

16. Main Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-22, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-39, 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. <Ref. to 5MT-62, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.

B: INSTALLATION

- 1) Attach the needle bearing and oil seal to the front of the main shaft assembly.

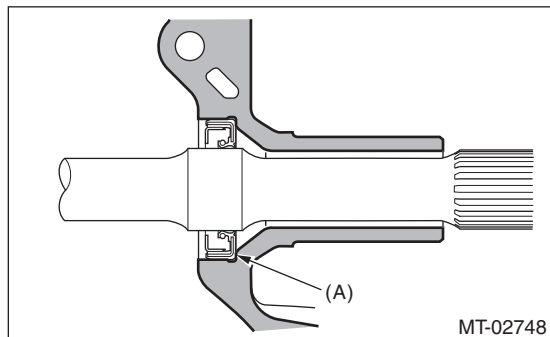
NOTE:

- Wrap the clutch splined section with vinyl tape to prevent damage to the oil seal.
- Apply NICHIMOLY N-130 or the equivalent to the sealing lip of the oil seal.
- Use a new oil seal.

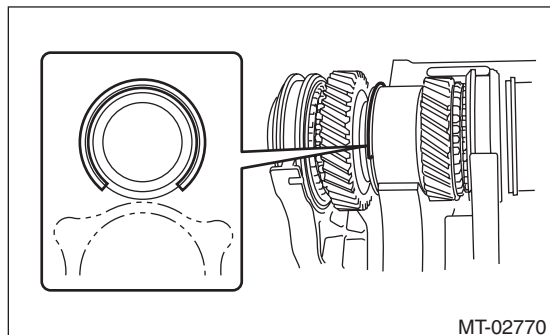
- 2) Fit the knock pin hole of the needle bearing outer race to the transmission case knock pin, and install the main shaft assembly.

NOTE:

- Align the end face of the seal with surface (A) when installing the oil seal.



- Face the cutout portion of the snap ring for the ball bearing to the drive pinion shaft assembly.



- 3) Install the drive pinion shaft assembly. <Ref. to 5MT-62, INSTALLATION, Drive Pinion Shaft Assembly.>

- 4) Check each shifter fork. <Ref. to 5MT-83, INSPECTION, Shifter Fork and Rod.>

- 5) Select a main shaft rear plate. <Ref. to 5MT-61, ADJUSTMENT, Main Shaft Assembly.>

- 6) Install the transmission case. <Ref. to 5MT-54, INSTALLATION, Transmission Case.>

- 7) Install the transfer case together with the extension case assembly. <Ref. to 5MT-39, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 8) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-25, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

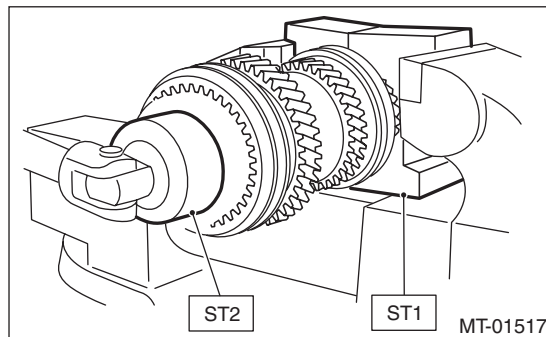
- 1) Put vinyl tape around main shaft spline to protect the oil seal from damage. Then pull out the oil seal and needle bearing by hand.

- 2) Remove the lock nut and lock washer.

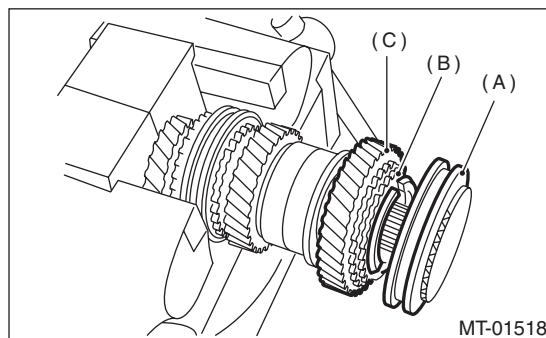
NOTE:

Flatten the lock nut tab before removing the lock nut.

