

A  
B  
MT  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M

# SECTION **MT**

## MANUAL TRANSAXLE

### CONTENTS

<p><b>PRECAUTIONS</b> ..... 2</p> <p style="padding-left: 20px;">Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" ..... 2</p> <p style="padding-left: 20px;">Precautions ..... 2</p> <p><b>PREPARATION</b> ..... 3</p> <p style="padding-left: 20px;">Special Service Tools ..... 3</p> <p style="padding-left: 20px;">Commercial Service Tools ..... 4</p> <p><b>NOISE, VIBRATION AND HARSHNESS (NVH)</b></p> <p><b>TROUBLESHOOTING</b> ..... 6</p> <p style="padding-left: 20px;">NVH Troubleshooting Chart ..... 6</p> <p><b>DESCRIPTION</b> ..... 7</p> <p style="padding-left: 20px;">Cross-Sectional View ..... 7</p> <p style="padding-left: 40px;">TRIPLE-CONE SYNCHRONIZER ..... 8</p> <p style="padding-left: 40px;">REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD) ..... 8</p> <p><b>M/T OIL</b> ..... 9</p> <p style="padding-left: 20px;">Changing M/T Oil ..... 9</p> <p style="padding-left: 40px;">DRAINING ..... 9</p> <p style="padding-left: 40px;">FILLING ..... 9</p> <p style="padding-left: 20px;">Checking M/T Oil ..... 9</p> <p style="padding-left: 40px;">OIL LEAKAGE AND OIL LEVEL ..... 9</p> <p><b>SIDE OIL SEAL</b> ..... 10</p> <p style="padding-left: 20px;">Removal and Installation ..... 10</p> <p style="padding-left: 40px;">REMOVAL ..... 10</p> <p style="padding-left: 40px;">INSTALLATION ..... 10</p> <p><b>POSITION SWITCH</b> ..... 11</p> <p style="padding-left: 20px;">Checking ..... 11</p> <p style="padding-left: 40px;">BACK-UP LAMP SWITCH ..... 11</p> <p style="padding-left: 40px;">PARK/NEUTRAL POSITION SWITCH ..... 11</p> <p><b>CONTROL LINKAGE</b> ..... 12</p> <p style="padding-left: 20px;">Components of Control Device and Cable ..... 12</p> <p style="padding-left: 20px;">Removal and Installation ..... 12</p> <p style="padding-left: 40px;">REMOVAL ..... 12</p> <p style="padding-left: 40px;">INSTALLATION ..... 13</p>	<p><b>AIR BREATHER HOSE</b> ..... 14</p> <p style="padding-left: 20px;">Removal and Installation ..... 14</p> <p style="padding-left: 40px;">COMPONENTS ..... 14</p> <p style="padding-left: 40px;">REMOVAL ..... 14</p> <p style="padding-left: 40px;">INSTALLATION ..... 14</p> <p><b>TRANSAXLE ASSEMBLY</b> ..... 15</p> <p style="padding-left: 20px;">Removal and Installation ..... 15</p> <p style="padding-left: 40px;">COMPONENTS ..... 15</p> <p style="padding-left: 40px;">REMOVAL ..... 15</p> <p style="padding-left: 40px;">INSTALLATION ..... 15</p> <p style="padding-left: 20px;">Disassembly and Assembly ..... 17</p> <p style="padding-left: 40px;">COMPONENTS ..... 17</p> <p style="padding-left: 40px;">DISASSEMBLY ..... 23</p> <p style="padding-left: 40px;">ASSEMBLY ..... 28</p> <p><b>INPUT SHAFT AND GEARS</b> ..... 34</p> <p style="padding-left: 20px;">Disassembly and Assembly ..... 34</p> <p style="padding-left: 40px;">GENERAL PRECAUTIONS ..... 34</p> <p style="padding-left: 40px;">DISASSEMBLY ..... 34</p> <p style="padding-left: 40px;">INSPECTION AFTER DISASSEMBLY ..... 36</p> <p style="padding-left: 40px;">ASSEMBLY ..... 37</p> <p><b>MAINSHAFT AND GEARS</b> ..... 38</p> <p style="padding-left: 20px;">Disassembly and Assembly ..... 38</p> <p style="padding-left: 40px;">GENERAL PRECAUTIONS ..... 38</p> <p style="padding-left: 40px;">DISASSEMBLY ..... 38</p> <p style="padding-left: 40px;">INSPECTION AFTER DISASSEMBLY ..... 39</p> <p style="padding-left: 40px;">ASSEMBLY ..... 40</p> <p><b>REVERSE IDLER SHAFT AND GEARS</b> ..... 43</p> <p style="padding-left: 20px;">Disassembly and Assembly ..... 43</p> <p style="padding-left: 40px;">DISASSEMBLY ..... 43</p> <p style="padding-left: 40px;">ASSEMBLY ..... 44</p> <p><b>FINAL DRIVE</b> ..... 45</p> <p style="padding-left: 20px;">Disassembly and Assembly ..... 45</p> <p style="padding-left: 40px;">DISASSEMBLY ..... 45</p> <p style="padding-left: 40px;">INSPECTION AFTER DISASSEMBLY ..... 46</p> <p style="padding-left: 40px;">ASSEMBLY ..... 46</p> <p><b>SHIFT CONTROL</b> ..... 48</p> <p style="padding-left: 20px;">Inspection ..... 48</p> <p><b>SERVICE DATA AND SPECIFICATIONS (SDS)</b> ..... 49</p> <p style="padding-left: 20px;">General Specifications ..... 49</p>
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# PRECAUTIONS

## PRECAUTIONS

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### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

ECS00GLL

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

#### **WARNING:**

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

## Precautions

UCS005LD

- If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Installed CSC returns to the original position when removing transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal, and may cause clutch fluid leakage.
- Do not reuse transaxle oil.
- Drain, fill and check transaxle oil with the vehicle on level surface.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation orientation prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied to.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, follow it.
- Be careful not to damage the sliding surfaces and mating surfaces of parts.

# PREPARATION

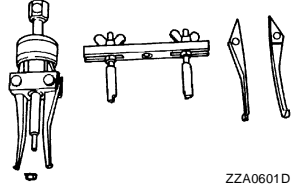
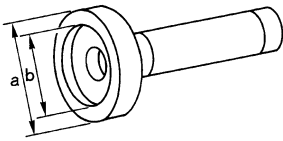
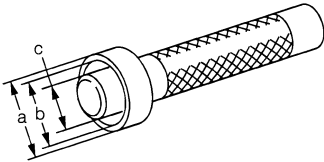
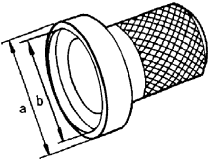
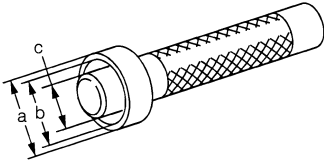
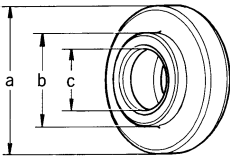
## PREPARATION

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### Special Service Tools

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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV381054S0 (J-34286) Puller   ZZA0601D	Removing mainshaft front bearing outer race
KV38100200 ( — ) Drift   ZZA1143D	<ul style="list-style-type: none"> <li>● Installing mainshaft front bearing outer race</li> <li>● Installing mainshaft rear bearing outer race</li> <li>● Installing differential side bearing outer race (clutch housing side)</li> </ul> <b>a: 65 mm (2.56 in) dia.</b> <b>b: 49 mm (1.93 in) dia.</b>
ST33220000 ( — ) Drift   ZZA1046D	Installing input shaft oil seal <b>a: 37 mm (1.46 in) dia.</b> <b>b: 31 mm (1.22 in) dia.</b> <b>c: 22 mm (0.87 in) dia.</b>
ST33400001 (J-26082) Drift   ZZA0814D	Installing differential side bearing outer race (transaxle case side) <b>a: 60 mm (2.36 in) dia.</b> <b>b: 47 mm (1.85 in) dia.</b>
KV38100300 (J-25523) Drift   ZZA1046D	Installing differential side oil seal <b>a: 54 mm (2.13 in) dia.</b> <b>b: 46 mm (1.81 in) dia.</b> <b>c: 32 mm (1.26 in) dia.</b>
ST36720030 ( — ) Drift   ZZA0978D	<ul style="list-style-type: none"> <li>● Installing input shaft rear bearing</li> <li>● Installing mainshaft front bearing inner race</li> </ul> <b>a: 70 mm (2.76 in) dia.</b> <b>b: 40 mm (1.57 in) dia.</b> <b>c: 29 mm (1.14 in) dia.</b>

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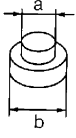
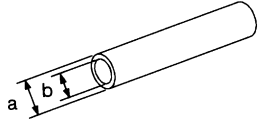
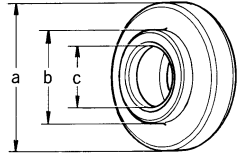
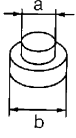
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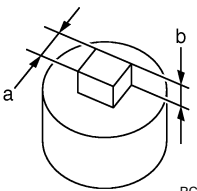
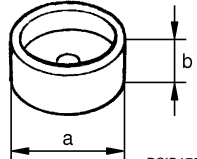
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# PREPARATION

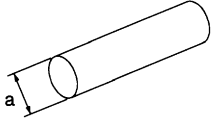
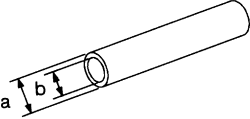
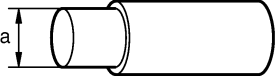
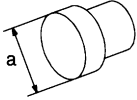
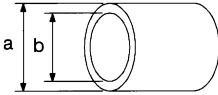
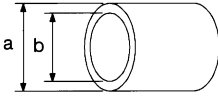
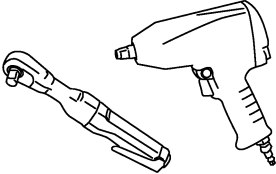
Tool number (Kent-Moore No.) Tool name	Description
ST33052000 (   —   ) Drift	<ul style="list-style-type: none"> <li>● Removing mainshaft rear bearing inner race</li> <li>● Removing 6th main gear</li> <li>● Removing 5th main gear</li> <li>● Removing 4th main gear</li> <li>● Removing 1st main gear</li> <li>● Removing 1st-2nd synchronizer assembly</li> <li>● Removing 2nd main gear</li> <li>● Removing bushing</li> <li>● Removing 3rd main gear</li> <li>● Removing mainshaft front bearing inner race</li> </ul> <p><b>a: 22 mm (0.87 in) dia.</b> <b>b: 28 mm (1.10 in) dia.</b></p>
 <p style="text-align: right; margin-right: 50px;">ZZA0969D</p>	<ul style="list-style-type: none"> <li>● Installing bushing</li> <li>● Installing 2nd main gear</li> <li>● Installing 3rd main gear</li> <li>● Installing 4th main gear</li> <li>● Installing 5th main gear</li> <li>● Installing 6th main gear</li> </ul> <p><b>a: 54 mm (2.13 in) dia.</b> <b>b: 32 mm (1.26 in) dia.</b></p>
KV32102700 (   —   ) Drift	<ul style="list-style-type: none"> <li>● Installing 2nd main gear</li> <li>● Installing 3rd main gear</li> <li>● Installing 4th main gear</li> <li>● Installing 5th main gear</li> <li>● Installing 6th main gear</li> </ul> <p><b>a: 54 mm (2.13 in) dia.</b> <b>b: 32 mm (1.26 in) dia.</b></p>
 <p style="text-align: right; margin-right: 50px;">S-NT065</p>	Installing mainshaft rear bearing inner race <b>a: 79 mm (3.11 in) dia.</b> <b>b: 45 mm (1.77 in) dia.</b> <b>c: 35.2 mm (1.386 in) dia.</b>
ST30901000 (J-26010-01) Drift	Installing mainshaft rear bearing inner race <b>a: 79 mm (3.11 in) dia.</b> <b>b: 45 mm (1.77 in) dia.</b> <b>c: 35.2 mm (1.386 in) dia.</b>
 <p style="text-align: right; margin-right: 50px;">ZZA0978D</p>	Removing differential side bearing inner race (clutch housing side) <b>a: 28.5 mm (1.122 in) dia.</b> <b>b: 38 mm (1.50 in) dia.</b>
ST33061000 (J-8107-2) Drift	Removing differential side bearing inner race (clutch housing side) <b>a: 28.5 mm (1.122 in) dia.</b> <b>b: 38 mm (1.50 in) dia.</b>
 <p style="text-align: right; margin-right: 50px;">ZZA0969D</p>	

## Commercial Service Tools

UCS00656

Tool name	Description
Socket	Removing and installing drain plug <b>a: 8 mm (0.31 in)</b> <b>b: 5 mm (0.20 in)</b>
 <p style="text-align: right; margin-right: 50px;">PCIB1776E</p>	Removing mainshaft front bearing outer race <b>a: 25 mm (0.98 in) dia.</b> <b>b: 25 mm (0.98 in)</b>
Spacer	Removing mainshaft front bearing outer race <b>a: 25 mm (0.98 in) dia.</b> <b>b: 25 mm (0.98 in)</b>
 <p style="text-align: right; margin-right: 50px;">PCIB1780E</p>	

# PREPARATION

Tool name	Description
Drift   S-NT063	<ul style="list-style-type: none"> <li>● Installing bushing</li> <li>● Installing shift lever oil seal</li> <li>● Installing control lever oil seal</li> </ul> <b>a: 17 mm (0.67 in) dia.</b>
Drift   S-NT065	Installing input shaft front bearing <b>a: 35 mm (1.38 in) dia.</b> <b>b: 25 mm (0.98 in) dia.</b>
Drift   PCIB1779E	Removing input shaft rear bearing <b>a: 24 mm (0.94 in) dia.</b>
Drift   NT109	<ul style="list-style-type: none"> <li>● Removing differential side bearing inner race (transaxle case side)</li> <li>● Installing input shaft rear bearing</li> </ul> <b>a: 43 mm (1.69 in) dia.</b>
Drift   S-NT474	Installing differential side bearing inner race (clutch housing side) <b>a: 45 mm (1.77 in) dia.</b> <b>b: 39 mm (1.54 in) dia.</b>
Drift   S-NT474	Installing differential side bearing inner race (transaxle case side) <b>a: 52 mm (2.05 in) dia.</b> <b>b: 45 mm (1.77 in) dia.</b>
Power tool   PBIC0190E	<ul style="list-style-type: none"> <li>● Loosening bolts and nuts</li> </ul>

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G

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# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

## NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

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### NVH Troubleshooting Chart

UCS005LG

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		<a href="#">MT-9</a>		<a href="#">MT-17</a>		<a href="#">MT-21</a>	<a href="#">MT-12</a>	<a href="#">MT-21</a>	<a href="#">MT-18</a>				
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2							3	3		
	Oil leakage		3	1	2	2	2						
	Hard to shift or will not shift		1	1				2				3	3
	Jumps out of gear							1	3	3			

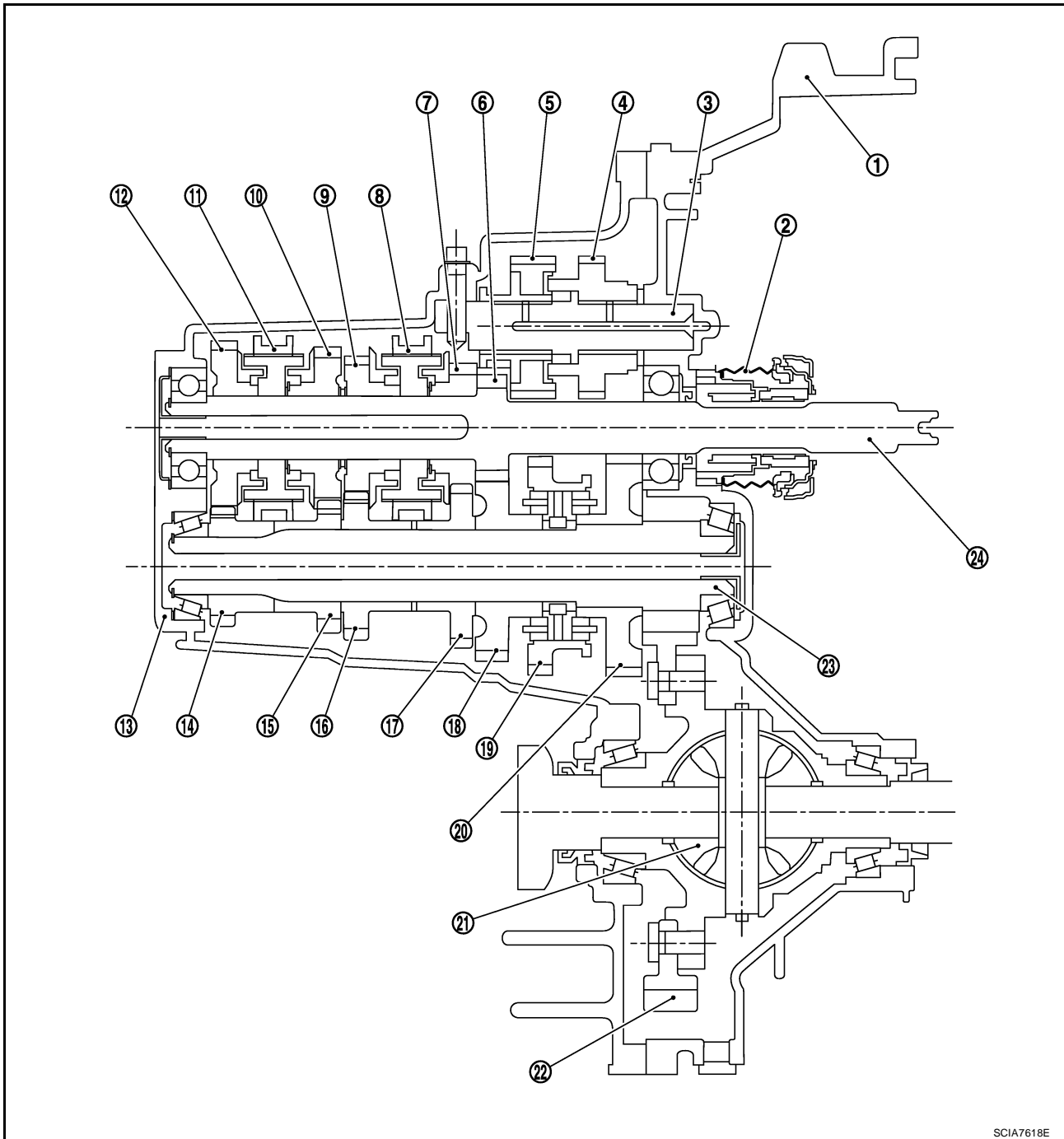
# DESCRIPTION

## DESCRIPTION

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### Cross-Sectional View

UCS0065I



SCIA7618E

- |                                   |                                    |                           |
|-----------------------------------|------------------------------------|---------------------------|
| 1. Clutch housing                 | 2. CSC (Concentric Slave Cylinder) | 3. Reverse idler shaft    |
| 4. Reverse input gear             | 5. Reverse output gear             | 6. 2nd input gear         |
| 7. 3rd input gear                 | 8. 3rd-4th synchronizer assembly   | 9. 4th input gear         |
| 10. 5th input gear                | 11. 5th-6th synchronizer assembly  | 12. 6th input gear        |
| 13. Transaxle case                | 14. 6th main gear                  | 15. 5th main gear         |
| 16. 4th main gear                 | 17. 3rd main gear                  | 18. 2nd main gear         |
| 19. 1st-2nd synchronizer assembly | 20. 1st main gear                  | 21. Differential assembly |
| 22. Final gear                    | 23. Mainshaft                      | 24. Input shaft           |

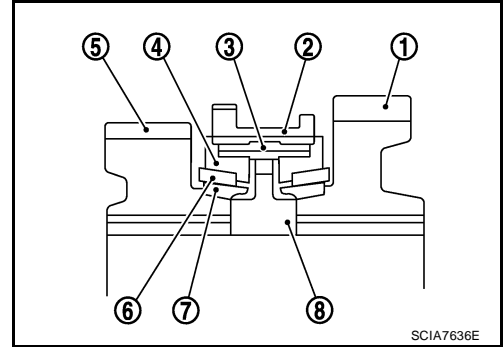
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# DESCRIPTION

## TRIPLE-CONE SYNCHRONIZER

Triple-cone synchronizer is used for the 1st and the 2nd gears to reduce operating force of the shift lever.

