

BRAKE SYSTEM

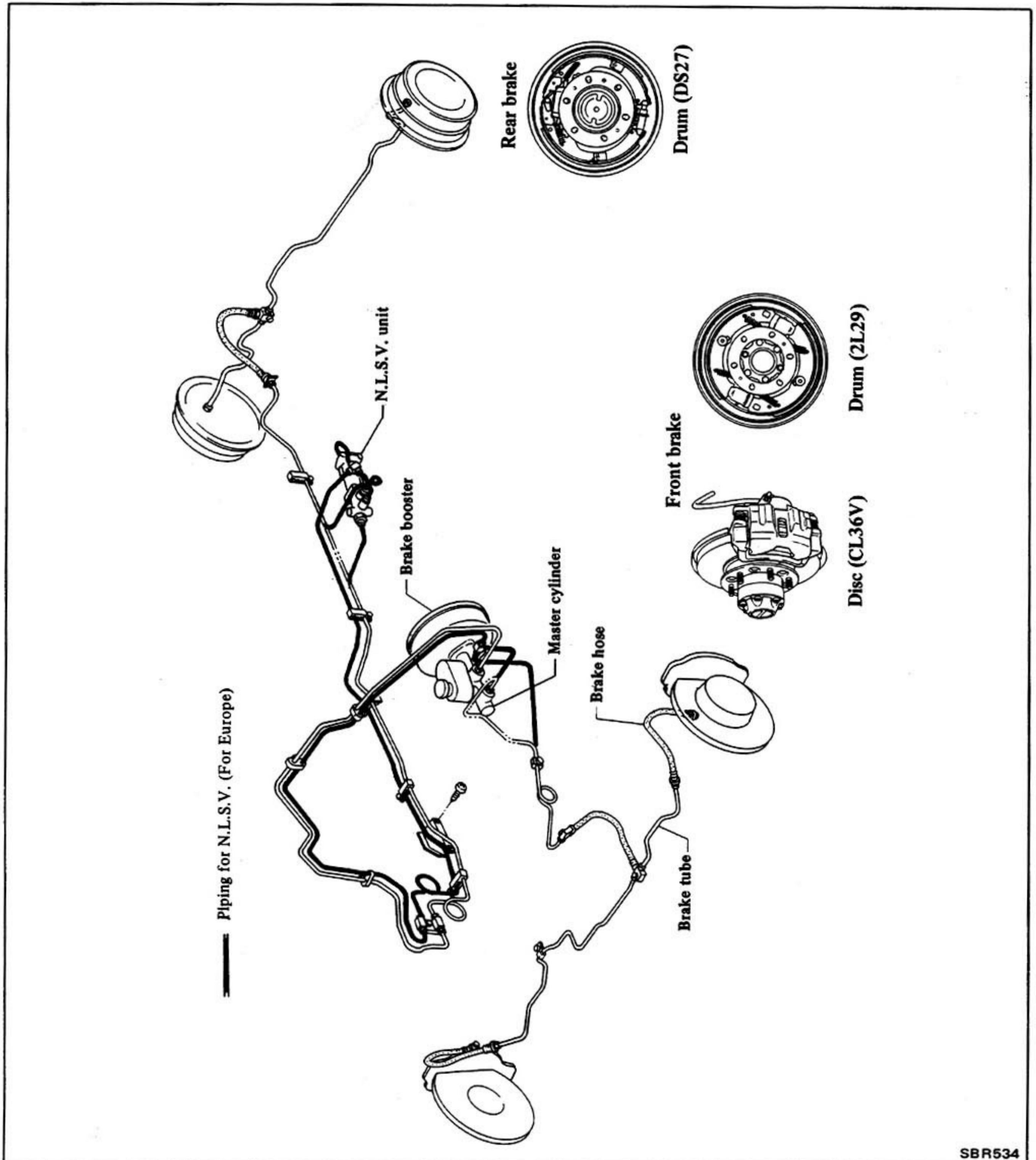
CONTENTS

DESCRIPTION	BR-2	BRAKE BOOSTER	BR-14
SERVICE BRAKE	BR-3	PARKING BRAKE	BR-18
BRAKE PEDAL	BR-3	PARKING BRAKE CONTROL	BR-18
MASTER CYLINDER	BR-4	CENTER BRAKE	BR-19
BRAKE HYDRAULIC LINE	BR-5	SERVICE DATA AND	
BLEEDING HYDRAULIC SYSTEM	BR-5	SPECIFICATIONS	BR-21
NISSAN LOAD SENSING VALVE (N.L.S.V.)		GENERAL SPECIFICATIONS	BR-21
– For Europe –	BR-6	INSPECTION AND ADJUSTMENT	BR-21
FRONT DISC BRAKE –CL36V–	BR-7	TIGHTENING TORQUE	BR-22
FRONT DISC ROTOR	BR-9	TROUBLE DIAGNOSES AND	
FRONT DRUM BRAKE –2L29–	BR-10	CORRECTIONS	BR-23
REAR BRAKE –DS27–	BR-12	SPECIAL SERVICE TOOL	BR-25

Refer to section MA (Brake System) for:

- CHECKING FOOT BRAKE
- CHECKING PARKING BRAKE

DESCRIPTION



- The brake system is a hydraulically controlled, dual line type which operates independently on the front and rear wheels.
- The brake booster is a power assist

device which utilizes the engine intake manifold vacuum.

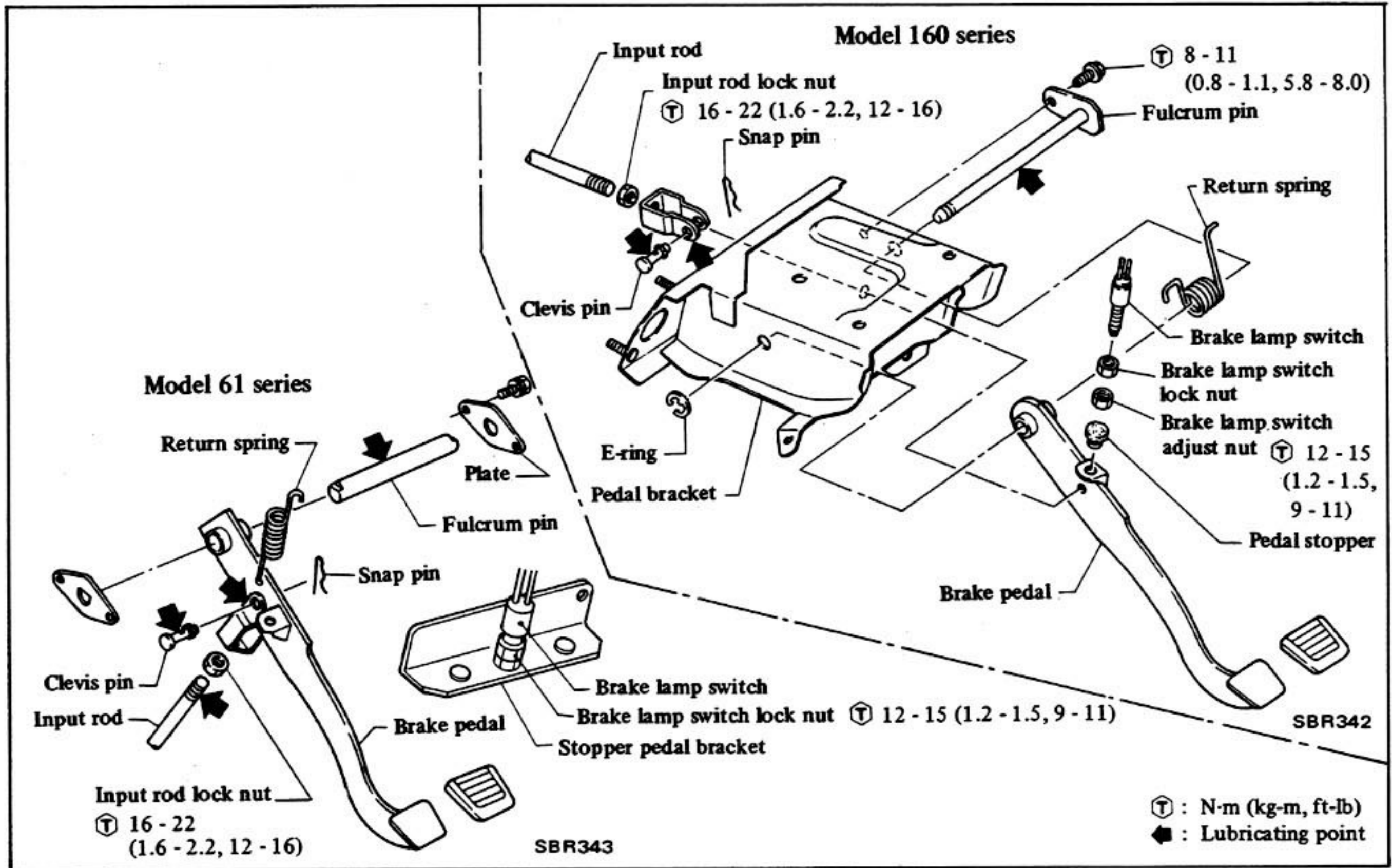
- The Nissan Load Sensing Valve (N.L.S.V.) responds to decelera-

tion, controlling the rear brake fluid pressure (For Europe).

- The drum brake requires shoe-to-drum clearance adjustment.

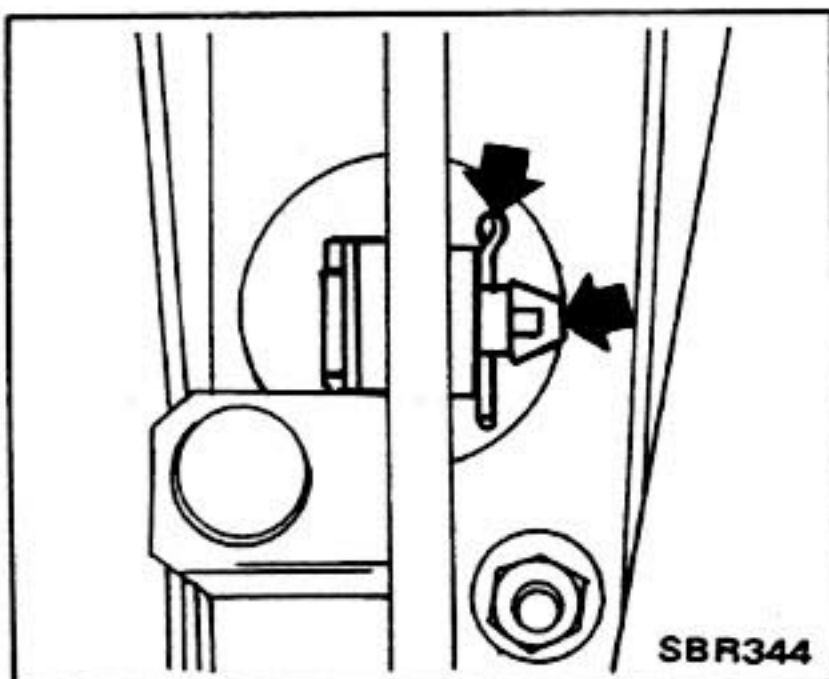
SERVICE BRAKE

BRAKE PEDAL

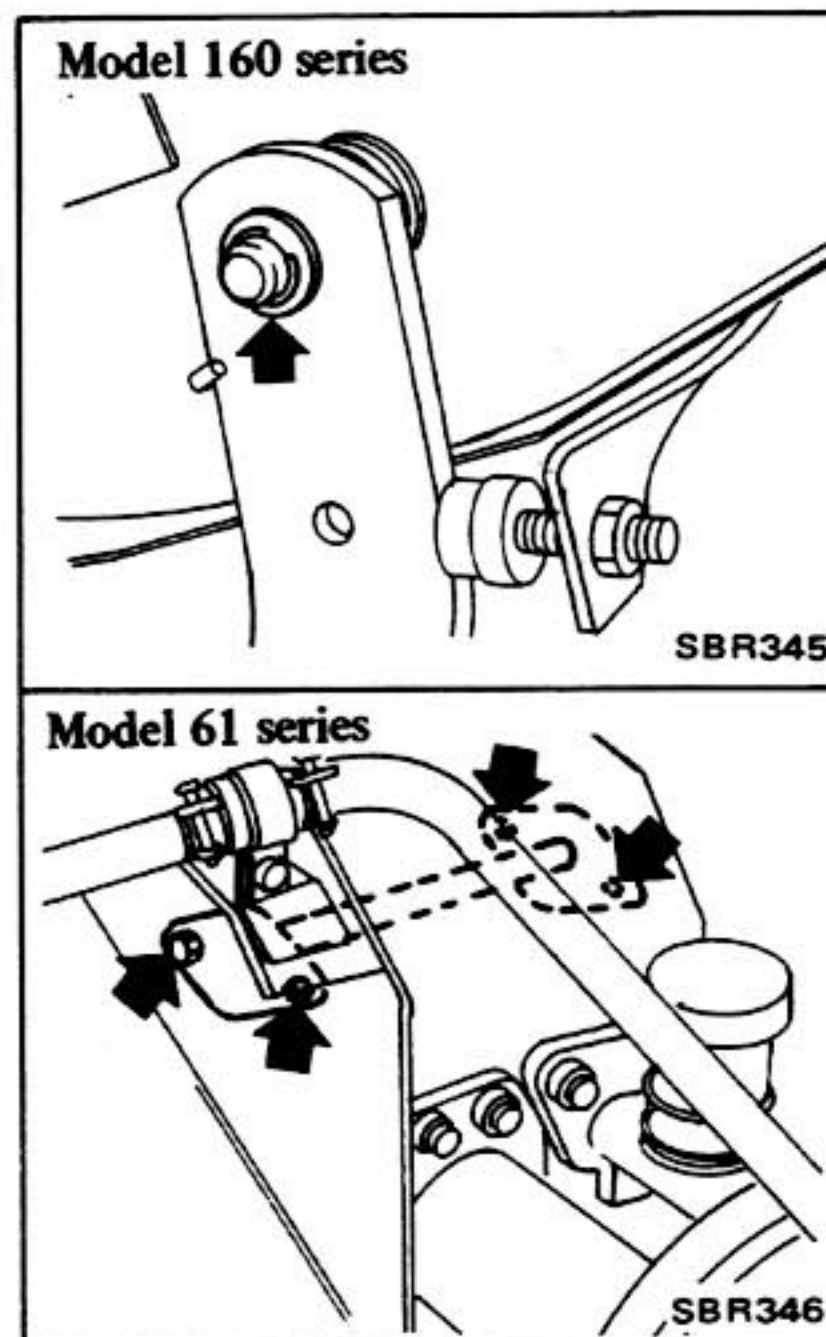


REMOVAL

1. Disconnect clevis pin.
When removing clevis pin, be careful not to damage clip of the clevis pin.



2. Remove fulcrum pin and pedal.



INSPECTION

Check brake pedal for the following items, servicing as necessary.

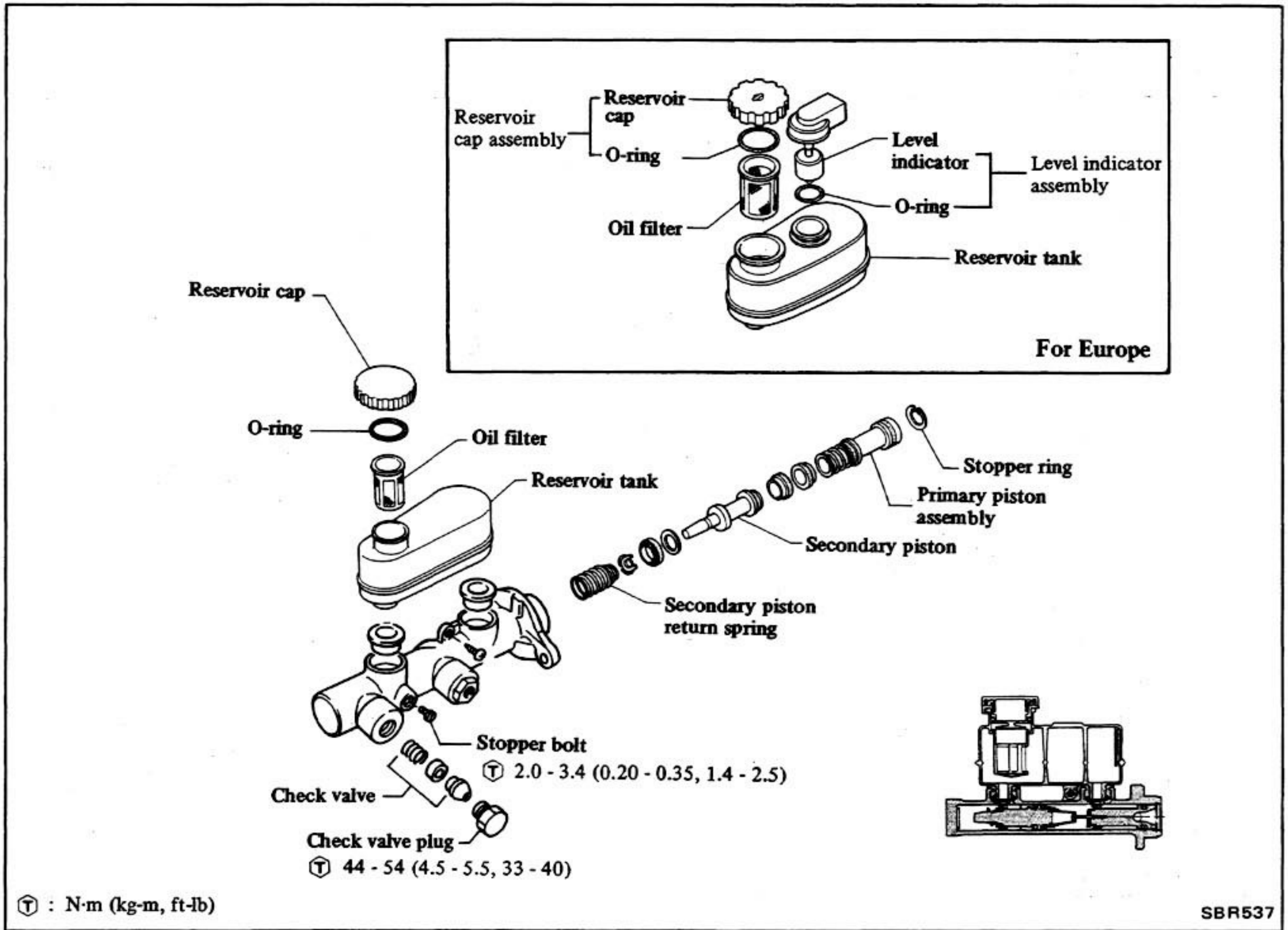
1. Check brake pedal for bend.
2. Check return spring for fatigue.
3. Check clevis for deformation and cracks at welded part.

INSTALLATION

1. Apply a coating of recommended multi-purpose grease to sliding portion and return coil spring.
2. Adjust brake pedal after installation is completed. Refer to Section MA for adjustment.

- T : Fulcrum pin fixing bolt
- 8 - 11 N-m
 - (0.8 - 1.1 kg-m,
 - 5.8 - 8.0 ft-lb)
- Input rod lock nut
- 16 - 22 N-m
 - (1.6 - 2.2 kg-m,
 - 12 - 16 ft-lb)

MASTER CYLINDER

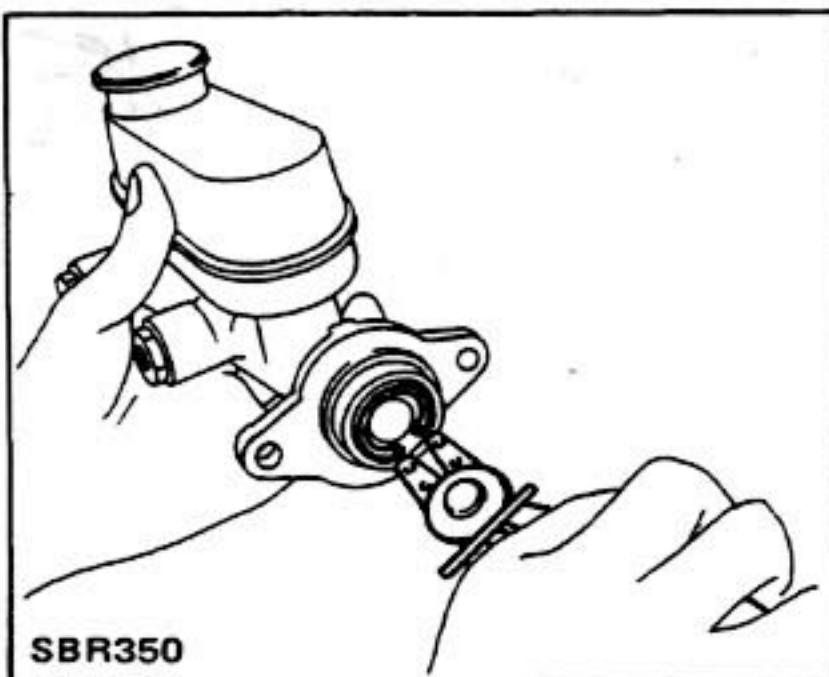


DISASSEMBLY

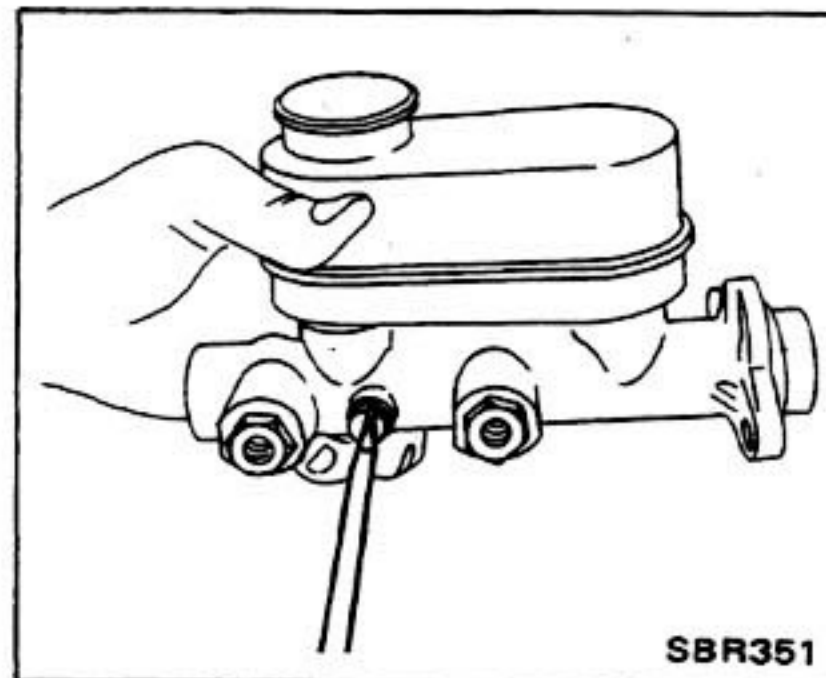
There is no interchangeability of repair kits or component parts between TOKICO and NABCO makes.

