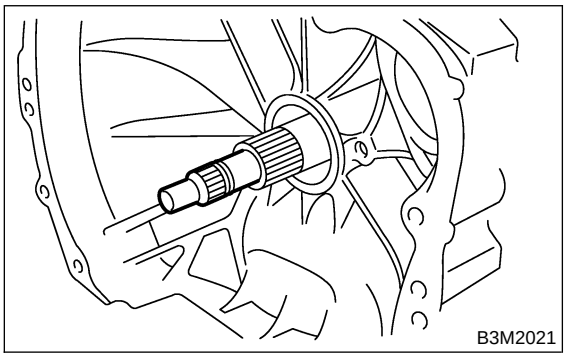
20. Front Differential S510152

A: REMOVAL S510152A18

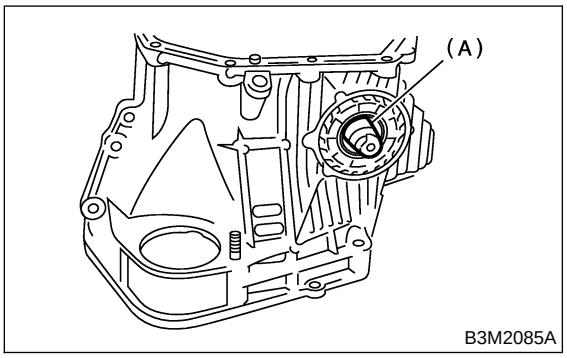
1) Extract the torque converter clutch assembly. <Ref. to AT-35, REMOVAL, Torque Converter Clutch Assembly.>
2) Remove the input shaft.



3) Disconnect the air breather hose. <Ref. to AT-28, REMOVAL, Air Breather Hose.>
4) Disconnect transmission harness connector from stay.

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

5) Disconnect inhibitor switch from stay.
6) Remove the oil charger pipe. <Ref. to AT-29, REMOVAL, Oil Charger Pipe.>
7) Remove the oil cooler inlet and outlet pipes. <Ref. to AT-30, REMOVAL, Oil Cooler Pipes.>
8) Separation of torque converter clutch case and transmission case. <Ref. to AT-58, REMOVAL, Torque Converter Clutch Case.>
9) Wrap the axle shaft serration with vinyl tape.



(A) Vinyl tape

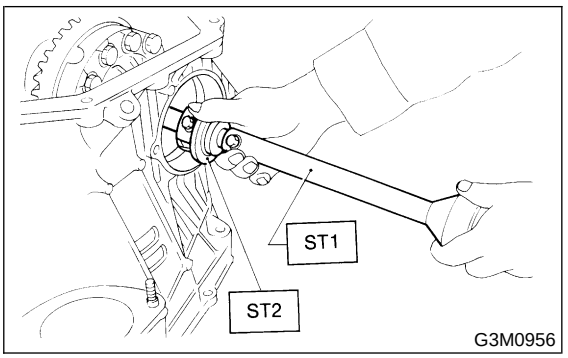
10) Remove the differential side retainer with ST.

NOTE:
Hold the differential case assembly by hand to avoid damaging retainer mounting hole of the torque converter clutch case.

ST 499787000 WRENCH ASSY
11) Extract the axle shaft with ST1 and ST2.

NOTE:
Do not reuse the circlip.

ST1 499095500 REMOVER
ST2 499247300 INSTALLER

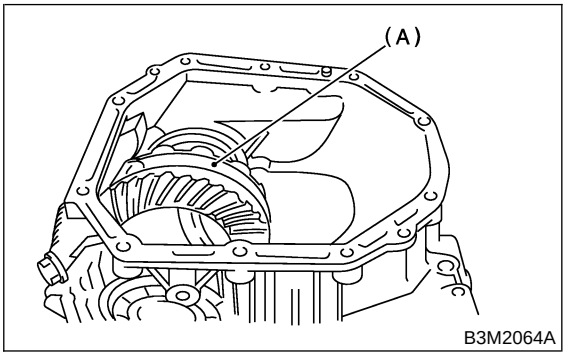


12) Remove the differential assembly.

