

GROUP 22B

MANUAL TRANSAXLE OVERHAUL

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GENERAL INFORMATION

M1222000101703

MANUAL TRANSAXLE MODELS

Transaxle model	Combined engine	Vehicle model
F5MBD-1-BAZ	3A92	A03A

SPECIFICATIONS

TORQUE SPECIFICATIONS

M1222012101379

Item	Specification N·m
Transaxle	
Reverse shift arm bracket assembly mounting bolt	17 ± 3 (13 ± 2 ft-lb)
Shift & select link mounting bolt	18 ± 5 (13 ± 3 ft-lb)
Speed sensor mounting bolt <without ABS>	10 ± 2 (89 ± 17 in-lb)
Fork shaft Shift fork mounting bolt	16 ± 2 (12 ± 1 ft-lb)
Transaxle case	30 ± 5 (22 ± 3 ft-lb)
Shift& select lever shaft assembly	18 ± 5 (13 ± 3 ft-lb)
Rock ball assembly	37 ± 11 (27 ± 8 ft-lb)
Reverse idler gear shaft mounting bolt	30 ± 8 (22 ± 5 ft-lb)
Drain plug	39 ± 11 (29 ± 8 ft-lb)
Back-up light switch	41 ± 11 (30 ± 8 ft-lb)
Harness bracket bolt	11 ± 3 (97 ± 26 in-lb)
Cable bracket mounting bolt	18 ± 5 (13 ± 3 ft-lb)
Neutral position switch <with ABS>	34 ± 5 (25 ± 3 ft-lb)
Selection bell crank mounting bolt	19 ± 3 (14 ± 2 ft-lb)
Control housing	
Oil protect plate mounting bolt	17 ± 5 (13 ± 3 ft-lb)
Differential	
Differential ring gear	124 ± 7 (91 ± 5 ft-lb)

GENERAL SPECIFICATIONS

M1222000201744

Item		Specification
Transaxle model		F5MBD-1-BAZ
Transaxle type		5-speed forward, 1-speed reverse
Transaxle gear ratio	1st	3.545
	2nd	1.913
	3rd	1.310
	4th	0.973
	5th	0.804
	Reverse	3.214
Final gear ratio		4.055

SERVICE SPECIFICATIONS

M1222000301020

Item		Standard value	Minimum limit
Rotational starting torque of differential case N·m (in-lb)	New part	0.8 – 1.6 (7 – 14)	
	Used part	0.5 – 1.0 (4 – 1)	
Output shaft bearing preload N·m (in-lb)	New part	3.2 – 6.3 (28 – 56)	
	Used part	0.8 – 1.6 (7 – 14)	
Output shaft synchronizer hub No.1 thrust crevice mm (in)		0 – 0.1 (0 – 0.0039)	
Output shaft 5th driven gear thrust crevice mm (in)		0 – 0.11 (0 – 0.0043)	
Input shaft synchronizer hub No.2 thrust crevice mm (in)		0 – 0.11 (0 – 0.0043)	
Input shaft 5th Driven thrust washer crevice mm (in)		0 – 0.11 (0 – 0.0039)	
Input shaft radial ball bearing thrust crevice mm (in)		0 – 0.11 (0 – 0.0043)	
Differential case preload mm (in)		0.05 – 0.171 (0.0020 – 0.0067)	–
Input shaft front bearing end play mm (in)		0 – 0.121 (0 – 0.0048)	–
Input shaft rear bearing end play mm (in)		0 – 0.09 (0 – 0.0035)	–
Synchroizer ring back surface to gear clearance mm (in)		–	0.5 (0.02)
Output shaft front bearing end play mm (in)		0 – 0.12 (0 – 0.0047)	–
Output shaft 3rd speed gear end play mm (in)		0 – 0.09 (0 – 0.0035)	–
Output shaft rear bearing end play mm (in)		0 – 0.09 (0 – 0.0035)	–
Backlash between differential gear and pinion mm (in)		0 – 0.15 (0 – 0.0059)	–
1ST-4TH thrust clearance mm (in)		0.1 – 0.35 (0.0039 – 0.0138)	–
5TH thrust clearance mm (in)		0.1 – 0.5 (0.0039 – 0.0197)	–
1ST-2TH radial clearance mm (in)		0.015 – 0.056 (0.0006 – 0.0022)	–
3RD-5TH radial clearance mm (in)		0.015 – 0.058 (0.0006 – 0.0023)	–

SNAP RING, SPACER AND THRUST PLATE FOR ADJUSTMENT

M1222012001112

ADJUSTMENT SHIMS (FOR DIFFERENTIAL SIDE LH TAPERED ROLLER BEARING PRELOAD ADJUSTMENT)

Thickness mm (in)	Identification symbol	Thickness mm (in)	Identification symbol
2.10 (0.0827)	AA	2.60 (0.1024)	LL
2.15 (0.0846)	BB	2.65 (0.1043)	MM
2.20 (0.0866)	CC	2.70 (0.1063)	NN
2.25 (0.0886)	DD	2.75 (0.1083)	PP
2.30 (0.0906)	EE	2.80 (0.1102)	QQ
2.35 (0.0925)	FF	2.85 (0.1122)	RR
2.40 (0.0945)	GG	2.90 (0.1142)	SS
2.45 (0.0965)	HH	2.95 (0.1161)	TT
2.50 (0.0984)	JJ	3.00 (0.1181)	UU
2.55 (0.1004)	KK		

ADJUSTMENT SHIMS (FOR OUTPUT SHAFT BEARING PRELOAD ADJUSTMENT)

Thickness mm (in)	Identification color	Thickness mm (in)	Identification color
1.55 (0.0610)	A	1.95 (0.0768)	J
1.60 (0.0630)	B	2.00 (0.0787)	K
1.65 (0.0650)	C	2.05 (0.0807)	L
1.70 (0.0669)	D	2.10 (0.0827)	M
1.75 (0.0689)	E	2.15 (0.0846)	N
1.80 (0.0709)	F	2.20 (0.0866)	P
1.85 (0.0728)	G	2.25 (0.0886)	Q
1.90 (0.0748)	H		

SHAFT SNAP RINGS (FOR INPUT SHAFT SYNCHRONIZER HUB NO.1&NO2 BUSHING END PLAY ADJUSTMENT)

Thickness mm (in)	Identification color	Thickness mm (in)	Identification color
2.28 (0.0898)	A	2.46 (0.0969)	D
2.34 (0.0921)	B	2.52 (0.0992)	E
2.40 (0.0945)	C	2.58 (0.1016)	F

SHAFT SNAP RINGS (FOR INPUT SHAFT RADIAL BALL BEARING BUSHING END PLAY ADJUSTMENT)

Thickness mm (in)	Identification color	Thickness mm (in)	Identification color
1.80 (0.0709)	F	2.15 (0.0846)	N
1.85 (0.0728)	G	2.20 (0.0866)	P
1.90 (0.0748)	H	2.25 (0.0886)	Q
1.95 (0.0768)	J	2.30 (0.0906)	R
2.00 (0.0787)	K	2.35 (0.0925)	S
2.05 (0.0807)	L	2.40 (0.0945)	T
2.10 (0.0827)	M		

SHAFT SNAP RINGS (FOR INPUT SHAFT 5TH DRIVEN GEAR END PLAY ADJUSTMENT)

Thickness mm (in)	Identification color	Thickness mm (in)	Identification color
2.22 (0.0874)	A	2.52 (0.0992)	F
2.28 (0.0898)	B	2.58 (0.1016)	G
2.34 (0.0921)	C	2.64 (0.1039)	H
2.40 (0.0945)	D	2.70 (0.1063)	J
2.46 (0.0969)	E		

SHAFT SNAP RINGS (FOR OUTPUT SHAFT 5TH THRUST WASHER END PLAY ADJUSTMENT)

Thickness mm (in)	Identification color	Thickness mm (in)	Identification color
2.28 (0.0898)	1	2.46 (0.0969)	4
2.34 (0.0921)	2	2.52 (0.0992)	5
2.40 (0.0945)	3	2.58 (0.1016)	6

SEALANTS AND ADHESIVES

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Item	Specified sealant
Clutch housing-transaxle case mating surface	MITSUBISHI Genuine sealant part No. MD997740 or equivalent
Control housing-transaxle case mating surface	

FORM-IN-PLACE GASKET (FIPG)

This transaxle has several areas where the form-in-place gasket (FIPG) is used for sealing. To ensure that the FIPG fully serves its purpose, it is necessary to observe some precautions when applying it. 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 fluid passages. To prevent leaks or blocking of passages, therefore, it is absolutely necessary to apply the FIPG evenly without a break, while observing the correct bead size. FIPG hardens as it reacts with the moisture in the atmospheric air, and it is usually used for sealing metallic flange areas.

⚠ CAUTION

When re-applying liquid gasket (FIPG), be sure that:

1. **Residues of FIPG are cleared from all the ins and outs of parts;**
2. **Use Mitsubishi genuine parts cleaner (MZ100387) or equivalent to well degrease the FIPG-applied surface.**
3. **FIPG is correctly applied in accordance with FIPG Application.**

Disassembly

Parts sealed with a FIPG can be easily removed without need for the use of a special method. In some cases, however, the FIPG in joints may have to be broken by tapping parts with a mallet or similar tool.

Surface Preparation

Thoroughly remove all substances deposited on the FIPG application surface, using a gasket scraper. Make sure that the FIPG application surface is flat and smooth. Also make sure that the surface is free from oils, greases and foreign substances. Do not fail to remove old FIPG that may remain in the fastener fitting holes.

FIPG Application

Applied FIPG bead should be of the specified size and free of any break. FIPG can be wiped away unless it has completely hardened. Install the mating parts in position while the FIPG is still wet (in less than 10 minutes after application). Do not allow FIPG to spread beyond the sealing areas during installation. Avoid operating the transaxle or letting oils or water come in contact with the sealed area before a time sufficient for FIPG to harden (approximately one hour) has passed.

FIPG application method may vary from location to location. Follow the instruction for each particular case described later in this manual.

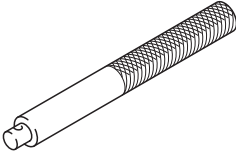
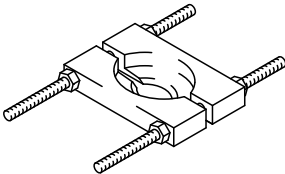
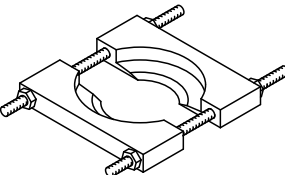
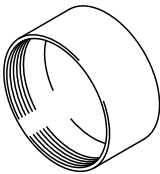
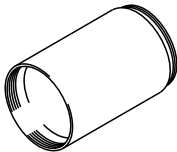
LUBRICANTS

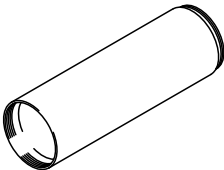
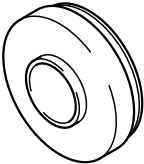
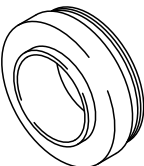
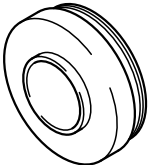
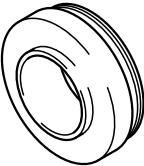
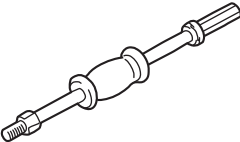
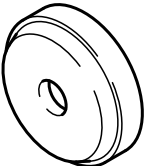
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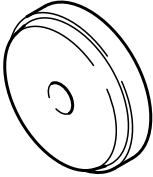
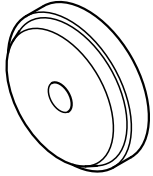
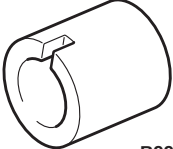
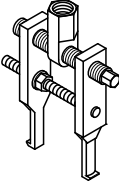
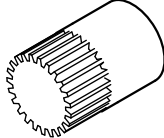
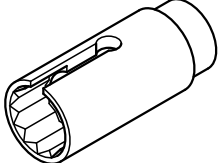
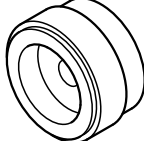
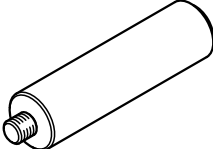
Item	Specified lubricant	Quantity
Each gear	MITSUBISHI MOTORS NEW MULTI GEAR OIL ECO API classification GL-4, SAE 75W-80	As required
Each oil seal	Mitsubishi part No.0101011 or equivalent	
Select lever shoe		

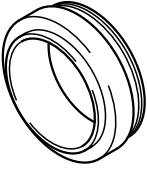
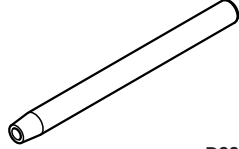
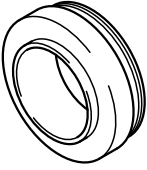
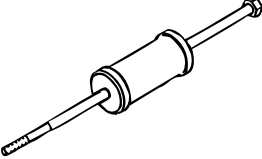
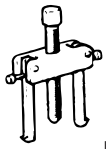
SPECIAL TOOLS

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Tool	Tool number and name	Supersession	Application
	MB990938 Handle	MB990938-01	Use with Installer adapter
	MD998801 Bearing remover	—	Installation and removal of gears, bearings and sleeves
	MD998917 Bearing remover	General service tool or MD998348-01	Installation and removal of gears, bearing and sleeves
	MD998812 Installer cap	General service tool or MIT304180-A	Use with Installer and Installer adapter
	MD998813 Installer-100	General service tool or MIT304180-A	Use with Installer cap and Installer adapter

