

17. Front Differential Assembly

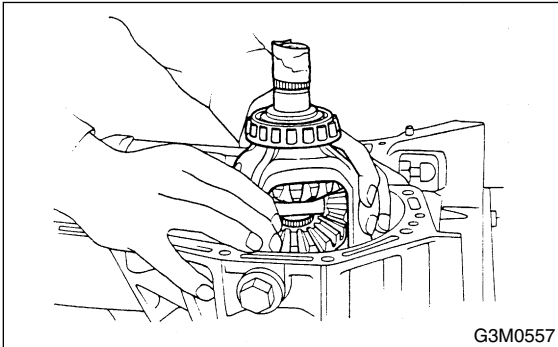
S503152

A: REMOVAL S503152A18

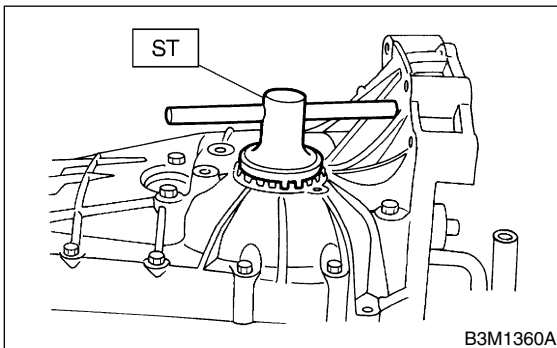
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-27, REMOVAL, Manual Transmission Assembly.>
- 2) Remove transfer case with extension case assembly. <Ref. to MT-39, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove transmission case. <Ref. to MT-51, REMOVAL, Transmission Case.>
- 4) Removes drive pinion shaft assembly. Remove transfer case with extension case assembly. <Ref. to MT-60, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove main shaft assembly. <Ref. to MT-54, REMOVAL, Main Shaft Assembly for Single-Range.>
- 6) Remove 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 differential side retainers using ST. ST 499787000 WRENCH ASSY

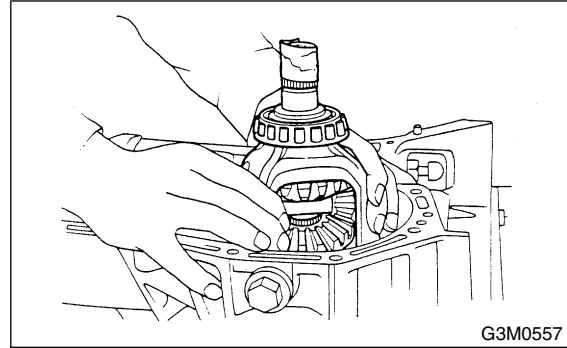


B: INSTALLATION S503152A11

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

NOTE:

- Be careful not to fold the sealing lip of oil seal.
- Wrap the left and right splines sections of axle shaft with vinyl tape to prevent scratches.



- 3) Install main shaft assembly. <Ref. to MT-54, INSTALLATION, Main Shaft Assembly for Single-Range.>
- 4) Install drive pinion assembly. <Ref. to MT-60, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install transmission case. <Ref. to MT-51, INSTALLATION, Transmission Case.>
- 6) Install transfer case with extension case assembly. <Ref. to MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY S503152A06

1. DIFFERENTIAL CASE ASSEMBLY

S503152A0601

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

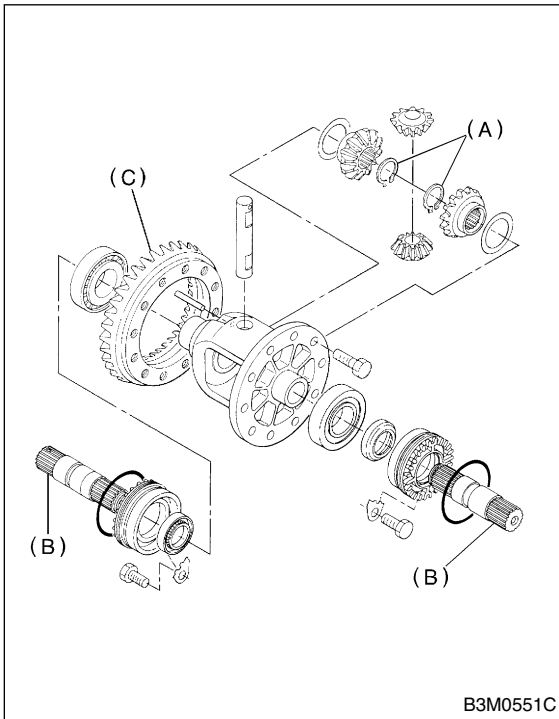
NOTE:

