

MANUAL TRANSMISSION AND DIFFERENTIAL

MT

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TRANSMISSION CASE

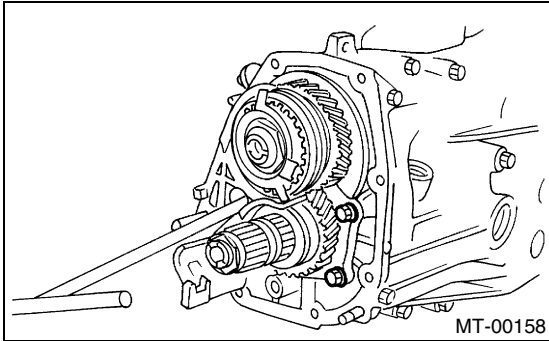
MANUAL TRANSMISSION AND DIFFERENTIAL

16. Transmission Case

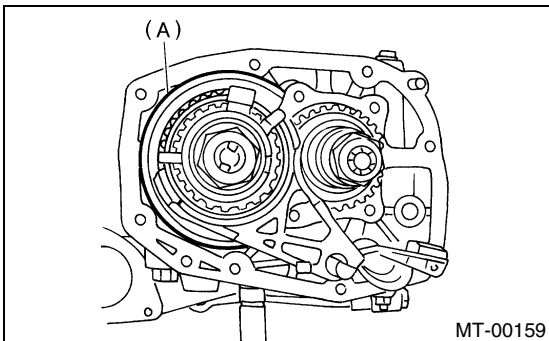
A: REMOVAL

1. SINGLE-RANGE

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-23, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the bearing mounting bolts.

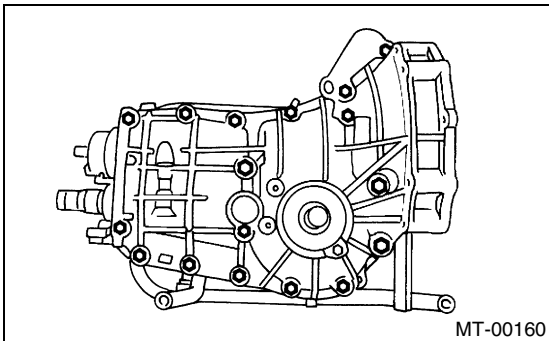


- 5) Remove the main shaft rear plate.

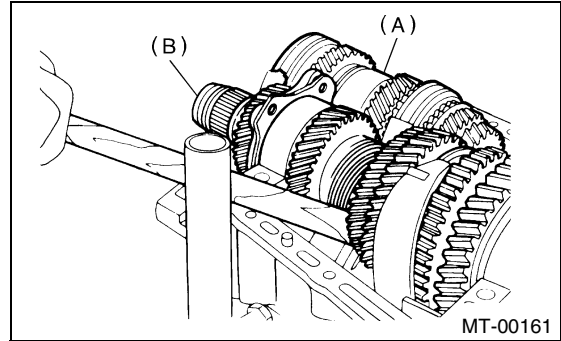


(A) Main shaft rear plate

- 6) Separate the transmission case into right and left cases by loosening the coupling bolts and nuts.



- 7) Using a hammer handle, etc. remove the drive pinion shaft assembly from left side transmission case, and then remove the main shaft assembly.



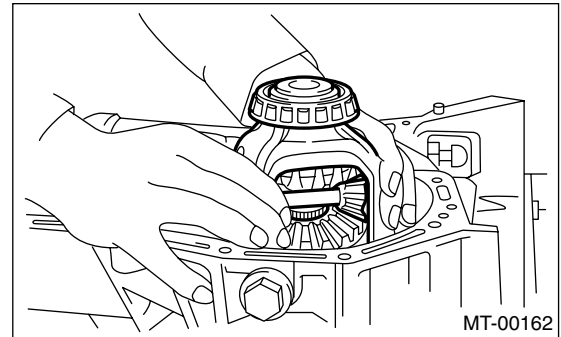
(A) Main shaft ASSY

(B) Drive pinion shaft ASSY

- 8) Remove the differential assembly.

NOTE:

- Be careful not to confuse the right and left roller bearing outer races.
- Be careful not to damage the retainer oil seal.



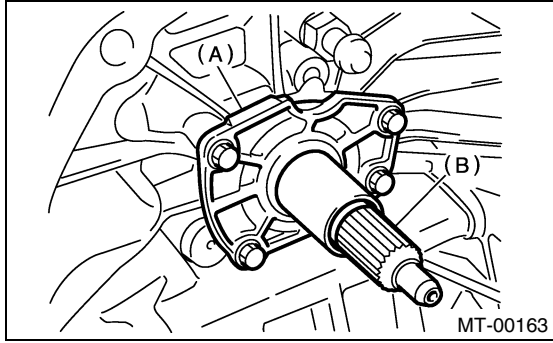
2. DUAL-RANGE

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-23, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>

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4) Remove the input shaft holder.



- (A) Input shaft holder
- (B) Input shaft

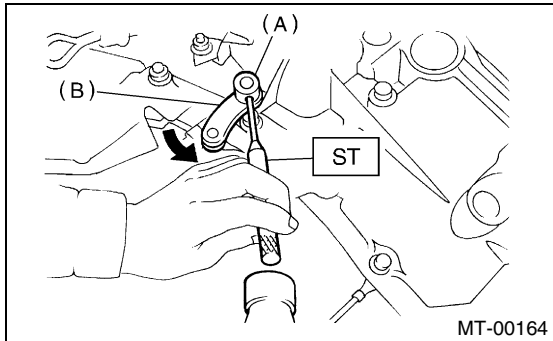
5) Remove the high-low switch. <Ref. to MT-43, REMOVAL, Switches and Harness.>

6) Using the ST, drive out the straight pin, and remove high-low shifter lever.

ST 398791700 STRAIGHT PIN REMOVER 2

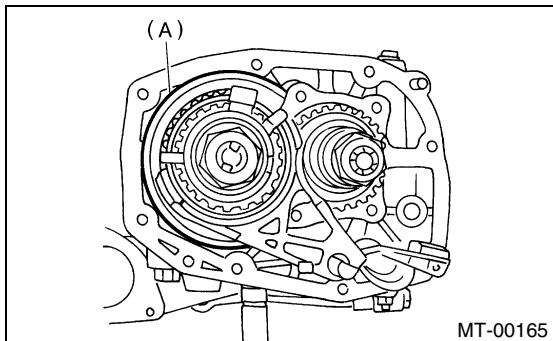
NOTE:

When driving out the straight pin, remove it in the direction that it does not butt against transmission case.



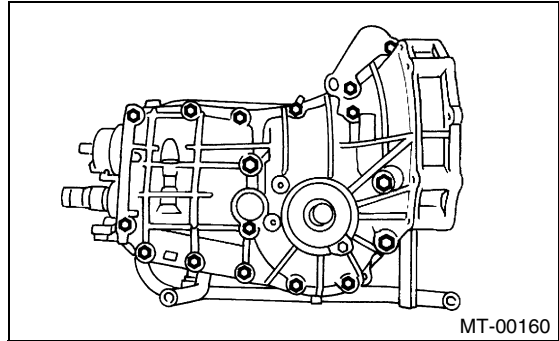
- (A) Straight pin
- (B) High-low shifter lever

7) Remove the main shaft rear plate.

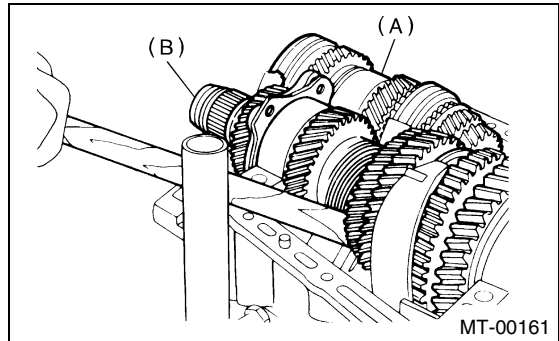


- (A) Main shaft rear plate

8) Separate the transmission case into right and left cases by loosening the seventeen coupling bolts and nuts.



9) Using a hammer handle, etc. remove the drive pinion shaft assembly from left side transmission case, and then remove the main shaft assembly.

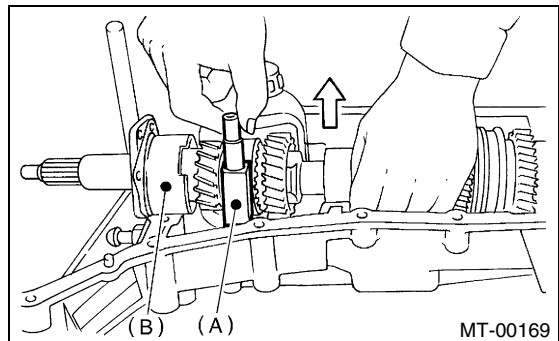


- (A) Main shaft ASSY
- (B) Drive pinion shaft ASSY

10) Removing high-low shifter fork:
Remove the high-low shifter fork together with high-low shifter shaft and washer.

NOTE:

Be careful not to drop the two high-low shifter pieces.



- (A) High-low shifter fork
- (B) Input shaft ASSY

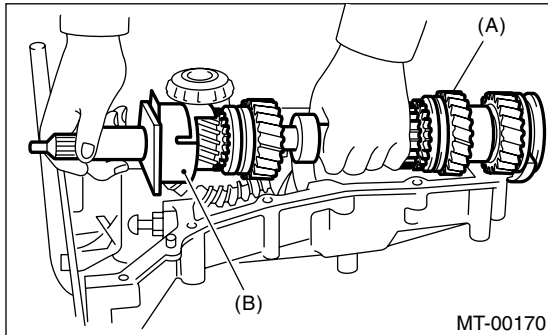
TRANSMISSION CASE

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11) Remove the main shaft assembly and input shaft assembly.

NOTE:

Be careful not to drop the input shaft and main shaft as they are separable.

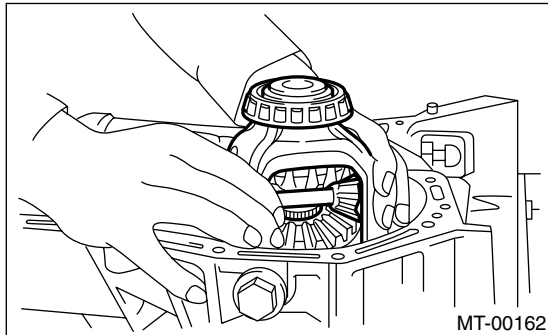


(A) Main shaft ASSY
(B) Input shaft ASSY

12) Remove the differential assembly.

NOTE:

- Be careful not to confuse the right and left roller bearing outer races.
- Be careful not to damage the retainer oil seal.



B: INSTALLATION

1. SINGLE-RANGE

- 1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
- 2) Install the front differential assembly.
- 3) Install the main shaft assembly.
Install the needle bearing knock pin hole into transmission case knock pin.
- 4) Install the drive pinion shaft assembly.
Install the roller bearing knock pin hole into transmission case knock pin.
- 5) Apply liquid gasket, and then put the case right side and left side together.

Liquid gasket:

THREE BOND 1215 (Parts No. 004403007) or equivalent

6) Tighten the seventeen bolts with bracket, clip, etc. as shown in the figure.

NOTE:

- Insert the bolts from bottom and tighten the nuts at top.
- Put the cases together so that drive pinion shim and input shaft holder shim are not caught up in between.
- Confirm that the speedometer gear is meshed.

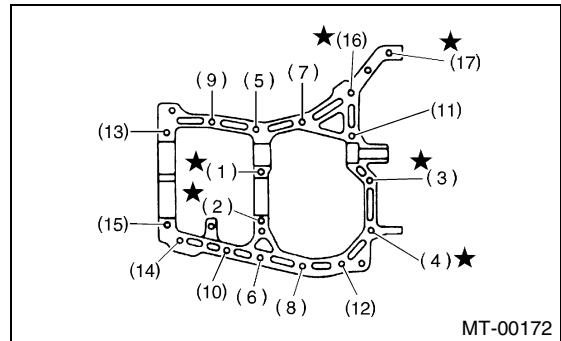
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf·m, 18.1 ft·lb)

★ 10 mm bolt

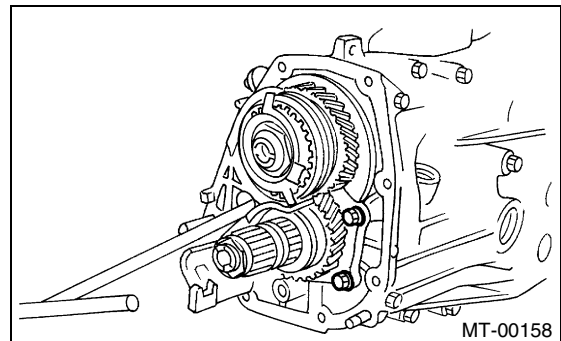
39 N·m (4.0 kgf·m, 28.9 ft·lb)



7) Tighten the ball bearing attachment bolts.

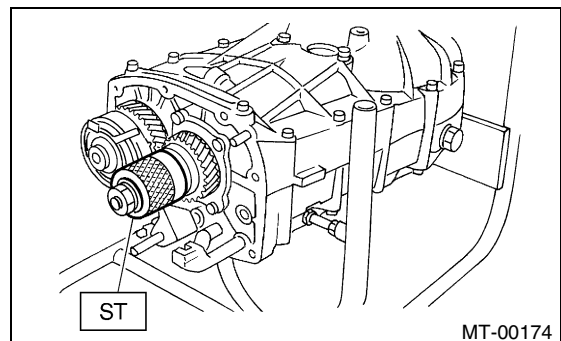
Tightening torque:

29 N·m (3.0 kgf·m, 21.7 ft·lb)



8) Using the ST, support the drive pinion assembly, and then adjust the backlash of hypoid gear and measure preload of roller bearing.

ST 498427100 STOPPER



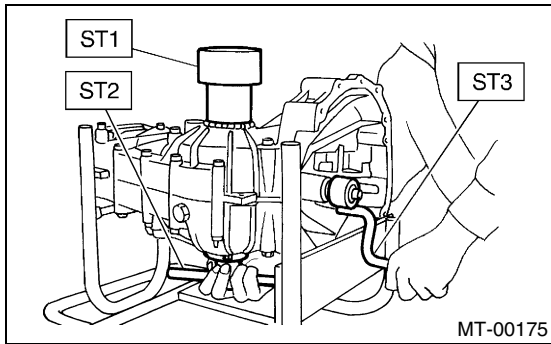
TRANSMISSION CASE

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9) Place the transmission with case left side facing downward and put ST1 on bearing cup.

10) Screw the retainer assembly into left case from the bottom with ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until a slight resistance is felt on ST2. This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE

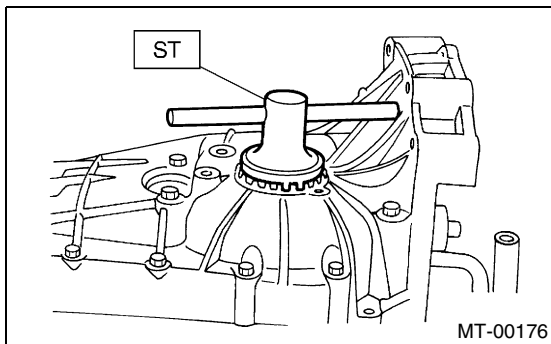


11) Remove the weight and screw in the retainer without O-ring on upper side and stop at the point where slight resistance is felt.

NOTE:

At this point, the backlash between hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY



12) Fit the lock plate. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on upper side by the same amount in order to obtain the backlash.

NOTE:

The notch on the lock plate moves by 1/2 notch if the plate is turned upside down.

13) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.

14) Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.

15) Turn the transmission main shaft several times while tapping around the retainer lightly with plastic hammer.

16) Inspect and adjust the backlash and tooth contact of hypoid gear. <Ref. to MT-98, INSPECTION, Front Differential Assembly.>

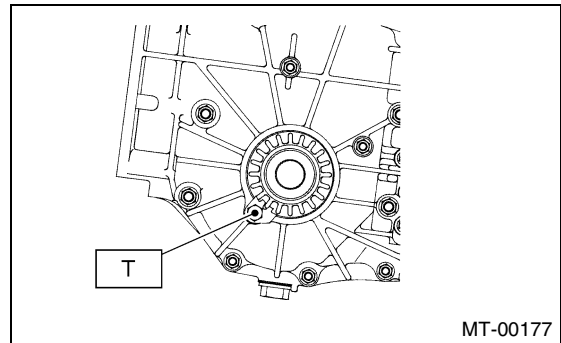
17) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into groove and tighten the retainer into the position where retainer has been tightened in. Tighten the lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

T: 25 N·m (2.5 kgf-m, 18.1 ft-lb)



18) Selecting of main shaft rear plate. <Ref. to MT-76, ADJUSTMENT, Main Shaft Assembly (Single-Range).>

19) Install the clutch release lever and bearing. <Ref. to CL-23, INSTALLATION, Release Bearing and Lever.>

20) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install the manual transmission assembly into the vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

TRANSMISSION CASE

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2. DUAL-RANGE

- 1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with white gasoline.
- 2) Install the front differential assembly.
- 3) Install the main shaft assembly and input shaft assembly.

Connect the main shaft assembly and input the shaft assembly, and install needle bearing knock pin hole into transmission case knock pin.

- 4) Install the drive pinion shaft assembly. Install the roller bearing knock pin hole into transmission case knock pin.
- 5) Apply liquid gasket, and then put the case right side and left side together.

Liquid gasket:

THREE BOND 1215 (Parts No. 004403007) or equivalent

- 6) Tighten the seventeen bolts with bracket, clip, etc. as shown in the figure.

NOTE:

- Insert the bolts from bottom and tighten the nuts at top.
- Put the cases together so that the drive pinion shim and input shaft holder shim are not caught up in between.
- Confirm that the speedometer gear is meshed.

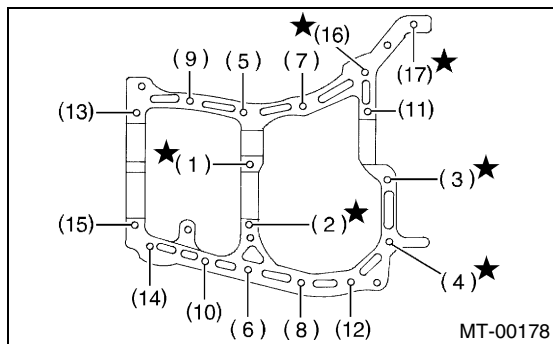
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

★ 10 mm bolt

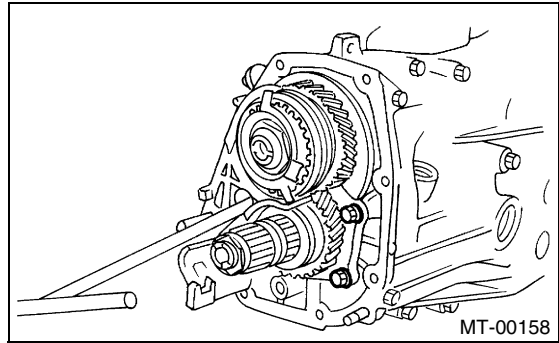
39 N·m (4.0 kgf-m, 28.9 ft-lb)



- 7) Tighten the ball bearing attachment bolts.

