

# SERVICE MANUAL

DATSUN  
MODEL 330 SERIES  
CHASSIS & BODY



**NISSAN MOTOR CO., LTD.**  
TOKYO, JAPAN

## SECTION BR

# BRAKE SYSTEM

**BR**

GENERAL DESCRIPTIONS	BR- 2
ADJUSTMENT .....	BR- 2
SERVICE BRAKE .....	BR- 5
HAND BRAKE .....	BR-19
SERVICE DATA AND SPECIFICATIONS .....	BR-23
TROUBLE DIAGNOSES AND CORRECTIONS .....	BR-26
SPECIAL SERVICE TOOLS .....	BR-29

## GENERAL DESCRIPTION

The 330 series cars are equipped with hydraulically operated service brakes on all four wheels, and mechanically operated hand brakes on rear wheels.

The front brake is either a single cylinder type disc brake (N34L) or a two-leading type drum brake. The N34L disc brake has been newly developed by NISSAN. The rear brake is a leading-trailing type drum brake.

A Master-Vac and a tandem master cylinder are standard equipment on all models. The Master-Vac diaphragm is 228.6 mm (9 in) in diameter for front disc brake type, and 152.4 mm (6 in) in diameter for front drum brake type. The master cylinder is equipped with a brake fluid level warning lamp switch.

For added safety, disc brake types come with an NP (NISSAN propor-

tioning) valve.

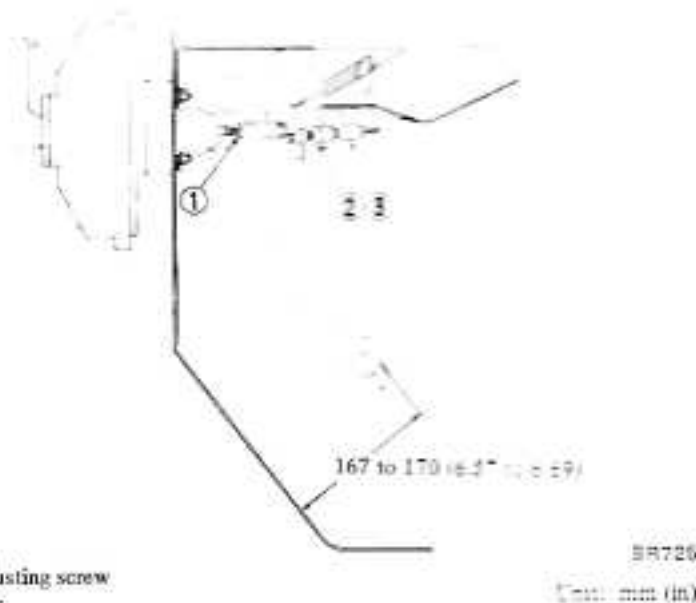
The hand brake is a mechanical type which brakes the rear wheels. It is engaged or released through a stick type lever or a center type lever. When this brake is engaged, the brake warning lamp, located on the instrument panel, will come on to indicate that the hand brake is in "engaged" condition.

## ADJUSTMENT

### CONTENTS

BRAKE PEDAL .....	BR-2	ADJUSTMENT OF LEVER STROKE .....	BR-3
FRONT DISC BRAKE .....	BR-3	ADJUSTMENT OF BALANCE LEVER .....	BR-3
FRONT DRUM BRAKE .....	BR-3	HAND BRAKE WARNING LAMP SWITCH ..	BR-4
REAR BRAKE .....	BR-3	CHECK AFTER ADJUSTMENT .....	BR-4
HAND BRAKE .....	BR-3	BLEEDING HYDRAULIC SYSTEM .....	BR-4

## BRAKE PEDAL



- 1 Push rod adjusting screw
- 2 Pedal stopper
- 3 Brake lamp switch

1. Adjust pedal height "H" to specification by moving pedal stopper.

Pedal height:  
 167 to 170 mm  
 (6.57 to 6.69 in)  
 Pedal stopper lock nut  
 tightening torque:  
 0.8 to 1.1 kg-m  
 (5.8 to 8.0 ft-lb)

2. Adjust push rod so that pedal free play (clearance between pedal hole and push rod should be measured on top face of pedal pad) is 2.5 to 4.5 mm (0.098 to 0.177 in). Then secure push rod with lock nut.

Push rod lock nut  
 tightening torque:  
 1.6 to 2.2 kg-m  
 (12 to 16 ft-lb)

Fig. BR-1 Adjusting brake pedal

3. Turn brake lamp switch bolt in or out until its end face comes into contact with pedal stopper surface. Be sure that brake lamp switch comes ON when pedal pad is depressed 16 to 21 mm (0.630 to 0.827 in) and goes OFF when released. See Figure BR-1.

## FRONT DISC BRAKE

Adjustment is not necessary under normal conditions since pad-to-rotor clearance is automatically compensated for by elasticity of piston seal and gripper.

## FRONT DRUM BRAKE

1. Depress brake pedal several times to settle brake shoes into normal position.
2. Jack up front of car and support it on stands.
3. Rotate adjusting cam clockwise until shoes drag against brake drum.

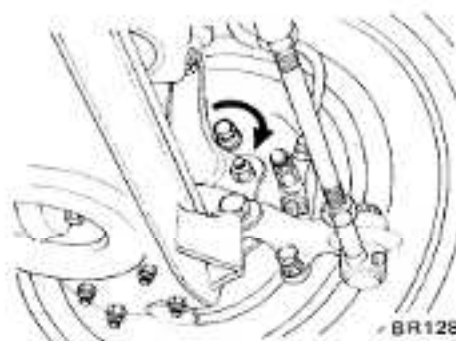


Fig. BR-2 Shoe adjust cam

4. Gradually turn adjusting cam counterclockwise until wheel is free to rotate.

## REAR BRAKE

Adjustment is not necessary under normal conditions since brake drum-to-shoe clearance is automatically compensated for by operating hand brake.

When brake drum-to-shoe clearance is correct, operating noise of rear wheel cylinder-adjusting wheel will not be heard even if hand brake is operated.

## HAND BRAKE

### ADJUSTMENT OF LEVER STROKE

#### Stick type

1. Before making lever stroke adjustment, manipulate brake lever to ensure that rear brake shoe-to-drum clearance is proper.
2. Turn turnbuckle in either direction until lever stroke is 105 to 115 mm (4.13 to 4.53 in) or until ratchet is engaged in 9 to 11 notches. Then, tighten lock nut securely.

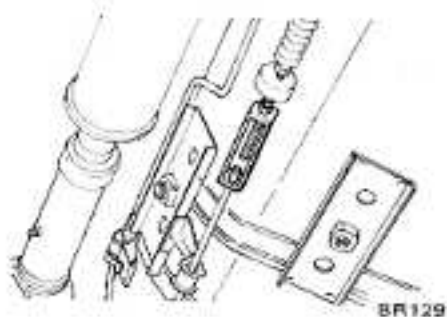


Fig. BR-3 Adjustment of lever stroke

#### Center lever type

1. Before making lever stroke adjustment, manipulate hand brake lever to ensure that rear brake shoe-to-drum clearance is proper.
2. Turn rear end thread of front cable in either direction until lever stroke is 90 to 100 mm (3.54 to 3.94 in) or until ratchet is engaged in 7 to 8 notches. Then tighten lock nut securely.

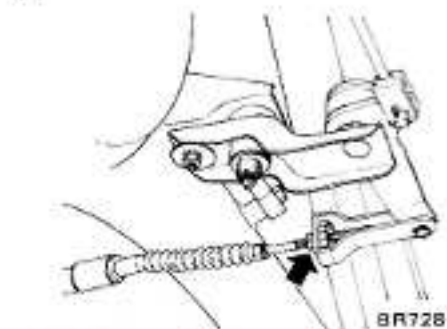


Fig. BR-4 Adjustment of lever stroke

## ADJUSTMENT OF BALANCE LEVER

When rear wheel cylinder is removed or when hand brake linkage located on rear axle case is serviced, be sure to make a balance lever adjustment.

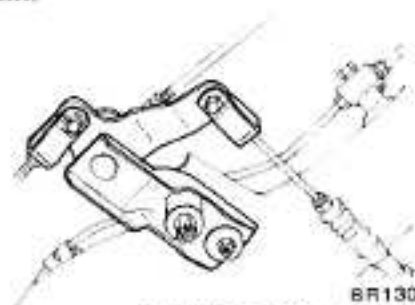
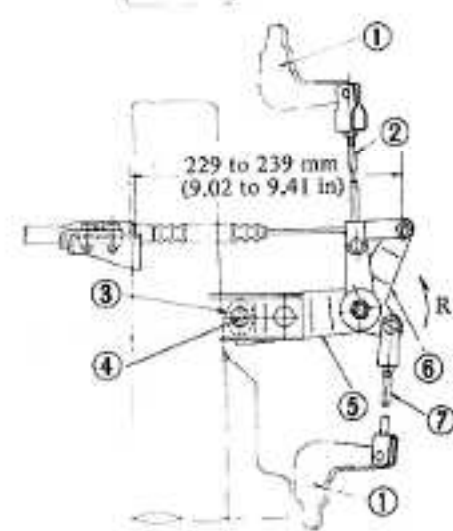
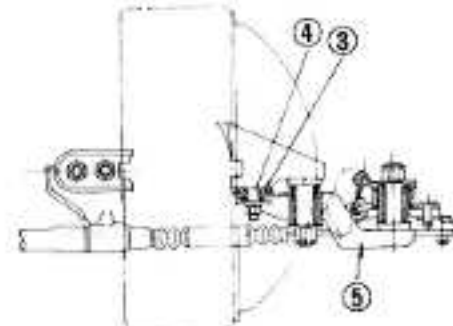


Fig. BR-5 Balance lever

1. Loosen front and rear cables until each wheel cylinder lever is returned all the way.



BR131

- 1 Wheel cylinder lever
- 2 Short cross-rod
- 3 Cushion rubber
- 4 Pin
- 5 Swing arm
- 6 Balance lever
- 7 Long cross-rod

Fig. BR-6 Adjusting hand brake

## Brake System

2. Adjust length of short cross-rod until cushion rubber at swing arm touches pin closely. (Swing arm turns in direction of "R" as shown in Figure BR-6.)
3. Adjust length of long cross-rod until rear cable is adjusted to a length of 229 to 239 mm (9.02 to 9.41 in). Refer to Figure BR-5.
4. Adjust hand brake in manner as described under "Adjustment of Lever Stroke".

### HAND BRAKE WARNING LAMP SWITCH

Bend hand brake warning lamp switch plate down so that brake warning light comes on when ratchet at hand brake lever is moved back one notch and goes out when returned to original position.

### CHECK AFTER ADJUSTMENT

1. Make sure that each wheel cylinder lever is returned to its original position as hand brake lever is moved back. Also check to be sure that inner cable is not excessively slack.

2. Make sure that ratchet is applied positively as hand brake control handle is pulled back. It should not bind or make noise.

## BLEEDING HYDRAULIC SYSTEM

Hydraulic brake system must be bled whenever any line has been disconnected or air has in some way entered system.

"Spongy" pedal action is an indication that air has entered brake system.

Bleeding hydraulic system deserves much attention as it is an essential element in regular brake servicing.

1. Clean all dirt around master cylinder reservoir, remove cylinder cover and top up reservoir with recommended brake fluid.

**Note:** Do not mix two different brand oils.

2. Thoroughly clean mud or dust from bleeder valve so that outlet hole is free from foreign materials. Install a bleeder hose on bleeder valve.

Dip other end of hose into a container filled with brake fluid.

3. Depress brake pedal two or three times and then keep pedal fully depressed.
4. With brake pedal fully depressed, open bleeder valve to exhaust air.

**Notes:**

- a. Carefully monitor brake fluid level at master cylinder during bleeding operation.
- b. Do not re-use brake fluid drained during bleeding operation.
- c. Bleed air in the following sequence.  
Rear wheel → front wheel
- d. Be careful not to splash brake fluid on painted areas.

5. Close bleeder valve quickly as brake pedal is on down stroke.
6. Allow brake pedal to return slowly with bleeder screw closed.
7. Repeat bleeding operations until no air bubbles show in hose.