When replacing the repair kit or component parts, ascertain the brand of the brake master cylinder body. Be sure to use parts of the same make as the former ones.

1. Pry off stopper ring.

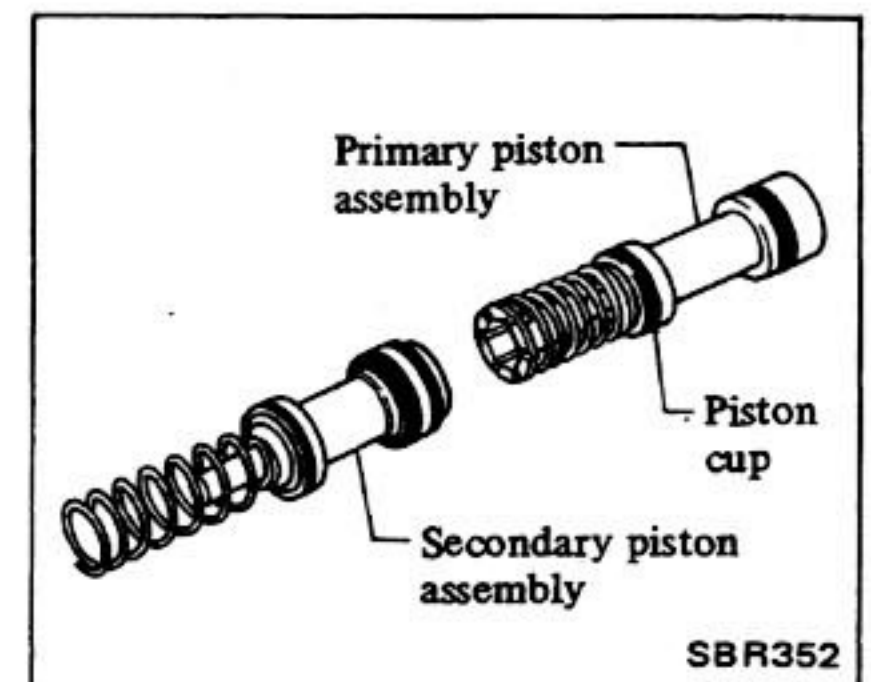


2. Remove stopper bolt, then primary and secondary piston assemblies can be taken out.



3. Remove reservoir.
4. Disassemble piston assembly.

Do not disassemble primary piston assembly.



5. Remove piston cups.

Do not reuse piston cups once removed. Always install new one.

INSPECTION

1. Clean all parts in brake fluid.
2. Check the parts for evidence of abnormal wear or damage.

3. Check piston-to-cylinder clearance.

Piston-to-cylinder clearance:
Less than 0.15 mm (0.0059 in)

ASSEMBLY

- a. Replace gaskets, packing and piston cups with new ones.
- b. Apply brake fluid or rubber grease to sliding contact surface of parts to facilitate assembly of master cylinder.

Ⓣ : Check valve plug
44 - 54 N·m
(4.5 - 5.5 kg·m,
33 - 40 ft·lb)

BRAKE HYDRAULIC LINE

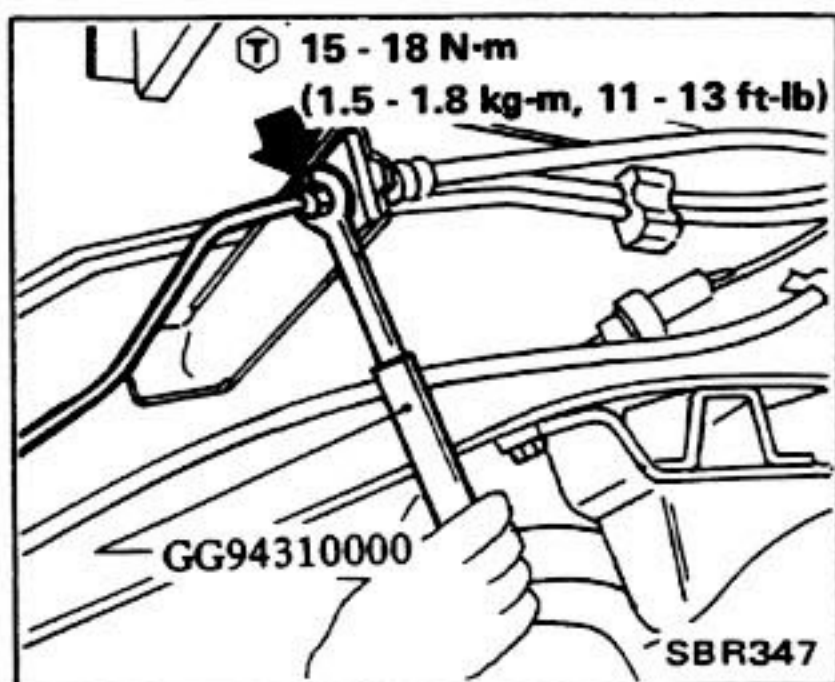
INSPECTION

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

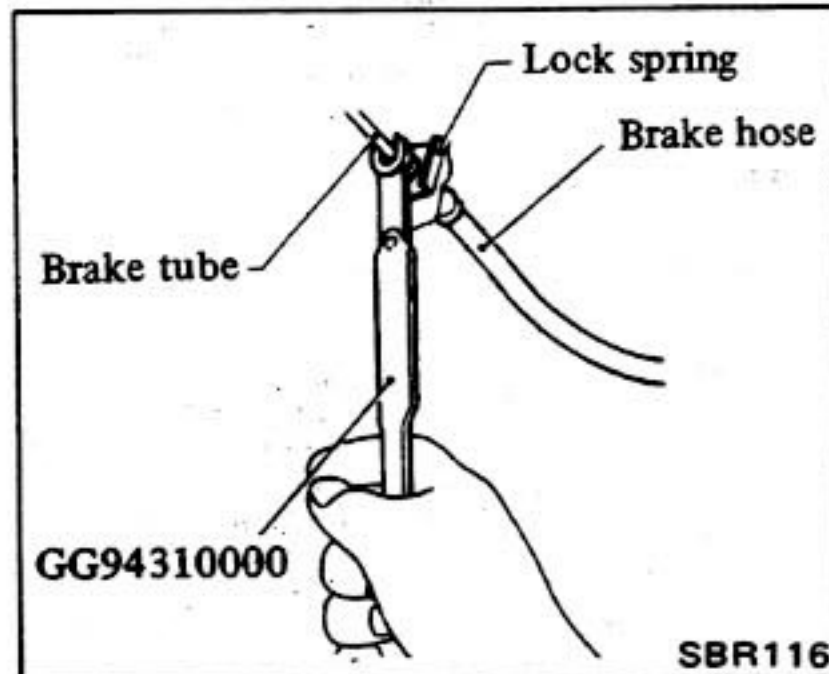
If leakage occurs at end around joints, re-tighten or, if necessary, replace faulty parts.

REMOVAL AND INSTALLATION

- To remove brake tube, disconnect flare nuts on both ends, and remove retainers and clips.



- To remove brake hose, first remove flare nut securing brake tube to hose, then withdraw lock spring. Next disconnect the other side. Do not twist brake hose.

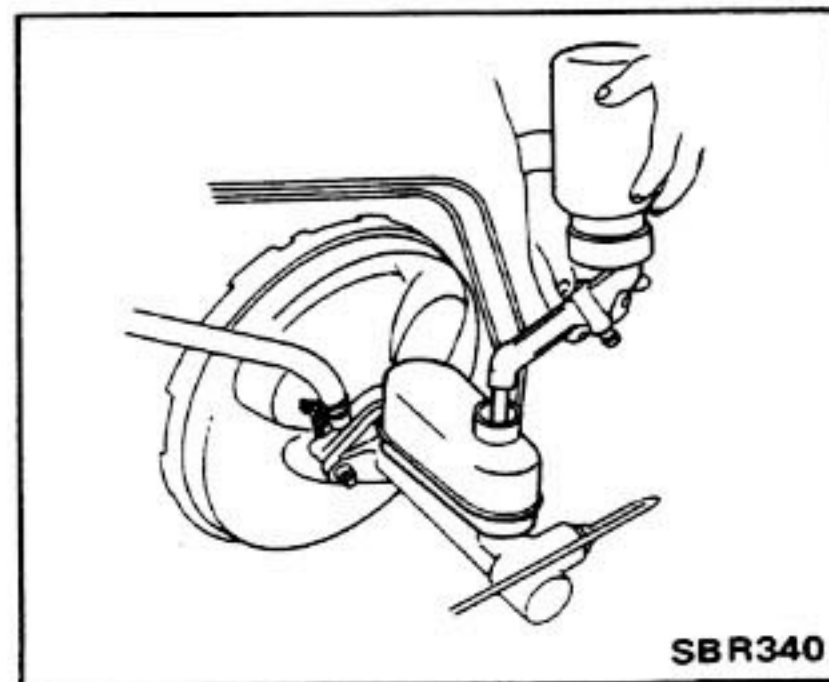


- Installation is in the reverse order of removal.

Ⓣ : Brake tube flare nut
15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

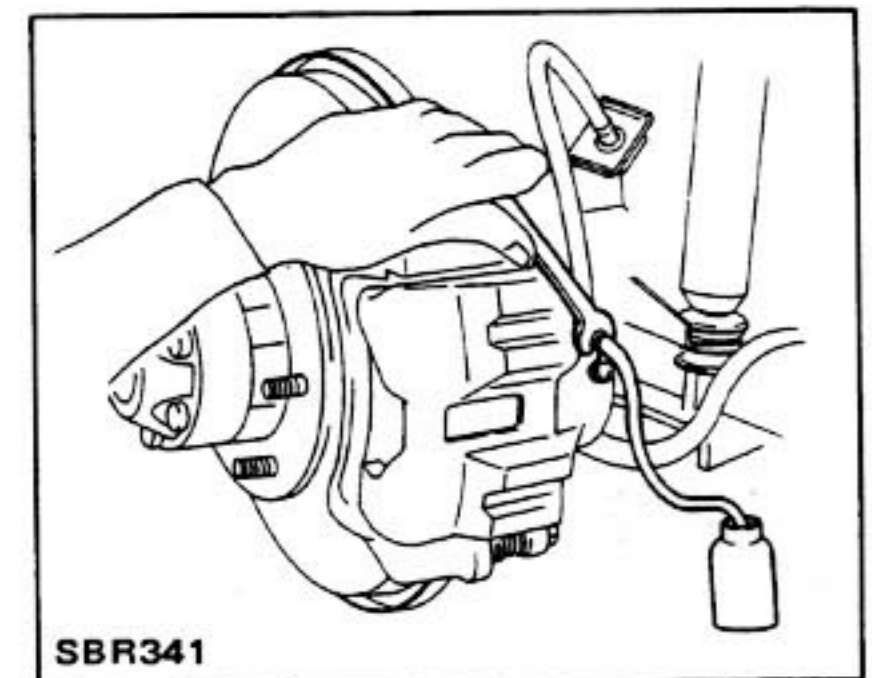
BLEEDING HYDRAULIC SYSTEM

1. Top up reservoir with recommended brake fluid.
 - a. Do not mix two different brand oils.
 - b. Carefully monitor brake fluid level at master cylinder during bleeding operation.
 - c. Do not reuse drained brake fluid.

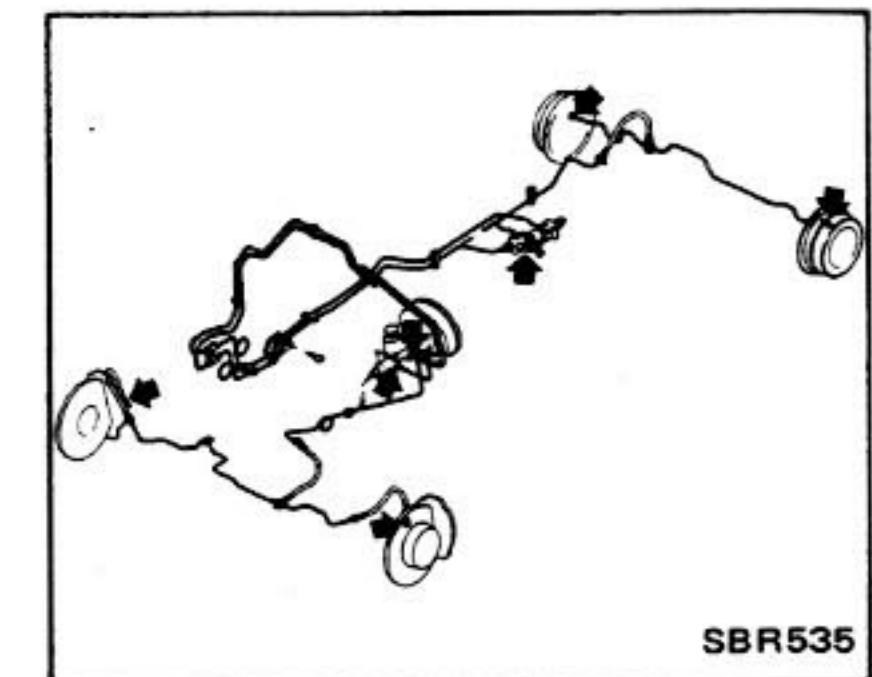


2. Install bleeder hose on bleeder valve. With brake pedal fully depressed, open bleeder valve to exhaust air. Then close bleeder valve and allow brake pedal to return. Repeat bleeding operation until no air bubbles show in hose.

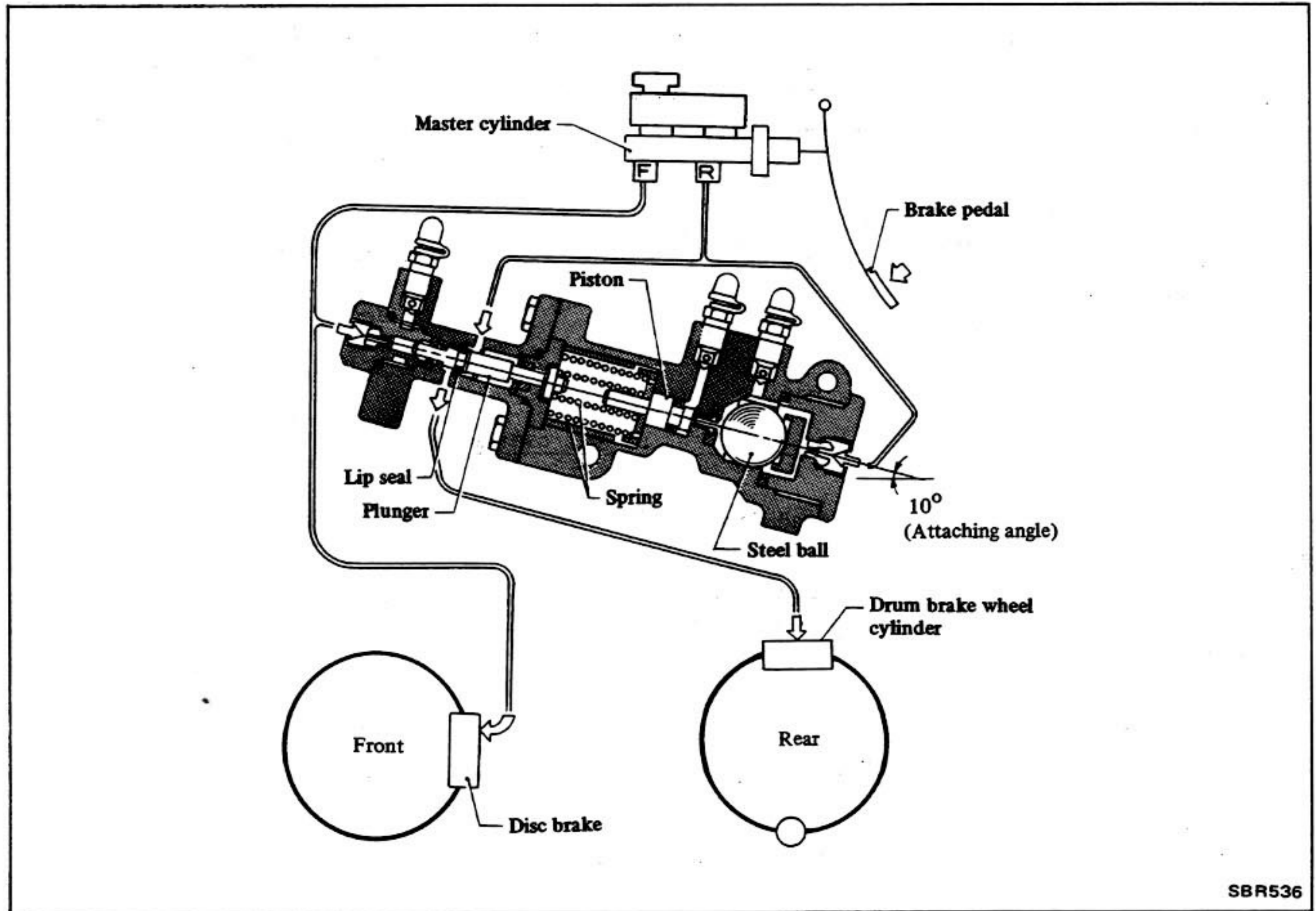
- a. Be careful not to splash brake fluid on painted area.
- b. Brake fluid containing air is white and contains air bubbles.
- c. Brake fluid containing no air runs out of bleeder valve in a solid stream free of air bubbles.



3. Bleed air in the following sequence. **Master cylinder → N.L.S.V. (For Europe) → Rear wheel → Front wheel.**



NISSAN LOAD SENSING VALVE (N.L.S.V.) –For Europe–

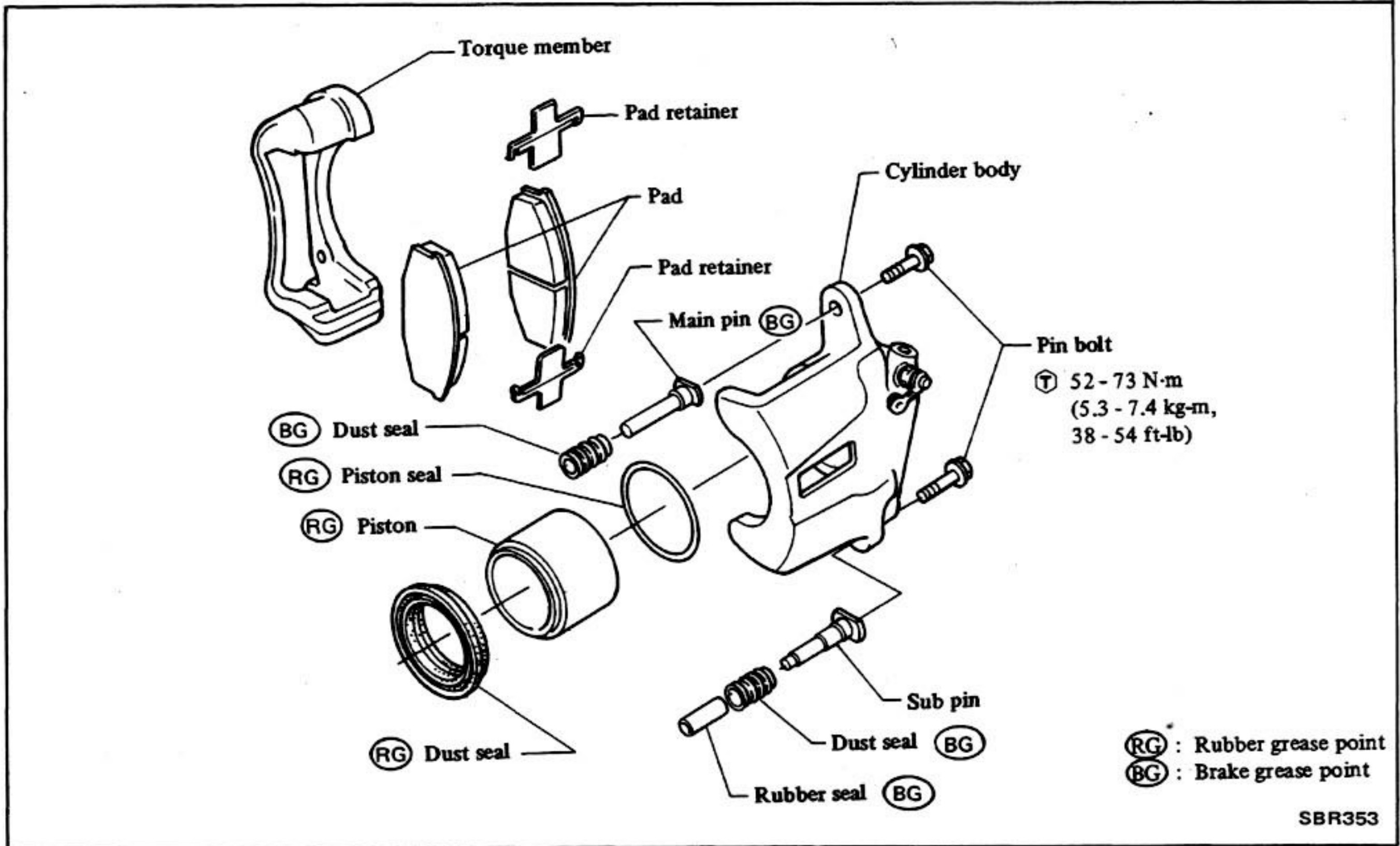


Do not reuse once disassembled N.L.S.V. Replace faulty N.L.S.V. as an assembly.

