

SECTION **CL**

CONTENTS

PRECAUTIONS	2	Assembly	11
Precautions	2	Installation	11
PREPARATION	3	PIPING	12
Special Service Tools	3	Removal	12
Commercial Service Tools	3	Installation	12
NOISE, VIBRATION AND HARSHNESS (NVH)		CLUTCH RELEASE MECHANISM	13
TROUBLESHOOTING	4	Components	13
NVH Troubleshooting Chart	4	Removal and Installation	13
CLUTCH	4	Inspection	14
CLUTCH SYSTEM - HYDRAULIC TYPE	5	Lubrication	14
Components	5	CLUTCH DISC, CLUTCH COVER AND	
Inspection and Adjustment	6	FLYWHEEL	15
ADJUSTING CLUTCH PEDAL	6	Components	15
AIR BLEEDING PROCEDURE	6	Inspection and Adjustment	15
CLUTCH MASTER CYLINDER	7	CLUTCH DISC	15
Components	7	CLUTCH COVER AND FLYWHEEL	15
Removal	7	FLYWHEEL INSPECTION	16
Installation	8	Installation	16
Disassembly	8	SERVICE DATA AND SPECIFICATIONS (SDS)	17
Inspection	8	Clutch Control System	17
Assembly	9	Clutch Master Cylinder	17
OPERATING CYLINDER	10	Clutch Operating Cylinder	17
Components	10	Clutch Disc	17
Removal	10	Clutch Cover	17
Disassembly	10	Clutch Pedal	17
Inspection	10		

GI

MA

EM

LC

EC

FE

CL

MT

AT

PD

AX

SU

BR

ST

RS

BT

HA

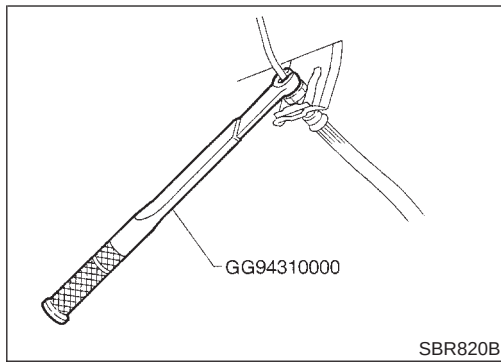
SC

EL

IDX

PRECAUTIONS

Precautions



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:

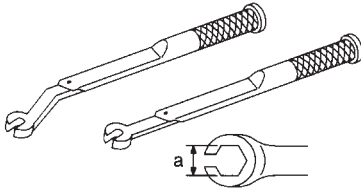
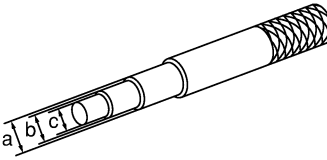
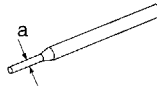
After cleaning the clutch disc, wipe it with a dust collector. Do not use compressed air.

PREPARATION

Special Service Tools

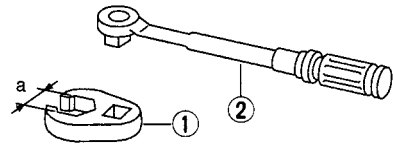
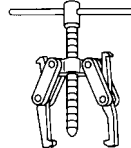
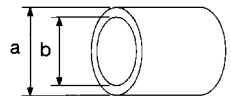
Special Service Tools

NMCL0002

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

Commercial Service Tools

NMCL0003

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

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

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

Symptom		SUSPECTED PARTS (Possible cause)		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-15	CL-16																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					</

