# MANUAL TRANSMISSION OVERHAUL

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SECTIONAL VIEW – With Front Limited Slip Differential (Front LSD)
## SPECIFICATIONS

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<td>Input shaft rear bearing clearance mm</td>
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<td>Output shaft preload mm</td>
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SEALANTS AND ADHESIVES

TRANSMISSION

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<td>Under cover-transmission case mating surface</td>
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<tr>
<td>Air breather</td>
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<td>Center differential drive gear bolt</td>
<td>THREEBOND 1303 or LOKTITE 648</td>
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TRANSFER

<table>
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FORM-IN-PLACE GASKET

The transmission has several areas where the form-in-place gasket (FIPG) is in use. To ensure that the gasket fully serves its purpose, it is necessary to observe some precautions when applying the gasket. Bead size, continuity and location are of paramount importance. Too thin a bead could cause leaks. Too thick a bead, on the other hand, could be squeezed out of location, causing blocking or narrowing of the fluid feed line. To eliminate the possibility of leaks from a joint, therefore, it is absolutely necessary to apply the gasket evenly without a break, while observing the correct bead size.

DISASSEMBLY

The parts assembled with the FIPG can be easily disassembled without use of a special method. In some cases, however, the sealant between the joined surfaces may have to be broken by lightly striking with a mallet or similar tool. A flat and thin gasket scraper may be lightly hammered in between the joined surfaces. In this case, however, care must be taken to prevent damage to the joined surfaces.

SURFACE PREPARATION

Thoroughly remove all substances deposited on the gasket application surfaces, using a gasket scraper or wire brush. Check to ensure that the surfaces to which the FIPG is to be applied is flat. Make sure that there are no oils, greases and foreign substances deposited on the application surfaces. Do not forget to remove the old sealant remaining in the bolt holes.

FORM-IN-PLACE GASKET APPLICATION

Applied FIPG bead should be of the specified size and without breaks. Also be sure to encircle the bolt hole circumference with a completely continuous bead. The FIPG can be wiped away unless it is hardened. While the FIPG is still moist (in less than 10 minutes), mount the parts in position. When the parts are mounted, make sure that the gasket is applied to the required area only. In addition, do not apply any oil or water to the sealing locations or start the engine until a sufficient amount of time (about one hour) has passed after installation is completed. The FIPG application procedure may vary on different areas. Observe the procedure described in the text when applying the FIPG.
### LUBRICANTS

#### TRANSMISSION

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#### TRANSFER

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### SNAP RINGS, SPACERS AND THRUST PLATES FOR ADJUSTMENT

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</tr>
</tbody>
</table>

**TORQUE SPECIFICATIONS**

**TRANSMISSION**

<table>
<thead>
<tr>
<th>Items</th>
<th>Nm (kgf·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under cover mounting bolt</td>
<td>6.9 (0.7)</td>
</tr>
<tr>
<td>Interlock plate bolt</td>
<td>30 (3.1)</td>
</tr>
<tr>
<td>Clutch housing-transmission case mounting bolt</td>
<td>44 (4.5)</td>
</tr>
<tr>
<td>Clutch release bearing retainer mounting bolt</td>
<td>9.8 (1.0)</td>
</tr>
<tr>
<td>Control housing mounting bolt</td>
<td>18 (1.9)</td>
</tr>
<tr>
<td>Shift cable bracket mounting bolt</td>
<td>18 (1.9)</td>
</tr>
<tr>
<td>Speedometer gear mounting bolt</td>
<td>3.9 (0.4)</td>
</tr>
<tr>
<td>Stopper bracket mounting bolt</td>
<td>18 (1.9)</td>
</tr>
<tr>
<td>Select lever mounting bolt</td>
<td>18 (1.9)</td>
</tr>
<tr>
<td>Select lever mounting nut</td>
<td>11 (1.2)</td>
</tr>
<tr>
<td>Center differential drive gear mounting bolt</td>
<td>132 (13.5)</td>
</tr>
<tr>
<td>Back-up lamp switch</td>
<td>32 (3.3)</td>
</tr>
<tr>
<td>Poppet spring plug</td>
<td>32 (3.3)</td>
</tr>
<tr>
<td>Reverse idler gear shaft mounting bolt</td>
<td>48 (4.9)</td>
</tr>
<tr>
<td>Roll stopper bracket mounting bolt</td>
<td>69 (7.0)</td>
</tr>
</tbody>
</table>
## TRANSFER

