

# BRAKE SYSTEM

	Page
PRECAUTIONS .....	15-2
TROUBLESHOOTING .....	15-2
SPECIAL TOOLS AND TEST EQUIPMENT .....	15-5
CHECKS AND ADJUSTMENTS .....	15-6
BLEEDING OF BRAKE SYSTEM .....	15-8
MASTER CYLINDER .....	15-9
BRAKE BOOSTER .....	15-12
FRONT BRAKE .....	15-17
S-16 Type Disc Brake (1/2 ton, 3/4 ton) .....	15-17
K Type Disc Brake (C&C) .....	15-21
S-12+8 Type Disc Brake (4 x 4) .....	15-25
REAR BRAKE .....	15-29
Leading-Trailing Type (1/2 ton, 3/4 ton) .....	15-29
Duo-Servo Type (C&C) .....	15-34
Duo-Servo Type (4 x 4) .....	15-40
BRAKE PEDAL .....	15-46
PARKING BRAKE .....	15-47
Parking Brake Lever and Front Cable .....	15-47
Rear Cable (4 x 2) .....	15-49
Rear Cable (4 x 4) .....	15-50
LSPV .....	15-52
BRAKE HOSES AND TUBES .....	15-57

## PRECAUTIONS

1. Care must be taken to replace each part properly as they could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.
2. It is very important to keep parts and area clean when repairing the brake system.

## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Low or spongy pedal	Linings worn	Replace brake shoes or pads	15-17, 29
	Leak in brake system	Repair leak	
	Master cylinder faulty	Repair or replace master cylinder	15-9
	Air in brake system	Bleed brake system	15-8
	Wheel cylinder faulty	Repair wheel cylinder	15-29
	Piston seals worn or damaged	Repair brake calipers	15-17
	Rear brake automatic adjuster faulty	Repair or replace adjuster	15-29
Brakes drag	Parking brake out of adjustment	Adjust parking brake	15-7
	Binding parking brake wire	Repair as necessary	
	Booster push rod out of adjustment	Adjust push rod	15-15
	Tension spring faulty	Replace spring	15-29
	Brake line restricted	Repair as necessary	15-57
	Lining cracked or distorted	Replace brake shoe	15-29
	Wheel cylinder or caliper piston sticking	Repair as necessary	15-17, 29
	Automatic adjuster broken	Replace adjuster	15-29
	Master cylinder faulty	Repair or replace master cylinder	15-9
Brakes pull	Tires improperly inflated	Inflate tires to proper pressure	
	Oil or grease on linings	Check for cause. Replace lining	15-17, 29
	Brake shoes distorted, linings worn or glazed	Replace brake shoes	15-17, 29
	Drum or disc out of round	Replace drum or disc	15-17, 29
	Tension spring faulty	Replace spring	15-29
	Wheel cylinder faulty	Repair wheel cylinder	15-29
	Piston frozen in caliper	Repair caliper	15-17
	Disc brake pad sticking	Replace pads	15-17
Hard pedal but brakes inefficient	Oil or grease on linings	Check for cause. Replace lining	15-17, 29
	Brake shoes distorted, linings worn or glazed, drums worn	Replace brake shoes	15-17, 29
	Disc brake pads worn	Replace pads	15-17
	Piston frozen in caliper	Repair caliper	15-17
	Brake booster faulty	Repair booster	15-12
	Brake line restricted	Repair as necessary	15-57

## TROUBLESHOOTING (CONT'D)

Problem	Possible cause	Remedy	Page
Snapping or clicking noise when brakes are applied	On drum brakes in 3 places-brake shoes binding at backing plate ledges	Lubricate	15-31
	On drum brakes in 3 places-backing plate ledges worn	Replace and lubricate ledges	15-31
	On drum brakes—loose or missing hold down spring	Replace	15-29
	On drum brakes—loose set bolt at backing plate	Tighten	
	On disc brakes—loose or missing anti-rattle spring	Replace	15-17
Scraping or grinding noise when brakes are applied	Worn brake linings	Replace. Refinish drums or rotors if heavily scored	15-19
	Caliper to wheel or rotor interference	Replace as required	15-17
	Dust cover to rotor or drum interference	Correct or replace	15-17, 29
	Other brake system components: Warped or bent brake backing plate or splash shield, cracked drums or rotors	Inspect or service	
	Tires rubbing against chassis and body	Inspect or service	
Squeaking, squealing, groaning or chattering noise when brakes are applied  Note: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is normal and is aggravated by severe environmental conditions such as cold, heat, wetness, snow, salt, mud, etc. This occasional squeal is not a functional problem and does not indicate any loss of brake effectiveness	Brake drums and linings rotors and pads worn or scored	Inspect, service or replace	15-17, 29
	On disc brakes—missing or damaged brake pad anti-squeal shim	Replace	15-17
	On disc brakes—burred or rusted calipers	Clean or deburr	
	Dirty, greased, contaminated or glazed linings	Clean or replace	15-29
	Improper lining parts	Inspect for correct usage replace	15-29
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	15-6, 12
	On drum brakes—weak damaged or incorrect shoe hold down springs, loose or damaged shoe hold down spring pins, springs and grooved backing plate ledges	Inspect, service or replace	15-29

## TROUBLESHOOTING (CONT'D)

Problem	Possible cause	Remedy	Page
Squealing and squeaking noise when brakes are not applied	Bent or warped backing plate causing interference with drum	Service or replace	
	Improper machining of drum causing interference with backing plate or shoe	Replace drum	15-29
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	15-6, 12
	Poor return of brake booster or master cylinder or wheel cylinder	Inspect, service or replace	15-9, 12, 29
	On disc brakes—rusted, stuck	Inspect, lubricate as necessary	15-17
	Other brake system components:	Inspect, service, replace as required	15-29
	Loose or extra parts in brakes		
	Rear drum adjustment too tight causing lining to glaze		
	Worn, damaged or insufficiently lubricated wheel bearings		
	On drum brakes—weak, damaged or incorrect shoe hold down springs		15-29
	On drum brakes—grooved backing plate ledges		15-29
	Improper positioning of shoe in caliper		15-17
	Outside diameter of rotor rubbing caliper housing		
	Housing installation of disc brake pad support plate		15-17
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove stones, etc.	
	Loose wheel nuts	Tighten to correct torque. Replace if stud holes are elongated	
	On disc brakes—loose or missing anti-rattle spring or pad support plate or crimping on outer shoe	Inspect, service or replace	15-17
	On disc brakes—failure of shim	Inspect, replace if necessary	15-17
	On disc brakes—wear on side bushing	Inspect, replace if necessary	
	On disc brakes—loose installation bolt	Inspect, tighten if necessary	
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	15-6, 12
	On disc brakes—poor return of piston	Inspect, service or replace	15-17
	Drum brakes—loose or extra parts	Inspect, remove or service	
	Worn, damaged or dry wheel bearings	Inspect, lubricate or replace	

## SPECIAL TOOLS AND TEST EQUIPMENT

Tool	SST No.	Use
Flare nut wrench	09751-36011 or Commercial	To disconnect brake tubes
Brake booster tester	Commercial	To test operation of booster
Booster overhaul tool	09738-00010	To separate front and rear shells
Push rod gauge	09737-00010	To adjust length of push rod
Brake adjusting tool	09704-10010 or Commercial	To adjust brake
Brake shoe return spring tool	09703-30010 or Commercial	To replace return spring
Brake shoe return spring remove	09717-20010	To remove return spring
Brake shoe return spring replacer	09718-20010	To install return spring
Shoe hold down spring tool	09718-00010	To replace shoe hold down spring

## CHECKS AND ADJUSTMENTS

### CHECK AND ADJUSTMENT OF BRAKE PEDAL

#### 1. CHECK THAT PEDAL HEIGHT IS CORRECT

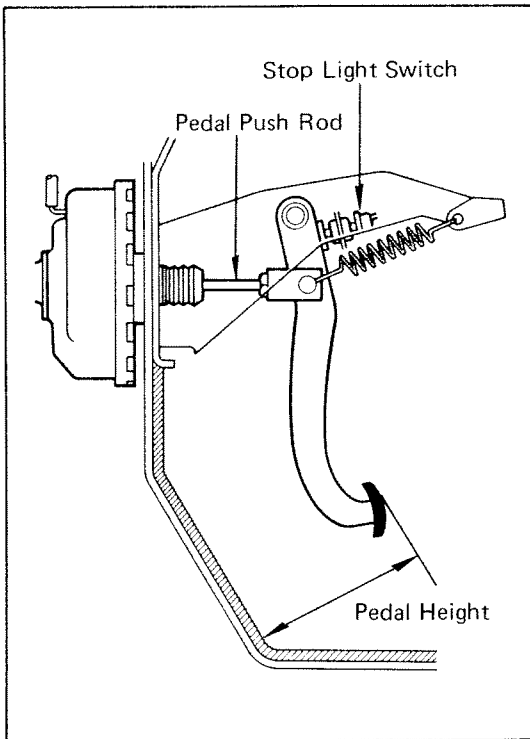
Pedal height: 157 – 167 mm (6.18 – 6.57 in.)

If incorrect, adjust the pedal height.

#### 2. IF NECESSARY, ADJUST PEDAL HEIGHT

- Sufficiently loosen the stop light switch.
- Adjust the pedal height by turning the pedal push rod.
- Return the stop light switch until its body lightly contacts the pedal stopper.

NOTE: After adjusting the pedal height, check and adjust the pedal freeplay.



#### 3. CHECK AND ADJUST PEDAL FREEPLAY

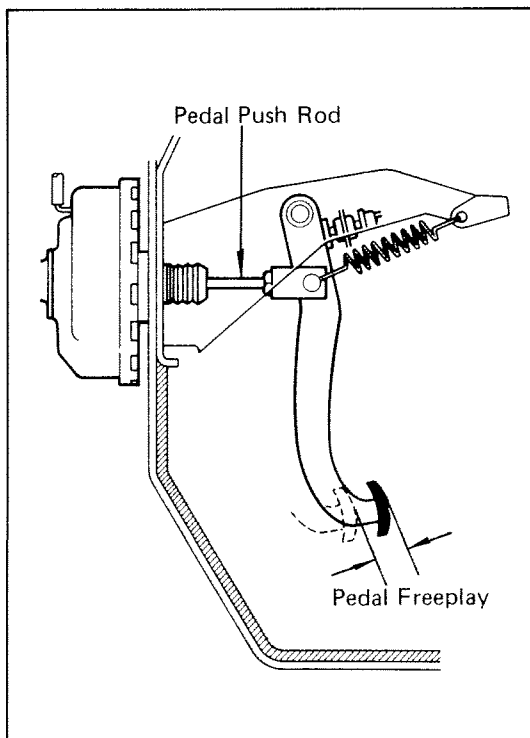
- Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
- Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

Pedal freeplay: 3 – 6 mm (0.12 – 0.24 in.)

NOTE: The pedal freeplay is the amount of the stroke until the booster air valve is moved by the pedal push rod.

- If incorrect, adjust the pedal freeplay by turning the pedal push rod.
- Start the engine and confirm that the pedal freeplay exists.

NOTE: After adjusting the pedal freeplay, check the pedal height.



#### 4. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT

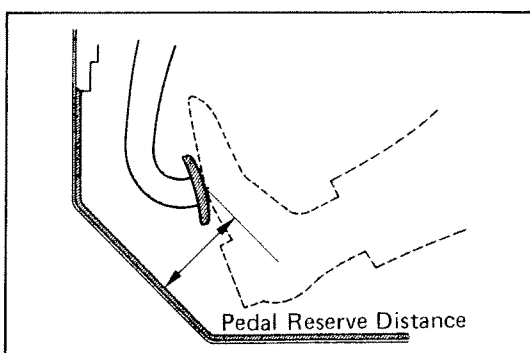
Depress the pedal and measure the pedal reserve distance, as shown.

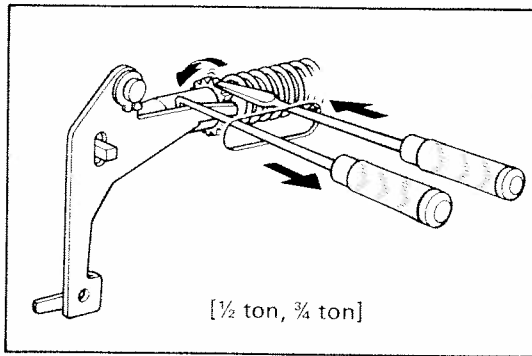
Pedal reserve distance from floor panel at 50 kg (110 lb):

4x2 More than 76.2 mm (3.000 in.)

4x4 More than 85.0 mm (3.346 in.)

If incorrect, troubleshoot the brake system.





## ADJUSTMENT OF REAR BRAKE

1. JACK UP VEHICLE AND RELEASE PARKING BRAKE
2. REMOVE SHOE ADJUSTING HOLE PLUG FROM REAR BRAKE BACKING PLATE
3. EXPAND SHOE UNTIL WHEEL IS COMPLETELY LOCKED

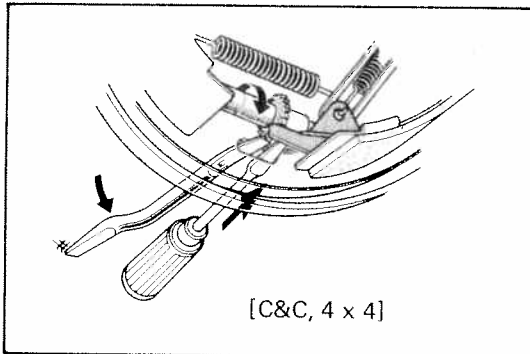
Using a brake adjusting tool, turn the adjuster.

4. LOOSEN ADJUSTER UNTIL WHEEL TURNS FREELY

While detaching the adjuster lever from the adjuster, loosen the adjuster until the wheel turns freely.

Standard number of notches to be backed off:  
10 – 12 notches

5. INSTALL SHOE ADJUSTING HOLE PLUG



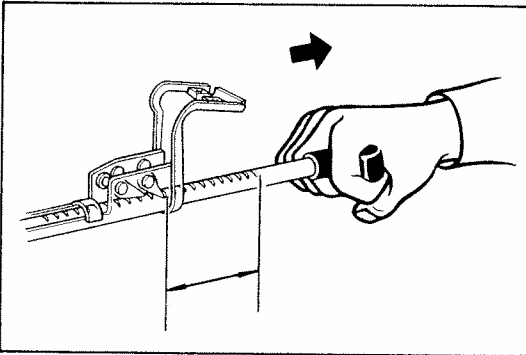
## CHECK AND ADJUSTMENT OF PARKING BRAKE

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way, and count the notches of lever travel.

Lever travel at 20 kg (44 lb): 7 – 15 clicks

If incorrect, adjust the parking brake.

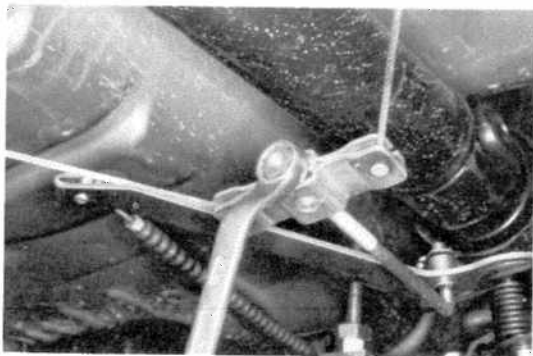


2. IF NECESSARY, ADJUST PARKING BRAKE

NOTE: Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

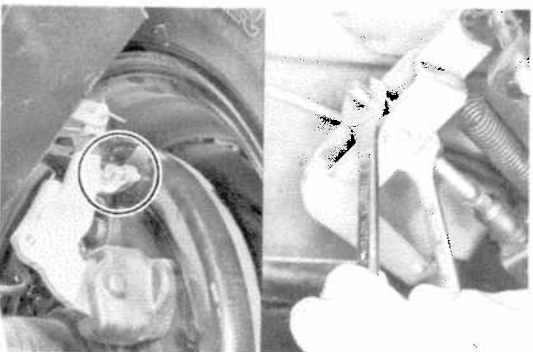
(4 x 2)

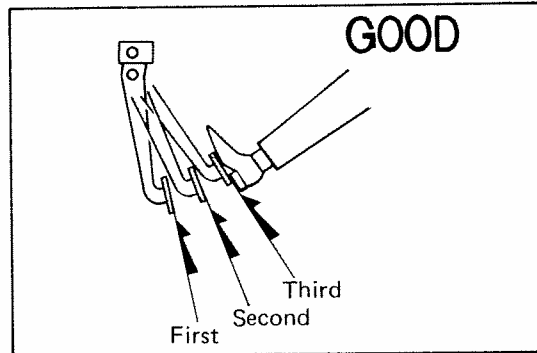
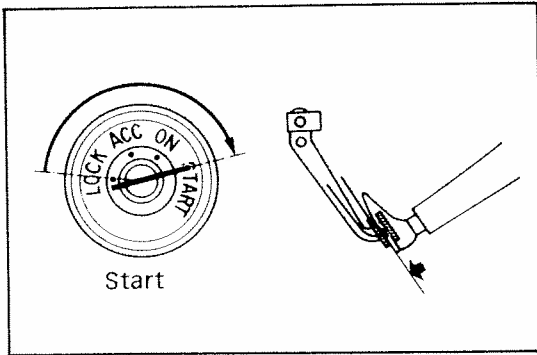
- (a) Tighten the adjusting nut until the travel is correct.
- (b) After adjusting the parking brake, confirm that the rear brakes are not dragging.



(4 x 4)

- (a) Tighten the bellcrank stopper screw until the play of the rear brake links become zero, and then loosen the screw one turn. Tighten the screw lock nut.
- (b) Tighten one of the adjusting nuts of the intermediate lever while loosening another one until the travel is correct. Tighten the two adjusting nuts.
- (c) After adjusting the parking brake, confirm that the bellcrank stopper screw comes in contact with the backing plate.





## OPERATIONAL TEST OF BRAKE BOOSTER

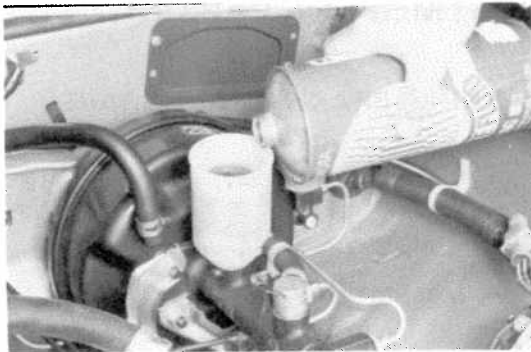
NOTE: If available, use a brake booster tester to check the booster operating condition.

### 1. OPERATING CHECK

- Depress the brake pedal several times with the engine off, and check that there is no change in the pedal reserve distance.
- Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.

### 2. AIR TIGHTNESS CHECK

- Start the engine and stop it after one or two minutes. Depress the brake pedal several times slowly. If the pedal goes further down the first time, but gradually rises after the second or third times, the booster is air tight.
- Depress the brake pedal while the engine is running, and stop it with the pedal depressed. If there is no change in pedal reserve travel after holding the pedal for thirty seconds, the booster is air tight.



## BLEEDING OF BRAKE SYSTEM

NOTE: If any work is done on the brake system or if air is suspected in the brake lines, bleed the system of air.

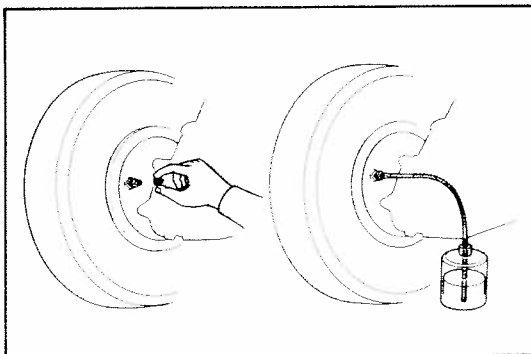
CAUTION: Do not let brake fluid remain on a painted surface. Wash it off immediately.

### 1. FILL BRAKE RESERVOIRS WITH BRAKE FLUID

Check the reservoir after bleeding each wheel. Add fluid, if necessary.

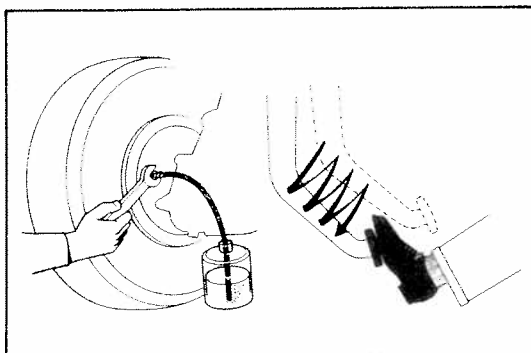
### 2. CONNECT VINYL TUBE TO WHEEL CYLINDER BLEEDER PLUG

Insert other end of the tube in a half-filled container of brake fluid.



### 3. BLEED BRAKE LINE

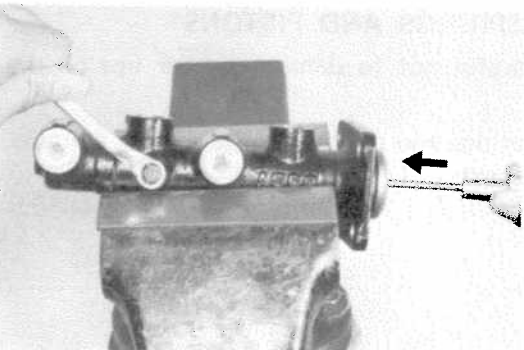
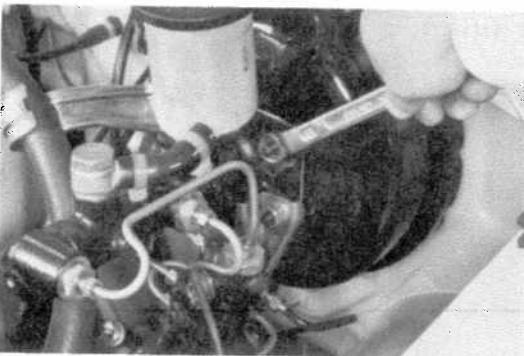
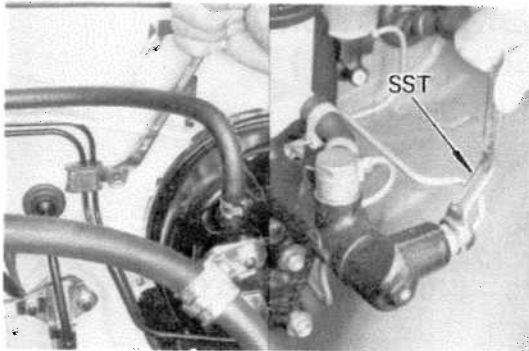
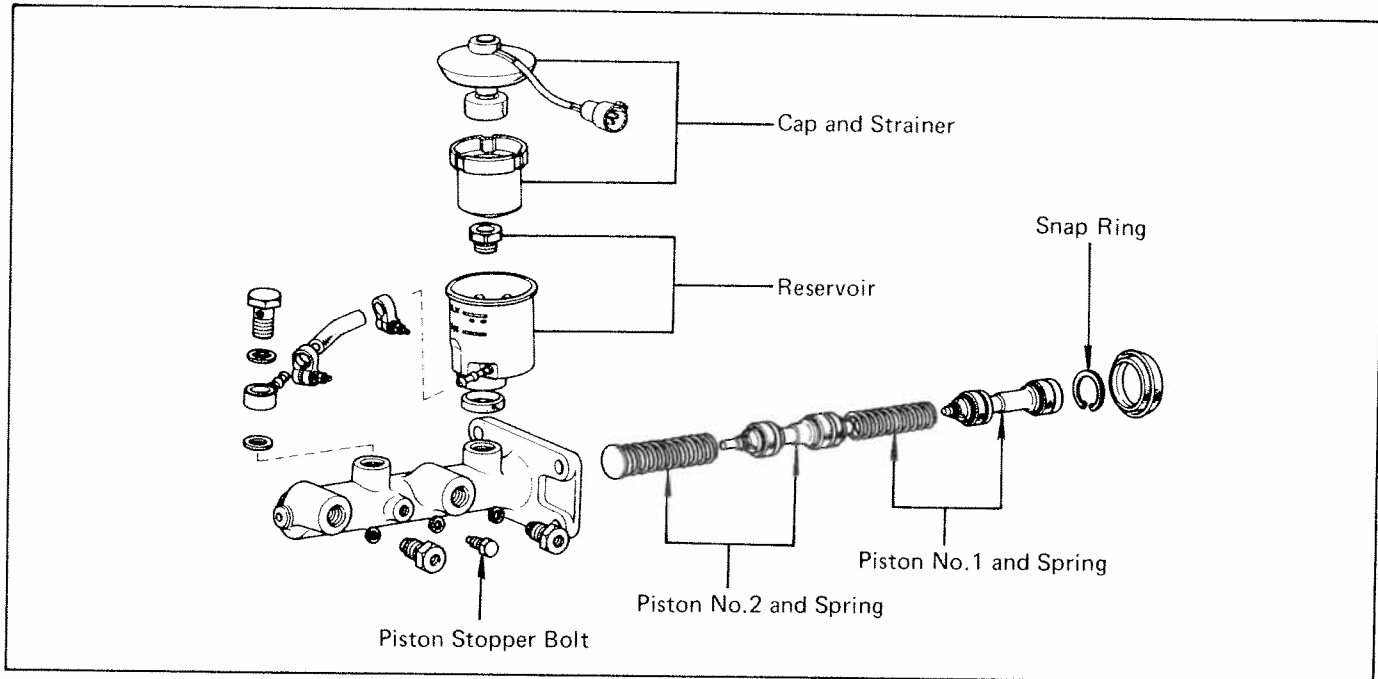
- Slowly pump the brake pedal several times.
- While having an assistant press on the pedal, loosen the bleeder plug until fluid starts to run out. Then close the bleeder plug.
- Repeat this procedure until there are no more air bubbles in the fluid.



### 4. REPEAT PROCEDURE FOR EACH WHEEL



## MASTER CYLINDER



### REMOVAL OF MASTER CYLINDER

**CAUTION:** Do not let brake fluid remain on a painted surface. Wash it off immediately.

#### 1. REMOVE BRAKE TUBE CLAMP BOLT

#### 2. DISCONNECT TWO BRAKE TUBES

Using a flare nut wrench\*, disconnect two brake tubes from the master cylinder.

\*SST 09751-36011 or Commercial wrench

#### 3. REMOVE MASTER CYLINDER

(a) Remove four nuts.

(b) Remove the master cylinder and gasket from the brake booster.

### DISASSEMBLY OF MASTER CLYINDER

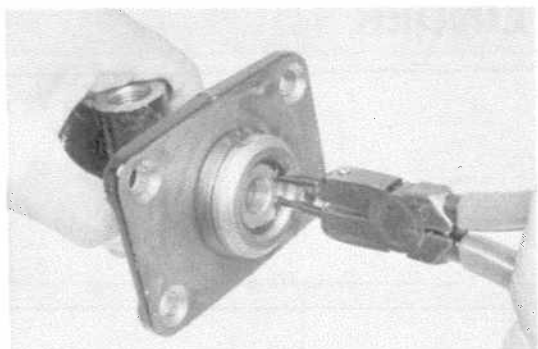
#### 1. REMOVE HOSE AND RESERVOIR

(a) Remove the union bolt from the master cylinder.

(b) Remove the reservoir with hose from the master cylinder.

#### 2. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way, and remove the piston stopper bolt.

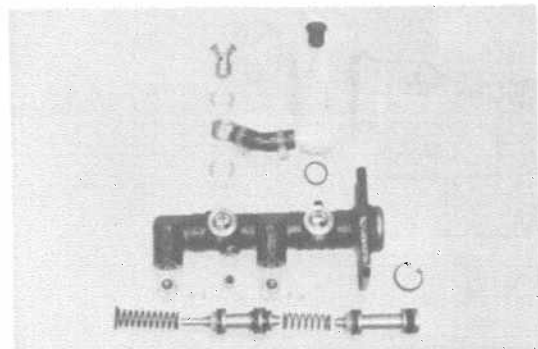


### 3. REMOVE TWO PISTONS AND SPRINGS

- (a) Using snap ring pliers, remove the snap ring.
- (b) Remove two pistons and springs from the master cylinder.

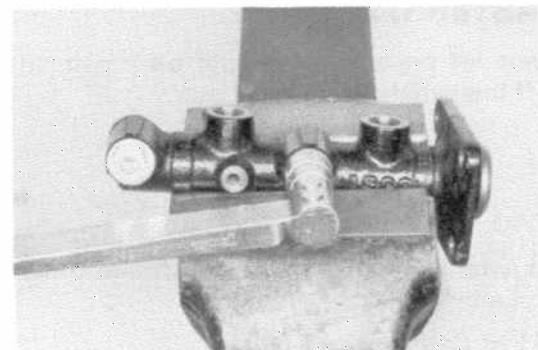
NOTE: It may be necessary to inject compressed air in the outlet plug to force out the No.2 piston.

### 4. REMOVE TWO OUTLET PLUGS



## INSPECTION OF MASTER CYLINDER COMPONENTS

1. CLEAN ALL PARTS WITH BRAKE FLUID
2. INSPECT ALL PARTS FOR WEAR OR DAMAGE  
Replace worn or damaged parts as necessary.



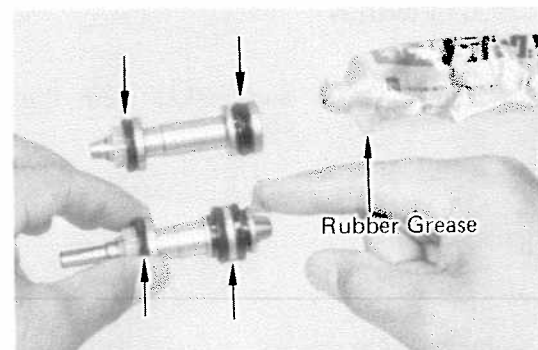
## ASSEMBLY OF MASTER CYLINDER (See illustration on page 15-9 )

### 1. INSTALL TWO OUTLET PLUGS

Torque the outlet plugs.

