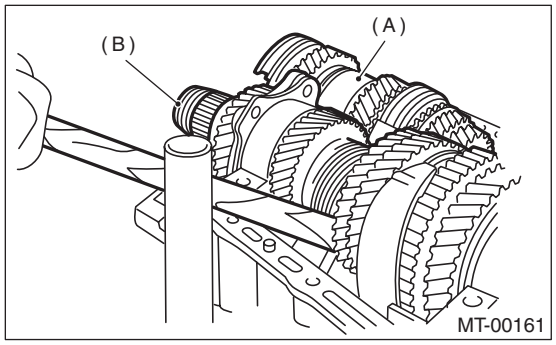
17.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-26, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-53, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

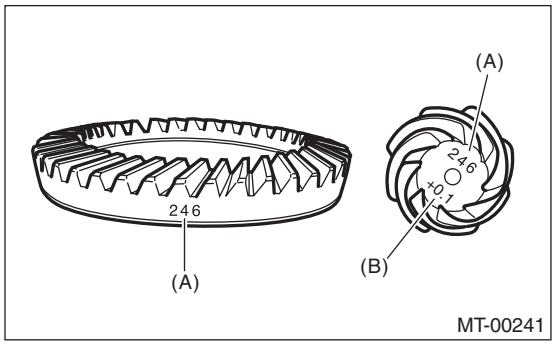
NOTE:
Use a hammer handle, etc. to remove if too tight.



(A) Main shaft ASSY for single range
(B) Drive pinion shaft ASSY

B: INSTALLATION

1) Remove the front differential assembly.
2) Alignment marks/numbers on hypoid gear set:
The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers. The figure (B) below shows a number for shim adjustment. If no number is shown, the value is zero.

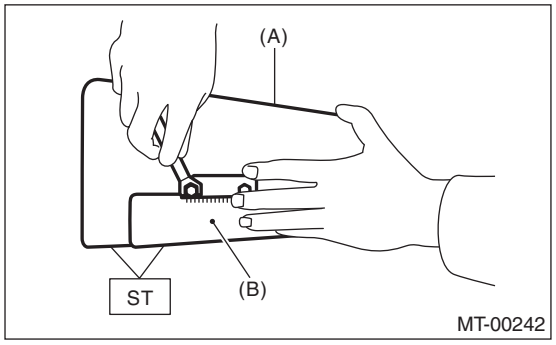


(A) Set number
(B) Number for shim adjustment

3) Place the drive pinion shaft assembly on transmission main case RH without shim and tighten the bearing mounting bolts.
4) Perform inspection and adjustment of ST.

NOTE:
• Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
• Tighten the two bolts.

ST 499917500 DRIVE PINION GAUGE ASSY

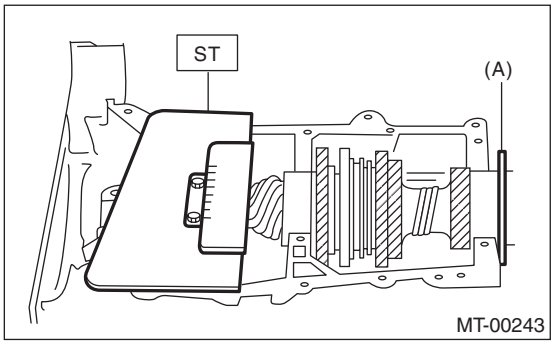


(A) Plate
(B) Scale

5) Position the ST by inserting the knock pin of ST into the knock hole of transmission case.

ST 499917500 DRIVE PINION GAUGE ASSY

6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.
ST 499917500 DRIVE PINION GAUGE ASSY



(A) Adjust the clearance to zero without shim.

