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SECTION **BR**
BRAKE SYSTEM

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PRECAUTIONS

PRECAUTIONS

PFP:00001

Precautions for Models with SRS Air Bag and Pre-Tensioner Seat Belt

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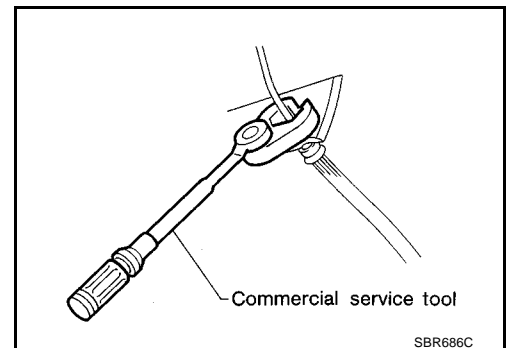
WARNING:

- Before removing and installing components and harnesses of SRS air bag and seat belt pre-tensioner system, turn ignition switch OFF, disconnect battery ground cable, and wait at least 3 minutes. (This discharges electricity held in the air bag sensor unit's additional power circuit.)
- Do not use pneumatic or electric tools to remove and install the components.
- Do not solder SRS air bag and seat belt pre-tensioner system harnesses when making repairs. Make sure harness is not pinched and there is no contact with other components.
- When checking the SRS air bag and the seat belt pre-tensioner circuit or the components of each system, do not use an electric tester such as a circuit tester. (This is to prevent accidental triggering caused by the weak electric current of a tester.)
- Never insert foreign material (such as a screwdriver) in the air bag module and pre-tensioner seat belt connectors. (The units may be actuated by mistake by static electricity.)
- Seat belt pre-tensioner and SRS air bag harnesses can be distinguished from other harnesses by their yellow connectors.
- When servicing, refer to "SB Seat Belt" and "SRS Air Bag" for safety.

Precautions for Brake System

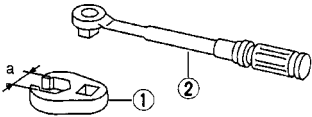
EFS002UN

- Clean dust on brake pads, shoes, drums, and back plates with a vacuum dust collector. Do not blow with compressed air.
- Recommended fluid is brake fluid "DOT 3" or "DOT 4".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas such as the body. If brake fluid is splashed or spilled on paint, wipe it off and flush the area with water immediately.
- Use only clean brake fluid when cleaning master cylinder and disc brake components.
- Never use mineral oils such as gasoline or kerosene to clean. They will ruin the rubber parts and cause improper operation.
- Always use a flare nut torque wrench to securely tighten brake tube flare nuts.
- The brake system is an important safety part. If a brake fluid leak is detected, always disassemble the related parts. If damage, deformation or excessive wear is detected, replace affected parts with new ones.
- Before starting operation, be sure to turn the ignition switch OFF and disconnect the ABS actuator and control module connector or battery cables.
- When installing brake piping, be sure to check torque.



PREPARATION

PREPARATION	PFP:00002
Commercial Service Tools	EFS002UO

Tool name	Description
<div>1. Flare nut crowfoot a: 10 mm (0.39 in)</div> <div>2. Torque wrench</div> <div></div> <div>S-NT360</div>	Removing and installing brake piping

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PF0:00003

NVH Troubleshooting Chart

EF0002UP

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

Symptom			BRAKE			Noise			Possible cause and SUSPECTED PARTS															Reference page																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

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BRAKE PEDAL

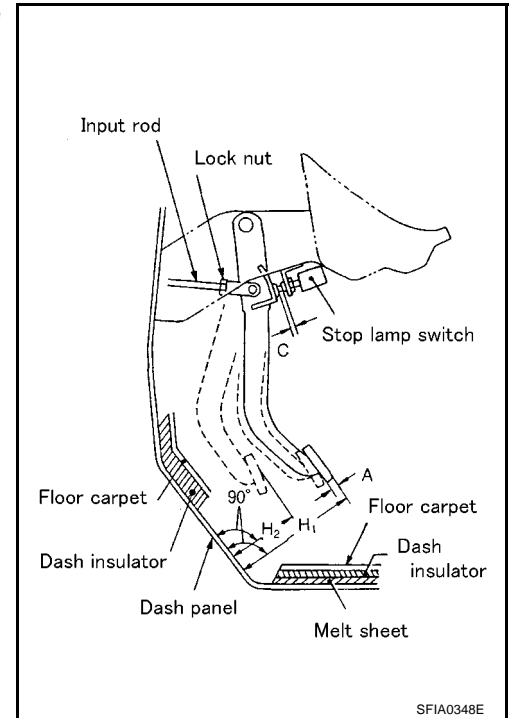
BRAKE PEDAL

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On-Vehicle Inspection and Adjustment

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Adjust clearance between dash panel and brake pedal upper surface to the following dimensions.



SFIA0348E

H1	Brake pedal height	M/T model		154.7 - 164.7 mm (6.09 - 6.48 in)
		A/T or CVT model		163.4 - 173.4 mm (6.43 - 6.83 in)
H2	Pedal height when depressed [With engine running and at depression force of 490 N (50 kg, 110.6 lb)]	M/T model	Without ACC	83.2 mm (3.276 in) or more
			With ACC	85.8 mm (3.378 in) or more
		A/T or CVT model	Without ACC	91.9 mm (3.618 in) or more
			With ACC	94.5 mm (3.720 in) or more
C	Clearance between stopper rubber and threaded end of the stop Stop lamp switch			0.74 - 1.96 mm (0.0291- 0.0772 in)
A	Free play			3-11mm(0.12-0.43in)

BRAKE PEDAL

1. Loosen stop lamp switch by rotating it counter-clockwise by 45°.
2. Loosen input rod lock nut (A), then rotate input rod, set pedal to the specified height, and tighten lock nut (A).

CAUTION:

Confirm threaded end of input rod remains inside the clevis.

 : 15.7 - 21.6 N·m (1.6 - 2.2 kg·m, 12 - 15 ft·lb)

3. Pull pedal by hand and hold it. Press stop lamp switch until its threaded end contacts the stopper rubber.
4. While holding it against the stopper rubber, turn the switch clockwise by 45° and secure it.

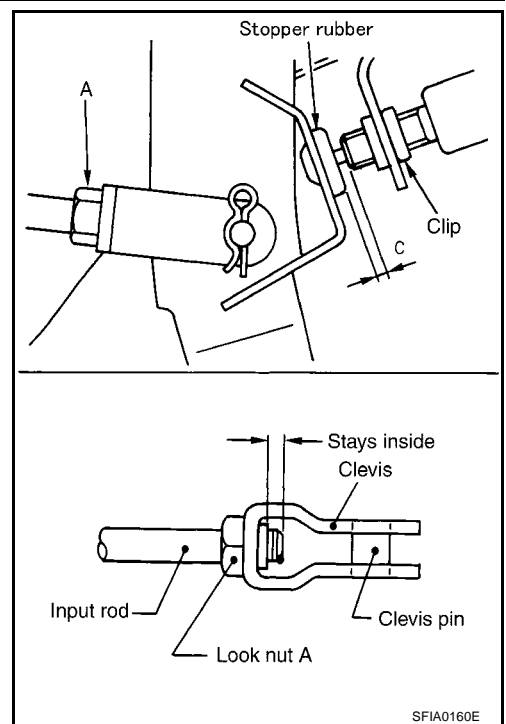
CAUTION:

Be sure stopper rubber to stop lamp switch screw threaded end gap (C) is within specifications.

5. Check pedal free play.
6. Start the engine and check brake pedal depressed height.

CAUTION:

Be sure stop lamps go off when pedal is released.

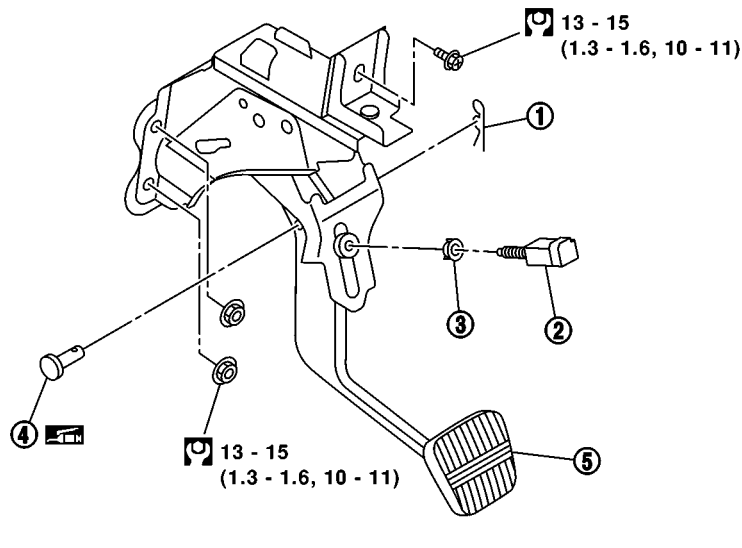



SFIA0160E

Components

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SEC. 465



 : N·m (kg·m, ft·lb)

SFIA0474E

- | | | |
|---------------|-------------------------|---------|
| 1. Snap pin | 2. Stop lamp switch | 3. Clip |
| 4. Clevis pin | 5. Brake pedal assembly | |

Removal and Installation

REMOVAL

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Be careful not to deform brake tube.

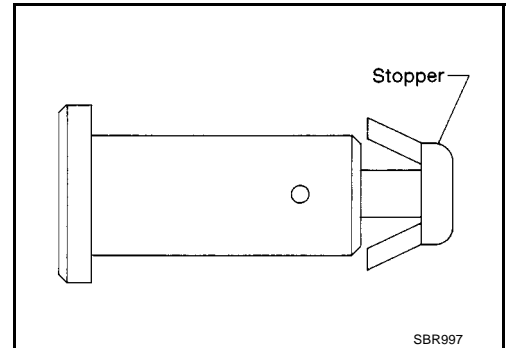
1. Remove the instrument of the driver-side lower panel.
2. Remove stop lamp switch from brake pedal assembly.
3. Remove snap pin and clevis pin from brake booster clevis.
4. Remove brake pedal assembly mounting nuts. Pull brake booster toward the engine compartment. Be careful not to deform the brake tube.
5. Remove brake booster clevis from input rod.
6. Remove steering column assembly from steering member.

BRAKE PEDAL

INSPECTION AFTER REMOVAL

Check brake pedal for the following.

- Bent brake pedal
- Deformed clevis pin
- Cracks in welded area
- Cracked or deformed clevis pin stopper



INSTALLATION

Install in reverse order of removal. Be careful of the following:

- Adjust brake pedal assembly after installing it.

