SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

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

EFS000X5

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.

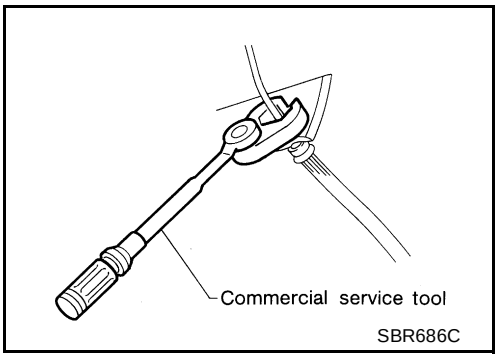
WARNING:

- **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 harness connectors.**

Precautions for Brake System

EFS000RE

- Recommended fluid is brake fluid “DOT3”.
- 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 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-9, "Brake Burnishing Procedure" .



WARNING:

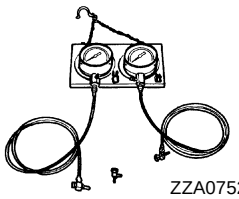
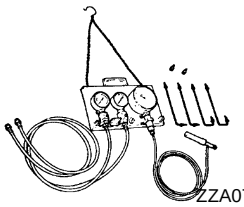
- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

PREPARATIONS

PFP:00002

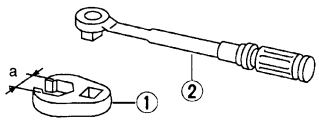
Special Service Tools

EFS000TH

Tool name Tool number		Description
Brake fluid pressure tester KV991V0010	 ZZA0752D	Brake fluid pressure measurement
Booster tester set KV991019S0 KV99101910 KV99101920 KV99101930 KV99101940 KV99101950 EG1512	 ZZA0751D	Checking brake booster function

Commercial Service Tools

EFS000XA

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

NOISE, VIBRATION, AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

EFS000TL

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

Reference page			BR-21	BR-21	BR-21	—	—	BR-23	—	—	—	BR-23	—	—	—	—	—	—	—	—
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	Drum out of round	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×									×	×	×	×	×	×	×
		Shake				×								×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×				×	×	×		×

X: Applicable

BRAKE PEDAL

PFP:46501

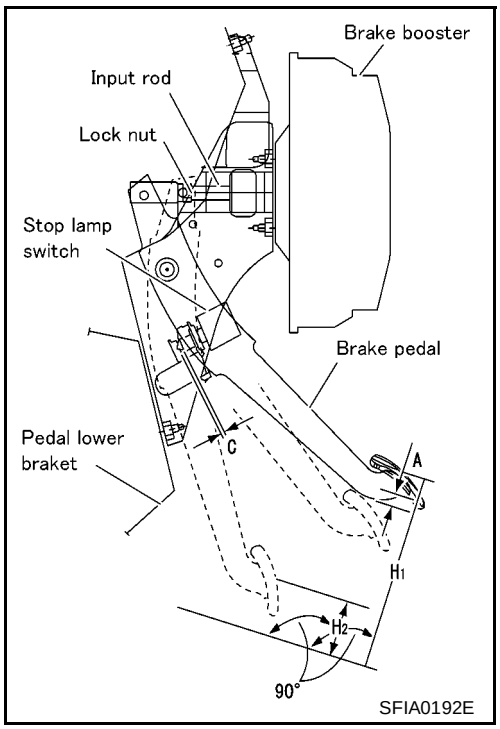
On-Vehicle Inspection and Adjustment

EFS000RG

PLAY AND CLEARANCE BETWEEN THE PEDAL AND FLOOR WHEN DEPRESSED

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

H1	**: Pedal height**	**: 174.8 - 184.8 mm (6.88 - 7.28 in) (M/T models)**
H2	**: Depressed pedal height (under a force of 490 N (50 kg) with the engine running)**	**: 80 mm (3.15 in) or more**
C	**: Clearance between stopper rubber and threaded end of stop lamp switch**	**: 0.74 - 1.96 mm (0.03 - 0.08 in)**
A	**: Pedal play**	**: 3 - 11 mm (0.12 - 0.43 in)**



ADJUSTMENT

1. Loosen the stop lamp switch by turning it counterclockwise by 45°.
2. Loosen lock nut “A” on input rod to rotate the input rod. Then, adjust and set the pedal to the specified height and tighten lock nut “A”.

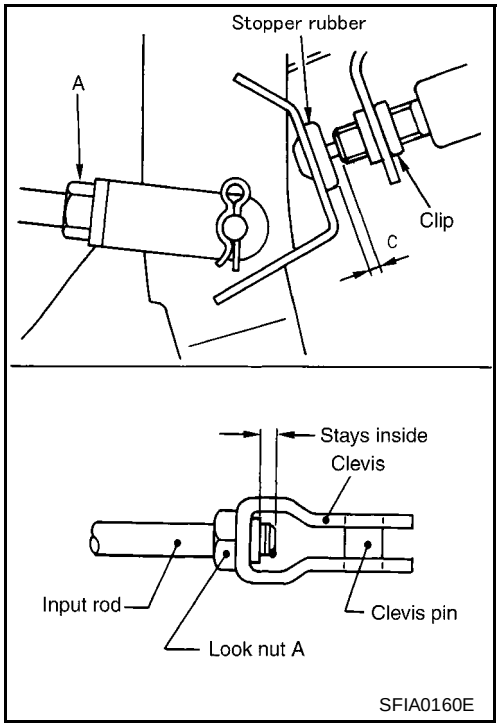
   CAUTION:
   Check that the threaded end of the input rod stays inside the clevis.

Tightening torque for lock nut “A”	**: 16 - 21 N·m (1.6 - 2.2 Kg·m,12-15 ft·lb)**

3. Pull the pedal and hold it by hand. In that condition, press the stop lamp switch until its threaded end contacts the stopper rubber.
4. With stop lamp switch's threaded end contacting the stopper rubber, rotate switch clockwise by 45° to secure.

   CAUTION:
   Confirm the clearance “C” between stopper rubber and stop lamp switch's threaded end is within the specified value.
5. Check the pedal play.

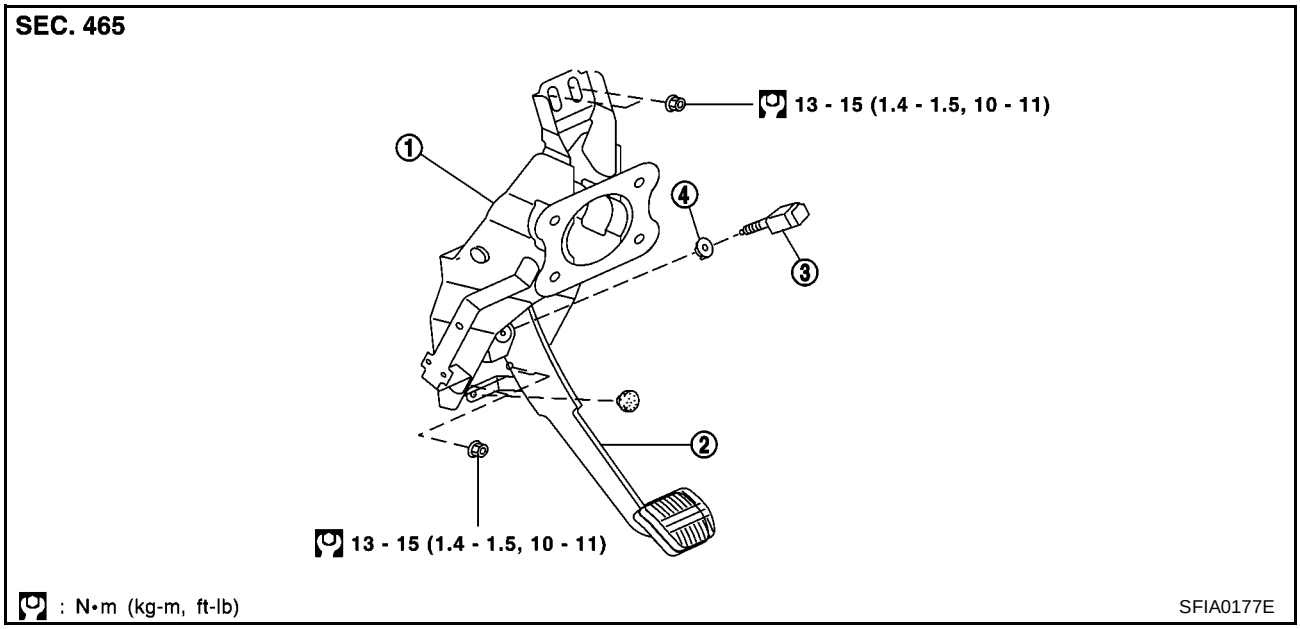
   CAUTION:
   Make sure that the stop lamps go off when the pedal is released.
6. Start the engine to check the brake pedal's depressed height.



Removal and Installation

EFS000RH

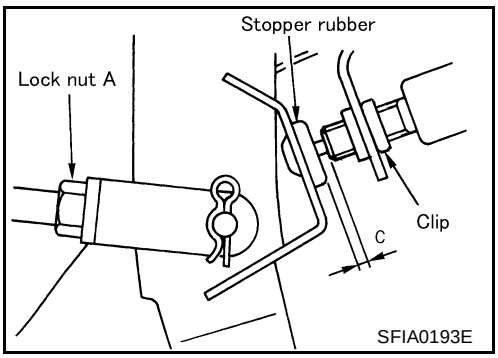
COMPONENTS



1 Pedal bracket 2 Brake pedal 3 Stop lamp switch
4 Clip

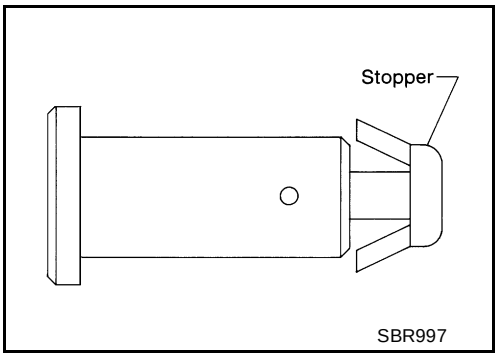
REMOVAL

1. Remove instrument panel assembly, RH-side ventilator duct, and steering member.
2. Disconnect the harness connectors of the stop lamp switch.
3. Remove the snap pin and clevis pin from the brake booster clevis.
4. Remove the nuts and bolts mounting the bracket to remove pedal assembly from vehicle.



INSPECTION AFTER REMOVAL

- Check brake pedal for bend, damage, and cracking in welded areas. Replace if necessary.
- Check clevis pin and resin stopper for damage and deformation. Replace clevis pin if necessary.



