

SECTION 19

BRAKES

CONTENTS

19-1. GENERAL DESCRIPTION	19-2
19-2. FRONT DISC BRAKE	19-14
19-3. REAR DRUM BRAKE	19-20
19-4. MASTER CYLINDER	19-27
19-5. BRAKE BOOSTER	19-30
19-6. PARKING BRAKE	19-38
19-7. BRAKE PIPES AND HOSES	19-39
19-8. MAINTENANCE SERVICE	19-42
19-9. TORQUE SPECIFICATION	19-49

NOTE:

All brake fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of all parts. There is to be no welding as it may result in extensive damage and weakening of the metal.

19-1. GENERAL DESCRIPTION

When the foot brake pedal is depressed, hydraulic pressure is developed in the master cylinder to actuate pistons (two in front and four in rear).

The master cylinder is a tandem master cylinder. Two brake pipes are connected to the master cylinder and they make two independent circuits. One connects the front brakes (right & left) and the other connects the rear brakes (right & left).

The proportioning and bypass (P & B) valve is included within the brake circuit which connects the master cylinder and the rear wheel brake.

In this brake system, the disc brake type is used for the front wheel brake and a drum brake type (leading/trailing shoes) for the rear wheel brake.

The parking brake system is mechanical. It applies brake force to only rear wheels by means of the cable and mechanical linkage system. The same brake shoes are used for both parking and foot brakes.

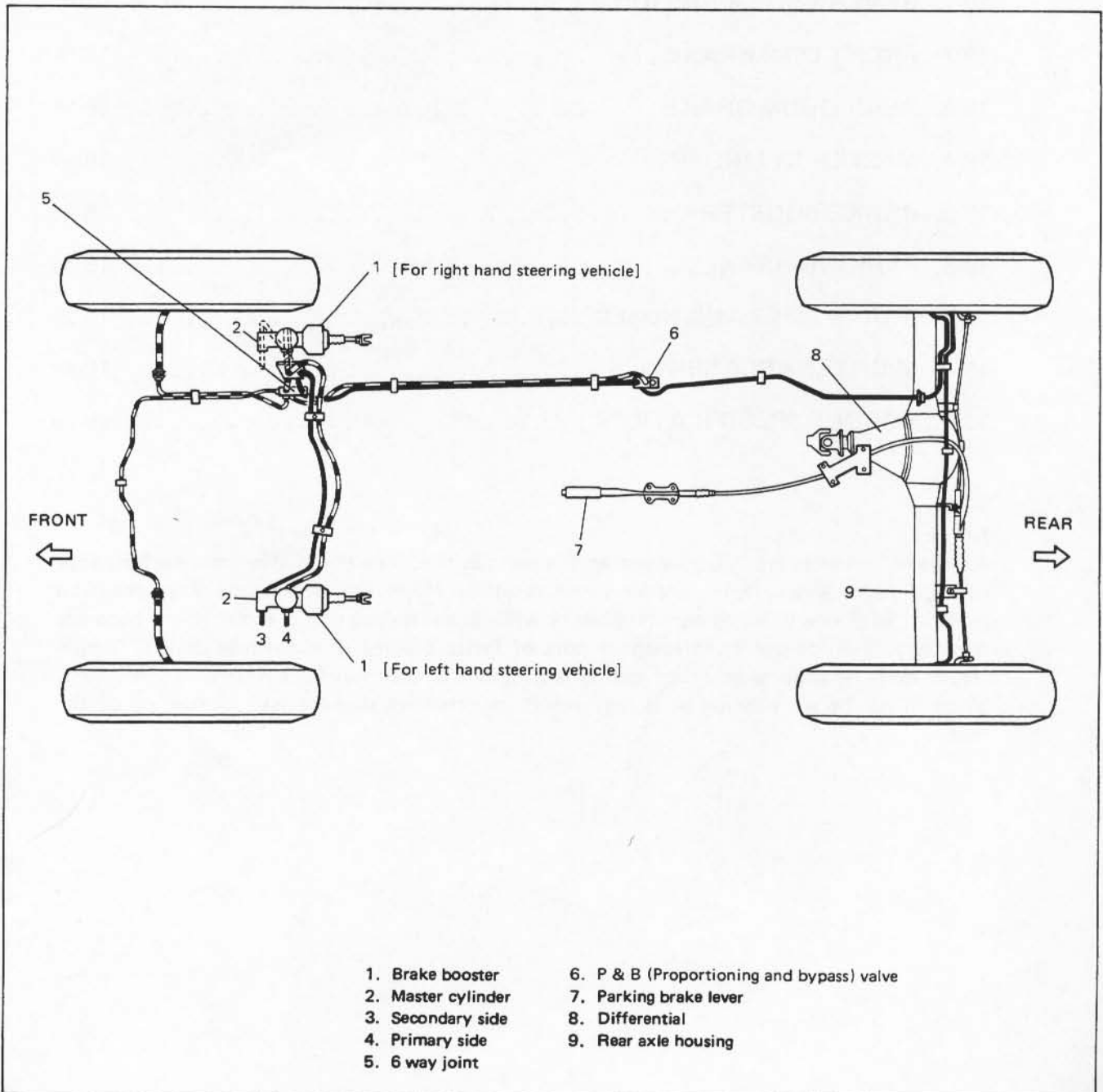
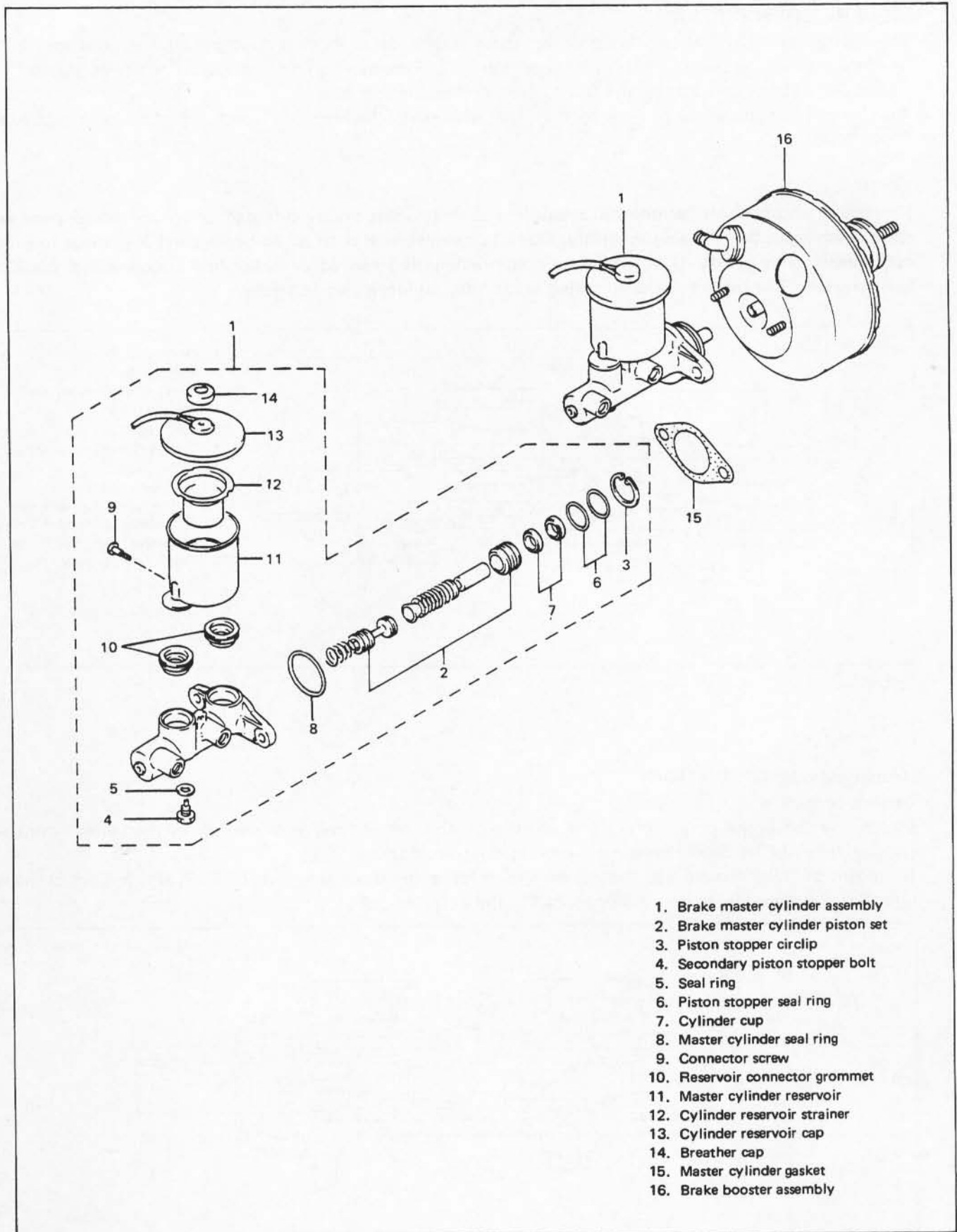


Fig. 19-1

MASTER CYLINDER



1. Brake master cylinder assembly
2. Brake master cylinder piston set
3. Piston stopper circlip
4. Secondary piston stopper bolt
5. Seal ring
6. Piston stopper seal ring
7. Cylinder cup
8. Master cylinder seal ring
9. Connector screw
10. Reservoir connector grommet
11. Master cylinder reservoir
12. Cylinder reservoir strainer
13. Cylinder reservoir cap
14. Breather cap
15. Master cylinder gasket
16. Brake booster assembly

Fig. 19-2

MASTER CYLINDER ASSEMBLY

[GENERAL DESCRIPTION]

The master cylinder has two pistons and three piston cups. Its hydraulic pressure is produced in the primary ("a" in the below figure) and secondary ("b") chambers. The hydraulic pressure produced in the primary chamber ("a") acts on the front wheel brakes (right & left).

Also, the hydraulic pressure produced in the secondary chamber ("b") acts on the rear wheel brakes (right & left).

NOTE:

Replace all components included in repair kits to service this master cylinder. Lubricate rubber parts with clean, fresh brake fluid to ease assembly. Do not use lubricated shop air on brake parts as damage to rubber components may result. If any hydraulic component is removed or brake line disconnected, bleed the brake system. The torque values specified are for dry, unlubricated fasteners.

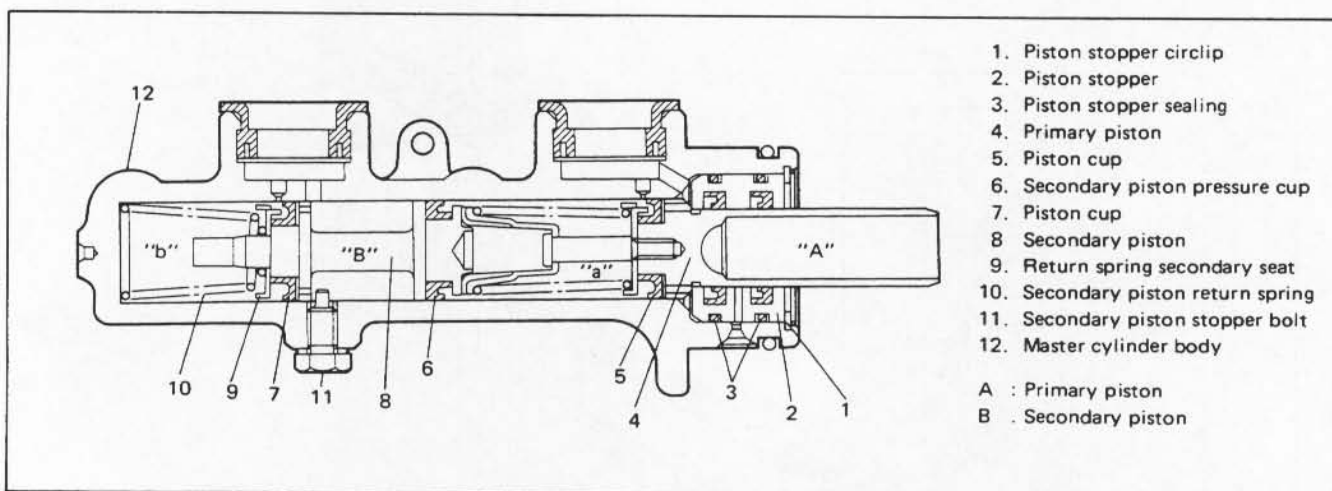


Fig. 19-3

[Master cylinder OPERATION]

Normal operation

Depressing the brake pedal forces the primary piston "A" to move to the left in the below figure and consequently the hydraulic pressure is produced in the chamber "a".

By means of this pressure and the return spring force, the secondary piston "B" is also pushed to the left and thus the hydraulic pressure is produced in the chamber "b".

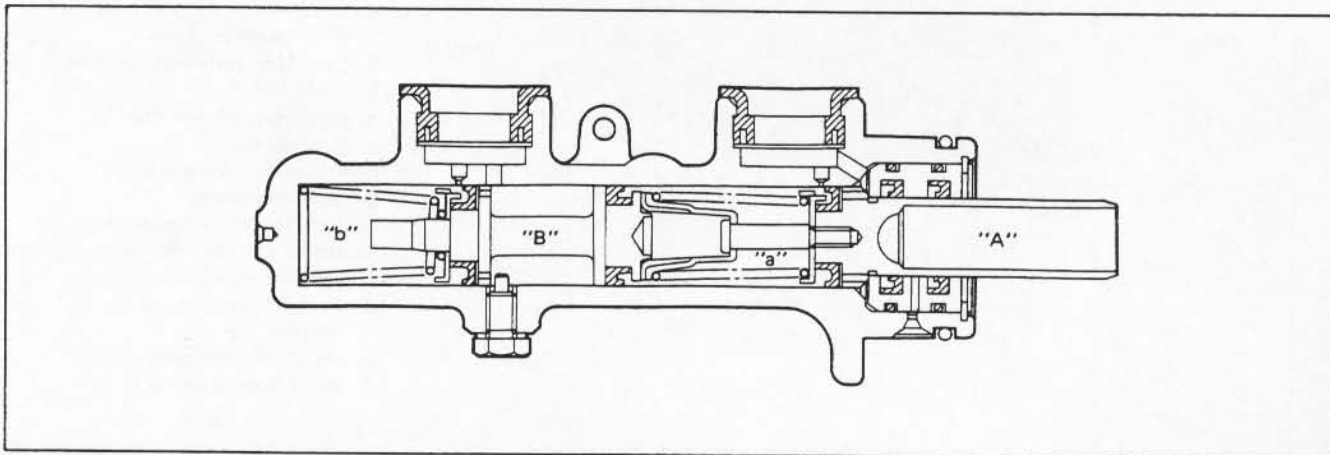


Fig. 19-3-1

One-circuit operation (Primary chamber "a" circuit failure)

Depressing the brake pedal forces the primary piston "A" to move as described previously, but since the brake circuit connected to the chamber "a" cannot hold the pressure, no pressure is produced in the fluid immediately ahead of the piston "A". The piston "A" keeps moving while compressing the spring and when it reaches the retainer, the piston "B" is pushed and begins to move. This causes the pressure to rise in the chamber "b" and the pressure acts on rear wheel brakes (right & left).

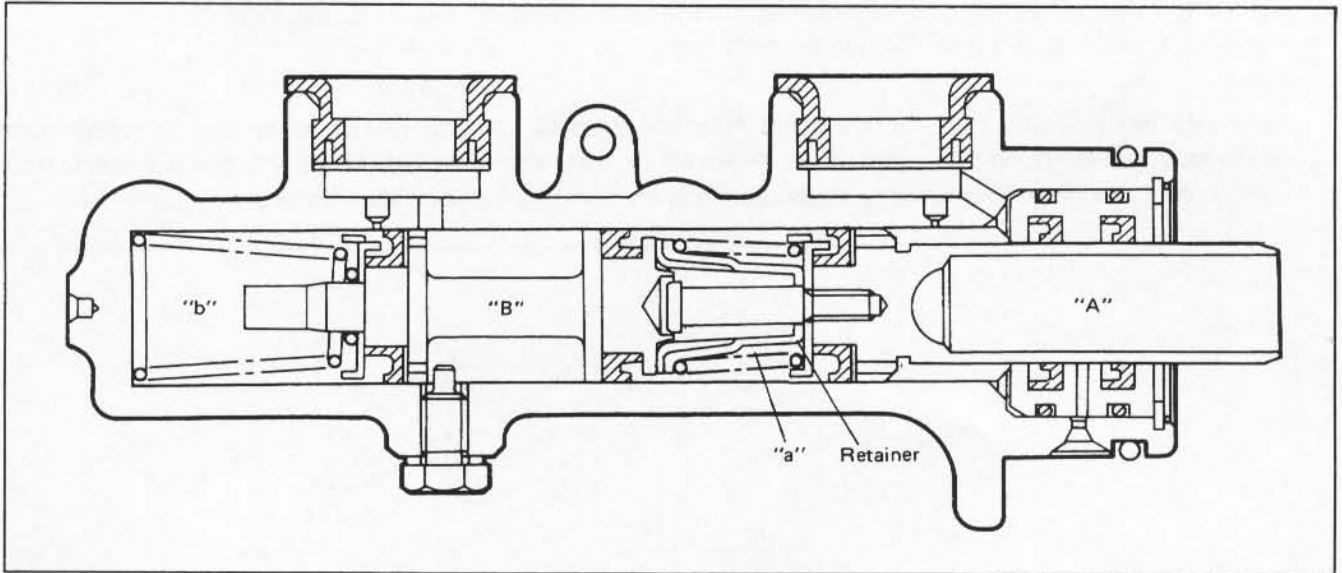


Fig. 19-4

One-circuit operation (Secondary chamber "b" circuit failure)

In this case, the leftward movement of the piston "A" has but little effect in causing the fluid pressure to rise in the chamber "a" in the beginning, because the initial rise of the fluid pressure causes the piston "B" to promptly yield and move to the left. However, when the forward end of the piston "B" comes to the head of the cylinder and stops there, the leftward movement of the piston "A" becomes effective. Thus the fluid pressure is produced in the chamber "a" and it acts on front wheel brakes (right & left). The figure shows the secondary piston "B" at halt.

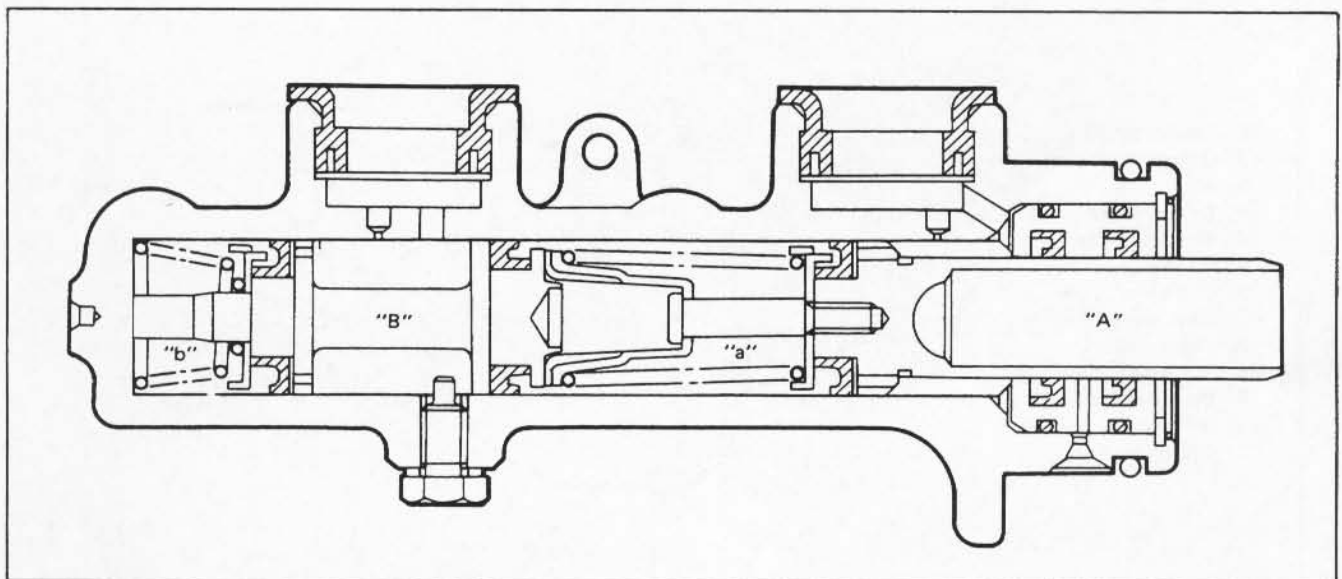


Fig. 19-4-1

[Caliper OPERATION]

Single piston floating caliper type

The single piston floating caliper type brake is employed in this model. One cylinder and one piston are used for this type. (The cylinder is constructed as a monoblock with the caliper.) Fluid pressure generated in the cylinder causes the pad (1) on the piston side to press against the disc. At the same time, the floating type caliper body is moved to the right by the cylinder pressure, as shown in below figure, which pulls pad (2) against the disc and so brakes the wheel.

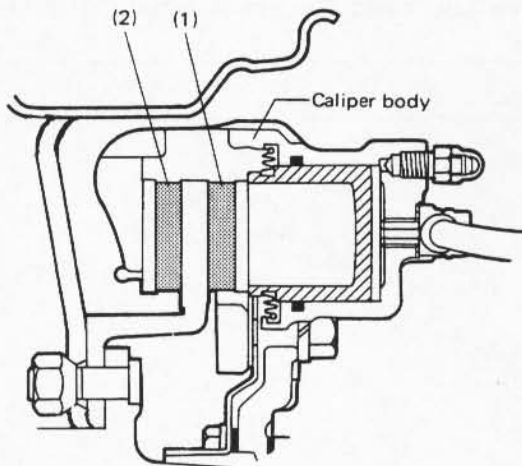


Fig. 19-6

The disc brake has no servo assistance as in drum braking, and it is necessary to increase the working pressure of the piston and pad. For this purpose, the wheel cylinder has a large bore. Even only a little change in clearance between the disc and pad has therefore a large influence on the brake pedal stroke. It is necessary to have the clearance adjusted to the minimum at all times, by means of the piston (rubber) seal.

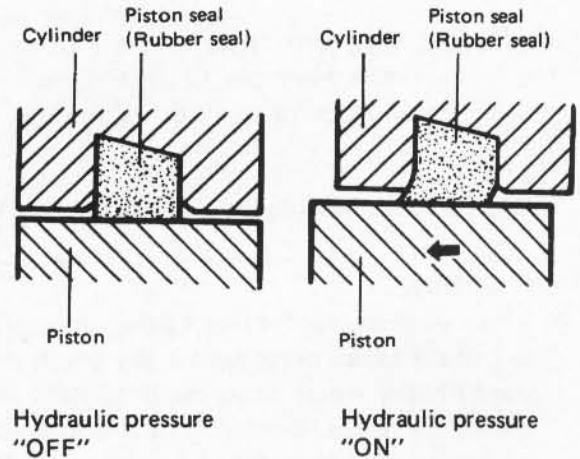


Fig. 19-7

Clearance correction

When oil pressure is applied to the piston, the piston moves forward. The rubber seal, which exerts considerable pressure against the piston, moves with the cylinder. However, as a part of the rubber seal has been fixed into a groove in the cylinder, the shape of the rubber seal is distorted toward internal end of the cylinder, as shown in above figure. When pressure is taken off from the foot brake pedal and fluid pressure is released from the piston, a restoring force is generated at the seal and pushes the piston back. As the pads wear away and the clearance between the disc and pads becomes larger, the piston moves a larger distance. The seal then could change in shape further but, since the end of the seal is fixed into the groove in the cylinder, the distortion is limited to the same amount as previously described. The piston moves further to cover the distance of clearance. The piston returns by the same distance and the rubber seal recovers its shape as described above and thus the clearance between the disc and pads are maintained in adjustment.