BRAKE FLUID

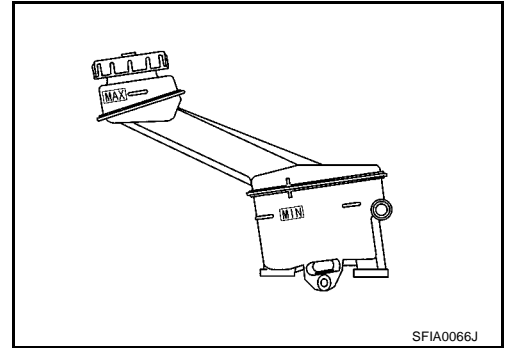
BRAKE FLUID

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Checking Brake Fluid Level

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- Confirm reservoir tank fluid level is within specifications (between MAX and MIN lines).
- Visually check around reservoir tank for fluid leaks.
- If fluid level is excessively low, check brake system for leaks.
- If warning lamp remains illuminated after parking lever is released, check brake system for fluid leakage.



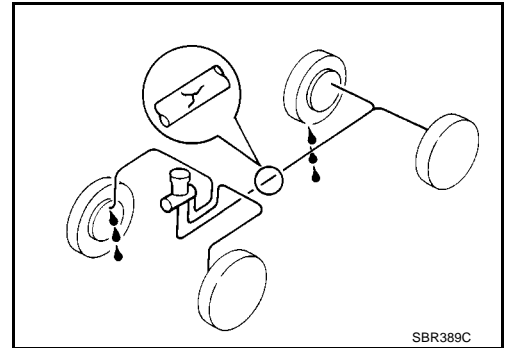
Checking Brake Line

EFS002UU

CAUTION:

If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

1. Check brake line (tube and hoses) for cracks, deterioration or other damage. Replace and damaged parts.
2. Check for oil leakage by fully depressing brake pedal while engine is running.

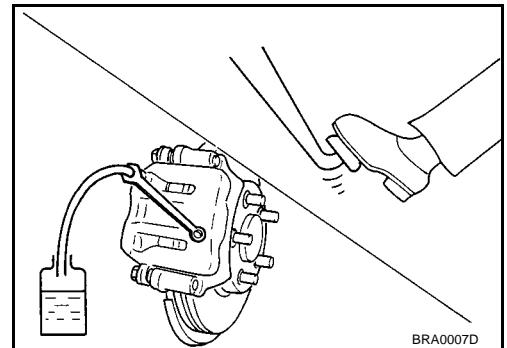


Changing Brake Fluid

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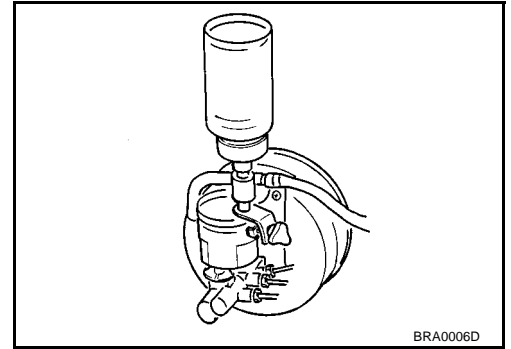
CAUTION:

- Refill with new brake fluid "DOT 3 or DOT 4".
 - Always keep fluid level higher than minimum line on reservoir tank.
 - Never reuse drained brake fluid.
 - Be careful not to splash brake fluid on spill or splash on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
1. Connect a vinyl tube to the air bleeder.
 2. Drain brake fluid gradually from the air bleeder of each wheel while depressing the brake pedal.
 3. Turn OFF ignition switch. Remove ABS actuator connector.



BRAKE FLUID



4. Be sure there is no foreign material in reservoir tank. Refill with new brake fluid.
5. Connect a vinyl tube to the air bleeder.
6. Rest foot on brake pedal. Loosen air bleeder. Slowly depress pedal until it stops. Tighten air bleeder. Release brake pedal. Repeat this process a few times, then pause to add new brake fluid to master cylinder. Continue until new brake fluid flows out. For bleeding procedure. Refer to [BR-10, "Bleeding Brake System"](#).



Bleeding Brake System

EFS002UW

CAUTION:

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
 - Fill reservoir with new brake fluid "DOT 3" or "DOT 4". Make sure it is full at all times while bleeding air out of system.
 - Place a container under master cylinder to avoid spillage of brake fluid.
 - While bleeding, pay attention to master cylinder fluid level.
 - For models with ABS, turn ignition switch OFF and disconnect ABS actuator connectors or battery ground cable.
 - Bleed air in the following order.
Right rear brake, Left front brake, Left rear brake, Right front brake
1. Turn OFF ignition switch. Remove ABS actuator connector.
 2. Connect a vinyl tube to the air bleeder.
 3. Fully depress the brake pedal 4 to 5 times.
 4. With brake pedal depressed, loosen air bleeder and bleed air.
 5. Close air bleeder.
 6. Slowly release brake pedal.
 7. Tighten air bleeder to the specified torque.
 -  **Front caliper : 7 - 13 N·m (0.72 - 1.3 kg-m, 62 - 115 in-lb)**
 -  **Rear caliper : 12 - 16 N·m (1.3 - 1.6 kg-m, 9 - 11 ft-lb)**
 8. Repeat steps 2 - 7. Occasionally refill master cylinder reservoir tank. Be sure to keep it at least half-full.

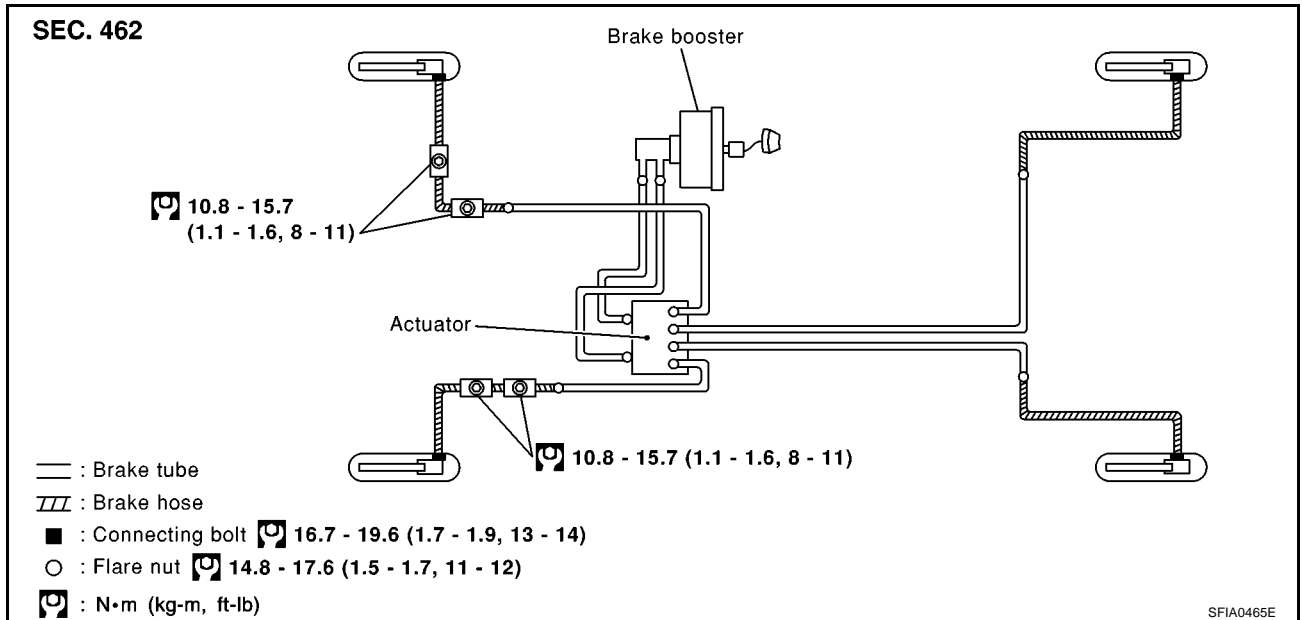
BRAKE PIPING AND HOSE

BRAKE PIPING AND HOSE

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Hydraulic Piping

EFS002UX



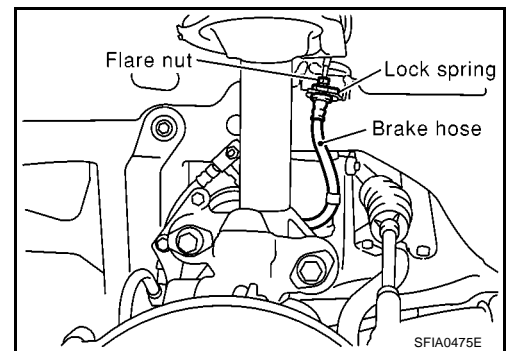
Removal and Installation of Front Brake Piping and Brake Hose

EFS002UY

REMOVAL

CAUTION:

- Do not allow brake fluid to spill or splash on painted surfaces. Brake fluid can seriously damage paint. If it gets on a painted surface, wipe it off immediately and wash with water.
 - Do not bend or twist the brake hose sharply, or strongly pull it.
 - Cover brake fluid line connections to prevent dust and other foreign material from entering.
1. Connect a vinyl tube to the air bleeder.
 2. Drain brake fluid gradually from the air bleeder of each wheel while depressing the brake pedal.
 3. Using a flare nut wrench, remove brake tube flare nuts and disconnect brake tube from the brake hose.
 4. Remove union bolts and disconnect caliper assembly from the brake hose.
 5. First remove lock spring from brake tube and strut mounting positions. Then remove brake hose.



INSTALLATION

CAUTION:

- Refill with new brake fluid "DOT 3" or "DOT4".
 - Never reuse drained brake fluid.
1. Connect brake hose to caliper assembly and tighten union bolts to the specified torque.
- #### CAUTION:
- Securely connect brake hose to the protrusions on the cylinder body.
 - Do not reuse the copper washer for union bolts.
2. Connect brake hose to the strut and fix with lock spring.
 3. Connect brake hose to brake tube. Temporarily tighten flare nuts by hand as far as they will go. Secure them with the lock spring.
 4. Using a flare nut torque wrench, tighten to the specified torque.