**Notes:**

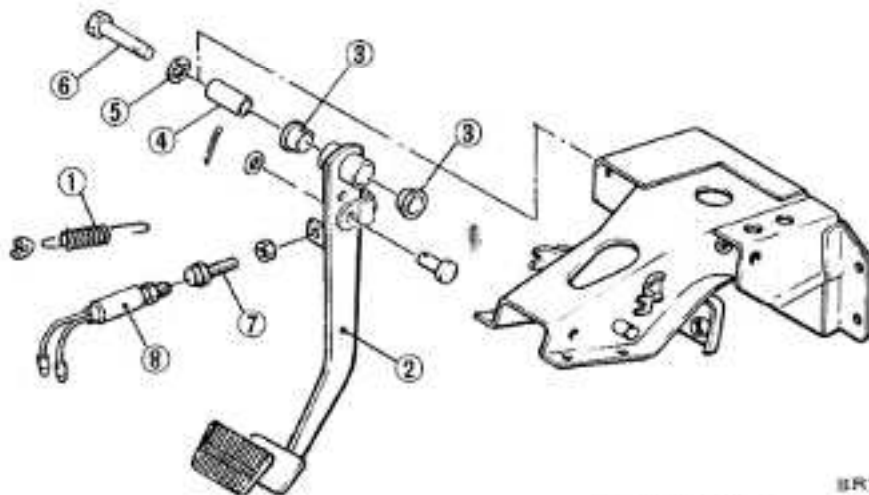
- a. Brake fluid containing air is white and contains air bubbles.
  - b. Brake fluid containing no air runs out of bleeder valve in a solid stream free of air bubbles.
8. Repeat steps above on remaining brake line to expel air.

## SERVICE BRAKE

### CONTENTS

BRAKE PEDAL .....	BR- 5	INSPECTION .....	BR-10
REMOVAL .....	BR- 5	ASSEMBLY .....	BR-10
INSPECTION .....	BR- 5	FRONT DRUM BRAKE .....	BR-11
INSTALLATION .....	BR- 5	REMOVAL .....	BR-11
MASTER CYLINDER .....	BR- 6	DISASSEMBLY AND ASSEMBLY .....	BR-11
REMOVAL .....	BR- 6	INSPECTION .....	BR-12
DISASSEMBLY AND ASSEMBLY .....	BR- 6	INSTALLATION .....	BR-12
INSPECTION .....	BR- 7	REAR DRUM BRAKE .....	BR-13
INSTALLATION .....	BR- 7	REMOVAL .....	BR-13
BRAKE LINE .....	BR- 7	DISASSEMBLY AND ASSEMBLY .....	BR-13
REMOVAL .....	BR- 7	INSPECTION .....	BR-13
INSPECTION .....	BR- 7	INSTALLATION .....	BR-13
INSTALLATION .....	BR- 7	MASTER-VAC .....	BR-14
NP-VALVE .....	BR- 7	DESCRIPTION .....	BR-14
DESCRIPTION .....	BR- 7	INSPECTION OF OPERATION .....	BR-15
OPERATING TEST .....	BR- 8	REMOVAL .....	BR-16
FRONT DISC BRAKE .....	BR- 8	DISASSEMBLY .....	BR-16
DESCRIPTION .....	BR- 8	INSPECTION .....	BR-17
PAD REPLACEMENT .....	BR- 8	ASSEMBLY AND ADJUSTMENT .....	BR-17
REMOVAL AND INSTALLATION .....	BR- 9	INSTALLATION .....	BR-18
DISASSEMBLY .....	BR- 9		

### BRAKE PEDAL



- 1 Return spring
- 2 Brake pedal
- 3 Pedal bushing
- 4 Pedal shaft sleeve
- 5 Washer
- 6 Fulcrum pin
- 7 Stopper
- 8 Brake lamp switch

#### REMOVAL

1. Remove pedal return spring.
2. Remove cotter pin from push rod, and separate pedal from Master-Vac.
3. Remove fulcrum pin and pedal.

Note: Turn fulcrum pin clockwise to loosen it.

#### INSPECTION

- Check brake pedal for the following items, servicing as necessary.
1. Check pedal bushing for wear, deformation or damage.
  2. Check pedal shaft sleeve for wear or roughness.
  3. Check for bent brake pedal.
  4. Check for fatigued return spring.

#### INSTALLATION

Install brake pedal in reverse order of removal, paying attention to the following:

1. Fulcrum pin tightening torque: 3.1 to 4.1 kg-m (22 to 30 ft-lb).

Fig. BR-7 Brake pedal

2. Bend up cotter pin securely after installing clevis pin.
3. Apply sufficient amount of recommended multipurpose grease to sliding contact surface and hook of return spring.

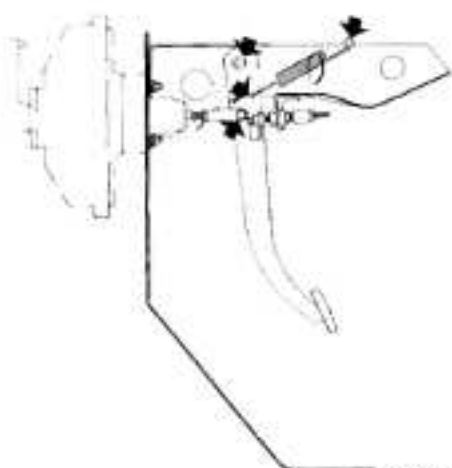


Fig. BR-8 Lubricating points

4. Adjust brake pedal, referring to "Brake Pedal Adjustment", Page BR-2.

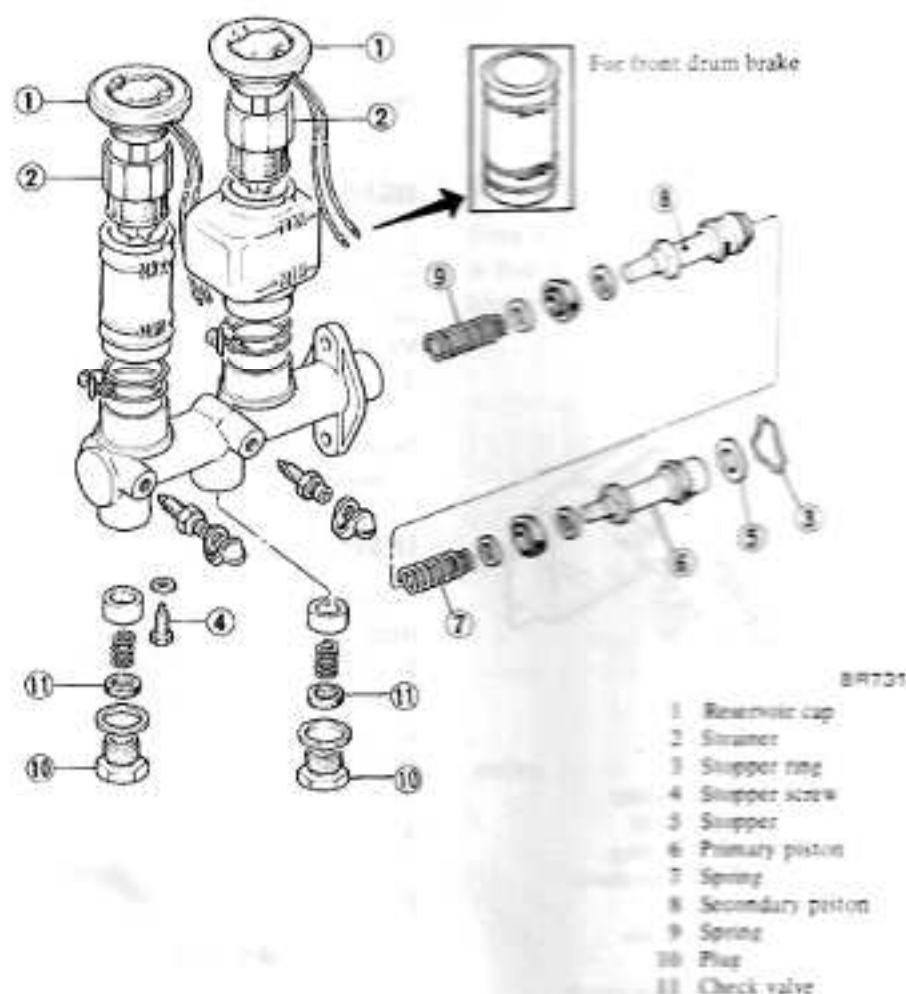
### REMOVAL

Disconnect wiring to brake warning light switch and brake tube, and remove master cylinder and two nuts securing master cylinder in place.

#### Notes:

- a. Before disconnecting brake tube, be sure to set up a container to receive draining brake fluid. Use of a rag is also suggested to keep adjacent parts and areas clean at all times.
- b. When removing brake tubes, use suitable tube wrench.

## MASTER CYLINDER



- 1 Reservoir cap
- 2 Strainer
- 3 Stopper ring
- 4 Stopper screw
- 5 Stopper
- 6 Primary piston
- 7 Spring
- 8 Secondary piston
- 9 Spring
- 10 Plug
- 11 Check valve

Fig. BR-9 Master cylinder

### DISASSEMBLY AND ASSEMBLY

1. Remove reservoir cap and drain out brake fluid.
2. Pry off stopper ring with a screwdriver.
3. Remove two stopper screws and take out stopper, primary piston assembly, spring, and secondary piston assembly, in that order.

**Note:** Discard cup if it has been removed from piston assembly, and use new one.

4. Unscrew plug to gain access to check valve for disassembling.

**Note:** Never detach reservoir tank. If it is removed for any reason, discard it and install a new one. Do not remove or disassemble brake fluid level gauge.

5. Assemble master cylinder in reverse sequence of disassembly, paying particular attention to the following:

#### Notes:

- a. Replace gaskets and packings with new ones.
- b. Apply brake fluid or rubber grease to sliding contact surfaces of parts to facilitate assembly of master cylinder.

## INSPECTION

Thoroughly clean all parts in a suitable solvent, and check for worn or damaged parts. Replace any part that is faulty.

**Note:** Do not clean rubber parts with mineral oil, since this will cause them to deteriorate. Use brake fluid or alcohol. When alcohol is used for cleaning these parts, do not immerse them in it longer than 30 seconds. After parts are cleaned, dry with compressed air.

1. Check cylinder and piston for evidence of abnormal wear or damage.

Replace if found faulty.

2. Check piston-to-cylinder clearance. If it is more than 0.15 mm (0.0059 in), replace either piston or cylinder.

3. Check for weakened, fatigued or damaged springs, replacing as necessary.

4. When master cylinder is disassembled be sure to discard cups and valves. Replace any other parts which show evidence of deformation, wear or damage.

5. Replace damaged dust covers, oil reservoirs and caps.

## INSTALLATION

Install master cylinder in reverse order of removal.

Bleed air out of master cylinder after it is installed in its original position.

Tightening torque:

Brake master cylinder attaching nut:

0.8 to 1.1 kg-m  
(5.8 to 8.0 ft-lb)

Brake tube flare nut:

1.5 to 1.8 kg-m  
(11 to 13 ft-lb)

**Note:** When installing brake tubes, use Pipe Torque Wrench GG94310000.

## BRAKE LINE

Hydraulic brake lines vary according to brake type and steering position. Brake tube is a double layer steel tube capable of bearing the high pressures created when brakes are applied.

### REMOVAL

1. Remove flare nuts on both ends, and remove retainers and clips.

**Note:** When removing brake tubes and hose, use suitable tube wrench.

2. To remove brake hose, first remove flare nut securing brake tube to brake hose and withdraw lock spring. End of hose can then be removed from bracket. Next remove brake hose. Do not twist brake hose.

### INSPECTION

Check brake lines (tubes and hoses) for evidence of cracks, deterioration or other damage. Replace any faulty parts.

If leakage occurs at end around joints, re-tighten or, if necessary, replace faulty parts.

### INSTALLATION

Pay particular attention to following instructions when installing brake lines.

1. Leave a sufficient space between brake lines and adjacent parts so that brake lines are completely free from vibration during driving.

Make sure that front brake hose is more than 20 mm (0.787 in) from wheel.

2. Be careful not to warp or twist brake hoses.

3. Always fasten brake tubes to mounting clips where necessary.

Above rear axle housing are two double clips which should be used to secure brake hoses in manner described below.

Bend short clip straight up. With brake tube on long clip, bend clip up and around tube. Finally, wrap short clip around tube to secure the installation.



BR141

Fig. BR-10 Fastening brake tube securely with double clip

4. Do not tighten brake line mounting flare nut excessively.

Tightening torque:

Brake tube flare nut:

1.5 to 1.8 kg-m  
(11 to 13 ft-lb)

Brake hose connector:

1.7 to 2.0 kg-m  
(12 to 14 ft-lb)

3-way connector mounting bolt:

0.8 to 1.0 kg-m  
(5.8 to 7.2 ft-lb)

**Note:** When installing brake tubes, use Pipe Torque Wrench GG94310000.

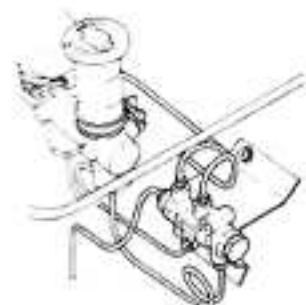
5. Upon completion of installation of brake lines, bleed air out of brake lines.

## NP-VALVE

### DESCRIPTION

The NP-valve completely separates the front and rear brake lines, allowing them to function independently, and preventing the rear brakes from locking before the front brakes.

Damage, such as brake line leakage, in either the front or rear brake system will not affect the normal operation of the system.



