

GROUP 22B

MANUAL TRANSMISSION OVERHAUL

CONTENTS

GENERAL INFORMATION	22B-2	OUTPUT SHAFT.....	22B-23
GENERAL SPECIFICATIONS.....	22B-3	DISASSEMBLY AND REASSEMBLY.....	22B-23
INSPECTION.....		INSPECTION.....	22B-29
SERVICE SPECIFICATIONS.....	22B-3	REVERSE IDLER GEAR	22B-31
SNAP RING, SPACER AND THRUST PLATE FOR ADJUSTMENT.....	22B-3	DISASSEMBLY AND REASSEMBLY.....	22B-31
TORQUE SPECIFICATIONS.....	22B-5	SPEEDOMETER GEAR	22B-32
SEALANTS AND ADHESIVES	22B-5	DISASSEMBLY AND REASSEMBLY.....	22B-32
LUBRICANTS	22B-6	SELECT LEVER	22B-33
SPECIAL TOOLS.....	22B-7	DISASSEMBLY AND REASSEMBLY.....	22B-33
TRANSMISSION	22B-10	CONTROL HOUSING.....	22B-34
DISASSEMBLY AND REASSEMBLY.....	22B-10	DISASSEMBLY AND REASSEMBLY.....	22B-34
INSPECTION	22B-17	CLUTCH HOUSING	22B-36
INPUT SHAFT	22B-17	DISASSEMBLY AND REASSEMBLY.....	22B-36
DISASSEMBLY AND REASSEMBLY.....	22B-17	TRANSMISSION CASE	22B-39
INSPECTION	22B-22	DISASSEMBLY AND REASSEMBLY.....	22B-39
		DIFFERENTIAL.....	22B-41
		DISASSEMBLY AND REASSEMBLY.....	22B-41

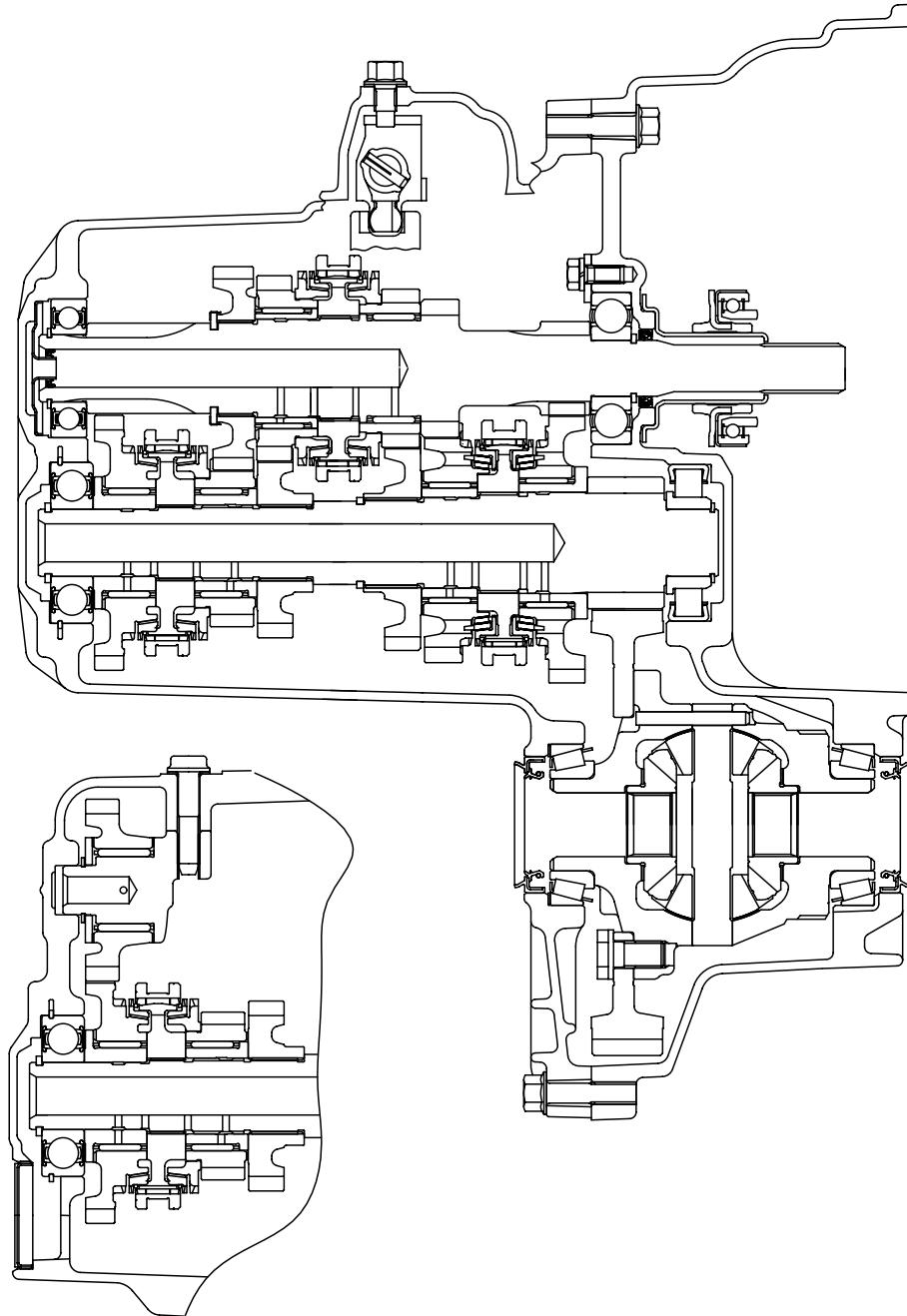
GENERAL INFORMATION

M1222000100186

MANUAL TRANSMISSION MODELS

Transmission model	Combined engine	Vehicle model
F5M42-2-V4C1	4G69-S4-MIVEC	NA4W

SECTIONAL VIEW



AK305222

GENERAL SPECIFICATIONS

M1222000200246

TRANSMISSION MODEL TABLE

Transmission model	Speedometer gear ratio	Final gear ratio	Vehicle model	Engine model
F5M42-2-V4C1	27/36	4.312	NA4W	4G69-S4-MIVEC

GEAR RATIO TABLE

	F5M42
1st	3.583
2nd	1.947
3rd	1.266
4th	0.970
5th	0.767
Reverse	3.363

SERVICE SPECIFICATIONS

M1222000300209

Item	Standard value	Minimum limit
Differential case preload	0.05 – 0.11 mm	–
Input shaft front bearing end play	0 – 0.12 mm	–
Input shaft 5th speed gear end play	0 – 0.09 mm	–
Input shaft rear bearing end play	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

M1222012000216

SPACER (FOR ADJUSTMENT OF DIFFERENTIAL CASE PRELOAD)

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

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

THRUST PLATE (FOR ADJUSTMENT OF INPUT SHAFT 5TH SPEED GEAR END PLAY)

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 AND OUTPUT SHAFT FRONT BEARING END PLAY)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
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 symbol	Thickness mm	Identification symbol
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 symbol	Thickness mm	Identification symbol
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)

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.72 – 0.79	–	0.98 – 1.02	–
0.80 – 0.84	–	1.02 – 1.06	–

Thickness mm	Identification symbol	Thickness mm	Identification symbol
0.85 – 0.90	–	1.07 – 1.11	–
0.90 – 0.94	–	1.12 – 1.16	–
0.94 – 0.98	–	1.16 – 1.20	–

TORQUE SPECIFICATIONS

M1222012100150

Part	N·m
Roll stopper bracket mounting bolt	70 ± 10
Shift cable bracket mounting bolt	18 ± 3
Select lever mounting bolt	18 ± 3
Speedometer gear mounting bolt	3.9 ± 1.0
Backup light switch	32 ± 2
Poppet spring	32 ± 2
Harness bracket bolt	18 ± 3
Interlock plate bolt	30 ± 3
Control housing mounting bolt	18 ± 3
Under cover mounting bolt	6.9 ± 0.9
Reverse idler gear shaft mounting bolt	48 ± 6
Clutch housing-transaxle case mounting bolt	44 ± 5
Front bearing retainer mounting bolt	18 ± 3
Select lever mounting nut	11 ± 1
Stopper bracket mounting bolt	21.7 ± 0.3
Clutch release bearing retainer mounting bolt	9.8 ± 0.2
Differential drive gear mounting bolt	132 ± 5

SEALANTS AND ADHESIVES

M1222000500184

Item	Specified sealant
Clutch housing-transaxle case mating surface	Mitsubishi genuine sealant Part No. MD997740 or equivalent
Under cover-transaxle case mating surface	
Control housing-transaxle 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)

paramount importance.

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

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

M1222000400165

TRANSMISSION

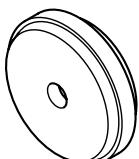
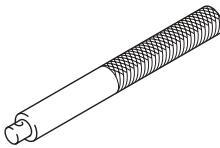
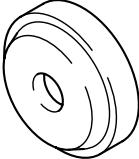
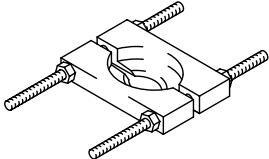
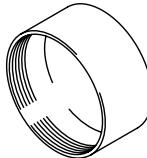
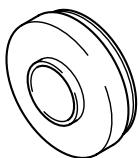
Item	Specified lubricant
Each O-ring	Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API classification GL-4
Each oil seal	
Select lever shoe	Mitsubishi genuine grease Part No.0101011 or equivalent
Input shaft front oil seal	

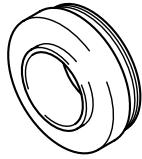
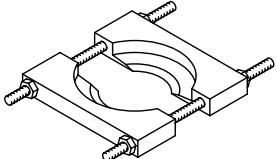
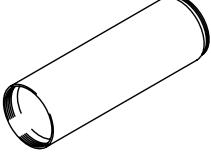
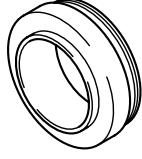
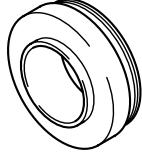
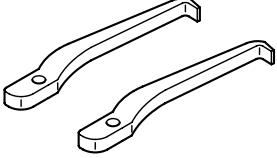
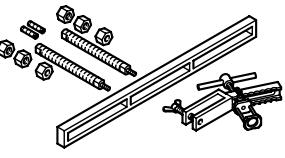
TRANSFER

Item	Specified lubricant
Each O-ring	Hypoid gear oil API classification GL-5 SAE 90
Each oil seal	

SPECIAL TOOLS

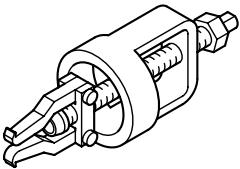
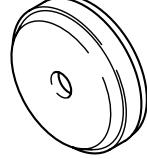
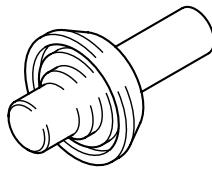
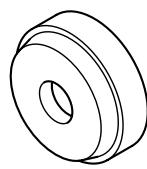
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Tool	Number	Name	Use
	MB990935	Installer adapter	Installation of differential case taper roller bearing outer race
	MB990938	Handle	Use with Installer adapter
	MB990927	Installer adapter	Installation of sealing cap
	MD998801	Bearing remover	Installation and removal of gears, bearings 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
	MD998825	Installer adapter (52)	<ul style="list-style-type: none"> • Installation of 1st-2nd speed synchronizer hub • Installation of 3rd-4th speed synchronizer hub • Installation of 1st speed gear sleeve

Tool	Number	Name	Use
	MD998824	Installer adapter (50)	<ul style="list-style-type: none"> • Installation of 4th speed gear sleeve • Installation of 5th speed gear • Installation of thrust plate stopper
	MD998818	Installer adapter (38)	<ul style="list-style-type: none"> • Installation of input shaft rear bearing • Installation of output shaft front bearing inner race • Installation of reverse gear sleeve • Installation of output shaft rear bearing
	MD998917	Bearing remover	Installation and removal of gears, bearing and sleeves
	MD998814	Installer-200	Use with Installer cap and Installer adapter
	MD998822	Installer adapter (46)	<ul style="list-style-type: none"> • Installation of 2nd speed gear sleeve • Installation of 3rd speed gear
	MD998819	Installer adapter (40)	<ul style="list-style-type: none"> • Installation of 5th-reverse speed synchronizer hub • Installation of 4th speed gear • Installation of 5th speed gear sleeve
	MD999566	Claw	Removal of taper roller bearing outer race
	MD998772	Valve spring compressor	Removal of output shaft front roller bearing outer race

**MANUAL TRANSMISSION OVERHAUL
SPECIAL TOOLS**

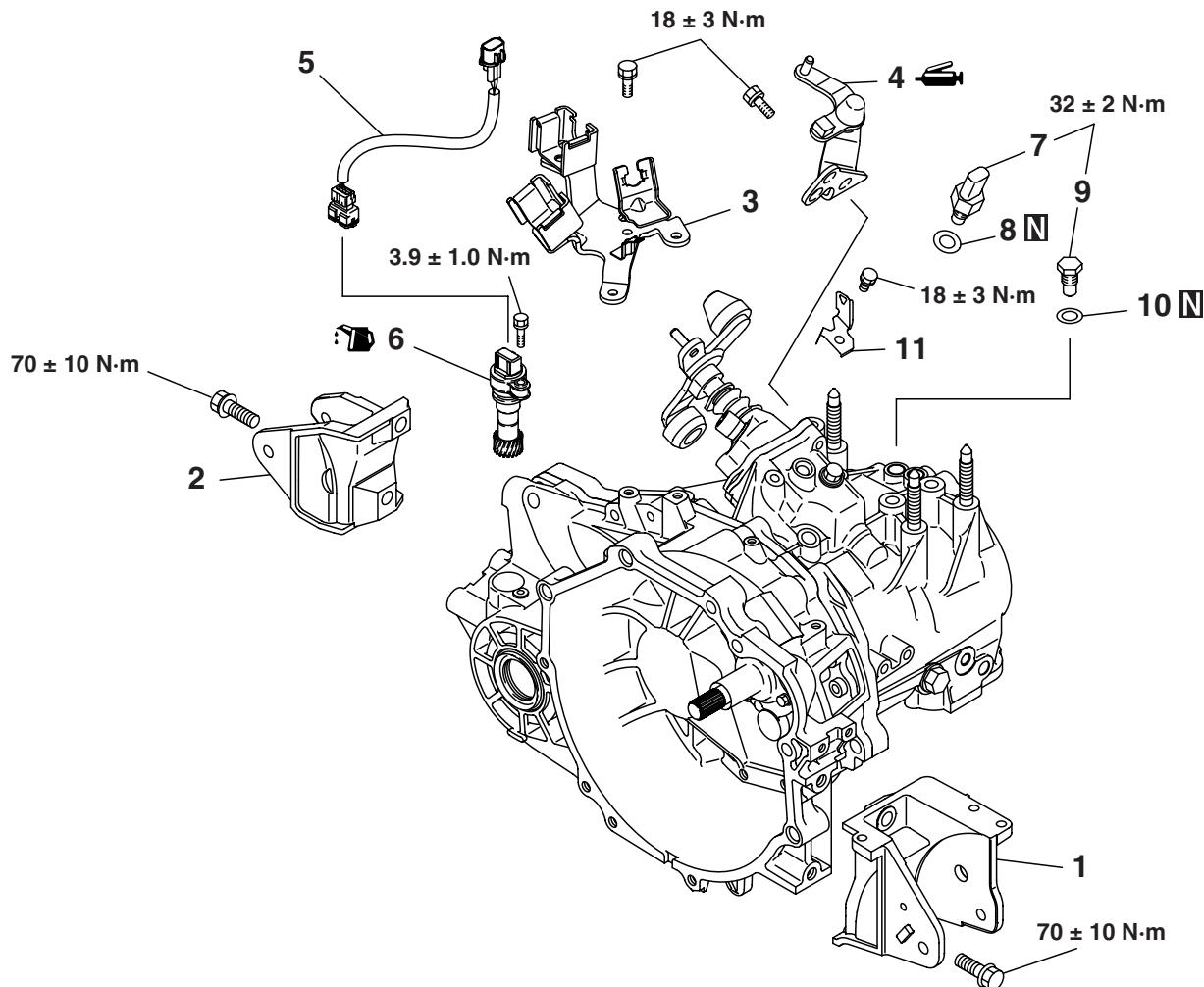
22B-9

Tool	Number	Name	Use
	MD998346	Bearing outer race remover	Removal of output shaft front roller bearing outer race
	MB990934	Installer adapter	Installation of output shaft front 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

