

# Main Shaft Assembly for Single-Range

## MANUAL TRANSMISSION AND DIFFERENTIAL

### 15. Main Shaft Assembly for Single-Range

#### A: REMOVAL

- 1) Remove the manual transmission assembly from the vehicle. <Ref. to 6MT-25, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case together with the extension case assembly. <Ref. to 6MT-40, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 6MT-57, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 6MT-66, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly for single-range.

#### B: INSTALLATION

- 1) Install the needle bearing and oil seal to the front of the transmission single-range main shaft assembly.

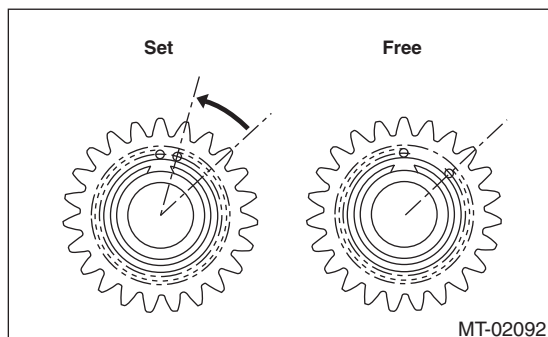
##### NOTE:

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

- 2) Rotate the reverse idler sub gear by two teeth from free status to make it engage with the reverse gear of the main shaft and install the main shaft assembly.

(1) When the reverse idler sub gear is at free status, put alignment marks on reverse idler sub gear and reverse idler gear.

(2) Rotate the reverse idler sub gear in the arrow direction by two teeth from the alignment mark and secure it with a wire.



- (3) After installing the main shaft assembly, check that the reverse idler gear and reverse idler sub gear are misaligned by two teeth and remove the wire.

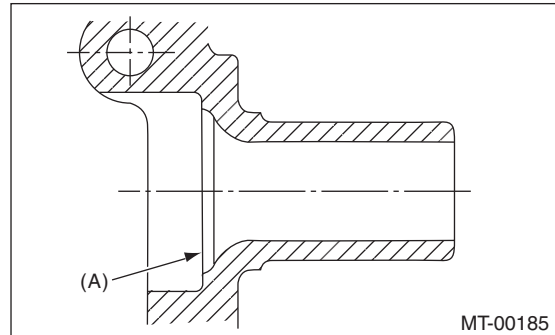
##### CAUTION:

**Make sure to remove the wire.**

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

##### NOTE:

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



- 4) Install the drive pinion shaft assembly. <Ref. to 6MT-66, INSTALLATION, Drive Pinion Shaft Assembly.>

- 5) Install the transmission case. <Ref. to 6MT-58, INSTALLATION, Transmission Case.>

- 6) Install the transfer case together with the extension case assembly. <Ref. to 6MT-40, INSTALLATION, Transfer Case and Extension Case Assembly.>

- 7) Install the manual transmission assembly to the vehicle. <Ref. to 6MT-29, INSTALLATION, Manual Transmission Assembly.>

#### C: DISASSEMBLY

##### NOTE:

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

- 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.

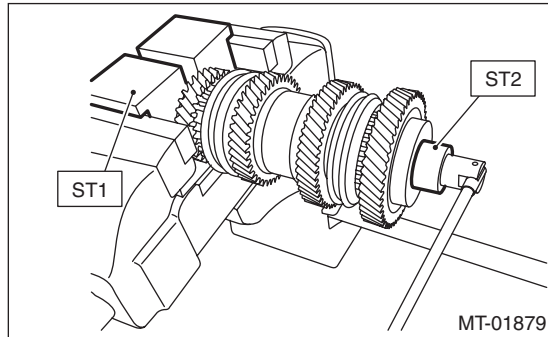
- 2) Flatten the tab of the lock nut.

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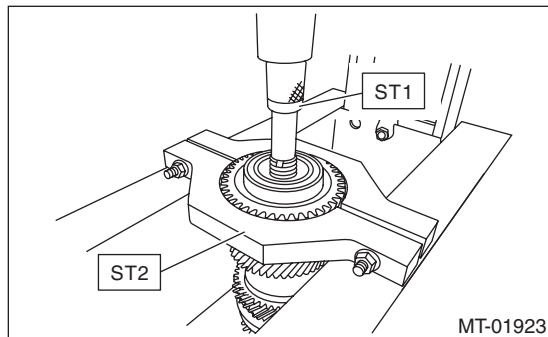
3) Remove the lock nut from transmission main shaft assembly for single-range.

