

CLUTCH

SECTION **CL**

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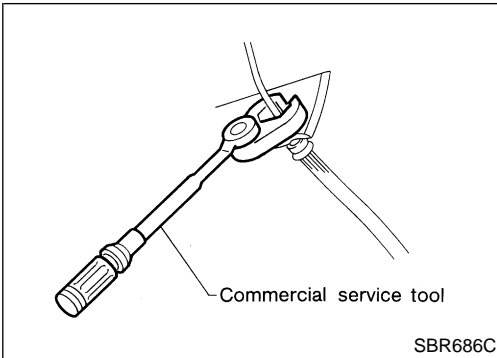
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PRECAUTIONS

Precautions



Precautions

NECL0001

- 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.

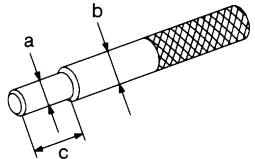
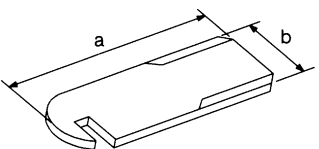
PREPARATION

Special Service Tools

Special Service Tools

NECL0002

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
ST20630000 (J26366) Clutch aligning bar	 <p>Installing clutch cover and clutch disc a: 15.9 mm (0.626 in) dia. b: 22.8 mm (0.898 in) dia. c: 55 mm (2.17 in)</p> NT405
ST20050240 (—) Diaphragm spring adjusting wrench	 <p>Adjusting unevenness of diaphragm spring of clutch cover a: 150 mm (5.91 in) b: 25 mm (0.98 in)</p> NT404

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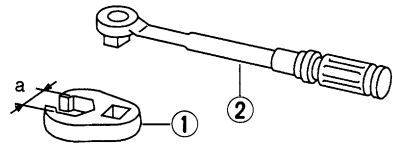
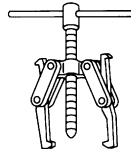
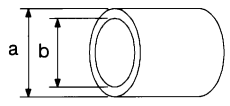
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Commercial Service Tools

NECL0003

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

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

NVH Troubleshooting Chart

NECL0027S01

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.

Reference page		CL-6	CL-7	CL-8	CL-9	EM-41 (KA24DE), EM-112 (VG33E & VG33ER)	CL-10	CL-12	CL-12	CL-12	CL-12	CL-12	CL-12	CL-12	CL-12	CL-12	CL-13	CL-13	CL-13	CL-13	
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	6	7		