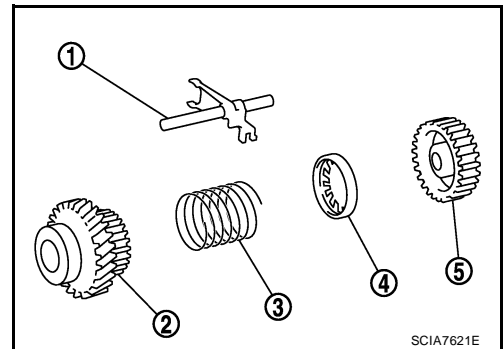
- 1st main gear (1)
- 1st-2nd coupling sleeve (2)
- Insert key (3)
- Outer baulk ring (4)
- 2nd main gear (5)
- Synchronizer cone (6)
- Inner baulk ring (7)
- 1st-2nd synchronizer hub (8)



## REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear assembly consists of reverse input gear, return spring, reverse baulk ring and reverse output gear. When the shift lever is shifted to the reverse position, the construction allows smooth shift operation by stopping the reverse idler shaft rotation by frictional force of synchronizer.

- Reverse fork rod (1)
- Reverse output gear (2)
- Return spring (3)
- Reverse baulk ring (4)
- Reverse input gear (5)





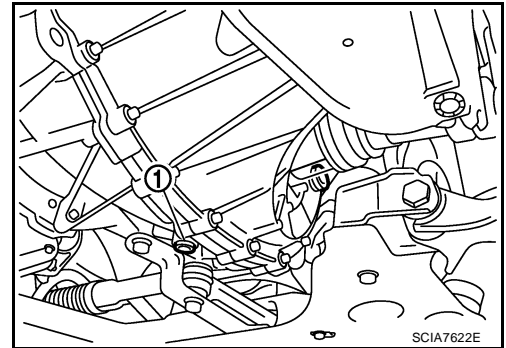
## M/T OIL

### Changing M/T Oil DRAINING

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug (1) and drain oil.
3. Install a new gasket onto drain plug (1) and install it into transaxle. Tighten drain plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

**CAUTION:**

Do not reuse gasket.



### FILLING

1. Remove filler plug (1). Fill with new oil until oil level reaches the specified limit at filler plug hole as shown.

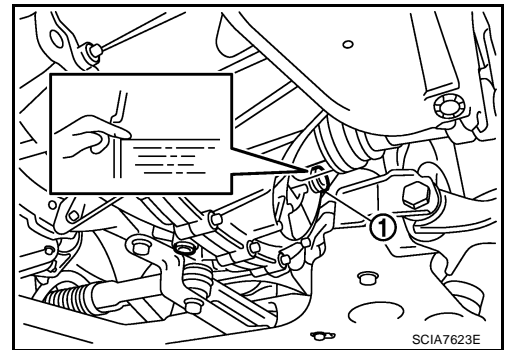
**Oil grade and capacity**

: Refer to [MA-11, "Fluids and Lubricants"](#)

2. After refilling oil, check oil level. Install a new gasket on filler plug (1), then install it into transaxle. Tighten filler plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

**CAUTION:**

Do not reuse gasket.



### Checking M/T Oil OIL LEAKAGE AND OIL LEVEL

1. Make sure that oil is not leaking from transaxle or around it.
2. Remove filler plug (1) and check oil level at filler plug hole as shown.

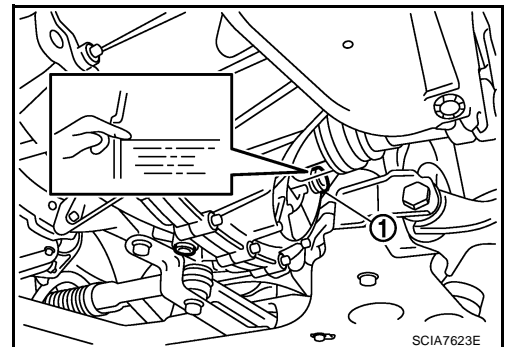
**CAUTION:**

Do not start engine while checking oil level.

3. Install a new gasket onto filler plug (1) and install it into transaxle. Tighten filler plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

**CAUTION:**

Do not reuse gasket.



# SIDE OIL SEAL

## SIDE OIL SEAL

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### Removal and Installation

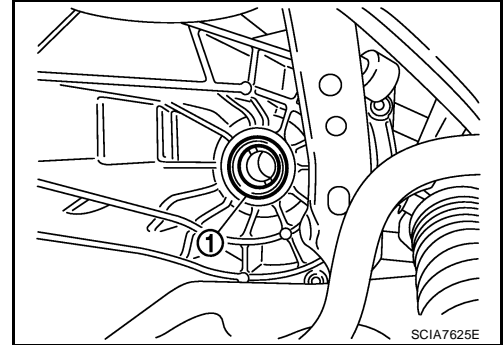
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#### REMOVAL

1. Remove front drive shafts from transaxle assembly. Refer to [FAX-8, "Removal and Installation \(Left Side\)"](#).
2. Remove differential side oil seal (1) using a suitable tool.

**CAUTION:**

Be careful not to damage transaxle case and clutch housing.



#### INSTALLATION

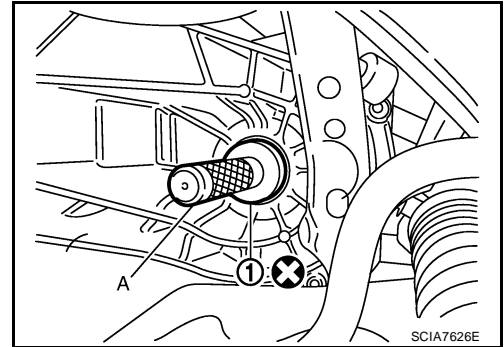
1. Install differential side oil seal (1) to clutch housing and transaxle case using Tool (A).

**Tool number A: ST38100300 (J-25523)**

2. Installation is in the reverse order of removal. Check oil level after installation. Refer to [MT-9, "Checking M/T Oil"](#).

**CAUTION:**

Do not reuse oil seal.



# POSITION SWITCH

PFP:32005

UCS005LL

## POSITION SWITCH

### Checking

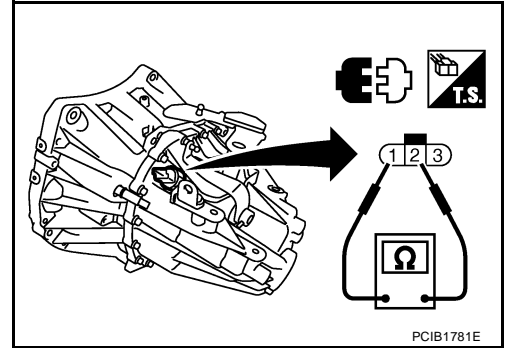
#### NOTE:

For removal and installation of the switches, refer to [MT-17, "Case and Housing Components"](#)

### BACK-UP LAMP SWITCH

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



### PARK/NEUTRAL POSITION SWITCH

- Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No

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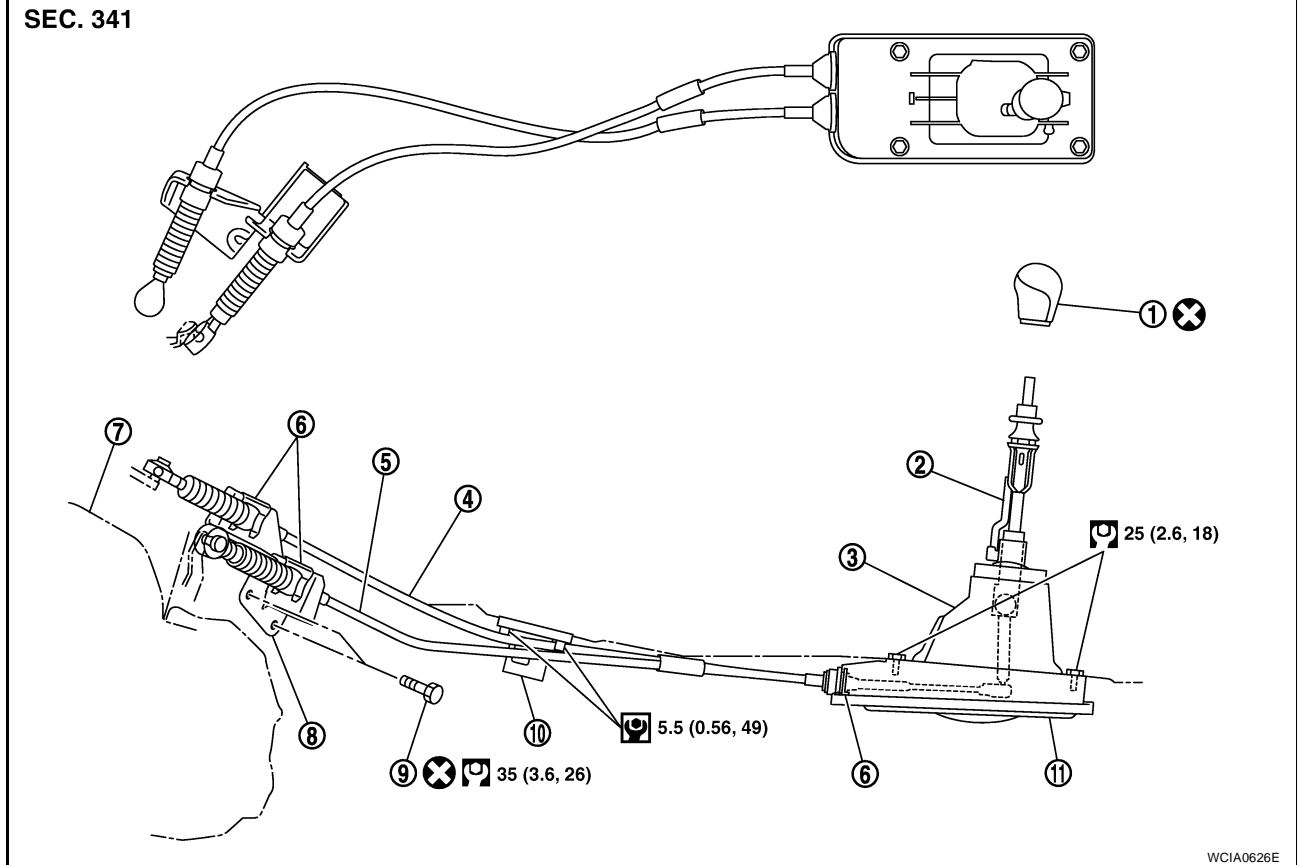
# CONTROL LINKAGE

## CONTROL LINKAGE

PFP:34103

### Components of Control Device and Cable

UCS005LM



WCIA0626E

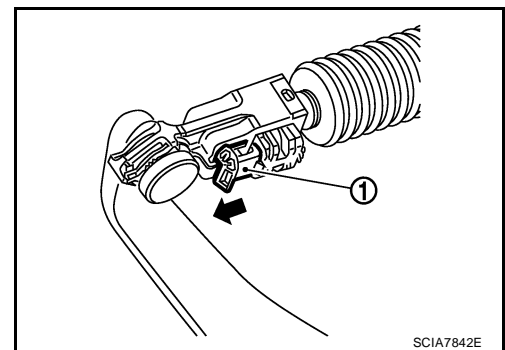
- |                           |                   |                            |
|---------------------------|-------------------|----------------------------|
| 1. Control lever knob     | 2. Control lever  | 3. Control device assembly |
| 4. Select cable           | 5. Shift cable    | 6. Lock plate              |
| 7. Clutch housing         | 8. Cable bracket  | 9. Tapping bolt            |
| 10. Cable support bracket | 11. Adapter plate |                            |

## Removal and Installation

### REMOVAL

UCS005LN

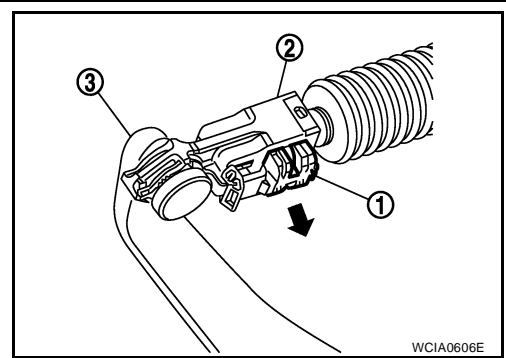
1. Remove battery. Refer to [SC-9, "Removal and Installation"](#).
2. Remove air duct (Inlet), air duct and air cleaner case. Refer to [EM-16, "Removal and Installation"](#).
3. Remove shift cable from shift lever.
4. Remove select cable according to the following.
  - a. Move stopper (1) to the unlocked position.



SCIA7842E

# CONTROL LINKAGE

- b. Pull the release button (1) of select cable (2) and then remove it from select lever (3).
5. Shift control lever to neutral position.
6. Remove control lever knob.
7. Remove center console assembly. Refer to [IP-22, "CENTER CONSOLE ASSEMBLY"](#).
8. Remove control device assembly bolts.
9. Remove exhaust front tube, center muffler and heat plate. Refer to [EX-4, "Removal and Installation"](#).
10. Remove cable support bracket.
11. Remove select cable and shift cable from cable bracket.
12. Remove control device assembly from the vehicle.



## INSTALLATION

Installation is in the reverse order of removal.

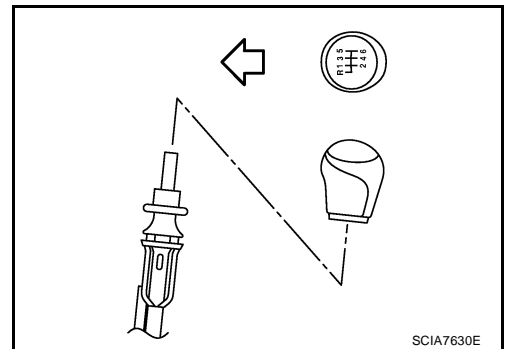
### NOTE:

Self tapping bolts are used to attach cables to the clutch housing.

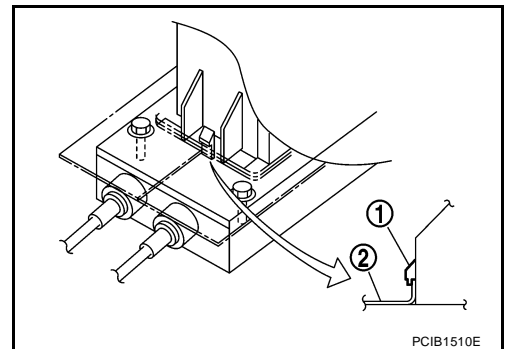
- Securely assemble each cable and lever of control shaft.
- Be careful about the installation direction, and push control lever knob onto control lever.

### CAUTION:

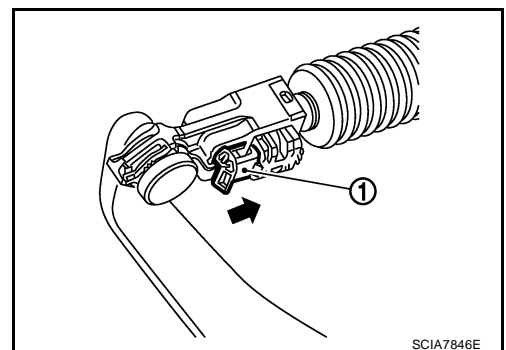
**Do not reuse control lever knob.**



- Make sure that the front/rear claws (1) of control device assembly are in contact with flange of the floor (2).
- When control lever is selected to 1st-2nd side and 5th-6th side, confirm control lever returns to neutral position smoothly.
- When control lever is shifted to each position, make sure there is no binding or disconnection in each boot.



- Move stopper (1) to lock position when installing the shift cable onto the shift lever.



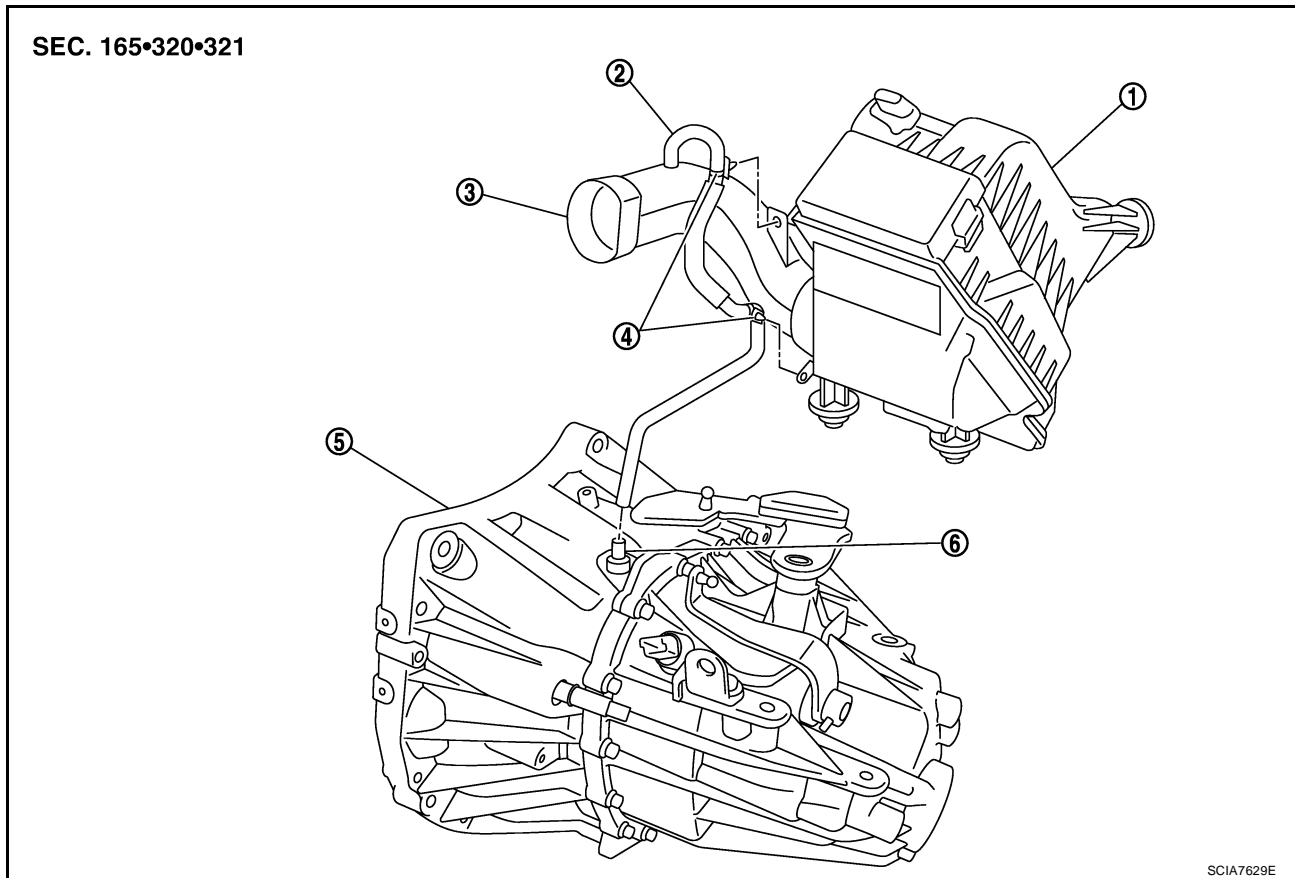
# AIR BREATHER HOSE

## AIR BREATHER HOSE

PF3:31098

### Removal and Installation COMPONENTS

UCS005LO



- |                     |                       |                    |
|---------------------|-----------------------|--------------------|
| 1. Air cleaner case | 2. Air breather hose  | 3. Air duct        |
| 4. Clip             | 5. Transaxle assembly | 6. 2 way connector |

### REMOVAL

1. Remove battery. Refer to [SC-9, "Removal and Installation"](#)
2. Remove air duct (Inlet), air duct and air cleaner case. Refer to [EM-16, "Removal and Installation"](#).
3. Remove air breather hose.