Torque:

16 mm $\phi$	350 — 550 kg-cm (26 — 39 ft-lb)
18 mm $\phi$	RN C&C rear side
	530 — 840 kg-cm (39 — 60 ft-lb)

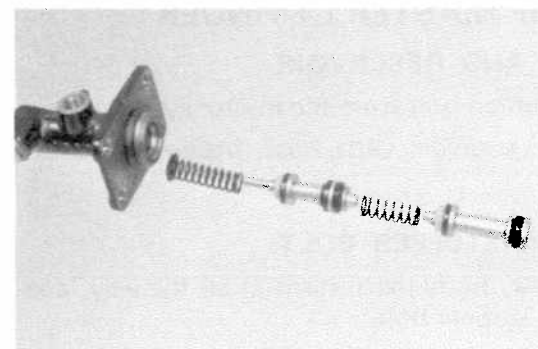


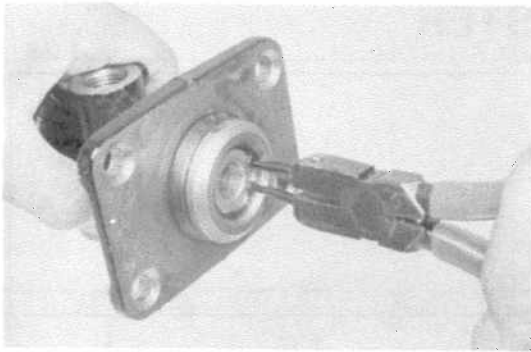
### 2. APPLY RUBBER GREASE TO RUBBER PARTS OF PISTON

### 3. INSTALL TWO SPRINGS AND PISTONS

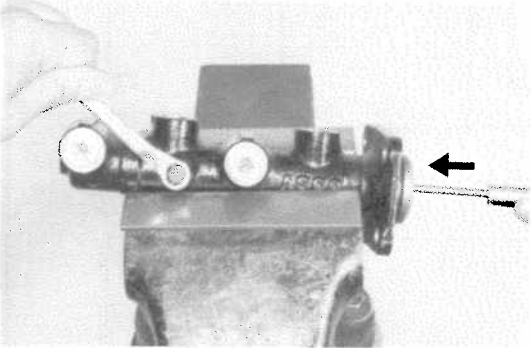
CAUTION: Be careful not to damage rubber lips on the pistons.

- (a) Insert two springs and pistons in the master cylinder housing, as shown.





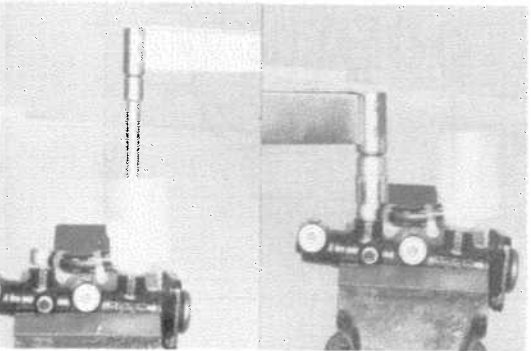
- (b) Using snap ring pliers, install the snap ring.



#### 4. INSTALL PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way, and install the piston stopper bolt. Torque the bolt.

Torque: 80 – 150 kg-cm (70 – 130 in.-lb)



#### 5. INSTALL RESERVOIR AND HOSE

- (a) Install the reservoir on the master cylinder with MAX mark facing toward the front. Torque the bolts.

Torque: 200 – 300 kg-cm (15 – 21 ft-lb)

- (b) Install the union bolt to the master cylinder. Torque the union bolt.

Torque: 400 – 900 kg-cm (29 – 65 ft-lb)

### INSTALLATION OF MASTER CYLINDER

1. ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER  
(See page 15-15)

#### 2. INSTALL MASTER CYLINDER

Install the master cylinder and gasket on the brake booster with four nuts. Torque the nuts.

Torque: 100 – 160 kg-cm (8 – 11 ft-lb)

#### 3. CONNECT TWO BRAKE TUBES

- (a) Using a flare nut wrench\*, connect two brake tubes to the outlet plugs. Torque the nuts.

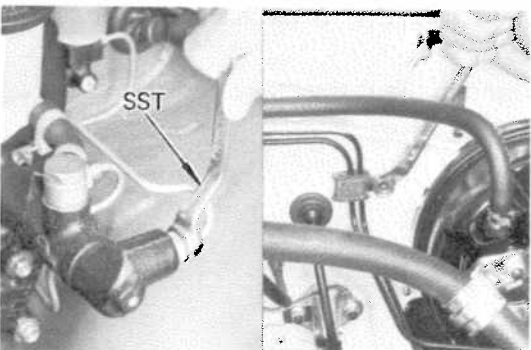
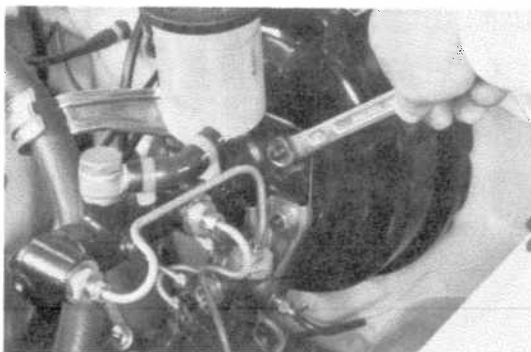
Torque: 130 – 180 kg-cm (10 – 13 ft-lb)

\*SST 09751-36011 or Commercial wrench

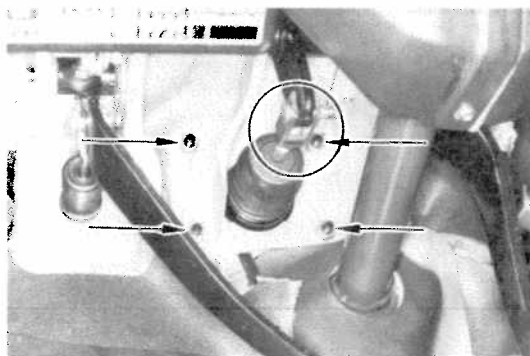
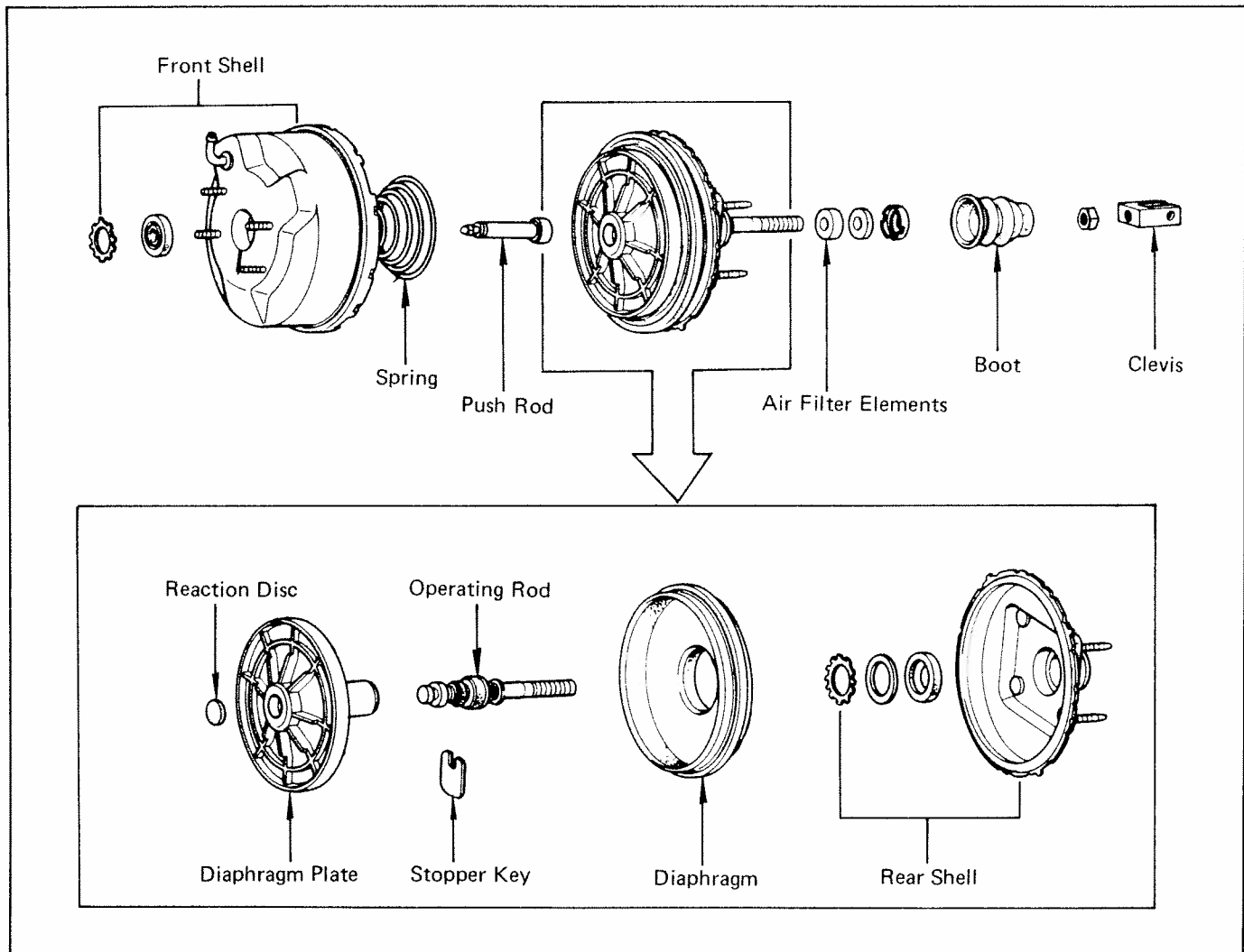
- (b) Install the brake tube clamp bolt.

#### 4. ADJUST BRAKE PEDAL (See page 15-6)

#### 5. FILL BRAKE RESERVOIRS WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page 15-8)

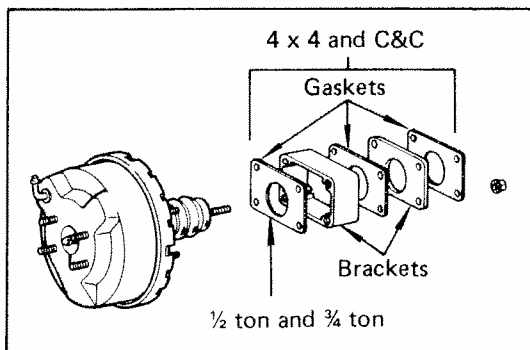


## BRAKE BOOSTER



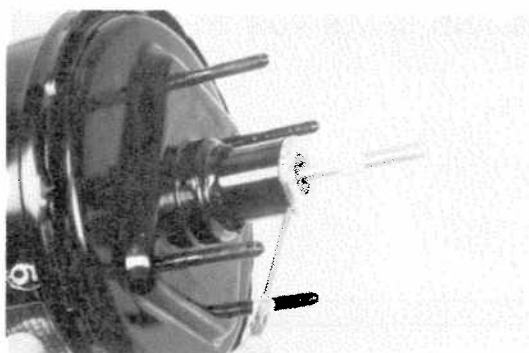
### REMOVAL OF BRAKE BOOSTER

1. REMOVE MASTER CYLINDER (See page 15-9)
2. REMOVE CLEVIS PIN FROM BRAKE PEDAL  
Remove clip and clevis pin.
3. DISCONNECT HOSE FROM BRAKE BOOSTER



4. REMOVE BRAKE BOOSTER, BRACKET AND GASKET

Remove four nuts, and pull out the brake booster.

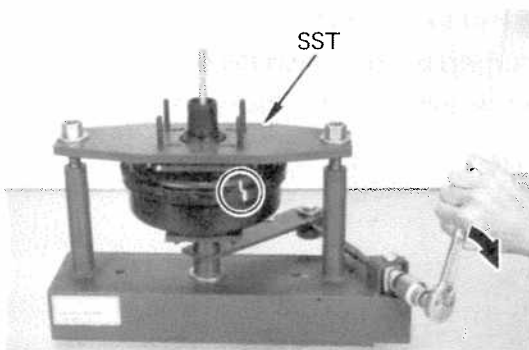


## DISASSEMBLY OF BRAKE BOOSTER

### 1. REMOVE CLEVIS AND BOOT

### 2. REMOVE AIR FILTER ELEMENTS

Using a screwdriver, remove the retainer and two elements.



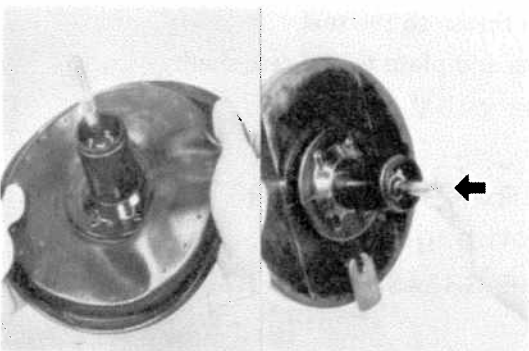
### 3. SEPARATE FRONT AND REAR SHELLS

(a) Put an alignment mark on the front and rear shell.

(b) Using an overhaul tool\*, turn the front shell to separate the front and rear shells.

\*SST 09738-00010

(c) Remove the push rod and spring.

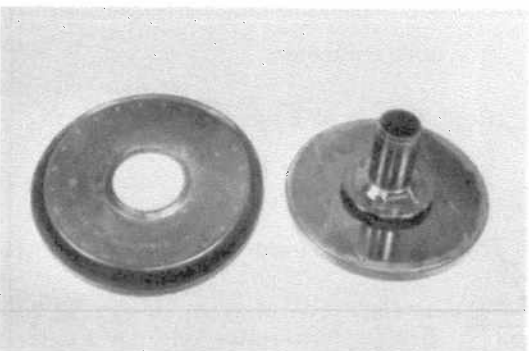


### 4. REMOVE DIAPHRAGM FROM DIAPHRAGM PLATE

### 5. REMOVE STOPPER KEY AND VALVE OPERATING ROD

(a) Push the valve operating rod in, and remove the stopper key.

(b) Pull out the valve operating rod.



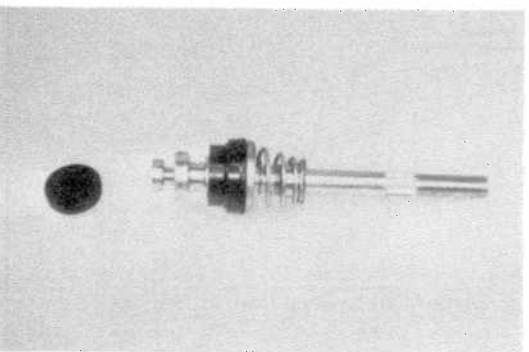
## INSPECTION OF BRAKE BOOSTER COMPONENTS

### 1. INSPECT DIAPHRAGM AND DIAPHRAGM PLATE FOR WEAR, DAMAGE OR CRACKS

Replace, if necessary.

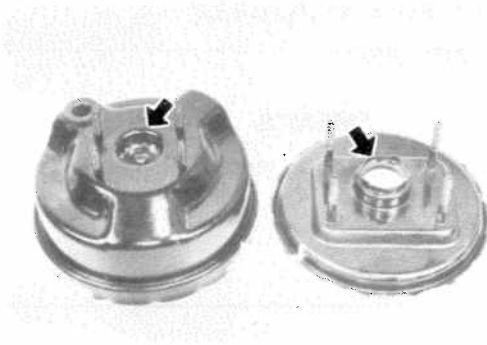
### 2. INSPECT VALVE OPERATING ROD FOR WEAR OR DAMAGE

Replace, if necessary.



### 3. INSPECT SHELLS AND SEALS FOR WEAR OR DAMAGE

Replace, if necessary.

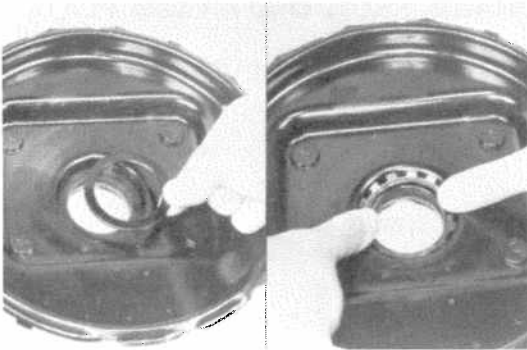


### 4. IF NECESSARY, REPLACE SEAL

- (a) Using a screwdriver, pry out the retainer.
- (b) Remove the plate and seal from the rear shell.

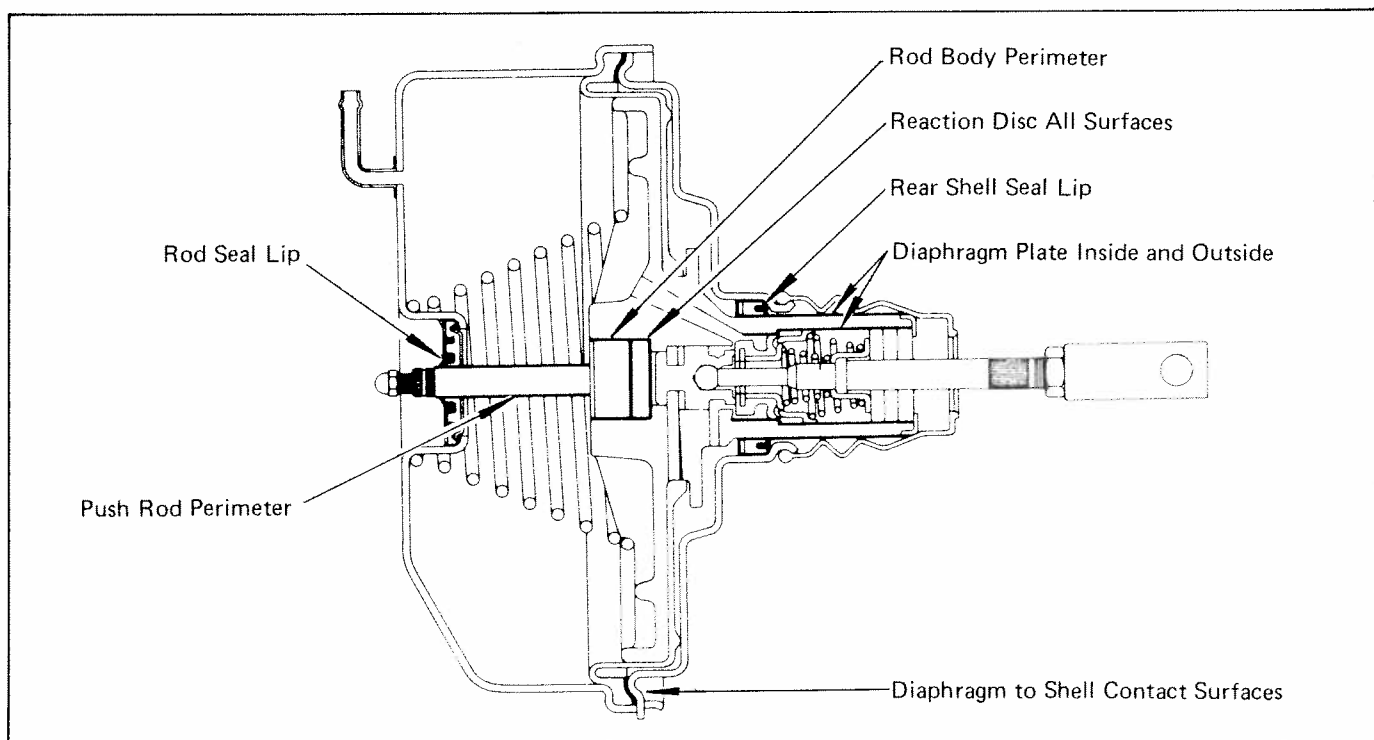


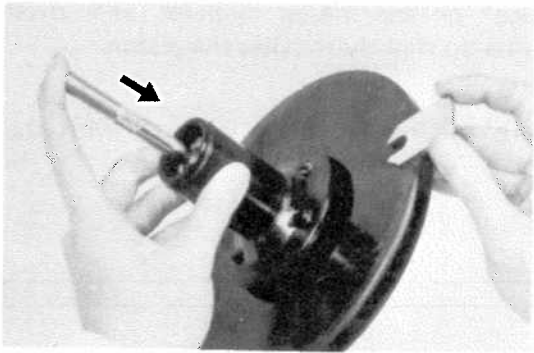
- (c) Apply silicon grease to the seal.
- (d) Install the seal and plate to the rear shell.
- (e) Secure the seal with the retainer.



## ASSEMBLY OF BRAKE BOOSTER (See illustration on page 15-12)

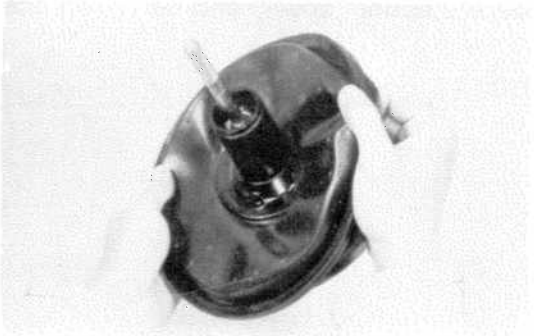
1. APPLY SILICONE GREASE TO PARTS SHOWN BELOW





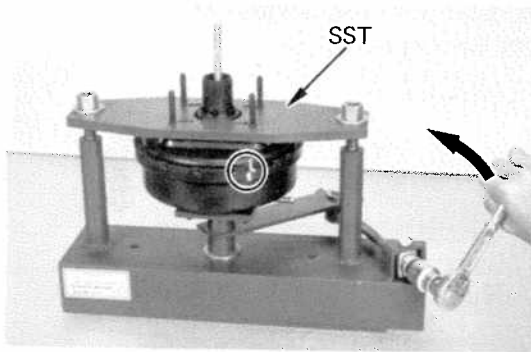
## 2. INSTALL VALVE OPERATING ROD AND STOPPER KEY

- (a) Insert the valve operating rod in the diaphragm plate.
- (b) Push the valve operating rod in, and install the stopper key.



## 3. INSTALL DIAPHRAGM ON DIAPHRAGM PLATE

## 4. ASSEMBLE DIAPHRAGM PLATE AND REAR SHELL

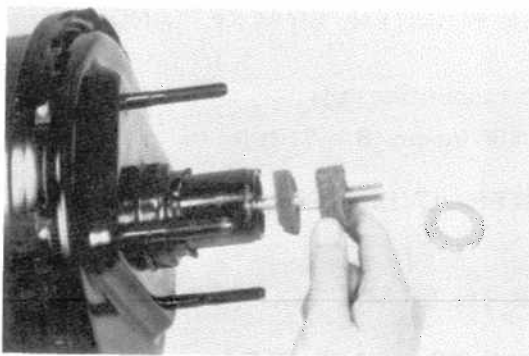


## 5. ASSEMBLE FRONT AND REAR SHELLS

- (a) Place the spring and push rod in the front shell.
- (b) Using an overhaul tool\*, assemble the front and rear shells by turning the front shell until the alignment marks match.

\*SST 09738-00010

NOTE: If the front shell is too tight to be turned, apply more silicone grease on the diaphragm edge that contacts the front and rear shells.



## 6. INSTALL AIR FILTER ELEMENTS

Install two elements and retainer.

## 7. INSTALL BOOT AND CLEVIS

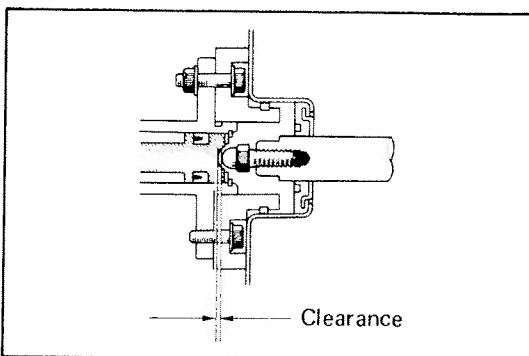
# INSTALLATION OF BRAKE BOOSTER (See illustration on page 15-12 )

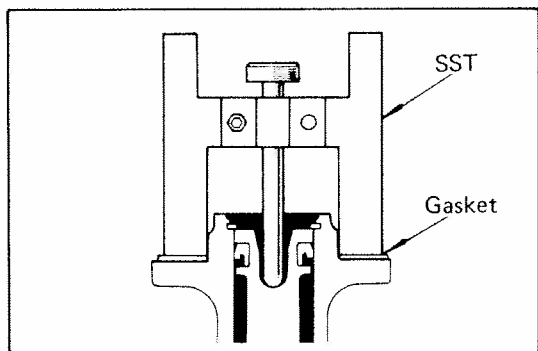
## 1. ADJUST LENGTH OF BOOSTER PUSH ROD

Adjust the length of the booster push rod to provide the specified clearance between the push rod and the master cylinder piston.

Standard clearance:

at idling vacuum	0.1 — 0.5 mm (0.004 — 0.020 in.)
at no vacuum	0.60 — 0.65 mm (2.236 — 0.0256 in.)

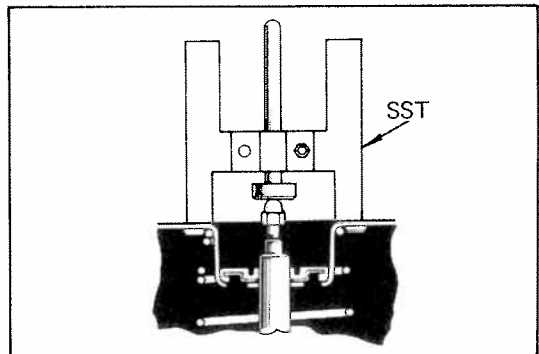




- (a) Set the gauge\* on the master cylinder, and lower the pin until its tip slightly touches the piston.

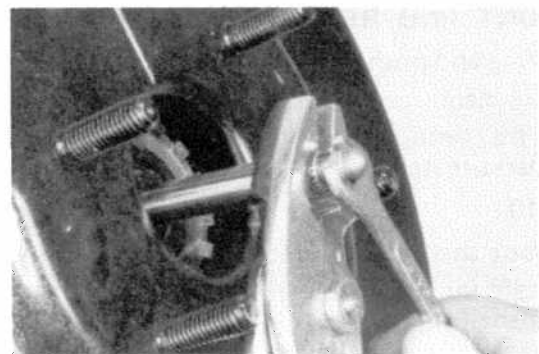
\*SST 09737-00010

NOTE: Make sure the measurement is taken with the gasket in place.

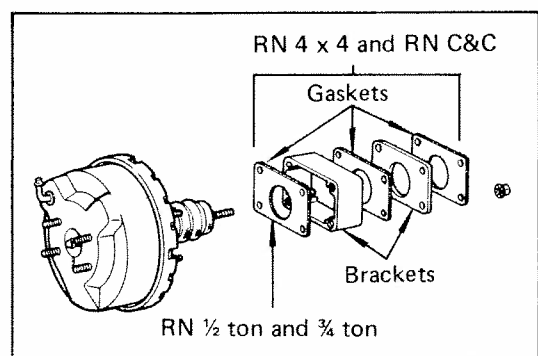


- (b) Turn the gauge\* upside down, and set it on the booster.

\*SST 09737-00010



- (c) Adjust the booster push rod length until the push rod lightly touches the pin head.



## 2. INSTALL BRAKE BOOSTER, BRACKET AND GASKET

Tighten the booster mounting nuts.

Torque: 100 – 160 kg-cm (8 – 11 ft-lb)

## 3. INSTALL MASTER CYLINDER (See steps 2 and 3, page 15-11)

## 4. CONNECT HOSE TO BRAKE BOOSTER

## 5. CONNECT CLEVIS TO BRAKE PEDAL

Install clevis pin and clip.

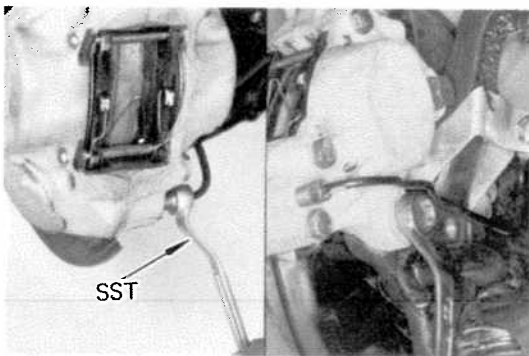
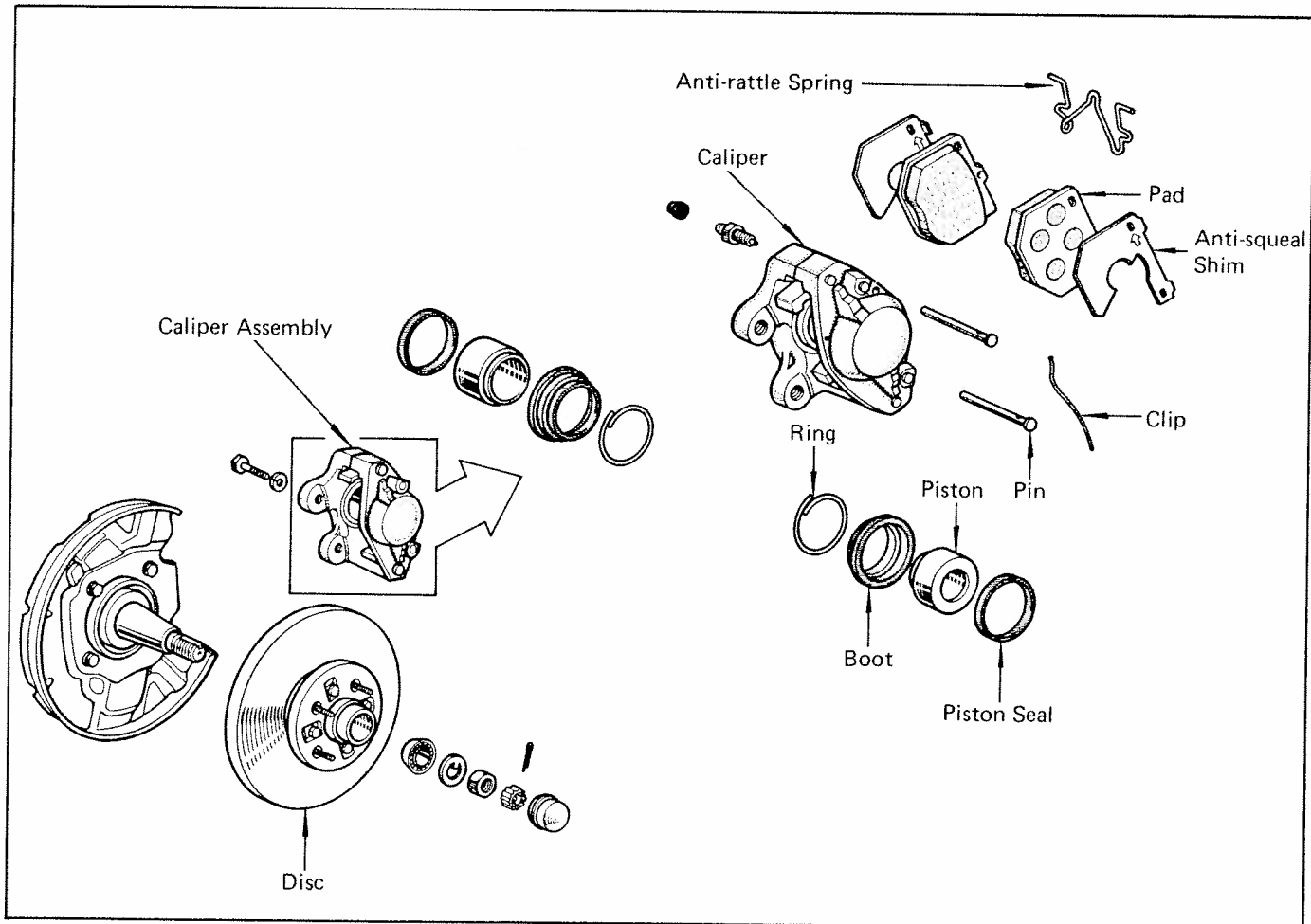
## 6. ADJUST BRAKE PEDAL (See page 15-6)

## 7. BLEED BRAKE SYSTEM (See page 15-8)

## 8. PERFORM OPERATIONAL CHECK (See page 15-8)



## FRONT BRAKE S-16 Type Disc Brake (1/2ton, 3/4ton)



### REMOVAL AND DISASSEMBLY OF BRAKE CALIPER

#### 1. REMOVE CALIPER

If only the brake pads are to be replaced, do not remove the caliper.