BR732

Fig. BR-11 NP-valve

**OPERATING TEST**

Drive car only with driver laden, on dry concrete road and apply brake abruptly at 50 km/h (31 MPH).

1. NP-valve is functioning normally if rear wheels lock simultaneously with front wheels or front wheels lock ahead of rear wheels.
2. If rear wheels lock first, NP-valve may be malfunctioning. Replace NP-valve as an assembly.

**Note:** When conducting this test, watch out for other cars.

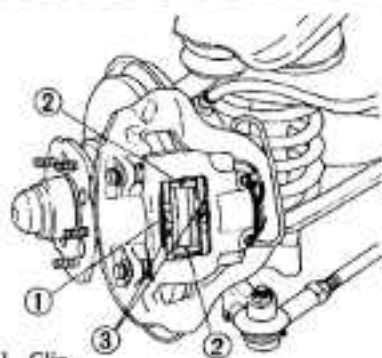
**FRONT DISC BRAKE**

**DESCRIPTION**

The N34L type disc brake, newly designed by NISSAN, is installed on all 330 models. The N34L type disc brake has two pistons in a single cylinder.

When the brake is operated, the inner pad is directly pushed against the rotor by piston "B", and the outer pad is indirectly pushed by piston "A". The yoke and cylinder body slide through the grippers, and there is no metallic contact. The gripper is useful for preventing dragging and reducing the knock-back phenomenon.

The pad-to-rotor clearance is automatically adjusted due to the elasticity of the piston seal.

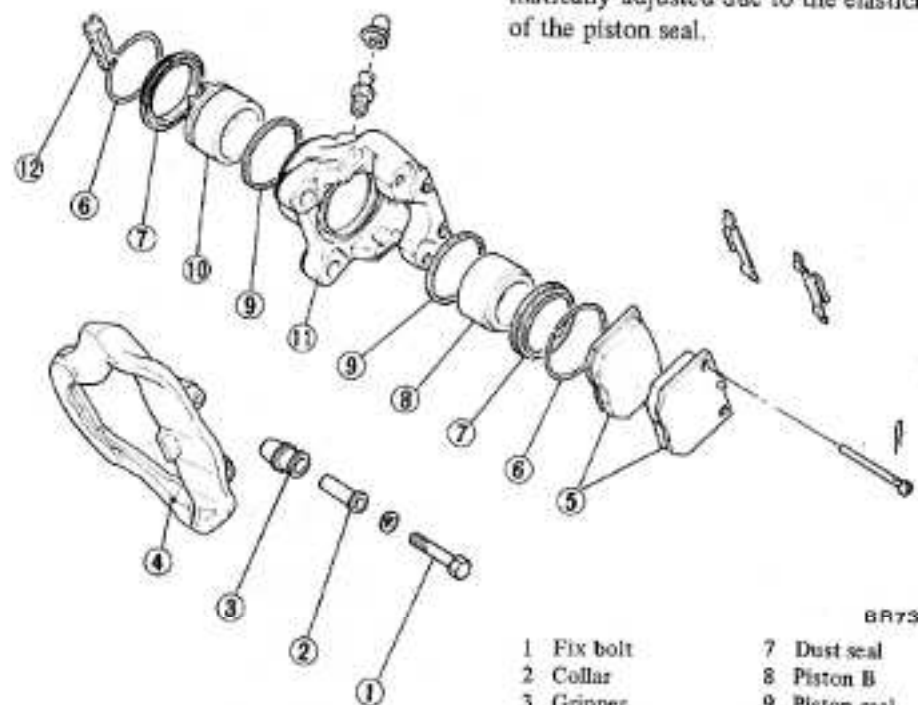


- 1 Clip
- 2 Retaining pin
- 3 Pad spring

BR734

Fig. BR-13 Removing pad

**Note:** After removing pads, do not depress brake pedal, or piston will jump out.



BR733

- |                 |                  |
|-----------------|------------------|
| 1 Fix bolt      | 7 Dust seal      |
| 2 Collar        | 8 Piston B       |
| 3 Gripper       | 9 Piston seal    |
| 4 Yoke          | 10 Piston A      |
| 5 Pad           | 11 Cylinder body |
| 6 Retainer ring | 12 Yoke holder   |

Fig. BR-12 N34L disc brake

**Inspection**

1. Clean pad with cleaning solvent.

**Note:** Do not use mineral oil to clean pads.

2. When pad is heavily fouled with oil or grease or when pad is deteriorated or deformed, replace it.
3. When thickness of friction material is less than 2 mm (0.079 in), replace pad.

**Note:** Always replace pads in full set of four, using genuine parts.

5. Check rotor, referring to following section, "Inspection".

**Installation**

1. Clean piston end and surroundings of gripper.

**Note:** Do not use mineral oil to clean. Be careful not to get oil on rotor.

2. Loosening air bleeder, push piston B (outer piston) in cylinder until dust seal groove of piston B coincides with end surface of retaining ring on dust seal. After piston B is at the point, tighten air bleeder. Inner pad can then be installed.

**PAD REPLACEMENT**

**Removal**

1. Jack up front of car, and support it on safety stands. Remove tire.
2. Remove clip ①.
3. Remove retaining pin ② holding pad spring ③ by finger.

**Note:** Check to ensure that pad springs rebound easily.

4. Detach pads with pliers.



## Brake System

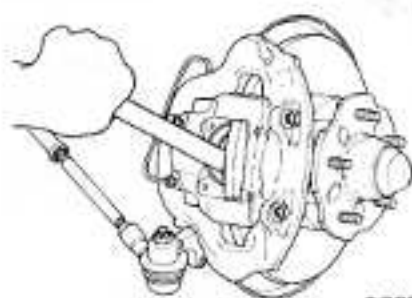
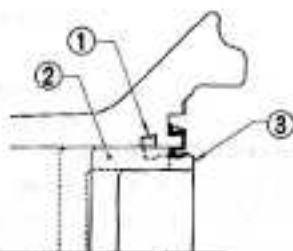


Fig. BR-14 Pushing piston B

Note: Piston can be easily pushed in by hand, but if pushed too far, groove of piston will go inside of piston seal as shown in Figure BR-15. At this point, if piston is pressured or moved, piston seal will be damaged. If piston has been pushed in too far, remove caliper assembly and disassemble it. Then, push piston out in direction shown by arrow.

Assemble it again, referring to following section.



- 1 Piston seal
- 2 Piston B
- 3 Normal position

BR736

Fig. BR-15 Position of piston

3. Push piston A (inner piston) in cylinder by pulling yoke. Outer pad can then be installed.

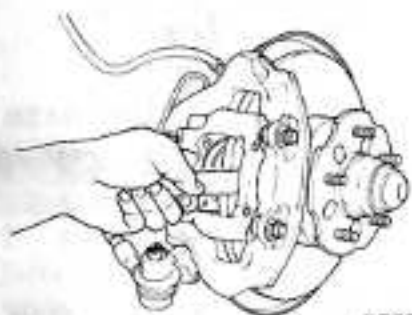


Fig. BR-16 Pulling in piston A

4. After installing pads, install retaining pin and pad spring, and fix with clip.

5. Depress brake pedal several times, and pads will settle into proper position.

Add brake fluid to reservoir tank of master cylinder.

6. Install wheels and lower car to ground.

Note: If necessary, bleed brake system.

### REMOVAL AND INSTALLATION

#### Removal

1. Remove brake tube from caliper assembly.

#### Notes:

- a. When removing brake tube, use suitable tube wrench. Never use open-end or adjustable wrench.
- b. Plug up hole in caliper and brake hose so that brake fluid does not flow out.

2. Remove caliper assembly from knuckle spindle.

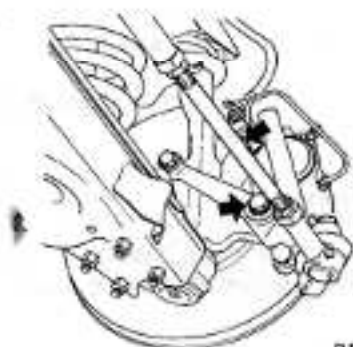


Fig. BR-17 Removing caliper

3. If necessary, remove rotor as follows:

- (1) Remove hub cap, cotter pin and adjusting cap.
- (2) Loosen bearing lock nut and remove wheel hub with rotor.
- (3) Secure wheel hub in a vice, loosen bolts and remove rotor from wheel hub.

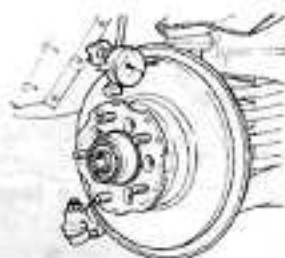
#### Installation

1. Install rotor and wheel hub in reverse order of removal. Adjust wheel bearing preload correctly, referring to Section FA, "Adjustment".

Tightening torque:

Rotor to wheel hub:  
3.9 to 5.3 kg-m  
(28 to 38 ft-lb)

2. Using a dial gauge, measure run-out of rotor at circumference of 250 mm (9.84 in). If it exceeds 0.15 mm (0.0059 in), machine reconditioning or replacement is required.



BR739

Fig. BR-18 Measuring runout of rotor

3. Install caliper assembly to knuckle spindle.

Tightening torque:

Caliper to knuckle spindle:  
7.3 to 9.9 kg-m  
(53 to 72 ft-lb)

4. Install brake tube and bleed brake system.

Tightening torque:

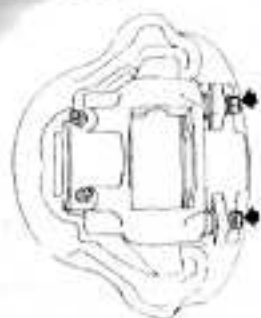
Brake tube flare nut:  
1.5 to 1.8 kg-m  
(11 to 13 ft-lb)  
Air bleeder:  
0.7 to 0.9 kg-m  
(5.1 to 6.5 ft-lb)

Note: When installing brake tube, use Pipe Torque Wrench GG94310000.

#### DISASSEMBLY

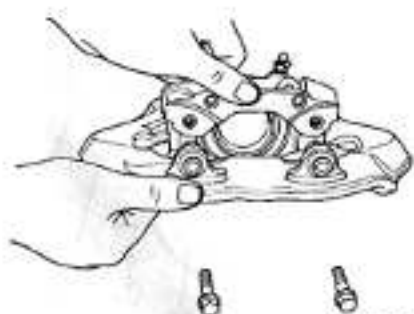
1. Drain brake fluid from cylinder body.
2. Wipe off dust and mud from caliper assembly.
3. Remove pads. Refer to "Pad Replacement".

4. Remove fixing bolts from cylinder body. See Figure BR-19.
5. Separate yoke and cylinder body. See Figure BR-20.



BR740

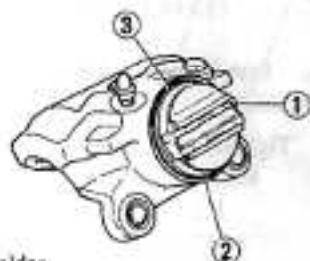
Fig. BR-19 Removing fixing bolts



BR741

Fig. BR-20 Removing yoke

6. Remove yoke holder ① from piston.
7. Remove retaining rings ② and dust seals ③ from end of both pistons A and B.



- 1 Yoke holder
- 2 Retaining ring
- 3 Dust seal

BR742

Fig. BR-21 Removing piston

8. Force out pistons from cylinder by feeding compressed air gradually.

Note: Be careful not to push piston in.

9. Remove piston seals.

Note: Be careful not to damage seals and cylinder body.

10. If necessary, remove gripper, being careful not to damage collar.

## INSPECTION

Clean all parts and check as follows:

Note: Clean rubber parts with alcohol or brake fluid, not with mineral oil.

### Cylinder body

1. Check inside surface of cylinder for score, rust, wear, damage or presence of foreign substances. If any surface fault is detected, replace cylinder body.
2. Minor damage from rust of foreign substances may be eliminated by polishing surface with a fine emery cloth. If damage is major, cylinder assembly must be replaced.

### Piston

Check piston for score, rust, wear, damage or presence of foreign substances. Replace if any fault is detected.

Note: Do not use emery cloth on piston surface.

### Piston seal, dust seal

Replace piston seal and dust seal at each disassembly.

### Gripper

Check for wear, cracks or other damage. Replace if any fault is detected.

### Rotor

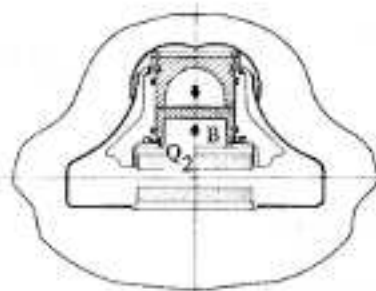
1. Check rotor for score and damage. If excessive, machine second-conditioning will be required.
2. Measure thickness of rotor with a micrometer. If thickness of rotor is beyond wear limit of 10.5 mm (0.414 in), replace rotor.
3. Measure thickness around the entire periphery on same circumference. If parallelism is over 0.03 mm (0.001 in), replace rotor.

