SECTION MT
MANUAL TRANSAXLE

CONTENTS

PRECAUTIONS

PFP:00001

Cautions

ECS00FE3

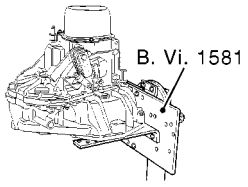
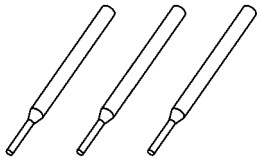
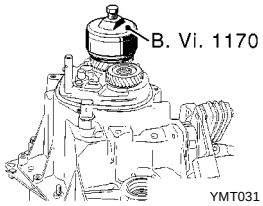
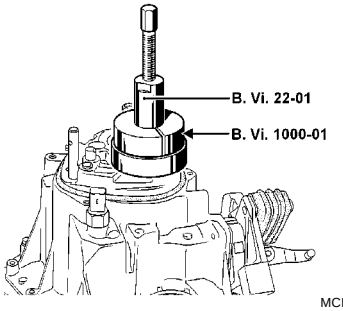
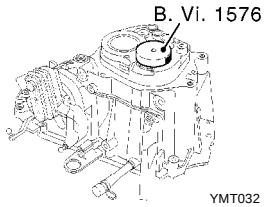
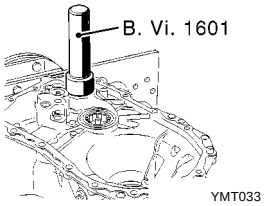
- Do not reuse transaxle oil, once it has been drained.
- Check oil level or replace oil with vehicle on level ground.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation status prior to removal or disassembly. If mating marks are required, be certain 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.

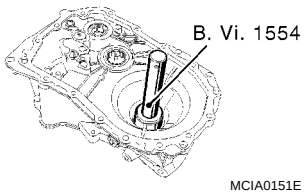
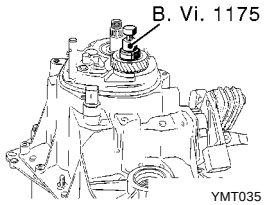
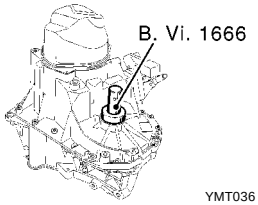
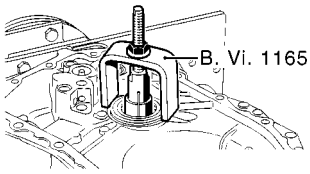
PREPARATION

PFP:00002

Special Service Tools

ECS00FD1

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

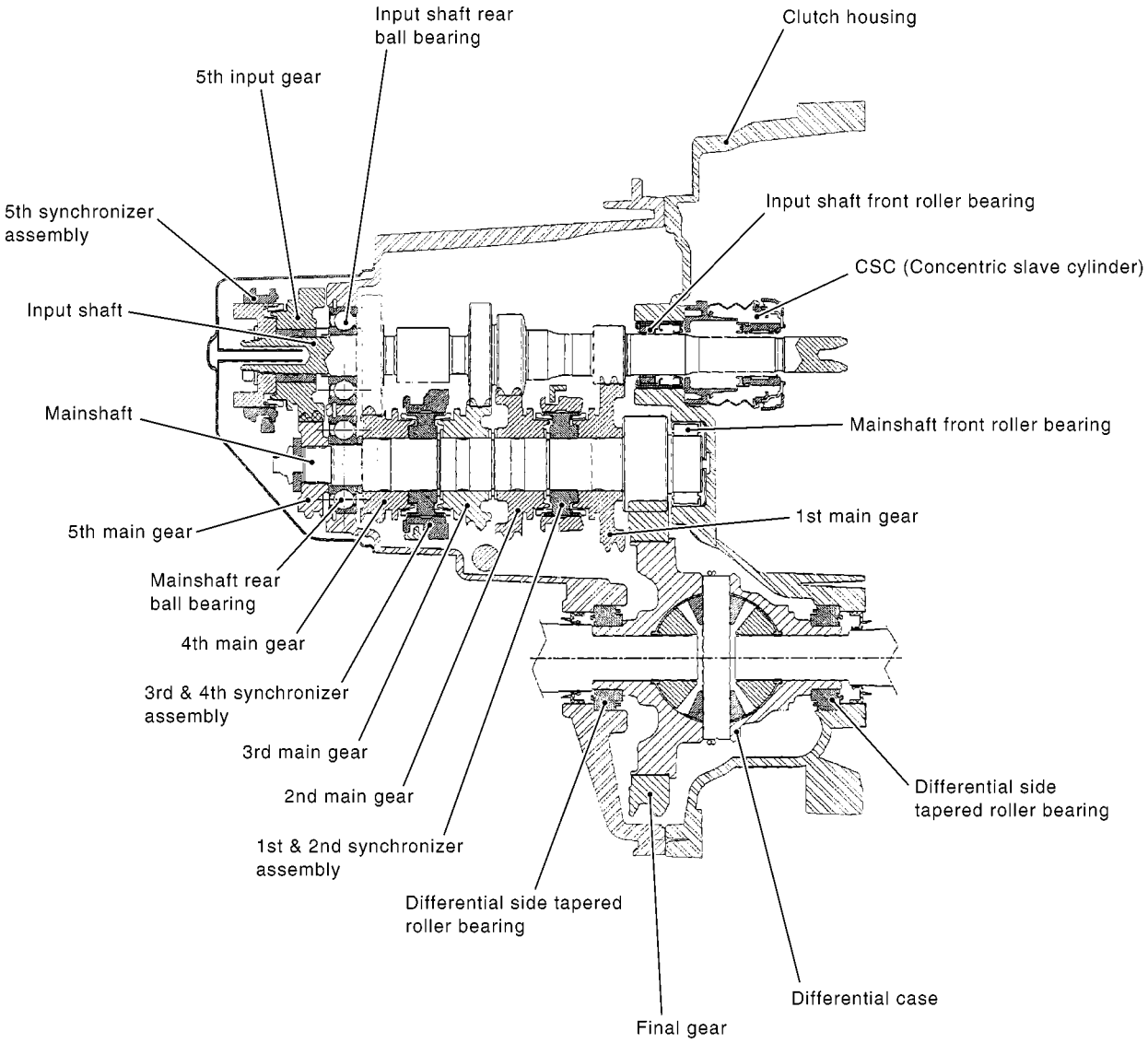
Tool number Tool name	Description	
B. Vi. 1554 Drift kit	 MCIA0151E	Installing bearing race
B. Vi. 1175 Installer	 YMT035	Installing 5th gear
B. Vi. 1666 Drift	 YMT036	Installing differential oil seal
B. Vi. 1165 Extractor	 MCIA0152E	Removing mainshaft bearing

DESCRIPTION

PFP:zzzzz

Cross-sectional View

ECS00FF3



MCIA0153E

REMOVAL AND INSTALLATION

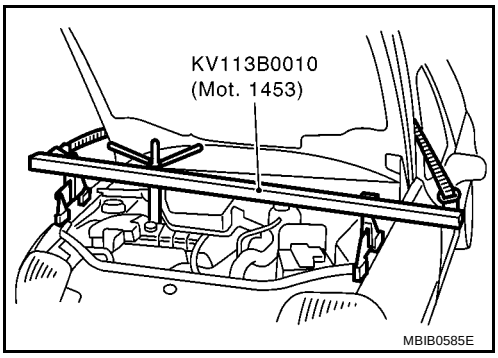
PFP:00000

Removal

ECS00FE4

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-16, "AIR CLEANER AND AIR DUCT" (CR engine) or EM-123, "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-45, "Removal and Installation (CR Engine Models)" , “STARTING SYSTEM”.
7. Remove the engine mounting LH side installation bolt. Refer to EM-69, "ENGINE ASSEMBLY" (CR engine) or EM-147, "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-69, "ENGINE ASSEMBLY" (CR engine) or EM-147, "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

ECS00FE5

Install in the reverse order of removal.

TIGHTENING TORQUES

PFP:32010

Description

ECS00FE6

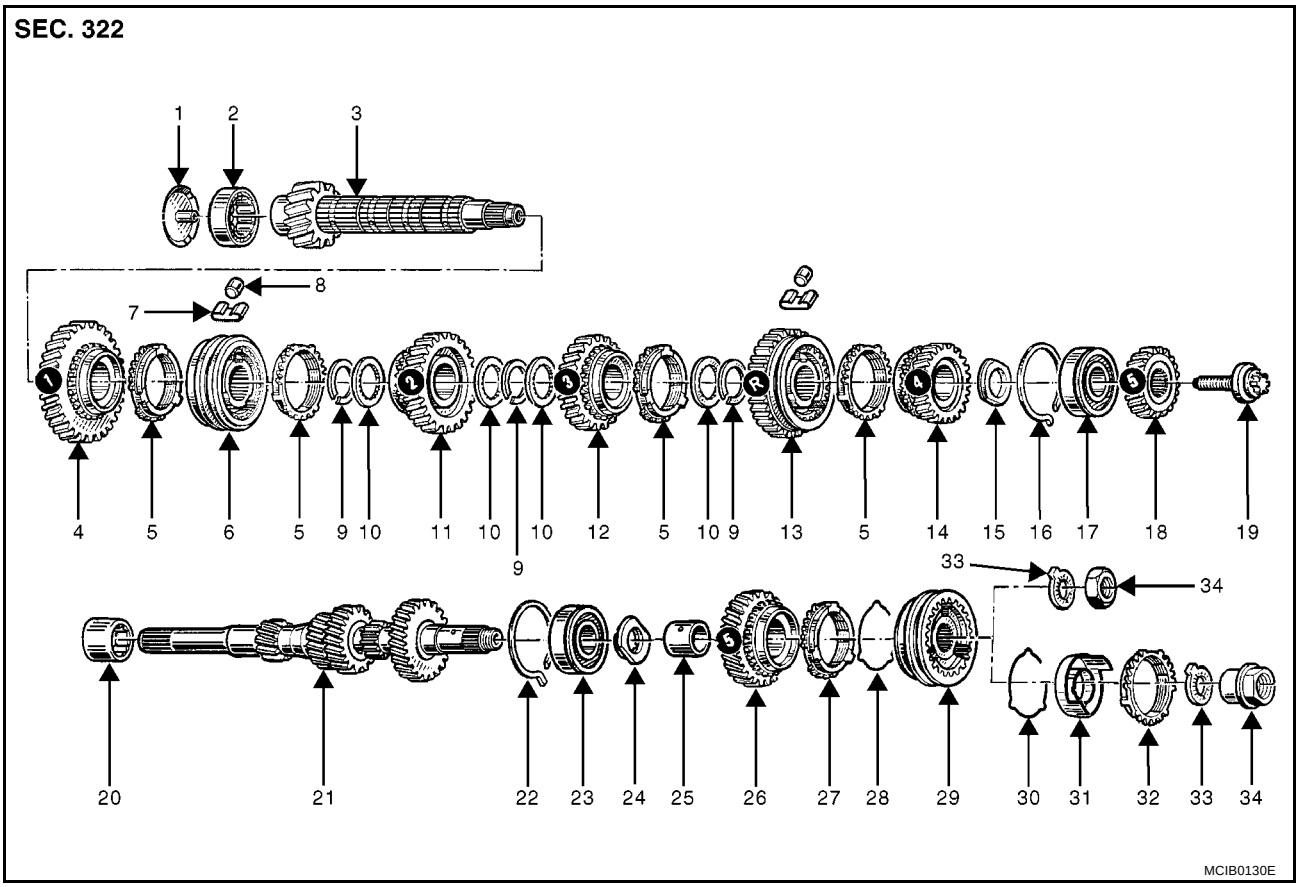
Tightening portion	N·m (kg-m, ft-lb)
Gearbox casing bolt	**25 (2.6, 18)**
Mainshaft bolt	**70 (7.1, 52)**
Input shaft nut	**190 (19, 140)**
Rear cover bolt	**25 (2.6, 18)**
Back-up lamp switch	**25 (2.6, 18)**
Concentric slave cylinder	**21 (2.1, 15)**
Selector shaft bolt	**20 (2.0, 15)**
Gear shift 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

ECS00FE7

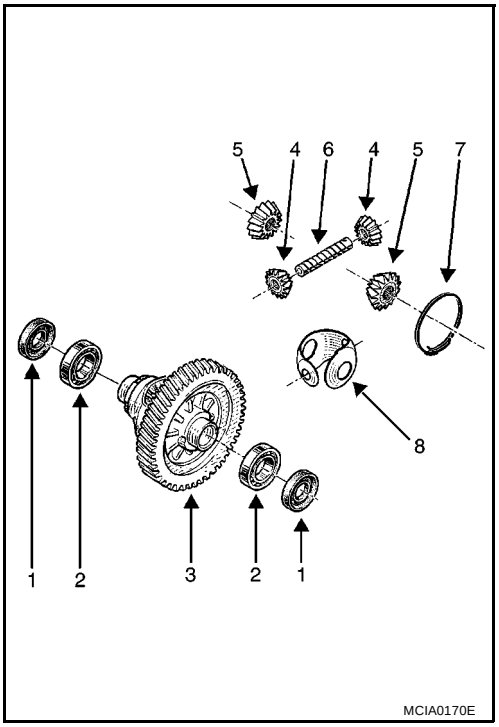


1. Oil channel	2. Mainshaft front bearing	3. Mainshaft
4. 1st main gear	5. Baulk ring	6. 1st & 2nd synchronizer hub
7. Spring	8. Roller	9. Stop ring
10. Adapter plate	11. 2nd main gear	12. 3rd main gear
13. 3rd & 4th synchronizer hub	14. 4th main gear	15. Support washer
16. Retaining clip	17. Mainshaft 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		

Differential Gear

ECS00FE8

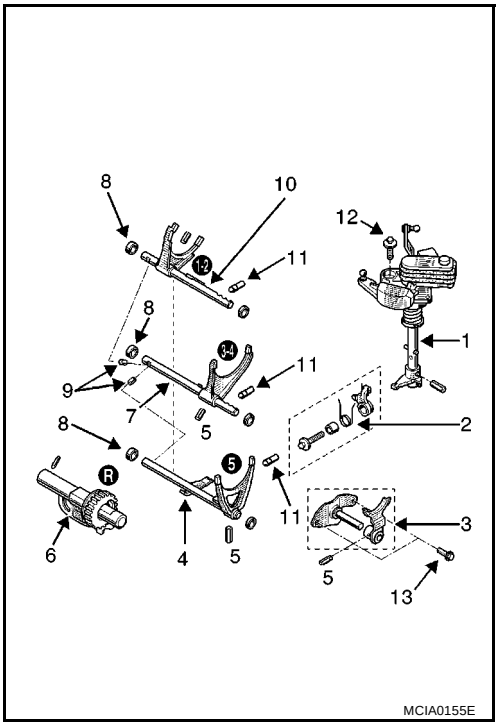
1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer



Shift Control Components

ECS00FE9

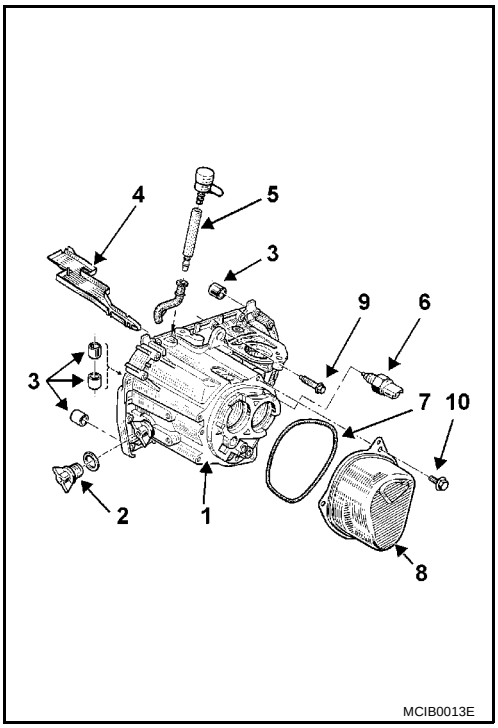
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg-m, 15 ft-lb)]
13	Reverse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



Case Components

ECS00FEA

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)]

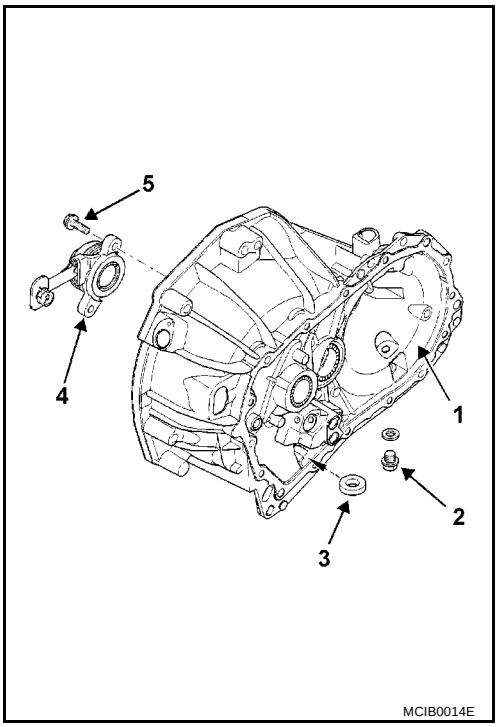


MCIB0013E

Clutch Housing

ECS00FEB

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)]



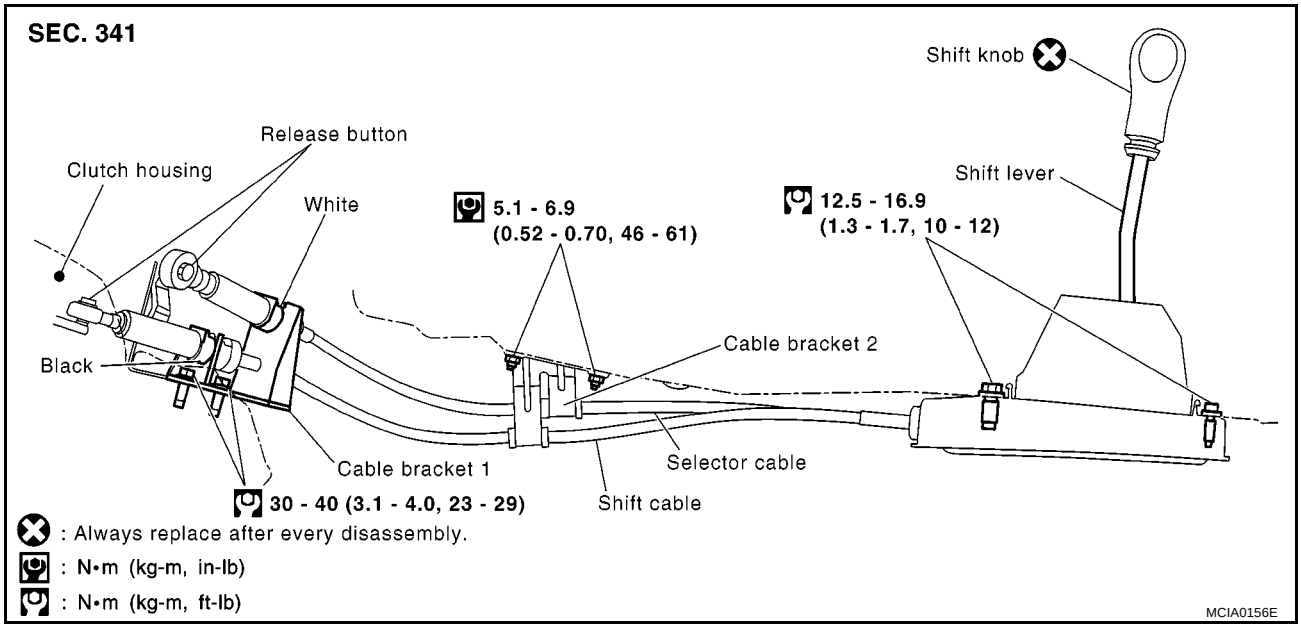
MCIB0014E

CONTROL LINKAGE

PFP:34103

Removal and Installation of Control Device and Cable

ECS00FEC



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. Separate cable bracket 2 from the vehicle.
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.

CAUTION:
Do not reuse shift knob.

RATIOS

PFP:32010

NISSAN Gearbox

ECS00FED

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
JH3-102	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-103	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-110	11:41	21:43	28:39	34:35	39:32	11:39	15:61
JH3-140	11:37	22:41	28:37	30:29	42:31	11:39	15:58
JH3-148	11:41	21:43	28:39	34:35	39:32	11:39	14:59

CONSUMABLES

PFP:32010

Description

ECS00FEE

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

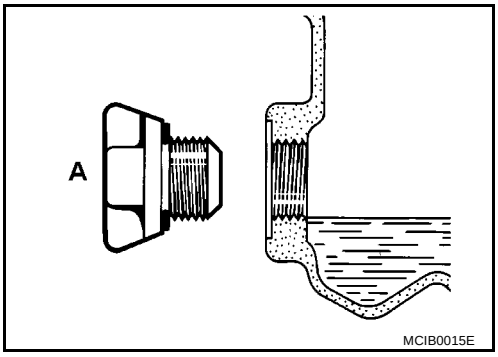
PFP:32010

Description

ECS00FEF

Capacity	Grade
2.6 ℓ (4-5/8 Imp pt)	SAE 75W-80, 75W-85

Fill to the level of the oil filler cap hole.



TROUBLE DIAGNOSIS

PFP:00004

Symptom Chart

ECS00FEG

Symptoms (after checking the clutch)	Possible causes

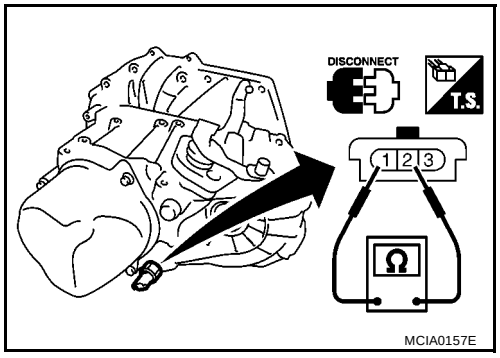
Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

Back-up Lamp Switch

ECS00FEH

Gear position	Continuity
Reverse	Yes
Except reverse	No



MCIA0157E

PRECAUTIONS

PFP:00001

Precautions

ECS00FEI

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.

PARTS TO BE REPLACED SYSTEMATICALLY

PFP:32010

Description

ECS00FEJ

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.

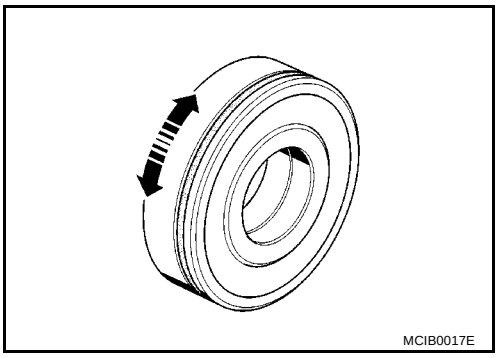
CHECKING

PFP:32010

Bearings

ECS00FEK

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

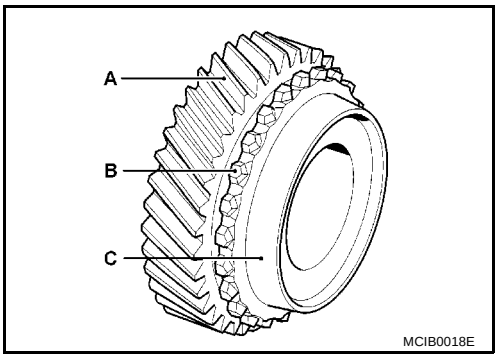

MCIB0017E

Gearing

ECS00FEL

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.



MCIB0018E

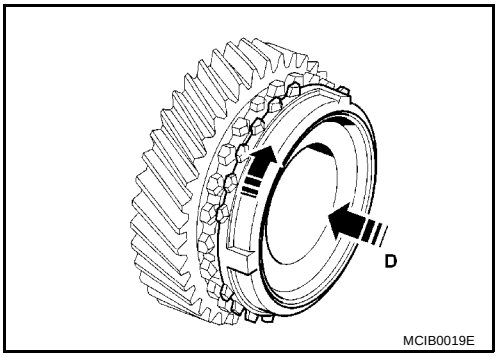
Synchronizer Ring

ECS00FEM

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

1. Check that put the ring onto the gear cone.
2. Check that rotate the ring 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.

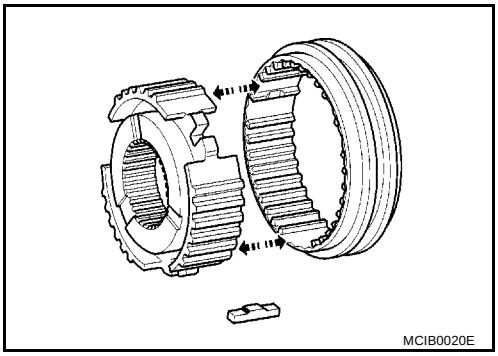


MCIB0019E

Sliding Gear Hub

ECS00FEN

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


MCIB0020E

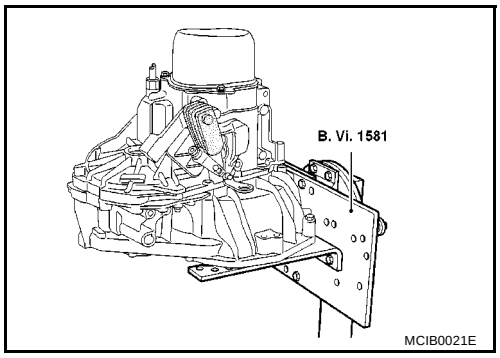
SEPARATING THE HOUSINGS

PFP:32010

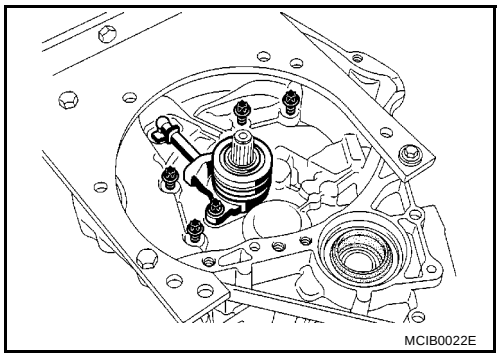
Removal

ECS00FEO

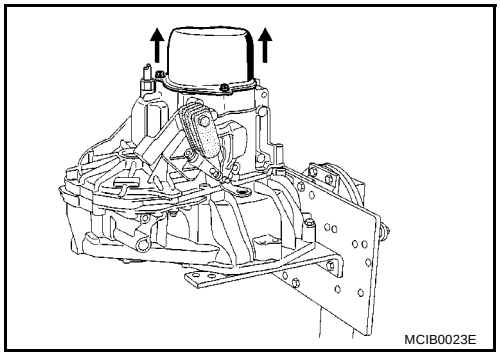
Fit the B. Vi. 1581 support plate on a Desvil stand.
Fit the gearbox on the B. Vi. 1581 support.



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

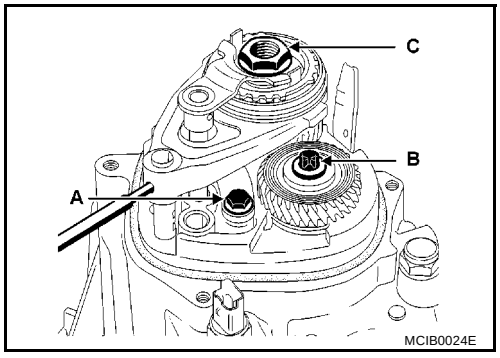


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.

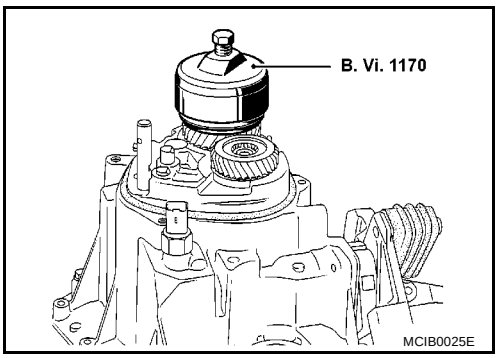


Remove the two reverse gear fork support mounting bolts (A).
Drive in the 5th gear fork using B. Vi. 31-01.
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

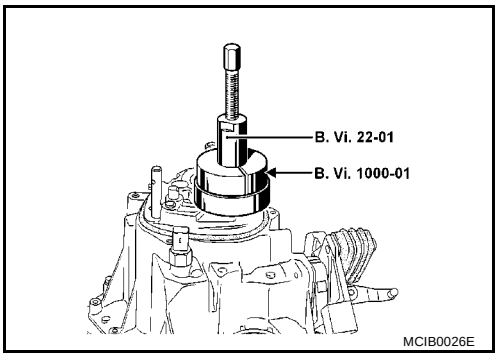
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



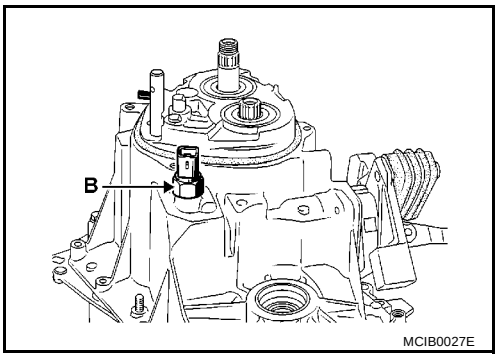
Remove the 5th gear hub using B. Vi. 1170.
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.