NOTE:
- Remove the seal pipe if it is attached. (Reusing is not allowed.)
- Be careful not to damage the retainer mounting hole of the torque converter clutch case.

B: INSTALLATION S510152A11

1) Install the differential assembly to the case, paying special attention not to damage the inside of the case (particularly, the differential side retainer contact surface).



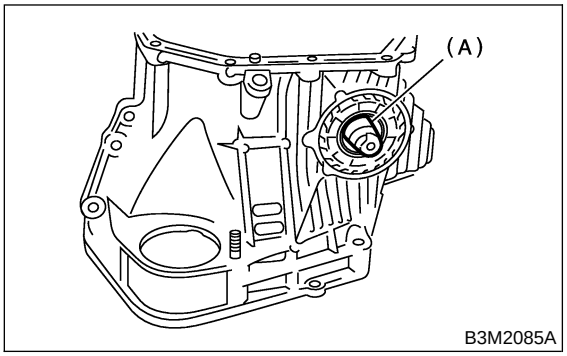
(A) Differential assembly

2) Install the new circlip to the axle shaft, insert the shaft into the differential assembly, and tap it into position with a plastic hammer.

NOTE:
If no play is felt, check whether the shaft is fully inserted. If shaft insertion is correct, replace the axle shaft.

Thrust play:
0.3 — 0.5 mm (0.012 — 0.020 in)

3) Wrap vinyl tape around the splined portion of the axle shaft.



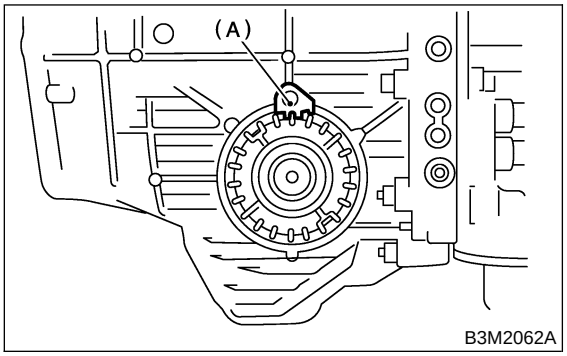
(A) Vinyl tape

4) Install the oil seal and outer race (taper roller bearing) to the differential side retainer. Then screw in the retainer and the O-ring after coating the threads with oil.

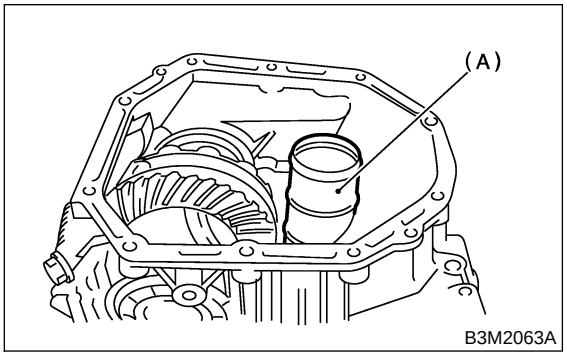
NOTE:
- Pay attention not to damage the oil seal lips.
- Do not confuse the RH and LH oil seals.
- Keep the O-ring removed from the retainer.

5) Using ST, install the side retainers. <Ref. to AT-74, ADJUSTMENT, Front Differential.>
ST 499787000 WRENCH ASSY
6) Install the lock plate.

Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

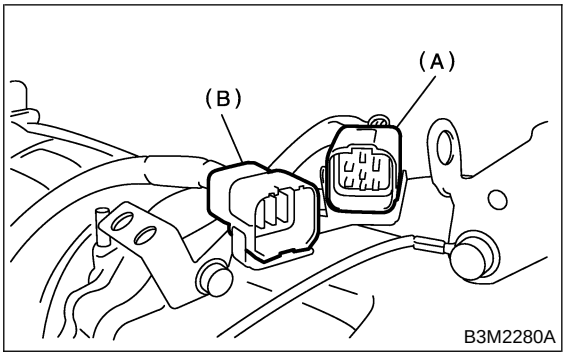


7) Install the new seal pipe to the torque converter clutch case.