ⓧ : Brake tube flare nut
15 - 18 N·m
(1.5 - 1.8 kg·m,
11 - 13 ft·lb)

N.L.S.V. mounting bolt
8 - 11 N·m
(0.8 - 1.1 kg·m,
5.8 - 8.0 ft·lb)

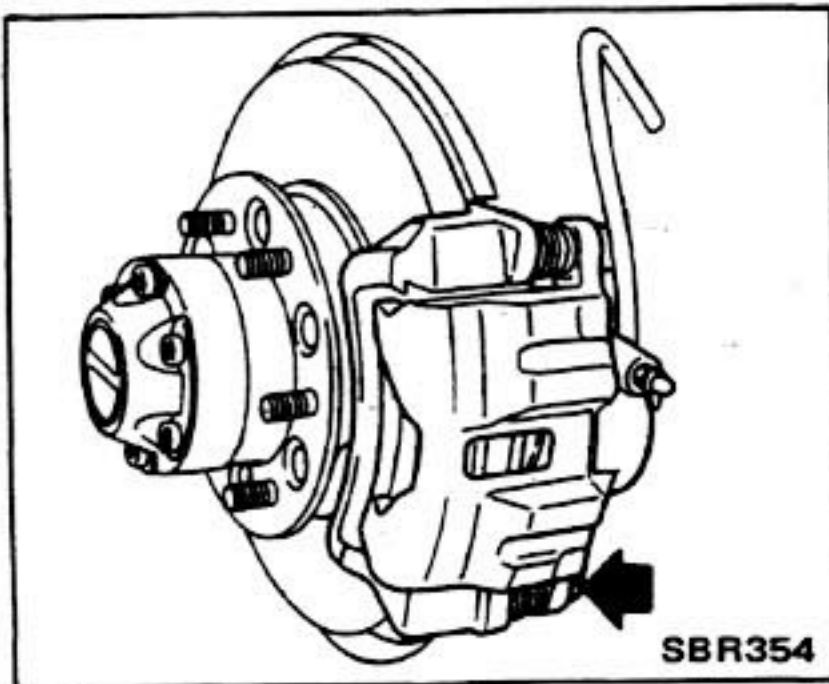
FRONT DISC BRAKE –CL36V–



PAD REPLACEMENT

Removal

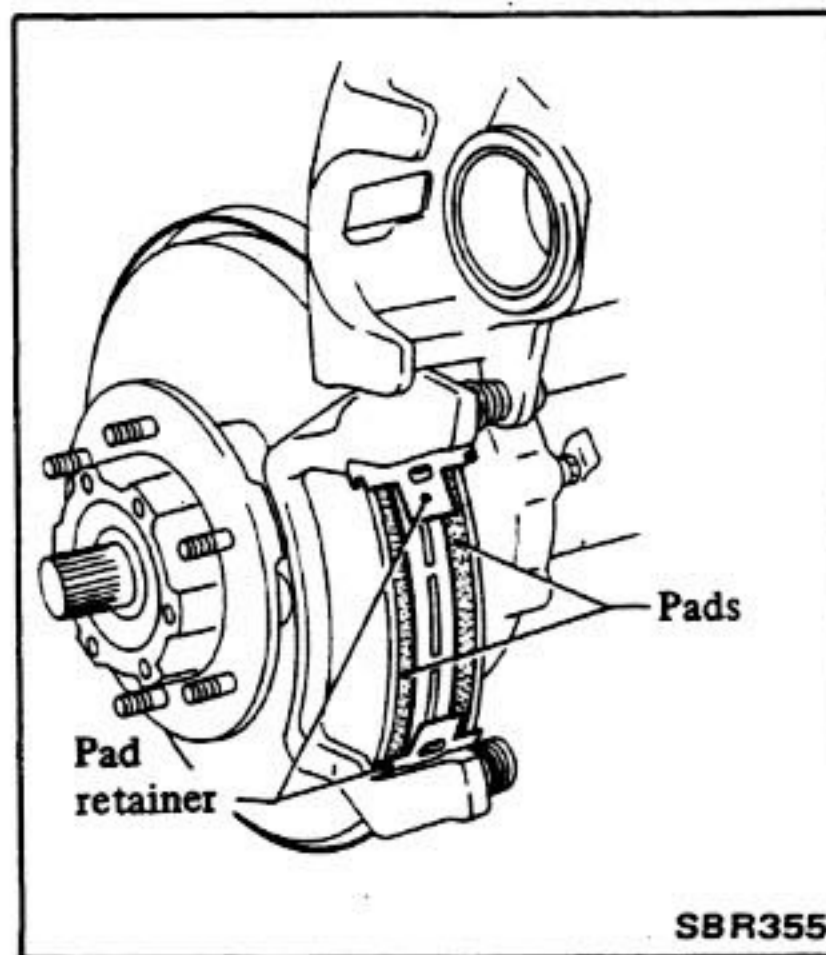
1. Jack up front of vehicle, and support it on safety stands. Remove wheel.
2. Remove lower pin bolt.



3. Open cylinder body upward and remove pad retainer.

Do not pull out cylinder body in axial direction (direction of pin guide).

4. Detach pads.



CAUTION:
 After removing pads, do not depress brake pedal, or pistons will jump out.

Inspection

1. When pads are heavily fouled with oil or grease or when pad is deteriorated or deformed, replace it.

2. If pad is worn to less than the specified value, replace.

**Pad wear limit
 (Minimum thickness):
 2 mm (0.08 in)**

Always replace pads in pad kit (four pads).

3. Check rotor, referring to Rotor for inspection.

Installation

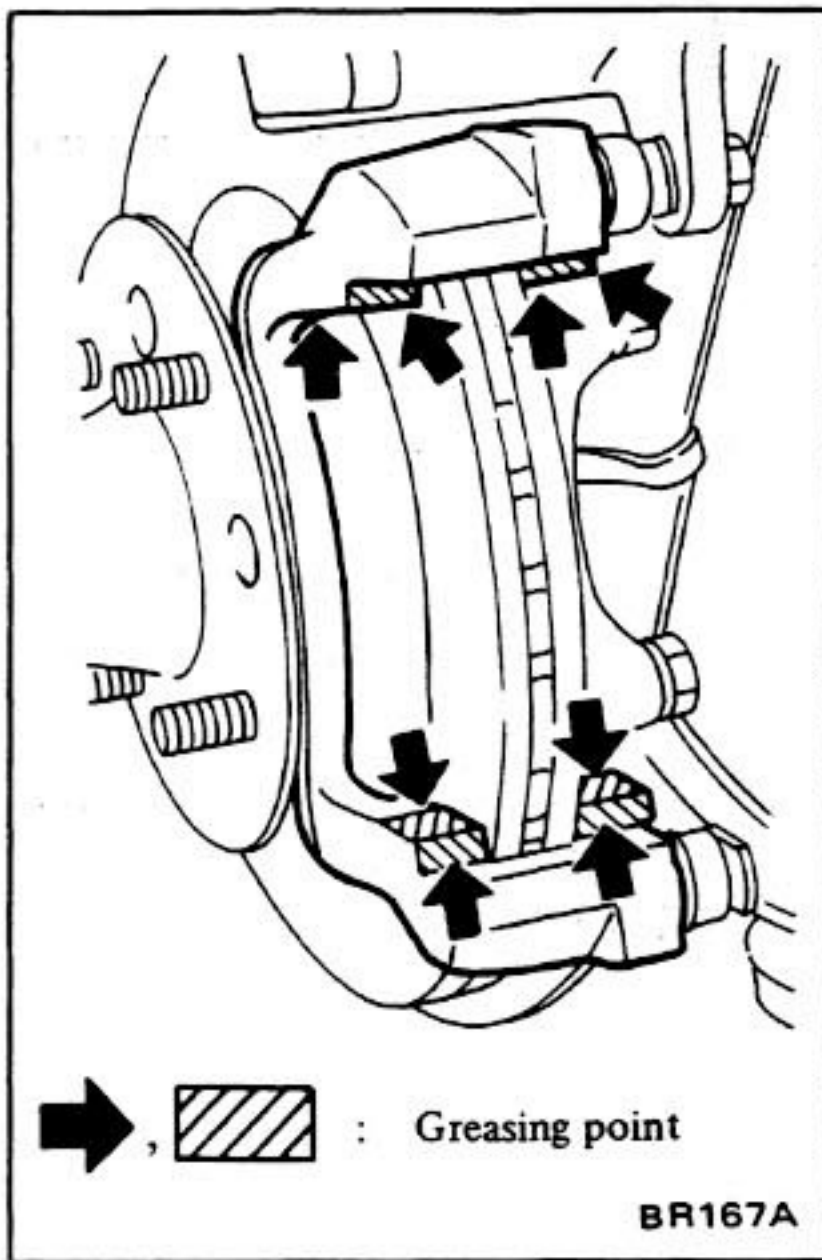
1. Clean piston end and surroundings of pin bolts.

CAUTION:
 Use brake fluid to clean. Never use mineral oil.

Be careful not to get oil on rotor.

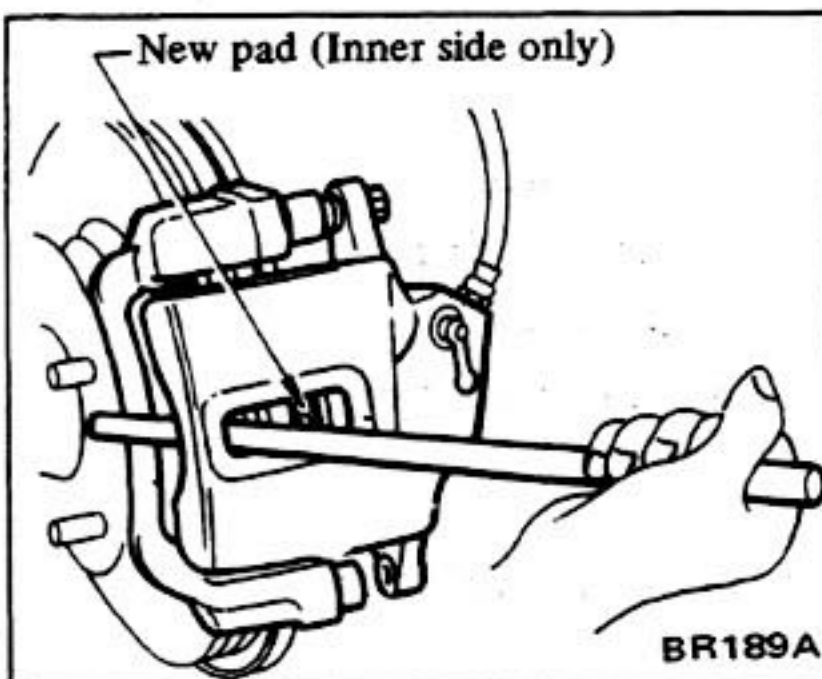
2. Coat the following point with recommended brake grease.

- Torque member-to-pad clearance
- Do not grease friction face of pad.



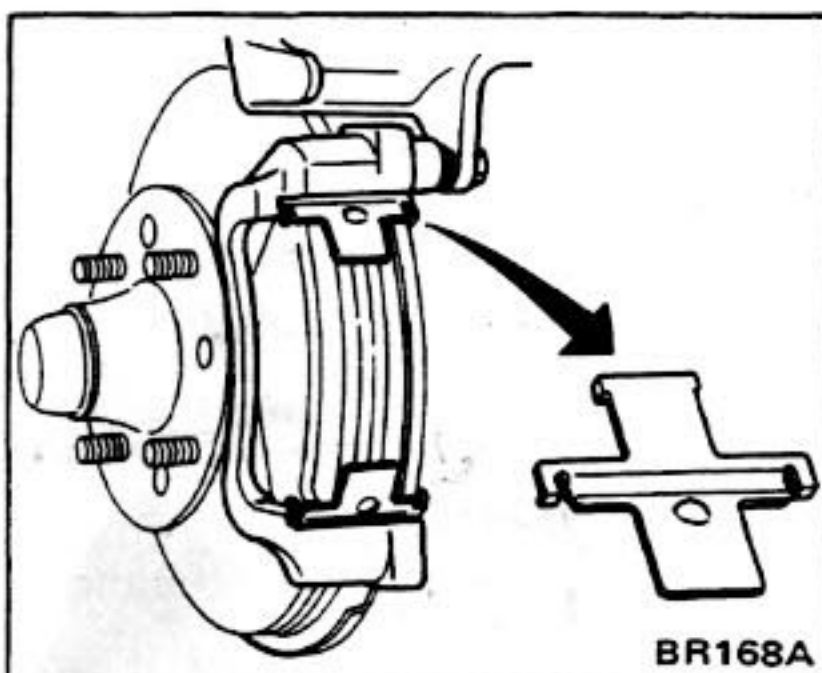
3. Install new pad (inner side).

Insert lever into opening in cylinder body as shown below and push piston by catching torque member.



4. Install new pad (outer side).

5. After installing pads, install pad retainer, being careful not to fit it upside down.



6. Install cylinder body and then tighten lower pin bolt.

Ⓣ : Pin bolt
52 - 73 N·m
(5.3 - 7.4 kg-m,
38 - 54 ft-lb)

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

8. Install wheels and lower vehicle to ground.

REMOVAL

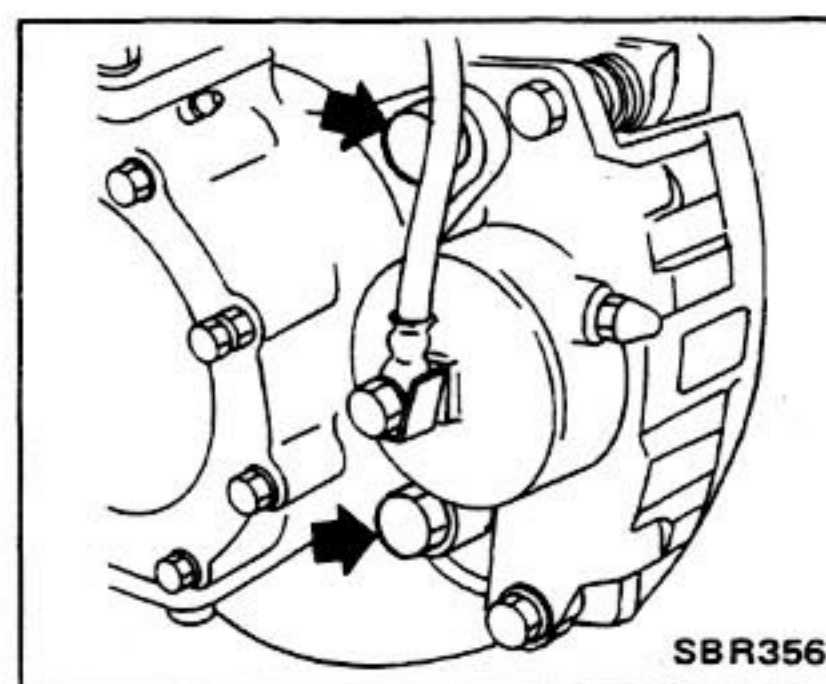
1. Jack up front of vehicle, and support it on safety stands. Remove wheel.
2. Remove front brake hose.

CAUTION:

When removing brake tube, use Tool GG94310000. Never use open-end or adjustable wrench.

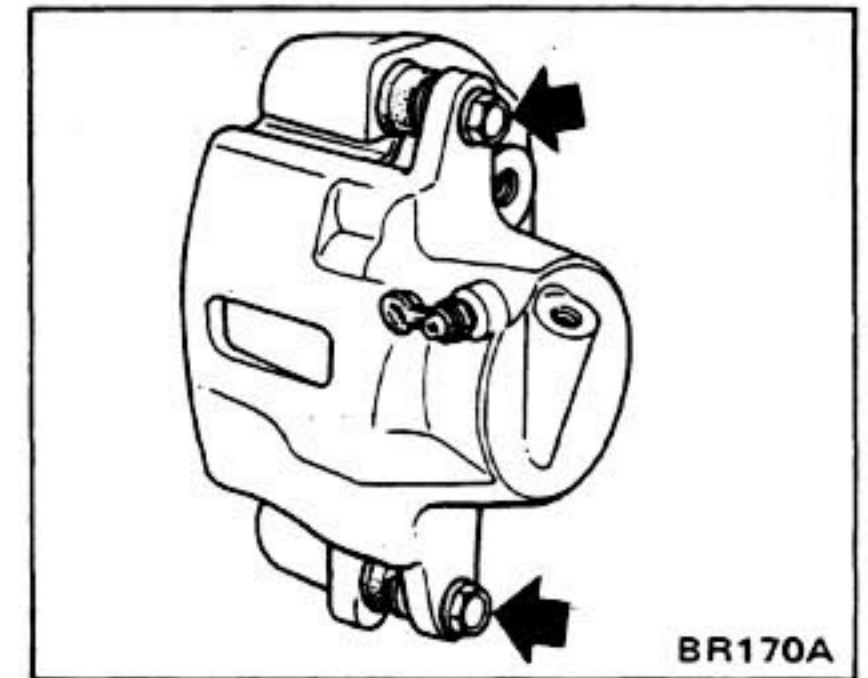
Plug up hole in caliper and brake tube so that brake fluid does not flow out.

3. Remove caliper assembly from knuckle spindle.



DISASSEMBLY

1. Drain brake fluid from cylinder body.
2. Wipe off dust and mud from caliper assembly.
3. Remove pin bolts.



4. Separate cylinder body and torque member.

5. Remove pad retainers and pads.

6. Force out pistons with dust seal from cylinder by feeding compressed air gradually.

WARNING:

Gradually increase air pressure so that piston does not pop out.

7. Remove piston seals.

CAUTION:

Be careful not to damage seals and cylinder body.

8. If necessary, remove sub pin, main pin and dust seals.

INSPECTION

Clean all parts and check as follows:

CAUTION:

Use brake fluid to clean. Never use 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.

Torque member

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

Piston

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

CAUTION:

Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck on sliding surface.

Piston seal and dust seal

Replace piston seal and dust seal at each disassembly.

Main pin, sub pin and rubber bushing

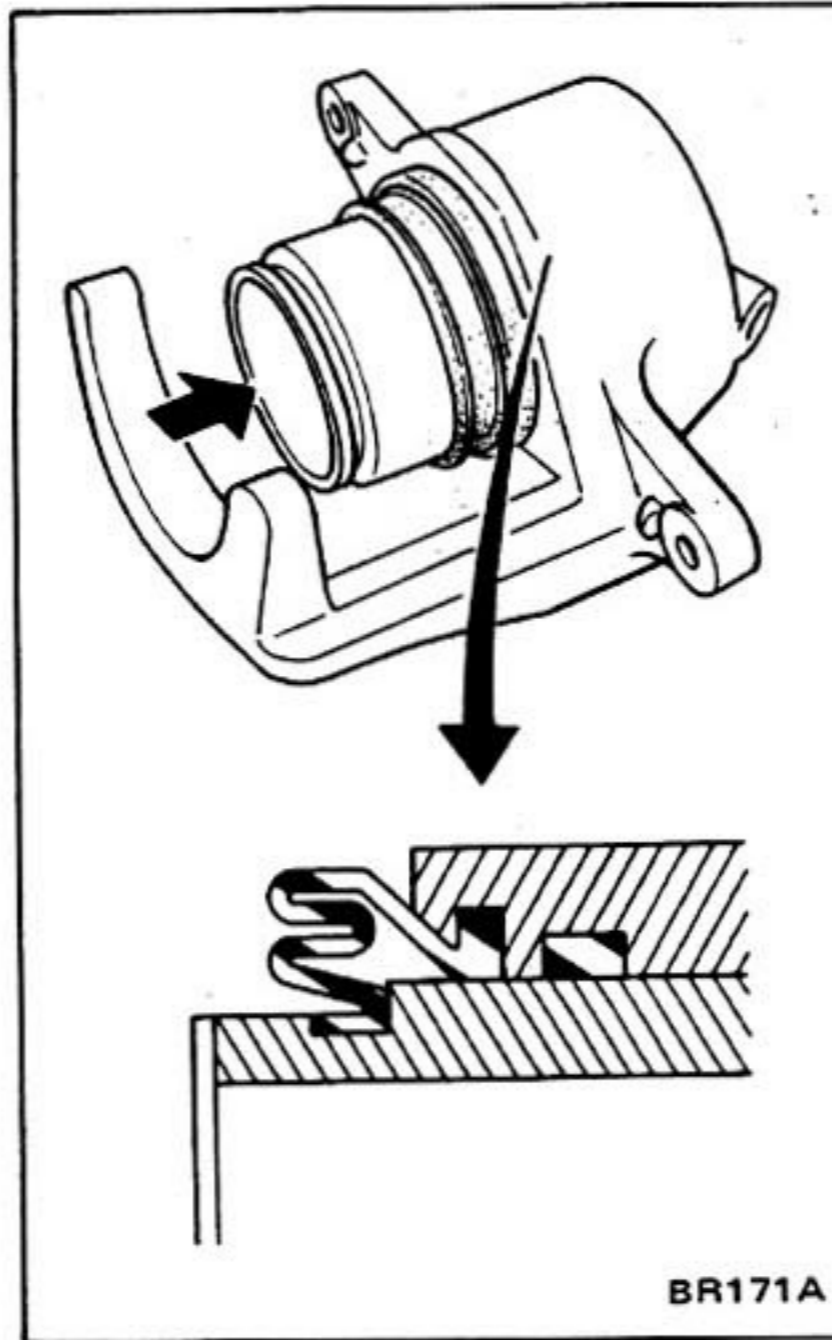
Check for wear, cracks or other damage. Replace if any fault is detected.

ASSEMBLY

Assemble front brake in reverse order of disassembly, closely observing the following:

1. Install piston seals, taking care not to damage them.
2. Apply brake fluid to sliding portions of piston, inside of cylinder body.
3. With dust seal fitted to piston, insert dust seal into groove in cylinder body and install piston. Then securely fit dust seal.

Apply rubber grease to inside of dust seal.



4. Coat the following part with recommended brake grease.
 - Torque member-to-pad clearance.
5. Apply a coat of recommended multi-purpose grease to main pin rubber bushing and to sub pin.
6. Tighten pin bolts.

Ⓣ : Pin bolts
 52 - 73 N·m
 (5.3 - 7.4 kg·m,
 38 - 54 ft·lb)

INSTALLATION

1. Install caliper assembly without pads and pad retainer to knuckle flange.

Ⓣ : Caliper mounting bolt
 108 - 147 N·m
 (11 - 15 kg·m,
 80 - 108 ft·lb)

2. Install pads and pad retainer.
Refer to Pad Replacement.
3. Install front brake hose and bleed brake system.

CAUTION:

When installing brake tubes, use Tool GG94310000.

Ⓣ : Brake tube flare nut
 15 - 18 N·m
 (1.5 - 1.8 kg·m,
 11 - 13 ft·lb)
 Air bleeder
 7 - 9 N·m
 (0.7 - 0.9 kg·m,
 5.1 - 6.5 ft·lb)

4. After installing, see if there is no leak by depressing brake pedal several times.

Turn rotor to make sure it does not drag excessively.

FRONT DISC ROTOR

REMOVAL

Refer to Removal (Section FA).

INSPECTION

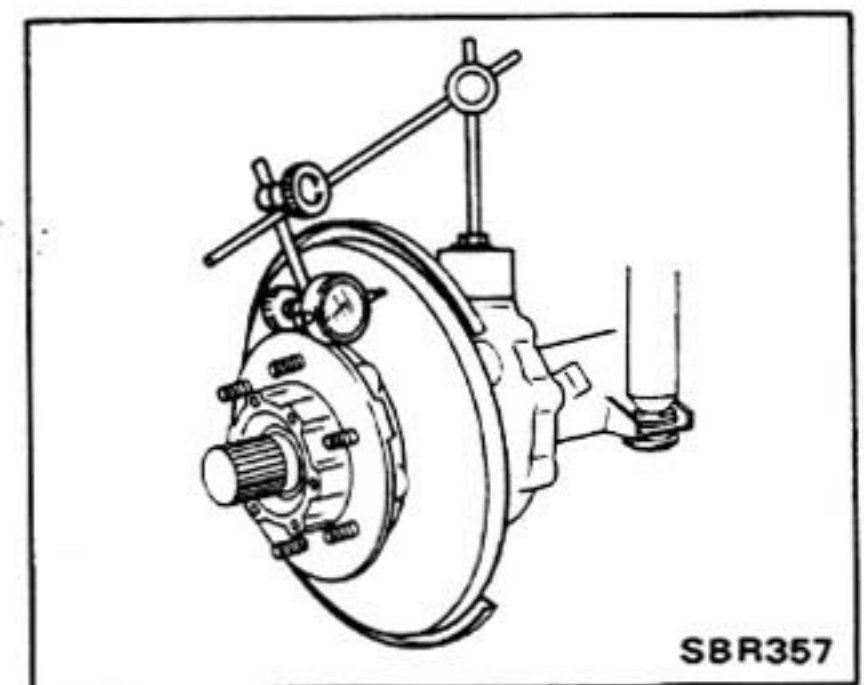
Check the following items and, if necessary, replace. Checks can be made by removing only wheel.

