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SECTION **BR** BRAKE SYSTEM

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PRECAUTIONS

PRECAUTIONS

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

EFS003F4

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 may include seat belt switch inputs and dual stage front air bag modules. If equipped with 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.

The vehicle may be equipped with a passenger air bag deactivation switch. Because no rear seat exists where a rear-facing child restraint can be placed, the switch is designed to turn off the passenger air bag so that a rear-facing child restraint can be used in the front passenger seat. The switch is located in the center of the instrument panel, near the ashtray. When the switch is turned to the ON position, the passenger air bag is enabled and could inflate for certain types of collision. When the switch is turned to the OFF position, the passenger air bag is disabled and will not inflate. A passenger air bag OFF indicator on the instrument panel lights up when the passenger air bag is switched OFF. The driver air bag always remains enabled and is not affected by the passenger air bag deactivation switch.

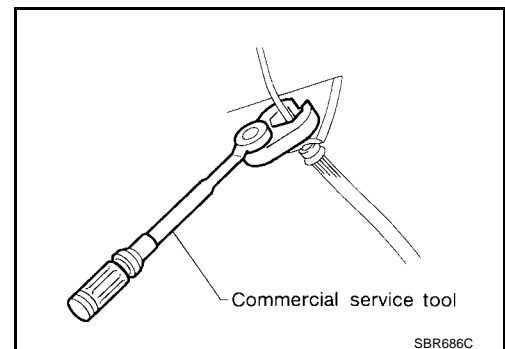
WARNING:

- 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.
- The vehicle may be equipped with a passenger air bag deactivation switch which can be operated by the customer. When the passenger air bag is switched OFF, the passenger air bag is disabled and will not inflate. When the passenger air bag is switched ON, the passenger air bag is enabled and could inflate for certain types of collision. After SRS maintenance or repair, make sure the passenger air bag deactivation switch is in the same position (ON or OFF) as when the vehicle arrived for service.

Precautions for Brake System

EFS003F5

- Use brake fluid “DOT 3”.
- 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.
- To clean master cylinder parts, disc brake caliper parts or wheel cylinder parts, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of hydraulic system.
- Use flare nut wrench when removing and installing brake tubes.
- Always torque brake lines 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-28, "Brake Burnishing Procedure"](#) .



WARNING:

- Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.

PRECAUTIONS

EFS003F6

Wiring Diagrams and Trouble Diagnosis

When you read wiring diagrams, refer to the following:

- Refer to [GI-13, "How to Read Wiring Diagrams"](#) .
- Refer to [PG-9, "POWER SUPPLY ROUTING"](#) for power distribution circuit.

When you perform trouble diagnosis, refer to the following:

- Refer to [GI-9, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"](#) .
- Refer to [GI-25, "How to Perform Efficient Diagnosis for an Electrical Incident"](#) .

PREPARATION

PREPARATION

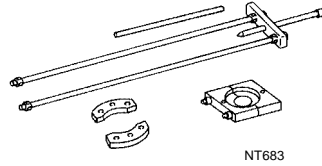
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Special Service Tools

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

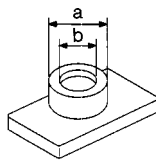
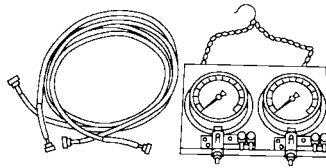
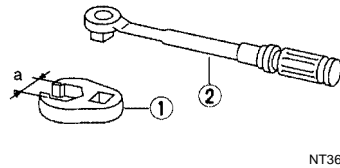
Tool number (Kent-Moore No.) Tool name	Description
KV40106500 (J25852-B) Rear axle shaft bearing puller	Removing wheel bearing and ABS sensor rotor



Commercial Service Tools

EFS003F8

Tool name	Description
1 Flare nut crowfoot 2 Torque wrench	Removing and installing each brake piping a: 10 mm (0.39 in)
Brake fluid pressure gauge	Measuring brake fluid pressure
Rear wheel sensor rotor drift	Installing rear wheel sensor rotor a: 75 mm (2.95 in) dia. b: 63 mm (2.48 in) dia.



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NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

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NVH Troubleshooting Chart

EFS003F9

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

Symptom		Possible cause and SUSPECTED PARTS	Reference page																	
			MA-43	MA-42	MA-43	MA-42	BR-29	BR-25	—	—	BR-27	MA-42	PR-3	FFD-5, RFD-6, RFD-44	FAX-4	FAX-4	FSU-4, RSU-4	WT-3	PS-5	
BRAKE	Noise	Linings or pads - damaged	x	x	x	x									x	x	x	x	x	
	Shake	Linings or pads - uneven wear						x							x		x	x	x	
	Shimmy, Judder	Return spring damaged							x	x	x	x	x				x	x	x	
		Shims damaged																		
		Rotor or drum imbalance																		
		Rotor or drum damage																		
		Rotor or drum runout																		
		Rotor or drum deformation																		
		Rotor or drum deflection																		
		Rotor or drum rust																		
		Rotor thickness variation																		
		Drum out of round																		
		PROPELLER SHAFT																		
		DIFFERENTIAL																		
		DRIVE SHAFT																		
		AXLE																		
		SUSPENSION																		
		TIRES																		
		ROAD WHEEL																		
		STEERING																		

x: Applicable

BRAKE PEDAL AND BRACKET

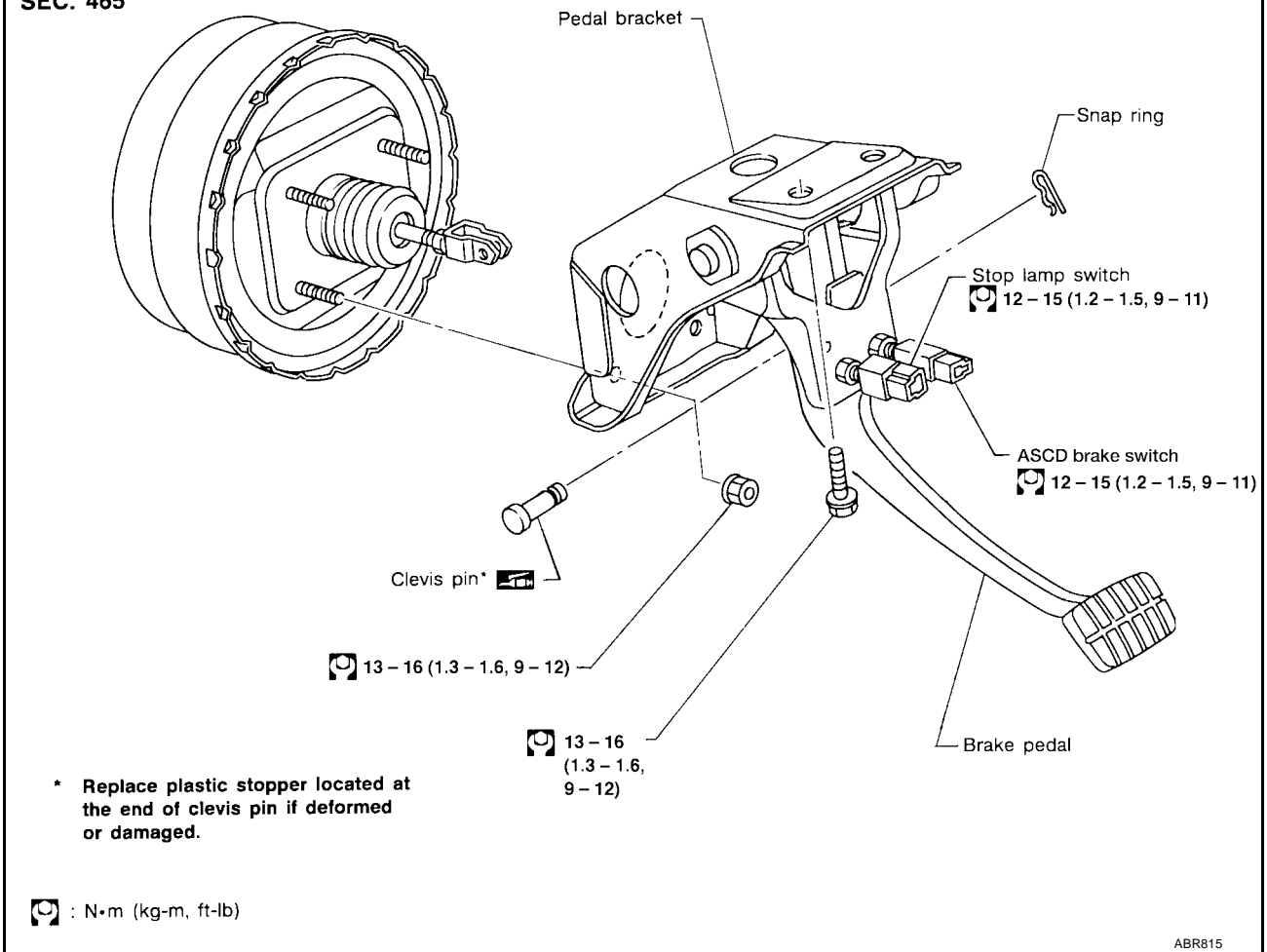
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BRAKE PEDAL AND BRACKET

Removal and Installation

SEC. 465

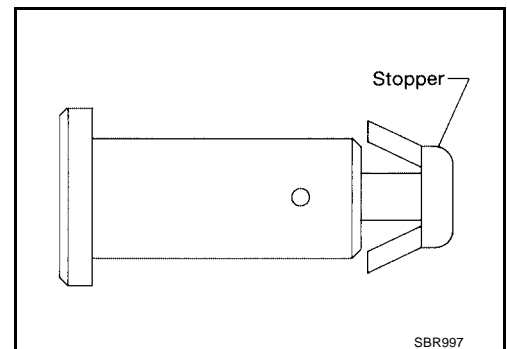


Inspection

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Check brake pedal for following items.

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



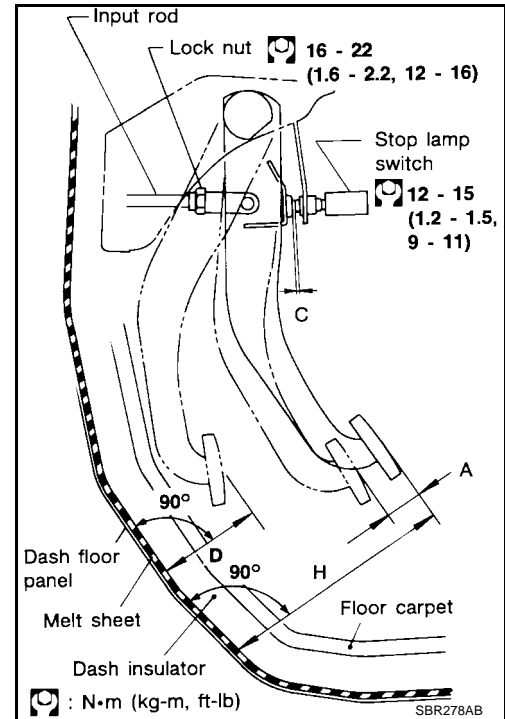
BRAKE PEDAL AND BRACKET

EFS003FC

Adjustment

Check brake pedal free height from metal panel.