DRUM BRAKE ASSEMBLY (Rear Wheel Brake)

[GENERAL DESCRIPTION]

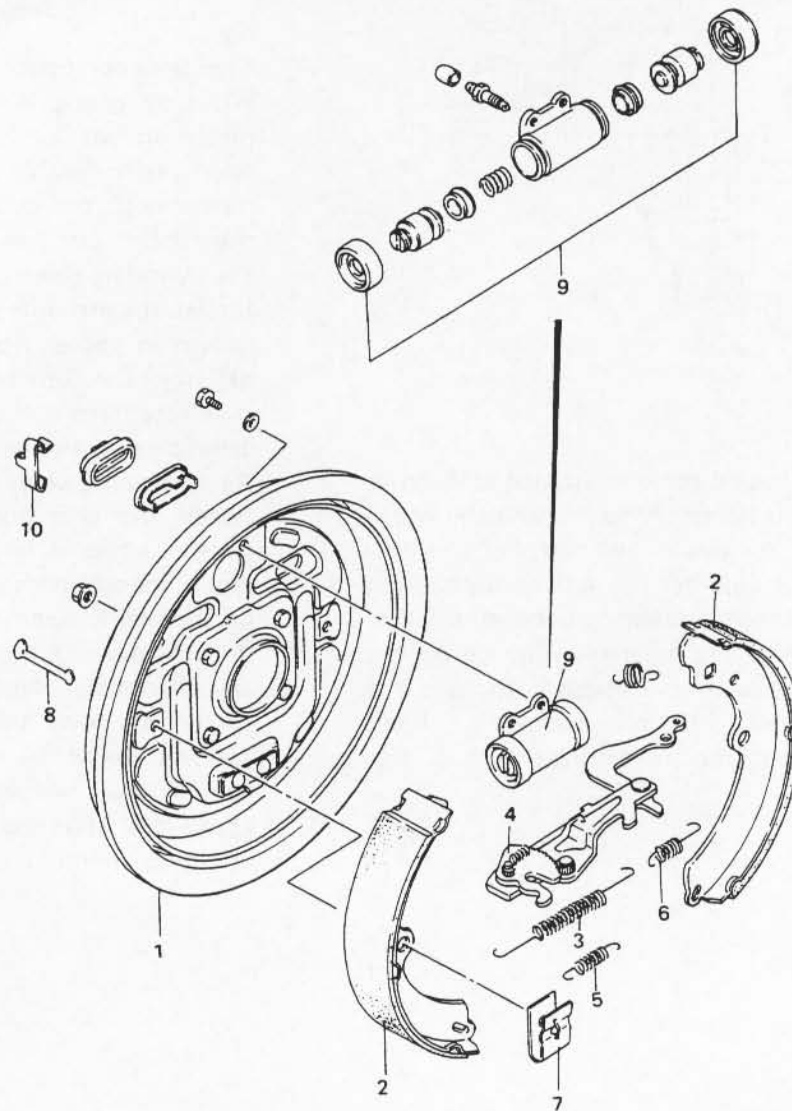
The drum brake assembly has a self shoe clearance adjusting system so that drum-to-shoe clearance is maintained appropriate at all times. For details, refer to OPERATION in the next page.

NOTE:

Replace all components included in repair kits used to service this drum brake. Lubricate parts as specified.

WARNING:

When servicing wheel brake parts, do not create dust by grinding or sanding brake linings or by cleaning wheel brake parts with a dry brush or with compressed air. (A water dampened cloth should be used.) Many wheel brake parts contain asbestos fibers which can become airborne if dust is created during servicing. Breathing dust containing asbestos fibers may cause serious bodily harm. If any hydraulic component is removed or brake line disconnected, bleed the brake system. The torque values specified are for dry, unlubricated fasteners.



1. Brake back plate
2. Brake shoe
3. Shoe return spring (A)
4. Brake strut rod
5. Shoe return spring (B)
6. Rod spring
7. Shoe hold down spring
8. Shoe hold down pin
9. Wheel cylinder
10. Stopper plate

Fig. 19-8

[Rear brake OPERATION]

With the general drum brake type, when the brake pedal is depressed, two pistons in the wheel cylinder force the brake shoes outward, restraining the turn of the drum.

The more the brake shoes get worn, the longer distance the pistons must move. As a result, the brake pedal travel (pedal-to-wall clearance) increases. Then the shoe clearance must be adjusted by the shoe adjusting screws. Thus periodical adjustment is required for the drum brake type in general.

This rear brake is provided with a self-adjusting system which automatically adjusts the shoe-to-drum clearance (pedal-to-wall clearance) caused by such brake shoe wear.

Clearance correction

In each rear wheel cylinder, pistons, piston cups, and a piston spring (1) are installed. When the brake pedal is depressed, fluid pressure is applied to the inside of the chamber on the piston (2), (3).

Being actuated by this pressure, the piston (2) moves to the left (piston (3) moves to the right) in the following figure and presses the brake shoe against the brake drum, thus producing brake force.

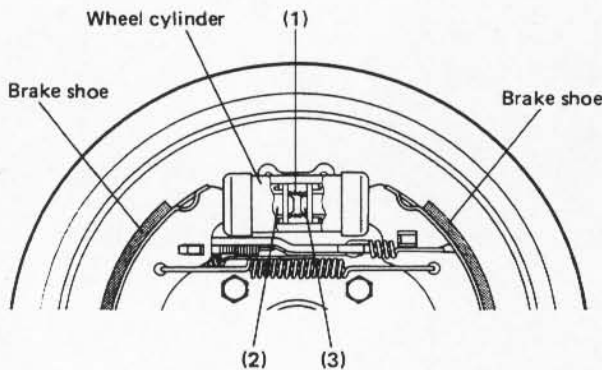


Fig. 19-9

At this time, the distance the brake shoe moves is "B", that is, the distance that "A" (the end of the long hole made in the brake shoes web) moves till it contacts the lever (1) which is fitted in the long hole.

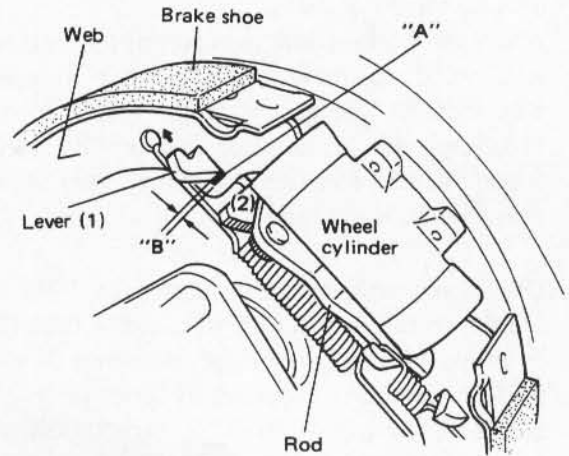


Fig. 19-10

When the brake pedal is depressed, the piston and brake shoe move toward the brake drum side by the aforementioned distance "B" and "A" of the brake shoe web contacts the lever (1). As the brake shoe gets worn and the brake shoe clearance becomes larger, the force applied to the lever (1) at the time of such a contact becomes larger. When it exceeds 10 – 12 kg (22 – 26 lbs), the "A" of the brake shoe web moves the lever (1) as much as the amount of the brake shoe lining wear toward the direction as shown with an arrow in the figure. Thus the shoe is forced against the drum and the brake force is produced.

The distance the lever (1) moves corresponds to the amount of wear. In accordance with the lever (1) movement, the fan-shaped ratchet (2) also moves, for they are assembled as a unit. The lever (1) and ratchet (2) remain in the positions as they moved until the shoe-to-drum clearance becomes even larger.

When the brake pedal is released, the brake shoe is allowed to move back by the amount of clearance "B" by means of the return spring. In this way, the brake shoe-to-drum clearance is automatically adjusted constant every time the brake pedal is depressed.

The brake shoe-to-drum clearance "B" corresponds to 0.6 – 0.8 mm (0.0236 – 0.0315 in.) in terms of the brake drum diameter $A \leftrightarrow A'$. And the amount adjusted by one notch of the ratchet corresponds to 0.20 mm (0.008 in.) in terms of the brake drum diameter $A \leftrightarrow A'$.

The spring provided in the wheel cylinder prevents the piston from moving back more than the specified brake shoe-to-drum clearance.

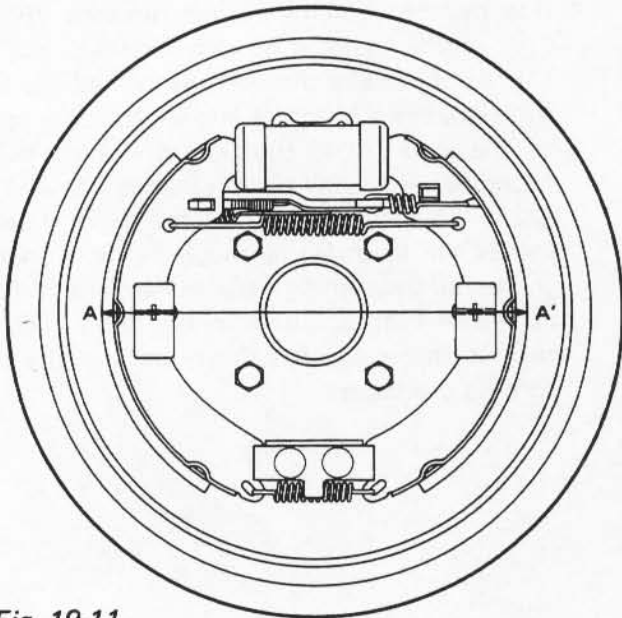


Fig. 19-11

BOOSTER ASSEMBLY

[GENERAL DESCRIPTION]

The booster is located between the master cylinder and the brake pedal. It is so designed that the force created when the brake pedal is depressed is mechanically increased combined with the engine vacuum. The booster has a diaphragm of ϕ 180 mm effective diameter. Its operation is described in the following pages.

NOTE:

- Use all components included in repair kits to service this booster. Lubricate rubber parts, where indicated, with silicone grease provided in kits. The torque values specified are for dry, unlubricated fasteners. If any hydraulic component is removed or brake line disconnected, bleed the brake system.
- Never lubricate any hydraulic component with silicone grease.

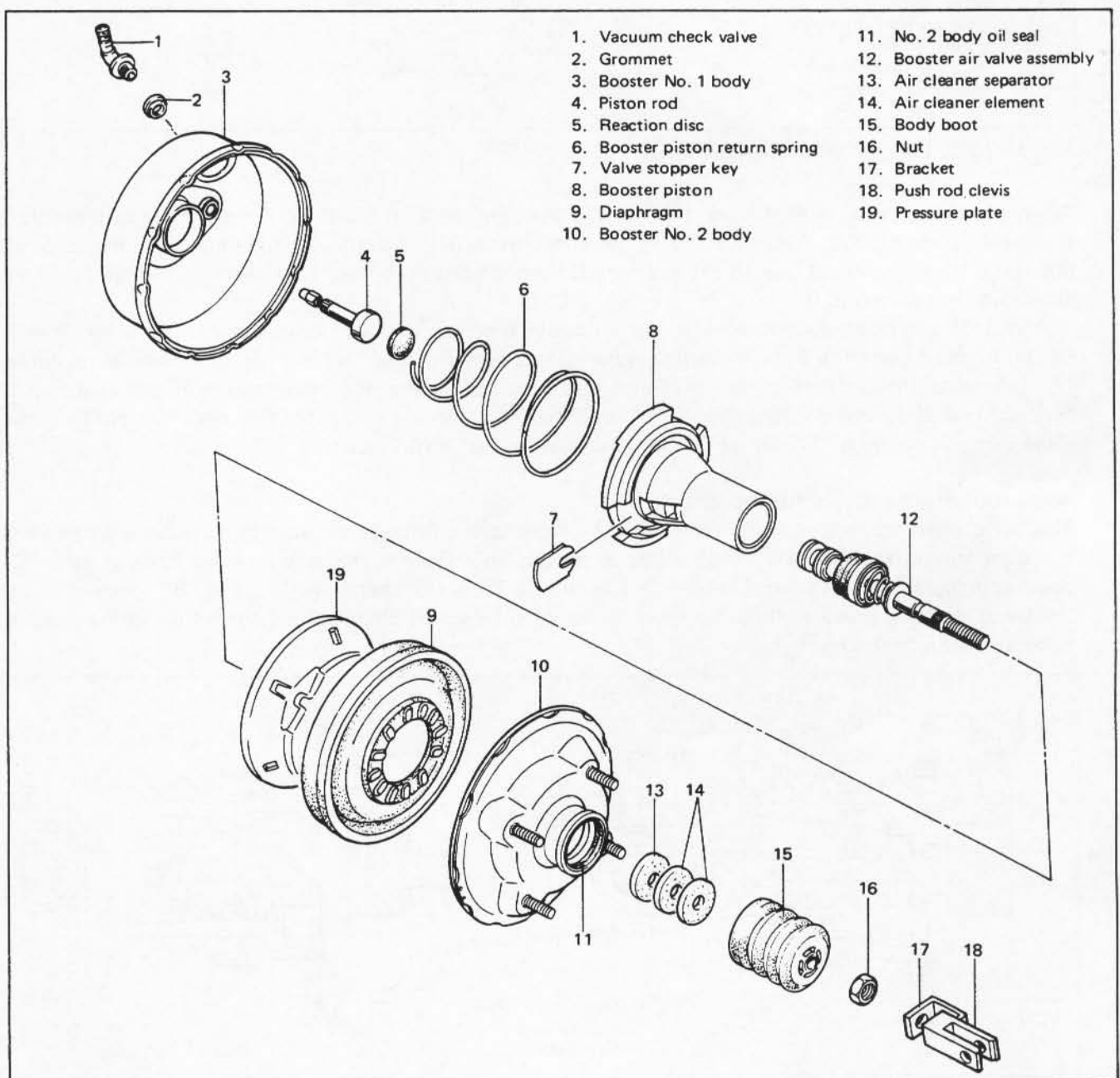


Fig. 19-12

[Booster OPERATION]

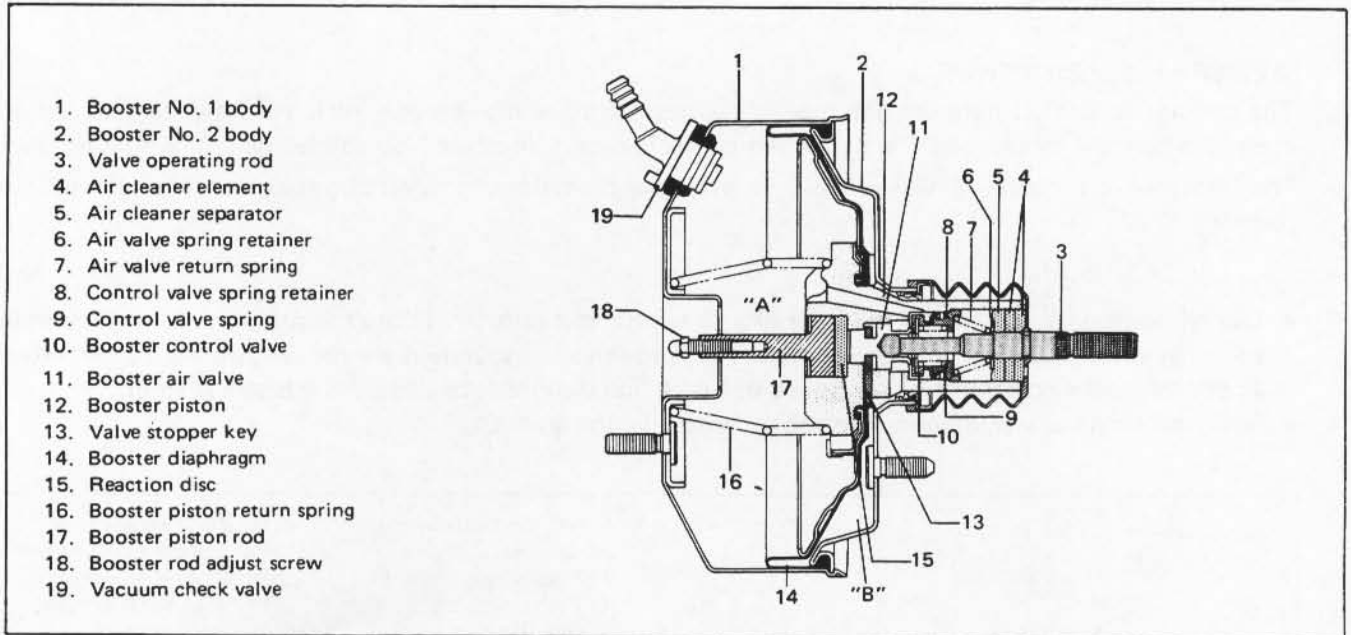


Fig. 19-13-1 Vacuum Booster Assembly

When the brake pedal is depressed, the force is transmitted to the piston of the master cylinder through the valve operating rod, booster air valve, reaction disc and piston rod. At the same time, the force of the booster piston developed due to the pressure difference between the two chambers "A" and "B" in the above figure is added to it.

The end of the booster control valve has a double function of a vacuum valve and air valve. That is, as shown in the figure, the booster control valve closes between the "A" and "B" chambers as its outer end "C" contacts the booster piston seat and opens as "C" leaves the booster piston seat (vacuum valve function). Also it closes between the "B" chamber and outside air as its inner end "D" contacts the air valve seat and opens as "D" leaves the air valve seat (air valve function).

When foot brake pedal is not depressed

The valve operating rod is pushed to the right by the spring force as shown. The air valve is also enough to the right to contact the valve stopper key as shown. In this state, the vacuum valve (control valve "C") is open and the air valve (control valve "D") is closed. Thus the chambers "A" and "B" conduct and share the same negative pressure (because of no pressure difference) which allows the return spring to push the booster piston to the right.

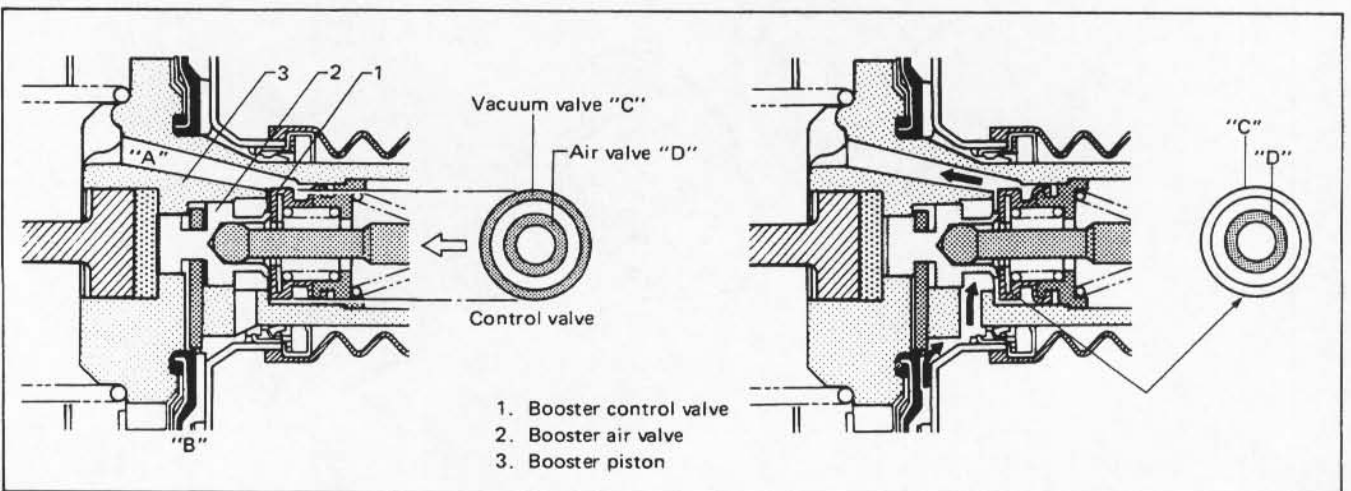


Fig. 19-13-2 Vacuum Booster Assembly

When foot brake pedal is depressed

Being pushed by the operating rod, the booster air valve moves to the left as shown. Then the control valve is pushed against the booster piston seat closely by the valve spring force. Thus the vacuum valve (control valve "C") is closed to cut off between the chambers "A" and "B". At this time the air valve (control valve "D") is still closed.

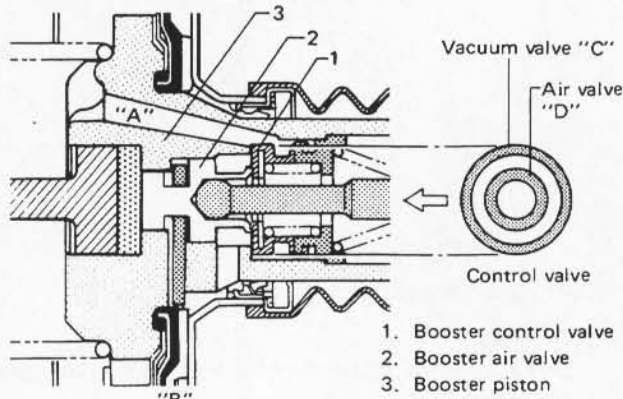


Fig. 19-14-1

As the booster air valve moves further to the left, it leaves the control valve and the air valve (control valve "D") opens to allow the air to flow into the chamber "B". The entry of air causes a difference in pressures between the chambers "A" and "B". When this pressure difference grows greater than the piston return spring force, the booster piston moves to the left and the booster control valve also moves to the left. The resulting air valve (control valve "D") closure stops the air flow into the chamber "B" and its pressure remains as it is. In this way, a small brake pedal depressing force is made into a strong push to the master cylinder push rod to produce high hydraulic pressure.

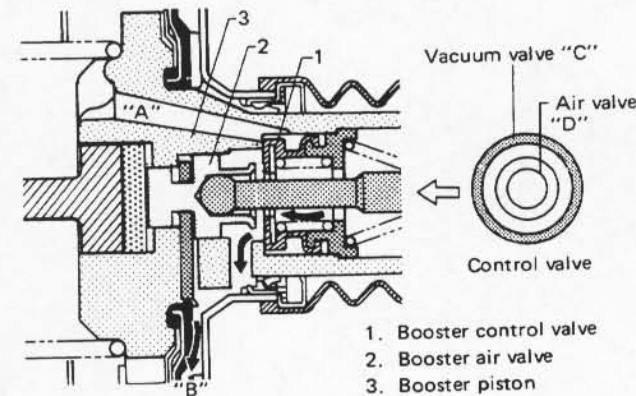


Fig. 19-14-2

When foot brake pedal is released

When the brake pedal is released, the booster air valve returns to the right by the master cylinder piston return force and the air valve return spring force as shown. Then the vacuum valve (control valve "C") opens and causes negative pressure in the chamber "B". The result is that the master cylinder piston and booster piston return to their original positions. This is the same state as described under "When foot brake pedal is not depressed".