ST1	498937000	TRANSMISSION HOLDER
ST2	499987003	SOCKET WRENCH (35)



- 3) Remove the 5th hub & sleeve No. 2, baulk lever, baulk ring, and 5th drive gear & needle bearing.



- (A) 5th hub & sleeve No. 2
- (B) Baulk ring
- (C) 5th drive gear

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

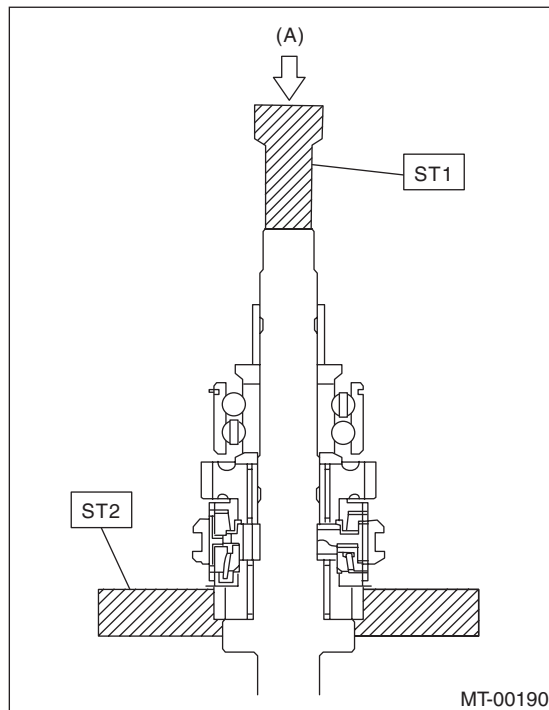
4) Using ST1 and ST2, remove the rest of the parts.

NOTE:

- When replacing the sleeve & hub, replace them as a set.
- Do not disassemble the sleeve & hub; the engaging point is pre-determined.
- If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



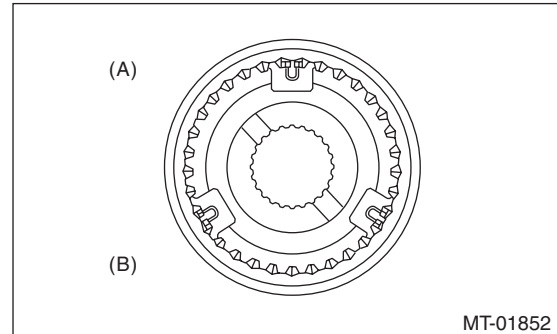
(A) Press

D: ASSEMBLY

1) When the sleeve & hub assemblies have been disassembled, reassemble by aligning the alignment marks.

NOTE:

Position the open ends of the spring 120° apart.



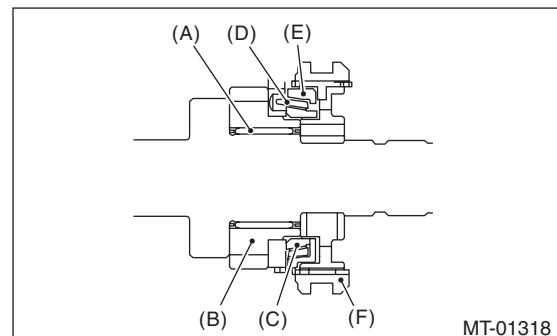
(A) 3rd-4th coupling sleeve & synchronizer hub ASSY

(B) 3rd gear side

2) Install the 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, 3rd needle bearing and sleeve & hub assembly.

NOTE:

Align the groove in baulk ring with the shifting insert.



