SECTION CL
CLUTCH

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SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

INFOID:0000000004064164

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

CLUTCH

Reference page		CL-6	CL-7	CL-9	CL-11	EM-102	CL-14	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	CL-17	EM-117
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Free play out of adjustment)	CLUTCH LINE (Air in line)	MASTER CYLINDER PISTON CUP (Damaged)	OPERATING CYLINDER PISTON CUP (Damaged)	ENGINE MOUNTING (Loose)	RELEASE BEARING (Worn, dirty or damaged)	CLUTCH DISC (Out of true)	CLUTCH DISC (Runout is excessive)	CLUTCH DISC (Lining broken)	CLUTCH DISC (Dirty or burned)	CLUTCH DISC (Oily)	CLUTCH DISC (Worn out)	CLUTCH DISC (Hardened)	CLUTCH DISC (Lack of spline grease)	DIAPHRAGM SPRING (Damaged)	DIAPHRAGM SPRING (Out of tip alignment)	PRESSURE PLATE (Distortion)	FLYWHEEL (Distortion)
Symptom	Clutch grabs/chatters					1			2			2	2	2			2		
	Clutch pedal spongy		1	2	2														
	Clutch noisy						1												
	Clutch slips	1										2	2			3		4	5
	Clutch does not disengage	1	2	3	4			5	5	5	5	5			5	6	6	7	

PRECAUTION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000004064165

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

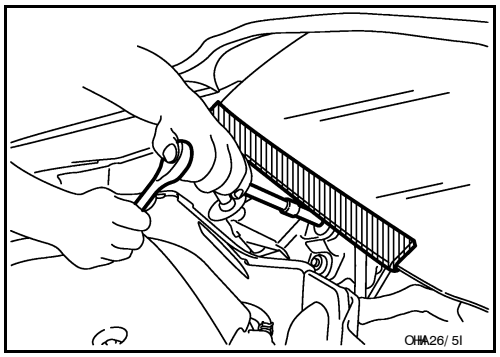
WARNING:

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

Precaution for Procedure without Cowl Top Cover

INFOID:0000000004064166

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



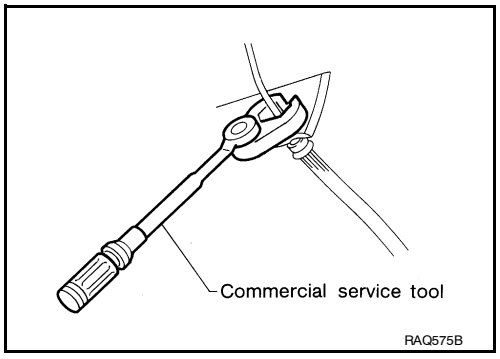
Service Notice or Precautions

INFOID:0000000004064167

- Always use recommended fluid. Refer to MA-11, "Fluids and Lubricants".
- Never reuse drained fluid.
- Be careful not to splash fluid on painted areas.
- When removing and installing clutch piping, use tool.
- Use new fluid to clean or wash all parts of master cylinder.
- Never use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.

WARNING:

After cleaning clutch disc, wipe it with a dust collector. Do not use compressed air.



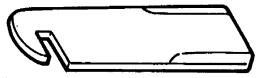
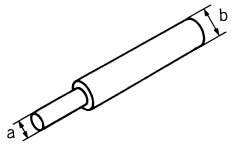
PREPARATION

PREPARATION

Special Service Tool

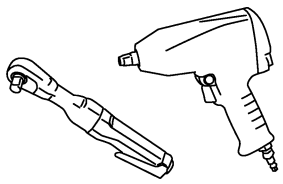
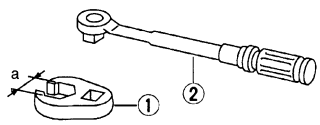
INFOID:0000000004064168

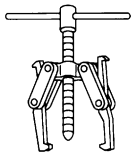
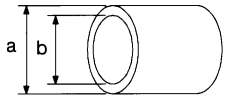
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST20050240 (—) Diaphragm adjusting wrench 	Adjusting unevenness of diaphragm spring of clutch cover
ST20630000 (J-26366) Clutch aligning bar 	Installing clutch disc **a: 15.8 mm (0.622 in) dia.** **b: 22.9 mm (0.902 in) dia.**

Commercial Service Tool

INFOID:0000000004064169

Tool name	Description
Pin punch 	Removing and installing master cylinder spring pin **Tip diameter: 4.5 mm (0.177 in) dia.**
Power tool 	Loosening bolts and nuts
1. Flare nut crowfoot 2. Torque wrench 	Removing and installing clutch piping **a: 10 mm (0.39 in)**

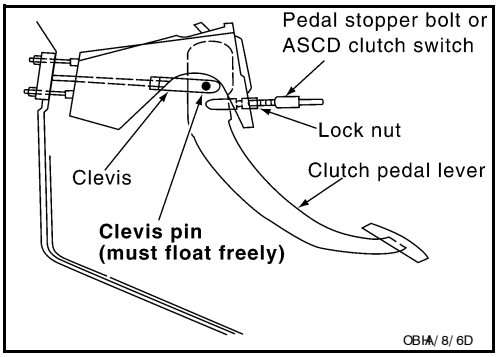
Tool name	Description
Bearing puller  MS/ 66	Removing release bearing
Bearing drift  MS363	Installing release bearing **a: 52 mm (2.05 in) dia.** **b: 45 mm (1.77 in) dia.**

ON-VEHICLE MAINTENANCE

CLUTCH PEDAL

On-Vehicle Inspection and Adjustment

INFOID:0000000004064170



1. Check to see if the clevis pin floats freely in the bore of the clutch pedal. It should not be bound by the clevis or clutch pedal.

a. If the clevis pin is not free, check that the pedal stopper bolt or ASCD clutch switch is not applying pressure to the clutch pedal causing the clevis pin to bind. To adjust, loosen the lock nut and turn the pedal stopper bolt or ASCD clutch switch.

b. Tighten the lock nut to the specified torque. Refer to CL-8, "Exploded View".

c. Verify that the clevis pin floats in the bore of the clutch pedal. It should not be bound by the clutch pedal.