Components

NMCI 0004

GI



EM

LC

EC

FE

CL

MT

AT

PD

AX

SU

BR

ST

RS

BT

HA

SC

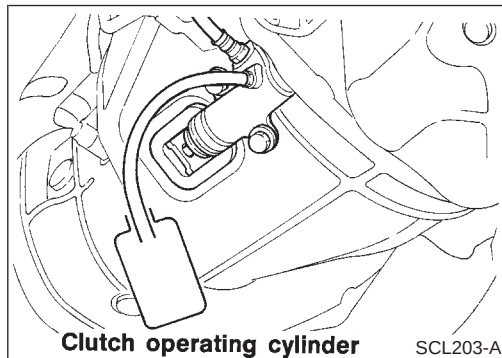
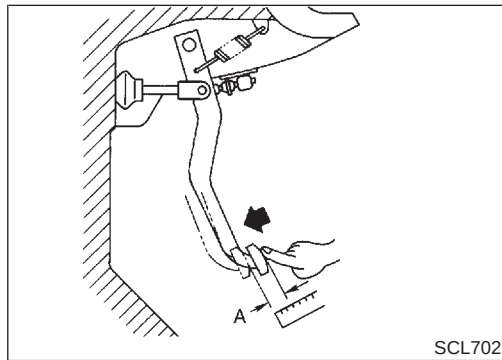
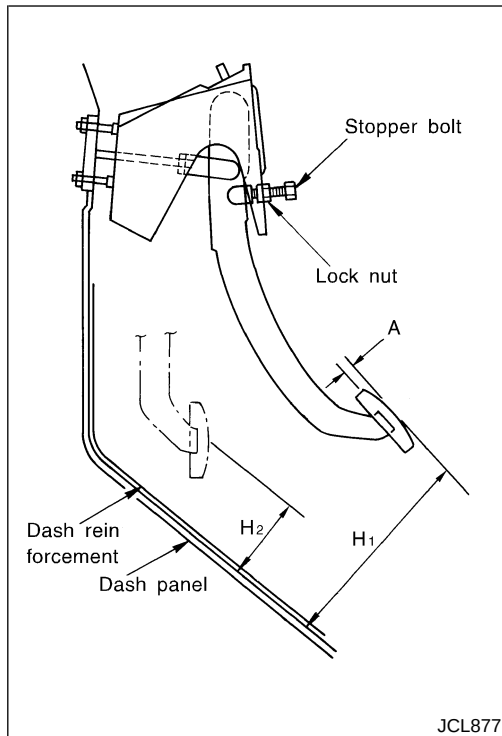
EL

IDX

- ## CL-5

CLUTCH SYSTEM — HYDRAULIC TYPE

Inspection and Adjustment



Inspection and Adjustment

ADJUSTING CLUTCH PEDAL

Pedal Height

1. Verify that clutch pedal height "H₁" is within specification.
 - Measure distance between the upper surface of dash reinforcement and pedal.

Pedal height "H₁":

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

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

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

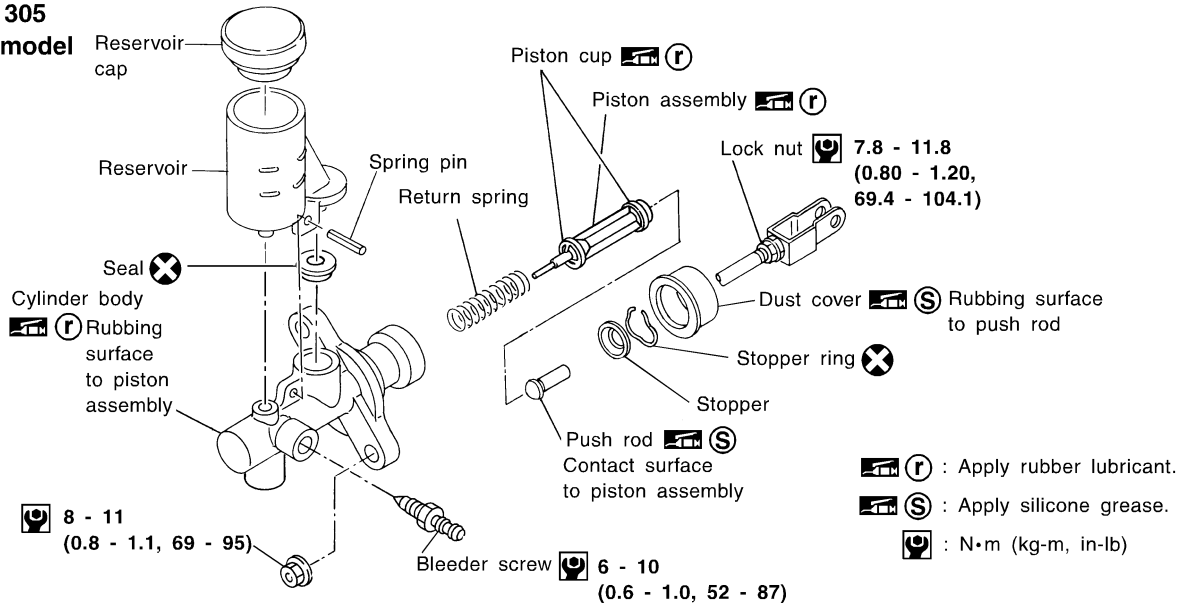
- a. Top up reservoir with recommended brake fluid.
 - b. Connect a transparent vinyl tube to air bleeder valve.
 - c. Slowly depress the clutch pedal to its full stroke and release it completely. Repeat this operation several times at 2 to 3 seconds intervals.
 - d. Open the air bleeder with the clutch 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