<table>
<thead>
<tr>
<th>Items</th>
<th>Nm (kgf·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer cover mounting bolt</td>
<td>23 (2.4)</td>
</tr>
<tr>
<td>Transmission-transfer mounting bolt</td>
<td>69 (7.0)</td>
</tr>
</tbody>
</table>

## SPECIAL TOOLS

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number</th>
<th>Name</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm bushing remover &amp; installer ring</td>
<td>MB990887</td>
<td>Installation of transfer oil seal</td>
<td></td>
</tr>
<tr>
<td>Bushing remover &amp; installer base</td>
<td>MB990891</td>
<td>Installation of transfer oil seal</td>
<td></td>
</tr>
<tr>
<td>Installer adapter</td>
<td>MB990928</td>
<td>Installation of input shaft oil seal</td>
<td></td>
</tr>
<tr>
<td>Installer adapter</td>
<td>MB990932</td>
<td>Removal of differential case taper roller bearing</td>
<td></td>
</tr>
<tr>
<td>Installer adapter</td>
<td>MB990933</td>
<td>Installation of transfer oil seal</td>
<td></td>
</tr>
<tr>
<td>Installer adapter</td>
<td>MB990935</td>
<td>Installation of output shaft front taper roller bearing outer race</td>
<td></td>
</tr>
<tr>
<td>Installer adapter</td>
<td>MB990937</td>
<td>Installation of differential case taper roller bearing</td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Number</td>
<td>Name</td>
<td>Use</td>
</tr>
<tr>
<td>--------------</td>
<td>----------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>MB990938</td>
<td>Handle</td>
<td>Use with Installer adapter</td>
</tr>
<tr>
<td></td>
<td>MB991445</td>
<td>Bushing remover and installer base</td>
<td>Installation of differential case taper roller bearing outer race</td>
</tr>
<tr>
<td></td>
<td>MD998304</td>
<td>Oil seal installer</td>
<td>Installation of transfer extension housing oil seal</td>
</tr>
<tr>
<td></td>
<td>MD998364</td>
<td>Camshaft oil seal installer</td>
<td>Installation of gear, bearing and sleeve</td>
</tr>
<tr>
<td></td>
<td>MD998800</td>
<td>Oil seal installer</td>
<td>Installation of differential oil seal and transfer cover oil seal</td>
</tr>
<tr>
<td></td>
<td>MD998801</td>
<td>Bearing remover</td>
<td>Installation and removal of gear, bearing and sleeve</td>
</tr>
<tr>
<td></td>
<td>MD998812</td>
<td>Installer cap</td>
<td>Use with Installer and installer adapter</td>
</tr>
<tr>
<td></td>
<td>MD998813</td>
<td>Installer-100</td>
<td>Use with Installer cap and installer adapter</td>
</tr>
<tr>
<td></td>
<td>MD998814</td>
<td>Installer-200</td>
<td>Use with Installer cap and installer adapter</td>
</tr>
<tr>
<td>Tool</td>
<td>Number</td>
<td>Name</td>
<td>Use</td>
</tr>
<tr>
<td>-------------</td>
<td>----------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>MD998818</td>
<td>Installer adapter (38)</td>
<td>Installation of input shaft front bearing</td>
<td></td>
</tr>
<tr>
<td>MD998819</td>
<td>Installer adapter (40)</td>
<td>Installation of input shaft rear bearing and output shaft taper roller bearing</td>
<td></td>
</tr>
<tr>
<td>MD998820</td>
<td>Installer adapter (42)</td>
<td>Installation of reverse gear bearing sleeve</td>
<td></td>
</tr>
<tr>
<td>MD998821</td>
<td>Installer adapter (44)</td>
<td>Installation of 4th speed gear, 5th speed gear sleeve and 5th-reverse speed synchronizer hub</td>
<td></td>
</tr>
<tr>
<td>MD998824</td>
<td>Installer adapter (50)</td>
<td>Installation of 1st-2nd speed synchronizer hub, 2nd speed gear sleeve and 3rd speed gear</td>
<td></td>
</tr>
<tr>
<td>MD998825</td>
<td>Installer adapter (52)</td>
<td>Installation of 1st speed gear sleeve, 3rd-4th speed synchronizer hub, 4th speed gear sleeve, 5th speed gear and thrust plate stopper</td>
<td></td>
</tr>
<tr>
<td>MD998917</td>
<td>Bearing remover</td>
<td>Removal and installation of gear, bearing and sleeve</td>
<td></td>
</tr>
<tr>
<td>MD999566</td>
<td>Claw</td>
<td>Removal of taper roller bearing outer race</td>
<td></td>
</tr>
</tbody>
</table>
TRANSMISSION
DISASSEMBLY AND REASSEMBLY