INSTALLATION

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

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

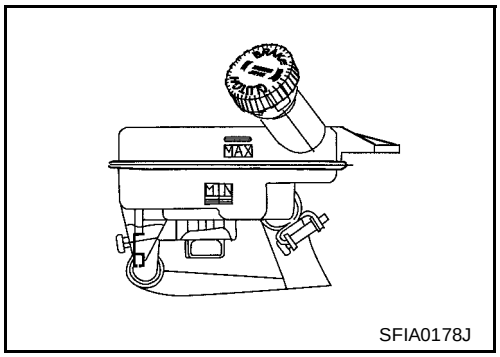
BRAKE FLUID

PFP:KN100

Checking Brake Fluid Level

EFS000X6

- Check if the fluid level in reservoir tank is within the specified range (MAX - MIN level).
- Visually check for leakage around reservoir tank.
- If fluid level is excessively low, check brake system for leaks.
- If warning lamp remains illuminated after parking lever is released, check brake system for fluid leakage.



SFIA0178J

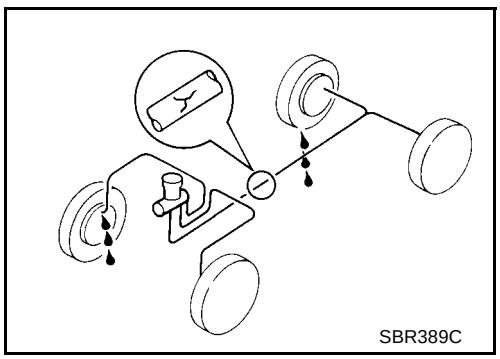
Checking Brake Line

EFS000X7

CAUTION:

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

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


SBR389C

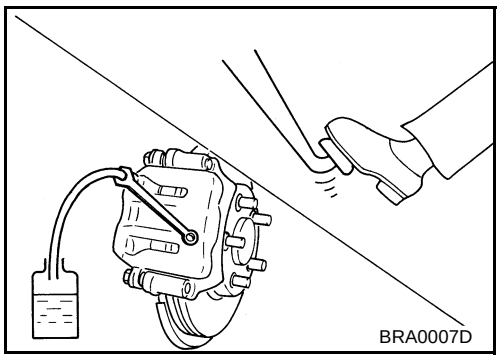
Changing Brake Fluid

EFS000RJ

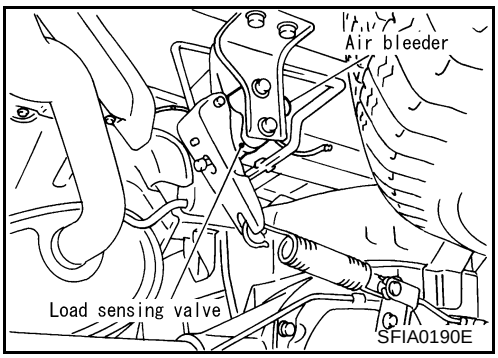
CAUTION:

- **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. Connect a vinyl tube to the air bleeder.
2. Depress the brake pedal to drain brake fluid gradually from the air bleeder of each wheel.


BRA0007D

3. Make sure that there is no foreign material in the reservoir tank, and refill with new brake fluid.
4. Connect a vinyl tube to the air bleeder.
5. Rest foot on brake pedal. Loosen air bleeder. Slowly depress pedal until it stops. Tighten air bleeder. Release brake pedal. Repeat this process a few times, then pause to add new brake fluid to master cylinder. Continue until new brake fluid flows out. For air bleeding operation, refer to BR-9, "Bleeding Brake System" .



Brake Burnishing Procedure

EFS000X9

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.

Bleeding Brake System

EFS000RK

CAUTION:

- **Carefully monitor brake fluid level at master cylinder during bleeding operation.**
- **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.**
- **Bleed air in the following order. Right rear brake → Left front brake → Left rear brake → Right front brake**

1. Clean reservoir tank inside, and fill it with new brake fluid.
2. Connect brake tube to air bleeder tube of load sensing valve and loosen the air bleeder.
3. With brake pedal depressed, loosen air bleeder and bleed air.
4. Slowly depress the brake pedal to its full stroke and release. Repeat this until the new brake fluid comes out at an interval of 2 or 3 seconds. Then, close the air bleeder with the brake pedal depressed.
5. Depress pedal several times and hold the pedal depressed. Loosen the air bleeder of load sensing valve to bleed air, then quickly tighten the bleeder.
6. Tighten the air bleeder to the specified torque.

   : 5.9 - 7.8 N·m (0.6 - 0.8 kg·m,52 - 69 in·lb)

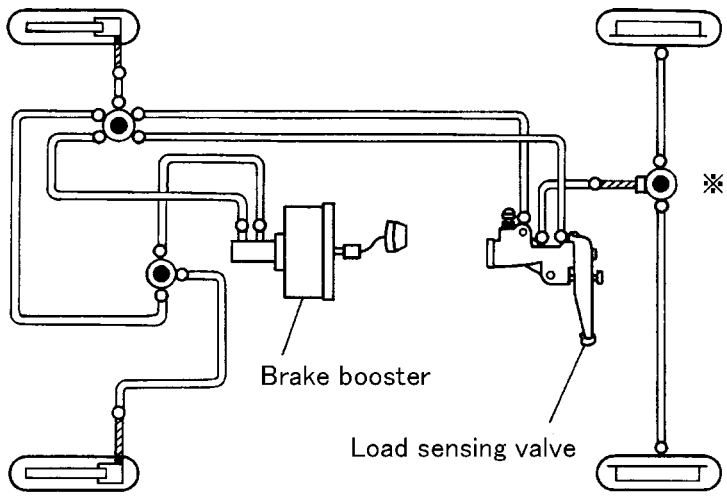
7. Repeat steps 1 - 6. Occasionally refill master cylinder reservoir tank. Be sure to keep it at least half-full.

BRAKE PIPING AND BRAKE HOSE

PFP:46210

Hydraulic Piping

EFS000RN



⚌	: Brake tube	
⚍	: Brake hose	
■	: Connecting bolt	17–19 N·m (1.7–2.0 kg·m, 13–14 ft·lb)
○	: Flare nut	15–17 N·m (1.5–1.8 kg·m, 11–12 ft·lb)
◉	: Mounting bolt	5.10–8.81 N·m (0.52–0.90 kg·m, 46–78 in·lb) ※ 8–10 N·m (0.8–1.1 kg·m, 70–95 in·lb)
□	: Brake hose	15–17 N·m (1.5–1.8 kg·m, 11–12 ft·lb)

SFIA0237E

CAUTION:

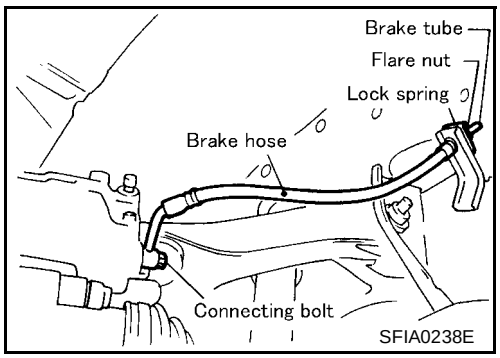
- **Avoid any twists and bends when installing.**
- **Make sure that there is no interference with other parts when turning the steering clockwise or counterclockwise.**
- **Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the parts. If any irregularity is detected, replace the part with a new one.**

Removal and Installation of Front Brake Piping and Brake Hose

EFS000RO

REMOVAL

1. Connect a vinyl tube to the air bleeder.
2. Depress the brake pedal to drain brake fluid gradually from the air bleeder of each wheel.
3. Cover the brake line connection to prevent foreign material such as dust or dirt from entering into the connection.
4. Using a flare nut wrench, remove the brake tube from the brake hose. Remove the connecting bolt, and remove the brake hose from the caliper assembly.
5. Remove the lock spring.

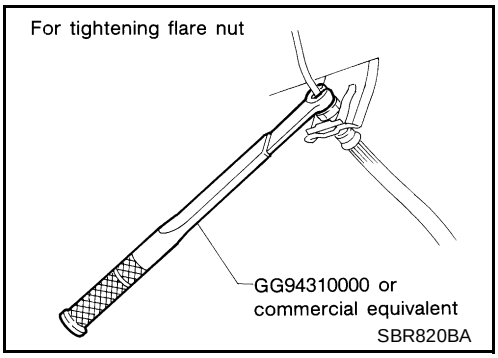


INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**
- **Discard the old copper washer; replace with a new one.**

1. Install the brake hose by aligning with the protrusion on the caliper assembly, and tightening the connecting bolts to the specified torque.
2. Install the brake hose to the brake tube on the vehicle, and temporarily tighten the flare nut by hand until it stops to install the bracket. Fix it with the lock spring, and tighten it to the specified torque.
3. After the work, bleed air. Refer toBR-9, "Bleeding Brake System".

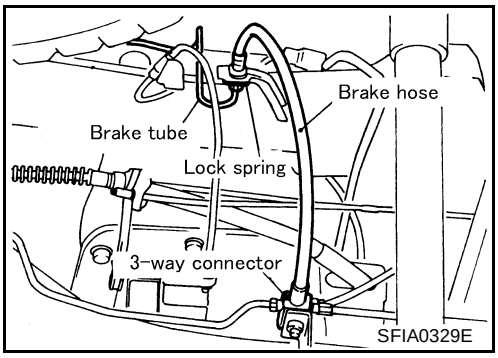


Removal and Installation of Rear Brake Piping and Brake Hose

EFS000RP

REMOVAL

1. Connect a vinyl tube to the air bleeder.
2. Depress the brake pedal to drain brake fluid gradually from the air bleeder of each wheel.
3. Cover the brake line connection to prevent foreign material such as dust or dirt from entering into the connection.
4. Using a flare nut wrench, remove flare nuts (three locations) to disconnect brake tube from brake hose.
5. Remove the lock plate.
6. Disconnect brake hose from 3-way connector.



INSTALLATION

1. Connect brake hose to 3-way connector and tighten to the specified torque.

   : 17 - 19 N·m (1.7 - 2.0 kg·m,13 - 14 ft·lb)

2. Install brake tube to brake hose, and temporarily tighten the flare nut by hand until it stops. Fix the tube with the lock plate. Tighten it to the specified torque with the brake tube torque wrench.
3. After the work, bleed air.

Inspection

EFS000RQ

CAUTION:

If leaks are found at connections, retighten or replace the damaged parts as required.

