

**SECTION** **MT**  
**MANUAL TRANSAXLE**

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**MT**  
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 E  
 F  
 G  
 H  
 I  
 J  
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**CONTENTS**

<p><b>PRECAUTIONS</b> ..... 3</p> <p style="padding-left: 20px;">Cautions ..... 3</p> <p><b>PREPARATION</b> ..... 4</p> <p style="padding-left: 20px;">Special Service Tools ..... 4</p> <p style="text-align: center;"><b>JH3</b></p> <hr/> <p><b>DESCRIPTION</b> ..... 6</p> <p style="padding-left: 20px;">Cross-sectional View ..... 6</p> <p><b>REMOVAL AND INSTALLATION</b> ..... 7</p> <p style="padding-left: 20px;">Removal ..... 7</p> <p style="padding-left: 20px;">Installation ..... 7</p> <p><b>TIGHTENING TORQUES</b> ..... 8</p> <p style="padding-left: 20px;">Description ..... 8</p> <p><b>COMPONENTS</b> ..... 9</p> <p style="padding-left: 20px;">Gear Components ..... 9</p> <p style="padding-left: 20px;">Differential Gear ..... 10</p> <p style="padding-left: 20px;">Shift Control Components ..... 10</p> <p style="padding-left: 20px;">Case Components ..... 11</p> <p style="padding-left: 20px;">Clutch Housing ..... 11</p> <p><b>CONTROL LINKAGE</b> ..... 12</p> <p style="padding-left: 20px;">Removal and Installation of Control Device and Cable ..... 12</p> <p style="padding-left: 40px;">REMOVAL ..... 12</p> <p style="padding-left: 40px;">INSTALLATION ..... 12</p> <p><b>RATIOS</b> ..... 13</p> <p style="padding-left: 20px;">NISSAN Gearbox ..... 13</p> <p><b>CONSUMABLES</b> ..... 14</p> <p style="padding-left: 20px;">Description ..... 14</p> <p><b>CAPACITIES - LUBRICANTS</b> ..... 15</p> <p style="padding-left: 20px;">Description ..... 15</p> <p><b>TROUBLE DIAGNOSIS</b> ..... 16</p> <p style="padding-left: 20px;">Symptom Chart ..... 16</p> <p style="padding-left: 20px;">Back-Up Lamp Switch ..... 16</p> <p style="padding-left: 20px;">Park/Neutral Position Switch ..... 16</p> <p><b>PRECAUTIONS</b> ..... 17</p> <p style="padding-left: 20px;">Precautions ..... 17</p> <p><b>PARTS TO BE REPLACED SYSTEMATICALLY</b> .... 18</p> <p style="padding-left: 20px;">Description ..... 18</p>	<p><b>CHECKING</b> ..... 19</p> <p style="padding-left: 20px;">Bearings ..... 19</p> <p style="padding-left: 20px;">Gearing ..... 19</p> <p style="padding-left: 20px;">Synchronizer Ring ..... 19</p> <p style="padding-left: 20px;">Sliding Gear Hub ..... 19</p> <p><b>SEPARATING THE HOUSINGS</b> ..... 20</p> <p style="padding-left: 20px;">Removal ..... 20</p> <p><b>REPAIRING THE GEARBOX</b> ..... 22</p> <p style="padding-left: 20px;">Removal ..... 22</p> <p><b>MAINSHAFT</b> ..... 24</p> <p style="padding-left: 20px;">Removal ..... 24</p> <p style="padding-left: 20px;">Refitting ..... 25</p> <p><b>TRANSAXLE CASE BEARING</b> ..... 26</p> <p style="padding-left: 20px;">Removal ..... 26</p> <p style="padding-left: 20px;">Refitting ..... 26</p> <p><b>CLUTCH HOUSING BEARING</b> ..... 27</p> <p style="padding-left: 20px;">Removal ..... 27</p> <p style="padding-left: 20px;">Refitting ..... 27</p> <p><b>SELECTOR SHAFT RINGS</b> ..... 28</p> <p style="padding-left: 20px;">Removal ..... 28</p> <p style="padding-left: 20px;">Refitting ..... 28</p> <p><b>DIFFERENTIAL BEARINGS</b> ..... 29</p> <p style="padding-left: 20px;">Removal and Installation ..... 29</p> <p><b>SELECTOR SHAFT</b> ..... 30</p> <p style="padding-left: 20px;">Removal ..... 30</p> <p style="padding-left: 20px;">Refitting ..... 30</p> <p><b>ASSEMBLY</b> ..... 31</p> <p style="padding-left: 20px;">Refitting ..... 31</p> <p><b>HOUSING ASSEMBLY</b> ..... 33</p> <p style="padding-left: 20px;">Assembly ..... 33</p> <p style="text-align: center;"><b>JR5</b></p> <hr/> <p><b>DESCRIPTION</b> ..... 36</p> <p style="padding-left: 20px;">Cross-Sectional View ..... 36</p> <p><b>REMOVAL AND INSTALLATION</b> ..... 37</p> <p style="padding-left: 20px;">Removal ..... 37</p> <p style="padding-left: 20px;">Installation ..... 37</p> <p><b>TIGHTENING TORQUES</b> ..... 38</p> <p style="padding-left: 20px;">Description ..... 38</p>
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<b>COMPONENTS</b> .....	<b>39</b>	Synchronizer Ring .....	49
Gear Components .....	39	Sliding Gear Hub .....	49
Differential Gear .....	40	<b>SEPARATING THE HOUSINGS</b> .....	<b>50</b>
Shift Control Components .....	40	Removal .....	50
Case Components .....	41	<b>REPAIRING THE GEARBOX</b> .....	<b>52</b>
Clutch Housing .....	41	Removal .....	52
<b>CONTROL LINKAGE</b> .....	<b>42</b>	Removing the Gearing .....	53
Removal and Installation of Control Device and		Checking Parts .....	53
Cable .....	42	Refitting the Gearing .....	54
REMOVAL .....	42	<b>TRANSAXLE CASE BEARING</b> .....	<b>55</b>
INSTALLATION .....	42	Removing the Bearing, Input Shaft Side .....	55
<b>RATIOS</b> .....	<b>43</b>	Refitting .....	55
NISSAN Gearbox .....	43	<b>CLUTCH HOUSING BEARING</b> .....	<b>56</b>
<b>CONSUMABLES</b> .....	<b>44</b>	Removal and Installation .....	56
Description .....	44	<b>SELECTOR SHAFT RINGS</b> .....	<b>57</b>
<b>CAPACITIES - LUBRICANTS</b> .....	<b>45</b>	Removal .....	57
Description .....	45	Refitting .....	57
<b>TROUBLE DIAGNOSIS</b> .....	<b>46</b>	<b>DIFFERENTIAL BEARINGS</b> .....	<b>58</b>
Symptom Chart .....	46	Removal and Installation .....	58
Back-Up Lamp Switch .....	46	<b>SELECTOR SHAFT</b> .....	<b>59</b>
Park/Neutral Position Switch .....	46	Removal .....	59
<b>PRECAUTIONS</b> .....	<b>47</b>	Refitting .....	59
Precautions .....	47	<b>REPAIRING THE GEARBOX</b> .....	<b>60</b>
<b>PARTS TO BE REPLACED SYSTEMATICALLY</b> ....	<b>48</b>	Setting the Pre-tensioning of the Output Shaft Bear-	
Description .....	48	ings .....	60
<b>CHECKING</b> .....	<b>49</b>	<b>ASSEMBLY</b> .....	<b>61</b>
Bearings .....	49	Refitting .....	61
Gearing .....	49	<b>HOUSING ASSEMBLY</b> .....	<b>63</b>
		Assembly .....	63

# PRECAUTIONS

## PRECAUTIONS

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A

### Cautions

BCS000L0

- Do not reuse transaxle oil, once it has been drained.
- Check oil level or replace oil with vehicle on level ground.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check the correct installation status prior to removal or disassembly. If mating marks are required, make sure that they do not interfere with the function of the parts they are applied to.
- In principle, tighten nuts and bolts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Be careful not to damage sliding surfaces and mating surfaces.

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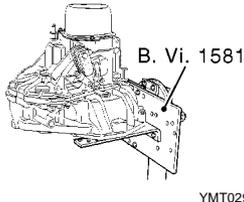
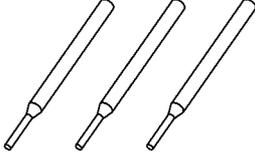
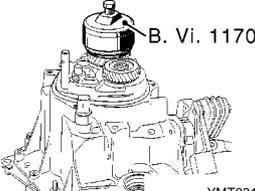
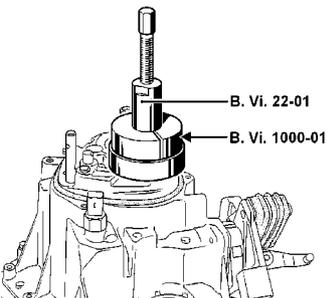
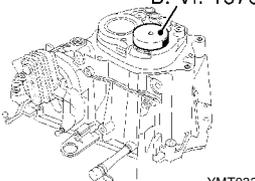
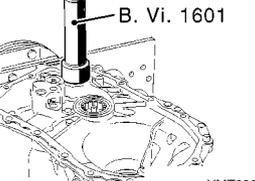
# PREPARATION

## PREPARATION

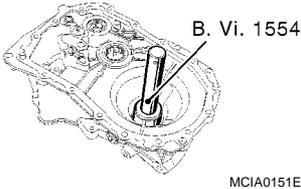
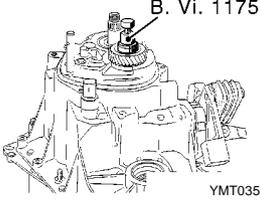
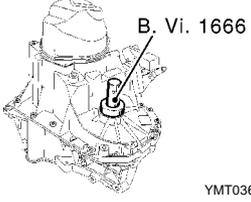
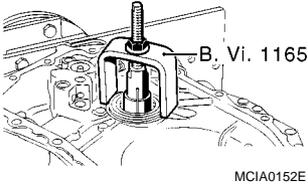
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### Special Service Tools

BCS000L1

Tool number Tool name	Description	
B. Vi. 1581 Transmission stand	 <p>YMT029</p>	Disassembly and assembly for transmission or transaxle
B. Vi. 31-01 Pin punch	 <p>YMT030</p>	Removing and installing retaining pin
B. Vi. 1170 Puller	 <p>YMT031</p>	Removing 5th synchronizer
B. Vi. 22-01 Puller	 <p>MCIB0026E</p>	Removing 5th gear
B. Vi. 1000-01 Puller		Removing 5th gear
B. Vi. 1576 Mandrel	 <p>YMT032</p>	Removing input shaft bearing
B. Vi. 1601 Mandrel	 <p>YMT033</p>	Installing bearing guide of mainshaft

# PREPARATION

Tool number Tool name	Description	
B. Vi. 1554 Drift kit	<div style="text-align: right;">Installing bearing race</div> 	A B MT
B. Vi. 1175 Installer	<div style="text-align: right;">Installing 5th gear</div> 	D E
B. Vi. 1666 Drift	<div style="text-align: right;">Installing differential oil seal</div> 	F G
B. Vi. 1165 Extractor	<div style="text-align: right;">Removing mainshaft bearing</div> 	H I J

# DESCRIPTION

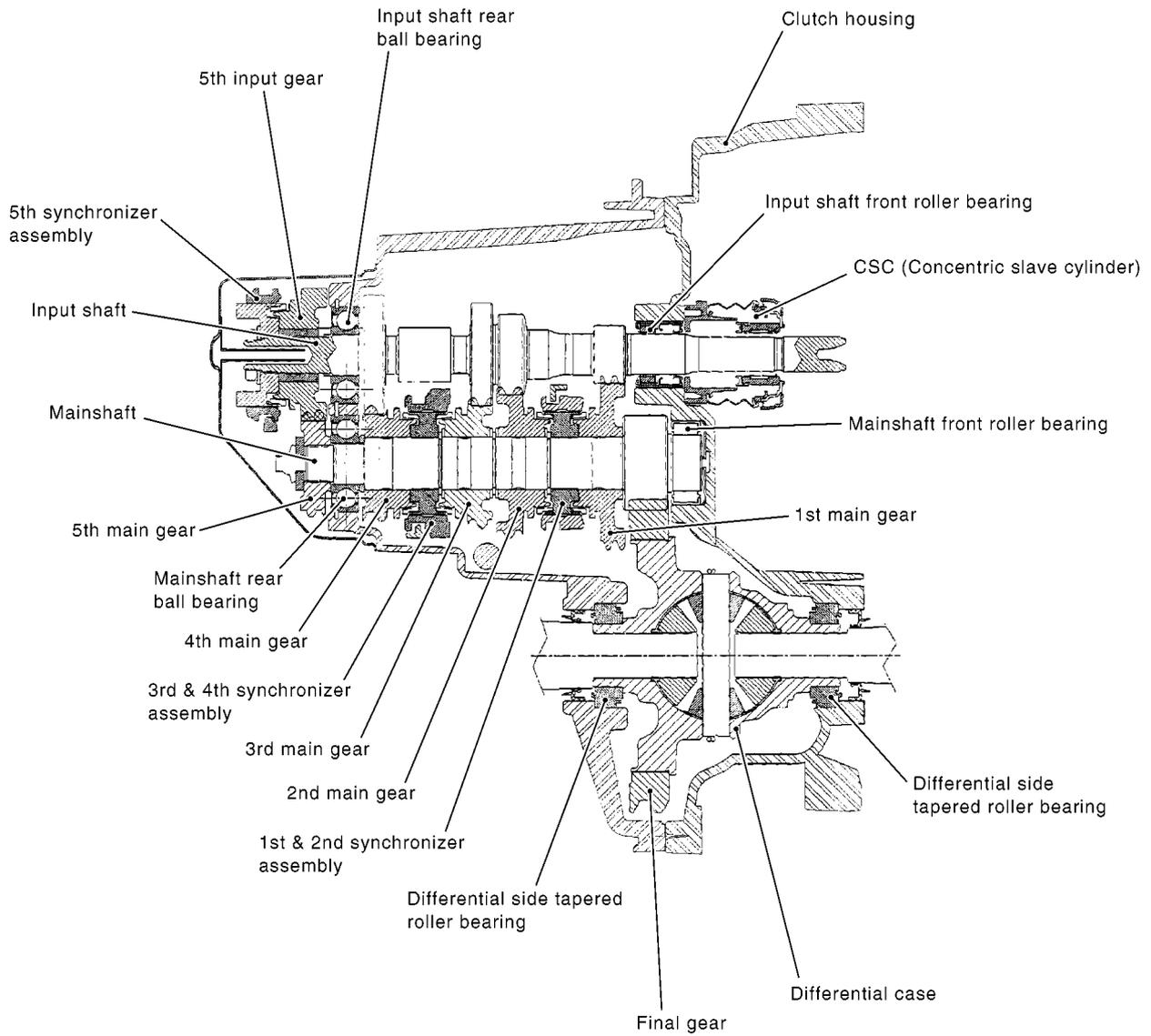
[JH3]

## DESCRIPTION

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### Cross-sectional View

BCS000L2



MCIA0153E

## REMOVAL AND INSTALLATION

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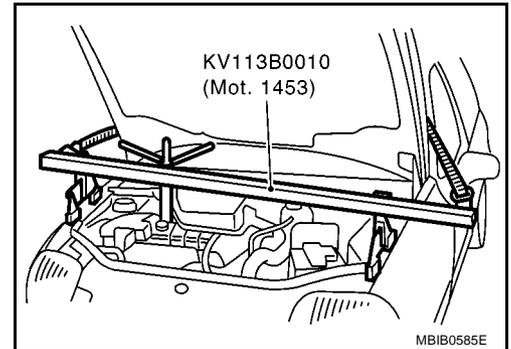
## Removal

BCS000L3

**CAUTION:**

Remove the crankshaft position sensor (POS) from transaxle assembly before separating transaxle from engine. Be careful not to damage sensor edge.

1. Remove battery.
2. Remove the air cleaner. Refer to [EM-18, "AIR CLEANER AND AIR DUCT"](#) (CR engine) or [EM-245, "AIR CLEANER AND AIR DUCT"](#) (K9K engine).
3. Disconnect the cable end ball of the select cable, and the cable end of the shift cable. Refer to [MT-12, "CONTROL LINKAGE"](#).
4. Disconnect the clutch tube.
5. Remove the engine harness clamp.
6. Remove the starter. Refer to [SC-51, "Removal and Installation \(CR Engine Models\)"](#), "STARTING SYSTEM".
7. Remove the engine mounting LH side installation bolt. Refer to [EM-70, "ENGINE ASSEMBLY"](#) (CR engine) or [EM-279, "ENGINE ASSEMBLY"](#) (K9K engine).
8. Set the engine hanger.



9. Lift up the vehicle and remove the front fender protectors (RH & LH).
10. Remove the undercover.
11. Remove the front exhaust pipe. Refer to [EX-3, "Removal and Installation"](#), "EXHAUST SYSTEM".
12. Remove the turbocharger outlet tube bracket from the transaxle.
13. Remove the RH and LH drive shafts. Refer to [FAX-13, "Removal and Installation"](#), "FRONT DRIVE SHAFT".
14. Disconnect the ground cable from the transaxle.
15. Set the transmission jack.
16. Remove the rear engine mounting bracket. Then, remove the rear torque link from the transaxle. Refer to [EM-70, "ENGINE ASSEMBLY"](#) (CR engine) or [EM-279, "ENGINE ASSEMBLY"](#) (K9K engine).

**CAUTION:**

Do not remove the rear torque link from the suspension member.

17. Remove the engine mounting bracket LH.
18. Disconnect the position switch connector.
19. Remove the transaxle mounting nuts and bolts, and remove the transaxle.

## Installation

BCS000L4

Install in the reverse order of removal.