- H : Free height (Refer to [BR-34, "Brake Pedal"](#) .)
- D : Depressed height (Refer to [BR-34, "Brake Pedal"](#) .)
Under force of 490 N (50 kg, 110 lb) with engine running
- C₁ , C₂ : Clearance between pedal stopper and threaded end of stop lamp switch and ASCD brake switch [0.3 - 1.0 mm (0.012 - 0.039 in)]
- A : Pedal free play [1.0 - 3.0 mm (0.039 - 0.118 in)]



If necessary, adjust brake pedal free height.

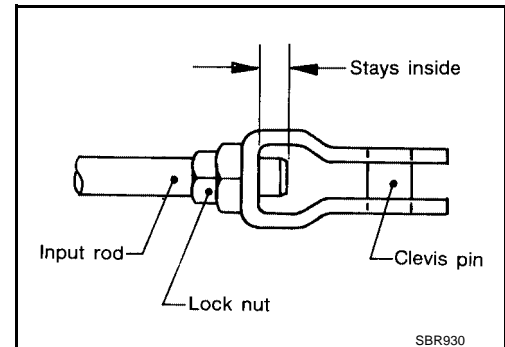
1. Loosen lock nut and adjust pedal free height by turning brake booster input rod. Then tighten lock nut.

Make sure that tip of input rod stays inside.

2. Loosen lock nut and adjust clearance "C" with stop lamp switch respectively, Then tighten lock nuts.
3. Check pedal free play.

Make sure that stop lamp is off when pedal is released.

4. Check brake pedal depressed height while engine is running. If lower than specification, check for leaks, air in system, or damage to components (master cylinder, wheel cylinder, etc.). Then make necessary repairs.



BRAKE FLUID

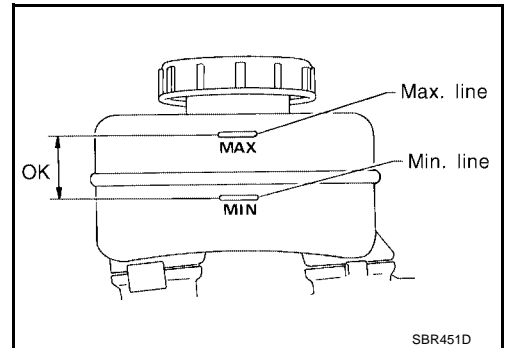
BRAKE FLUID

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Checking Brake Fluid Level

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- Check fluid level in reservoir tank. It should be between MAX and MIN lines on reservoir tank.
- If fluid level is extremely low, check brake system.
- If the brake warning lamp comes on, check brake fluid level switch and parking brake switch.



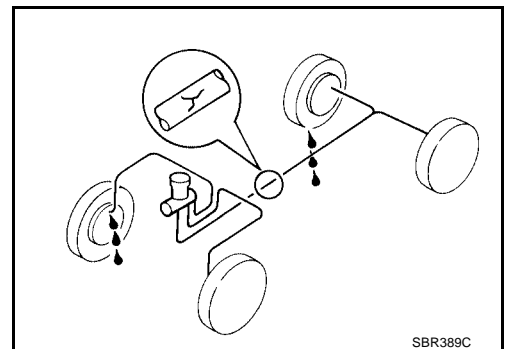
Checking Brake Line

EFS003FE

CAUTION:

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

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

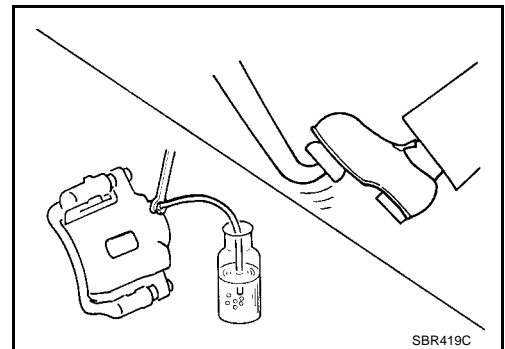


Changing Brake Fluid

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CAUTION:

- Refill with new brake fluid "DOT 3".
 - 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. Clean inside of reservoir tank, and refill with new brake fluid.
 2. Connect a vinyl tube to each air bleeder valve.
 3. Drain brake fluid from each air bleeder valve by depressing brake pedal.
 4. Refill until brake fluid comes out of each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to [BR-10, "Bleeding Brake System"](#).



BRAKE FLUID

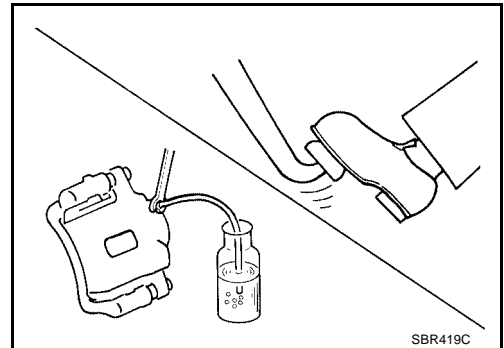
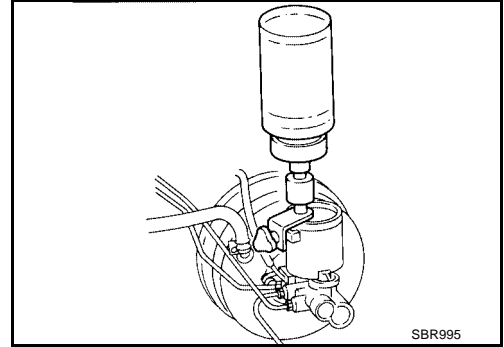
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Bleeding Brake System

CAUTION:

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
 - If master cylinder is suspected to have air inside, bleed air from master cylinder first. Refer to [BR-14, "INSTALLATION"](#).
 - Fill reservoir with new brake fluid "DOT 3". 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.
 - Turn ignition switch OFF and disconnect the ABS/VDC connector or battery cable.
 - Bleed air in the following order.
 - Left rear brake
 - Right rear brake
 - Left front brake
 - Right front brake
 - **ABS actuator/VDS**
1. Connect a transparent vinyl tube to air bleeder valve.
 2. Fully depress brake pedal several times.
 3. With brake pedal depressed, open air bleeder valve to release air.
 4. Close air bleeder valve.
 5. Release brake pedal slowly.
 6. Repeat steps 2. through 5. until clear brake fluid comes out of air bleeder valve.
 7. Tighten air bleeder.

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



BRAKE PIPING AND HOSE

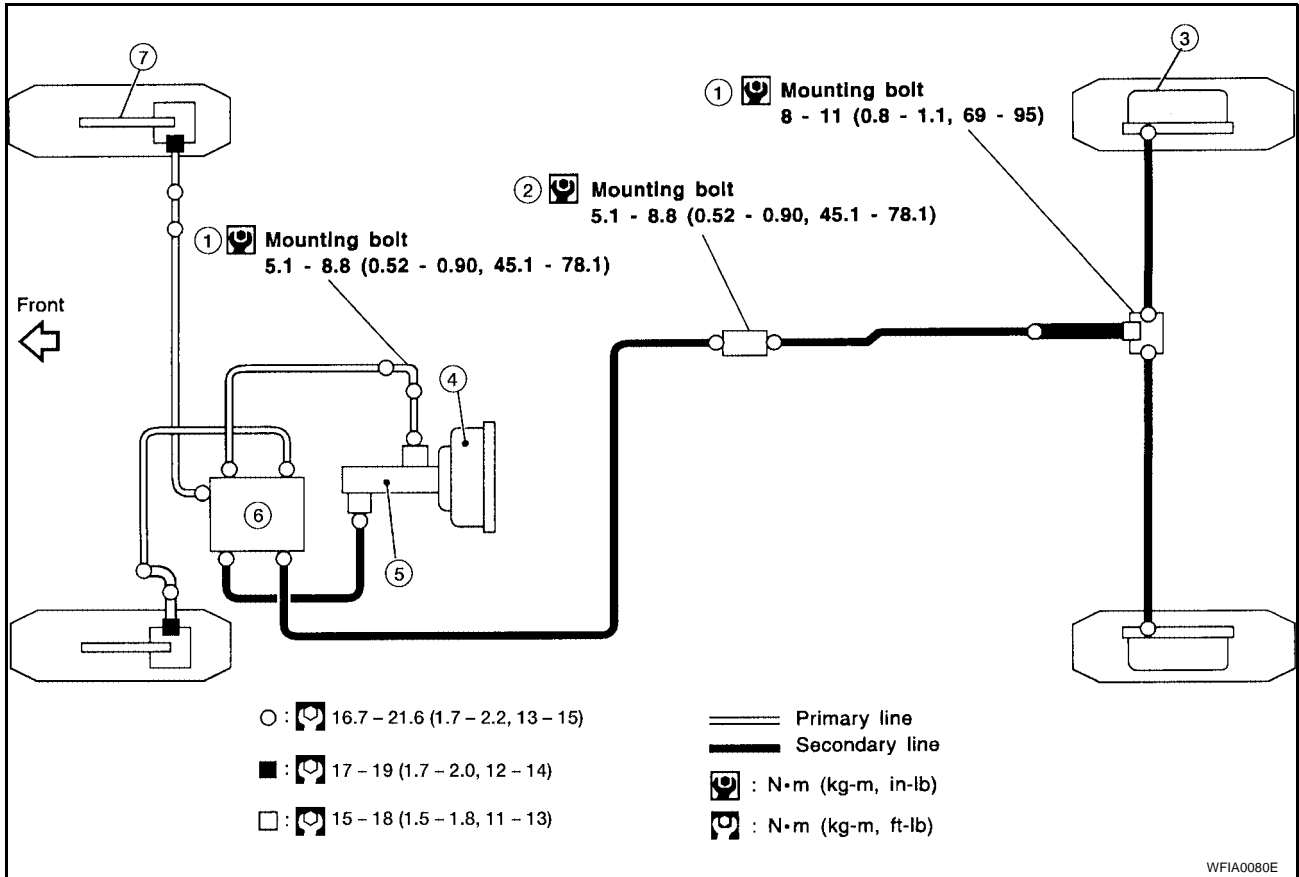
BRAKE PIPING AND HOSE

Hydraulic Circuit

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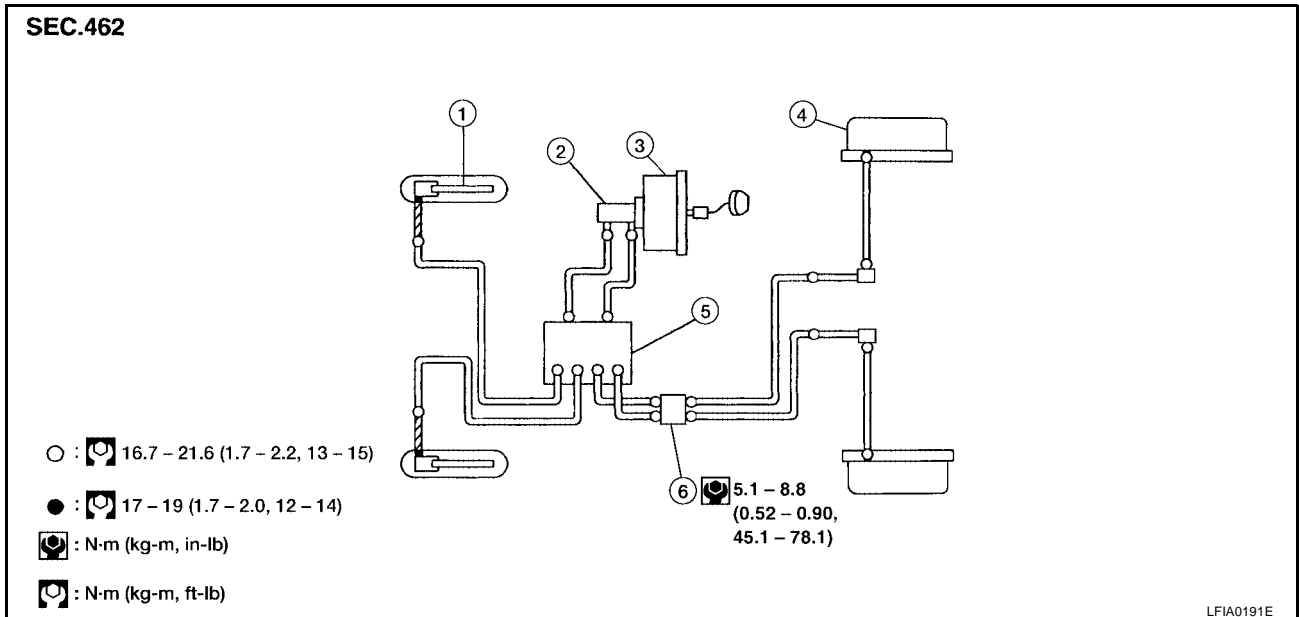
EFS003FH

