

20. Drive Pinion Shaft SS10216

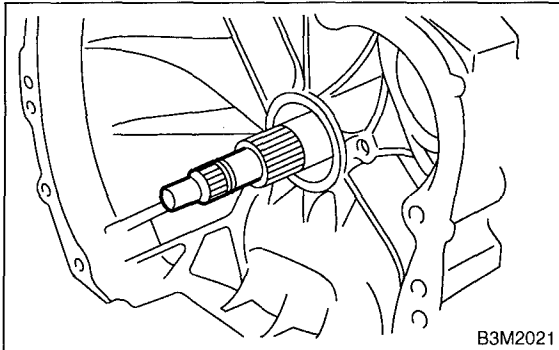
A: REMOVAL SS10216A18

1) Extract the torque converter clutch assembly.

NOTE:

- Extract the torque converter clutch horizontally. Be careful not to scratch the bushing inside the oil pump shaft.
- Note that oil pump shaft also comes out.

2) Remove the input shaft.



3) Disconnect transmission harness connector from stay.

NOTE:

Lift-up lever behind the connector and disconnect it from stay.

- 4) Disconnect inhibitor switch connector from stay.
- 5) Disconnect the air breather hose. <Ref. to AT-27 REMOVAL, Air Breather Hose.>
- 6) Remove the oil charger pipe. <Ref. to AT-28 REMOVAL, Oil Charger Pipe.>
- 7) Remove the oil cooler inlet and outlet pipes. <Ref. to AT-29 REMOVAL, Oil Cooler Pipes.>
- 8) Separation of torque converter clutch case and transmission case sections

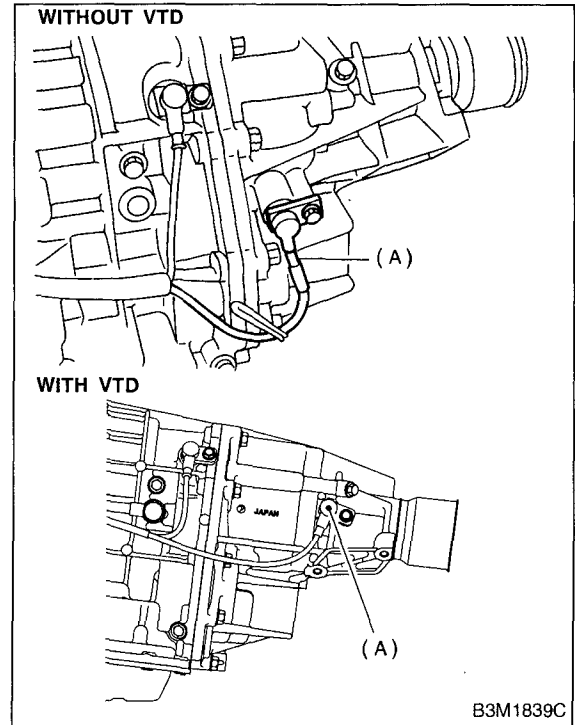
CAUTION:

- Be careful not to damage the oil seal and bushing inside the torque converter clutch case by the oil pump cover.
- Be careful not to lose the rubber seal.

NOTE:

Separate these cases while tapping lightly on the housing.

9) Remove rear vehicle speed sensor.



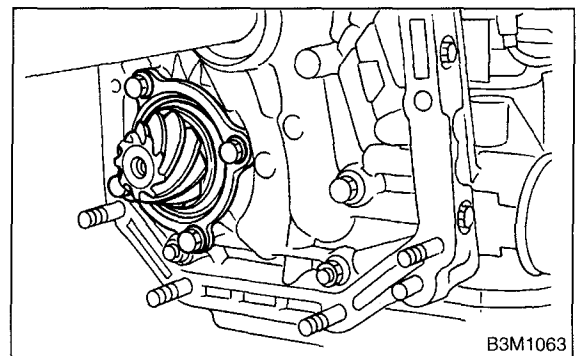
(A) Rear vehicle speed sensor

10) Separate transmission case and extension case sections.