(A) Seal pipe

8) Install the torque converter clutch case to transmission case. <Ref. to AT-59, INSTALLATION, Torque Converter Clutch Case.>
9) Install air breather hose.
10) Insert inhibitor switch and transmission connector into stay.

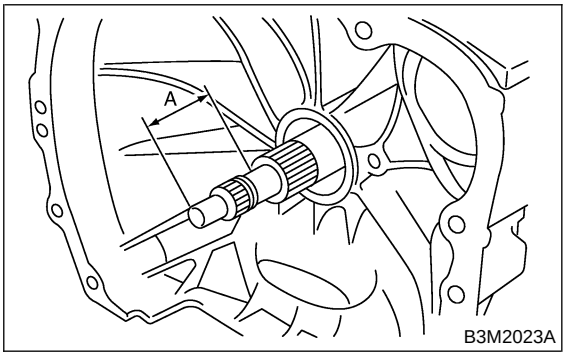


(A) Transmission harness
(B) Inhibitor switch harness

11) Install oil cooler pipes. <Ref. to AT-30, INSTALLATION, Oil Cooler Pipes.>
12) Install the oil charger pipe with O-ring <Ref. to AT-29, INSTALLATION, Oil Charger Pipe.>
13) Insert the input shaft while turning lightly by hand.

NOTE:
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-35, INSTALLATION, Torque Converter Clutch Assembly.>

C: DISASSEMBLY S510152A06

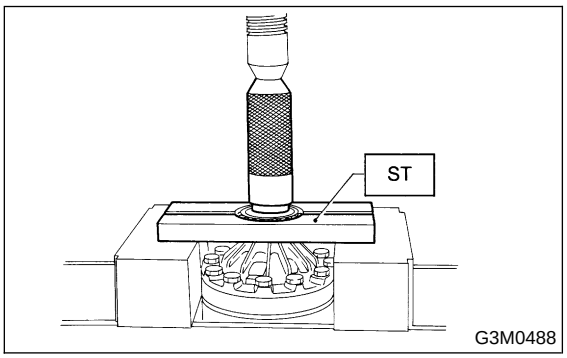
1. DIFFERENTIAL CASE ASSEMBLY

S510152A0601

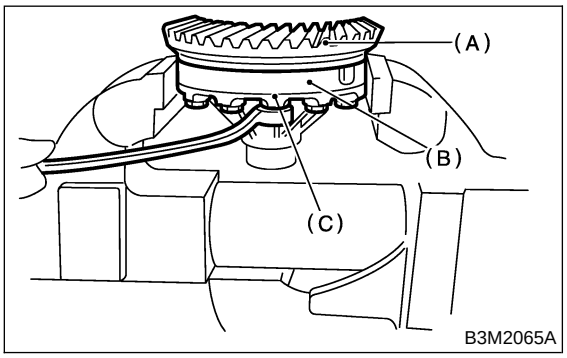
1) Using a press and ST, remove the taper roller bearing.

NOTE:
Replacing bearing inner and outer races as a single unit.

ST 498077000 REMOVER

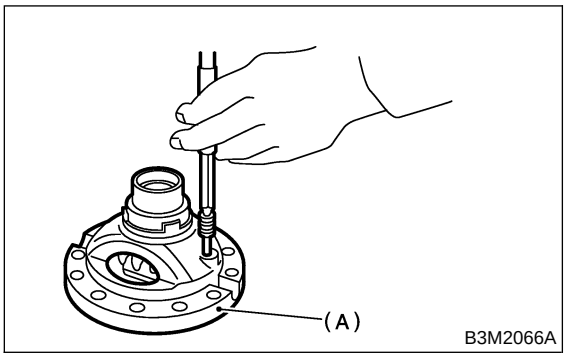


2) Secure the case in a vise and remove the crown gear tightening bolts, then separate the crown gear, case (RH) and case (LH).



