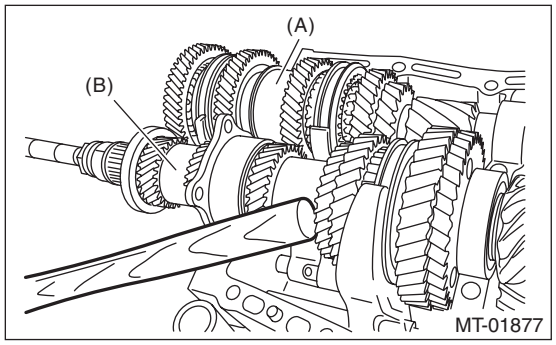
17.Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-26, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-44, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 6MT-63, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

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

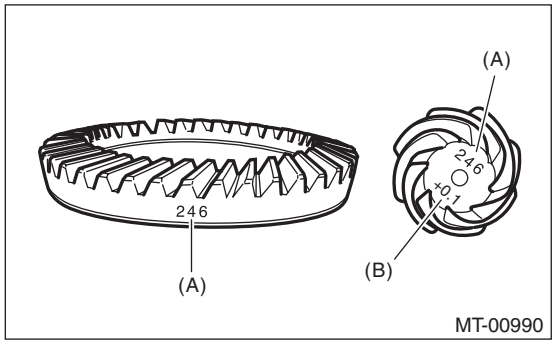


(A) Main shaft ASSY
(B) Drive pinion shaft ASSY

5) Remove the main shaft assembly.

B: INSTALLATION

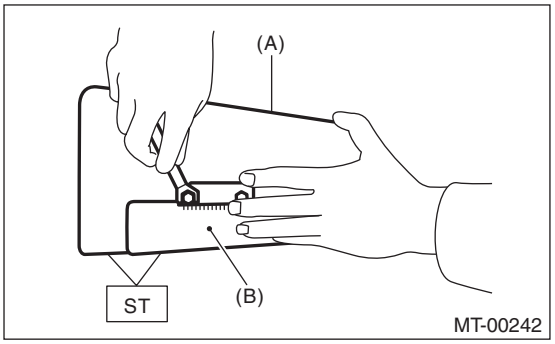
1) Remove the front differential assembly.
2) Hypoid gear set match mark/No.: The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers.
The figure (B) below shows a number for shim adjustment. If no number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

ST 499917500 DRIVE PINION GAUGE ASSY



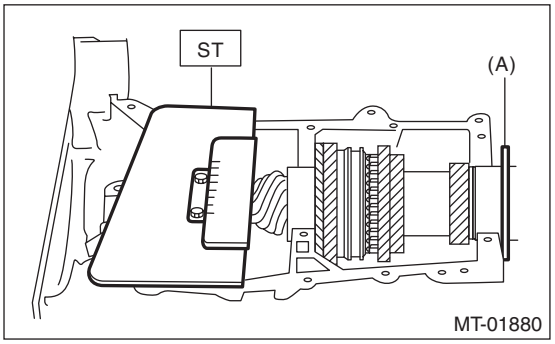
(A) Plate
(B) Scale

(2) Tighten the two bolts.
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 –.)

8) Select one to three shims in the following table for the value determined as described above, and take the shim(s) whose thickness is closest to the said value.

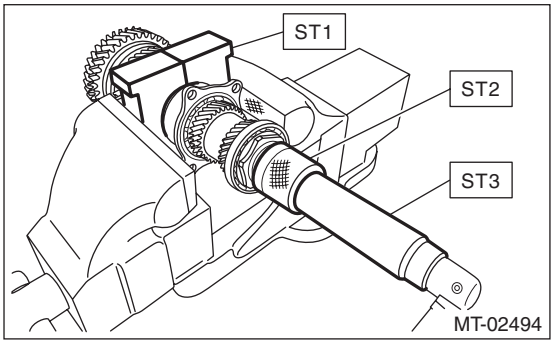
NOTE:
Install the shim with it's cut in facing the shifter fork & rod side.

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)

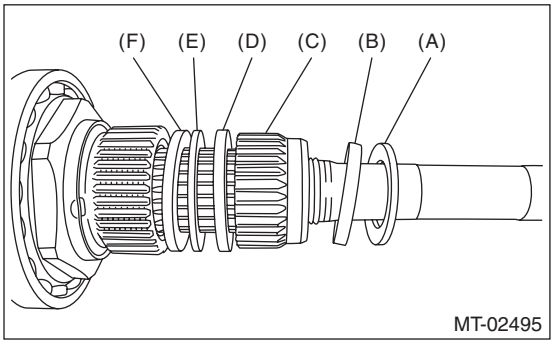
9) Install the front differential assembly.<Ref. to 6MT-87, INSTALLATION, Front Differential Assembly.>
10) Fit the transmission case knock pin to the knock pin hole of the roller bearing and install the drive pinion shaft assembly.
11) Install the main shaft assembly.<Ref. to 6MT-67, INSTALLATION, Main Shaft Assembly.>
12) Check each shifter fork.<Ref. to 6MT-103, INSPECTION, Shifter Fork and Rod.>
13) Install the transmission case.<Ref. to 6MT-64, INSTALLATION, Transmission Case.>
14) Install the transfer case together with the extension case assembly.<Ref. to 6MT-45, INSTALLATION, Transfer Case and Extension Case Assembly.>
15) Install the manual transmission assembly to the vehicle.<Ref. to 6MT-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.
• When replacing the coupling sleeve and synchronizer hub, replace them as a set. Because these must engage at the specified point, avoid disassembly as much as possible. If it is necessary to disassemble, mark the engaging points on the splines beforehand.
1) Flatten the tab of the lock nut.
2) Remove the lock nut using ST1, ST2 and ST3.
ST1 18680AA020 HOLDER
ST2 18667AA020 HOLDER
ST3 18662AA010 SOCKET WRENCH (27)



