

## GROUP 22B

# MANUAL TRANSMISSION OVERHAUL

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**GENERAL INFORMATION**

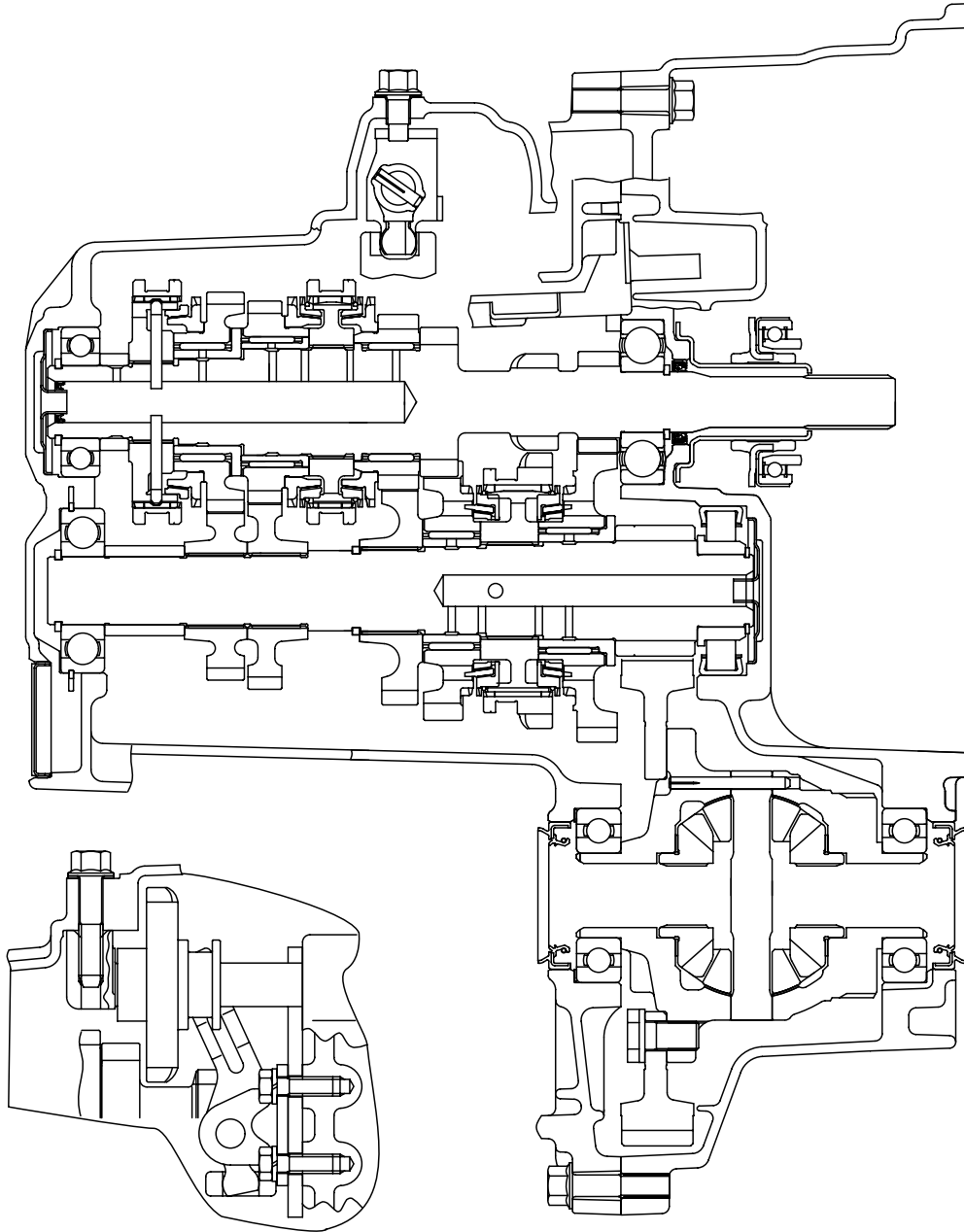
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**MANUAL TRANSMISSION MODELS**

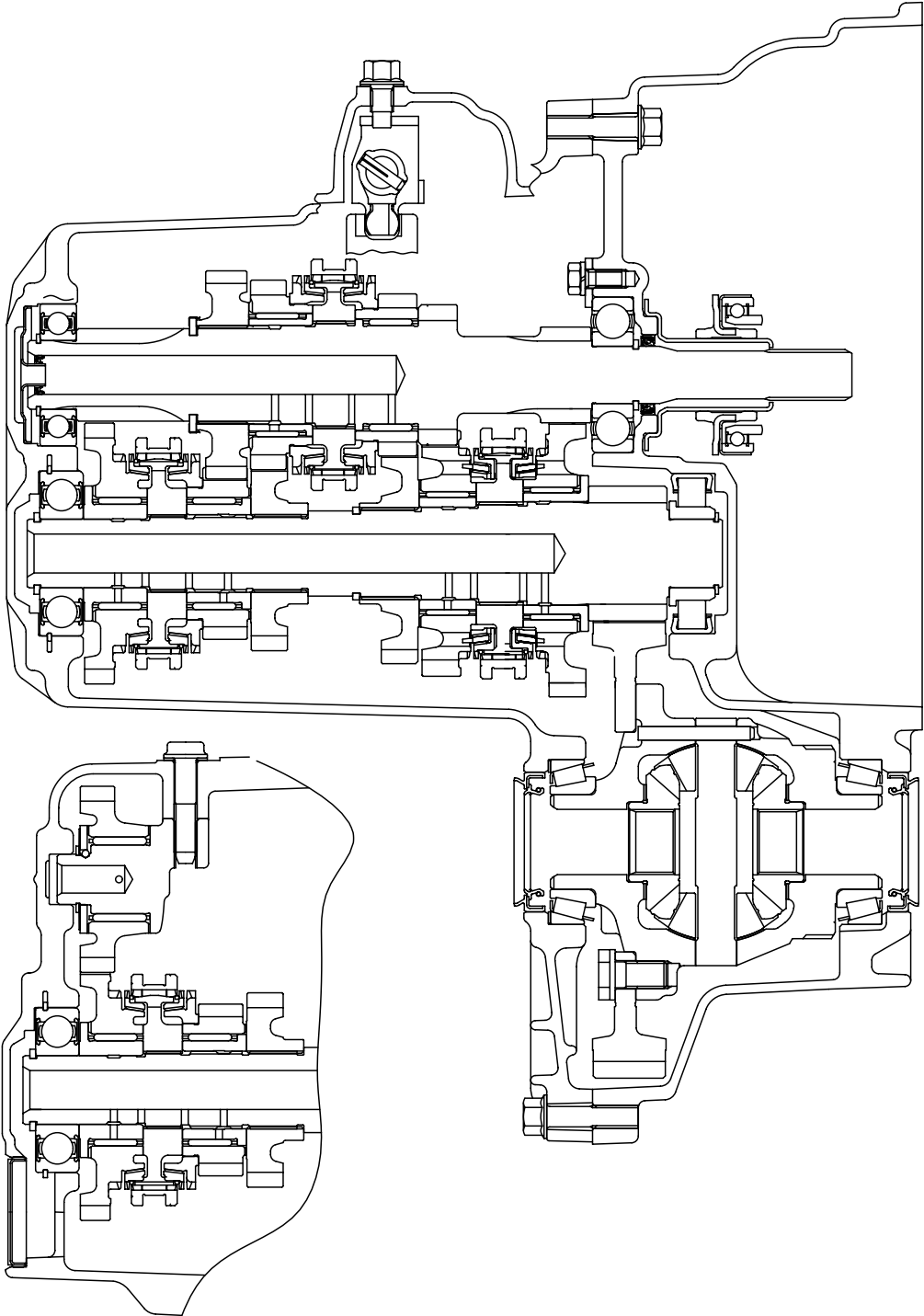
<b>Transmission model</b>	<b>Combined engine</b>	<b>Vehicle model</b>
F5M41-1-V7B3	4G13-S4-MPI	CS1A
F5M41-1-R7B5	4G18-S4-MPI	CS3A, CS3W
F5M42-2-R7B6	4G63-D4-MPI	CS9A, CS9W

SECTIONAL VIEW

<F5M41>



<F5M42>



## GENERAL SPECIFICATIONS

M1222000200310

### TRANSMISSION MODEL TABLE

Transmission model	Speedometer gear ratio	Final gear ratio	Vehicle model	Engine model
F5M41-1-V7B3	30/36	4.333	CS1A	4G13-S4-MPI
F5M41-1-R7B5	30/36	4.052	CS3A, CS3W	4G18-S4-MPI
F5M42-2-R7B6	30/36	4.058	CS9A, CS9W	4G63-D4-MPI

### GEAR RATIO TABLE

Item	F5M41	F5M42
1st	3.583	
2nd	1.947	
3rd	1.343	1.379
4th	0.976	1.030
5th	0.804	0.820
Reverse	3.416	3.363

## SERVICE SPECIFICATIONS

M1222000300146

Item	Standard value	Minimum limit
Differential case preload <F5M41>	0.05 – 0.17 mm	–
Differential case preload <F5M42>	0.05 – 0.11 mm	–
Input shaft front bearing end play	0 – 0.12 mm	–
Input shaft 5th speed gear end play <F5M42>	0 – 0.09 mm	–
Input shaft rear bearing end play <F5M41>	0 – 0.09 mm	–
Input shaft rear bearing end play <F5M42>	0 – 0.12 mm	–
Synchronizer ring back surface to gear clearance	–	0.5 mm
Output shaft front bearing end play	0 – 0.12 mm	–
Output shaft 3rd speed gear end play	0 – 0.09 mm	–
Output shaft rear bearing end play	0 – 0.09 mm	–
Backlash between differential gear and pinion	0 – 0.15 mm	–

## SNAP RING, SPACER AND THRUST PLATE FOR ADJUSTMENT

M1222012000380

### SPACER (FOR ADJUSTMENT OF DIFFERENTIAL CASE PRELOAD) <F5M41>

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.77	77	1.31	E
0.86	86	1.40	None
0.95	95	1.49	C
1.04	04	1.58	B
1.13	D	1.67	A
1.22	G	1.76	F

### SPACER (FOR ADJUSTMENT OF DIFFERENTIAL CASE PRELOAD) <F5M42>

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.71	71	1.01	01
0.74	74	1.04	04
0.77	77	1.07	07
0.80	80	1.10	J
0.83	83	1.13	D
0.86	86	1.16	K
0.89	89	1.19	L
0.92	92	1.22	G
0.95	95	1.25	M
0.98	98		

### SNAP RING (FOR ADJUSTMENT OF INPUT SHAFT FRONT BEARING END PLAY)

Thickness mm	Identification colour	Thickness mm	Identification colour
2.24	None	2.38	Brown
2.31	Blue		

### THRUST PLATE (FOR ADJUSTMENT OF INPUT SHAFT 5TH SPEED GEAR END PLAY) <F5M42>

Thickness mm	Identification symbol	Thickness mm	Identification symbol
2.82	0	2.98	6
2.86	2	3.02	7
2.90	3	3.06	8
2.94	5	3.10	9

**SNAP RING (FOR ADJUSTMENT OF INPUT SHAFT REAR BEARING END PLAY) <F5M41>**

Thickness mm	Identification colour	Thickness mm	Identification colour
2.31	Black (2)	2.55	Yellow
2.35	None	2.59	Black
2.39	Blue	2.63	Orange
2.43	Brown	2.67	Blue
2.47	Green	2.71	Brown
2.51	White		

**SNAP RING (FOR ADJUSTMENT OF INPUT SHAFT REAR BEARING END PLAY) <F5M42>**

Thickness mm	Identification colour	Thickness mm	Identification colour
1.43	Green (2)	1.59	Yellow (2)
1.51	White (2)		

**SNAP RING (FOR ADJUSTMENT OF OUTPUT SHAFT FRONT BEARING END PLAY)**

Thickness mm	Identification colour	Thickness mm	Identification colour
1.43	Green (2)	1.59	Yellow (2)
1.51	White (2)		

**SNAP RING (FOR ADJUSTMENT OF OUTPUT SHAFT 3RD SPEED GEAR END PLAY)**

Thickness mm	Identification colour	Thickness mm	Identification colour
2.81	Green	2.97	Orange
2.85	White	3.01	Red
2.89	Yellow	3.05	Pink
2.93	Black	3.09	Blue

**SNAP RING (FOR ADJUSTMENT OF OUTPUT SHAFT REAR BEARING END PLAY)**

Thickness mm	Identification colour	Thickness mm	Identification colour
2.31	Black (2)	2.55	Yellow
2.35	None	2.59	Black
2.39	Blue	2.63	Orange
2.43	Brown	2.67	Blue
2.47	Green	2.71	Brown
2.51	White		

**SPACER (FOR ADJUSTMENT OF BACKLASH BETWEEN DIFFERENTIAL SIDE GEAR AND PINION) <F5M41>**

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.72 – 0.79	–	0.98 – 1.02	–
0.80 – 0.84	–	1.02 – 1.06	–
0.85 – 0.90	–	1.07 – 1.11	–
0.90 – 0.94	–	1.12 – 1.16	–
0.94 – 0.98	–	1.16 – 1.20	–

**SPACER (FOR ADJUSTMENT OF BACKLASH BETWEEN DIFFERENTIAL SIDE GEAR AND PINION)  
<F5M42>**

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.75 – 0.82	–	1.05 – 1.12	–
0.83 – 0.92	–	1.09 – 1.16	–
0.93 – 1.00	–	1.15 – 1.22	–
1.01 – 1.08	–		

**TORQUE SPECIFICATIONS**

M1222012100354

Item	Specification
Roll stopper bracket mounting bolt	70 ± 10 N· m
Shift cable bracket mounting bolt	18 ± 3 N· m
Select lever mounting bolt	18 ± 3 N· m
Vehicle speed sensor mounting bolt	3.9 ± 1.0 N· m
Back-up lamp switch	32 ± 2 N· m
Restrict ball <F5M41>	32 ± 2 N· m
Poppet spring	32 ± 2 N· m
Harness bracket bolt	18 ± 3 N· m
Harness bracket bolt <F5M42>	3.9 ± 1.0 N· m
Interlock plate bolt	30 ± 3 N· m
Control housing mounting bolt	18 ± 3 N· m
Under cover mounting bolt <F5M42>	6.9 ± 0.9 N· m
Reverse idler gear shaft mounting bolt	48 ± 6 N· m
Clutch housing-transmission case mounting bolt	44 ± 5 N· m
Reverse shift lever bolt <F5M41>	18 ± 3 N· m
Front bearing retainer mounting bolt	18 ± 3 N· m
Select lever mounting nut	11 ± 1 N· m
Stopper bracket mounting bolt	21.7 ± 0.3 N· m
Clutch release bearing retainer mounting bolt	9.8 ± 2.0 N· m
Differential drive gear mounting bolt	132 ± 5 N· m



## SEALANTS AND ADHESIVES

M1222000500344

Item	Specified sealant
Clutch housing-transmission case mating surface	MITSUBISHI Genuine sealant part No. MD997740 or equivalent
Under cover-transmission case mating surface	
Control housing-transmission case mating surface	
Air breather	3M SUPER WEATHERSTRIP No. 8001 or equivalent
Differential drive gear bolt	3M STUD Locking No. 4170 or equivalent

### FORM-IN-PLACE GASKET (FIPG)

This transmission 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.

### 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 transmission 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.

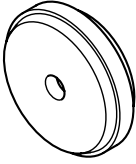
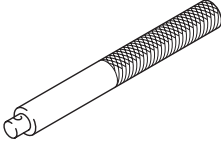

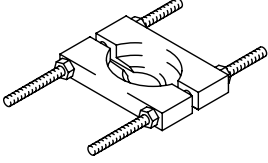
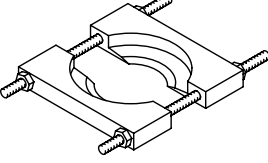
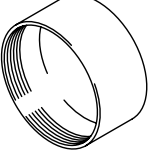
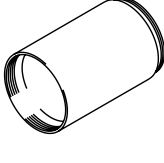
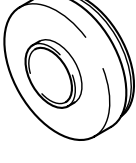
## LUBRICANTS

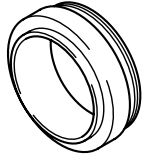
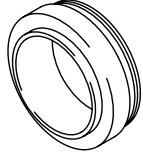
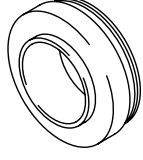
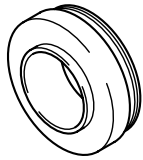
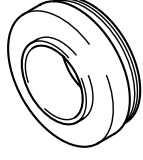
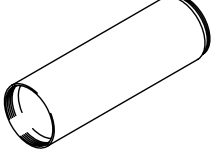
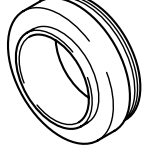
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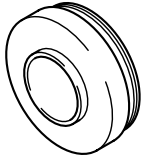
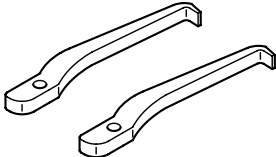
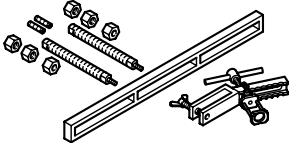
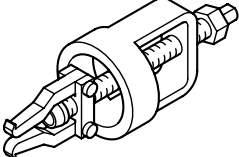
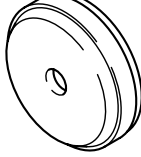
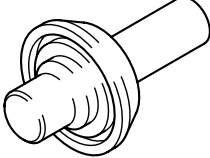

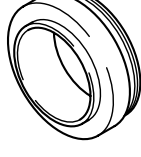
Item	Specified lubricant	Quantity
Each O-ring	DiaQueen NEW MULTI GEAR OIL API classification GL-3, SEA 75W-80 or Gear oil API classification GL-4, SAE 75W-85/75W-90	As required
Each oil seal		
Select lever shoe	Mitsubishi part No.0101011 or equivalent	

## SPECIAL TOOLS

M1222000600374

Tool	Number	Name	Use
	MB990935	Installer adapter	Installation of differential case taper roller bearing outer race <F5M42>
	MB990938	Handle	Use with Installer adapter
	MB990927	Installer adapter	Installation of sealing cap
	MD998801	Bearing remover	Installation and removal of gears, bearings and sleeves
	MD998917	Bearing remover	Installation and removal of gears, bearing and sleeves
	MD998812	Installer cap	Use with Installer and Installer adapter
	MD998813	Installer-100	Use with Installer cap and Installer adapter
	MD998816	Installer adapter (30)	Installation of input shaft front bearing

<b>Tool</b>	<b>Number</b>	<b>Name</b>	<b>Use</b>
	MD998825	Installer adapter (52)	<ul style="list-style-type: none"> <li>• Installation of 3rd-4th speed synchronizer hub</li> <li>• Installation of 1st-2nd speed synchronizer hub &lt;F5M42&gt;</li> <li>• Installation of 1st speed gear sleeve &lt;F5M42&gt;</li> </ul>
	MD998824	Installer adapter (50)	<ul style="list-style-type: none"> <li>• Installation of 4th speed gear sleeve</li> <li>• Installation of 5th speed gear and thrust plate stopper &lt;F5M42&gt;</li> </ul>
	MD998820	Installer adapter (42)	<ul style="list-style-type: none"> <li>• Installation of 5th speed gear sleeve &lt;F5M41&gt;</li> <li>• Installation of 2nd speed gear sleeve &lt;F5M41&gt;</li> <li>• Installation of 3rd speed gear &lt;F5M41&gt;</li> </ul>
	MD998819	Installer adapter (40)	<ul style="list-style-type: none"> <li>• Installation of 4th speed gear</li> <li>• Installation of 5th speed-reverse synchronizer hub &lt;F5M41&gt;</li> <li>• Installation of differential case ball bearing &lt;F5M41&gt;</li> <li>• Installation of 5th speed gear sleeve &lt;F5M42&gt;</li> </ul>
	MD998818	Installer adapter (38)	<ul style="list-style-type: none"> <li>• Installation of input shaft rear bearing and roller bearing inner race</li> <li>• Installation of reverse gear sleeve &lt;F5M42&gt;</li> <li>• Installation of output shaft rear ball bearing &lt;F5M42&gt;</li> </ul>
	MD998814	Installer-200	Use with Installer cap and Installer adapter
	MD998822	Installer adapter (46)	<ul style="list-style-type: none"> <li>• Installation of 1st gear sleeve &lt;F5M41&gt;</li> <li>• Installation of 1st-2nd speed synchronizer hub &lt;F5M41&gt;</li> <li>• Installation of 2nd speed gear sleeve &lt;F5M42&gt;</li> <li>• Installation of 3rd speed gear &lt;F5M42&gt;</li> </ul>

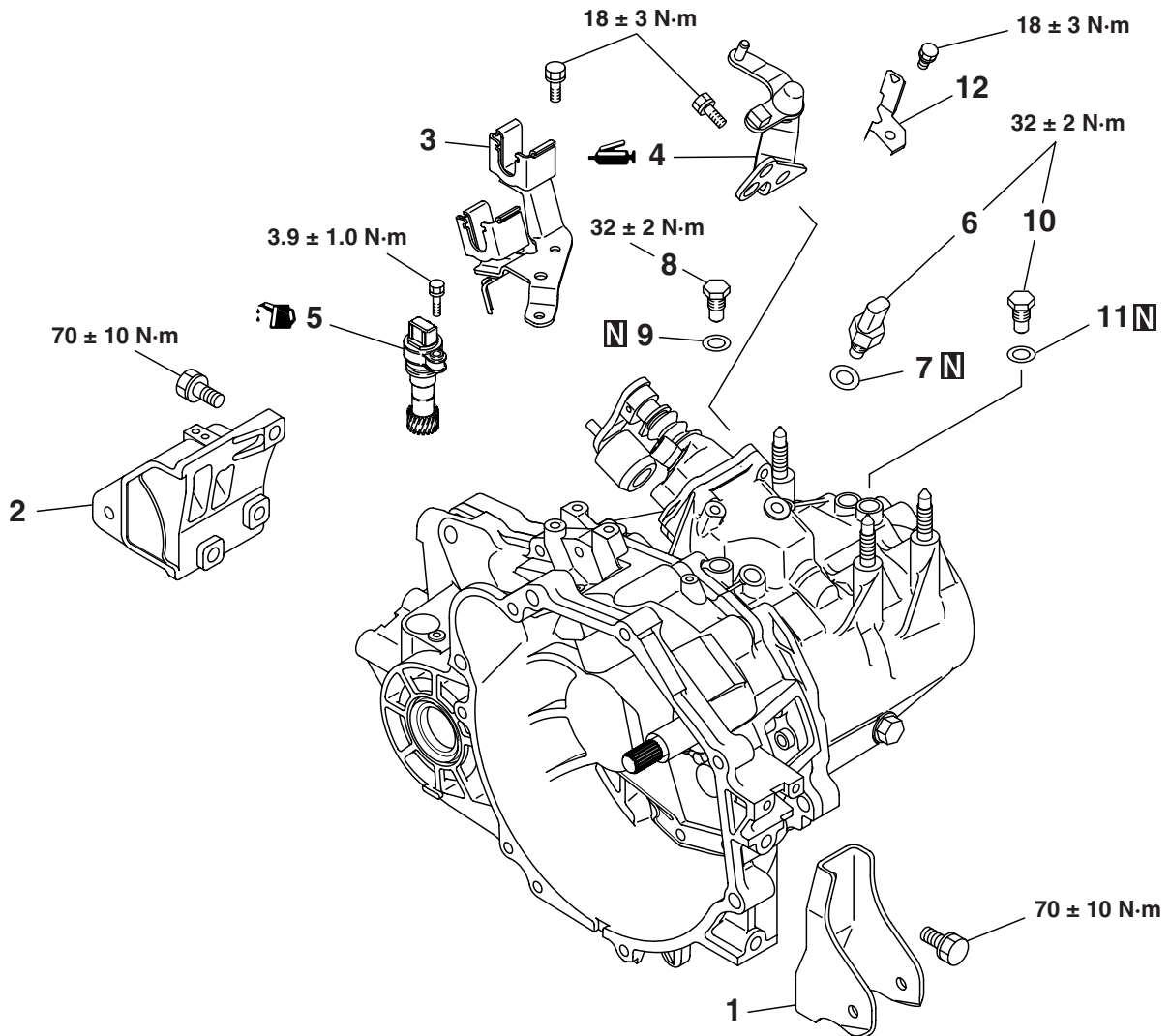
Tool	Number	Name	Use
	MD998817	Installer adapter (34)	Installation of output shaft rear ball bearing <F5M41>
	MD999566	Claw	Removal of taper roller bearing outer race
	MD998772	Valve spring compressor	Removal of output shaft front roller bearing outer race
	MD998346	Bearing outer race remover	Removal of output shaft front roller bearing outer race
	MB990934	Installer adapter	Installation of output shaft front roller bearing outer race
	MD998325	Differential oil seal installer	Installation of differential oil seal
	MB990926	Installer adapter	Installation of clutch housing input shaft oil seal
	MD998823	Installer adapter (48)	Installation of differential case taper roller bearing <F5M42>

# TRANSMISSION

## DISASSEMBLY AND REASSEMBLY

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<F5M41>



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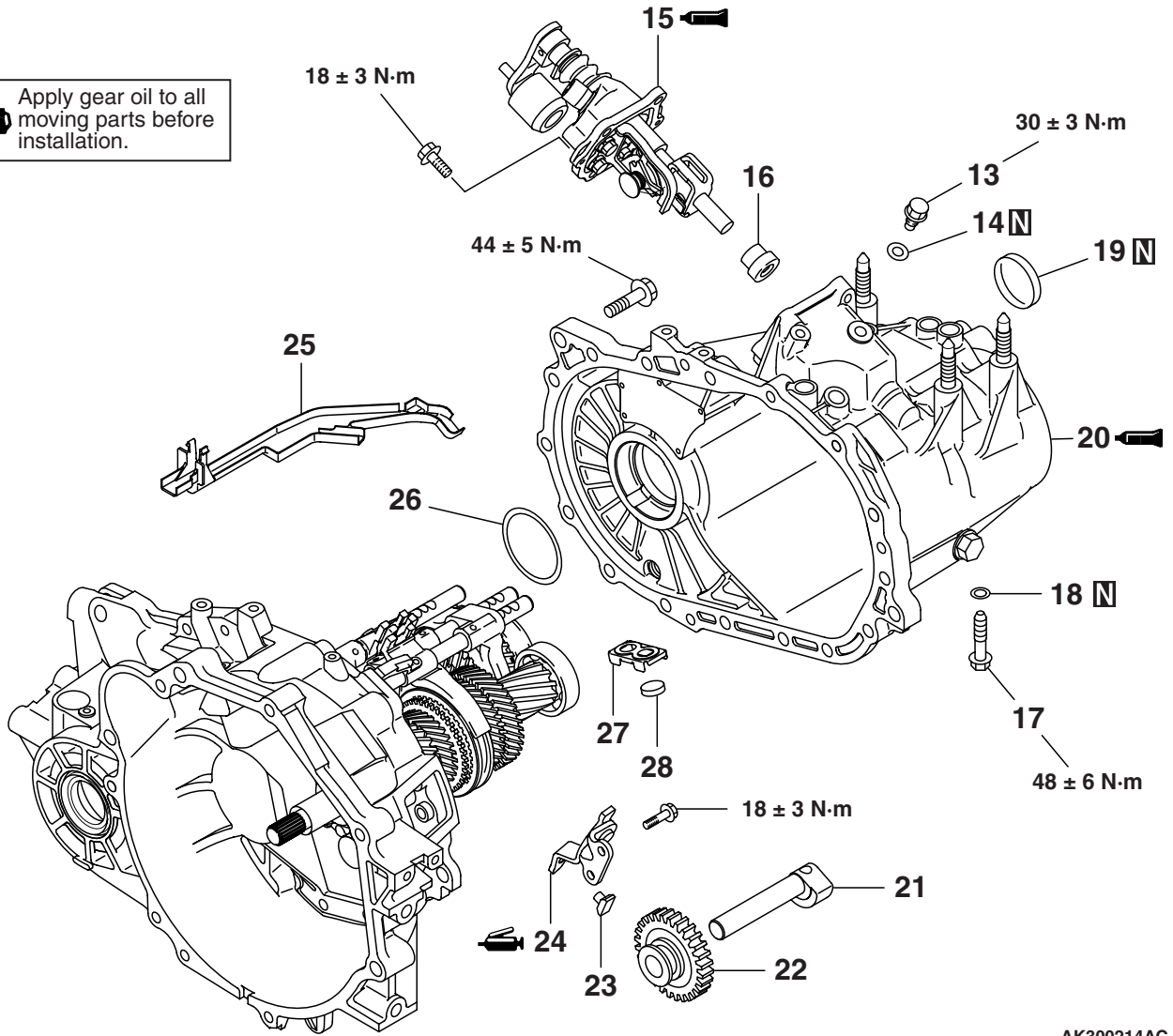
### Disassembly steps

1. Roll stopper bracket, front
2. Roll stopper bracket, rear
3. Shift cable bracket
- >>O<< 4. Select lever
- >>N<< 5. Vehicle speed sensor
6. Back-up lamp switch
7. Gasket

### Disassembly steps (Continued)

8. Restrict ball
9. Gasket
10. Poppet spring
11. Gasket
12. Harness bracket

Apply gear oil to all moving parts before installation.