TRANSMISSION

DISASSEMBLY AND REASSEMBLY

M1222001000245



AK305089AB

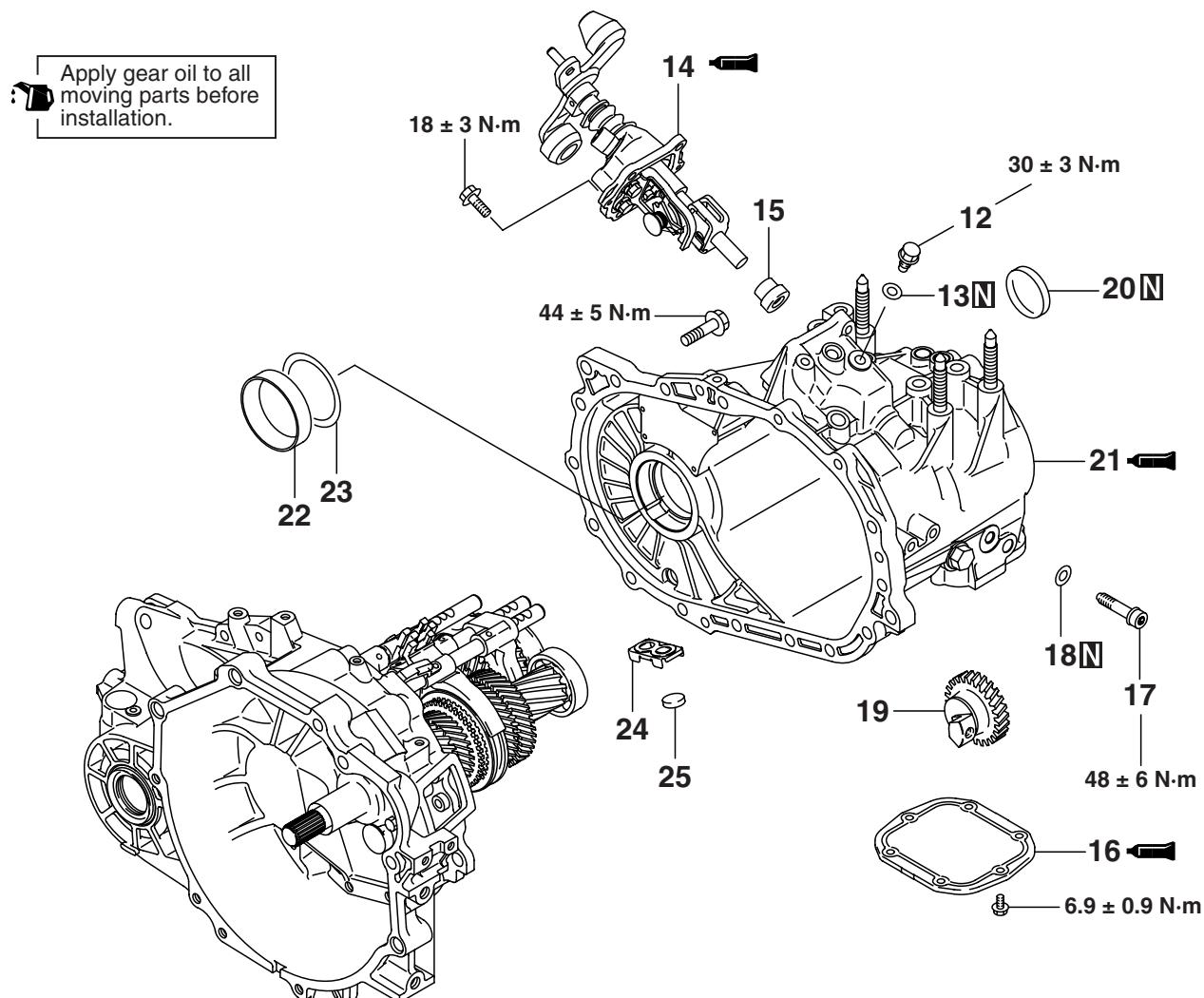
Disassembly steps

>>|<<

1. Roll stopper bracket, front
2. Roll stopper bracket, rear
3. Shift cable bracket
4. Select lever
5. Speed sensor harness
6. Speedometer gear
7. Backup light switch

Disassembly steps (Continued)

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



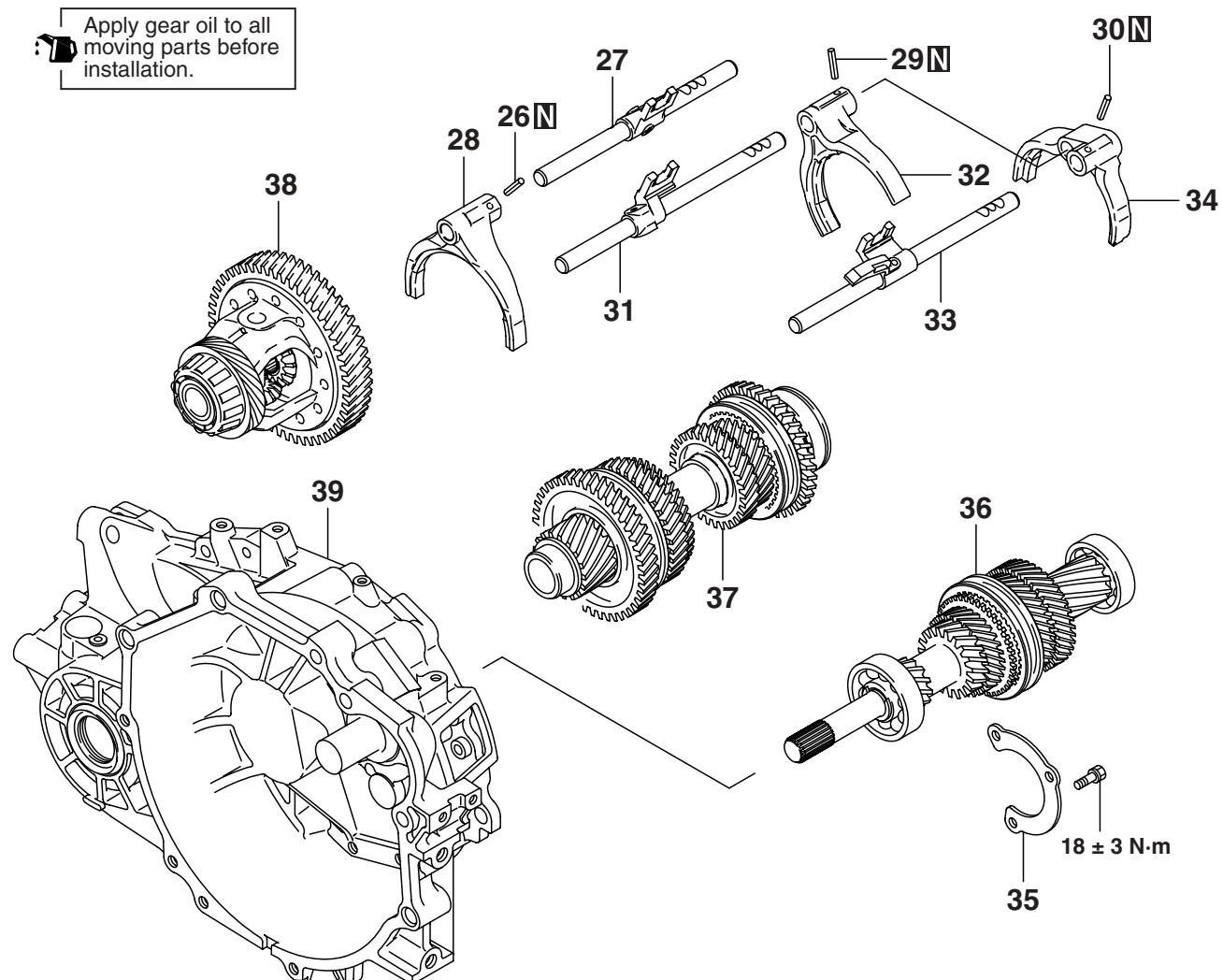
AK305099AB

Disassembly steps

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

Disassembly steps (Continued)

<<A>> >>F<< 20. Sealing cap
<> >>E<< 21. Transaxle case
>>D<< 22. Outer race
>>D<< 23. Spacer
24. Magnet holder
25. Magnet



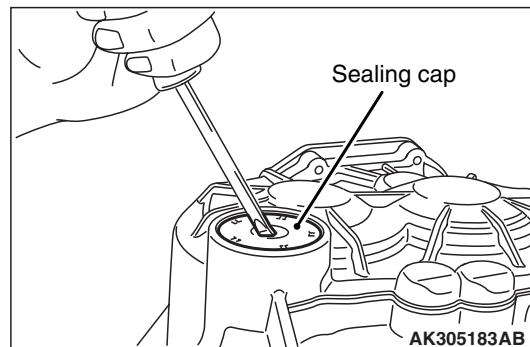
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Disassembly steps

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

DISASSEMBLY SERVICE POINTS

<<A>> SEALING CAP REMOVAL

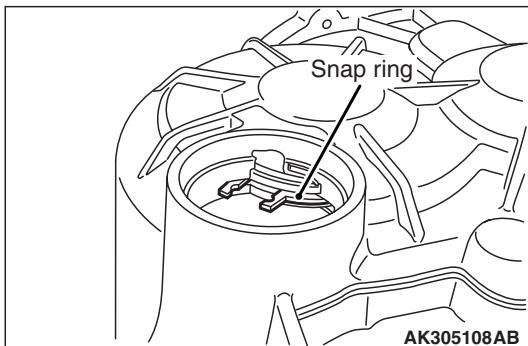


AK305183AB

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

<> TRANSAXLE CASE REMOVAL

1. Remove all sixteen bolts securing the transaxle 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.

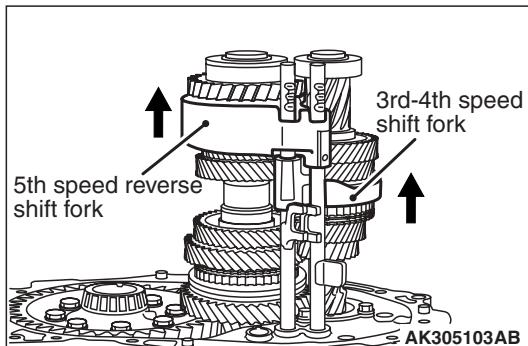
CAUTION

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

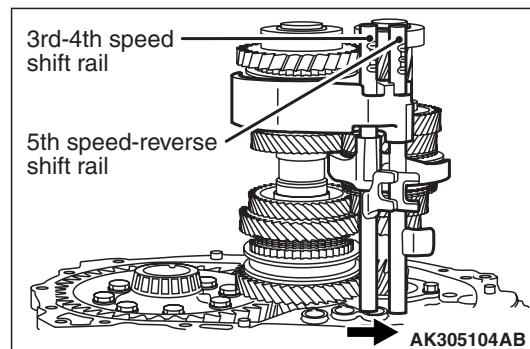
3. Remove the transaxle case from the clutch housing by gently prying on opposite sides at the same time.

<<C>> 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.

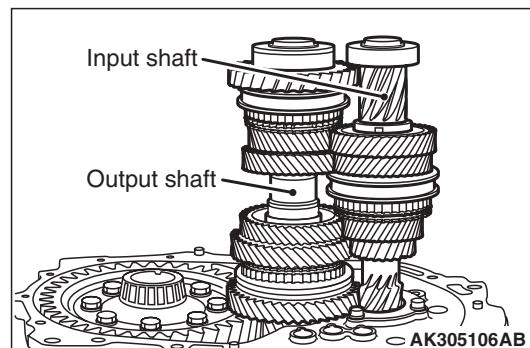


2. Pull up on the 3rd-4th speed shift rail and 5th speed-reverse shift rail and take them out of the hole in the clutch housing.



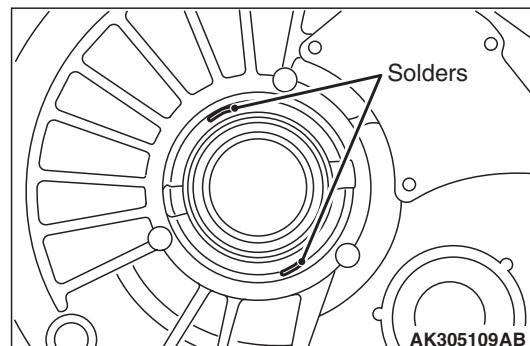
3. Slide the 3rd-4th speed shift rail and 5th speed-reverse shift rail in the direction shown and remove them together with the shift forks.

<<D>> INPUT SHAFT AND OUTPUT SHAFT REMOVAL



Remove the input and output shafts together.

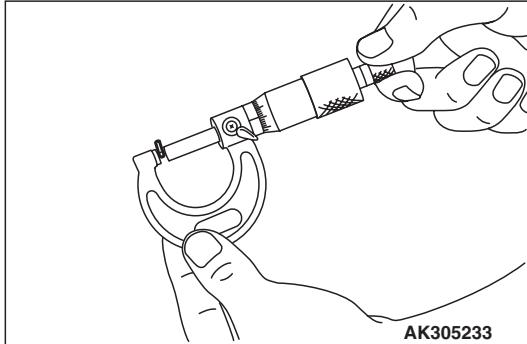
ADJUSTMENT BEFORE REASSEMBLY SPACER SELECTION FOR DIFFERENTIAL CASE PRELOAD ADJUSTMENT



1. Put solders (1.6 mm diameter, about 10 mm long) in the illustrated positions of the transaxle case.
2. Install the taper bearing outer race and differential assembly into the transaxle case.

NOTE: If necessary, replace the differential case and taper bearing before carrying out these adjustments.

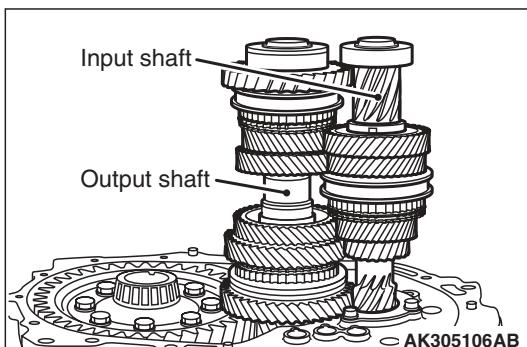
3. Install the clutch housing and tighten the bolts to the specified torque of 44 ± 5 N·m.
4. Remove the clutch housing, and then remove the differential assembly.
5. Remove the outer race and take out crushed solders.



6. Measure the thickness of the crushed solder with a micrometer and select a spacer that will provide the standard preload value.

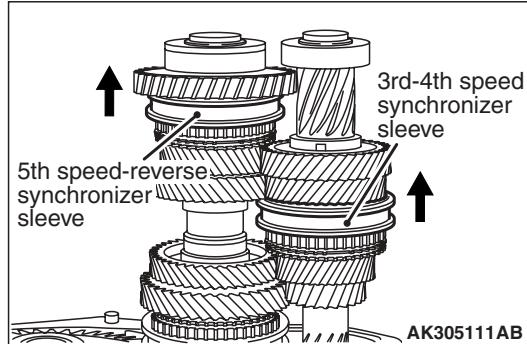
Standard value: 0.05 – 0.11 mm preload

REASSEMBLY SERVICE POINTS >>A<< OUTPUT SHAFT/INPUT SHAFT INSTALLATION

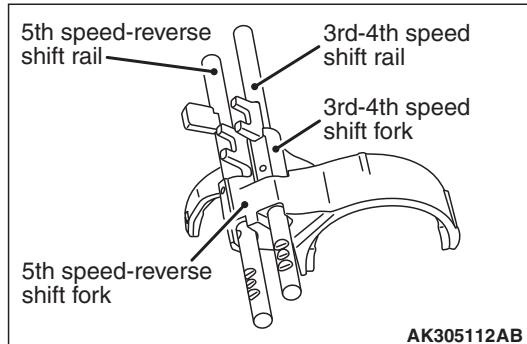


Install the input and output shafts together.

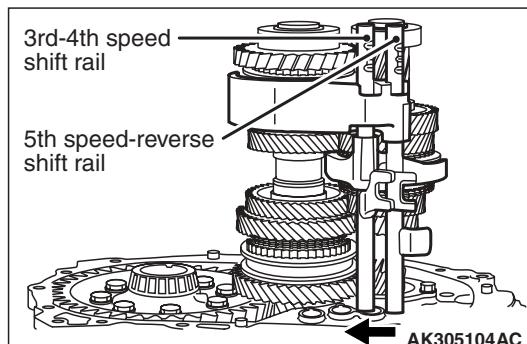
>>B<< 5TH SPEED-REVERSE SHIFT FORK/5TH SPEED-REVERSE SHIFT RAIL/3RD-4TH SPEED SHIFT FORK/3RD-4TH SPEED SHIFT RAIL INSTALLATION



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



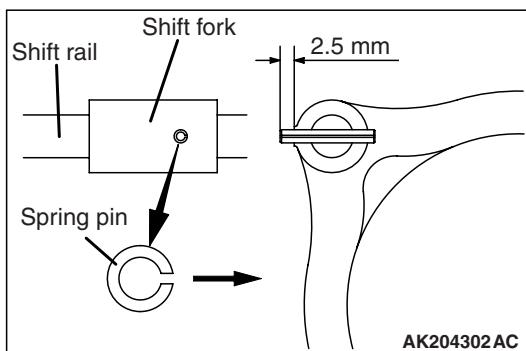
2. Assemble the 3rd-4th speed shift rail and fork, and the 5th speed-reverse shift rail and fork.



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.

>>C<< SPRING PIN INSTALLATION

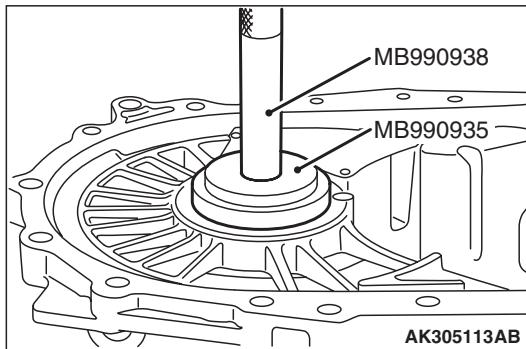
1. Align the pin holes in the shift rail and shift fork.