Tightening torque:

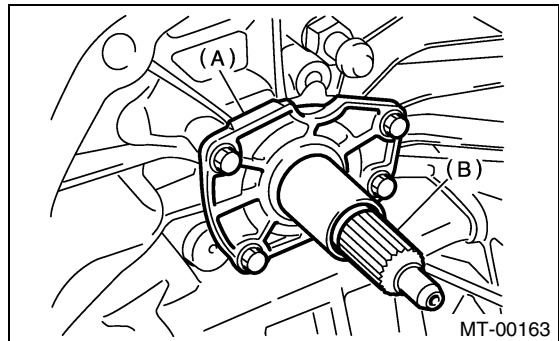
30 N·m (2.9 kgf-m, 21.0 ft-lb)



- 8) Tighten the input shaft holder attaching bolts.

Tightening torque:

20 N·m (2.0 kgf-m, 14.5 ft-lb)

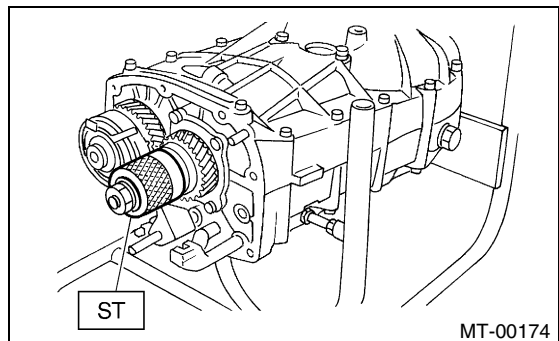


(A) Input shaft holder

(B) Input shaft

- 9) Using the ST, support the drive pinion assembly, and then adjust the backlash of hypoid gear and measure preload of roller bearing.

ST 498427100 STOPPER



- 10) Place the transmission with case left side facing downward and put ST1 on bearing cup.

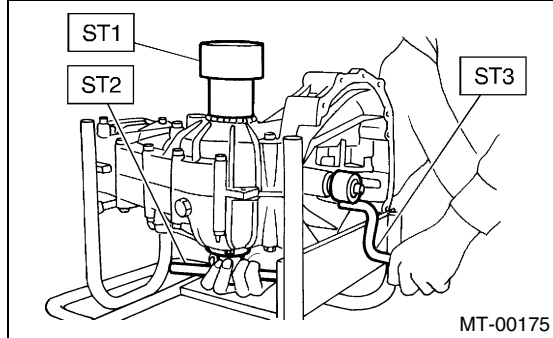
- 11) Screw the retainer assembly into left case from the bottom with ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th and turn the shaft several times. Screw in the retainer while turning ST3 until a slight resistance is felt on ST2.

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This is the contact point of hypoid gear and drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT
ST2 499787000 WRENCH ASSY
ST3 499927100 HANDLE

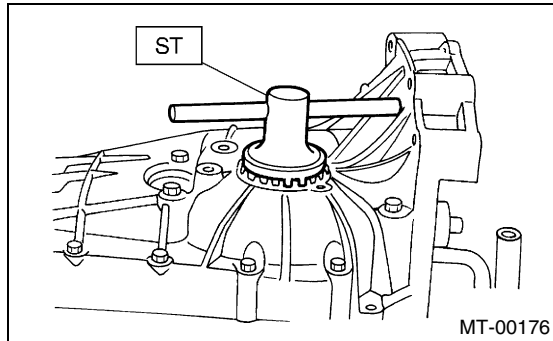


12) Remove the weight and screw in the retainer without O-ring on upper side and stop at the point where slight resistance is felt.

NOTE:

At this point, the backlash between hypoid gear and drive pinion shaft is zero.

ST 499787000 WRENCH ASSY



13) Fit the lock plate. Loosen the retainer on the lower side by 1-1/2 notches of lock plate and turn in the retainer on upper side by the same amount in order to obtain the backlash.

NOTE:

The notch on the lock plate moves by 1/2 notch if the plate is turned upside down.

14) Turn in the retainer on the upper side additionally by 1 notch in order to apply preload on taper roller bearing.

15) Tighten temporarily both the upper and lower lock plates and mark both holder and lock plate for later readjustment.

16) Turn the transmission main shaft several times while tapping around the retainer lightly with plastic hammer.

17) Inspect and adjust the backlash and tooth contact of hypoid gear. <Ref. to MT-98, INSPECTION, Front Differential Assembly.>

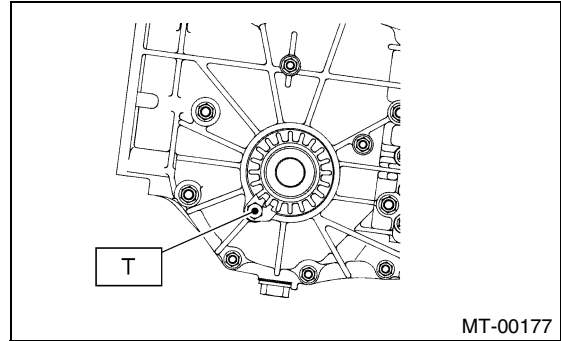
18) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into groove and tighten the retainer into the position where retainer has been tightened in. Tighten the lock plate.

NOTE:

Carry out this job on both upper and lower retainers.

Tightening torque:

T: 24.5 N·m (2.5 kgf·m, 18.1 ft·lb)



19) Selection of main shaft rear plate <Ref. to MT-76, ADJUSTMENT, Main Shaft Assembly (Single-Range).>

20) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install the clutch release lever and bearing. <Ref. to CL-23, INSTALLATION, Release Bearing and Lever.>

22) Install the manual transmission assembly into the vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check the transmission case for cracks, damage, and oil leaks.

MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

17. Main Shaft Assembly (Single-Range)

A: REMOVAL

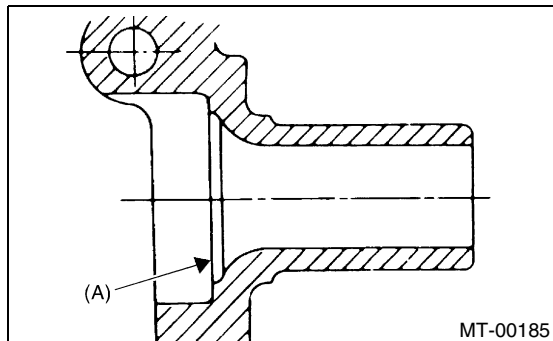
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.

B: INSTALLATION

- 1) Wrap the clutch splined section with vinyl tape to prevent damage to oil seal.
- 2) Apply grease (Unilube #2 or equivalent) to the sealing lip of oil seal.
- 3) Install the needle bearing and new oil seal onto the front of transmission main shaft assembly.
- 4) 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.

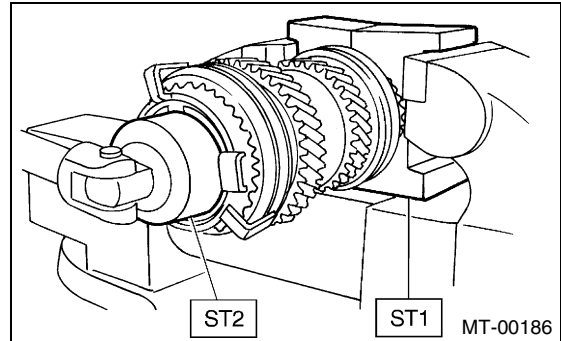


- 5) Install the drive pinion assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

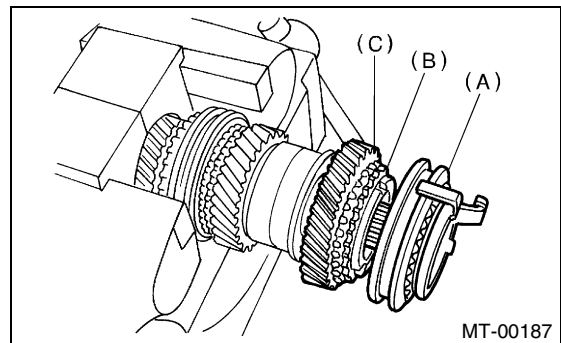
C: DISASSEMBLY

- 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 caulking before removing lock nut.
- 3) Remove the lock nut from transmission main shaft assembly.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

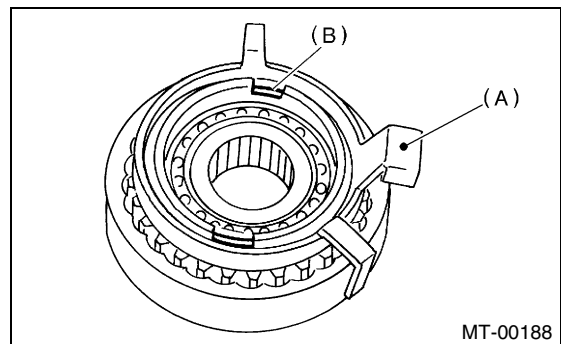


- 4) Remove the 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



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

- 5) 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 (SINGLE-RANGE)

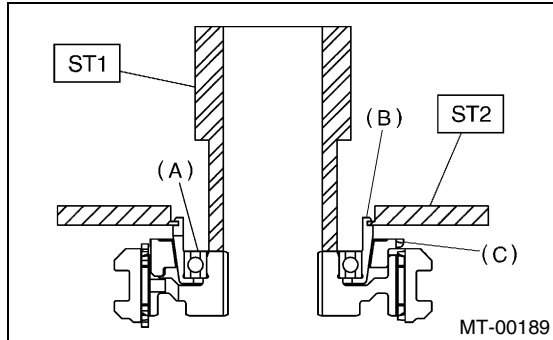
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6) Using the ST1, ST2 and a press, remove the ball bearing, synchro cone and baulk ring (Rev).

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.

ST1 499757002 INSTALLER
ST2 498077400 SYNCHRO CONE REMO-
ER



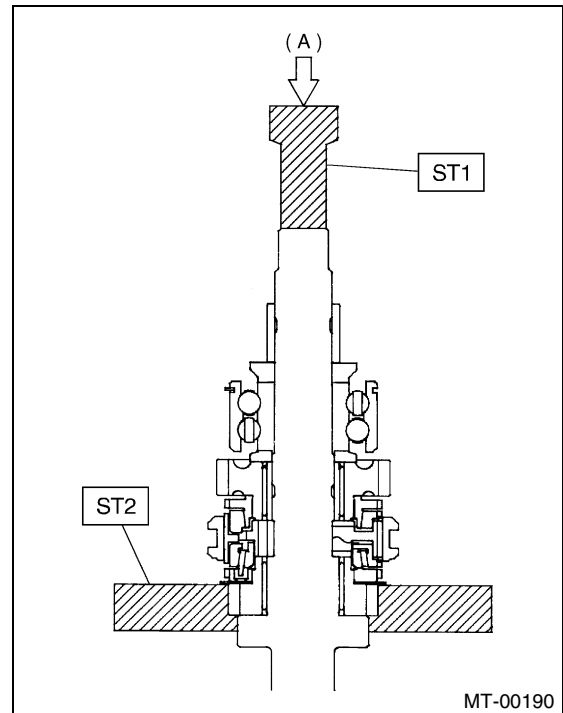
- (A) Ball bearing
- (B) Synchro cone
- (C) Baulk ring

7) 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 (SINGLE-RANGE)

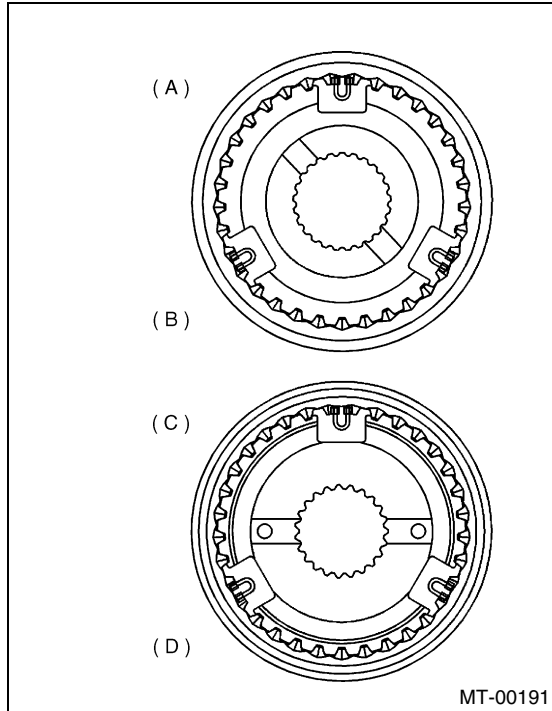
MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

1. NON-TURBO MODEL

1) Assemble when each sleeve and hub assembly are disassembled.

2) 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

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

4) Align the groove in baulk ring with shifting insert.

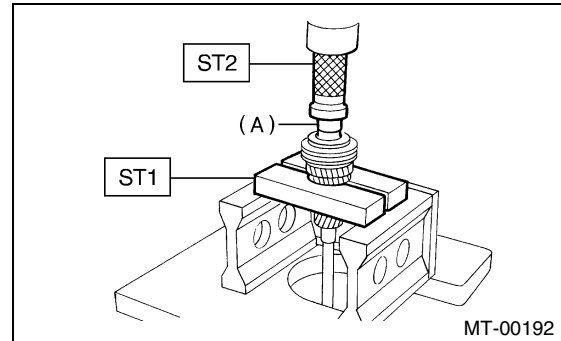
5) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

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

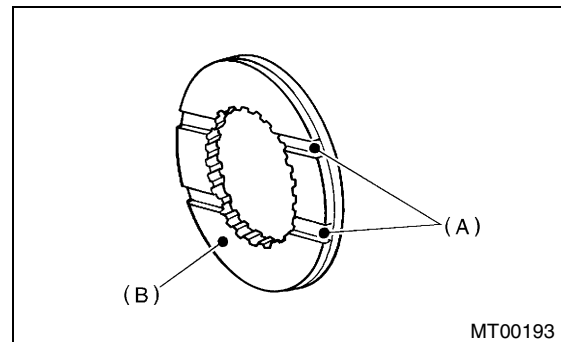


(A) 4th needle bearing race

6) 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

MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

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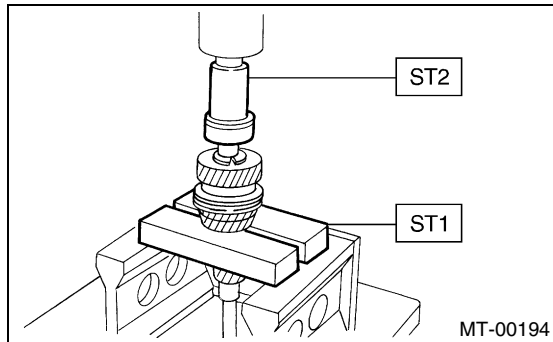
7) Drive the new ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

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



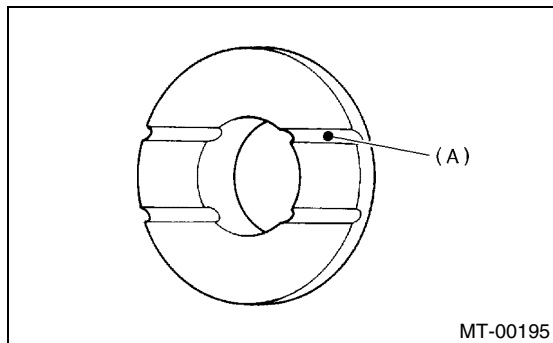
8) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

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.

9) Install the bearing onto synchro cone.

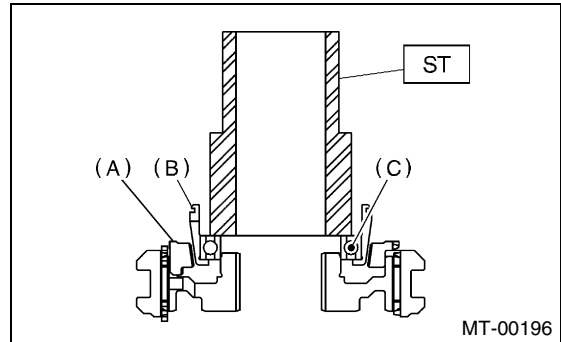
10) Install the baulk ring, synchro cone onto 5th-Rev sleeve and hub assembly and new ball bearing using ST and a press.

NOTE:

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

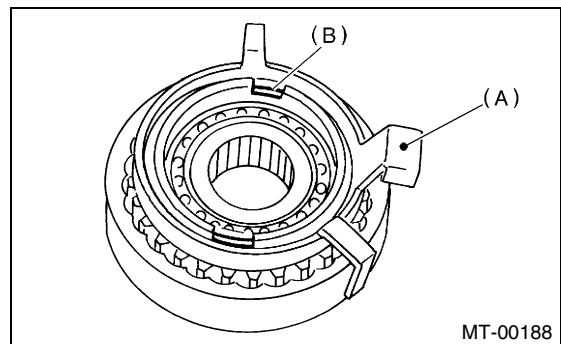
ST 499757002 INSTALLER

11) After press fitting, make sure the synchro cone rotates freely.



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

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



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

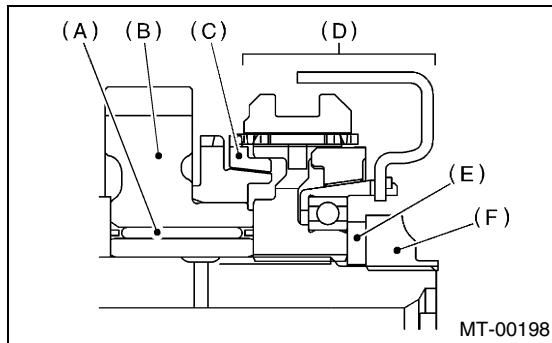
MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

13) Install rest of the parts to 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

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

15) Secure the lock nuts in two places after tightening.

ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

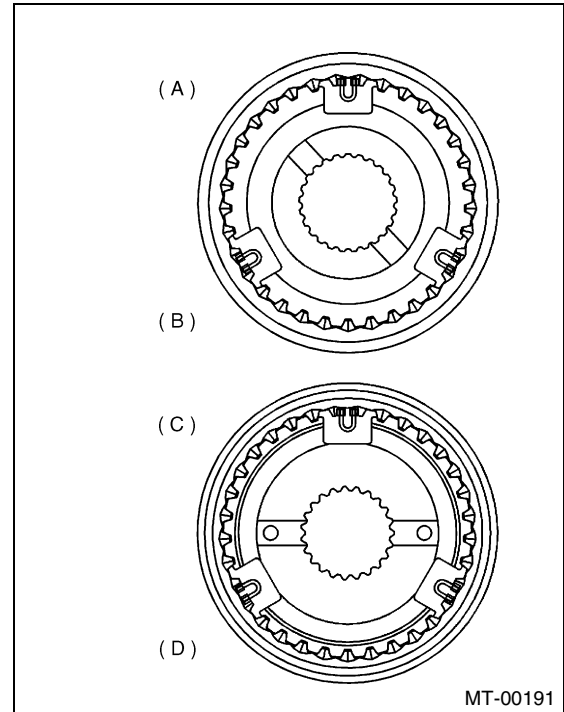
Tightening torque:

120 N·m (12.2 kgf·m, 88.2 ft·lb)

2. TURBO MODEL

1) Assemble each sleeve and hub assembly.

2) Position the open ends of spring 120° apart.

