

## 15. Front Differential Assembly

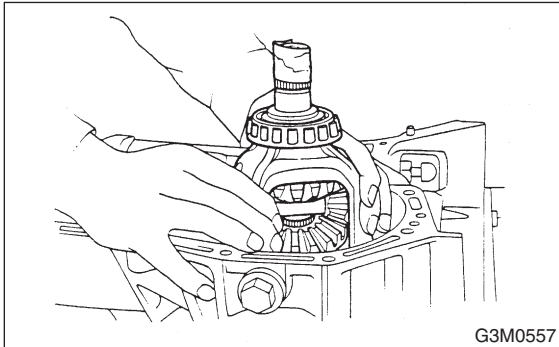
S503152

### A: REMOVAL S503152A18

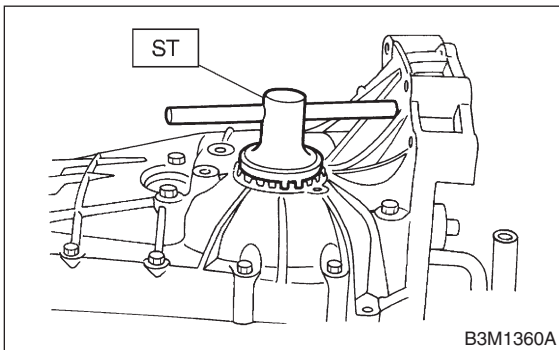
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-27 REMOVAL, Manual Transmission Assembly.>
- 2) Remove back-up light switch and neutral position switch.
- 3) Remove transfer case and extension case assembly. <Ref. to MT-40 REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove transmission case. <Ref. to MT-51 REMOVAL, Transmission Case.>
- 5) Remove drive pinion shaft assembly. <Ref. to MT-59 REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove main shaft assembly. <Ref. to MT-54 REMOVAL, Main Shaft Assembly.>
- 7) Remove differential assembly. <Ref. to MT-69 REMOVAL, Front Differential Assembly.>

#### CAUTION:

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



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



### B: INSTALLATION S503152A11

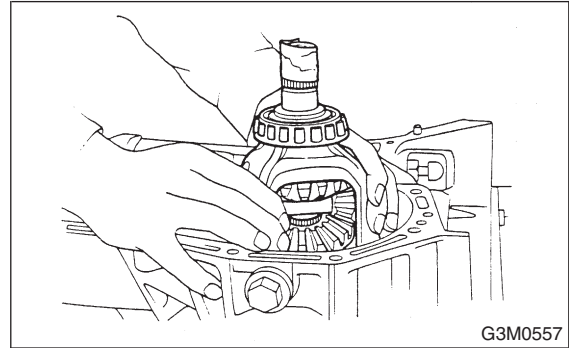
- 1) Install differential assembly. <Ref. to MT-69 INSTALLATION, Front Differential Assembly.>

#### 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.



- 2) Install main shaft assembly. <Ref. to MT-54 INSTALLATION, Main Shaft Assembly.>
- 3) Install drive pinion shaft assembly. <Ref. to MT-59 INSTALLATION, Drive Pinion Shaft Assembly.>
- 4) Install transmission case. <Ref. to MT-51 INSTALLATION, Transmission Case.>
- 5) Install transfer case and extension case assembly. <Ref. to MT-40 INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install back-up light switch and neutral position switch.
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-31 INSTALLATION, Manual Transmission Assembly.>

# FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

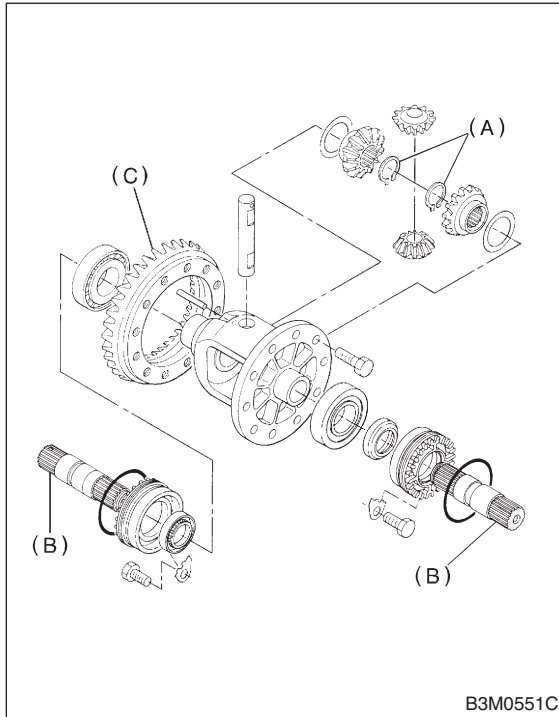
## C: DISASSEMBLY S503152A06

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.