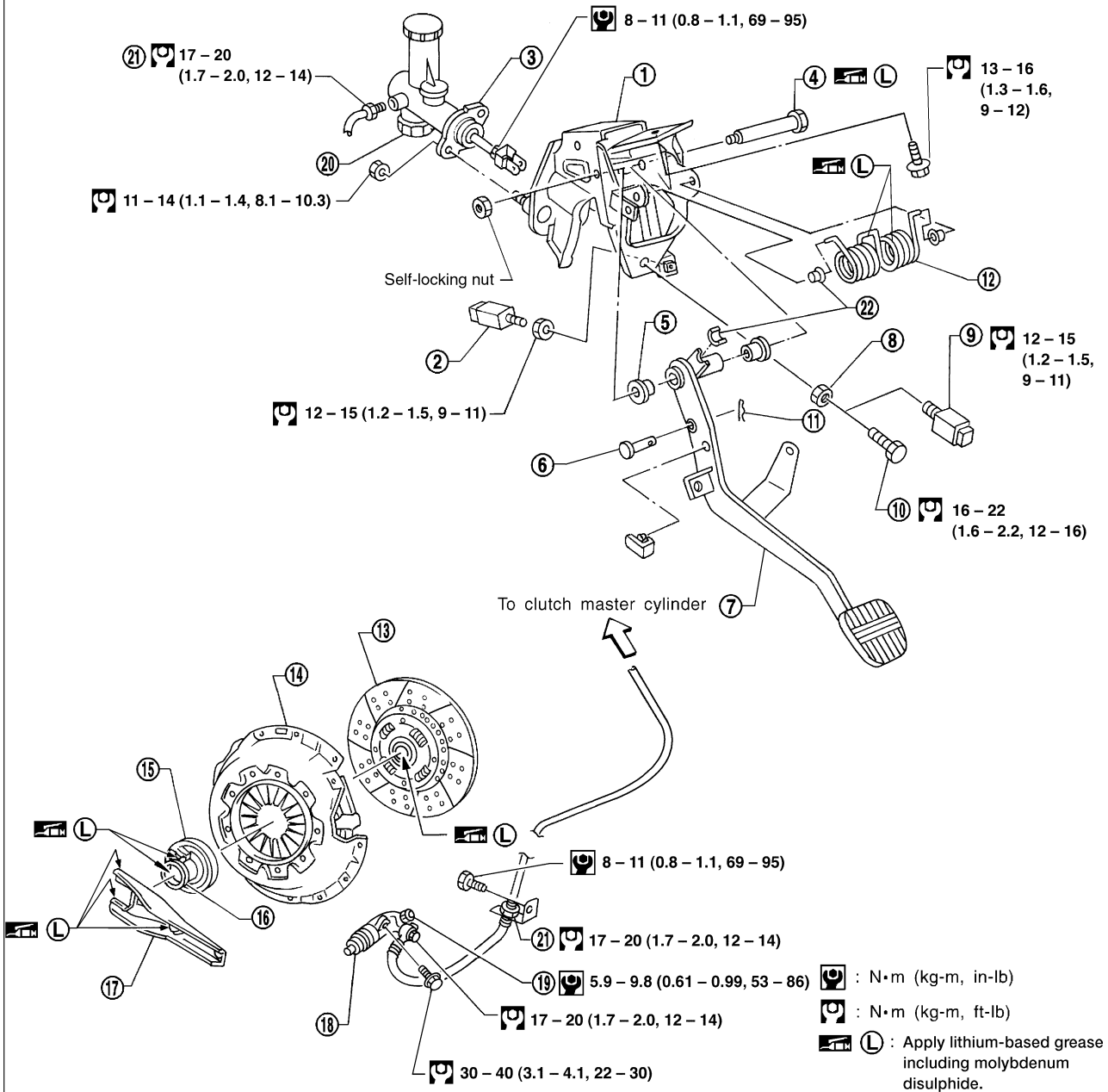
CLUTCH SYSTEM — HYDRAULIC TYPE

Components

Components

NECL0004

SEC. 300 • 305 • 306 • 465



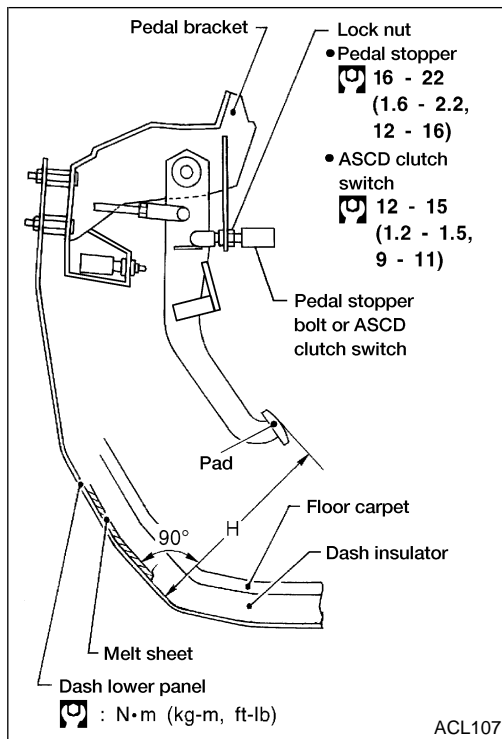
WCL044

- | | | |
|----------------------------|---------------------------------------|-------------------------------------|
| 1. Clutch pedal bracket | 9. ASCD cancel switch | 16. Release bearing sleeve |
| 2. Clutch interlock switch | 10. Pedal stopper bolt (without ASCD) | 17. Withdrawal lever |
| 3. Clutch master cylinder | 11. Snap pin | 18. Operating cylinder |
| 4. Fulcrum pin | 12. Assist spring | 19. Air bleeder |
| 5. Bushing | 13. Clutch disc | 20. Clutch damper (not serviceable) |
| 6. Clevis pin | 14. Clutch cover | 21. Flare nut |
| 7. Clutch pedal | 15. Release bearing | 22. Bushing |
| 8. Lock nut | | |

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CLUTCH SYSTEM — HYDRAULIC TYPE

Inspection and Adjustment



Inspection and Adjustment

ADJUSTING CLUTCH PEDAL

NECL0005

NECL0005S01

1. Adjust pedal height with pedal stopper bolt or ASCD cancel switch.

Pedal height "H":

KA24DE: 221 – 231 mm (8.70 – 9.09 in)

VG33E, VG33ER: 227 – 237 mm (8.94 – 9.33 in)

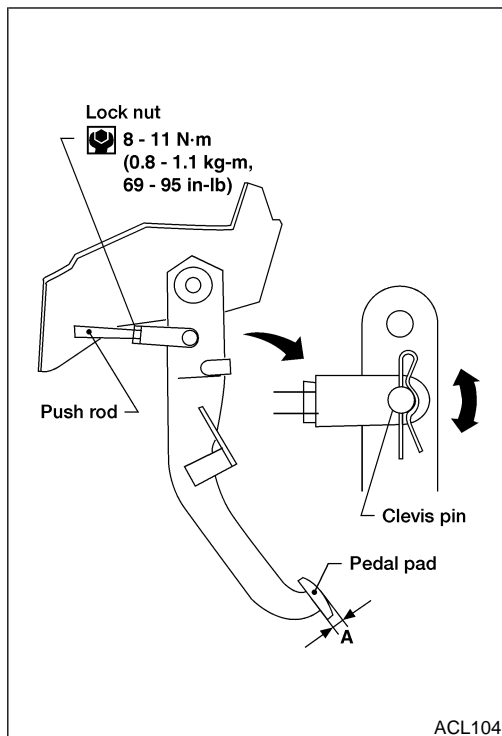
2. Adjust pedal free play with master cylinder push rod. Then tighten lock nut.