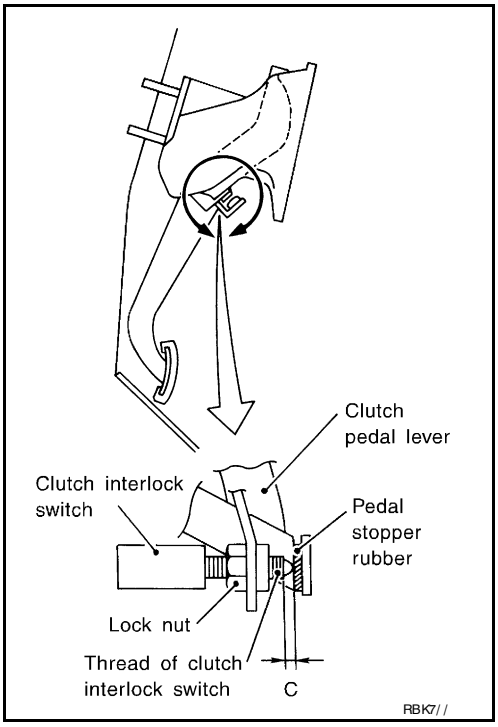
d. If the clevis pin is still not free, remove the clevis pin and check for deformation or damage. Replace clevis pin if necessary. Leave pin removed for step 2.

2. Check clutch pedal stroke for free range of movement.

a. With the clevis pin removed, manually move the clutch pedal up and down to determine if it moves freely.

b. If any sticking is noted, replace the assembly.

3. Adjust clearance “C” while depressing clutch pedal fully. (With clutch interlock switch)



Clearance "C" : 0.1 - 1.0 mm (0.004 - 0.039 in)

4. Check clutch hydraulic and system components (clutch master cylinder, clutch operating cylinder, clutch withdrawal lever and clutch release bearing) for sticking or binding.

a. If any sticking or binding noted, repair or replace related parts as necessary.

b. If hydraulic system repair was necessary, bleed the clutch hydraulic system. Refer to CL-7, "Bleeding".

NOTE:
Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.

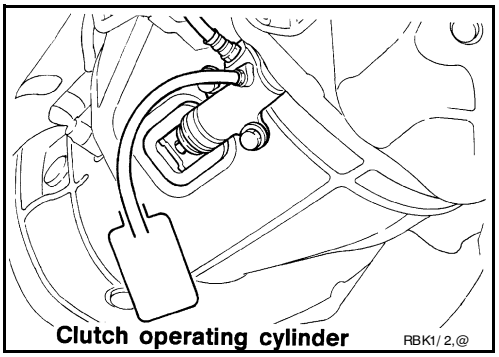
CLUTCH FLUID

Bleeding

INFOID:0000000004064171

CAUTION:
Do not spill clutch fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
NOTE:
- Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.
- Monitor the fluid level in the reservoir tank to make sure it does not empty.

1. Top off reservoir with new recommended brake fluid. Refer to MA-11, "Fluids and Lubricants".
2. Connect a transparent vinyl tube and container to the air bleeder valve on the clutch operating cylinder.
3. Fully depress the clutch pedal several times.
4. With the clutch pedal depressed, open the bleeder valve to release the air.
5. Close the bleeder valve.
6. Repeat steps 3 to 5 until clear brake fluid comes out of the air bleeder valve.
7. Tighten the air bleeder to the specified torque. Refer to CL-11, "Exploded View".