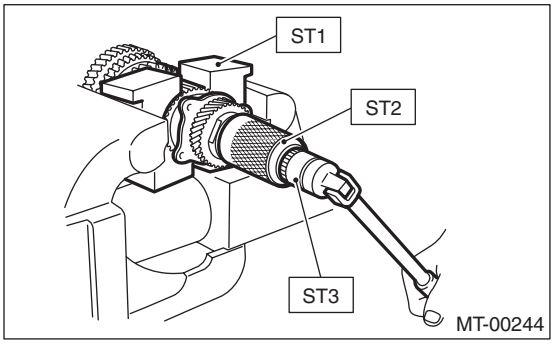
7) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by –.)
ST 499917500 DRIVE PINION GAUGE ASSY
8) Select one to three shims in the following table for the value determined as described above, and take the shim(s) which thickness is closest to the said value.

Drive pinion shim	
Part No.	Thickness mm (in)
32295AA031	0.150 (0.0059)
32295AA041	0.175 (0.0069)
32295AA051	0.200 (0.0079)
32295AA061	0.225 (0.0089)
32295AA071	0.250 (0.0098)
32295AA081	0.275 (0.0108)
32295AA091	0.300 (0.0118)
32295AA101	0.500 (0.0197)

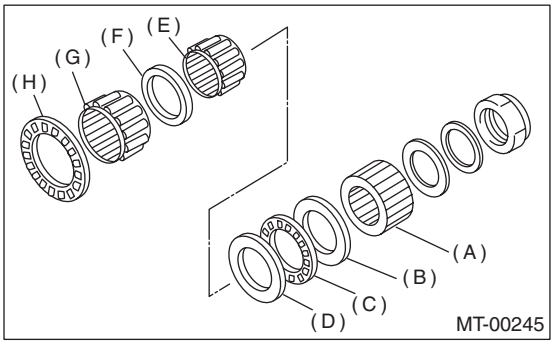
9) Install the front differential assembly. <Ref. to 5MT-70, INSTALLATION, Front Differential Assembly.>
10) Set the transmission main shaft assembly for single range and drive pinion assembly in the install location. (So there is no clearance between the two when moved all the way to the front). Inspect the suitable 1st – 2nd shifter fork, 3rd – 4th shifter fork and 5th shifter fork so that the coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms. <Ref. to 5MT-67, INSPECTION, Drive Pinion Shaft Assembly.>
11) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>
12) Install the transfer case together with the extension case assembly. <Ref. to 5MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>
13) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-29, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Attach a cloth to the end of driven shaft (on the frictional side of the thrust needle bearing) to prevent damage during disassembly or reassembly.
1) Unlock the crimping of lock nut. Remove the lock nut with ST1, ST2 and ST3.
ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)



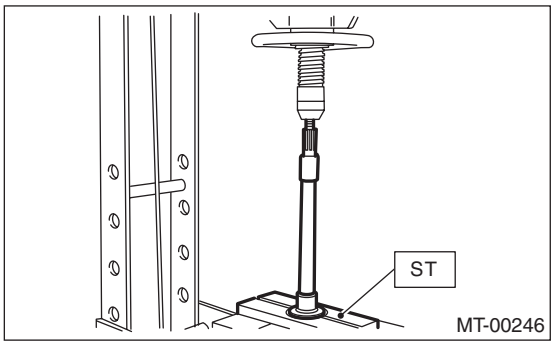
2) Draw out the drive pinion from driven shaft. Remove the differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing and drive pinion collar.



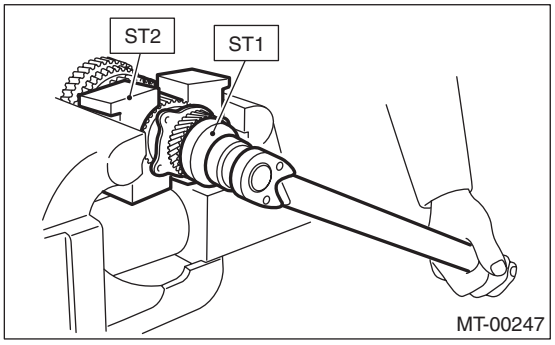
(A) Differential bevel gear sleeve
(B) Adjusting washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Adjusting washer No. 2 (25 × 37.5 × 4)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)

3) Remove the roller bearing and washer using ST and a press.