#### **CAUTION:**

**When air breather hose is removed, be sure to hold two way connector securely.**

### INSTALLATION

Installation is in the reverse order of removal.

- When installing air breather hose on two way connector, aim paint mark face toward the vehicle front.
- When installing air breather hose on two way connector, push it until it hits transaxle case.
- When installing air breather hose to air duct and air cleaner case, make sure that clips are fully inserted.

#### **CAUTION:**

**Make sure air breather hose is not collapsed or blocked due to folding or bending when installed.**

# TRANSAXLE ASSEMBLY

PF3:32010

## TRANSAXLE ASSEMBLY

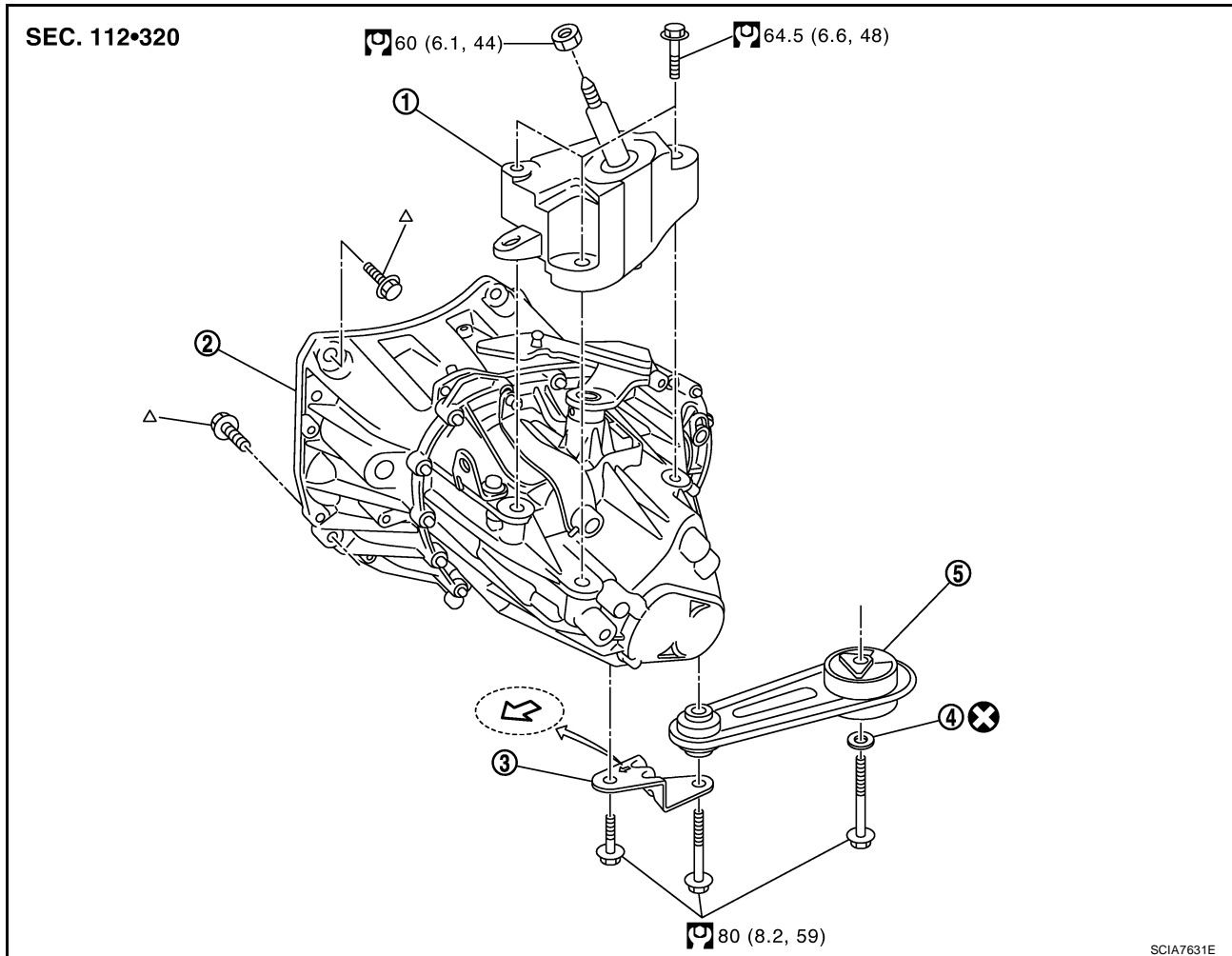
### Removal and Installation

UCS005LQ

#### CAUTION:

If transaxle assembly is removed from the vehicle, always replace CSC (Concentric Slave Cylinder). Inserted CSC returns to the original position when removing transaxle assembly. Dust on clutch disc sliding parts may damage CSC seal, and may cause clutch fluid leakage.

#### COMPONENTS



- |                                             |                       |                              |
|---------------------------------------------|-----------------------|------------------------------|
| 1. LH engine mount bracket (transaxle side) | 2. Transaxle assembly | 3. Rear engine mount bracket |
| 4. Washer                                   | 5. Rear torque rod    | ← Front                      |

Δ: Refer to [MT-15, "INSTALLATION"](#) for specification.

#### REMOVAL

1. Drain gear oil. Refer to [MT-9, "Changing M/T Oil"](#).
2. Drain clutch fluid and remove clutch tube from CSC. Refer to [CL-9, "Removal and Installation"](#).

#### CAUTION:

**Do not depress clutch pedal during removal procedure.**

3. Remove engine and transaxle assembly. Refer to [EM-73, "Removal and Installation"](#).
4. Remove starter motor. Refer to [SC-23, "Removal and Installation"](#).
5. Remove transaxle assembly to engine bolts.
6. Separate transaxle assembly from engine.

#### INSTALLATION

Installation is in the reverse order of removal.

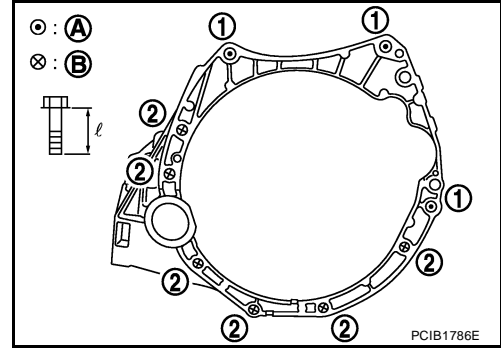
## TRANSAXLE ASSEMBLY

- If transaxle is removed from the vehicle, always replace CSC. Refer to [CL-11, "Removal and Installation"](#) .
- When installing the transaxle assembly to the engine, install the bolts as shown.

**CAUTION:**

**When installing transaxle assembly, be careful not to bring transaxle input shaft into contact with clutch cover.**

Bolt No.	1	2
Quantity	3	6
Bolt length "ℓ" mm (in)	60 (2.36)	50 (1.97)
Tightening torque N·m (kg·m, ft·lb)	62.0 (6.3, 46)	



A: M/T to engine

B: Engine to M/T

- Bleed the air from the clutch hydraulic system. Refer to [CL-8, "Air Bleeding Procedure"](#) .
- After installation, check oil level, and check for leaks and loose mechanisms. Refer to [MT-9, "Checking M/T Oil"](#) .

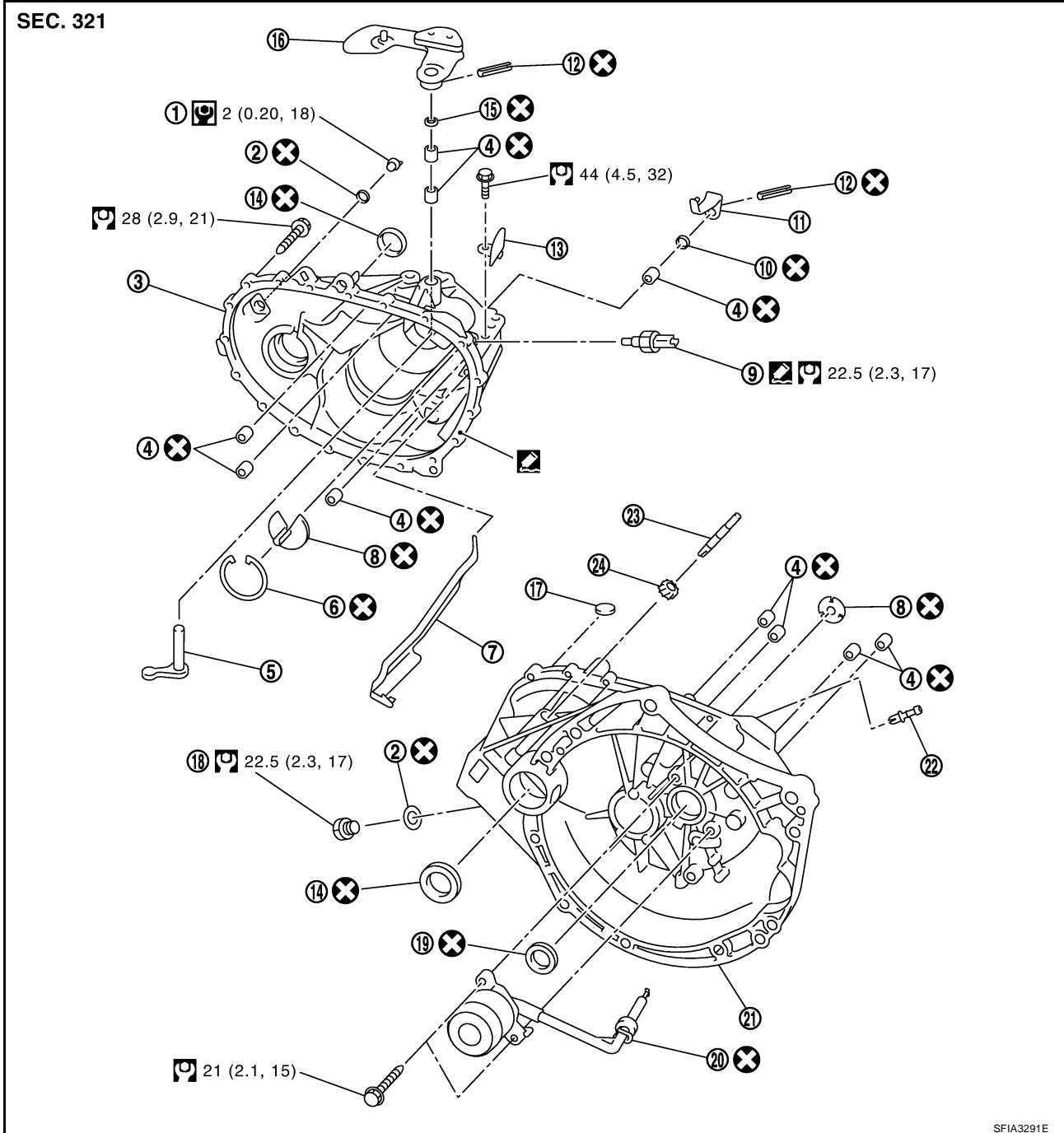


# TRANSAXLE ASSEMBLY


UCS005LR

## Disassembly and Assembly COMPONENTS

### Case and Housing Components

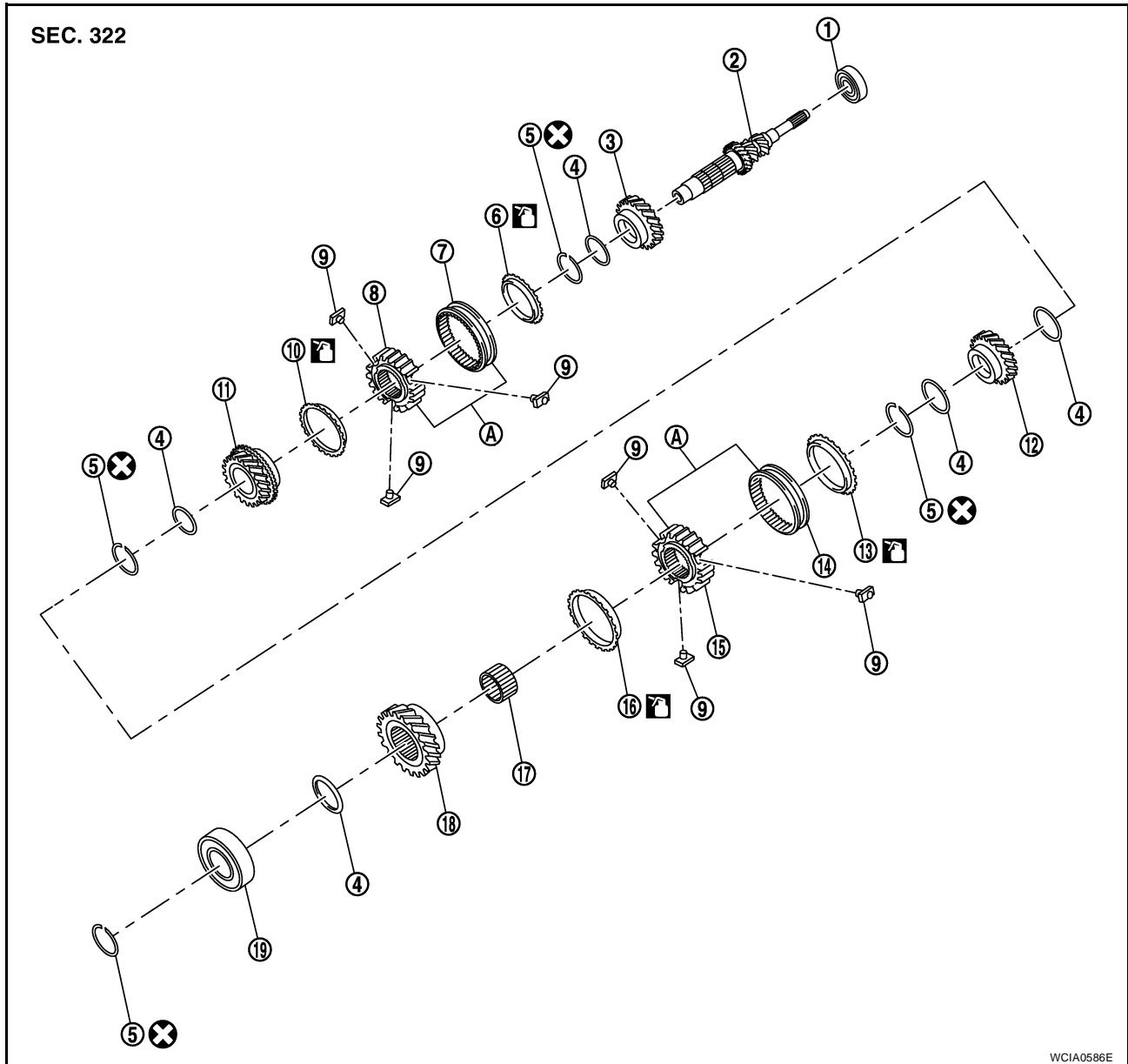


- |                          |                                     |                            |
|--------------------------|-------------------------------------|----------------------------|
| 1. Filler plug           | 2. Gasket                           | 3. Transaxle case          |
| 4. Bushing               | 5. Shift finger                     | 6. Snap ring               |
| 7. Oil gutter            | 8. Oil channel                      | 9. Position switch         |
| 10. Shift lever oil seal | 11. Shift lever                     | 12. Retaining pin          |
| 13. Bracket              | 14. Differential side oil seal      | 15. Control lever oil seal |
| 16. Control lever        | 17. Magnet                          | 18. Drain plug             |
| 19. Input shaft oil seal | 20. CSC (Concentric Slave Cylinder) | 21. Clutch housing         |
| 22. 2way connector       | 23. Pinion shaft                    | 24. Pinion gear            |


 Apply Genuine Silicone RTV or the equivalent. Refer to GI-XX, "Recommended chemical products and sealants"