Pedal free play (measured at pedal pad) "A":

9 - 16 mm (0.35 - 0.63 in)

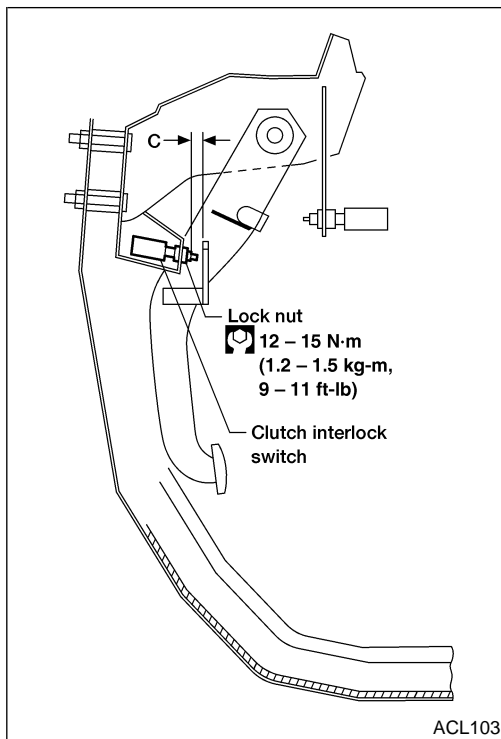
Pedal free play means the following total measured at position of pedal pad:

- Play due to clevis pin, clevis pin hole in clutch pedal and master cylinder.
3. Make sure that clevis pin can rotate smoothly. If not, readjust pedal free play with master cylinder push rod.



CLUTCH SYSTEM — HYDRAULIC TYPE

Inspection and Adjustment (Cont'd)



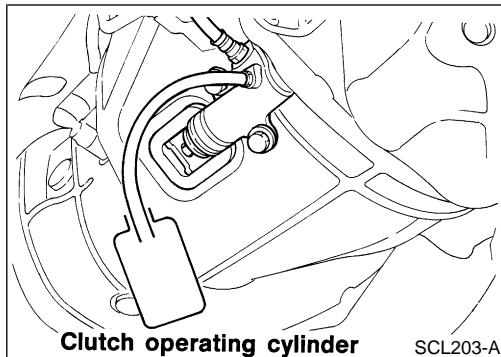
— Models with Clutch Interlock System —

NECL0005S0101

1. Adjust clearance "C" shown in the figure while fully depressing clutch pedal.

Clearance C:

0.1 - 1.0 mm (0.004 - 0.039 in)



AIR BLEEDING PROCEDURE

NECL0005S02

Bleed air according to the following procedure.

Bleed air from operating cylinder.