BRAKE PIPING AND HOSE

 : 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

5. Refill brake fluid until new brake fluid comes out of each air bleeder.
6. Afterwards, bleed air.

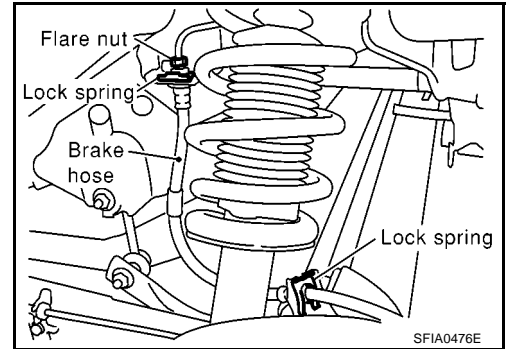
Removal and Installation of Rear Brake Piping and Brake Hose

EFS002UZ

REMOVAL

CAUTION:

- Do not allow brake fluid to spill or splash on painted surfaces. Brake fluid can seriously damage paint. If it gets on a painted surface, wipe it off immediately and wash with water.
 - Do not bend or twist the brake hose sharply, or strongly pull it.
 - Cover brake fluid line connections to prevent dust and other foreign material from entering.
1. Connect a vinyl tube to the air bleeder.
 2. Drain brake fluid gradually from the air bleeder of each wheel while depressing the brake pedal.
 3. Using a flare nut wrench, remove brake tube flare nuts and disconnect brake tube from the brake hose.
 4. Remove lock spring and union bolts.



INSTALLATION

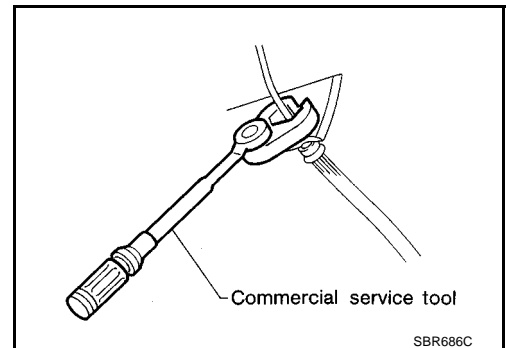
CAUTION:

- Refill with new brake fluid "DOT 3" or "DOT 4".
 - Never reuse drained brake fluid.
1. Connect brake hose to the brake tube. Temporarily tighten flare nut by hand as far as it will go.
 2. Secure brake hose with lock spring and connect wheel-side hose to the caliper assembly.
 3. Tighten union bolts to the specified torque. Then, tighten flare nut to the specified torque with a flare nut torque wrench.

 Flare nut : 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

 Union bolt : 16.7- 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)

4. Refill brake fluid until new brake fluid comes out of each air bleeder.
5. Afterwards, bleed air.



Inspection

EFS002V0

CAUTION:

If any connection leaks, retighten it. Replace any damaged parts.

1. Check hose, tube, and connections for fluid leaks, damage, twist, deformation, contact with other parts, and loose connections.

BRAKE PIPING AND HOSE

-
2. Run the engine. Depress brake pedal and hold it for approximately 5 seconds while checking each part for leaks.

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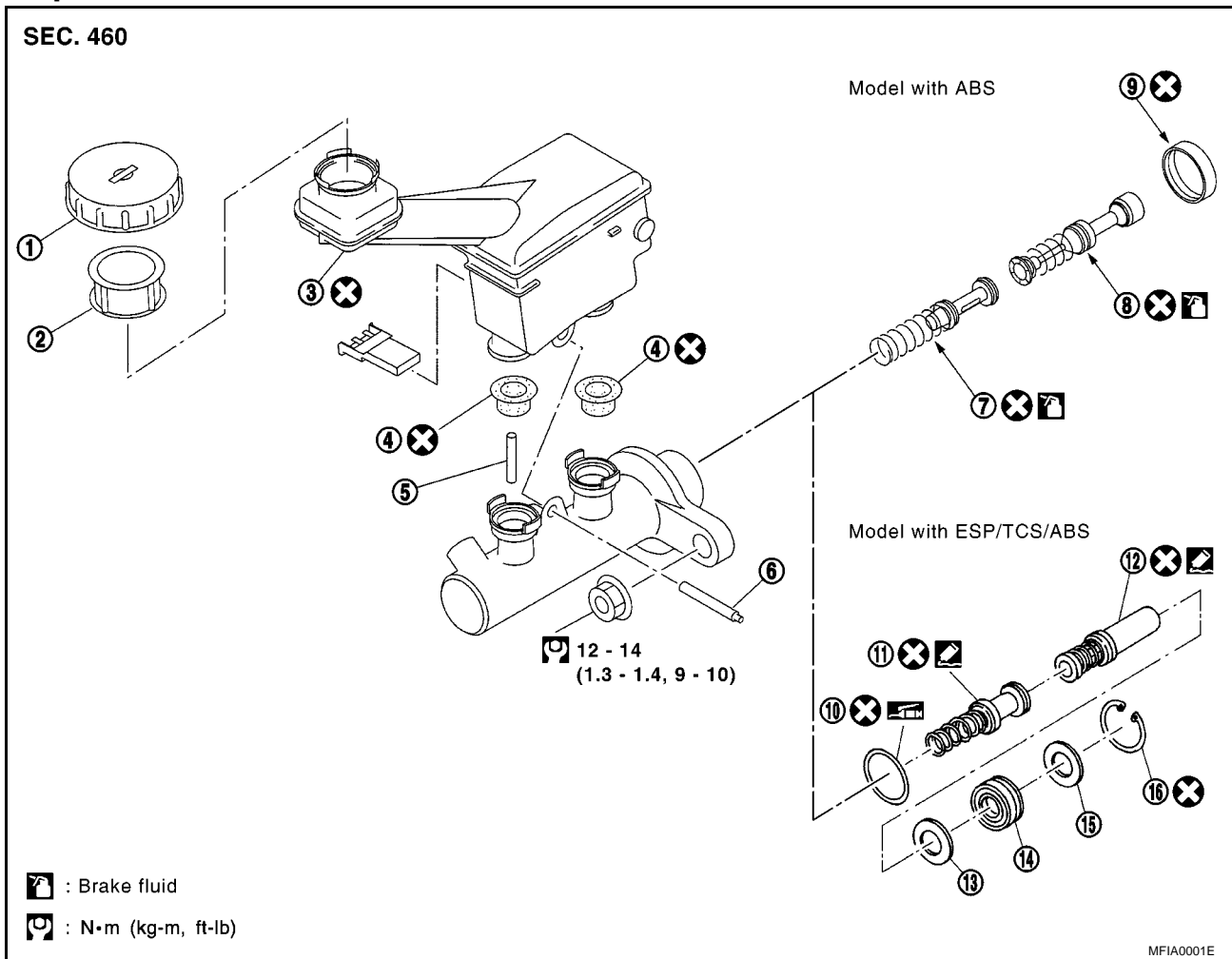
BRAKE MASTER CYLINDER

BRAKE MASTER CYLINDER

PFP:46010

Components

EFS002V1



- | | | |
|---------------------|-------------------------------|-----------------------------|
| 1. Cap | 2. Strainer | 3. Reservoir tank |
| 4. Grommet | 5. Piston stopper | 6. Pin |
| 7. Secondary piston | 8. Primary piston assembly | 9. Stopper cap |
| 10. O-ring | 11. Secondary piston assembly | 12. Primary piston assembly |
| 13. Plate | 14. Guide assembly | 15. Plate |
| 16. Snap ring | | |

Removal and Installation

REMOVAL

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.

1. Drain brake fluid.
2. Remove fluid level sensor harness connector.
3. Using a flare nut wrench, disconnect master cylinder assembly and brake tube.
4. First remove master cylinder assembly mounting nuts. Then remove master cylinder assembly.

INSTALLATION

1. Connect brake tube to master cylinder assembly and temporarily tighten flare nut by hand.
2. Connect master cylinder assembly to brake booster assembly and tighten mounting nuts to the specified torque.

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BRAKE MASTER CYLINDER

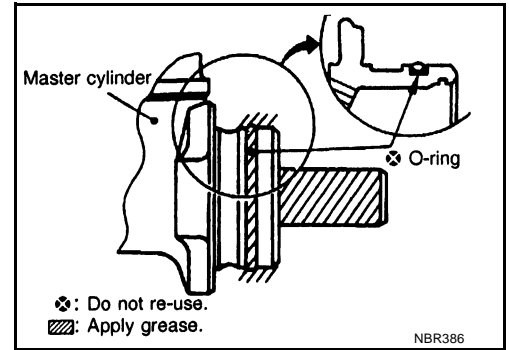
CAUTION:

(Model with ESP/TCS/ABS)

- Do not damage and stain the rod of the primary piston.
 - Do not reuse the O-ring seal, and primary piston.
 - Apply silicon grease for the O-ring seal and primary piston.
3. Tighten brake tube flare nuts.

 : 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

4. Refill with new brake fluid and bleed air from the brake piping.



EFS002V3

Disassembly and Assembly

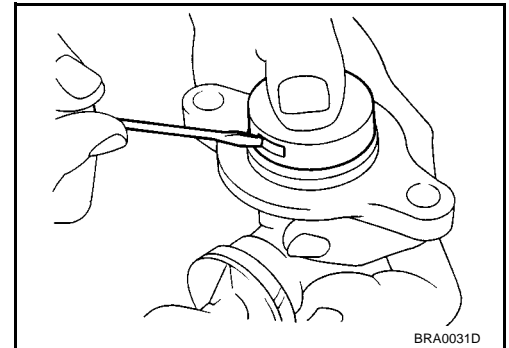
DISASSEMBLY

Model with ABS

CAUTION:

Remove master cylinder reservoir tank only when necessary.

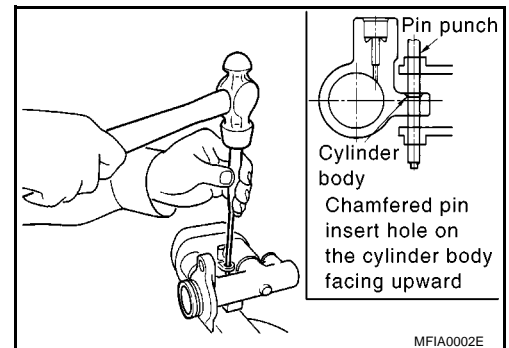
1. Using a slotted screwdriver as shown in the figure, lever stopper cap tabs up and remove stopper cap. While removing, be sure to hold cap securely to prevent the master cylinder piston from popping out.



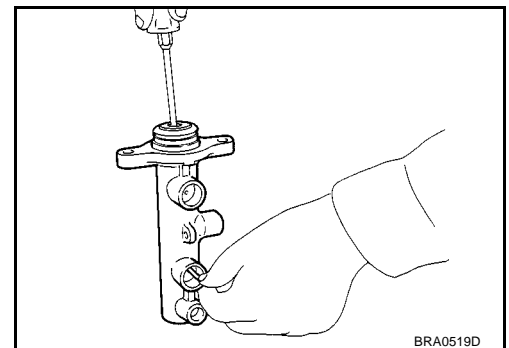
2. Secure cylinder body flange in a vise as shown in the figure.