# TIGHTENING TORQUES

[JH3]

## TIGHTENING TORQUES

PFP:32010

### Description

BCS000L5

Tightening portion	N·m (kg·m, ft·lb)
Gearbox casing bolt	25 (2.6, 18)
Mainshaft bolt	70 (7.1, 52)
Input shaft nut	190 (19, 140)
Rear cover bolt	25 (2.6, 18)
Back-up lamp switch	25 (2.6, 18)
Concentric slave cylinder	21 (2.1, 15)
Selector shaft bolt	20 (2.0, 15)
Gear shift catch bolt	10 (1.0, 7)
Reverse gear fork support bolt	25 (2.6, 18)
Drain bolt	25 (2.6, 18)
Selector shaft balls	23 (2.3, 17)

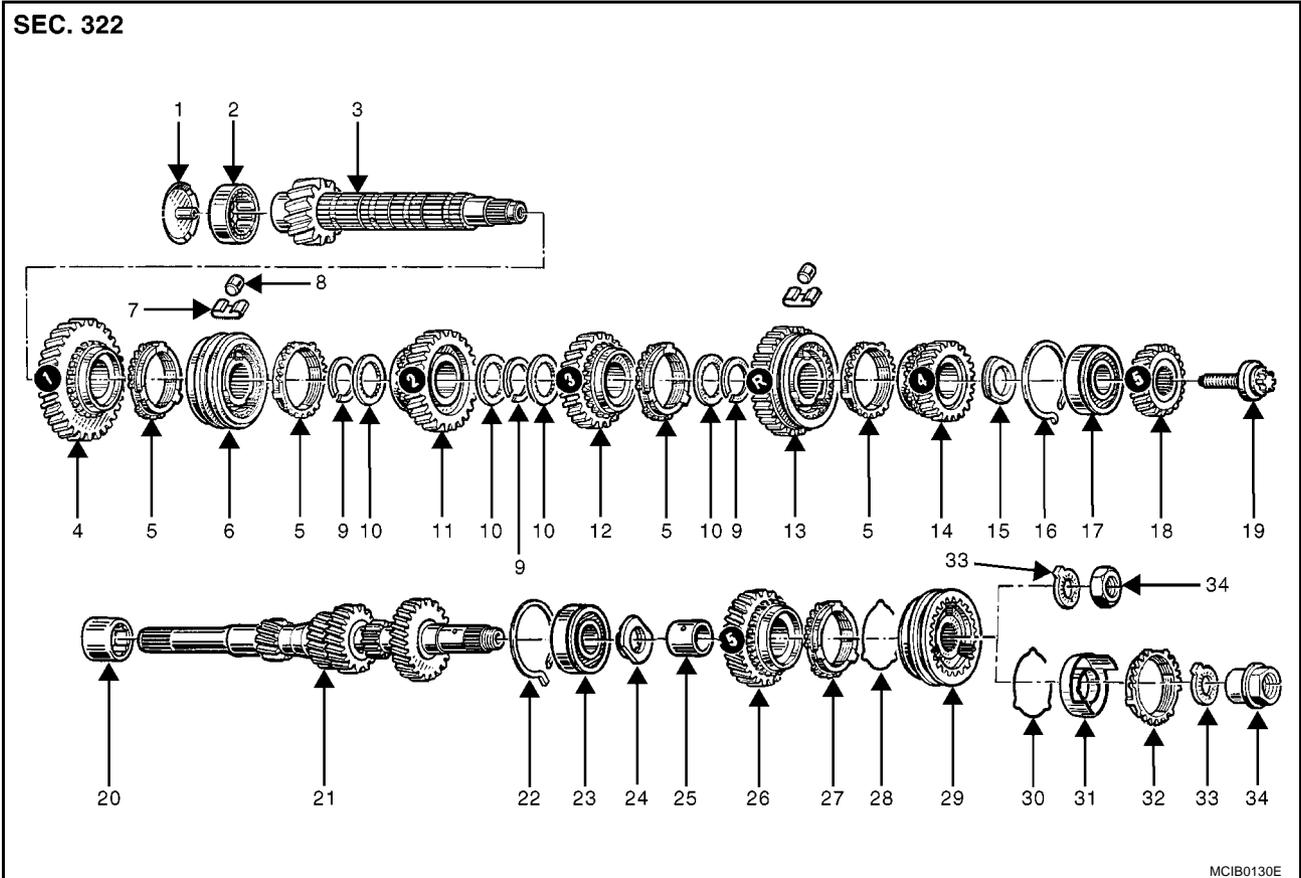
## COMPONENTS

PFP:32010

### Gear Components

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- |                                |                              |                               |
|--------------------------------|------------------------------|-------------------------------|
| 1. Oil channel                 | 2. Mainshaft front bearing   | 3. Mainshaft                  |
| 4. 1st main gear               | 5. Baulk ring                | 6. 1st & 2nd synchronizer hub |
| 7. Spring                      | 8. Roller                    | 9. Stop ring                  |
| 10. Adapter plate              | 11. 2nd main gear            | 12. 3rd main gear             |
| 13. 3rd & 4th synchronizer hub | 14. 4th main gear            | 15. Support washer            |
| 16. Retaining clip             | 17. Mainshaft rear bearing   | 18. 5th main gear             |
| 19. Bolt                       | 20. Bearing guide            | 21. Input shaft               |
| 22. Retaining clip             | 23. Input shaft rear bearing | 24. Support washer            |
| 25. 2nd & 3rd gear bushing     | 26. 5th main gear            | 27. Baulk ring                |
| 28. Spread spring              | 29. 5th synchronizer hub     | 30. Spread spring             |
| 31. Friction cone              | 32. Baulk ring               | 33. Washer                    |
| 34. Nut                        |                              |                               |

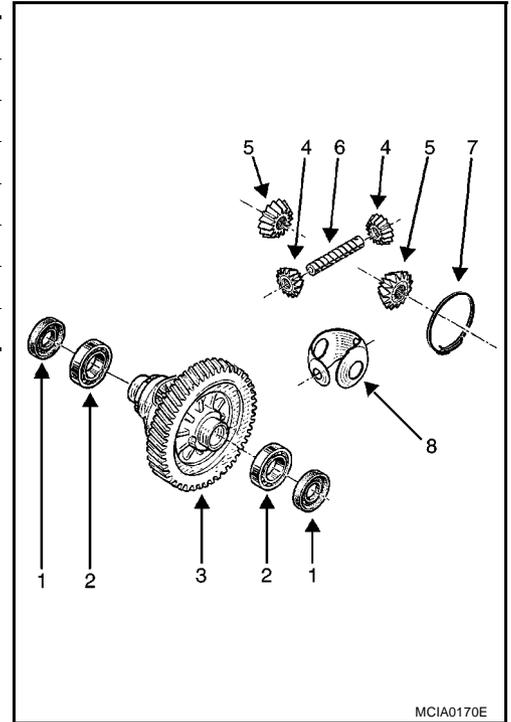
# COMPONENTS

[JH3]

## Differential Gear

BCS000L7

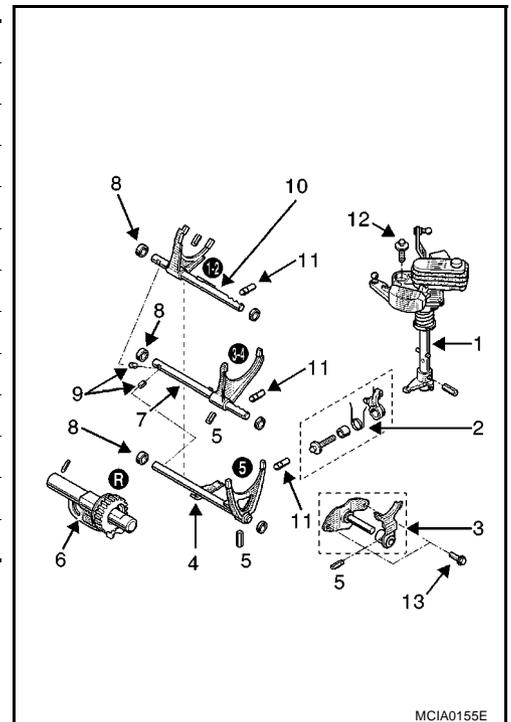
1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer



## Shift Control Components

BCS000L8

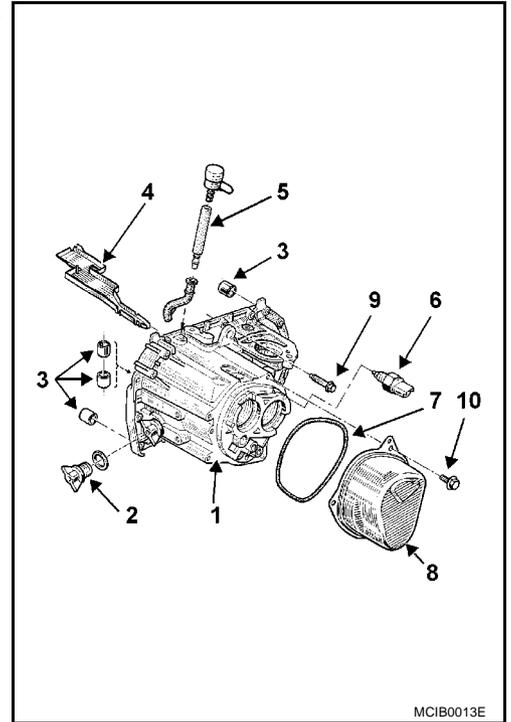
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg·m, 15 ft·lb)]
13	Reverse gear fork shaft bolt [25 N·m (2.6 kg·m, 18 ft·lb)]



## Case Components

BCS000L9

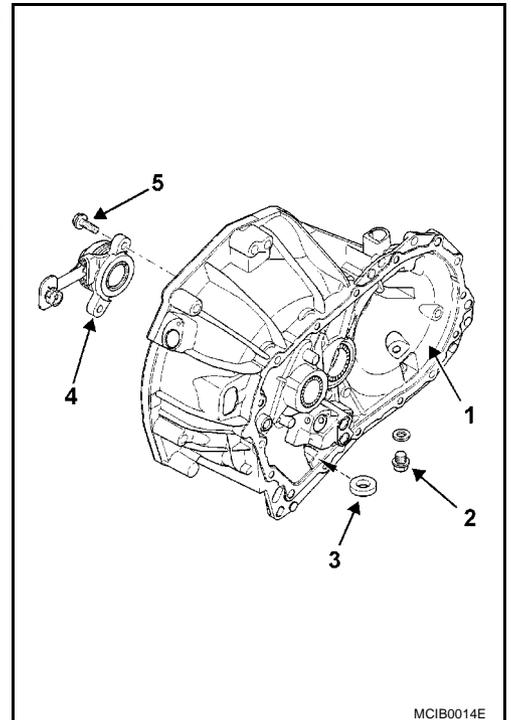
1	Transaxle case
2	Filler plug
3	Dowel pin
4	Oil gutter
5	Breather pipe
6	Back-up lamp switch
7	O-ring
8	Transaxle case cover
9	Gearbox edge bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
10	Fifth gear housing bolt [25 N·m (2.6 kg-m, 18 ft-lb)]



## Clutch Housing

BCS000LA

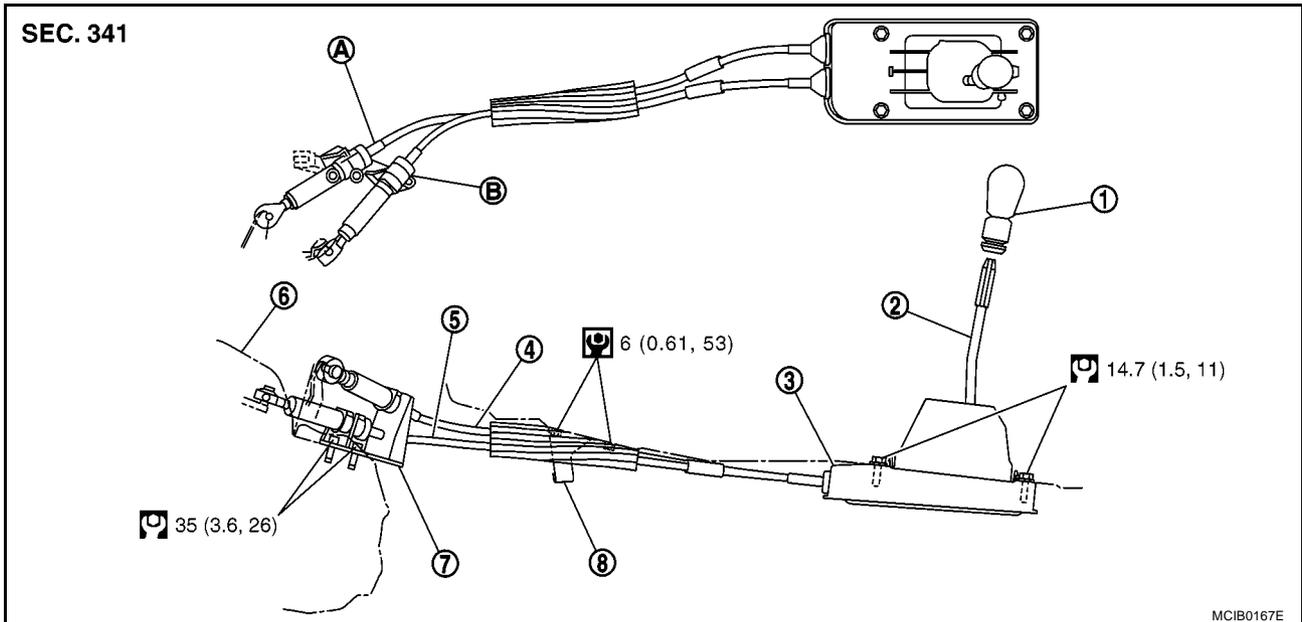
1	Clutch housing
2	Drain bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
3	Magnet
4	Concentric slave cylinder
5	Concentric slave cylinder bolt [21 N·m (2.1 kg-m, 15 ft-lb)]



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## CONTROL LINKAGE

### Removal and Installation of Control Device and Cable



- |                    |                     |                   |
|--------------------|---------------------|-------------------|
| 1. Shift knob      | 2. Shift lever      | 3. Control device |
| 4. Selector lever  | 5. Shift cable      | 6. Clutch housing |
| 7. Cable bracket 1 | 8. Cable bracket 2* |                   |
| A. Black color     | B. White color      |                   |

\*: Only for HR16DE

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-11](#).

#### REMOVAL

1. Remove center console and shift boot. Refer to [IP-4, "INSTRUMENT PANEL ASSEMBLY"](#).
2. Remove control device mounting bolts.
3. Pressing release bottom of cable end, remove cable from either manual transmission shift lever.
4. Lift up cable and remove it from cable bracket 1.
5. Remove center muffler and heat plate. Refer to [EX-3, "Removal and Installation"](#), "EXHAUST SYSTEM".
6. Remove cable bracket 2 from the vehicle. (Only for HR16DE)
7. Remove front and rear claws of control device. Remove control device and cable from the vehicle.

#### NOTE:

If shift knob needs to be removed, pull it up to remove.

#### INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing, make sure to insert cable end into either manual transmission shift lever.
- After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.
- After installation, make sure that the shift to each position works well.
- When installing shift knob, press it onto selector lever.

# RATIOS

[JH3]

## RATIOS

PFP:32010

## NISSAN Gearbox

BCS000LC

Engine	Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
K9K (50 kw)	JH3-162	11:37	22:41	28:37	30:29	42:31	11:39	15:58
CR14DE	JH3-103	11:41	21:43	28:39	34:35	39:32	11:39	15:61
HR16DE	JH3-149	12:41	22:43	29:39	35:35	40:32	12:39	16:61

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# CONSUMABLES

[JH3]

## CONSUMABLES

PFP:32010

### Description

BCS000LD

Types	Packaging	Parts Department No.	Component
Gearbox oil			Cover all parts
RHODORSEAL	100 g tubes	77 01 404 452	Housing assembly
LOCTITE 518	24 ml syringe	77 01 421 162	Back-up lamp switch threading

# CAPACITIES - LUBRICANTS

[JH3]

## CAPACITIES - LUBRICANTS

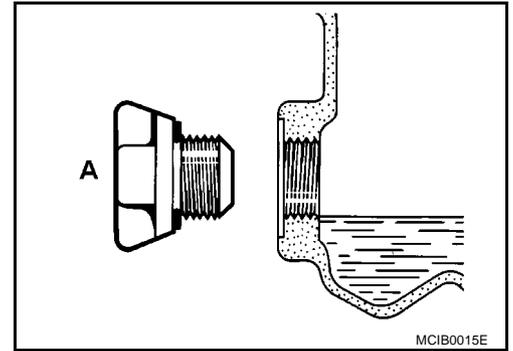
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### Description

BCS000LE

Capacity	Grade
2.6 ℓ (4-5/8 Imp pt)	Nissan Genuine gear oil Passenger Car or API GL-4 Viscosity 75W-80

Fill to the level of the oil filler cap hole.



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## TROUBLE DIAGNOSIS

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### Symptom Chart

BCS000LF

Symptoms (after checking the clutch)	Possible causes							
Symptoms	Oil level or grade	External control	Synchronizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

**NOTE:**

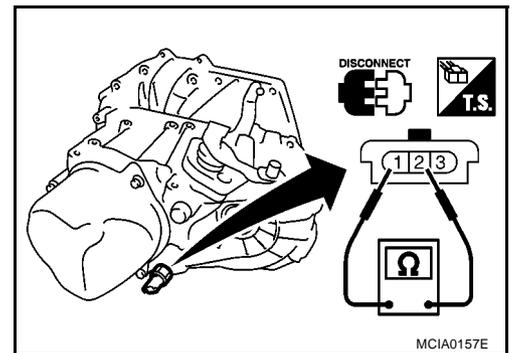
The numbers indicate the order of priority for diagnostics.

### Back-Up Lamp Switch

BCS000LG

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



### Park/Neutral Position Switch

BCS000LH

- Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No

# PRECAUTIONS

[JH3]

## PRECAUTIONS

PFP:00001

### Precautions

BCS000LI

Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)

Cover all turning and synchronizer points in oil.

Observe the tightening torques.

Carefully carry out the specific settings and adjustments.

Be sure to properly refit parts in the same order and position after removal.

Marking the position of the sliding rods in relation to the hubs before removal is recommended.

During refitting, make sure the inside of the box remains free of dust or impurities.

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## PARTS TO BE REPLACED SYSTEMATICALLY

[JH3]

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### PARTS TO BE REPLACED SYSTEMATICALLY

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#### Description

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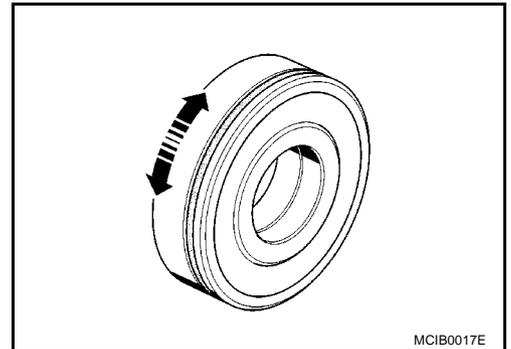
If they have been removed:

- the lip seals,
- the O-rings,
- the gear supporting rings,
- the roll pins,
- the input shaft and mainshaft bearing circlips,
- the sliding gear hub springs.

