SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

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

EFS0024Y

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. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

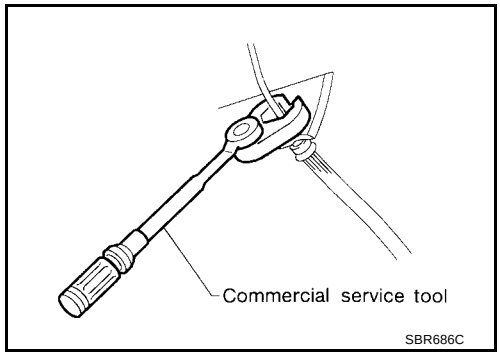
WARNING:

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

Precautions for Brake System

EFS0024Z

- **Always use recommended brake fluid. Refer to MA-13, "RECOMMENDED 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, disc brake caliper and wheel cylinder, use clean brake fluid.**
- **Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.**
- **Use flare nut wrench when removing and installing brake tube.**
- **Always tighten brake lines to specified torque when installing.**



- **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-29 (Front disc brake) and BR-24 (Rear disc brake) for brake burnishing procedure.

WARNING:

- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

Wiring Diagrams and Trouble Diagnosis

EFS00250

When you read wiring diagrams, refer to the following:

- Refer to GI-12, "How to Read Wiring Diagrams" .
- Refer to PG-4, "POWER SUPPLY ROUTING CIRCUIT" for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

- Refer to GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" .
- Refer to GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident" .
- For trouble diagnoses of models with ABS, refer to BRC-8, "TROUBLE DIAGNOSIS" .
- For trouble diagnoses of models with TCS even if the diagnostic items are related to the ABS system, refer to BRC-51, "TROUBLE DIAGNOSIS" .

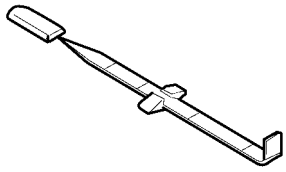
PREPARATION

PFP:00002

Special Service Tool

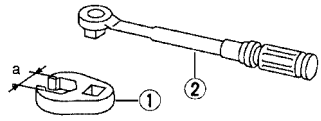
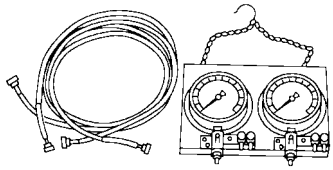
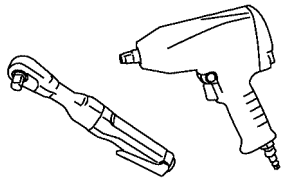
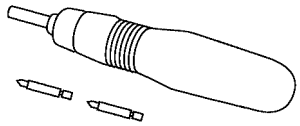
EFS004KO

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
— (J-46532) Brake and clutch pedal height measurement tool  LFIA0227E	Measuring brake pedal height

Commercial Service Tools

EFS00251

Tool name	Description
1 Flare nut crowfoot 2 Torque wrench  S-NT360	Removing and installing each brake piping **a: 10 mm (0.39 in)**
Brake fluid pressure gauge  NT151	Measuring brake fluid pressure
Power tool  PBIC0190E  PBIC0191E	Loosening bolts, nuts, and screws

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EFS00252

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

		Reference page	BR-18, BR-25	BR-18, BR-25	BR-18, BR-25	BR-22, BR-28	BR-18, BR-25	BR-22, BR-28	BR-22, BR-28	BR-22, BR-28	BR-24	BR-18, BR-25	FAX-4, "NVH Troubleshooting Chart"	FAX-4, "NVH Troubleshooting Chart"	FSU-4, "NVH Troubleshooting Chart", RSU-4, "NVH Troubleshooting Chart"	WT-2, "NVH Troubleshooting Chart"	WT-2, "NVH Troubleshooting Chart"	PS-5, "NVH Troubleshooting Chart"
		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	DRIVE SHAFT	AXLE	SUSPENSION	TIRES	ROAD WHEEL	STEERING
Symptom	Noise		×	×	×								×	×	×	×	×	×
	Shake					×							×	×	×	×	×	×
	Shimmy, Shudder					×	×	×	×	×	×	×		×	×	×	×	×

×: Applicable

BRAKE PEDAL

PFP:46501

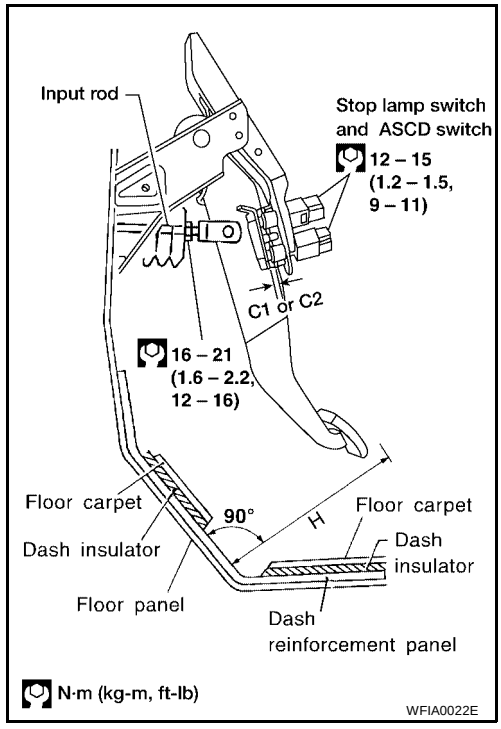
Inspection and Adjustment

EFS00253

Inspect the brake pedal free height "H" from dash reinforcement panel using Tool. Adjust if necessary.

Tool : — (J-46532)

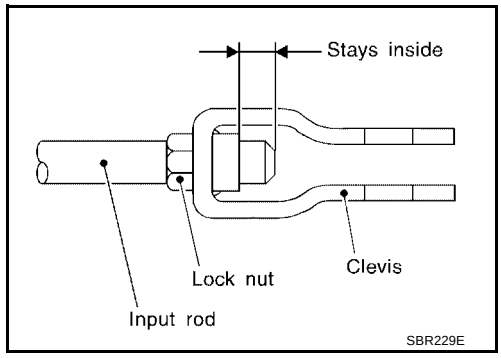
Free height "H"	**Refer to BR-31, "Brake Pedal" .**	
Clearance between pedal stopper and threaded end of stop lamp switch and ASCD switch "C1, C2"	**0.74 - 1.96 mm (0.0291 - 0.0772 in)**	
Pedal height (with engine running, brake pedal force 490 N {50 kgf, 110 lbf}) "H2"	**M/T vehicle**	**: More than 84 mm (3.31 in)**
	A/T vehicle	**: More than 90.3 mm (3.55 in)**
Pedal play "A"	**3 - 11 mm (0.12 - 0.43 in)**	



1. Loosen the stop lamp switch and ASCD switch (if equipped) by turning 45° counterclockwise.
2. Loosen lock nut on the input rod, then turn input rod to adjust the pedal to specified height. When finished adjusting, tighten lock nut.

   CAUTION:
   Make sure that the screw portion of the end of input rod is located inside the clevis.

   Lock nut : 16 - 21 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)



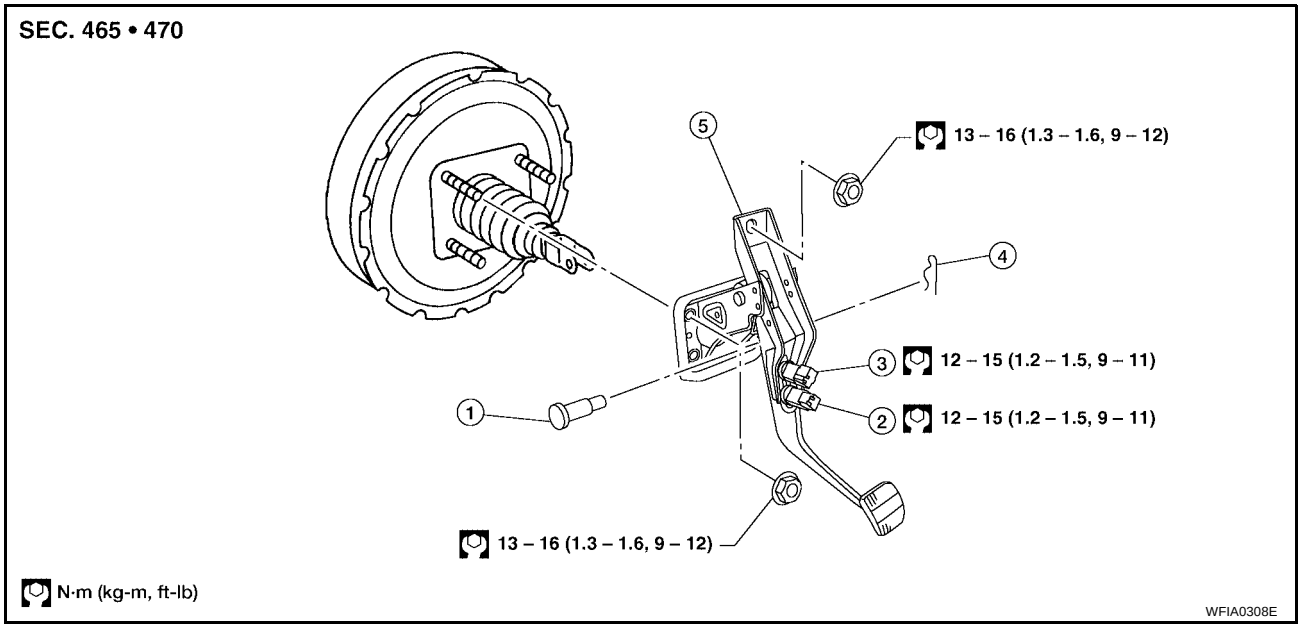
3. With the pedal pulled up and held by hand, press the stop lamp switch and the ASCD switch (if equipped) in until threaded ends contact rubber stops.
4. With the threaded ends of the stop lamp switch and ASCD switch (if equipped) contacting the rubber stops, turn the switches 45° clockwise to lock in place.

