

TRANSMISSION SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

CONTROL SYSTEM**CS****AUTOMATIC TRANSMISSION****4AT****AUTOMATIC TRANSMISSION
(DIAGNOSTIC)****4AT(H4SO)****AUTOMATIC TRANSMISSION
(DIAGNOSTIC)****4AT(H4DOTC)****AUTOMATIC TRANSMISSION
(DIAGNOSTIC)****4AT(H4DOTC 2.5)****MANUAL TRANSMISSION AND
DIFFERENTIAL****5MT****CLUTCH SYSTEM****CL**

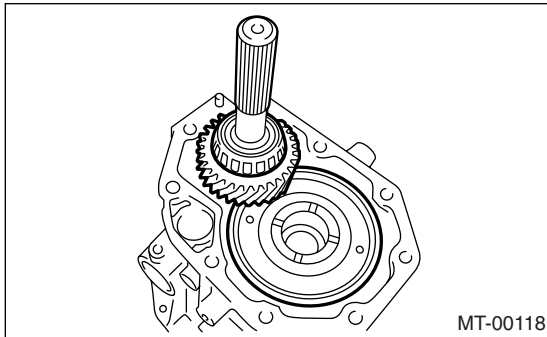
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

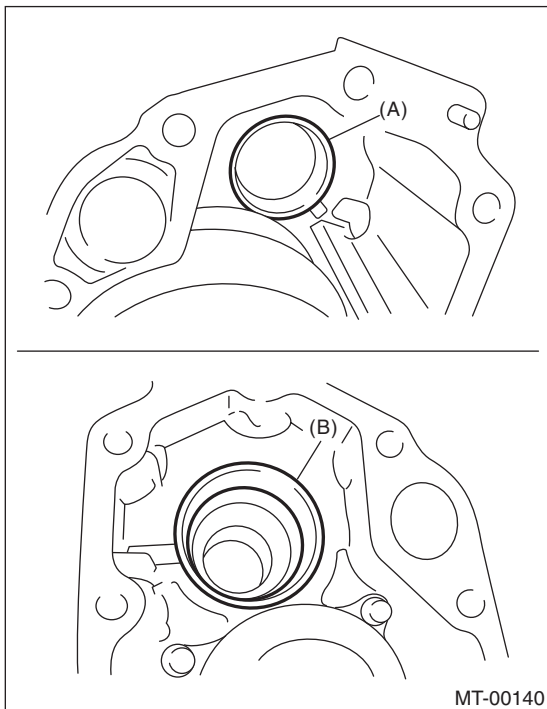
13. Transfer Driven Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the extension case assembly.
- 5) Remove the transfer driven gear.



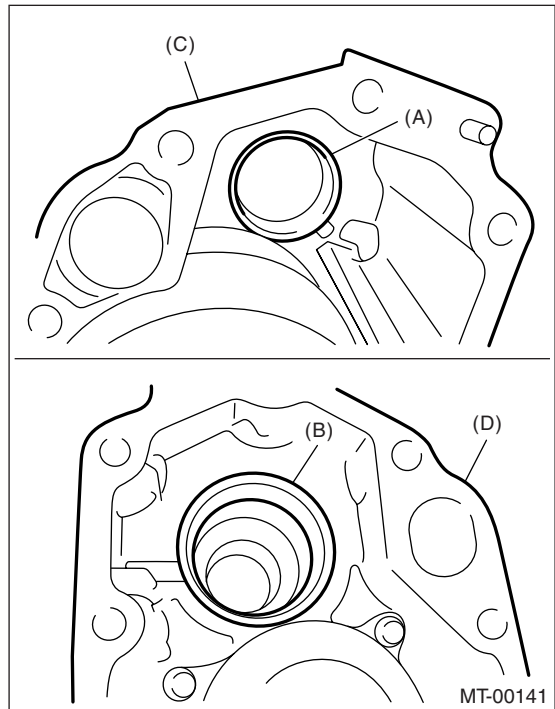
- 6) Remove the bearing outer race from extension case and transfer case.



- (A) Bearing outer race (transfer case)
- (B) Bearing outer race (extension case)

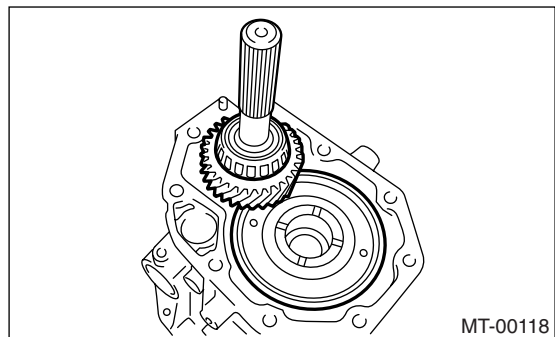
B: INSTALLATION

- 1) Install the bearing outer race to extension case and transfer case.



- (A) Bearing outer race
- (B) Bearing outer race
- (C) Transfer case
- (D) Extension case

- 2) Install the transfer driven gear.



- 3) Install the transfer case and extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the back-up light switch and neutral position switch. <Ref. to 5MT-44, INSTALLATION, Switches and Harness.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

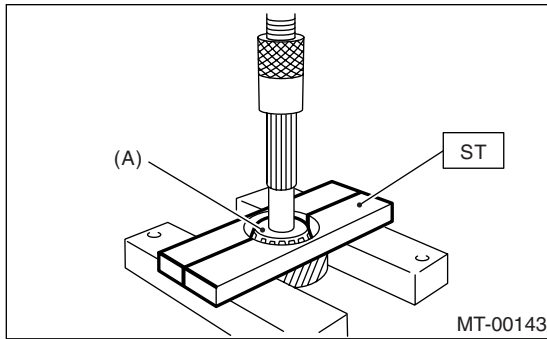
Transfer Driven Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1) Using the ST, remove the roller bearing (extension case side).

ST 498077000 REMOVER

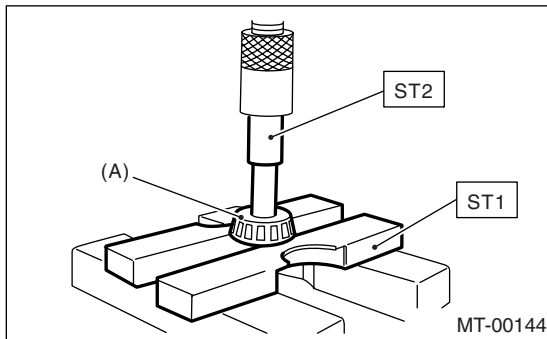


(A) Roller bearing

2) Using the ST1 and ST2, remove the roller bearing (transfer case side).

ST1 498077000 REMOVER

ST2 899864100 REMOVER



(A) Roller bearing

D: ASSEMBLY

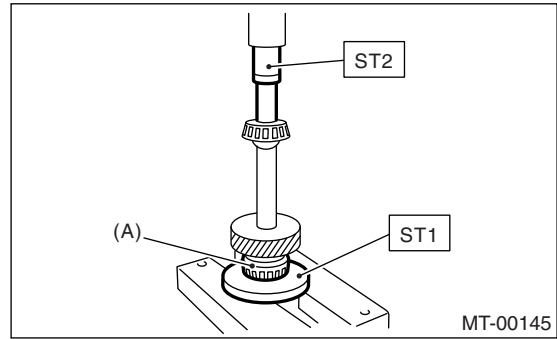
1) Using the ST, install the roller bearing (extension case side).

ST1 398177700 INSTALLER

ST2 899864100 REMOVER

CAUTION:

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



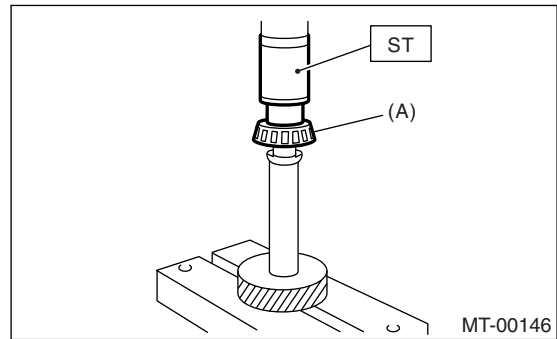
(A) Roller bearing

2) Using the ST, install the roller bearing (transfer case side).

ST 499757002 INSTALLER

CAUTION:

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



(A) Roller bearing

E: INSPECTION

1) Bearings

Replace the bearings in the following cases:

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make noise when turned after gear oil lubrication.

2) Driven gear

Replace the drive gear in the following cases:

- If their tooth surfaces and shaft are excessively broken or damaged.

Center Differential

MANUAL TRANSMISSION AND DIFFERENTIAL

14.Center Differential

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transfer driven gear. <Ref. to 5MT-56, REMOVAL, Transfer Driven Gear.>
- 5) Remove the center differential.

B: INSTALLATION

- 1) Install the center differential into transfer case.
- 2) Install the transfer driven gear. <Ref. to 5MT-56, INSTALLATION, Transfer Driven Gear.>
- 3) Install the extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 4) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the back-up light switch and neutral position switch. <Ref. to 5MT-44, INSTALLATION, Switches and Harness.>
- 6) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

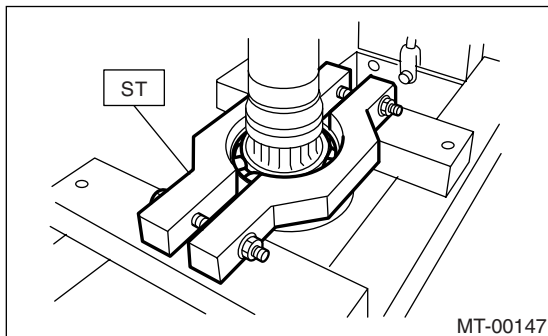
C: DISASSEMBLY

- 1) Remove the ball bearing using ST.

NOTE:

Do not reuse the ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER



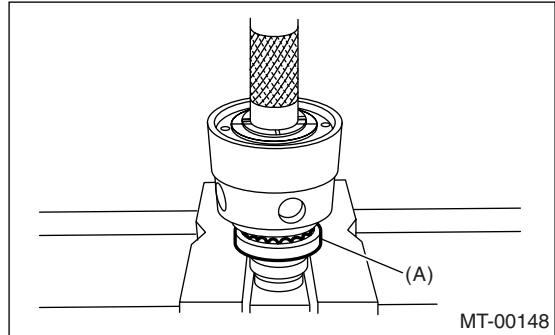
- 2) Do not disassemble the center differential except ball bearing part because it is a non-disassemble part.

D: ASSEMBLY

Install the ball bearing to center differential assembly.

CAUTION:

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



(A) Ball bearing

E: INSPECTION

- 1) Bearings

Replace the bearings in the following cases:

- Broken or rusty bearings
- Worn or damaged
- Bearings that fail to turn smoothly or make noise when turned after gear oil lubrication.
- Bearings having other defects

- 2) Center differential

Replace the center differential assembly in the following case:

- Worn or damaged

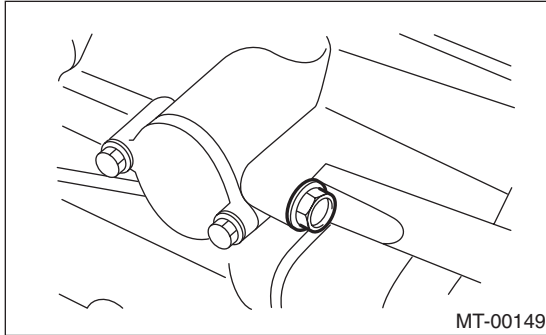
Reverse Check Sleeve

MANUAL TRANSMISSION AND DIFFERENTIAL

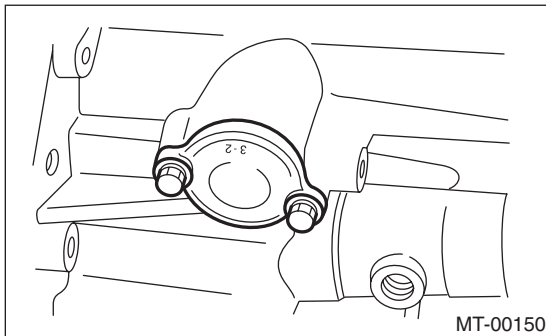
15. Reverse Check Sleeve

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the shifter arm.
- 4) Remove the plug, gasket, reverse accent spring and reverse check ball.



- 5) Remove the reverse check sleeve.

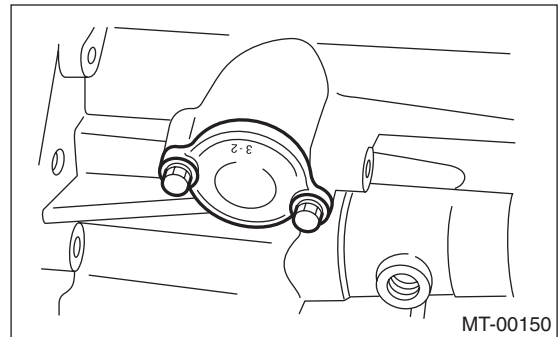


B: INSTALLATION

- 1) Install the reverse check sleeve.

Tightening torque:

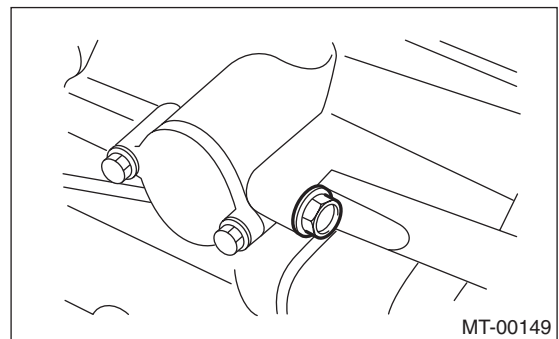
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



- 2) Install the reverse check ball, reverse accent spring, gasket and plug to transfer case.

Tightening torque:

9.75 N·m (1.0 kgf-m, 7.2 ft-lb)



- 3) Install the shifter arm to transfer case assembly.
- 4) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

Reverse Check Sleeve

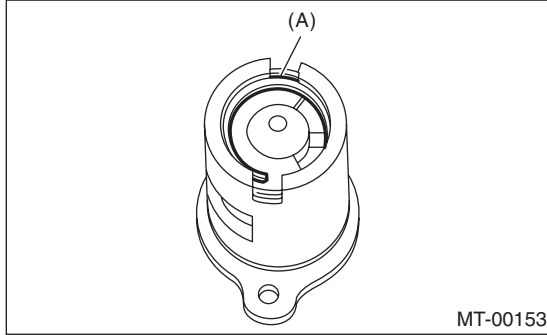
MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1) Cover the reverse check sleeve with a rag, and remove the snap ring using a screwdriver.

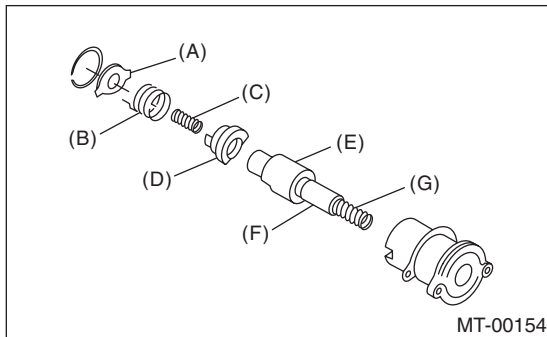
NOTE:

Replace the snap ring with a new one if deformed or reactive force is weakened.



(A) Snap ring

2) Remove the reverse check plate, reverse check spring, reverse check cam, return spring (5th-Rev), reverse accent shaft, return spring cap and return spring (1st-2nd).



- (A) Reverse check plate
- (B) Reverse check spring
- (C) Return spring (5th-Rev)
- (D) Reverse check cam
- (E) Reverse accent shaft
- (F) Return spring cap
- (G) Return spring (1st-2nd)

3) Remove the O-ring.

NOTE:

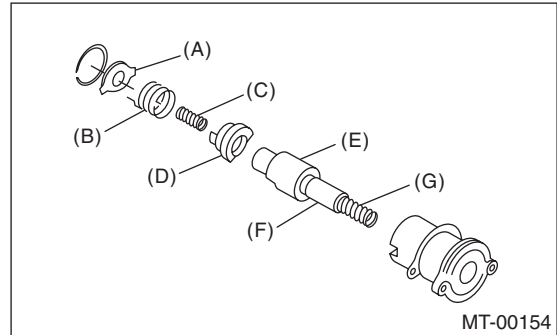
- Reverse check sleeve assembly uses an O-ring which should not be scratched.
- Be careful not to break the adjustment shim placed between reverse check sleeve assembly and case.

D: ASSEMBLY

1) Install the return spring (1st-2nd), return spring cap, reverse accent shaft, check cam, return spring and check spring onto reverse check sleeve.

NOTE:

Be sure the bent section of reverse check spring is positioned in the groove in check cam.



- (A) Reverse check plate
- (B) Reverse check spring
- (C) Return spring (5th-Rev)
- (D) Reverse check cam
- (E) Reverse accent shaft
- (F) Return spring cap
- (G) Return spring (1st-2nd)

2) Hook the bent section of reverse check spring over reverse check plate.

3) Rotate the cam so that the protrusion of reverse check cam is at the opening in plate.

4) With the cam held in that position, install the plate onto reverse check sleeve and hold with snap ring.

5) Position a new O-ring in groove in sleeve.

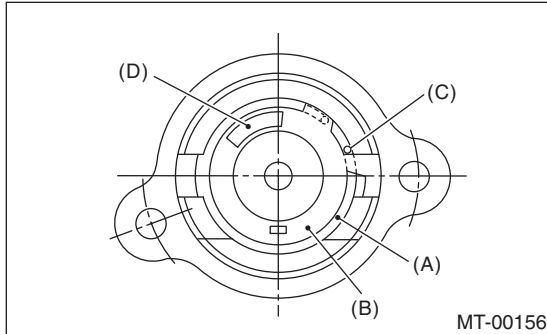
Reverse Check Sleeve

MANUAL TRANSMISSION AND DIFFERENTIAL

E: INSPECTION

- Make sure the cutout section of reverse accent shaft is aligned with the opening in reverse check sleeve.
- Spin the cam by hand for smooth rotation.
- Move the cam and shaft all the way toward plate and release.

If the cam does not return properly, replace the reverse check spring; if shaft does not, check for scratches on the inner surface of sleeve. If sleeve is in good order, replace the spring.



- (A) Snap ring
- (B) Reverse check plate
- (C) Check spring
- (D) Check cam

- Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-61, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

- 1) Shift the gear into 3rd gear position.
- 2) Shifter arm turns lightly toward the 1st/2nd gear side but heavily toward the reverse gear side because of the function of return spring, until arm contacts the stopper.
- 3) Make adjustment so that the heavy stroke (reverse side) is a little more than the light stroke (1st/2nd side).
- 4) To adjust, remove the bolts holding reverse check sleeve assembly to the case, move the sleeve assembly outward, and place adjusting shim (0 to 1 ea.) between sleeve assembly and case to adjust the clearance.

- 5) Be careful not to break the O-ring when placing shim(s).

NOTE:

- When the shim is removed, the neutral position will move closer to reverse; when shim is added, the neutral position will move closer to 1st gear.
- If the shims alone cannot adjust clearance, replace the reverse accent shaft and re-adjust.