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

>>D<< SPACER AND OUTER RACE INSTALLATION

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

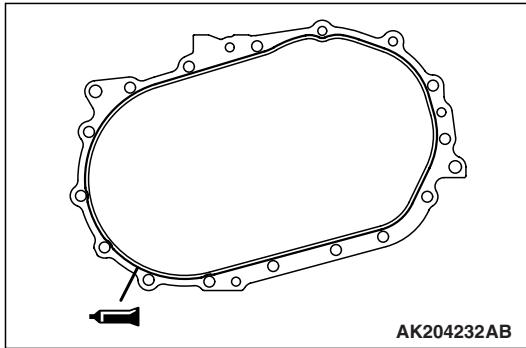


2. Using special tools, press the outer race into the transaxle case.
 - Installer adapter (MB990935)
 - Handle (MB990938)

>>E<< TRANSMAXLE CASE INSTALLATION

CAUTION

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

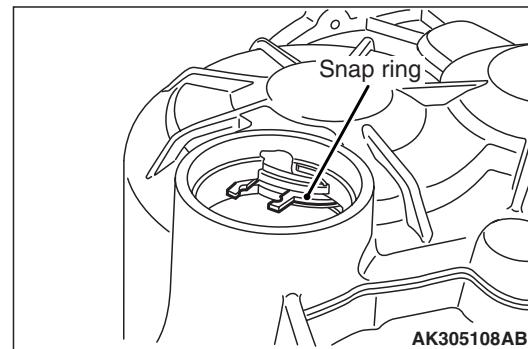


1. Apply a 2 mm diameter bead of sealant as illustrated onto the transaxle case.

Specified sealant:

Mitsubishi genuine sealant Part No. MD997740
or equivalent

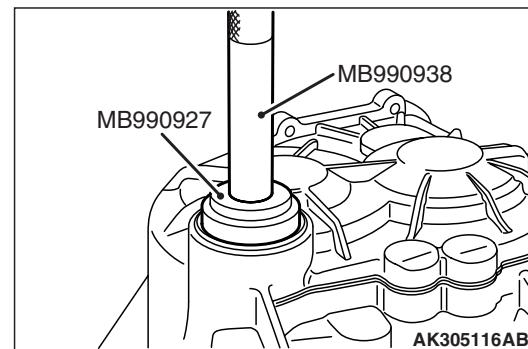
NOTE: Be sure to install the transaxle case onto the transaxle housing while the sealant is still wet (within 15 minutes).



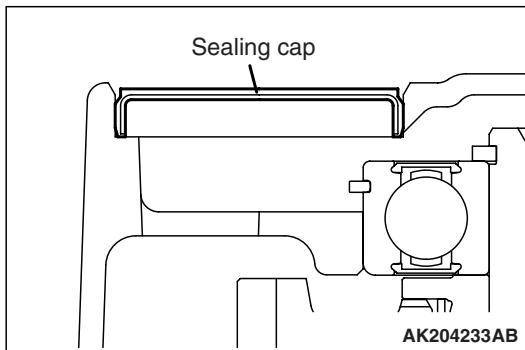
2. Align the transaxle case and expand the snap ring. After the case is on far enough for the snap ring to ride on the bearing, release the snap ring. Push down on the transaxle case, twisting it from side to side until the case contacts the housing.
3. Tighten the transaxle case mounting bolts to the specified torque of 44 ± 5 N·m.
4. Place the transaxle 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.

>>F<< SEALING CAP INSTALLATION



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

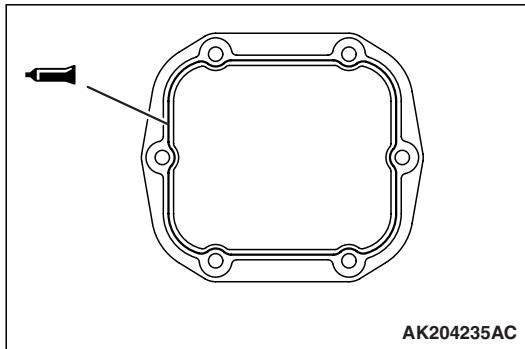


- Evenly press the sealing cap so it is fully seated and not at an angle.

>>G<< 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).

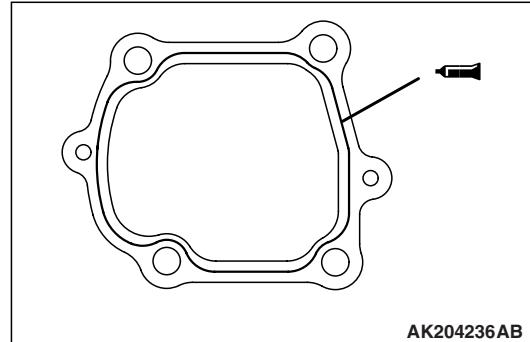
- Install the under cover to the transaxle case and tighten the bolts to specified torque of 6.9 ± 0.9 N·m.

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

>>H<< 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:

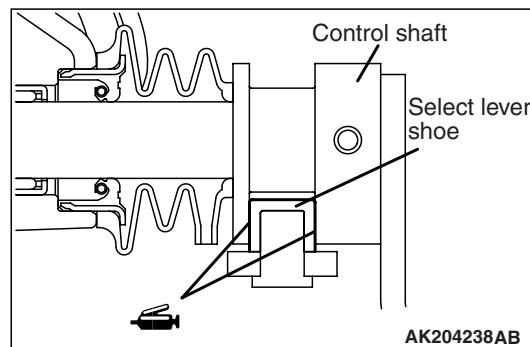
Mitsubishi genuine sealant Part No. MD997740 or equivalent

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 transaxle case and tighten the bolts to specified torque of 18 ± 3 N·m.

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

>>I<< SELECT LEVER INSTALLATION

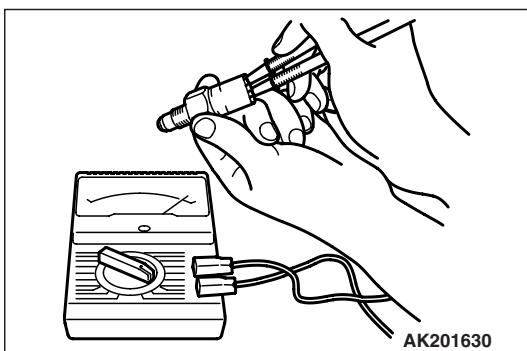


- Apply grease (Mitsubishi Genuine Part number 0101011 or equivalent) to the control shaft sliding portion of the select lever shoe.
- Install the select lever and tighten the bolts to specified torque of 18 ± 3 N·m.

INSPECTION

BACKUP LIGHT SWITCH

M1222001100189



Check for continuity between terminals.

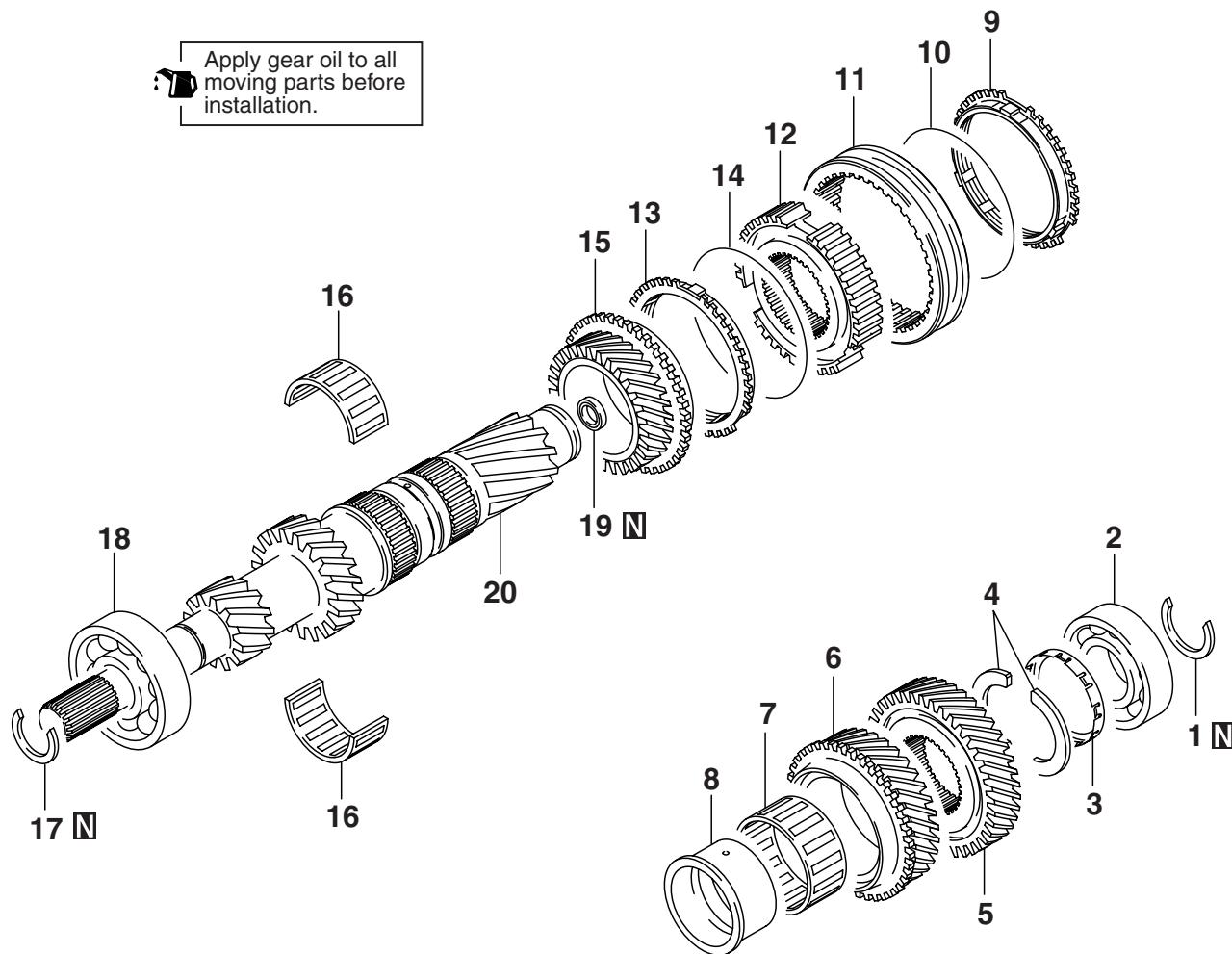
SWITCH CONDITION	CONTINUITY
Pressed	Open
Released	Conductive

INPUT SHAFT

DISASSEMBLY AND REASSEMBLY

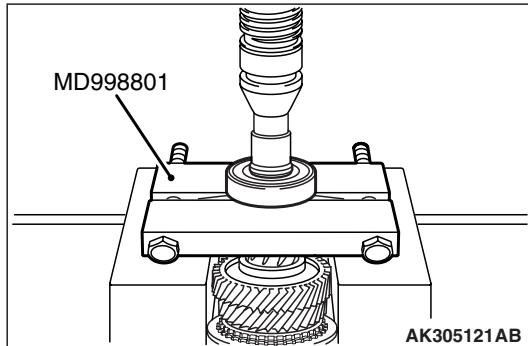
M1222001600203

Apply gear oil to all
moving parts before
installation.

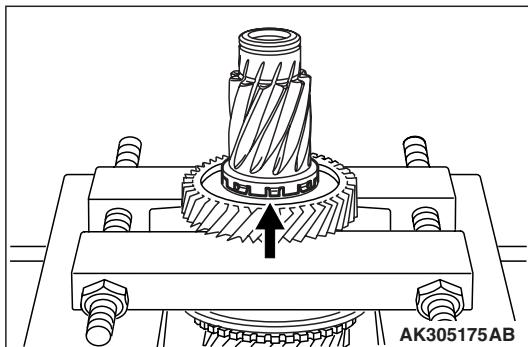


AK204391AB

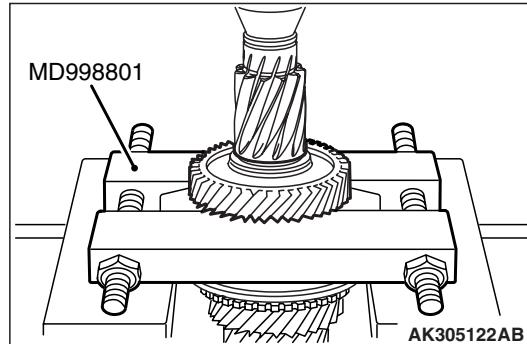
		Disassembly steps
<<A>>	>>M<<	1. Snap ring
<>	>>L<<	2. Ball bearing
<>	>>K<<	3. Thrust plate stopper
<>	>>J<<	4. Thrust plate
<<C>>	>>I<<	5. 5th speed gear
		6. 4th speed gear
		7. Needle roller bearing
<<D>>	>>H<<	8. 4th speed gear sleeve
	>>E<<	9. Synchronizer ring
	>>D<<	10. Synchronizer spring
	>>G<<	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
<<E>>	>>B<<	18. Ball bearing
	>>A<<	19. Oil seal
		20. Input shaft

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

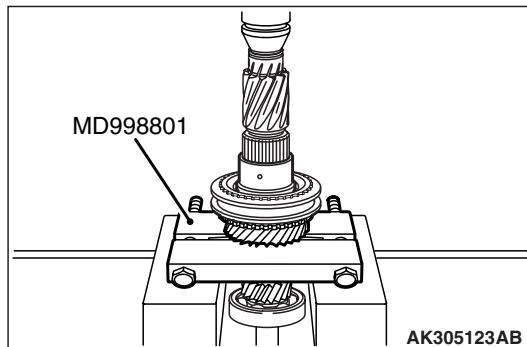
1. Using special tool Bearing remover (MD998801), support the ball bearing, and then set them on the press.
2. Push down on the input shaft with the press and remove the ball bearing.

**<> THRUST PLATE STOPPER
REMOVAL**

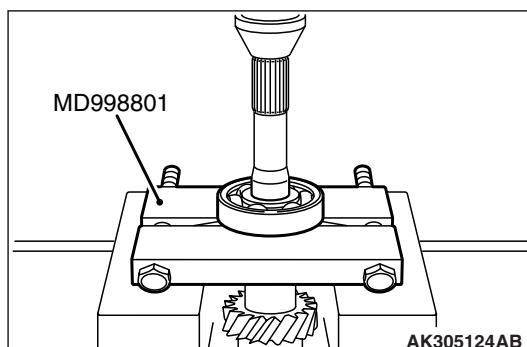
Using a screwdriver, pry up at the position shown in the illustration and remove the thrust plate stopper.

<<C>> 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.

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

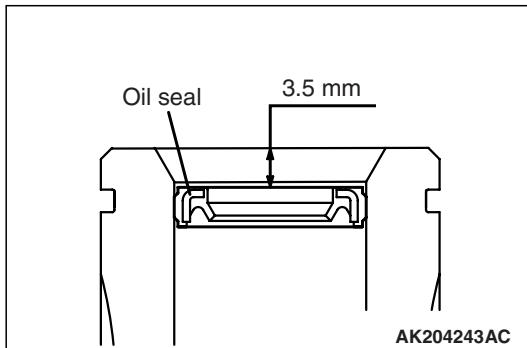
1. Using special tool Bearing remover (MD998801), support the 3rd speed gear, and then set them on the press.
2. Push down on the input shaft with the press and remove the 4th speed gear sleeve.

<<E>> 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.

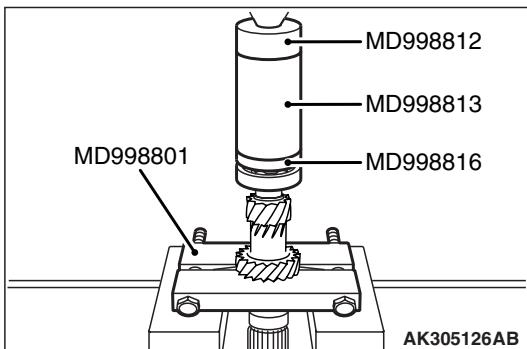
REASSEMBLY SERVICE POINTS

>>A<< OIL SEAL INSTALLATION



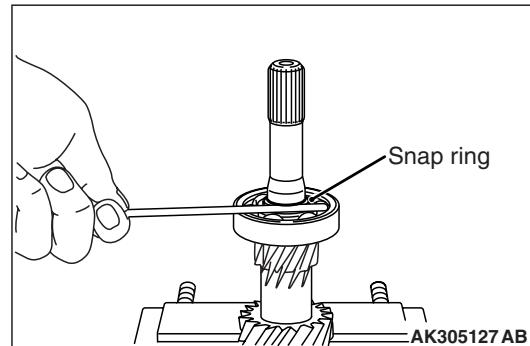
Install the oil seal into the end of the input shaft as shown.

>>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)

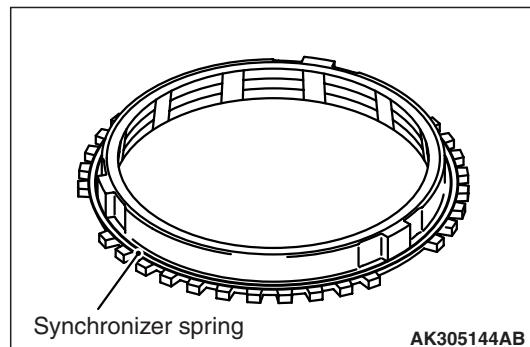
>>C<< SNAP RING INSTALLATION



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

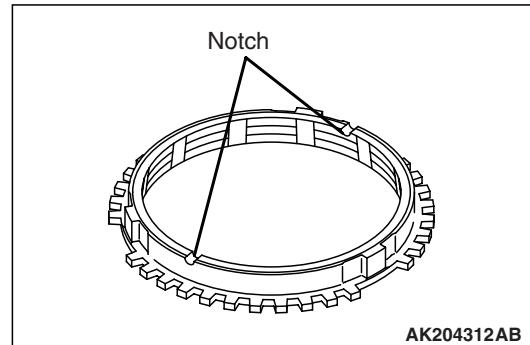


Install the synchronizer spring onto the synchronizer ring as shown.

>>E<< SYNCHRONIZER RING INSTALLATION

CAUTION

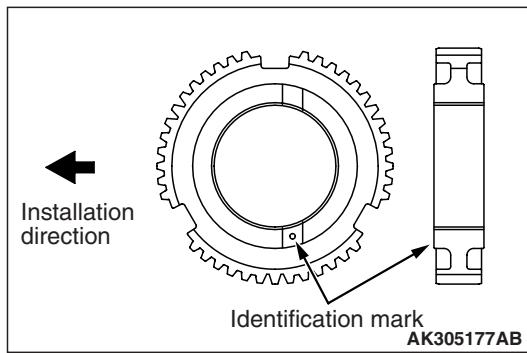
There are 3rd speed and 4th speed synchronizer rings, if the wrong one is installed it will effect the shift feeling.



