

# MAIN SHAFT ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

### 16. Main Shaft Assembly

#### A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-27, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-41, REMOVAL, Transfer Case and Extension Case Assembly.>
- 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) Install the needle bearing and oil seal onto the front of transmission main shaft assembly.

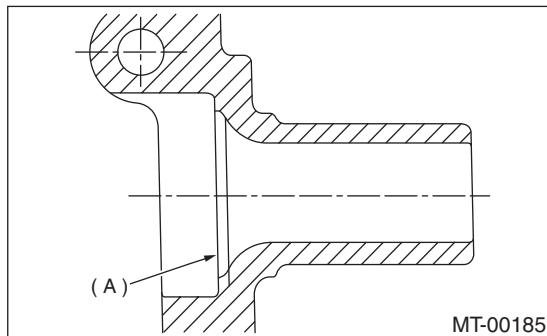
##### NOTE:

- Wrap the clutch splined section with vinyl tape to prevent damage to oil seal.
- Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.
- Use a new one.

- 2) Install the needle bearing outer race knock pin hole into transmission case knock pin.

##### NOTE:

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



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

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

- 5) Install the transfer case with extension case assembly. <Ref. to 5MT-41, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-30, INSTALLATION, Manual Transmission Assembly.>

#### C: DISASSEMBLY

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

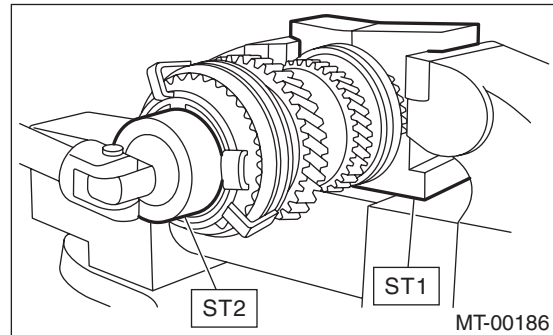
- 2) Remove the lock nut from transmission main shaft assembly.

##### NOTE:

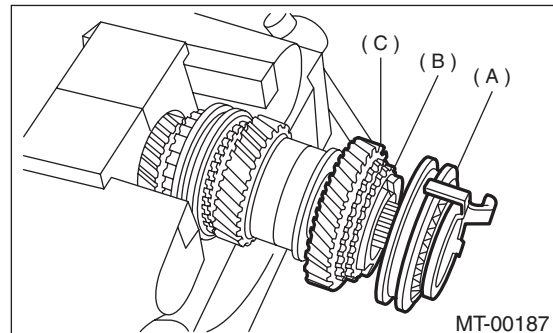
Remove the caulking before removing lock nut.

ST1 498937000 TRANSMISSION HOLDER

ST2 499987003 SOCKET WRENCH (35)

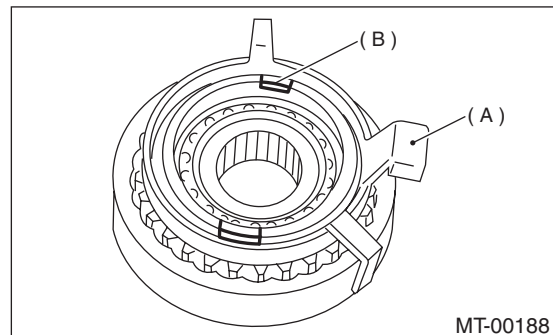


- 3) Remove the 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



- (A) 5th-Rev sleeve and hub ASSY
- (B) Baulk ring
- (C) 5th drive gear

- 4) Remove the snap ring and synchro cone stopper from 5th-Rev sleeve and hub assembly.



- (A) Synchro cone stopper
- (B) Snap ring

# MAIN SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

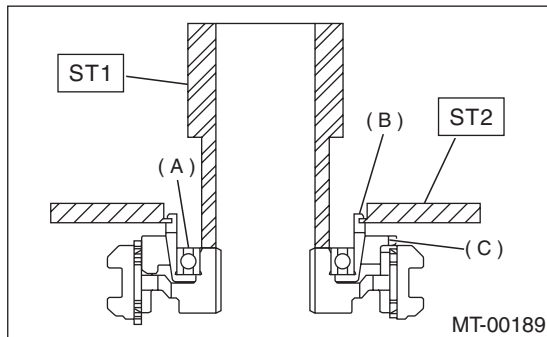
5) Using the ST1, ST2 and a press, remove the ball bearing, synchro cone and baulk ring (Rev).

