SECTION CL
CLUTCH

CONTENTS

QG18DE

QR25DE

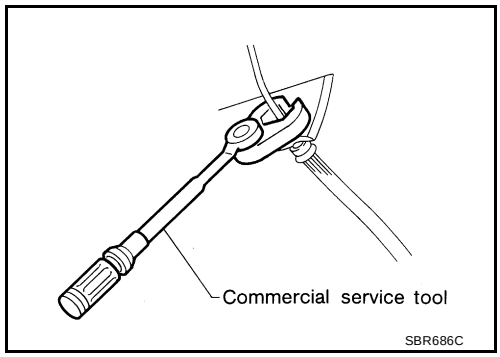
PRECAUTIONS

PFP:00001

Precautions

ECS00489

- **Recommended fluid is brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**
- **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.**
- **Use flare nut wrench when removing or installing clutch hydraulic tubes.**
- **Use new brake fluid to clean or wash all parts of master cylinder and operating 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.

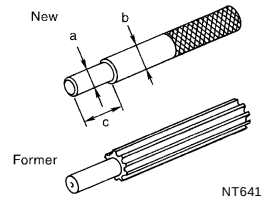
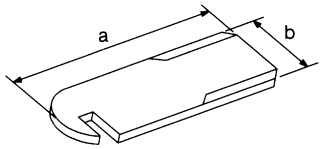
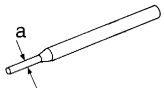
PREPARATION

PFP:00002

Special Service Tools

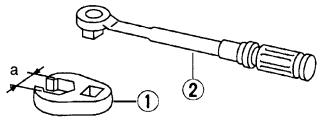
ECS0048A

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
KV30101600 (New) KV30101000 (Former) (J-33213) Clutch aligning bar  NT641	Installing clutch cover and clutch disc **a: 15.9 mm (0.626 in) dia.** **b: 17.9 mm (0.705 in) dia.** **c: 40 mm (1.57 in)**
ST20050240 (—) Diaphragm spring adjusting wrench  S-NT404	Adjusting unevenness of diaphragm spring of clutch cover **a: 150 mm (5.91 in)** **b: 25 mm (0.98 in)**
KV32101000 (J-25689-A) Pin punch  S-NT410	Removing and installing spring pin **a: 4 mm (0.16 in) dia.**

Commercial Service Tools

ECS0048B

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Removing and installing clutch piping **a: 10 mm (0.39 in)**

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ECS0048C

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

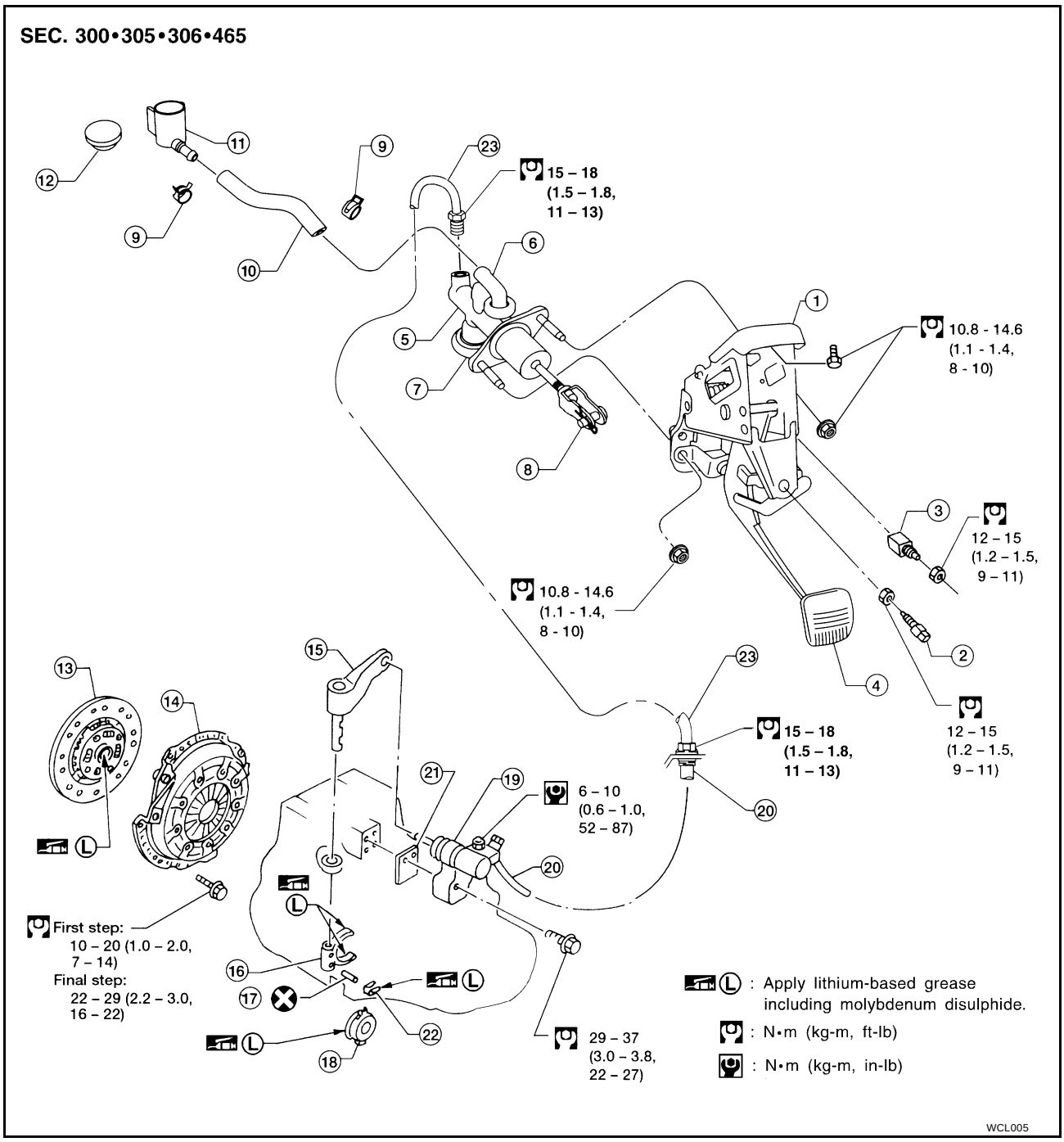
Reference page		CL-7	CL-7	CL-9	CL-11	EM-54, "Removal and Installation"	CL-14	CL-17							CL-17	CL-18				CL-18
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Inspection and adjustment)	CLUTCH LINE (Air in line)	MASTER CYLINDER PISTON CUP (Damaged)	OPERATING CYLINDER PISTON CUP (Damaged)	ENGINE MOUNTING (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)	CLUTCH COVER (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	

CLUTCH SYSTEM

PFP:30502

Components

ECS0048D



1. Clutch pedal bracket
2. ASCD clutch switch (if equipped)
3. Clutch interlock switch
4. Clutch pedal
5. Clutch master cylinder
6. Nipple
7. Clutch damper (not serviceable)
8. Clevis
9. Hose clamp
10. Reservoir hose
11. Reservoir tank
12. Reservoir cap
13. Clutch disc
14. Clutch cover
15. Withdrawal lever
16. Clutch lever
17. Spring pin
18. Release bearing
19. Operating cylinder
20. Clutch hose
21. Spacer
22. Release bearing spring
23. Clutch tube

Inspection and Adjustment

ECS0048E

ADJUSTING CLUTCH PEDAL

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

b. Tighten the lock nut.

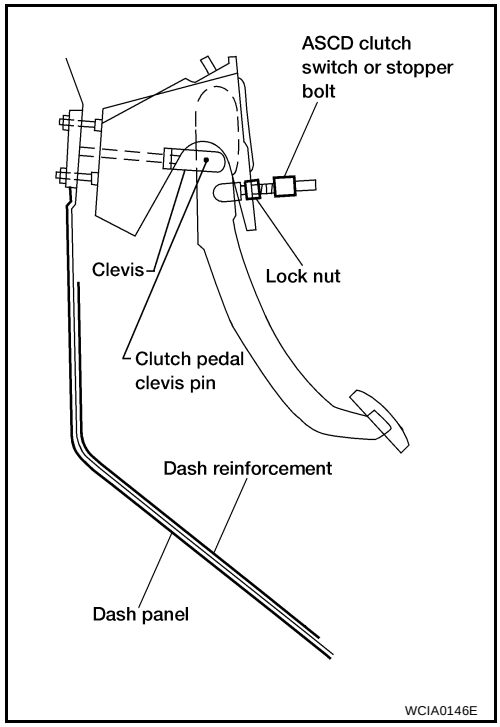
c. Verify that the clutch pedal clevis pin floats freely in the bore of the clutch pedal. It should not be bound by the clevis or clutch pedal.

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

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

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

b. If any sticking is noted, replace the related parts (clutch pedal, pedal bracket, assist spring, bushing, etc.). Reassemble the pedal and re-verify that the clevis pin floats freely in the bore of the pedal.



3. Adjust the clearance “C” while fully depressing the clutch pedal (with the clutch interlock switch) as shown.

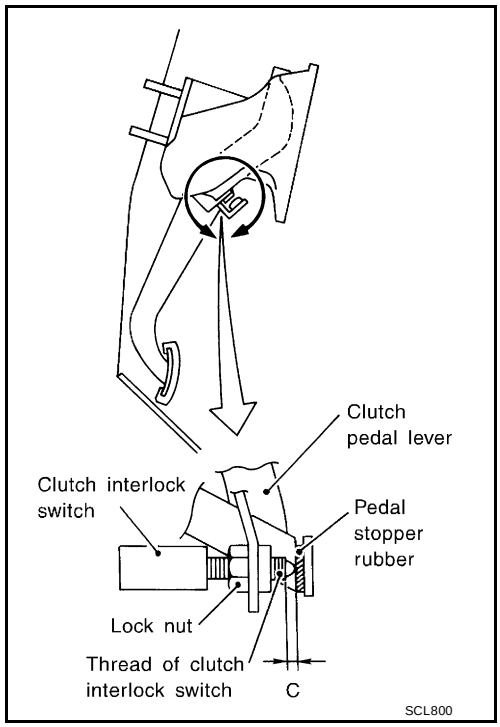
Clearance "C" : 0.1 - 1.0 mm (0.004 - 0.039 in)

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

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

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

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 of the air from the system.