11) Remove the reduction driven gear. Without VTD <Ref. to AT-48 WITHOUT VTD, REMOVAL, Reduction Driven Gear.>

With VTD <Ref. to AT-48 WITH VTD, REMOVAL, Reduction Driven Gear.>

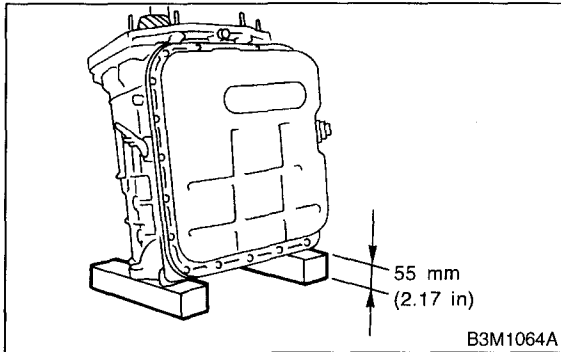
12) Loosen the taper roller bearing mounting bolts.



13) Place two wooden blocks on the workbench, and stand the transmission case with its rear end facing down.

CAUTION:

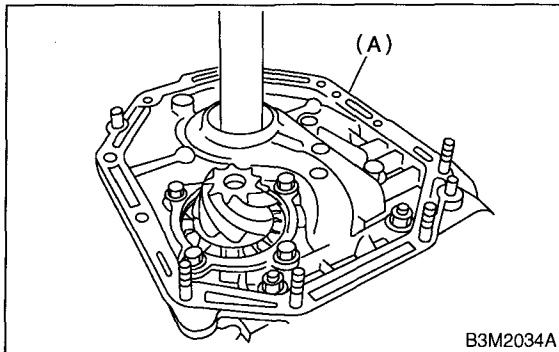
- Be careful not to scratch the rear mating surface of the transmission case.
- Note that the parking rod and drive pinion protrude from the mating surface.



14) Remove the oil pump housing.

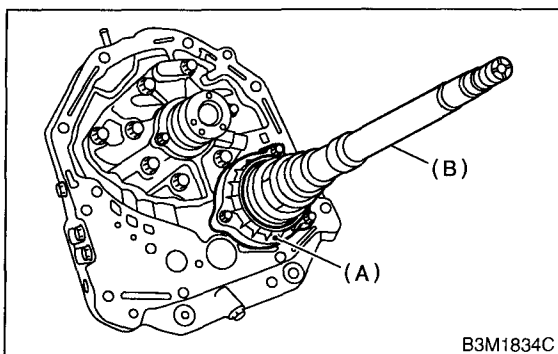
CAUTION:

Be careful not to lose the total end play adjusting thrust washer.



(A) Oil pump housing

15) Remove the oil seal retainer. Also remove the O-ring and oil seal (air breather).



(A) Oil seal retainer
(B) Drive pinion shaft

16) Remove O-rings from oil pump housing.

CAUTION:

Be careful not to damage O-ring.

17) Remove the drive pinion assembly.

B: INSTALLATION SS10216A11

1) Assemble the drive pinion assembly to the oil pump housing.

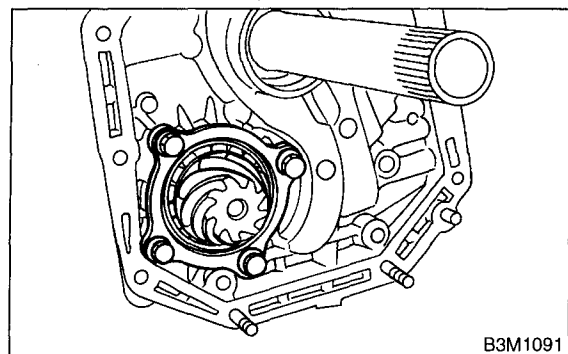
CAUTION:

- Be careful not to bend the shims.
- Be careful not to force the pinion against the housing bore.

2) Tighten four bolts to secure the roller bearing.