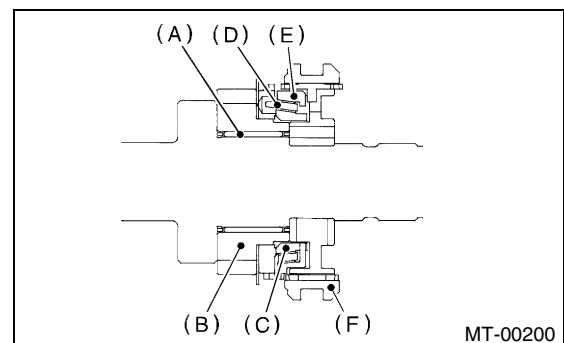


- (A) 3rd-4th hub ASSY
- (B) 3rd gear side
- (C) 5th-Rev hub ASSY
- (D) 5th gear side

3) 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

MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

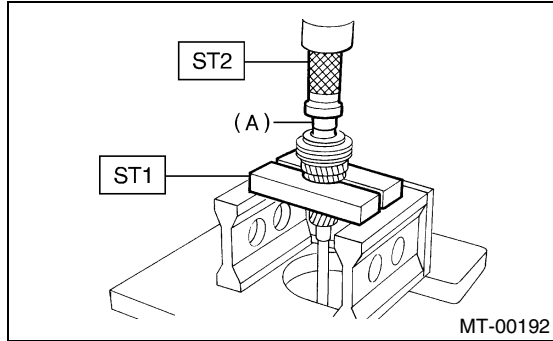
4) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

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

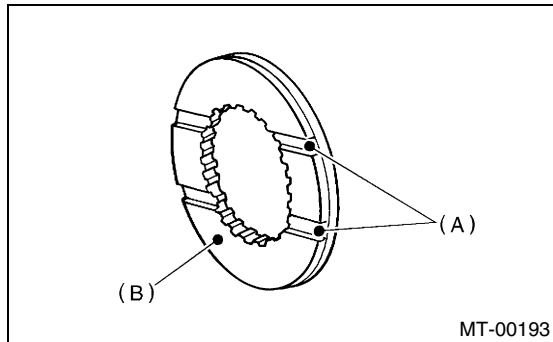


(A) 4th needle bearing race

5) 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

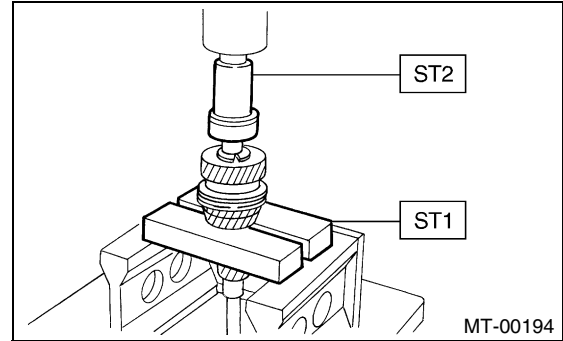
6) Drive the ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

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



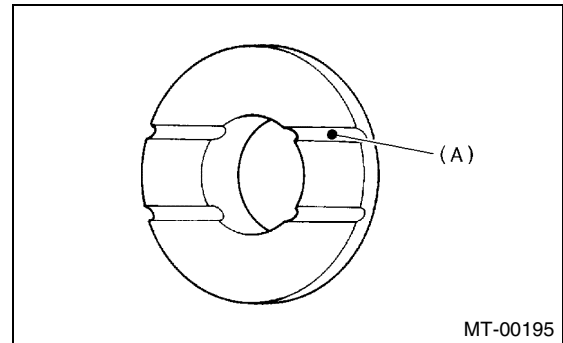
7) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

8) Install the bearing onto synchro cone.

9) Install the baulk ring, synchro cone and new ball bearing onto 5th-Rev sleeve and hub assembly using ST and a press.

NOTE:

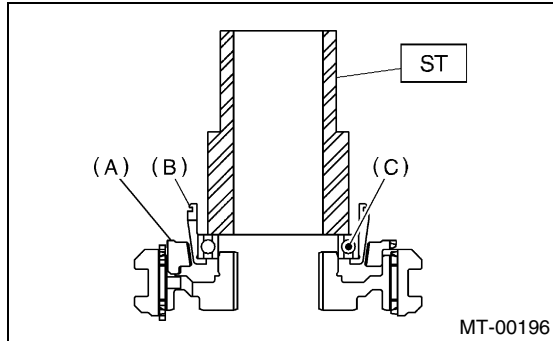
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

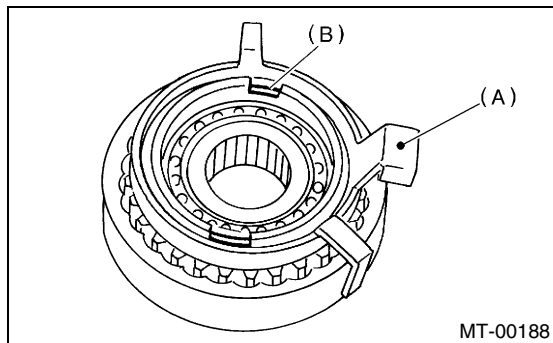
10) After press fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER



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

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

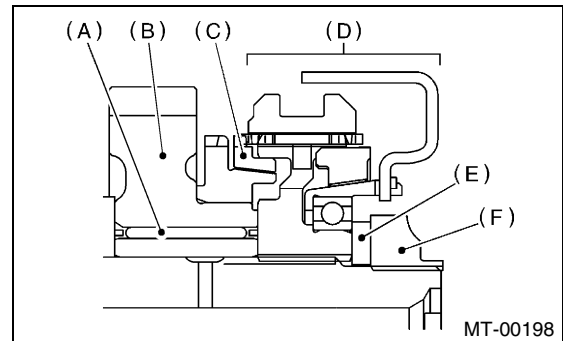


- (A) Synchro cone stopper
- (B) Snap ring

12) 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

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

14) 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, 88.2 ft-lb)

MAIN SHAFT ASSEMBLY (SINGLE-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

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:

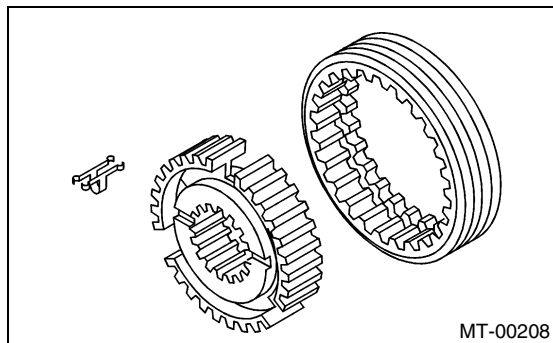
• When the inner surface and end face are damaged.

• 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.

F: ADJUSTMENT

Selection of main shaft rear plate:

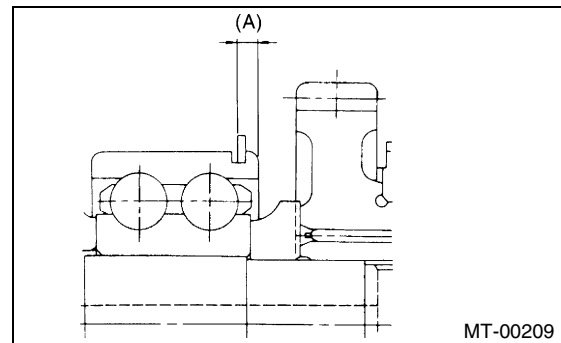
Using the ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

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



MAIN SHAFT ASSEMBLY (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

18. Main Shaft Assembly (Dual-Range)

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly and input shaft assembly.

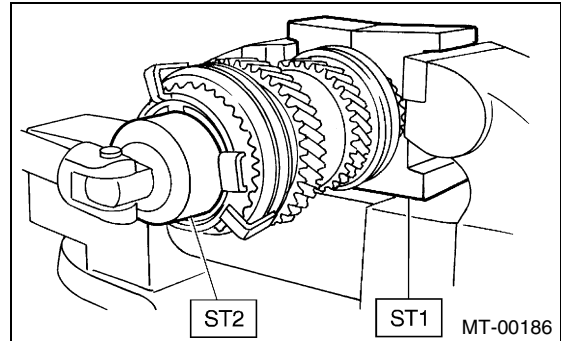
B: INSTALLATION

- 1) Install the needle bearing onto the front of transmission main shaft assembly.
- 2) Connect the main shaft assembly and input shaft assembly.
- 3) Install the needle bearing outer race knock pin hole into transmission case knock pin.
- 4) Install the drive pinion assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 6) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

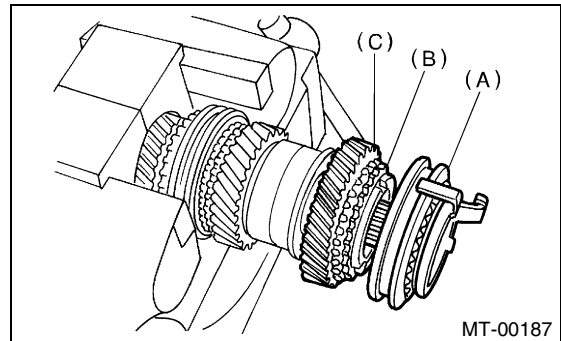
C: DISASSEMBLY

- 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 caulking of the lock nut.
- 3) Remove the lock nut from transmission main shaft assembly.

ST1 498937000 TRANSMISSION HOLDER
ST2 499987003 SOCKET WRENCH (35)

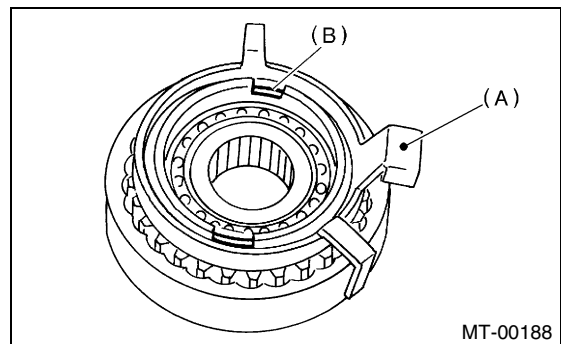


- 4) Remove the 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



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

- 5) 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 (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

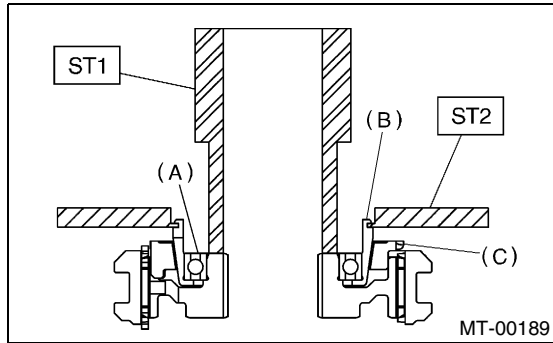
6) Using the ST1, ST2 and a press, remove the ball bearing, synchro cone and baulk ring (Rev).

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 REMO-
VER



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

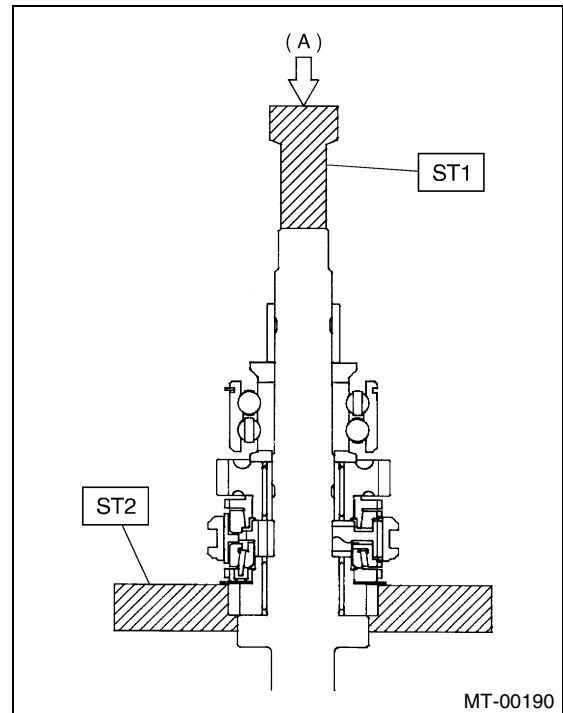
7) Using the ST1 and ST2, remove rest of the parts.

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, marking engagement point on splines beforehand.

ST1 899864100 REMOVER

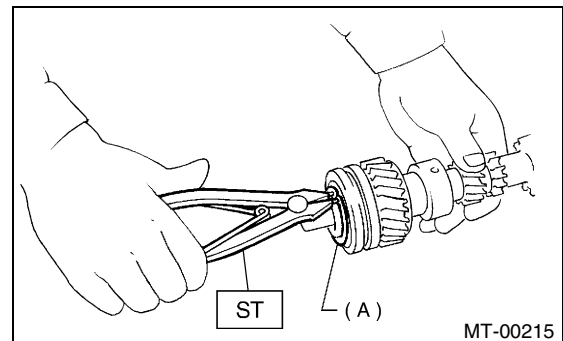
ST2 899714110 REMOVER



- (A) Press

8) Remove the snap ring from main shaft.

ST 899474100 EXPANDER

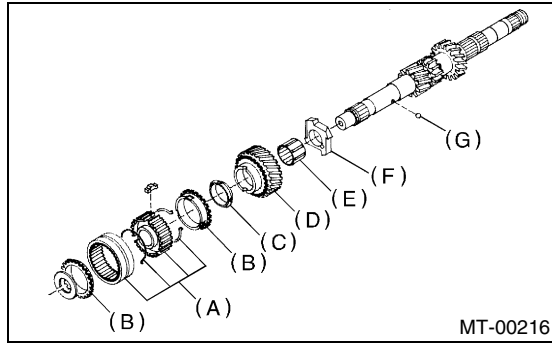


- (A) Snap ring

MAIN SHAFT ASSEMBLY (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Remove rest of the parts.



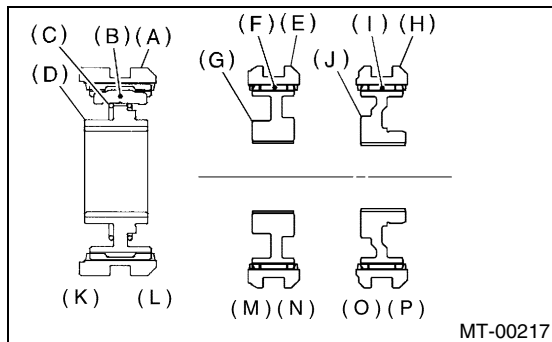
- (A) Sleeve and hub ASSY
- (B) High-low baulk ring
- (C) Friction damper
- (D) Low input gear
- (E) Needle bearing
- (F) Input low gear spacer
- (G) Ball

D: ASSEMBLY

1) Assemble when each sleeve and hub assembly are disassembled.

NOTE:

Position the open ends of spring 120° apart.



- (A) High-low coupling sleeve
- (B) Shifting insert
- (C) High-low synchronizer spring
- (D) High-low synchronizer hub
- (E) Sleeve
- (F) Insert key
- (G) 3rd-4th synchronizer hub
- (H) Sleeve
- (I) Insert key
- (J) 5th-Rev synchronizer hub
- (K) High side
- (L) Low side
- (M) 3rd side
- (N) 4th side
- (O) 5th side
- (P) Rev side

2) Install the 3rd drive gear, baulk ring, sleeve and hub assembly for 3rd-4th needle bearing on transmission main shaft. (2.0L model)

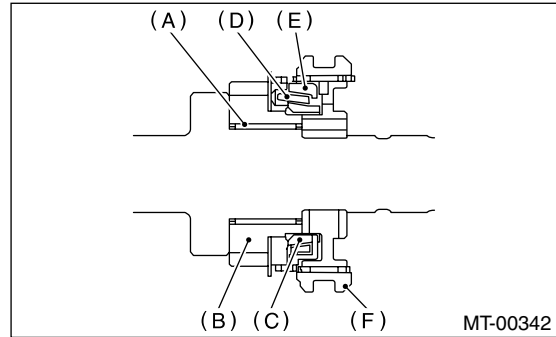
NOTE:

Align the groove in baulk ring with shifting insert.

3) 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. (2.5L model)

NOTE:

Align the groove in baulk ring with shifting insert.

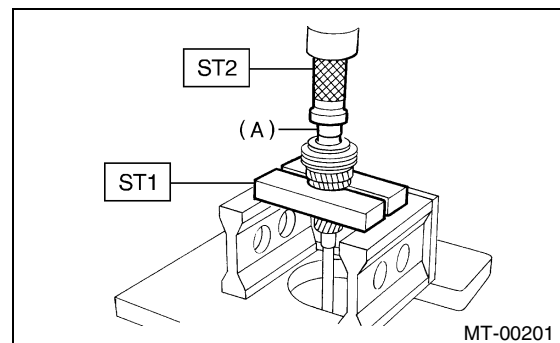


- (A) 3rd needle bearing
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) Synchro cone
- (E) Outer baulk ring
- (F) Sleeve and hub ASSY

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



- (A) 4th needle bearing race

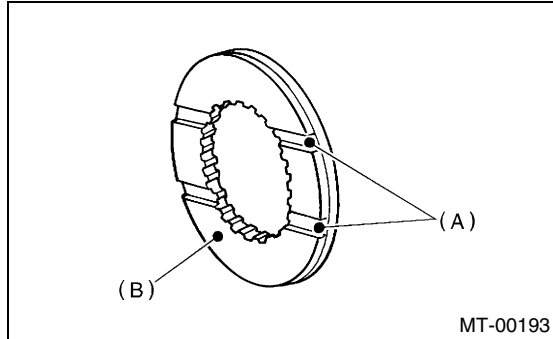
MAIN SHAFT ASSEMBLY (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

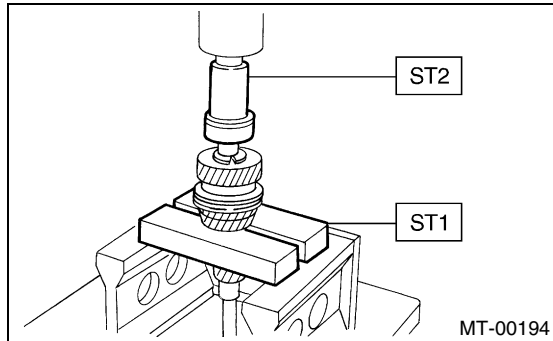
Face the thrust washer in correct direction.



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

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

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

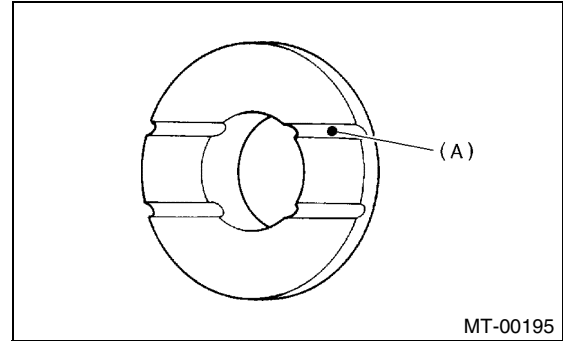


7) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

Face the thrust washer in correct direction.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER



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

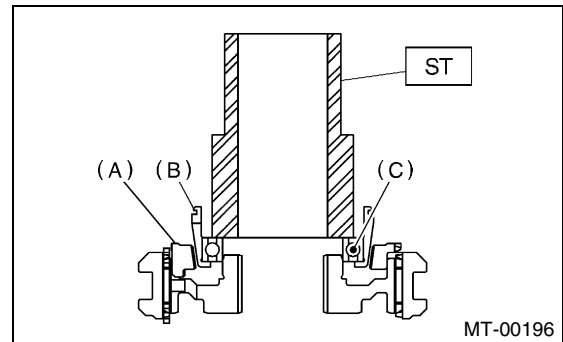
8) Install the bearing onto synchro cone.