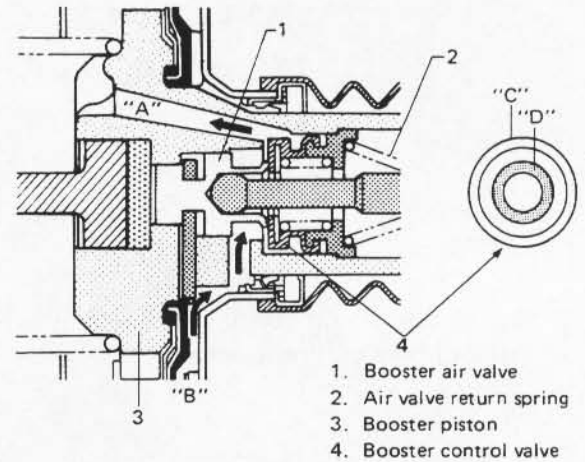


Fig. 19-14-3

Reference

Should any of the vacuum related parts in the booster be faulty, the brake force is not increased. Even then, however, the brake depressing force is transmitted to the valve operating rod, booster air valve, valve stopper key and booster piston in that order, to push the master cylinder push rod. Thus, the braking operation itself will not fail.

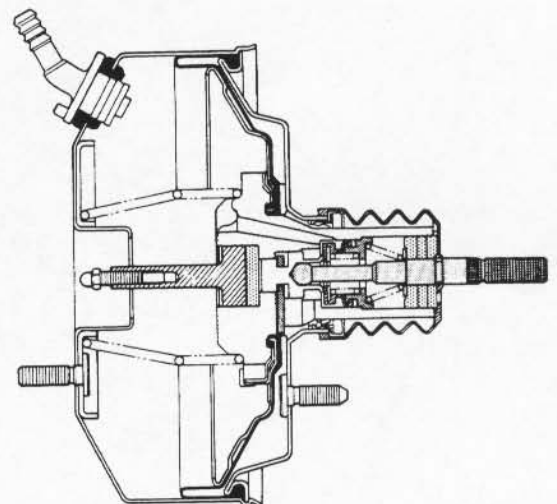


Fig. 19-14-4

19-2. FRONT DISC BRAKE

REMOVAL

Brake Pad

- 1) Loosen, but do not remove, front wheel hub nuts and raise car off the floor by jacking.

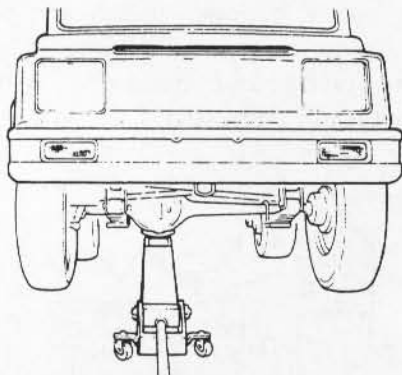


Fig. 19-15

- 2) Rest car steady on safety stands. Remove hub nuts and take off front wheels.

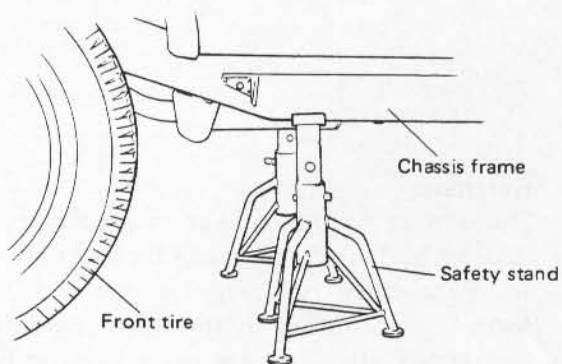


Fig. 19-16

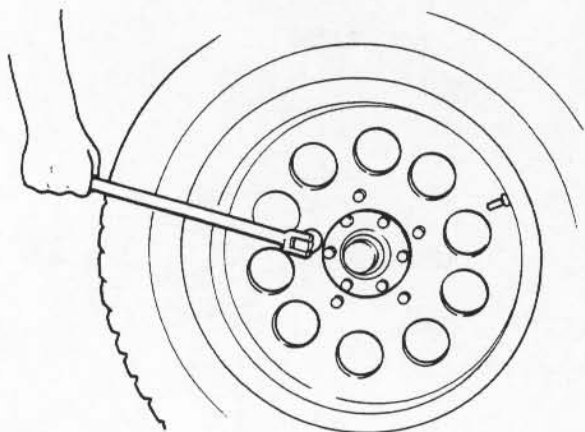


Fig. 19-17

- 3) Remove caliper pin bolts (2 pcs).

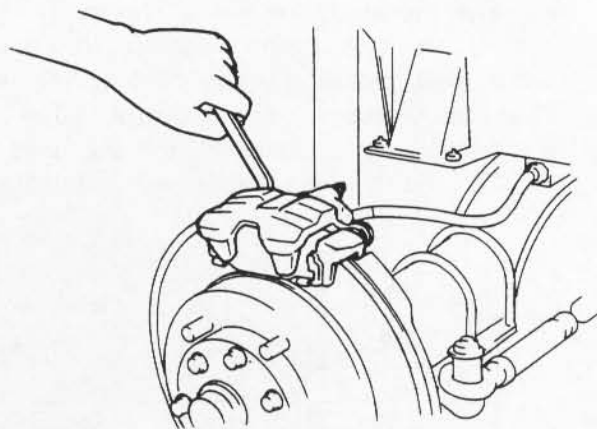


Fig. 19-18

- 4) Remove caliper.

NOTE:

During removal, be careful not to damage brake flexible hose. Also, don't depress brake pedal.

- 5) Remove pads.

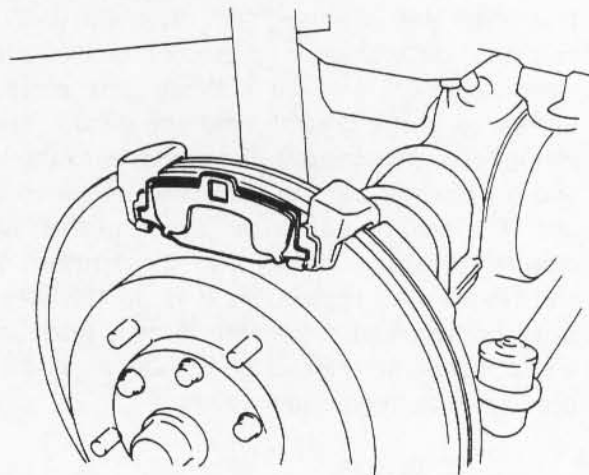


Fig. 19-19

Caliper

After taking down the wheel, remove piston and piston seal according to the following procedure.

- 1) Wipe caliper clean.
- 2) Detach brake flexible hose from caliper body (cylinder).

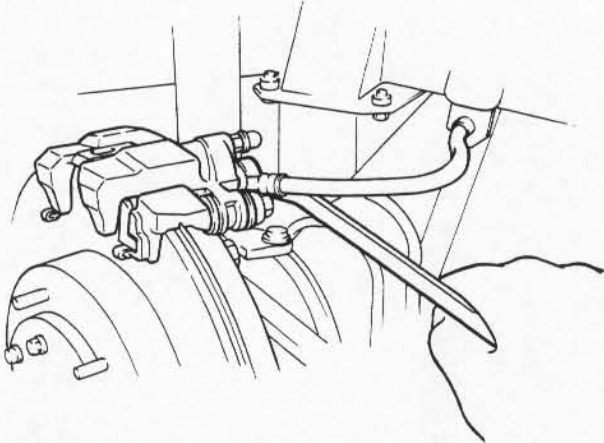


Fig. 19-20

- 3) Remove caliper pin bolts (2 pcs).

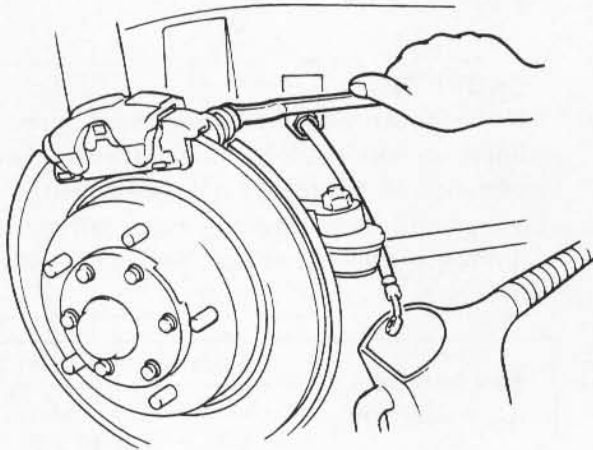


Fig. 19-21

- 4) Remove cylinder boot set ring.

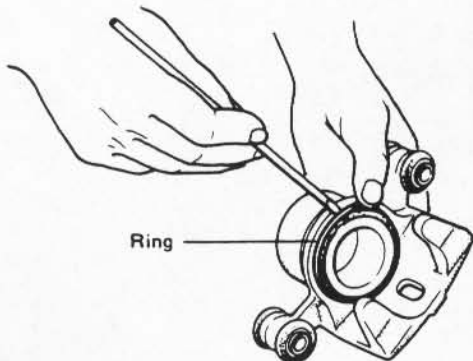


Fig. 19-22

- 5) Blow compressed air into cylinder through bolt hole where flexible hose was fitted. With this air pressure, the piston can be pushed out of cylinder.

WARNING:

Do not apply too highly compressed air which will cause piston to jump out of cylinder. It should be taken out gradually with moderately compressed air. Do not place your fingers in front of the piston when using compressed air to push it out.

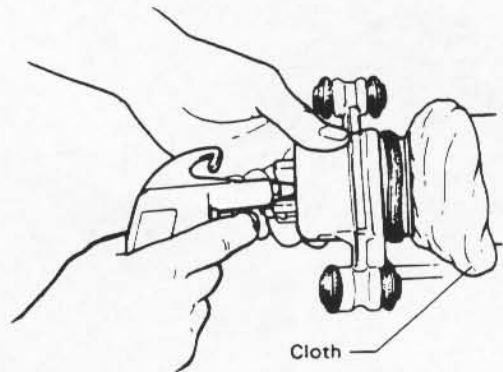


Fig. 19-23 Cloth

- 6) Remove piston seal using a thin blade like a thickness gauge, etc.

CAUTION:

Be careful not to damage inside (bore side) of cylinder.

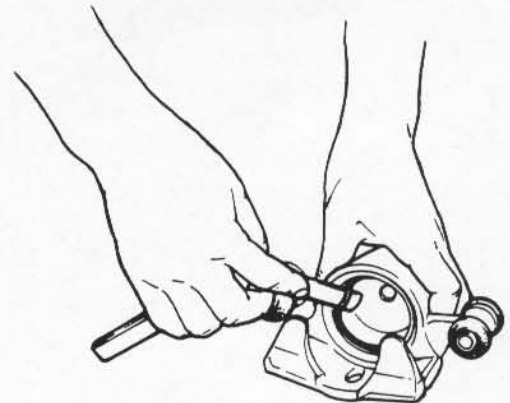


Fig. 19-24

Disc

1) After taking down the wheel, remove caliper assembly by loosening caliper bolts (2 pcs).

CAUTION:

During removal, be careful not to damage brake flexible hose and not to depress brake pedal.

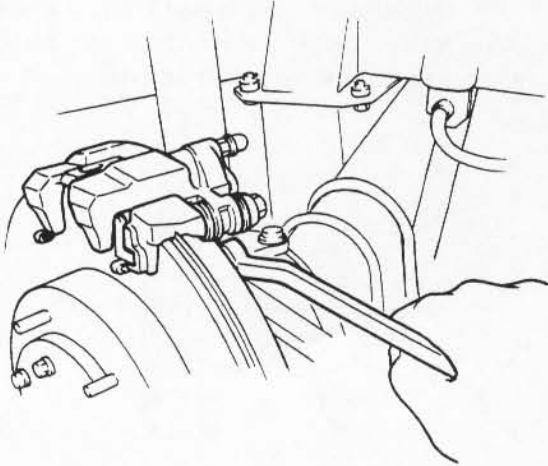


Fig. 19-25

2) Remove disc by using two 8 mm bolts (B).

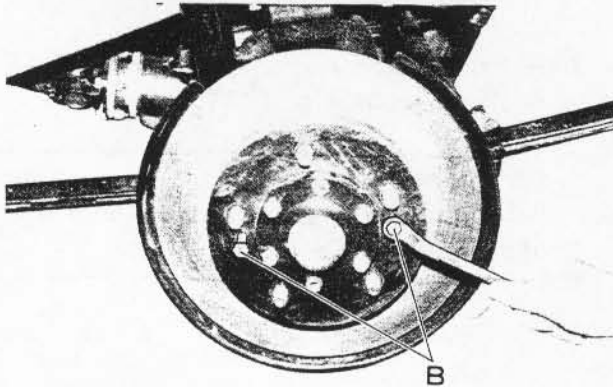


Fig. 19-26

INSPECTION OF COMPONENTS

Brake Pad

Check the pad lining for wear. When the wear exceeds its limit, replace with a new one.

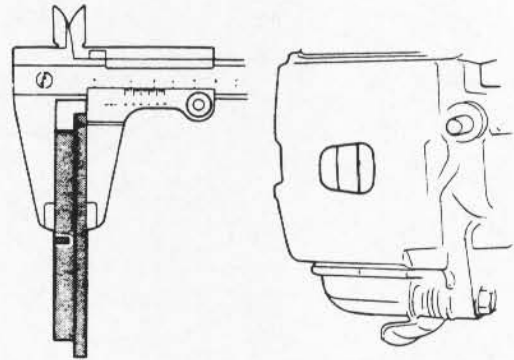


Fig. 19-27

CAUTION:

Never polish pad lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage disc. When pad lining requires correction, replace it with a new one.

	Standard	Limit
Pad thickness (lining + pad rim)	15.0 mm (0.590 in.)	6.0 mm (0.236 in.)

NOTE:

When pads are removed, visually inspect caliper for brake fluid leak. Correct leaky point, if any.

Cylinder Slide Bush

Check bush for smooth movement as shown. If it is found faulty, correct or replace. Apply rubber grease to bush outer surface. Rubber grease should be the one whose viscosity is less affected by such low temperature as -40°C (-40°F).

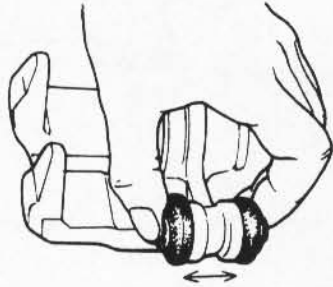


Fig. 19-28

Bush Dust Boot and Cylinder Boot

Check boots for breakage, crack and damage. If defective, replace.

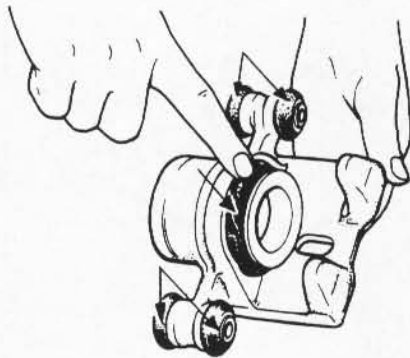


Fig. 19-29

Piston Seal

Excessive or uneven wear of pad lining may indicate unsmooth return of the piston. In such a case, replace the rubber seal.

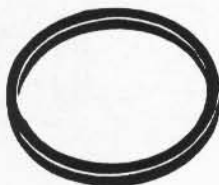


Fig. 19-30

Brake Disc

Check disc surface for scratches in wearing parts. Scratches on disc surface noticed at the time of specified inspection or replacement are normal and the disc is not defective if these are not serious. But when there are deep scratches or scratches all over the surface, replace disc. When only one side is scratched, polish and correct that side.

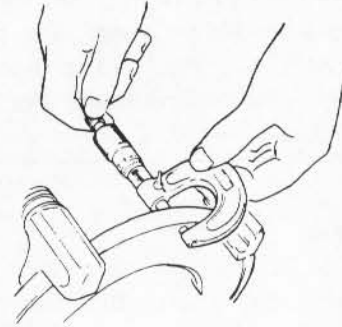


Fig. 19-31

	Standard	Limit
Disc thickness	10 mm (0.394 in.)	8.5 mm (0.334 in.)

To check disc deflection, measure at 2 points on its periphery and center with a dial gauge, while rotating the disc.

Limit on disc deflection	0.15 mm (0.006 in.)
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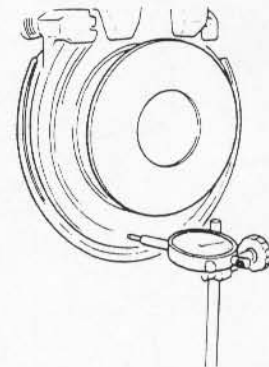


Fig. 19-32

NOTE:

Check front wheel bearing for looseness before measurement.

PRECAUTIONS ON INSTALLATION

Reassemble the front brake in the reverse order of disassembly, using care for the following points.

CAUTION:

- Wash each part cleanly before installation in the same fluid as the one used in master cylinder reservoir.
- Never use other fluid or thinner.
- Before installing piston and piston seal to cylinder, apply fluid to them.
- After reassembling brake line, bleed air from lines.

Piston Seal

Piston seal is used to seal piston and cylinder and to adjust clearance between pad and disc. Replace with a new one at every overhaul. Fit piston seal into groove in cylinder taking care not to twist it.

Piston and Boot

Before inserting piston into cylinder, boot must be fitted in piston. Make sure to fit boot in proper direction as shown below.

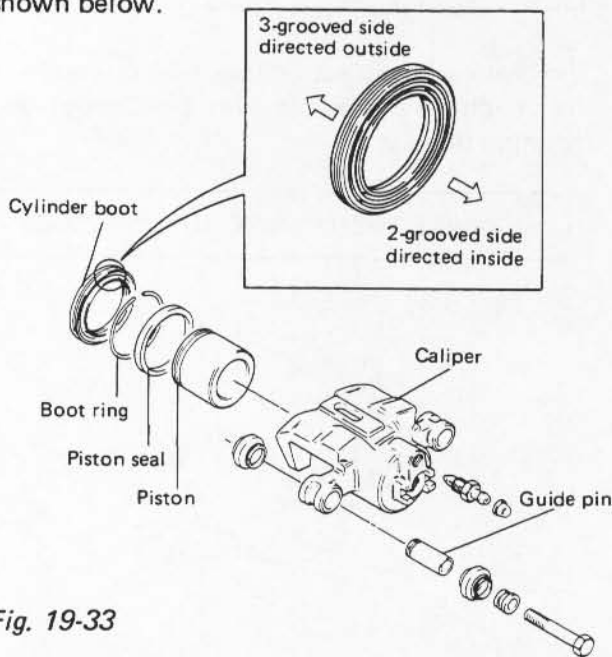


Fig. 19-33

When installing boot to cylinder, position outer end of piston so that it projects out of the end of cylinder by about 10 mm (0.4 in.) as shown in Fig. 19-34, this will facilitate installation. Install boot set ring.

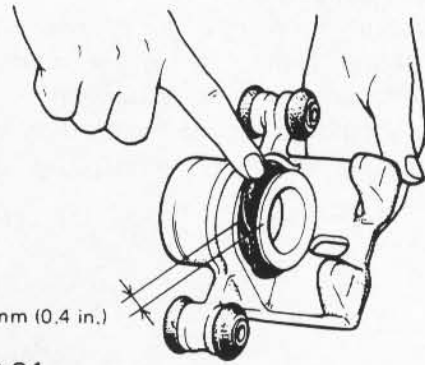


Fig. 19-34

Caliper

Before installing caliper (cylinder body) to carrier, check to ensure that guide pins (2 pcs) are greased and that guide pin inserted in each carrier hole can be moved smoothly in thrust direction.

NOTE:

Where temperature gets as low as -30°C in cold weather, use rubber grease whose viscosity varies very little even at -40°C (-40°F).

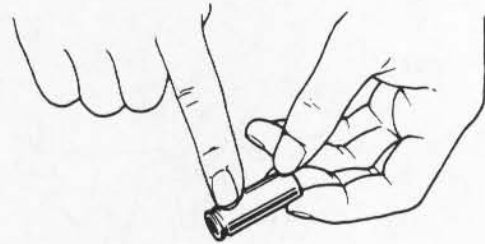


Fig. 19-35

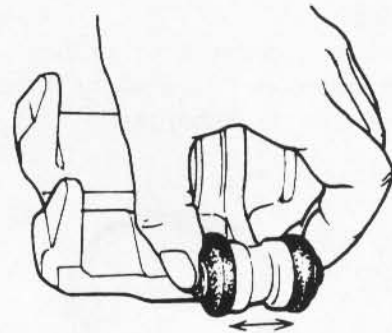


Fig. 19-36

Front Brake Disc and Pad

- Use care not to scratch or put oil or grease on sliding surface of disc and pad during installation work.
- After installing brake disc to wheel hub properly, tighten wheel nuts to specified torque.

Front Wheel Spindle

Apply SEALING COMPOUND 366E (99000-31090) to mating surfaces of brake caliper holder and steering knuckle.

Dust Cover

When fitting dust cover onto brake caliper holder, apply SEALING COMPOUND 366E (99000-31090) to mating surfaces of both parts.

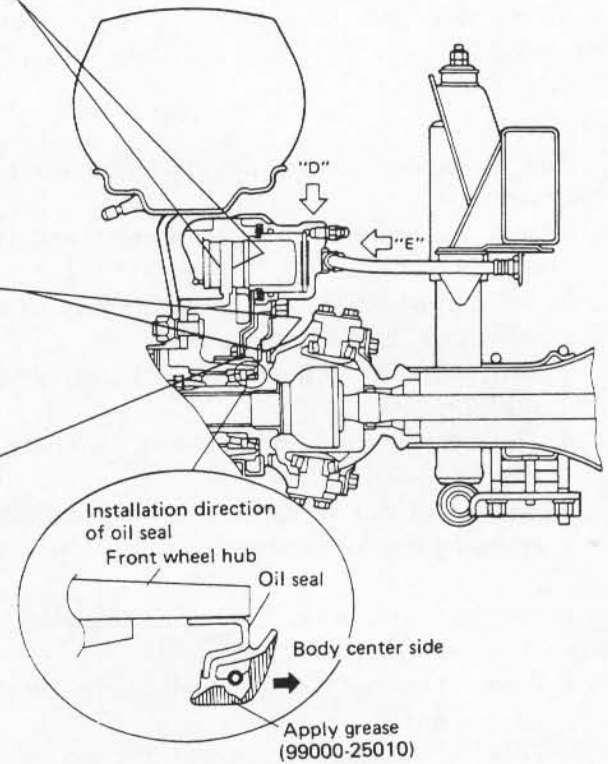
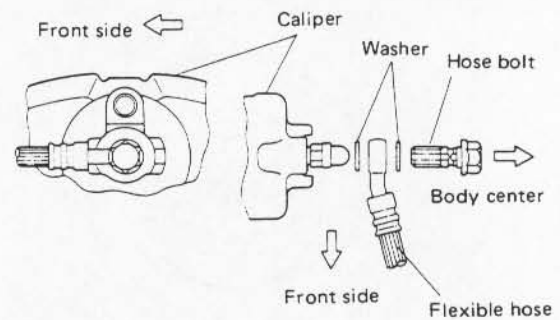


Fig. 19-37

Front Brake Flexible Hose

- Connect flexible hose to caliper as shown below and tighten hose bolt to specified torque.
- Connect the other end of hose to chassis body bracket, being careful not to kink it with the front wheels directed straightforward.



Viewed in arrow "E" direction

Viewed in arrow "D" direction

Fig. 19-38

NOTE:

After completing installation, fill reservoir with brake fluid and bleed brake system. Perform brake test and check each installed part for oil leakage.