1. Sliding surface
 If there are cracks or considerable chips, replace.
2. Runout
 Adjust wheel bearing correctly. Using a dial gauge, measure runout.

Runout limit

(Total indicator reading):

Less than 0.07 mm (0.0028 in)
 at center of rotor pad
 contact surface



3. Parallelism

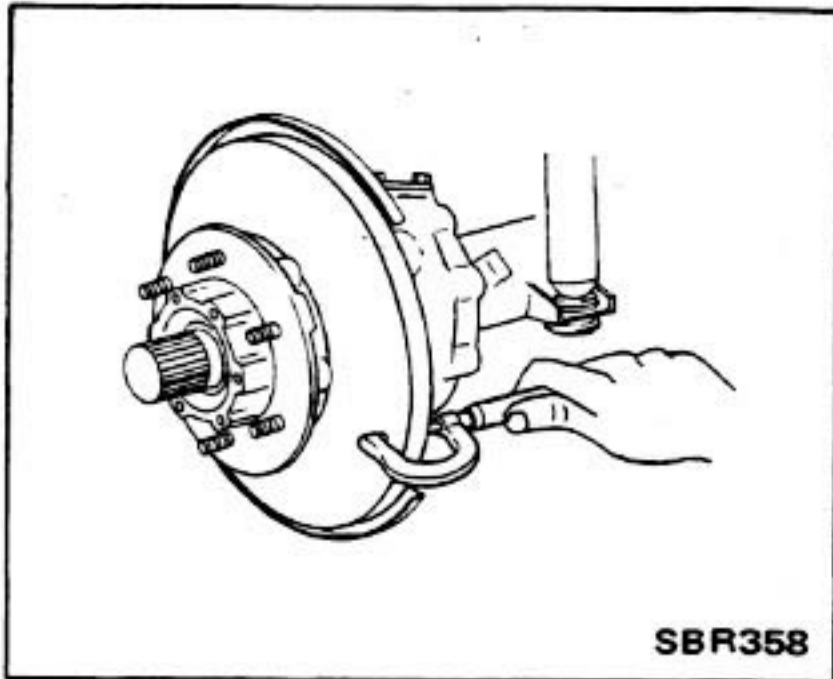
Measure thickness of rotor in circumferential direction, using a micrometer.

Parallelism:

Circumferential direction
 Less than
 0.03 mm (0.0012 in)

Service Brake — BRAKE SYSTEM

As this value increases (wear occurs progressively), vibration corresponding to revolution of tire may often be transmitted to interior of vehicle.



4. Thickness
If rotor thickness is beyond wear limit, replace rotor. When correcting thickness, be sure that the thickness after correction does not exceed the limit.

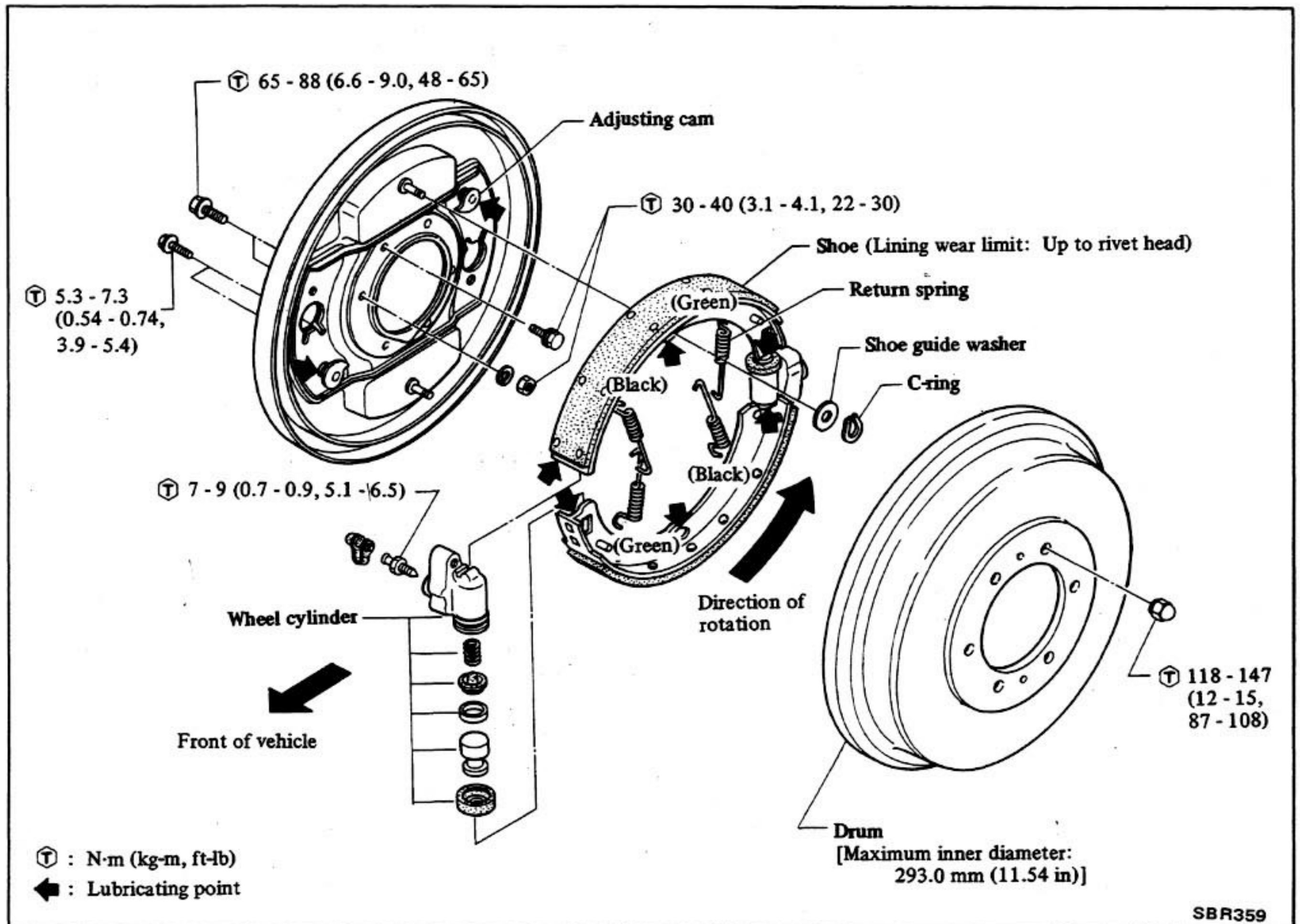
Standard thickness:
20.0 mm (0.787 in)
Wear limit (Minimum thickness):
18 mm (0.71 in)

INSTALLATION

Install rotor in reverse order of removal. Adjust wheel bearing preload correctly. Refer to Adjustment (Section MA).

Ⓣ : Rotor to wheel hub
50 - 68 N·m
(5.1 - 6.9 kg-m,
37 - 50 ft-lb)

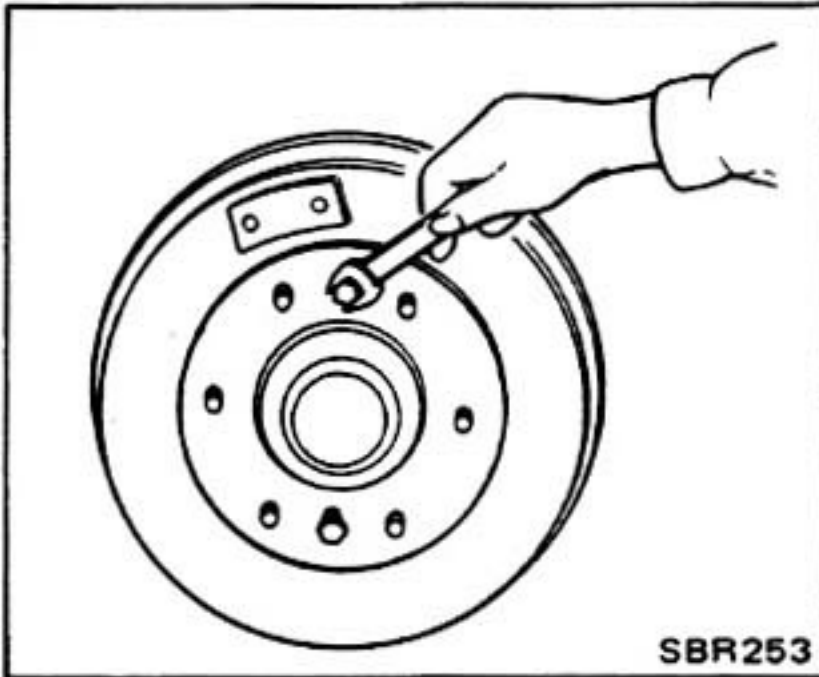
FRONT DRUM BRAKE —2L29—



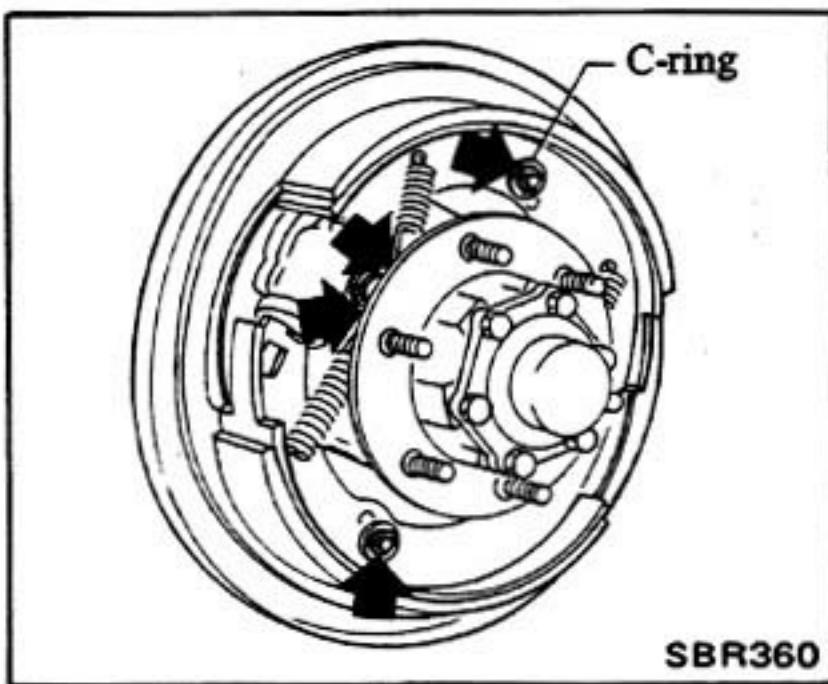
SHOE REPLACEMENT

Removal

1. Remove wheel and drum. If drum is hard to remove, screw in bolt to drive drum out.



2. Remove C-ring and return springs.



3. Remove brake shoes.

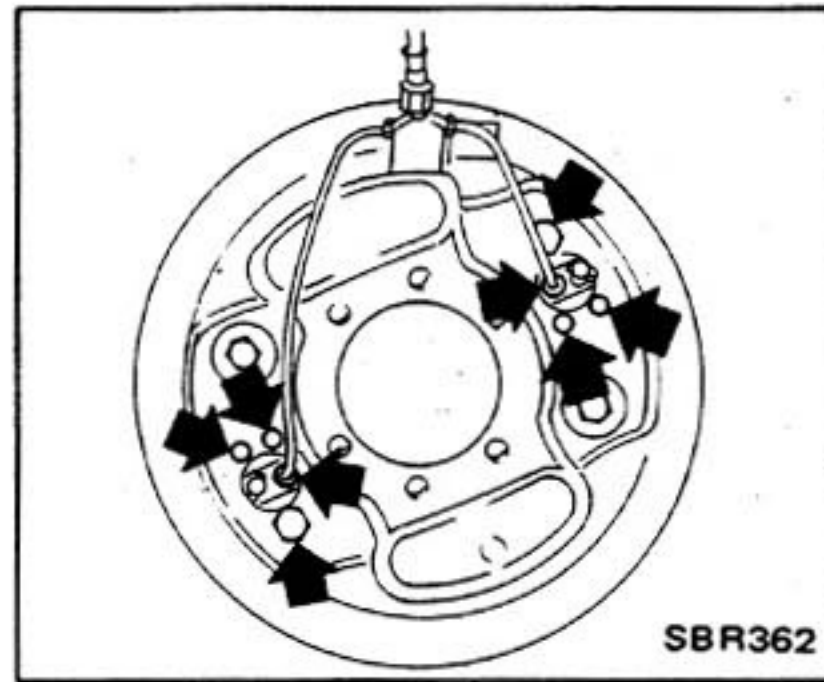
Installation

1. Apply brake grease to the following contact areas.
 - Shoe to wheel cylinder piston and anchor.
 - Adjuster cam to shoe.
 - Shoe guide washer to shoe.
2. After installation is completed, adjust shoe-to-drum clearance. Refer to Section MA for adjustment.

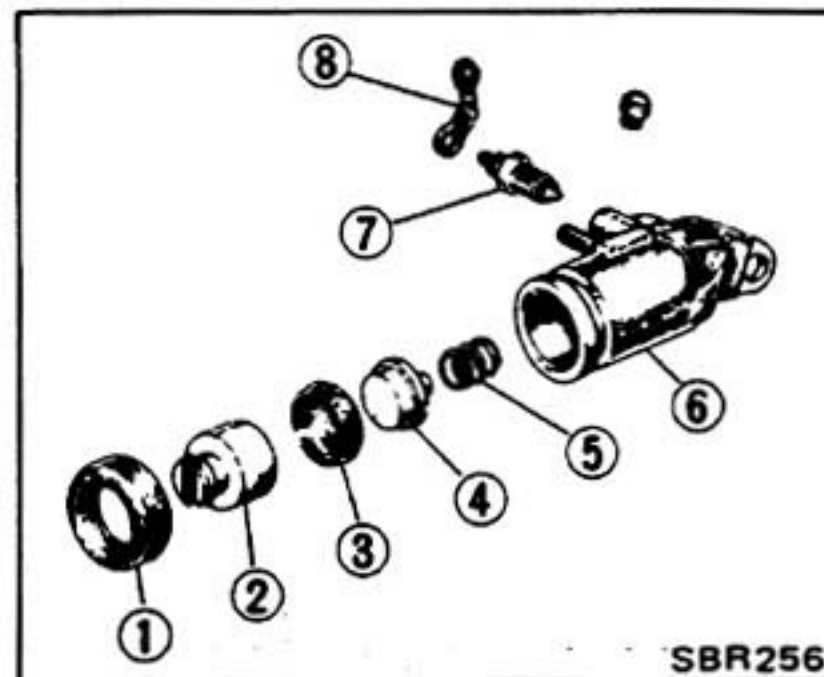
WHEEL CYLINDER

Removal

1. Remove brake shoe.
2. Disconnect brake tube.
3. Then remove wheel cylinder.



Disassembly



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

Inspection

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 limit.

Piston-to-cylinder clearance:

Less than 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.

Assembly

- a. Apply a coating of brake fluid to piston cup at assembly.
- b. The brake wheel cylinder is available in both NABCO make and TOKICO make. There is no inter-

changeability of repair kits or component parts between NABCO and TOKICO makes.

When replacing the repair kit or component parts, ascertain the brand of the brake wheel cylinder body. Be sure to use parts of the same make as the former ones.

Installation

ⓧ : Wheel cylinder fixing nut

Small bolt

5.3 - 7.3 N·m
(0.54 - 0.74 kg·m,
3.9 - 5.4 ft·lb)

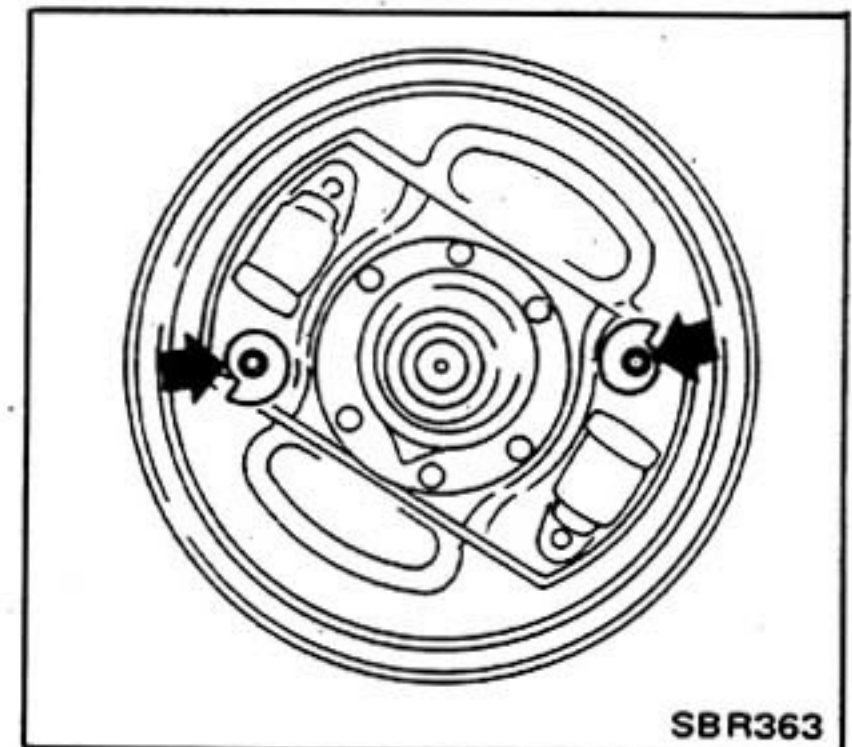
Large bolt

65 - 88 N·m
(6.6 - 9.0 kg·m,
48 - 65 ft·lb)

Refer to Shoe Replacement for installation.

ADJUSTER CAM

The adjuster cam can not be removed from the back plate. It should always be replaced along with the back plate assembly.



BRAKE DRUM

Inspection

1. Check inner diameter of brake drum to make sure it is properly round and tapered. If it is not, repair or replace brake drum.

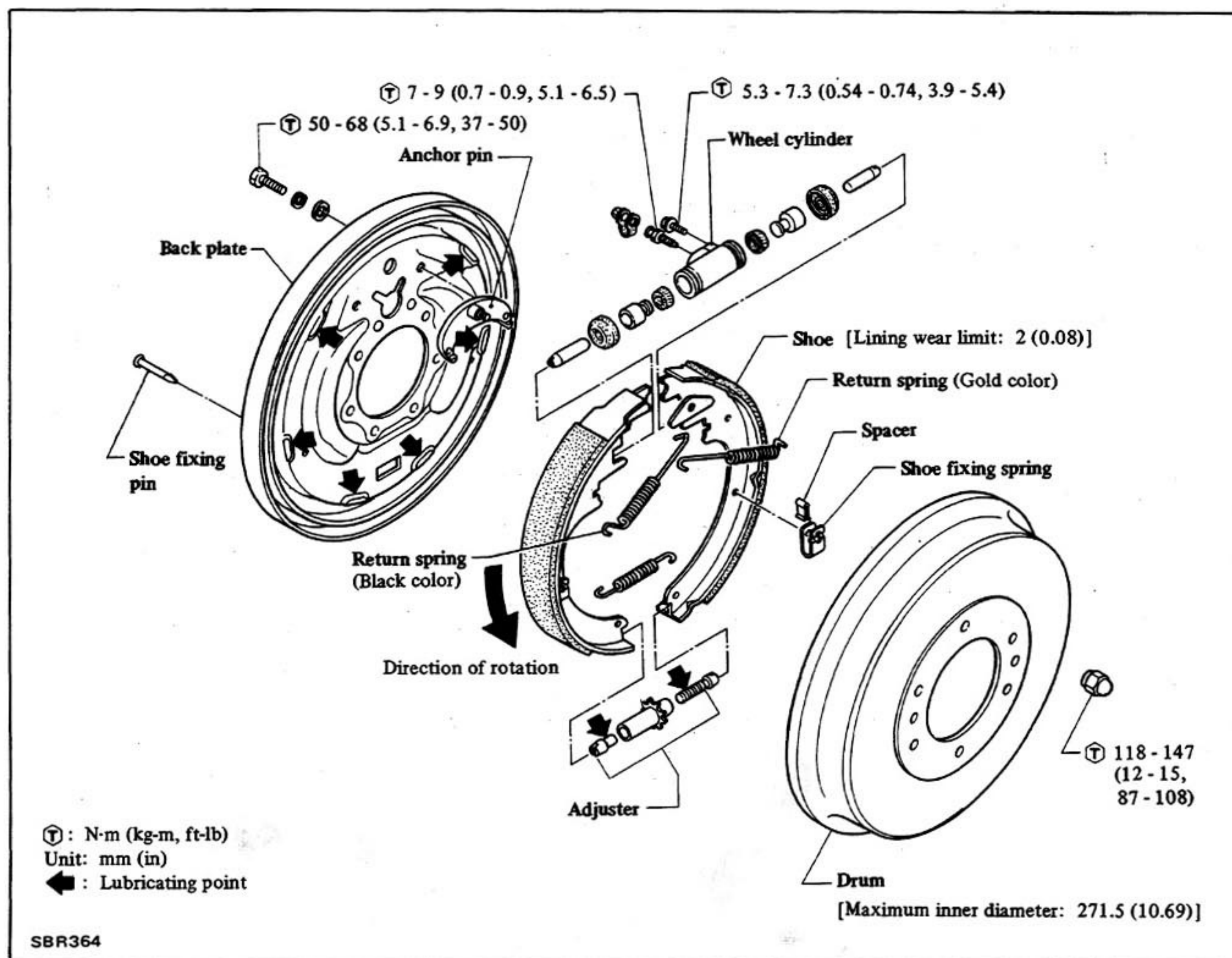
Service Brake – BRAKE SYSTEM

Standard inner diameter:
292.1 mm (11.50 in)
Maximum inner diameter:
293.0 mm (11.54 in)
Out-of-roundness (ellipticity):
Less than 0.05 mm (0.0020 in)
Radial runout
(Total indicator reading):
Less than 0.15 mm (0.0059 in)

2. Contact surface with which linings come into contact should be fine-finished with No. 120 to 150 sandpaper.
3. 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.