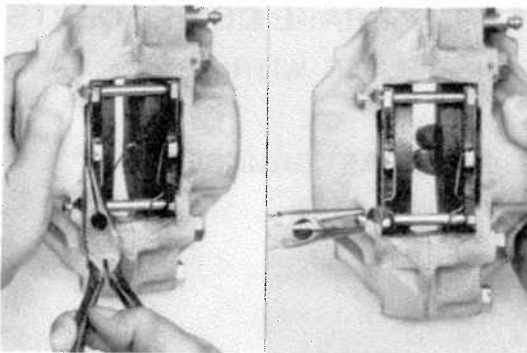
If repairing the caliper, disconnect the brake line using a flare nut wrench\*. Use a container to catch the brake fluid.

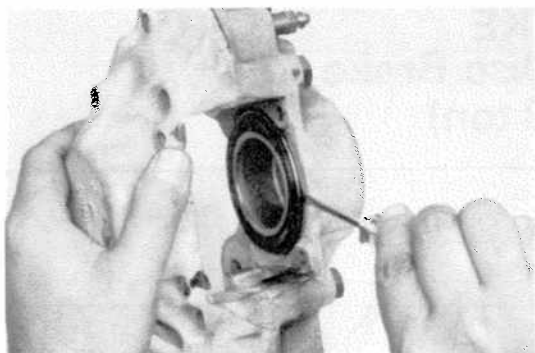
\*SST 09751-36011 or Commercial wrench

#### 2. REMOVE BRAKE PADS

Remove the following parts from the caliper:

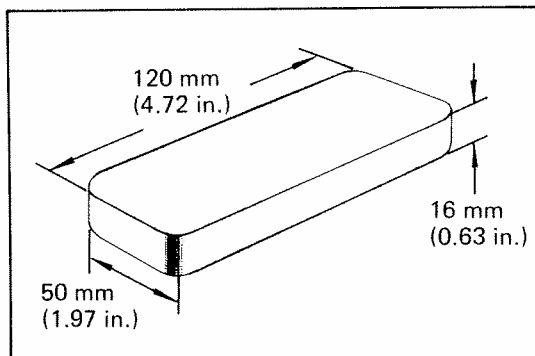
- Clip
- Two pins
- Antirattle spring
- Two pads and shims





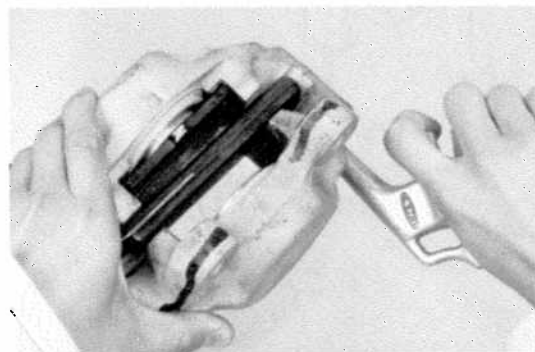
### 3. REMOVE BOOT

Using a screwdriver, remove the set ring and boot.



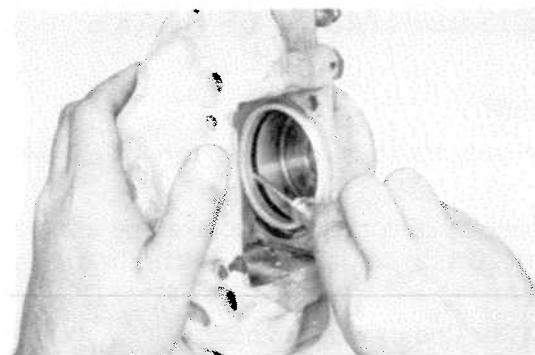
### 4. REMOVE PISTON FROM CALIPER

- (a) Prepare the wooden plate to hold the piston shown in the figure.
- (b) Place the plate into the caliper slot and insert a pad at one side.



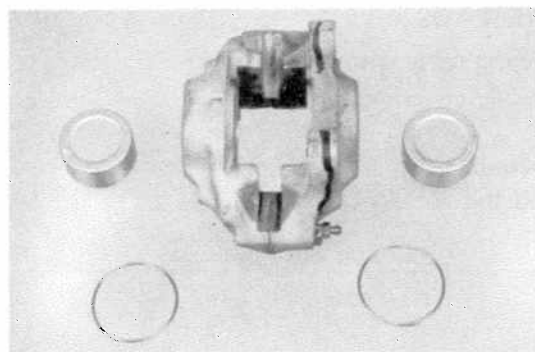
- (c) Using compressed air, remove the pistons alternately from the caliper.

**WARNING:** Do not place your fingers in front of the piston when using compressed air.



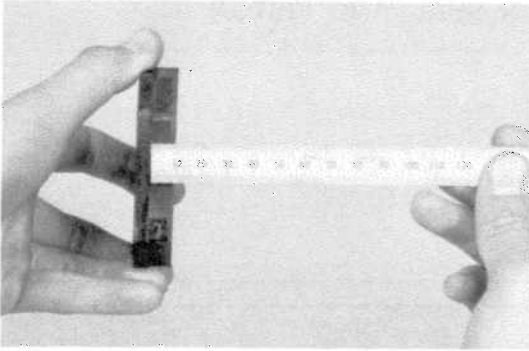
### 5. REMOVE PISTON SEAL

Using a screwdriver, remove the seal from the caliper.



## INSPECTION OF FRONT BRAKE COMPONENTS

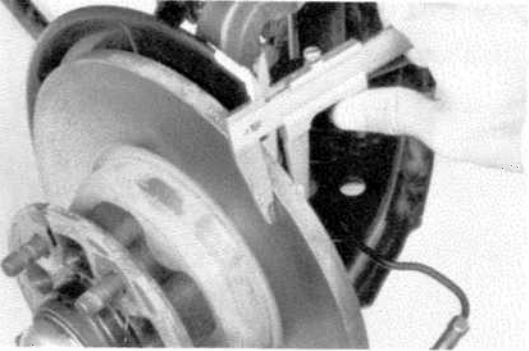
1. WASH PISTON AND CALIPER WITH BRAKE FLUID
2. INSPECT PARTS FOR WEAR, DAMAGE OR CORROSION  
Replace the parts as necessary.



### 3. MEASURE PAD LINING THICKNESS

Minimum thickness: 1.0 mm (0.039 in.)

If the pads are less than minimum or show signs of uneven wear, replace the pad.



### 4. MEASURE DISC THICKNESS

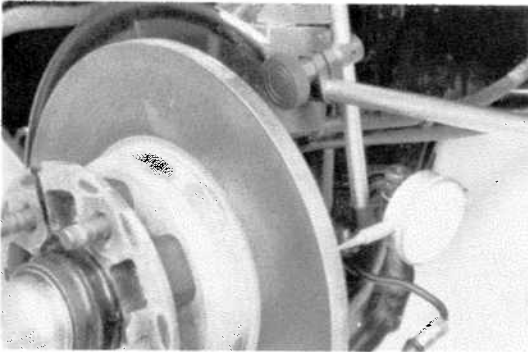
Minimum thickness: 11.5 mm (0.453 in.)

Standard thickness: 12.5 mm (0.492 in.)

If the disc thickness is less than minimum, replace the disc.

### 5. CHECK LINING CONTACT SURFACE FOR SCORING

Repair or replace the disc as necessary.

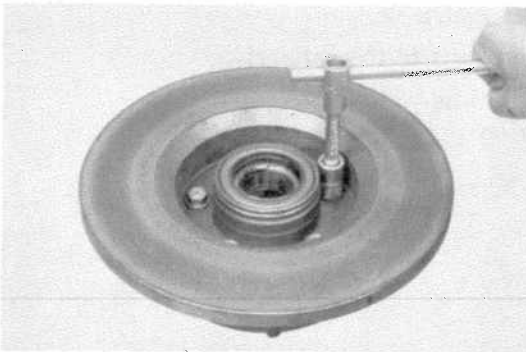


### 6. MEASURE DISC RUNOUT

Maximum disc runout: 0.15 mm (0.0059 in.)

If the runout is greater than the maximum, replace the disc.

NOTE: Make sure the front bearing is adjusted correctly before measuring the runout.



### 7. IF NECESSARY, REPLACE DISC

(a) Remove the axle hub. (See page 13-7)

(b) Remove the disc from the axle hub.

(c) Install a new disc. Torque five bolts.

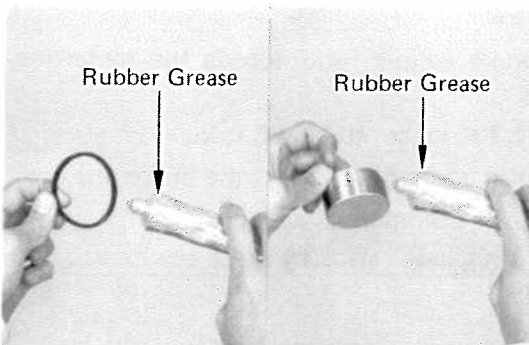
Torque: 400 — 550 kg-cm (29 — 39 ft-lb)

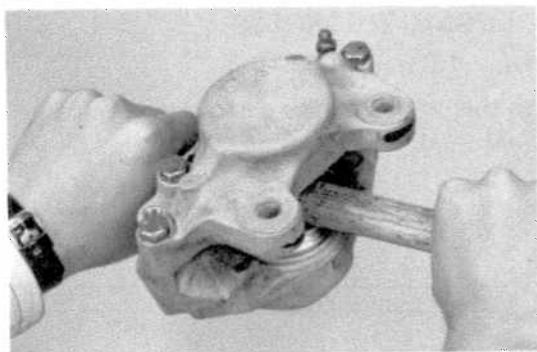
(d) Install the axle hub and adjust the front bearing preload. (See page 13-8)

## ASSEMBLY AND INSTALLATION OF BRAKE CALIPER

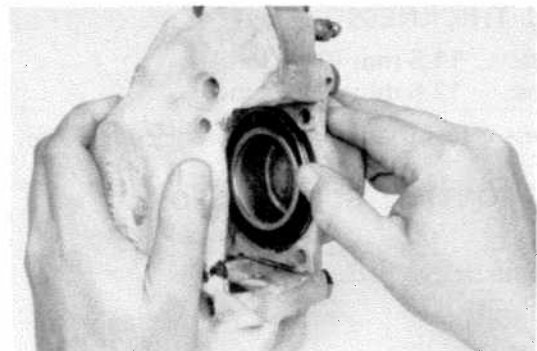
(See illustration on page 15-17 )

### 1. APPLY RUBBER GREASE TO PISTON SEAL AND PISTON



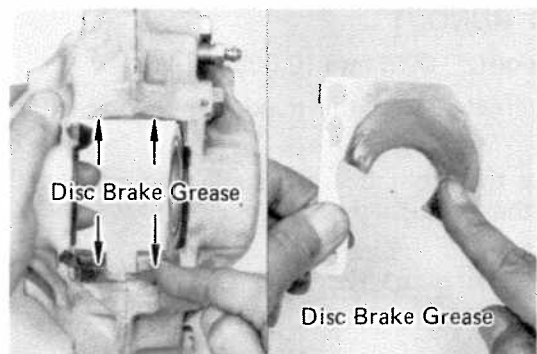


## 2. INSTALL PISTON SEAL AND PISTON IN CALIPER

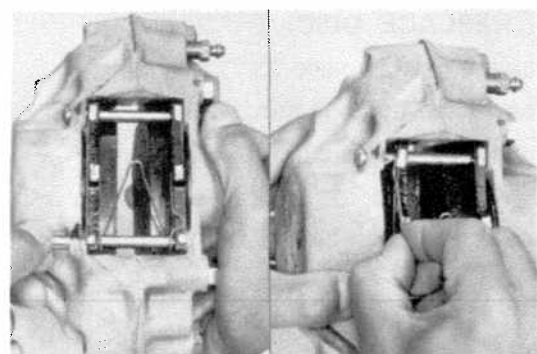


## 3. INSTALL BOOT IN CALIPER

Install the boot with a set ring.



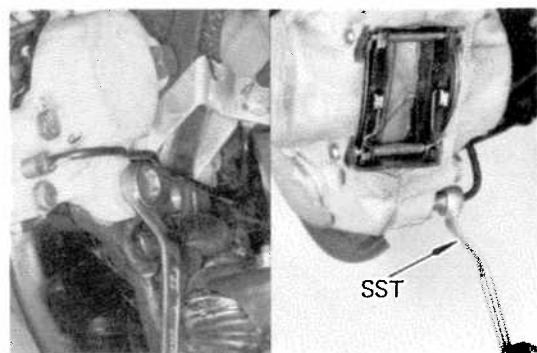
## 4. APPLY DISC BRAKE GREASE TO ANTISQUEAL SHIMS AND CALIPER



## 5. INSTALL BRAKE PADS

Install the following parts to the caliper:

- (a) Two pads and shims
- (b) Antirattle spring
- (c) Two pins
- (d) Clip



## 6. INSTALL CALIPER

- (a) Install the brake caliper, and torque the mounting bolts.

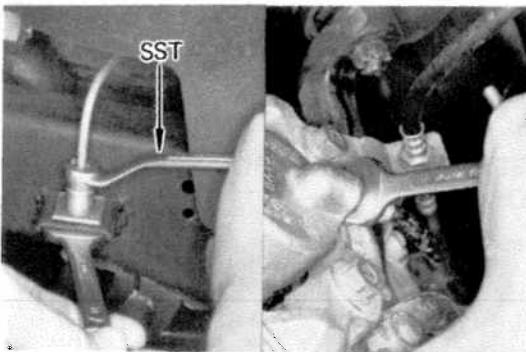
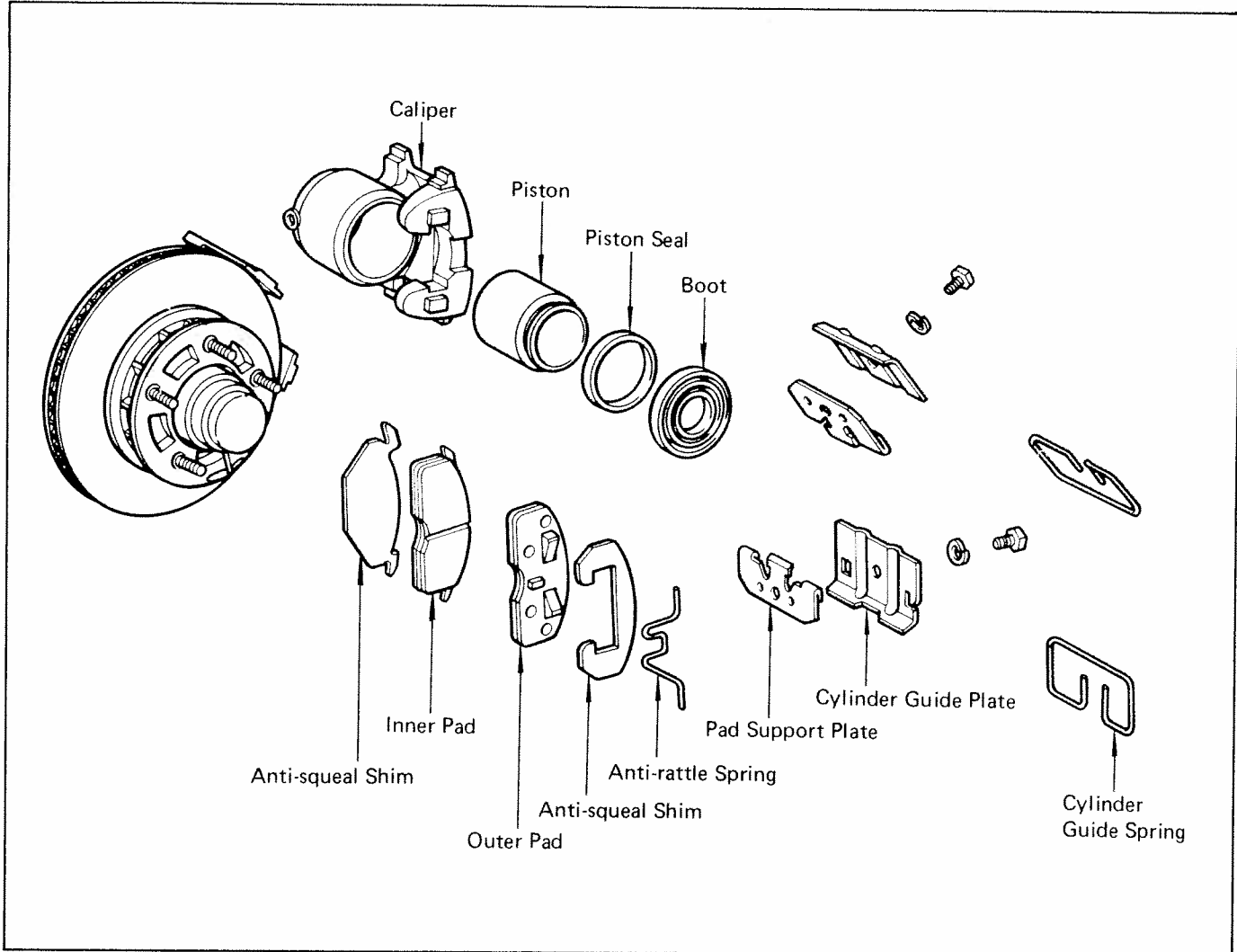
Torque: 930 – 1,200 kg-cm (68 – 86 ft-lb)

- (b) Using a flare nut wrench\*, connect the brake line.

\*SST 09751-36011 or Commercial wrench

Torque: 130 – 180 kg-cm (10 – 13 ft-lb)

## K Type Disc Brake (C&C)



### REMOVAL AND DISASSEMBLY OF BRAKE CALIPER

#### 1. REMOVE BRAKE HOSE

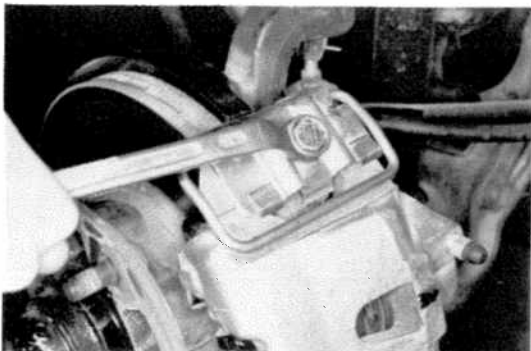
If only the brake pads are to be replaced, do not disconnect the brake line.

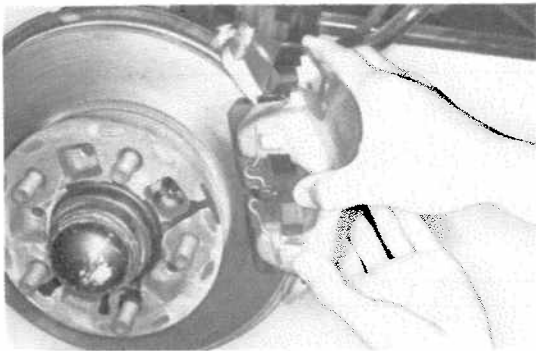
If repairing the cylinder, disconnect the brake line using a flare nut wrench\*. Use a container to catch the brake fluid.

\*SST 09751-36011 or Commercial wrench

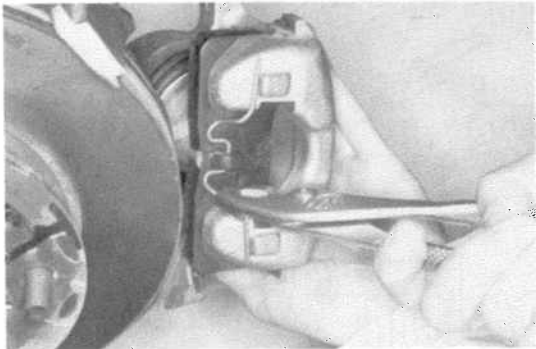
#### 2. REMOVE CALIPER

- Remove the cylinder guide plates, cylinder support springs and pad support plates.



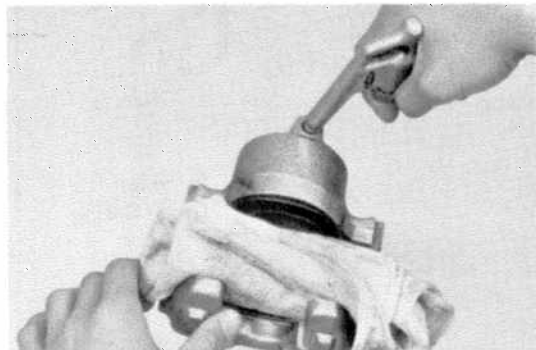


- (b) Remove the cylinder with the outer pad from the disk brake mounting.



### 3. REMOVE BRAKE PADS

- (a) Remove the anti-rattle spring and outer pad from the caliper.
- (b) Remove the inner pad from the disc brake mounting.



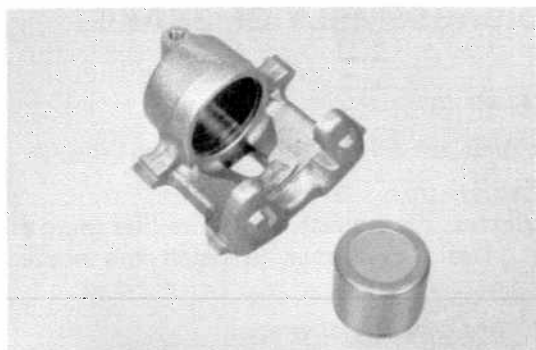
### 4. REMOVE PISTON FROM CYLINDER

- (a) Put a piece of cloth or such between the piston and caliper.
- (b) Using compressed air, remove the piston from the caliper.

**WARNING:** Do not place your fingers in front of the piston when using compressed air.

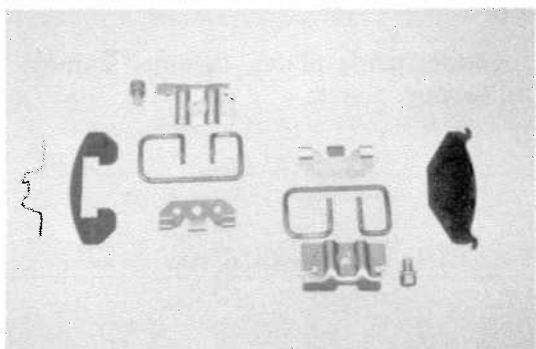
### 5. REMOVE PISTON SEAL

Using a screwdriver, remove the seal from the caliper.

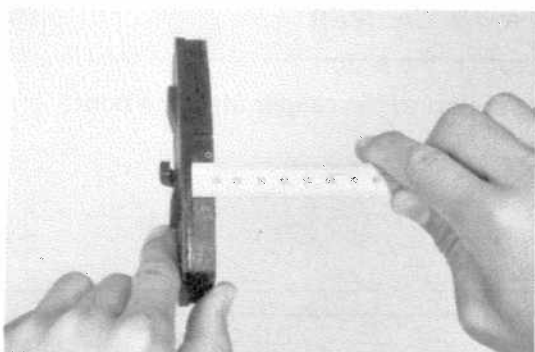


## INSPECTION OF FRONT BRAKE COMPONENTS

1. WASH PISTON AND CALIPER WITH BRAKE FLUID
2. INSPECT CALIPER AND PISTON FOR WEAR, DAMAGE OR CORROSION  
Replace the parts as necessary.



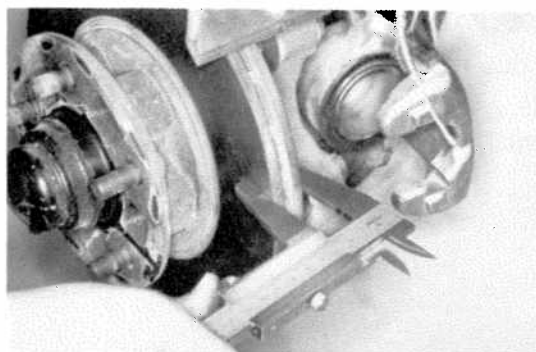
3. INSPECT PARTS FOR DAMAGE OR WEAKENESS  
Replace the parts as necessary.



#### 4. MEASURE PAD LINING THICKNESS

Minimum thickness: 1.0 mm (0.039 in.)

If the pads are less than minimum or show signs of uneven wear, replace the pad.



#### 5. MEASURE DISC THICKNESS

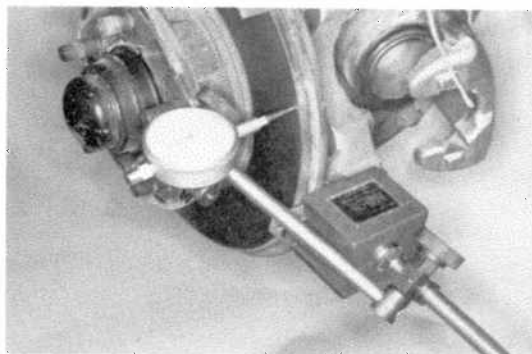
Minimum thickness: 19.0 mm (0.748 in.)

Standard thickness: 20.0 mm (0.787 in.)

If the disc thickness is less than minimum, replace the disc.

#### 6. CHECK LINING CONTACT SURFACE FOR SCORING

Repair or replace the disc as necessary.

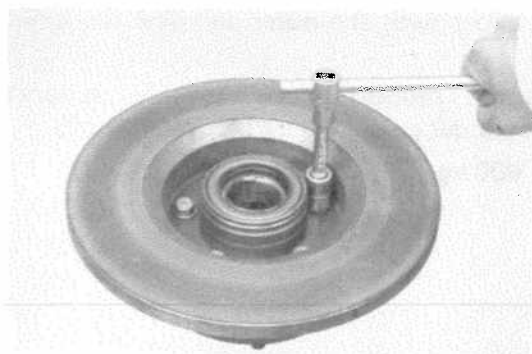


#### 7. MEASURE DISC RUNOUT

Maximum disc runout: 0.15 mm (0.0059 in.)

If the runout is greater than the maximum, replace the disc.

NOTE: Make sure the front bearing is adjusted correctly before measuring the runout.



#### 8. IF NECESSARY, REPLACE DISC

(a) Remove the axle hub. (See page 13-7)

(b) Remove the disc from the axle hub.

(c) Install a new disc. Torque five bolts.

Torque: 550 – 750 kg-cm (40 – 54 ft-lb)

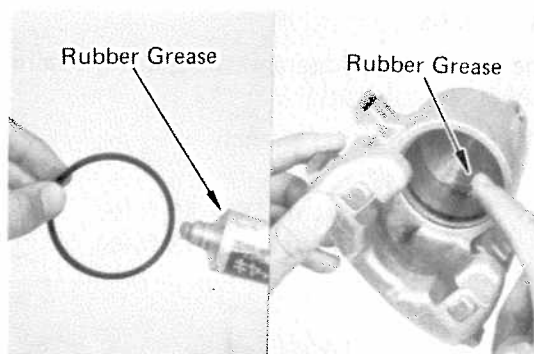
(d) Install the axle hub and adjust the front bearing preload. (See page 13-8)

### ASSEMBLY AND INSTALLATION OF BRAKE CALIPER

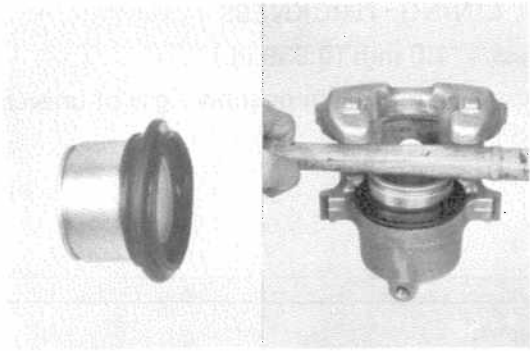
(See illustration on page 15-21)

#### 1. APPLY RUBBER GREASE TO PISTON SEAL AND CALIPER

#### 2. INSTALL PISTON SEAL IN CALIPER

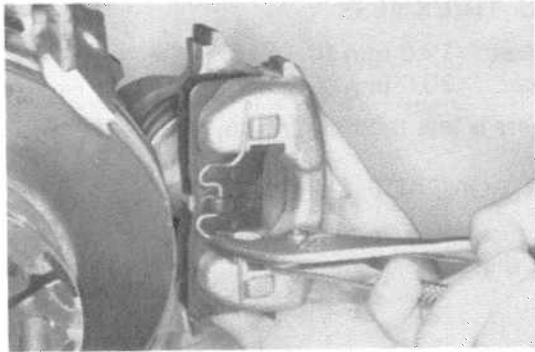






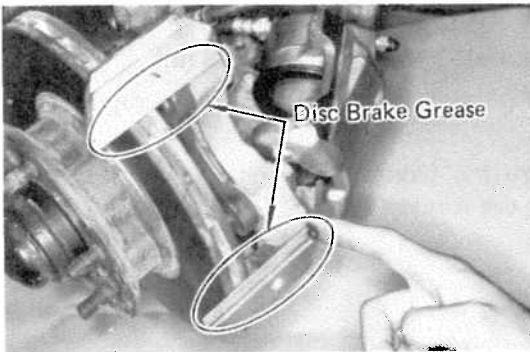
### 3. INSTALL PISTON IN CALIPER

- (a) Install the boot on the piston.
- (b) Assemble the piston to the caliper after the boot.



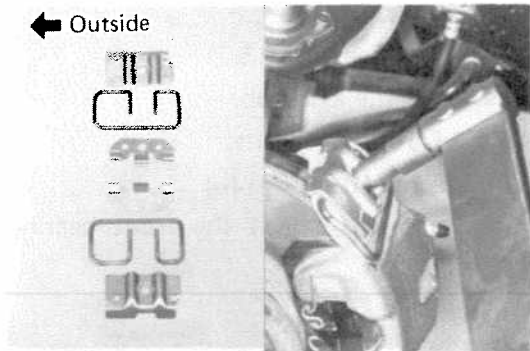
### 4. INSTALL BRAKE PADS

- (a) Install the outer pad and anti-rattle spring to the caliper.
- (b) Install the inner pad to the disc brake mounting.



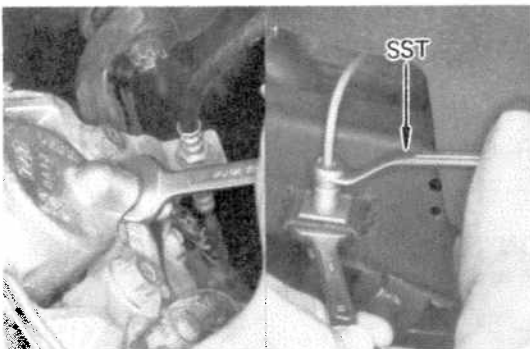
### 5. INSTALL CALIPER

- (a) Apply disc brake grease to the rubbing parts of the caliper.



- (b) Install the caliper with the outer pad over the inner pad.
- (c) Install the pad support plates, cylinder support springs and cylinder guide plates. Torque the bolts.