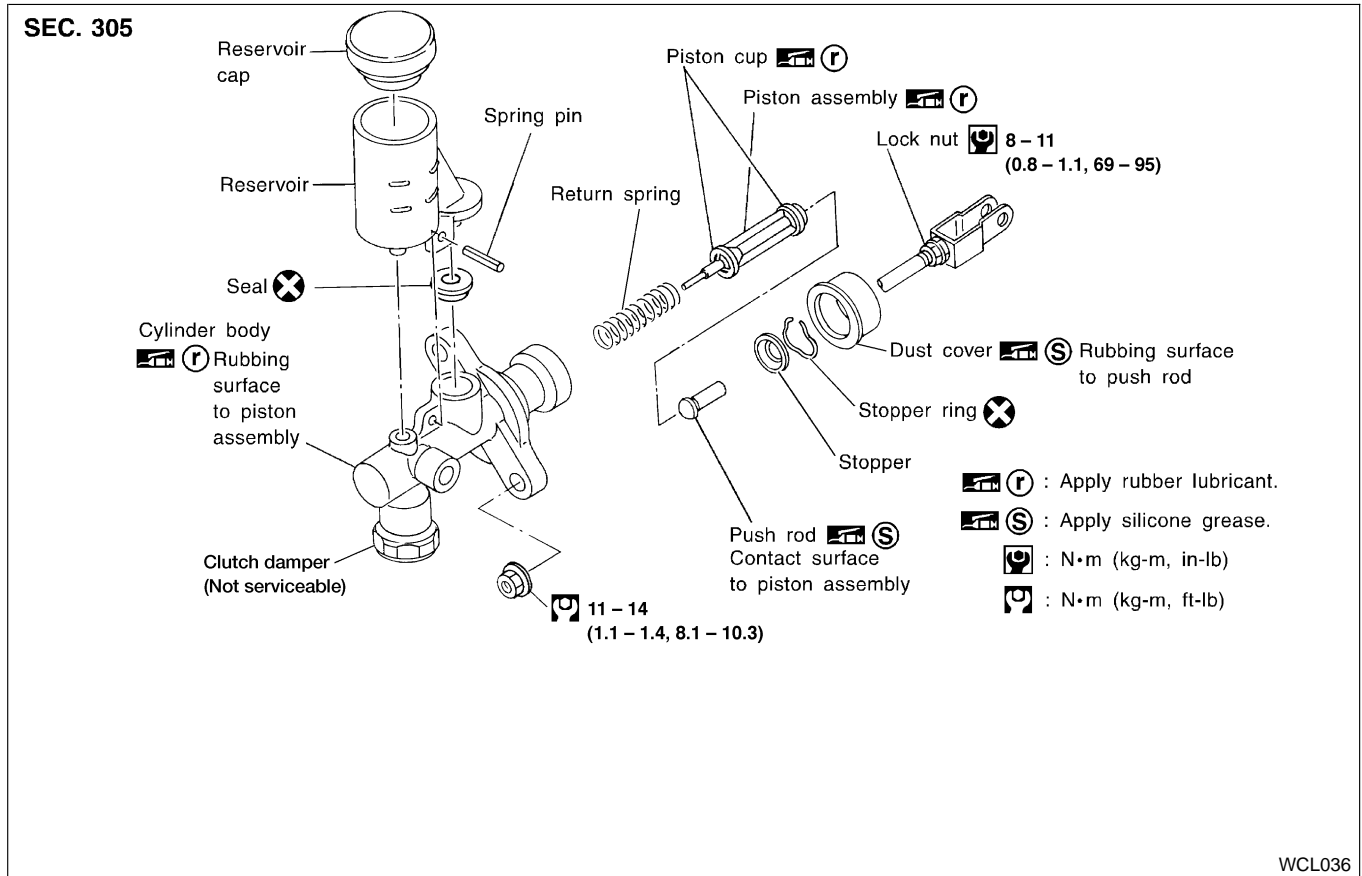
1. Fill the master cylinder reservoir tank with new brake fluid.
2. Connect a transparent vinyl hose to the air bleeder.
3. Slowly depress the clutch pedal to its full stroke length and release it completely. Repeat this operation several times at 2 to 3 second intervals.
4. Open the air bleeder with the clutch pedal fully depressed.
5. Close the air bleeder.
6. Release the clutch pedal and wait at least 5 seconds.
7. Repeat steps 3 through 6 above until air bubbles no longer appear in the brake fluid.

CLUTCH MASTER CYLINDER

Components

Components

NECL0006



Disassembly and Assembly

NECL0007

- Use a screwdriver to remove stopper ring while pushing push rod into cylinder.
- When installing stopper ring, tap in lightly while pushing push rod into cylinder.

Inspection

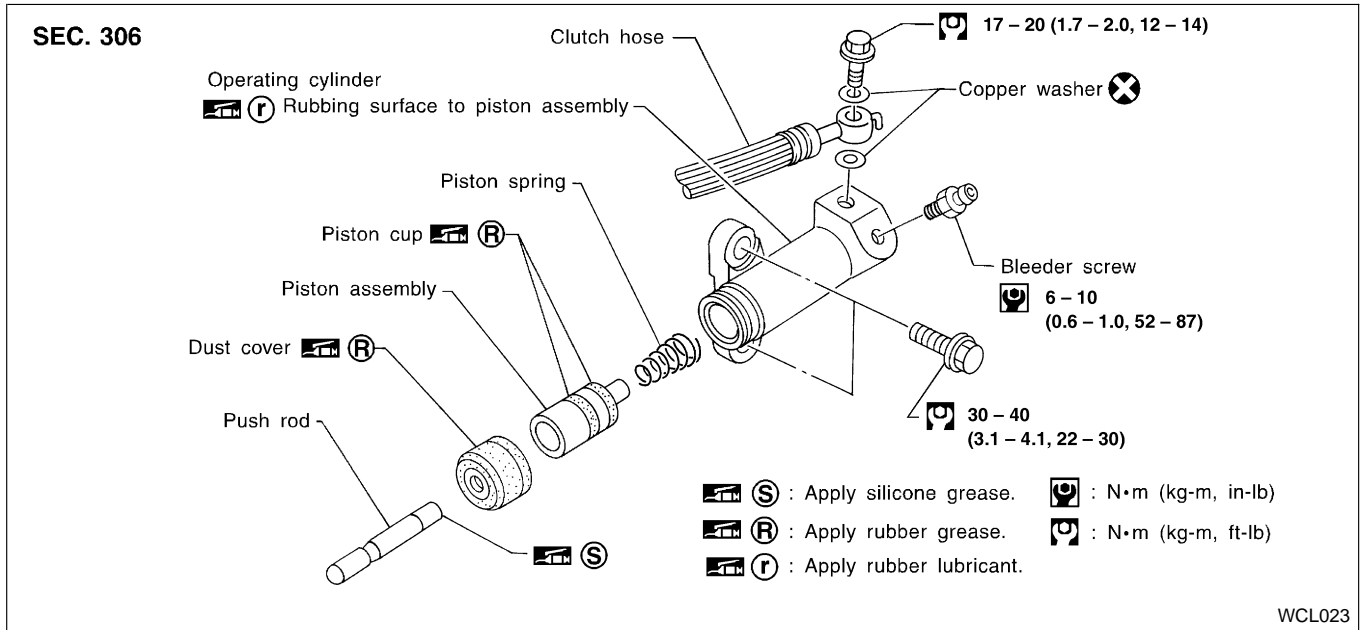
NECL0008

Check the following items, and replace if necessary.