# TRANSAXLE ASSEMBLY

## Gear Components

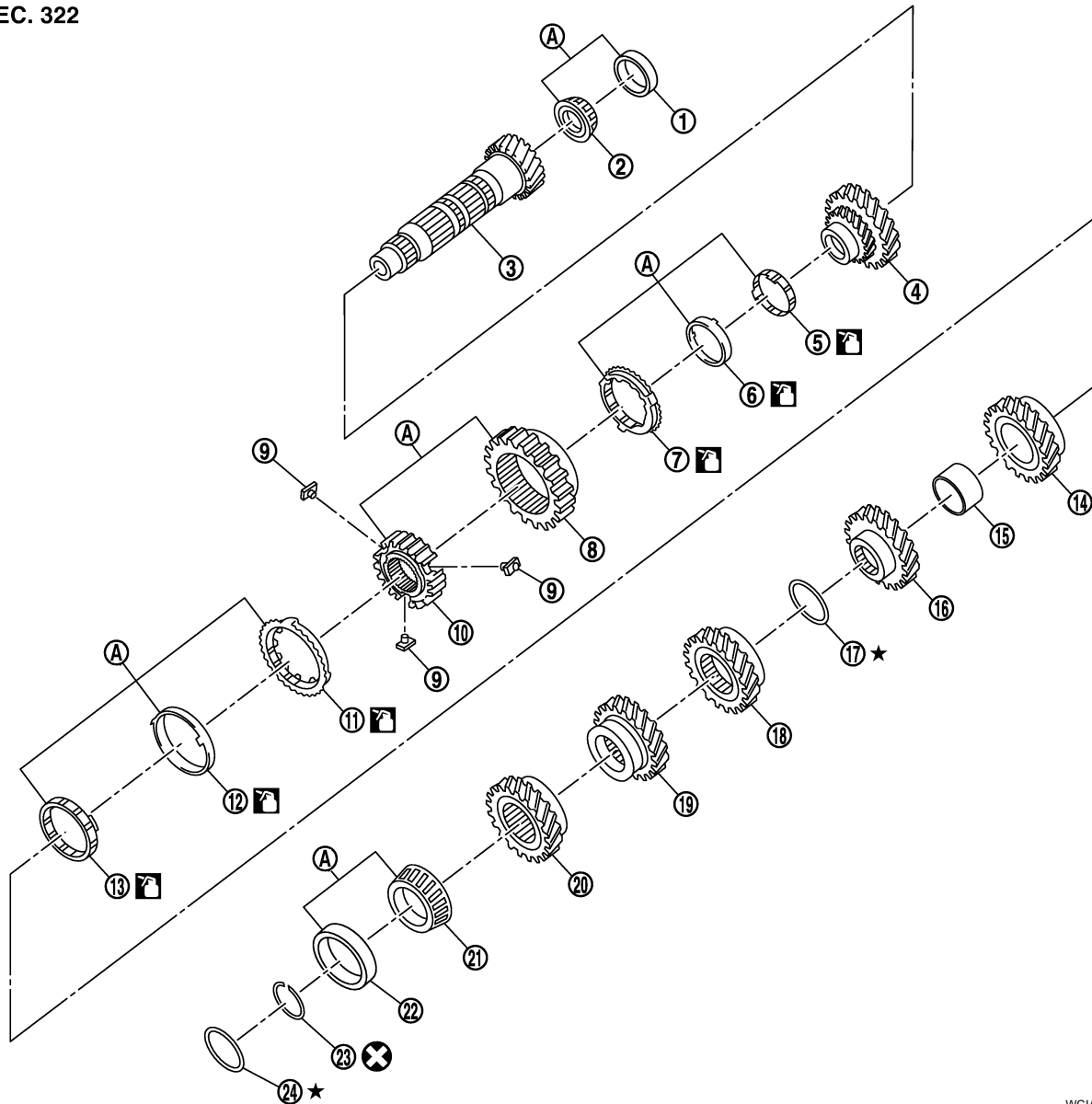


WCIA0586E

- |                              |                               |                                                                                                      |
|------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------|
| 1. Input shaft front bearing | 2. Input shaft                | 3. 3rd input gear                                                                                    |
| 4. Washer                    | 5. Snap ring                  | 6. 3rd baulk ring                                                                                    |
| 7. 3rd-4th coupling sleeve   | 8. 3rd-4th synchronizer hub   | 9. Insert key                                                                                        |
| 10. 4th baulk ring           | 11. 4th input gear            | 12. 5th input gear                                                                                   |
| 13. 5th baulk ring           | 14. 5th-6th coupling sleeve   | 15. 5th-6th synchronizer hub                                                                         |
| 16. 6th baulk ring           | 17. Needle bearing            | 18. 6th input gear                                                                                   |
| 19. Input shaft rear bearing | A. Replace the parts as a set |  Apply gear oil |

# TRANSAXLE ASSEMBLY

SEC. 322



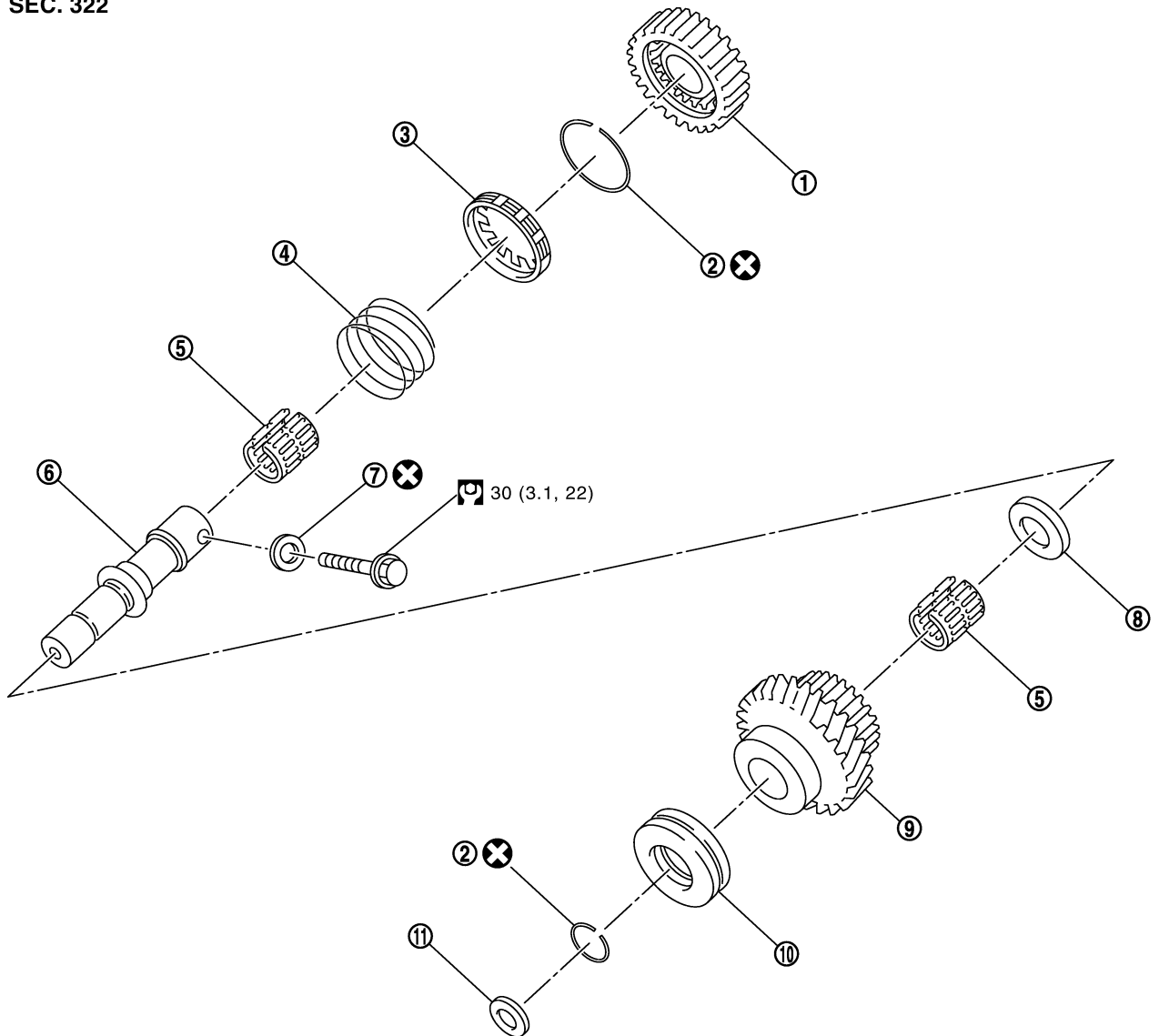
WCIA0587E

- |                                        |                                        |                                        |
|----------------------------------------|----------------------------------------|----------------------------------------|
| 1. Main shaft front bearing outer race | 2. Main shaft front bearing inner race | 3. Main shaft                          |
| 4. 1st main gear                       | 5. 1st inner baulk ring                | 6. 1st synchronizer cone               |
| 7. 1st outer baulk ring                | 8. 1st-2nd coupling sleeve             | 9. Insert key                          |
| 10. 1st-2nd synchronizer hub           | 11. 2nd outer baulk ring               | 12. 2nd synchronizer cone              |
| 13. 2nd inner baulk ring               | 14. 2nd main gear                      | 15. Bushing                            |
| 16. 3rd main gear                      | 17. Intermediate adjusting shim        | 18. 4th main gear                      |
| 19. 5th main gear                      | 20. 6th main gear                      | 21. Main shaft rear bearing inner race |
| 22. Main shaft rear bearing outer race | 23. Snap ring                          | 24. Bearing preloading shim            |
- A. Replace the parts as a set      Apply gear oil

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# TRANSAXLE ASSEMBLY

SEC. 322



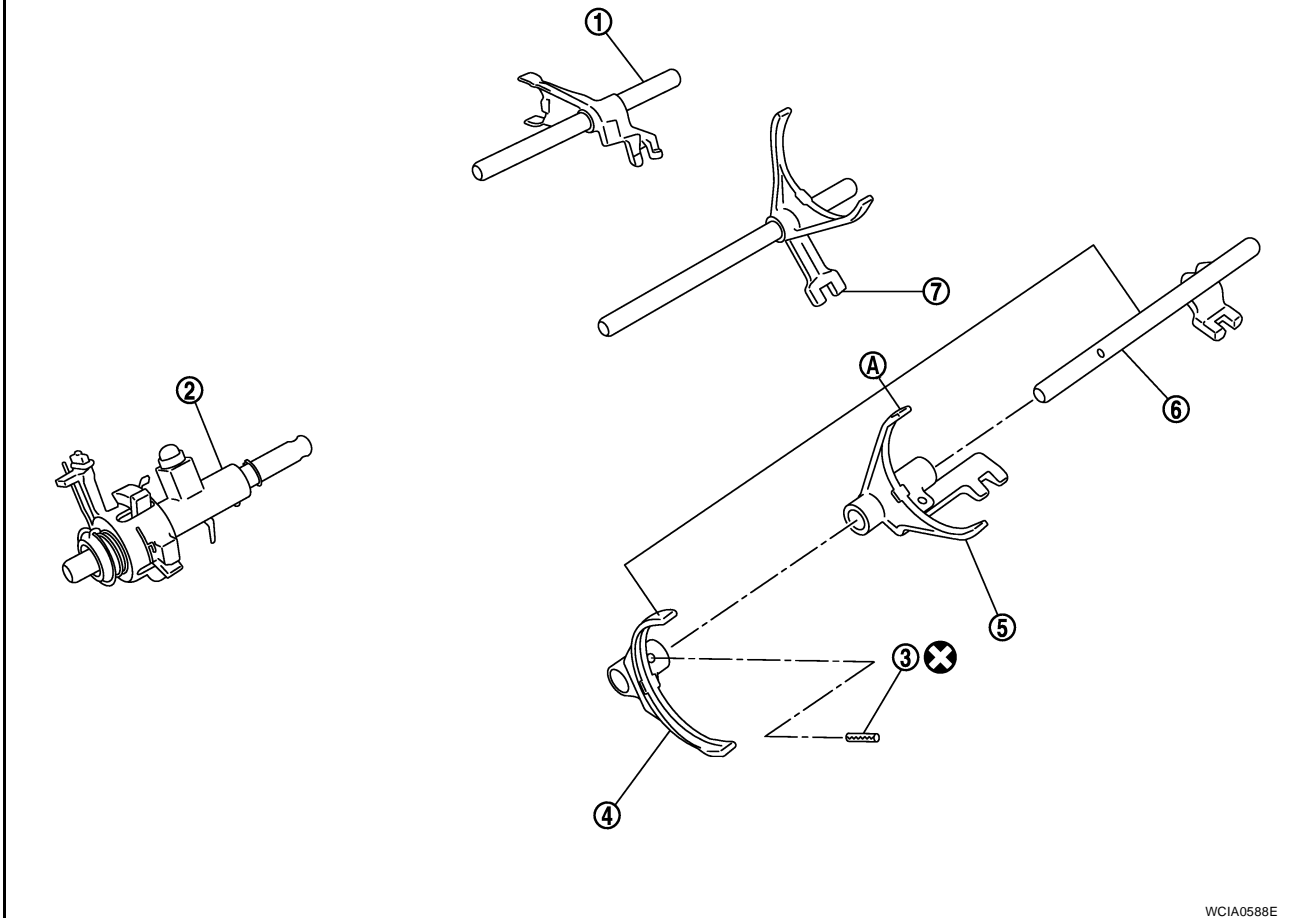
SFIA3294E

- |                        |                   |                        |
|------------------------|-------------------|------------------------|
| 1. Reverse output gear | 2. Snap ring      | 3. Reverse baulk ring  |
| 4. Return spring       | 5. Needle bearing | 6. Reverse idler shaft |
| 7. Seal washer         | 8. Washer         | 9. Reverse input gear  |
| 10. Lock washer        | 11. Spring washer |                        |

# TRANSAXLE ASSEMBLY

## Shift Control Components

SEC. 328



- |                       |                               |                                 |
|-----------------------|-------------------------------|---------------------------------|
| 1. Reverse fork rod   | 2. Selector                   | 3. Retaining pin                |
| 4. 5th-6th shift fork | 5. 3rd-4th shift fork         | 6. 3rd-4th and 5th-6th fork rod |
| 7. 1st-2nd fork rod   | A. Replace the parts as a set |                                 |

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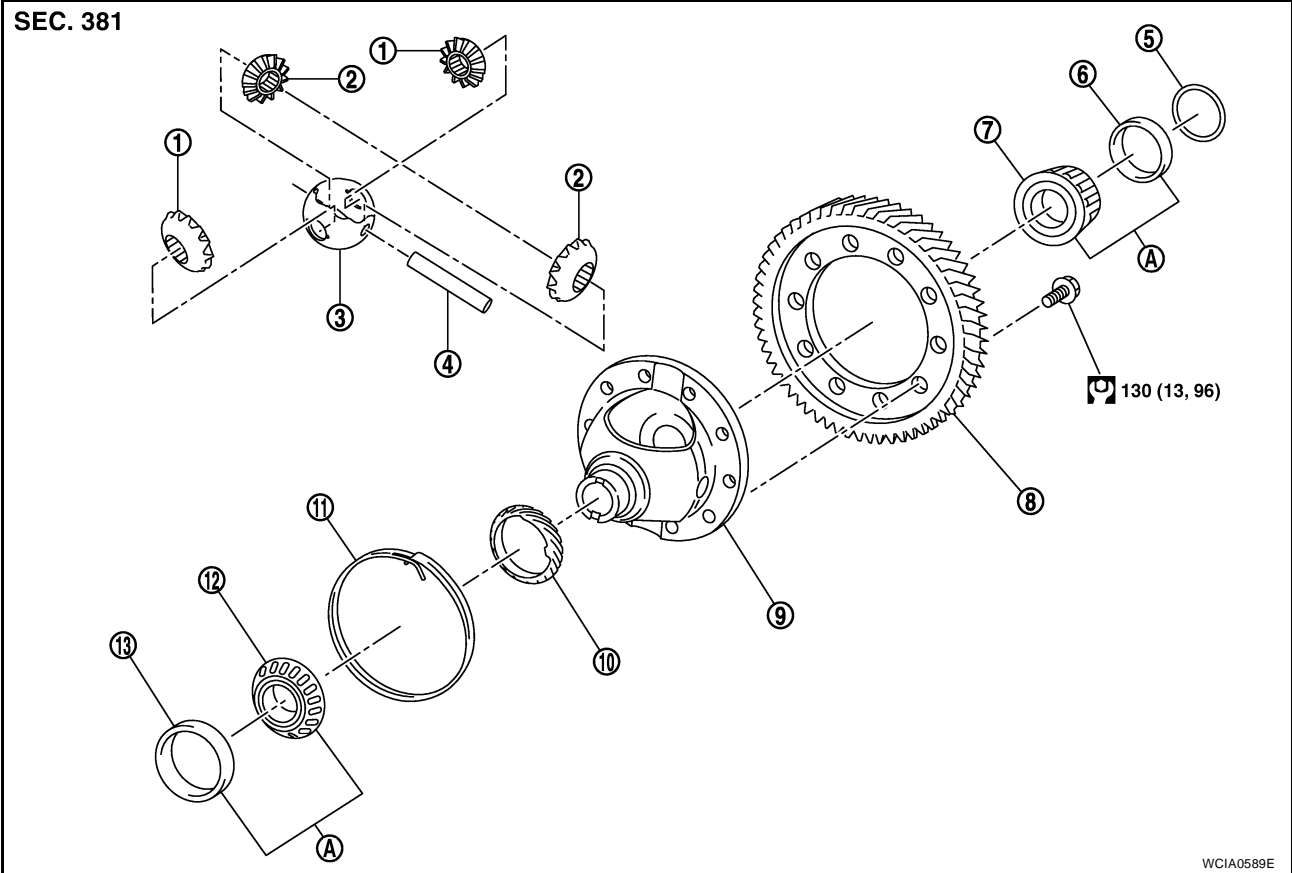
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# TRANSAXLE ASSEMBLY

## Final Drive Components

SEC. 381



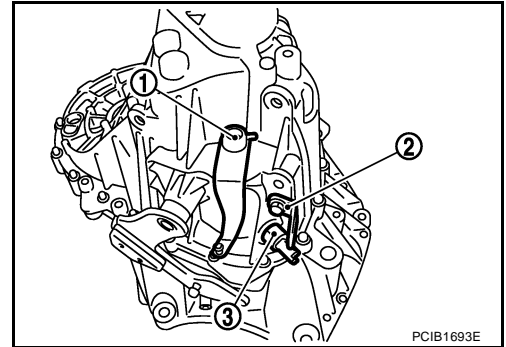
WCIA0589E

- |                                                                |                               |                                                                |
|----------------------------------------------------------------|-------------------------------|----------------------------------------------------------------|
| 1. Side gear                                                   | 2. Pinion mate gear           | 3. Thrust washer                                               |
| 4. Pinion mate shaft                                           | 5. shim                       | 6. Differential side bearing outer race (transaxle case side)  |
| 7. Differential side bearing inner race (transaxle case side)  | 8. Final gear                 | 9. Differential case                                           |
| 10. Speedometer drive gear                                     | 11. Lock ring                 | 12. Differential side bearing inner race (clutch housing side) |
| 13. Differential side bearing outer race (clutch housing side) | A. Replace the parts as a set |                                                                |

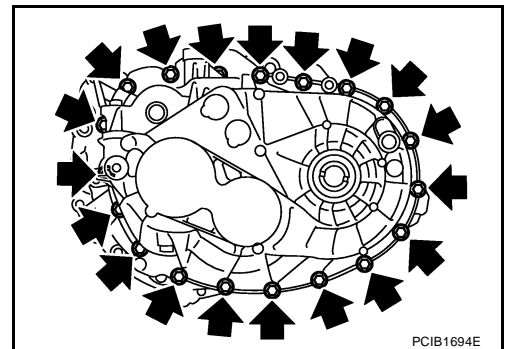
# TRANSAXLE ASSEMBLY

## DISASSEMBLY

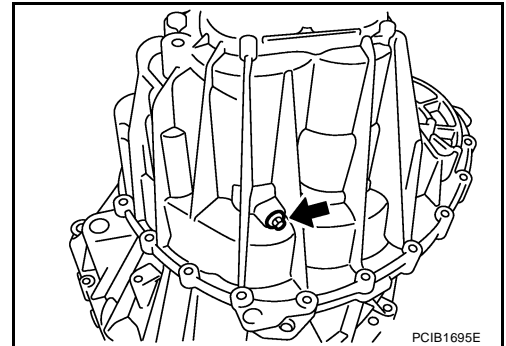
1. Remove drain plug and gasket from clutch housing, and drain oil.
2. Remove filler plug and gasket from transaxle case.
3. Remove CSC from clutch housing.
4. Remove retaining pin from shift lever (1) using a suitable tool.
5. Remove bracket (2) and position switch (3) from transaxle case.