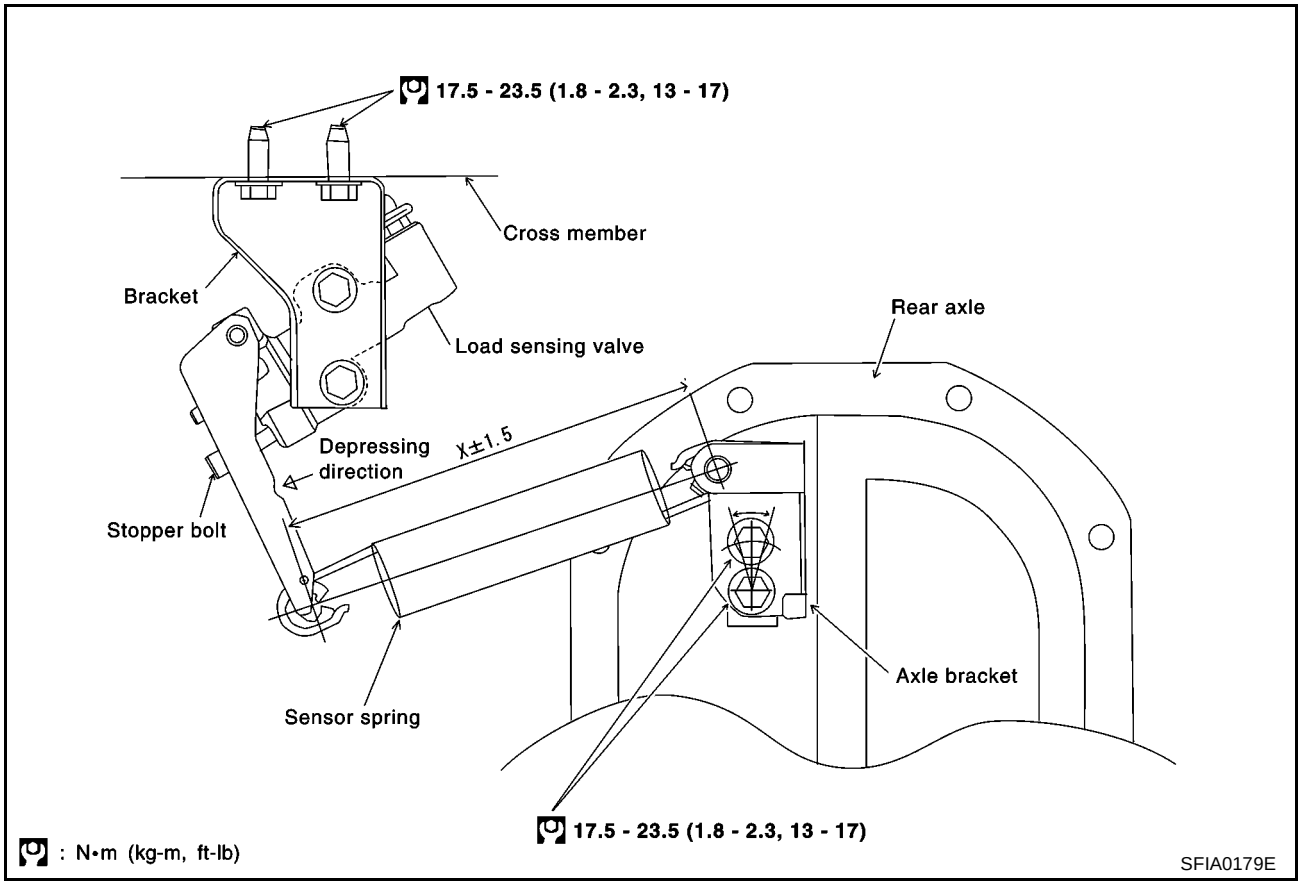
1. Check the hose, tube, connections for fluid leak, damage, twist, deformation, and interference with other parts. Also, check for loose connections.
2. While depressing the pedal under the force of 785 N (80 kg,177 lb) with the engine running for approximately 5 seconds, check for fluid leak from each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

LOAD SENSING VALVE

PFP:46400

Removal and Installation

EFS0012N



CAUTION:

- **Always use a brake tube wrench to remove brake tube. Be careful not to damage the flare nut and brake tube. Also, use brake tube torque wrench for the brake tube installation and tightening to the specified torque.**

REMOVAL

1. Drain brake fluid.
2. Cover brake line connections/openings to protect them from foreign material such as dust or dirt.
3. Using a flare nut wrench, remove flare nut on brake tube from load sensing valve .
4. Remove the mounting bolts to remove load sensing valve.

INSTALLATION

- Carefully performing the following, install in the reverse order of removal.
- After installing the load sensing valve to vehicle, perform the following: bleed air from brake line, and check mounting length “L” of sensor spring.

Inspection

EFS0012O

INSPECTION

1. With the vehicle in the unladen condition, a person should sit in the driver's seat at the rear. Then he/she should get out of the car gently. (This is to stabilize the suspension deflection.)

NOTE:

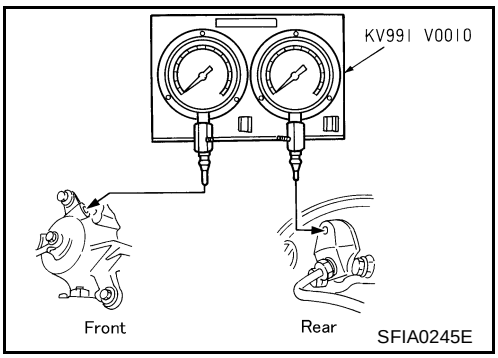
“Unladen condition”: with full coolant, lubricant, 6 to 8 litters of fuel, spare tire, jack, and hand tools loaded.

2. Press load sensing valve against stopper bolt. Check if the center-to-center length “L” between adjusting reference hole and reference pin is as specified below.

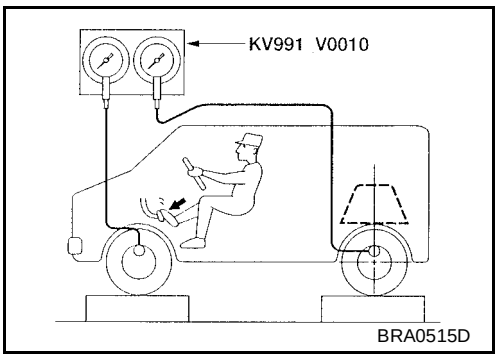
Length L : 168.5 - 171.5 mm (6.63 - 6.75 in)

- If the measurement is outside the standard, perform the following; loosen mounting bolt of sensor spring bracket. By moving sensor spring bracket, adjust so that the length “L” comes into the specified range.

3. Connect brake fluid pressure tester (special service tool) to air bleeders of front caliper and rear wheel cylinder.
4. Bleed air from brake fluid pressure tester (Special service tool).
5. With brake pedal depressed, check the fluid pressure at front caliper and rear wheel cylinder. The respective measurements should be as specified in the table below.



6. Under condition of step 2 above, adjust rear shaft weight with weights to obtain 203.4 - 206.4 mm (8.01 - 8.13 in) as length “L”. Then, check the fluid pressure as described in step 5 above. If the measurements are outside the standards, replace load sensing valve main body.



Standard

Front caliper fluid pressure MPa (kg/cm^2)	Wheel cylinder fluid pressure MPa (kg/cm^2)	
	All models	
	unladen	loaded
4.9 (50)	3.4 - 4.4 (35 - 45)	4.3 - 6.3 (58 - 78)
9.8 (100)	4.9 - 5.9 (50 - 60)	5.7 - 7.6 (58 - 78)

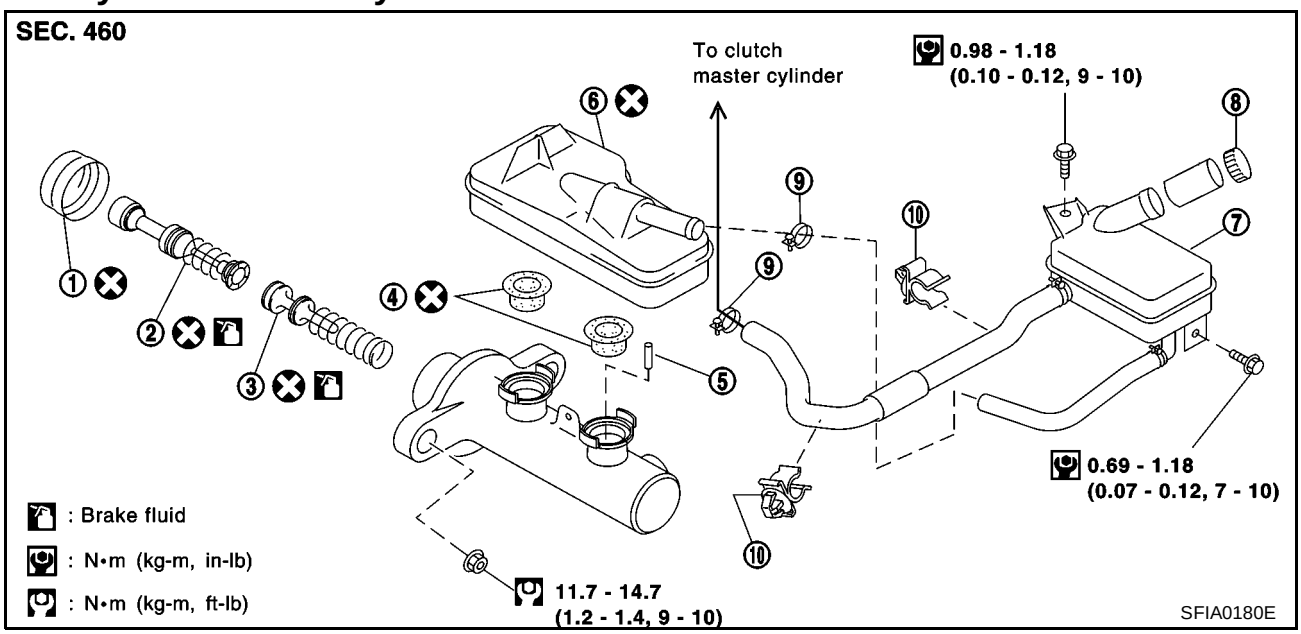
7. After inspection, remove brake fluid pressure tester (special service tool) and bleed air.

BRAKE MASTER CYLINDER

PFP:46010

Master Cylinder Assembly

EFS000RU



1	Stopper cap	2	Primary piston assembly	3	Secondary piston assembly
4	Grommet	5	Pin	6	Reservoir tank
7	Reservoir tank	8	Reservoir cap	9	Clamp
10	Clip				

REMOVAL

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

INSTALLATION

1. Connect brake tube to master cylinder assembly. Temporarily tighten the flare nut by hand.
2. Install master cylinder assembly to brake booster assembly. Tighten the mounting nuts to the specified torque.
3. Tighten the brake tube flare nut to the specified torque.

Tightening torque :15 - 17 N·m (1.5 - 1.8 kg·m,11 -1 3 ft·lb)

4. Fill up with new brake fluid, and bleed air from brake line.

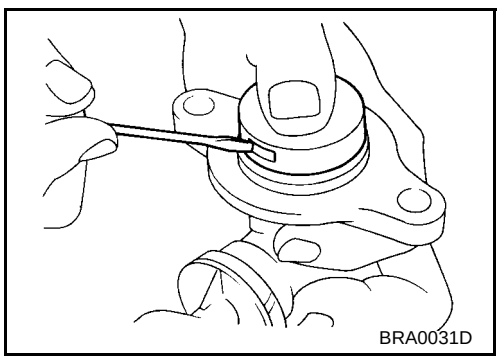
DISASSEMBLY

Models without ABS

CAUTION:

Remove master cylinder reservoir tank only when necessary.