**NOTE:**

- Replace the sleeve and hub with new ones. Do not attempt to disassemble because they must engage at a specified point. If they should be disassembled, mark engagement point on splines beforehand.
- Do not reuse the ball bearing.

ST1 499757002 INSTALLER

ST2 498077400 SYNCHRO CONE REMOVER



- (A) Ball bearing
- (B) Synchro cone
- (C) Baulk ring

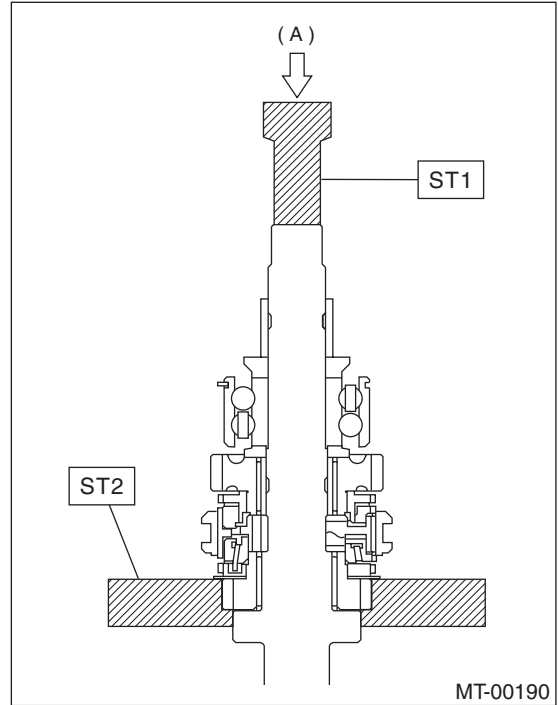
6) Using the ST1 and ST2, remove rest of the parts.

**NOTE:**

Replace the sleeve and hub with new ones. Do not attempt to disassemble because they must engage at a specified point. If they should be disassembled, mark engagement point on splines beforehand.

ST1 899864100 REMOVER

ST2 899714110 REMOVER



- (A) Press

# MAIN SHAFT ASSEMBLY

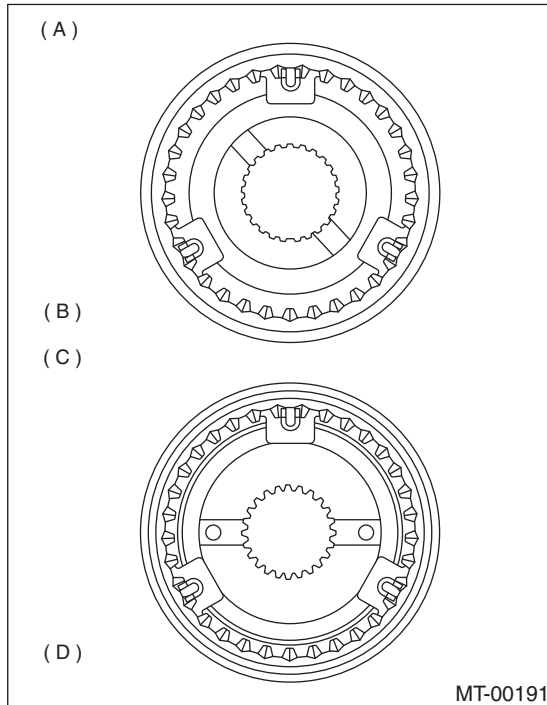
## MANUAL TRANSMISSION AND DIFFERENTIAL

### D: ASSEMBLY

1) Assemble each sleeve and hub assembly.

NOTE:

Position the open ends of spring 120° apart.