(A) 3rd needle bearing

(B) 3rd drive gear

(C) Inner baulk ring

(D) Synchro cone

(E) Outer baulk ring

(F) Sleeve & hub ASSY

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

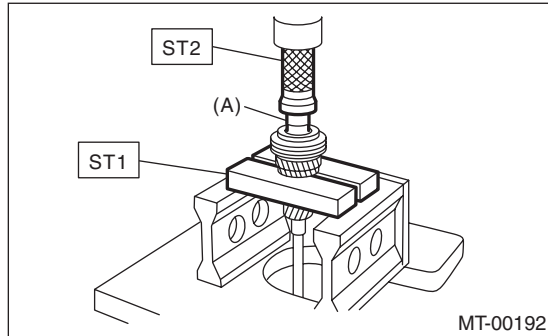
3) Install the 4th needle bearing race using ST1, ST2 and a press.

CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

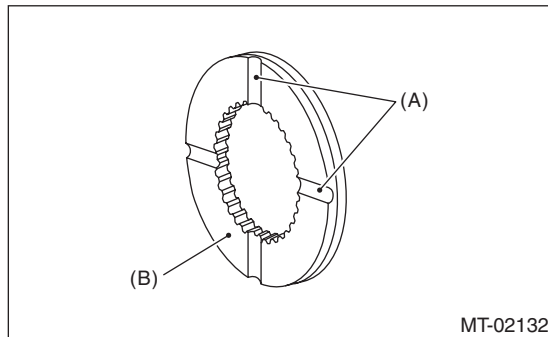


(A) 4th needle bearing race

4) Install the baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to the main shaft.

NOTE:

- Align the baulk ring and hub & sleeve assembly with the key groove.
- Make sure the thrust washer is facing the correct direction.



(A) Groove

(B) Face this surface to the 4th gear side.

5) Press-fit the double ball bearing using ST1, ST2 and a press.

CAUTION:

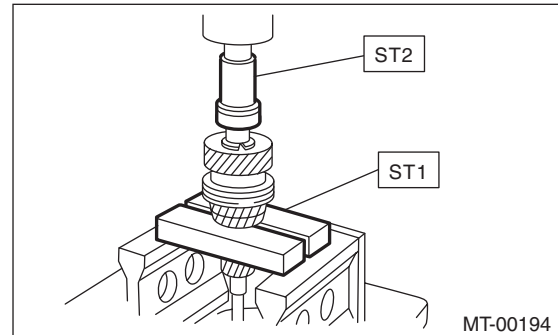
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

NOTE:

- Install the snap ring side of the double ball bearing facing the 5th drive gear side.
- Use a new double ball bearing.



6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of the main shaft.

CAUTION:

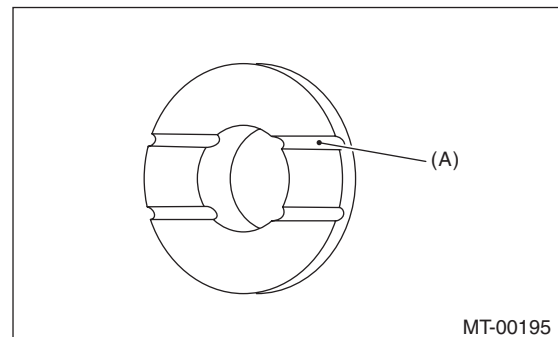
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Make sure the thrust washer is facing the correct direction.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



(A) Face this surface to the 5th gear side.

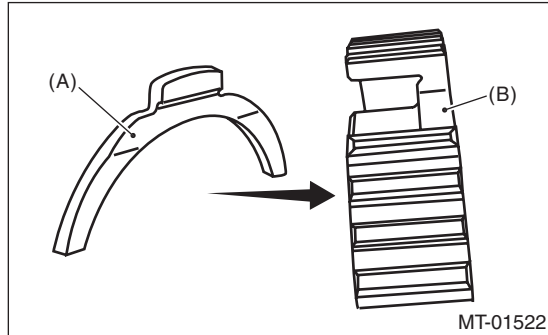
Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

7) Install the rest of the parts to the rear section of the main shaft.