   CAUTION:
   Make sure that the gap (C^1 , C^2) between the rubber stops and switch ends are within specification.
5. Check the pedal play.

   CAUTION:
   Make sure that the stop lamp goes off when the pedal is released.
6. Start the engine and check the height of the brake pedal when depressing it.

Removal and Installation

EFS00254



1. Clevis Pin
2. Stop lamp switch
3. ASCD cancel switch
4. Snap pin
5. Brake pedal assembly

REMOVAL

WARNING:

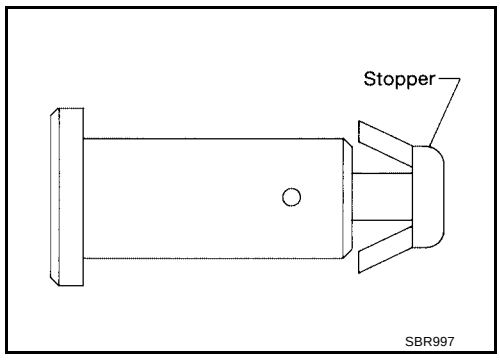
Do not deform the brake tube.

1. Remove the instrument lower cover on driver side. Refer to IP-12, "Instrument Lower Cover LH" .
2. Remove the stop lamp switch from the pedal assembly.
3. Remove ASCD switch (if equipped) from pedal assembly.
4. Remove snap pin and clevis pin from the clevis of brake booster.
5. Remove mounting nuts, then carefully remove brake pedal assembly.

INSPECTION AFTER REMOVAL

Check brake pedal for following items.

- Crack or deformation of clevis pin stopper
- Clevis pin deformation
- Crack of any welded portion
- Brake pedal bend



INSTALLATION

- Installation is in the reverse order of removal.
- After installing the brake pedal assembly in the vehicle, be sure to adjust it. Refer to BR-6, "Inspection and Adjustment" .

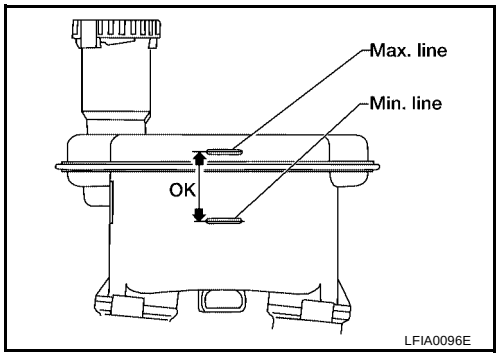
BRAKE FLUID

PFP:KN100

Checking Brake Fluid Level

EFS00257

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



Changing Brake Fluid

EFS00255

CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Always keep fluid level higher than minimum line on reservoir tank.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**

1. Connect a vinyl tube and container to the air bleeder.
2. Depressing the brake pedal, drain the brake fluid gradually from the air bleeder of each wheel.
3. Turn the ignition switch to OFF and disconnect the ABS actuator and control unit connector.
4. Clean inside of reservoir tank, and refill with new brake fluid.
5. Loosen the air bleeder, depress the pedal slowly to the full stroke and then release it. Repeat the procedure every 2 or 3 seconds until the new brake fluid comes out, then close the air bleeder while depressing the pedal.
   Refer to BR-8, "Bleeding Brake System" .

Bleeding Brake System

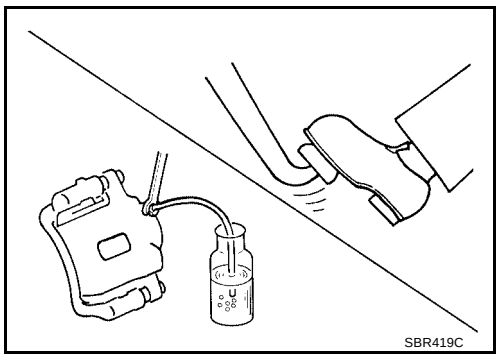
EFS00256

CAUTION:

- **Carefully monitor brake fluid level at master cylinder during bleeding operation.**
- **Fill reservoir with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" . Make sure it is full at all times while bleeding air out of system.**
- **Place a container under master cylinder to avoid spillage of brake fluid.**
- **Do not loosen the connecting portion of the actuator during air bleeding.**

1. For models with ABS, turn ignition switch OFF and disconnect ABS actuator and control unit connectors or battery ground cable.
2. Connect a transparent vinyl tube and container to air bleeder valve.
3. Fully depress brake pedal several times.
4. With brake pedal depressed, open air bleeder valve to release air.
5. Close air bleeder valve.
6. Release brake pedal slowly.
7. Tighten air bleeder valve to specification.

   Air bleeder valve : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



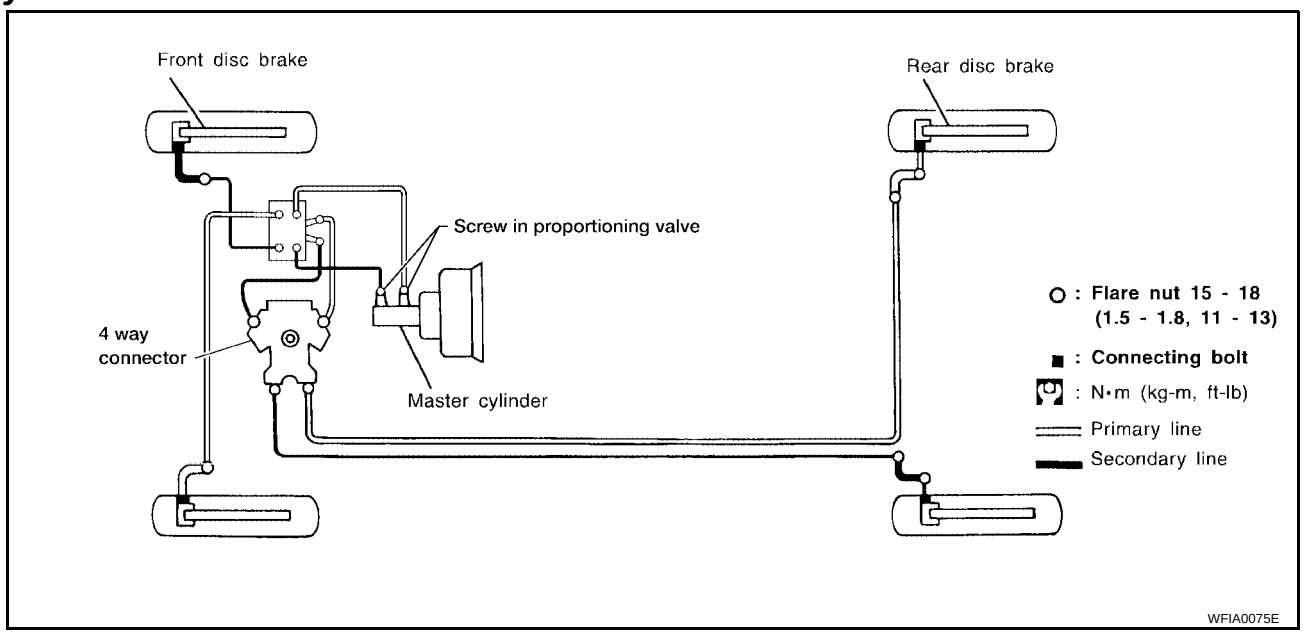
8. Repeat steps 2. through 7. until no more air bubbles come out of air bleeder valve.
9. Bleed the brake hydraulic system air bleeder valves in the following order:
   Right rear brake → Left front brake → Left rear brake → Right front brake

BRAKE PIPING AND HOSE

PFP:46210

Hydraulic Circuit

EFS00258



Front Brake Piping and Hose

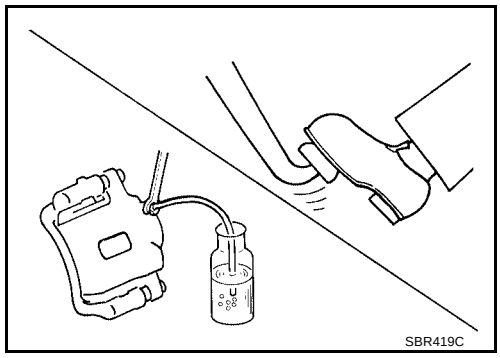
EFS00259

REMOVAL

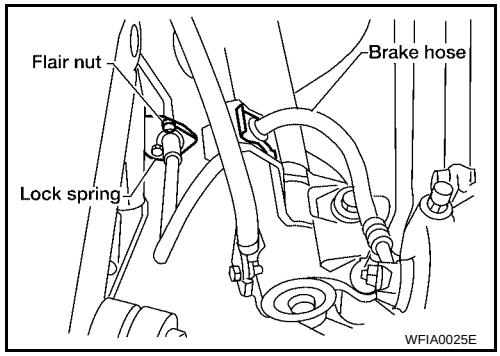
CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **All hoses must be free from excessive bending, twisting and pulling.**
- **Cover the open end of lines and hoses when disconnecting to prevent entrance of dirt.**

1. Connect vinyl tube and container to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.



3. Remove the flare nut connecting the brake tube and hose, then withdraw the lock spring.
4. Remove the connecting bolt and disconnect the brake hose from the caliper assembly.
5. Remove lock springs from the mounting portion of the brake tube and the mounting portion of the strut.