CAUTION:

- Secure with chamfered pin insert hole on the cylinder body facing upward.
 - When securing in the vise, use copper plates or cloth to protect the flange.
3. Using a pin punch [tool: diameter Approx. 4 mm (0.16 in)], remove reservoir tank mounting pins.
4. Remove master cylinder assembly from the vise.
5. Remove reservoir tank and grommet from the cylinder body.



6. Using a Phillips screwdriver, press and hold piston pin as shown in the figure. Remove piston stopper from the cylinder body.
7. Carefully pull primary piston assembly straight out to prevent damage to the cylinder inner wall.
8. Tap flange against a wood block to loosen secondary piston assembly. Carefully pull secondary piston assembly straight out to prevent damage to the cylinder inner wall.



BRAKE MASTER CYLINDER

Models with ESP/TCS/ABS

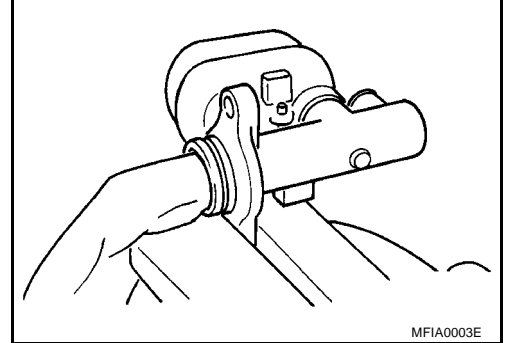
CAUTION:

Be careful not to damage rod of primary piston with covering cloths in acting.

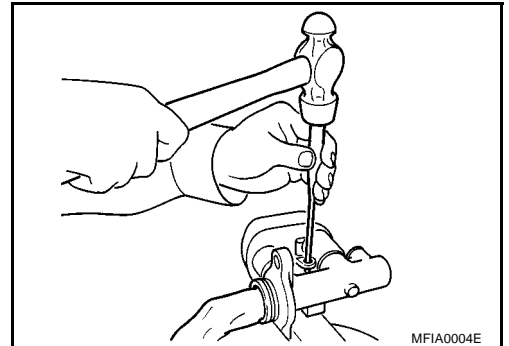
1. Tighten the flange of the cylinder body in base in the figure.

CAUTION:

- Pay attention to the orientation of master cylinder body.
- Use the copper plate or closes for fixing the body in the vise.



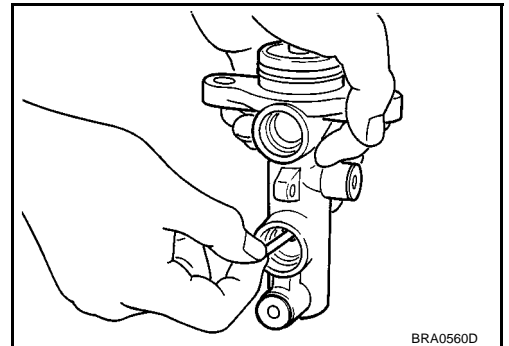
2. Using the pin-punch [commercial service tool: dia approx. 4mm (0.16 in)], remove pin form reservoir tank.
3. Remove the master cylinder assembly from the vise.
4. Remove the reservoir tank and grommet from the cylinder body.



5. Push the primary piston and remove the stopper pin from secondary tank boss hole in the cylinder body.

CAUTION:

Be careful not to damage the inner wall of the cylinder.



6. Remove the snap ring in pushing primary piston.

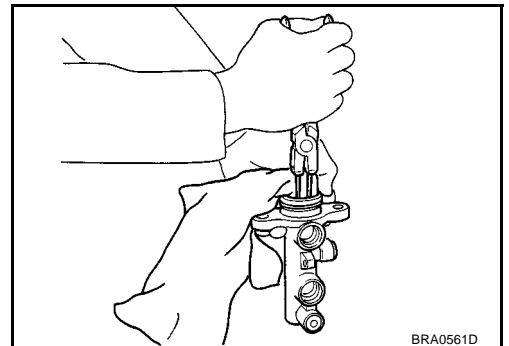
CAUTION:

Be careful not to put out the piston.

7. Holding the rod of the primary piston, remove the primary piston assembly, the plate and the guide with pulling straight to prevent the cup from being caught by the inner wall of the cylinder.
8. Remove the plate and the guide from primary piston.

CAUTION:

Be careful not to damage the rod from the inner wall of the plate.



INSPECTION AFTER REMOVAL

- Check cylinder inner wall for damage, wear, corrosion, and pinholes. Replace cylinder if damage, wear, or corrosion is detected.

BRAKE MASTER CYLINDER

ASSEMBLY

Model with ABS

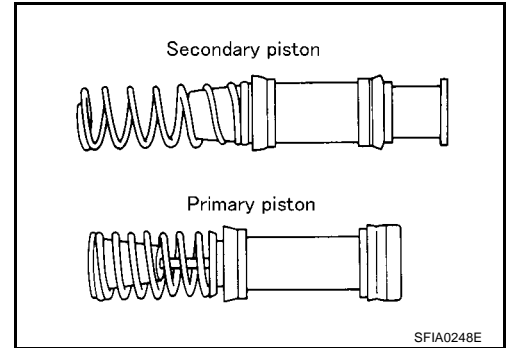
CAUTION:

- Never use mineral oils such as kerosene or gasoline during the cleaning and assembly processes.
- Be sure there is no foreign material on the cylinder inner wall, piston, and cup seal. Be careful not to damage parts with a service tool during assembly.
- Do not drop the parts. Do not use any dropped parts.

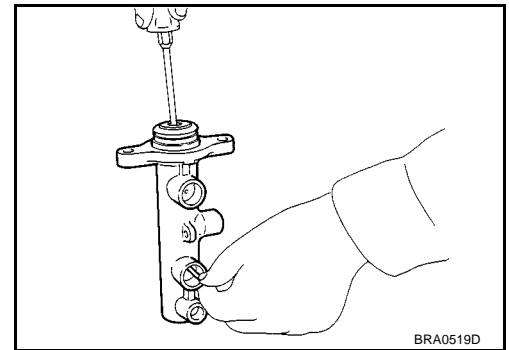
1. Apply brake fluid to the inner wall of cylinder body and contact surface of the piston assembly. Then insert secondary piston assembly and primary piston assembly into cylinder body in this order.

CAUTION:

- Do not reuse primary and secondary piston assemblies.
- Always replace the inner kit as an assembly.
- Pay attention to orientation of the piston cup. Insert it straight in order to prevent it from catching on the cylinder's inner wall.



2. Visually check secondary piston slit position through cylinder body secondary tank boss hole and install piston stopper.



3. Hold piston with stopper cap. Press stopper cap in until its tabs fully engage groove on the cylinder body.

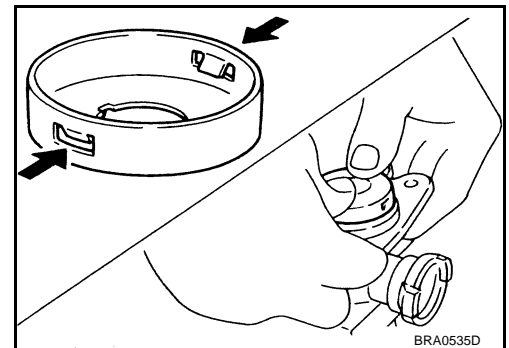
CAUTION:

Do not reuse stopper cap.

4. Apply brake fluid to grommet before pressing it into cylinder body.

CAUTION:

Do not reuse grommet.

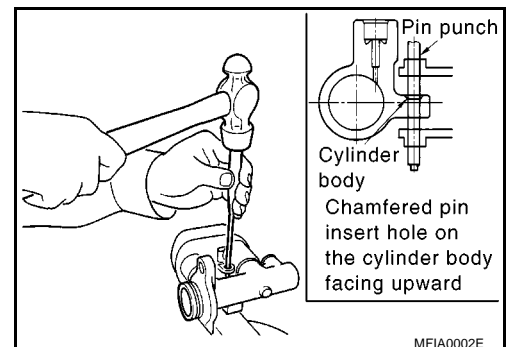


5. Secure cylinder body flange in a vise as shown in the figure.

CAUTION:

- Secure with chamfered pin insert hole on the cylinder body facing upward.
- When securing in the vise, use copper plates or cloth to protect the flange.

6. Install reservoir tank to the cylinder body. Tilt reservoir tank as shown in the figure and insert mounting pin. When mounting pin passes through pinhole in the master cylinder, return reservoir tank to the upright position. Push mounting pin all the way through the opposite pinhole in the reservoir tank.



BRAKE MASTER CYLINDER

CAUTION:

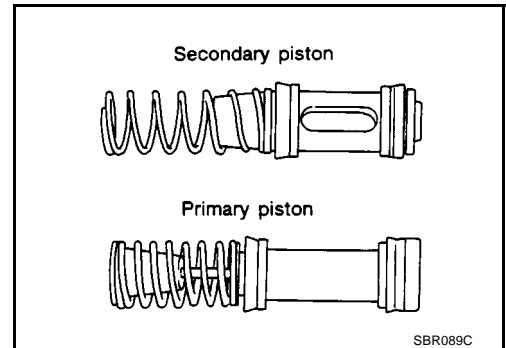
- Do not reuse reservoir tank mounting pin.
- Do not reuse reservoir tank.
- Be sure to insert pin from the chamfered pinhole on the cylinder body.

Models with ESP/TCS/ABS

1. Apply brake fluid to the inner wall of cylinder body and contact surface of the piston assembly.
2. Insert secondary piston and primary piston assembly into cylinder body in this order.

CAUTION:

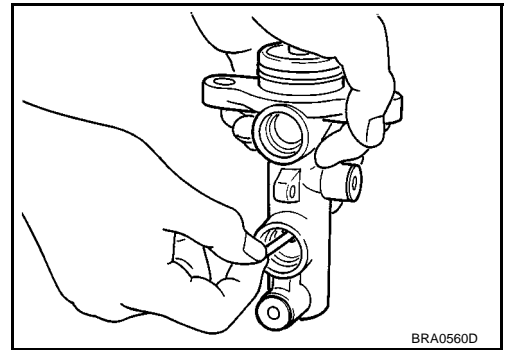
- Pay attention to the orientation of the piston cup, and insert straight to prevent the cup from being caught by the inner wall of the cylinder.
- Always replace the inner kit as an assembly.



3. Align the slit in the center of the piston with the axial direction of the valve stopper to assemble. Visually check the secondary piston slit from the valve stopper mounting hole, and install the valve stopper.