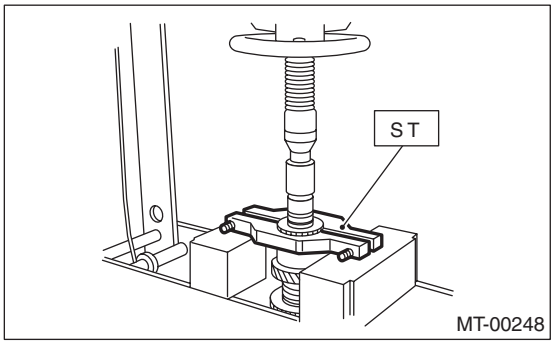
NOTE:
Do not reuse the roller bearing.
ST 498077000 REMOVER



4) Unlock the crimping of lock nut. Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 899884100 HOLDER

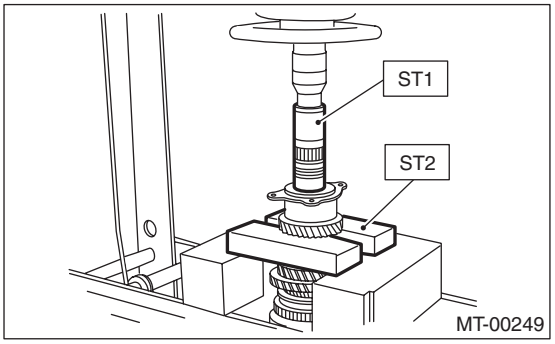


5) Remove the 5th driven gear using ST.
ST 499857000 5TH DRIVEN GEAR REMOVER

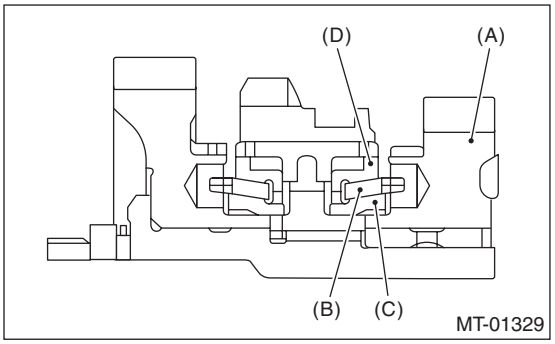


6) Remove the woodruff key.

7) Remove the roller bearing, 3rd-4th driven gear using ST1 and ST2.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER

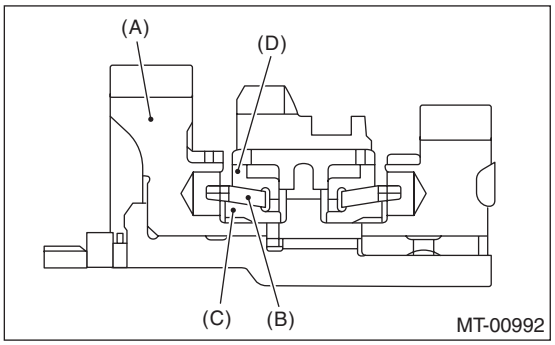


8) Remove the key.
9) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.



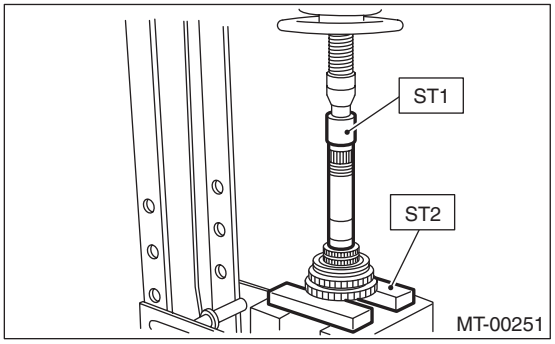
(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

10) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd driven gear bushing, gear and hub assembly using ST1 and ST2.



