MITSUBISHI MOTORS

LANCER EVOLUTION-VIII

TRANSMISSION MAINTENANCE MANUAL

MITSUBISHI MOTORS CORPORATION

Transmission

CONTENTS

Maintenance Manual

W5M51

MANUAL TRANSMISSION

FOREWORD

This manual explains the maintenance procedures for the W5M51 manual transmission on the 2003 Lancer Evolution VIII, but only for points which differ from the following maintenance manual:

- W5M51 Manual Transmission Maintenance Manual (No. 1039M17)

This manual is based on the car as it was in January 2003. Some maintenance procedures may have changed due to subsequent specification changes.
International SI standard units are used in the manual; old units are not shown alongside them.
(However, old units are used for some figures we have taken from existing documents).

Any opinions, requests, or questions concerning this manual, should be written on the 'Servicing Comment Form' at the end, and sent to us by fax.

January 2003

MITSUBISHI MOTOR CORPORATION

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Extent of maintenance operation covered in this manual

This manual explains maintenance procedures carried out after the transmission has been removed from the vehicle. Please consult the relevant vehicle maintenance manual if you need to remove the transmission from the vehicle or carry out checks/maintenance without removing it.

How to follow the explanations

Maintenance Procedures

(1) At the beginning of each section there are component drawings to enable you to grasp how they are fitted.
(2) Numbers on these drawings denote the order for maintenance procedures, The drawings also show parts that cannot be re-used, and tightening torques.

- Removal order:
  The numbers before the part names given in the removal order correspond to the numbers in the component drawings, and denote the order in which they are removed.
- Fitting order:
  If the order in which they are fitted is simply the reverse of the order in which they were removed, the fitting order is omitted.
- Dismantling order:
  The numbers before the part names given in the dismantling order correspond to the numbers in the component drawings, and denote the order in which they are dismantled.
- Assembly order:
  If the order in which they are assembled is simply the reverse of the dismantling order, the assembly order is omitted.

Categorisation of Key Maintenance Points

Key points for maintenance/maintenance standards / use of special tools are explained in detail as key maintenance

<<A>> = key point concerning removing/dismantling
>>A<< = key point concerning fitting/assembling
◀*▶ = key points concerning removing / dismantling are in '01-1 W5M51 Manual Transmission Maintenance Manual'.
▶*◀ = key points concerning fitting / removing are in '01-1 W5M51 Manual Transmisson Maintenance Manual'.

Symbols for Lubricants and Sealants

Lubricant/sealant application/topping-up locations are shown on the component drawing on the following page, by these symbols.

 ..... Grease

 ..... Sealant, liquid gasket (FIPG)

 ..... Brake fluid

 ..... Gear oil

Checks

The only checks explained in this manual are those for which special tools or measuring instruments are used. General visual checks and cleaning of components are not explained, but this constitutes essential maintenance and must be carried out.

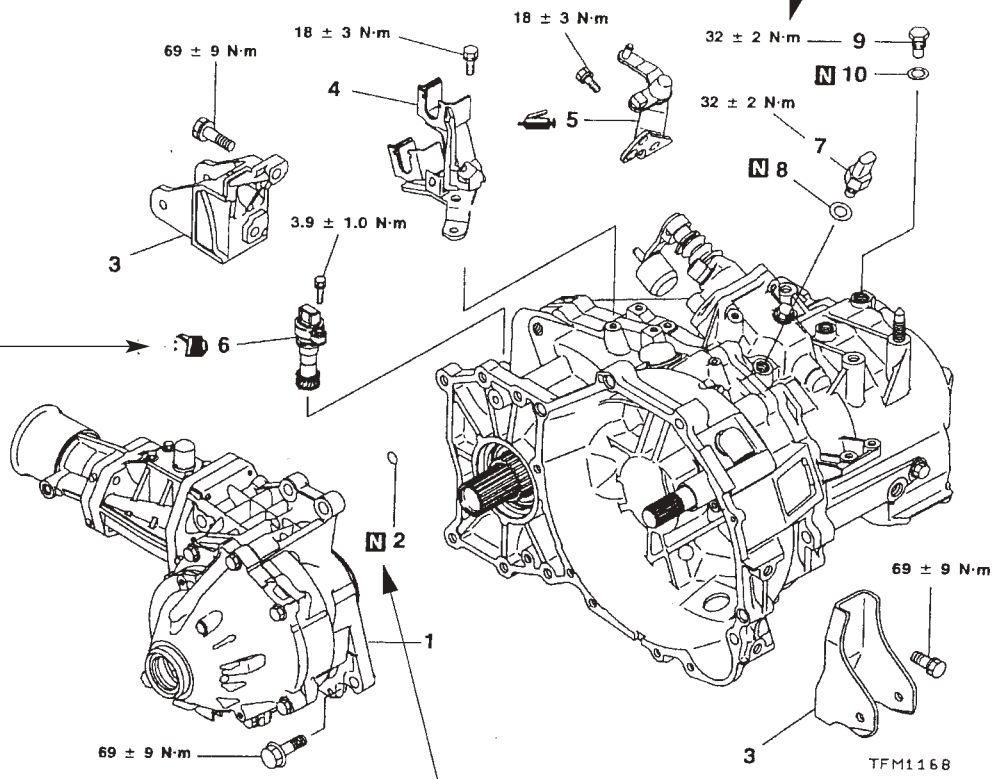
Page number | Group Title | Section Title

6 MANUAL TRANSMISSION - TRANSMISSION

Transmission

Dismantling / Assembling

Denotes tightening torque



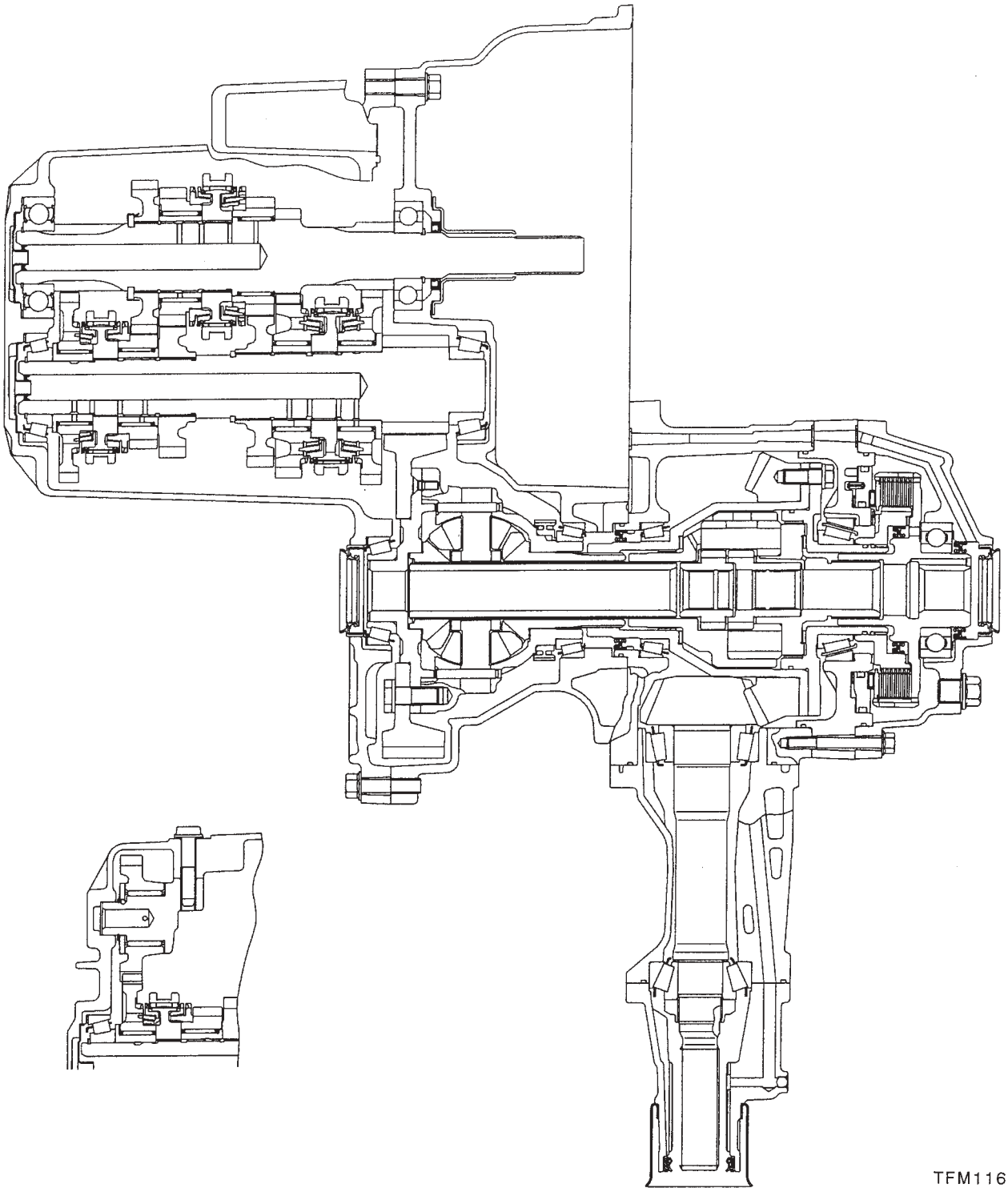
Denotes part that cannot be re-used

Dismantling Order

1. Transfer
2. O ring
3. Roll stopper bracket
4. Shift cable bracket
5. Select lever
6. Speedometer gear
7. Reversing light switch
8. Gasket
9. Poppet spring
10. Gasket

OVERVIEW

Cross Section



Specifications

Transmission Type

Transmission Type	Speedometer Gear Ratio	Final Reduction Gear Ratio	Front LSD?	Vehicle Type	Engine Type
W5M51-2-X5BA	28/36	4.529	Yes	CT9A	4G63-I/C-T/C

Gear Ratio Table

1st gear	2.785
2nd gear	1.950
3rd gear	1.444
4th gear	1.096
5th gear	0.825
Reverse	3.416
Transfer gear ratio	0.3023

Maintenance Standards

Item	Standard (mm)	Limit (mm)
Clearance between rear surface of synchroniser ring and gear	-	0.5

Tightening Torques

Transmission

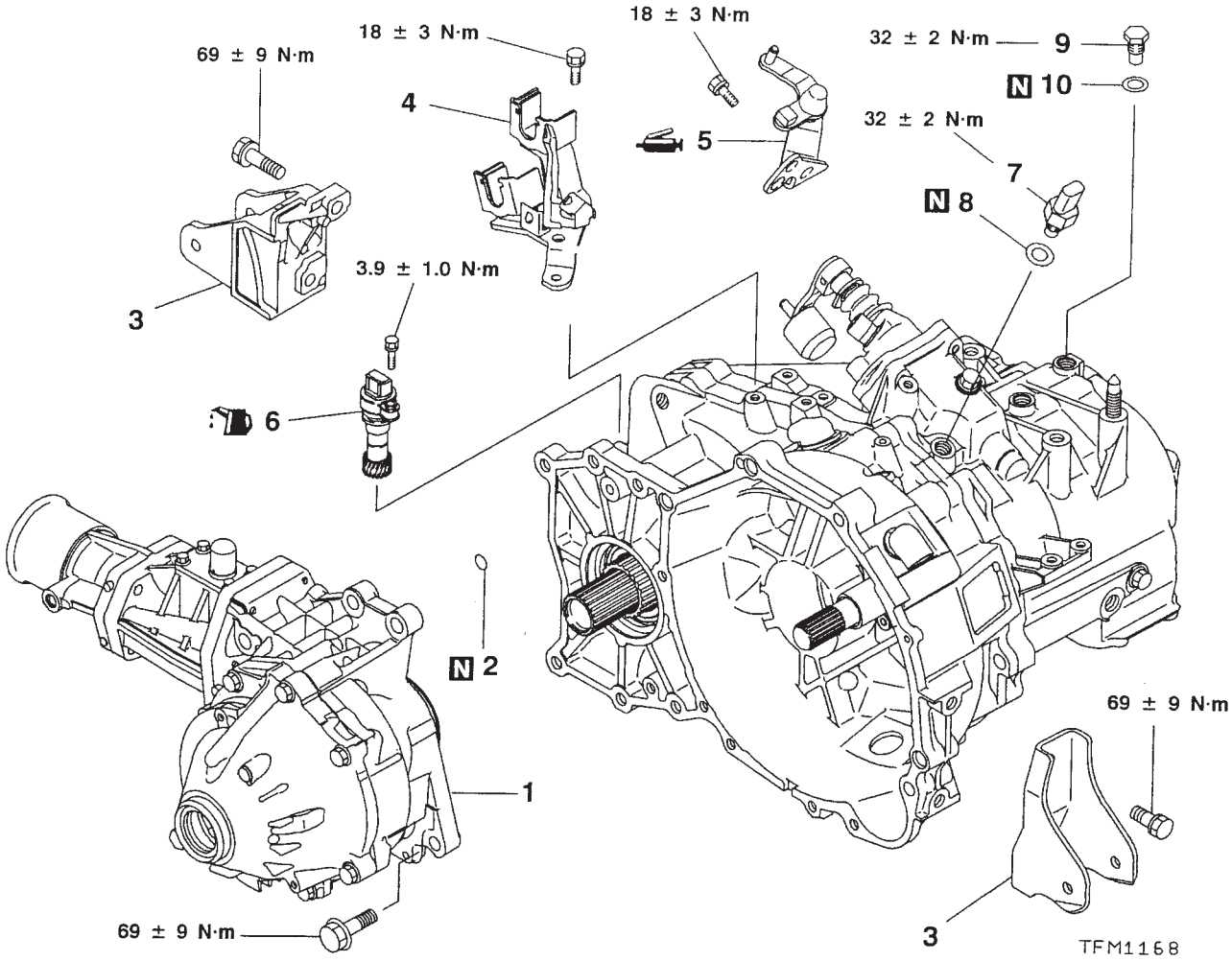
Item	Tightening Torque (N•m)
Cover fitting bolts	6.9 ± 1.0
Interlock plate bolts	30 ± 3
Clutch housing and transmission case tightening bolts	44 ± 5
Control housing fitting bolts	18 ± 3
Shift cable bracket fitting bolts	18 ± 3
Speedometer gear fitting bolts	3.9 ± 1.0
Stopper bracket fitting bolts	18 ± 3
Select lever fitting bolts	18 ± 3
Reversing light switch	32 ± 2
Poppet spring	32 ± 2
Reverse idler gear shaft fitting bolts	48 ± 5
Roll stopper bracket fitting bolts	69 ± 9

Transfer

Item	Tightening Torque (N•m)
Transmission and transfer tightening bolts	69 ± 9

Transmission

Dismantling / Assembling



Dismantling Order

1. Transfer
2. O ring
3. Roll stopper bracket
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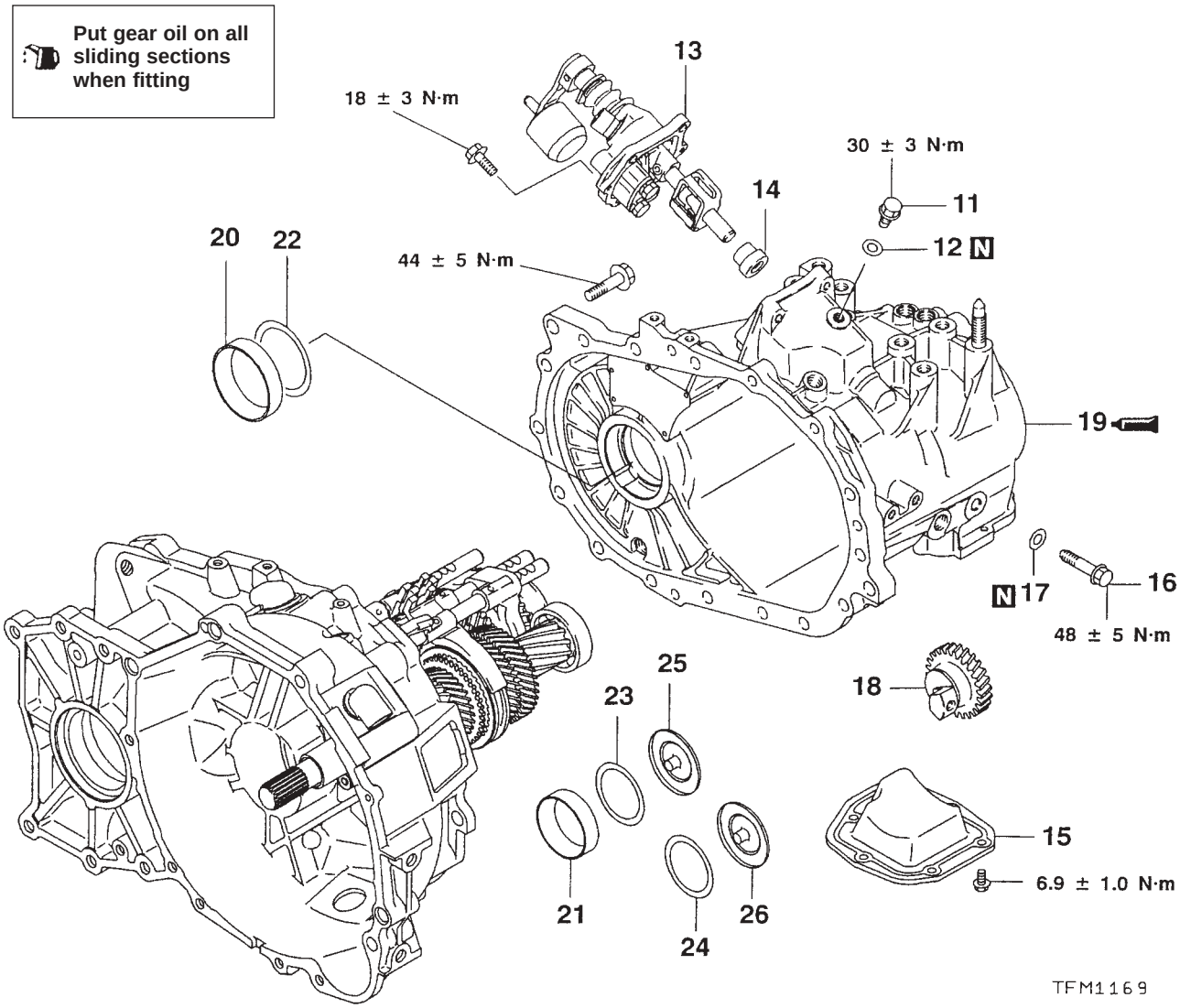
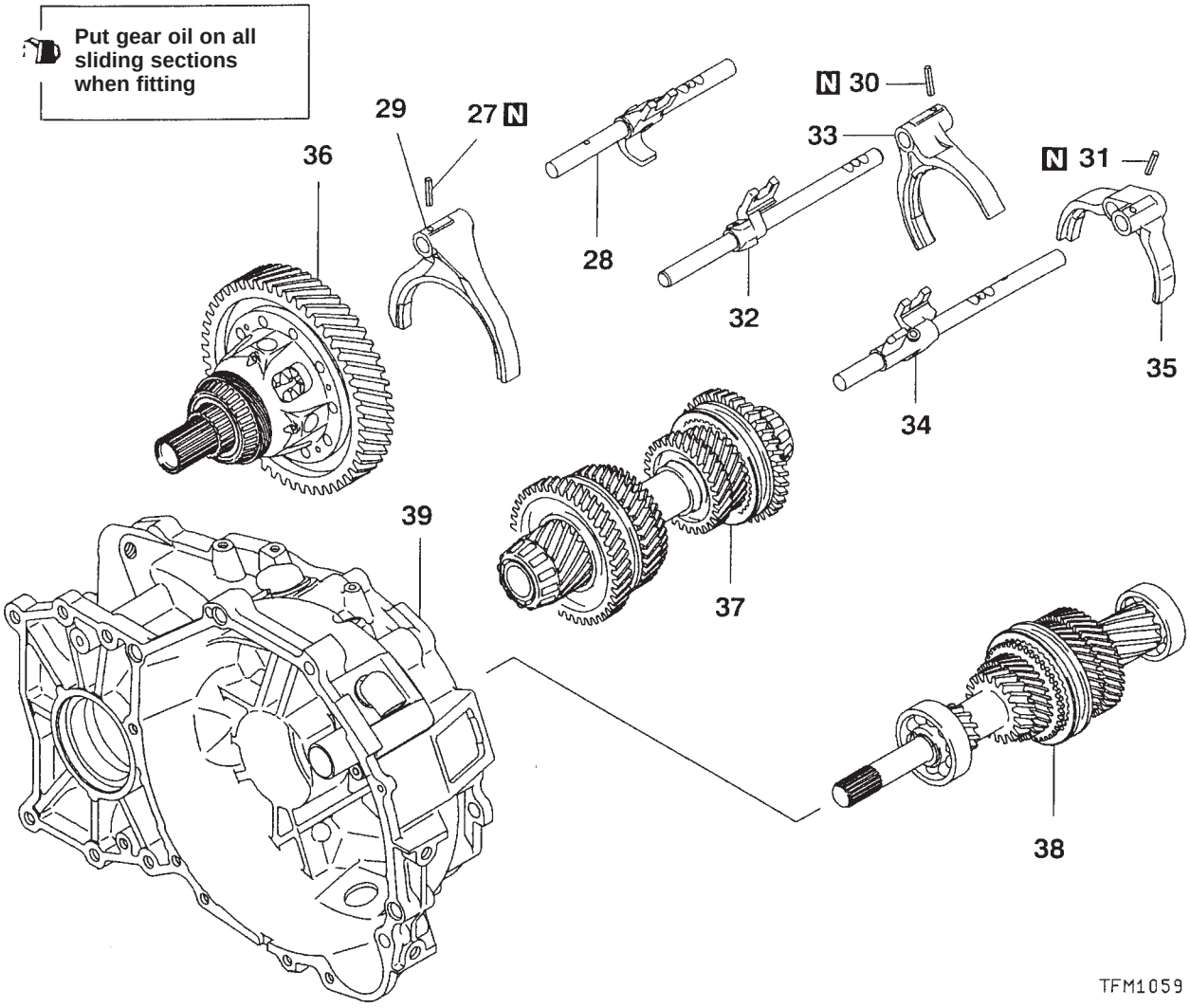


Dismantling Order

	11.	Interlock plate bolt
	12.	Gasket
▶*◀	13.	Control housing
	14.	Neutral return spring
▶*◀	15.	Cover
	16.	Reverse idler shaft bolt
	17.	Gasket
	18.	Reverse idler gear
▶*◀	19.	Transmission case
	20.	Outer race
	21.	Outer race
▶*◀	22.	Spacer
▶*◀	23.	Spacer
▶*◀	24.	Spacer
	25.	Oil guide
	26.	Oil guide