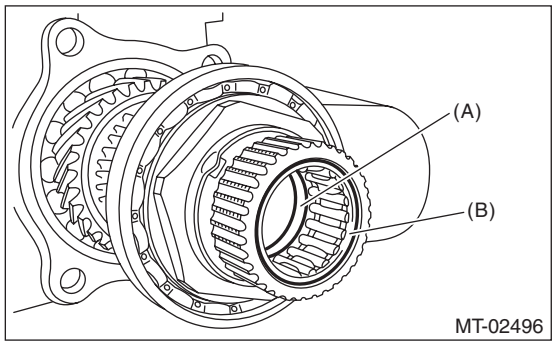
3) Remove the lock washer, washer, differential bevel gear sleeve, adjusting washer No. 1, thrust bearing and adjusting washer No. 2.



(A) Lock washer
(B) Washer
(C) Differential bevel gear sleeve
(D) Adjusting washer No. 1 (25 × 36 × t)
(E) Thrust bearing (25 × 36 × 2)
(F) Adjusting washer No. 2 (25 × 36 × t)

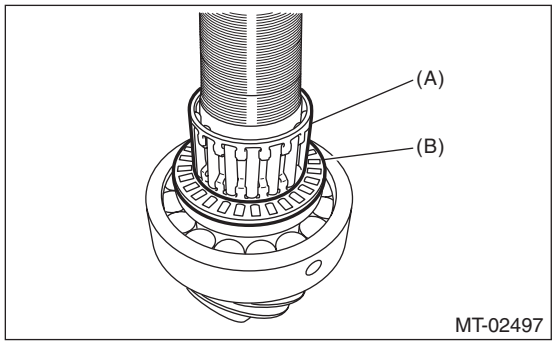
4) Draw out the drive pinion shaft from driven shaft.

5) Remove the needle bearing and drive pinion collar from driven shaft.



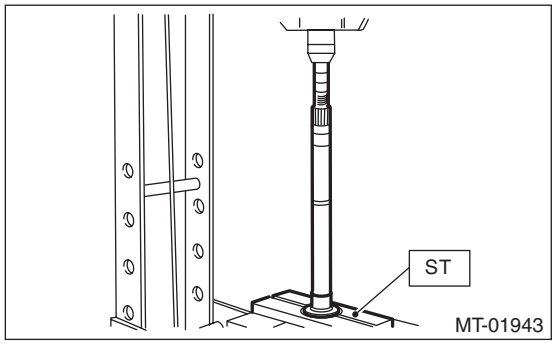
(A) Drive pinion collar
(B) Needle bearing (25 × 30 × 20)

6) Remove the needle bearing and thrust bearing from drive pinion shaft.



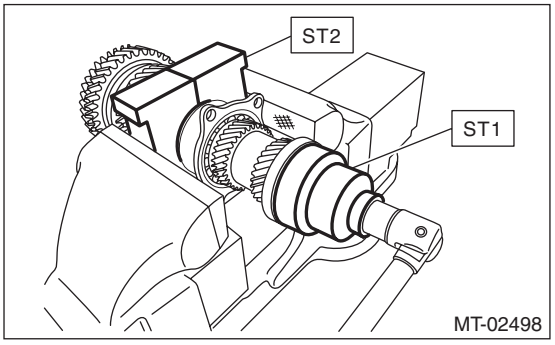
(A) Needle bearing (30 × 37 × 23)
(B) Thrust bearing (33 × 50 × 3)

7) Remove the roller bearing and washer using ST and a press.
ST 498077000 REMOVER

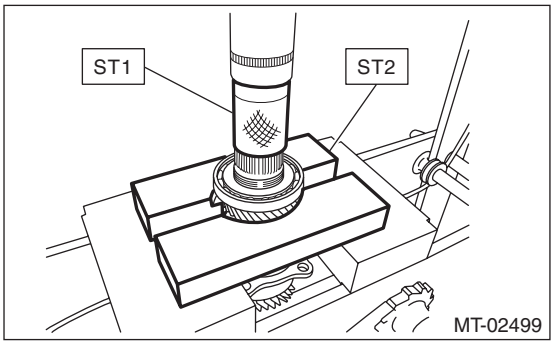


8) Flatten the tab of the lock nut.

