

18. BRAKES

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18-1. Description

Hydraulic pressure is produced in the master cylinder when the foot brake pedal is depressed. This pressure eventually actuates the piston of each wheel cylinder.

In the tandem master cylinder employed in this vehicle, the hydraulic pressure produced there is applied to two independent circuits as illustrated in Fig. 18-1. One circuit is for front left and rear right brakes and the other is for front right and rear left brakes. And due to this arrangement, the brake lines in this system are of cross type.

The above described master cylinder and the brake line system assure greater safety, as even if a pressure leak should occur in the brake line of one circuit, the other braking system works, so that the vehicle provide a certain degree of braking.

The front wheel brake system is of the disc brake type, and a drum type brake (leading-trailing shoes) is employed for the rear wheel brakes.

The parking brake is mechanically operated by a wire and link system. It works on the rear wheels only. The same brake shoes are used for the parking and foot brakes.

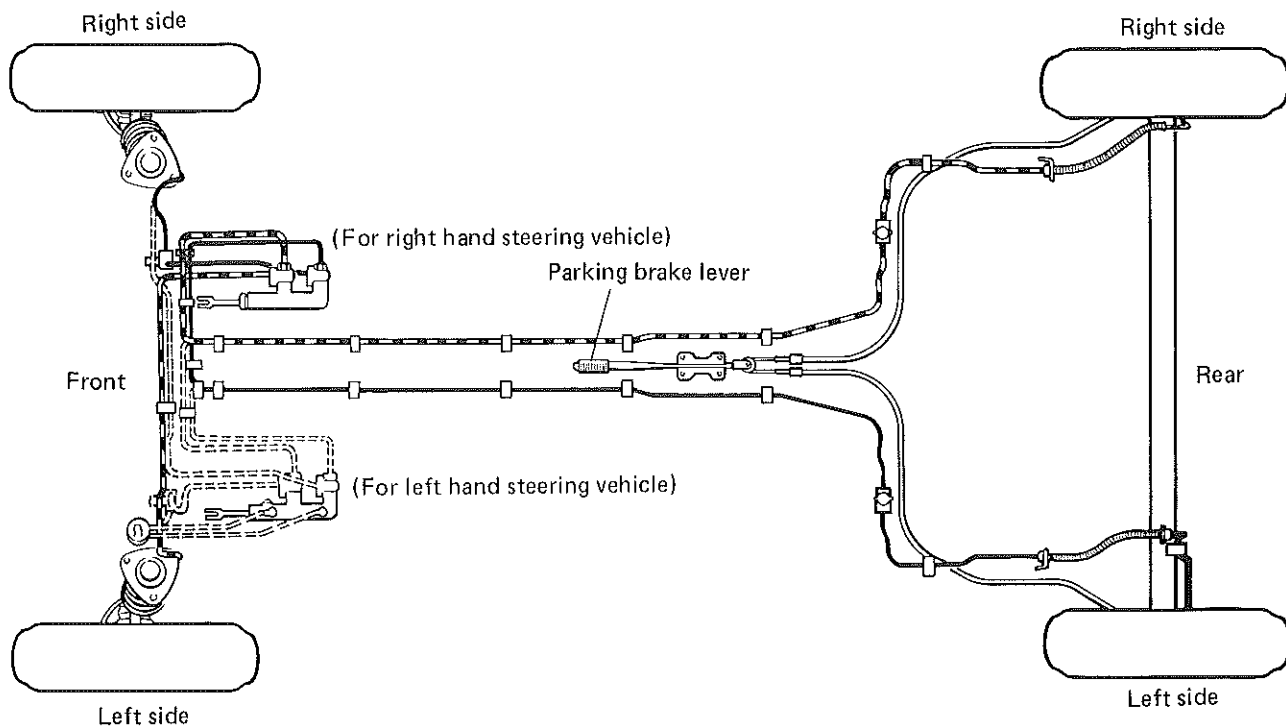


Fig. 18-1

18-2. Tandem Master Cylinder

The tandem master cylinder is similar in construction to an ordinary master cylinder, the principal differences being that it has two pistons and four piston cups and that hydraulic pressure is developed in two chambers, one for front left & rear right brakes and the other for front right & rear left brakes.

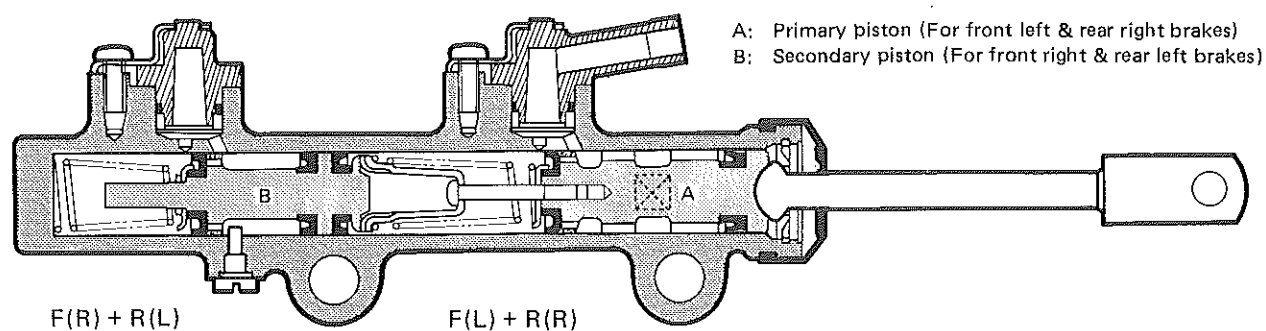


Fig. 18-2

18-3. Tandem Master Cylinder Operation

Normal operation

Depressing the brake pedal forces primary piston "A" toward the left (in Fig. 18-3) to pressurize the oil immediately ahead for front left & rear right brakes. By this pressure and by the force of return spring, secondary piston "B" moves similarly to pressurize the oil for front right & rear left brakes.

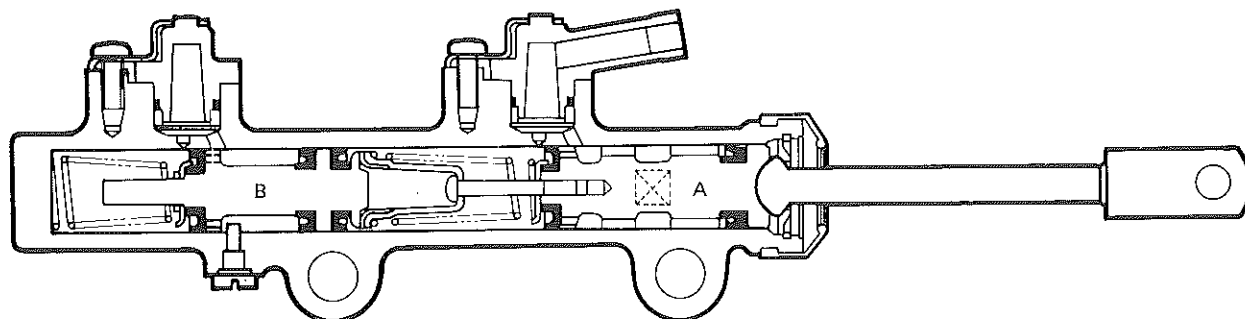


Fig. 18-3

One-circuit operation (front left & rear right brakes circuit failure)

Depressing the brake pedal causes primary piston "A" to move as above but, because the front left & rear right brakes circuit cannot hold pressure, the oil immediately ahead of this piston does not get pressurized. As piston "A" keeps moving, compressing the spring, it begins to push piston "B" when the spring has been compressed fully. From this point on, piston "B" moves to pressurize the oil ahead and thus actuate the front right & rear left brakes.

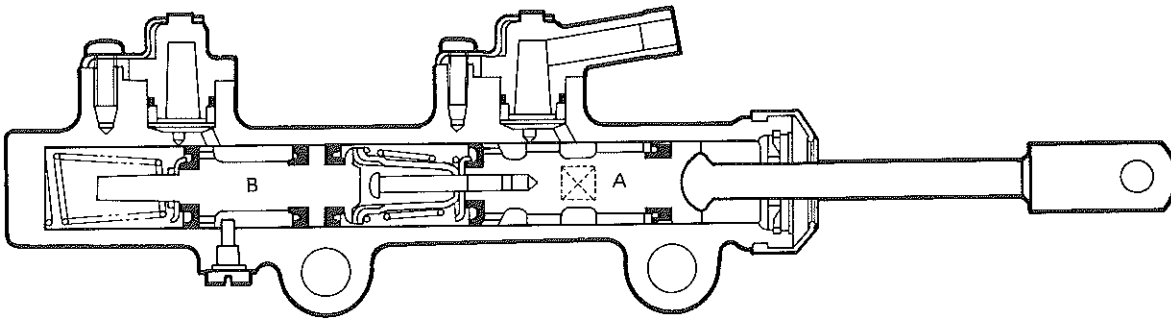


Fig. 18-4

One-circuit operation (front right & rear left brakes circuit failure)

In this case, the leftward movement of piston "A" has but little effect in pressurizing its oil (for front left & rear right brakes) at first, because the initial rise in oil pressure causes piston "B" to promptly yield and move toward the left. Very soon the forward end of piston "B" comes to and bears against the head of the cylinder. From this point on, the leftward movement of piston "A" becomes effective to pressurize the oil ahead of it for the front left & rear right brakes. Fig. 18-5 shows secondary piston "B" at halt.