## CHECKING

### Bearings

Check that the bearings show no signs of damage and that they turn evenly. Replace them if necessary.



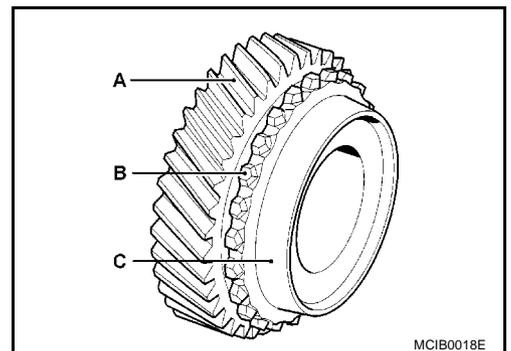
BCS000LK

### Gearing

#### NOTE:

The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

1. Check that the teeth (A) are not broken or chipped.
2. Check that the claws (B) are not broken, chipped or worn.
3. Check that the friction cone (C) shows no scratches or blueness.



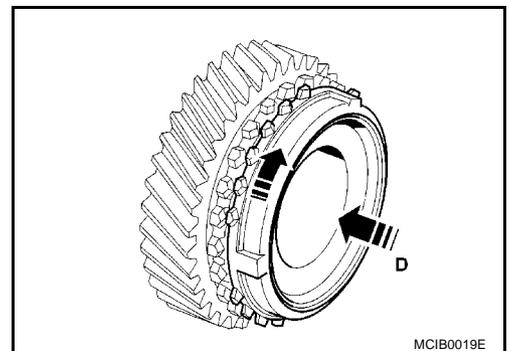
BCS000LL

### Synchronizer Ring

Check that the grooves and ridges on the ring are not worn or damaged.

1. Check that the ring puts onto the gear cone.
2. Check that the ring rotates while applying force in the direction of the cone (D).
3. Check that the ring should lock against the cone.

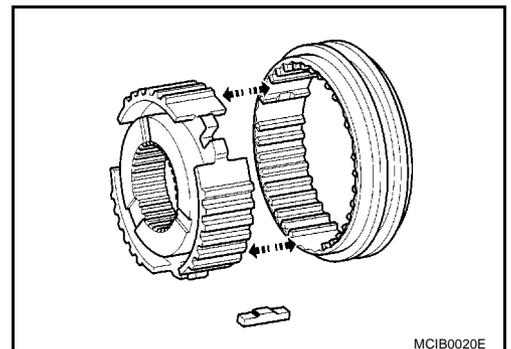
Otherwise, replace the synchronizer ring.



BCS000LM

### Sliding Gear Hub

Make sure the sliding gear turns smoothly in the hub. Check that the rollers or keys are in good condition.



BCS000LN

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# SEPARATING THE HOUSINGS

[JH3]

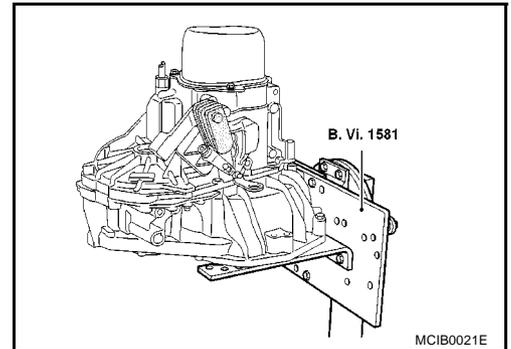
## SEPARATING THE HOUSINGS

PFP:32010

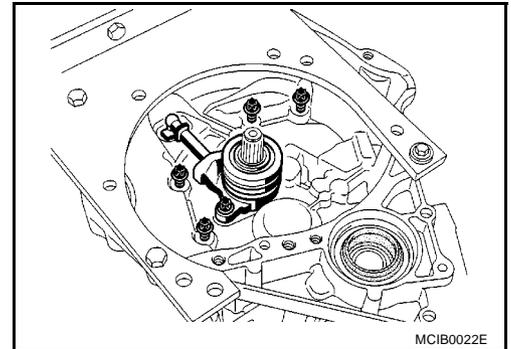
### Removal

BCS000LO

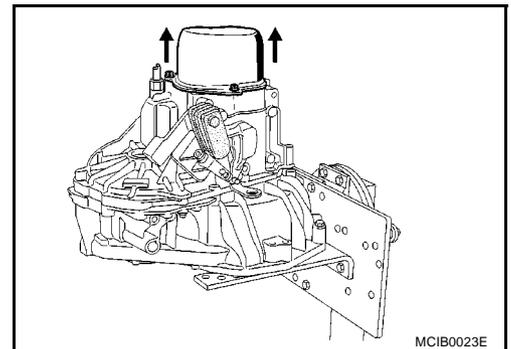
Fit the B. Vi. 1581 support plate on a Desvil stand.  
Fit the gearbox on the B. Vi. 1581 support.



1. Remove the concentric slave cylinder.
2. Remove the bolts located inside the housing.

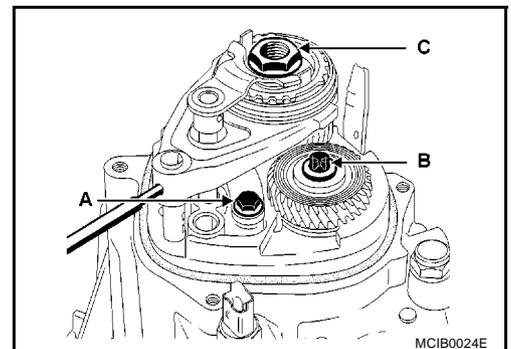


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.



Remove the two reverse gear fork support mounting bolts (A).  
Drive in the 5th gear fork using B. Vi. 31-01.  
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

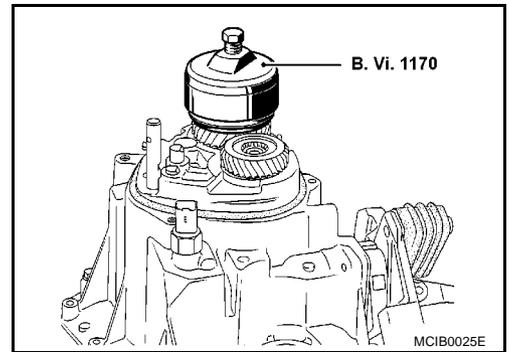
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



# SEPARATING THE HOUSINGS

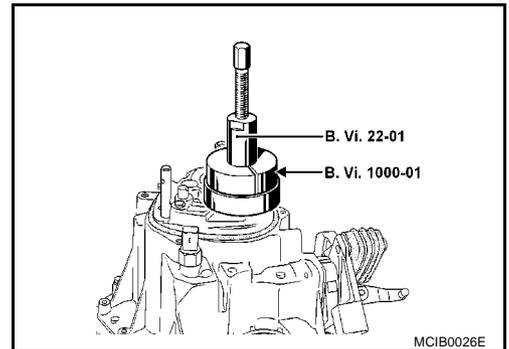
[JH3]

Remove the 5th gear hub using B. Vi. 1170.  
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.

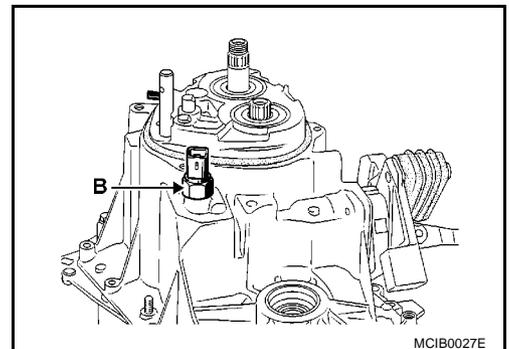


Remove the fixed 5th gear using B. Vi. 22-01 and B. Vi. 1000-01.

Remove the gearbox edge bolts.



Remove the back-up lamp switch (B).  
Engage 3rd gear.  
Lift and remove the mechanism housing.



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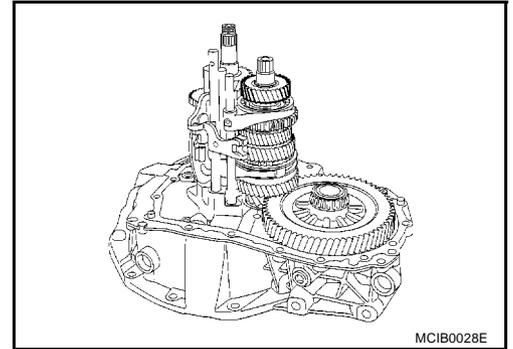
## REPAIRING THE GEARBOX

PFP:32010

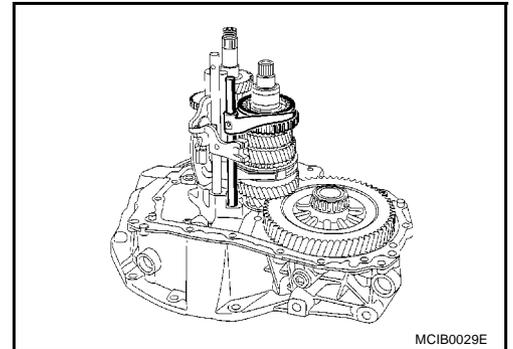
### Removal

BCS000LP

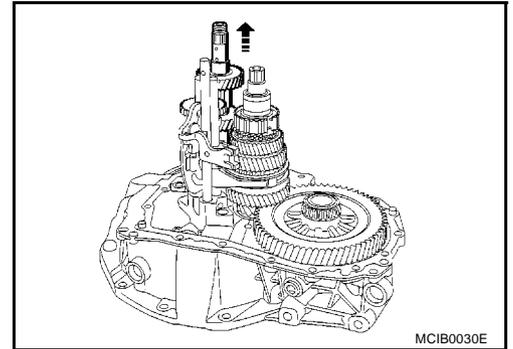
1. Remove the 4th-gear pinion.



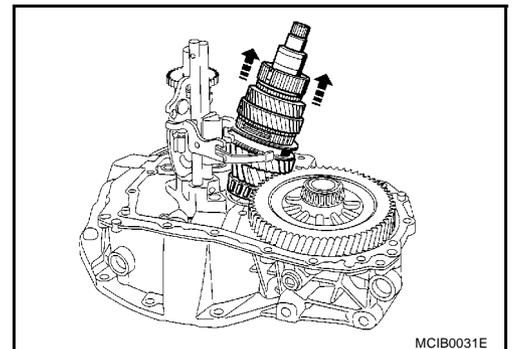
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.



3. Remove input shaft assembly.



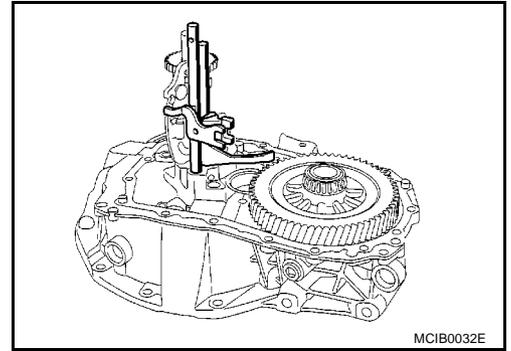
4. Remove mainshaft assembly.



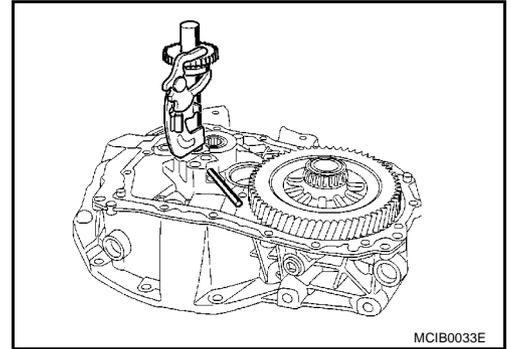
# REPAIRING THE GEARBOX

[JH3]

5. Remove the 1st/2nd shaft and fork and the 5th gear shaft.



6. Remove the pin from the reverse gear and remove the reverse gear.



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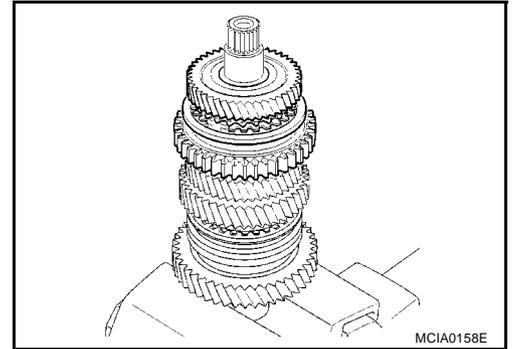
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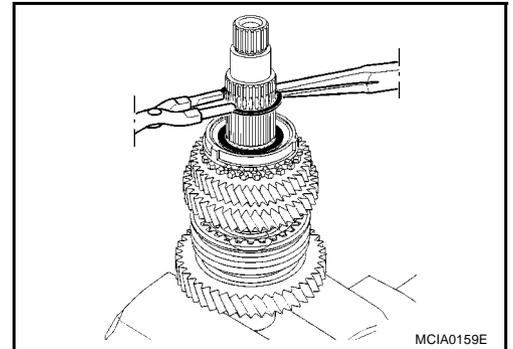
## MAINSHAFT

### Removal

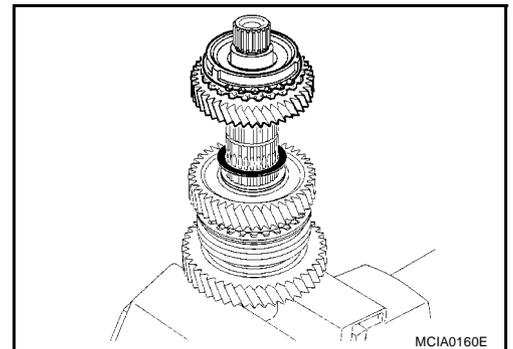
1. Put the mainshaft in a vice with soft jaws.
2. Remove the 4th main gear and the 3rd/4th gear sliding gear hub.



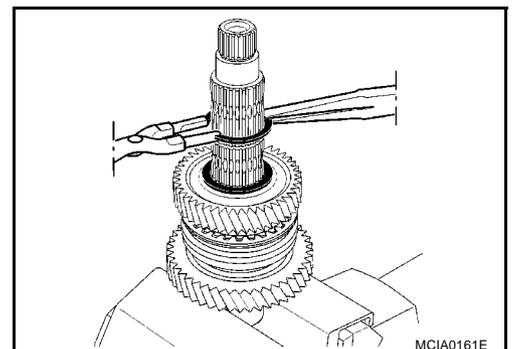
3. Remove the stop ring (systematically replace) and the grooved washer.



4. Remove the 3rd main gear and the grooved washer.



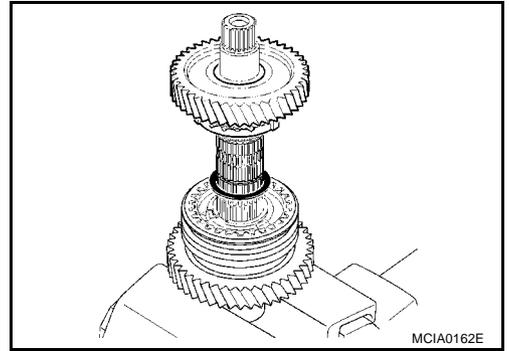
5. Remove the stop ring (systematically replace) and the grooved washer.



# MAINSHAFT

[JH3]

6. Remove the 2nd main gear and the grooved washer.

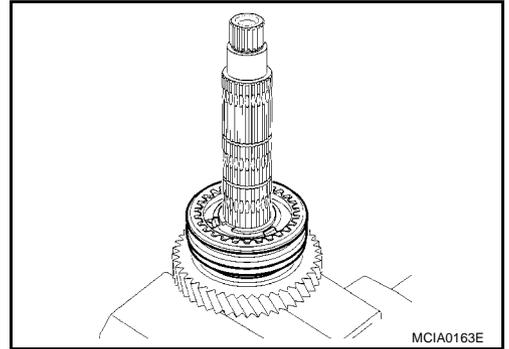


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7. Remove the stop ring and the 1st/2nd gear sliding gear hub.



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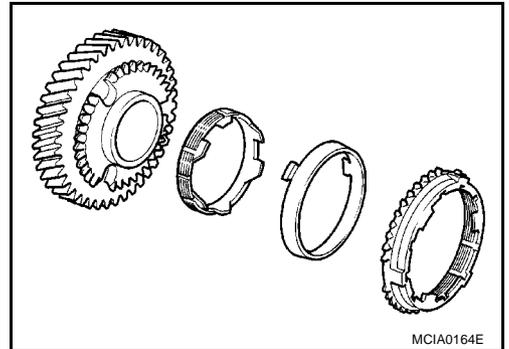
## Refitting

Proceed in the reverse order of removal.  
The retaining rings must be systematically replaced.  
Oil the synchronizer rings.

### **WARNING:**

**Make sure that the notches on the synchronizer double cones are correctly positioned.**

BCS000LR



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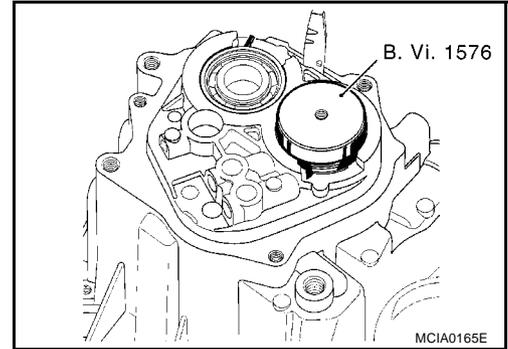
## TRANSAXLE CASE BEARING

PFP:32010

### Removal

BCS000LS

Remove the circlips with circlip pliers and drive the bearing inside the housing using tool B. Vi. 1576.



### Refitting

BCS000LT

Place the new circlips in their respective housings.  
Fit the bearings using tool B. Vi. 1576.  
Knock the tool with the bearing using a small hammer.

## CLUTCH HOUSING BEARING

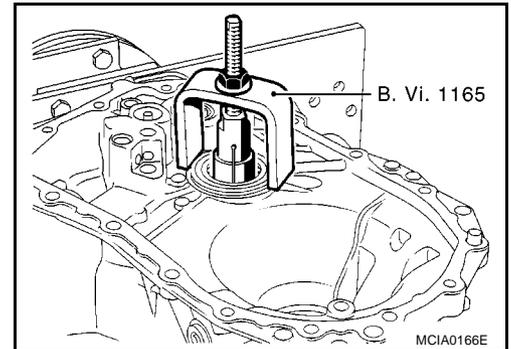
PFP:32010

### Removal

BCS000LU

Cut the base of the plastic hollow needle located at the centre of the bearing.