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

NOTE:

- Use a new ball bearing.
- After press fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER

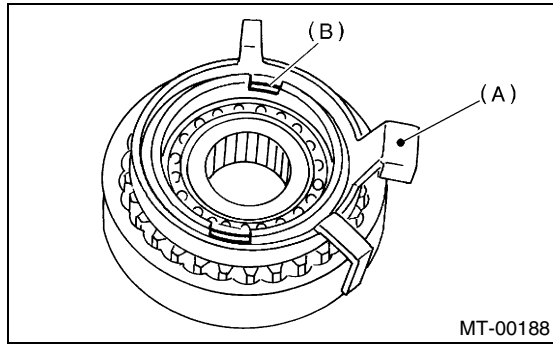


- (A) Baulk ring
- (B) Synchro cone
- (C) Ball bearing

MAIN SHAFT ASSEMBLY (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

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

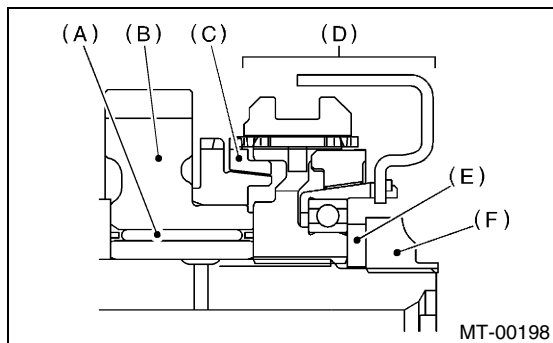


- (A) Synchro cone stopper
- (B) Snap ring

11) Install rest of the 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

12) 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:

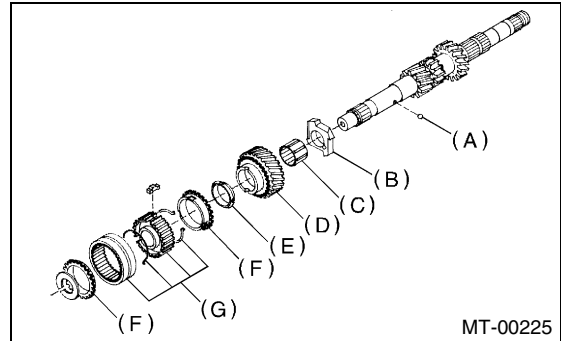
120 N·m (12.2 kgf·m, 88.2 ft·lb)

13) Install the needle bearing on main shaft.

14) Install the parts to the front section of transmission main shaft.

NOTE:

- Be careful not to damage the graded section of transmission main shaft when installing the needle bearing.
- Face the grooved side toward input gear.
- Align the high-low baulk ring's groove with shifting insert.



- (A) Ball
- (B) Input low gear spacer
- (C) Needle bearing
- (D) Low input gear
- (E) Friction damper
- (F) High-low baulk ring
- (G) Sleeve and hub ASSY

15) Install a new snap ring to the rod section of transmission main shaft using ST1 and ST2.

NOTE:

Select a suitable outer snap ring so that axial clearance between snap ring and hub is held within 0.060 to 0.100 mm (0.0024 to 0.0039 in).

ST1 499757002 INSTALLER
ST2 499757001 SNAP RING GUIDE

Snap ring	
Part No.	Thickness mm (in)
805025058	2.37 (0.0933)
805025051	2.42 (0.0953)
805025052	2.47 (0.0972)
805025053	2.52 (0.0992)
805025054	2.57 (0.1012)
805025055	2.62 (0.1031)
805025056	2.67 (0.1051)
805025057	2.72 (0.1071)

MAIN SHAFT ASSEMBLY (DUAL-RANGE)

MANUAL TRANSMISSION AND DIFFERENTIAL

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.

F: ADJUSTMENT

Choose the main shaft rear plate. <Ref. to MT-76, ADJUSTMENT, Main Shaft Assembly (Single-Range).>

INPUT SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

19. Input Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly and input shaft assembly.

B: INSTALLATION

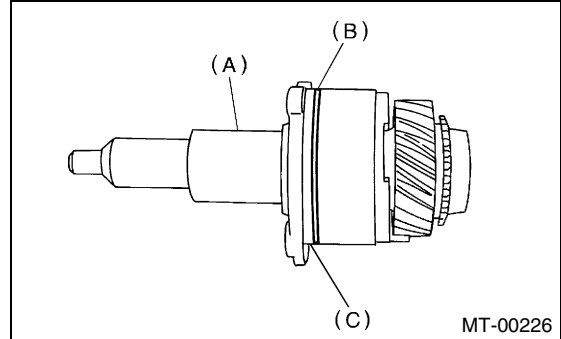
- 1) Install the needle bearing onto the front of transmission main shaft assembly.
- 2) Connect the main shaft assembly and input shaft assembly.
- 3) Install the needle bearing outer race knock pin hole into transmission case knock pin.
- 4) Install the drive pinion assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 6) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly on vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

- 1) Remove the O-ring from input shaft holder. Also, remove the input shaft holder shim.

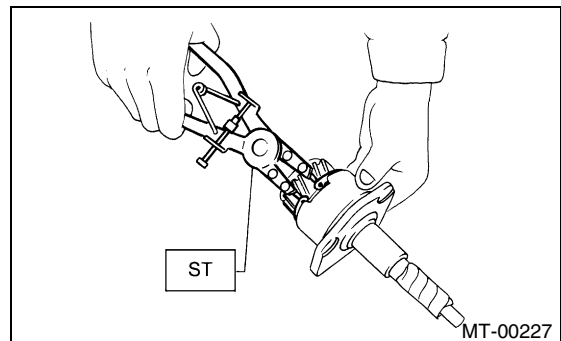
NOTE:

- Use a new O-ring.
- Number of shims used varies from none to two.

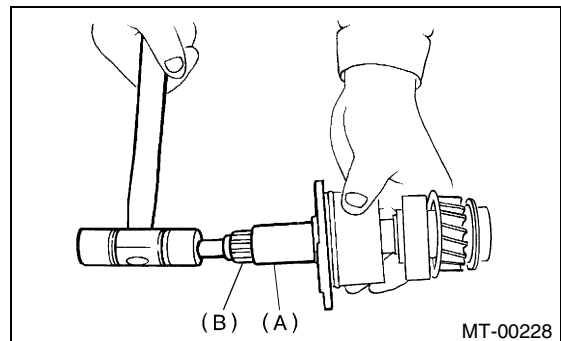


- (A) Input shaft holder
(B) O-ring
(C) Input shaft holder shim

- 2) Put vinyl tape around the input shaft splines to protect oil seal from damage.
- 3) Remove the inner snap ring.
ST 398663600 PLIERS



- 4) Hold the input shaft holder stationary and remove the input shaft by tapping its end with a plastic hammer.

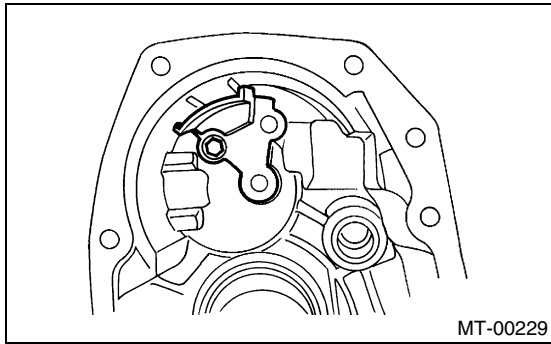


- (A) Input shaft holder
(B) Input shaft

INPUT SHAFT ASSEMBLY

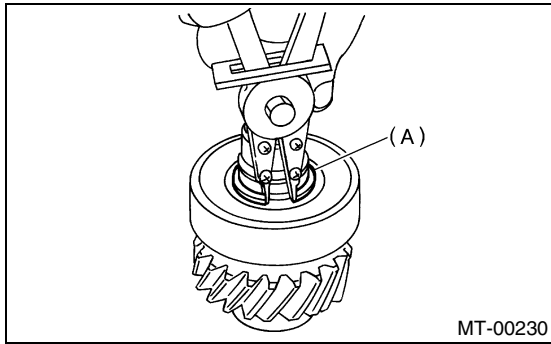
MANUAL TRANSMISSION AND DIFFERENTIAL

5) Remove the outer snap ring. Then remove the oil squeeze plate and straight pin.



- (A) Snap ring
- (B) Oil squeeze plate

6) Remove the snap ring.



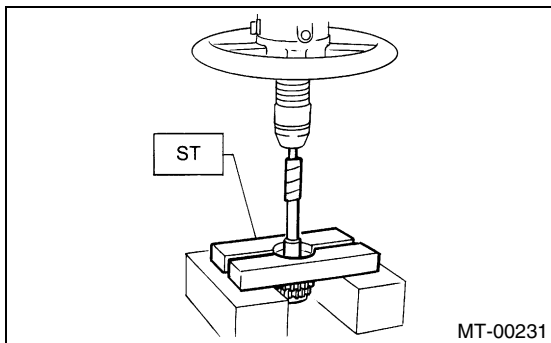
- (A) Snap ring

7) Using a press and ST, remove the ball bearing.

NOTE:

Remove the inner snap ring before pressing.

ST 498077000 REMOVER



8) Remove the oil seal from input shaft holder.

D: ASSEMBLY

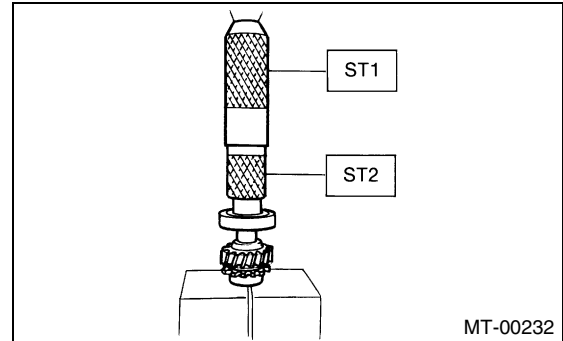
1) Install the ball bearing onto input shaft.

NOTE:

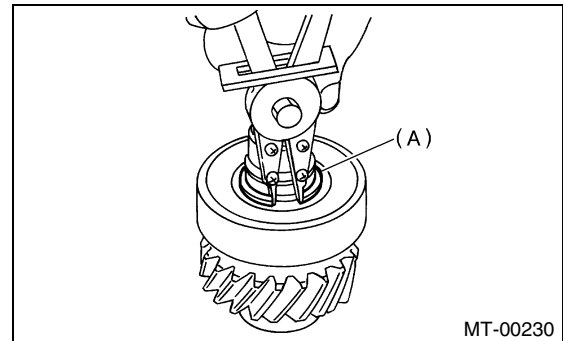
Place the snap ring between input shaft gear and ball bearing beforehand. Use the table at 5) as a guide in selecting a suitable snap ring.

ST1 899580100 INSTALLER

ST2 399513600 INSTALLER



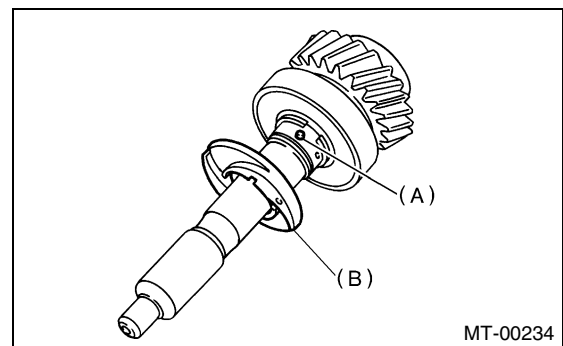
2) Install the snap ring on input shaft.



- (A) Snap ring

3) Inspect the clearance between ball bearing and snap ring. <Ref. to MT-85, INSPECTION, Input Shaft Assembly.>

4) Install the straight pin and oil squeeze plate to input shaft.



- (A) Straight pin
- (B) Oil squeeze plate

5) Install the snap ring.

INPUT SHAFT ASSEMBLY

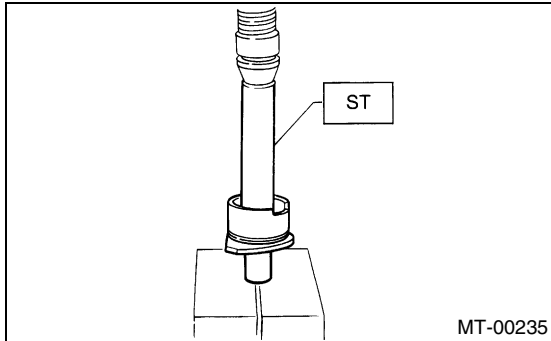
MANUAL TRANSMISSION AND DIFFERENTIAL

6) Drive the oil seal into input shaft holder.

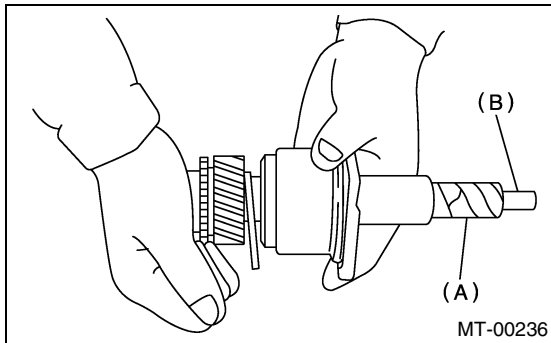
NOTE:

Apply a coat of grease to sealing lips before installing oil seal.

ST 398507703 DUMMY COLLAR



7) Wind vinyl tape around the shaft splines and insert input shaft into holder by lightly tapping it by hand.



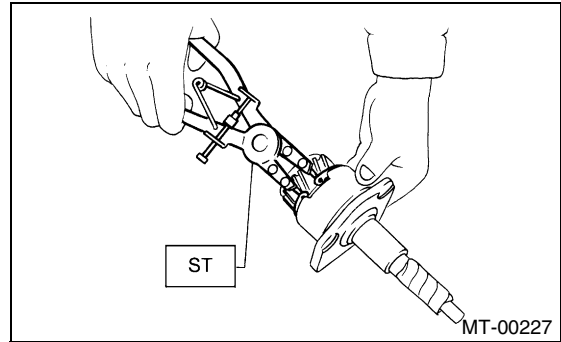
- (A) Vinyl tape
- (B) Input shaft

8) Install the snap ring to input shaft holder.

NOTE:

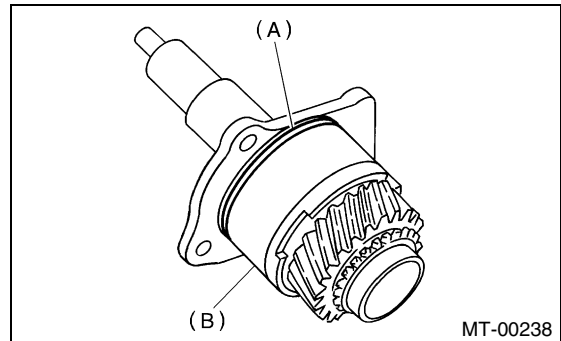
Select a suitable snap ring so that clearance between snap ring and bearing is held within 0 to 0.12 mm (0 to 0.0047 in).

ST 398663600 PLIERS



Snap ring	
Part No.	Thickness mm (in)
805168020	1.84 (0.0724)
805168030	1.92 (0.0756)
805168040	2.00 (0.0787)

9) Install the O-ring to input shaft holder.



- (A) O-ring
- (B) Input shaft holder

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.

INPUT SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

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.

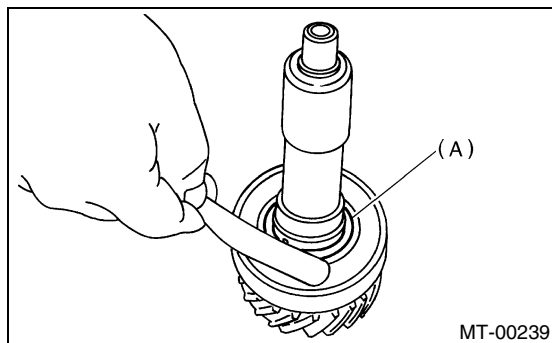
8) Gearshift mechanism

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

9) Measure the clearance between snap ring and ball bearing using thickness gauge.

Clearance:

0 — 0.12 mm (0 — 0.0047 in)



(A) Snap ring

If the measurement is not within specification, select a suitable snap ring.

Snap ring	
Part No.	Thickness mm (in)
805028050	2.48 (0.0976)
805028060	2.56 (0.1008)
805028070	2.64 (0.1039)

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

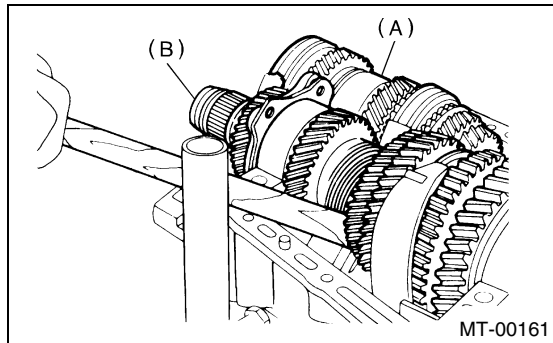
20. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly.

NOTE:

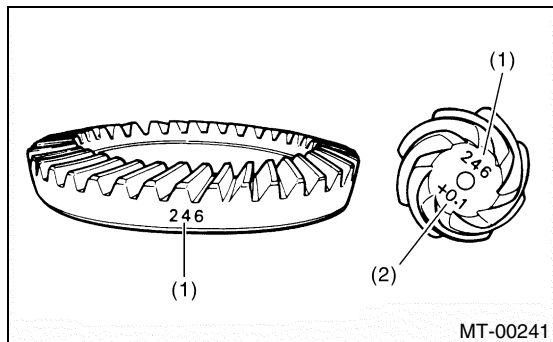
Use a hammer handle, etc. to remove if too tight.



- (A) Main shaft assembly
- (B) Drive pinion shaft assembly

B: INSTALLATION

- 1) Remove the differential assembly.
- 2) Alignment marks/numbers on hypoid gear set:
The upper number on driven pinion is the match number for combining it with hypoid driven gear. The lower number is for shim adjustment. If no lower number is shown, the value is zero. The number on hypoid driven gear indicates a number for combination with drive pinion.



- (A) Match number
- (B) Shim adjust number

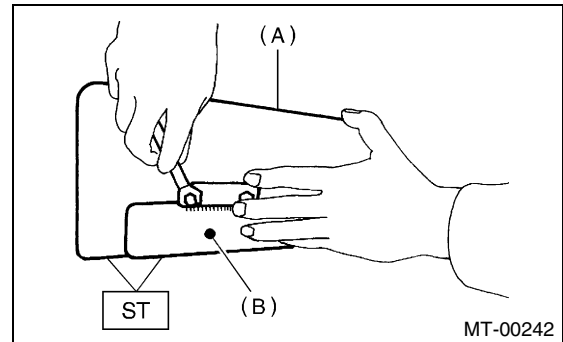
- 3) Place the drive pinion shaft assembly on right hand transmission main case without shim and tighten the bearing mounting bolts.