CAUTION:

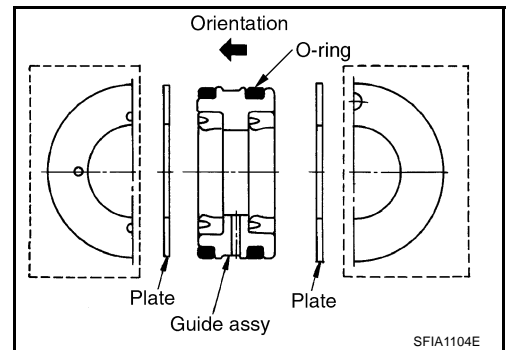
Always replace the piston pin O-ring with new one in the repair kit.



4. Insert the plate and the guide into the cylinder body.

CAUTION:

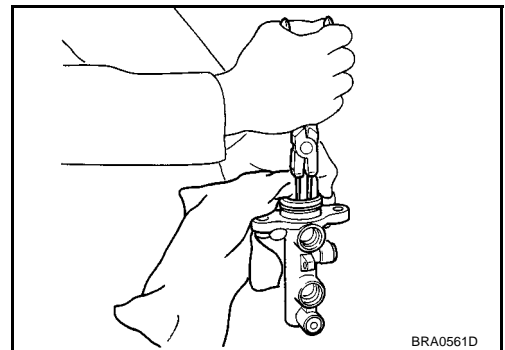
- Be careful not to damage the rod of the primary piston.
- Pay attention to the orientation of the guide.
- Do not drop the O-ring.



5. Be careful not to damage the rod of the primary piston with covering the close. Then insert snap ring to cylinder with pushing primary piston.

CAUTION:

- Be careful to check the snap ring in the inner tip of the cylinder body.
- Don not reuse snap ring.



6. Apply brake fluid to a grommet, and press it into the master cylinder to install.

CAUTION:

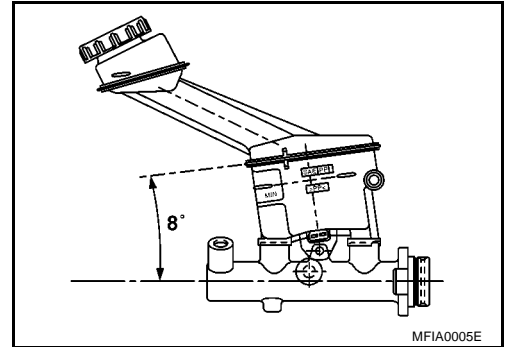
Do not reuse the grommet.

BRAKE MASTER CYLINDER

7. Install the reservoir tank to the master cylinder.

CAUTION:

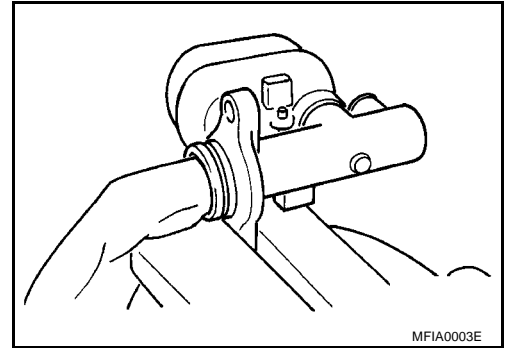
Pay attention to the orientation of the reservoir tank.



8. Tighten the flange of the cylinder body in the figure.

CAUTION:

- Using the copper plate or closes to cover the flange for fixing base.
- Pay attention to the orientation of the cylinder body.
- Secure with chamfered pin insert hole on the cylinder body facing upward.



9. Install reservoir tank to the cylinder body. Tilt reservoir tank as shown in the figure and insert mounting pin. When mounting pin passes through pinhole in the master cylinder, return reservoir tank to the upright position. Push mounting pin all the way through the opposite pinhole in the reservoir tank.

CAUTION:

- Do not reuse reservoir tank mounting pin.
- Do not reuse reservoir tank.
- Be sure to insert pin from the chamfered pinhole on the cylinder body.

BRAKE BOOSTER

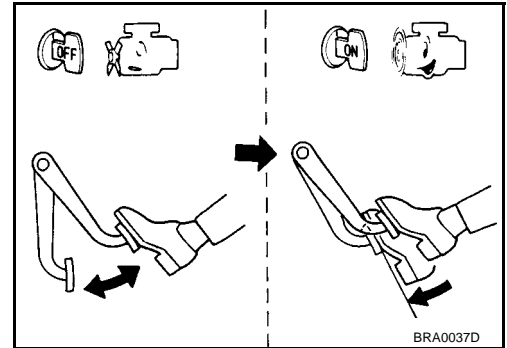
BRAKE BOOSTER

PFP:47200

On-Vehicle Inspection and Service FUNCTION INSPECTION

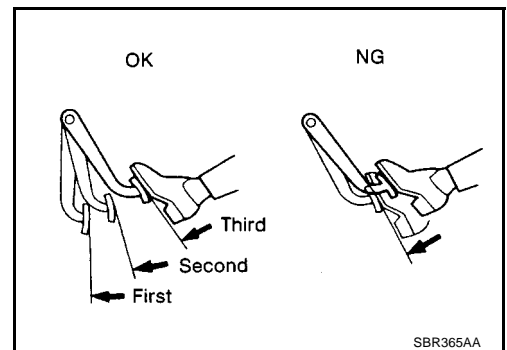
EFS002V4

With the engine stopped, discharge stored vacuum by depressing brake pedal several times at 5 second intervals. With the brake pedal fully depressed, start the engine. Confirm that clearance between brake pedal and the floor panel decreases when engine vacuum stabilizes.



AIRTIGHTNESS INSPECTION

- Run the engine at idle for approximately 1 minute. Stop it after applying vacuum to the booster. Depress the brake pedal several times with normal force to discharge the stored vacuum. Confirm that clearance between brake pedal and the floor panel gradually increases as the brake pedal is depressed.
- Run the engine. Depress and hold the brake pedal then stop the engine. Keep the brake pedal depressed for 30 seconds or more and make sure the pedal stroke does not change.

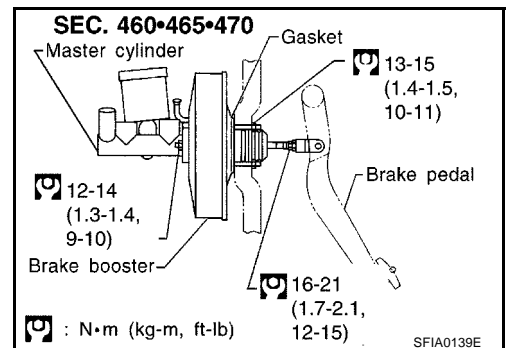


Removal and Installation REMOVAL

EFS002V5

CAUTION:

- Be careful not to deform or bend brake piping while removing and installing the brake booster.
 - Replace clevis pin if it is damaged.
 - Be careful not to damage brake booster stud bolt threads. If brake booster is tilted or inclined during installation, the dash panel may damage the threads.
 - Be sure to install the check valve in the correct orientation.
1. Remove vacuum piping from the brake booster.
 2. Remove master cylinder.
 3. Remove snap pin and clevis pin on passenger compartment clevis. Remove input rod from the brake pedal.
 4. Remove brake booster and brake pedal assembly mounting nuts.
 5. Remove booster assembly from the engine compartment.



INSPECTION AFTER REMOVAL

Output rod length inspection

1. Using a handy vacuum pump, apply a vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg) to the brake booster.

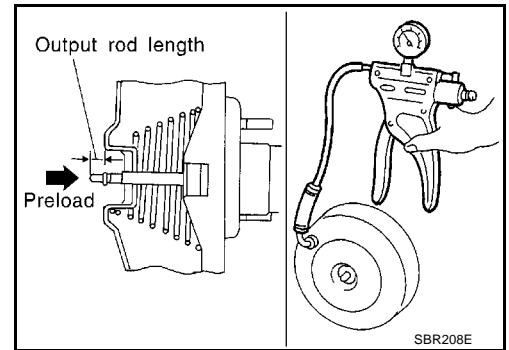
BRAKE BOOSTER

2. Place an output rod gauge in the master cylinder. Rotate the screw until the gauge contacts the primary piston.
3. Turn output rod gauge upside down to secure A. Adjust it with B until clearance between output rod and screw is 0 mm.

Reference value at vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg):

Without ESP : 10.4 mm (0.409 in)

With ESP : -6.2 mm (0.244 in)

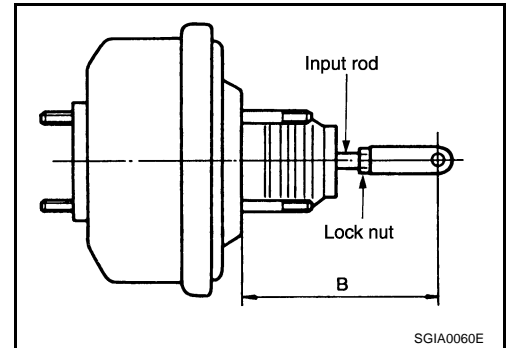


INSTALLATION

1. Loosen lock nut to adjust input rod length so that length "B" (in the figure) satisfies the specified value.

Length "B" standard : 125 mm (4.92 in)

2. After adjusting "B", temporarily tighten lock nut to install booster assembly to vehicle.
3. Connect brake pedal to input rod clevis.
4. Connect brake pedal assembly mounting nuts and tighten to the specified torque.
5. Connect master cylinder to the booster assembly.
6. Adjust brake pedal height and play.
7. Tighten input rod lock nut to the specified torque.
8. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#).



VACUUM LINES

VACUUM LINES

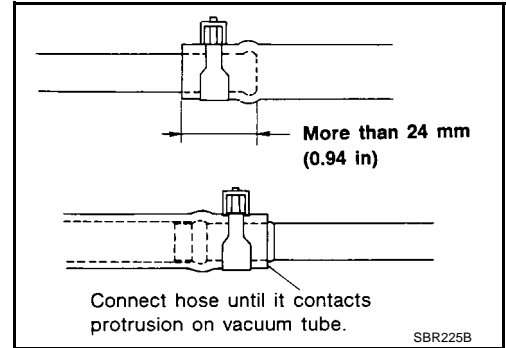
PFP:41920

Removal and Installation

EFS002V6

CAUTION:

- Because vacuum hose contains a check valve, it must be installed in the correct orientation. Refer to the stamp or label to confirm correct installation. The brake booster will not operate normally if the hose is installed in the wrong direction.
- Insert the vacuum hose for at least 24 mm (0.94 in).
- Never use lubricating oil during assembly.



Inspection

VISUAL INSPECTION

Check for improper assembly, damage and aging.

