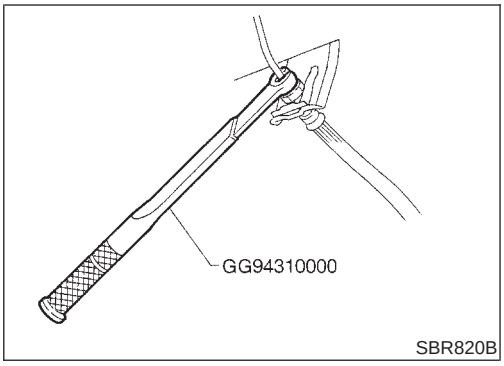
SECTION CL

CONTENTS



Precautions

NMCL0001

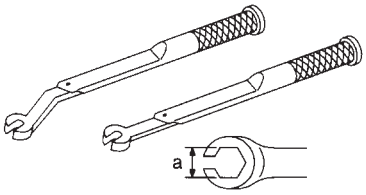
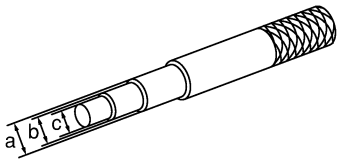
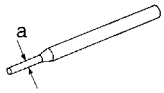
- **Recommended fluid is brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas.**
- **When removing and installing clutch piping, use Tool.**
- **Use new brake fluid to clean or wash all parts of master cylinder, operating cylinder and clutch damper.**
- **Never use mineral oils such as gasoline or kerosene. It will ruin the rubber parts of the hydraulic system.**

WARNING:

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

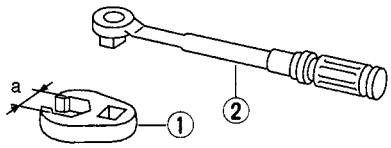
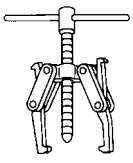
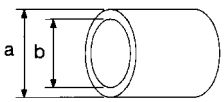
Special Service Tools

NMCL0002

Tool number Tool name	Description	
GG94310000 Flare nut torque wrench	 NT406	Removing and installing clutch piping **a: 10 mm (0.39 in)**
KV30100100 Clutch aligning bar	 NT840	Installing clutch disc **a: 22.8 mm (0.898 in)** **b: 15.7 mm (0.618 in)** **c: 12 mm (0.472 in)**
KV32101000 Pin punch	 NT410	Removing and installing master cylinder spring pin **a: 4 mm (0.157 in) dia.**

Commercial Service Tools

NMCL0003

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench	 NT360	Removing and installing clutch piping **a: 10 mm (0.39 in)**
Bearing puller	 NT077	Removing release bearing
Bearing drift	 NT474	Installing release bearing **a: 52 mm (2.05 in) dia.** **b: 45 mm (1.77 in) dia.**

NVH Troubleshooting Chart

NMCL0027S01

Use the chart below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, repair or replace these parts.