Disassembly steps
1. Transfer
2. O-ring
3. Roll stopper bracket
4. Insulator washer
5. Shift cable bracket
6. Select lever
7. Speedometer gear
8. Back-up lamp switch
9. Gasket
10. Plug
11. Gasket

Unit: Nm {kgf·m}
Apply gear oil to all moving parts before installation.

Disassembly steps
12. Interlock plate bolt
13. Gasket
14. Control housing
15. Neutral return spring
16. Under cover
17. Reverse idler gear shaft bolt
18. Gasket
19. Reverse idler gear
20. Transmission case
21. Outer race
22. Outer race
23. Spacer
24. Spacer
25. Spacer
26. Oil guide
27. Oil guide

Unit: Nm (kgf·m)
Apply gear oil to all moving parts before installation.

Disassembly steps

- **C** 28. Spring pin
- 29. 1st-2nd speed shift rail
- 30. 1st-2nd speed shift fork
- **C** 31. Spring pin
- **C** 32. Spring pin
- **B** 33. 3rd-4th speed shift rail
- **B** 34. 3rd-4th speed shift fork
- **B** 35. 5th-reverse speed shift rail
- **B** 36. 5th-reverse speed shift fork
- **C** 37. Center differential
- **C** 38. Output shaft
- **C** 39. Input shaft
- 40. Clutch housing
DISASSEMBLY SERVICE POINTS

- **A** SPRING PIN REMOVAL
  Shift the 5th-reverse shift fork in the direction shown in the illustration.

- **B** 3RD-4TH SPEED SHIFT RAIL / 3RD-4TH SPEED SHIFT FORK / 5TH-REVERSE SPEED SHIFT RAIL / 5TH-REVERSE SPEED SHIFT FORK REMOVAL
  Pull out the shift rails from the shift rail holes in the clutch housing.

- **C** CENTER DIFFERENTIAL / OUTPUT SHAFT / INPUT SHAFT REMOVAL
  Remove the input shaft, output shaft and center differential together.

ADJUSTMENT BEFORE REASSEMBLY

SPACER SELECTION FOR ADJUSTING INPUT SHAFT END PLAY / OUTPUT SHAFT PRELOAD / DIFFERENTIAL PRELOAD

1. Install the input shaft, output shaft and center differential as a set to the clutch housing.

2. Place two pieces of solder (1.6 mm in diameter and approx. 10 mm in length) on the input shaft rear bearing at the positions shown in the illustration.
(3) Place two pieces of solder (1.6 mm in diameter and approx. 10 mm in length) on the transmission case at the positions shown in the illustration.

(4) Install the bearing outer race.

(5) Install the transmission case and tighten the bolts to the specified torque.

(6) Remove the transmission case. If the solder is not crushed, repeat the steps (2) through (5) using the solder with larger diameter.

(7) Measure the thickness of the crushed solder with a micrometer and select spacers that will provide the standard end play/preload value.

**Standard value:**
- Input shaft end play ........... 0 – 0.17 mm
- Output shaft end play .......... 0.13 – 0.18 mm
- Center differential preload .... 0.05 – 0.11 mm

**REASSEMBLY SERVICE POINTS**

**A** INPUT SHAFT / OUTPUT SHAFT / CENTER DIFFERENTIAL INSTALLATION

Install the input shaft, output shaft and differential as a unit.