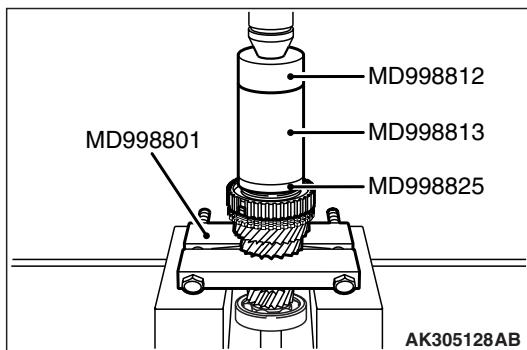
- Ascertain whether or not there are identification notches on the synchronizer ring.
 - Two notches: 3rd speed synchronizer ring**
 - No notches: 4th speed synchronizer ring**
- Install the synchronizer ring so that it completely fits over the machined cone of the gear.

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

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

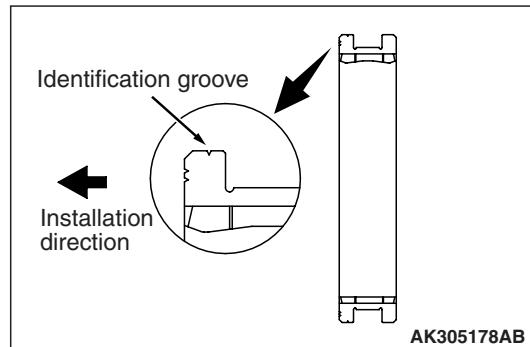


- Check the installation direction of the 3rd-4th speed synchronizer hub, and put it on the input shaft.

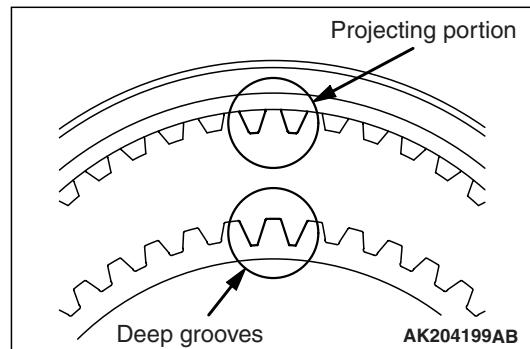


- Using special tools, press install the 3rd-4th speed synchronizer hub with the press.
 - Installer cap (MD998812)
 - Installer-100 (MD998813)
 - Installer adapter (MD998825)
- Make sure that the synchronizer ring can rotate freely.

>>G<< SYNCHRONIZER SLEEVE INSTALLATION

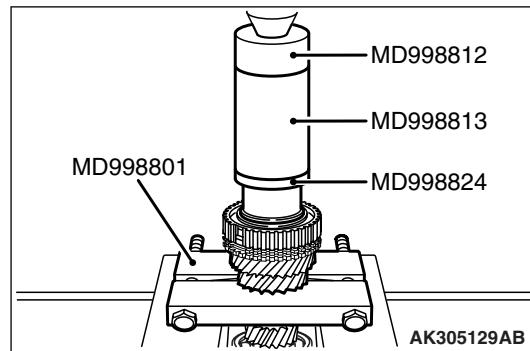


- Check the installation direction of the synchronizer sleeve, and install it onto the 3rd-4th speed synchronizer hub.



- 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).

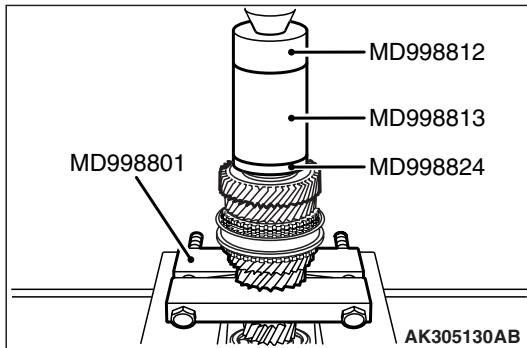
>>H<< 4TH SPEED GEAR SLEEVE INSTALLATION



- 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 4th speed gear sleeve with the press.
 - Installer cap (MD998812)
 - Installer-100 (MD998813)

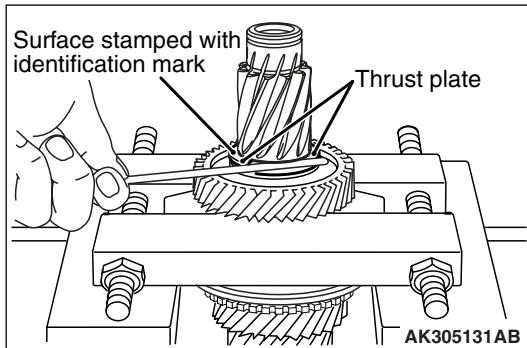
- Installer adapter (MD998824)

>>I<< 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)

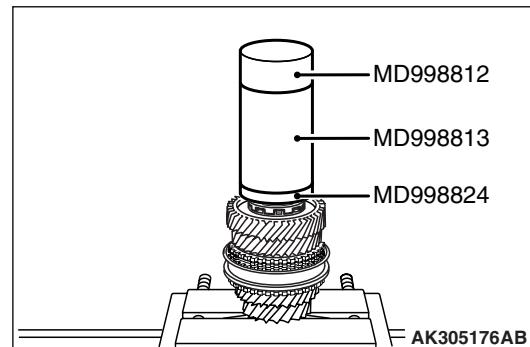
>>J<< THRUST PLATE INSTALLATION



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

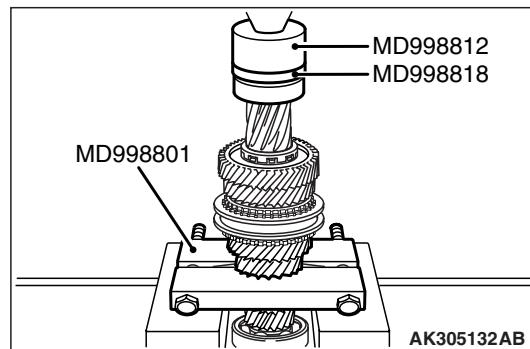
>>K<< THRUST PLATE STOPPER INSTALLATION



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

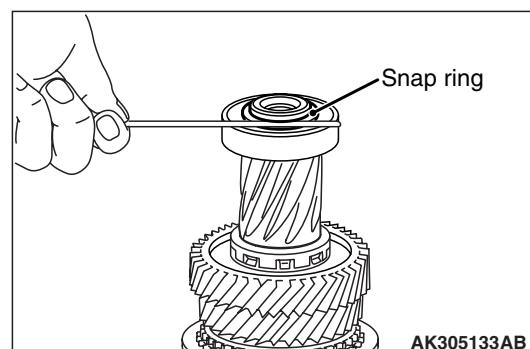
- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (MD998824)

>>L<< 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, install the ball bearing onto the input shaft with the press.
 - Installer cap (MD998812)
 - Installer adapter (MD998818)

>>M<< SNAP RING INSTALLATION



1. Install the thickest snap ring that can be fitted in the groove of the input shaft.

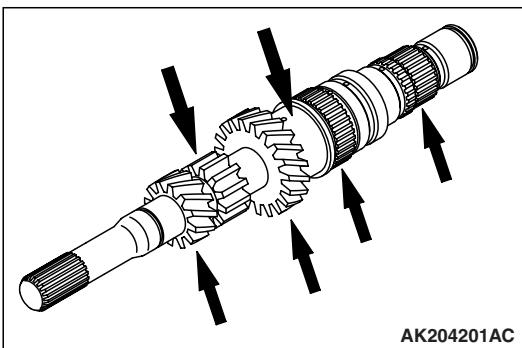
2. Make sure that the rear bearing end play meets the standard value.

Standard value: 0 – 0.12 mm

INSPECTION

INPUT SHAFT

M1222001700169

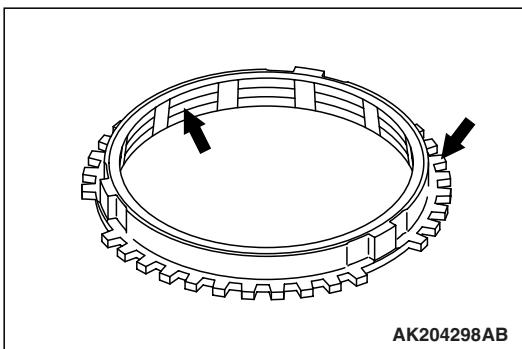


1. Check the outside diameter of the needle bearing mounting portion for damage, abnormal wear and seizure.
2. Check the splines for damage and wear.
3. Check that the helical gear teeth surfaces are not damaged or worn.

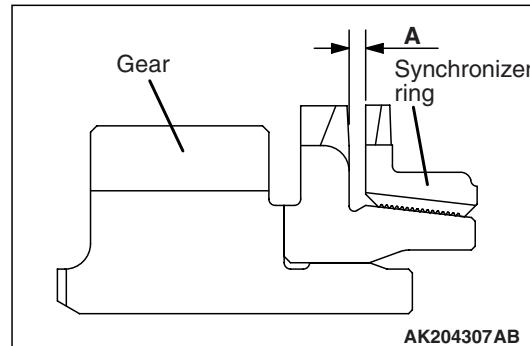
NEEDLE ROLLER BEARING

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

SYNCHRONIZER RING



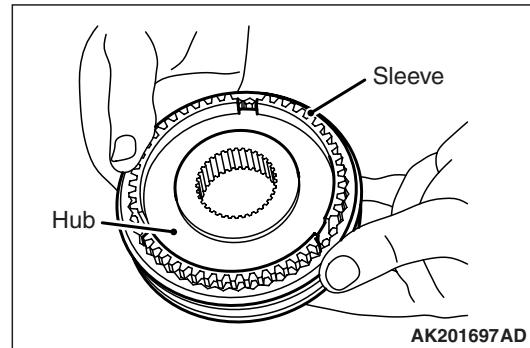
1. Check the clutch gear teeth for damage and broken.
2. Check internal surface for damage, wear and broken threads.



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

SYNCHRONIZER SLEEVE AND HUB

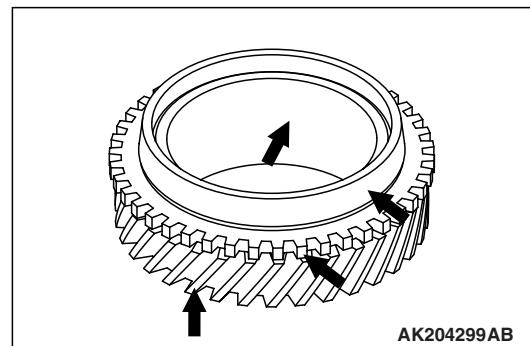


1. Combine the synchronizer sleeve and hub, and check that they slide smoothly.
2. Check that the sleeve is free from damage at its inside splines ends.

SYNCHRONIZER SPRING

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

SPEED GEARS



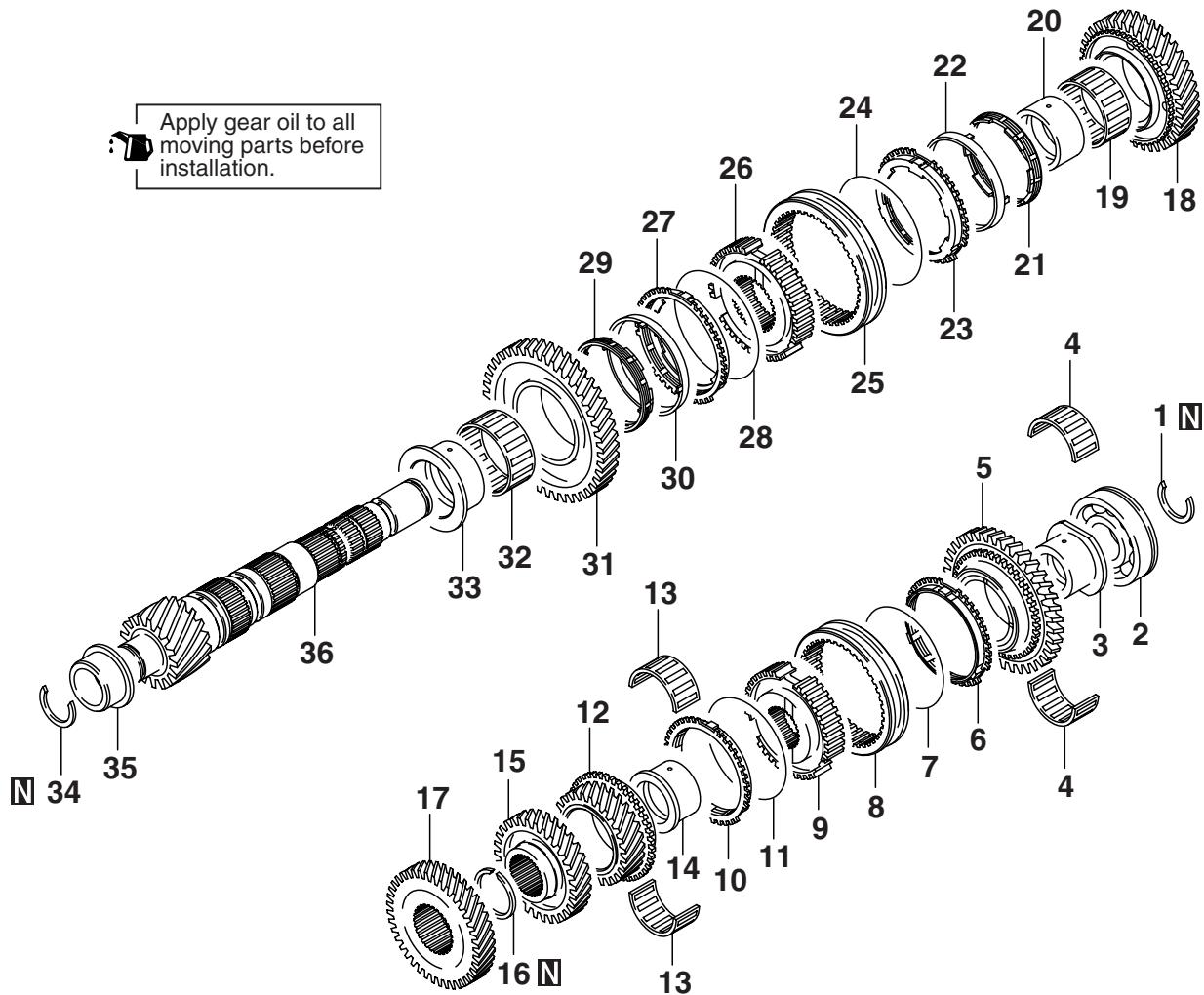
1. Check that the helical and clutch gear tooth surfaces are not damaged or worn.

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

OUTPUT SHAFT

DISASSEMBLY AND REASSEMBLY

M1222002200190



AK204392AB

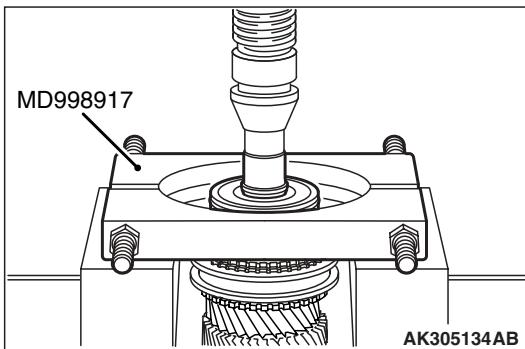
Disassembly steps

<<A>>	>>R<<	1. Snap ring
	>>Q<<	2. Ball bearing
<>	>>P<<	3. Reverse gear sleeve
		4. Needle roller bearing
		5. Reverse gear
	>>M<<	6. Synchronizer ring
	>>L<<	7. Synchronizer spring
<<C>>	>>O<<	8. Synchronizer sleeve
	>>N<<	9. 5th speed-reverse synchronizer hub
	>>M<<	10. Synchronizer ring
	>>L<<	11. Synchronizer spring
		12. 5th speed gear

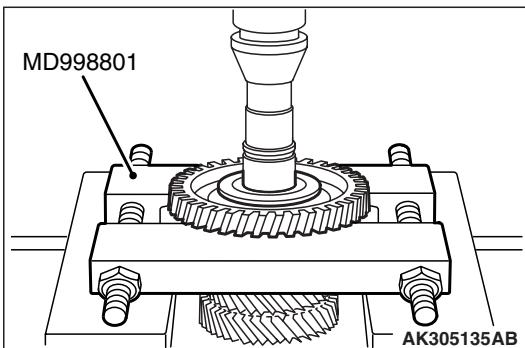
Disassembly steps (Continued)

<<D>>	>>K<<	13. Needle roller bearing
	>>J<<	14. 5th speed gear sleeve
	>>I<<	15. 4th speed gear
	>>H<<	16. Snap ring
<<E>>	>>G<<	17. 3rd speed gear
		18. 2nd speed gear
		19. Needle roller bearing
>>D<<	>>F<<	20. 2nd speed gear sleeve
		21. Inner synchronizer ring
		22. Synchronizer cone
		23. Outer synchronizer ring
		24. Synchronizer spring
		25. Synchronizer sleeve

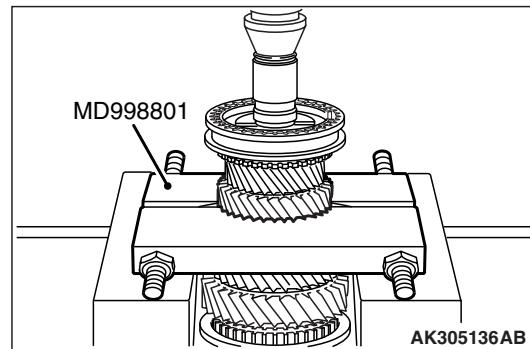
Disassembly steps (Continued)	
>>E<<	26. 1st-2nd speed synchronizer hub
	27. Outer synchronizer ring
>>D<<	28. Synchronizer spring
	29. Inner synchronizer ring
	30. Synchronizer cone
	31. 1st speed gear
	32. Needle roller bearing
<<F>>	>>C<< 33. 1st speed gear sleeve
>>B<<	34. Snap ring
<<G>>	>>A<< 35.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

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

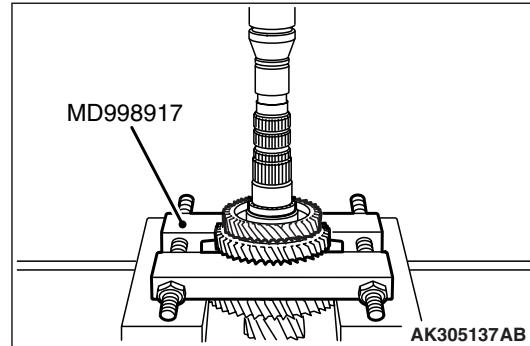
1. Using special tool Bearing remover (MD998917), support the ball bearing, and then set them on the press.
2. Push down on the output shaft with the press, and remove the ball bearing.