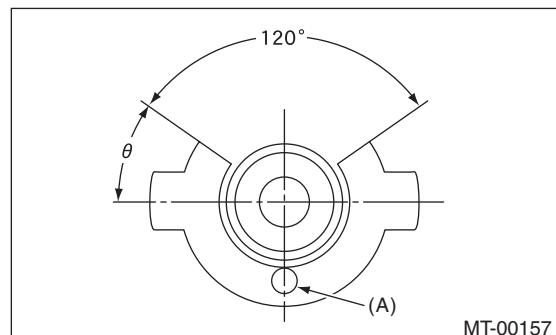
| Adjusting shim | |
|----------------|-------------------|
| Part No. | Thickness mm (in) |
| 32190AA000 | 0.15 (0.0059) |
| 32190AA010 | 0.30 (0.0118) |

| Reverse accent shaft | | |
|----------------------|------|---|
| Part No. | Mark | Remarks |
| 32188AA130 | S | Neutral position is closer to 1st gear. |
| 32188AA140 | T | Standard |
| 32188AA150 | U | Neutral position is closer to reverse gear. |

2. REVERSE CHECK PLATE ADJUSTMENT

- 1) Shift the shifter arm to "5th" and then to reverse to see if reverse check mechanism operates properly.
- 2) Also check to see if the arm returns to neutral when released from reverse position. If the arm does not return properly, replace the reverse check plate.

| Reverse check plate | | | |
|---------------------|----------|----------------|-----------------------------------|
| Part No. | (A): No. | Angle θ | Remarks |
| 32189AA000 | 0 | 28° | Arm stops closer to 5th gear. |
| 32189AA010 | 1 | 31° | Arm stops closer to 5th gear. |
| 32189AA020 | 2 | 34° | Arm stops in the center. |
| 32189AA030 | 3 | 37° | Arm stops closer to reverse gear. |
| 32189AA040 | 4 | 40° | Arm stops closer to reverse gear. |



Transmission Case

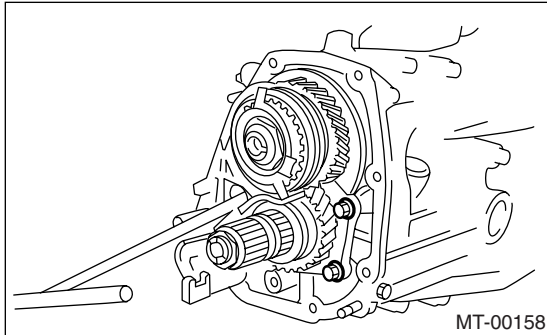
MANUAL TRANSMISSION AND DIFFERENTIAL

16. Transmission Case

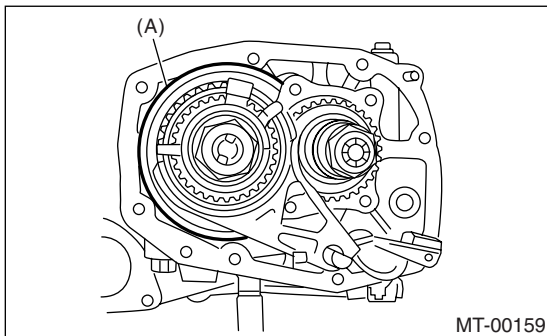
A: REMOVAL

1. SINGLE-RANGE

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-20, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the bearing mounting bolts.

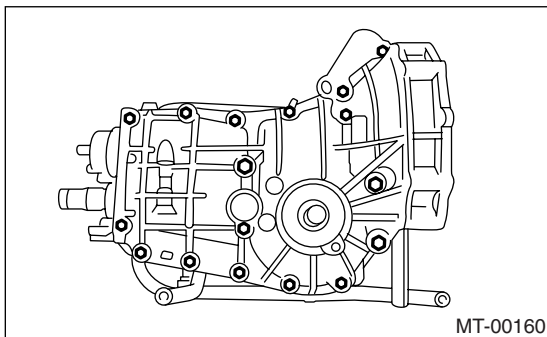


- 5) Remove the main shaft rear plate.



(A) Main shaft rear plate

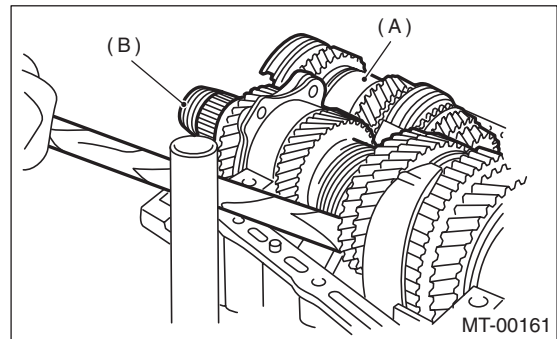
- 6) Separate the transmission case into right and left cases by loosening the coupling bolts and nuts.



- 7) Remove the drive pinion shaft assembly from left side transmission case.

NOTE:

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



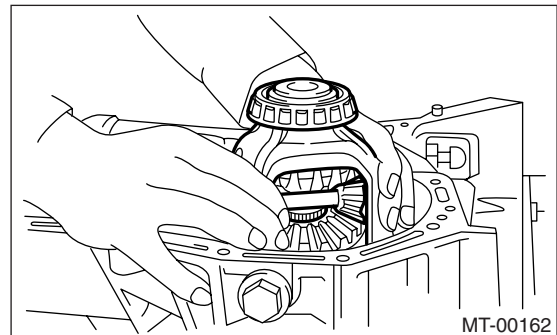
(A) Main shaft assembly

(B) Drive pinion shaft assembly

- 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.



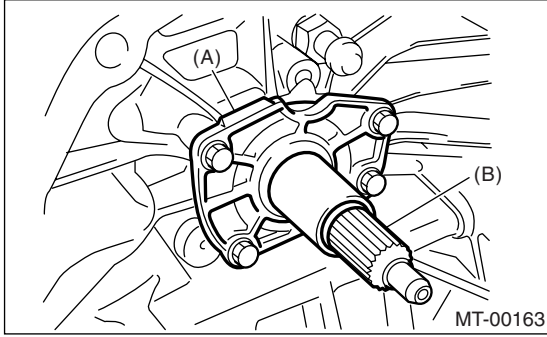
2. DUAL-RANGE

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the clutch release lever. <Ref. to CL-20, REMOVAL, Release Bearing and Lever.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Remove the input shaft holder.



(A) Input shaft holder

(B) Input shaft

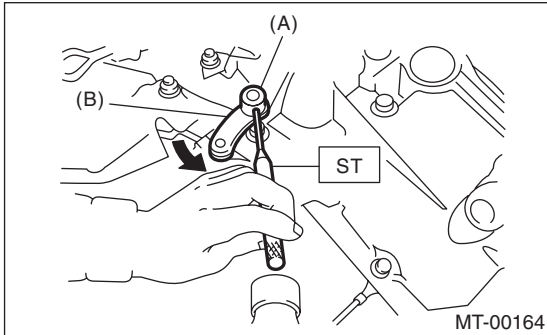
5) Remove the high-low switch. <Ref. to 5MT-43, REMOVAL, Switches and Harness.>

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

ST 398791700 STRAIGHT PIN REMOVER 2

NOTE:

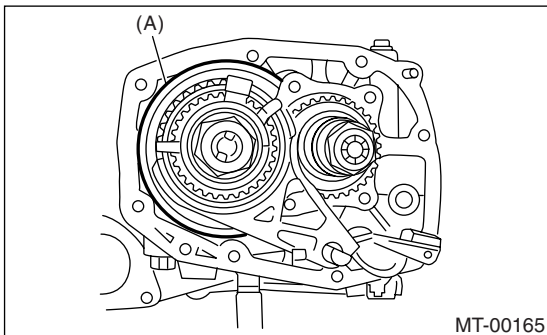
When driving out the straight pin, remove it in the direction that it does not butt against transmission case.



(A) Straight pin

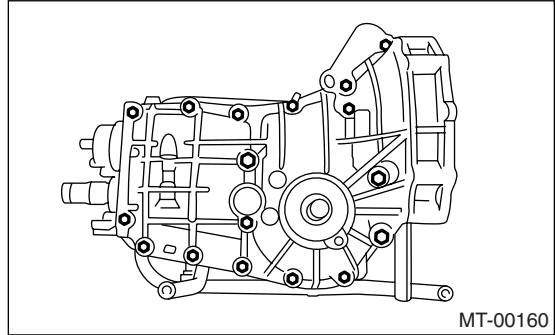
(B) High-low shifter lever

7) Remove the main shaft rear plate.

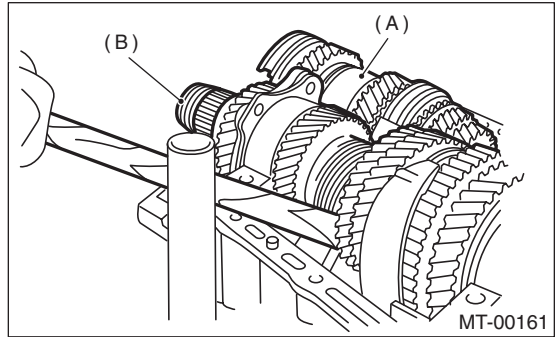


(A) Main shaft rear plate

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.



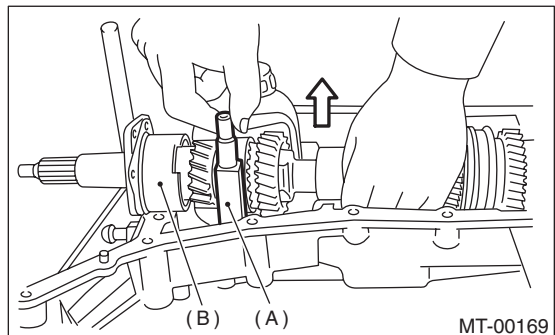
(A) Main shaft ASSY

(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

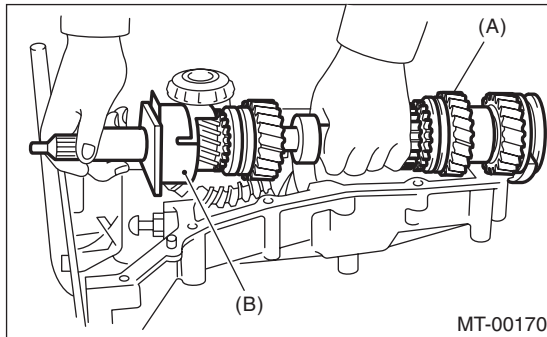
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

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.

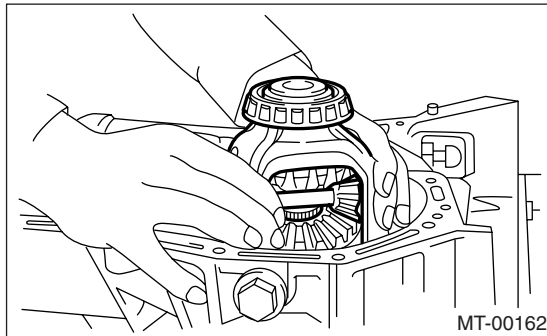


(A) Main shaft ASSY
(B) Input shaft ASSY

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 (Part No. : 004403007) or equivalent

6) Tighten the seven teen 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.

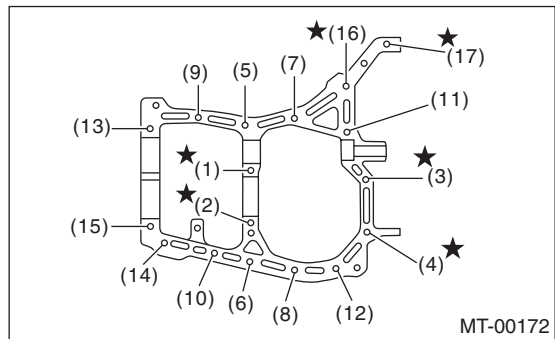
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

★ 10 mm (0.39 in) bolt

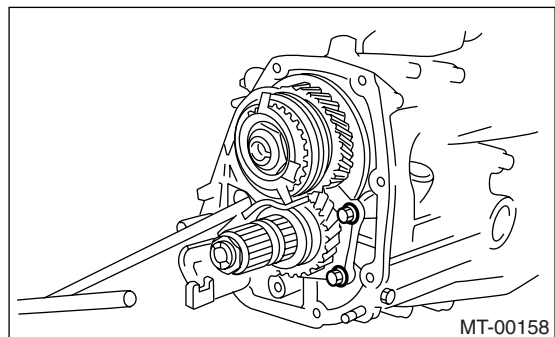
39 N·m (4.0 kgf-m, 28.9 ft-lb)



7) Tighten the bearing attachment bolts.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



Transmission Case

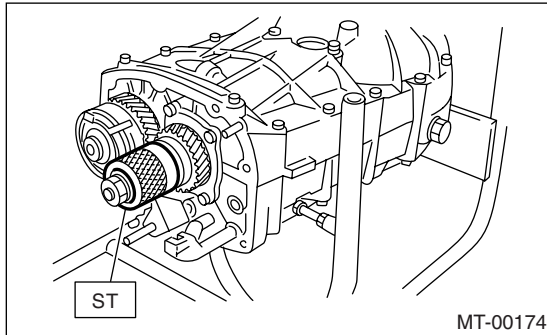
MANUAL TRANSMISSION AND DIFFERENTIAL

8) Backlash adjustment of hypoid gear and preload adjustment of roller bearing:

NOTE:

Support the drive pinion assembly with ST.

ST 498427100 STOPPER



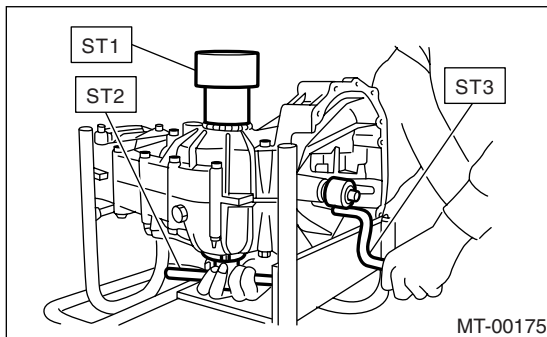
9) Place the transmission with case left side facing downward and put ST1 on bearing outer race.

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

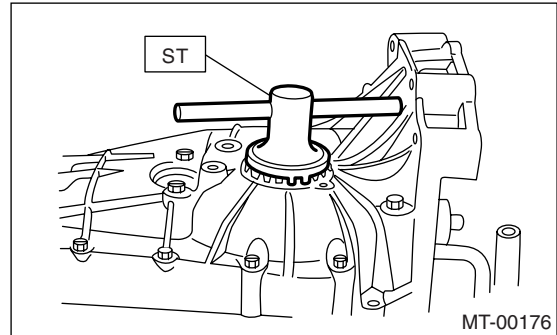


11) Remove the weight and screw in the retainer without O-ring on upper side and stop at the point where slight resistance is felt.

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 5MT-100, INSPECTION, Front Differential Assembly.>

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

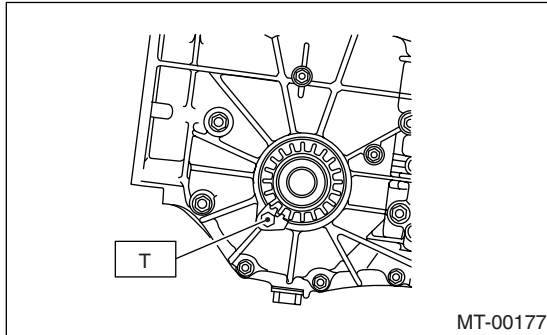
17) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into groove and tighten the retainer into the position where retainer has been tightened in. Tighten the lock plate.

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 5MT-76, ADJUSTMENT, Main Shaft Assembly For Single-Range.>

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

20) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

21) Install the manual transmission assembly into the vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

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.

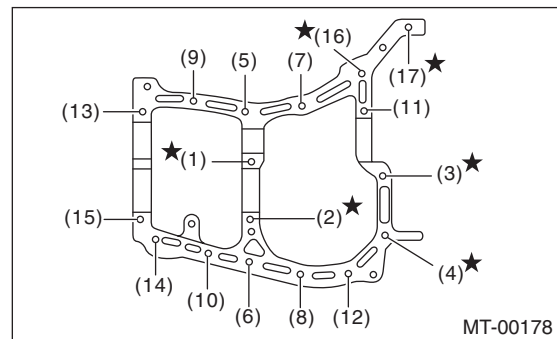
Tightening torque:

8 mm bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

★ 10 mm bolt

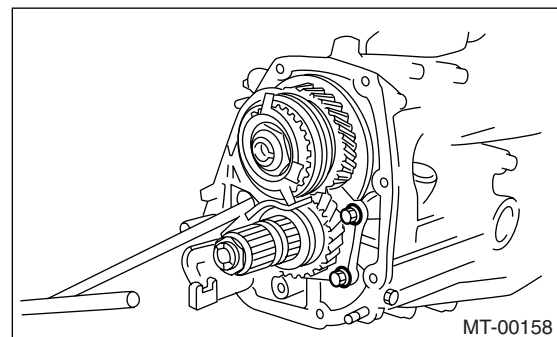
39 N·m (4.0 kgf-m, 28.9 ft-lb)



7) Tighten the bearing attachment bolts.

Tightening torque:

30 N·m (3.1 kgf-m, 22.1 ft-lb)



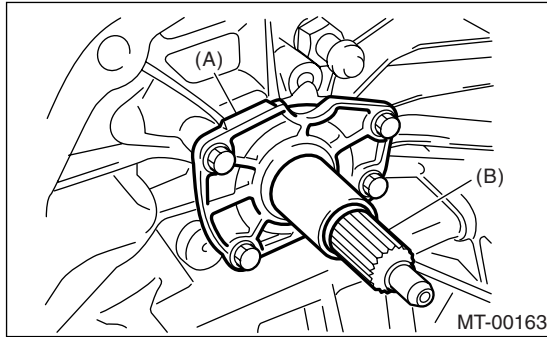
Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

8) Tighten the input shaft holder attaching bolts.

Tightening torque:

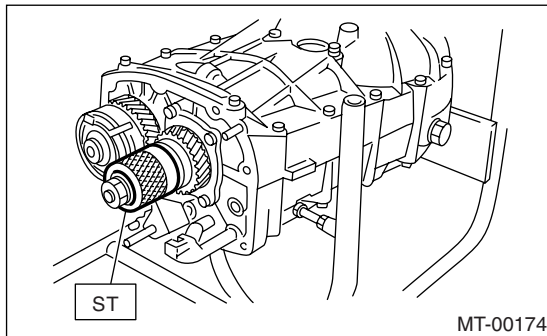
20 N·m (2.0 kgf·m, 14.5 ft·lb)



- (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.

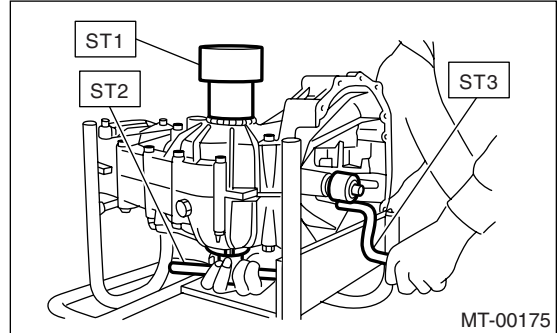
ST 498427100 STOPPER



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. 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

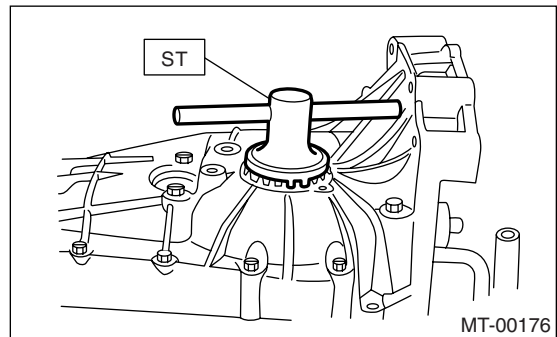


12) Remove the weight and screw in the retainer without O-ring on upper side and stop at the point where slight resistance is felt.