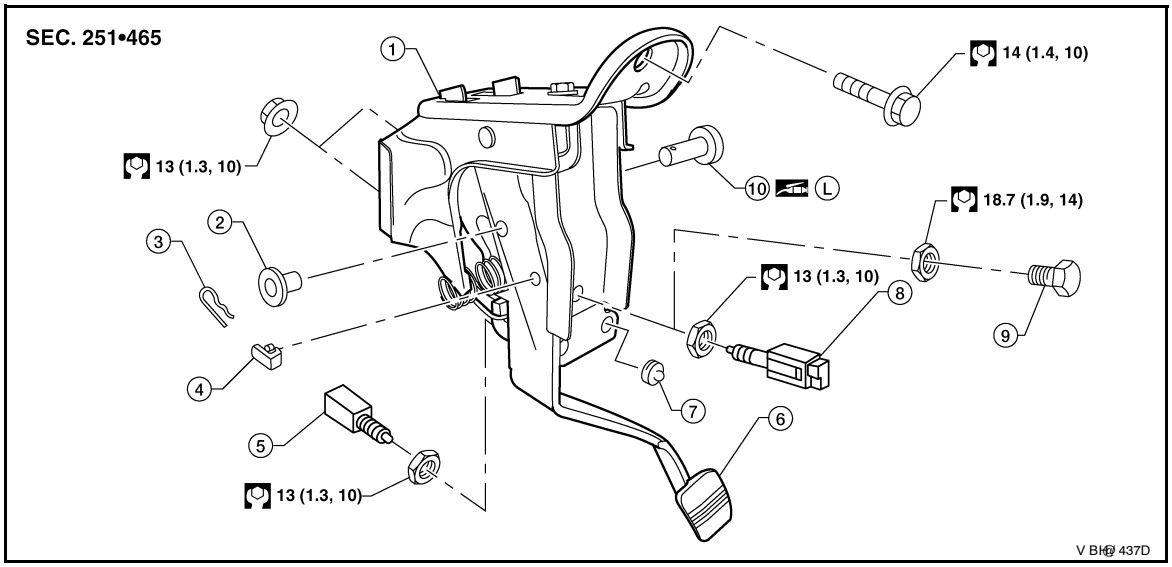


ON-VEHICLE REPAIR

CLUTCH PEDAL

Exploded View

INFOID:0000000004064172



1. Bracket
2. Bushing
3. Snap pin
4. Pedal stopper rubber
5. Clutch interlock switch
6. Clutch pedal
7. Stopper rubber
8. ASCD clutch switch (with ASCD)
9. Pedal stopper bolt (without ASCD)
10. Clevis pin

Removal and Installation

INFOID:0000000004064173

REMOVAL

1. Remove the clutch pedal bracket nuts from inside the engine compartment.
2. Disconnect the clutch interlock switch and ASCD clutch switch, then remove the wiring harness from the pedal assembly.
3. Remove the snap pin and clevis pin.
4. Remove the pedal bracket bolt and then remove the clutch pedal assembly.

INSTALLATION

Installation is in the reverse order of removal.

NOTE:

Tighten the pedal stopper bolt lock nut or ASCD clutch switch lock nut to the specified torque after installing the clutch pedal assembly in the vehicle and adjusting the pedal free play.

Inspection

INFOID:0000000004064174

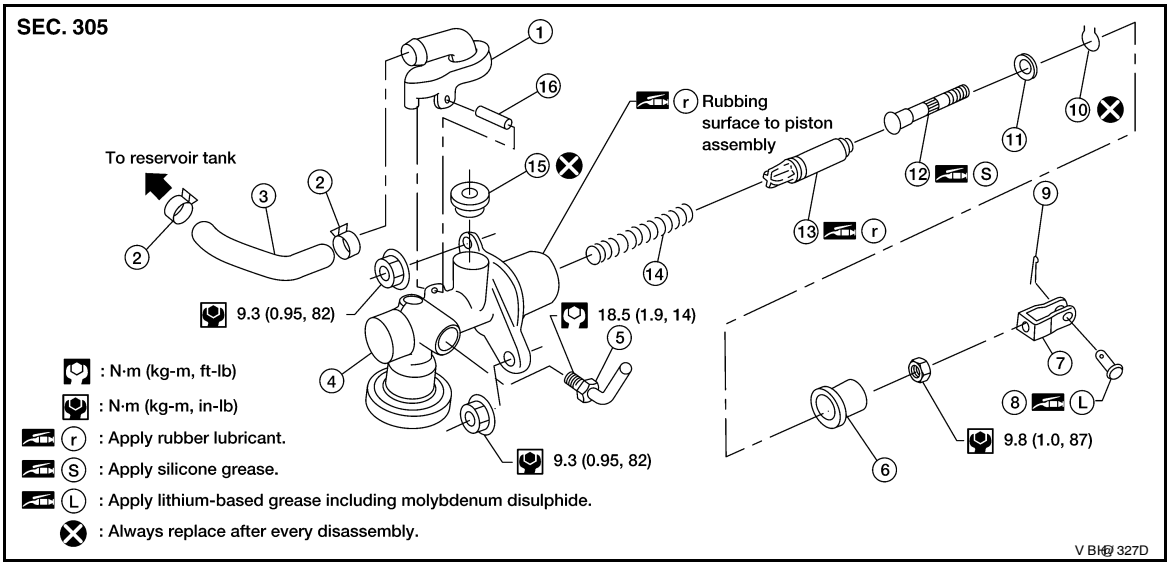
INSPECTION AFTER REMOVAL

- Inspect the clutch pedal for bends, damage, or cracked welds. Replace if necessary.
- Make sure that the assist spring and return spring have not lost their spring. Replace if necessary.

CLUTCH MASTER CYLINDER

Exploded View

INFOID:0000000004064175



1. Nipple
2. Clamp
3. Reservoir hose
4. Cylinder body
5. Clutch tube
6. Dust cover
7. Clevis
8. Clevis pin
9. Snap pin
10. Stopper ring
11. Stopper
12. Push rod
13. Piston assembly
14. Return spring
15. Reservoir seal
16. Spring pin

Removal and Installation

INFOID:0000000004064176

REMOVAL

1. Remove the snap pin and clevis pin from the clevis, and separate it from the clutch pedal.
2. Drain the brake fluid from the clutch hydraulic system.
   CAUTION:
   Do not spill brake fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
3. Remove the hose clamp and hose from the clutch master cylinder.
4. Remove the clutch tube using suitable tool.
5. Remove the clutch master cylinder nuts, and remove the clutch master cylinder from the vehicle.

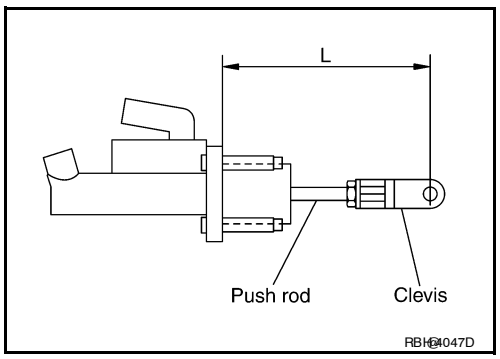
INSTALLATION

Installation is in the reverse order of removal.