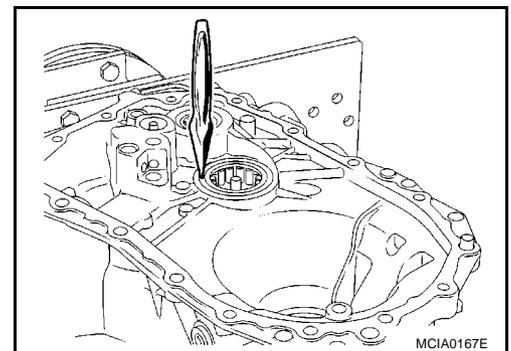
Fit tool B. Vi. 1165 and extract the bearing.



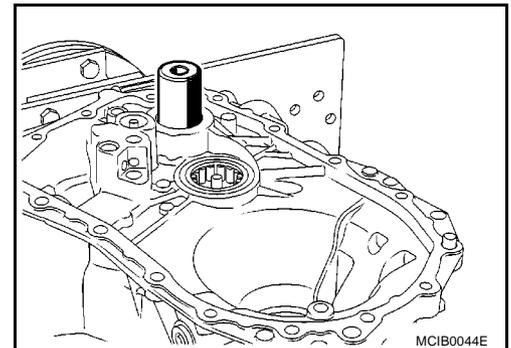
### Refitting

BCS000LV

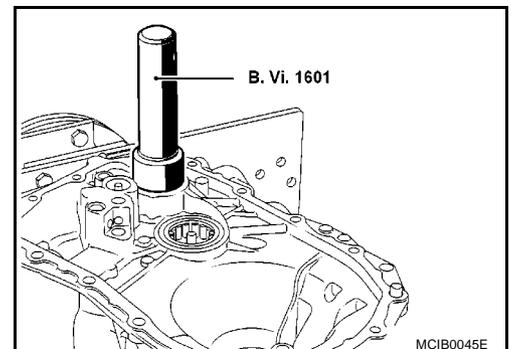
1. Fit a new deflector, then the bearing on the press flush with the inner surface of the housing.
2. Set the bearing with a mortise chisel.



3. Remove the input shaft bearing guide using the press and a 38 mm (1.50 in) diameter tube.



4. Refit the bearing guide using the press and tool B. Vi. 1601.



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# SELECTOR SHAFT RINGS

[JH3]

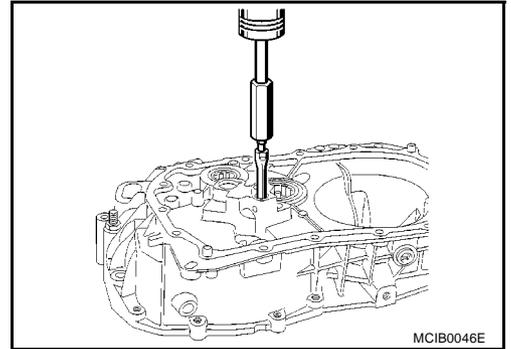
## SELECTOR SHAFT RINGS

PFP:32010

### Removal

BCS000LW

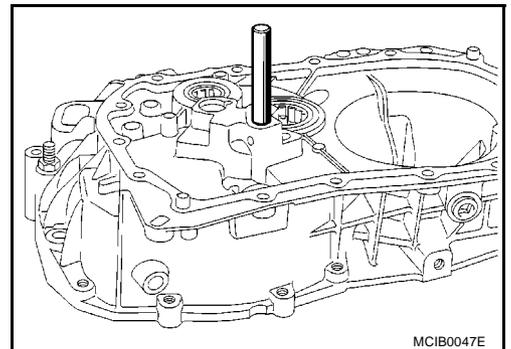
Remove the rings with an inertia puller.



### Refitting

BCS000LX

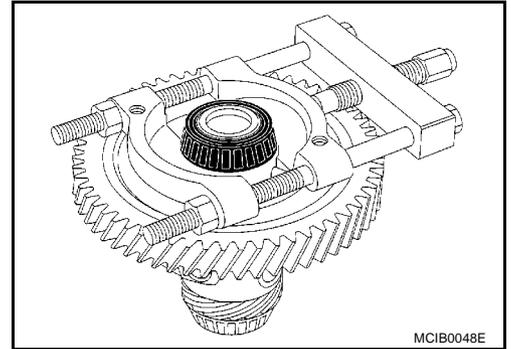
Refit the rings using a 14.5 mm (0.57 in) tube down to the thrust bearing.



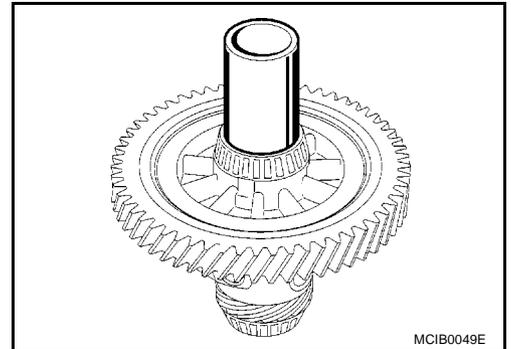
## DIFFERENTIAL BEARINGS

### Removal and Installation

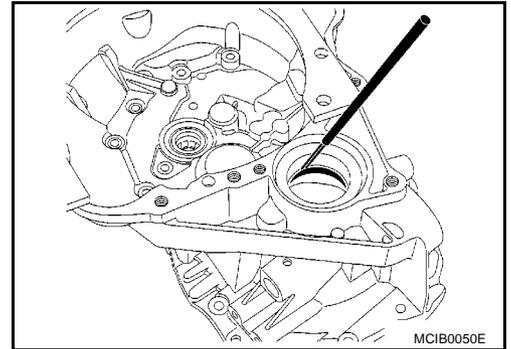
1. Remove the bearing using an antisticking pin.



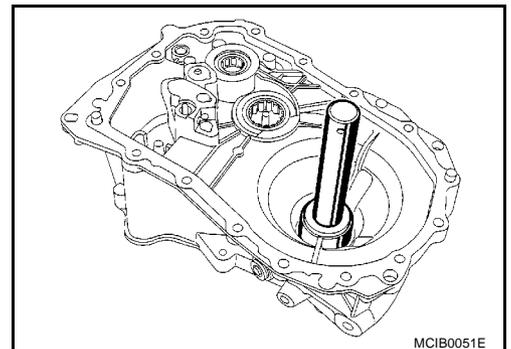
2. Refit the bearings using a 40 mm (1.57 in) tube.



3. Remove the bearing races using a roll pin punch.



4. Refit the bearing races using tools C-F from the B. Vi. 1554 kit.



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# SELECTOR SHAFT

[JH3]

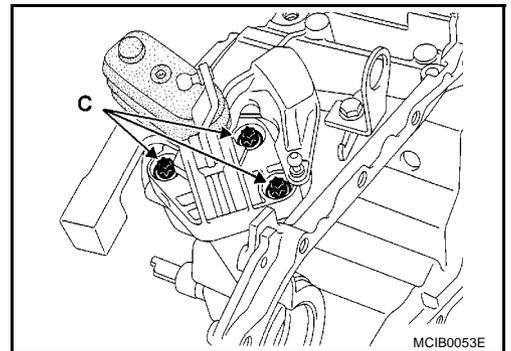
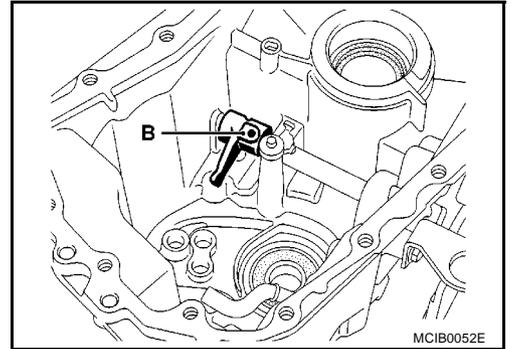
## SELECTOR SHAFT

PFP:32010

### Removal

BCS000LZ

After removing the pin from the selector finger (B), remove the mounting bolts (C) and remove the control shaft unit.



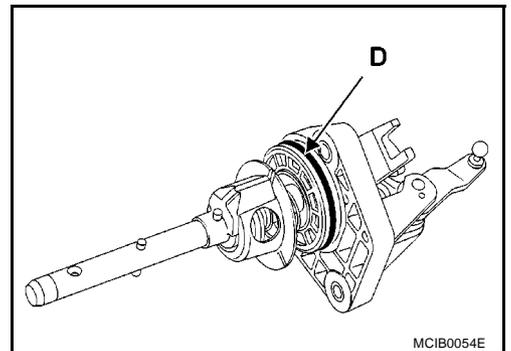
### Refitting

Proceed in the reverse order to removal.

#### NOTE:

Replace the O-ring (D).

BCS000M0



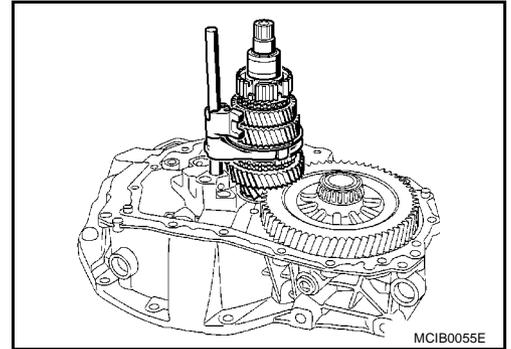
## ASSEMBLY

PFP:00000

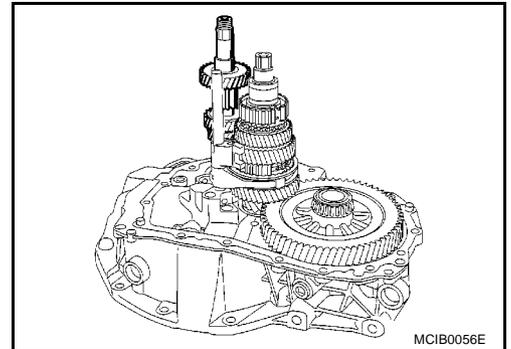
### Refitting

BCS000M1

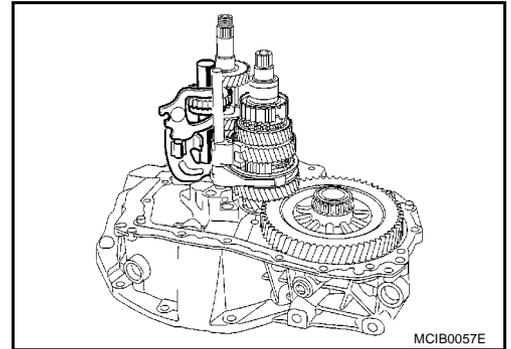
1. Fit the mainshaft and 1st/2nd gear fork assembly.



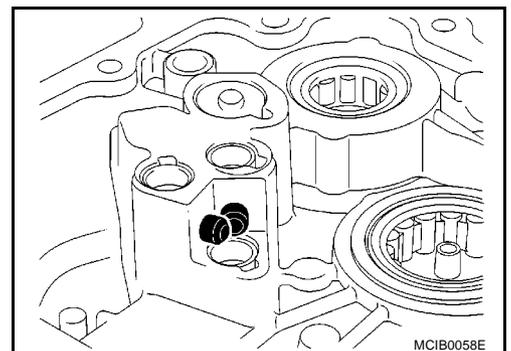
2. Fit the input shaft.



3. Fit the reverse gear assembly.



4. Fit the two locking shafts.



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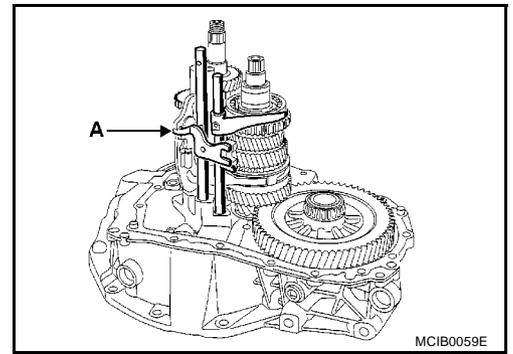
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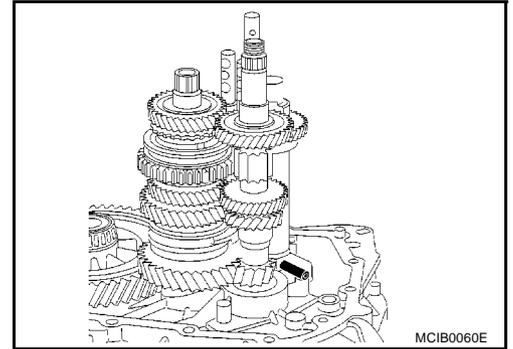
# ASSEMBLY

[JH3]

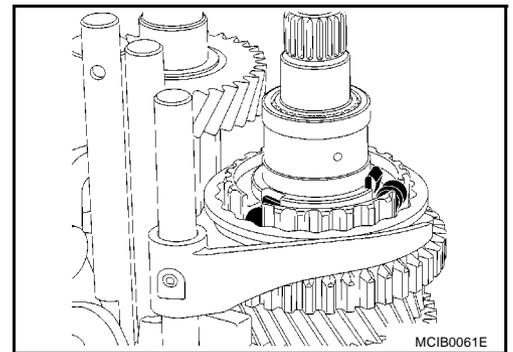
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly. Rotate the reverse gear assembly to position the 5th gear fork (A).



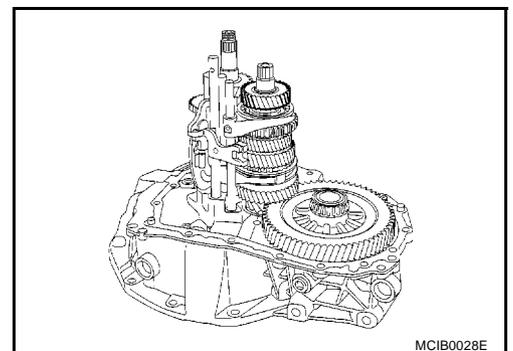
6. Pin the reverse gear assembly.



7. Shift to 3rd gear and insert the rollers and clawing springs.



8. Refit the 4th main gear fitted with its synchronizer ring.



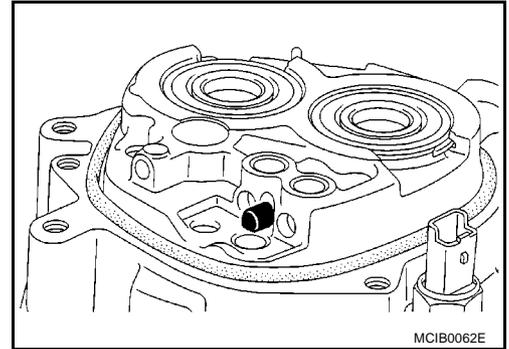
## HOUSING ASSEMBLY

PFP:32010

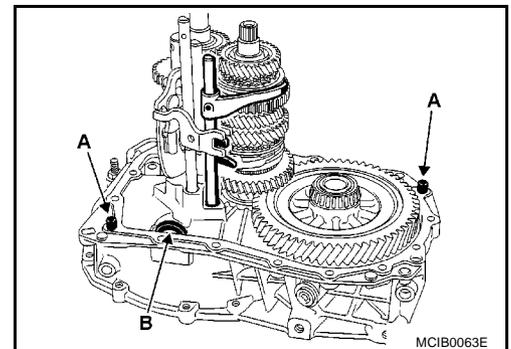
### Assembly

BCS000M2

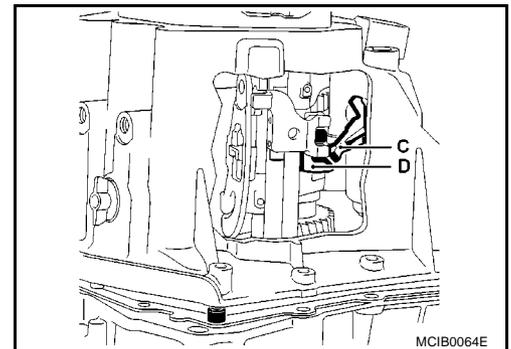
1. Fit the 1st/2nd, 3rd/4th, and 5th gear shaft ball cartridges into the housing mechanism.
2. Engage 3rd gear.



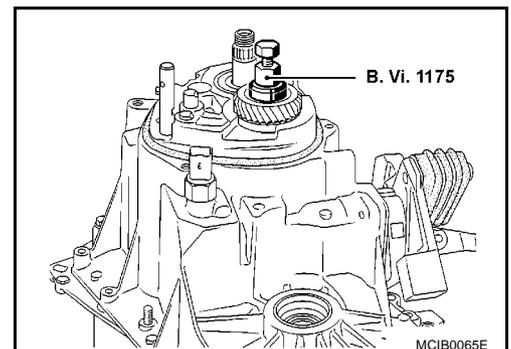
3. Check the positioning of the centring dowels (A).
4. Check the positioning of magnet (B).



5. Apply a line of LOCTITE 518 to the gasket face.
6. Offer up the housing while guiding the selector finger (C) into fork (D) of the 3rd gear.



7. Pretighten the peripheral bolts and rotate the input shaft to check that they make contact with the bearings.
8. Tighten the bolts to a torque of [25 N-m (2.6 kg-m, 18 ft-lb)].
9. Put three drops of LOCTITE Frenbloc on the splines of the fixed 5th gear and fit it using tool B. Vi. 1175.