(A) 1st driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

NOTE:
If necessary, use the new gear and hub assembly, when replacing the gear or hub assembly. Do not attempt to disassemble as they must engage at a specific point. If they have to be disassembled, mark the engaging point beforehand.
ST1 499757002 INSTALLER
ST2 899714110 REMOVER

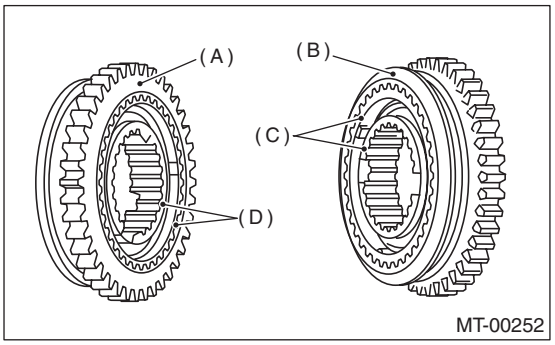


11) Remove the sub gear, washer, and snap ring (outer) for the 1st driven gear. (Non-turbo model)

D: ASSEMBLY

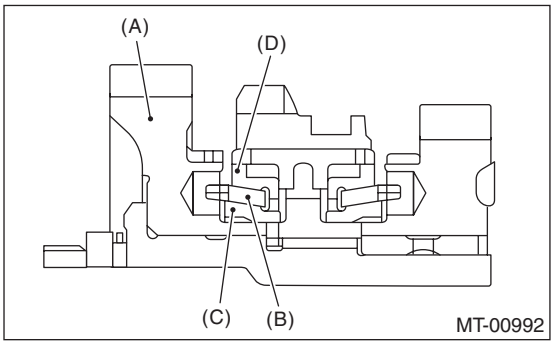
1) Install the sleeve and gear and hub assembly by matching alignment marks.

NOTE:
Use the new gear and hub assembly, if the gear & hub have been replaced.



(A) 1st gear side
(B) 2nd gear side
(C) Flush surface
(D) Stepped surface

2) Install the washer, snap ring (outer) and sub gear onto the 1st driven gear. (Non-turbo model)
3) Install the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, gear & hub assembly onto driven shaft.



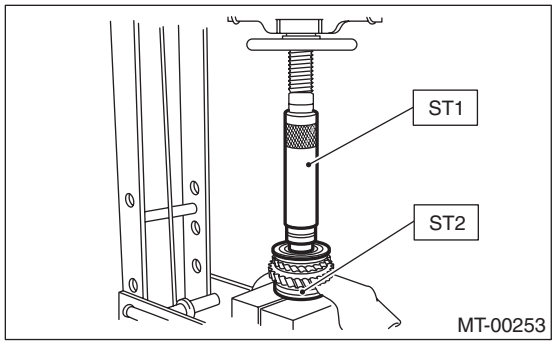
(A) 1st driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

NOTE:
• Take care to install the gear and hub assembly in proper direction.
• Align the baulk ring and gear and hub assembly with the key groove.

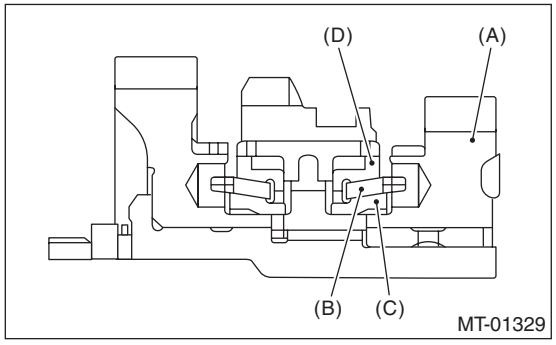
4) Install the 2nd driven gear bushing onto driven shaft using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
• Attach a cloth to the end of driven shaft to prevent damage.
• When press fitting, align the oil holes of shaft and bush.
ST1 499277200 INSTALLER
ST2 499587000 INSTALLER



5) Install the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring, and insert them onto driven shaft.