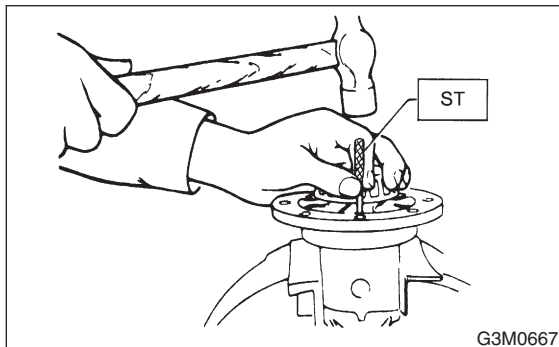
2) Loosen twelve bolts and remove hypoid driven gear.



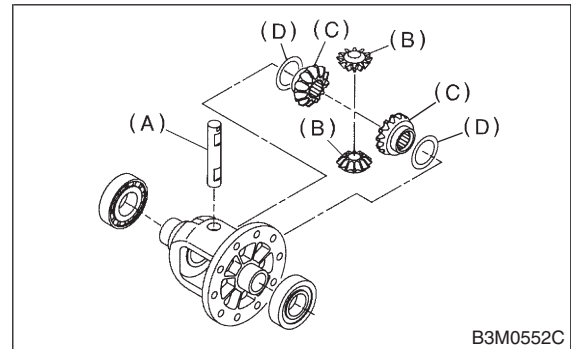
- (A) Snap ring
- (B) Axle drive shaft
- (C) Hypoid driven gear

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

ST 899904100 REMOVER

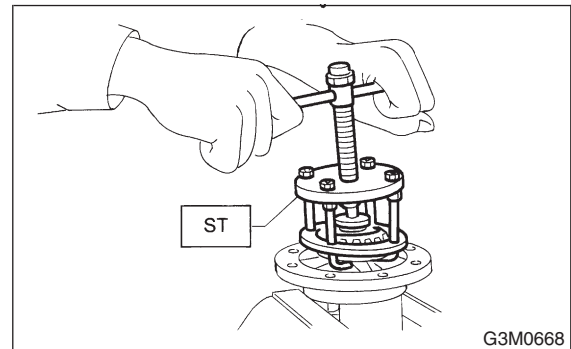


4) Pull out pinion shaft, and remove differential bevel pinion and gear and washer.



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

5) Remove roller bearing using ST 399527700 PULLER SET

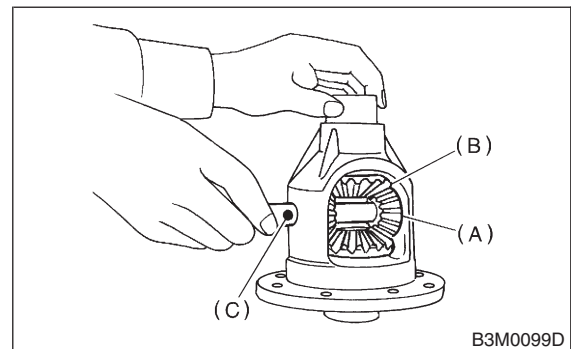


## D: ASSEMBLY S503152A02

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.

## NOTE:

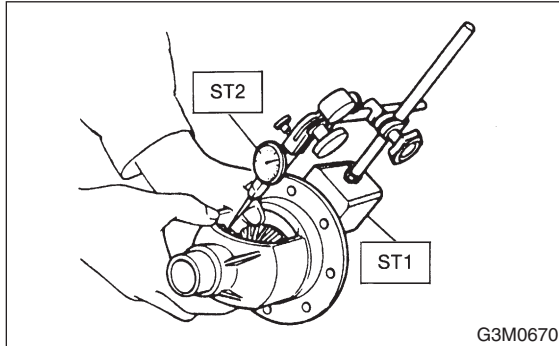
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

## Standard backlash:

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



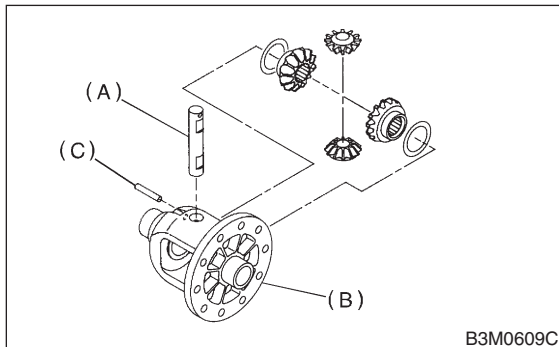
Washer (38.1 × 50 × t)	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

3) 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 (40 × 80 × 19.75) to differential case.

