SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

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

NFS00001

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 Battery Service

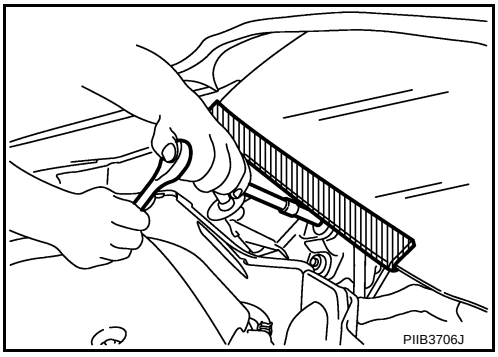
NFS00002

Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

Precautions for Procedures without Cowl Top Cover

NFS000HT

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.

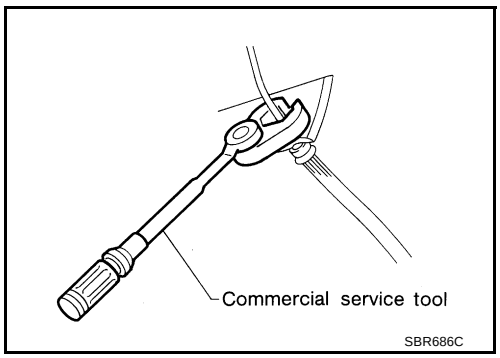


Precautions for Brake System

NFS00003

- Recommended fluid is brake fluid “DOT 3”. Refer to MA-12, "Fluids and Lubricants" .
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.

- Use flare nut wrench when removing and installing brake tube.
- When installing brake piping, be sure to check torque.
- Before working, turn the ignition switch OFF and disconnect the connectors for the control unit or the battery 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-38, "Brake Burnishing Procedure" .



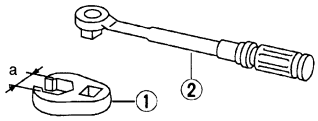
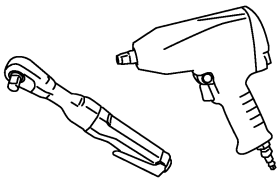
WARNING:
Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

PREPARATION

PFP:00002

Commercial Service Tools

NFS00004

Tool name		Description
1. Flare nut crowfoot a:10 mm (0.39 in)/12mm(0.47 in) 2. Torque wrench	 S-NT360	Removing and installing each brake piping
Power tool	 PBIC0190E	Removing front/rear caliper assembly and tires
Pin punch Tip diameter: 4 mm (0.16 in) dia	 ZZA0515D	Removing and installing reservoir tank pin

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

NFS00005

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

Reference page			BR-29, BR-31, BR-42, BR-45	BR-26, BR-39	BR-27, BR-40	—	—	BR-35, BR-37, BR-47, BR-50	—	—	—	BR-35, BR-37, BR-47, BR-50	—	NVH in PR section	NHV in RFD section	NVH in FAX, RAX and FSU, RSU section	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in PS section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	Drum out of round	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×									×	×	×	×	×	×	×
		Shake				×								×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×	×			×	×	×		×

×: Applicable

BRAKE PEDAL

PFP:46501

Inspection and Adjustment

NFS00006

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

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

Brake pedal height "H" (from dash lower panel top surface)

M/T models: 154 – 164 mm (6.06 – 6.46 in)

A/T models: 162 – 172 mm (6.38 – 6.77 in)

Depressed pedal height "D" (under a force of 490 N (50 kg, 110 lb) with the engine running)

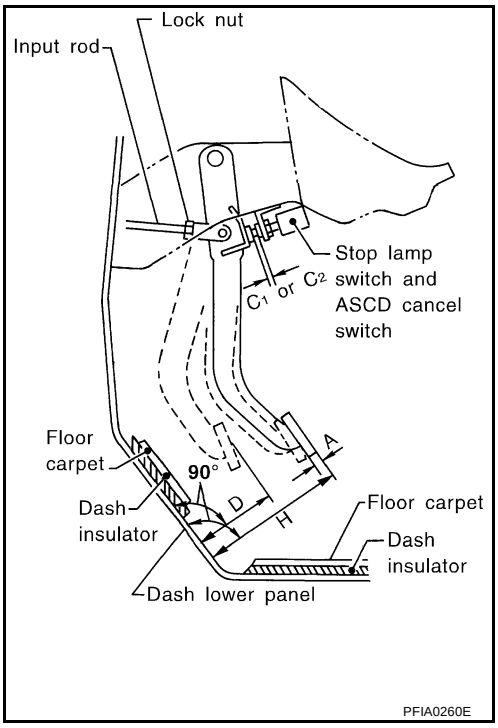
M/T models: More than 90 mm (3.54 in)

A/T models: More than 95 mm (3.74 in)

Clearance "C_1 " or "C_2 " between the stopper rubber and the threaded end of the stop lamp switch and ASCD cancel switch:

0.74 – 1.96 mm (0.0291 – 0.0772 in)

Pedal play "A": 3 – 11 mm (0.12 – 0.43 in)



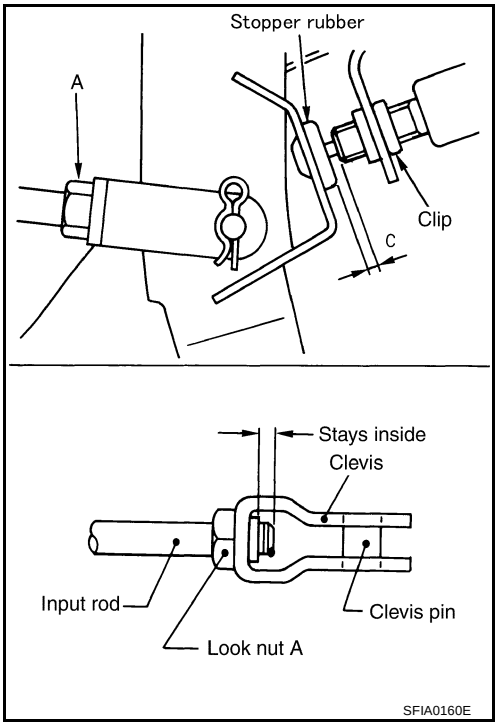
ADJUSTMENT

1. Loosen the stop lamp switch and ASCD cancel switch by rotating it counterclockwise by 45°.
2. Loosen the lock nut (A) on the input rod, then rotate the input rod to set the pedal to the specified height, and tighten the lock nut (A) to the specified torque. Refer to BR-23, "Components" .

   CAUTION:
   Check that the threaded end of the input rod stays inside the clevis.
3. With the pedal pulled and held by hand, press the stop lamp switch and ASCD cancel switch until its threaded end contacts the stopper rubber.
4. With the threaded end of the stop lamp switch contacting the stopper rubber and ASCD cancel switch, rotate the switch clockwise by 45° to secure.

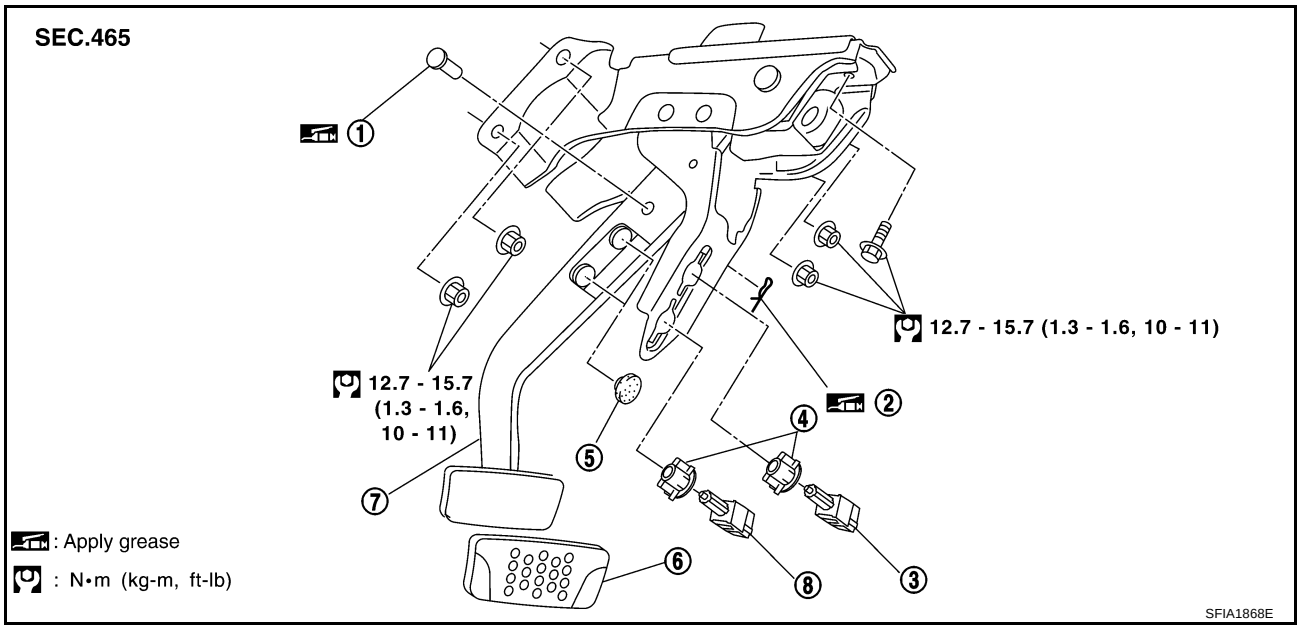
   CAUTION:
   Make sure that the clearance (C) between the stopper rubber and threaded end of the stop lamp switch and ASCD cancel switch is within the standard.
5. Check the pedal play.

   CAUTION:
   Make sure that the stop lamps go off when the pedal is released.
6. Start the engine to check the brake pedal's depressed height.



Components

NFS000IF



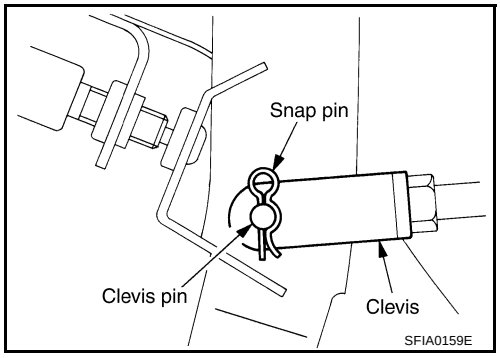
1. Clevis pin
2. Snap pin
3. Stop lamp switch
4. Clip
5. Stopper rubber
6. Pedal pad
7. Brake pedal assembly
8. ASCD cancel switch

Removal and Installation

NFS00007

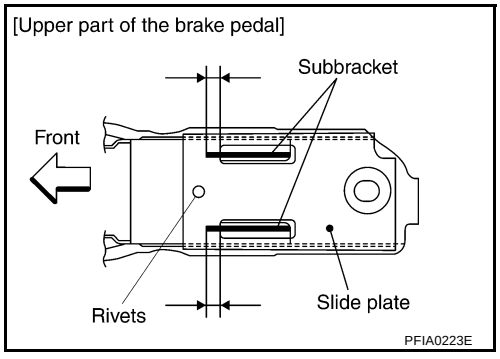
REMOVAL

1. Remove the lower driver-side instrument panel. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove the steering column. Refer to PS-11, "STEERING COLUMN" .
3. Remove the stop lamp switch and ASCD cancel switch from the pedal assembly.
4. Remove the snap pin and clevis pin from the brake booster clevis.
5. Remove the mounting nuts and bolt from the bracket, and remove the pedal assembly from the vehicle.

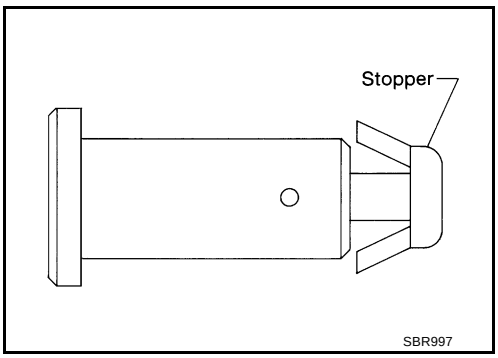


INSPECTION AFTER REMOVAL

- Check that the rivets in the upper part of the brake pedal are not deformed.
- Make sure the sub bracket and the slide plate are at least 4 mm (0.16 in) apart.



- Check the brake pedal for bend, damage, and cracks on the welded parts. Replace the applicable part if a failure is detected.
- Check the clevis pin and resin stopper for damage and deformation. If a failure is detected, replace the clevis pin.



INSTALLATION

Paying attention to the following items, install in the reverse order of removal.

- After installing the brake pedal assembly to the vehicle, adjust the brake pedal.

BRAKE FLUID

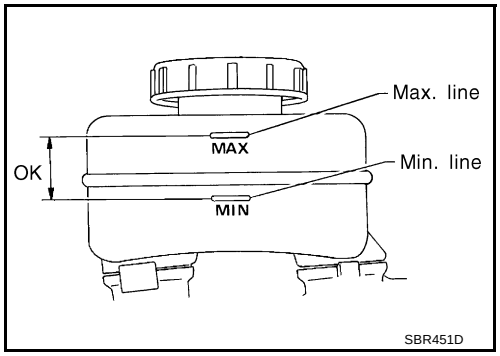
PFP:KN100

On-Vehicle Inspection

NFS00008

LEVEL CHECK

- Check that the fluid level in the reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around the 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.



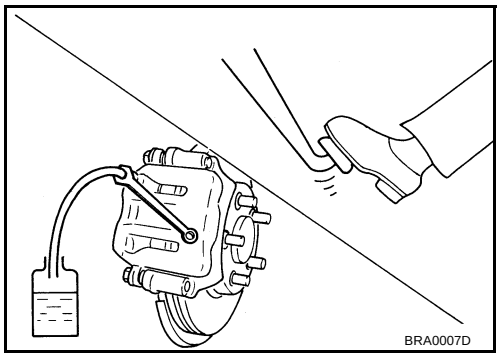
Drain and Refill

NFS00009

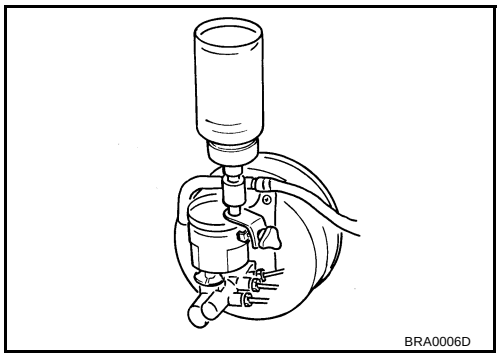
CAUTION:

- **Refill with new brake fluid “DOT3”.**
- **Never reuse drained brake fluid.**
- **Do not let brake fluid come in contact with painted surfaces on the body. This might damage the paint, so if it does come in contact, immediately wipe area and wash off with water.**

1. Connect a vinyl tube to bleed valve.
2. Depress the brake pedal, loosen the bleed valve, and gradually remove the brake fluid.
3. Turn the key switch to the off position and remove the battery negative terminal.



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-11, "Bleeding Brake System" .



Bleeding Brake System

NFS0000A

CAUTION:

While bleeding, pay attention to master cylinder fluid level.

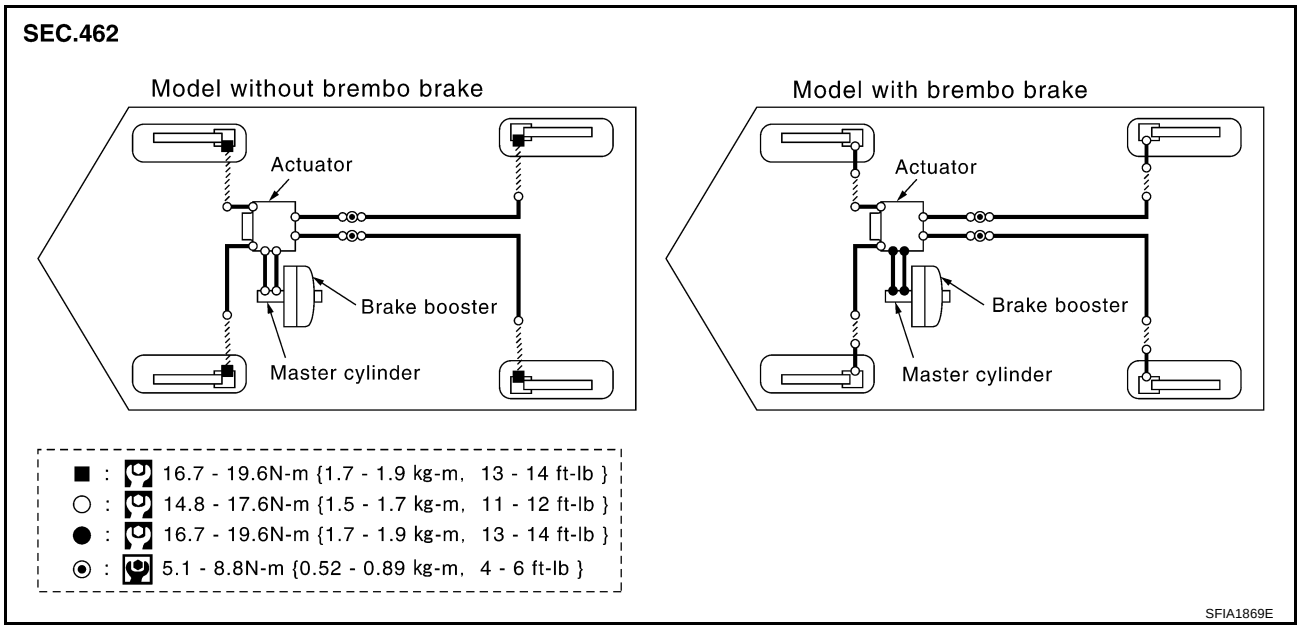
1. Turn the ignition switch to the OFF position.
2. Connect a vinyl tube to the rear right bleed valve.
3. Fully depress brake pedal 4 to 5 times.
4. With the brake pedal depressed, loosen the bleed valve to let the air out, and then tighten it immediately.
5. Repeat steps 3, 4 until no more air comes out.
6. Tighten the bleed valve to the specified torque. Refer to BR-27, "Components" (Front) and BR-40, "Components" (Rear).
7. In steps 2 to 6 below, with the master cylinder reservoir tank filled at least half way, bleed air from the front left, rear left, and front right tires, in that order.