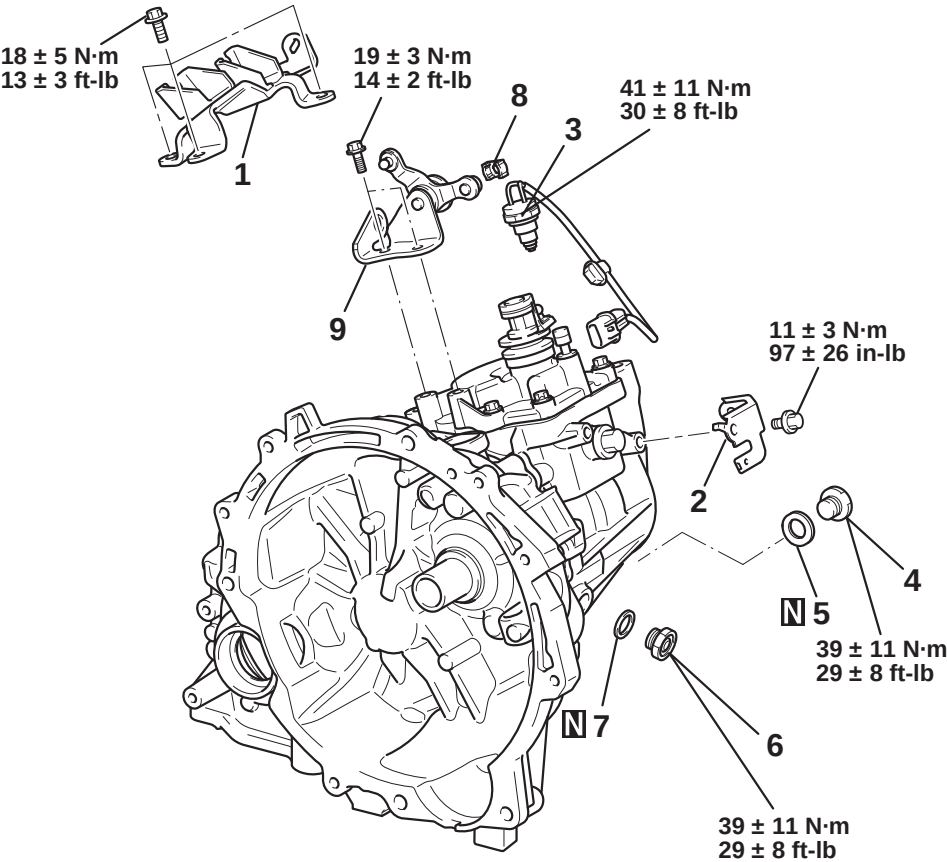
Tool	Tool number and name	Supersession	Application
	MD998814 Installer-200	MIT304180-A	Use with Installer cap and Installer adapter
	MD998816 Installer adapter (30)	–	Installation of input shaft front bearing
	MD998820 Installer adapter (42)	MD998820-01	• Installation of 5th speed gear sleeve • Installation of 2nd speed gear sleeve • Installation of 3rd speed gear • Installation of 3rd-4th speed synchronizer hub
	MD998817 Installer adapter (34)	–	Installation of output shaft rear ball bearing
	MD998818 Installer adapter (38)	General service tool	Installation of input shaft rear bearing and roller bearing inner race
 MB990211	MB990211 Slide hammer	MB990211-01	Removal output shaft bearing outer race
	MB990929 Installer adapter	–	Installation differential bearing outer race

Tool	Tool number and name	Supersession	Application
	MB990932 Installer adapter	–	Installation differential bearing outer race
	MB990933 Installer adapter	–	Removal differential bearing outer race
 B992000	MB992000 Crankshaft adapter	–	Installation of nipple
	MB992039 Slide hammer puller	MB992039-01	• Remove of cylindrical roller bearing (outer race) • Remove of tapered roller bearing outer race
 MB991144	MB991144 Side gear holding tool	–	• Measurement of differential side bearing preload • Measurement of output shaft assembly bearing preload
	MD998773 Knock sensor wrench	MD998773-01	Installation and removal of speed sensor and neutral start switch assembly
 B992873	MB992873 Installer oil seal	–	Installation of differential oil seal
	MB992075 Handle	–	

Tool	Tool number and name	Supersession	Application
	MD998825 Installer adapter (52)	—	Installation of speedometer drive gear
 D998245	MD998245 Installer lock pin	—	Slotted spring pin
	MD998821 Installer adapter (48)	—	Installation of differential bearing
 MD999552	MD999552 Remover, valve body & pump housing	—	Remove of tapered roller bearing outer race
 MB990801	MB990801 Rear axle bearing outer race puller	—	

TRANSAXLE
DISASSEMBLY AND REASSEMBLY

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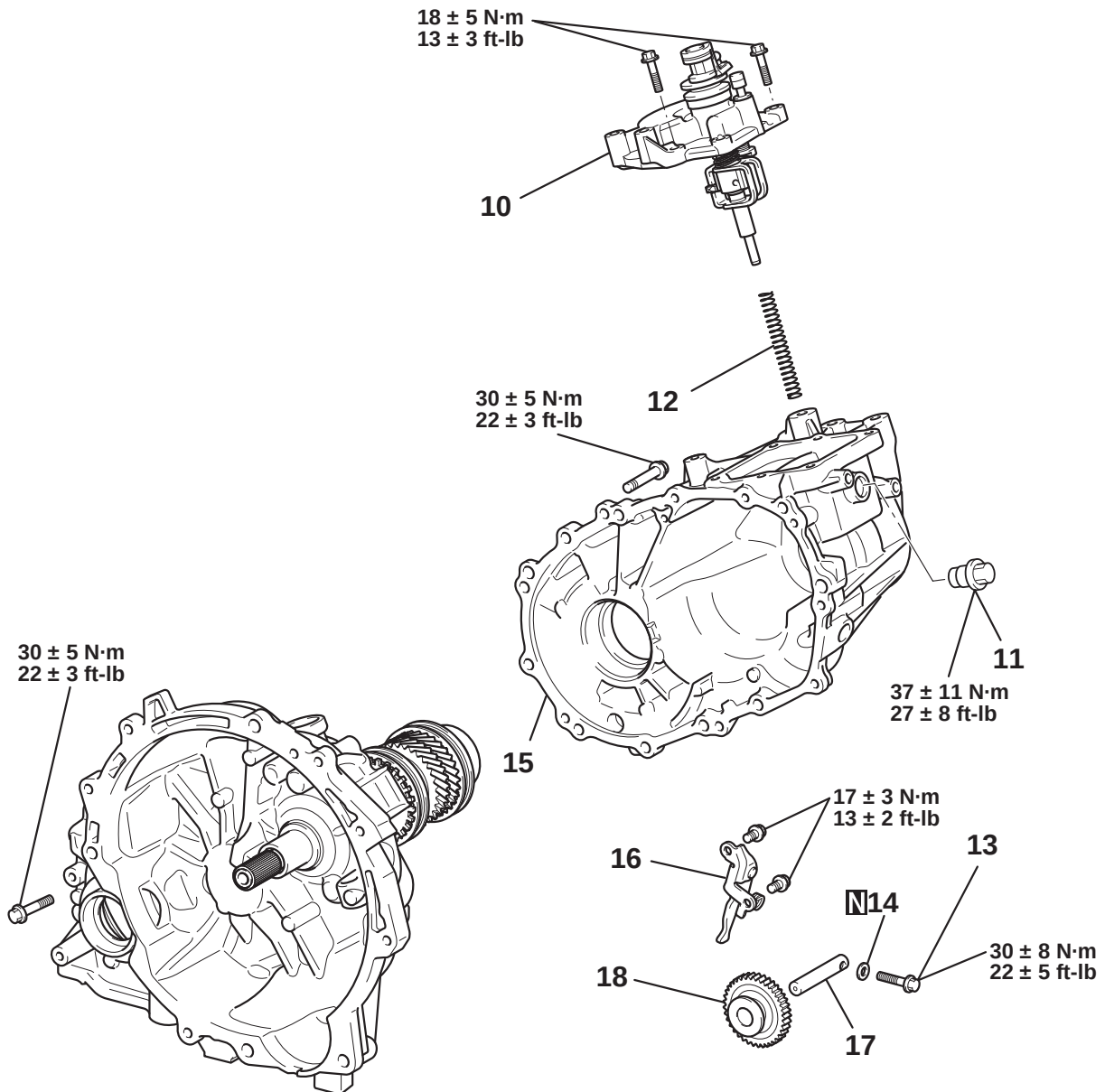
Disassembly steps

1. Control cable bracket
2. Wiring harness clamp
3. Back-up light switch
4. Drain plug
5. Gasket

Disassembly steps (Continued)

6. Drain plug
7. Gasket
8. Control bell crank dust cover
9. Selecting bell crank assembly

<<A>> >>G<<



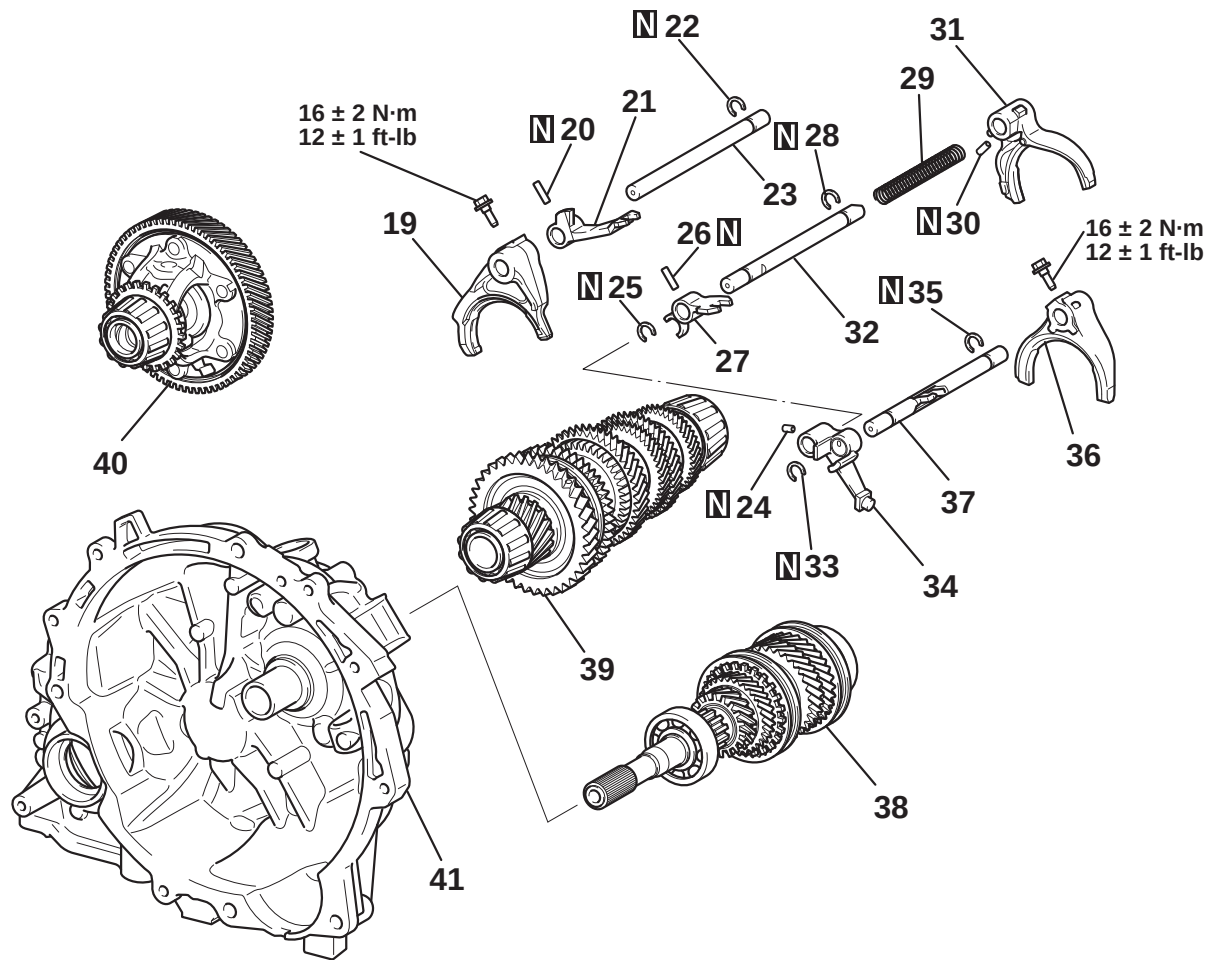
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Disassembly steps

- <> >>F<< 10. Rock ball assembly
- <> >>F<< 11. Shaft and select lever shaft assembly
- <<C>> >>E<< 12. Compression spring
- <<C>> >>E<< 13. Flange bolt
- <<C>> >>E<< 14. Gasket

Disassembly steps (Continued)

- <<D>> >>D<< 15. Transaxle case
- <<D>> >>D<< 16. Reverse shaft arm bracket assembly
- >>C<< 17. Reverse idler gear shaft
- >>C<< 18. Reverse idler gear sub-assembly



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<<E>>

Disassembly steps

- 19. Gear shift fork No.1
- 20. Slotted spring pin
- 21. Gear shift head No.1
- 22. Shaft snap ring
- 23. Gear shift fork shaft No.1
- >>B<< 24. Straight pin
- >>B<< 25. Shaft snap ring
- >>B<< 26. Slotted spring pin
- >>B<< 27. Gear shift head No.3
- >>B<< 28. Shaft snap ring
- >>B<< 29. Compression spring
- >>B<< 30. Straight pin

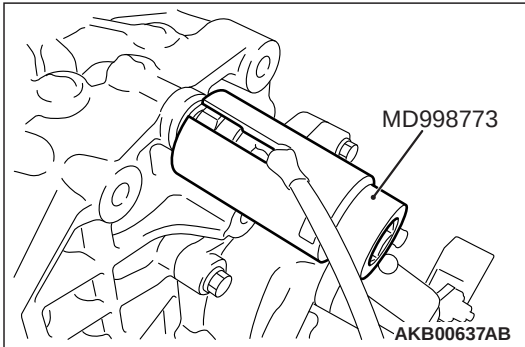
Disassembly steps (Continued)

- 31. Gear shift fork No.3
- 32. Gear shift fork shaft No.3
- >>B<< 33. Shaft snap ring
- >>B<< 34. Reverse shift fork
- >>B<< 35. Shaft snap ring
- 36. Gear shift fork No.2
- 37. Gear shift fork shaft No.2
- <<E>> >>A<< 38. Input shaft assembly
- <<E>> >>A<< 39. Output shaft assembly
- 40. Differential assembly
- 41. Clutch housing case assembly

DISASSEMBLY SERVICE POINTS

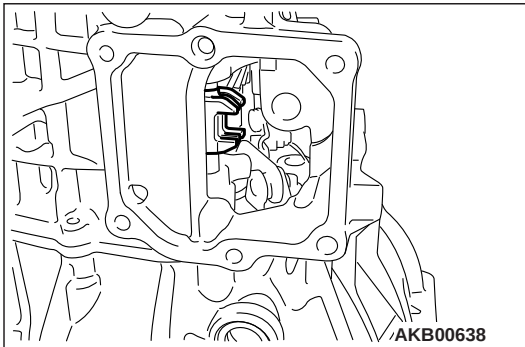
<<A>> BACK-UP LIGHT SWITCH REMOVAL

Using the special tool, knock sensor wrench (MD998773), remove the inner race of back-up light switch from the transaxle case.