BLEEDING PROCEDURE

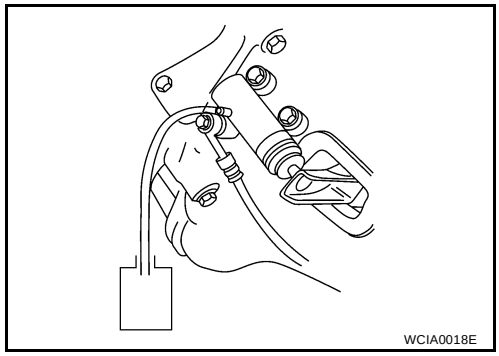
CAUTION:
Carefully monitor fluid level at master cylinder during bleeding operation.

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.

1. Top off reservoir with recommended 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. Connect a transparent vinyl tube to air bleeder valve to drain the fluid into a clean container.
3. Slowly depress the clutch pedal to its full stroke and release it completely. Repeat this operation several times at 2 to 3 seconds intervals.
4. Open the air bleeder valve with the clutch pedal fully depressed.



5. Close the air bleeder valve.

Air bleeder valve tightening torque : 5.9 - 9.8 N·m (0.6 - 1.0 kg-m, 52 - 87 in-lb)

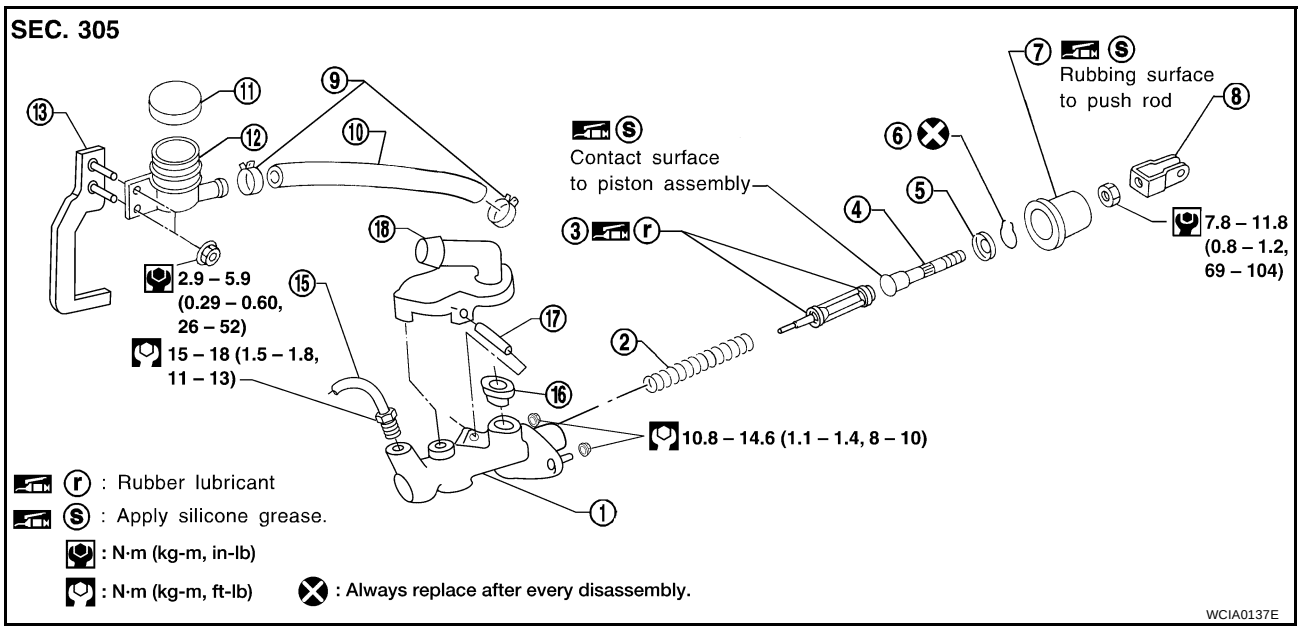
6. Release the clutch pedal and wait at least 5 seconds.
7. Repeat steps 1 through 6 above until air bubbles no longer appear at the air bleeder valve in the brake fluid.

CLUTCH MASTER CYLINDER

PFP:30610

Components

ECS0048F



1.	Master cylinder body	2.	Return spring	3.	Piston assembly seals
4.	Push rod	5.	Stopper	6.	Stopper ring
7.	Dust cover	8.	Clevis	9.	Hose clamps
10.	Reservoir hose	11.	Reservoir cap	12.	Reservoir tank
13.	Bracket	14.	Clutch damper (not serviceable)	15.	Clutch tube
16.	Seal	17.	Pin	18.	Nipple

Removal

ECS0048G

1. Drain brake fluid from clutch system.

   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 flare nut using a flare nut wrench.
3. Remove reservoir hose.
4. Remove the snap pin from the clevis pin and remove the clutch pedal from the clevis.
5. Unscrew master cylinder nuts and reservoir tank bracket nuts to remove master cylinder from the vehicle.

Installation

ECS0048H

1. Install the reservoir hose.
2. Connect clutch tube to master cylinder, and hand-tighten the flare nut.
3. Install the master cylinder to the cowl, and tighten the master cylinder nuts to the specified torque.

   Master cylinder nuts : 10.8 - 14.6 N·m (1.1 - 1.4 kg-m, 8 - 10 ft-lb)
4. Tighten reservoir tank bracket nuts to the specified torque.

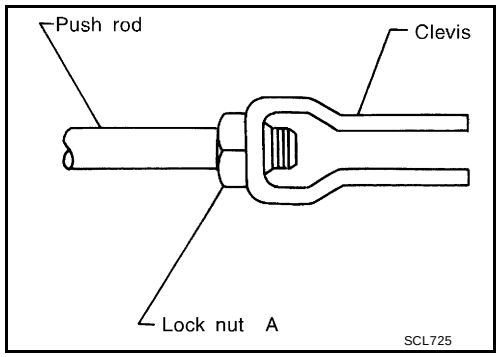
   Reservoir tank bracket nuts : 2.9 - 5.9 N·m (0.29 - 0.60 kg-m, 26 - 52 in-lb)
5. Tighten clutch tube flare nut using a flare nut torque wrench to the specified torque.

   Clutch flare tube nut : 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
6. After installing the clevis pin, install the snap pin to connect the clutch pedal to the push rod.
7. After finishing the operation, bleed the air from the clutch piping. Refer to CL-7, "BLEEDING PROCEDURE" .

Disassembly

ECS0048I

1. Loosen push rod lock nut "A" to remove clevis and lock nut "A".
2. Remove dust cover.
3. 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.
4. Remove piston assembly from cylinder body.
5. Remove return spring.
6. Remove pin using pin punch, then remove nipple and seal.



Inspection

ECS0048J

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 or deformation of the dust cover

Assembly

ECS0048K

1. Install the return spring.
2. Apply rubber lubricant to the sliding part of piston assembly, and insert piston assembly into cylinder body.
3. 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.
4. Apply silicone grease, and install dust cover.
5. Install clevis to push rod, and tighten lock nut "A" to the specified torque.

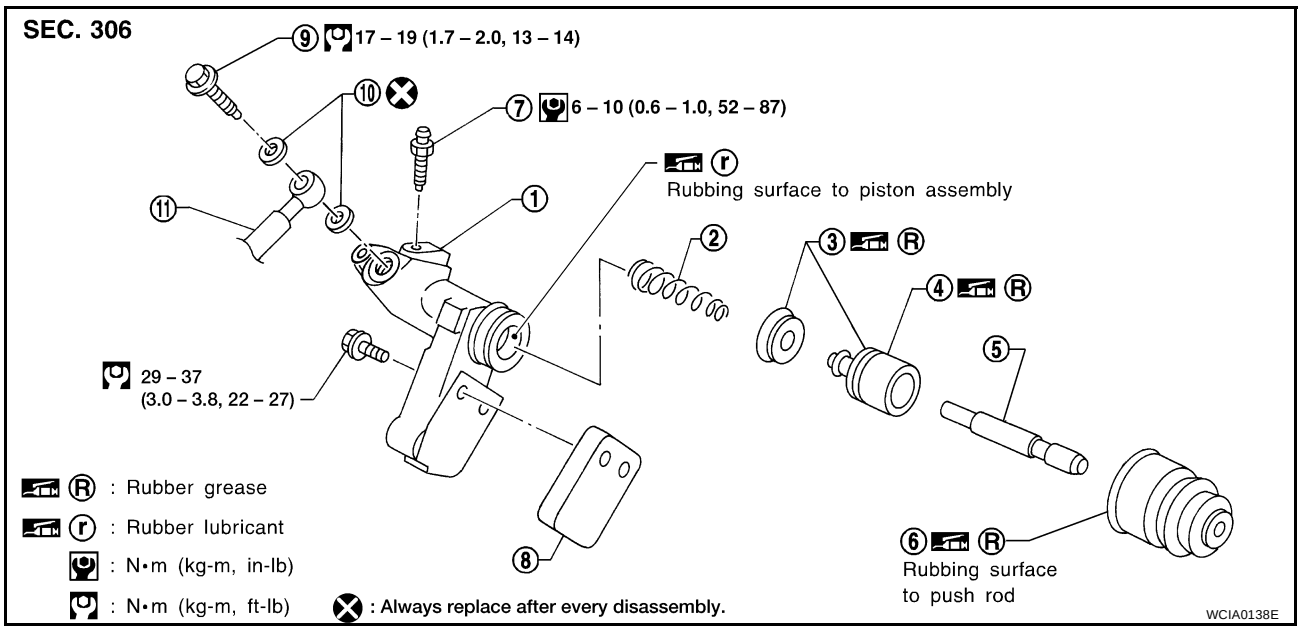
   Lock nut "A" : 7.8 - 11.8 N·m (0.8 - 1.2 kg-m, 69 - 104 in-lb)
6. Install seal and nipple to cylinder body, and install pin using a pin punch.