AK300214AC

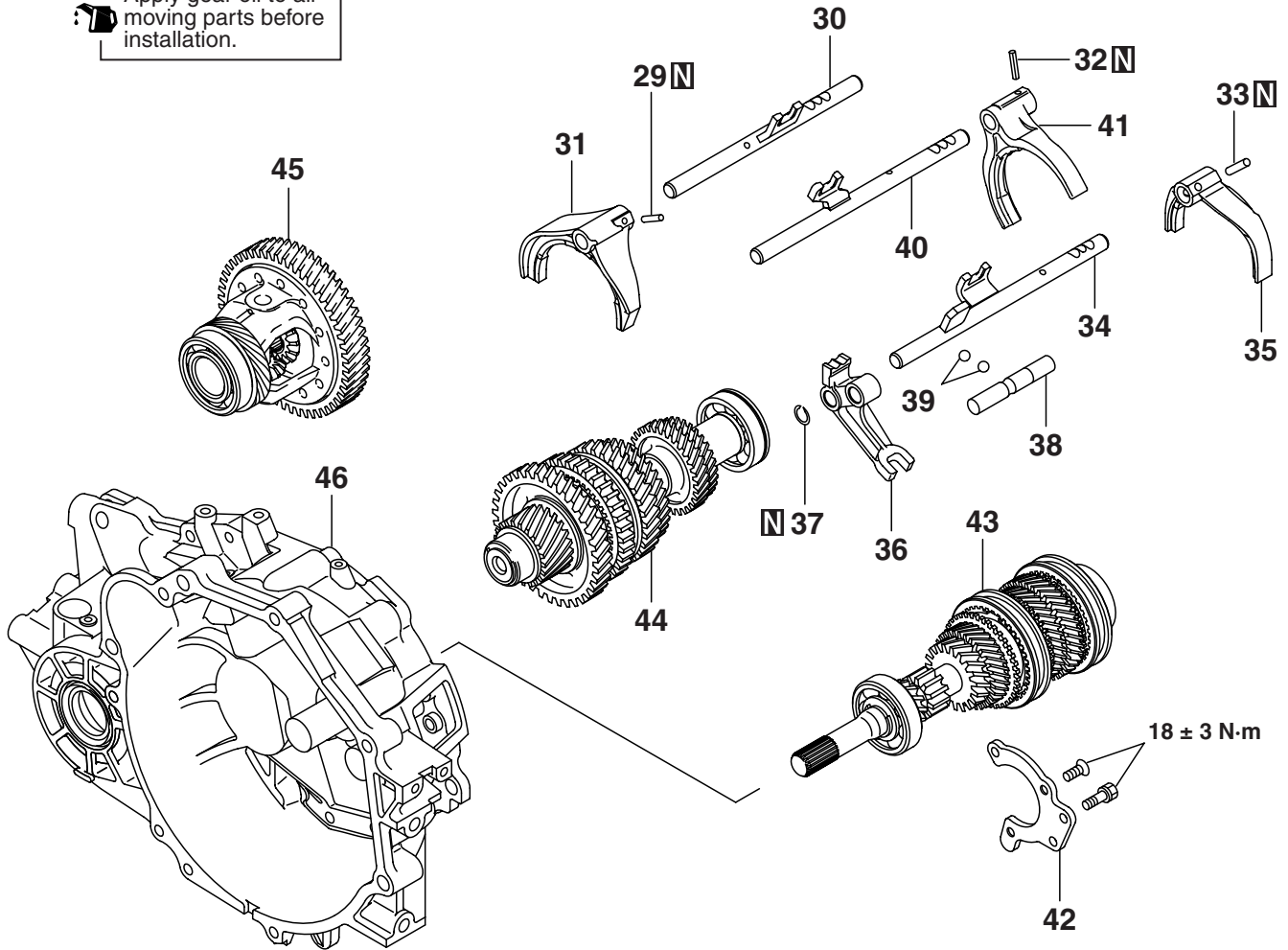
**Disassembly steps**

- 13. Interlock plate bolt
- 14. Gasket
- >>M<< 15. Control housing
- >>K<< 16. Neutral return spring
- >>J<< 17. Reverse idler gear shaft bolt
- >>I<< 18. Gasket
- <<A>> >>H<< 19. Sealing cap
- <<B>> >>L<< 20. transmission case
- <<C>> >>G<< 21. Reverse idler gear shaft

**Disassembly steps (Continued)**

- 22. Reverse idler gear
- 23. Reverse shift lever shoe
- 24. Reverse shift lever
- >>G<< 25. Oil guide
- >>E<< 26. Spacer
- 27. Magnet holder
- 28. Magnet

 Apply gear oil to all moving parts before installation.



AK300216AC

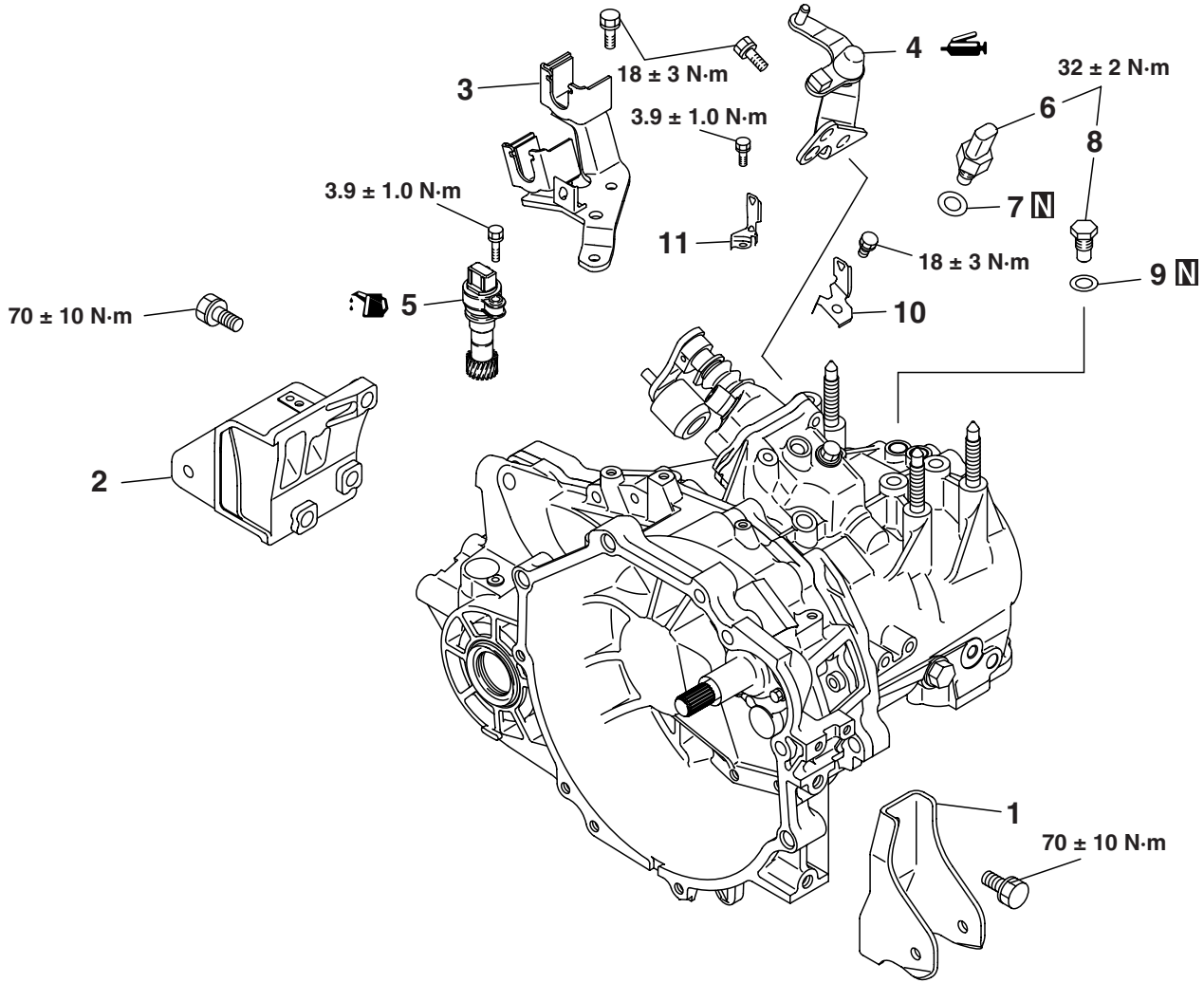
**Disassembly steps**

**Disassembly steps (Continued)**

- >>D<< 29. Spring pin
- 30. 1st-2nd speed shift rail
- 31. 1st-2nd speed shift fork
- >>D<< 32. Spring pin
- >>D<< 33. Spring pin
- <<D>> >>B<< 34. 5th speed-reverse shift rail
- <<D>> >>B<< 35. 5th speed-reverse shift fork
- >>B<< 36. Reverse shift lug
- >>B<< 37. Snap ring
- >>B<< 38. Reverse interlock rail

- >>B<< 39. Steel ball
- <<D>> >>B<< 40. 3rd-4th speed shift rail
- <<D>> >>B<< 41. 3rd-4th speed shift fork
- 42. Front bearing retainer
- <<F>> >>A<< 43. Input shaft
- <<F>> >>A<< 44. Output shaft
- 45. Differential
- 46. Clutch housing

<F5M42>



AK501981AC

**Disassembly steps**

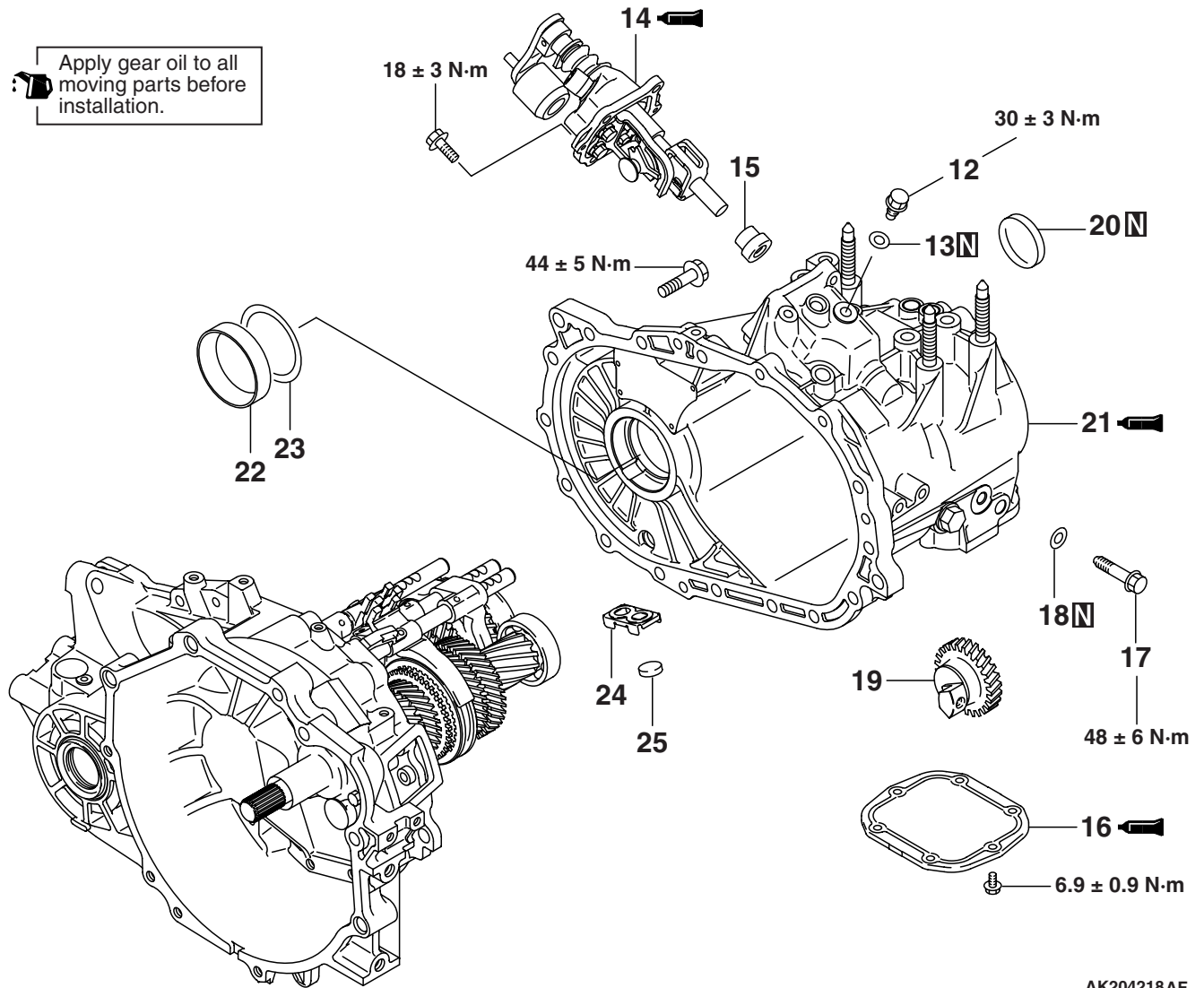
1. Roll stopper bracket, front
2. Roll stopper bracket, rear
3. Shift cable bracket
- >>O<< 4. Select lever
- >>N<< 5. Vehicle speed sensor
6. Back-up lamp switch
7. Gasket

**Disassembly steps (Continued)**

8. Poppet spring
9. Gasket
10. Harness bracket
11. Harness bracket



Apply gear oil to all moving parts before installation.



AK204218AF

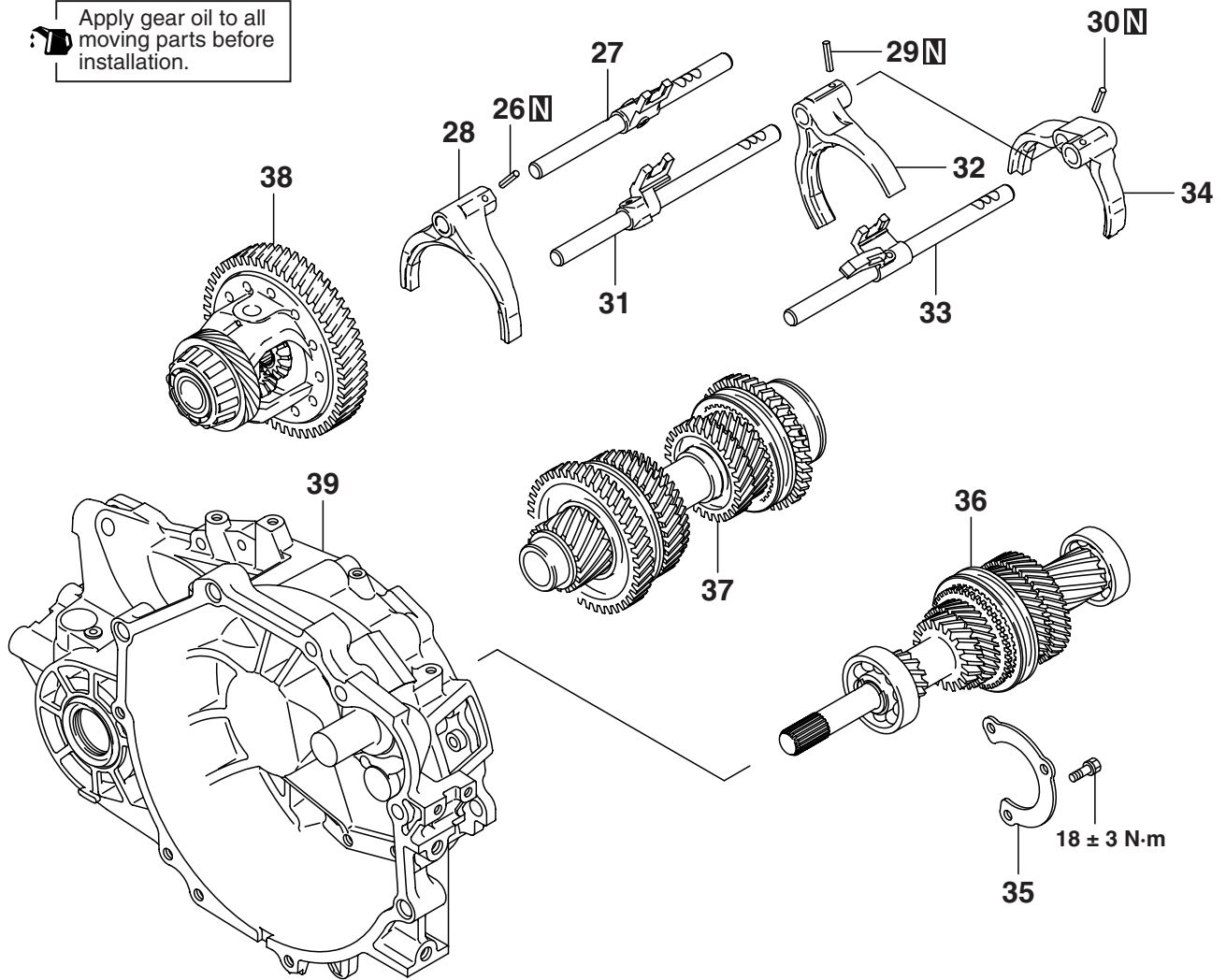
**Disassembly steps**

- 12. Interlock plate bolt
- 13. Gasket
- >>M<< 14. Control housing
- 15. Neutral return spring
- >>L<< 16. Under cover
- 17. Reverse idler gear shaft bolt
- 18. Gasket
- 19. Reverse idler gear assembly

**Disassembly steps (Continued)**

- <<A>> >>J<< 20. Sealing cap
- <<B>> >>I<< 21. transmission case
- >>F<< 22. Outer race
- >>F<< 23. Spacer
- 24. Magnet holder
- 25. Magnet

Apply gear oil to all moving parts before installation.

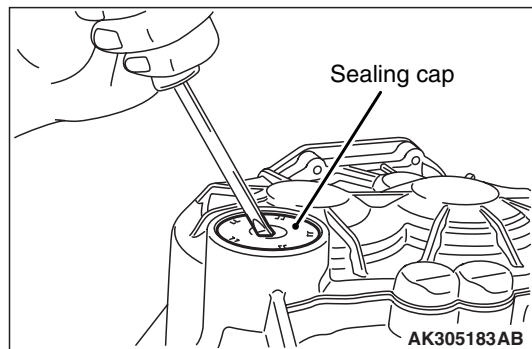


AK204219AB

**Disassembly steps**

- >>D<< 26. Spring pin
- >>D<< 27. 1st-2nd speed shift rail
- >>D<< 28. 1st-2nd speed shift fork
- >>D<< 29. Spring pin
- >>D<< 30. Spring pin
- <<E>> >>C<< 31. 3rd-4th speed shift rail
- <<E>> >>C<< 32. 3rd-4th speed shift fork
- <<E>> >>C<< 33. 5th speed-reverse shift rail
- <<E>> >>C<< 34. 5th speed-reverse shift fork
- <<F>> >>A<< 35. Front bearing retainer
- <<F>> >>A<< 36. Input shaft
- <<F>> >>A<< 37. Output shaft
- 38. Differential
- 39. Clutch housing

**DISASSEMBLY SERVICE POINTS**  
**<<A>> SEALING CAP REMOVAL**

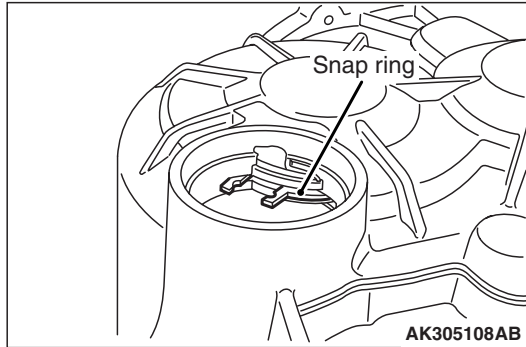


AK305183AB

1. Drive a screwdriver into the center of the sealing cap.
2. Bend the screwdriver back to remove the sealing cap.

## <<B>> TRANSMISSION CASE REMOVAL

1. Remove all sixteen bolts securing the transmission case to the clutch housing.



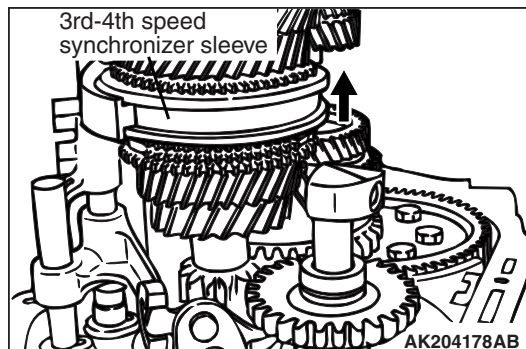
2. Use snap ring pliers to expand the indicated snap ring. The snap ring will release the grooved ball bearing, and the output shaft assembly will fall under its own weight.

### **CAUTION**

**Do not use a scraper or chisel to remove the transmission case.**

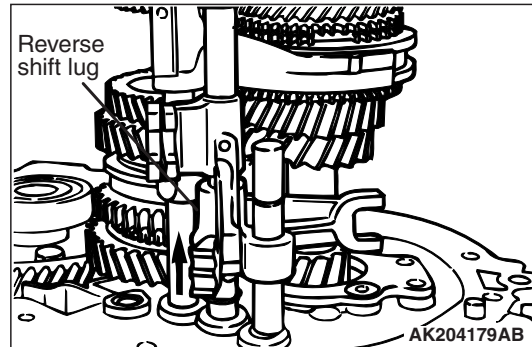
3. Remove the transmission case from the clutch housing by gently prying on opposite sides at the same time.

## <<C>> REVERSE IDLER GEAR SHAFT REMOVAL

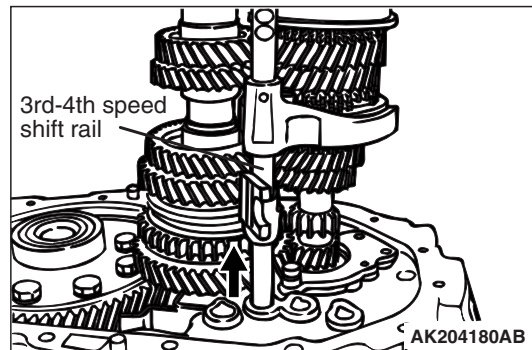


1. Shift the 3rd-4th speed synchronizer sleeve toward the 4th speed side.

## <<D>> 3RD-4TH SPEED SHIFT RAIL/3RD-4TH SPEED SHIFT FORK/5TH SPEED-REVERSE SHIFT RAIL/5TH SPEED-REVERSE SHIFT FORK REMOVAL



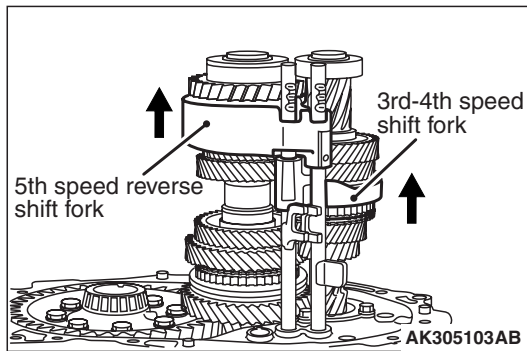
1. While sliding the reverse shift lug in the direction shown, remove the 5th speed shift fork, 5th speed shift rail, reverse shift lug, snap ring, steel ball and reverse interlock rail.



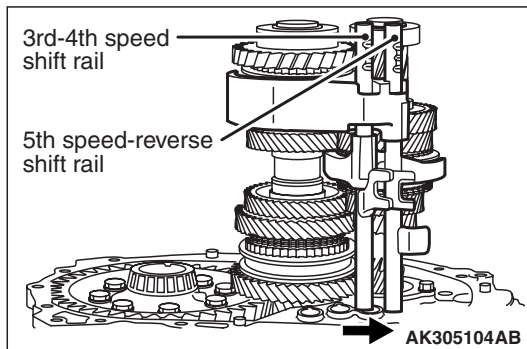
2. While sliding the 3rd-4th speed shift rail in the direction shown, remove it together with the shift fork.