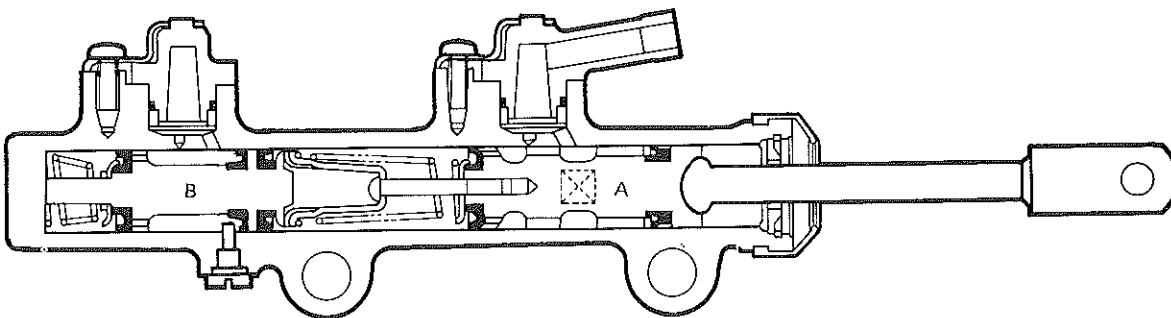


Fig. 18-5

18-4. Front Brake Construction and Operation

As shown in Fig. 18-8, the pads apply pressure to both sides of the disc by means of oil pressure, and so effect braking on the wheels.

Generally, the following disc brake types are available.

1) Opposed-piston type

Cylinders and pistons are disposed on both sides of each disc. Oil pressure generated in the cylinders causes the pads to press against a disc from both sides.

There are 2 types of caliper bodies; solid type and separate type.

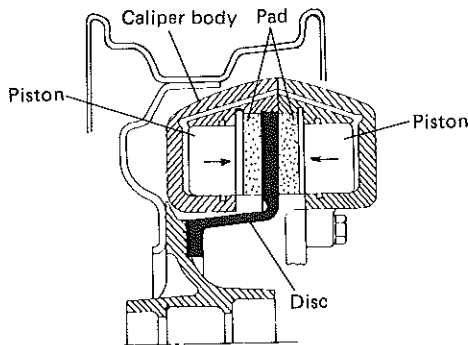


Fig. 18-6

2) Two-piston floating caliper yoke type

This type has a fixed cylinder in which 2 pistons are installed. On depressing the brake pedal, pressure "P" is generated in the wheel cylinder, the inner piston ④ moves to left and the pad ⑥ presses against the disc. The outer piston ③ moves to right and the pad ⑤ presses against the disc through the caliper yoke at the same pressure as that of the pad ⑥.

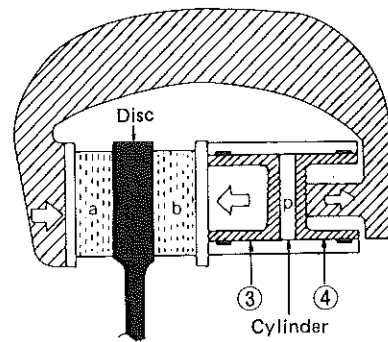


Fig. 18-7

3) 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.) Oil 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 Fig. 18-8, which pulls pad ② against the disc and so brakes the wheel.

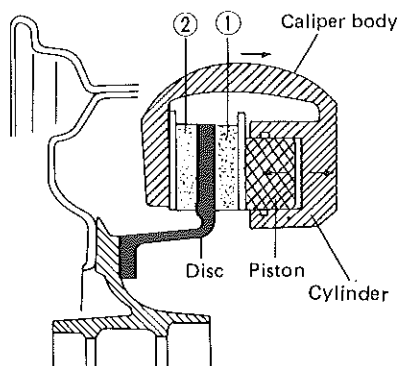


Fig. 18-8

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. 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 rubber seal.

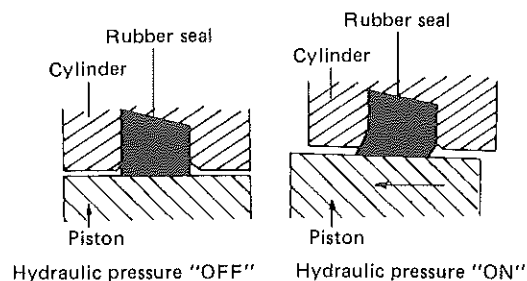


Fig. 18-9

[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 Fig. 18-9. When pressure is taken off from the foot brake pedal and oil 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.

18-5. Proportioning Valve Construction and Operation

Proportioning valve

The proportioning valve serves to control the oil pressure applied to the rear wheel cylinder.

When the brakes are applied, the center of gravity of a car moves forward with a decrease of car speed and a change in load on the front and rear wheels.

When a high running speed is rapidly decreased, rear wheels are locked earlier than front wheels causing unstable maneuverability.

To prevent this, a proportioning valve is installed to reduce the oil pressure supplied to the rear wheels when the car speed is rapidly reduced, thus providing highly effective and well-balanced braking of all wheels at any time.

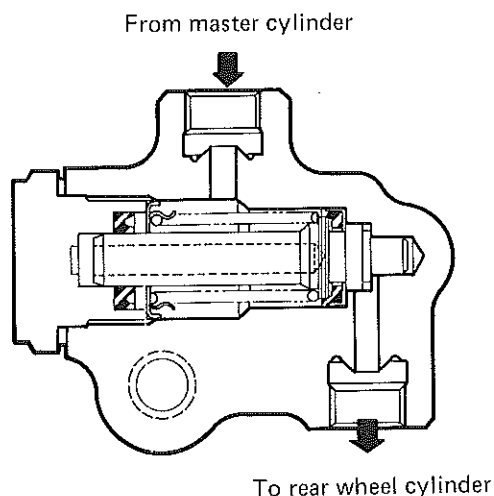


Fig. 18-10-1

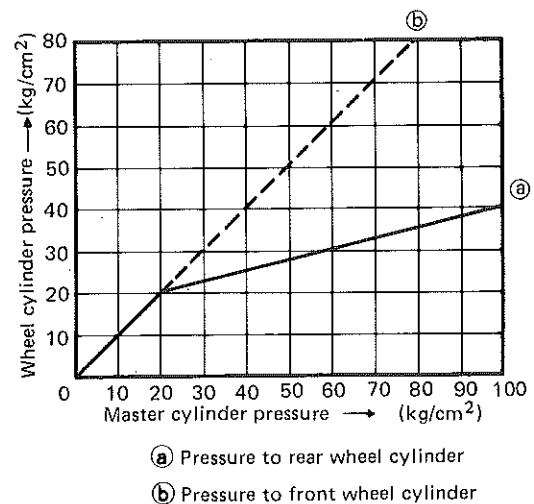


Fig. 18-10-2

When the oil pressure P_1 from the master cylinder is less than 20 kg/cm^2 (284 psi), the force F_1 of the spring pushing the piston to the right is larger than the force F_2 of oil pressure pushing the piston to the left. Therefore, the piston ① is pushed to right and the brake oil is led to the rear wheel cylinder, passing between the piston and lip seal ②. Thus, all the oil pressure from the master cylinder is transmitted to the rear wheel cylinders.

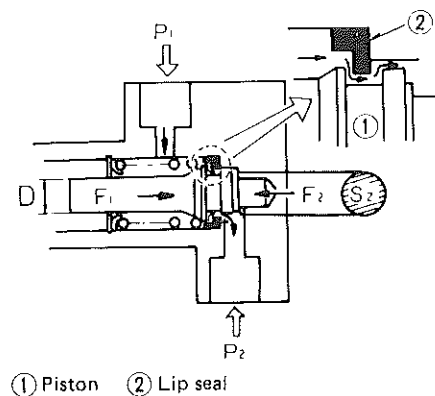


Fig. 18-11

When the oil pressure P_1 from the master cylinder is about 20 kg/cm^2 (284 psi), the force F_2 of the oil pressure pushing the piston to left and the force F_1 pushing the piston to right (spring force + part of oil pressure) are balanced. In other words, the total oil pressure of the master cylinder is applied to the rear wheel cylinder.

When the oil pressure P_1 increases further, F_2 overcomes F_1 and pushes the piston to left. The lip seal ③ contacts the piston and cuts off the oil pressure P_1 and P_2 ; that is, oil pressure from the master cylinder to the wheel cylinder is cut off.

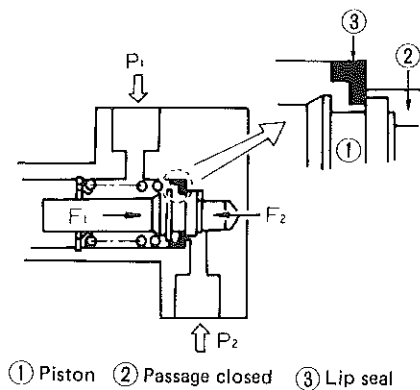


Fig. 18-12

When the pressure P_1 increases further, F_1 becomes larger than F_2 , pushes the piston to right and the pressure of the master cylinder and wheel cylinders becomes immediately the same. But as soon as F_2 overcomes F_1 , it pushes the piston to left, the piston closes the lip seal and cuts off the oil pressures P_1 and P_2 . The change of pressure is shown by (a) in Fig. 18-10-2.

[Reference]

The force required to move the piston to left is given from the area:

$$S_2 = 0.549 \text{ cm}^2$$

The force required to move the piston to right is given from the area:

$$S_0 = S_2 - S_1 = S_2 - \frac{\pi}{4} D^2$$

$$= 0.549 - 0.410 = 0.139 \text{ cm}^2$$

Spring force $P_3 = 7.4 \text{ Kg}$

Force to move the piston to right:

$$F_1 = P_1 (S_2 - S_1) + P_3$$

Force to move the piston to left:

$$F_2 = P_2 \times S_2$$

When the oil pressure P_1 on the master cylinder side and P_2 on the wheel cylinder side are the same, 25 Kg/cm^2 (355 psi):

$$F_1 = 25 \times 0.139 + 7.4 = 10.88 \text{ Kg}$$

$$F_2 = 25 \times 0.549 = 13.73 \text{ Kg}$$

therefore, when F_2 is higher than F_1 , the piston is pushed to left and cuts off pressure to the cylinder. When the oil pressure P_1 of the master cylinder is increased from 25 to 50 Kg/cm^2 (711 psi):

$$F_1 = 50 \times 0.139 + 7.4 = 14.35 \text{ Kg}$$

$$F_2 = 13.73 \text{ Kg (no change)}$$

therefore, F_1 is higher than F_2 , the piston is pushed to right, opens a passage to the wheel cylinder instantly but immediately cuts off P_1 and P_2 .