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.

Transmission Case

MANUAL TRANSMISSION AND DIFFERENTIAL

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 5MT-100, INSPECTION, Front Differential Assembly.>

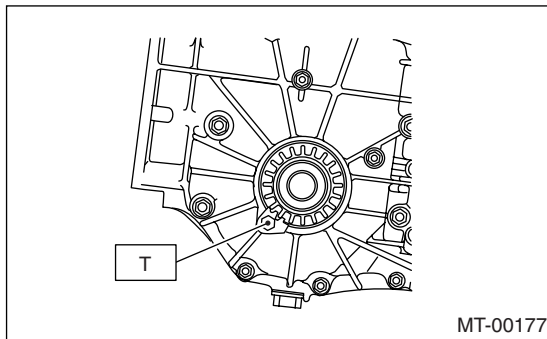
18) After checking the tooth contact of hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into groove and tighten the retainer into the position where retainer has been tightened in. Tighten the lock plate.

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 5MT-76, ADJUSTMENT, Main Shaft Assembly For Single-Range.>

20) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

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

22) Install the manual transmission assembly into the vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

17. Main Shaft Assembly For Single-Range

A: REMOVAL

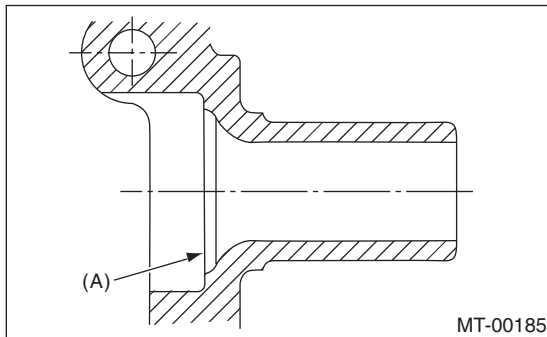
- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-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 5MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

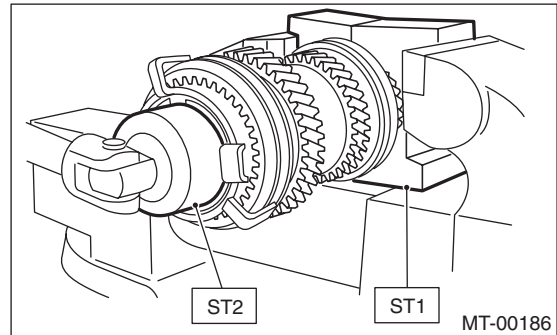
C: DISASSEMBLY

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

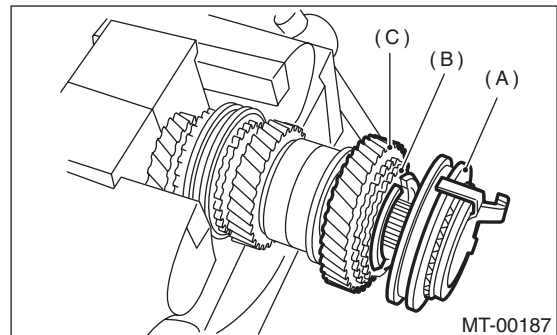
NOTE:

Unlock the caulking before removing lock nut.

- | | | |
|-----|-----------|---------------------|
| ST1 | 498937000 | TRANSMISSION HOLDER |
| ST2 | 499987003 | SOCKET WRENCH (35) |

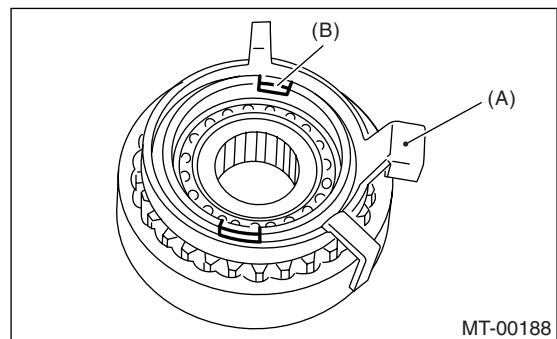


- 3) Remove the 5th-Rev sleeve and hub assembly, 5th baulk ring, 5th drive gear and needle bearing.



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

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



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

Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

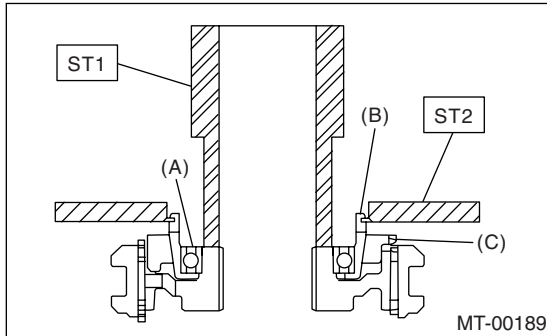
5) Using the ST1, ST2 and a press, remove the ball bearing, synchro cone and baulk ring (Rev).

NOTE:

If replace the sleeve or hub assembly as necessary, use the new sleeve & hub assembly as a unit. Do not 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 REMOVER



- (A) Ball bearing
- (B) Revers synchro cone
- (C) Revers baulk ring

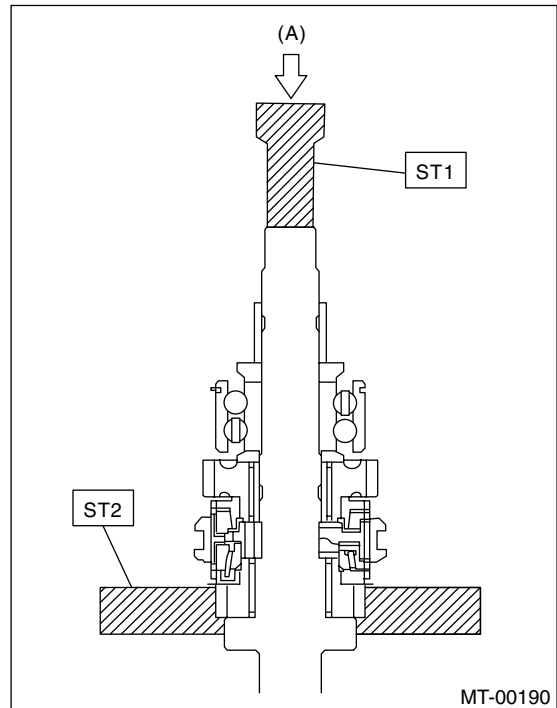
6) Using the ST1 and ST2, remove rest of the parts.

NOTE:

If replace the sleeve or hub assembly as necessary, use the new sleeve & hub assembly as a unit. Do not 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

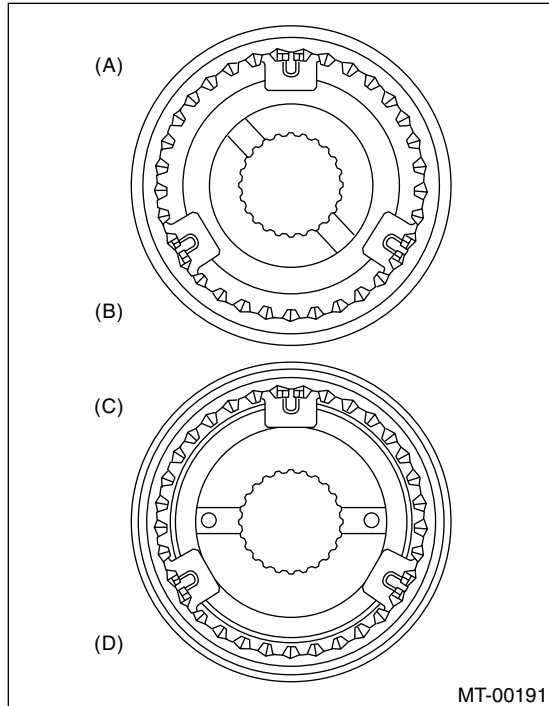
Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

D: ASSEMBLY

1. NON-TURBO MODEL

1) Assemble each sleeve and hub assembly.



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

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

NOTE:

Align the convex part in baulk ring with shifting insert.

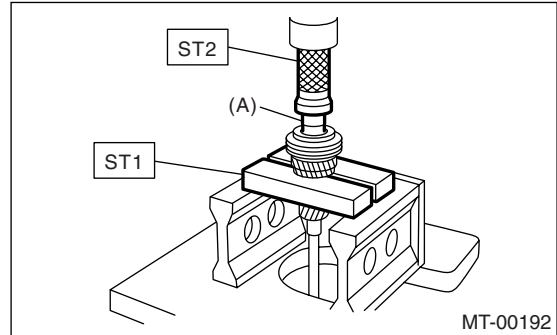
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

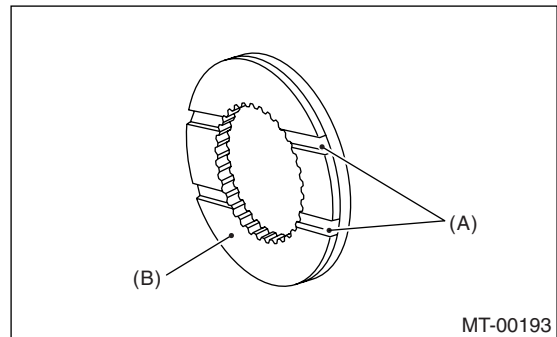


(A) 4th needle bearing race

4) Install the 4th baulk ring, 4th 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 convex part.
- Pay attention to the orientation of thrust washer.



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

Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

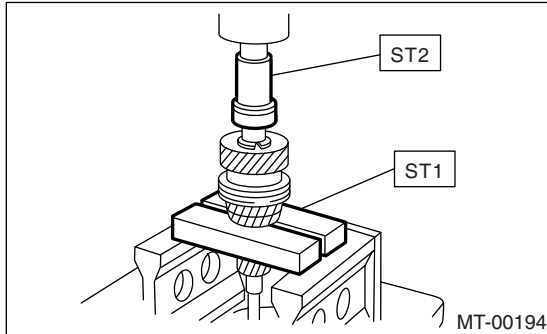
5) Drive the ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

CAUTION:

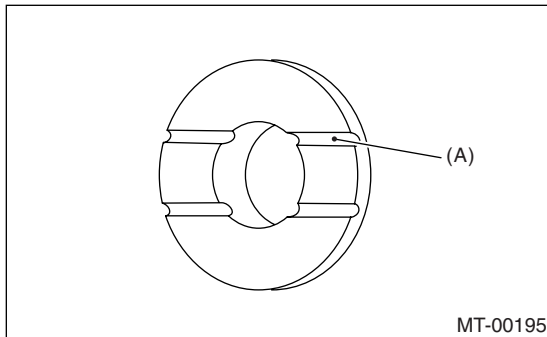
Do not apply load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Pay attention to the orientation of thrust washer.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

7) Install the bearing onto synchro cone.

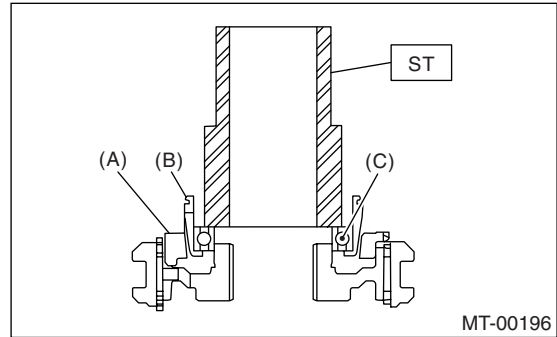
8) Install the Rev baulk ring, Rev synchro cone and new ball bearing. onto 5th-Rev sleeve and hub assembly using ST and a press.

CAUTION:

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

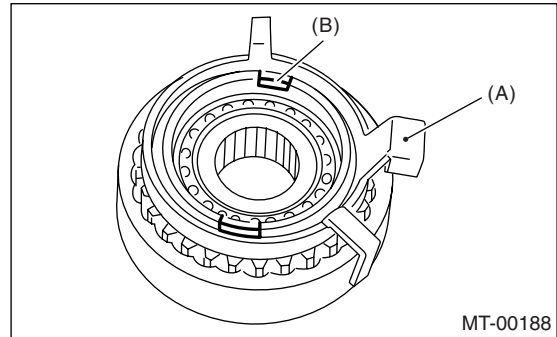
9) After press fitting, make sure the synchro cone rotates freely.

ST 499757002 INSTALLER



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

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



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

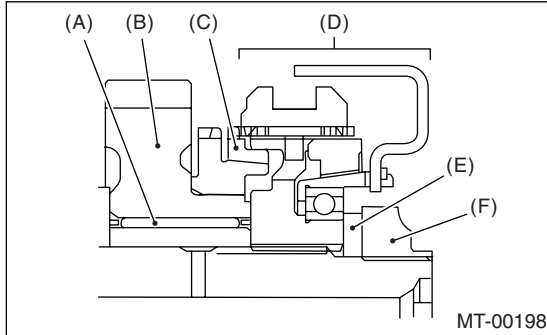
Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Align the convex part in baulk ring with shifting insert.



- (A) 5th needle bearing
- (B) 5th drive gear
- (C) 5th 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.

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

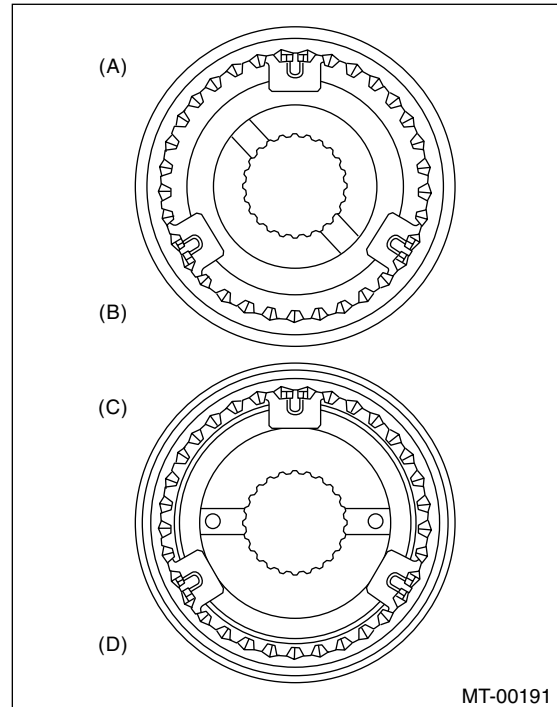
ST1 499987003 SOCKET WRENCH
ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)

2. TURBO MODEL

1) Assemble each sleeve and hub assembly.

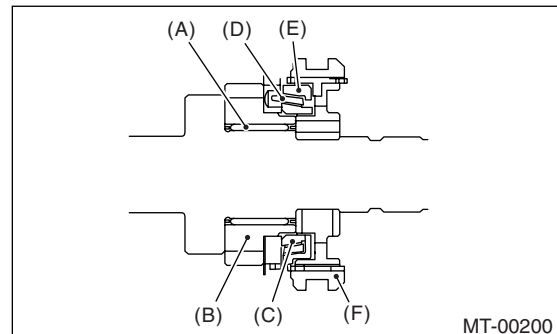


- (A) 3rd-4th hub ASSY
- (B) 3rd gear side
- (C) 5th-Rev hub ASSY
- (D) 5th gear side

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

NOTE:

Align the convex part 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 For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

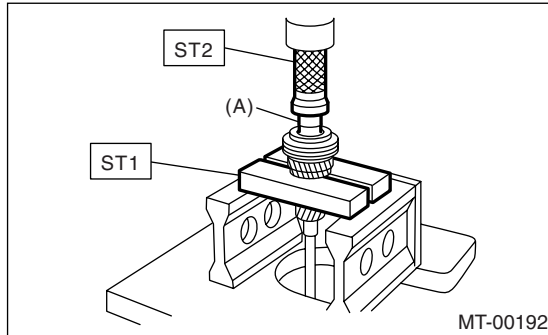
3) Install the 4th needle bearing race onto transmission main shaft using ST1, ST2 and a press.

CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER

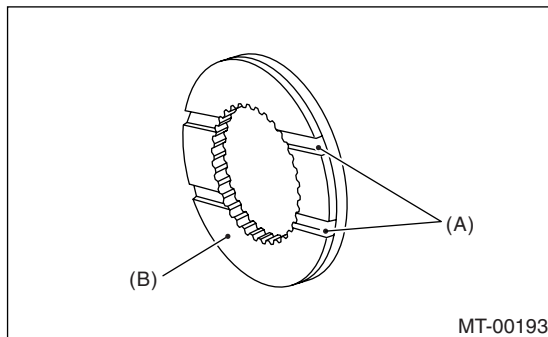


(A) 4th needle bearing race

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

NOTE:

- Align the baulk ring and gear & hub assembly with key convex part.
- Pay attention to the orientation of thrust washer.



(A) Groove

(B) Face this surface to 4th gear side

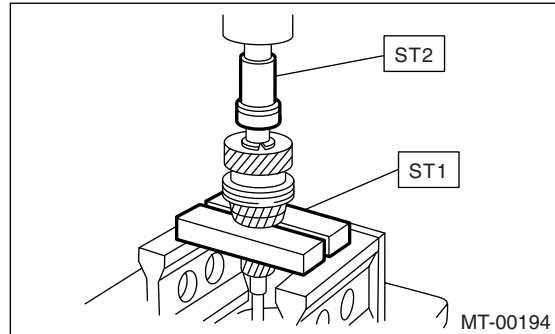
5) Drive the ball bearing onto the rear section of transmission main shaft using ST1, ST2 and a press.

CAUTION:

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

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

CAUTION:

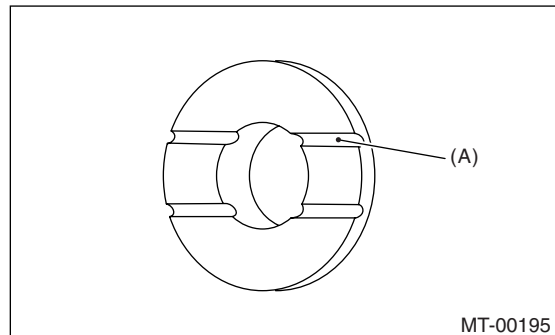
Do not apply load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

NOTE:

Pay attention to the orientation of thrust washer.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

7) Install the bearing onto synchro cone.

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

CAUTION:

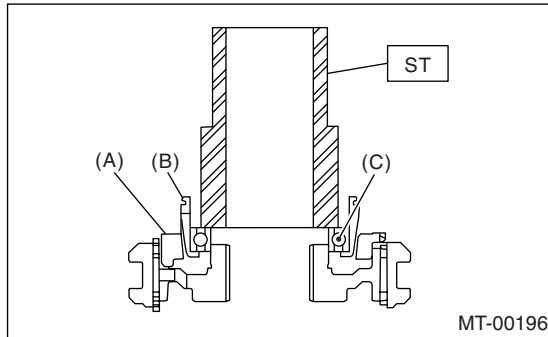
Do not apply load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

Main Shaft Assembly For Single-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

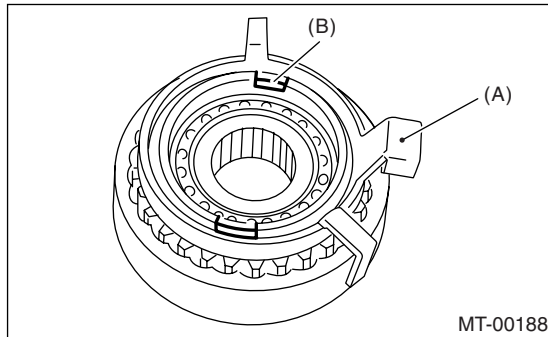
9) Make sure the synchro cone rotates smoothly after press-fitting.