4x2 and 4x4 with MT



- | | | |
|------------------------|----------------------|-----------------|
| 1. Three-way connector | 2. Two-way connector | 3. Rear brake |
| 4. Brake booster | 5. Master cylinder | 6. ABS actuator |
| 7. Front brake | | |

4x4 with AT and VDC



- | | | |
|----------------|--------------------|--------------------|
| 1. Front brake | 2. Master cylinder | 3. Brake booster |
| 4. Rear brake | 5. VDC actuator | 6. 4-way connector |

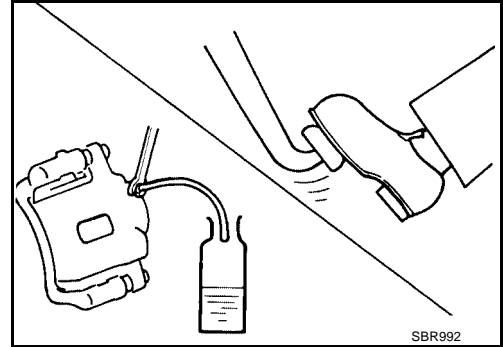
BRAKE PIPING AND HOSE

Front and Rear Brake Piping and Hose REMOVAL

EFS003F1

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.
1. Connect vinyl tube 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. Cover openings to prevent entrance of dirt whenever disconnecting brake line.



INSTALLATION

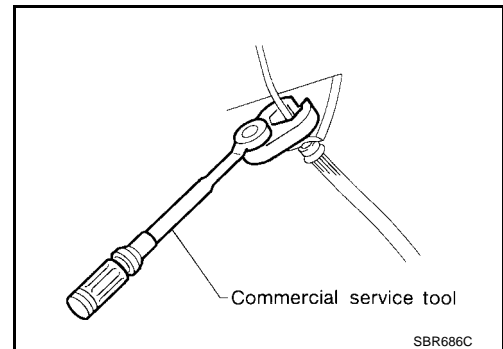
CAUTION:

- Refill with new brake fluid "DOT 3".
 - Never reuse drained brake fluid.
1. 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 - 19 N·m (1.7 - 2.0 kg·m, 12 - 14 ft·lb)

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#).



Inspection

EFS003FJ

Check brake lines (tubes and hoses) for cracks, deterioration and other damage. Replace any damaged parts.

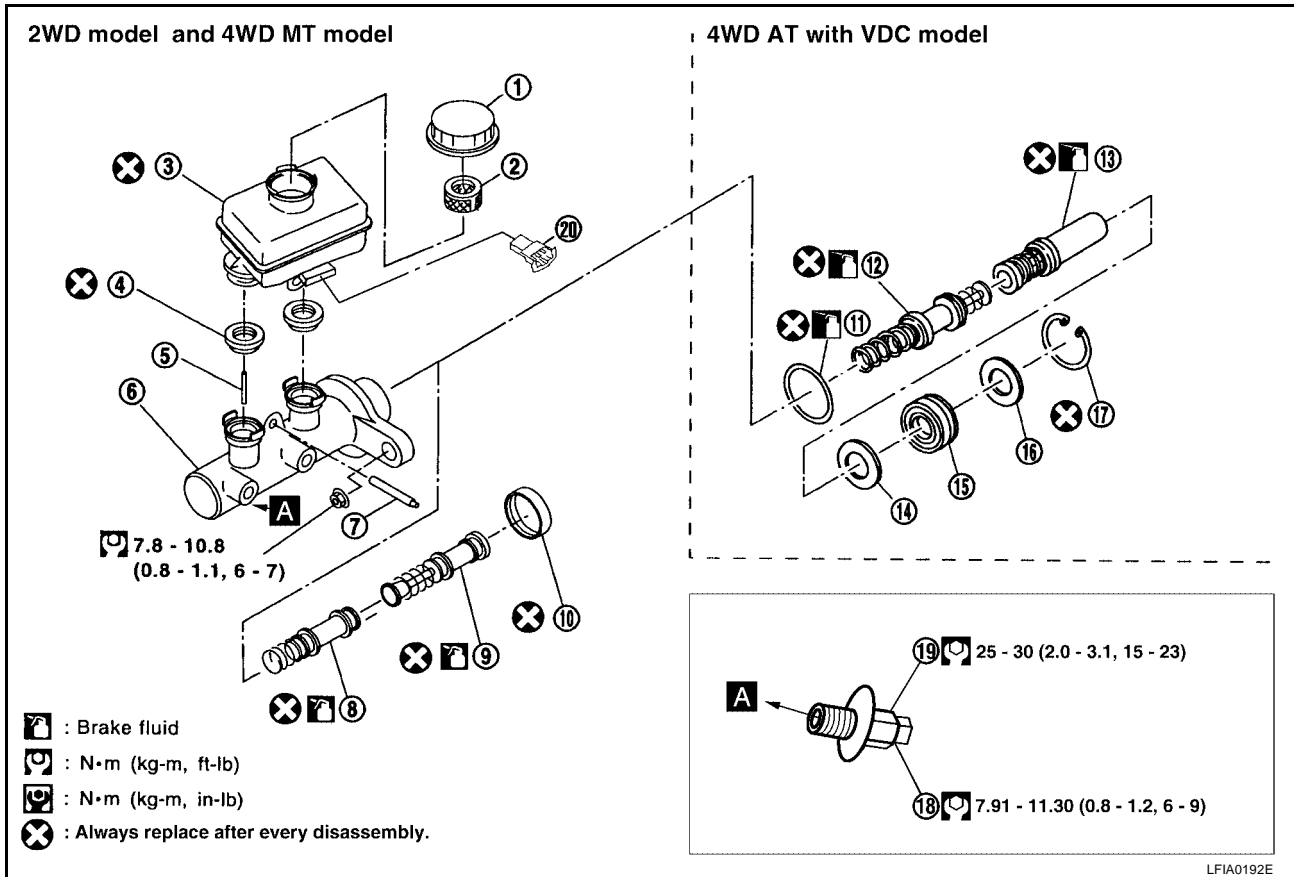
MASTER CYLINDER

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MASTER CYLINDER

Components



- | | | |
|--|------------------------------|----------------------------------|
| 1. Reservoir cap | 2. Filter | 3. Reservoir tank |
| 4. Seal | 5. Valve stopper | 6. Cylinder body |
| 7. Spring pin | 8. Secondary piston assembly | 9. Primary piston assembly |
| 10. Stopper cap | 11. O-ring | 12. Secondary piston assembly |
| 13. Primary piston assembly | 14. Plate | 15. Guide |
| 16. Plate | 17. Snap ring | 18. Pressure switch (2WD models) |
| 19. Pressure sensor (4WD models with AT and VDC) | 20. Brake fluid level switch | |

Removal and Installation

REMOVAL

EFS003FL

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.
- In the case of brake fluid leakage from the master cylinder, disassemble the cylinder. Then check piston cups for deformation and scratches and replace necessary parts.

1. Connect a vinyl tube to air bleeder on brakes.
2. Drain brake fluid from each air bleeder, depressing brake pedal to empty fluid from master cylinder.
3. Disconnect brake fluid level switch.
4. Disconnect pressure sensor (4WD models with AT and VDC) or pressure switch (2WD models and 4WD models with MT).
5. Remove flare nuts.
6. Remove master cylinder nuts.

MASTER CYLINDER

INSTALLATION

CAUTION:

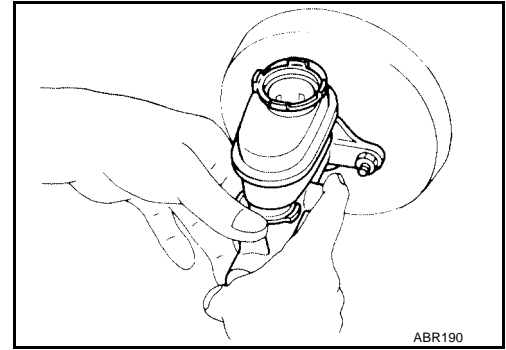
- Refill with new brake fluid "DOT 3".
 - Never reuse drained brake fluid.
1. Place master cylinder onto brake booster and secure master cylinder nuts lightly.
 2. Tighten master cylinder nuts.

Master cylinder nuts : 12 - 15 N-m (1.2 - 1.5 kg-m, 9 - 11 ft-lb)

3. Fill reservoir tank with new brake fluid.
4. Plug all ports on master cylinder with fingers to prevent air suction while releasing brake pedal.
5. Have driver depress brake pedal slowly several times until no air comes out of master cylinder.
6. Fit brake lines to master cylinder.
7. Tighten flare nuts.

Flare nuts : 17 - 22 N-m (1.7 - 2.2 kg-m, 13 - 16 ft-lb)

8. Bleed air from brake system. Refer to [BR-10, "Bleeding Brake System"](#) .



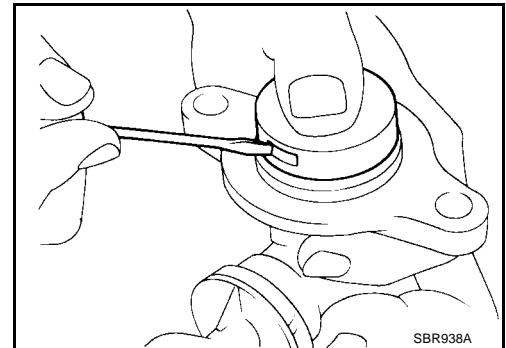
Disassembly and Assembly

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DISASSEMBLY

2WD Models and 4WD models with MT

1. If necessary, remove pressure sensor (4WD models with AT and VDC) or pressure switch (2WD models and 4WD models with MT).
2. If necessary, remove brake fluid level switch.
3. Bend claws of stopper cap outward.