Inspection and service

Any defect in the proportioning valve will lock the rear wheels faster than the front wheels and cause unstable maneuverability of the car. It is therefore recommended to replace the valve periodically.

Replacement interval for proportioning valve	4 (four) years
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18-6. Rear Brake Construction

The rear brake has a double-piston type wheel cylinder interposed between the leading end of one shoe and the trailing end of the other. The other ends of these shoes pivot on the adjuster sleeve complete with an adjusting screw.

When hydraulic pressure applies to the wheel cylinder, which is bolted to the backing plate, the two pushrods of this cylinder move out to spread the shoes apart against the force of two return springs.

Brake adjustment is to be effected by turning the notched screw of the adjuster sleeve. This screw is accessible through a hole provided in the brake drum.

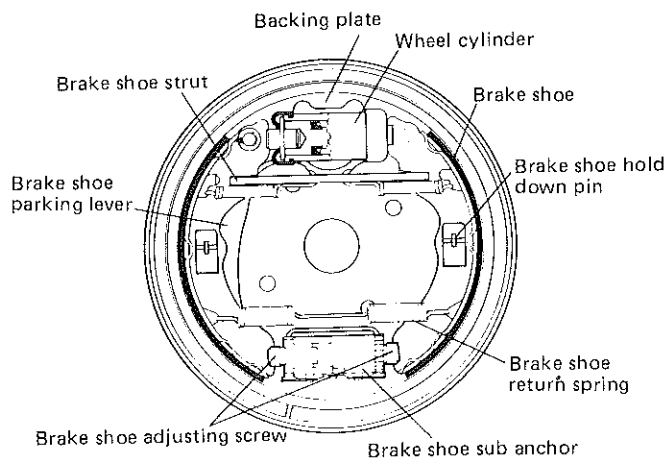


Fig. 18-13

18-7. Parking Brake Construction

For the purpose of utilizing the shoes in the rear brake, the parking brake system uses a brake shoe lever and a strut in addition to the wire cable for transmitting the manual effort (exerted to the parking lever) to the rear brakes. The shoe lever and strut are mounted on the backing plate of each brake in a floating manner.

The strut is to parking brake what the wheel cylinder is to foot brake. Pulling the parking lever causes the strut to expand the two shoes and push them against the drum.

18-8. Rear Wheel Cylinder Construction

The double-piston cylinder used in the rear brake has two pistons, each of which is provided with a cup on the center facing side and a boot on the outer side. The inner end of the pushrod or actuating pin contacts the piston and its outer end is fitted to the shoe web. A bleeder screw is provided in the cylinder itself. This screw is a plug; it is to be loosened only when "air purging" from the circuit is required.

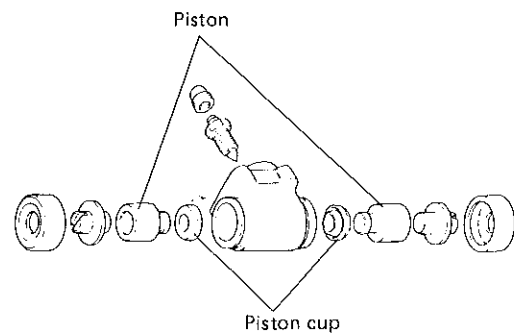


Fig. 18-14

18-9.
Front Brake Removal and Disassembly

Pad removal

Lift the front end of the machine by jacking after loosening hub nuts, and support it with safety stands.

Take off the wheel.

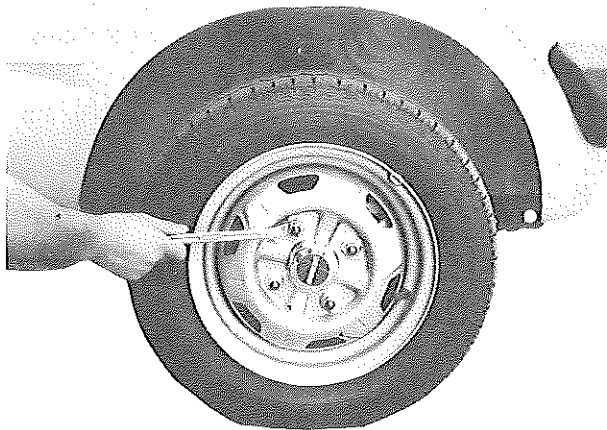


Fig. 18-15

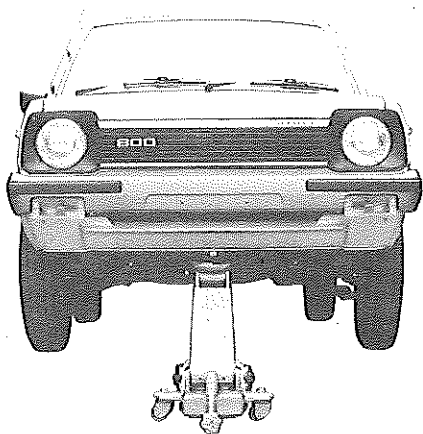


Fig. 18-16

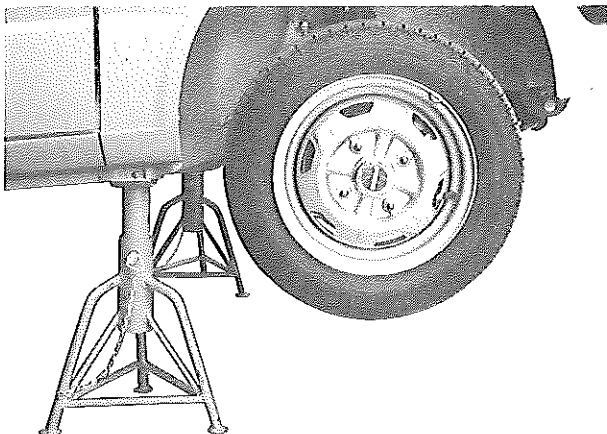


Fig. 18-17

Remove the under side bolt of caliper pin bolts (2pcs.).

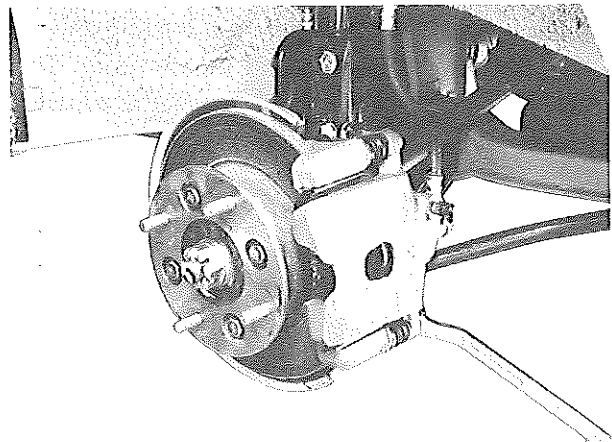


Fig. 18-18

Remove the pads (2pcs.) while lifting caliper end by hand.

NOTE:

At this time, be careful not to damage the brake flexible hose.

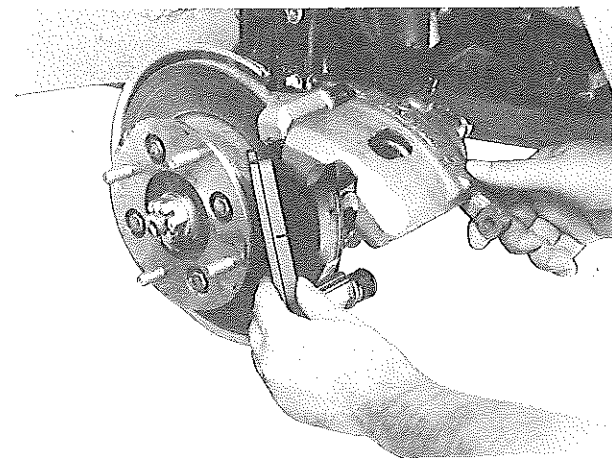


Fig. 18-19

Piston & piston seal removal

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

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

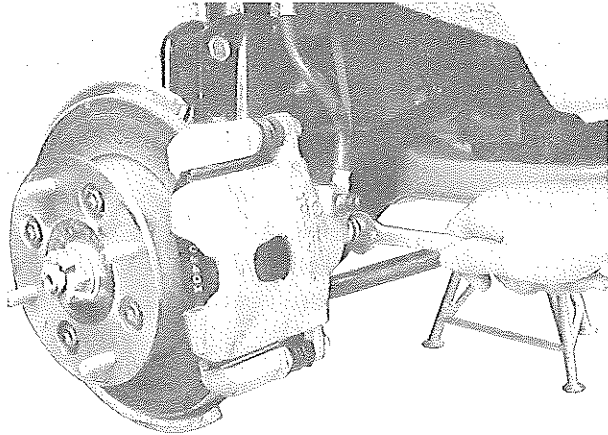


Fig. 18-20

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

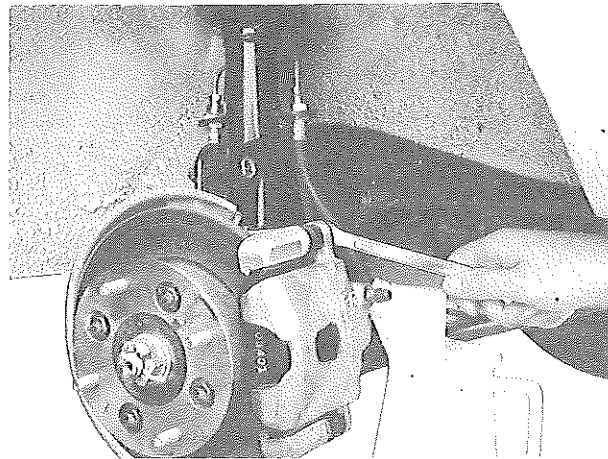


Fig. 18-21

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

NOTE:

Do not apply too highly compressed air which will cause the piston to jump out of the cylinder. It should be taken out gradually with moderately compressed air and without any damage on the outer surface.