ST 499757002 INSTALLER



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

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

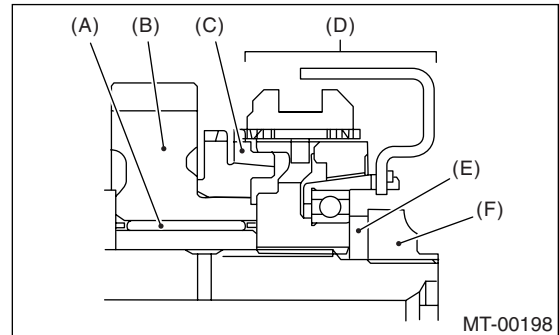


- (A) Synchro cone stopper
- (B) Snap ring

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

NOTE:

Align the convex part 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.

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

ST1 499987003 SOCKET WRENCH

ST2 498937000 TRANSMISSION HOLDER

Tightening torque:

120 N·m (12.2 kgf-m, 88.5 ft-lb)

Main Shaft Assembly For 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 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.

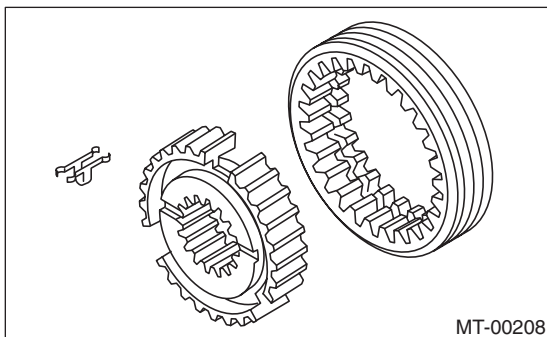
4) Baulk ring

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:

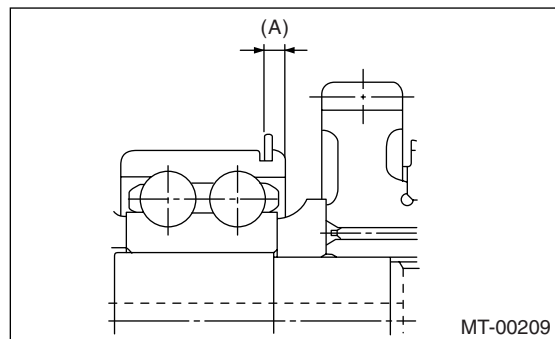
Using the ST, measure the amount (A) of ball bearing protrusion from transmission main case surface and select the proper plate in the following table:

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 For Dual-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

18. Main Shaft Assembly For Dual-Range

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly and input shaft assembly.

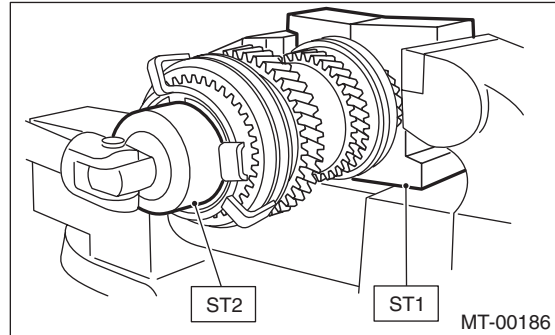
B: INSTALLATION

- 1) Install the needle bearing onto the front of transmission main shaft assembly.
- 2) Select the input shaft adjusting shim and install it to the input shaft assembly. <Ref. to 5MT-86, ADJUSTMENT, Input Shaft Assembly.>
- 3) Connect the main shaft assembly and input shaft assembly.
- 4) Install the needle bearing outer race knock pin hole into transmission case knock pin.
- 5) Install the drive pinion assembly. <Ref. to 5MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 6) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

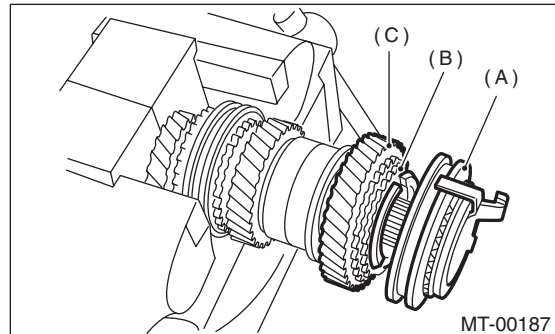
C: DISASSEMBLY

- 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)

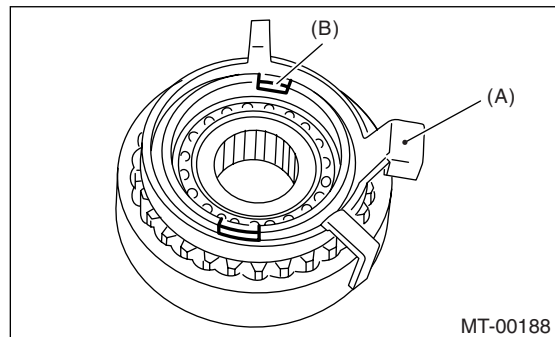


- 4) Remove the 5th-Rev sleeve and hub assembly, baulk ring, 5th drive gear and needle bearing.



(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 For Dual-Range

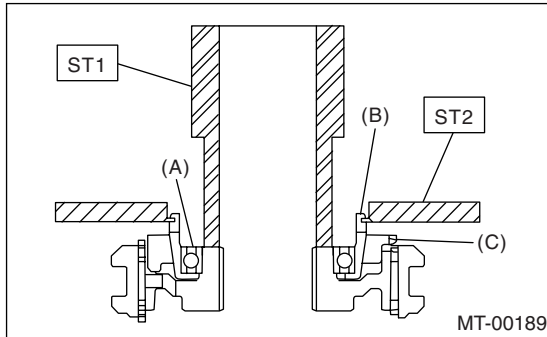
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

- If replace the sleeve or hub assembly as necessary, use the new sleeve & hub assembly as a unit. Do not 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 REMOV-
ER



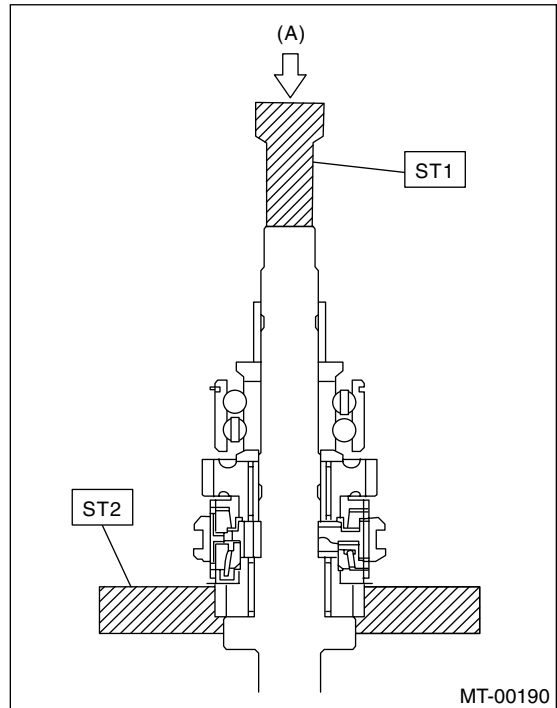
- (A) Ball bearing
- (B) Synchro cone
- (C) Baulk ring

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

NOTE:

- If replace the sleeve or hub assembly as necessary, use the new sleeve & hub assembly as a unit. Do not disassemble because they must engage at a specified point. If they should be disassembled, marking engagement point on splines beforehand.

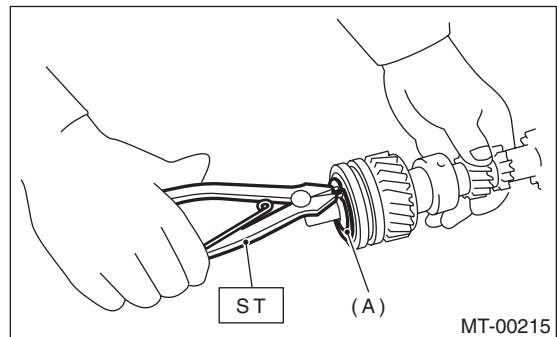
ST1 899864100 REMOVER
ST2 899714110 REMOVER



- (A) Press

8) Remove the snap ring from main shaft.

ST 899474100 EXPANDER

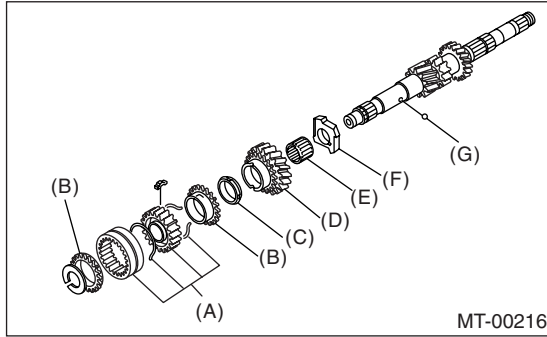


- (A) Snap ring

Main Shaft Assembly For Dual-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

9) Remove rest of the parts.



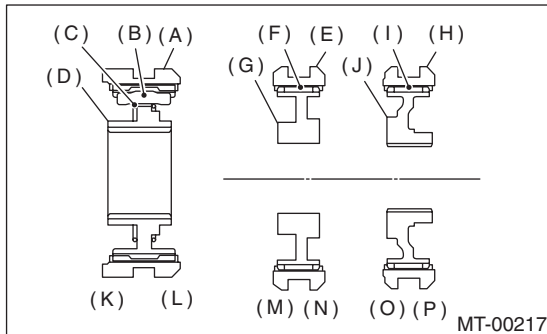
- (A) Sleeve and hub ASSY
- (B) High-low baulk ring
- (C) Friction damper
- (D) Low input gear
- (E) Needle bearing
- (F) Input low gear spacer
- (G) Ball

D: ASSEMBLY

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

NOTE:

Position the open ends of spring for high-low sleeve and hub assembly 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. (2.0 L model)

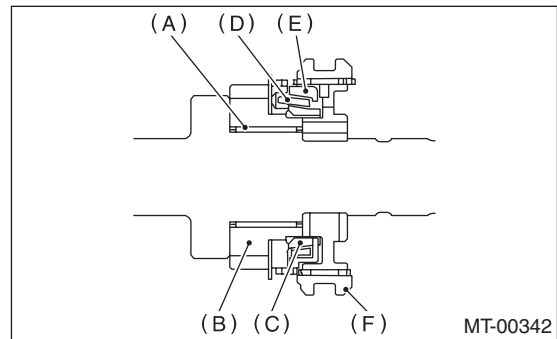
NOTE:

Align the convex part 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. (2.5 L model)

NOTE:

Align the convex part in baulk ring with shifting insert.

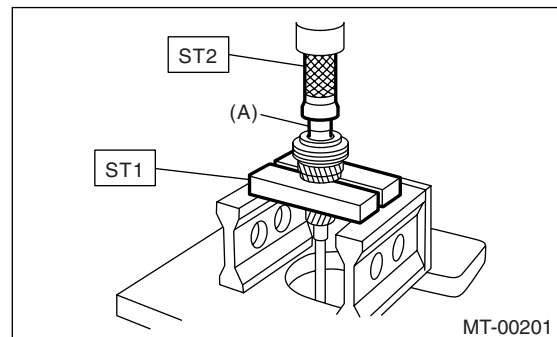


- (A) 3rd needle bearing
- (B) 3rd drive gear
- (C) Inner baulk ring
- (D) Synchro cone
- (E) Outer baulk ring
- (F) Sleeve and hub ASSY

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

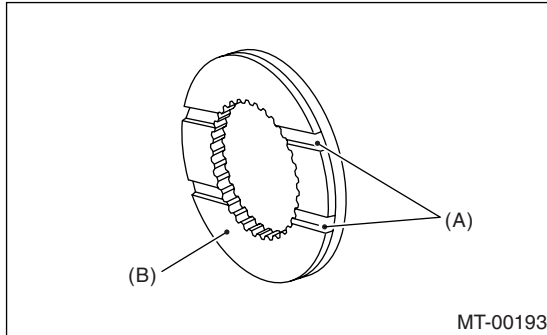
Main Shaft Assembly For Dual-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Pay attention to the orientation of thrust washer.



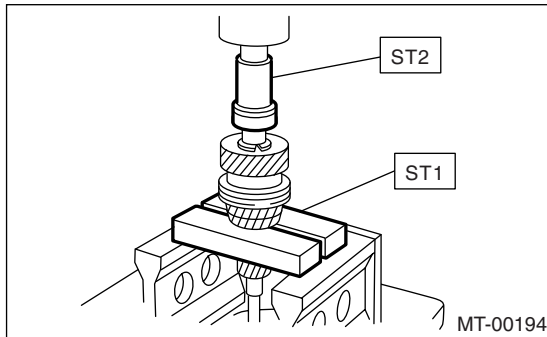
(A) Groove

(B) Face this surface to 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



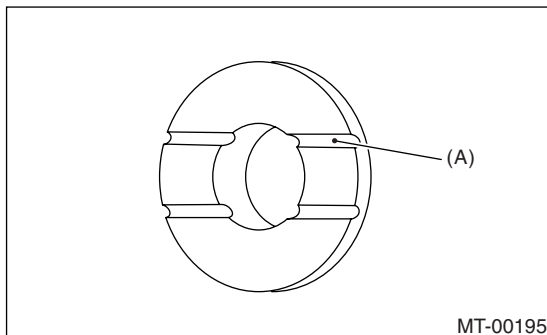
7) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

NOTE:

Pay attention to the orientation of thrust washer.

ST1 899714110 REMOVER

ST2 499877000 RACE 4-5 INSTALLER



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

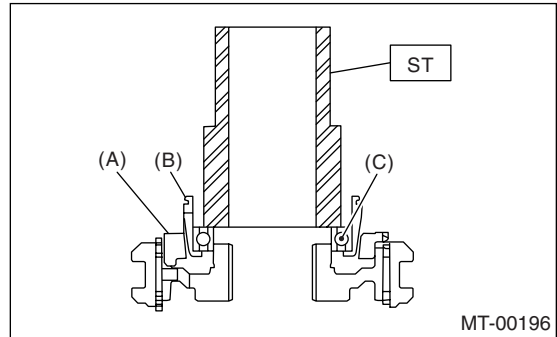
8) Install the bearing onto synchro cone.

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

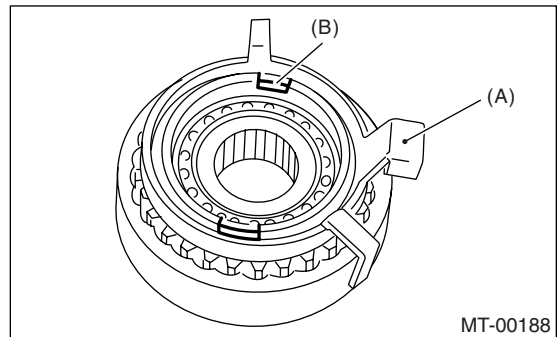


(A) Baulk ring

(B) Synchro cone

(C) Ball bearing

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



(A) Synchro cone stopper

(B) Snap ring

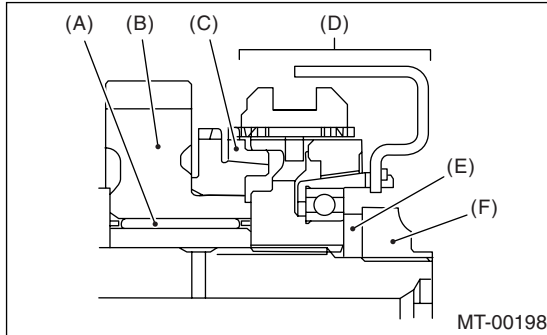
Main Shaft Assembly For Dual-Range

MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Align the convex part 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:

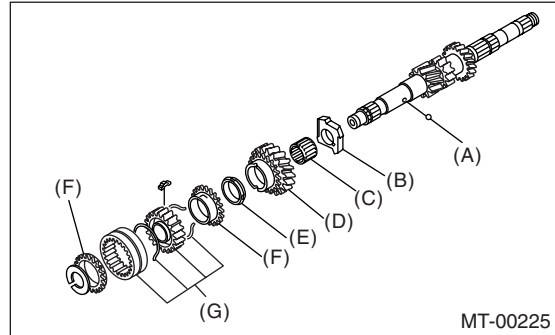
120 N·m (12.2 kgf·m, 88.5 ft·lb)

13) Install the needle bearing on main shaft.

14) Install the rest of 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 For 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 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 5MT-76, ADJUSTMENT, Main Shaft Assembly For 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 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly and input shaft assembly.

B: INSTALLATION

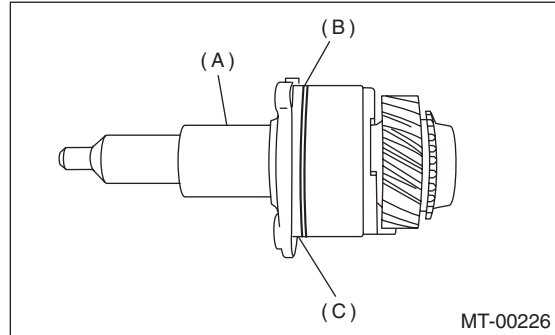
- 1) Install the needle bearing onto the front of transmission main shaft assembly.
- 2) Connect the main shaft assembly and input shaft assembly.
- 3) Install the needle bearing outer race knock pin hole into transmission case knock pin.
- 4) Install the drive pinion assembly. <Ref. to 5MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 5) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>
- 6) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 7) Install the manual transmission assembly on vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

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

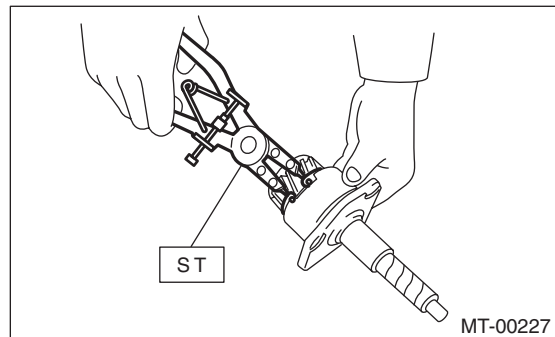
NOTE:

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

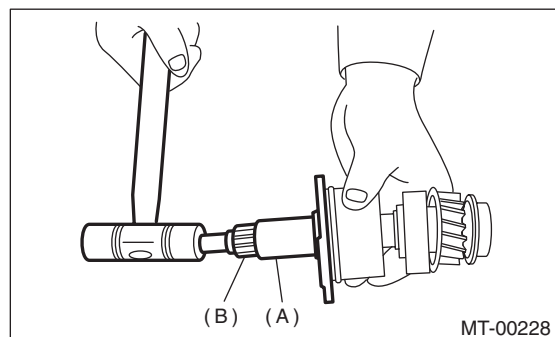


- (A) Input shaft holder
(B) O-ring
(C) Input shaft holder shim

- 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.