- 4) 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



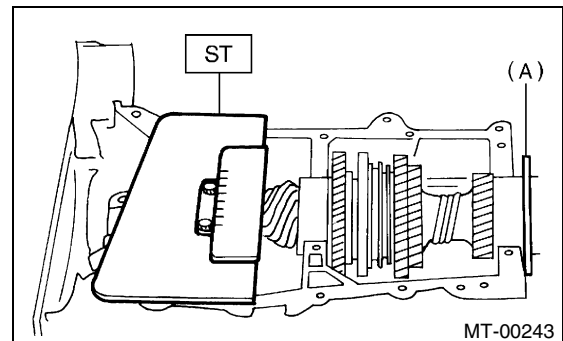
- (A) Plate
- (B) Scale

- 5) Position the ST by inserting the knock pin of ST into the knock hole in 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 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 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

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Select one to three shims from the next table for the value determined as described above and take a shim thickness which is closest to the indicated 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 differential assembly. <Ref. to MT-95, INSTALLATION, Front Differential Assembly.>

10) Set the transmission main shaft assembly and drive pinion assembly in position. (So there is no clearance between the two when moved all the way to the front). Inspect the suitable 1st — 2nd, 3rd — 4th and 5th shifter fork so that coupling sleeve and reverse driven gear are positioned in the center of their synchronizing mechanisms. <Ref. to MT-92, INSPECTION, Drive Pinion Shaft Assembly.>

11) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>

12) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

13) Install the manual transmission assembly to vehicle. <Ref. to MT-32, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

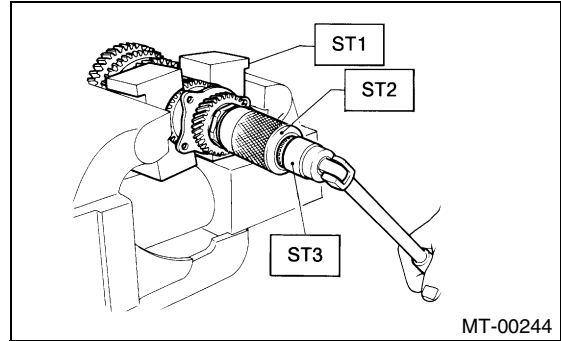
Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

1) Straighten the lock nut at staked portion. Remove the lock nut using ST1, ST2 and ST3.

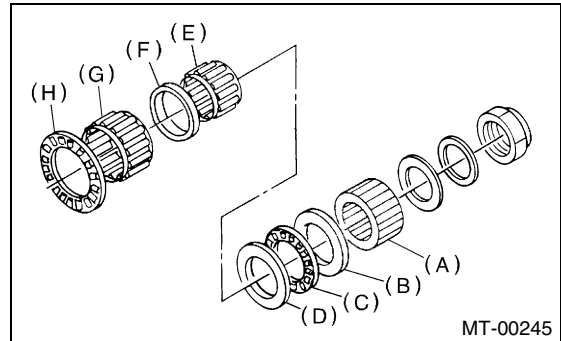
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)



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



- (A) Differential bevel gear sleeve
- (B) Washer No. 1 (25 × 37.5 × t)
- (C) Thrust bearing (25 × 37.5 × 3)
- (D) 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)

DRIVE PINION SHAFT ASSEMBLY

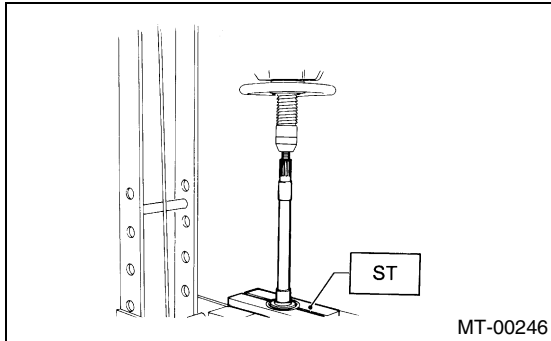
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Do not reuse the roller bearing.

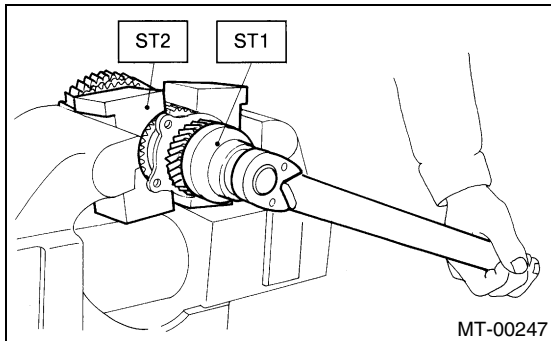
ST 498077000 REMOVER



4) Straighten the lock nut at staked portion. Remove the lock nut using ST1 and ST2.

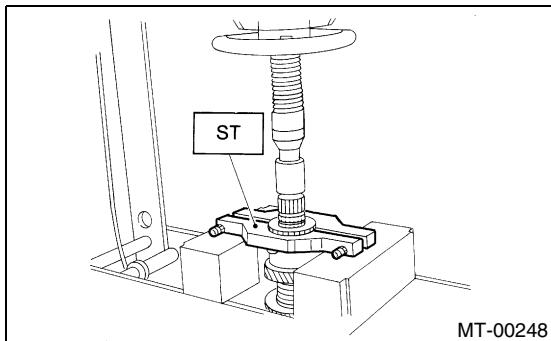
ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



5) Remove the 5th driven gear using ST.

ST 499857000 5TH DRIVEN GEAR REMOVER

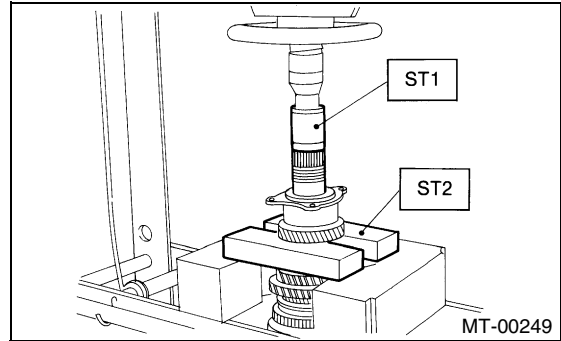


6) Remove the woodruff key.

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

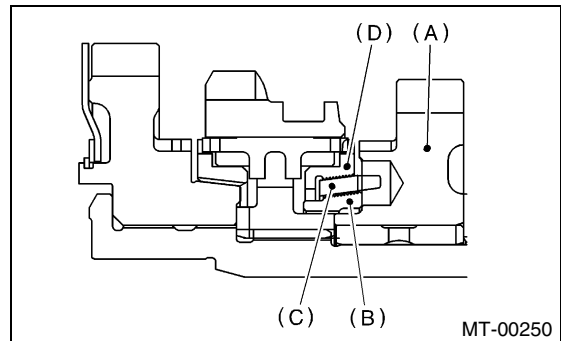
ST1 499757002 INSTALLER

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

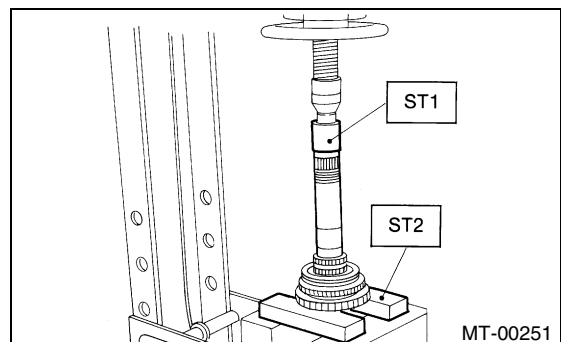
10) Remove the 1st driven gear, 2nd gear bushing, gear and hub using ST1 and ST2.

NOTE:

Replace the gear and hub if necessary. Do not attempt to disassemble if at all possible because they must engage at a specified point. If they should be disassembled, mark engagement point beforehand.

ST1 499757002 INSTALLER

ST2 899714110 REMOVER



DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

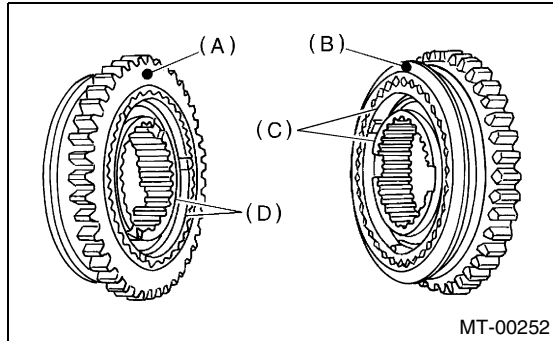
11) Remove the sub gear for 1st driven gear. (Non-turbo model only)

D: ASSEMBLY

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

NOTE:

- Use a new gear and hub assembly, if gear or hub have been replaced.



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

2) Install the washer, snap ring and sub gear to 1st driven gear.

3) Install the 1st driven gear, 1st baulk ring, gear and hub assembly onto driven shaft.

NOTE:

- Take care to install the gear and hub assembly in proper direction.
- Align the baulk ring and gear & hub assembly with key groove.

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

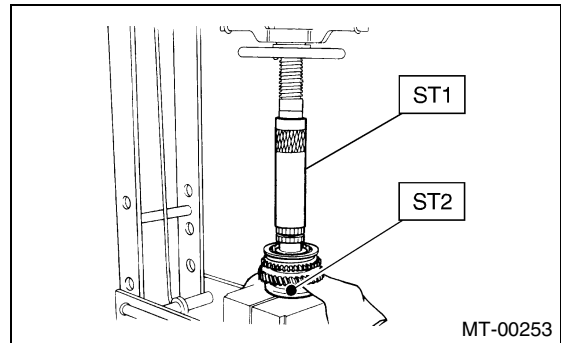
NOTE:

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

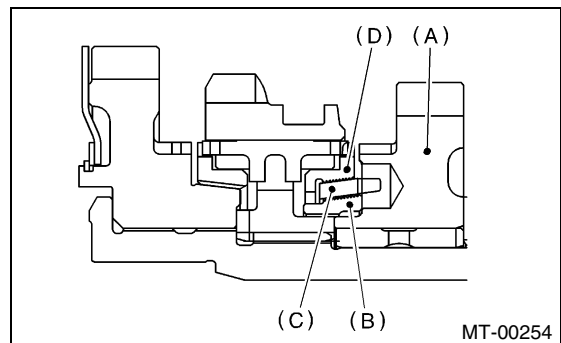
NOTE:

- 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, outer baulk ring and insert onto driven shaft.



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

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

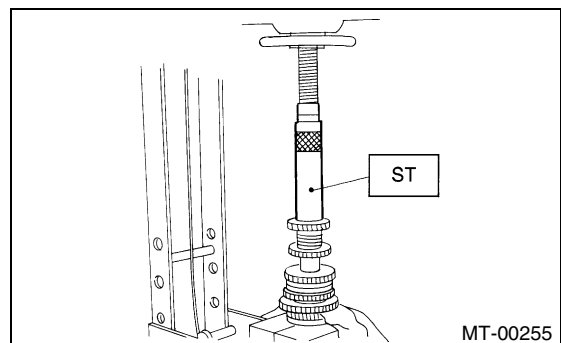
NOTE:

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

NOTE:

Align the groove in baulk ring with insert.

ST 499277200 INSTALLER



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

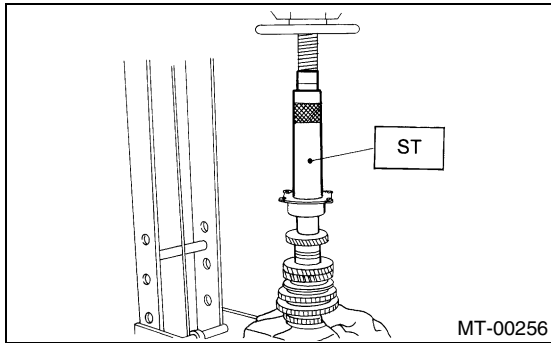
DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

NOTE:

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

ST 499277200 INSTALLER

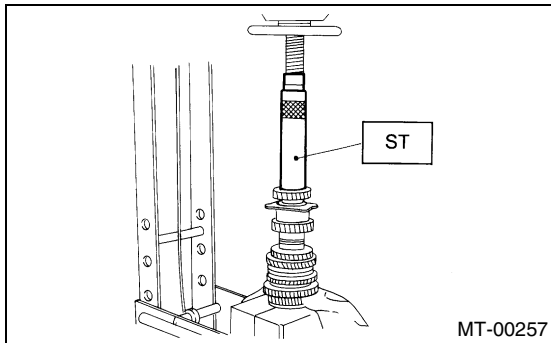


8) Position the woodruff key in groove on the rear of driven shaft. Install the 5th driven gear onto drive shaft using ST and press.

NOTE:

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

ST 499277200 INSTALLER

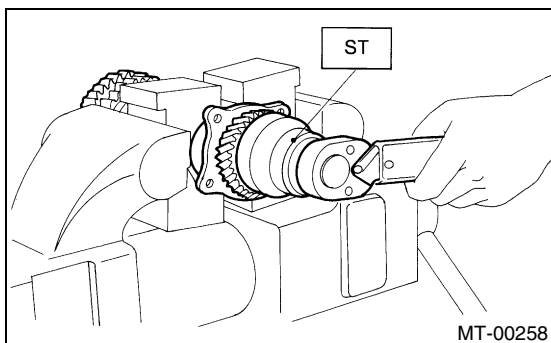


9) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

Tightening torque:

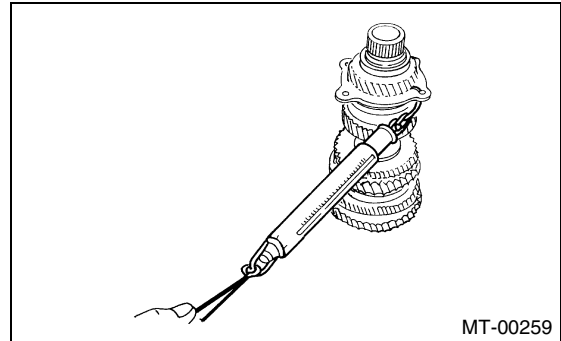
260 N·m (26.5 kgf·m, 192 ft·lb)



NOTE:

- Stake the lock nut at two points.

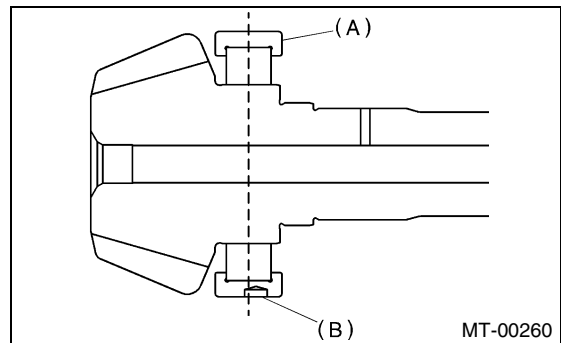
- Using the spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 ft).



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 in outer race is offset.



- (A) Roller bearing
- (B) Knock pin hole

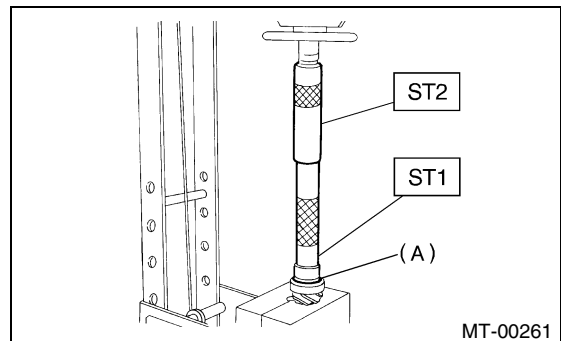
11) Install the washer using ST1, ST2 and press.

NOTE:

- Discard the old lock nuts, replace with new ones.
- Secure the lock nut in four places.

ST1 499277100 BUSH 1-2 INSTALLER

ST2 499277200 INSTALLER

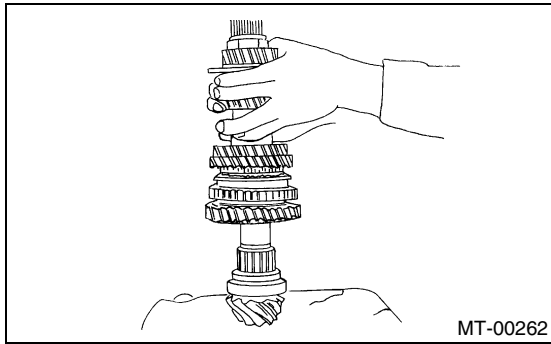


- (A) Washer

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

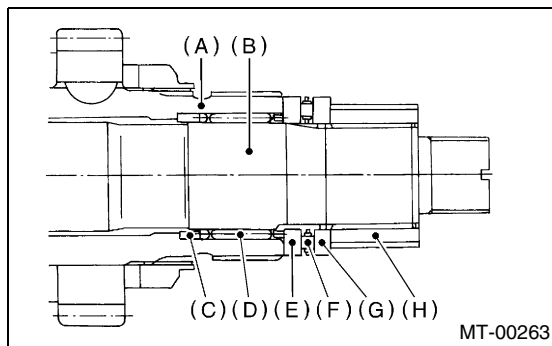
12) Install the thrust bearing and needle bearing.
Install the driven shaft assembly.



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

NOTE:

Be careful because the spacer must be installed in proper direction.



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

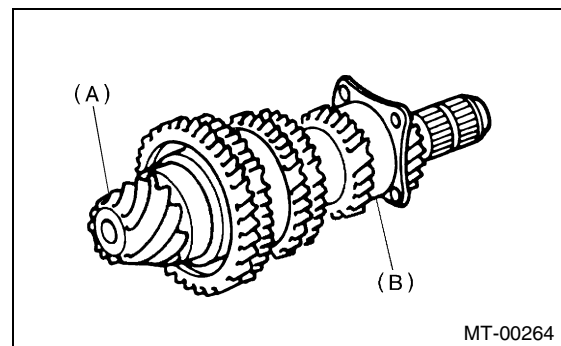
E: INSPECTION

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.
- The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike the other bearings.



- (A) Drive pinion shaft
- (B) Ball bearing

- 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.

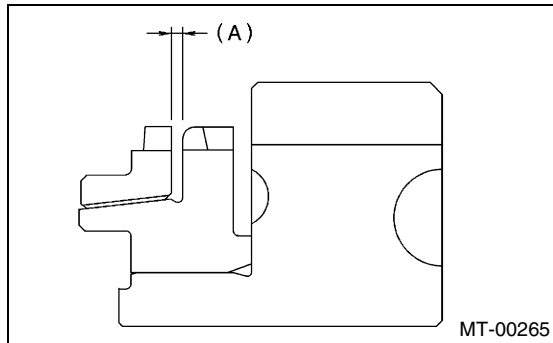
- If the gap between the end faces of the ring and the gear splined part is excessively small when the ring is pressed against the cone.

DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

Clearance (A):

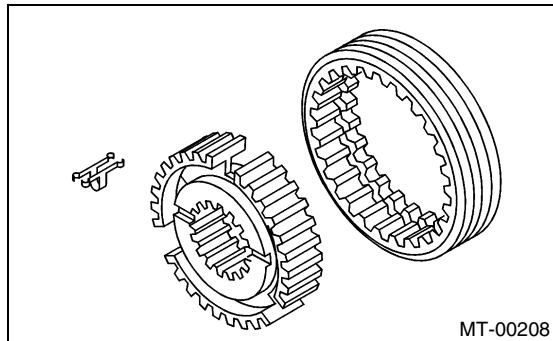
0.5 — 1.0 mm (0.020 — 0.040 in)



- 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.

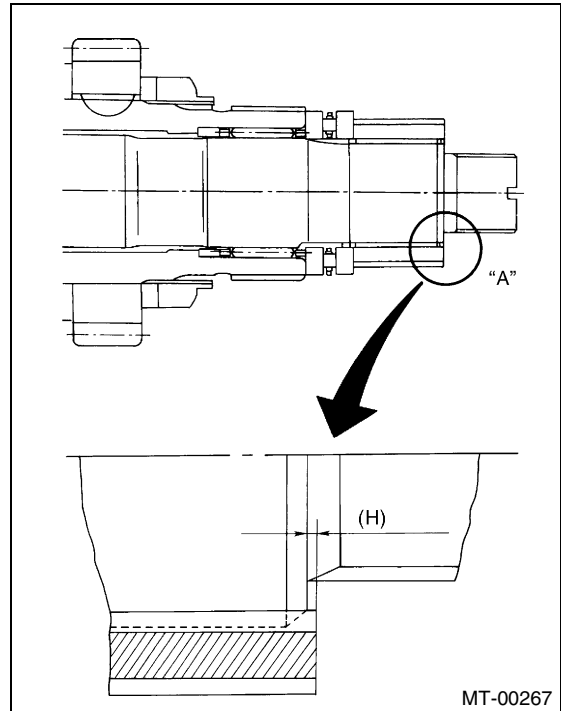
7) O-ring

Replace the O-ring if the sealing face is deformed, hardened, damaged, worn, or defective in any way.