## ASSEMBLY

1. Install piston seals, taking care not to damage them.
2. Apply castor oil to sliding portions of piston, inside of cylinder, and insert piston A and piston B one by one.

Notes:

- a. Insert piston A in direction shown by arrow Q1 and piston B in direction shown by arrow Q2.



BR743

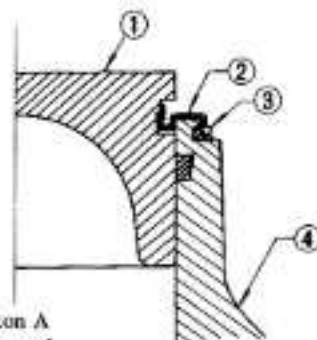
Fig. BR-22 Inserting piston

- b. When inserting pistons, be careful not to insert too far. Refer to "Pad Replacement", Page BR-8.
- c. Install piston A so that its yoke groove coincides with yoke groove of cylinder.

3. Install dust seal and clamp securely with retainer ring.

Notes:

- a. Apply N34 disc brake grease to sealing surface of dust seal.
- b. Be careful not to deform dust seal.
- c. Wipe off excess grease with alcohol.



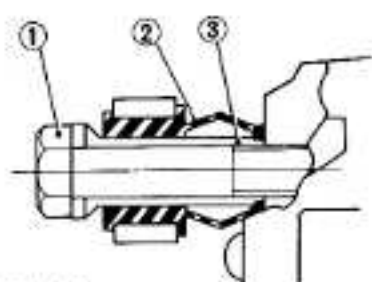
- 1 Piston A
- 2 Dust seal
- 3 Retaining ring
- 4 Cylinder

BR744

Fig. BR-23 Installing dust seal

## Brake System

4. Install yoke holder to piston A.
5. Install gripper. Do not use any lubricant except water for inserting collar.



- 1 Fix bolt
- 2 Gripper
- 3 Collar

BR745

Fig. BR-24 Installing gripper

6. Install yoke in reverse order of removal.

### Notes:

- a. Be sure that there is no clearance between piston and yoke.
- b. Be careful not to put gripper between cylinder body and collar.

7. Tighten fixing bolts.

Tightening torque:

Fixing bolt:  
1.6 to 2.1 kg-m  
(12 to 15 ft-lb)

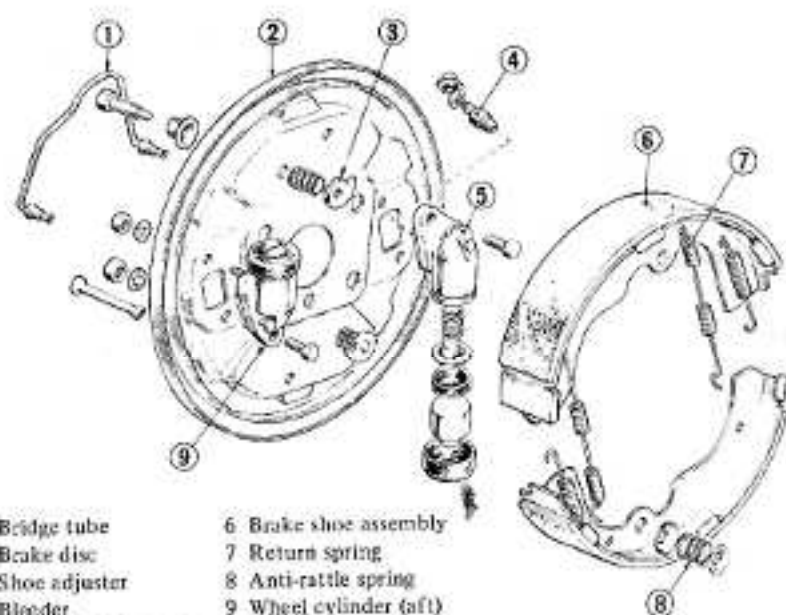
8. Install pad, retaining pin, pad spring, and fix with clip.

6. Disconnect brake hose and install a brake line plug in open end of brake hose. Remove brake tube and bridge tube.

Note: When removing brake tube and hose, use suitable tube wrench.

7. Remove cylinder mounting bolts and detach fore and aft wheel cylinders.
8. Remove four bolts securing brake disc in place, and detach brake disc. These bolts differ in length. Be sure to note location of each bolt so that they may be re-installed in their proper positions.

## FRONT DRUM BRAKE



- 1 Bridge tube
- 2 Brake disc
- 3 Shoe adjuster
- 4 Bleeder
- 5 Wheel cylinder (fore)
- 6 Brake shoe assembly
- 7 Return spring
- 8 Anti-rattle spring
- 9 Wheel cylinder (aft)

BR664

Fig. BR-25 Front drum brake

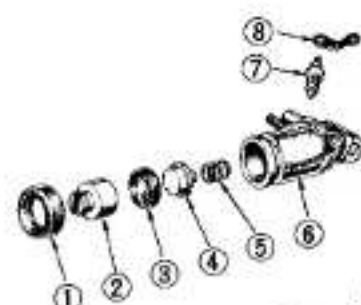
### REMOVAL

1. Jack up front of car, and support it with safety stands.
2. Remove tire and brake drum. If brake drum cannot be easily removed, return shoe adjuster, install two bolts (M8 x 1.25) in holes on flange face of brake drum, and screw bolts evenly

- until brake drum is driven out.
3. Remove hub assembly from knuckle spindle. (Refer to Section FA.)
4. Remove anti-rattle spring and pin.
5. Remove return spring and brake shoes.

## DISASSEMBLY AND ASSEMBLY

### Wheel cylinder



- 1 Dust cover
- 2 Piston
- 3 Piston cup
- 4 Spring retainer
- 5 Spring
- 6 Cylinder
- 7 Bleeder
- 8 Bleeder cap

BR158

Fig. BR-26 Wheel cylinder

Remove dust cover. Apply air through oil hole, and parts will be disassembled.

Thoroughly wash all parts in brake fluid or alcohol. Assemble wheel cylinder in reverse order of disassembly.

### Notes:

- a. Do not wash rubber parts with mineral oil, or they will deteriorate. Do not immerse rubber parts in alcohol longer than 30 seconds. After parts are cleaned, dry them with compressed air.
- b. Apply a coating of brake fluid to piston cup at assembly.

## INSPECTION

### Brake drum

1. Replace any brake drum whose diameter is beyond limit of 1.0 mm (0.0394 in) with respect to standard inner diameter of 241.3 mm (9 1/2 in).
2. Allowable maximum "out-of-round" of brake drum is 0.02 mm (0.0008 in).  
Re-condition or replace brake drum if specified limit is exceeded.
3. Measure for tapered brake drum. If specified limit of 0.02 mm (0.0008 in) is exceeded at a point 60 mm (2.362 in) from inlet, re-condition or replace brake drum.
4. Contact surface with which linings come into contact should be fine-finished with No. 120 to 150 sandpaper.
5. Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial wear or stepped wear on its contact surface.

**Note:** After brake drum has been completely re-conditioned or replaced, check drum and shoes for proper contact pattern.

### Brake assembly

1. Replace any linings which are cracked, worn or oil-stained.
2. Replace linings if their thicknesses are worn down to less than 1.5 mm (0.591 in).
3. Replace any shoe return springs which are broken or fatigued.
4. Replace fatigued anti-rattle spring, damaged pin and/or retainer.

### Wheel cylinder

1. Replace any cylinder or piston which is scratched, scored or worn on

its sliding contact surface.

2. Replace worn parts if piston-to-cylinder clearance is beyond 0.15 mm (0.0059 in).
3. Replace any piston cup which is worn or otherwise damaged.
4. Replace if contacting face of cylinder and shoe is worn locally or in step.
5. Replace any damaged dust cover, fatigued piston spring or faulty threaded parts.
6. Replace any tube connector which is worn on its threaded portion.

## INSTALLATION

Install wheel cylinder in reverse sequence of removal, paying particular attention to the following:

1. Tighten following parts to specified torque.

Tightening torque:

- Flared nut:  
1.5 to 1.8 kg-m  
(11 to 13 ft-lb)
- Air bleeder:  
0.7 to 0.9 kg-m  
(5.1 to 6.5 ft-lb)

Wheel cylinder mounting nuts:

- Stud bolt side:  
0.5 to 0.7 kg-m  
(3.6 to 5.1 ft-lb)
- Hexagon bolt side:  
1.6 to 2.2 kg-m  
(12 to 16 ft-lb)

2. Referring to Figure BR-27 for the location of lubricating points, apply a coating of brake grease to these points. Exercise care not to allow grease to come into contact with linings or adjuster.

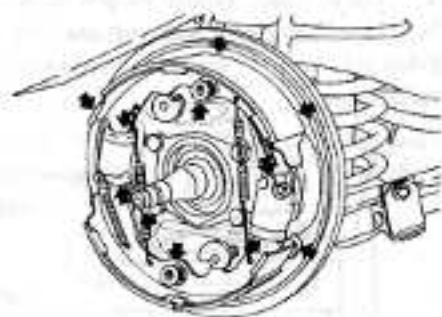


Fig. BR-27 Lubricating points

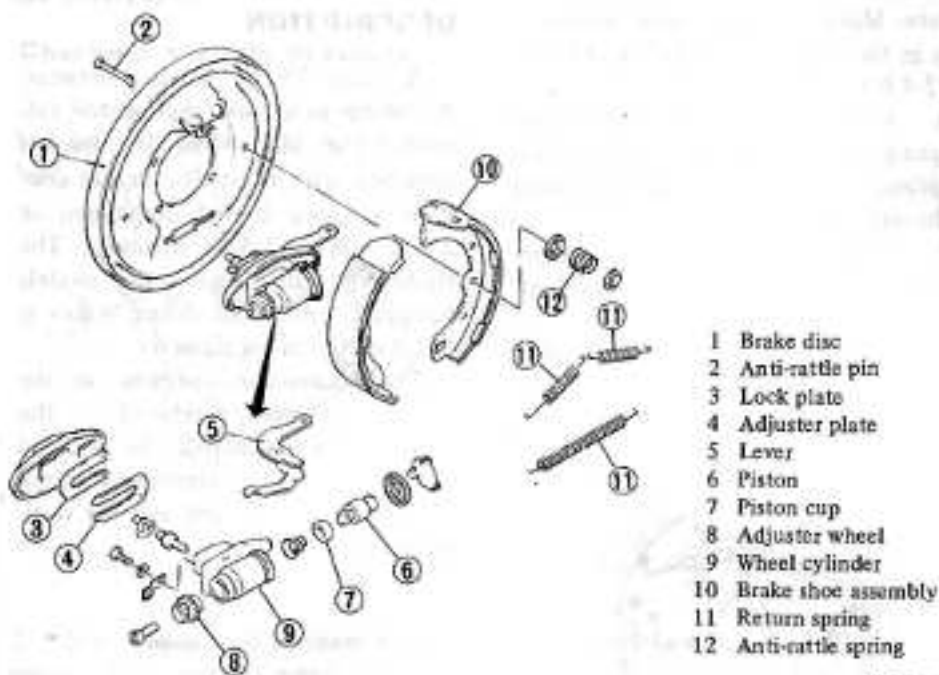
3. When assembling disc to spindle, note location of the four bolts. These bolts are not the same in length. After tightening bolts, be sure to lock them.
4. Install grease catcher in its original position, paying attention to top and bottom sides.

Tightening torque:

- Brake disc only:  
5.1 to 6.1 kg-m  
(37 to 44 ft-lb)
- Knuckle arm and parts tightened together:  
7.3 to 9.9 kg-m  
(53 to 72 ft-lb)

5. In installing brake hoses, be careful not to apply an undue stress to it or to twist it.
6. Make sure that entire brake shoe fits in place.
7. After installation is completed, check and adjust shoe-to-drum clearance, referring to instructions under the heading "Adjustment" in this section.
8. Install hub assembly, referring to Section "FA".

## REAR DRUM BRAKE



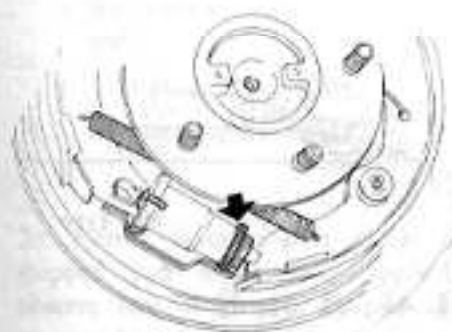
- 1 Brake disc
- 2 Anti-rattle pin
- 3 Lock plate
- 4 Adjuster plate
- 5 Lever
- 6 Piston
- 7 Piston cup
- 8 Adjuster wheel
- 9 Wheel cylinder
- 10 Brake shoe assembly
- 11 Return spring
- 12 Anti-rattle spring

BR746

Fig. BR-28 Rear brake

### REMOVAL

1. Jack up rear of car, and support it with safety stands.
2. Remove tire and brake drum.  
If necessary to spread shoe clearance, return adjust wheel with a screwdriver.