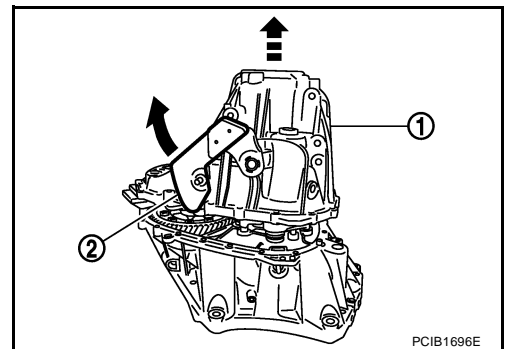
6. Remove bolts.



7. Remove reverse idler shaft bolt (←) and seal washer.



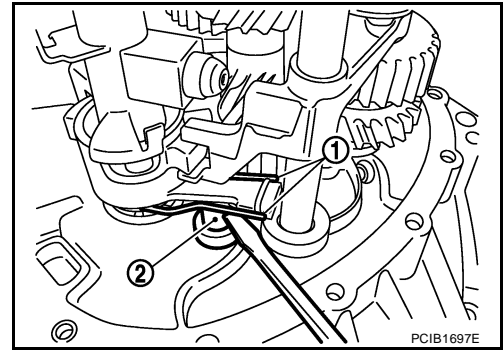
8. Remove transaxle case (1) upward while rotating control lever (2).



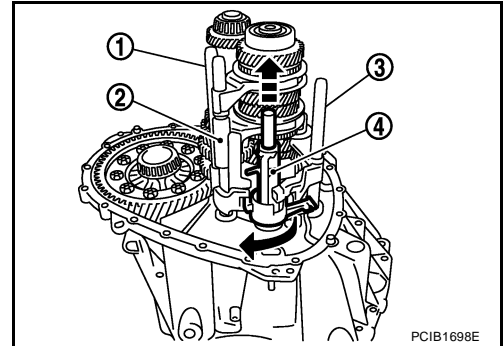
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# TRANSAXLE ASSEMBLY

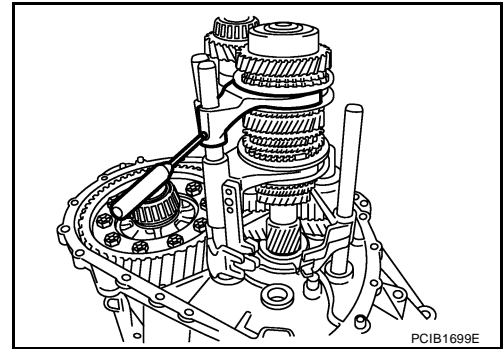
9. Remove spring (1) of selector from return bushing (2).
10. Remove bearing preloading shim from mainshaft assembly.



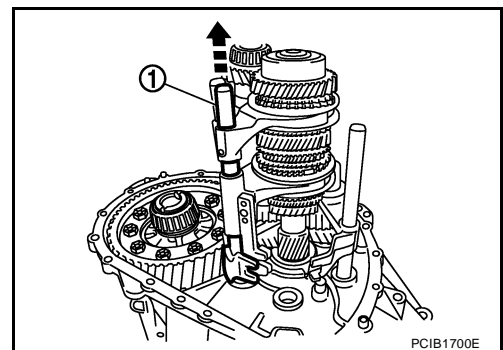
11. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod (2), and reverse fork rod (3) to neutral position.
12. Remove selector (4) from clutch housing.



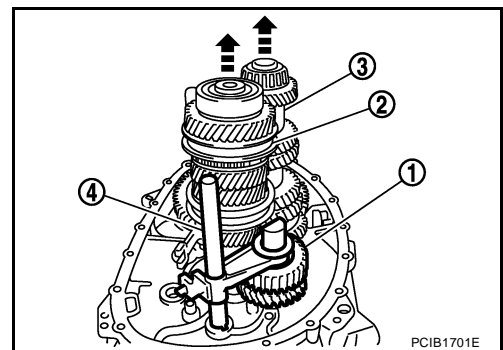
13. Remove retaining pin from 5th-6th shift fork using a suitable tool.



14. Remove 3rd-4th and 5th-6th fork rod assembly according to the following.
  - a. Lift the fork rod (1) up.
  - b. Remove 3rd-4th and 5th-6th fork rod assembly from clutch housing.



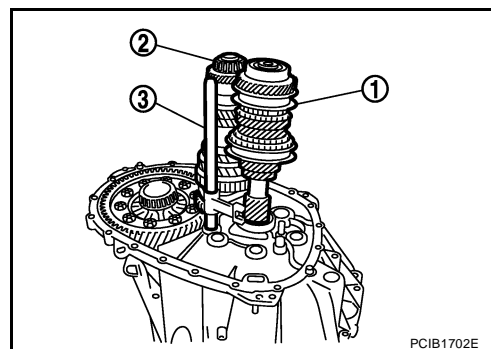
15. Remove reverse gear assembly (1) according to the following.
  - a. Lift the input shaft assembly (2) and mainshaft assembly (3) up.
  - b. Remove reverse gear assembly (1) and reverse fork rod (4) from clutch housing.
16. Remove spring washer located under the reverse idler shaft.



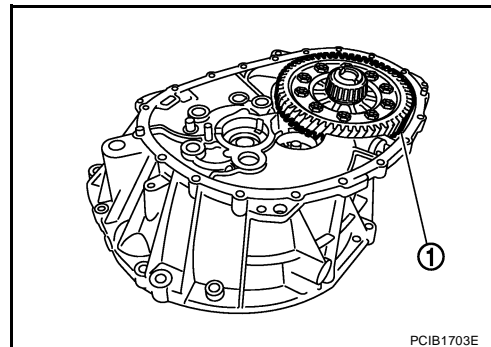


# TRANSAXLE ASSEMBLY

17. Remove input shaft assembly (1), mainshaft assembly (2), and 1st-2nd fork rod (3) from clutch housing.



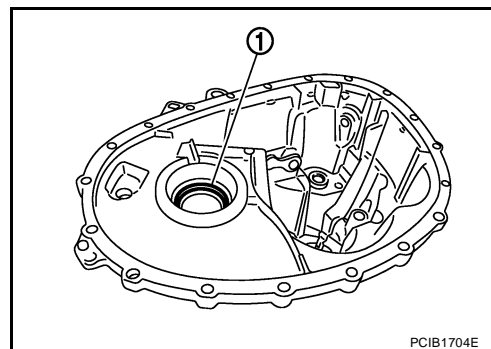
18. Remove final drive assembly (1) from clutch housing.  
19. Remove magnet from clutch housing.



20. Remove differential side oil seals (1) from clutch housing and transaxle case using a suitable tool.

**CAUTION:**

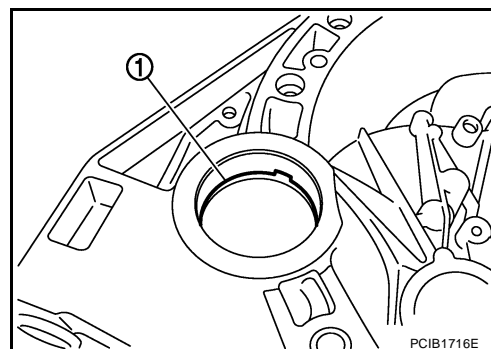
**Be careful not to damage clutch housing and transaxle case.**



21. Remove differential side bearing outer race (1) from clutch housing using a suitable tool.

**CAUTION:**

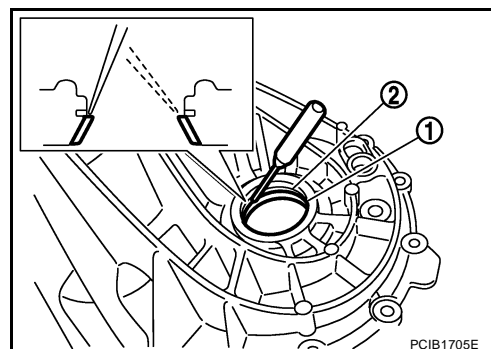
**Be careful not to damage clutch housing.**



22. Remove differential side bearing outer race (1) and shim (2) from transaxle case using a brass bar as shown.

**CAUTION:**

**Be careful not to damage transaxle case.**



A  
B  
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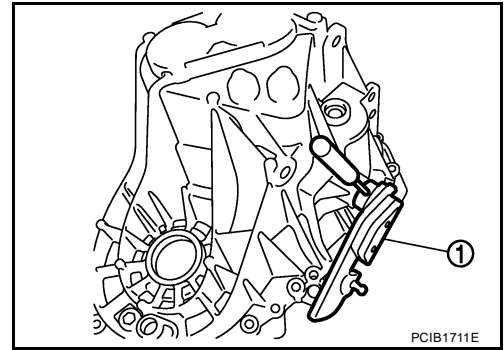
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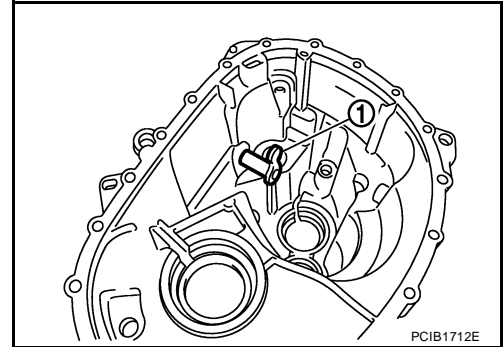
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# TRANSAXLE ASSEMBLY

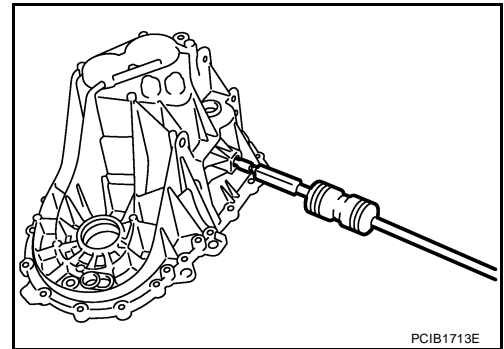
23. Remove retaining pin from control lever (1) using a suitable tool.
24. Remove control lever.



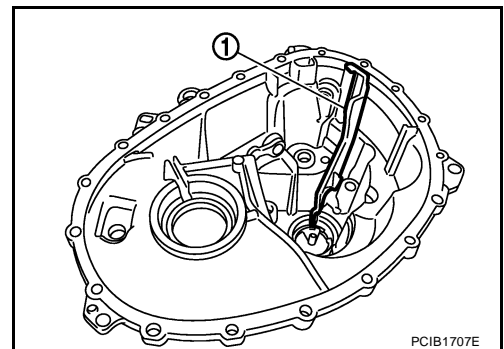
25. Remove shift finger (1) from transaxle case.



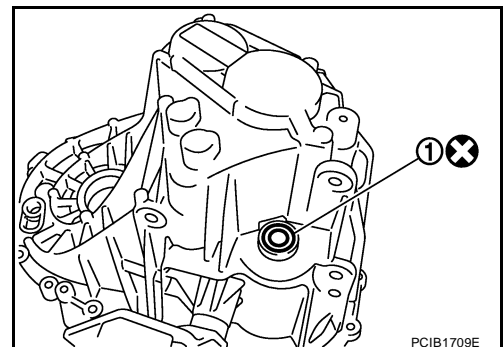
26. Remove control lever oil seal and bushings from transaxle case using a suitable tool.



27. Remove oil gutter (1) from transaxle case.

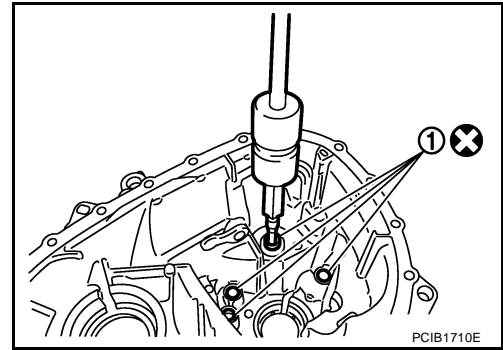


28. Remove shift lever oil seal (1) from transaxle case.



# TRANSAXLE ASSEMBLY

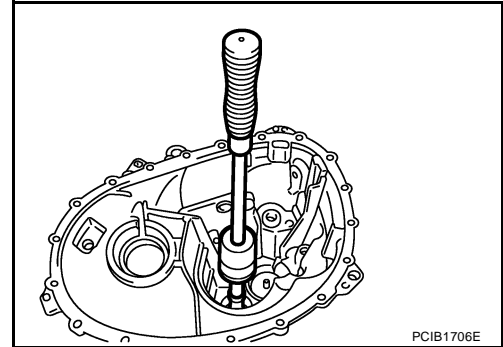
29. Remove bushings (1) from transaxle case using a suitable tool.



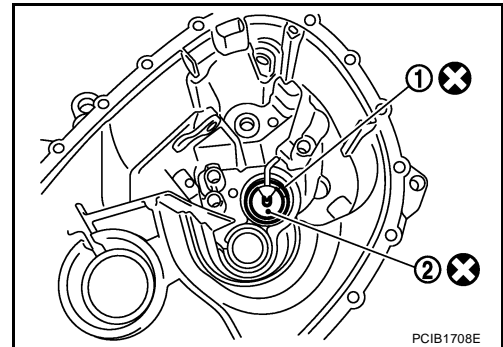
30. Remove mainshaft rear bearing outer race and shim from transaxle case using a suitable tool.

**CAUTION:**

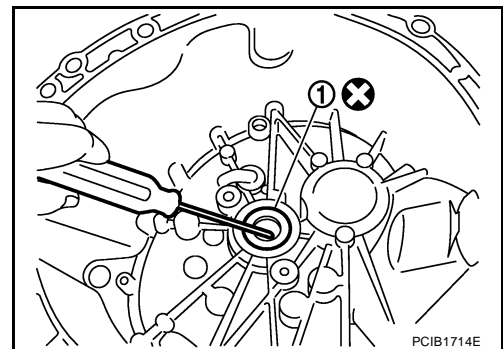
**Be careful not to damage transaxle case.**



31. Remove snap ring (1) and oil channel (2) from transaxle case.

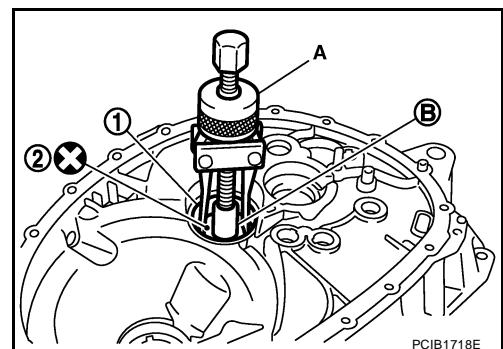


32. Remove input shaft oil seal (1) from clutch housing using a suitable tool.



33. Remove mainshaft front bearing outer race (1) and oil channel (2) from clutch housing using Tool (A) and suitable tool (B).

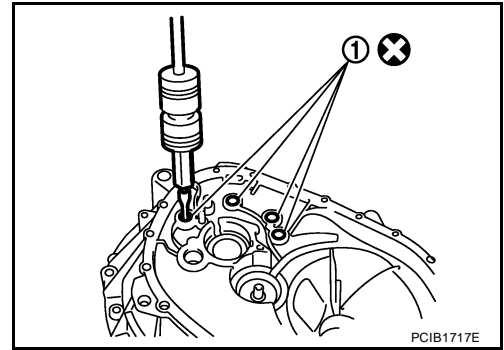
**Tool number A: KV381054S0 (J-34286)**



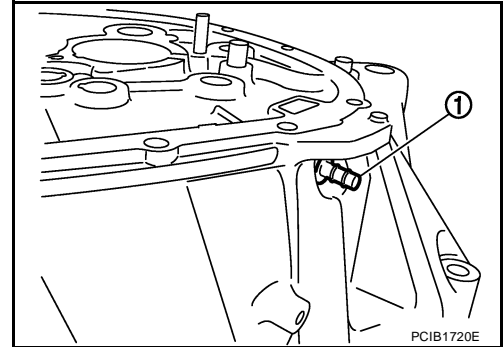
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# TRANSAXLE ASSEMBLY

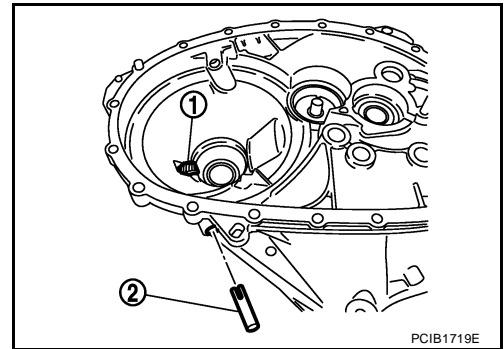
34. Remove busings (1) from clutch housing using a suitable tool.



35. Remove two way connector (1) from clutch housing.

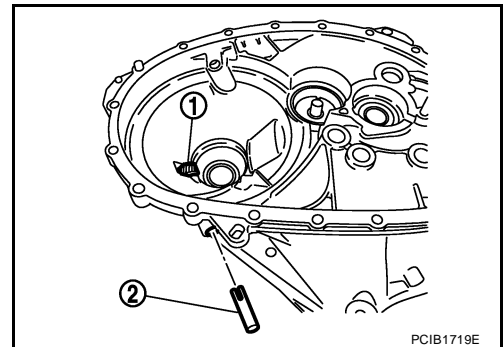


36. Remove pinion gear (1) and pinion shaft (2) from clutch housing.



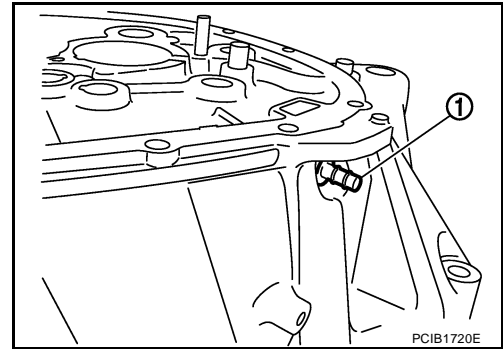
## ASSEMBLY

1. Install pinion gear (1) and pinion shaft (2) into clutch housing.

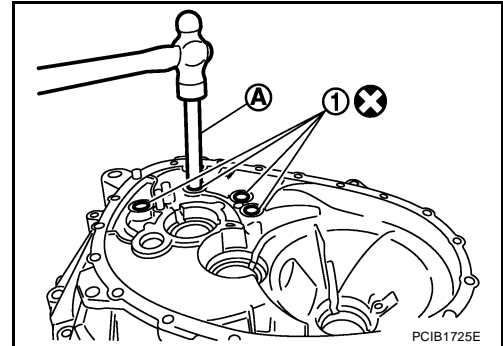


# TRANSAXLE ASSEMBLY

2. Install two way connector (1) into clutch housing.



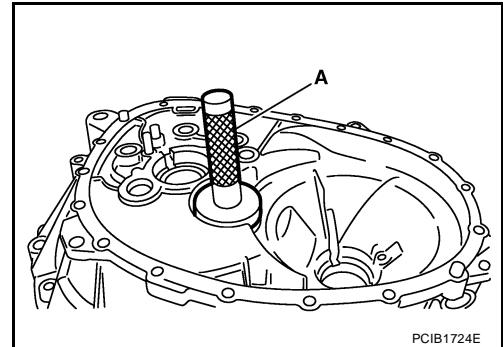
3. Install bushings (1) until they are flush with end face of clutch housing using a suitable tool (A).



