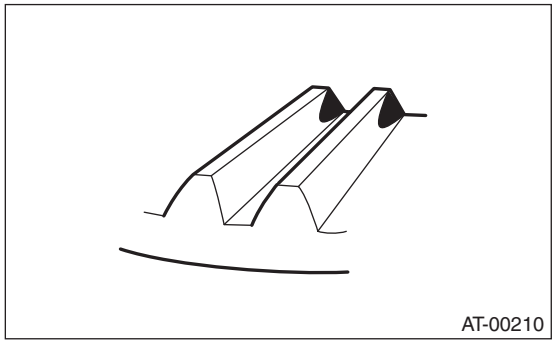
Corrective action: Loosen the differential side retainer to move the hypoid driven gear away from the drive pinion shaft.



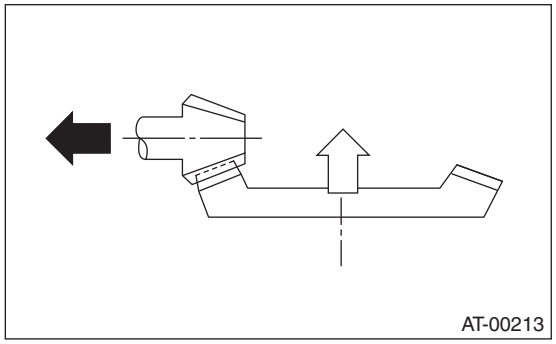
- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



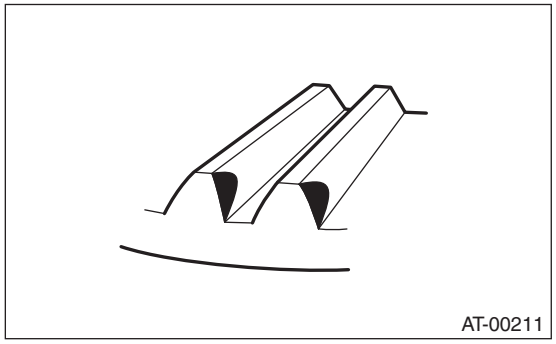
Corrective action: Increase the thickness of drive pinion shim and tighten the differential side retainer to move the hypoid driven gear closer to the drive pinion shaft according to the procedure for bringing drive pinion shaft away from hypoid driven gear.



- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



Corrective action: Reduce thickness of the drive pinion shim according to the procedures for moving the drive pinion shaft closer to hypoid driven gear. Also loosen the differential side retainer to move the hypoid driven gear away from the drive pinion shaft.