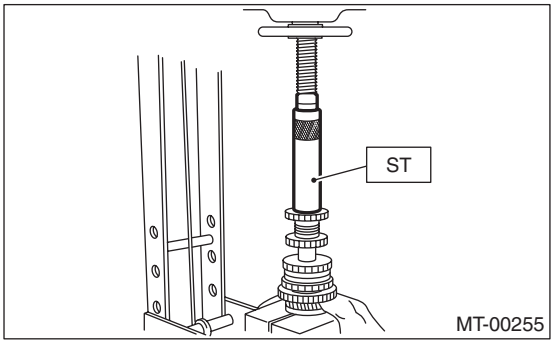


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring

6) After installing key on driven shaft, install the 3rd-4th driven gear using ST and a press.

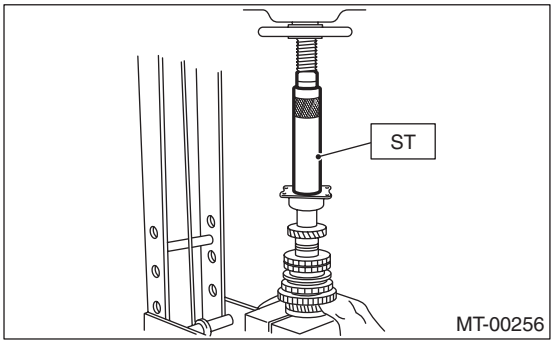
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:
Align the groove in baulk ring with the insert.
ST 499277200 INSTALLER



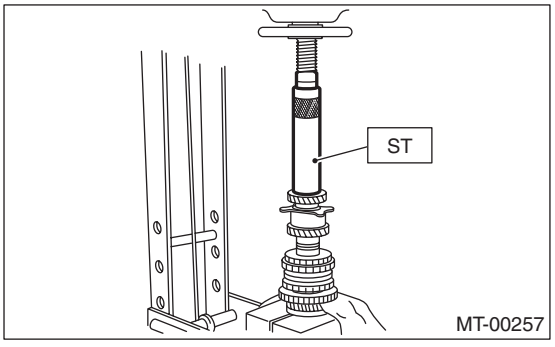
7) Install a set of roller bearings onto the driven shaft using ST and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST 499277200 INSTALLER



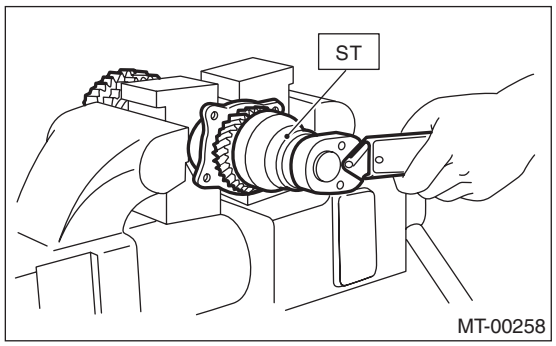
8) Position the woodruff key in groove of the rear of driven shaft. Install the 5th driven gear onto driven shaft using ST and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST 499277200 INSTALLER

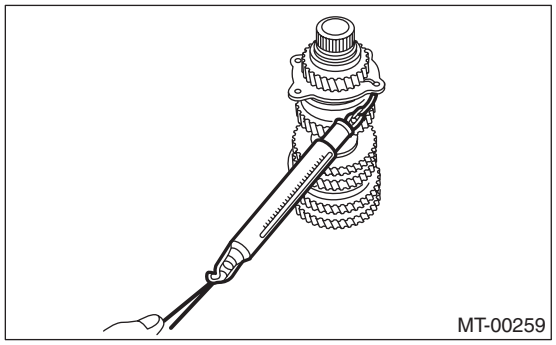


9) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.
ST 499987300 SOCKET WRENCH (50)

Tightening torque:
260 N·m (26.5 kgf-m, 191.8 ft-lb)

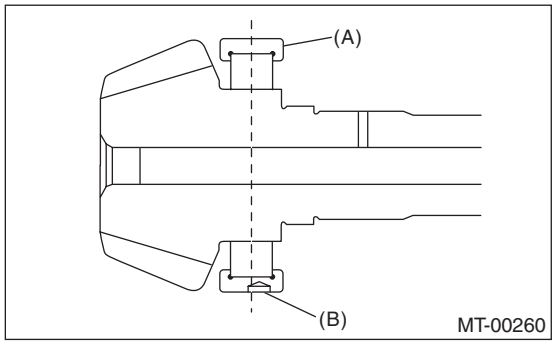


NOTE:
- Crimp the locknut in 2 locations.
- Using a spring scale, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 ft).