BRAKE TUBE AND HOSE

PFP:46300

Hydraulic Circuit

NFS0000B



CAUTION:

- **Make sure it does not twist or break when being attached.**
- **Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.**
- **The brake tube is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.**
- **Do not let brake fluid come in contact with painted surfaces on the body. This might damage the paint, so if it does come in contact, immediately wipe area and wash off with water.**
- **Do not bend or twist brake hose sharply, or strongly pull it.**
- **When removing components, cover connections so that no dirt, dust, or other foreign matter gets in.**
- **Refill with new brake fluid " DOT 3 ".**
- **Never reuse drained brake fluid.**

Removal and Installation of the Front Brake Tube and Brake Hose (Other than Brembo Calipers)

NFS0000C

REMOVAL

1. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
2. Using a flare nut wrench, remove brake tube from brake hose.
3. Remove union bolt and remove the brake hose from the caliper assembly.
4. Remove the lock plate and nut, and remove the brake hose from the vehicle.

INSTALLATION

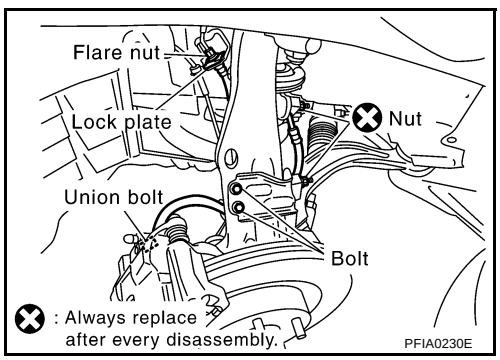
1. Attach the brake hose to the vehicle and tighten the nut to the specified torque.

   : 19.6 – 23.5 N·m (2.0 – 2.3 kg-m, 15 – 17 ft-lb)

   NOTE:
   When removed bracket attaching the bolt is tightened with provisions torque.

   : 10.8 – 15.6 N·m (1.1 – 1.5 kg-m, 8 – 11 ft-lb)

2. Install brake hose by aligning with the protrusion on caliper assembly, and tighten union bolts to the specified torque.



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

CAUTION:
Do not reuse the copper washer.

3. Attach the brake hose to the brake tube, partially tighten the flare nut as far as possible by hand, then secure it to the bracket with the lock plate.
4. Using a flare nut wrench, tighten the flare nut to the specified torque.

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

5. Refill brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .

Removal and Installation of the Front Brake Tube and Brake Hose (With Brembo Calipers)

NFS0000D

REMOVAL

1. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
2. Using a flare nut wrench, remove the brake tube from the brake hose.
3. Using a flare nut wrench, remove the caliper-side brake tube from the brake hose.
4. Remove the lock plate and nut, and remove the brake hose from the vehicle.

INSTALLATION

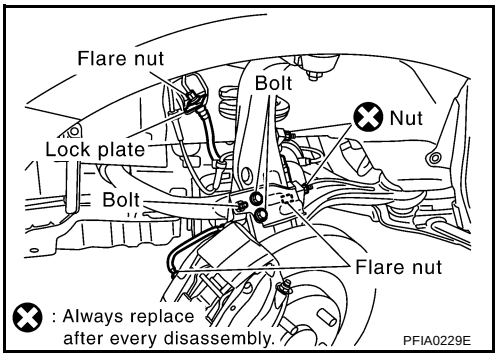
1. Attach the brake hose to the vehicle and tighten the nut to the specified torque.

Nut : 19.6 – 23.5 N·m (2.0 – 2.3 kg-m, 15 – 17 ft-lb)

Bolt : 10.8 – 15.6 N·m (1.1 – 1.5 kg-m, 8 – 11 ft-lb)

2. Attach the caliper-side brake tube to the brake hose, partially tighten the flare nut as far as possible by hand, then tighten it to the specified torque with flare nut torque wrench.

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



3. Attach the brake hose to the brake tube, partially tighten the flare nut as far as possible by hand, then secure to the bracket with the lock plate.
4. Using a flare nut torque wrench, tighten the flare nut to the specified torque with flare nut torque.

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

5. Refill brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .

Removal and Installation of the Rear Brake Tube and Brake Hose (Other than Brembo Calipers)

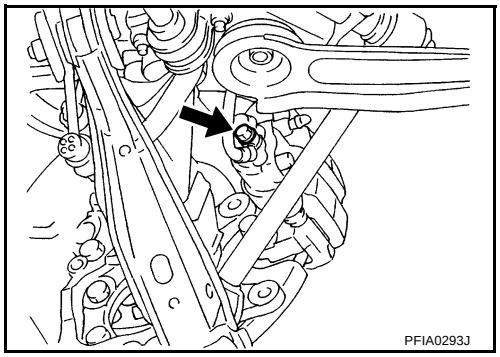
NFS0000E

REMOVAL

1. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
2. Using a flare nut wrench, remove brake tube from brake hose.
3. Remove union bolts, and then remove brake hose from the caliper assembly.
4. Remove the lock plate and then remove the brake hose from the vehicle.

INSTALLATION

1. Attach the brake hose L-pin to the caliper assembly positioning hole and tighten the union bolt to the specified torque.



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

CAUTION:
Do not reuse the copper washer.

2. After securing the brake hose to the vehicle with the lock plate, partially tighten the brake tube flare nut as far as possible by hand and then tighten to the specified torque with flare nut torque wrench.

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

3. Refill brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .

Removal and Installation of the Rear Brake Tube and Brake Hose (With Brembo Calipers)

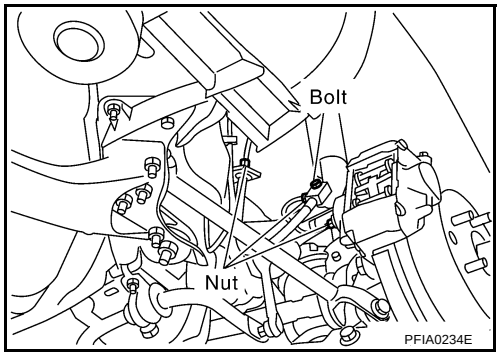
NFS0000F

REMOVAL

1. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
2. Using a flare nut wrench, remove the brake tube from the brake hose.
3. Using a flare nut wrench, remove the caliper-side brake tube from the brake hose.
4. Remove the lock plate and bolt, and remove the brake hose from the vehicle.

INSTALLATION

1. Attach the brake hose to the vehicle and tighten the bolt to the specified torque.



: **19.6 – 22.5 N·m (2.0 – 2.2 kg-m, 15 – 16 ft-lb)**

2. Attach the caliper-side brake tube to brake hose, partially tighten the flare nut as far as possible by hand, then tighten it to the specified torque with flare nut torque wrench.

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

3. Attach the brake hose to the brake tube, partially tighten the flare nut as far as possible by hand, then secure to the bracket with the lock plate.
4. Using a flare nut torque wrench, tighten the flare nut to the specified torque.

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

5. Refill brake fluid and bleed air. Refer toBR-11, "Bleeding Brake System" .

Inspection after Installation

NFS0000G

CAUTION:
If a leak is detected at the connections, retighten it or, if necessary, replace the damaged part.

1. Check 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 engine running for approximately 5 seconds, check for fluid leakage from each part.

BRAKE MASTER CYLINDER

PFP:46010

On-Vehicle Inspection

NFS0000H

LEAK INSPECTION

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

Removal and Installation

NFS0000I

CAUTION:

Do not let brake fluid come in contact with painted surfaces on the body. This might damage the paint, so if it does come in contact, immediately wipe area and wash off with water.

REMOVAL

1. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
2. Remove the fluid surface sensor harness connector.
3. Using a flare nut wrench, disconnect master cylinder assembly and brake tube.
4. Remove the master cylinder assembly nut and remove the master cylinder assembly from the vehicle. Refer to BR-24, "Removal and Installation" .

INSTALLATION

CAUTION:

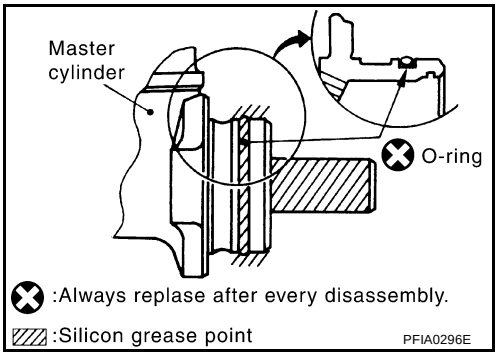
- **Refill with new brake fluid “DOT3”.**
- **Never reuse drained brake fluid.**

1. Attach the master cylinder assembly to the brake booster assembly and tighten the nut to the specified torque. BR-23, "Components" .

   CAUTION:

   Vehicles equipped with VDC require particular attention when conducting the following installation.

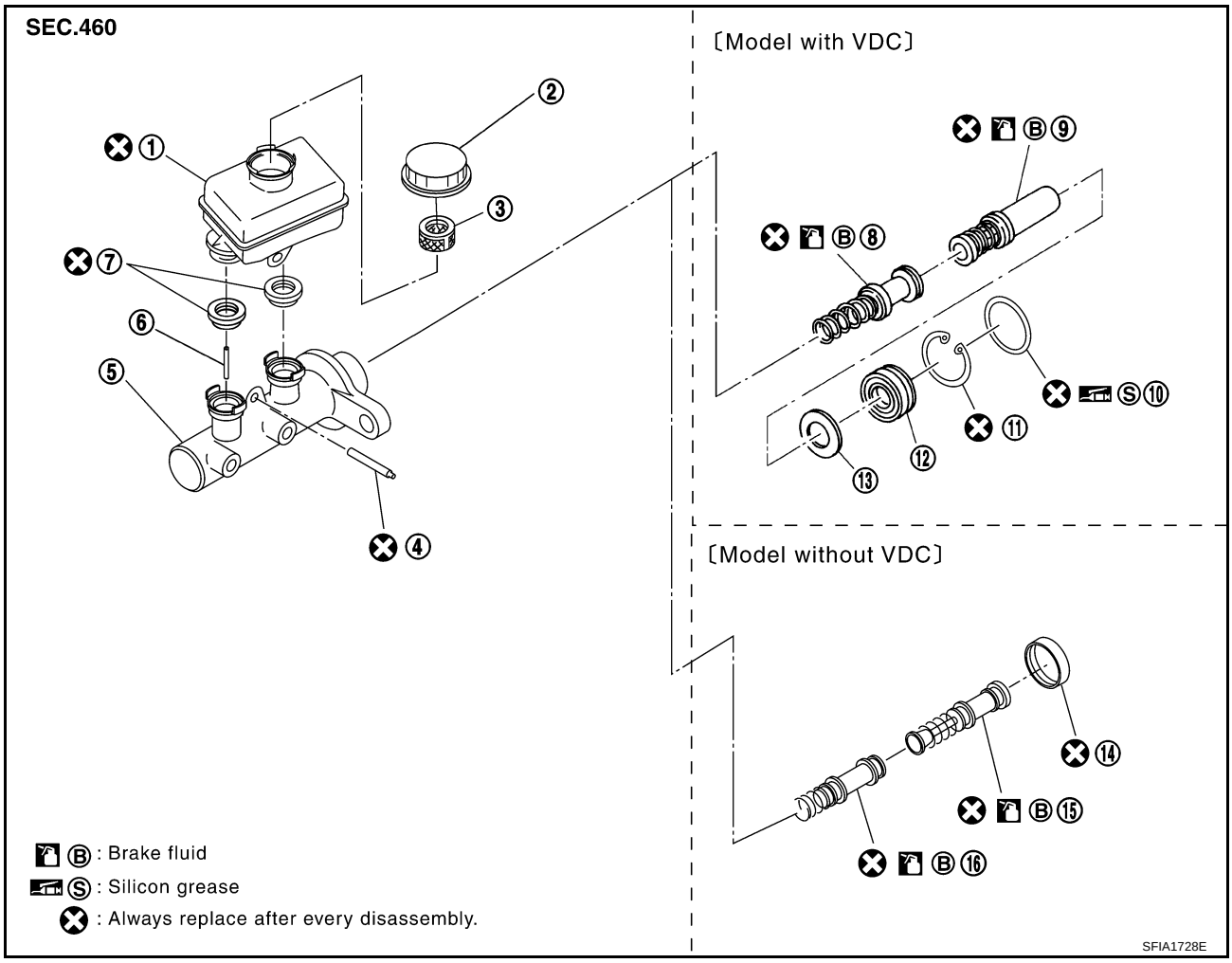
   - **Make sure the sliding surface of the primary piston rod is not damaged, and that no foreign matter become attached.**
   - **Do not reuse the O-ring on the rear end of the master cylinder as it is a non-reusable part.**
   - **Apply the silicon grease in the inner kit to and around the O-ring at the rear end of the master cylinder and to the inside of the booster.**



2. Install brake tube to master cylinder assembly and temporarily tighten flare nuts by hand.
3. Tighten the brake tube flare nut to the specified torque with flare nut torque wrench. Refer to BR-12, "Hydraulic Circuit" .
4. Refill brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .

Components

NFS0000J



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

Disassembly and Assembly

NFS0000K

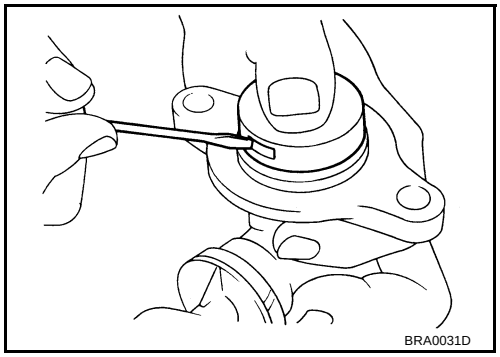
MODELS WITHOUT VDC

Disassembly

CAUTION:

Only remove the reservoir tank when absolutely necessary.

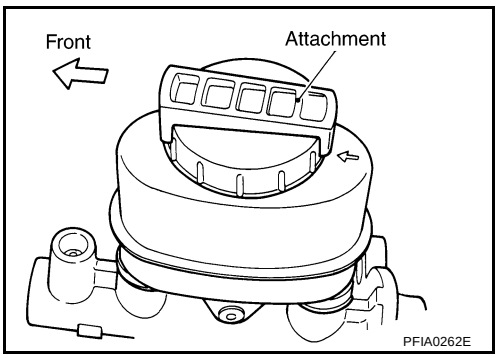
1. Using a flat-bladed screwdriver as shown in the figure, lift up the tabs on the stopper cap and remove it from the master cylinder. The piston inside the master cylinder might pop out when this is done, so hold the stopper cap down at the same time.



2. Attach the attachment in the inner kit to the reservoir cap as shown in the figure.

CAUTION:

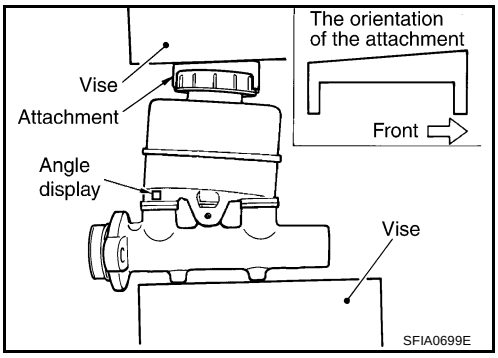
When attaching the attachment to the reservoir cap, make sure it is pointing in the right direction.



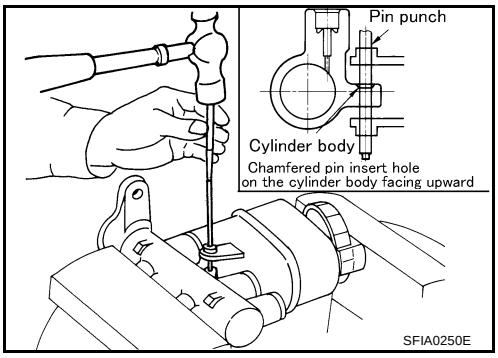
3. Place the side of the cylinder body with chamfering around the pin insertion hole facing up, and secure the master cylinder assembly with a vise.