## <<E>> 3RD-4TH SPEED SHIFT RAIL/3RD-4TH SPEED SHIFT FORK/5TH SPEED-REVERSE SHIFT RAIL/5TH SPEED-REVERSE SHIFT FORK REMOVAL

1. Shift the 3rd-4th speed shift fork and 5th speed-reverse shift fork in the direction shown.

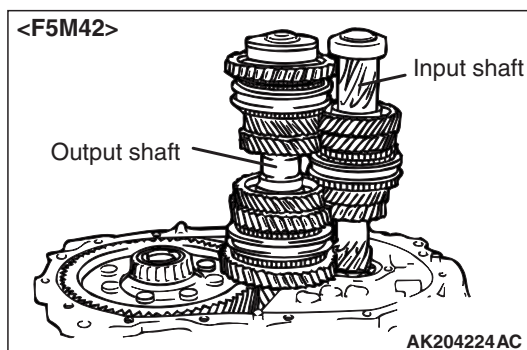
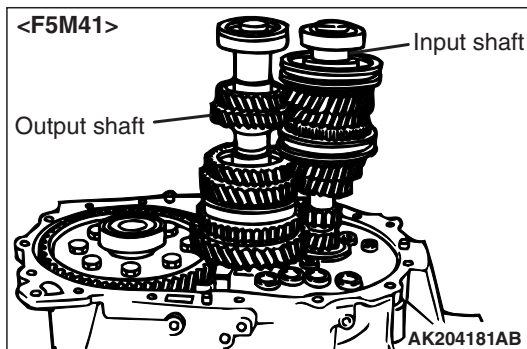


- Pull up on the 3rd-4th speed shift rail and 5th speed-reverse shift rail and take them out of the hole in the clutch housing.



- Slide the 3rd-4th speed shift rail and 5th speed-reverse shift rail in the direction shown and remove them together with the shift forks.

## <<F>> INPUT SHAFT AND OUTPUT SHAFT REMOVAL



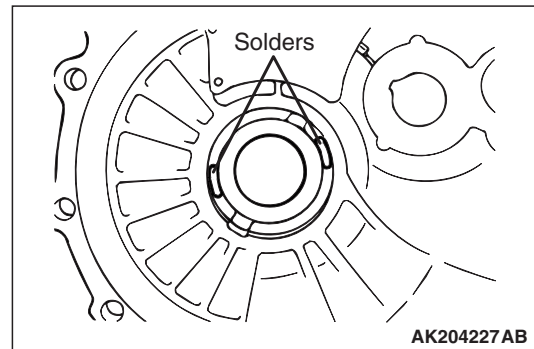
Remove the input and output shafts together.

## ADJUSTMENT BEFORE REASSEMBLY SPACER SELECTION FOR ADJUSTMENT OF DIFFERENTIAL CASE PRELOAD

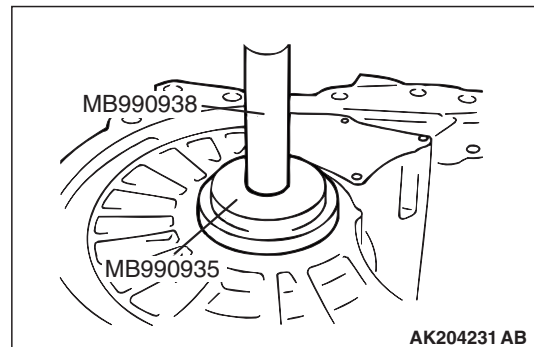
### <Measurement using Solder>

#### ⚠ CAUTION

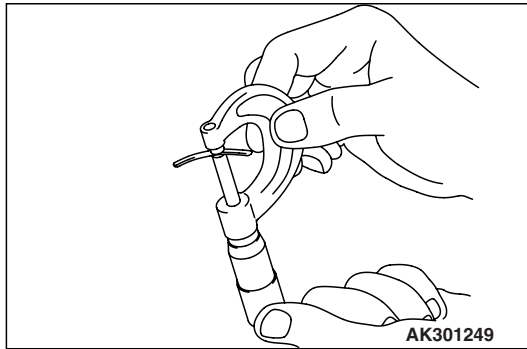
- If the solder is not available, select the spacer in accordance with Plastigage method.
- If the spacer appropriate for the standard value cannot be selected using the solder, select the spacer in accordance with Plastigage method.



- Put solders (1.6 mm diameter, about 10 mm long) in the illustrated positions of the transmission case.



- Using special tools, press the outer race into the transmission case. <F5M42>
  - Installer adapter (MB990935)
  - Handle (MB990938)
- Install the differential assembly into the transmission case.
- Install the clutch housing on the transmission case without applying FIPG. Tighten the mounting bolts to the specified torque of  $44 \pm 5$  N·m.
- Remove the bolts and clutch housing, and take out the crushed solders.
- If the solders have not crushed, use thicker the solders (1.6 mm diameter, about 10 mm long) and repeat steps 2 to 5.



7. Measure the thickness of the crushed solder with a micrometer, and then select a spacer that will provide the standard value.

**Spacer thickness:**

**(T1 – 0.05 mm) to (T1 – 0.17 mm) <F5M41>**

**(T1 – 0.05 mm) to (T1 – 0.11 mm) <F5M42>**

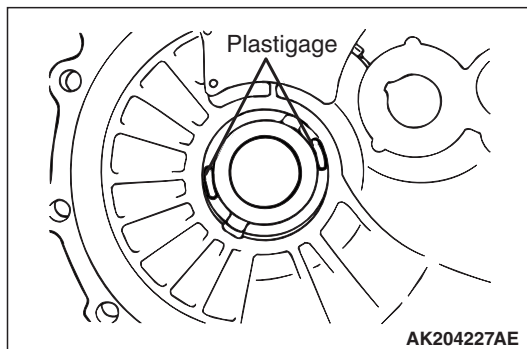
**T1: The crushed solder thickness mm**

**Standard value:**

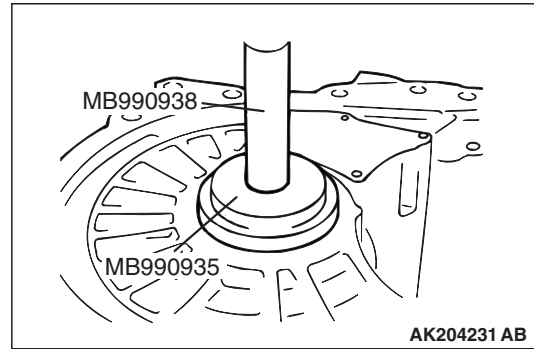
**0.05 – 0.17 mm <F5M41>**

**0.05 – 0.11 mm <F5M42>**

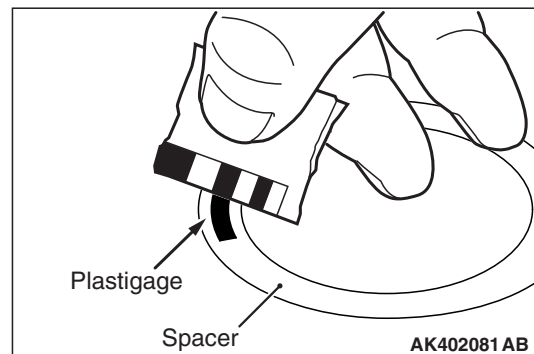
**<Measurement using Plastigage>**



1. Put the plastigage (about 10 mm long) in the illustrated positions of the converter housing.
2. Install the adjusting spacer having the minimum thickness.



3. Using special tools, press the outer race into the transmission case. <F5M42>
  - Installer adapter (MB990935)
  - Handle (MB990938)
4. Install the differential assembly into the transmission case.
5. Install the clutch housing on the transmission case without applying FIPG. Tighten the mounting bolts to the specified torque of  $44 \pm 5$  N·m.
6. Remove the bolts and clutch housing, and take out the crushed plastigage.
7. If the plastigage have not crushed, replace the spacer with a thicker one and repeat steps 3 to 6.



8. Measure the width of the crushed plastigage at its widest part using a scale printed on the plastigage package, and then select a spacer that will provide the standard value.

**Spacer thickness:**

**(T2 + T3 – 0.05 mm) to (T2 + T3 – 0.17 mm) <F5M41>**

**(T2 + T3 – 0.05 mm) to (T2 + T3 – 0.11 mm) <F5M42>**

**T2: The spacer thickness used for measurement mm**

**T3: The crushed plastigage thickness mm**

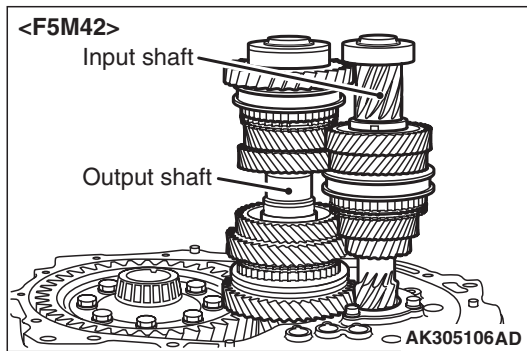
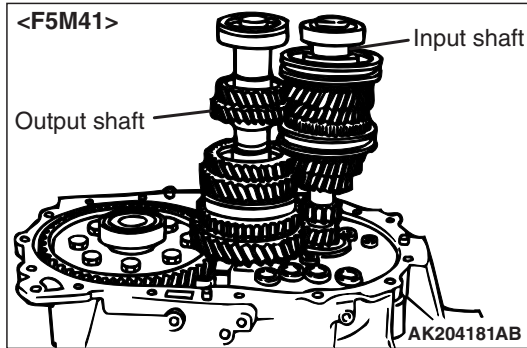
**Standard value:**

**0.05 – 0.17 mm <F5M41>**

**0.05 – 0.11 mm <F5M42>**

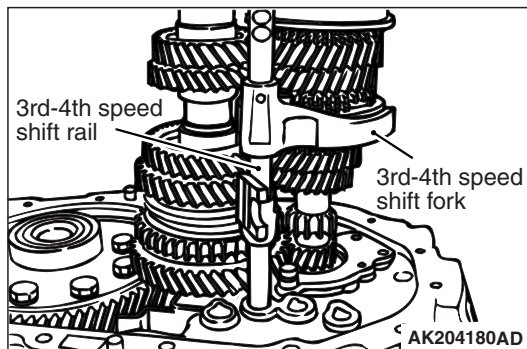
**REASSEMBLY SERVICE POINTS**

**>>A<< OUTPUT SHAFT/INPUT SHAFT  
INSTALLATION**

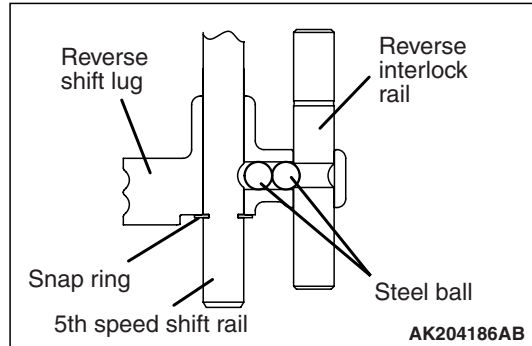
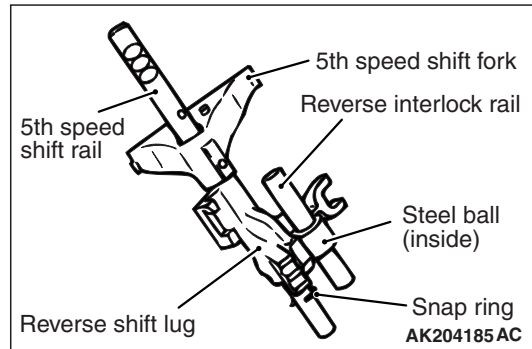


Install the input and output shafts together.

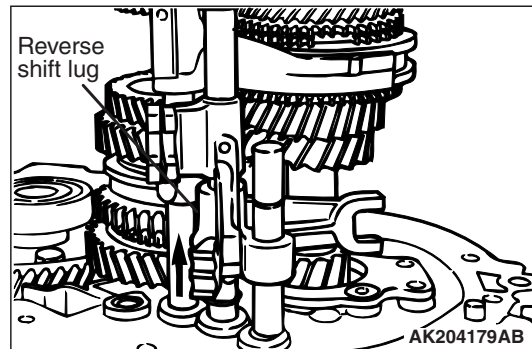
**>>B<< REVERSE INTERLOCK  
RAIL/STEEL BALL/5TH SPEED-REVERSE  
SHIFT RAIL/REVERSE SHIFT LUG/SNAP  
RING/5TH SPEED-REVERSE SHIFT  
FORK/3RD-4TH SPEED SHIFT  
FORK/3RD-4TH SPEED SHIFT RAIL  
INSTALLATION**



1. Install the 3rd-4th shift rail and fork.

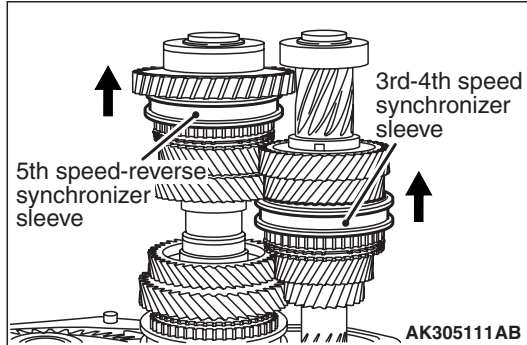


2. Install the reverse interlock rail, steel ball, 5th speed shift rail, 5th speed shift fork, reverse shift lug and snap ring in the illustrated positions.

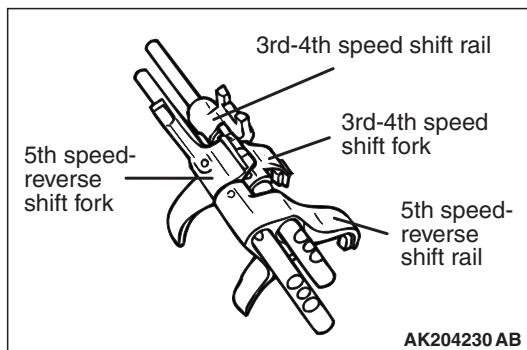


3. While sliding the reverse shift lug in the direction shown, install the 5th speed shift fork, 5th speed shift rail, reverse shift lug, snap ring, steel ball and reverse interlock rail.

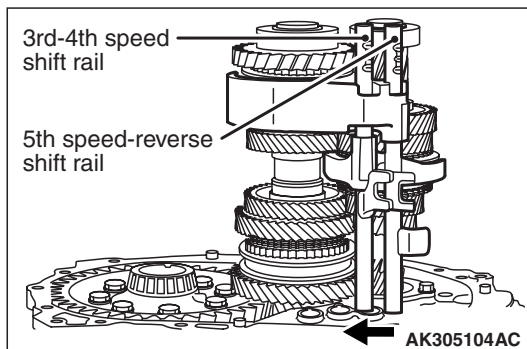
**>>C<< 5TH SPEED-REVERSE SHIFT FORK/5TH SPEED-REVERSE SHIFT RAIL/3RD-4TH SPEED SHIFT FORK/3RD-4TH SPEED SHIFT RAIL INSTALLATION**



1. Shift the 3rd-4th speed synchronizer sleeve and 5th speed-reverse synchronizer sleeve in the direction shown.



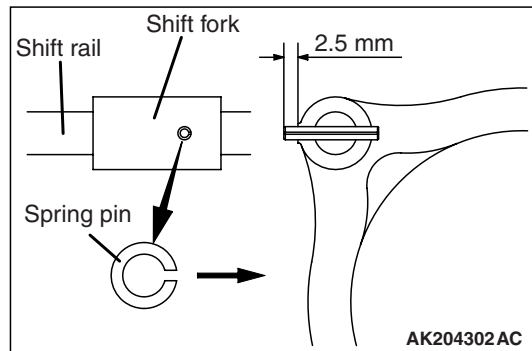
2. Assemble the 3rd-4th speed shift rail and fork, and the 5th speed-reverse shift rail and fork.



3. While fitting each shift fork in the groove of synchronizer sleeve, slide the shift rails in the direction shown and install.
4. Insert the 3rd-4th speed shift rail and 5th speed-reverse shift rail into the rail hole in the clutch housing.

**>>D<< SPRING PIN INSTALLATION**

1. Align the pin holes in the shift rail and shift fork.



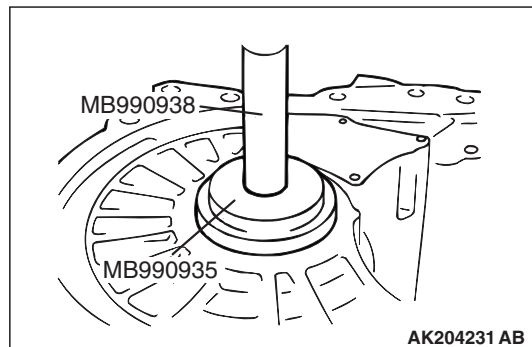
2. Insert the new spring pin. Push it in as shown so that the slit and center axis of the rail are aligned.

**>>E<< SPACER INSTALLATION**

Install the spacer selected in the section "ADJUSTMENT BEFORE REASSEMBLY."

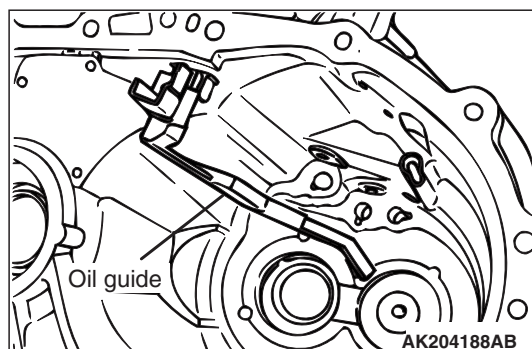
**>>F<< SPACER AND OUTER RACE INSTALLATION**

1. Install the spacer selected in the section "ADJUSTMENT BEFORE REASSEMBLY."

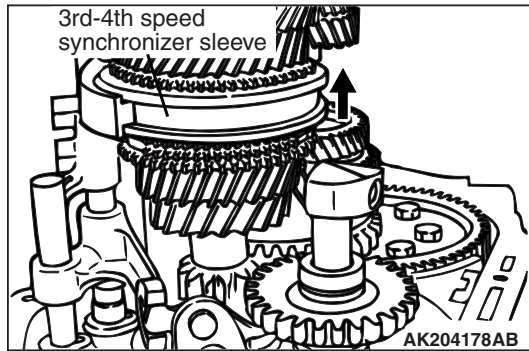


2. Using special tools, press the outer race into the transaxle case.
  - Installer adapter (MB990935)
  - Handle (MB990938)

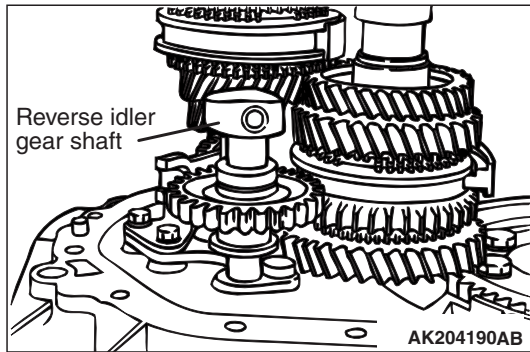
**>>G<< OIL GUIDE INSTALLATION**



install the oil guide as shown in the illustration.

**>>H<< REVERSE IDLER GEAR SHAFT  
INSTALLATION**

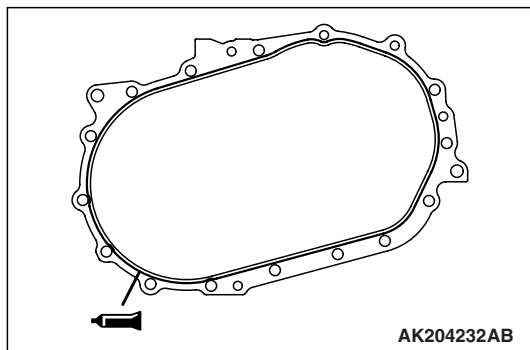
1. Shift the 3rd-4th speed synchronizer sleeve toward the 4th speed side.



2. Face the threaded hole of the reverse idler gear shaft toward the direction shown.

**>>I<< TRANSMISSION CASE  
INSTALLATION****⚠ CAUTION**

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

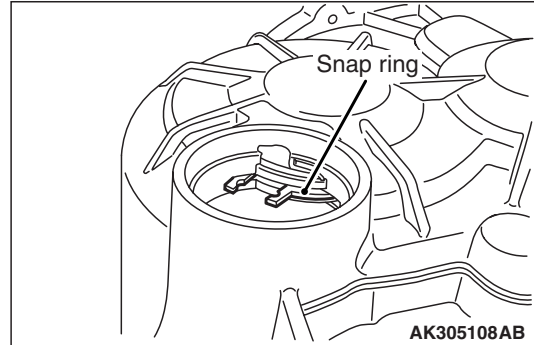


1. Apply a 2 mm diameter bead of sealant as illustrated onto the transmission case.

**Specified sealant:**

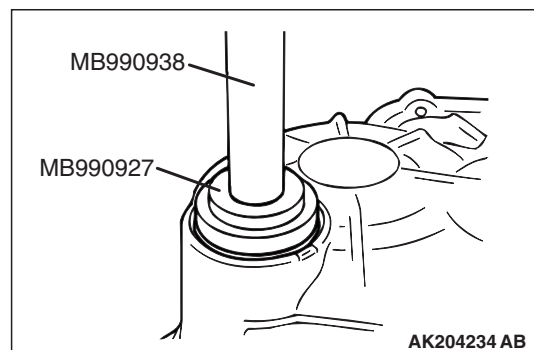
**Mitsubishi genuine sealant Part No.  
MD997740 or equivalent**

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



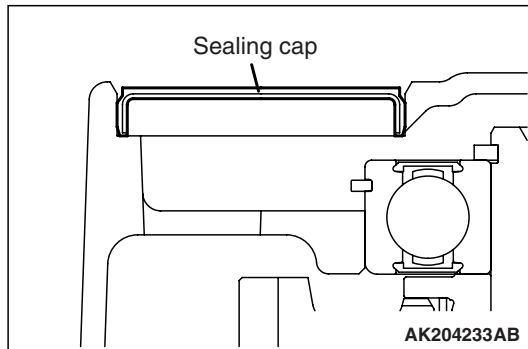
2. Align the transmission case and expand the snap ring. After the case is on far enough for the snap ring to ride on the bearing, release the snap ring. Push down on the transmission case, twisting it from side to side until the case contacts the housing.
3. Tighten the transmission case mounting bolts to the specified torque of  $44 \pm 5$  N·m.
4. Place the transmission upside down and let the snap ring fit in the groove by the output shaft's own weight.

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

**>>J<< SEALING CAP INSTALLATION**

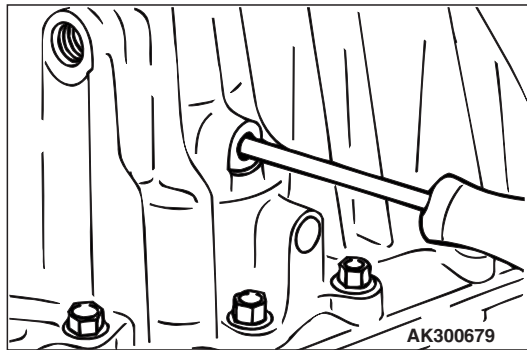
1. Using special tools, press install the sealing cap onto the case.
  - Installer adapter (MB990927)
  - Handle (MB990938)





- Evenly press the sealing cap so it is fully seated and not at an angle.

### >>K<< REVERSE IDLER GEAR SHAFT BOLT INSTALLATION

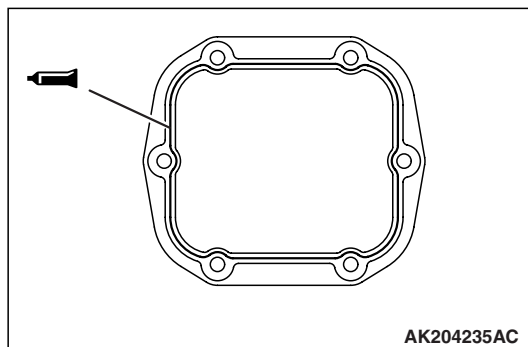


Using a Phillips screwdriver (8 mm in shank diameter) center the bolt hole.

### >>L<< UNDER COVER INSTALLATION

#### ⚠ CAUTION

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



- Apply a 2 mm diameter bead of sealant as illustrated onto the under cover.

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

*NOTE: Be sure to install the under cover to the case quickly while the sealant is still wet (within 15 minutes).*

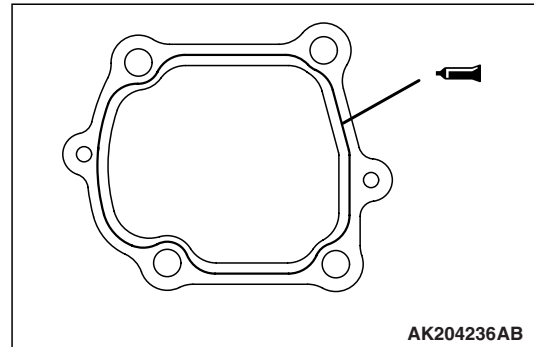
- Install the under cover to the transmission case and tighten the bolts to specified torque of  $6.9 \pm 0.9$  N·m.

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

### >>M<< CONTROL HOUSING INSTALLATION

#### ⚠ CAUTION

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



- Apply a 0.2 mm diameter bead of sealant as illustrated onto the control housing.

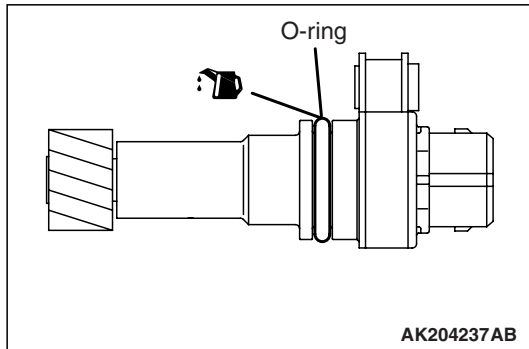
**Specified sealant:**  
**Mitsubishi genuine sealant Part No.**  
**MD997740 or equivalent**

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

- Install the control housing to the transmission case and tighten the bolts to specified torque of  $18 \pm 3$  N·m.

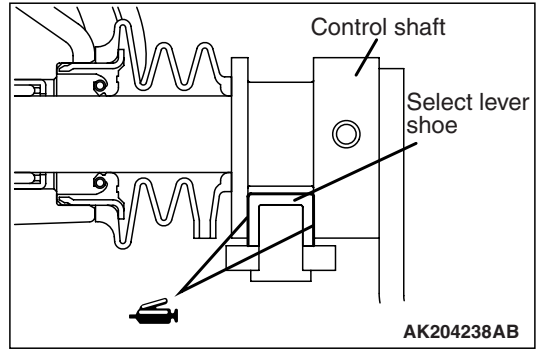
*NOTE: After installation, keep the sealed area away from the oil for approximately one hour.*

>>N<< VEHICLE SPEED SENSOR  
INSTALLATION



1. Apply gear oil to the O-ring of the vehicle speed sensor. Install into the transmission housing.  
**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. Tighten the bolt to specified torque of  $3.9 \pm 1.0$  N·m.

>>O<< SELECT LEVER INSTALLATION

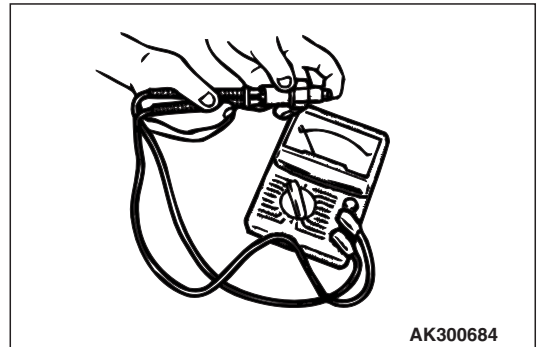


1. Apply grease to the control shaft sliding portion of the select lever shoe.  
**Specified grease:**  
**Mitsubishi Part number 0101011 or equivalent**
2. Install the select lever and tighten the bolts to specified torque of  $18 \pm 3$  N·m.