10) Install the roller bearing onto drive pinion.

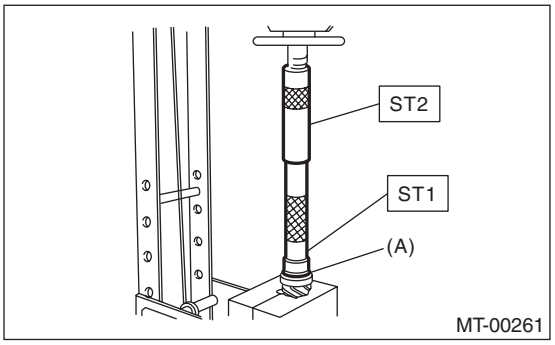
NOTE:
When installing the roller bearing, note its directions (front and rear) because the knock pin hole of outer race is offset.



(A) Roller bearing
(B) Knock pin hole

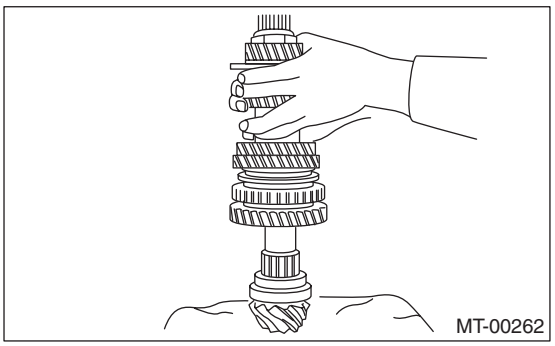
11) Install the washer using ST1, ST2 and a press.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER



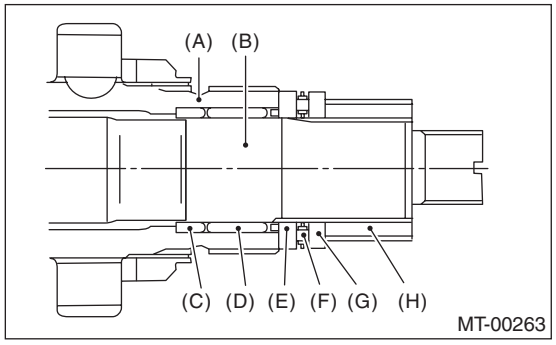
(A) Washer

12) Install the thrust bearing and needle bearing. Install the driven shaft assembly.



13) Install the drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in this order.

NOTE:
Be careful to install the spacer in the proper direction.

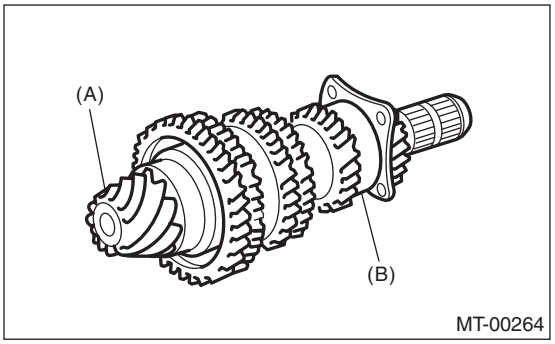


(A) Driven shaft
(B) Drive pinion shaft
(C) Drive pinion collar
(D) Needle bearing (25 × 30 × 20)
(E) Adjusting washer No. 2 (25 × 36 × 4)
(F) Thrust bearing (25 × 37.5 × 3)
(G) Adjusting washer No. 1 (25 × 36 × t)
(H) Differential bevel gear sleeve

14) Adjust the thrust bearing preload. <Ref. to 5MT-68, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION

Disassembled parts should be washed clean first with cleaning solvent and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
• When the bearing balls, outer races and inner races are broken or rusty.
• When the bearing is worn.
• When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
• The roller bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion shaft assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike other bearings.