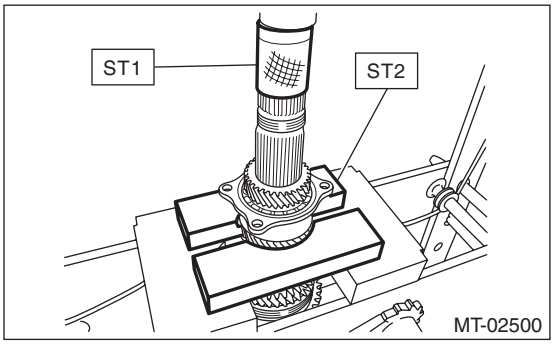
9) Remove the lock nut using ST1 and ST2.
ST1 499987300 SOCKET WRENCH (50)
ST2 18680AA020 HOLDER



10) Remove the ball bearing, 6th driven gear and drive pinion spacer using the ST1, ST2 and a press.
ST1 899754112 PRESS
ST2 899714110 REMOVER



11) Remove the 5th driven gear, double ball bearing and 3rd-4th driven gear using ST1, ST2 and a press.
ST1 899754112 PRESS
ST2 899714110 REMOVER

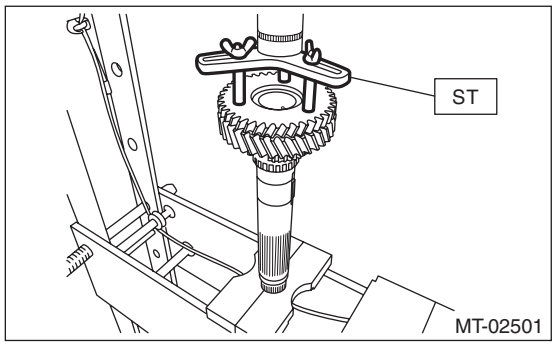


12) Remove the key.
13) Remove the 2nd driven gear, inner baulk ring, synchro cone, outer baulk ring, shifting insert and 1st-2nd coupling sleeve.

CAUTION:
When removing 1st-2nd coupling sleeve, be careful not to lose the shifting insert.

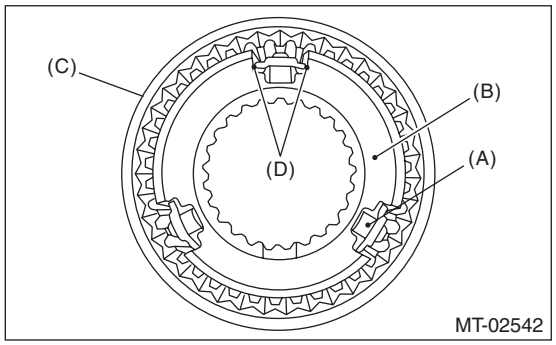
14) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd driven gear bushing and 1st-2nd synchronizer hub using ST and a press.

ST 18762AA000 COMPRESSOR SPECIAL TOOL



D: ASSEMBLY

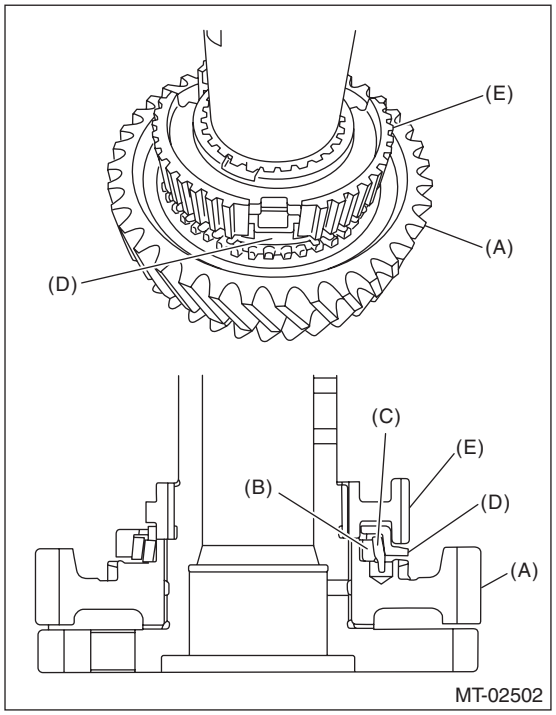
NOTE:
• Match the alignment marks, and install the coupling sleeve to the synchronizer hub and then install the shifting insert.
• Make sure that there is no large clearance at both sides of the shifting insert after assembly.



(A) Shifting insert
(B) Synchronizer hub
(C) Coupling sleeve
(D) There is no large clearance at this part.

1) Install the 1st driven gear, inner baulk ring, synchro cone and outer baulk ring and 1st-2nd synchronizer hub onto driven shaft.

NOTE:
• Install the 1st-2nd synchronizer hub in proper direction.
• Align the protrusion of the outer baulk ring into the groove of the 1st-2nd synchronizer hub.

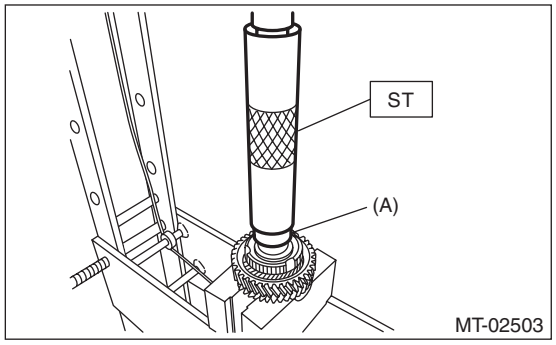


(A) 1st driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring
(E) 1st-2nd synchronizer hub

2) Install the 2nd driven gear bushing 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).