<> REVERSE GEAR BEARING SLEEVE REMOVAL

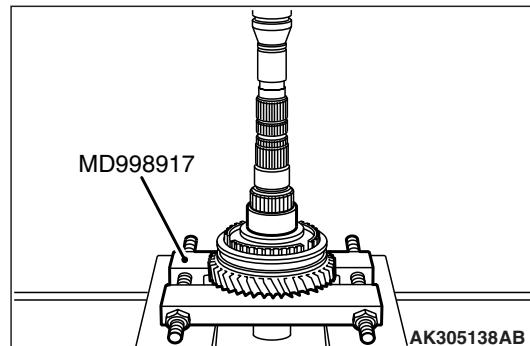
1. Using special tool Bearing remover (MD998801), support the reverse gear, and then set them on the press.
2. Push down on the output shaft with the press and remove the reverse gear bearing sleeve.

<<C>> 5TH SPEED-REVERSE SYNCHRONIZER HUB 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 output shaft with the press and remove the 5th speed-reverse synchronizer hub.

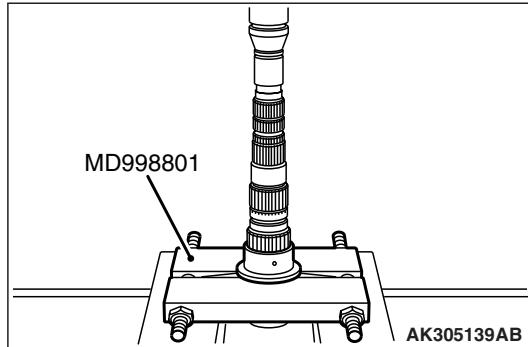
<<D>> 3RD SPEED GEAR REMOVAL

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

<<E>> 2ND SPEED GEAR SLEEVE REMOVAL

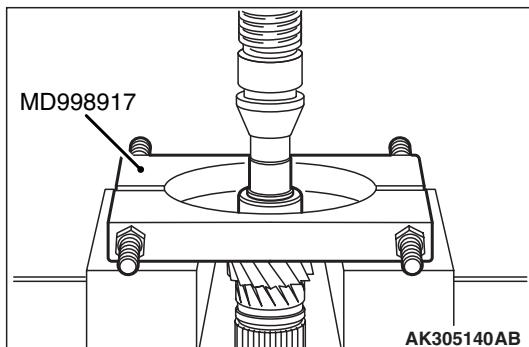
1. Using special tool Bearing remover (MD998917), support the 1st speed gear, and then set them on the press.
2. Push down on the output shaft with the press and remove the 2nd speed gear sleeve.

<<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.

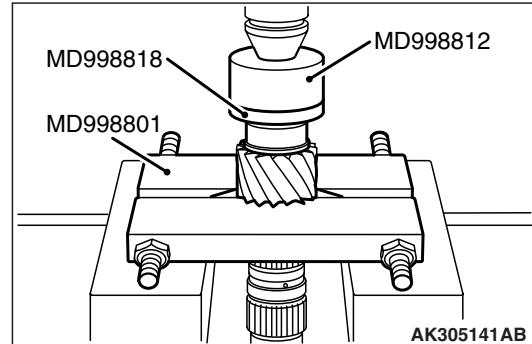
<<G>> ROLLER BEARING INNER RACE REMOVAL



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.

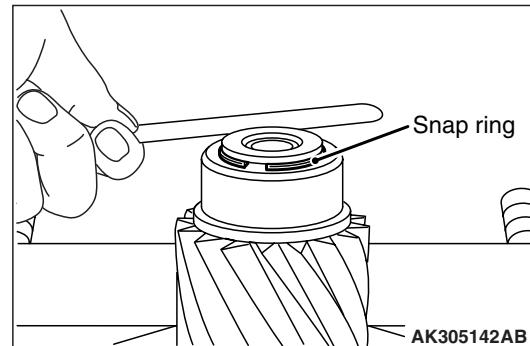
REASSEMBLY SERVICE POINTS

>>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

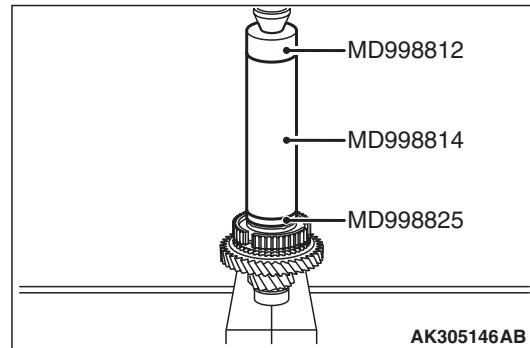
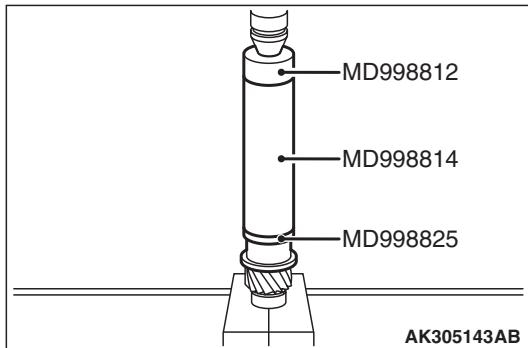


1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the front bearing inner race end play meets the standard value.

Standard value: 0 – 0.12 mm

>>C<<1ST SPEED GEAR SLEEVE INSTALLATION

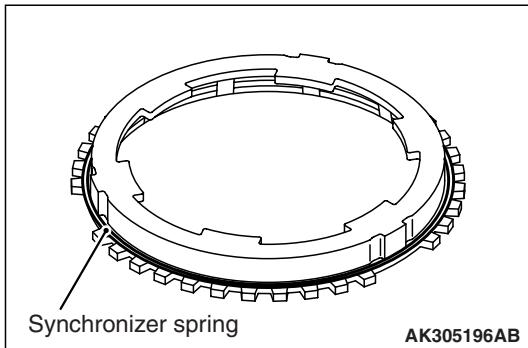
1. Set the output shaft on the press support stand.



2. Using special tools, install the 1st speed gear sleeve with the press.

- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998825)

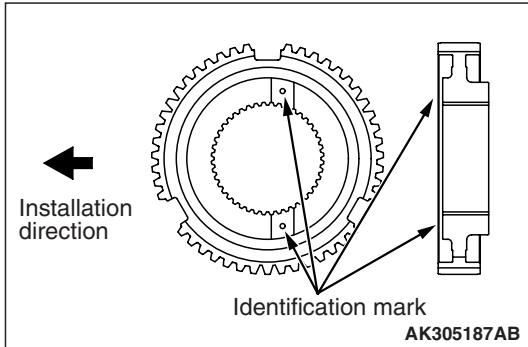
>>D<< SYNCHRONIZER SPRING INSTALLATION



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.



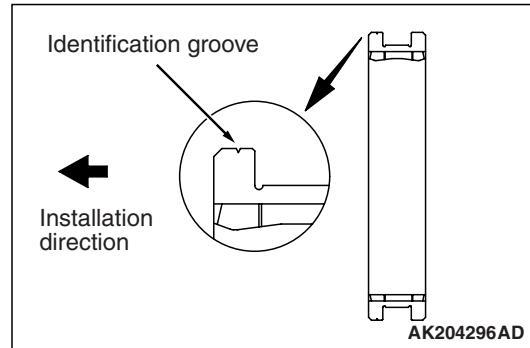
2. Check that the 1st-2nd speed synchronizer hub is in the correct installation direction, and put it on the output shaft.

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

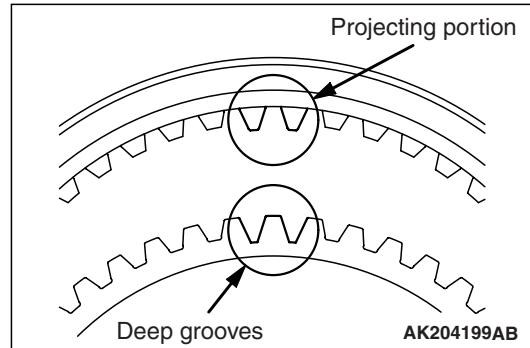
- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998825)

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

>>F<< SYNCHRONIZER SLEEVE INSTALLATION



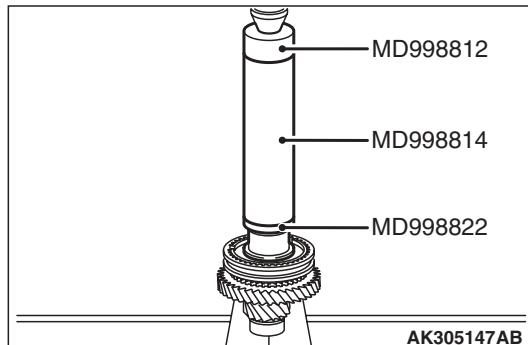
1. Check that the synchronizer sleeve is in the correct direction for installation, and install it on the 1st-2nd speed synchronizer hub.



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.

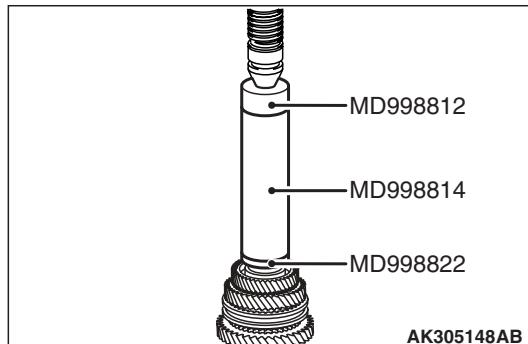


2. Using special tools, install the 2nd speed sleeve onto the output shaft with the press.

- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998822)

>>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).

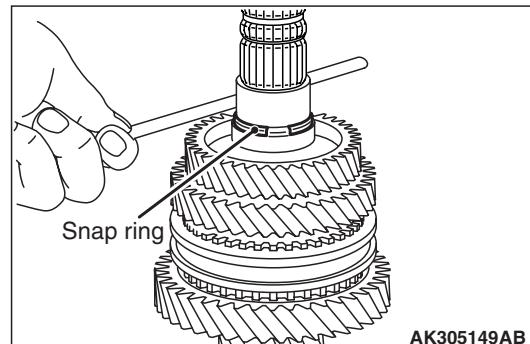


2. Using special tools, install the 3rd speed gear onto the output shaft with the press.

- Installer cap (MD998812)
- Installer-200 (MD998814)
- Installer adapter (MD998822)

3. Make sure that the 2nd speed gear and the outer synchronizer ring can rotate freely.

>>I<< SNAP RING INSTALLATION

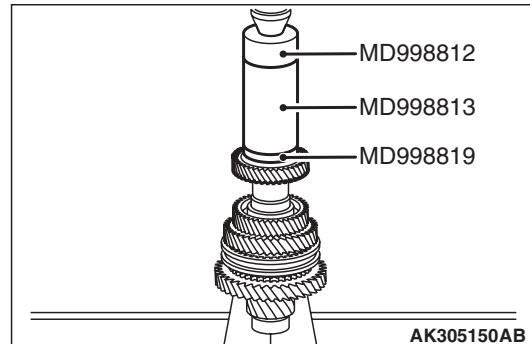


1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the 3rd speed gear end play meets the standard value.

Standard value: 0 – 0.09 mm

>>J<< 4TH SPEED GEAR INSTALLATION

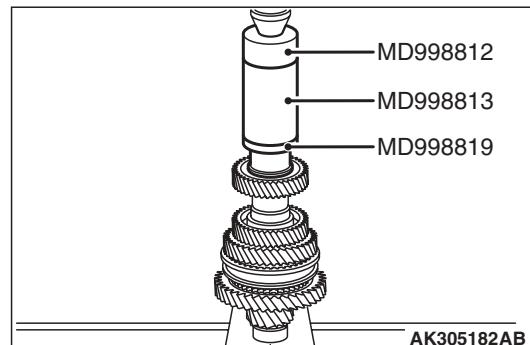
1. Set the output shaft on the press support stand.



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)

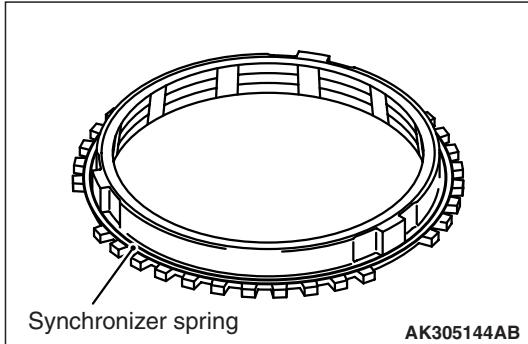
**>>K<< 5TH SPEED GEAR SLEEVE
INSTALLATION**



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

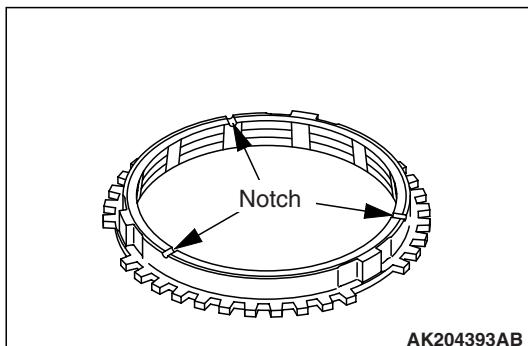


Install the synchronizer spring onto the synchronizer ring as shown.

>>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.

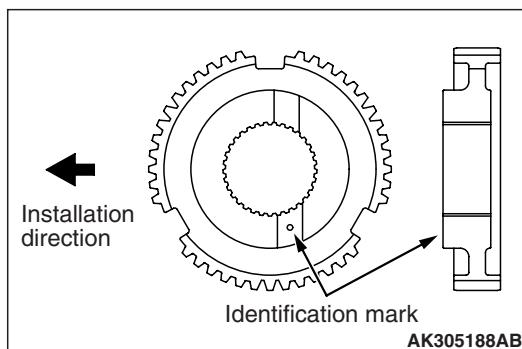
No notches: 5th speed synchronizer ring
Three notches: Reverse synchronizer ring

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

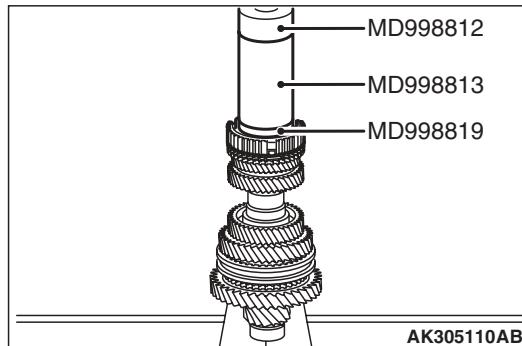
>>N<< 5TH SPEED-REVERSE SYNCHRONIZER HUB INSTALLATION

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.

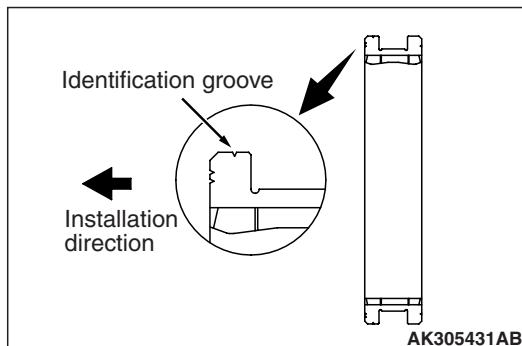


4. Using special tools, press install the 5th speed-reverse synchronizer hub with the press.

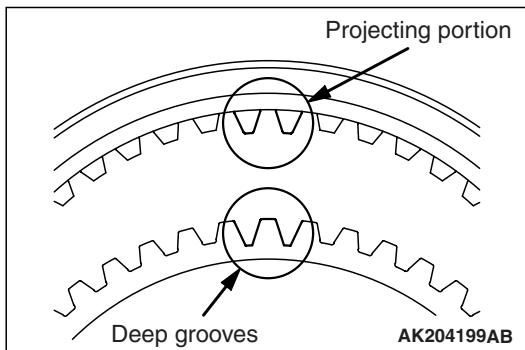
- Installer cap (MD998812)
- Installer-100 (MD998813)
- Installer adapter (MD998819)

5. Make sure that the synchronizer ring on the 5th speed gear side can rotate freely.

>>O<< SYNCHRONIZER SLEEVE INSTALLATION



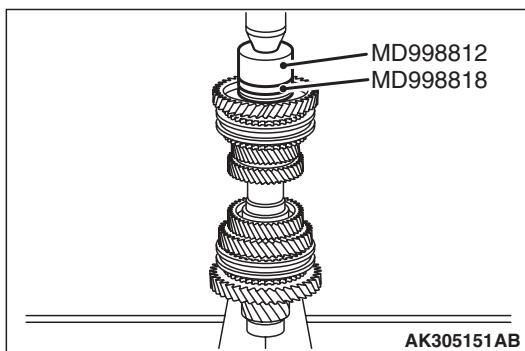
1. Check that the synchronizer sleeve is in the correct direction for installation, and install it on the 5th speed-reverse synchronizer hub.



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.

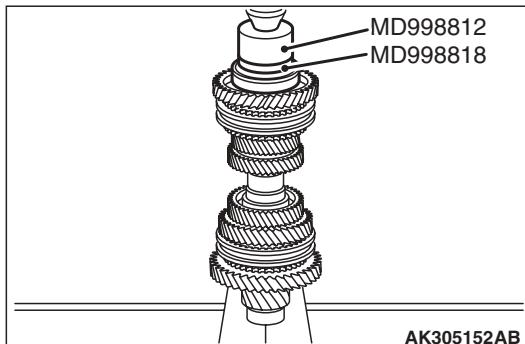


2. Using special tools, press fit the reverse gear sleeve. Make sure that the reverse gear and the synchronizer ring can rotate freely during the pressing process.