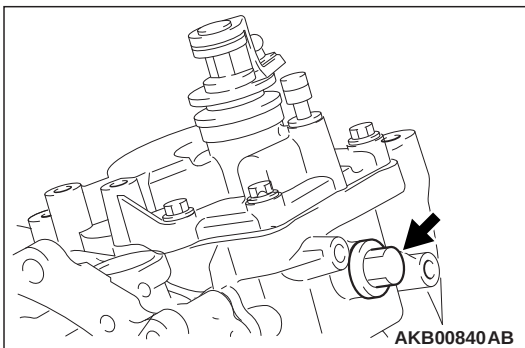


<> CONTROL BELL CRANK ASSEMBLY REMOVAL

Using the remove the rock ball assembly.

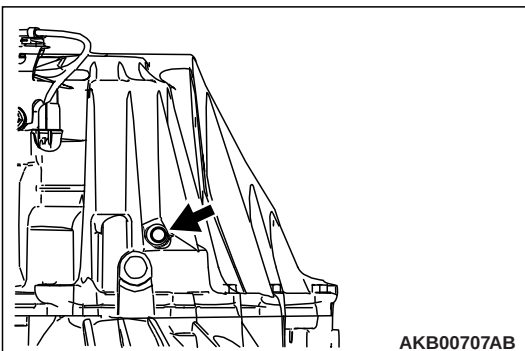


Using the remove the rock ball assembly.



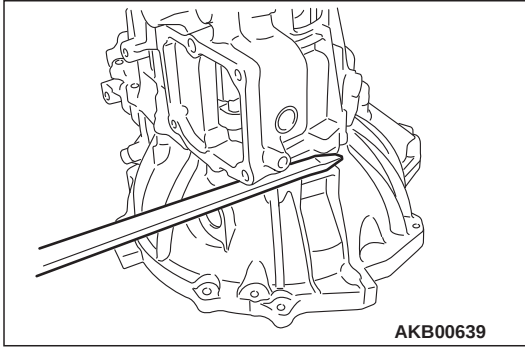
<<C>> FLANGE BOLT REMOVAL

Reverse idler gear shaft installation flange bolt is removed.



<<D>> TRANSAXLE CASE REMOVAL

Using the tire-lever large remove the transaxle case.



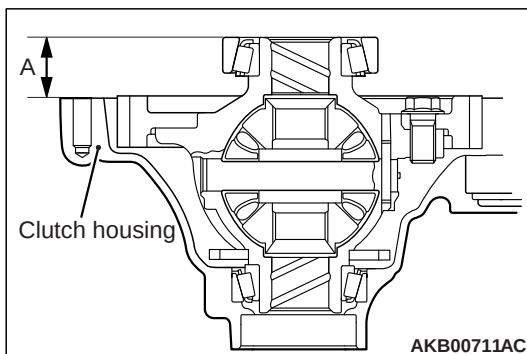
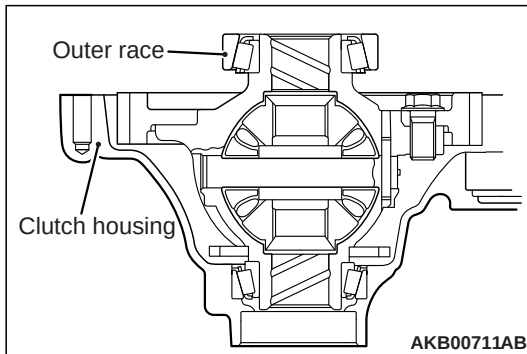
<<E>> INPUT SHAFT ASSEMBLY/OUTPUT SHAFT ASSEMBLY/SHIFT FORK SHAFT ASSEMBLY REMOVAL

Removal the shift fork, input and output shafts together.

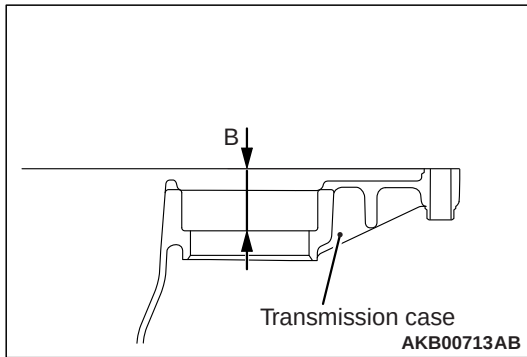
ADJUSTMENT BEFORE ASSEMBLY

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTMENT

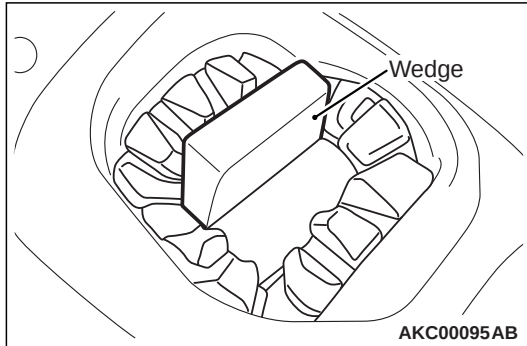
1. Set the differential assembly to the clutch housing assembly.
2. Push and fit the tapered roller bearing outer race by hand.
3. To fit the tapered roller bearing outer race, rotate the differential assembly by hand about 10 times.



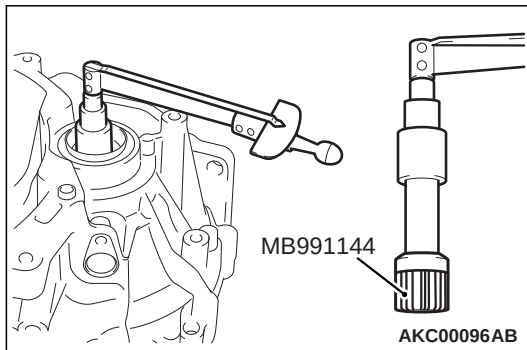
4. Put the clutch housing assembly on the surface table and use a height gauge to measure the dimension "A" which is from the mating surface of the clutch housing assembly to the end surface of the tapered roller bearing outer race.



5. Put the straight edge on the mating surface of the transaxle case assembly and measure the dimension "B" with a vernier caliper.
6. Select the shim whose dimension is the difference between "B" and "A."



7. Insert a wedge between the side gear and the pinion shaft to lock the side gear.
8. Install the differential assembly to the clutch housing assembly. Tighten the transaxle case bolts to the specified torque of 30 ± 5 N·m (22 ± 3 ft-lb).



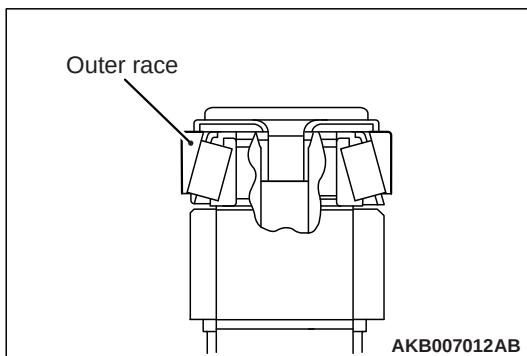
9. Using special tool Side gear holding tool (MB991144), measure the rotational starting torque of differential case. When it is not within the standard range, reselect the shim.

Standard value:

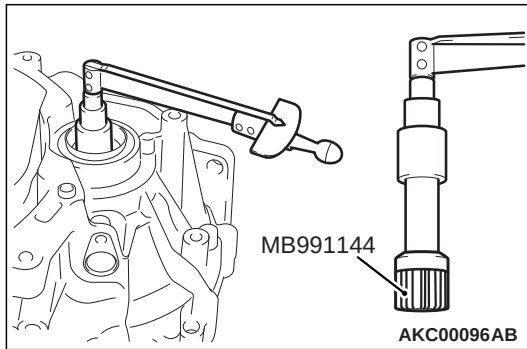
Used part: $0.5 - 1.0$ N·m (4 – 9 in-lb)

New part: $0.8 - 1.6$ N·m (7 – 14 in-lb)

OUTPUT SHAFT ASSEMBLY BEARING PRELOAD ADJUSTMENT



1. Set the output shaft assembly to the clutch housing assembly.
2. Push and fit the tapered roller bearing outer race by hand.
3. To fit the tapered roller bearing outer race, rotate the output shaft assembly by hand.
4. Put the clutch housing assembly on the surface table.
5. Install the output shaft assembly and differential assembly to the clutch housing assembly. Tighten the transaxle case bolts to the specified torque of 30 ± 5 N·m (22 ± 3 ft-lb).
6. Place the selected shim, then install the output shaft assembly.



- Measure the rotational starting torque of output shaft. When it is not within the standard range, reselect the shim.
(Differential assembly + output shaft starting torque) - (differential assembly starting torque) = output shaft starting torque

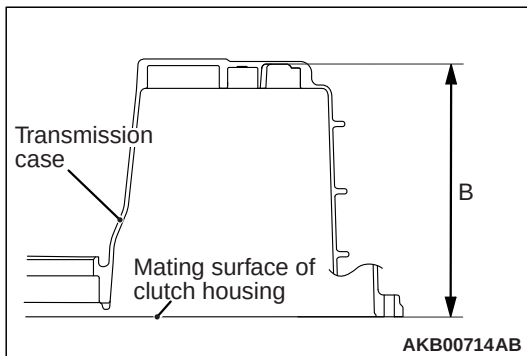
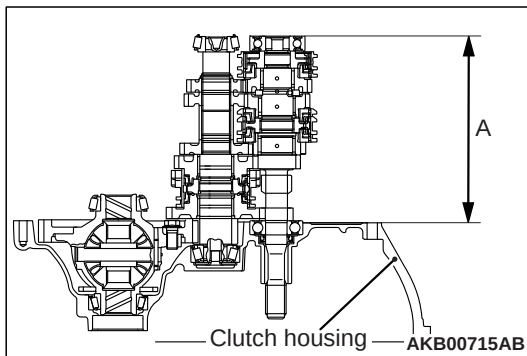
Standard value:

Used part: 0.8 – 1.6 N·m (7 – 14 in-lb)

New part: 3.2 – 6.3 N·m (28 – 56 in-lb)

INPUT SHAFT ASSEMBLY BEARING PRELOAD ADJUSTMENT

- Set the input shaft assembly to the clutch housing assembly.
- Put the clutch housing assembly on the surface table and measure the dimension "A" which is from the mating surface of the clutch housing assembly to the end surface of the bearing outer race, with a height gauge.



- Put the straight edge on the mating surface of the transaxle case assembly and measure the dimension "B" with a vernier caliper.
- Select the shim whose dimension is the difference between "B" and "A."
- Install the output shaft assembly and differential assembly to the clutch housing assembly. Tighten the transaxle case bolts to the specified torque of 30 ± 5 N·m (22 ± 3 ft-lb).
- Place the selected shim, then install the input shaft assembly.

REASSEMBLY SERVICE POINTS

>>A<< OUTPUT SHAFT/INPUT SHAFT INSTALLATION

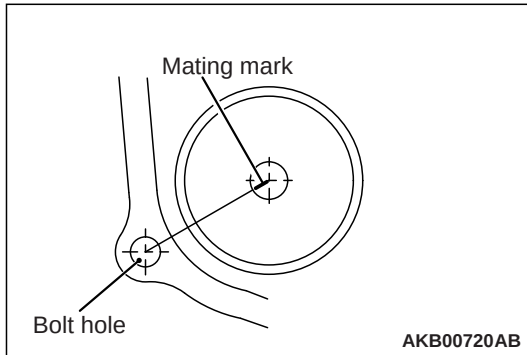
Install the input and output shafts together.

>>B<< SLOTTED SPRING PIN INSTALLATION

- Align the pin holes in the shift rail and shift fork.
- Insert the new slotted spring pin. Push it in as shown so that the slit and center axis of the rail are aligned.
Using the special tool installer lock pin, (MD998245) the slotted pin, slotted spring pin.

>>C<< REVERSE IDLER GEAR SUB-ASSEMBLY, REVERSE IDLER THRUST WASHER AND REVERSE IDLER GEAR SHAFT INSTALLATION

1. Install the reverse idler gear sub-assembly, reverse idler thrust washer and reverse idler gear shaft.
2. Before installing the transaxle case assembly, confirm that the reverse idler gear addition mark is positioned as show in the illustration.



>>D<< TRANSAXLE CASE INSTALLATION

⚠ CAUTION

Squeeze sealant evenly onto the transaxle case. Do not leave gaps or excess amounts, otherwise oil leaks are likely.

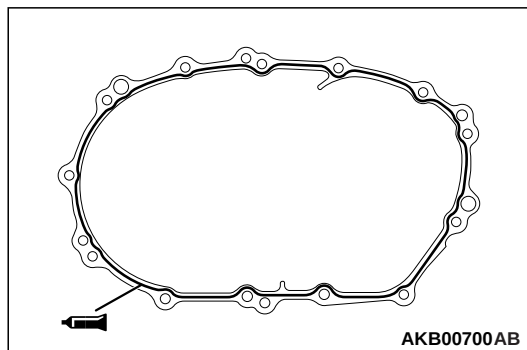
1. Apply a 1.2 mm diameter bead of sealant as illustrated onto the transaxle case.

Specified sealant:

Mitsubishi genuine sealant Part No. MD997740 or equivalent

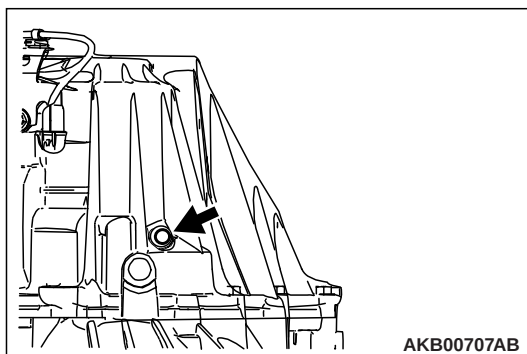
NOTE: Be sure to install the transaxle case onto the transaxle housing while the sealant is still wet (within 15 minutes).

2. Tighten the transaxle case mounting bolts to the specified torque of 30 ± 5 N·m (22 ± 3 ft-lb).



>>E<< REVERSE IDLER GEAR SHAFT INSTALLATION

Using a Phillips screwdriver (8 mm(0.3 in) in shank diameter) center the bolt hole.



>>F<< CONTROL HOUSING INSTALLATION

⚠ CAUTION

Squeeze sealant onto the case. Do not leave gaps or excess amounts, otherwise oil leaks are likely.