CLUTCH

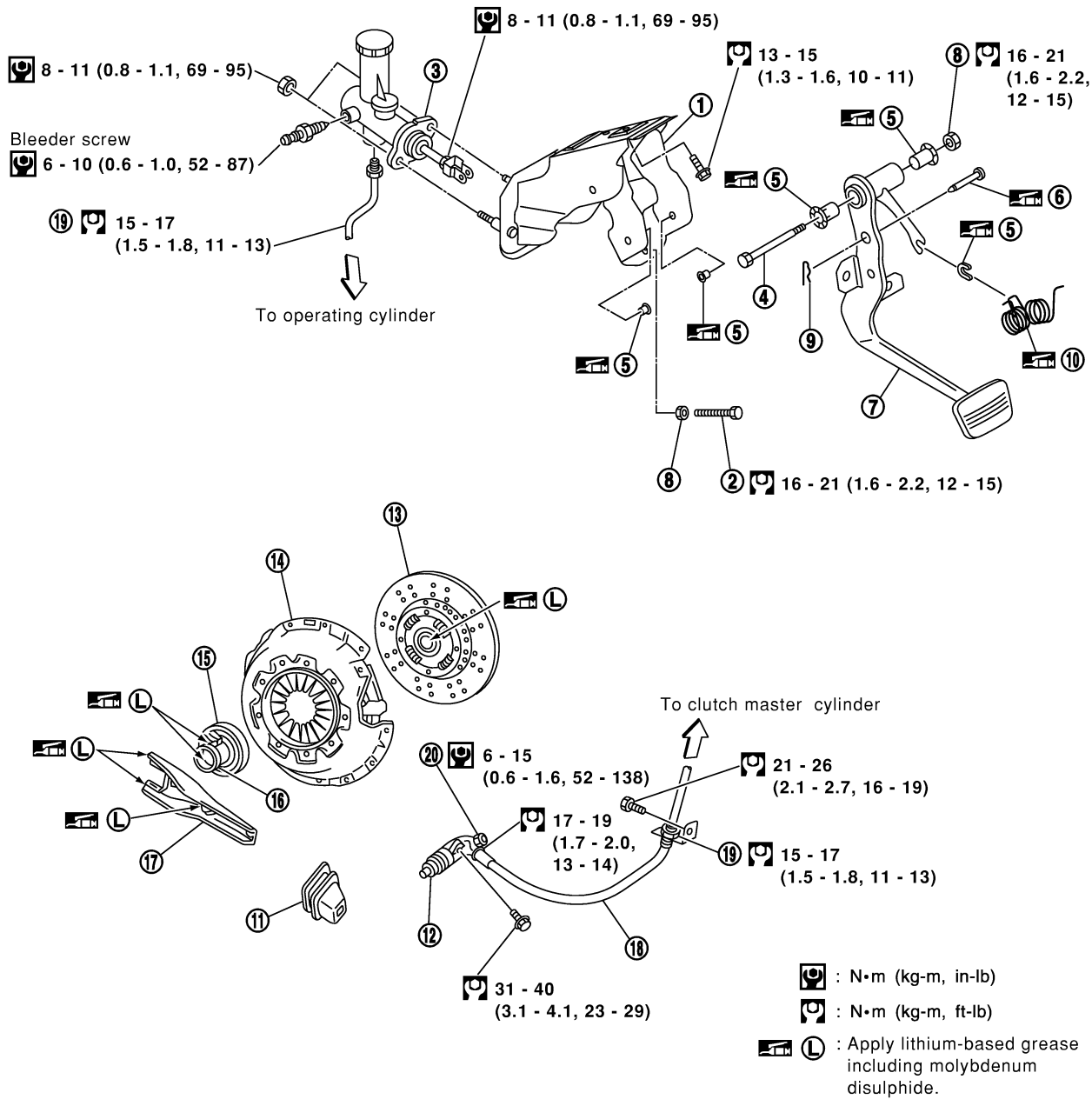
NMCL0027S0101

Reference page		CL-6	CL-6	CL-7	CL-10	Refer to EM-66, "REMOVAL".	CL-13	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-15	CL-16
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	

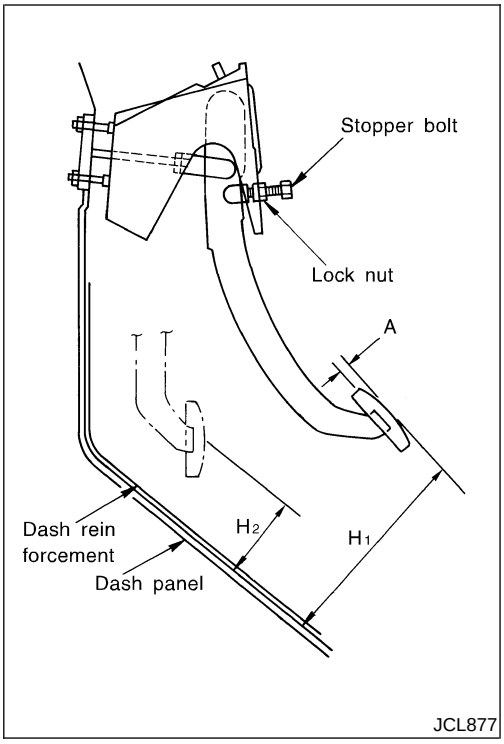
Components

NMCL0004

SEC. 300•305•306•465



1. Clutch pedal bracket
2. Stopper bolt
3. Clutch master cylinder
4. Fulcrum pin
5. Bushing
6. Clevis pin
7. Clutch pedal
8. Lock nut
9. Snap pin
10. Assist spring
11. Dust boot
12. Operating cylinder
13. Clutch disc
14. Clutch cover
15. Release bearing
16. Release bearing sleeve
17. Withdrawal lever
18. Clutch hose
19. Flare nut
20. Air bleeder



Inspection and Adjustment

NMCL0005

ADJUSTING CLUTCH PEDAL

NMCL0005S01

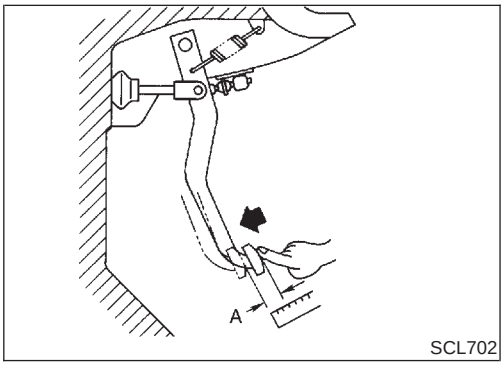
Pedal Height

NMCL0005S0102

1. Verify that clutch pedal height "H_1" is within specification.

- Measure distance between the upper surface of dash reinforcement and pedal.

