

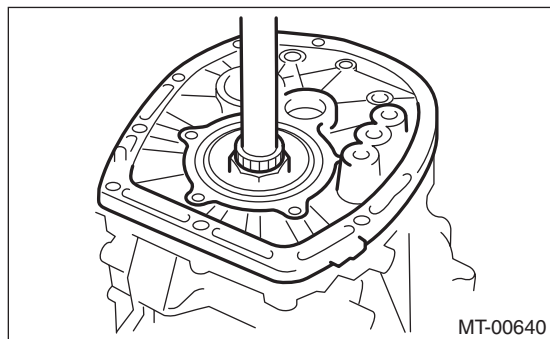
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

22. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT(TY85)-31, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT(TY85)-38, Preparation for Overhaul.>
- 3) Remove the neutral position switch, back-up light switch and harness. <Ref. to 6MT(TY85)-41, REMOVAL, Neutral Position Switch.> <Ref. to 6MT(TY85)-40, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT(TY85)-42, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT(TY85)-54, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT(TY85)-56, REMOVAL, Center Differential.>
- 7) Remove the transmission case. <Ref. to 6MT(TY85)-57, REMOVAL, Transmission Case.>
- 8) Remove the individual gear assemblies. <Ref. to 6MT(TY85)-63, REMOVAL, Main Shaft Assembly.>
- 9) Remove the drive pinion shaft assembly.

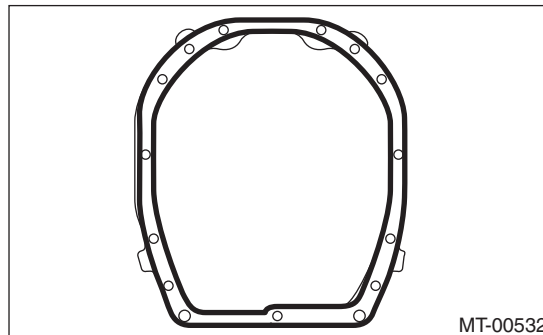


B: INSTALLATION

- 1) Remove any remaining gasket material from the drive plate and clutch housing.
- 2) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215B or equivalent



- 3) Install the individual gear assemblies. <Ref. to 6MT(TY85)-64, INSTALLATION, Main Shaft Assembly.>
- 4) Install the transmission case. <Ref. to 6MT(TY85)-59, INSTALLATION, Transmission Case.>
- 5) Install the center differential. <Ref. to 6MT(TY85)-56, INSTALLATION, Center Differential.>
- 6) Install the transfer driven gear. <Ref. to 6MT(TY85)-54, INSTALLATION, Transfer Driven Gear.>
- 7) Install the extension case. <Ref. to 6MT(TY85)-42, INSTALLATION, Extension Case.>
- 8) Install the neutral position switch, back-up light switch and harness. <Ref. to 6MT(TY85)-41, INSTALLATION, Neutral Position Switch.> <Ref. to 6MT(TY85)-40, INSTALLATION, Back-up Light Switch.>
- 9) Install the manual transmission assembly to the vehicle. <Ref. to 6MT(TY85)-33, INSTALLATION, Manual Transmission Assembly.>

Drive Pinion Shaft Assembly

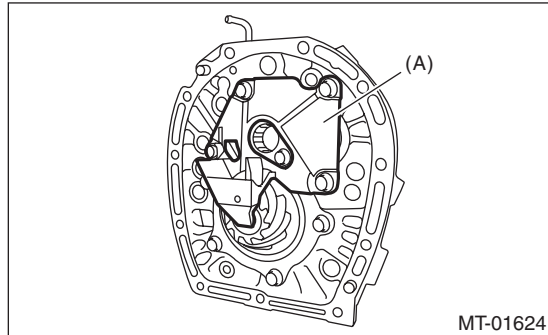
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

NOTE:

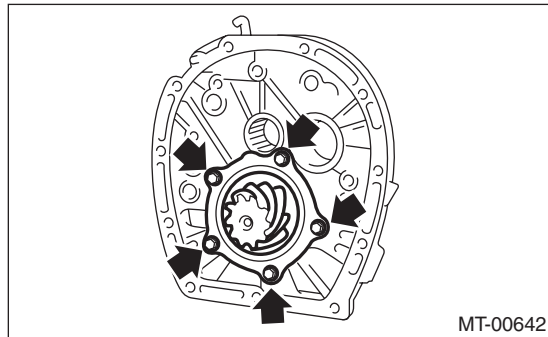
Replace the drive pinion shaft and hypoid driven gear as a set.