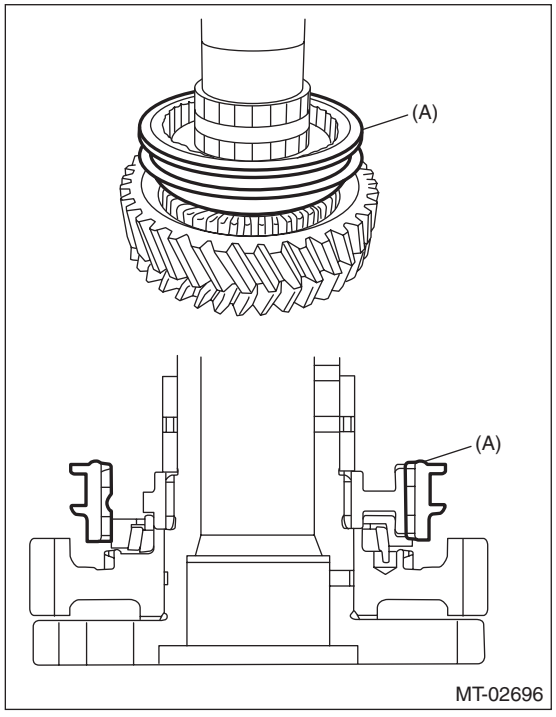
NOTE:
• Attach a cloth to the end of the driven shaft to prevent damage.
• When press fitting, align the oil holes of the shaft and bushing.
ST 18654AA000 INSTALLER



(A) 2nd driven gear bushing

3) Install the 1st-2nd coupling sleeve.

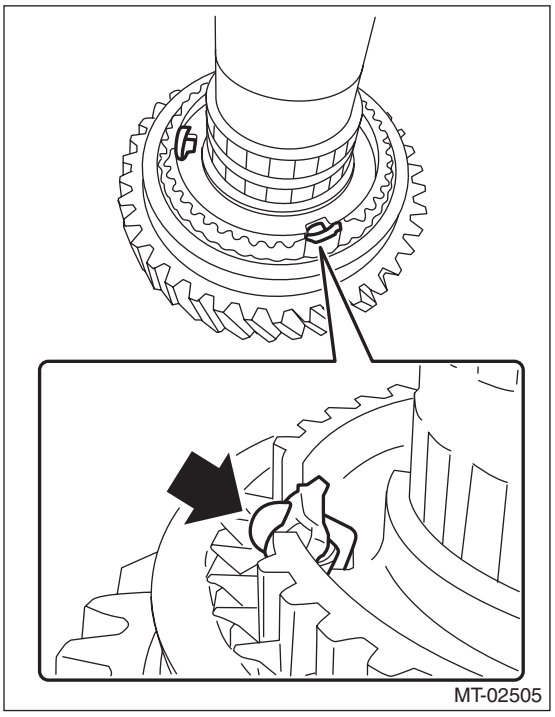
NOTE:
• Install the 1st-2nd coupling sleeve in proper direction.
• Align the alignment marks of 1st-2nd coupling sleeve and the 1st-2nd synchronizer hub.



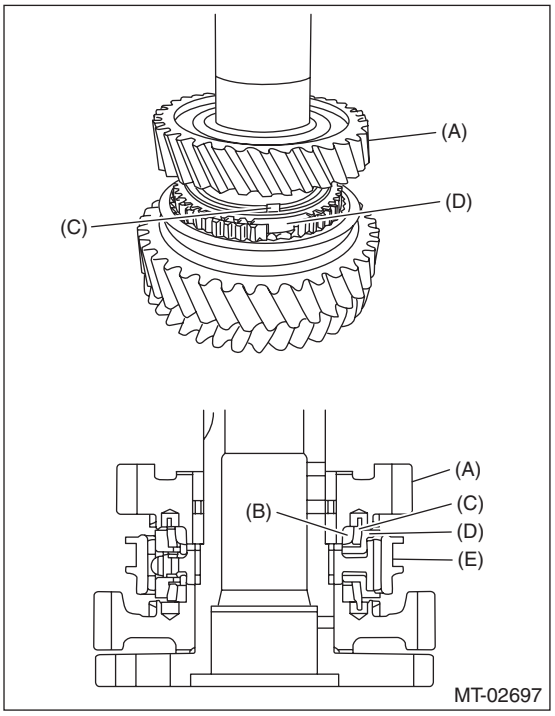
(A) 1st-2nd coupling sleeve

4) Install the 1st-2nd shifting insert.

NOTE:
Press in the ball part to install.



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

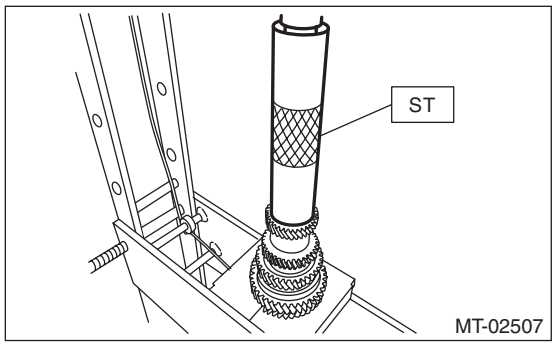


(A) 2nd driven gear
(B) Inner baulk ring
(C) Synchro cone
(D) Outer baulk ring
(E) 1st-2nd coupling sleeve

6) Install the key to the driven shaft.
7) Using the ST and a press, install the 3rd-4th driven gear.