SEC. 305

RHD model



SCL744-A

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.

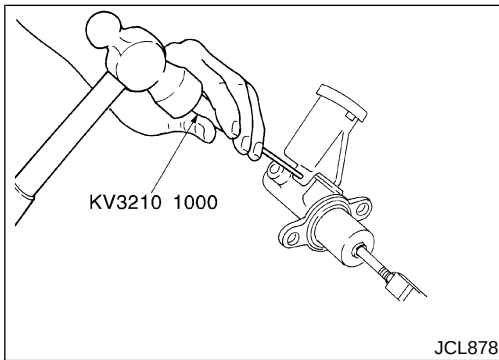
2. Remove clutch tube using a flare nut wrench.
3. Remove snap pin between clutch pedal and push rod, and remove clevis pin.
4. Unscrew master cylinder assembly mounting nuts and reservoir tank bracket mounting bolts to remove master cylinder assembly from vehicle.

CLUTCH MASTER CYLINDER

Installation

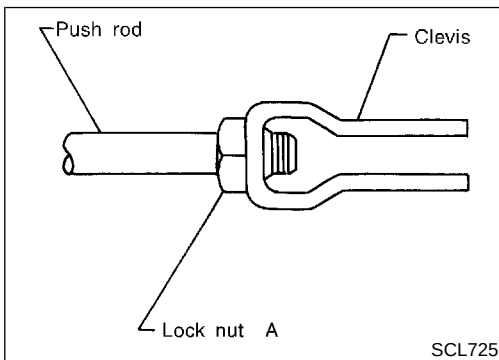
Installation

1. Connect clutch tube to master cylinder assembly, and hand-tighten flare nut. NMCL0030
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

1. Remove spring pin using pin punch (SST) and remove reservoir tank and seal from the cylinder body. NMCL0031
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

Inspect for the following, and replace parts if necessary. NMCL0032

- 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.

- GI
- MA
- EM
- LC
- EC
- FE
- CL
- MT
- AT
- PD
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