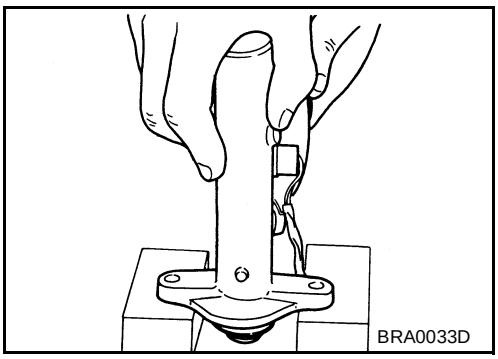
1. Using a flat-bladed screwdriver as shown in the figure, lever stopper cap tabs up and remove stopper cap. While removing, be sure to hold cap securely to prevent the master cylinder piston from popping out.



2. Draw primary piston assembly straight out without tipping it at an angle in order to avoid damaging the inner wall of the cylinder.

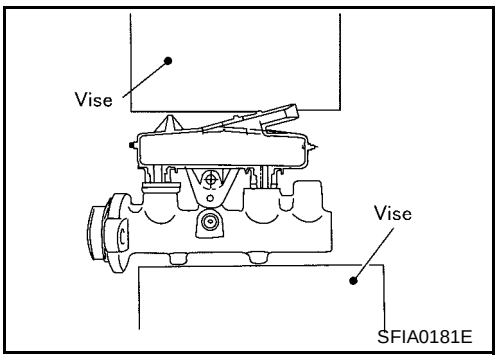
3. Lightly tap the flanged side of cylinder body against wood block or similar soft material, as illustrated. Draw out secondary piston assembly straight, avoiding damage to inner wall of the cylinder.

CAUTION:
Reservoir tank may be removed only when the removal is necessary for work.

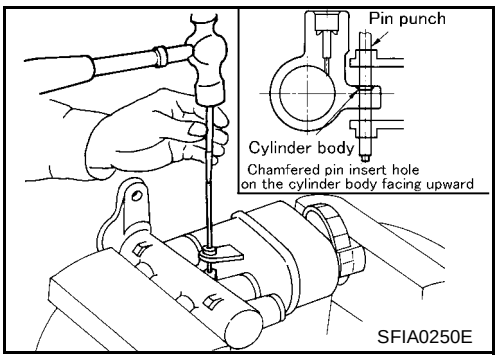


4. Support master cylinder assembly with vise, paying attention to the protrusions on the reservoir tank.
5. Secure master cylinder assembly with the vise. At this time, secure so that the pin securing reservoir tank to cylinder body does not contact the pin inserting hole on reservoir tank.

CAUTION:
- **Secure the flange onto vise with the chamfered pin insert hole on the cylinder body facing upward.**
- **When securing master cylinder assembly with vise, use maximum care not to overtighten to avoid damage.**



6. Using a pin punch {commercial service tool: diameter approx. 4 mm (0.16 in)}, remove the mounting pins on the reservoir tank.
7. Remove master cylinder assembly from the vise.
8. Remove reservoir tank and grommets from cylinder body.



INSPECTION

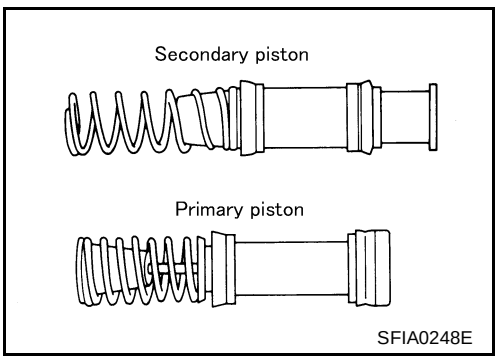
- Check cylinder inner wall for damage, wear, corrosion, pinholes. Replace if necessary.

ASSEMBLY

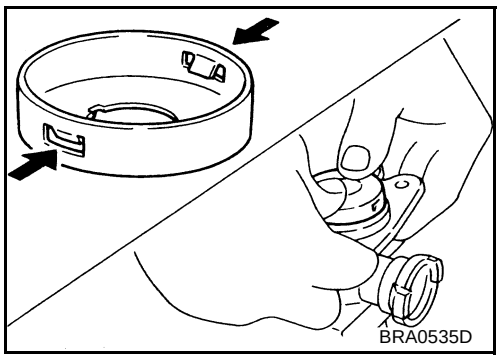
CAUTION:
- **Never use mineral oils such as kerosene or gasoline during the cleaning and assembly processes.**
- **Confirm that cylinder inner wall, piston, and cup seal are free of foreign materials, such as dirt and dust. Be careful not to damage the parts with a service tool when assembling.**
- **Do not drop parts. If any part is dropped, do not use the part.**

1. Apply brake Fluid to contact surface of the piston assembly and the cylinder's inner wall. Insert secondary piston assembly and primary piston assembly into the cylinder body in the correct order.

CAUTION:
- **Discard the old primary and secondary piston assemblies; replace with new ones.**
- **Identify the correct orientation of piston cup. Insert piston straight so that it does not catch on cylinder inner wall.**
- **Always replace the inner kit as an assembly.**



2. Hold down pistons with the stopper cap. With that condition, press stopper cap fully until its tabs engage with the groove on cylinder body. Confirm the stopper cap is securely installed.



CAUTION:
Discard the old stopper cap; replace with a new one.

3. Apply brake Fluid to grommet before pressing it into cylinder body.

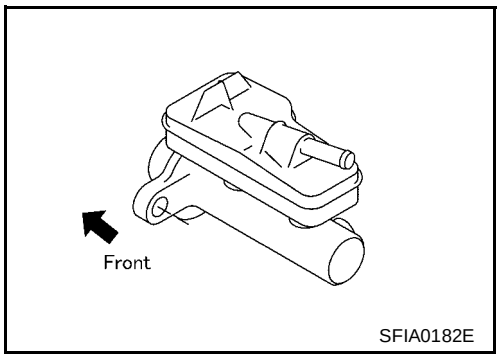
CAUTION:
Discard the old grommet; replace with a new one.

4. Install reservoir tank by pressing it into cylinder body. Install reservoir tank in the following steps:

CAUTION:
Discard the old reservoir tank; replace with a new one.

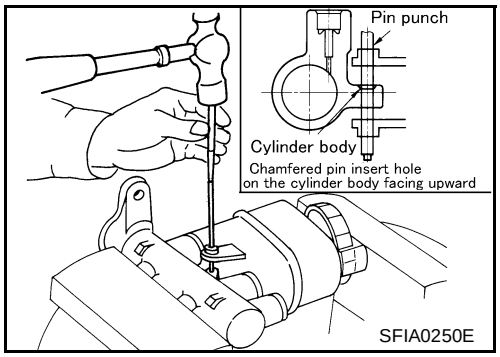
a. Support master cylinder assembly with vise according with the protrusions on the reservoir cap.

b. Set reservoir tank in the front direction as indicated by the arrow onto cylinder body. Tighten with vise until each pin inserting hole aligns with the corresponding hole.



CAUTION:
- **Secure the flange onto vise with the chamfered pin insert hole on the cylinder body facing upward.**
- **When securing master cylinder assembly with vise, use maximum care not to overtighten to avoid damage.**

c. Using a pin punch {commercial service tool: diameter approx. 4 mm (0.16in)}, remove the mounting pins on the reservoir tank.



CAUTION:
- **Discard the old reservoir tank mounting pin; replace with a new one.**
- **Make sure to insert the pin from the chamfered pin hole of the cylinder body.**

VACUUM BRAKE BOOSTER

PFP:47200

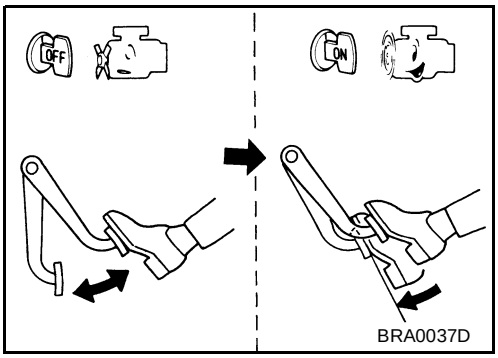
On-Vehicle Inspection and Service

EFS000RV

FUNCTION INSPECTION

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

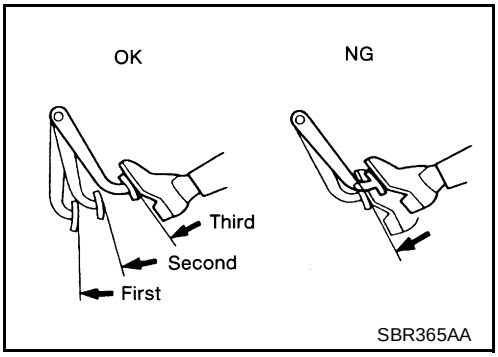
CAUTION:
Depress pedal at intervals of approximately 5 seconds.



AIRTIGHTNESS INSPECTION

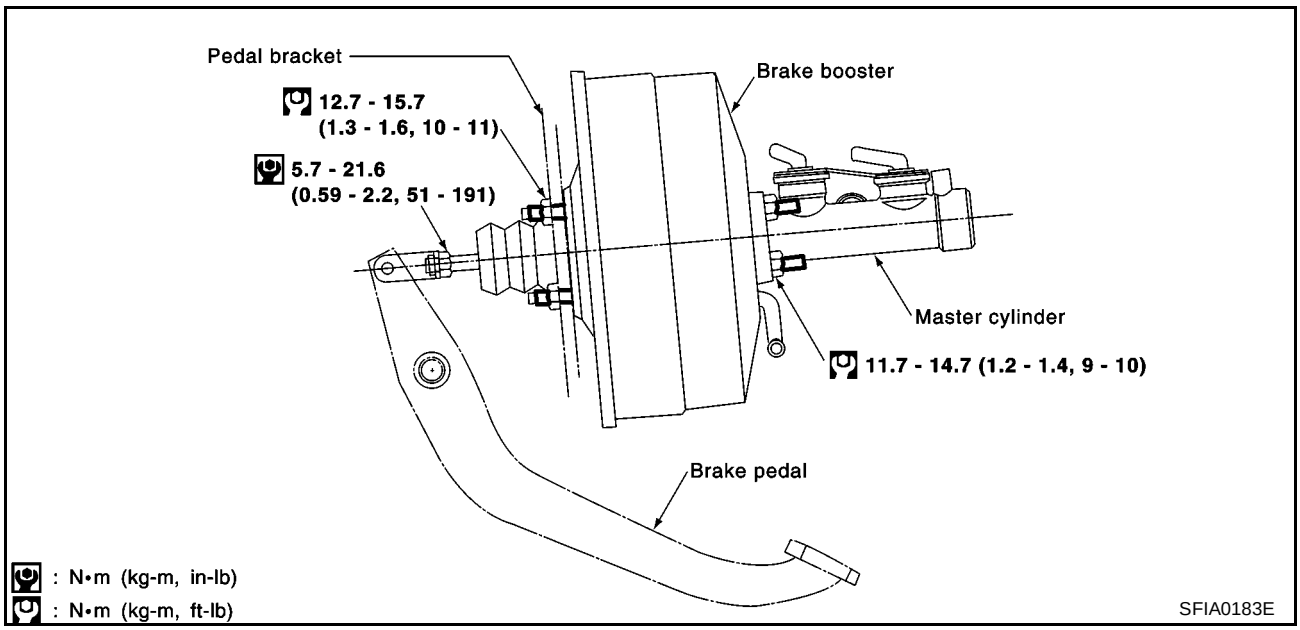
- Run the engine at idle for approximately 1 minute, and stop it after applying vacuum to the booster. Depress the brake pedal normally to change the vacuum to the atmospheric pressure. Check that distance between the brake pedal and floor panel gradually increases.