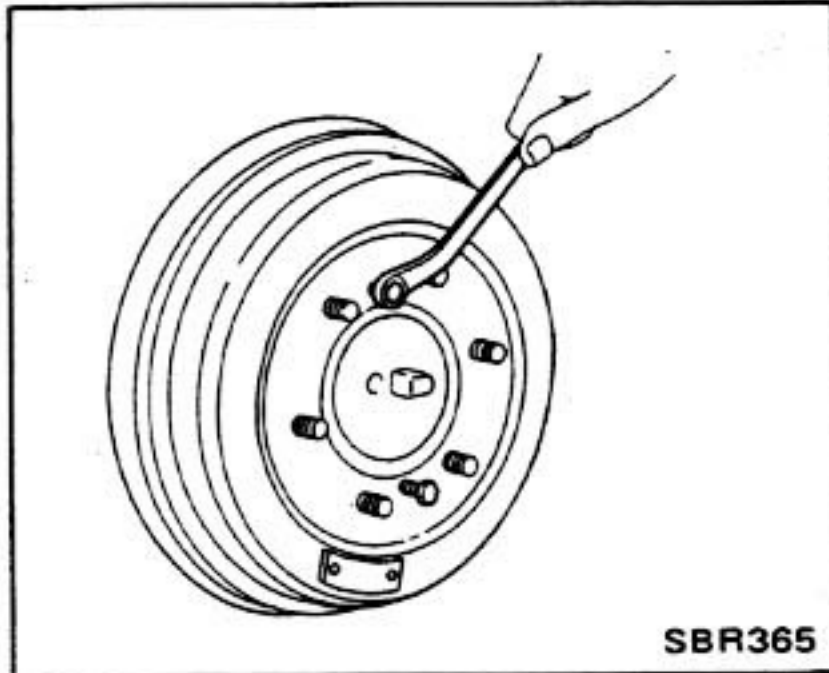
After brake drum has been completely re-conditioned or replaced, check drum and shoes for proper contact pattern.

REAR BRAKE –DS27–

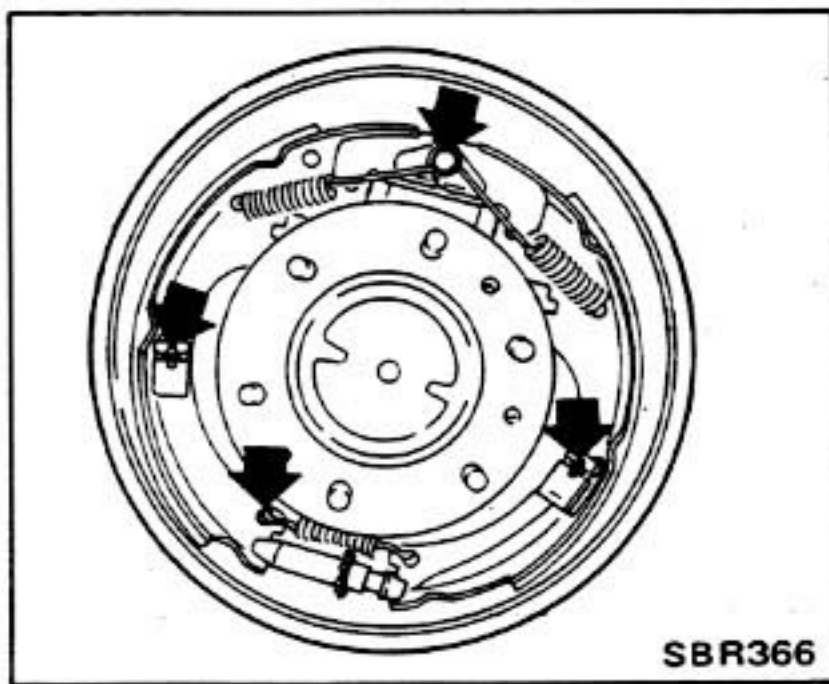


SHOE REPLACEMENT

1. Remove wheel and drum. If drum is hard to remove, screw in bolt to drive drum out.



2. Remove shoe fixing springs and return springs.

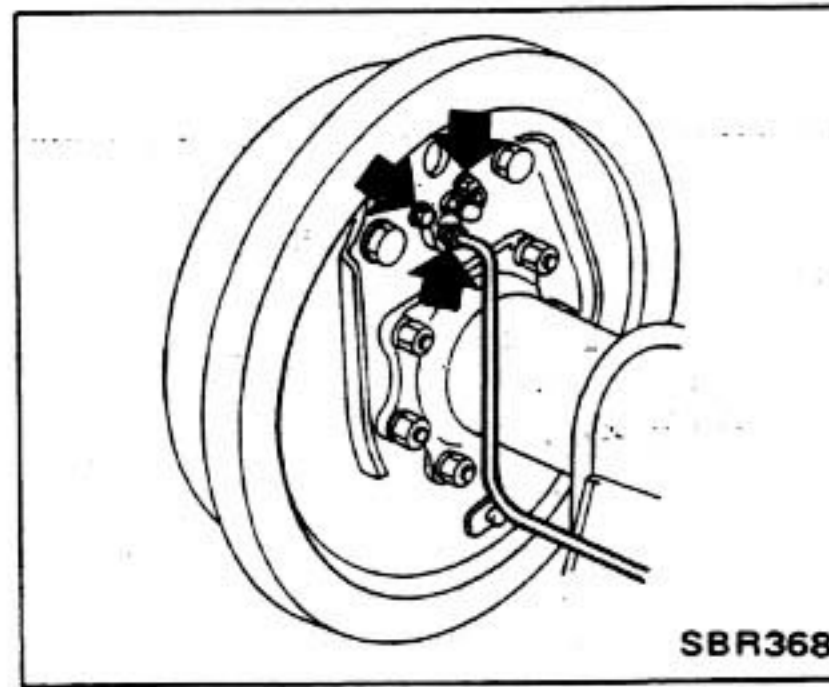


3. Remove shoe assemblies.
4. Apply brake grease to the following points.
 - Brake shoe installing grooves of adjuster and wheel cylinder.
 - Contact surfaces between brake disc and brake shoe assembly (six places).
5. After installation is completed, adjust shoe-to-drum clearance. Refer to Section MA for adjustment.

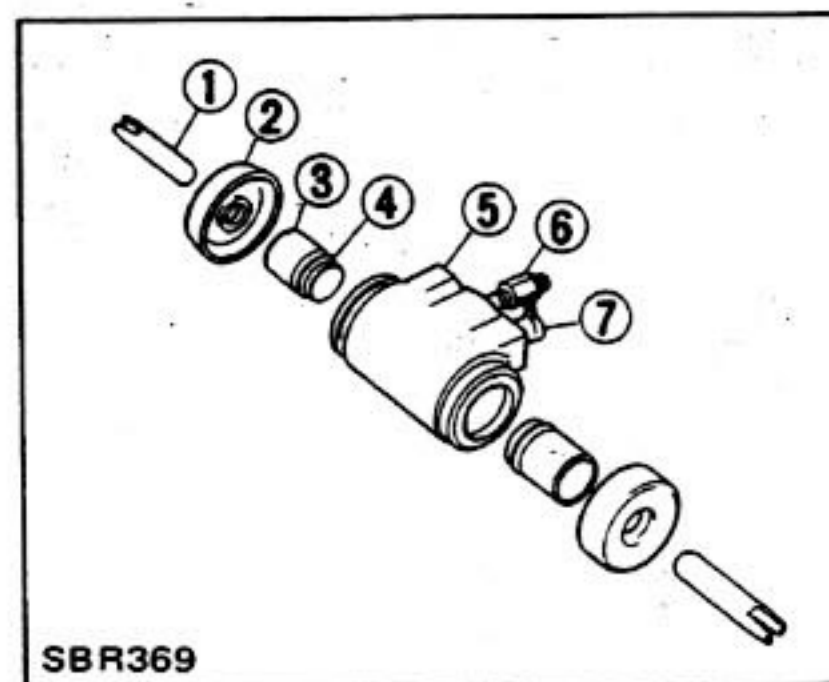
WHEEL CYLINDER

Removal

1. Remove brake shoe.
2. Disconnect brake tube.
3. Then remove wheel cylinder.



Disassembly



- 1 Piston head
- 2 Dust cover
- 3 Piston
- 4 Piston cup
- 5 Wheel cylinder housing
- 6 Bleeder screw
- 7 Bleeder cap

Inspection

1. Replace any cylinder to piston which is scratched, scored or worn on its sliding contact surface.
2. Replace worn parts if piston-to-cylinder clearance is beyond specified value.

Piston-to-cylinder clearance:
Less than 0.15 mm (0.0059 in)

3. Replace piston cup which is worn or damaged.
4. Replace if contacting face of cylinder and shoe is worn locally or in step.
5. Replace damaged dust cover, fatigued piston spring or faulty threaded parts.
6. Replace tube connector which is worn on its threaded portion.

Assembly

- a. Apply a coating of brake fluid to piston cup at assembly.
- b. The brake wheel cylinder is available in both NABCO make and TOKICO make. There is no interchangeability of repair kits or component parts between NABCO and TOKICO makes.

When replacing the repair kit or component parts, ascertain the brand of the brake wheel cylinder body. Be sure to use parts of the same make as the former ones.

Installation

ⓧ : Wheel cylinder fixing bolt
5.3 - 7.3 N·m
(0.54 - 0.74 kg·m,
3.9 - 5.4 ft·lb)

BRAKE DRUM

Inspection

1. Check inner diameter of brake drum to make sure it is properly round and tapered. If it is not, repair or replace brake drum.

Standard diameter:
270 mm (10.63 in)

Maximum inner diameter:
271.5 mm (10.69 in)

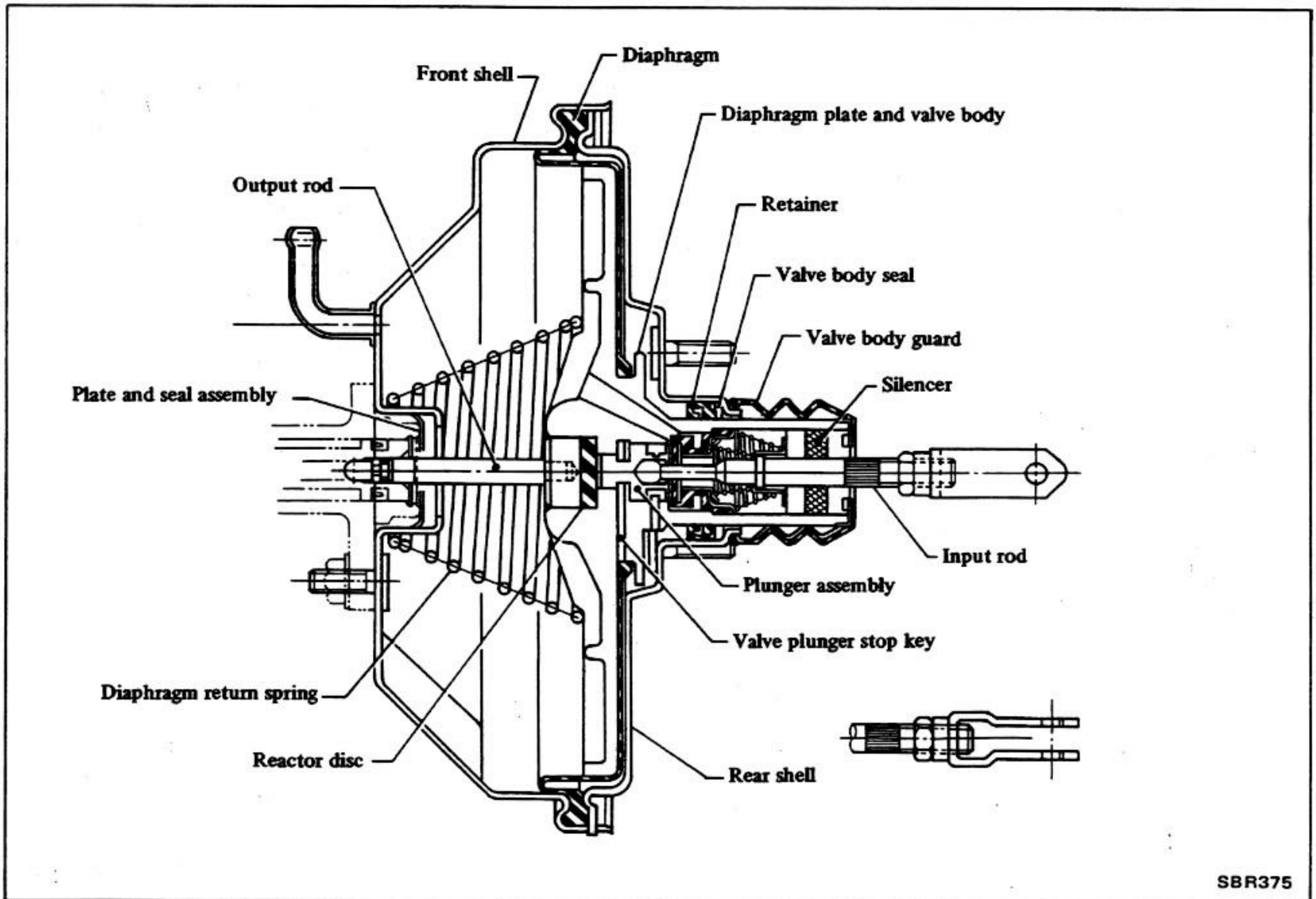
Out-of-roundness (ellipticity):
Less than 0.05 mm (0.0020 in)

Radial run-out
(total indicator reading):
Less than 0.12 mm (0.0047 in)

2. Contact surface with which linings come into contact should be finished to such an extent that it is ground by a No. 120 to 150 sandpaper.
3. Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial or stepped wear on its contact surface.

After brake drum is completely reconditioned or replaced, check drum and shoes for proper contact pattern.

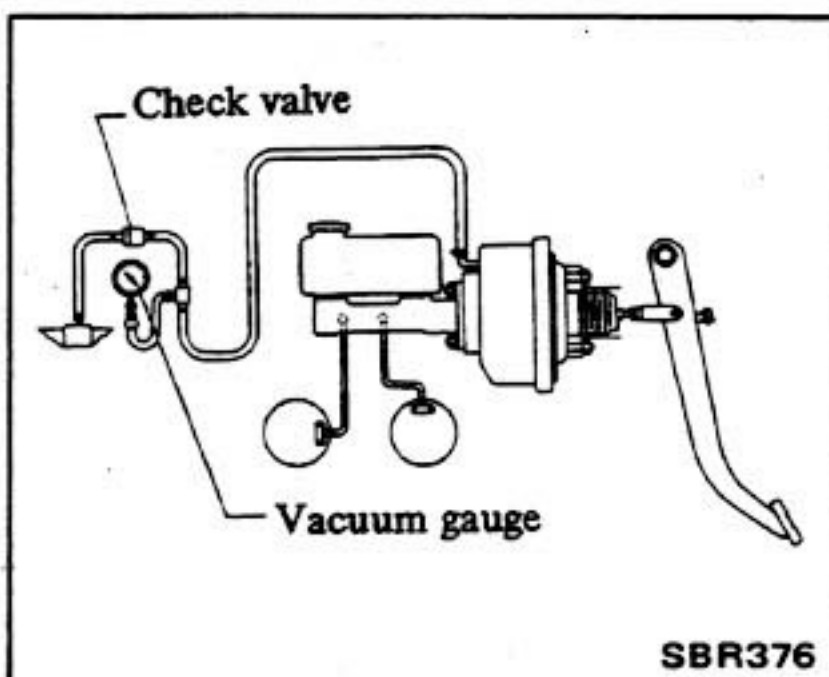
BRAKE BOOSTER



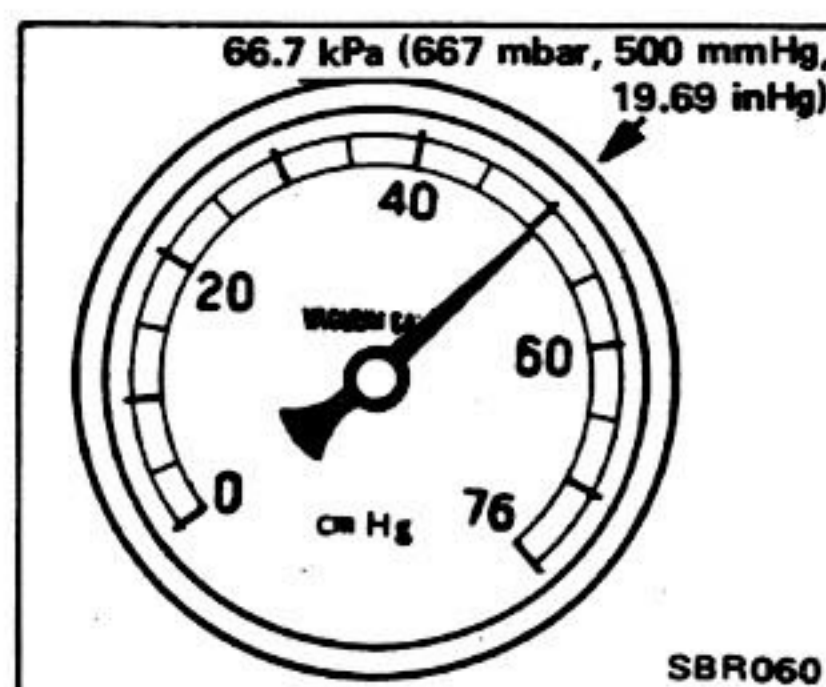
INSPECTION

Airtight test (No load)

1. Connect a vacuum gauge between check valve and brake booster.



2. Start engine and increase engine speed. Stop engine when vacuum is 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg).



3. If vacuum pressure drops more than the specified value, correct the cause in accordance with the following chart.

Maximum vacuum leakage (15 seconds after engine is stopped):
 3.3 kPa
 (33 mbar, 25 mmHg, 0.98 inHg)

Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Air leakage at output rod seal.	Replace brake booster as an assembly.
3. Air leakage between valve body and seal.	
4. Air leakage at valve plunger seat.	
5. Damaged piping or joints.	Repair or replace.

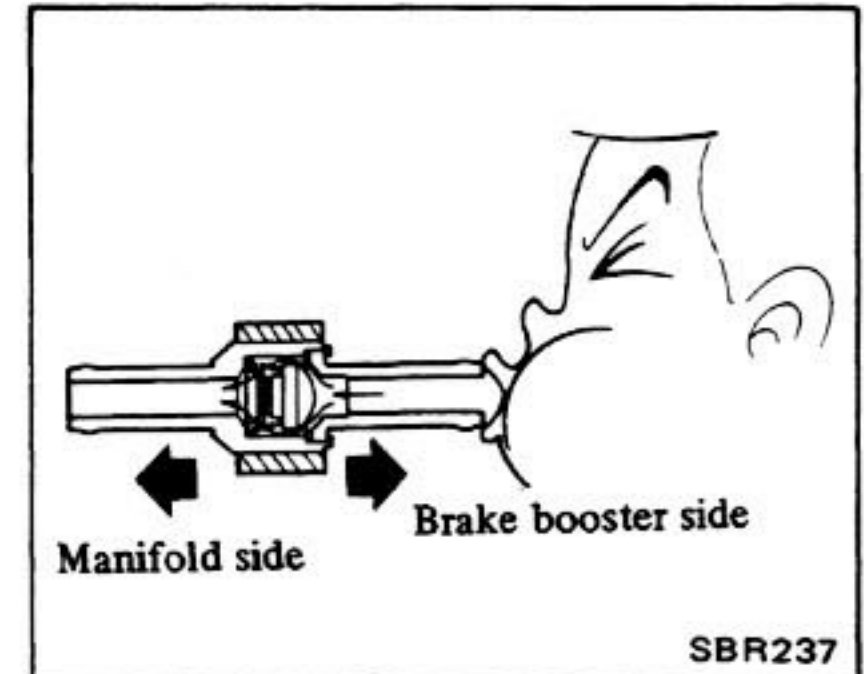
Airtight test (Under load)

With brake pedal fully depressed, perform an airtight test following the same procedures as used in airtight test under no load.

Maximum vacuum leakage (15 seconds after engine is stopped):
3.3 kPa
(33 mbar, 25 mmHg, 0.98 inHg)

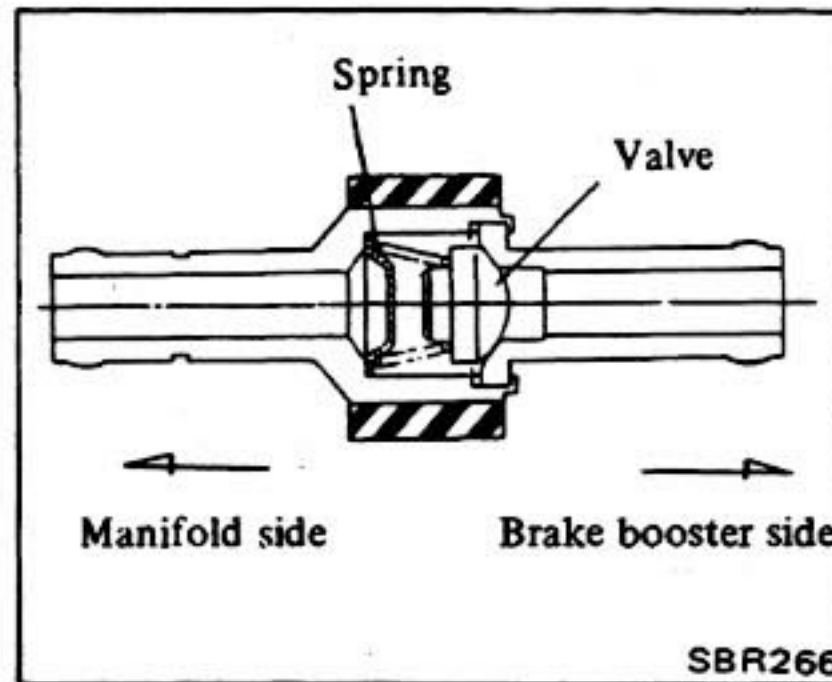
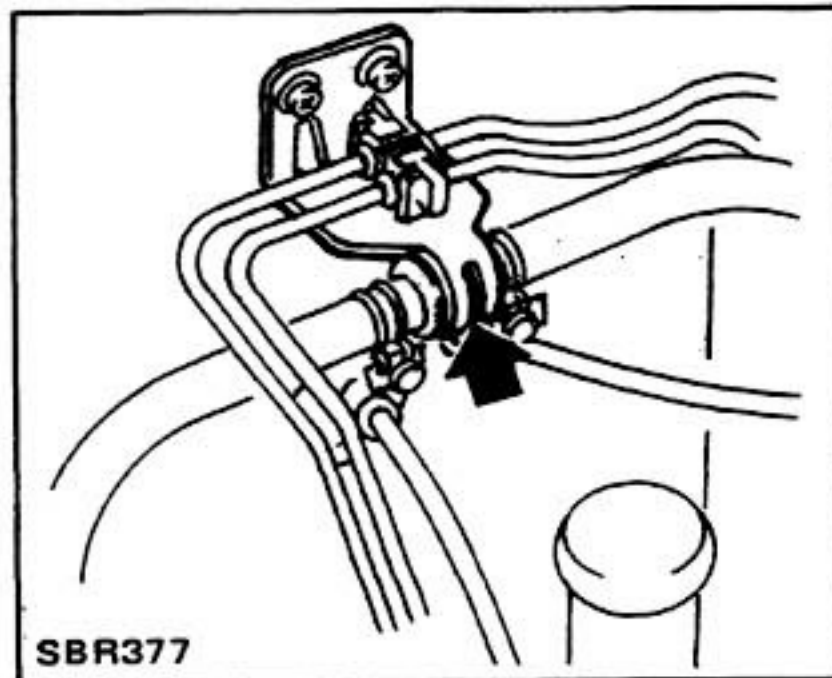
Probable cause	Corrective action
1. Air leakage at check valve.	Replace check valve.
2. Damaged diaphragm.	Replace brake booster as an assembly.
3. Reaction disc dropped off (Brake booster).	
4. Air leakage at poppet assembly seat and valve body.	