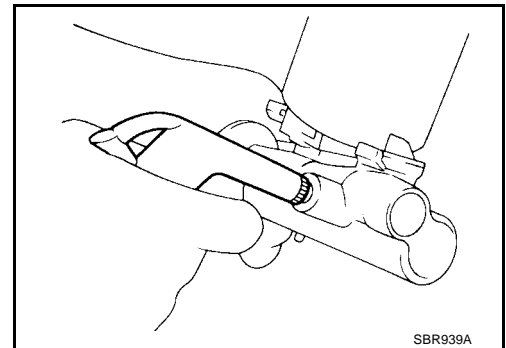


4. Remove piston assemblies.

NOTE:

If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.

5. Draw out reservoir tank.



4WD models with AT and VDC

CAUTION:

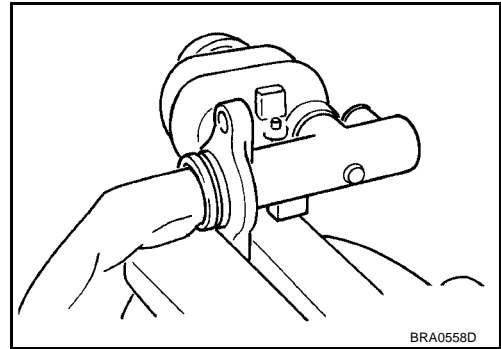
Be careful not to damage the rod of the primary piston with covering cloths.

MASTER CYLINDER

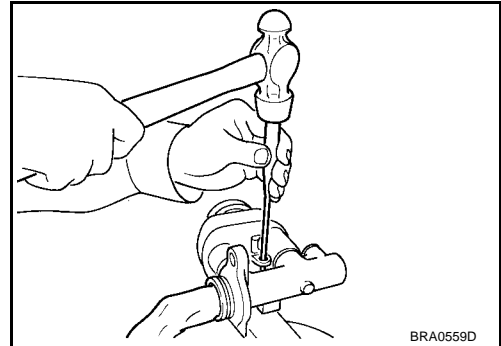
1. Tighten the cylinder body flange in a vise as shown.

CAUTION:

- Pay attention to the orientation of the master cylinder body.
- Use a copper plate to protect the body in the vise.



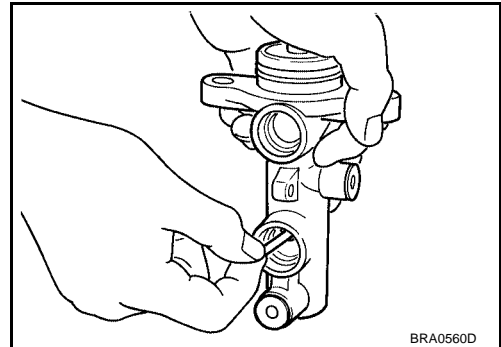
2. Remove pin from the reservoir tank using suitable tool.
3. Remove the master cylinder assembly from the vise.
4. Remove the reservoir tank and grommet from the cylinder body.



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

CAUTION:

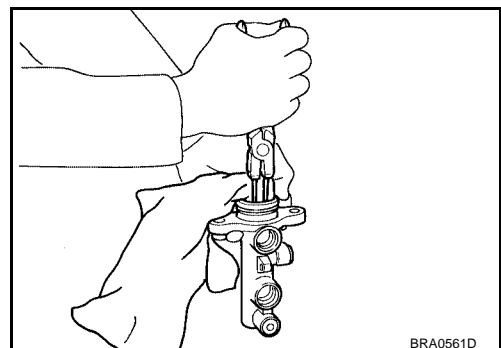
Be careful not to damage the inner wall of the cylinder.



6. Press in the primary piston and remove the snap ring.
7. Holding the rod of the primary piston, remove the primary piston assembly, the plate and the guide. Pull components straight out of the cylinder to prevent damage to the inner wall of the cylinder.
8. Remove the plate and guide from the primary piston.

CAUTION:

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



INSPECTION AFTER DISASSEMBLY

Master cylinder

Check master cylinder inner wall for pin holes and scratches. Replace if damaged.

Piston

Check the piston cup for damage. Replace the piston if damage is found.

ASSEMBLY

CAUTION:

- Never use mineral oils such as kerosene or gasoline during the cleaning and assembly process.
- Make sure there is no foreign material such as dirt and dust on the inner cylinder wall, piston and cup seal.

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MASTER CYLINDER

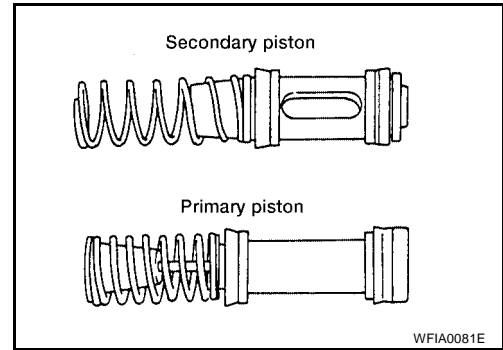
- Be careful not to damage the parts with a service tool when assembling.
- Do not drop parts. Do not use dropped parts.

2WD Models and 4WD models with MT

1. Insert secondary piston assembly. Then insert primary piston assembly.

CAUTION:

Pay attention to direction of piston cups in figure. Also, insert pistons squarely to avoid scratches on cylinder bore.



2. Install stopper cap.

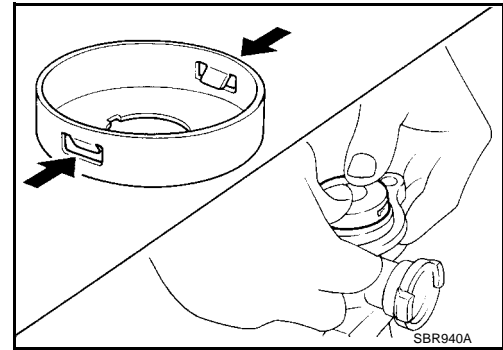
NOTE:

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. If necessary, install pressure switch (2WD models).

Pressure switch : 7.91 - 11.30 N·m (0.8 - 1.2 kg·m, 6 - 9 ft·lb)

6. If necessary, install brake fluid level switch.



4WD models with AT and VDC

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

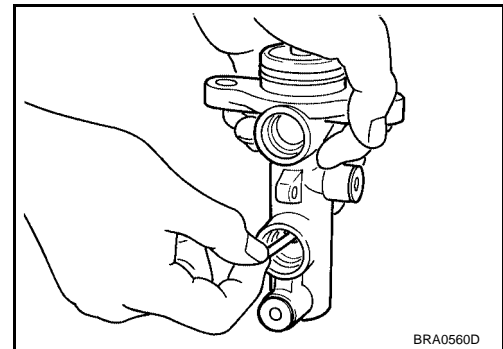
CAUTION:

- Pay attention to direction of piston cups. Also, insert pistons squarely to avoid scratches on cylinder bore.
- Always replace the inner kit as an assembly.

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

CAUTION:

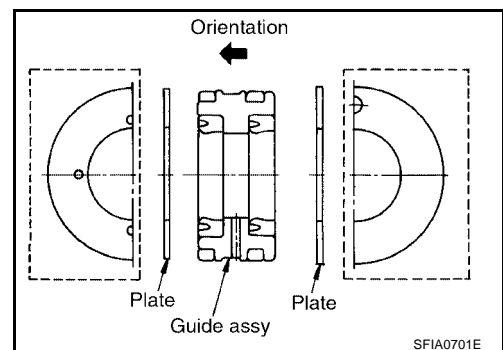
Always replace the piston pin O-ring with a new one in the repair kit.



4. Insert the plates and the guide into the cylinder body as shown.

CAUTION:

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

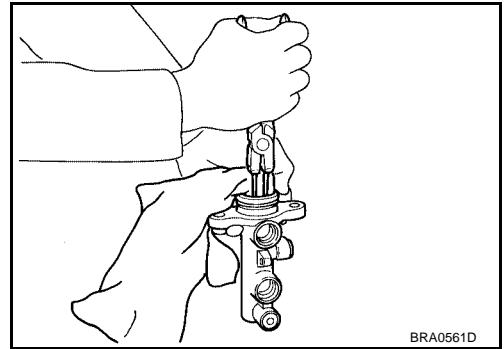


MASTER CYLINDER

5. Press in the primary piston and install a new snap ring.

CAUTION:

- Make sure snap ring is fully inserted in the snap ring groove.
- Do not reuse snap ring.



6. Tighten the cylinder body flange in a vise as shown.

CAUTION:

- Pay attention to the orientation of the master cylinder body.
- Use a copper plate to protect the body in the vise.

7. Apply brake fluid to new grommets and install them into the master cylinder.

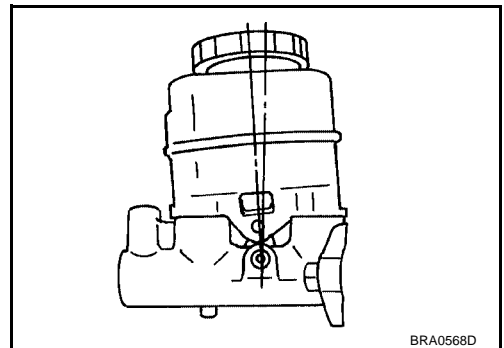
CAUTION:

Do not reuse grommets.

8. Install a new reservoir tank to the master cylinder.

CAUTION:

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

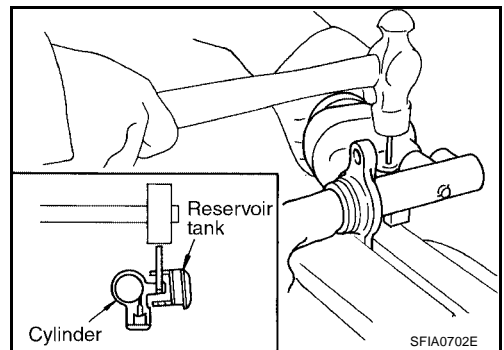


9. Install spring pin to hold reservoir tank to cylinder body.

10. If necessary, install pressure sensor.

**Pressure sensor : 25 - 30 N·m (2.0 - 3.1 kg·m,
15 - 23 ft-lb)**

11. If necessary, install brake fluid level switch.



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BRAKE BOOSTER

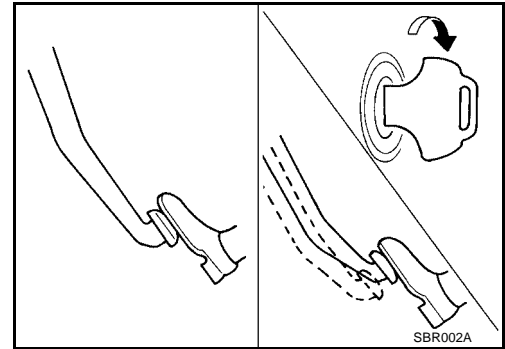
PFP:47200

BRAKE BOOSTER

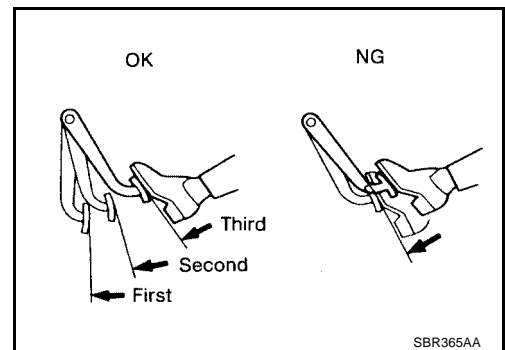
On-vehicle Service OPERATING CHECK

EFS003FN

- Depress brake pedal several times with engine off. After exhausting vacuum, make sure there is no change in pedal stroke.