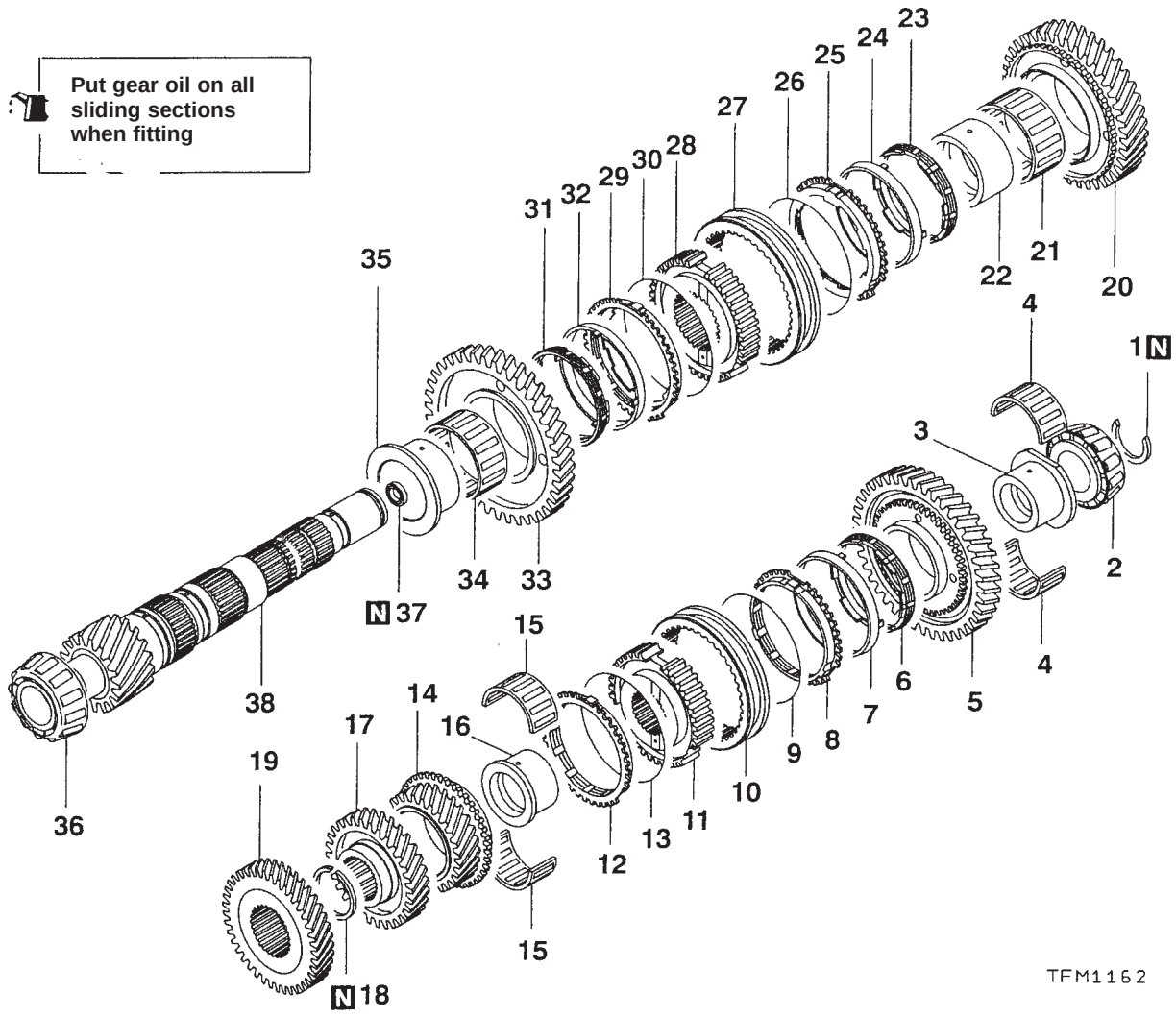


Dismantling Order

- ▸✱◂ 27. Spring pin
- 28. 1st-2nd gear shift rail
- 29. 1st-2nd gear shift fork
- ▸✱◂ 30. Spring pin
- ◂✱▸ ▸✱◂ 31. Spring pin
- ◂✱▸ ▸✱◂ 32. 3rd-4th gear shift rail
- ◂✱▸ ▸✱◂ 33. 3rd-4th gear shift fork
- ◂✱▸ ▸✱◂ 34. 5th gear-Reverse shift rail
- ◂✱▸ ▸✱◂ 35. 5th gear-Reverse shift fork
- ◂✱▸ ▸✱◂ 36. Centre differential
- ◂✱▸ ▸✱◂ 37. Output shaft
- ◂✱▸ ▸✱◂ 38. Input shaft
- 39. Clutch housing

Output Shaft

Dismantling / Assembling

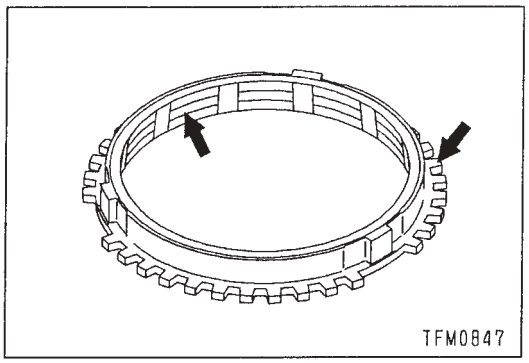


Dismantling Order

▶✱◀	1.	Snap ring
◀✱▶ ▶✱◀	2.	Tapered roller bearing
◀✱▶ ▶✱◀	3.	Reverse gear sleeve
▶✱◀	4.	Needle roller bearing
▶✱◀	5.	Reverse gear
	6.	Inner synchroniser ring
	7.	Synchroniser cone
	8.	Outer synchroniser ring
▶✱◀	9.	Synchroniser spring
▶✱◀	10.	Synchroniser sleeve
◀✱▶ ▶✱◀	11.	5th gear-Reverse synchroniser hub
	12.	Synchroniser ring
▶✱◀	13.	Synchroniser spring
	14.	5th gear
	15.	Needle roller bearing
▶✱◀	16.	5th gear sleeve
▶✱◀	17.	4th gear
▶✱◀	18.	Snap ring
◀✱▶ ▶✱◀	19.	3rd gear
	20.	2nd gear
	21.	Needle roller bearing
◀✱▶ ▶✱◀	22.	2nd gear sleeve
	23.	Inner synchroniser ring
	24.	Synchroniser cone
	25.	Outer synchroniser ring
▶✱◀	26.	Synchroniser spring
▶✱◀	27.	Synchroniser sleeve
▶✱◀	28.	1st-2nd gear synchroniser hub
	29.	Outer synchroniser ring
▶✱◀	30.	Synchroniser spring
	31.	Inner synchroniser ring
	32.	Synchroniser cone
	33.	1st gear
	34.	Needle roller bearing

Dismantling Order

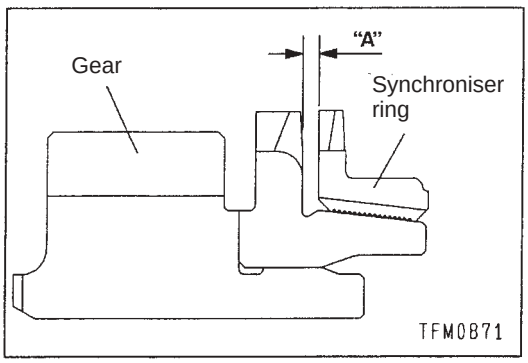
◀*▶ ▶*◀ 35. 1st gear sleeve
◀*▶ ▶*◀ 36. Tapered roller bearing
▶*◀ 37. Oil seal
38. Output shaft



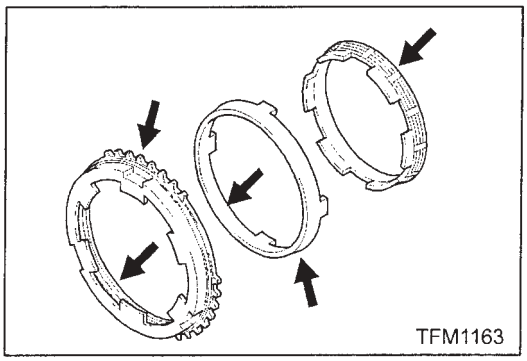
Checks

Synchroniser ring (for 5th gear)

1. There must be no scratching / damage on clutch gear teeth surfaces.
2. There must be no scratching / wear / squashed threads on inside diameter of cone.



3. Push synchroniser ring up against gear and check Clearance A. If clearance is below limit, replace ring.
   Limit: 0.5 mm

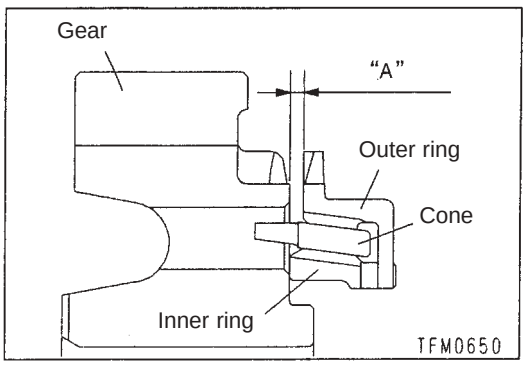


Outer synchroniser ring, inner synchroniser ring and synchroniser cone (for Reverse)

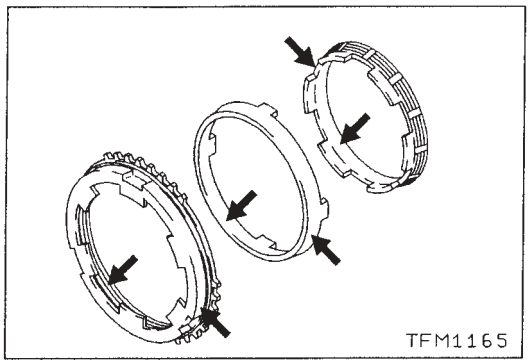
Note

These 3 parts should be replaced as a set, not separately.

1. There must be no scratching / damage on the gear teeth surfaces or the cone surface.

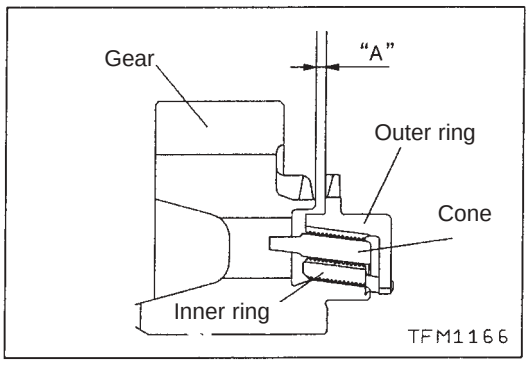


2. Assemble the outer ring, inner ring and the cone, push them up against the gear and check Clearance A. If it is below the limit, replace them.
   Limit: 0.5 mm



Outer synchroniser ring, inner synchroniser ring, synchroniser cone (for 1st, 2nd gears)
Note
These 3 parts should be replaced as a set, not separately.

1. There must be no scratching / damage on the gear teeth surfaces or the cone surface.



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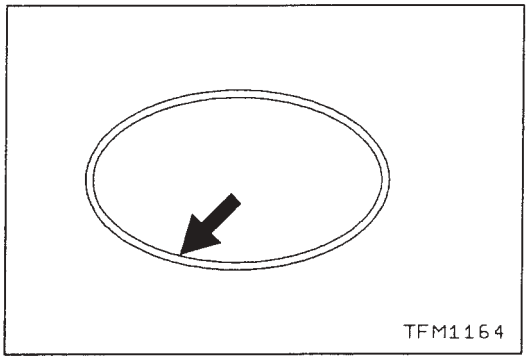
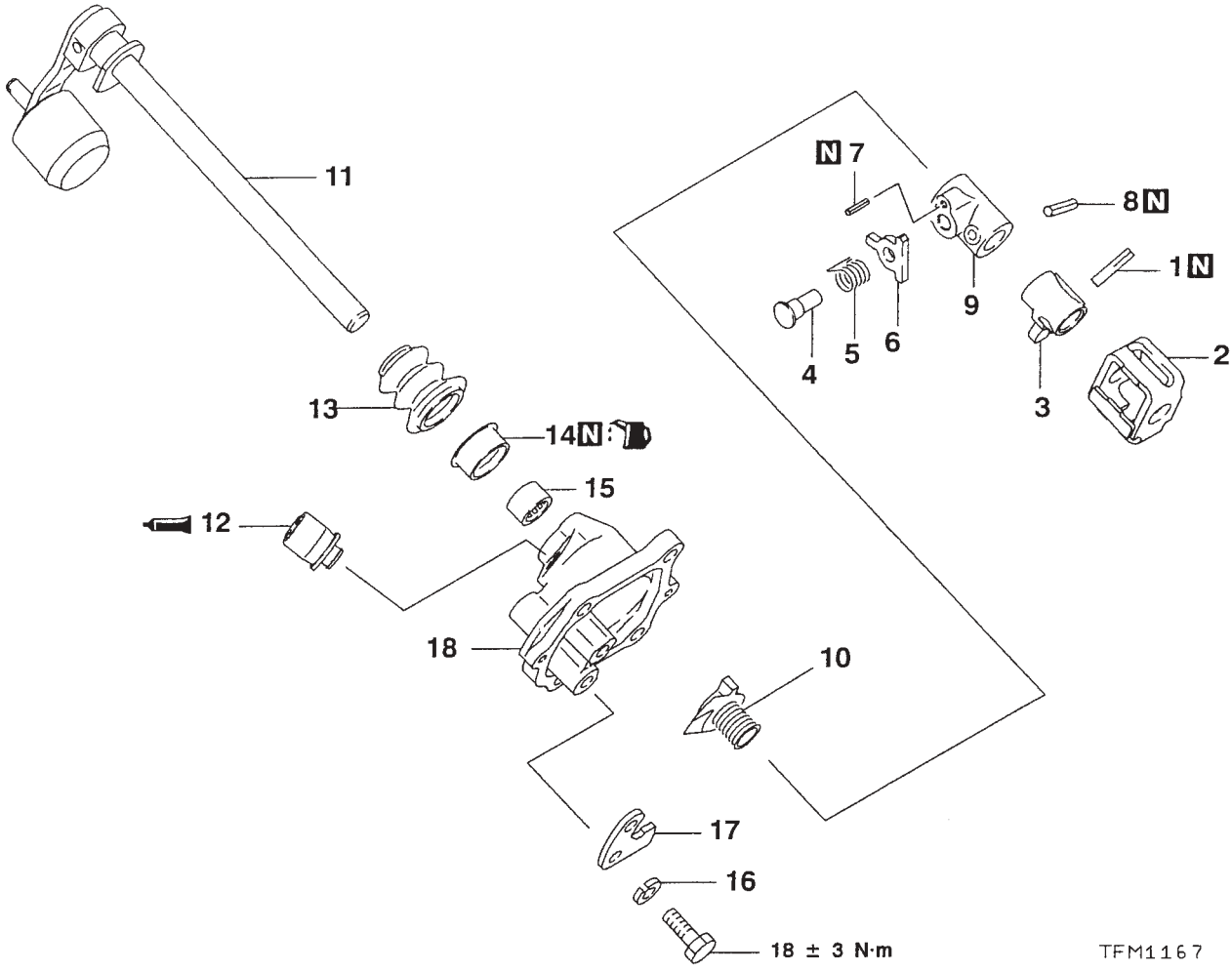


Synchroniser spring
Spring must not be weakened, deformed or broken.

Control Housing

Dismantling / Assembling



Dismantling Order

◆*▶ ▶*◆ 1. Lock pin
2. Interlock plate
3. Control finger
4. Pin
5. Return spring
6. Stopper plate
▶*◆ 7. Spring pin
▶*◆ 8. Spring pin
9. Stopper body
10. Neutral return spring
11. Control shaft
▶*◆ 12. Air breather
13. Control shaft boot
▶*◆ 14. Oil seal
▶*◆ 15. Needle bearing
16. Spring washer
17. Stopper bracket
18. Control housing

Maintenance Manual

W6MAA

MANUAL TRANSMISSION

FOREWORD

This manual explains the maintenance procedures for the W6MAA manual transmission.
Please read the manual thoroughly so that you can carry out maintenance quickly and correctly in order to maintain the performance of the car.
This manual is based on the car as it was in January 2003. Some maintenance procedures may have changed from those given in this manual due to subsequent specification changes.
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January 2003

MITSUBISHI MOTOR CORPORATION

CONTENTS

SECTION 21

CLUTCH

CONTENTS

How to Follow this Manual

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Extent of maintenance operation covered in this manual

This manual explains the maintenance procedure after the transmission has been removed from the vehicle. Please consult the relevant vehicle maintenance manual if you need to remove the transmission from the vehicle or carry out checks/ maintenance without removing it.

How to follow the explanations

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(1) At the beginning of each section there are component drawings to enable you to grasp how they are fitted.
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Categorisation of Key Maintenance Points

Key points for maintenance/maintenance standards / use of special tools are explained in detail as key maintenance points.

<<A>> = key point concerning removing/dismantling
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Symbols for Lubricants and Sealants

Lubricant/sealant application/topping-up locations are shown on the component drawing on the following page, by these symbols.

 ..... Grease
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 ..... Brake fluid
 ..... Gear oil

Checks

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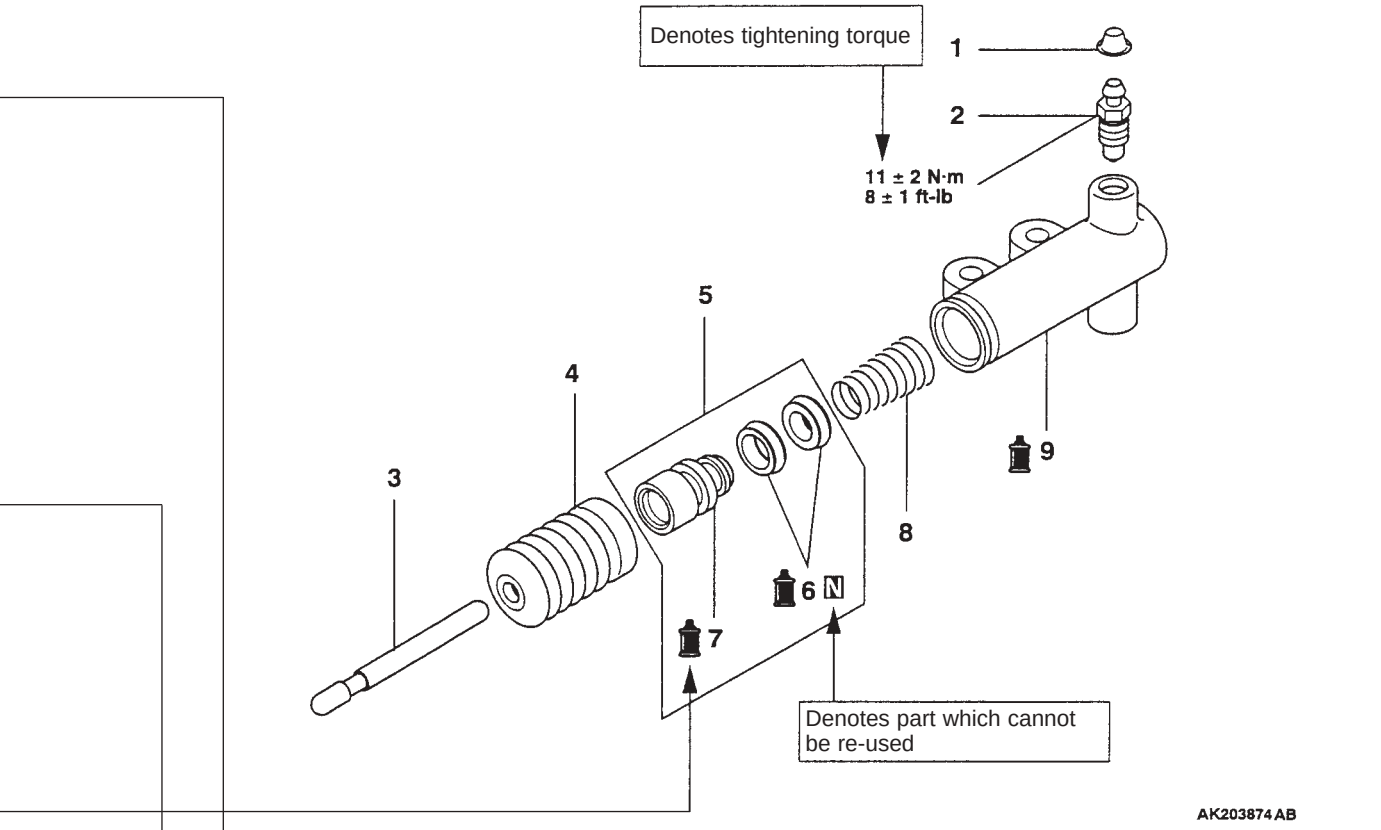
Page number

Section title

21-8 CLUTCH RELEASE CYLINDER

Clutch Release Cylinder

Dismantling / Assembling

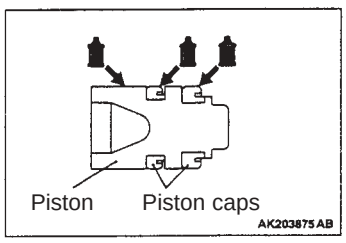


Dismantling Order
1. Lock pin
2. Interlock plate
3. Control finger
4. Pin
>>A<< 5. Return spring

Explains procedure / precautions required when removing / fitting / dismantling / assembling.

Key Point for Assembling

>>A<< Fitting piston assembly
Smear brake fluid on inner surface of release cylinder and all over piston / piston caps, then insert piston assembly into release cylinder.



These symbols/letters correspond with symbols/letters in removal / fitting / dismantling / assembling order

AK204447

Specifications

M1212000200137

Item		Specification
Clutch disc	Type	Dry single plate type
	Facing dimensions (mm)	240 x 160
Clutch cover	Type	Diaphragm spring pull type
	Set load (N)	9320
Clutch control method		Hydraulic

Maintenance Standards

M1212000300101

Item	Limit (mm)
Clutch disc facing rivet sinkage	0.3
Clutch diaphragm spring tip height variation	0.5

Tightening Torques

M1212001800109

Item	Tightening Torque (N •m)
Clutch tube flare nut	15 ± 2
Clutch fluid line bracket bolt	18 ± 3
Clutch release cylinder fitting bolt	18 ± 3
Clutch release fork shaft fitting bolt	9.8 ± 2.0
Clutch release cylinder union bolt	22 ± 2
Clutch cover bolt	18 ± 3
Clutch release cylinder air breather	11 ± 1

Lubricants

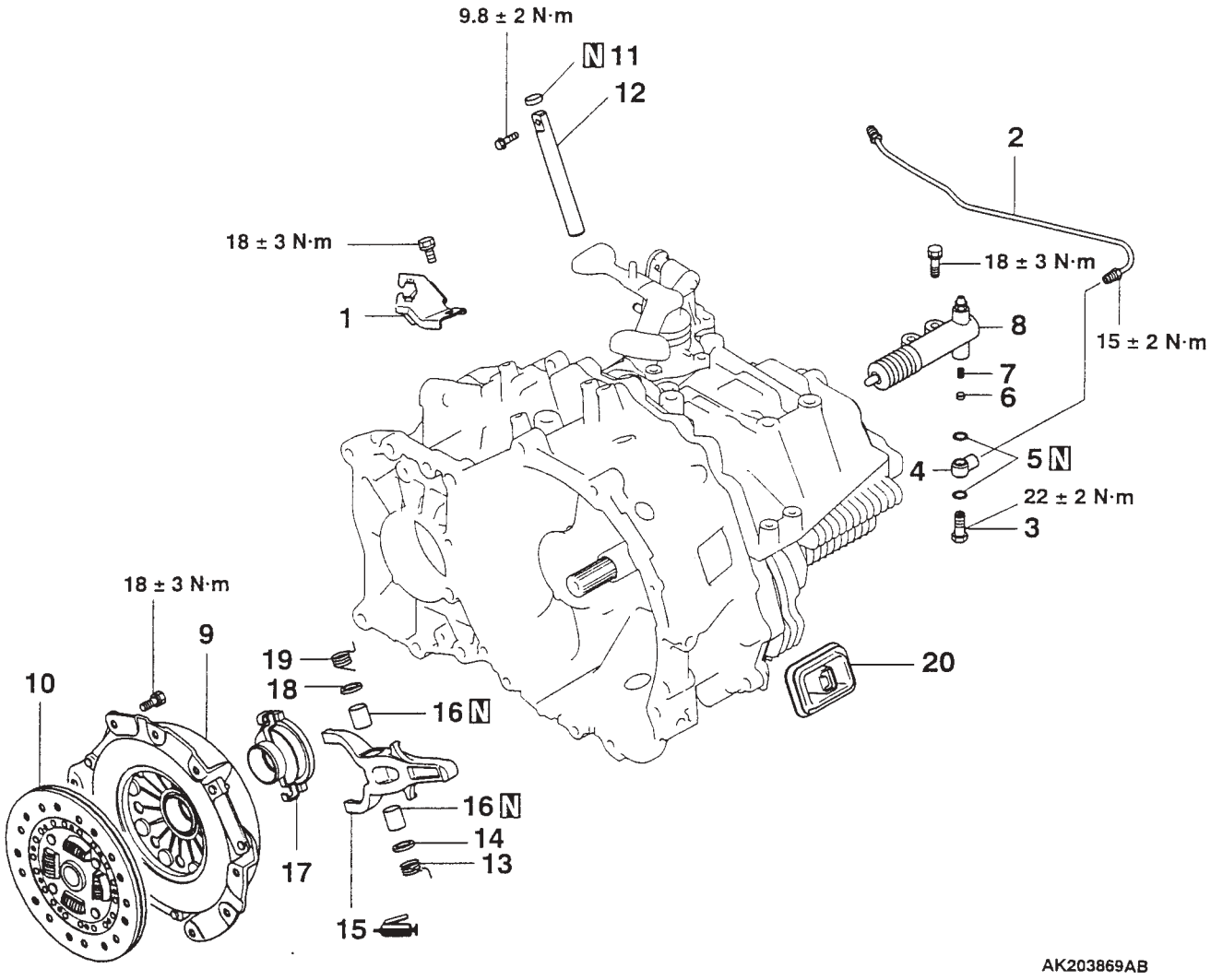
M1212000400119

Item	Brand
Release fork and release cylinder push rod contact surfaces	0101011 or equivalent
Release fork and release shaft sliding section	
Release fork and release bearing contact surfaces	
Whole of piston and piston caps	
Inside of release cylinder	4 or equivalent