INSPECTION

M1222001100349

BACK-UP LAMP SWITCH



Check for continuity between terminals.


Switch condition	Continuity
Pressed	Open
Released	Conductive

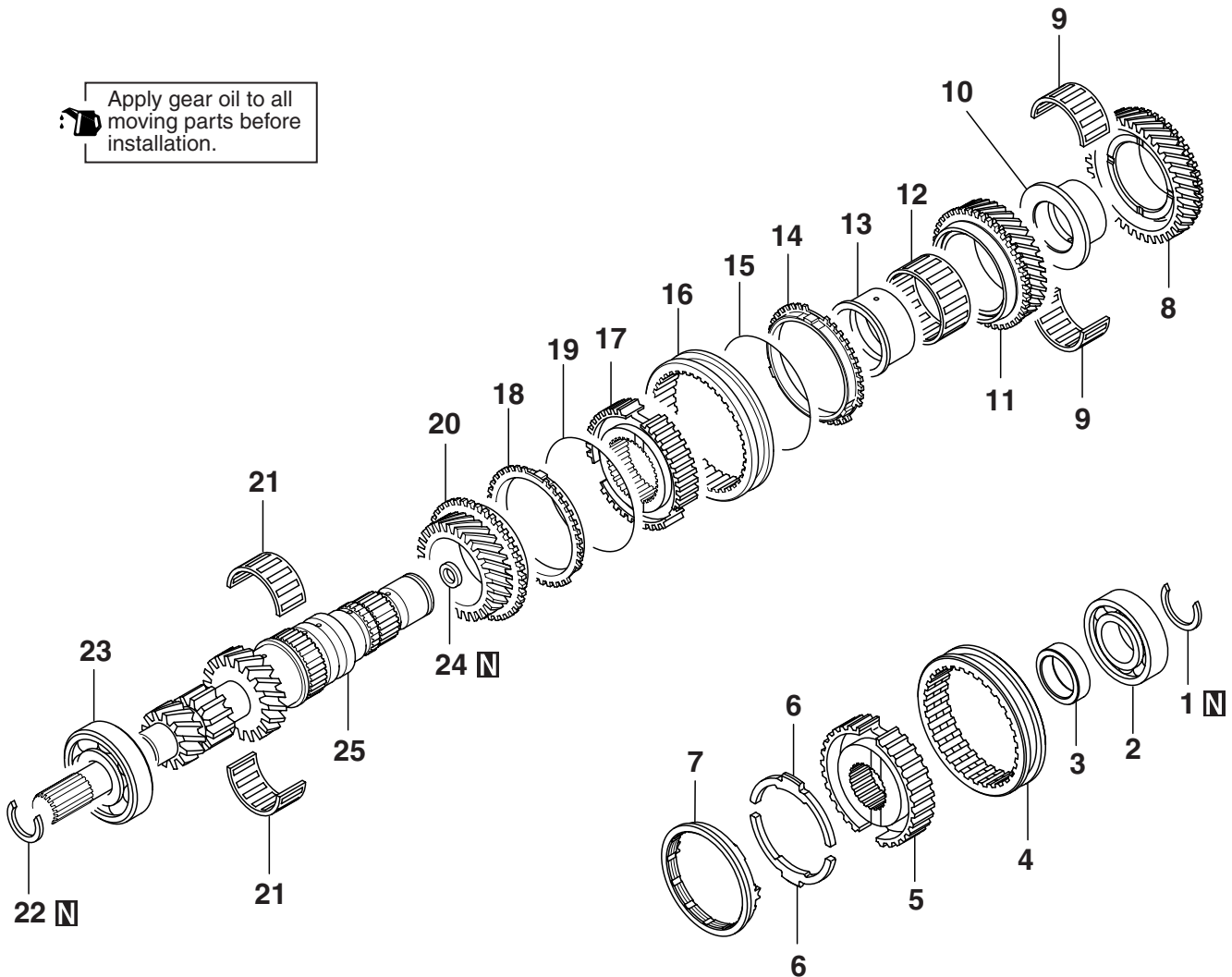
# INPUT SHAFT

## DISASSEMBLY AND REASSEMBLY

M1222001600399

<F5M41>

 Apply gear oil to all moving parts before installation.



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### Disassembly steps

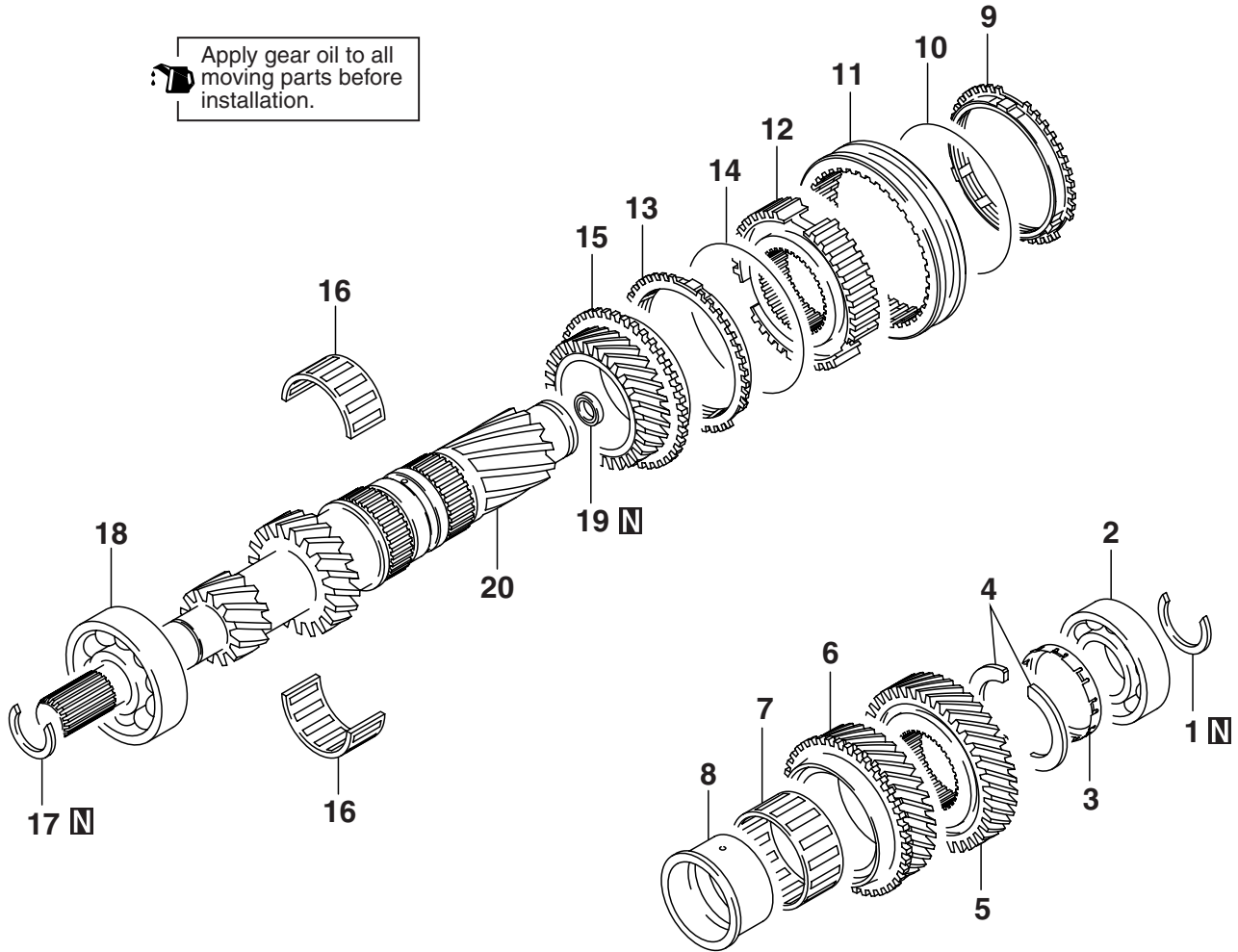
- |       |       |                                       |
|-------|-------|---------------------------------------|
| >>P<< | 1.    | Snap ring                             |
| <<A>> | >>O<< | 2. Ball bearing                       |
|       | 3.    | Input collar                          |
|       | >>N<< | 4. Synchronizer sleeve                |
| <<B>> | >>M<< | 5. 5th speed-reverse synchronizer hub |
|       | 6.    | Synchronizer lever                    |
|       | 7.    | Synchronizer ring                     |
|       | 8.    | 5th speed gear                        |
|       | 9.    | Needle roller bearing                 |
| <<C>> | >>I<< | 10. 5th speed gear sleeve             |
|       | 11.   | 4th speed gear                        |
|       | 12.   | Needle roller bearing                 |

### Disassembly steps (Continued)

- |       |       |                                    |
|-------|-------|------------------------------------|
| <<F>> | >>H<< | 13. 4th speed gear sleeve          |
|       | >>E<< | 14. Synchronizer ring              |
|       | >>D<< | 15. Synchronizer spring            |
|       | >>G<< | 16. Synchronizer sleeve            |
|       | >>F<< | 17. 3rd-4th speed synchronizer hub |
|       | >>E<< | 18. Synchronizer ring              |
|       | >>D<< | 19. Synchronizer spring            |
|       | 20.   | 3rd speed gear                     |
|       | 21.   | Needle roller bearing              |
|       | >>C<< | 22. Snap ring                      |
| <<G>> | >>B<< | 23. Ball bearing                   |
|       | >>A<< | 24. Oil seal                       |
|       | 25.   | Input shaft                        |

<F5M42>

Apply gear oil to all moving parts before installation.

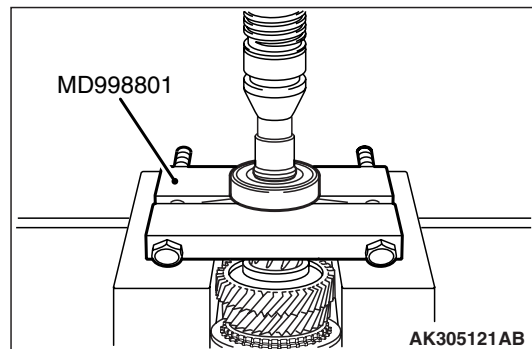


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**DISASSEMBLY SERVICE POINTS**

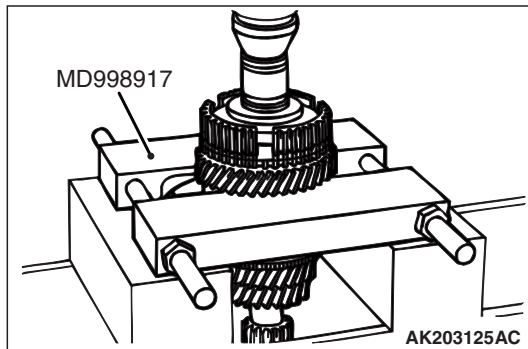
**<<A>> BALL BEARING REMOVAL**

- |       |       |     |                                |
|-------|-------|-----|--------------------------------|
|       | >>P<< | 1.  | Snap ring                      |
| <<A>> | >>O<< | 2.  | Ball bearing                   |
| <<D>> | >>L<< | 3.  | Thrust plate stopper           |
|       | >>K<< | 4.  | Thrust plate                   |
| <<E>> | >>J<< | 5.  | 5th speed gear                 |
|       |       | 6.  | 4th speed gear                 |
|       |       | 7.  | Needle roller bearing          |
| <<F>> | >>H<< | 8.  | 4th speed gear sleeve          |
|       | >>E<< | 9.  | Synchronizer ring              |
|       | >>D<< | 10. | Synchronizer spring            |
|       | >>G<< | 11. | Synchronizer sleeve            |
|       | >>F<< | 12. | 3rd-4th speed synchronizer hub |
|       | >>E<< | 13. | Synchronizer ring              |
|       | >>D<< | 14. | Synchronizer spring            |
|       |       | 15. | 3rd speed gear                 |
|       |       | 16. | Needle roller bearing          |
|       | >>C<< | 17. | Snap ring                      |
| <<G>> | >>B<< | 18. | Ball bearing                   |
|       | >>A<< | 19. | Oil seal                       |
|       |       | 20. | Input shaft                    |



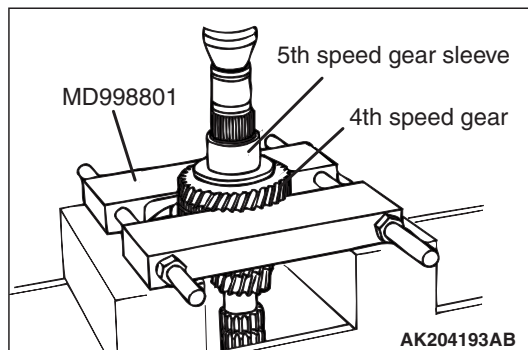
1. Using special tool Bearing remover (MD998801), support the ball bearing, and then set them on the press.
2. Push down on the input shaft with the press and remove the ball bearing.

**<<B>> 5TH SPEED-REVERSE  
SYNCHRONIZER HUB REMOVAL**



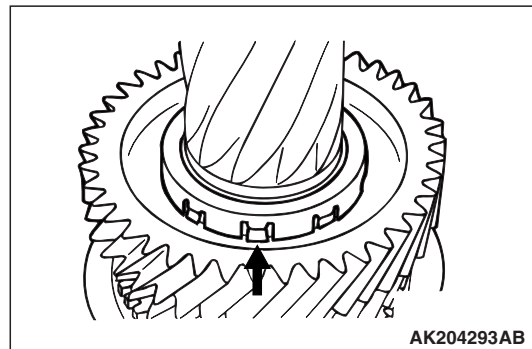
1. Using special tool Bearing remover (MD998917), support the 5th speed gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 5th speed-reverse synchronizer hub.

**<<C>>5TH SPEED GEAR SLEEVE  
REMOVAL**



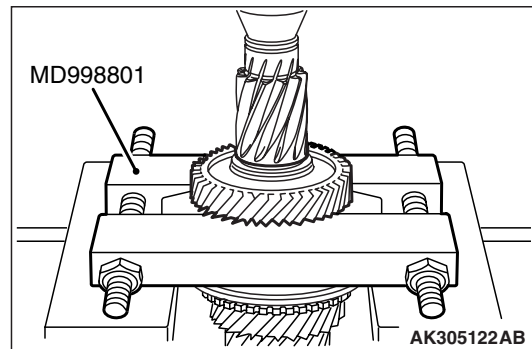
1. Using special tool Bearing remover (MD998801), support the 4th speed gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 5th speed gear sleeve.

**<<D>> THRUST PLATE STOPPER  
REMOVAL**



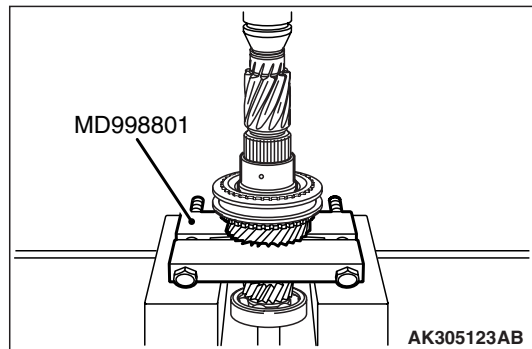
Using a screwdriver, pry up at the position shown in the illustration and remove the thrust plate stopper.

**<<E>>5TH SPEED GEAR REMOVAL**



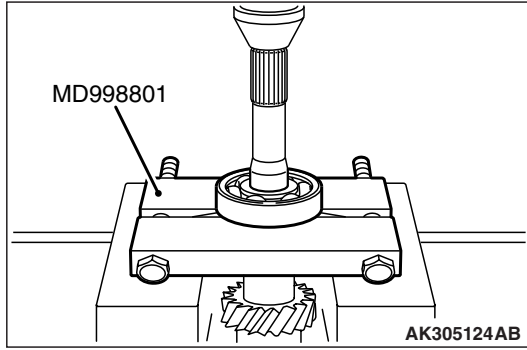
1. Using special tool Bearing remover (MD998801), support the 5th speed gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 5th speed gear.

**<<F>>4TH SPEED GEAR SLEEVE  
REMOVAL**



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

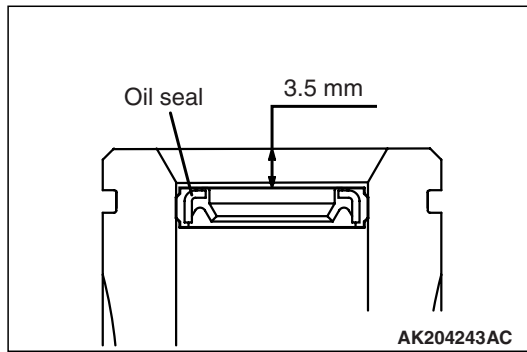
**<<G>> BALL BEARING REMOVAL**



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 ball bearing.

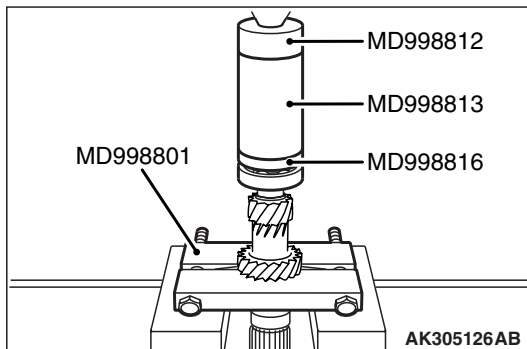
**REASSEMBLY SERVICE POINTS**

**>>A<< OIL SEAL INSTALLATION**



Install the oil seal into the end of the input shaft as shown.

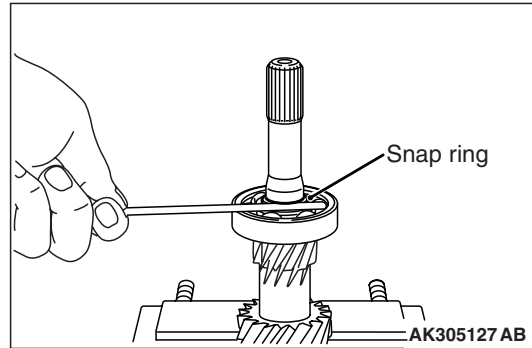
**>>B<< BALL BEARING INSTALLATION**



1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.

2. Using special tools, press install the ball bearing with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998816)

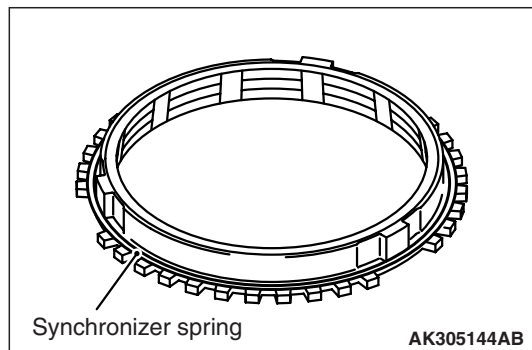
**>>C<< SNAP RING INSTALLATION**



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

**Standard value: 0 – 0.12 mm**

**>>D<< SYNCHRONIZER SPRING INSTALLATION**

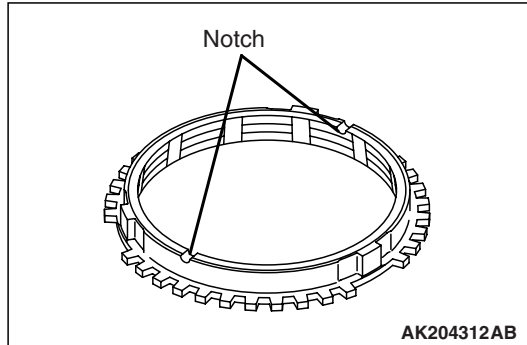


Install the synchronizer spring onto the synchronizer ring as shown.

## >>E<< SYNCHRONIZER RING INSTALLATION

### ⚠ CAUTION

There are 3rd speed and 4th speed synchronizer rings, if the wrong one is installed it will effect the shift feeling.



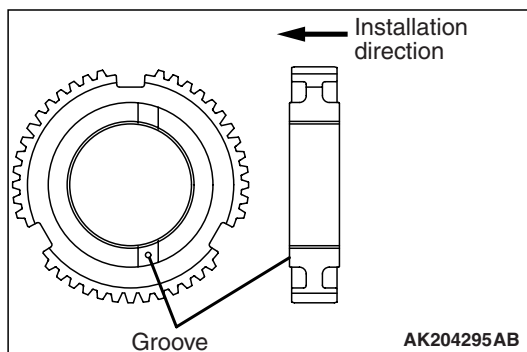
1. Ascertain whether or not there are identification notches on the synchronizer ring.

**Two notches: 3rd speed synchronizer ring**

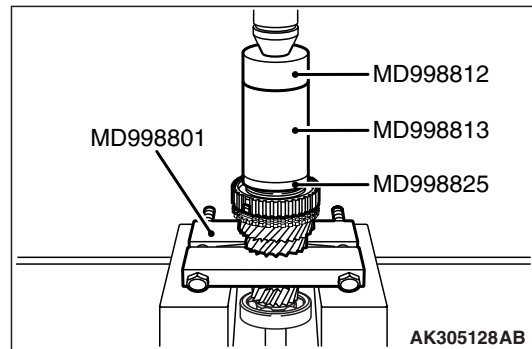
**No notches: 4th speed synchronizer ring**

2. Install the synchronizer ring so that it completely fits over the machined cone of the gear.

## >>F<< 3RD- 4TH SPEED SYNCHRONIZER HUB INSTALLATION

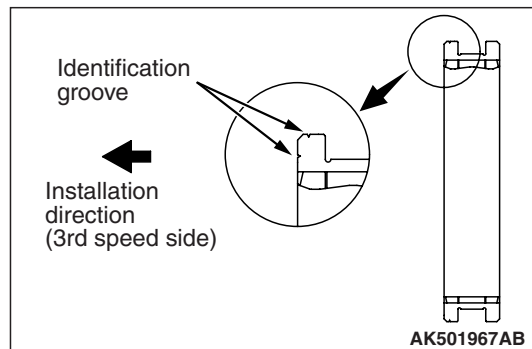


1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Make sure that the synchronizer ring has been perfectly matched to the 3rd speed gear cone.
3. Check the installation direction of the 3rd-4th speed synchronizer hub, and put it on the input shaft.

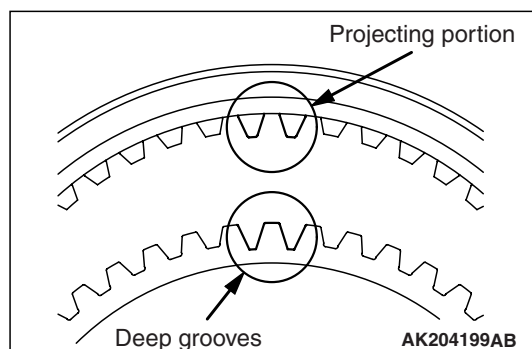


4. Using special tools, press install the 3rd-4th speed synchronizer hub with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998825)
5. Make sure that the synchronizer ring can rotate freely.

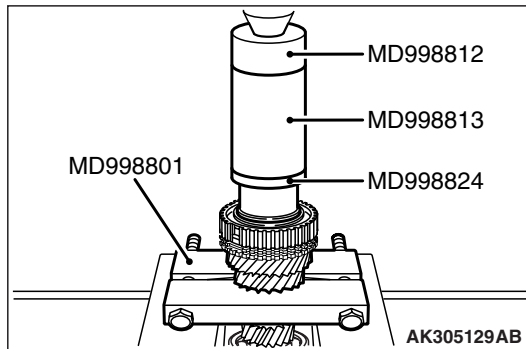
## >>G<< SYNCHRONIZER SLEEVE INSTALLATION



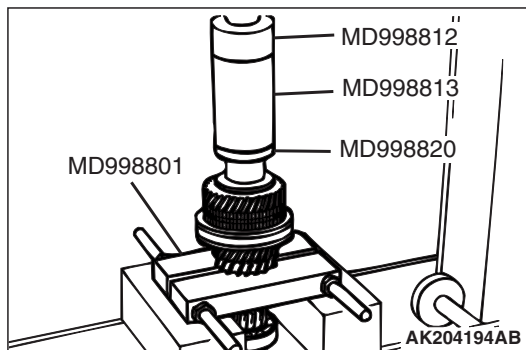
1. Check the installation direction of the synchronizer sleeve, and install it onto the 3rd-4th speed synchronizer hub.



2. Install the synchronizer sleeve so that the areas with teeth that have raised tips (three areas total) are aligned with the areas on the synchronizer hub that have deep grooves between the teeth (three areas total).

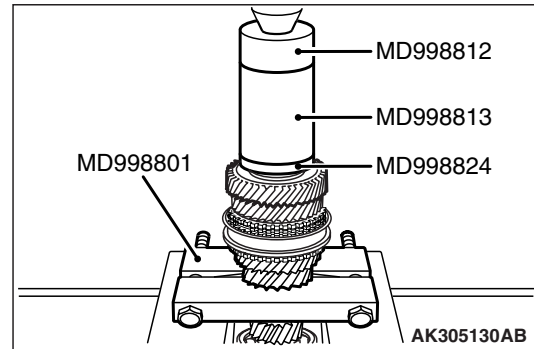
>>H<< 4TH SPEED GEAR SLEEVE  
INSTALLATION

1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Using special tools, install the 4th speed gear sleeve with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998824)

>>I<< 5TH SPEED GEAR SLEEVE  
INSTALLATION

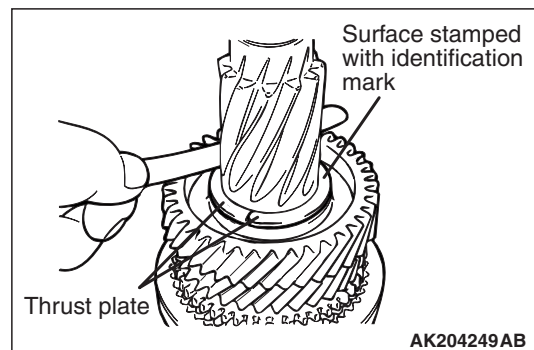
1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Using special tools, install the 5th speed gear sleeve onto the input shaft with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998820)

## &gt;&gt;J&lt;&lt; 5TH SPEED GEAR INSTALLATION



1. Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
2. Using special tools, install the 5th speed gear onto the input shaft with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998824)

## &gt;&gt;K&lt;&lt; THRUST PLATE INSTALLATION

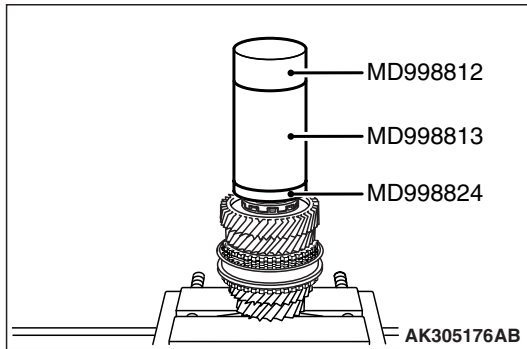


1. Install the thickest thrust plates that can be fitted in the groove of the input shaft. Install the thrust plate so the surface stamped with the identification mark is facing up.
2. Make sure that the 5th speed gear end play meets the standard value.

