

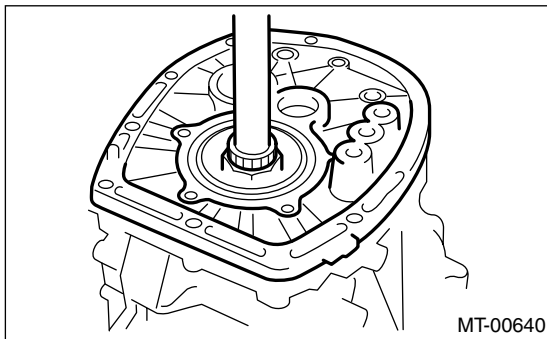
DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

22. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 6MT-35, REMOVAL, Manual Transmission Assembly.>
- 2) Prepare the transmission for overhaul. <Ref. to 6MT-40, Preparation for Overhaul.>
- 3) Remove the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, REMOVAL, Oil Pipe.>, <Ref. to 6MT-45, REMOVAL, Neutral Position Switch.>, <Ref. to 6MT-43, REMOVAL, Back-up Light Switch.>
- 4) Remove the extension case. <Ref. to 6MT-47, REMOVAL, Extension Case.>
- 5) Remove the transfer driven gear. <Ref. to 6MT-58, REMOVAL, Transfer Driven Gear.>
- 6) Remove the center differential. <Ref. to 6MT-60, REMOVAL, Center Differential.>
- 7) Remove the oil pump. <Ref. to 6MT-61, REMOVAL, Oil Pump.>
- 8) Remove the transmission case. <Ref. to 6MT-65, REMOVAL, Transmission Case.>
- 9) Remove each gear assembly. <Ref. to 6MT-70, REMOVAL, Main Shaft Assembly.>
- 10) Remove the drive pinion shaft assembly.

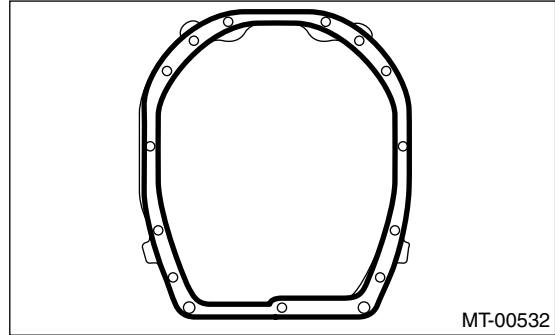


B: INSTALLATION

- 1) Completely remove the remaining gasket on drive plate and clutch housing.
- 2) Apply liquid gasket to the clutch housing.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007)



- 3) Install each gear assembly. <Ref. to 6MT-71, INSTALLATION, Main Shaft Assembly.>
- 4) Install the transmission case. <Ref. to 6MT-66, INSTALLATION, Transmission Case.>
- 5) Install the oil pump. <Ref. to 6MT-62, INSTALLATION, Oil Pump.>
- 6) Install the center differential. <Ref. to 6MT-60, INSTALLATION, Center Differential.>
- 7) Install the transfer driven gear. <Ref. to 6MT-58, INSTALLATION, Transfer Driven Gear.>
- 8) Install the extension case. <Ref. to 6MT-47, INSTALLATION, Extension Case.>
- 9) Install the oil pipe, neutral position switch, back-up light switch and harness. <Ref. to 6MT-42, INSTALLATION, Oil Pipe.>, <Ref. to 6MT-45, INSTALLATION, Neutral Position Switch.>, <Ref. to 6MT-43, INSTALLATION, Back-up Light Switch.>
- 10) Install the manual transmission assembly to vehicle. <Ref. to 6MT-37, INSTALLATION, Manual Transmission Assembly.>

DRIVE PINION SHAFT ASSEMBLY

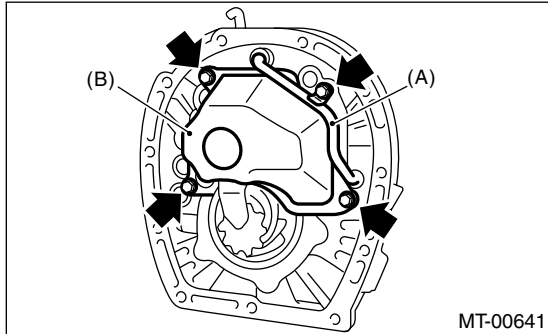
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