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

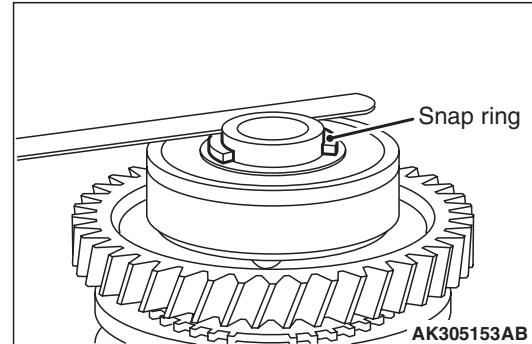
>>Q<< BALL BEARING INSTALLATION

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 (MD998818)

>>R<< SNAP RING INSTALLATION



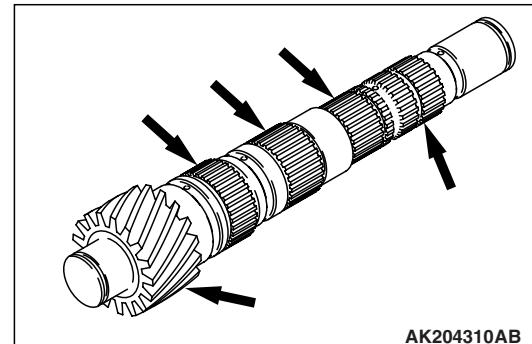
1. Install the thickest snap ring that can be fitted in the groove of output shaft.
2. Make sure that the rear bearing end play meets the standard value.

Standard value: 0 – 0.09 mm

INSPECTION

M1222002300164

OUTPUT SHAFT

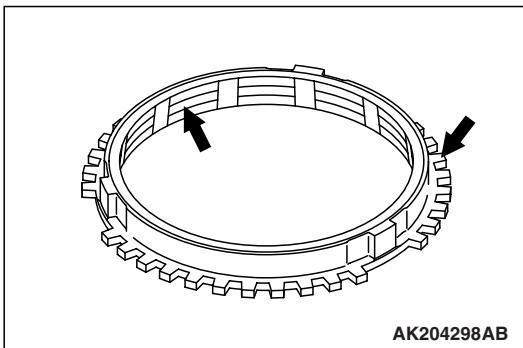


1. Check the splines for damage and wear.
2. Check that the helical gear teeth surfaces are not damaged or worn.

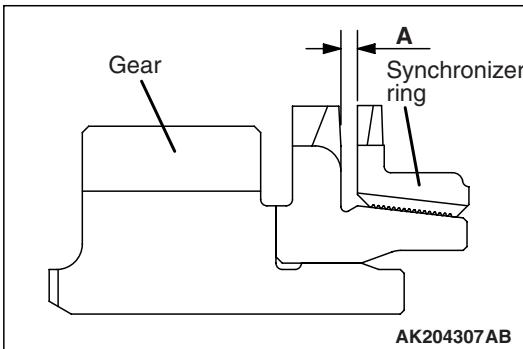
NEEDLE ROLLER BEARING

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

SYNCHRONIZER RING



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



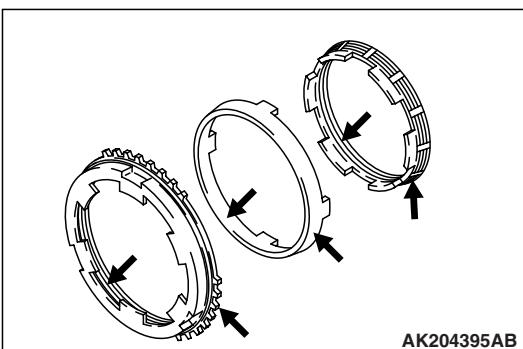
3. Force the synchronizer ring toward the clutch gear and check clearance "A." If "A" is less than the limit, replace the synchronizer ring.

Minimum limit: 0.5 mm

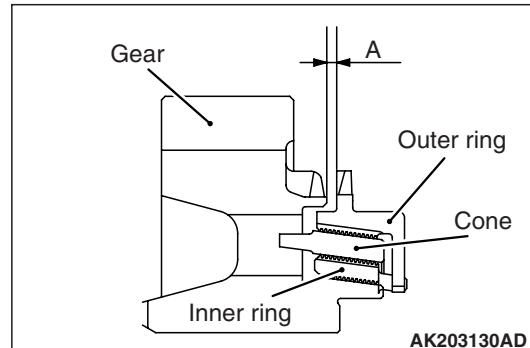
OUTER SYNCHRONIZER RING/INNER SYNCHRONIZER RING/SYNCHRONIZER CONE <FOR 1ST, 2ND SPEED>

CAUTION

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



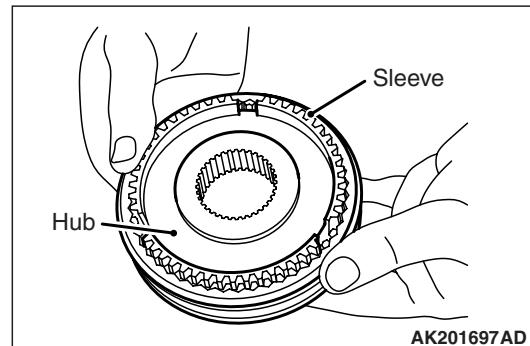
1. Check that the clutch gear tooth surfaces and cone surfaces are not damaged or broken.



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.

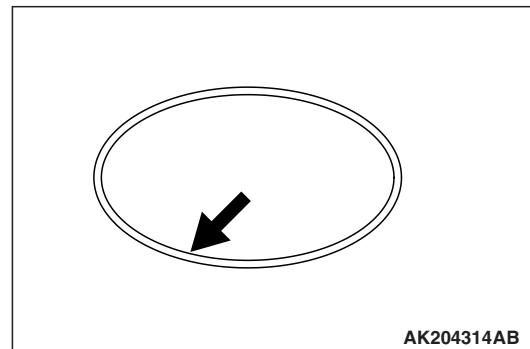
Minimum limit: 0.5 mm

SYNCHRONIZER SLEEVE AND HUB



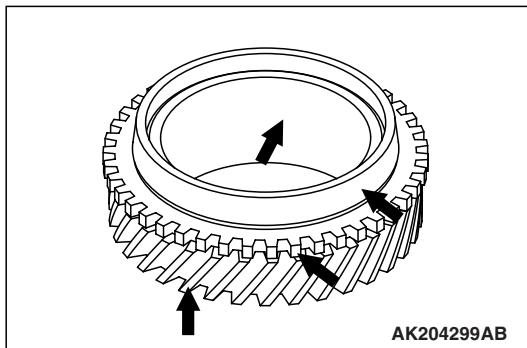
1. Combine the synchronizer sleeve and hub, and check that they slide smoothly.
2. Check that the sleeve is free from damage at its inside splines ends.

SYNCHRONIZER SPRING



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

SPEED GEARS



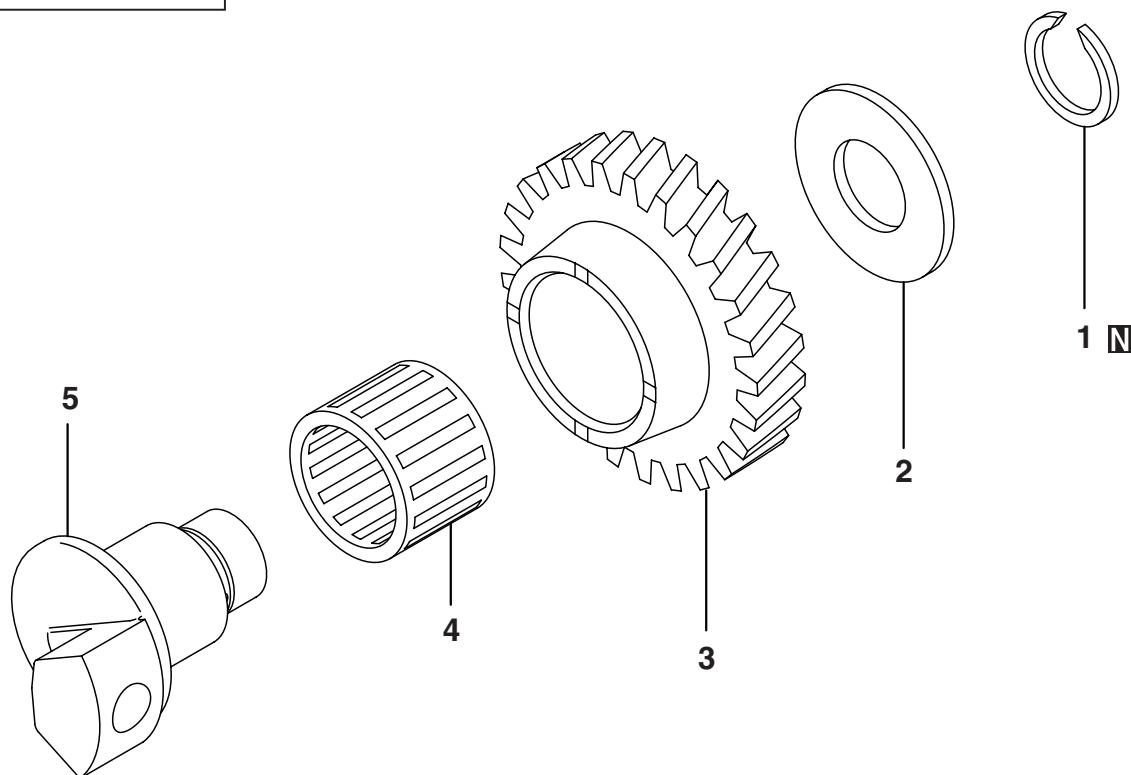
1. Check that the helical and clutch gear tooth surfaces are not damaged or worn.
2. Check that the synchronizer cone surfaces are not roughened, damaged or worn.
3. Check that the gear inside diameter and front and rear surfaces are not damaged and worn.

REVERSE IDLER GEAR

DISASSEMBLY AND REASSEMBLY

M1222012500158

Apply gear oil to all
moving parts before
installation.



AK305225AB

Disassembly steps

1. Snap ring
2. Thrust washer

Disassembly steps (Continued)

3. Reverse idler gear

Disassembly steps (Continued)

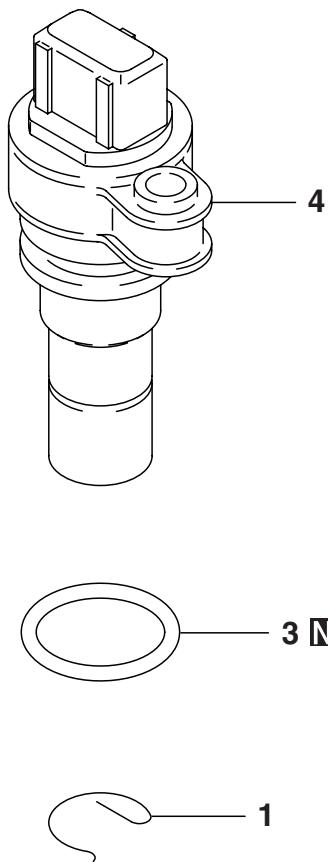
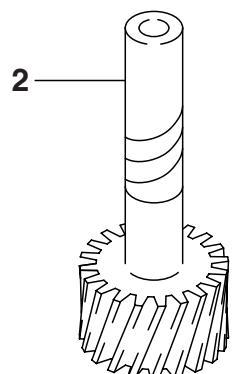
4. Needle roller bearing
5. Reverse idler gear shaft

SPEEDOMETER GEAR

DISASSEMBLY AND REASSEMBLY

M1222003400131

 Apply gear oil to all moving parts before installation.



Disassembly steps

1. E-clip
2. Speedometer driven gear

Disassembly steps (Continued)