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

FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

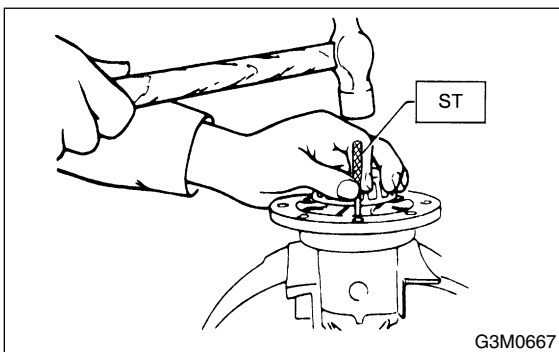
2) Loosen twelve bolts and remove hypoid driven gear.



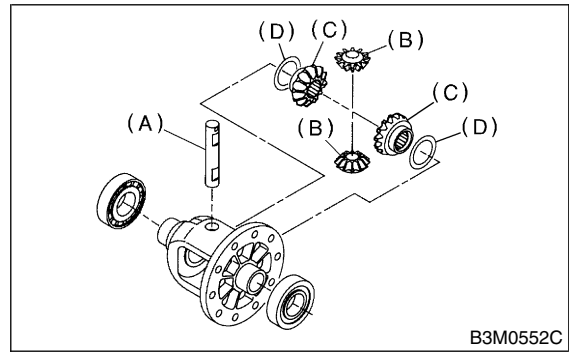
- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid driven gear

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

ST 899904100 REMOVER



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



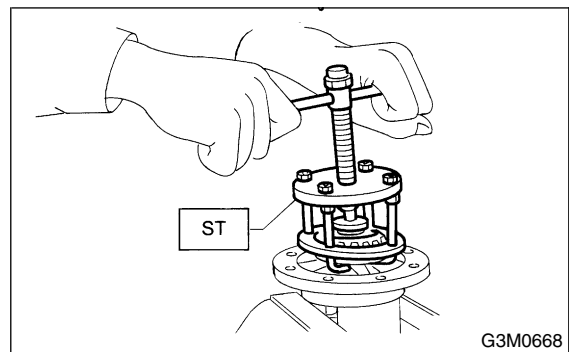
- (A) Pinion shaft
- (B) Bevel pinion
- (C) Bevel gear
- (D) Washer

5) Remove roller bearing using ST.

NOTE:

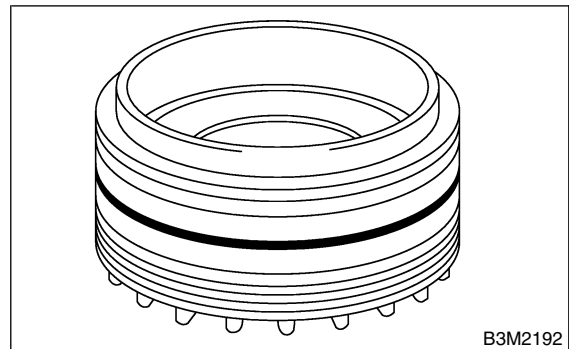
When replacing bearing inner race, replace it with outer race as a set.

ST 399527700 PULLER SET



2. SIDE RETAINER S503152A0602

1) Remove O-ring.