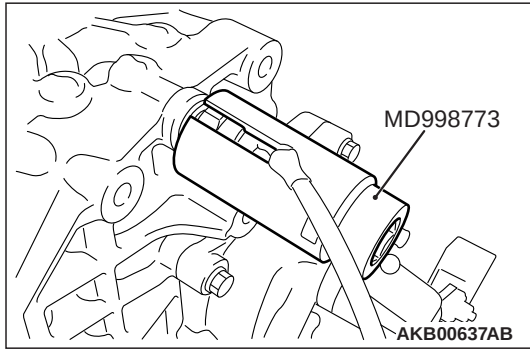
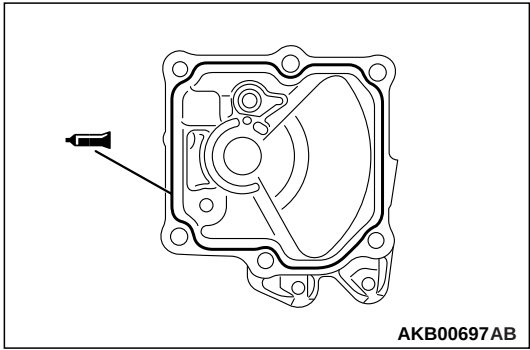
- 1. Apply a 1.2 mm (0.05 in) diameter bead of sealant as illustrated onto the control housing.

Specified sealant:
Mitsubishi genuine sealant Part No. MD997740 or equivalent

NOTE: Be sure to install the housing to the case quickly while the sealant is still wet (within 10 minutes).

- 2. Install the control housing to the transaxle case and tighten the bolts to specified torque of 18 ± 3 N·m (13 ± 23 ft-lb).

NOTE: After installation, keep the sealed area away from the oil for approximately one hour.



>>G<< BACK-UP LIGHT SWITCH INSTALLATION

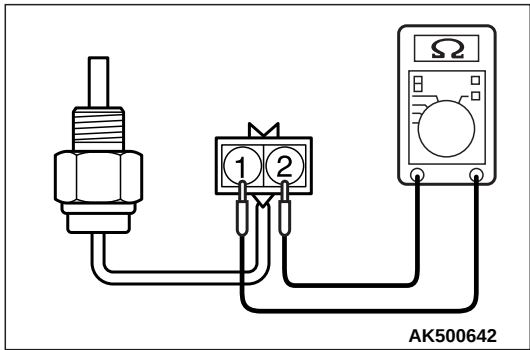
Using the special tool, knock sensor wrench (MD998773), tighten the back-up light switch to specified torque of 41 ± 11 N·m (30 ± 8 ft-lb).

INSPECTION

M1222001100941

BACK-UP LIGHT SWITCH

Check for continuity between terminals.

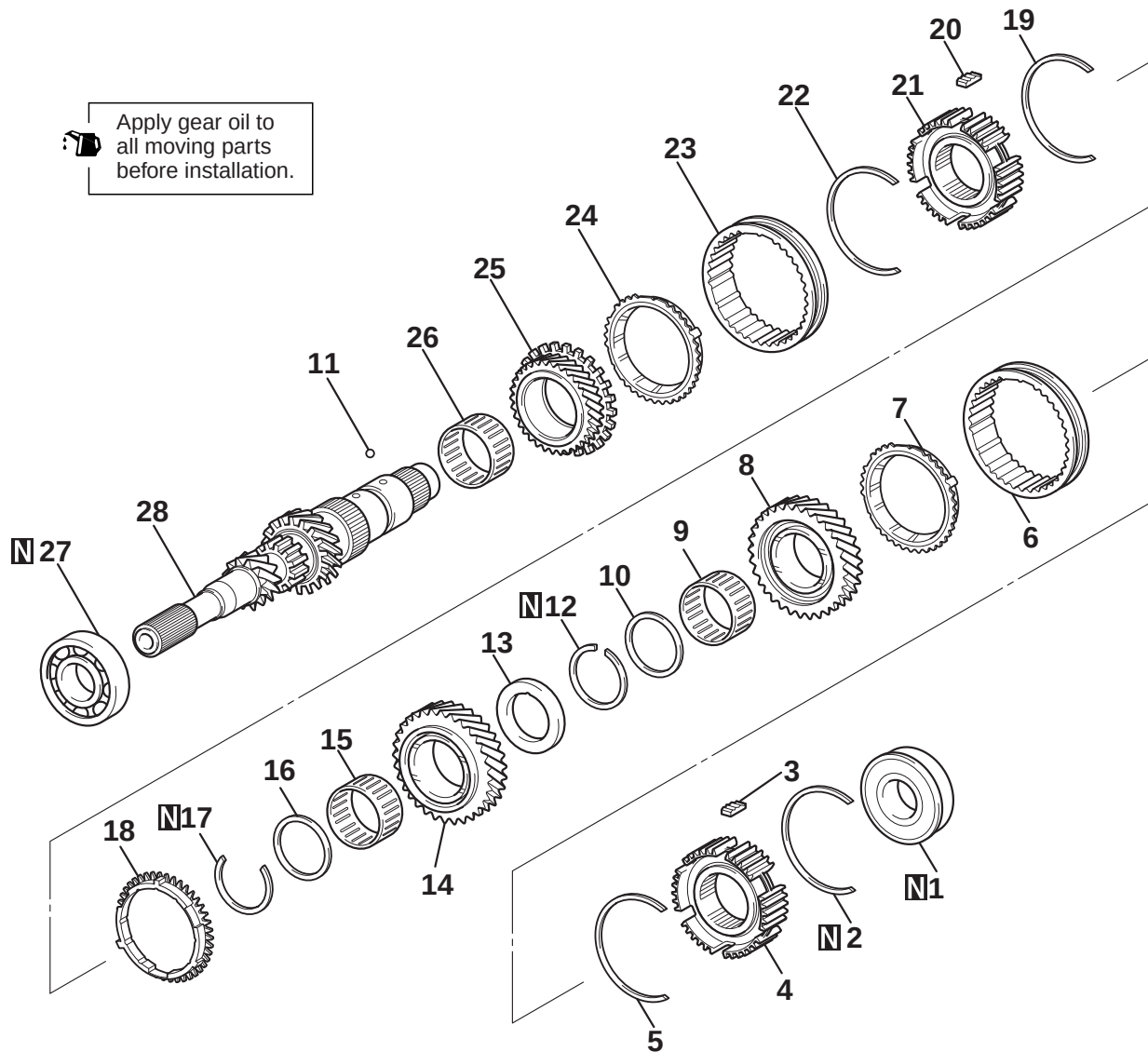


Switch Condition	Continuity
Pressed	Conductive
Released	Open

DISASSEMBLY AND REASSEMBLY



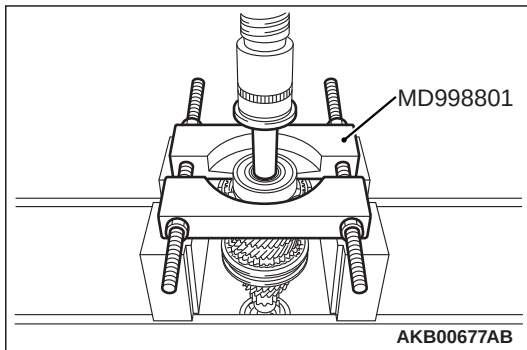
Apply gear oil to all moving parts before installation.



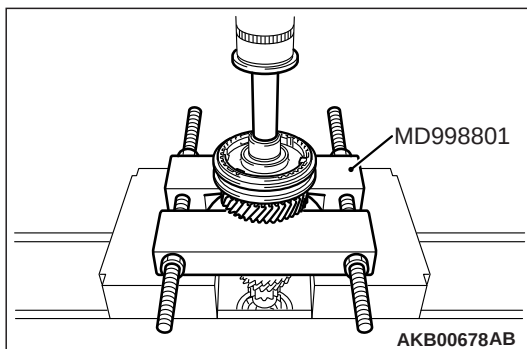
		Disassembly steps		Disassembly steps (Continued)	
<<A>>	>>G<<	1.	Radial ball bearing		15. Needle roller bearing
	>>F<<	2.	Synchromesh shifting key No.3 spring	>>C<<	16. Spacer
	>>F<<	3.	Synchromesh shifting key No.3	>>B<<	17. Snap ring
	>>F<<	4.	Synchronizer clutch hub No.3	>>B<<	18. Synchronizer ring No.2
	>>F<<	5.	Synchromesh shifting key No.3 spring	>>B<<	19. Synchromesh shifting key No.2 spring
	>>F<<	6.	Synchronizer clutch hub No.3	<<C>>	>>B<<
	>>F<<	7.	Synchronizer ring No.3	>>B<<	20. Synchromesh shifting key No.2
<>		8.	5th gear sub-assembly	>>B<<	21. Synchronizer clutch hub No.2
		9.	Needle roller bearing	>>B<<	22. Synchromesh shifting key No.2 spring
		10.	Spacer	>>B<<	23. Synchronizer clutch hub No.2
	>>E<<	11.	Ball	>>B<<	24. Synchronizer ring No.2
	>>D<<	12.	Snap ring		25. 3rd gear sub-assembly
		13.	Thrust washer		26. Needle roller bearing
		14.	4th gear sub-assembly	<<D>>	>>A<<
				27. Radial ball bearing	
				28. Input shaft	

DISASSEMBLY SERVICE POINTS**<<A>> RADIAL BALL BEARING REMOVAL**

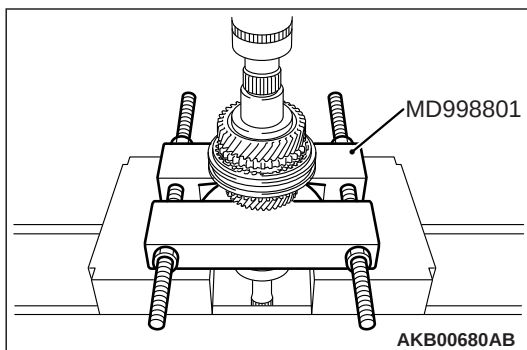
1. Using special tool Bearing remover (MD998801), support the radial ball bearing, and then set them on the press.
2. Push down on the input shaft with the press and remove the radial ball bearing.

**<> 5TH GEAR SUB-ASSEMBLY REMOVAL**

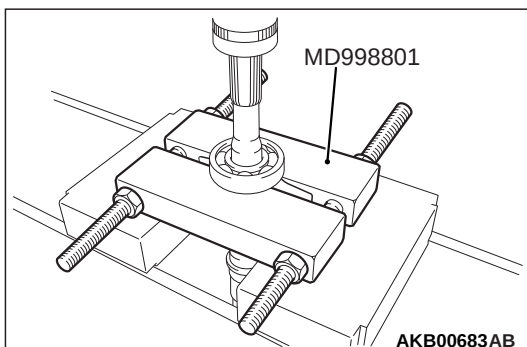
1. Using special tool Bearing remover (MD998801), support the 5th speed gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 5th speed-reverse synchronizer.

**<<C>> 4TH GEAR SUB-ASSEMBLY/3RD GEAR SUB-ASSEMBLY REMOVAL**

1. Using special tool Bearing remover (MD998801), support the 3rd gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 4th speed-reverse synchronizer and 3rd speed-reverse synchronizer.

**<<D>> RADIAL BALL BEARING REMOVAL**

1. Using special tool Bearing remover (MD998801), support the ball bearing, and then set them on the press.
2. Push down on the input shaft with the press and remove the radial ball bearing.

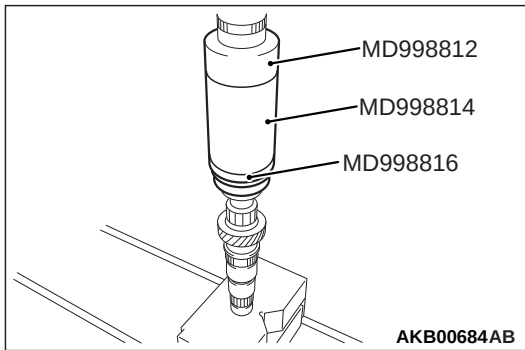


REASSEMBLY SERVICE POINTS

>>A<< RADIAL BALL BEARING INSTALLATION

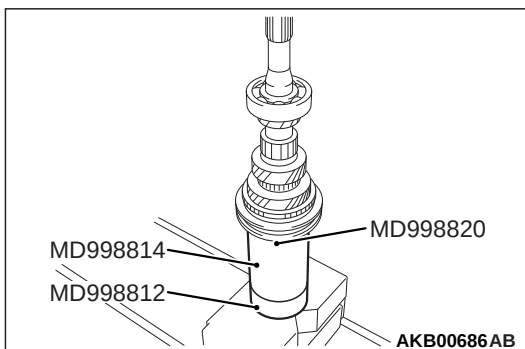
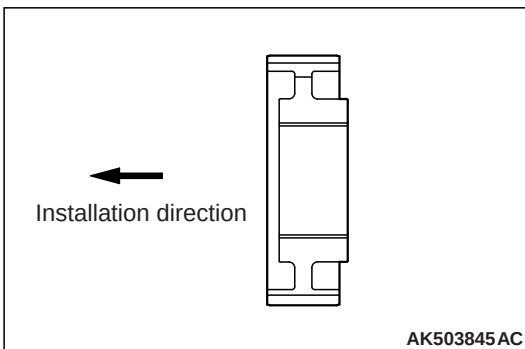
Using special tools, press install the radial ball bearing with the press.

- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998816)



>>B<< SYNCHROMESH SHIFTING KEY No.2 SPRING/SYNCHROMESH SHIFTING KEY No.2/SYNCHRONIZER CLUTCH HUB No.2/SYNCHRONIZER RING No.2 INSTALLATION

1. Synchronizer ring No.2 and synchronizer clutch hub No.2 are attached beforehand and it is made synchronizer assembly.
2. Check that the synchronizer clutch hub No.2 and synchronizer ring No.2 is in the correct installation direction, and put it on the output shaft.

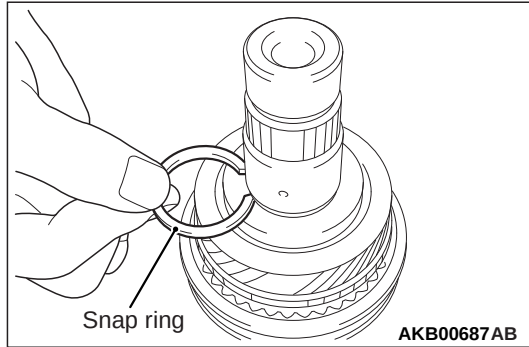


3. Using special tools, install the synchronizer clutch hub No.2 with the press.
 - Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998820)
4. Make sure that the outer synchronizer ring on the 5th gear sub-assembly side can rotate freely.