- 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. Booster is airtight if pedal stroke is less each time.
- 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**.

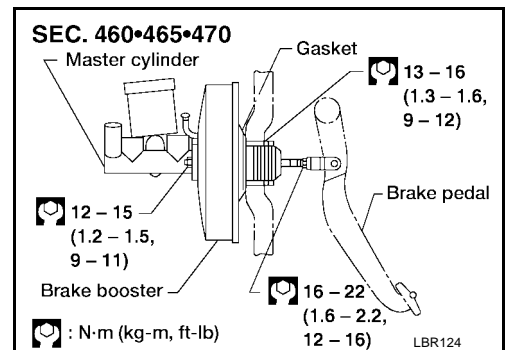
Removal and Installation

REMOVAL

EFS003FO

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.

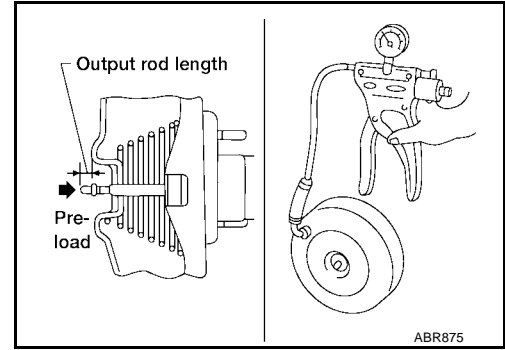


BRAKE BOOSTER

INSPECTION AFTER REMOVAL

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 (2.0 kg, 4.4 lb) to output rod length.
3. Check output rod length.

Output rod length : **10.275 - 10.525 mm (0.4045 - 0.4144 in)**

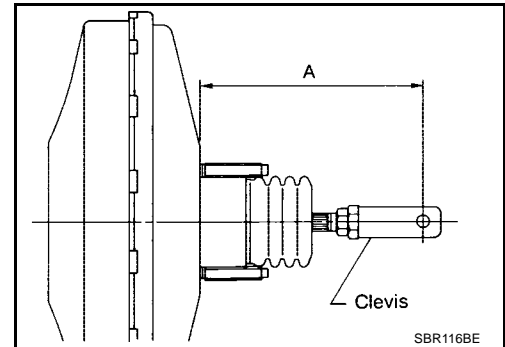


INSTALLATION

CAUTION:

- Be careful not to deform or bend brake pipes during installation of booster.
- Replace clevis pin if damaged.
- Refill with new brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Take care not to damage brake booster mounting bolt thread when installing. Due to the narrow angle of installation, the threads can be damaged by the dash panel.

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KA24DE : **160 mm (6.30 in)**
VG33E and VG33ER : **165 mm (6.50 in)**



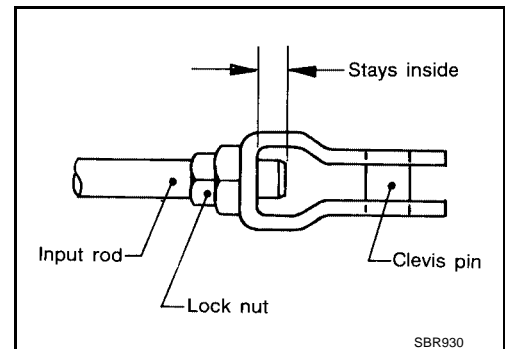
1. Before fitting booster, temporarily adjust clevis to dimension shown.
2. Fit booster, then secure mounting nuts (brake pedal bracket to brake booster) lightly.
3. Connect brake pedal and booster input rod with clevis pin.
4. Secure brake booster nuts.

Brake booster nuts : **13 - 16 N·m (1.3 - 1.6 kg·m, 9 - 12 ft·lb)**

5. Install master cylinder. Refer to [BR-14, "INSTALLATION"](#).
6. Adjust brake pedal height and free play. Refer to [BR-8, "Adjustment"](#).
7. Secure lock nut for clevis.

Lock nut : **16 - 22 N·m (1.6 - 2.2 kg·m, 12 - 16 ft·lb)**

8. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#).



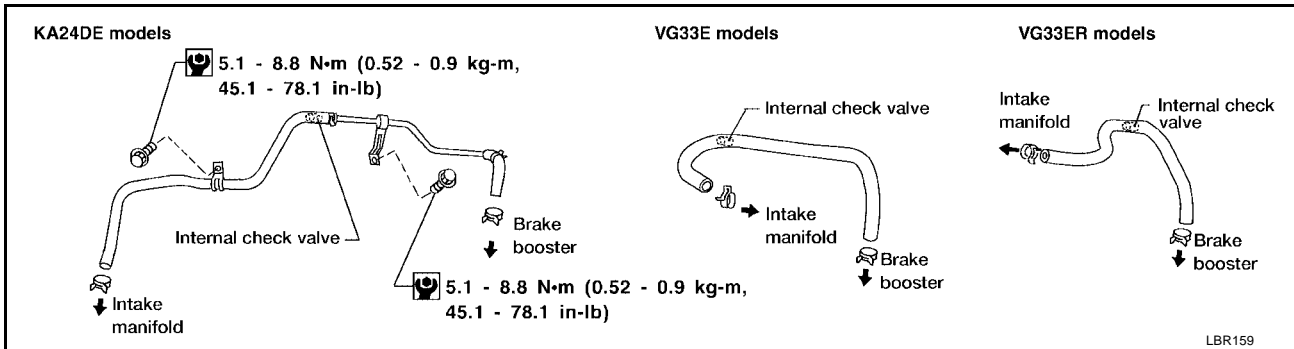
VACUUM LINES

PF:41920

VACUUM LINES

Removal and Installation

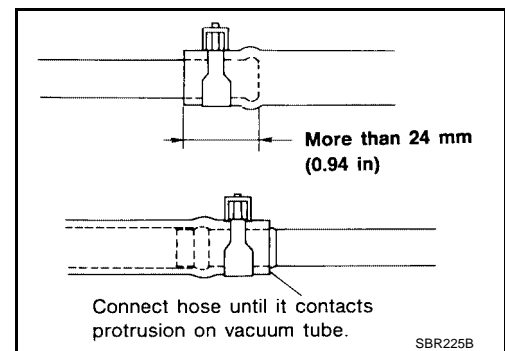
EFS003FP



CAUTION:

When installing vacuum hoses, 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, paying attention to its direction.



VACUUM LINES

EFS003FQ

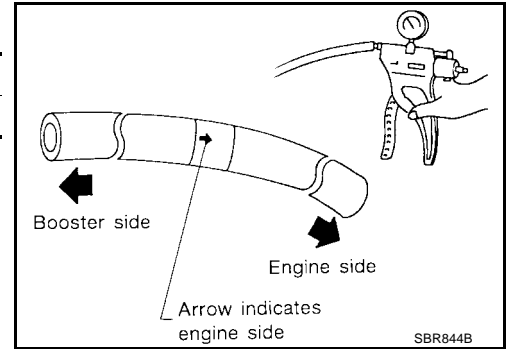
Inspection VISUAL INSPECTION

Check vacuum lines and connections for airtightness, improper attachment, chafing and deterioration.

CHECK VALVE INSPECTION

Check vacuum with a vacuum pump.

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



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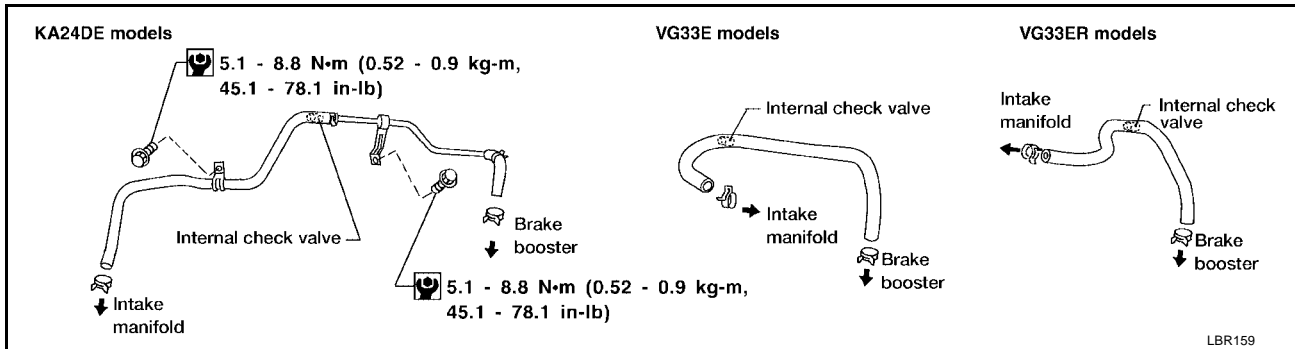
VACUUM PIPING

VACUUM PIPING

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Vacuum Hose

EFS003FR



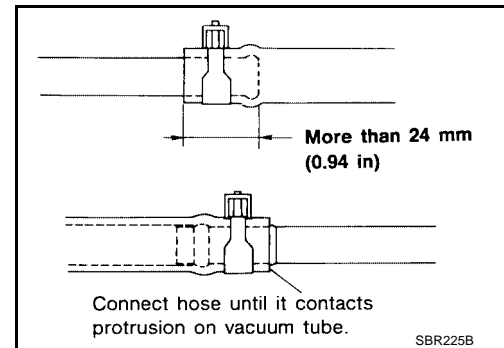
Removal and Installation

EFS003FS

CAUTION:

When installing vacuum hoses, 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, paying attention to its direction.



VACUUM PIPING

EFS003FT

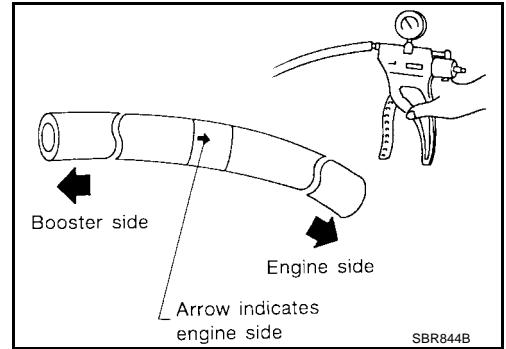
Inspection HOSES AND CONNECTORS

Check vacuum lines and connections for airtightness, improper attachment, chafing and deterioration.

CHECK VALVE

Check vacuum with a vacuum pump.