(A) Crown gear
(B) Differential case (RH)
(C) Differential case (LH)

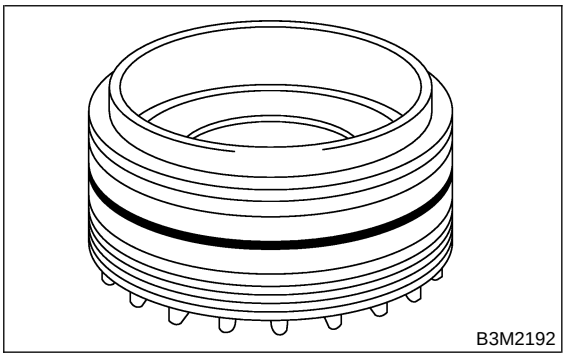
3) Pull out the straight pin and shaft, and remove the differential bevel gear, washer, and differential bevel pinion.



(A) Differential case (RH)

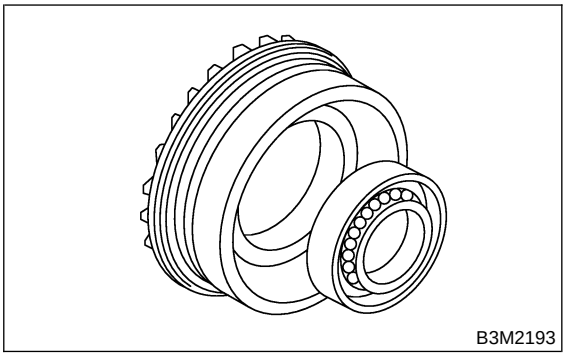
2. SIDE RETAINER S510152A0602

1) Remove O-ring.

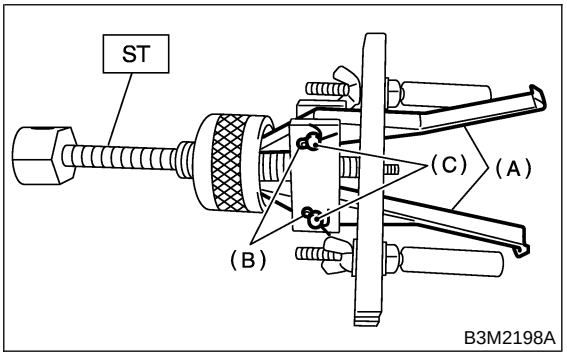


2) Remove oil seal.

NOTE:
Do not re-use oil seal. Prepare a new one.



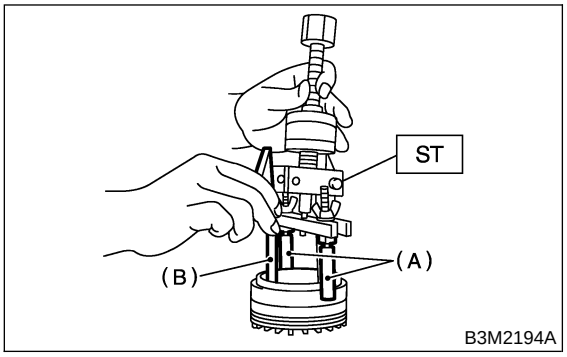
3) Take out either split pin, remove claw.
ST 398527700 PULLER ASSY



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

4) Securely attach two claws to outer race, set ST to side retainer.
ST 398527700 PULLER ASSY

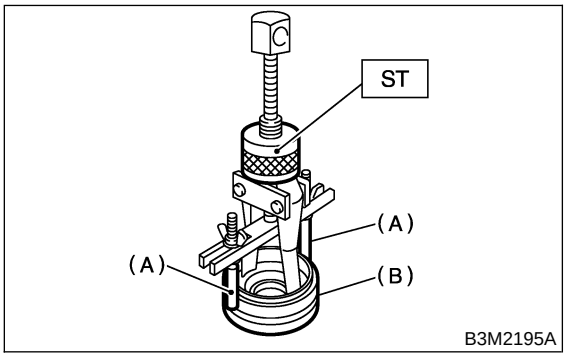
NOTE:
- Attach two shafts' notches to side retainer.
- Return removed claw to the original position, and install pin and split pin.