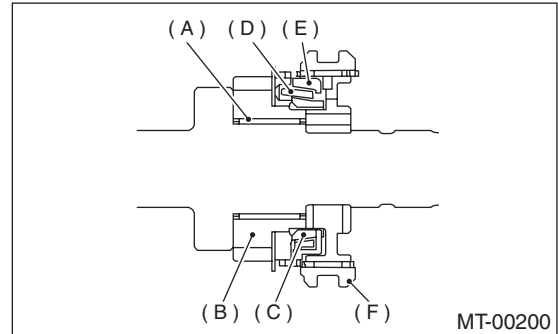


- (A) 3rd-4th hub ASSY
- (B) 3rd gear side
- (C) 5th-Rev hub ASSY
- (D) 5th gear side

2) Install the 3rd drive gear, outer baulk ring, synchro cone, inner baulk ring, sleeve and hub assembly for 3rd needle bearing on transmission main shaft.

NOTE:

Align the groove in baulk ring with shifting insert.



- (A) 3rd needle bearing
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) Synchro cone
- (E) Outer baulk ring
- (F) Sleeve and hub ASSY

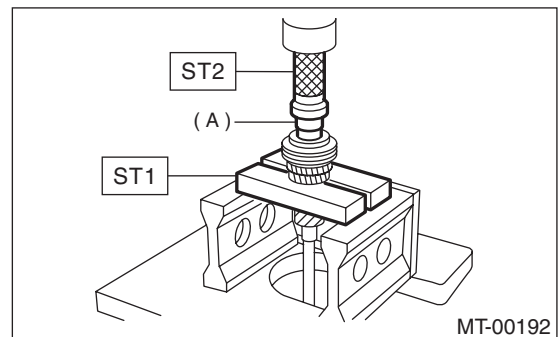
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

NOTE:

Do not apply pressure 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

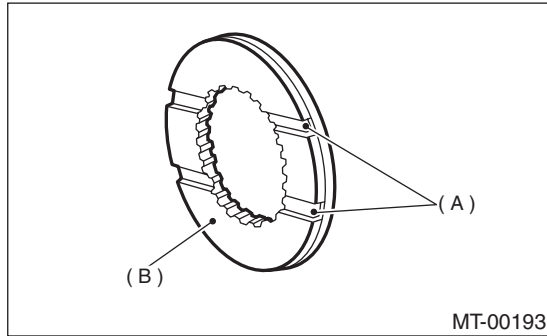
# MAIN SHAFT ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

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

**NOTE:**

Align the baulk ring and gear & hub assembly with key groove.



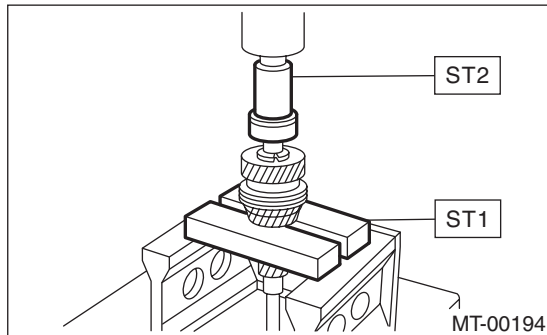
- (A) Groove
- (B) 4th gear side

5) Drive the ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

**NOTE:**

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

- ST1 899714110 REMOVER
- ST2 499877000 RACE 4-5 INSTALLER

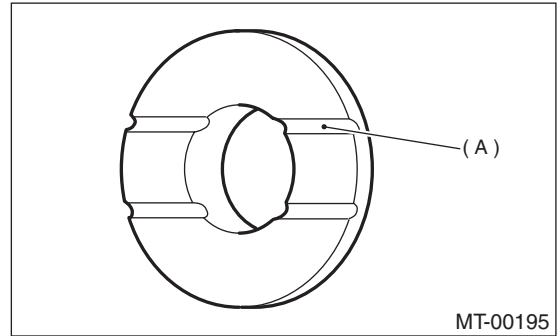


6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

**NOTE:**

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Face the thrust washer in correct direction.

- ST1 899714110 REMOVER
- ST2 499877000 RACE 4-5 INSTALLER



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

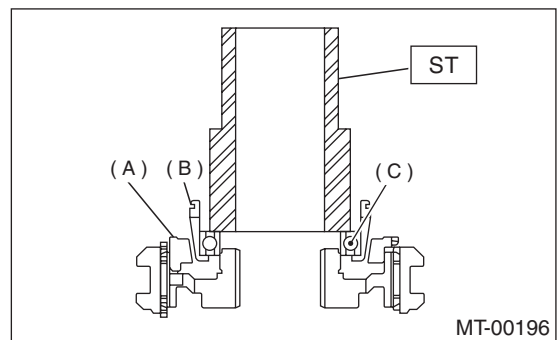
7) Install the bearing onto synchro cone.