CAUTION:

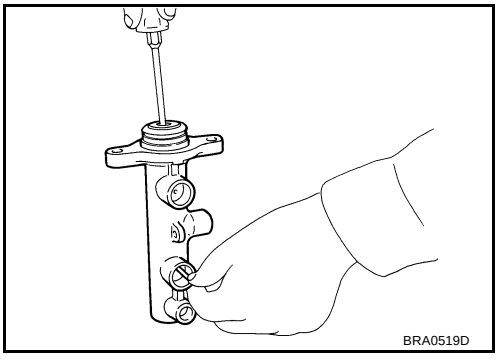
- **Tighten without letting the pin securing the reservoir tank and cylinder body come in contact with the pin insertion hole of the reservoir tank.**
- **When securing the master cylinder assembly with the vise, be sure not to over-tighten.**
- **When securing in a vise, use copper plates or cloth to protect the flange.**



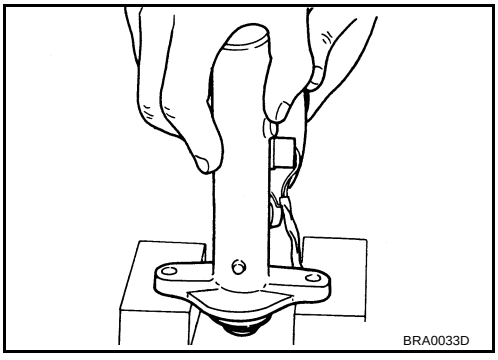
4. Using a pin punch [commercial service tool: diameter approx. 4 mm (0.16 in)], remove mounting pins on the reservoir tank.
5. Remove master cylinder assembly from the vise.
6. Remove reservoir tank and grommet from cylinder body.



7. Using a Phillips flat-bladed screwdriver, push in the piston and remove the piston stopper from the cylinder body.
8. Carefully pull the primary piston assembly straight out to prevent cylinder inner wall from being damaged.



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



Inspection after Disassembly

Master cylinder

- Check that there is no damage, friction, rusting, or pinholes on the cylinder inner wall, and replace if there are any non-standard conditions.

Assembly

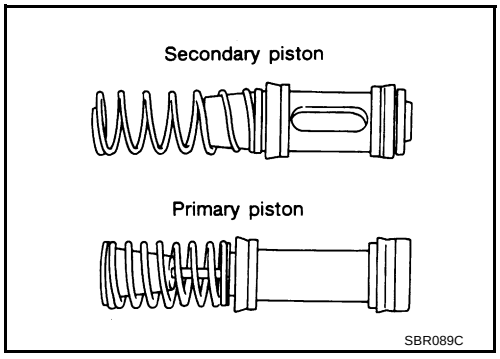
CAUTION:

- **Never use mineral oils such as kerosene, gasoline during the cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to the inner cylinder walls, the piston, or the cap seal, and use care to avoid damaging parts with the assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

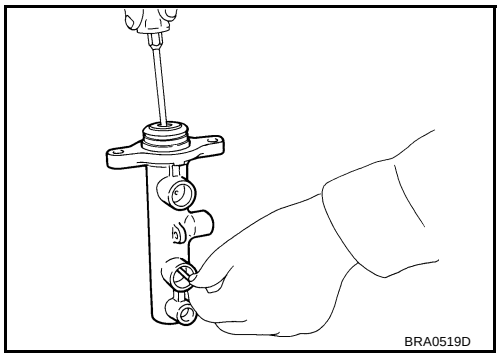
1. Apply fluid to cylinder inner wall body and contact surface of the piston assembly. Then insert secondary piston assembly and primary piston assembly into cylinder body in this order.

   CAUTION:

   - **Do not reuse the primary and secondary piston assemblies.**
   - **Be sure to replace the assembly without disassembling the new inner kit.**
   - **Pay attention to the orientation of the piston cup, and insert straight to prevent the cup from being caught by cylinder inner wall.**



2. Perform a visual inspection of the secondary piston slit through the tank boss hole on the secondary side of the cylinder body, and attach the piston stopper.



3. Holding down the piston with the stopper cap, push the stopper cap tabs so they are firmly into the cylinder grooves, then attach the stopper cap.

   CAUTION:

   Do not reuse the stopper cap.

4. Apply brake fluid the grommet and attach to the cylinder body.

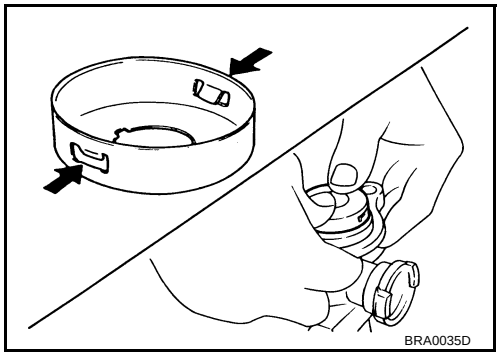
   CAUTION:

   Do not reuse the grommet.

5. Attach the attachment in the inner kit to the reservoir cap as described in disassembly step 2.

   CAUTION:

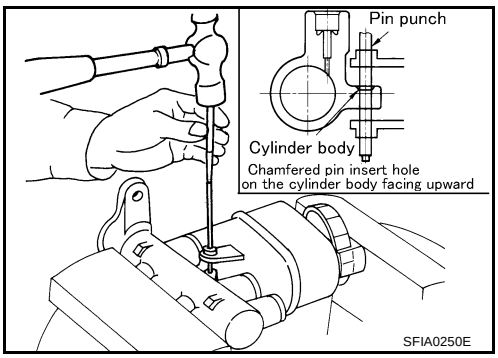
   Make sure the attachment is pointing in the right direction.



6. Master cylinder assembly is fixed in the vise as described in disassembly step 3.

7. Using a pin punch [commercial service tool: diameter Approx. 4 mm (0.16 in)], attach the reservoir tank mounting pin so that the attachment side and the opposite side are identical.

CAUTION:
Do not reuse reservoir tank and mounting pin.



MODELS WITH VDC

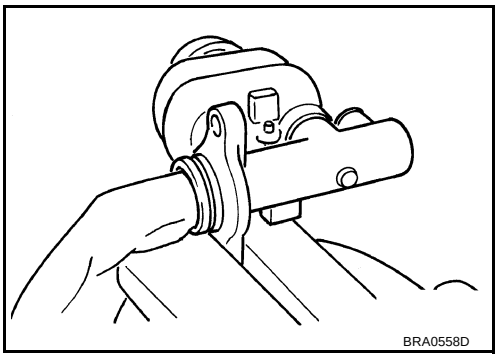
Disassembly

CAUTION:

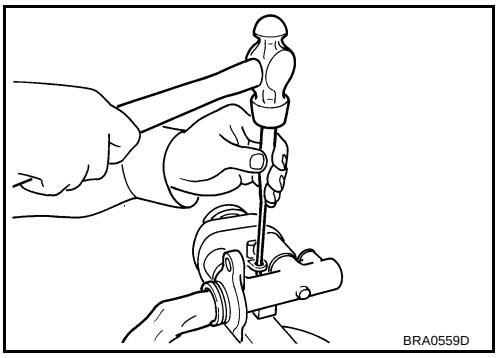
- **While working, cover the primary piston rod with cloth to prevent it from being damaged.**
- **Only remove the reservoir tank when absolutely necessary.**

1. Place the side of the cylinder body with chamfering around the pin insertion hole up, and secure the cylinder body flange section with a vise as shown in the figure.

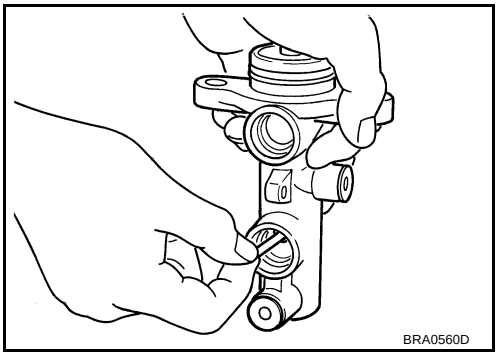
CAUTION:
When securing in a vise, use copper plates or cloth to protect the flange.



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

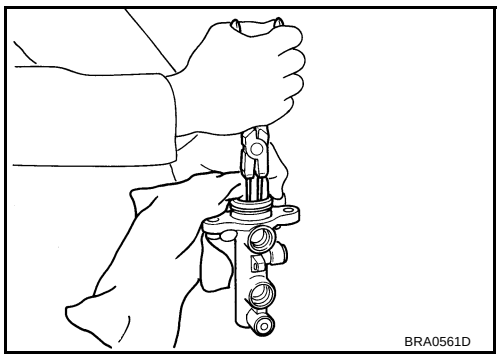


5. Push in the primary piston and remove the stopper pin from the cylinder body secondary-side tank boss hole.

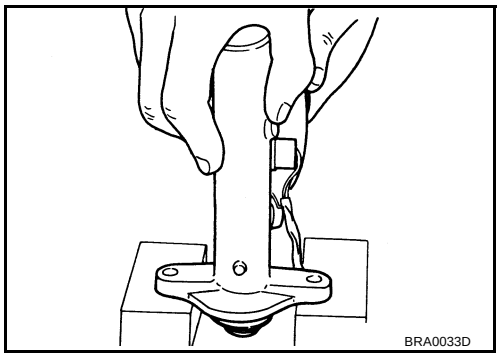


6. Remove the snap ring while pushing the primary piston in to prevent the piston from popping out.
7. Holding the primary piston rod, pull the primary piston assembly, the plate, and the guide straight out.
8. Remove the plate and guide from the primary piston.

CAUTION:
When removing the plate from the primary piston rod, make sure the inside of the plate does not damage the rod.


BRA0561D

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


BRA0033D

Inspection after Disassembly

Master cylinder

- Check that there is no damage, friction, rusting, or pinholes on the cylinder inner wall, and replace if there are any non-standard conditions.

Assembly

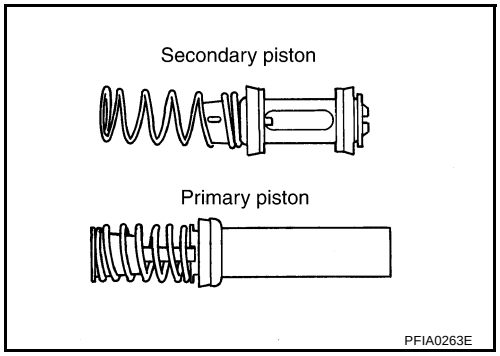
CAUTION:

- **Never use mineral oils such as kerosene, gasoline during the cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to the inner cylinder walls, the piston, or the cap seal, and use care to avoid damaging parts with the assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to the inside surface of the cylinder body and the contact surface of the piston assembly, and apply the silicon grease in the inner kit to the primary piston rod.
2. Insert the secondary piston and the primary piston into the cylinder body.

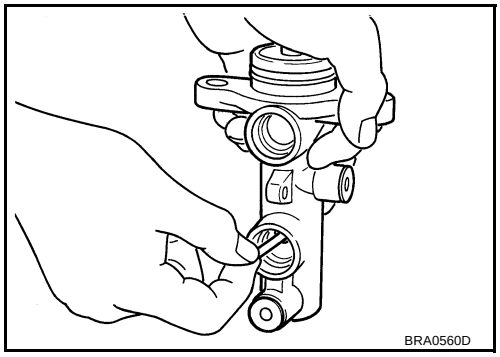
CAUTION:

- **Do not reuse the primary and secondary piston assemblies.**
- **Be sure to replace the assembly without disassembling the new inner kit.**
- **Pay attention to the orientation of the piston cup, and insert straight to prevent the cup from being caught by cylinder inner wall.**



PFIA0263E

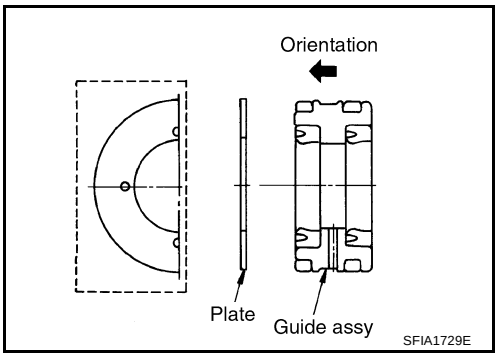
3. Visually inspect the secondary piston slit through the piston stopper mounting hole and then install the piston stopper while pushing in the primary piston.


BRA0560D

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

CAUTION:

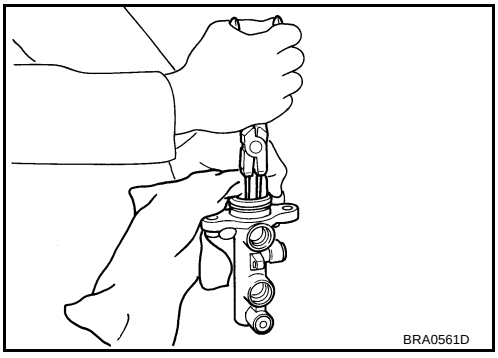
- **Make sure not to damage the primary piston rod.**
- **Pay attention to the direction of the guide.**
- **Do not drop the O-ring.**
- **Make sure the guide and/or plate are not inserted at an angle.**



5. Cover the primary piston rod with cloth to prevent it getting damaged, and attach the snap ring with the primary piston pushed in.

CAUTION:

- **Make sure the area around the snap ring is snug in the cylinder body bore groove.**
- **Do not reuse the snap ring.**



6. Place the side of the cylinder body with chamfering around the pin insertion hole up, and secure the cylinder body flange section with a vise.

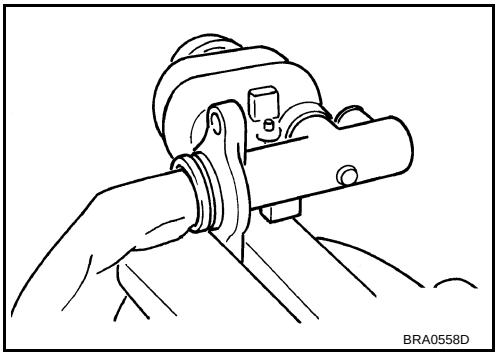
CAUTION:

When securing in a vise, use copper plates or cloth to protect the flange.

7. Apply brake fluid to the grommet and attach the reservoir tank to the master cylinder.

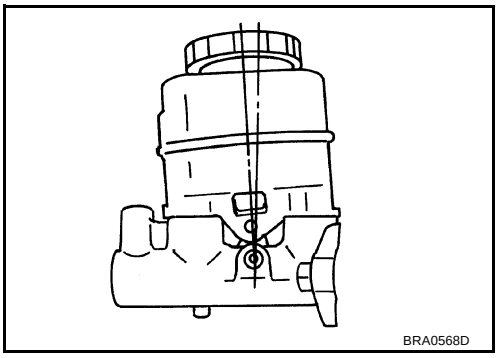
CAUTION:

Do not reuse the grommet.

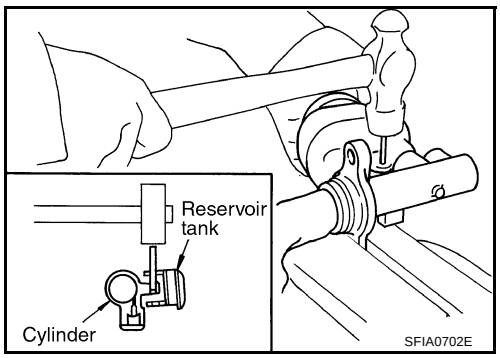


NOTE:

Attach the reservoir tank in the orientation shown in the figure.



8. Tilt the reservoir tank so that the mounting pin can be inserted as shown in the figure, and insert the mounting pin. When the mounting pin has passed the master cylinder pinhole, return the reservoir tank to a level position. Attach the mounting pin to the opposite mounting pin hole of the reservoir tank so that it is the same as the insertion side.



CAUTION:

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

BRAKE BOOSTER

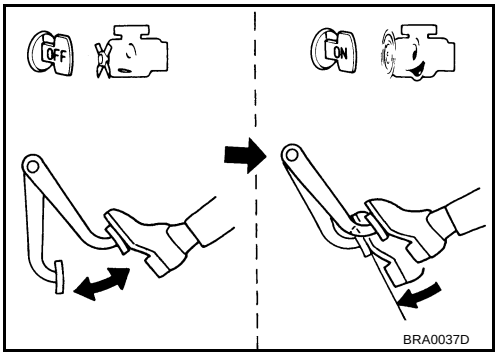
PFP:47200

On-Vehicle Inspection

NFS0000L

OPERATING CHECK

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

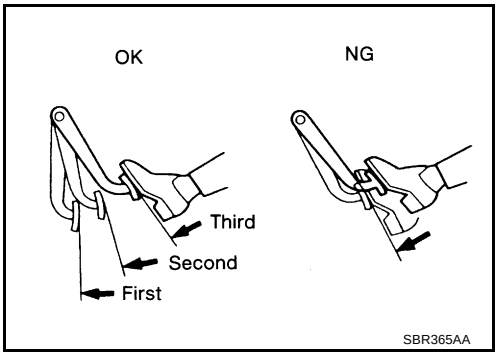


CAUTION:

Depressing pedal interval is approximately 5 seconds.

AIRTIGHT CHECK

- Run the engine at idle for approximately 1 minute, and stop it after applying vacuum to the booster. Depress the brake pedal normally to change the vacuum to the atmospheric pressure. Check that distance between the 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.