INSTALLATION

CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**

1. Attach the brake hose to the caliper assembly, then temporarily tighten the connecting bolt by hand.

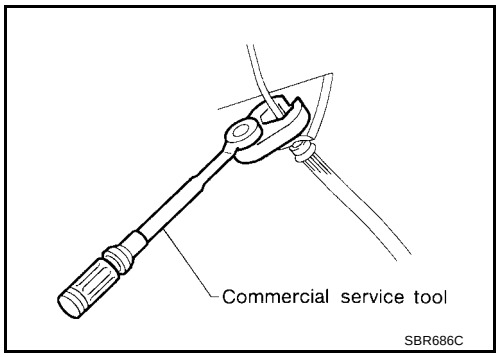
   CAUTION:

   - **Correctly attach the brake hose to the cylinder body.**
   - **The copper washers of the connecting bolt have to be replaced with new ones every time the fitting is disconnected.**

2. Attach the brake hose to the strut, then secure it with a lock spring.
3. Attach the brake hose to the brake tube and temporarily tighten the flare nut as much as possible by hand, then secure it with a lock spring.
4. Tighten all flare nuts and connecting bolts.

Flare nut	**: 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)**
Connecting bolt	**: 17 - 20 N·m (1.7 - 2.0 kg-m, 12 - 14 ft-lb)**

5. Refill until new brake fluid comes out of each air bleeder valve.
6. Bleed air. Refer to BR-8, "Bleeding Brake System" .



Rear Brake Piping and Hose

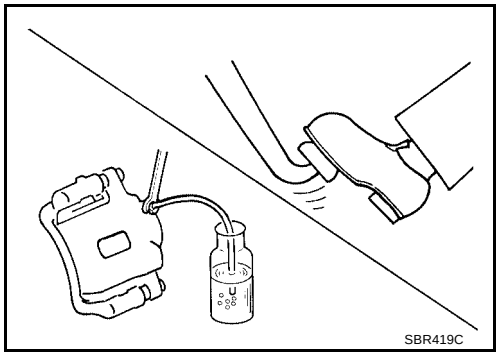
EFS0025A

REMOVAL

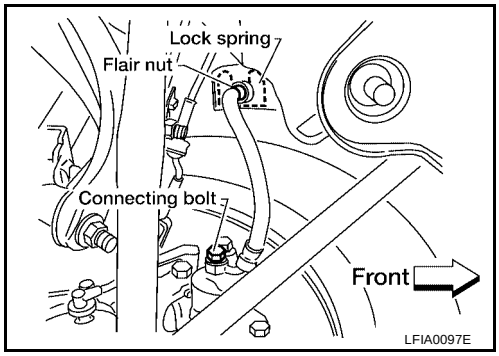
CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **All hoses must be free from excessive bending, twisting and pulling.**
- **Cover the open end of lines and hoses when disconnecting to prevent entrance of dirt.**

1. Connect vinyl tube and container to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.



3. Remove flare nut connecting brake tube and hose, then withdraw lock spring.
4. Remove connecting bolt and disconnect brake hose from caliper assembly.



INSTALLATION

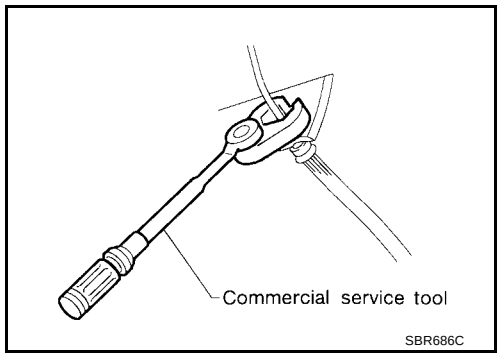
CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**

1. Attach the brake hose to the brake tube and temporarily tighten the flare nut as much as possible by hand.
2. Attach the brake hose with a lock spring, then tighten the connecting bolt to the specified torque. Tighten the flare nut with a torque wrench to the specified torque.

Flare nut	**: 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)**
Connecting bolt	**: 17 - 20 N·m (1.7 - 2.0 kg-m, 12 - 14 ft-lb)**

3. Refill until new brake fluid comes out of each air bleeder valve.
4. Bleed air from the brake system. Refer to BR-8, "Bleeding Brake System" .



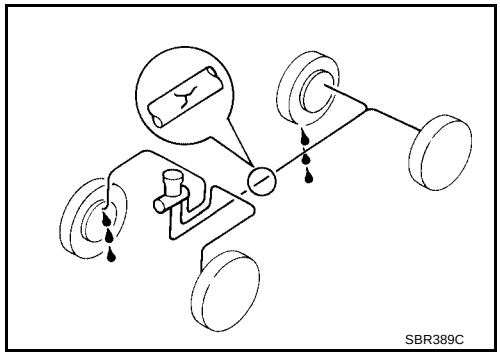
Inspection

EFS0025B

CAUTION:

If leakage occurs around hose and tube connections, retighten or, if necessary, replace damaged parts.

1. Check brake lines (tubes and hoses) for leaks, cracks, distortion, deformation, without interfering with other parts or loosening connecting parts, deterioration or other damage. Replace any damaged parts.
2. Apply a stepping force of 784 N (80 kgf, 176 lbf) to the brake pedal with the engine running and keep it for about 5 seconds, then check each part for leaks.



BRAKE MASTER CYLINDER

PFP:46010

On-board Inspection

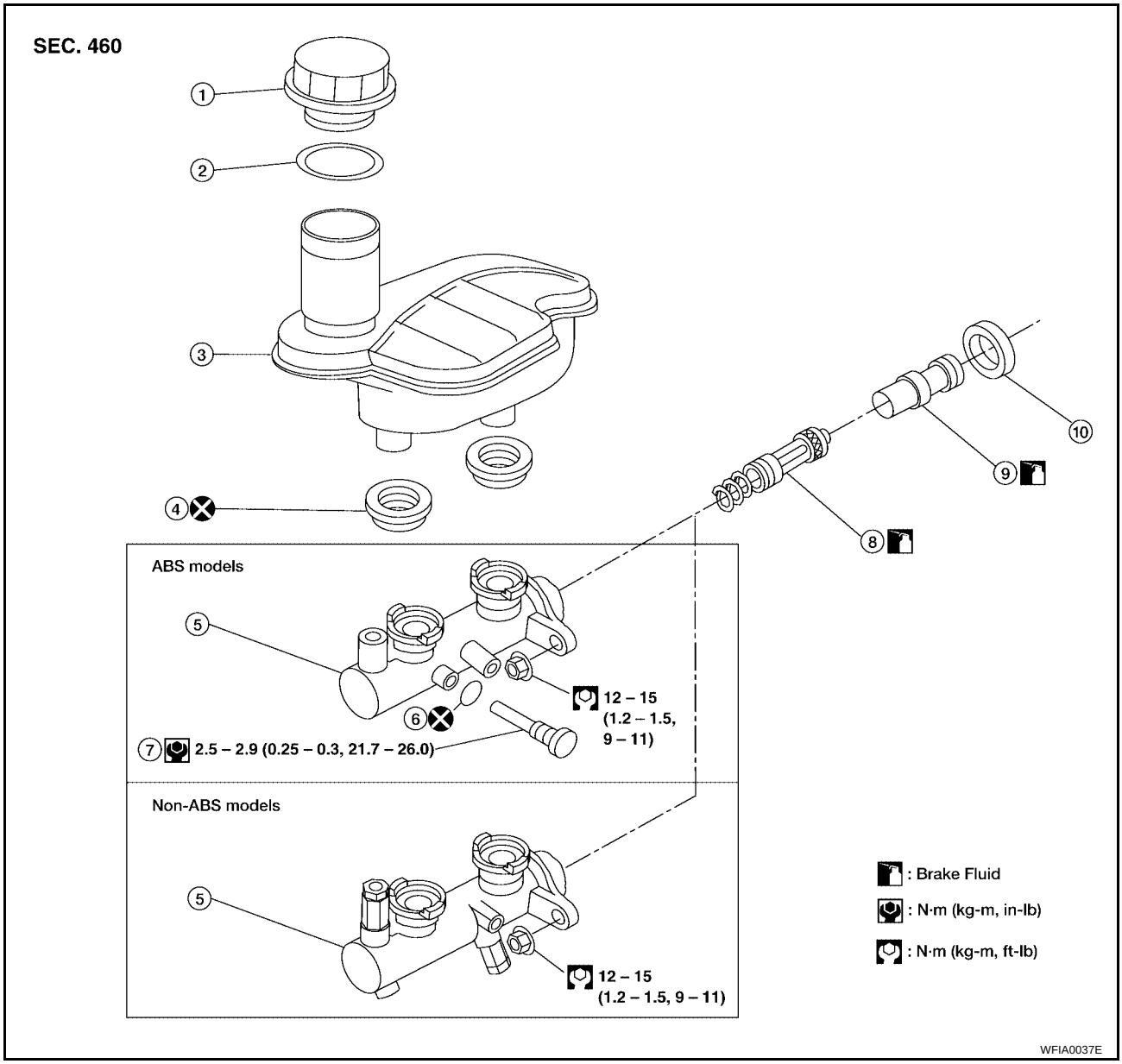
EFS004KP

LEAK INSPECTION

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

Removal and Installation

EFS0025C



1. Reservoir cap
2. O-ring
3. Reservoir tank
4. Seal
5. Cylinder body
6. O-ring
7. Piston stopper
8. Secondary piston assembly
9. Primary piston assembly
10. Stopper cap

CAUTION:

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

REMOVAL

1. Remove air cleaner and inlet duct. Refer to EM-17, "Removal and Installation" (QR25DE), EM-120, "Removal and Installation" (VQ35DE).

