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# SECTION BR

## BRAKE SYSTEM

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# PRECAUTIONS

## PRECAUTIONS

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### Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AFS0038C

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

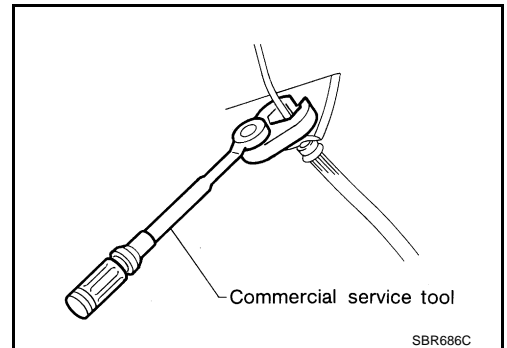
#### WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

### Precautions for Brake System

AFS0038D

- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing a brake tube and use a flare nut torque wrench when installing a brake tube.
- When installing brake piping, be sure to check torque.
- Before working, turn ignition switch OFF and disconnect connectors of VDC/TCS/ABS control unit or the battery cable from the negative terminal.
- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to [BR-30, "Brake Burnishing Procedure"](#) (Front: 2WD model), [BR-36, "Brake Burnishing Procedure"](#) (Front: AWD model), [BR-43, "Brake Burnishing Procedure"](#) (Rear).



#### WARNING:

- Collect dust on brake parts with dust collector. Do not blow off the dust.

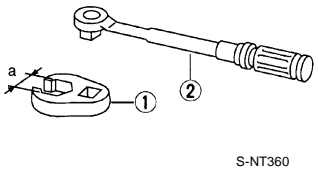
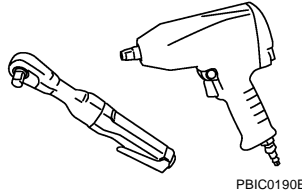
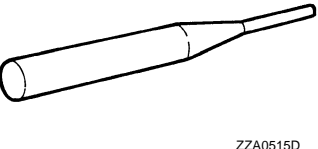
# PREPARATION

## PREPARATION

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### Commercial Service Tools

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Tool name	Description
<p>1. Flare nut crowfoot  a:10 mm (0.39 in) (Other)  a:12 mm (0.47 in) (Between VDC actuator and master cylinder)</p> <p>2. Torque wrench</p>	 <p>Installing brake piping</p>
<p>Power tool</p>	 <p>Removing front/rear caliper assembly and tire</p>
<p>Pin punch  Tip diameter: 4 mm (0.16 in) dia</p>	 <p>Removing and installing reservoir tank pin</p>



# BRAKE PEDAL

## BRAKE PEDAL

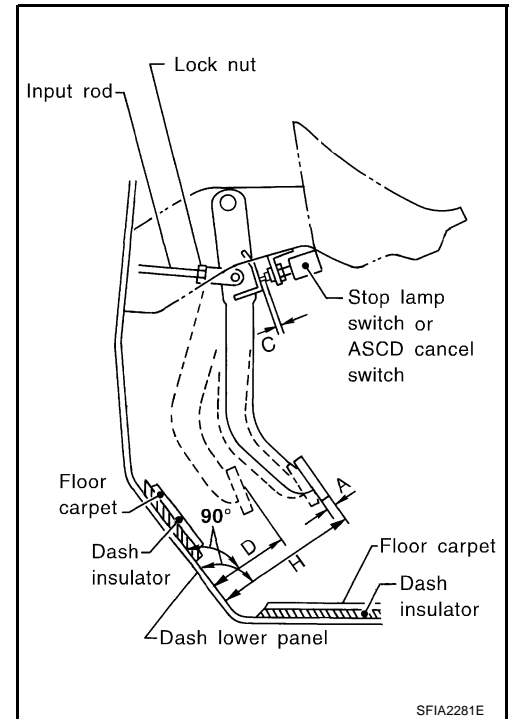
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### Inspection and Adjustment

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### PLAY AND CLEARANCE BETWEEN BRAKE PEDAL AND FLOOR PANEL WITH PEDAL DEPRESSED

1. Check brake pedal play.
2. Check brake pedal free height from dash lower panel.
3. Adjust the height referring to the following specifications.



SFIA2281E

H	Brake pedal free height (from dash panel top surface)	M/T model	154 - 164 mm (6.06 - 6.46 in)
		A/T model	162 - 172 mm (6.38 - 6.77 in)
D	Brake pedal depressed height (under a force of 490 N (50 kg, 110 lb) with the engine running)	M/T model	90 mm (3.54 in) or more
		A/T model	95 mm (3.74 in) or more
C	Clearance between stopper rubber and the threaded end of stop lamp switch and ASCD cancel switch.		0.74 - 1.96 mm (0.0291 - 0.0772 in)
A	Pedal play		3 - 11 mm (0.12 - 0.43 in)

# BRAKE PEDAL

## ADJUSTMENT

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

### CAUTION:

Make sure that the threaded end of input rod stays inside clevis.

Lock nut (A) :

Refer to [BR-21, "COMPONENTS"](#) .

3. With the pedal pulled and held by hand, press stop lamp switch and ASCD cancel switch until its threaded end contacts stopper rubber.
4. With the threaded end of stop lamp switch and ASCD cancel switch contacting stopper rubber, rotate the switch clockwise by 45° to secure.

### CAUTION:

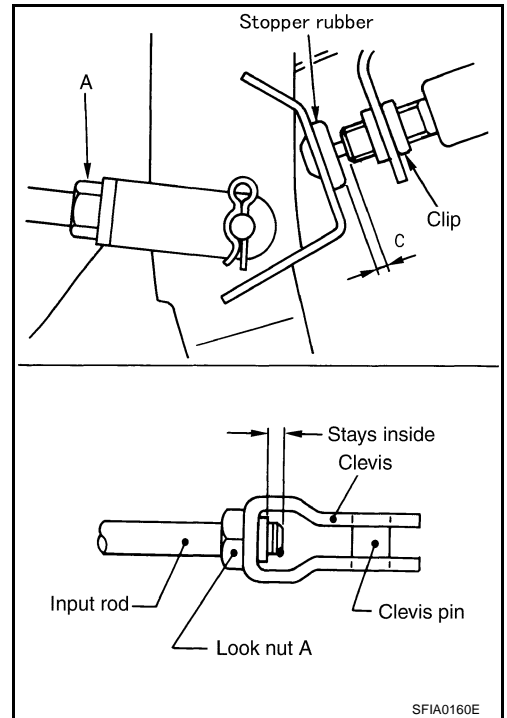
Make sure that the clearance (C) between stopper rubber and threaded end of stop lamp switch and ASCD cancel switch is within the standard.

5. Check the pedal play.

### CAUTION:

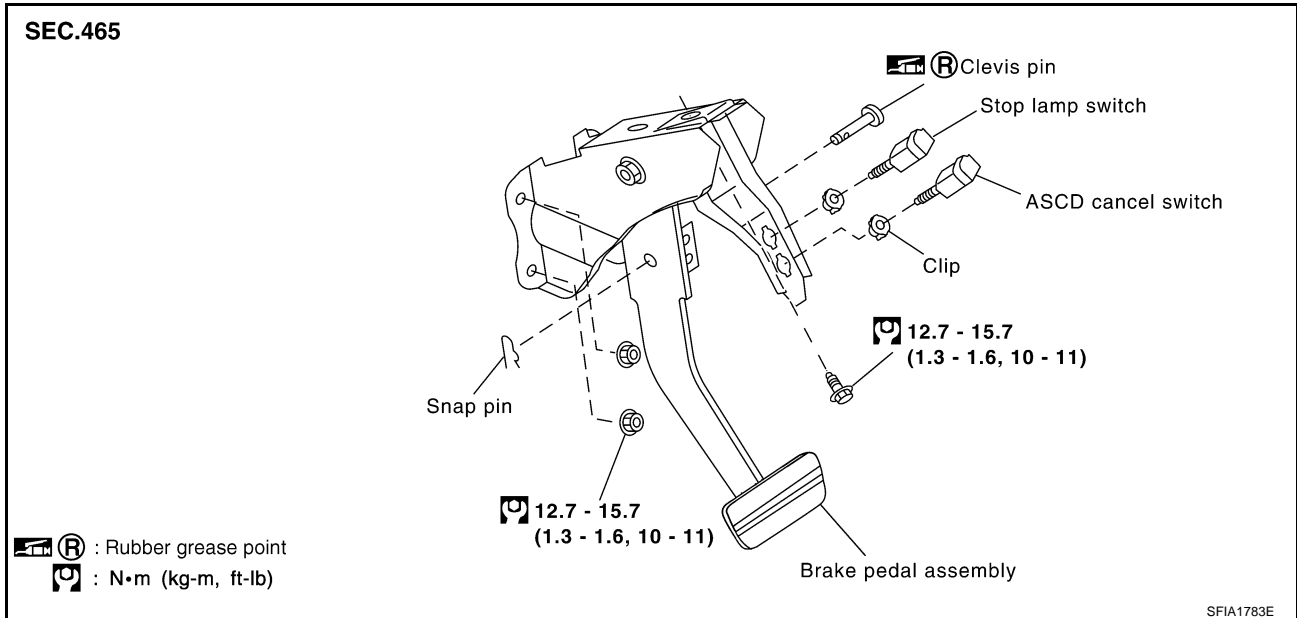
Make sure that stop lamps go off when pedal is released.

6. Start engine to check brake pedal depressed height.



## Removal and Installation COMPONENT PARTS LOCATION

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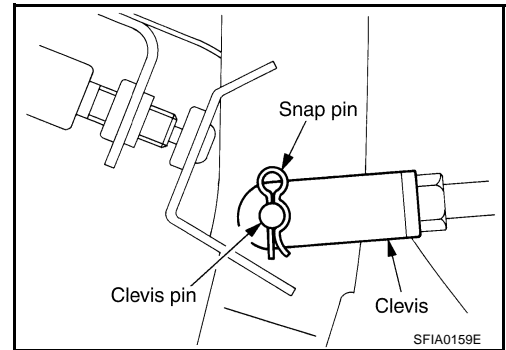


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# BRAKE PEDAL

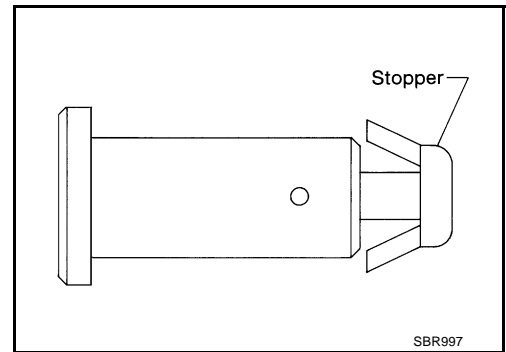
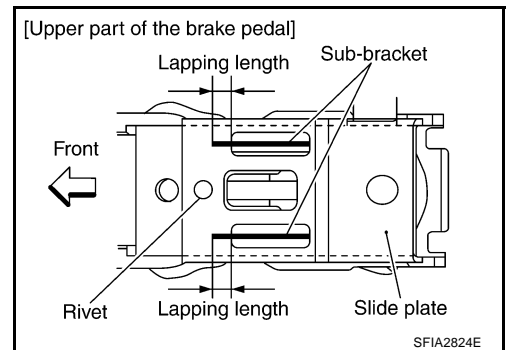
## REMOVAL

1. Remove the instrument lower driver panel. Refer to [IP-13, "\(J\) Instrument Driver Lower Panel"](#).
2. Remove stop lamp switch and ASCD cancel switch from pedal assembly.
3. Remove snap pin and clevis pin from clevis of brake booster.
4. Remove mounting nuts and bolt from bracket, and remove pedal assembly from vehicle.



## INSPECTION AFTER REMOVAL

- Check brake pedal upper rivet for deformation.
  - Make sure that the lapping length of sub-bracket and slide plate is at least 5.5 mm (0.22 in).
  - Check brake pedal for bend, damage, and cracks on the welded parts.
  - Replace brake pedal assembly if any non-standard condition is detected.
- 
- Check clevis pin and plastic stopper for damage and deformation. Replace clevis pin if there are.



## INSTALLATION

Installation is in the reverse order of the removal.

- After installing brake pedal assembly to vehicle, adjust brake pedal. Refer to [BR-7, "ADJUSTMENT"](#).



# BRAKE FLUID

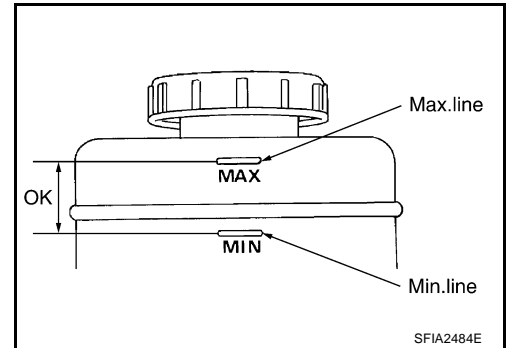
## BRAKE FLUID

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### Checking Brake Fluid Level

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- Check fluid level in reservoir tank. It should be between Max and Min lines on reservoir tank.
- If fluid level is extremely low, check brake system for leaks.
- Release parking brake lever or pedal, and then see if brake warning lamp goes off. If not, check brake system for leaks.

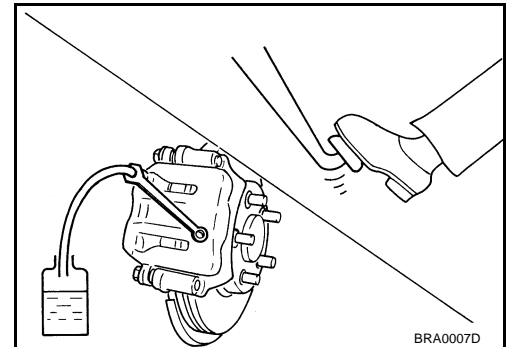


### Drain and Refill

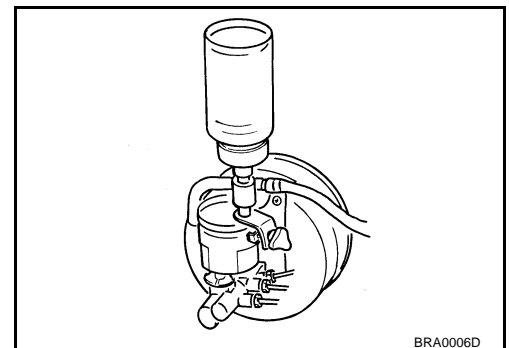
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#### CAUTION:

- Carefully monitor brake fluid level in reservoir tank during draining operation.
  - Refill with new brake fluid "DOT3".
  - Never reuse drained brake fluid.
  - Do not let brake fluid splash on painted surfaces of body. This might damage the paint, when splashing it on the surfaces, immediately wipe off the m with cloth and wash it away with water.
1. Turn ignition switch OFF and remove the battery cable from the negative terminal.
  2. Connect a vinyl tube to bleed valve.
  3. Depress brake pedal, loosen bleed valve, and gradually remove brake fluid.



4. Make sure there is no foreign material in the reservoir tank, and refill with new brake fluid.
5. Rest foot on brake pedal. Loosen bleed valve. Slowly depress pedal until it stops. Tighten bleed valve. 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. Bleed Air. Refer to [BR-10, "Bleeding Brake System"](#) .