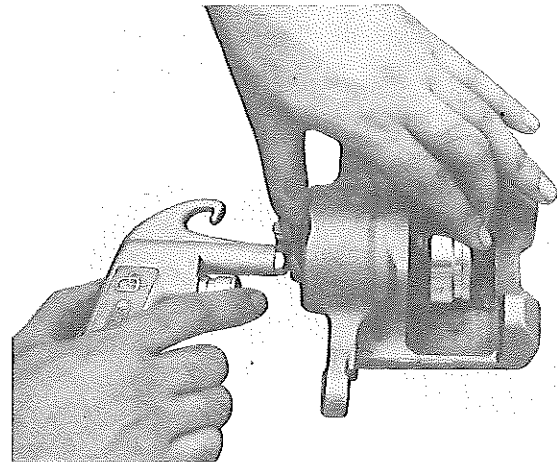


Fig. 18-22

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

CAUTION:

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



Fig. 18-23

18-10. Rear Brake Removal

Lift the rear axle of the machine by jacking after loosening hub nuts, and support it with safety stands.

Take off the wheel.

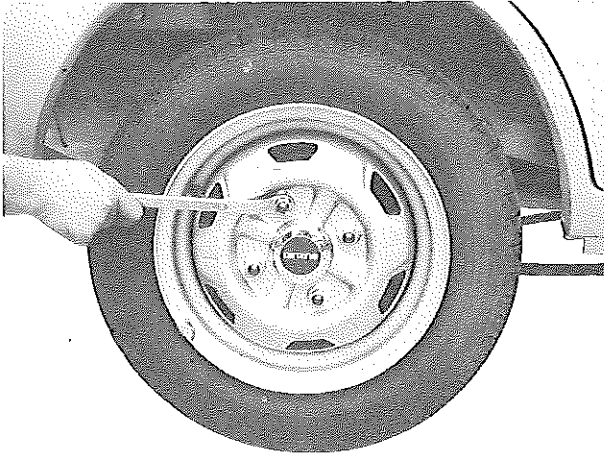


Fig. 18-24

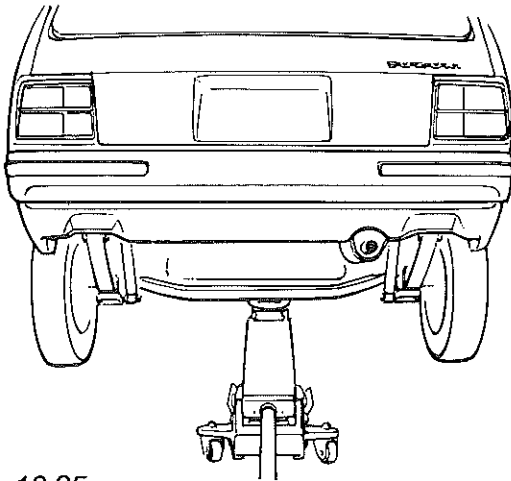


Fig. 18-25

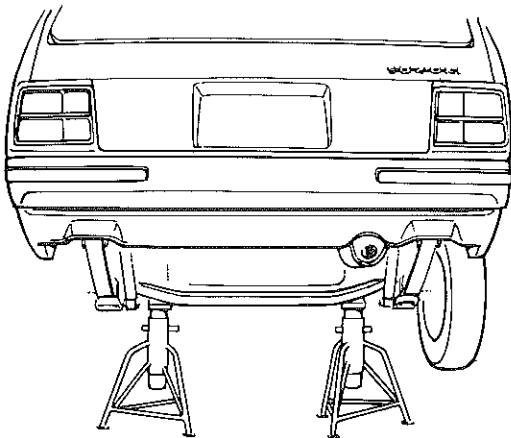


Fig. 18-26

Remove the spindle cap.

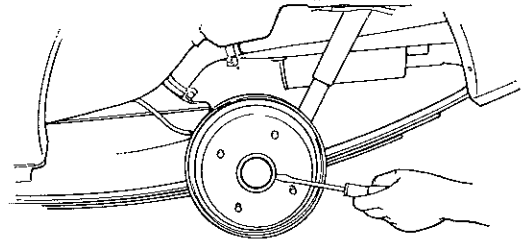


Fig. 18-27

Remove the nut securing the brake drum to the spindle, and pull the drum off by using these special tools:

Front wheel hub remover Ⓐ (09943-17910)
Sliding hammer Ⓑ (09942-15510)

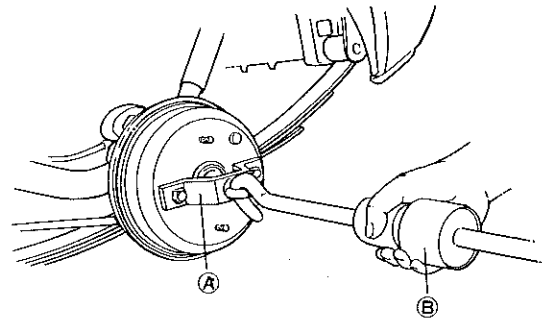


Fig. 18-28

Remove the brake shoe hold down pins.

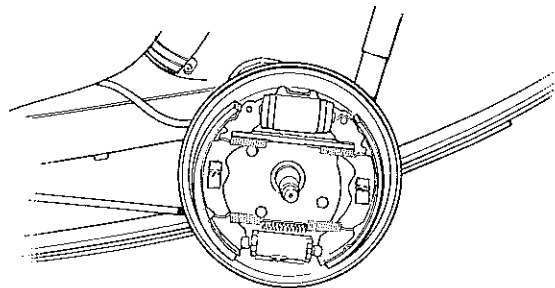


Fig. 18-29

Master cylinder

Complaints on the master cylinder are in most cases traceable to excessively worn piston cups or improperly seating check valves; experience tells us that the primary cause of these malconditions is the impurities, particularly abrasive or gritty matters, that have entered the brake fluid reservoir. Check the master cylinder for the possibility of these malconditions. The internals of the master cylinder should be replaced at regular intervals, and they should be handled as a kit. The recommended interval is two years.

Master cylinder internals replacement interval	2 (two) years
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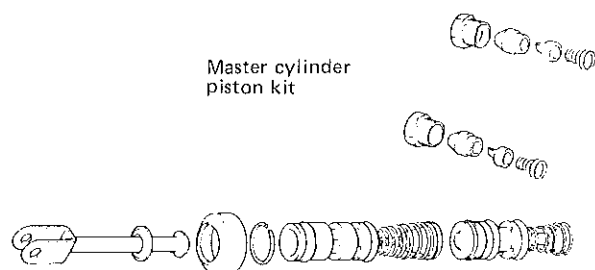


Fig. 18-30

The overall length of the primary piston sub-assembly is specified to be 91.1 mm (3.587 in.). This specification assumes great importance in the function of the master cylinder. When rebuilding this sub-assembly after its disassembly for overhaul or for replacement of piston cups, be sure to set the overall length to the specification value by means of the forming screw.

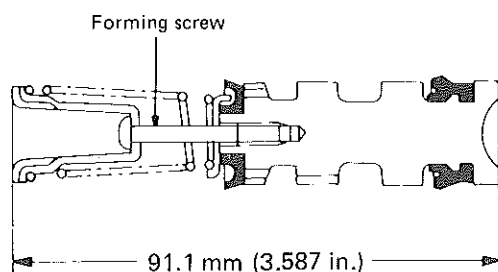


Fig. 18-31

Front brake disc

Check the disc surface for scratches in the wearing parts. Scratches on the disc surface noticed at the time of the 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 the disc.

When only one side is scratched, polish and correct that side.

	Standard	Limit
Disc thickness	11 mm (0.433 in.)	9.5 mm (0.374 in.)

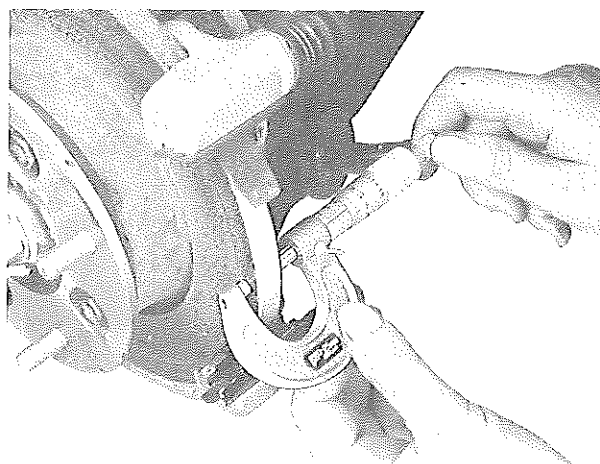


Fig. 18-32

To measure the deflection of a disc, make measurements at 2 points on the periphery and center of the disc with a dial gauge, while rotating the disc. Large deflections cause shaking of the steering wheel or juddering of the brake pedal.