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

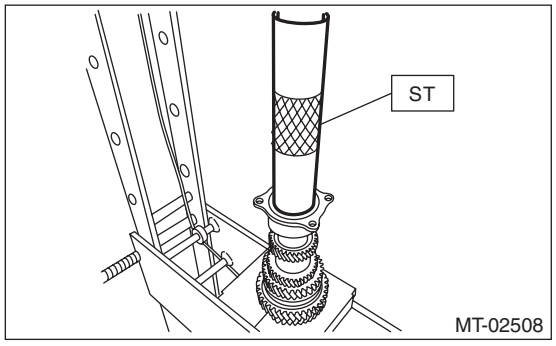
NOTE:
• Match the groove on the 3rd-4th driven gear to the key.
• Install the 3rd-4th driven gear in the proper direction.
ST 499277200 INSTALLER



8) Install the double ball bearing 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).

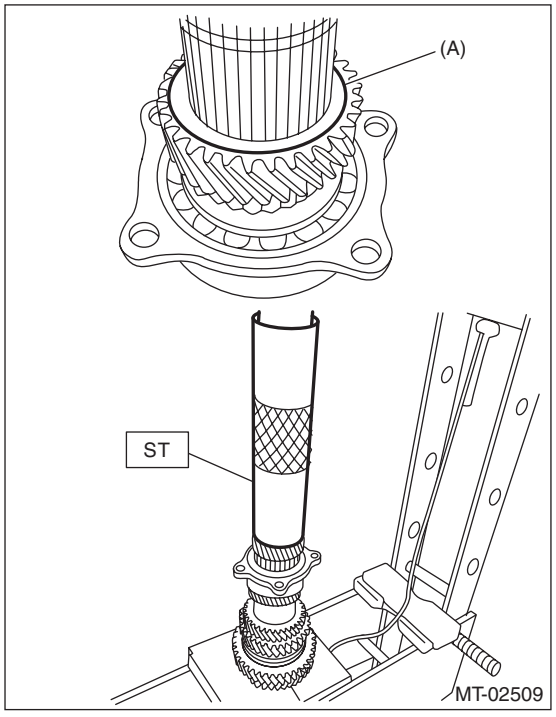
NOTE:
Use a new double ball bearing.
ST 499277200 INSTALLER



9) 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).

NOTE:
Install the 5th driven gear with the groove side facing the 6th driven gear.
ST 499277200 INSTALLER



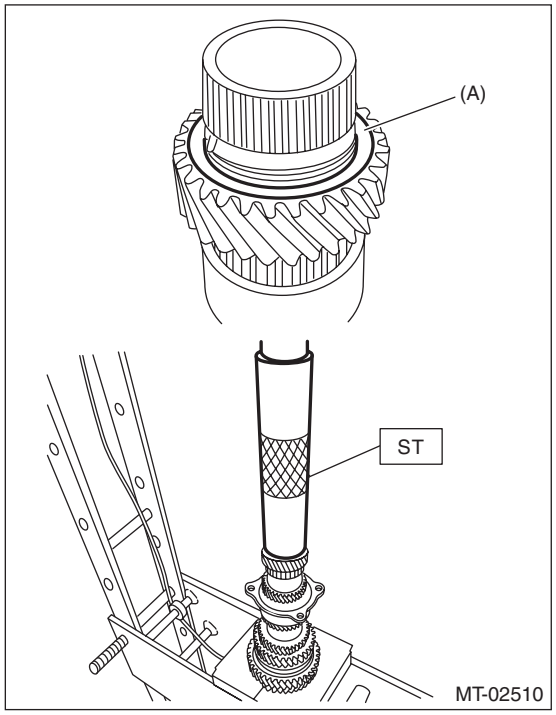
(A) Install with the groove side facing the 6th driven gear.

10) Install the drive pinion spacer to the driven shaft.

11) Install the 6th 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).

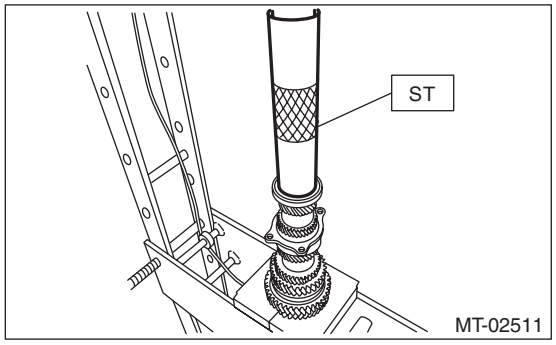
NOTE:
Install with the stepped side on the end surface of the 6th driven gear facing the rear ball bearing side.
ST 499277200 INSTALLER



(A) Install with the stepped side facing the rear ball bearing.

12) Install the ball bearing onto driven shaft using ST and a press.