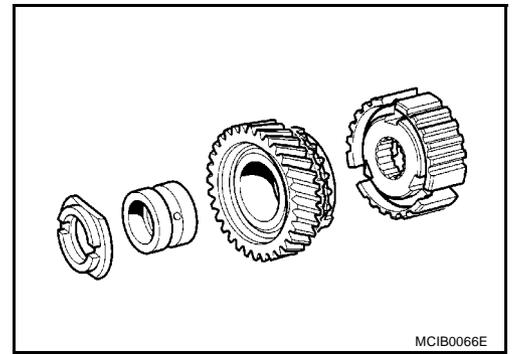


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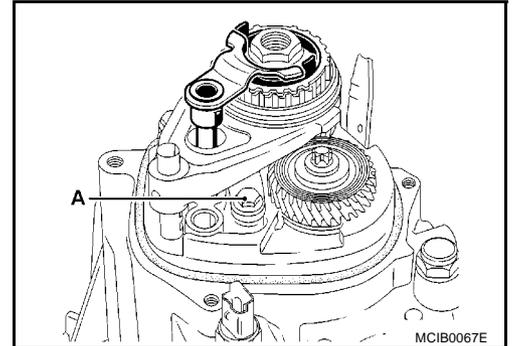
# HOUSING ASSEMBLY

[JH3]

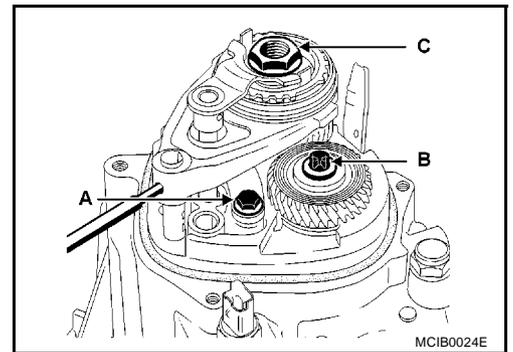
10. On the input shaft, fit the support washer (top side gear side).
11. On the input shaft, fit the sprocket bushing.
12. On the input shaft, fit the 5th main gear fitted with its synchronizer ring.
13. On the input shaft, fit the 5th gear hub fitted with its spring.



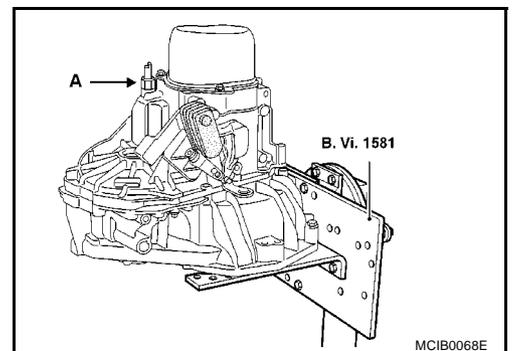
14. Refit the 5th gear fork/sliding gear/reverse gear fork assembly.
15. Fit the reverse gear synchronizer.
16. Screw on the reverse gear fork support and tighten the bolts (A) to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
17. Slide the 5th gear fork on its shaft to engage 5th gear.



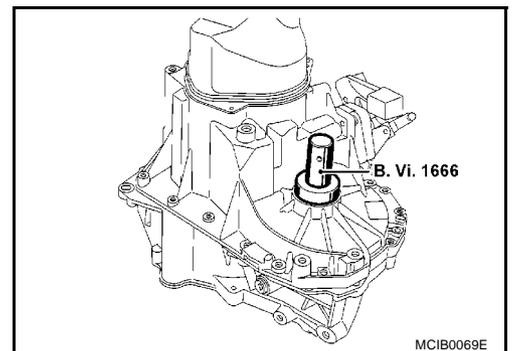
18. Tighten the gear bolt and nut to torque of:  
**output shaft bolt (B) : [70 N·m (7.1 kg-m, 52 ft-lb)]**  
**input shaft nut (C) : [190 N·m (19 kg-m, 140 ft-lb)]**
19. Reset to neutral and pin the 5th gear fork.



20. Fit a new O-ring, position the 5th gear cover and tighten the bolts to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
21. Fit the back-up lamp switch (A) and tighten to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].



22. Refit the new differential output seals using B. Vi. 1666.

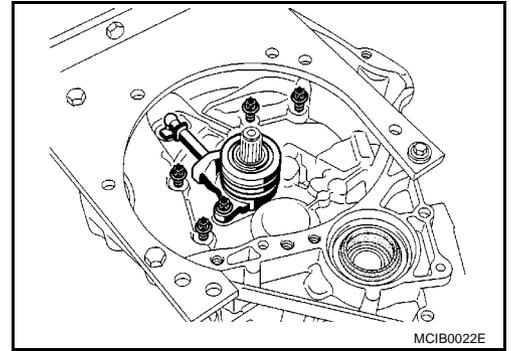


# HOUSING ASSEMBLY

[JH3]

23. Refit the concentric slave cylinder and tighten the bolts.

**Tightening torque : 21 N-m (2.1 kg-m, 15 ft-lb)**



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# DESCRIPTION

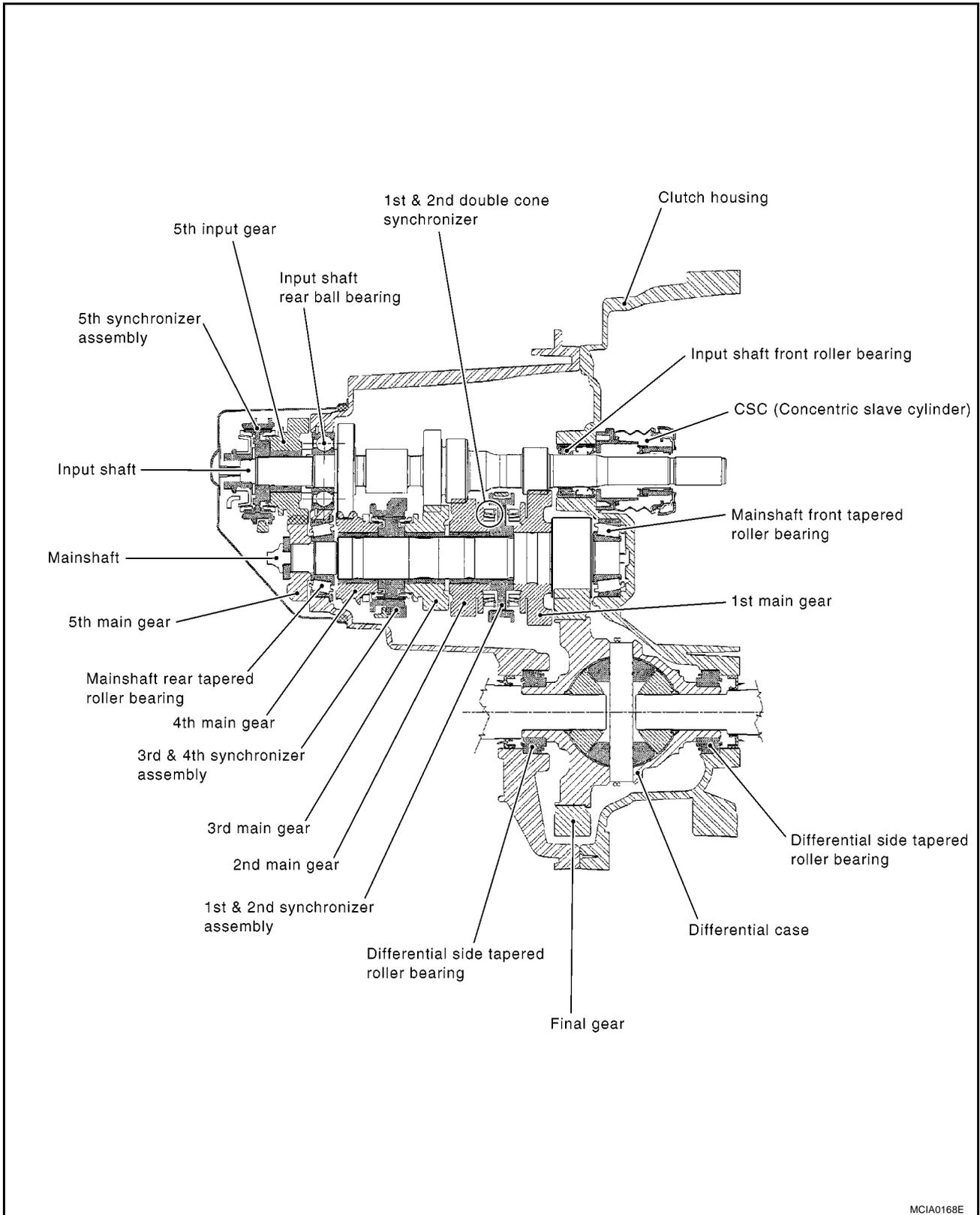
[JR5]

## DESCRIPTION

PFP:00000

### Cross-Sectional View

BCS000M3



## REMOVAL AND INSTALLATION

PFP:00000

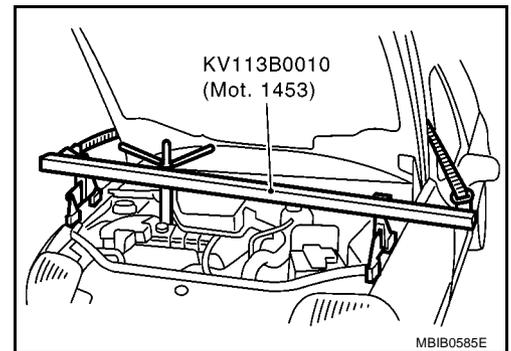
### Removal

BCS000M4

**CAUTION:**

Remove the crankshaft position sensor (POS) from transaxle assembly before separating transaxle from engine. Be careful not to damage sensor edge.

1. Remove battery.
2. Remove the air cleaner. Refer to [EM-245, "AIR CLEANER AND AIR DUCT"](#).
3. Disconnect the cable end ball of the select cable, and the cable end of the shift cable. Refer to [MT-42, "CONTROL LINKAGE"](#).
4. Disconnect the clutch tube.
5. Remove the engine harness clamp.
6. Remove the starter. Refer to [SC-51, "Removal and Installation \(CR Engine Models\)"](#), "STARTING SYSTEM".
7. Remove the engine mounting LH side installation bolt. Refer to .
8. Set the engine hanger.



9. Lift up the vehicle and remove the front fender protectors (RH & LH).
10. Remove the undercover.
11. Remove the front exhaust pipe. Refer to [EX-3, "Removal and Installation"](#), "EXHAUST SYSTEM".
12. Remove the turbocharger outlet tube bracket from the transaxle.
13. Remove the RH and LH drive shafts. Refer to [FAX-13, "Removal and Installation"](#), "FRONT DRIVE SHAFT".
14. Disconnect the ground cable from the transaxle.
15. Set the transmission jack.
16. Remove the rear engine mounting bracket. Then, remove the rear torque link from the transaxle. Refer to [EM-279, "ENGINE ASSEMBLY"](#).

**CAUTION:**

**Do not remove the rear torque link from the suspension member.**

17. Remove the engine mounting bracket LH.
18. Disconnect the position switch connector.
19. Remove the transaxle mounting nuts and bolts, and remove the transaxle.

### Installation

BCS000M5

Install in the reverse order of removal.

# TIGHTENING TORQUES

[JR5]

## TIGHTENING TORQUES

PFP:32010

### Description

BCS000M6

Tightening portion	N·m (kg·m, ft·lb)
Gearbox casing bolt	25 (2.6, 18)
Mainshaft bolt	70 (7.1, 52)
Input shaft nut	190 (19, 140)
Rear cover bolt	25 (2.6, 18)
Back-up lamp switch	25 (2.6, 18)
Concentric slave cylinder	21 (2.1, 15)
Selector shaft bolt	20 (2.0, 15)
Gear shift catch bolt	10 (1.0, 7)
Reverse gear fork support bolt	25 (2.6, 18)
Drain bolt	25 (2.6, 18)
Selector shaft balls	23 (2.3, 17)

## COMPONENTS

PFP:32010

### Gear Components

BCS000M7

A

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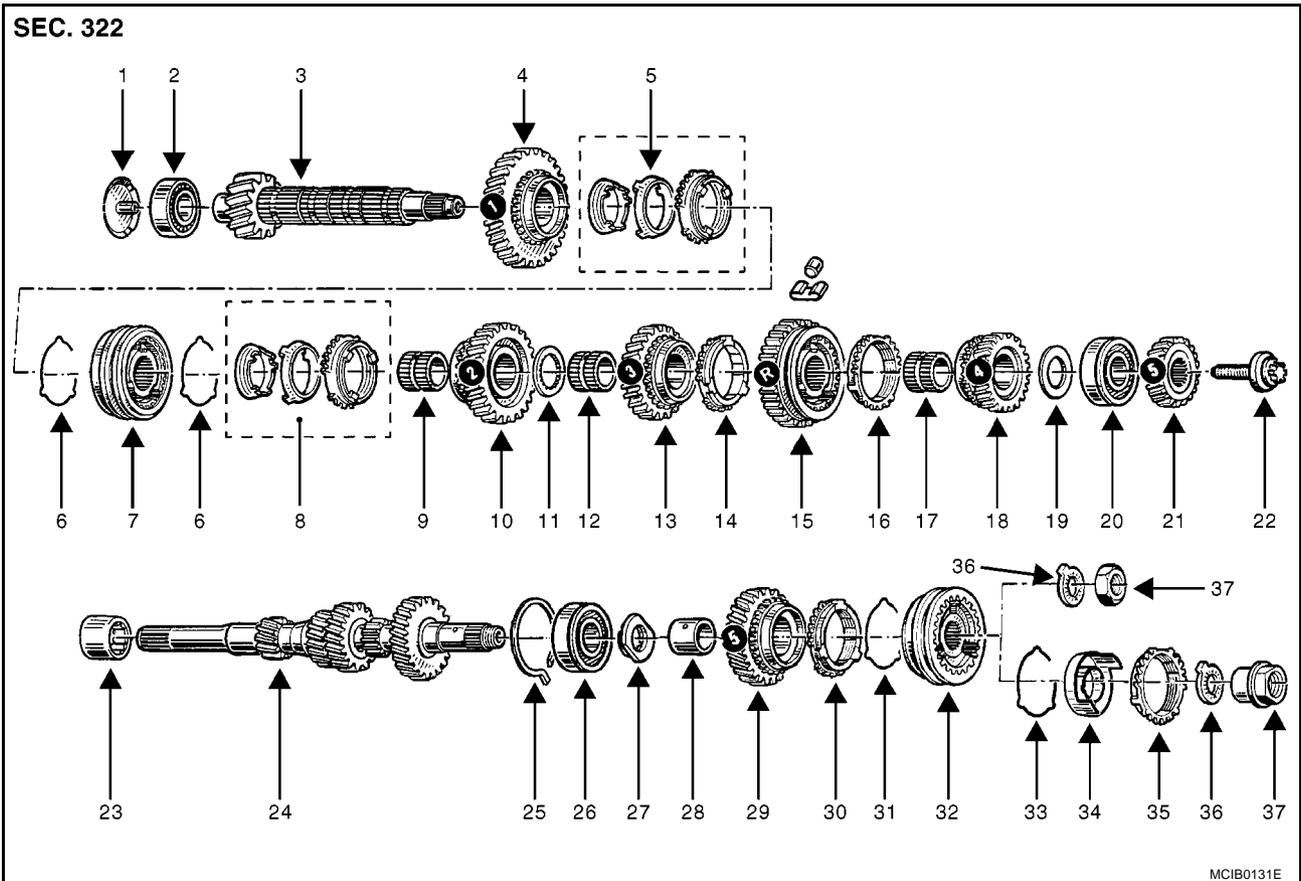
I

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- |                               |                              |   |
|-------------------------------|------------------------------|---|
| 1. Oil channel                | 2. Mainshaft front bearing   | 3. Mainshaft                                    |
| 4. 1st main gear              | 5. Synchronizer ring         | 6. Spread spring                                |
| 7. 1st & 2nd synchronizer hub | 8. Synchronizer ring         | 9. Mainshaft bearing                            |
| 10. 2nd main gear             | 11. Adapter plate            | 12. Mainshaft bearing                           |
| 13. 3rd main gear             | 14. Baulk ring               | 15. 3rd & 4th synchronizer hub and reverse gear |
| 16. Baulk ring                | 17. Mainshaft bearing        | 18. 4th main gear                               |
| 19. Adapter plate             | 20. Mainshaft rear bearing   | 21. 5th main gear                               |
| 22. Bolt                      | 23. Bearing guide            | 24. Input shaft                                 |
| 25. Retaining clip            | 26. Input shaft rear bearing | 27. Adapter plate                               |
| 28. 2nd & 3rd gear bushing    | 29. 5th main gear            | 30. Baulk ring                                  |
| 31. Spread spring             | 32. 5th synchronizer hub     | 33. Spread spring                               |
| 34. Friction cone             | 35. Baulk ring               | 36. Washer                                      |
| 37. Nut                       |                              |   |

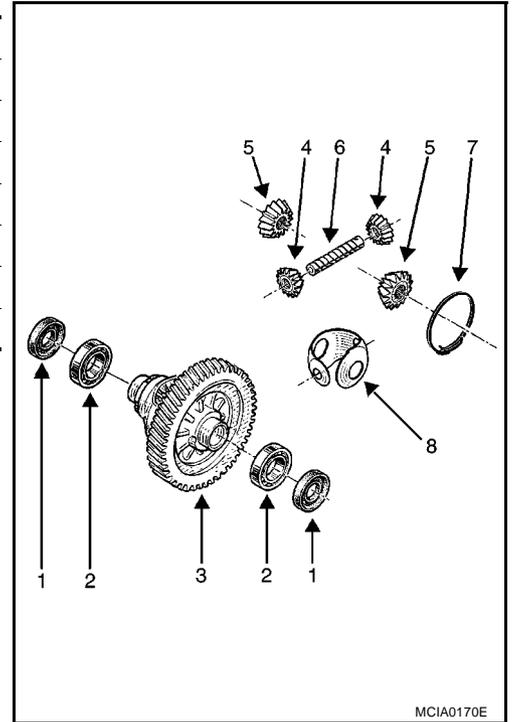
# COMPONENTS

[JR5]