Limit on disc deflection	0.15 mm (0.006 in.)
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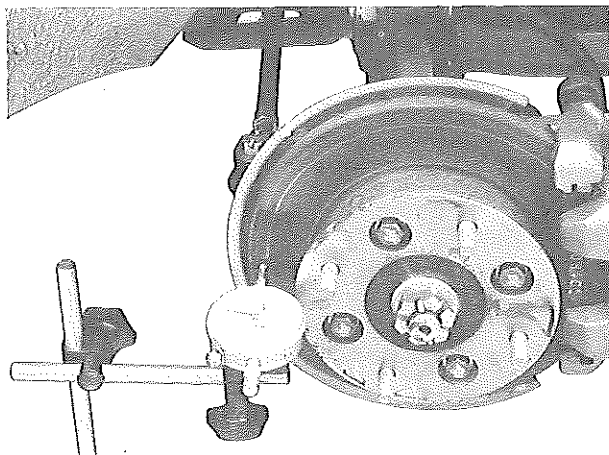


Fig. 18-33

Front brake pad

Check the pad lining for wear. When the wear exceeds the limit, replace with a new one. Timing for the pad replacement can be determined with the line of the groove which is provided on each pad lining also. When it disappears, replace with a new pad.

CAUTION:

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

Pad thickness (lining + pad rim)	Standard	Limit
	15.5 mm (0.610 in.)	6.5 mm (0.256 in.)

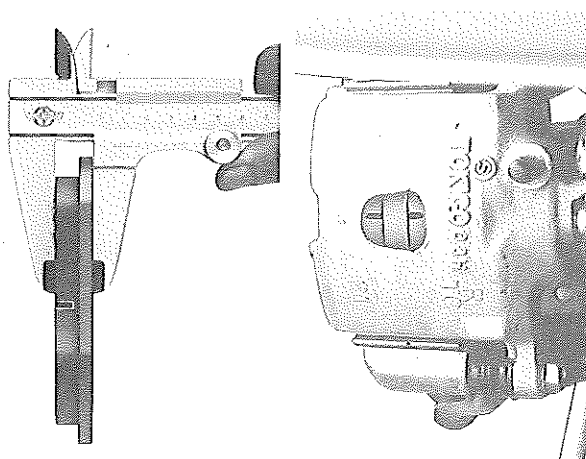


Fig. 18-34

Front brake rubber seal

(Piston seal)

Excessive or uneven wear of pad lining may indicate unsmooth return of the piston.

In such a case, replace the rubber seal.

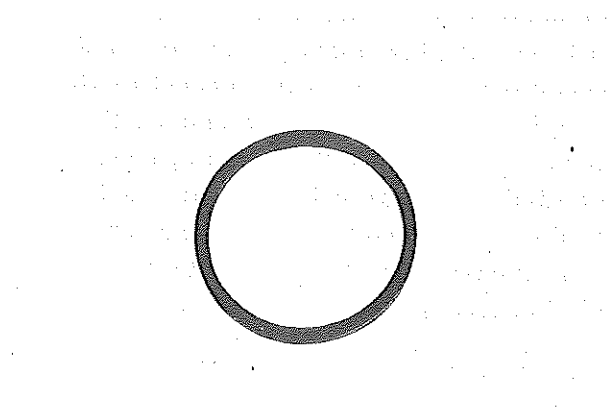


Fig. 18-35

Disc brake noise

Disc brake noises are classified into 2 kinds as follows:

1) Noise during normal running while the brake is not in use.

There are 2 types of these noises:

One caused by the pad and disc coming in contact with each other and the other caused by vibration of the pad. These are eliminated when the brake is operated.

Check items ③, ④ and ⑤ in the list below and correct to remove the noises.

2) Noise during operation of the brake.

Check items ①, ②, ③ and ④ in the list and correct if necessary.

Inspection	Remedy
① Wear of lining	Replace
② Deterioration of lining face	Replace
③ Foreign materials adhering	Clean
④ Scratching or deflection of the disc	Repair or replace
⑤ Unsmooth return of the piston	Replace the seal

Rear brake drum

Inspect the drum for cleanliness. Remove oil stains, if any. Check the wear of its braking surface by measuring its inside diameter, and determine its "out-of-round" from I.D. readings. The braking surface with groovy wear can be repaired by turning in a lathe if machining stock is available; a minor "out-of-round" can be corrected also by turning. A drum cracked or distorted or worn beyond repair must be replaced.

	Standard	Service limit
Brake drum inside diameter	180 mm (7.087 in.)	182 mm (7.165 in.)
Brake drum "out-of-round"	0	0.5 mm (0.02 in.)

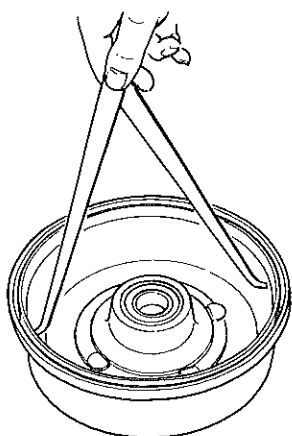


Fig. 18-36

Rear brake shoe

Glazed surfaces, if any, of brake shoes can and must be reconditioned by grinding with sandpaper. Oil stains too can be removed similarly. Where the lining is worn beyond the service limit, the shoe must be replaced.

Brake lining thickness (lining + shoe rim)	Standard	Service limit
	7 mm (0.27 in.)	3 mm (0.12 in.)

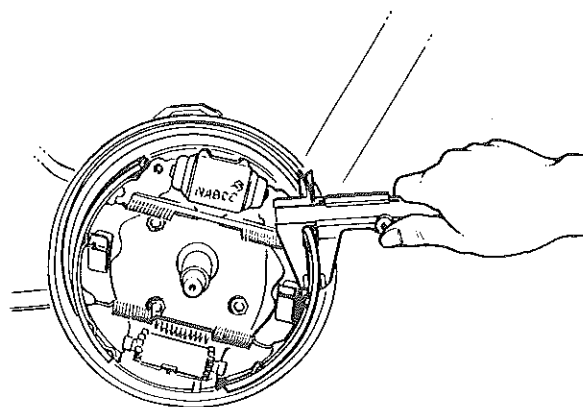


Fig. 18-37

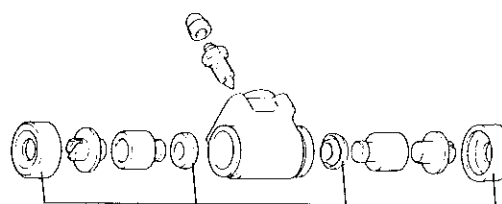
Rear wheel cylinder

Inspect piston cups for wear and for evidence of deterioration, and replace them if found in defective condition, even when the end of the regular replacement intervals is a head.

The internals of each cylinder are to be replaced as a kit at regular intervals.

Piston cups and boots are of rubber; they must not be washed with gasoline or similar washing fluid. Use the brake fluid to wash them, or they may distort or swell.

Cylinder internals replacement interval	2 (two) years
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Rear wheel cylinder piston cup kit

Fig. 18-38

Brake pipes

The brake pipes are double-layer wound type, made by rolling steel strip into a two-layer wall pipe, with its surfaces treated for rust prevention. After driving the machine along in sea water at the beach or in a shore area full of salt sprays, it is a good practice to wash the brake pipes with soft water.

Inspect the brake pipes in regard to the following items

- | |
|--|
| (1) Cut marks or dents |
| (2) Leakage of brake fluid |
| (3) Signs of rubbing at the clamps and clips |
| (4) Rusting or corrosion |

Air purging

Whenever any component or part of the foot brake system has been replaced, reconnected or otherwise worked on to expose the brakefluid side of the circuit to the atmosphere, some air will get into the circuit; and the presence of such air will result in a "spongy" brake pedal. In such a case, or whenever the presence of air in the circuit is suspected, carry out an "air purging" operation at each wheel cylinder, as follows:

- (1) Tie a transparent vinyl tube ① into the bleeder plug of the wheel cylinder (in order to catch the brake fluid).
- (2) Pump the brake pedal several times and depress the pedal all the way.
- (3) Loosen the bleeder plug by turning it a half rotation. The fluid with air bubbles will come out. Tighten up the plug when air bubbles stop coming out.

This operation requires two persons, one at the brake pedal and one at the wheel cylinder.

NOTE:

Each of the four wheel cylinders is provided with an air bleeder plug. Air purging must be carried out at each of them, beginning with the one which is located the farthest from the master cylinder.

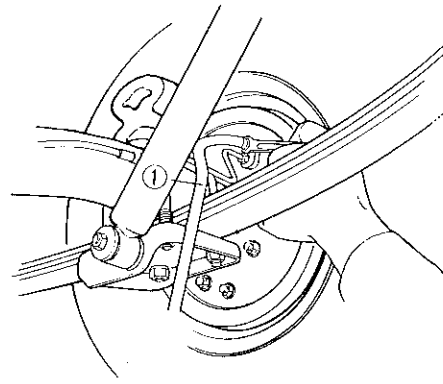


Fig. 18-39

Brake fluid

The brake system uses a glycol type brake fluid. When purchasing the replacement fluid, be sure to specify the glycol type meeting the following specifications:

Brake Fluid	Specifications
	DOT 3, DOT 4, SAE J1703

Some commercially available brake fluids are of silicone or petroleum base; do not use any of these fluid. Remember, any brake fluid which is a mixture of two or more brands is likely to effect some of the brake system components adversely, resulting in faulty braking.

The brake fluid in service is subject to gradual deterioration because the moisture content of air finds its way slowly into the brake fluid. For this reason the brake fluid should be regarded as an expendable item and be replaced at regular intervals.