2. Remove clutch fluid reservoir without disconnecting hose and position aside. Refer to CL-8, "CLUTCH MASTER CYLINDER" .
3. Connect a vinyl tube and container to air bleeder valve.
4. Drain brake fluid from each air bleeder valve by depressing brake pedal to empty fluid from the master cylinder. Remove the harness connector of the brake fluid master cylinder level sensor.
5. Remove brake pipe flare nuts.
6. Disconnect fluid level sensor.
7. Remove master cylinder nuts and master cylinder.
8. Remove reservoir tank and seals, if necessary.

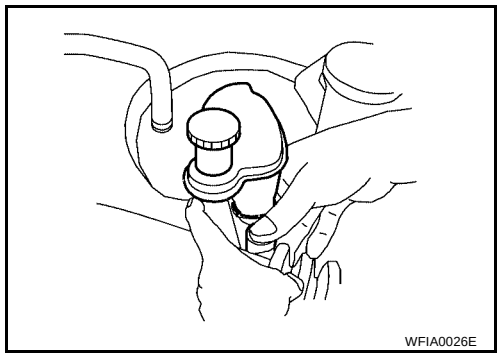
INSTALLATION

CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**

Installation is in the reverse order of removal.

- Plug all ports on master cylinder with fingers to prevent air suction while releasing brake pedal.
- Have driver depress brake pedal slowly several times until no air comes out of master cylinder.
- Install the brake lines to master cylinder.
- Tighten flare nuts to specification. Refer to BR-9, "BRAKE PIPING AND HOSE" .
- Bleed air from the brake system. Refer to BR-8, "Bleeding Brake System" .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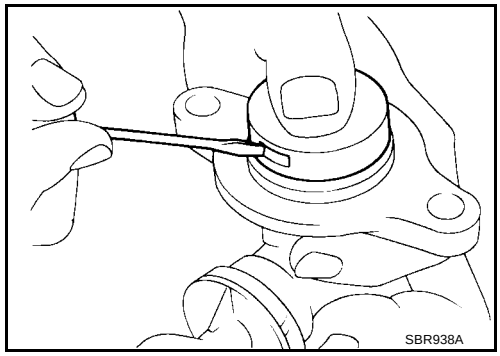
EFS0025D

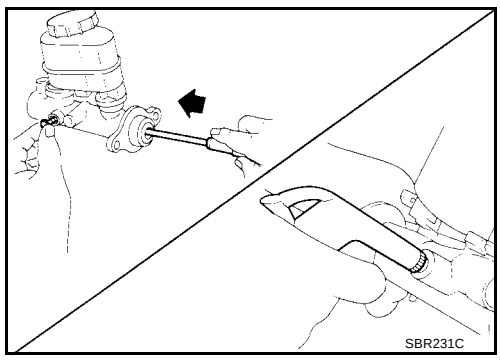
Disassembly and Assembly

DISASSEMBLY

1. Bend claws of stopper cap outward.


SBR938A

2. Remove piston stopper while piston is pushed into cylinder.
3. Remove piston assemblies.
   If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.
4. Remove the reservoir tank.


SBR231C

INSPECTION AFTER REMOVAL

Master Cylinder Inner Wall

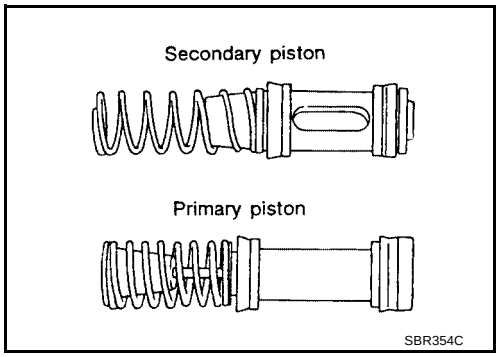
- Check the inner wall of the cylinder for damage, abrasion, corrosion and pin holes. If defective, replace the master cylinder.

Piston

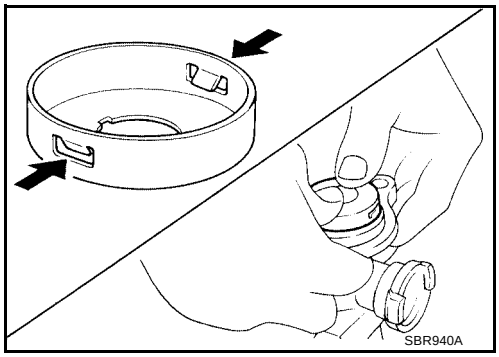
- Check for deformation of or scratches on piston cups.

ASSEMBLY

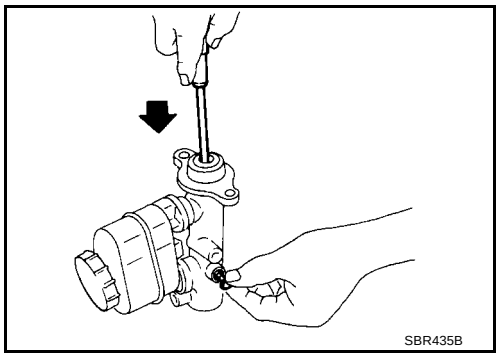
1. Insert secondary piston assembly. Then insert primary piston assembly.
   - Pay attention to alignment of secondary piston slit with piston stopper mounting hole of cylinder body.



2. Install stopper cap.
   Before installing stopper cap, ensure that claws are bent inward.



3. Push reservoir tank seals into cylinder body.
4. Push reservoir tank into cylinder body.
5. Install piston stopper while piston is pushed into cylinder.



BRAKE BOOSTER

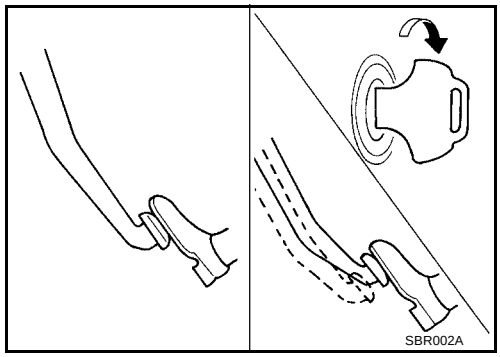
PFP:47200

On-vehicle Service

EFS0025E

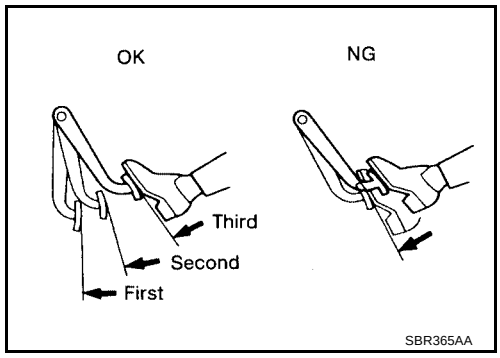
OPERATING CHECK

1. Stop engine and depress brake pedal several times. Check that pedal stroke does not change.
2. Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.



AIRTIGHT CHECK

- Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. The pedal should go further down the first time, and then it should gradually rise thereafter.
- 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.



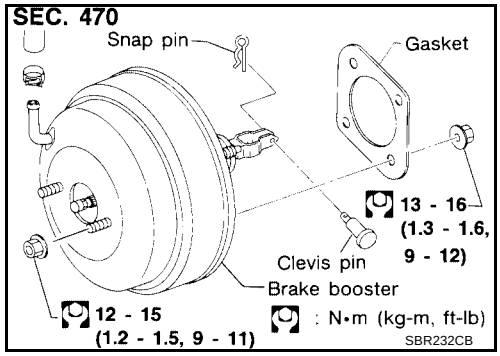
Removal and Installation

EFS0025F

REMOVAL

CAUTION:

- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **Be careful not to deform or bend brake pipes during removal of booster.**
- **Replace clevis pin if damaged.**
- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**
- **Take care not to damage brake booster mounting bolt thread when installing. Due to the acute angle of installation, the threads can be damaged with the dash panel.**



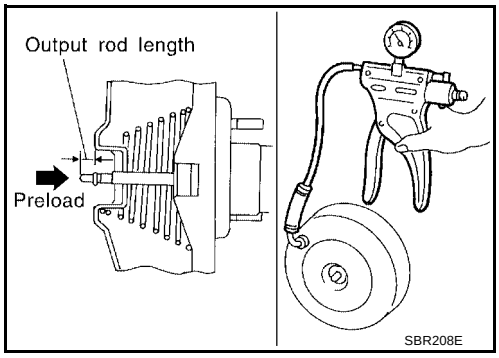
1. Remove air cleaner and air duct. Refer to EM-17, "Removal and Installation" (QR25DE), EM-120, "Removal and Installation" (VQ35DE).
2. Remove clutch fluid reservoir without disconnecting hose and position aside. Refer to CL-8, "CLUTCH MASTER CYLINDER" .
3. Remove the master cylinder. Refer to BR-12, "REMOVAL" .
4. Remove the vacuum pipe from the brake booster.
5. Remove driver lower instrument panel. Refer to IP-12, "Instrument Lower Cover LH" .
6. Remove snap pin and clevis pin from clevis, then remove the input rod from the brake pedal.
7. Remove the mounting nuts from the brake booster and the brake pedal assembly.
8. Remove the booster assembly from the engine compartment.

INSPECTION AFTER REMOVAL

Output Rod Length Check

1. Apply vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg) to brake booster with a hand vacuum pump.
2. Add preload of 19.6 N (2 kg, 4.4 lb) to output rod.
3. Check output rod length.