OPERATING CYLINDER

PFP:30620

Components

ECS0048L



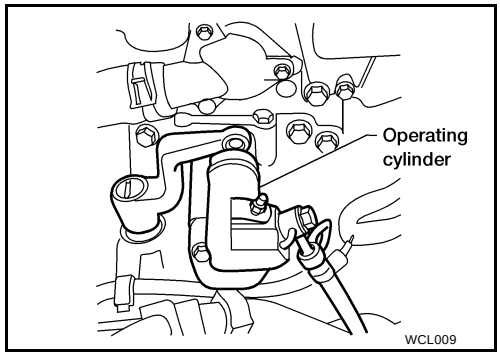
1. Cylinder body
2. Piston spring
3. Piston cup
4. Piston
5. Push rod
6. Dust cover
7. Air bleeder
8. Spacer
9. Union bolt
10. Copper washer
11. Clutch hose

Removal

ECS0048M

1. Drain brake fluid from clutch system.

   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

ECS0048N

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

Inspection

ECS0048O

Inspect for the 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 or deformation of dust cover

Assembly

ECS0048P

1. Apply rubber lubricant to the overall inside surface of the cylinder body. Also, apply rubber grease to the piston.

2. Install the piston assembly into the cylinder body. Make sure tapered piston spring is installed correctly.
3. Install dust cover.

Installation

ECS0048Q

Install the components in the reverse order of removal. Follow 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 CL-7, "BLEEDING PROCEDURE" .**

PIPING

PFP:00000

Removal

ECS0048R

1. Remove air cleaner and air duct.
2. Drain brake fluid from clutch system.

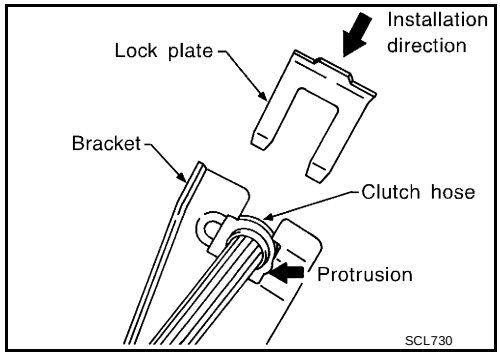
CAUTION:
Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

3. Remove flare nut from cylinder body using a flare nut wrench.
4. Remove clutch hose from operating cylinder.
5. Remove clutch hose and clutch tube from bracket by removing lock plate.

Installation

ECS0048S

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.

Flare nut : 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 the clutch hose bolt to the specified torque.

Clutch hose bolt : 17 - 19 N·m (1.7 - 2.0 kg-m, 13 - 14 ft-lb)

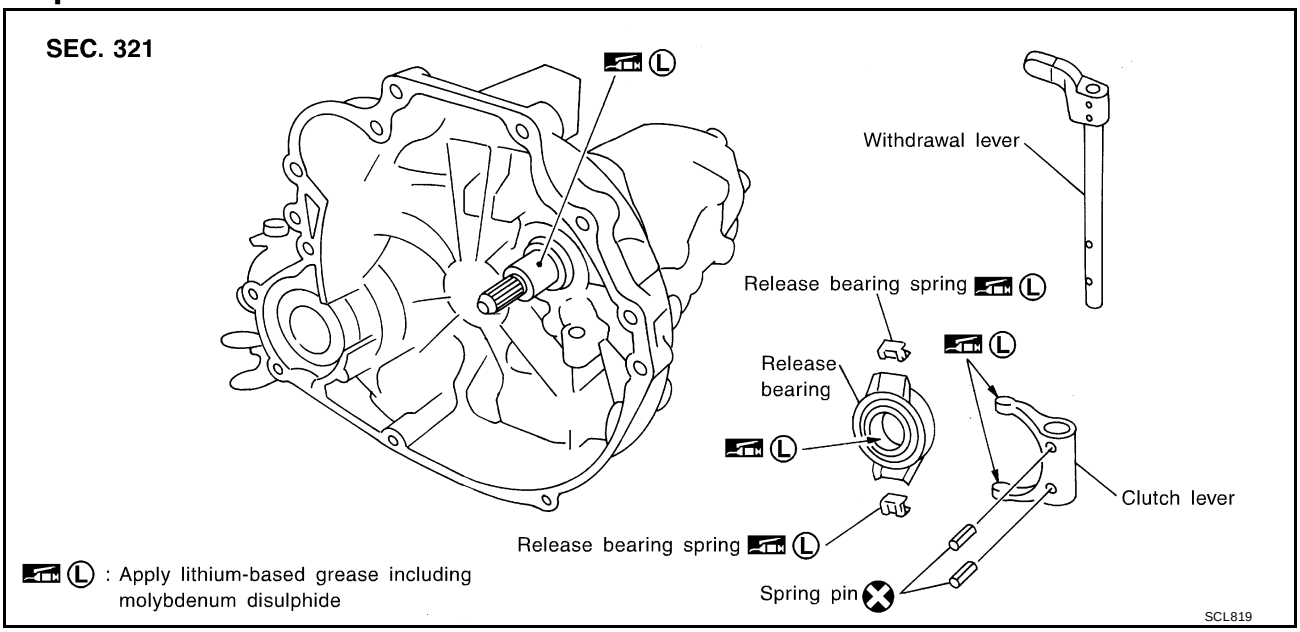
4. Bleed air from the clutch piping. Refer to CL-7, "BLEEDING PROCEDURE" .
5. Install air cleaner and air duct.

CLUTCH RELEASE MECHANISM

PFP:30502

Components

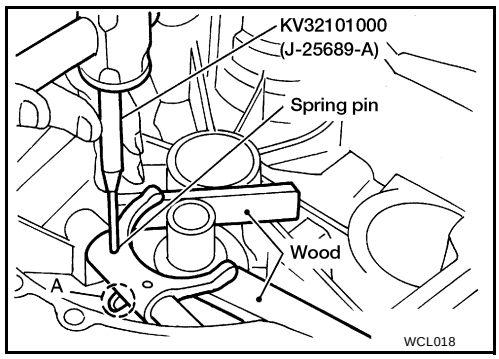
ECS0048T



Removal

ECS0048U

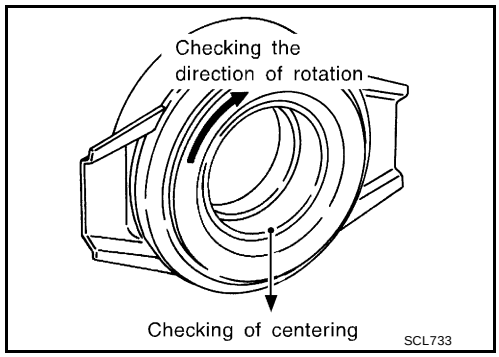
1. Remove manual transaxle from vehicle. Refer to MT-16, "Removal and Installation" for RS5F70A, MT-80, "Removal and Installation" for RS5F51A, or MT-139, "Removal and Installation" for RS6F51H.
2. Move withdrawal lever enough to remove release bearing and release bearing spring, and remove release bearing from clutch lever.
3. Support clutch lever claws with an appropriate wood block, align retaining pin with A in the figure, and drive out spring pins using a pin punch.
4. Pull out withdrawal lever and remove clutch lever from clutch housing.



Inspection

ECS0048V

- 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 clutch lever if its contact surface is worn abnormally.



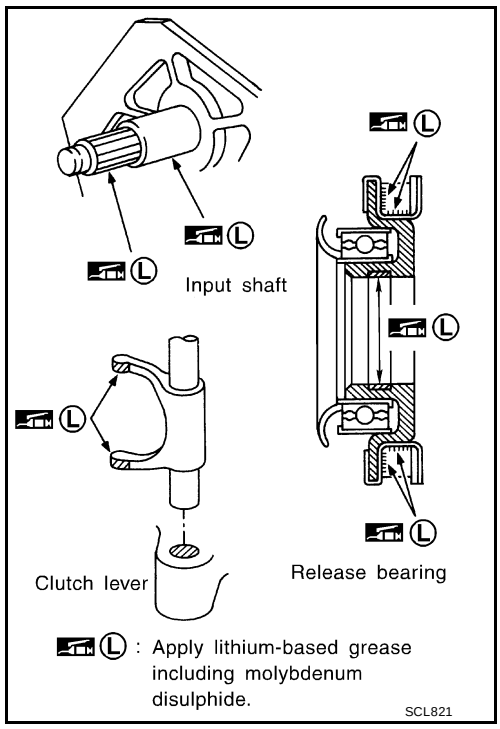
Installation

ECS0048W

CAUTION:

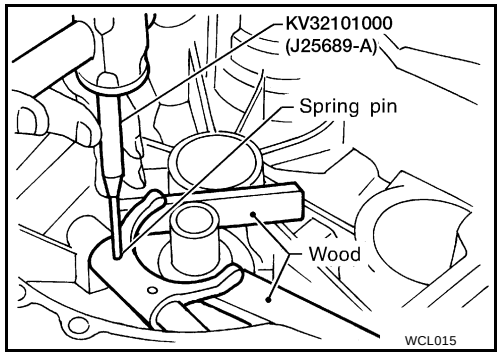
- **Be sure to apply grease to the clutch components. Otherwise, abnormal noise, poor clutch disengagement, or clutch damage may occur. Wipe the excess grease off completely, because it may cause the clutch components to slip and shudder.**
- **Keep the clutch disc facing, pressure plate, and flywheel free of oil and grease.**

- **Clean old grease and abrasive materials off the grease application area.**
- **Apply approximately 1 mm (0.04 in) thick clutch sleeve grease evenly on the sliding part of the clutch lever and the release bearing spring.**
- **Apply just enough clutch sleeve grease to fill up the release bearing inner groove.**
- **Apply the clutch grease to the clutch disc and the input shaft spline. Install the clutch disc to the input shaft, remove the excess grease around the shaft, and remove the clutch disc.**
- **Lightly and evenly apply the clutch sleeve grease on the sliding part of the release bearing, install the release bearing, remove the excess grease around the bearing, and remove the release bearing.**

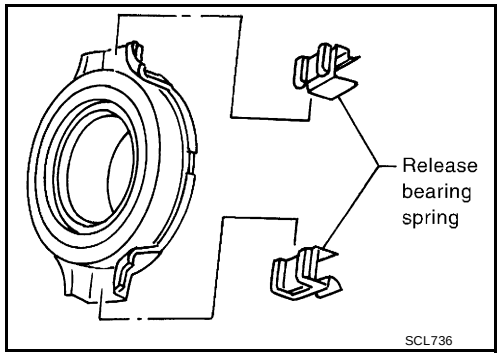


1. Assemble clutch lever to clutch housing, and insert withdrawal lever.
2. Support clutch lever claws with an appropriate wood block, and install new spring pins using a pin punch.

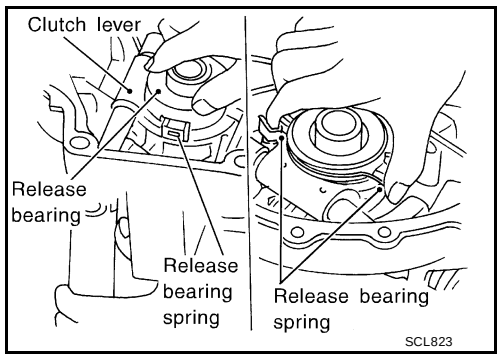
   CAUTION:
   Spring pins cannot be reused.



3. Install release bearing springs to release bearing as shown in the figure.

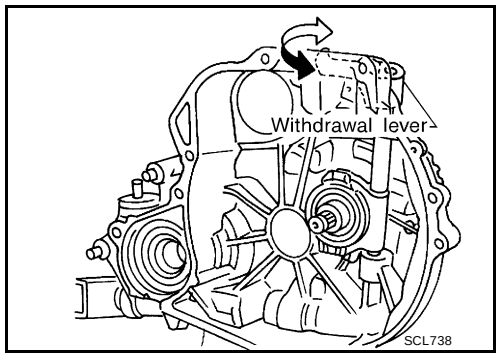


4. Operate withdrawal lever manually, press clutch spring from both sides, and install release bearing to clutch lever securely.
5. Make sure a click is heard when release bearing spring is pressed from both sides.



6. Make sure all parts operate smoothly when operating withdrawal lever.
7. Install manual transaxle. Refer to MT-16, "Removal and Installation" for RS5F70A, MT-80, "Removal and Installation" for RS5F51A, or MT-139, "Removal and Installation" for RS6F51H.

   CAUTION:
   Remove any excess grease with a shop towel.

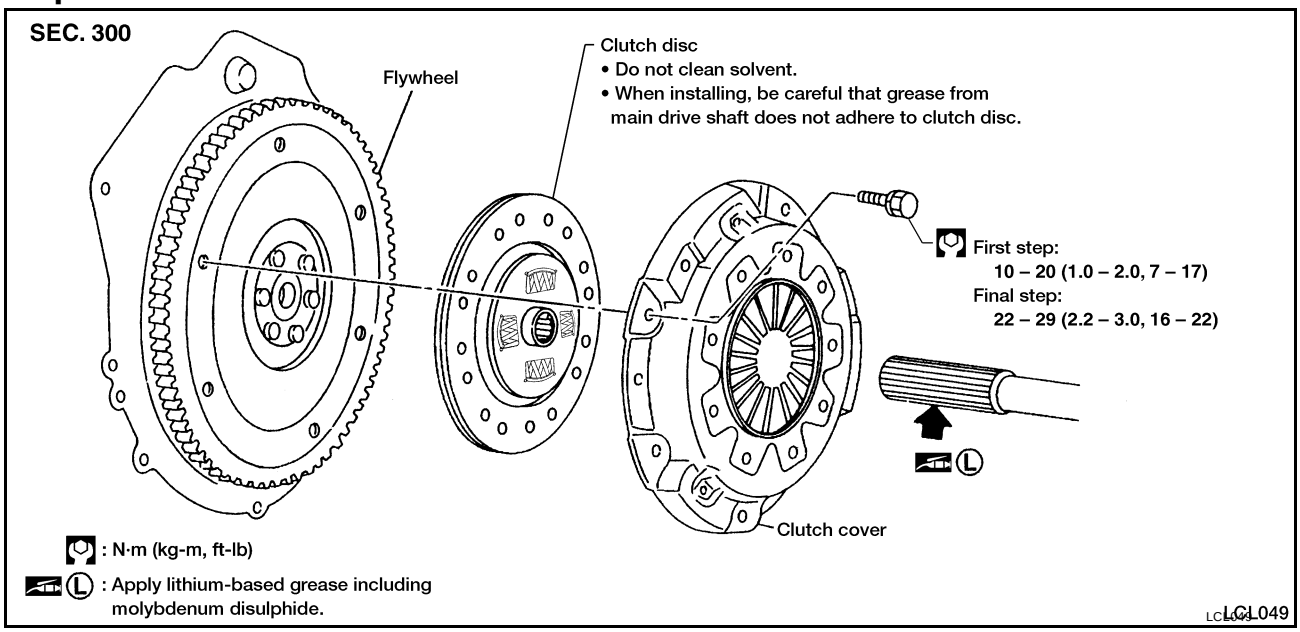


CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

PFP:30100

Components

ECS0048X



NOTE:
The following operations are with manual transaxle removed from vehicle.

Removal

ECS006S4

1. Evenly loosen the clutch cover bolts, then remove the clutch cover and clutch disc.

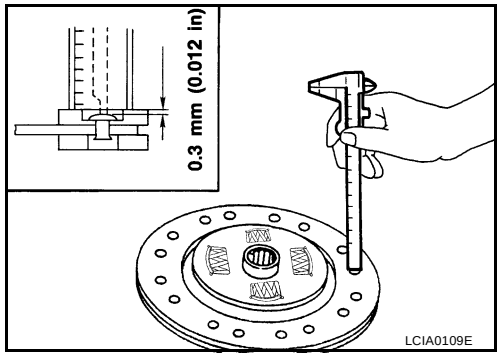
Inspection and Adjustment

ECS0048Y

CLUTCH DISC

- Check clutch disc for wear of facing.

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

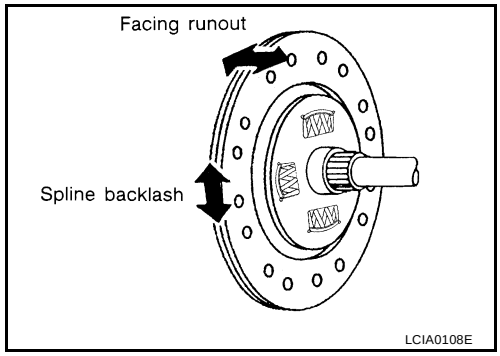


- Check clutch disc for backlash of spline and runout of facing.

  Maximum backlash of spline (at outer edge of disc) : 0.9 mm (0.035 in)

  Runout limit : 1.0 mm (0.039 in)

  Distance of runout check point (from hub center) : 102.5 mm (4.04 in)



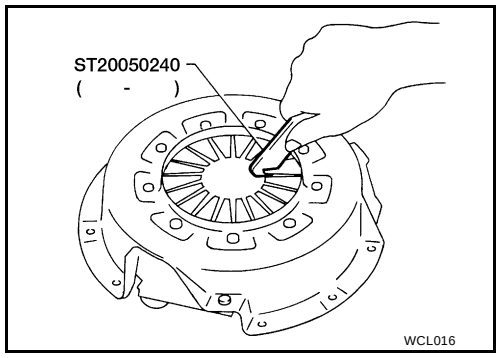
- Check clutch disc for burns, discoloration or oil or grease leakage. Replace if necessary.

CLUTCH COVER

Check clutch cover installed on vehicle for unevenness of diaphragm spring toe height.

Uneven limit : 0.88 mm (0.0346 in)

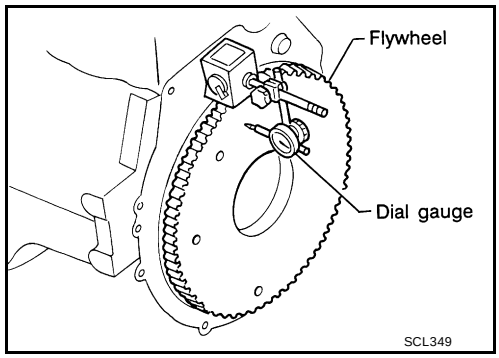
If out of limit, adjust the height with Tool.