CLUTCH

Removal / Fitting

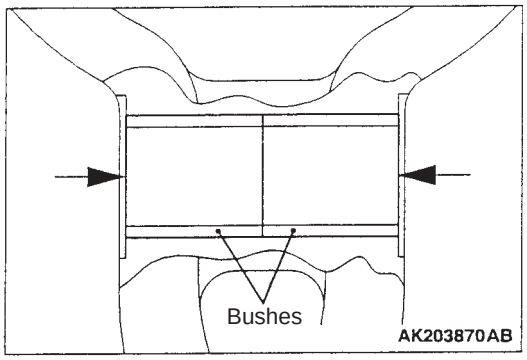
M1212001000103



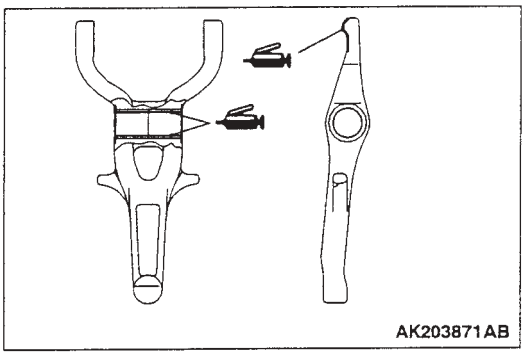
		RemovalOrder
	1.	Clutch fluid line bracket
	2.	Clutch fluid line
	3.	Union bolt
	4.	Union
	5.	Gaskets
>>E<<	6.	Valve plate
>>E<<	7.	Valve plate spring
>>D<<	8.	Clutch release cylinder
	9.	Clutch cover
	10.	Clutch disc

		Removal Order (continued)
>>C<<	11.	Sealing cap
	12.	Release fork shaft
	13.	Support spring (L)
	14.	Washer
>>B<<	15.	Release fork
>>A<<	16.	Bushes
	17.	Clutch release bearing
	18.	Washer
	19.	Support spring (R)
	20.	Release fork boot

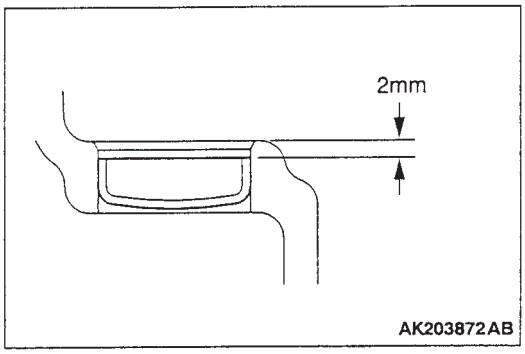
KEY POINTS FOR FITTING



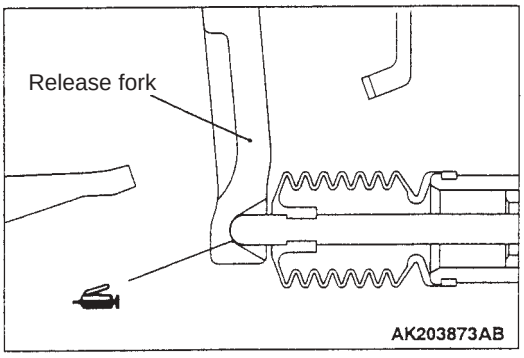
>>A<< Fitting bushes
Press fit bushes as far as position on release fork shown in drawing.



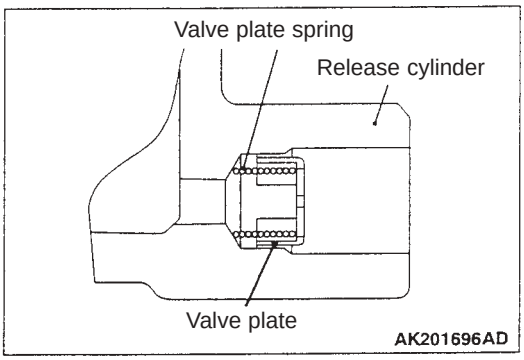
>>B<< Fitting release fork
Apply grease on release fork at locations shown in drawing.
Grease
Brand: 0101011 or equivalent



>>C<< Fitting sealing cap
Press fit sealing cap as far as position shown in drawing, making sure it is not tilted.



>>D<< Fitting clutch release cylinder
Apply grease on release fork at location shown in drawing.
Grease
Brand: 0101011 or equivalent



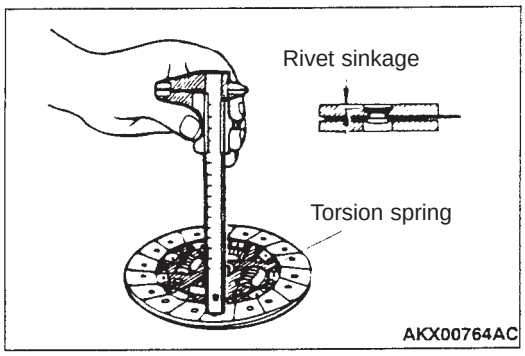
>>E<< Fitting valve plate spring / valve plate
Bring end of spring with larger diameter to valve plate side, and fit valve plate spring
and valve plate.

Checks

M1212001100092

Clutch Cover

1. Check pressure plate surface for wear, cracks and discoloration.
2. Check if any strap plate rivets are loose. If any are loose, replace them.



Clutch Disc

Care required

Do not wash clutch disc with cleaning oil.

1. Check facing for loose rivets, lop-sided contact and burnt or un-lubricated spots. If there are any defects replace clutch disc.
2. Measure sinkage of rivets. If it is over limit, replace clutch disc.
   Limit: 0.3 mm. maximum
3. Check for torsion spring play or damage. If it is defective, replace clutch disc.
4. Fit clutch disc on input shaft, check slide-ability and variation in direction of rotation. If slide-ability is poor, clean, re-fit it and check again. If variation of rotation is excessive, change clutch disc and/or input shaft.

Clutch release bearing

Care required

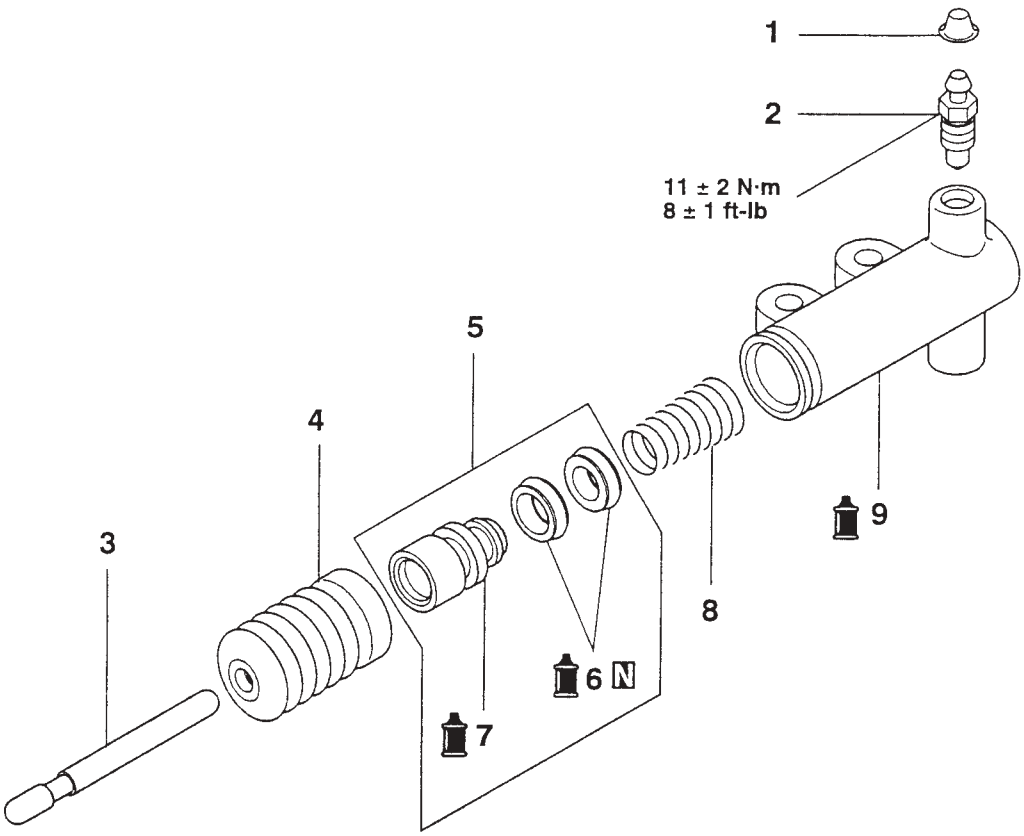
Do not wash clutch release bearing with cleaning oil because grease is sealed in.

1. Make sure bearing is not burnt, scratched, and that there is no abnormal noise or rotation.
2. Make sure pull ring on release bearing is not worn.
3. If there is abnormal wear on release fork and bearing contact surfaces, replace it.

CLUTCH RELEASE CYLINDER

Dismantling / Assembling

M1212001500090



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Dismantling Order

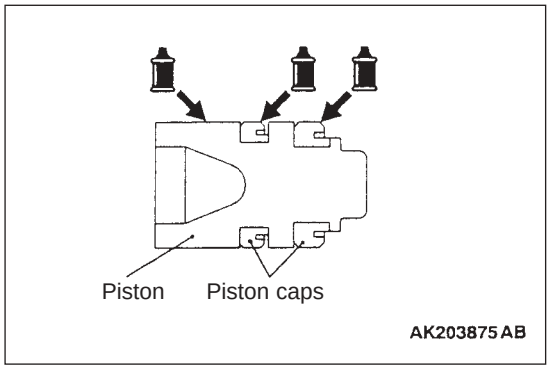
1. Cap
2. Air breather
3. Push rod
4. Boot

>>A<< 5. Piston assembly

Dismantling Order(continued)

6. Piston cap
7. Piston
8. Conical spring
9. Release cylinder

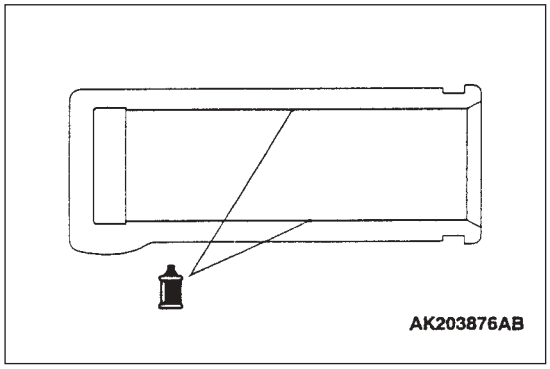
KEY POINT FOR ASSEMBLING



>>A<< Fitting piston assembly
Smear brake fluid on inside of release cylinder and all over piston and piston caps, then insert piston assembly into release cylinder.

Brake Fluid

Brand: Diaqueen Brake Fluid Super 4 or equivalent



Checks

M1212001600097

Release cylinder

1. Check whether inner surface of release cylinder is rusty or scratched.
2. Using a cylinder gauge, measure 3 points (deepest part, middle, and at mouth) on inside diameter of release cylinder. If clearance with outside of piston is over limit, replace release cylinder assembly.
   Limit: 0.15mm

Memo:

CHAPTER 22

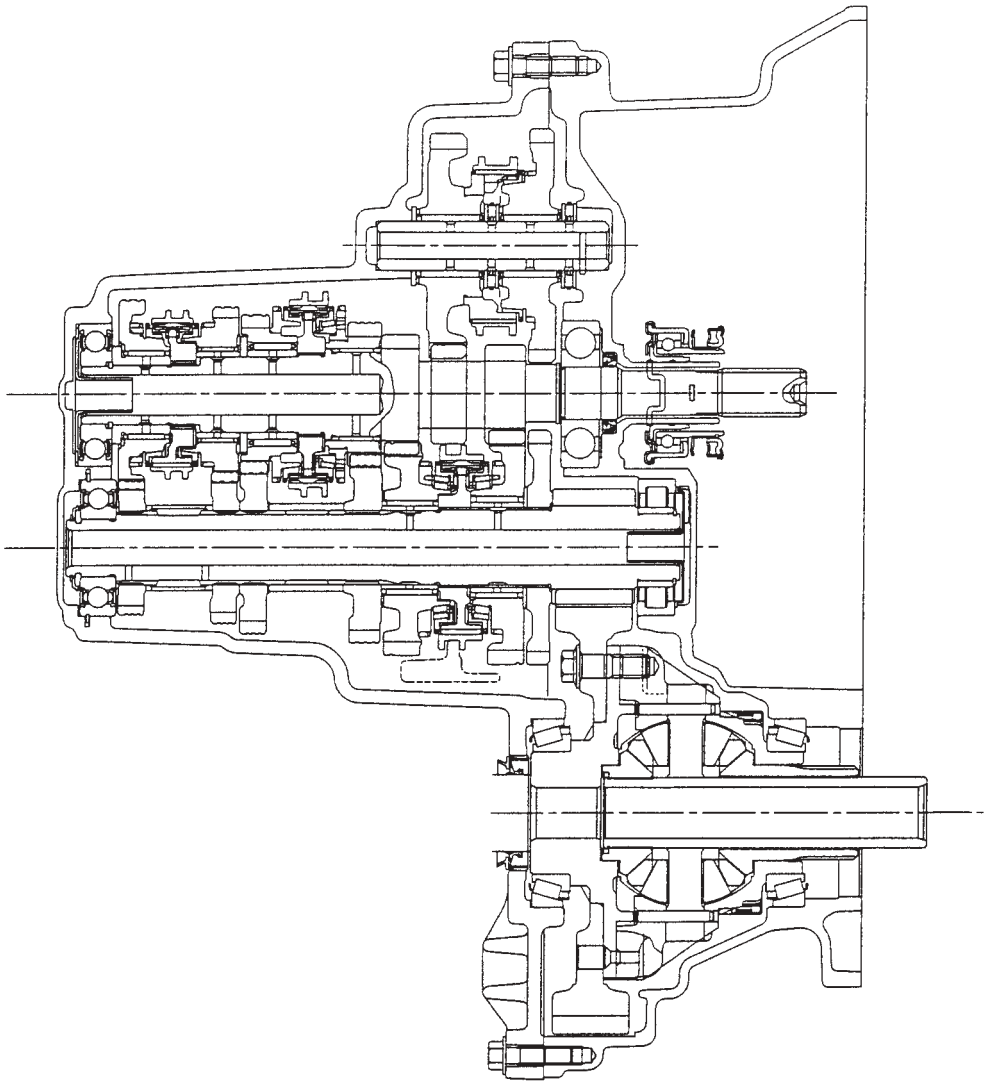
MANUAL TRANSMISSION

CONTENTS

OVERVIEW

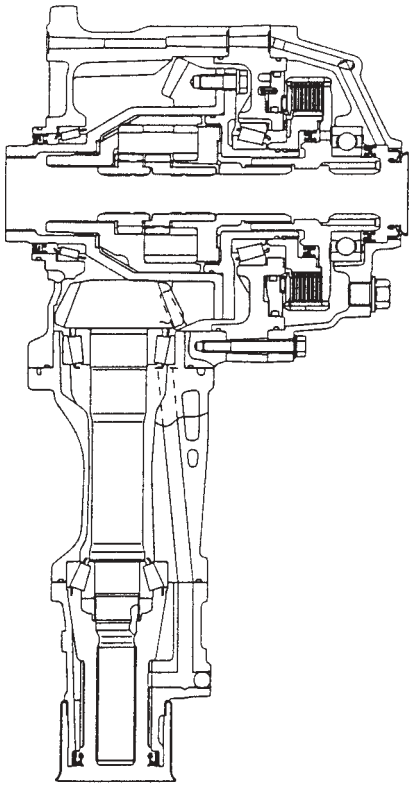
Cross Section (Transmission)

M1222000100119



AK204394

Cross Section (Transfer)



AK204401

SPECIFICATIONS

M1222000200150

Transmission Type Table

Transmission Type	Speedometer Gear Ratio?	Final Reduction Gear Ratio	Front LSD?	Vehicle Type	Engine Type
W6MAA-1-GFNF	No	4-583	Yes	CT9A	4G63-I/C-T/C

Gear Ratio Table

1st gear	2.909
2nd gear	1.944
3rd gear	1.434
4th gear	1.100
5th gear	0.868
6th gear	0.693
Reverse	2.707

Maintenance Standards

M1222000300135

Item	Standard (mm)	Limit (mm)
Differential side bearing pre-load	0.15 to 0.20	-
Input shaft end play	0 to 0.06	-
Main shaft end play	0 to 0.06	-
Reverse idler gear end play	0.04 to 0.10	-
Distance between input shaft front bearing and thrust washer	167.6 to 167.7	-
Input shaft 6th gear bush end play	0 to 0.1	-
Wear on one side of shift fork claws	-	0.2
Clearance between synchroniser ring and gear	-	0.7
Clearance between synchroniser ring and synchroniser cone	-	0.2
Backlash on differential side gear and pinion	0.025 to 0.150	-

Sealants / Adhesives

M1222000500128

Item	Brand
Clutch housing ÅÃ transaxle case mating surfaces	MZ100077 or equivalent
Reverse switch	MZ100077 or equivalent
Air breather	MZ100055 or equivalent
Differential drive gear bolt	0110106 or Locktight 648 or equivalent

Liquid Gaskets (Flow-In-Place Gasket)
On this transmission FIPG is used in several assemblies. For the liquid gasket to fully achieve its objectives, careful attention needs to be paid to the amount used, the application procedure, and the condition of the surfaces on which it is applied.
Not using enough will result in leakage, while if too much is used it will overflow and block or constrict the oil passages. Hence, to prevent leakage from joints, it is absolutely essential to apply the correct amount and leave no gaps.

Dismantling
Parts assembled using FIPG can be dismantled easily; no special method is required. However, in some cases you may need to tap it with a wooden mallet or similar tool to break the sealant between the mating surfaces.

Cleaning the Gasket Surface
Completely remove all material adhering to mating surfaces using a gasket scraper. Make sure that the surfaces on which the FIPG will be applied are smooth. There must be no oil, grease or other substances adhering to mating surfaces. Do not forget to remove any old FIPG from fitting holes, screw holes.

Application Procedure
Apply the FIPG within the specified diameter, leaving no gaps. Make sure it is applied all the way around fitting holes. Before it solidifies FIPG can be wiped off. Fit the specified sections together while it is still wet (within 10 minutes). Make absolutely sure that it only adheres to the areas where it is needed. Do not put any oil or water on the parts after fitting them together, or drive the car, until sufficient time (about 1 hour) has elapsed.
The procedure for applying FIPG varies from assembly to assembly, so be sure to use the procedure described here.

Lubricants

M1222000400091

Item	Brand
Lip on transfer oil seal	Sunlight No. 2 or Retinax A or equivalent
O-rings	

ADJUSTMENT SHIMS, THRUST WASHERS, SNAP RINGS

M1222012000142

Shims (for adjusting differential side bearing pre-load)

Thickness (mm)	Thickness (mm)
0.48	0.72
0.52	0.76
0.56	0.80
0.60	0.84
0.64	0.88
0.68	0.92

Shims (for adjusting input shaft end play)

Thickness (mm)	Thickness (mm)
0.44	1.00
0.48	1.04
0.52	1.08
0.56	1.12
0.60	1.16
0.64	1.20
0.68	1.24
0.72	1.28
0.76	1.32
0.80	1.36
0.84	1.40
0.88	1.44
0.92	1.48
0.96	1.52

Shims (for adjusting main shaft end play)

Thickness (mm)	Thickness (mm)
0.44	0.80
0.48	0.84
0.52	0.88
0.56	0.92
0.60	0.96
0.64	1.00
0.68	1.04
0.72	1.08
0.76	

Shims (for adjusting reverse idler gear end play)

Thickness (mm)	Thickness (mm)
1.76	2.24
1.80	2.28
1.84	2.32
1.88	2.36
1.92	2.40
1.96	2.44
2.00	2.48
2.04	2.52
2.08	2.56
2.12	2.60
2.16	2.64
2.20	

Thrust Washers (for adjusting distance between input shaft front bearing and thrust washer)

Thickness (mm)	Thickness (mm)
3.84	4.02
3.90	4.08
3.96	4.14

Snap Rings (for adjusting input shaft 6th gear bush end play)

Thickness (mm)	Thickness (mm)
1.71	2.01
1.76	2.06
1.81	2.11
1.86	2.16
1.91	2.21
1.96	2.26

TIGHTENING TORQUES

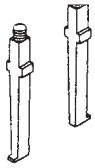
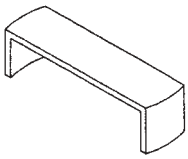
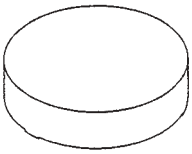
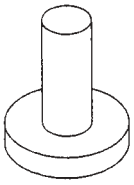
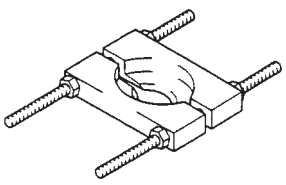
M1222013900052

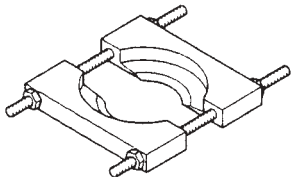
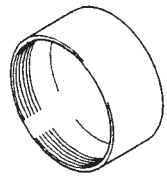
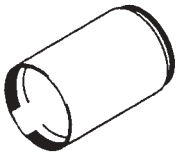
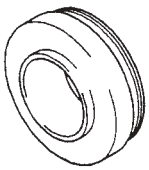
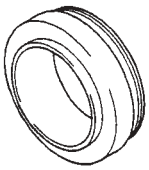
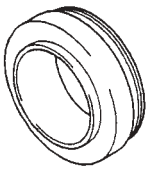
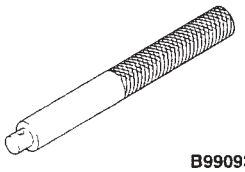
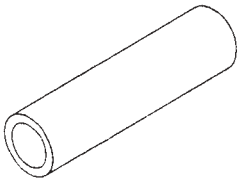
Item	Tightening Torque (Nm)
Transfer bolt	70 ± 10
Roll stopper bracket bolt	69 ± 9
Vehicle speed sensor bolt	11 ± 1
Reverse switch	28 ± 5
Stopper bolt	29 ± 1
Shift check plug	15 ± 2
Transaxle case bolt (with sealant)	63 ± 1
Transaxle case bolt	52 ± 1
Shift check plug	15 ± 2
Reverse lever assembly	14 ± 1
Main shaft bearing retainer bolt	7.3 ± 1.0
Drain plug	35 ± 4
Filler plug	35 ± 4

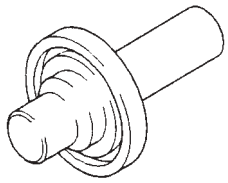
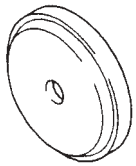
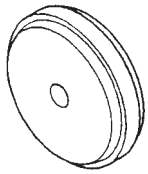
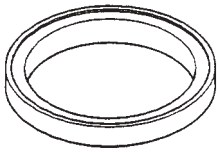
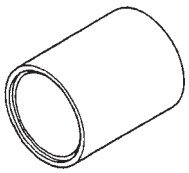
Item	Tightening Torque (Nm)
Differential drive gear bolt	132 ± 5
Transfer cover case bolt	23 ± 3
Plug	30 ± 2
Magnet plug	30 ± 2