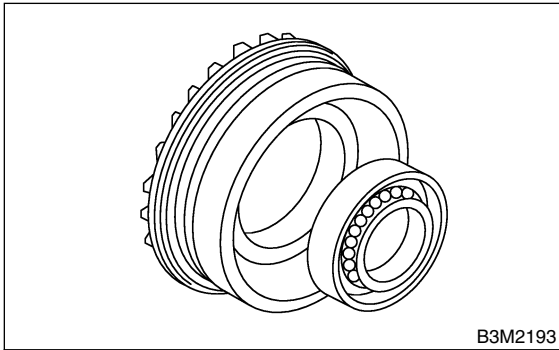
FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

2) Remove oil seal.

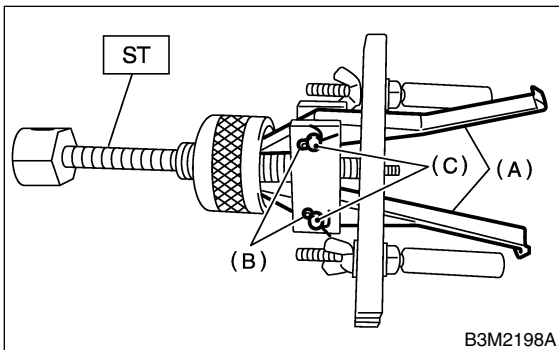
NOTE:

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



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

ST 398527700 PULLER ASSY



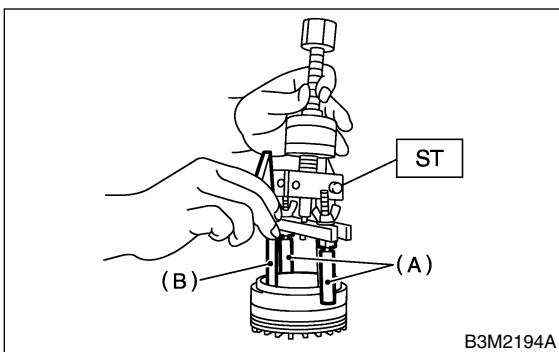
- (A) Claw
- (B) Split pin
- (C) Pin

4) Attach two claws to 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 pin and split pin.

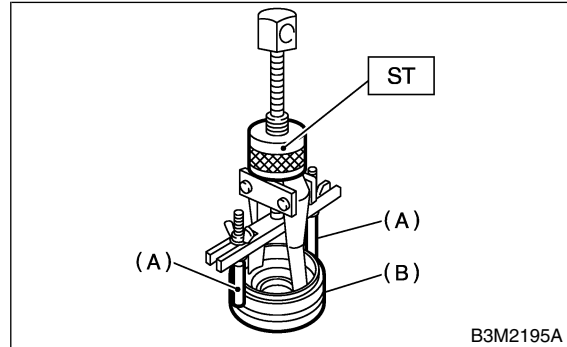


- (A) Shaft
- (B) Claw

5) Remove bearing outer race form side retainer.
ST 398527700 PULLER ASSY

NOTE:

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



- (A) Shaft
- (B) Side retainer

D: ASSEMBLY S503152A02

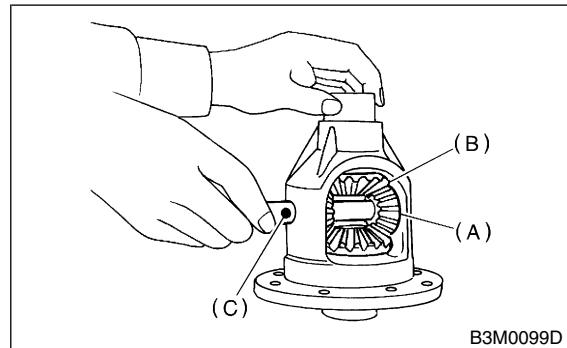
1. DIFFERENTIAL CASE ASSEMBLY

S503152A0201

1) Install 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 backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. < Ref. to MT-74, ADJUSTMENT, Front Differential Assembly.>

NOTE:

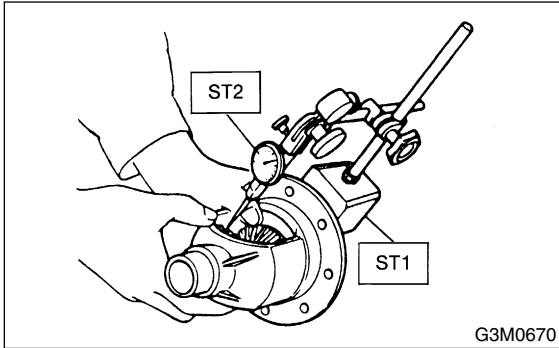
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