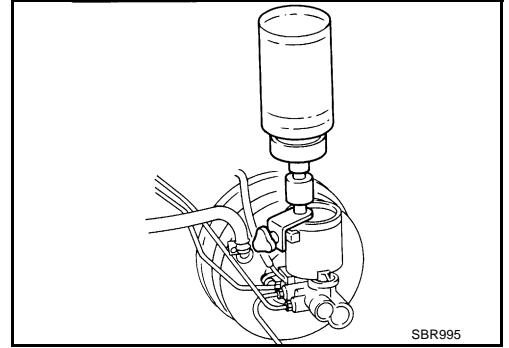
# BRAKE FLUID

## Bleeding Brake System

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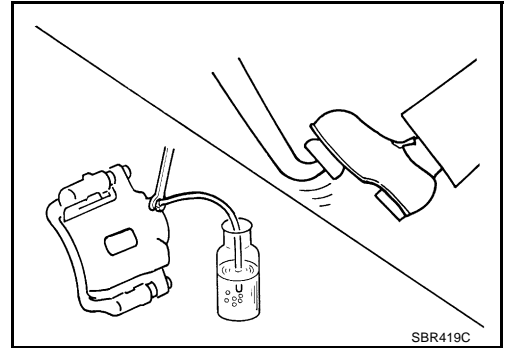
### CAUTION:

- Carefully monitor brake fluid level in reservoir tank during bleeding operation.
- Fill reservoir with new brake fluid "DOT 3". Make sure it is at least half way at all times while bleeding air out of system.
- Place a container under master cylinder to avoid spillage of brake fluid.
- Turn ignition switch OFF and disconnect VDC actuator connectors or the battery cable from negative terminal.



- **Bleed air in the following order. Right rear brake → Left front brake → Left rear brake → Right front brake**

1. Connect a transparent vinyl tube to bleed valve.
2. Fully depress brake pedal several times.
3. With brake pedal depressed, open bleed valve to release air.
4. Close bleed valve.
5. Release brake pedal slowly.
6. Repeat steps 2 through 5 until clear brake fluid comes out of bleed valve.



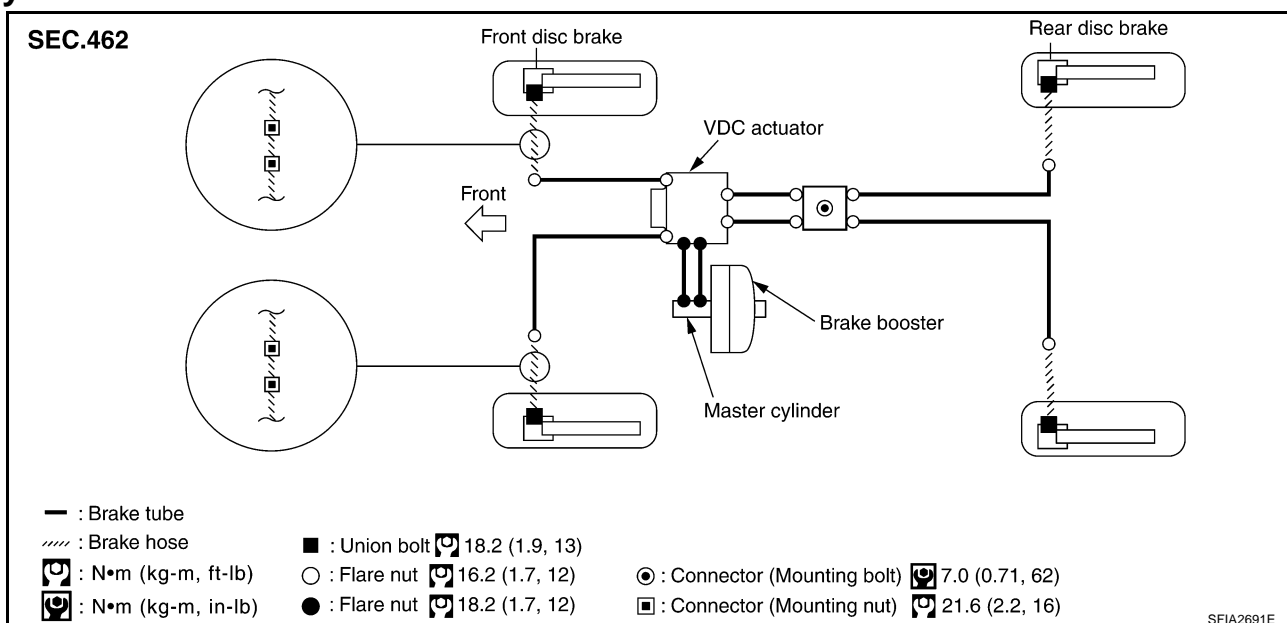
# BRAKE PIPING AND HOSE

## BRAKE PIPING AND HOSE

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### Hydraulic Circuit

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### CAUTION:

- All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.
- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.
- The brake tubes and hoses are an important safety parts. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted surfaces of body, immediately wipe it off with cloth and then wash it away with water.
- Do not bend or twist brake hose sharply, or strongly pull it.
- When removing components, cover brake line connections so that no dirt, dust, or other foreign matter gets in.
- Refill with new brake fluid "DOT 3".
- Do not reuse drained brake fluid.

### Front Brake Piping and Hose REMOVAL

AFS0000C

1. Drain brake fluid. Refer to [BR-9, "Drain and Refill"](#).
2. Using a flare nut wrench, remove brake tube from brake hose. Remove union bolt, and remove brake hose from caliper assembly.
3. Remove lock plate.
4. Remove mounting nuts, and remove brake hose from vehicle.

### INSTALLATION

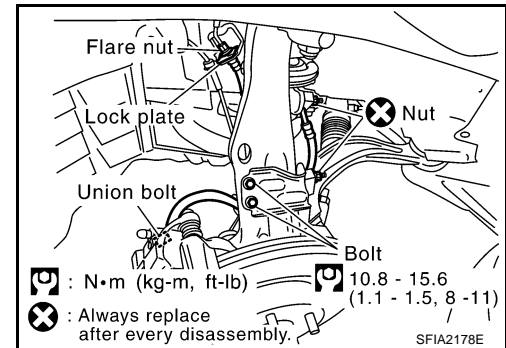
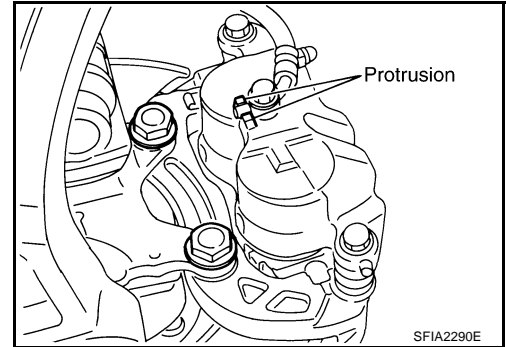
1. Assemble union bolt and copper washers to brake hose.

## BRAKE PIPING AND HOSE

2. Position the metal fitting of brake hose by aligning with the protrusion on the caliper assembly, and tighten union bolt to the specified torque.

### CAUTION:

- Do not reuse copper washer.
- Refill with new brake fluid "DOT3".
- Never reuse drained brake fluid.

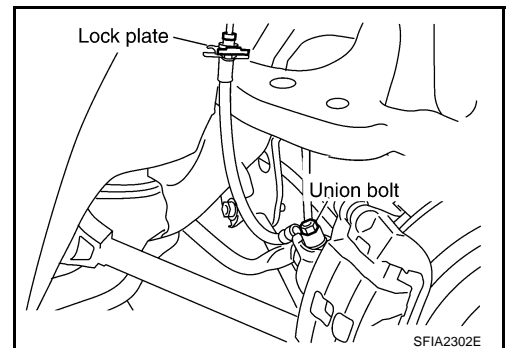


3. Connect brake hose to brake tube on vehicle, and temporarily tighten flare nut by hand until as much as possible. Fix it with lock plate, and tighten flare nut to the specified torque with a flare nut torque wrench.
4. Install brake hose to vehicle, and tighten mounting nuts to the specified torque.
5. After the work, bleed air. Refer to [BR-10, "Bleeding Brake System"](#) .

## Rear Brake Piping and Hose REMOVAL

AFS0000D

1. Drain brake fluid. Refer to [BR-9, "Drain and Refill"](#) .
2. Using a flare nut wrench, remove brake tube from brake hose.
3. Remove union bolt, and then remove brake hose from caliper assembly.
4. Remove lock plate, and remove brake hose from vehicle.



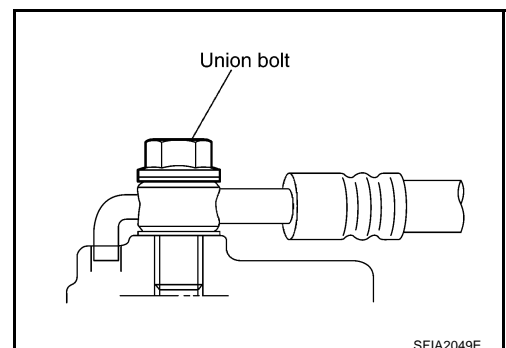
## INSTALLATION

1. Assemble union bolt and copper washers to brake hose.
2. Position the L-shape metal fitting of the brake hose to the brake caliper assembly positioning hole, and then tighten union bolt to the specified torque.

### CAUTION:

- Do not reuse copper washer.
- Refill with new brake fluid "DOT3".
- Never reuse drained brake fluid.

3. Connect brake hose to brake tube on the vehicle, and temporarily tighten flare nut by hand as much as possible. Secure it to bracket with lock plate, and tighten flare nut to the specified torque with a flare nut torque wrench.
4. After the work, bleed air. Refer to [BR-10, "Bleeding Brake System"](#) .



# BRAKE PIPING AND HOSE

## Inspection After Installation

AFS0000E

### **CAUTION:**

**If leak is detected at the connections, retighten it or replace the damaged part.**

1. Check brake hose, tube, and connections for fluid leaks, damage, twist, deformation, contact with other parts, and loose connections.
2. While depressing pedal under a force of 785 N (80 kg, 177 lb) with the engine running for approximately 5 seconds, check for fluid leak from each part.

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# BRAKE MASTER CYLINDER

## BRAKE MASTER CYLINDER

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### On-Board Inspection LEAK INSPECTION

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- Check for leaking in a master cylinder installation surface, a reservoir tank installation surface, and brake tube connections.

### Removal and Installation

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#### CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, immediately wipe it off with cloth and wash it away with water.
- Do not operate with primary piston when removing and installing.

#### REMOVAL

1. Drain brake fluid. Refer to [BR-9, "Drain and Refill"](#) .
2. Remove harness connector for brake fluid level switch.
3. Using a flare nut wrench, remove brake tube from master cylinder.
4. Remove mounting nuts, and remove master cylinder assembly from vehicle. Refer to [BR-21, "Removal and Installation"](#) .

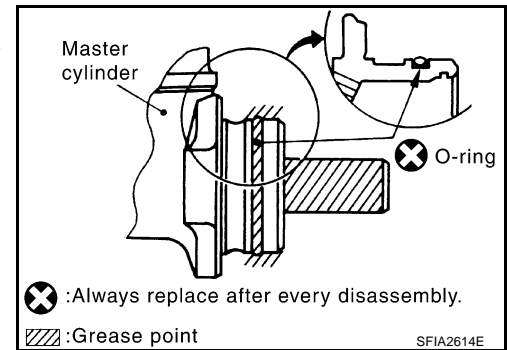
#### INSTALLATION

#### CAUTION:

- Refill with new brake fluid "DOT3".
  - Never reuse drained brake fluid.
1. Install master cylinder to brake booster assembly, and tighten mounting nuts to the specified torque.

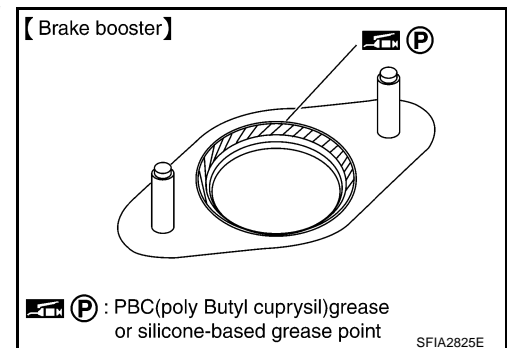
#### CAUTION:

- Check if the lot of primary piston has dust or scratch.
- Do not damage and stain rod of primary piston.
- Do not reuse O-ring.
- Apply silicon grease or brake fluid for O-ring and primary piston.



AWD model

- Apply silicon grease to the master cylinder insertion of brake booster.



2. Install brake tube to master cylinder, and temporarily tighten the flare nuts on the brake tube to master cylinder by hand.
3. Using a flare nut torque wrench, tighten flare nut on the brake tube to the specified torque.
4. Install harness connector of brake fluid level switch.

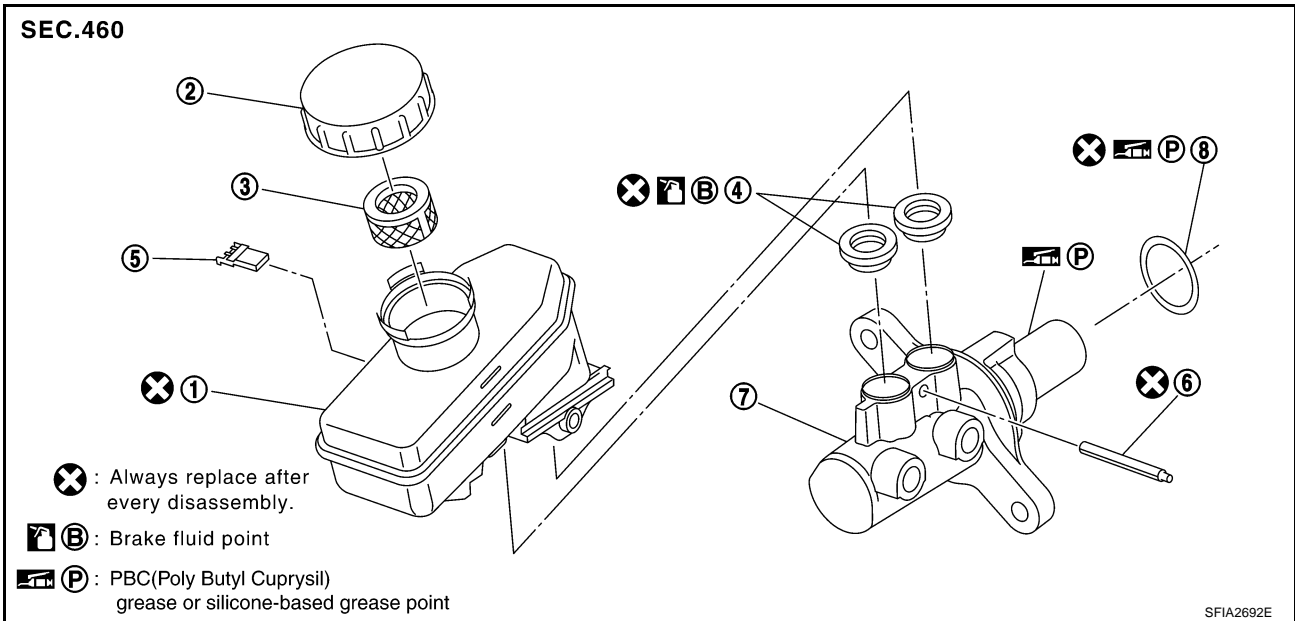
# BRAKE MASTER CYLINDER

5. Refill new brake fluid and bleed air. Refer to [BR-10, "Bleeding Brake System"](#).

## Disassembly and Assembly COMPONENTS

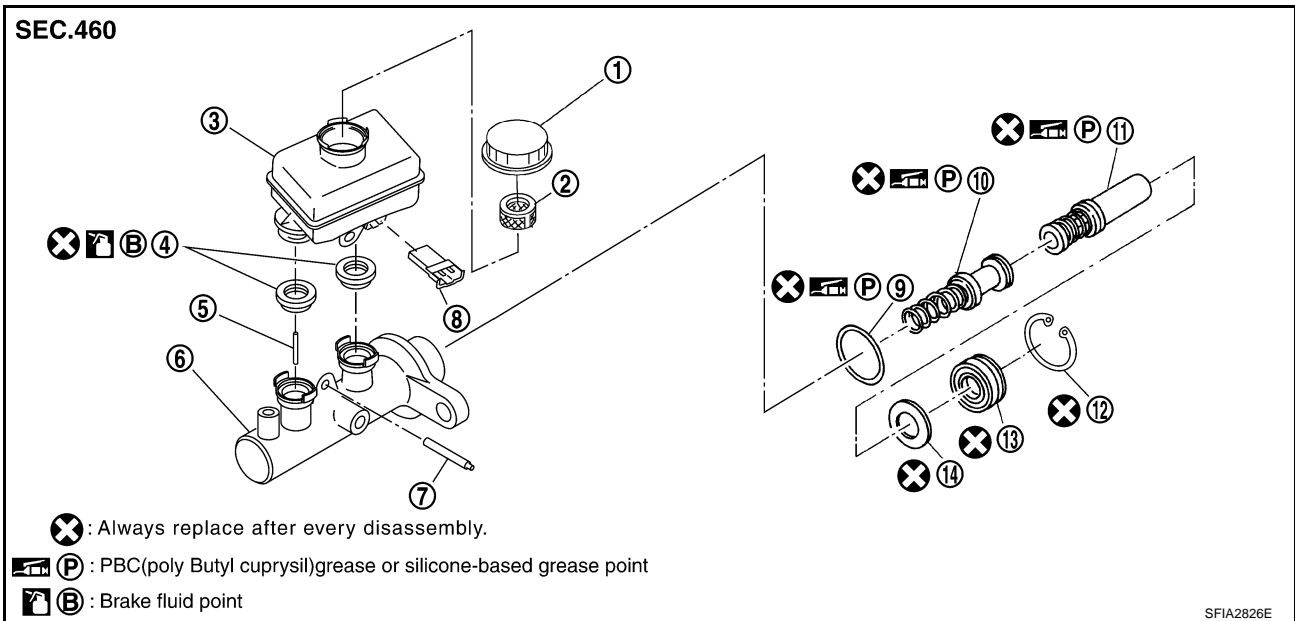
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### 2WD model