Brake fluid change interval	2 (two) years
-----------------------------	---------------

Rear brake shoe clearance adjustment

The hole for gaining access to the adjusting wheel or screw is provided in the brake drum. Through this hole, insert a screwdriver to turn the adjusting wheel or screw.

Turn the wheel or screw to expand the shoe all the way, locking hard the brake drum, and then turn it back 3 to 6 notches to introduce a drum-to-shoe clearance. Leave the adjusting wheel or screw right there.

Carry out the above method for another shoe.

NOTE:

Also adjust the each shoe of the other brake according to the above method.

Brake shoe clearance
adjustment

Back away 3 to 6
notches

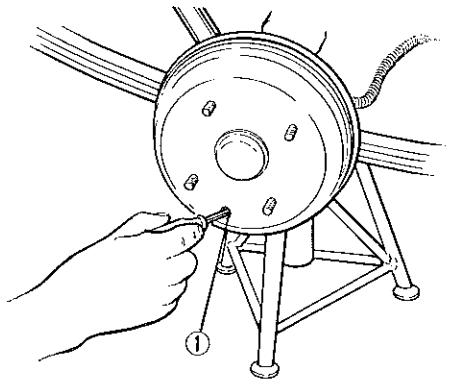


Fig. 18-40 ① Adjusting hole

Brake pedal

Confirm that clearance ② between the wall and the pedal arm is more than 50 mm (1.97 in) when the pedal is depressed by a load of approx. 30 kg (66 lb). If the clearance is less than 50 mm (1.97 in), adjust the brake shoe clearance to obtain the specified value.

CAUTION:

- If the specified clearance cannot be obtained, or the feel is spongy when the pedal is depressed, check the shoes for excessive wear and the brake system for air entered.
- After reassembling the brake oil line, bleed air from the line.

NOTE:

Inspect pedal clearance daily, as well as at periodically scheduled inspection.

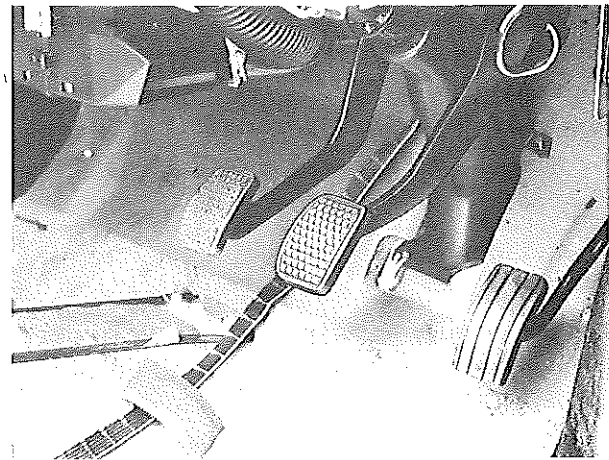


Fig. 18-41

Pedal-to-wall clearance ②
(when pedal is depressed
at 30 kg (66 lb)

50 mm
(1.97 in.) minimum

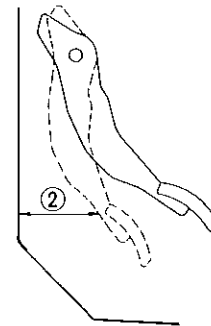


Fig. 18-42

Parking brake cable

Inspect the brake cable for damage, and check for smoothness of its movement. Oil the cable as necessary. A defective cable must be replaced. Advise the user to inspect and service the cable in this manner at regular intervals.

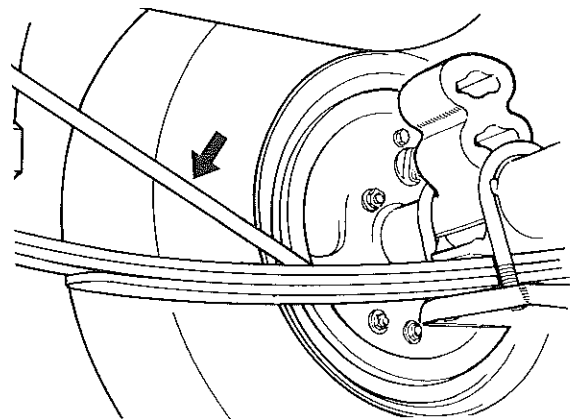


Fig. 18-43

Brake hoses and pipes

These are critical safety parts and demand greater attention. Be always sure that the hoses and pipes are in good condition, free of any evidence of crack or breakage. A damaged hose or pipe or a rusted or leaking one must be replaced.

CAUTION:

After replacing any of the brake pipes or hoses, be sure to carry out an air bleeding operation. You are duty-bound to do this before releasing the serviced machine to the user.

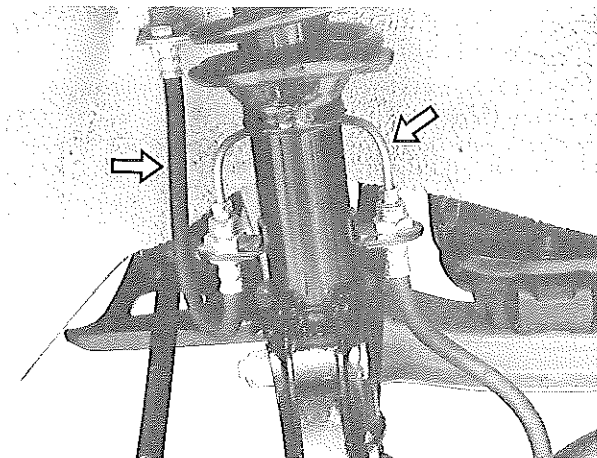


Fig. 18-44

Parking brake lever

Pull up the parking brake lever all the way with one hand to apply brake fully, and see how many notches of the ratchet of the lever has traversed. If the lever moves by more than 6 notches, it means that the shoe-to-drum clearance in the rear brakes is too much and needs to be readjusted to the specification. Throught, the hole provided in the brake drum, insert a screw-driver and back away the adjusting screw 3 to 6 notches from its zero-clearance position, as in the case of the wheel brake.

Parking brake stroke ①	6 notches maximum
Brake shoe clearance adjustment	Back away 3 to 6 notches

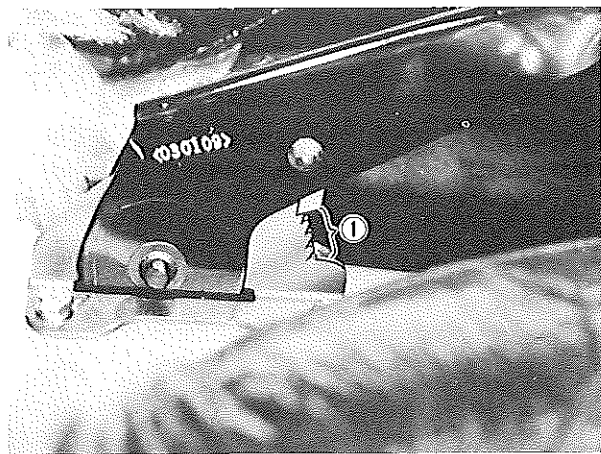


Fig. 18-45

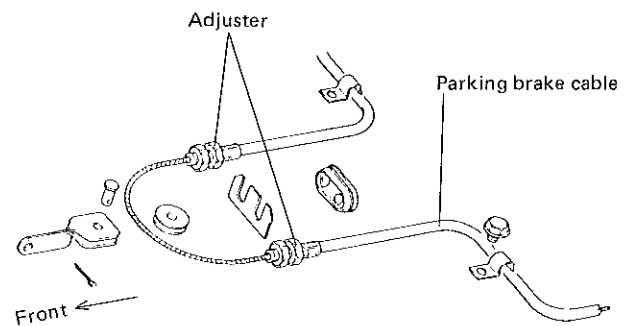


Fig. 18-46

18-12. Precautions on Installation

Front brake

Reassemble the front brake in the reverse order to disassembly, taking care in the following points.

CAUTION:

- Wash each part cleanly before installation in the same fluid as the one used in the fluid tank.
- Never use other fluid or thinner.

1) Piston seal

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

2) Piston and boot

Before inserting the piston into the cylinder, the boot must be fitted in the cylinder.

Push the boot outside as shown in the Fig. 18-48 when inserting the piston, and the work can be done easily. At this time, be careful not to damage the piston, cylinder or boot.