4. When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.



Check valve

1. Remove check valve.



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 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg) is registered on vacuum pressure gauge. With a steady vacuum pressure of 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg), measure oil pressure with respect to each pedal operating force.

Relationship between oil pressure and pedal operating force is illustrated in the following figures. Also check brake line for evidence of fluid leakage.

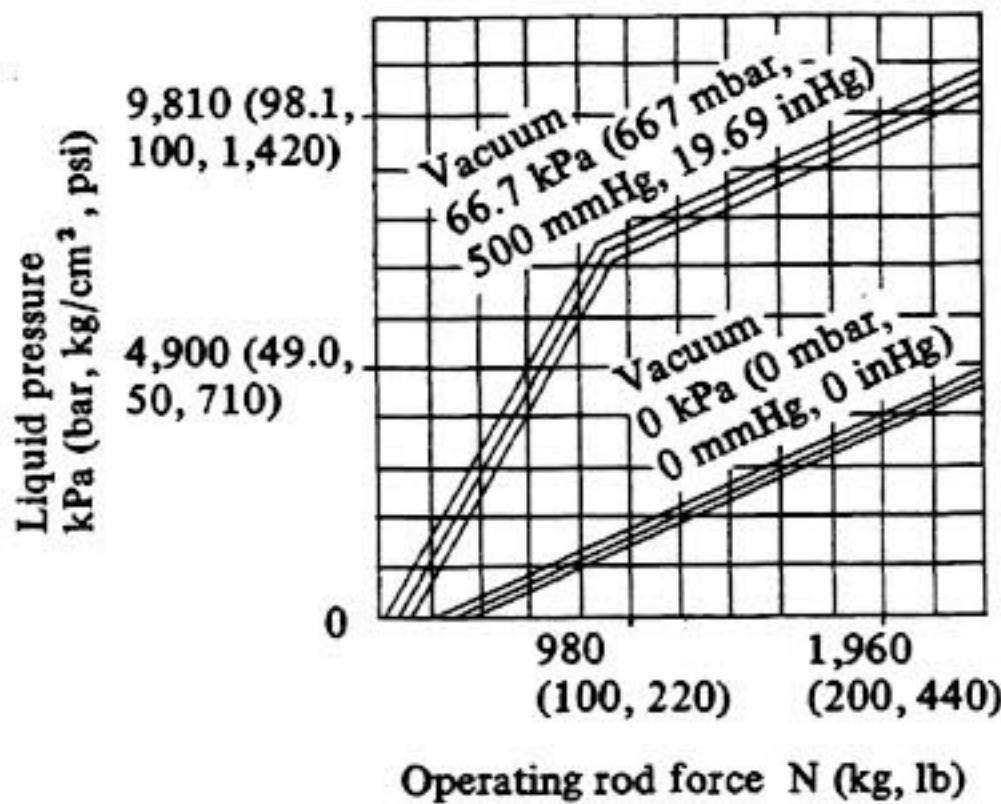
Determine whether source of problem is in brake booster or check valve. Before you reach a final conclusion, always inspect check valve first.

2. Apply a vacuum pressure of 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg) to port of check valve on brake booster side.

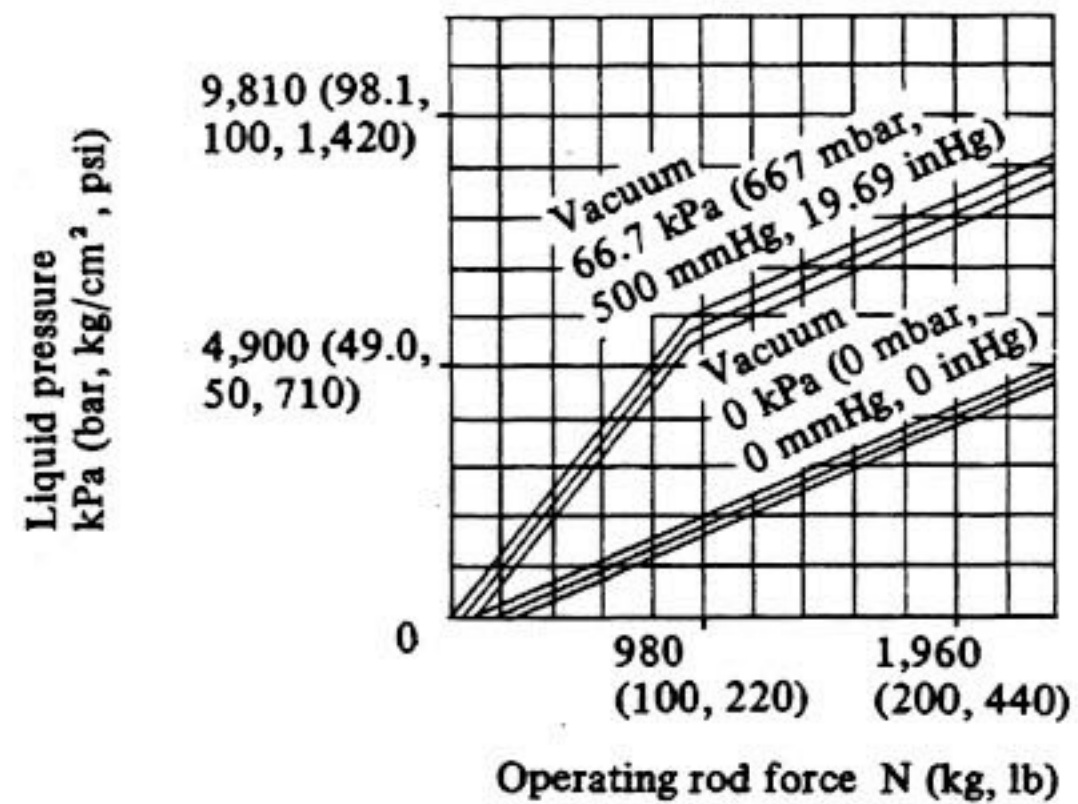
3. If vacuum pressure drops below the specified value in 15 seconds, replace check valve with a new one.

Maximum vacuum leakage of check valve:
1.3 kPa
(13 mbar, 10 mmHg, 0.39 inHg)

Front disc brake



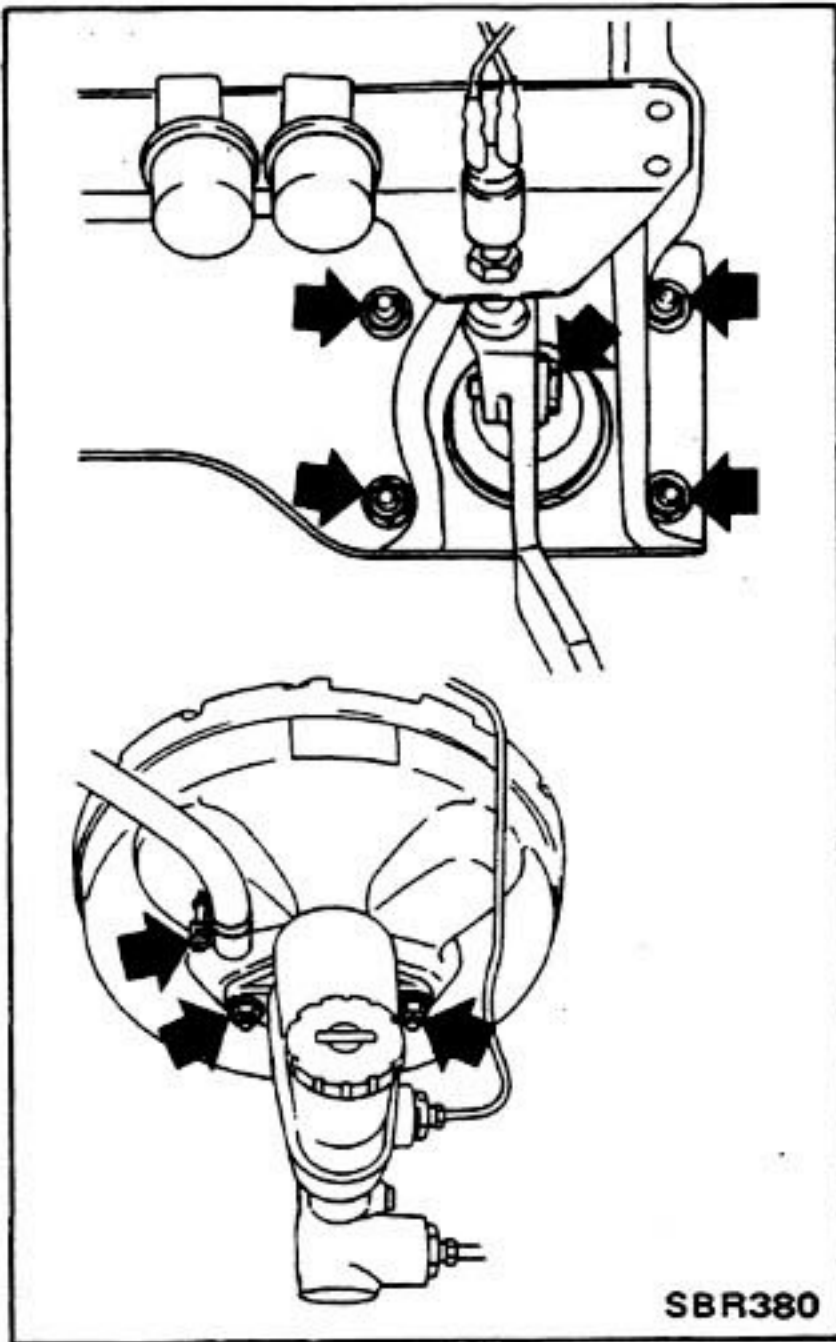
Front drum brake



The values for pedal operating force are 1/4 those of rod operating force.

REMOVAL

To remove brake booster, detach the following points.

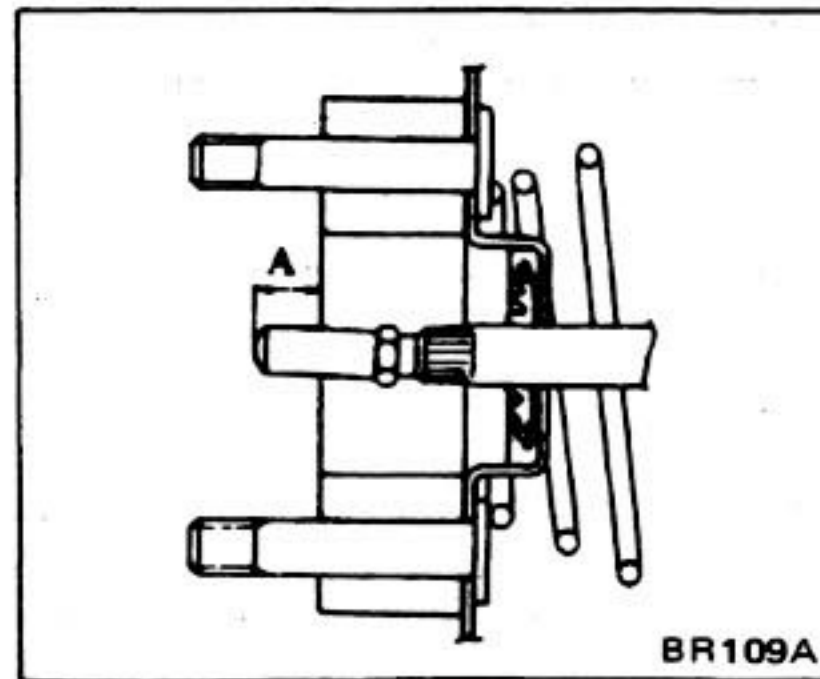


ADJUSTMENT

Output rod length

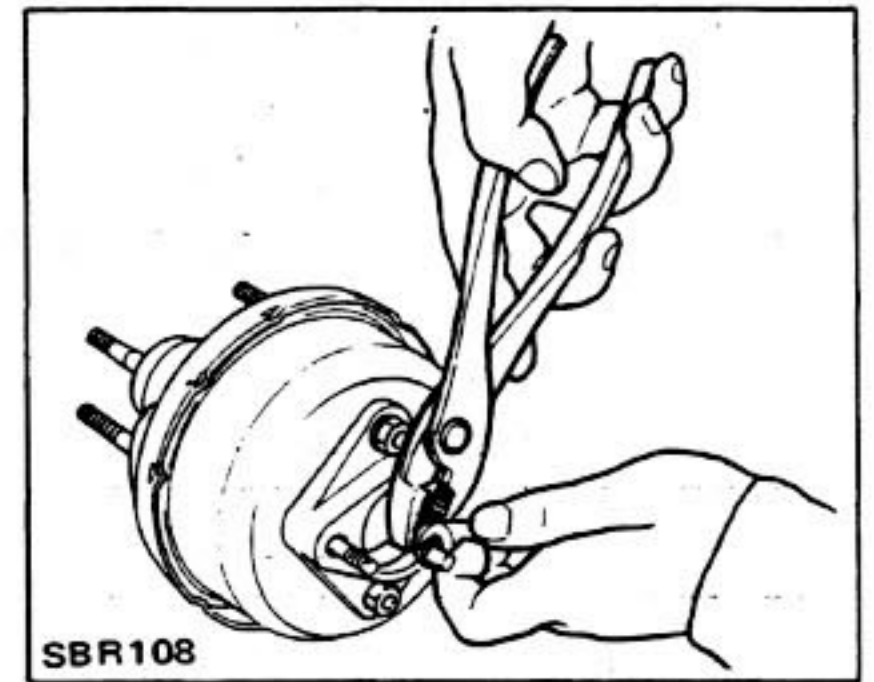
1. Check length.

Length "A":
9.75 - 10.00 mm
(0.3839 - 0.3937 in)



2. Adjust length if necessary.

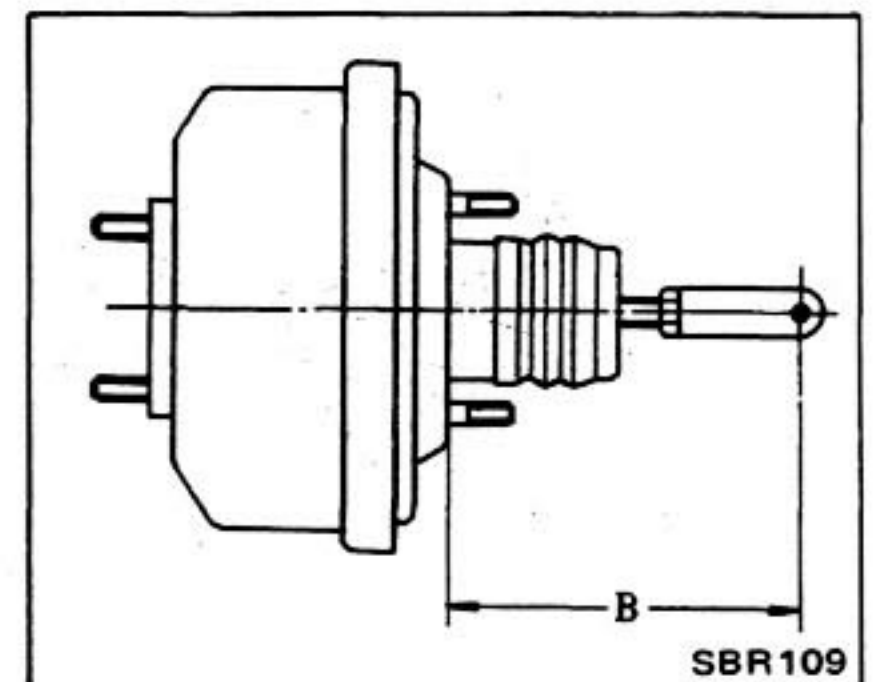
If amount of adjustment required exceeds 0.5 mm (0.020 in), reaction disc may have been either dislocated or fallen off. Replace brake booster assembly.



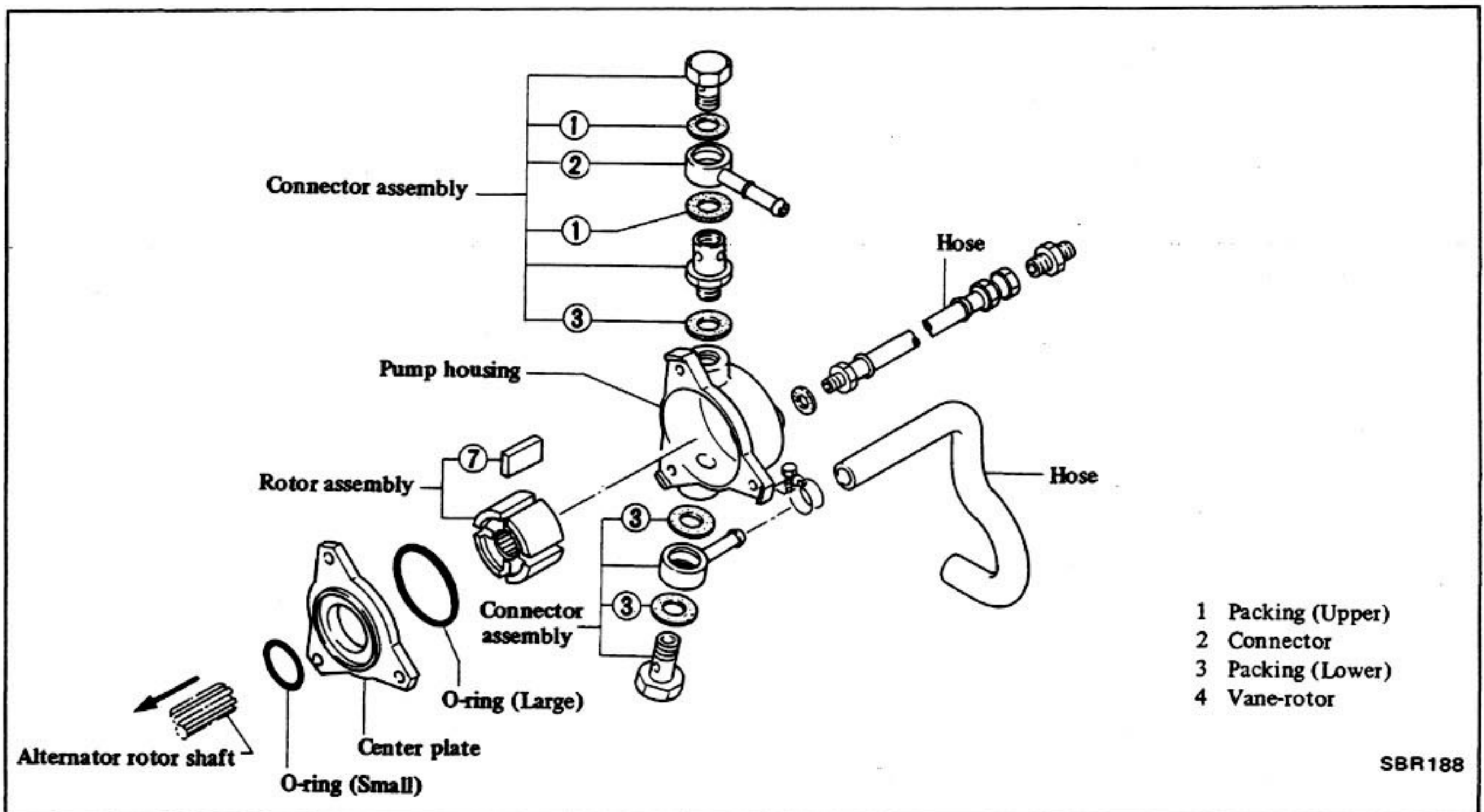
Input rod length

Adjust length by turning adjusting nut.

Length "B":
128 mm (5.04 in)



VACUUM PUMP (Equipped with SD33 engine only)

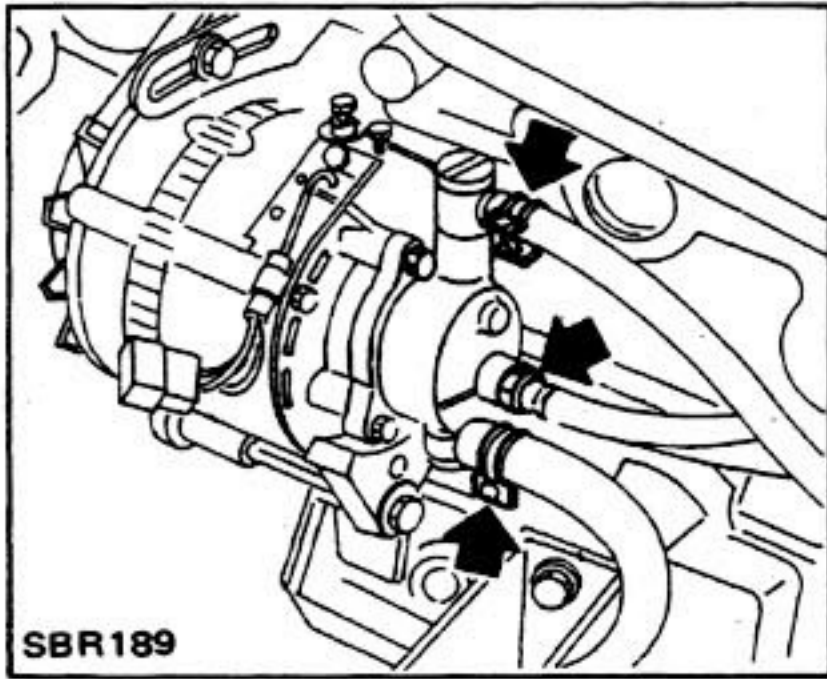


Removal and installation

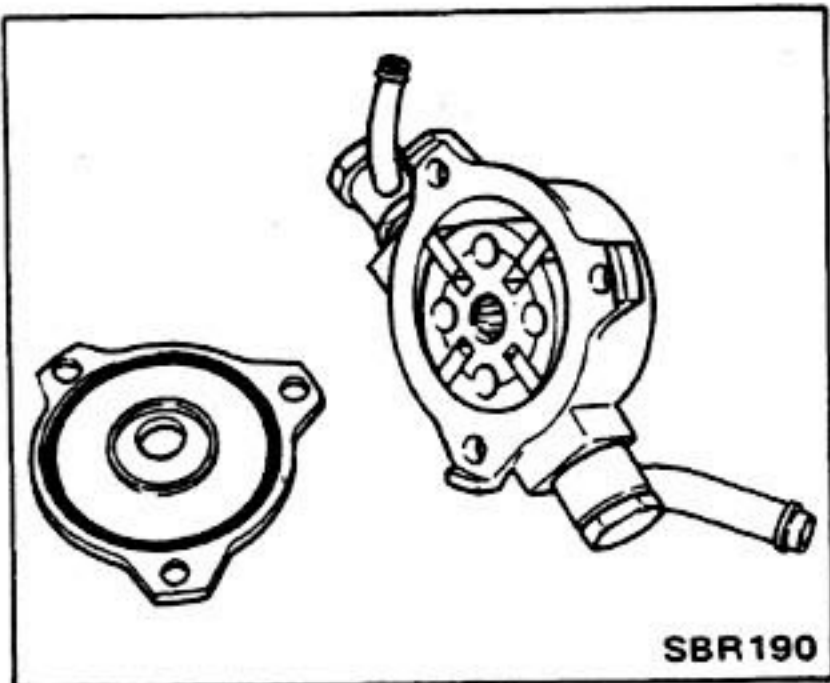
1. Drain oil from vacuum pump.