- Before installation, check the position of the clevis and push rod. If "L" is outside standard length, adjust the position of the clevis and push rod.

  Length "L" : 120.5 mm (4.74 in)

- After installation, inspect and adjust the clutch pedal as necessary, then bleed the clutch hydraulic system. Refer to CL-6, "On-Vehicle Inspection and Adjustment" and CL-7, "Bleeding".

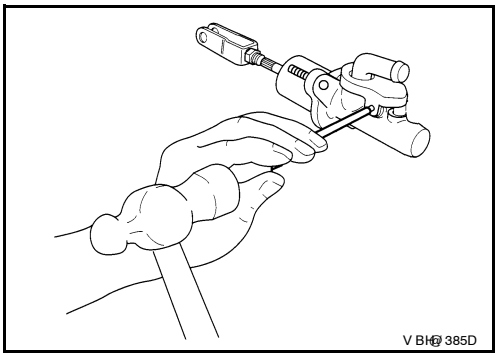


Disassembly and Assembly

INFOID:0000000004064177

DISASSEMBLY

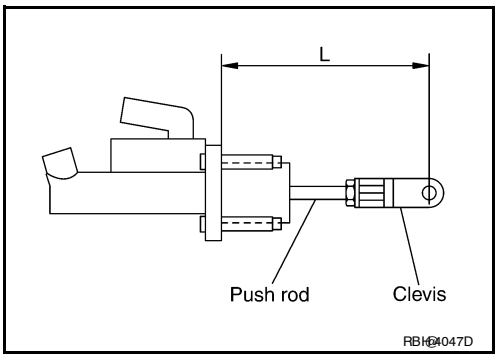
1. Remove the spring pin, using suitable tool.
2. Remove the nipple and reservoir seal from the cylinder body.
3. Loosen the push rod lock nut then remove the clevis and lock nut, if necessary.
   NOTE:
   Clutch pedal height is controlled with the position of the clevis and push rod.
4. Remove the dust cover from the cylinder body.
5. Remove the stopper ring and stopper. Remove the push rod from the cylinder body while holding it securely to prevent the piston assembly from popping out.
6. Remove the piston assembly and return spring.



ASSEMBLY

1. Apply rubber lubricant to the internal surface of the cylinder body, sliding surface of piston assembly, and the piston cup. Insert the return spring and piston assembly to the cylinder body.
2. Apply silicone grease to the push rod and install the stopper and stopper ring.
   CAUTION:
   Restrain the push rod while doing this because there is a danger the piston assembly will fly out of the master cylinder.
3. Install the dust cover to the cylinder body.
4. Install the reservoir seal and nipple to the cylinder body.
5. Install the clevis to the push rod.
6. Check and adjust the position of the clevis and push rod. After adjusting the length "L", tighten lock nut to the specified torque. Refer to CL-9, "Exploded View".

Length “L” : 120.5 mm (4.74 in)



Inspection

INFOID:0000000004064178

INSPECTION AFTER DISASSEMBLY

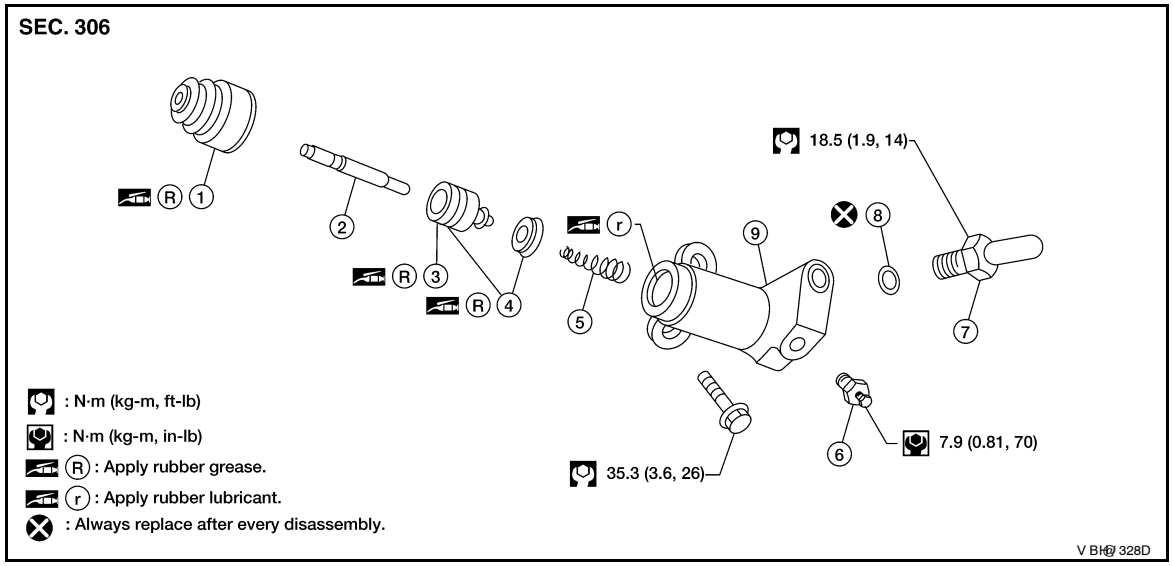
Inspect for the following, replace parts as necessary.