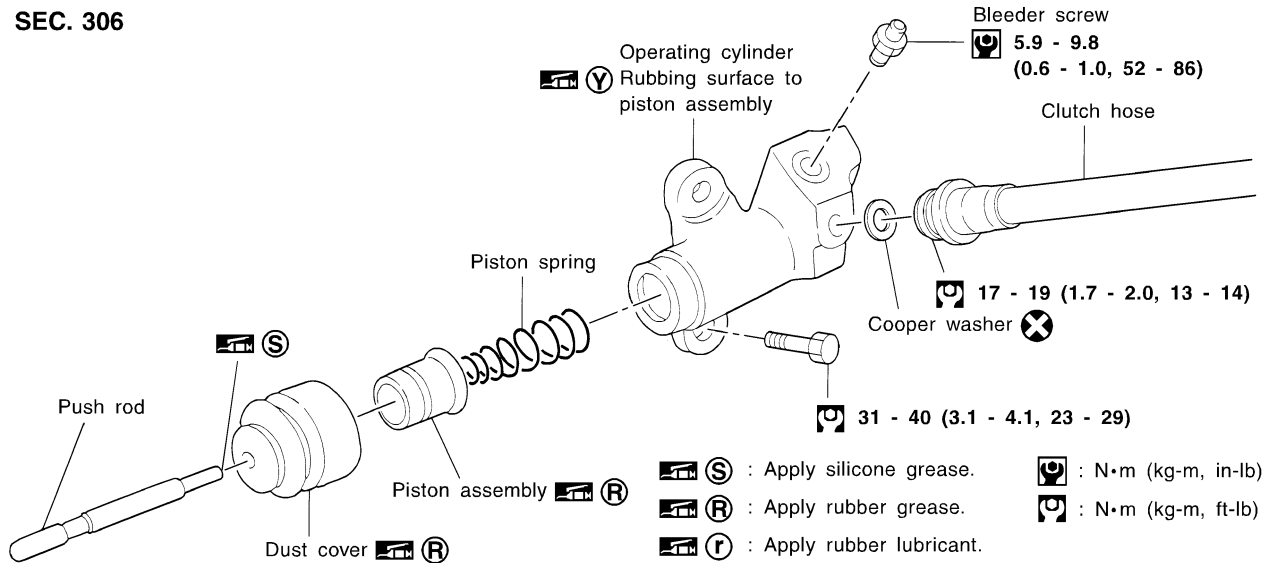
OPERATING CYLINDER

Components

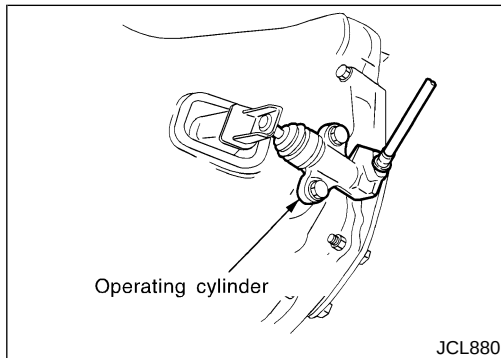
Components

NMCL0009

SEC. 306



JCL879



JCL880

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

1.

Apply recommended rubber grease to piston cup and piston, and insert piston assembly.

NMCL0037
2.

Install dust cover.

GI

MA

EM

LC

Installation

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

NMCL0038

EC

CAUTION:

Install the hose without twisting it.

FE

- 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.

CL

MT

AT

PD

AX

SU

BR

ST

RS

BT

HA

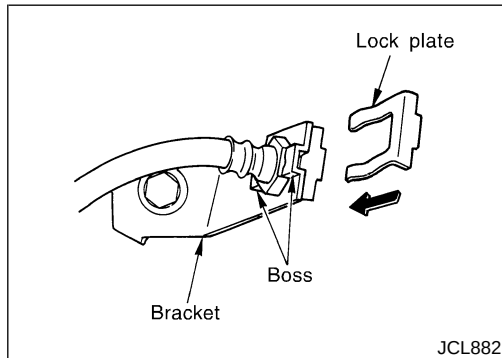
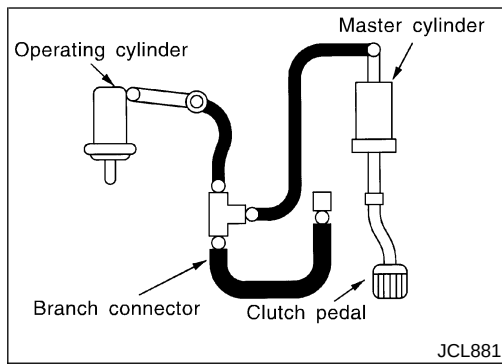
SC

EL

IDX

PIPING

Removal



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.