## Differential Gear

BCS000M8

1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer

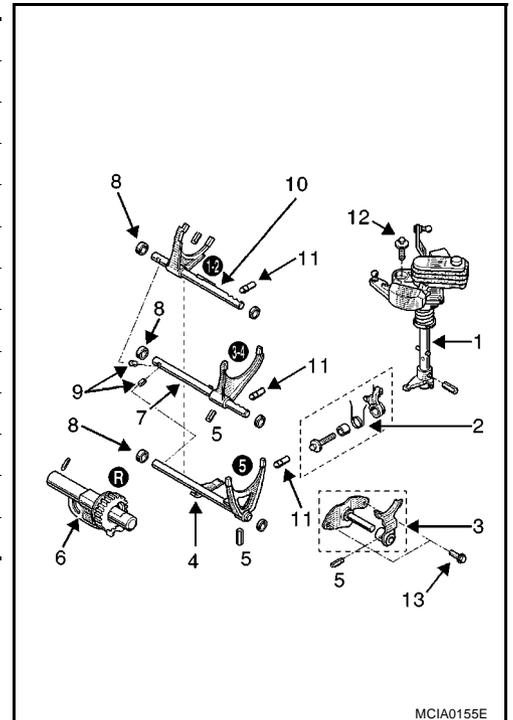


MCIA0170E

## Shift Control Components

BCS000M9

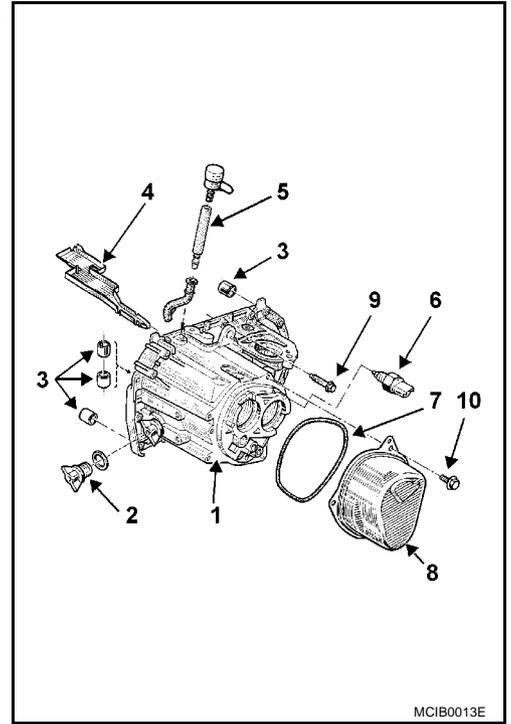
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg·m, 15 ft·lb)]
13	Reverse gear fork shaft bolt [25 N·m (2.6 kg·m, 18 ft·lb)]



MCIA0155E

## Case Components

1	Transaxle case
2	Filler plug
3	Dowel pin
4	Oil gutter
5	Breather pipe
6	Back-up lamp switch
7	O-ring
8	Transaxle case cover
9	Gearbox edge bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
10	Fifth gear housing bolt [25 N·m (2.6 kg-m, 18 ft-lb)]



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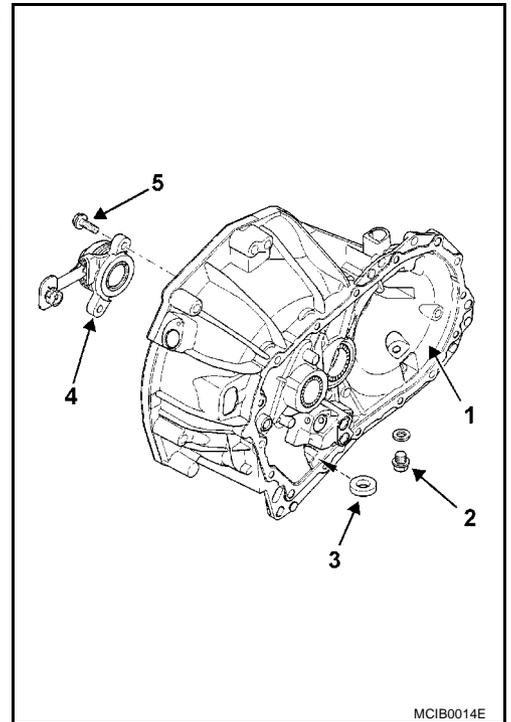
F

G

H

## Clutch Housing

1	Clutch housing
2	Drain bolt [25 N·m (2.6 kg-m, 18 ft-lb)]
3	Magnet
4	Concentric slave cylinder
5	Concentric slave cylinder bolt [21 N·m (2.1 kg-m, 15 ft-lb)]



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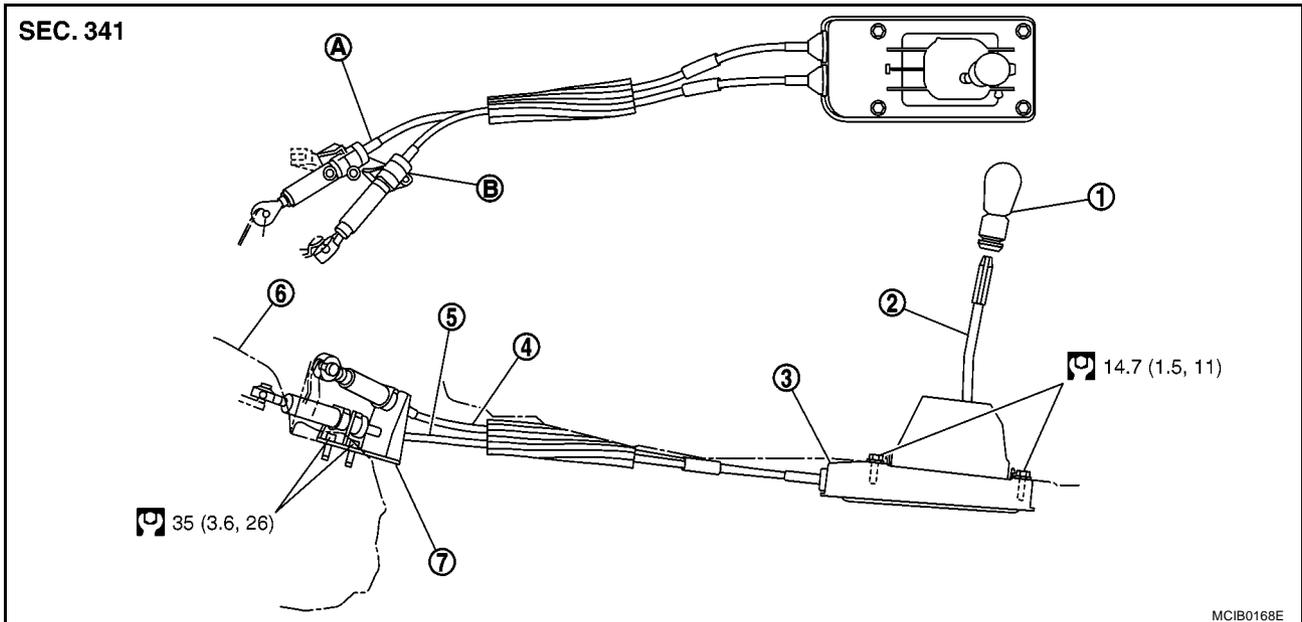
M

## CONTROL LINKAGE

PFP:34103

### Removal and Installation of Control Device and Cable

BCS000MC



- |                    |                |                   |
|--------------------|----------------|-------------------|
| 1. Shift knob      | 2. Shift lever | 3. Control device |
| 4. Selector lever  | 5. Shift cable | 6. Clutch housing |
| 7. Cable bracket 1 |                |                   |
| A. Black color     | B. White color |                   |

Refer to GI section to make sure icons (symbol marks) in the figure. Refer to [GI-11](#).

### REMOVAL

1. Remove center console and shift boot. Refer to [IP-4, "INSTRUMENT PANEL ASSEMBLY"](#).
2. Remove control device mounting bolts.
3. Pressing release bottom of cable end, remove cable from either manual transmission shift lever.
4. Lift up cable and remove it from cable bracket 1.
5. Remove center muffler and heat plate. Refer to [EX-3, "Removal and Installation"](#), "EXHAUST SYSTEM".
6. Remove front and rear claws of control device. Remove control device and cable from the vehicle.

### NOTE:

If shift knob needs to be removed, pull it up to remove.

### INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing, make sure to insert cable end into either manual transmission shift lever.
- After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st, 2nd, or Reverse.
- After installation, make sure that the shift to each position works well.
- When installing shift knob, press it onto selector lever.

# RATIOS

[JR5]

## RATIOS

PPF:32010

## NISSAN Gearbox

BCS000MD

Engine	Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
K9K (63 kw)	JH5-140	11:41	21:43	28:37	35:34	42:31	11:39	15:56

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# CONSUMABLES

[JR5]

## CONSUMABLES

PFP:32010

### Description

BCS000ME

Types	Packaging	Parts Department No.	Component
Gearbox oil			Cover all parts
RHODORSEAL	100 g tubes	77 01 404 452	Housing assembly
LOCTITE 518	24 ml syringe	77 01 421 162	Back-up lamp switch threading

# CAPACITIES - LUBRICANTS

[JR5]

## CAPACITIES - LUBRICANTS

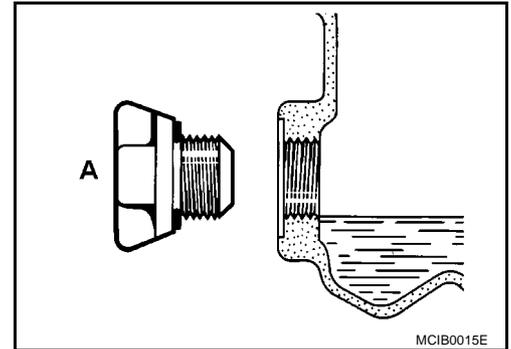
PFP:32010

### Description

BCS000MF

Capacity	Grade
2.6 ℓ (4-5/8 Imp pt)	Nissan Genuine gear oil Passenger Car or API GL-4 Viscosity 75W-80

Fill to the level of the oil filler cap hole.



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## TROUBLE DIAGNOSIS

PFP:00004

### Symptom Chart

BCS000MG

Symptoms (after checking the clutch)	Possible causes							
Symptoms	Oil level or grade	External control	Synchronizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

**NOTE:**

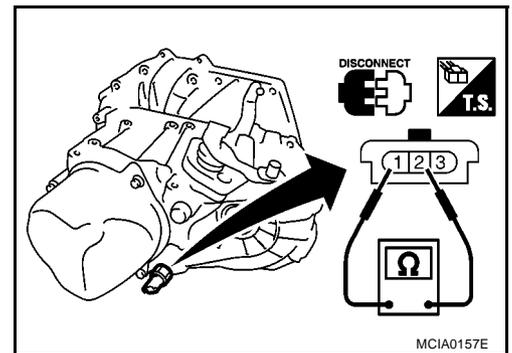
The numbers indicate the order of priority for diagnostics.

### Back-Up Lamp Switch

BCS000MH

- Check continuity between terminals 1 and 2.

Gear position	Continuity
Reverse	Yes
Except reverse	No



### Park/Neutral Position Switch

BCS000MI

- Check continuity between terminals 2 and 3.

Gear position	Continuity
Neutral	Yes
Except neutral	No

# PRECAUTIONS

[JR5]

## PRECAUTIONS

PFP:00001

### Precautions

BCS000MJ

Removing and handling the parts must be carried out on a workbench with a knockproof cover. (rubber or thick plastic)

Cover all turning and synchronizer points in oil.

Observe the tightening torques.

Carefully carry out the specific settings and adjustments.

Be sure to properly refit parts in the same order and position after removal.

Marking the position of the sliding rods in relation to the hubs before removal is recommended.

During refitting, make sure the inside of the box remains free of dust or impurities.

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## PARTS TO BE REPLACED SYSTEMATICALLY

[JR5]

---

### PARTS TO BE REPLACED SYSTEMATICALLY

PFP:32010

#### Description

BCS000MK

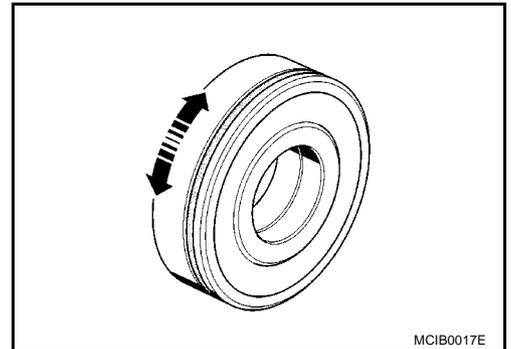
If they have been removed:

- the lip seals,
- the O-rings,
- the gear supporting rings,
- the roll pins,
- the input shaft and mainshaft bearing circlips,
- the sliding gear hub springs.

## CHECKING

### Bearings

Check that the bearings show no signs of damage and that they turn evenly. Replace them if necessary.



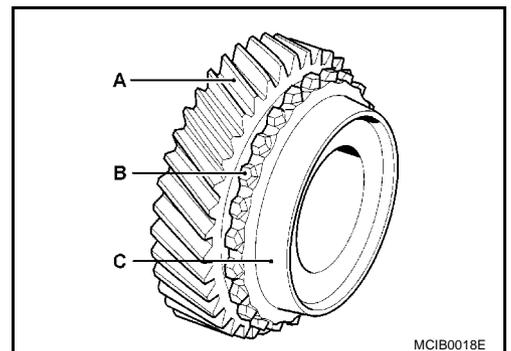
BCS000ML

### Gearing

#### NOTE:

The inspection focuses mainly on the appearance of the teeth, especially in terms of claw chamfers.

1. Check that the teeth (A) are not broken or chipped.
2. Check that the claws (B) are not broken, chipped or worn.
3. Check that the friction cone (C) shows no scratches or blueness.



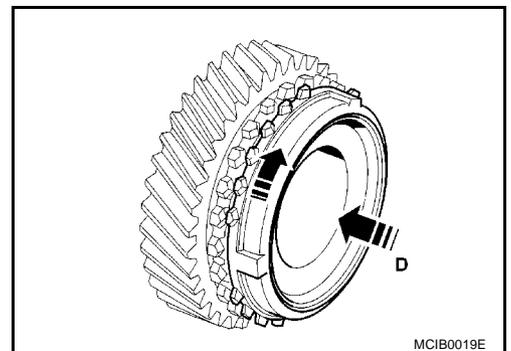
BCS000MM

### Synchronizer Ring

Check that the grooves and ridges on the ring are not worn or damaged.

1. Check that the ring puts onto the gear cone.
2. Check that the ring rotates while applying force in the direction of the cone (D).
3. Check that the ring should lock against the cone.

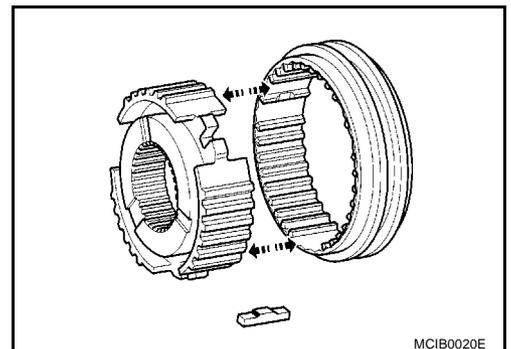
Otherwise, replace the synchronizer ring.



BCS000MN

### Sliding Gear Hub

Make sure the sliding gear turns smoothly in the hub. Check that the rollers or keys are in good condition.



BCS000MO

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# SEPARATING THE HOUSINGS

[JR5]

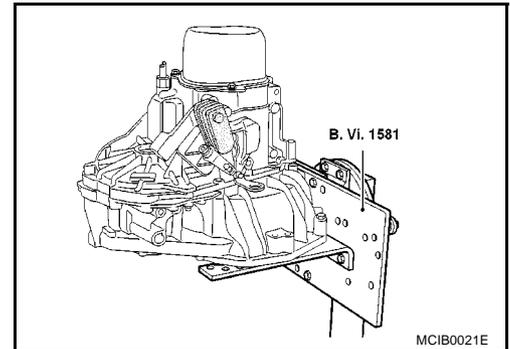
## SEPARATING THE HOUSINGS

PFP:32010

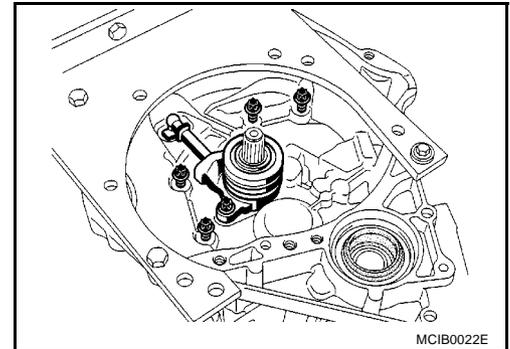
### Removal

BCS000MP

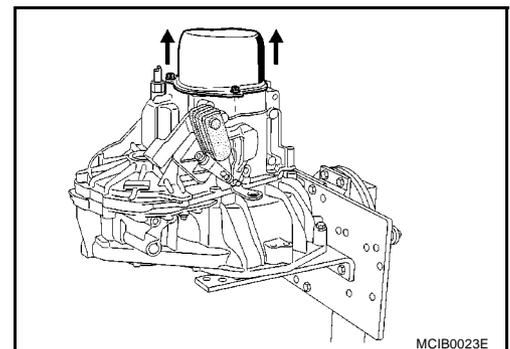
Fit the B. Vi. 1581 support plate on a Desvil stand.  
Fit the gearbox on the B. Vi. 1581 support.



1. Remove the concentric slave cylinder.
2. Remove the bolts located inside the housing.

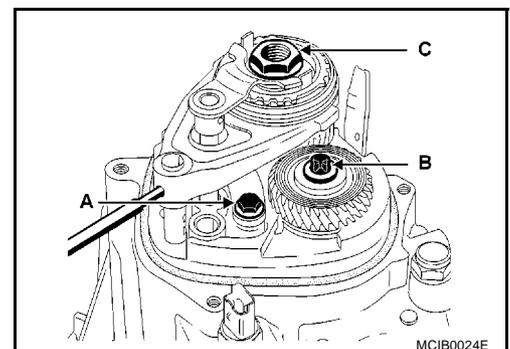


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.



Remove the two reverse gear fork support mounting bolts (A).  
Drive in the 5th gear fork using B. Vi. 31-01.  
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

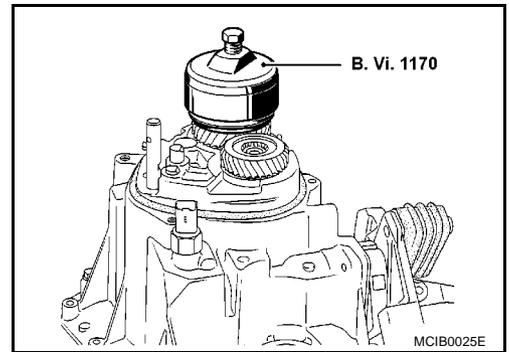
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



# SEPARATING THE HOUSINGS

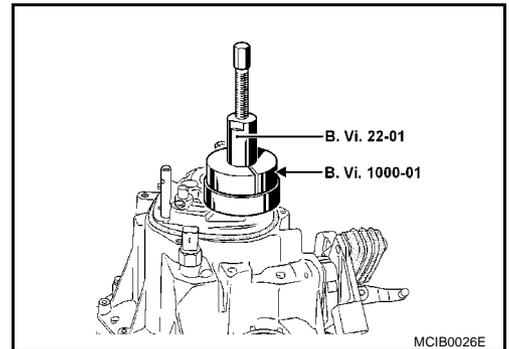
[JR5]

Remove the 5th gear hub using B. Vi. 1170.  
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.