4. Install oil channel and mainshaft front bearing outer race into clutch housing using Tool (A).

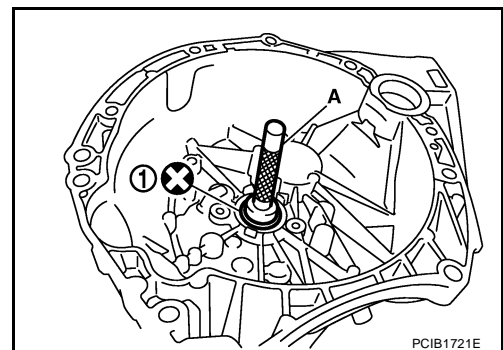
**Tool number** A: KV38100200 ( — )

**CAUTION:**  
Do not reuse oil channel.

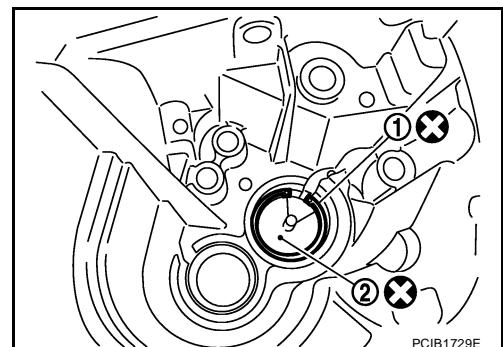


5. Install input shaft oil seal (1) into clutch housing using Tool (A).

**Tool number** A: ST33220000 ( — )



6. Install snap ring (1) and oil channel (2) onto transaxle case.

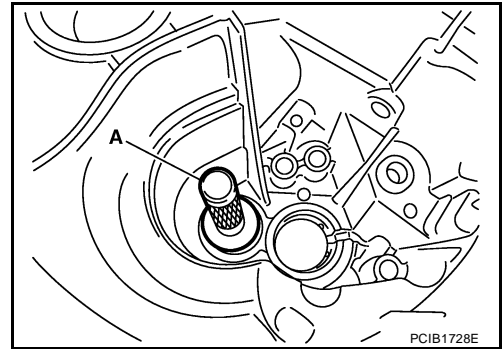


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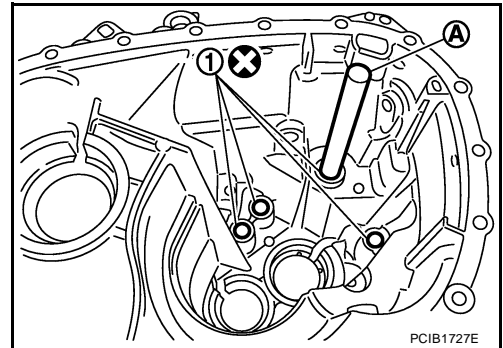
# TRANSAXLE ASSEMBLY

7. Install shim and mainshaft rear bearing outer race into transaxle case using Tool (A).

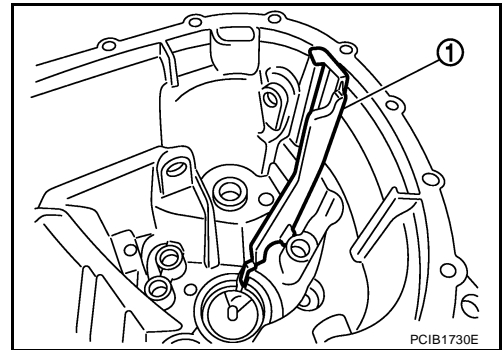
Tool number A: KV38100200 ( — )



8. Install bushings (1) into transaxle case using a suitable tool (A).

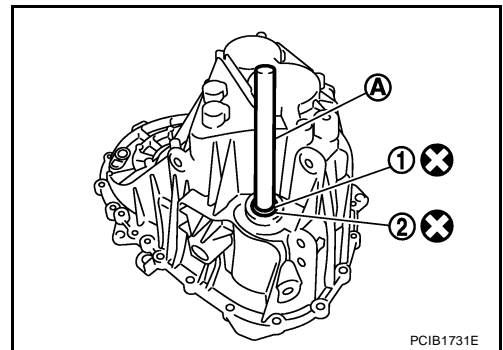


9. Install oil gutter (1) onto transaxle case.

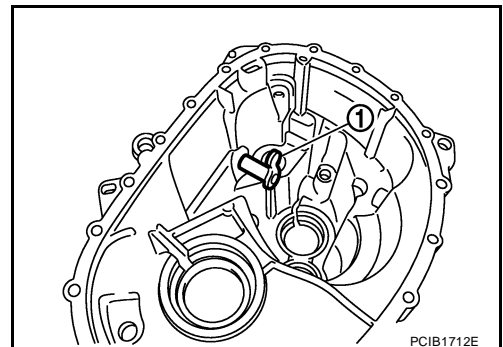


10. Install shift lever oil seal (1) and bushing (2) into transaxle case using a suitable tool (A).

11. Install control lever oil seal and bushings into transaxle case using a suitable tool.



12. Install shift finger (1) into transaxle case.

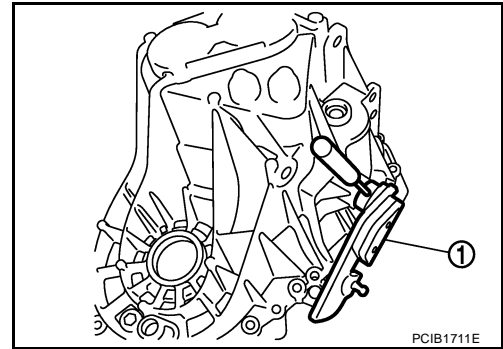


# TRANSAXLE ASSEMBLY

13. Install control lever (1) and then install retaining pin.

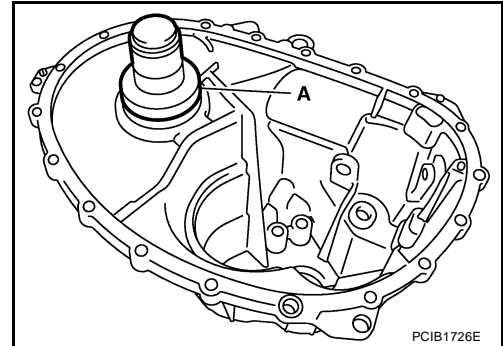
**CAUTION:**

**Do not reuse retaining pin.**



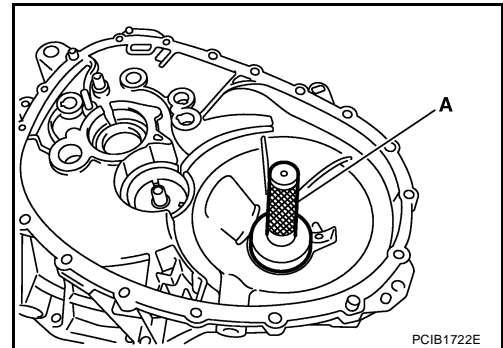
14. Install shim and differential side bearing outer race into transaxle case using Tool (A).

**Tool number A: ST33400001 (J-26082)**



15. Install differential side bearing outer race into clutch housing using Tool (A).

**Tool number A: KV38100200 ( — )**

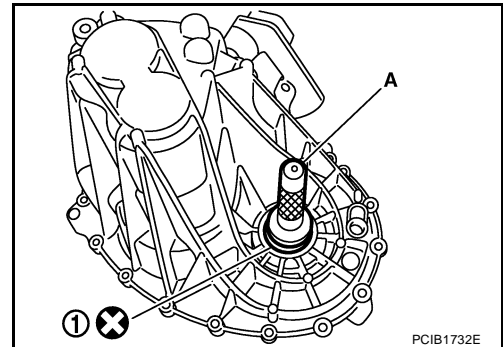


16. Install differential side oil seals (1) into clutch housing and transaxle case using Tool (A).

**Tool number A: KV38100300 (J-25523)**

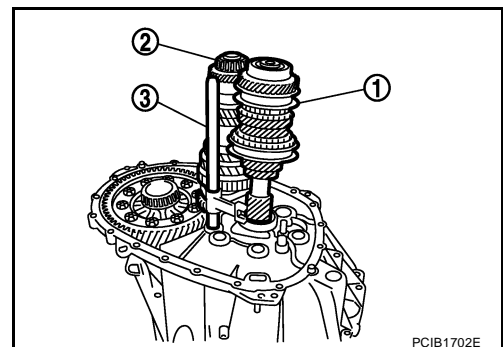
17. Install magnet onto clutch housing.

18. Install final drive assembly into clutch housing.



19. Install input shaft assembly (1), mainshaft assembly (2) and 1st-2nd fork rod assembly (3) into clutch housing.

20. Install spring washer located under the reverse idler shaft.

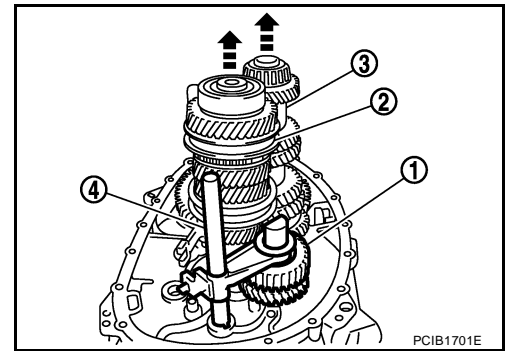


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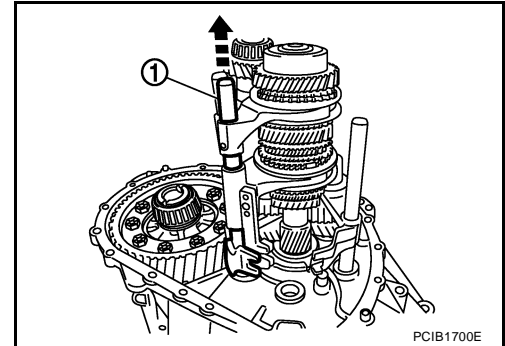
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## TRANSAXLE ASSEMBLY

21. Install reverse gear assembly (1) according to the following.
- Lift up the input shaft assembly (2) and mainshaft assembly (3).
  - Install reverse gear assembly (1) and reverse fork rod (4) to clutch housing.

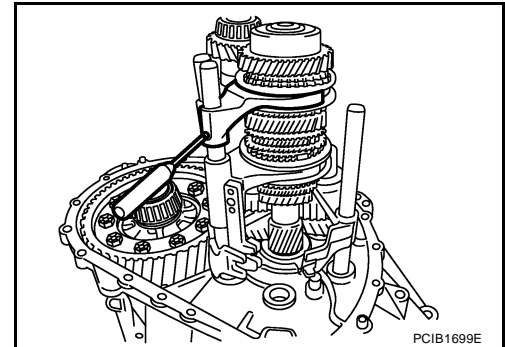


22. While lifting up fork rod (1), install 3rd-4th and 5th-6th fork rod assembly to clutch housing.



23. Install retaining pin into 5th-6th shift fork using a suitable tool.

**CAUTION:**  
Do not reuse retaining pin.

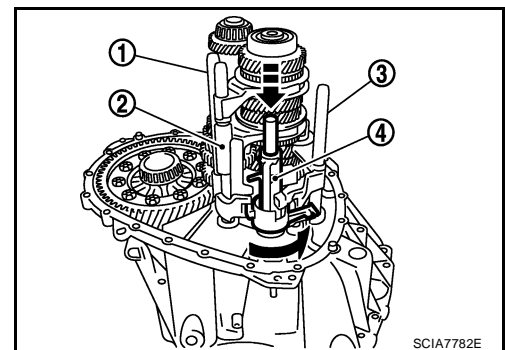


24. Move 1st-2nd fork rod (1), 3rd-4th and 5th-6th fork rod assembly (2), and reverse fork rod (3) to neutral position.
25. Install selector (4) into clutch housing.
26. Install spring of selector into return bushing.
27. Install bearing preloading shim onto mainshaft assembly.
28. Apply recommended sealant onto the mating surface of transaxle case.

● Use Genuine Silicone RTV or equivalent. Refer to GI-XX, "Recommended chemical products and sealants".

**CAUTION:**

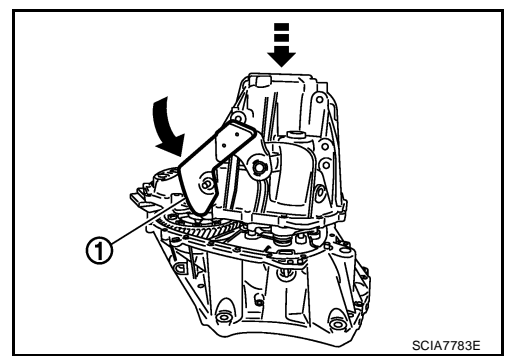
- Remove old sealant adhering to the mating surfaces. Also remove any moisture, oil, or foreign material adhering to both mating surfaces.
- Check for damage on the mating surface.
- Apply a continuous bead of liquid gasket to the mating surface.





# TRANSAXLE ASSEMBLY

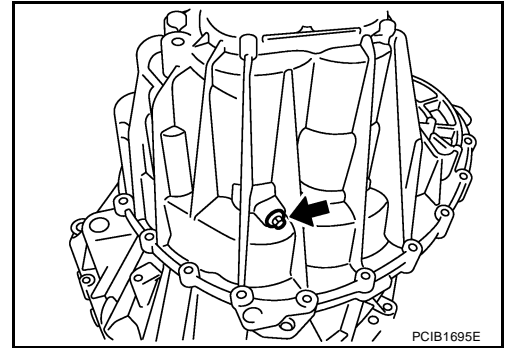
29. Engage shift finger and selector by moving control lever (1). Install transaxle case to clutch housing.



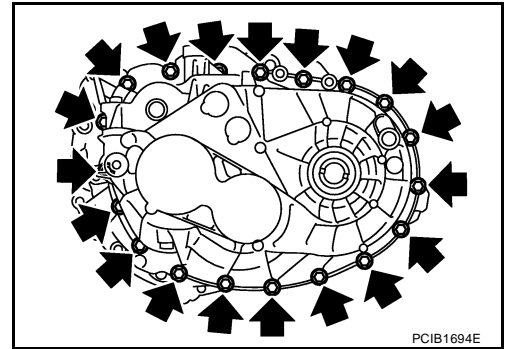
30. Install seal washer and reverse idler shaft bolt (←), and then tighten bolt to specification. Refer to [MT-18, "Gear Components"](#).

**CAUTION:**

**Do not reuse seal washer.**



31. Tighten bolts to specification. Refer to [MT-17, "Case and Housing Components"](#).



32. Apply sealant to the threads of position switch (1). Then install it into transaxle case and tighten to specification. Refer to [MT-17, "Case and Housing Components"](#).

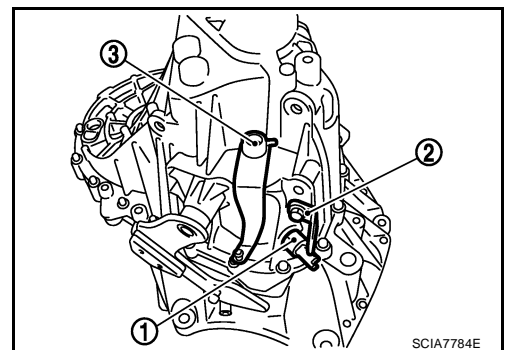
- Use Genuine Silicone RTV or equivalent. Refer to GI-XX, "Recommended chemical products and sealants".

33. Install bracket (2), and tighten bolt to specification. Refer to [MT-17, "Case and Housing Components"](#).

34. Install shift lever (3), and then install retaining pin using a suitable tool.

**CAUTION:**

**Do not reuse retaining pin.**



35. Install CSC onto clutch housing. Refer to [MT-17, "Case and Housing Components"](#).

36. Install a new gasket onto drain plug, and then install it into clutch housing. Tighten drain plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

37. Install a new gasket onto filler plug, and then install it into transaxle case. Tighten filler plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

**CAUTION:**

- Do not reuse gasket.

- After oil is filled, tighten filler plug to specification. Refer to [MT-17, "Case and Housing Components"](#).

# INPUT SHAFT AND GEARS

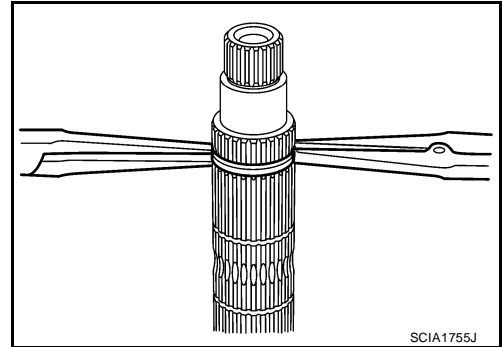
## INPUT SHAFT AND GEARS

PF3:32200

### Disassembly and Assembly GENERAL PRECAUTIONS

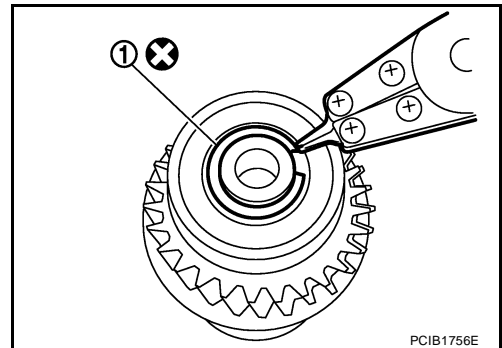
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- Do not reuse snap ring.
- Position input shaft on the vise with back plate and remove gears and snap rings.
- For installation and removal of snap ring, position snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.
- Disassemble gear components putting matching marks on the parts that do not affect any functions.

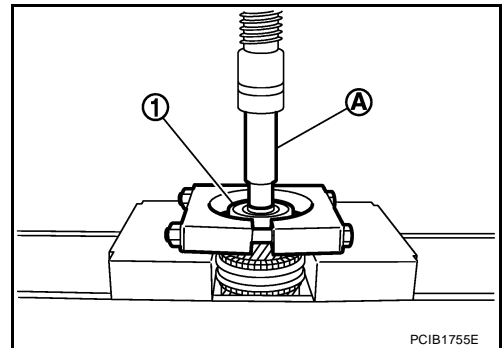


### DISASSEMBLY

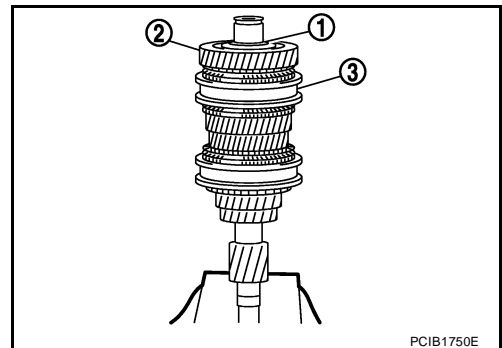
1. Remove snap ring (1).