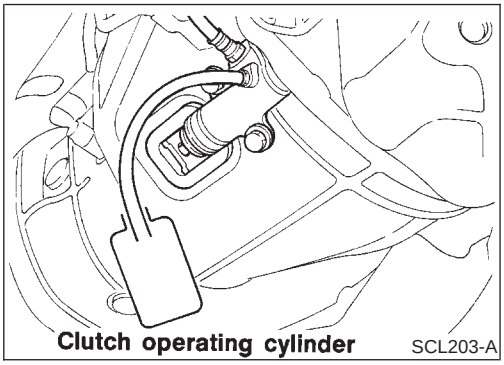
Pedal height "H_1":
191 - 201 mm (7.52 - 7.91 in)



2. Adjust pedal free play with master cylinder push rod. Then tighten lock nut.

Pedal free play "A":
9 - 16 mm (0.35 - 0.63 in)

- Push or step on clutch pedal until resistance is felt, and check the distance the pedal moves.



AIR BLEEDING PROCEDURE

NMCL0005S02

1. Bleed air from clutch piping connector according to the following procedure.

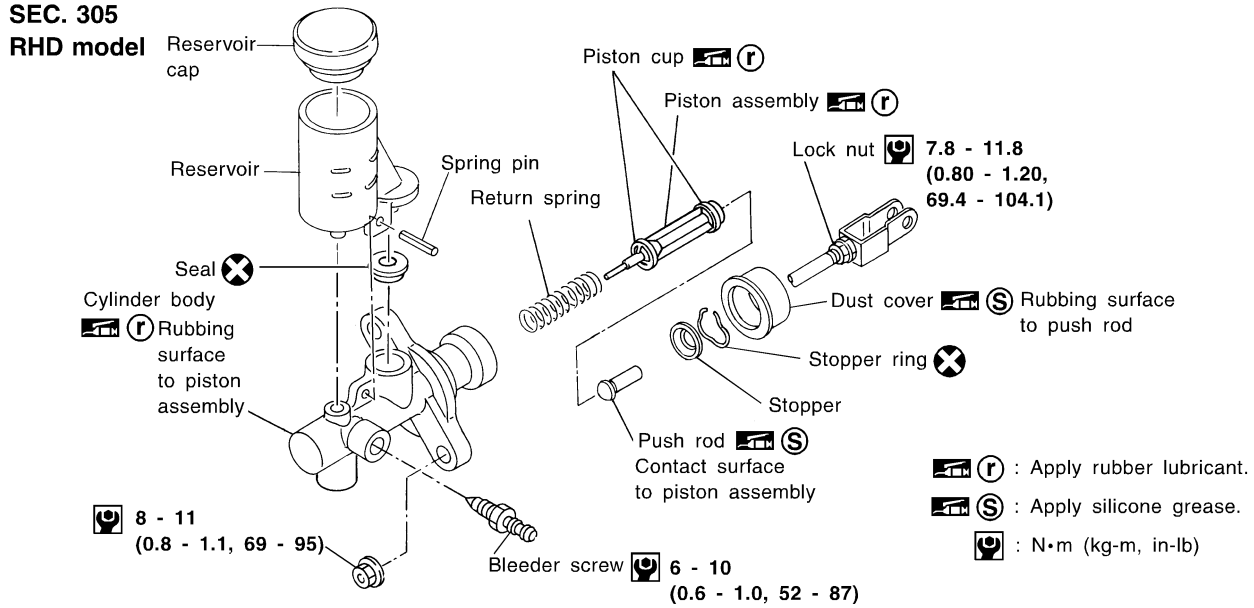
- **Carefully monitor fluid level at master cylinder during bleeding operation.**

a. Top up reservoir with recommended brake fluid.
b. Connect a transparent vinyl tube to air bleeder valve.
c. Slowly depress the clutch pedal to its full stroke and release it completely. Repeat this operation several times at 2 to 3 seconds intervals.
d. Open the air bleeder with the clutch pedal fully depressed.
e. Close the air bleeder.
f. Release the clutch pedal and wait at least 5 seconds.
g. Repeat steps c through f mentioned above, then air bubbles will no longer appear at the damper in the brake fluid.

2. Bleed air from clutch operating cylinder according to the above procedure.
3. Repeat the above air bleeding procedures 1 and 2 several times.

Components

NMCL0006



Removal

NMCL0029

1. Drain brake fluid.

CAUTION:

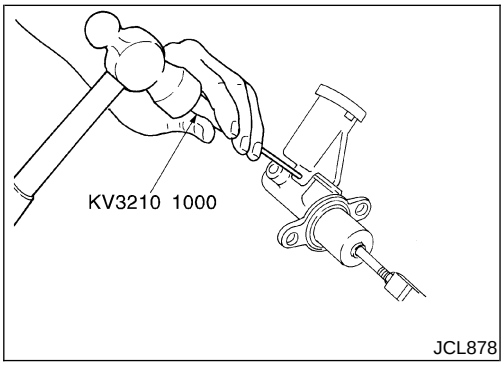
Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

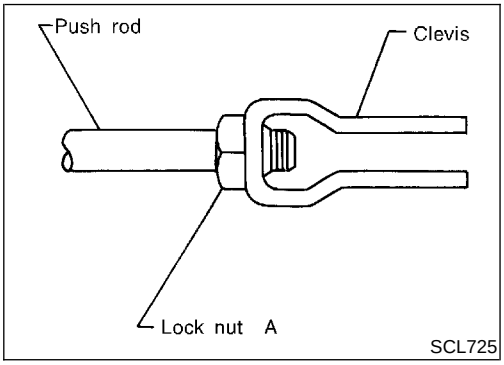
2. Remove clutch tube using a flare nut wrench.
3. Remove snap pin between clutch pedal and push rod, and remove clevis pin.
4. Unscrew master cylinder assembly mounting nuts and reservoir tank bracket mounting bolts to remove master cylinder assembly from vehicle.