  CAUTION:
  Depress pedal at intervals of approximately 5 seconds.



Removal and Installation

EFS000RW



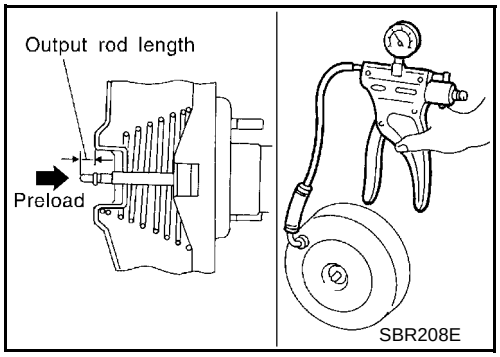
REMOVAL

1. Remove vacuum hose from brake booster.
2. Remove master cylinder.
3. Remove the snap pin and clevis pin on the clevis in the passenger compartment, and remove the input rod from the brake pedal.
4. Remove pedal bracket mounting nuts.
5. Remove the booster assembly from the engine compartment.

INSPECTION AFTER REMOVAL

Output Rod Length Inspection

1. Using a hand-held vacuum pump, apply a vacuum of -66.7 kPa (-500 mmHg) to the brake booster.
2. Place an output rod gauge (special service tool) in the master cylinder. Then, rotate the screw until the end of the gauge contacts the primary piston.
3. Turn the output rod gauge (special service tool) upside down to secure “A” and adjust it with “B” so that the clearance between the output rod and screw is 0 mm (0 in).

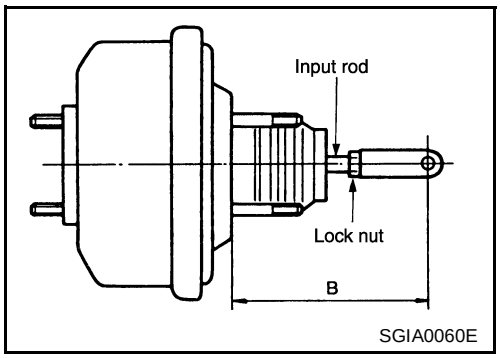


The reference value of ℓ at the negative pressure of 66.7 kPa (-500 mmHg): 1.4 mm (0.055 in)

INSTALLATION

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

Length (B) : 125.2 mm (4.93 in)



2. After adjusting “B”, temporarily tighten the lock nut to install the booster assembly to the vehicle. At this time, make sure to install a gasket between the booster assembly and the vehicle.
3. Connect the brake pedal with the clevis of the input rod.
4. Install the pedal bracket mounting nuts and tighten them to the specified torque.
5. Install the master cylinder to the booster assembly.
6. Adjust the height and play for brake pedal.
7. Tighten input rod lock nut to the specified torque.
8. Bleed air.

SERVO UNIT

Inspection

CAUTION:

- **During work, carefully check the fluid level in master cylinder reservoir tank.**
- **Refill with new brake Fluid “DOT 3.**
- **Do not spill brake fluid on painted surfaces on body. If spilled, wipe up immediately and wash the affected area –with water.**

1. Install vacuum gauge and brake fluid pressure tester of the booster tester set (special service tool).
2. Bleed air in line to the fluid pressure tester of booster tester set (special service tool).
3. Install pedal effort gauge (commercial service tool) to brake pedal.
4. Start engine. When the vacuum reaches the standard below, stop engine.

Vacuum level at brake booster [kPa (mmHg,inHg)]

KA24DE model :–66.7 kpa (–500 mmHg,–19.69 inHg)
ZD30DD model :–93.3 kpa (–700 mmHg,–27.56 inHg)

5. Check vacuum decrease for brake inactivation.

Standard: The decrease in vacuum for 15 seconds should be 3.3 kPa (25 mmHg) or less.

6. With engine stopped, bring pressure level in booster to 0 kPa (0 mmHg) (atmospheric pressure) by depressing the brake pedal several times. Then, measure the pressure generated by the fluid.

Specification

Depressing force (N kg)	Pressure generated by fluid [MPa (kg/cm^2)]
1.5 (15)	0.5 (5.0) or more
2.0 (20)	0.9 (9.0) or more

CAUTION:
The values of fluid pressure were measured for front wheel side.

7. Start engine to measure the pressure generated by the fluid during idle.

Depressing force (N kg)	Pressure generated by fluid [MPa (kg/cm^2)]
	2WD models without ABS
49 (5.0)	0.6 - 1.3 (6.0 - 14)
98 (10)	2.8 - 3.5 (28 - 36)
147 (15)	4.9 - 5.5 (49 - 57)

CAUTION:
The values of fluid pressure were measured for front wheel side.

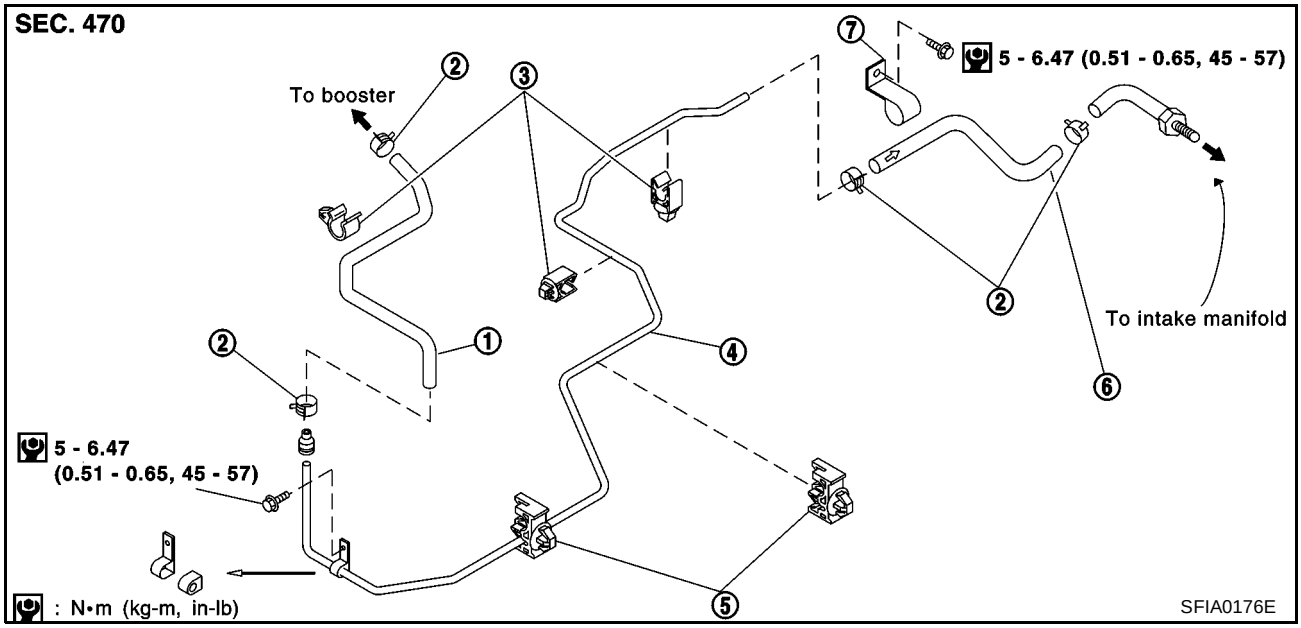
8. After measuring, remove the booster tester set, and bleed air.

VACUUM PIPING

PFP:41920

Removal and Installation

EFS000RX



1	Vacuum hose	2	Clamp	3	Clip
4	Vacuum tube	5	Clip	6	Vacuum hose
7	Clamp				

Inspection

EFS000RY

VISUAL INSPECTION

Check for improper assembly, damages and aging.

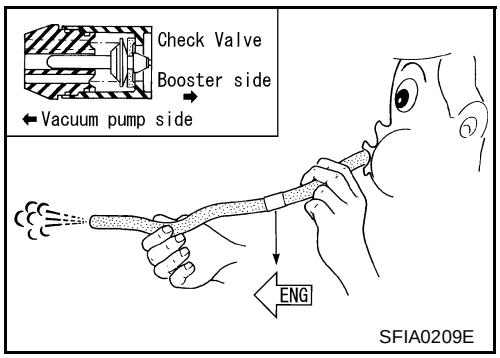
CHECK VALVE INSPECTION

Quick Inspection

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

CAUTION:

If any irregularity is detected at the vacuum hose, replace it with the check valve as a set.



Airtightness Inspection

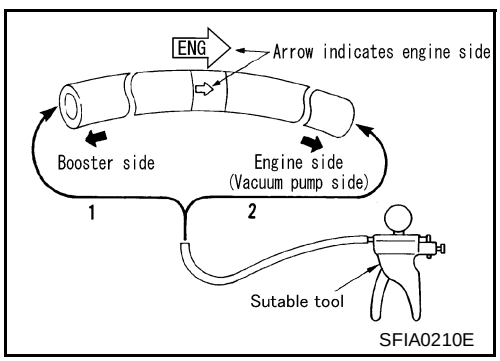
- Use a hand-held vacuum pump (commercial service tool) for checking.

When connected to the booster side 1

: Under a vacuum of -66.7 kPa (-500 mmHg), the decrease in vacuum for 15 seconds should be 1.3 kPa (10 mmHg) or less.