FLYWHEEL

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

Maximum allowable runout : Refer to EM-68, "FLYWHEEL RUNOUT" .



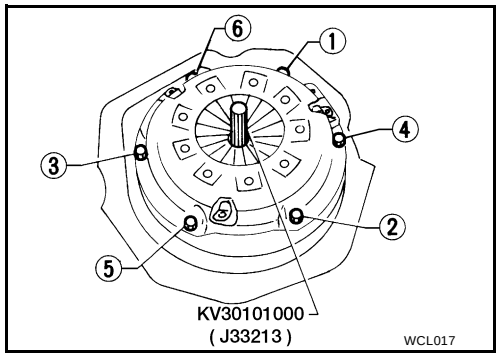
Installation

ECS0048Z

1. Insert Tool into clutch disc hub when installing clutch cover and disc.

   CAUTION:
   Be careful not to allow grease to contaminate clutch facing.
2. Tighten the clutch cover bolts in numerical order in 2 steps to specification.

   First step : 10 - 20 N·m (1.0 - 2.0 kg-m, 7 - 14 ft-lb)
   Final step : 22 - 29 N·m (2.2 - 3.0 kg-m, 16 - 22 ft-lb)



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Clutch Control System

ECS00490

Type of clutch control	Hydraulic

Clutch Master Cylinder

ECS00491

Unit: mm (in)

Inner diameter	15.87 (5/8)

Clutch Operating Cylinder

ECS00492

Unit: mm (in)

Inner diameter	19.05 (3/4)

Clutch Disc

ECS00493

Unit: mm (in)

Engine model		QG18DE
Model		215
Facing size (Outer dia. × inner dia. × thickness)		215 × 145 × 3.5 (8.46 × 5.71 × 0.138)
Thickness of disc assembly With load		7.7 - 8.3 (0.303 - 0.327) with 4,900 N (499.8 kg, 1,101.5 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 the hub center)	102.5 (4.04)
Maximum backlash of spline (at outer edge disc)		0.9 (0.035)

Clutch Cover

ECS00494

Unit: mm (in)

Engine model	QG18DE
Model	215
Full-load	4,900 N (499.8 kg, 1,101.5 lb)
Uneven limit of diaphragm spring toe height	0.88 (0.0346)

Clutch Pedal

ECS00495

Unit: mm (in)

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

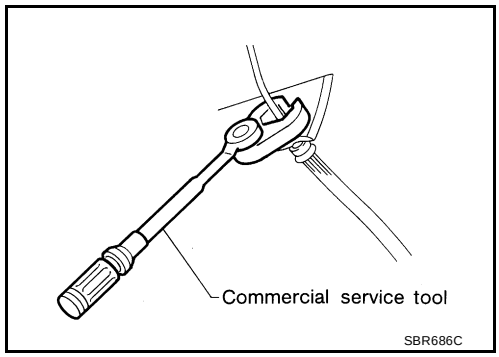
PRECAUTIONS

PFP:00001

Precautions

ECS00496

- **Recommended fluid is brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**
- **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.**
- **Use flare nut wrench when removing or installing clutch hydraulic tubes.**
- **Use new brake fluid to clean or wash all parts of master cylinder and operating 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.

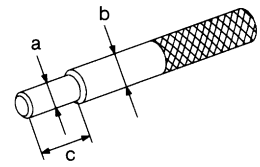
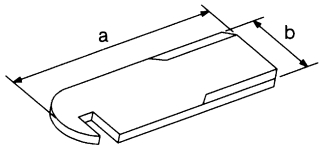
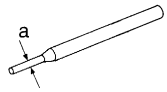
PREPARATION

PFP:00002

Special Service Tools

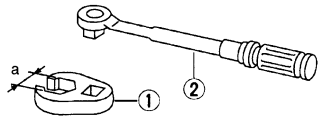
ECS00497

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 (J-26366) Clutch aligning bar  NT405	Installing clutch cover and clutch disc **a: 15.8 mm (0.622 in) dia.** **b: 22.9 mm (0.902 in) dia.** **c: 45.0 mm (1.772 in)**
ST20050240 (—) Diaphragm spring adjusting wrench  S-NT404	Adjusting unevenness of diaphragm spring of clutch cover **a: 150 mm (5.91 in)** **b: 25 mm (0.98 in)**
KV32101000 (J-25689-A) Pin punch  S-NT410	Removing and installing spring pin **a: 4 mm (0.16 in) dia.**

Commercial Service Tools

ECS00498

Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Removing and installing clutch piping **a: 10 mm (0.39 in)**

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ECS00499

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

Reference page		CL-24	CL-24	CL-26	CL-28	EM-54, "Removal and Installation"	CL-31	CL-33							CL-33	CL-34			CL-34
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Inspection and 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)	CLUTCH COVER (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	

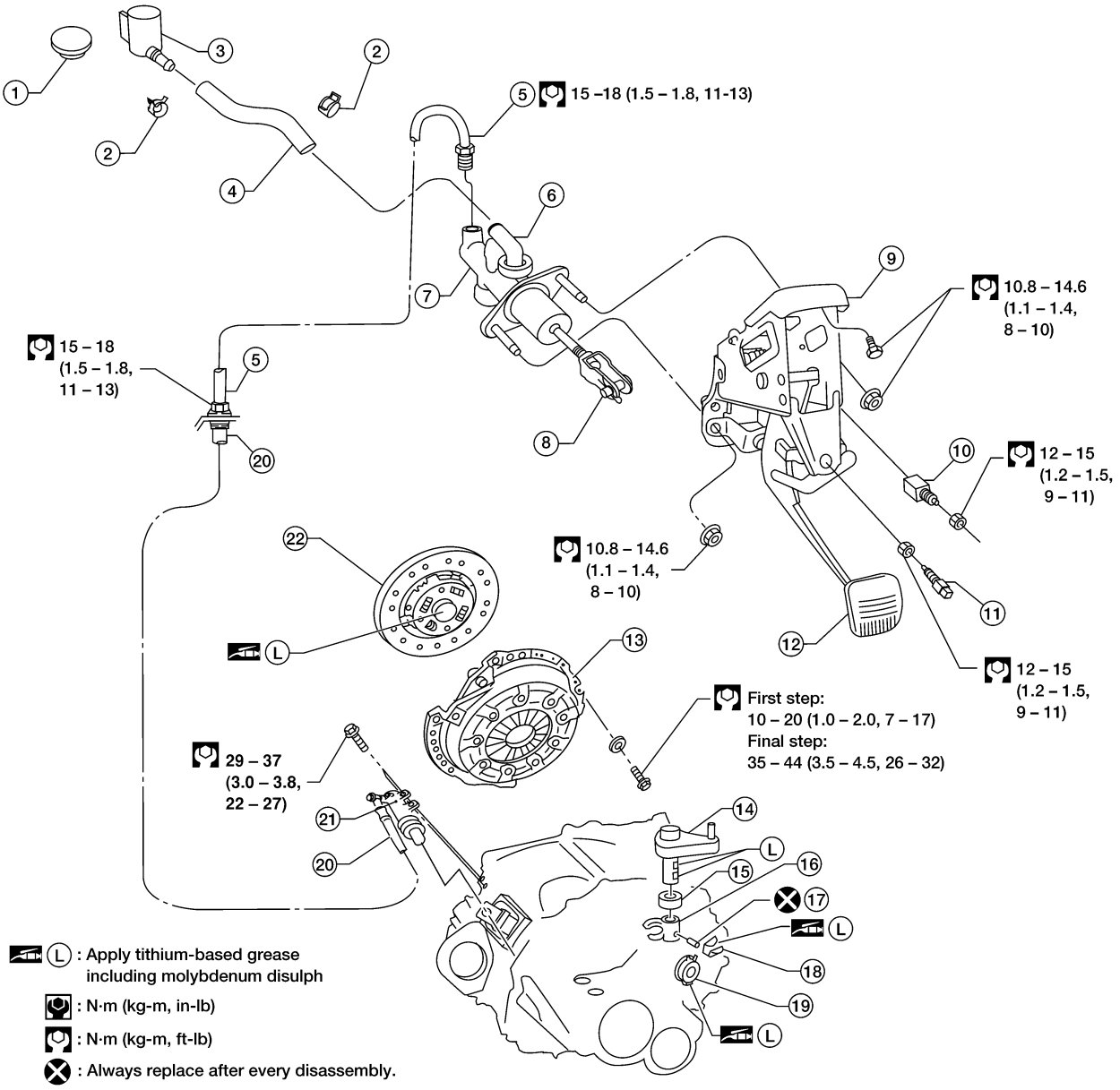
CLUTCH SYSTEM

PFP:30502

Components

ECS0049A

SEC. 300 • 305 • 306 • 465



WCIA0139E

1. Reservoir cap
2. Hose clamp
3. Reservoir tank
4. Reservoir hose
5. Clutch tube
6. Nipple
7. Clutch master cylinder
8. Clevis
9. Clutch pedal bracket
10. Clutch interlock switch
11. ASCD clutch switch (if equipped)
12. Clutch pedal
13. Clutch cover
14. Withdrawal lever
15. Spacer
16. Clutch lever
17. Spring pin
18. Release bearing spring
19. Release bearing
20. Clutch hose
21. Operating cylinder
22. Clutch disc

Inspection and Adjustment

ECS0049B

ADJUSTING CLUTCH PEDAL

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

b. Tighten the lock nut.