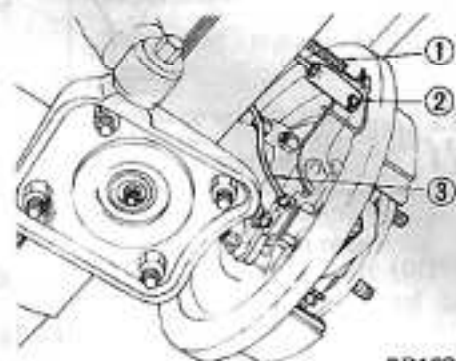


BR747

Fig. BR-29 Returning shoe

6. Remove hand brake return spring, cross-rod cotter pin, and brake tube flare nut. Install a brake line plug in open end of brake tube.

**Note:** When removing brake tubes, use suitable tube wrench.



BR163

- 1 Hand brake return spring
- 2 Cross-rod cotter pin
- 3 Brake tube

Fig. BR-30 Removing hand brake

3. If brake drum cannot be easily removed, install two bolts (M8 x 1.25) in holes on flange face of brake drum, and screw bolts evenly until brake drum is driven out.
4. Remove anti-rattle spring and pin.
5. Remove return springs and brake shoes.

7. Remove wheel cylinder dust cover. Remove lock plate and adjuster plate securing wheel cylinder in place, and detach wheel cylinder.

8. To remove brake disc, withdraw rear axle together with brake disc from rear axle case, remove rear axle shaft (Refer to "Rear Axle") and press out bearing cage.

## DISASSEMBLY AND ASSEMBLY

### Wheel cylinder



BR748

Fig. BR-31 Wheel cylinder

Remove snap ring and dust cover. Inject air through oil hole, and parts will be disassembled.

Thoroughly wash all parts in brake fluid or alcohol. Assemble wheel cylinder in reverse order of disassembly.

### Notes:

- a. Do not wash rubber parts with mineral oil, or they will deteriorate. Do not immerse rubber parts in alcohol longer than 30 seconds. After parts are cleaned, dry them with compressed air.
- b. Apply a coating of brake fluid to piston cup at assembly.

### INSPECTION

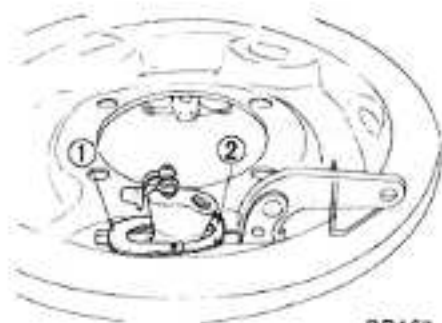
Refer to "Inspection" of "Front Drum Brake".

### INSTALLATION

Install rear brake in reverse order of removal, closely observing the following:

## Brake System

1. Install wheel cylinder, properly inserting adjuster plate and lock plate in direction shown in Figure BR-32 and aligning projected portion in adjuster plate with hole in lock plate.



BR167

1 Lock plate 2 Adjuster plate

Fig. BR-32 Attaching wheel cylinder

Also apply grease to sliding surfaces of cylinder, disc and adjuster plate so that wheel cylinder moves freely.

2. When installing boots in place, make sure that sliding contact of disc on wheel cylinder is clean and free from mud.

3. Measure wheel cylinder sliding resistance without installing brake tube. Make sure that sliding resistance is in the range from 2 to 7 kg (4.4 to 15.4 lb).

4. Install brake shoes and return springs in place. Hook up these return springs on rear side after passing through holes.

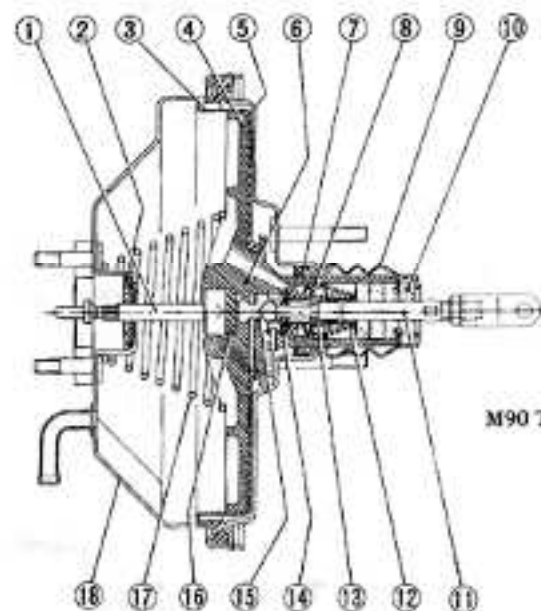
5. Make sure that auto-adjuster operates properly as wheel lever is actuated.

6. Apply brake grease to lubricating points shown in Figure BR-33.

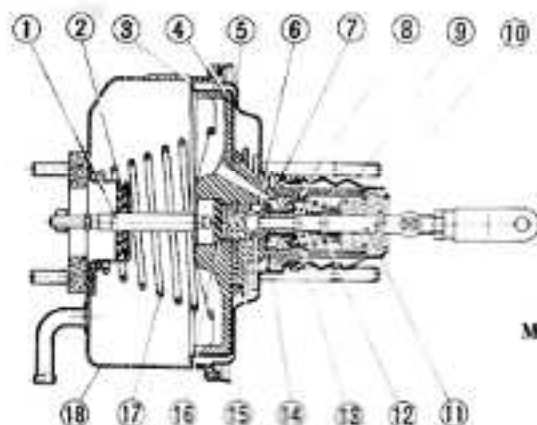


BR749

Fig. BR-33 Points requiring grease



M90 Type



M60 Type

1 Push rod  
2 Plate and seal  
3 Diaphragm  
4 Diaphragm plate  
5 Rear shell  
6 Vacuum valve  
7 Seal  
8 Poppet assembly  
9 Valve body gasket

10 Air silencer filter  
11 Valve operating rod  
12 Valve return spring  
13 Poppet return spring  
14 Exhaust valve  
15 Valve plunger  
16 Reaction disc  
17 Diaphragm return spring  
18 Front shell

BR750

Fig. BR-34 Sectional view of Master-Vac

**INSPECTION OF OPERATION**

**Checking vacuum pressure**

1. Connect a vacuum gauge in the line between check valve and Master-Vac.

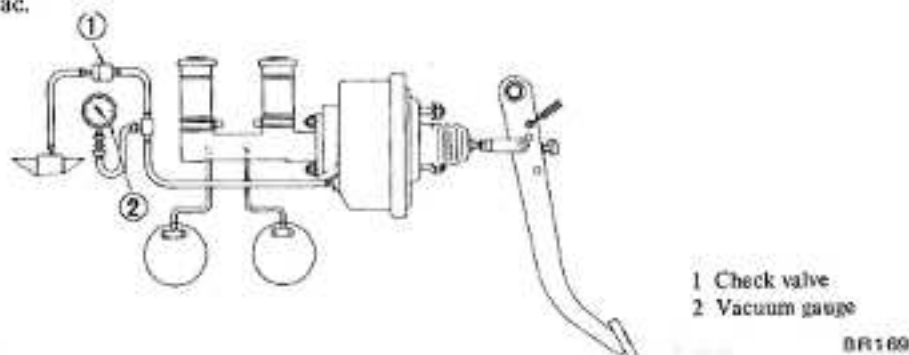


Fig. BR-35 Air-tight test set-up

2. Start engine and increase engine speed. Stop engine when vacuum gauge indicates 500 mmHg (19.7 inHg).

**Air tight test**

1. Fifteen seconds after engine is stopped, observe rate of drop in air pressure registered by vacuum gauge. If pressure drop exceeds 10 mmHg (0.394 inHg), refer to following chart to determine cause of failure.

Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Air leakage at push rod seal.	Replace seal.
3. Air leakage between valve body and seal.	Repair or replace faulty part(s).
4. Air leakage at valve plunger seat.	Repair or replace seat.
5. Damaged piping or joints.	Repair or replace.

2. Fifteen seconds after engine is stopped and brake fully applied, observe rate of drop in air pressure registered by vacuum gauge. If a pres-

sure drop exceeds 10 mmHg (0.394 inHg), refer to following chart to determine cause of failure.

Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Damaged diaphragm.	Replace.
3. Reaction disc has dropped off.	Re-install and check push rod for proper turn.
4. Air leakage at poppet assembly seat and valve body.	Replace faulty part(s).

Note: When replacement of any part is required, be sure to replace Master-Vac as an assembly.

**Inspection check valve**

1. Remove clip and disconnect hoses at connections. Check valve can now be removed.

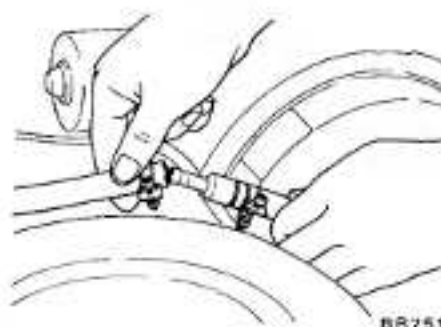


Fig. BR-36 Location of check valve



Fig. BR-37 Location of check valve (Diesel-powered vehicle optional)

2. Using a Master-Vac tester, apply a vacuum pressure of 500 mmHg (19.7 inHg) to port of check valve on Master-Vac side. If a pressure drop exceeds 10 mmHg (0.394 inHg) in 15 seconds, replace check valve.

3. When pressure is applied to Master-Vac side of check valve and valve does not open, replace check valve.

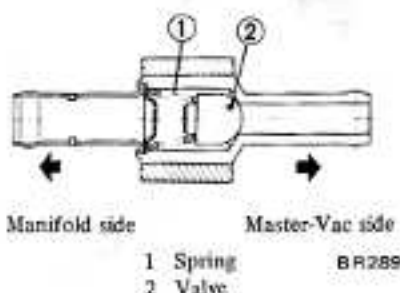


Fig. BR-38 Cross-sectional view of check valve

## Brake System

### Operating test

1. Connect an oil pressure gauge to brake line, at connection on master cylinder.
2. Install a pedal force gauge on brake pedal.
3. Start engine, and increase engine speed until a vacuum pressure of 500 mmHg (19.7 inHg) is registered on vacuum pressure gauge. With a steady vacuum pressure of 500 mmHg (19.7 inHg), measure oil pressure with respect to each pedal operating force.

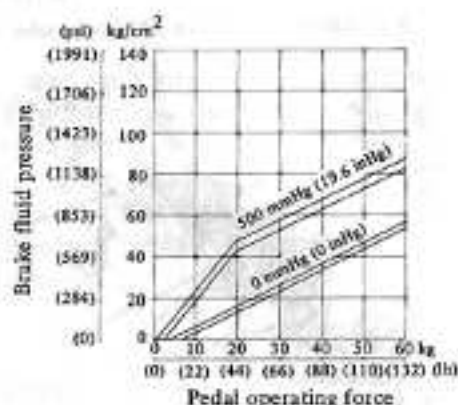
Relationship between oil pressure

and pedal operating force is illustrated in Figure BR-39. If test results are not as specified in Figure BR-39, check Master-Vac for condition in manner described under "Inspection" before removal of this unit.

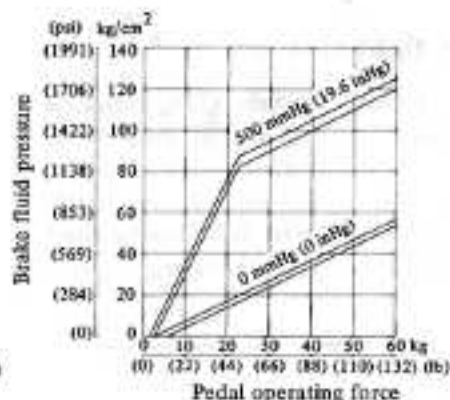
Also check brake line for evidence of fluid leakage.

**Note:** Determine whether source of problem is in Master-Vac or check valve. Before you reach a final conclusion, always inspect check valve first.

M60 Type



M90 Type



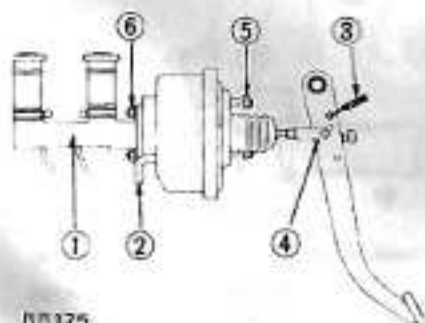
BR764

Fig. BR-39 Performance curves of Master-Vac

### REMOVAL

Referring to Figure BR-40, remove parts in numerical order enumerated.