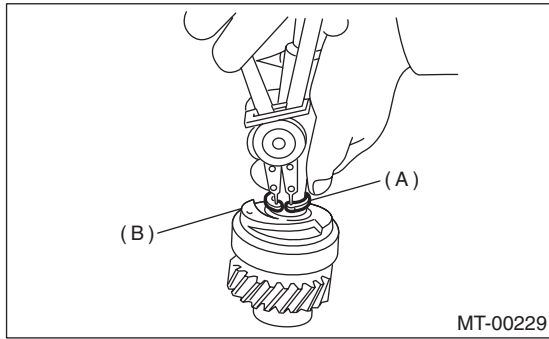


- (A) Input shaft holder
(B) Input shaft

Input Shaft Assembly

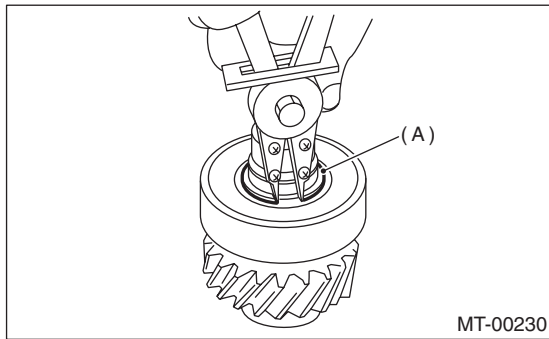
MANUAL TRANSMISSION AND DIFFERENTIAL

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.



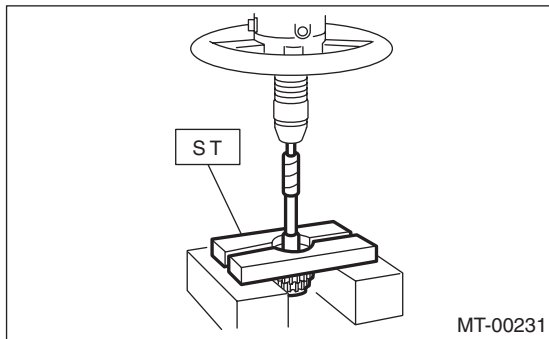
- (A) Snap ring

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

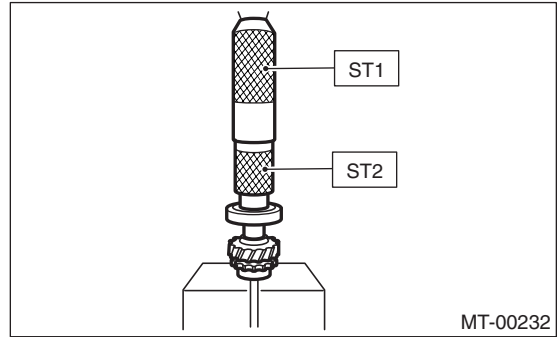
1) Install the ball bearing onto input shaft.

NOTE:

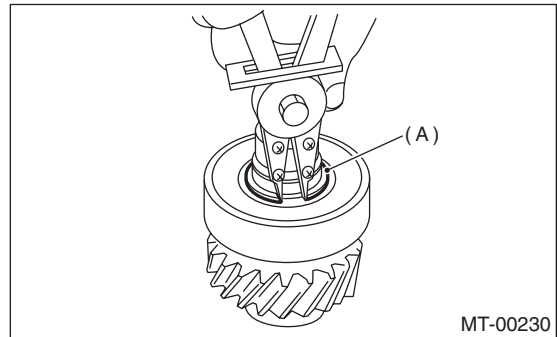
Place the snap ring between input shaft gear and ball bearing beforehand. Use the table at 8) as a guide in selecting a suitable snap ring.

ST1 899580100 INSTALLER

ST2 399513600 INSTALLER



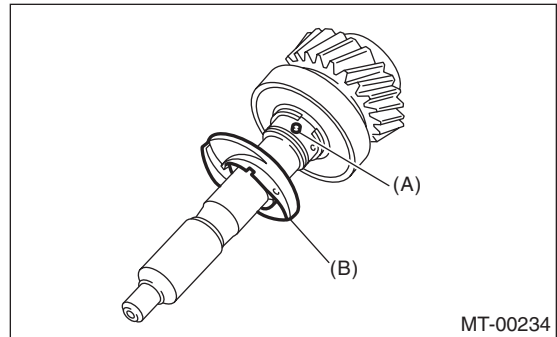
2) Install the snap ring on input shaft.



- (A) Snap ring

3) Inspect the clearance between ball bearing and snap ring. <Ref. to 5MT-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

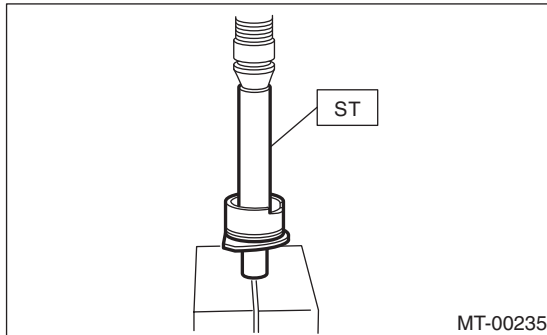
MANUAL TRANSMISSION AND DIFFERENTIAL

6) Drive the oil seal into input shaft holder.

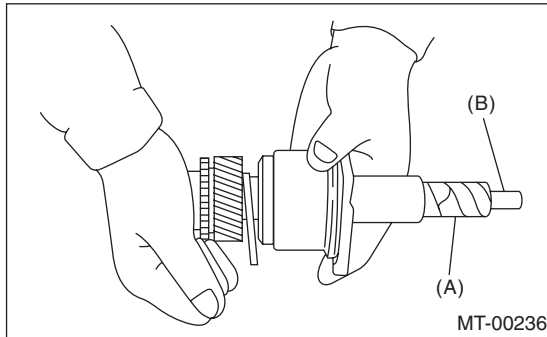
NOTE:

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.



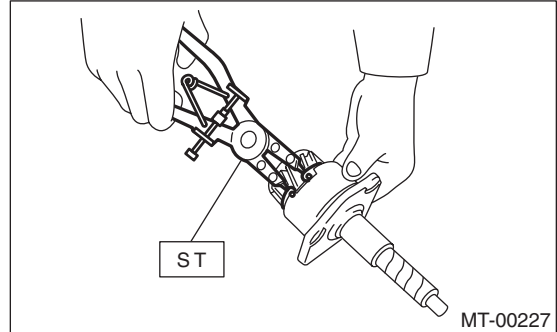
- (A) Vinyl tape
- (B) Input shaft

8) Install the snap ring to input shaft holder.

NOTE:

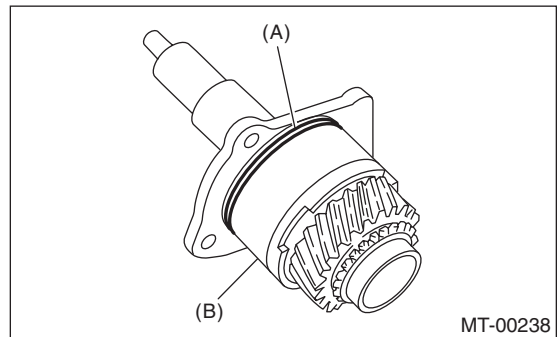
Select a suitable snap ring so that clearance between snap ring and bearing is held within 0 to 0.12 mm (0 to 0.0047 in).

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 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 excessively 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.

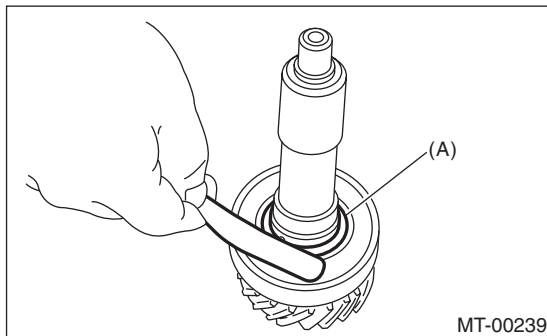
8) Gearshift mechanism

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) |

F: ADJUSTMENT

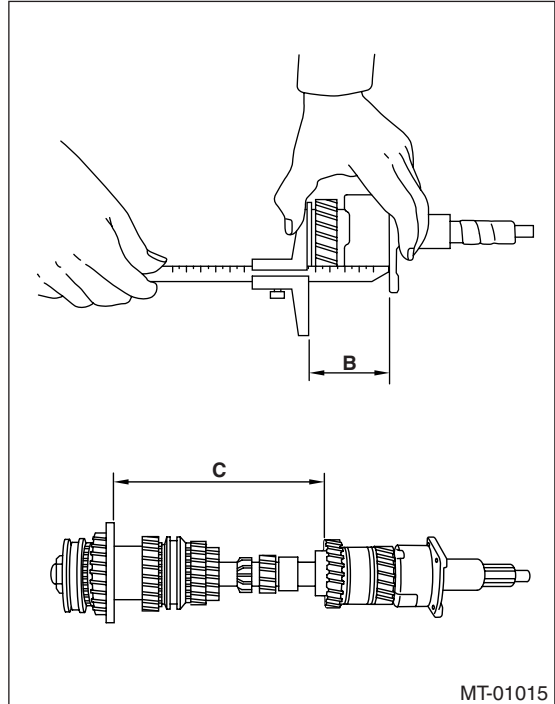
- 1) Place transmission main shaft assembly and input shaft on transmission main case without shim.
- 2) The proper number of shim can be determined as follows:

$$D = A - (B + C)$$

A: Main case length (353 mm (13.90 in))

B: Input shaft complete length

C: Main shaft assembly length



NOTE:

The thickness of shim is 0.45 to 0.55 mm (0.0177 to 0.0217 in).

| Dimension "D" mm (in) | Number of shims |
|---------------------------------|-----------------|
| 52.50 — 53.11 (2.0669 — 2.0909) | — |
| 52.00 — 52.49 (2.0472 — 2.0665) | 1 |
| 51.26 — 51.99 (2.0181 — 2.0468) | 2 |

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

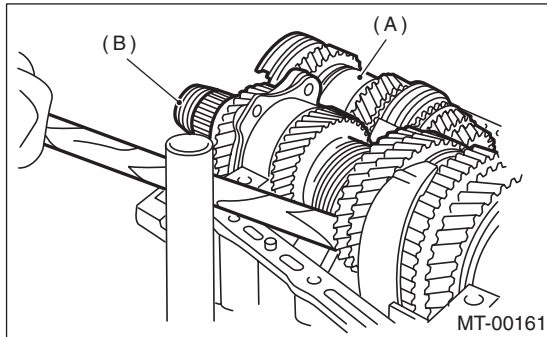
20. Drive Pinion Shaft Assembly

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly.

NOTE:

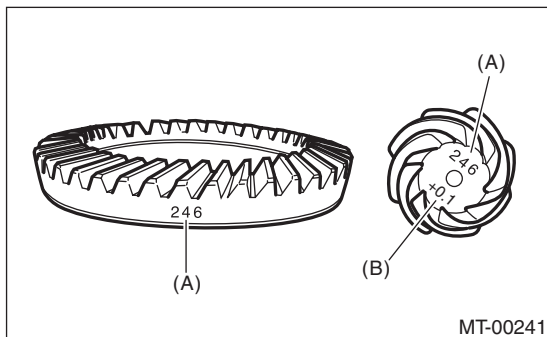
Use a hammer handle, etc. to remove if too tight.



- (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.



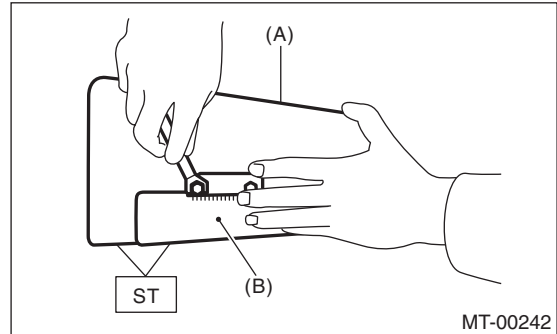
- (A) Match number
- (B) Shim adjust number

- 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



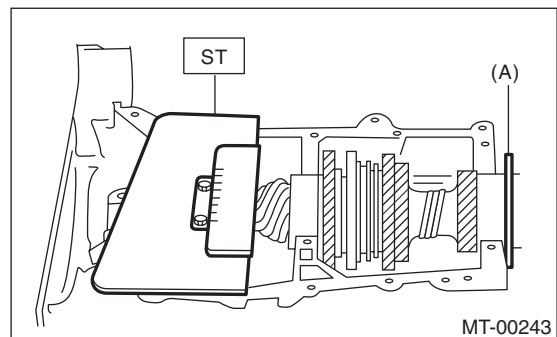
- (A) Plate
- (B) Scale

- 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 5MT-96, 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 5MT-93, INSPECTION, Drive Pinion Shaft Assembly.>

11) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>

12) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

13) Install the manual transmission assembly to vehicle. <Ref. to 5MT-32, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:

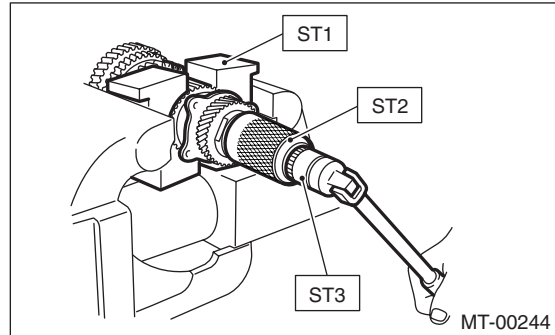
Attach a cloth to the end of driven shaft (on the frictional side of thrust needle bearing) during disassembly or reassembly to prevent damage.

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

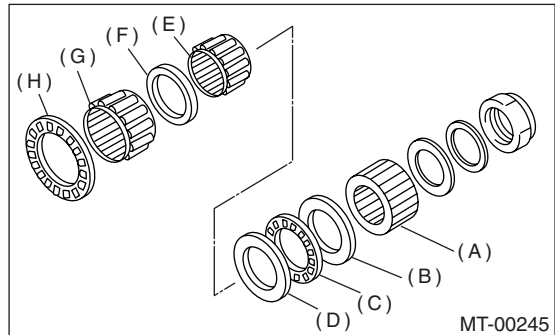
ST1 899884100 HOLDER

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) Adjusting washer No. 1 (25×37.5×t)
- (C) Thrust bearing (25×37.5×3)
- (D) Adjusting 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

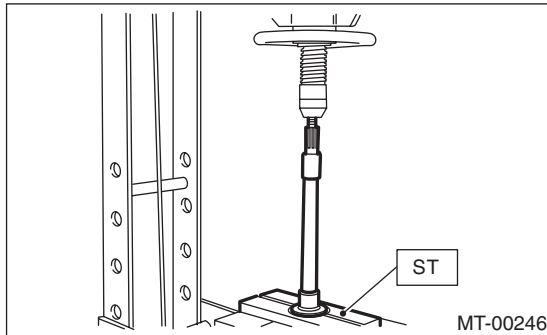
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

Do not reuse the roller bearing.

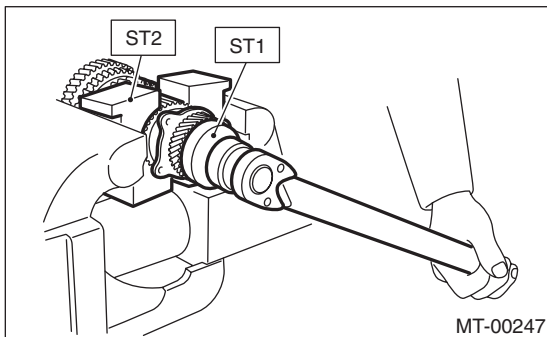
ST 498077000 REMOVER



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

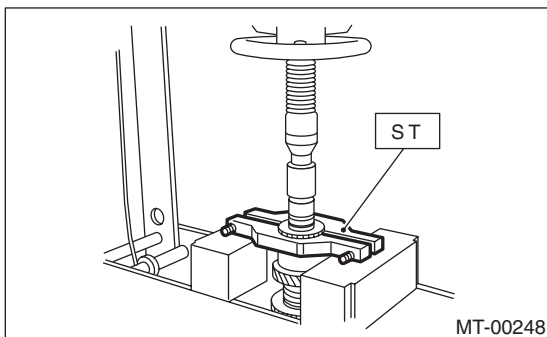
ST1 499987300 SOCKET WRENCH (50)

ST2 899884100 HOLDER



5) Remove the 5th driven gear using ST.

ST 499857000 5TH DRIVEN GEAR REMOVER

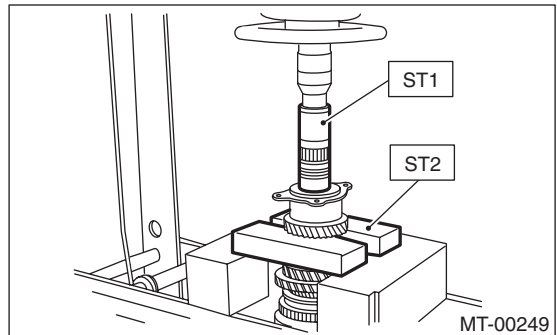


6) Remove the woodruff key.

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

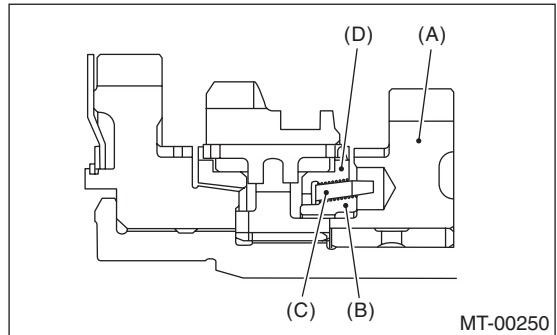
ST1 499757002 INSTALLER

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

Drive Pinion Shaft Assembly

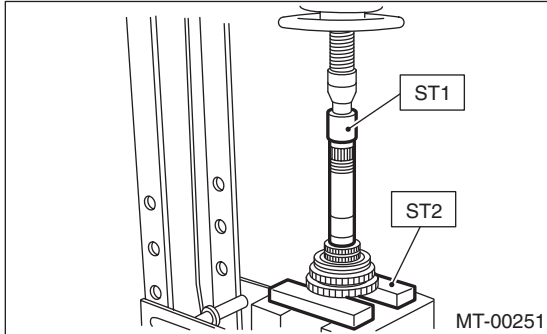
MANUAL TRANSMISSION AND DIFFERENTIAL

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

NOTE:

If replace the gear or hub assembly as necessary, use the new gear & hub assembly as a unit. 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



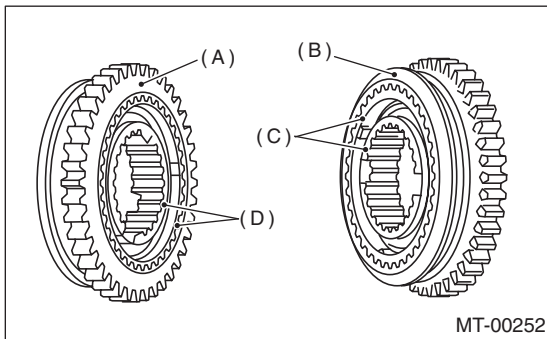
11) Remove the sub gear for 1st driven gear. (Non-turbo model)

D: ASSEMBLY

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

NOTE:

If replace the gear or hub assembly as necessary, use the new gear & hub assembly as a unit.