- |                   |                                       |               |
|-------------------|---------------------------------------|---------------|
| 1. Reservoir tank | 2. Reservoir cap                      | 3. Oil filter |
| 4. Grommet        | 5. Brake fluid level switch connector | 6. Pin        |
| 7. Cylinder body  | 8. O-ring                             |               |

### AWD model



- |                               |                                       |                   |
|-------------------------------|---------------------------------------|-------------------|
| 1. Reservoir cap              | 2. Oil filter                         | 3. Reservoir tank |
| 4. Grommet                    | 5. Piston stopper                     | 6. Cylinder body  |
| 7. Pin                        | 8. Brake fluid level switch connector | 9. O-ring         |
| 10. Secondary piston assembly | 11. Primary piston assembly           | 12. Snap-ring     |
| 13. Guide assembly            | 14. Plate                             |                   |

## DISASSEMBLY (FOR 2WD MODEL)

### CAUTION:

- Master cylinder cannot be disassembled.

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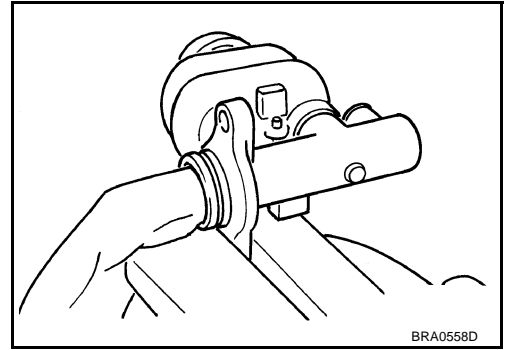
# BRAKE MASTER CYLINDER

- Remove the reservoir tank only when absolutely necessary.

1. Clamp flange of cylinder body in vise as shown in the figure.

**CAUTION:**

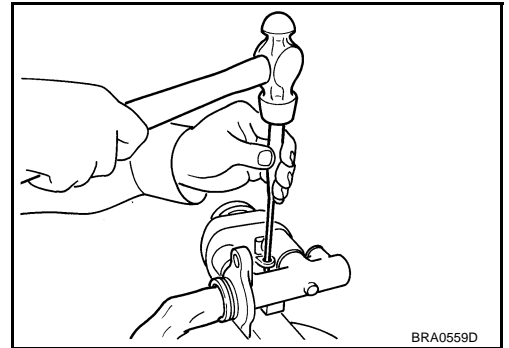
- Using copper plate or cloth to cover flange for securing vise.
- When securing master cylinder assembly in a vise, be sure not to over tighten.
- Be sure to fix the flange part with the installation side of cylinder body brake tube up.



2. Using a pin-punch [commercial service tool: diameter approx. 4 mm (0.16 in)], remove pin from reservoir tank.

3. Remove master cylinder assembly from vise.

4. Remove reservoir tank and grommet from cylinder body.



## ASSEMBLY (FOR 2WD MODEL)

**CAUTION:**

- Do not use mineral oils such as kerosene, gasoline during the cleaning and assembly process.
  - Do not drop parts. If a part is dropped, do not use it.
1. Apply brake fluid to a grommet, and place it into master cylinder to install.

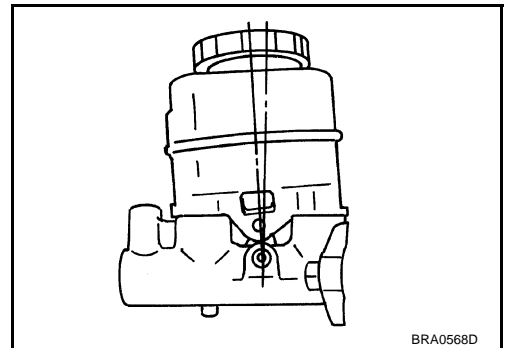
**CAUTION:**

Do not reuse grommet.

2. Install reservoir tank to master cylinder.

**CAUTION:**

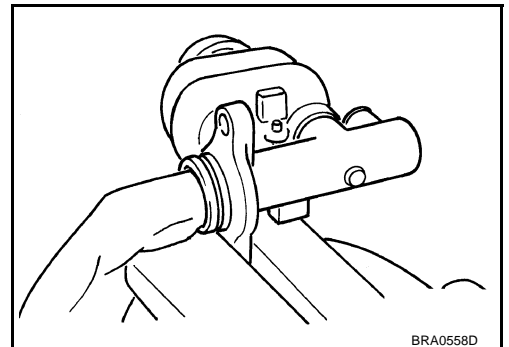
- Do not reuse reservoir tank and reservoir tank mounting pin.
- Pay attention to the orientation of reservoir tank.



3. Secure flange of cylinder body as shown in the figure.

**CAUTION:**

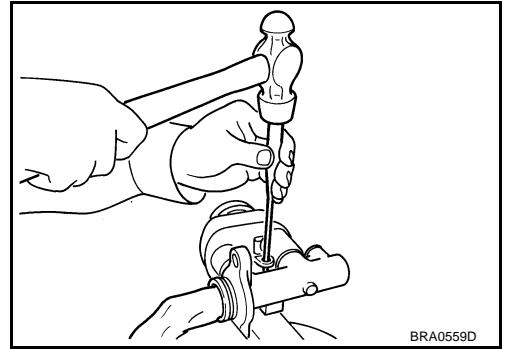
- Using copper plate or cloth to cover flange when securing in a vise.
- When securing master cylinder assembly in a vise, be sure not to over tighten.
- Be sure to fix the flange part with the brake tube installation side of cylinder body up.





# BRAKE MASTER CYLINDER

- Using a pin punch [commercial service tool: diameter approx. 4 mm (0.16 in)], insert the reservoir tank mounting pin into the pin hole so that the attachment side and the opposite side are identical.

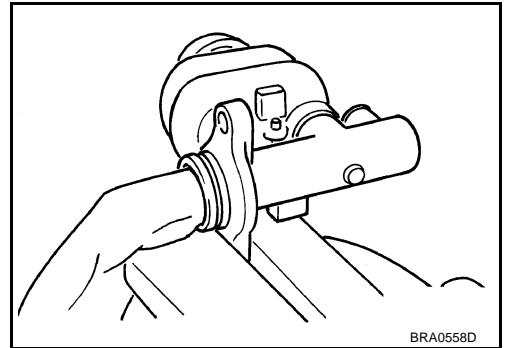


## DISASSEMBLY (FOR AWD MODEL)

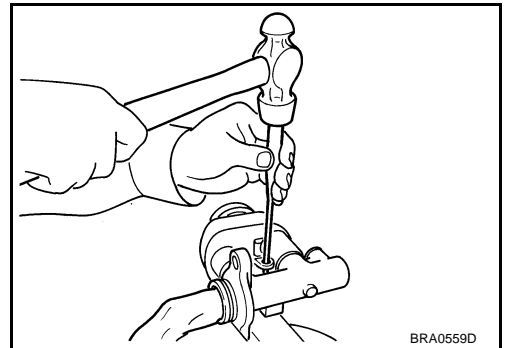
- Secure flange of cylinder body in vise shown in the figure.

### CAUTION:

- Using copper plate or cloth to cover flange for fixing vise.
- When securing master cylinder assembly in a vise, be sure not to over tighten.
- Be sure to fix the flange part with the brake tube installation side of cylinder body down.



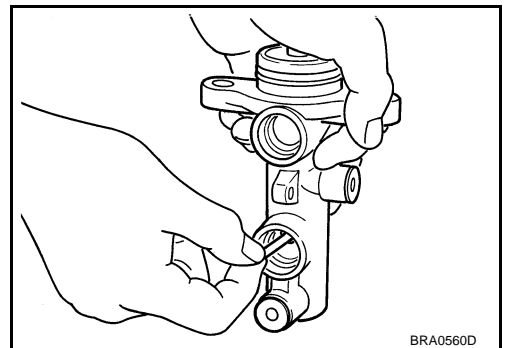
- Using a pin-punch [commercial service tool: diameter approx. 4 mm (0.16 in)], remove pin from reservoir tank.
- Remove master cylinder assembly from vise.
- Remove reservoir tank and grommet from cylinder body.



- While pushing primary piston, remove piston stopper through secondary tank boss hole in the cylinder body.

### CAUTION:

Be careful not to damage the inner wall of cylinder.



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# BRAKE MASTER CYLINDER

6. Remove snap ring with pushing primary piston.

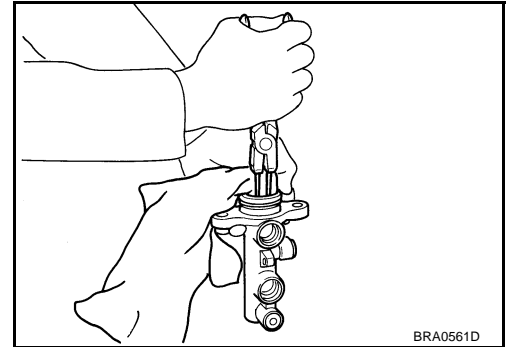
**CAUTION:**

**Be careful not to pop out piston.**

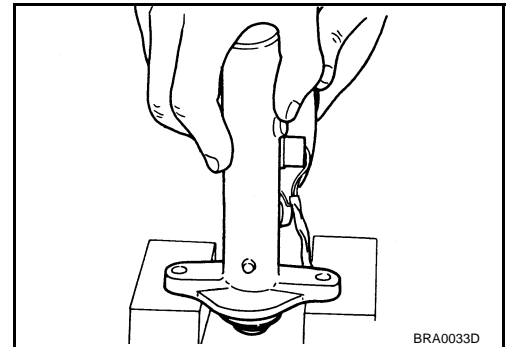
7. Holding rod of primary piston, remove primary piston assembly, plate and guide assembly with pulling straight to prevent piston cup from being caught by the inner wall of cylinder.
8. Remove plate and guide assembly from primary piston.

**CAUTION:**

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



9. Tap flange using a soft block such as wood, and carefully pull secondary piston assembly straight out to prevent cylinder inner wall from being damaged.



## INSPECTION AFTER DISASSEMBLY

Inspect the next items.

### Cylinder Body

- Check the inner wall of cylinder for damage, wear, corrosion, and pin holes. Replace cylinder if a malfunction is detected.

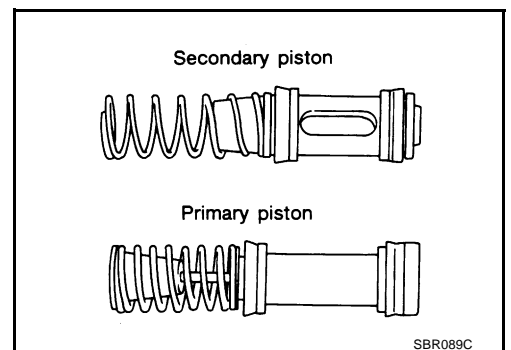
## ASSEMBLY (FOR AWD MODEL)

**CAUTION:**

- **Never use mineral oils such as kerosene or gasoline during the cleaning and assembly processes.**
  - **Make sure that there is no foreign material such as dirt and dust on the inner wall of cylinder, piston, and piston cup. Be careful not to damage parts with a service tool when assembling.**
  - **Do not drop parts. Do not use any dropped parts.**
1. Apply brake fluid to the inner wall of cylinder body, primary piston assembly and secondary piston assembly.
  2. Insert secondary piston and primary piston assembly into cylinder body in this order.

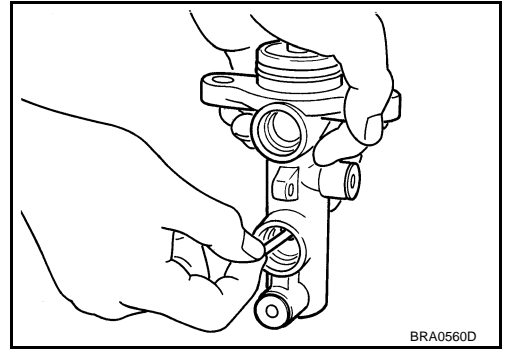
**CAUTION:**

- **Do not reuse primary and secondary piston assemblies.**
- **Always replace inner kit as a set.**
- **Pay attention to the orientation of piston cup, and insert straight to prevent cup from being caught by the inner wall of cylinder.**



# BRAKE MASTER CYLINDER

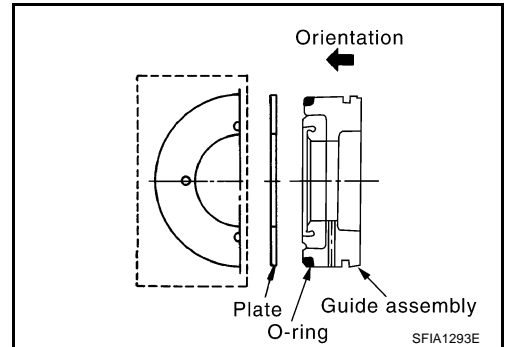
3. Set the slit of secondary piston towards the piston stopper mounting hole of cylinder body. And then install the piston stopper through the slit of secondary piston.



4. Insert plate and guide assembly into cylinder body.

**CAUTION:**

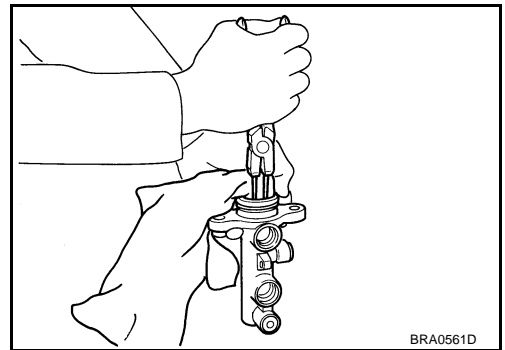
- Be careful not to damage rod of primary piston.
- Pay attention to the orientation of guide assembly.
- Do not drop O-ring.
- Be careful the guide and/or plate are not inserted at an angle to cylinder inner wall.



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

**CAUTION:**

- Make sure that snap ring is securely engaged in cylinder body inner diameter groove.
- Do not reuse snap ring.