Tightening torque:

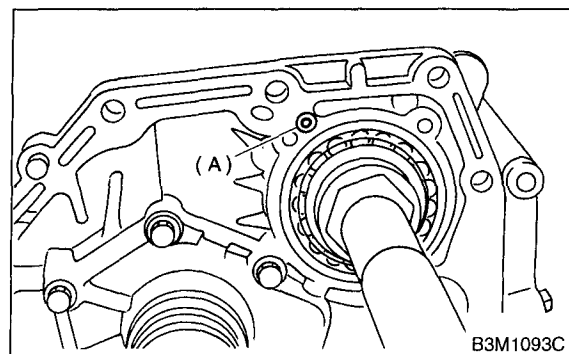
41 N·m (4.2 kgf-m, 30.4 ft-lb)



3) Attach the O-ring to the oil seal retainer with vaseline. Install the seal to the oil pump housing bore.

CAUTION:

Always discard old O-rings and install new ones.



(A) O-ring

4) Install the oil seal retainer taking care not to damage the oil seal lips. Then secure with three bolts.

NOTE:

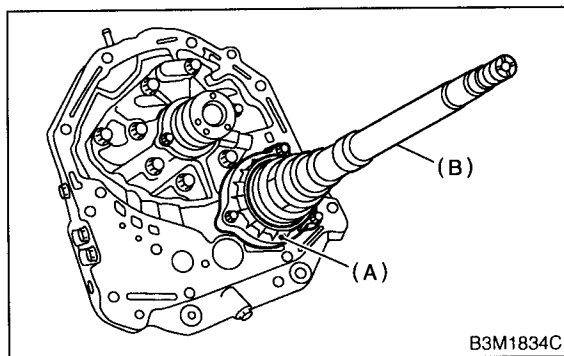
Make sure the O-ring is fitted correctly in position.

Tightening torque:

7 N·m (0.7 kgf-m, 5.1 ft-lb)

DRIVE PINION SHAFT

Automatic Transmission

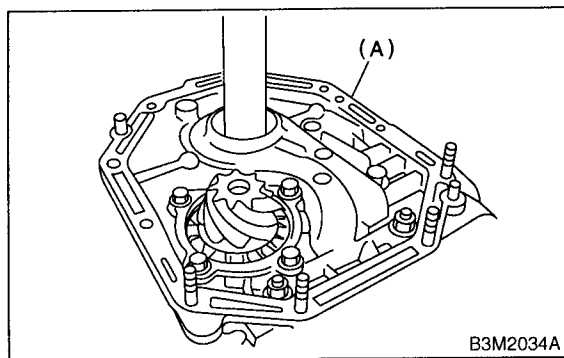


- (A) Oil seal retainer
- (B) Drive pinion shaft

5) Secure the housing with two nuts and the bolt.

Tightening torque:

T: 41 N·m (4.2 kgf·m, 30.4 ft·lb)



- (A) Oil pump housing

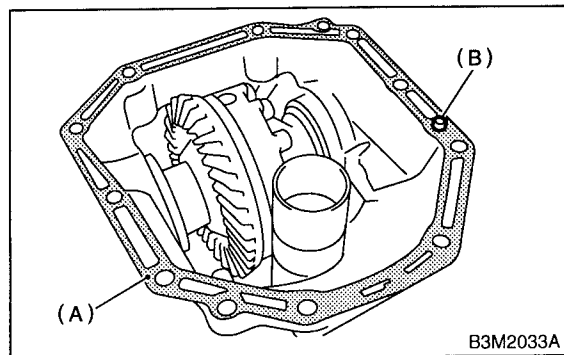
6) Apply proper amount of liquid gasket to the entire torque converter clutch case mating surface.

Liquid gasket:

THREE BOND 1215

NOTE:

Make sure that the rubber seal and seal pipe are fitted in position.