>>C<< SNAP RING INSTALLATION

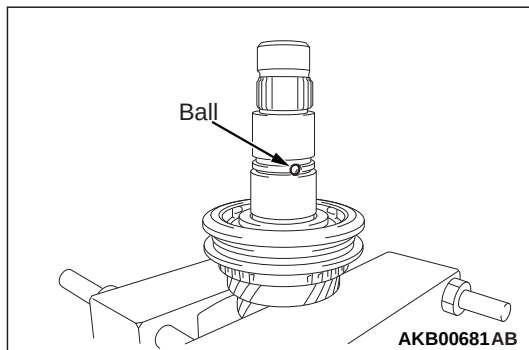
1. Install the thickest snap ring that can be fitted in the groove of the input shaft.
2. Make sure that the rear bearing end play meets the standard value.

Standard value: 0 - 0.1 mm (0 - 0.0039 in)

**>>D<< SNAP RING INSTALLATION**

1. Install the thickest snap ring that can be fitted in the groove of the input shaft.
2. Make sure that the rear bearing end play meets the standard value.

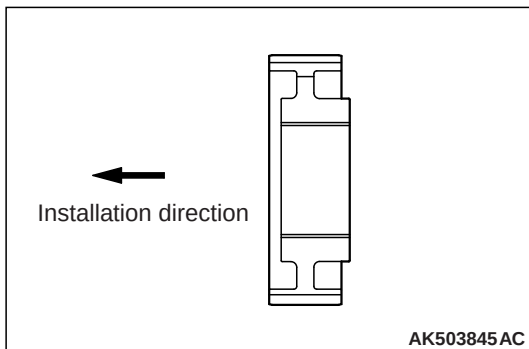
Standard value: 0 – 0.1 mm (0 - 0.0039 in)

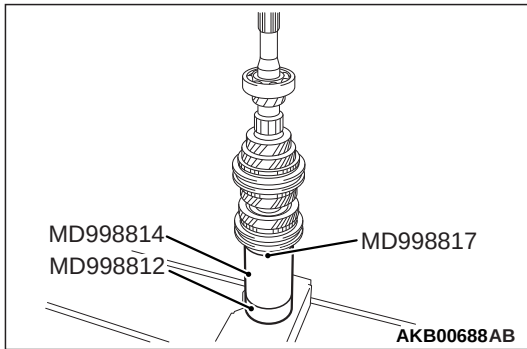
**>>E<< BALL INSTALLATION**

1. A ball is installed in the input shaft.
2. Next a Needle roller bearing is installed in the input shaft.

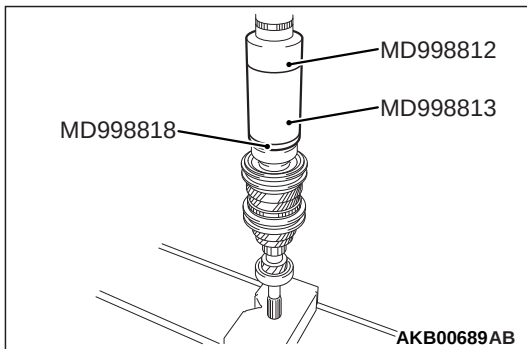
**>>F<< SYNCHROMESH SHIFTING KEY No.3
SPRING/SYNCHROMESH SHIFTING KEY
No.3/SYNCHRONIZER CLUTCH HUB
No.3/SYNCHRONIZER RING No.3 INSTALLATION**

1. Synchronizer ring No.3 and synchronizer clutch hub No.3 are attached beforehand and it is made synchronizer assembly.
2. Check that the synchronizer clutch hub No.3 and synchronizer ring No.3 is in the correct installation direction, and put it on the output shaft.





3. Using special tools, install the synchronizer clutch hub No.3 with the press.
 - Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998817)
4. Make sure that the outer synchronizer ring on the 5th gear sub-assembly side can rotate freely.



>>G<< RADIAL BALL BEARING INSTALLATION

Using special tools, install the radial ball bearing onto the input shaft with the press.

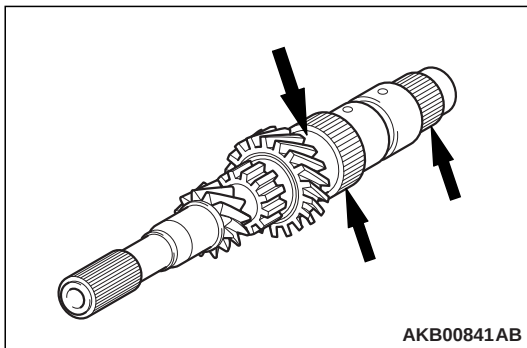
- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (MD998818)

INSPECTION

M1222001700385

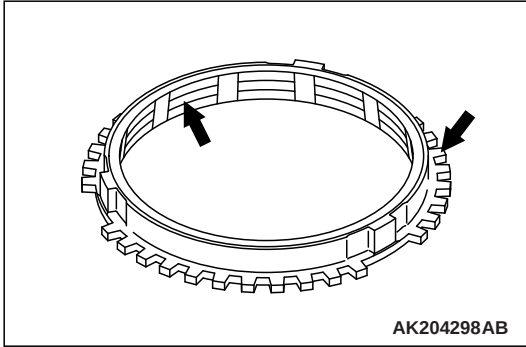
INPUT SHAFT

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.
3. Check that the helical gear teeth surfaces are not damaged or worn.

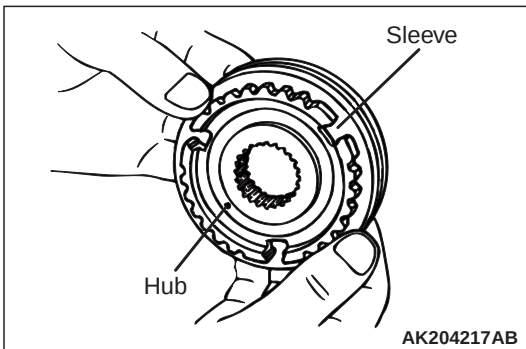


NEEDLE ROLLER BEARING

1. Combine the needle roller bearing with the input shaft or bearing sleeve and gear, and check that it rotates smoothly without noise or play.
2. Check the needle roller bearing cage for deformation.

**SYNCHRONIZER RING**

1. Check the clutch gear teeth for damage and broken.
2. Check internal surface for damage, wear and broken threads.

**SYNCHRONIZER SLEEVE AND HUB**

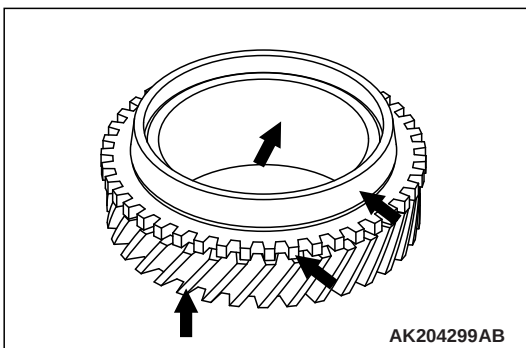
1. Combine the synchronizer sleeve and hub, and check that they slide smoothly.
2. Check that the sleeve is free from damage at its inside splines ends.

SYNCHRONIZER SPRING

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

SPEED GEARS

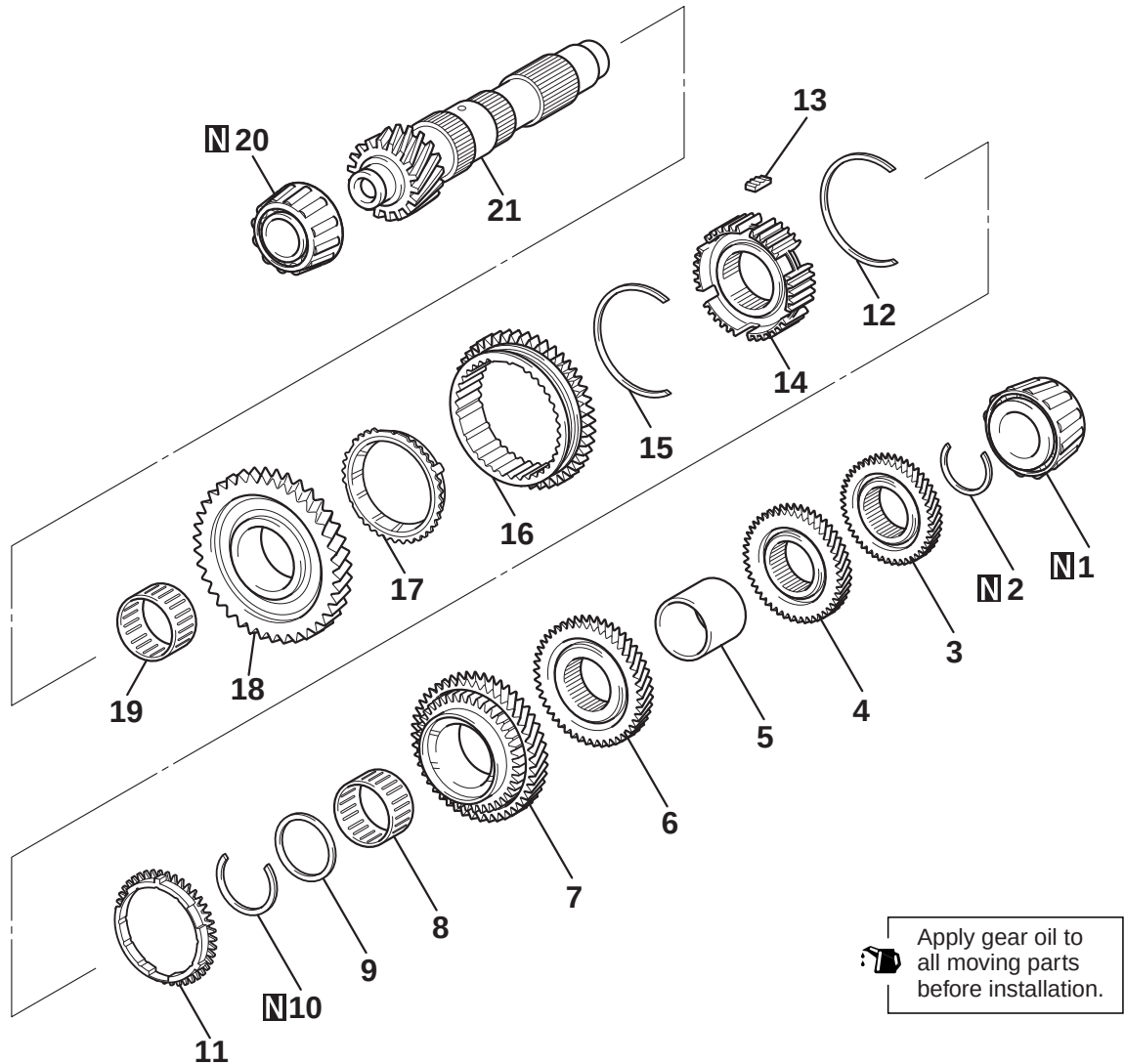
1. Check that the helical and clutch gear tooth surfaces are not damaged or worn.
2. Check that the synchronizer cone surfaces are not roughened, damaged or worn.
3. Check that the gear inside diameter and front and rear surfaces are not damaged and worn.



OUTPUT SHAFT

DISASSEMBLY AND REASSEMBLY

M1222002200758



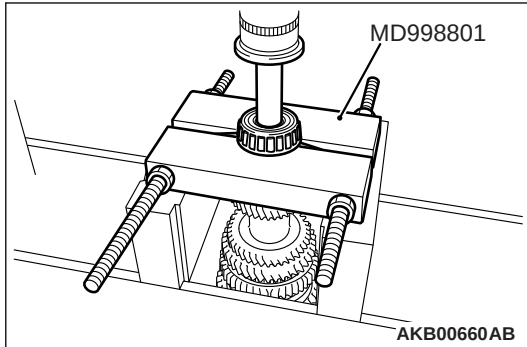
AKB00657AB

- Disassembly steps**
- <<A>> >>H<< 1. Tapered roller bearing
>>G<< 2. Snap ring
<> >>F<< 3. 5th driven gear
<> >>E<< 4. 4th driven gear
<<C>> >>D<< 5. Output gear spacer
<<C>> 6. 3rd driven gear
7. 2nd gear
8. Needle roller bearing
9. Spacer
>>C<< 10. Snap ring
11. Synchronizer ring No.1

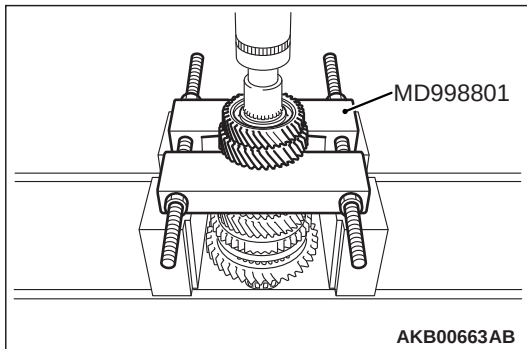
- Disassembly steps (Continued)**
- <<D>> >>B<< 12. Synchromesh shifting key No.1 spring
13. Synchromesh shifting key No.1
14. Synchronizer clutch hub No.1
15. Synchromesh shifting key No.1 spring
16. Reverse gear
17. Synchronizer ring No.1
18. 1st gear
19. Needle roller bearing
<<E>> >>A<< 20. Tapered roller bearing
21. Output shaft

DISASSEMBLY SERVICE POINTS**<<A>> TAPERED ROLLER BEARING REMOVAL**

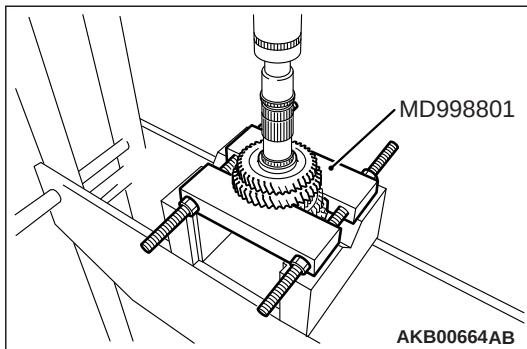
1. Using special tools, support the tapered roller bearing, and then set them on the press.
 - Bearing remover (MD998801)
2. Push down on the output shaft with the press, and remove the tapered roller bearing.