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

1) After completing the preceding steps 1) through 3), select the adjusting washer No. 1 so that dimension (H) is zero through visual check. Position the washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install the lock nut (18 × 13.5).



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

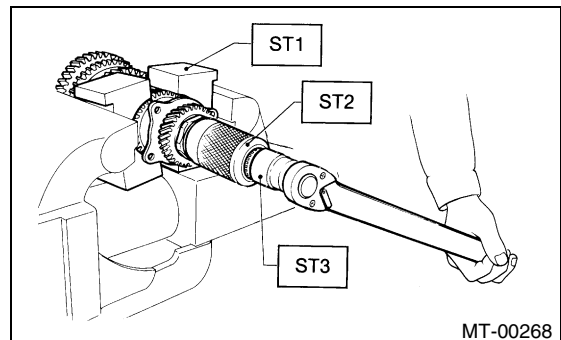
ST1 899884100 HOLDER

ST2 498427100 STOPPER

ST3 899988608 SOCKET WRENCH (27)

Tightening torque:

120 N·m (12.2 kgf·m, 88.2 ft·lb)



DRIVE PINION SHAFT ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

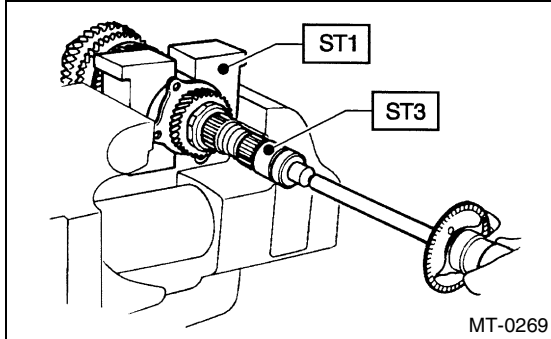
3) After removing the ST2, measure the starting torque using torque driver.

ST1 899884100 HOLDER

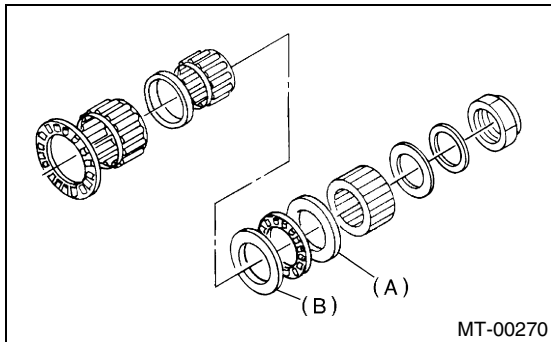
ST3 899988608 SOCKET WRENCH (27)

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 specified limit, select a new adjusting washer No. 1 and recheck starting torque.

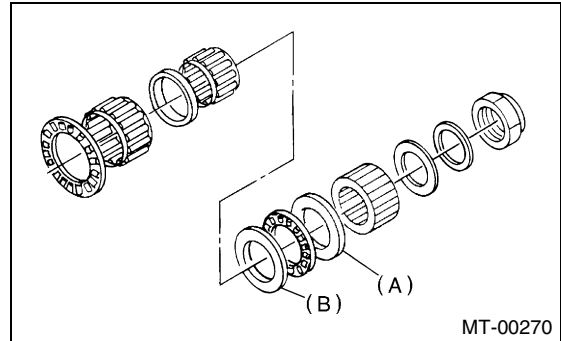


(A) Adjusting washer No.1

(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) If the specified starting torque range cannot be obtained when a No. 1 adjusting washer is used, then select a suitable No. 2 adjusting washer from those listed in 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	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 specified range, then clinch the lock nut at four positions.

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

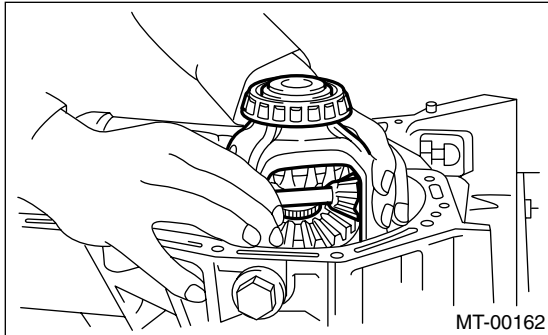
21. Front Differential Assembly

A: REMOVAL

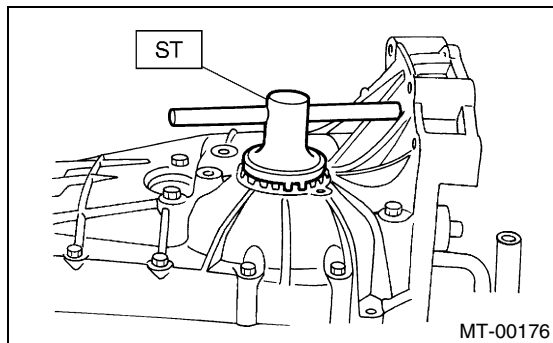
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.
Single-range model
<Ref. to MT-69, REMOVAL, Main Shaft Assembly (Single-Range).>
Dual-range model
<Ref. to MT-77, REMOVAL, Main Shaft Assembly (Dual-Range).>
- 6) Remove the differential assembly.

NOTE:

Be careful not to confuse the right and left roller bearing outer races.



- 7) Remove the differential side retainers using ST. ST 499787000 WRENCH ASSY



- 8) Remove the bearing outer race from transmission case. ST 398527700 PULLER ASSY

B: INSTALLATION

- 1) Insert the bearing outer race to transmission case.

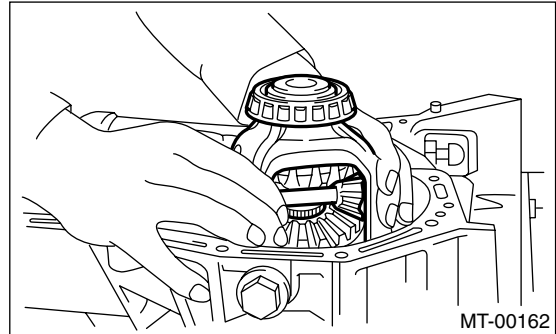
NOTE:

Apply the transmission gear oil to outer surface of bearing outer race.

- 2) Install the differential side retainers using ST. ST 499787000 WRENCH ASSY
- 3) Install the differential assembly.

NOTE:

Be careful not to fold the sealing lip of oil seal.



- 4) Install the main shaft assembly. <Ref. to MT-77, INSTALLATION, Main Shaft Assembly (Dual-Range).>
- 5) Install the drive pinion assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

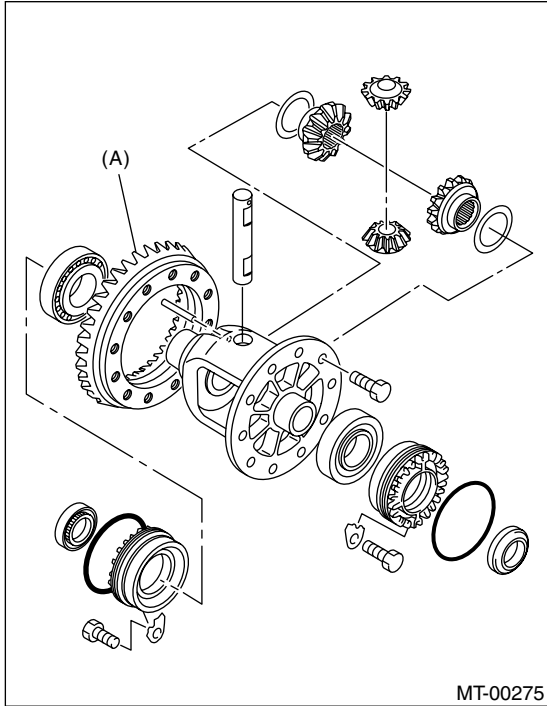
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

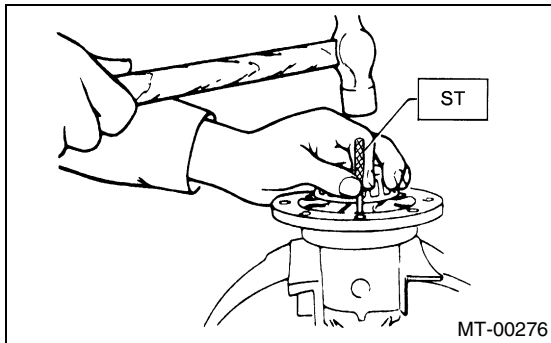
1) Loosen the twelve bolts and remove the hypoid driven gear.



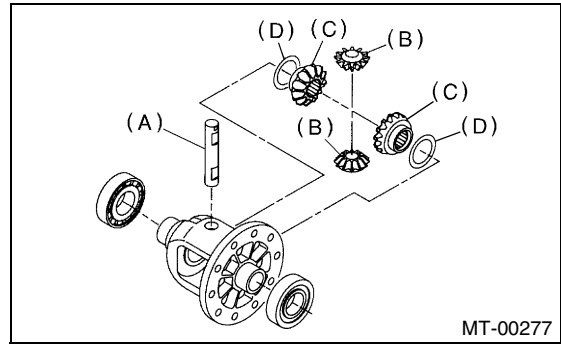
(A) Hypoid driven gear

2) Drive out the straight pin from differential assembly toward hypoid driven gear.

ST 899904100 REMOVER

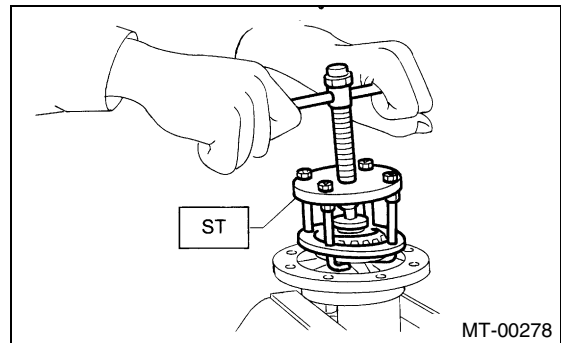


3) Pull out the pinion shaft, and remove the differential bevel pinion and gear and washer.



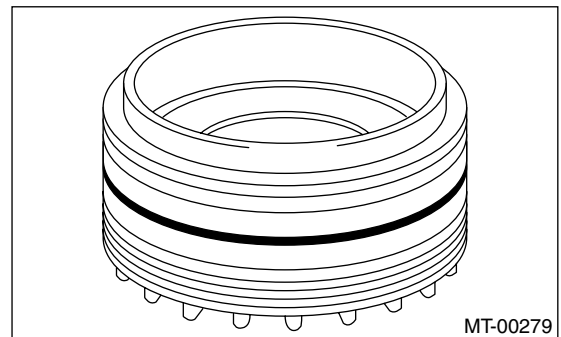
- (A) Pinion shaft
- (B) Bevel pinion
- (C) Bevel gear
- (D) Washer

4) Remove the roller bearing using ST.
ST 899524100 PULLER SET



2. SIDE RETAINER

1) Remove the O-ring.



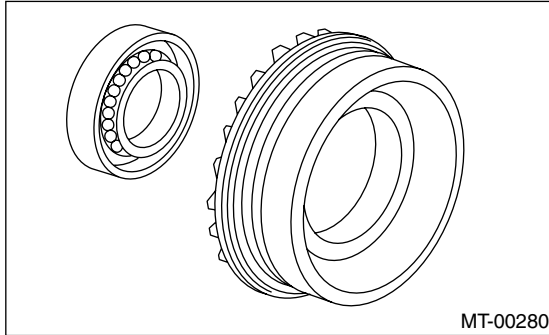
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

2) Remove the oil seal.

NOTE:

Remove the oil seal using a flat tip screwdriver.



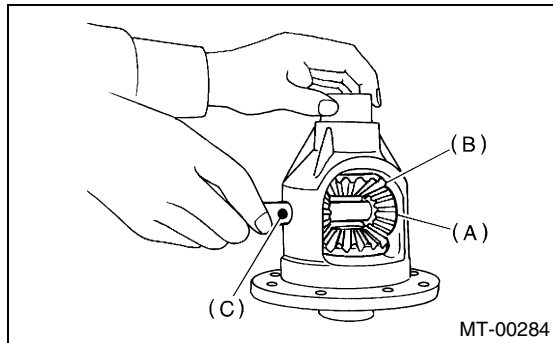
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Install the bevel gear and bevel pinion together with washers, and insert pinion shaft.

NOTE:

Face the chamfered side of washer toward gear.



- (A) Bevel pinion
- (B) Bevel gear
- (C) Pinion shaft

2) Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to MT-100, ADJUSTMENT, Front Differential Assembly.>

NOTE:

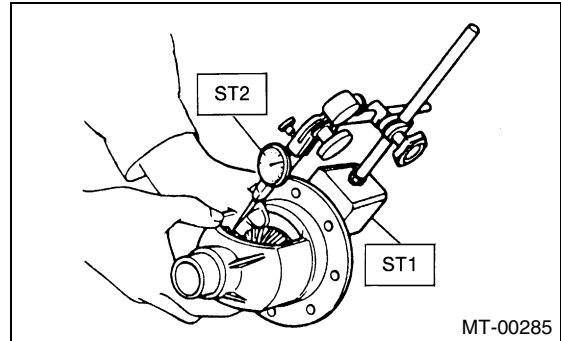
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

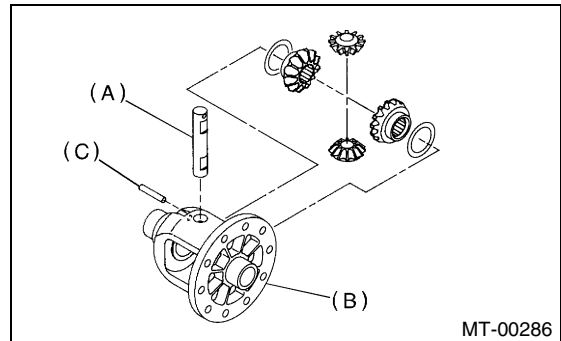


3) Align the pinion shaft and differential case at their holes, and drive the straight pin into holes from the hypoid driven gear side, using ST.

NOTE:

Lock the straight pin after installing.

ST 899904100 REMOVER



- (A) Pinion shaft
- (B) Differential case
- (C) Straight pin

4) Install the roller bearing to differential case.

CAUTION:

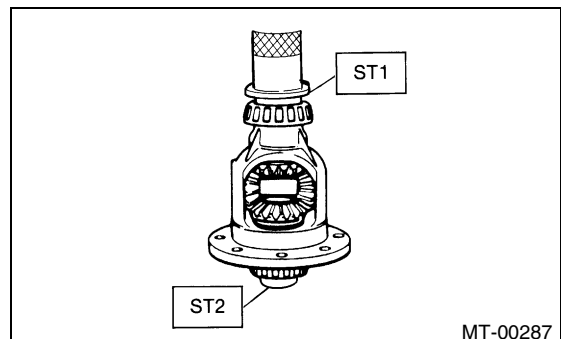
Do not apply pressure in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Be careful because the roller bearing outer races are used as a set.

ST1 499277100 BUSH 1-2 INSTALLER

ST2 398497701 ADAPTER



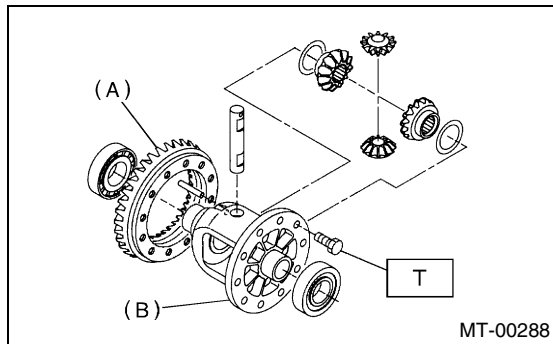
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

5) Install the hypoid driven gear to differential case using twelve bolts.

Tightening torque:

T: 62 N·m (6.3 kgf-m, 45.6 ft-lb)



- (A) Hypoid driven gear
- (B) Differential case

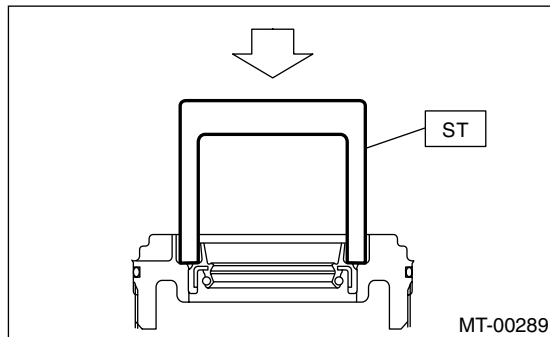
2. SIDE RETAINER

1) Install a new oil seal.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:

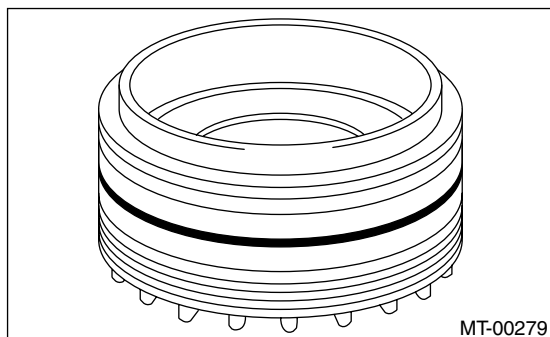
- When pressing fit the oil seal to side retainer, tap it to press fit using a plastic hammer.
- Do not use the press.



2) Install a new O-ring.

NOTE:

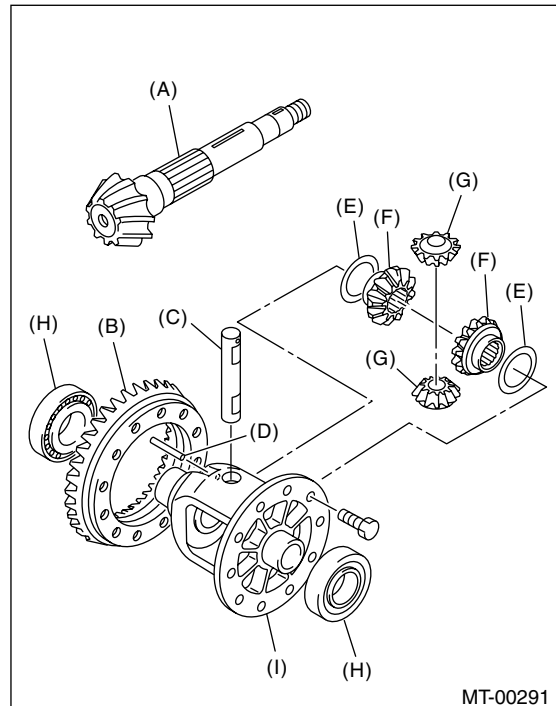
Do not stretch or damage the O-ring.



E: INSPECTION

Repair or replace the differential gear in the following cases:

- The hypoid drive gear and drive pinion shaft tooth surface are damaged, excessively worn, or seized.
- The roller bearing on the drive pinion shaft has a worn or damaged roller path.
- There is damage, wear, or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft, and straight pin.
- The differential case has worn or damaged sliding surfaces.