SPECIAL TOOLS

M1222000600147

Tool	Number	Name	Purpose
 MB990810	MB9908910	Side bearing puller	Used together with claws
	MB991967	Claws	Removal of differential side bearing outer race
	MB991968	Bridge	Removal of differential side bearing outer race
	MB991969	Measurement adaptor	Differential side bearing pre-load measurement
	MB991966	Bearing outer race installer	Fitting differential side bearing outer race
	MD998801	Bearing remover	Fitting/removal of gears, bearings and sleeves

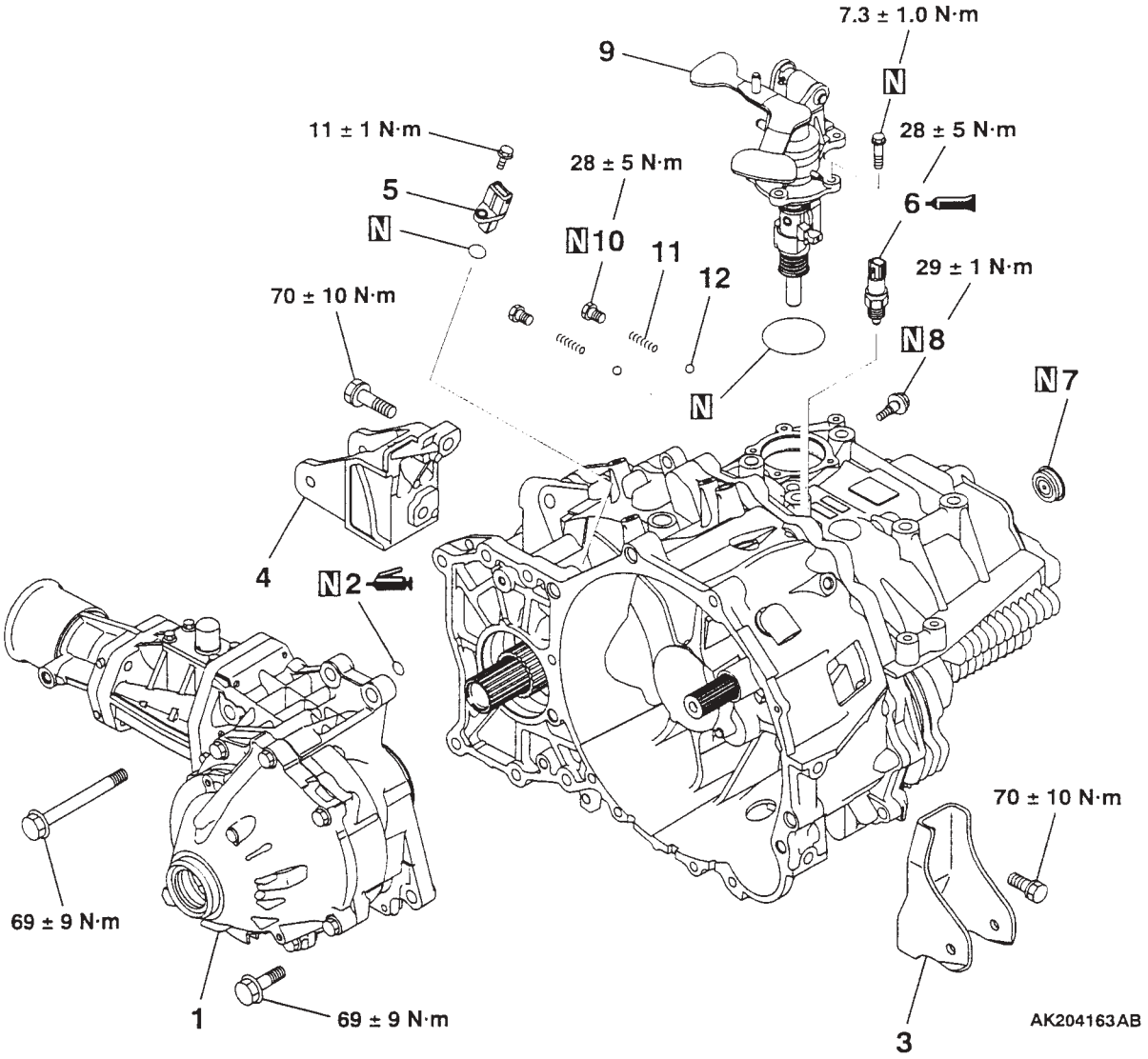
Tool	Number	Name	Purpose
	MD998917	Bearing remover	Fitting/removal of gears, bearings and sleeves
	MD998812	Installer cap	Used together with installer/ installer adapter
	MD998813	Installer 100	Used with installer cap / installer adaptor
	MD998818	Installer adaptor (38)	Fitting input shaft rear bearing / roller bearing inner race
	MD998823	Installer adaptor (48)	Fitting 3rd – 4th gear synchroniser assembly
	MD998822	Installer adaptor (46)	Fitting 1st gear sleeve / 1st – 2nd gear synchroniser hub
	MB990938	Handle	Used together with installer adaptor
	MD998323	Bearing installer	Fitting input shaft oil seal

Tool	Number	Name	Purpose
	MD998800	Oil seal installer	Fitting differential oil seal and transfer oil seal
	MB990936	Installer adaptor	Fitting transfer tapered roller bearing and transfer oil seal
	MB990937	Installer adaptor	Fitting transfer oil seal
	MB990887	Arm bush adaptor & installer ring	Fitting transfer oil seal
	MB990891	Bush remover & installer base	Used together with arm bush adaptor and installer ring

TRANSMISSION

Dismantling / Assembling

M1222001000148



Dismantling Order

1. Transfer
2. O-ring
3. Front roll stopper bracket
4. Rear roll stopper bracket
5. Vehicle speed sensor

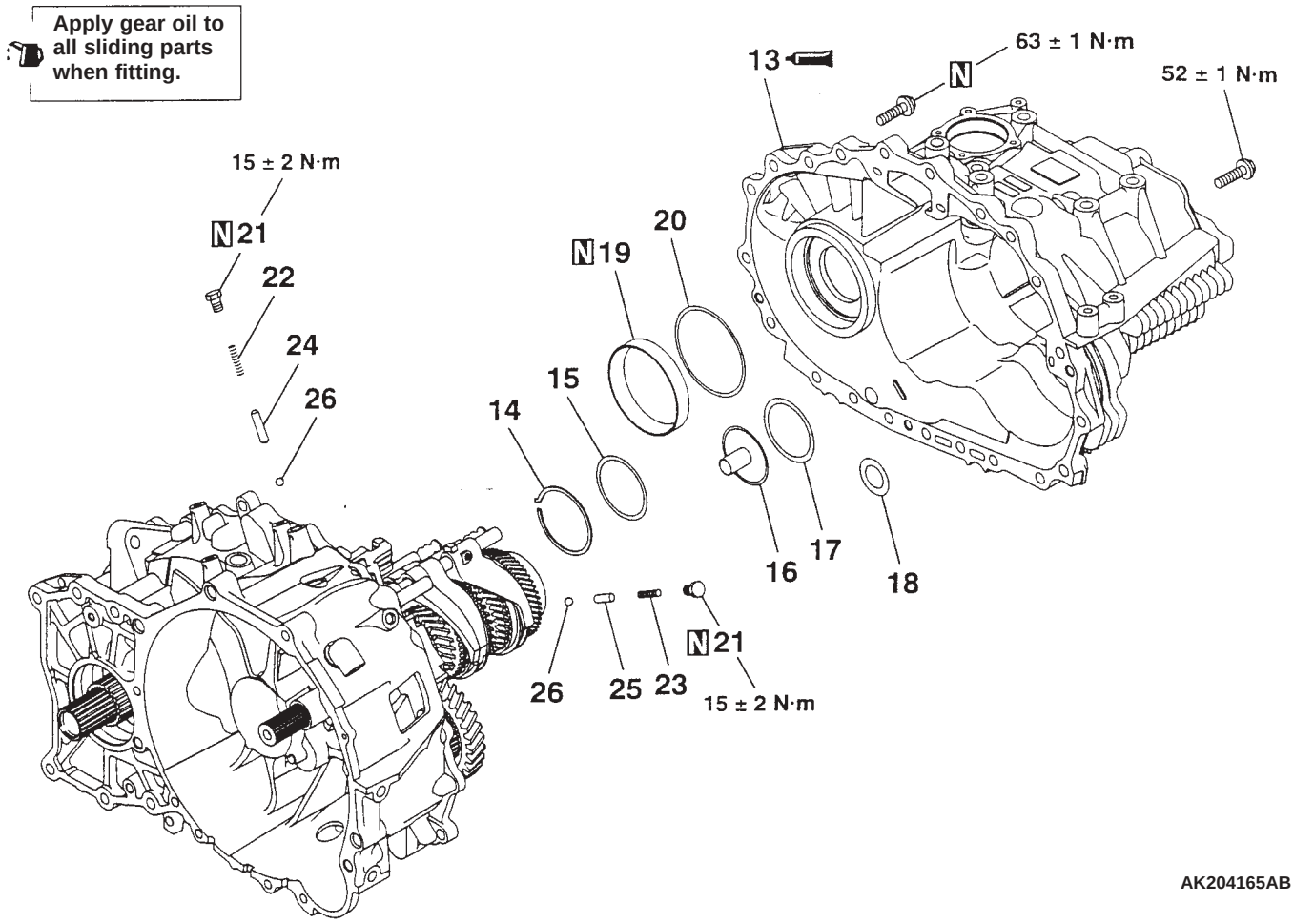
>>P<< 6. Reverse switch

Dismantling Order (continued)

7. Bore plug
8. Stopper bolt

>>O<< 9. Control assembly

10. Shift check plugs
11. Shift check springs
12. Check balls

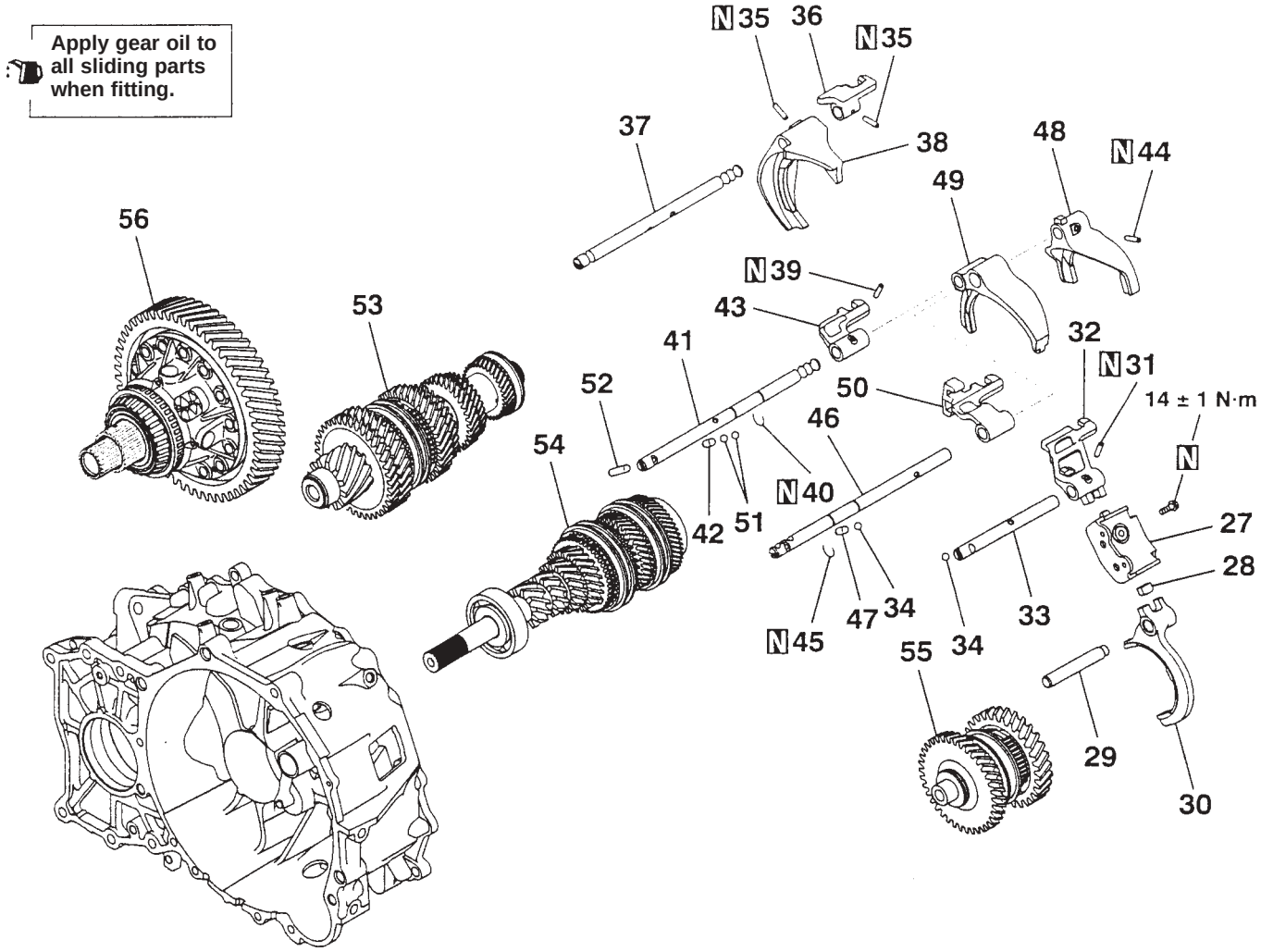


Dismantling Order

>>N<<	13.	Transaxle case
	14.	Snap ring
>>M<<	15.	Main shaft rear bearing adjustment shim
	16.	Oil channel
>>M<<	17.	Input shaft rear bearing adjustment shim
>>M<<	18.	Reverse idler adjustment shim
<<A>> >>L<<	19.	Differential side bearing outer race

Dismantling Order (continued)

>>K<<	20.	Differential side bearing adjustment shim
>>J<<	21.	Shift check plug
>>J<<	22.	5th-6th gear shift check spring
>>J<<	23.	Shift check spring
>>J<<	24.	Shift check sleeve
>>J<<	25.	Reverse shift check sleeve
>>J<<	26.	Check ball



Dismantling Order

27.	Reverse lever assembly		
28.	Shifter cap		
29.	Reverse fork rod		
30.	Reverse shift fork		
31.	Retaining pin		
32.	Reverse bracket		
33.	Reverse bracket fork rod		
34.	Interlock balls		
35.	Retaining pin	>>A<<	
36.	1st-2nd gear bracket	>>A<<	
37.	1st-2nd gear fork rod	>>A<<	
38.	1st-2nd gear shift fork		
39.	Retaining pin		
40.	C ring		
41.	3rd-4th gear fork rod	>>B<<	
42.	Interlock pin	>>C<<	
43.	3rd-4th gear bracket	>>D<<	
44.	Retaining pin		
45.	C ring	>>D<<	
46.	5th-6th gear fork rod	>>D<<	
47.	Interlock pin	>>D<<	
48.	5th-6th gear shift fork	>>D<<	
49.	3rd-4th gear shift fork	>>E<<	
50.	5th-6th gear bracket	>>F<<	
51.	Interlock balls		
52.	Shift check sleeve		
53.	Main shaft assembly		
54.	Input shaft assembly		
55.	Reverse idler gear assembly		
56.	Centre differential		

Dismantling Order (continued)

Assembly Order

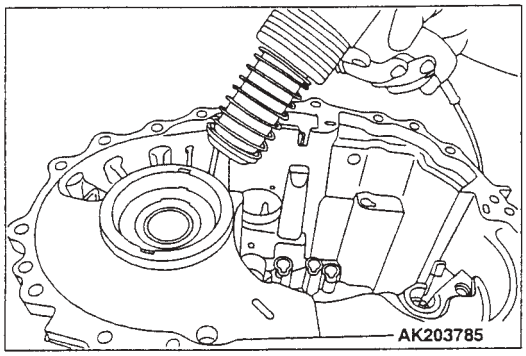
56.	Centre differential		
55.	Reverse idler gear assembly	>>A<<	
54.	Input shaft assembly	>>A<<	
53.	Main shaft assembly	>>A<<	
37.	1st-2nd gear fork rod		
36.	1st-2nd gear bracket		
35.	Retaining pin		
38.	1st-2nd gear shift fork		
52.	Shift check sleeve		
41.	3rd-4th gear fork rod	>>B<<	
42.	Interlock pin	>>C<<	
43.	3rd-4th gear bracket	>>D<<	
49.	3rd-4th gear shift fork		
40.	C ring		
39.	Retaining pin		
51.	Interlock balls		
46.	5th-6th gear fork rod		

Assembly Order (cont.)

	47.	Interlock pin
>>F<<	50.	5th-6th gear bracket
>>F<<	48.	5th-6th gear shift fork
>>F<<	45	C ring
>>F<<	44.	Retaining pin
>>G<<	34.	Interlock balls
>>H<<	33.	Reverse bracket fork rod

Assembly Order (cont.)

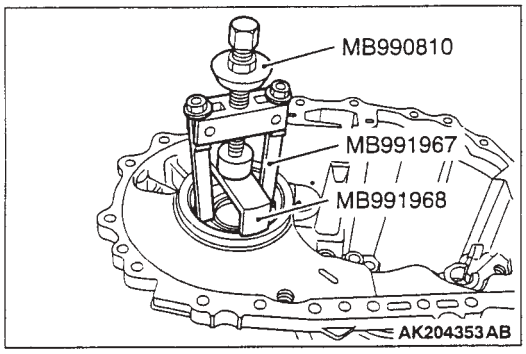
>>H<<	32.	Reverse bracket
	31.	Retaining pin
	30.	Reverse shift fork
	29.	Reverse fork rod
>>I<<	27.	Reverse lever assembly
	28.	Shifter cap



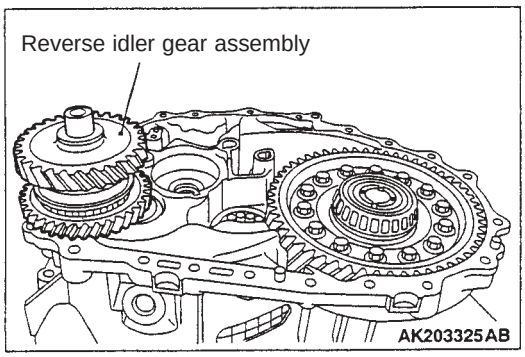
Key Points for Dismantling

<<A>> Removing differential side bearing outer race

1. Heat transaxle case to about 100˚C (maximum 120˚C).



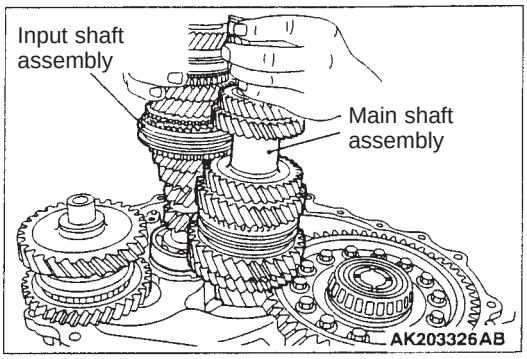
2. Remove differential side bearing outer race using the following special tools:
   - Side bearing puller (MB990810)
   - Claws (MB991967)
   - Bridge (MB991968)



Key Points for Assembling

>>A<< Fitting input shaft assembly/main shaft assembly/reverse idler gear assembly

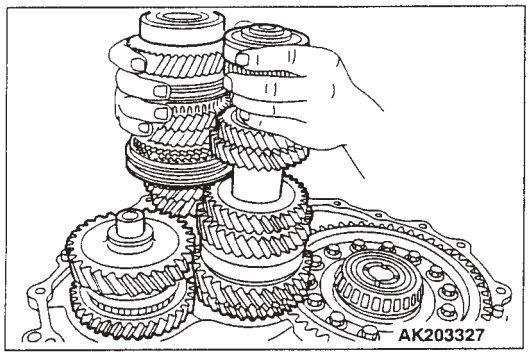
1. Temporarily locate reverse idler gear assembly.



⚠ Care required

When fitting assembly, make sure that you do not scratch input idler shaft seal (Wind plastic tape around spline of input shaft assembly).

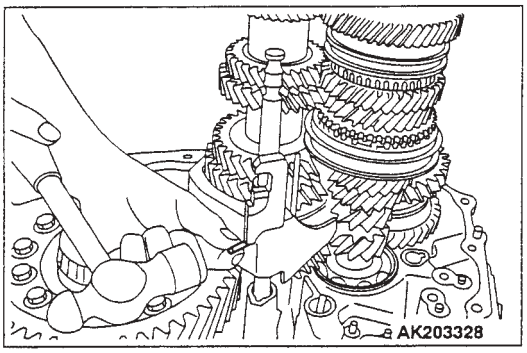
2. Insert input shaft assembly first, then main shaft assembly, so that they rest lightly (literally 'float') on clutch housing.



⚠ Care required

Match up lock pin at tip of reverse idler gear assembly with grooved location on clutch housing, and fit this assembly.

3. Fit reverse idler gear assembly between input shaft and main shaft assemblies, which are resting lightly on clutch housing, then fit all 3 into it at the same time.

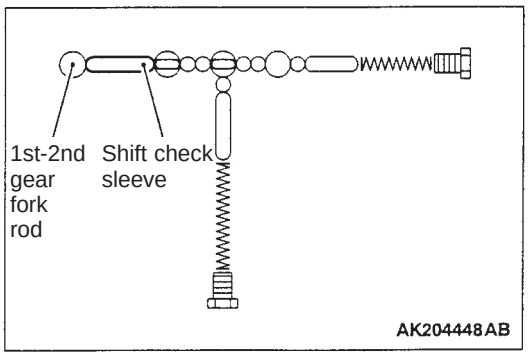


>>B<< Fitting 1st-2nd gear fork rod and 1st-2nd gear shift fork

⚠ Care required

- **Retaining pins must not be re-used.**
- **When fitting retaining pin, use hexagonal wrench to locate it.**

Fit 1st-2nd gear fork rod and shift fork, then fit retaining pin.

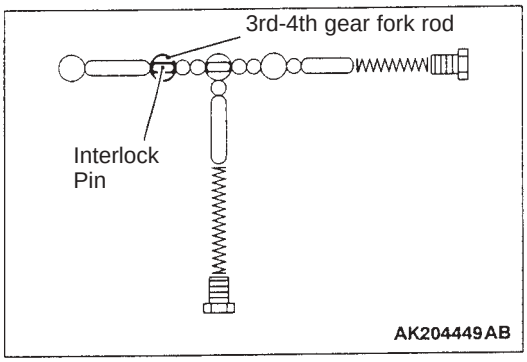


>>C<< Fitting shift check sleeve

⚠ Care required

Make sure you do not fit a similar part by mistake (shift check sleeve length = 36.25mm).

Fit shift check sleeve.



>>D<< Fitting 3rd-4th gear bracket, shift fork and fork rod

⚠ Care required

To prevent interlock pin from coming out, smear vaseline on it. When fitting, take care not to drop it.

1. Fit interlock pin to 3rd-4th gear fork rod.
2. Fit 3rd-4th gear bracket, shift fork and fork rod.

⚠ Care required

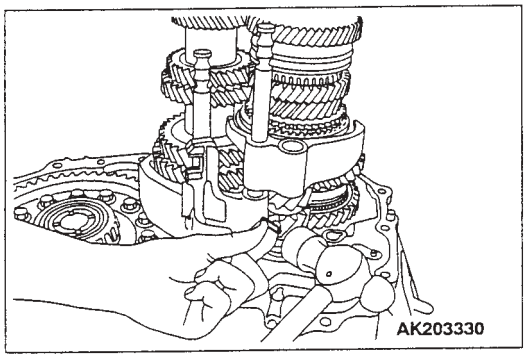
C rings must not be re-used.

3. Fit C ring to 3rd-4th gear shift fork.

⚠ Care required

- **Retaining pins must not be re-used.**
- **When fitting retaining pin, use hexagonal wrench to locate it.**

4. Fit retaining pin to 3rd-4th gear bracket.

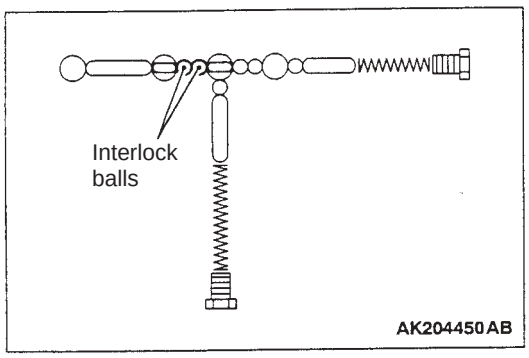


>>E<< Fitting interlock balls

⚠ Care required

Make sure interlock balls do not fall from fitting position.