**<> 5TH DRIVE GEAR AND 4TH GEAR REMOVAL**

1. Using special tool Bearing remover (MD998801), support the 4th driven gear, and then set them on the press.
2. Push down on the output shaft with the press and remove the 5th driven gear and 4th driven gear.

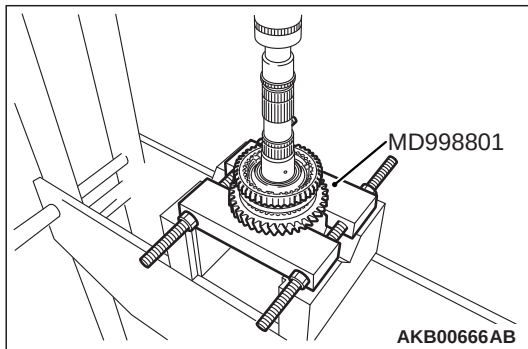
**<<C>> 3RD DRIVE GEAR AND 2ND GEAR REMOVAL**

Using special tool Bearing remover (MD998801), support the 2nd gear and remove the 3rd drive gear and 2nd gear.



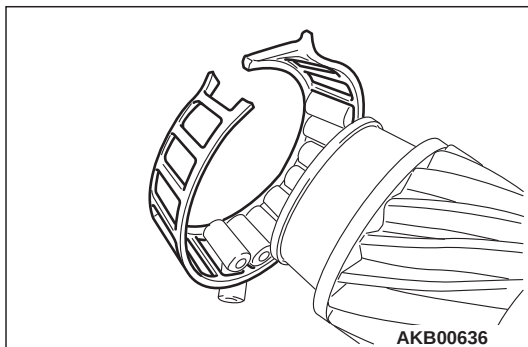
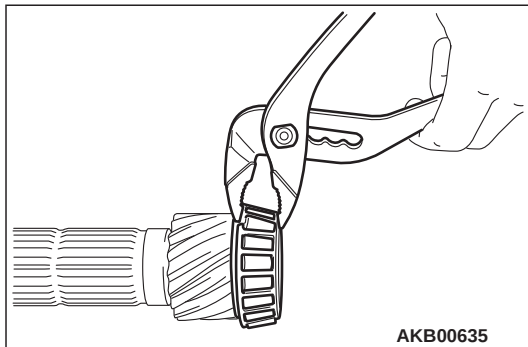
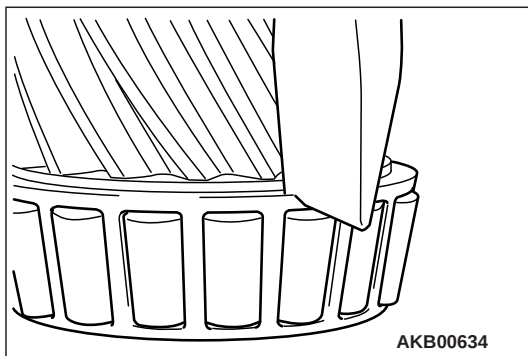
<<D>> REVERSE GEAR, SYNCHRONIZER CLUTCH HUB No.1 AND 1ST GEAR REMOVAL

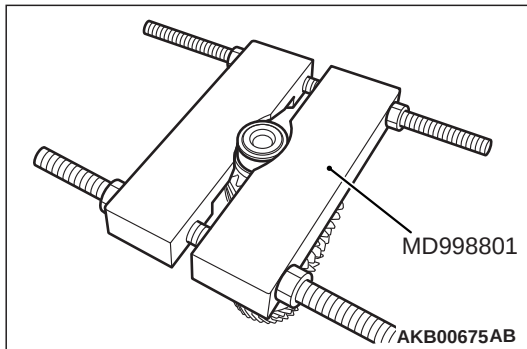
Using special tool Bearing remover (MD998801), support the 1st gear and remove the 1st gear, reverse gear and synchronizer clutch hub No.1.



⚠ CAUTION RED ROLLER BEARING REMOVAL Be careful so as not to injure anything but tapered roller bearing.

1. The cage of tapered roller bearing is cut using cold chisel and a roller is removed.

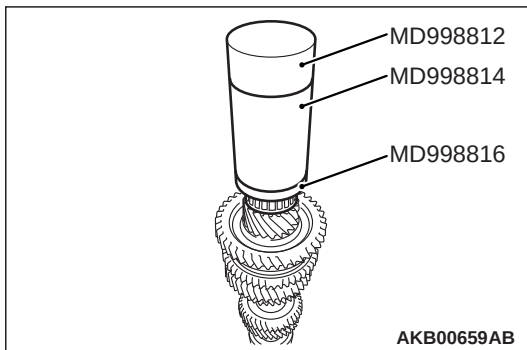




2. Special tools Bearing remover (MD998801) is set inner race portion and it removes by a press.

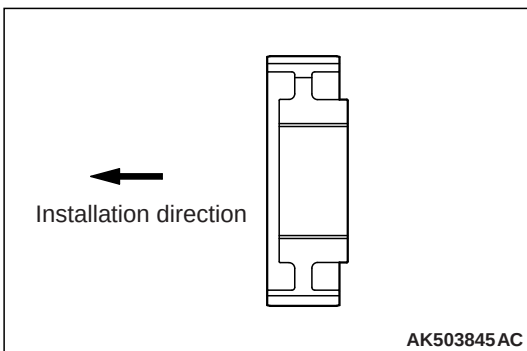
REASSEMBLY SERVICE POINTS

>>A<< TAPER ROLLER BEARING INNER RACE INSTALLATION

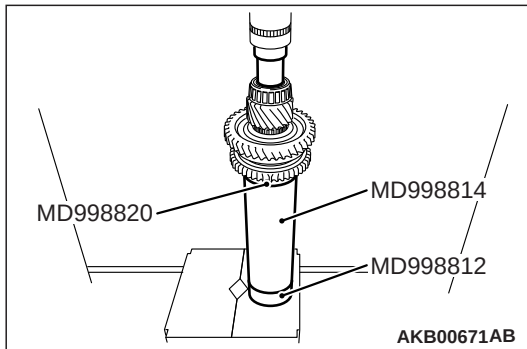


1. Using special tool Bearing remover (MD998801), support the output shaft gear, and then set them on the press.
2. Using special tools, install the roller bearing inner race with the press.
 - Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998816)

>>B<< 1ST-2ND SPEED SYNCHRONIZER HUB INSTALLATION

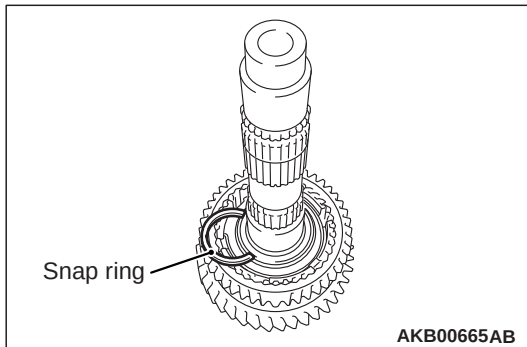


1. Synchronizer ring No.1 and synchronizer clutch hub No.1 are attached beforehand and it is made synchronizer assembly.
2. Check that the synchronizer clutch hub No.1 and synchronizer ring No.1 is in the correct installation direction, and put it on the output shaft.



3. Using special tools, install the 1st-2nd speed synchronizer hub with the press.
 - Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998820)
4. Make sure that the outer synchronizer ring on the 1st speed gear side can rotate freely.

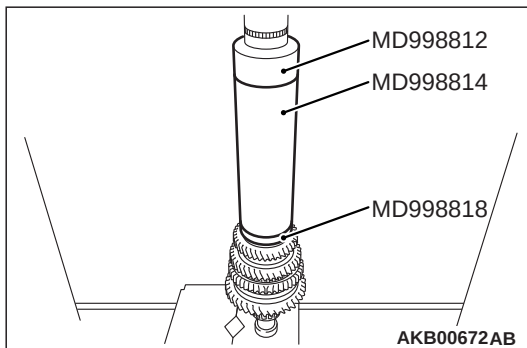
>>C<< SNAP RING INSTALLATION



1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the front bearing end play meets the standard value.

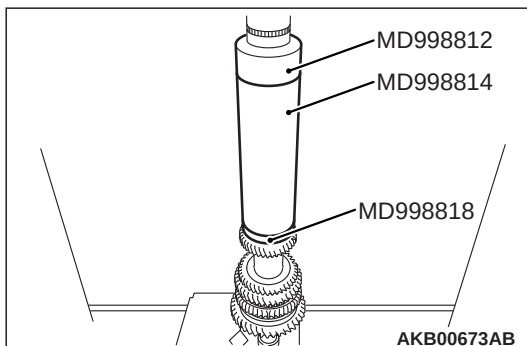
Standard value: 0 - 0.1 mm (0 - 0.0039 in)

>>D<< 3RD DRIVEN GEAR INSTALLATION



1. Check that the 2nd gear and the outer synchronizer ring have been properly installed.
2. Using special tools, install the 3rd speed gear onto the output shaft with the press.
 - Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998818)
3. Make sure that the 2nd speed gear and the outer synchronizer ring can rotate freely.

>>E<< 4TH DRIVEN GEAR INSTALLATION

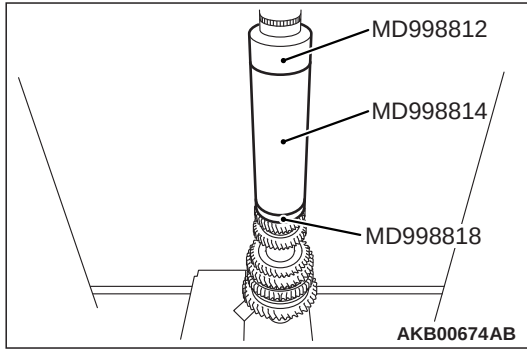


- Using special tools, install the 4th speed gear onto the output shaft with the press.
- Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998818)

>>F<< 5TH DRIVEN GEAR INSTALLATION

Using special tools, install the 5th speed gear onto the output shaft with the press.

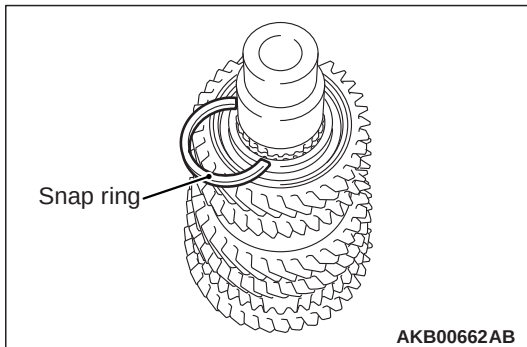
- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998818)



>>G<< SNAP RING INSTALLATION

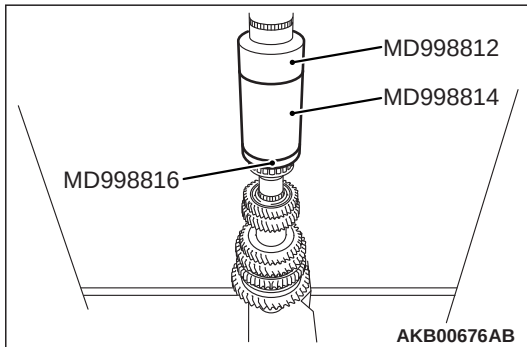
1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the front bearing end play meets the standard value.

Standard value: 0 - 0.1 mm (0 - 0.0039 in)



>>H<< TAPER ROLLER BEARING INNER RACE INSTALLATION

1. Using special tool Bearing remover (MD998801), support the output shaft gear, and then set them on the press.
 2. Using special tools, install the roller bearing inner race with the press.
- Installer cap (MD998812)
 - Installer-200 (MD998814)
 - Installer adapter (MD998816)

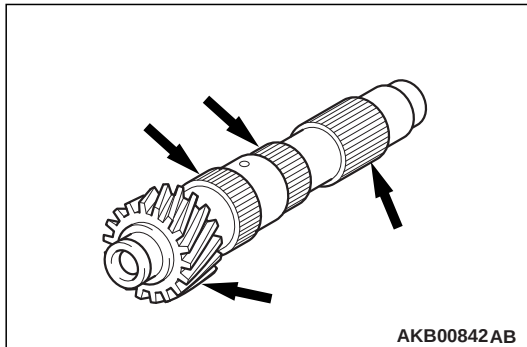


INSPECTION

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OUTPUT SHAFT

1. Check the splines for damage and wear.
2. Check that the helical gear teeth surfaces are not damaged or worn.

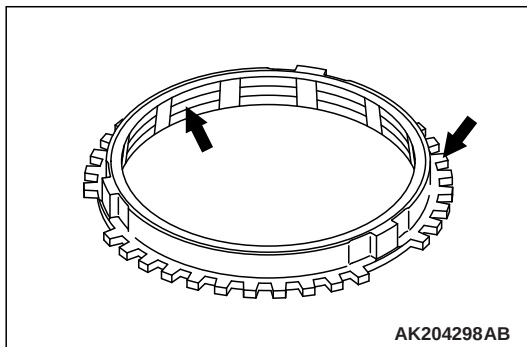


NEEDLE ROLLER BEARING

1. Combine the needle roller bearing with the bearing sleeve and gear, and check that it rotates smoothly without noise or play.
2. Check the needle roller bearing cage for deformation.

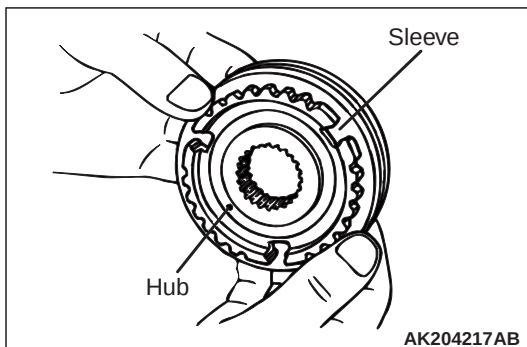
SYNCHRONIZER RING

1. Check if the clutch gear teeth are damaged or broken.
2. Check internal surface for damage, wear and broken threads.



SYNCHRONIZER SLEEVE AND HUB

1. Combine the synchronizer sleeve and hub, and check that they slide smoothly.
2. Check that the sleeve is free from damage at its inside splines ends.