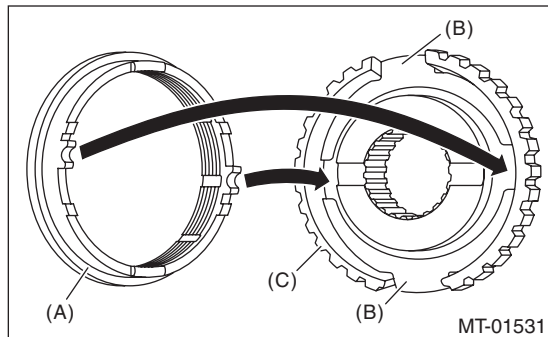
CAUTION:

- Install the baulk lever so that the concave side faces toward the 5th hub.



- (A) Baulk lever
(B) 5th hub

- Align the protruded section of baulk ring between the baulk levers.



- (A) Baulk ring
(B) Baulk lever
(C) 5th hub

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

NOTE:

- Use new lock nuts and lock washers.
- Make sure the lock washer is installed in the proper direction.

ST1 499987003

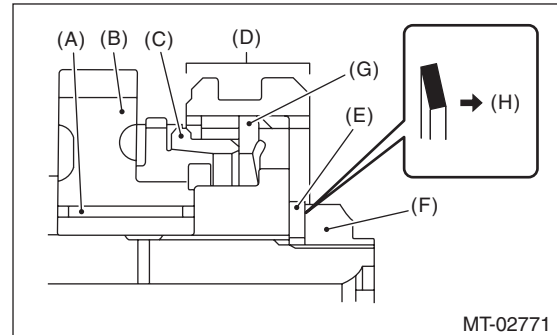
SOCKET WRENCH (35)

ST2 498937000

TRANSMISSION HOLDER

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)



- (A) Needle bearing
(B) 5th drive gear
(C) Baulk ring
(D) 5th hub & sleeve No. 2
(E) Lock washer
(F) Lock nut
(G) Baulk lever
(H) Nut side

9) Crimp lock nuts in two locations after tightening.

CAUTION:

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

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 transmission gear oil lubrication.
- 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.

Main Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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 contact surface between the cone and baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.

4) Baulk ring, synchro cone

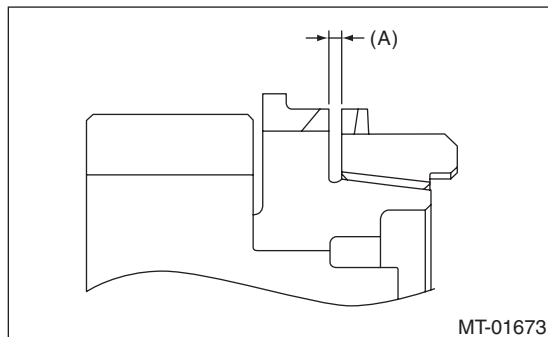
Replace the baulk ring and synchro cone in the following cases.

- When the inner surface and end face are damaged.
- When the baulk ring inner surface is abnormally or partially worn down.
- When the contact surface of the baulk ring insert section is cracked or abnormally worn.
- 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.

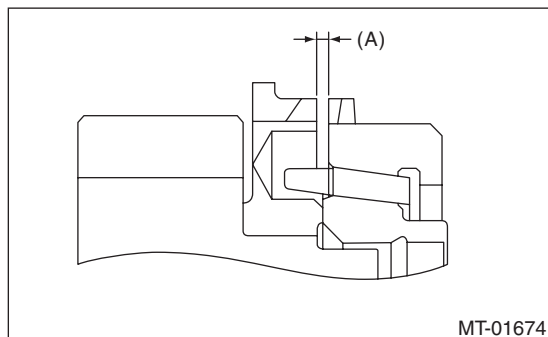
Clearance (A):

0.5 mm (0.020 in) or more

Single cone



Double cone



- Apply transmission 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) Shifting insert key

Replace the insert key if deformed, excessively worn or defective in any way.

6) 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.

7) Oil seal

Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.

8) Gearshift mechanism

Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT

Selection of main shaft rear plate:

Measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

NOTE:

Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and moving flange of bearing.

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2