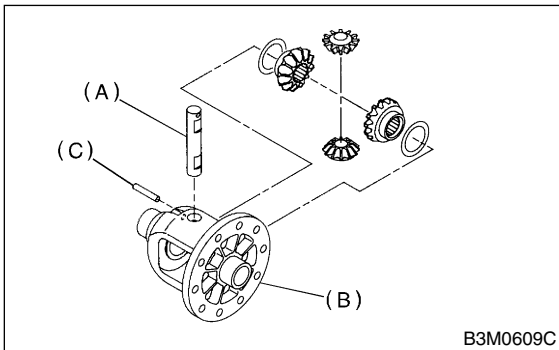


3) Align pinion shaft and differential case at their holes, and drive straight pin into holes from the hypoid driven gear side, using ST.

NOTE:

Lock straight pin after installing.

ST 899904100 REMOVER



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

4) Install roller bearing to differential case.

CAUTION:

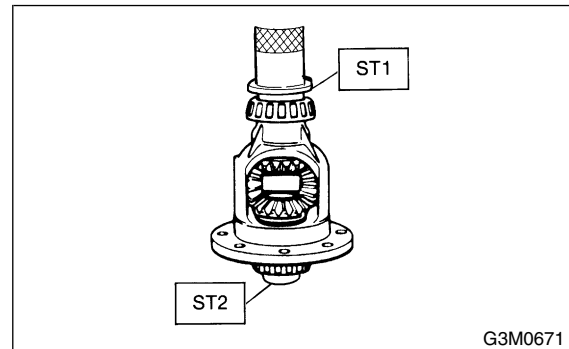
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Be careful to use roller bearing outer races as a set.

ST1 499277100 BUSHING 1-2 INSTALLER

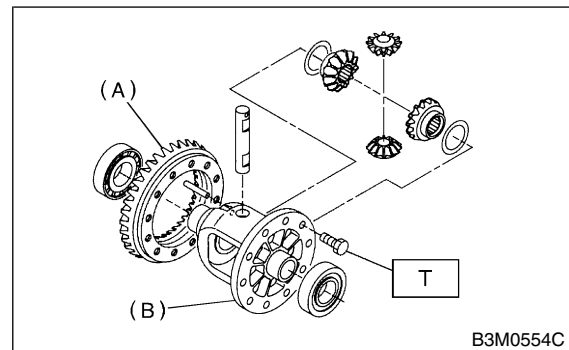
ST2 398497701 ADAPTER



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

Tightening torque:

T: 62 N·m (6.3 kgf·m, 45.6 ft·lb)



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

2. SIDE RETAINER S503152A0202

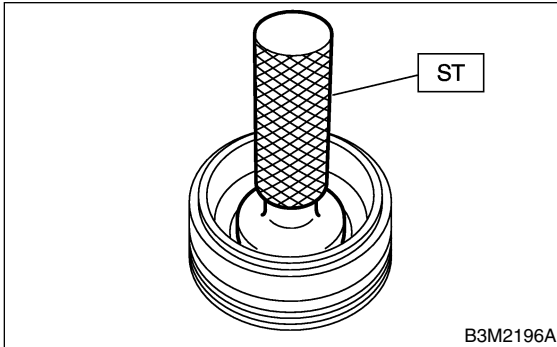
1) Install bearing outer race to side retainer.

NOTE:

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

2) Install new oil seal.

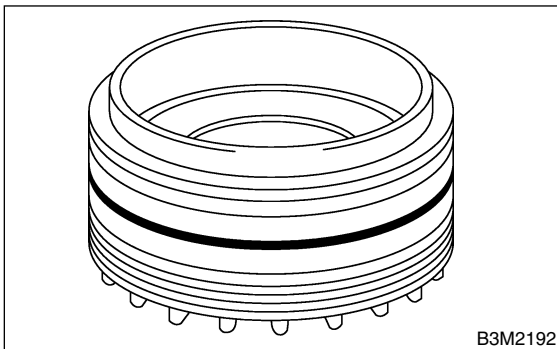
ST 49979700 INSTALLER



3) Install new O-ring.