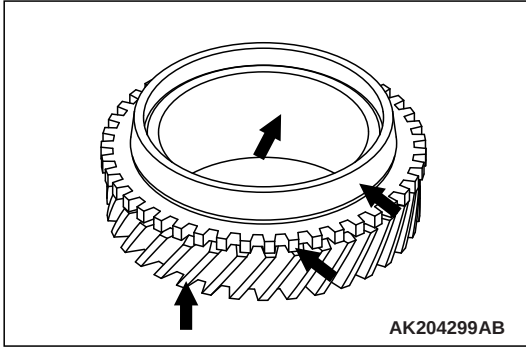


SYNCHRONIZER SPRING

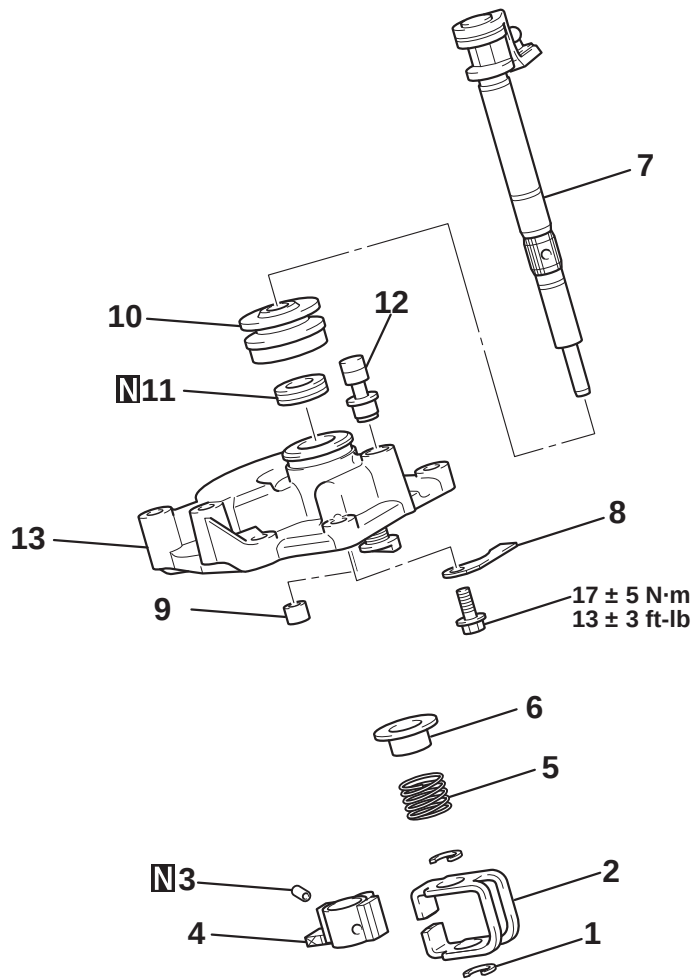
Check that the spring is not sagging, deformed or broken.

SPEED GEARS

1. Check that the helical and clutch gear tooth surfaces are not damaged or worn.
2. Check that the synchronizer cone surfaces are not roughened, damaged or worn.
3. Check that the gear inside diameter and front and rear surfaces are not damaged and worn.

**CONTROL HOUSING****DISASSEMBLY AND REASSEMBLY**

M1222013100517



 Apply gear oil to all moving parts before installation.

ACD00003AB

Disassembly steps

- >>D<<
1. Shaft snap ring
 2. Shaft inter lock plate
 3. Spring pin
 4. Inner No.1 lever shaft
 5. Compression spring
 6. Select spring No.2 seat
 7. Shaft and select lever shaft

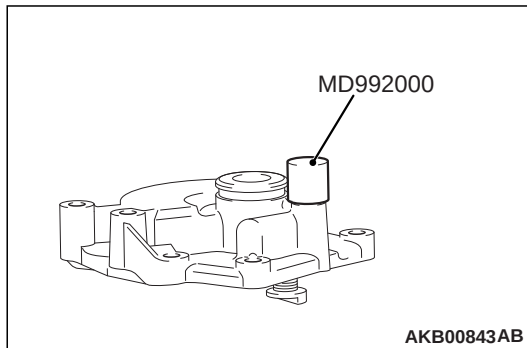
Disassembly steps (Continued)

- >>C<<
- >>B<<
- >>A<<
8. Oil protect plate
 9. Ring pin
 10. Shift lever boot
 11. Oil seal
 12. Plug
 13. Control shaft cover

REASSEMBLY SERVICE POINTS

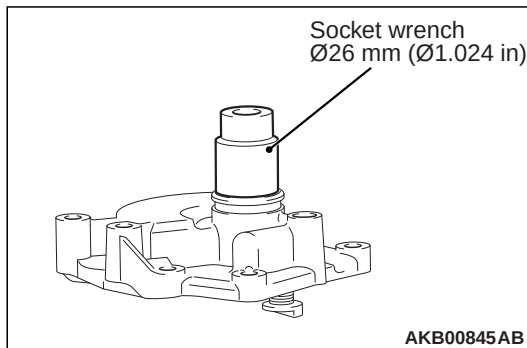
>>A<< BREATHER PLUG INSTALLATION

Using special tool crankshaft adapter (MB992000), install the plug.



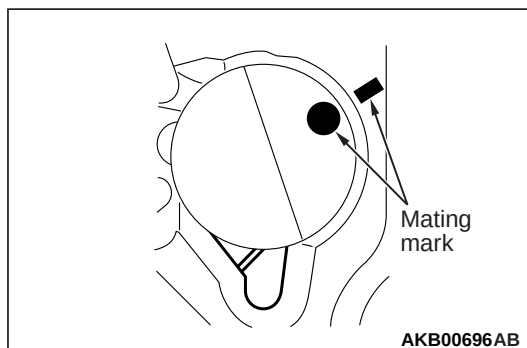
>>B<< OIL SEAL INSTALLATION

Using $\phi 26$ mm ($\phi 1.024$ in) socket wrench, press fit the oil seal into the control shaft cover.



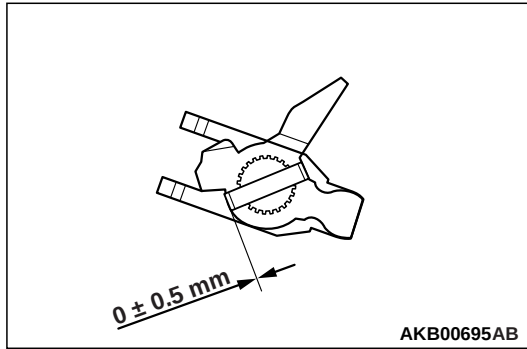
>>C<< SHIFT LEVER BOOT INSTALLATION

1. Shift lever boot is hooked and attached to the slot on the control cover.
2. Install the shift lever boot so that the embossed mark is in the direction shown in the figure.



>>D<<SPRING PIN INSTALLATION

Using special tool installer lock pin (MD998245), install the spring pin.

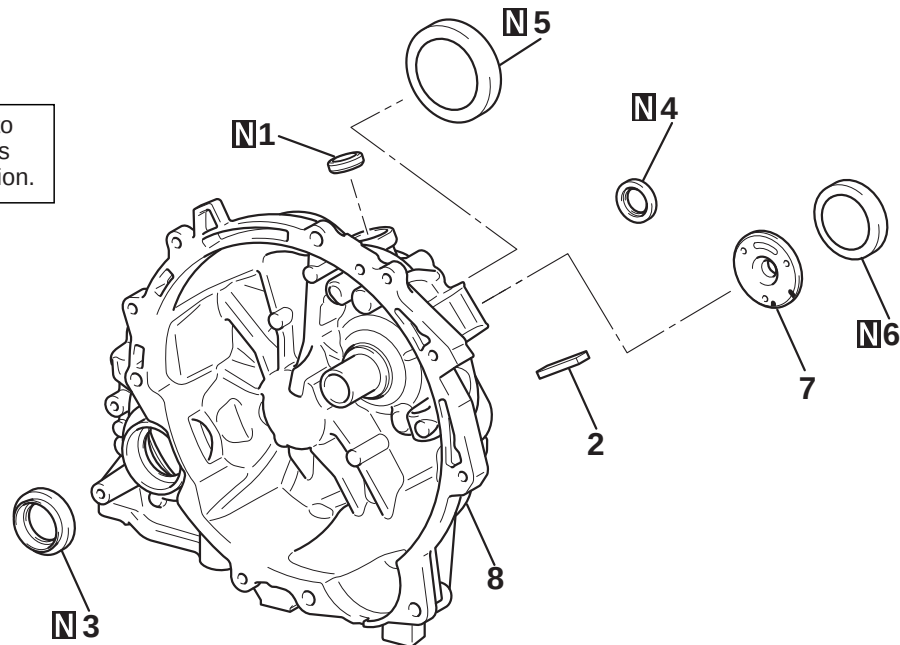


CLUTCH HOUSING

DISASSEMBLY AND REASSEMBLY

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Apply gear oil to
all moving parts
before installation.



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Disassembly steps

- >>F<< 1. Oil seal
2. Magnet
>>E<< 3. Oil seal
>>D<< 4. Oil seal

Disassembly steps (Continued)

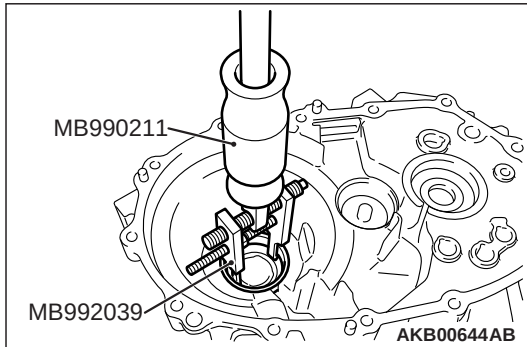
- <<A>> >>C<< 5. Outer race
<> >>B<< 6. Outer race
>>A<< 7. Oil guide
8. Clutch housing

DISASSEMBLY SERVICE POINT

<<A>> TAPER ROLLER BEARING (OUTER RACE) REMOVAL

1. Using special tools, remove the taper roller bearing (outer race).

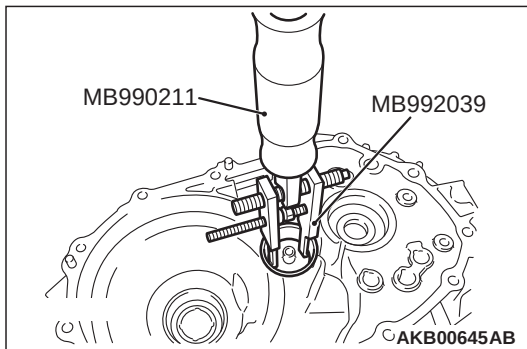
- Slide hammer (MB990211)
- Slide hammer puller (MB992039)



<> TAPER ROLLER BEARING (OUTER RACE) REMOVAL

1. Using special tools, remove the taper roller bearing (outer race).

- Slide hammer (MB990211)
- Slide hammer puller (MB992039)



REASSEMBLY SERVICE POINTS

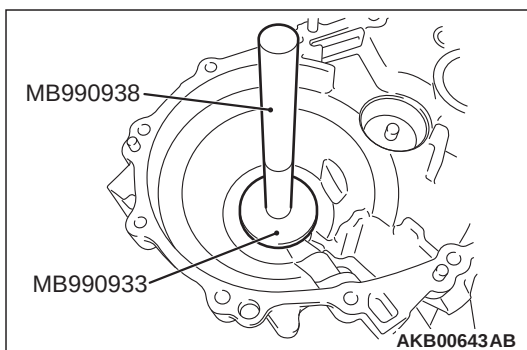
>>A<< OIL GUIDE INSTALLATION

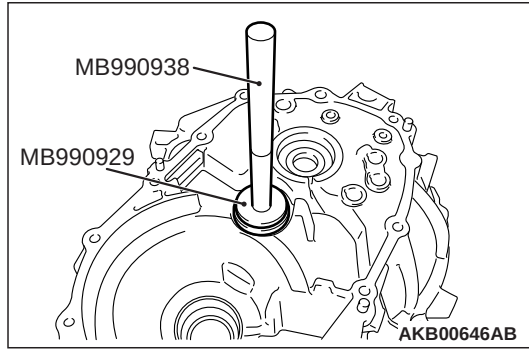
1. Make sure that the lubrication hole of the oil guide is at the upwards as shown in the illustration.

>>B<< OUTER RACE INSTALLATION

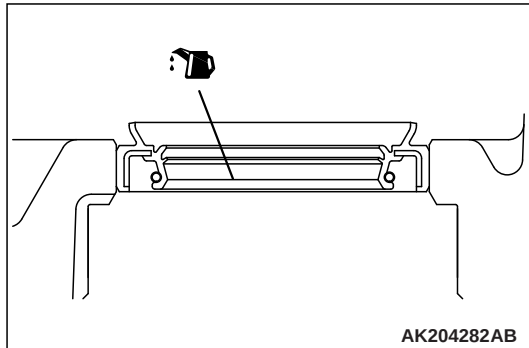
1. Using special tools, press fit the outer race into the clutch housing.