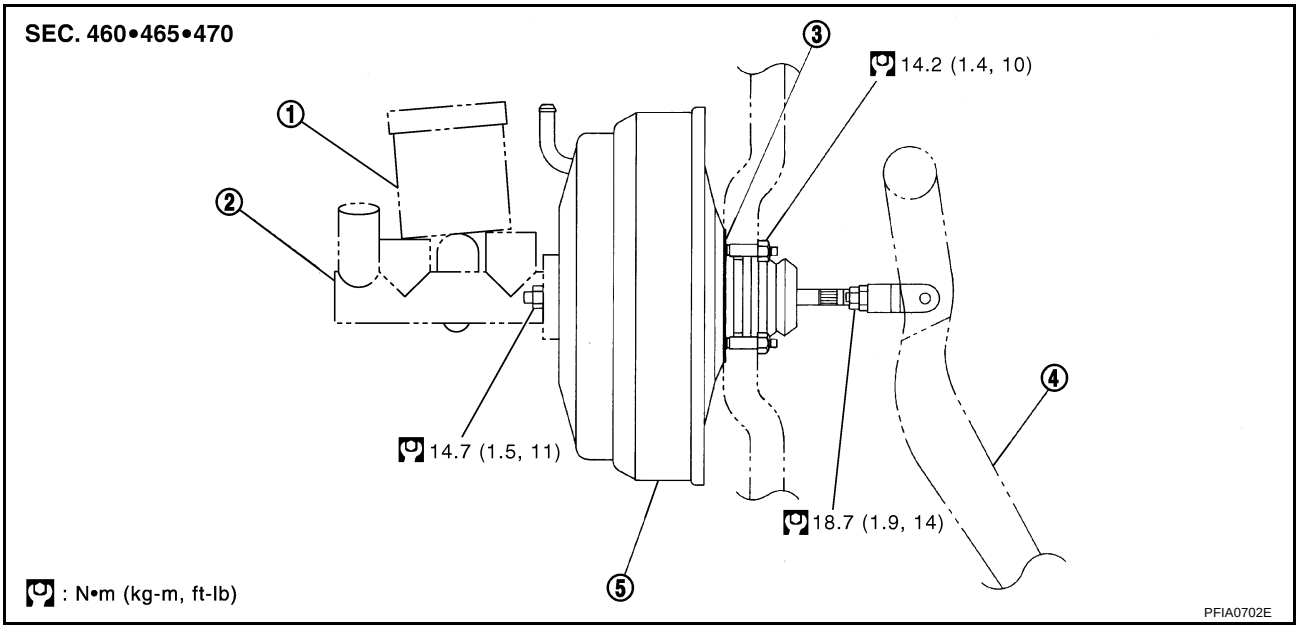


CAUTION:

Depressing pedal interval is approximately 5 seconds.

Components

NFS000IG



1. Reservoir tank
2. Master cylinder
3. Gasket
4. Brake pedal
5. Brake booster

Removal and Installation

NFS0000M

REMOVAL

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.**
- **Attach the check valve in the correct orientation.**

1. Remove vacuum hose from the brake booster. Refer to BR-25, "VACUUM LINES" .
2. Remove the brake master cylinder. Refer to BR-24, "Removal and Installation" .
3. Remove the brake piping between brake master cylinder and ABS actuator and electric unit (control unit)/ VDC actuator. Refer to BR-12, "Hydraulic Circuit" .

   CAUTION:
   For M/T vehicles with remove the brake piping after removing the clutch reservoir tank bolt.
4. Remove the brake pedal attachment snap pin and clevis pin from inside the vehicle.
5. Remove the nuts on the brake booster and brake pedal assembly.
6. Remove brake booster assembly from the engine compartment side.

INSPECTION AFTER REMOVAL

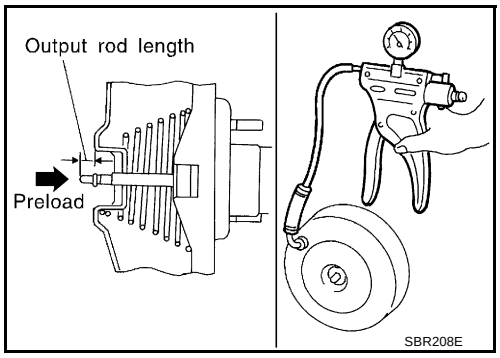
Output Rod Length Inspection

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

Standard dimension when vacuum –66.7 kPa (–500 mmHg, –19.69 inHg):

With TCS models: 10.4 mm (0.409 in)

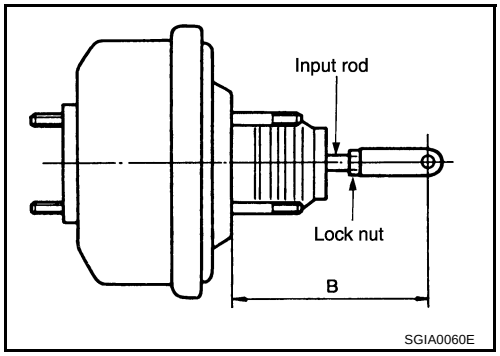
With VDC models: –6.2 mm (–0.244 in)



INSTALLATION

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

   Length “B”: 125 mm (4.92 in)
2. After adjusting “B”, temporarily tighten the lock nut to install the booster assembly to the vehicle. At this time, make sure to install a gasket between the booster assembly and the vehicle.
3. Connect the brake pedal with the clevis of the input rod.
4. Install the pedal bracket mounting nuts and tighten them to the specified torque.
5. Install the brake piping between brake master cylinder and ABS actuator and electric unit (control unit) /VDC actuator. Refer to BR-12, "Hydraulic Circuit" .
6. Install the master cylinder to the booster assembly. Refer to BR-24, "Removal and Installation" .
7. Adjust the height and play of the brake pedal.
8. Tighten the lock nut of the input rod to the specified torque.
9. Refill new brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .

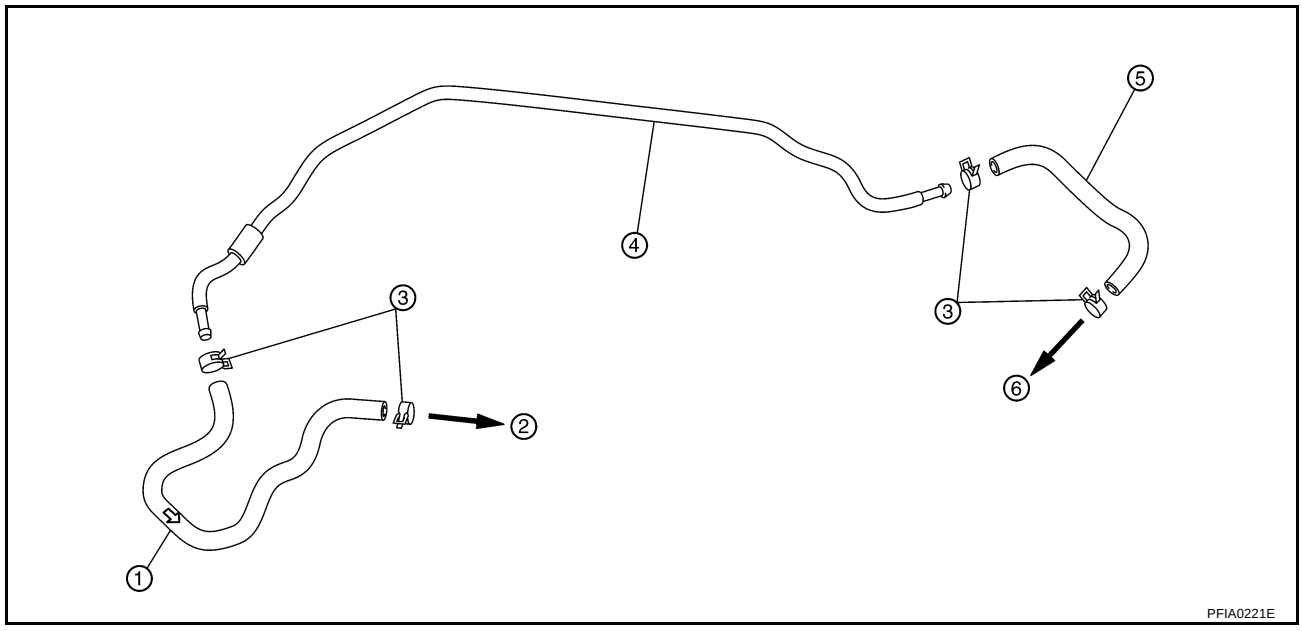


VACUUM LINES

PFP:41920

Components

NFS000IH



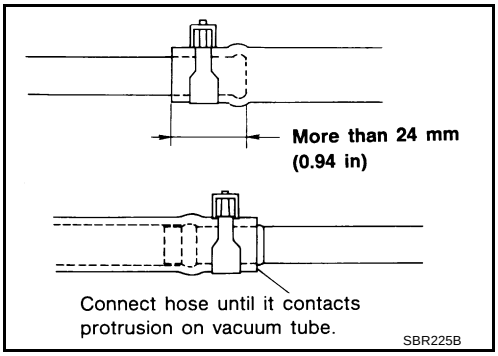
1. Check valve inclusion position stamp
2. Intake manifold
3. Clamp
4. Vacuum piping
5. Vacuum hose
6. Brake booster

Removal and Installation

NFS0000N

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

NFS0000O

VISUAL INSPECTION

Check for improper assembly, damage and deteriorate.

CHECK VALVE INSPECTION

Airtightness Inspection

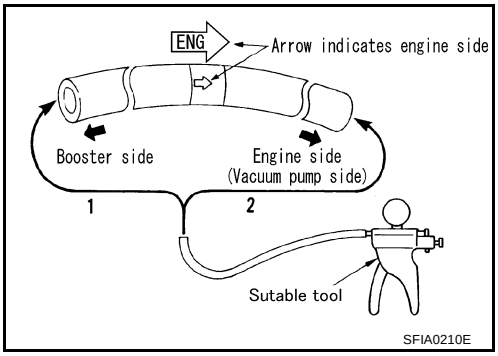
Use a hand-held vacuum pump to check.

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

PFP:41000

On-Vehicle Inspection

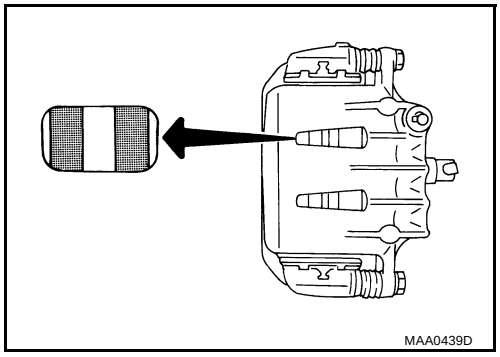
NFS000AS

PAD WEAR INSPECTION

Other than Brembo Calipers

- Check pad thickness from check hole on cylinder body. Use a scale for inspection if necessary.

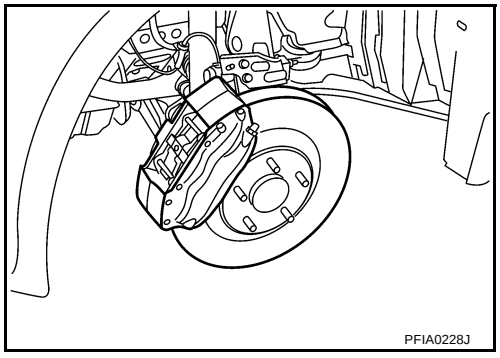
Standard thickness : 11.0 mm (0.433 in)
Repair limit thickness : 2.0 mm (0.079 in)



With Brembo Calipers

- Inspect the thickness of the pad through the caliper inspection hole. Use a scale for inspection if necessary.

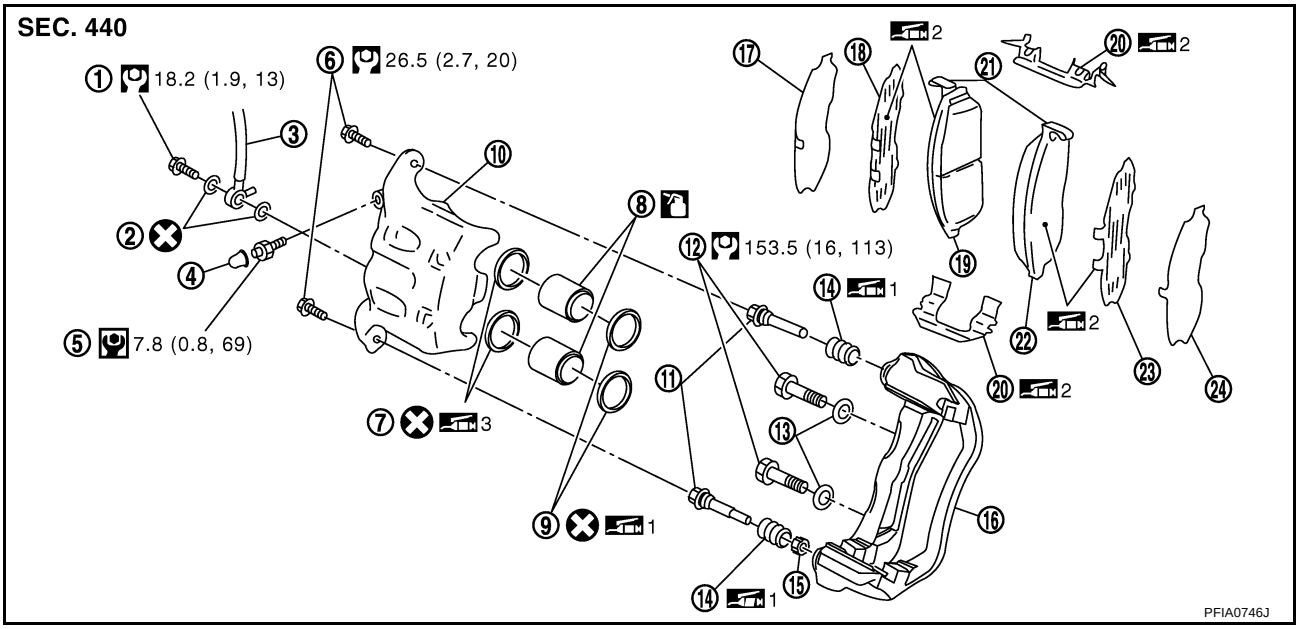
Standard thickness : 9.3 mm (0.366 in)
Repair limit thickness : 2.0 mm (0.079 in)



Components

NFS000AT

OTHER THAN BREMBO CALIPERS



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

Refer to GI-10, "Components" and the followings for the symbols in the figure.

1: Apply rubber grease.

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

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

WARNING:

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

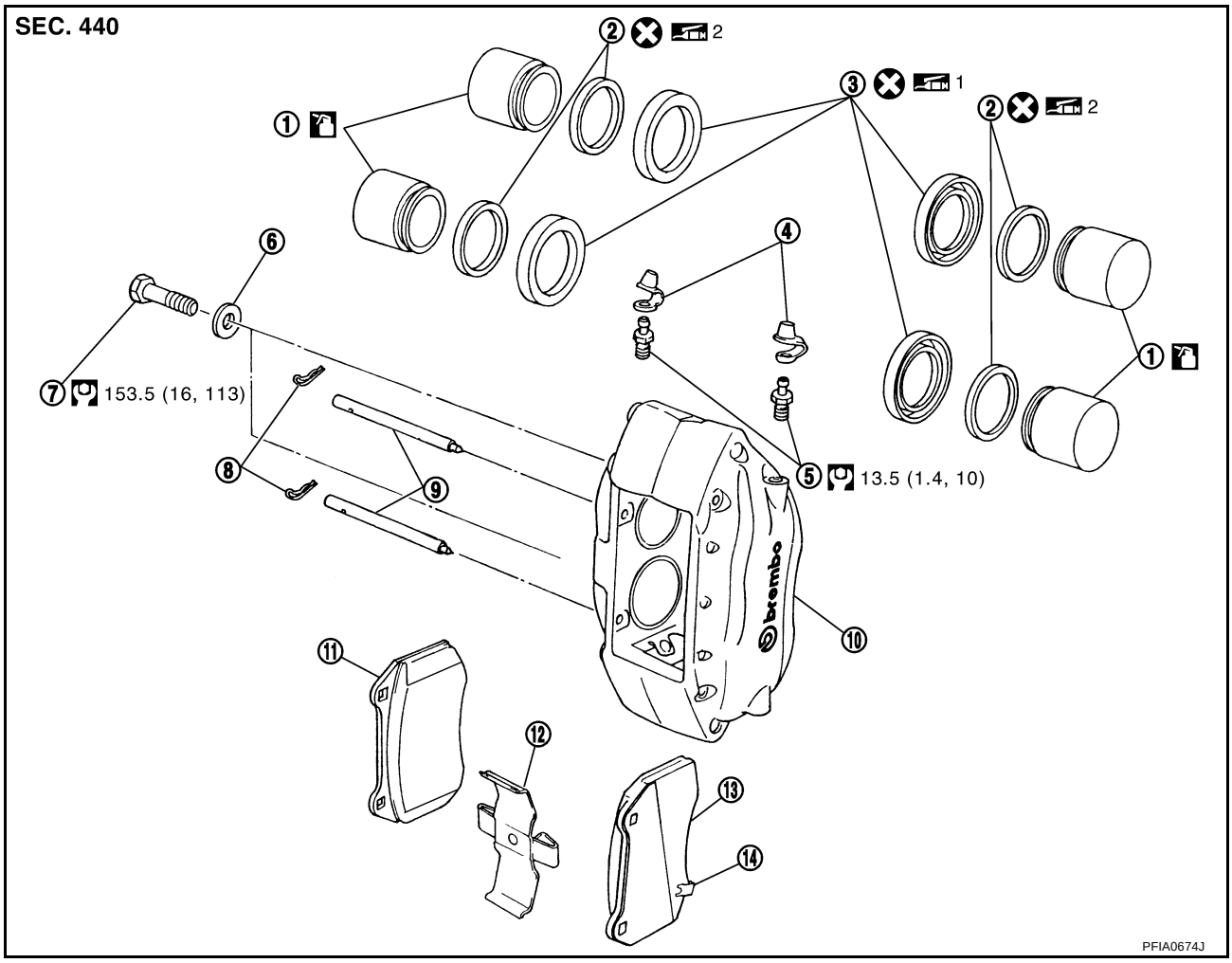
CAUTION:

- **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.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shim and shim covers as a set when replacing brake pads.**
- **Keep rotor clean, from brake fluid.**
- **Burnish the brake pads and disc rotor mutually contacting surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-38, "Brake Burnishing Procedure" .**

WITH BREMBO CALIPERS

NOTE:

Refer to BR-30, "HOW TO APPLY GREASE TO THE BRAKE PAD" for how to apply grease to brake pads.