Specified length : 10.275 - 10.525 mm (0.4045 - 0.4144 in)



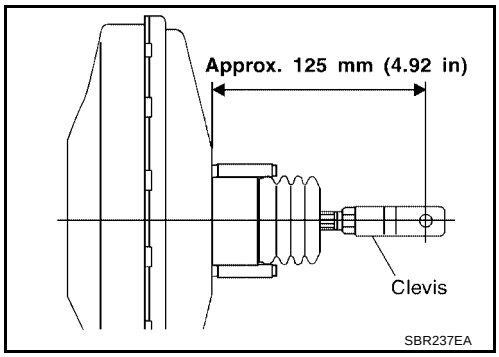
INSTALLATION

1. Adjust the length of the input rod by loosening the lock nut so that the dimensions shown match the standard value.

Standard value : 125 mm (4.92 in)

2. Tighten the lock nut temporarily and install the booster assembly in the vehicle.
3. Connect the brake pedal to the clevis of the input rod.
4. Tighten the mounting nut for the brake pedal assembly to the specified torque.

Brake pedal assembly : 13 - 16 N·m (1.3 - 1.6 kg-m, 9 - 12 ft-lb)



5. Install the master cylinder on the booster assembly. Refer to BR-13, "INSTALLATION" .
6. Adjust the height and play of the brake pedal. Refer to BR-6, "Inspection and Adjustment" .
7. Tighten the lock nut of the input rod to the specified torque.

Input rod lock nut : 16 - 21 N·m (1.6 - 2.2 kg-m, 12 - 15 ft-lb)

8. Install clutch fluid reservoir. Refer to CL-8, "CLUTCH MASTER CYLINDER" .
9. Install air cleaner and air duct. Refer to EM-17, "Removal and Installation" (QR25DE), EM-120, "Removal and Installation" (VQ35DE).
10. Install driver lower instrument panel. Refer to IP-12, "Instrument Lower Cover LH" .
11. Bleed air from brake system. Refer to BR-8, "Bleeding Brake System" .

VACUUM LINES

PFP:41920

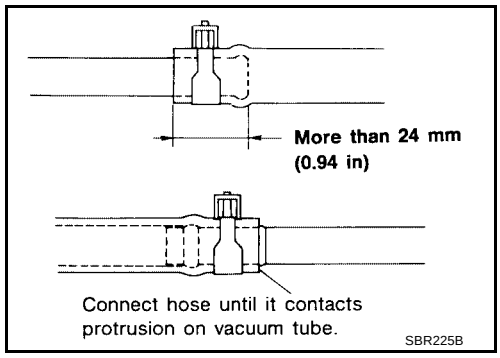
Removal and Installation

EFS0025G

CAUTION:

When installing vacuum hose, pay attention to the following points.

- **Do not apply any oil or lubricants to vacuum hose with check valve.**
- **Insert vacuum tube into vacuum hose as shown.**
- **Install vacuum hose with internal check valve, noting that arrow on hose indicates engine side.**



Inspection

EFS0025H

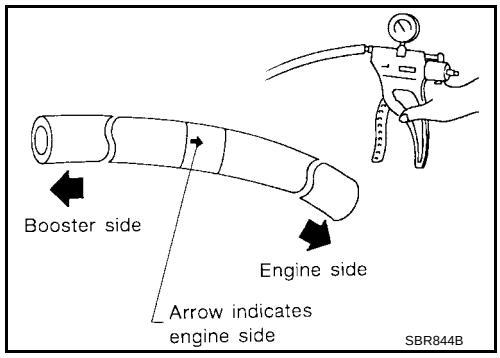
HOSES AND CONNECTORS

Check vacuum hose and connections for airtightness, improper attachment, chafing and deterioration. Repair or replace as necessary.

CHECK VALVE

Check vacuum with a vacuum pump.

Connect to booster side	Vacuum should exist
Connect to engine side	Vacuum should not exist

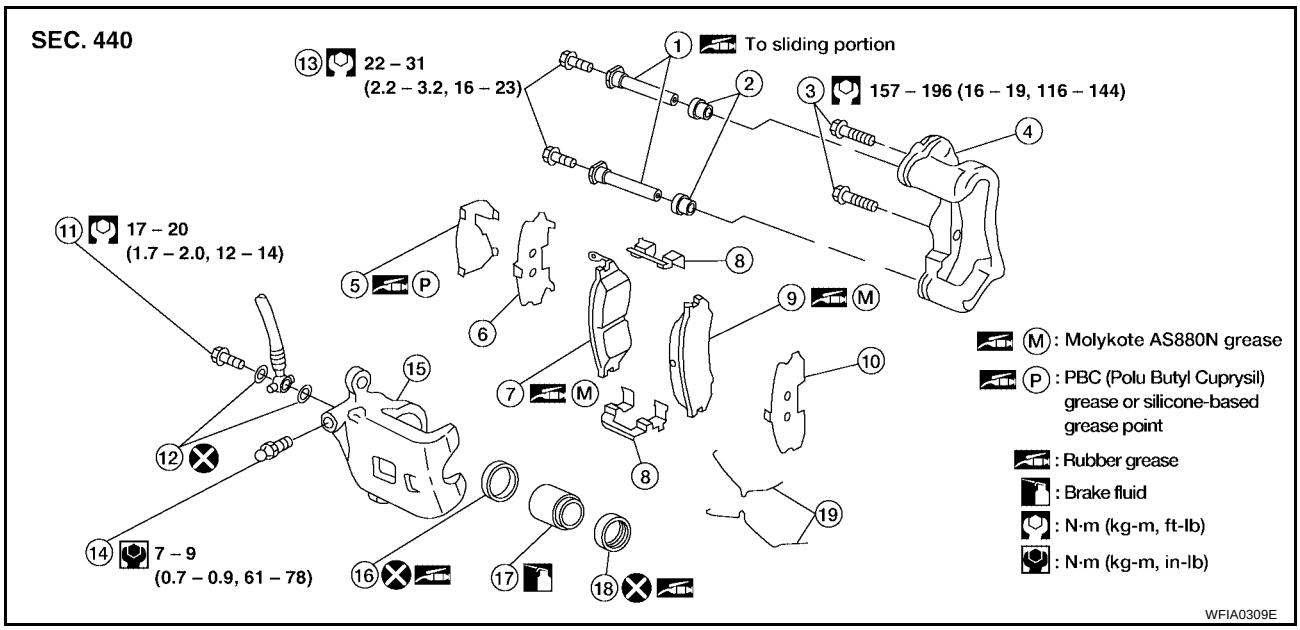


FRONT DISC BRAKE

PFP:41000

Component

EFS0025I



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

WARNING:

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

CAUTION:

- **When cylinder body is open, do not depress the brake pedal because the piston will pop out.**
- **It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.**
- **Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.**
  Refer to BR-24, "Brake Burnishing Procedure" .

On-vehicle Service

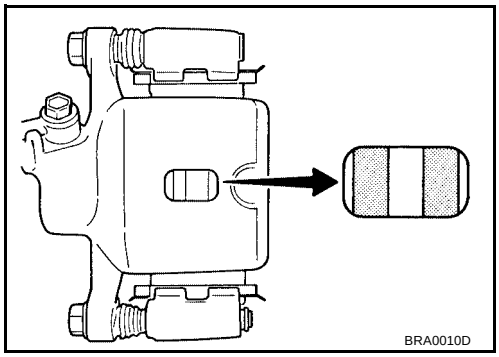
EFS0028M

INSPECTION

Pad Thickness

- Remove a wheel with the vehicle lifted up, and then check the thickness of the pad from the inspection hole of the cylinder body. If necessary, check it with a micrometer.

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

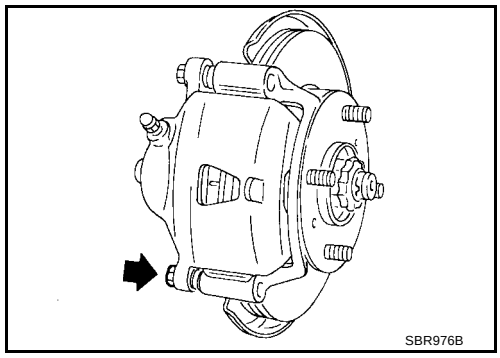


PAD REPLACEMENT

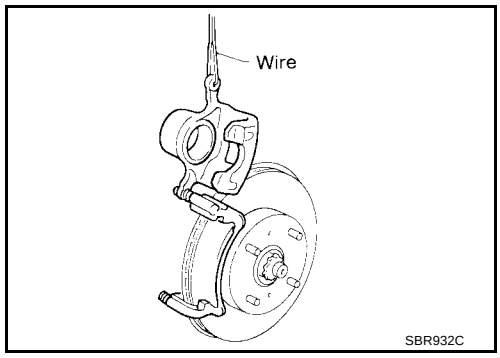
Removal

- If shims are rusted or show peeling of the rubber coat, replace them with new shims.
- Whenever the brake pads are replaced, the inner shim, the outer shim and the shim cover have to be replaced as a set.

1. Remove master cylinder reservoir cap.
2. Remove tire from vehicle, using power tool.
3. Remove pin bolt, using power tool.