Installation

NMCL0030

1. Connect clutch tube to master cylinder assembly, and hand-tighten flare nut.
2. Install master cylinder assembly to vehicle, and tighten mounting nuts to the specified torque.
   : 8 - 10 N·m (0.8 - 1.1 kg-m, 69 - 95 in-lb)
3. Tighten clutch tube flare nut using a flare nut torque wrench.
   : 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
4. After installing clevis pin, install snap pin to connect clutch pedal to push rod.
5. After finishing the operation, inspection and adjustment of pedal height, bleed air from clutch piping. (Refer to “Adjusting clutch pedal”, CL-6 and “Air Bleeding Procedure”, CL-6.)





Disassembly

NMCL0031

1. Remove spring pin using pin punch (SST) and remove reservoir tank and seal from the cylinder body.
2. Loosen push rod lock nut A to remove clevis and lock nut A.
3. Remove dust cover.
4. Remove stopper ring and stopper, and remove push rod from cylinder body. During removal, keep push rod depressed, to prevent piston inside master cylinder from popping out.
5. Remove piston assembly from cylinder body.

Inspection

NMCL0032

Inspect for the following, and replace parts if necessary.

- Damage, wear, rust, and pinholes on the cylinder inner wall
- Damage and deformation of the reservoir tank
- Weak spring
- Crack and deformation of the dust cover

Assembly

NMCL0033

1. Apply rubber lubricant to the sliding part of piston assembly, and insert piston assembly.
2. After installing stopper to push rod, install stopper ring while keeping piston assembly depressed by hand, so that piston assembly will not pop out.

CAUTION:

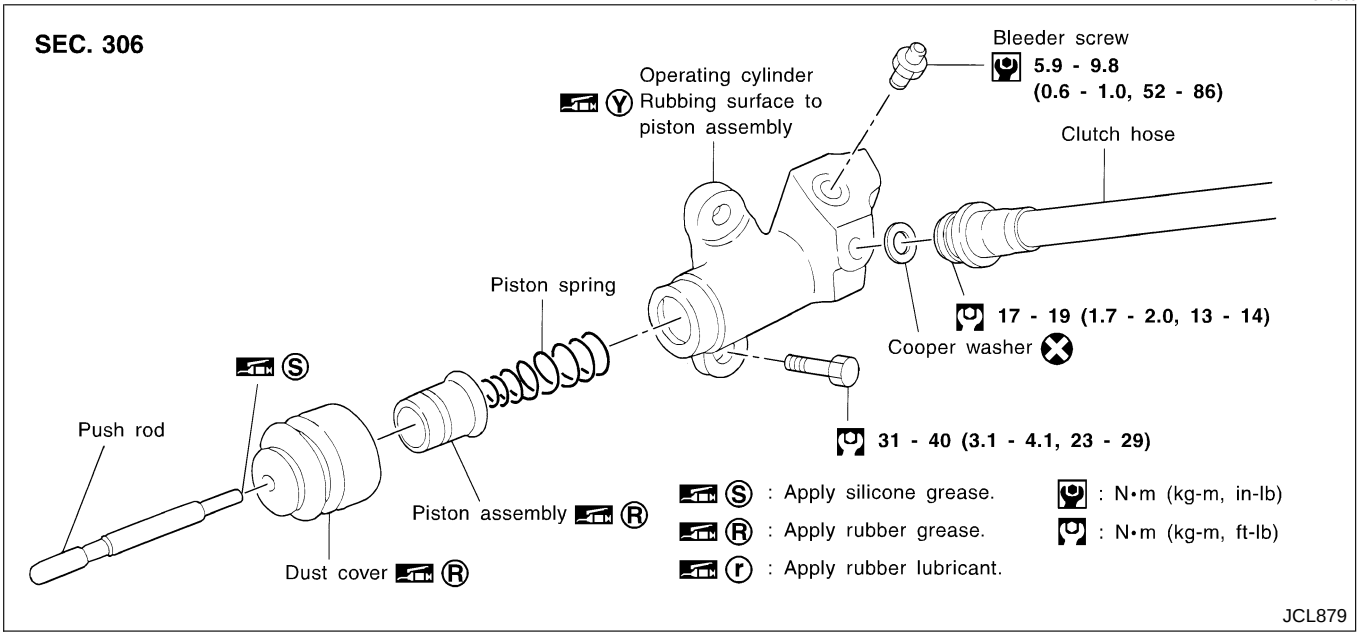
Stopper ring cannot be reused. Always use a new stopper ring for assembly.