1) Remove the oil guide A.



(A) Oil guide A

2) Remove the drive pinion shaft and shim from the adapter plate.



3) Affix the ST to the work table.

ST 18664AA000 BASE

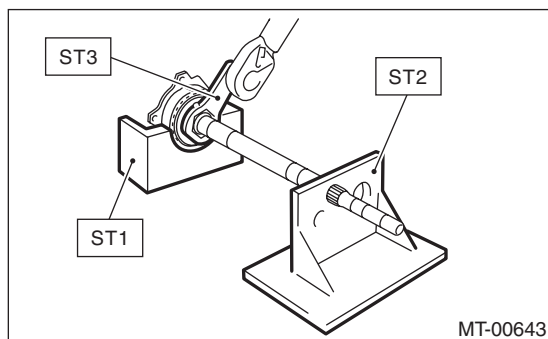
4) Flatten the tab of the lock nut.

5) Attach ST3 to the lock nut, and set the drive pinion shaft to ST. Remove the lock nut and lock washer.

ST1 18667AA000 HOLDER

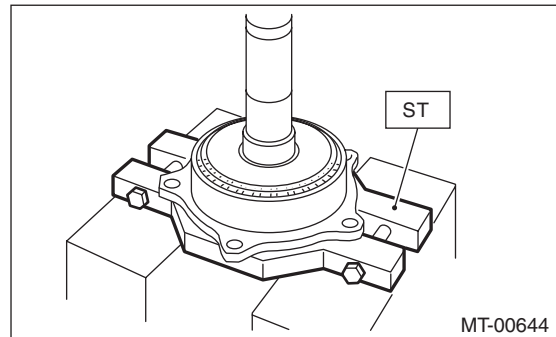
ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH



6) Using the ST, remove the double taper roller bearing assembly.

ST 18723AA000 REMOVER



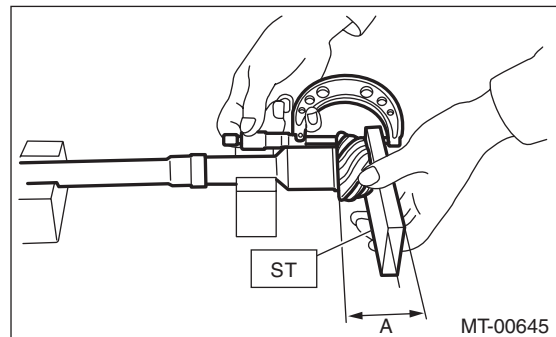
D: ASSEMBLY

1) Using the ST, measure drive pinion measurement A.

NOTE:

When selecting the drive pinion shim, refer to measurement A.

ST 398643600 GAUGE



2) Using the ST and a press, attach the double taper roller bearing inner race (front side) to the drive pinion shaft.

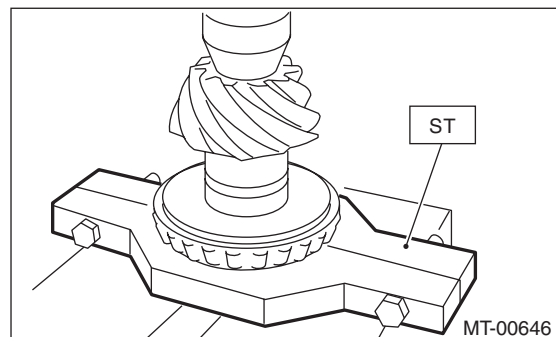
ST 18723AA000 REMOVER

CAUTION:

Do not apply pressure in excess of 40 kN (4.0 ton, 4.4 US ton, 3.9 Imp ton).

NOTE:

Use a new double taper roller bearing.