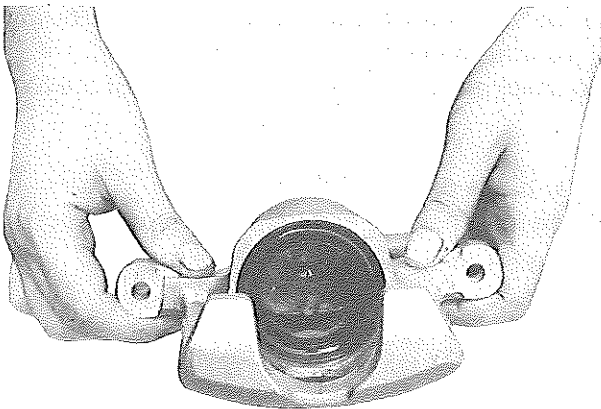


Fig. 18-47

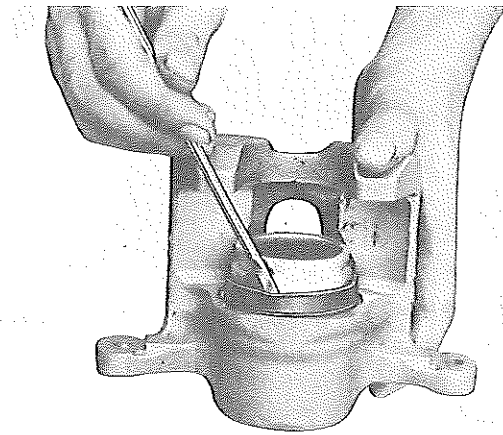


Fig. 18-48

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

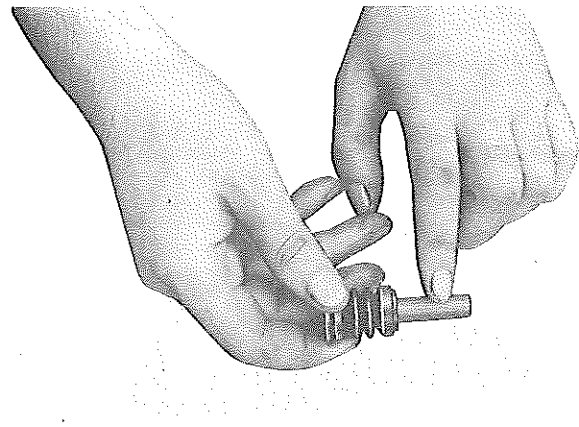


Fig. 18-49

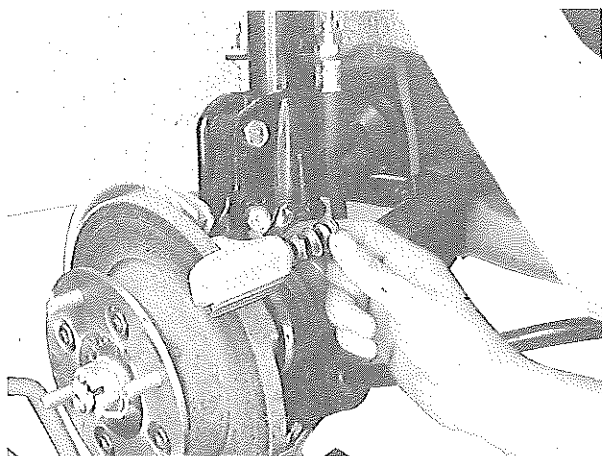


Fig. 18-50

4) When installing the caliper (cylinder body) to the carrier, tighten the caliper pin bolts ② (2 pcs) to the specified torque given below.

Also, check the carrier bolts ① (2 pcs) for tightness to the below specified torque.

Tightning torque

		N.m	kg-m	lb-ft
Carrier bolt ①		70 – 100	7.0 – 10.0	50.5 – 72.5
Caliper pin bolt ②		22 – 32	2.2 – 3.2	15.5 – 23.0

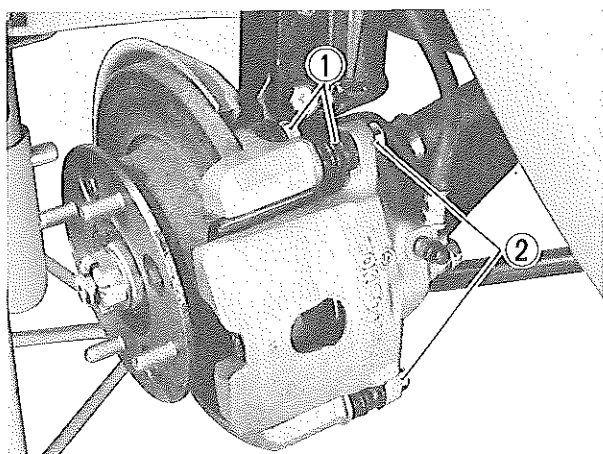


Fig. 18-51

5) After reinstalling all the parts which has been removed and disassembled, purge the air from the brake system as shown in Fig. 18-39.

6) Fit the tires and make certain that the tires rotate smoothly, with a force of less than 3.5Kg (7.70 lb).

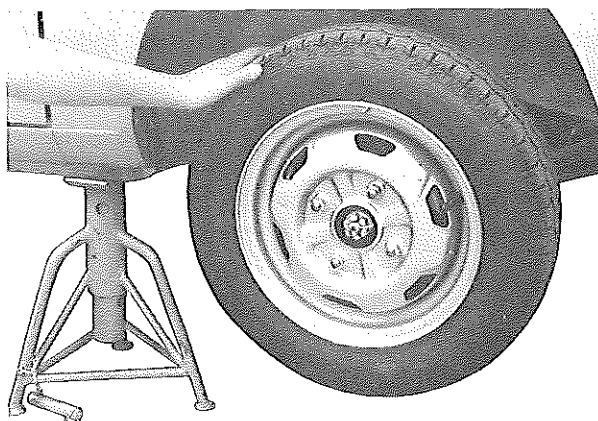


Fig. 18-52

NOTES:

- The above figure is for the outer periphery of the tires.
- Be careful not to depress the brake pedal when checking rotation of the tires.

If rotation of the tires is heavy, check the following points:

- Wear or breakage of wheel bearings.
- Flatness of disc (Improper flatness brings the disc into contact with the lining during rotating and makes the rotation heavy).

To check this, measure the deflection of the disc.

Rear brake shoe hold down pin

When installing the brake shoe, ensure correct installation of the shoe holding springs ③.

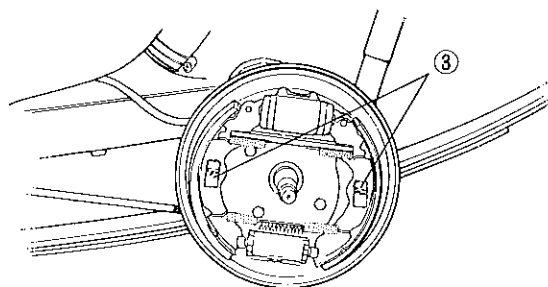


Fig. 18-53

NOTE:

After installing hold down pins, apply SEALING COMPOUND 366E (99000-31090) around the pins from outside of the backing plate.

Rear brake drum

Check inside of the brake drum to be sure that it is free from rust, oil or any foreign matter before installing it.

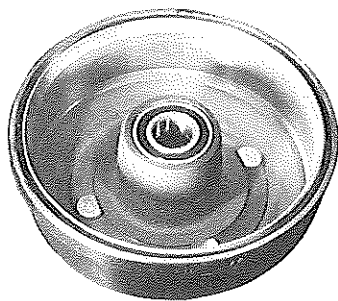


Fig. 18-54

Rear brake shoe

Check the brake shoe to be sure that it is free from oil or water before installing it.

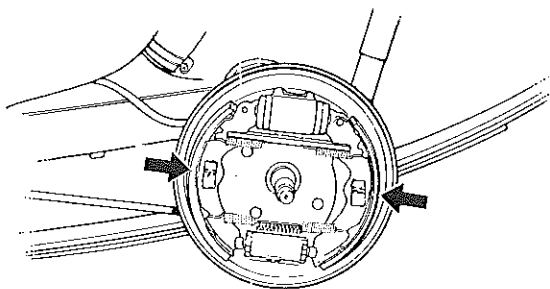


Fig. 18-55

Brake flexible hose

In case of the front hose, fit its body side first and in case of the rear hose, its housing side first.

When tightening the hose nuts, hold the nuts on the hose side with a wrench using care not to twist the hose.

CAUTION:

Make sure that the front brake hoses are not twisted when the steering wheel is steered for the straight ahead direction.

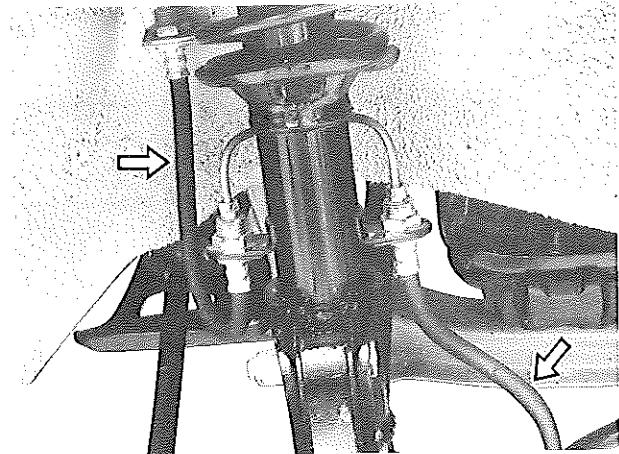


Fig. 18-56

CAUTION:

After replacing any of the brake pipes or hoses, be sure carry out an air bleeding operation. You are duty-bound to do this before releasing the serviced machine to the user.