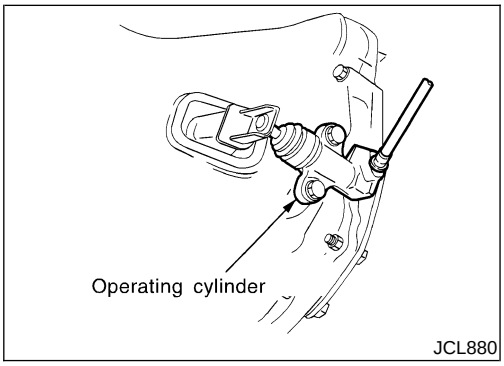
3. Install dust cover.
4. Install clevis to push rod, and tighten lock nut A to the specified torque.

   : 8 - 12 N·m (0.8 - 1.2 kg-m, 69 - 104 in-lb)
5. Install seal and nipple to cylinder body, and install spring pin using a pin punch.

Components

NMCL0009





Removal

NMCL0034

1. Drain brake fluid.

CAUTION:

Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

2. Remove union bolt and clutch hose from operating cylinder.
3. Remove operating cylinder mounting bolts, and remove cylinder from vehicle.

Disassembly

NMCL0035

Remove dust cover, and remove piston assembly from cylinder body.

Inspection

NMCL0036

Inspect for following, and replace parts if necessary.

- Damage, foreign material, wear, rust, and pinholes on the cylinder inner surface, piston, and sliding part of piston cup
- Weak spring
- Crack and deformation of dust cover

Assembly

NMCL0037

1. Apply recommended rubber grease to piston cup and piston, and insert piston assembly.
2. Install dust cover.

Installation

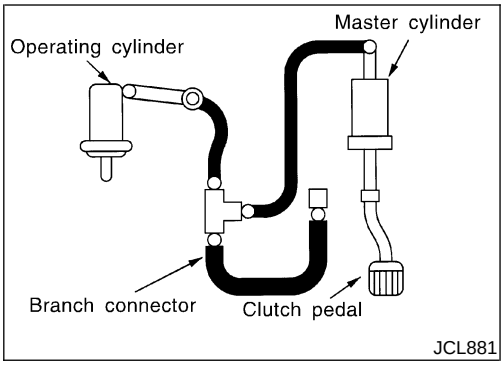
NMCL0038

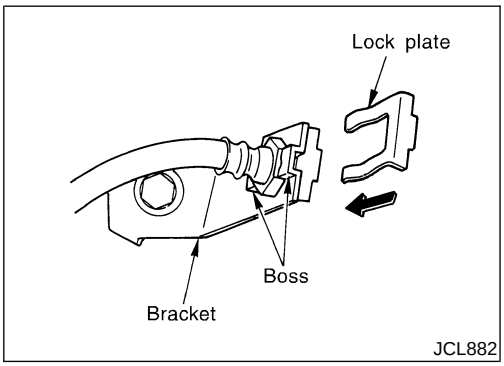
Install the components in the reverse order of removal. Adhere to the operations described below.

CAUTION:

Install the hose without twisting it.

- **The copper washer of the union bolt should not be reused. Always use a new copper washer for installation.**
- **After finishing the operation, bleed air from the clutch piping. Refer to "Air Bleeding Procedure", CL-6.**





Removal

NMCL0039

For removal and installation of piping, pay extra attention to the following procedures.

1. Drain brake fluid.

CAUTION:

Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, quickly wipe it out and wash it away with water immediately.

2. Remove flare nut using a flare nut wrench.
3. Remove clutch hose and clutch tube.

Installation

NMCL0040

1. When installing clutch hose to bracket, face lock plate in the correct direction as shown to secure clutch hose.

CAUTION:

Install clutch hose without twisting or bending it.

2. Tighten flare nut to the specified torque, using a flare nut wrench.

   : 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)

CAUTION:

Be careful not to damage flare nut and clutch tube.