- (A) THREE BOND (Part No. 1215)
- (B) Rubber seal

7) Combine the torque converter case with the transmission case. <Ref. to AT-60 INSTALLATION, Torque Converter Clutch Case.>

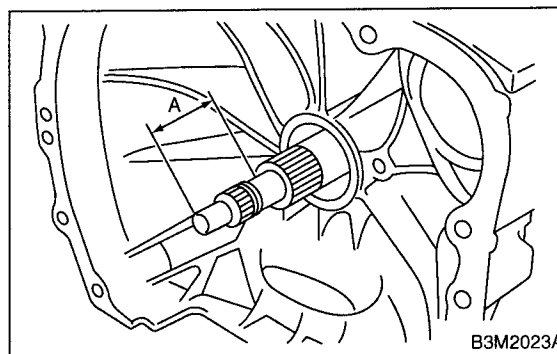
- 8) Install the reduction driven gear.
Without VTD <Ref. to AT-48 WITHOUT VTD, INSTALLATION, Reduction Driven Gear.>
With VTD <Ref. to AT-49 WITH VTD, INSTALLATION, Reduction Driven Gear.>
- 9) Combine the extension case with the transmission case, and install vehicle speed sensor 1 (rear). <Ref. to AT-36 INSTALLATION, Extension Case.>
- 10) Install air breather hose. <Ref. to AT-27 INSTALLATION, Air Breather Hose.>
- 11) Insert inhibitor switch and transmission connector into stay.
- 12) Install the oil charger pipe with O-ring.
- 13) Insert the input shaft while turning lightly by hand.

CAUTION:

Be careful not to damage the bushing.

Normal protrusion A:

50 — 55 mm (1.97 — 2.17 in)

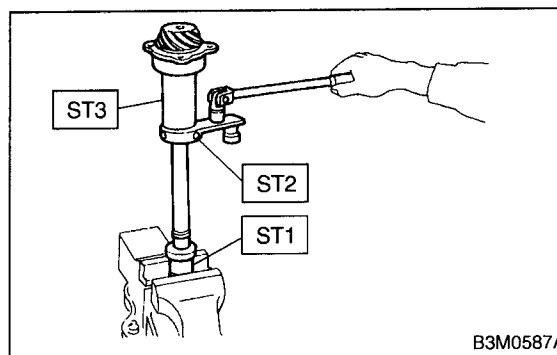


14) Install the torque converter clutch assembly. <Ref. to AT-34 INSTALLATION, Torque Converter Clutch Assembly.>

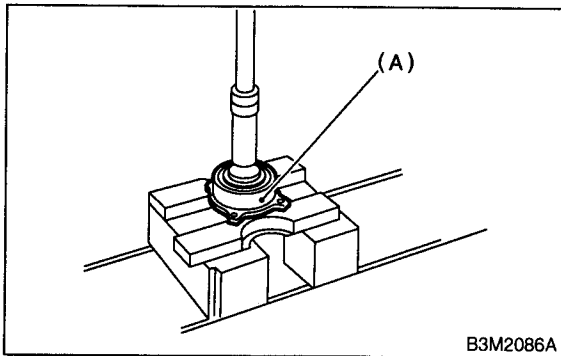
C: DISASSEMBLY SS10216A06

1) Straighten the staked portion of the lock nut, and remove the lock nut while locking the rear spline portion of the shaft with ST1 and ST2. Then pull off the drive pinion collar.

- ST1 498937110 HOLDER
- ST2 499787700 WRENCH
- ST3 499787500 ADAPTER

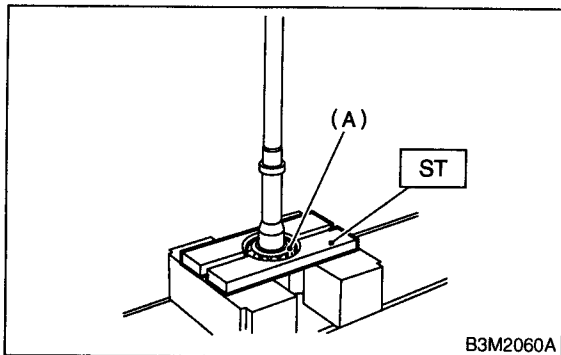


- 2) Remove the O-ring.
- 3) Using a press, separate the rear roller bearing and outer race from the shaft.