NOTE:

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

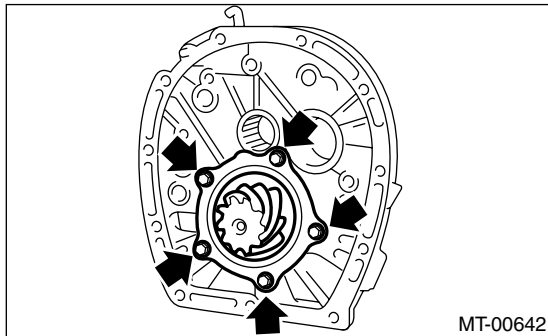
1) Remove the pipe and oil chamber.



(A) Pipe

(B) Oil chamber

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



3) Secure the ST on workbench.

ST 18664AA000 BASE

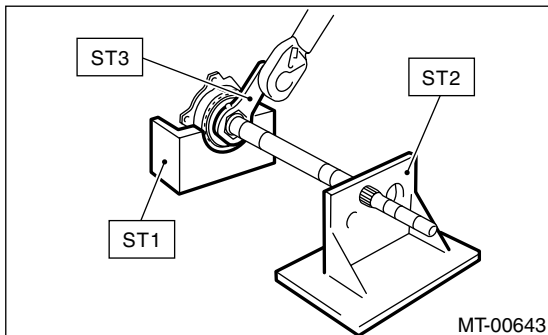
4) Lift the caulking of lock nut.

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

ST1 18667AA000 HOLDER

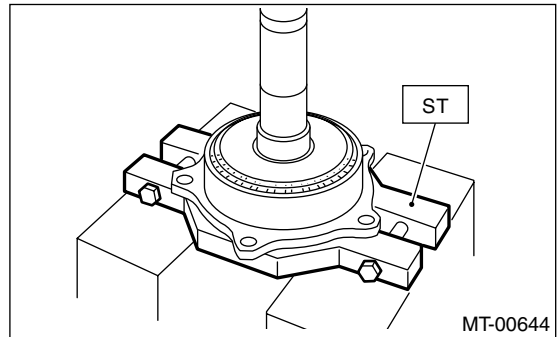
ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH



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

ST 18723AA000 REMOVER



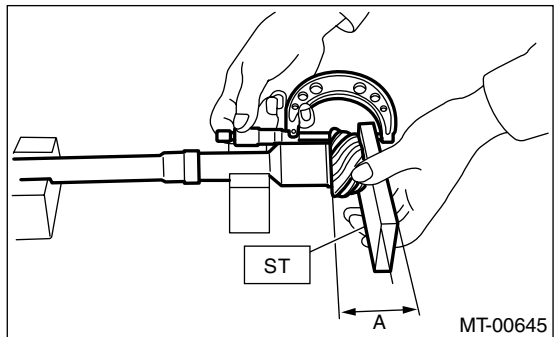
D: ASSEMBLY

1) Using the ST, measure dimension A of drive pinion.

NOTE:

Note dimension A for selection of drive pinion shim.

ST 398643600 GAUGE

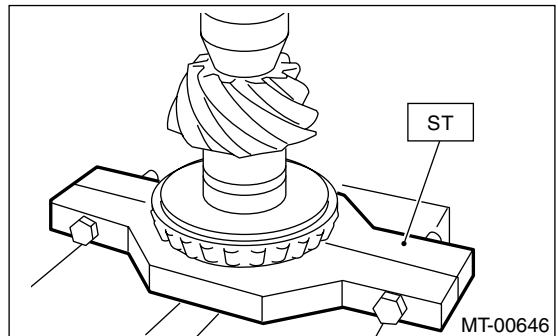


2) Install the inner bearing inner race to drive pinion shaft using ST and press.