- Handle (MB990938)
- Installer adapter (MB990933)



**>>C<< OUTER RACE INSTALLATION**

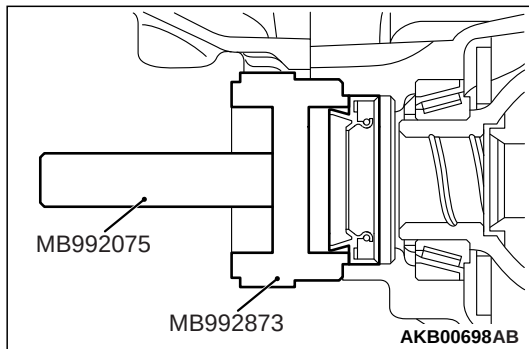
1. Using special tools, press fit the outer race into the clutch housing.
 - Handle (MB990938)
 - Installer adapter (MB990929)

**>>D<< OIL SEAL INSTALLATION**

1. Apply gear oil to the oil seal lip.

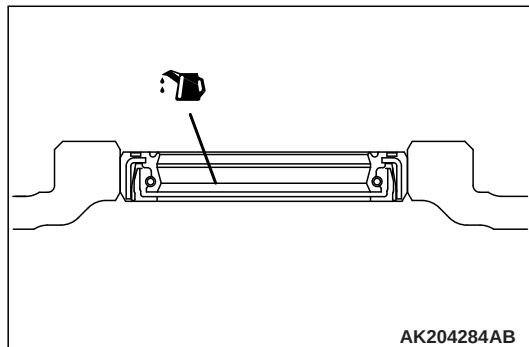
Specified Lubricant:

DiaQueen NEW MULTI GEAR OIL API classification GL-3, SEA 75W-80 or Gear oil API classification GL-4, SAE 75W-85/75W-90



2. Using special tools, install the oil seal.

- Oil seal installer (MB992873)
- Handle (MB992075)

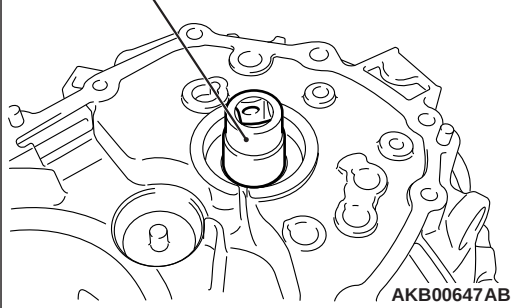
**>>E<< OIL SEAL INSTALLATION**

1. Apply gear oil to the oil seal lip.

Specified Lubricant:

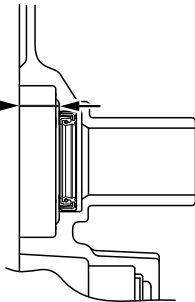
DiaQueen NEW MULTI GEAR OIL API classification GL-3, SEA 75W-80 or Gear oil API classification GL-4, SAE 75W-85/75W-90

Socket wrench $\varnothing 36$ mm ($\varnothing 1.142$ in)



2. Using $\varnothing 36$ mm ($\varnothing 1.142$ in) socket wrench, press fit the oil seal into the clutch housing.

14.5 mm
(0.57 in)

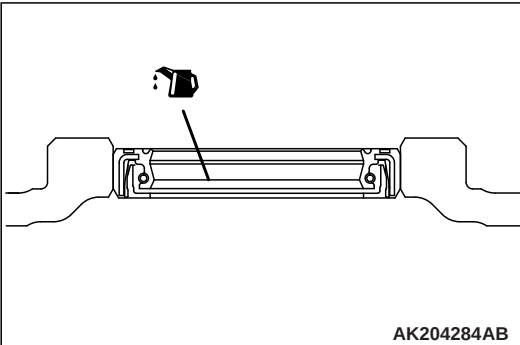


>>F<< OIL SEAL INSTALLATION

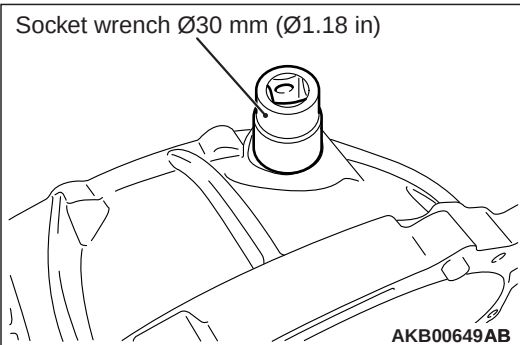
1. Apply gear oil to the oil seal lip.

Specified Lubricant:

**DiaQueen NEW MULTI GEAR OIL API classification
GL-3, SEA 75W-80 or Gear oil API classification GL-4,
SAE 75W-85/75W-90**



Socket wrench $\varnothing 30$ mm ($\varnothing 1.18$ in)

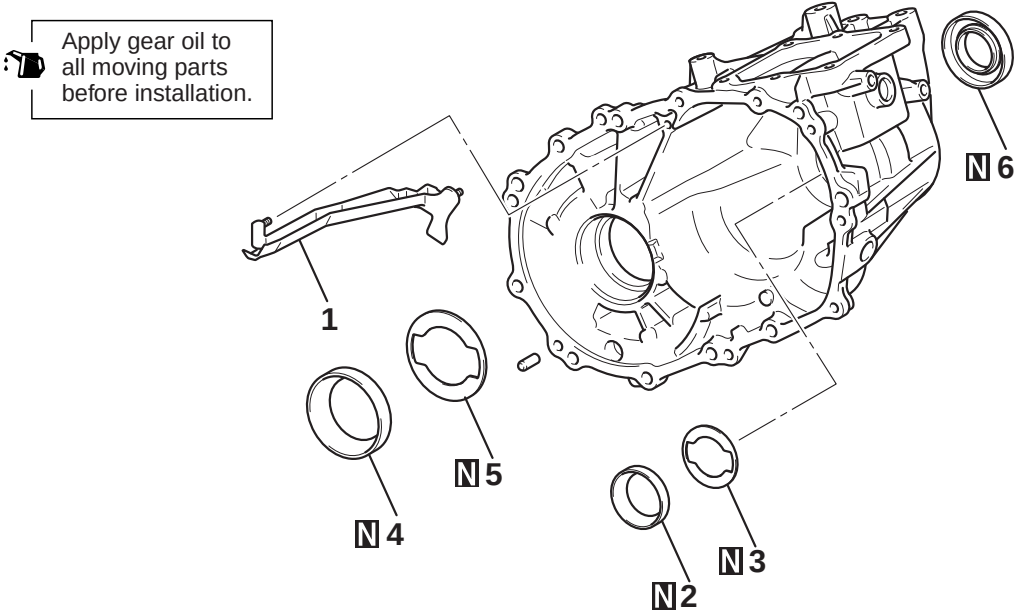


2. Using $\varnothing 30$ mm ($\varnothing 1.18$ in) socket wrench, press fit the oil seal into the clutch housing.

TRANSMISSION CASE

DISASSEMBLY AND REASSEMBLY

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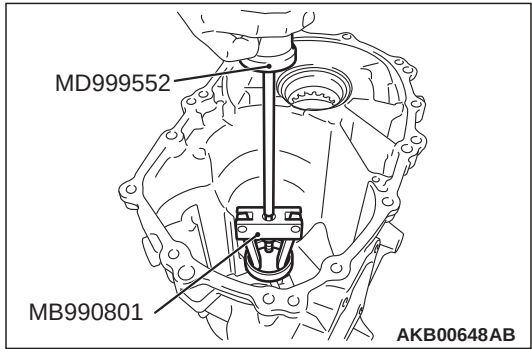
Disassembly steps			Disassembly steps (Continued)		
<<A>> >>C<<	1.	Oil receiver pipe	<> >>B<<	4.	Tapered roller bearing outer race
	2.	Tapered roller bearing outer race		5.	Shim
	3.	Shim	>>A<<	6.	Oil seal

DISASSEMBLY SERVICE POINTS

<<A>> TAPERED ROLLER BEARING OUTER RACE REMOVAL

Using special tools, remove the tapered roller bearing outer race.

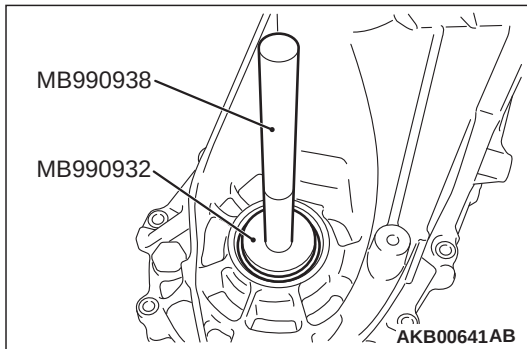
- Valve body & pump housing remover (MD999552)
- Rear axle bearing outer race puller (MB990801)



<> TAPERED ROLLER BEARING OUTER RACE REMOVAL

Using special tools, remove the tapered roller bearing outer race.

- Handle (MB990938)
- Installer adapter (MB990932)

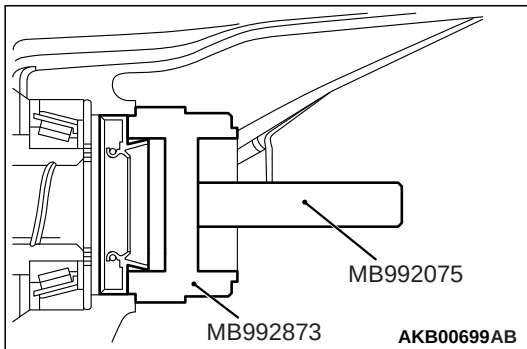


REASSEMBLY SERVICE POINTS

>>A<< OIL SEAL INSTALLATION

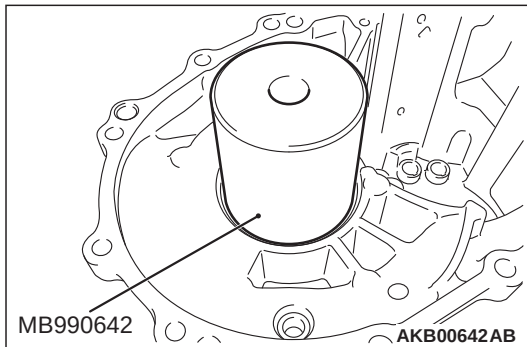
1. Using special tools, install the oil seal.
 - Installer oil seal (MB992873)
 - Handle (MB992075)
2. Pack grease to the oil seal lip area.

Specified grease: Mitsubishi Part No. 0101011 or equivalent



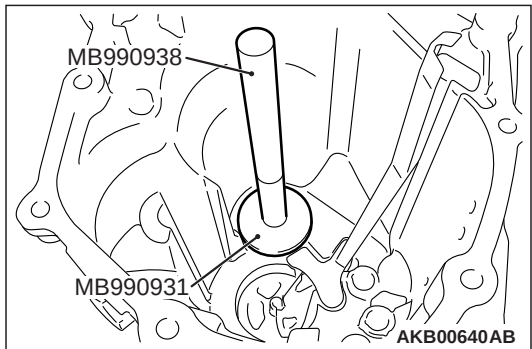
>>B<< TAPERED ROLLER BEARING OUTER RACE INSTALLATION

Set special tool base (MB990642), Install the tapered roller bearing outer race.



>>C<< TAPERED ROLLER BEARING OUTER
RACE INSTALLATION

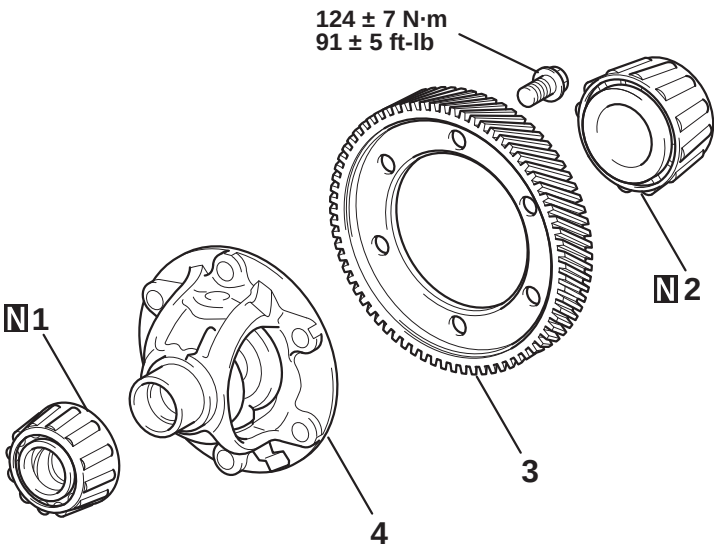
1. Set special tools, Install the tapered roller bearing outer race
- Handle (MB990938)
 - Installer adapter (MB990931)



DIFFERENTIAL

DISASSEMBLY AND REASSEMBLY

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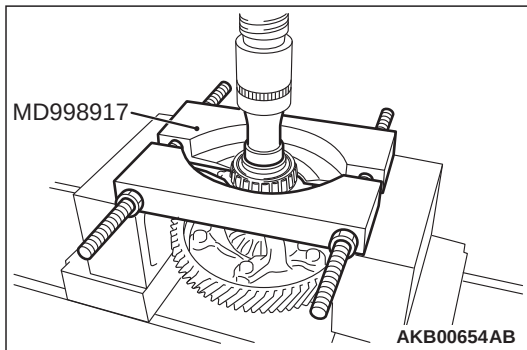
- Disassembly steps**
- <<A>> >>C<< 1. Tapered roller bearing
- <> >>B<< 2. Tapered roller bearing

- Disassembly steps (Continued)**
- >>A<< 3. Ring gear
4. Differential case assembly

DISASSEMBLY SERVICE POINTS

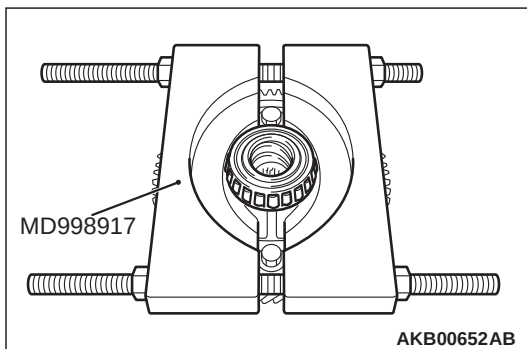
<<A>> TAPERED ROLLER BEARING REMOVAL

1. Using special tool bearing remover (MD998917), support the tapered roller bearing, and then set them on the press.
2. Push down on the differential case with the press and remove the tapered roller bearing.



<> TAPERED ROLLER BEARING REMOVAL

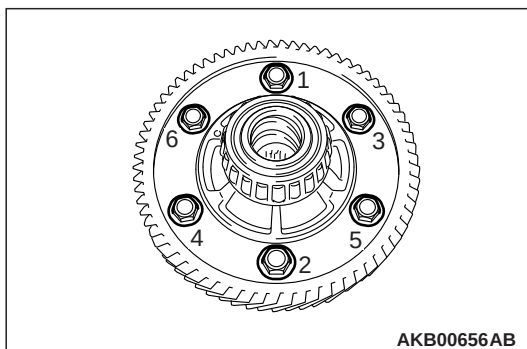
1. Using special tool bearing remover (MD998917), support the tapered roller bearing, and then set them on the press.
2. Push down on the differential case with the press and remove the tapered roller bearing.



REASSEMBLY SERVICE POINTS

>>A<< RING GEAR INSTALLATION

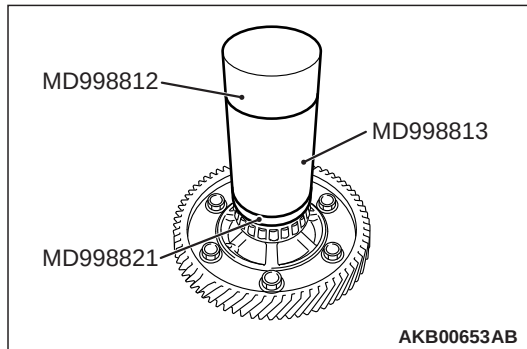
1. Tighten to the specified torque of 124 ± 7 N·m (91 ± 5 ft-lb) in the illustrated sequence.



**>>B<< TAPERED ROLLER BEARING
INSTALLATION**

Using special tools, install the tapered roller bearing.

- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (48) (MD998821)

**>>C<< TAPERED ROLLER BEARING
INSTALLATION**

Using special tools, install the tapered roller bearing.

- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (48) (MD998821)