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.



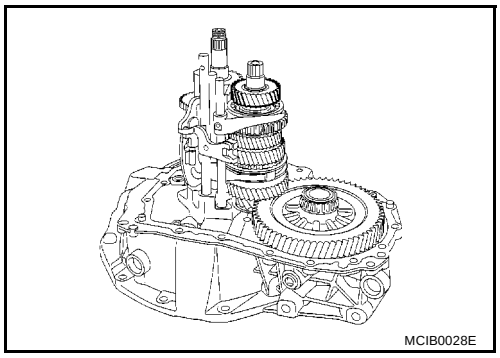
REPAIRING THE GEARBOX

PFP:32010

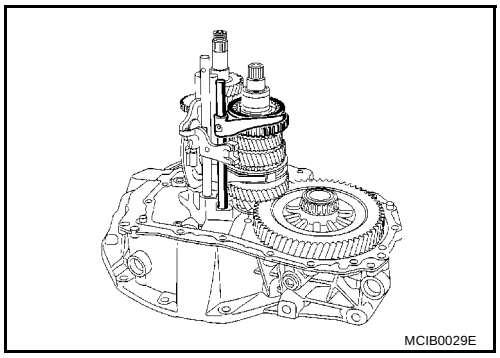
Removal

ECS00FEP

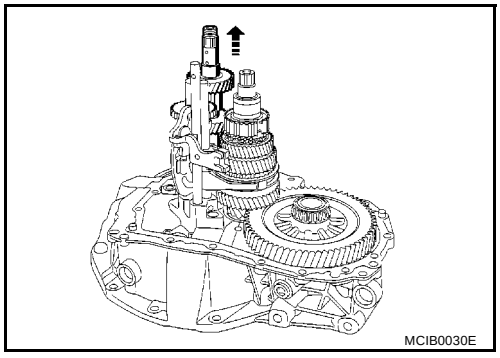
1. Remove the 4th-gear pinion.


MCIB0028E

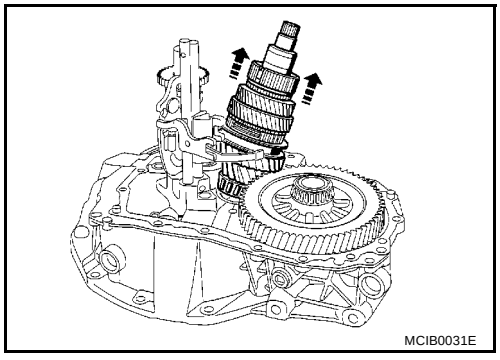
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.


MCIB0029E

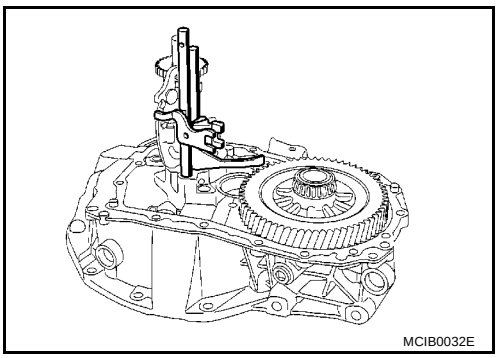
3. Remove input shaft assembly.


MCIB0030E

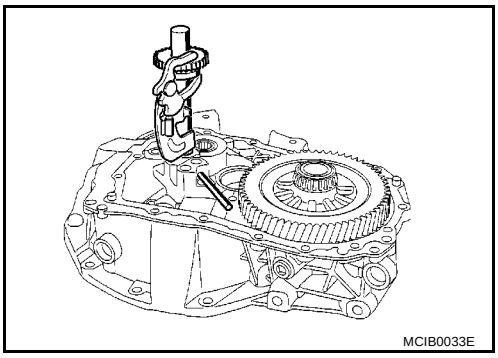
4. Remove mainshaft assembly.


MCIB0031E

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


MCIB0032E

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


MCIB0033E

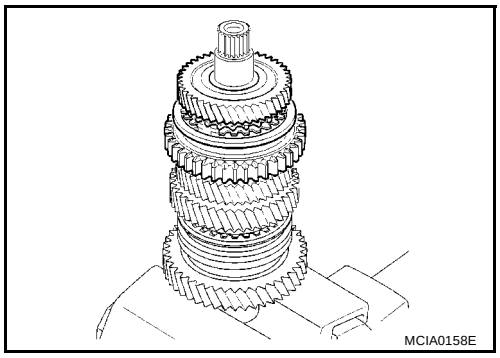
MAINSHAFT

PFP:32241

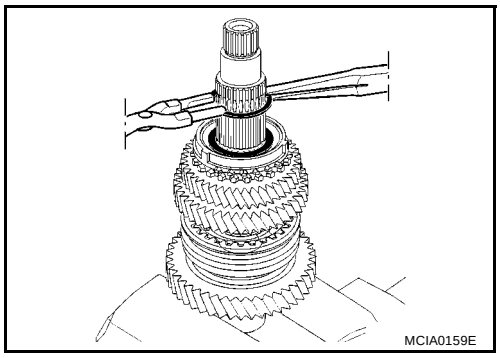
Removal

ECS00FEQ

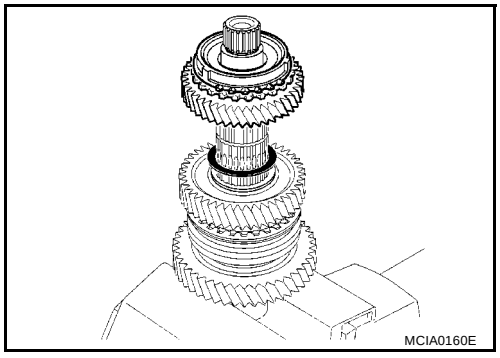
1. Put the mainshaft in a vice with soft jaws.
2. Remove the 4th main gear and the 3rd/4th gear sliding gear hub.


MCIA0158E

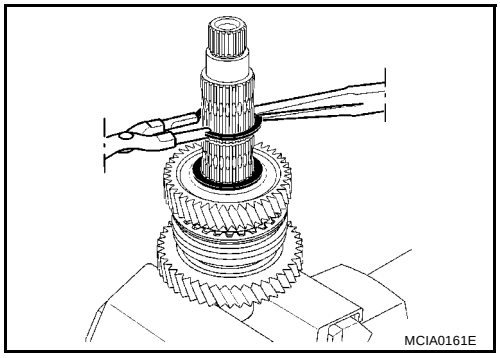
3. Remove the stop ring (systematically replace) and the grooved washer.


MCIA0159E

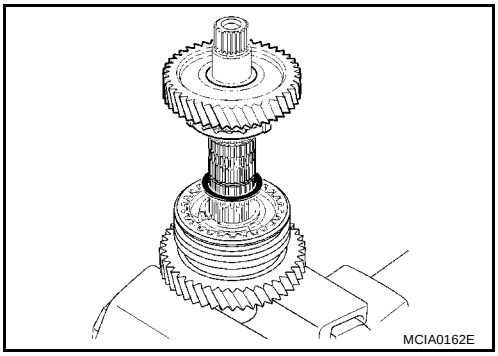
4. Remove the 3rd main gear and the grooved washer.


MCIA0160E

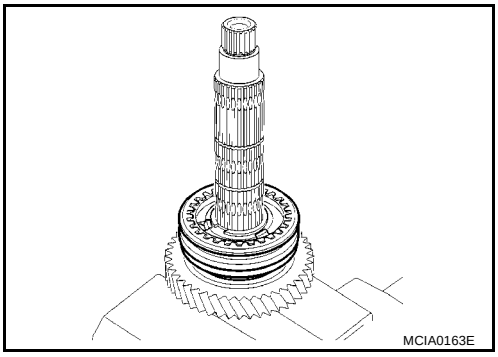
5. Remove the stop ring (systematically replace) and the grooved washer.


MCIA0161E

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


MCIA0162E

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

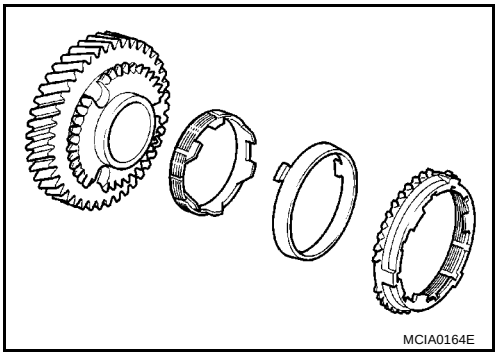

MCIA0163E

Refitting

ECS00FER

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.


MCIA0164E

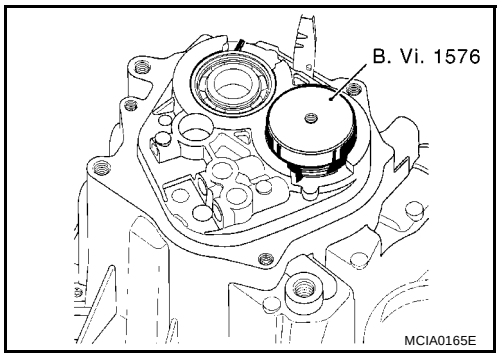
TRANSAXLE CASE BEARING

PFP:32010

Removal

ECS00FES

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



Refitting

ECS00FET

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.

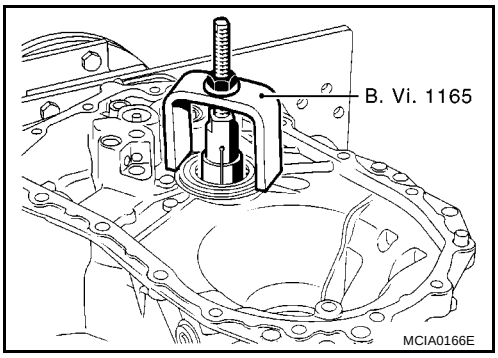
CLUTCH HOUSING BEARING

PFP:32010

Removal

ECS00FEU

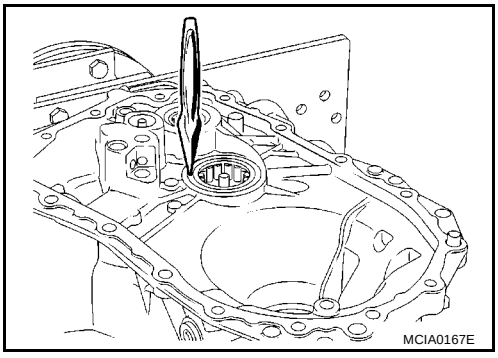
Cut the base of the plastic hollow needle located at the centre of the bearing.
Fit tool B. Vi. 1165 and extract the bearing.



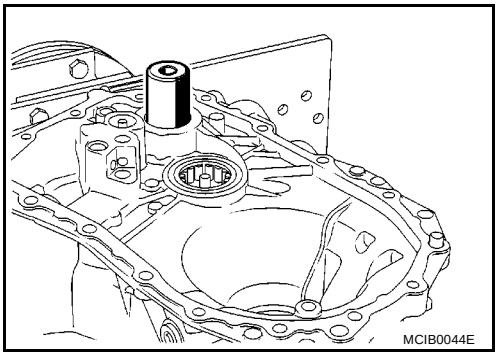
Refitting

ECS00FEV

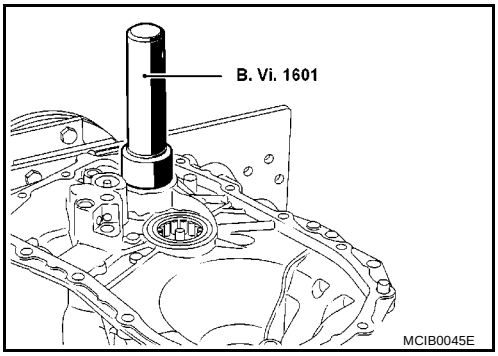
1. Fit a new deflector, then the bearing on the press flush with the inner surface of the housing.
2. Set the bearing with a mortise chisel.



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.



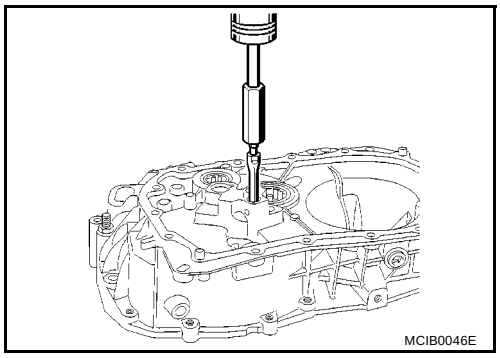
SELECTOR SHAFT RINGS

PFP:32010

Removal

ECS00FEW

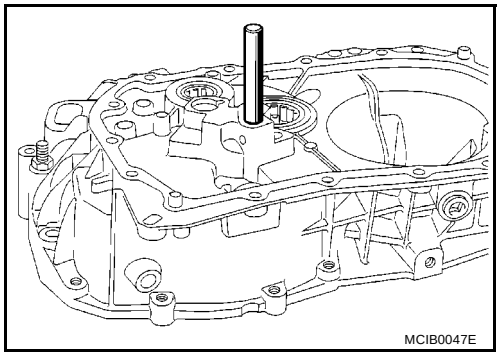
Remove the rings with an inertia puller.