- (A) Drive pinion shaft
- (B) Hypoid driven gear
- (C) Pinion shaft
- (D) Straight pin
- (E) Washer
- (F) Differential bevel gear
- (G) Differential bevel pinion
- (H) Roller bearing
- (I) Differential case

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

1. BEVEL PINION GEAR BACKLASH

Measure the backlash between bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it.

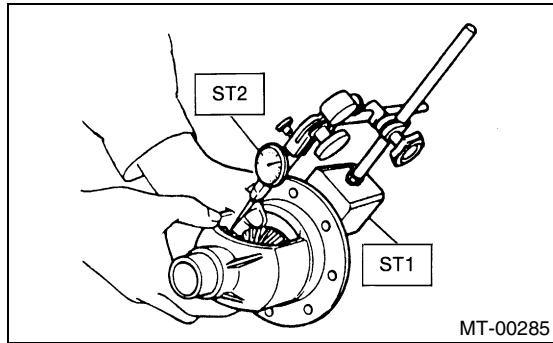
NOTE:

Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)



2. HYPOID GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface at a right angle.

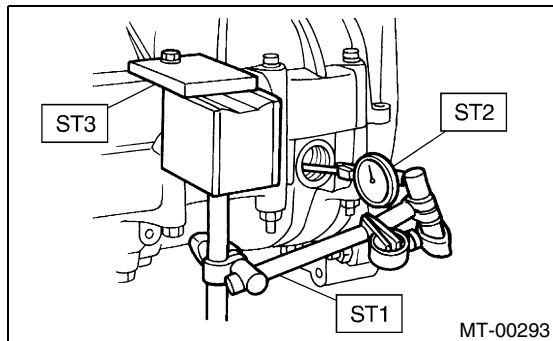
ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE

2) Install the axle shaft (SUBARU Genuine Parts) to both sides, move it clockwise and counter clockwise to contact tooth, and then read the value of dial gauge runout.

Parts No. 38415AA100 AXEL SHAFT

Backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

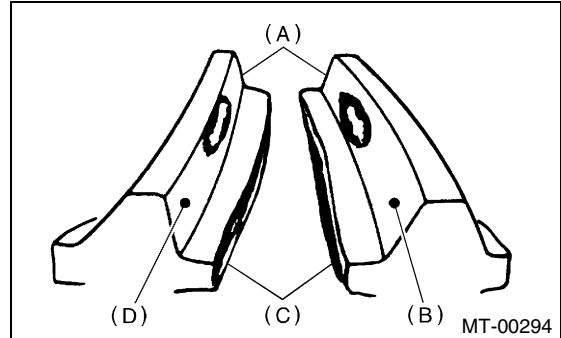


3) If the backlash is outside specified range, adjust it by turning the holder in right side case.

3. TOOTH CONTACT OF HYPOID GEAR

Check the tooth contact of hypoid gear as follows: Apply a uniform thin coat of red lead on both tooth surfaces of 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on hypoid gear, and judge whether face contact is correct. If it is inaccurate, make adjustment. <Ref. to MT-100, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



- (A) Toe
- (B) Coast side
- (C) Heel
- (D) Drive side

FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

- 1) Disassemble the front differential. <Ref. to MT-95, REMOVAL, Front Differential Assembly.>
- 2) Select a different washer from the table and install.

Washer	
Part No.	Thickness mm (in)
803038021	0.925 — 0.950 (0.0364 — 0.0374)
803038022	0.975 — 1.000 (0.0384 — 0.0394)
803038023	1.025 — 1.050 (0.0404 — 0.0413)

- 3) Adjust until the specified value is obtained.

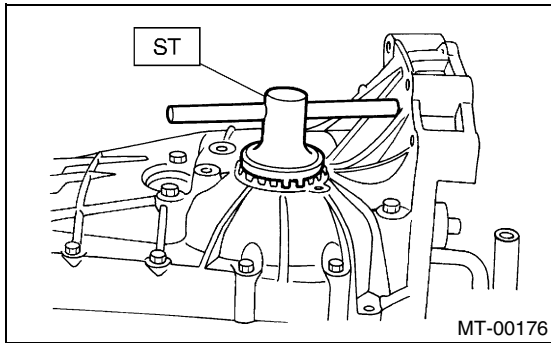
Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

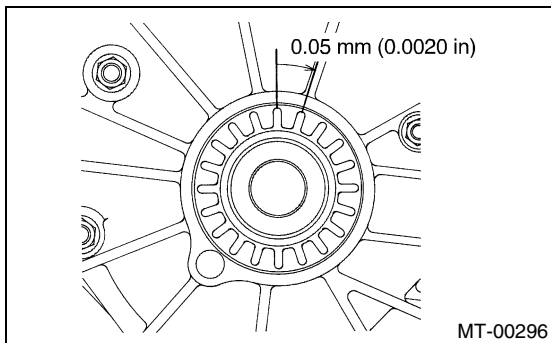
Adjust backlash by turning the holder in right side case.

ST 499787000 WRENCH ASSY



NOTE:

Each time holder rotates one tooth, backlash changes by 0.05 mm (0.0020 in).

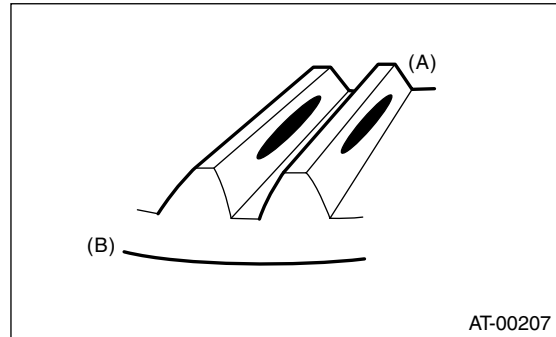


3. TOOTH CONTACT OF HYPOID GEAR

- 1) Adjust until the teeth contact is correct.
- 2) Check and adjust the teeth contact with following.

- Tooth contact

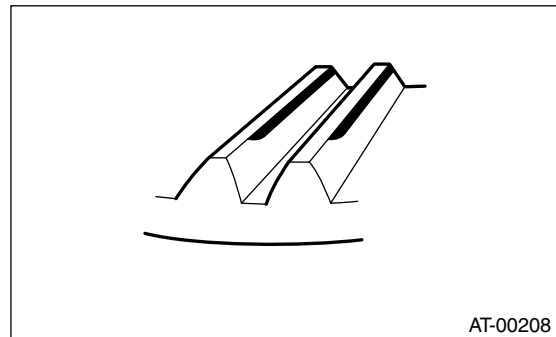
Checking item: Tooth contact pattern is slightly shifted toward to toe side under no-load rotation. [When loaded, contact pattern moves toward heel.]



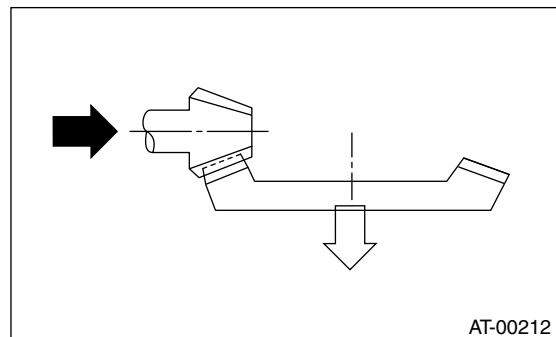
- (A) Toe side
- (B) Heel side

- Face contact

Checking item: Backlash is too large.
Contact pattern



Corrective action: Reduce thickness of drive pinion shim in order to bring drive pinion close to crown gear.



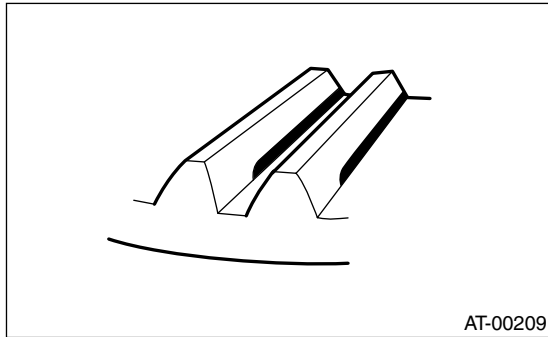
FRONT DIFFERENTIAL ASSEMBLY

MANUAL TRANSMISSION AND DIFFERENTIAL

- Flank contact

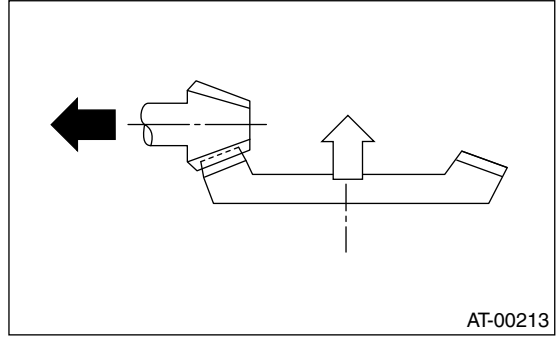
Checking item: Backlash is too small.

Contact pattern



Corrective action: Increase thickness of drive pinion shim in order to move drive pinion away from crown gear.

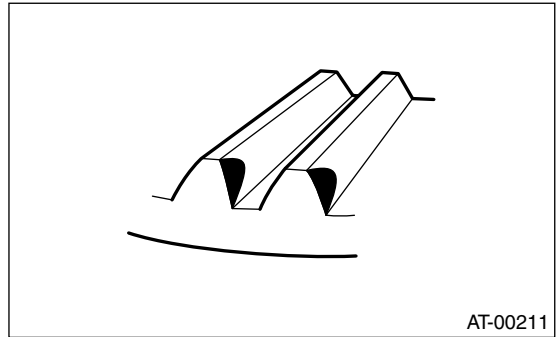
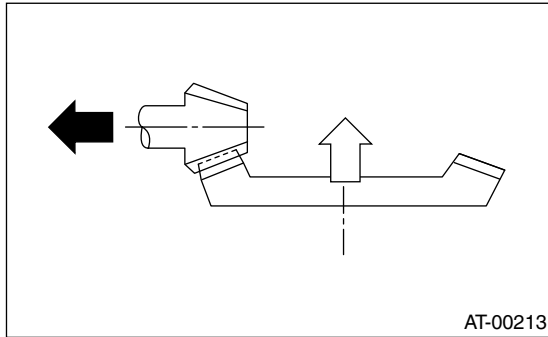
Corrective action: Increase thickness of drive pinion shim in order to bring drive pinion close to crown gear.



- Heel contact (Outside end contact)

Checking item: Contact areas is small.

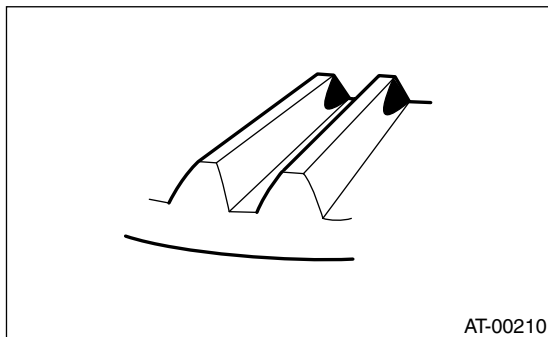
Contact pattern



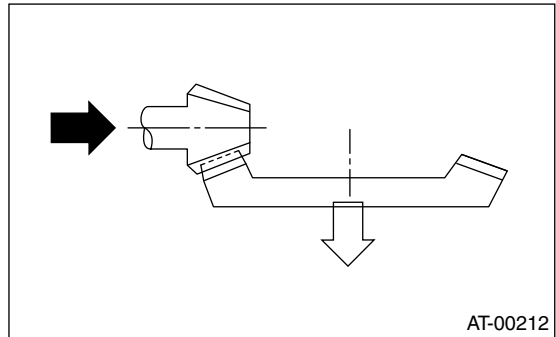
- Toe contact (Inside end contact)

Checking item: Contact areas is small.

Contact pattern



Corrective action: Reduce thickness of drive pinion shim in order to move drive pinion away from crown gear.



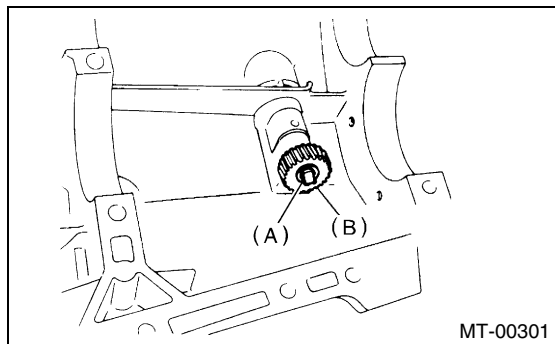
SPEEDOMETER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

22.Speedometer Gear

A: REMOVAL

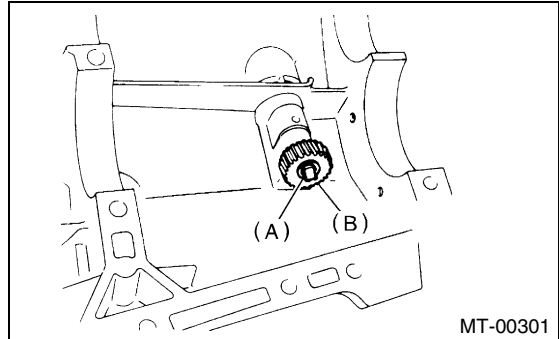
- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 5) Remove the vehicle speed sensor. <Ref. to MT-46, REMOVAL, Vehicle Speed Sensor.>
- 6) Remove the outer snap ring and pull out speedometer driven gear. Next, remove the oil seal, speedometer shaft and washer.



- (A) Outer snap ring
- (B) Speedometer driven gear

B: INSTALLATION

- 1) Install the washer and speedometer shaft, and press fit the new oil seal with ST. ST 899824100 or 499827000PRESS
- 2) Install the vehicle speed sensor. <Ref. to MT-46, INSTALLATION, Vehicle Speed Sensor.>
- 3) Install the speedometer driven gear and new snap ring.



- (A) Outer snap ring
- (B) Speedometer driven gear

- 4) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 5) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install the back-up light switch and neutral position switch. <Ref. to MT-44, INSTALLATION, Switches and Harness.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

Check the speedometer gear, oil seal and speedometer shaft for damage. Replace if damaged.

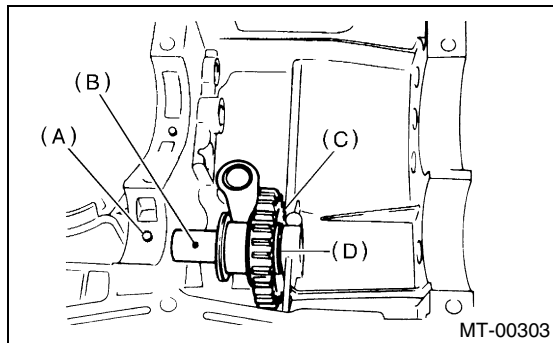
REVERSE IDLER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

23.Reverse Idler Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly.
Single-range model
<Ref. to MT-69, REMOVAL, Main Shaft Assembly (Single-Range).>
Dual-range model
<Ref. to MT-77, REMOVAL, Main Shaft Assembly (Dual-Range).>
- 7) Remove the differential assembly. <Ref. to MT-95, REMOVAL, Front Differential Assembly.>
- 8) Remove the shifter forks and rods. <Ref. to MT-105, REMOVAL, Shifter Fork and Rod.>
- 9) Pull out the straight pin, and remove the idler gear shaft, reverse idler gear and washer.



- (A) Straight pin
- (B) Idler gear shaft
- (C) Idler gear
- (D) Washer

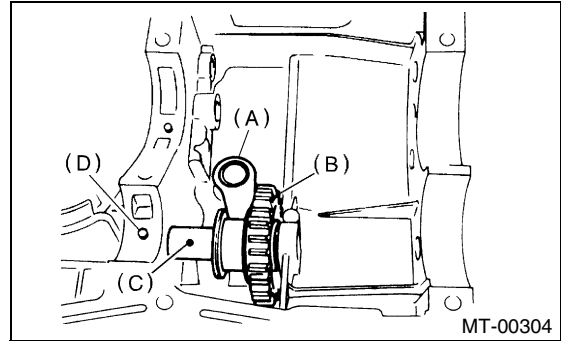
- 10) Remove the reverse shifter lever.

B: INSTALLATION

- 1) Install the reverse shifter lever, reverse idler gear and reverse idler gear shaft, and secure with straight pin.

NOTE:

Be sure to install the reverse idler shaft from rear side.



- (A) Reverse shifter lever
- (B) Reverse idler gear
- (C) Reverse idler gear shaft
- (D) Straight pin

- 2) Inspect and adjust the clearance between reverse idler gear and transmission case wall. <Ref. to MT-103, INSTALLATION, Reverse Idler Gear.> and <Ref. to MT-104, ADJUSTMENT, Reverse Idler Gear.>
- 3) Install the shifter forks and rods. <Ref. to MT-105, INSTALLATION, Shifter Fork and Rod.>
- 4) Install the differential assembly. <Ref. to MT-95, INSTALLATION, Front Differential Assembly.>
- 5) Install the main shaft assembly.
Single-range model
<Ref. to MT-69, INSTALLATION, Main Shaft Assembly (Single-Range).>
Dual-range model
<Ref. to MT-77, INSTALLATION, Main Shaft Assembly (Dual-Range).>
- 6) Install the drive pinion shaft assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>

- 7) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 8) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 9) Install the back-up light switch and neutral position switch. <Ref. to MT-44, INSTALLATION, Switches and Harness.>

- 10) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

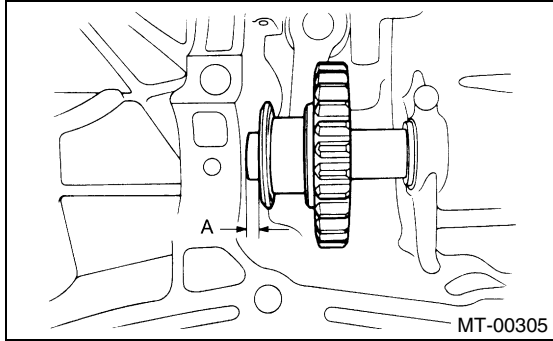
- 1) Move the reverse shifter rod toward the reverse side. Inspect the clearance between reverse idler gear and transmission case wall. If out of specification, select the appropriate reverse shifter lever and adjust.

REVERSE IDLER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

Clearance A:

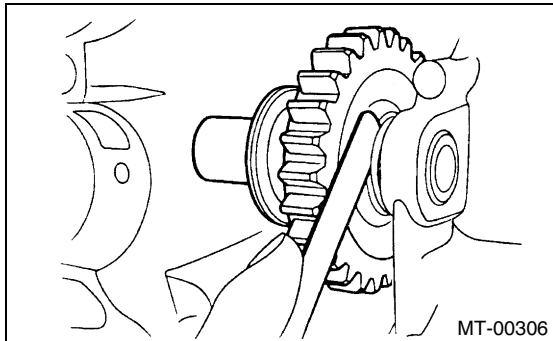
6.0 — 7.5 mm (0.236 — 0.295 in)



2) After installing a suitable reverse shifter lever, shift into neutral. Inspect the clearance between reverse idler gear and transmission case wall. If out of specification, select the appropriate washer and adjust.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



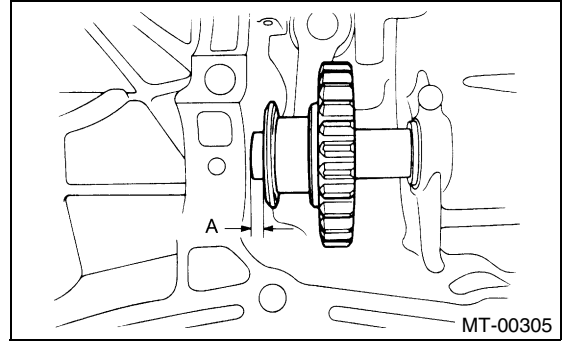
3) Check the reverse idler gear and shaft for damage. Replace if damaged.