Install these parts in reverse order of removal.



BR175

Fig. BR-40 Procedures for removing Master-Vac

**Note:** After Master-Vac is properly installed on vehicle, be sure to conduct an air-tight test and operation test described previously in this Section.

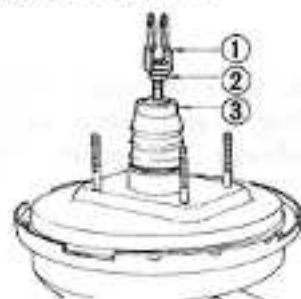
### DISASSEMBLY

When disassembling Master-Vac, observe the following:

- a) Thoroughly clean mud or dust from Master-Vac.
- b) Extreme care should be taken not to allow dirt, dust, water or any other foreign matter to get into any component parts.

Be sure to select a clean place for disassembly or assembly.

- c) Mark mating joints so that they may be installed exactly in their original positions.
- d) Keep all disassembled parts arranged properly so that they may readily be assembled at any time.
- e) Clean rubber parts and synthetic resin parts in alcohol.
- f) After all disassembled parts are cleaned in an approved solvent, place on a clean work bench. Use care not to allow dirt and dust to come into contact with these parts.
  1. Temporarily install spacer on rear shell spacer. Place Master-Vac in a vise. Use of soft jaws is suggested.
  2. Remove clevis and lock nut. Detach valve body guard.



- 1 Clevis
- 2 Lock nut
- 3 Valve body guard

BR176

Fig. BR-41 Removing rear shell

3. Identify front shell and rear shell clearly so that they may be reassembled in their original positions. (Bolts to be attached on dashboard are not same in pitch.)

4. Using Master-Vac Wrench ST08080000, remove rear shell-seal assembly, and disassemble diaphragm plate assembly, front shell assembly, diaphragm spring and push rod assembly.



BR177

Fig. BR-42 Removing rear shell

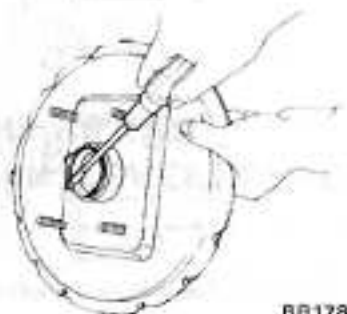


## Brake System

### Rear shell-seal assembly

Pry off seal assembly with a screwdriver as shown.

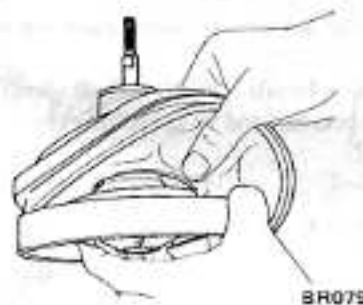
**Note:** Do not disassemble seal assembly unless absolutely necessary. Whenever it must be removed, use care not to damage it.



BR178  
Fig. BR-43 Removing seal

### Diaphragm plate assembly

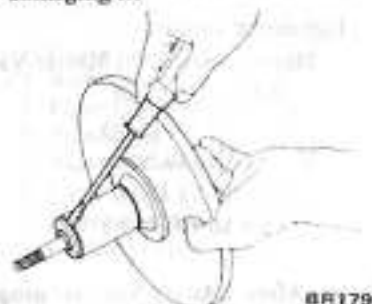
1. Place diaphragm plate assembly on a clean work bench. Detach diaphragm from groove in plate as shown.



BR079  
Fig. BR-44 Separating diaphragm

2. Using a screwdriver as shown, evenly pry air silencer retainer until it is detached from diaphragm plate assembly.

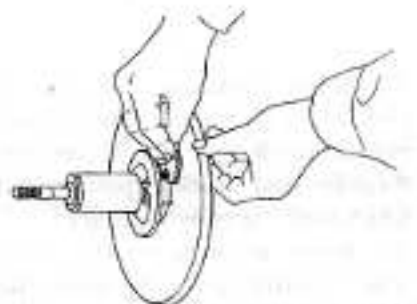
**Note:** Never use a hammer to remove this retainer, since this is a sure way of damaging it.



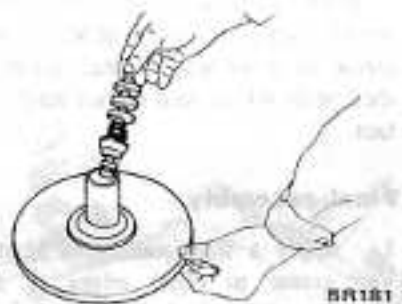
BR179  
Fig. BR-45 Removing air silencer retainer

3. Pull out valve plunger stop key and withdraw silencer and plunger assembly.

**Note:** To remove valve plunger stop key properly, proceed as follows: With key hole facing down, lightly push valve operating rod while simultaneously applying vibration to it.



BR180  
Fig. BR-46 Pulling out stop key



BR181  
Fig. BR-47 Removing valve operating rod assembly

4. Withdraw reaction disc.

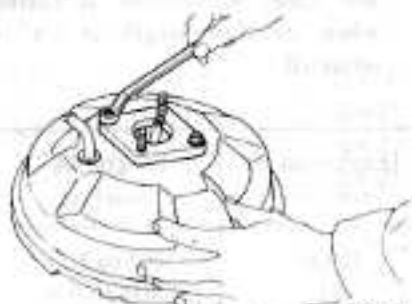


BR182  
Fig. BR-48 Removing reaction disc

**Note:** Valve rod and plunger assembly cannot be disassembled, since they are calked.

### Front shell-seal assembly

1. Detach spacer from front shell assembly.



BR183  
Fig. BR-49 Removing spacer

2. Withdraw front seal assembly.

### INSPECTION

1. Check poppet assembly for condition. If it shows evidence of wear or damage, replace it and valve operating rod assembly.

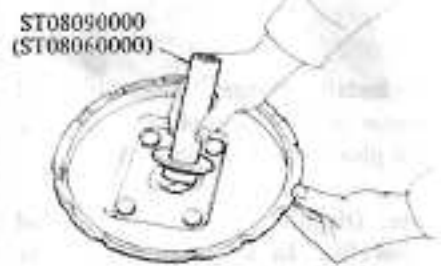
2. Check other component parts for condition. If any part shows evidence of wear or damage, replace it.

### ASSEMBLY AND ADJUSTMENT

Assemble in reverse order of disassembly.

### Rear shell-seal assembly

1. Apply a coating of Master-Vac grease to sealing surface and lip of seal, and install that seal in rear shell with Master-Vac Oil Seal Retainer Drift ST08090000 [152.4 mm (6 in) diameter diaphragm ST08060000].



BR184  
Fig. BR-50 Installing oil seal

## Brake System

Note: Referring to Figure BR-51, install seal in place, properly aligning pawl of special tool with seal hole. Adjustment is correct when specified length at "A" is obtained.

Diaphragm dia. mm (in)	Length "A" mm (in)
228.6 (9)	10.2 to 10.8 (0.402 to 0.425)
152.4 (6)	6.7 to 7.0 (0.264 to 0.276)

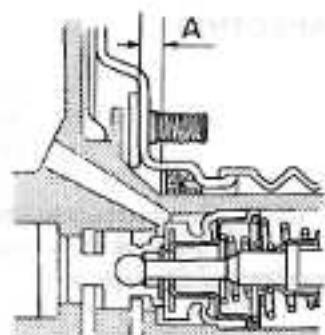


Fig. BR-51 Length at "A"

### Diaphragm plate assembly

1. Apply a thin coating of grease to sliding contact portion on periphery of plunger assembly.

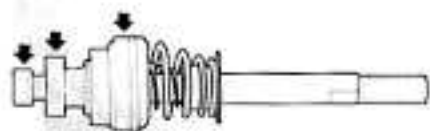


Fig. BR-52 Points requiring grease

2. Install plunger assembly and silencer in diaphragm plate, and lightly push plunger stop key into place.

Note: Diaphragm plate is made of bakelite. In installing plunger assembly, be careful not to damage diaphragm plate.



Fig. BR-53 Inserting stop key

3. Before installing diaphragm in position, apply a thin coating of mica-powder to all parts of it except outer diameter and seating portion with which shell comes into contact.

4. Before installing reaction disc in place on diaphragm plate, apply a thin coating of Master-Vac grease.

### Front shell-seal assembly

Before installing front shell-seal assembly, apply a coating of Master-Vac grease to inner wall of seal and front shell with which seal comes into contact.

### Final assembly

1. Apply a thin coating of Master-Vac grease to outer edges of diaphragm with which rear and front shells come into contact, before installing diaphragm in position.

2. Before installing push rod assembly in place, apply a coating of Master-Vac grease to sliding contact surface of diaphragm plate.

3. Align marks scribed in rear shell and front shell. Carefully turn Master-Vac Wrench ST08080000 clockwise until it reaches notch in shell retainer.

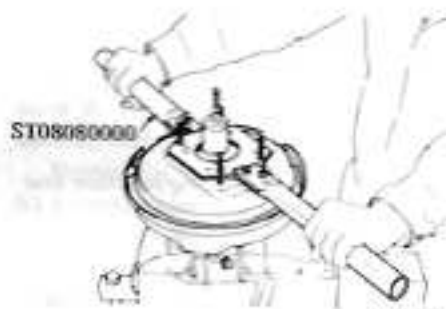


Fig. BR-54 Tightening rear shell

4. After assembly, adjust length of push rod to specified value indicated in Figure BR-55. Length adjustment of push rod is made at tip of push rod.

Length "B"  
10.00 to 10.50 mm  
(0.394 to 0.413 in)

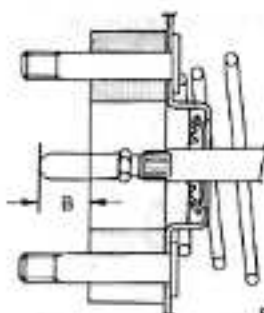


Fig. BR-55 Length at "B"



Fig. BR-56 Adjusting push rod length

5. Install clevis. Adjust length of operating rod to specified value.

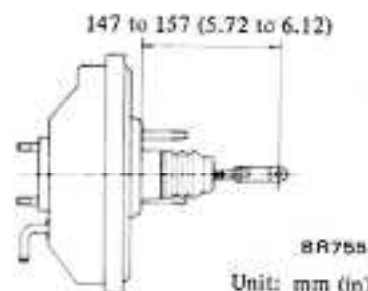


Fig. BR-57 Installing clevis to operating rod

## INSTALLATION

Install in reverse order of removal.

Tightening torque:

- Master cylinder to Master-Vac:  
0.8 to 1.1 kg-m  
(5.8 to 8.0 ft-lb)
- Master-Vac to body:  
0.8 to 1.1 kg-m  
(5.8 to 8.0 ft-lb)

Note: After Master-Vac is properly installed in vehicle, conduct airtight and operational tests.