(A) Outer race

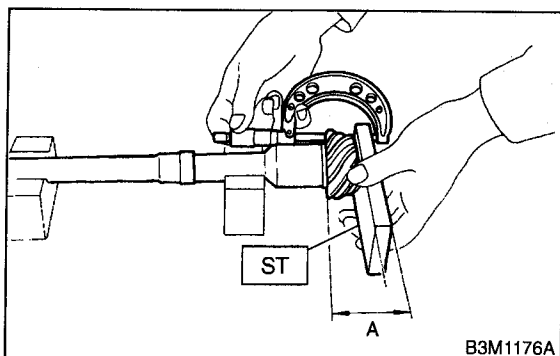
- 4) Using a press and ST, separate the front roller bearing from the shaft.
ST 498517000 REPLACER



(A) Front roller bearing

D: ASSEMBLY SS10216A02

- 1) Measure dimension "A" of the drive pinion shaft.
ST 398643600 GAUGE

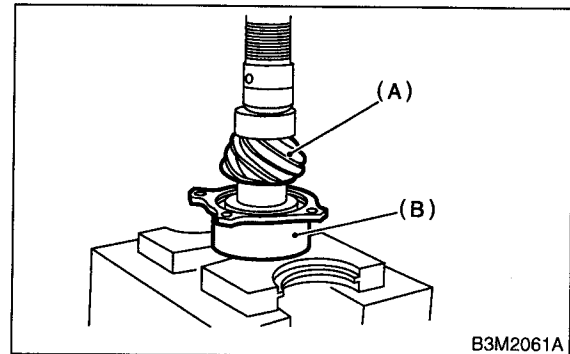


- 2) Using a press, force-fit the roller bearing in position.

CAUTION:
Do not change the relative positions of the outer race and bearing cone.

NOTE:

If too much pressure is applied, the roller bearing will not turn easily.



(A) Drive pinion shaft
(B) Roller bearing

- 3) After fitting the O-ring to the shaft, attach the drive pinion collar to the shaft.

CAUTION:

Be careful not to damage the O-ring.

- 4) Tighten the lock washer and lock nut with ST1, ST2 and ST3.

Calculate lock washer and lock nut specifications using the following formula.

$$T2 = L1 / (L1 + L2) \times T1$$

T1: 116 N·m (11.8 kgf·m, 85.3 ft·lb)

[Required torque setting]

T2: Tightening torque

L1: ST2 length 0.072 m (2.83 in)

L2: Torque wrench length

Example:

| Torque wrench length m (in) | Tightening torque N·m (kgf·m, ft·lb) |
|--------------------------------|---|
| 0.1 (3.94) | 49 (5.0, 36) |
| 0.15 (5.91) | 37 (3.8, 27) |
| 0.2 (7.87) | 30 (3.1, 22) |
| 0.25 (9.84) | 25 (2.6, 19) |

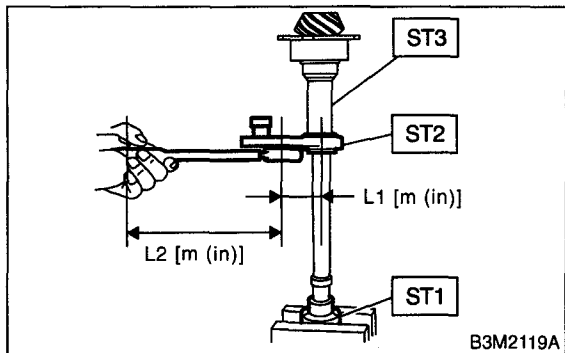
- ST1 498937110 HOLDER
ST2 499787700 WRENCH
ST3 499787500 ADAPTER

DRIVE PINION SHAFT

Automatic Transmission

NOTE:

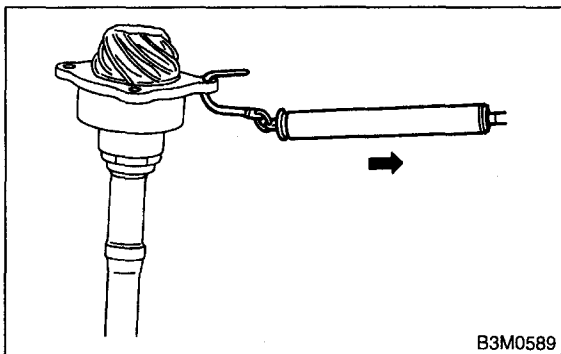
- Pay attention to the orientation of lock washer.
- Install ST2 to torque wrench as straight as possible.



5) Measure the starting torque of the bearing. Make sure the starting torque is within the specified range. If out of the allowable range, replace the roller bearing.

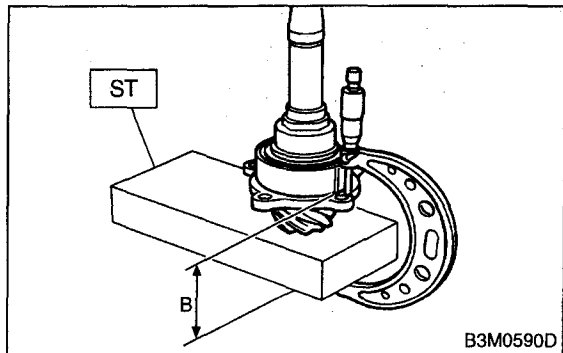
Starting torque:

0.3 — 2.0 N·m (0.03 — 0.2 kgf·m, 0.2 — 1.4 ft·lb)



6) Stake the lock nut securely at two places.
7) Measure dimension "B" of the drive pinion shaft.

ST 398643600 GAUGE



8) Determine the thickness "t" (mm) of the drive pinion shim.

NOTE:

The number of shims must be three or less.

$$t = 6.5 \pm 0.0625 - (B - A)$$

| Available drive pinion shims | |
|------------------------------|-------------------|
| Part No. | Thickness mm (in) |
| 31451AA050 | 0.150 (0.0059) |
| 31451AA060 | 0.175 (0.0069) |
| 31451AA070 | 0.200 (0.0079) |
| 31451AA080 | 0.225 (0.0089) |
| 31451AA090 | 0.250 (0.0098) |
| 31451AA100 | 0.275 (0.0108) |

E: INSPECTION

S510216A10

- Make sure that all component parts are free of harmful cuts, gouges, and other faults.
- Adjust the teeth alignment. <Ref. to AT-74 ADJUSTMENT, Drive Pinion Shaft.>

F: ADJUSTMENT

S510216A01

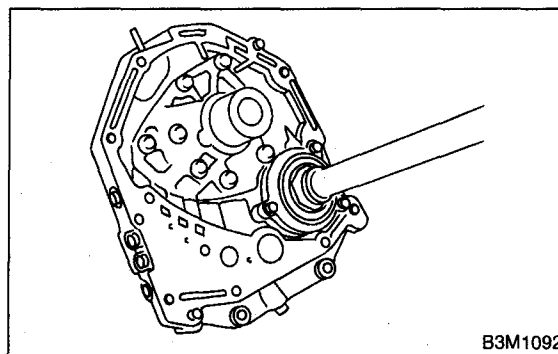
1) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

CAUTION:

- Thoroughly remove the liquid gasket from the case mating surface beforehand.
- Use an old gasket or an aluminum washer so as not to damage the mating surface of the housing.

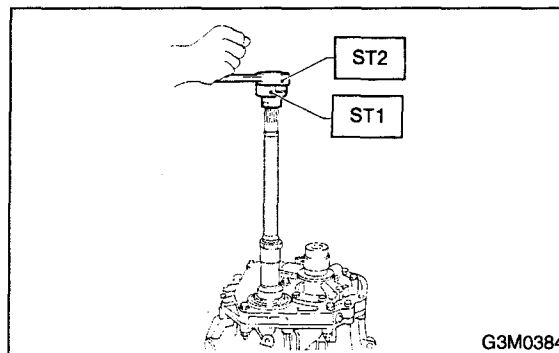
Tightening torque:

41 N·m (4.2 kgf·m, 30.4 ft·lb)



2) Rotate the drive pinion several times with ST1 and ST2.