- Rubbing surface of cylinder and piston, for uneven wear, rust or damage
- Piston with piston cup, for wear or damage
- Return spring, for wear or damage
- Dust cover, for cracks, deformation or damage
- Reservoir, for deformation or damage

Components

NECL0009



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Inspection

NECL0010

Check the following items, and replace if necessary.

- Rubbing surface of cylinder and piston, for uneven wear, rust or damage
- Piston with piston cup, for wear or damage
- Piston spring, for wear or damage
- Dust cover, for cracks, deformation or damage

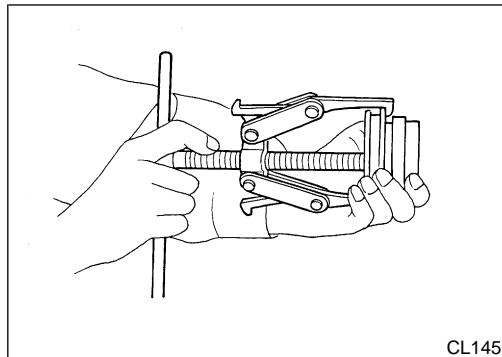
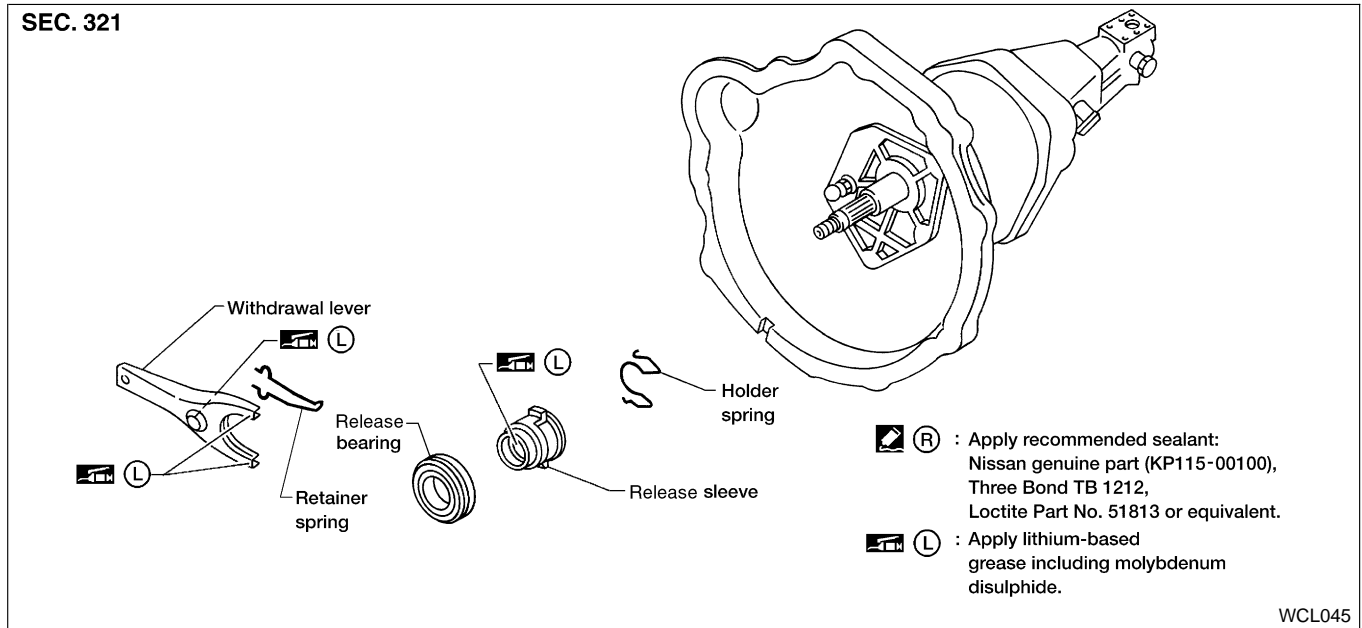
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CLUTCH RELEASE MECHANISM