Fit (2) interlock balls.



>>F<< Fitting 5th-6th gear bracket, shift fork and fork rod

⚠ Care required

To prevent interlock pin coming out, smear vaseline on it.

When fitting, take care not to drop it.

1. Fit interlock pin to 5th-6th gear fork rod

⚠ Care required

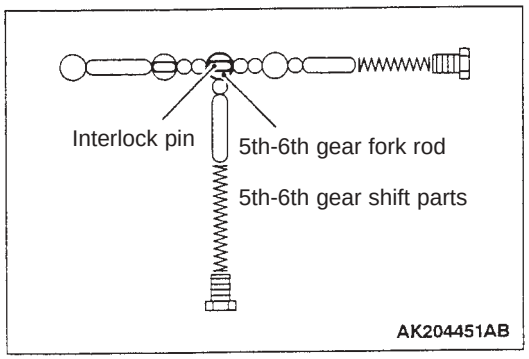
Fit 5th-6th gear shift check components, with the 3 grooves in the 5th-6th gear fork rod facing these components.

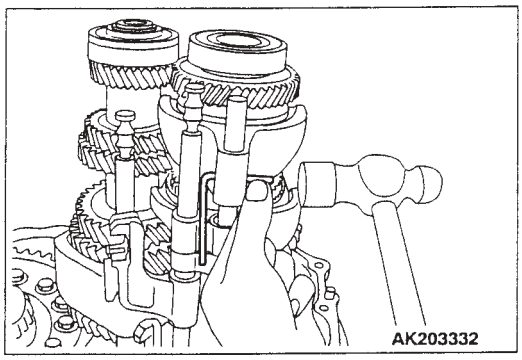
2. Fit 5th-6th gear bracket / shift fork / fork rod.

⚠ Care required

C rings must not be re-used.

3. Fit C ring to 5th-6th gear bracket.

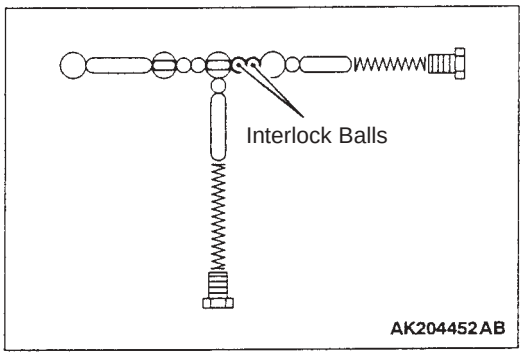




⚠ Care required

- **Retaining pins must not be re-used.**
- **When fitting retaining pin, use hexagonal wrench to locate it.**

4. Fit retaining pin to 5th-6th gear shift fork.

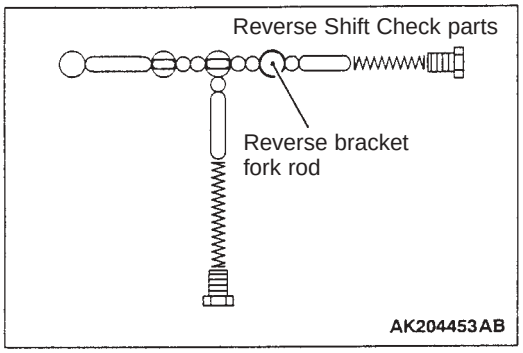


>>G<< Fitting interlock balls

⚠ Care required

Make sure interlock balls do not fall from fitting position.

Fit (2) interlock balls.

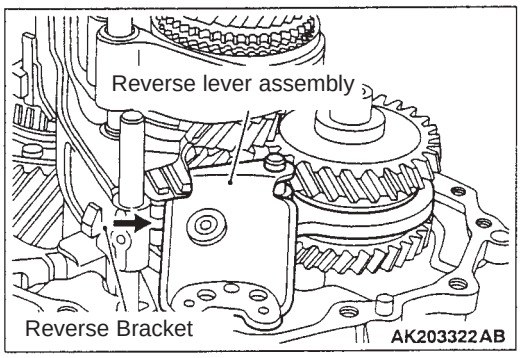


>>H<< Fitting reverse bracket fork rod and reverse bracket

⚠ Care required

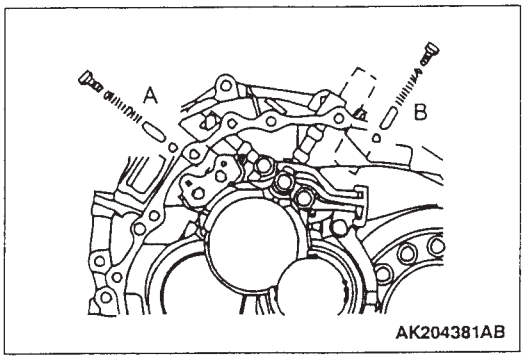
Fit reverse shift check components with the 2 grooves in the reverse bracket fork rod are facing these components.

Fit reverse bracket fork rod and reverse bracket.



>>I<< Fitting reverse lever assembly

1. Fit shifter cap to cam on reverse lever assembly, then fit reverse shift fork.
2. Lifting reverse shift fork up, bring it up against cam on reverse bracket.

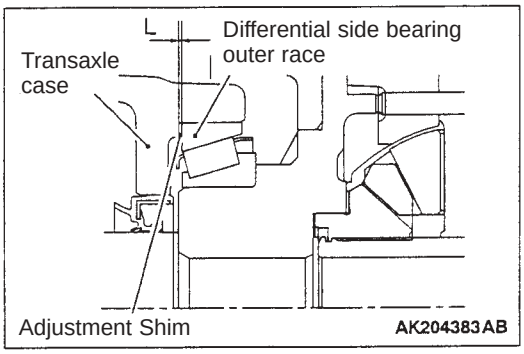


>>J<< Fitting shift check sleeves, check balls, check springs and check ball plugs

Care required

- **Check balls must not be re-used.**
- **Make sure you use shift check sleeves and check springs of correct length (A: short, B: long)**
- **Make sure that check balls do not fall into air breather groove on clutch housing.**

Fit shift check sleeves (2), check balls (2), check springs (2), and check ball plugs (2).



>>K<< Fitting differential side bearing adjustment shim(s)

Care required

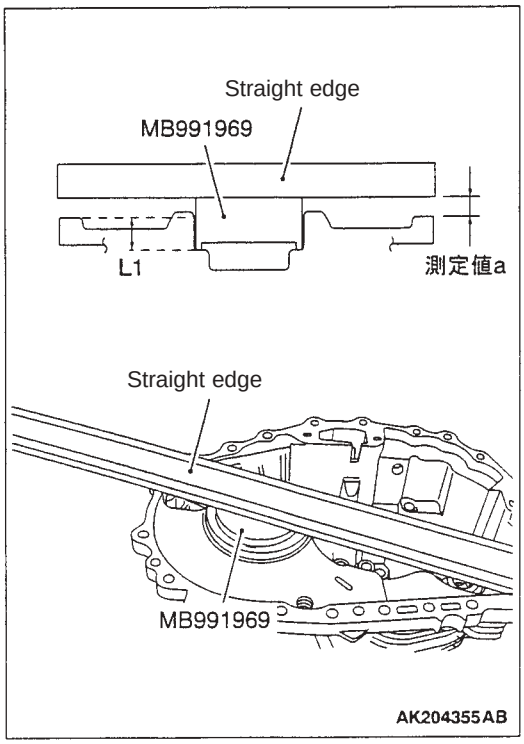
You must use no more than 2 shims.

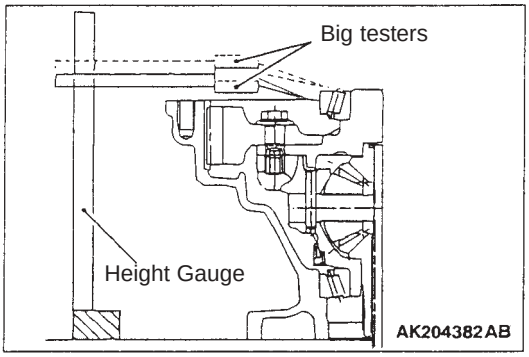
Fit adjustment shim(s) so that pre-load for differential side bearing will be standard thickness.

Standard thickness : 0.15 – 0.21 mm

1. Shim selection method
   (1) Measure distance from end of transaxle case to shim fitting surface (Dimension L1) and distance from end of clutch housing to end of differential side bearing (L2).
   (2) Calculate clearance between transaxle case and differential side bearing outer race using following formula: L = L1 – L2
   (3) Select shim(s) with thickness of L (calculation result) plus 0.15 – 0.21 (standard value).

2. Measurement method
   (1) Fit measurement adaptor (Special tool No. MB991969) to differential side bearing hole in transaxle case, and calculate
   Dimension L1, shown in drawing, using following formula: L1 = 25.00 (height of MB991969) – Measurement ‘a’
   (2) Fit outer race to differential side bearing on final gear side.
   Pushing gently to keep outer race horizontal, rotate final gear at least 5 times.
   Comment: Reason for rotating final gear is to run in bearing roller.

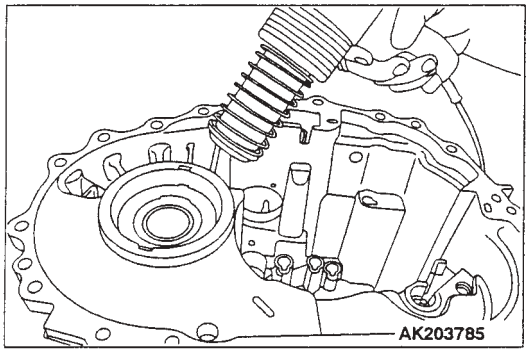




⚠ Care required

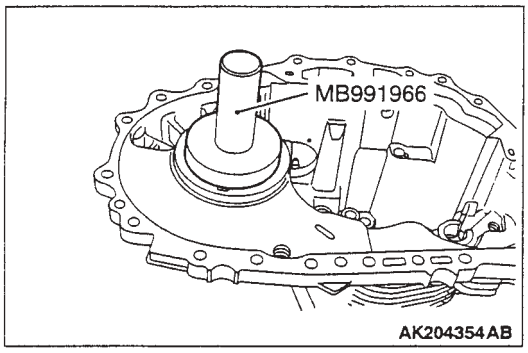
Measure dimensions at 3 optional points on outer race. Check whether outer race is horizontal before measuring.

(3)Using a height gauge, measure distance from differential side bearing outer race to transaxle fitting surface on clutch housing (Dimension L2).



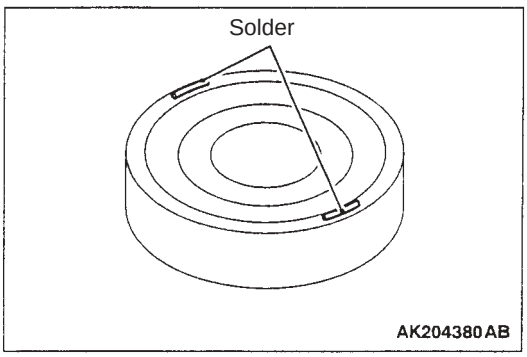
>>L<< Fitting differential side bearing outer race.

1. Heat transaxle case to about 100˚C (maximum 120˚C).



2. Using the bearing outer race installer (Special tool No. MB991966), fit differential side bearing outer race.

>>M<< Fitting adjustment shims



⚠ Care required

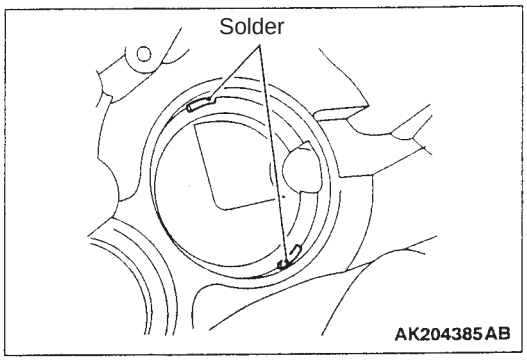
You must only use one of each type of shim.

Fit shim(s) you have selected.

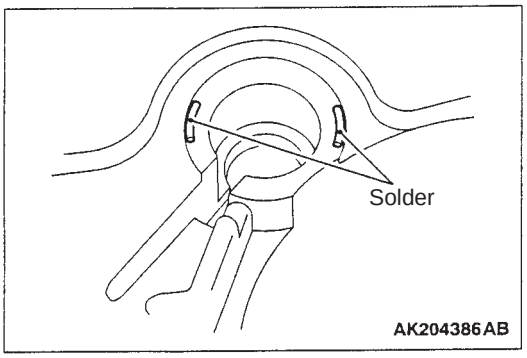
Comment: Refer to ‘Pre-assembly adjustment’ (below) when selecting shims.

Pre-assembly adjustment

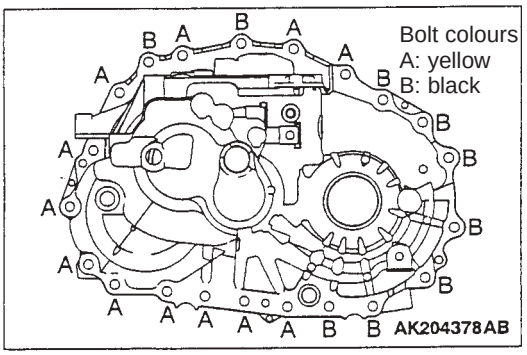
(1)Put solder (length about 10mm, diameter 1.6mm) on input shaft rear bearings at locations shown on drawing.



(2) Put solder (length about 10mm, diameter 1.6mm) on transaxle case at locations shown in drawing (main shaft rear bearing fitting area).



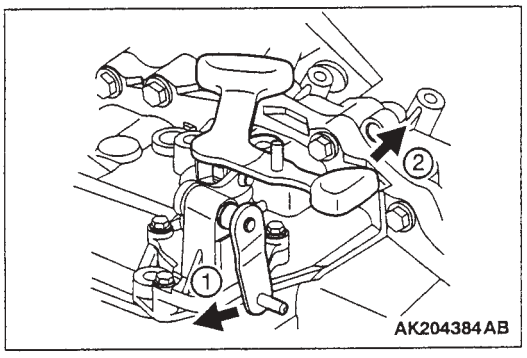
(3) Put solder (length about 10mm, diameter 1.6mm) on transaxle case locations shown in drawing (reverse idler bosses).
(4) Temporarily locate snap ring on main shaft rear bearing area of transaxle case.
(5) With snap ring temporarily located on main shaft bearing area, open out snap ring to make it bigger than the bore plug fitting hole, and put transaxle onto clutch housing.



Care required

For this operation, use the transaxle case bolts you remove.

(6) Tighten fitting bolts to specified torque.



Care required

For this operation, use the O-ring you remove.

(7) Fit control assembly and tighten fitting bolts to specified torque.
(8) Shift to 2nd gear, lift up main shaft, and fit snap ring securely to main shaft rear bearing.
Comment: See control assembly fitting section for how to shift gears.
(9) Return control assembly to neutral position and remove fitting bolts. Then remove control assembly.
(10) Remove transaxle case.
(11) Remove snap ring from main shaft rear bearing, then remove transaxle case.
(12) Remove solder, measure thickness of squashed solder using a micrometer, and select shims which will give the appropriate end play.

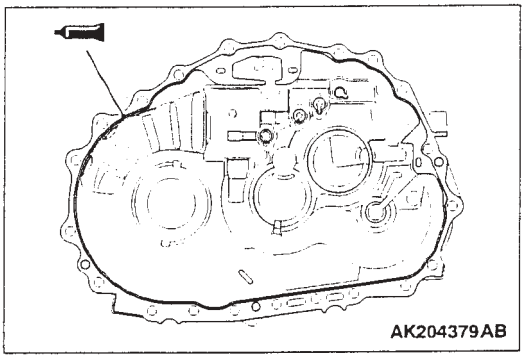
Comment: If solder has not been squashed, repeat operations (1) to (11) using solder with a larger diameter.
Input shaft end play: standard thickness: 0 – 0.06 mm
Main shaft end play: standard thickness: 0 – 0.06 mm
Reverse idler gear end play: standard thickness:0.04 – 0.10mm

>>N<< Fitting transaxle case

⚠ Care required

Snap rings must not be re-used.

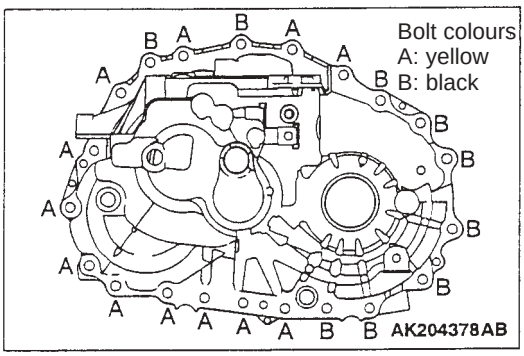
1. Temporarily assemble snap ring on man shaft rear bearing on transaxle.
2. Squeeze sealant (liquid gasket) into transaxle locations shown in drawing.
   Liquid gasket brand:
   MZ100077 or equivalent
3. With snap ring temporarily assembled on main shaft bearing, open out snap ring to make it bigger than the bore plug fitting hole and put transaxle case onto clutch housing,



⚠ Care required

Bolts (B) must not be re-used.

4. Tighten fitting bolts to specified torque.



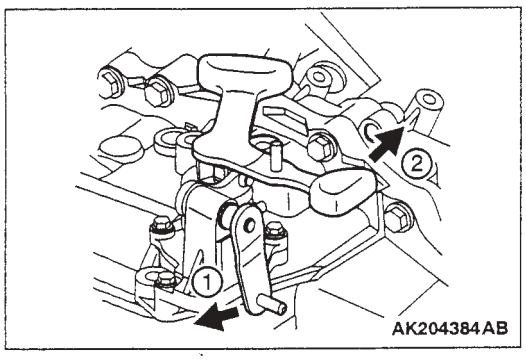
>>O<< Fitting control assembly

⚠ Care required

O-rings must not be re-used.

1. Fit control assembly, and tighten fitting bolts to specified torque.
2. Shift to 2nd gear, lift main shaft up and fit snap ring securely to main shaft rear bearing.

Comment: Shift to 2nd gear by moving shift lever in the order shown in the drawing.



>>P<< Fitting reverse switch

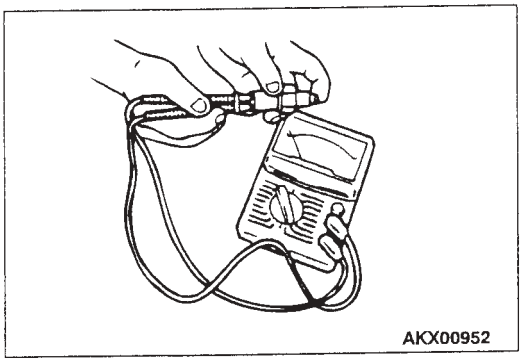
1. Put sealant (liquid gasket) on screw area on reverse switch.
   Liquid gasket:
   MZ100077 or equivalent
2. Fit reverse switch to transaxle case.

Checks

M1222001100123

Reversing light switch

1. Check current between terminals.

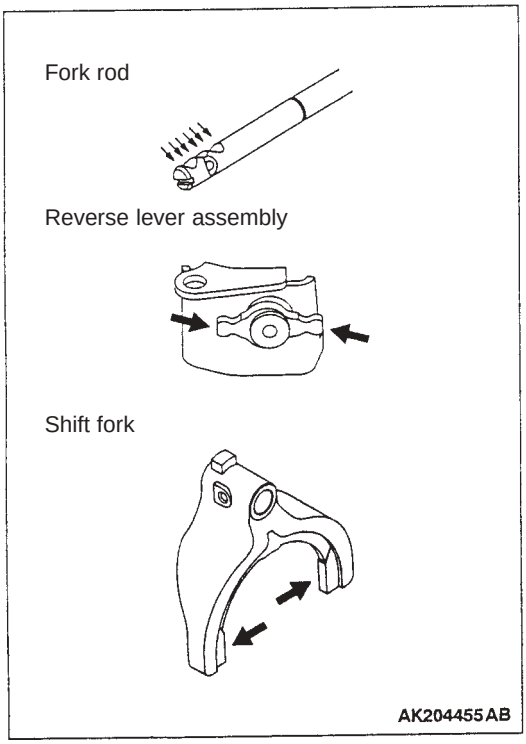


Item	Live
Press switch	Yes
Release switch	No

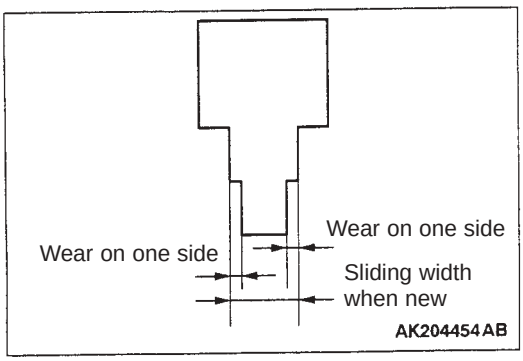
2. If there is a fault, check the reversing light switch.

Fork rod / Reverse lever assembly / Shift fork

1. Check for wear, scratches, warping or other abnormalities on contact and sliding surfaces. If anything is abnormal replace that part (if the only problem is extent of contact, replacement is not necessary).



2. Check width of claws on shift fork (section that slides against coupling sleeve), make sure it is not above the limit.