ST1 498937110 HOLDER
ST2 499787700 WRENCH

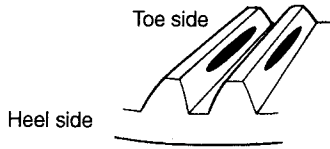
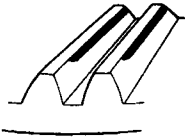
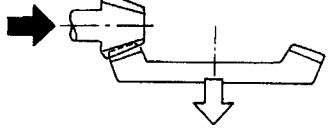
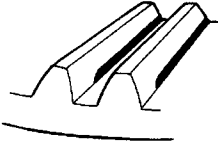
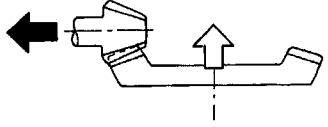

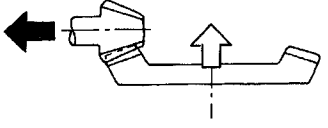

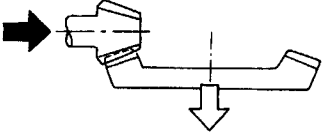



DRIVE PINION SHAFT

Automatic Transmission

3) Apply red lead evenly to the surfaces of three or four teeth of the crown gear. Rotate the drive pinion in the forward and reverse directions several times. Then remove the oil pump housing, and check the tooth contact pattern.

If tooth contact is improper, readjust the backlash or shim thickness. <Ref. to AT-81 ADJUSTMENT, Front Differential.>

| Checking item | Contact pattern | Corrective action |
|--|---|--|
| <p>Tooth contact Tooth contact pattern is slightly shifted toward to under no-load rotation. [When loaded, contact pattern moves toward heel.]</p> |  <p>B3M0317A</p> | — |
| <p>Face contact Backlash is too large.</p> | <p>This may cause noise and chipping at tooth ends.</p>  <p>B3M0319</p> | <p>Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.</p>  <p>B3M0323</p> |
| <p>Flank contact Backlash is too small.</p> | <p>This may cause noise and stepped wear on surfaces.</p>  <p>B3M0320</p> | <p>Reduce thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.</p>  <p>B3M0324</p> |
| <p>Toe contact (Inside end contact) Contact areas is small.</p> | <p>This may cause chipping at toe.</p>  <p>B3M0321</p> | <p>Adjust as for flank contact.</p>  <p>B3M0324</p> |
| <p>Heel contact (Outside end contact) Contact area is small.</p> | <p>This may cause chipping at heel ends.</p>  <p>B3M0322</p> | <p>Adjust as for face contact.</p>  <p>B3M0323</p> |

 : Adjusting direction of drive pinion
 : Adjusting direction of crown gear

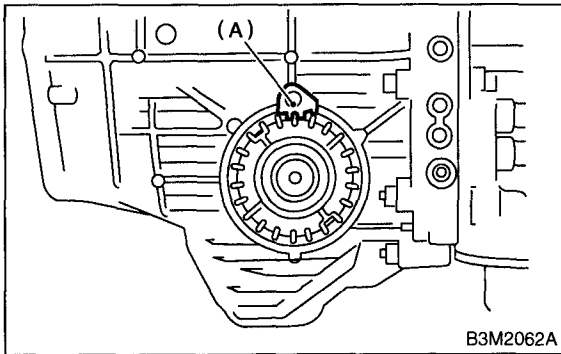
DRIVE PINION SHAFT

Automatic Transmission

4) If tooth contact is correct, mark the retainer position and loosen it. After fitting the O-ring, screw in the retainer to the marked position. Then tighten the lock plate to the specified torque.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



(A) Lock plate