2. Install the suitable tools (A) onto input shaft rear bearing (1), and remove input shaft rear bearing (1) from input shaft.

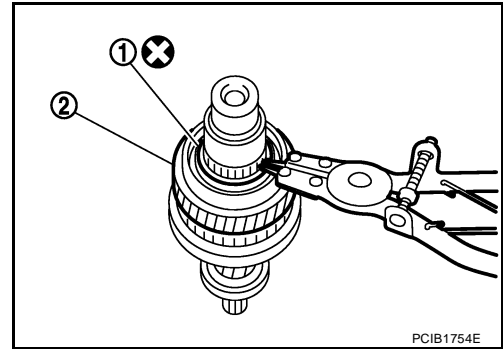


3. Remove washer (1), 6th input gear (2) and 5th-6th synchronizer assembly (3).
4. Remove needle bearing.

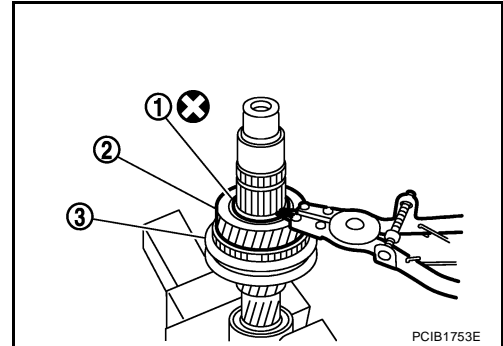


# INPUT SHAFT AND GEARS

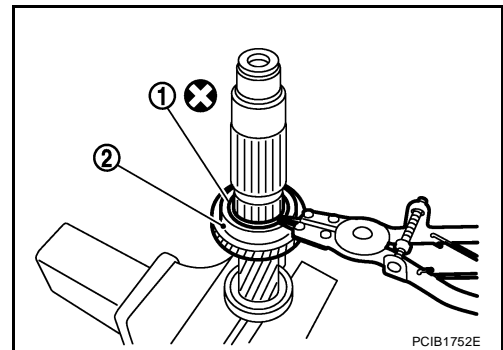
5. Remove snap ring (1), washer and 5th input gear (2).
6. Remove washer.



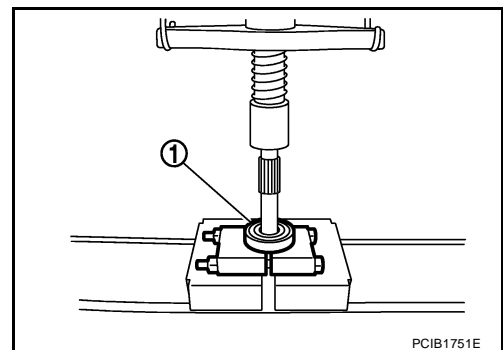
7. Remove snap ring (1), washer, 4th input gear (2) and 3rd-4th synchronizer assembly (3).



8. Remove snap ring (1), washer and 3rd input gear (2).



9. Remove input shaft front bearing (1) from input shaft using a suitable tool.



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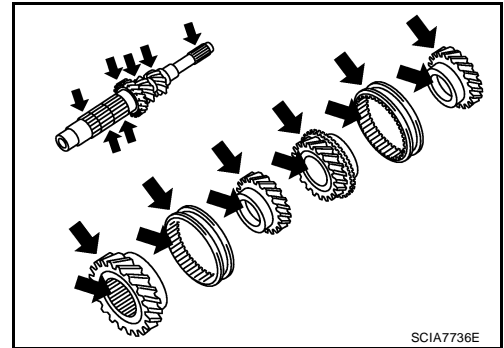
# INPUT SHAFT AND GEARS

## INSPECTION AFTER DISASSEMBLY

### Input Shaft and Gears

Check items below. If necessary, replace them with new ones.

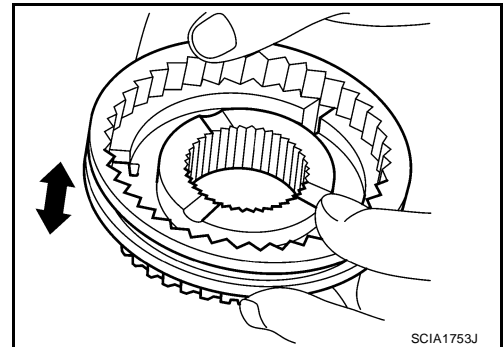
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



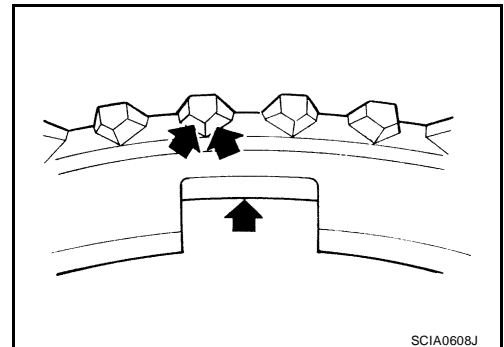
### Synchronizer

Check items below. If necessary, replace them with new ones.

- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and insert key.
- Coupling sleeve and synchronizer hub must move smoothly.



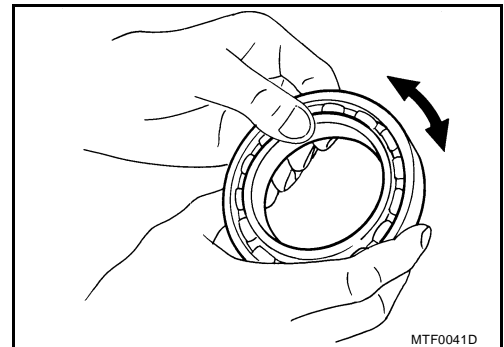
- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



### Bearing

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing

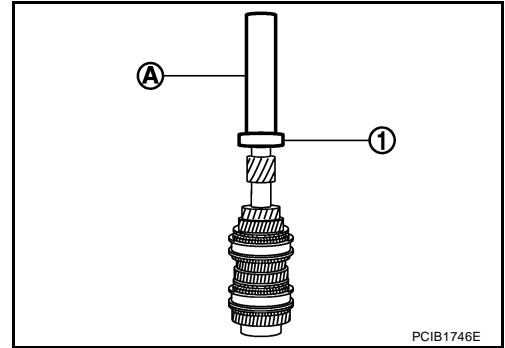


# INPUT SHAFT AND GEARS

## ASSEMBLY

Note the following. Assembly is in the reverse order of disassembly. Refer to [MT-18, "Gear Components"](#) .

- Press-fit the input shaft front bearing (1) onto the input shaft using a suitable tool (A).

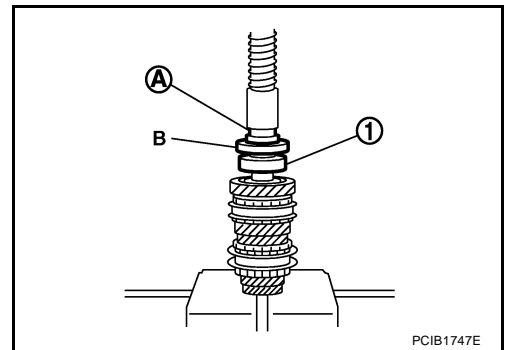


- Press-fit the input shaft rear bearing (1) onto the input shaft using a suitable tool (A), and Tool (B).

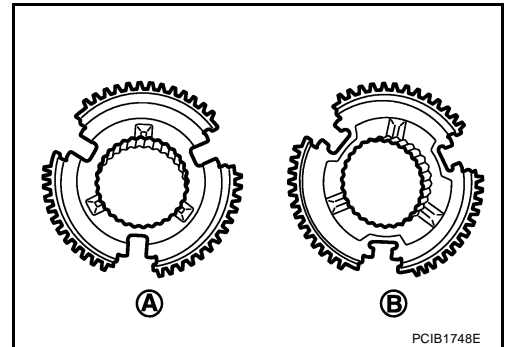
Tool number B: ST36720030 ( — )

### CAUTION:

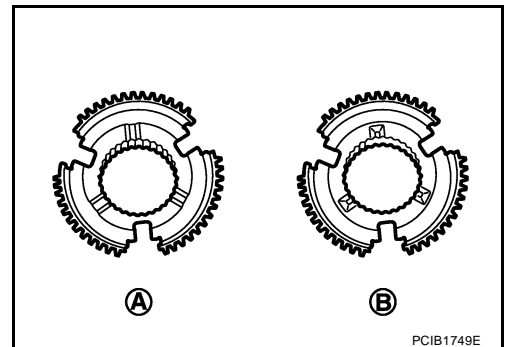
- Do not reuse snap ring.
- Make sure that snap ring is securely installed in the groove.



- Be careful with the orientation of 3rd-4th synchronizer hub.  
A: 3rd input gear side  
B: 4th input gear side



- Be careful with the orientation of 5th-6th synchronizer hub.  
A: 5th input gear side  
B: 6th input gear side



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# MAINSHAFT AND GEARS

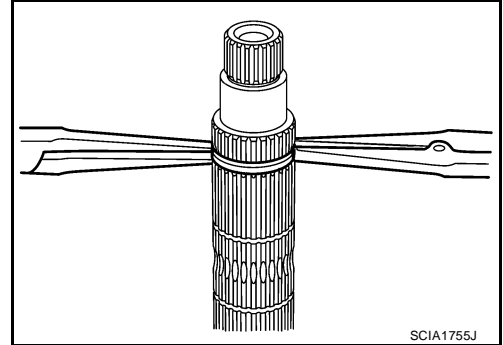
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## MAINSHAFT AND GEARS

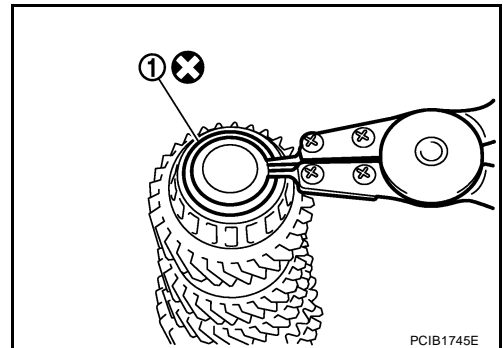
### Disassembly and Assembly GENERAL PRECAUTIONS

- Do not reuse snap rings.
- Position mainshaft on the vise with back plate and remove gears and snap rings.
- For installation and removal of snap ring, position snap ring pliers and flat pliers at both sides of snap ring. Stretch snap ring, and move it with flat pliers.
- Disassemble gear components putting matching marks on the parts that do not affect any functions.



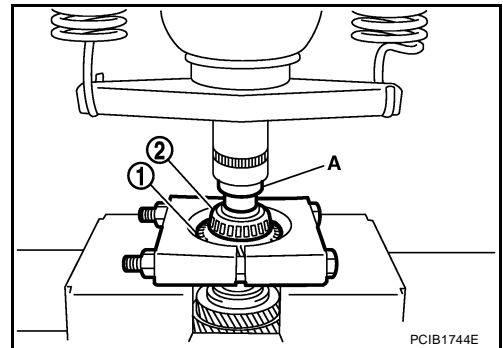
### DISASSEMBLY

1. Remove snap ring (1).



2. Install Tool (A) and suitable tool onto 6th main gear (1), and remove mainshaft rear bearing inner race (2) and 6th main gear (1) from mainshaft.

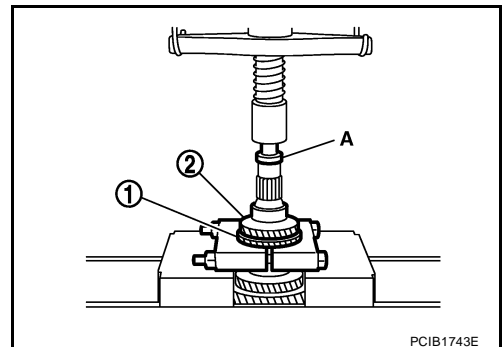
**Tool number** A: ST33052000 ( — )



3. Install Tool (A) and suitable tool onto 4th main gear (1), and remove 5th main gear (2), and 4th main gear (1) from mainshaft.

**Tool number** A: ST33052000 ( — )

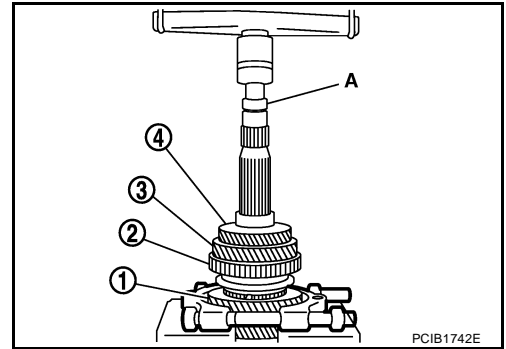
4. Remove intermediate adjusting shim.



# MAINSHAFT AND GEARS

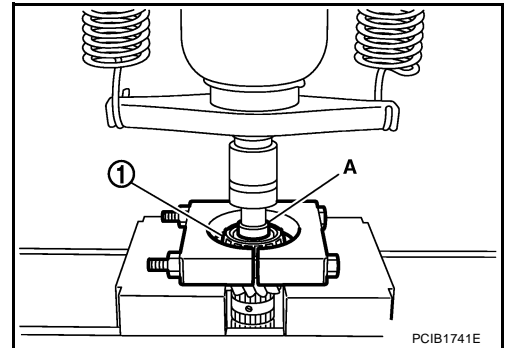
5. Install Tool (A) and suitable tool onto 1st main gear (1), and remove 1st main gear (1), 1st-2nd synchronizer assembly (2), 2nd main gear (3), bushing, and 3rd main gear (4) from mainshaft.

**Tool number**     **A: ST33052000 ( — )**



6. Install Tool (A) and suitable tool onto mainshaft front bearing inner race (1), and remove mainshaft front bearing (1) from mainshaft.

**Tool number**     **A: ST33052000 ( — )**

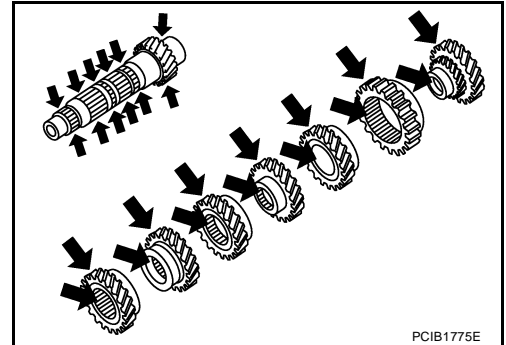


## INSPECTION AFTER DISASSEMBLY

### Mainshaft and Gears

Check items below. If necessary, replace them with new ones.

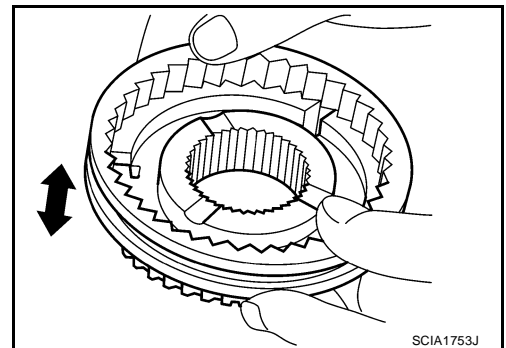
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



### Synchronizer

Check items below. If necessary, replace them with new ones.

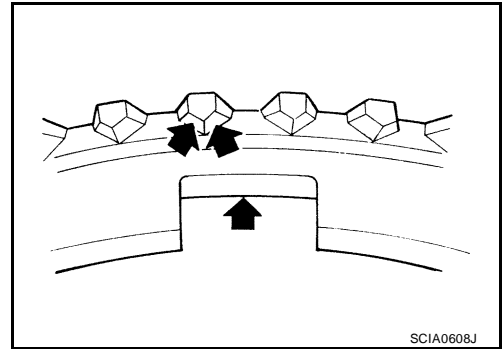
- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub, insert key.
- Coupling sleeve and synchronizer hub must move smoothly.



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## MAINSHAFT AND GEARS

- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



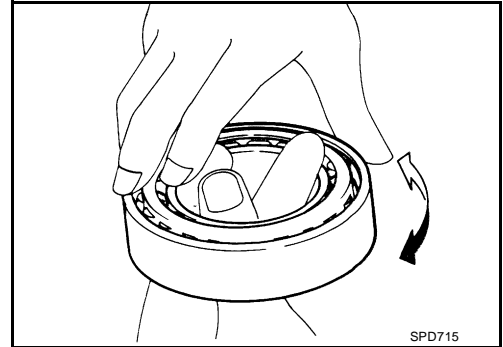
### Bearing

Check items below. If necessary, replace them with new ones.

#### CAUTION:

**When replacing tapered roller bearing, replace outer and inner races as a set.**

- Damage and rough rotation of bearing



#### CAUTION:

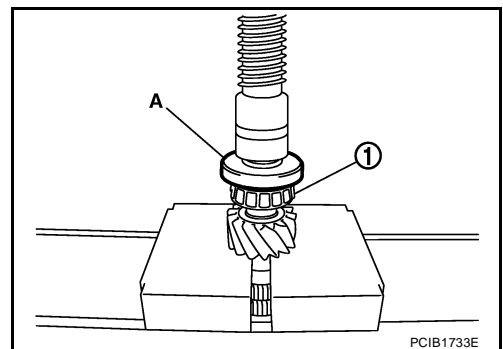
**Bearing preloading shim: after the intermediate adjusting shim and/or the 6th main gear, 5th main gear, and 4th main gear have been replaced, it is necessary to modify the bearing preload setting by changing the bearing preload shim.**

- Replacing the intermediate adjusting shim.
  - Increase the size of the bearing preload shim, if the replaced intermediate adjusting shim is thinner than the shim used before.
  - Decrease the size of the bearing preload shim, if the replaced intermediate adjusting shim is thicker than the shim used before.
- Replacing the 6th main gear, 5th main gear, and 4th main gear.
  - Measure the thickness of the main gear used before and the new main gear.
  - Increase the thickness of the bearing preload shim, if the difference is smaller than 0.025 mm (0.0010 in).
  - Decrease the thickness of the bearing preload shim, if the difference is greater than 0.025 mm (0.0010 in).