Tightening torque

Fastening parts	N·m	kg·m (lb·ft)
Flexible hose bolt	20 – 25	2.0 – 2.5 (14.5 – 18.0)
Carrier bolt	70 – 100	7.0 – 10.0 (51.0 – 72.0)
Caliper holder bolt	40 – 60	4.0 – 6.0 (29.0 – 43.0)
Caliper pin bolt	18 – 26	1.8 – 2.6 (13.0 – 18.5)
Wheel nut	50 – 80	5.0 – 8.0 (36.5 – 57.5)

Inspection for Front Brake After Installing

Mount tires and make certain that they rotate smoothly, with a force of less than 3.0 kg (6.6 lb).

NOTE:

For the above check, the following must be observed.

- 1) Jack up front wheels, both right and left, off the ground.
- 2) Set free wheeling hubs of both right and left wheels to "LOCK", if equipped.
- 3) Shift transfer shift lever to 2H (rear wheel) position.
- 4) The below figure shows outer periphery of tire.
- 5) Be careful not to depress brake pedal when checking tire for rotation.

If tire rotation is heavy, check the following:

- Wheel bearings for breakage.
- Wheel bearing starting preload for proper adjustment.
- Disc for flatness (Improper flatness brings disc into contact with lining during rotation and makes rotation heavy).

To check this, measure disc deflection.

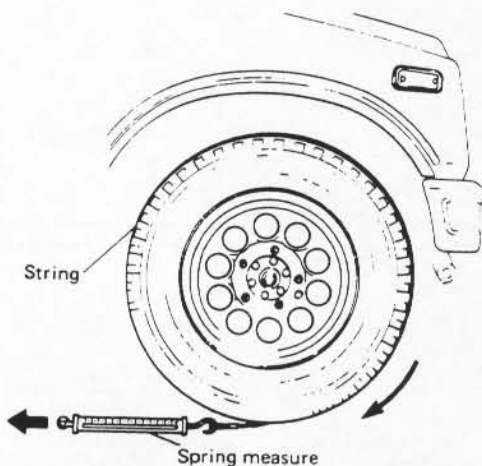


Fig. 19-39

19-3. REAR DRUM BRAKE

REMOVAL

Brake Drums

- 1) Remove wheel center cap.
- 2) Loosen, but do not remove, rear wheel nuts and brake drum nuts.
- 3) Hoist car.
- 4) Remove rear wheel nuts and take off rear wheel.
- 5) Check to ensure that parking brake lever is not pulled up.
- 6) To increase clearance between brake shoe and brake drum, remove parking brake shoe lever return spring ① and disconnect parking brake cable joint ③ from parking brake shoe lever ②.

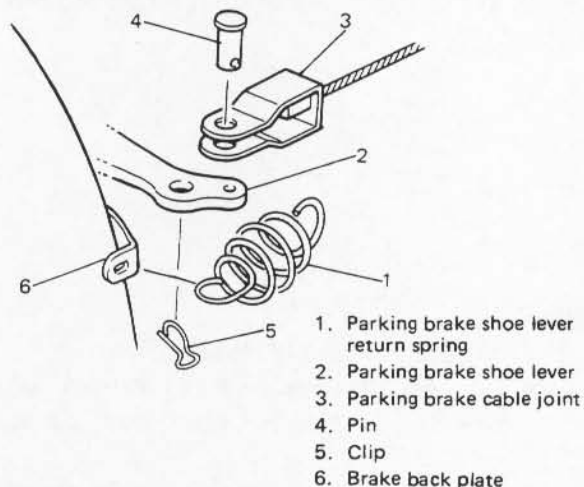


Fig. 19-40

- 7) Remove parking brake shoe lever stopper plate.

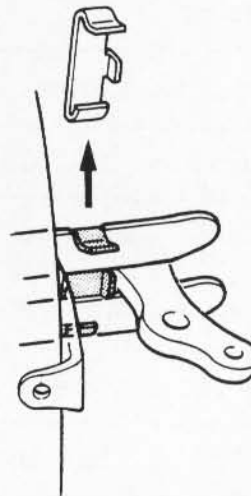


Fig. 19-41

8) Remove brake drum by using special tools.

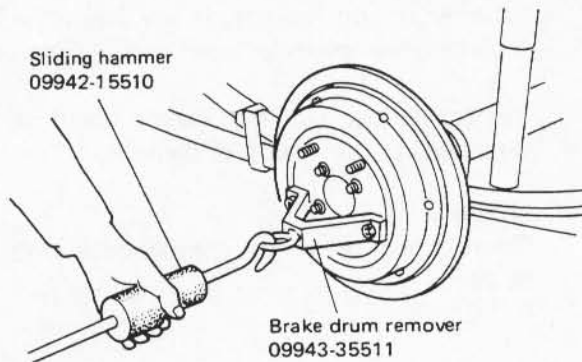


Fig. 19-42

Brake Shoes and Strut

- 1) Remove brake drum referring to REMOVAL on previous page.
- 2) Remove shoe hold down springs ① by turning shoe hold down pins ② as shown.

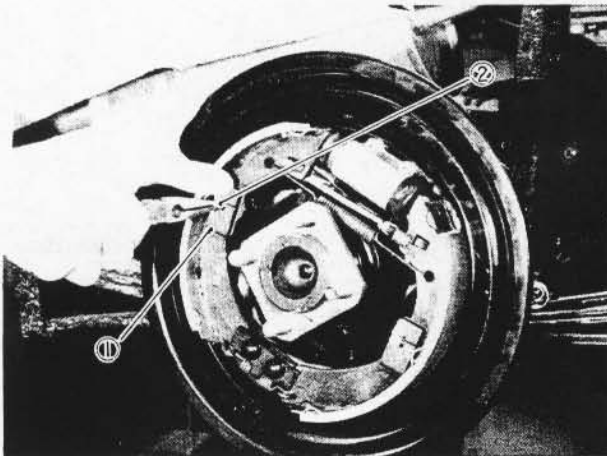


Fig. 19-43

- 3) Remove brake shoes.
- 4) Remove brake shoe strut.

INSPECTION OF COMPONENTS

Brake Drum

Inspect drum for cleanliness. Check its braking surface for wear by measuring its inside diameter.

Item	Standard	Service limit
Brake drum ID	220 mm (8.66 in.)	222 mm (8.74 in.)

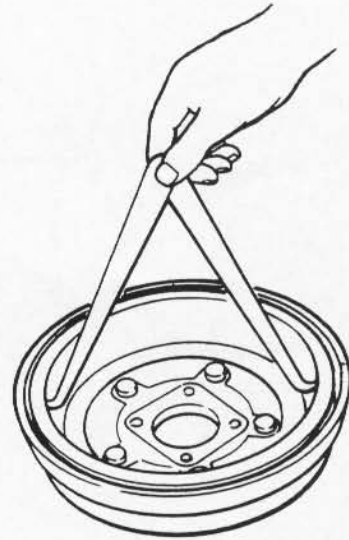


Fig. 19-44

Whenever brake drums are removed, they should be thoroughly cleaned and inspected for cracks, scores, deep grooves.

Cracked, Scored, or Grooved Drum

A cracked drum is unsafe for further service and must be replaced. Do not attempt to weld a cracked drum. Smooth up any slight scores. Heavy or extensive scoring will cause excessive brake lining wear and it will probably be necessary to resurface drum braking surface.

If brake linings are slightly worn and drum is grooved, drum should be polished with fine emery cloth but should not be cut.

NOTE:

When drum is removed, visually inspect wheel cylinder for brake fluid leak. Correct leaky point, if any.

Brake Shoe and Rim

If lining is worn out beyond service limit, replace shoe.

Brake lining	Standard	Service limit
Thickness (lining + shoe rim)	7.0 mm (0.28 in.)	3.0 mm (0.12 in.)

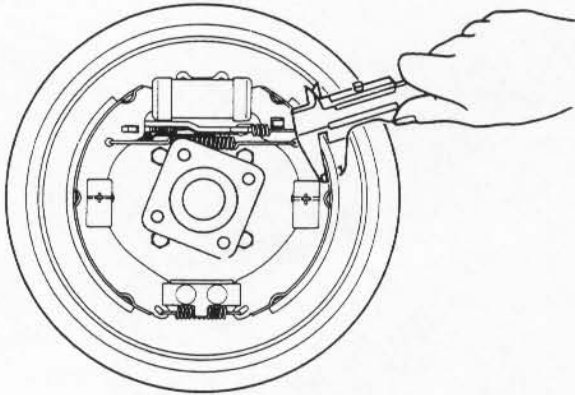


Fig. 19-45

If one of brake linings is worn to or beyond service limit, all linings must be replaced at the same time.

NOTE:

Never polish lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage drum. When it is required to correct lining, replace it with a new one.

Wheel Cylinder

When removing brake drum, check wheel cylinder for oil leakage. If any leakage is found, replace wheel cylinder inner parts.

Inspect wheel cylinder disassembled parts for wear, cracks, corrosion or damage.

NOTE:

Clean wheel cylinder components with brake fluid.

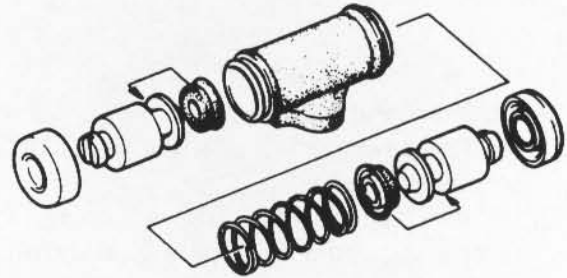


Fig. 19-46

Brake Strut

Inspect ratchet of strut for wear or damage.

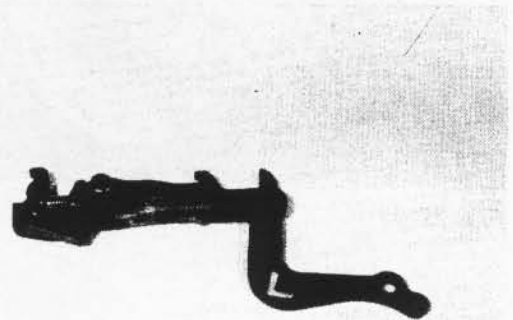


Fig. 19-47

Springs

Inspect for damage or weakening.
Inspect each part for rust. If found defective, replace.

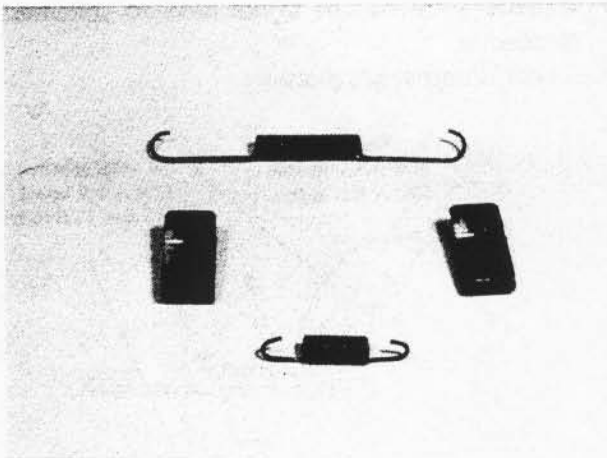


Fig. 19-48

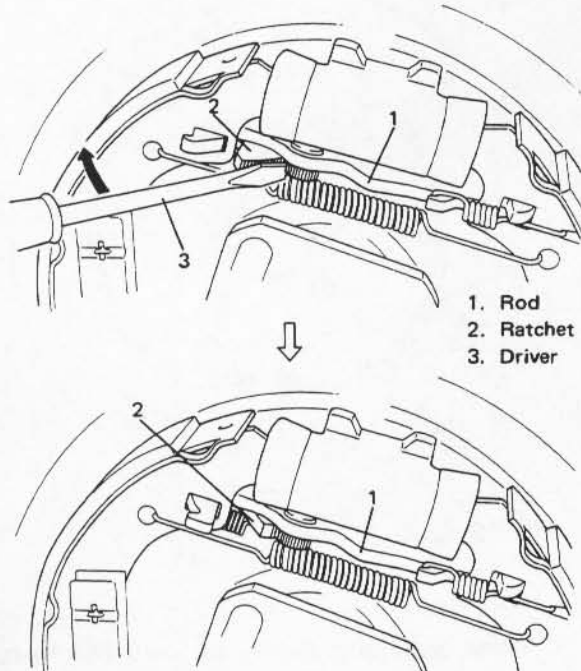
Self Shoe Clearance Adjusting System

To check self shoe clearance adjusting system of rear brake for operation, follow steps described below.

- 1) Remove brake drum.

Carry out steps 1) through 8) of brake drum removal (p. 19-20).

- 2) To maximize brake shoe-to-drum clearance, put screw driver between rod and ratchet and push down ratchet as shown in figure.



Above figure shows ratchet position where brake shoe-to-drum clearance is maximum.

Fig. 19-49

- 3) Install parking brake shoe lever stopper plate.

NOTE:

Make sure to install this plate.

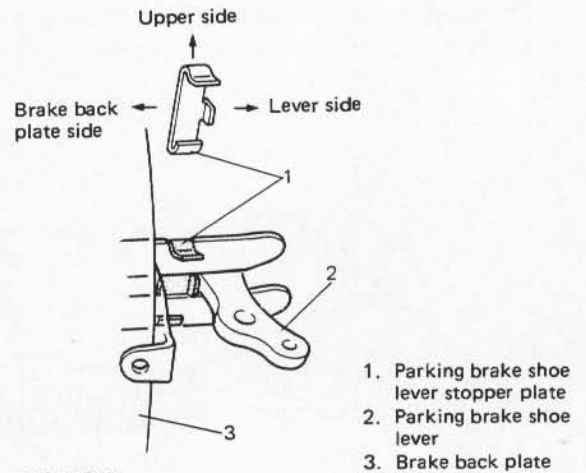


Fig. 19-49-1

- 4) Install brake drum and depress brake pedal with about 30 kg (66 lbs) load 4 or 5 times.

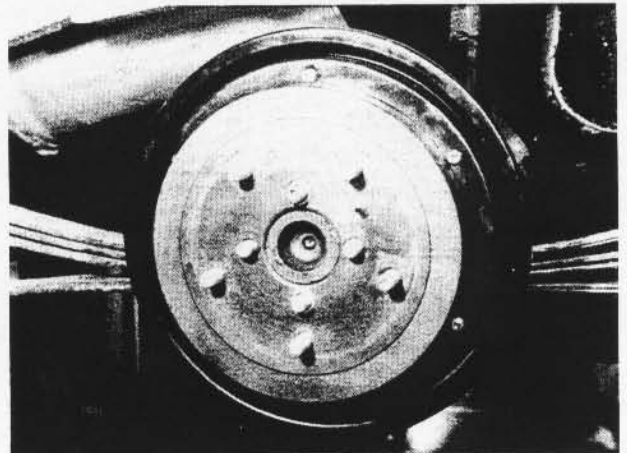


Fig. 19-49-2

- 5) Remove parking brake shoe lever stopper plate.

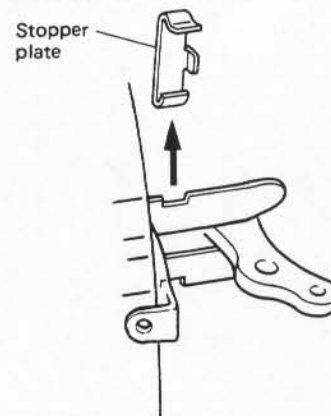
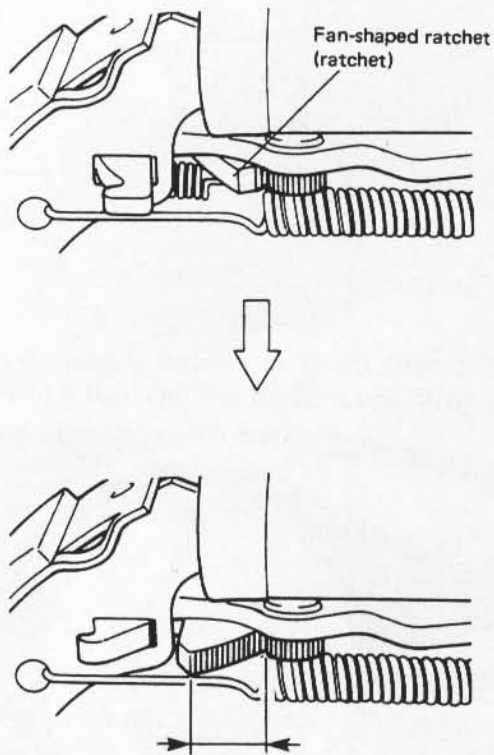


Fig. 19-49-3

6) Remove brake drum and check fan-shaped ratchet position.

If it has shifted off its previous position in step 2) when it was pushed down, it proves proper operation of shoe adjusting system.



If not, replace strut assembly.

Fig. 19-49-4

NOTE:

For brake drum installation, refer to steps 1) through 8) of brake drum installation in this section (p. 19-25).

PRECAUTIONS ON INSTALLATION

Wheel Cylinder

- 1) Tighten wheel cylinder to brake back plate to specified torque.
- 2) Tighten flare nut of brake pipe to specified torque.
- 3) Install breather plug cap.

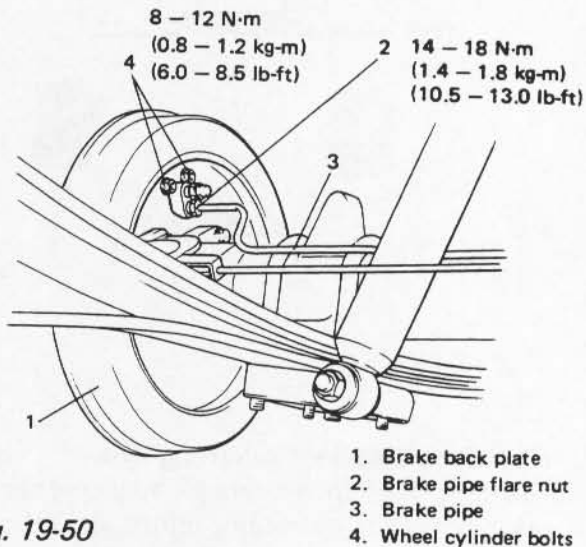


Fig. 19-50

Brake Shoes

- 1) Assemble parts as shown in the reverse order of removal.

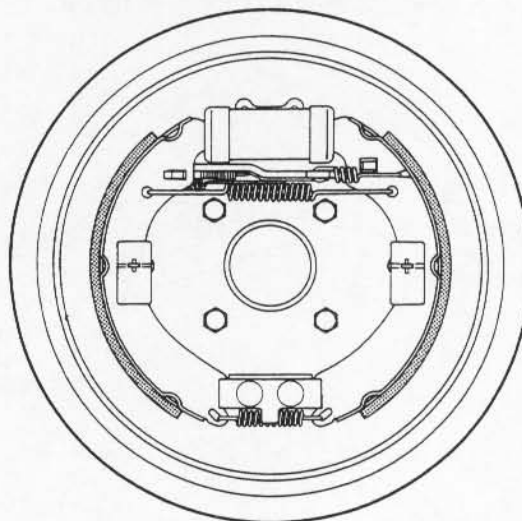


Fig. 19-50-1

NOTE:

When installing shoes, use care not to cause damage to wheel cylinder boots.

- 2) Install shoe hold down springs by pushing them down in place and turning hold down pins.

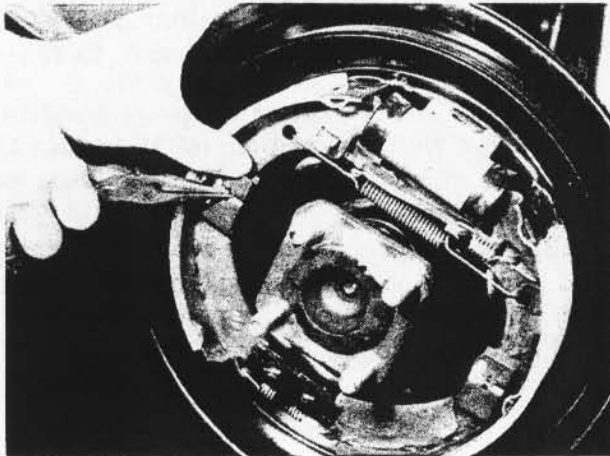


Fig. 19-51

Brake Drum

- 1) Install parking brake shoe lever stopper plate, referring to the following figure for its installation direction.

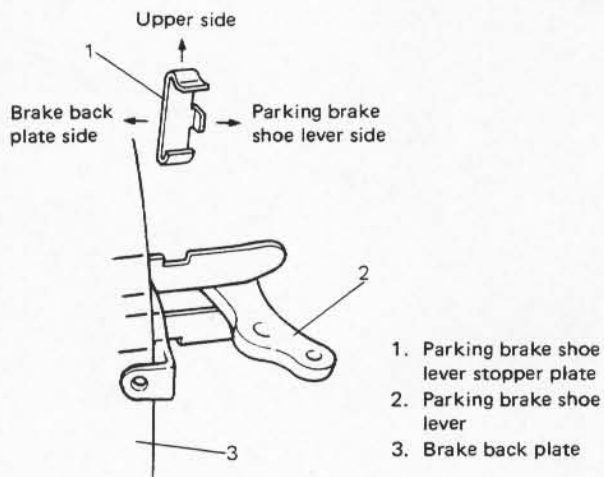


Fig. 19-52

1. Parking brake shoe lever stopper plate

- 2) Connect brake cable joint to parking brake shoe lever by using joint pin. Insert joint pin down from the top and install clip into joint pin hole securely.

NOTE:

Check to ensure that clip is in good condition before installing it. If deformed or broken, replace.

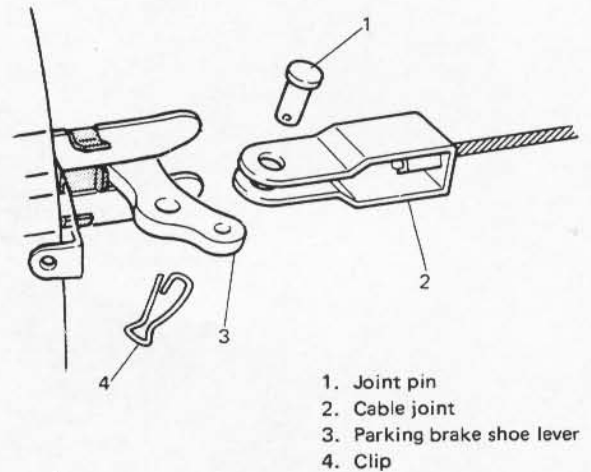


Fig. 19-52-1

- 3) Install parking brake shoe lever return spring.

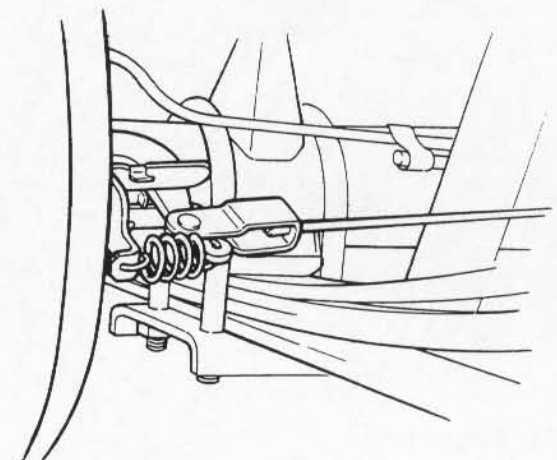
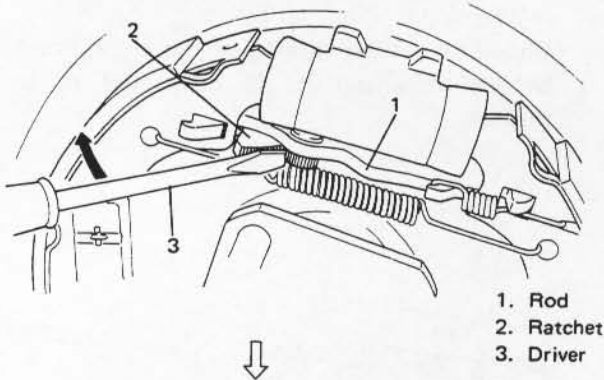


Fig. 19-53

- 4) Before installing brake drum, to maximize brake shoe-to-drum clearance, put screw driver between rod and ratchet and push down ratchet as shown in figure.