1.	Piston	2.	Piston seal	3.	Piston boot
4.	Cap	5.	Bleed valve	6.	Washer
7.	Bolt	8.	Clips	9.	Pad pins
10.	Caliper	11.	Inner pad	12.	Cross spring
13.	Outer pad	14.	Pad wear sensor		

Refer to GI-10, "Components" and the followings for the symbols in the figure.

1: Apply rubber grease.

2: Apply polyglycol ether based lubricant.

: Apply brake fluid.

WARNING:

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

CAUTION:

- **While the brake pad and cylinder body are separated, the piston may suddenly jump out, so do not depress the brake pedal.**
- **Apart from caliper assembly, disassembly or replacement, there is no need to remove caliper bolts or brake hose or tube.**
- **Do not damage piston boot.**
- **Keep the rotor clean of brake fluid.**

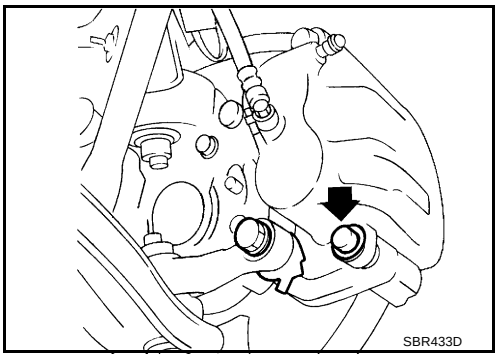
- **Burnish the brake pads and disc rotor mutually contacting surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-38, "Brake Burnishing Procedure" .**

Removal and Installation of Brake Pad (Other than Brembo Calipers)

NFS000AU

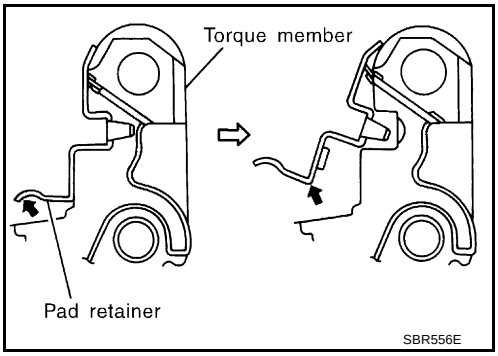
REMOVAL

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.

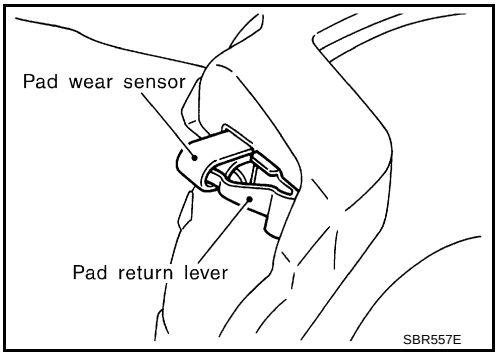
   CAUTION:
   - **When removing pad retainer from torque member, lift pad retainer in the direction shown by arrow (shown in the figure) so as not to deform it.**
   - **Do not damage piston boot.**
   - **Keep rotor clean, free from brake fluid.**



INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease between pad retainer and 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.

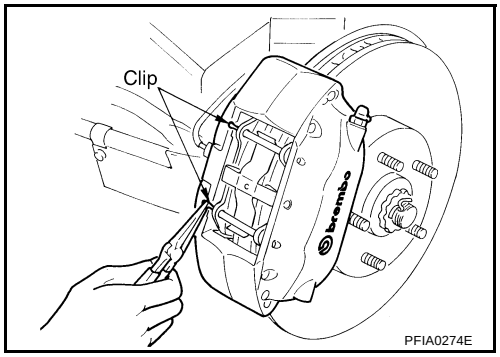
   CAUTION:
   When replacing pads with new ones, press in piston until pads can be installed. In this case, carefully monitor brake fluid level in reservoir tank because brake fluid will return to master cylinder reservoir tank.
4. Install lower sliding pin bolt, and tighten it to the specified torque. Refer to BR-27, "Components" .
5. Secure disc rotor with wheel nuts. Depress brake pedal a few times until it gets a responsive touch.
6. Check front disc brake for drag.
7. Install tires to vehicle.

Removal and Installation of Brake Pad (With Brembo Calipers)

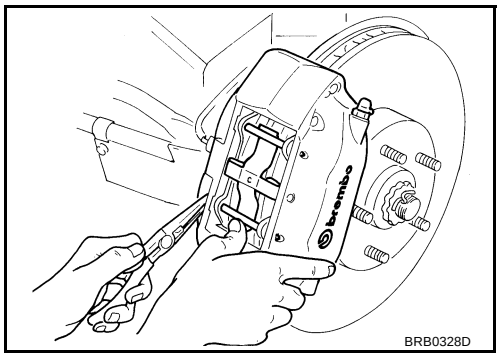
NFS0000W

REMOVAL

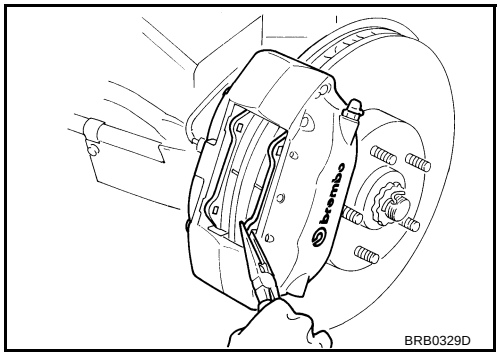
1. Remove tires from vehicle with a power tool.
2. Remove the clip from the pad pin.



3. Remove the pad pin while holding down the cross spring, then remove the cross spring from the caliper.



4. Using pliers, remove the pad from the caliper.



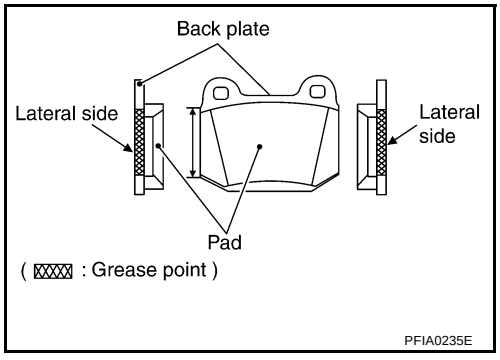
HOW TO APPLY GREASE TO THE BRAKE PAD

Pad Side

Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease about 0.5 g (0.018 oz) per surface equally to back plate side of Inner Pad and Outer Pad. (Refer to the figure.)

CAUTION:

Make sure no foreign matter attaches itself to the grease.



INSTALLATION

1. Insert the piston to the position where the pad is attached.

   NOTE:

   Using a disc brake piston tool (commercial service tool), etc., makes it easier to push in the piston.

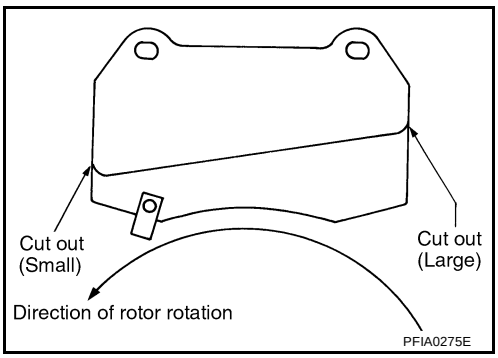
   CAUTION:

   By pushing in the piston, the brake fluid returns to the master cylinder reservoir tank. Watch the level of the surface of the reservoir tank.

2. Attach pad.

CAUTION:

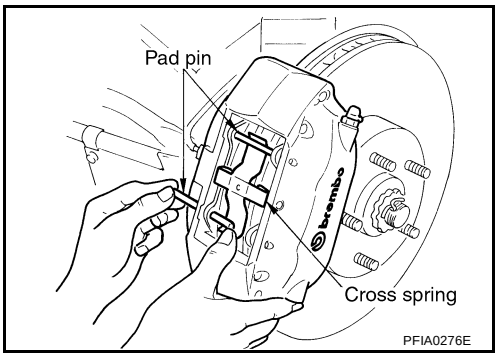
- **Attach the pad with wear sensor to the outer side.**
- **The side of the shim with the larger cutouts should be on the entry side of the disc rotor spin.**



3. Insert the upper pad pin from the inner cylinder side, then insert firmly to the outer cylinder side through the hole in the top of the pad.
4. As shown in the figure, place the top of the cross spring over the top pad pin, press in the cross spring, push the lower pad pin from the inner cylinder side to the outer cylinder side, and secure the cross spring.
5. Insert the clip in the small hole at the end of the pad pin.

CAUTION:

If the clip is not fully attached, the pad pin or the pad could fall out while the vehicle is in motion.



6. Install tires to vehicle.

Removal and Installation of Brake Caliper Assembly (Other than Brembo Calipers)

NFS000AV

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid gradually (from bleed valve while depressing brake pedal). Refer to BR-10, "Drain and Refill" .
4. Remove union bolt, and then remove brake hose from caliper assembly.
5. Remove torque member mounting bolts (from torque member), and remove caliper assembly (from vehicle with a power tool).

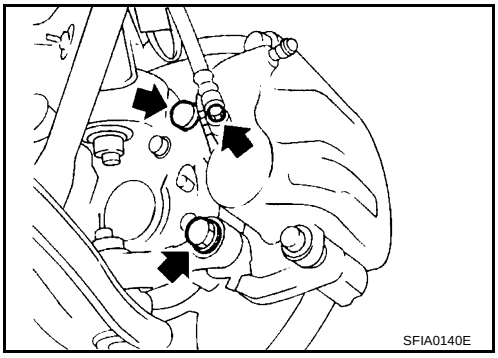
CAUTION:

Do not drop brake pad.

6. Remove disc rotor.

CAUTION:

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



INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

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 mounting bolts to the specified torque. Refer to BR-27, "Components" .

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-27, "Components" .

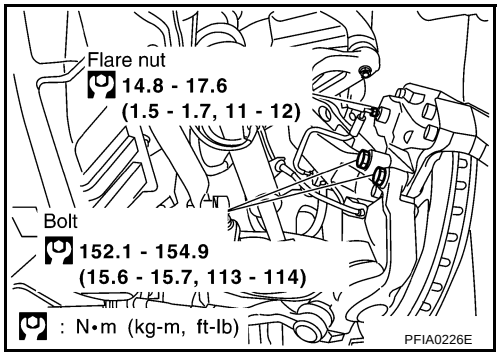
   CAUTION:
   - **Do not reuse copper washers for union bolts.**
   - **Assemble brake hose securely on caliper assembly.**
4. After installing caliper assembly, refill with new brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .
5. Install tires to vehicle.

Removal and Installation of Caliper Assembly (With Brembo Calipers)

NFS0000X

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
3. Remove the brake pad. Refer to BR-30, "Removal and Installation of Brake Pad (With Brembo Calipers)" .
4. Remove the brake tube flare nut using a flare wrench.
5. Remove the brake tube bracket from the knuckle spindle.



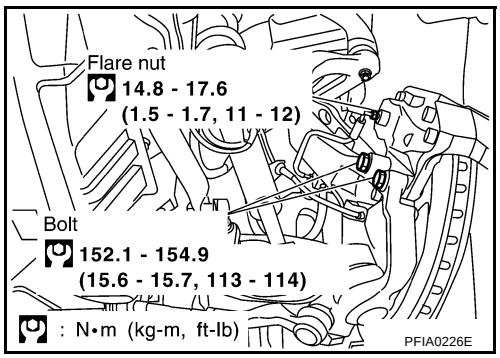
6. Remove the caliper bolt and remove the caliper assembly from the vehicle.
7. Remove disc rotor.

INSTALLATION

CAUTION:
- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

1. Install disc rotor.
2. Install caliper assembly to the vehicle, and tighten bolts to the specified torque.

   CAUTION:
   When attaching the caliper assembly to the vehicle, wipe any oil off the knuckle spindle washers and caliper assembly attachment surfaces.



3. Attach the brake tube to the caliper assembly and partially tighten the flare nut.

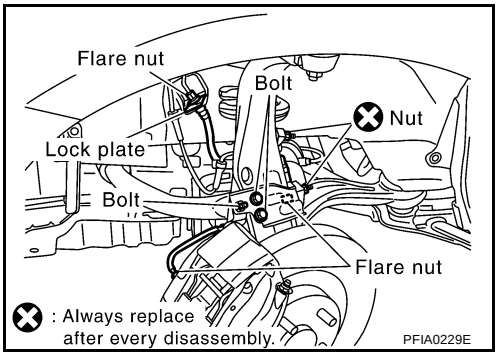
4. Attach the brake tube bracket to the knuckle spindle and tighten to the specified torque.

   : 10.8 – 15.6 N·m (1.1 – 1.5 kg-m, 8 – 11 ft-lb)

5. Using a flare nut torque wrench, tighten the caliper assembly and brake tube connection flare nut to the specified torque.

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

6. Attach brake pad. Refer to BR-30, "Removal and Installation of Brake Pad (With Brembo Calipers)" .
7. Refill new brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .
8. Install tires to vehicle.



Disassembly and Assembly of Brake Caliper Assembly (Other than Brembo Calipers)

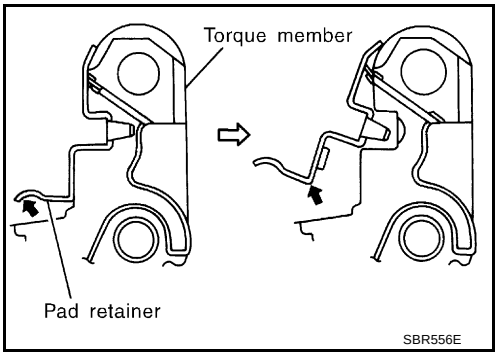
NFS000AW

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

DISASSEMBLY

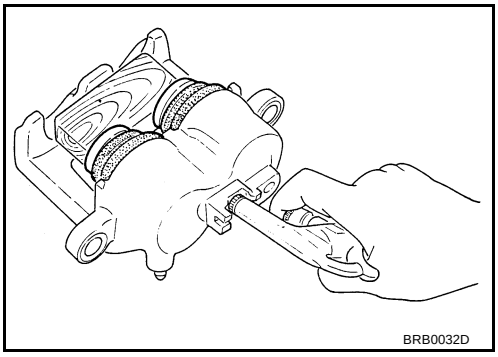
1. Remove caliper assembly from vehicle. Refer to BR-31, "Removal and Installation of Brake Caliper Assembly (Other than Brembo Calipers)" .
2. Remove sliding pin bolts from cylinder body, and remove pads, shims, shim cover and pad retainers from torque member.

   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.



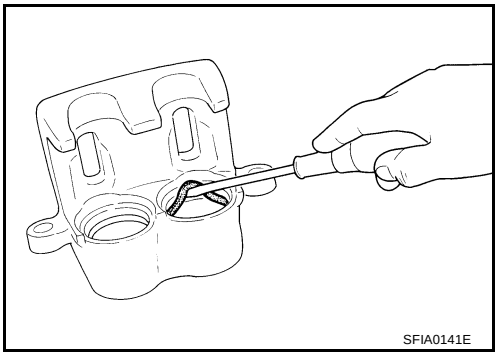
3. Remove sliding pins and sliding pin boots from torque member.
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.

   CAUTION:
   Do not get fingers caught in the pistons.



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.

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.