ST 18723AA000 REMOVER

CAUTION:

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



DRIVE PINION SHAFT ASSEMBLY

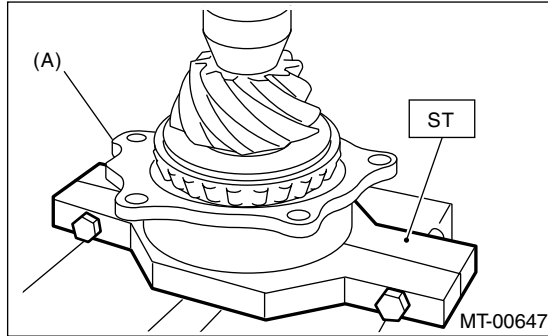
MANUAL TRANSMISSION AND DIFFERENTIAL

3) Install the retainer and outer bearing inner race to drive pinion shaft using ST and press.

ST 18723AA000 REMOVER

NOTE:

Press to the point where bearing is turned smoothly without slack.



(A) Retainer

4) Install the washer and a new lock nut.
5) Set the ST to drive pinion, then tighten the lock nut.

ST1 18667AA000 HOLDER

ST2 18664AA000 BASE

ST3 18621AA000 ADAPTER WRENCH

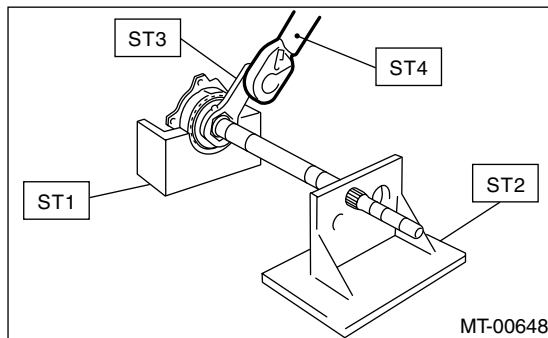
ST4 18852AA000 TORQUE WRENCH

NOTE:

Tighten with the ST and torque wrench straight-lined.

Tightening torque:

265 N·m (27.0 kgf·m, 195 ft·lb)

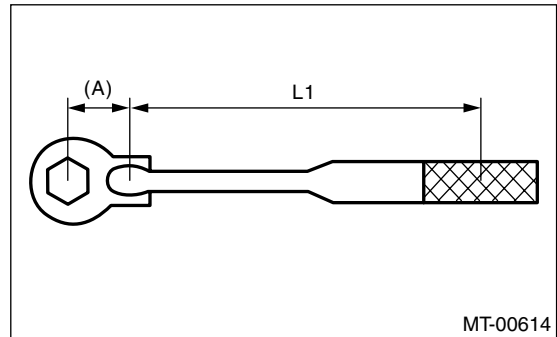


NOTE:

• If torque wrench except ST4 is used, calculate the following equation, then tighten the lock nut.
Tighten with the ST and torque wrench straight-lined.

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

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



(A) 0.1 m (3.94 in)

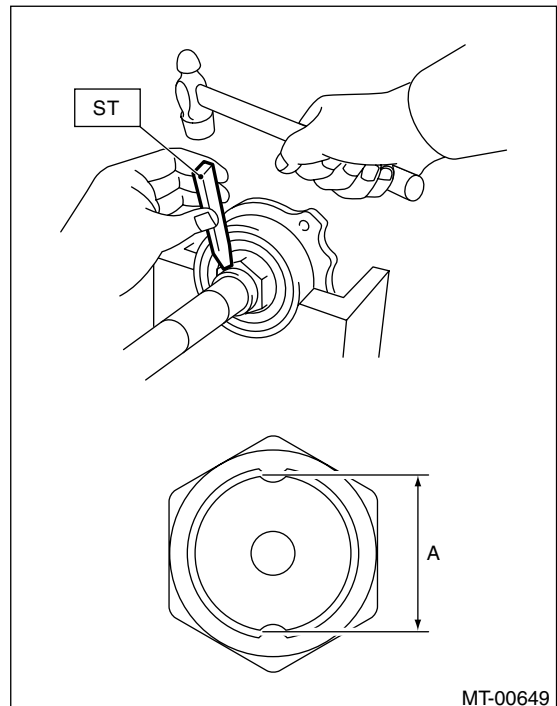
6) Measure the starting torque. <Ref. to 6MT-100, INSPECTION, Drive Pinion Shaft Assembly.>

7) Using the ST, caulk two portions on the lock nut to obtain dimension A 37 ± 0.5 mm (1.46 ± 0.02 in).

ST 18670AA000 PUNCH

NOTE:

Do not crack the caulking part of lock nut.