- (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 convex part.

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

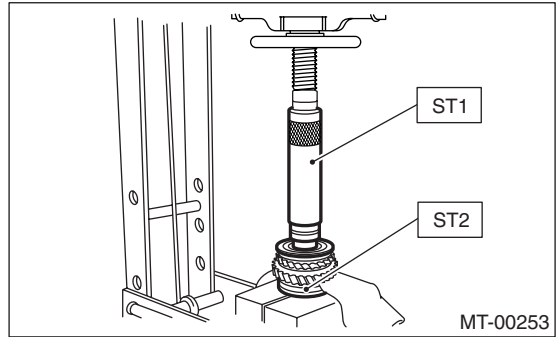
CAUTION:

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

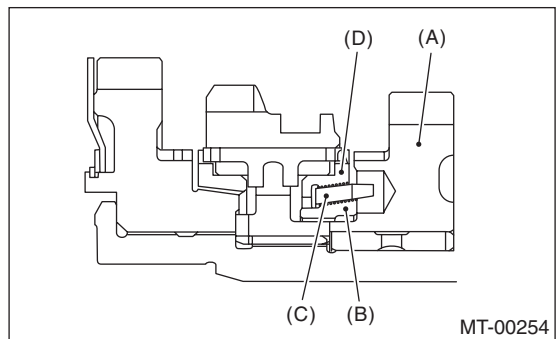
NOTE:

- 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

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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

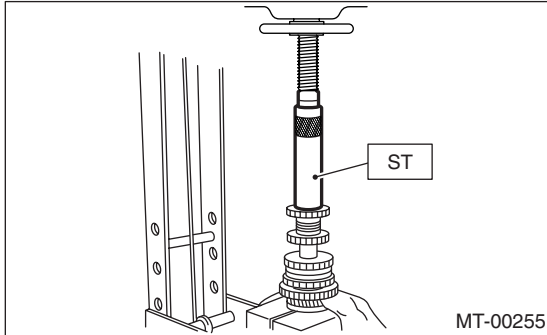
CAUTION:

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

NOTE:

Align the convex part in baulk ring with insert.

ST 499277200 INSTALLER

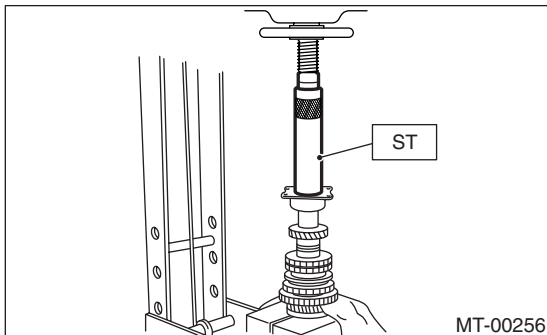


7) Install a set of roller bearings onto the driven shaft using ST and press.

CAUTION:

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

ST 499277200 INSTALLER

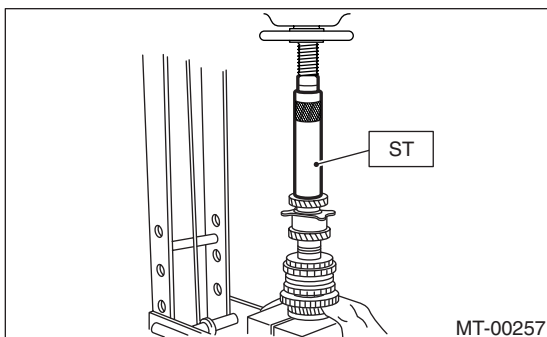


8) Position the woodruff key in groove on the rear of driven shaft. Install the 5th driven gear onto driven shaft using ST and press.

CAUTION:

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

ST 499277200 INSTALLER

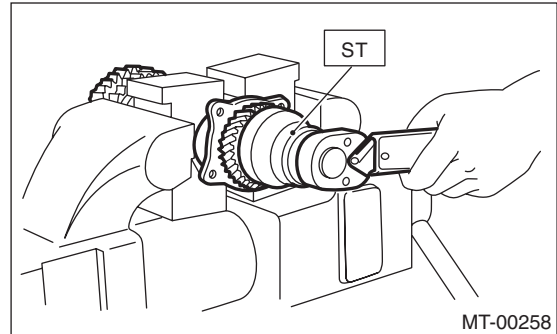


9) Install the lock washer. Install the lock nut and tighten to the specified torque using ST.

ST 499987300 SOCKET WRENCH (50)

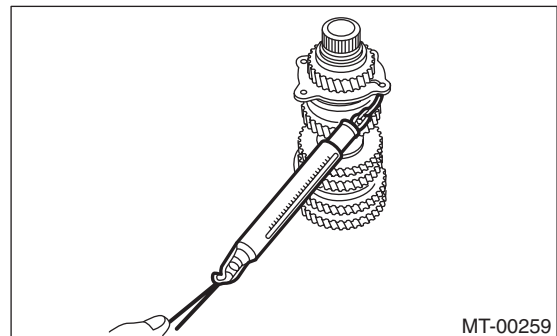
Tightening torque:

260 N·m (26.5 kgf·m, 192 ft·lb)



NOTE:

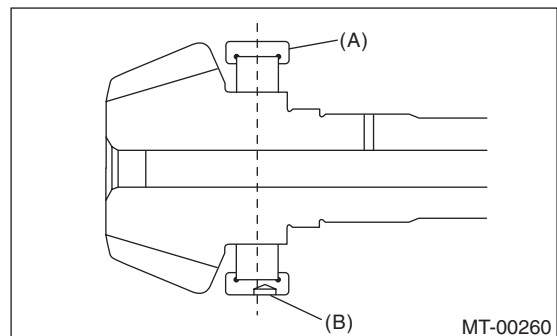
- Stake the lock nut at two points.
- Using the spring balancer, check that starting torque of roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 ft).



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

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

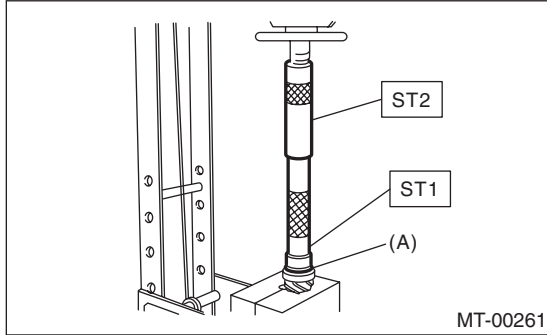
11) Install the washer using ST1, ST2 and press.

NOTE:

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

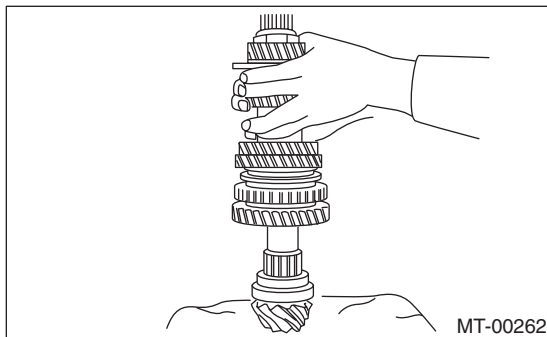
ST1 499277100 BUSH 1-2 INSTALLER

ST2 499277200 INSTALLER



(A) Washer

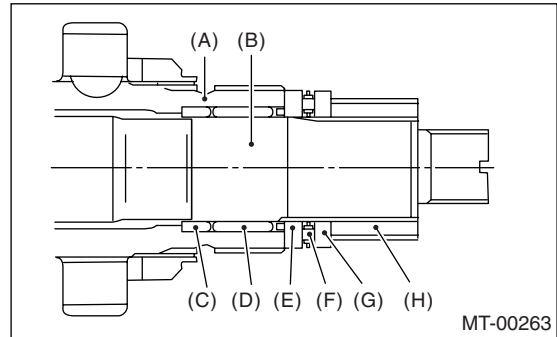
12) Install the thrust bearing and needle bearing. Install the driven shaft assembly.



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 pinion shaft
- (C) Drive pinion collar
- (D) Needle bearing (25x30x20)
- (E) Adjusting washer No. 2 (25x36x4)
- (F) Thrust bearing (25x37.5x3)
- (G) Adjusting washer No. 1 (25x36xt)
- (H) Differential bevel gear sleeve

Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

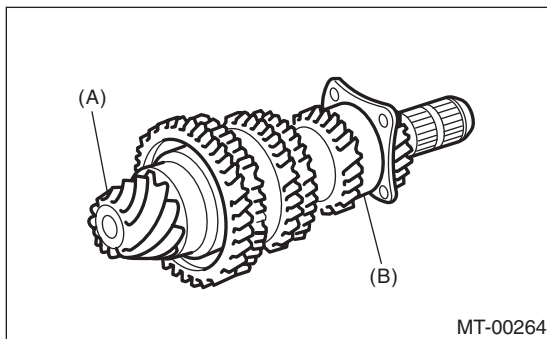
E: INSPECTION

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 noise when turned after gear oil lubrication.
- The roller 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) Roller 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.

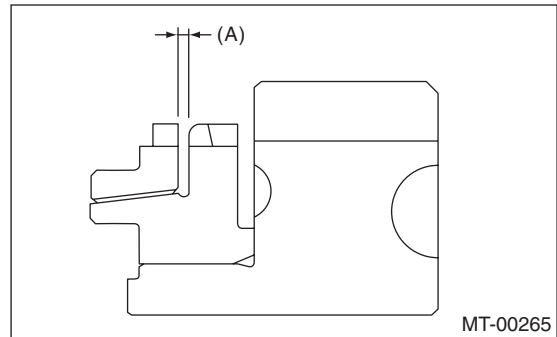
4) Baulk ring

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.

Clearance (A):

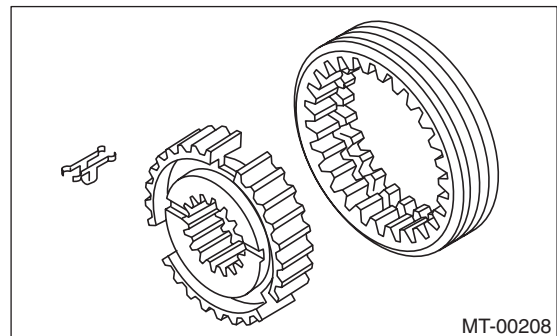
0.5 — 1.0 mm (0.020 — 0.040 in)



- 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.

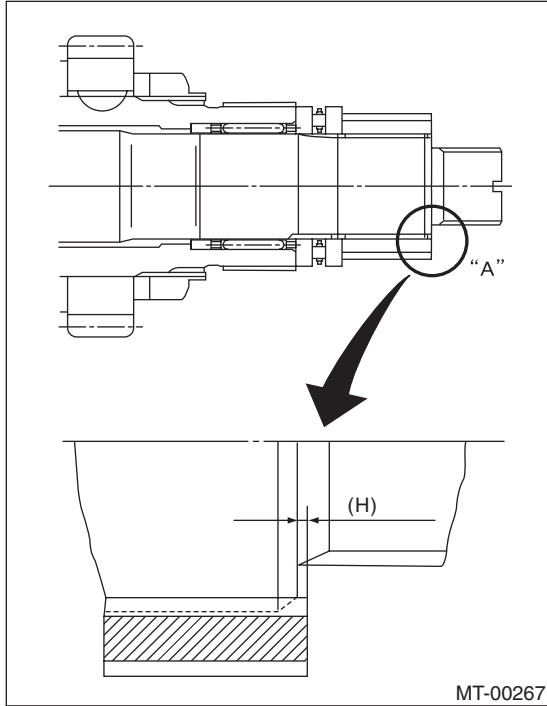
Drive Pinion Shaft Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

F: ADJUSTMENT

1. THRUST BEARING PRELOAD

1) 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).

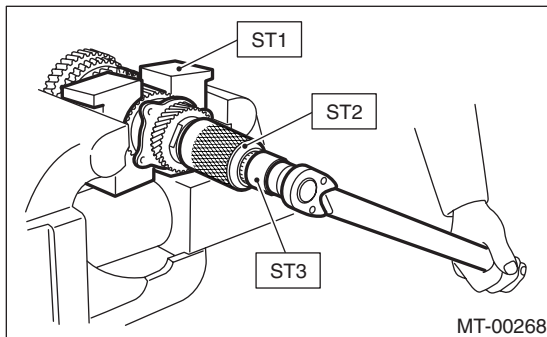


2) Using the ST1, ST2 and ST3, tighten the lock nut to specified torque.

ST1 899884100 HOLDER
 ST2 498427100 STOPPER
 ST3 899988608 SOCKET WRENCH (27)

Tightening torque:

120 N·m (12.2 kgf·m, 88.5 ft·lb)

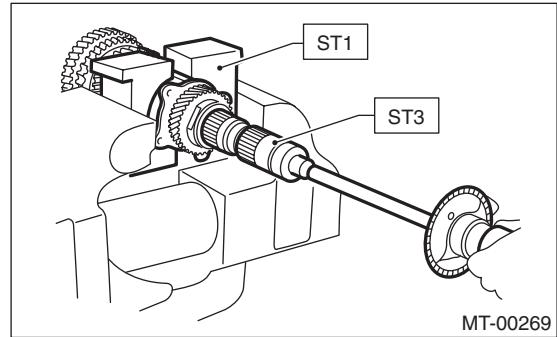


3) After removing the ST2, measure the starting torque using torque driver.

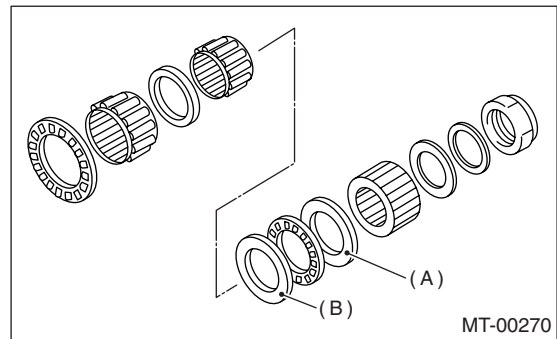
ST1 899884100 HOLDER
 ST3 899988608 SOCKET WRENCH (27)

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.



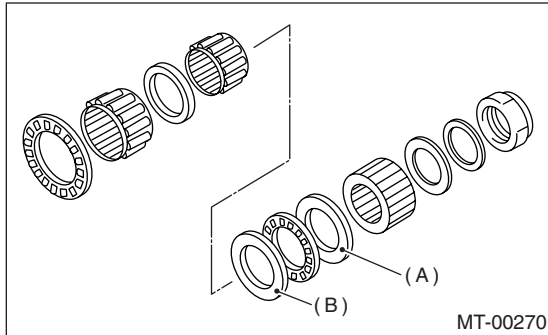
(A) Adjusting washer No. 1

(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) |

Drive Pinion Shaft Assembly

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

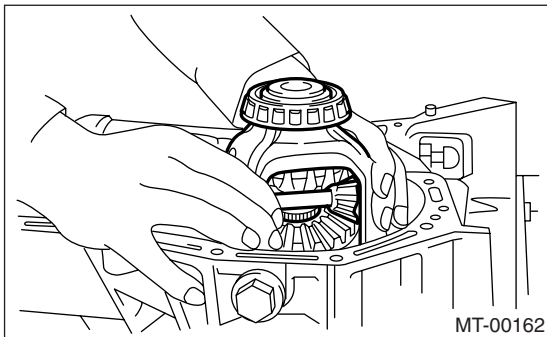
21. Front Differential Assembly

A: REMOVAL

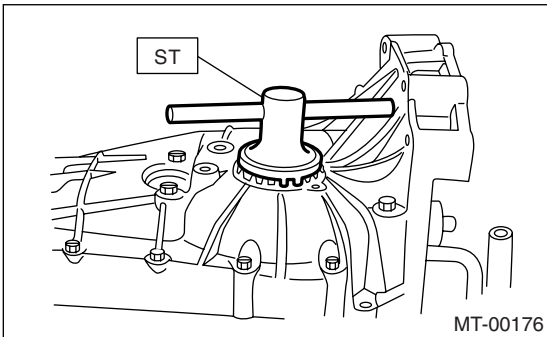
- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 4) Remove the drive pinion shaft assembly. <Ref. to 5MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 5) Remove the main shaft assembly.
Single-range model
<Ref. to 5MT-69, REMOVAL, Main Shaft Assembly For Single-Range.>
Dual-range model
<Ref. to 5MT-77, REMOVAL, Main Shaft Assembly For Dual-Range.>
- 6) 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.



- 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.

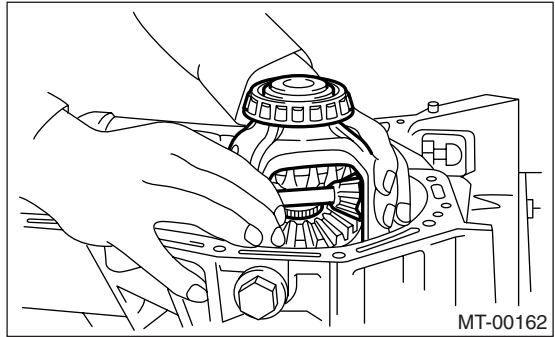
NOTE:

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.
- Wrap the right and left spline sections of axle shaft with vinyl tape to prevent scratches.



- 4) Install the main shaft assembly. <Ref. to 5MT-69, INSTALLATION, Main Shaft Assembly For Single-Range.>
- 5) Install the drive pinion assembly. <Ref. to 5MT-69, INSTALLATION, Main Shaft Assembly For Single-Range.>
- 6) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>
- 7) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 8) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

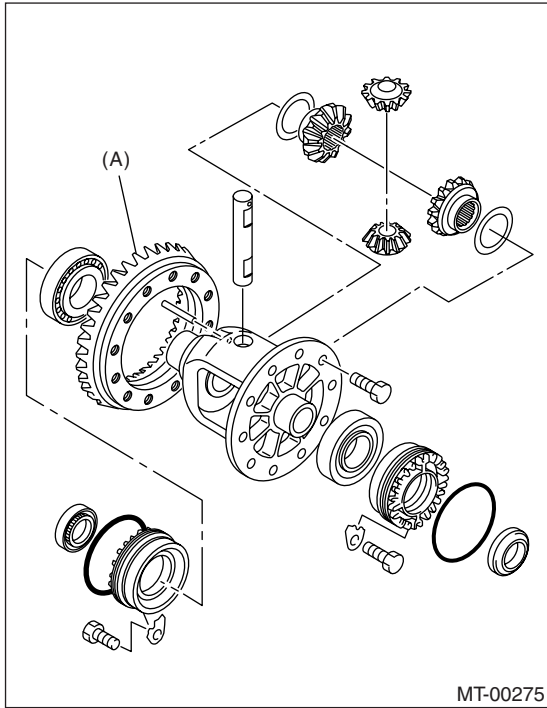
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

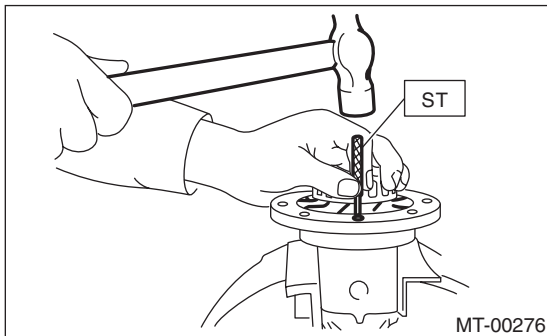
1) Loosen the twelve bolts and remove the hypoid driven gear.