### ASSEMBLY

1. Press-fit the mainshaft front bearing inner race (1) onto the mainshaft using Tool (A).

**Tool number**    **A: ST36720030 ( — )**

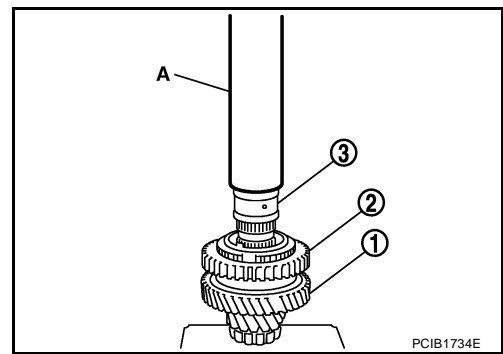




# MAINSHAFT AND GEARS

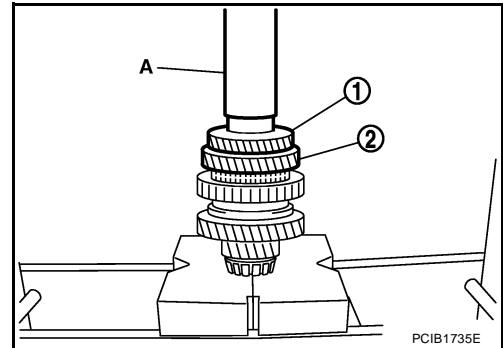
- Install 1st main gear (1), and 1st-2nd synchronizer assembly (2) onto the mainshaft.
- Press-fit the bushing (3) onto the mainshaft using Tool (A).

**Tool number**    **A: KV32102700 ( — )**



- Press-fit 3rd main gear (1) onto the mainshaft with Tool (A) after installing the 2nd main gear (2) and the 3rd main gear (1) onto the mainshaft.

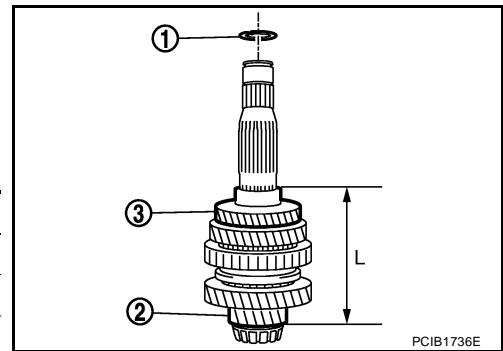
**Tool number**    **A: KV32102700 ( — )**



- Select the thickness of the intermediate adjusting shim (1) needed by measuring the distance "L" between the base of the mainshaft (2) and the top of the 3rd main gear (3). Refer to the following table to determine the thickness of the adjusting shim.

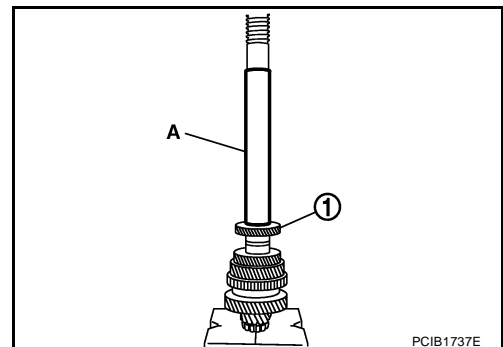
Unit: mm (in)

Distance "L"	Adjusting shim thickness
147.690 – 147.666 (5.8146 – 5.8136)	1.500 (0.0591)
147.665 – 147.641 (5.8136 – 5.8126)	1.525 (0.0600)
147.640 – 147.616 (5.8126 – 5.8116)	1.550 (0.0610)
147.615 – 147.591 (5.8116 – 5.8107)	1.575 (0.0620)
147.590 – 147.566 (5.8106 – 5.8097)	1.600 (0.0630)
147.565 – 147.541 (5.8096 – 5.8087)	1.625 (0.0640)
147.540 – 147.516 (5.8086 – 5.8077)	1.650 (0.0650)
147.515 – 147.491 (5.8077 – 5.8067)	1.675 (0.0659)
147.490 – 147.466 (5.8067 – 5.8057)	1.700 (0.0669)
147.465 – 147.441 (5.8057 – 5.8048)	1.725 (0.0679)
147.440 – 147.416 (5.8047 – 5.8038)	1.750 (0.0689)
147.415 – 147.391 (5.8037 – 5.8028)	1.775 (0.0699)



- Install selected intermediate adjusting shim.
- Press-fit the 4th main gear (1) onto the mainshaft using Tool (A).

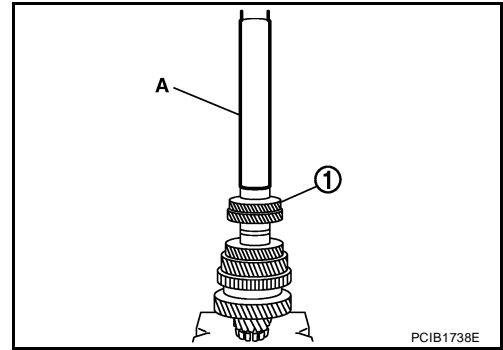
**Tool number**    **A: KV32102700 ( — )**



## MAINSHAFT AND GEARS

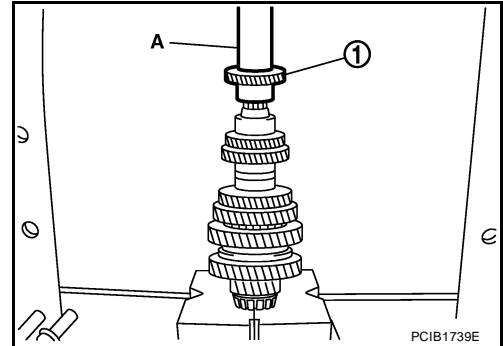
8. Press-fit the 5th main gear (1) onto the mainshaft using Tool (A).

**Tool number**    **A: KV32102700 ( — )**



9. Press-fit the 6th main gear (1) onto the mainshaft using Tool (A).

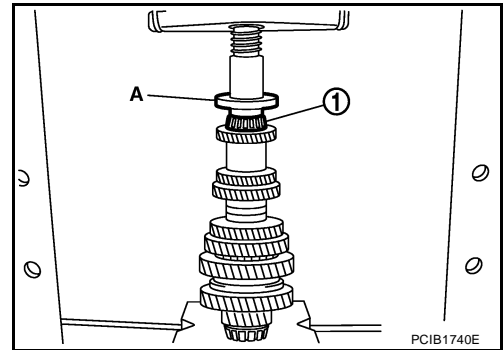
**Tool number**    **A: KV32102700 ( — )**



10. Press-fit the mainshaft rear bearing inner race (1) onto the mainshaft using Tool (A).

**Tool number**    **A: ST30901000 (J-26010-01)**

11. Install snap ring onto mainshaft.



# REVERSE IDLER SHAFT AND GEARS

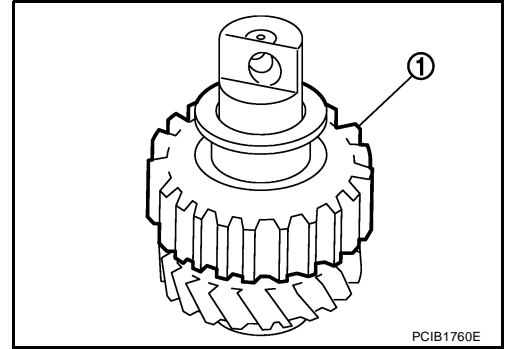
## REVERSE IDLER SHAFT AND GEARS

PFP:32281

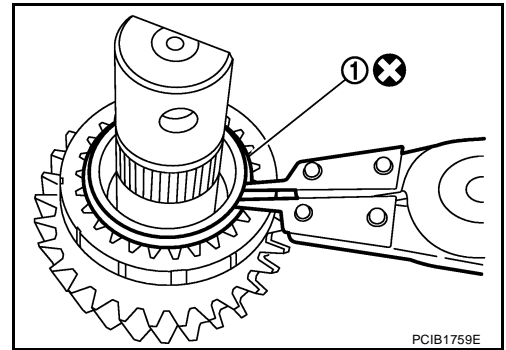
UCS0065F

### Disassembly and Assembly DISASSEMBLY

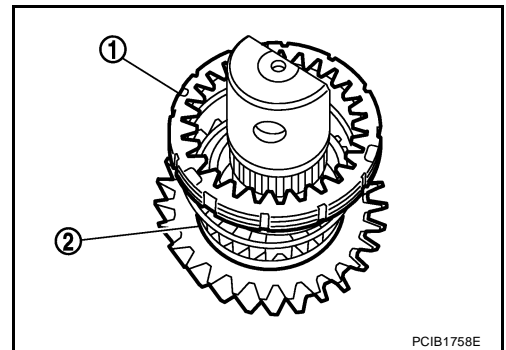
1. Remove reverse output gear (1).



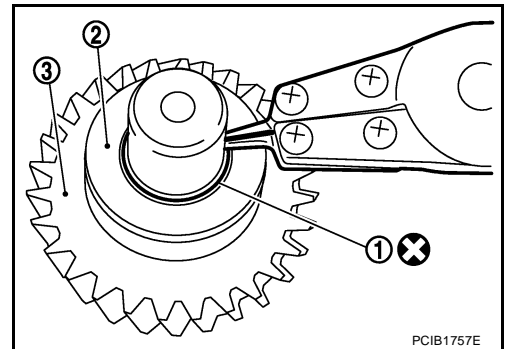
2. Remove snap ring (1).



3. Remove reverse baulk ring (1) and return spring (2).



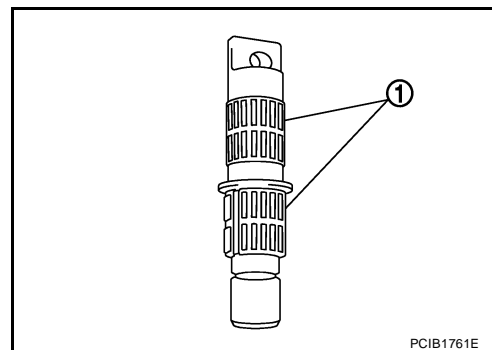
4. Remove snap ring (1), lock washer (2), reverse input gear (3) and washer.



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## REVERSE IDLER SHAFT AND GEARS

5. Remove needle bearings (1) from reverse idler shaft.



### ASSEMBLY

Assembly is in the reverse order of disassembly. Refer to [MT-18, "Gear Components"](#)

#### CAUTION:

- Do not reuse snap ring.
- Make sure that snap ring is securely installed in the groove.

# FINAL DRIVE

## FINAL DRIVE

PFP:38411

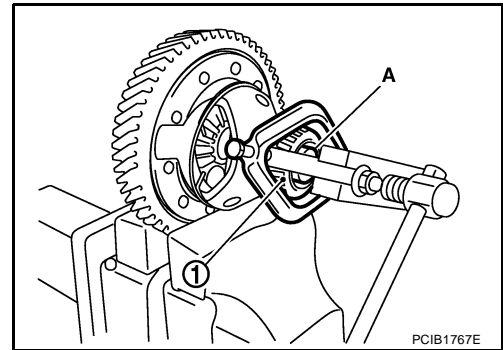
### Disassembly and Assembly

UCS0065G

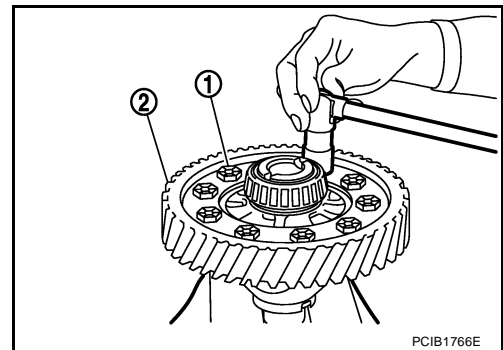
1. Remove differential side bearing inner race (clutch housing side) (1) using Tool (A) and a suitable tool.

**Tool number A: ST33061000 (J-8107-2)**

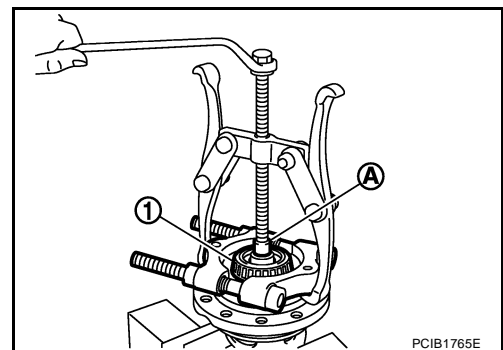
2. Remove speedometer drive gear.



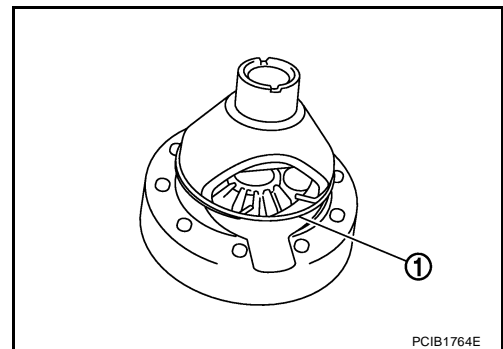
3. Remove final gear bolts (1), and then separate the final gear (2) from differential case.



4. Remove differential side bearing inner race (transaxle case side) (1) using a suitable tool (A).



5. Remove lock ring (1) from differential case.
6. Remove pinion mate shaft, pinion mate gears, side gears and thrust washer from differential case.



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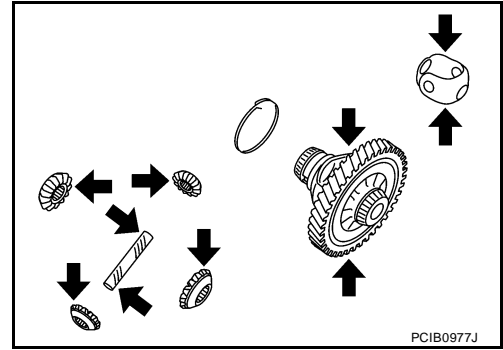
M

# FINAL DRIVE

## INSPECTION AFTER DISASSEMBLY

### Gear, Washer, Shaft and Case

- Check side gears, thrust washer, pinion mate shaft, pinion mate gears, lock ring and differential case. If necessary, replace with a new one.

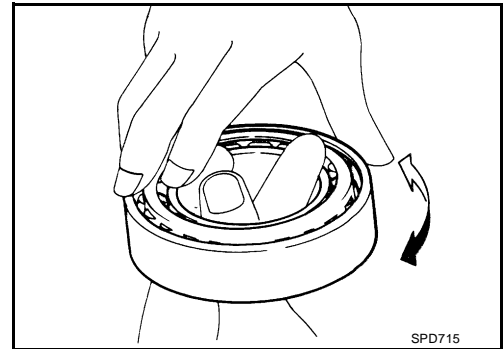


### Bearing

- Check for bearing damage and rough rotation. If necessary, replace with a new one.

#### **CAUTION:**

**When replacing tapered roller bearing, replace outer and inner races as a set.**



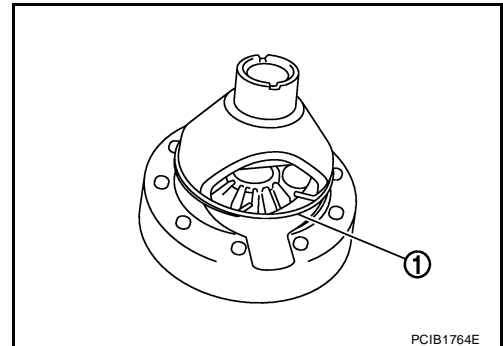
## ASSEMBLY

1. Install pinion mate shaft, pinion mate gears, side gears and thrust washer into differential case.
2. Install lock ring (1) onto differential case.

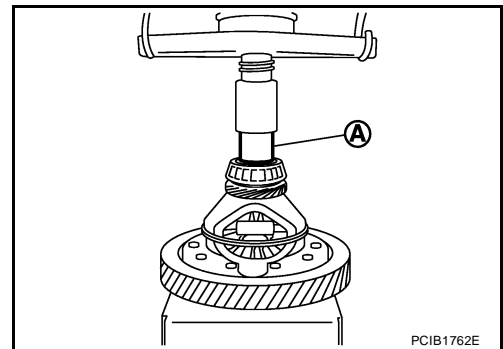
#### **CAUTION:**

**Make sure that lock ring is securely installed in the groove.**

3. Install final gear into differential case, and tighten final gear bolts to specification. Refer to [MT-22, "Final Drive Components"](#)
4. Install speedometer drive gear onto differential case.

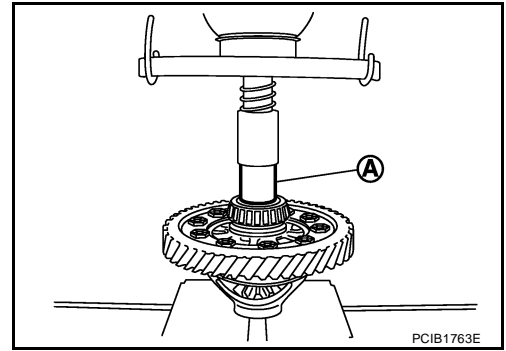


5. Press-fit the differential side bearing inner race (clutch housing side) onto the differential case using a suitable tool (A).



## FINAL DRIVE

6. Press-fit the differential side bearing inner race (transaxle case side) onto the differential case using a suitable tool (A).



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# SHIFT CONTROL

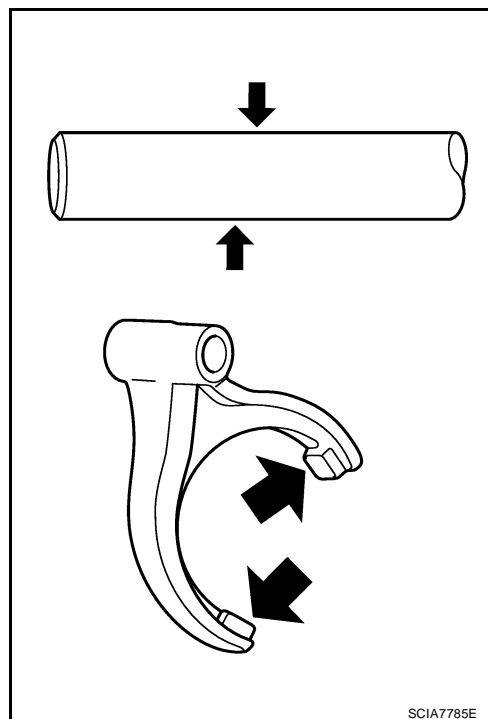
## SHIFT CONTROL

PF3:32982

### Inspection

UCS0065H

- Check contact surface and sliding surface of fork rod and shift fork for wear, damage, and bend. Replace if necessary.





# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

### General Specifications

UCS006KD

Engine type		MR18DE	
Transaxle model		RS6F94R	
Number of speeds		6	
Synchromesh type		Warner	
Shift pattern		<p style="text-align: center;">PCI1769E</p>	
Gear ratio	1st	3.727	
	2nd	2.105	
	3rd	1.452	
	4th	1.171	
	5th	0.971	
	6th	0.811	
	Reverse	3.687	
	Final gear	3.933	
Number of teeth	Input gear	1st	11
		2nd	19
		3rd	31
		4th	35
		5th	35
		6th	37
		Reverse	11
	Main gear	1st	41
		2nd	40
		3rd	45
		4th	41
		5th	34
		6th	30
		Reverse	42
	Reverse idler gear	Input/Output	28/29
	Final gear	Final gear/Pinion	59/15
Side gear/Pinion mate gear		21/18	
Oil capacity	ℓ (US pt, Imp pt)	Approx. 2.0 (4-1/4, 3-1/2)	
Remarks	Reverse synchronizer	Installed	
	Triple-cone synchronizer	1st and 2nd	

# SERVICE DATA AND SPECIFICATIONS (SDS)

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