When connected to engine side 2

: No vacuum will be applied

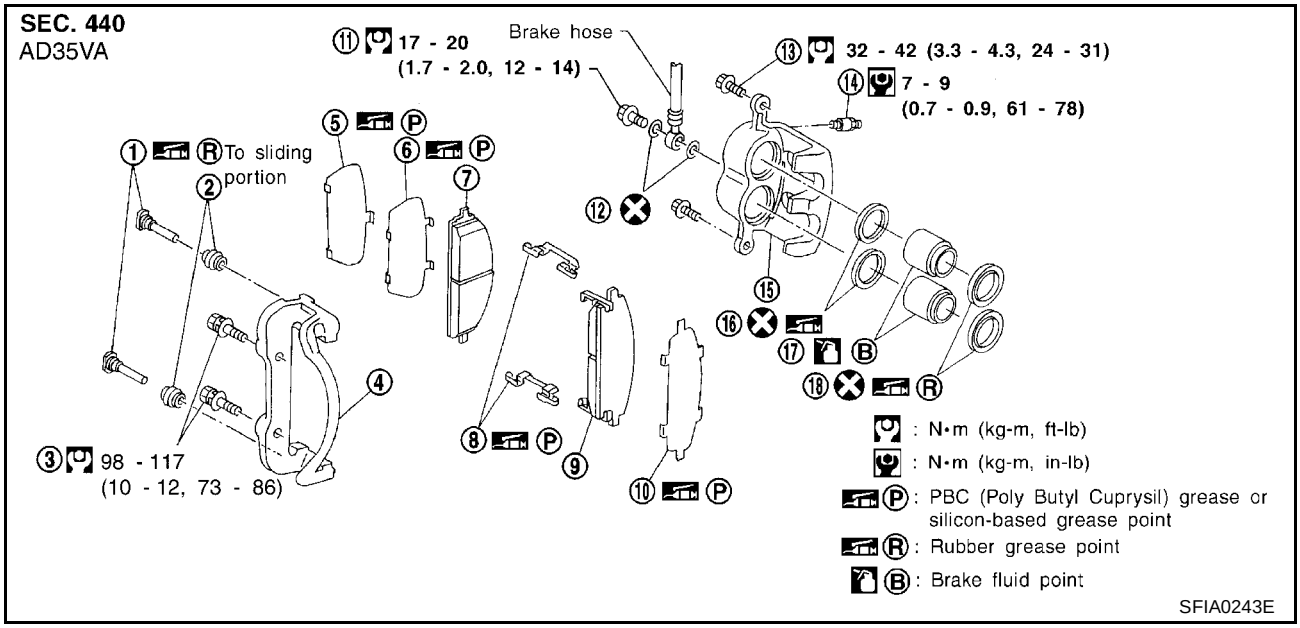


FRONT DISC BRAKE

PFP:41000

Components

EFS000RZ



1	Main pin	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 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

CAUTION:

- **Clean dust on brake caliper and pad with a vacuum dust collector. Do not blow with compressed air.**
- **Never depress brake pedal while removing cylinder body. Pistons may suddenly jump out of the cylinder body.**
- **Removal of mounting bolts on torque member and brake hose is unnecessary except for disassembly/replacement of caliper assembly. In this case, hang the cylinder body with a wire so that the brake hose is not under tension.**
- **Do not damage the piston boot.**
- **Always replace the shims and shim covers as a set when replacing the brake pads.**
- **Keep brake fluid clean of the rotor.**

On-Vehicle Inspection and Service

EFS000S0

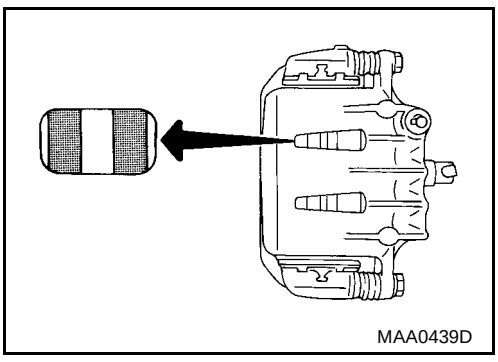
PAD WEAR INSPECTION

- Remove the wheel with the vehicle lifted to check the pad thickness from the check hole on the cylinder body. If necessary, use a scale to check.

Model AD35VA

Standard thickness : 11.0 mm (0.433 in)

Wear limit of thickness : 2.0 mm (0.079 in)



Removal and Installation of Brake Pad

EFS000S1

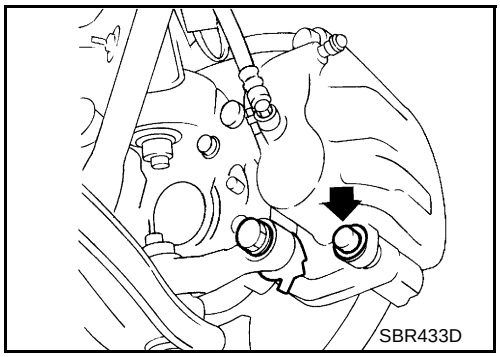
REMOVAL

CAUTION:

- **Clean dust on the caliper and brake pad with a vacuum dust collector. Do not blow with compressed air.**
- **While removing the cylinder body, never depress the brake pedal because the piston will pop out. At this time, hang the cylinder body with a wire so that the brake hose is not under tension.**
- **It is not necessary to remove the mounting bolts on the torque member and brake hose except for disassembly or replacement of the caliper assembly.**
- **If any shim is excessively corroded, replace with a new one.**
- **Always replace the inner shims, outer shims, and shim covers as a set when replacing the brake pads.**

1. Remove the lower sliding pin bolt.
2. Hang the cylinder body with a wire, and remove the pads, pad retainers, shims and shim covers.

   CAUTION:
   - **Be careful not to damage the piston boot. Do not allow brake fluid to get on the rotor.**
   - **Always replace the shims and shim covers as a set when replacing the brake pads.**



INSTALLATION

1. Install inner shim and shim cover to inner pad. And install outer shim and outer cover to outer pad.
2. Install pad retainer and pad to torque member.

   CAUTION:
   Install inner pad so that it is positioned under the sensor.
3. Install the cylinder body to the torque member.

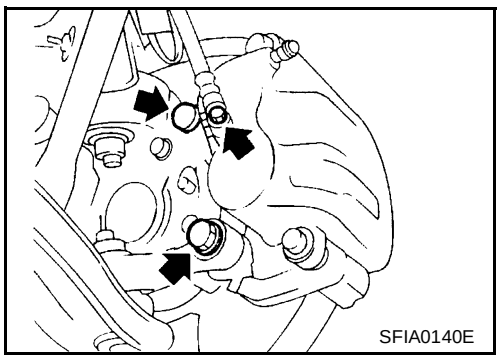
   CAUTION:
   When replacing the pads with new ones, press in the piston until the pads can be installed. In this case, carefully monitor the brake fluid level in the reservoir tank because the brake fluid will return to the reservoir tank of the master cylinder.
4. Tighten union bolt to the specified torque.
5. After installing the caliper assembly, refill with new brake fluid and bleed air.

Removal and Installation of Caliper Assembly

EFS000S2

REMOVAL

1. Connect a vinyl tube to the air bleeder.
2. Drain brake fluid gradually from the air bleeder while depressing the brake pedal.
3. Remove union bolt to disconnect brake hose from caliper assembly.
4. Remove torque member mounting bolts to remove caliper assembly from vehicle.
5. Disengage front wheel hub assembly to remove disc rotor.



INSTALLATION

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

CAUTION:
Before installing torque member to vehicle, wipe off grease on washer seat surface of knuckle spindle or steering knuckle and fitting surface on torque member.

3. Install brake hose to caliper assembly. Temporarily tighten the union bolt.

CAUTION:
- **Discard the old copper washer of union bolt; replace with a new one.**
- **Assemble the brake hose securely to the protrusion on caliper assembly.**

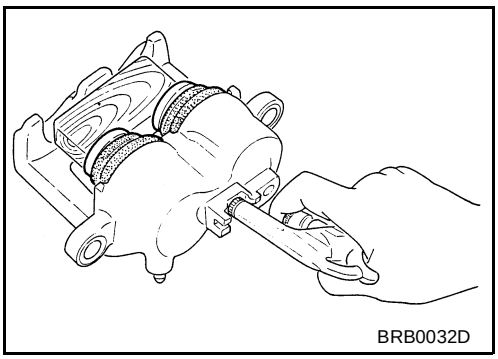
4. Tighten union bolt to the specified torque.
5. After installing the caliper assembly, refill with new brake fluid and bleed air.

Disassembly and Assembly of Caliper Assembly

EFS000S3

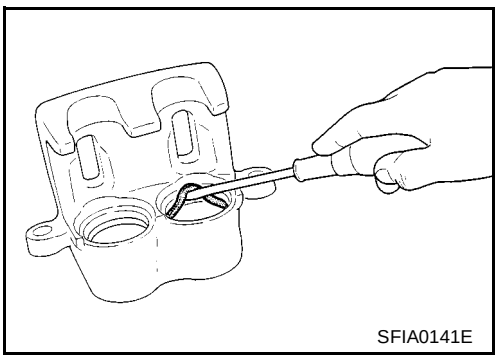
DISASSEMBLY

1. Remove caliper assembly from vehicle.
2. Remove slide pin bolts. Remove pads, shims, shim covers, and pad retainers from caliper assembly.
3. Remove slide pin and slide pin boot from torque member.
4. Place a wooden block as illustrated. Blow air from the union bolt mounting hole to remove the pistons and piston boots. If only a piston is removed, press the removed piston lightly into cylinder body and blow air again.


BRB0032D

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

CAUTION:
Be careful not to damage the inner wall of the cylinder.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CALIPER INSPECTION

Cylinder Body

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

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

Torque Member

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

Piston

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

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

Sliding Pin, Pin Bolt and Pin Boot

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

DISC ROTOR INSPECTION

Visual Inspection

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

Runout Inspection

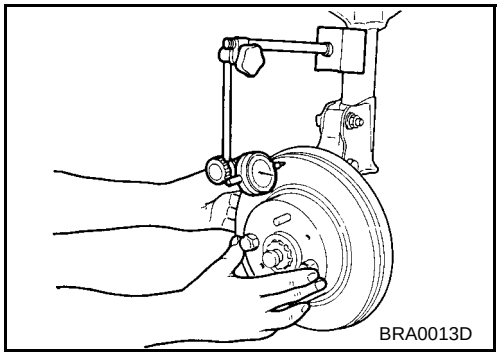
1. Using wheel nuts, fix the disc rotor to the wheel hub. (2 or more positions)
2. Use a dial gauge to check runout.

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

   Maximum runout : 0.1 mm (0.004 in) or less

   CAUTION:

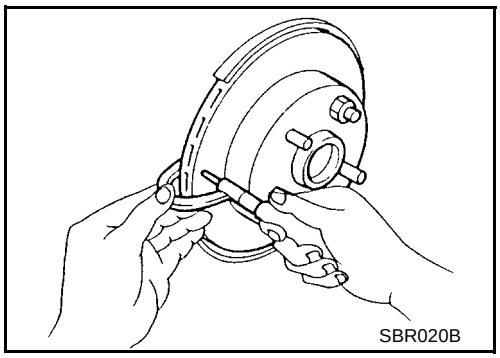
   Before measuring, make sure that the axle endplay is 0 mm (0 in).
3. If runout is outside the limit, find the minimum runout point. To do this, shift the mounting positions of the disc rotor and wheel hub by one hole.