Refitting

ECS00FEX

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



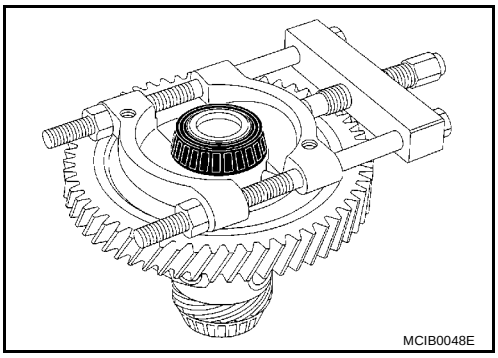
DIFFERENTIAL BEARINGS

PFP:32010

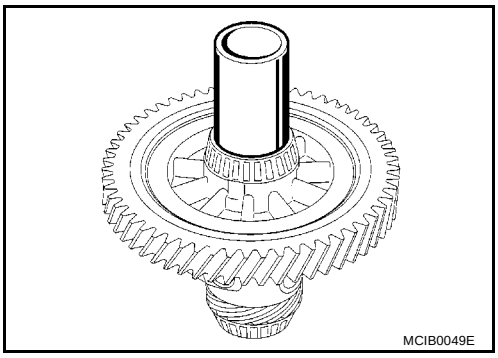
Removal and Installation

ECS00FEY

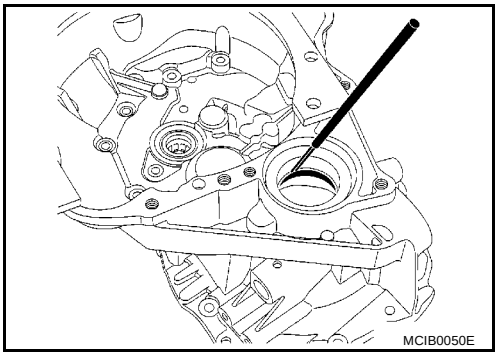
1. Remove the bearing using an antisticking pin.


MCIB0048E

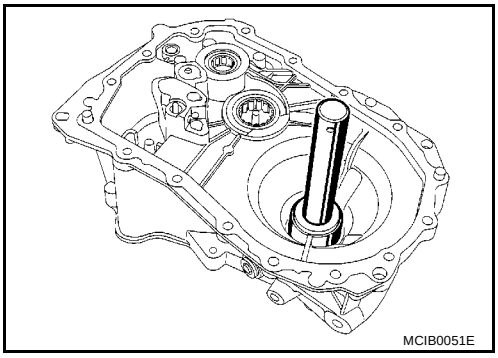
2. Refit the bearings using a 40 mm (1.57 in) tube.


MCIB0049E

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


MCIB0050E

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


MCIB0051E

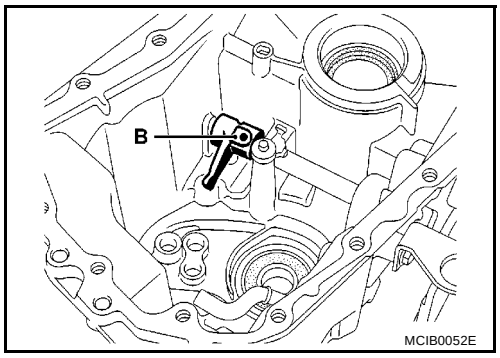
SELECTOR SHAFT

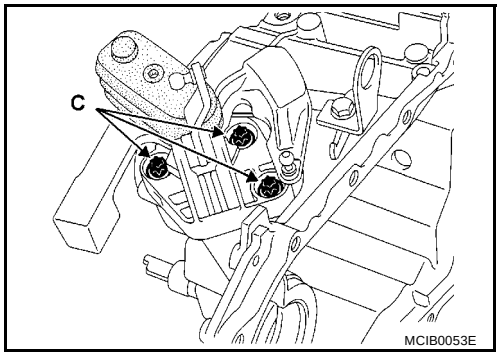
PFP:32010

Removal

ECS00FEZ

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



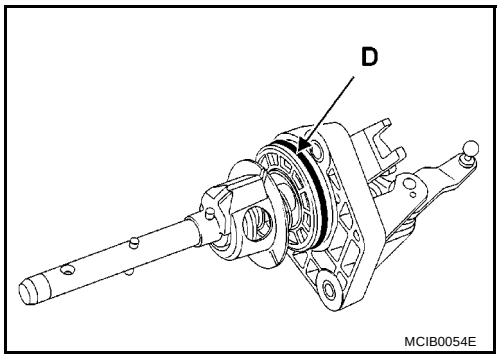


Refitting

ECS00FF0

Proceed in the reverse order to removal.

NOTE:
Replace the O-ring (D).



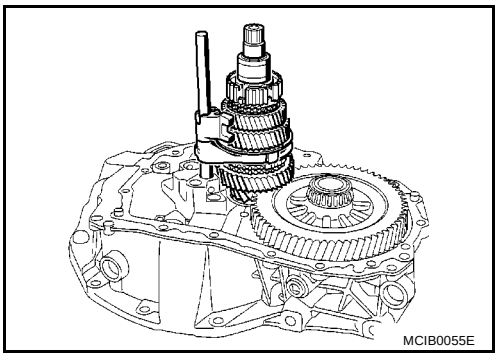
ASSEMBLY

PFP:00000

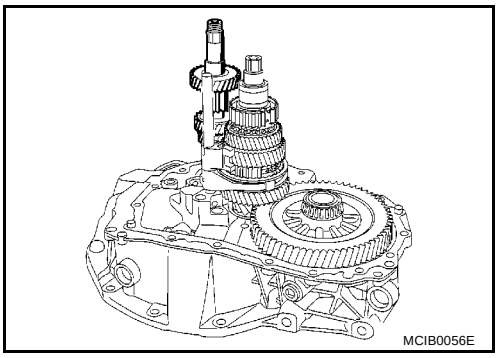
Refitting

ECS00FF1

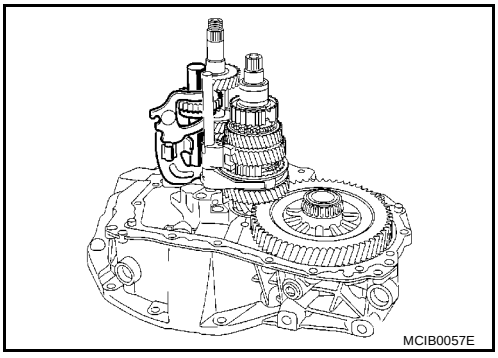
1. Fit the mainshaft and 1st/2nd gear fork assembly.


MCIB0055E

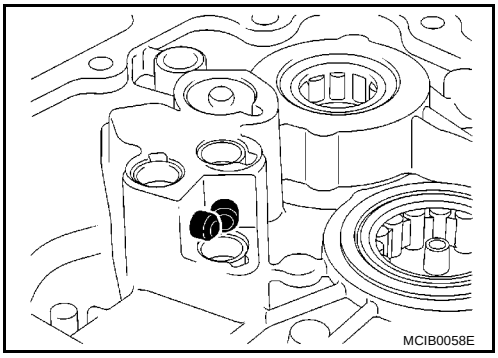
2. Fit the input shaft.


MCIB0056E

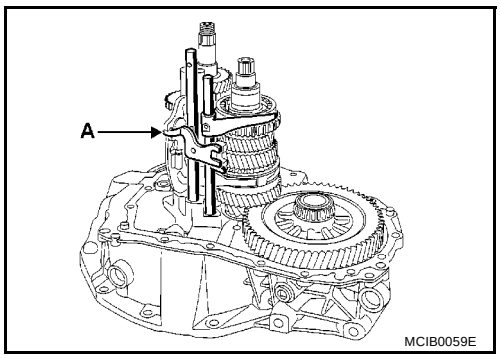
3. Fit the reverse gear assembly.


MCIB0057E

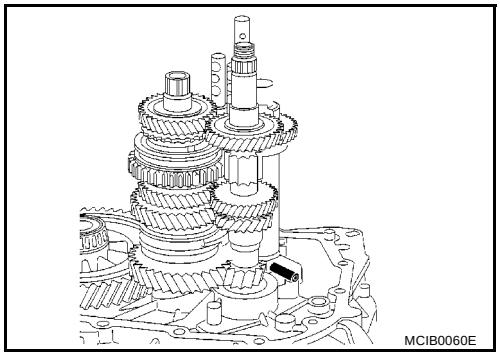
4. Fit the two locking shafts.


MCIB0058E

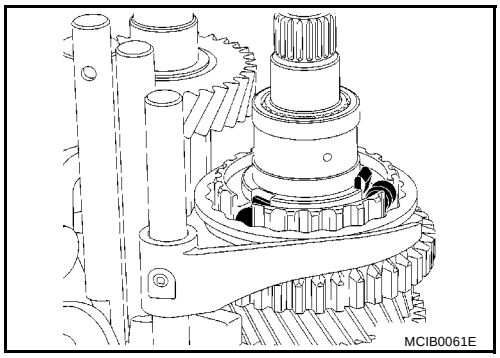
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly.
Rotate the reverse gear assembly to position the 5th gear fork (A).



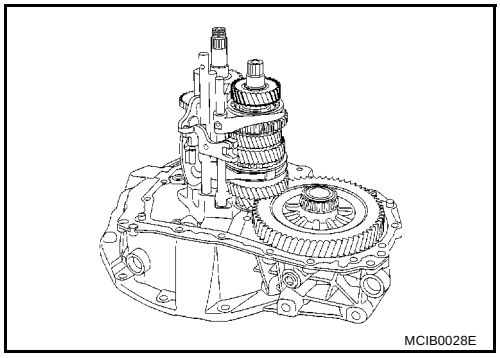
6. Pin the reverse gear assembly.



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



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



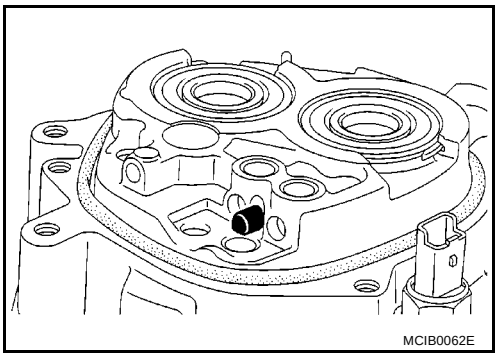
HOUSING ASSEMBLY

PFP:32010

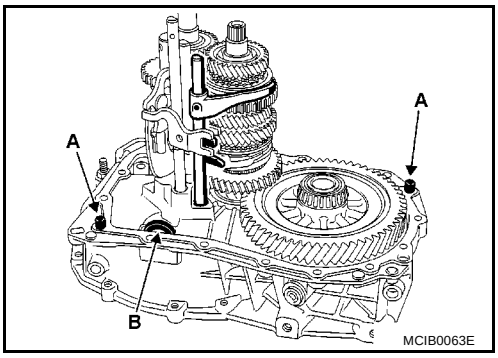
Assembly

ECS00FF2

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

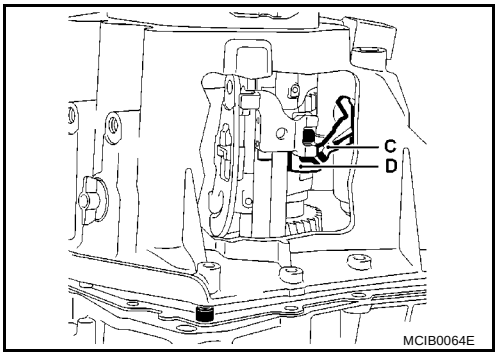

MCIB0062E

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



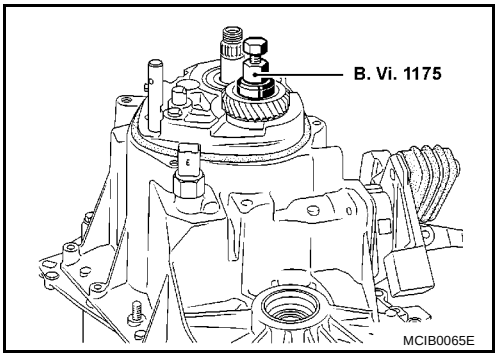
MCIB0063E

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.



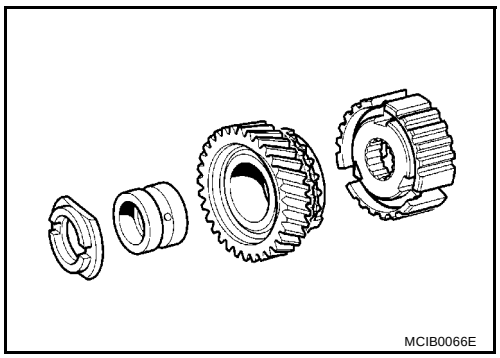
MCIB0064E

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.

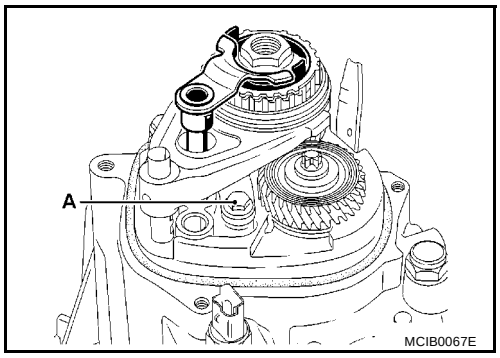


MCIB0065E

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.


MCIB0066E

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.

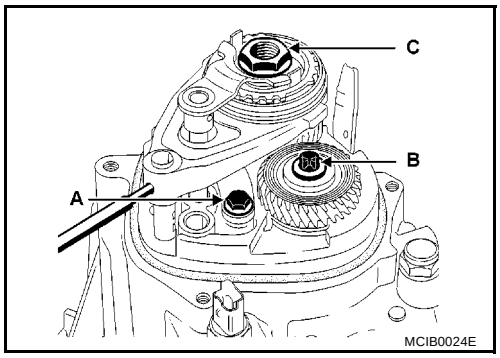


MCIB0067E

18. Tighten the gear bolt and nut to torque of:

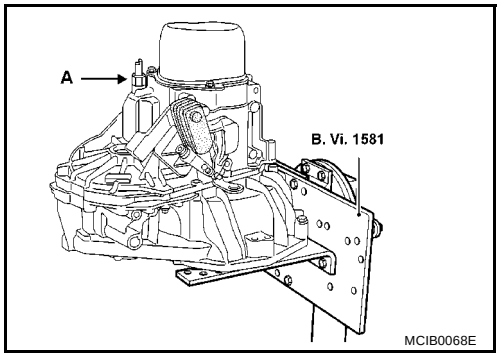
    output shaft bolt (B) : [70 N·m (7.1 kg-m, 52 ft-lb)]
    input shaft nut (C) : [190 N·m (19 kg-m, 140 ft-lb)]

19. Reset to neutral and pin the 5th gear fork.



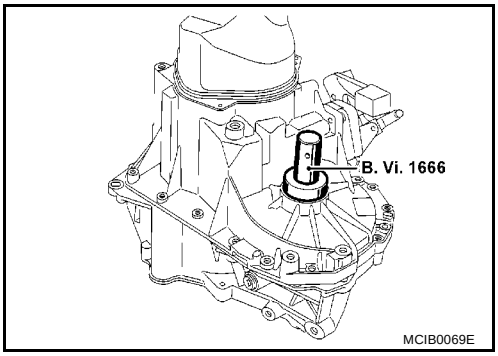
MCIB0024E

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)].