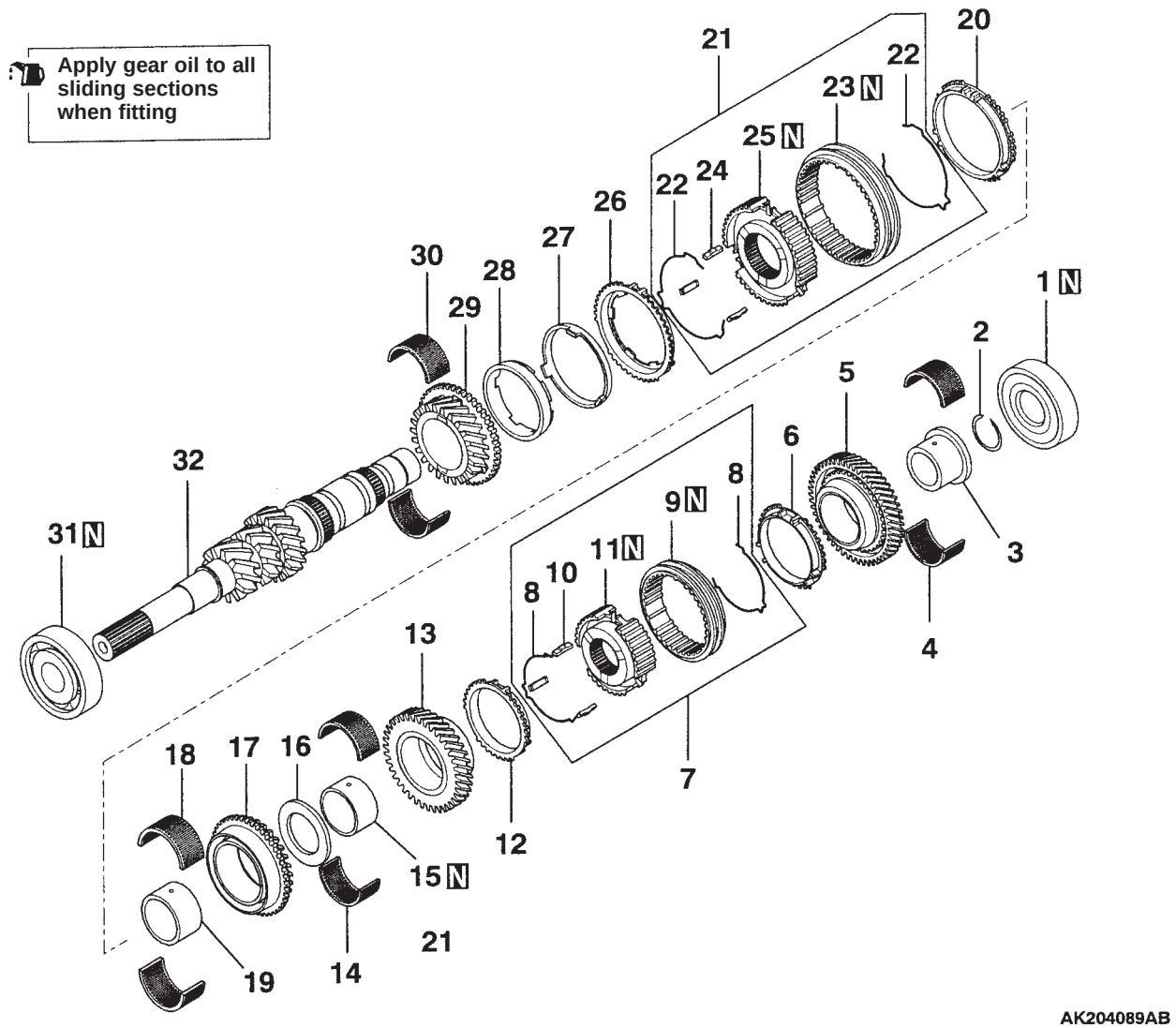


Item	Limit for wear on 1 side (mm)	Sliding width when new (mm)
1st-2nd gear	0.2	7.80 to 7.93
3rd-4th gear	0.2	7.80 to 7.93
5th-6th gear	0.2	6.10 to 6.23
Reverse	0.2	12.80 to 12.93

INPUT SHAFT

Dismantling / Assembling

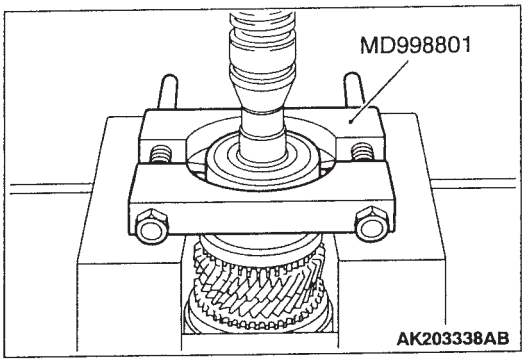
M1222001600139



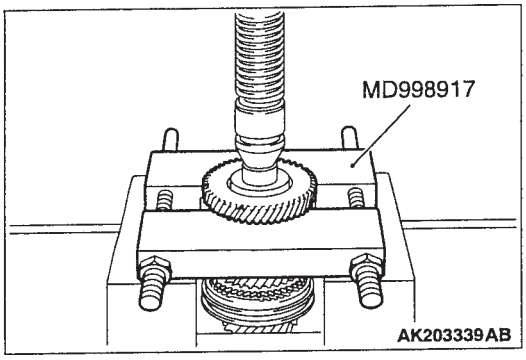
AK204089AB

		Dismantling Order			Dismantling Order (cont.)
<<A>>	>>K<<	1. Input shaft rear bearing	<<D>>		17. 4th gear
	>>J<<	2. Snap ring	<<D>>		18. Needle roller bearing
<<B>>	>>I<<	3. 6th gear sleeve	<<D>>	>>D<<	19. 4th gear sleeve
<<B>>		4. Needle roller bearing	<<D>>		20. Synchroniser ring
<<B>>		5. 6th gear	<<D>>	>>C<<	21. 3rd-4th gear synchroniser assembly
		6. Synchroniser ring		>>B<<	22. Synchroniser spring
<<C>>	>>H<<	7. 5th-6th gear synchroniser assembly		>>B<<	23. Synchroniser sleeve
	>>G<<	8. Synchroniser spring		>>B<<	24. Synchroniser key
	>>G<<	9. Synchroniser sleeve		>>B<<	25. 3rd-4th gear synchroniser hub
	>>G<<	10. Synchroniser key	<<D>>		26. Synchroniser outer ring
	>>G<<	11. 5th-6th gear synchroniser hub	<<D>>		27. Synchroniser cone
<<C>>		12. Synchroniser ring	<<D>>		28. Synchroniser inner ring
<<C>>		13. 5th gear	<<D>>		29. 3rd gear
		14. Needle roller bearing			30. Needle roller bearing
<<D>>	>>F<<	15. 5th gear sleeve	<<E>>	>>A<<	31. Ball bearing
<<D>>	>>E<<	16. Thrust washer			32. Input shaft

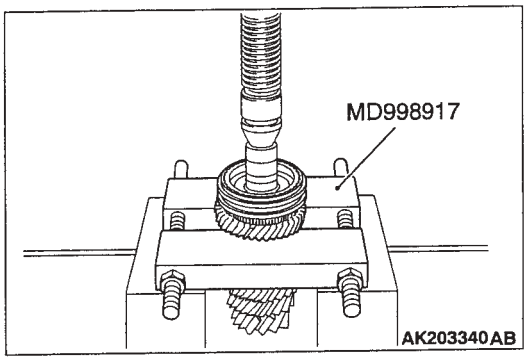
Key Points for Dismantling



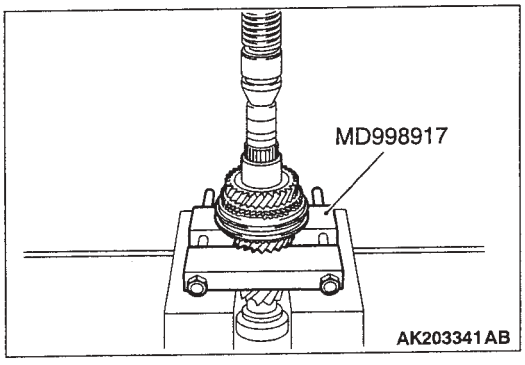
<<A>> Removing input shaft rear bearing
Using the bearing remover (Special tool No. MD998801), remove input shaft rear bearing.



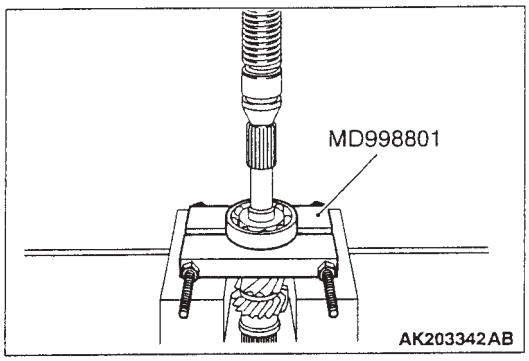
<<B>> Removing 6th gear sleeve / needle bearing / 6th gear
Fit the bearing remover (Special tool No. MD998917) to the 6th gear and remove 6th gear sleeve, needle bearing and 6th gear.



<<C>> Removing 5th-6th gear synchroniser assembly / synchroniser ring / 5th gear
Fit the bearing remover (Special tool No. MD998917) to the 5th gear and remove 5th-6th gear synchroniser assembly, synchroniser ring and 5th gear.



<<D>> Removing 5th gear sleeve / thrust washer / 4th gear/ needle bearing / 4th gear sleeve / 3rd-4th gear synchroniser assembly / synchroniser outer ring / synchroniser cone / synchroniser inner ring / 3rd gear
Fit the bearing remover (Special tool No. MD998917) to the 3rd gear and remove 5th gear sleeve, thrust washer, 4th gear, needle bearing, 4th gear sleeve, 3rd-4th gear synchroniser assembly, synchroniser outer ring, synchroniser cone, synchroniser inner ring, and 3rd gear.



<<E>> Removing ball bearing

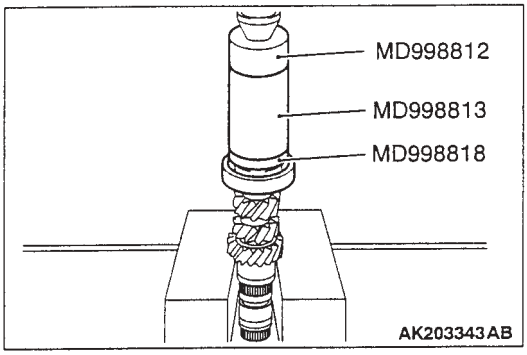
Using the bearing remover (Special tool No. MD998801), remove ball bearing.

Key Points for Assembly

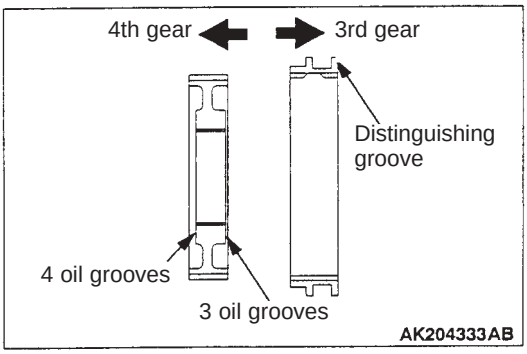
>>A<< Fitting ball bearing

Fit ball bearing, using the following special tools:

- Installer cap (MD998812)
- Installer 100 (MD98813)
- Installer adaptor (MD998818)



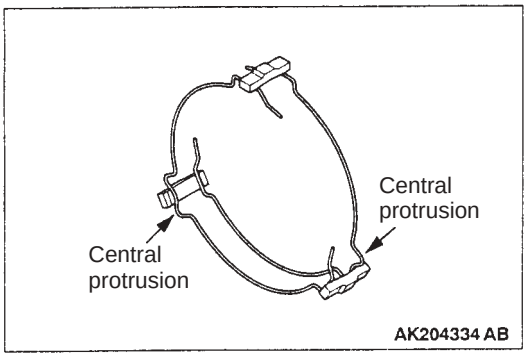
>>B<< Fitting 3rd-4th gear synchroniser hub / synchroniser key / synchroniser sleeve / synchroniser spring



⚠ Care required

Synchroniser hub must not be re-used.

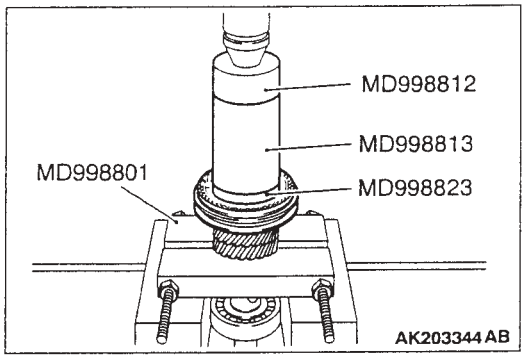
1. Join 3rd-4th gear synchroniser hub and synchroniser sleeve in direction shown in drawing.



⚠ Care required

Do not fit the central protrusions from the 2 synchroniser springs into the same synchroniser key.

2. Fit synchroniser keys and springs in positions as shown in the drawing.



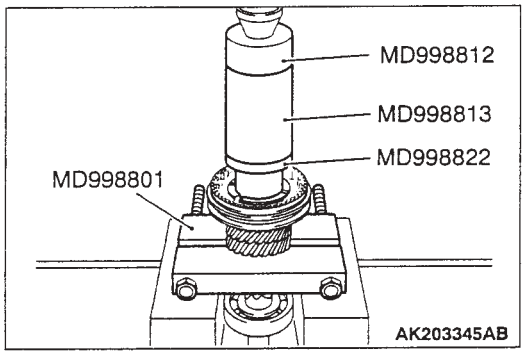
>>C<< Fitting 3rd-4th gear synchroniser assembly

⚠ Care required

Make sure synchroniser ring does not get chewed up when fitting assembly.

Fit 3rd-4th gear synchroniser assembly using the following special tools:

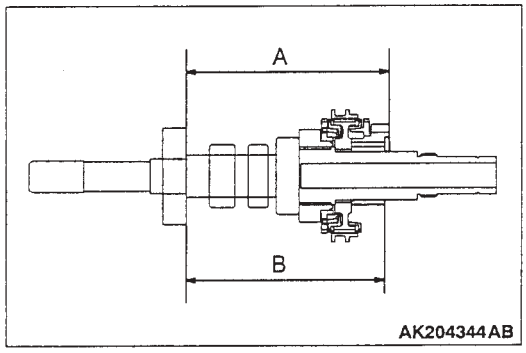
- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer 100 (MD998813)
- Installer adaptor (MD998823)



>>D<< Fitting 4th gear sleeve

Fit 4th gear sleeve using the following special tools:

- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer 100 (MD998813)
- Installer adaptor (MD998822)



>>E<< Fitting thrust washer

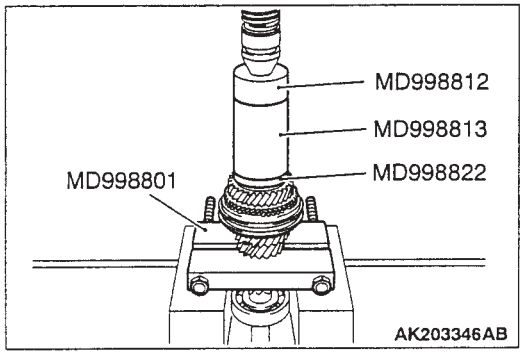
⚠ Care required

Use only 1 thrust washer.

1. Select a thrust washer that will make Dimension A in the drawing the standard length.
   Standard length: 167.6 ~ 167.7 mm

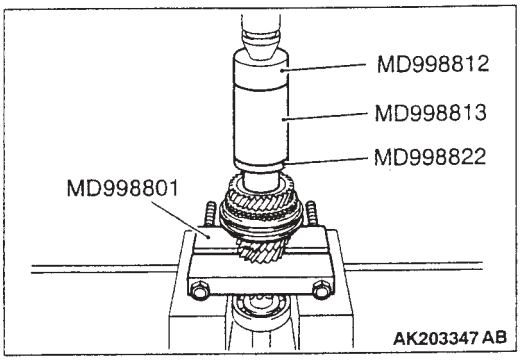
<u>How to select the thrust washer</u>

a. Using a height gauge, measure Dimension B (in the drawing - distance between 4th gear bearing sleeve and front bearing).
b. Select a thrust washer that produces the standard length when its thickness is added to Dimension B.



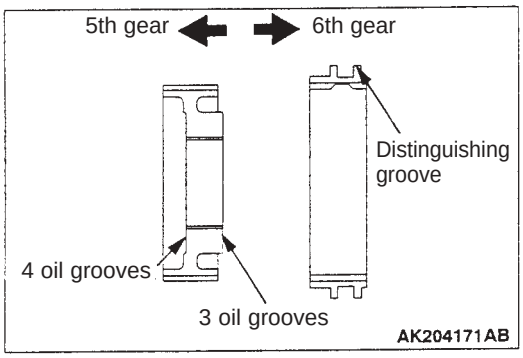
2. Fit thrust washer using the following special tools:

- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer 100 (MD998813)
- Installer adaptor (MD998822)



>>F<< Fitting 5th gear sleeve

Fit 5th gear sleeve using the following special tools:
- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer 100 (MD998813)
- Installer adaptor (MD998822)

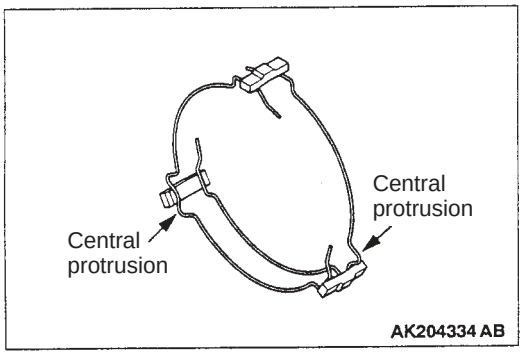


>>G<< Fitting 5th-6th gear synchroniser hub / synchroniser key / synchroniser sleeve

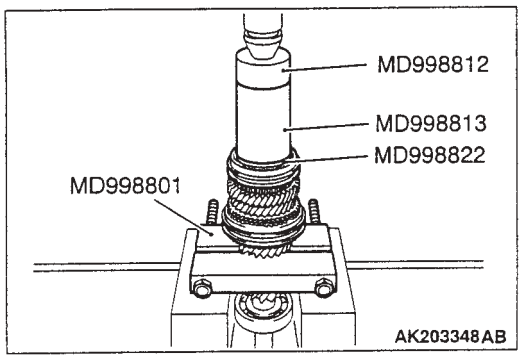
⚠ Care required

Synchroniser hub must not be re-used.

1. Join 5th-6th gear synchroniser hub and synchroniser sleeve in direction shown in drawing.



2. Fit synchroniser keys and springs in positions shown in the drawing.

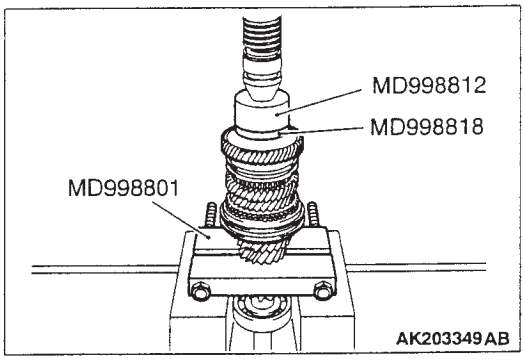


>>H<< Fitting 5th-6th gear synchroniser assembly

⚠ Care required

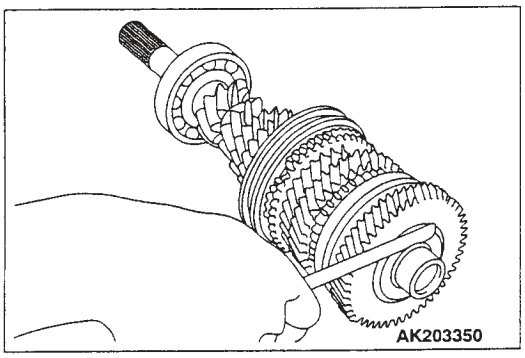
Make sure synchroniser ring does not get chewed up when fitting assembly.

Fit 5th-6th gear synchroniser assembly using the following special tools:
- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer 100 (MD998813)
- Installer adaptor (MD998822)



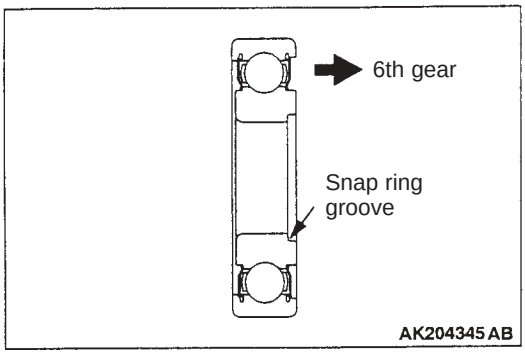
>>I<< Fitting 6th gear sleeve

Fit 6th gear sleeve using the following special tools:
- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer adaptor (MD998818)



>>J<< Fitting snap ring

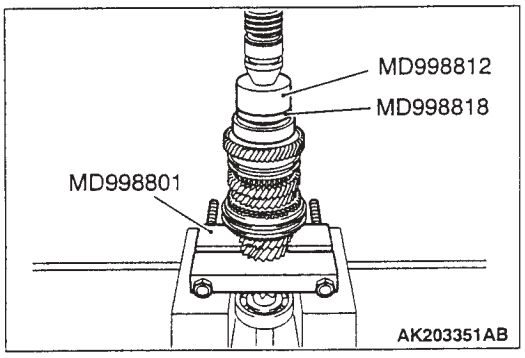
Select a snap ring that produces the standard clearance between the snap ring and the snap ring groove, and fit it.
Standard clearance: 0 ~ 0.1 mm



>>K<< Fitting input shaft rear bearing

⚠ Care required

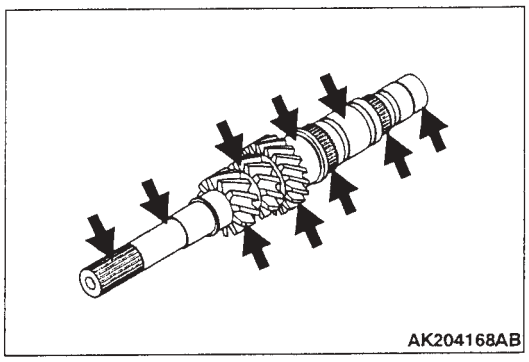
Fit input shaft rear bearing so that its snap ring groove runs in the direction shown in the drawing.



Press fit input shaft rear bearing using the following special tools:
- Bearing remover (MD998801)
- Installer cap (MD998812)
- Installer adaptor (MD998818)

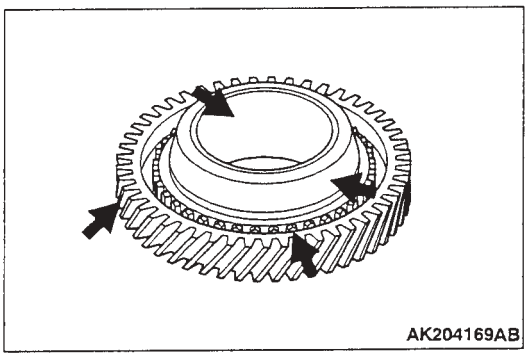
Checks

M1222001700114



Input Shaft

There must be no scratching, peeling, gouging, uneven wear, warping or other abnormalities on the input shaft.

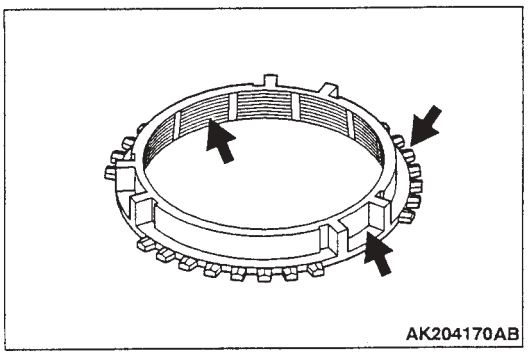


Gears

1. There must be no scratching or wear on the helical gears or clutch gear teeth sides for any of the gears.
2. There must be no surface roughness, scratching or wear on the synchroniser cones of any of the gears (excluding 3rd).
3. There must be no scratching or wear on the inside diameters or front/rear surfaces of any of the gears.

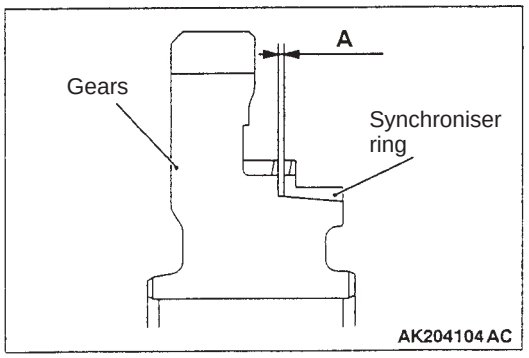
Needle bearing

1. When the input shaft, sleeve and gears are assembled and rotated, they must rotate smoothly, with no play orabnormal noise.
2. The retainers must not be deformed.

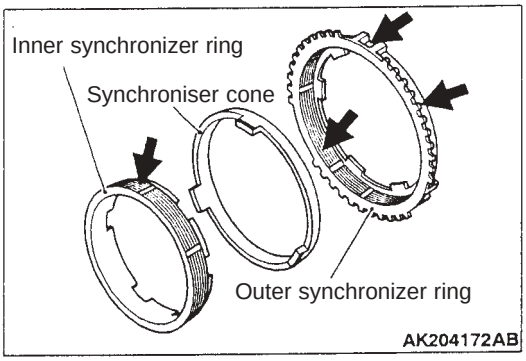


Single cone synchroniser ring

1. There must be no scratching or damage on the synchroniser ring clutch gear.
2. There must be no scratching, wear or squashed threads on the inside diameter of the synchroniser ring cone.
3. There must be no scratching, damage or excessive wear on the synchroniser ring ⇔ synchroniser key contact surface.