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

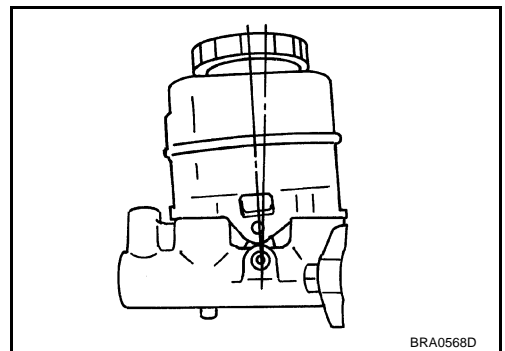
**CAUTION:**

**Do not reuse grommet.**

7. Install reservoir tank to master cylinder.

**CAUTION:**

**Pay attention to the orientation of reservoir tank.**



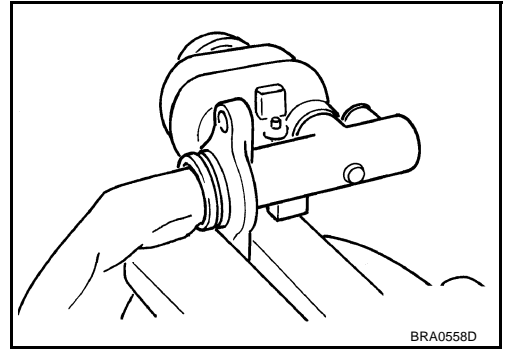
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## BRAKE MASTER CYLINDER

8. Secure flange of cylinder body as shown in the figure.

**CAUTION:**

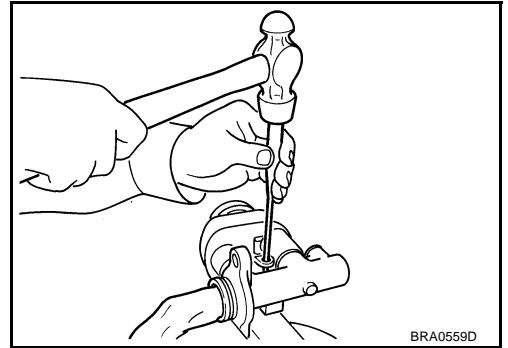
- Using copper plate or cloth to cover flange for securing in the vise.
- When securing master cylinder assembly in a vise, be sure not to over tighten.
- Be sure to secure the flange part with the brake tube installation side down.



9. Using a pin punch [commercial service tool: diameter approx. 4 mm (0.16 in)], insert the reservoir tank mounting pin into the pin hole so that the insertion side and the opposite side are identical.

**CAUTION:**

- Pay attention to the orientation of piston cup, and insert straight to prevent cup from being caught by the inner wall of cylinder.



# BRAKE BOOSTER

## BRAKE BOOSTER

PF0:47200

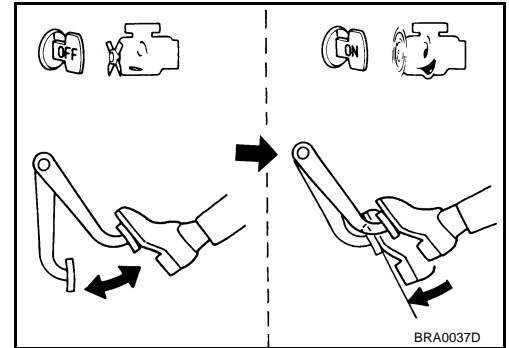
### On-Vehicle Service OPERATING CHECK

AFS0000G

With the engine stopped, change the vacuum to the atmospheric pressure by depressing brake pedal several times. Then with brake pedal fully depressed, start engine and when the vacuum pressure reaches the standard, make sure that the clearance between brake pedal and floor panel decreases.

**CAUTION:**

Depressing pedal interval is approximately 5 seconds.

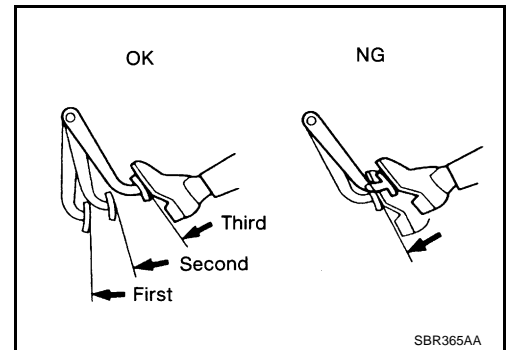


### AIRTIGHT CHECK

- Run engine at idle for approximately 1 minute, and stop it after applying vacuum to booster. Depress brake pedal normally to change the vacuum to the atmospheric pressure. Make sure that distance between brake pedal and floor panel gradually increases.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for 30 seconds.

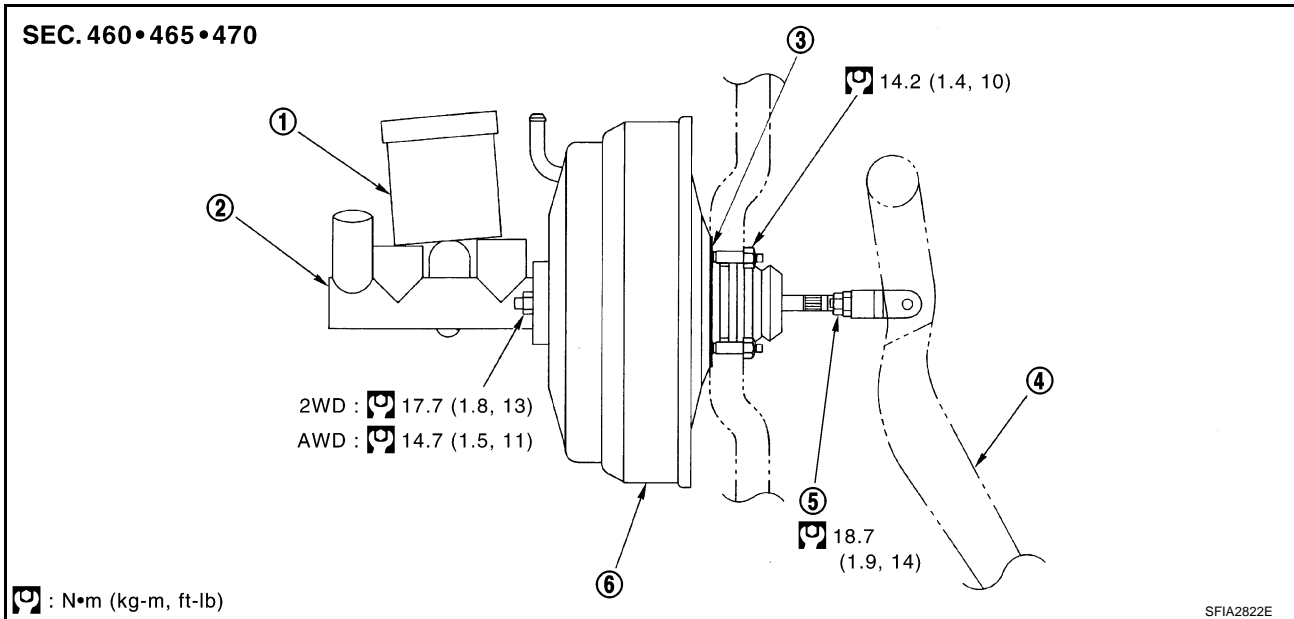
**CAUTION:**

Depressing pedal interval is approximately 5 seconds.



### Removal and Installation COMPONENTS

AFS0000H



- |                   |                  |                  |
|-------------------|------------------|------------------|
| 1. Reservoir tank | 2. Cylinder body | 3. Gasket        |
| 4. Brake pedal    | 5. Lock nut      | 6. Brake booster |

### REMOVAL

**CAUTION:**

- Be careful not to splash brake fluid on painted areas such as body. It may cause paint damage. If brake fluid is splashed on painted surfaces of body, wipe it off with cloth immediately and then, wash it away with water.
- Be careful not to deform or bend brake piping while removing and installing brake booster.

# 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, dash panel may damage the threads.
  - Be sure to install check valve in the correct orientation.
1. Remove vacuum hose from brake booster.
  2. Remove master cylinder. Refer to [BR-14, "Removal and Installation"](#) .
  3. Remove snap pin and clevis pin on the clevis of the brake booster, and remove input rod from brake pedal. Refer to [BR-7, "COMPONENT PARTS LOCATION"](#) .
  4. Remove brake pedal mounting nuts on pedal bracket.
  5. Remove brake booster assembly from dash panel.

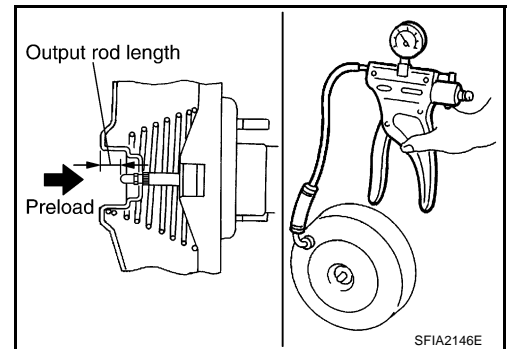
## INSPECTION AFTER REMOVAL

### Output Rod Length Inspection

1. Using a handy vacuum pump, apply a vacuum of  $-66.7$  kPa ( $-500$  mmHg,  $-19.69$  inHg) to brake booster.
2. Check output rod length.

**Standard dimension when vacuuming  
 $-66.7$  kPa ( $-500$  mmHg,  $-19.69$  inHg)**

**2WD: 30.5 mm (1.20 in)  
AWD: 6.2 mm (0.24 in)**

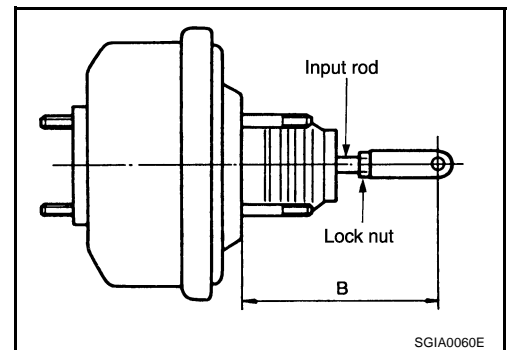


## INSTALLATION

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

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

2. After adjusting length "B", temporarily tighten lock nut to install brake booster assembly to dash panel. At this time, make sure to install a gasket between booster assembly and dash panel.
3. Connect brake pedal to clevis of input rod with the clevis pin and snap pin.
4. Install brake pedal bracket mounting nuts and tighten them to the specified torque.
5. Install vacuum hose into brake booster. Refer to [BR-23, "Removal and Installation"](#) .
6. Install master cylinder to booster assembly. Refer to [BR-14, "Removal and Installation"](#) .
7. Adjust the height and play of brake pedal. Refer to [BR-7, "ADJUSTMENT"](#) .
8. Tighten lock nut of input rod to the specified torque.
9. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#) .



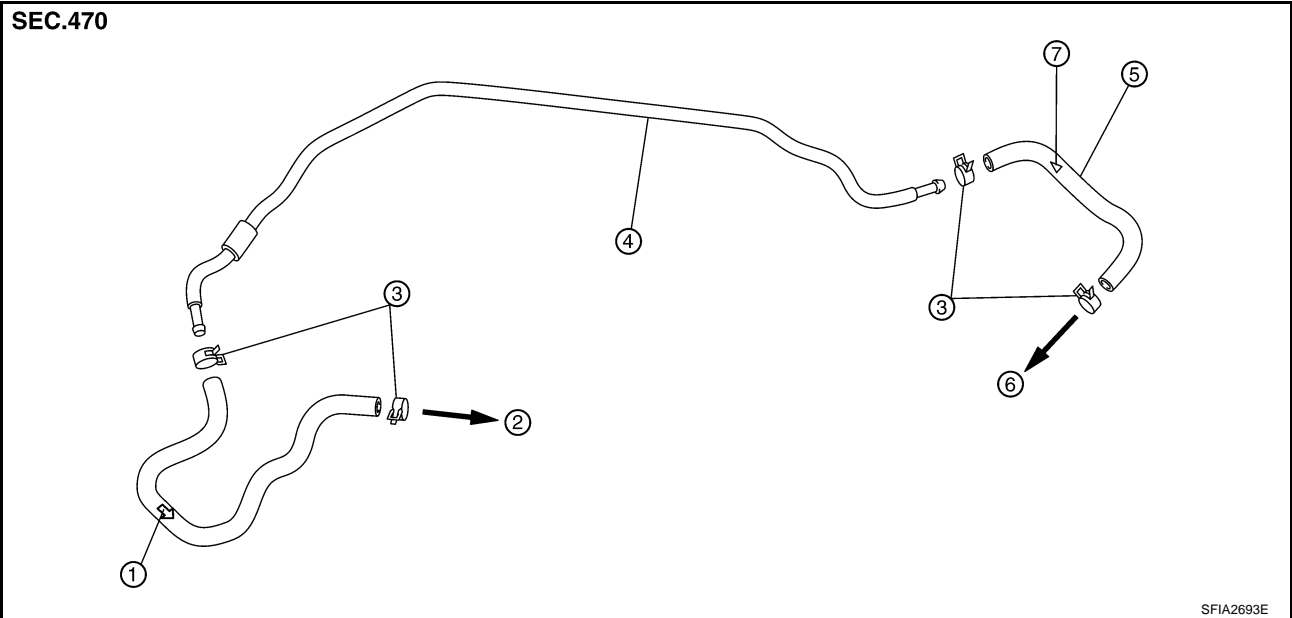
# VACUUM LINES

## VACUUM LINES

PFP:41920

### Removal and Installation

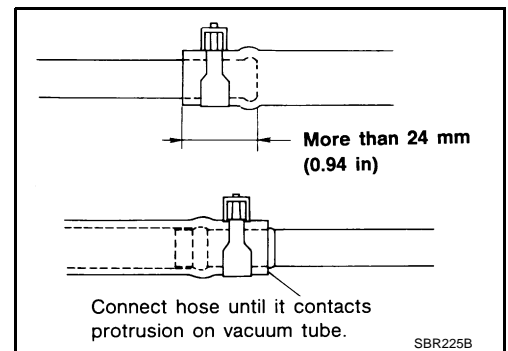
AFS0007E



- |   |                        |                      |
|---|------------------------|----------------------|
| 1. Engine direction indicator stamp<br>(built in check valve) | 2. For intake manifold | 3. Clamp             |
| 4. Vacuum piping  | 5. Vacuum hose         | 6. For brake booster |
| 7. Orifice mark (2WD models)                                  |                        |                      |

#### 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. Brake booster will not operate normally if hose is installed in the wrong direction.
- Insert vacuum hose for at least 24 mm (0.94 in).
- Never use lubricating oil during assembly.



AFS0007F

### Inspection VISUAL INSPECTION

Check for improper assembly, damage and aging.

# VACUUM LINES

## CHECK VALVE INSPECTION

### Airtightness Inspection

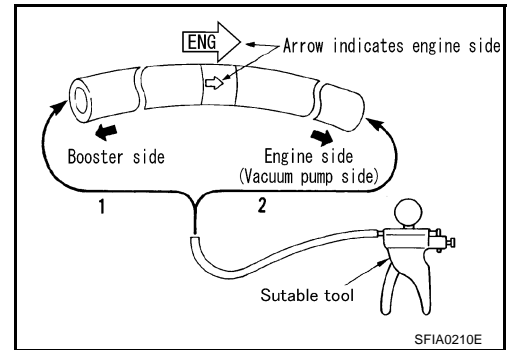
Use a handy vacuum pump to check.