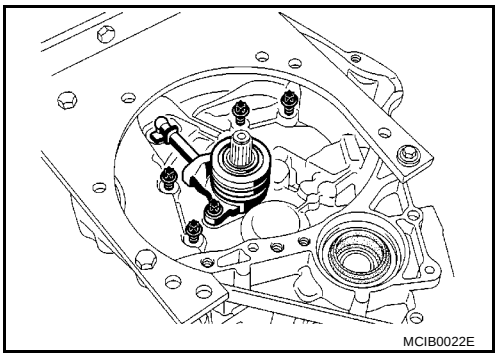
MCIB0068E

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



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

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

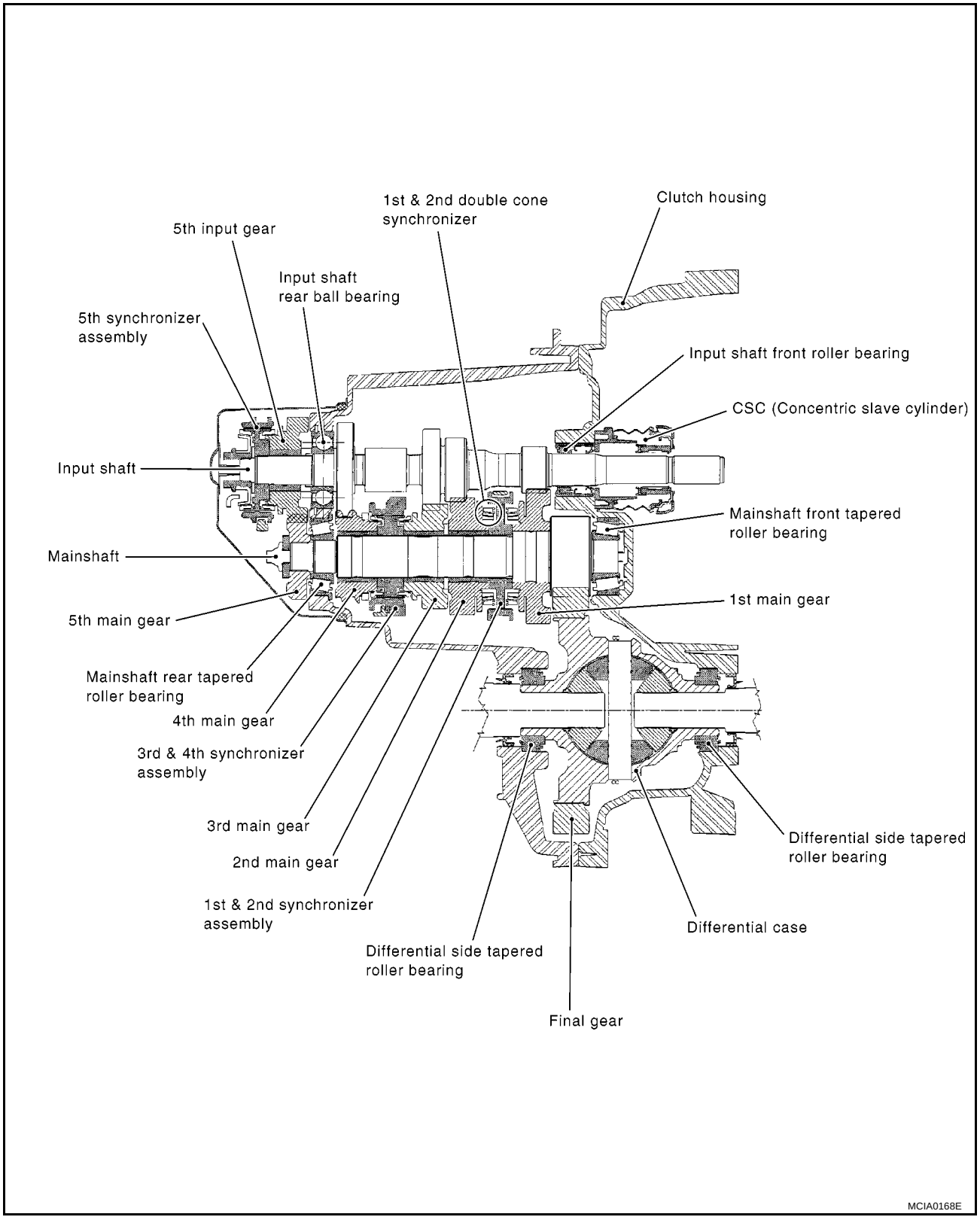


DESCRIPTION

PFP:00000

Cross-sectional View

ECS00FD2



REMOVAL AND INSTALLATION

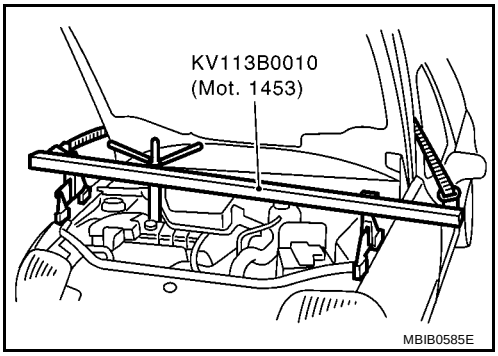
PFP:00000

Removal

ECS00FD3

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-123, "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-45, "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-147, "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

ECS00FD4

Install in the reverse order of removal.

TIGHTENING TORQUES

PFP:32010

Description

ECS00FD5

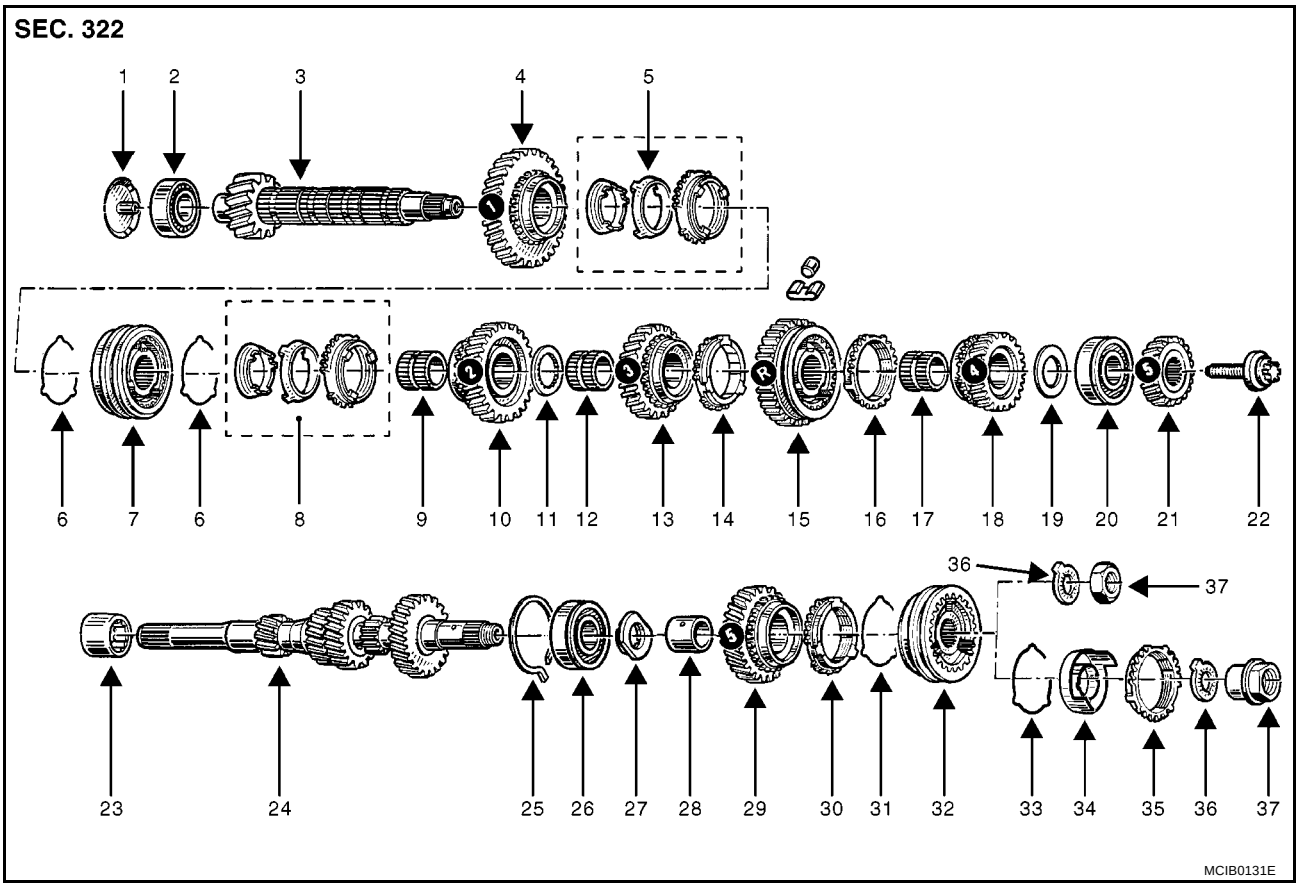
Tightening portion	N·m (kg-m, ft-lb)
Gearbox casing bolt	**25 (2.6, 18)**
Mainshaft bolt	**70 (7.1, 52)**
Input shaft nut	**190 (19, 140)**
Rear cover bolt	**25 (2.6, 18)**
Back-up lamp switch	**25 (2.6, 18)**
Concentric slave cylinder	**21 (2.1, 15)**
Selector shaft bolt	**20 (2.0, 15)**
Gear shift 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

ECS00FD6

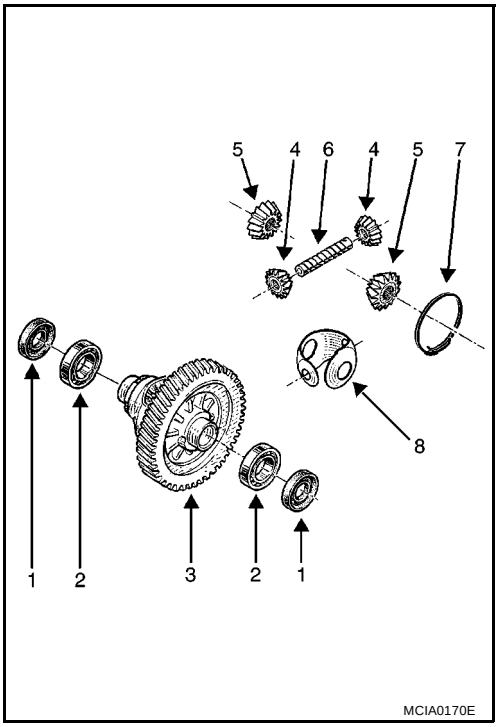


1. Oil channel	2. Mainshaft front bearing	3. Mainshaft
4. 1st main gear	5. Synchronizer ring	6. Spread spring
7. 1st & 2nd synchronizer hub	8. Synchronizer ring	9. Mainshaft bearing
10. 2nd main gear	11. Adapter plate	12. Mainshaft bearing
13. 3rd main gear	14. Baulk ring	15. 3rd & 4th synchronizer hub 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		

Differential Gear

ECS00FD7

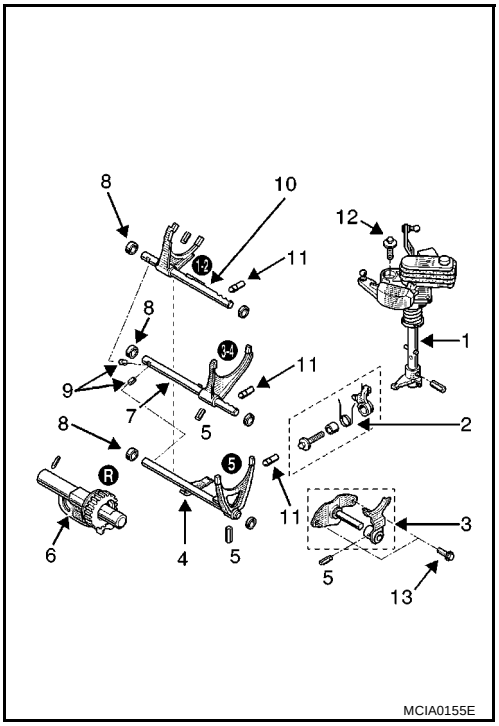
1	Oil seal
2	Differential side bearing
3	Differential case
4	Pinion mate gear
5	Bevel side gear
6	Pinion mate shaft
7	Shaft retaining spring
8	Side gear thrust washer



Shift Control Components

ECS00FD8

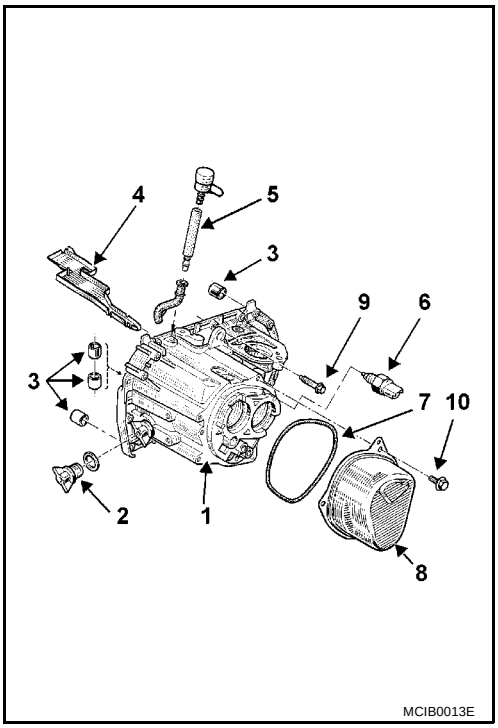
1	Control assembly
2	Gear shift catch
3	Reverse gear brake fork and shaft
4	Fork rod (For 5th)
5	Lock pin
6	Reverse idler gear assembly
7	Fork rod (For 3rd and 4th)
8	Ring
9	Lock pin
10	Fork rod (For 1st and 2nd)
11	Check ball cartridge
12	Selector shaft bolt [20 N·m (2.0 kg-m, 15 ft-lb)]
13	Reverse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



Case Components

ECS00FD9

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)]