8) Install the baulk ring and synchro cone onto 5th-Rev sleeve and hub assembly using ST and a press.

**NOTE:**

- Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
- Use a new ball bearing.
- After press fitting, make sure the synchro cone rotates freely.

- ST 499757002 INSTALLER

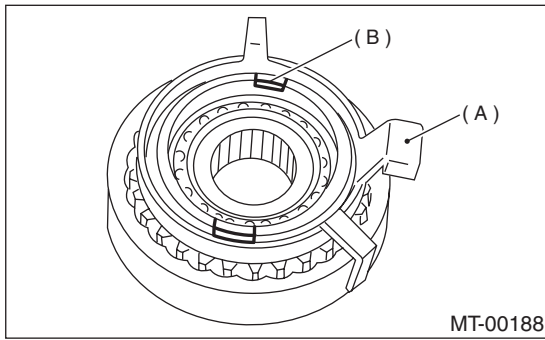


- (A) Baulk ring
- (B) Synchro cone
- (C) Ball bearing

# MAIN SHAFT ASSEMBLY

## MANUAL TRANSMISSION AND DIFFERENTIAL

9) Install the synchro cone stopper and snap ring to 5th-Rev sleeve and hub assembly.

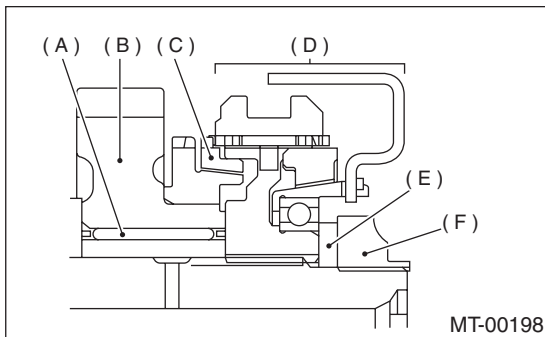


- (A) Synchro cone stopper
- (B) Snap ring

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

### NOTE:

Align the groove in baulk ring with shifting insert.



- (A) Needle bearing
- (B) 5th drive gear
- (C) Baulk ring
- (D) 5th-Rev sleeve and hub ASSY
- (E) Lock washer
- (F) Lock nuts

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

### NOTE:

Secure the lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH  
ST2 498937000 TRANSMISSION HOLDER

### Tightening torque:

**120 N·m (12.2 kgf·m, 88.5 ft·lb)**

## E: INSPECTION

Disassembled parts should be washed clean first and then inspected carefully.

### 1) Bearings

Replace the bearings in the following cases:

- Bearings whose balls, outer races and inner races are broken or rusty.
- Worn bearings
- Bearings that fail to turn smoothly or make abnormal noise when turned after gear oil lubrication.
- Bearings having other defects

### 2) Bushing (each gear)

Replace the bushing in the following cases:

- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

### 3) Gears

Replace the gears with new ones if their 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.

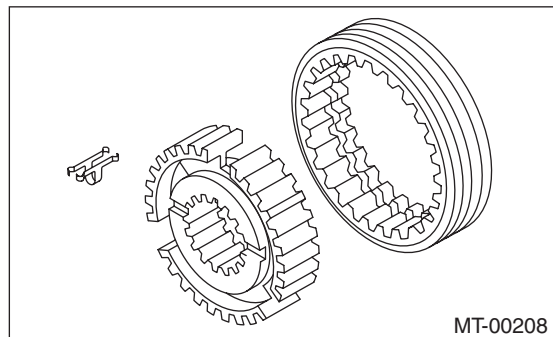
### 4) Baulk ring

Replace the ring in the following cases:

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

### 5) Shifting insert key

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



### 6) Oil seal

Replace the oil seal if the lip is deformed, hardened, damaged, 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.

### 8) Gearshift mechanism

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

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## F: ADJUSTMENT

Selection of main shaft rear plate:

Using the ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper 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 the moving flange of bearing.

ST 498147000 DEPTH GAUGE

Dimension (A) mm (in)	Part No.	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 3.99 (0.1524 — 0.1571)	32294AA051	2