4. Suspend the cylinder body with wire. Then remove pads with retainers, inner and outer shims and pad return springs.



Installation

1. Apply Molykote AS880N grease between pad plate and inner and outer shim. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .
2. Attach the inner shim and shim cover to the inner pad and attach the outer shim to the outer pad.
3. Apply grease to the contact surface of pad retainer with the pads, then attach the pad retainer, pads and pad return spring to the torque member.
4. Install the cylinder body to the torque member.
5. Insert a main pin bolt (on the lower side) and tighten it to specification. Refer to BR-18, "Component" .
6. Inspect brake fluid level, then install master cylinder reservoir cap.
7. Check the brakes for drag.
8. Install tire to vehicle. Refer to WT-5, "Rotation" .

CAUTION:

Burnish the brake contact surfaces after refinishing or replacing brake rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-24, "Brake Burnishing Procedure" .

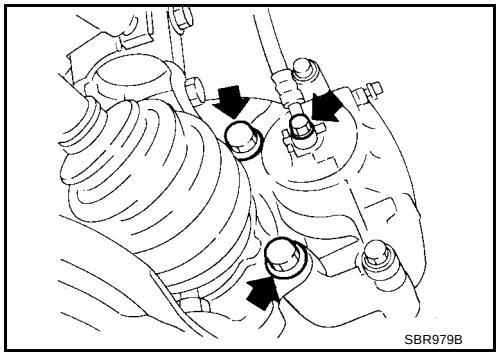
Removal and Installation

EFS0025L

REMOVAL

1. Remove master cylinder reservoir cap.
2. Remove tire from vehicle, using power tool.
3. Connect the vinyl tube and container to the air bleeder.
4. Depress the brake pedal and drain the brake fluid gradually from the air bleeder.

5. Remove connecting bolt and torque member bolts, using power tool.
6. Remove the brake caliper.
7. Remove brake rotor.
8. Separate cylinder body from torque member as required.



INSTALLATION

CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**

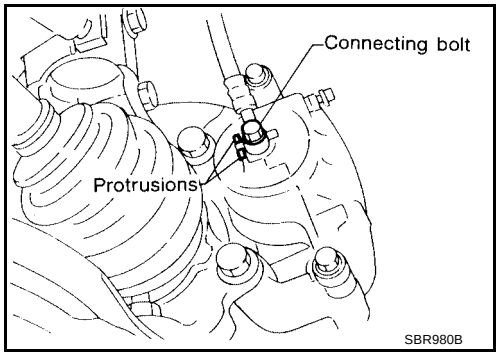
1. Install brake rotor.
2. Install the brake caliper and tighten main pin bolt to specification if required. Refer to BR-18, "Component" .

   CAUTION:

   When installing the caliper assembly in the vehicle, wipe oil from the seating surface of the knuckle spindle washer and the mounting surface of the caliper assembly.
3. Install brake hose to caliper and tighten connecting bolt to specification.

   CAUTION:

   - **The copper washer of the connecting bolt has to be replaced every time the fitting is disconnected.**
   - **Correctly attach the brake hose to the projecting portion of the cylinder body.**
4. Inspect brake fluid level, then install master cylinder reservoir cap.
5. Bleed air from brake system. Refer to BR-8, "Bleeding Brake System" .
6. Install tire to vehicle. Refer to WT-5, "Rotation" .



CAUTION:

Burnish the brake contact surfaces after refinishing or replacing brake rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-24, "Brake Burnishing Procedure" .

Disassembly and Assembly

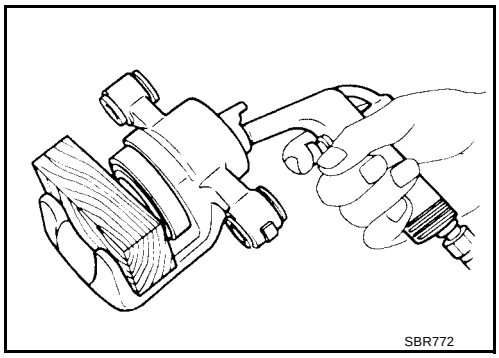
EFS0025M

DISASSEMBLY

1. Push out piston with piston boot using compressed air.

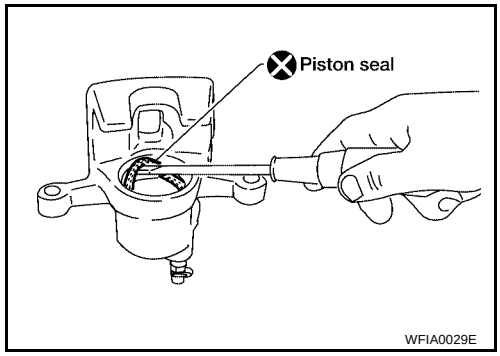
   WARNING:

   Do not place your fingers in front of piston.



2. Remove piston seal with a suitable tool.

CAUTION:
Do not scratch or score cylinder wall.



INSPECTION AFTER DISASSEMBLY

Caliper

CYLINDER BODY

CAUTION:

Use brake fluid to clean. Never use mineral oil.

- **Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.**
- **Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.**

TORQUE MEMBER

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

PISTON

CAUTION:

Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

SLIDE PIN, PIN BOLT AND PIN BOOT

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

Rotor

VISUAL INSPECTION

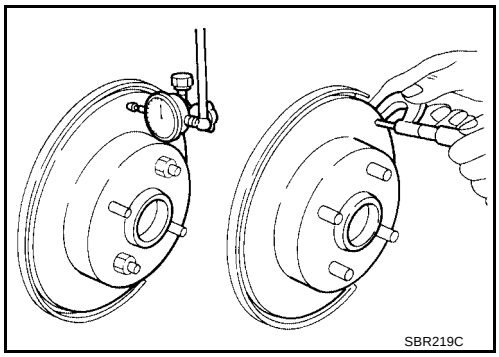
Check rotor for roughness, cracks or chips.

RUNOUT

1. Secure rotor to wheel hub with at least two nuts (M12 x 1.25).
2. Check runout using a dial indicator.
   Make sure that wheel bearing axial end play is within the specifications before measuring runout. Refer to FAX-5, "Front Wheel Bearing" .
3. Change relative positions of rotor and wheel hub so that runout is minimized.

   Maximum runout : 0.07 mm (0.0028 in)

4. If the runout is still out of specification, turn rotor with on-car brake lathe (“MAD, DL-8700”, “AMMCO 700 and 705” or equivalent).



THICKNESS

Check thickness using a micrometer.

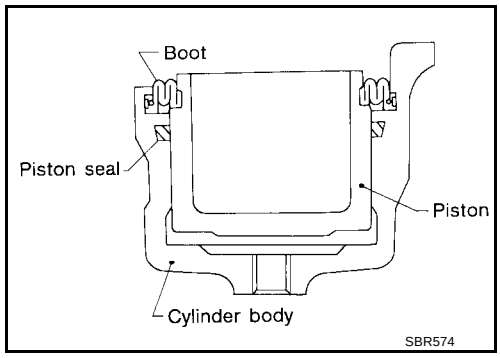
Thickness variation (At least 8 positions) : Maximum 0.015 mm (0.0006 in)

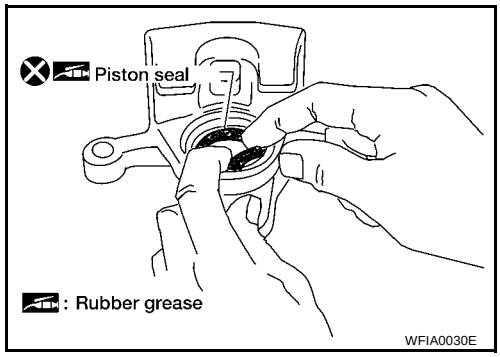
If thickness variation exceeds the specification, turn rotor with on-car brake lathe.

Rotor thickness repair limit : 22.0 mm (0.866 in)

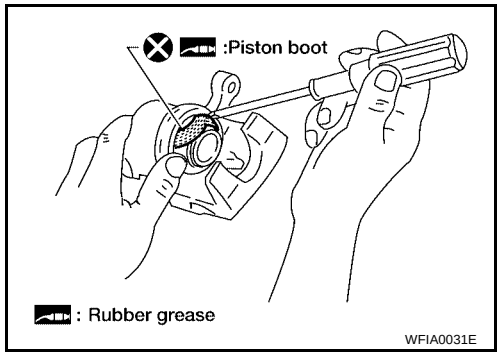
ASSEMBLY

1. Apply rubber grease to new piston seal and insert seal into groove on cylinder body.

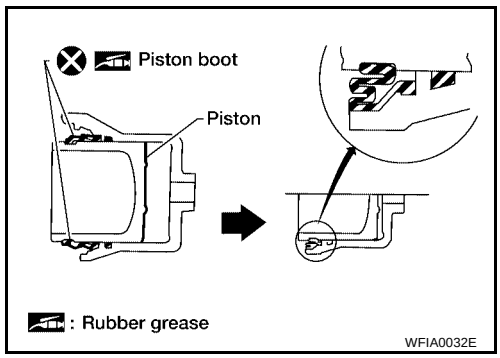




2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.