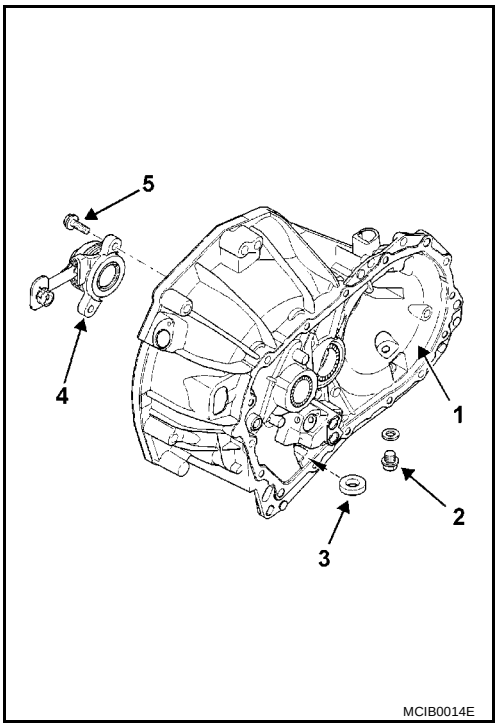


MCIB0013E

Clutch Housing

ECS00FDA

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)]



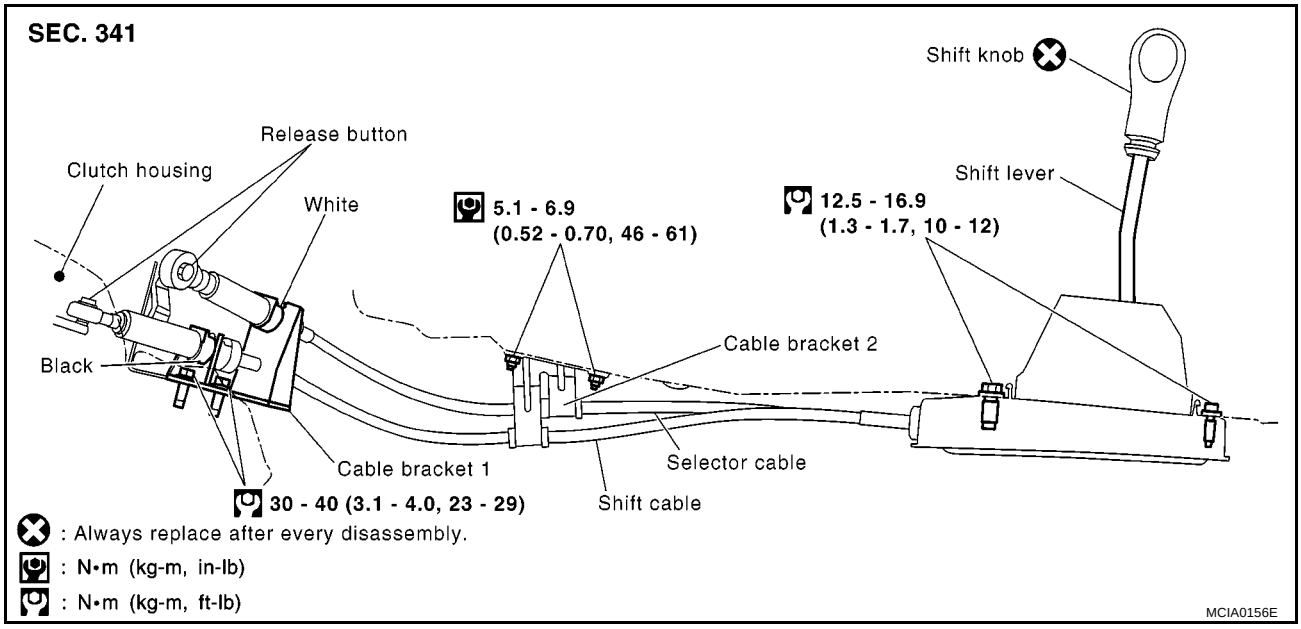
MCIB0014E

CONTROL LINKAGE

PFP:34103

Removal and Installation of Control Device and Cable

ECS00FDB



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. Separate cable bracket 2 from the vehicle.
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.

CAUTION:
Do not reuse shift knob.

RATIOS

PFP:32010

NISSAN Gearbox

ECS00FDC

Suffix	First	Second	Third	Fourth	Fifth	Reverse gear	Final drive
JR5-106	11:41	21:43	28:37	35:34	42:31	11:39	15:56
JR5-114	11:41	21:43	28:37	35:34	42:31	11:39	15:56

CONSUMABLES

PFP:32010

Description

ECS00FDD

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

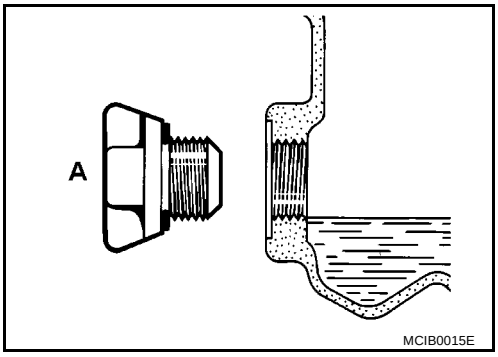
PFP:32010

Description

ECS00FDE

Capacity	Grade
2.5 ℓ (4-3/8 Imp pt)	SAE 75W-80, 75W-85

Fill to the level of the oil filler cap hole.



TROUBLE DIAGNOSIS

PFP:00004

Symptom Chart

ECS00FDF

Symptoms (after checking the clutch)	Possible causes

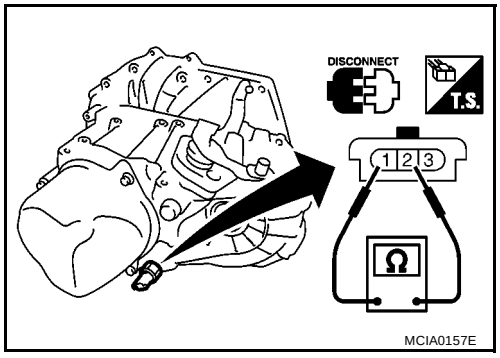
Symptoms	Oil level or grade	External control	Synchro-nizer	Gearing	Sliding gear hub	Fork and balls	Bearings	Engine mounting - housing
Gear grinding	1	2	3		4			
One or more gears cannot be selected	1	2	3			4		
Gear disengagement		2	4		4	3		1
One or more gears locked		1		4		2		3
Noisy	1			3			2	

NOTE:
The numbers indicate the order of priority for diagnostics.

Back-up Lamp Switch

ECS00FDG

Gear position	Continuity
Reverse	Yes
Except reverse	No



PRECAUTIONS

PFP:00001

Precautions

ECS00FDH

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.

PARTS TO BE REPLACED SYSTEMATICALLY

PFP:32010

Description

ECS00FDI

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.

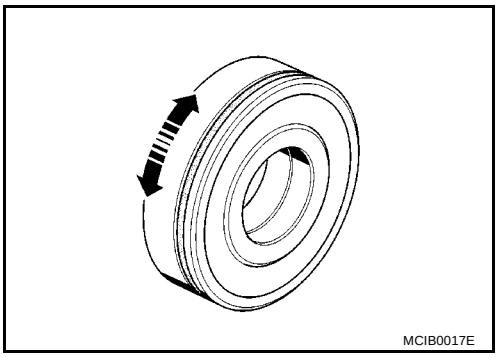
CHECKING

PFP:32010

Bearings

ECS00FDJ

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

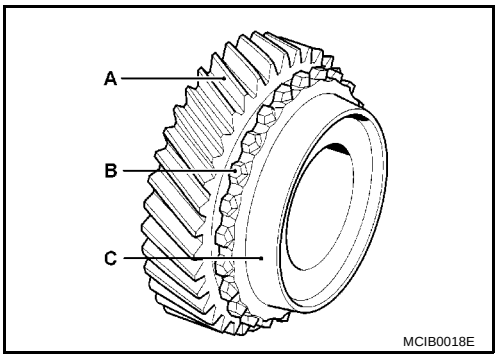

MCIB0017E

Gearing

ECS00FDK

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.



MCIB0018E

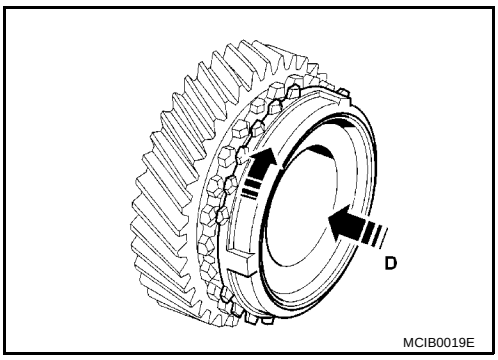
Synchronizer Ring

ECS00FDL

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

1. Check that put the ring onto the gear cone.
2. Check that rotate the ring 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.

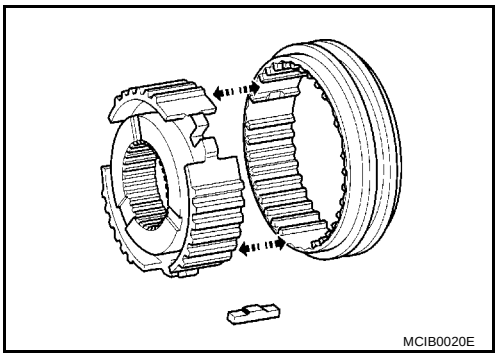


MCIB0019E

Sliding Gear Hub

ECS00FDM

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


MCIB0020E

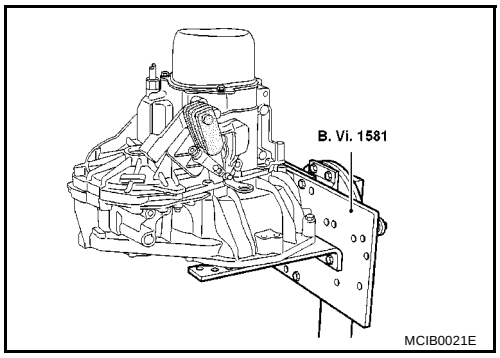
SEPARATING THE HOUSINGS

PFP:32010

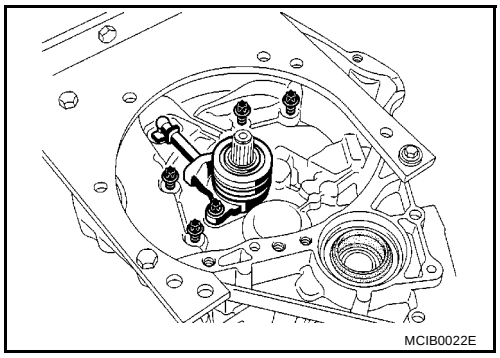
Removal

ECS00FDN

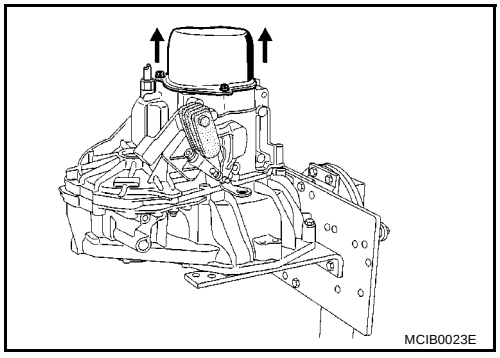
Fit the B. Vi. 1581 support plate on a Desvil stand.
Fit the gearbox on the B. Vi. 1581 support.



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

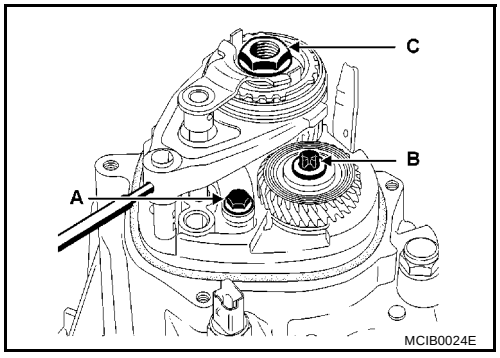


3. Remove the rear housing. This must be removed along the horizontal axis of the gearbox because it has a lubrication spline which is located in the input shaft bore.

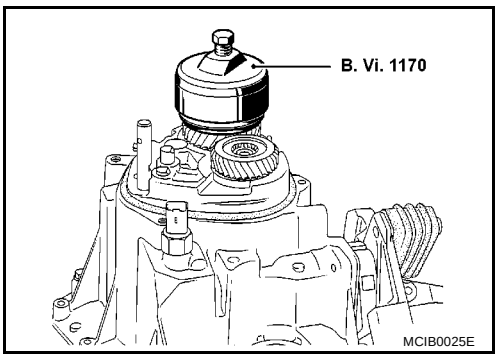


Remove the two reverse gear fork support mounting bolts (A).
Drive in the 5th gear fork using B. Vi. 31-01.
Shift the 3rd gear on the gear selector lever and the 5th gear by sliding the 5th gear fork on its shaft.

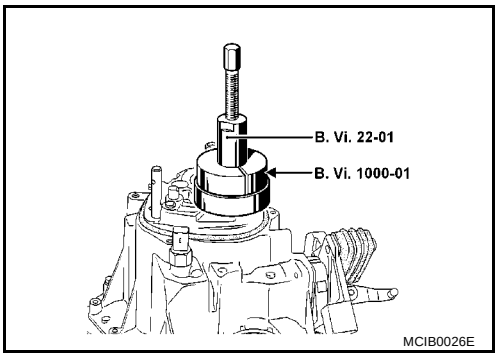
4. Remove the mainshaft bolt (B).
5. Remove the input shaft nut (C).
6. Remove the reverse gear synchronizer.
7. Remove the 5th gear fork and sliding gear.



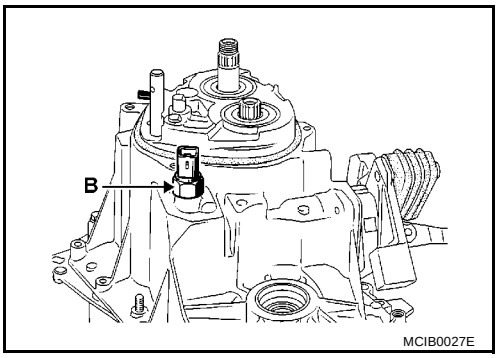
Remove the 5th gear hub using B. Vi. 1170.
To do this, fit the sliding gear B. Vi. 1170 and rotate it so that the splines are opposite those of the input shaft hub.



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.