#### 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





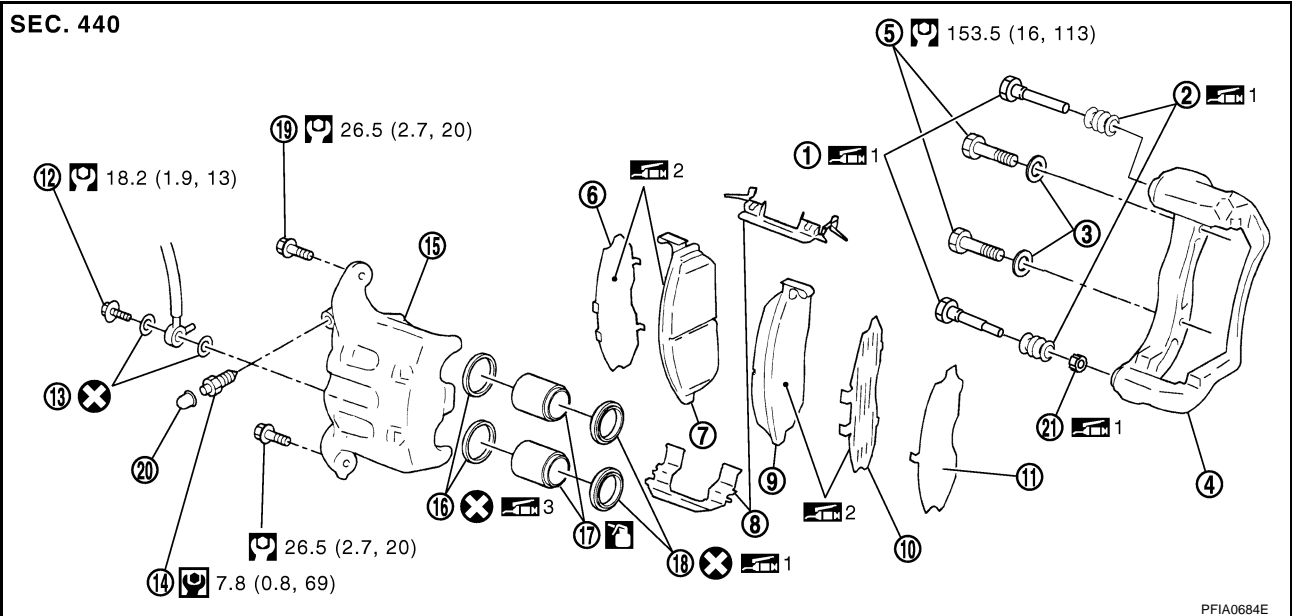
# FRONT DISC BRAKE

## FRONT DISC BRAKE

PFP:41000

### Components (2WD Model)

AFS002R4



- |                      |                                |                   |
|----------------------|--------------------------------|-------------------|
| 1. Sliding pin       | 2. Sliding pin boot            | 3. Washer         |
| 4. Torque member     | 5. Torque member mounting bolt | 6. inner shim     |
| 7. Inner pad         | 8. Pad retainer                | 9. Outer pad      |
| 10. Outer shim       | 11. Outer shim cover           | 12. Union bolt    |
| 13. Copper washer    | 14. Bleed valve                | 15. Cylinder body |
| 16. Piston seal      | 17. Piston                     | 18. Piston boot   |
| 19. Sliding pin bolt | 20. Cap                        | 21. Bushing       |

Refer to [GI-10, "Components"](#) and the followings for the symbols in the figure.

1: Rubber grease

2: PBC (Poly Butyl Cuprysil) grease or silicone-based grease

3: Polyglycol ether based lubricant

: Brake fluid

### CAUTION:

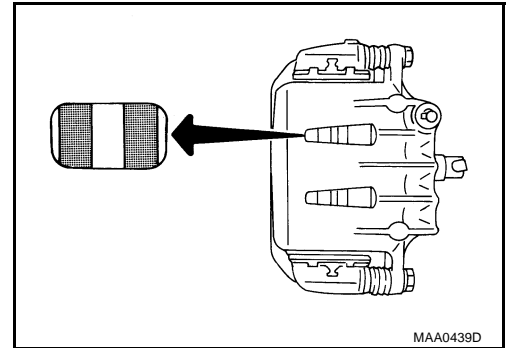
- Clean dust on caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.
- While removing cylinder body, do not depress brake pedal because piston will pop out.
- It is not necessary to remove torque member mounting bolts on torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so that brake hose is not under tension.
- Do not damage piston boot.
- Always replace shim and shim covers as a set when replacing brake pads.
- Keep rotor clean, from brake fluid.

# FRONT DISC BRAKE

## On-Vehicle Inspection PAD WEAR INSPECTION

AFS002R5

- Check pad thickness from check hole on cylinder body.
  - Standard thickness : 11.0 mm (0.433 in)
  - Replace limit thickness : 2.0 mm (0.079 in)



## Removal and Installation of Brake Pad REMOVAL

AFS002R6

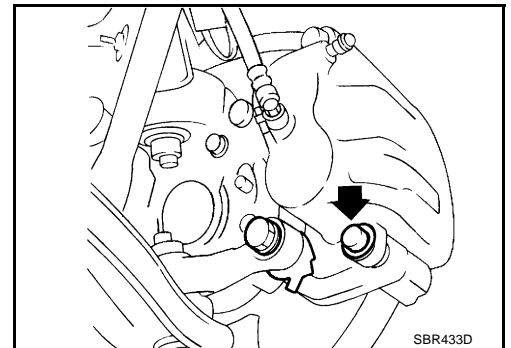
### WARNING:

Clean brake pad with a vacuum dust collector to minimize the hazard of air borne particles or other materials.

### CAUTION:

- While removing pad assemblies, do not depress brake pedal because piston will pop out.
- Be careful not to damage piston boot or get oil on disc 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 torque member mounting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
- Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.
- Burnish the brake pads (or linings) and disc rotor mutually contacting surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to [BR-30, "Brake Burnishing Procedure"](#).

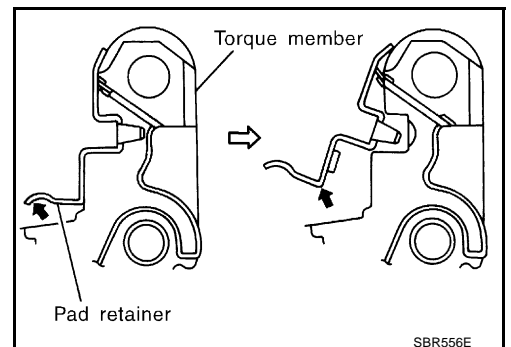
1. Remove tires from vehicle with a power tool.
2. Remove lower sliding pin bolt.



3. Hang cylinder body with a wire, and remove pads, shims and pad retainers from torque member.

### CAUTION:

- Do not damage piston boot.
- When removing pad retainer from torque member, lift pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.
- Do not damage piston boot.
- Keep rotor clean, free from brake fluid.



# FRONT DISC BRAKE

## INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or equivalent to the outer shim cover sides of outer shim. Install inner shim to inner pad, and outer shim and outer shim cover to outer pad.
2. Install pad retainers and pad assemblies to torque member.

### CAUTION:

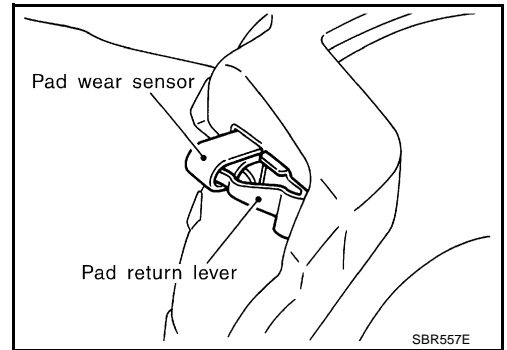
Inner pad and outer pad have pad-return mechanism on upper side of pad retainer. When installing pad to torque member, be sure to install pad return lever to pad wear sensor securely.

3. Install cylinder body to torque member.

### CAUTION:

When replacing pads with new ones, press in piston until pads can be installed. In this case, carefully monitor brake fluid level in reservoir tank because brake fluid will return to master cylinder reservoir tank.

4. Install lower sliding pin bolt, and tighten it to the specified torque. Refer to [BR-25, "Components \(2WD Model\)"](#) .
5. Secure disc rotor with wheel nuts. Depress brake pedal a few times until it gets a responsive touch.
6. Check brake for drag.
7. Install tire to the vehicle.



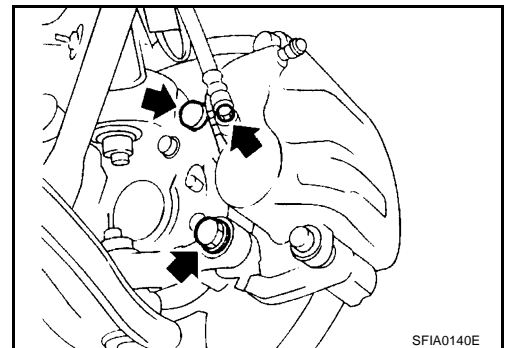
## Removal and Installation of Brake Caliper Assembly

### REMOVAL

1. Remove tire from vehicle with a power tool.
2. Drain brake fluid gradually from bleed valve while depressing brake pedal. Refer to [BR-9, "Drain and Refill"](#) .
3. Remove union bolt, and then remove brake hose from caliper assembly.
4. Remove torque member mounting bolts from torque member, and remove caliper assembly from vehicle with a power tool.
5. Remove disc rotor.

### CAUTION:

Put matching marks on both disc rotor and wheel hub when removing disc rotor.



### INSTALLATION

1. Install disc rotor.

### CAUTION:

Align the matching marks of disc rotor and wheel hub, which were marked at the time of removal when reusing disc rotor.

2. Install caliper assembly to vehicle, and tighten mounting bolts to the specified torque. Refer to [BR-25, "Components \(2WD Model\)"](#) .

### CAUTION:

Before installing torque member to vehicle, wipe oil and grease on washer seats on steering knuckle and mounting surface of torque member.

3. Install a projection of brake hose metal fitting by aligning with protrusions on cylinder body, and tighten union bolt to the specified torque. Refer to [BR-25, "Components \(2WD Model\)"](#) .

### CAUTION:

- Do not reuse copper washers for union bolts.
- Assemble brake hose securely on caliper assembly.

4. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to [BR-10, "Bleeding Brake System"](#) .
5. Install tires to vehicle.

# FRONT DISC BRAKE

## Disassembly and Assembly of Brake Caliper Assembly

AFS002R8

### NOTE:

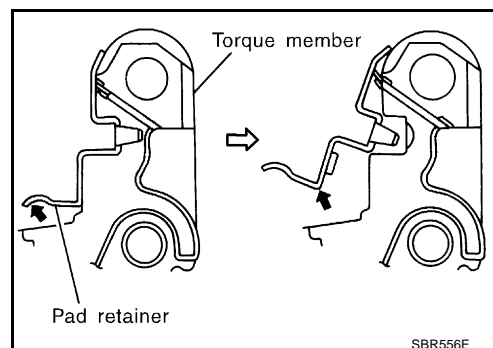
Do not remove torque member, brake pads, shims, shim covers and pad retainers, when disassembling or assembling cylinder body.

### DISASSEMBLY

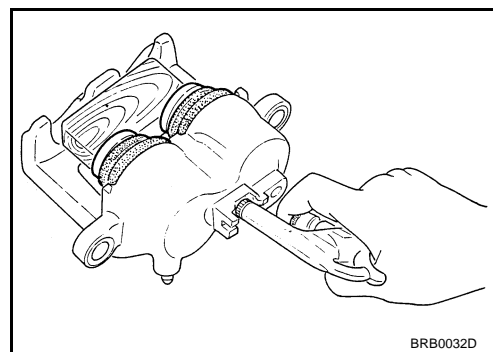
1. Remove caliper assembly from vehicle. Refer to [BR-27](#), "[REMOVAL](#)".
2. Remove sliding pin bolts from cylinder body, and remove pads, shims, shim cover and pad retainers from torque member.

### CAUTION:

When removing pad retainer from torque member, lift the pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.



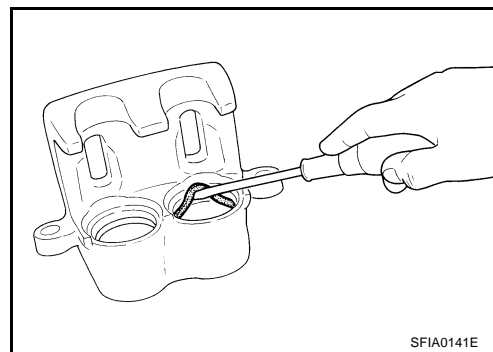
3. Remove sliding pins and sliding pin boots from torque member.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.



5. Using a flat-bladed screwdriver, remove piston seals from cylinder body.

### CAUTION:

Be careful not to damage the inner wall of cylinder.



## INSPECTION AFTER DISASSEMBLY

### Cylinder Body

### CAUTION:

Use new brake fluid to clean. Do not use mineral oils such as gasoline or kerosene.

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

### Torque Member

Check for wear, cracks, and damage. If a malfunction is detected, replace applicable part.

### Piston

### CAUTION:

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

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

# FRONT DISC BRAKE

## Sliding Pin, Sliding Pin Bolt, and Sliding Pin Boot

Check sliding pins and sliding pin boots for wear, damage, and cracks. If a malfunction is detected, replace applicable part.

## DISC ROTOR INSPECTION

### Visual Inspection

Check surfaces of disc rotor for uneven wear, cracks, and serious damage. If a malfunction is detected, replace applicable part.

### Runout Inspection

1. Using wheel nuts, secure disc rotor to wheels hub. (2 or more positions)
2. Using a dial indicator, check runout.

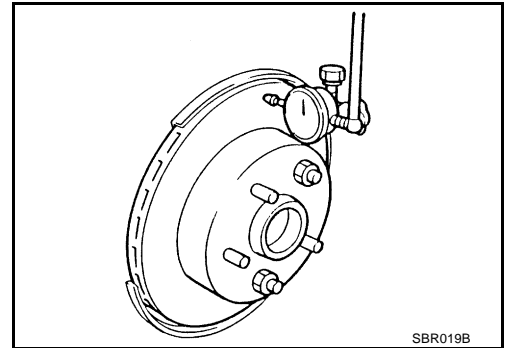
**Measurement** : At a point 10.0 mm (0.394 in) from point  
**point** : outer edge of disc

**Runout limit** : 0.035 mm (0.0014 in) or less

### CAUTION:

**Before measuring, make sure that axle end play is 0 mm.**

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



### Thickness Inspection

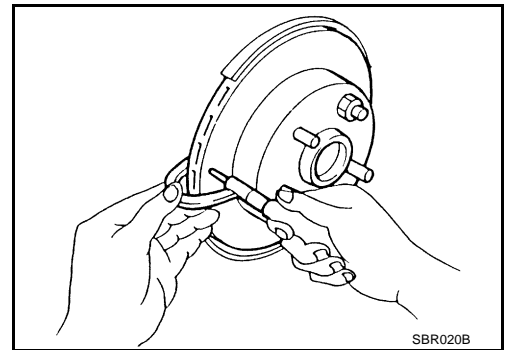
1. Using a micrometer, check thickness of disc rotor. If thickness is outside standard, replace disc rotor.

**Standard thickness** : 28.0 mm (1.10 in)

**Repair limit thickness** : 26.0 mm (1.02 in)

**Maximum uneven wear (measured at 8 positions)** : 0.015 mm (0,0006 in) or less

2. If runout is still out of specification, grind rotor with on-car brake lathe ("MAD, DL-8700", "AMMCO 700 and 705" or equivalent) until runout becomes within the specified limit.