3. Make sure piston boot is properly installed.



Brake Burnishing Procedure

EFS0025N

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

CAUTION:

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

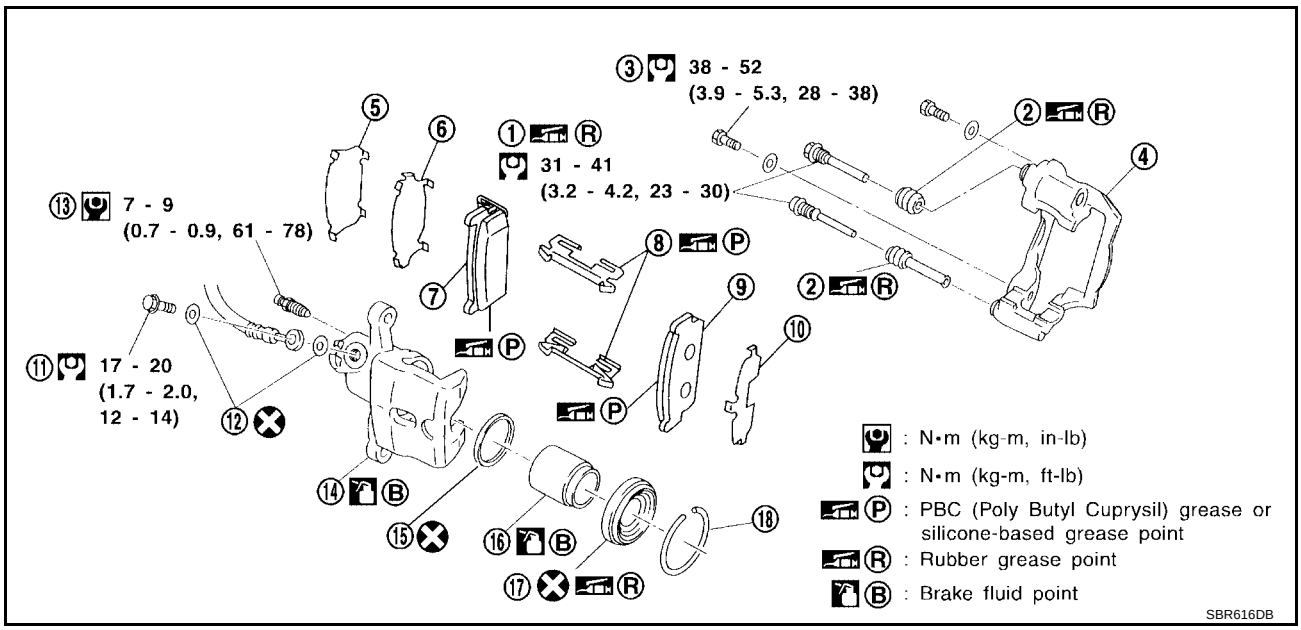
1. **Drive the vehicle on a straight smooth road at 50 km/h (31 MPH).**
2. **Use medium brake pedal/foot effort to bring the vehicle to a complete stop from 50 km/h (31 MPH). Adjust brake pedal/foot pressure so that vehicle stopping time equals 3 to 5 seconds.**
3. **To cool the brake system, drive the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

REAR DISC BRAKE

PFP:44000

Component

EFS0025O



1. Main pin bolt	2. Pin boot	3. Torque member fixing bolt
4. Torque member	5. Shim cover	6. Inner shim
7. Inner pad	8. Pad retainer	9. Outer pad
10. Outer pad	11. Connecting bolt	12. Copper washers
13. Bleed valve	14. Cylinder body	15. Piston seal
16. Piston	17. Piston boot	18. Piston boot retainer

WARNING:

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

CAUTION:

- **When cylinder body is open, do not depress brake pedal because piston will pop out.**
- **Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.**
- **It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.**
- **Burnish the brake contact surfaces after refinishing or replacing brake rotors, after replacing pads, or if a soft pedal occurs at very low mileage.**
  Refer to BR-29, "Brake Burnishing Procedure" .

On-vehicle Service

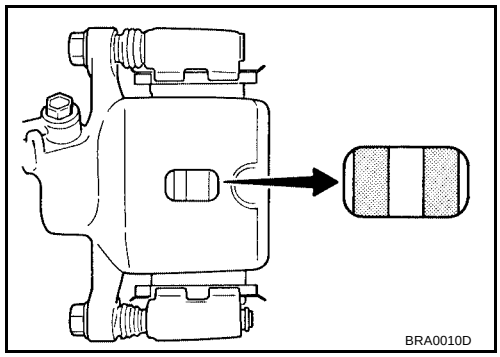
EFS0028L

INSPECTION

Pad Thickness

- Remove a wheel with the vehicle lifted up, and then check the thickness of the pad from the inspection hole of the cylinder body. If necessary, check it with a scale.

Standard pad thickness : 8.0 mm (0.31 in)
Pad wear limit : 1.5 mm (0.059 in)

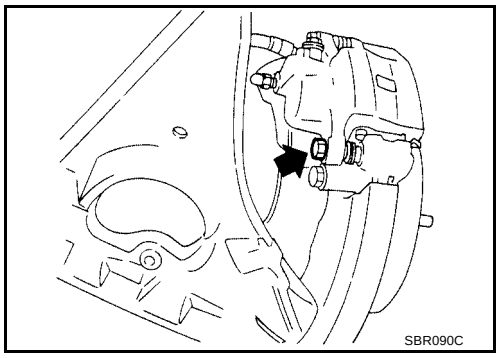


PAD REPLACEMENT

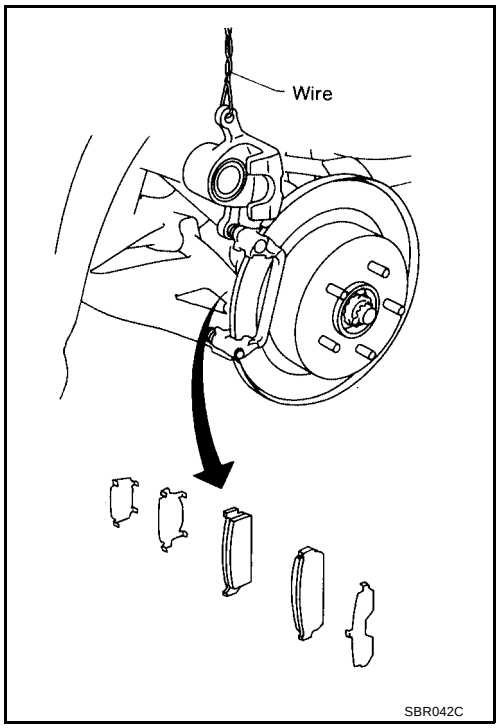
Removal

- If shims are rusted or show peeling of the rubber coat, replace them with new shims.
- Whenever the brake pads are replaced, the inner shim, the outer shim and the shim cover have to be replaced as a set.

1. Remove master cylinder reservoir cap.
2. Remove tire from vehicle, using power tool.
3. Remove lower pin bolt, using power tool.



4. Open cylinder body upward and secure with wire. Then remove pad retainers, and inner and outer shims.



Installation

1. Apply grease to the inner and outer shim, and then attach them to the pads.
2. Attach the pad retainer to the torque member, and then attach it to the pad.
3. When installing new pads, push piston back into cylinder body.
   - Carefully monitor brake fluid level because brake fluid will return to the reservoir when pushing back piston.
4. Close cylinder body down into the torque member.
5. Install a main pin bolt and tighten it to specification. Refer to BR-25, "Component" .
6. Check the brake for drag.
7. Install tire to vehicle. Refer to WT-5, "Rotation" .

CAUTION:

Burnish the brake contact surfaces refinishing or replacing brake rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-29, "Brake Burnishing Procedure" .

Removal and Installation

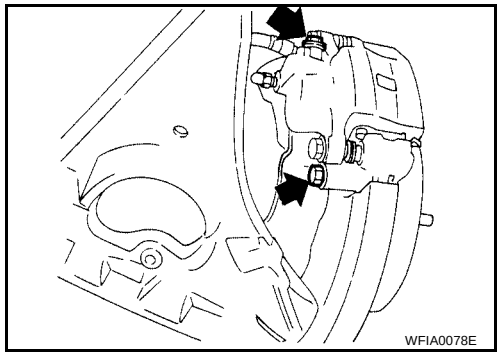
EFS0025R

REMOVAL

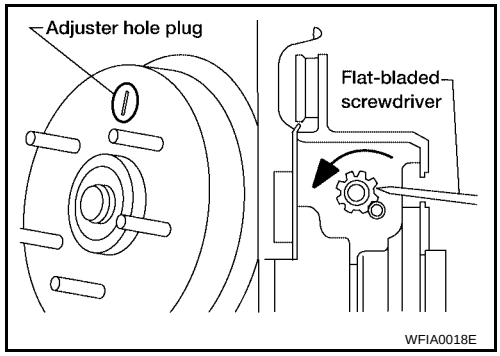
WARNING:

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

1. Remove master cylinder reservoir cap.
2. Remove tire from vehicle, using power tool.
3. Connect a vinyl tube and container to the air bleeder.
4. Depress the brake pedal and drain the brake fluid gradually from the air bleeder.
5. Remove torque member fixing bolts using power tool and brake hose connecting bolt.



6. Remove caliper and brake rotor. If the brake rotor cannot be removed, remove as follows:
   - Make sure parking brake lever is completely disengaged.
   - Hold down the brake rotor with a wheel nut and remove the brake rotor plug.
   - Insert a flat-bladed screwdriver through the plug opening and rotate the star wheel on the adjuster assembly in the direction shown to loosen and retract the brake shoes.
   - Remove wheel nuts and rotor.



INSTALLATION

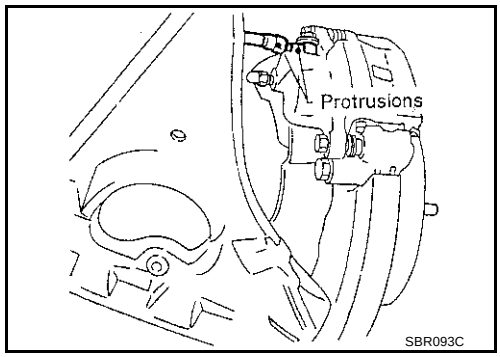
CAUTION:

- **Refill with new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Never reuse drained brake fluid.**

1. Install brake rotor.
2. Install caliper assembly and tighten main pin bolt to specification. Refer to BR-25, "Component" .
3. Install brake hose to caliper and tighten connecting bolt to specification. Refer to BR-25, "Component" .