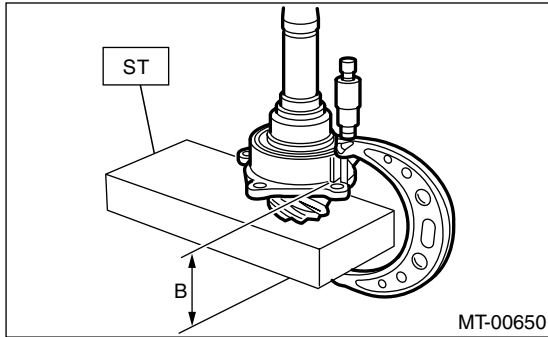


DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Using the ST, measure dimension B of the drive pinion.

ST 398643600 GAUGE



9) Calculate the following formula, then select one or two pieces of drive pinion shim from the table below.

$$6.5 \pm 0.0625 \text{ mm} - (B - A) [0.26 \pm 0.0025 \text{ in} - (B - A)]$$

NOTE:

A: Measured value from step 1).

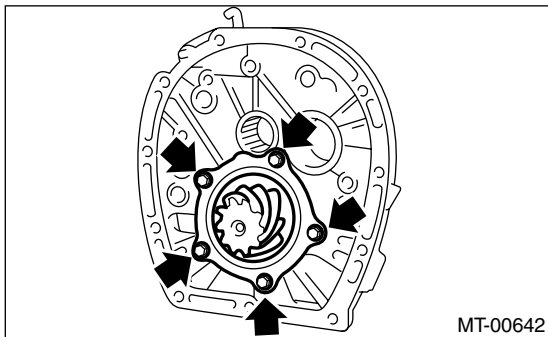
B: Measured value from step 8).

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 gear oil to the side face of taper roller bearing, then install the drive pinion shaft and selected shim to adapter plate.

Tightening torque:

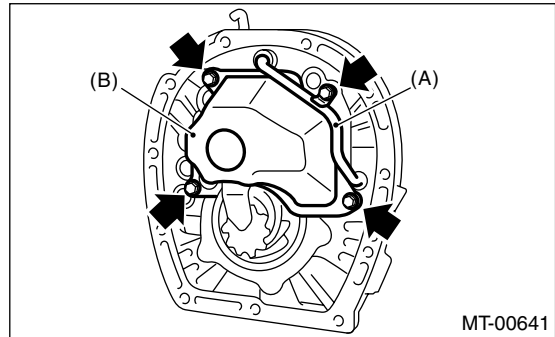
54 N·m (5.5 kgf·m, 40 ft·lb)



11) Install the oil chamber and pipe.

Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)



(A) Pipe

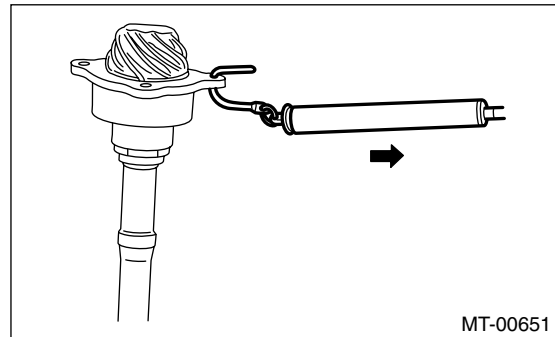
(B) Oil chamber

E: INSPECTION

1) Using the spring balancer, measure the starting torque. If the starting torque is out of specification, replace the taper roller bearing.

Starting torque:

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



2) Gears

Replace the gears in the following case.

- Gear teeth surfaces are broken or excessively worn.

3) Bearings

Replace the bearings in the following cases.

- Worn, rusted and damaged bearing
- Bearings that fail to turn smoothly or make abnormal noise when turned

4) Adapter plate

Replace the adapter plate in the following cases.

- Worn, rusted and damaged bearing
- Damaged adapter plate

5) Make sure the pipe and pipe chamber is not damaged or clogged. Repair or replace if damaged or clogged.