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



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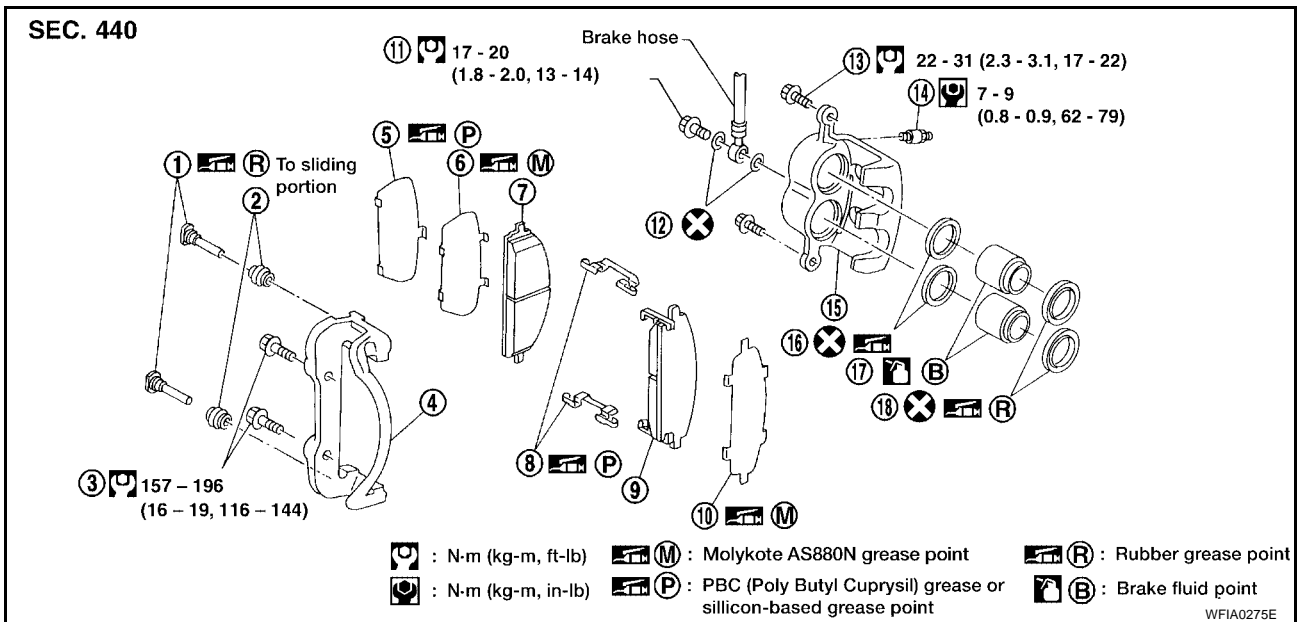
FRONT DISC BRAKE

FRONT DISC BRAKE

PFP:41000

Components

EFS003FU



- | | | |
|-------------------|-----------------------------|------------------------------|
| 1. Main pin | 2. Pin boot | 3. Torque member fixing bolt |
| 4. Torque member | 5. Shim cover (if equipped) | 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 |

Pad Replacement

EFS003FV

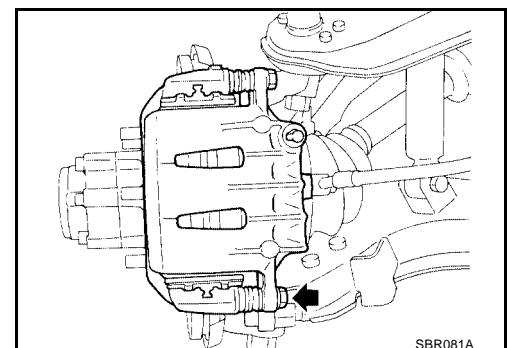
WARNING:

Clean brakes 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, or piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.
- If shims are rusted or show peeling of the rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to [BR-28, "Brake Burnishing Procedure"](#).

1. Remove reservoir cap.
2. Remove lower main pin bolt.



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FRONT DISC BRAKE

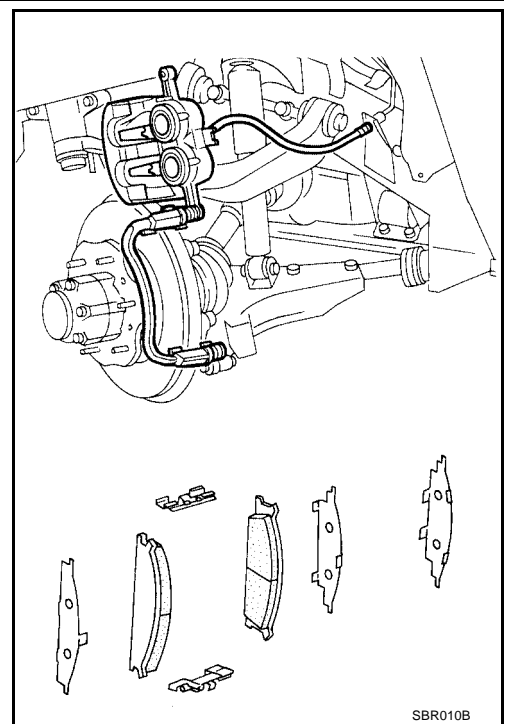
3. Rotate cylinder body upward. Remove pad retainers, inner and outer shims and shim cover (if equipped).

Standard pad thickness : 10 mm (0.39 in)

Pad wear limit : 2.0 mm (0.079 in)

CAUTION:

Carefully monitor brake fluid level because brake fluid will return to reservoir tank when pushing back pistons.



Caliper Removal and Installation

REMOVAL

EFS003FW

WARNING:

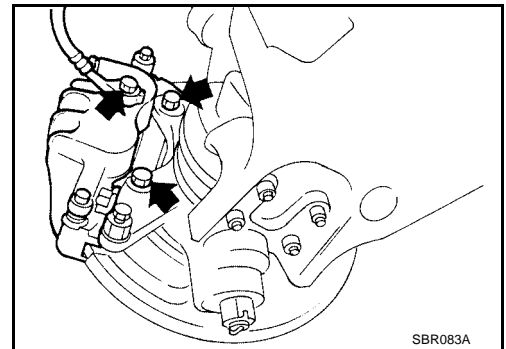
Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

Suspend caliper assembly with wire so as not to stretch brake hose. Remove torque member fixing bolts and connecting bolt.

NOTE:

It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.



INSTALLATION

CAUTION:

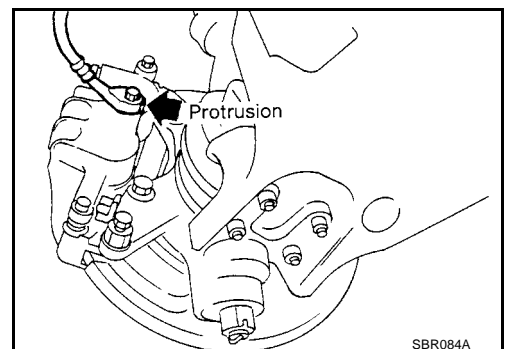
- Refill with new brake fluid "DOT 3".
 - Never reuse drained brake fluid.
1. Install caliper assembly and brake hose. Align protrusion on brake hose with slot on caliper assembly.

Torque member fixing bolts

KA24DE models : 72 - 97 N·m (7.3 - 9.9 kg·m, 53 - 72 ft·lb)

VG33E and VG33ER models : 157 - 196 N·m (16 - 19 kg·m, 116 - 144 lb·ft)

Connecting bolt : 17 - 20 N·m (1.8 - 2.0 kg·m, 13 - 14 lb·ft)



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FRONT DISC BRAKE

2. Bleed air. Refer to [BR-10, "Bleeding Brake System"](#).

Caliper Disassembly and Assembly DISASSEMBLY

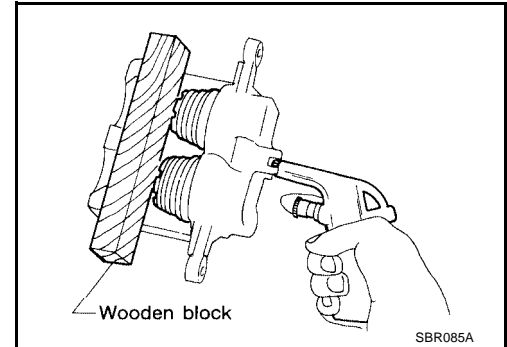
EFS003FX

WARNING:

Do not place your fingers in front of piston.

CAUTION:

- Do not scratch or score cylinder wall.
 - CL28VD type front disc brake uses plastic pistons. Handle them carefully.
1. Push out piston and dust covers with compressed air. Use a wooden block so that both pistons come out evenly.
 2. Remove piston seal with a suitable tool.



INSPECTION AFTER DISASSEMBLY

Cylinder Body

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

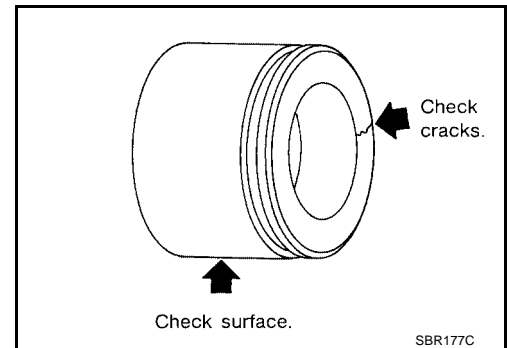
CAUTION:

Use brake fluid to clean. Never use mineral oil.

Piston

CAUTION:

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



Main Pin, Main Pin Bolt and Pin Boot

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

FRONT DISC BRAKE

DISC ROTOR INSPECTION

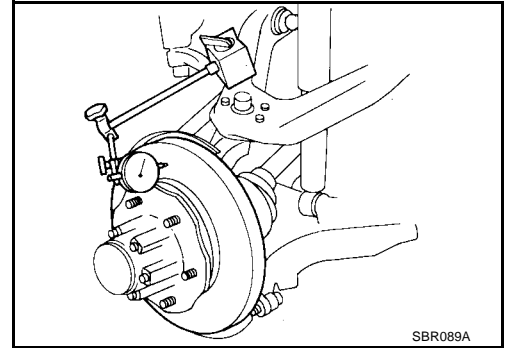
Runout

1. Check rotor runout using a dial indicator.

Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to [FAX-5, "Front Wheel Bearing"](#).

Maximum rotor runout : 0.07 mm (0.0028 in)

2. If the rotor runout is out of specification, find minimum rotor runout position as follows:
 - a. Remove nuts and rotor from wheel hub.
 - b. Shift the rotor one hole and secure rotor to wheel hub with nuts.
 - c. Measure runout.
 - d. Repeat steps a. to c. so that minimum rotor runout position can be found.
3. If the rotor runout is still out of specification, turn rotor with on-car brake lathe ("MAD, DL-8700", "AMMCO 700 and 705" or equivalent).



Thickness

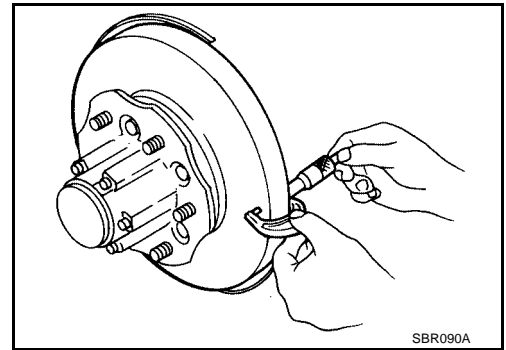
Thickness variation (At least 8 positions) : Maximum 0.02 mm (0.0008 in)

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

Rotor repair limit

KA24DE model : 24.0 mm (0.945 in)

VG33E and VG33ER models : 26.0 mm (1.024 in)

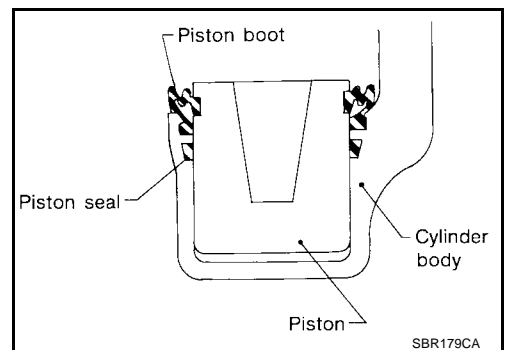
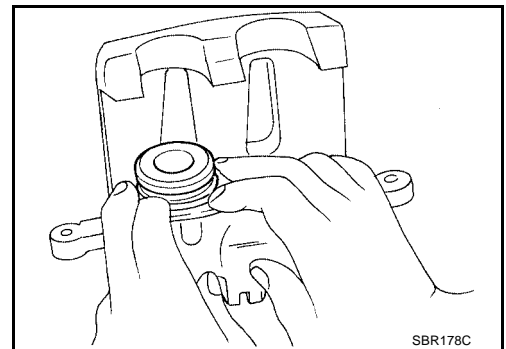


ASSEMBLY

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. Properly secure piston boot.