Below figure shows ratchet position where brake shoe-to-drum clearance is maximum.

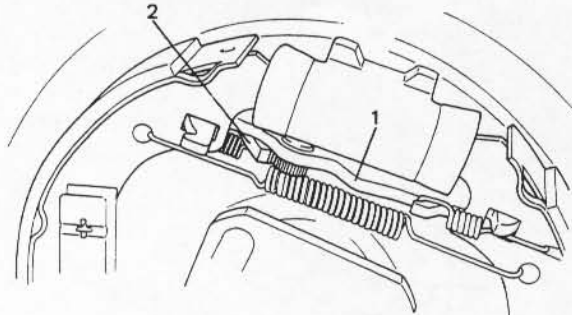


Fig. 19-54

- 5) Install brake drum after making sure that inside of brake drum and brake shoes are free from dirt and oil.
 6) Torque wheel nuts and brake drum nuts to specification.

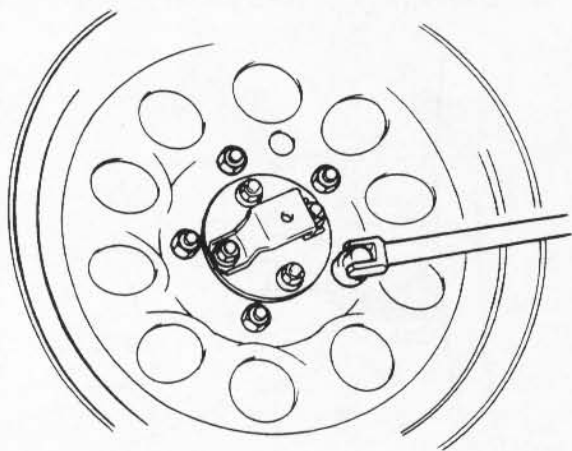


Fig. 19-55

NOTE:

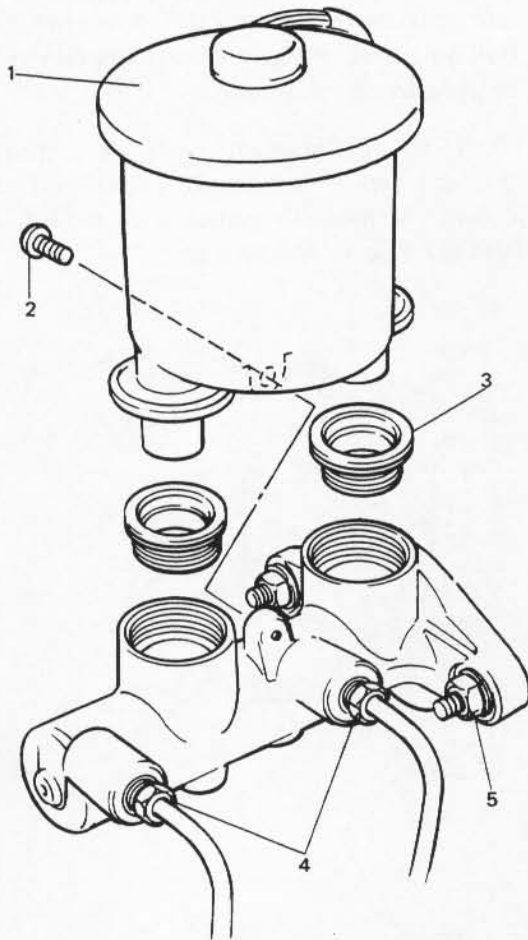
If brake backing plate was removed from wheel cylinder or brake pipe was disconnected from wheel cylinder. Bleed air from brake system. (For bleeding operation, refer to p. 19-46.)

- 7) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load four or five times so as to obtain proper drum-to-shoe clearance.
 8) Check to ensure that brake drum is free from dragging and proper braking is obtained. Then remove car from hoist and perform brake test (foot brake and parking brake).

19-4. MASTER CYLINDER

REMOVAL

- 1) Clean outside of reservoir.
- 2) Take out fluid with a syringe or such.
- 3) Remove reservoir connector screw.
- 4) Remove reservoir.



1. Reservoir
2. Connector screw
3. Grommets
4. Flare nuts
5. Attaching nuts

Fig. 19-56

- 5) Disconnect 2 brake pipes from master cylinder.

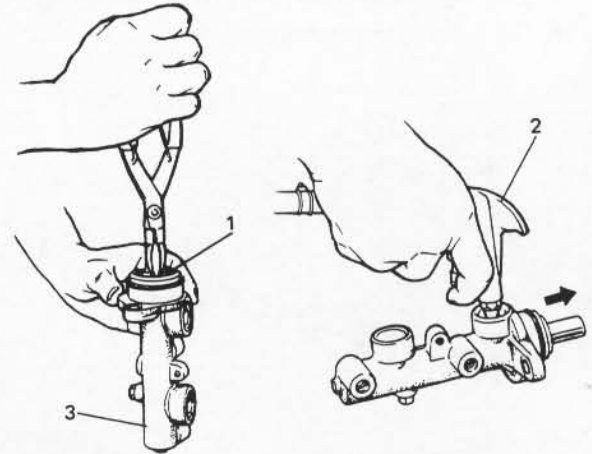
NOTE:

Do not allow brake fluid to get on painted surfaces.

- 6) Remove 2 attaching nuts and washers.
- 7) Remove master cylinder.

DISASSEMBLY

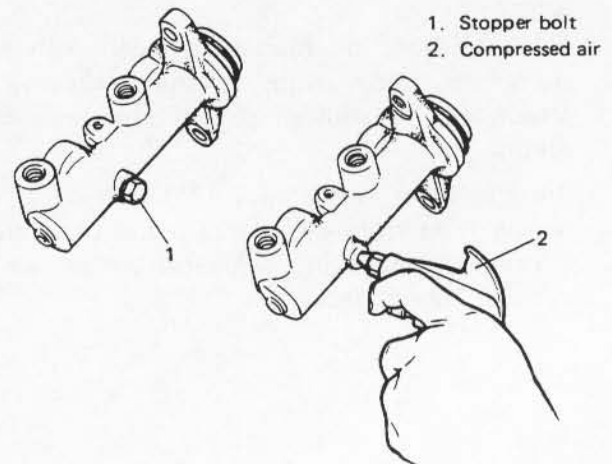
- 1) Remove circlip.
- 2) Remove primary piston by using compressed air as shown. Be cautious during removal as primary piston will jump out.



1. Circlip
2. Compressed air
3. Master cylinder

Fig. 19-57

- 3) Remove piston stopper bolt. Then remove secondary piston by blowing compressed air into hole from which piston stopper bolt was removed.



1. Stopper bolt
2. Compressed air

Fig. 19-58

INSPECTION OF COMPONENTS

Master Cylinder Inner Parts

Inspect all disassembled parts for wear or damage, and replace parts if necessary.

NOTE:

- Wash disassembled parts with brake fluid.
- Do not reuse piston cups.

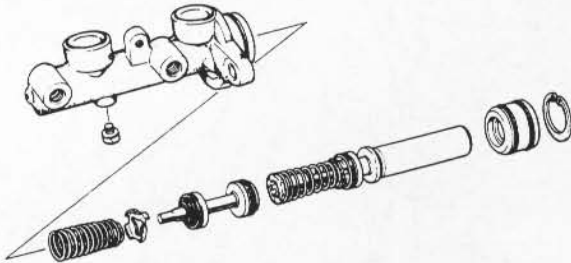


Fig. 19-59

Inspect master cylinder bore for scoring or corrosion. It is best to replace a corroded cylinder. Corrosion can be identified as pits or excessive roughness.

NOTE:

Polishing bore of master cylinder with cast aluminum body with anything abrasive is prohibited, as damage to cylinder bore may occur.

Rinse cylinder in clean brake fluid. Shake excess rinsing fluid from cylinder. Do not use a cloth to dry cylinder, as lint from cloth will remain on cylinder bore surface.

Reservoir

NOTE:

Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use a container which has been used for mineral oil or a container which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in the hydraulic brake system and water will mix with brake fluid, lowering the fluid boiling point. Keep all fluid containers capped to prevent contamination.

Fluid to fill reservoir with is indicated on reservoir cap of the car with embossed letters or in owner's manual supplied with the car. Add fluid up to MAX line.

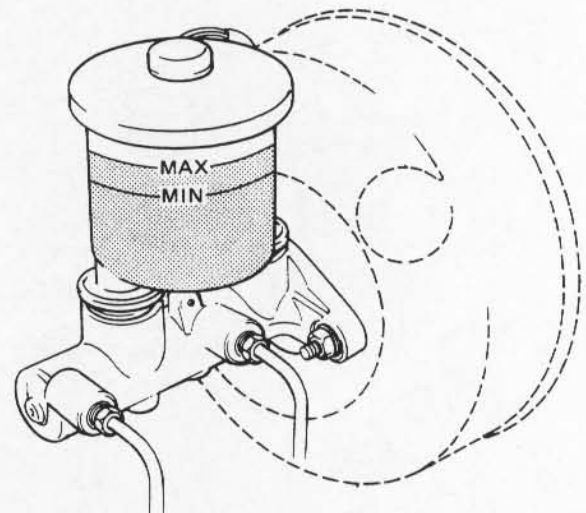


Fig. 19-60

ASSEMBLY

NOTE:

Before assembling, wash each part in fluid recommended to use for the car.

1) Assemble secondary piston as shown below.

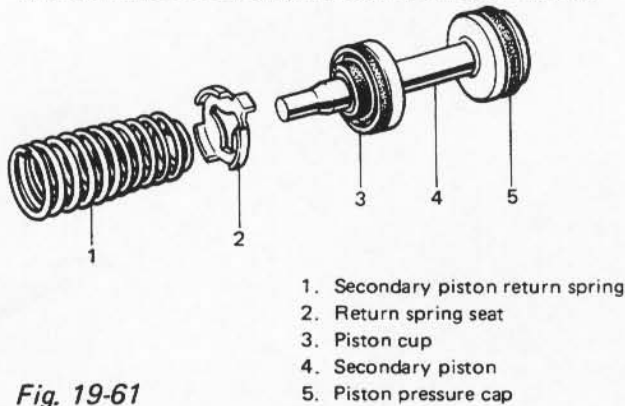


Fig. 19-61

- 2) Install secondary piston assembly into cylinder.
- 3) Install primary piston in cylinder.
- 4) Depress, and install circlip.

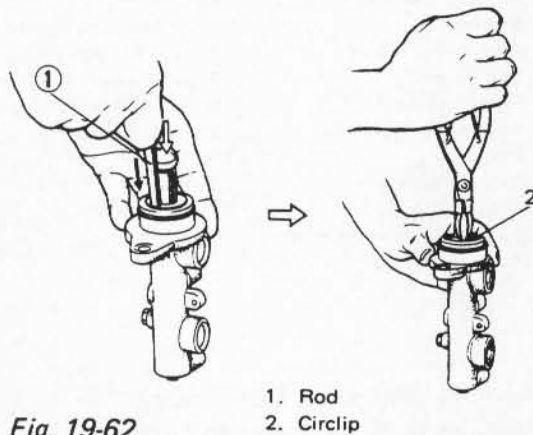


Fig. 19-62

- 5) Install piston stopper bolt with pistons pushed in all the way and tighten it to specified torque.

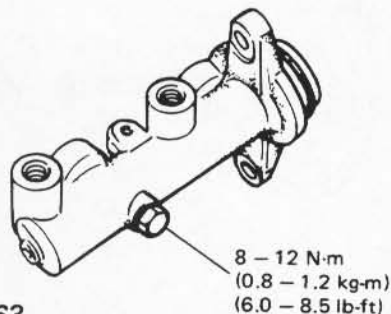


Fig. 19-63

- 6) For installation on car, refer to INSTALLATION.

PRECAUTION OF INSTALLATION

NOTE:

- See NOTE at the beginning of this section.
- Adjust clearance between booster piston rod and primary piston with special tool (See page 19-33).

- 1) Install master cylinder as shown and torque attaching nuts to specification.
- 2) Connect 2 hydraulic lines and torque flare nuts to specification.
- 3) When using new grommets, lubricate them with the same fluid as the one to fill reservoir with. Then press-fit grommets to master cylinder. Grommets must be seated in place.
- 4) Install reservoir and tighten screw to specified torque.
- 5) Fill reservoir with specified fluid.

After installing, check brake pedal height, bleed air from system (See p. 19-43 and p. 19-46) and also check for fluid leakage.

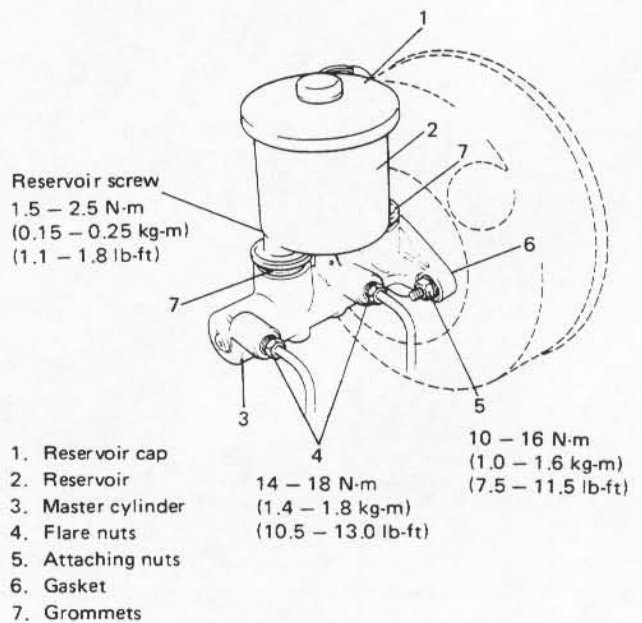


Fig. 19-64

19-5. BRAKE BOOSTER

REMOVAL

- 1) Take out fluid from master cylinder with a syringe or such.
- 2) Disconnect 2 brake pipes from master cylinder and remove master cylinder from booster.
- 3) Disconnect vacuum hose from booster.
- 4) Disconnect push rod clevis from brake pedal arm.
- 5) Remove attaching nuts and then booster as shown.

NOTE:

Below figure shows booster of right hand steering car. The only difference for booster of left hand steering car is vacuum valve "A" installing position.

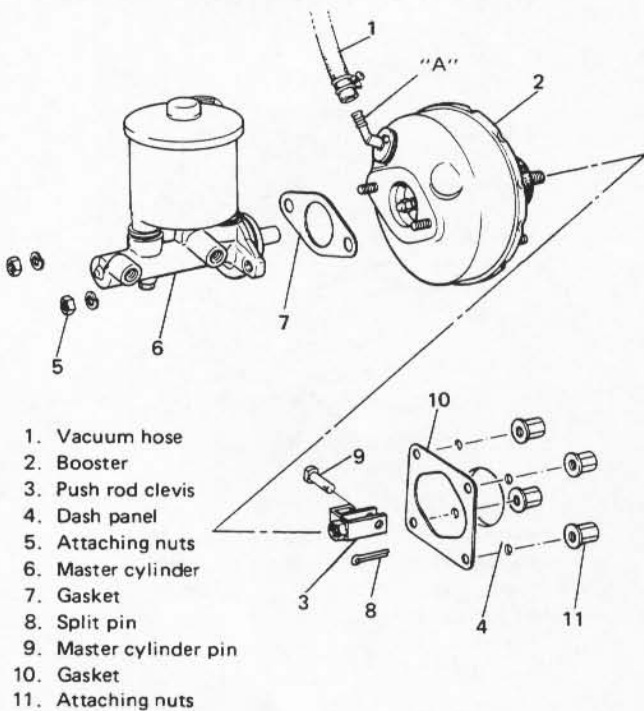
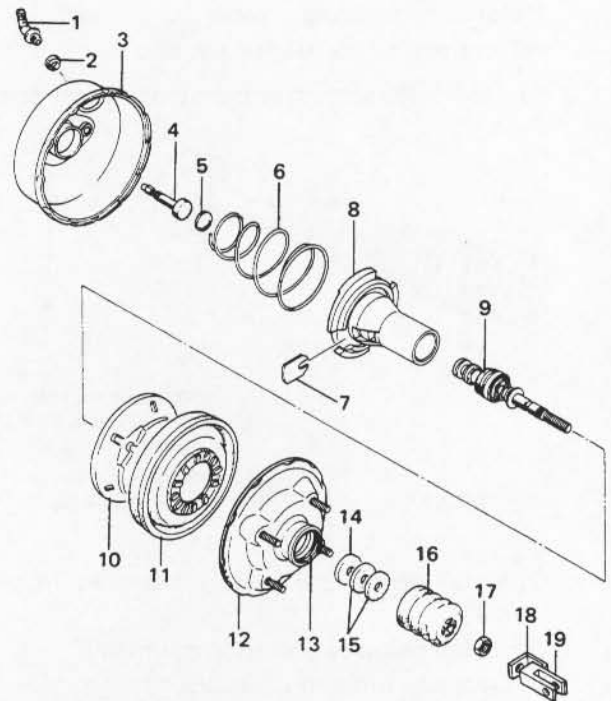


Fig. 19-65

DISASSEMBLY



- | | |
|---------------------------------|---------------------------|
| 1. Vacuum check valve | 11. Diaphragm |
| 2. Grommet | 12. Booster No. 2 body |
| 3. Booster No. 1 body | 13. No. 2 body oil seal |
| 4. Piston rod | 14. Air cleaner separator |
| 5. Reaction disc | 15. Air cleaner element |
| 6. Booster piston return spring | 16. Body boot |
| 7. Valve stopper key | 17. Nut |
| 8. Booster piston | 18. Bracket |
| 9. Booster air valve assembly | 19. Push rod clevis |
| 10. Pressure plate | |

Fig. 19-66

- 1) Remove piston rod from booster.
- 2) Remove push rod clevis and nut.

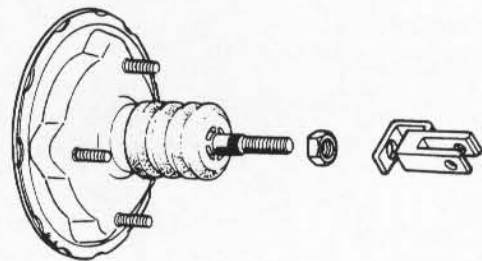


Fig. 19-67

3) Set booster to special tool (A) as shown.

NOTE:

When setting, check to be sure that booster vacuum check valve is not in faulty contact with base of special tool.

Tighten 2 nuts on upper part of special tool evenly to specified torque.

Special tool nuts tightening torque	N·m	kg·m	lb·ft
	3 – 5	0.3 – 0.5	2.2 – 3.6

NOTE:

Be careful not to over-tighten nuts, or booster body will be deformed.

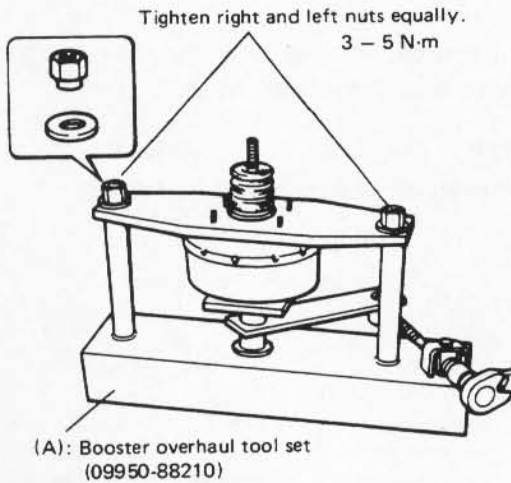


Fig. 19-68

4) Turn special tool bolt clockwise until No. 1 body projecting part and No. 2 body depressed part fit each other. Once they are matched, make match marking on No. 1 and No. 2 bodies to facilitate their installation.

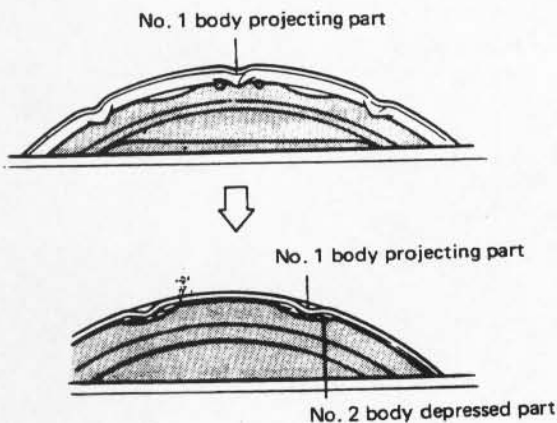


Fig. 19-69

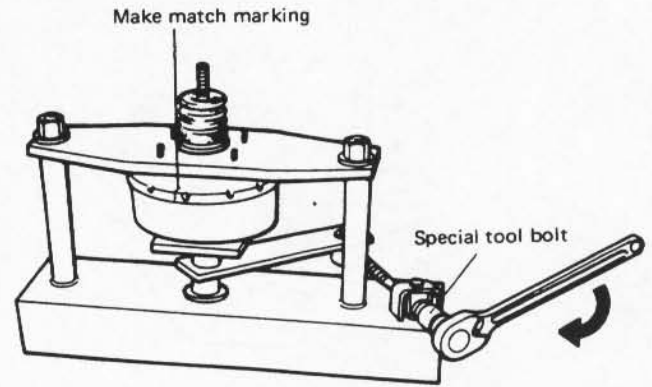


Fig. 19-70

5) Remove booster from special tool and separate No. 1 body and No. 2 body. Remove piston return spring.

NOTE:

When separating two bodies, hold both bodies carefully to prevent either body from jumping off by spring force.

6) From booster No. 2 body, remove boot, air cleaner elements and air cleaner separator in this order.

7) Using camshaft pulley holder (special tool 09917-68210), turn booster piston counter-clockwise and remove piston.

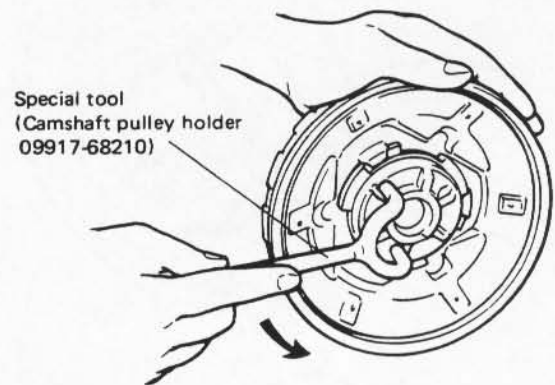
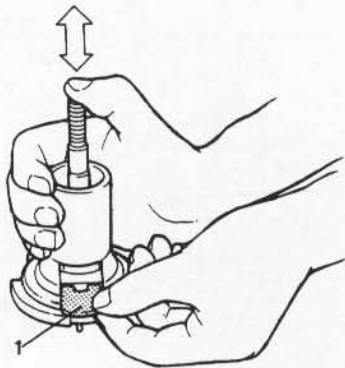


Fig. 19-71

8) While compressing air valve spring (by moving rod up and down as shown), remove valve stopper key. Then remove booster air valve assembly from booster piston.