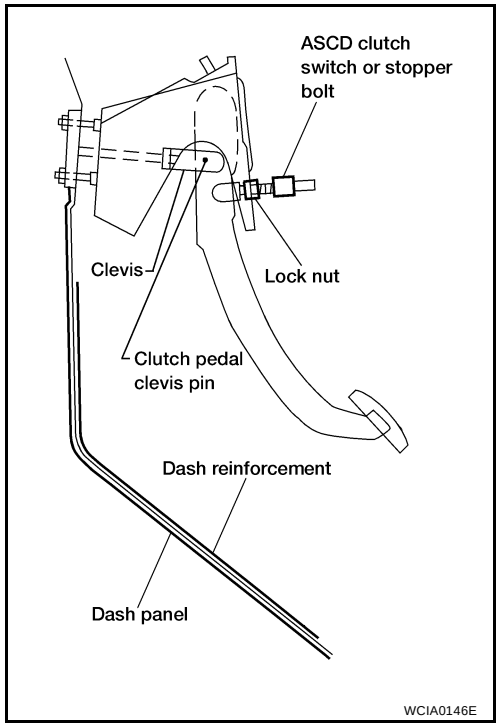
c. Verify that the clutch pedal clevis pin floats freely in the bore of the clutch pedal. It should not be bound by the clevis or clutch pedal.

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

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

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

b. If any sticking is noted, replace the related parts (clutch pedal, pedal bracket, assist spring, bushing, etc.). Reassemble the pedal and re-verify that the clevis pin floats freely in the bore of the pedal.



3. Adjust the clearance “C” while fully depressing the clutch pedal (with the clutch interlock switch) as shown.

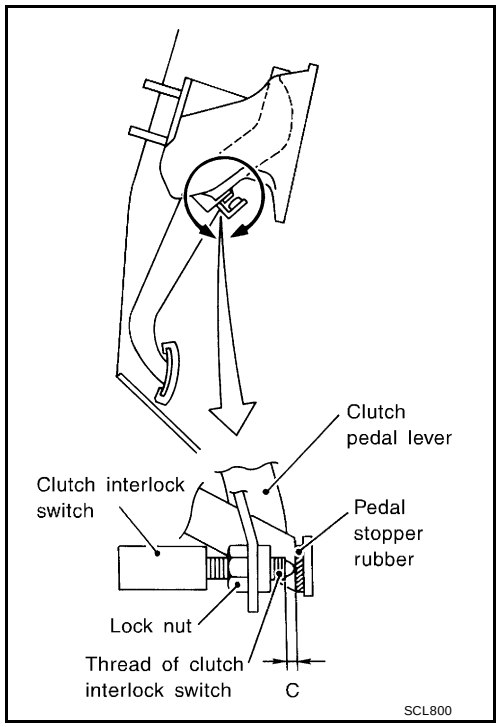
Clearance "C" : 0.1 - 1.0 mm (0.004 - 0.039 in)

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

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

b. If any hydraulic system repair was necessary, bleed the clutch hydraulic system. Refer to CL-24, "BLEEDING PROCEDURE" .

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 of the air from the system.



BLEEDING PROCEDURE

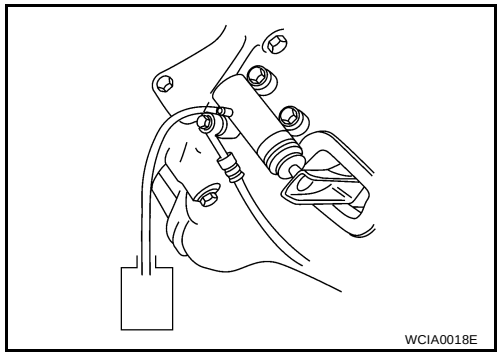
CAUTION:
Carefully monitor fluid level at master cylinder during bleeding operation.

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

1. Top off reservoir with recommended 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. Connect a transparent vinyl tube to air bleeder valve.
3. Slowly depress the clutch pedal to its full stroke and release it completely. Repeat this operation several times at 2 to 3 seconds intervals.
4. Open the air bleeder valve with the clutch pedal fully depressed.



5. Close the air bleeder valve.

Air bleeder valve tightening torque : 5.9 - 9.8 N·m (0.6 - 1.0 kg-m, 52 - 87 in-lb)

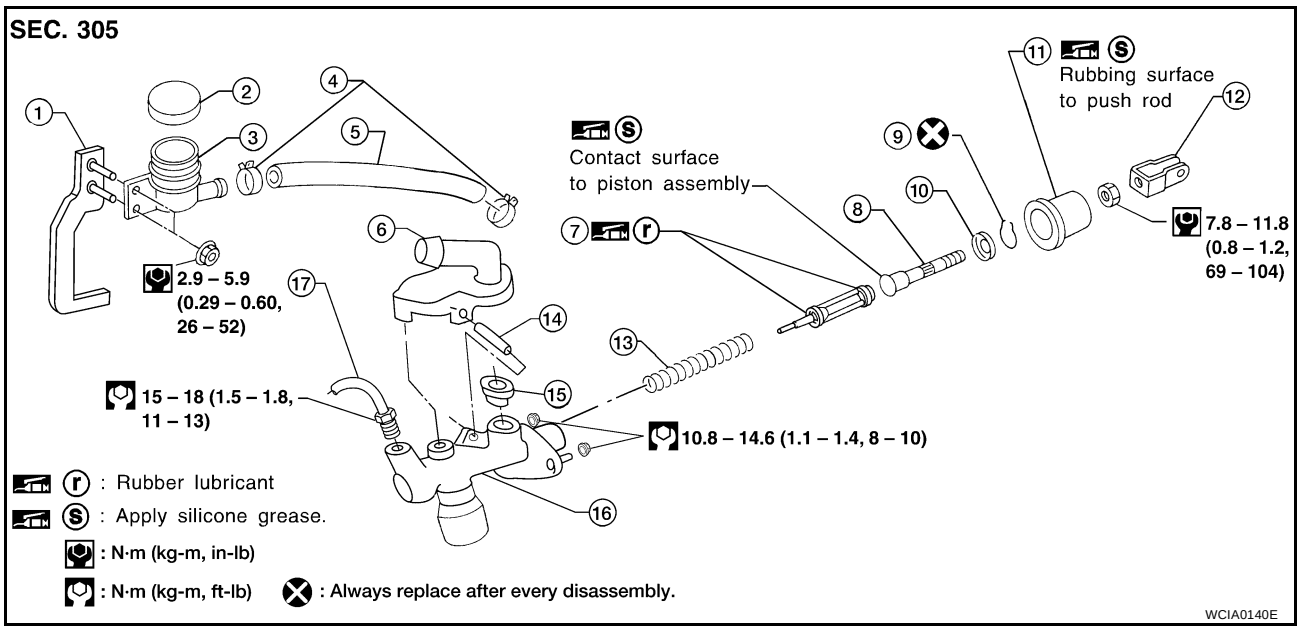
6. Release the clutch pedal and wait at least 5 seconds.
7. Repeat steps 1 through 6 above until air bubbles no longer appear in the brake fluid.

CLUTCH MASTER CYLINDER

PFP:30610

Components

ECS0049C



1. Bracket	2. Reservoir cap	3. Reservoir tank
4. Hose clamps	5. Reservoir hose	6. Nipple
7. Piston assembly seals	8. Push rod	9. Stopper ring
10. Stopper	11. Dust cover	12. Clevis
13. Return spring	14. Pin	15. Seal
16. Master cylinder body	17. Clutch tube	

Removal

ECS0049D

1. Drain brake fluid from clutch system.

   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 flare nut using a flare nut wrench.
3. Remove reservoir hose.
4. Remove the snap pin from the clevis pin and remove the clutch pedal from the clevis.
5. Unscrew master cylinder nuts and reservoir tank bracket nuts to remove master cylinder from the vehicle.

Installation

ECS0049E

1. Install reservoir hose.
2. Connect clutch tube to master cylinder, and hand-tighten flare nut.
3. Install master cylinder to cowl, and tighten master cylinder nuts to the specified torque.

   Master cylinder nuts : 10.8 - 14.6 N·m (1.1 - 1.4 kg-m, 8 - 10 ft-lb)
4. Tighten reservoir tank bracket nuts to the specified torque.

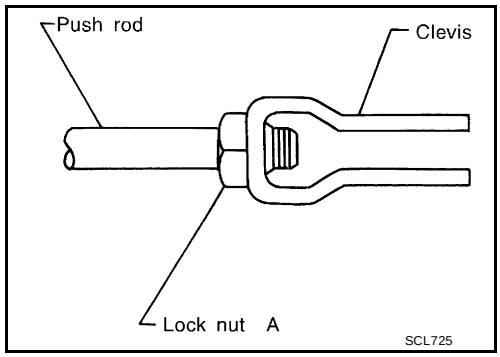
   Reservoir tank bracket nuts : 2.9 - 5.9 N·m (0.29 - 0.60 kg-m, 26 - 52 in-lb)
5. Tighten clutch tube flare nut using a flare nut torque wrench to the specified torque.

   Clutch tube flare nut : 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
6. After installing clevis pin, install snap pin to connect clutch pedal to push rod.
7. After finishing the operation, bleed air from clutch piping. Refer to CL-24, "BLEEDING PROCEDURE" .

Disassembly

ECS0049F

1. Loosen push rod lock nut "A" to remove clevis and lock nut "A".
2. Remove dust cover.
3. 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.
4. Remove piston assembly from cylinder body.
5. Remove return spring.
6. Remove pin using pin punch, then remove nipple and seal.



Inspection

ECS0049G

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 or deformation of the dust cover

Assembly

ECS0049H

1. Install spring.
2. Apply rubber lubricant to the sliding part of piston assembly, and insert piston assembly into cylinder body.
3. 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.
4. Apply silicone grease, and install dust cover.
5. Install clevis to push rod, and tighten lock nut "A" to the specified torque.