**Standard value: 0 – 0.09 mm**



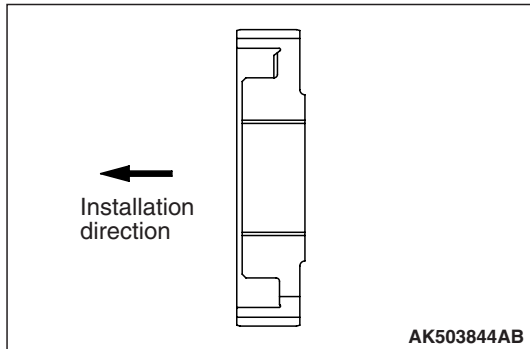
### >>L<< THRUST PLATE STOPPER INSTALLATION



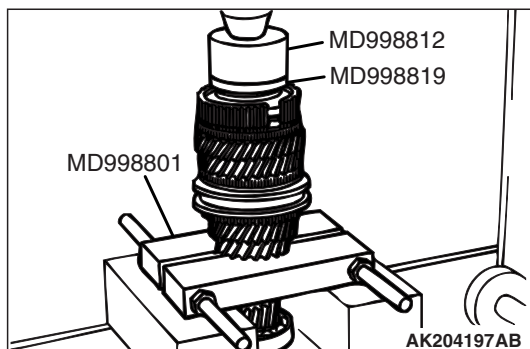
Install the thrust plate stopper by pressing special tools, by hand. Make sure that it is not tilted.

- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (MD998824)

### >>M<< 5TH SPEED-REVERSE SYNCHRONIZER HUB INSTALLATION



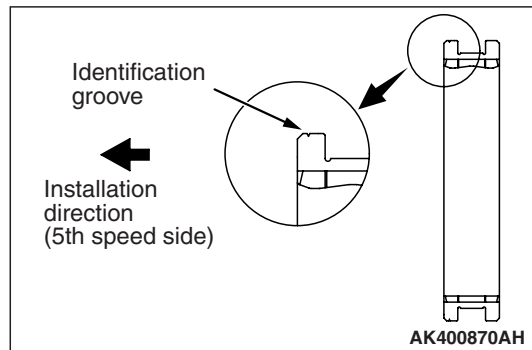
1. Check that the 5th speed- reverse synchronizer hub is in the correct installation direction, and put it on the input shaft.



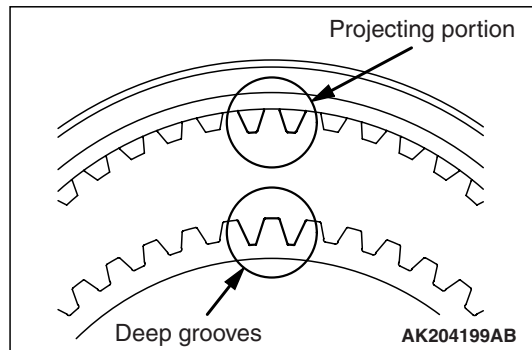
2. Using special tool Bearing remover (MD998801), support the input shaft gear, and then set them on the press.

3. Using special tools, install the 5th speed-reverse synchronizer hub with the press.
  - Installer cap (MD998812)
  - Installer adapter (MD998819)
4. Make sure that the synchronizer ring on the 5th speed gear side can rotate freely.

### >>N<< SYNCHRONIZER SLEEVE INSTALLATION

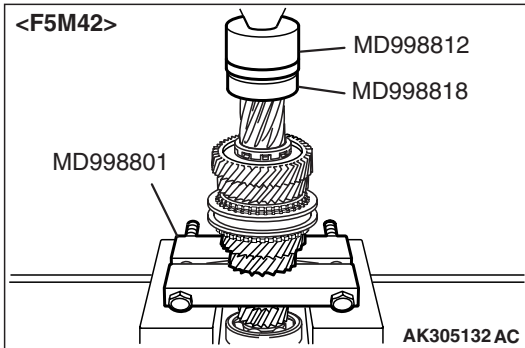
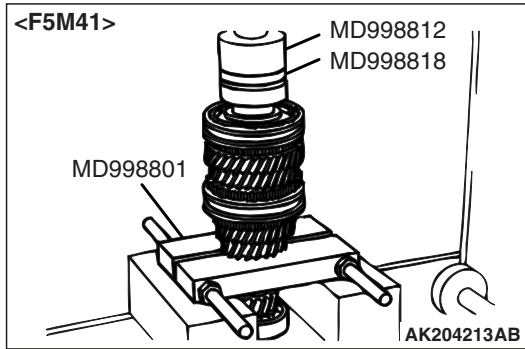


1. Install the synchronizer sleeve so that the identification grooves are oriented in the direction shown.



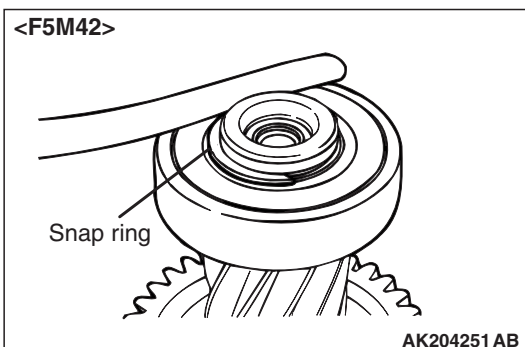
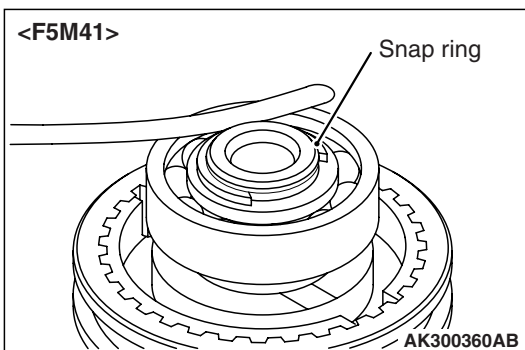
2. When the synchronizer sleeve is installed, check that the deep groove portion of the synchronizer hub is aligned with the projecting portion of the sleeve.

## &gt;&gt;O&lt;&lt; BALL BEARING INSTALLATION



- Using special tool Bearing remover (MD998801), support the 2nd speed gear portion of the input shaft, and then set them on the press.
- Using special tools, install the ball bearing onto the input shaft with the press.
  - Installer cap (MD998812)
  - Installer adapter (MD998818)

## &gt;&gt;P&lt;&lt; SNAP RING INSTALLATION



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

**Standard value:**

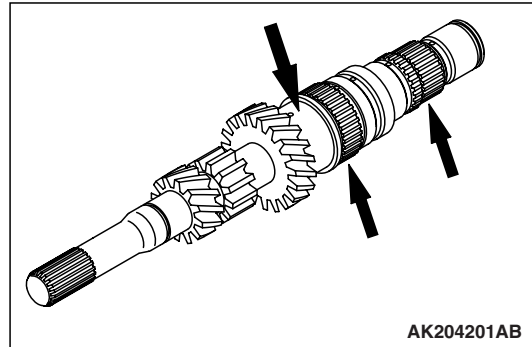
0 – 0.09 mm &lt;F5M41&gt;

0 – 0.12 mm &lt;F5M42&gt;

## INSPECTION

## INPUT SHAFT

M1222001700125

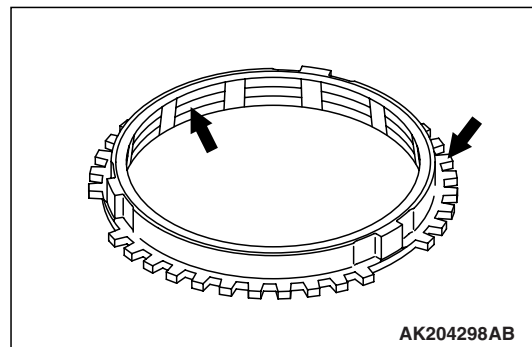


- Check the outside diameter of the needle bearing mounting portion for damage, abnormal wear and seizure.
- Check the splines for damage and wear.
- Check that the helical gear teeth surfaces are not damaged or worn.

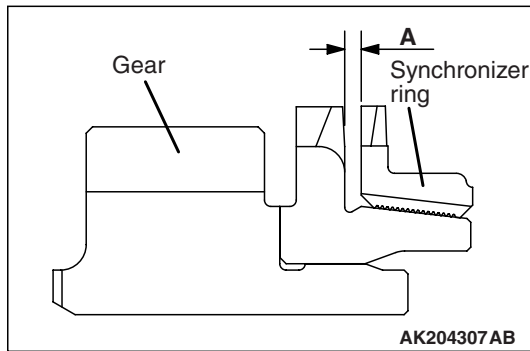
## NEEDLE ROLLER BEARING

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

## SYNCHRONIZER RING



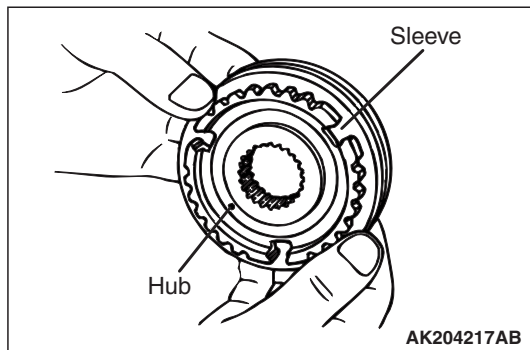
- Check the clutch gear teeth for damage and broken.
- Check internal surface for damage, wear and broken threads.



- Force the synchronizer ring toward the clutch gear and check clearance "A." If "A" is less than the limit, replace the synchronizer ring.

**Minimum limit: 0.5 mm**

### SYNCHRONIZER SLEEVE AND HUB

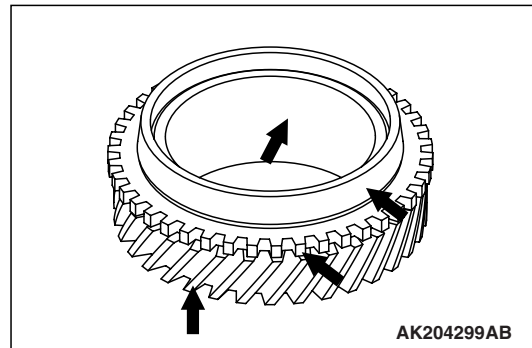


- Combine the synchronizer sleeve and hub, and check that they slide smoothly.
- Check that the sleeve is free from damage at its inside splines ends.

### SYNCHRONIZER SPRING

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

### SPEED GEARS



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

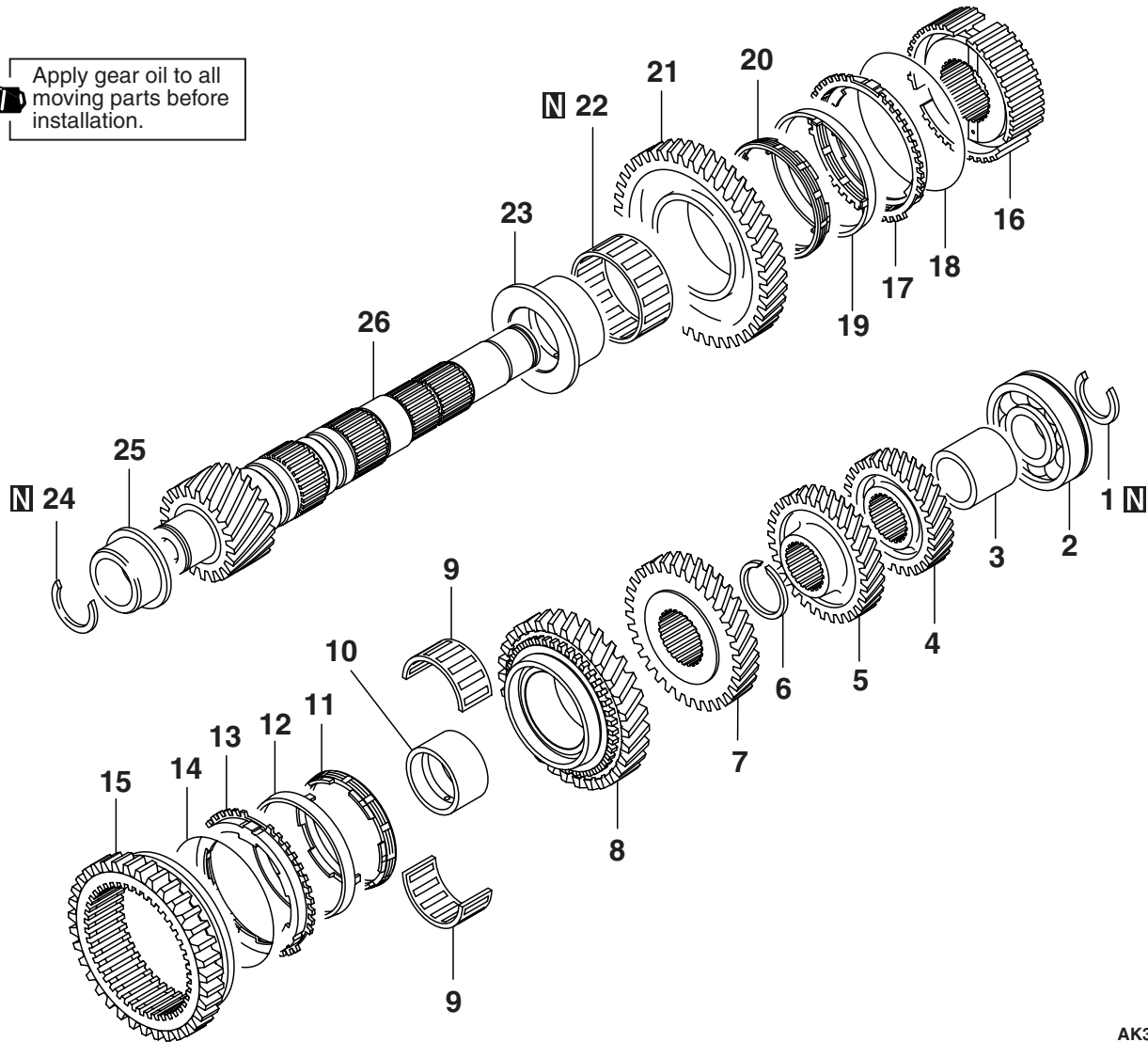
# OUTPUT SHAFT

## DISASSEMBLY AND REASSEMBLY

M1222002200394

<F5M41>

Apply gear oil to all moving parts before installation.



AK300292AB

### Disassembly steps

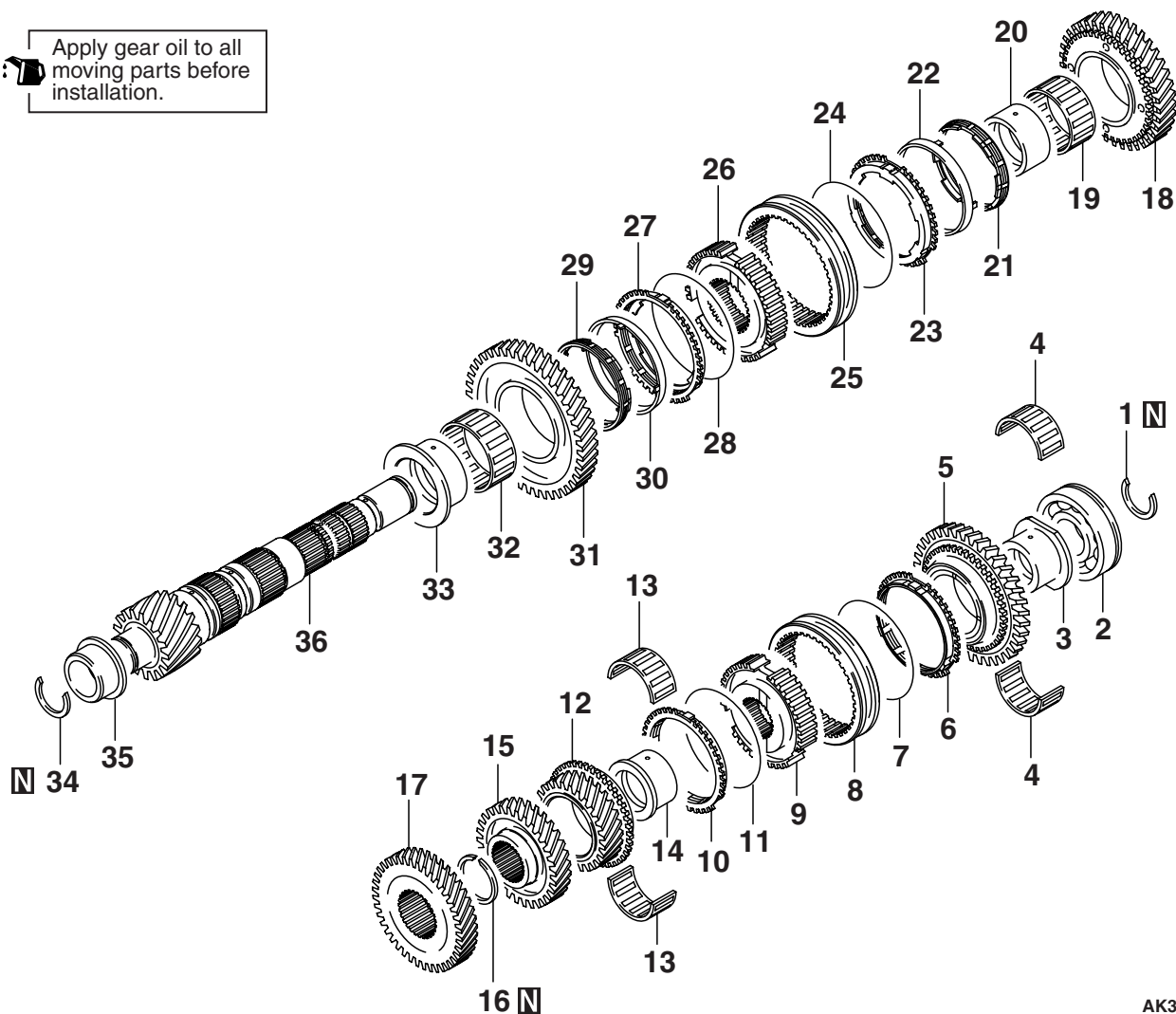
- >>R<< 1. Snap ring
- <<A>> >>Q<< 2. Ball bearing
- 3. Collar
- 4. 5th speed gear
- >>J<< 5. 4th speed gear
- >>I<< 6. Snap ring
- <<D>> >>H<< 7. 3rd speed gear
- 8. 2nd speed gear
- 9. Needle roller bearing
- <<E>> >>G<< 10. 2nd speed gear sleeve
- 11. Inner synchronizer ring
- 12. Synchronizer cone
- 13. Outer synchronizer ring
- >>D<< 14. Synchronizer spring

### Disassembly steps (Continued)

- >>F<< 15. Synchronizer sleeve
- >>E<< 16. 1st-2nd speed synchronizer hub
- 17. Outer synchronizer ring
- >>D<< 18. Synchronizer spring
- 19. Synchronizer cone
- 20. Inner synchronizer ring
- 21. 1st speed gear
- 22. Needle roller bearing
- <<F>> >>C<< 23. 1st speed gear sleeve
- >>B<< 24. Snap ring
- <<G>> >>A<< 25. Roller bearing inner race
- 26. Output shaft

<F5M42>

Apply gear oil to all moving parts before installation.



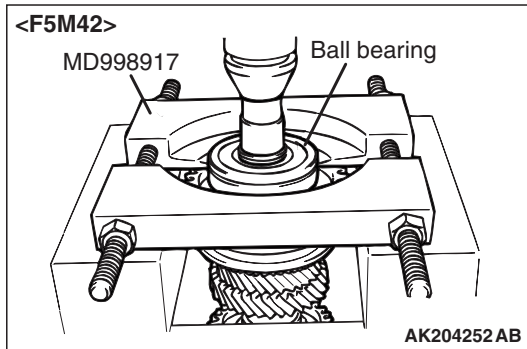
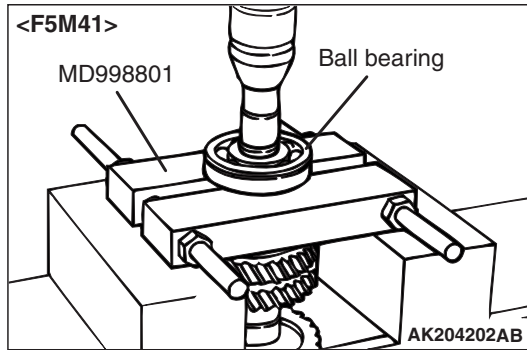
AK300024AB

**Disassembly steps**

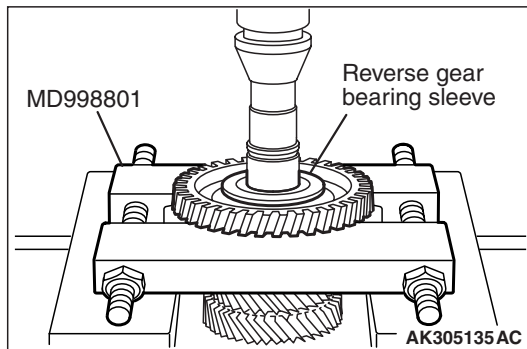
- >>R<< 1. Snap ring
- <<A>> >>Q<< 2. Ball bearing
- <<B>> >>P<< 3. Reverse gear sleeve
- 4. Needle roller bearing
- 5. Reverse gear
- >>M<< 6. Synchronizer ring
- >>L<< 7. Synchronizer spring
- >>O<< 8. Synchronizer sleeve
- <<C>> >>N<< 9. 5th speed-reverse synchronizer hub
- >>M<< 10. Synchronizer ring
- >>L<< 11. Synchronizer spring
- 12. 5th speed gear
- 13. Needle roller bearing
- >>K<< 14. 5th speed gear sleeve
- >>J<< 15. 4th speed gear
- >>I<< 16. Snap ring
- <<D>> >>H<< 17. 3rd speed gear
- 18. 2nd speed gear
- 19. Needle roller bearing

**Disassembly steps (Continued)**

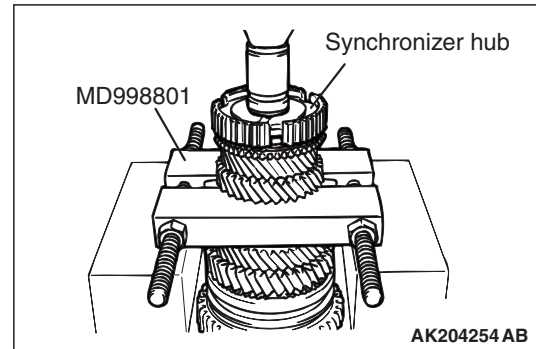
- <<E>> >>G<< 20. 2nd speed gear sleeve
- 21. Inner synchronizer ring
- 22. Synchronizer cone
- 23. Outer synchronizer ring
- >>D<< 24. Synchronizer spring
- >>F<< 25. Synchronizer sleeve
- >>E<< 26. 1st-2nd speed synchronizer hub
- 27. Outer synchronizer ring
- >>D<< 28. Synchronizer spring
- 29. Inner synchronizer ring
- 30. Synchronizer cone
- 31. 1st speed gear
- 32. Needle roller bearing
- <<F>> >>C<< 33. 1st speed gear sleeve
- >>B<< 34. Snap ring
- <<G>> >>A<< 35. Roller bearing inner race
- 36. Output shaft

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

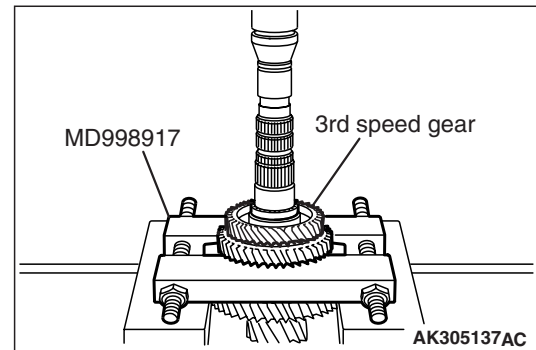
- Using special tools, support the ball bearing, and then set them on the press.
  - Bearing remover (MD998801) <F5M41>
  - Bearing remover (MD998917) <F5M42>
- Push down on the output shaft with the press, and remove the ball bearing.

**<<B>> REVERSE GEAR SLEEVE REMOVAL**

- Using special tool Bearing remover (MD998801), support the reverse gear, and then set them on the press.
- Push down on the output shaft with the press and remove the reverse gear bearing sleeve.

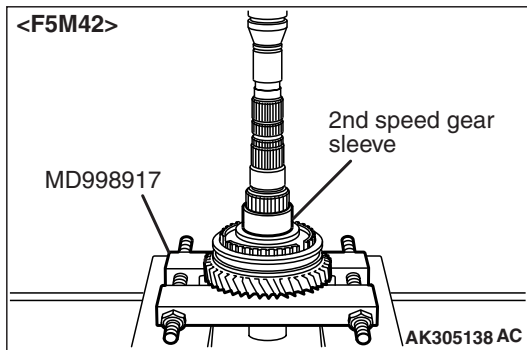
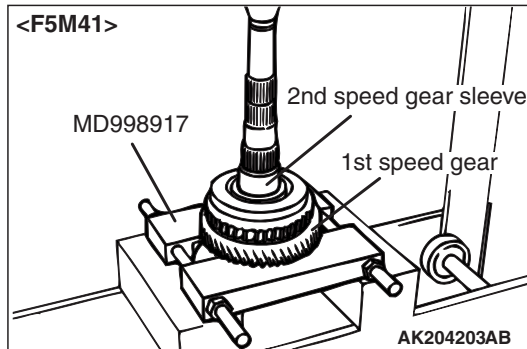
**<<C>> 5TH SPEED-REVERSE SYNCHRONIZER HUB REMOVAL**

- Using special tool Bearing remover (MD998801), support the 4th speed gear, and then set them on the press.
- Push down on the output shaft with the press and remove the 5th speed-reverse synchronizer hub.

**<<D>> 3RD SPEED GEAR REMOVAL**

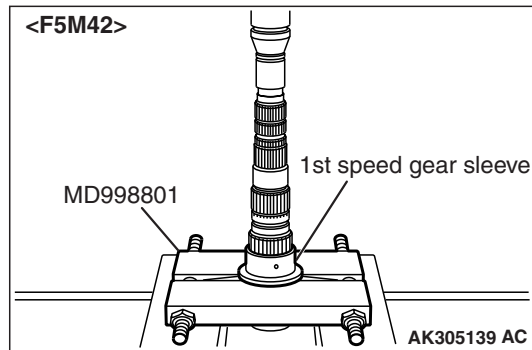
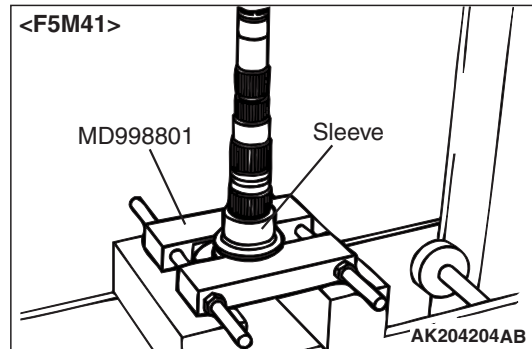
- Using special tool Bearing remover (MD998917), support the 2nd speed gear, and then set them on the press.
- Push down on the output shaft with the press and remove the 3rd speed gear.