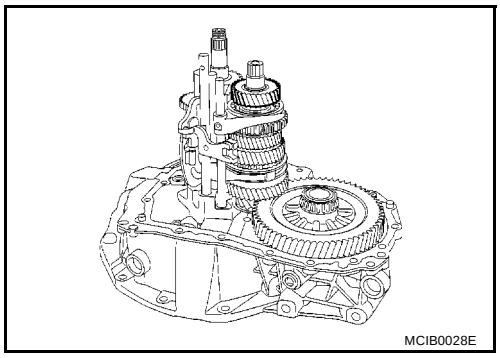
REPAIRING THE GEARBOX

PFP:32010

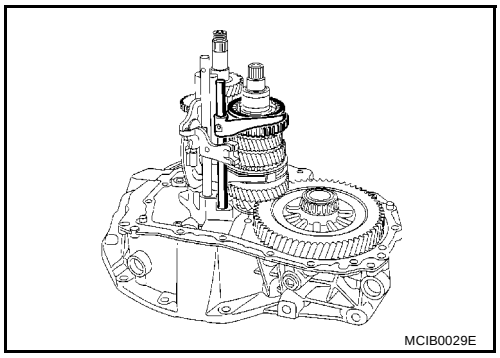
Removal

ECS00FDO

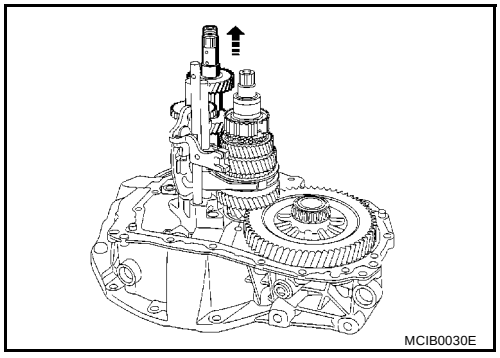
1. Remove the 4th-gear pinion.


MCIB0028E

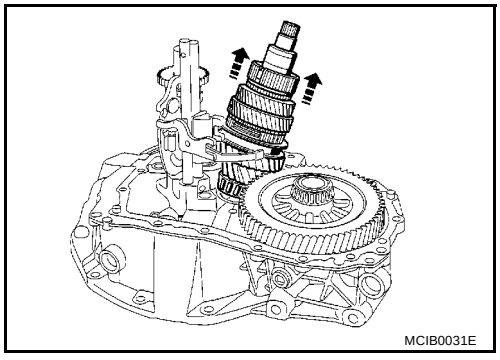
2. Remove the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the mainshaft assembly.


MCIB0029E

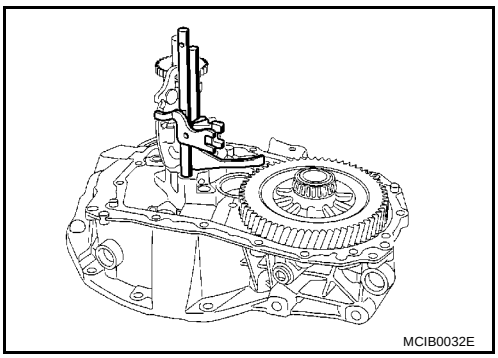
3. Remove input shaft assembly.


MCIB0030E

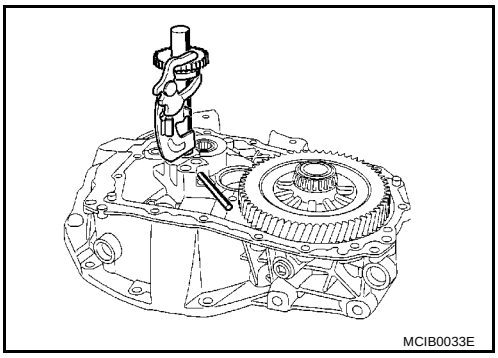
4. Remove mainshaft assembly.


MCIB0031E

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


MCIB0032E

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

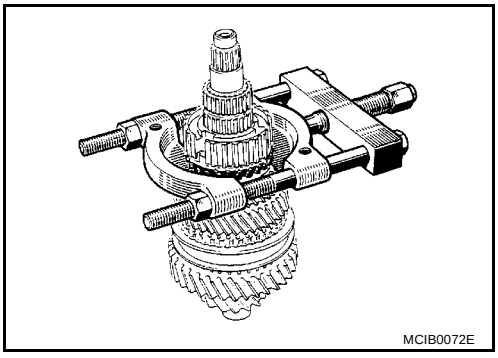

MCIB0033E

Removing the Gearing

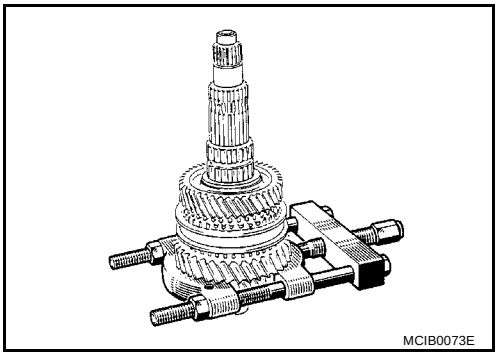
ECS00FDP

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

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


MCIB0072E

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


MCIB0073E

Checking Parts

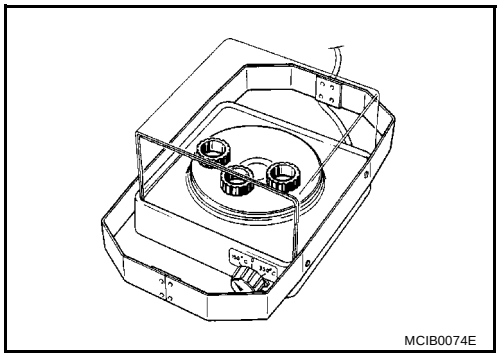
ECS00FDQ

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.

Refitting the Gearing

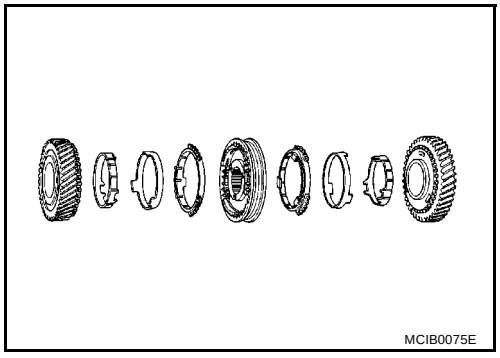
ECS00FDR

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).


MCIB0074E

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.


MCIB0075E

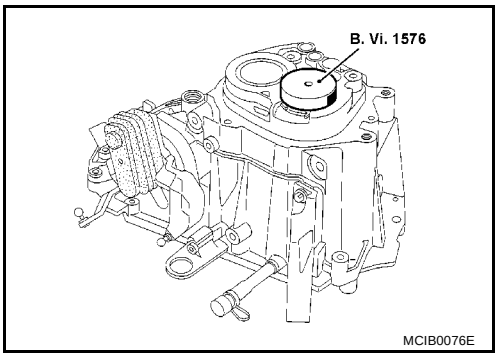
TRANSAXLE CASE BEARING

PFP:32010

Removing the Bearing, Input Shaft Side

ECS00FDS

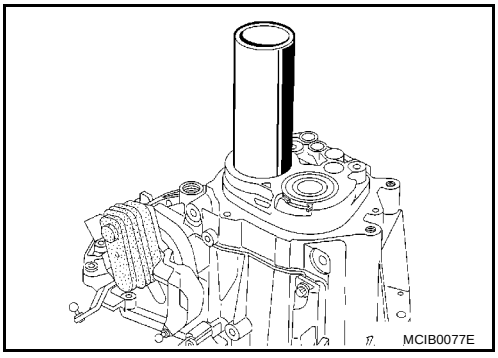
Remove the circlips and drive the bearing inside the housing using tool B. Vi. 1576.



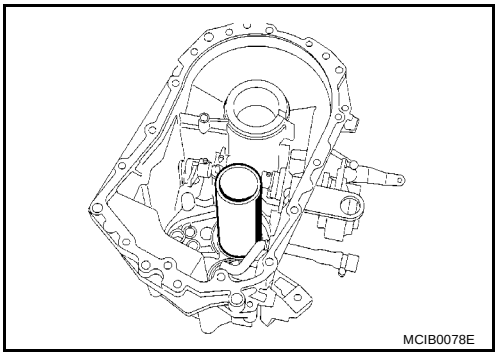
Refitting

ECS00FDT

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.



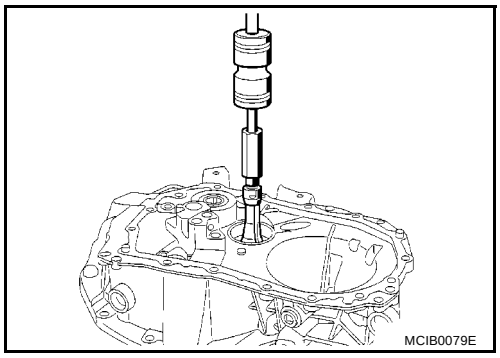
CLUTCH HOUSING BEARING

PFP:32010

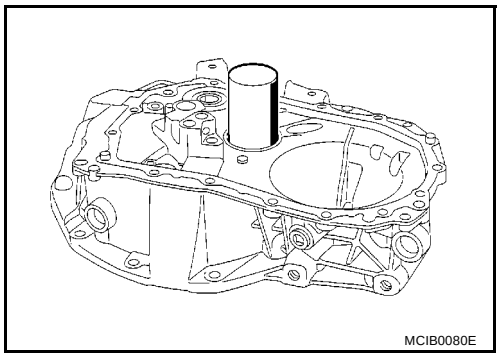
Removal and Installation

ECS00FDU

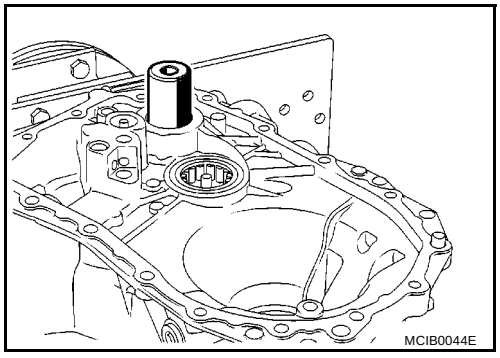
1. Cut the base of the deflector plastic hollow needle located at the centre of the bearing.
   Drive out the cup using a puller.



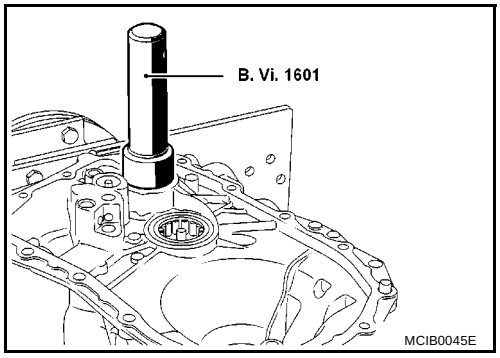
2. Fit a new deflector, then the bearing race using a 55 mm (2.17 in) diameter tube.



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.



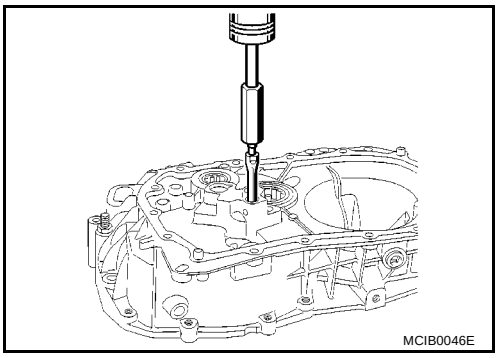
SELECTOR SHAFT RINGS

PFP:32010

Removal

ECS00FDV

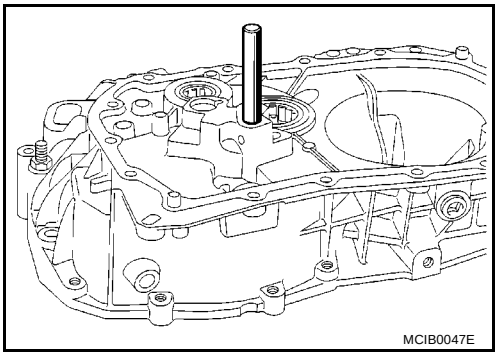
Remove the rings with an inertia puller.



Refitting

ECS00FDW

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



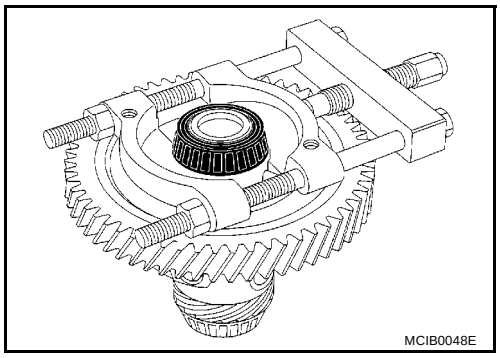
DIFFERENTIAL BEARINGS

PFP:32010

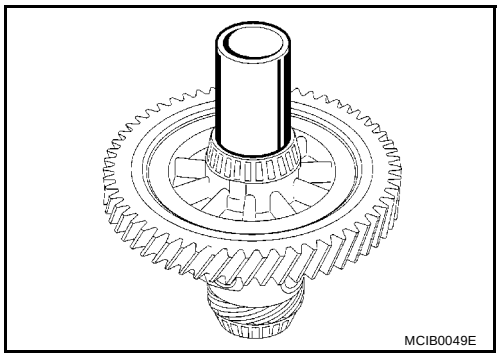
Removal and Installation

ECS00FDX

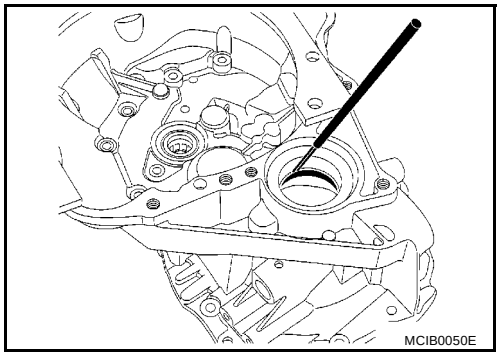
1. Remove the bearing using an antisticking pin.


MCIB0048E

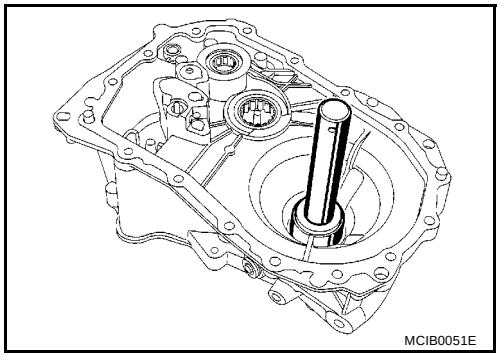
2. Refit the bearings using a 40 mm (1.57 in) tube.