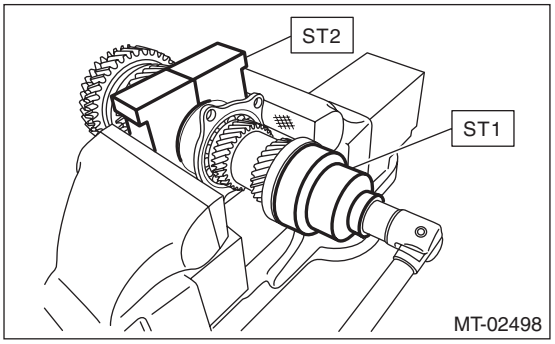
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
ST 499277200 INSTALLER



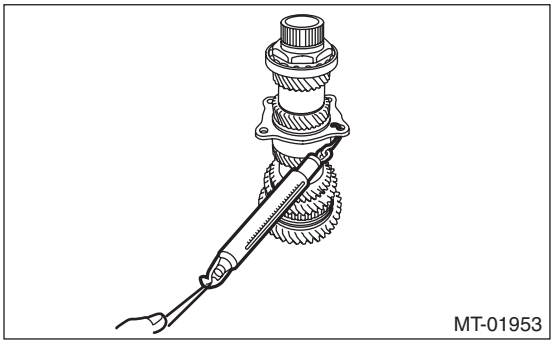
13) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE:
Use a new lock nut.

Tightening torque:
440 N·m (44.9 kgf-m, 324.5 ft-lb)
ST1 499987300 SOCKET WRENCH (50)
ST2 18680AA020 HOLDER

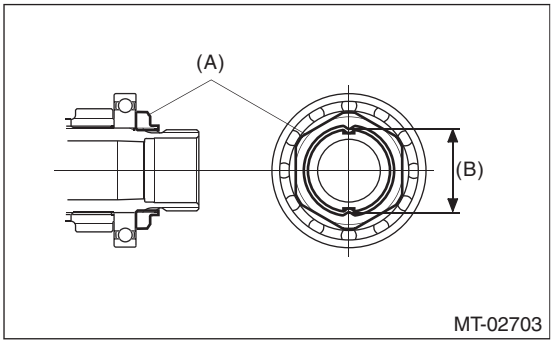


14) Using a spring scale, check that starting load of the ball bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.34 lbf).



15) Crimp the lock nut at two locations so that the dimension (B) becomes 39.1 mm (1.54 in) or less.

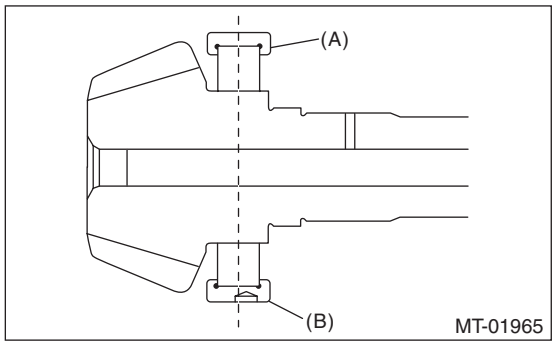
CAUTION:
When crimping the lock nut, be careful not to crack it.



(A) Lock nut
(B) Outer dimension after crimping

16) Install the roller bearing onto drive pinion.

NOTE:
- Use a new roller bearing.
- Install the knock pin hole of the roller bearing outer race, facing the rear side.

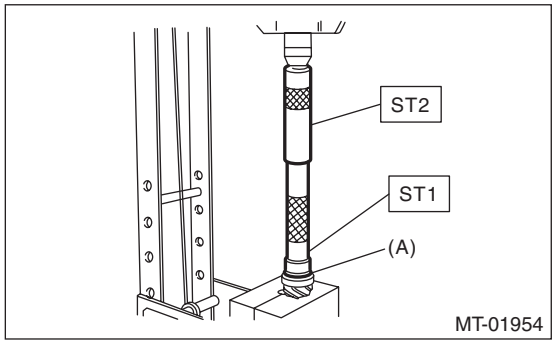


(A) Roller bearing
(B) Knock pin hole

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

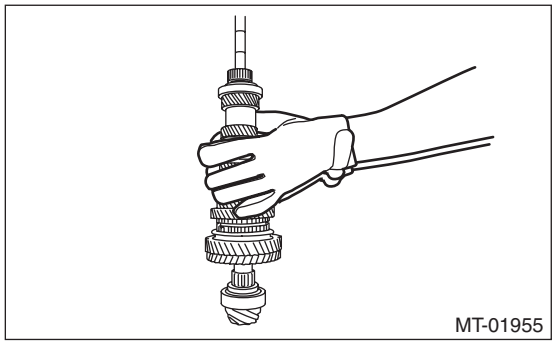
CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER

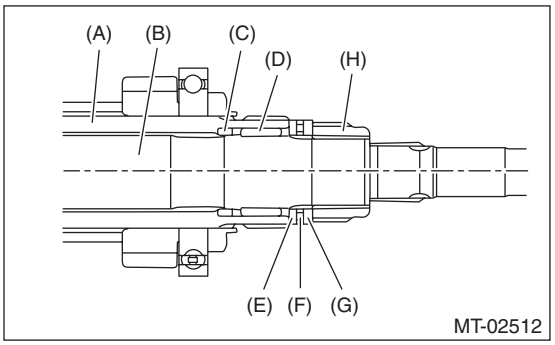


(A) Washer

18) Install the thrust bearing and needle bearing and install the driven shaft assembly.