- Damage, foreign material, wear, corrosion, and pin holes on the cylinder inner surface
- Damaged or deformed nipple
- Weak spring
- Cracked or deformed dust cover

OPERATING CYLINDER

Exploded View

INFOID:0000000004064179



1. Dust cover
2. Push rod
3. Piston
4. Piston cup
5. Piston spring
6. Air bleeder
7. Clutch hose
8. Copper washer
9. Cylinder body

Removal and Installation

INFOID:0000000004064180

REMOVAL

1. Drain the brake fluid from the clutch hydraulic system.
   CAUTION:
   Do not spill brake fluid on painted surfaces. If it spills, wipe up immediately and wash the affected area with water.
2. Remove the clutch hose and copper washer from the operating cylinder.
   CAUTION:
   Do not reuse the copper washer.
3. Remove the operating cylinder bolts, and remove the operating cylinder from the vehicle.

INSTALLATION

Installation is in the reverse order of removal.

- Tighten the clutch hose fitting to the specified torque. Refer to CL-13, "Exploded View".
  CAUTION:
  Make sure the clutch hose is not bent or twisted.
- After installation, bleed the clutch hydraulic system. Refer to CL-7, "Bleeding".

Disassembly and Assembly

INFOID:0000000004064181

DISASSEMBLY

- Remove the dust cover, push rod and piston assembly from the cylinder body.

ASSEMBLY

1. Apply rubber lubricant to the cylinder body inner surface and rubber grease to the piston cup and piston.
2. Insert the piston assembly and piston spring into the cylinder body.
3. Apply rubber grease to the dust cover and install the push rod and dust cover.

Inspection

INFOID:0000000004064182

INSPECTION AFTER DISASSEMBLY

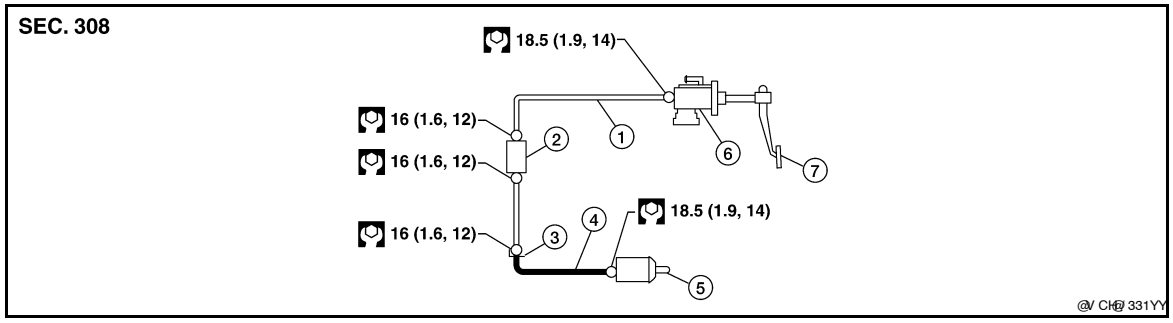
Inspect for the following, replace parts as necessary.

- Damage, foreign material, wear, corrosion, and pinholes on the cylinder inner surface, piston, and sliding part of piston cup
- Weak spring
- Cracked or deformed dust cover

CLUTCH PIPING

Exploded View

INFOID:0000000004064183



1. Clutch tube
2. Clutch orifice
3. Lock plate
4. Clutch hose
5. Operating Cylinder
6. Master cylinder
7. Clutch pedal

Removal and Installation

INFOID:0000000004064184

Carefully observe the following during clutch tube removal and installation.

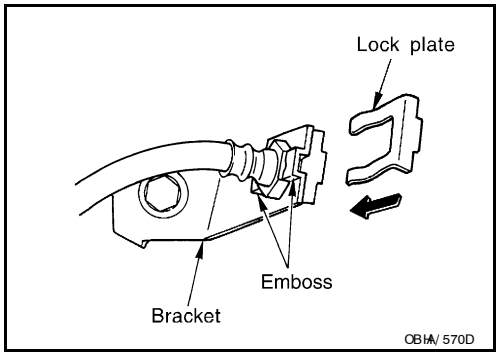
CAUTION:

Do not spill brake fluid onto painted surfaces. If it spills, wipe up immediately and wash the affected area with water.

- When installing the clutch hose to the bracket, align the clutch hose metal fittings with the bracket positioning emboss, then install the lock plate to secure.

  CAUTION:
  - **Do not damage the clutch hose.**
  - **Make sure the clutch hose is not bent or twisted.**
- Tighten the clutch tube and hose fittings to the specified torque.

  CAUTION:
  - **Do not reuse the copper washer.**
  - **Do not damage the clutch tube fittings or clutch tube.**
- After installation, bleed the air from the clutch hydraulic system. Refer to CL-7, "Bleeding".