D: ADJUSTMENT

1) Select the appropriate reverse shifter lever from the table below, and adjust until the gap between the reverse idler gear and transmission case wall is within specification.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

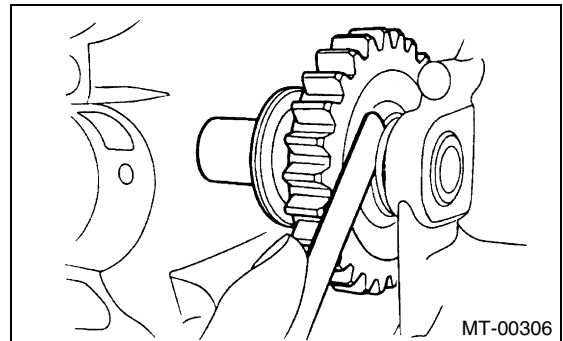


Reverse shifter lever		
Part No.	Mark	Remarks
32820AA070	7	Further from case wall
32820AA080	8	Standard
32820AA090	9	Closer to case wall

2) Select the appropriate washer from the table below, and adjust until the gap between the reverse idler gear and transmission case wall is within specification.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



Washer	
Part No.	Thickness mm (in)
803020151	0.4 (0.016)
803020152	1.1 (0.043)
803020153	1.5 (0.059)
803020154	1.9 (0.075)
803020155	2.3 (0.091)

SHIFTER FORK AND ROD

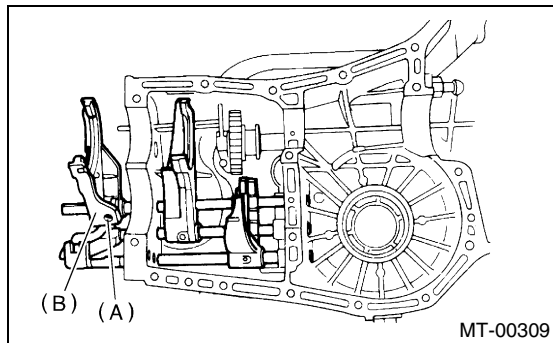
MANUAL TRANSMISSION AND DIFFERENTIAL

24. Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly.
Single-range model
<Ref. to MT-69, REMOVAL, Main Shaft Assembly (Single-Range).>
Dual-range model
<Ref. to MT-77, REMOVAL, Main Shaft Assembly (Dual-Range).>
- 7) Remove the differential assembly. <Ref. to MT-95, REMOVAL, Front Differential Assembly.>
- 8) Drive out the straight pin with ST, and 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER

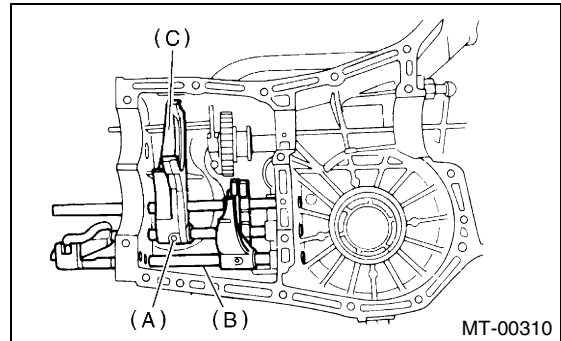


- (A) Straight pin
(B) 5th shifter fork

- 9) Remove the plugs, springs and checking balls.
- 10) Drive out the straight pin, and pull out 3-4 fork rod and shifter fork.

NOTE:

When removing the rod, keep other rods in neutral.



- (A) Straight pin
(B) 3-4 fork rod
(C) Shifter fork

- 11) Drive out the straight pin, and pull out 1-2 fork rod and shifter fork.

- 12) Remove the outer snap ring, and pull out the reverse shifter rod arm from reverse fork rod. Then take out the ball, spring and interlock plunger from rod.

And then remove the rod.

NOTE:

When pulling out the reverse shifter rod arm, be careful not to let the ball pop out of arm.

- 13) Remove the reverse shifter lever.

B: INSTALLATION

- 1) Apply grease to plunger.

ST 399411700 ACCENT BALL INSTALLER

- 2) Install the reverse arm fork spring, ball and interlock plunger to reverse fork rod arm. Insert the reverse fork rod into hole in reverse fork rod arm, and hold it with outer snap ring using ST.

- 3) Position the ball, spring and new gasket in reverse shifter rod hole, on left side transmission case, and tighten the checking ball plug.

- 4) Install the 1-2 fork rod into 1-2 shifter fork via the hole on the rear of transmission case.

- 5) Align the holes in rod and fork, and new drive straight pin into these holes using ST.

NOTE:

- Set other rods to neutral.
- Make sure the interlock plunger is on the 3-4 fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

- 6) Apply a coat of grease to plunger.

- 7) Install the interlock plunger onto 3-4 fork rod.

- 8) Install the 3-4 fork rod into 3-4 shifter fork via the hole on the rear of transmission case.

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Align the holes in rod and fork, and new drive straight pin into these holes.

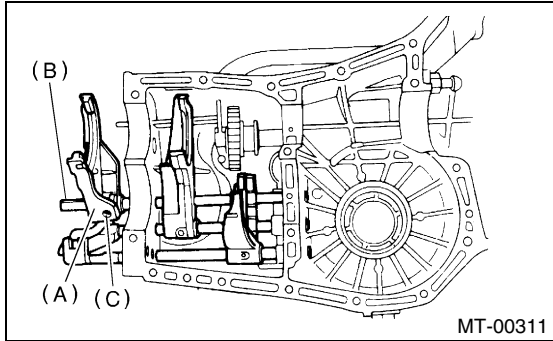
NOTE:

- Set the reverse fork rod to neutral.
- Make sure the interlock plunger (installing before) is on the reverse fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

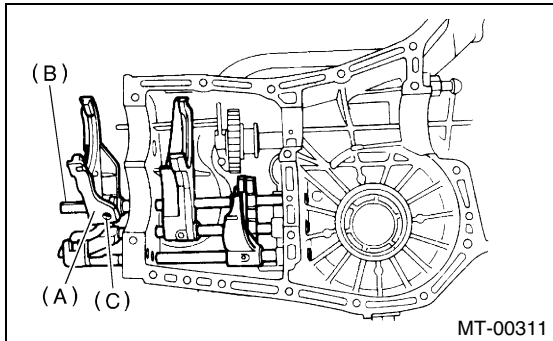
10) Install the 5th shifter fork onto the rear of reverse fork rod. Align holes in the two parts and new drive straight pin into place.

ST 398791700 STRAIGHT PIN REMOVER



- (A) 5th shifter fork
- (B) Reverse fork rod
- (C) Straight pin

11) Position the balls, checking ball springs and new gaskets into 3-4 and 1-2 rod holes, and install plugs.



- (A) 5th shifter fork
- (B) Reverse fork rod
- (C) Straight pin

12) Install the differential assembly. <Ref. to MT-95, INSTALLATION, Front Differential Assembly.>

13) Install the main shaft assembly.

Single-range model

<Ref. to MT-69, INSTALLATION, Main Shaft Assembly (Single-Range).>

Dual-range model

<Ref. to MT-77, INSTALLATION, Main Shaft Assembly (Dual-Range).>

14) Install the drive pinion shaft assembly. <Ref. to MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>

15) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>

16) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

17) Install the back-up light switch and neutral position switch. <Ref. to MT-44, INSTALLATION, Switches and Harness.>

18) Install the manual transmission assembly to vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

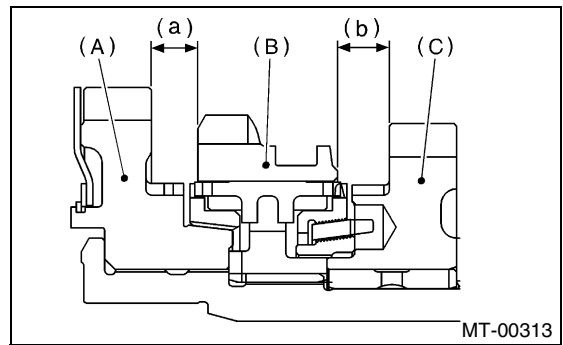
1) Check the shift shaft and shift rod for damage. Replace if damaged.

2) Gearshift mechanism:

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

3) Inspect the clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.5 mm (0.374 in)



- (A) 1st driven gear
- (B) Reverse driven gear
- (C) 2nd driven gear

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA060	1	Approach to 1st gear by 0.2 mm (0.008 in).

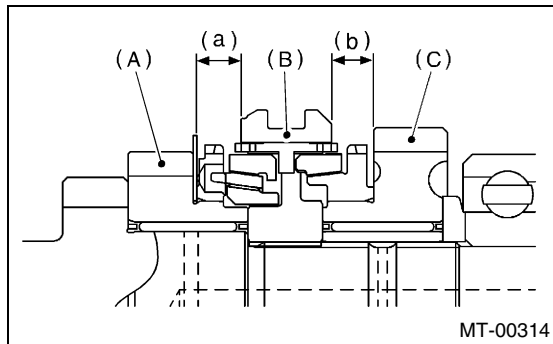
SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

1st-2nd shifter fork		
Part No.	Mark	Remarks
32804AA070	—	Standard
32804AA080	3	Become close from 2nd gear by 0.2 mm (0.008 in).

4) Inspect the clearance between 3rd, 4th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a) and (b):
9.3 mm (0.366 in)

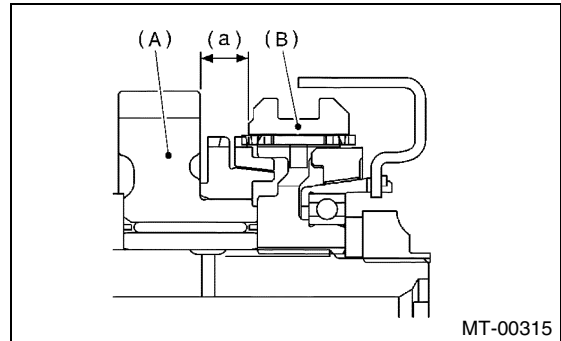


- (A) 3rd drive gear
- (B) Coupling sleeve
- (C) 4th drive gear

3rd-4th shifter fork		
Part No.	Mark	Remarks
32810AA061	1	Approach to 4th gear by 0.2 mm (0.008 in).
32810AA071	—	Standard
32810AA101	3	Become close from 3rd gear by 0.2 mm (0.008 in).

5) Inspect the clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

Clearance (a):
9.3 mm (0.366 in)



- (A) 5th drive gear
- (B) Coupling sleeve

5th shifter fork (Non-turbo)		
Part No.	Mark	Remarks
32812AA201	7	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA211	—	Standard
32812AA221	9	Become distant from 5th gear by 0.2 mm (0.008 in).

5th shifter fork (Turbo)		
Part No.	Mark	Remarks
32812AA231	7	Approach to 5th gear by 0.2 mm (0.008 in).
32812AA241	—	Standard
32812AA251	9	Become distant from 5th gear by 0.2 mm (0.008 in).

SHIFTER FORK AND ROD

MANUAL TRANSMISSION AND DIFFERENTIAL

6) Inspect the rod end clearances (A) and (B). If any clearance is not within specifications, replace the rod or fork as required.

Clearance (A):

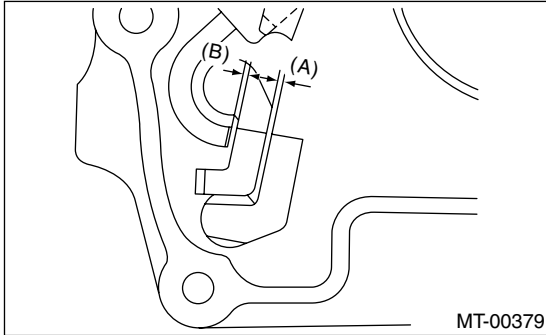
1st — 2nd to 3rd — 4th:

0.4 — 1.4 mm (0.016 — 0.055 in)

Clearance (B):

3rd — 4th to 5th:

0.5 — 1.3 mm (0.020 — 0.051 in)



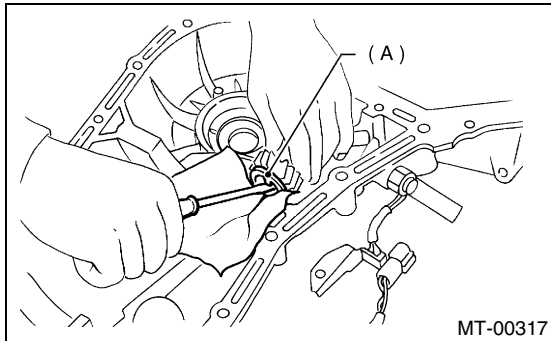
COUNTER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

25. Counter Gear

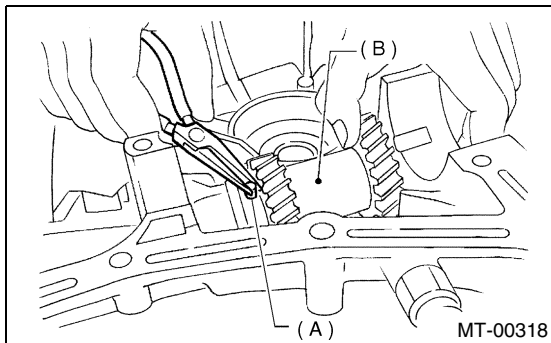
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to MT-63, REMOVAL, Transmission Case.>
- 4) Move the counter gear shaft until it touches transmission case, and remove the snap ring with a suitable tool.



(A) Snap ring

- 5) Slide the washer at rear of high-low counter shaft, and remove the straight pin from counter shaft.

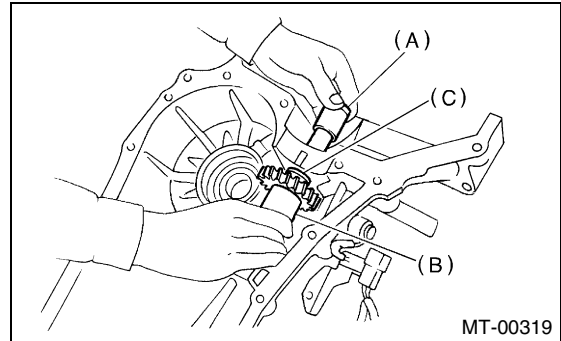


(A) Straight pin
(B) Counter gear

- 6) Remove the counter shaft from transmission case, taking care not to drop the counter gear and two washers.

NOTE:

- Be careful not to damage the O-ring.
- Be careful not to drop the straight pin on front side.
- Be careful not to drop the two needle bearings and collar contained in counter gear.



(A) Counter shaft
(B) Counter gear
(C) Washers

B: INSTALLATION

- 1) Install the O-ring and straight pin onto counter gear shaft.
- 2) Install the following parts in main case (Right-side), and push the shaft perfectly into case.
 - Counter gear shaft
 - Two counter gear washers
 - Two needle bearings
 - Counter gear collar
 - Counter gear
 - Straight pin
 - Snap ring
- 3) Install the transmission case. <Ref. to MT-65, INSTALLATION, Transmission Case.>
- 4) Install the transfer case with extension case assembly. <Ref. to MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly on vehicle. <Ref. to MT-35, INSTALLATION, Manual Transmission Assembly.>

NOTE:

- Make sure that the cut-out end surface of counter gear shaft does not protrude above the end surface of the case.
- Position the cut-out portion of counter gear shaft as shown in the figure.

C: INSPECTION

- 1) After installing the snap ring, measure the clearance between snap ring and counter washer.

COUNTER GEAR

MANUAL TRANSMISSION AND DIFFERENTIAL

Clearance:

0.05 — 0.35 mm (0.0020 — 0.0138 in)

2) If the clearance is out of measured value, select a snap ring and install to put clearance within measured value. <Ref. to MT-110, ADJUSTMENT, Counter Gear.>

D: ADJUSTMENT

Selection of snap ring:

If the measurement is not within specification, select suitable snap ring.

Snap ring	
Part No.	Thickness mm (in)
031319000	1.50 (0.0591)
805019010	1.72 (0.0677)

GENERAL DIAGNOSTIC

MANUAL TRANSMISSION AND DIFFERENTIAL

26. General Diagnostic

A: INSPECTION

1. MANUAL TRANSMISSION

Symptom	Possible cause	Remedy
1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission.	(a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear	Replace.
	(b) Worn, damaged or burred chamfer of spline of gears	Replace.
	(c) Worn or scratched bushings	Replace.
	(d) Incorrect contact between synchronizer ring and gear cone or wear	Correct or replace.
2. Gear slips out. • Gear slips out when coasting on rough road. • Gear slips out during acceleration.	(a) Defective pitching stopper adjustment	Adjust.
	(b) Loose engine mounting bolts	Tighten or replace.
	(c) Worn fork shifter, broken shifter fork rail spring	Replace.
	(d) Worn or damaged ball bearing	Replace.
	(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve	Replace.
	(f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)	Replace.
	(g) Worn 1st driven gear, needle bearing and race	Replace.
	(h) Worn 2nd driven gear, needle bearing and race	Replace.
	(i) Worn 3rd drive gear and bushing	Replace.
	(j) Worn 4th drive gear and bushing	Replace.
	(k) Worn reverse idler gear and bushing	Replace.
3. Unusual noise comes from transmission. NOTE: If an unusual noise is heard when the vehicle is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission.	(a) Insufficient or improper lubrication	Lubricate or replace with specified oil.
	(b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds.	Replace.

GENERAL DIAGNOSTIC

MANUAL TRANSMISSION AND DIFFERENTIAL

2. DIFFERENTIAL

Symptom	Possible cause	Remedy
<p>1. Broken differential (case, gear, bearing, etc.)</p> <p>NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution.</p>	(a) Insufficient or improper oil	Disassemble the differential and replace broken components and at the same time check other components for any trouble, and replace if necessary.
	(b) Use of vehicle under severe conditions such as excessive load and improper use of clutch	Readjust the bearing preload and backlash and face contact of gears.
	(c) Improper adjustment of taper roller bearing	Adjust.
	(d) Improper adjustment of drive pinion and hypoid driven gear	Adjust.
	(e) Excessive backlash due to worn differential side gear, washer or differential pinion vehicle under severe operating conditions.	Add recommended oil to specified level. Do not use the vehicle under severe operating conditions.
	(f) Loose hypoid driven gear clamping bolts	Tighten.
<p>2. Differential and hypoid gear noises</p> <p>Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises.</p> <ul style="list-style-type: none"> • Gear noise when driving: If noise increases as vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc. • Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment • Bearing noise when driving or when coasting: Cracked, broken or damaged bearings • Noise which mainly occurs when turning: Unusual noise from differential side gear, differential pinion, differential pinion shaft, etc. 	(a) Insufficient oil	Lubricate.
	(b) Improper adjustment of hypoid driven gear and drive pinion	Check tooth contact.
	(c) Worn teeth of hypoid driven gear and drive pinion	Replace as a set. Readjust the bearing preload.
	(d) Loose roller bearing	Readjust the hypoid driven gear to drive pinion backlash and check tooth contact.
	(e) Distorted hypoid driven gear or differential case	Replace.
	(f) Worn washer and differential pinion shaft	Replace.