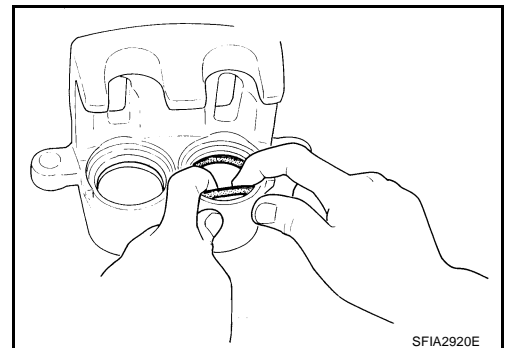


## ASSEMBLY

### CAUTION:

**When assembling, use only rubber lubricant specified below.**

1. Apply polyglycol ether based lubricant to the piston seal, and install them to cylinder body.

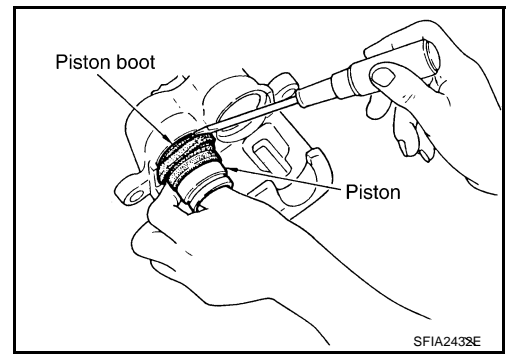


# FRONT DISC BRAKE

2. Apply rubber grease to piston boots. Cover the piston end with piston boot, and install cylinder-side lip on piston boot properly into groove on cylinder body.

**CAUTION:**

**Do not reuse piston boot.**

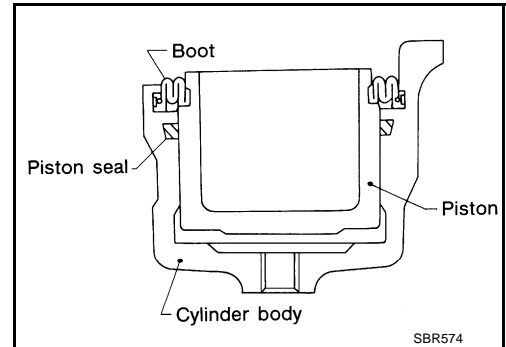


3. Apply brake fluid to piston, and press piston into cylinder body by hand to assemble piston-side lip on piston boot properly into a groove on piston.

**CAUTION:**

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

4. Install sliding pins and sliding pin boots to the torque member.

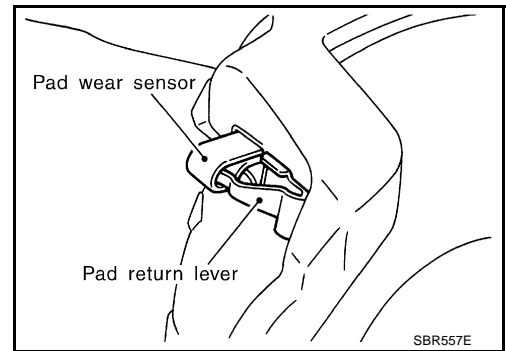


5. Install the torque member to the steering knuckle and tighten the mounting bolts to the specified torque. Refer to [BR-25, "Components \(2WD Model\)"](#).

**CAUTION:**

**Before installing torque member to vehicle, wipe off oil and grease on the washer seats on steering knuckle and the mounting surface of the torque member.**

6. Install pad retainers to torque member.
7. After assembling shims and shim covers to pad, install it to torque member.



**CAUTION:**

**Inner pad and outer pad have pad-return mechanism on the upper side of the pad retainer. When installing pad, be sure to install pad return lever to pad wear sensor securely as shown in the figure.**

8. Install cylinder body, and tighten sliding pin bolt to the specified torque. Refer to [BR-25, "Components \(2WD Model\)"](#).
9. Position a projection of brake hose metal fitting by aligning with protrusions on cylinder body and tighten union bolt to specified torque. Refer to [BR-11, "Hydraulic Circuit"](#).

**CAUTION:**

- Assemble brake hose securely to cylinder body.
- Do not reuse copper washer for union bolts.

10. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to [BR-10, "Bleeding Brake System"](#).

## Brake Burnishing Procedure

AFS002R9

Burnish the brake pad (or lining) and disc rotor mutually contacting surfaces of disc rotor according to 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:**

- Be careful of vehicle speed because brake does not operate easily until pad and disc rotor are securely fitted.
- Only perform this procedure under safe road and traffic conditions. Use extreme caution.

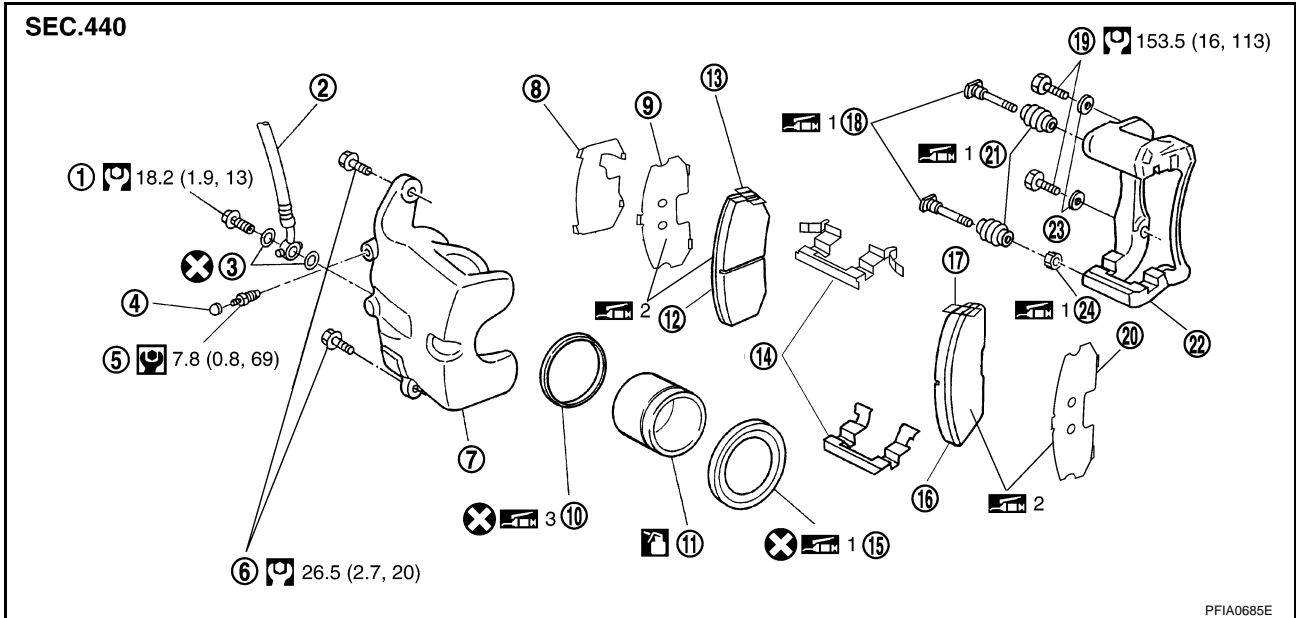
1. Drive vehicle on straight, flat road.

# FRONT DISC BRAKE

2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

## Components (AWD Model)

AFS00001



PFIA0685E

- |                         |                     |                     |
|-------------------------|---------------------|---------------------|
| 1. Union bolt           | 2. Brake hose       | 3. Copper washer    |
| 4. Cap                  | 5. Bleed valve      | 6. Sliding pin bolt |
| 7. Cylinder body        | 8. Inner shim cover | 9. Inner shim       |
| 10. Piston seal         | 11. Piston          | 12. Inner pad       |
| 13. Pad wear sensor     | 14. Pad retainer    | 15. Piston boot     |
| 16. Outer pad           | 17. Pad wear sensor | 18. Sliding pin     |
| 19. Torque member bolts | 20. Outer shim      | 21. Slide pin boot  |
| 22. Torque member       | 23. Washer          | 24. Bushing         |

Refer to [GI-10. "Components"](#) and the followings for the symbols in the figure.

- 1: Rubber grease
- 2: PBC (Poly Butyl Cuprysil) grease or silicone-based grease
- 3: Polyglycol ether based lubricant
- : Brake fluid

### CAUTION:

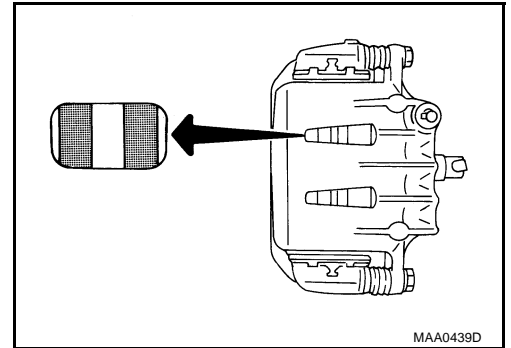
- Clean dust on the caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.
- While removing cylinder body, never depress brake pedal because piston will pop out.
- It is not necessary to remove mounting bolts on the torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so that brake hose is not under tension.
- Do not damage piston boot.
- Always replace shims and shim covers as a set when replacing brake pads.
- Keep rotor clean, free from brake fluid.

# FRONT DISC BRAKE

## On-Vehicle Inspection PAD WEAR INSPECTION

AFS002RG

- Check pad thickness from check hole on cylinder body.
  - Standard thickness : 11.0 mm (0.433 in)
  - Repair limit thickness : 2.0 mm (0.079 in)



## Removal and Installation of Brake Pad REMOVAL

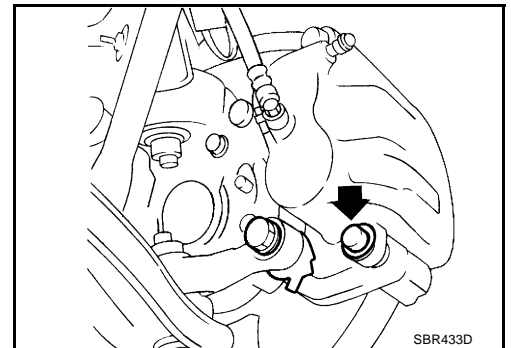
AFS002RB

### WARNING:

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

### CAUTION:

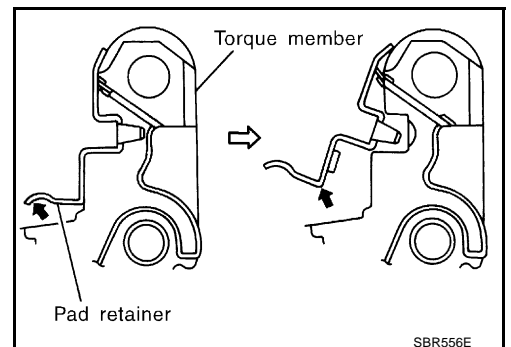
- While removing pad assemblies, do not depress brake pedal because piston will pop out.
  - Be careful not to damage piston boot or get oil on disc rotor. Always replace shims in replacing pads.
  - If shims are rusted or show peeling of rubber coat, replace them with new shims.
  - It is not necessary to remove torque member mounting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
  - Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.
  - Burnish the brake pads (or lining) and disc rotor after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to [BR-36, "Brake Burnishing Procedure"](#).
1. Remove tires from vehicle with a power tool.
  2. Remove lower sliding pin bolt.



3. Hang cylinder body with a wire, and remove pads, pad retainers, shims and shim cover from torque member.

### CAUTION:

- Do not damage piston boot.
- When removing pad retainer from torque member, lift pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.
- Do not damage piston boot.
- Keep rotor clean, free from brake fluid.





# FRONT DISC BRAKE

## INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or equivalent to the both sides of inner shim and outer shim, install outer shim to outer pad, and inner shim and inner shim cover to inner pad.
2. Apply PBC (Poly Butyl Cuprysil) or equivalent to pad contact surface on pad retainer, and install pad retainers and pads to torque member.

### CAUTION:

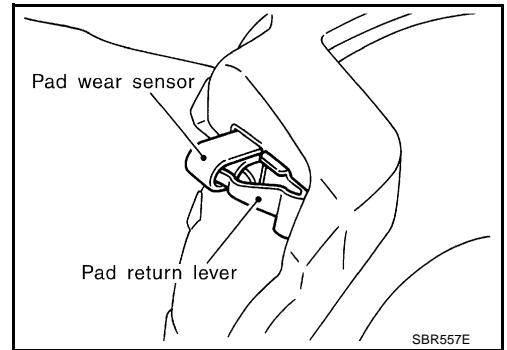
Inner pad and outer pad have pad-return mechanism on upper side of pad retainer. When installing pad to torque member, be sure to install pad return lever to pad wear sensor securely.

3. Install cylinder body to torque member.

### CAUTION:

When replacing pads with new ones, press in piston until pads can be installed. In this case, carefully monitor brake fluid level in reservoir tank because brake fluid will return to master cylinder reservoir tank.

4. Install lower sliding pin bolt, and tighten it to the specified torque. Refer to [BR-31, "Components \(AWD Model\)"](#).
5. Secure disc rotor with wheel nuts. Depress brake pedal a few times until it gets a responsive touch.
6. Check brake for drag.
7. Install tire to vehicle.



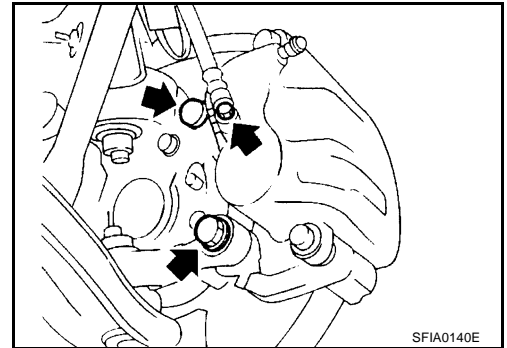
## Removal and Installation of Brake Caliper Assembly

### REMOVAL

1. Remove tire from vehicle with a power tool.
2. Drain brake fluid gradually from bleed valve while depressing brake pedal. Refer to [BR-9, "Drain and Refill"](#).
3. Remove union bolt, and then remove brake hose from caliper assembly.
4. Remove torque member mounting bolt from torque member, and remove caliper assembly from vehicle with a power tool.
5. Remove disc rotor.

### CAUTION:

Put matching mark on both disc rotor and wheel hub when removing disc rotor.



### INSTALLATION

1. Install disc rotor.

### CAUTION:

Align the matching marks of disc rotor and wheel hub, which were marked at the time of removal when reusing disc rotor.

2. Install caliper assembly to vehicle, and tighten mounting bolts to the specified torque. Refer to [BR-31, "Components \(AWD Model\)"](#).

### CAUTION:

Before installing torque member to vehicle, wipe oil and grease on washer seats on steering knuckle and mounting surface of torque member.

3. Install a projection of brake hose metal fitting by aligning with protrusions on cylinder body, and tighten union bolt to the specified torque. Refer to [BR-31, "Components \(AWD Model\)"](#).

### CAUTION:

- Do not reuse copper washers for union bolt.
- Assemble brake hose securely on caliper assembly.

4. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to [BR-36, "Brake Burnishing Procedure"](#).

# FRONT DISC BRAKE

5. Install tire to vehicle.

## Disassembly and Assembly of Brake Caliper Assembly

AFS002RD

### NOTE:

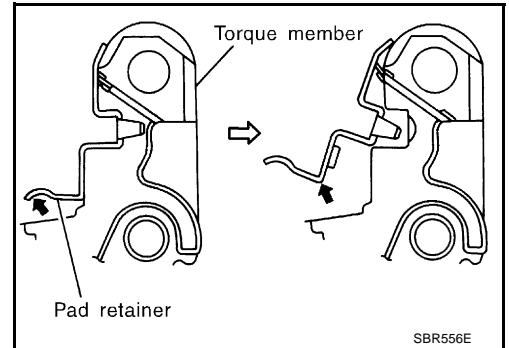
Do not remove torque member, brake pads, shims, shim cover and pad retainer, when disassembling or assembling cylinder body.