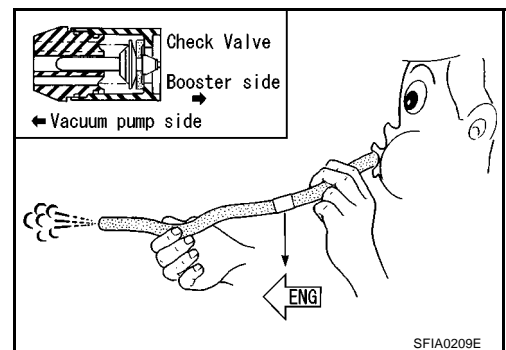
CHECK VALVE INSPECTION

Quick Inspection

The check valve is incorporated in the vacuum hose. Blow air into vacuum hose to inspect the check valve. The check valve is normal when air can only be blown in from the booster side.

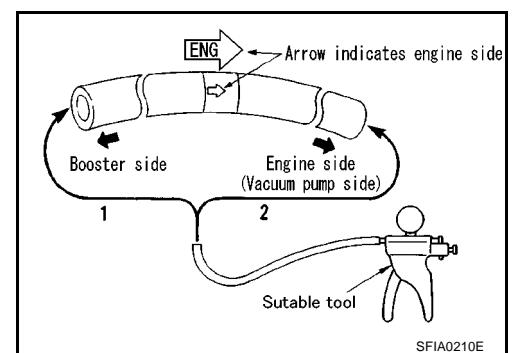
CAUTION:

If air can blow both ways through the vacuum hose, replace hose and check valve as a set.



Airtightness Inspection

Use a hand-held vacuum pump to check.



When connected to booster side (1):

Vacuum decrease should be within 1.3 kPa (10 mmHg, 0.39 inHg) for 15 seconds under a vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg)

When connected to engine side (2):

No vacuum will be applied

FRONT DISC BRAKE

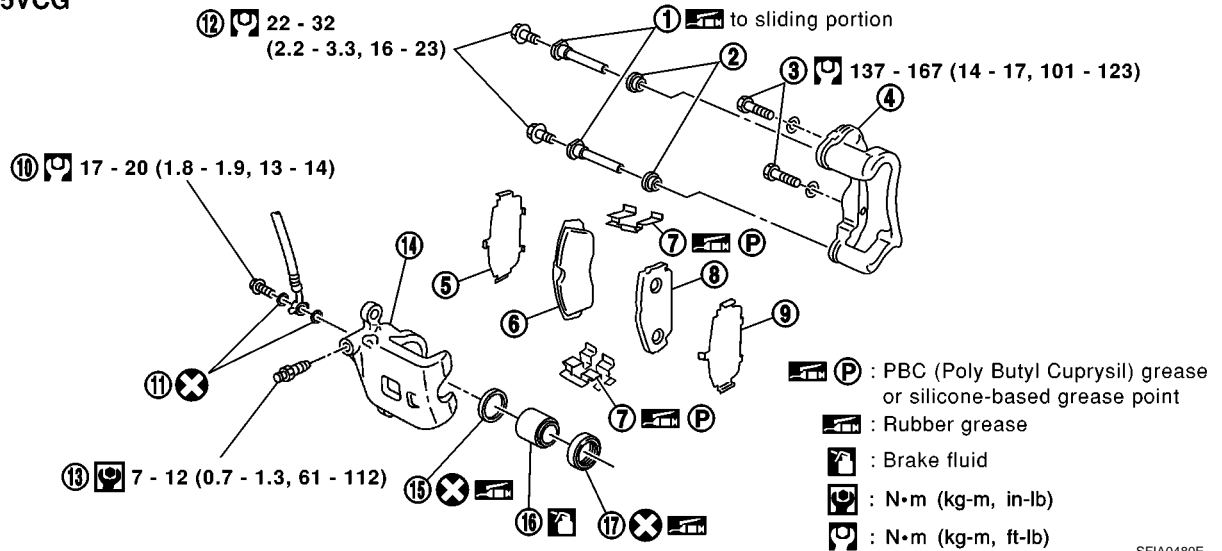
FRONT DISC BRAKE

PFP:41000

Component

EFS002V8

SEC. 440
CL25VCG



- | | | |
|---------------------|-------------------|------------------------------|
| 1. Main pin | 2. Pin boot | 3. Torque member fixing bolt |
| 4. Torque member | 5. Inner shim | 6. Inner pad |
| 7. Pad retainer | 8. Outer pad | 9. Outer shim |
| 10. Connecting bolt | 11. Copper washer | 12. Main pin bolt |
| 13. Bleed valve | 14. Cylinder body | 15. Piston seal |
| 16. Piston | 17. Piston boot | |

WARNING:

- Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

- When cylinder body is open, do not depress brake pedal because piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.
- If shims are rusted or show peeling of the rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to [BR-27, "BRAKE BURNISHING PROCEDURE"](#).

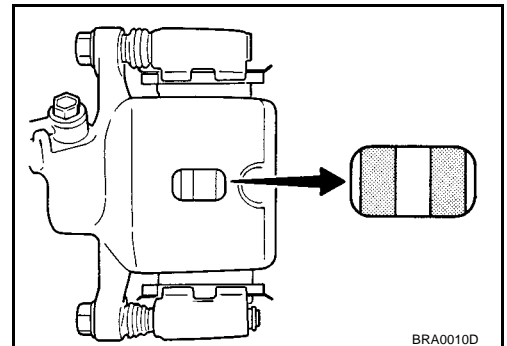
Inspection

PAD THICKNESS

EFS002V9

Check pad thickness by lifting vehicle, removing the wheel, and looking through check hole on cylinder body. If necessary, use a scale.

Standard pad thickness : 11 mm (0.43 in)
Pad wear limit : 2.0 mm (0.079 in)



FRONT DISC BRAKE

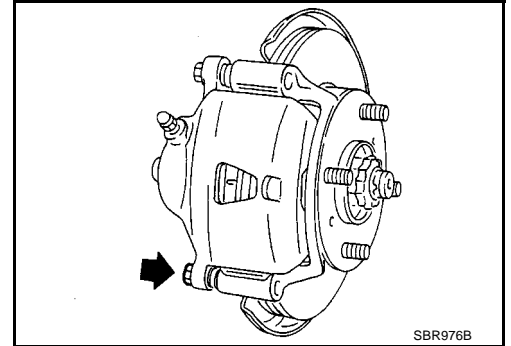
Pad Replacement REMOVAL

EFS002VA

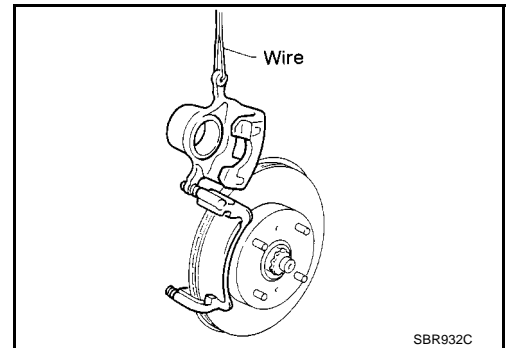
CAUTION:

When replacing brake pads, always replace inner shims, outer shims, and shim covers as a set.

1. Remove master cylinder reservoir tank cap.
2. Remove lower sliding pin bolt.



3. Hang cylinder body with a wire, and remove pads, pad retainers, shims and pad return springs.



INSTALLATION

1. Apply brake grease on back of the pad and both sides of the shim. Install inner shim and inner shim cover to inner pad, outer shim to outer pad.
2. Apply brake grease on the pad retainer pad contact surface. Install pad retainers, pads and pad return springs to the torque member.
3. Connect cylinder body to the torque member.

CAUTION:

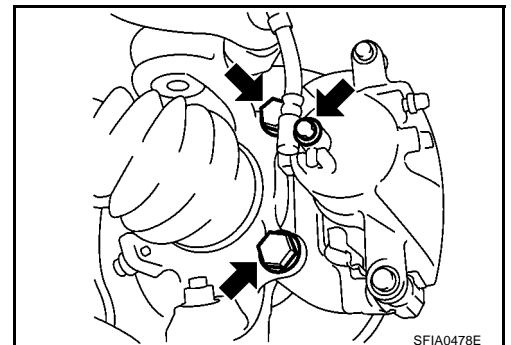
When replacing pads with new ones, press piston in until the pads can be installed. Carefully monitor brake master cylinder reservoir fluid level. Brake fluid will return, raising master cylinder reservoir tank fluid level.

4. Insert lower sliding pin bolt and tighten to the specified torque.
5. Check brakes for drag.

Caliper Removal and Installation REMOVAL

EFS002VB

1. Connect a vinyl tube to the air bleeder.
2. Drain brake fluid gradually from air bleeder while depressing brake pedal.
3. Remove union bolts and torque member mounting bolts, and remove caliper assembly.
4. Remove disc rotor.



FRONT DISC BRAKE

INSTALLATION

CAUTION:

- Refill with new brake fluid "DOT 3" or "DOT 4".
- Never reuse drained brake fluid.

1. Install disc rotor.
2. Install caliper assembly. Tighten mounting bolts to the specified torque.

CAUTION:

Before installing caliper assembly, wipe oil and grease on the trailing arm washer seats and caliper assembly mounting surface.

3. Connect brake hose to caliper assembly and tighten union bolts to the specified torque.

CAUTION:

- Do not reuse the copper washer for union bolts.
 - Securely assemble brake hose to protrusions on cylinder body.
4. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#).

Caliper Disassembly and Assembly DISASSEMBLY

EFS002VC

BR

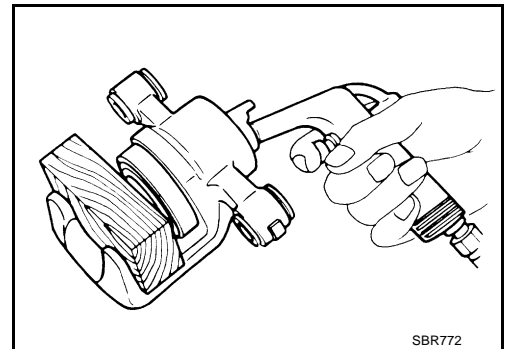
WARNING:

Do not place your fingers in front of piston.

CAUTION:

Do not scratch or score cylinder wall.

1. Push out piston with piston boot with compressed.
2. Remove piston seal with a suitable tool.



INSPECTION AFTER DISASSEMBLY

Cylinder Body

CAUTION:

Use new brake fluid to clean. Never use mineral oils such as gasoline or kerosene.

- Check cylinder inner wall for corrosion, wear and damage. If corrosion, wear or damage is detected, replace the cylinder body.
- Minor flaws caused by corrosion or foreign material can be removed by polishing the surface with fine sandpaper. Replace the cylinder body, if necessary.

Torque Member

Check for wear, cracks and damage. If wear, cracks or damage is detected, replace the applicable part.

Piston

CAUTION:

The piston sliding surface is plated. Do not polish with sandpaper.