(A) Shaft
(B) Claw

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

NOTE:
● Secure ST shaft right up against the side retainer.
● Replace bearing inner and outer races as a single unit.



(A) Shaft
(B) Side retainer

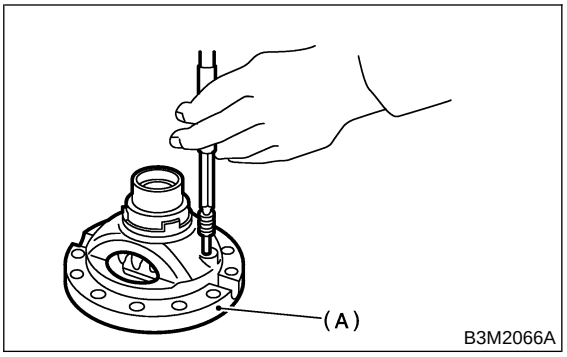
D: ASSEMBLY S510152A02

1. DIFFERENTIAL CASE ASSEMBLY

S510152A0201

1) Install the washer, differential bevel gear and differential bevel pinion in the differential case (RH). Insert the pinion shaft, and fit the straight pin.

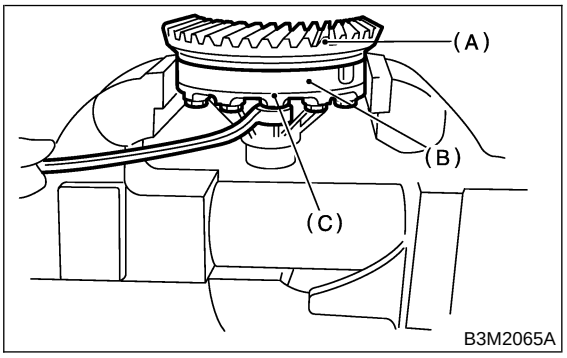
NOTE:
Install straight pin from reverse direction.



(A) Differential case (RH)

2) Install the washer and differential bevel gear to the differential case (LH). Then put the case over the differential case (RH), and connect both cases.
3) Install the crown gear and secure by tightening the bolt.

Standard tightening torque:
62 N·m (6.3 kgf-m, 45.6 ft-lb)

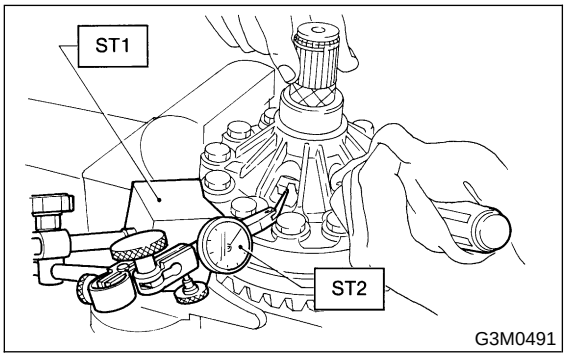


(A) Crown gear
(B) Differential case (RH)
(C) Differential case (LH)

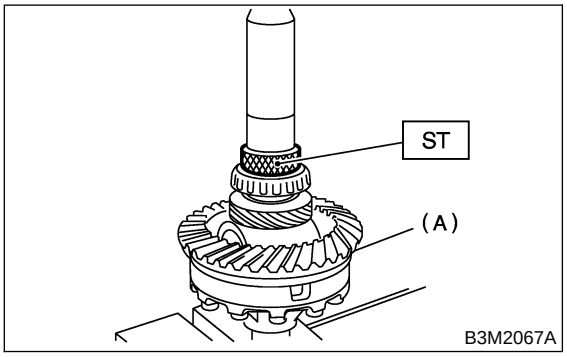
4) Measurement of backlash (Selection of washer)
Measure the gear backlash with ST1 and ST2, and insert ST2 through the access window of the case.
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

NOTE:
● Measure the backlash by applying a pinion tooth between two bevel gear teeth.
● Fix bevel pinion gear in place with a screwdriver or similar tool when measuring.