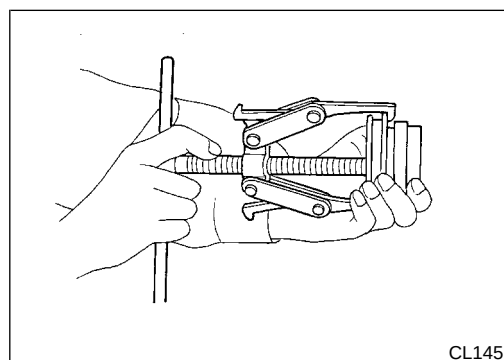
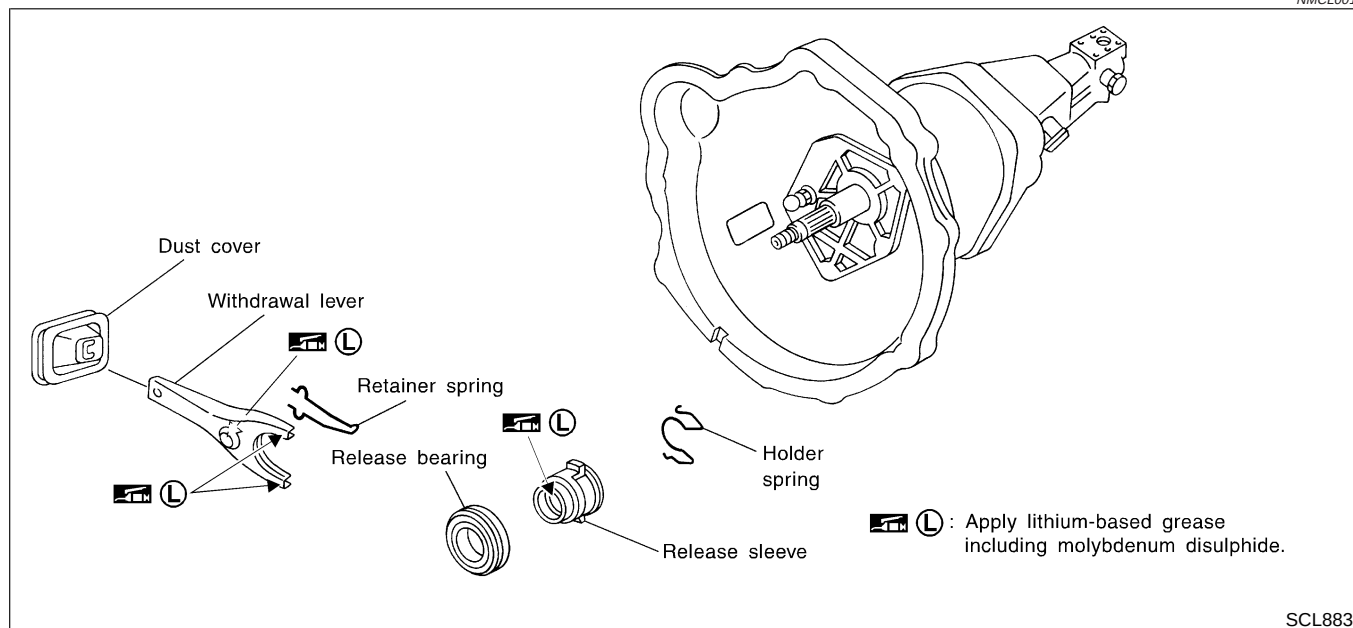
3. Install clutch hose to operating cylinder, and tighten mounting bolts to the specified torque.

 : 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

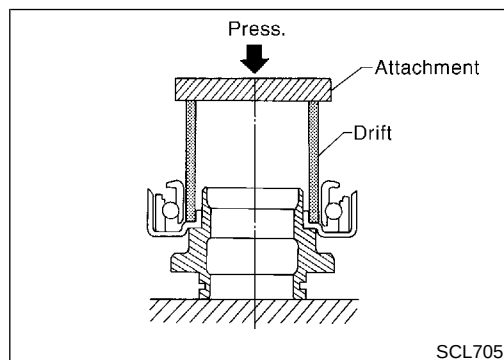
NMCL0013



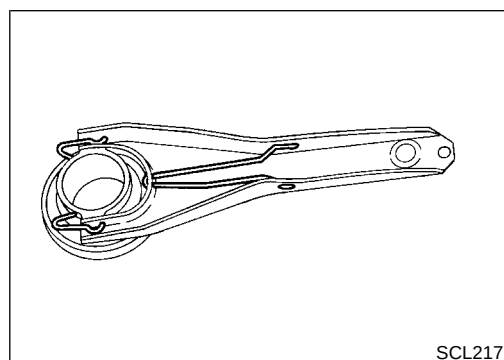
Removal and Installation

NMCL0014

- Remove release bearing.



- Install release bearing with suitable drift.



- Install retainer spring and holder spring.