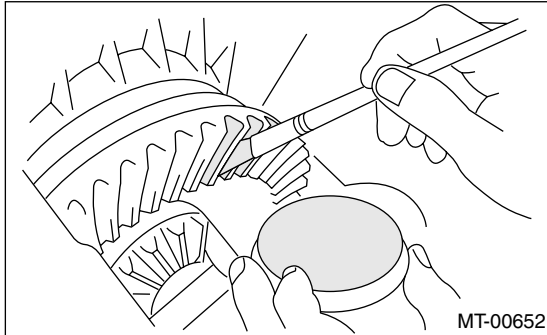
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F: ADJUSTMENT

1) Inspect and adjust the backlash between hypoid driven gear and drive pinion. <Ref. to 6MT-108, HYPOID GEAR BACKLASH, ADJUSTMENT, Front Differential Assembly.>

2) Apply a uniform thin coat of red lead on both teeth surfaces of three or four teeth of the hypoid driven gear.



3) Install the drive pinion shaft assembly to clutch housing, then tighten it with at least four bolts.

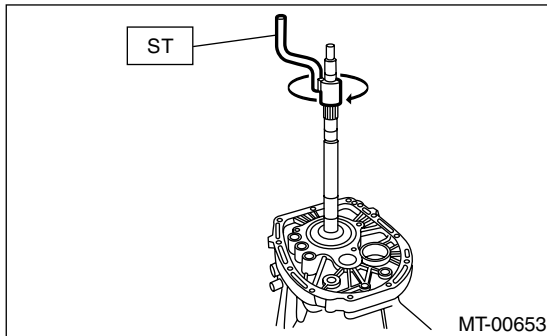
NOTE:

Install it with the remaining liquid gasket to prevent the mating surface of clutch housing and adapter plate from damaging.

Tightening torque:

50 N·m (5.1 kgf·m, 36.9 ft·lb)

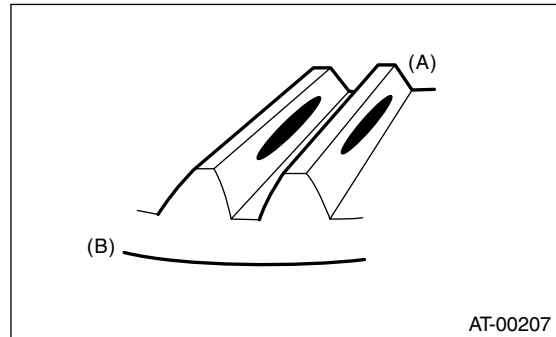
4) Using the ST, rotate several times.
ST 18631AA000 HANDLE



5) Remove the drive pinion shaft assembly, and then check tooth contact. If it is inaccurate, adjust the backlash or thickness of shim.

- Tooth contact

Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



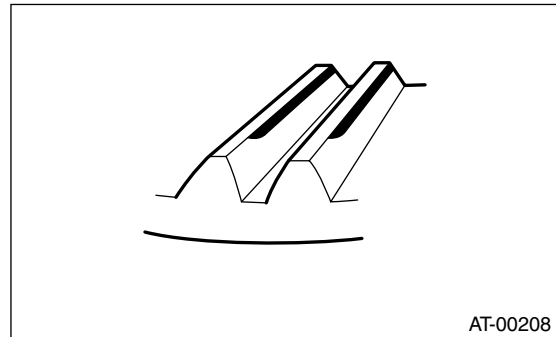
(A) Toe side

(B) Heel side

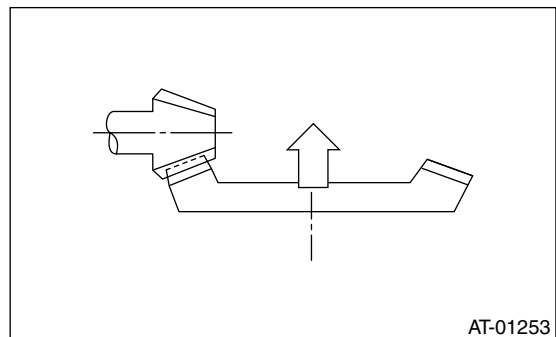
- Face contact

Checking item: Backlash is too large.

Contact pattern



Corrective action: Verify the backlash again, and then adjust it.