ST1 498937000 TRANSMISSION HOLDER  
ST2 499987003 SOCKET WRENCH (35)



4) Remove the 6th drive gear and ball bearing using the ST1, ST2 and a press.

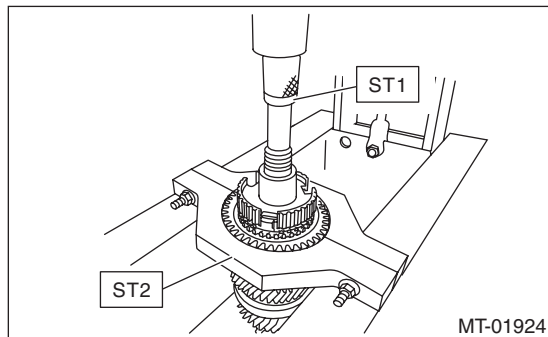
ST1 899864100 REMOVER  
ST2 18722AA000 REMOVER



5) Remove the needle bearing, 6th baulk ring and 5th-6th coupling sleeve.

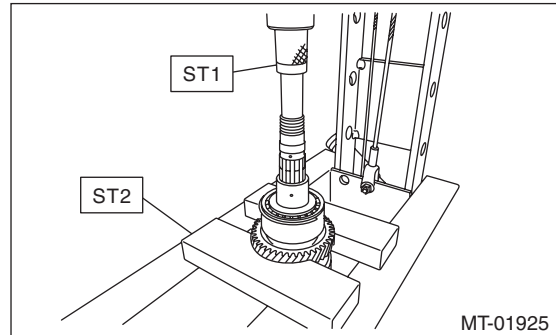
6) Remove the 5th drive gear, 6th needle bearing race, 5th baulk ring, 5th-6th synchronizer hub and needle bearing using the ST1, ST2 and a press.

ST1 899864100 REMOVER  
ST2 18722AA000 REMOVER



7) Shift the 3rd-4th coupling sleeve into 3rd, then remove the 4th drive gear, taper roller bearing and 5th needle bearing race using the ST1, ST2 and a press.

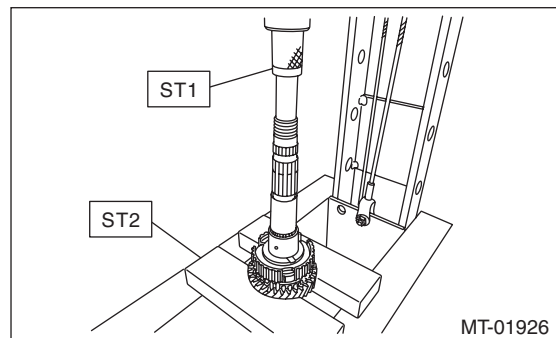
ST1 899864100 REMOVER  
ST2 899714110 REMOVER



8) Remove the 4th gear thrust washer, 4th baulk ring, needle bearing and 3rd-4th coupling sleeve.

9) Remove the 3rd drive gear, 4th needle bearing race, 3rd-4th synchronizer hub, inner baulk ring, 3rd synchro cone, outer baulk ring and needle bearing using the ST1, ST2 and a press.

ST1 899864100 REMOVER  
ST2 899714110 REMOVER

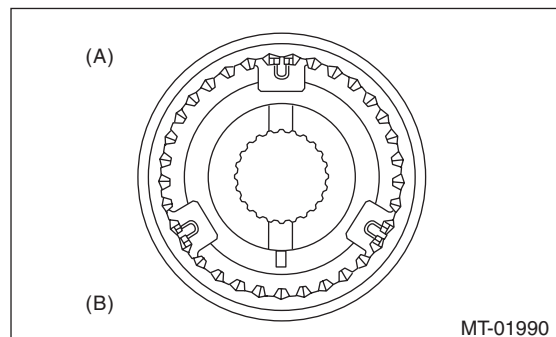


## D: ASSEMBLY

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 hub ASSY

(B) 3rd gear side

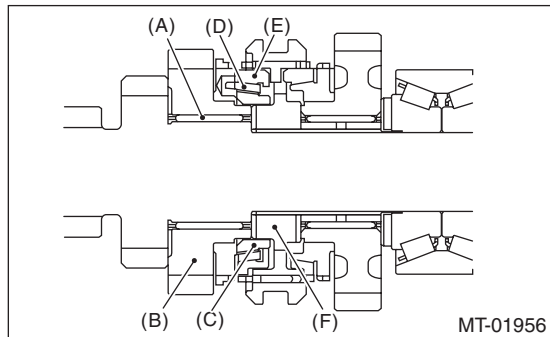
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2) Install the needle bearing, 3rd drive gear, outer baulk ring, 3rd synchro cone, inner baulk ring and 3rd-4th synchronizer hub on the transmission main shaft.