Thickness Inspection

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

Standard thickness	**: 30.0 mm (1.181 in)**
Minimum required thickness	**: 28.0 mm (1.102 in)**
Maximum uneven wear (measured at 8 positions)	**: 0.02 mm (0.0008 in) or less**

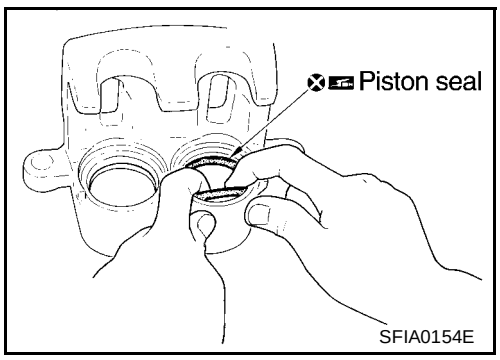


ASSEMBLY

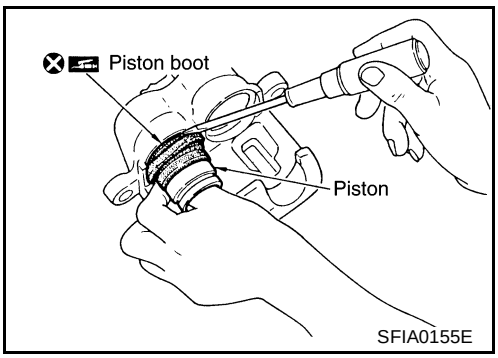
1. Apply rubber grease to the piston seals, and install them to the cylinder body.

   CAUTION:

   Discard the old piston seal; replace with a new one.

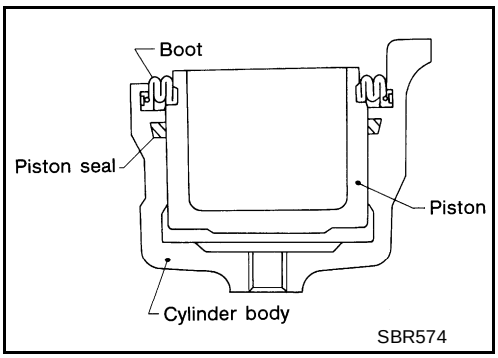


2. Apply brake fluid or rubber grease to the piston boots. Cover the piston end with the piston boot, and install the cylinder-side lip on the piston boot properly into the groove on the cylinder body.



CAUTION:
Discard the old piston boot; replace with a new one.

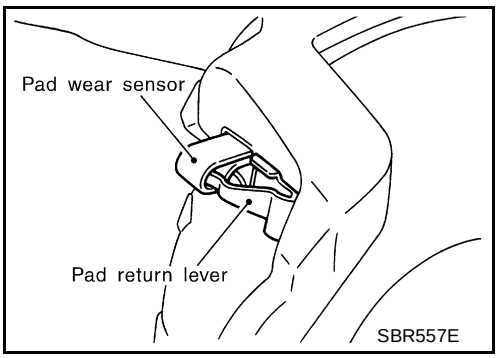
3. Apply brake fluid to the piston, and press the piston into the cylinder body by hand to assemble the piston-side lip on the piston boot properly into the groove on the piston.



CAUTION:
When pressing in piston, press it evenly on different areas. Avoid piston getting caught on cylinder inner wall.

4. Install slide pin and slide pin boot to torque member.

5. Install the torque member to the knuckle spindle, and tighten the mounting bolts to the specified torque.



CAUTION:
Before installing the torque member to the vehicle, wipe oil and grease on the washer seats on the knuckle spindle and mounting surface of the torque member.

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

CAUTION:
The inner pad and outer pad have the pad-return mechanism on the upper side of the pad retainer. When installing the pad, be sure to install the pad return lever to the pad wear sensor securely shown to the left.

8. Install the cylinder body, and tighten the sliding pin bolt to the specified torque.
9. Install brake hose to cylinder body, and tighten the union bolt to the specified torque.

CAUTION:
- **Securely assemble brake hose to projected part on cylinder body.**
- **Discard the old copper washer of union bolt; replace with a new one.**

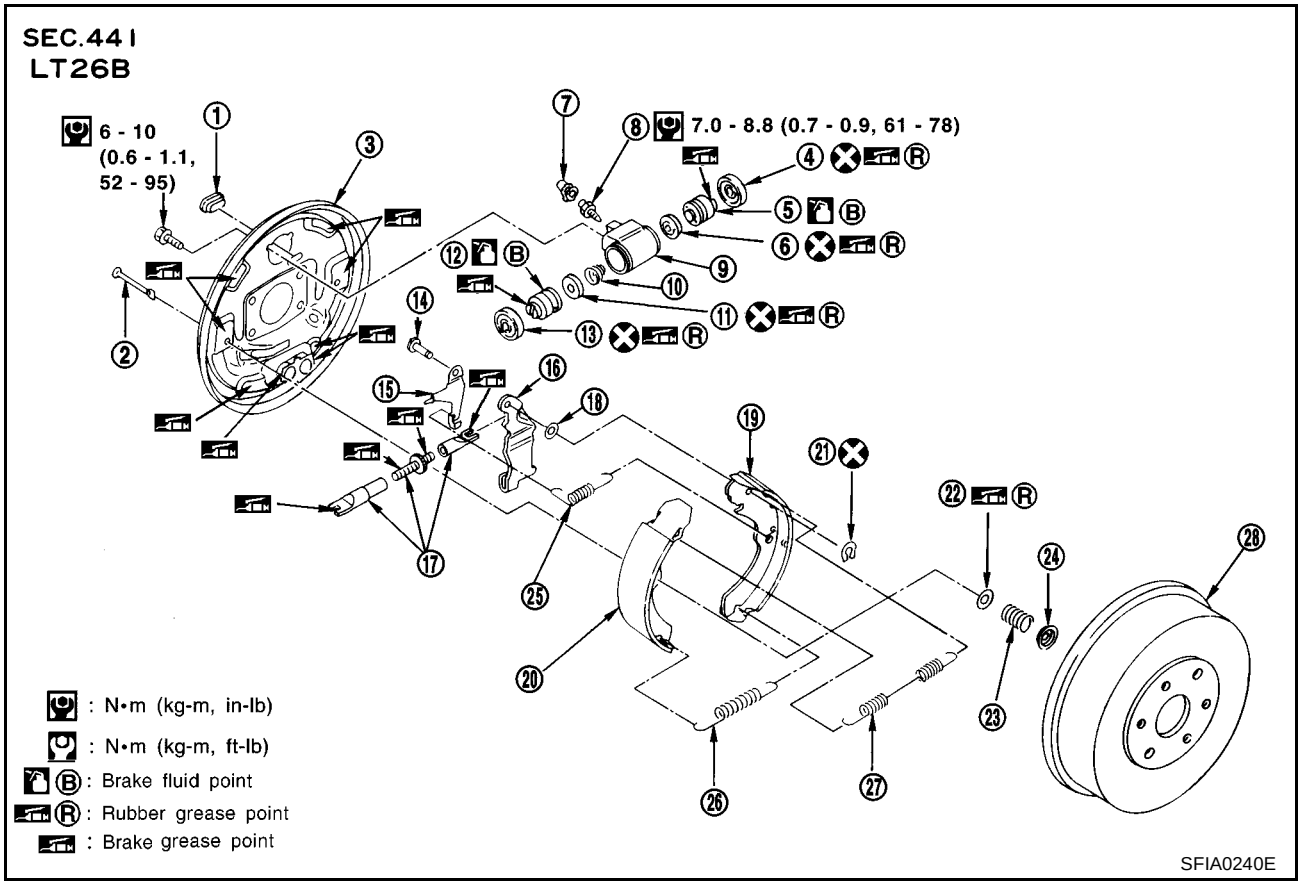
10. After installing the caliper assembly, refill with new brake fluid and bleed air.

REAR DRUM BRAKE

PFP:41000

Components

EFS000S4



1	Plug	2	Shoe hold pin	3	Back plate
4	Boot	5	Piston	6	Piston cup
7	Cap	8	Air bleeder	9	Wheel cylinder
10	Spring	11	Piston cup	12	Piston
13	Boot	14	Pin	15	Adjuster lever
16	Toggle lever	17	Adjuster	18	Conical washer
19	Shoe (trailing side)	20	Shoe (leading side)	21	Retainer ring
22	Retainer	23	Retainer spring	24	Retainer
25	Adjuster spring	26	Return spring	27	Return spring
28	Drum				

WARNING:

- **Clean the dust on the drum and back plate with a vacuum dust collector. Do not blow with compressed air.**

CAUTION:

- **Make sure that the parking brake lever has been fully released.**

Removal and Installation of Drum Brake Assembly

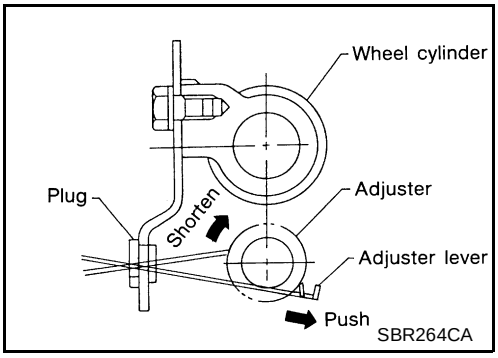
EFS000S6

REMOVAL

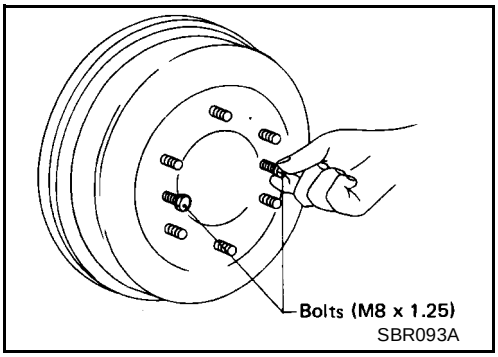
1. Carefully follow the steps below for removal.

- If it is difficult to remove the brake drum, remove as follows:

2. Using a screwdriver, rotate the star wheel on adjuster assembly in the direction shown by the arrow in the figure from the adjusting hole (a plug hole at the side of the wheel cylinder) to retract the shoes.



3. If brake drum and wheel hub are stuck, screw 2 bolts {8 mm (0.31 in)} into the threaded parts on brake drum as shown in figure. Then tighten them alternately to remove brake drum.