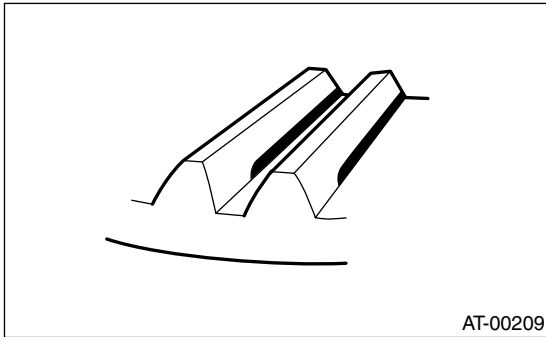
DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

- Flank contact

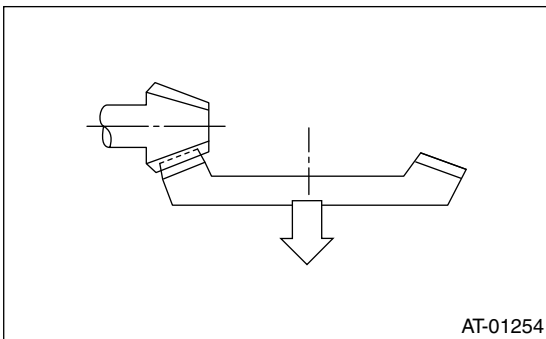
Checking item: Backlash is too small.

Contact pattern



AT-00209

Corrective action: Verify the backlash again, and then adjust it.

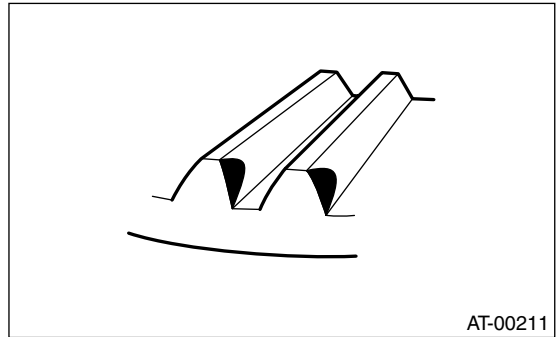


AT-01254

- Heel contact (Outside end contact)

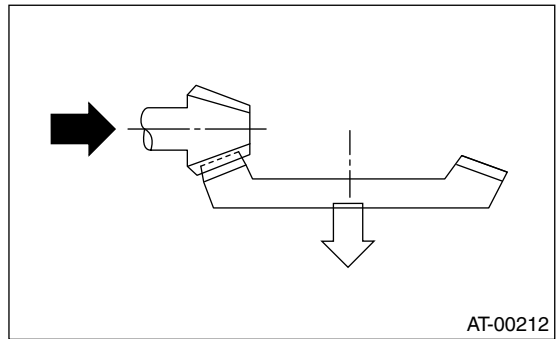
Checking item: Contact areas is small.

Contact pattern



AT-00211

Corrective action: Increase thickness of drive pinion shim in order to bring drive pinion close to crown gear.

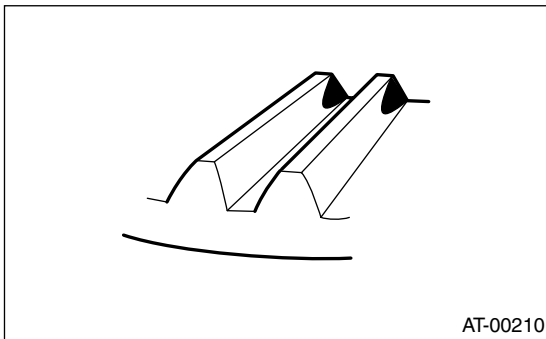


AT-00212

- Toe contact (Inside end contact)

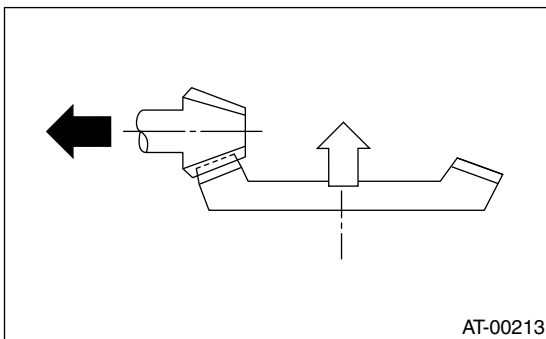
Checking item: Contact areas is small.

Contact pattern



AT-00210

Corrective action: Reduce thickness of drive pinion shim in order to move drive pinion away from crown gear.



AT-00213