MCIB0049E

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


MCIB0050E

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


MCIB0051E

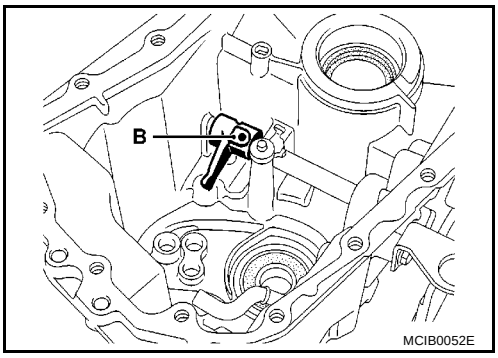
SELECTOR SHAFT

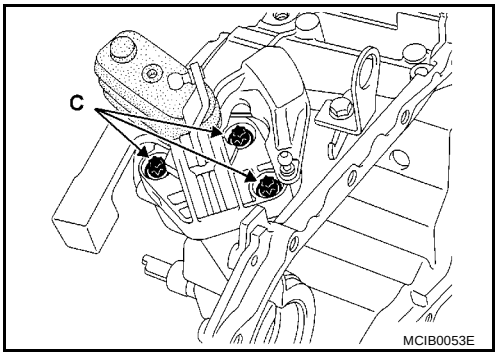
PFP:32010

Removal

ECS00FDY

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



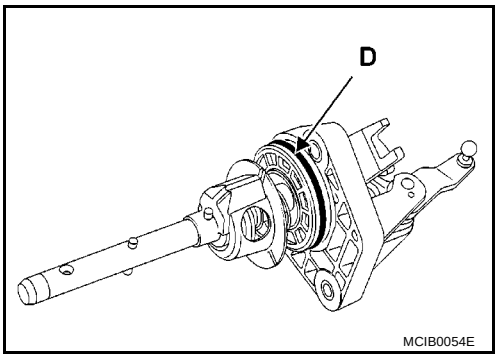


Refitting

ECS00FDZ

Proceed in the reverse order to removal.

NOTE:
Replace the O-ring (D).



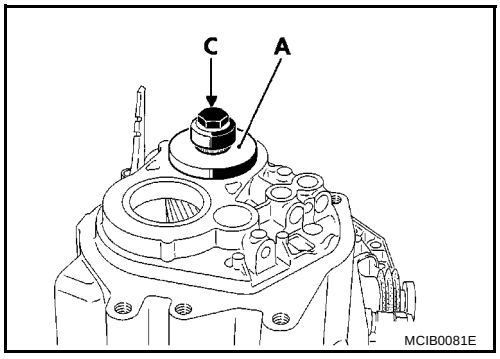
REPAIRING THE GEARBOX

PFP:32010

Setting the Pre-tensioning of the Output Shaft Bearings

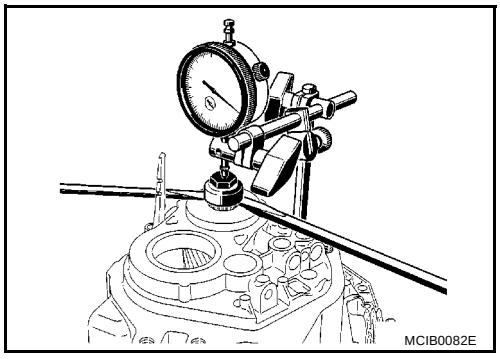
ECS00FE0

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.

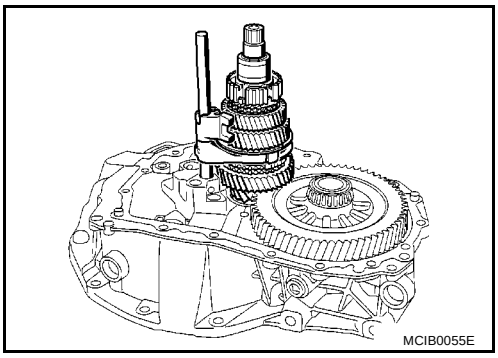
ASSEMBLY

PFP:00000

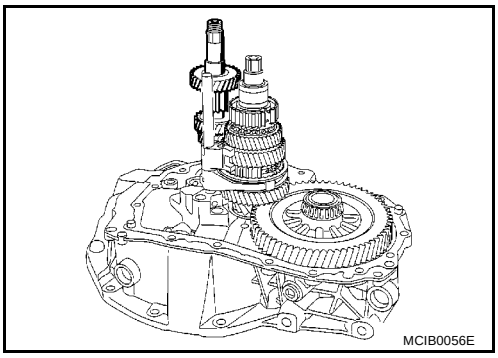
Refitting

ECS00FE1

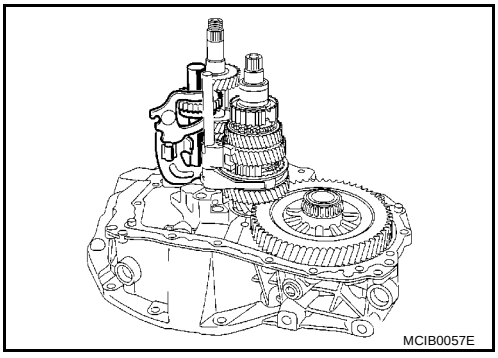
1. Fit the mainshaft and 1st/2nd gear fork assembly.


MCIB0055E

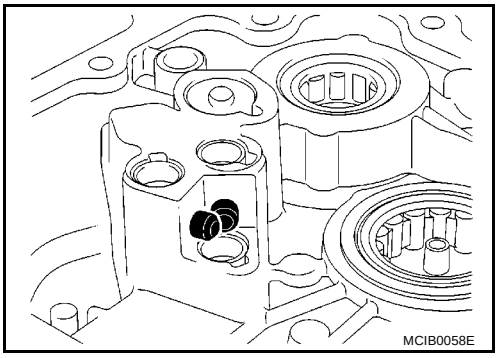
2. Fit the input shaft.


MCIB0056E

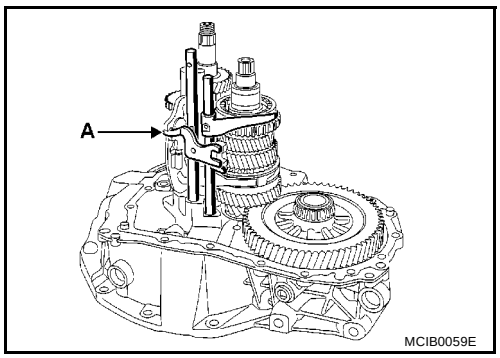
3. Fit the reverse gear assembly.


MCIB0057E

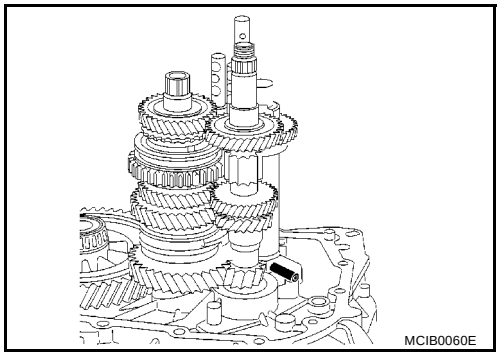
4. Fit the two locking shafts.


MCIB0058E

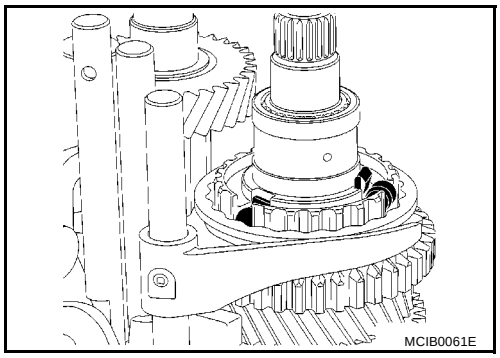
5. Fit the 5th gear shaft and the 3rd/4th gear shaft/fork and sliding gear assembly while gently lifting the input shaft assembly.
Rotate the reverse gear assembly to position the 5th gear fork (A).



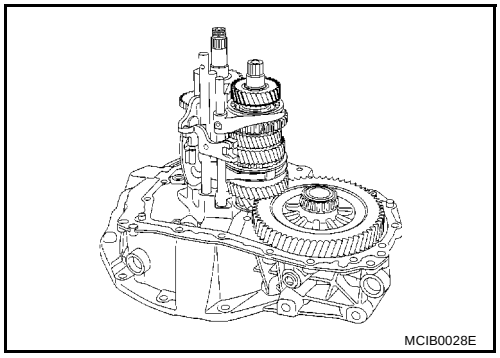
6. Pin the reverse gear assembly.



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



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



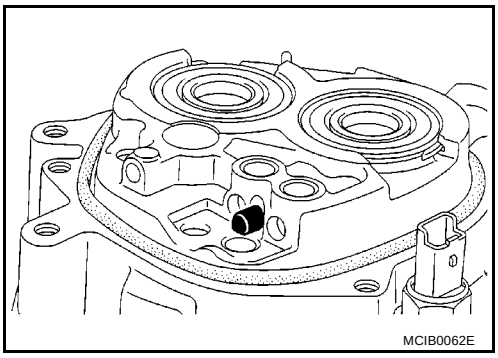
HOUSING ASSEMBLY

PFP:32010

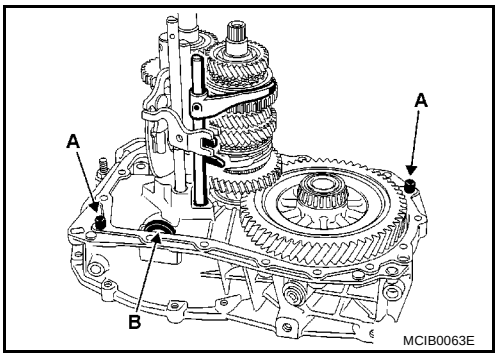
Assembly

ECS00FE2

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

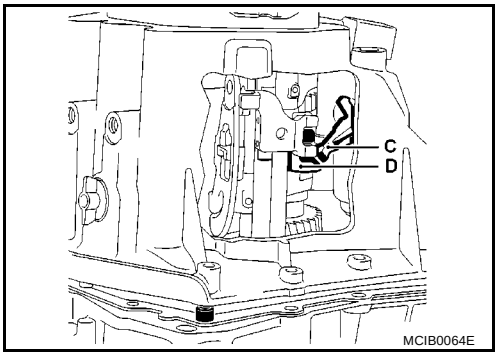

MCIB0062E

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



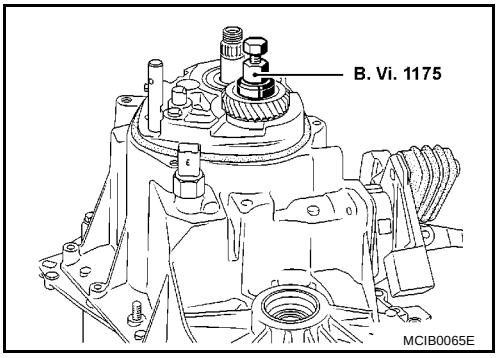
MCIB0063E

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.



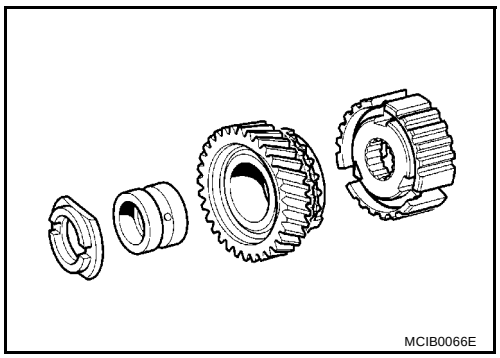
MCIB0064E

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.

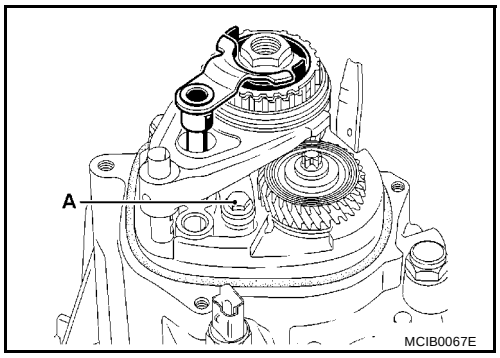


MCIB0065E

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.


MCIB0066E

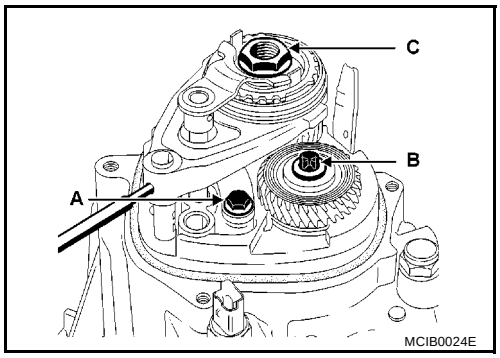
14. Refit the 5th gear fork/sliding gear/reverse gear fork assembly.
15. Fit the reverse gear synchronizer.
16. Screw on the reverse gear fork support and tighten the bolts (A) to a torque of [25 N·m (2.6 kg-m, 18 ft-lb)].
17. Slide the 5th gear fork on its shaft to engage 5th gear.



MCIB0067E

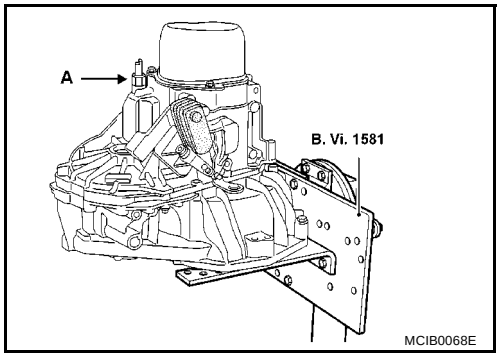
18. Tighten the gear bolt and nut to torque of:

    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.



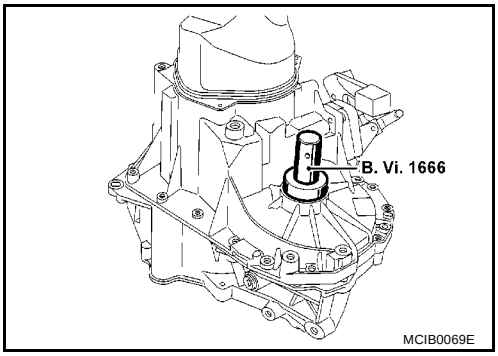
MCIB0024E

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)].



MCIB0068E

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



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

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