CLUTCH RELEASE MECHANISM

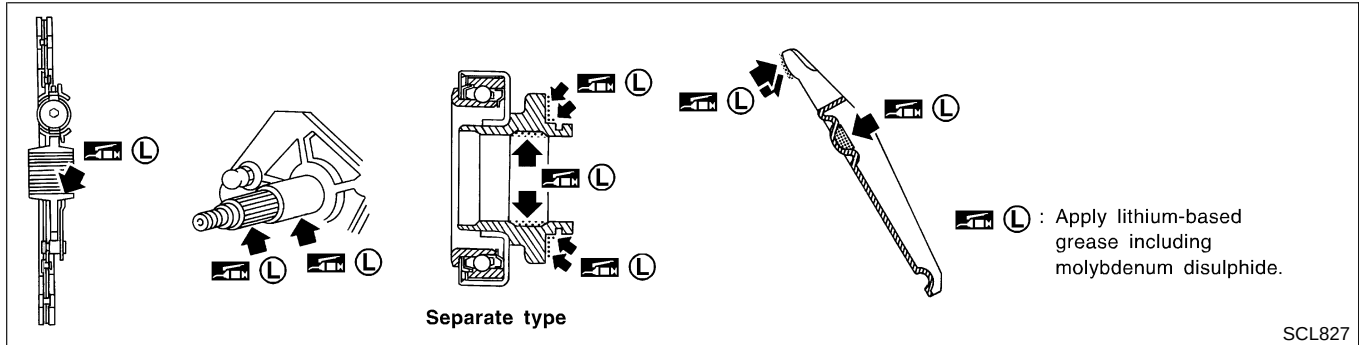
Inspection

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



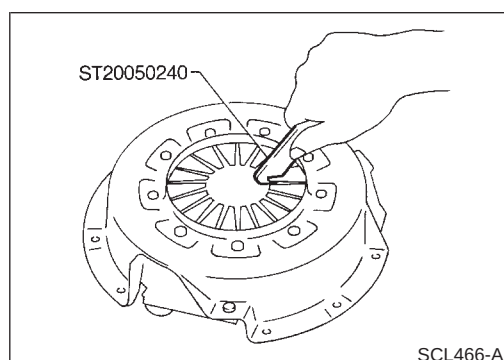
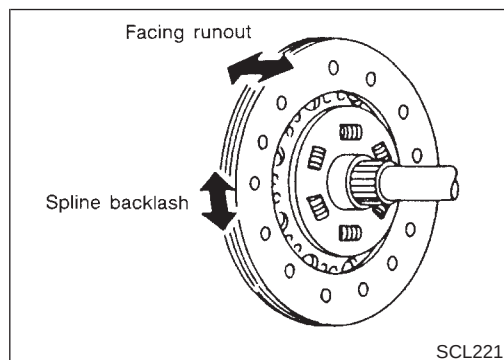
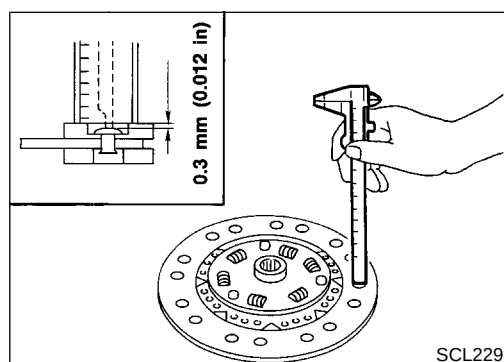
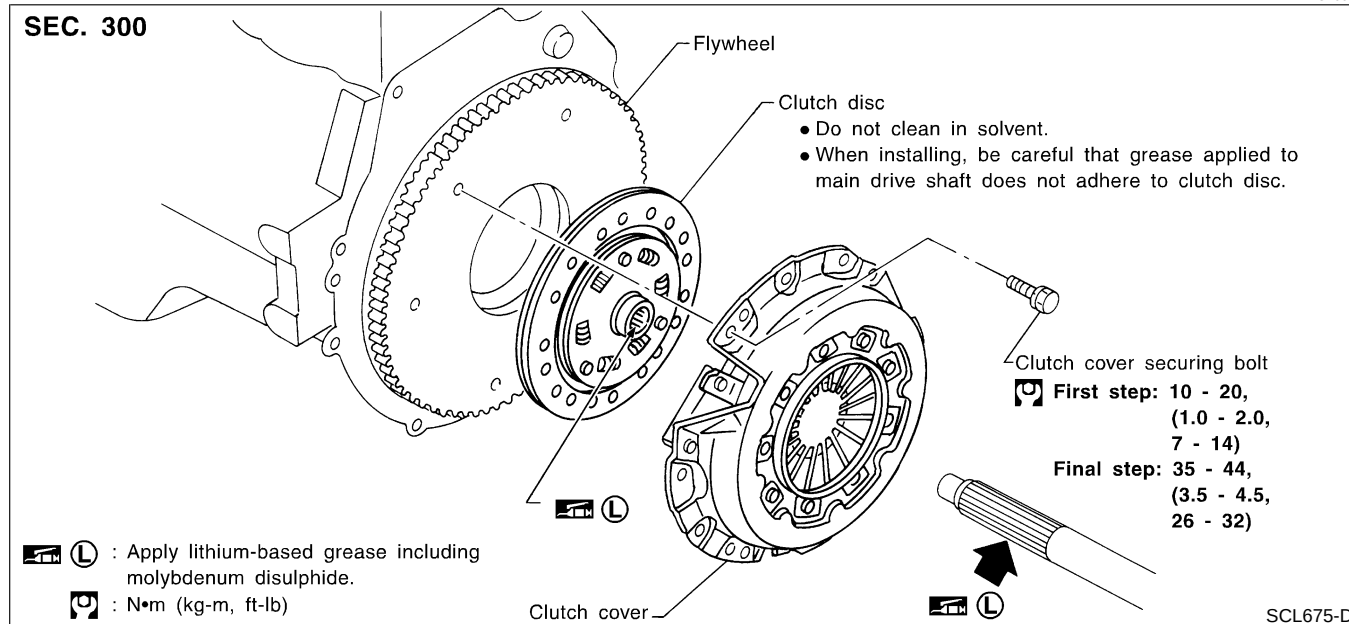
Lubrication