Manually rotate fan belt clockwise to discharge any oil which may have accumulated in vacuum pump.

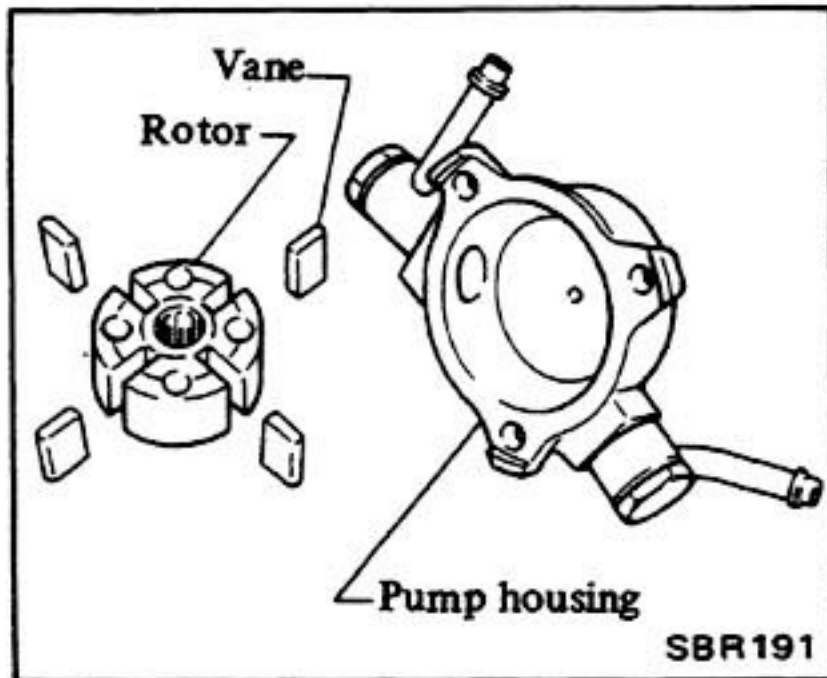
2. Remove vacuum pump assembly from AC alternator.



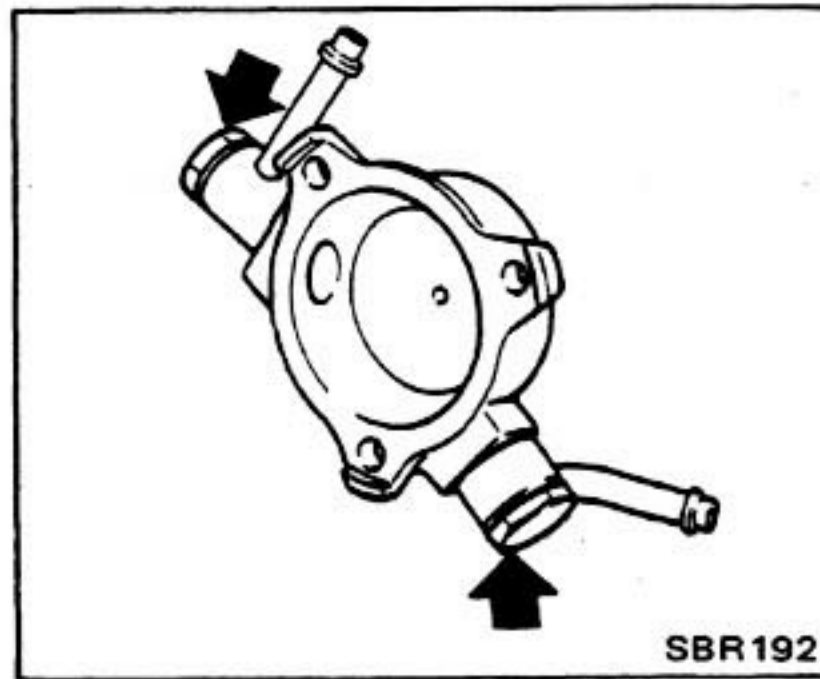
3. Separate center plate and vacuum pump housing.



4. Disassemble rotor, vane and vacuum pump housing.



5. Disconnect valve assembly.

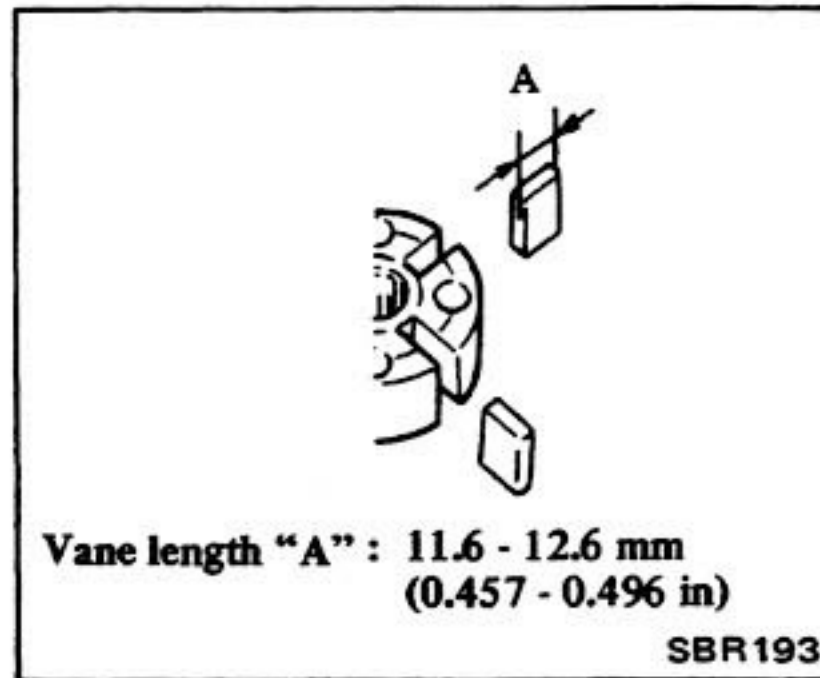


6. Install vacuum pump in the reverse order of removal.

INSPECTION

Clean all parts and check them as follows:

- Check for wear or scratches on mating surfaces of rotor and vacuum pump housing and of rotor and center plate. If any wear or scratches are noted, replace those parts.
- Check for wear or scratches on vanes. If necessary, replace.

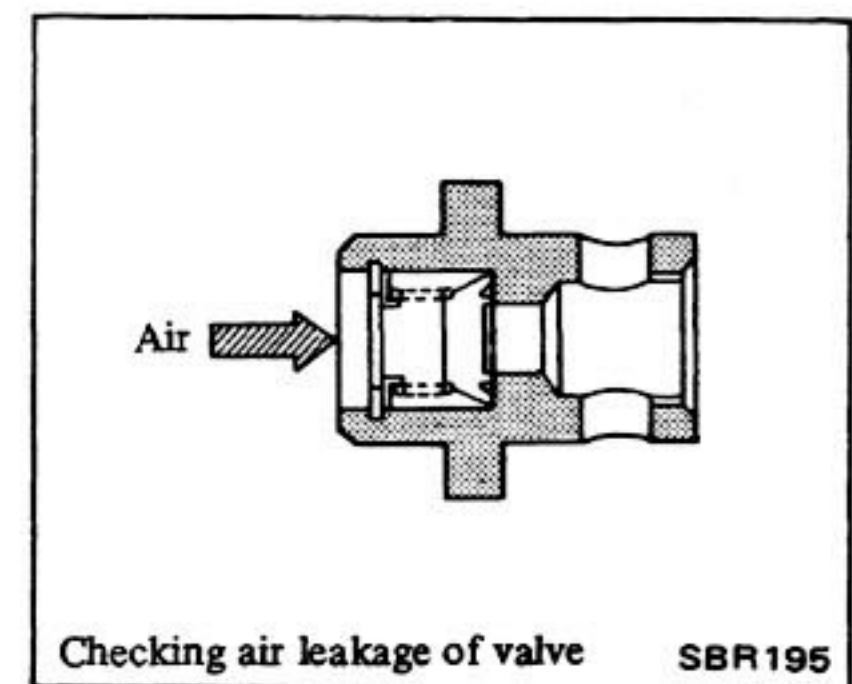
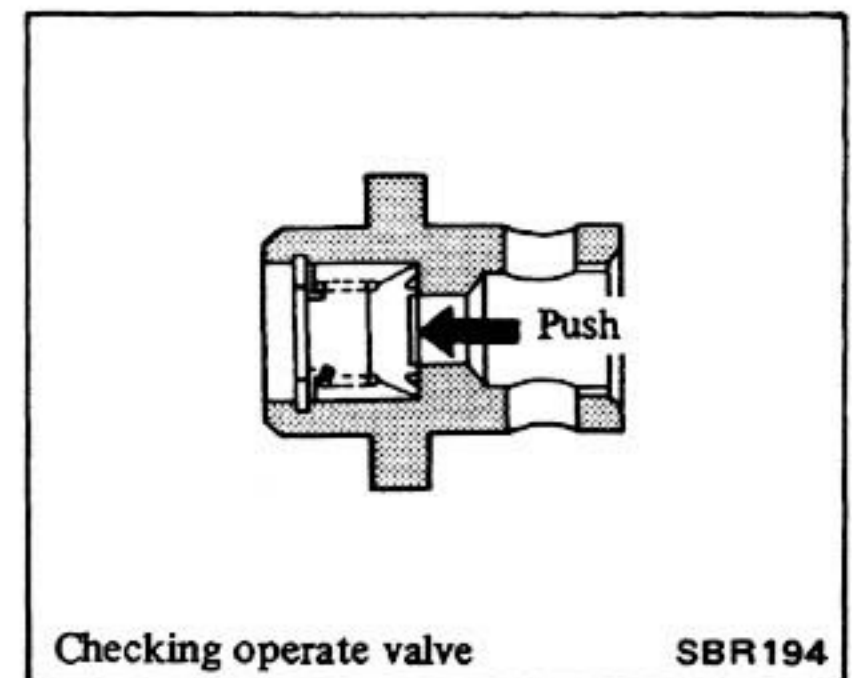


- Check inner wall of vacuum pump housing for wear. If necessary, replace.

Vacuum pump housing inner diameter:

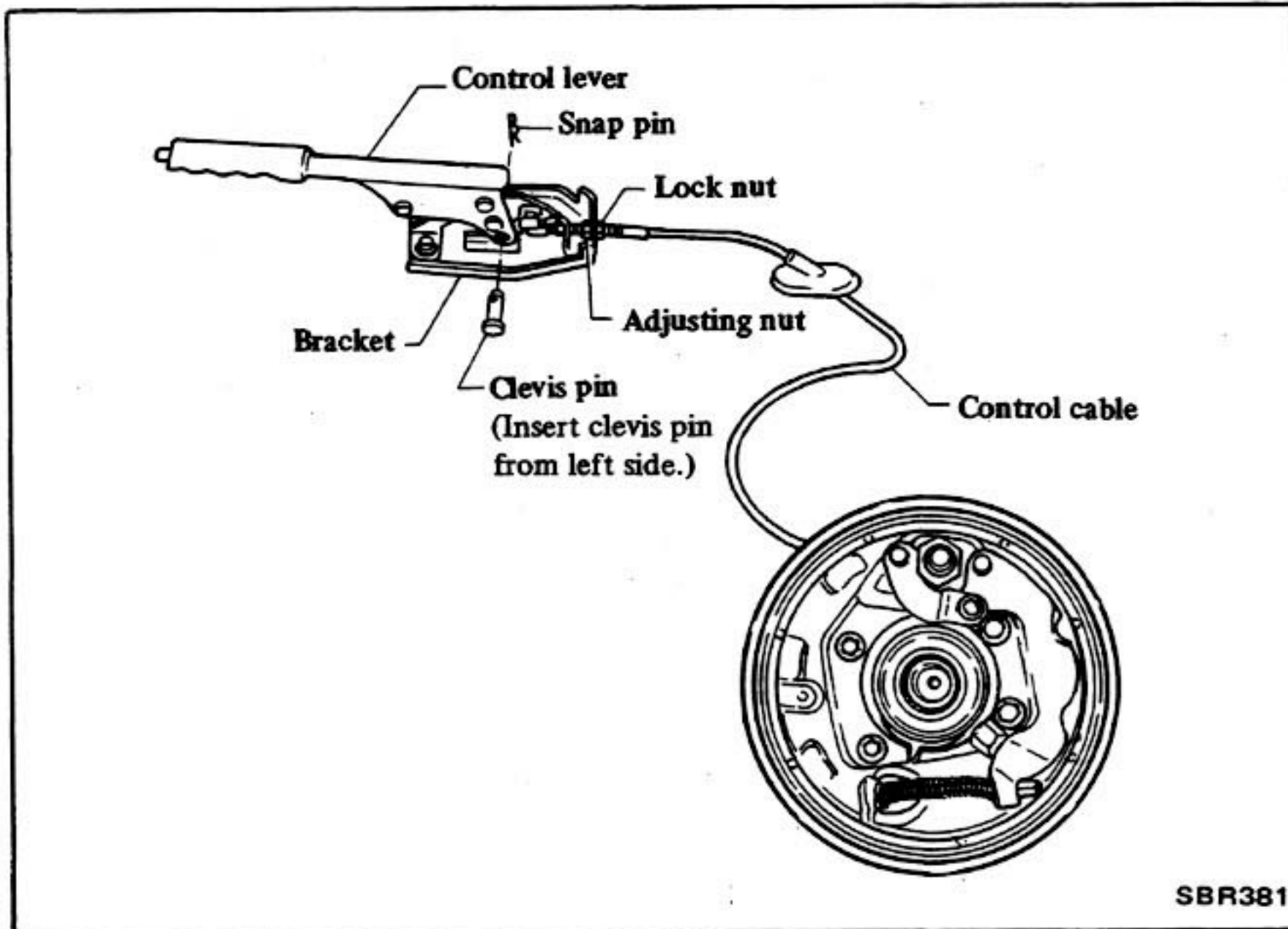
53.7 - 53.8 mm
(2.114 - 2.118 in)

- Check rotor shaft opening and serrates end of rotor shaft for wear. If necessary, replace.
- Check valve locations and copper washers for bending or deformity. If necessary, replace.
- Check operation of valves. If necessary, replace.



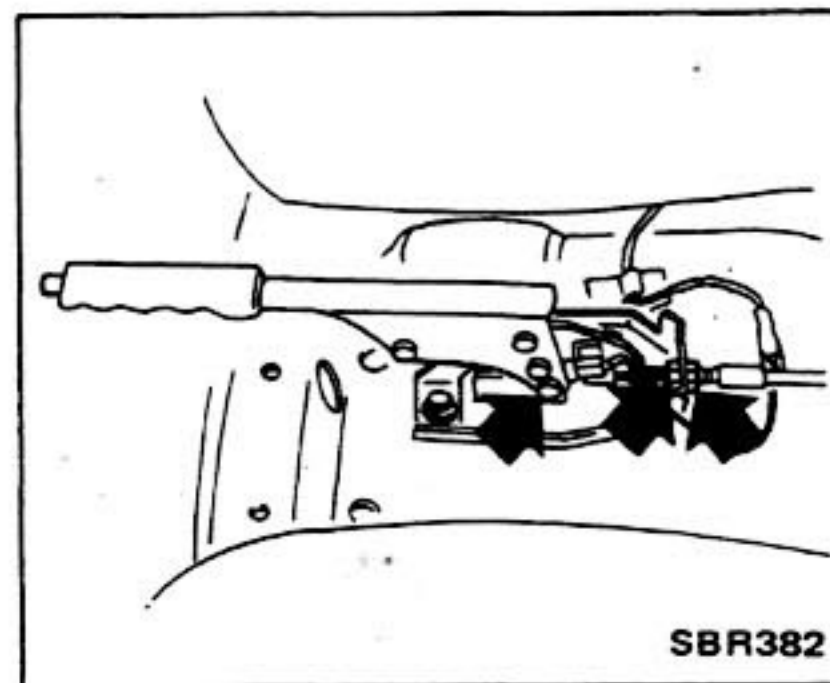
PARKING BRAKE

PARKING BRAKE CONTROL



REMOVAL

1. Disconnect harness connector.
2. Disconnect control cable from control lever and bracket.



3. Remove control lever and bracket.
4. Disconnect control cable from center brake and remove control cable. Refer to Center Brake.

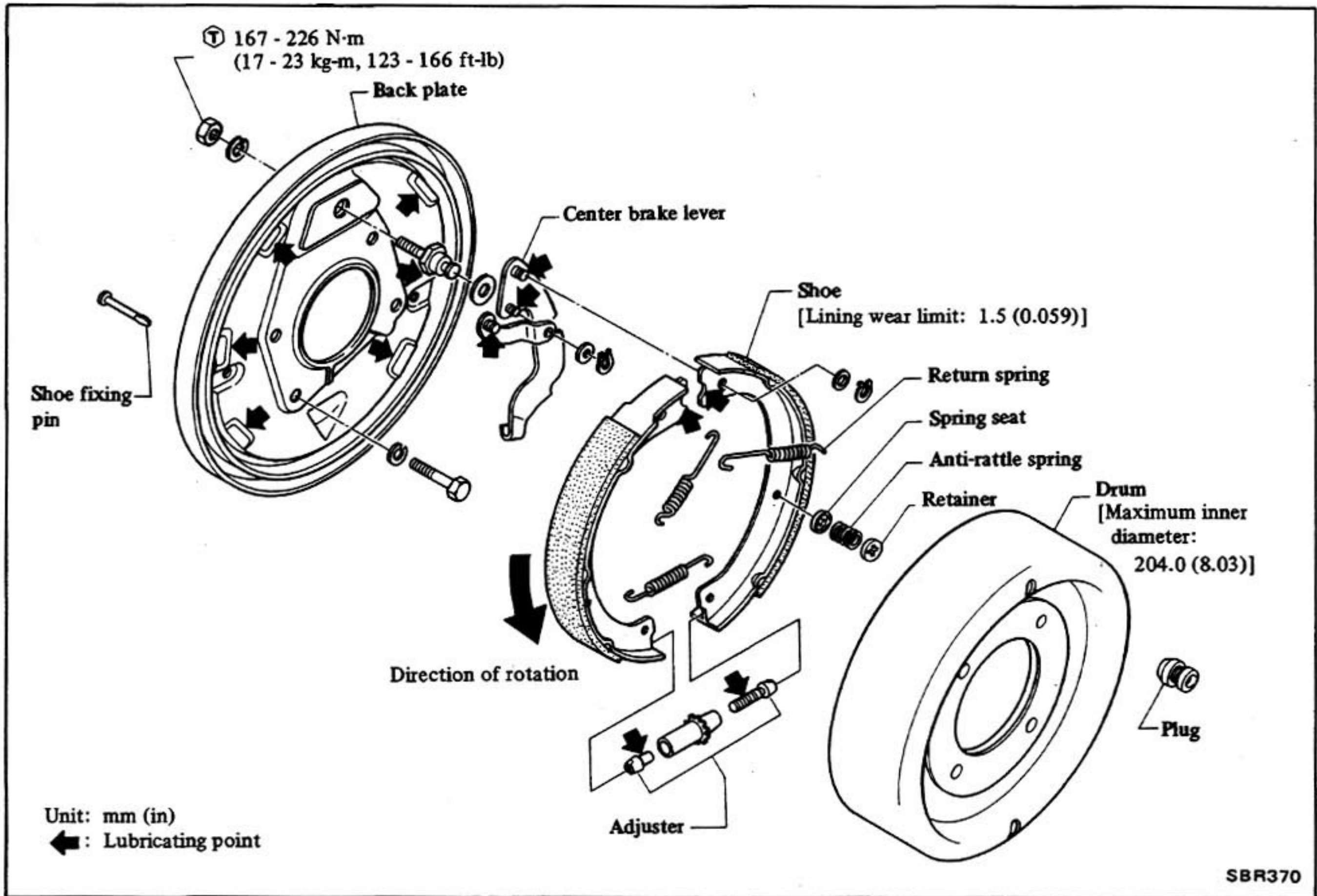
INSPECTION

1. Check control lever and ratchet for evidence of wear or other damage.
2. Check wires for evidence of discontinuity or other deterioration.
3. Check parts at each connection for deformation or damage.