Components

Components

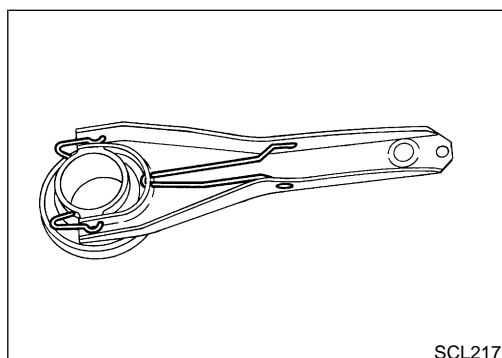
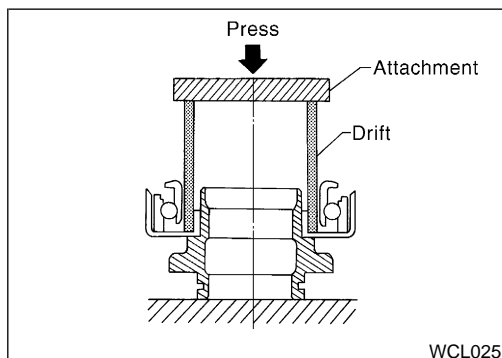
NECL0013



Removal and Installation

NECL0014

- Remove release bearing.
- Install release bearing with suitable drift.
- Install retainer spring and holder spring.



CLUTCH RELEASE MECHANISM

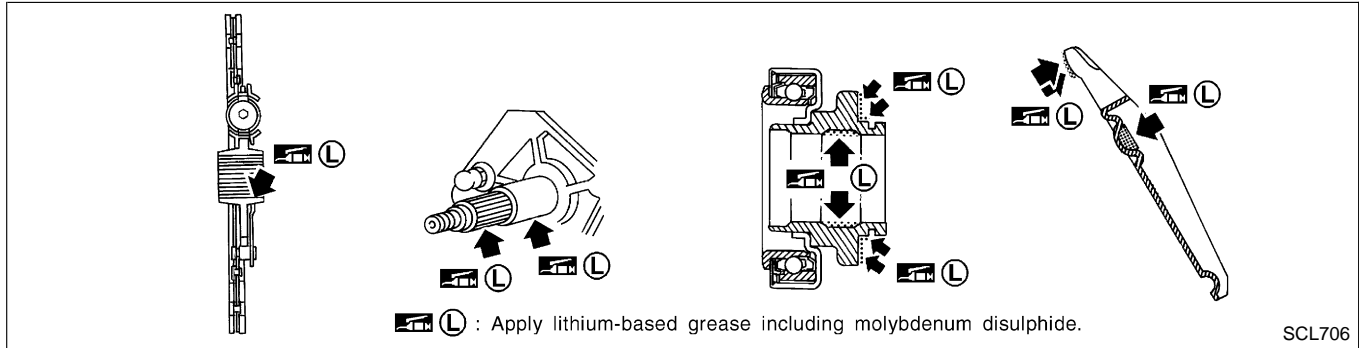
Inspection

Inspection

NECL0015

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



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Lubrication

NECL0016

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

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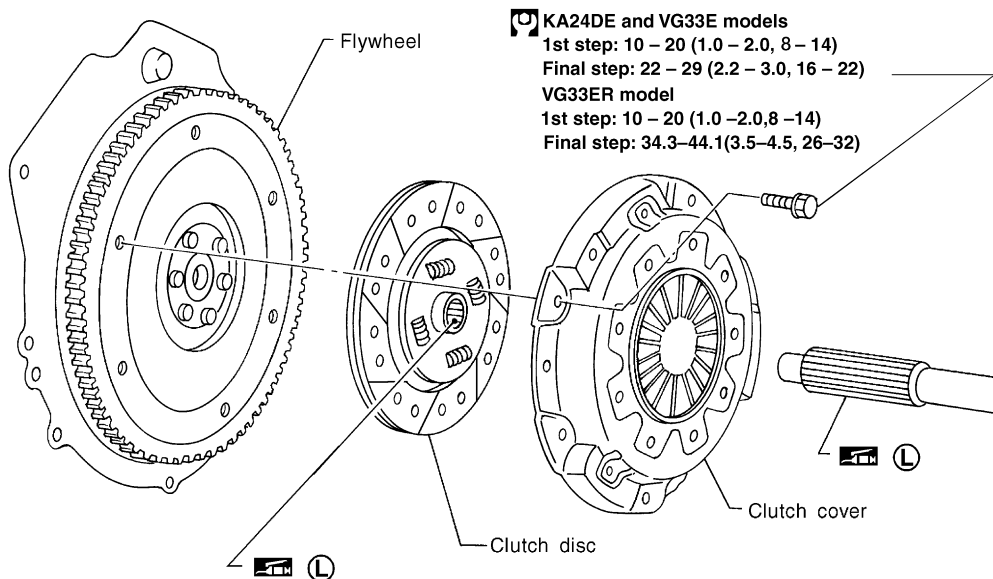
CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