### NOTE:

Align the groove in baulk ring with the shifting insert.



- (A) 3rd needle bearing
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) 3rd synchro cone
- (E) Outer baulk ring
- (F) 3rd-4th synchronizer hub

3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2, ST3 and a press.

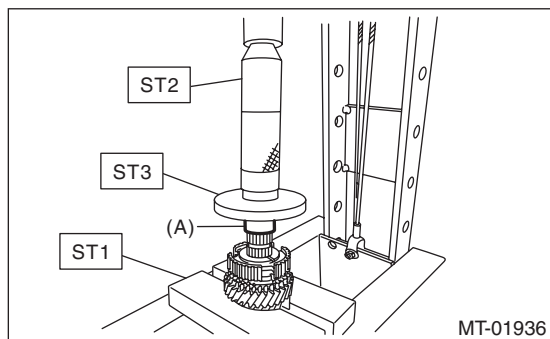
### CAUTION:

**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

ST3 398177700 INSTALLER

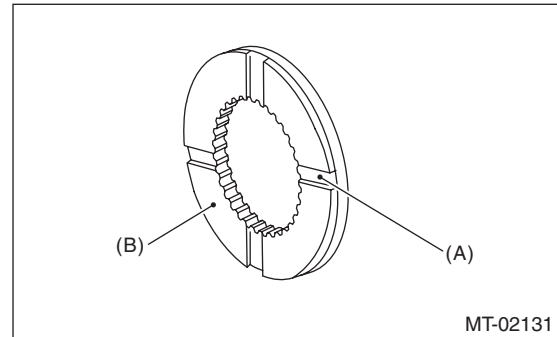


- (A) 4th needle bearing race

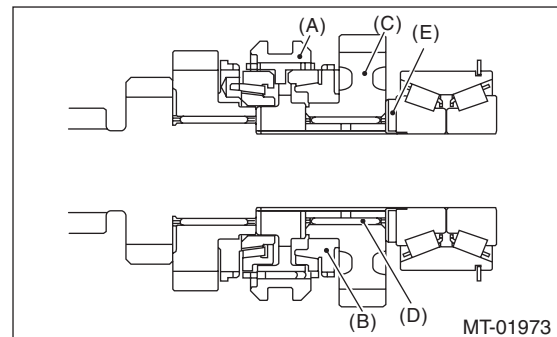
4) Install the 3rd-4th coupling sleeve, 4th baulk ring, needle bearing, 4th drive gear and 4th gear thrust washer to the transmission main shaft.

### NOTE:

- Align the 4th baulk ring and 3rd-4th synchronizer hub with the key groove.
- Install the 3rd-4th coupling sleeve with the groove side facing the 3rd drive gear.
- Install the 4th gear thrust washer with the groove side facing the 4th drive gear.



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



- (A) 3rd-4th coupling sleeve
- (B) 4th baulk ring
- (C) 4th drive gear
- (D) Needle bearing
- (E) 4th gear thrust washer

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5) Install the double taper roller bearing into the rear section of transmission main shaft using ST1, ST2 and a press.

### CAUTION:

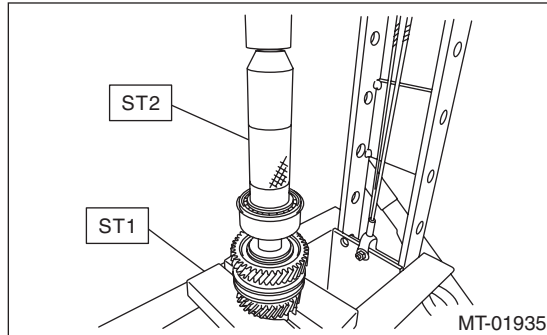
**Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**

### NOTE:

Install the double taper roller bearing with snap ring side facing the 5th drive gear side.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



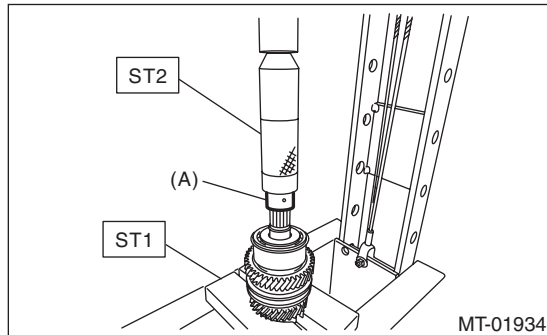
6) Install the 5th needle bearing race into the rear section of transmission main shaft using ST1, ST2 and a press.

### CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



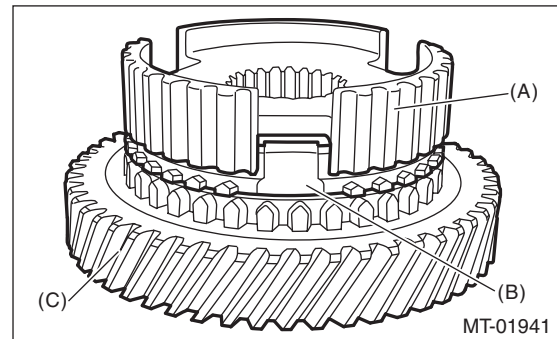
(A) 5th needle bearing race

7) Install the needle bearing, 5th drive gear, 5th baulk ring, and 5th-6th synchronizer hub on the transmission main shaft.

### NOTE:

- Align the protruded section of 5th baulk ring with concave section of 5th-6th synchronizer hub.

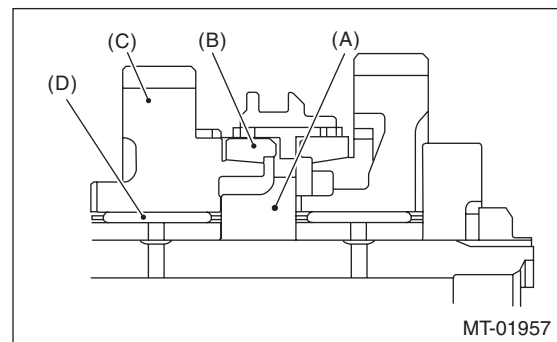
- Install the 5th-6th synchronizer hub with the groove side facing the 5th drive gear.



(A) 5th-6th synchronizer hub

(B) 5th baulk ring

(C) 5th drive gear



(A) 5th-6th synchronizer hub

(B) 5th baulk ring

(C) 5th drive gear

(D) 5th needle bearing (cage: black)

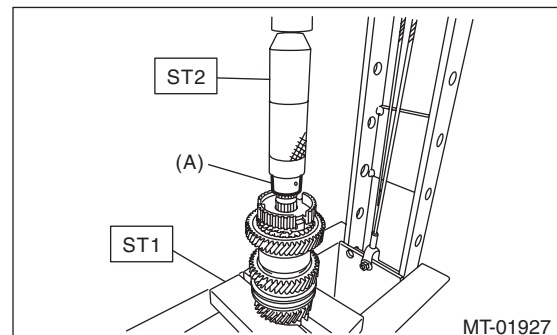
8) Install the 6th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

### CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



(A) 6th needle bearing race

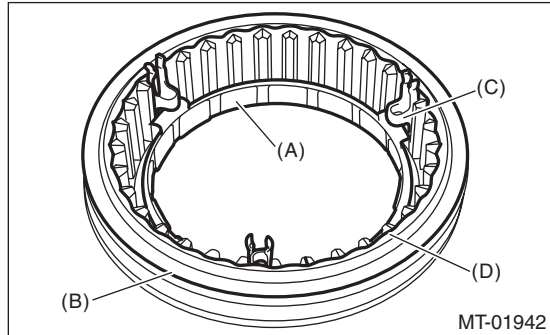
## Main Shaft Assembly for Single-Range

### MANUAL TRANSMISSION AND DIFFERENTIAL

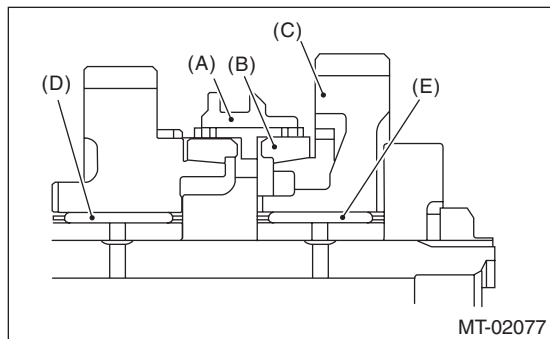
9) Install the 5th-6th coupling sleeve, 6th baulk ring, 6th drive gear and needle bearing on the transmission main shaft.

**NOTE:**

Install the 5th-6th coupling sleeve with the short flange side facing the 5th drive gear.



- (A) 6th baulk ring
- (B) 5th-6th coupling sleeve
- (C) 5th-6th shifting insert key
- (D) Face this side to 5th gear (short flange side)



- (A) 5th-6th coupling sleeve
- (B) 6th baulk ring
- (C) 6th drive gear
- (D) 5th needle bearing (cage: black)
- (E) 6th needle bearing (cage: silver)

10) Install the ball bearing onto transmission main shaft using ST2 and a press.