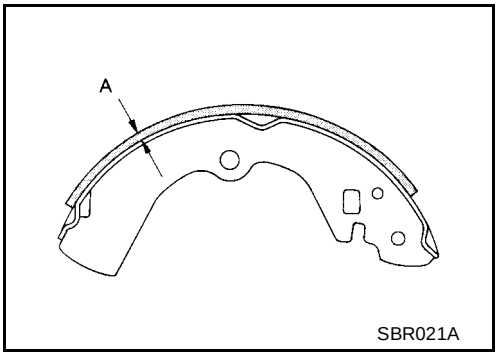
INSPECTION AFTER REMOVAL

Lining Thickness Inspection

Using a scale, check the thickness of the lining.

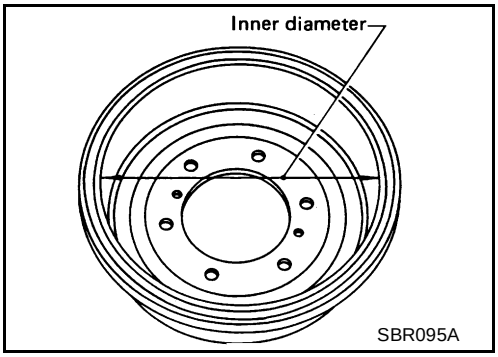
Standard thickness : 5.5 mm (0.217 in)

Wear limit of thickness (A) : 1.5 mm (0.059 in)



Drum Inner Diameter Inspection

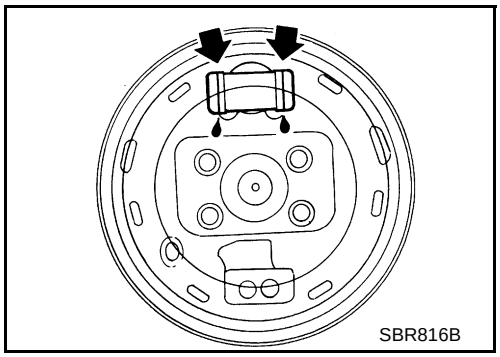
With a pair of vernier calipers, check the inner diameter of drum.



Standard inner diameter	Model LT26B	: 260.0 mm (10.24 in) dia.
Maximum inner diameter		: 261.5 mm (10.30 in) dia.

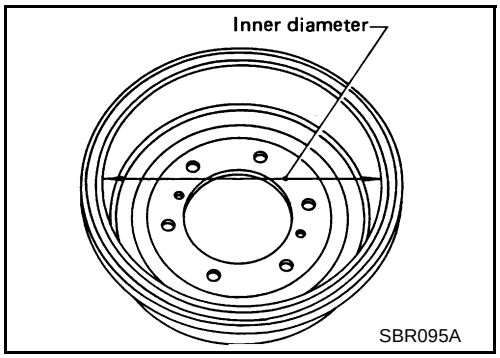
Wheel Cylinder Leakage Inspection

- Check wheel cylinder for fluid leak.
- Check for wear, damage and loose components. If any irregularity is detected, replace it.


SBR816B

Other Inspection

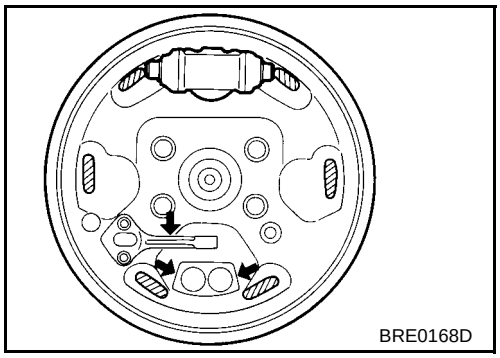
- Visually check the inside of the drum for unusual wear, damage, and cracks.
- Visually check the lining for unusual wear, damage, and peeling.
- Check the shoe sliding surface for unusual wear and damage.
- Check the return spring for sagging.
- Check the adjuster for rough operation.
- Visually check the back plate for damage, cracks, and deformation.
- Using an open-end wrench, check the mounting bolts on the back plate for looseness.



SBR095A

INSTALLATION

1. Referring to the component part drawing, carefully follow the steps below for installation.
   - Apply brake Grease to the sliding surfaces (the shaded areas) and parts on the back plate as indicated by arrows in the figure.

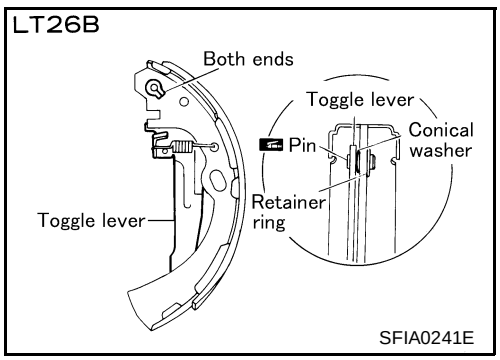

BRE0168D

2. If the toggle lever has been removed, install it as follows:

a. Apply brake grease to the sliding surfaces on the toggle lever. Then install the toggle lever and conical washer to the brake shoe.

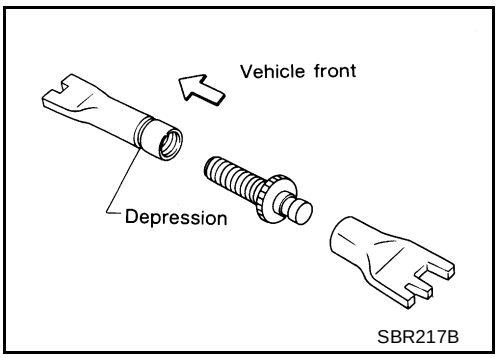
b. Install a retainer ring to the toggle lever and crimp the both ends of the retainer ring until they contact.

CAUTION:
Discard the old retainer ring; replace with a new one.



SFIA0241E

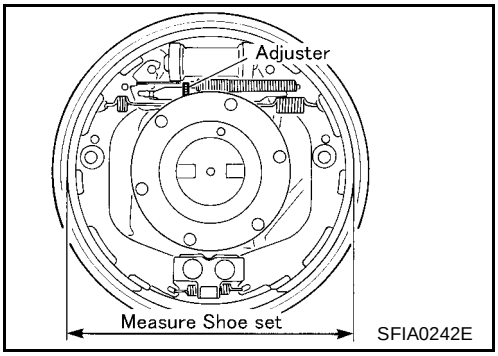
3. If the adjuster has been disassembled, apply brake grease to the thread. Then make sure to identify the right/left wheels to assemble.



Model LT26B

Rear RH wheel	Groove (indicated by * in the figure)	None
	Direction of thread	Clockwise
Rear LH wheel	Groove (indicated by * in the figure)	Existing
	Direction of thread	Counterclockwise

4. After assembling, make sure that each part is securely installed. Measure the inner diameter of the drum, and using the adjuster, adjust the outer diameter at the center of the shoes so that it is smaller than the inner diameter of the drum by 0.45 to 0.65 mm (0.0177 - 0.0256 in).
5. Install the brake drum, secure it with wheel nuts, and adjust the shoe clearance. Depressing the brake pedal repeatedly, the shoe clearance is adjusted the standard automatically.



Removal and Installation of Wheel Cylinder

EFS000S7

REMOVAL

1. Remove rear brake shoe.
2. Remove the brake tube from the wheel cylinder.
3. Remove the mounting bolts on the wheel cylinder, and then remove the wheel cylinder from the back plate.

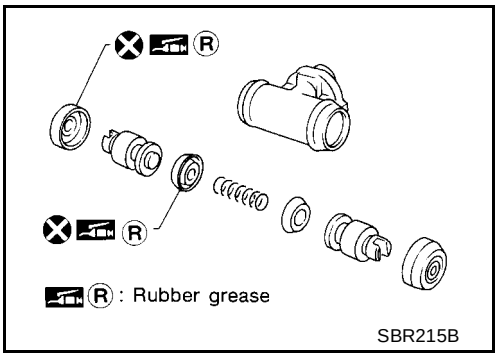
INSTALLATION

Install in the reverse order of removal. Tighten to the specified torque.

Wheel Cylinder Overhaul

EFS000S8

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



Wheel Cylinder Inspection

EFS000S9

Check the pistons, piston cups, and inner wall of the cylinder for wear, corrosion, and damage. If any irregularity is detected, replace the applicable part.

CAUTION:

- **When inserting pistons, be careful not to damage the cylinder.**

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

EFS0012U

Unit: mm (in)

Applied	2WD	
Front	Brake model	AD35VA
	Cylinder bore diameter x number of pistons	47.6 (1.874 in) x 2
	Pad Length x width x thickness	414.4 x 53.1 x 11 (5.57 x 2.091 x 0.43)
	Rotor outer diameter x thickness	279 x 30 (10.98 x 1.181)
Rear	Brake model	LT26B
	Cylinder bore diameter	20.6 (13/16)
	Lining length x width x thickness	249.6 x 50 x 5.5 (9.83 x 1.97 x 0.217)
	Drum inner diameter	260 (10.24)
Master cylinder	Bore diameter	25.40 (1)
Control valve	Valve model	Linkage type load sensing valve
Brake booster	Booster model	M215T
	Diaphragm diameter	Pri: 230 (9.06) Sec: 205 (8.07)
Recommended brake fluid		DOT 3

Front Disc Brake

EFS0012S

Brake type		AD35VA
Pad	Standard thickness (new)	11 mm (0.43 in)
	Wear limit of thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	30 mm (1.18 in)
	Wear limit of thickness	28 mm (1.10 in)
	Maximum runout	0.1 (0.004 in) mm or less

Rear Drum Brake

EFS0012T

Brake type		LT26B
Lining	Standard thickness (new)	5.5 mm (0.217 in)
	Wear limit of thickness	1.5 mm (0.059 in)
Drum	Standard inner diameter (new)	260.0 mm (10.24 in) dia.
	Wear limit of thickness	261.5 mm (10.30 in) dia.

Brake Pedal

EFS0012P

Looseness at clevis pin (at pedal top surface)	1 - 3 mm (0.04 - 0.12 in)
Pedal height (from the surface of floor panel)	M/T models:184.8 - 194.8 mm (7.28 - 7.67 in)
Pedal height when depressed [pedal depressing force: 490N (50 kg,110 lb)] (from dash panel top surface)	80 mm (3.15 in) or more
Clearance between stopper rubber and threaded end surface of stopper lamp switch	0.74 - 1.96 mm (0.0291-0.0772 in)

Check Valve

EFS0012Q

Vacuum leakage KA24DE: at vacuum of –66.7 kPa (-500 mmHg,–19.69 inHg) ZD30DD: at vacuum of –93.3 kPa (-700 mmHg,–27.56 inHg)	Within 1.3 kPa (10 mmHg,0.39 inHg) of vacuum for 15 seconds

Brake Booster

EFS0012R

Vacuum type

Vacuum leakage KA24DE: at vacuum of –66.7 kPa (–500 mmHg,–19.69 inHg) ZD30DD: at vacuum of –93.3 kPa (–700 mmHg,–27.56 inHg)	Within 3.3 kPa (25 mmHg,0.98 inHg) of vacuum for 15 seconds
Input rod installation standard dimension	M/T models: 125.2 mm (4.93 in)