Standard value:
0.13 — 0.18 mm (0.0051 — 0.0071 in)



5) Using ST, install taper roller bearing.
ST 398487700 DRIFT



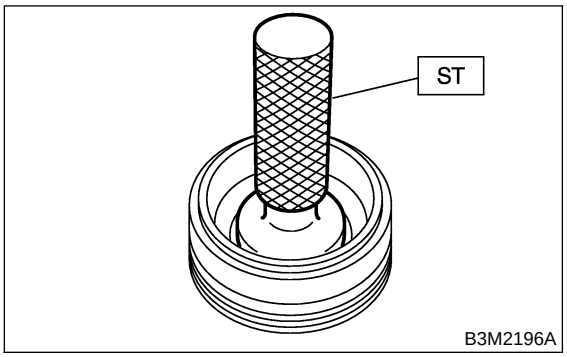
(A) Taper roller bearing

2. SIDE RETAINER S510152A0202

1) Install bearing outer race to side retainer.

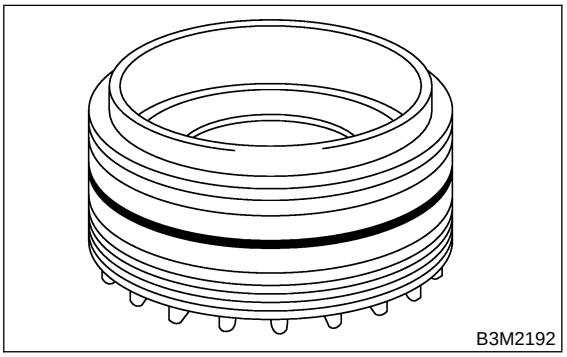
NOTE:
Avoid scratching side retainer and bearing outer race when pressing into place.

2) Install new oil seal.
ST 499797000 INSTALLER



3) Install new O-ring.

NOTE:
Do not stretch or damage O-ring.



E: INSPECTION S510152A10

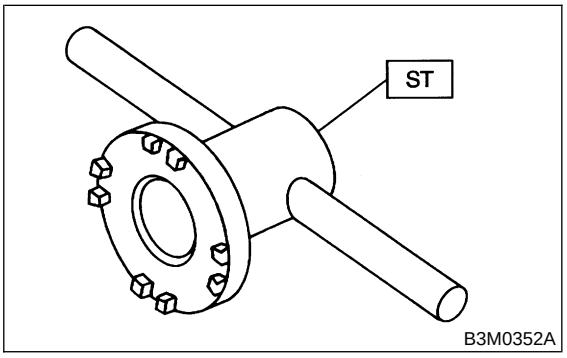
● Check each component for harmful cuts, damage and other faults.
● Measure the backlash and adjust to within specifications.
<Ref. to AT-78, ADJUSTMENT, Front Differential.>

F: ADJUSTMENT S510152A01

1) Using ST, screw in the retainer until light contact is felt.

NOTE:
Screw in the RH side slightly deeper than the LH side.