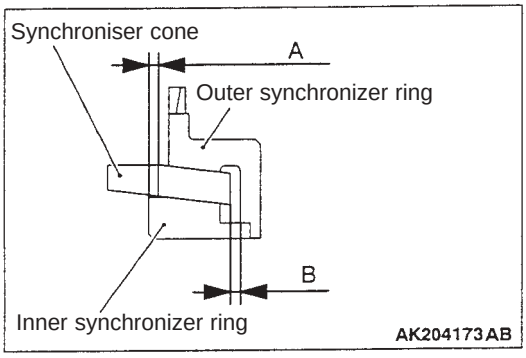


4. Push synchroniser ring up against gear cone, and check Clearance A. If clearance is below limit, replace.
   Limit: 0.7 mm



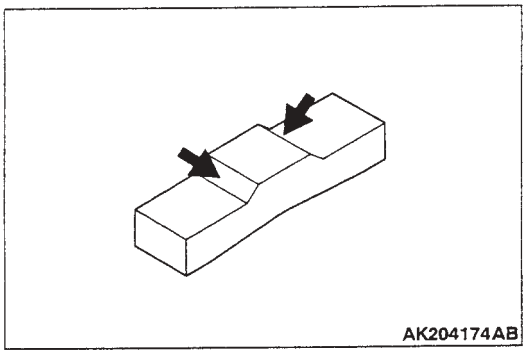
Double cone synchroniser ring

1. There must be no scratching / damage on the outer synchroniser ring clutch gear.
2. There must be no scratching / wear / squashed threads on any of the synchroniser ring ⇔ synchroniser cone contact surfaces.
3. There must be no scratching, damage or excessive wear on the outer synchroniser ring ⇔ synchroniser key contact surfaces.



4. Assemble the synchroniser rings and synchroniser cones and check Clearances ‘A’ and ‘B’ on the drawing. If either is over limit, replace.

Limit: 0.2 mm



Synchroniser key

There must be no scratching or abnormal wear on the synchroniser key € synchroniser hub contact surfaces.

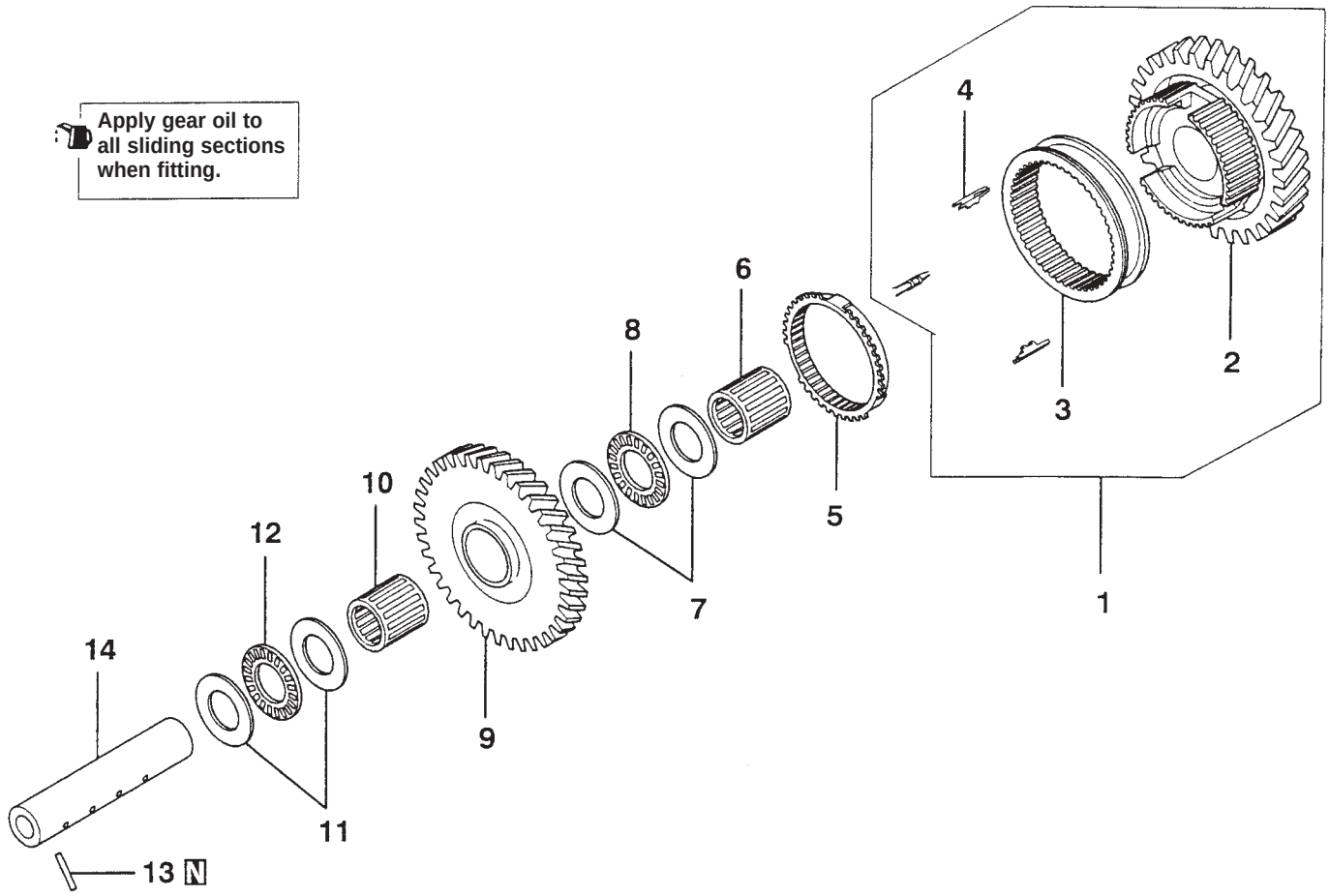
Synchroniser spring

Synchroniser springs must not be weakened, deformed or damaged.

REVERSE IDLER GEAR

Dismantling / Assembling

M1222012500095



AK204079AB

Dismantling Order

1. Reverse idler gear (rear) assembly
2. Reverse idler gear (rear)
<<A>> >>B<< 3. Reverse idler gear sleeve
>>A<< 4. Insert spring
5. Synchroniser ring
6. Needle bearing
7. Washers

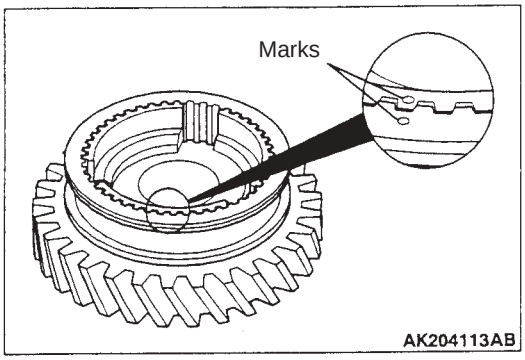
Dismantling Order (continued)

8. Thrust bearing
9. Reverse idler gear (front)
10. Needle bearing
11. Washers
12. Thrust bearing
13. Pin
14. Reverse idler gear shaft

Key Points for Removing

<<A>> Removing reverse idler gear sleeve

⚠ Care required



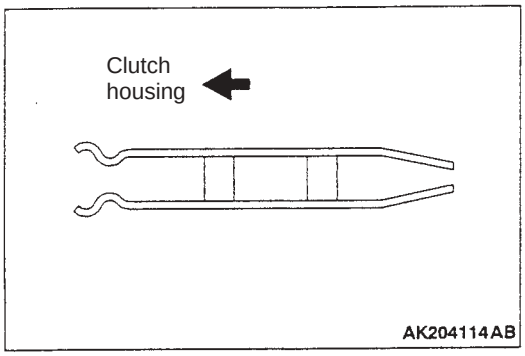
Mating may be faulty if the splines are re-assembled at a different place when these parts are re-used.

Mark the reverse idler gear sleeve and hub to indicate where they must be re-assembled

Key Points for Assembly

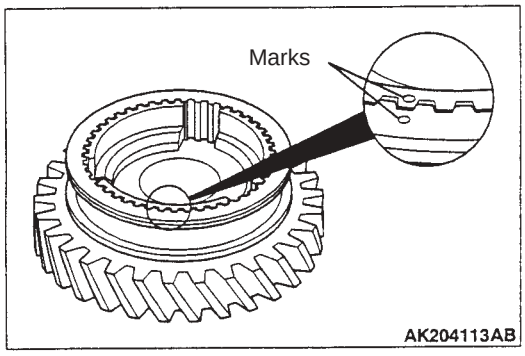
>>A<< Fitting insert spring

Fit insert spring into reverse idler gear sleeve, making sure fitting direction is correct.



>>B<< Fitting reverse idler gear sleeve

⚠ Care required

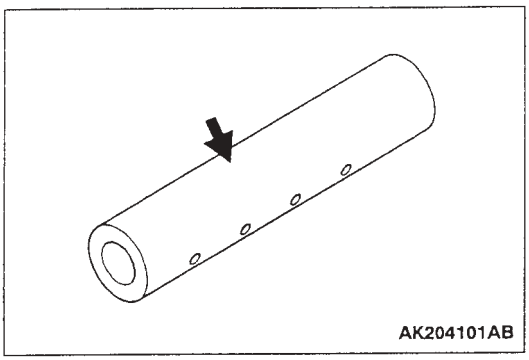


Mating may be faulty if the splines are re-assembled at a different place when these parts are re-used.

Match up marks made during dismantling when reassembling the splines.

Reverse Idler Gear Checks

M1222012400021



Reverse idler shaft

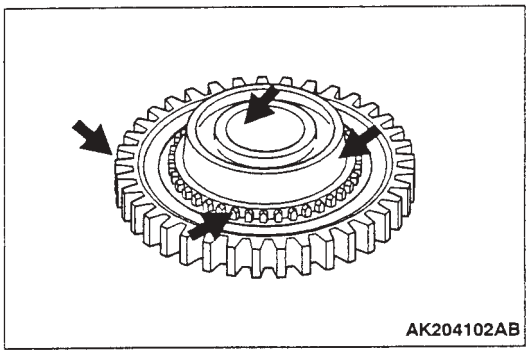
There must be no scratching, peeling, gouging, uneven wear, warping or other abnormalities on reverse idler shaft.

Thrust bearing

1. When the thrust bearing is assembled with the washer and rotated, rotation must be smooth and there must be no play or abnormal noise.
2. Retainers must not be deformed.

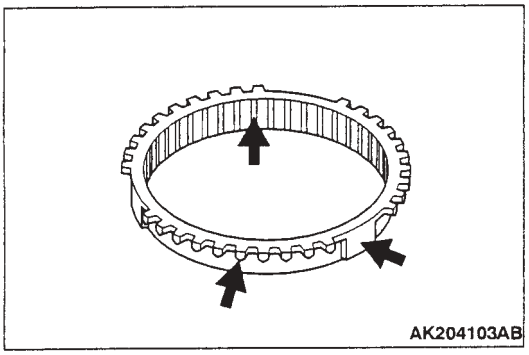
Needle bearing

1. When reverse idler shaft and gear are assembled and rotated, rotation must be smooth and there must be no play or abnormal noise.
2. Retainers must not be deformed.



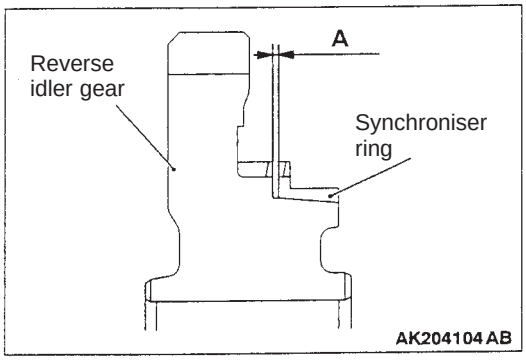
Reverse idler gear (front)

1. There must be no scratching or wear on the reverse idler gear, helical gears or clutch gear teeth sides.
2. There must be no roughness, scratching or wear on reverse idler gear synchroniser cone surface.
3. There must be no scratching or wear on the inside diameter or the front or rear surfaces of the reverse idler gear.

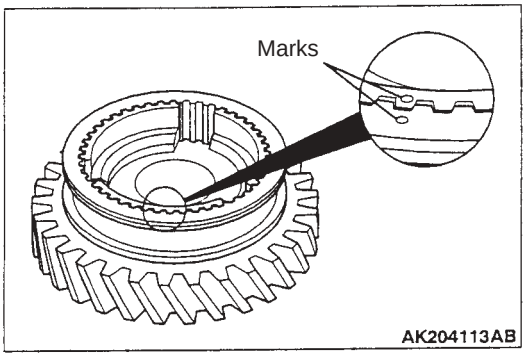


Synchroniser ring

1. There must be no scratching or damage on the synchroniser ring clutch gear.
2. There must be no scratching, wear or squashed threads on the inside diameter of the synchroniser ring cone.
3. There must be no scratching, damage or excessive wear on the synchroniser ring ⇔ synchroniser key contact surface.

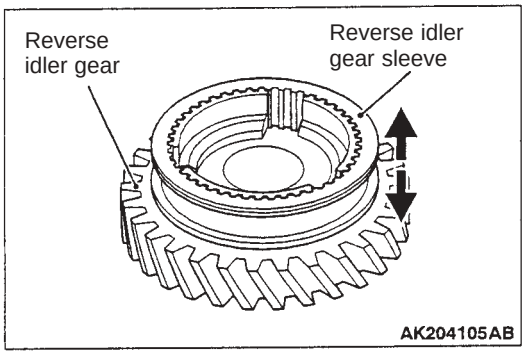


4. Push synchroniser ring up against reverse idler gear cone and check Clearance 'A'. If it is below limit, replace.
   Limit: 0.7 mm

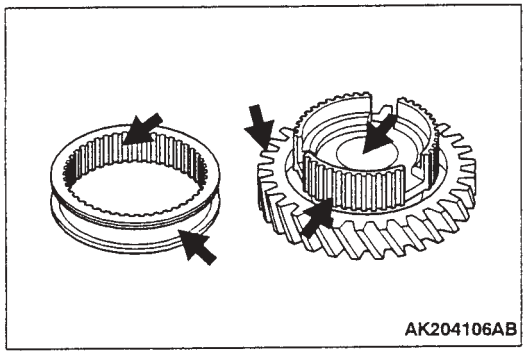


⚠ Care required

When re-assembling the reverse idler gear sleeve and the and the reverse idler gear, you must match up the marks made when they were dismantled.



1. When you have re-assembled the reverse idler gear sleeve and hub, slide them against each other. They must slide smoothly, not stick or catch.

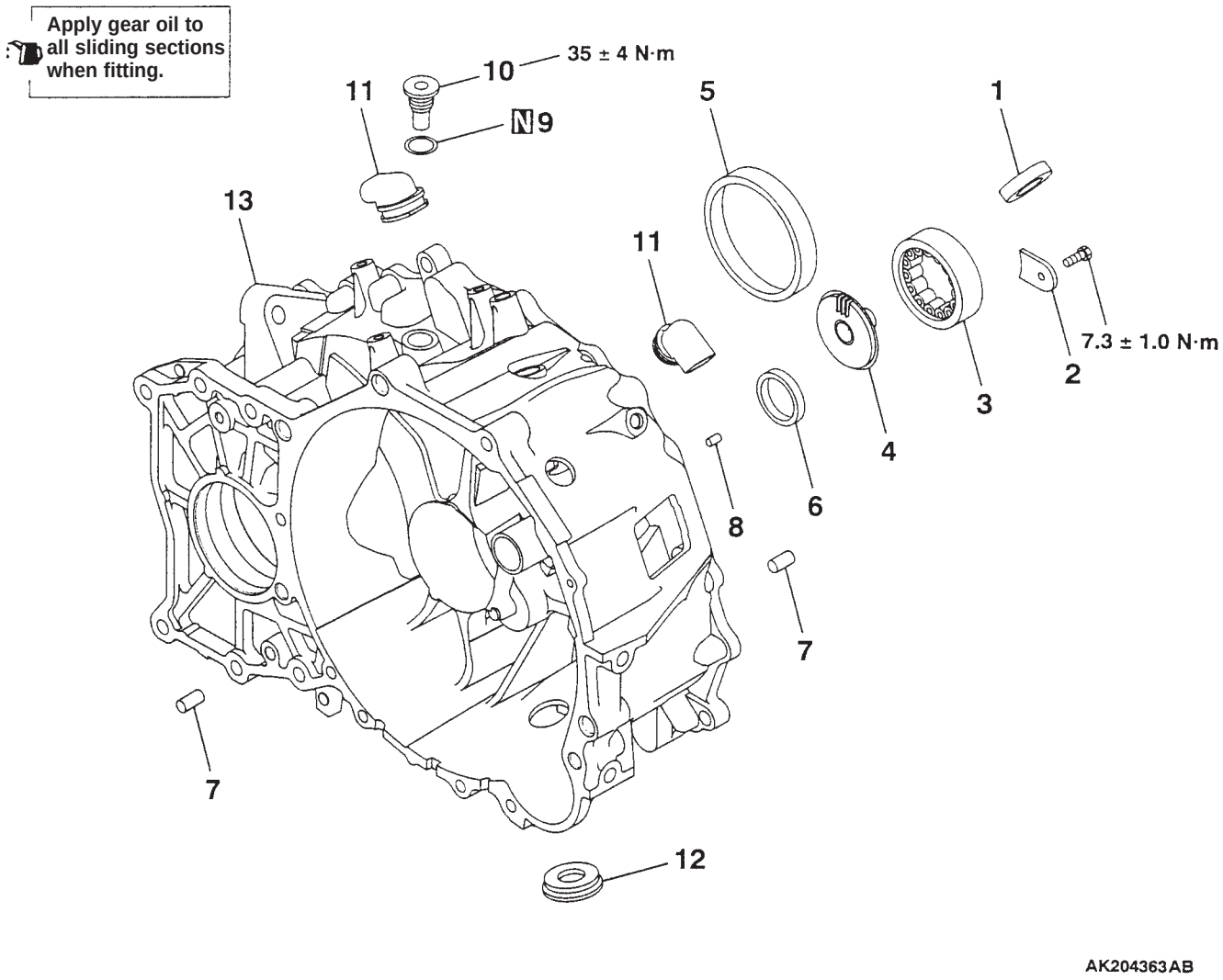


2. There must be no scratching on the front or rear ends inside the reverse idler gear sleeve.
3. There must be no scratching or wear on the helical gears of the reverse idler gear or the clutch gear teeth sides.
4. There must be no scratching or wear on the inside diameter or front or rear surfaces of the reverse idler gear.

CLUTCH HOUSING

Dismantling / Assembling

M1222003700121



Dismantling Order

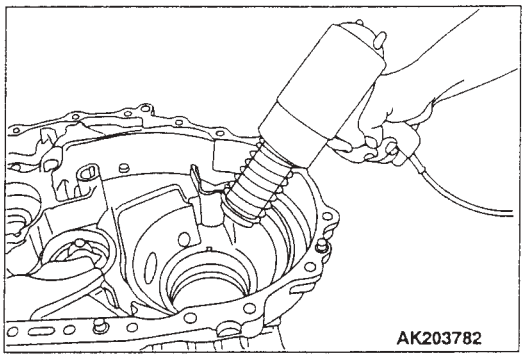
1. Magnet
2. Main shaft bearing retainer >>C<<
3. Main shaft front bearing
4. Oil channel >>B<<
5. Differential side bearing outer race <<A>> >>D<<
6. Input shaft oil seal >>A<<

Dismantling Order (continued)

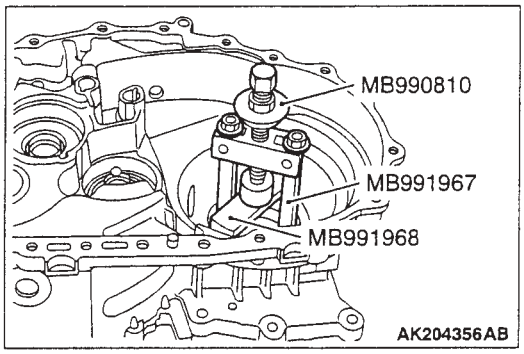
7. Dowel pin
8. Knock pin
9. Drain plug gasket
10. Drain plug
11. Cover 'A'
12. Maintenance hole cover
13. Clutch housing

Key Points for Dismantling

<<A>> Removing differential side bearing outer race



1. Heat clutch housing to about 100˚C (maximum 120˚C).

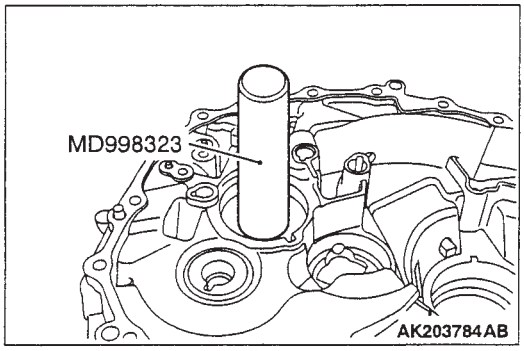


2. Remove differential side bearing outer race, using the following special tools:
- Side bearing puller (MB990810)
- Claws (MB991967)
- Bridge (MB991968)

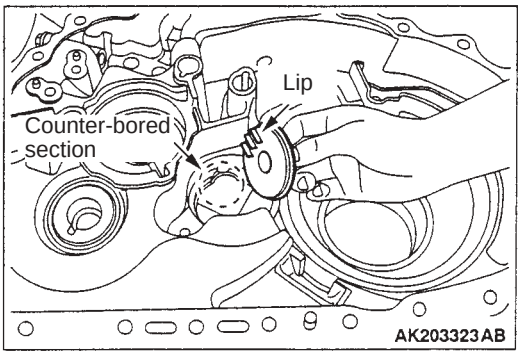
Key Points for Assembly

>>A<< Fitting input shaft oil seal

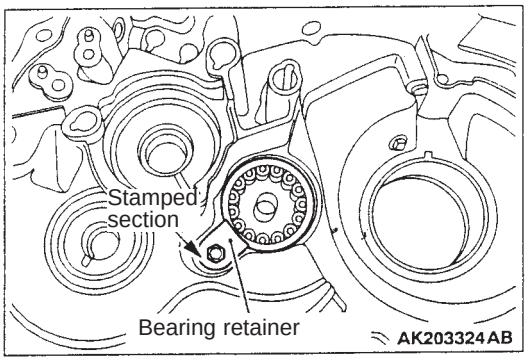
⚠ Care required



Oil seals must not be re-used.
Using the bearing installer (Special tool No. MD998323), knock input shaft oil seal into clutch housing.

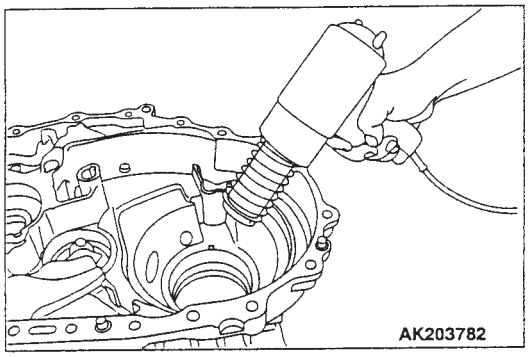


>>B<< Fitting oil channel
Fit the lip of the main shaft oil channel into the counter-sunk section in the clutch housing.



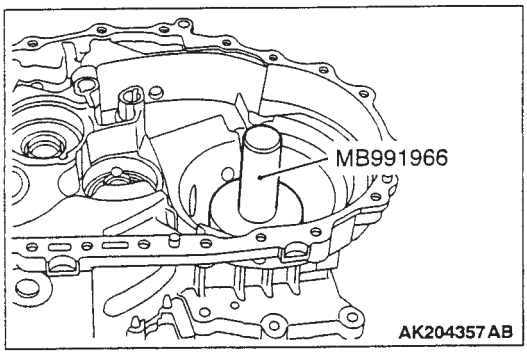
>>C<< Fitting bearing retainer

Fit bearing retainer so that the stamped surface is visible, and tighten fitting bolts to specified torque.