<<E>> 2ND SPEED GEAR SLEEVE  
REMOVAL



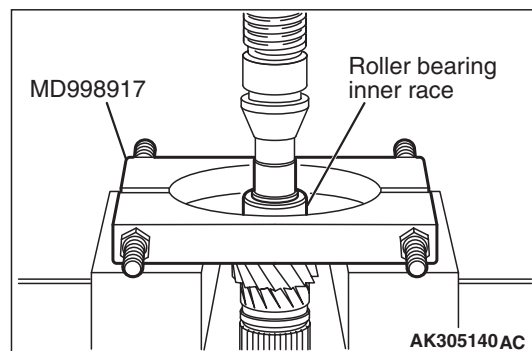
1. Using special tool Bearing remover (MD998917), support the 1st speed gear, and then set them on the press.
2. Push down on the output shaft with the press and remove the 2nd speed gear sleeve.

<<F>> 1ST SPEED GEAR SLEEVE  
REMOVAL

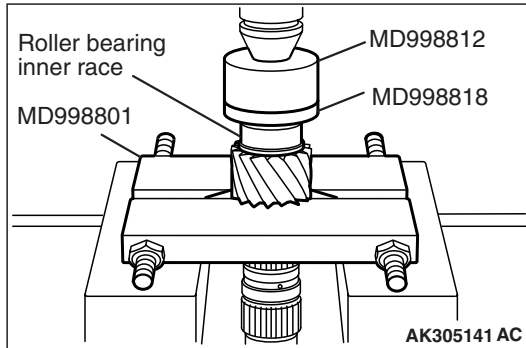


1. Using special tool Bearing remover (MD998801), support the 1st speed gear sleeve, and then set them on the press.
2. Push down on the output shaft with the press and remove the 1st speed gear sleeve.

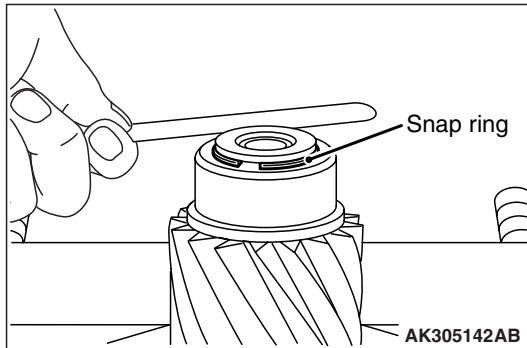
<<G>> ROLLER BEARING INNER RACE  
REMOVAL



1. Using special tool Bearing remover (MD998917), support the roller bearing inner race, and then set them on the press.
2. Push down on the output shaft with the press and remove the roller bearing inner race.

**REASSEMBLY SERVICE POINTS****>>A<< 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 adapter (MD998818)

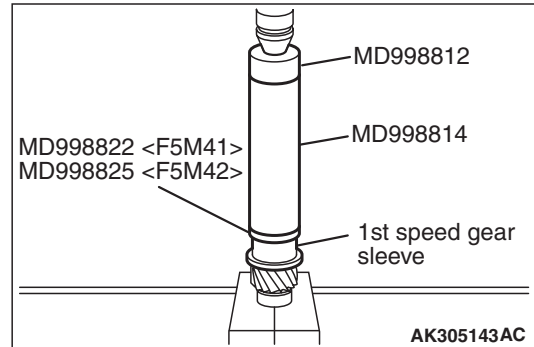
**>>B<< SNAP RING INSTALLATION**

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.

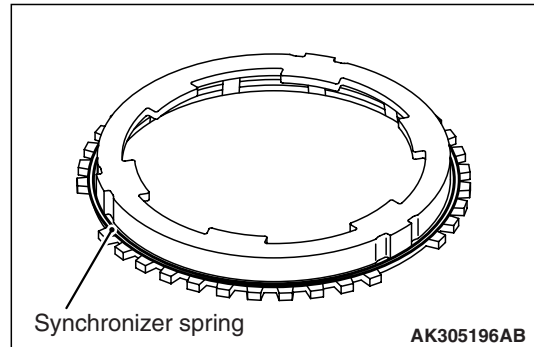
**Standard value: 0 – 0.12 mm**

**>>C<< 1ST SPEED GEAR SLEEVE  
INSTALLATION**

1. Set the output shaft on the press support stand.



2. Using special tools, install the 1st speed gear sleeve with the press.
  - Installer cap (MD998812)
  - Installer-200 (MD998814)
  - Installer adapter (MD998822) <F5M41>
  - Installer adapter (MD998825) <F5M42>

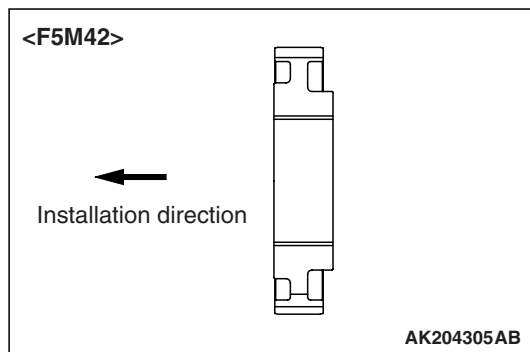
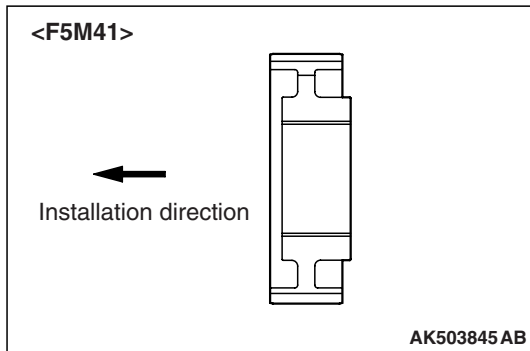
**>>D<< SYNCHRONIZER SPRING  
INSTALLATION**

Install the synchronizer spring onto the outer synchronizer ring as shown.

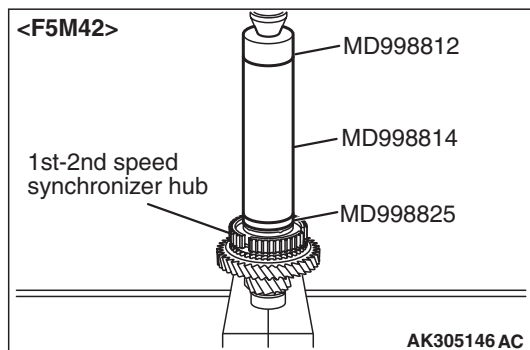
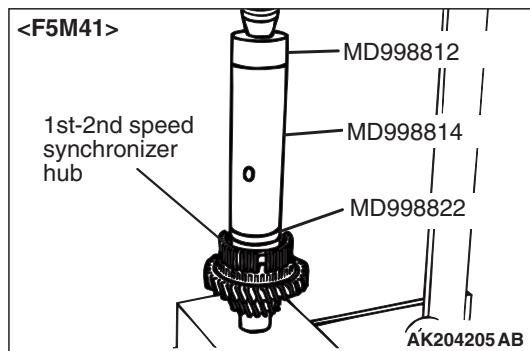


## >>E<< 1ST-2ND SPEED SYNCHRONIZER HUB INSTALLATION

1. Set the output shaft on the press support stand.



2. Check that the 1st-2nd speed synchronizer hub is in the correct installation direction, and put it on the output shaft.

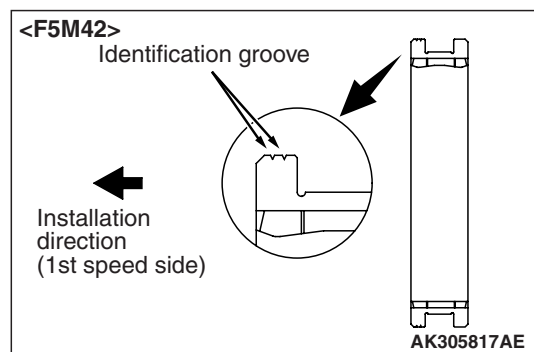
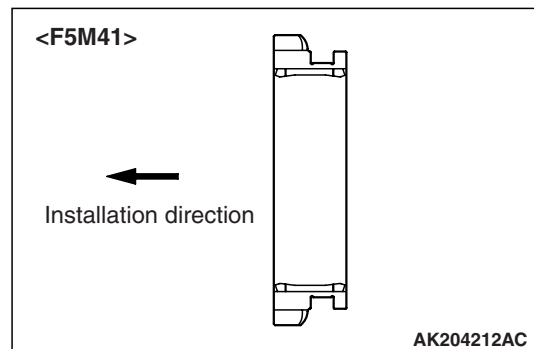


3. Using special tools, install the 1st-2nd speed synchronizer hub with the press.

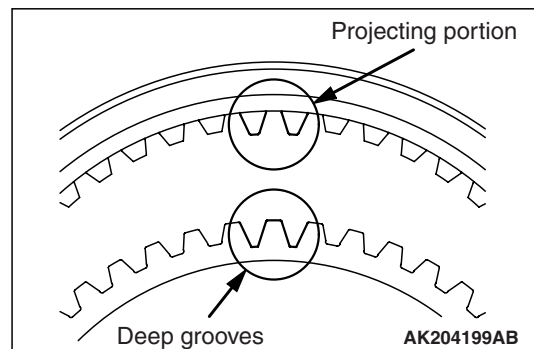
- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998822) <F5M41>
- Installer adapter (MD998825) <F5M42>

4. Make sure that the outer synchronizer ring on the 1st speed gear side can rotate freely.

## >>F<< SYNCHRONIZER SLEEVE INSTALLATION



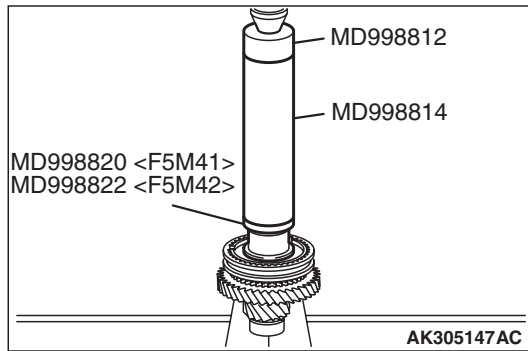
1. Check that the synchronizer sleeve is in the correct direction for installation, and install it on the 1st-2nd speed synchronizer hub.



2. Install the synchronizer sleeve so that the areas with teeth that have raised tips (three areas total) are aligned with the areas on the synchronizer hub that have deep grooves between the teeth (three areas total).

**>>G<< 2ND SPEED GEAR SLEEVE  
INSTALLATION**

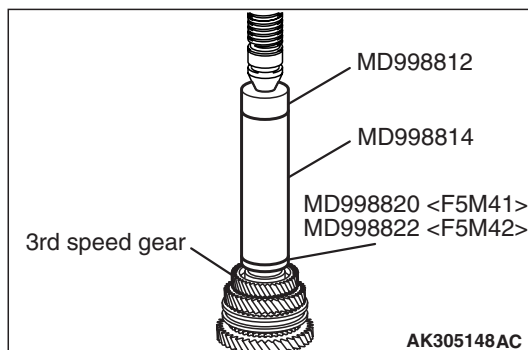
1. Set the output shaft on the press support stand.



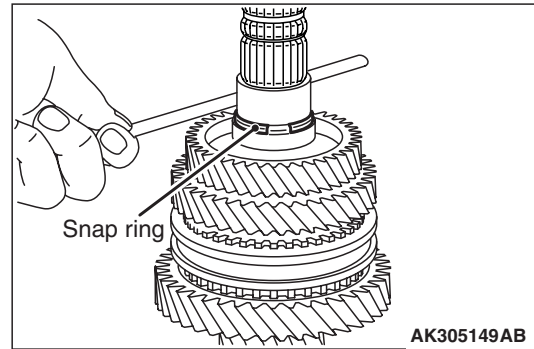
2. Using special tools, install the 2nd speed sleeve onto the output shaft with the press.
  - Installer cap (MD998812)
  - Installer-200 (MD998814)
  - Installer adapter (MD998820) <F5M41>
  - Installer adapter (MD998822) <F5M42>

**>>H<< 3RD SPEED GEAR INSTALLATION**

1. Check that the 2nd speed gear and the outer synchronizer ring have been properly installed. Also, make sure the claws on the synchronizer cone (four places) are correctly fitted into the holes in the 2nd speed gear (four places).



2. Using special tools, install the 3rd speed gear onto the output shaft with the press.
  - Installer cap (MD998812)
  - Installer-200 (MD998814)
  - Installer adapter (MD998820) <F5M41>
  - Installer adapter (MD998822) <F5M42>
3. Make sure that the 2nd speed gear and the outer synchronizer ring can rotate freely.

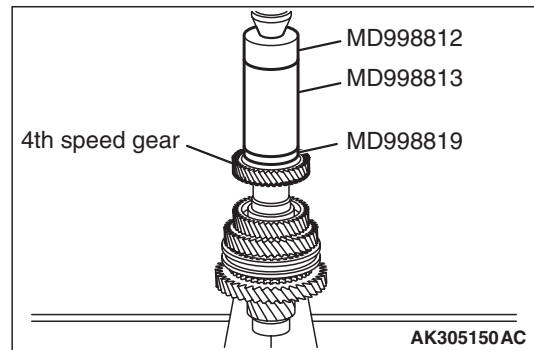
**>>I<< SNAP RING INSTALLATION**

1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the 3rd speed gear end play meets the standard value.

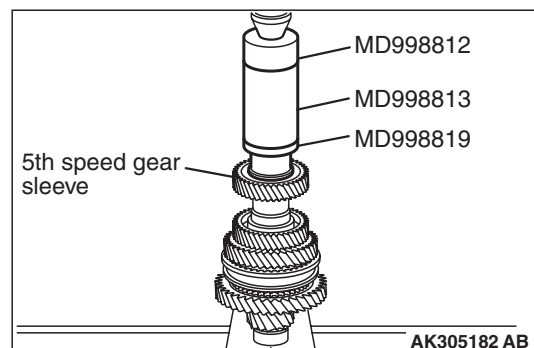
**Standard value: 0 – 0.09 mm**

**>>J<< 4TH SPEED GEAR INSTALLATION**

1. Set the output shaft on the press support stand.



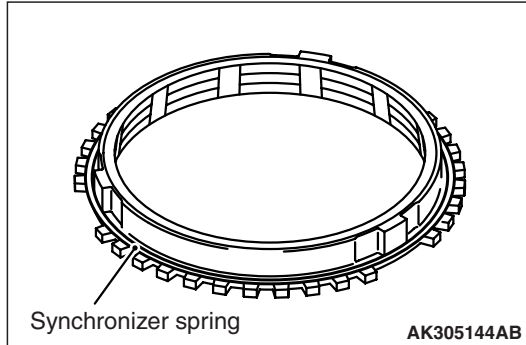
2. Using special tools, install the 4th speed gear onto the output shaft with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998819)

**>>K<< 5TH SPEED GEAR SLEEVE  
INSTALLATION**

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

- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (MD998819)

## >>L<< SYNCHRONIZER SPRING INSTALLATION

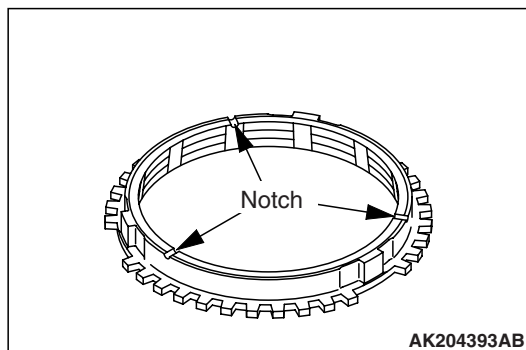


Install the synchronizer spring onto the synchronizer ring as shown.

## >>M<< SYNCHRONIZER RING INSTALLATION

### ⚠ CAUTION

There is a 5th speed synchronizer ring and a reverse synchronizer ring. Be careful not to confuse the two when installing, as a mistake can effect the shift feeling.



1. Check for the presence of identification notches on the synchronizer ring.

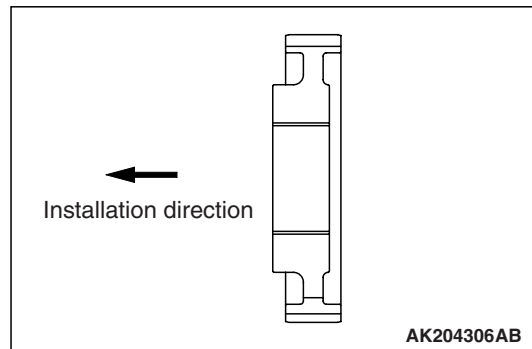
**No notches: 5th speed synchronizer ring**

**Three notches: Reverse synchronizer ring**

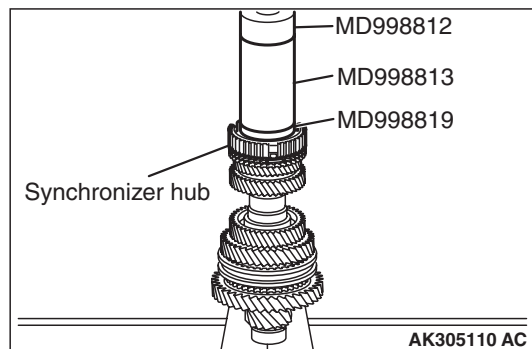
2. Install the synchronizer ring so that it fits completely over the machined cone of the gear.

## >>N<< 5TH SPEED-REVERSE SYNCHRONIZER HUB INSTALLATION

1. Set the output shaft on the press support stand.
2. Make sure that the synchronizer ring is fitted correctly on the cone of the 5th speed gear.

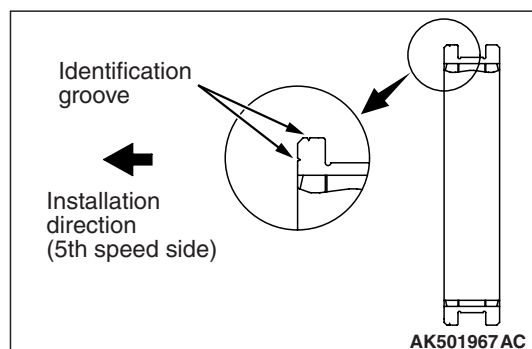


3. Check that the 5th speed-reverse synchronizer hub is oriented correctly for installation, and fit it on the output shaft.

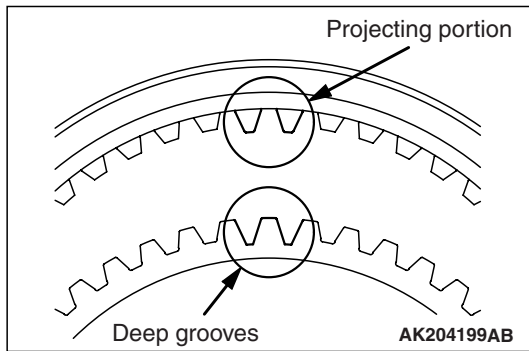


4. Using special tools, press install the 5th speed-reverse synchronizer hub with the press.
  - Installer cap (MD998812)
  - Installer-100 (MD998813)
  - Installer adapter (MD998819)
5. Make sure that the synchronizer ring on the 5th speed gear side can rotate freely.

## >>O<< SYNCHRONIZER SLEEVE INSTALLATION



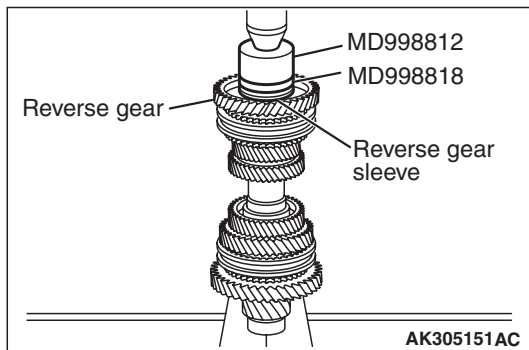
1. Check that the synchronizer sleeve is in the correct direction for installation, and install it on the 5th speed-Reverse synchronizer hub.



2. Install the synchronizer sleeve so that the areas with teeth that have raised tips (three areas total) are aligned with the areas on the synchronizer hub that have deep grooves between the teeth (three areas total).

**>>P<< REVERSE GEAR SLEEVE INSTALLATION**

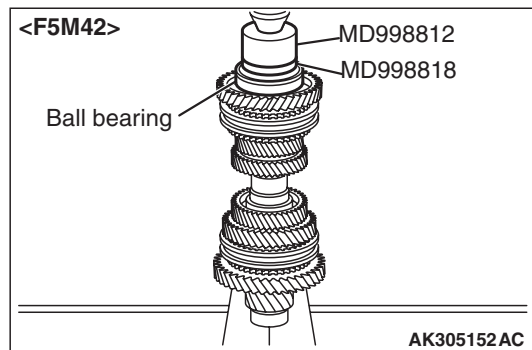
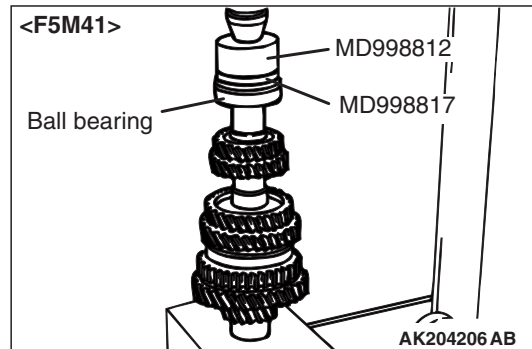
1. Make sure the synchronizer ring, reverse gear and needle roller bearing have been correctly installed.



2. Using special tools, press fit the reverse gear sleeve. Make sure that the reverse gear and the synchronizer ring can rotate freely during the pressing process.
  - Installer cap (MD998812)
  - Installer adapter (MD998818)

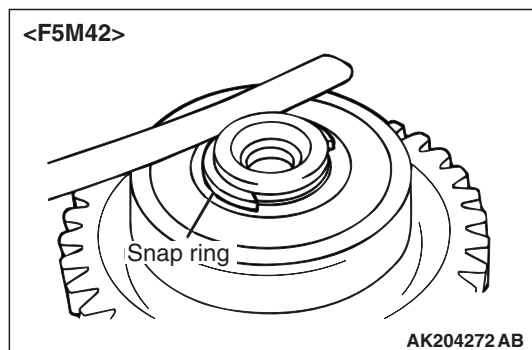
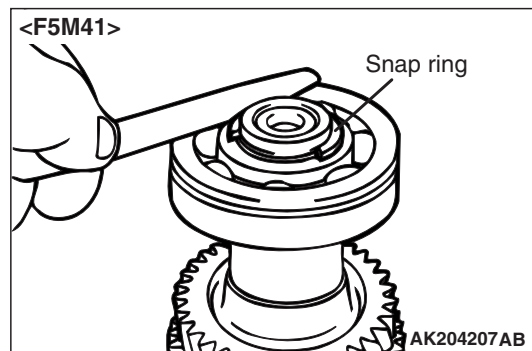
**>>Q<< BALL BEARING INSTALLATION**

1. Check the installation direction of the ball bearing.



2. Using special tools, install the ball bearing with the press.
  - Installer cap (MD998812)
  - Installer adapter (MD998817) <F5M41>
  - Installer adapter (MD998818) <F5M42>

**>>R<< SNAP RING INSTALLATION**



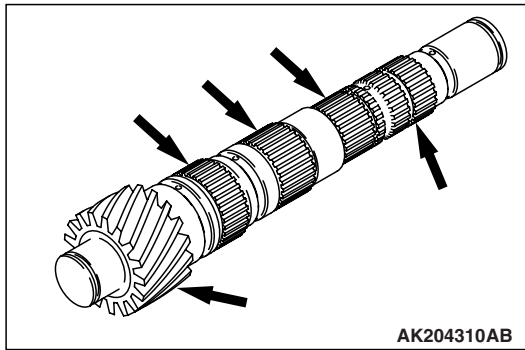
1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the rear bearing end play meets the standard value.

**Standard value: 0 – 0.09 mm**

## INSPECTION

### OUTPUT SHAFT

M1222002300119

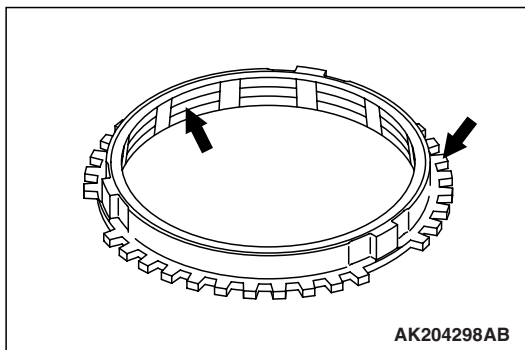


1. Check the splines for damage and wear.
2. Check that the helical gear teeth surfaces are not damaged or worn.

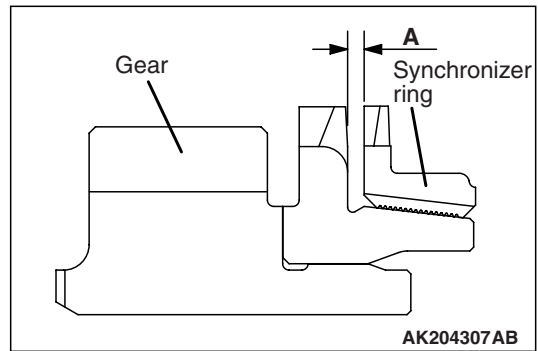
### NEEDLE ROLLER BEARING

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.



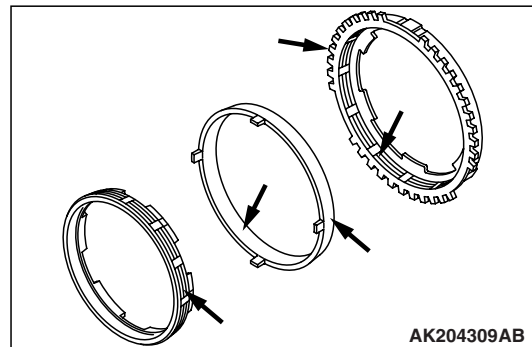
3. Force the synchronizer ring toward the clutch gear and check clearance "A." If "A" is less than the limit, replace the synchronizer ring.