### DISASSEMBLY

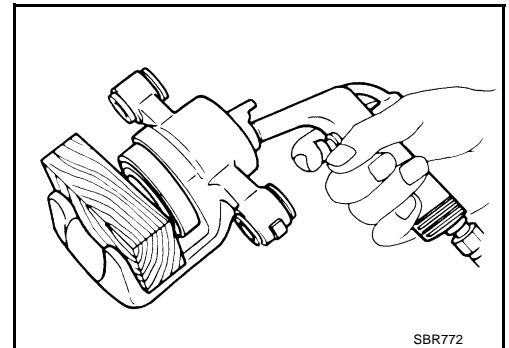
1. Remove caliper assembly from vehicle. Refer to [BR-33](#), "[REMOVAL](#)".
2. Remove sliding pin bolts from cylinder body, and remove pads, shims, shim cover and pad retainer from torque member.

### CAUTION:

When removing pad retainer from torque member, lift the pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.



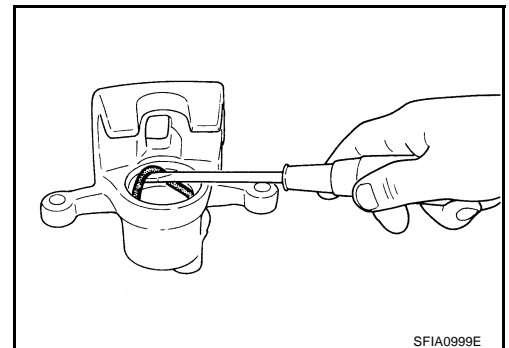
3. Remove sliding pins and sliding pin boots from torque member.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.



5. Using a flat-bladed screwdriver, remove piston seals from cylinder body.

### CAUTION:

Be careful not to damage the inner wall of cylinder.



## INSPECTION AFTER DISASSEMBLY

### Cylinder Body

### CAUTION:

Use new brake fluid to clean. Do not use mineral oils such as gasoline or kerosene.

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

### Torque Member

Check for wear, cracks, and damage. If a malfunction is detected, replace applicable part.

### Piston

### CAUTION:

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

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

# FRONT DISC BRAKE

## Sliding Pin, Sliding Pin Bolt, and Sliding Pin Boot

Check sliding pins and sliding pin boots for wear, damage, and cracks. If a malfunction is detected, replace applicable part.

## DISC ROTOR INSPECTION

### Visual Inspection

Check surfaces of disc rotor for uneven wear, cracks, and serious damage. If a malfunction is detected, replace applicable part.

### Runout Inspection

1. Using wheel nuts, secure disc rotor to wheels hub. (2 or more positions)
2. Using a dial indicator, check runout.

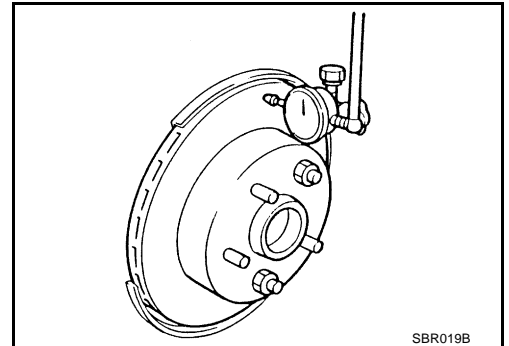
**Measurement point** : At a point 10.0 mm (0.394 in) from outer edge of disc.

**Runout limit** : 0.035 mm (0.0014 in) or less

### CAUTION:

**Before measuring, make sure that axle end play is 0 mm.**

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



### Thickness Inspection

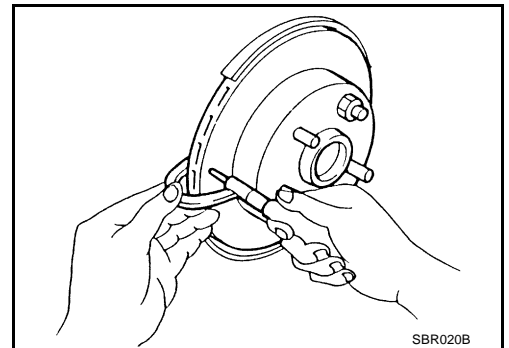
1. Using a micrometer, check thickness of disc rotor. If thickness is outside standard, replace disc rotor.

**Standard thickness** : 24.0 mm (0.945 in)

**Repair limit thickness** : 22.0 mm (0.866 in)

**Maximum uneven wear (measured at 8 positions)** : 0.015 mm (0.0006 in) or less

2. If runout is still out of specification, grind the rotor with on-car brake lathe ("MAD, DL-8700", "AMMCO 700 and 705" or equivalent) until runout becomes within the specified limit.

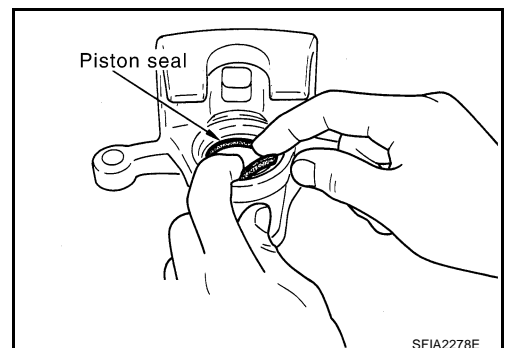


## ASSEMBLY

### CAUTION:

**When assembling, use only rubber lubricant specified below.**

1. Apply polyglycol ether based lubricant to the piston seal, and install them to cylinder body.

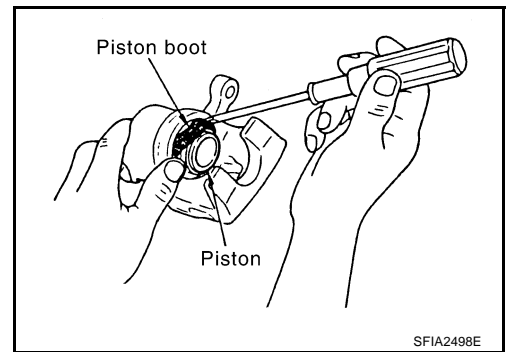


# FRONT DISC BRAKE

2. Apply rubber grease to piston boots. Cover the piston end with piston boot, and install cylinder-side lip on piston boot properly into groove on cylinder body.

**CAUTION:**

**Do not reuse piston boot.**

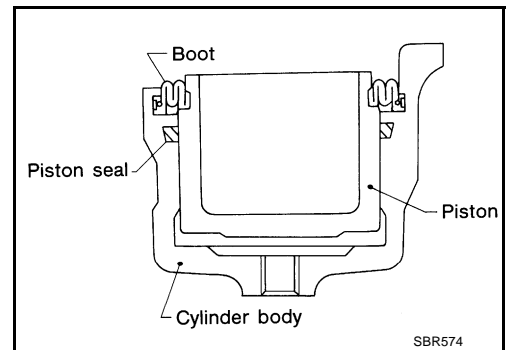


3. Apply brake fluid to piston, and press piston into cylinder body by hand to assemble piston-side lip on piston boot properly into a groove on piston.

**CAUTION:**

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

4. Install sliding pins and sliding pin boots to the torque member.

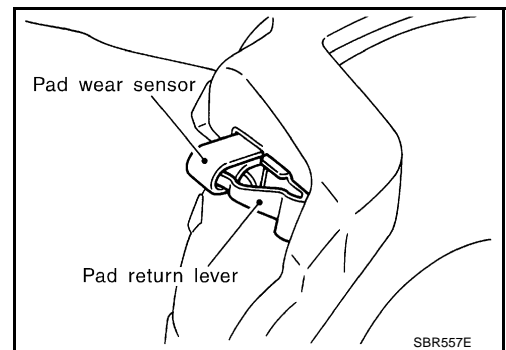


5. Install the torque member to the steering knuckle and tighten the mounting bolts to the specified torque. Refer to [BR-31, "Components \(AWD Model\)"](#).

**CAUTION:**

**Before installing torque member to vehicle, wipe off oil and grease on the washer seats on steering knuckle and the mounting surface of the torque member.**

6. Install pad retainers to torque member.
7. After assembling shims and shim cover to pad, install it to torque member.



**CAUTION:**

**Inner pad and outer pad have pad-return mechanism on the upper side of the pad retainer. When installing pad, be sure to install pad return lever to pad wear sensor securely as shown in the figure.**

8. Install cylinder body, and tighten sliding pin bolt to specified torque. Refer to [BR-31, "Components \(AWD Model\)"](#).
9. Position the metal fitting of brake hose by aligning with protrusions on cylinder body and tighten union bolts to specified torque. Refer to [BR-11, "Hydraulic Circuit"](#).

**CAUTION:**

- Assemble brake hose securely to cylinder body.
- Do not reuse copper washer for union bolts.

10. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to [BR-36, "Brake Burnishing Procedure"](#).

## Brake Burnishing Procedure

AFS002RE

Burnish brake pad (or lining) and disc rotor mutually contact surfaces of disc rotor according to 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:**

- Be careful of vehicle speed because brake does not operate easily until pad and disc rotor are securely fitted.
- Only perform this procedure under safe road and traffic conditions. Use extreme caution.

1. Drive vehicle on straight, flat road.

## FRONT DISC BRAKE

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2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

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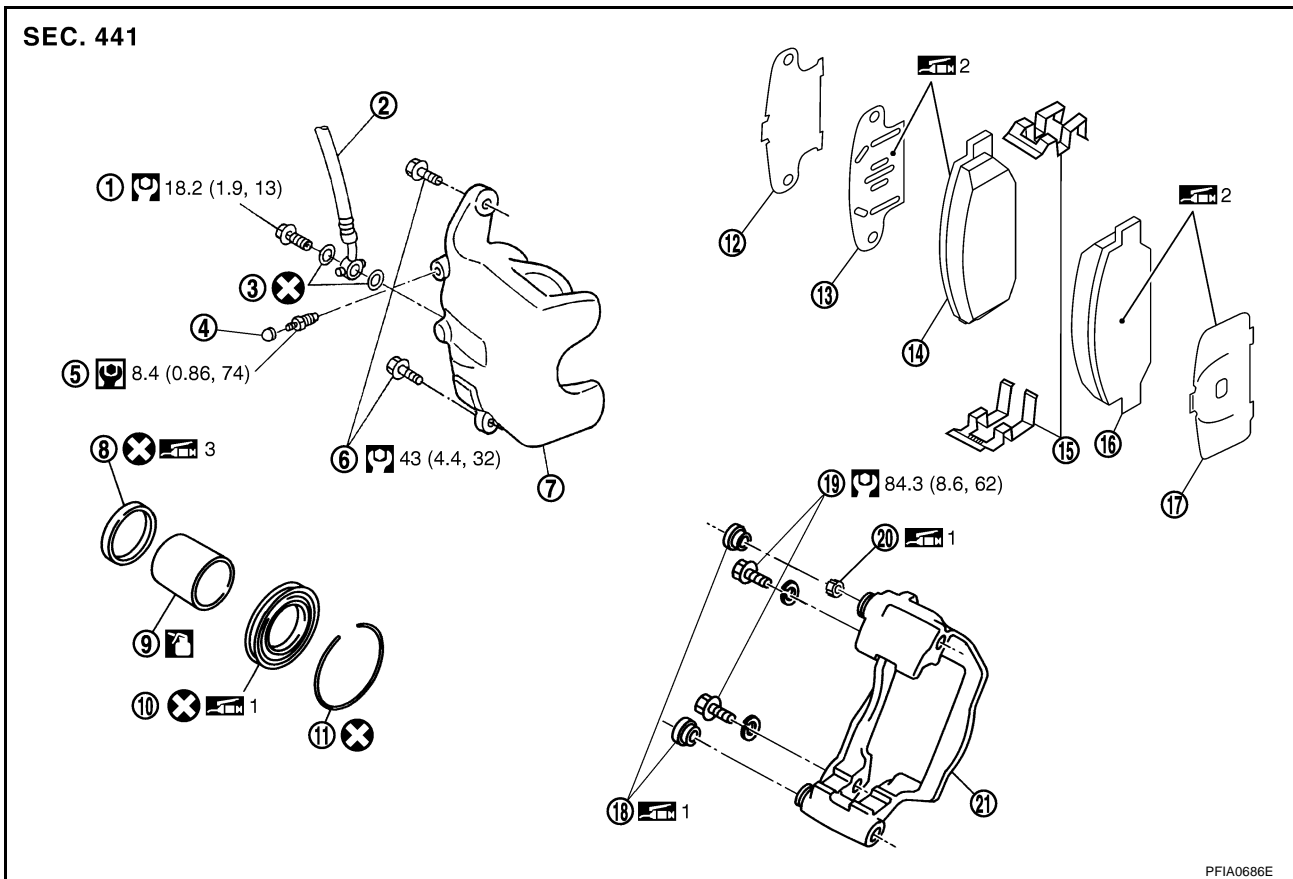
# REAR DISC BRAKE

PFP:44000

AFS00000

## REAR DISC BRAKE

### Components



- |                        |                    |                      |
|------------------------|--------------------|----------------------|
| 1. Union bolt          | 2. Brake hose      | 3. Copper washer     |
| 4. Cap                 | 5. Bleed valve     | 6. Sliding pin bolt  |
| 7. Cylinder body       | 8. Piston seal     | 9. Piston            |
| 10. Piston boot        | 11. Retaining ring | 12. Inner shim cover |
| 13. Inner shim         | 14. Inner pad      | 15. Pad retainer     |
| 16. Outer pad          | 17. Outer shim     | 18. Slide pin boot   |
| 19. Torque member bolt | 20. Bushing        | 21. Torque member    |

Refer to [GI-10, "Components"](#) and the followings for the symbols in the figure.

- 1: Rubber grease
- 2: PBC (Poly Butyl Cuprysil) grease or silicone-based grease
- 3: Polyglycol ether based lubricant
- : Brake fluid

### CAUTION:

- Clean dust on the caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.
- While removing cylinder body, never depress brake pedal because the piston will pop out.
- It is not necessary to remove mounting bolts on the torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so that brake hose is not under tension.
- Do not damage piston boot.
- Always replace shims and shim covers as a set when replacing brake pads.
- Keep rotor clean, free from brake fluid.

# REAR DISC BRAKE

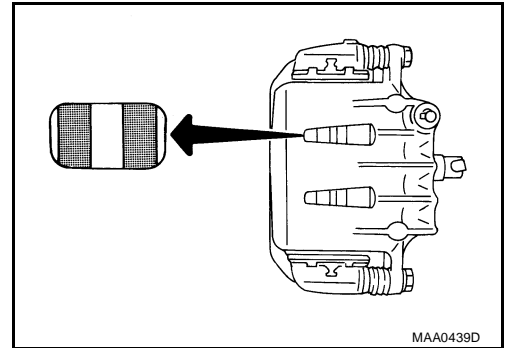
## On-Vehicle Inspection PAD WEAR INSPECTION

AFS0000P

- Check pad thickness from inspection hole on cylinder body.

**Standard thickness : 8.5 mm (0.335 in)**

**Repair limit thickness : 2.0 mm (0.079 in)**

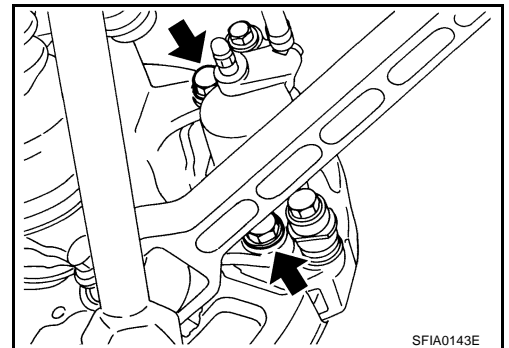


## Remove and Installation of Brake Pad REMOVAL

AFS0000Q

### CAUTION:

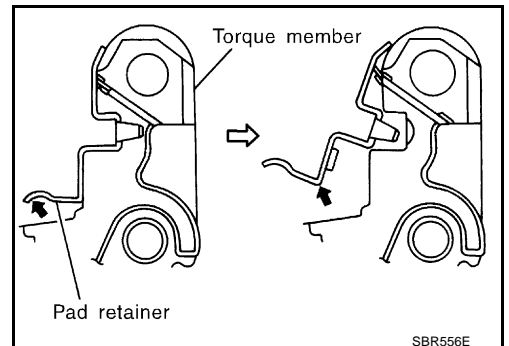
- Clean brake pads with a vacuum dust collector to minimize the hazard of air borne particles or other materials.
  - While removing pad assemblies, do not depress brake pedal, otherwise piston will pop out.
  - Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.
  - If shims are rusted or show peeling of 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.
  - Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.
  - Burnish the brake pads (or linings) and disc rotors mutually contacting surfaces after refinishing or replacing drums or rotor, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to [BR-43, "Brake Burnishing Procedure"](#).
1. Remove master cylinder reservoir cap.
  2. Remove tire.
  3. Remove lower sliding pin bolt.