INSTALLATION

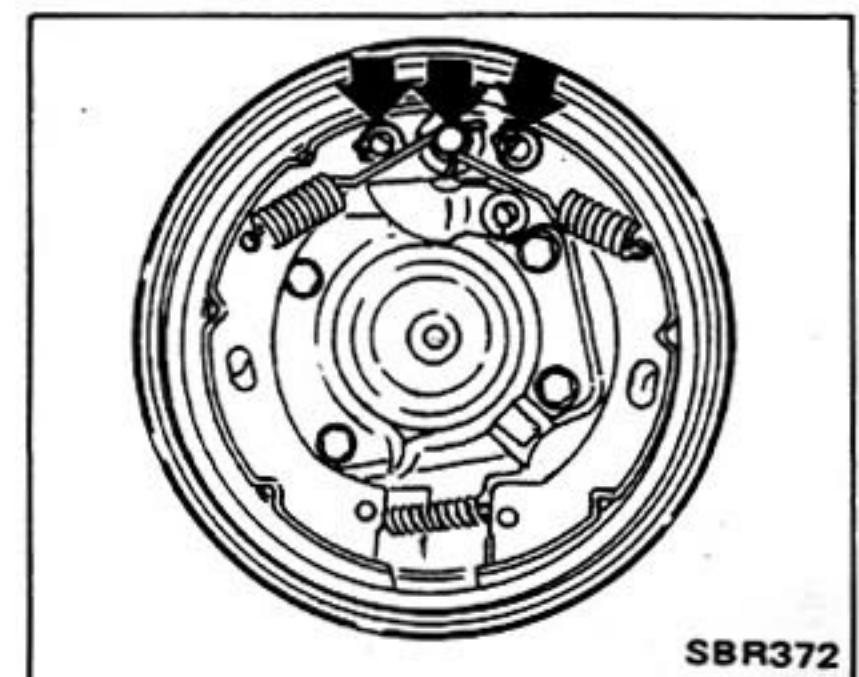
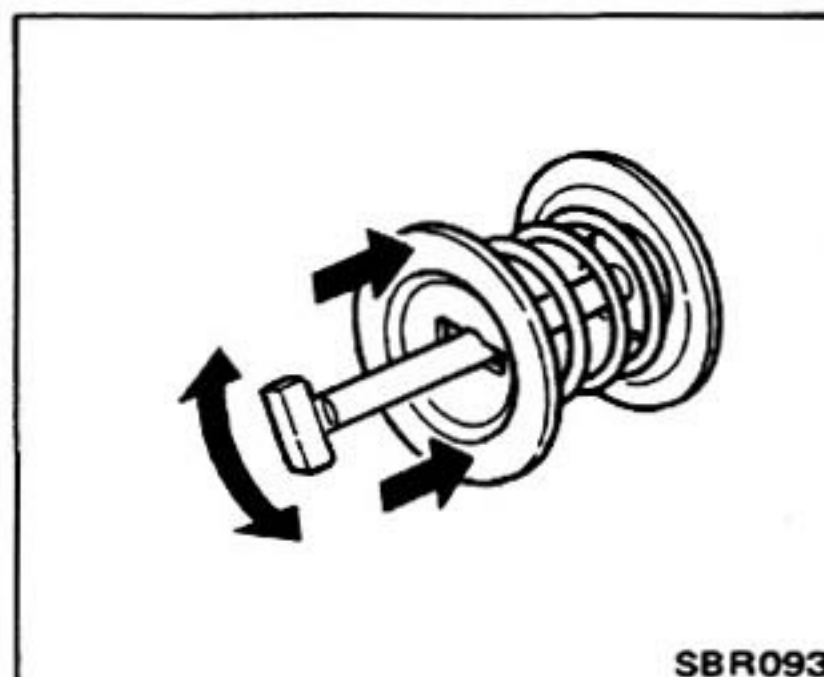
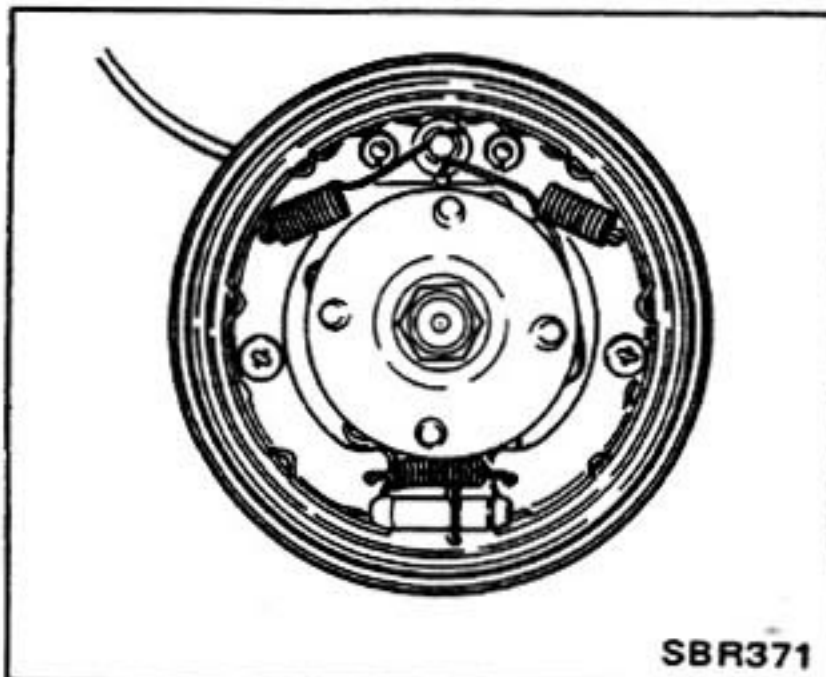
1. Apply a coating of grease to sliding contact surfaces.
2. Insert clevis pin from left side.
3. After installation is completed, adjust entire system. Refer to Section MA for adjustment.

CENTER BRAKE



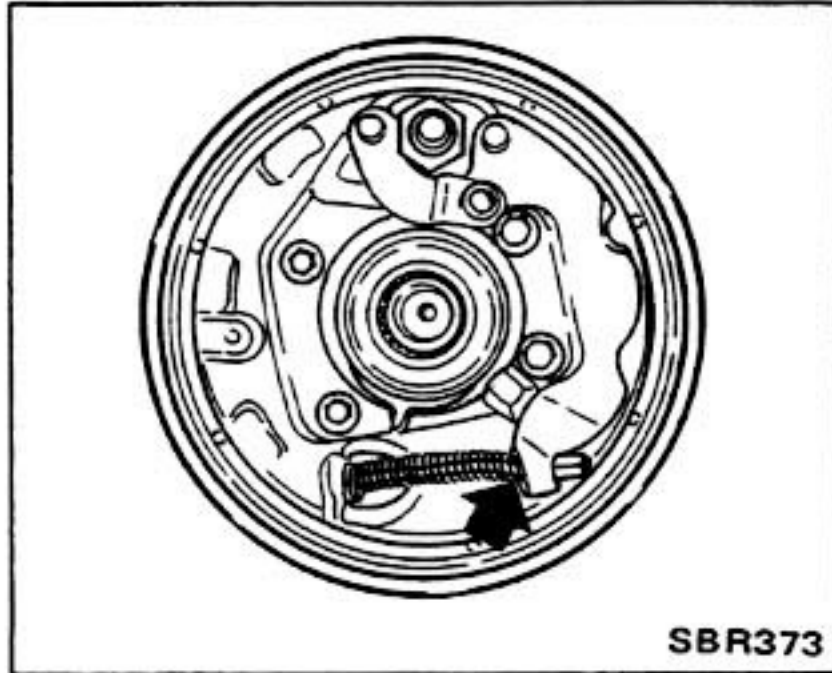
SHOE REPLACEMENT

1. Remove propeller shaft and drum.
2. Remove anti-rattle spring and pin.
3. Remove C-ring, return springs and adjuster.



Parking Brake – BRAKE SYSTEM

4. Remove shoe assemblies.
5. Disconnect hand brake cable from center brake lever and remove center brake lever.



6. Apply brake grease to the following points.
 - Contact surfaces between brake shoe and anchor pin.
 - Bolt of adjuster and nut sleeve.
 - Contact surfaces between brake back plate and brake shoe assembly (six places).

7. After installation is completed, adjust shoe-to-drum clearance. Refer to Section MA for adjustment.

BRAKE DRUM

Inspection

1. Check inner diameter of brake drum to make sure it is properly round and tapered. If it is not, repair or replace brake drum.

Standard diameter:

203.2 mm (8.00 in)

Maximum inner diameter:

204.0 mm (8.03 in)

Out-of-roundness (ellipticity):

Less than 0.02 mm (0.0008 in)

Radial run-out

(total indicator reading):

Less than 0.10 mm (0.0034 in)

Taper [measured at a point

35 mm (1.38 in) from inlet]:

Less than 0.02 mm (0.0008 in)

2. Contact surface with which linings come into contact should be finished to such an extent that it is ground by a No. 120 to 150 sandpaper.

3. Using a drum racer, finish brake drum by machining if it shows any sign of score marks, partial or stepped wear on its contact surface.

After brake drum is completely re-conditioned or replaced, check drum and shoes for proper contact pattern.

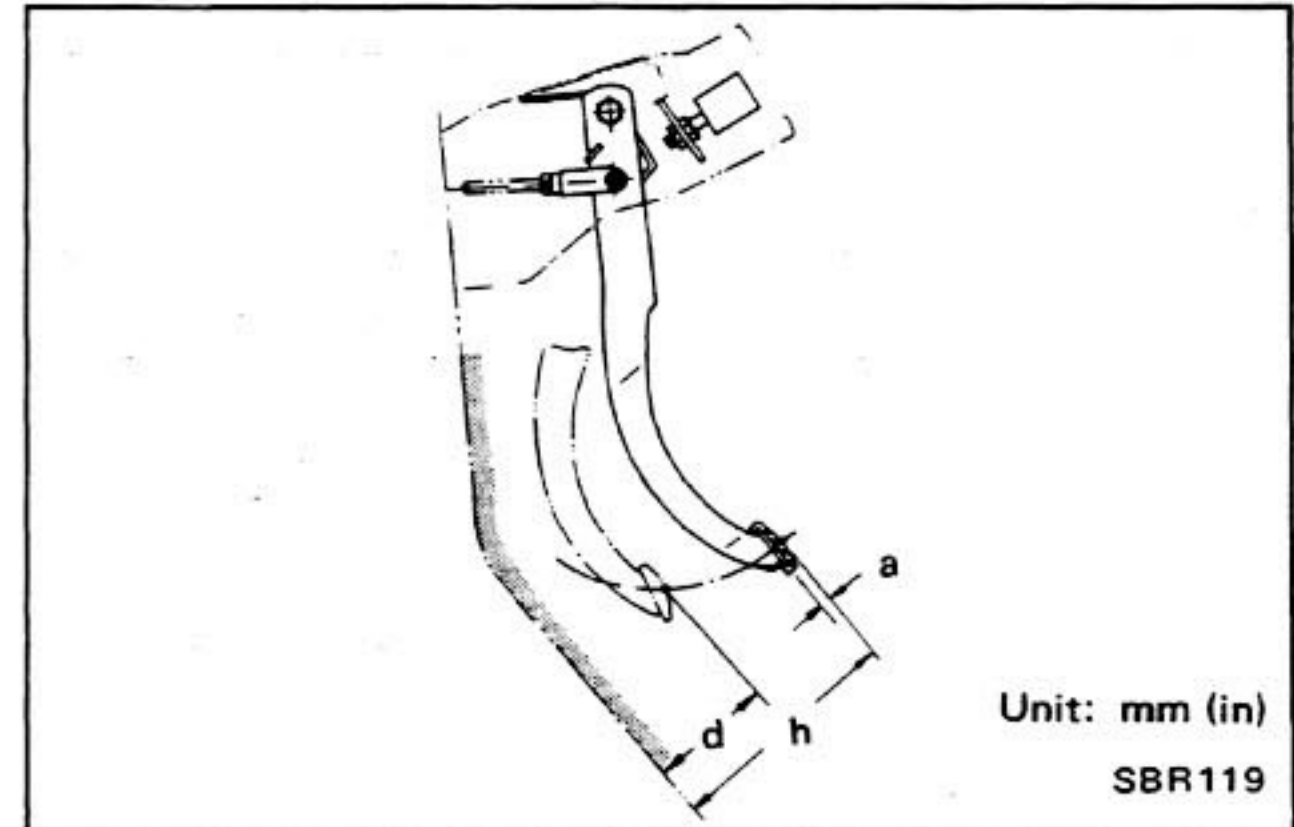
SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

Item		Model	
		160 series	61 series
Type	Front	CL36V	2L29
	Rear	DS27	
Pad or lining dimension Width x thickness x length mm (in)	Front	Pad: 52 x 11.5 x 130 (2.05 x 0.453 x 5.12)	Lining: 55 x 6.9 x 305 (2.17 x 0.272 x 12.01)
	Rear	Lining: 50 x 6 x 283 (1.97 x 0.24 x 11.14)	
Rotor outer diameter or drum inner diameter mm (in)	Front	Rotor: 295 (11.61)	Drum: 292.1 (11.50)
	Rear	Drum: 270 (10.63)	
Caliper or wheel cylinder inner diameter mm (in)	Front	Caliper: 68.1 (2.681)	Wheel cylinder: 25.4 (1)
	Rear	Wheel cylinder: 19.05 (3/4)	
Master cylinder inner diameter mm (in)		23.81 (15/16)	22.23 (7/8)
Brake booster	Type	Master-Vac (M90)	Mater-Vac (M75)
	Diaphragm diameter mm (in)	234 (9.21)	195 (7.68)
Vacuum pump (SD33)	Discharge amount mL (Imp fl oz)	30 (1.1)	
	No. of revolutions in use rpm	1,000 - 11,500	
Center brake drum inner diameter mm (in)		203.2 (8.00)	
Center brake lining dimension Width x thickness x length mm (in)		45 x 5.1 x 195 (1.77 x 0.201 x 7.68)	

INSPECTION AND ADJUSTMENT

BRAKE PEDAL



Model	160 series	61 series
Free height "h"	190 - 196 (7.48 - 7.72)	181 - 187 (7.13 - 7.36)
Free play at pedal pad "a"	1 - 5 (0.04 - 0.20)	
Depressed height "d" [Under force of 490 N (50 kg, 110 lb)]	65 (2.56)*1 80 (3.15)*2	80 (3.15)*2

*1: Front disc brake *2: Front drum brake

PARKING BRAKE

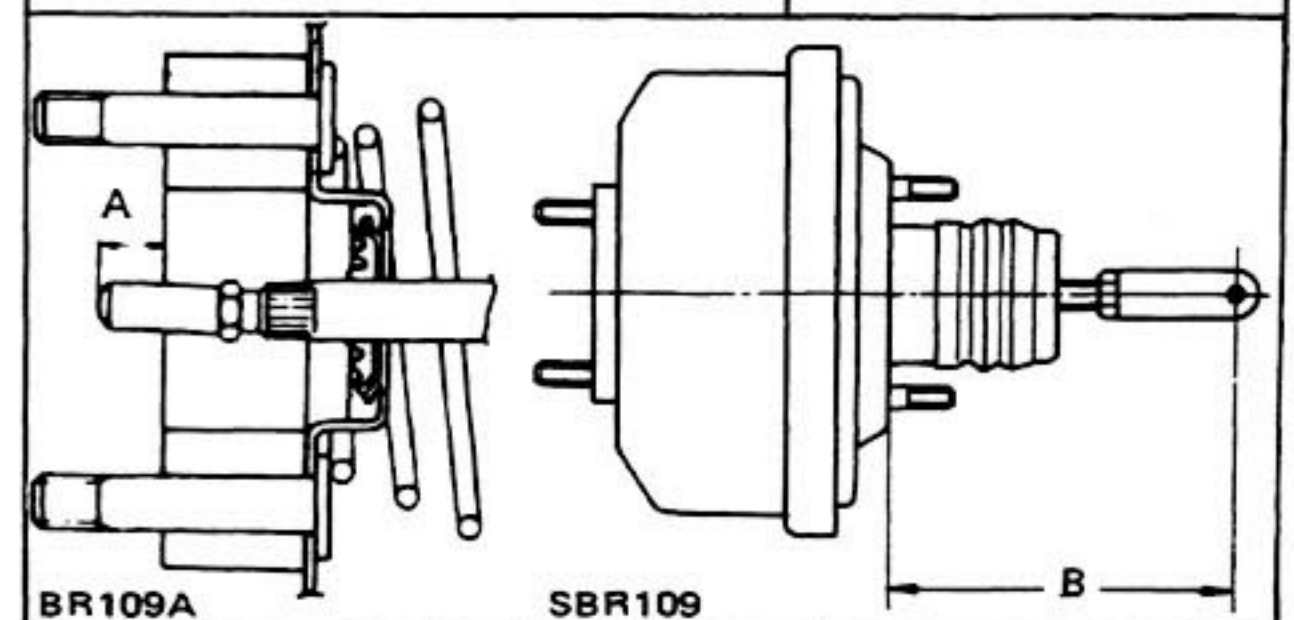
Pulling force	N (kg, lb)	196 (20, 44)
Number of notches		5 - 6

MASTER CYLINDER

Piston to cylinder clearance mm (in)	Less than 0.15 (0.0059)
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BRAKE BOOSTER

Maximum vacuum leakage (15 seconds after engine is stopped)	kPa (mbar, mmHg, inHg)	3.3 (33, 25, 0.98)
Output rod length "A"	mm (in)	9.75 - 10.00 (0.3839 - 0.3937)
Input rod length "B"	mm (in)	128 (5.04)



CHECK VALVE

Maximum vacuum leakage [15 seconds after 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg) pressure is applied] kPa (mbar, mmHg, inHg)	1.3 (13, 10, 0.39)
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FRONT DISC BRAKE

Unit: mm (in)

Pad wear limit	Minimum thickness	2 (0.08)
Rotor repair limit	Maximum runout	0.07 (0.0028)
	Maximum parallelism	0.03 (0.0012)
	Minimum thickness	18 (0.71)

FRONT DRUM BRAKE

Unit: mm (in)

Lining wear limit (Minimum thickness)	Up to rivet head
Drum wear limit Maximum inner diameter	293.0 (11.54)
Radial runout	Less than 0.15 (0.0059)
Out-of-roundness	Less than 0.05 (0.0020)
Wheel cylinder repair limit: Piston-to-cylinder clearance	Less than 0.15 (0.0059)

REAR BRAKE

Unit: mm (in)

Lining wear limit (Minimum thickness)	2 (0.08)
Drum wear limit Maximum inner diameter	271.5 (10.69)
Radial runout	Less than 0.12 (0.0047)
Out-of-roundness	Less than 0.05 (0.0020)
Wheel cylinder repair limit: Piston-to-cylinder clearance	Less than 0.15 (0.0059)

CENTER BRAKE

Unit: mm (in)

Lining wear limit (Minimum thickness)	1.5 (0.059)
Drum wear limit Maximum inner diameter	204.0 (8.03)
Radial runout	Less than 0.10 (0.0039)
Out-of-roundness	Less than 0.02 (0.0008)
Taper [Measured at a point 35 mm (1.38 in) from inlet]	Less than 0.02 (0.0008)

TIGHTENING TORQUE

Item \ Unit	N-m	kg-m	ft-lb
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Wheel cylinder air bleeder	7 - 9	0.7 - 0.9	5.1 - 6.5
Stop lamp switch lock nut	12 - 15	1.2 - 1.5	9 - 11
Input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Fulcrum pin fixing bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Brake booster pedal bracket	8 - 11	0.8 - 1.1	5.8 - 8.0
Pedal bracket attaching bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Master cylinder to brake booster	8 - 11	0.8 - 1.1	5.8 - 8.0
Master cylinder check valve plug	44 - 54	4.5 - 5.5	33 - 40
N.L.S.V. mounting bolt	8 - 11	0.8 - 1.1	5.8 - 8.0
Vacuum pump to alternator	6 - 7	0.6 - 0.7	4.3 - 5.1
Front disc brake back plate	30 - 40	3.1 - 4.1	22 - 30
Front disc caliper fixing bolt	108 - 147	11 - 15	80 - 108
Pin bolt	52 - 73	5.3 - 7.4	38 - 54
Front disc rotor fixing bolt	50 - 68	5.1 - 6.9	37 - 50
Front drum brake back plate	30 - 40	3.1 - 4.1	22 - 30
Front wheel cylinder to back plate	Large	65 - 88	6.6 - 9.0
	Small	5.3 - 7.3	0.54 - 0.74
Rear drum brake back plate	53 - 63	5.4 - 6.4	39 - 46
Rear wheel cylinder	5.3 - 7.3	0.54 - 0.74	3.9 - 5.4
Rear anchor bolt	50 - 68	5.1 - 6.9	37 - 50

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.</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.</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>

Trouble Diagnoses and Corrections – BRAKE SYSTEM

Condition	Probable cause	Corrective action
Unbalanced brakes	<p>Improper tire inflation.</p> <p>Improper adjustment of shoe-to-drum clearance.</p> <p>Grease, oil, mud or water on linings or pads.</p> <p>Mud in brake drum.</p> <p>Deterioration of linings or pads.</p> <p>Excessive wear of linings or pads.</p> <p>Wheel cylinder in poor condition.</p> <p>Poor sliding condition of brake shoe.</p> <p>Looseness of cylinder body or back plate securing bolts/nuts.</p> <p>Scored or out-of-round drums.</p> <p>Sticking wheel cylinder cups.</p> <p>Deformation of back plate.</p> <p>Incorrect adjustment of wheel bearings.</p> <p>Incorrect adjustment of wheel alignment.</p> <p>Looseness of leaf spring securing U-bolts.</p>	<p>Inflate to correct pressure.</p> <p>Readjust.</p> <p>Clean brake mechanism and check for cause of problem. Replace linings or pads.</p> <p>Clean.</p> <p>Replace.</p> <p>Replace.</p> <p>Repair or replace.</p> <p>Adjust.</p> <p>Fasten or replace.</p> <p>Recondition or replace brake drum as required. Check for improper lining contact with drum and grind lining if necessary.</p> <p>Recondition or replace cylinder.</p> <p>Replace.</p> <p>Adjust or replace.</p> <p>Adjust.</p> <p>Tighten or replace.</p>
Brakes fade	<p>Brake fluid has too low boiling point.</p> <p>Use of improper linings or brake linings are contaminated.</p> <p>Brake drums are out-of-round.</p> <p>Hydraulic connections, master cylinder and wheel cylinders are corroded or damaged.</p> <p>Bleed screw is open.</p>	<p>Drain and fill system with approved fluid.</p> <p>Replace linings.</p> <p>Repair or replace as necessary.</p> <p>Repair as necessary.</p> <p>Close screw and bleed system.</p>
Brake chatters	<p>Groove or out-of-round brake drum or rotor.</p> <p>Loose or bent support plate.</p> <p>Distorted brake shoes or pads.</p> <p>Grease or brake fluid on linings.</p>	<p>Grind or replace as required.</p> <p>Tighten support plate bolts to specified torque, or replace plate.</p> <p>Replace as necessary.</p> <p>Replace linings.</p>
Brake squeals	<p>Dirty or scored brake drums.</p> <p>Distorted brake shoes or bent support plate.</p> <p>Weak or broken brake shoe retaining spring or return spring.</p> <p>Glazed or contaminated brake lining.</p>	<p>Blow out assembly with compressed air or refinish drum.</p> <p>Replace faulty unit.</p> <p>Replace if faulty.</p> <p>Cam ground lining to eliminate glaze. If it does not, replace linings.</p>
Brakes drag	<p>Pedal linkage is binding or output rod adjustment is too long.</p>	<p>Lubricate linkage, check pedal return spring for condition and adjust output rod as necessary.</p>

BRAKE SYSTEM – Special Service Tool

Condition	Probable cause	Corrective action
(Brakes drag)	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. Parking brake will not return. Clogged master cylinder return port. Clogged brake lines. Incorrect adjustment of wheel bearings. Improper shoe-to-drum clearance. Weak shoe return springs. No free travel in brake shoe return.	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. Check and clean. Adjust or repair. Adjust. Replace. Adjust pedal height.
Pedal pulsates	Out-of-round or off-center drum. On disc brakes, lateral runout of brake rotor is excessive. Excessive variation in thickness of brake rotor surfaces.	Turn drum or replace as necessary. Check with dial indicator, turning disc by hand. If runout exceeds specifications, repair or replace disc. Measure around disc face with micrometer. Replace disc as required.

SPECIAL SERVICE TOOL

Tool number	Tool name
GG94310000	Flare nut torque wrench 