ASSEMBLY

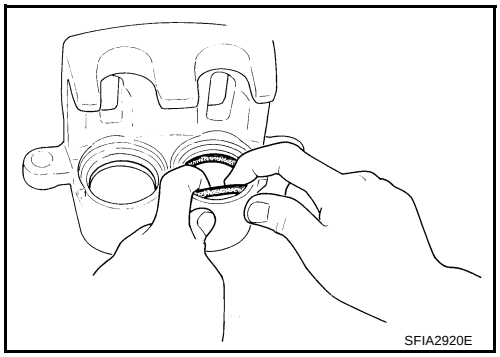
CAUTION:

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.

   CAUTION:

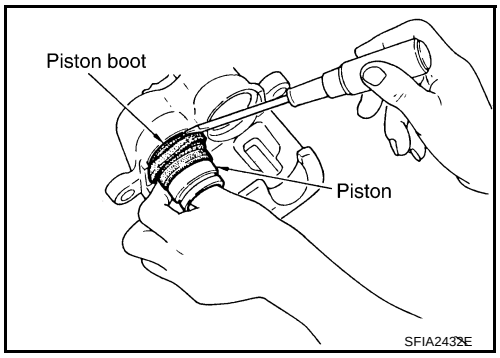
   Do not reuse piston seal.



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.

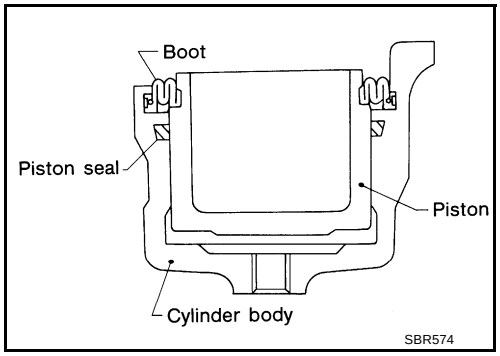


3. Apply brake fluid to piston, and press piston into cylinder body by hand to assemble piston-side lip on piston boot properly into a groove on piston.

   CAUTION:

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

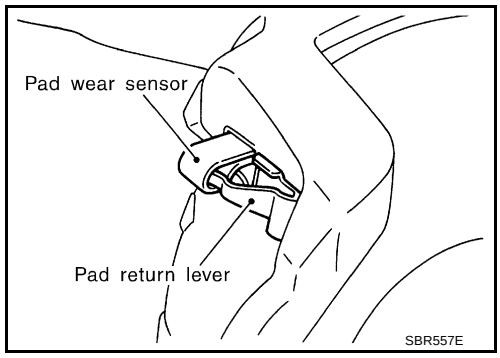
4. Install sliding pins and sliding pin boots to the torque member.



5. Install the torque member to the steering knuckle and tighten the mounting bolts to the specified torque. Refer to BR-27, "Components" .

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. Press in piston until pads can be installed, and then install cylinder body to torque member.
8. Install cylinder body, and tighten sliding pin bolt to the specified torque. Refer to BR-27, "Components" .



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-12, "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-11, "Bleeding Brake System" .

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.

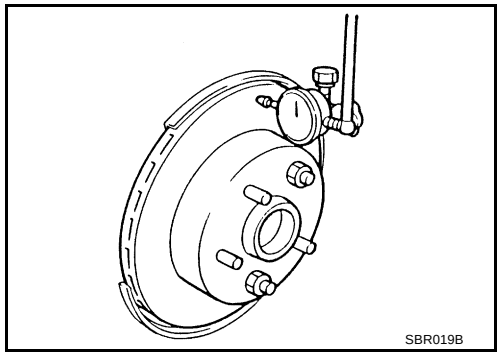
Runout Inspection

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 (with it attached to the vehicle):
0.035 mm (0.0014 in) or less

NOTE:
Make sure that wheel bearing axial end play is with in the specification before measuring runout. Refer to FAX-4, "On-Vehicle Inspection and Service" .

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.

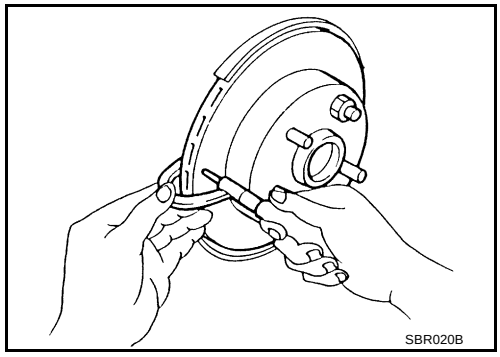


Thickness Inspection

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.



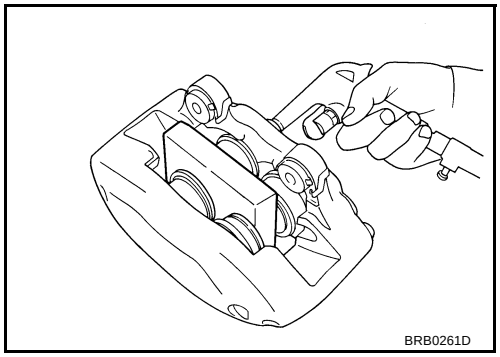
Disassembly and Assembly of Caliper Assembly (With Brembo Calipers)

NFS0000Y

DISASSEMBLY

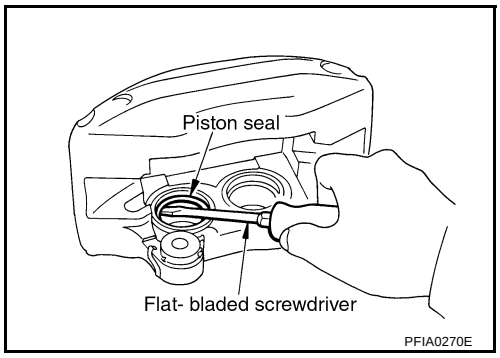
1. Insert a piece of wood as shown in the figure, blow air in through the flare nut mounting hole, and remove the piston and piston boot. If the four pistons do not all come out at the same time, press the piston(s) that have come out a ways into the cylinder body and blow air in again.

   CAUTION:
   Do not get fingers caught in the piston.
2. Remove the piston boot from the piston.



3. Using a flat-bladed screwdriver, remove the piston seal.

   CAUTION:
   - **Be careful not to damage cylinder inner wall.**
   - **Never remove the four bolts from the inner and outer sides of the caliper. Do not tighten them further, either.**



CALIPER INSPECTION

Caliper

CAUTION:
- **Use new brake fluid to clean. Never use mineral oils such as gasoline or kerosene.**
- **Check for corrosion, wear, or damage to the cylinder inner wall, and replace the caliper if there are any non-standard conditions.**

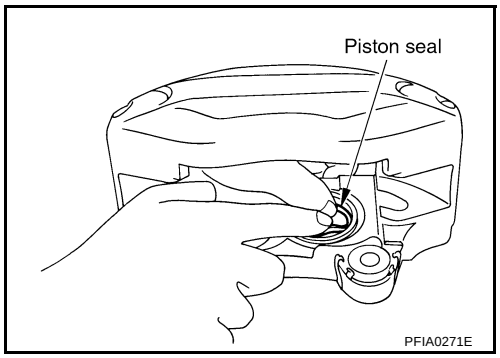
Piston

CAUTION:
- **Since the piston surface is plated, do not repair using sandpaper.**
- **Check piston surface for corrosion, wear, and damage. If any non-standard condition is detected, replace applicable part.**

ASSEMBLY

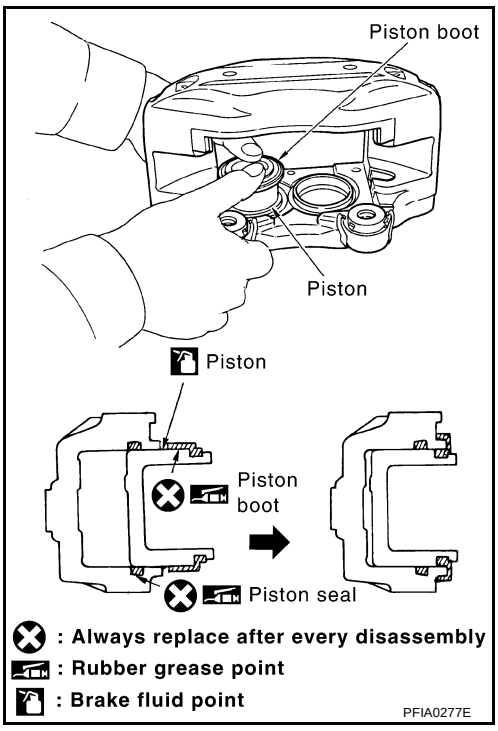
CAUTION:
When assembling, use only rubber lubricant specified below.

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



2. Apply brake fluid or rubber grease to the piston boot, place it on the piston, and firmly insert the piston boot cylinder-side lip into the cylinder body groove.
3. Insert the piston into the cylinder body by hand and firmly attach the piston boot piston-side lip into the piston groove.

CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.



4. Attach the shim and shim cover to the pad and attach to the caliper.

DISC ROTOR INSPECTION

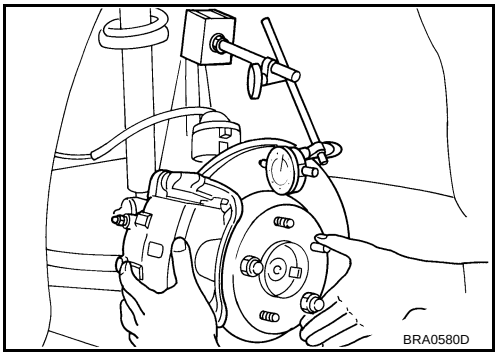
Visual Inspection

Check surface of the disc rotor for uneven wear, cracks, and serious damage. If any non-standard condition is detected, replace applicable part.

Runout Inspection

1. Using wheel nuts, fix disc rotor to the wheel hub. (2 or more positions)
2. Inspect runout using a dial gauge.

Standard value
(measured at 10 mm (0.39 in) inside the disc edge)
Runout limit (with it attached to the vehicle)
: 0.040 mm (0.0016 in) or less
Runout limit (just the disc rotor)
: 0.040 mm (0.0016 in) or less



NOTE:
Make sure that wheel bearing axial end play is with in the specifications before measuring runout. Refer to FAX-4, "On-Vehicle Inspection and Service" .

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

Thickness Inspection

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

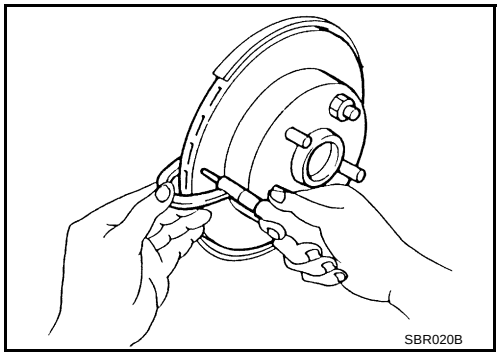
Standard

Standard thickness : 30.0 mm (1.181 in)

Wear limit : 28.4 mm (1.118 in)

Maximum uneven wear (measured at 8 positions)

: 0.015 mm (0.0006 in) or less



Brake Burnishing Procedure

NFS000AX

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.
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.

REAR DISC BRAKE

PFP:44000

On-Vehicle Inspection

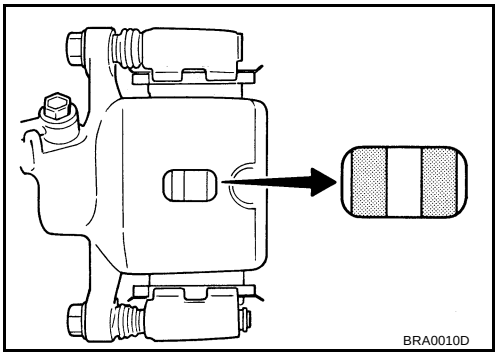
NFS0000Z

PAD WEAR INSPECTION

Other than Brembo Calipers

- Inspect the thickness of the pad through the cylinder body inspection hole. Use a scale for inspection if necessary.

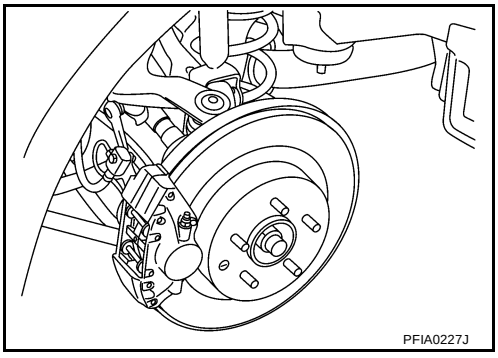
Standard thickness : 8.5 mm (0.335 in)
Repair limit thickness : 2.0 mm (0.079 in)



With Brembo Calipers

- Inspect the thickness of the pad through the caliper inspection hole. Use a scale for inspection if necessary.

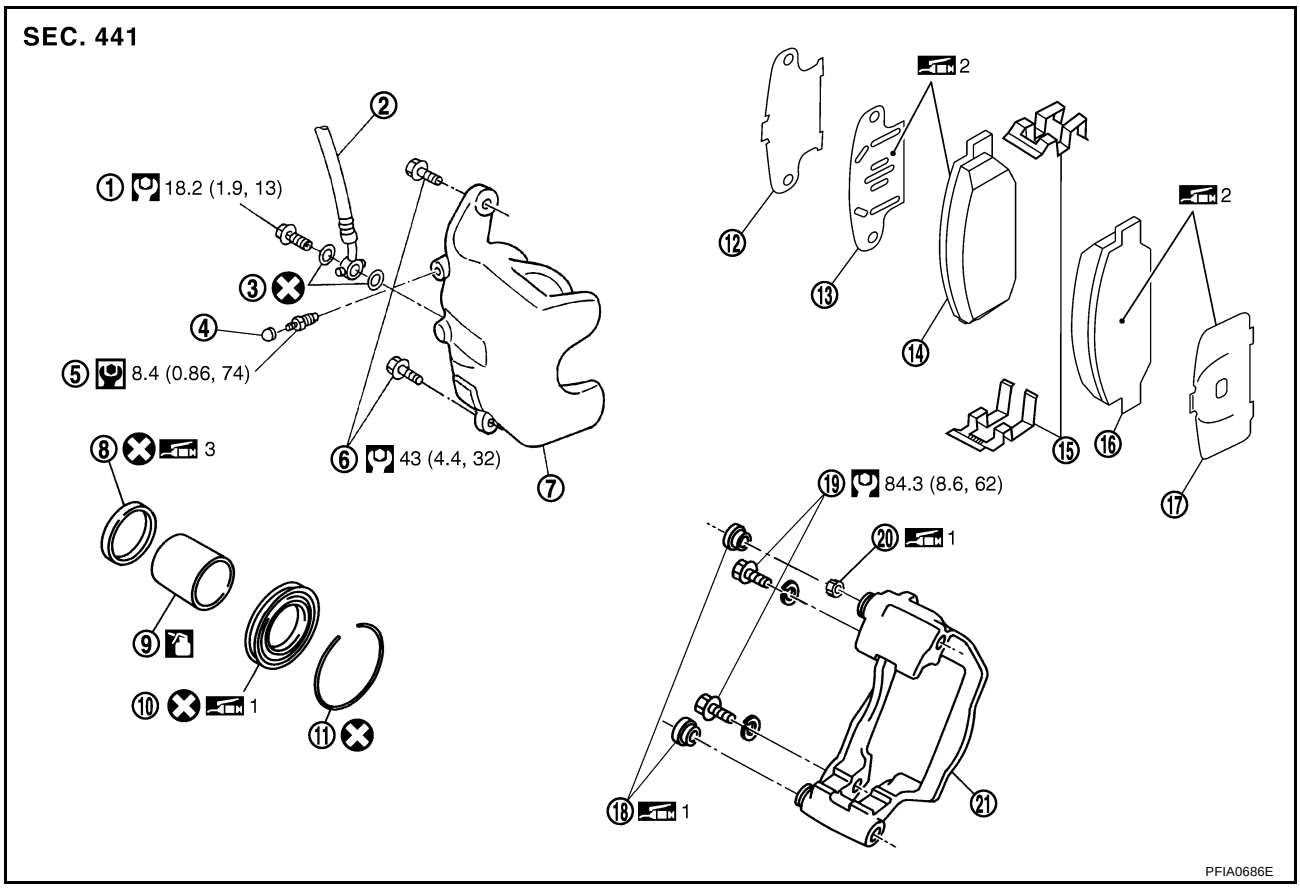
Standard thickness : 9.1 mm (0.358 in)
Repair limit thickness : 2.0 mm (0.079 in)



Components

NFS00010

OTHER THAN BREMBO CALIPERS



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: Apply rubber grease.

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

3: Apply polyglycol ether based lubricant.

: Apply brake fluid.