Check piston surface for corrosion, wear and damage. If corrosion, wear or damage is detected, replace the applicable part.

Sliding Pin, Pin Bolt, and Pin Boot

Check sliding pin and sliding pin boot for wear, damage and cracks. If corrosion, wear or damage is detected, replace the applicable part.

DISC ROTOR INSPECTION

Visual Inspection

Check surface of the disc rotor for uneven wear, cracks and serious damage. If uneven wear, cracks or serious damage is detected, replace it.

FRONT DISC BRAKE

Run Out Inspection

1. Using wheel nuts, fix the disc rotor to the wheels hub. (2 or more positions)
2. Using a dial indicator, check run out.

Measurement point:

At a point 10 mm (0.39 in) from the outer edge of the disc.

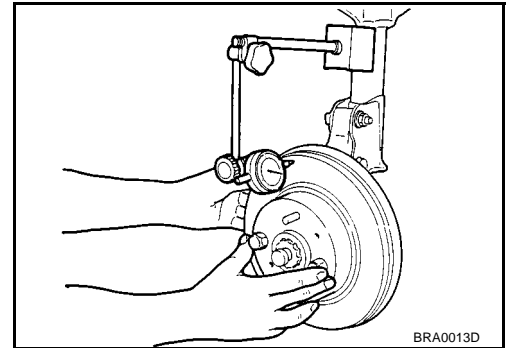
Run out limit:

0.07 mm (0.0028 in) or less

CAUTION:

Before measuring, make sure that the axle endplay is 0 mm (0 in).

3. If the run out is outside the limit, find the minimum run out point by shifting the mounting positions of the disc rotor and wheel hub by one hole.



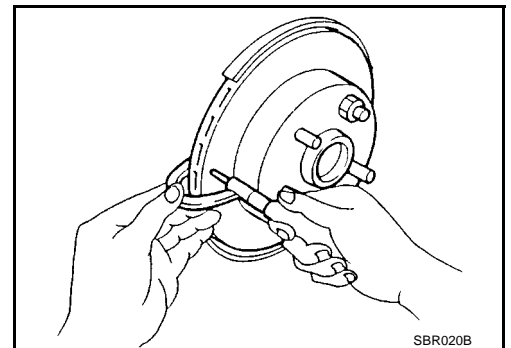
Thickness Inspection

Using a micrometer, check thickness of the disc rotor. If the thickness is outside the standard, replace the disc rotor.

Standard thickness : 28.0 mm (1.102 in)

Wear limit : 26.0 mm (1.024 in)

Maximum uneven wear (measured at 8 positions):
0.02 mm (0.0008 in) or less



ASSEMBLY

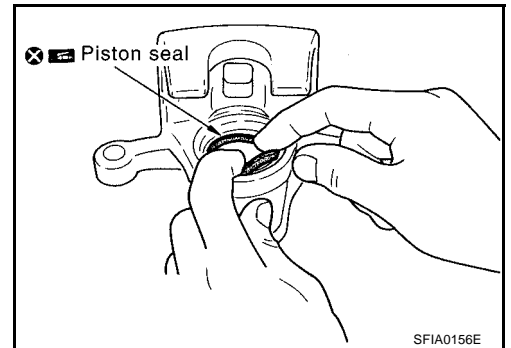
CAUTION:

When assembling, do not use rubber grease.

1. Apply rubber lubricant to piston seals, and install them to cylinder body.

CAUTION:

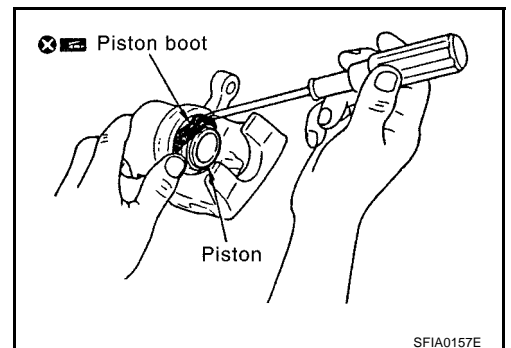
Do not reuse piston seals.



2. Apply brake fluid or rubber lubricant to piston boots. Cover piston end with piston boot. Install cylinder side lip on piston boot properly into groove on cylinder body.

CAUTION:

Do not reuse piston boot.

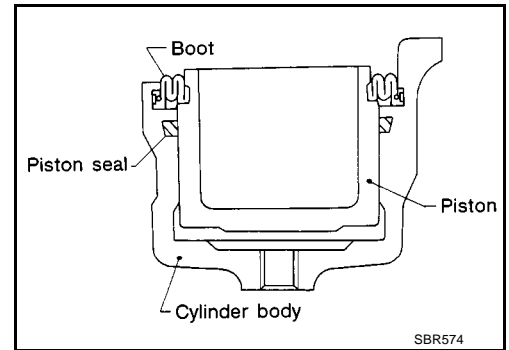


FRONT DISC BRAKE

3. Apply brake fluid to piston. Press piston into cylinder body by hand. Assemble piston side lip on piston boot properly into groove on piston.

CAUTION:

Press piston evenly and change pressing point to prevent cylinder inner wall from being rubbed.



BRAKE BURNISHING PROCEDURE

Burnish the brake contact surfaces according to the following procedure after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage.

CAUTION:

Only perform this procedure under safe road and traffic conditions. Use extreme caution.

1. Drive the vehicle on a straight smooth road at 50 km/h (31MPH).
2. Use medium brake pedal/foot effort to bring the vehicle to a complete stop from 50 km/h (31 MPH). Adjust brake pedal/foot pressure such that vehicle stopping time equals 3 to 5 seconds.
3. To cool the brake system, drive the vehicle at 50 km/h (31 MPH) for 1 minute without stopping.
4. Repeat steps 1 to 3, 10 times or more to complete the burnishing procedure.

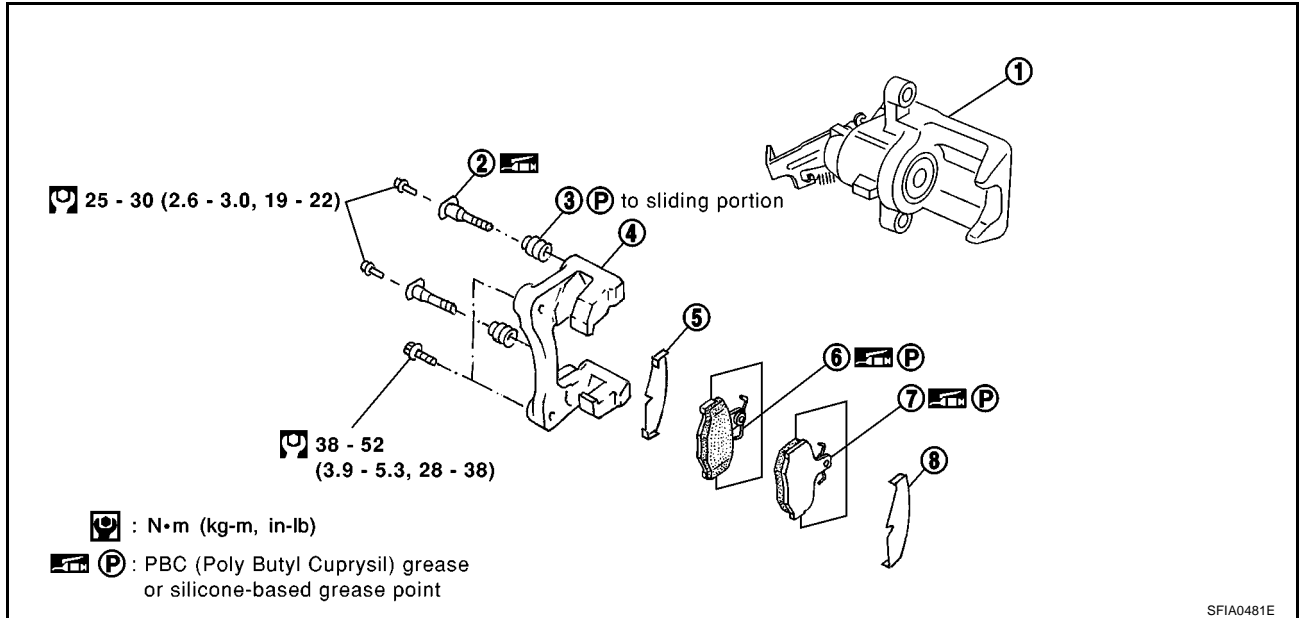
REAR DISC BRAKE

REAR DISC BRAKE

PFP:44000

Component

EFS002VD



- | | | |
|------------------|---------------|--------------|
| 1. Cylinder body | 2. Pin | 3. Pin boot |
| 4. Torque member | 5. Inner shim | 6. Inner pad |
| 7. Outer pad | 8. Outer shim | |

NOTE:

The cylinder body cannot be disassembled.

Inspection

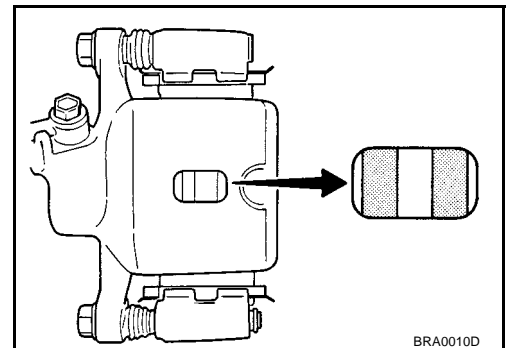
PAD WEAR INSPECTION

EFS002VE

Check pad thickness by lifting vehicle, removing the wheel, and looking through check hole on cylinder body. If necessary, use a scale.

standard thickness : 11 mm (0.433 in)

pad wear limit : 2.0 mm (0.079 in)



Pad Replacement

EFS002VF

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

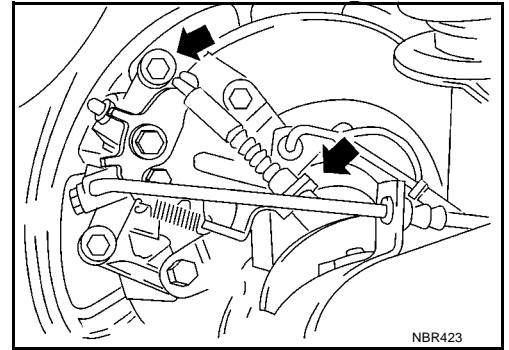
CAUTION:

- When cylinder body is open, do not depress brake pedal because piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.
- If shims are rusted or show peeling of rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.