**B** 5TH-REVERSE SPEED SHIFT FORK / 5TH-REVERSE SPEED SHIFT RAIL / 3RD-4TH SPEED SHIFT FORK / 3RD-4TH SPEED SHIFT RAIL INSTALLATION

(1) Install the 3rd-4th speed shift rails and fork, and 5th-reverse speed shift rail and fork.
(2) Slide the shift rails into the shift rail holes in the clutch housing.

**C** **SPRING PIN INSTALLATION**
Install the spring pin with its slit directed as shown in the illustration.

**D** **SPACER INSTALLATION**
Install the spacer selected in the section “ADJUSTMENT BEFORE REASSEMBLY”.

**E** **TRANSMISSION CASE INSTALLATION**
Apply sealant to the illustrated position of the transmission case.

Specified sealant: THREEBOND 1216

Caution
Squeeze out the sealant uniformly, while making sure that it is not broken or excessively applied.

**F** **UNDER COVER INSTALLATION**
Apply sealant to the illustrated position of the transmission case.

Specified sealant: THREEBOND 1216

Caution
Squeeze out the sealant uniformly, while making sure that it is not broken or excessively applied.
**CONTROL HOUSING INSTALLATION**

Apply sealant to the illustrated position of the transmission case.

Specified sealant: THREEBOND 1216

**Caution**

Squeeze out the sealant uniformly, while making sure that it is not broken or excessively applied.

**SPEEDOMETER GEAR INSTALLATION**

Apply transmission oil to the O-ring of the speedometer gear.

Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W

**SELECT LEVER INSTALLATION**

Apply grease to the control shaft sliding portion of the select lever shoe.

Specified grease: MOLYWHITE TA No.1 or No.2

**O-RING INSTALLATION**

Lubricate O-ring with transmission oil.

Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W

**INSPECTION**

**BACK-UP LAMP SWITCH**

Check for continuity between terminals.

<table>
<thead>
<tr>
<th>Switch condition</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressed</td>
<td>Not exist</td>
</tr>
<tr>
<td>Released</td>
<td>Exists</td>
</tr>
</tbody>
</table>
Apply gear oil to all moving parts before installation.

Disassembly steps

1. Snap ring
2. Ball bearing
3. Thrust plate stopper
4. Thust plate
5. 5th speed gear
6. 4th speed gear
7. Needle roller bearing
8. 4th speed gear sleeve
9. Synchronizer ring
10. Synchronizer spring
11. Synchronizer sleeve
12. 3rd-4th speed synchronizer hub
13. Outer synchronizer ring
14. Synchronizer spring
15. Synchronizer cone
16. Inner synchronizer ring
17. 3rd speed gear
18. Needle roller bearing
19. Snap ring
20. Ball bearing
21. Oil seal
22. Input shaft
DISASSEMBLY SERVICE POINTS

**A** BALL BEARING REMOVAL

**B** THRUST PLATE STOPPER REMOVAL
Using a screwdriver, pry up the position shown in the illustration and remove the thrust plate stopper.

**C** 5TH SPEED GEAR REMOVAL

**D** 4TH SPEED GEAR SLEEVE REMOVAL
Install the special tool to the 3rd speed gear and remove the 4th speed gear sleeve.

**E** BALL BEARING REMOVAL
**REASSEMBLY SERVICE POINTS**

**A ‣ OIL SEAL INSTALLATION**
Make sure that the oil seal is pressed into the position shown in the illustration.

**B ‣ BALL BEARING INSTALLATION**

**C ‣ SNAP RING INSTALLATION**
Select and install a snap ring so that the input shaft front bearing end play will have the standard value.

*Standard value: 0 – 0.12 mm*

**D ‣ SYNCHRONIZER SPRING INSTALLATION**
Install the synchronizer spring securely to the illustrated position of the outer synchronizer ring.

**E ‣ 3RD-4TH SPEED SYNCHRONIZER HUB INSTALLATION**
Install the synchronizer hub in such a way that it will be oriented in the direction shown.
Caution
When the hub is installed, make sure that the synchronizer ring is not caught.

**F SYNCHRONIZER SLEEVE INSTALLATION**

1. Install the synchronizer sleeve in such a way that it will be oriented in the direction shown.

2. When the synchronizer sleeve is installed, make sure that the deep groove portion of the synchronizer hub is aligned with the projecting portion of the sleeve.