**Minimum limit: 0.5 mm**

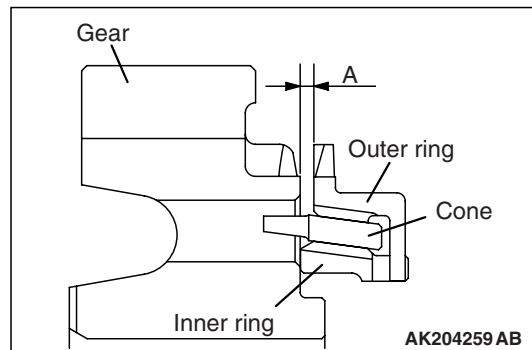
### OUTER SYNCHRONIZER RING/INNER SYNCHRONIZER RING/SYNCHRONIZER CONE

#### ⚠ CAUTION

**When replacing, replace the outer ring, inner ring and cone as a set.**

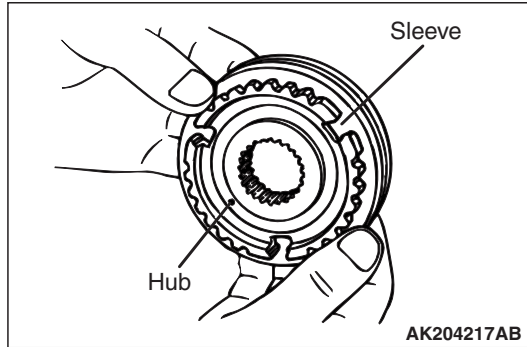


1. Check that the clutch gear tooth surfaces and cone surfaces are not damaged or broken.

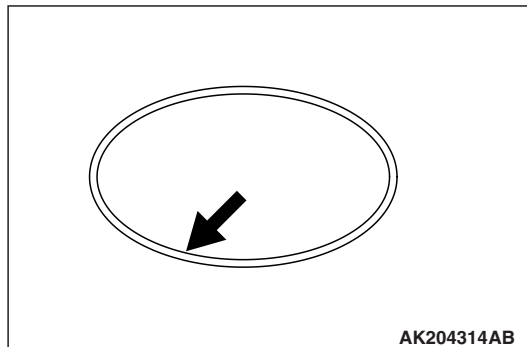


2. Install the outer ring, inner ring and cone, force them toward the gear, and check clearance "A." If "A" is less than the limit, replace them as a set.

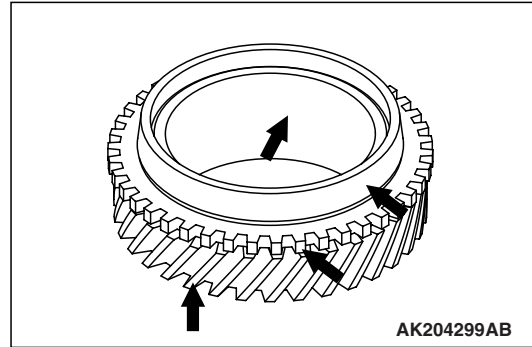
**Minimum limit: 0.5 mm**

**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.

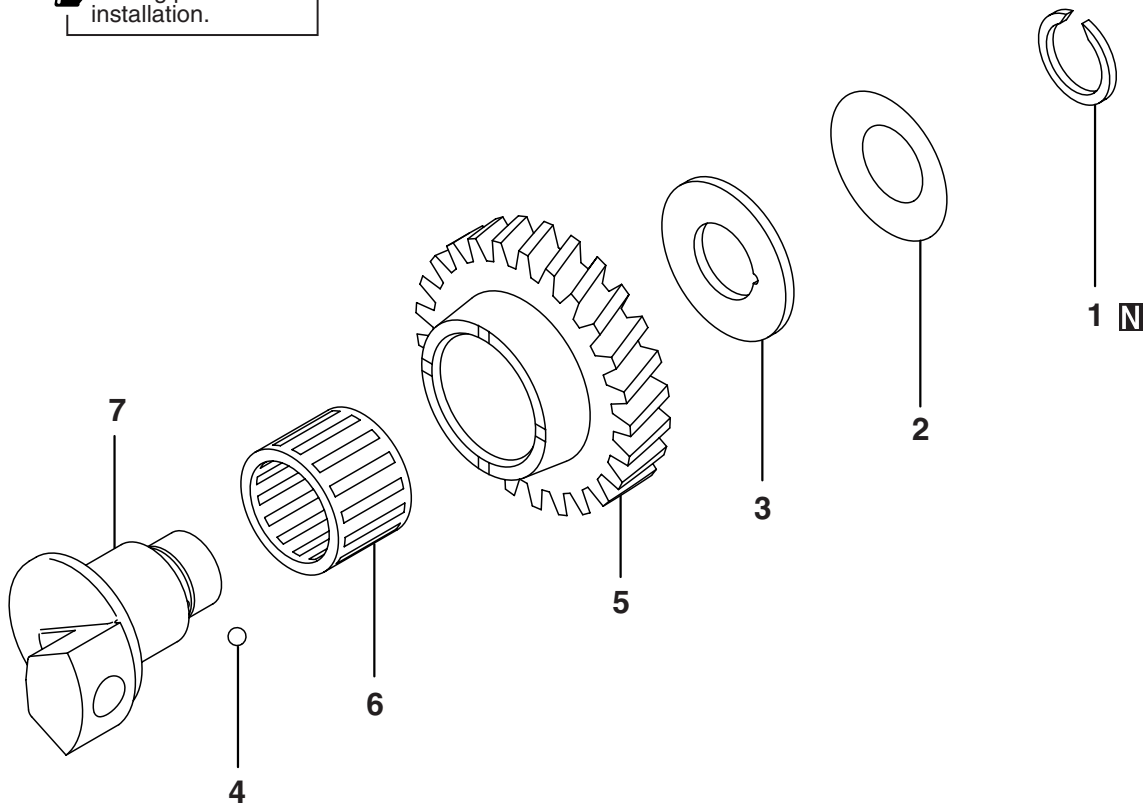
# REVERSE IDLER GEAR

## DISASSEMBLY AND REASSEMBLY

M1222012500103

<F5M42>

 Apply gear oil to all moving parts before installation.



AK204396AB

### Disassembly steps

1. Snap ring
2. Cone spring
3. Thrust washer
4. Steel ball


### Disassembly steps (Continued)

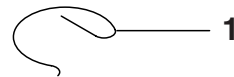
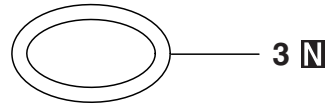
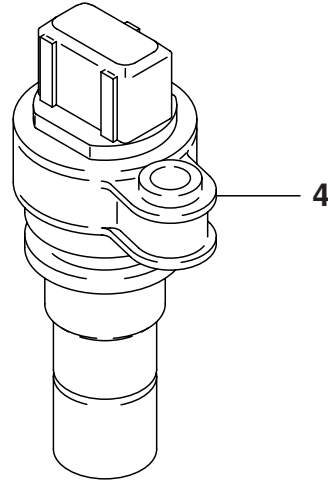
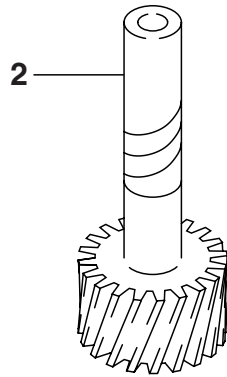
5. Reverse idler gear
6. Needle roller bearing
7. Reverse idler gear shaft

**VEHICLE SPEED SENSOR**

**DISASSEMBLY AND REASSEMBLY**

M1222007000038

 Apply gear oil to all moving parts before installation.



**Disassembly steps**

1. E-clip
2. Speed sensor gear

AK204397AB

**Disassembly steps (Continued)**

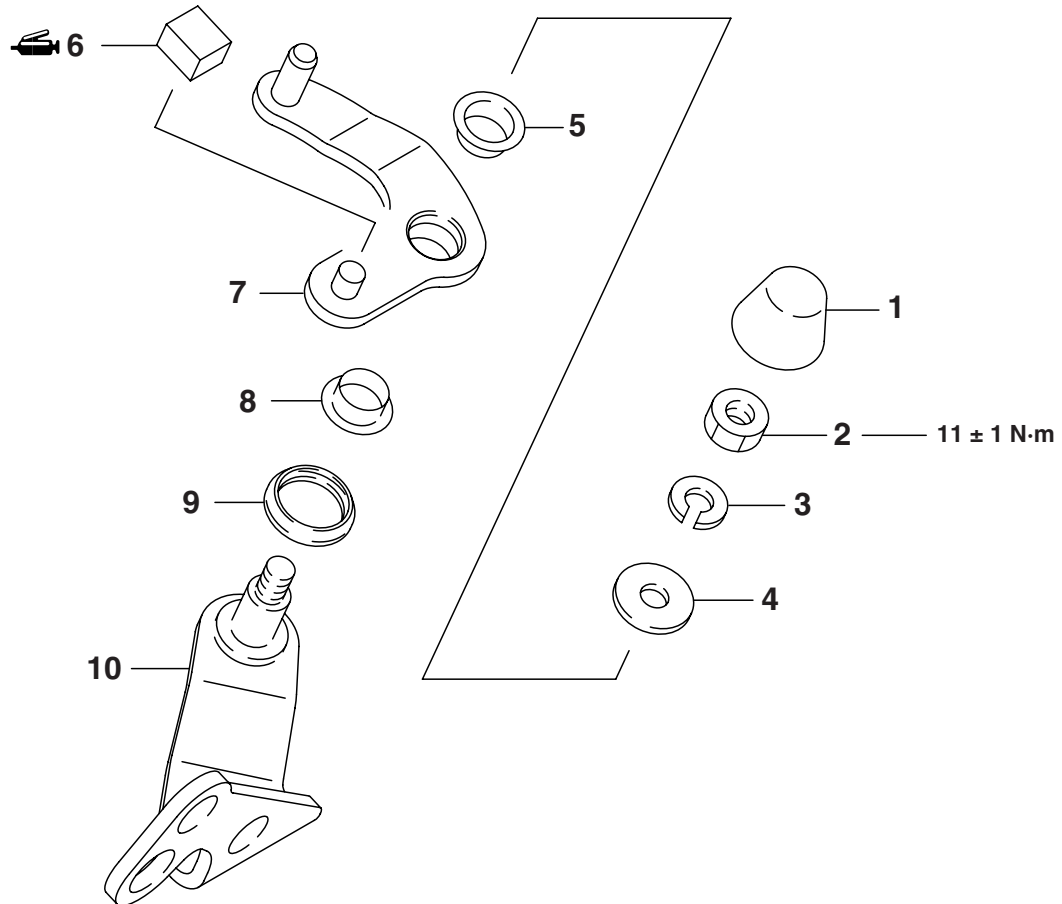
3. O-ring
4. Speed sensor



# SELECT LEVER

## DISASSEMBLY AND REASSEMBLY

M1222012800096



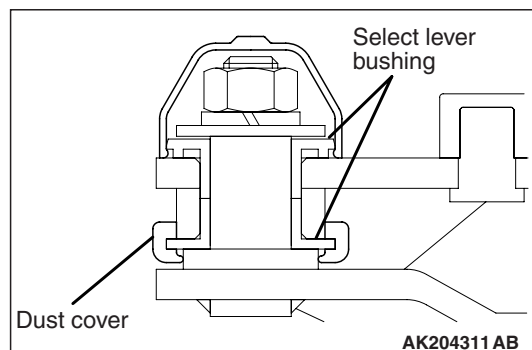
AK204398AB

### Disassembly steps

1. Dust cover
2. Nut
3. Spring washer
4. Washer
- >>A<< 5. Select lever bushing
6. Select lever shoe
7. Select lever
- >>A<< 8. Select lever bushing
- >>A<< 9. Dust cover
10. Select lever shaft

### REASSEMBLY SERVICE POINT

### >>A<< DUST COVER AND SELECT LEVER BUSHING INSTALLATION

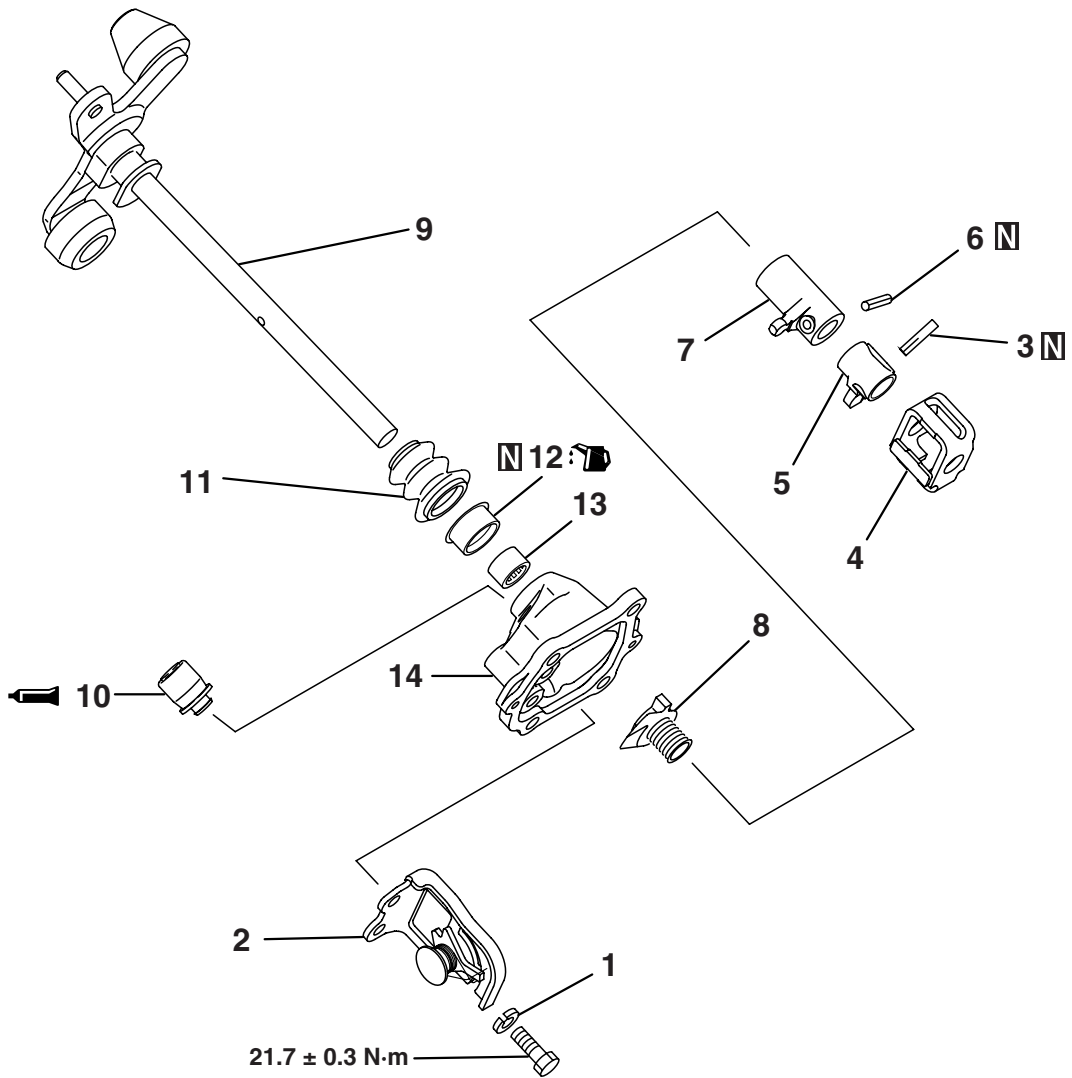


Make sure the dust cover and select lever bushing installation direction is correct, and the distinguished parts are correctly assembled as shown.

# CONTROL HOUSING

## DISASSEMBLY AND REASSEMBLY

M1222013100324



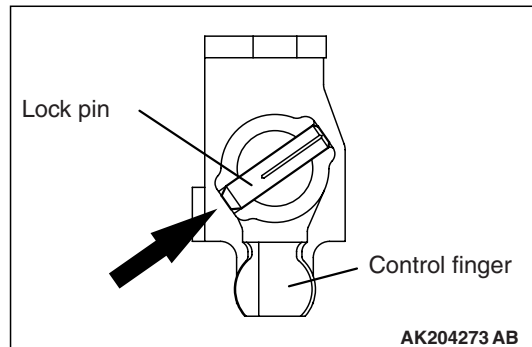
AK500015 AB

### Disassembly steps

- 1. Spring washer
- 2. Stopper bracket
- <<A>> >>E<< 3. Lock pin
- 4. Interlock plate
- 5. Control finger
- >>D<< 6. Spring pin
- 7. Stopper body
- 8. Spring
- 9. Control shaft
- >>C<< 10. Air breather
- 11. Control shaft boot
- >>B<< 12. Oil seal
- >>A<< 13. Needle bearing
- 14. Control housing

### DISASSEMBLY SERVICE POINT

#### <<A>> LOCK PIN REMOVAL

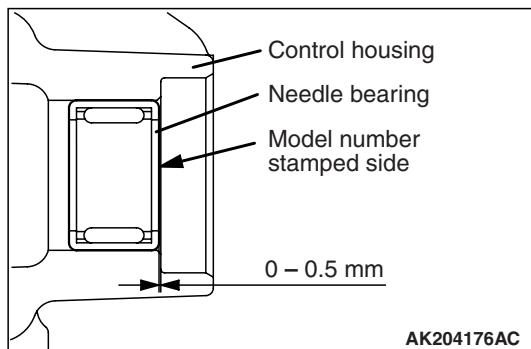


AK204273 AB

Drive out the lock pin from the direction shown.

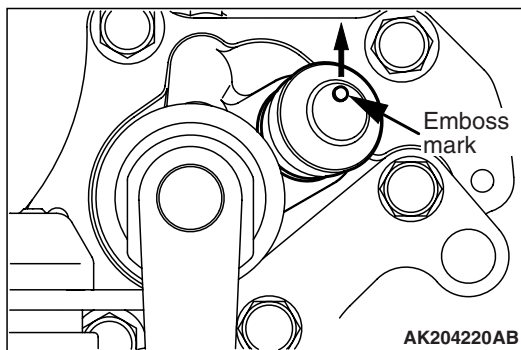
**REASSEMBLY SERVICE POINTS**

**>>A<< NEEDLE BEARING INSTALLATION**



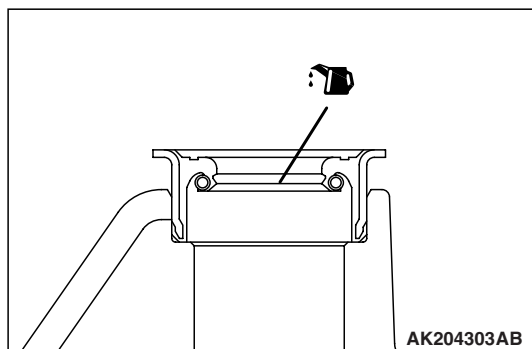
Press fit the needle bearing into the control housing side as shown. Make sure that the side with the model number stamped on it faces the end of the control housing as shown.

**Specified sealant:**  
**3M SUPER WEATHER STRIP No.8001 or equivalent**



2. Install the air breather so that the embossed mark is in the direction shown in the figure.

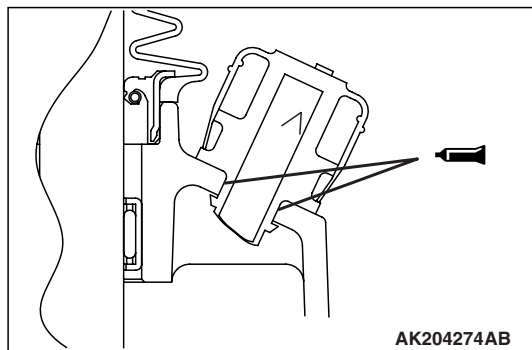
**>>B<< OIL SEAL INSTALLATION**



Apply gear oil to the oil seal lip area.

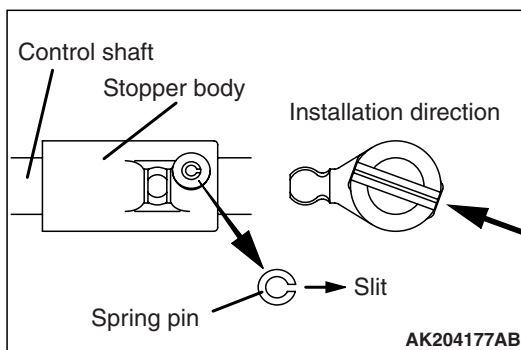
**Specified Lubricant:**  
**DiaQueen NEW MULTI GEAR OIL API classification GL-3, SEA 75W-80 or Gear oil API classification GL-4, SAE 75W-85/75W-90**

**>>C<< AIR BREATHER INSTALLATION**



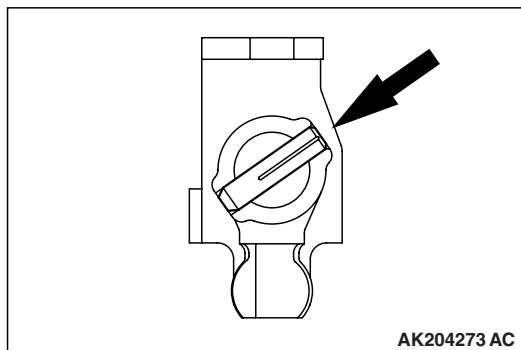
1. Apply sealant to the inserting portion of air breather.

**>>D<< SPRING PIN INSTALLATION**



Drive in the spring pin so that the slit is in the direction shown in the figure.

**>>E<< LOCK PIN INSTALLATION**

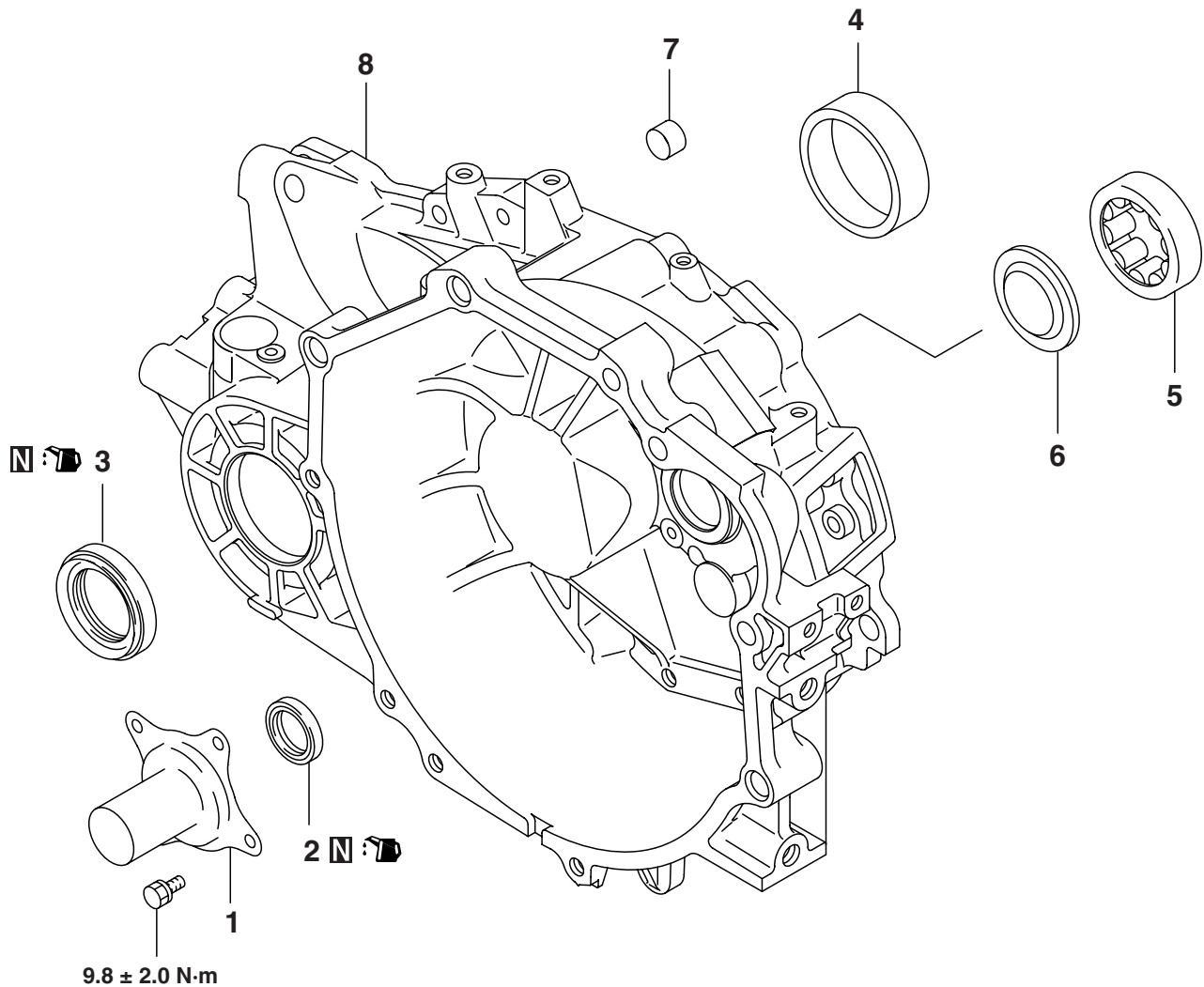


Drive the lock pin in from the direction shown in the figure.

# CLUTCH HOUSING

## DISASSEMBLY AND REASSEMBLY

M1222003700392



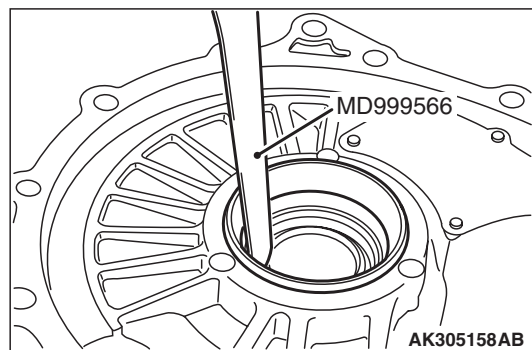
AK300521AB

### Disassembly steps

- 1. Clutch release bearing retainer
- >>E<< 2. Oil seal
- >>D<< 3. Oil seal
- <<A>> >>C<< 4. Outer race <F5M42>
- <<B>> >>B<< 5. Outer race
- 6. Oil guide <F5M41>
- >>A<< 7. Bushing
- 8. Clutch housing

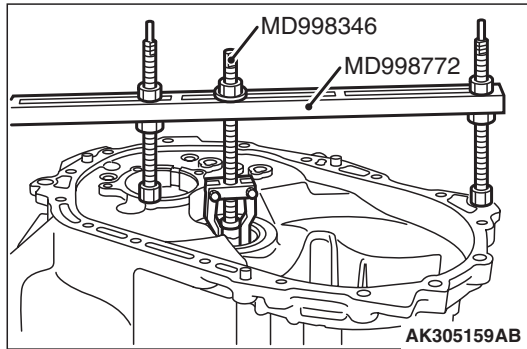
### DISASSEMBLY SERVICE POINT

#### <<A>> OUTER RACE REMOVAL



Using special tool Claw (MD999566), remove the outer race from the clutch housing.