Drive Pinion Shaft Assembly

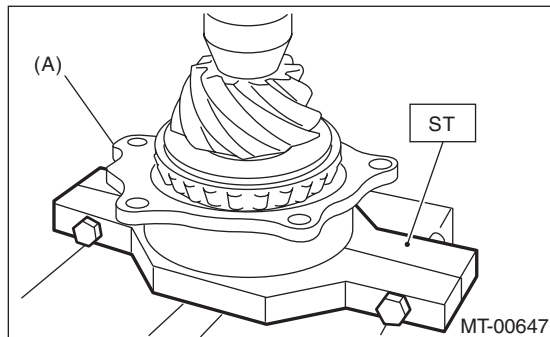
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Using the ST and a press, attach the double taper bearing outer race and the double taper roller bearing to the drive pinion shaft.

ST 18723AA000 REMOVER

NOTE:

- Use a new double taper roller bearing.
- Push in to a position where the bearing rotates smoothly.



(A) Double taper roller bearing outer race

4) Attach a new lock washer and a new lock nut.

5) Set the ST to the drive pinion, and tighten the lock nut.

ST1 18667AA000 HOLDER

ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH

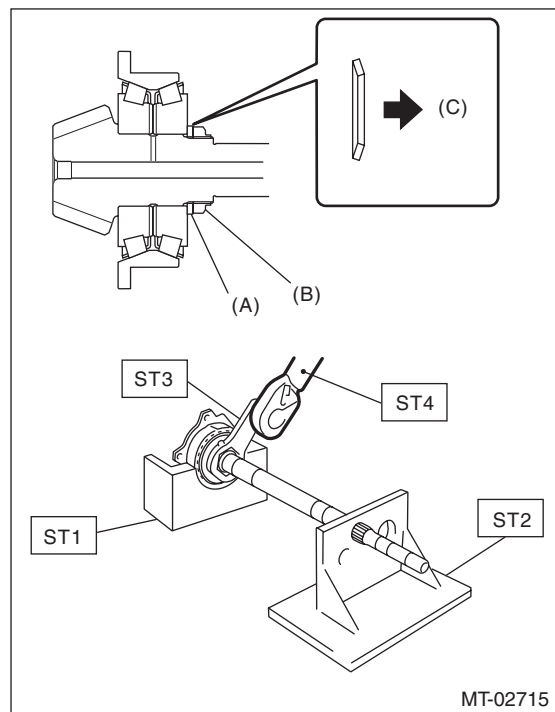
ST4 18852AA000 TORQUE WRENCH

NOTE:

- Tighten using the ST and the straight line torque wrench.
- Make sure the lock washer is installed in the proper direction.

Tightening torque:

265 N·m (27.0 kgf-m, 195.4 ft-lb)



(A) Lock washer

(B) Lock nut

(C) Nut side

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

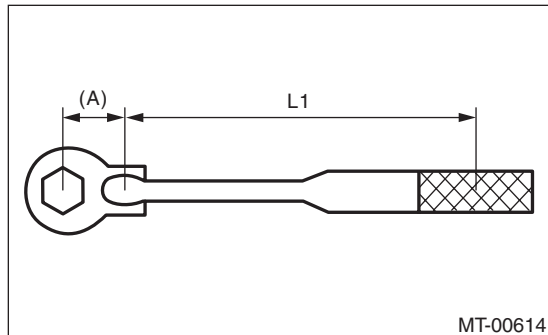
NOTE:

When using a torque wrench other than ST4, use the calculation below to calculate and tighten the lock nut.