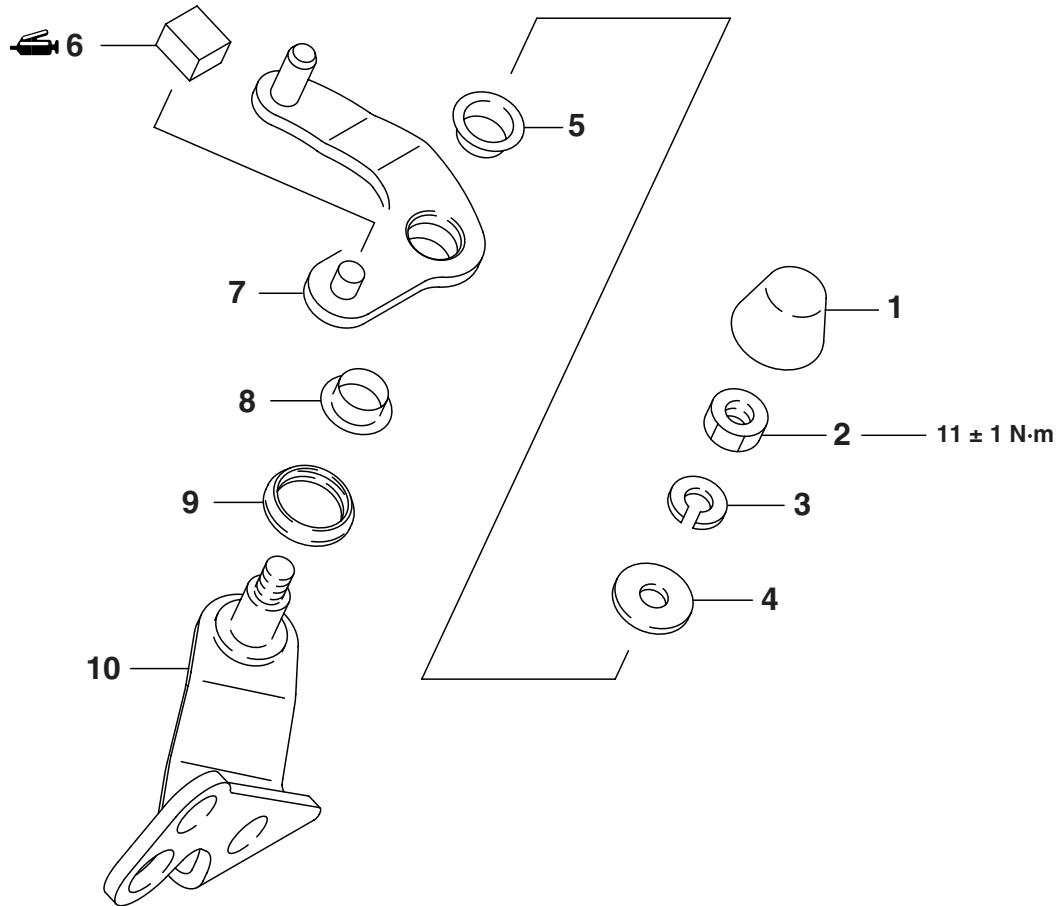
3. O-ring
4. Sleeve

AK204397AB

SELECT LEVER

DISASSEMBLY AND REASSEMBLY

M1222012800126



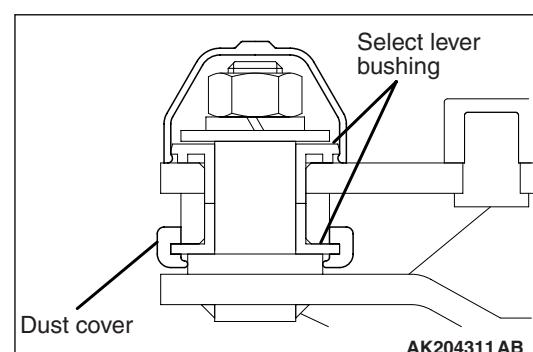
AK204398AB

Disassembly steps

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



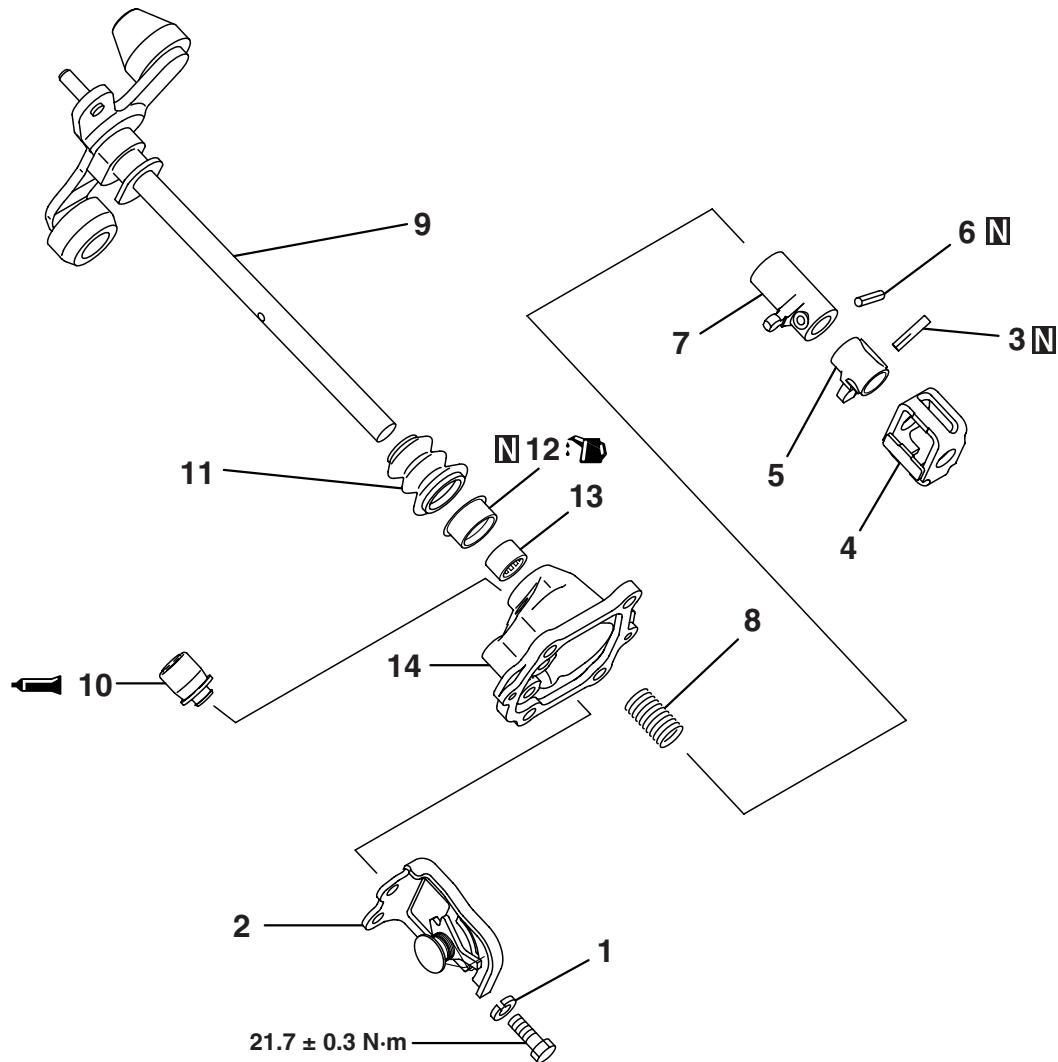
AK204311AB

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

M1222013100186



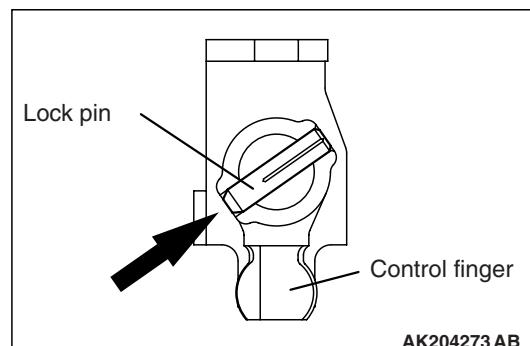
AK305226AB

Disassembly steps

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

DISASSEMBLY SERVICE POINT

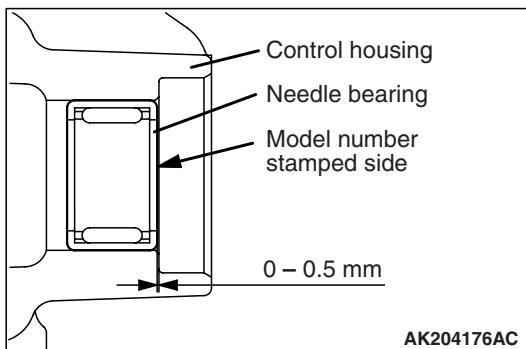
<<A>> LOCK PIN REMOVAL



AK204273 AB

Drive out the lock pin from the direction shown.

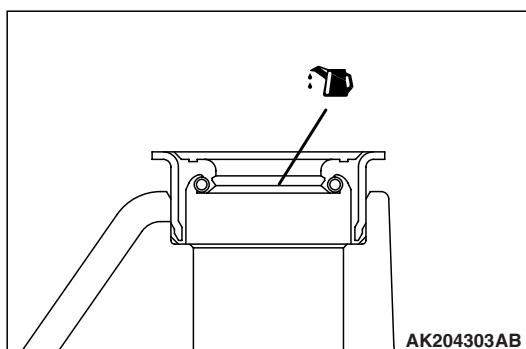
REASSEMBLY SERVICE POINTS
>>A<< NEEDLE BEARING INSTALLATION



Press fit the needle bearing into the control housing side as shown.

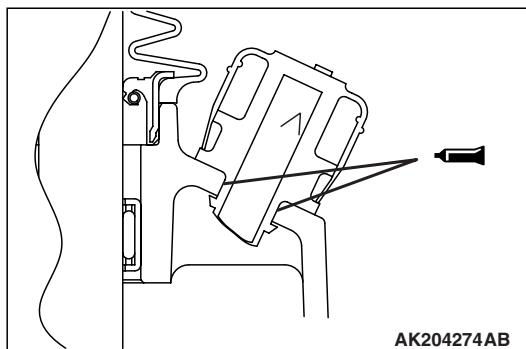
Make sure that the side with the model number stamped on it faces the end of the control housing as shown.

>>B<< OIL SEAL INSTALLATION



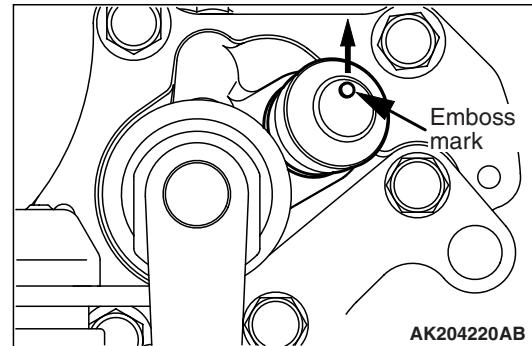
Apply gear oil (Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API classification GL-4) to the oil seal lip area.

>>C<< AIR BREATHER INSTALLATION



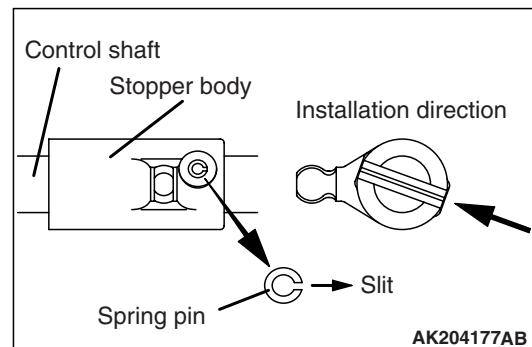
1. Apply sealant to the inserting portion of air breather.

Specified sealant:
3M SUPER WEATHERSTRIP No.8001 or equivalent



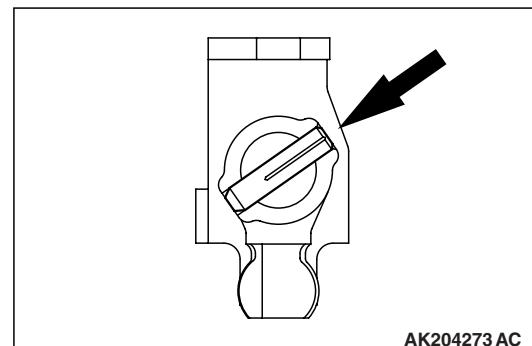
2. Install the air breather so that the emboss mark is in the direction shown in the figure.

>>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

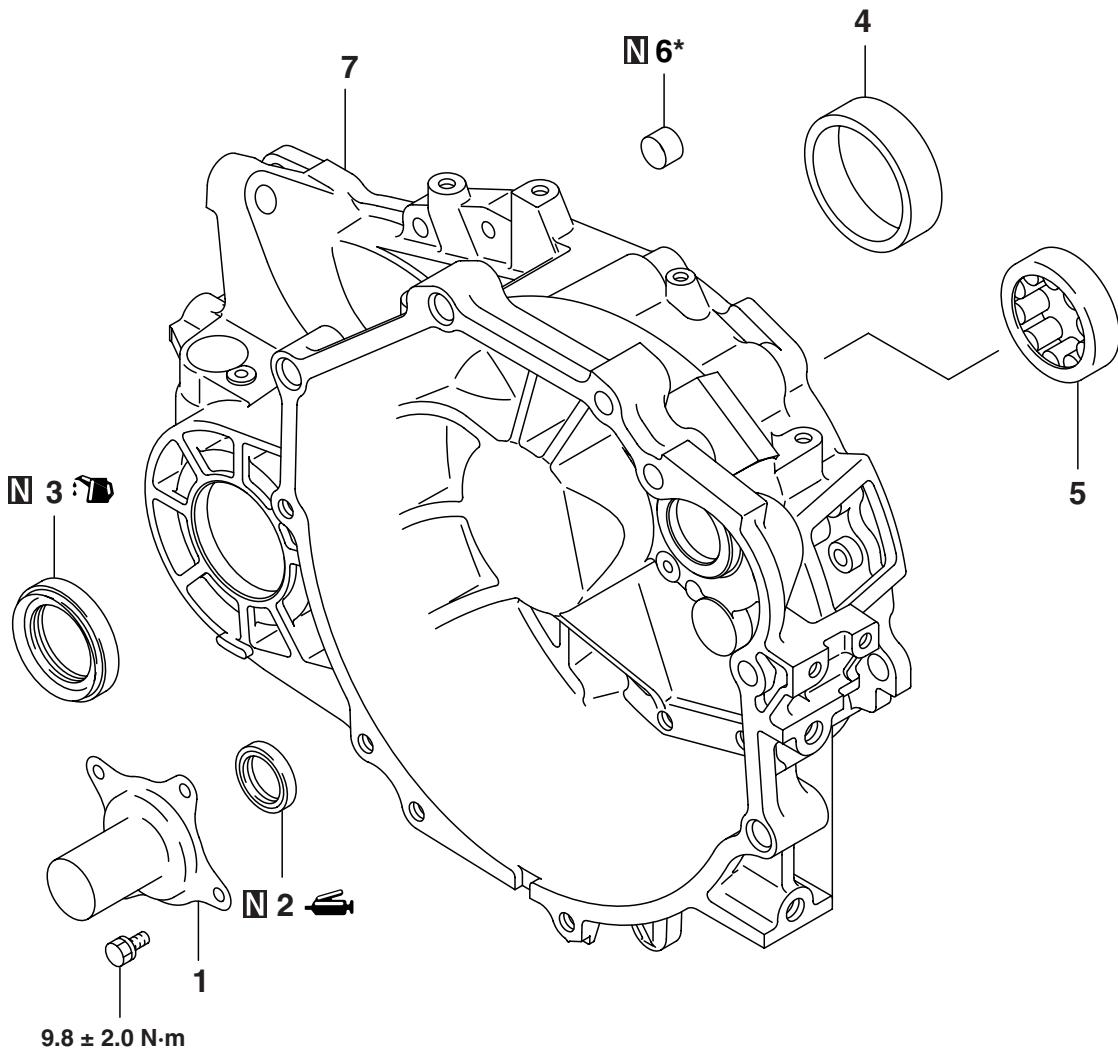


Drive the lock pin in from the direction shown in the figure.

CLUTCH HOUSING

DISASSEMBLY AND REASSEMBLY

M1222003700206



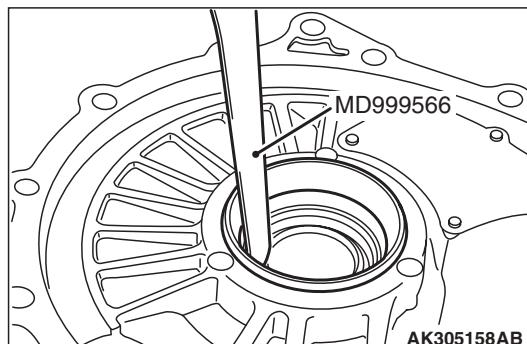
Disassembly steps

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

*NOTE: * Refer to the bushing installation procedures only when replacing the clutch housing.*

DISASSEMBLY SERVICE POINTS

<<A>> OUTER RACE REMOVAL

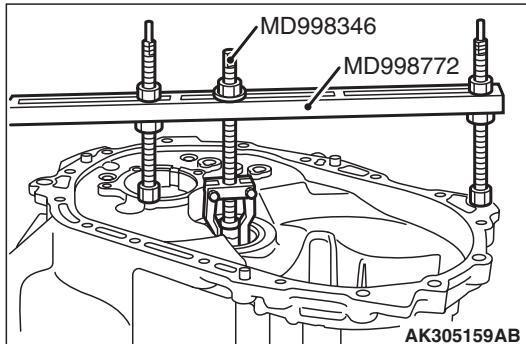


Using special tool Claw (MD999566), remove the outer race from the clutch housing.

AK204400AD

AK305158AB

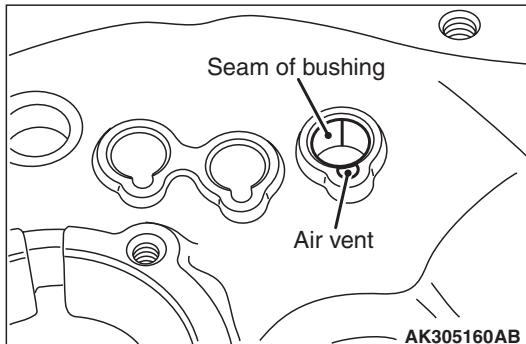
<> OUTER RACE REMOVAL



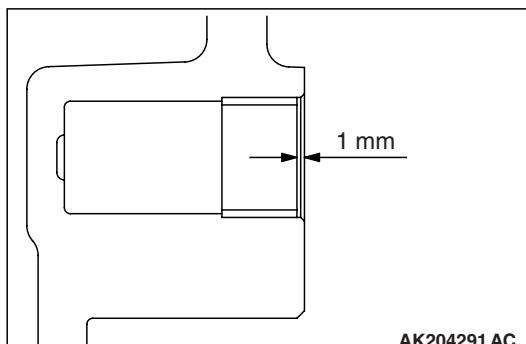
1. Set special tools as indicated in the figure.
 - Valve spring compressor (MD998772)
 - Bearing outer race remover (MD998346)
2. Turn the nut on special tool Bearing outer race remover (MD998346) to pull up on the tool and take out the outer race.

REASSEMBLY SERVICE POINTS

>>A<< BUSHING INSTALLATION

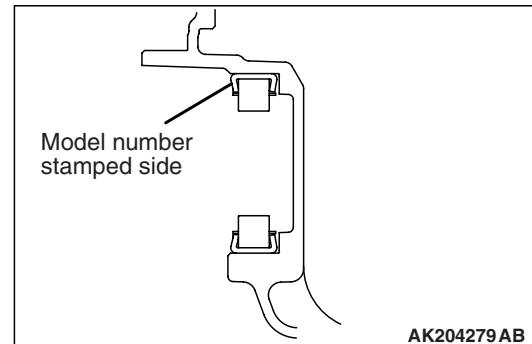


1. Press fit the bushing so the seam is away from the air vent.

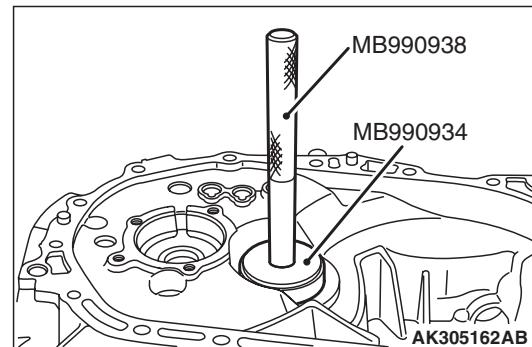


2. Be sure the bushing is fully seated as shown. It must be 1 mm below the housing surface.

>>B<< OUTER RACE INSTALLATION



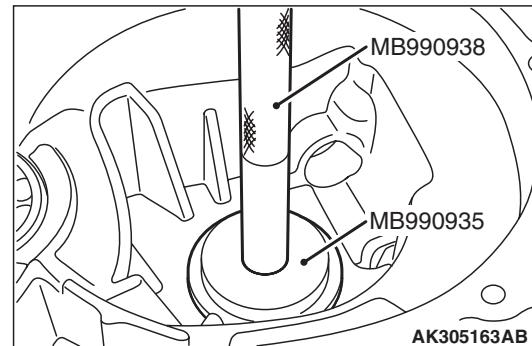
1. Check the installation direction of the outer race. Install the outer race so the side with the model number stamping can be seen.