**G SYNCHRONIZER SPRING INSTALLATION**

**H 4TH SPEED GEAR SLEEVE INSTALLATION**
5TH SPEED GEAR INSTALLATION

Select and install a thrust plate so that the input shaft 5th speed gear clearance will have the standard value.

Standard value: 0 – 0.09 mm

Caution
Install the plate with its identification stamped surface faced against the thrust plate stopper.

THRUST PLATE STOPPER INSTALLATION

Install the thrust plate stopper by pressing the special tools with hand. Make sure that the stopper is not installed aslant.

BALL BEARING INSTALLATION

SNAP RING INSTALLATION

Select and install a snap ring so that the input shaft rear bearing clearance will have the standard value.

Standard value: 0 – 0.12 mm
INSPECTION

INPUT SHAFT
(1) Check the outside diameter of the needle bearing mounting portion for damage, abnormal wear and seizure.
(2) Check the splines for damage and wear.

NEEDLE ROLLER BEARING
(1) Check to ensure that when the input shaft and gear are combined and made to rotate, they rotate smoothly without looseness and noise.
(2) Check to ensure that the cage is not deformed.

SYNCHRONIZER RING
(1) Check to ensure that the clutch gear tooth surfaces are not damaged and broken.
(2) Check to ensure that the cone inside surface is not damaged or worn and that the threads are not crushed.
(3) Press the synchronizer ring against the gear and check clearance “A”. If “A” is less than the limit, replace.
   Limit: 0.5 mm

OUTER SYNCHRONIZER RING / INNER SYNCHRONIZER RING / SYNCHRONIZER CONE
(1) Check to ensure that the clutch gear tooth surface and cone surface are not damaged and broken.
(2) Install the outer ring, inner ring and cone, press them against the gear, and check clearance “A”. If “A” is less than the limit, replace.

Limit: 0.5 mm

Caution
When any of the outer ring, inner ring or cone has to be replaced, replace them as a set.

SYNCHRONIZER SLEEVE AND HUB

(1) Check to ensure that when the synchronizer sleeve and hub are combined and made to slide, they slide smoothly without binding.

(2) Check to ensure that the front and rear ends of the sleeve inside surface are not damaged.

Caution
When replacement of either the synchronizer sleeve or hub is necessary, make sure that the synchronizer sleeve and hub are replaced as a set.

SYNCHRONIZER SPRING

Check to ensure that the spring is not sagging, deformed or broken.

SPEED GEARS

(1) Check to ensure that the helical and clutch gear tooth surfaces are not damaged or worn.

(2) Check to ensure that the synchronizer cone surfaces are not roughened, damaged or worn.

(3) Check to ensure that the gear inside diameter and front and rear surfaces are not damaged and worn.
OUTPUT SHAFT

DISASSEMBLY AND REASSEMBLY

Apply gear oil to all moving parts before installation.

Disassembly steps

1. Snap ring
2. Taper roller bearing
3. Reverse gear bearing sleeve
4. Needle roller bearing
5. Reverse gear
6. Synchronizer ring
7. Synchronizer spring
8. Synchronizer sleeve
9. 5th-reverse speed synchronizer hub
10. Synchronizer ring
11. Synchronizer spring
12. 5th speed gear
13. Needle roller bearing
14. 5th speed gear sleeve
15. 4th speed gear
16. Snap ring
17. 3rd speed gear
18. 2nd speed gear
19. Needle roller bearing
20. 2nd speed gear sleeve
21. Inner synchronizer ring
22. Synchronizer cone
23. Outer synchronizer ring
24. Synchronizer spring
25. Synchronizer sleeve
26. 1st-2nd speed synchronizer hub
27. Outer synchronizer ring
28. Synchronizer spring
29. Inner synchronizer ring
30. Synchronizer cone
31. 1st speed gear
32. Needle roller bearing
33. 1st speed gear sleeve
34. Taper roller bearing
35. Oil seal
36. Output shaft
DISASSEMBLY SERVICE POINTS

**A** TAPER ROLLER BEARING REMOVAL

**B** REVERSE GEAR BEARING SLEEVE REMOVAL
Mount a special tool on the reverse gear and remove the reverse gear bearing sleeve.