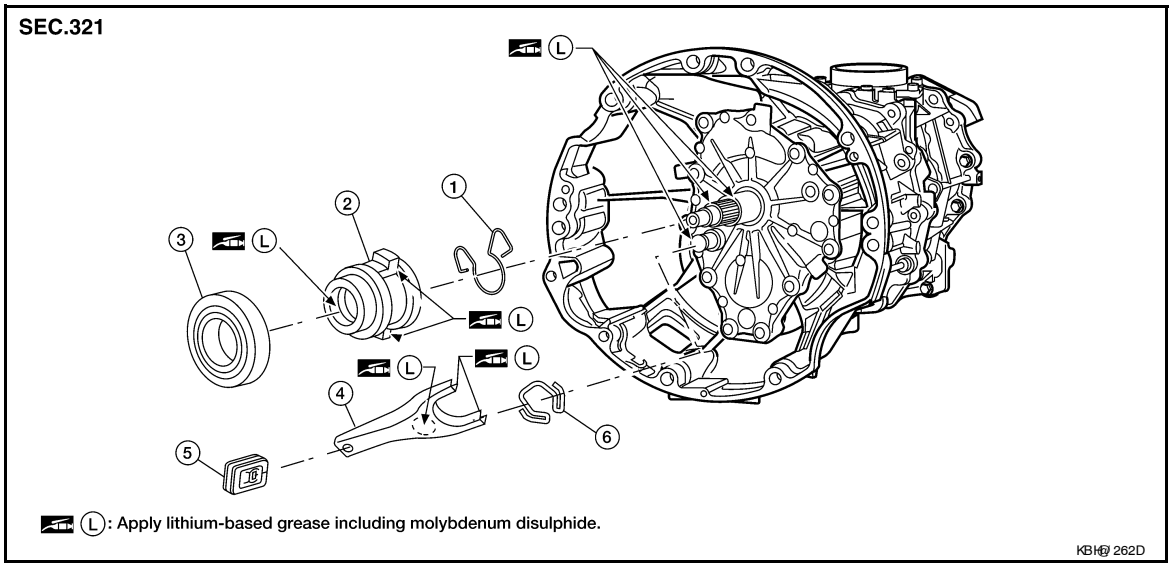


REMOVAL AND INSTALLATION

CLUTCH RELEASE MECHANISM

Exploded View

INFOID:0000000004064185



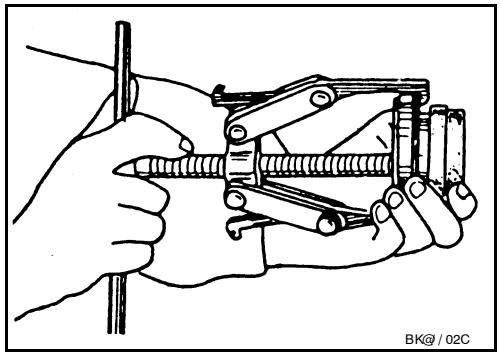
1. Holder spring
2. Release bearing sleeve
3. Release bearing
4. Withdrawal lever
5. Dust cover
6. Snap spring

Removal and Installation

INFOID:0000000004064186

REMOVAL

1. Remove the manual transmission from the vehicle. Refer to TM-21, "Removal and Installation from Vehicle (For 2WD Models)" or TM-23, "Removal and Installation from Vehicle (For 4WD Models)".
2. Remove the release bearing sleeve assembly, holder spring, and withdrawal lever from inside the clutch housing.
3. Remove the dust cover.
4. Remove the snap spring from the withdrawal lever.
5. Remove the release bearing from release bearing sleeve using suitable tool.

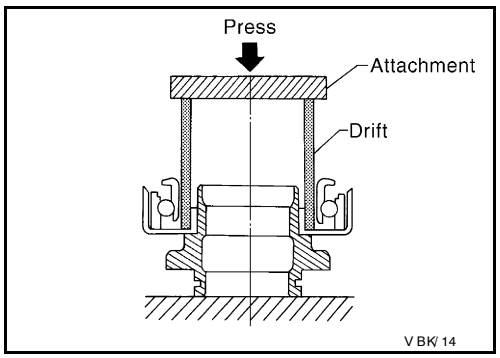


INSTALLATION

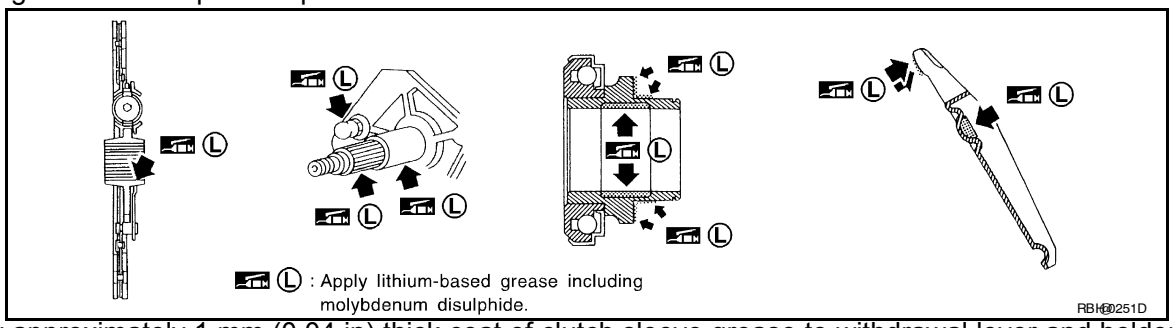
Installation is in the reverse order of removal.

NOTE:

- Install the release bearing to release bearing sleeve using suitable tool, as shown.



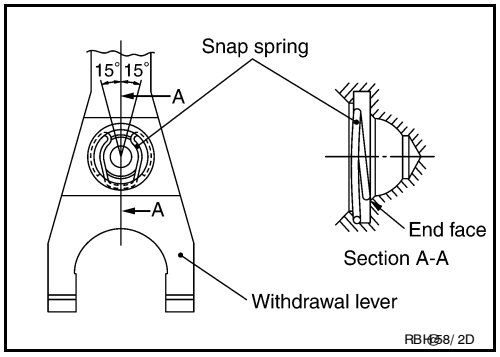
- Clean old grease and abrasive materials off the grease application areas.
- Apply grease to the specified points as shown.



- Apply approximately 1 mm (0.04 in) thick coat of clutch sleeve grease to withdrawal lever and holder spring frictional surfaces.
- Apply a coat of clutch sleeve grease to ball pin contact surface of the withdrawal lever and inner slots of the release bearing. The grease surface should be level with the surrounding area.
- Apply a thin coat of clutch sleeve grease to the release bearing frictional surface. After grease application, Install release bearing. Wipe off excess grease forced out during bearing installation.