## CAUTION:

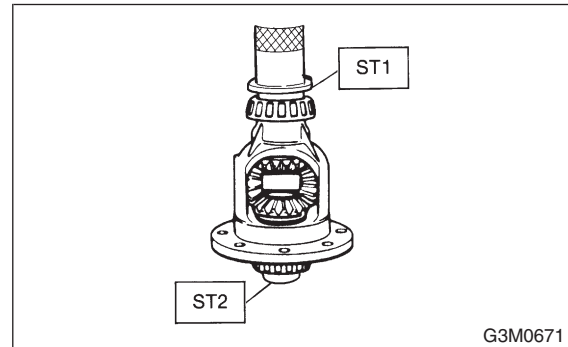
**Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**

## NOTE:

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

ST1 499277100 BUSH 1-2 INSTALLER

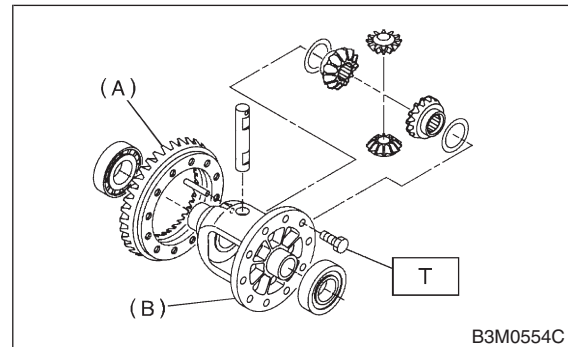
ST2 398497701 ADAPTER



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

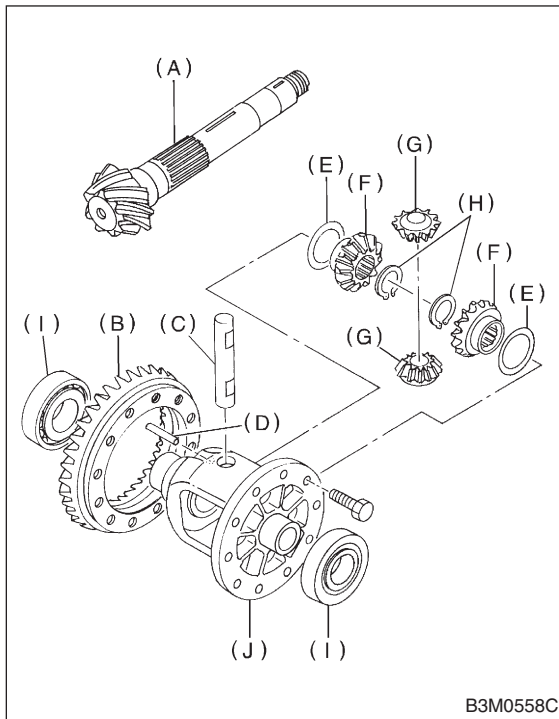
# FRONT DIFFERENTIAL ASSEMBLY

Manual Transmission and Differential

## 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:

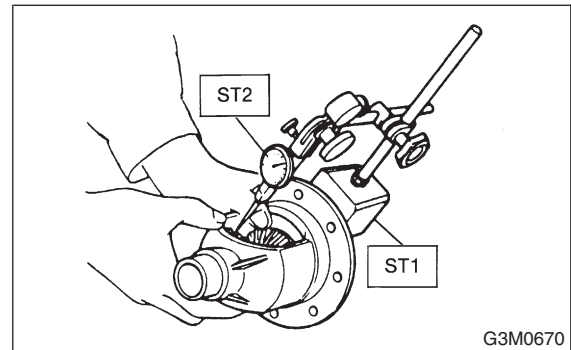
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

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 and ST2. 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.

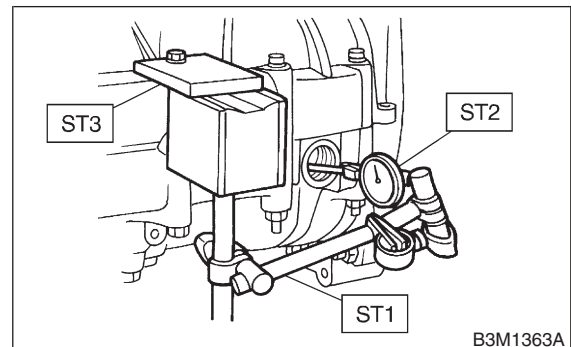
ST1 498247001 MAGNET BASE

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.