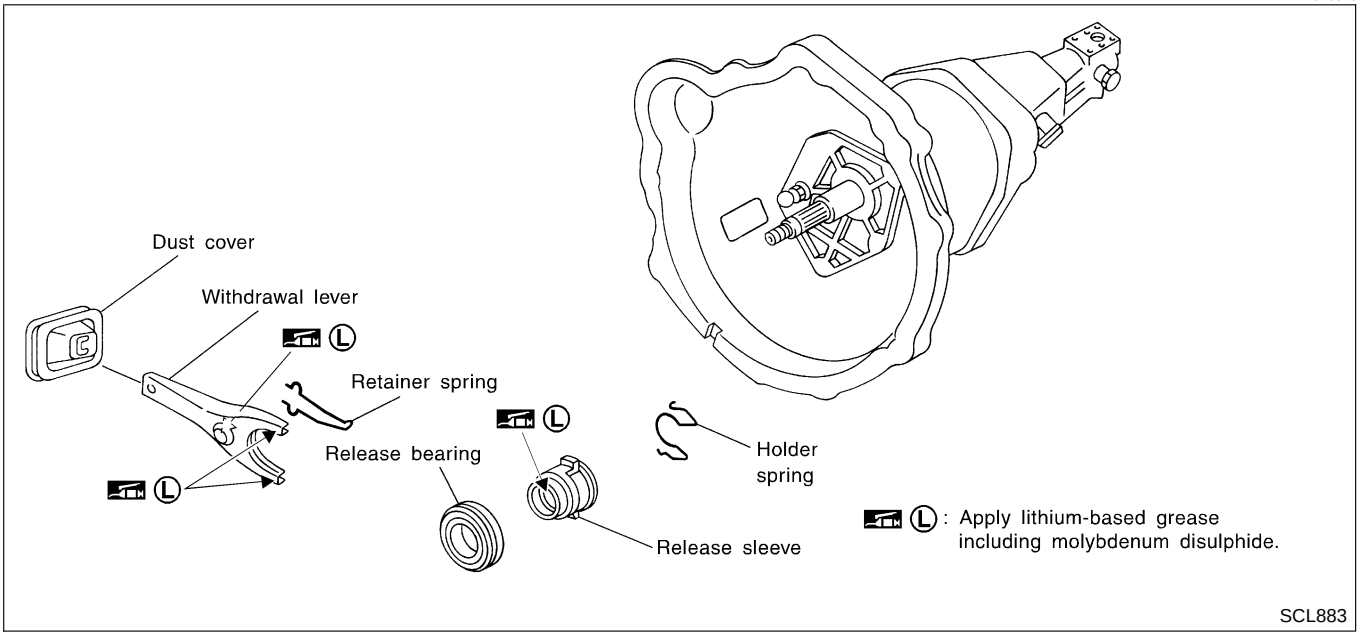
3. Install clutch hose to operating cylinder, and tighten mounting bolts to the specified torque.

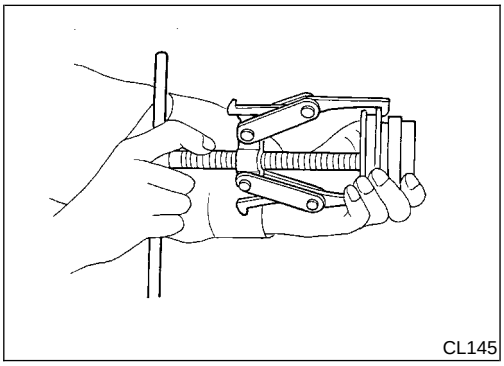
   : 17 - 20 N·m (1.7 - 2.0 kg-m, 12 - 14 ft-lb)

4. After finishing the operation, bleed air from the clutch piping. Refer to “Air Bleeding Procedure”, CL-6.

Components

NMCL0013

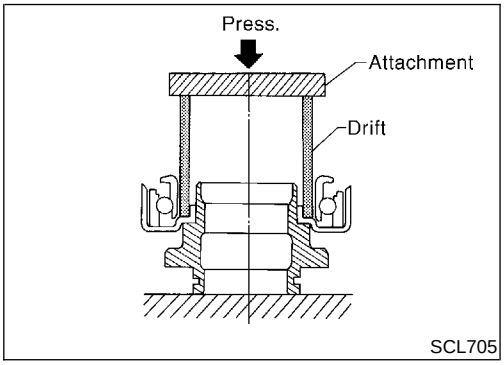




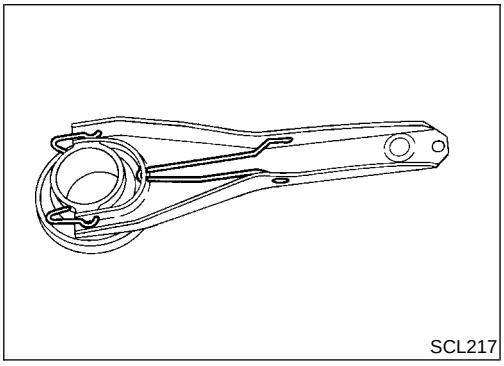
Removal and Installation

NMCL0014

- Remove release bearing.



- Install release bearing with suitable drift.



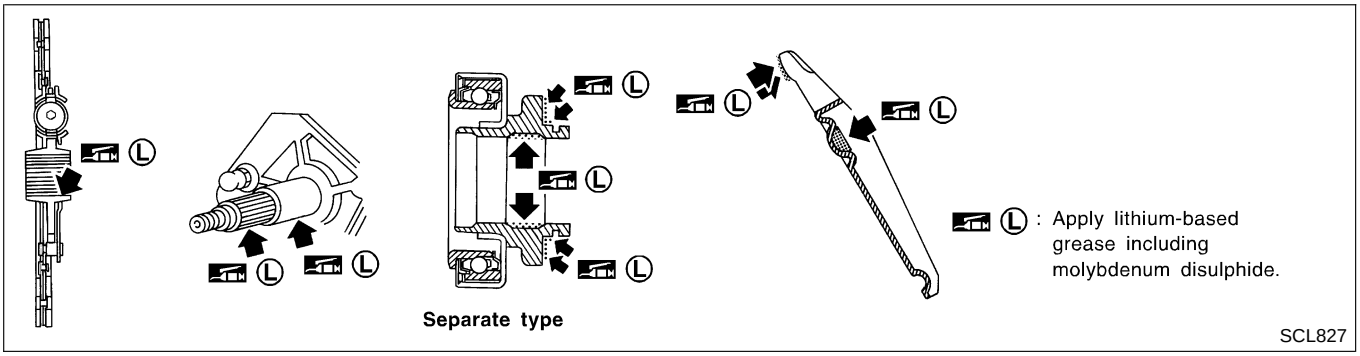
- Install retainer spring and holder spring.