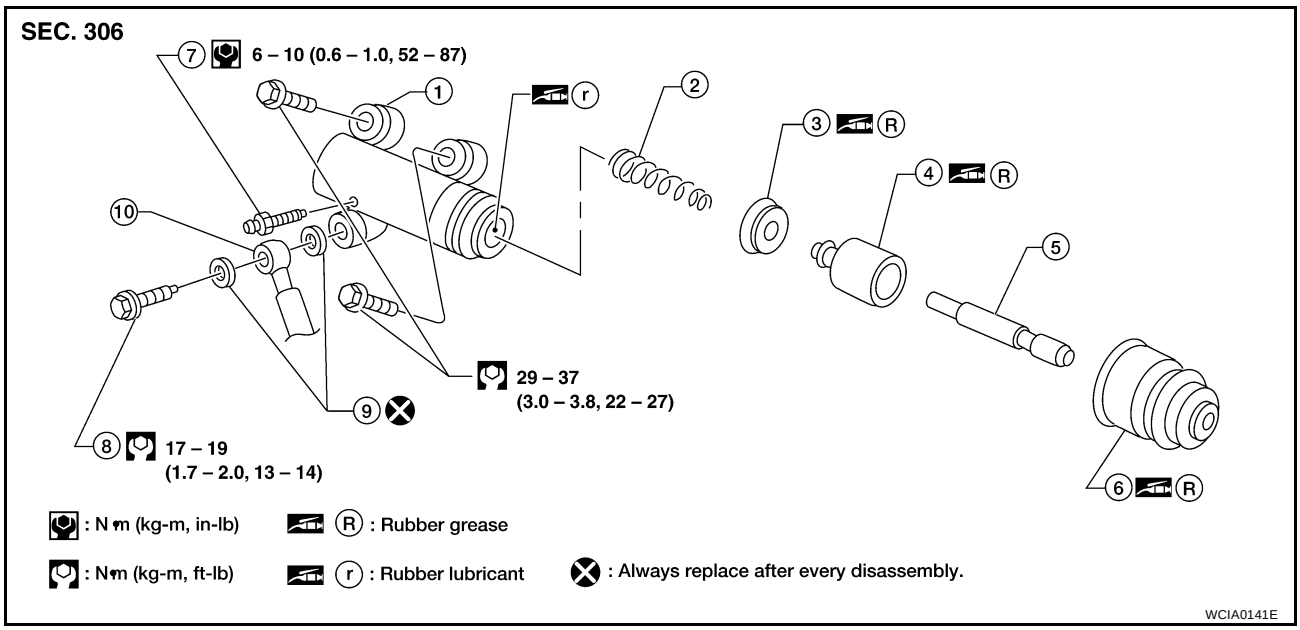
   Lock nut "A" : 7.8 - 11.8 N·m (0.8 - 1.2 kg-m, 69 - 104 in-lb)
6. Install seal and nipple to cylinder body, and install pin using a pin punch.

OPERATING CYLINDER

PFP:30620

Components

ECS0049I



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

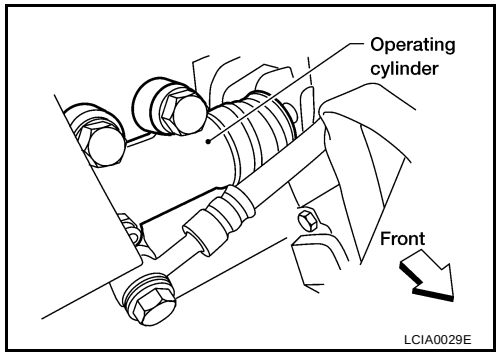
Removal

ECS0049J

1. Drain brake fluid from clutch system.

   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

ECS0049K

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

Inspection

ECS0049L

Inspect for the 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 or deformation of dust cover

Assembly

ECS0049M

1. Apply rubber lubricant to the overall inside surface of the cylinder body. Also, apply rubber grease to the piston.

2. Install the piston assembly into the cylinder body. Make sure tapered piston spring is installed correctly.
3. Apply rubber grease, and install dust cover.

Installation

ECS0049N

Install the components in the reverse order of removal. Follow 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 CL-24, "BLEEDING PROCEDURE" .**

PIPING

PFP:00000

Removal

ECS0049O

1. Remove air cleaner and air duct.
2. Drain brake fluid from clutch system.

   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.
3. Remove flare nut from cylinder body using a flare nut wrench.
4. Remove clutch hose from operating cylinder.
5. Remove clutch hose and clutch tube from bracket by removing lock plate.

Installation

ECS0049P

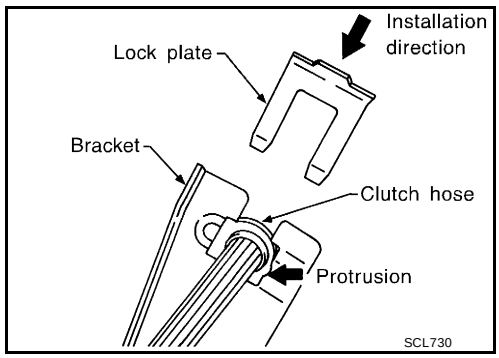
1. When installing clutch hose to bracket, face lock plate in the correct direction as shown to secure clutch hose.

   CAUTION:
   Install clutch hose without twisting or bending it.
2. Tighten flare nut to the specified torque, using a flare nut wrench.

   Flare nut : 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 the clutch hose bolt to the specified torque.

   Clutch hose bolt : 17 - 19 N·m (1.7 - 2.0 kg-m, 13 - 14 ft-lb)



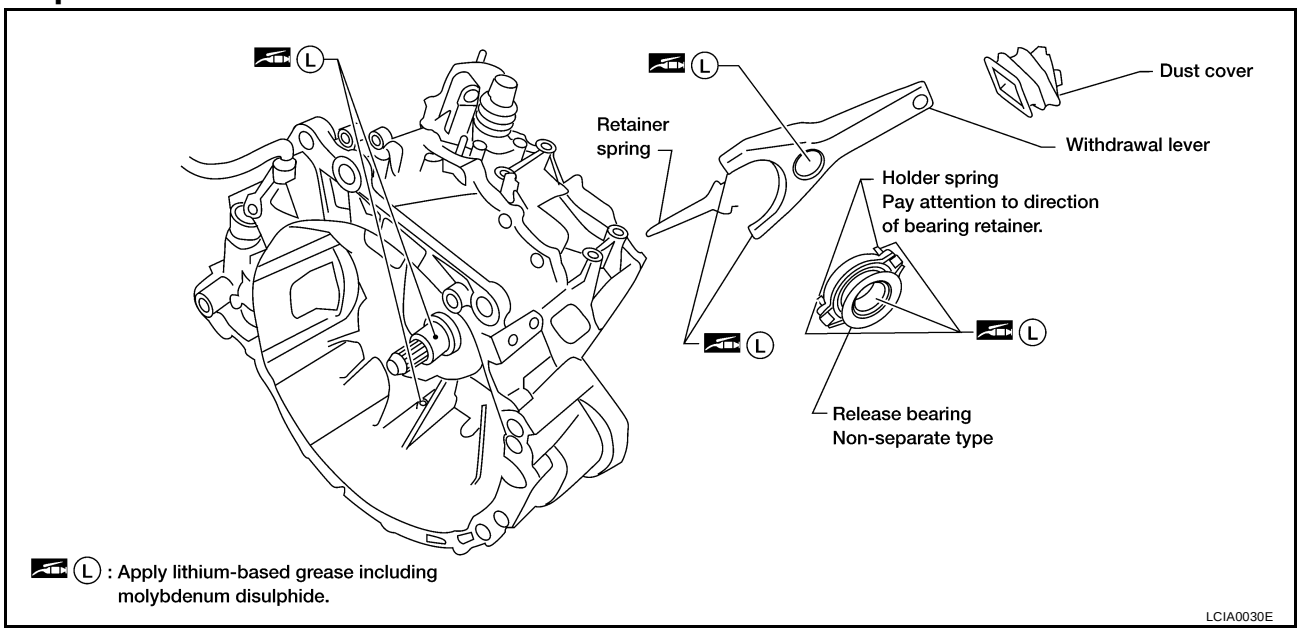
4. Bleed air from the clutch piping. Refer to CL-24, "BLEEDING PROCEDURE" .
5. Install air cleaner and air duct.

CLUTCH RELEASE MECHANISM

PFP:30502

Components

ECS0049Q



Removal

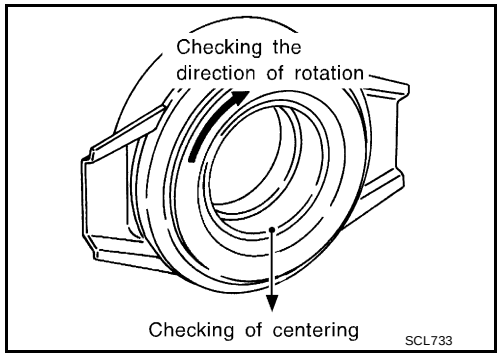
ECS0049R

1. Remove manual transaxle from vehicle. Refer to MT-16, "Removal and Installation" .
2. Move withdrawal lever enough to remove release bearing, and remove release bearing from clutch lever.
3. Remove withdrawal lever retainer spring.
4. Pull out withdrawal lever and remove dust cover.

Inspection After Removal

ECS0049S

- 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 its deformed or cracked.