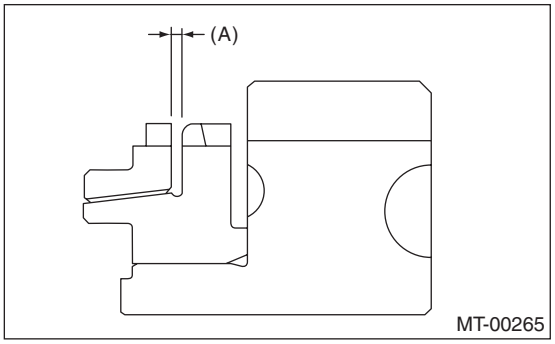


(A) Drive pinion shaft
(B) Roller bearing

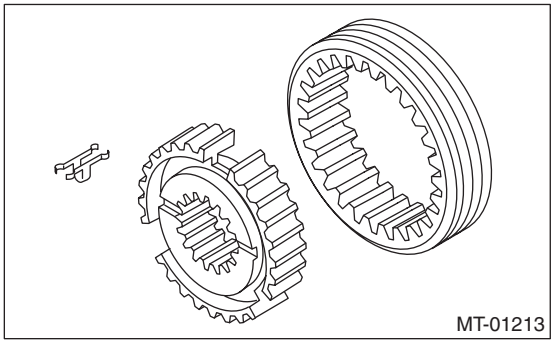
• When the bearing has other problems.
2) Bushing (each gear)
Replace the bushing in following cases.
• When the sliding surface is damaged or abnormally worn.
• When the inner wall is abnormally worn.
3) Gear
Replace gears in the following cases.
• Replace the gear with a new part if its tooth surfaces are broken, damaged or abnormally worn.
• Correct or replace if the cone that contacts the baulk ring is rough or damaged.
• Correct or replace if the inner surface or end face is damaged.

4) Baulk ring
Replace the ring in following cases.
• When the inner surface and end face are damaged.
• When the ring inner surface is abnormally or partially worn down.
• If the gap between the end faces of the ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 — 1.0 mm (0.020 — 0.040 in)



• When the contact surface of synchronizer ring insert is scratched or abnormally worn.
5) Shifting insert key
Replace the insert key if deformed, abnormally worn or defective in any way.

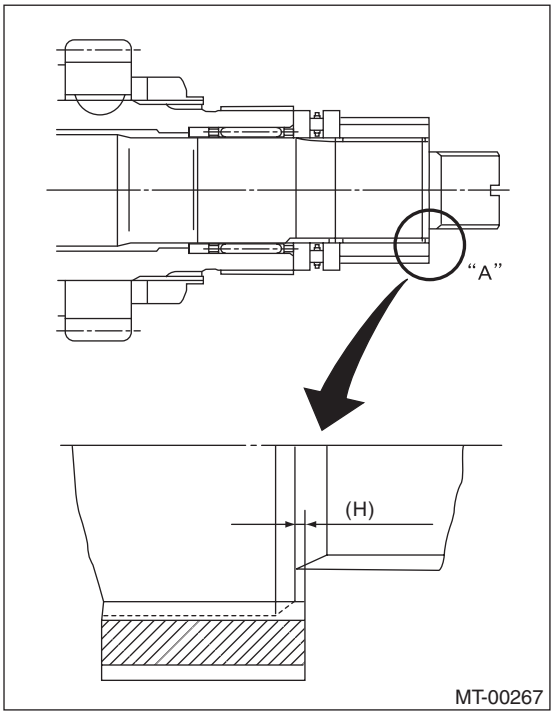


6) Oil seal
Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.
7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