19) 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.



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

20) Adjust the thrust bearing preload. <Ref. to 6MT-85, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION

Disassembled parts should be washed with cleaning solvent first, then inspected carefully.

1) Bearing

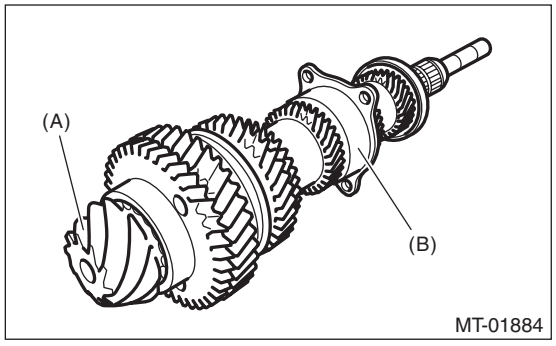
Replace the bearings in the following cases.

• 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 or ball 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) Ball bearing

• When bearing has other defects.

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 new part if its tooth surfaces are broken, damaged or excessively 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, synchro cone

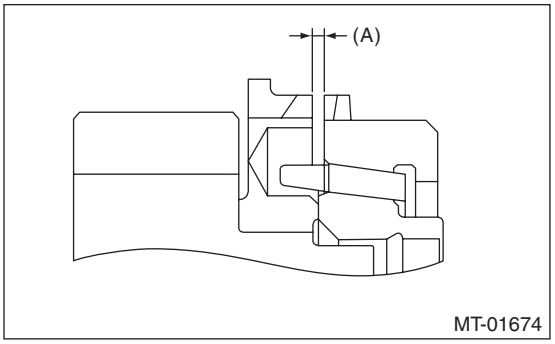
Replace the baulk ring and synchro cone in the following cases.

• When the inner surface and end face are damaged.

• When the baulk ring inner surface is abnormally or partially worn down.

• If the gap between the end faces of the baulk ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

Clearance (A):
0.5 mm (0.020 in) or more



• When the contact surface of the baulk ring insert section is damaged or abnormally worn.

• Apply gear oil to the cone of the gear and while press-fitting the baulk ring, check there is no rotation in the circumferential direction.

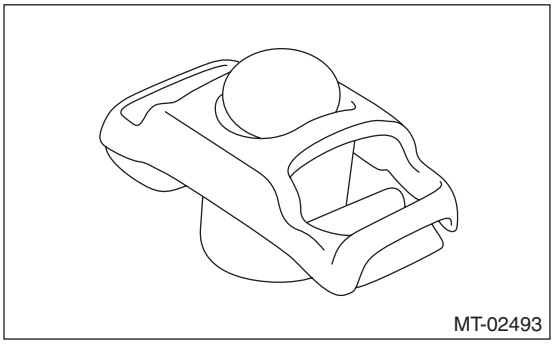
5) Coupling sleeve and synchronizer hub

• Check the slipping condition of the coupling sleeve.

• Check the splines on the coupling sleeve and synchronizer hub for wear.

6) Shifting insert

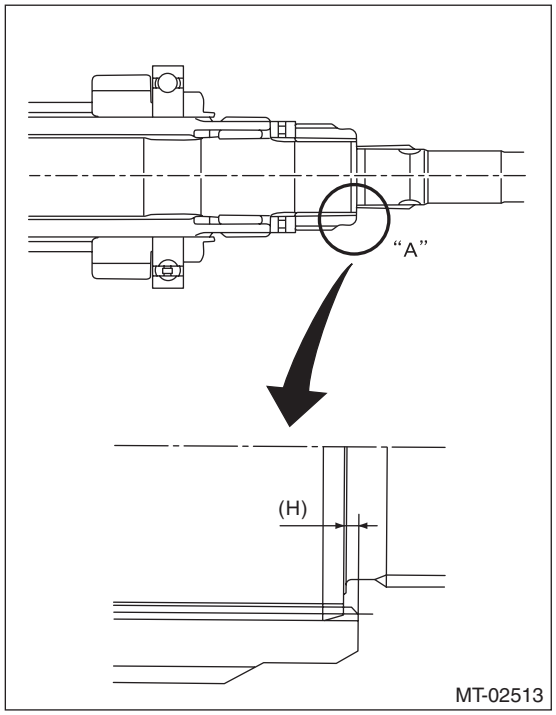
Replace the shifting insert if there is deformation, excessive wear on the ball section or any defectiveness.



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 the washer (20 × 31 × 4) and lock washer (20 × 31 × 2.3) and attach the lock nut (20 × 11).