WARNING:

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

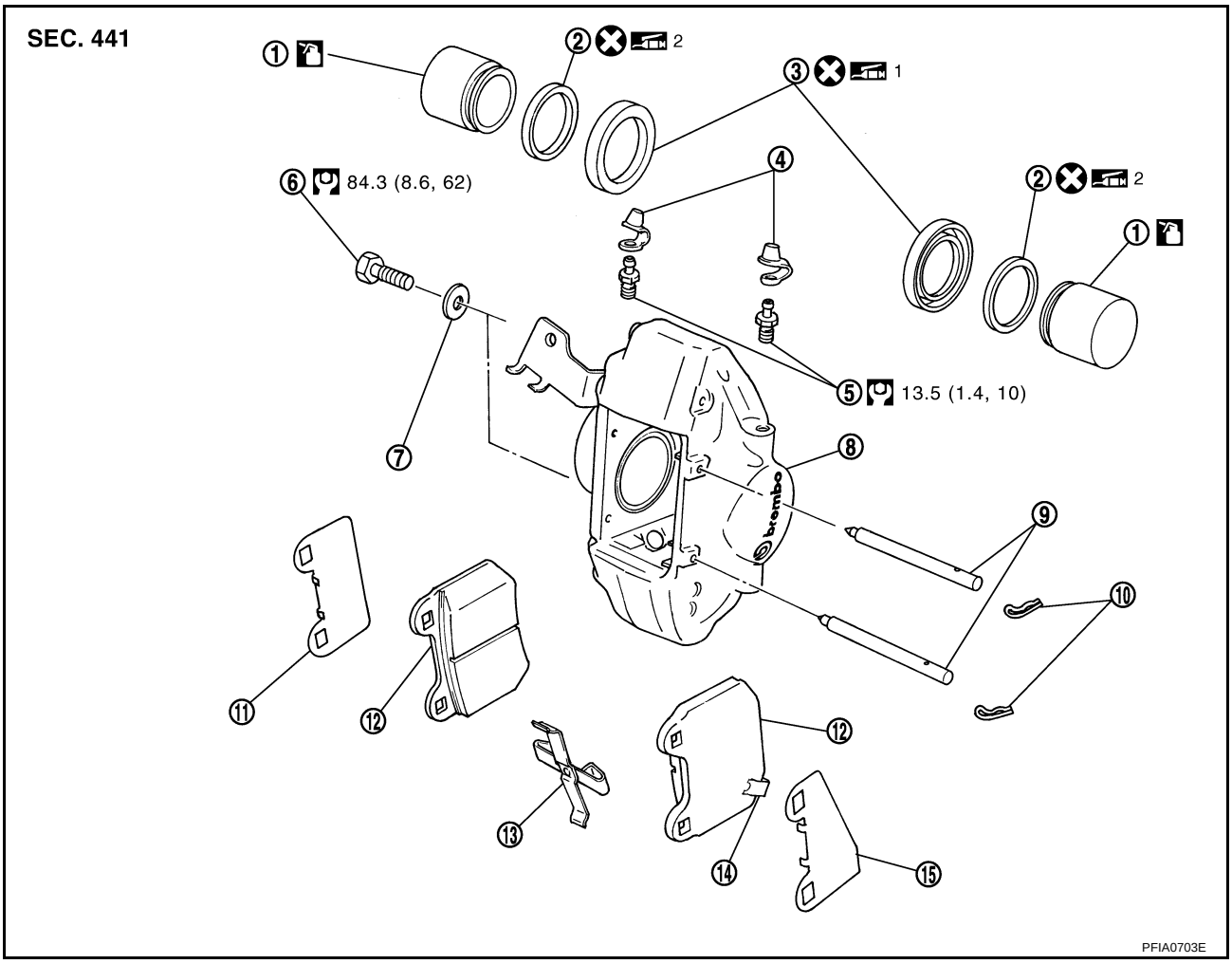
CAUTION:

- **While removing cylinder body, never depress the brake pedal because the piston will pop out.**
- **It is not necessary to remove bolts on torque member and brake hose except for disassembly or replacement of the caliper assembly. In this case, hang cylinder body with a wire so as not to stretch brake hose.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shims and shim covers as a set when replacing brake pads.**
- **Keep the rotor clean of brake fluid.**

WITH BREMBO CALIPERS

NOTE:

Refer to BR-43, "HOW TO APPLY GREASE TO THE BRAKE PAD" for how to apply grease to brake pads.



1.	Piston	2.	Piston seal	3.	Piston boot
4.	Cap	5.	Bleed valve	6.	Bolt
7.	Washer	8.	Caliper	9.	Pad pins
10.	Clips	11.	Inner shim cover	12.	Brake pad
13.	Cross spring	14.	Pad wear sensor	15.	Outer shim cover

Refer to GI-10, "Components" and the followings for the symbols in the figure.

1: Apply rubber grease.

2: Apply polyglycol ether based lubricant.

: Apply brake fluid.

WARNING:

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

CAUTION:

- **While removing cylinder body, never depress the brake pedal because the piston will pop out.**
- **Apart from caliper assembly, disassembly or replacement, there is no need to remove caliper bolts or brake hose or tube.**
- **Do not damage piston boot.**
- **Always replace shim cover as a set when replacing brake pads.**
- **Keep the rotor clean of brake fluid.**

Removal and Installation of Brake Pad (Other than Brembo Calipers)

NFS00011

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove sliding pin bold (one on top).
3. Hang cylinder body with a wire, and remove pads, pad retainers, shims from torque member.

INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) grease or silicon- based grease to the rear of the pad and to both sides of the shim, and attach the inner shim and shim cover to the inner pad, and the outer shim to the outer pad.
2. Attach the pad retainer and pad to the torque member.
3. Push the piston in so that the pad is firmly attached and attach the cylinder body to the torque member.

   NOTE:
   Using a disc brake piston tool (commercial service tool), etc., makes it easier to push in the piston.

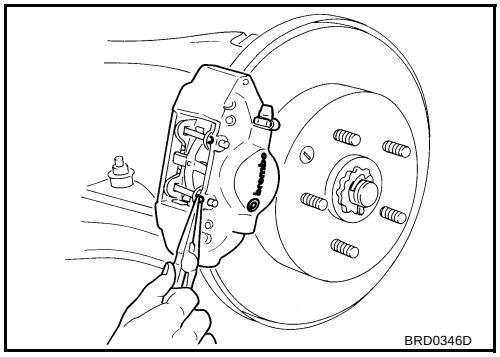
   CAUTION:
   By pushing in the piston, the brake fluid returns to the master cylinder reservoir tank. Watch the level of the surface of the reservoir tank.
4. Attach the sliding pin bolt (one on top) and tighten to the specified torque.
5. Check brake for drag.
6. Install tires to vehicle.

Removal and Installation of Brake Pad (With Brembo Calipers)

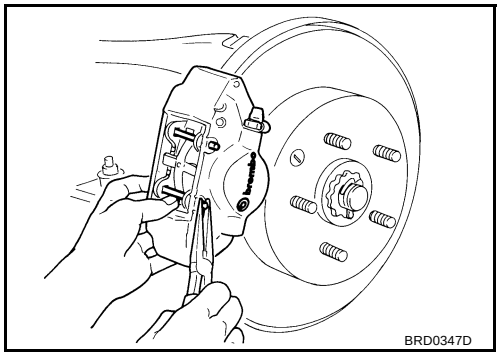
NFS00016

REMOVAL

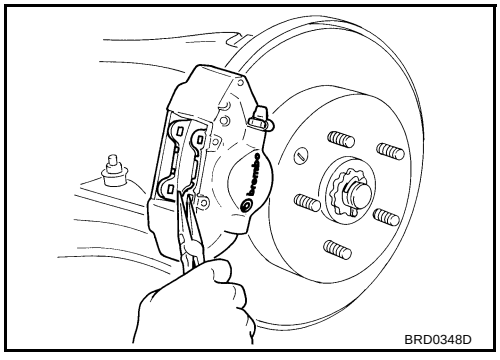
1. Remove tires from vehicle with a power tool.
2. Remove the clip from the pad pin.



3. Remove the pad pin while holding down the cross spring, then remove the cross spring from the caliper.



4. Using pliers, remove the pad from the caliper.

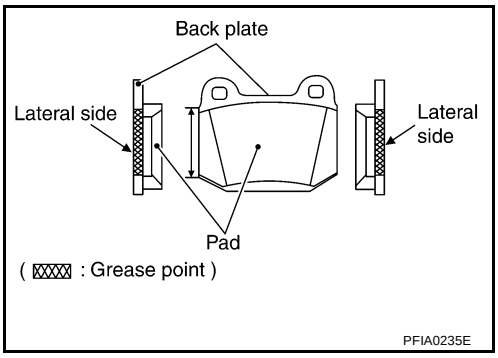


HOW TO APPLY GREASE TO THE BRAKE PAD

Pad Side

Apply PBC (Poly Butyl Cuprysil) grease or silicone-based grease about 0.5 g (0.018 oz) per surface equally to back plate side of Inner Pad and Outer Pad. (Refer to the figure)

CAUTION:
Make sure no foreign matter attaches itself to the grease.

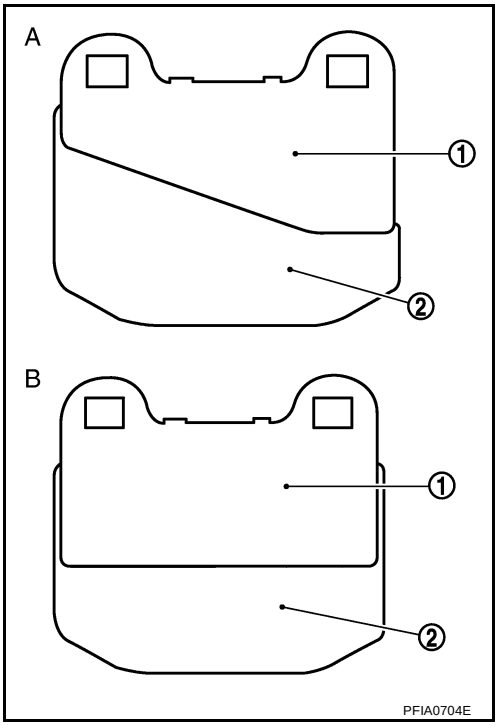


Pad Rear

Apply approximately 1.5 g (0.053 oz) of PBC (Poly Butyl Cuprysil) grease or silicone -based grease between shim cover (1) and pad (2).

- A: Outer side
- B: Inner side

CAUTION:
Make sure no foreign matter attaches itself to the grease.



INSTALLATION

1. Insert the piston to the position where the pad is attached.

   NOTE:
   Using a disc brake piston tool (commercial service tool), etc., makes it easier to push in the piston.

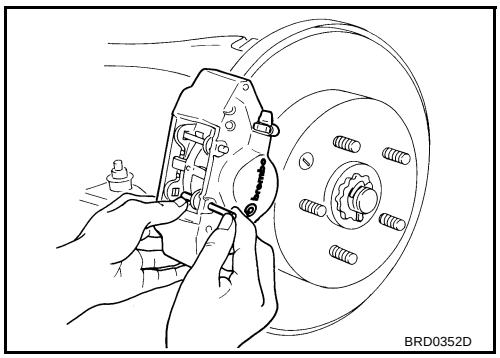
   CAUTION:
   Pushing the piston in will make the brake fluid return to the master cylinder reservoir tank, so watch the level of the surface of the reservoir tank.

2. Attach pad and shim cover.

   CAUTION:
   Attach the pad with wear sensor to the outer side.

3. Insert the upper pad pin from the outer cylinder side, then insert firmly to the inner cylinder side through the hole in the top of the pad.
4. As shown in the figure, place the top of the cross spring over the top pad pin, press in the cross spring, push the lower pad pin from the outer cylinder side to the inner cylinder side, and secure the cross spring.
5. Insert the clip in the small hole at the end of the pad pin.

   CAUTION:
   If the clip is not fully attached, the pad pin or the pad could fall out while the vehicle is in motion.
6. Install tires to vehicle.



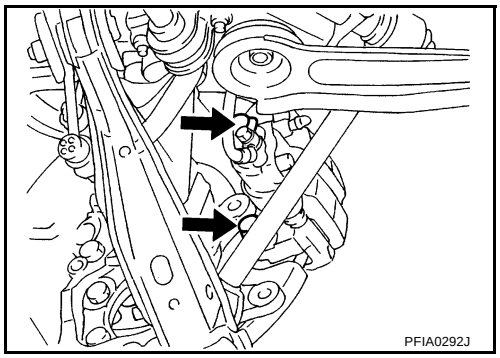
Removal and Installation of Caliper Assembly (Other than Brembo Calipers) NFS00012

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
4. Remove union bolts then disconnect brake hose from caliper assembly and torque member bolts, and remove caliper assembly.

   CAUTION:
   Do not drop brake pad.
5. Remove disc rotor.

   CAUTION:
   Put matching marks on wheel hub assembly and disc rotor, if it necessary to remove disc rotor.



INSTALLATION

CAUTION:
- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

1. Install disc rotor.

   CAUTION:
   Alignment marks of disc rotor and wheel hub put at the time of removal when reusing disc rotor.
2. Install caliper assembly to the vehicle, and tighten torque member mounting bolts to the specified torque.

   CAUTION:
   Before installing caliper assembly to the vehicle, wipe off oil and grease on washer seats on axle assembly and mounting surface of caliper assembly.
3. Install L shape pin of brake hose to caliper assembly and tighten union bolts to the specified torque.

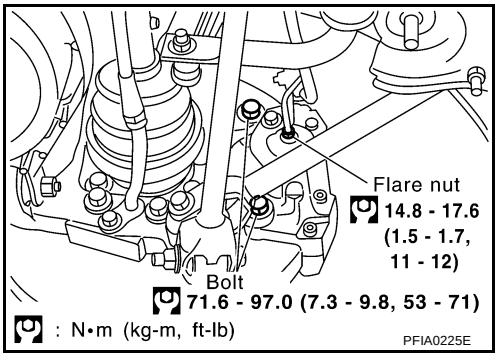
   CAUTION:
   - **Do not reuse the copper washer for union bolts.**
   - **Securely attach brake hose to protrusion on caliper assembly.**
4. Insert new brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .
5. Check rear disc brake for drag.
6. Install tires to vehicle.

Removal and Installation of Caliper Assembly (With Brembo Calipers)

NFS00017

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Drain brake fluid. Refer to BR-10, "Drain and Refill" .
3. Remove the brake pad. Refer to BR-42, "Removal and Installation of Brake Pad (With Brembo Calipers)" .
4. Remove the brake tube flare nut using a flare wrench.
5. Remove the brake hose bolt, move the brake hose, and remove the caliper assembly from the vehicle.
6. Remove disc rotor.

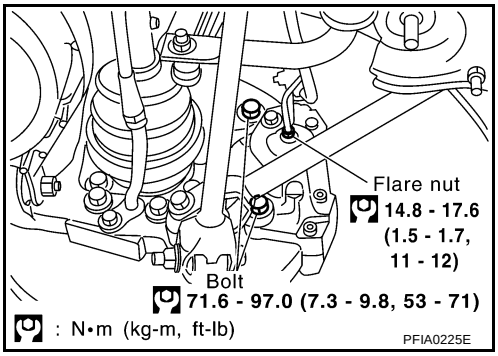


INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

1. Install disc rotor.
2. Install the brake tube to the caliper assembly and partially tighten the flare nut.
3. Install the caliper assembly to the vehicle and tighten the bolt to the specified torque.
4. Tighten the flare nut to the specified torque.
5. Install brake pad and shim. Refer to BR-42, "Removal and Installation of Brake Pad (With Brembo Calipers)" .
6. Refill new brake fluid and bleed air. Refer to BR-11, "Bleeding Brake System" .
7. Install tires to vehicle.



Disassembly and Assembly of Caliper Assembly (Other than Brembo Calipers)

NFS00013

NOTE:

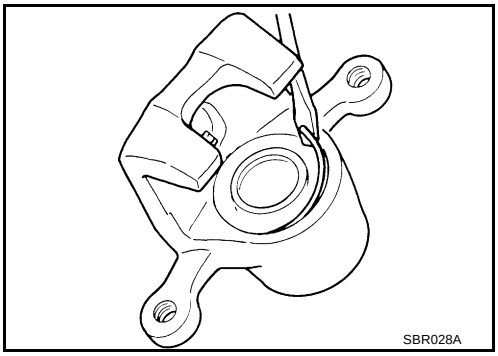
Do not remove torque member, pads, shims, shim covers and pad retainers when disassembling and assembling cylinder body assembly.

DISASSEMBLY

1. Remove the slide pin bolt, and then remove cylinder body from torque member.

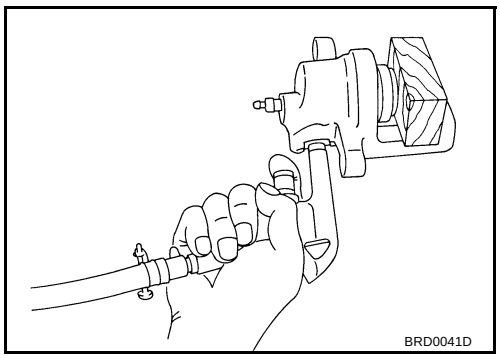
   CAUTION:

   Do not drop pads, shims, shim cover and pad retainer from torque member.
2. Remove sliding pin boot from torque member.
3. As shown in the figure, using a flat-bladed screwdriver, remove the retaining ring from the cylinder body.



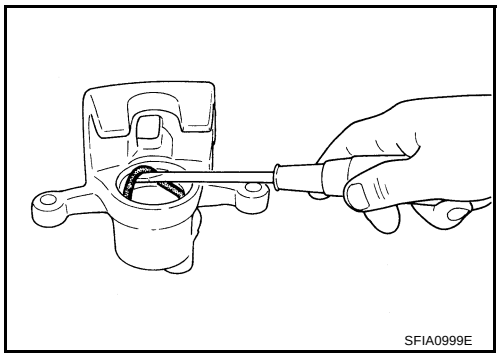
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.