CAUTION:

- **Before installing the manual transaxle to the vehicle, check that each sliding surface slides smoothly by operating withdrawal lever.**
- **Be careful not to bring any grease into contact with the clutch disc facing, pressure plate surface, or flywheel surface.**
- **When assembling, make sure that both ends of the snap spring touch the end face of the withdrawal lever.**
- **Be careful with the orientation of the installation.**

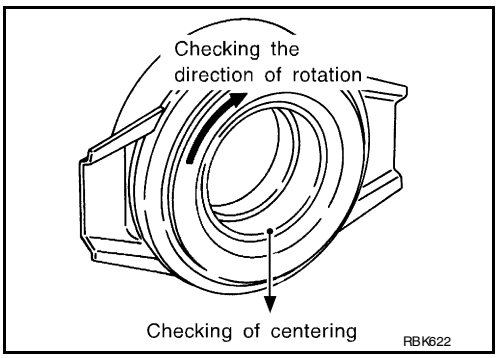


Inspection

INFOID:0000000004064187

INSPECTION AFTER REMOVAL

- Replace the release bearing if it is seized, damaged, faulty in rotation direction, or has poor aligning function.
- Replace the withdrawal lever if its contact surface is worn abnormally.
- Replace the dust seal if it is deformed or cracked.



CLUTCH DISC, CLUTCH COVER

Exploded View

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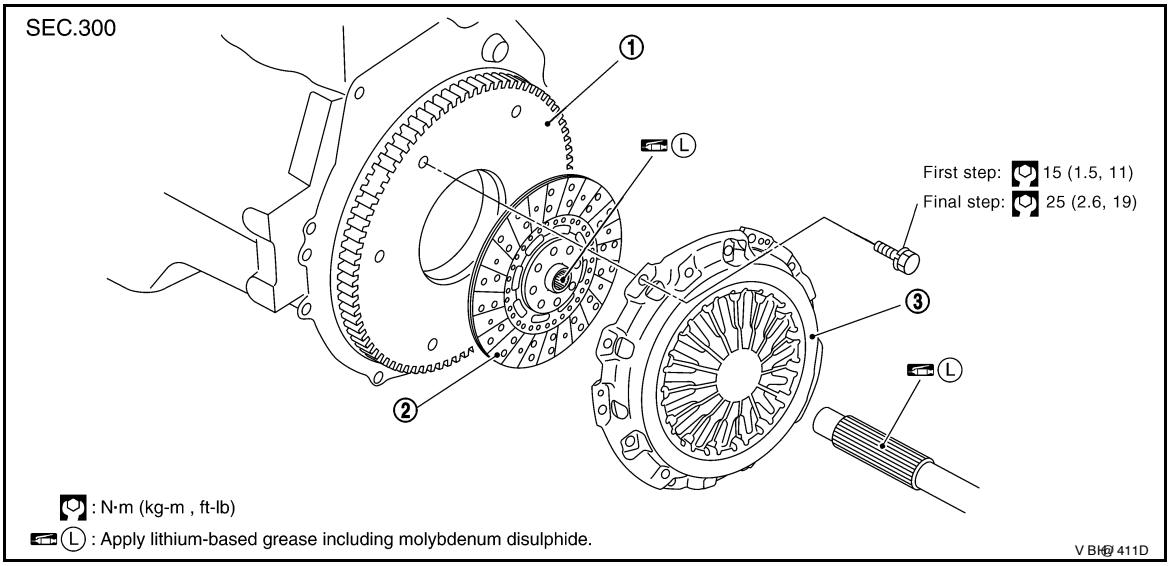


1. Flywheel
2. Clutch disc
3. Clutch cover

Removal and Installation

INFOID:0000000004064189

CAUTION:
- **Do not clean the clutch disc with solvent.**
- **When installing, do not get grease from the main drive shaft onto the clutch disc friction surface.**
- **If the flywheel is removed, align the dowel pin with the smallest hole of flywheel. Refer to EM-107, "Disassembly and Assembly".**

REMOVAL

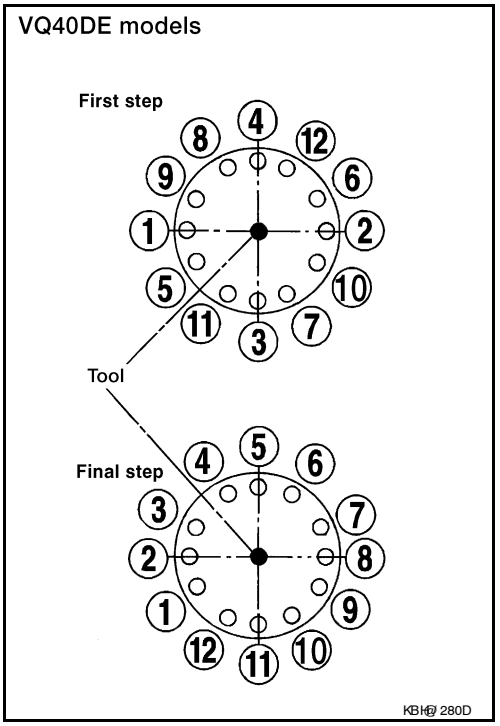
1. Remove the manual transmission from the vehicle. Refer to TM-21, "Removal and Installation from Vehicle (For 2WD Models)" or TM-23, "Removal and Installation from Vehicle (For 4WD Models)".
2. Remove the clutch cover bolts using power tool. Remove the clutch cover and clutch disc.

INSTALLATION

1. Apply recommended grease to clutch disc and main drive shaft spline.
   CAUTION:
   Do not allow grease to contaminate the clutch facing.