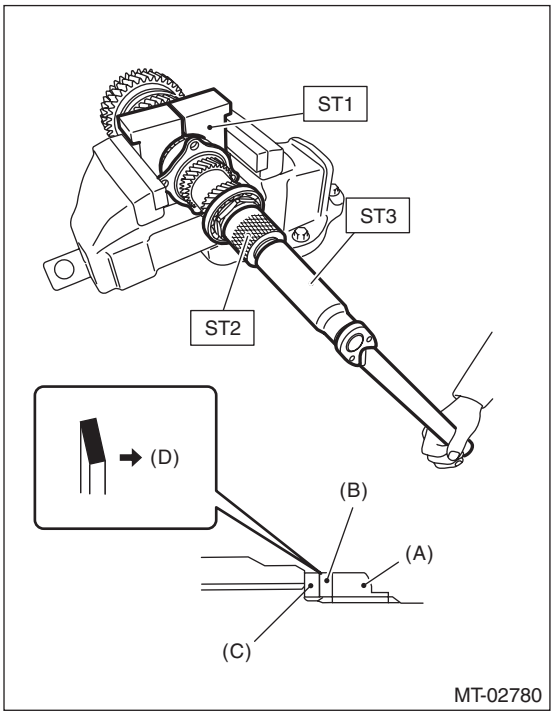


2) Using the ST1, ST2 and ST3, tighten the lock nut to the specified torque.

NOTE:
- Use new lock nuts and lock washers.
- Install the lock washer in the correct direction.

Tightening torque:
126 N·m (12.8 kgf-m, 92.9 ft-lb)

ST1 18680AA020 HOLDER
ST2 18667AA020 HOLDER
ST3 18662AA010 SOCKET (27)

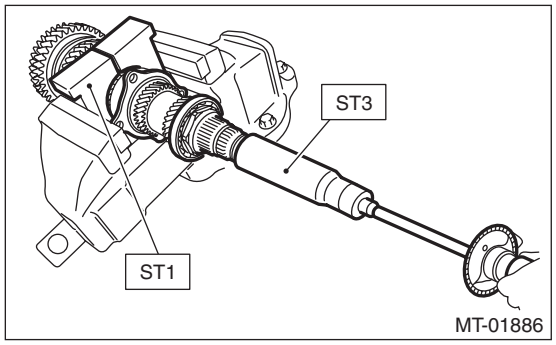


(A) Lock nut
(B) Lock washer
(C) Washer
(D) Lock nut side

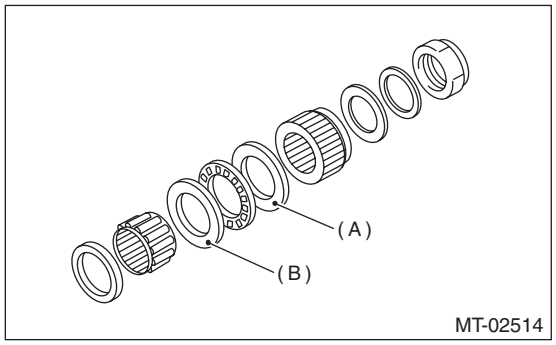
3) After removing the ST2 used in step 2), measure the starting torque using torque driver.

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

ST1 18680AA020 HOLDER
ST3 18662AA010 SOCKET (27)



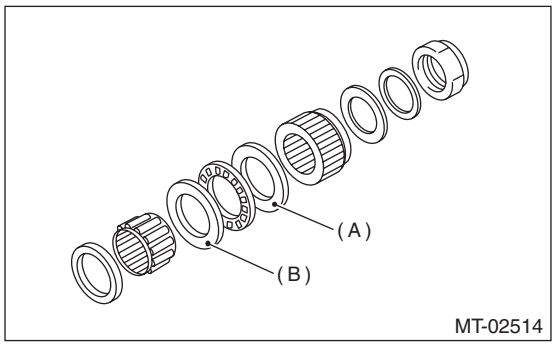
4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and recheck starting torque.



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

Adjusting washer No. 1	
Part No.	Thickness mm (in)
803025071	2.925 (0.1152)
803025072	2.950 (0.1161)
803025073	2.975 (0.1171)
803025074	3.000 (0.1181)
803025075	3.025 (0.1191)
803025076	3.050 (0.1201)
803025077	3.075 (0.1211)

5) If the specified starting torque cannot be obtained by the selection of adjusting washer No. 1, select adjusting washer No. 2 from the list below. Repeat steps 1) through 4) to adjust starting torque.



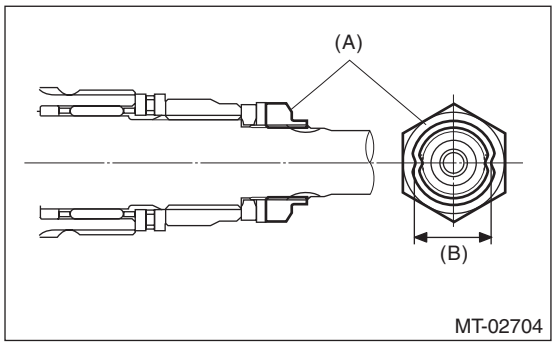
(A) Adjusting washer No. 1
(B) Adjusting washer No. 2

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)
803025070	2.850 (0.1122)
803025074	3.000 (0.1181)
803025078	3.150 (0.1240)

6) Recheck that the starting torque is within the specified range, and crimp the lock nut at two locations so that the dimension (B) becomes 20.1 mm (0.79 in) or less.

CAUTION:
When crimping the lock nut, be careful not to crack it.



(A) Lock nut
(B) Outer dimension after crimping