**C** 5TH-REVERSE SPEED SYNCHRONIZER HUB REMOVAL
Mount a special tool on the 4th speed gear and remove the 5th-reverse speed synchronizer hub.

**D** 3RD SPEED GEAR REMOVAL
Mount a special tool on the 2nd speed gear and remove the 3rd speed gear.

**E** 2ND SPEED GEAR SLEEVE REMOVAL
Mount a special tool on the 1st speed gear and remove the 2nd speed gear sleeve.
1ST SPEED GEAR SLEEVE REMOVAL

TAPER ROLLER BEARING REMOVAL

REASSEMBLY SERVICE POINTS

OIL SEAL INSTALLATION

Make sure that the oil seal is pressed into the position shown in the illustration.

TAPER ROLLER BEARING INSTALLATION

1ST SPEED GEAR SLEEVE INSTALLATION
SYNCHRONIZER SPRING INSTALLATION

1ST-2ND SPEED SYNCHRONIZER HUB INSTALLATION
Install the 1st-2nd speed synchronizer hub in such a way that it will be oriented in the direction shown.

Caution
When the hub is installed, make sure that the synchronizer ring is not caught.

SYNCHRONIZER SLEEVE INSTALLATION
(1) Install the synchronizer sleeve in such a way that it will be oriented in the direction shown.

(2) When the synchronizer sleeve is installed, make sure that the deep groove portion of the synchronizer hub is aligned with the projecting portion of the sleeve.
G 2ND SPEED GEAR SLEEVE INSTALLATION

H 3RD SPEED GEAR INSTALLATION

SNAP RING INSTALLATION
Select and install a snap ring so that the output shaft 3rd speed gear clearance will have the standard value.
Standard value: 0 – 0.09 mm

J 4TH SPEED GEAR INSTALLATION

K 5TH SPEED GEAR SLEEVE INSTALLATION
SYNCHRONIZER SPRING INSTALLATION

5TH-REVERSE SPEED SYNCHRONIZER HUB INSTALLATION
Install the 5th-reverse speed synchronizer hub in such a way that it will be oriented in the direction shown.

Caution
When the hub is installed, make sure that the synchronizer ring is not caught.

REVERSE GEAR / NEEDLE ROLLER BEARING / REVERSE GEAR BEARING SLEEVE INSTALLATION

TAPER ROLLER BEARING INSTALLATION
**SNAP RING INSTALLATION**
Select and install a snap ring so that the output shaft rear bearing clearance will have the standard value.

**Standard value:** \( 0 \, \text{–} \, 0.09 \, \text{mm} \)

**INSPECTION**

**OUTPUT SHAFT**
Check the splines for damage and wear.

**NEEDLE ROLLER BEARING**
(1) Check to ensure that when the bearing sleeve and gear are combined and made to rotate, they rotate smoothly without looseness and noise.
(2) Check the cage for deformation.

**SYNCHRONIZER RING**
(1) Check to ensure that the clutch gear tooth surfaces are not damaged and broken.
(2) Check to ensure that the cone inside diameter is not damaged or worn and that the threads are not crushed.
(3) Press the synchronizer ring against the gear and check clearance “A”. If “A” is less than the limit, replace.

**Limit:** \( 0.5 \, \text{mm} \)
OUTER SYNCHRONIZER RING / INNER SYNCHRONIZER RING / SYNCHRONIZER CONE

1. Check to ensure that the clutch gear tooth surfaces and cone surfaces are not damaged and broken.

2. Install the outer ring, inner ring and cone, press them against the gear, and check clearance “A”. If “A” is less than the limit, replace.

   Limit: 0.5 mm

   Caution
   When any of the outer ring, inner ring or cone has to be replaced, replace them as a set.

SYNCHRONIZER SLEEVE AND HUB

1. Check to ensure that when the synchronizer sleeve and hub are combined and made to slide, they slide smoothly without binding.

2. Check to ensure that the front and rear ends of the sleeve inside surface are not damaged.

   Caution
   When replacement of either the synchronizer sleeve or hub is necessary, make sure that the synchronizer sleeve and hub are replaced as a set.