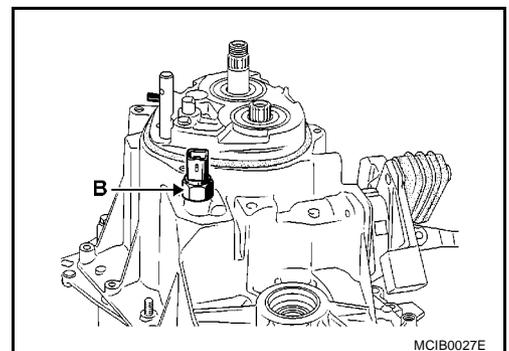


Remove the fixed 5th gear using B. Vi. 22-01 and B. Vi. 1000-01.

Remove the gearbox edge bolts.



Remove the back-up lamp switch (B).  
Engage 3rd gear.  
Lift and remove the mechanism housing.



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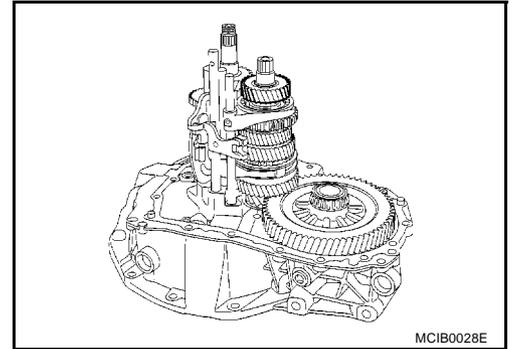
## REPAIRING THE GEARBOX

PFP:32010

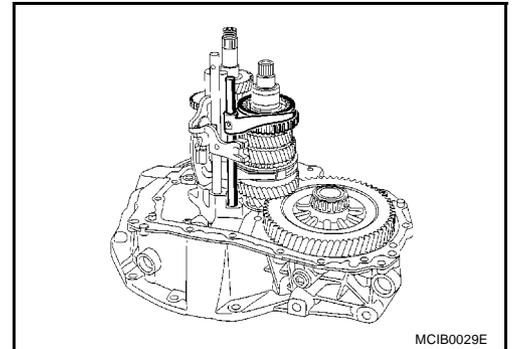
### Removal

BCS000M0

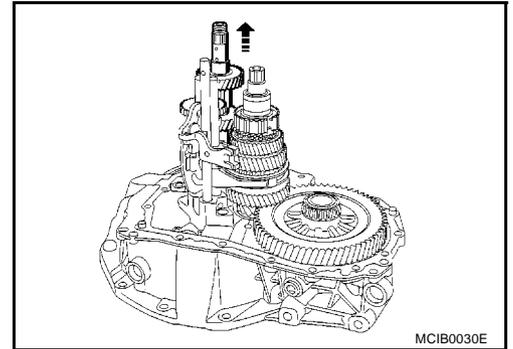
1. Remove the 4th-gear pinion.



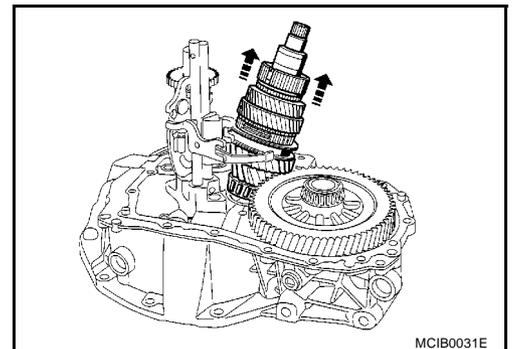
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.



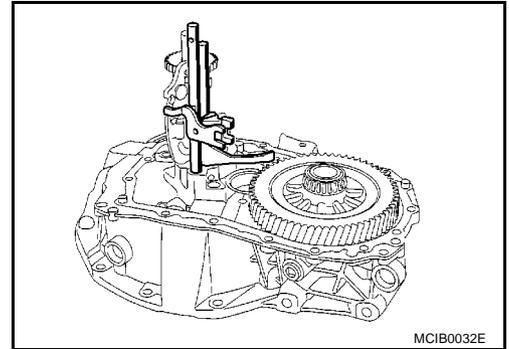
3. Remove input shaft assembly.



4. Remove mainshaft assembly.



- Remove the 1st/2nd shaft and fork and the 5th gear shaft.

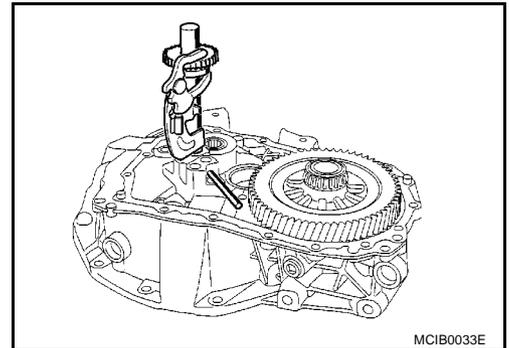


A

B

MT

- Remove the pin from the reverse gear and remove the reverse gear.



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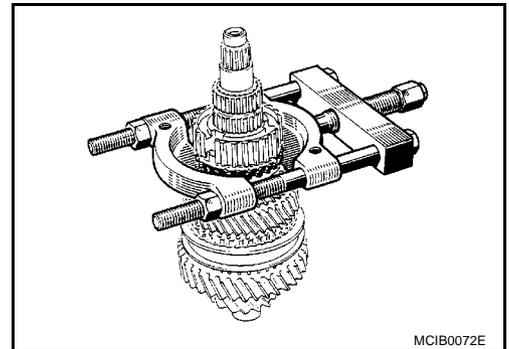
G

## Removing the Gearing

### NOTE:

The rings underneath the 2nd, 3rd and 4th gears are fitted tightened. They will be systematically replaced during refitting.

- Remove the ring/hub/3rd gear assembly with the press, resting underneath the 3rd gear claw teeth.



BCS000MR

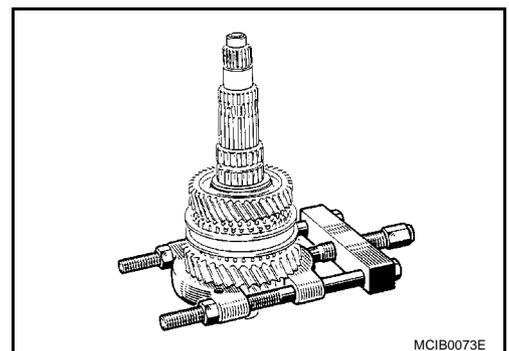
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- Remove the rings/1st and 2nd gears/hub/sliding gear assembly with the press, resting underneath the 1st gear.



L

M

## Checking Parts

The sprocket teeth and the claws should not be chipped or excessively worn.

Also ensure that there are no signs of grating or abnormal wear on the surfaces of the shafts or the inner walls of the sprockets.

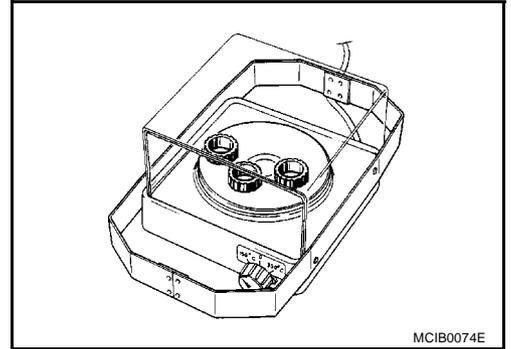
It is advisable to mark the position of the sliding shafts in relation to the hub.

BCS000MS

## Refitting the Gearing

A hot plate with a setting of 150°C (302°F) should be used for refitting.

Place the new rings on the cold hot plate. Heat them for 15 minutes with a thermostat setting of 150°C (302°F).



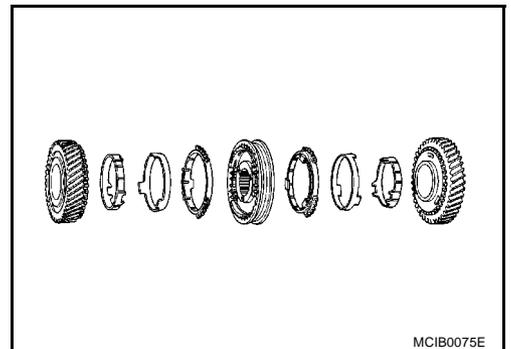
Proceed in the reverse order to removal.

Refit the rings:

Remove a ring from the heating plate, using pliers, and use a tube with an internal diameter of 33 mm (1.30 in) to fit it on the shaft until it is resting on the hub.

**NOTE:**

The 1st/2nd gear has double-cone synchronizer, bring the notches of the synchro rings together with those on the hubs and gears.



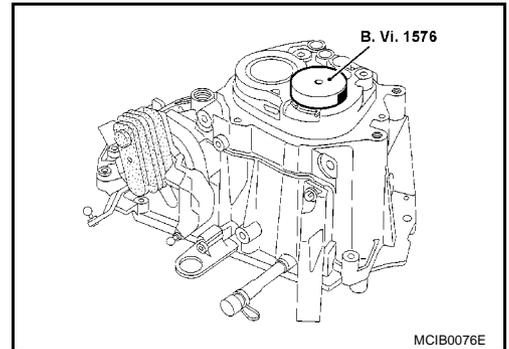
## TRANSAXLE CASE BEARING

PFP:32010

### Removing the Bearing, Input Shaft Side

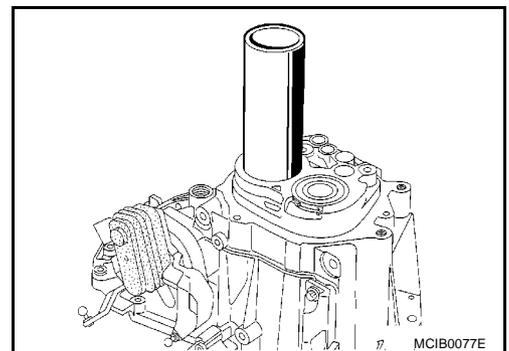
BCS000MU

Remove the circlips and drive the bearing inside the housing using tool B. Vi. 1576.

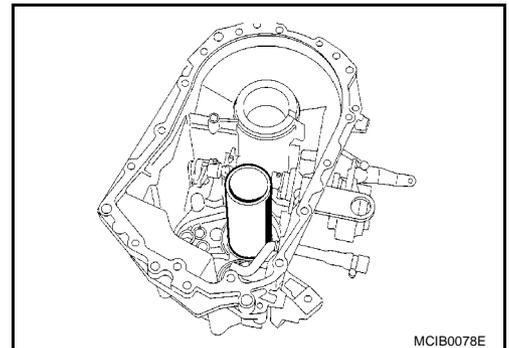


### Refitting

1. Fit a new circlip.
2. Fit the bearing using tool B. Vi. 1576.
3. Remove the bearing race, output shaft side using a tube with a diameter of 55 mm (2.17 in).



4. Refit the race using a 60 mm (2.36 in) diameter tube.



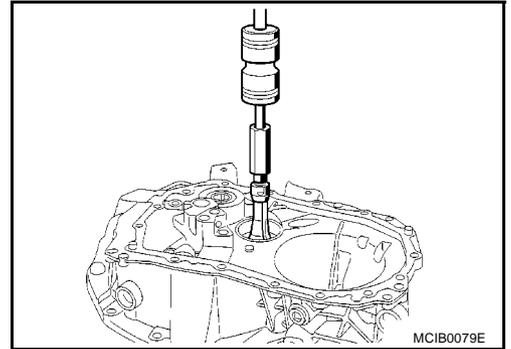
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## CLUTCH HOUSING BEARING

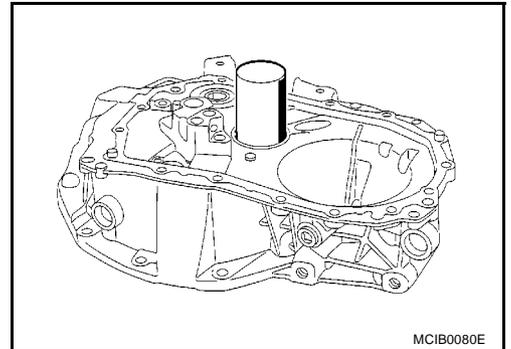
BCS000MW

### Removal and Installation

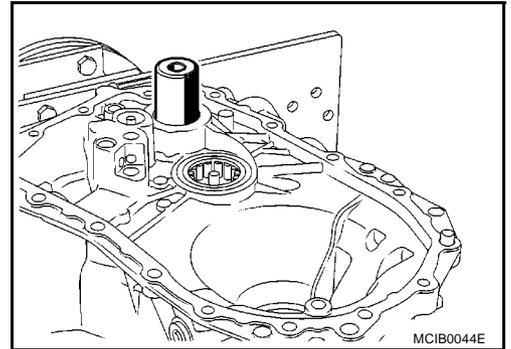
1. Cut the base of the deflector plastic hollow needle located at the centre of the bearing.  
Drive out the cup using a puller.



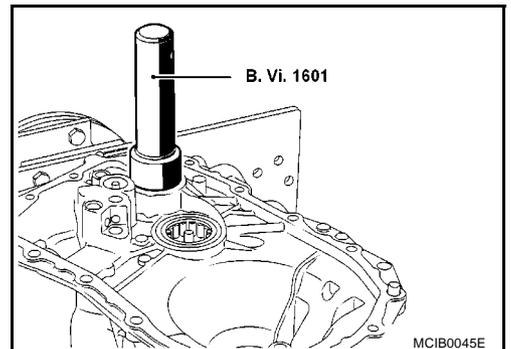
2. Fit a new deflector, then the bearing race using a 55 mm (2.17 in) diameter tube.



3. Remove the input shaft bearing guide using the press and a 38 mm (1.50 in) diameter tube.



4. Refit the bearing guide using the press and tool B. Vi. 1601.



# SELECTOR SHAFT RINGS

[JR5]

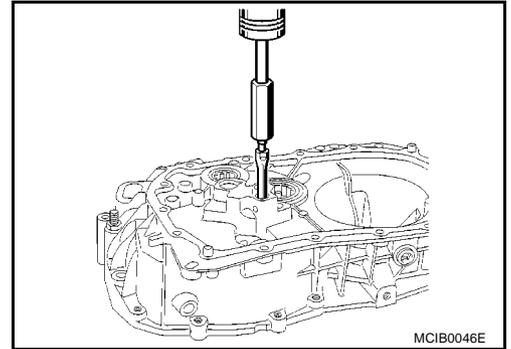
## SELECTOR SHAFT RINGS

PFP:32010

### Removal

BCS000MX

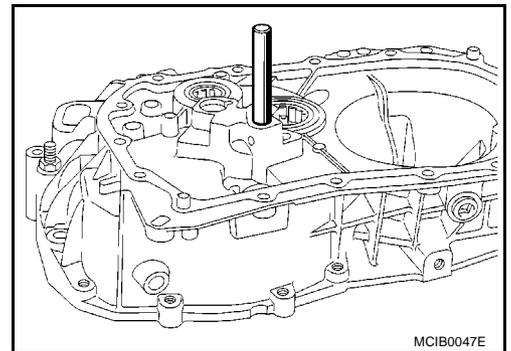
Remove the rings with an inertia puller.



### Refitting

BCS000MY

Refit the rings using a 14.5 mm (0.57 in) tube down to the thrust bearing.



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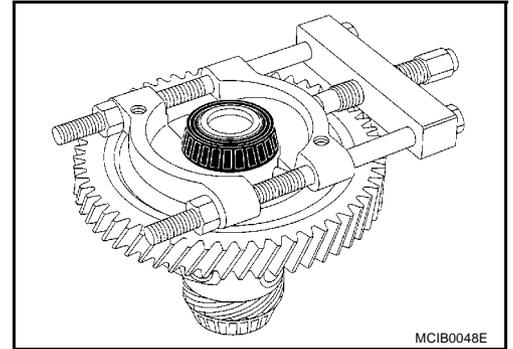
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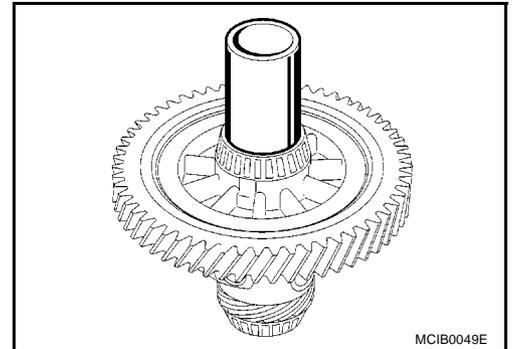
## DIFFERENTIAL BEARINGS

### Removal and Installation

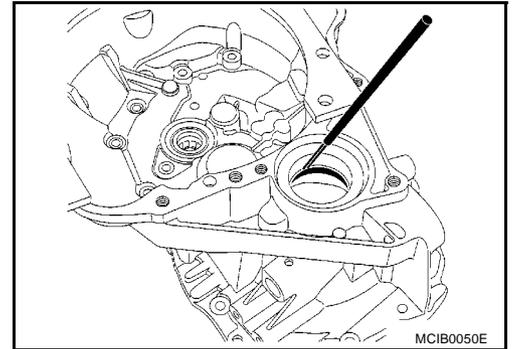
1. Remove the bearing using an antisticking pin.



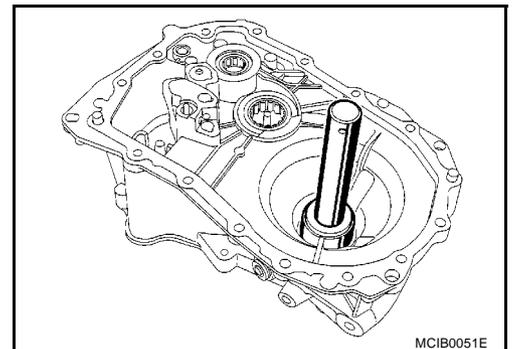
2. Refit the bearings using a 40 mm (1.57 in) tube.