Tighten using the ST and the straight line torque wrench.

$$T = L1 / (0.1 + L1) \times 285$$

T	N·m (kgf-m, ft-lb)	Torque wrench setting
L1	m (in)	Torque wrench length
0.1 m (3.94 in)		Length of ST
285 N·m (29.0 kgf-m, 210 ft-lb)		Tightening torque (lock nut)



(A) 0.1 m (3.94 in)

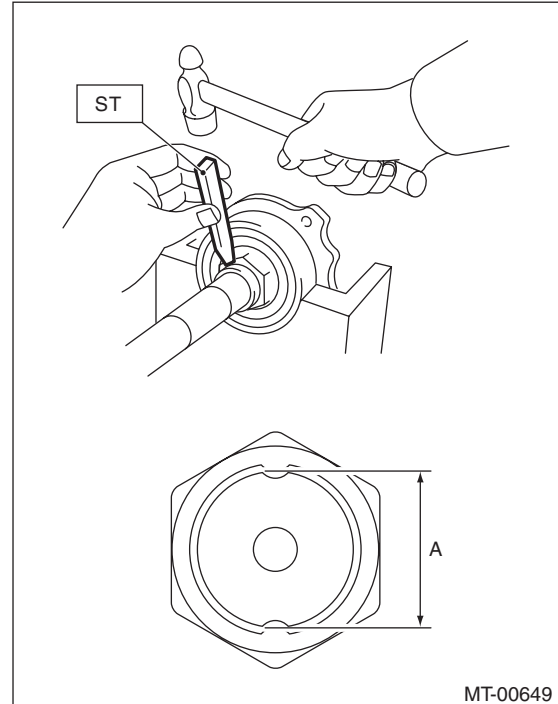
6) Measure the starting torque. <Ref. to 6MT(TY85)-96, INSPECTION, Drive Pinion Shaft Assembly.>

7) Using the ST, crimp the lock nut in 2 locations, with dimensions within A 37 ± 0.5 mm (1.46 ± 0.02 in).

ST 18670AA000 PUNCH

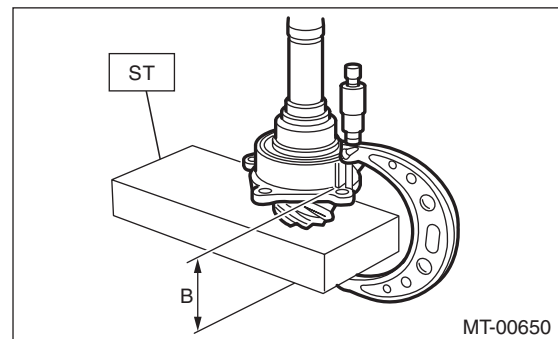
NOTE:

Do not damage the crimp area of the lock nut.



8) Using the ST, measure drive pinion measurement B.

ST 398643600 GAUGE



Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Calculate from the calculation below to select 1 or 2 drive pinion shims from the following table.
 $6.5 \pm 0.0625 \text{ mm} - (B - A)$ [$0.26 \pm 0.0025 \text{ in} - (B - A)$]

NOTE:

A: Measurement value in step 1)

B: Measurement value in step 8)

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA270	0.15 (0.0059)
32295AA280	0.175 (0.0069)
32295AA290	0.20 (0.0079)
32295AA300	0.225 (0.0089)
32295AA310	0.25 (0.0098)
32295AA320	0.275 (0.0108)

10) Apply transmission gear oil to the side face of the double taper roller bearing, and attach the drive pinion shaft and the selected shims to the adapter plate.

Tightening torque:

54 N·m (5.5 kgf-m, 39.8 ft-lb)

11) Install the oil guide A.

Tightening torque:

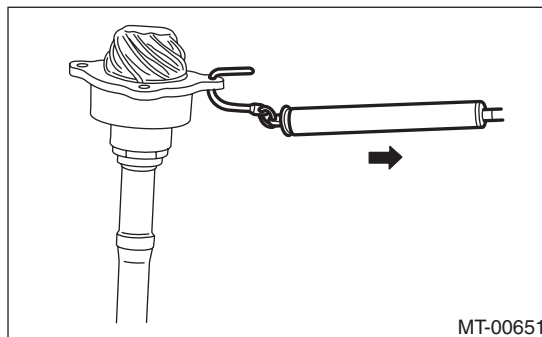
18 N·m (1.8 kgf-m, 13.3 ft-lb)

E: INSPECTION

1) Using a spring scale, measure the starting torque. If the starting torque is outside the specification range, replace the double taper roller bearing.