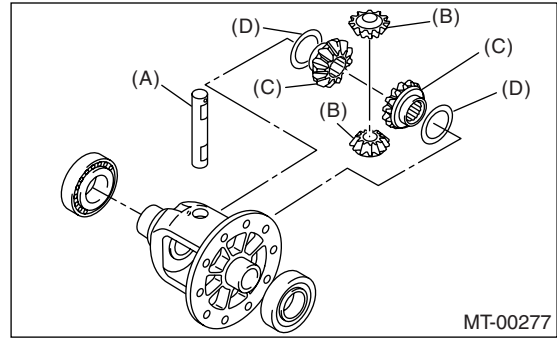
(A) Hypoid driven gear

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

ST 899904100 REMOVER

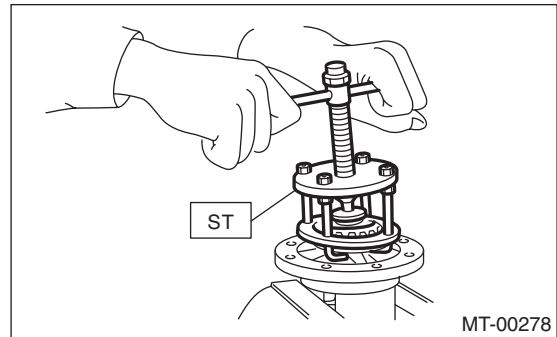


3) Pull out the pinion shaft, and remove the differential bevel pinion and gear and washer.



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

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



Front Differential Assembly

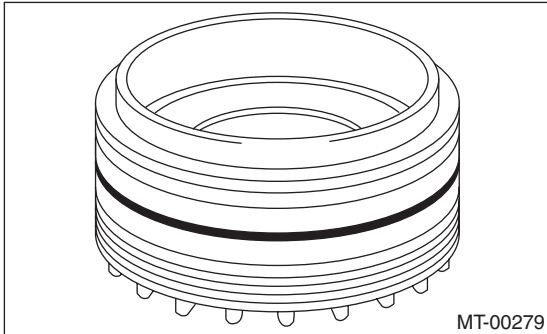
MANUAL TRANSMISSION AND DIFFERENTIAL

2. SIDE RETAINER

NOTE:

Replace the oil seal and O-ring after adjustment of drive pinion gear backlash and tooth contact.

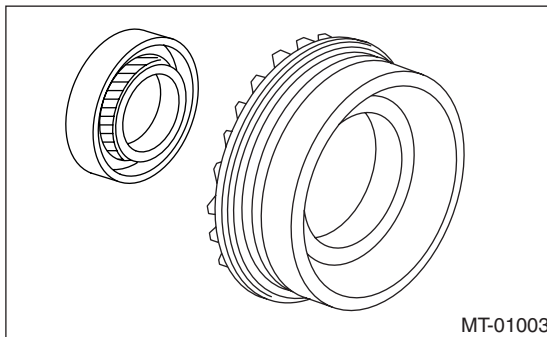
1) Remove the O-ring.



2) Remove the oil seal.

NOTE:

- Remove the oil seal using a flat tip screwdriver
- Do not reuse the oil seal. Prepare a new oil seal.



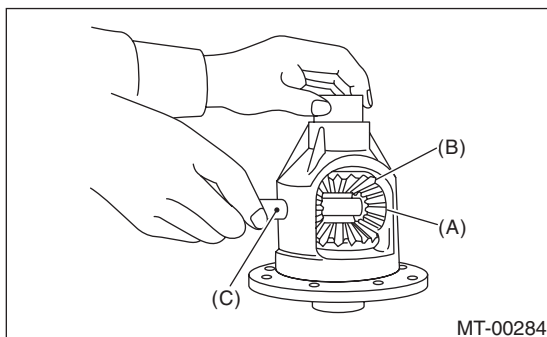
D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

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

NOTE:

Face the chamfered side of washer toward gear.



- (A) Differential bevel pinion
- (B) Differential bevel gear
- (C) Pinion shaft

2) Measure the backlash between differential bevel gear and pinion. If it is not within specifications, install a suitable washer to adjust it. <Ref. to 5MT-101, ADJUSTMENT, Front Differential Assembly.>

NOTE:

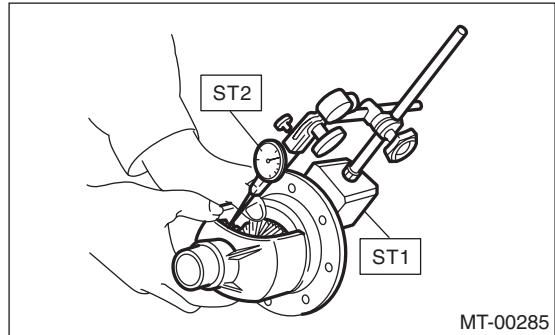
Be sure the pinion gear tooth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE

ST2 498247100 DIAL GAUGE

Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

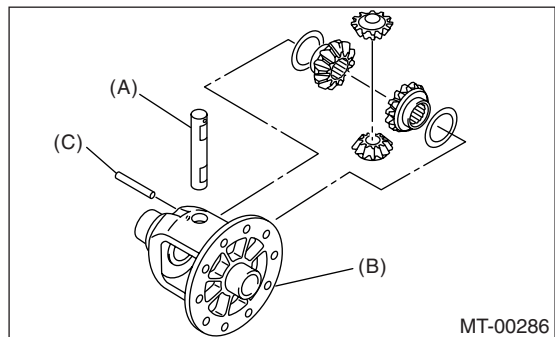


3) Align the pinion shaft and differential case at their holes, and drive the straight pin into holes from the hypoid driven gear side, using ST.

NOTE:

Lock the straight pin after installing.

ST 899904100 REMOVER



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

Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

4) Install the roller bearing to differential case.

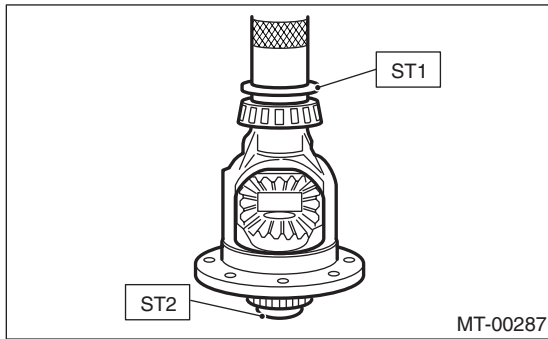
CAUTION:

Do not apply load 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.

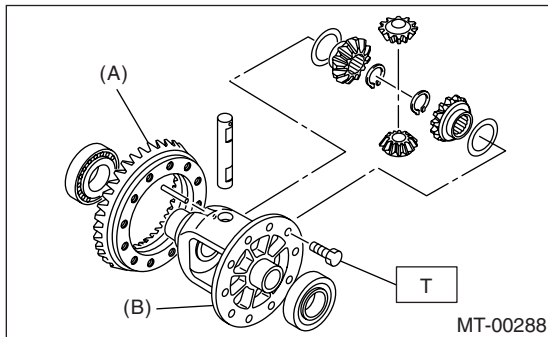
ST1 499277100 BUSH 1-2 INSTALLER
ST2 398497701 ADAPTER



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

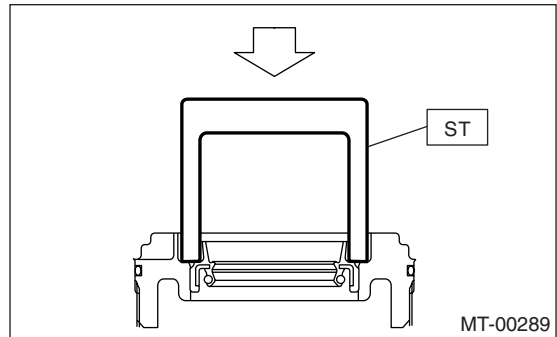
2. SIDE RETAINER

1) Install a new oil seal.

ST 18675AA000 DIFFERENTIAL OIL SEAL INSTALLER

CAUTION:

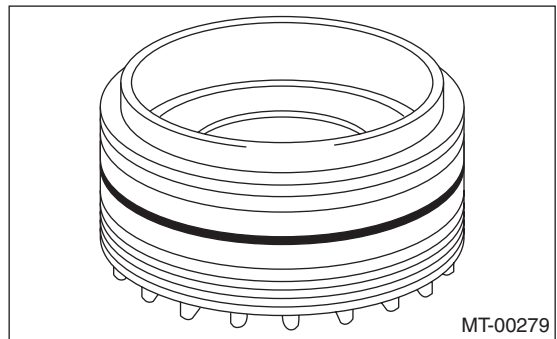
- When pressing fit the oil seal to side retainer, tap it to press fit using a plastic hammer.
- Do not use the press.



2) Install a new O-ring.

NOTE:

Do not stretch or damage the O-ring.



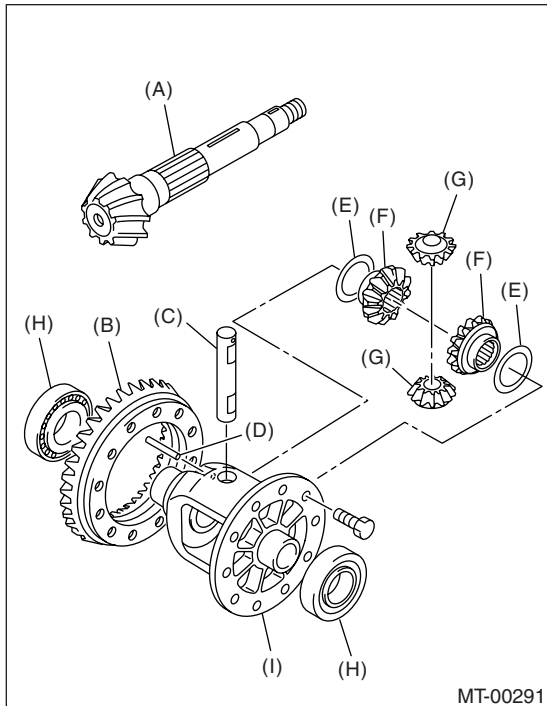
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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

1. DIFFERENTIAL BEVEL PINION GEAR BACKLASH

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

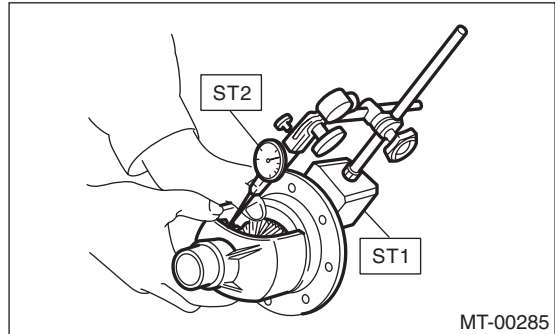
NOTE:

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.

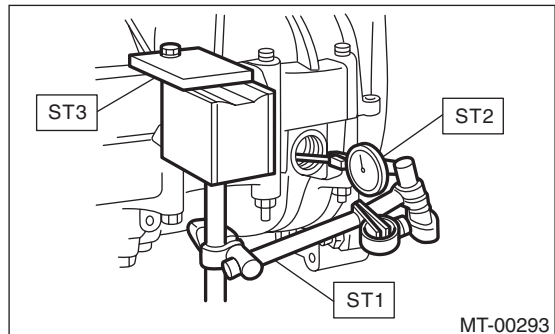
- ST1 498247001 MAGNET BASE
- ST2 498247100 DIAL GAUGE
- ST3 498255400 PLATE

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.

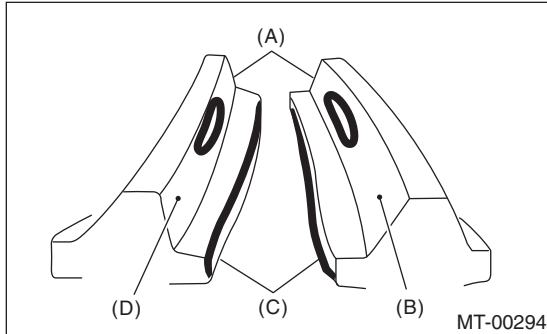
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

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 5MT-101, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.



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

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

- 1) Disassemble the front differential. <Ref. to 5MT-96, 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.

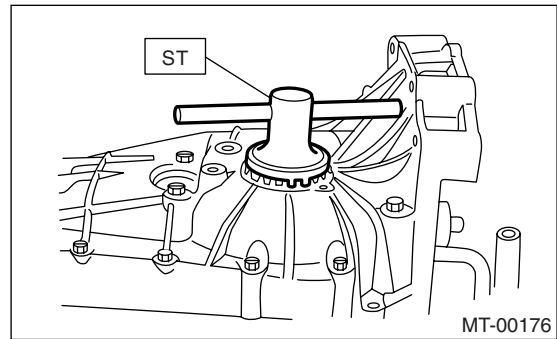
Standard backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

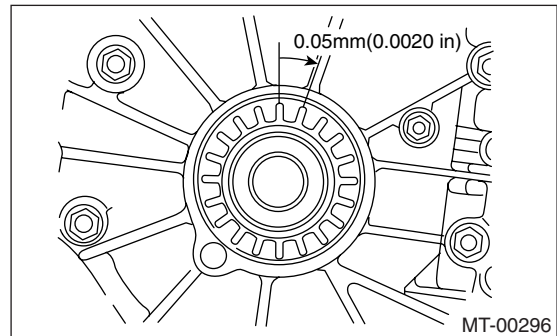
Adjust backlash by turning the holder in right side case.

ST 499787000 WRENCH ASSY



NOTE:

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

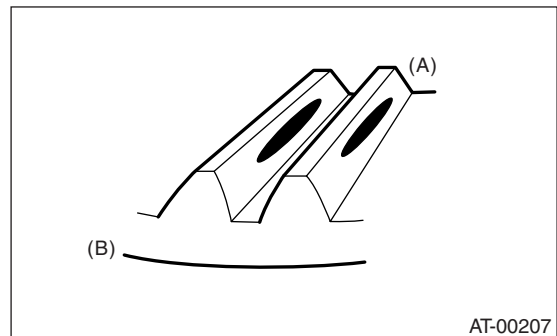


3. TOOTH CONTACT OF HYPOID GEAR

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

- 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

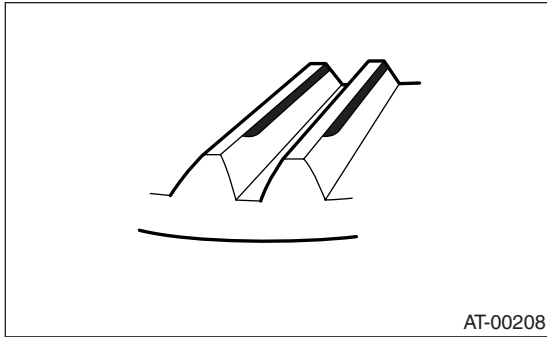
Front Differential Assembly

MANUAL TRANSMISSION AND DIFFERENTIAL

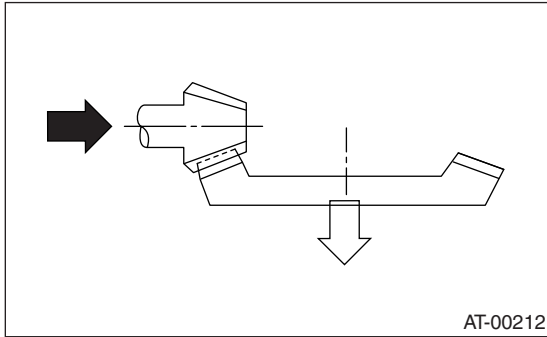
- Face contact

Checking item: Backlash is too large.

Contact pattern



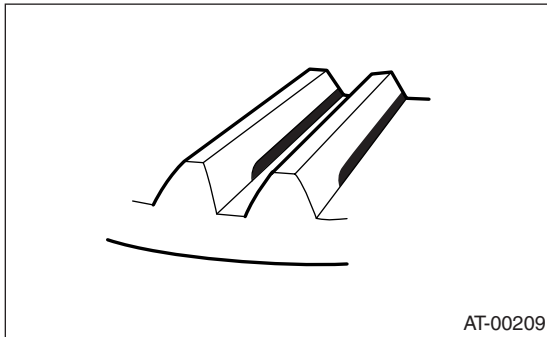
Corrective action: Reduce thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.



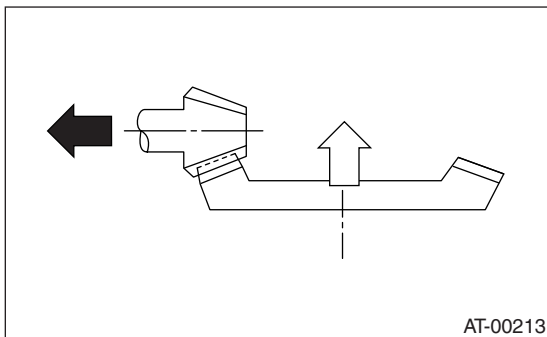
- Flank contact

Checking item: Backlash is too small.

Contact pattern



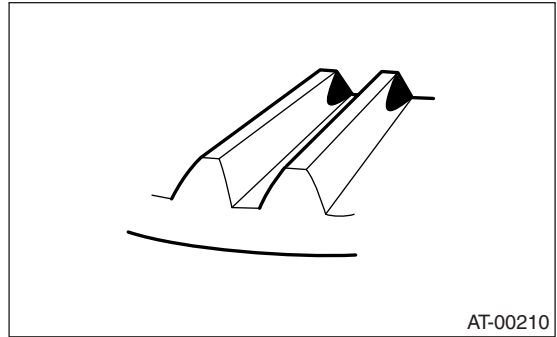
Corrective action: Increase thickness of drive pinion height adjusting shim in order to move drive pinion away from crown gear.



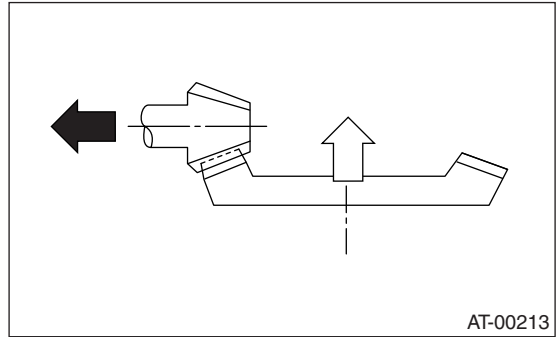
- Toe contact (Inside end contact)

Checking item: Contact areas is small.

Contact pattern



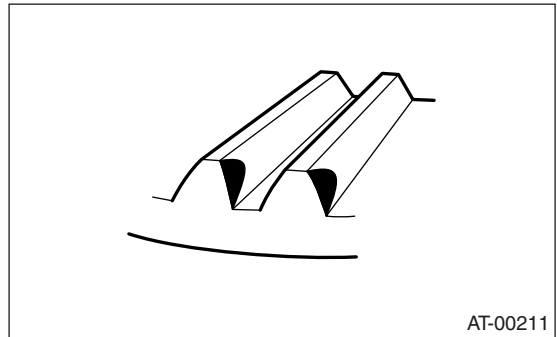
Corrective action: Increase thickness of drive pinion height adjusting shim in order to bring drive pinion close to crown gear.