**Torque:** 400 – 600 kg-cm (29 – 44 ft-lb)



### 6. INSTALL BRAKE HOSE

Connect the caliper side of the hose and then, using a flare nut wrench\*, connect the tube side.

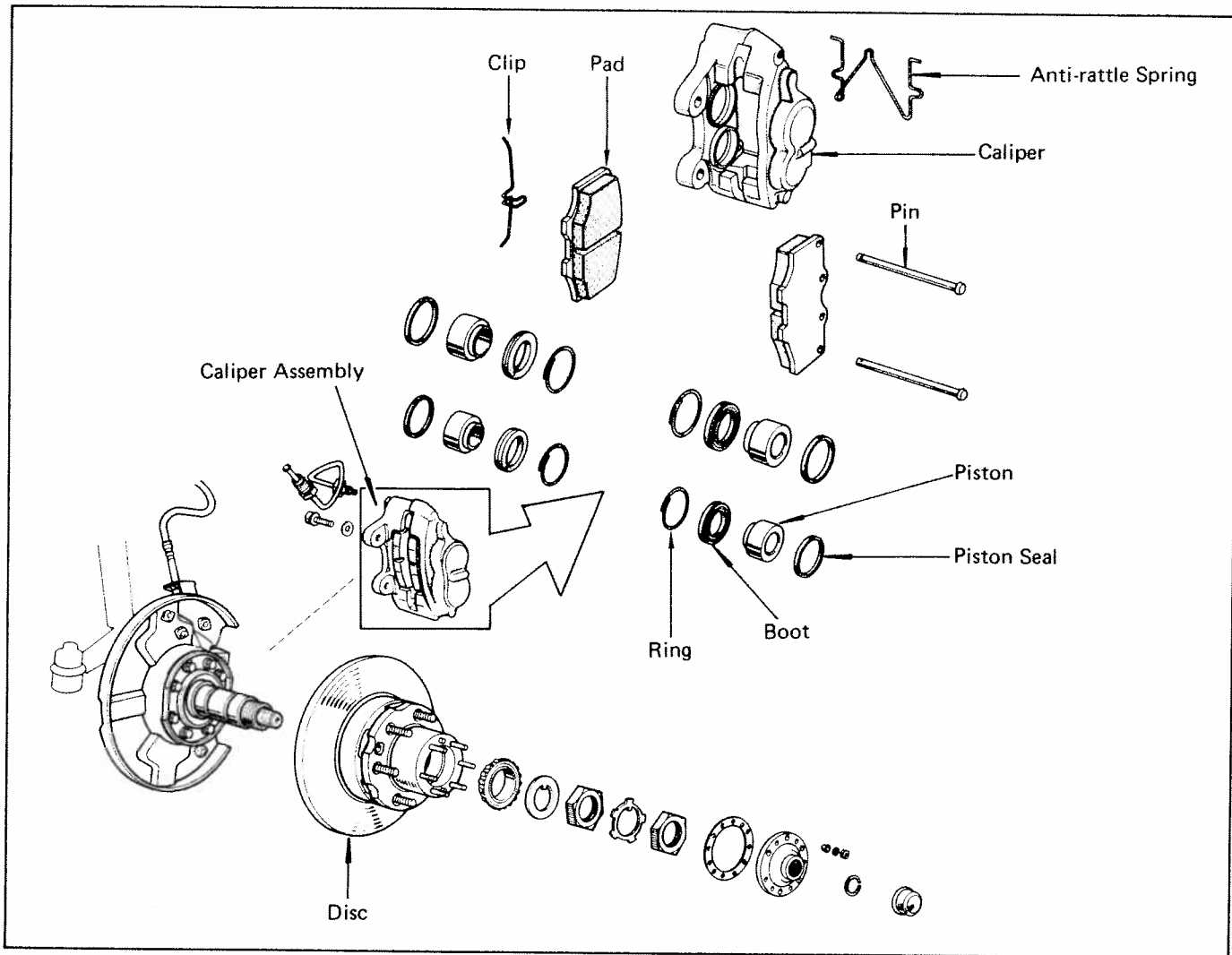
\*SST 09751-36011 or Commercial wrench

**Torque:**

Caliper side	200 – 270 kg-cm (15 – 19 ft-lb)
Tube side	130 – 180 kg-cm (10 – 13 ft-lb)



## S-12+8 Type Disc Brake (4×4)



### REMOVAL AND DISASSEMBLY OF BRAKE CYLINDER

#### 1. REMOVE CYLINDER

If only the brake pads are to be replaced, do not remove the caliper.

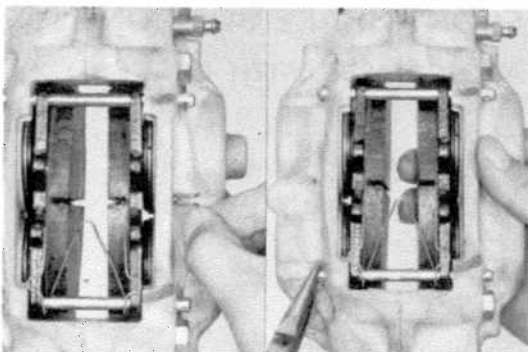
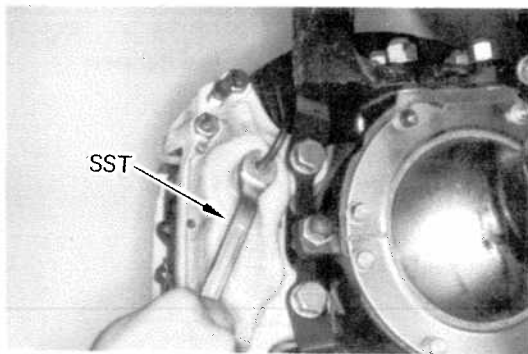
If repairing the cylinder, disconnect the brake line using a flare nut wrench\*. Use a container to catch the brake fluid.

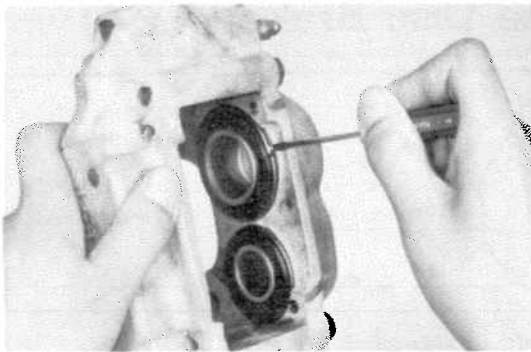
\*SST 09751-36011 or Commercial wrench

#### 2. REMOVE BRAKE PADS

Remove the following parts from the caliper:

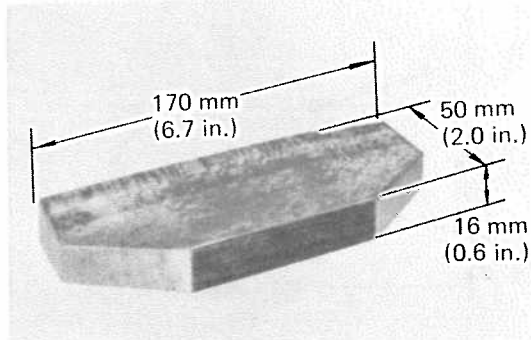
- Clip
- Two pins
- Anti-rattle spring
- Two pads





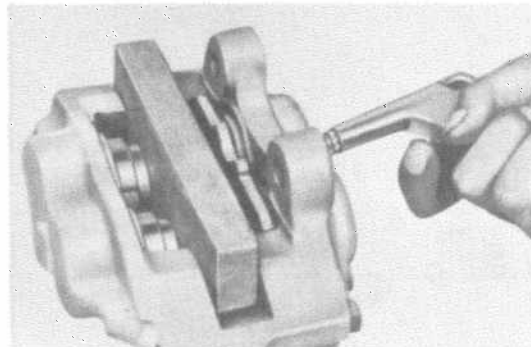
### 3. REMOVE BOOT

Using a screwdriver, remove the set ring and boot.



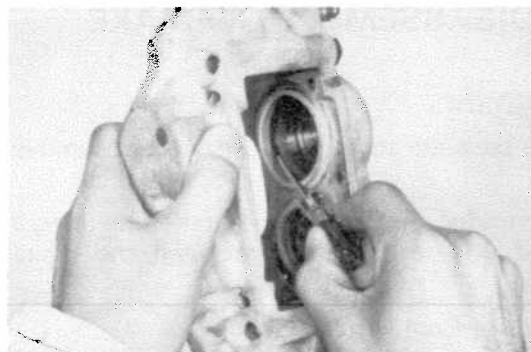
### 4. REMOVE PISTON FROM CALIPER

- (a) Prepare the wooden plate as shown in the figure, to hold the piston.
- (b) Place the plate into the caliper slot and insert a pad at one side.



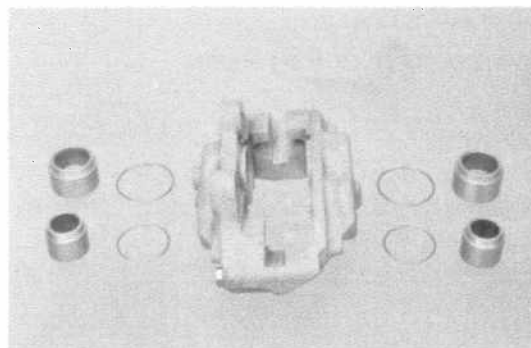
- (c) Use compressed air to remove the pistons alternately from the caliper.

**WARNING:** Do not place your fingers in front of the piston when using compressed air.



### 5. REMOVE PISTON SEAL

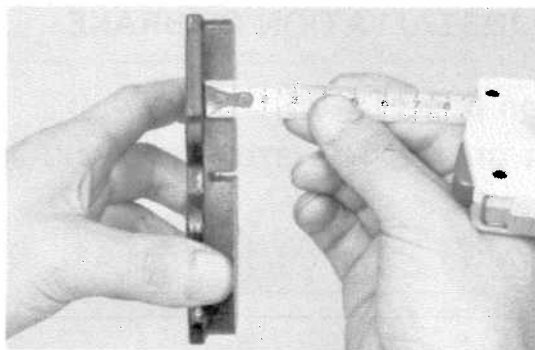
Using a screwdriver, remove the seal from the caliper.



## INSPECTION OF FRONT BRAKE COMPONENTS

1. WASH PISTON AND CALIPER WITH BRAKE FLUID
2. INSPECT PARTS FOR WEAR, DAMAGE OR CORROSION

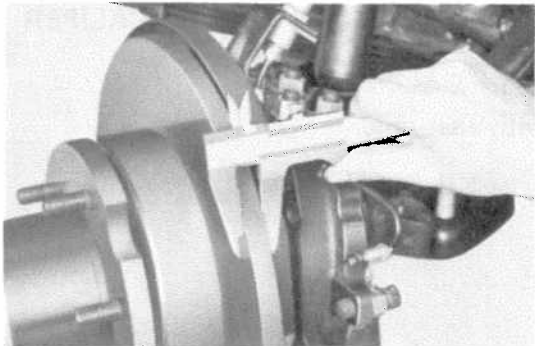
Replace the parts as necessary.



### 3. MEASURE PAD LINING THICKNESS

Minimum thickness: 1.0 mm (0.039 in.)

If the pads are less than minimum or show signs of uneven wear, replace the pad.



### 4. MEASURE DISC THICKNESS

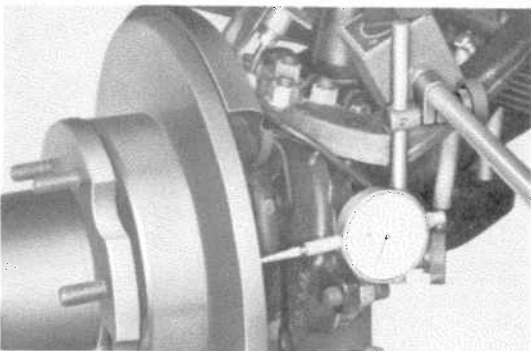
Minimum thickness: 11.5 mm (0.453 in.)

Standard thickness: 12.5 mm (0.492 in.)

If the disc thickness is less than minimum, replace the disc.

### 5. CHECK LINING CONTACT SURFACE FOR SCORING

Repair or replace the disc as necessary.



### 6. MEASURE DISC RUNOUT

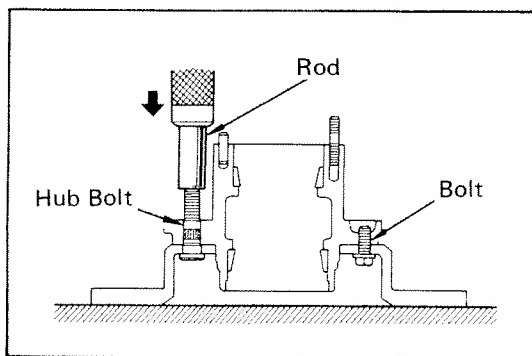
Maximum disc runout: 0.15 mm (0.0059 in.)

If the runout is greater than the maximum, replace the disc.

NOTE: Make sure the front bearing is adjusted correctly before measuring the runout.

### 7. IF NECESSARY, REPLACE DISC

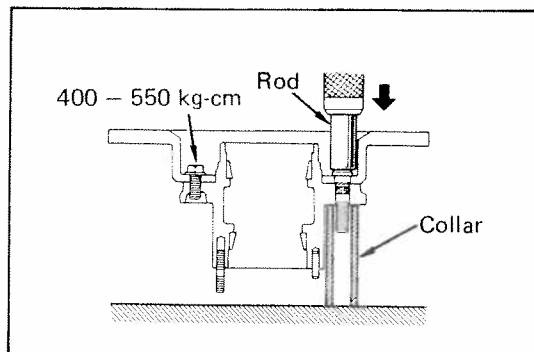
- (a) Remove the axle hub. (See page 13-36)
- (b) Using a rod, press the hub bolts out of the axle hub.
- (c) Remove the two bolts and separate the disc and hub.

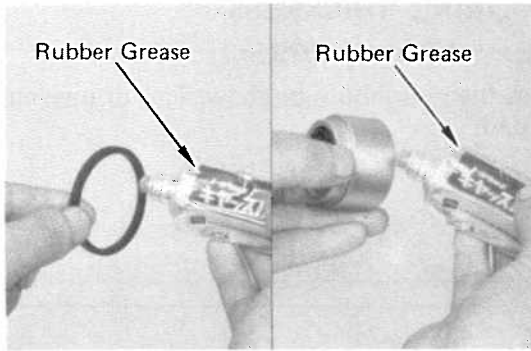


- (d) Install a new disc to the axle hub and tighten the two bolts.

**Torque:** 400 – 550 kg-cm (29 – 39 ft-lb)

- (e) Using a collar and rod, press the hub bolts into the hub.
- (f) Install the axle hub and adjust the front bearing preload. (See page 13-38)

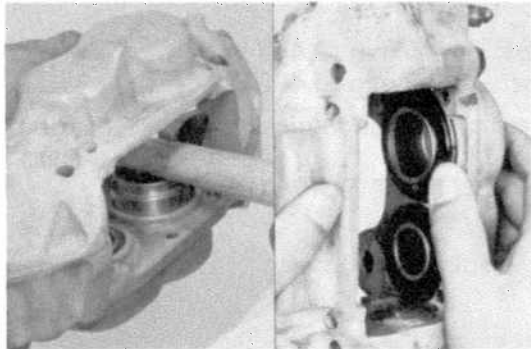




## ASSEMBLY AND INSTALLATION OF BRAKE CALIPER

(See illustration on page 15-25)

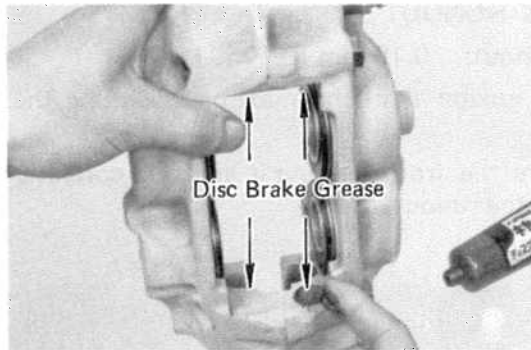
1. APPLY RUBBER GREASE TO PISTON SEAL AND PISTON



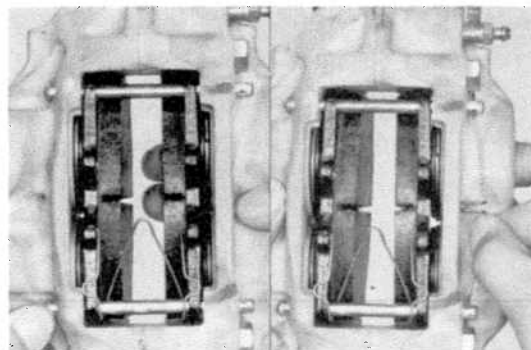
2. INSTALL PISTON SEAL AND PISTON IN CALIPER

3. INSTALL BOOT IN CALIPER

Install the boot with a set ring.



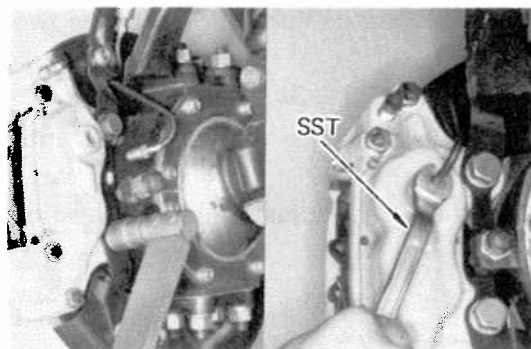
4. APPLY DISC BRAKE GREASE TO CALIPER



5. INSTALL BRAKE PADS

Install the following parts to the caliper:

- (a) Two pads
- (b) Anti-rattle spring
- (c) Two pins
- (d) Clip



6. INSTALL CALIPER

- (a) Install the brake caliper, and torque the mounting bolts.

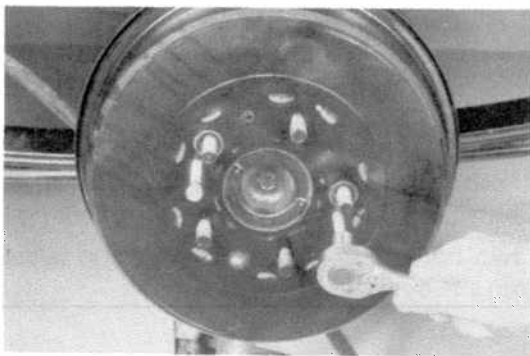
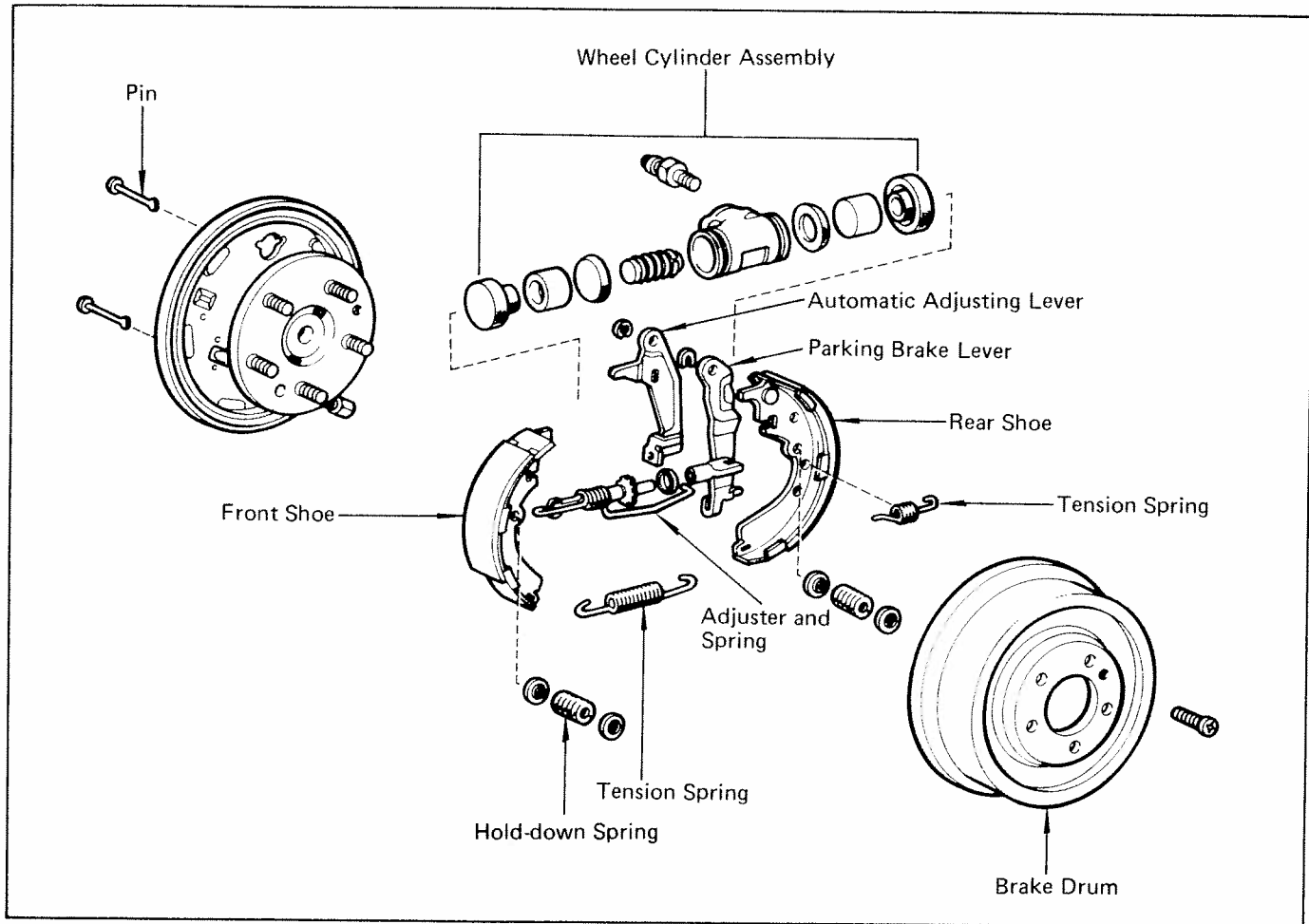
Torque: 750 – 1,050 kg-cm (55 – 75 ft-lb)

- (b) Using a flare nut wrench\*, connect the brake line.

\*SST 09751-36011 or Commercial wrench

Torque: 130 – 180 kg-cm (10 – 13 ft-lb)

## REAR BRAKE Leading-Trailing Type (1/2 ton, 3/4 ton)

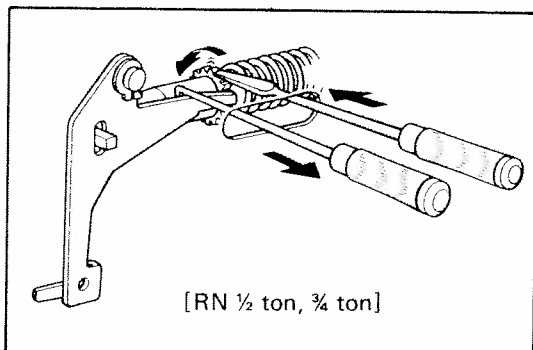


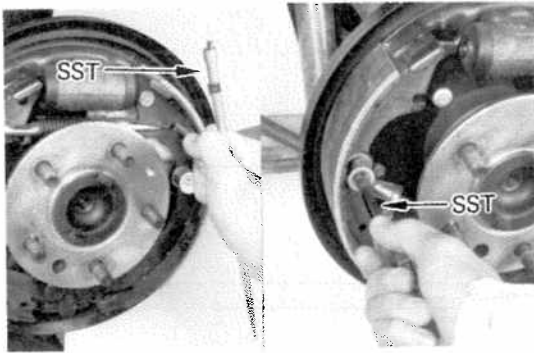
### REMOVAL OF REAR BRAKE

#### 1. REMOVE REAR WHEEL AND BRAKE DRUM

NOTE: If the brake drum cannot be removed easily, perform the following steps:

- (a) Insert a hook through the hole in the backing plate, and hold the adjuster lever away from the adjuster.
- (b) Using a screwdriver, reduce the brake shoe adjustment by turning the adjuster.





## 2. REMOVE FRONT BRAKE SHOE AND ADJUSTER

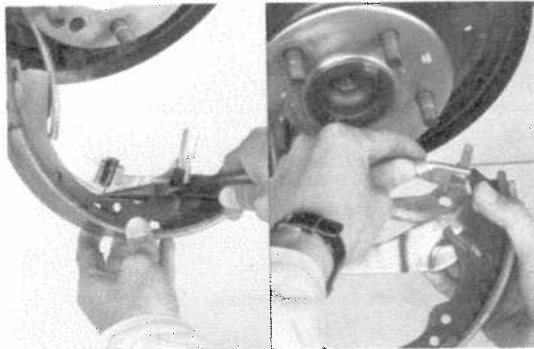
- (a) Using a brake spring tool\*, remove the return spring and adjuster.

\*SST 09703-30010 or Commercial tool

- (b) Using a hold-down spring tool\*, remove the front shoe hold-down spring and pin.

\*SST 09718-00010 or Commercial tool

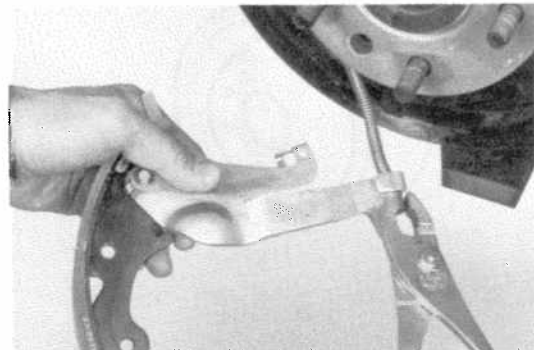
- (c) Remove the front brake shoe and anchor spring.



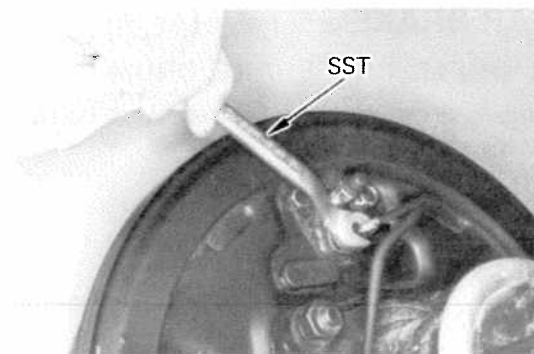
## 3. REMOVE REAR BRAKE SHOE, LEVER AND STRUT

- (a) Remove hold-down spring and pin, and remove the rear shoe.

- (b) Remove the strut and spring from the lever.



- (c) Disconnect the parking brake cable from the lever.



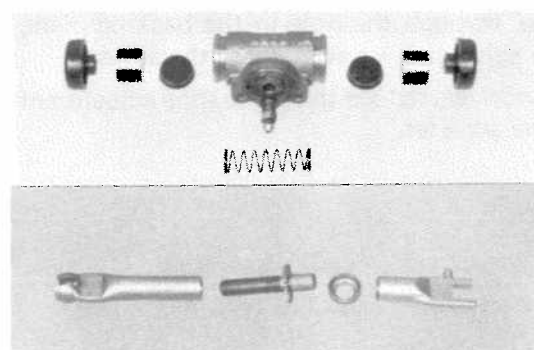
## 4. IF NECESSARY, REMOVE AND DISASSEMBLE WHEEL CYLINDER

- (a) Using a flare nut wrench\*, disconnect the line. Use a container to catch the brake fluid.

\*SST 09751-36011 or Commercial wrench

- (b) Remove two bolts and the wheel cylinder.

- (c) Remove the two boots, two pistons, two piston cups and spring from the cylinder.



## INSPECTION OF REAR BRAKE COMPONENTS

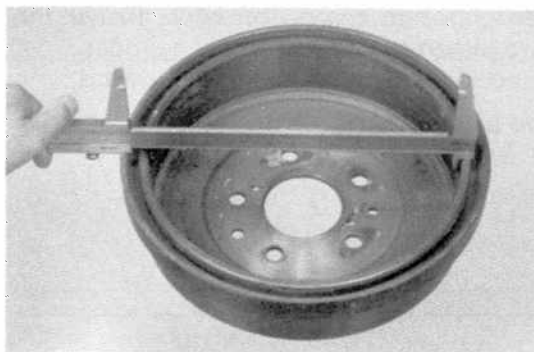
### 1. CLEAN WHEEL CYLINDER COMPONENTS WITH BRAKE FLUID

### 2. INSPECT CYLINDER COMPONENTS FOR WEAR, DAMAGE OR CORROSION

Replace the parts as necessary.

### 3. INSPECT ADJUSTER FOR WEAR OR DAMAGE

Replace the parts, as necessary.



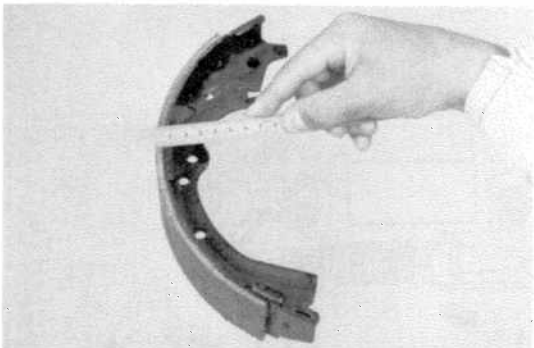
**4. INSPECT BRAKE DRUM FOR CRACKS OR SCORING**

**5. MEASURE BRAKE DRUM INSIDE DIAMETER**

Maximum inside diameter: 256.0 mm (10.079 in.)

Standard inside diameter: 254.0 mm (10.000 in.)

If the drum is scored or worn, the brake drum may be turned to the maximum inside diameter with a lathe.



**6. MEASURE BRAKE SHOE LINING THICKNESS**

Minimum thickness: 1.0 mm (0.039 in.)

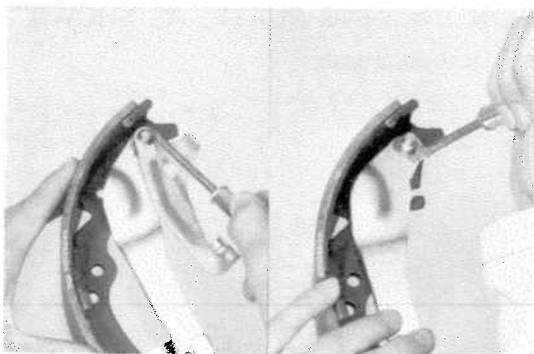
If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If any of the brake shoes have to be replaced, replace all the rear brake shoes to maintain effective brakes.



**7. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT**

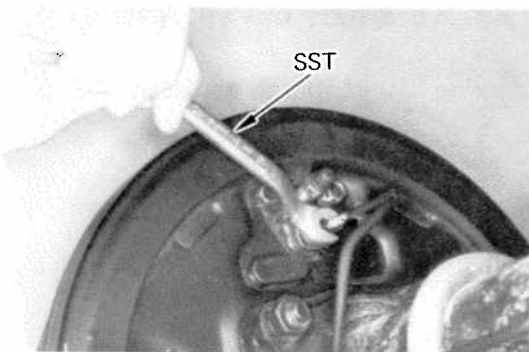
Replace the brake shoe or turn the brake drum, as necessary.