NOTE:

Booster air valve assembly can't be disassembled.



1. Valve stopper key

Booster air valve assembly

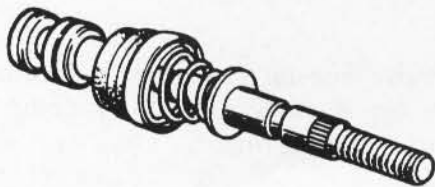


Fig. 19-72

9) Remove diaphragm from pressure plate.

NOTE:

Don't use screwdriver or any other tool for removal. Pull it off by hand carefully handling pressure plate groove area where diaphragm is fitted.

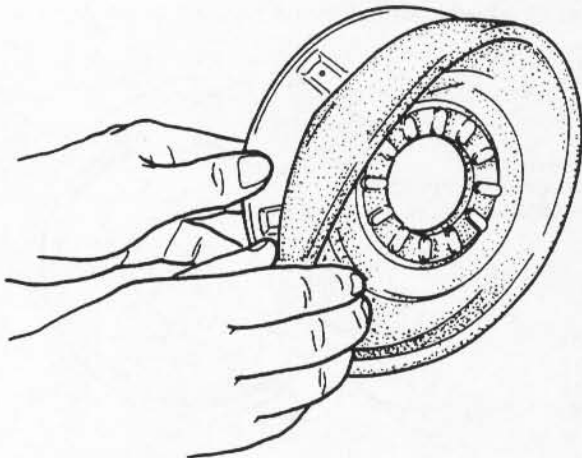


Fig. 19-73

10) Remove reaction disc from booster piston with fingers.

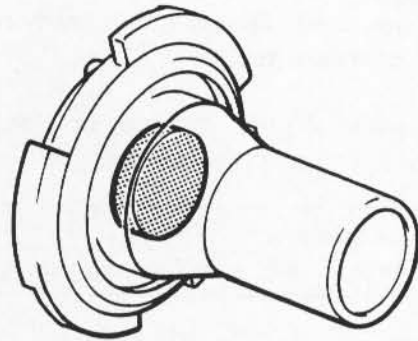
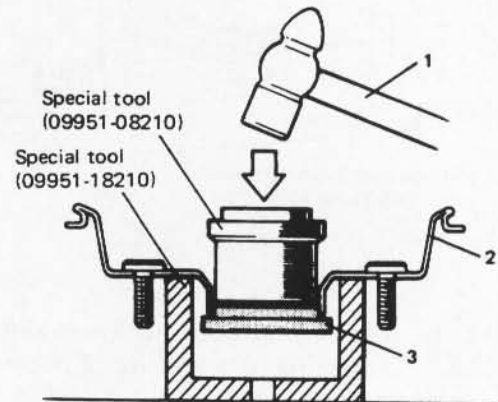


Fig. 19-74

11) Remove oil seal from booster No. 2 body with special tools as shown.

NOTE:

Removed oil seal must not be reused.



- 1. Hammer lightly
- 2. No. 2 body
- 3. Oil seal

Fig. 19-75

INSPECTION

Inner Parts

NOTE:

After disassembly, soak all metal parts in ethyl alcohol. Wipe rubber diaphragm and plastic parts with a clean cloth. Use ethyl alcohol damped cloth to wipe out heavy dirt. Application of much ethyl alcohol especially to rubber parts is prohibited.

[Rubber parts]

Wipe fluid from rubber parts and carefully inspect each rubber part for cuts, nicks or other damage. These parts are the key to the control of air flow. If there is any question as to the serviceability of rubber parts, REPLACE them.

[Metal parts]

BADLY DAMAGED ITEMS, OR THOSE WHICH WOULD TAKE EXTENSIVE WORK OR TIME TO REPAIR, SHOULD BE REPLACED. IN CASE OF DOUBT, INSTALL NEW PARTS.

Inspection/Adjustment of Clearance Between Booster Piston Rod and Master Cylinder Piston

The length of booster piston rod is adjusted to provide specified clearance between piston rod end and master cylinder piston.

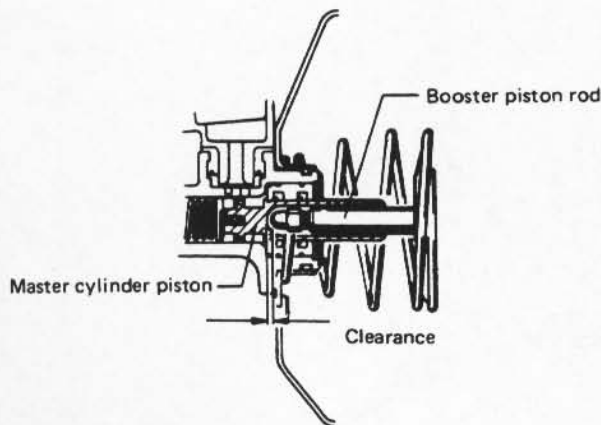


Fig. 19-76

- Before measuring clearance, push piston rod several times so as to make sure reaction disc is in place.
- Take measurement with gasket installed to master cylinder.
- Keep inside of booster at atmospheric pressure for measurement.

1) Set special tool (D) on master cylinder and push pin until it contacts piston.

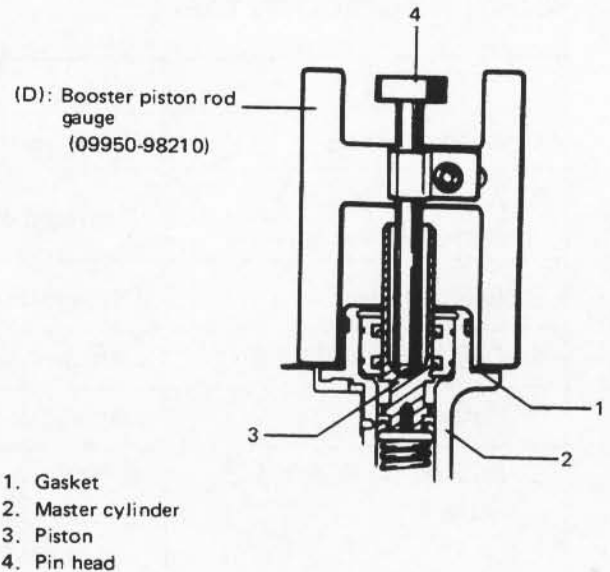


Fig. 19-77

- 2) Turn special tool upside down and place it on booster. Adjust booster piston rod length until rod end contacts pin head.
- 3) Adjust clearance by turning adjusting bolt of piston rod.

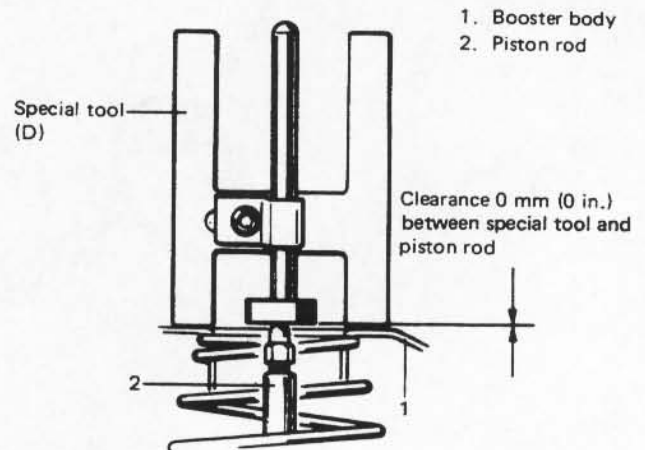


Fig. 19-78

Reference

When adjusted as above, if negative pressure is applied to booster with engine at idle, piston to piston rod clearance should become 0.1 – 0.5 mm (0.004 – 0.020 in.).

BOOSTER INSPECTION TABLE

Part	Inspect For	Corrective Action
1. Booster piston	Cracks, distortion or damage.	Replace.
2. Air valve ass'y (Control valve spring)	Damaged or worn seal surfaces.	Replace.
3. Reaction disc	Damage or wear.	Replace.
4. Diaphragm and boot	Damage.	Replace.
5. Piston rod	Damage or bend.	Replace.
6. Booster No. 1 & No. 2 body.	<ol style="list-style-type: none"> Scratches, scores, pits, dents, or other damage affecting rolling or sealing of diaphragm or other seals. Cracks, damage at ears, damaged threads on studs. Bent or nicked locking lugs. Loose studs. 	<p>Replace, unless easily repaired.</p> <p>Replace, unless easily repaired.</p> <p>Replace, unless easily repaired.</p> <p>Replace.</p>
7. Air filters and separator	Dirt.	Replace.

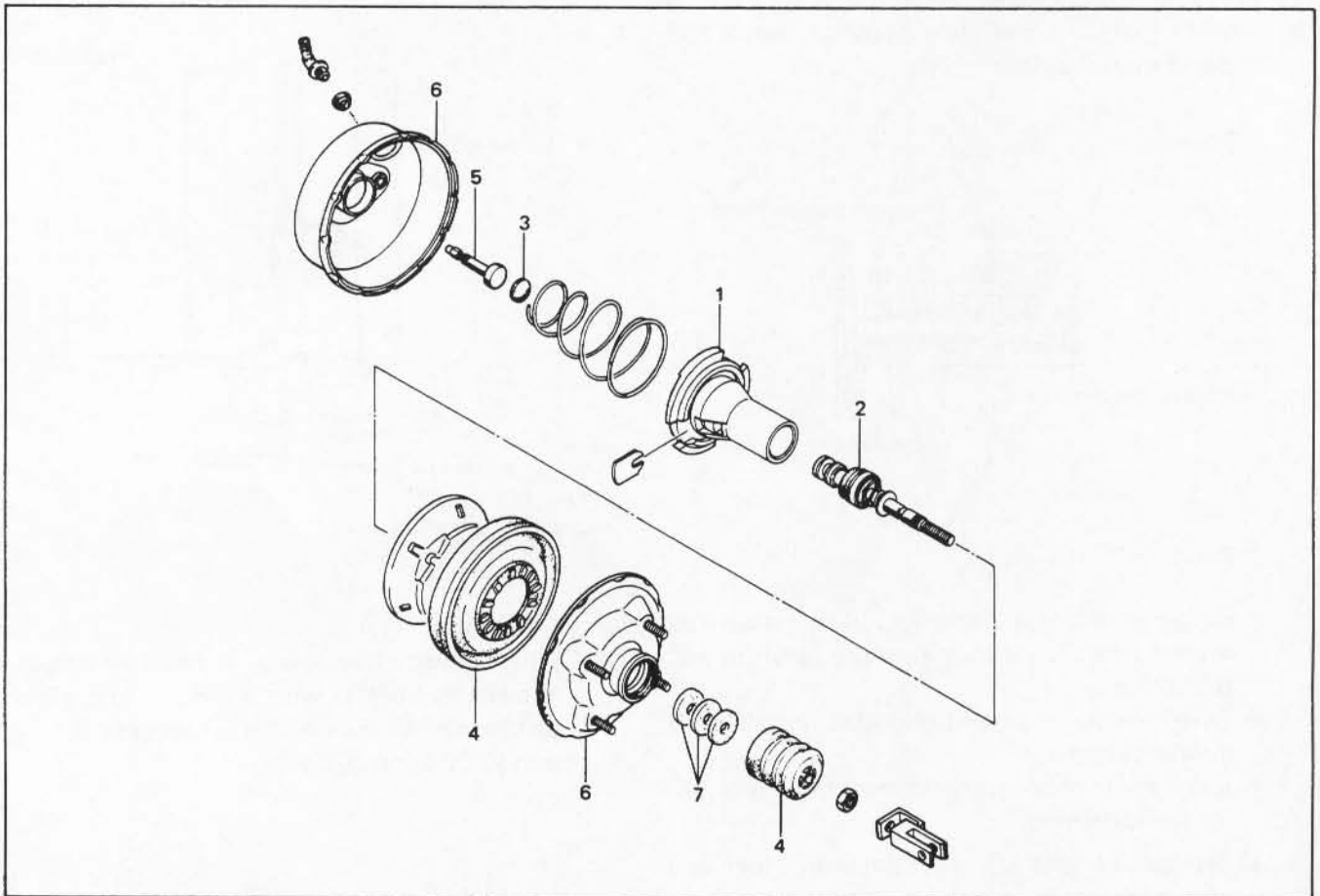


Fig. 19-79

ASSEMBLY

NOTE:

- See NOTE at the beginning of this section.
- Be sure to use silicon grease wherever application of grease is instructed during assembly. Use of oil and grease for installation of check valve and its grommet is strictly prohibited.

- 1) Apply grease to oil seal outer surface and oil seal lip as shown. Press-fit oil seal to booster No. 2 body by using special tool (B) and (C).

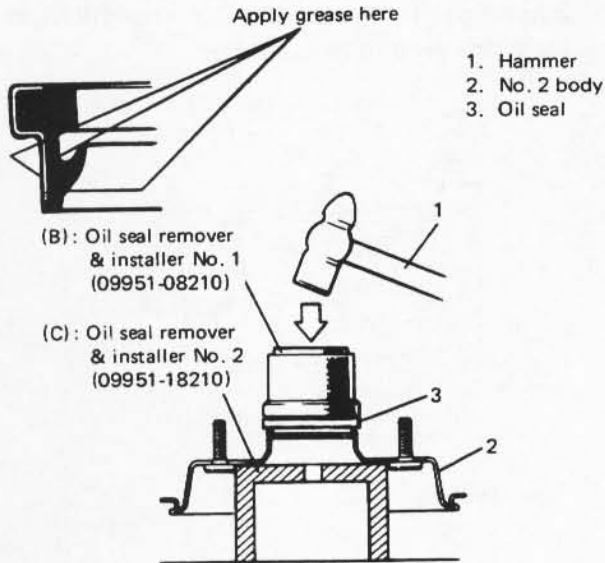


Fig. 19-80

- 2) Install booster air valve assembly to booster piston. Before installation, apply grease as shown.



Fig. 19-81

- 3) Compress air valve assembly and insert valve stopper key.

NOTE:

Be sure that valve assembly is in piston "A" as indicated in figure. (Don't force installation.)

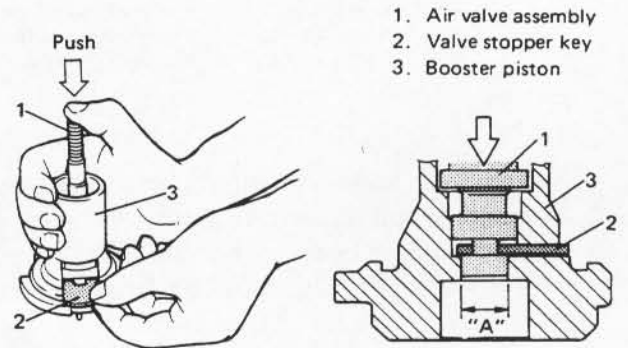


Fig. 19-82

- 4) Install diaphragm to pressure plate by hand.

NOTE:

Check to be sure that diaphragm is seated securely in pressure plate groove for diaphragm by turning diaphragm.

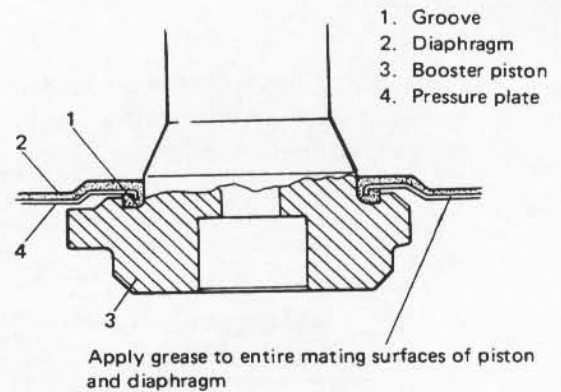


Fig. 19-83

- 5) Install reaction disc to booster piston after greasing its entire face.
- 6) Install booster piston to booster No. 2 body.

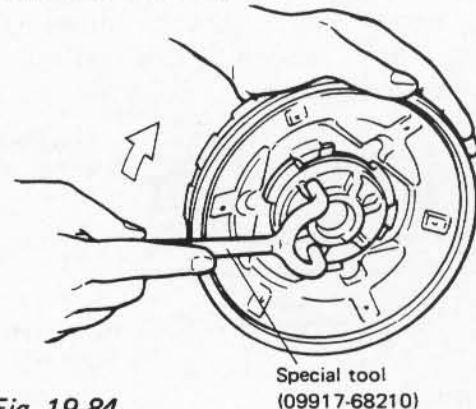
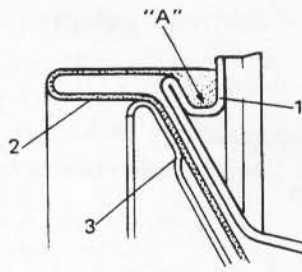


Fig. 19-84

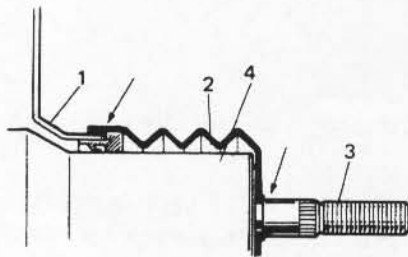


1. Booster No. 2 body
2. Diaphragm
3. Pressure plate

Check all around booster No. 2 body to make sure that diaphragm is seated securely in its outer groove as shown in "A".

Fig. 19-85

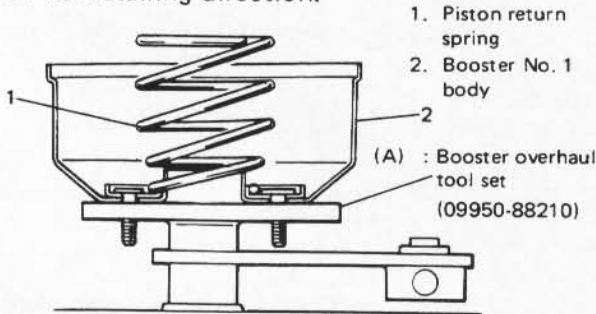
- 7) Install air cleaner separator and then 2 elements to rod of air valve assembly.
- 8) Install body boot to booster No. 2 body. Both ends of boot must be fitted securely as shown.



1. No. 2 body
2. Boot
3. Rod
4. Booster piston

Fig. 19-86

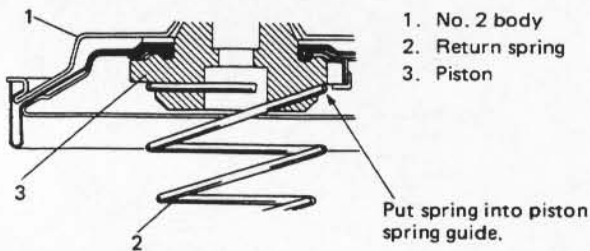
- 9) Place No. 1 body on special tool (A). Then install piston return spring, being careful for its installing direction.



1. Piston return spring
 2. Booster No. 1 body
- (A) : Booster overhaul tool set (09950-88210)

Fig. 19-87

- 10) Place booster No. 2 body on piston return spring. Then check to be sure that spring is in piston spring guide.



1. No. 2 body
2. Return spring
3. Piston

Put spring into piston spring guide.

Fig. 19-88

- 11) Put No. 1 and No. 2 bodies together by aligning markings made before disassembly. Holding No. 2 body with upper plate (special tool) as shown, torque 2 nuts equally to specification.

Special tool nuts tightening torque	N·m	kg·m	lb·ft
	3 - 5	0.3 - 0.5	2.2 - 3.6

NOTE:
When holding No. 2 body, use care so that diaphragm is not caught by projections at 16 locations around No. 1 body.

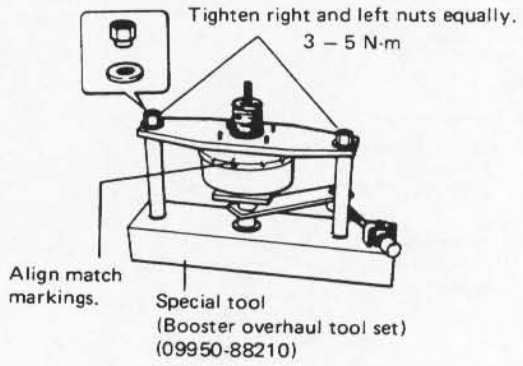


Fig. 19-89

- 12) Turn special tool bolt counterclockwise until No. 1 body projecting part comes to mid-position of No. 2 body depressed parts as shown.

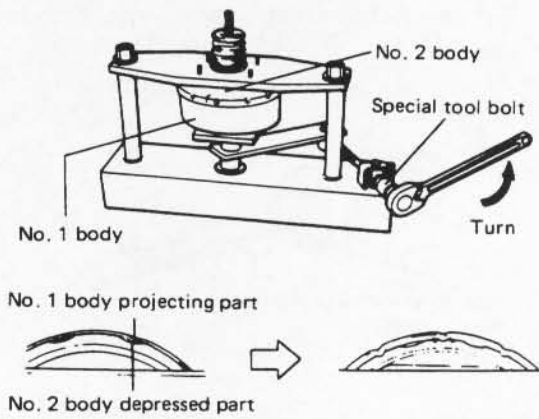


Fig. 19-90

- 13) Remove booster from special tool and install push rod clevis so that below measurement "A" is obtained and torque nut to specification.

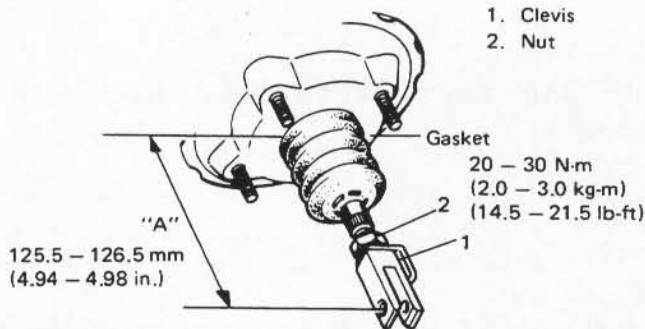


Fig. 19-91

- 14) Insert piston rod into booster piston.

NOTE:

Whenever booster was disassembled, make sure to check clearance between piston rod and master cylinder piston after reassembly. (For details, refer to p. 19-33.)

INSTALLATION

NOTE:

- See NOTE at the beginning of this section.
 - Adjust clearance between booster piston rod and master cylinder piston with special tool. (See page 19-33.)
 - Check length of push rod clevis. (Refer to Fig. 19-91).
- 1) Install booster to dash panel as shown. Then connect booster push rod clevis to pedal arm with pin and split pin.
 - 2) Torque booster attaching nuts to specification.
 - 3) Install master cylinder to booster and torque attaching nuts to specification.
 - 4) Connect 2 brake pipes and torque flare nuts to specification. (See p. 19-29).
 - 5) Fill reservoir with specified fluid.
 - 6) Bleed air from brake system. (See BLEEDING BRAKES on p. 19-46).
 - 7) After installing, check pedal height and play. (See p. 19-43).