**CAUTION:**

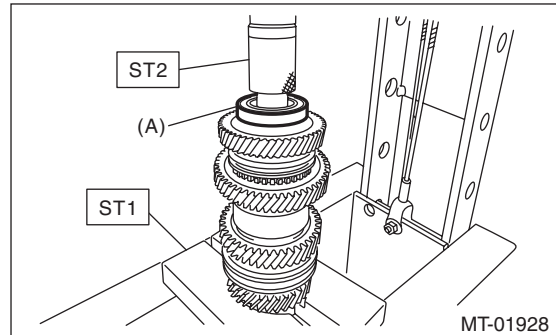
**Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**

**NOTE:**

Install the ball bearing with the side which does not have lock nut mounting dent facing 6th drive gear.

ST1 899714110 REMOVER

ST2 899754112 PRESS



- (A) Ball bearing

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

**NOTE:**

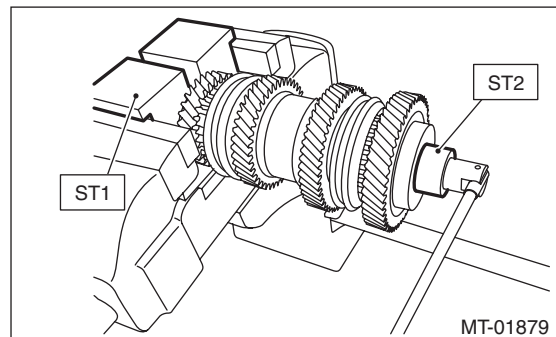
Lock nuts and lock washers must be replaced with new parts.

**Tightening torque:**

**160 N·m (16.3 kgf-m, 118.0 ft-lb)**

ST1 499987003 SOCKET WRENCH (35)

ST2 498937000 TRANSMISSION HOLDER



12) Crimp lock nuts in two locations after tightening.

# Main Shaft Assembly for Single-Range

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## 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.
- 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.
- Repair or replace if the inner surface or end face is damaged.

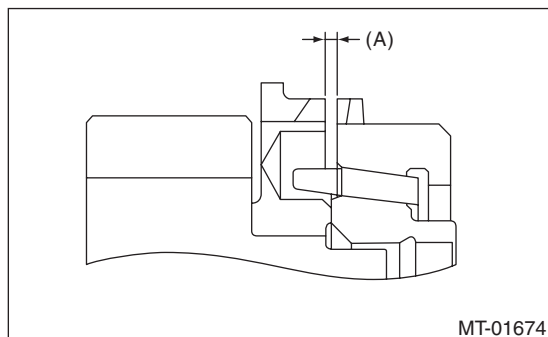
### 4) Baulk ring

Replace the baulk ring in the following cases.

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

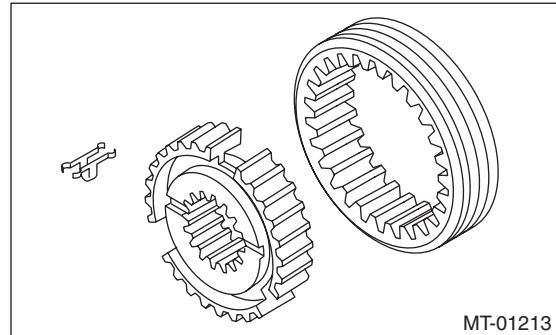
**Clearance (A):**

**0.5 mm (0.020 in) or more**



### 5) Shifting insert key

Replace the insert key if deformed, excessively 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.

### 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:

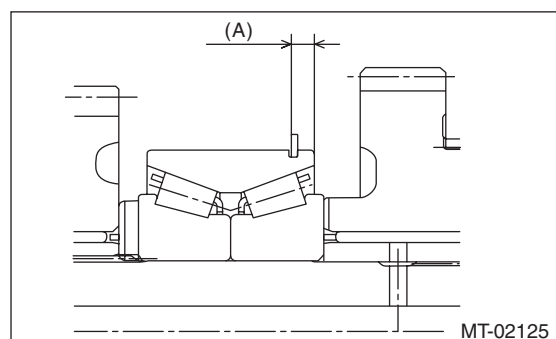
Using the ST, measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

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.

ST 498147001 DEPTH GAUGE

Dimension (A) mm (in)	Part number	Mark
4.00 — 4.13 (0.1575 — 0.1626)	32294AA041	1
3.87 — 4.00 (0.1524 — 0.1575)	32294AA051	2



(A) Measured value