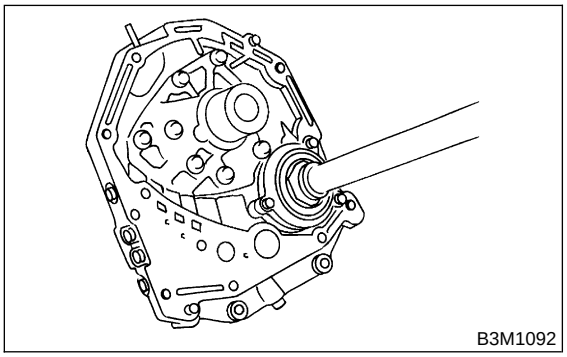
ST 499787000 WRENCH ASSY



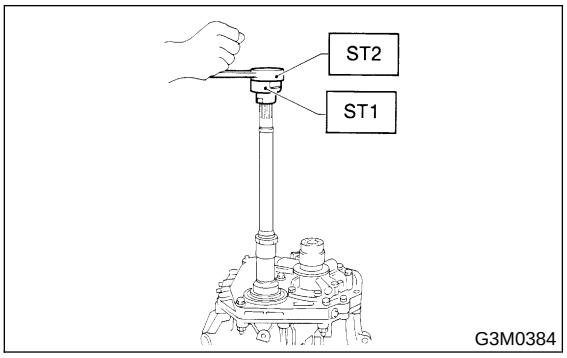
2) Remove the oil pump housing.
3) Install the oil pump housing assembly to the torque converter clutch case, and secure evenly by tightening four bolts.

NOTE:
● 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.

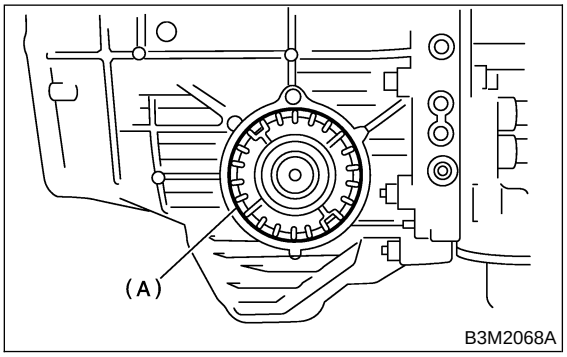
Tightening torque:
41 N·m (4.2 kgf-m, 30.4 ft-lb)



4) Rotate the drive pinion several times with ST1 and ST2.
ST1 498937110 HOLDER
ST2 499787700 WRENCH

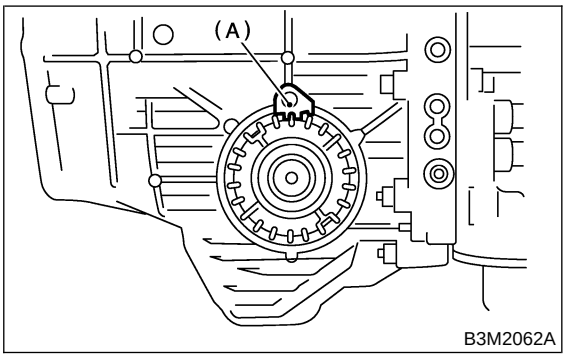


5) Tighten the LH retainer until contact is felt while rotating the shaft. Then loosen the RH retainer. Keep tightening the LH retainer and loosening the RH retainer until the pinion shaft can no longer be turned. This is the “zero” state.



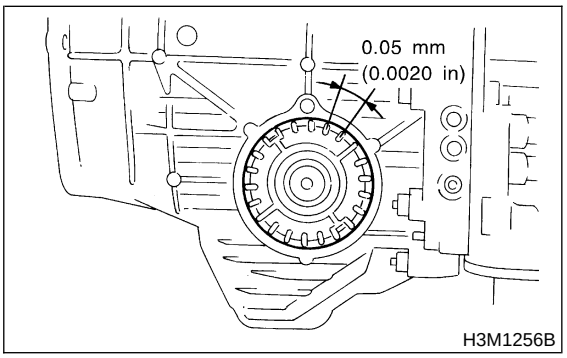
(A) Retainer

6) After the “zero” state is established, back off the LH retainer 3 notches and secure it with the lock plate. Then back off the RH retainer and retighten until it stops. Rotate drive pinion a few times. Tighten the RH retainer 1-3/4 notches further. This sets the preload. Finally, secure the retainer with its lock plate.



(A) Lock plate

NOTE:
Turning the retainer by one tooth changes the backlash about 0.05 mm (0.0020 in).



7) Turn the drive pinion several rotations with ST1 and check to see if the backlash is within the standard value with ST2, ST3, ST4 and ST5.

NOTE:
After confirming that the backlash is correct, check the tooth contact.

ST1	499787700	WRENCH
ST2	498247001	MAGNET BASE
ST3	498247100	DIAL GAUGE
ST4	499787500	ADAPTER
ST5	498255400	PLATE

Backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)