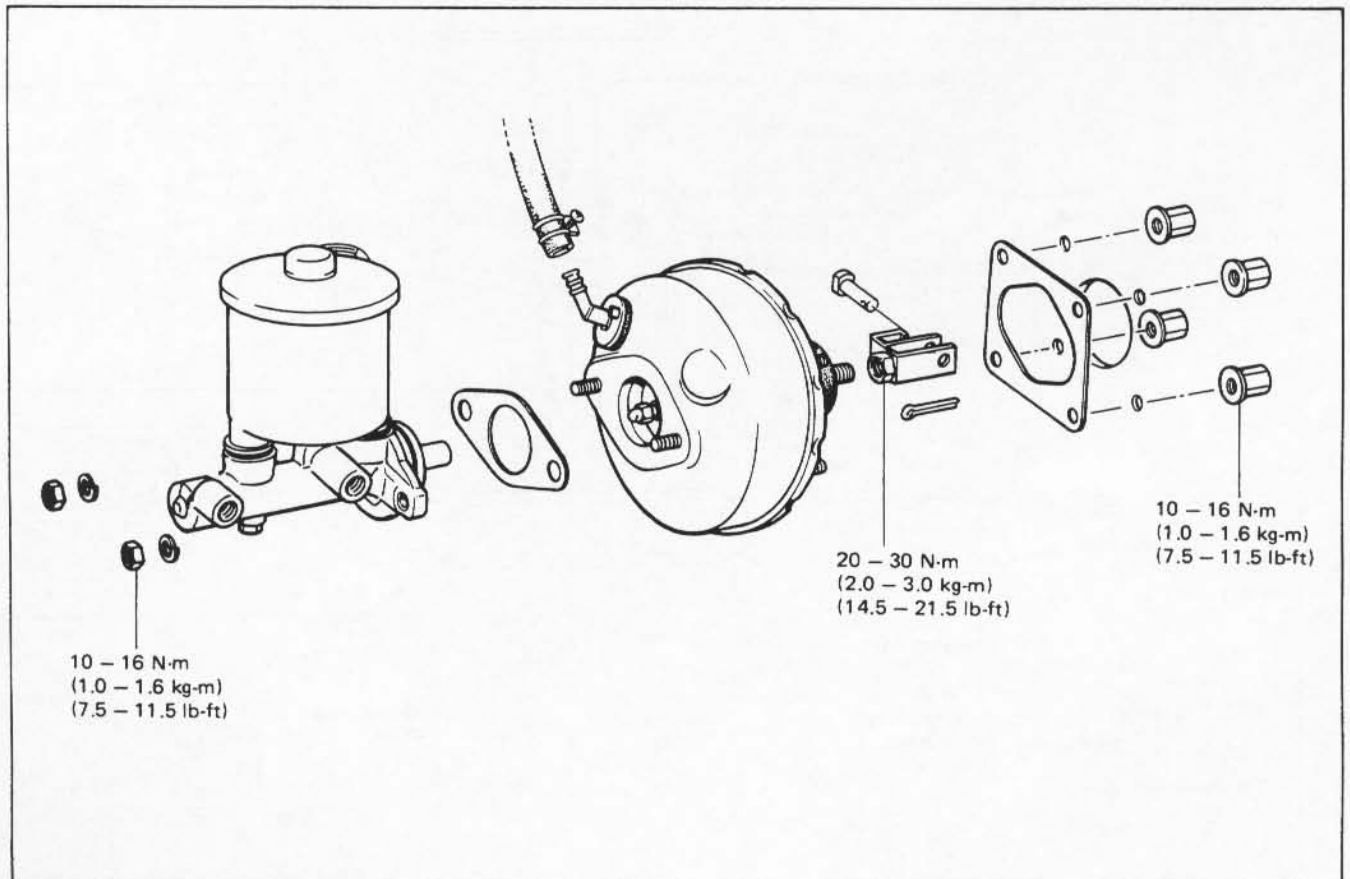


Fig. 19-92

19-6. PARKING BRAKE

NOTE:

For parking brake inspection and adjustment, refer to p. 19-44 under 19-8 MAINTENANCE SERVICE in this section.

INSTALLATION

- If parking brake cable was removed and reinstalled, make sure to clamp it properly according to illustrated instruction for each clamp in the figure below.
- After installing cable, check the following;
 - * Parking brake lever stroke is within specification
 - * Parking brake operates properly
 - * Brake is free from dragging

For stroke data and cable adjustment, refer to p. 19-44 and 19-45 under 19-8 MAINTENANCE SERVICE in this section.

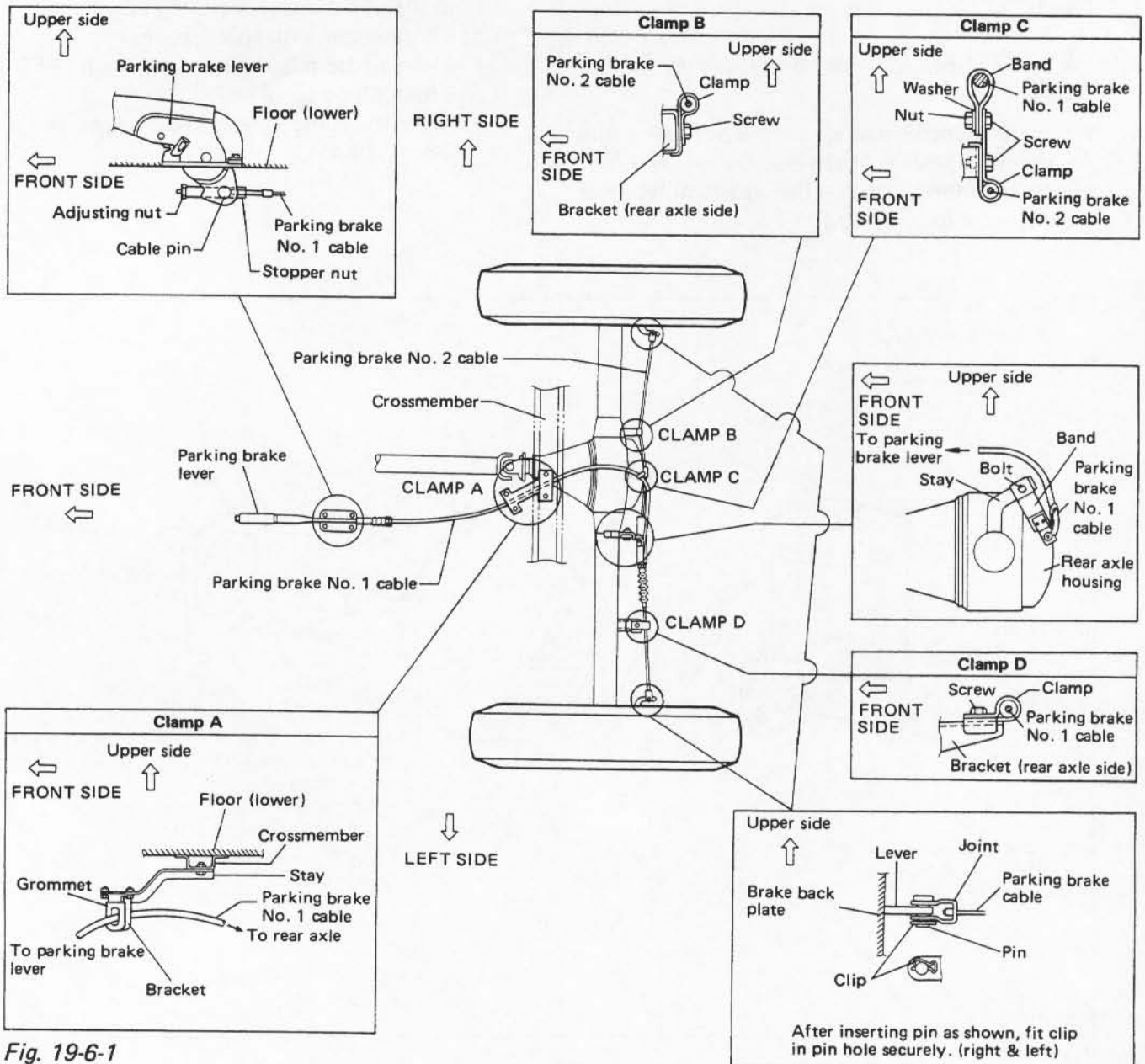


Fig. 19-6-1

19-7. BRAKE PIPES AND HOSES

REMOVAL AND INSTALLATION

- 1) Take out fluid with a syringe or such.
- 2) Clean dirt and foreign material from both hose end or pipe end fittings. Remove brake hose or pipe.
- 3) Reverse removal procedure for brake hose or pipe installation. When installing hose, make sure that it has no twists or kinks. Inspect to see that hose doesn't make contact with any part of suspension. Check in extreme right and extreme left turn conditions. If hose makes any contact, remove and correct. Fill and maintain brake fluid level in reservoir. Bleed brake system.

CAUTION:

- Refer to Fig. 19-38 when connecting brake flexible hose to brake caliper and tighten to specified torque.
- Be sure to install brake pipe in proper position referring to Fig. 19-7-2 and clamp it securely and correctly.

Tightening torque

	N·m	kg·m	lb·ft
Brake pipe flare nuts	14 – 18	1.4 – 1.8	10.5 – 13.0
Brake flexible hose bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
6-way joint bolt	6 – 10	0.6 – 1.0	4.5 – 7.0
Proportioning and bypass valve bolt	6 – 10	0.6 – 1.0	4.5 – 7.0
Proportioning and bypass valve plate bolt	6 – 10	0.6 – 1.0	4.5 – 7.0

NOTE:

- Be sure to install brake flexible hose E-ring into hose groove.

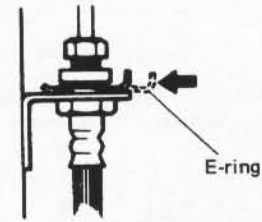
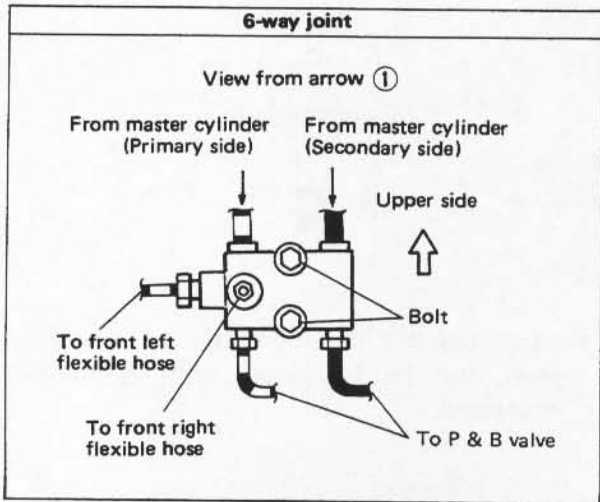


Fig. 19-7-1

- Upon completion of installation, check each joint for fluid leakage with brake pedal depressed.



- Brake flexible hose and E-ring**
- Make sure that flexible hose is not twisted when it is installed or connected to the pipe.
 - When installing flexible hose to bracket, align 6 vertexes of metal fixture on hose with internal angles of bracket.
 - Insert E-ring till E-ring end surface is flush with or lower than bracket end surface. (Refer to p. 19-39.)
 - For installation of flexible hose to brake caliper, refer to p. 19-19.
 - Install the flexible hose so that it won't be kinked when the steering wheel is straightened.
- After installing the flexible hose, turn the steering wheel to the right fully and check that the clearance between the wheel/tire and flexible hose is larger than 25 mm (0,984 in) in that state and then check likewise with the steering wheel turned to the full left position. (This is to ensure that more than 25 mm (0.984 in) clearance is maintained even when bumping or rebounding fully).

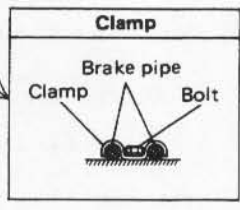
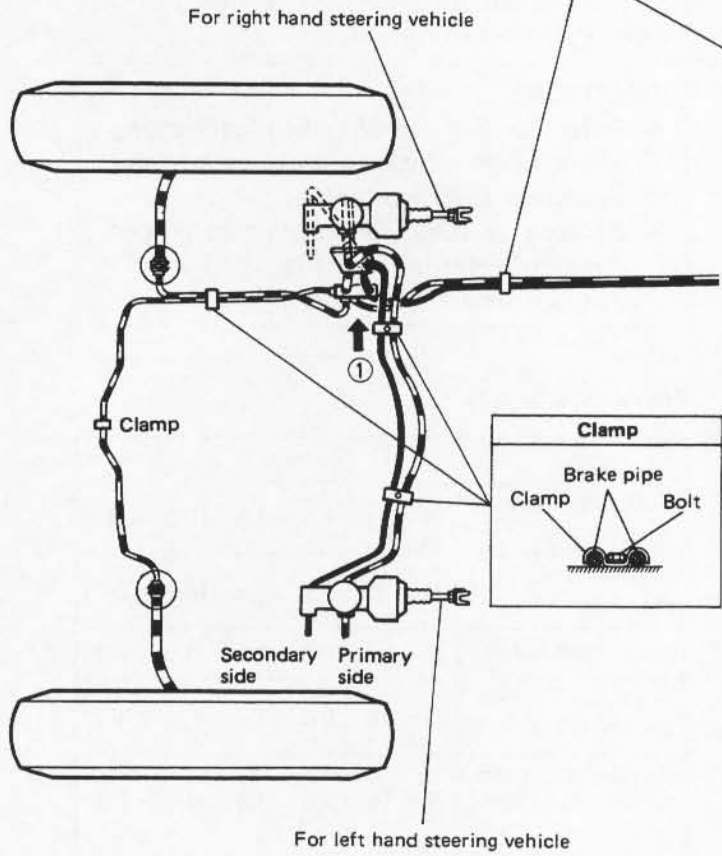
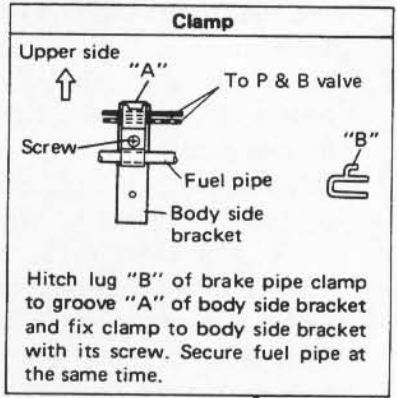
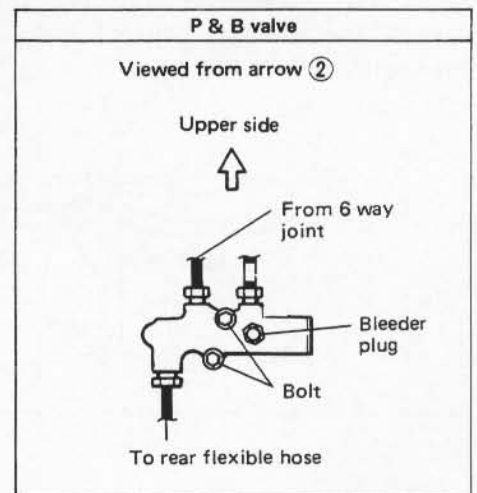
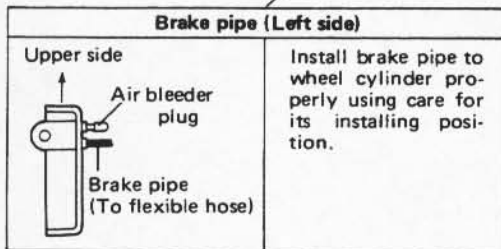
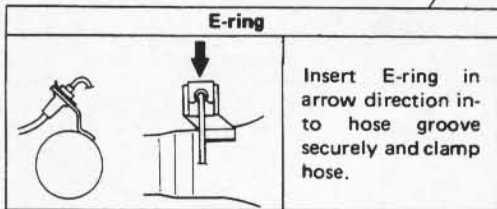
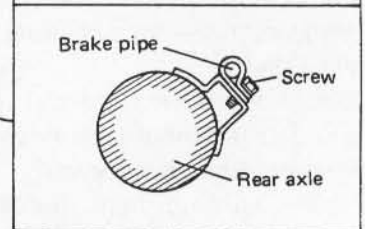
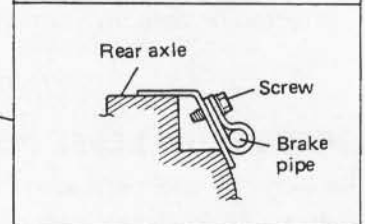
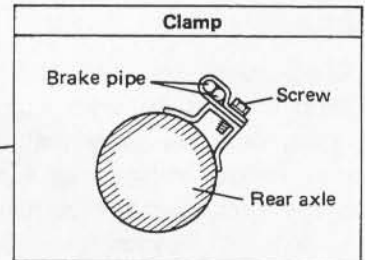
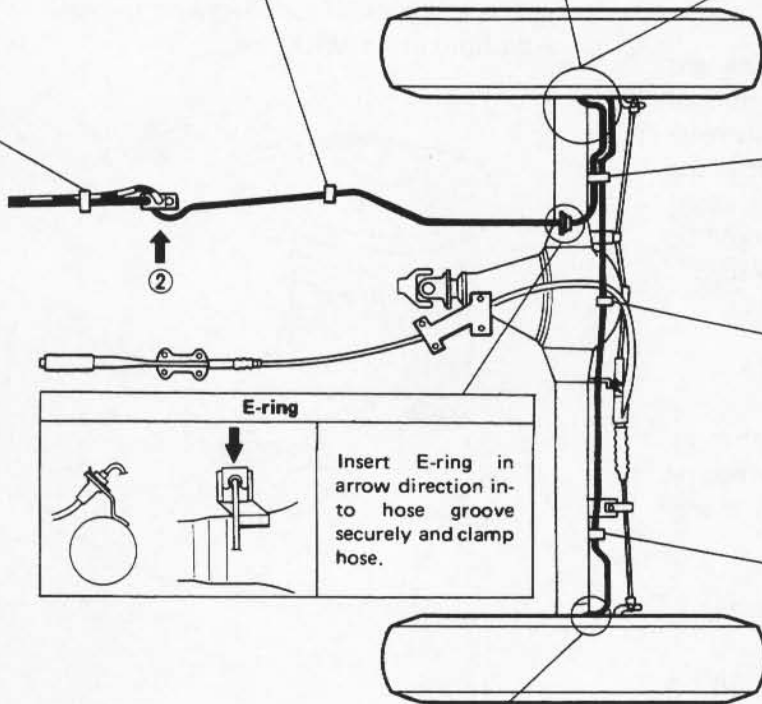
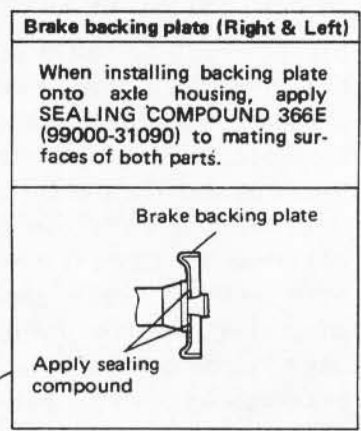
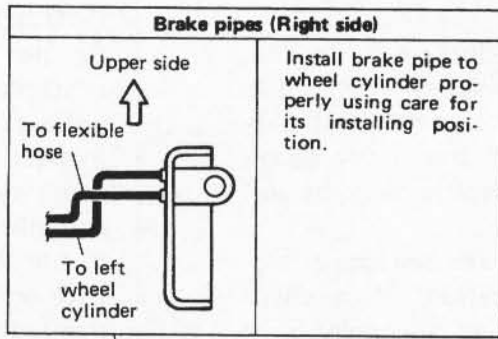
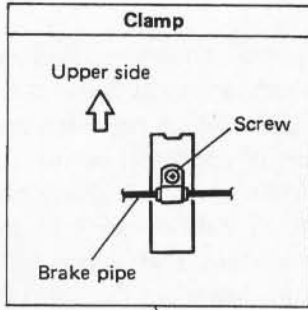


Fig. 19-7-2



19-8. MAINTENANCE SERVICE

ROAD TESTING BRAKES

Brakes should be tested on dry, clean, smooth and reasonably level roadway which is not crowned. Road test brakes by making brake applications with both light and heavy pedal forces at various speeds to determine if the car stops evenly and effectively.

Also drive car to see if it leads to one side or the other without brake application. If it does, check tire pressure, front end alignment and front suspension attachments for looseness. See diagnosis chart for other causes.

BRAKE FLUID LEAKS

Check master cylinder fluid levels. While a slight drop in reservoir level does result from normal lining wear, an abnormally low level indicates a leak in the system. In such a case, check the entire brake system for leakage. If even a slight evidence of leakage is noted, the cause should be corrected or defective parts should be replaced.

BRAKE FLUID LEVEL INSPECTION

Be sure to use particular brake fluid either as marked on reservoir cap of that car or recommended in owner's manual which comes along with that car.

Use of any other fluid is strictly prohibited.

Fluid level should be between MIN and MAX lines marked on reservoir.

When warning light lights sometimes during driving, replenish fluid to MAX line.

When fluid decreases quickly, inspect brake system for leakage. Correct leaky points and then refill to specified level.



Fig. 19-8-1

FILL RESERVOIR

CAUTION:

Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use a container which has been used for mineral oil or a container which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in the hydraulic brake system and water will mix with brake fluid, lowering the fluid boiling point. Keep all fluid containers capped to prevent contamination.

Fluid to fill reservoir which is indicated on reservoir cap of the car with embossed letters or in owner's manual supplied with the car.

Add fluid up to MAX line.

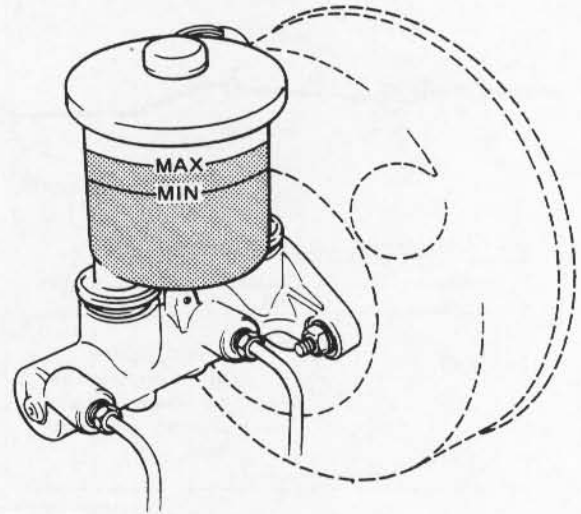


Fig. 19-8-2

BRAKE PEDAL FREE HEIGHT ADJUSTMENT

Brake pedal height is normal if brake pedal is as high as clutch pedal.

- 1) When booster push rod clevis has been reinstalled, it is important that measurement between booster mounting surface (with a gasket attached) and the center of clevis pin hole is adjusted within 125.5 mm – 126.5 mm (4.94 – 4.98 in.). (See page 19-37.)
- 2) When stop light switch has been removed, refer to the following STOP LIGHT SWITCH ADJUSTMENT for proper installation. The services in above steps 1) and 2) may affect brake pedal height.

STOP LIGHT SWITCH ADJUSTMENT

Adjustment should be made as follows when installing the switch.

Pull up brake pedal toward you and while holding it there, adjust switch position so that clearance between the end of thread and brake pedal contact plate (shown as "A" in figure) is within 0.5 – 1.0 mm (0.02 – 0.04 in.). Then tighten lock nut to specified torque.