**8. IF NECESSARY, REPLACE BRAKE SHOES**

(a) Using a screwdriver, remove the parking brake lever and automatic adjusting lever from the rear shoe.

(b) Using pliers, install the parking brake lever and automatic adjusting lever with a new C washers.



**ASSEMBLY OF REAR BRAKE**  
**(See illustration on page 15-29)**

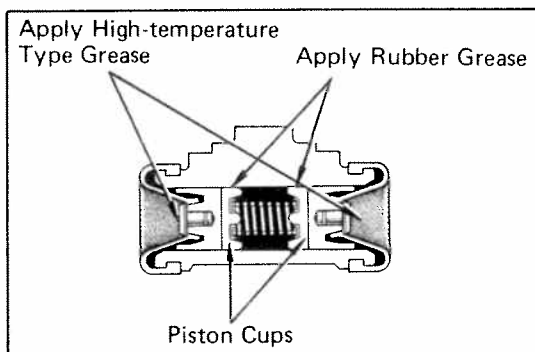
**1. IF NECESSARY, INSTALL AND ASSEMBLE WHEEL CYLINDER**

(a) Install the wheel cylinder on the backing plate with two bolts.

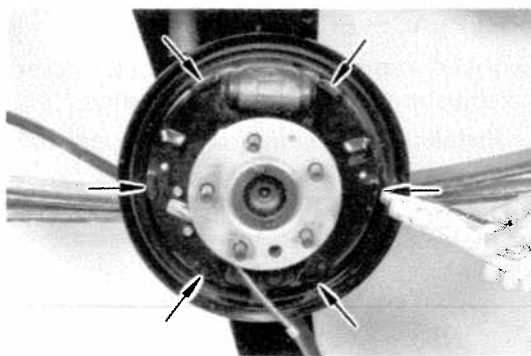
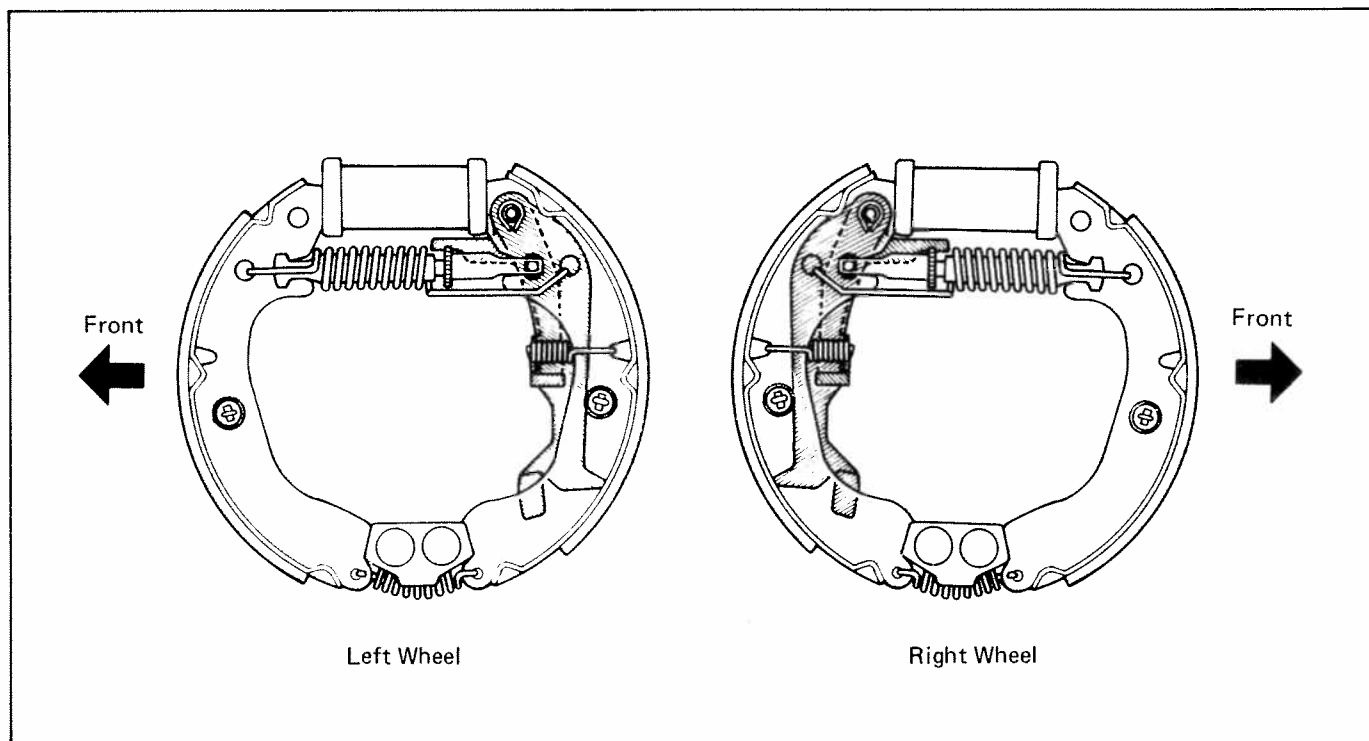
(b) Using a flare nut wrench\*, connect the brake line.

\*SST 09751-36011 or Commercial wrench

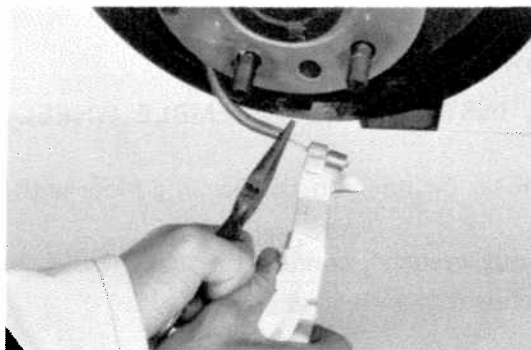




- (c) Apply rubber grease to the piston cups. Install the spring and two piston cups in the wheel cylinder. Make sure flanges of the cups are pointed inward.
- (d) Install the two pistons and boots to the cylinder.

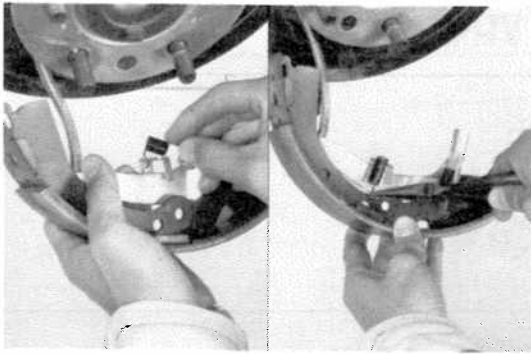


2. **APPLY GREASE ON BACKING PLATE, AS SHOWN**  
Use a high-temperature type grease.

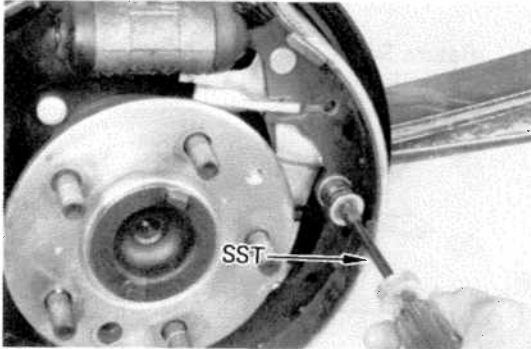


3. **INSTALL REAR BRAKE SHOE, LEVER AND STRUT**
  - (a) Connect the parking brake cable to the lever.





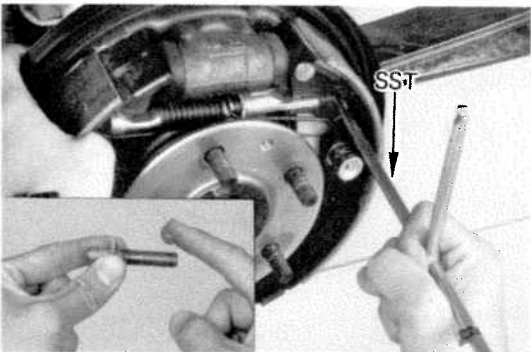
(b) Install the strut and spring to the lever.



(c) Set the rear brake shoe in place with the end of the shoe inserted in the wheel cylinder.

Using a hold-down spring tool\*, install the shoe hold-down spring and pin.

\*SST 09718-00010 or Commercial tool



#### 4. INSTALL FRONT BRAKE SHOE AND ADJUSTER

(a) Install the anchor spring between the front and rear shoes.

(b) Set the front brake shoe in place with the end of the shoe inserted in the wheel cylinder and the adjuster in place. Install the shoe hold-down spring and pin.

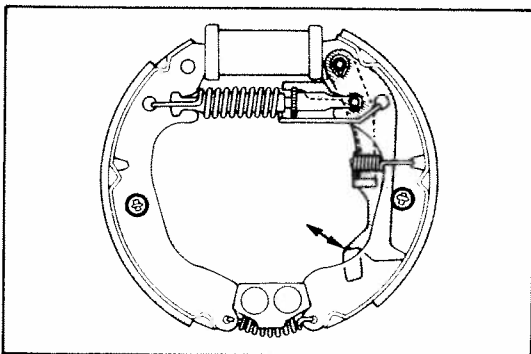
(c) Using a brake spring tool\*, install the return spring.

\*SST 09703-30010 or Commercial tool

#### 5. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM

Move adjuster back and forth, as shown. Check that the adjusting bolt turns.

If the bolt does not turn, check for incorrect installation of the rear brakes.

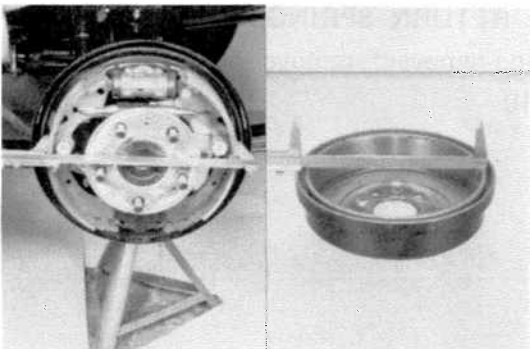


#### 6. ADJUST CLEARANCE BETWEEN BRAKE SHOES AND DRUM

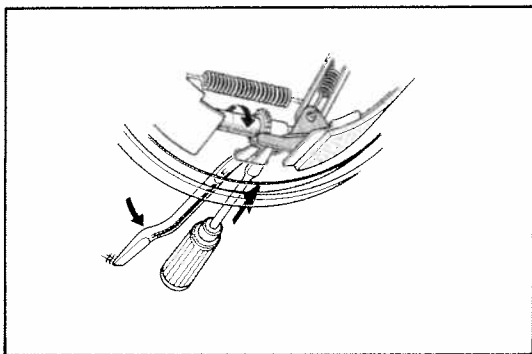
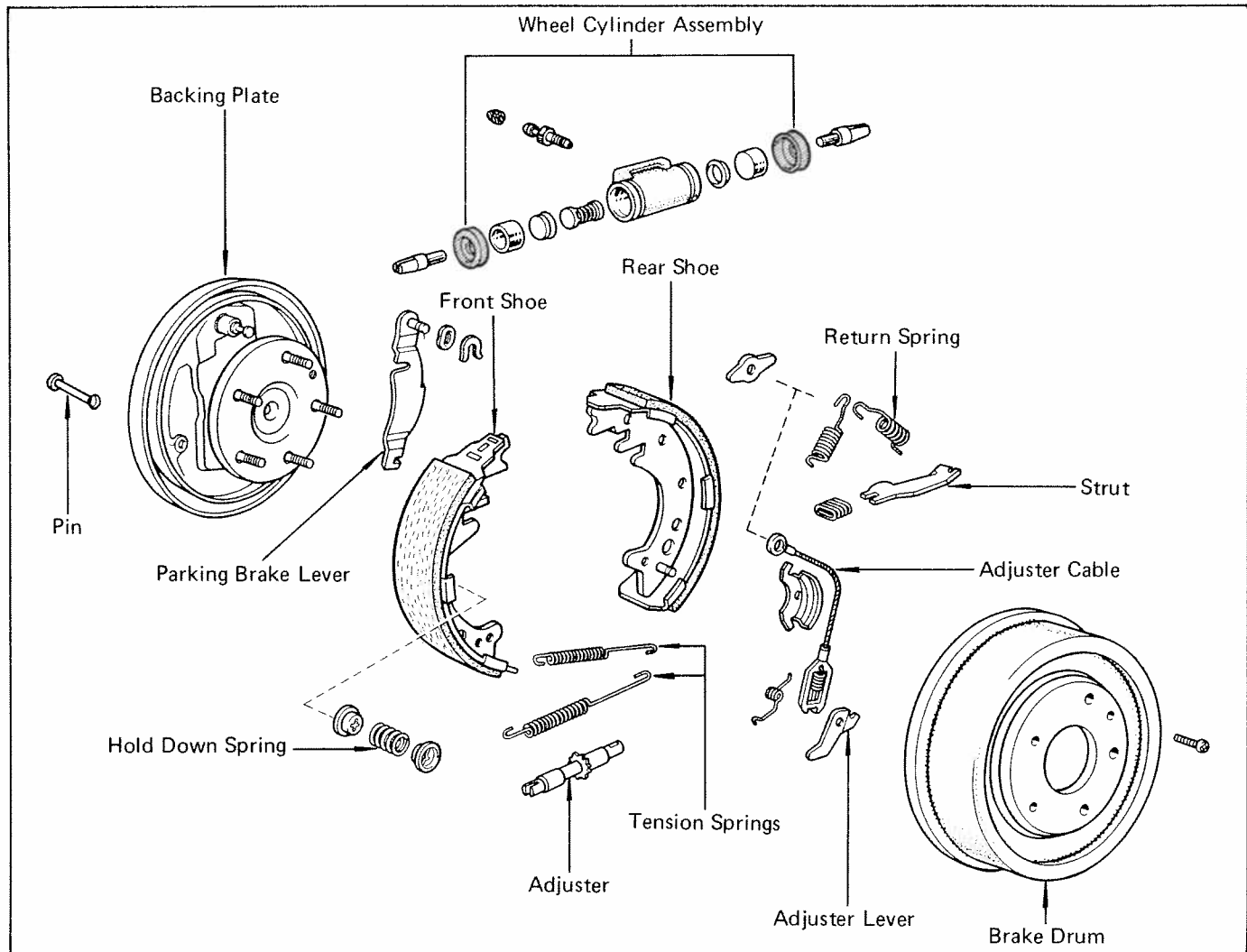
Measure the brake drum inside diameter and diameter of the brake shoes. Turn the adjusting bolt so that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

#### 7. INSTALL BRAKE DRUM AND REAR WHEEL



## Duo-Servo Type (C&C)



### REMOVAL OF REAR BRAKE

#### 1. REMOVE REAR WHEEL AND BRAKE DRUM

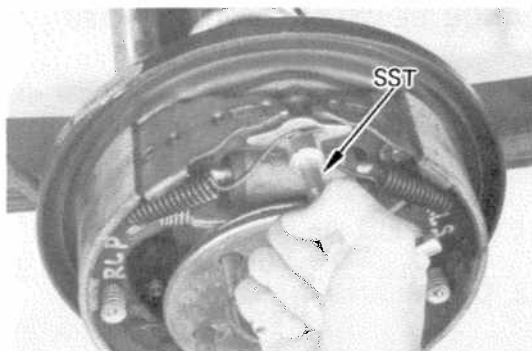
NOTE: If the brake drum cannot be removed easily, perform the following steps:

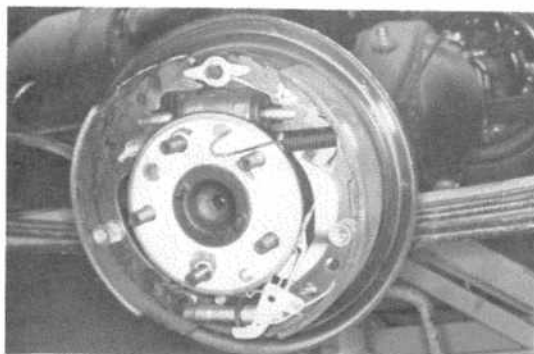
- Insert a screwdriver through the hole in the backing plate, and hold the adjuster lever away from the adjuster.
- Using another screwdriver, reduce the brake shoe adjustment by turning the adjuster.

#### 2. REMOVE SHOE RETURN SPRINGS

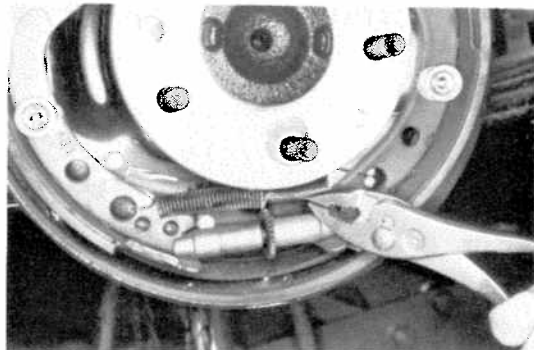
Using a brake spring remover\*, remove the return springs.

\*SST 09717-20010

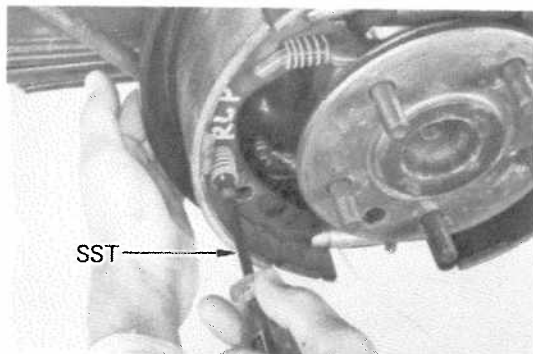




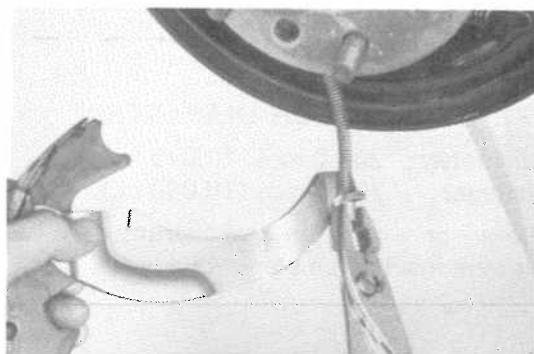
3. **REMOVE ADJUSTING CABLE, CABLE GUIDE AND ADJUSTING**



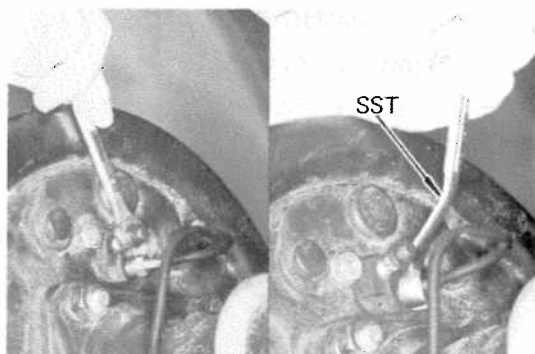
4. **REMOVE TWO TENSION SPRINGS**  
Using pliers, remove the two tension springs.



5. **REMOVE SHOES ADJUSTER AND STRUT**  
(a) Using a hold-down spring tool\*, remove the shoe hold-down springs and pins.  
\*SST 09718-00010 or Commercial tool  
(b) Remove the shoes, adjuster and strut.

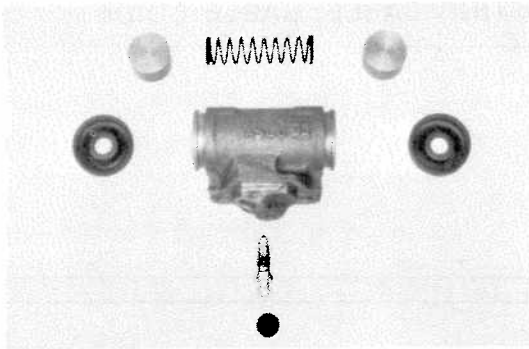


- (c) Disconnect the parking brake cable from the lever.



6. **IF NECESSARY, REMOVE AND DISASSEMBLE WHEEL CYLINDER**  
(a) Remove the bleeder plug and then, using a flare nut wrench\*, disconnect the line.  
Use a container to catch the brake fluid.  
\*SST 09751-36011 or Commercial wrench  
(b) Remove two bolts and the wheel cylinder.  
(c) Remove two rods, boots, pistons, piston cups and one spring from the cylinder.

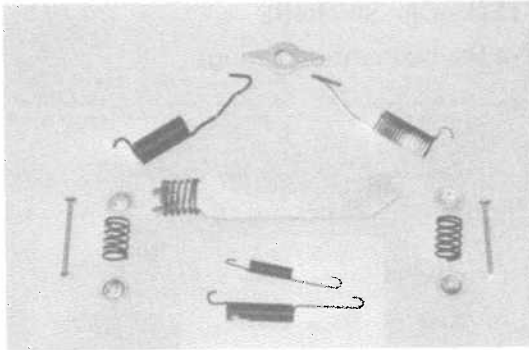
## INSPECTION OF REAR BRAKE COMPONENTS



1. CLEAN WHEEL CYLINDER COMPONENTS WITH BRAKE FLUID

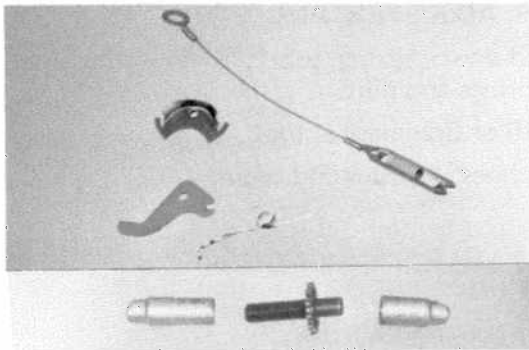
2. INSPECT PARTS FOR WEAR, DAMAGE OR CORROSION

Replace the parts as necessary.



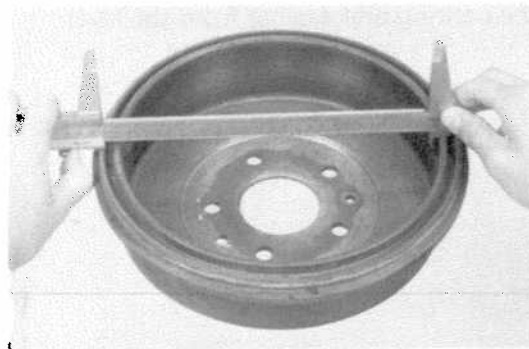
3. INSPECT SPRINGS AND STRUT FOR WEAR OR DAMAGE

Replace the parts as necessary.



4. INSPECT CABLE AND ADJUSTER FOR WEAR OR DAMAGE

Replace the parts as necessary.



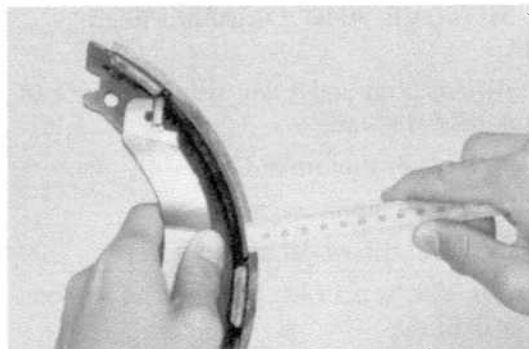
5. INSPECT BRAKE DRUM FOR CRACKS OR SCORING

6. MEASURE BRAKE DRUM INSIDE DIAMETER

Maximum inside diameter: 256.0 mm (10.079 in.)

Standard inside diameter: 254.0 mm (10.000 in.)

If the drum is scored or worn, the brake drum may be turned to the maximum inside diameter with a lathe.



7. MEASURE BRAKE SHOE LINING THICKNESS

Minimum thickness: 1.0 mm (0.039 in.)

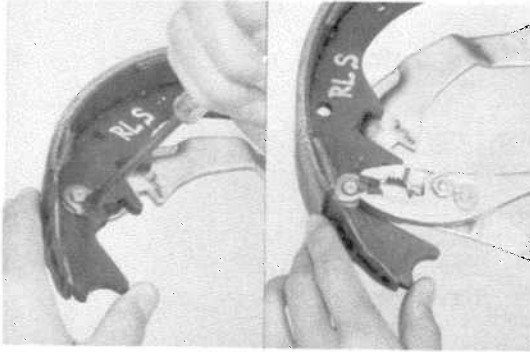
If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If any of the brake shoes have to be replaced, replace all the rear brake shoes to maintain effective brakes.



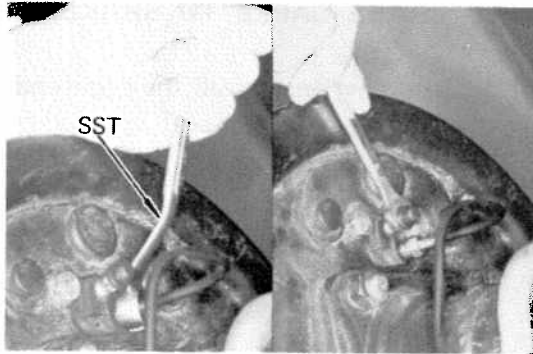
## 8. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

Replace the brake shoe or turn the brake drum, as necessary.



## 9. IF NECESSARY, REPLACE BRAKE SHOES

- (a) Using a screwdriver, remove the parking brake lever from the rear shoe.
- (b) Using pliers, install the parking brake lever with a new C washer.



## ASSEMBLY OF REAR BRAKE

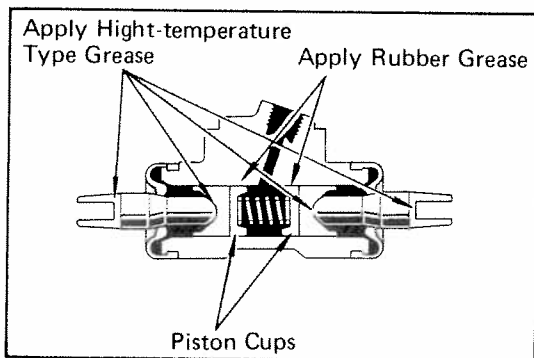
(See illustration on page 15-34 )

### 1. IF NECESSARY, ASSEMBLE AND INSTALL WHEEL CYLINDER

- (a) Install the wheel cylinder on the backing plate with two bolts.
- (b) Using a flare nut wrench\*, connect the brake line and install the bleeder plug.

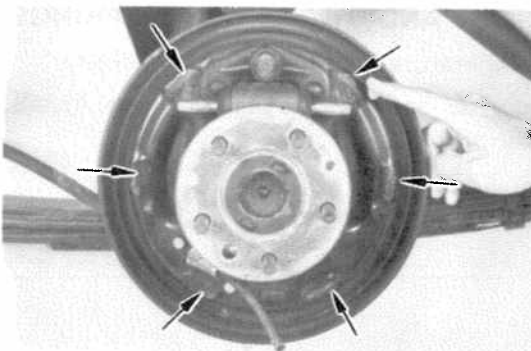
\*SST 09751-36011 or Commercial wrench

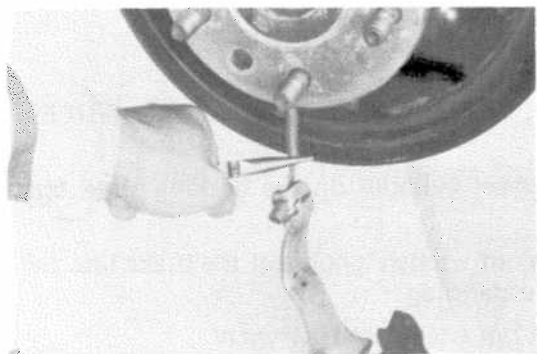
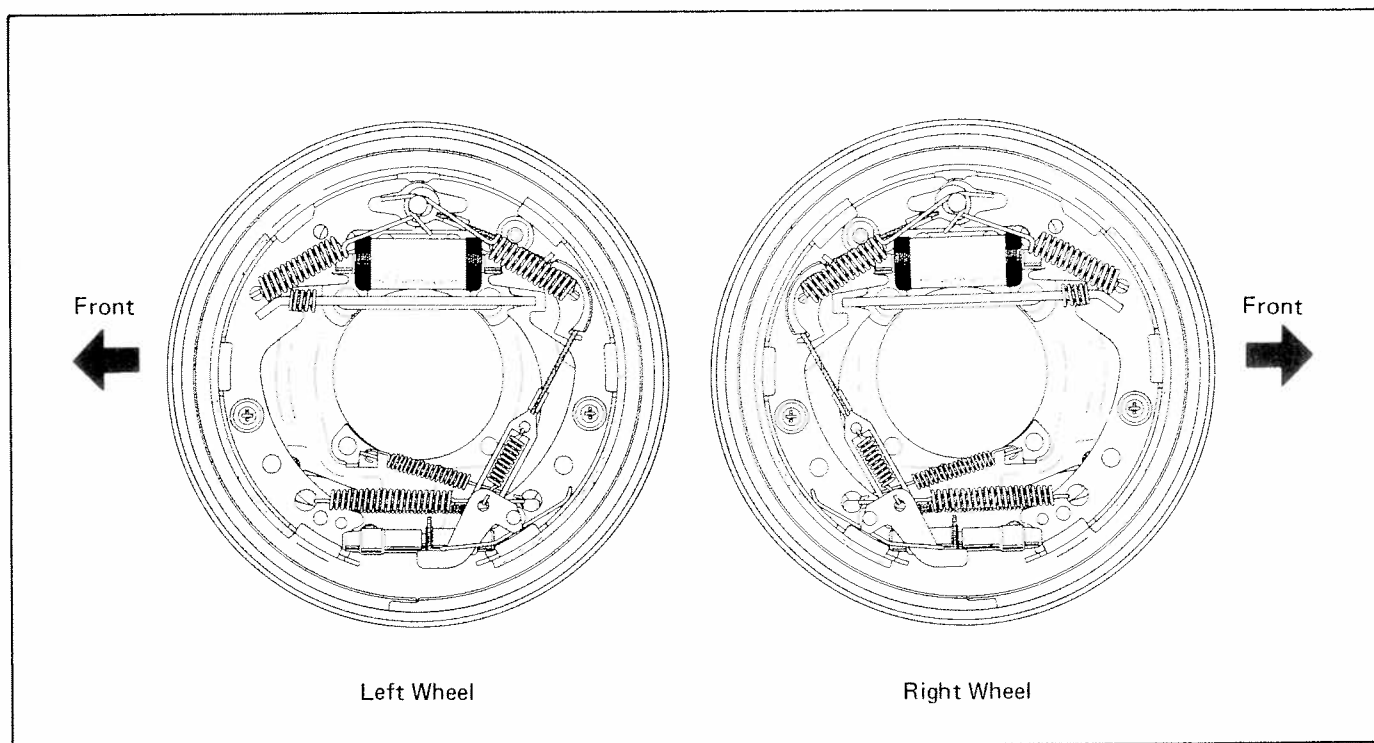
- (c) Apply rubber grease to the piston cups. Install the spring and two piston cups in the wheel cylinder. Make sure flanges of the cups are pointed inward.
- (d) Install the two pistons, boots and rods in the cylinder.