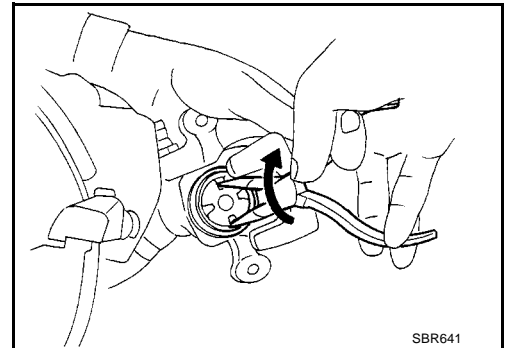
REAR DISC BRAKE

REMOVAL

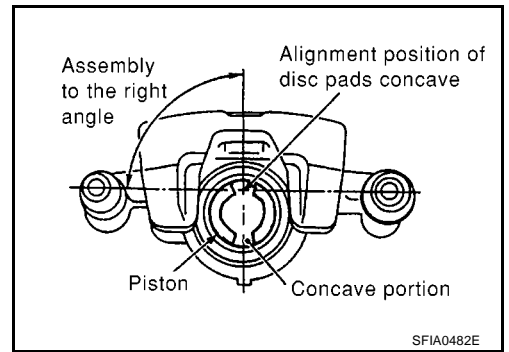
1. Remove master cylinder reservoir cap.
2. Remove brake cable lock spring.
3. Release parking brake control lever, then disconnect cable from the caliper.
4. Remove upper pin bolt.



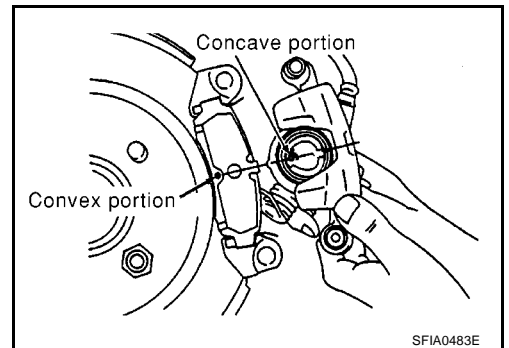
5. When installing new pads, push piston into cylinder body by gently turning piston clockwise, as shown.
Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.



6. Adjust the piston to the right angle as shown in the figure.



7. As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
8. Install brake cable, brake cable mounting bolt, lock spring and master cylinder reservoir cap.



REAR DISC BRAKE

EFS002VG

Caliper Removal and Installation

REMOVAL

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

1. Remove brake cable lock spring.
2. Release parking brake control lever, then disconnect cable from the caliper.
3. Remove torque member fixing bolts and connecting bolt.
4. Remove brake hose connecting bolt.
5. Plug off the brake hose and cylinder body to prevent air entering the system.

CAUTION:

Care should be taken as not to let:

- Air enter the cylinder body and brake hose.

INSTALLATION

CAUTION:

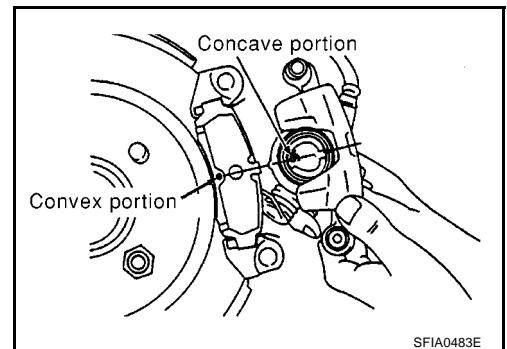
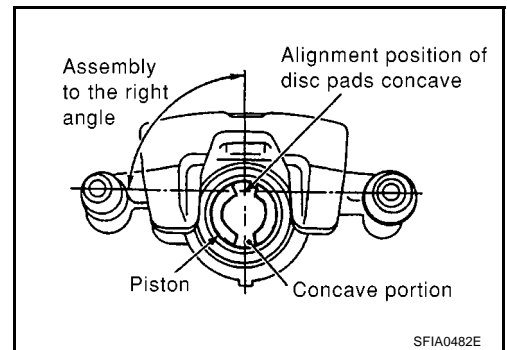
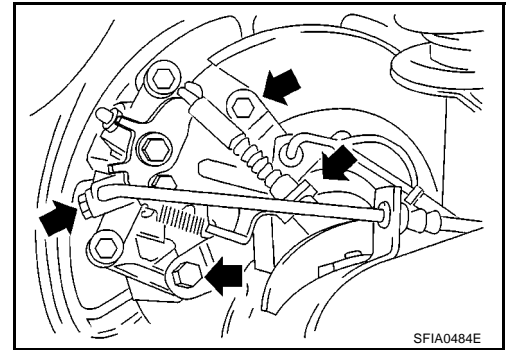
- Refill with new brake fluid "DOT 3" or "DOT 4".
- Never reuse drained brake fluid.
- Do not drain (factory) filled brake fluid from (new) caliper assemblies.

1. Install caliper assembly.
- As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
2. Remove the plug from the cylinder body and brake hose.

CAUTION:

Care should be taken as not to let:

- Air enter the cylinder body and brake hose.
 - Brake fluid spill from the cylinder body and brake hose.
3. Install brake hose to caliper securely.
 4. Install all parts and secure all bolts.
 5. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#)



Caliper Disassembly and Assembly

Remove pin bolts and pins.

NOTE:

Cylinder body can not be disassembled.

INSPECTION AFTER DISASSEMBLY

CALIPER

CAUTION:

Do not drain any brake fluid from cylinder body. Cylinder body can not be disassembled.

Cylinder body

Check cylinder body for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.

Torque Member

Check for wear, cracks or other damage. Replace if necessary.

EFS002VH

REAR DISC BRAKE

Pin and Pin Boot

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

DISC ROTOR INSPECTION

Visual Inspection

Check surface of the disc rotor for uneven wear, cracks and serious damage. If uneven wear, cracks or serious damage is detected, replace it.

Run Out Inspection

1. Using wheel nuts, fix the disc rotor to the wheels hub. (2 or more positions)
2. Using a dial indicator, check run out.

Measurement point:

At a point 10 mm (0.39 in) from the outer edge of the disc.

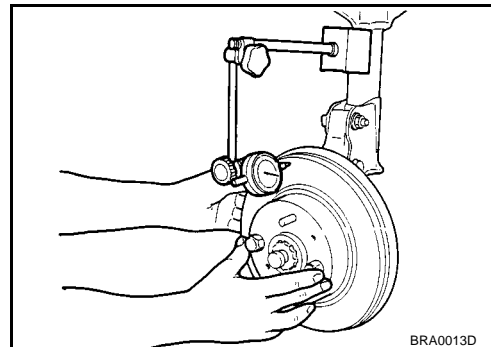
Run out limit:

0.15 mm (0.0059 in) or less

CAUTION:

Before measuring, make sure that the axle endplay is 0 mm (0 in).

3. If the run out is outside the limit, find the minimum run out point by shifting the mounting positions of the disc rotor and wheel hub by one hole.



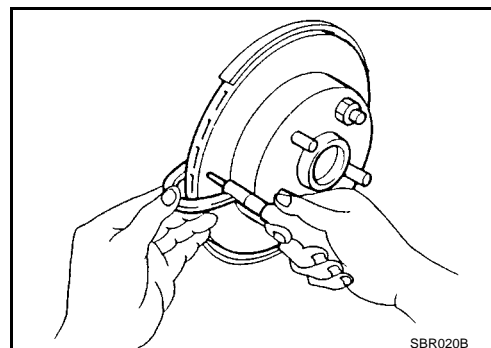
Thickness Inspection

Using a micrometer, check thickness of the disc rotor. If the thickness is outside the standard, replace the disc rotor.

Standard thickness : 10.0 mm (0.39 in)

Wear limit : 9.0 mm (0.35 in)

Maximum uneven wear (measured at 8 positions):
0.02 mm (0.0008 in) or less



SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EFS002VI

Unit: mm (in)

Front brake	Brake model	CL25VCG
	Cylinder bore diameter	57.2 (2.25)
	Pad Length x width x thickness	110.6 × 54.2 × 11.0 (4.34 × 2.134 × 0.433)
	Rotor outer diameter x thickness	280 × 28 (11.02 × 1.10)
Rear brake	Brake model	FNc38/11/11, FN11
	Cylinder bore diameter	38.0 (1.496)
	Pad Length x width x thickness	89.0 × 40.7 × 11.0 (3.504 × 1.602 × 0.433)
	Rotor outer diameter x thickness	278 × 10 (10.94 × 0.39)
Master cylinder	Cylinder bore diameter	22.22 (7/8)
Control valve	Valve model	Electronic control type
Brake booster	Booster model	V255
	Diaphragm diameter	225 (8.86)
Recommended brake fluid		DOT 3 or DOT 4

Brake Pedal

EFS002VJ

Free play (at pedal top surface)			3 - 11 mm (0.12 - 0.43 in)
Looseness at clevis pin (at pedal top surface)			1 - 3 mm (0.04 - 0.12 in)
Brake pedal height (from dash panel top surface)	M/T model		154.7 - 164.7 mm (6.09 - 6.48 in)
	A/T or CVT model		163.4 - 173.4 mm (6.43 - 6.83 in)
Depressed pedal height under force of 490 N (50 kg, 110.6 lb) (from dash panel top surface)	M/T model	Without ACC	83.2 mm (3.276 in) or more
		With ACC	85.8 mm (3.378 in) or more
	A/T or CVT model	Without ACC	91.9 mm (3.618 in) or more
		With ACC	94.5 mm (3.720 in) or more
Clearance between threaded end of stop lamp switch and pedal stopper			0.74 - 1.96 mm (0.0291 - 0.0772 in)

Check Valve

EFS002VK

Vacuum leakage [at vacuum of 66.7 kPa (-500 mmHg, -19.69 inHg)]	Within 1.3 kPa (10 mmHg, 0.39 inHg) of vacuum for 15 seconds
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Brake Booster

EFS002VL

Vacuum type

Vacuum leakage [at vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg)]	Within 3.3 kPa (25 mmHg, 0.98 inHg) of vacuum for 15 seconds
Input rod installation standard dimension	125 mm (4.92 in)

Front Disc Brake

EFS002VM

Brake type		CL25VCG
Brake pad	Standard thickness (new)	11.0 mm (0.433 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	28.0 mm (1.102 in)
	Repair limit thickness	26.0 mm (1.024 in)
	Runout limit	0.07 mm (0.0028 in)

SERVICE DATA AND SPECIFICATIONS (SDS)

Rear Disc Brake

EFS002VN

Brake type		FNc38/11/11, FN11
Brake pad	Standard thickness (new)	11.0 mm (0.433 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	10.0 mm (0.39 in)
	Repair limit thickness	9.0 mm (0.35 in)
	Runout limit	0.15 mm (0.0059 in)

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SERVICE DATA AND SPECIFICATIONS (SDS)