Components

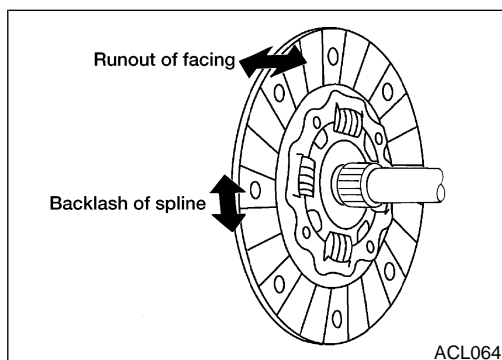
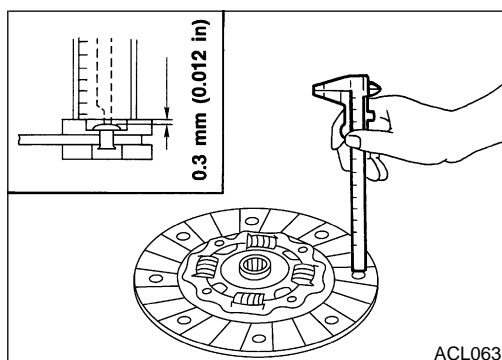
Components

NECL0018

SEC. 300



WCL034



Inspection and Adjustment

CLUTCH DISC

NECL0019

NECL0019S01

Check the following items, and replace if necessary.

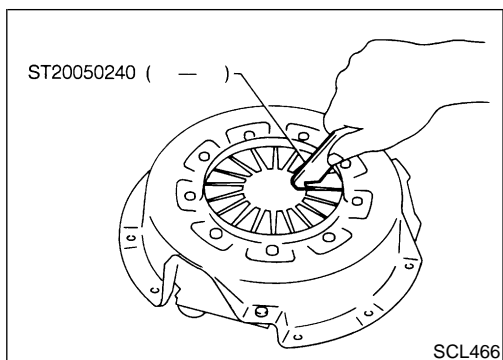
- Clutch disc, for burns, discoloration, oil or grease leakage
- Clutch disc, for wear of facing

**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 of facing limit (at outer edge of disc) :**
 1.0 mm (0.039 in)
- Distance of runout check point (from hub center) :**
Model 240: 115 mm (4.53 in)
Model 250: 120 mm (4.72 in)

CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

Inspection and Adjustment (Cont'd)



CLUTCH COVER AND FLYWHEEL

NECL0019S02

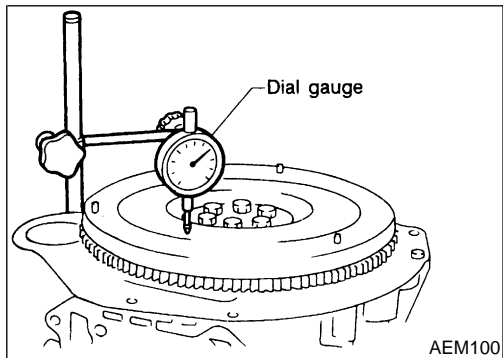
- Check clutch cover, installed on vehicle, for uneven diaphragm spring toe height.

Uneven limit:

KA24DE: 0.7 mm (0.028 in)

VG33E, VG33ER: 0.5 mm (0.0020 in)

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



FLYWHEEL INSPECTION

NECL0019S03

CAUTION:

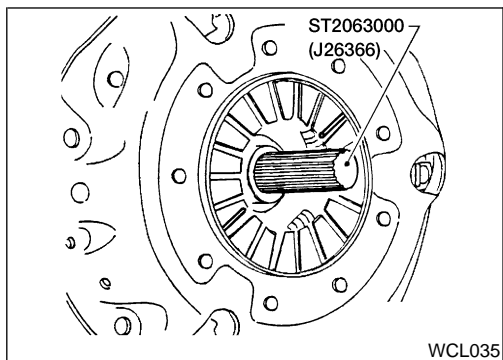
Do not allow any magnetic materials to contact the ring gear teeth.

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

- Check flywheel runout.

Maximum allowable runout:

Refer to *EM-52 (KA24DE)*, or *EM-123 (VG33E, VG33ER)*, "Flywheel/Drive Plate Runout".



Installation

NECL0020

- Apply recommended grease to contact surface of splines.
- **Too much lubricant may damage clutch disc facing.**
- Insert Tool into clutch disc hub when installing clutch cover and disc.
- Be careful not to allow grease to contaminate clutch facing.

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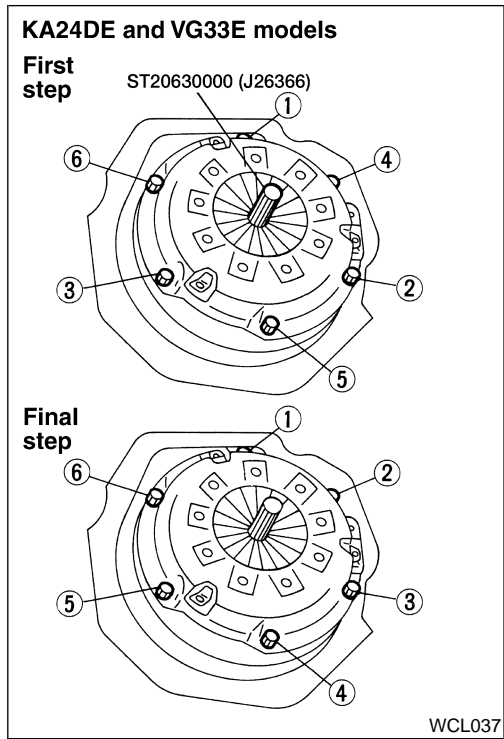
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CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

Installation (Cont'd)



- Tighten bolts in numerical order, in two steps.