CAUTION:

- Secure dust seal properly.
- Lubricate with new brake fluid before installing pistons into cylinder body.



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FRONT DISC BRAKE

Brake Burnishing Procedure

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

CAUTION:

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

1. Drive the vehicle on a straight smooth road at 50 km/h (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.

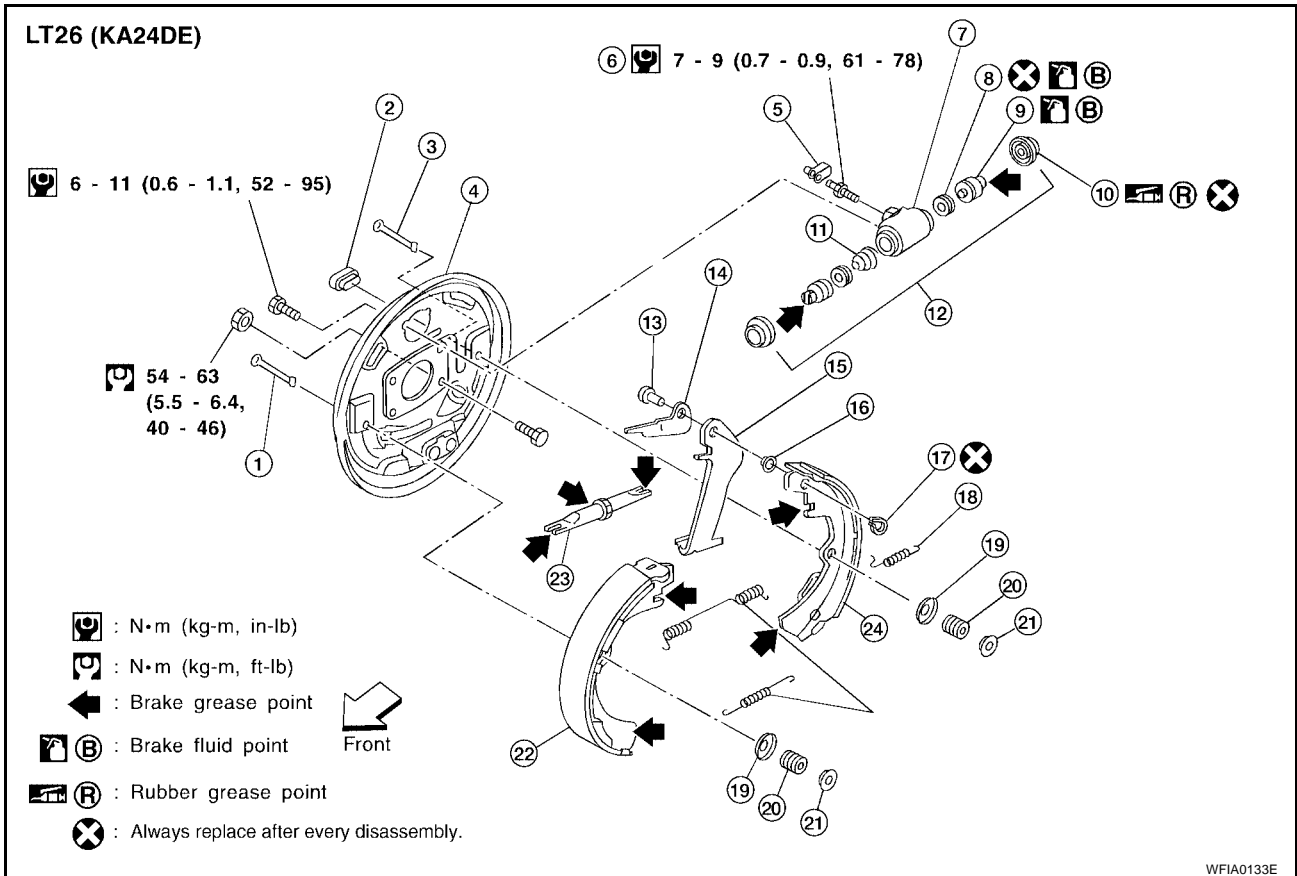
REAR DRUM BRAKE

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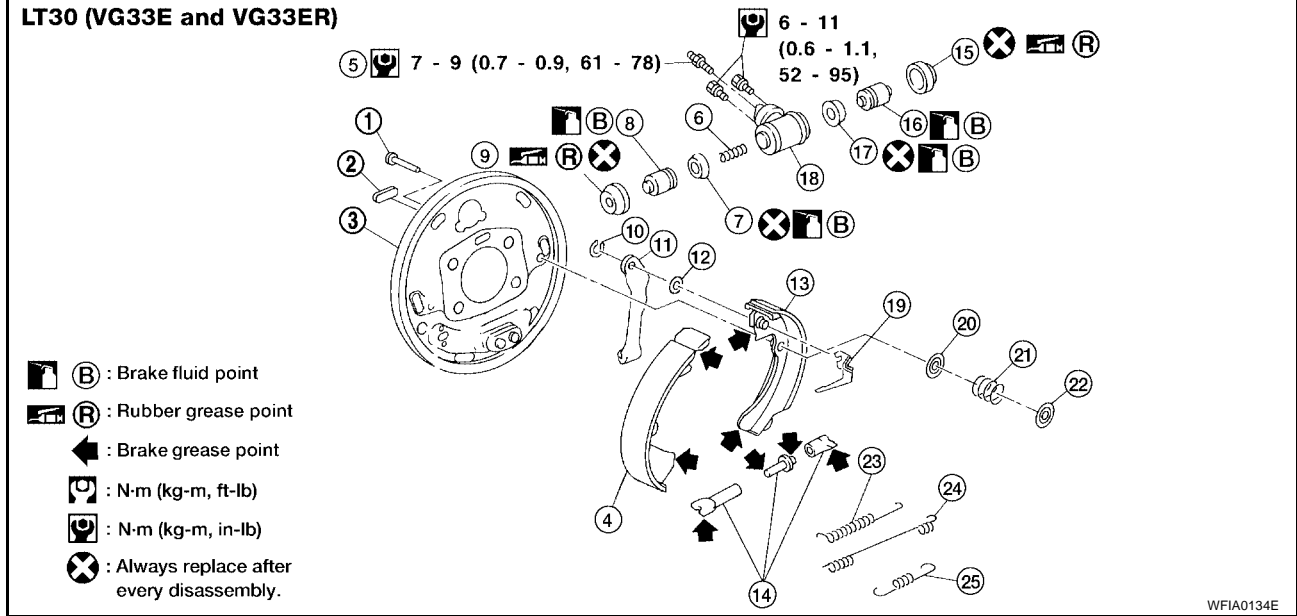
REAR DRUM BRAKE

Components



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|-------------------------|----------------------|--------------------------|
| 1. Shoe hold pin | 2. Plug | 3. Shoe hold pin |
| 4. Back plate | 5. Air bleeder cap | 6. Air bleeder |
| 7. Cylinder body | 8. Piston cup | 9. Piston |
| 10. Dust cover | 11. Spring | 12. Wheel cylinder |
| 13. Pin | 14. Adjusting lever | 15. Toggle lever |
| 16. Washer | 17. Retainer clip | 18. Retainer spring |
| 19. Spring seat | 20. Shoe hold spring | 21. Retainer |
| 22. Shoe (leading side) | 23. Adjuster | 24. Shoe (trailing side) |

REAR DRUM BRAKE

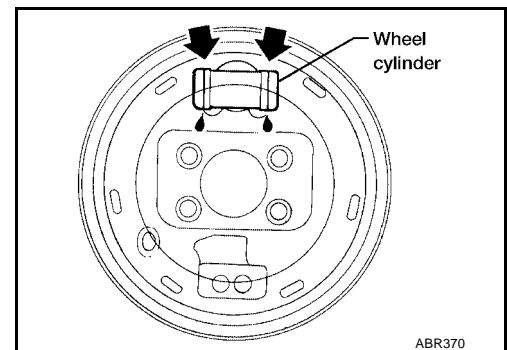


- | | | |
|---------------------------|---------------------|---------------------------|
| 1. Shoe hold pin | 2. Plug | 3. Back plate |
| 4. Shoe (leading side) | 5. Air bleeder | 6. Spring |
| 7. Piston cup | 8. Piston | 9. Boot |
| 10. Retainer ring | 11. Toggle lever | 12. Wave washer |
| 13. Shoe (trailing side) | 14. Adjuster | 15. Boot |
| 16. Piston | 17. Piston cup | 18. Wheel cylinder |
| 19. Adjuster lever | 20. Spring seat | 21. Shoe hold spring |
| 22. Retainer | 23. Adjuster spring | 24. Return spring (upper) |
| 25. Return spring (lower) | | |

Inspection WHEEL CYLINDER

EFS003G0

- Check wheel cylinder for leakage.
- Check for wear, damage and loose conditions. Replace if any such condition exists.



EFS003G1

Removal and Installation REMOVAL

WARNING:

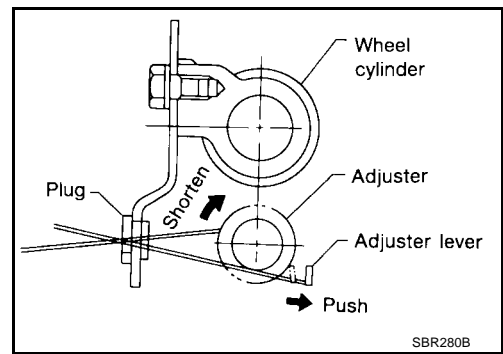
Clean brake lining with a vacuum dust collector to minimize the hazard of airborne asbestos or other materials.

CAUTION:

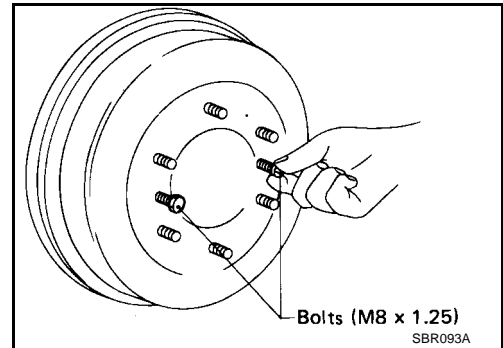
Make sure parking brake lever is released completely.

REAR DRUM BRAKE

1. Release parking brake lever fully, then remove drum.
If drum is hard to remove, the following procedures should be carried out.
 - a. Remove plug. Then shorten adjuster to make clearance between brake shoe and drum.



- b. Install two bolts as shown. Tighten the two bolts gradually.



2. After removing shoe hold pin by rotating retainer, remove leading shoe then remove trailing shoe. Remove spring by rotating shoes in direction arrow.