SYNCHRONIZER SPRING

Check to ensure that the spring is not sagging, deformed or broken.

SPEED GEARS

1. Check to ensure that the helical and clutch gear tooth surfaces are not damaged or worn.

2. Check to ensure that the synchronizer cone surfaces are not roughened, damaged or worn.

3. Check to ensure that the gear inside diameter and front and rear surfaces are not damaged and worn.
REVERSE IDLER GEAR
DISASSEMBLY AND REASSEMBLY

Apply gear oil to all moving parts before installation.

Disassembly steps
1. Snap ring
2. Thrust washer
3. Reverse idler gear
4. Needle roller bearing
5. Reverse idler gear shaft

INSPECTION
NEEDLE ROLLER BEARING
(1) Check to ensure that when the shaft and gear are combined and made to rotate, they rotate smoothly without looseness and noise.
(2) Check to ensure that the cage is not deformed.
Apply gear oil to all moving parts before installation.

Disassembly steps
1. e-clip
2. Speedometer driven gear
3. O-ring
4. Sleeve
SELECT LEVER
DISASSEMBLY AND REASSEMBLY

Disassembly steps
1. Dust cover
2. Nut
3. Spring washer
4. Washer
5. Select lever bushing

6. Select lever shoe
7. Select lever
8. Select lever bushing
9. Dust cover
10. Select lever shaft

REASSEMBLY SERVICE POINT
DUST COVER INSTALLATION
CONTROL HOUSING

DISASSEMBLY AND REASSEMBLY

Disassembly steps

1. Lock pin
2. Interlock plate
3. Control finger
4. Pin
5. Return spring
6. Stopper plate
7. Spring pin
8. Spring pin
9. Stopper body
10. Neutral return spring

11. Spacer
12. Control shaft
13. Air breather
14. Control shaft boot
15. Oil seal
16. Needle bearing
17. Spring washer
18. Stopper bracket
19. Control housing

Unit: Nm (kgf · m)
DISASSEMBLY SERVICE POINT

A LOCK PIN REMOVAL
Drive the lock pin out of position from the direction shown.

REASSEMBLY SERVICE POINTS

A NEEDLE BEARING INSTALLATION
Press fit the needle bearing to the position shown in the illustration, while making sure that the model number stamped side is oriented in the direction shown.

B OIL SEAL INSTALLATION
Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W

C AIR BREATHER INSTALLATION
(1) Apply a sealant to the outside circumference of the inserting portion.
   Specified sealant: THREEBOND 1501

(2) Make sure that the projecting portion is oriented in the direction shown.
D. **SPRING PIN INSTALLATION**

E. **SPRING PIN INSTALLATION**

F. **LOCK PIN INSTALLATION**

Drive in the lock pin in the direction shown in the illustration.
**CLUTCH HOUSING**

**DISASSEMBLY AND REASSEMBLY**

**Disassembly steps**

1. Clutch release bearing retainer
2. Oil seal
3. Outer race
4. Outer race
5. Bushing*
6. Cover-A
7. Cover-B
8. Clutch housing

**NOTE:**

*: Never remove the bushings from the clutch housing.

Only the case when installing new bushings into a new clutch housing, refer to ▶B◀.
DISASSEMBLY SERVICE POINTS

A＞OUTER RACE REMOVAL

B＞OUTER RACE REMOVAL

REASSEMBLY SERVICE POINTS

A＞COVER-A / COVER-B INSTALLATION
Install the covers directed as shown in the illustration

B＞BUSHING INSTALLATION
Press fit the bushing to the illustrated position, while making sure that the split ends of the bushing do not coincide with the air purge groove.
OUTER RACE INSTALLATION

Apply transmission oil to the oil seal lip area.

Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
TRANSMISSION CASE
DISASSEMBLY AND REASSEMBLY

Disassembly steps
1. Oil seal
2. Needle bearing*
3. Bushing*
4. Transmission case

NOTE:
*: Never remove the bearing and bushing from the transmission case.
Only the case when installing new bearing and bushing into a new transmission case, refer to ▶A◀ and ▶B◀.
REASSEMBLY SERVICE POINTS

►A► BUSHING INSTALLATION
Press fit the bushing to the illustrated position, while making sure that the split ends of the bushing do not coincide with the air purge groove.