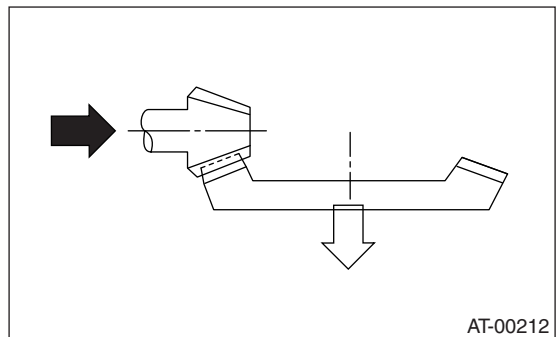
- Heel contact (Outside end contact)

Checking item: Contact areas is small.

Contact pattern



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



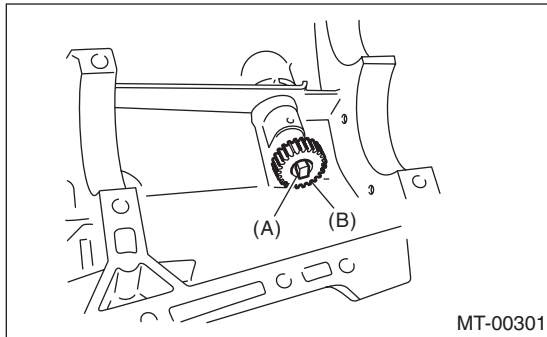
Speedometer Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

22.Speedometer Gear

A: REMOVAL

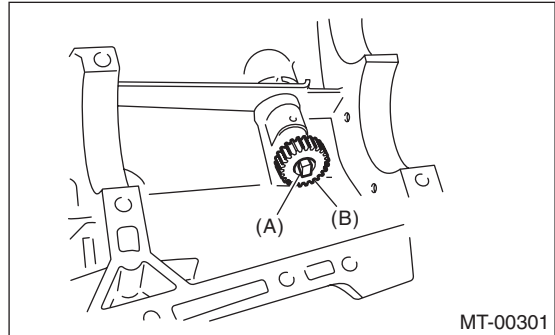
- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 5) Remove the vehicle speed sensor. <Ref. to 5MT-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 5MT-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 5MT-64, INSTALLATION, Transmission Case.>
- 5) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 6) Install the back-up light switch and neutral position switch. <Ref. to 5MT-44, INSTALLATION, Switches and Harness.>
- 7) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

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

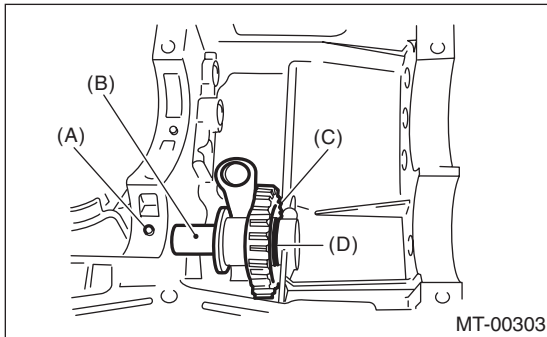
Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

23.Reverse Idler Gear

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly.
Single-Range model
<Ref. to 5MT-69, REMOVAL, Main Shaft Assembly For Single-Range.>
Dual-Range model
<Ref. to 5MT-77, REMOVAL, Main Shaft Assembly For Dual-Range.>
- 7) Remove the differential assembly. <Ref. to 5MT-96, REMOVAL, Front Differential Assembly.>
- 8) Remove the shifter forks and rods. <Ref. to 5MT-106, REMOVAL, Shifter Fork and Rod.>
- 9) Pull out the straight pin, and remove the Rev idler gear shaft, reverse idler gear and washer.



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

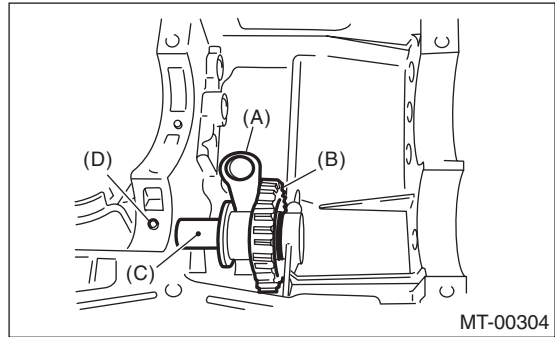
- 10) Remove the reverse shifter lever.

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 5MT-104, INSTALLATION, Reverse Idler Gear.> and <Ref. to 5MT-105, ADJUSTMENT, Reverse Idler Gear.>
- 3) Install the shifter forks and rods. <Ref. to 5MT-106, INSTALLATION, Shifter Fork and Rod.>
- 4) Install the differential assembly. <Ref. to 5MT-96, INSTALLATION, Front Differential Assembly.>
- 5) Install the main shaft assembly.
Single-Range model
<Ref. to 5MT-69, INSTALLATION, Main Shaft Assembly For Single-Range.>
Dual-Range model
<Ref. to 5MT-77, INSTALLATION, Main Shaft Assembly For Dual-Range.>
- 6) Install the drive pinion shaft assembly. <Ref. to 5MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>
- 7) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>
- 8) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 9) Install the back-up light switch and neutral position switch. <Ref. to 5MT-44, INSTALLATION, Switches and Harness.>
- 10) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

Reverse Idler Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

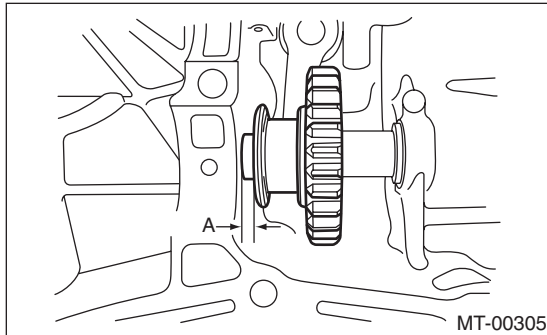
C: INSPECTION

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.

Clearance A:

6.0 — 7.5 mm (0.236 — 0.295 in)

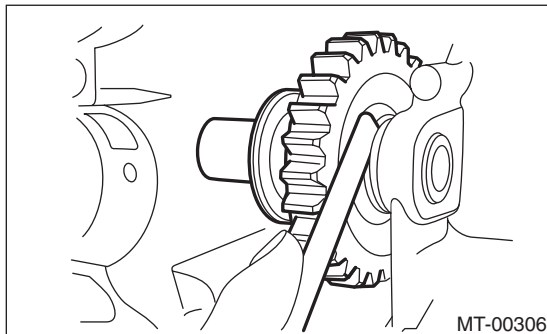


2) After installing a suitable reverse shifter lever, shift into neutral. Inspect the clearance between reverse idler gear and transmission case wall.

If out of specification, select the appropriate washer and adjust.

Clearance:

0 — 0.5 mm (0 — 0.020 in)



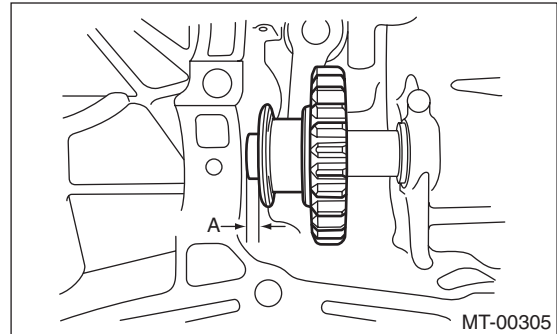
3) Check the reverse idler gear and shaft for damage. Replace if damaged.

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)

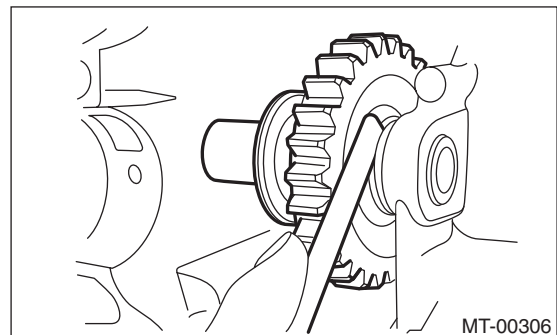


| Reverse shifter lever | | |
|-----------------------|------|------------------------|
| Part No. | Mark | Remarks |
| 32820AA070 | 7 | Further from case wall |
| 32820AA080 | 8 | Standard |
| 32820AA090 | 9 | Closer to case wall |

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

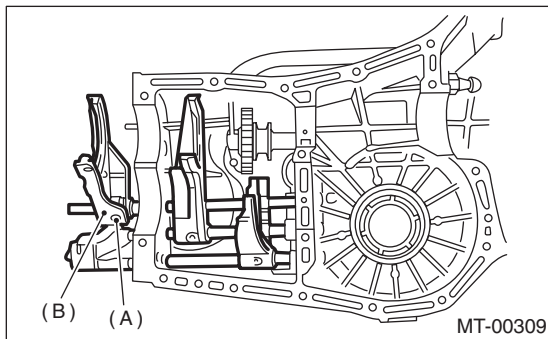
MANUAL TRANSMISSION AND DIFFERENTIAL

24. Shifter Fork and Rod

A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the back-up light switch and neutral position switch. <Ref. to 5MT-43, REMOVAL, Switches and Harness.>
- 3) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 4) Remove the transmission case. <Ref. to 5MT-62, REMOVAL, Transmission Case.>
- 5) Remove the drive pinion shaft assembly. <Ref. to 5MT-87, REMOVAL, Drive Pinion Shaft Assembly.>
- 6) Remove the main shaft assembly.
Single-Range model
<Ref. to 5MT-69, REMOVAL, Main Shaft Assembly For Single-Range.>
Dual-Range model
<Ref. to 5MT-77, REMOVAL, Main Shaft Assembly For Dual-Range.>
- 7) Remove the differential assembly. <Ref. to 5MT-96, REMOVAL, Front Differential Assembly.>
- 8) Drive out the straight pin with ST, and 5th shifter fork.

ST 398791700 STRAIGHT PIN REMOVER



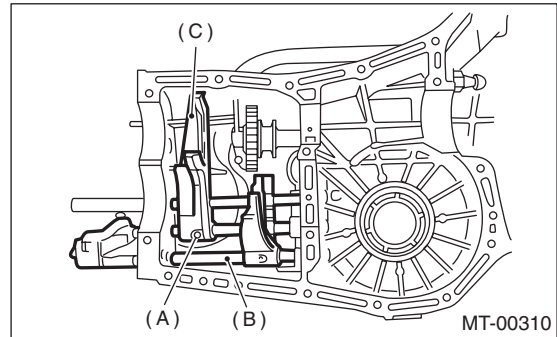
- (A) Straight pin
(B) 5th shifter fork

- 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) 3rd-4th fork rod
(C) Shifter fork

- 11) Drive out the straight pin, and pull out 1st-2nd 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 1st-2nd fork rod into 1st-2nd 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 3rd-4th fork rod side.

ST 398791700 STRAIGHT PIN REMOVER

- 6) Apply a coat of grease to plunger.

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

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

Shifter Fork and Rod

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

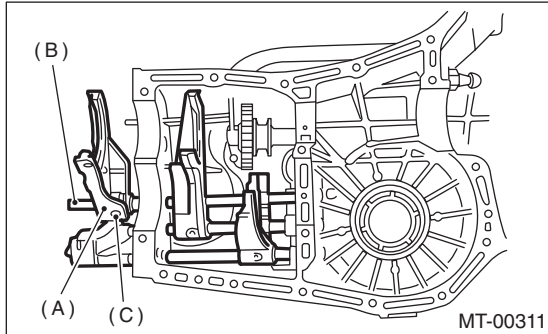
NOTE:

- 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

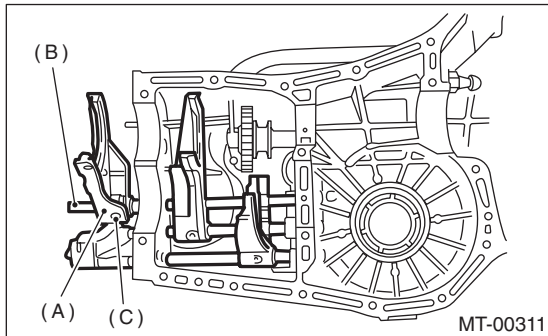
10) Install the 5th shifter fork onto the rear of reverse fork rod. Align holes in the two parts and new drive straight pin into place.

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 3rd-4th and 1st-2nd fork rod holes, and install plugs.



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

12) Install the differential assembly. <Ref. to 5MT-96, INSTALLATION, Front Differential Assembly.>

13) Install the main shaft assembly.

Single-Range model

<Ref. to 5MT-69, INSTALLATION, Main Shaft Assembly For Single-Range.>

Dual-Range model

<Ref. to 5MT-77, INSTALLATION, Main Shaft Assembly For Dual-Range.>

14) Install the drive pinion shaft assembly. <Ref. to 5MT-87, INSTALLATION, Drive Pinion Shaft Assembly.>

15) Install the transmission case. <Ref. to 5MT-64, INSTALLATION, Transmission Case.>

16) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>

17) Install the back-up light switch and neutral position switch. <Ref. to 5MT-44, INSTALLATION, Switches and Harness.>

18) Install the manual transmission assembly to vehicle. <Ref. to 5MT-36, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION

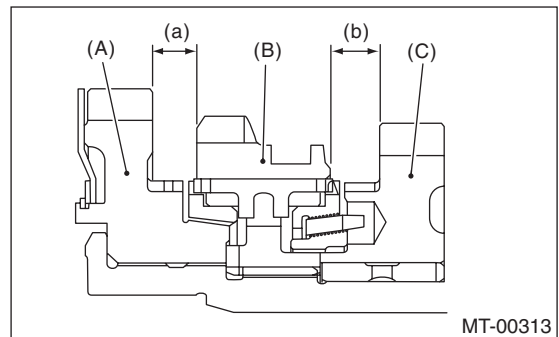
1) Check the shift shaft and shift rod for damage. Replace if damaged.

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

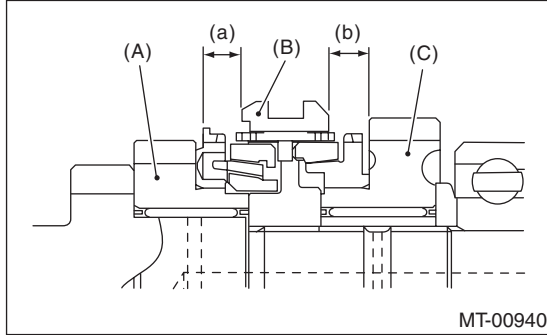
| 1st-2nd shifter fork | | |
|----------------------|------|--|
| Part No. | Mark | Remarks |
| 32804AA060 | 1 | Approach to 1st gear by 0.2 mm (0.008 in). |
| 32804AA070 | — | Standard |
| 32804AA080 | 3 | Approach to 2nd gear by 0.2 mm (0.008 in). |

Shifter Fork and Rod

MANUAL TRANSMISSION AND DIFFERENTIAL

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)

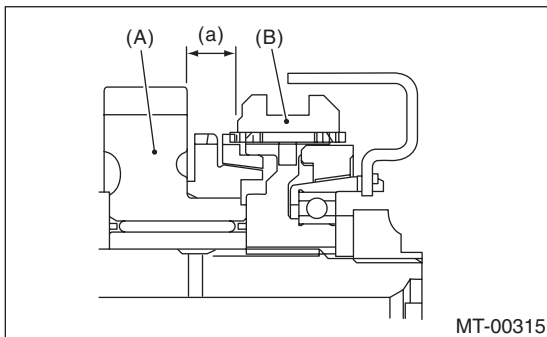


- (A) 3rd drive gear
- (B) Coupling sleeve
- (C) 4th drive gear

| 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 | Approach to 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

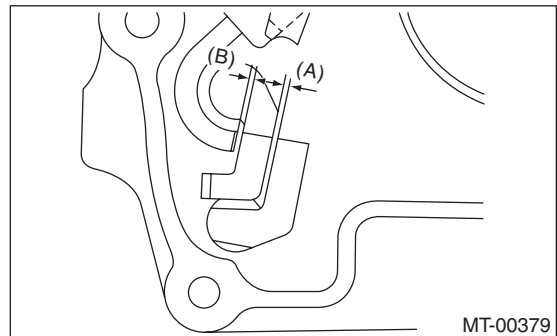
| 5th shifter fork (Non-turbo) | | |
|------------------------------|------|--|
| Part No. | Mark | Remarks |
| 32812AA201 | 7 | Approach to 5th gear by 0.2 mm (0.008 in). |
| 32812AA211 | — | Standard |
| 32812AA221 | 9 | Approach to 5th gear by 0.2 mm (0.008 in). |

| 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). |

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)

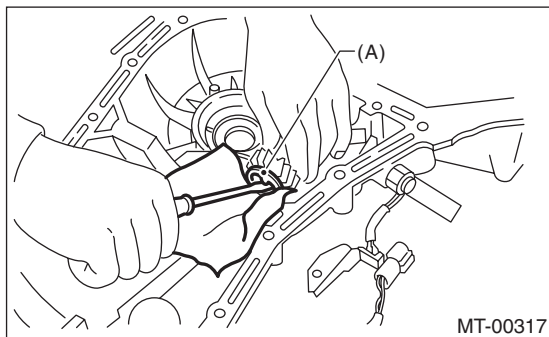


Counter Gear

25.Counter Gear

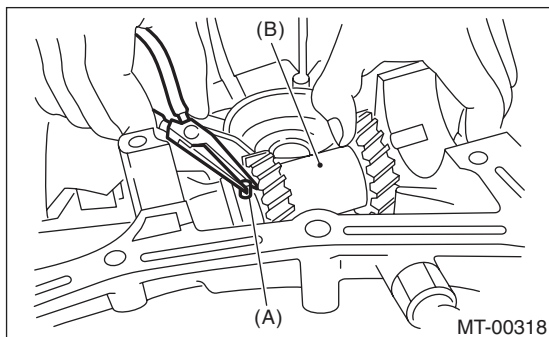
A: REMOVAL

- 1) Remove the manual transmission assembly from vehicle. <Ref. to 5MT-32, REMOVAL, Manual Transmission Assembly.>
- 2) Remove the transfer case with extension case assembly. <Ref. to 5MT-50, REMOVAL, Transfer Case and Extension Case Assembly.>
- 3) Remove the transmission case. <Ref. to 5MT-62, 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.

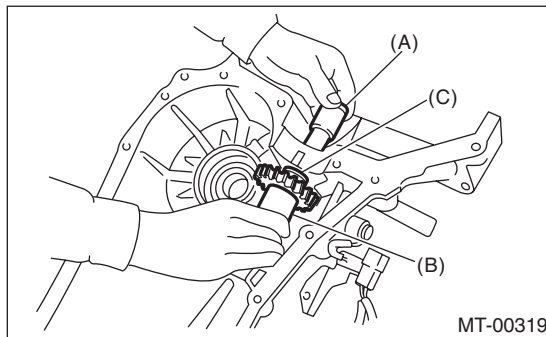


(A) Straight pin
(B) Counter gear

- 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 5MT-64, INSTALLATION, Transmission Case.>
- 4) Install the transfer case with extension case assembly. <Ref. to 5MT-50, INSTALLATION, Transfer Case and Extension Case Assembly.>
- 5) Install the manual transmission assembly on vehicle. <Ref. to 5MT-36, 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.

Counter Gear

MANUAL TRANSMISSION AND DIFFERENTIAL

C: INSPECTION

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

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 5MT-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) |

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 | Replace. |
| | (g) Worn 1st driven gear and driven shaft | Replace. |
| | (h) Worn 2nd driven gear and 2nd bush | Replace. |
| | (i) 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: 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. |