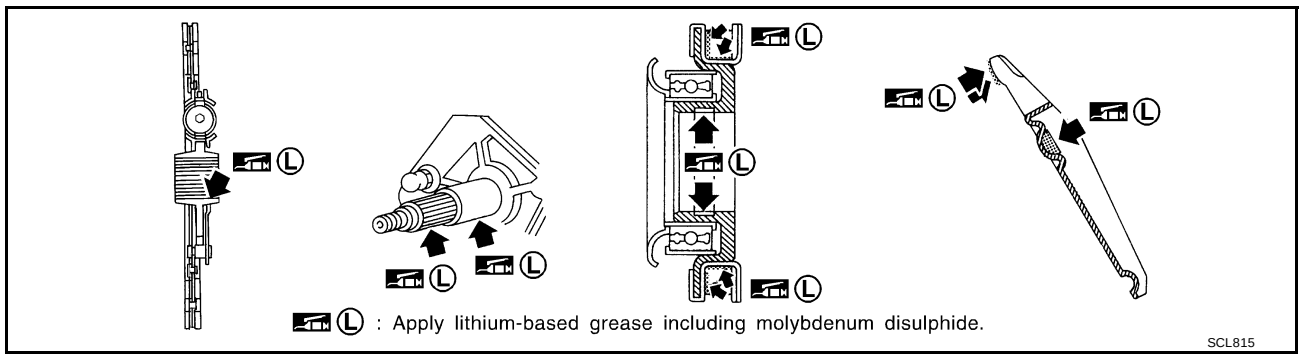


Installation

ECS0049T

Installation is in the reverse order of removal.

- Clean old grease and abrasive materials off the grease application area.



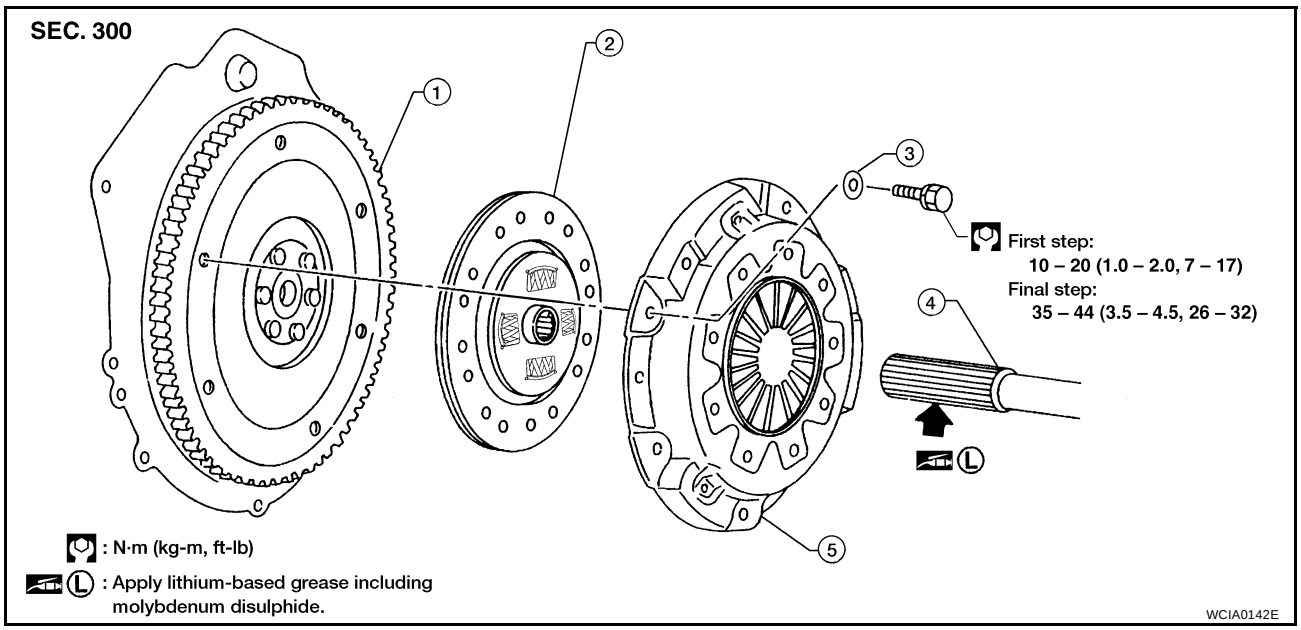
- Apply approximately 1 mm (0.04 in) thick of clutch sleeve grease to withdrawal lever and holder spring friction surfaces.
- Apply a coat of clutch sleeve grease to the grooves on contact surfaces of the withdrawal lever ball pin and inner surface of release bearing; make sure grease is flush with grooves.
- Apply a thin coat of clutch sleeve grease to release bearing frictional surface. After grease application, install release bearing. Wipe off excess grease forced out during bearing installation.

CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

PFP:30100

Components

ECS0049U



1. Flywheel
2. Clutch disc
3. Washer
4. Main drive shaft
5. Clutch cover

NOTE:
The following operations are with manual transaxle removed from vehicle.

Removal

ECS006S5

1. Evenly loosen the clutch cover bolts, then remove the clutch cover and clutch disc.

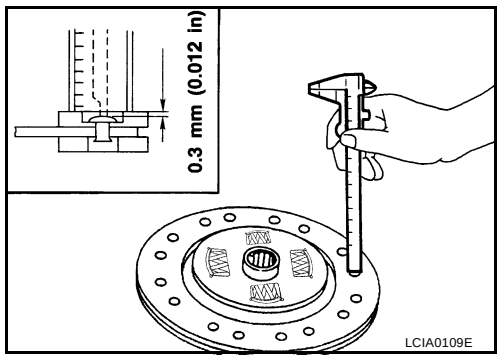
Inspection and Adjustment

ECS0049V

CLUTCH DISC

- Check clutch disc for wear of facing.

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

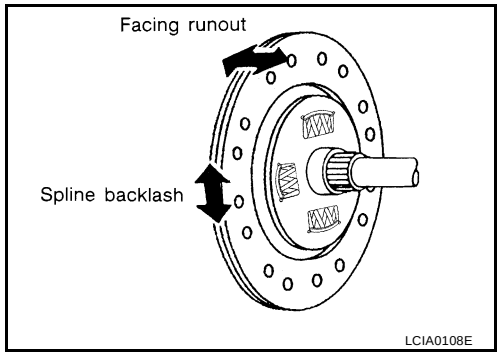


- Check clutch disc for backlash of spline and runout of facing.

  Maximum backlash of spline (at outer edge of disc) : 0.9 mm (0.035 in)

  Runout limit : 1.0 mm (0.039 in)

  Distance of runout check point (from hub center) : 115.0 mm (4.53 in)



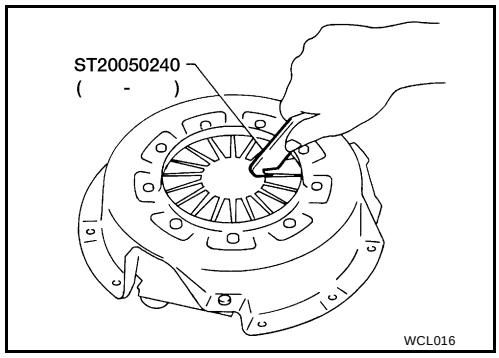
- Check clutch disc for burns, discoloration or oil or grease leakage. Replace if necessary.

CLUTCH COVER

Check clutch cover installed on vehicle for unevenness of diaphragm spring toe height.

Uneven limit : 0.7 mm (0.028 in)

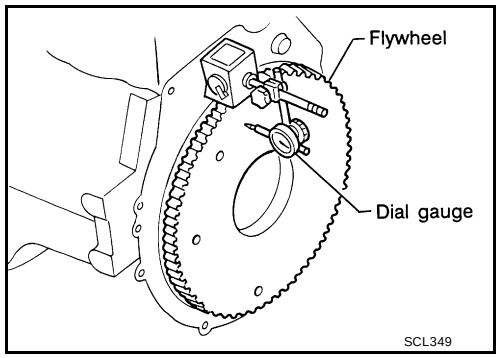
If out of limit, adjust the height with Tool.



FLYWHEEL

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

Maximum allowable runout : Refer to EM-165, "MOVEMENT AMOUNT OF FLYWHEEL (M/T MODEL)" .



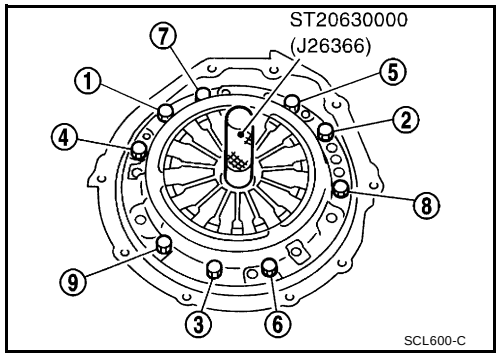
Installation

ECS0049W

1. Insert Tool into clutch disc hub when installing clutch cover and disc.

   CAUTION:
   Be careful not to allow grease to contaminate clutch facing.
2. Tighten bolts in numerical order by 2 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)

PFP:00030

Clutch Control System

ECS0049X

Type of clutch control	Hydraulic

Clutch Master Cylinder

ECS0049Y

Unit: mm (in)

Inner diameter	15.87 (5/8)

Clutch Operating Cylinder

ECS0049Z

Unit: mm (in)

Inner diameter	19.05 (3/4)

Clutch Disc

ECS004A0

Unit: mm (in)

Engine model		QR25DE
Model		240
Facing size (Outer dia. × inner dia. × thickness)		240 × 160 × 3.5 (9.45 × 6.30 × 0.138)
Thickness of disc assembly With load		7.8 - 8.4 (0.307 - 0.331) with 5,884 N (600 kg, 1,322 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 the hub center)	115.0 (4.53)
Maximum backlash of spline (at outer edge disc)		0.9 (0.035)

Clutch Cover

ECS004A1

Unit: mm (in)

Engine model	QR25DE
Model	240
Full-load	5,884 N (600 kg, 1,322 lb)
Uneven limit of diaphragm spring toe height	0.7 (0.028)

Clutch Pedal

ECS004A2

Unit: mm (in)

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