NOTE:

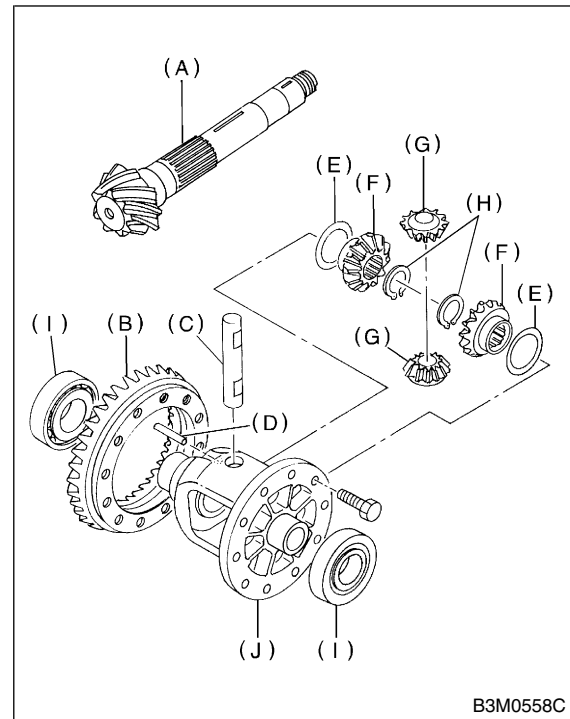
Do not stretch or damage O-ring.



E: INSPECTION S503152A10

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

S503152A1001

Measure 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.

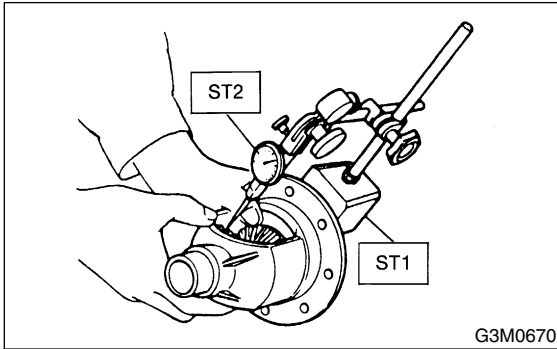
FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID GEAR BACKLASH

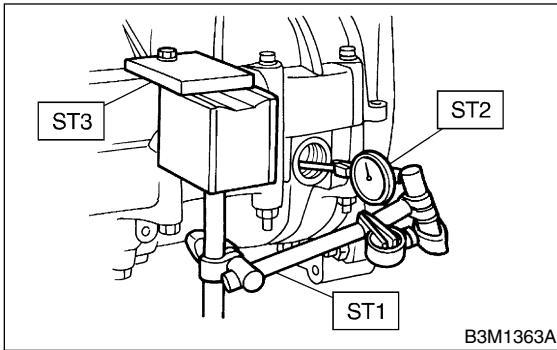
S503152A1002

Set 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:

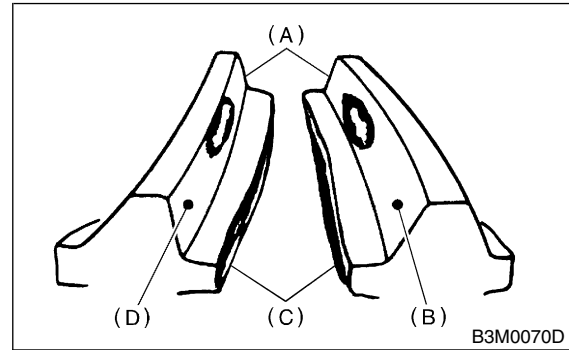
If backlash is outside specified range, adjust it by turning holder in right side case.