Starting torque:

0 — 0.95 N (0 — 0.097 kgf, 0 — 0.21 lbf)



2) Gear

Replace gears in the following cases.

- The gear teeth surface is damaged or excessively worn.

3) Bearing

Replace the bearings in the following cases.

- Wear, rusting or damage of the bearings
- The bearing does not rotate smoothly or an abnormal noise is emitted when turning.

4) Adapter plate

Replace the adapter plate in the following cases:

- Wear, rusting or damage of the bearings
- Damage of the adapter plate

5) Check that the pipes and pipe chambers are not damaged or clogged. Repair or replace if damaged or clogged.

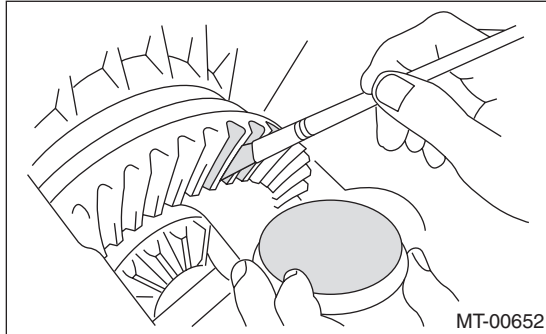
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1) Inspect and adjust the hypoid driven gear-to-drive pinion backlash. <Ref. to 6MT(TY85)-103, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2) Apply a thin uniform coat of lead-free red dye on the surfaces of 3 or 4 hypoid driven gear teeth.



3) Install the drive pinion shaft assembly to the clutch housing, and tighten at least 4 bolts.

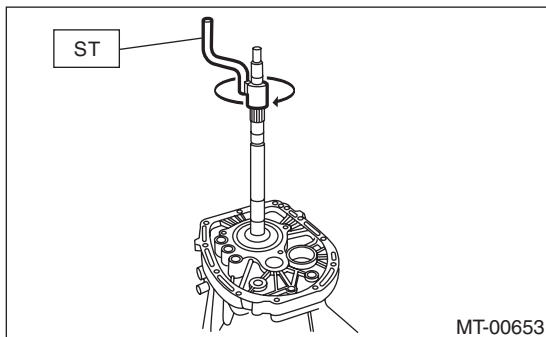
NOTE:

Install with the remaining liquid gasket, so that the clutch housing and the adapter plate will not be damaged.

Tightening torque:

50 N·m (5.1 kgf-m, 36.9 ft-lb)

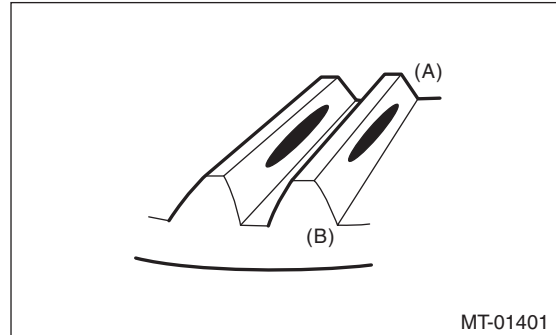
4) Turn a few times using the ST.
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and inspect the mating condition of the teeth. If the tooth contact is not correct, adjust the backlash or shim thickness.

- 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.)

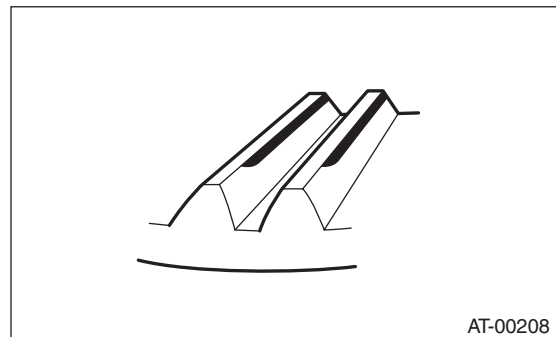


- (A) Toe side
- (B) Heel side

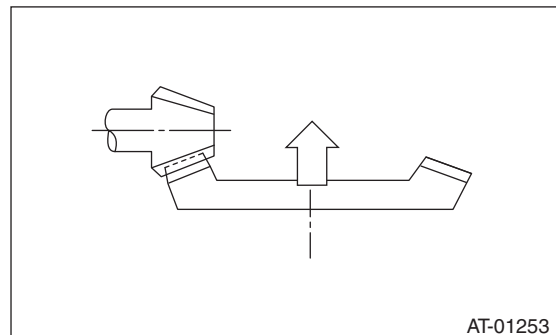
- Face contact

Check item: Backlash is too large.