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

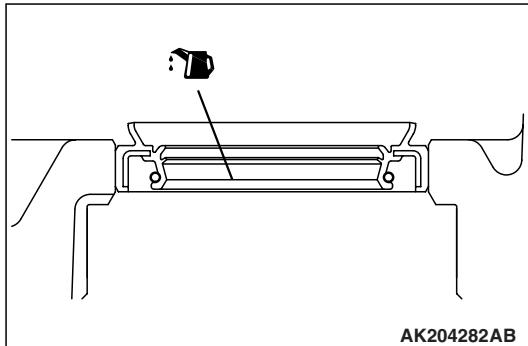
>>C<< OUTER RACE INSTALLATION

1. Check the installation direction of the outer race.

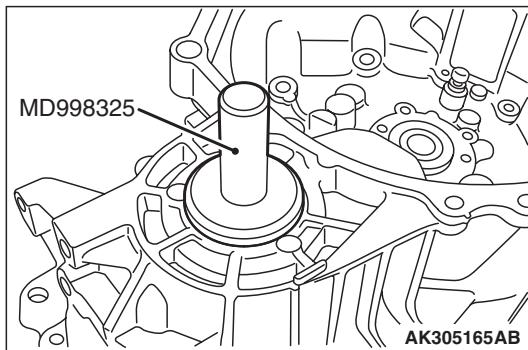


2. Using special tools, press fit the outer race into the clutch housing.
 - Handle (MB990938)
 - Installer adapter (MB990935)

>>D<< OIL SEAL INSTALLATION

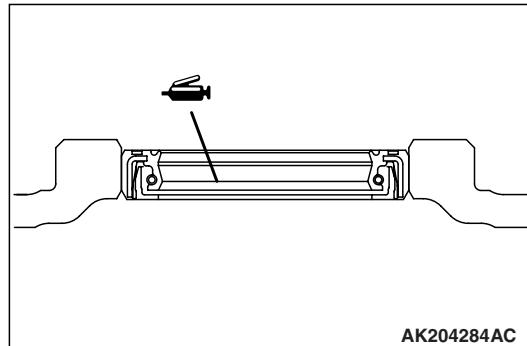


1. Apply gear oil (Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API classification GL-4) to the oil seal lip.

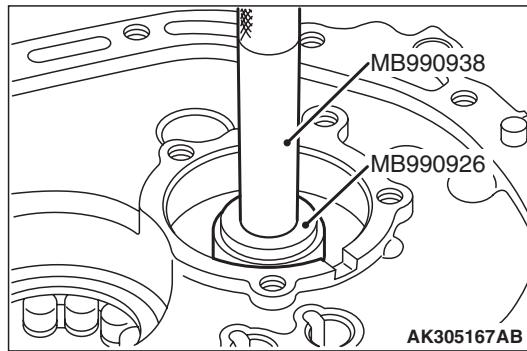


2. Using special tool Differential oil seal installer (MD998325), press fit the oil seal into the clutch housing.

>>E<< OIL SEAL INSTALLATION



1. Pack grease (MITSUBISHI genuine grease part No.0101011 or equivalent).

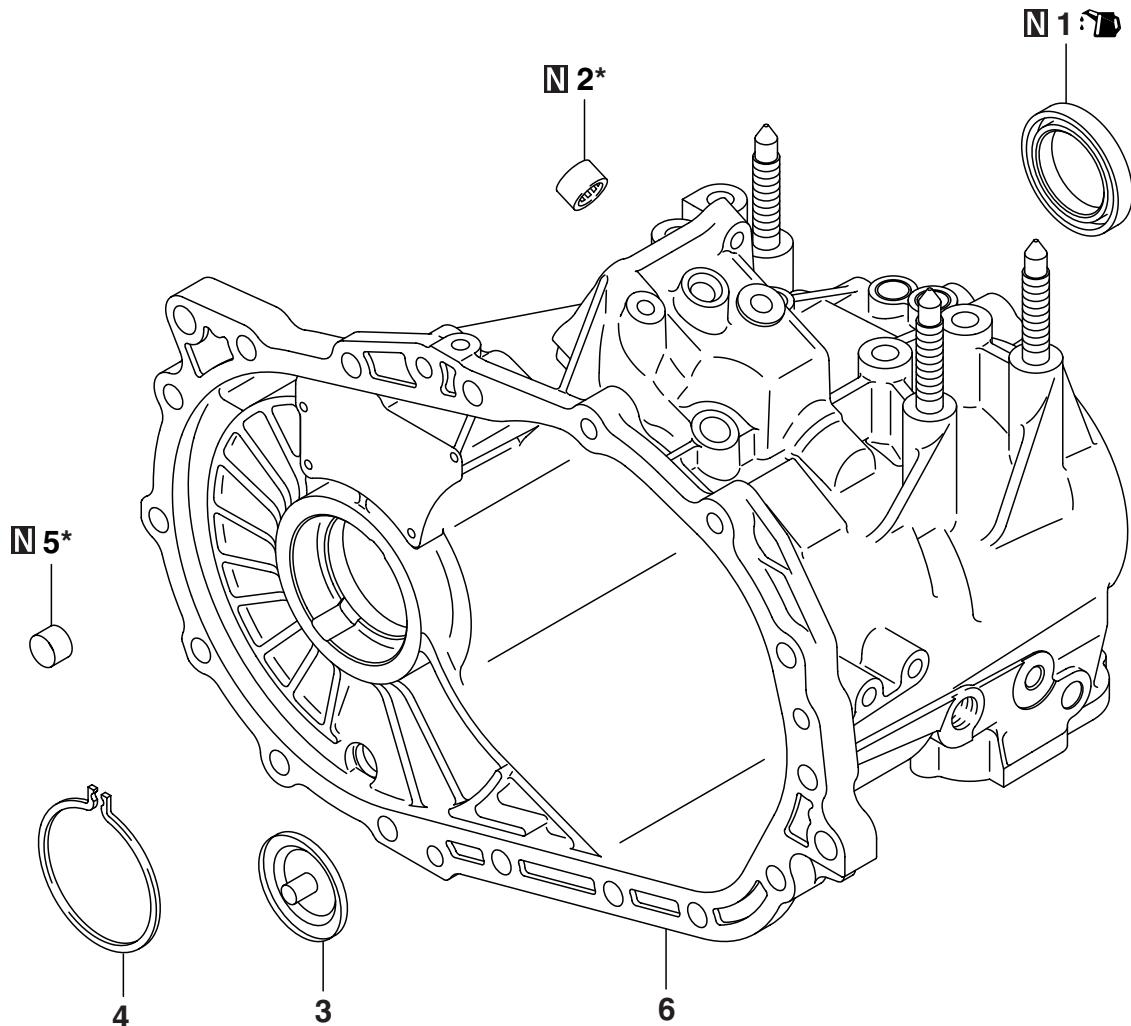


2. Using special tools, press fit the oil seal into the clutch housing.
 - Handle (MB990938)
 - Installer adapter (MB990926)

TRANSMISSION CASE

DISASSEMBLY AND REASSEMBLY

M1222013400143



AK204407AC

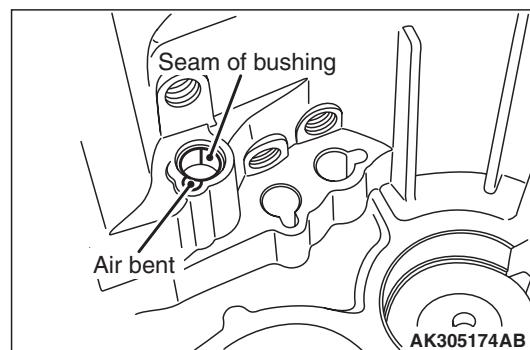
Disassembly steps

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

*NOTE: * Refer to the needle bearing and bushing installation procedures only when replacing the transmission case.*

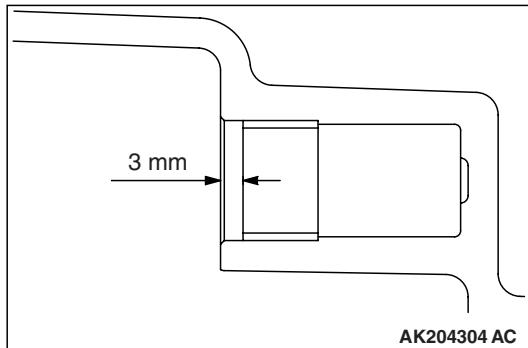
REASSEMBLY SERVICE POINTS

>>A<< BUSHING INSTALLATION



AK305174AB

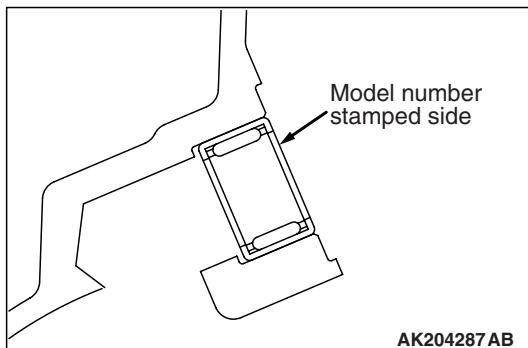
1. Press fit the bushing so the seam is away from the air vent.



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

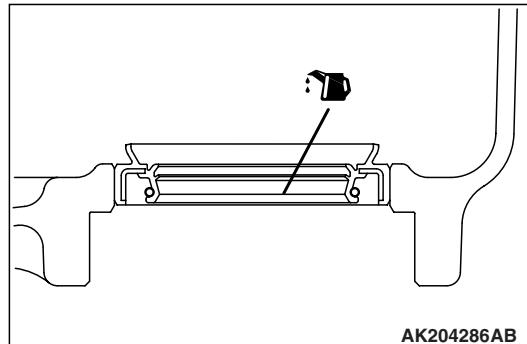
>>B<< NEEDLE BEARING INSTALLATION

1. Check the installation direction of the needle bearing.

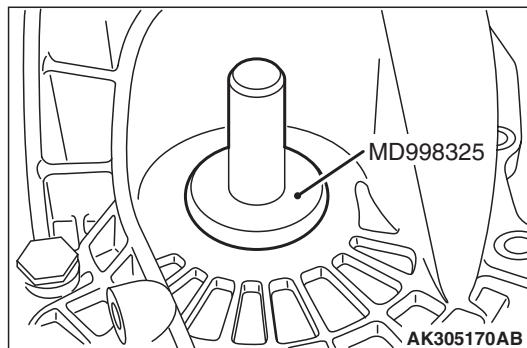


2. Press fit the needle bearing until it is flush with the case.

>>C<< OIL SEAL INSTALLATION



1. Apply gear oil (Hypoid gear oil SAE 75W-90 or 75W-85W conforming to API classification GL-4).

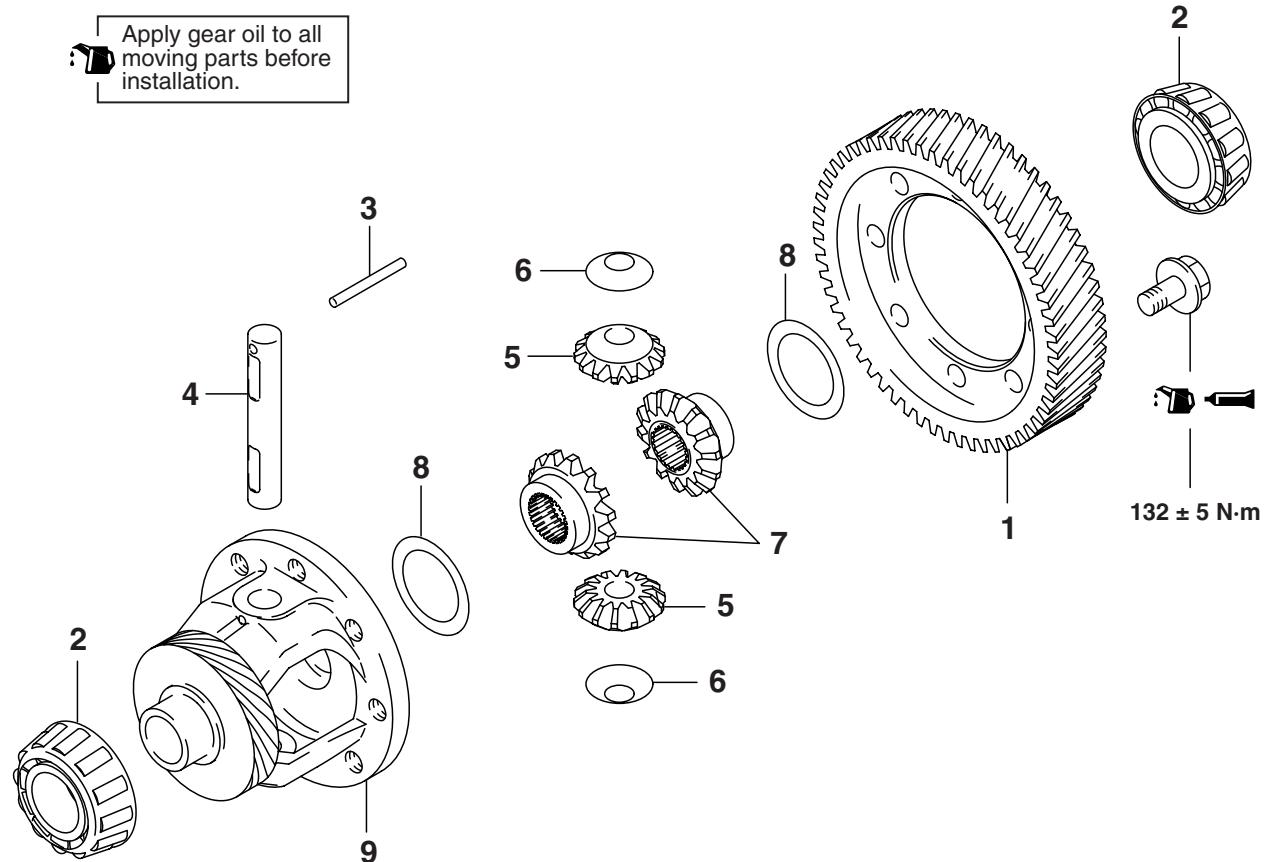


2. Using special tool Differential oil seal installer (MD998325), press fit the oil seal into the transaxle case.

DIFFERENTIAL

DISASSEMBLY AND REASSEMBLY

M1222002500157

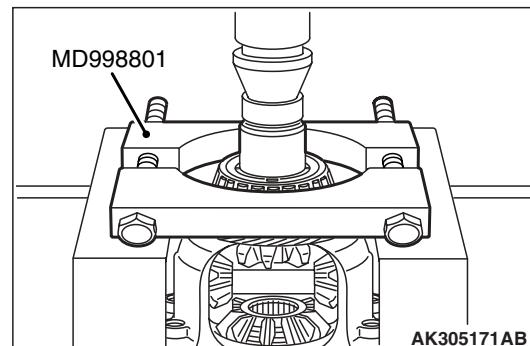


Disassembly steps

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

AK204408AB

DISASSEMBLY SERVICE POINT <<A>> TAPER ROLLER BEARING REMOVAL



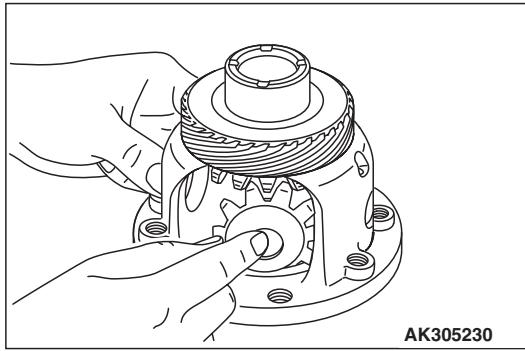
AK305171AB

1. 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

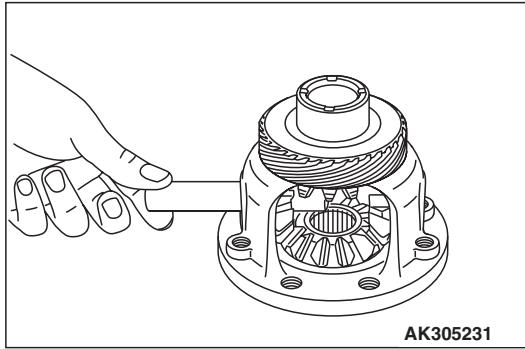
>>A<< SPACER/SIDE GEAR/WASHER/PINION/PINION SHAFT INSTALLATION



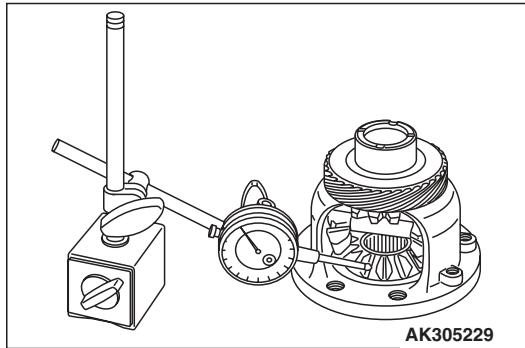
- After a spacer has been mounted on the back surface of the side gear, install the side gear in the differential case.

NOTE: When a new side gear is to be installed, mount a medium thickness spacer.

- 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.



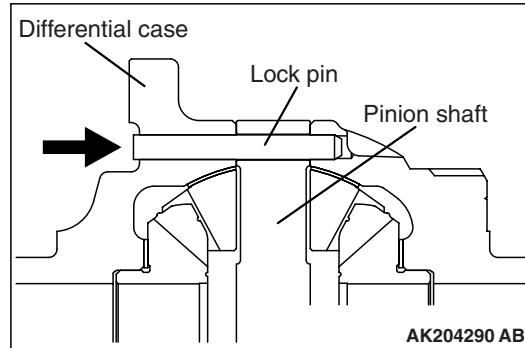
- Measure the backlash between the side gear and pinion.

Standard value: 0 – 0.15 mm

- If the backlash is out of specification, select a spacer that should get the back lash within the standard value and re-measure the backlash.

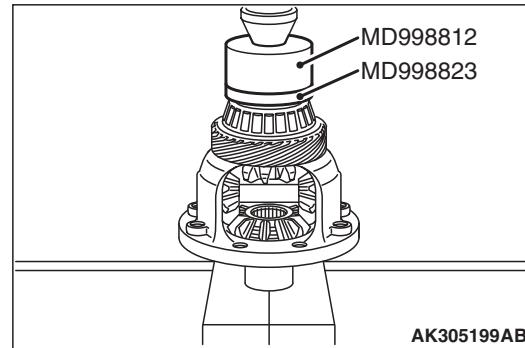
NOTE: Repeat until the backlash on both sides are equal.

>>B<< LOCK PIN INSTALLATION



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

>>C<< TAPER ROLLER BEARING INSTALLATION

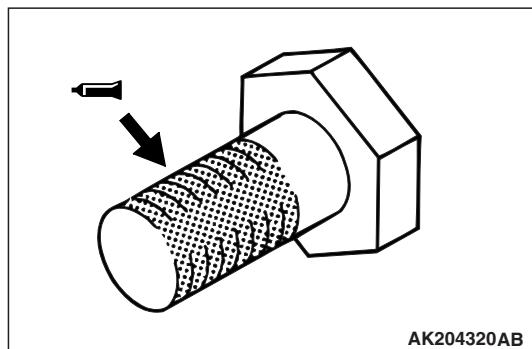


Using special tools, install the taper roller bearing with the press.

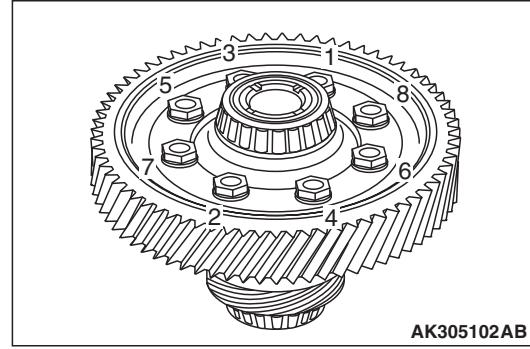
- Installer cap (MD998812)
- Installer adapter (MD998823)

>>D<< DIFFERENTIAL DRIVE GEAR
INSTALLATION

Specified sealant:
3M STUD Locking No.4170 or equivalent



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



2. Tighten to the specified torque of $132 \pm 5 \text{ N}\cdot\text{m}$ in the illustrated sequence.