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

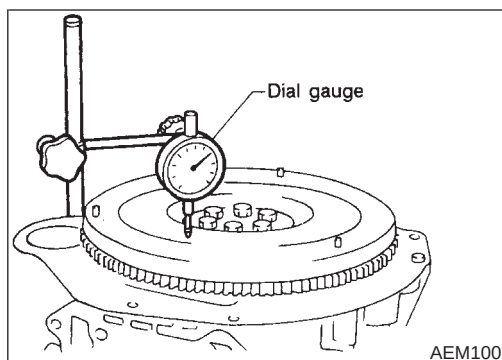
- Check clutch cover, installed on vehicle, for uneven diaphragm spring toe height.

Uneven limit:**0.7 mm (0.028 in)**

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

CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

Inspection and Adjustment (Cont'd)



FLYWHEEL INSPECTION

NMCL0019S03

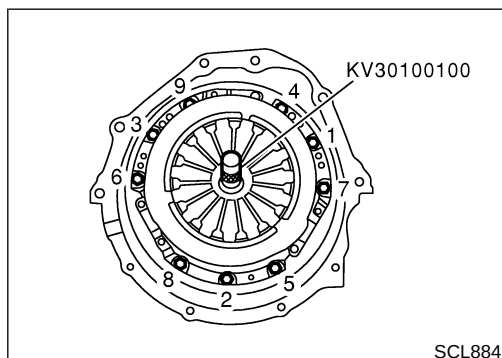
CAUTION:

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)

SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch Control System

Clutch Control System

NMCL0028

Type of clutch control	Hydraulic
------------------------	-----------

GI

Clutch Master Cylinder

NMCL0021

Inner diameter	15.87 mm (5/8 in)
----------------	-------------------

MA

Clutch Operating Cylinder

NMCL0022

Inner diameter	19.05 mm (3/4 in)
----------------	-------------------

EM

LC

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)

EC

FE

CL

MT

AT

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)

PD

AX

SU

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)

BR

ST

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

RS

BT

HA

SC

EL

IDX

NOTES