### 2. APPLY GREASE ON BACKING PLATE, AS SHOWN

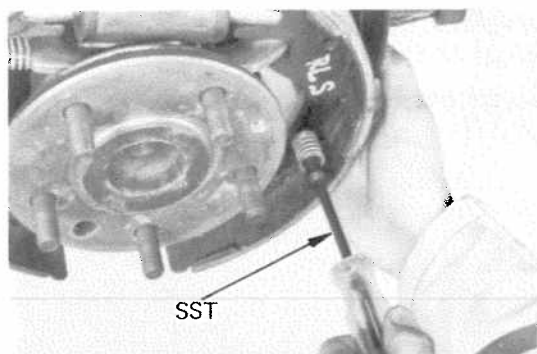
Use a high-temperature type grease.





### 3. CONNECT PARKING BRAKE CABLE TO BRAKE LEVER

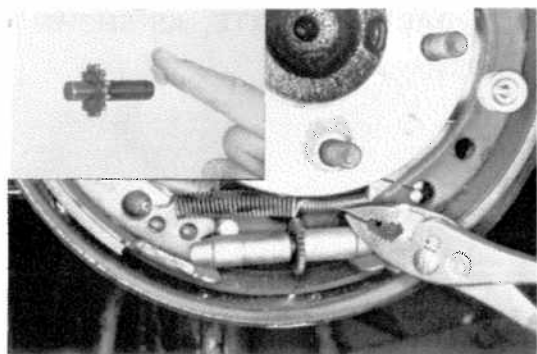
Using pliers, compress the spring and install the cable end to the lever.



### 4. INSTALL STRUT AND BRAKE SHOES

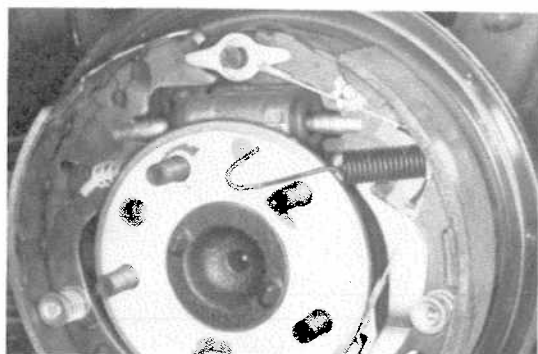
- (a) Install the strut with the spring forward.
- (b) Set the brake shoes in place with the ends of the shoes inserted in the piston rods and the strut in place. Using a brake spring driver\*, install the shoe hold-down springs and pins.

\*SST 09718-00010

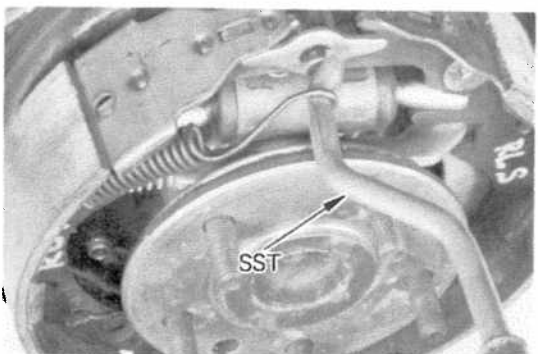


### 5. INSTALL ADJUSTER AND TWO TENSION SPRINGS

- (a) Apply high-temperature type grease to the adjuster.
- (b) Install the adjuster and using a pair of pliers, install the two tension springs.



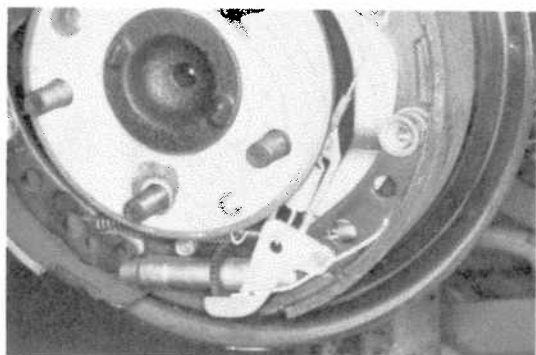
**6. INSTALL SHOE GUIDE PLATE, ADJUSTING CABLE AND CABLE GUIDE**



**7. INSTALL RETURN SPRINGS**

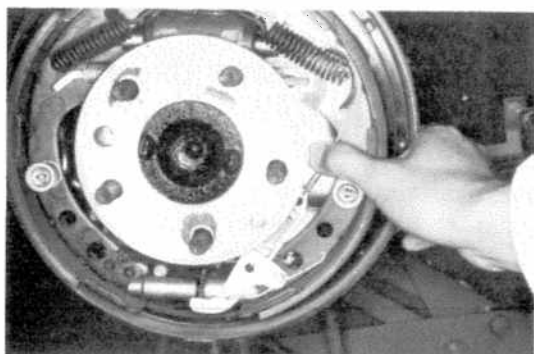
Using a brake spring replacer\*, install the front return spring and then install the rear return spring.

\*SST 09718-20010



**8. INSTALL ADJUSTING LEVER**

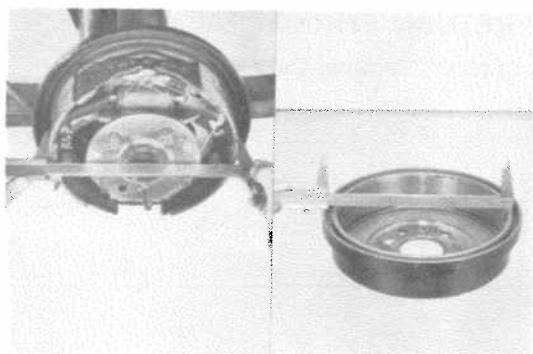
- (a) Install the tension spring to the rear shoe.
- (b) Hook the adjusting lever with the cable and install the lever.
- (c) Hold the adjusting lever with the tension spring.



**9. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM**

Pull the adjusting cable backward, as shown, and release. Check that the adjusting bolt turns.

If the bolt does not turn, check for incorrect installation of the rear brakes.



**10. ADJUST CLEARANCE BETWEEN BRAKE SHOES AND DRUM**

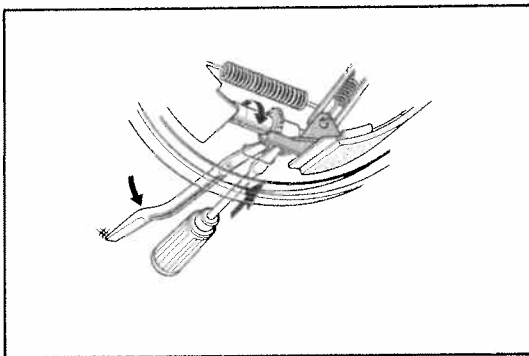
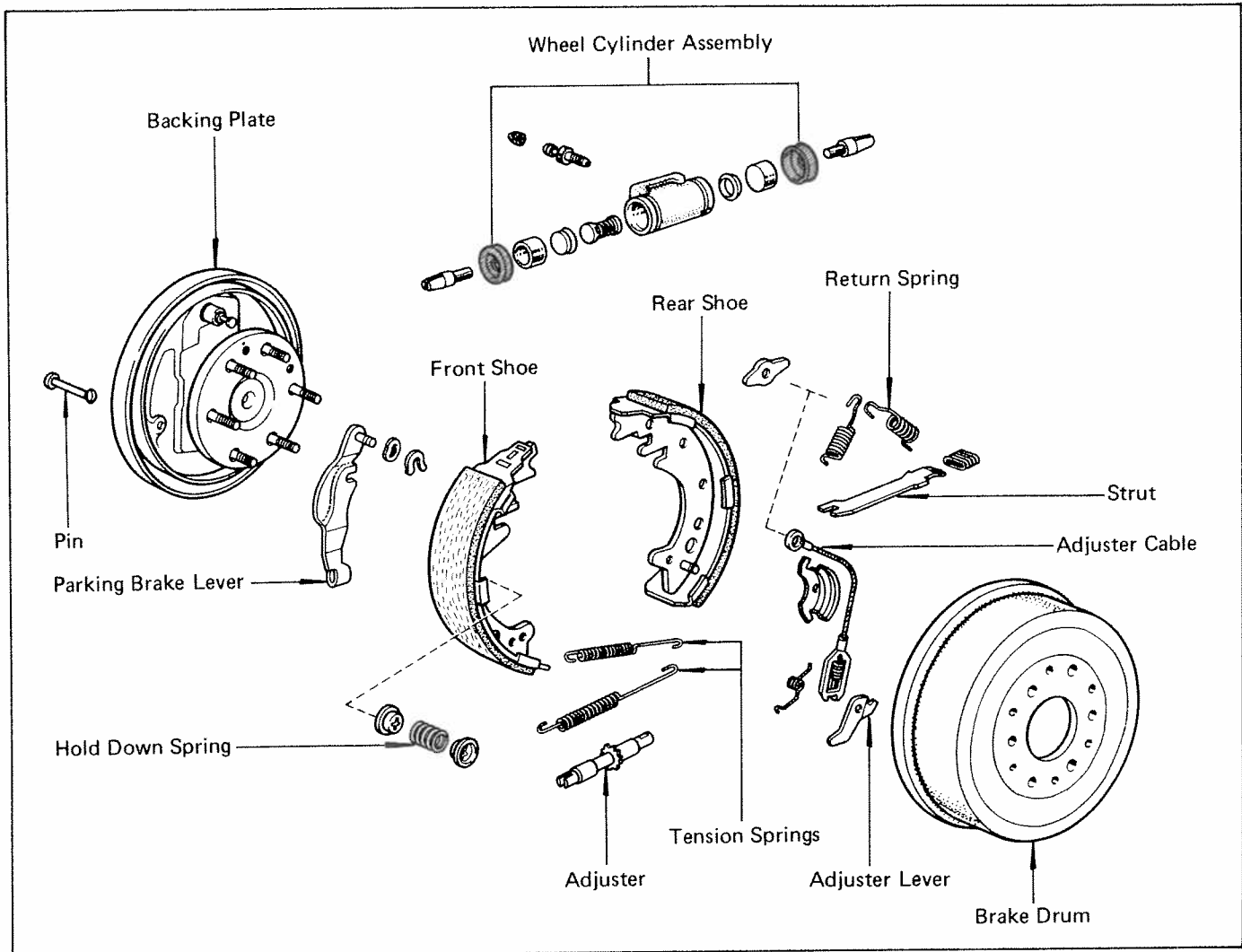
Measure the brake drum inside diameter and diameter of the brake shoes. Turn the adjusting bolt so that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

**11. INSTALL BRAKE DRUM AND REAR WHEEL**



## Duo-Servo Type (4×4)



### REMOVAL OF REAR BRAKE

#### 1. REMOVE REAR WHEEL AND BRAKE DRUM

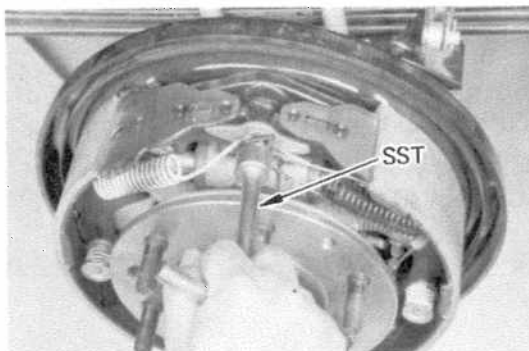
NOTE: If the brake drum cannot be removed easily, perform the following steps:

- (a) Insert a screwdriver through the hole in the backing plate, and hold the adjuster lever away from the adjuster.
- (b) Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.

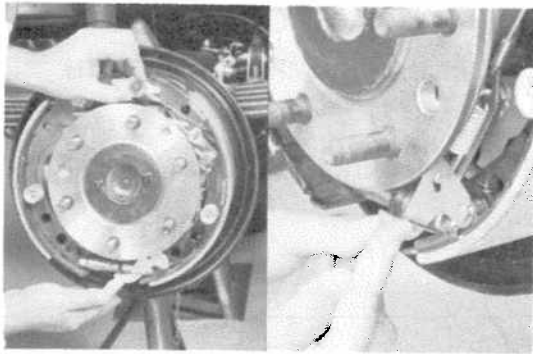
#### 2. REMOVE SHOE RETURN SPRING

Using a brake spring tool\*, remove the return spring.

\*SST 09717-20010

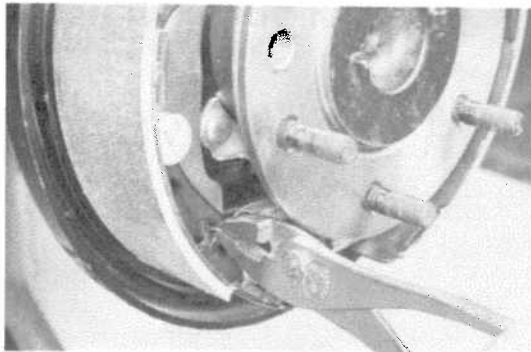






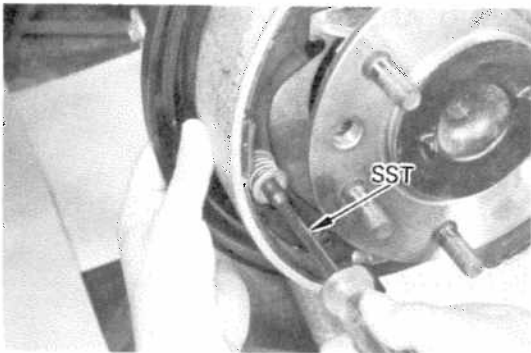
**3. REMOVE ADJUSTING CABLE, CABLE GUIDE AND ADJUSTING LEVER**

- (a) Push up the lever and remove the cable and cable guide.
- (b) Take off the spring from the lever and remove the lever and spring.



**4. REMOVE TWO TENSION SPRINGS**

Using pliers, remove the two tension springs.

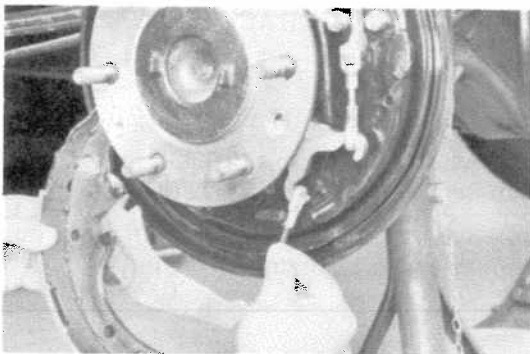


**5. REMOVE SHOES, ADJUSTER AND STRUT**

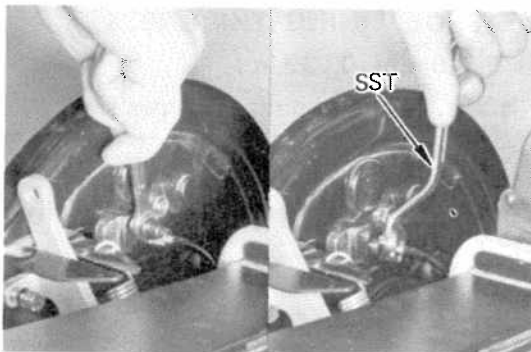
- (a) Using a hold-down spring tool\*, remove the shoe hold-down springs and pins.

\*SST 09718-00010 or Commercial tool

- (b) Remove the shoes, adjuster and strut.



- (c) Disconnect the parking brake cable from the bell-crank.



**6. IF NECESSARY, REMOVE AND DISASSEMBLE WHEEL CYLINDER**

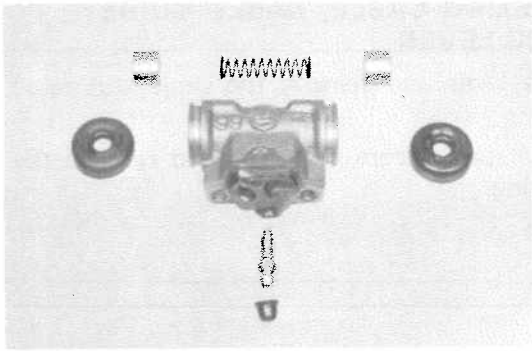
- (a) Remove the bleeder plug and then, using a flare nut wrench\*, disconnect the line.

Use a container to catch the brake fluid.

\*SST 09751-36011 or Commercial wrench

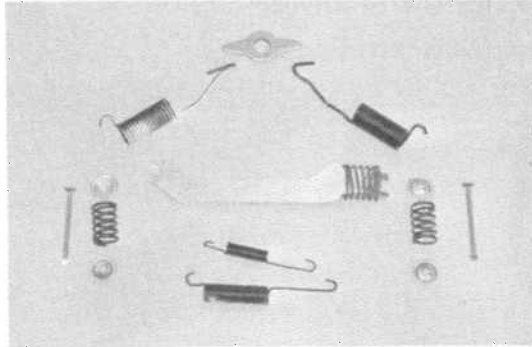
- (b) Remove two bolts and the wheel cylinder.
- (c) Remove two rods, boots, pistons, piston cups and one spring from the cylinder.

## INSPECTION OF REAR BRAKE COMPONENTS



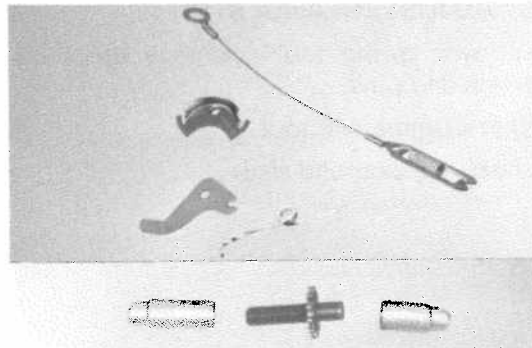
1. **CLEAN WHEEL CYLINDER COMPONENTS WITH BRAKE FLUID**
2. **INSPECT PARTS FOR WEAR, DAMAGE OR CORROSION**

Replace the parts as necessary.



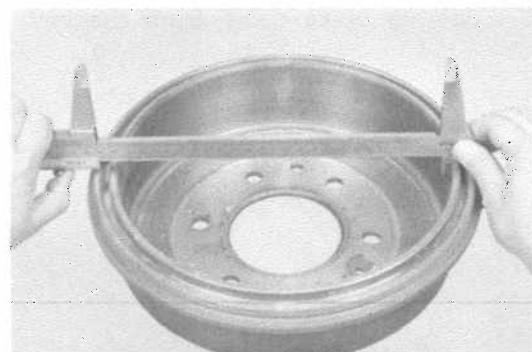
3. **INSPECT SPRINGS AND STRUT FOR WEAR OR DAMAGE**

Replace the parts as necessary.



4. **INSPECT CABLE AND ADJUSTER FOR WEAR OR DAMAGE**

Replace the parts as necessary.



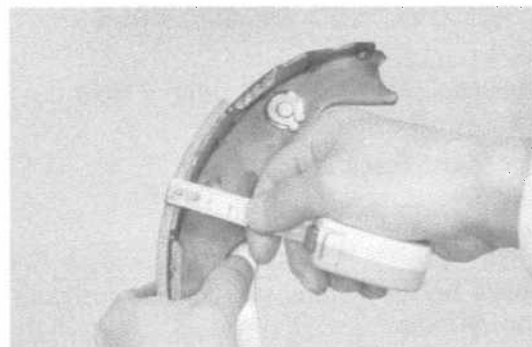
5. **INSPECT BRAKE DRUM FOR CRACKS OR SCORING**

6. **MEASURE BRAKE DRUM INSIDE DIAMETER**

Maximum inside diameter: 256.0 mm (10.079 in.)

Standard inside diameter: 254.0 mm (10.000 in.)

If the drum is scored or worn, the brake drum may be turned to the maximum inside diameter with a lathe.

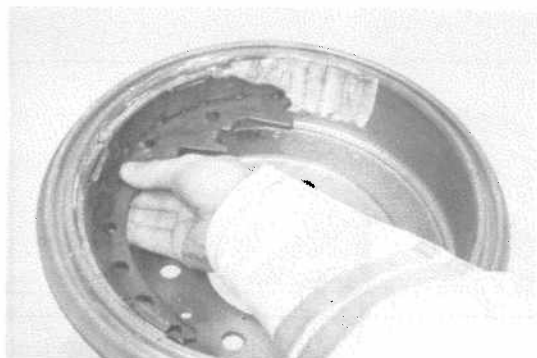


7. **MEASURE BRAKE SHOE LINING THICKNESS**

Minimum thickness: 1.0 mm (0.039 in.)

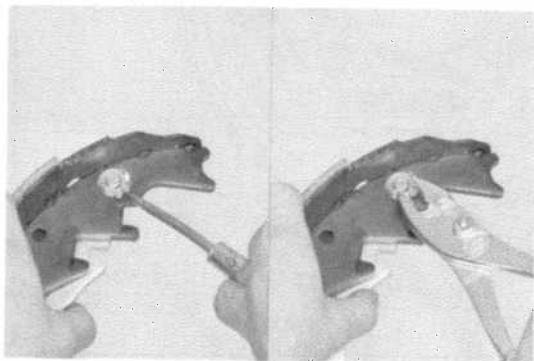
If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If any of the brake shoes have to be replaced, replace all the rear brake shoes to maintain effective brakes.



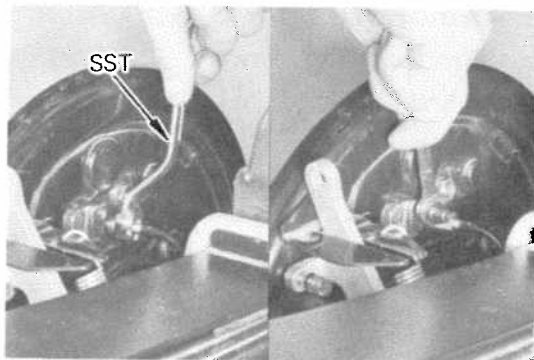
### 8. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

Replace the brake shoe or turn the brake drum, as necessary.



### 9. IF NECESSARY, REPLACE BRAKE SHOES

- (a) Using a screwdriver, remove the parking brake lever from the front shoe.
- (b) Using pliers, install the parking brake lever with a new C washer.



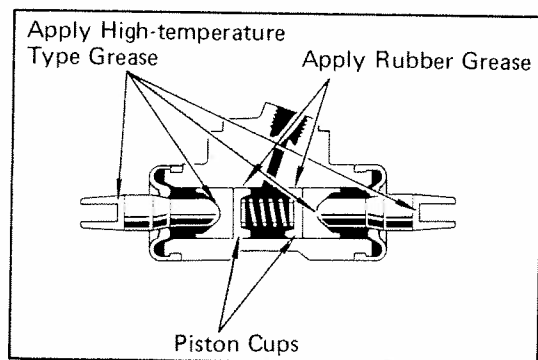
## ASSEMBLY OF REAR BRAKES (See illustration on page 15-40)

### 1. IF NECESSARY, ASSEMBLE AND INSTALL WHEEL CYLINDER

- (a) Install the wheel cylinder on the backing plate with two bolts.
- (b) Using a flare nut wrench\*, connect the brake line and install the bleeder plug.

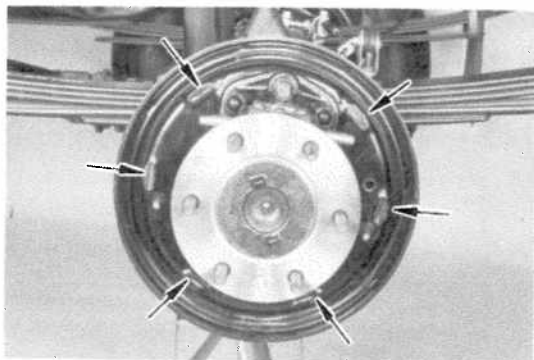
\*SST 09751-36011 or Commercial wrench

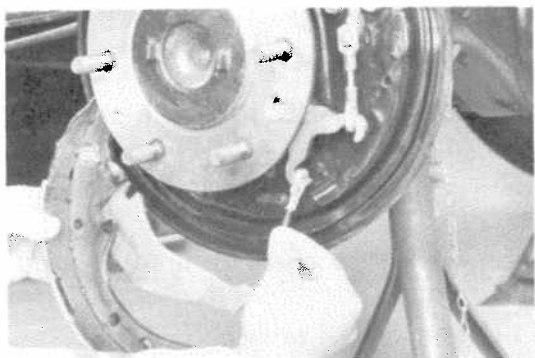
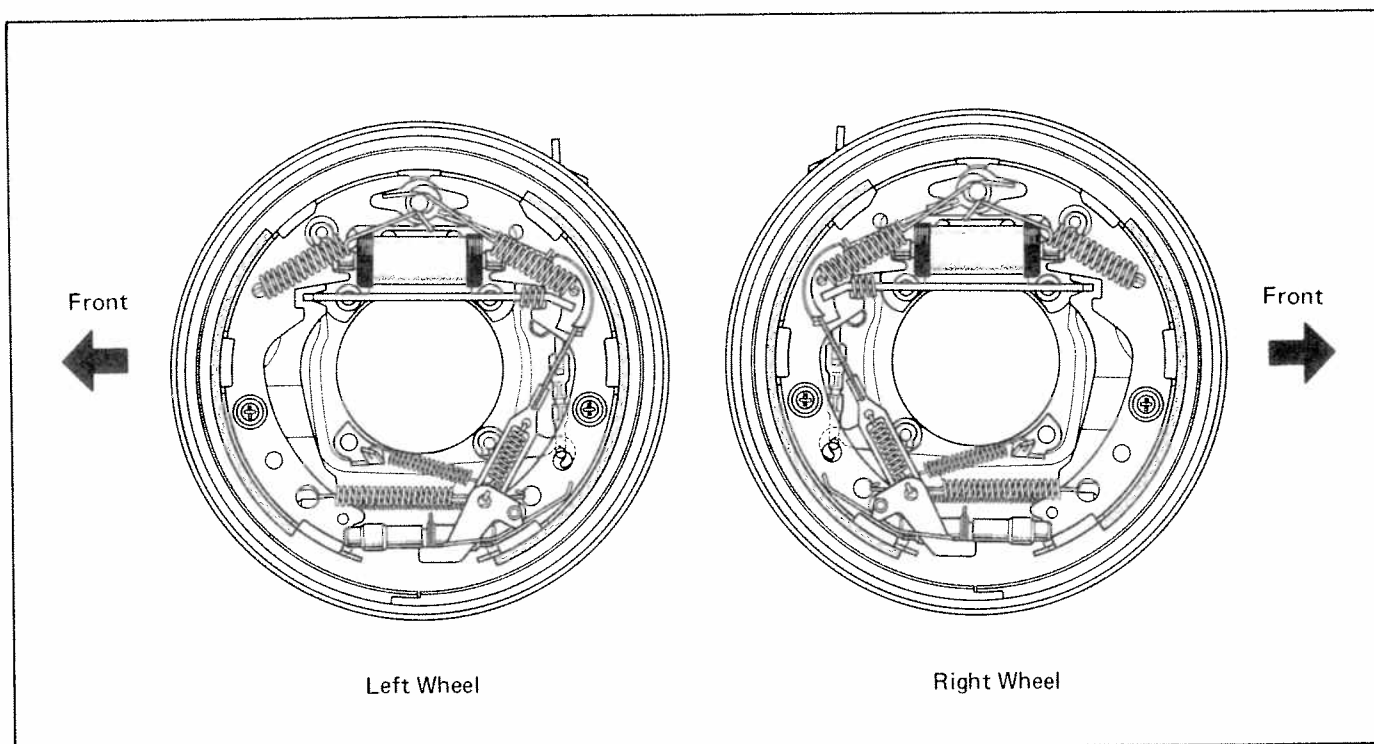
- (c) Apply rubber grease to the piston cups. Install the spring and two piston cups in the wheel cylinder. Make sure flanges of the cups are pointed inward.
- (d) Install the two pistons, boots and rods in the cylinder.



### 2. APPLY GREASE ON BACKING PLATE, AS SHOWN

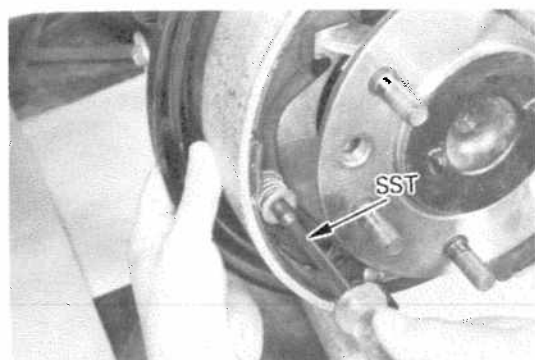
Use a high-temperature type grease.





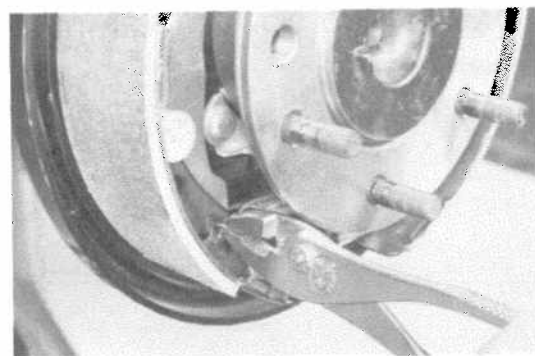
### 3. INSTALL STRUT AND SHOES

- (a) Install the strut with the spring rearward.
- (b) Install the parking brake cable to the bellcrank.



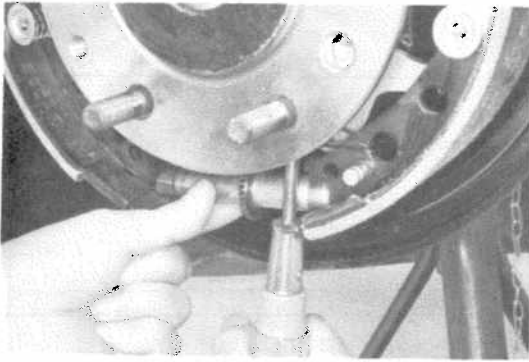
- (c) Set the brake shoes in place with the ends of the shoes inserted in the piston rods and the strut in place. Using a hold-down spring tool\*, install the shoe hold-down springs and pins.

\*SST 09718-00010 or Commercial tool

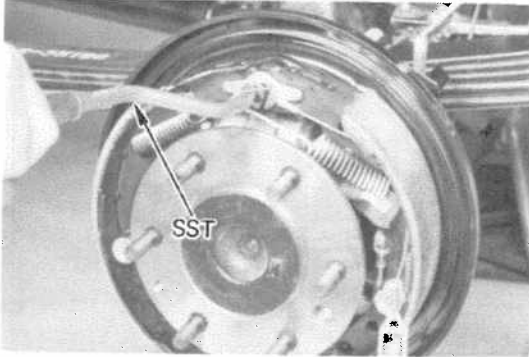


### 4. INSTALL TWO TENSION SPRINGS

Using pliers, install the two tension springs.