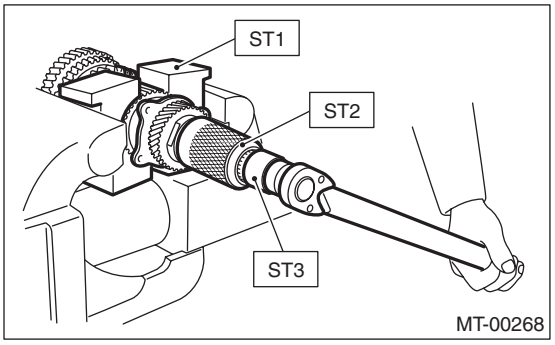
1) Select a suitable adjusting washer No. 1 so that dimension (H) will be zero in a visual check.
Position washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install lock nut (18 × 13.5).



2) Using the ST1, ST2 and ST3, tighten the lock nut to the specified torque.

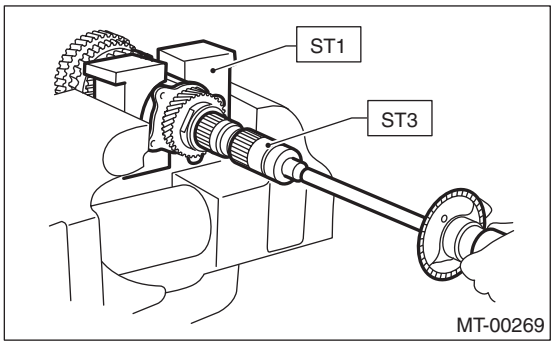
ST1	899884100	HOLDER
ST2	498427100	STOPPER
ST3	899988608	SOCKET WRENCH (27)

Tightening torque:
120 N·m (12.2 kgf-m, 88.5 ft-lb)

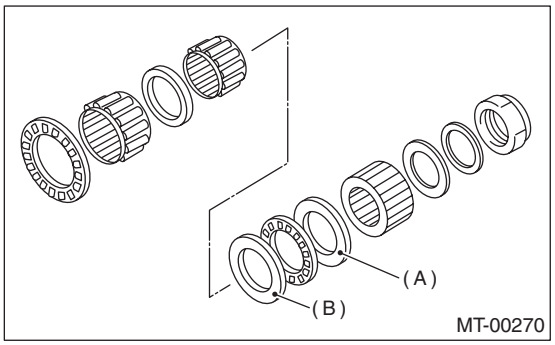


3) After removing the ST2, measure the starting torque using torque driver.
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.2 — 0.6 ft-lb)



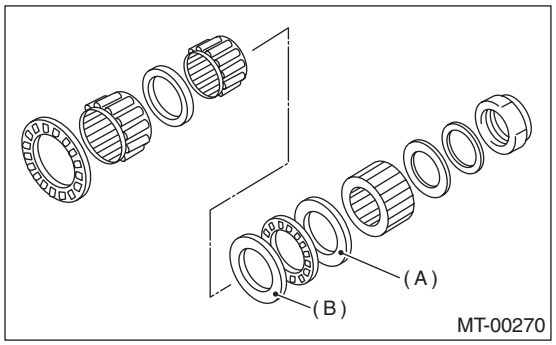
4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and recheck starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025051	3.925 (0.1545)
803025052	3.950 (0.1555)
803025053	3.975 (0.1565)
803025054	4.000 (0.1575)
803025055	4.025 (0.1585)
803025056	4.050 (0.1594)
803025057	4.075 (0.1604)

5) When the specified starting torque cannot be obtained by adjusting washer No. 1, select adjusting washer No. 2 from the following table. Repeat steps 1) through 4) to adjust starting torque.



(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

Starting torque	Dimension H	Adjusting washer No. 2
Low	Small	Select thicker one.
High	Large	Select thinner one.

Adjusting washer No. 2	
Part No.	Thickness mm (in)
803025059	3.850 (0.1516)
803025054	4.000 (0.1575)
803025058	4.150 (0.1634)

6) Recheck that the starting torque is within the specified range, then crimp the lock nut at four positions.