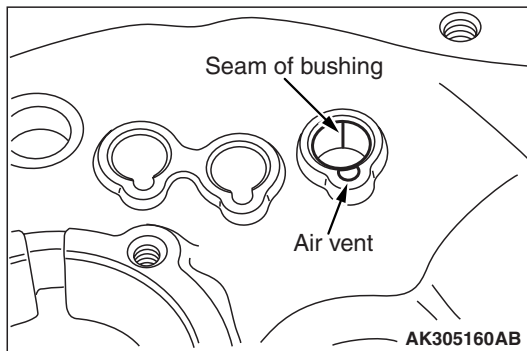
<<B>> OUTER RACE REMOVAL



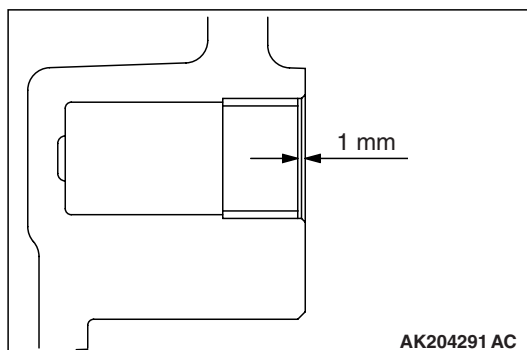
1. Set special tools as indicated in the figure.
  - Valve spring compressor (MD998772)
  - Bearing outer race remover (MD998346)
2. Turn the nut on special tool Bearing outer race remover (MD998346) to pull up on the tool and take out the outer race.

REASSEMBLY SERVICE POINTS

>>A<< BUSHING INSTALLATION

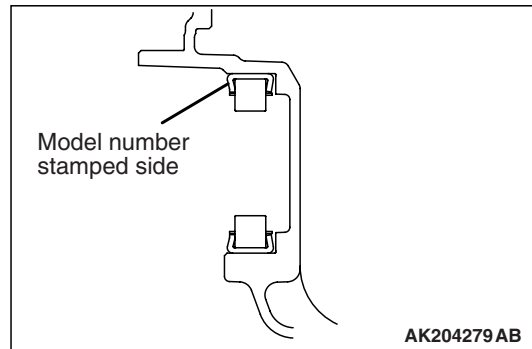


1. Press fit the bushing so the seam is away from the air vent.

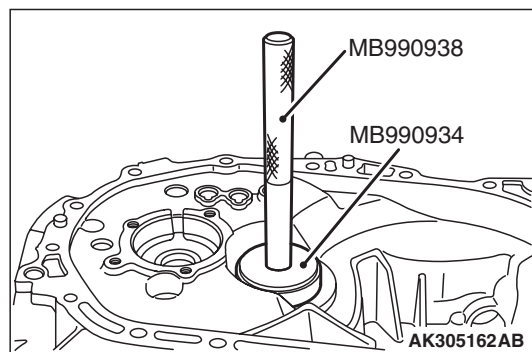


2. Be sure the bushing is fully seated as shown. It must be 1 mm below the housing surface.

>>B<< OUTER RACE INSTALLATION



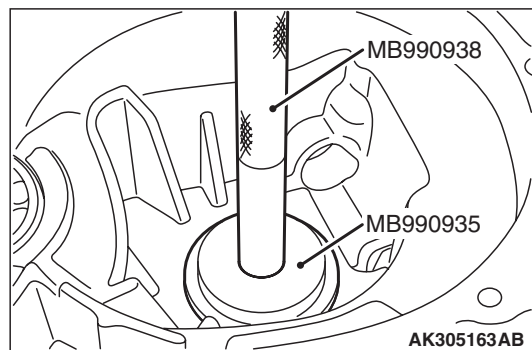
1. Check the installation direction of the outer race. Install the outer race so the side with the model number stamping can be seen.



2. Using special tools, press fit the outer race into the clutch housing.
  - Handle (MB990938)
  - Installer adapter (MB990934)

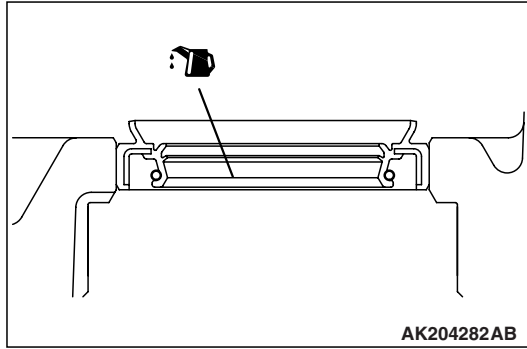
>>C<< OUTER RACE INSTALLATION

1. Check the installation direction of the outer race.



2. Using special tools, press fit the outer race into the clutch housing.
  - Handle (MB990938)
  - Installer adapter (MB990935)

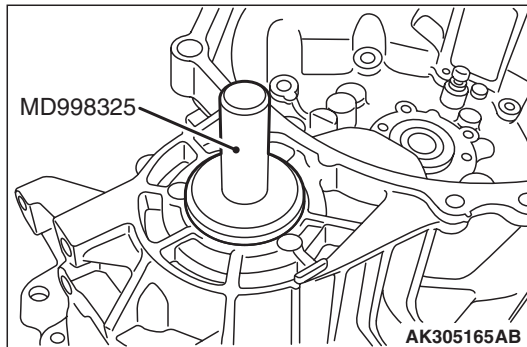
## &gt;&gt;D&lt;&lt; OIL SEAL INSTALLATION



1. Apply gear oil to the oil seal lip.

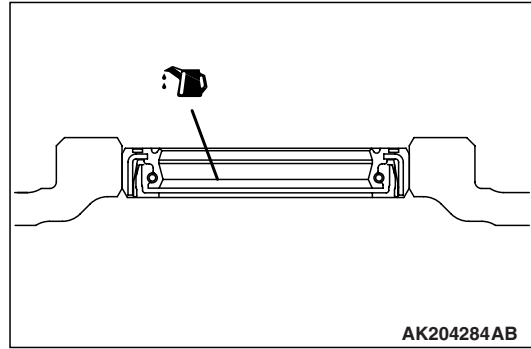
**Specified Lubricant:**

**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 tool Differential oil seal installer (MD998325), press fit the oil seal into the clutch housing.

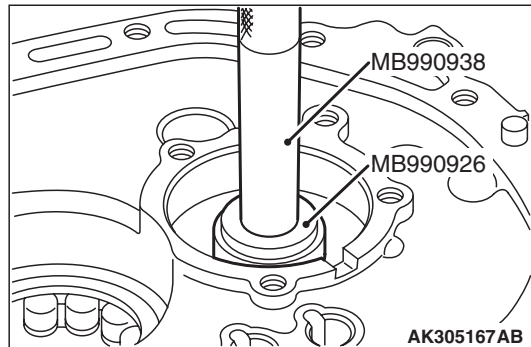
## &gt;&gt;E&lt;&lt; OIL SEAL INSTALLATION



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**

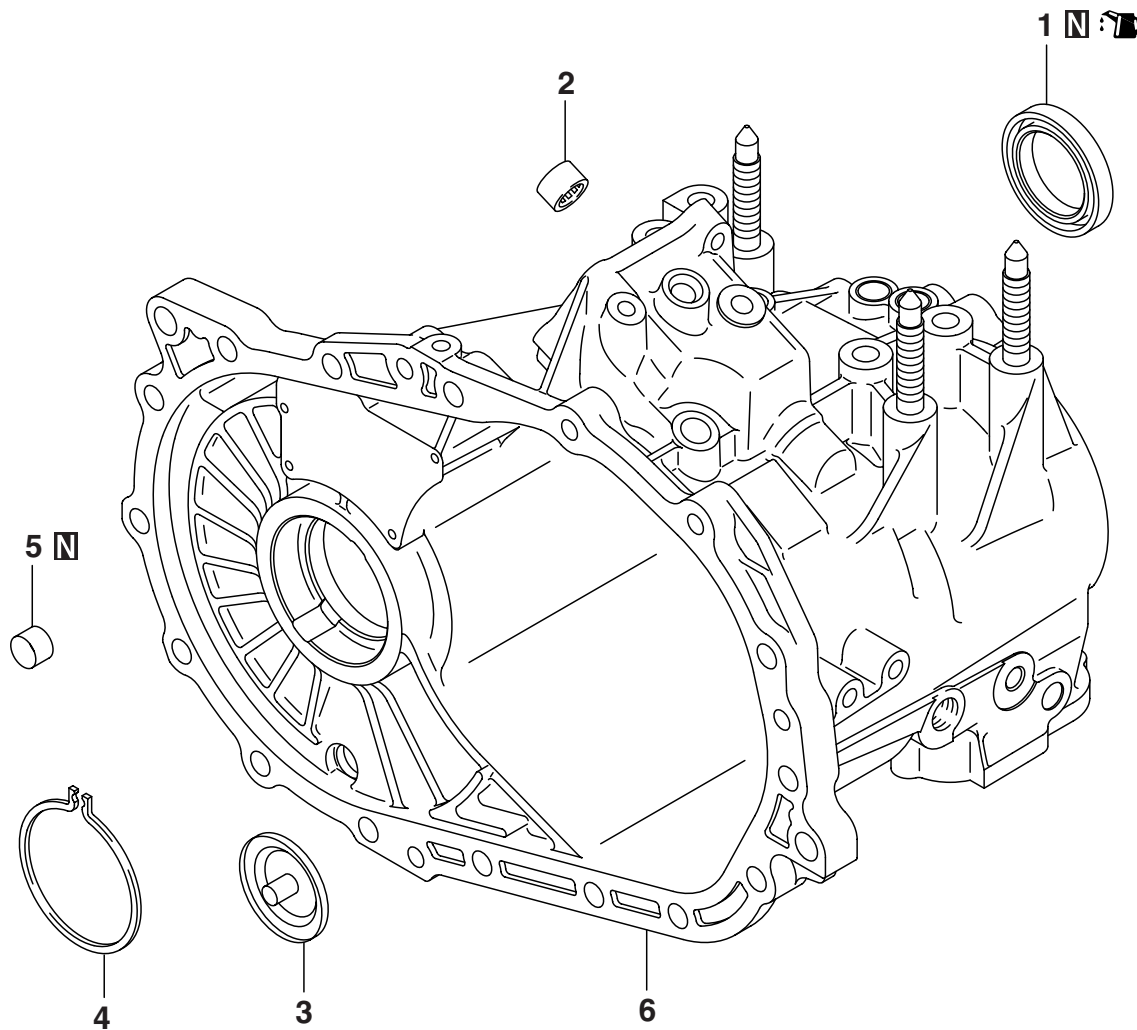


2. Using special tools, press fit the oil seal into the clutch housing.
  - Handle (MB990938)
  - Installer adapter (MB990926)

# TRANSMISSION CASE

## DISASSEMBLY AND REASSEMBLY

M1222013400336



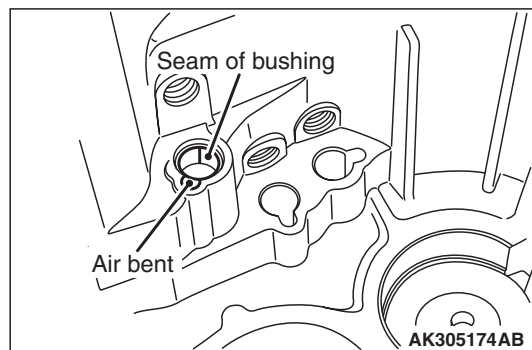
AK204407AB

### Disassembly steps

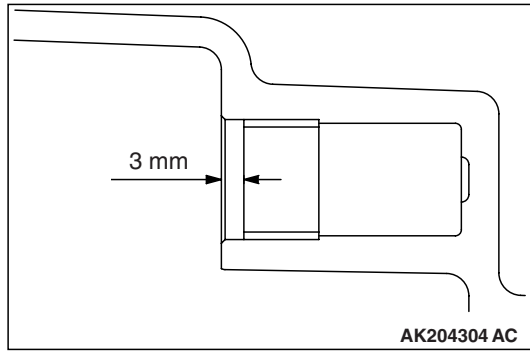
- >>C<< 1. Oil seal
- >>B<< 2. Needle bearing
- 3. Oil guide
- 4. Snap ring
- >>A<< 5. Bushing
- 6. Transmission

### REASSEMBLY SERVICE POINTS

#### >>A<< BUSHING INSTALLATION



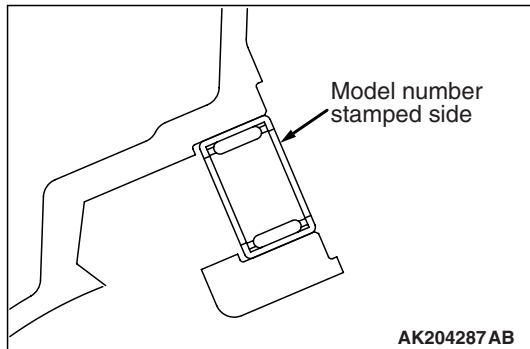
1. Press fit the bushing so the seam is away from the air vent.



2. Be sure the bushing is fully seated as shown. It must be 3 mm below the housing surface.

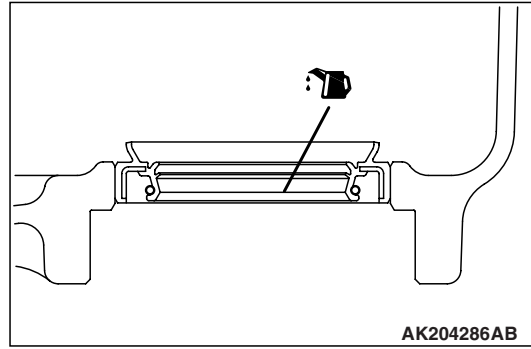
**>>B<< NEEDLE BEARING INSTALLATION**

1. Check the installation direction of the needle bearing.



2. Press fit the needle bearing until it is flush with the case.

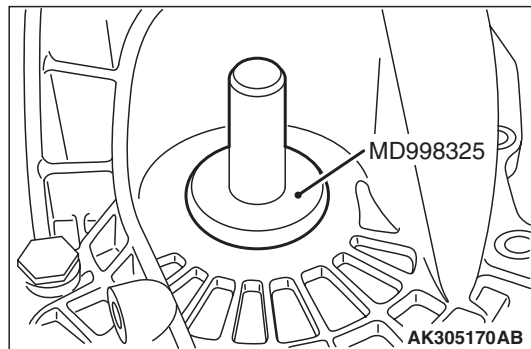
**>>C<< OIL SEAL INSTALLATION**



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 tool Differential oil seal installer (MD998325), press fit the oil seal into the transmission case.

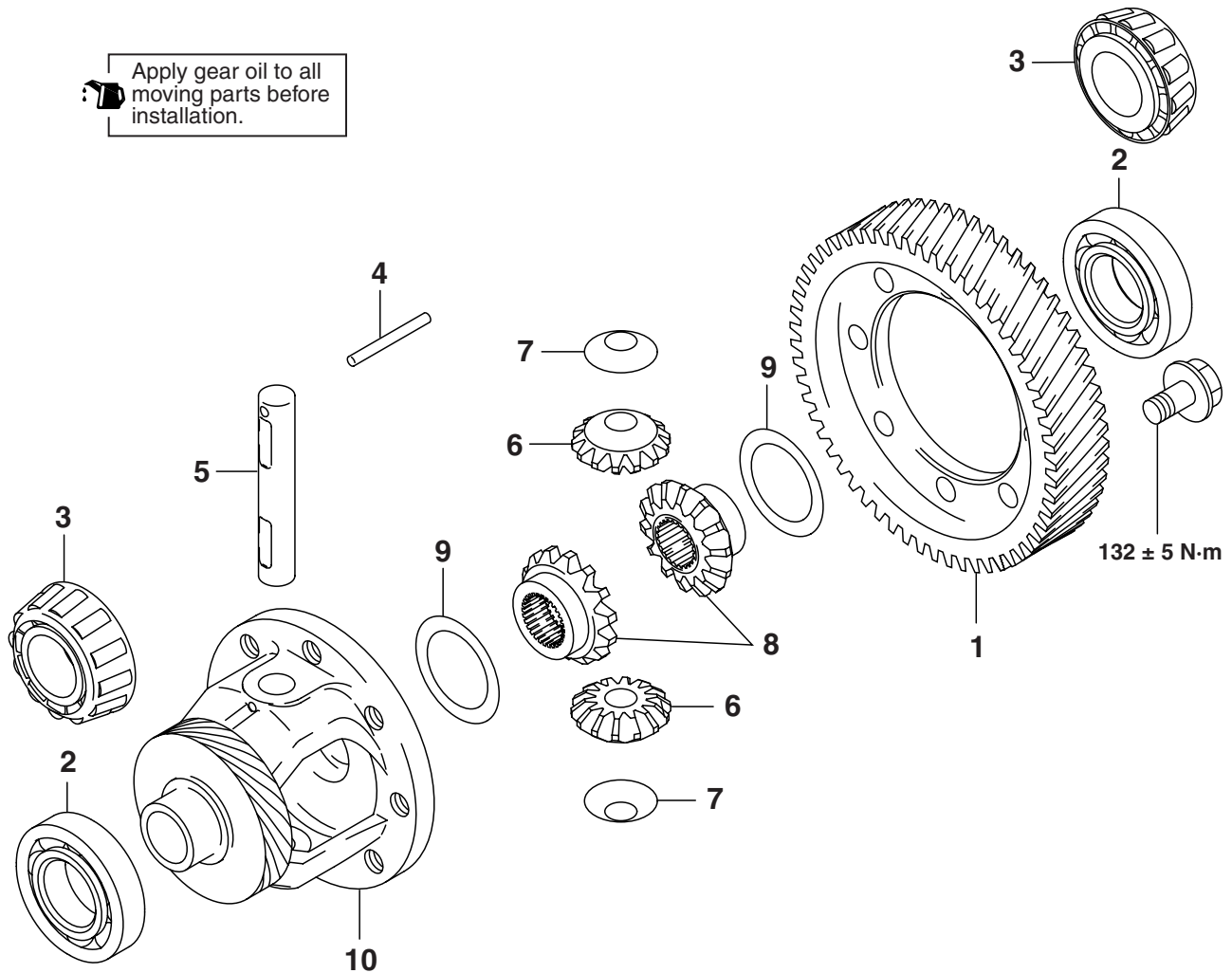


# DIFFERENTIAL

## DISASSEMBLY AND REASSEMBLY

M1222002500287

Apply gear oil to all moving parts before installation.



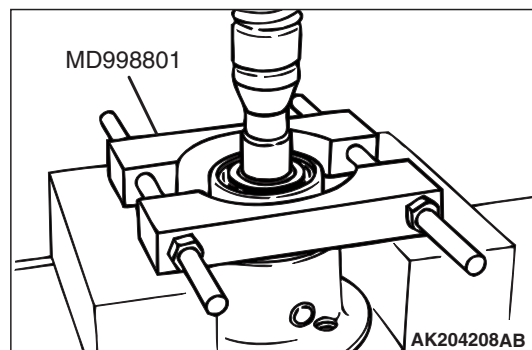
AK300293AB

### Disassembly steps

- >>E<< 1. Differential drive gear
- <<A>> >>D<< 2. Ball bearing <F5M41>
- <<B>> >>C<< 3. Taper roller bearing <F5M42>
- >>B<< 4. Lock pin
- >>A<< 5. Pinion shaft
- >>A<< 6. Pinion
- >>A<< 7. Washer
- >>A<< 8. Side gear
- >>A<< 9. Spacer
- >>A<< 10. Differential case

### DISASSEMBLY SERVICE POINT

#### <<A>> BALL BEARING REMOVAL

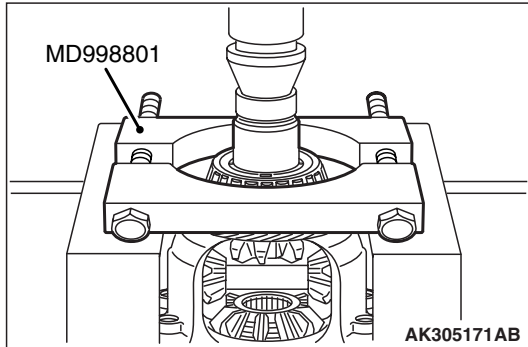


AK204208AB

1. Using special tool Bearing remover (MD998801), support the ball bearing, and then set them on the press.

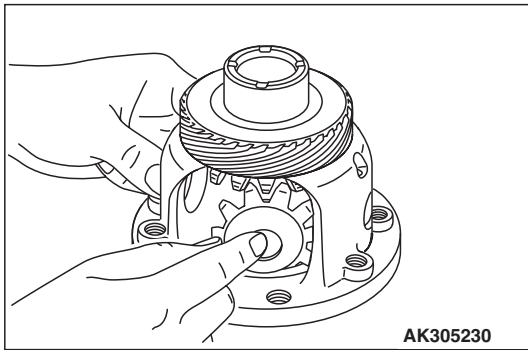
- Push down on the differential case with the press and remove the bearing.

**<<B>> TAPER ROLLER BEARING  
REMOVAL**

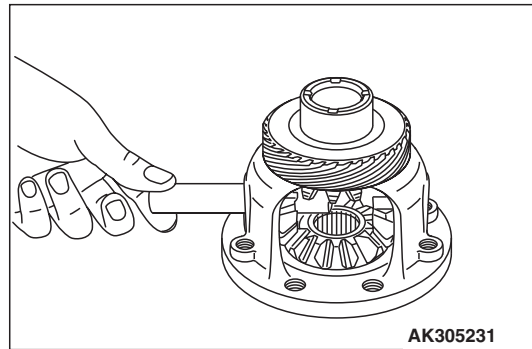


- Using special tool Bearing remover (MD998801), support the taper roller bearing, and then set them on the press.
- Push down on the differential case with the press and remove the bearing.

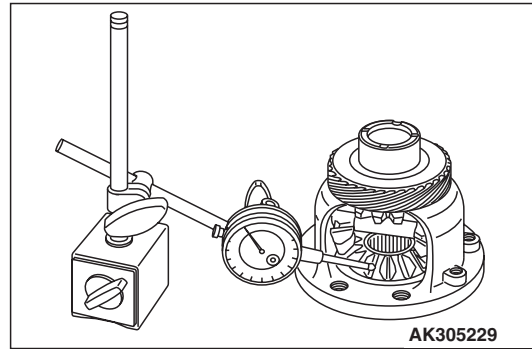
**REASSEMBLY SERVICE POINTS  
>>A<< SPACER/SIDE  
GEAR/WASHER/PINION/PINION SHAFT  
INSTALLATION**



- After a spacer has been mounted on the back surface of the side gear, install the side gear in the differential case.  
*NOTE: When a new side gear is to be installed, mount a medium thickness spacer (0.94 – 0.098 mm <F5M41>. 1.01 – 1.08 mm <F5M42>).*
- Set the washer on the back of each pinion, and put both pinions simultaneously in mesh with the side gears. While rotating them, install them in position.

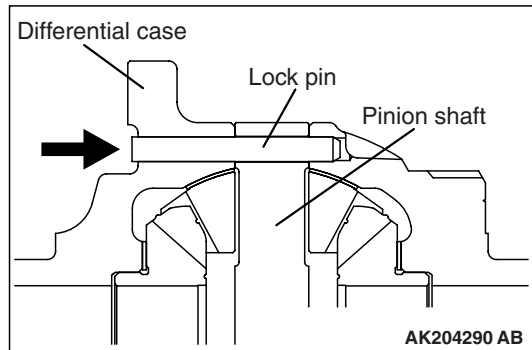


- Insert the pinion shaft.



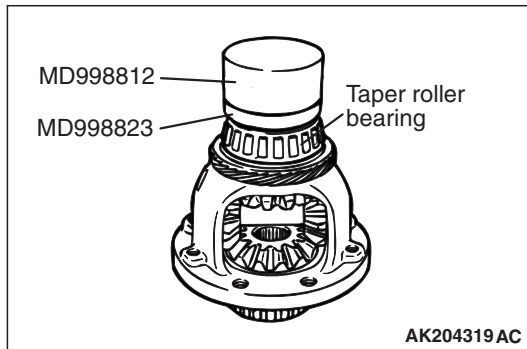
- Measure the backlash between the side gear and pinion.  
**Standard value: 0 – 0.15 mm**
- If the backlash is out of specification, select a spacer that should get the back lash with in the standard value and re-measure the backlash.  
*NOTE: Repeat until the backlash on both sides are equal.*

**>>B<< LOCK PIN INSTALLATION**



Install the lock pin so that it will be oriented in the direction shown.

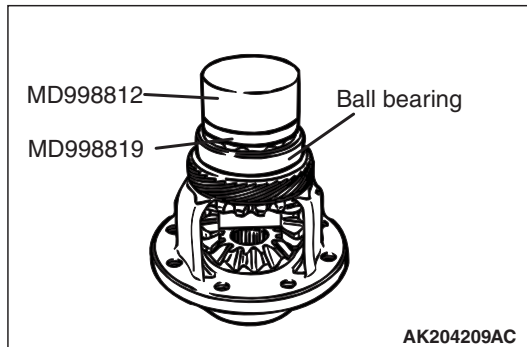
>>C<< TAPER ROLLER BEARING  
INSTALLATION



Using special tools, install the taper roller bearing with the press.

- Installer cap (MD998812)
- Installer adapter (MD998823)

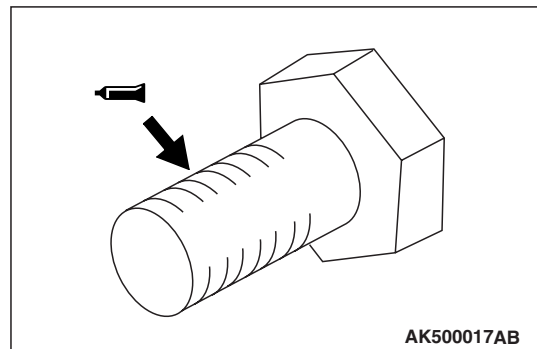
>>D<< BALL BEARING INSTALLATION



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

- Installer cap (MD998812)
- Installer adapter (MD998819)

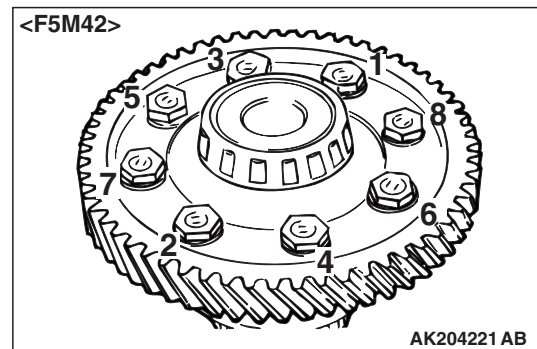
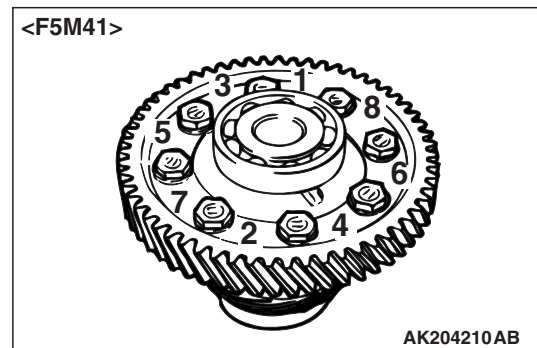
>>E<< DIFFERENTIAL DRIVE GEAR  
INSTALLATION



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

**Specified sealant:**

**3M STUD Locking No.4170 or equivalent**



2. Tighten to the specified torque of  $132 \pm 5$  N·m in the illustrated sequence.

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## NOTES