   CAUTION:
   Do not get fingers caught in the piston.



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

   CAUTION:
   Be careful not to damage cylinder inner wall.



CALIPER INSPECTION

Cylinder Body

CAUTION:

- **Use new brake fluid to clean. Never use mineral oils such as gasoline or kerosene.**
- **Check inner wall of cylinder for corrosion, wear, and damage. If any non-standard condition is detected, replace cylinder body.**
- **Minor flaws caused by corrosion or a foreign material can be removed by polishing the surface with a fine sandpaper. Replace the cylinder body, if necessary.**

Torque Member

Check for wear, cracks, and damage. If damage or deformation is present, replace the affected part.

Piston

CAUTION:
Since the piston surface is plated, do not repair using sandpaper.
Check piston surface for corrosion, wear, and damage. If any non-standard condition is detected, replace applicable part.

Sliding Pin Bolts and Sliding Pin Boots

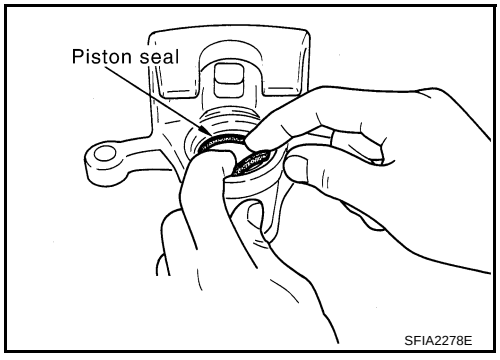
Check that there is no wear, damage, or cracks in the sliding pin bolts and sliding pin boots, and if there are, replace them.

ASSEMBLY

CAUTION:
When assembling, use only rubber lubricant specified below.

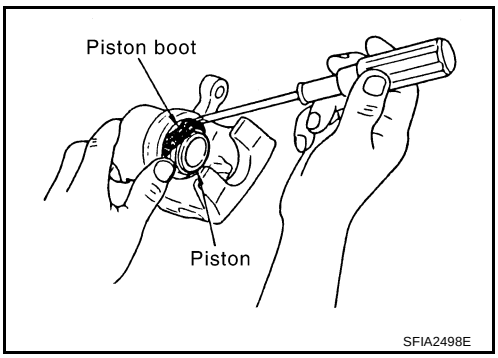
1. Apply polyglycol ether based lubricant to the piston seal, and install them to the cylinder body.

   CAUTION:
   Do not reuse piston seal.



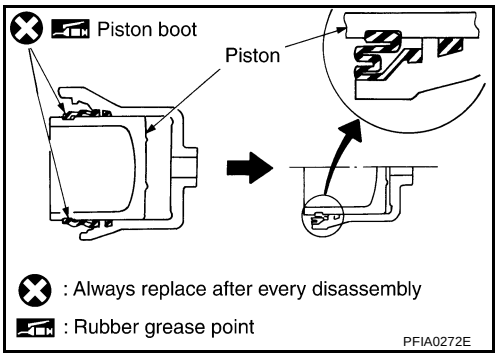
2. Apply rubber grease to piston boot. Cover the piston end with the piston boot, and then install cylinder slide lip on the piston boot securely into the groove on cylinder body.

CAUTION:
Do not reuse the piston boot.



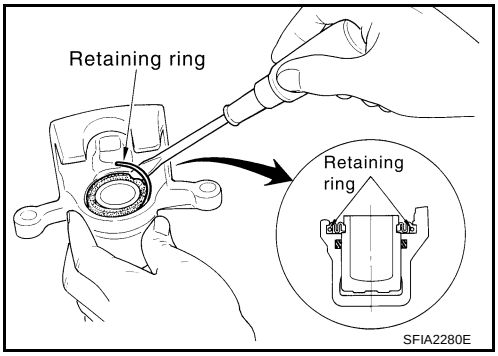
3. Apply a brake fluid to the piston, insert into the cylinder body by hand and firmly attach the piston boot piston-side lip into the piston groove.

CAUTION:
Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.



4. Fix piston boot with retaining ring.

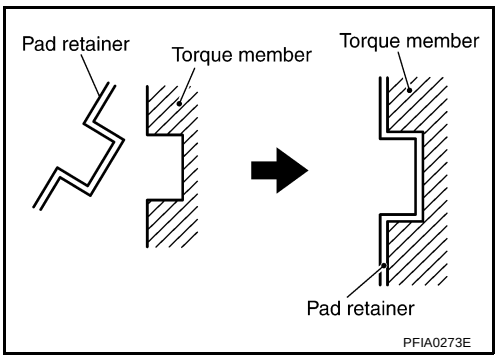
CAUTION:
- **Make sure the boot is firmly in the cylinder body groove.**
- **Do not reuse the retaining ring.**



5. Install the sliding pin bolt and sliding pin boot to the torque member.
6. Apply PBC (Poly Butyl Cuprysil) grease or silicon- based grease to the rear of the pad and to both sides of the shim, and attach the inner shim and shim cover to the inner pad, and the outer shim to the outer pad.
7. Install the pad retainer and pad to the torque member.

CAUTION:
When attaching the pad retainer, attach it firmly so that it does not float up higher than the torque member, as shown in the figure.

8. After assembling shims and shim covers to pad, install it to the torque member.
9. Install cylinder body. Tighten sliding pin bolts to the specified torque.



DISC ROTOR INSPECTION

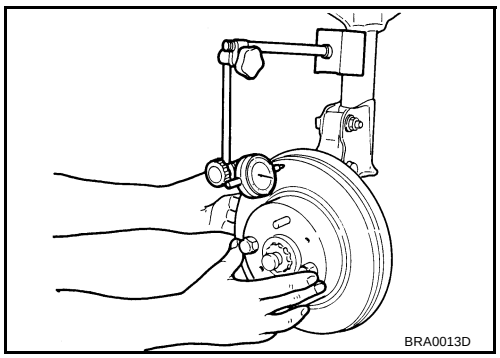
Visual Inspection

Check surface of the disc rotor for uneven wear, cracks, and serious damage. If any non-standard condition is detected, replace applicable part.

Runout Inspection

1. Using wheel nuts, fix disc rotor to the wheel hub. (2 or more positions)

2. Inspect runout using a dial gauge.



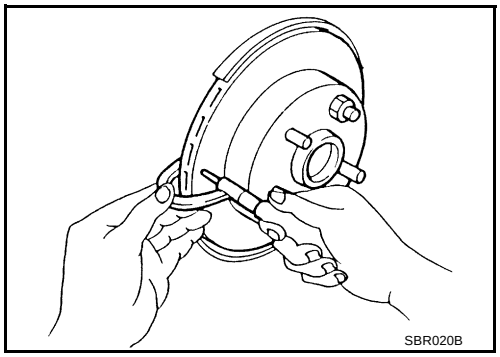
Standard value
(measured at 10 mm (0.39 in) inside the disc edge)
Measurement position:
At a point 10 mm (0.39 in) from outer edge of the disc
Runout limit (with it attached to the vehicle):
0.055 mm (0.0022 in) or less
Runout limit (just the disc rotor):
0.020 mm (0.008 in) or less

NOTE:
Make sure that wheel bearing axial end play is with in the specification before measuring runout. Refer to RAX-6, "On-Vehicle Inspection and Service" .

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

Thickness Inspection

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



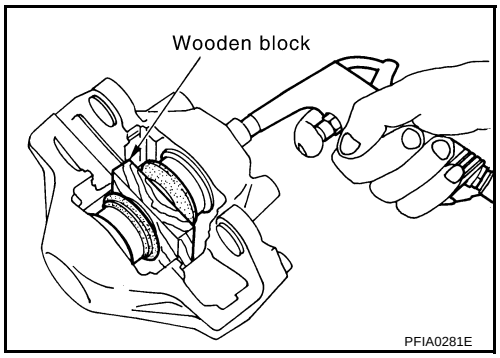
Standard
Standard thickness : 16.0 mm (0.630 in)
Wear limit : 14.0 mm (0.551 in)
Maximum uneven wear (measured at 8 positions)
: 0.015 mm (0.0006 in) or less

Disassembly and Assembly of Caliper Assembly (With Brembo Calipers)

NFS00018

DISASSEMBLY

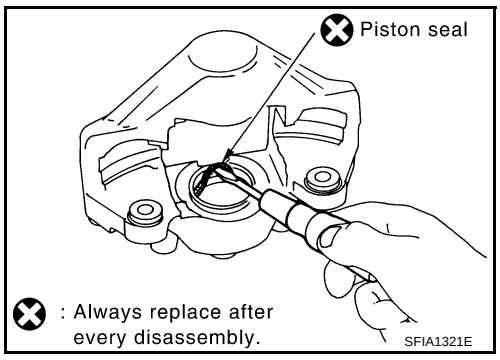
1. Insert a piece of wood as shown in the figure, blow air in through the flare nut mounting hole, and remove the piston and piston boot.



CAUTION:
Do not get fingers caught in the piston.

2. Remove the piston boot from the piston.

3. Using a flat-bladed screwdriver, remove the piston seal.



CAUTION:
- **Be careful not to damage cylinder inner wall.**
- **Never remove the four bolts from the inner and outer sides of the caliper. Do not tighten them further, either.**

CALIPER INSPECTION

Caliper

CAUTION:

- **Use new brake fluid to clean. Never use mineral oils such as gasoline or kerosene.**
- **Check for corrosion, wear, or damage to the cylinder inner wall, and replace the caliper if there are any non-standard conditions.**

Piston

CAUTION:

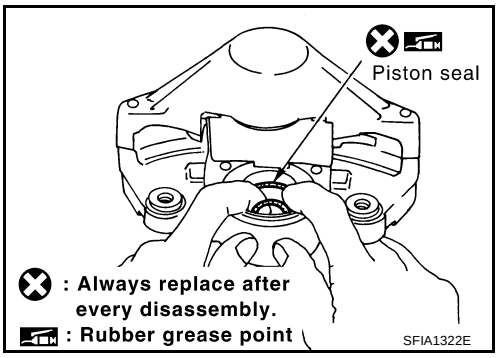
- **Since the piston surface is plated, do not repair using sandpaper.**
- **Check piston surface for corrosion, wear, and damage. If any non-standard condition is detected, replace applicable part.**

ASSEMBLY

CAUTION:

When assembling, use only rubber lubricant specified below.

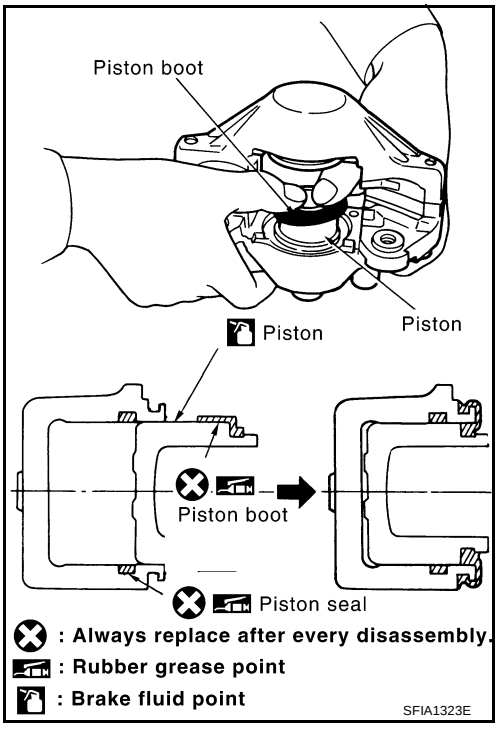
1. Apply polyglycol ether based lubricant to the piston seal, and install them to the cylinder body.



2. Apply brake fluid or rubber grease to the piston boot, place it on the piston, and firmly insert the piston boot cylinder-side lip into the cylinder body groove.
3. Insert the piston into the cylinder body by hand and firmly attach the piston boot piston-side lip into the piston groove.

   CAUTION:

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



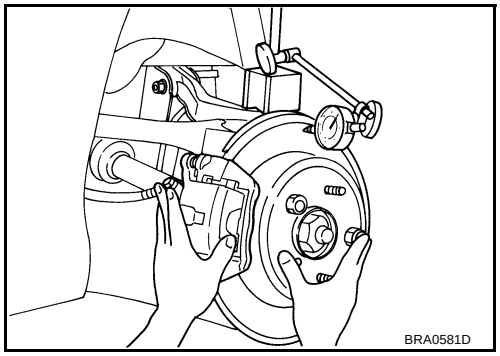
DISC ROTOR INSPECTION

Visual Inspection

Check surface of the disc rotor for uneven wear, cracks, and serious damage. If any non-standard condition is detected, replace applicable part.

Runout Inspection

1. Using wheel nuts, fix disc rotor to the wheel hub. (2 or more positions)
2. Inspect runout using a dial gauge.



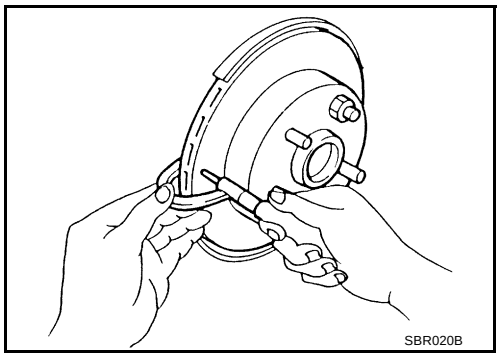
Standard value
(measured at 10 mm (0.39 in) inside the disc edge)
Runout limit (with it attached to the vehicle)
: 0.070 mm (0.0028 in) or less
Runout limit (just for disc rotor)
: 0.040 mm (0.0016 in) or less

NOTE:
Make sure that wheel bearing axial end play is with in the specification before measuring runout. Refer toRAX-6, "On-Vehicle Inspection and Service" .

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

Thickness Inspection

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



Standard
Standard thickness : 22.0 mm (0.866 in)
Wear limit : 20.2 mm (0.795 in)
Maximum uneven wear (measured at 8 positions)
: 0.015 mm (0.0020 in) or less

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

NFS00019

Unit: mm (in)

Brake model			Other than brembo	With brembo
Front brake	Rotor outer diameter × thickness		320 × 28.0 (12.60 × 1.102)	324 × 30.0 (12.76 × 1.181)
	Pad length × width × thickness		130.0 × 50.0 × 11.0 (5.12 × 1.97 × 0.43)	117.1 × 53.3 × 9.3 (4.61 × 2.098 × 0.366)
	Cylinder bore diameter		45.0 × 2 (1.772 × 2)	38 (1.50) × 2 + 44 (1.73) × 2
Rear brake	Rotor outer diameter × thickness		308 × 16 (12.13 × 0.63)	322 × 22 (12.68 × 0.87)
	Pad length × width × thickness		83.0 × 31.9 × 8.5 (3.27 × 1.26 × 0.335)	76.6 × 45 × 9.1 (3.016 × 1.77 × 0.358)
	Cylinder bore diameter		42.86 (1.6874)	40.0 × 2 (1.575)
Master cylinder	Cylinder bore diameter		26.99 (1.0626)	
Control valve	Valve model		Electric brake force distribution	
Brake booster	Diaphragm diameter	Coupe	255 (10.04)	Pri: 230(9.06) Sec: 205(8.07)
		Roadster	Pri: 230 (9.06) Sec: 205 (8.07)	Pri: 230 (9.06) Sec: 205 (8.07)
Recommended brake fluid			DOT 3	

Brake Pedal

NFS0001A

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

Brake Booster

NFS0001B

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)

Check Valve

NFS0001C

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

Front Disc Brake

NFS0001D

Brake model		Other than brembo	With brembo
Brake pad	Standard thickness (new)	11.0 mm (0.433 in)	9.3 mm (0.366 in)
	Repair limit thickness	2.0 mm (0.079 in)	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	28.0 mm (1.102 in)	30.0mm (1.181 in)
	Repair limit thickness	26.0 mm (1.024 in)	28.4mm (1.118 in)
	Maximum uneven wear (measured at 8 positions)	0.015mm (0.0006 in) or less	0.015 mm (0.0006 in) or less
	Runout limit (with it attached to the vehicle)	0.035 mm (0.0014 in) or less	0.040 mm (0.0016 in) or less
	Runout limit (just the disc rotor)	0.020 mm (0.0008 in) or less	0.040 mm (0.0016 in) or less

Rear Disc Brake

NFS0001E

Brake model		Other than brembo	With brembo
Brake pad	Standard thickness (new)	8.5 mm (0.335 in)	9.1 mm (0.358 in)
	Repair limit thickness	2.0 mm (0.079 in)	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	16.0 mm (0.630 in)	22.0 mm (0.866 in)
	Repair limit thickness	14.0 mm (0.551 in)	20.2 mm (0.795 in)
	Maximum uneven wear (measured at 8 positions)	0.015 mm (0.0006 in) or less	0.015 mm (0.0006 in) or less
	Runout limit (with it attached to the vehicle)	0.055 mm (0.0022 in) or less	0.07 mm (0.0028 in) or less
	Runout limit (just the disc rotor)	0.020 mm (0.008 in) or less	0.040 mm (0.0016 in) or less