Contact pattern



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



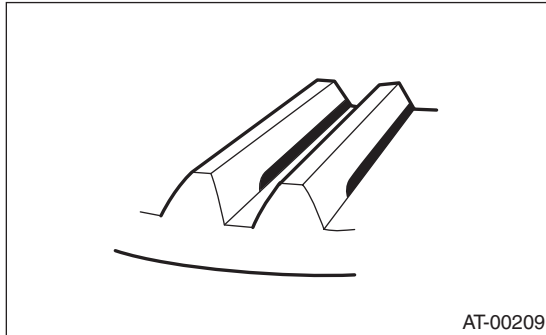
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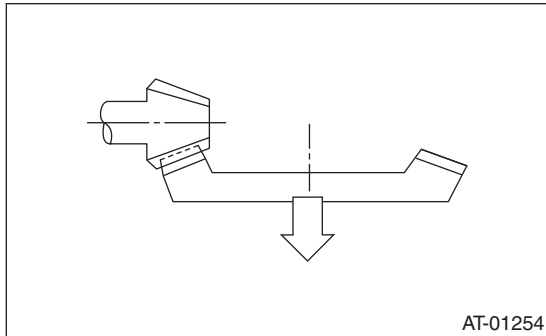
- Flank contact

Check item: Backlash is too small.

Contact pattern



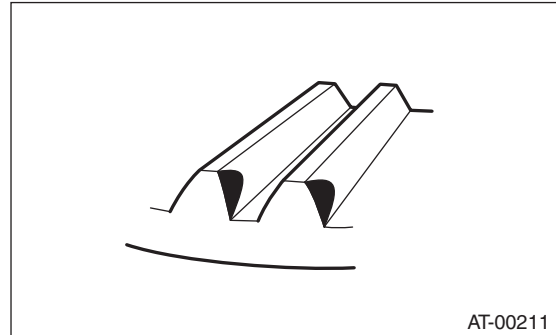
Corrective action: Loosen the side retainer to move the driven gear away from the drive pinion shaft.



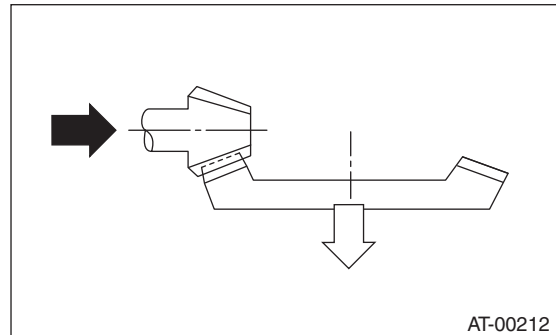
- Heel contact (outside end contact)

Check item: Teeth contact area is too small.

Contact pattern



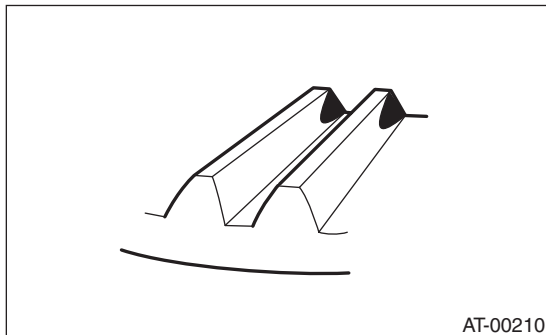
Adjustment: Increase thickness of the drive pinion shim according to the procedures for moving the drive pinion closer to the driven gear.



- Toe contact (inside contact)

Check item: Teeth contact area is too small.

Contact pattern



Adjustment: Reduce the thickness of the drive pinion shim according to the procedure for moving the drive pinion away from the driven gear.