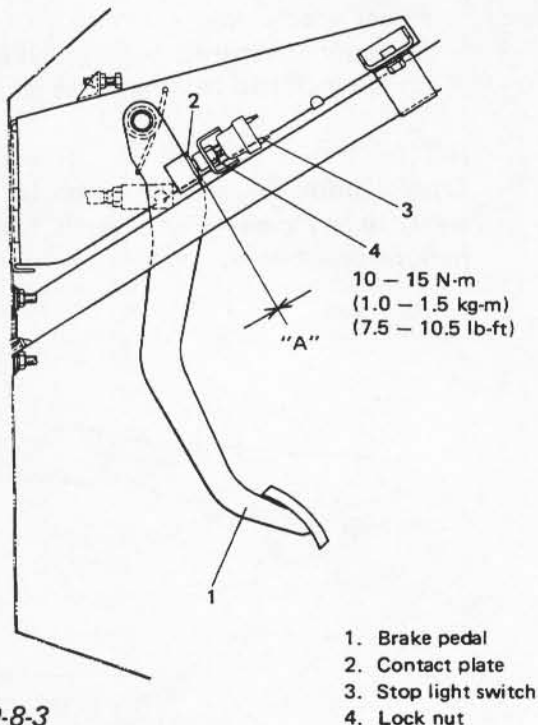


Fig. 19-8-3

EXCESSIVE PEDAL TRAVEL CHECK

- 1) Start the engine.
- 2) Depress brake pedal a few times.
- 3) With brake pedal depressed with approximately 30 kg (66 lbs) load, measure pedal arm to wall clearance "B". It mustn't be less than 75 mm (2.95 in.).

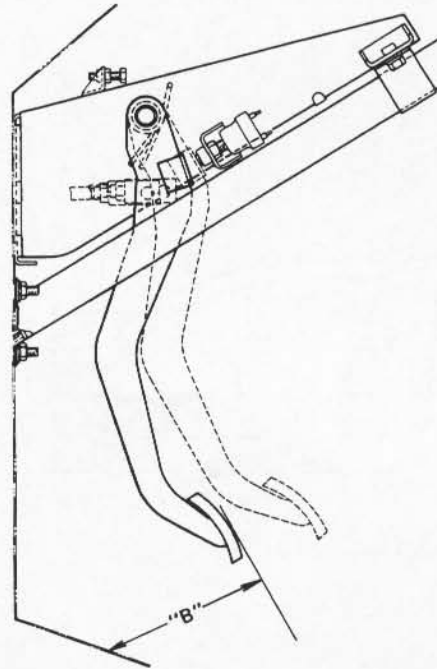


Fig. 19-8-4

- 4) If clearance "B" is less than 75 mm (2.95 in.), the most possible cause is either rear brake shoes are worn out beyond limit or air is in lines.

Should clearance "B" remain less than 75 mm (2.95 in.) even after replacement of brake shoes and bleeding of system, other possible but infrequent cause is malfunction of rear brake shoe adjusters or booster push rod length out of adjustment for the car with brake booster.

- See p. 19-22 for brake shoe inspection.
- See p. 19-46 for bleeding brake system.
- Remove brake drums for adjuster inspection. (See p. 19-23.) If defective, correct or replace.

BRAKE HOSE AND PIPE INSPECTION

Hose

The brake hose assembly should be checked for road hazard damage, for cracks and chafing of outer cover, for leaks and blisters. A light and mirror may be needed for an adequate inspection. If any of the above conditions are observed on brake hose, it will be necessary to replace it.

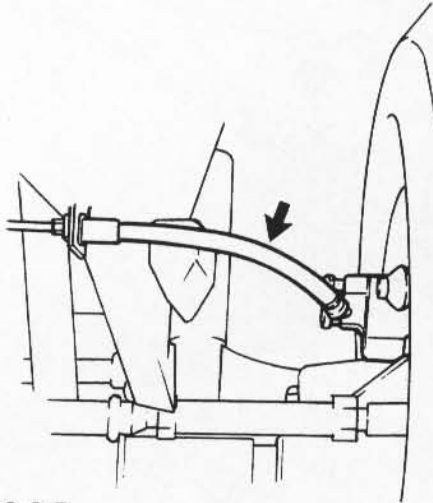


Fig. 19-8-5

Pipe

Inspect the tube for damage, cracks, dents and corrosion. If any defect is found, replace it.

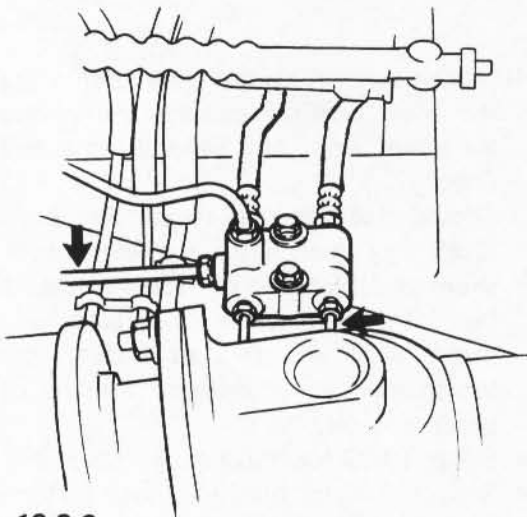


Fig. 19-8-6

PAD LINING INSPECTION

Inspect pad linings periodically according to maintenance schedule and whenever wheels are removed (for tire rotation or other reason). For wear check of pad linings, refer to p. 19-16.

DISC INSPECTION

Inspect disc periodically according to maintenance schedule.

For more information, refer to p. 19-17.

REAR BRAKE SHOE & LINING INSPECTION

Inspect brake shoe & lining according to maintenance schedule.

For shoe and lining inspection, refer to p. 19-22.

REAR BRAKE DRUM INSPECTION

Inspect brake drum according to maintenance schedule.

For more information, refer to p. 19-21.

PARKING BRAKE INSPECTION AND ADJUSTMENT

1) Parking brake lever stroke inspection.

Hold the center of parking brake lever grip and pull it up with 20 to 25 kg (44 to 55 lb) force.

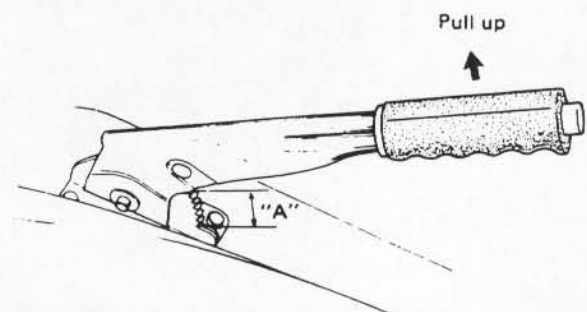
With parking brake lever pulled up as above, count ratchet notches in "A" as shown in figure. There should be 3 to 8 notches.

Also, check if both right and left rear wheels are locked firmly.

If number of notches is out of specification, adjust cable by referring to adjustment procedure described on the next page so as to obtain specified parking brake stroke.

NOTE:

Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking brake lever.



Parking brake stroke "A": When lever is pulled up at 20 kg (44 lb).	Within 3 - 8 notches
--	----------------------------

Fig. 19-8-7

- 2) Parking brake lever stroke adjustment
- a) If parking brake lever stroke was found out of specification when checked as described on the previous page, adjust parking brake cable.

NOTE:

Make sure for following conditions before cable adjustment.

- No air is trapped in brake system.
- Brake pedal travel is proper.
- Brake pedal has been depressed a few times with about 30 kg (66 lbs) load.
- Parking brake lever has been pulled up a few times with about 20 kg force.
- Rear brake shoes are not worn beyond limit, and self adjusting mechanism operates properly.

- b) After confirming that above 5 conditions are all satisfied, adjust parking brake lever stroke by loosening or tightening adjusting nut indicated in figure and tighten stopper nut to the pin.

NOTE:

- For cable adjustment, loosen stopper nut and turn adjusting nut while holding hold nut with spanner so as to prevent inner cable from getting twisted.
- Check brake drum for dragging after adjustment.

Parking brake stroke; when lever is pulled up at 20 kg (44 lb)	Within 3 – 8 notches
--	----------------------

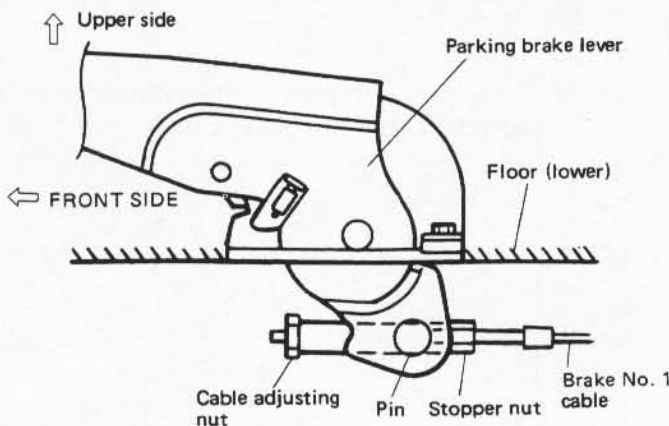


Fig. 19-8-8

3) Parking brake cable inspection

Check brake cable for damage and also for smooth movement. Replace if deteriorated.

BRAKE PEDAL PLAY INSPECTION

Pedal play should be within below specification. If out of specification, check stop light switch for proper installation position and adjust if necessary.

Also check pedal shaft bolt and master cylinder pin installation for looseness and replace if defective.

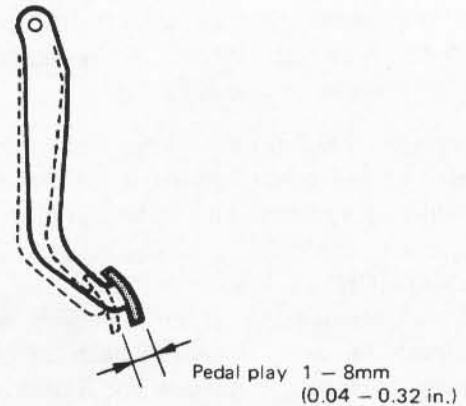


Fig. 19-8-9

REAR DRUM BRAKE SHOE ADJUSTMENT

Rear brake has self-adjusting mechanism but it does require adjustment for proper drum to shoe clearance when brake shoe has been replaced or brake drum has been removed for some other service.

Adjustment is automatically accomplished by depressing brake pedal 3 to 5 times with approximately 30 kg (66 lbs) load after all parts are installed.

Then check brake drum for dragging and brake system for proper performance. After lowering car from lift, brake test should be performed.

FLUSHING BRAKE HYDRAULIC SYSTEM

It is recommended that entire hydraulic system be thoroughly flushed with clean brake fluid whenever new parts are installed in hydraulic system.

Periodical change of brake fluid is also recommended.

BLEEDING BRAKES

NOTE:

Brake fluid is extremely damaging to paint. If fluid should accidentally touch painted surface, immediately wipe fluid from paint and clean painted surface.

With this vehicle, air bleeding is required at four places: right and left front wheels, P & B valve and rear wheel cylinder on left side as marked with dot • in Fig. 19-8-10. And at each of these places, there is air bleeder plug.

Whenever brake pipe or hose has been disconnected at any place, carry out air bleeding so as to make sure that no air remains in brake circuit.

CAUTION:

Upon completion of air bleeding at four places, be sure to tighten each air bleeder plug to specified torque and check entire brake circuit to make sure that no fluid leakage exists.

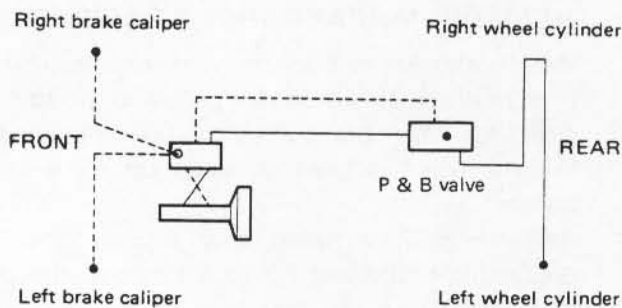


Fig. 19-8-10

- 1) Fill master cylinder reservoir with brake fluid and keep at least half filled during bleeding operation.
- 2) Remove bleeder plug cap. Attach vinyl tube to bleeder plug of wheel cylinder, and insert the other end into container.

1. Plug cap
2. Vinyl tube
3. Container

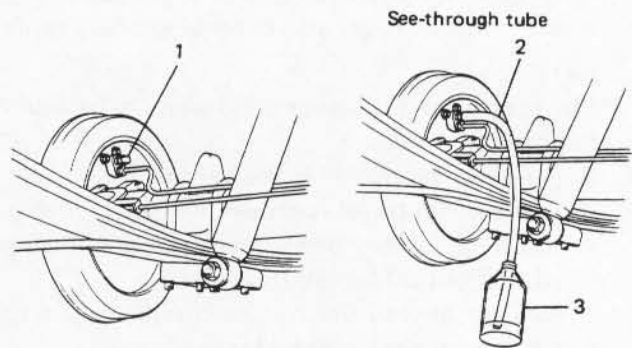
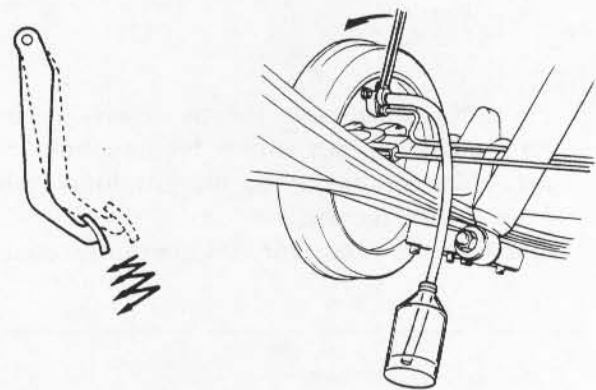


Fig. 19-8-11

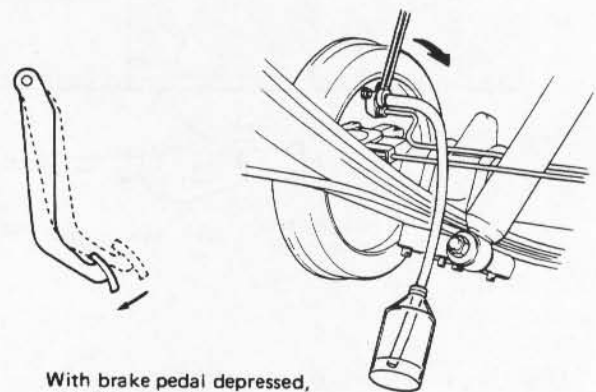
- 3) Depress brake pedal several times, and then while holding it depressed, loosen bleeder plug about one-third to one-half turn.



Depress brake pedal several times and with pedal depressed, loosen bleeder plug a little.

Fig. 19-8-12

- 4) When fluid pressure in the cylinder is almost depleted, retighten bleeder plug.



With brake pedal depressed, retighten bleeder plug.

Fig. 19-8-13

- 5) Repeat this operation until there are no more air bubbles in hydraulic line.
- 6) When bubbles stop, depress and hold brake pedal and tighten bleeder plug.
- 7) Then attach bleeder plug cap.

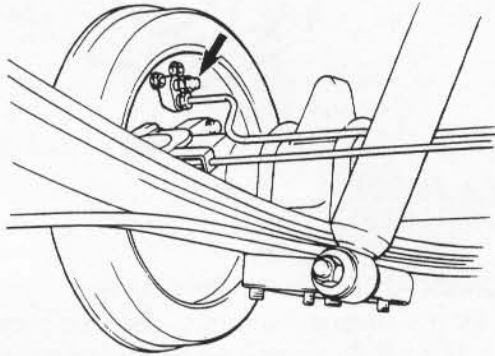


Fig. 19-8-14

- 8) After completing bleeding operation, apply fluid pressure to pipe line and check for leakage.
- 9) Replenish fluid into reservoir up to specified level.

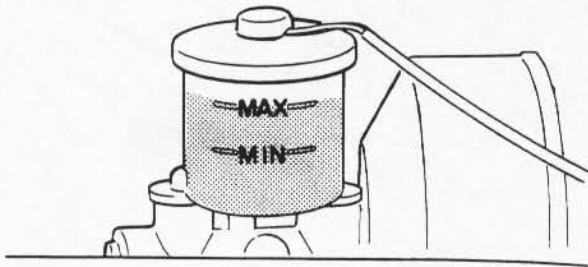


Fig. 19-8-15

- 10) Check brake pedal for "sponginess". If found spongy, repeat entire procedure of bleeding.

INSPECT BOOSTER OPERATION

There are two ways to perform this inspection, with and without a tester. Ordinarily, it is possible to roughly determine its condition without using a tester.

NOTE:

For this check, make sure that no air is in hydraulic line.

INSPECTION WITHOUT TESTER

Check Air Tightness

- 1) Start engine.
- 2) Stop engine after running for 1 or 2 minutes.
- 3) Depress brake pedal several times with the same load as in ordinary braking and observe pedal travel. If pedal goes down deep the first time but its travel decreases as it is depressed the second and more times, air tightness is obtained.

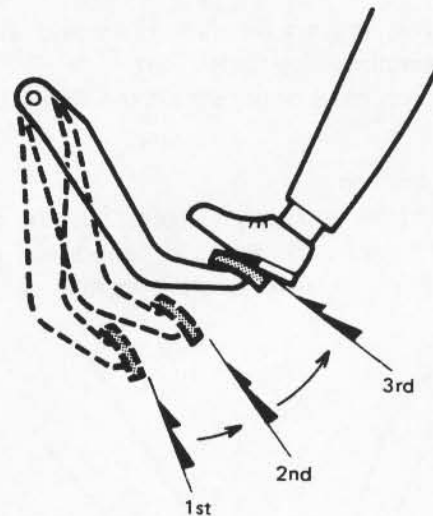


Fig. 19-8-16

4) If pedal travel doesn't change, air tightness isn't obtained.

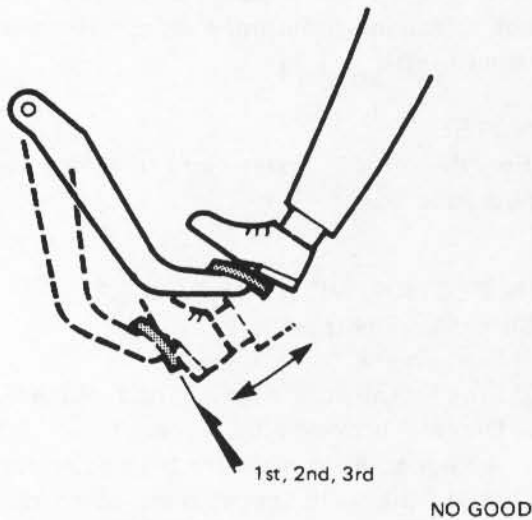


Fig. 19-8-17

NOTE:

If defective, inspect vacuum lines and sealing parts, and replace any faulty part. When this has been done, repeat the entire test!

Check Operation

1) With engine stopped, depress brake pedal several times with the same load and make sure that pedal travel doesn't change.

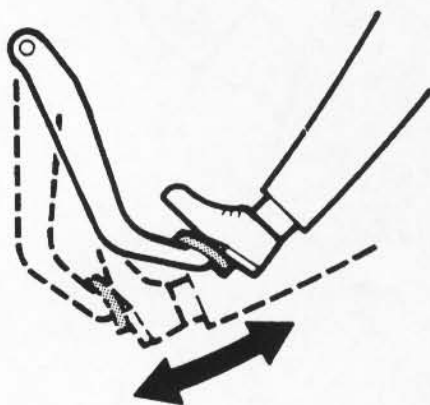


Fig. 19-8-18

2) Start engine while depressing brake pedal. If pedal travel increases a little, operation is satisfactory. But no change in pedal travel indicates malfunction.

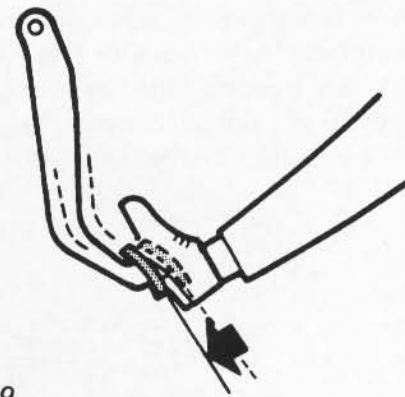


Fig. 19-8-19

Check Air Tightness Under Load

1) With engine running, depress brake pedal. Then stop engine while holding brake pedal depressed.

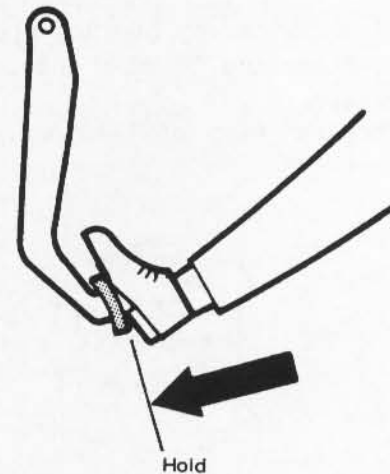


Fig. 19-8-20

2) Hold brake pedal depressed for 30 seconds. If pedal height does not change, condition is good. But it isn't if pedal rises.

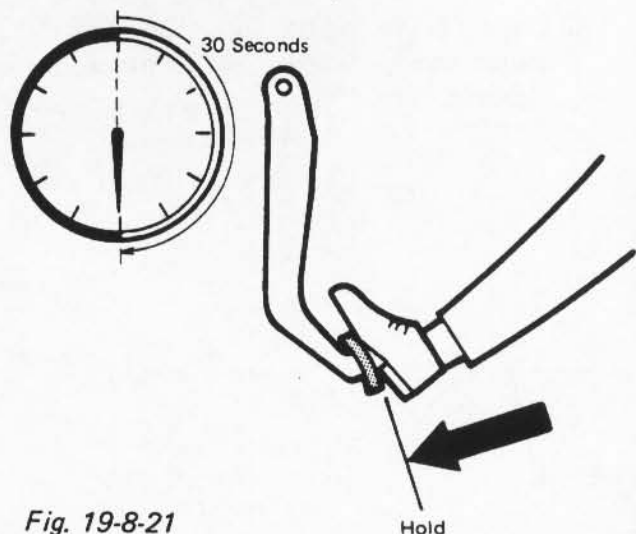


Fig. 19-8-21

19-9. TORQUE SPECIFICATION

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
1. Brake caliper holder bolt	40 – 60	4.0 – 6.0	29.0 – 43.0
2. Brake carrier bolt	70 – 100	7.0 – 10.0	51.0 – 72.0
3. Brake caliper pin bolt	18 – 26	1.8 – 2.6	13.5 – 18.5
4. Brake nut (Brake back plate nut)	18 – 28	1.8 – 2.8	13.5 – 20.0
5. Master cylinder nut	10 – 16	1.0 – 1.6	7.5 – 11.5
6. Booster nut	10 – 16	1.0 – 1.6	7.5 – 11.5
7. Brake pipe 6-way joint bolt	6 – 10	0.6 – 1.0	4.5 – 7.0
8. Brake flare nut	14 – 18	1.4 – 1.8	10.5 – 13.0
9. Brake pedal shaft nut	18 – 28	1.8 – 2.8	13.5 – 20.0
10. Universal joint flange nut	23 – 30	2.3 – 3.0	17.0 – 21.5
11. Brake flexible hose bolt	20 – 25	2.0 – 2.5	14.5 – 18.0
12. Proportioning and bypass valve bolt	6 – 10	0.6 – 1.0	4.5 – 7.0
13. Proportioning and bypass valve plate bolt	6 – 10	0.6 – 1.0	4.5 – 7.0
14. Brake flexible hose nut	20 – 40	2.0 – 4.0	14.5 – 28.5
15. Front brake caliper air bleeder plug	7 – 12	0.7 – 1.2	5.5 – 8.5