>>D<< Fitting differential side bearing outer race

1. Heat clutch housing to about 100˚C (maximum 120˚C).

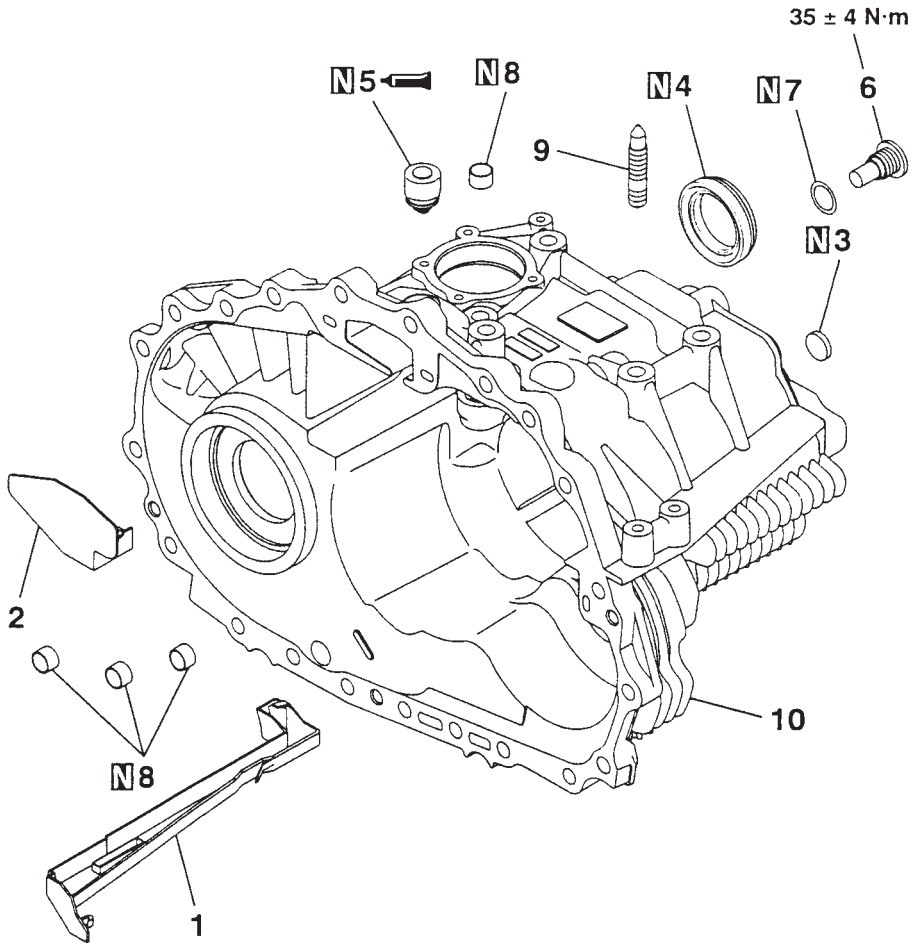


2. Using the bearing outer race installer (Special tool No. MB991966), fit differential side bearing outer race to clutch housing.

TRANSMISSION CASE

Dismantling / Assembling

M1222013400091



AK204369AB

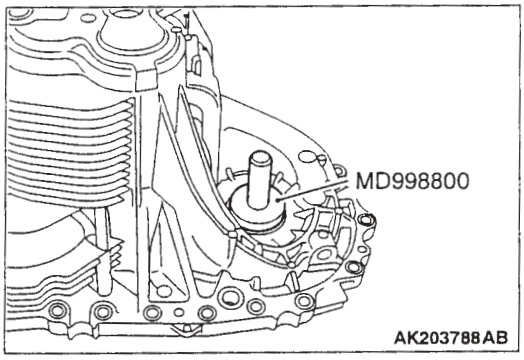
	Dismantling Order	
>>C<<	1.	Oil garter
>>C<<	2.	Baffle plate
	3.	Welch plug
>>B<<	4.	Differential oil seal
>>A<<	5.	Air breather

Dismantling Order (continued)	
6.	Filler plug
7.	Drain plug gasket
8.	Rod bush
9.	Stud
10.	Transaxle case

Key points for Assembly

>>A<< Fitting air breather

1. Smear adhesive all over air breather fitting section.
   Adhesive:
   MZ100055 or equivalent
2. Fit air breather to transaxle case.



>>B<< Fitting differential oil seal

⚠ Care required

Differential oil seal must not be re-used.
Using the oil seal installer (Special tool No. MD998800), fit differential oil seal to transaxle case.

>>C<< Fitting baffle plate / oil garter

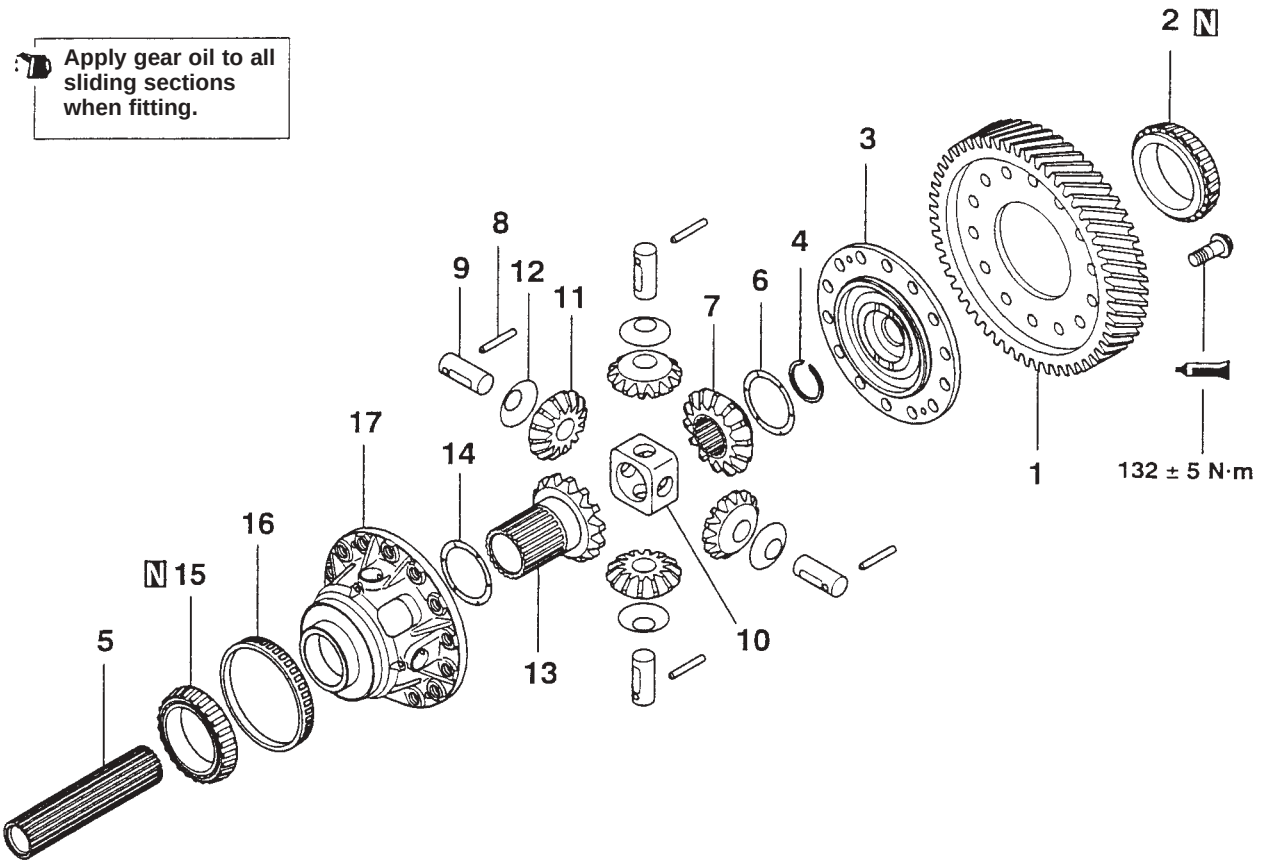
⚠ Care required

To prevent them coming out when fitting, smear Vaseline on the 'claws'.
Fit baffle plate / oil garter to transaxle case.

CENTRE DIFFERENTIAL

Dismantling / Assembling

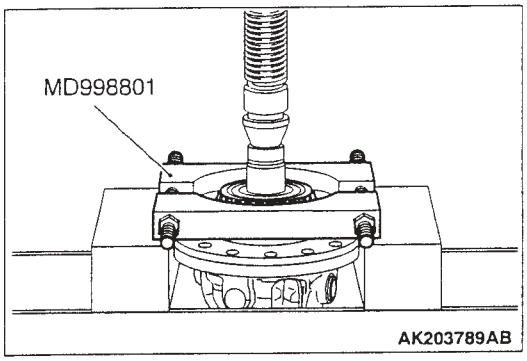
M1222010600029



AK204087AB

		Dismantling Order
	>>D<<	1. Centre differential drive gear
<<A>>	>>C<<	2. Tapered roller bearing
	>>B<<	3. Centre differential flange
	>>B<<	4. Snap ring
	>>B<<	5. Front output shaft
	>>B<<	6. Spacer
	>>B<<	7. Side gear
	>>B<<	8. Lock pins

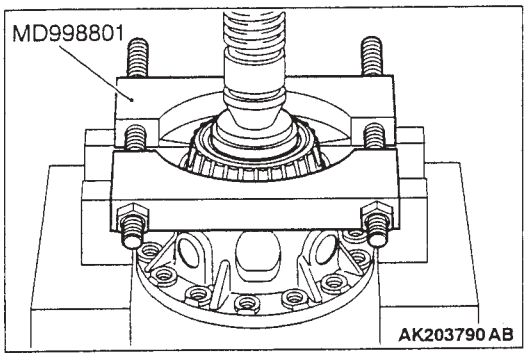
		Dismantling Order (continued)
	>>B<<	9. Pinion shafts
	>>B<<	10. Pinion shaft holder
	>>B<<	11. Pinions
	>>B<<	12. Washers
	>>B<<	13. Side gear
	>>B<<	14. Spacer
<<B>>	>>A<<	15. Tapered roller bearing
		16. Speedometer drive gear
		17. Differential case



Key Points for Dismantling

<<A>> Removing tapered roller bearing

Using the bearing remover (Special tool No. MD998801), remove tapered roll bearing.



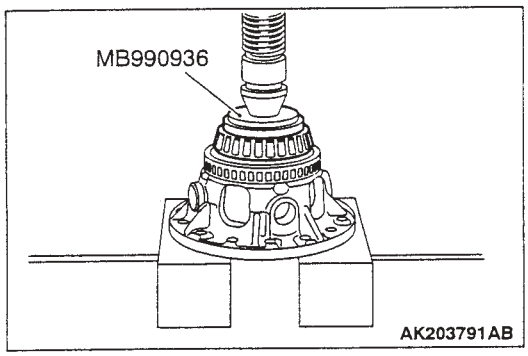
<<B>> Removing tapered roller bearing

Using the bearing remover (Special tool No. MD998801), remove tapered roll bearing.

Key Points for Assembly

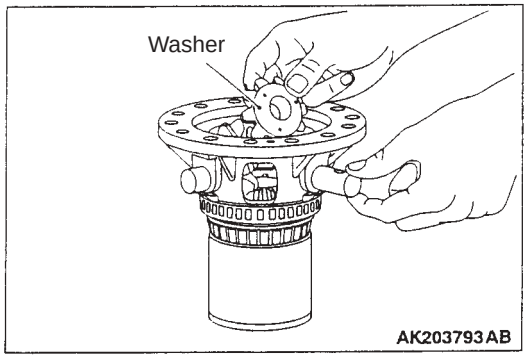
>>A<< Fitting tapered roller bearing

Using the installer adaptor (Special tool No. MD990936), fit tapered roll bearing.

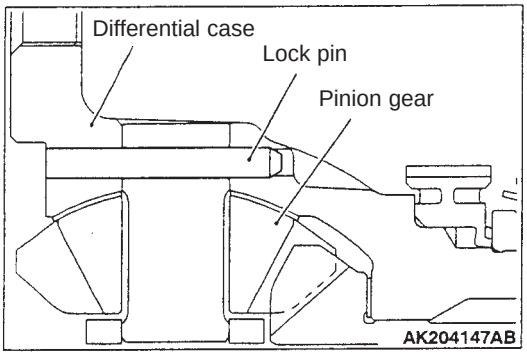


>>B<< Fitting spacer / side gear / washers / pinions / pinion shaft holder / pinion shafts / lock pins / front output shaft / snap ring / centre differential flange

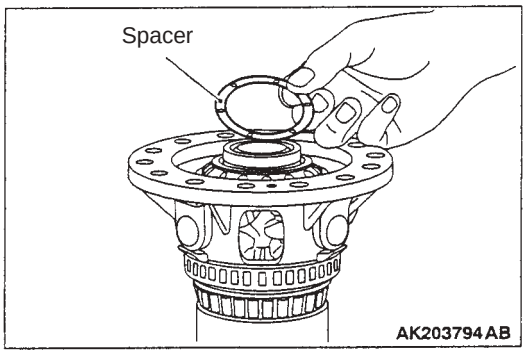
1. Fit spacer to side gear, then fit side gear inside centre differential case.
   NB: If fitting a new side gear, use a medium thickness (0.66 ~ 0.73 mm) spacer.



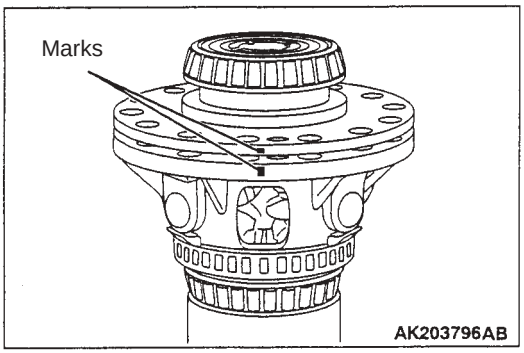
2. Fit washers on rear surface of pinion and engage 4 pinions to side gear. Rotate them and locate correctly, then fit the pinion shaft holder.
3. Insert the pinion shafts.



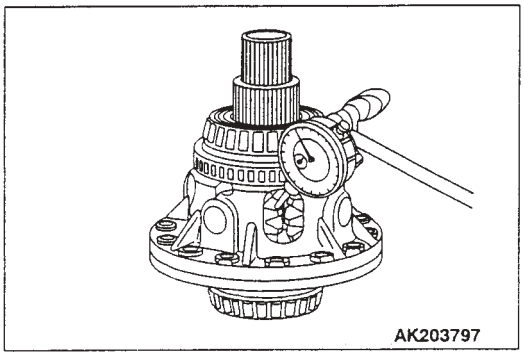
4. Fit lock pins in direction indicated in drawing.



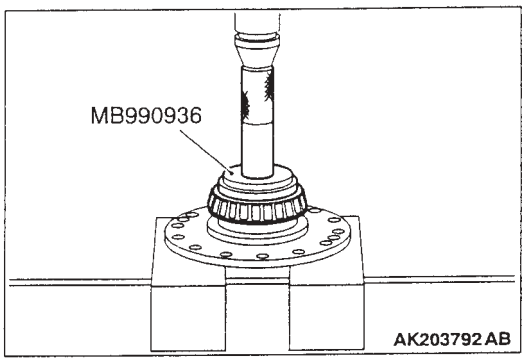
5. Fit front output shaft to side gear and fit snap ring.
6. Fit spacer to side gear, then the fit side gear inside the centre differential case.
   NB: If fitting a new side gear, use a medium thickness (0.66 ~ 0.73 mm) spacer.



7. Align marks made when dismantling, fit centre differential flange and temporarily tighten machine screws (4 places).

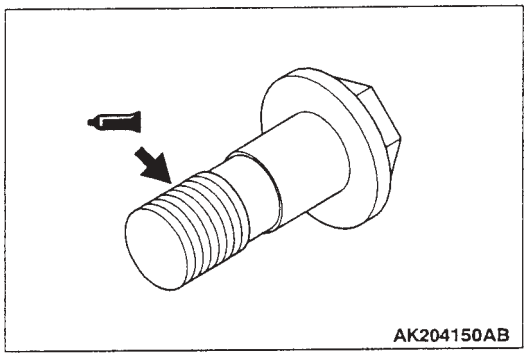


8. Measure backlash on side gear and pinion.
   Standard range: 0.025 ~ 0.150 mm
9. If backlash is outside standard range, select a spacer, fit it and re-measure backlash.
   NB: Adjust till backlash is the same on both sides.



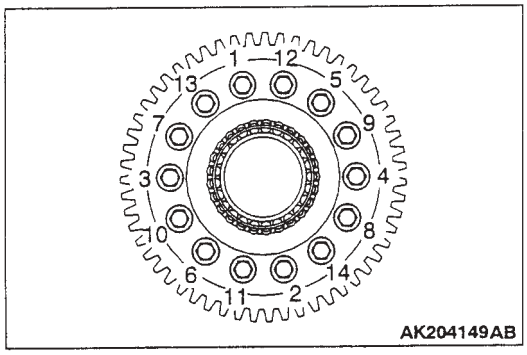
>>C<< Fitting tapered roller bearing

Using the installer adaptor (Special tool No. MD990936), fit tapered roll bearing.



>>D<< Fitting centre differential drive gear

1. Smear sealant over the whole of the thread on the bolts.
   Sealant brand:
   0110106 or Locktight 648 or equivalent

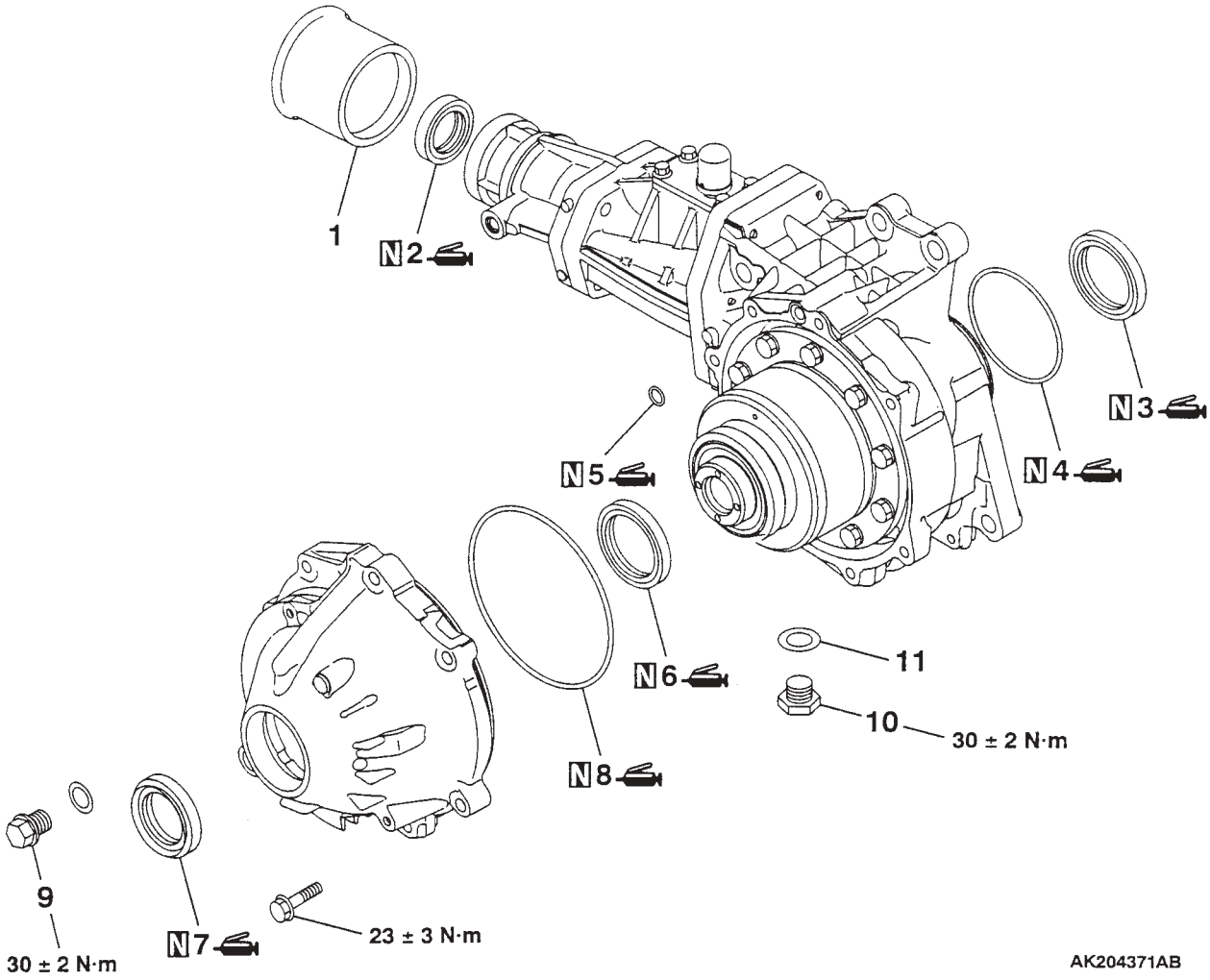


2. Tighten bolts, in the order shown in the drawing, to the specified torque, 158 ± 7 N•m

TRANSFER

Dismantling / Assembling

M1222004000051



Dismantling Order

1. Dust shield guard
>>F<< 2. Oil seal
>>E<< 3. Oil seal
>>D<< 4. O ring
>>A<< 5. O ring
>>C<< 6. Oil seal

Dismantling Order (continued)

>>B<< 7. Oil seal
>>A<< 8. O ring
9. Plug
10. Magnet plug
11. Gasket

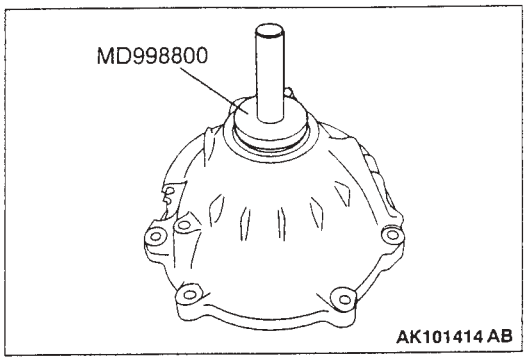
Key Points for Assembly

>>A<< Fitting O ring

Smear grease on O ring and fit it.

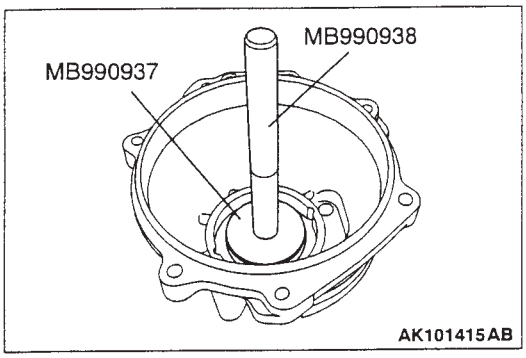
Grease brand:

Sunlight No. 2, Retinax A or equivalent



>>B<< Fitting oil seal

1. Smear grease on lip of oil seal.
   Grease brand:
   Sunlight 2, Retinax 648 or equivalent
2. Using the oil seal installer (Special tool No. MD998800),fit oil seal.



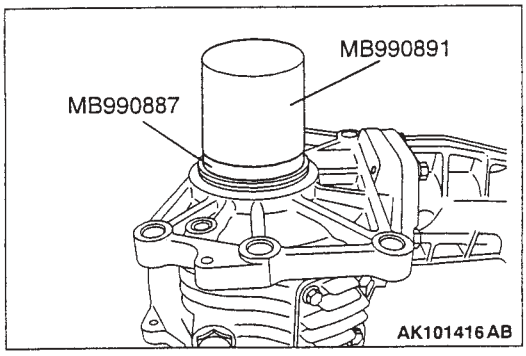
>>C<< Fitting oil seal

1. Smear grease on lip of oil seal.
   Grease brand:
   Sunlight 2, Retinax 648 or equivalent
2. Fit oil seal, using the following special tools:

- Installer adaptor (MB990937)
- Handle (MB990938)

>>D<< Fitting O ring

Apply grease to O ring and fit it.
Grease brand:
Sunlight 2, Retinax 648 or equivalent



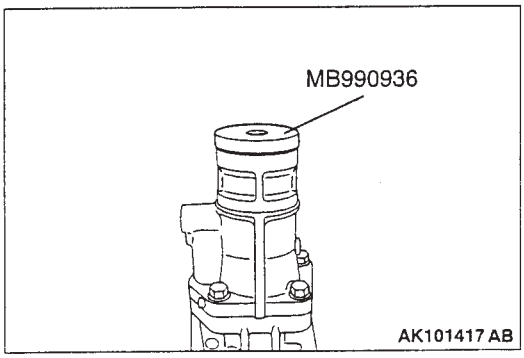
>>E<< Fitting oil seal

1. Smear grease on lip of oil seal.
   Grease brand:
   Sunlight 2, Retinax 648 or equivalent
2. Fit oil seal, using the following special tools:

- Arm bush remover and installer ring (MB990887)
- Bush remover and installer base (MB990891)

>>F<< Fitting oil seal

1. Smear grease on lip of oil seal.
   Grease brand:
   Sunlight 2, Retinax 648 or equivalent
2. Using the installer adaptor (Special tool No. MB990936), fit oil seal.



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