## HAND BRAKE

### CONTENTS

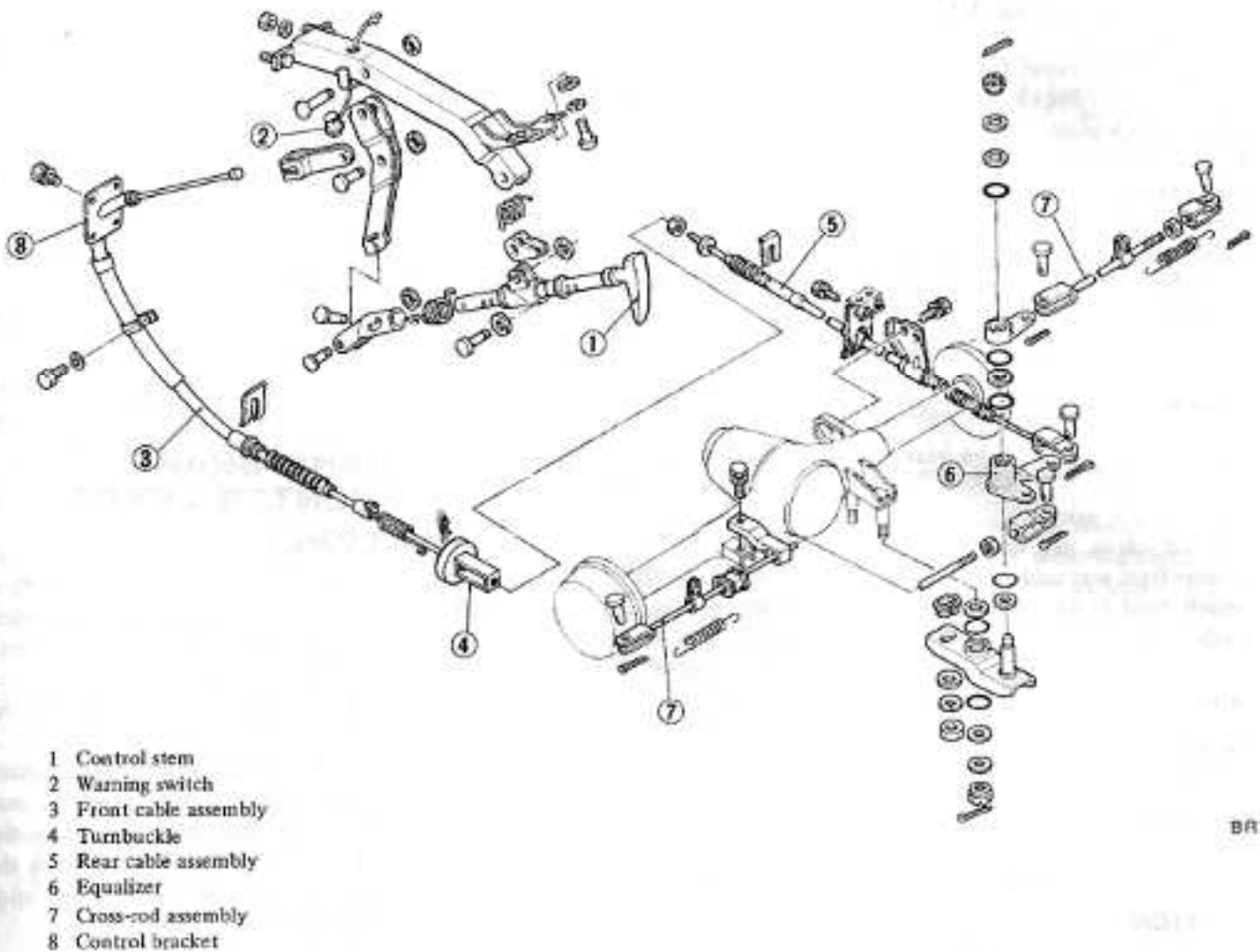
HAND BRAKE (STICK LEVER TYPE) .....	BR-19	HAND BRAKE (CENTER LEVER TYPE) .....	BR-20
REMOVAL .....	BR-20	REMOVAL .....	BR-21
INSPECTION .....	BR-20	INSPECTION .....	BR-21
INSTALLATION .....	BR-20	INSTALLATION .....	BR-21

### HAND BRAKE (STICK LEVER TYPE)

The stick lever type hand brake is standard equipment on models equipped with the column shift trans-

mission. The rear cable is equipped with an outer case and requires less movement on slopes. The equalizer is

of an L-shape design and the swing arm swivel bushing is made from urethane rubber.



- 1 Control stem
- 2 Warning switch
- 3 Front cable assembly
- 4 Turnbuckle
- 5 Rear cable assembly
- 6 Equalizer
- 7 Cross-rod assembly
- 8 Control bracket

BR756

Fig. BR-58 Hand brake linkage (Stick lever type)

## Brake System

### REMOVAL

#### Control stem

1. Disconnect terminal from hand brake warning switch.
2. Detach cable from clevis. (To facilitate removal of this cable, loosen turnbuckle located under floor in advance.)
3. Remove nuts securing control bracket in place in engine compartment.
4. Remove nuts securing control bracket in place in driver's compartment, and detach bracket complete with control stem.
5. To disassemble control stem properly, break fix plate and pull out clevis pin.

#### Front cable

1. Unfasten return spring. Loosen lock nut on turnbuckle.  
Disconnect front cable from rear cable by turning turnbuckle in place.
2. Withdraw lock plate.
3. Detach cable from clevis in driver's compartment.
4. Remove bolt securing front cable bracket and clip in place, withdraw cable together with bracket from engine compartment.
5. Remove cable clamps and detach.

#### Rear cable

1. Separate front cable from rear cable.
2. Withdraw lock palte.
3. Pull out clevis pin to separate balance lever from rear cable.
4. Detach hand brake cable bracket at rear axle case.

#### Cross-rod balance lever

Cross-rod and balance lever may be separated by removing clevis pin and nut in their pivot sections.

### INSPECTION

1. Check control stem and ratchet pawls for evidence of wear or damage. Replace parts which are unserviceable.

2. Replace worn or fatigued springs.
3. Check wires for evidence of discontinuity or other deterioration. Replace if necessary.
4. Replace faulty warning light and/or switch.
5. Replace worn or damaged nylon washer.
6. Check parts at each connections. If found to be deformed or damaged, replace.

### INSTALLATION

Install hand brake assembly in reverse order of removal, closely observing the following:

1. Apply grease to sliding contact surfaces of parts. See Figure BR-59.

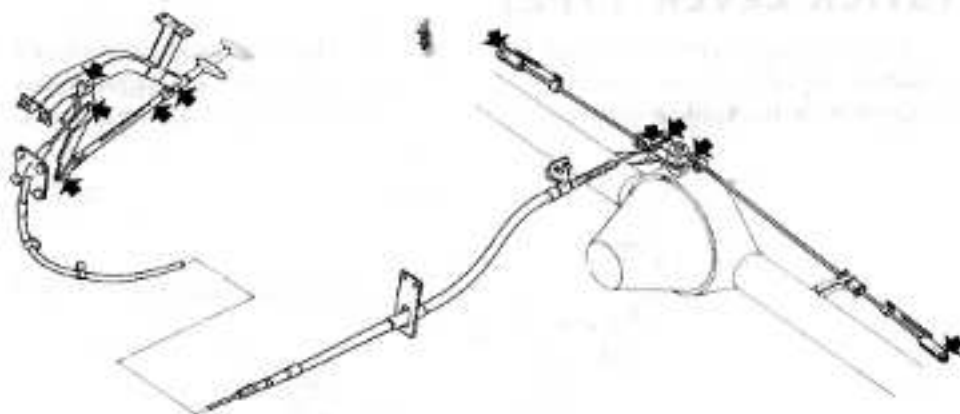
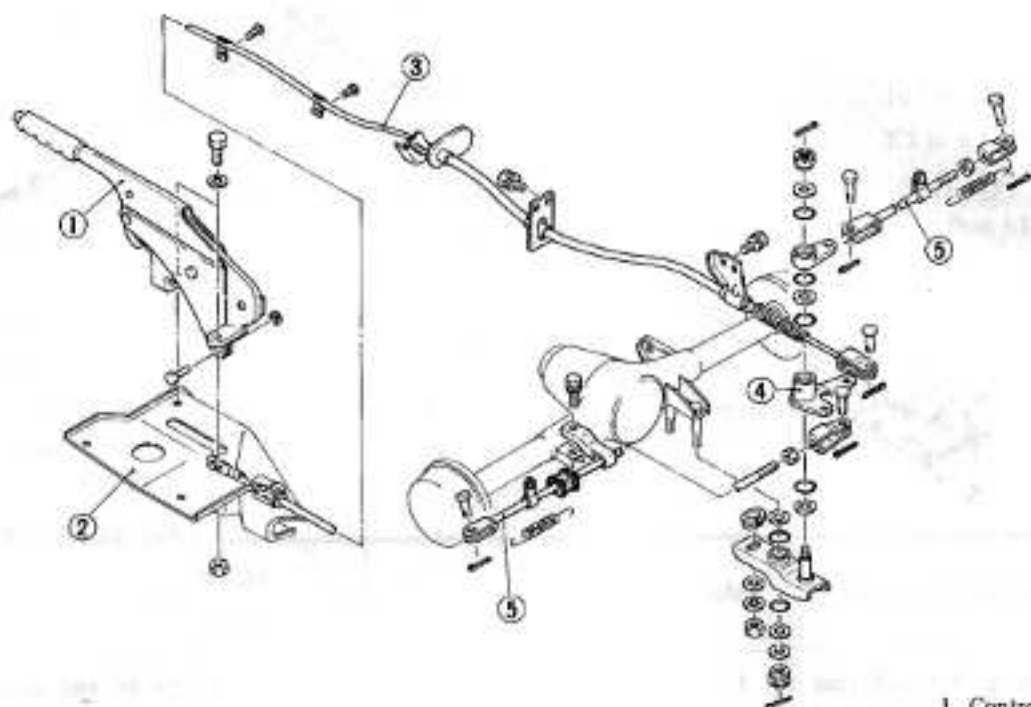


Fig. BR-59 Lubricating points

2. Upon completion of installation of hand brake assembly, adjust entire system, referring to "Adjustment", Page BR-3.
3. Make sure that no cable is interfered with by any adjacent parts. Do not apply undue stress to cables.
4. When control stem fix plate is removed for one reason or another, discard and do not re-use it.

### HAND BRAKE (CENTER LEVER TYPE)

The center lever type hand brake is standard equipment on all models equipped with the floor shift transmission. The control lever is designed so that the release rod interlocks with the pawl only when the push-button is pushed in. This design features reduced sound when the lever is pulled out. The front cable is connected to the balance lever. The rear linkage is the same in design as that for the stick lever type brake.



- 1 Control lever
- 2 Adapter bracket
- 3 Cable assembly
- 4 Equalizer
- 5 Cross-rod assembly

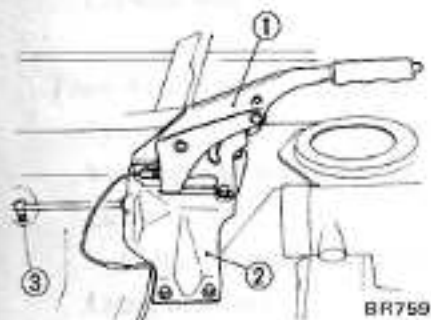
BR758

Fig. BR-60 Hand brake linkage (Center lever type)

**REMOVAL**

**Control lever and front cable**

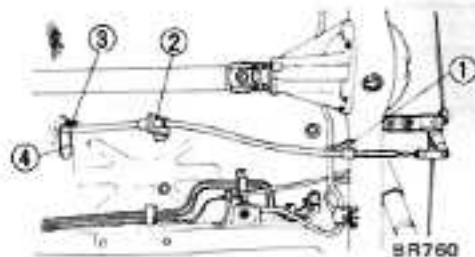
1. Remove console box, front seat and control lever boot.
2. Remove parking brake warning switch.
3. Remove control lever adapter bracket and cable clips.



- 1 Control lever
- 2 Adapter bracket
- 3 Clip

Fig. BR-61 Removing control lever

4. Separate front cable end from balance lever by pulling clevis pin out.
5. Remove rear bracket, cable clamp, front bracket and grommet rubber.



- 1 Rear bracket
- 2 Cable clamp
- 3 Front bracket
- 4 Grommet rubber

Fig. BR-62 Removing cable

6. Pull front cable out into driver's compartment and remove it together with control lever assembly.

7. Remove control lever from adapter bracket.
8. Detach front cable assembly by pulling out clevis pin and outer case.

**Cross rod and balance lever**

Cross-rod and balance lever may be separated by removing clevis pin and nut in their pivot sections.

**INSPECTION**

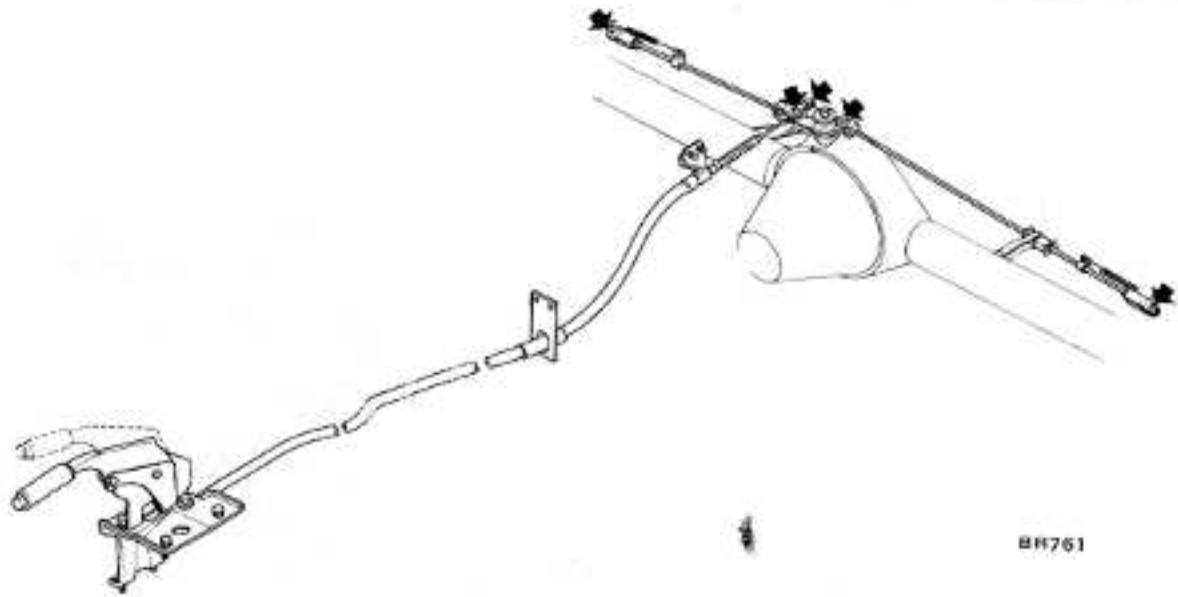
Refer to "Inspection". Page BR-20.