3. Remove the bearing races using a roll pin punch.



4. Refit the bearing races using tools C-F from the B. Vi. 1554 kit.



# SELECTOR SHAFT

[JR5]

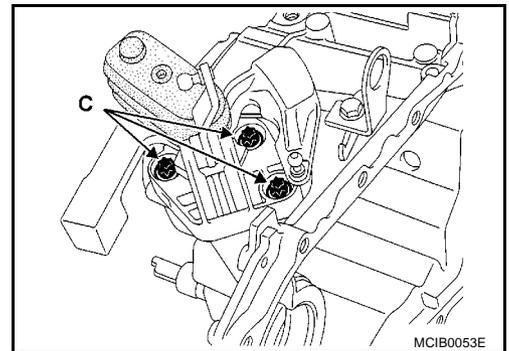
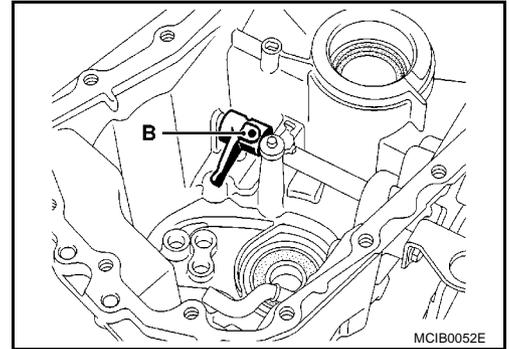
## SELECTOR SHAFT

PFP:32010

### Removal

BCS000N0

After removing the pin from the selector finger (B), remove the mounting bolts (C) and remove the control shaft unit.



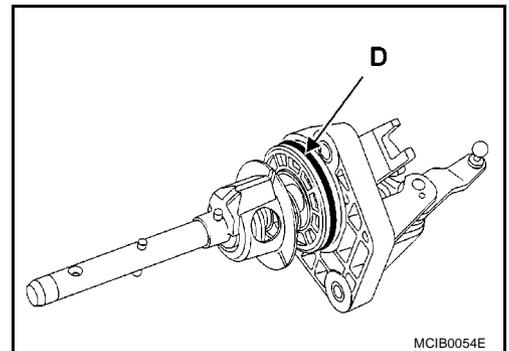
### Refitting

Proceed in the reverse order to removal.

#### NOTE:

Replace the O-ring (D).

BCS000N1



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## REPAIRING THE GEARBOX

### Setting the Pre-tensioning of the Output Shaft Bearings

BCS000N2

**NOTE:**

This operation is carried out in the event of replacing the bearings, housings or mainshaft.

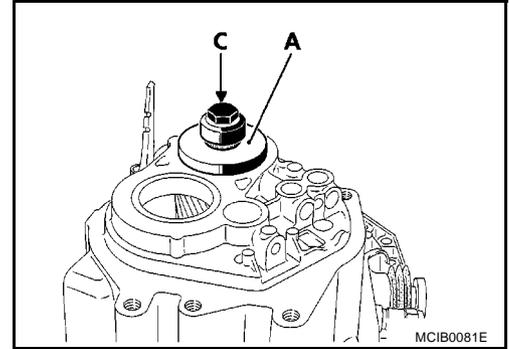
Clutch housing without differential and without input shaft.

Fit the mainshaft in the clutch housing with the bearings and the pre-setting washer B. Vi. 1161, or equivalent, of 1.60 mm (0.06 in) (large outer ý).

Fit the transaxle case assembly.

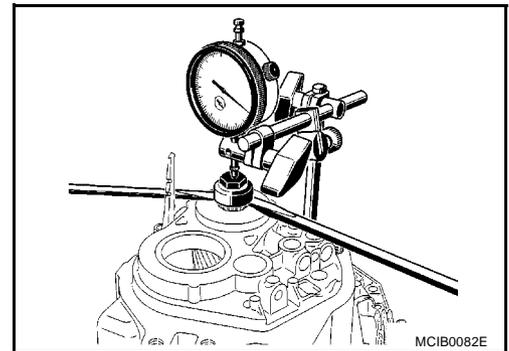
Fit and tighten to torque the box belt bolts.

Fit the dial gauge support plate B. Vi. 1161, or equivalent, on the tripod basin mountings.



1. Fit the B. Vi. 1527 special spacer (A).
2. Fit the bolt (C).
3. Fit the dial gauge with its magnetic holder.

1	Rotate the mainshaft several times to fit the bearings.
2	Set the dial gauge to zero.
3	Pull the mainshaft upwards by making a lever out of two screwdrivers.
4	Take a reading from the dial gauge.



Repeat the operations several times (1 to 4).

Calculate the average of the readings.

**Calculation of the value of the pre-load washer.**

Prescribed value + value of the pre-setting washer + average of the readings on the dial gauge = value of the pre-tensioning dial gauge washer.

**Example:** [Value in mm (in)]

0.26	+	0.49	+	1.60	=	2.35
↓		↓		↓		↓
Prescribed value		Average reading		Pre-setting washer value		Pre-load washer value

**NOTE:**

A set of pre-load washers of 2.15 mm (0.08 in) to 2.43 mm (0.10 in) from 0.04 mm (0.002 in) to 0.04 mm (0.002 in) thickness is supplied as replacement parts.

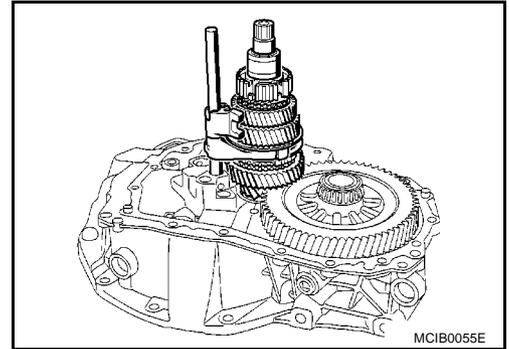
### ASSEMBLY

PFP:00000

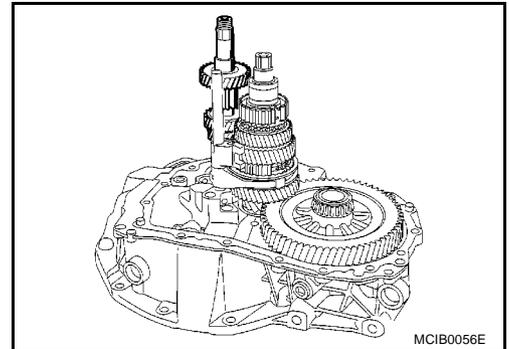
#### Refitting

BCS000N3

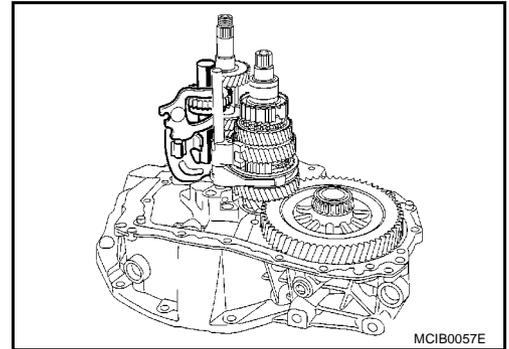
1. Fit the mainshaft and 1st/2nd gear fork assembly.



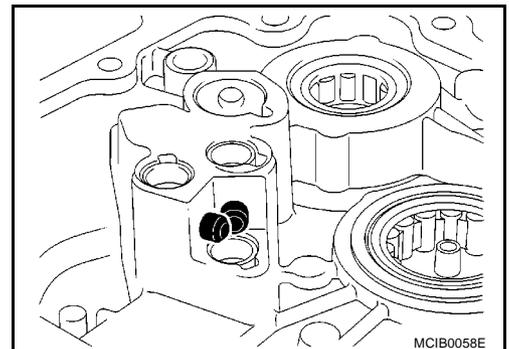
2. Fit the input shaft.



3. Fit the reverse gear assembly.



4. Fit the two locking shafts.

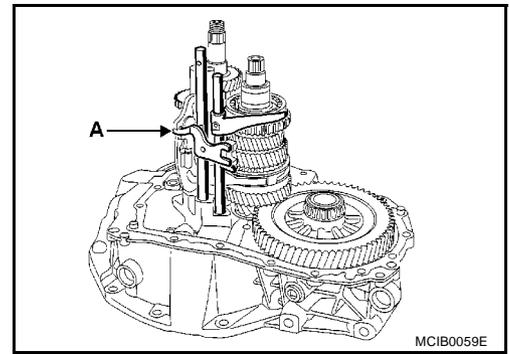


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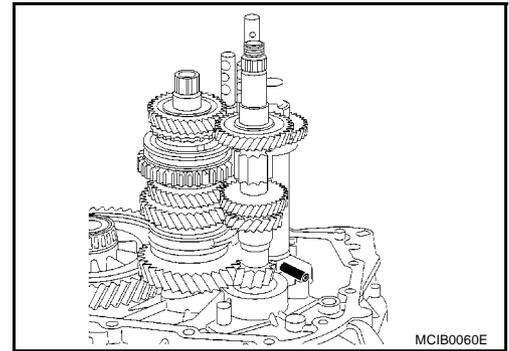
# ASSEMBLY

[JR5]

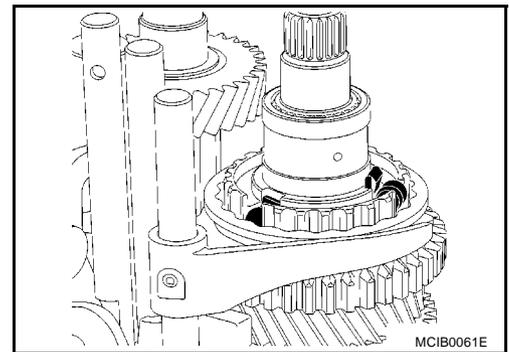
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly. Rotate the reverse gear assembly to position the 5th gear fork (A).



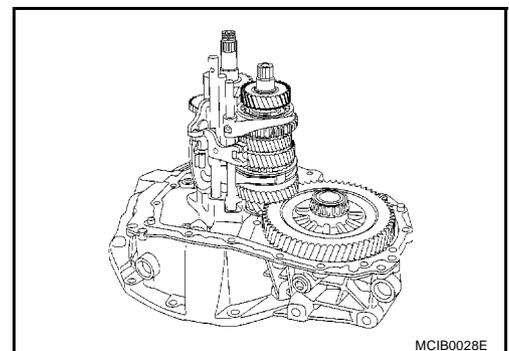
6. Pin the reverse gear assembly.



7. Shift to 3rd gear and insert the rollers and clawing springs.



8. Refit the 4th main gear fitted with its synchronizer ring.



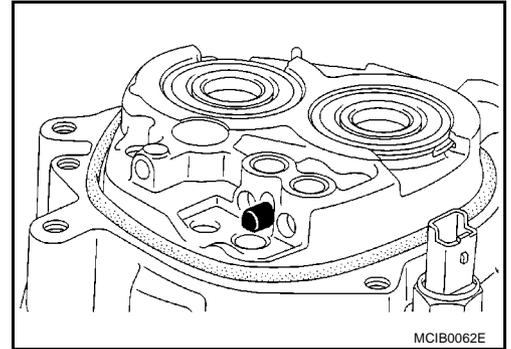
## HOUSING ASSEMBLY

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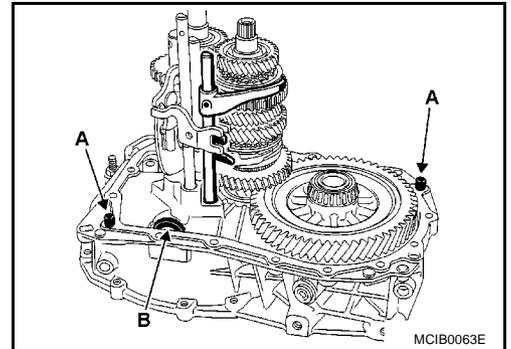
BCS000N4

### Assembly

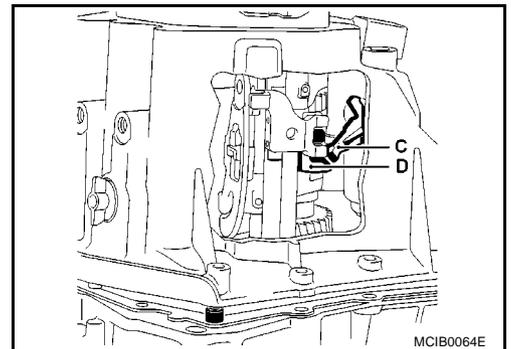
1. Fit the 1st/2nd, 3rd/4th, and 5th gear locking balls into the transaxle case.
2. Engage 3rd gear.



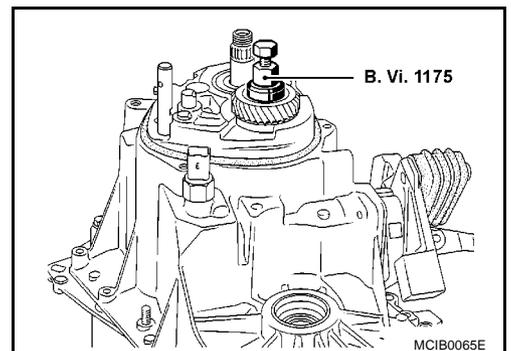
3. Check the positioning of the centring dowels (A).
4. Check the positioning of magnet (B).



5. Apply a line of LOCTITE 518 to the gasket face.
6. Offer up the housing while guiding the selector finger (C) into the fork (D) of the 3rd gear.



7. Pretighten the peripheral bolts and rotate the input shaft to check that they make contact with the bearings.
8. Tighten the bolts to a torque of [25 N-m (2.6 kg-m, 18 ft-lb)].
9. Put three drops of LOCTITE Frenbloc on the splines of the fixed 5th gear and fit it using tool B. Vi. 1175.

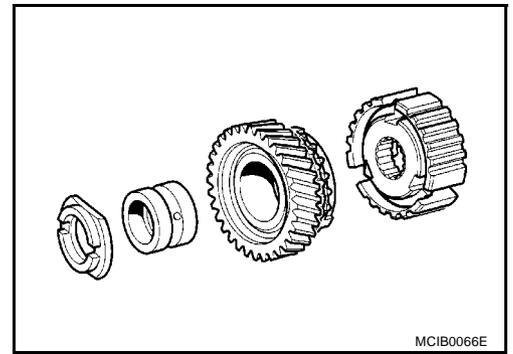


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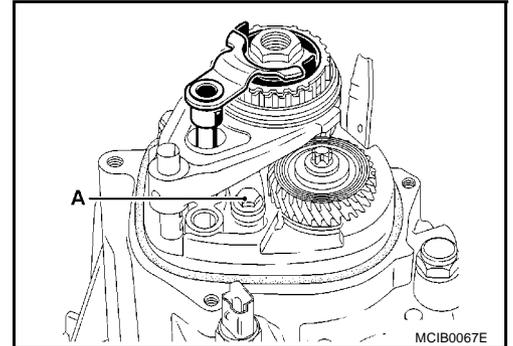
# HOUSING ASSEMBLY

[JR5]

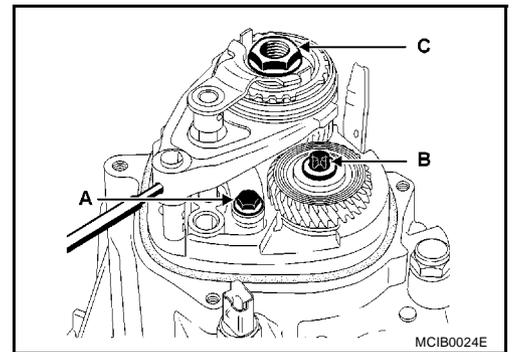
10. On the input shaft, fit the support washer (top side gear side).
11. On the input shaft, fit the sprocket bushing.
12. On the input shaft, fit the 5th main gear fitted with its synchronizer ring.
13. On the input shaft, fit the 5th gear hub fitted with its spring.



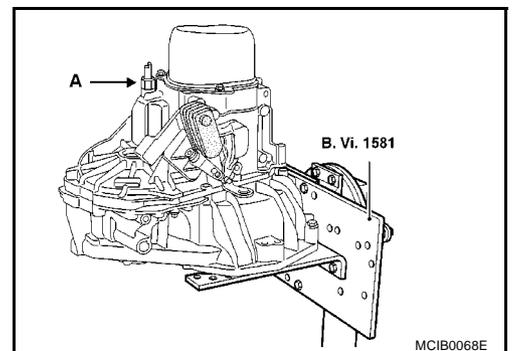
14. Refit the 5th gear fork/sliding gear/reverse gear fork assembly.
15. Fit the reverse gear synchronizer.
16. Screw on the reverse gear fork support and tighten the bolts (A) to a torque of [25 N·m (2.6 kg·m, 18 ft-lb)].
17. Slide the 5th gear fork on its shaft to engage 5th gear.



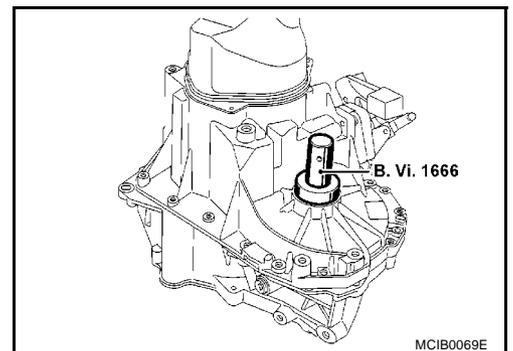
18. Tighten the gear bolt and nut to torque of:  
**output shaft bolt (B) : [70 N·m (7.1 kg·m, 52 ft-lb)]**  
**input shaft nut (C) : [190 N·m (19 kg·m, 140 ft-lb)]**
19. Reset to neutral and pin the 5th gear fork.



20. Fit a new O-ring, position the 5th gear cover and tighten the bolts to a torque of [25 N·m (2.6 kg·m, 18 ft-lb)].
21. Fit the back-up lamp switch (A) and tighten to a torque of [25 N·m (2.6 kg·m, 18 ft-lb)].



22. Refit the new differential output seals using B. Vi. 1666.

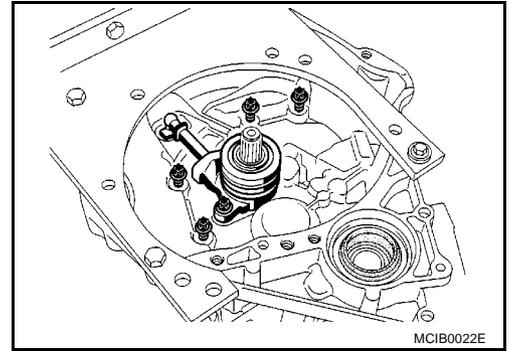


# HOUSING ASSEMBLY

[JR5]

23. Refit the concentric slave cylinder and tighten the bolts.

**Tightening torque : 21 N-m (2.1 kg-m, 15 ft-lb)**



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