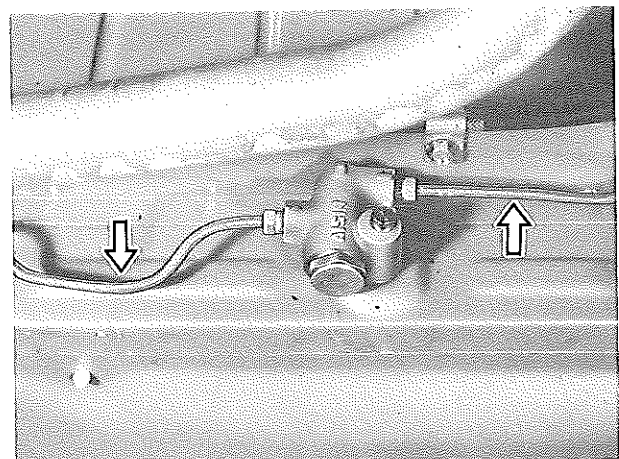


Fig. 18-57

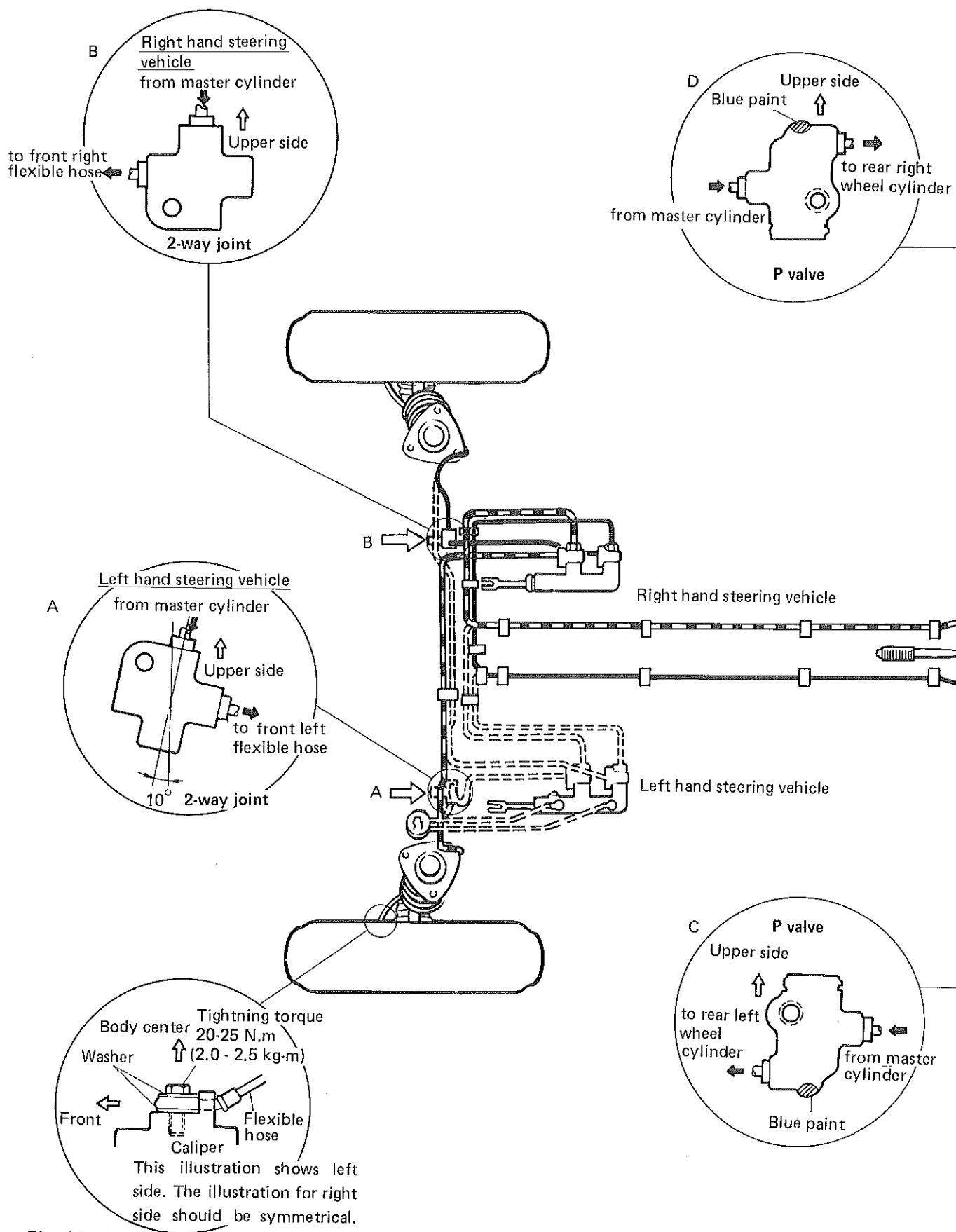
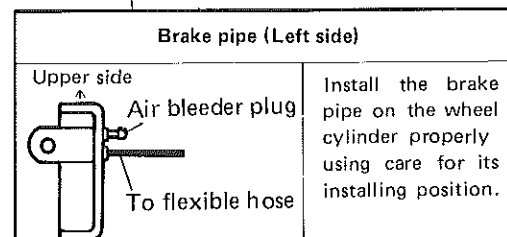
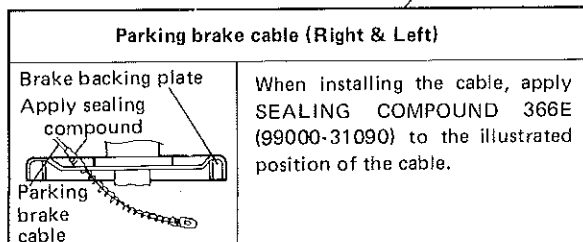
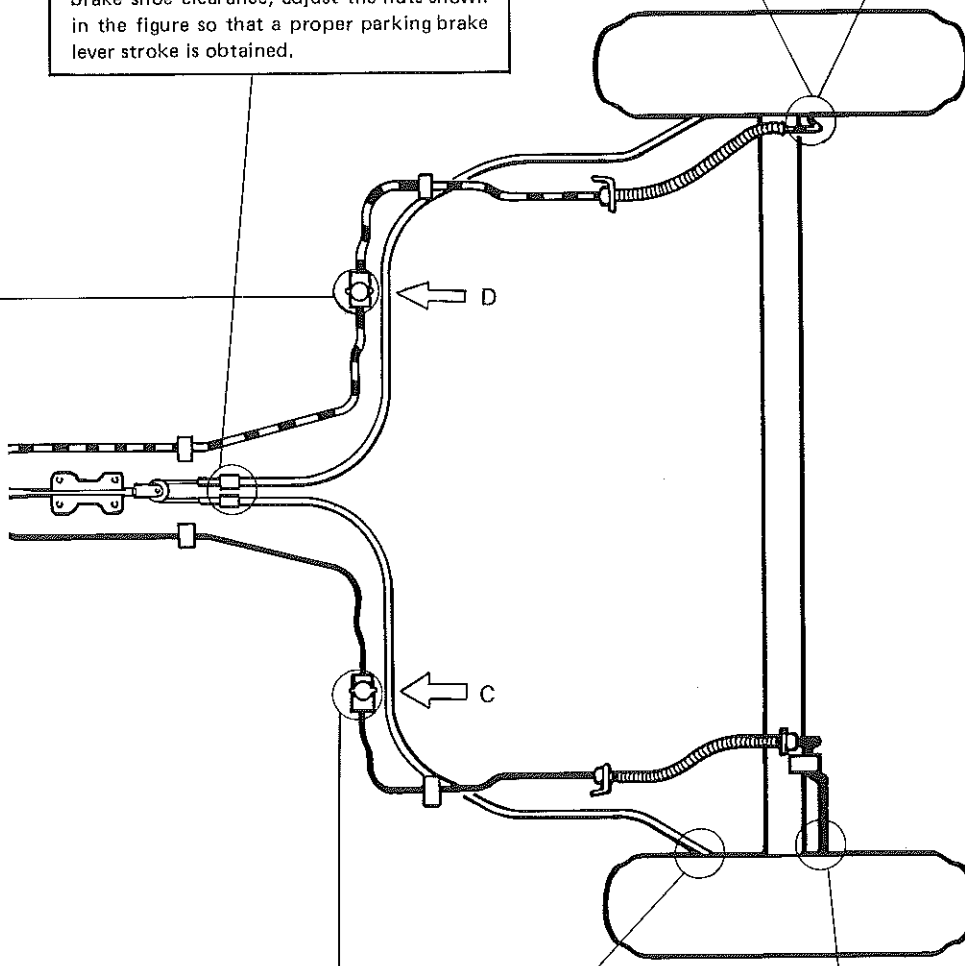
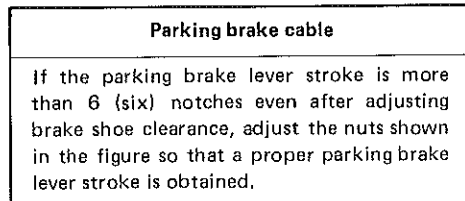
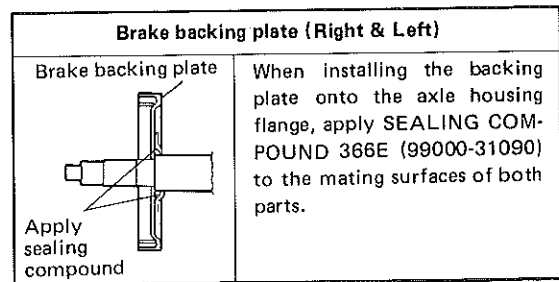
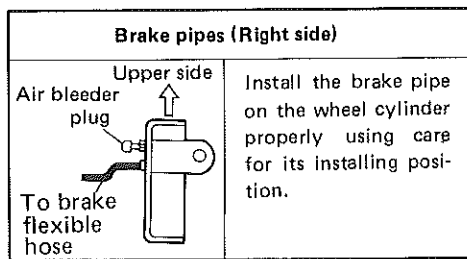


Fig. 18-58



18—13. Tightening Torque

Fastening parts	N.m (kg-m)	lb-ft
Brake bleeder plug (φ10)	9 - 13 (0.9 - 1.3)	7.0 - 9.0
Tube union nut	15 - 18 (1.5 - 1.8)	11.0 - 13.0
Flexible hose nut	20 - 40 (2.0 - 4.0)	14.5 - 28.5
2-way joint bolt	6 - 10 (0.6 - 1.0)	4.5 - 7.0
Backing plate bolt	18 - 28 (1.8 - 2.8)	13.5 - 20.0
Proportioning valve bolt	6 - 10 (0.6 - 1.0)	4.5 - 7.0
Wheel cylinder nut	7 - 11 (0.7 - 1.1)	5.0 - 8.0
Master cylinder nut	25 - 40 (2.5 - 4.0)	18.5 - 28.5
Brake caliper pin bolt	22 - 32 (2.2 - 3.2)	15.5 - 23.0
Brake carrier bolt	70 - 100 (7.0 - 10.0)	50.5 - 72.0
Brake disc bolt	40 - 60 (4.0 - 6.0)	28.5 - 43.0
Brake flexible hose bolt	20 - 25 (2.0 - 2.5)	14.0 - 18.0