2. Install clutch disc and clutch cover. Pre-tighten the bolts and install Tool. Then tighten the clutch cover bolts evenly in two steps to the specified torque in the order shown. Refer to CL-17, "Exploded View".

Tool number : ST20630000 (J-26366)



3. Install the manual transmission. Refer to TM-21, "Removal and Installation from Vehicle (For 2WD Models)" or TM-23, "Removal and Installation from Vehicle (For 4WD Models)".

Inspection and Adjustment

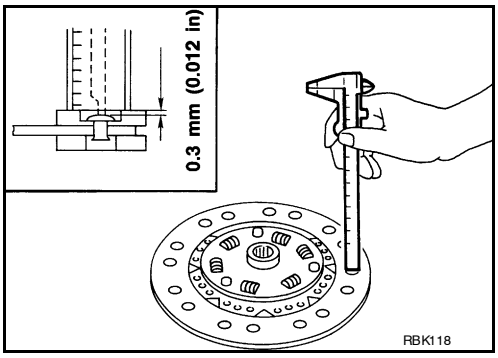
INFOID:0000000004064190

INSPECTION AND ADJUSTMENT AFTER REMOVAL

Clutch Disc

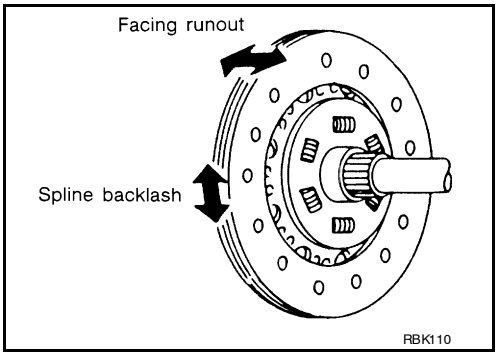
- Check the wear of the clutch disc facing.

Clutch disc facing wear : Refer to CL-20, "Clutch Disc".



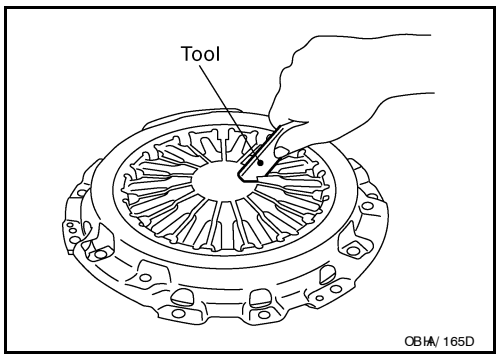
- Check the runout and backlash of the clutch disc. If the measurement exceeds the specification, replace the clutch disc.

Runout and backlash : Refer to CL-20, "Clutch Disc".



Clutch Cover

With the clutch cover installed on the vehicle, check the diaphragm spring toe height for unevenness. If unevenness exceeds the limit, adjust the diaphragm spring toe height using Tool.



Uneven limit of diaphragm spring toe height : **Refer to CL-20, "Clutch Cover".**

Tool number : **ST20050240 (—)**

- Check clutch cover thrust ring for wear or damage. If wear or damage is found, replace clutch cover assembly.

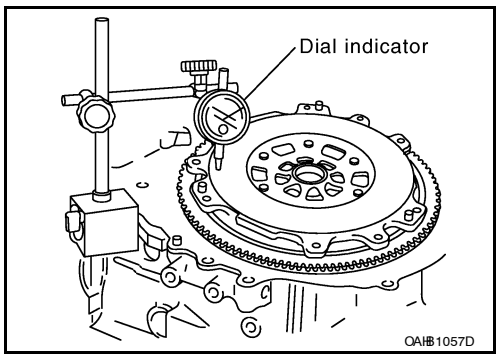
NOTE:

- Worn thrust ring will generate a beating noise when tapped at the rivet with a hammer.
- Broken thrust ring will make a clinking sound when cover is shaken up and down.

- If a trace of burn or discoloration is found on the clutch cover pressure plate to clutch disc contact surface, repair the surface with emery paper. If surface is damaged or distorted, replace the assembly.

Flywheel

- Check contact surface of flywheel for slight burns or discoloration. If any are found, repair flywheel with emery paper.
- Check the flywheel runout. Refer to EM-117, "Inspection After Disassembly".



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch Control System

INFOID:0000000004064191

Type of clutch control	Hydraulic

Clutch Master Cylinder

INFOID:0000000004064192

Unit: mm (in)

Inner diameter	15.87 (5/8)

Clutch Operating Cylinder

INFOID:0000000004064193

Unit: mm (in)

Inner diameter	19.05 (3/4)

Clutch Disc

INFOID:0000000004064194

Unit: mm (in)

Engine model	VQ40DE
Model	260
Facing size (Outer dia. × inner dia. × thickness)	260 × 190 × 3.2 (10.24 × 7.48 × 0.126)
Wear limit (depth to rivet head)	0.3 (0.012)
Runout limit/diameter of the area to be measured	1.0 (0.039) or less/250 (9.84) dia.
Maximum backlash of spline (at outer disc edge)	1.0 (0.039)

Clutch Cover

INFOID:0000000004064195

Unit: mm (in)

Engine model	VQ40DE
Set-load	8340 N (850 kg, 1875 lb)
Diaphragm spring lever height	44.0 - 46.0 (1.732 - 1.811)
Uneven limit of diaphragm spring toe height	0.7 (0.028)

Clutch Pedal

INFOID:0000000004064196

Unit: mm (in)

Clearance ″C″ between pedal stopper rubber and clutch interlock switch threaded while clutch pedal is fully depressed.	0.1 - 1.0 (0.004 - 0.039)