# FRONT DIFFERENTIAL ASSEMBLY

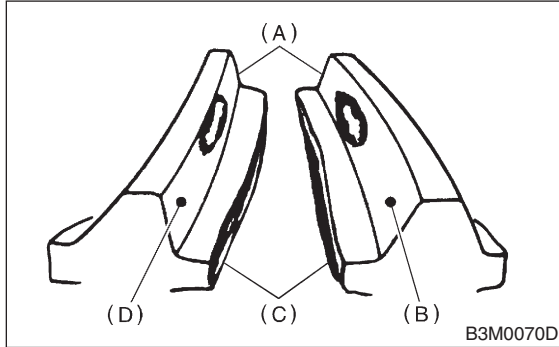
Manual Transmission and Differential

## 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 incorrect, make the following correction.

- 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-70 DISASSEMBLY, Front Differential Assembly.>
- 2) Select a different washer from the table and install. <Ref. to MT-70 ASSEMBLY, Front Differential Assembly.>

Washer (38.1 × 50 × t)	
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:**

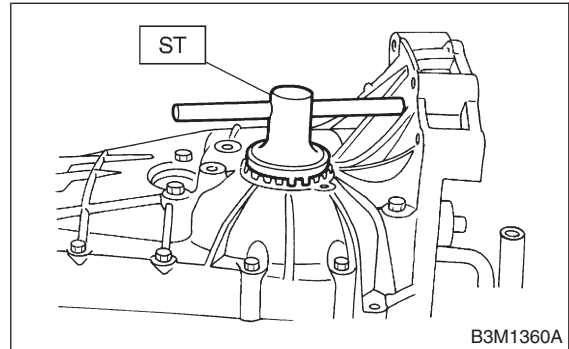
**0.13 — 0.18 mm (0.0051 — 0.0071 in)**

## 2. HYPOID GEAR BACKLASH

S503152A0102

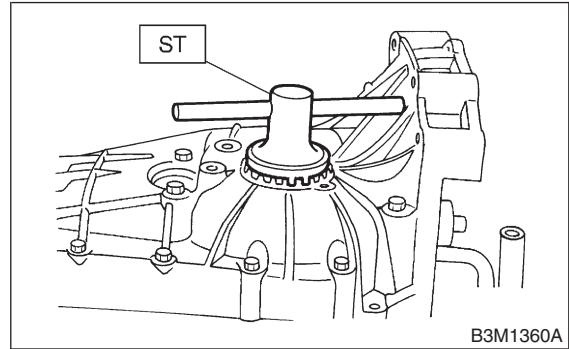
Adjust backlash by turning holder in right side case.

ST 499787000 WRENCH ASSY



**NOTE:**

Each time holder rotates one tooth, backlash changes by 0.05 mm (0.12 in).



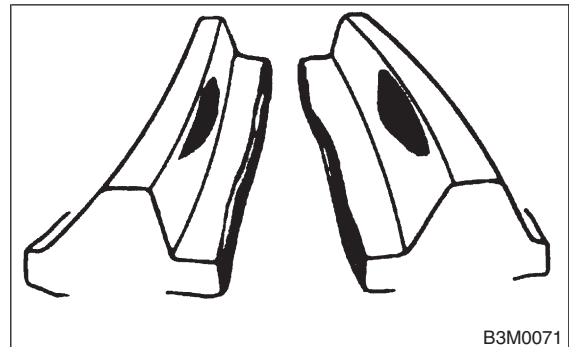
## 3. TOOTH CONTACT OF HYPOID GEAR

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.



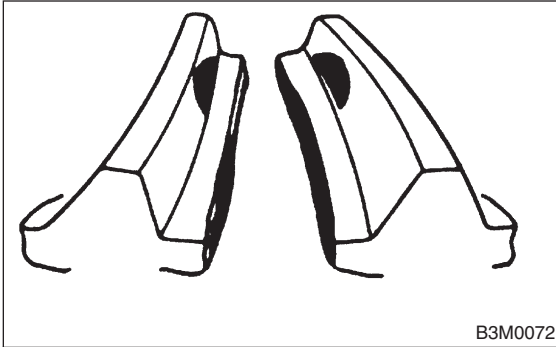
## FRONT DIFFERENTIAL ASSEMBLY

### Manual Transmission and Differential

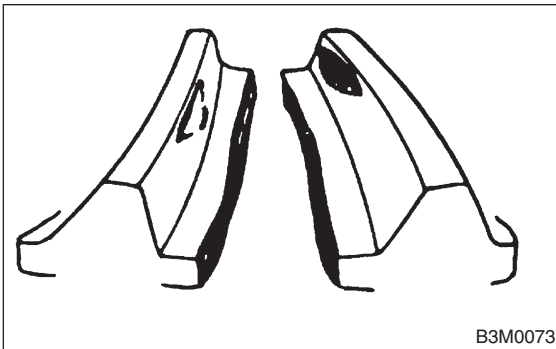
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- Backlash is insufficient.

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.