**INSTALLATION**

Install hand brake assembly in reverse order of removal, closely observing the following:

1. Apply grease to sliding contact surface of parts.

## Brake System



BR761

*Fig. BR-63 Lubricating points*

2. Upon completion of installation of hand brake assembly, adjust entire system, referring to "Adjustment",

Page BR-3.

3. Make sure that no cable is inter-

fered with by any adjacent parts. Do not apply undue stress to cables.

**SERVICE DATA AND SPECIFICATIONS**

**Brake pedal**

Free height	mm (in) .....	167 to 170 (6.57 to 6.69)
Free play at pedal pad	mm (in) .....	2.5 to 4.5 (0.098 to 0.177)
Full stroke at pedal pad	mm (in) .....	140 (5.51)
Depressed height	mm (in) .....	More than 65 (2.6)

**Master cylinder**

Inner diameter	mm (in) .....	22.22 ( $\frac{3}{4}$ )
Piston to cylinder clearance	mm (in) .....	0.15 (0.0059)

**Master-Vac**

Model		Front disc brake equipped models	Front drum brake equipped models
Item			
Type		M90	M60
Diaphragm diameter	mm (in)	228.6 (9)	152.4 (6)
Maximum vacuum leakage (after 15 sec.)	mmHg (inHg)	10 (0.394)	
Shell seal depth length A	mm (in)	10.2 to 10.8 (0.402 to 0.425)	6.7 to 7.0 (0.264 to 0.276)
Push rod length B	mm (in)	10.00 to 10.50 (0.394 to 0.413)	

**Front disc brake**

Type .....		N34L
Wheel cylinder inner diameter	mm (in) .....	54.00 (2.126)
Pad		51.6 x 9.7 x 77.8
Width x thickness x length	mm (in) .....	(2.031 x 0.382 x 3.063)
Pad wear limit	mm (in) .....	2 (0.079)

**Front drum brake**

Type .....		Two leading
Wheel cylinder inner diameter	mm (in) .....	25.40 (1)
Lining		63 x 5.0 x 232
Width x thickness x length	mm (in) .....	(2.480 x 0.197 x 9.13)
Lining wear limit	mm (in) .....	1.5 (0.059)

## Brake System

### Rear drum brake

Type .....		Leading-trailing
Wheel cylinder inner diameter		
Sedan, hardtop, station wagon	mm (in) .....	19.05 (¾)
Sedan standard	mm (in) .....	23.81 (1 5/16)
Lining		
Width x thickness x length	mm (in) .....	50 x 5.0 x 232 (1.969 x 0.197 x 9.13)
Lining wear limit	mm (in) .....	1.5 (0.591)
Wheel cylinder sliding resistance	kg (lb) .....	2 to 7 (4.4 to 15.4)

### Brake rotor

Outer diameter x thickness	mm (in) .....	271 x 12.5 (10.67 x 0.492)
Runout	mm (in) .....	0.15 (0.0059) maximum
Repair limit of thickness	mm (in) .....	10.5 (0.413)

### Brake drum

Inner diameter	mm (in) .....	241.3 (9 1/2)
Repair limit of inner diameter	mm (in) .....	242.3 (9.54)
Inside runout	mm (in) .....	0.02 (0.0008) maximum

### Parking brake

Item	Type	Stick type	Center lever type
	Stroke	mm (in)	105 to 115 (4.13 to 4.53)
Notches		9 to 11	7 to 8

### Tightening torque

Master cylinder to Master-Vac	kg-m (ft-lb) .....	0.8 to 1.1 (5.8 to 8.0)
Brake tube flare nut	kg-m (ft-lb) .....	1.5 to 1.8 (11 to 13)
Brake hose connector	kg-m (ft-lb) .....	1.8 to 2.1 (13 to 15)
Air bleeder valve	kg-m (ft-lb) .....	0.7 to 0.9 (5.1 to 6.5)
Fulcrum pin of brake pedal	kg-m (ft-lb) .....	3.1 to 4.1 (22 to 30)
Brake pedal stopper lock nut	kg-m (ft-lb) .....	0.8 to 1.1 (5.8 to 8.0)
NP-valve to body	kg-m (ft-lb) .....	0.54 to 0.74 (3.9 to 5.4)
Caliper fixing bolt	kg-m (ft-lb) .....	7.3 to 9.9 (53 to 72)
Front brake disc fixing bolt	kg-m (ft-lb) .....	7.3 to 9.9 (53 to 72)
Front brake disc fixing bolt with knuckle arm	kg-m (ft-lb) .....	5.1 to 6.9 (37 to 50)
Front wheel cylinder mounting nut		
Stud side	kg-m (ft-lb) .....	0.5 to 0.7 (3.6 to 5.1)
Hexagon side	kg-m (ft-lb) .....	1.6 to 2.2 (12 to 16)



## Brake System

Rear brake disc fixing bolt kg-m (ft-lb) ..... 2.7 to 3.7 (20 to 27)

### Master-Vac

Master-Vac to body kg-m (ft-lb) ..... 0.8 to 1.1 (5.8 to 8.0)

Operating rod lock nut kg-m (ft-lb) ..... 1.6 to 2.2 (12 to 16)

Flange to shell cover kg-m (ft-lb) ..... 0.8 to 1.1 (5.8 to 8.0)

## TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
Excessive pedal travel	<p>Low brake fluid level or empty master cylinder reservoir.</p> <p>Leakage in master cylinder.</p> <p>Deteriorated check valve.</p> <p>Air in system.</p> <p>Faulty brake adjustment.</p> <p>Excessive lateral play on disc caused by loose or worn wheel bearings or steering parts.</p>	<p>Fill and bleed as necessary. Test for source of leakage by examining all lines, connections and wheel cylinder.</p> <p>Overhaul master cylinder.</p> <p>Replace check valve and bleed system.</p> <p>Bleed system.</p> <p>Adjust shoe-to-drum clearance. Inspect auto-adjuster operation.</p> <p>Replace or adjust faulty parts.</p>
Spongy pedal	<p>Low fluid level in master cylinder.</p> <p>Air in system.</p> <p>Faulty brake adjustment.</p> <p>Reservoir filler cap vent hole clogged.</p> <p>Swollen hose due to deterioration or use of poor quality hose.</p> <p>Distorted brake shoes, or excessively worn or cracked brake drum.</p> <p>Soft or swollen caliper seals.</p> <p>Use of a brake fluid with too low boiling point.</p>	<p>Top with fluid and inspect for leakage.</p> <p>Correct as necessary.</p> <p>Adjust shoe-to-drum clearance. Inspect auto-adjuster operation.</p> <p>Clean and bleed system.</p> <p>Replace hose and bleed system.</p> <p>Replace faulty parts.</p> <p>Drain hydraulic system, flush with alcohol and replace all seals.</p> <p>Replace with specified brake fluid and bleed system.</p>
Poor braking effect	<p>Fluid leakage in brake lines.</p> <p>Low brake fluid level or empty master cylinder reservoir.</p> <p>Air in brake lines.</p> <p>Excessive shoe-to-drum clearance.</p> <p>Grease, oil, mud or water on linings or pads.</p> <p>Deterioration of linings or pads.</p> <p>Local fit of linings or pads.</p> <p>Linings or pads excessively worn.</p> <p>Master cylinder or wheel cylinders in poor condition.</p> <p>Frozen or seized caliper pistons on disc brakes.</p> <p>Binding mechanical linkage at brake pedal and shoes.</p>	<p>Check master cylinder, piping and wheel cylinder for leaks, and repair.</p> <p>Fill and bleed as necessary.</p> <p>Bleed system.</p> <p>Adjust.</p> <p>Clean brake mechanism and check for cause of problem. Replace linings or pads.</p> <p>Replace.</p> <p>Shave or replace.</p> <p>Replace.</p> <p>Repair or replace.</p> <p>Disassemble caliper and free up as required.</p> <p>Free up as required.</p>


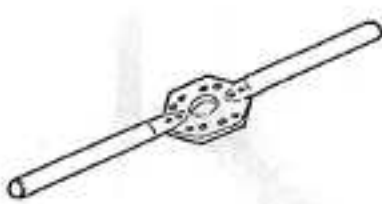

## Brake System

Condition	Probable cause	Corrective action
<p>Unbalanced brakes</p>	<p>Improper tire inflation.                      Improper adjustment of shoe-to-drum clearance.                      Grease, oil, mud or water on linings or pads.                      Mud in brake drum.                      Deterioration of linings or pads.                      Excessive wear of linings or pads.                      Wheel cylinder in poor condition.                      Poor sliding condition of brake shoe. pad.                      Looseness of cylinder body or back plate securing bolts.                      Scored or out-of-round drums.                      Sticking wheel-cylinder cups.                      Deformation of back plate.                      Incorrect adjustment of wheel bearings.                      Incorrect adjustment of wheel alignment.                      Looseness of leaf spring securing U-bolts.</p>	<p>Inflate to correct pressure.                      Readjust.                      Clean brake mechanism and check for cause of problem. Replace linings or pads.                      Clean.                      Replace.                      Replace.                      Repair or replace.                      Adjust.                      Fasten or replace.                      Recondition or replace brake drum as required. Check for improper lining contact with drum and grind lining if necessary.                      Recondition or replace cylinder.                      Replace.                      Adjust or replace.                      Adjust.                      Tighten or replace.</p>
<p>Brakes fade</p>	<p>Brake fluid has too low boiling point.                      Use of improper linings or brake linings are contaminated.                      Brake drums are out-of-round.                      Hydraulic connections, master cylinder and wheel cylinders are corroded or damaged.                      Bleed screw is open.</p>	<p>Drain and fill system with approved fluid.                      Replace linings.                      Repair or replace as necessary.                      Repair as necessary.                      Close screw and bleed system.</p>
<p>Brakes drag</p>	<p>Pedal linkage is binding or push rod adjustment is too long.                      Master cylinder compensator part is obstructed.                      Seized master cylinder piston.                      Poor shoe condition.                      Poor wheel cylinder condition.                      Deformation of piston cups.                      Poor condition of caliper because of faulty piston seals.                      Excessive runout of rotor.                      Hand brake will not return.                      Clogged master cylinder return port.</p>	<p>Lubricate linkage, check pedal return spring for condition and adjust push rod as necessary.                      Blow out foreign matter with compressed air.                      Disassemble master cylinder and replace piston. Bleed system.                      Clean and repair.                      Repair or replace.                      Replace.                      Replace piston seals.                      Turn rotor on lathe or replace.                      Check and repair.                      Clean.</p>

## Brake System

Condition	Probable cause	Corrective action
(Brakes drag)	Clogged brake lines. Incorrect adjustment of wheel bearings. Improper shoe-to-drum clearance. Weak shoe return springs. No free travel in brake shoe return.	Check and clean. Adjust or repair. Adjust. Replace. Adjust pedal height.
Brake chatters	Groove or out-of-round brake drum or rotor. Loose or bent support plate.  Distorted brake shoes or pads. Grease or brake fluid on linings.	Grind or replace as required. Tighten support plate bolts to specified torque, or replace plate. Replace as necessary. Replace linings.
Brake squeals	Dirty or scored brake drums.  Distorted brake shoes or bent support plate. Weak or broken brake shoe retaining spring or return spring. Glazed or contaminated brake lining.	Blow out assembly with compressed air or refinish drum. Replace faulty unit. Replace if faulty.  Cam ground lining to eliminate glaze. If it doesn't, replace linings.
Pedal pulsates	Out-of-round or off-center drum. On disc brakes, lateral runout of braking disc is excessive.  Excessive variation in thickness of braking disc surfaces.	Turn drum or replace as necessary. Check with dial indicator, turning disc by hand. If runout exceeds specifications, replace disc.  Measure around disc face with micrometer. Replace disc as required.

**SPECIAL SERVICE TOOLS**

No.	Tool number & tool name	Description Unit: mm (in)	For use on	Reference page or Figure No.
1.	GG94310000 Brake pipe torque wrench	Used to tighten and loosen brake tube flare nut. A torque limiting wrench is built in to assure torque accuracy.   SE227	All models	Page BR-7 Page BR-9
2.	ST08080000 Master-Vac wrench	Used to assemble and disassemble Master-Vac.   SE073	All models	Fig. BR-42 Fig. BR-54
3.	ST08060000 (for 6 inch dia. diaphragm) ST08090000 (for 9 inch dia. diaphragm) Master-Vac oil seal retainer drift	Used to install Master-Vac oil seal.   SE115	Master-Vac with band 9 and 6 inch dia. diaphragm	Fig. BR-50

Vertical text on the right edge of the page, possibly a page number or margin note.