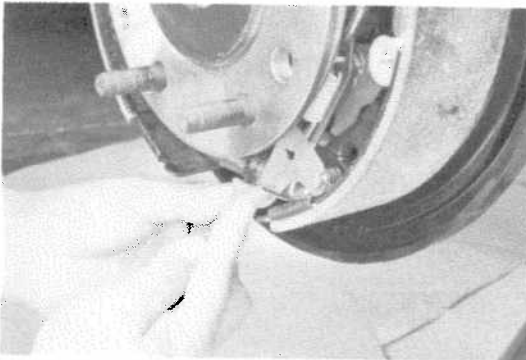
**5. INSTALL ADJUSTER**

Using a screw driver, open the shoes and install the adjuster.

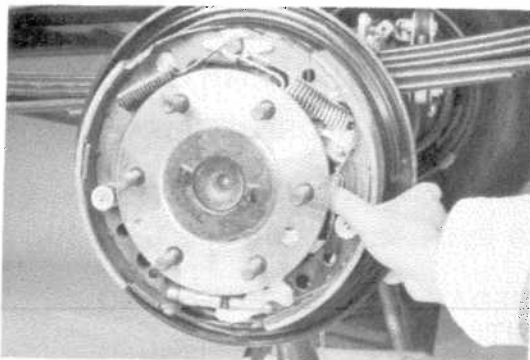
**6. INSTALL ADJUSTING CABLE AND RETURN SPRINGS**

- (a) Install the shoe guide plate, cable guide and adjusting cable.
- (b) Using a brake spring replacer\*, install the front return spring and then install the rear return spring.

\*SST 09718-20010

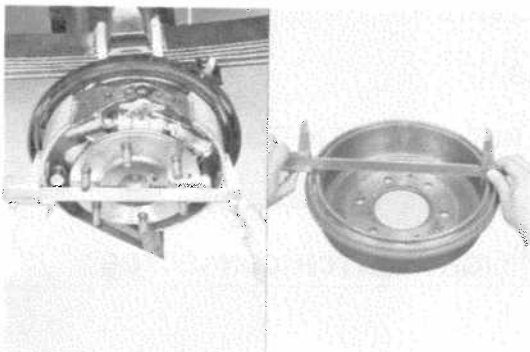
**7. INSTALL ADJUSTING LEVER**

- (a) Install the tension spring to the rear shoe.
- (b) Hook the adjusting lever with the cable and install the lever.
- (c) Hold the adjusting lever with the tension spring.

**8. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM**

Pull the adjusting cable backward as shown, and release. Check that the adjusting bolt turns.

If the bolt does not turn, check for incorrect installation of the rear brakes.

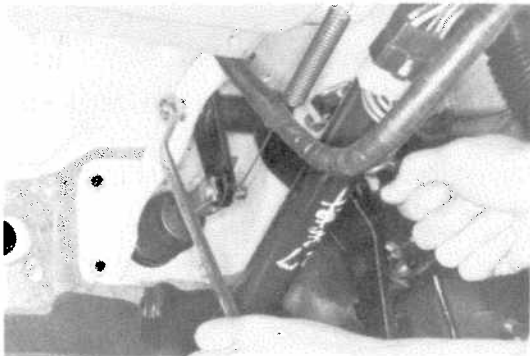
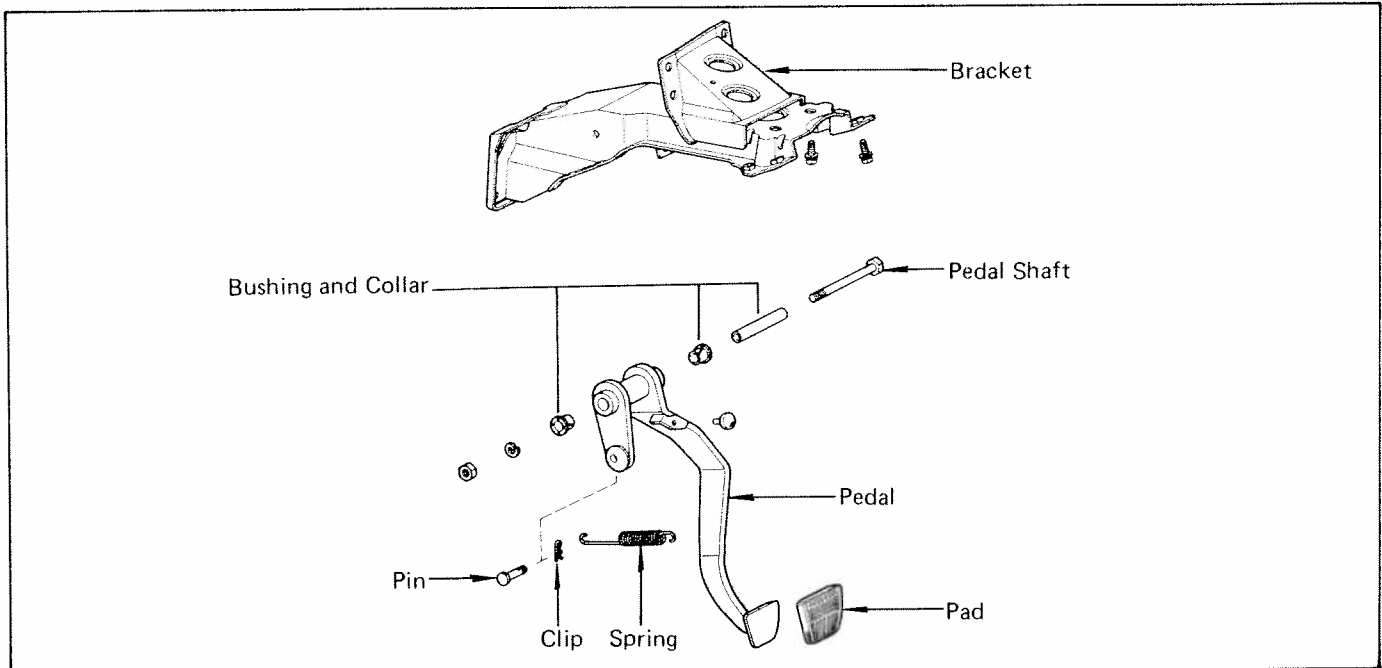
**9. ADJUST CLEARANCE BETWEEN BRAKE SHOES AND DRUM**

Measure the brake drum inside diameter and diameter of the brake shoes. Turn the adjusting bolt so that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

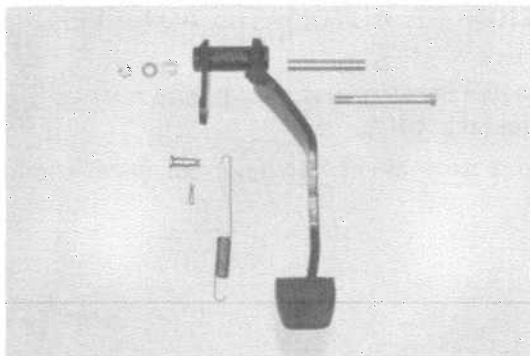
**10. INSTALL BRAKE DRUM AND REAR WHEEL**

## BRAKE PEDAL



### REMOVAL OF BRAKE PEDAL

1. DISCONNECT STOP LIGHT SWITCH CONNECTOR
2. REMOVE PUSH ROD PIN  
Remove the clip and pull out the push rod pin.
3. REMOVE SPRING
4. REMOVE PEDAL SHAFT
5. REMOVE BRAKE PEDAL WITH BUSHINGS AND COLLAR

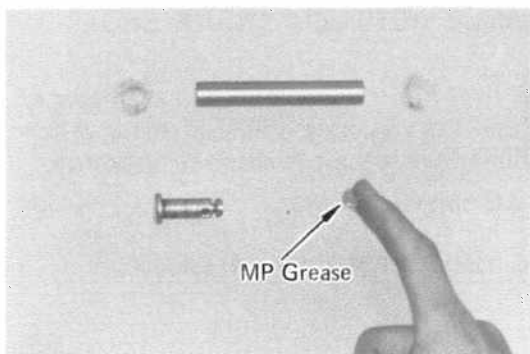


### INSPECTION OF BRAKE PEDAL PARTS

INSPECT ALL PARTS FOR WEAR OR DAMAGE

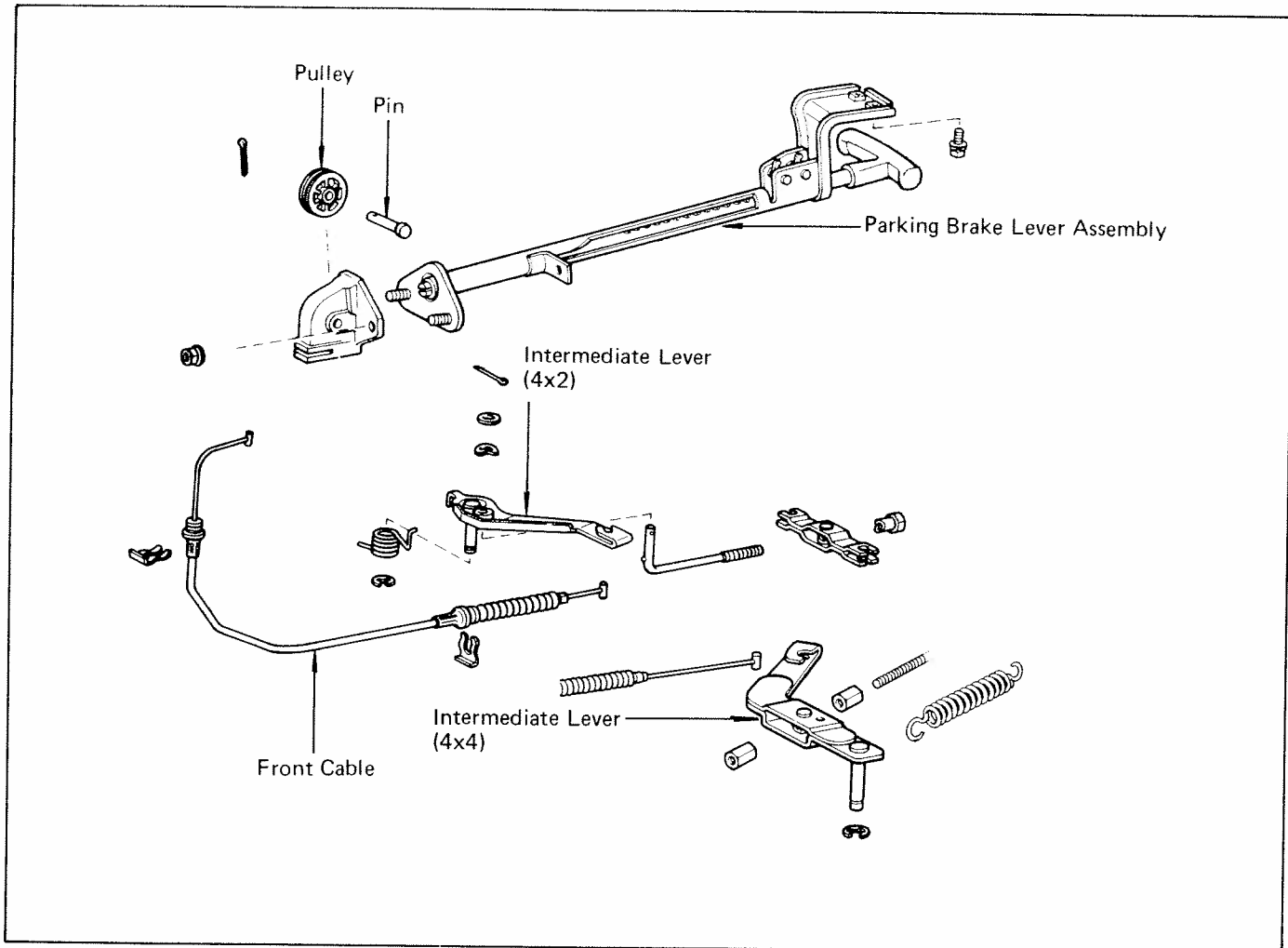
### INSTALLATION OF BRAKE PEDAL

1. COAT BUSHINGS WITH MULTIPURPOSE GREASE
2. PLACE BRAKE PEDAL WITH BUSHINGS AND COLLAR IN POSITION
3. INSTALL PEDAL SHAFT
4. INSTALL SPRING
5. INSTALL PUSH ROD PIN WITH CLIP
6. ADJUST PEDAL HEIGHT (See page 15-6)
7. CONNECT STOP LIGHT SWITCH CONNECTOR



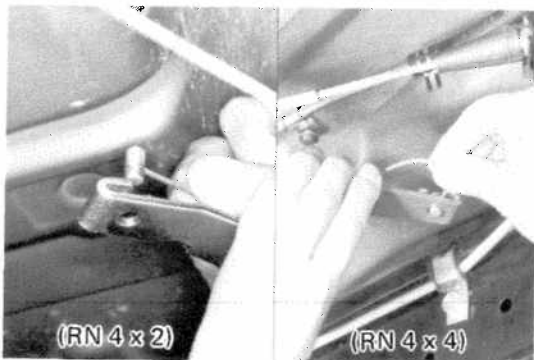
## PARKING BRAKE

### Parking Brake Lever and Front Cable



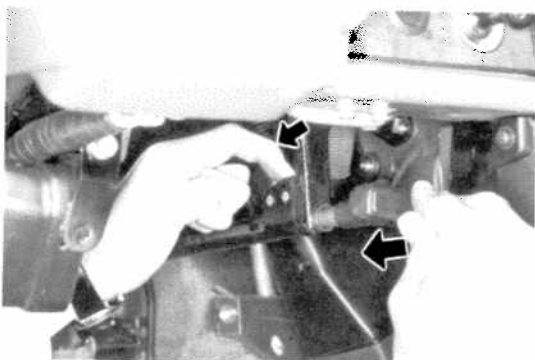
### REMOVAL OF PARKING BRAKE LEVER AND FRONT CABLE

1. DISCONNECT FRONT CABLE FROM INTERMEDIATE LEVER

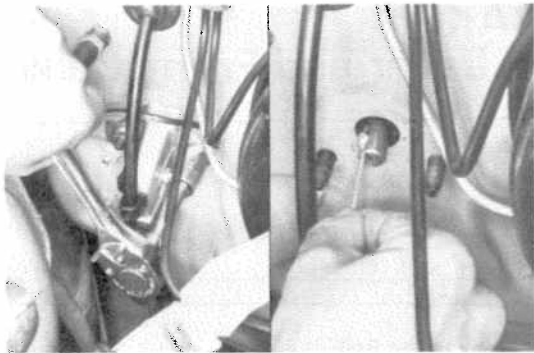


2. PUSH PARKING BRAKE PAWL AND COMPLETELY RETURN PARKING BRAKE LEVER

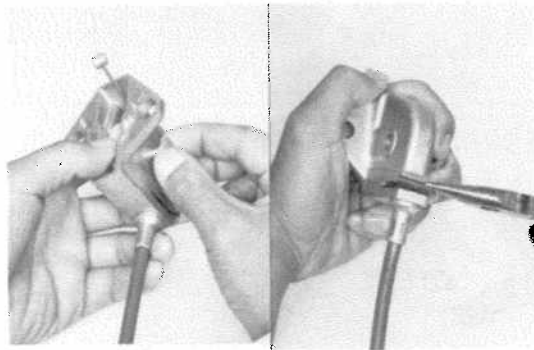
- (a) Remove the parking brake indicator light switch.
- (b) Push the parking brake pawl and completely return the parking brake lever.



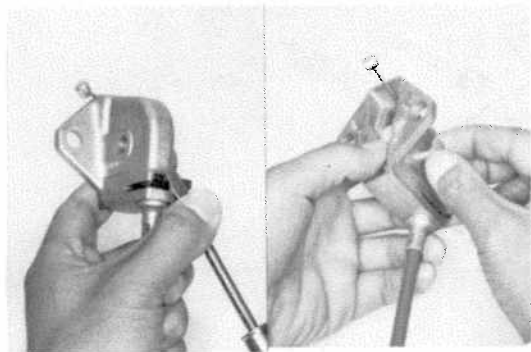




3. **REMOVE PULLEY BRACKET WITH FRONT CABLE FROM PARKING BRAKE LEVER SHAFT**  
Remove the bracket and disconnect the front cable from the shaft.

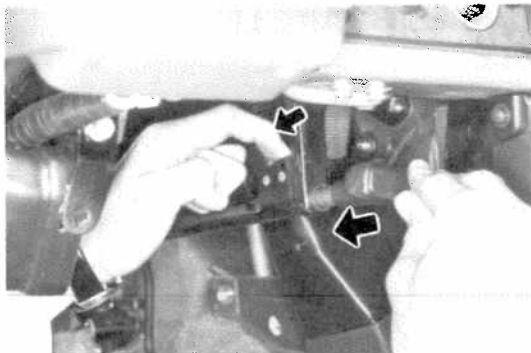


4. **REMOVE FOLLOWING PARTS FROM PULLEY BRACKET:**
  - (a) Pulley pin
  - (b) Pulley
  - (c) Clip
  - (d) Front cable

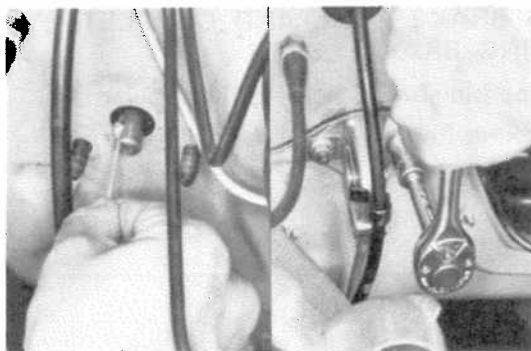


### **INSTALLATION OF PARKING BRAKE LEVER AND FRONT CABLE** (See illustration on page 15-47)

1. **INSTALL FRONT CABLE AND PULLEY TO PULLEY BRACKET**
  - (a) Insert the front cable in the bracket and secure it with a clip.
  - (b) Coat the pulley pin with multipurpose grease.
  - (c) Install the pulley and pulley pin, and secure the pin with a cotter pin.



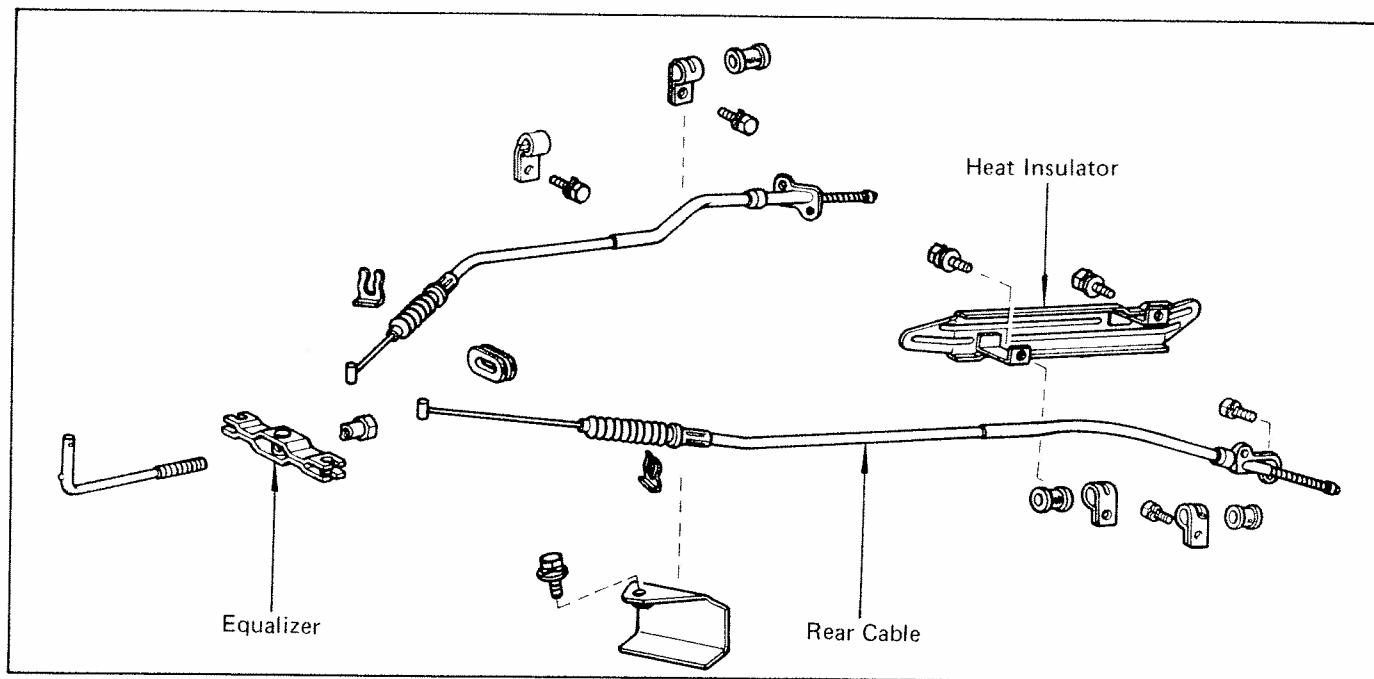
2. **PUSH PARKING BRAKE PAWL AND COMPLETELY RETURN PARKING BRAKE LEVER**



3. **CONNECT FRONT CABLE TO PARKING BRAKE LEVER SHAFT**
4. **INSTALL PULLEY BRACKET**
5. **INSTALL PARKING BRAKE INDICATOR LIGHT SWITCH**
6. **CONNECT FRONT CABLE TO INTERMEDIATE LEVER**
7. **ADJUST PARKING BRAKE** (See page 15-7)



## Rear Cable (4×2)



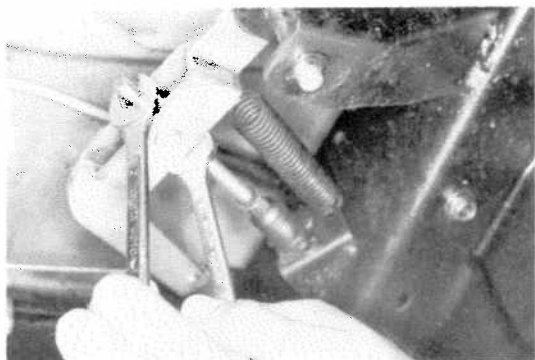
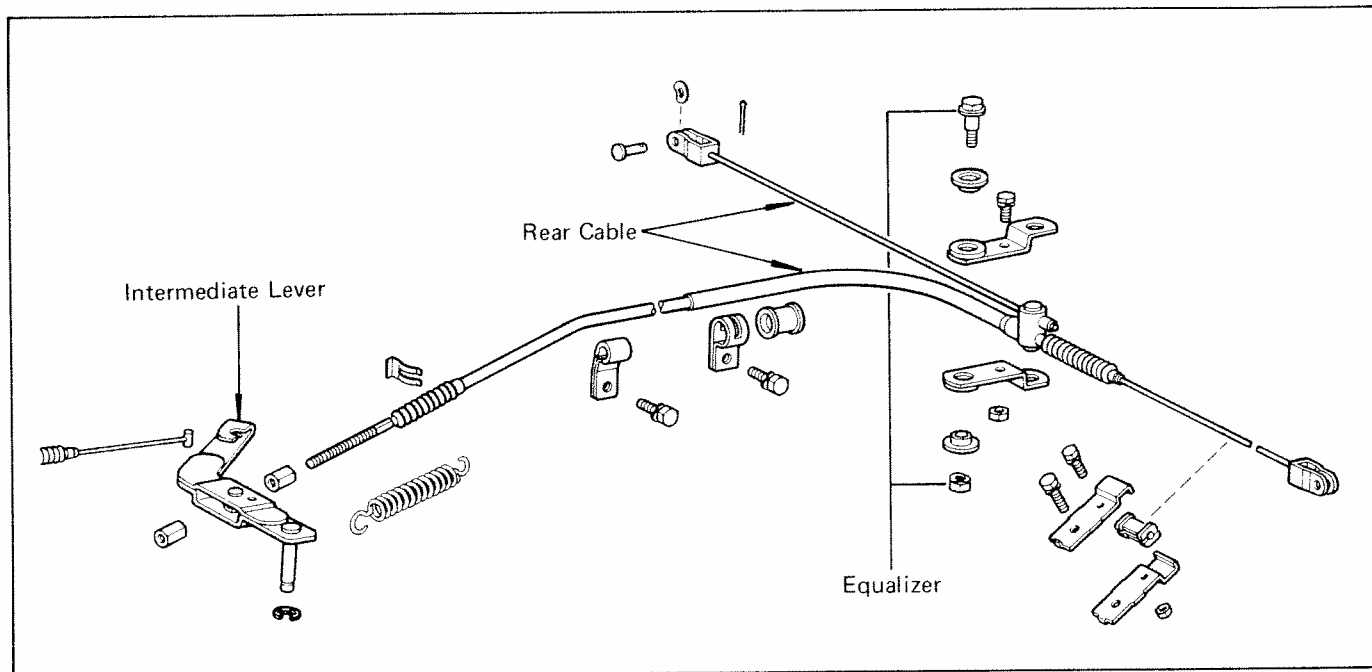
### REMOVAL OF REAR CABLE

1. DISCONNECT REAR CABLE FROM EQUALIZER
2. REMOVE CLIP AND CLAMPS
3. DISASSEMBLE REAR BRAKES AND DISCONNECT REAR CABLE FROM LEVER (See page 15-29 or 15-34)
4. REMOVE REAR CABLE FROM BACKING PLATE

### INSTALLATION OF REAR CABLE

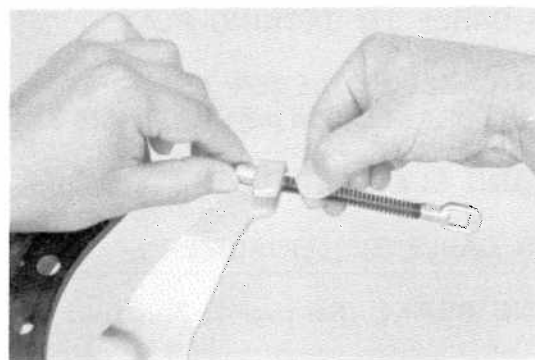
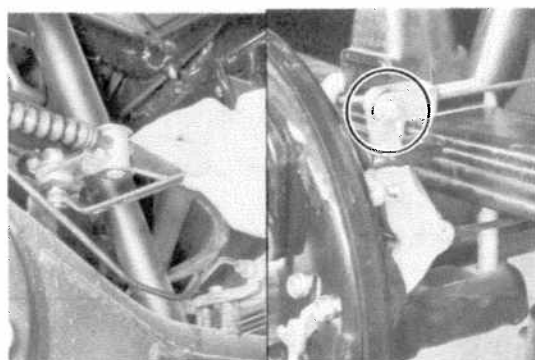
1. INSTALL REAR CABLE TO BACKING PLATE
2. CONNECT REAR CABLE TO LEVER AND ASSEMBLE REAR BRAKES (See page 15-31 or 15-37)
3. INSTALL CLIP AND CLAMPS
4. CONNECT REAR CABLE TO EQUALIZER
5. ADJUST PARKING BRAKE (See page 15-7)

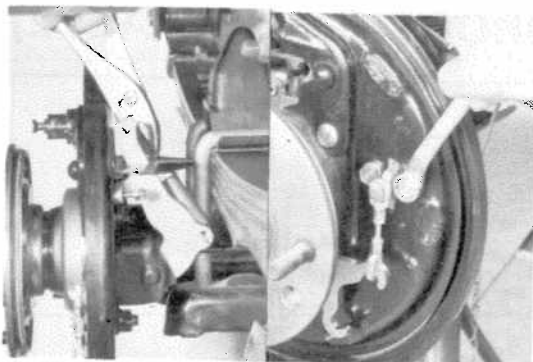
## Rear Cable (4×4)



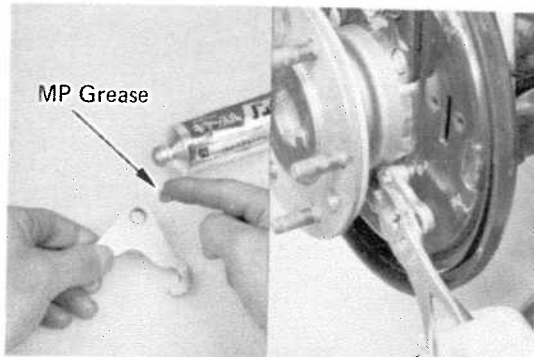
### REMOVAL OF REAR CABLE

1. DISCONNECT REAR CABLE FROM INTERMEDIATE LEVER
2. REMOVE CLIP AND CLAMPS
3. REMOVE EQUALIZER AND CABLE GUIDE FROM REAR AXLE HOUSING
4. DISCONNECT REAR CABLE FROM BELLCRANK
5. DISASSEMBLE REAR BRAKES AND REMOVE WIRE FROM LEVER (See page 15-40)



**6. REMOVE FRONT AND REAR BELLCRANKS**

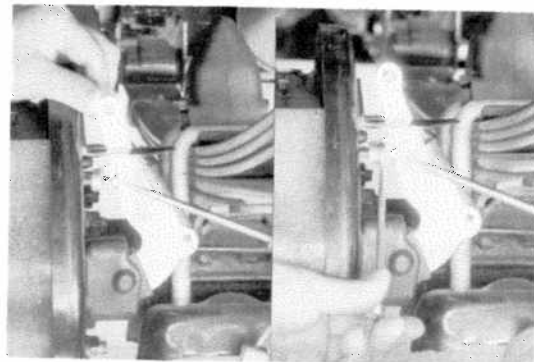
- (a) Remove the spring from the rear bellcrank.
- (b) Remove the two bellcranks and the wire.

**INSTALLATION OF REAR CABLE  
(See illustration on page 15-50 )****1. INSTALL FRONT AND REAR BELLCRANKS**

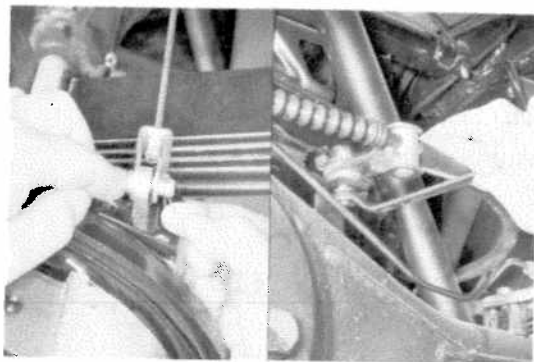
- (a) Coat the front bellcrank with multipurpose grease.
- (b) Using pliers, install the front bellcrank.
- (c) Install the wire, rear bellcrank and spring.

**2. ASSEMBLE REAR BRAKE (See page 15-43)****3. ADJUST REAR BELLCRANK STOPPER SCREW**

- (a) Tighten the bellcrank stopper screw until the play of the rear brake links become zero, and then loosen the screw one turn.
- (b) Tighten the screw lock nut.