Inspection

NMCL0015

Check the following items, and replace if necessary.

- Release bearing, to see that it rolls freely and is free from noise, cracks, pitting or wear
- Release sleeve and withdrawal lever rubbing surface, for wear, rust or damage



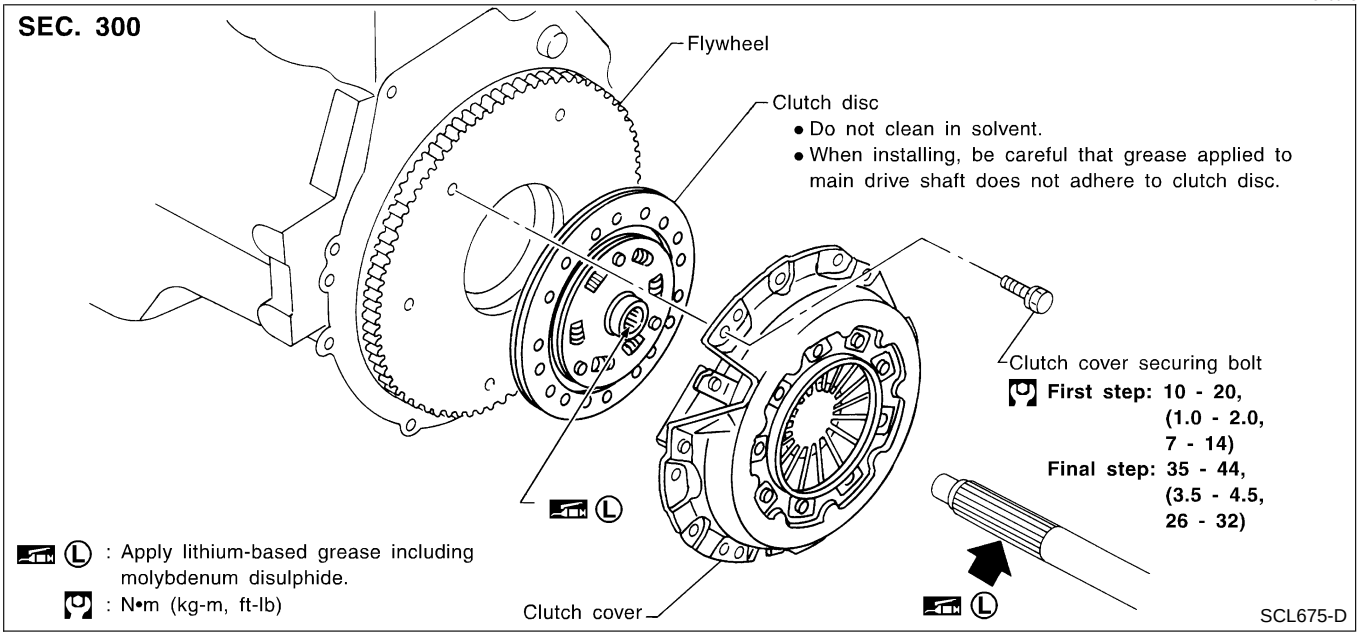
Lubrication

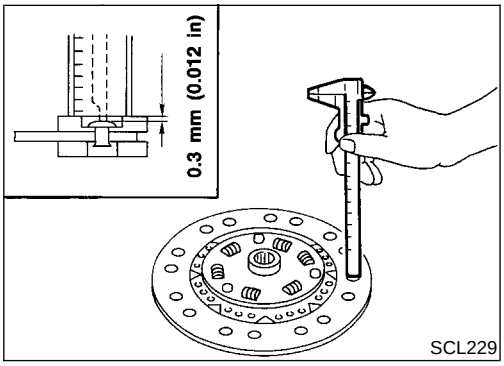
NMCL0016

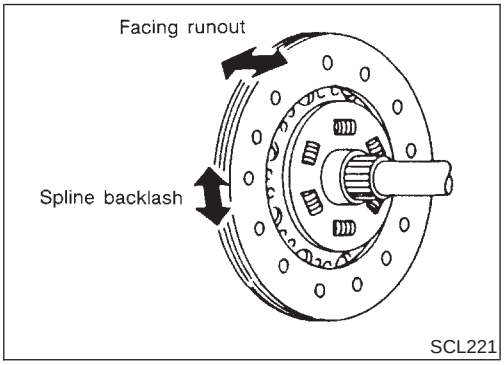
- Apply recommended grease to contact surface and rubbing surface.
- **Too much lubricant might damage clutch disc facing.**