3. TOOTH CONTACT OF HYPOID GEAR

S503152A1003

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-74, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



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

F: ADJUSTMENT

S503152A01

1. BEVEL PINION GEAR BACKLASH

S503152A0101

- 1) Disassemble the front differential. <Ref. to MT-69, 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:

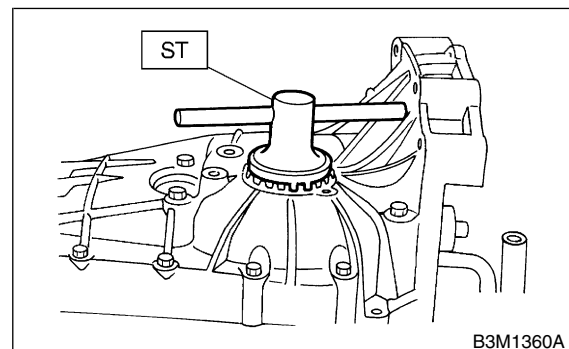
0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

S503152A0102

Adjust backlash by turning holder in the right side case.

ST 499787000 WRENCH ASSY

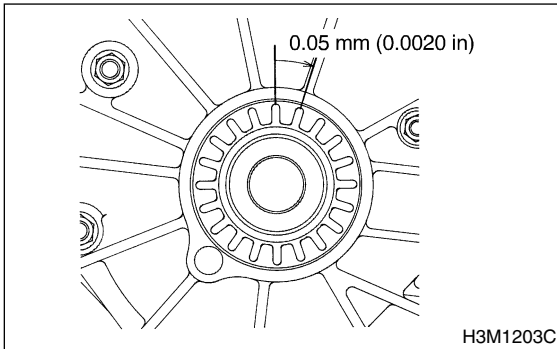


FRONT DIFFERENTIAL ASSEMBLY

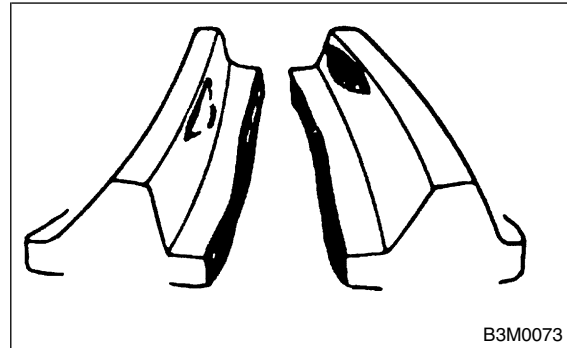
Manual Transmission and Differential

NOTE:

Each time holder rotates one tooth, backlash changes by 0.05 mm (0.0020 in).



- The drive pinion shim selected before is too thick. Reduce its thickness.



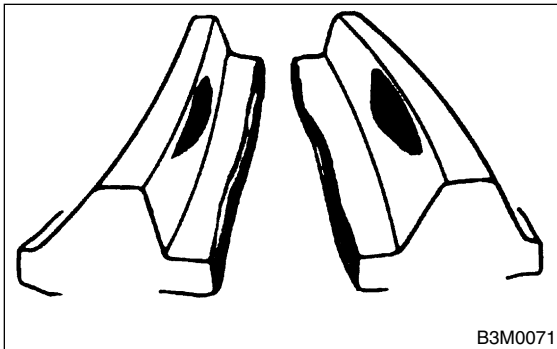
3. TOOTH CONTACT OF HYPOID GEAR

S503152A0103

Adjust until the teeth contact is correct.

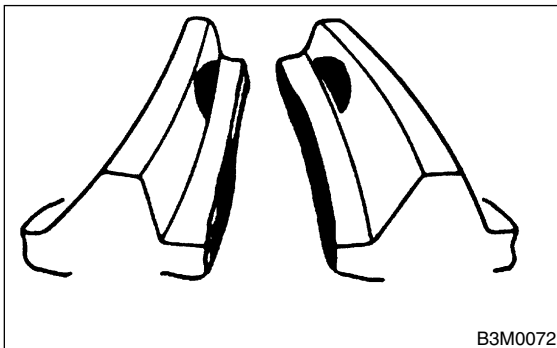
- Backlash is excessive.

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 thin. Increase its thickness.