**4. INSTALL REAR CABLE**

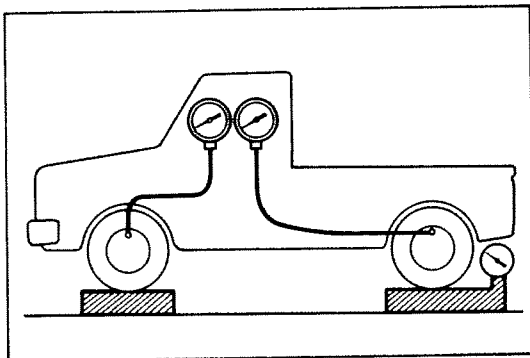
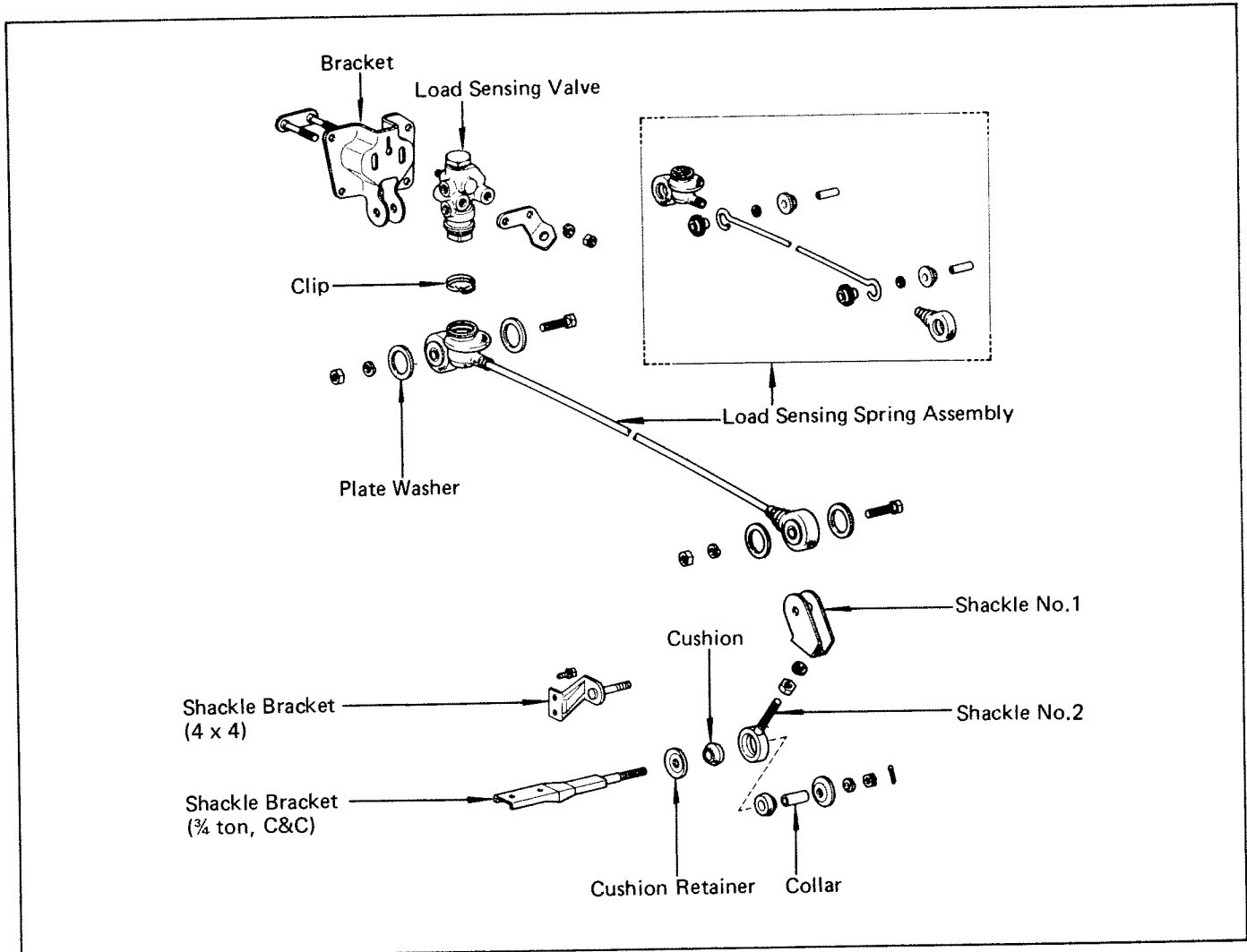
- (a) Connect the rear cable to the rear bellcrank.
- (b) Install the equalizer and cable guide to the rear axle housing.



- (c) Connect the rear cable to the intermediate lever.
- (d) Install the clip and clamps.

**5. ADJUST PARKING BRAKE (See page 15-7)**

# LSPV (LOAD SENSING PROPORTIONING VALVE)



## CHECK AND ADJUSTMENT OF FLUID PRESSURE

### 1. SET REAR AXLE LOAD

Rear axle load (include vehicle weight):

3/4 ton, C&C	600 kg (1,323 lb)
4 x 4	650 kg (1,433 lb)

### 2. INSTALL LSPV GAUGE\* AND BLEED AIR

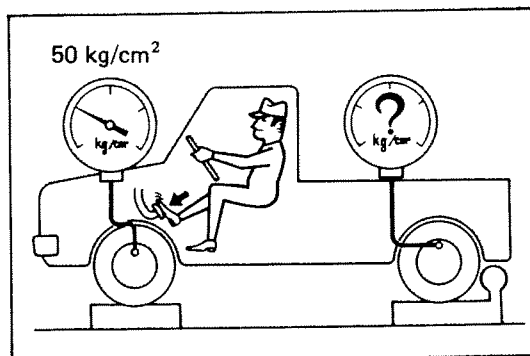
\*SST 09705-29017

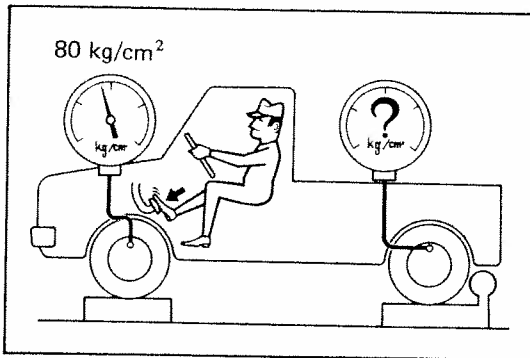
### 3. RAISE FRONT BRAKE PRESSURE TO 50 kg/cm<sup>2</sup> (711 psi) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure: 33 ± 5 kg/cm<sup>2</sup> (469 ± 71 psi)

NOTE: Brake pedal should not be depressed twice and/or returned while setting to the specified pressure.

Read the value of rear brake pressure two seconds after adjusting the specified fluid pressure.

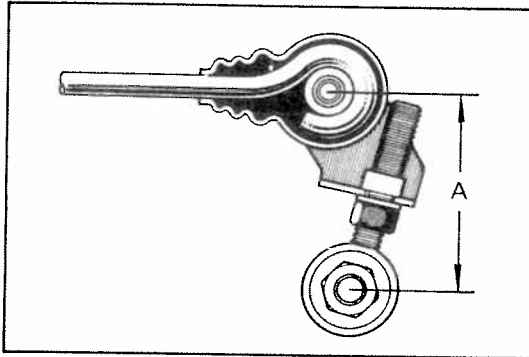




4. **RAISE FRONT BRAKE PRESSURE TO 80 kg/cm<sup>2</sup> (1,138 psi) AND CHECK REAR BRAKE PRESSURE**

Rear brake pressure:  $44 \pm 7$  kg/cm<sup>2</sup> (626  $\pm$  100 psi)

If the rear brake pressure is incorrect, adjust the fluid pressure.



5. **IF NECESSARY, ADJUST FLUID PRESSURE**

- (a) Adjust the length of the No.2 shackle.

Low pressure — Lengthen A

High pressure — Shorten A

Initial set:

4 x 2 78 mm (3.07 in.)

4 x 4 120 mm (4.72 in.)

Adjusting range:

4 x 2 72 — 84 mm (2.83 — 3.31 in.)

4 x 4 114 — 126 mm (4.49 — 4.96 in.)

NOTE: One turn of the No.2 shackle changes the fluid pressure about 0.6 kg/cm<sup>2</sup> (8.5 psi).

- (b) In event pressure cannot be adjusted by the No.2 shackle, raise or lower the valve body.

Low pressure — Lower

High pressure — Raise

- (c) Torque the nuts.

Torque: 100 — 160 kg-cm (8 — 11 ft-lb)

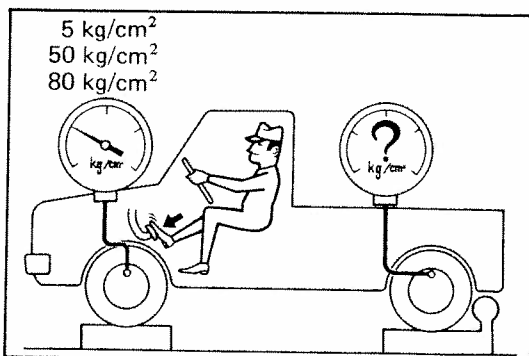
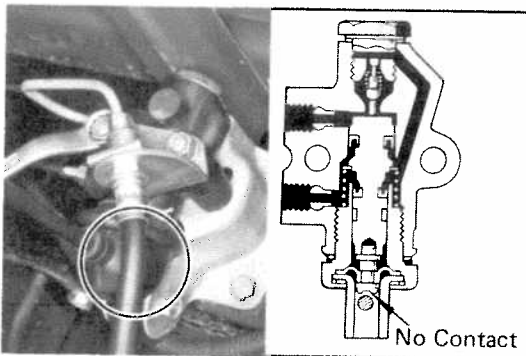
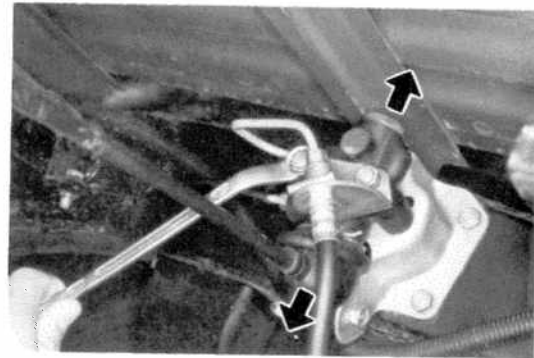
- (d) Adjust the length of the No. 2 shackle again.

If it cannot be adjusted, inspect the valve housing.

6. **IF NECESSARY, CHECK VALVE BODY**

- (a) Assemble the valve body in the uppermost position.

NOTE: When the brakes are applied, the piston will move down about 1 mm (0.04 in.). Even at this time, the piston should not contact or move the load sensing spring.

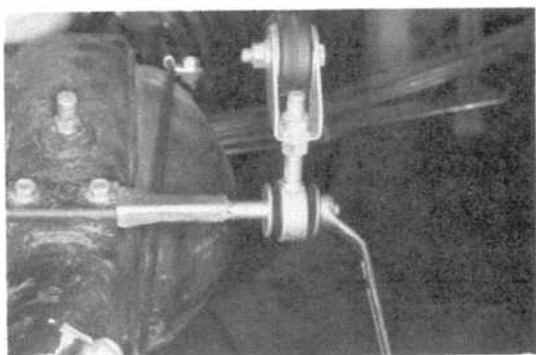


- (b) In this position, check the rear brake pressure.

kg/cm<sup>2</sup> (psi)

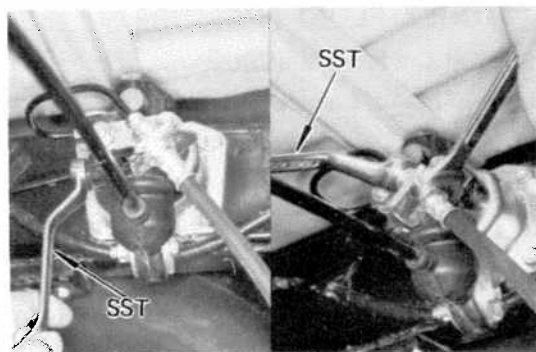
Front brake pressure	Rear brake pressure
5 (71)	5 (71)
50 (711)	19.7 — 23.7 (280 — 337)
80 (1,138)	29.8 — 35.8 (424 — 509)

If the measured value is not within standard, replace the valve body.



## REMOVAL OF LSPV (See illustration on page 15-52 )

1. DISCONNECT SHACKLE NO. 2 FROM BRACKET

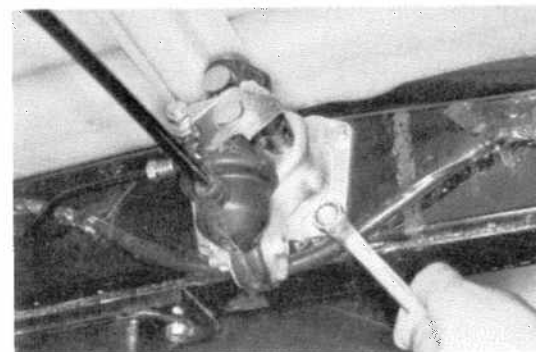


2. DISCONNECT BRAKE TUBE AND HOSE

(a) Using a flare nut wrench\*, disconnect the brake tube and hose from the valve body.

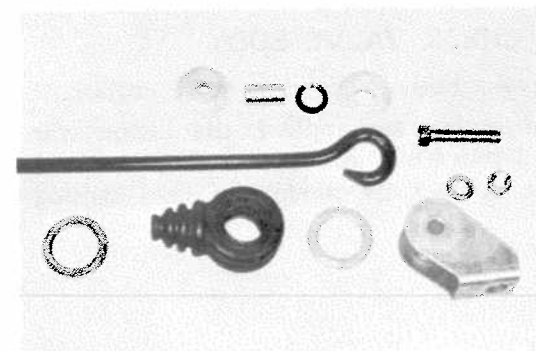
\*SST 09751-36011 or Commercial wrench

(b) Remove the clip from the brake hose.



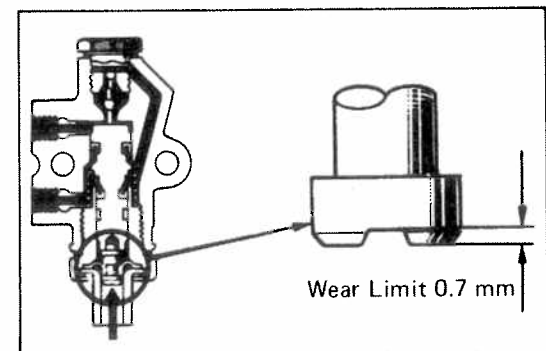
3. REMOVE LSPV ASSEMBLY

Remove the valve bracket mounting bolts and remove the LSPV assembly.



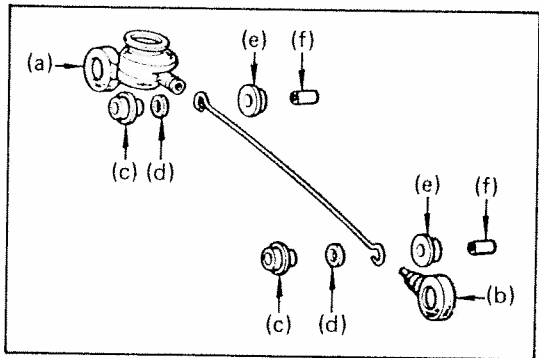
## INSPECTION LSPV

1. INSPECT LSPV PARTS FOR DAMAGE OR RUST



2. INSPECT VALVE PISTON PIN AND LOAD SENSING CONTACT SURFACE FOR WEAR

Wear limit: 0.7 mm (0.028 in.)



## INSTALLATION OF LSPV (See illustration on page 15-52)

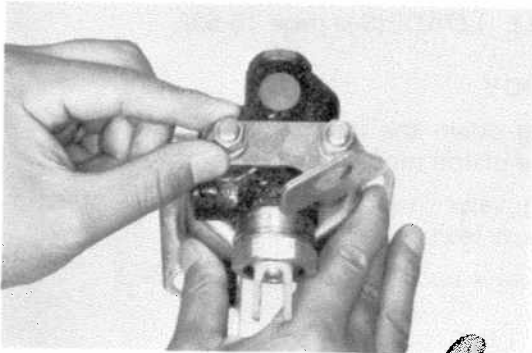
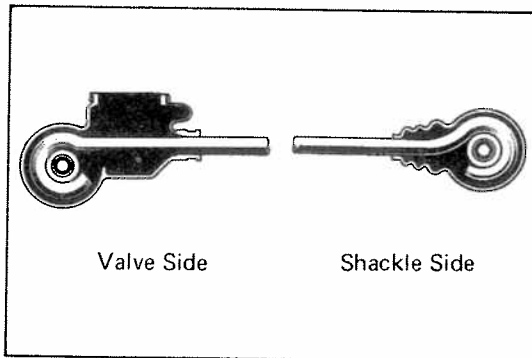
### 1. ASSEMBLE FOLLOWING PARTS TO LOAD SENSING SPRING

- (a) Load sensing valve boot
- (b) Load sensing spring boot
- (c) Bushings
- (d) Rubber plates
- (e) Bushings
- (f) Collars

#### NOTE:

Apply rubber grease to all rubbing areas.

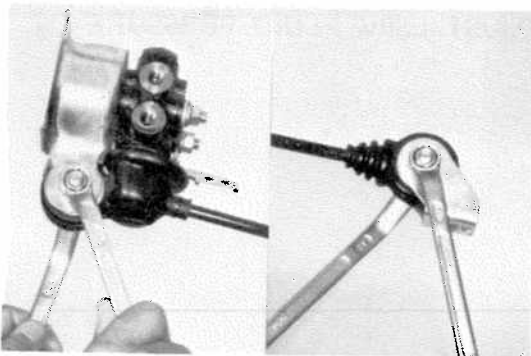
Do not mistake the valve side for the shackle side of the load sensing spring.



### 2. ASSEMBLE VALVE BODY TO BRACKET

Assemble the valve body to the valve body bracket together with the brake hose bracket

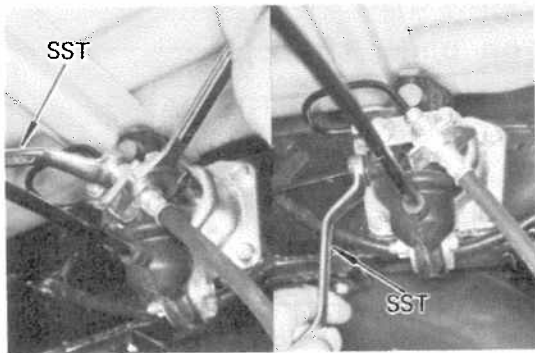
NOTE: Fingertighten the valve body mounting nuts.



### 3. CONNECT VALVE BODY AND NO.1 SHACKLE TO LOAD SENSING SPRING

### 4. INSTALL LSPV ASSEMBLY TO FRAME



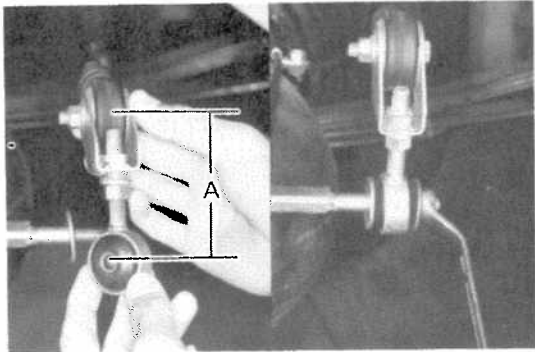


### 5. CONNECT BRAKE TUBE AND HOSE

- (a) Using a flare nut wrench\*, connect the brake tube and hose.

\*SST 09751-36011 or Commercial wrench

- (b) Install the clip to the brake hose.



### 6. CONNECT SHACKLE NO. 2 TO BRACKET

- (a) Install shackle No. 1 and shackle No. 2 to the load sensing spring.

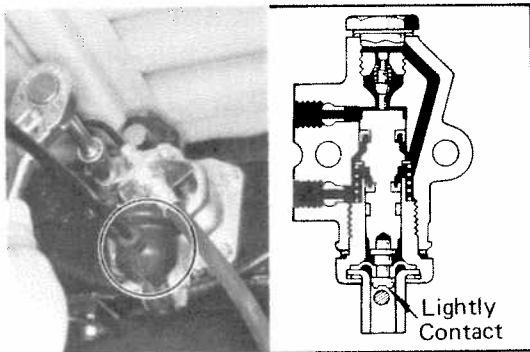
- (b) Set the dimension A by turning shackle No. 2.

Initial set:

4 x 2      78 mm (3.07 in.)

4 x 4      120 mm (4.72 in.)

- (c) Connect shackle No. 2 to the shackle bracket.



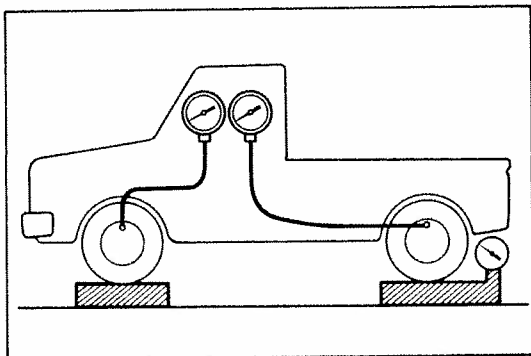
### 7. SET REAR AXLE LOAD (See page 15-52)

### 8. SET VALVE BODY

- (a) When pulling down the load sensing spring, confirm that the valve piston moves down smoothly.
- (b) Position the valve body so that the valve piston lightly contacts load sensing spring.
- (c) Tighten the valve body mounting nuts.

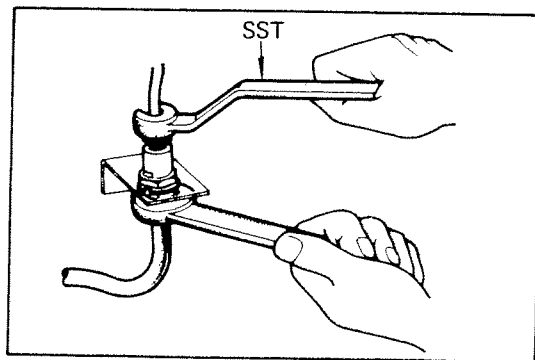
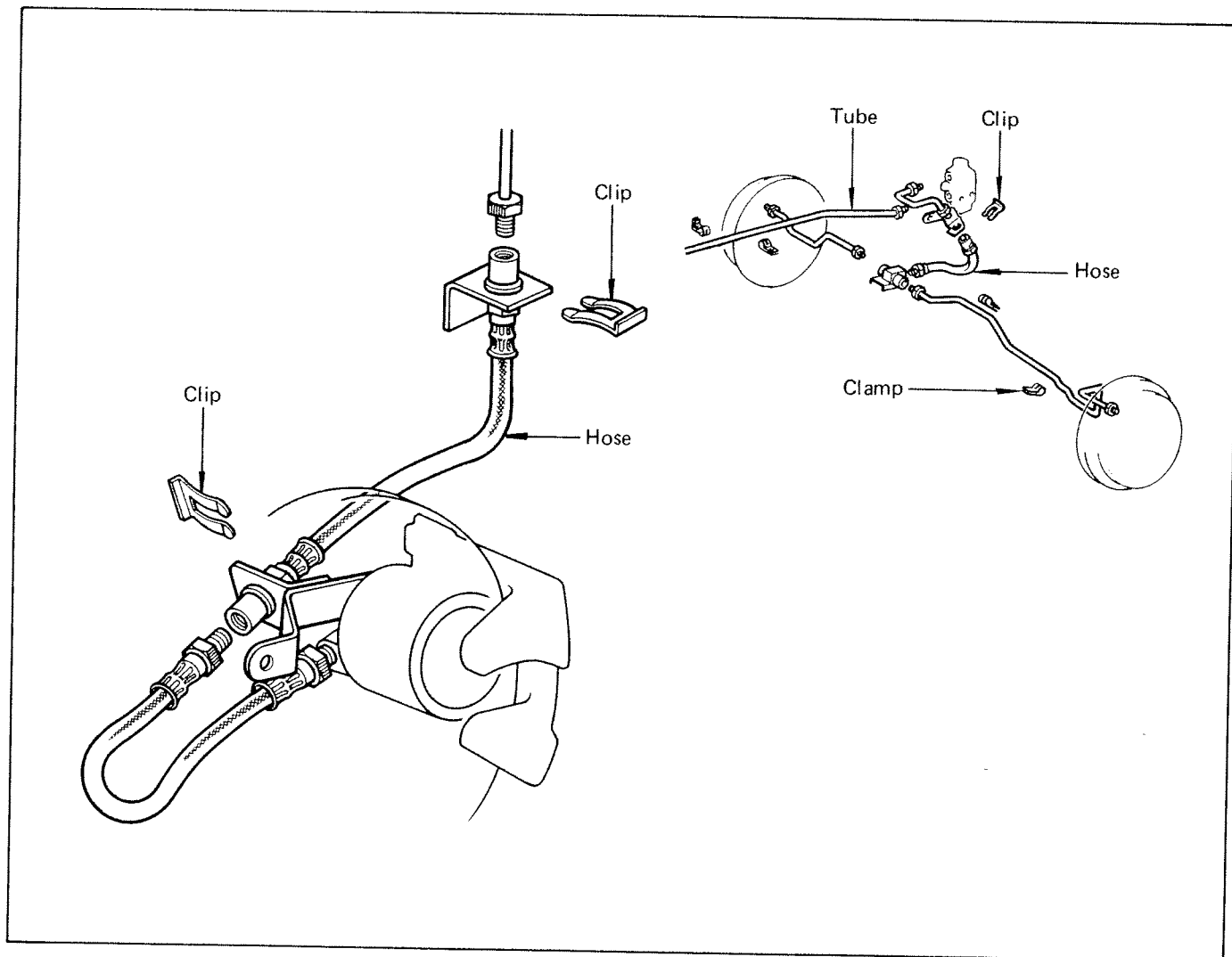
### 9. BLEED BRAKE LINE

### 10. CHECK AND ADJUST LSPV FLUID PRESSURE (See page 15-52)





## BRAKE HOSES AND TUBES

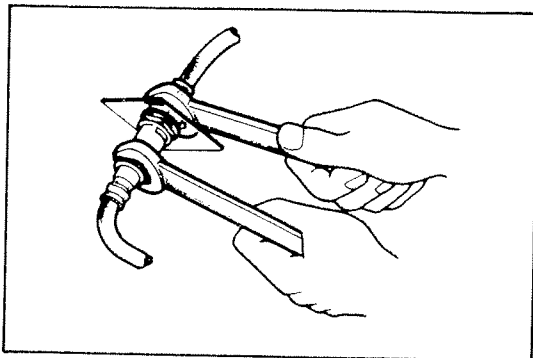


### DISCONNECTING OF BRAKE HOSES AND TUBES

#### 1. DISCONNECT HOSE AND TUBE

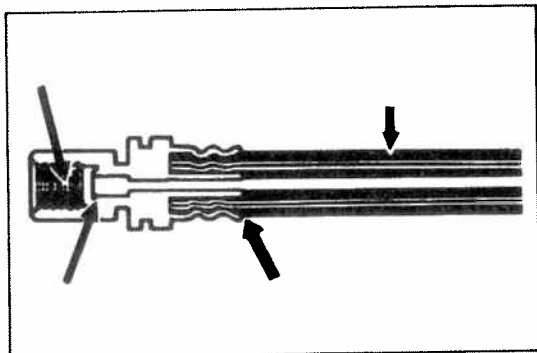
- Remove the clip.
- Using a wrench to hold the hose, and a flare nut wrench\* to hold the tube, disconnect the tube and hose.

\*SST 09751-36011 or Commercial wrench



#### 2. DISCONNECT TWO HOSES

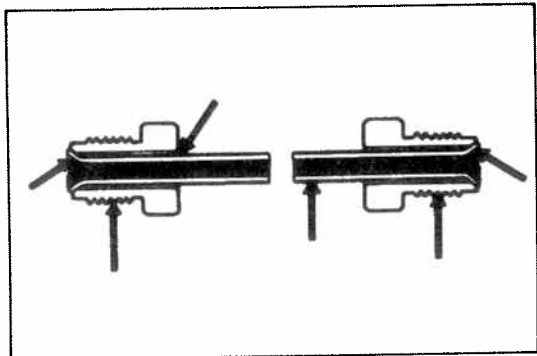
- Remove the clip.
- Using two wrenches, disconnect two hoses.



## INSPECTION OF BRAKE HOSES AND TUBES

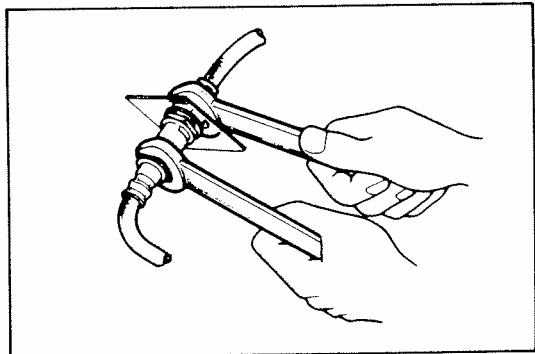
### 1. INSPECT BRAKE HOSES

- (a) Inspect the hose for damage, cracks or swelling.
- (b) Inspect the threads for damage.



### 2. INSPECT BRAKE TUBES

- (a) Inspect the tube for damage, cracks, dents or corrosion.
- (b) Inspect the threads for damage.



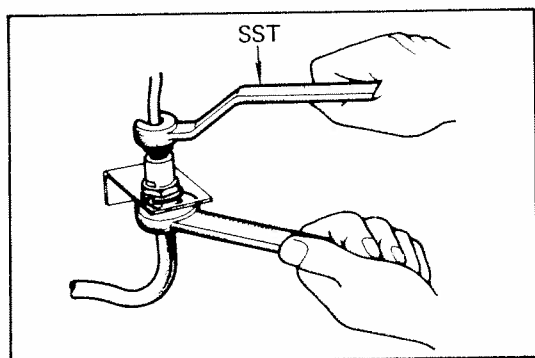
## CONNECTING OF BRAKE HOSES AND TUBES

### 1. CONNECT TWO HOSES

Using two wrenches, connect the two hoses. Torque the connection.

**Torque: 200 – 270 kg-cm (15 – 19 ft-lb)**

**NOTE:** All hoses must be free from excessive bending, twisting and pulling.



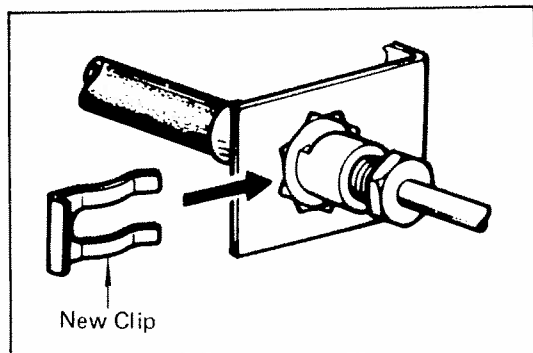
### 2. CONNECT HOSE AND TUBE

Using a wrench to hold the hose, and a flare nut wrench\* to hold the tube, connect the tube and hose. Torque the connection.

\*SST 09751-36011 or Commercial wrench

**Torque: 130 – 180 kg-cm (10 – 13 ft-lb)**

**NOTE:** Place the tube through the center of the grommet.



### 3. INSTALL NEW HOSE CLIP AND TUBE CLAMP

### 4. CHECK BRAKE HOSES AND TUBES

Check that the brake hoses and tubes have clearance from contacting sharp edges, moving components and the exhaust pipe.

### 5. BLEED BRAKE SYSTEM (See page 15-8)