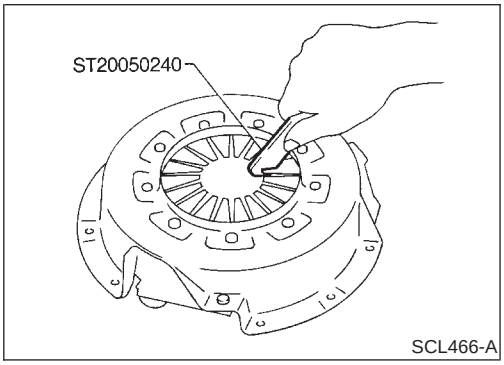
Components

NMCL0018









Inspection and Adjustment

NMCL0019

CLUTCH DISC

NMCL0019S01

Check the following items, and replace if necessary.

- Clutch disc, for burns, discoloration, oil or grease leakage
- Clutch disc, for wear of facing

Wear limit of facing surface to rivet head:
0.3 mm (0.012 in)

- Clutch disc, for backlash of spline and runout of facing

Maximum backlash of spline (at outer edge of disc):
1.0 mm (0.039 in)
Runout limit:
1.0 mm (0.039 in)
Distance of runout check point (from hub center):
115 mm (4.53 in)

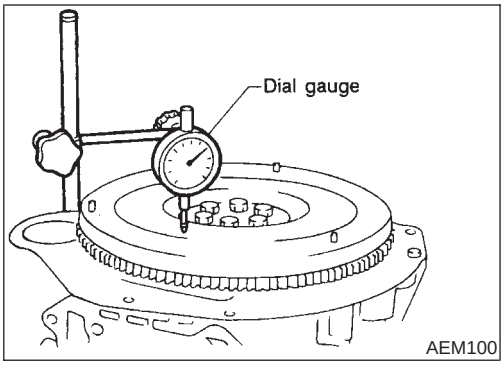
CLUTCH COVER AND FLYWHEEL

NMCL0019S02

- Check clutch cover, installed on vehicle, for uneven diaphragm spring toe height.

Uneven limit:
0.7 mm (0.028 in)

- If out of limit, adjust the height with Tool.



FLYWHEEL INSPECTION

NMCL0019S03

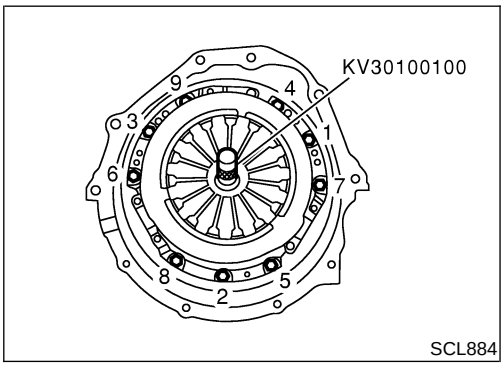
CAUTION:

Do not allow any magnetic materials to contact the ring gear teeth.

- Inspect contact surface of flywheel for slight burns or discoloration. Clean flywheel with emery paper.
- Check flywheel runout.

Maximum allowable runout:

Refer to EM-77, "Flywheel/Drive plate Runout".



Installation

NMCL0020

- Insert Tool into clutch disc hub when installing clutch cover and disc.
- Be careful not to allow grease to contaminate clutch facing.
- Tighten bolts in numerical order, in two steps.

First step:

: 10 - 20 N·m (1.0 - 2.0 kg-m, 7 - 14 ft-lb)

Final step:

: 35 - 44 N·m (3.5 - 4.5 kg-m, 26 - 32 ft-lb)

Clutch Control System

NMCL0028

Type of clutch control	Hydraulic

Clutch Master Cylinder

NMCL0021

Inner diameter	15.87 mm (5/8 in)

Clutch Operating Cylinder

NMCL0022

Inner diameter	19.05 mm (3/4 in)

Clutch Disc

NMCL0023

Unit: mm (in)

Model	240
Facing size (Outer dia. x inner dia. x thickness)	240 x 160 x 3.5 (9.45 x 6.30 x 0.138)
Thickness of disc assembly With load	7.9 - 8.3 (0.311 - 0.327) with 4,903 N (500 kg, 1,102 lb)
Wear limit of facing surface to rivet head	0.3 (0.012)
Runout limit of facing	1.0 (0.039)
Distance of runout check point (from hub center)	115 (4.53)
Maximum backlash of spline (at outer edge of disc)	1.0 (0.039)

Clutch Cover

NMCL0024

Unit: mm (in)

Model	240
Set-load	6,227 N (635 kg, 1,400 lb)
Diaphragm spring height	37.5 - 39.5 (1.476 - 1.555)
Uneven limit of diaphragm spring toe height	0.7 (0.028)

Clutch Pedal

NMCL0025

Unit: mm (in)

Pedal height “H”*	191 - 201 (7.52 - 7.91)
Pedal free play “A” (at pedal pad)	9 - 16 (0.35 - 0.63)

*: Measured from surface of dash lower panel to pedal pad.

NOTES