4. Hang cylinder body with a wire, and remove pads, shims and pad retainers from torque member.

### CAUTION:

- Do not damage piston boot.
- When removing pad retainer from torque member, lift pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.
- Do not damage piston boot.
- Keep rotor clean, free from brake fluid.



# REAR DISC BRAKE

## INSTALLATION

1. Apply brake grease to the back of pad and both sides of shim, and install inner shim and inner shim cover to inner pad, and outer shim and outer shim cover to outer pad.
2. Install pad retainers and pad assemblies to torque member.
3. Install cylinder body to torque member.

### CAUTION:

**When replacing pads with new ones, press in the piston until pads can be installed. In this case, carefully monitor the brake fluid level in the reservoir tank because brake fluid will return to reservoir tank of master cylinder.**

4. Insert lower sliding pin bolt to tighten to the specified torque. Refer to [BR-38, "Components"](#) .
5. Secure disc rotor with wheel nuts. Depress brake pedal a few times until it gets a responsive touch.
6. Check brake for drag.
7. Install tire to the vehicle.

## Removal and Installation of Brake Caliper Assembly

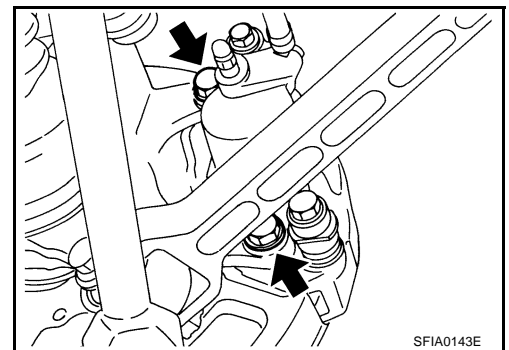
AFS0000R

### REMOVAL

1. Remove tire from vehicle with a power tool.
2. Drain brake fluid gradually from bleed valve while depressing brake pedal.
3. Remove union bolt, and then remove brake hose from caliper assembly.
4. Remove torque member fixing bolt from torque member, and remove caliper assembly from vehicle with a power tool.
5. Remove disc rotor.

### CAUTION:

**Put matching mark on both disc rotor and wheel hub when removing disc rotor.**



### INSTALLATION

1. Install disc rotor.

### CAUTION:

**Align the matching marks of disc rotor and wheel hub, which were marked at the time of removal when reusing disc rotor.**

2. Install caliper assembly to vehicle, and tighten torque member fixing bolts to the specified torque. Refer to [BR-38, "Components"](#) .

### CAUTION:

**Before installing caliper assembly to vehicle, wipe oil and grease on the washer seats on the axle assembly and mounting surface of caliper assembly.**

3. Install brake hose to caliper assembly and tighten union bolt to the specified torque. Refer to [BR-38, "Components"](#) .

### CAUTION:

- Do not reuse copper washers for union bolts.
- Assemble brake hose securely to the protrusion on caliper assembly.

4. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to [BR-10, "Bleeding Brake System"](#) .
5. Install tire to vehicle.



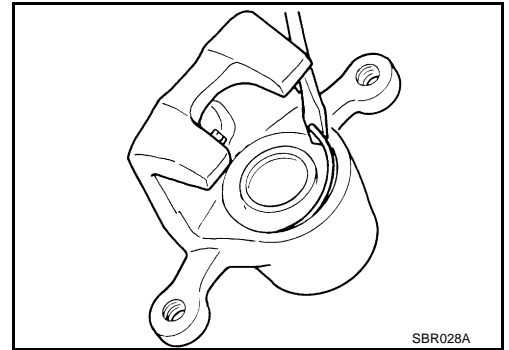
# REAR DISC BRAKE

## Disassembly and Assembly of Brake Caliper Assembly

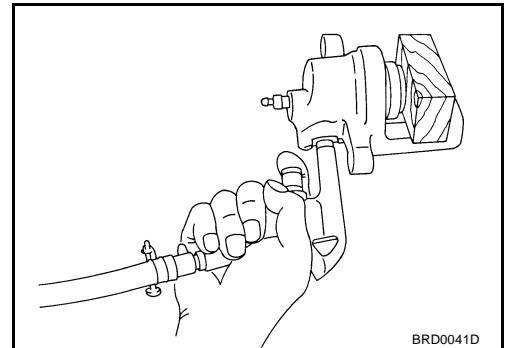
AFS0000S

### DISASSEMBLY

1. Remove caliper assembly from vehicle.
2. Remove sliding pin bolts and cylinder body from torque member. Then remove pads, shims, and shim covers from torque member, and remove pad retainers from cylinder body.
3. Remove sliding pin boot from torque member.
4. Using a flat-bladed screwdriver as shown in the figure, remove retaining ring from torque member.



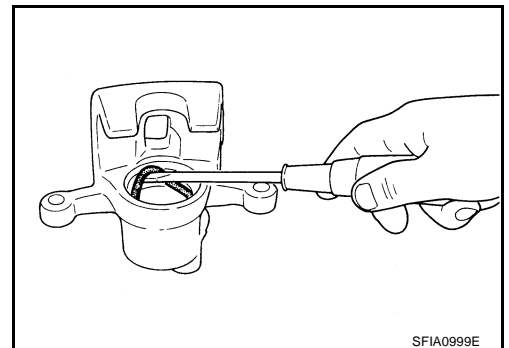
5. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boots.



6. Remove piston seal with a flat-bladed screw driver.

### **CAUTION:**

**Be careful not damage cylinder inner wall.**



### INSPECTION AFTER DISASSEMBLY

#### Cylinder Body

### **CAUTION:**

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

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

#### Torque Member

Check for wear, cracks, and damage. If a malfunction is detected, replace applicable part.

#### Piston

### **CAUTION:**

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

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

#### Sliding Pin Bolt and Sliding Pin Boot

Check sliding pin bolts and sliding pin boot for wear, damage, and cracks. If a malfunction is detected, replace applicable part.

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# REAR DISC BRAKE

## DISC ROTOR INSPECTION

### Visual Inspection

Check the surface of disc rotor for uneven wear, cracks, and serious damage. If a malfunction is detected, replace applicable part.

### Runout Inspection

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

#### Measurement point:

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

#### Runout limit:

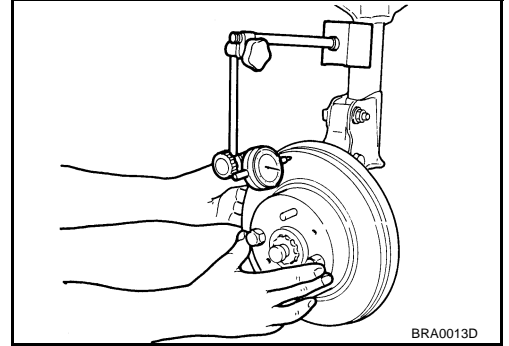
**AWD model: 0.10 mm (0.0039 in) or less**

**2WD model: 0.055 mm (0.0022 in) or less**

#### CAUTION:

**Before measuring, make sure that the axle end play is 0.05 mm (0.002in) or less.**

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



### Thickness Inspection

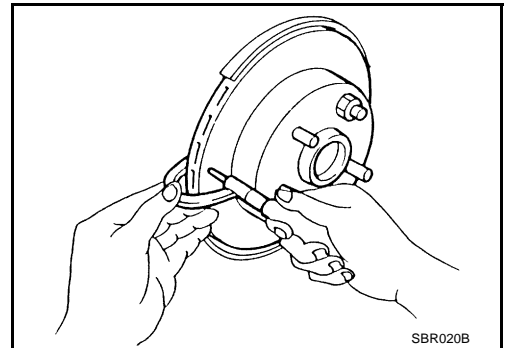
1. Using a micrometer, check the thickness of disc rotor. If the thickness is outside the standard, replace disc rotor.

**Standard thickness : 16.0 mm (0.630 in)**

**Repair limit thickness : 14.0 mm (0.551 in)**

**Maximum uneven wear (measured at 8 positions):  
0.015 mm (0.0006 in) or less**

2. If runout is still out of specification, grind rotor with on-car brake lathe ("MAD, DL-8700", "AMMCO 700 and 705" or equivalent) until runout becomes within the specified limit.

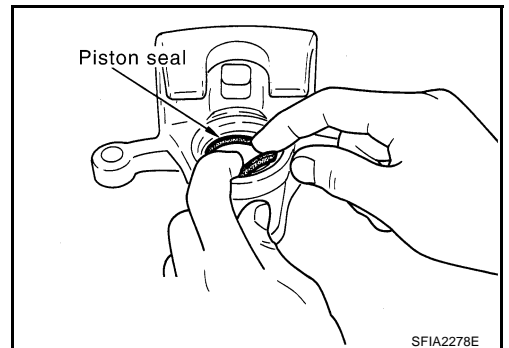


## ASSEMBLY

### CAUTION:

**When assembling, use only rubber lubricant specified below.**

1. Apply polyglycol ether based lubricant to the piston seal, and install them to the cylinder body.



## REAR DISC BRAKE

2. Apply rubber grease to piston boots. Cover piston end with piston boot, and install cylinder-side lip on the piston boots properly into the groove on the cylinder body.

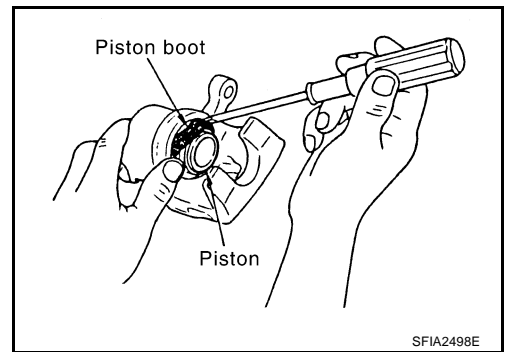
**CAUTION:**

**Do not reuse piston boot.**

3. Press piston into cylinder body by hand to assemble piston-side lip on the piston boot properly into the groove on the piston.

**CAUTION:**

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



4. Fix piston boot with retaining ring.

**CAUTION:**

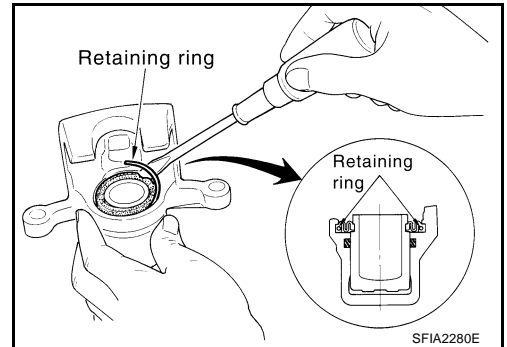
- **Make sure that boot is securely engaged in the groove on cylinder body.**

- **Do not reuse retaining ring.**

5. Install sliding pin bolts and sliding pin boots to torque member.
6. Install torque member to axle assembly, and tighten torque member fixing bolt to the specified torque.

**CAUTION:**

**Before installing torque member to axle assembly, wipe off oil and grease on the washer seats on the axle assembly and mounting surface of torque member.**



7. Install pad retainers to torque member.

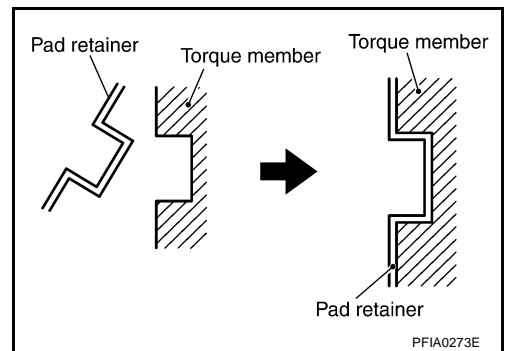
**CAUTION:**

**When installing pad retainer, attach it firmly so that it does not flat up higher than torque member, as shown in the figure.**

8. After assembling shims and shim cover to pads, assemble it to torque member.
9. Install cylinder body, and tighten sliding pin bolts to the specified torque.
10. Position the metal fitting of brake hose by aligning with protrusions on cylinder body and tighten union bolts to specified torque.

**CAUTION:**

- **Assemble brake hose securely to the cylinder body.**
- **Do not reuse copper washer on the union bolts.**



### Brake Burnishing Procedure

AFS002VP

Burnish brake contact surface according to the following procedure after refinishing or replacing rotors, after replacing pads, 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 (31 MPH).
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 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.

# SERVICE DATA AND SPECIFICATIONS (SDS)

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### General Specifications

AFS0000T

Unit: mm (in)

Front brake	Applied model	2WD	AWD
	Cylinder bore diameter	45.0×2 (1.772×2)	57.2 (2.252)
	Pad Length × width × thickness	130×50×11.0 (5.12×1.97×0.43)	125.6 × 46.0 × 11.0 (4.94 × 1.81 × 0.43)
	Rotor outer diameter × thickness	320×28.0 (12.6×1.102)	296×24.0 (11.65 × 0.945)
Rear brake	Applied model	2WD	AWD
	Cylinder bore diameter	42.86 (1.6874)	
	Pad Length × width × thickness	83.0 × 31.9 × 8.5 (3.27× 1.26× 0.335)	83.0 × 33.0 × 8.5 (3.27× 1.3× 0.335)
	Rotor outer diameter × thickness	308×16 (12.13× 0.63)	292×16 (11.50 × 0.63)
Master cylinder	Cylinder bore diameter	25.4 (1.0)	
Control valve	Valve model	Electric brake force distribution	
Brake booster	Booster model	N255	M215T
	Diaphragm diameter	255 (10.04)	Primary:230 (9.06) Secondary:205 (8.07)
Recommended brake fluid		DOT 3	

### Brake Pedal

AFS00220

Brake pedal free height (from dash panel top surface)	M/T model	154 - 164 (6.06 - 6.46)
	A/T model	162 - 172 (6.38 - 6.77)
Brake pedal depressed height [under a force of 490 N (50 kg, 110 lb) with the engine running]	M/T model	More than 90 (3.54)
	A/T model	More than 95 (3.74)
Clearance between stopper rubber and the threaded end of stop lamp switch and ASCD cancel switch		0.74 - 1.96 (0.0291 - 0.0772)
Pedal play		3 - 11 (0.12 - 0.43)

### Check Valve

AFS0000V

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

AFS0000W

#### 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 (4.92)

### Front Disc Brake

AFS0000X

Applied model		2WD	AWD
Brake pad	Standard thickness (new)	11.0 (0.433)	
	Repair limit thickness	2.0 (0.079)	
Disc rotor	Standard thickness (new)	28.0 (1.102)	24.0 (0.945)
	Repair limit thickness	26.0 (1.024)	22.0 (0.866)
	Maximum runout	0.035 (0.0014)	

# SERVICE DATA AND SPECIFICATIONS (SDS)

## Rear Disc Brake

AFS0000Y

Applied model		AWD	2WD
Brake pad	Standard thickness (new)	8.5 mm (0.335 in)	
	Repair limit thickness	2.0 mm (0.079 in)	
Disc rotor	Standard thickness (new)	16.0 mm (0.630 in)	
	Repair limit thickness	14.0 mm (0.551 in)	
	Maximum runout	0.10 mm (0.0039 in)	0.055 mm (0.0022 in)

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# SERVICE DATA AND SPECIFICATIONS (SDS)

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