CAUTION:

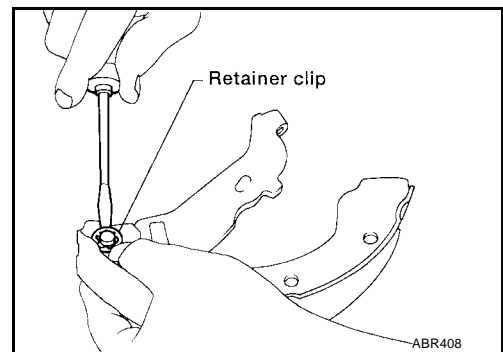
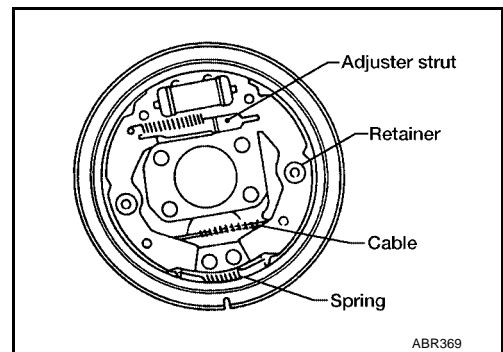
- Be careful not to damage wheel cylinder piston boots.
- Be careful not to damage parking brake cable when separating it.

3. Remove adjuster.
4. Disconnect parking brake cable from toggle lever.

CAUTION:

- Be careful not to damage parking brake cable when separating it.**

5. Remove retainer clip with a suitable tool. Then separate toggle lever and brake shoe (trailing side).



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REAR DRUM BRAKE

INSPECTION AFTER REMOVAL

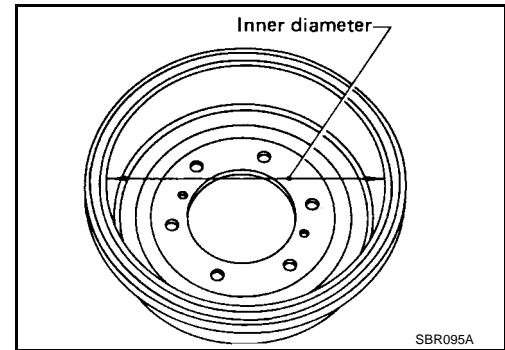
Drum

Maximum inner diameter (Repair limit)

LT26 : 261.5 mm (10.30 in)

LT30 : 296.5 mm (11.67 in)

- Contact surface should be fine finished with No. 120 to 150 emery paper.
- Using a drum lathe, lathe brake drum if it shows scoring, partial wear or stepped wear.
- After brake drum has been completely reconditioned or replaced, check drum and shoes for proper contact pattern.



Lining

Check lining thickness.

Standard lining thickness

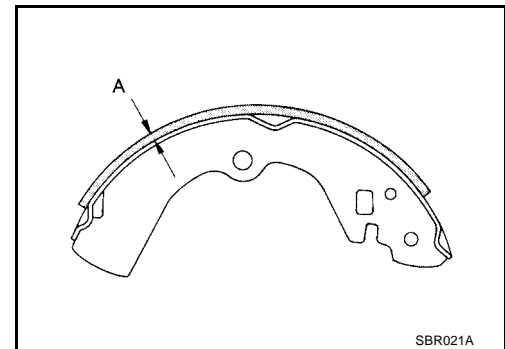
LT26 : 5.5 mm (0.217)

LT30 : 5.8 mm (0.228 in)

Lining wear limit (A)

LT26 : 1.5 mm (0.059 in)

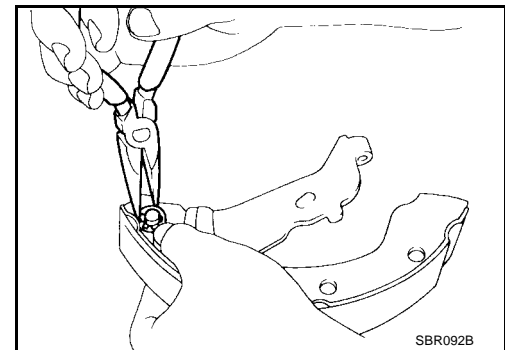
LT30 : 1.5 mm (0.059 in)



INSTALLATION

NOTE:

- Always perform shoe clearance adjustment.
 - 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-28, "Brake Burnishing Procedure"](#).
1. Fit toggle lever to brake shoe (trailing side) with retainer clip.

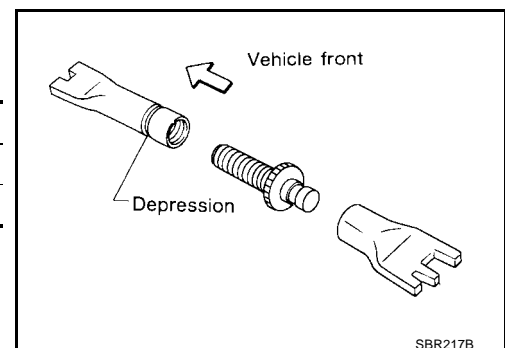


2. Shorten adjuster by rotating it.

- Pay attention to direction of adjuster.

Wheel	Screw	Depression
Left	Left-hand thread	Yes
Right	Right-hand thread	No

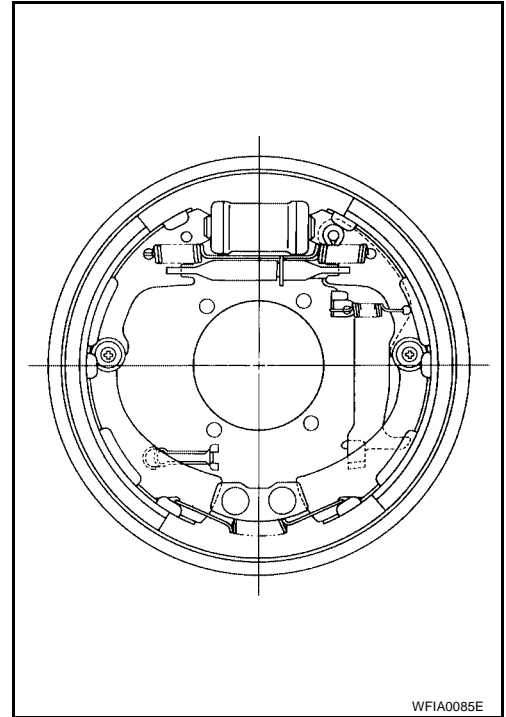
3. Connect parking brake cable to toggle lever.
4. Installation is in the reverse order of removal.



REAR DRUM BRAKE

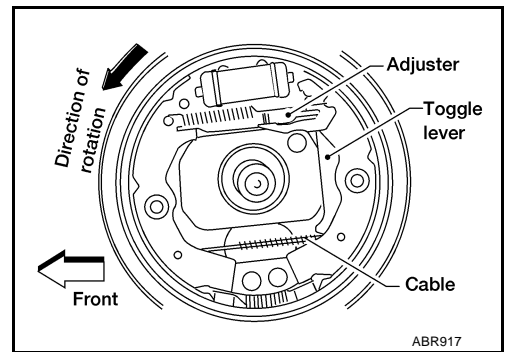
CAUTION:

Be careful not to damage wheel cylinder piston boots.



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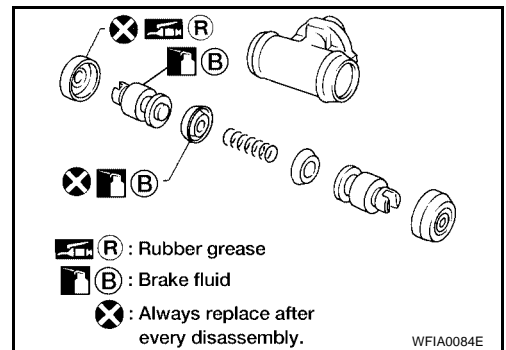
5. Adjust shoe-to-drum clearance.
6. Install brake drum.
7. When installing new wheel cylinder or overhauling wheel cylinder, bleed air. Refer to [BR-10, "Bleeding Brake System"](#).
8. Adjust parking brake. Refer to [PB-3, "Adjustment"](#).



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Wheel Cylinder Disassembly and Assembly

- Check all internal parts for wear, rust and damage. Replace if necessary.
- Pay attention not to scratch cylinder when installing pistons.



M

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EFS003G3

Unit: mm (in)

Applied model		KA24DE	VG33E and VG33ER
Front brake	Brake model	CL28VD	CL33VD
	Cylinder bore diameter × number of pistons	42.8 (1.685) × 2	46.4 (1.827) × 2
	Pad Length × width × thickness	146.6 × 48.5 × 10 (5.77 × 1.909 × 0.39)	132.0 × 52.5 × 11 (5.20 × 2.067 × 0.43)
	Rotor outer diameter × thickness	260 × 26 (10.2 × 1.02)	283 × 28 (11.4 × 1.10)
Rear brake	Brake model	LT26	LT30
	Cylinder bore diameter	22.22 (7/8)	22.22 (7/8)
	Lining length × width × thickness	249.6 × 40 × 5.5 (9.83 × 1.57 × 0.217)	296 × 50 × 6.1 (11.65 × 1.97 × 0.240)
	Drum inner diameter	260.0 (10.23)	295.0 (11.61)
Master cylinder	Bore diameter	25.40 (1)	
Brake booster	Booster model	M195T	M230T
	Diaphragm diameter	Pri: 205 (8.07) Sec: 180 (7.09)	Pri: 230 (9.06) Sec: 230 (9.06)
Recommended brake fluid		DOT 3	

Disc Brake

EFS003G4

Unit: mm (in)

Brake model		CL28VD	CL33VD
Pad	Wear limit minimum thickness	2.0 (0.079)	
	Standard pad thickness	10 (0.39)	
Rotor repair limit	Minimum thickness	24.0 (0.945)	26.0 (1.024)
Rotor runout	Maximum	0.07 (0.0028)	
Rotor thickness variation	Maximum	0.02 (0.0008)	

Drum Brake

EFS003G5

Unit: mm (in)

Brake model		LT26	LT30
Lining wear limit	Minimum thickness	1.5 (0.059)	
	Standard thickness	5.5 (0.217)	5.8 (0.228)
Drum repair limit	Maximum inner diameter	261.5 (10.30)	296.5 (11.67)
	Out-of-round limit	0.03 (0.0012)	

Brake Pedal

EFS003G6

Unit: mm (in)

Transmission		M/T	A/T
Free height "H"		191 - 201 (7.52 - 7.91)	201 - 211 (7.91 - 8.31)
Depressed height "D" [under force of 490 N (50 kg, 110 lb) with engine running]		105 (4.13)	115 (4.53)
Clearance "C" between pedal stopper and threaded end of stop lamp switch or ASCD brake switch		0.3 - 1.0 (0.012 - 0.039)	
Pedal free play	At pedal pad	1.0 - 3.0 (0.039 - 0.118)	

*: Measured from surface of metal floor to pedal pad

SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Brake Control

EFS003G7

Unit: notch

Control Type	Pedal
Pedal stroke [under force of 196 N (20 kg, 44 lb)]	5 - 6
Pedal stroke when warning switch comes on	1

Brake Booster

EFS003G8

Unit: mm (in)

Output rod length	10.275 - 10.525 (0.4045 - 0.4144)
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SERVICE DATA AND SPECIFICATIONS (SDS)