KA24DE, VG33E models

First step:

: 10 - 20 N·m (1.0 - 2.0 kg·m, 8 - 14 ft·lb)

Final step:

: 22 - 29 N·m (2.2 - 3.0 kg·m, 16 - 22 ft·lb)

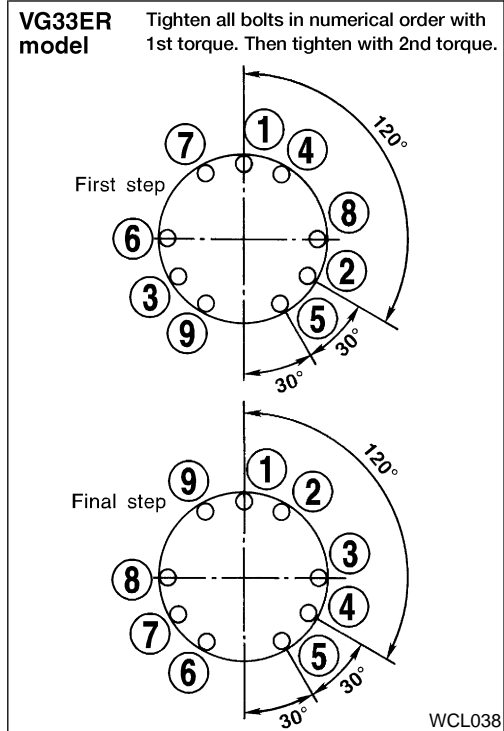
VG33ER model

First step:

: 10 - 20 N·m (1.0 - 2.0 kg·m, 8 - 14 ft·lb)

Final step:

: 34.3 - 44.1 N·m (3.5 - 4.5 kg·m, 26 - 32 ft·lb)



SERVICE DATA AND SPECIFICATIONS (SDS)

Clutch Control System

Clutch Control System

NECL0028

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

Clutch Master Cylinder (with clutch damper)

NECL0021

Inner diameter	15.87 mm (5/8 in)
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Clutch Operating Cylinder

NECL0022

Inner diameter	19.05 mm (3/4 in)
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Clutch Disc

NECL0029
Unit: mm (in)

Model	240	250
Engine	KA24DE	VG33E & VG33ER
Facing size (Outer dia. x inner dia. x thickness)	240 x 150 x 3.5 (9.45 x 5.90 x 0.138)	250 x 160 x 3.5 (9.84 x 6.30 x 0.138)
Thickness of disc assembly with load	7.75 - 8.25 (0.305 - 0.3248) with 4,903 N (500 kg, 1,103 lb)	8.1 - 8.5 (0.3189 - 0.3346) with 6,473 N (660 kg, 1,455 lb)
Wear limit of facing surface to rivet head	0.3 (0.012)	0.3 (0.012)
Runout limit of facing	1.0 (0.039)	1.0 (0.039)
Distance of runout check point (from hub center)	115 (4.53)	120 (4.72)
Maximum backlash of spline (at outer edge of disc)	1.0 (0.039)	1.0 (0.039)

Clutch Cover

NECL0030
Unit: mm (in)

Engine	KA24DE	VG33E	VG33ER	
Model	240	250	250	
Set-load	2WD	4,903 N (500 kg, 1,103 lb)	6,473 N (660 kg, 1,455 lb)	7,355 N (750 kg, 1,653 lb)
	4WD	—	6,473 N (660 kg, 1,455 lb)	7,355 N (750 kg, 1,653 lb)
Diaphragm spring height	37.5 - 39.5 (1.476 - 1.555)	36.5 - 38.5 (1.437 - 1.516)	39.5 - 41.5 (1.555 - 1.634)	
Uneven limit of diaphragm spring toe height	0.7 (0.028)	0.5 (0.020)	0.5 (0.020)	

Clutch Pedal

NECL0031
Unit: mm (in)

Engine	KA24DE	VG33E, VG33ER
Pedal height "H"	221 - 231 (8.70 - 9.09)	227 - 237 (8.94 - 9.33)
Pedal free play "A" (at pedal pad)	9 - 16 (0.35 - 0.63)	9 - 16 (0.35 - 0.63)
Clearance "C" between pedal stopper bracket and clutch pedal position switch (with clutch pedal fully depressed.)	0.1 - 1.0 (0.004 - 0.039)	0.1 - 1.0 (0.004 - 0.039)

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

NOTES