►B► NEEDLE BEARING INSTALLATION
Press fit the needle bearing until it is flush with the case, while making sure that the model number stamped side is oriented in the direction shown.

►C► OIL SEAL INSTALLATION
Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
Apply gear oil to all moving parts before installation.

**Disassembly steps**

1. Center differential drive gear
2. Center differential flange
3. Taper roller bearing
4. Snap ring
5. Front output shaft
6. Spacer
7. Side gear
8. Lock pin
9. Pinion shaft
10. Pinion shaft holder
11. Pinion
12. Washer
13. Side gear
14. Spacer
15. Taper roller bearing
16. Speedometer drive gear
17. Differential case

**DISASSEMBLY SERVICE POINTS**

**TAPER ROLLER BEARING REMOVAL**

Use the special tool to remove the taper roller bearing.
MTU 22B-47

**MANUAL TRANSMISSION OVERHAUL**

**Center Differential 22B-47**

**B> TAPER ROLLER BEARING REMOVAL**

Use the special tools to remove the taper roller bearing.

**REASSEMBLY SERVICE POINTS**

**A> TAPER ROLLER BEARING INSTALLATION**

Use the special tool to install the taper roller bearing.

**B> TAPER ROLLER BEARING INSTALLATION**

Use the special tools to install the taper roller bearing.

**C> SPACER / SIDE GEAR / WASHER / PINION/PINION HOLDER / PINION SHAFT / LOCK PIN / FRONT OUTPUT SHAFT / SNAP RING / CENTER DIFFERENTIAL FLANGE INSTALLATION**

1. Install the side gear in the center differential case with the spacer attached.
   
   **NOTE**
   
   If a new side gear is to be installed, select a spacer with medium thickness (0.8 – 0.9 mm).

2. Fit the washer on the back of each pinion. Engage the 4 pinions simultaneously in the side gear. Rotate the gears to place them in position, then install the pinion shaft holder.

3. Insert the pinion shafts.

4. Install the lock pins in the illustrated direction.
(5) Install the front output shaft to the side gear and fit the snap ring.

(6) Attach the spacer on the other side gear, then install the side gear in the center differential case.

**NOTE**
If a new side gear is to be installed, select a spacer with medium thickness (0.8 – 0.9 mm).

(7) Install the center differential flange on the case while aligning the mating marks, then secure it temporarily with machine screw.

(8) Measure the backlash between the side gear and the pinion.

**Standard value: 0.025 – 0.150 mm**

(9) If the measurement deviates from the standard value, correct the backlash using a spacer of different thickness and check it again.

**NOTE**
The backlash must be the same on both sides.

**CENTER DIFFERENTIAL DRIVE GEAR INSTALLATION**

(1) Apply sealant to the entire threaded portion of the bolt.

**Specified sealant:**
THREEBOND 1303 or LOKTITE 648

(2) Tighten the bolts to the specified torque in the illustrated sequence.
TRANSPORTER

DISASSEMBLY AND REASSEMBLY

Apply gear oil to all moving parts before installation.

Disassembly steps

1. Air breather
2. Dust seal guard
3. Oil seal
4. Oil seal
5. O-ring
6. O-ring
7. Oil seal
8. Oil seal
9. O-ring
10. Transfer cover
11. Transfer

Unit: Nm (kgf·m)
REASSEMBLY SERVICE POINTS

►A► O-RING INSTALLATION
Apply transmission oil to the O-ring.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W

►B► OIL SEAL INSTALLATION
(1) Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
(2) By using the special tool, install the oil seal.

►C► OIL SEAL INSTALLATION
(1) Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
(2) By using the special tool, install the oil seal.

►D► OIL SEAL INSTALLATION
(1) Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
(2) By using the special tool, install the oil seal.

►E► OIL SEAL INSTALLATION
(1) Apply transmission oil to the oil seal lip area.
Transmission oil: DIA QUEEN MULTI-GEAR OIL 75W/85W
(2) By using the special tool, install the oil seal.
**AIR BREather INSTALLATION**

Apply sealant to the air breather.

Specified sealant: THREEBOND 1501