   CAUTION:

   - **The copper washers for the connecting bolt have to be replaced every time the fitting is disconnected.**
4. Add new brake fluid and bleed air from brake system. Refer to BR-8, "Bleeding Brake System" .
5. Install master cylinder reservoir cap.
6. Adjust the parking brake. Refer to PB-3, "Adjustment" .
7. Install tire to vehicle. Refer to WT-5, "Rotation" .



CAUTION:

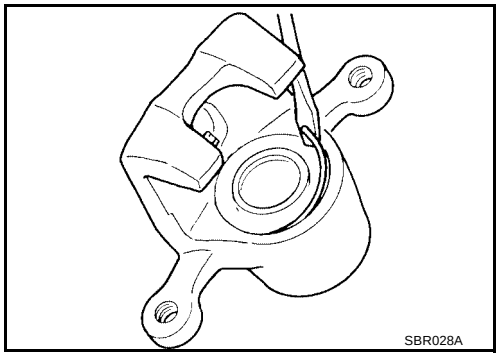
Burnish the brake contact surfaces refinishing or replacing brake rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-29, "Brake Burnishing Procedure" .

Disassembly and Assembly

EFS0025S

DISASSEMBLY

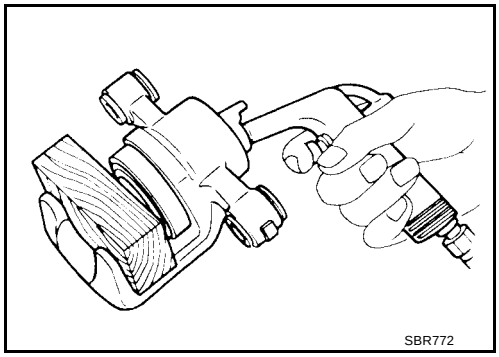
1. Remove piston boot retainer with a flat-bladed screwdriver.



2. Push out piston and piston boot with compressed air.

   WARNING:
   Do not place your finger in front of piston.
3. Remove piston seal with a suitable tool.

   CAUTION:
   Do not scratch or score cylinder wall.



INSPECTION AFTER DISASSEMBLY

Caliper

CYLINDER BODY

CAUTION:
Use brake fluid to clean. Never use mineral oil.

- **Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.**
- **Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.**

TORQUE MEMBER

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

PISTON

CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

SLIDE PIN, PIN BOLT AND PIN BOOT

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

Rotor

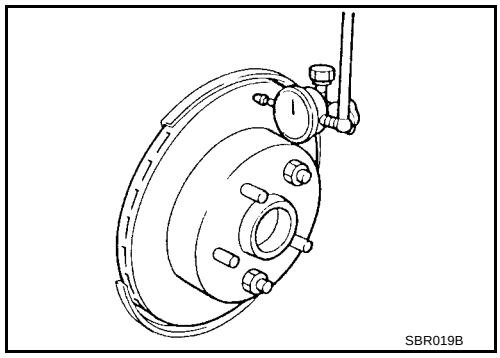
VISUAL INSPECTION

Check rotor for roughness, cracks or chips.

RUNOUT

1. Secure rotor to wheel hub with at least two nuts (M12 x 1.25).
2. Check runout using a dial indicator.
   Make sure that wheel bearing axial end play is within the specifications before measuring runout. Refer to RAX-5, "Rear Wheel Bearing" .
3. Change relative positions of rotor and wheel hub so that runout is minimized.

Maximum runout : 0.07 mm (0.0028 in)

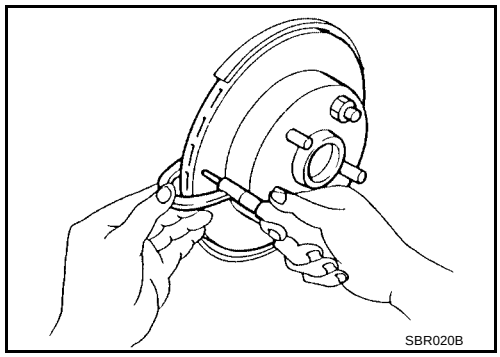


THICKNESS

Check thickness using a micrometer.

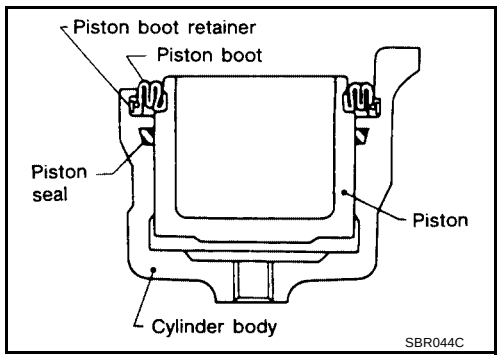
Rotor repair limit

Standard thickness	**: 9 mm (0.35 in)**
Minimum thickness	**: 8.0 mm (0.31 in)**
Maximum thickness variation (At least 8 positions)	**: 0.015 mm (0.0006 in)**



ASSEMBLY

1. Insert piston seal into groove on cylinder body.
2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.
3. Secure piston boot with retainer.



Brake Burnishing Procedure

EFS0025T

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

CAUTION:

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

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

DUAL PROPORTIONING VALVE

PFP:46400

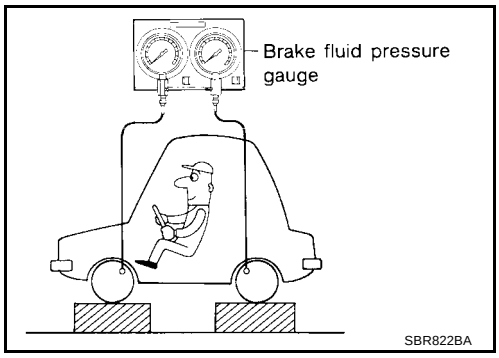
Inspection

EFS0025U

CAUTION:

- **Carefully monitor brake fluid level at master cylinder.**
- **Use new brake fluid. Refer to MA-13, "RECOMMENDED FLUIDS AND LUBRICANTS" .**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on paint areas, wash it away with water immediately.**

1. Connect Tool to air bleeders of front and rear brakes on either LH and RH side.

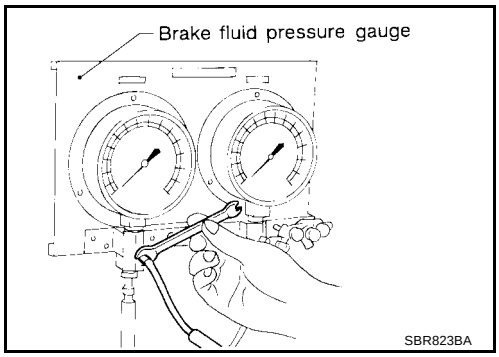


2. Bleed air from the Tool.
3. Check fluid pressure by depressing brake pedal.

   Applied pressure (Front brake) : **7,355 kPa (75 kg/cm2, 1,067 psi)**

   Output pressure (Rear brake) : **5,100 - 5,492 kPa (52 - 56 kg/cm2, 739 - 796 psi)**

   If output pressure is out of specification, replace dual proportioning valve.
4. Bleed air after disconnecting the Tool. Refer to BR-8, "Bleeding Brake System" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EFS0025V

Unit: mm (in)

Front brake	Brake model		CLZ25VD disc brake
	Cylinder bore diameter		57.2 (2.252)
	Pad Length × width × thickness		125.6 × 46 × 11 (4.94 × 1.81 × 0.43)
	Rotor outer diameter × thickness		296 × 26 (11.65 × 1.02)
Rear brake	Brake model		AD9V disc brake
	Cylinder bore diameter		34.9 (1.3740)
	Pad Length × width × thickness		89.1 × 39.5 × 10 (3.508 × 1.555 × 0.31)
	Rotor outer diameter × thickness		292 × 9 (11.50 × 0.35)
Master cylinder	Cylinder bore diameter		23.81 (15/16)
Control valve	Screw in type		30 × 0.4 (1.18 × 0.02)
Brake booster	Booster model		M215T
	Diaphragm diameter	Primary	230 (9.06)
		Secondary	205 (8.07)
Recommended brake fluid			DOT 3

Disc Brake

EFS0025W

Unit: mm (in)

Brake model		CLZ25VD	AD9V
Pad wear limit	Minimum thickness	2.0 (0.079)	1.5 (0.059)
Rotor repair limit	Maximum runout	0.07 (0.0028)	0.07 (0.0028)
	Minimum thickness	22.0 (0.866)	8.0 (0.31)
	Maximum thickness variation (At least 8 positions)	0.015 (0.0006)	0.015 (0.0006)

Brake Pedal

EFS0025X

Unit: mm (in)

Free height “H”*	M/T	164.1 - 174.1 (6.46 - 6.85)
	A/T	173.1 - 183.1 (6.81 - 7.21)
Clearance “C” between pedal stopper and threaded end of stop lamp switch or ASCD switch		0.74 - 1.96 (0.0291 - 0.0772)

*: Measured from surface of dash reinforcement panel to surface of pedal pad

Control Valve

EFS0025Y

Unit: kPa (kg/cm^2 , psi)

Applied pressure (front)	7,355 (75, 1,067)
Output pressure (rear)	5,100 - 5,492 (52 - 56, 739 - 796)

Brake Booster

EFS0025Z

Unit: mm (in)

Output rod length	10.275 - 10.525 (0.4045 - 0.4144)
Clevis length	130 (5.12)