

# BRAKE SYSTEM

## PRECAUTIONS

1. Care must be taken to replace each part properly as it 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 the area clean when repairing the brake system.

## TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Low or spongy pedal	Linings worn Brake pads worn Leak in brake system Master cylinder faulty  Air in brake system Wheel cylinder faulty Brake cylinder faulty Piston seals worn or damaged Rear brake automatic adjuster faulty	Replace brake shoes Replace pads Repair leak Repair or replace master cylinder Bleed brake system Repair wheel cylinder Repair cylinder Repair brake cylinder Repair or replace adjuster	<a href="#">BR-26</a> <a href="#">BR-18</a> , 34  <a href="#">BR-9</a>  <a href="#">BR-7</a> <a href="#">BR-26</a> <a href="#">BR-18</a> , 34 <a href="#">BR-18</a> , 34
Brakes drag	Parking brake out of adjustment Binding parking brake wire Booster push rod out of adjustment Tension or return spring faulty Brake line restricted Lining cracked or distorted Pad cracked or distorted Wheel cylinder or caliper piston sticking Adjuster broken Master cylinder faulty	Adjust parking brake Repair as necessary Adjust push rod Replace spring Repair as necessary Replace shoe Replace pad Repair as necessary  Replace adjuster Repair or replace master cylinder	<a href="#">BR-8</a>  <a href="#">BR-1</a> 6 <a href="#">BR-26</a> , 42  <a href="#">BR-26</a> , 42 <a href="#">BR-18</a> , 34 <a href="#">BR-18</a> , 26 34  <a href="#">BR-9</a>
Brakes pull	Tires improperly inflated  Oil or grease on shoes or pads  Brake shoes distorted, linings worn or glazed Brake pads distorted, worn or glazed Drum or disc out of round Tension or return spring faulty Wheel cylinder faulty Brake cylinder faulty Piston frozen in brake cylinder Brake pad sticking	Inflate tires to proper pressure Check for cause. Replace shoes or pads Replace brake shoes  Replace pads Replace drum or disc Replace spring Repair wheel cylinder Repair cylinder Repair cylinder Replace pads	 <a href="#">BR-18</a> , 26 34 <a href="#">BR-26</a> , 42  <a href="#">BR-18</a> , 34 <a href="#">BR-18</a> , 26 34 <a href="#">BR-26</a> , 42 <a href="#">BR-26</a> <a href="#">BR-18</a> , 34 <a href="#">BR-18</a> , 34 <a href="#">BR-18</a> , 34

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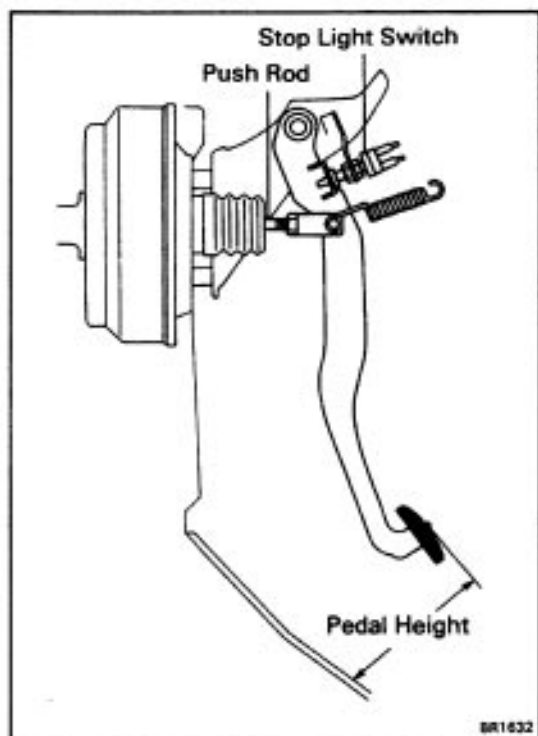
## TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Hard pedal but brakes inefficient	Oil or grease on shoes or pads  Brake shoes distorted, linings worn or glazed, drums worn  Brake pads distorted, worn or glazed Piston frozen in brake cylinder Brake booster faulty Vacuum leaks Brake line restricted	Check for cause. Replace shoes or pads Replace brake shoes  Replace pads Repair cylinder Repair booster Repair as necessary Repair as necessary	<a href="#">BR-18,26</a> 34 <a href="#">BR-26,</a>  <a href="#">BR-18,34</a> <a href="#">BR-18,34</a> <a href="#">BR-15</a>
Snapping or clicking noise when brakes are applied	(Drum brake) Brake shoes binding at backing plate ledges Backing plate ledges worn Loose or missing shoe hold-down spring Loose set bolt at backing plate (Disc brake) Loose or missing pad support plate Loose installation bolt Wear on slide bushing	Lubricate  Replace and lubricate ledges Replace shoe hold-down spring Tighten  Replace pad support plate Tighten Replace slide bushing	<a href="#">BR-26</a>  <a href="#">BR-26</a> <a href="#">BR-26</a>  <a href="#">BR-26</a>  <a href="#">BR-18,34</a> <a href="#">BR-18, 34</a> <a href="#">BR-18, 34</a>
Scraping or grinding noise when brakes are applied	Worn brake linings or pads  Caliper to wheel or rotor interference Dust cover to rotor or backing plate to drum interference Other brake system components faulty  Tires rubbing against chassis and/or body	Replace or refinish drums or rotors if heavily scored Replace as required  Correct or replace  Repair or replace as necessary Repair as necessary	<a href="#">BR-18, 26</a> 34 <a href="#">BR-18, 34</a>  BR- 18, 26 34

Problem	Possible cause	Remedy	. Page
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 Dirty, greased, contaminated or glazed linings or pads Improper linings or pads using Maladjustment of brake pedal or booster push rod (Disc brake) Missing or damaged brake pad anti-squeal shim Pad wear and pad wear indicator making contact with the rotor Burled or rusted calipers (Drum brake) Weak damaged or incorrect shoe hold-down springs, loose or damaged shoe hold-down spring pins and springs and grooved backing plate ledges	Inspect, repair or replace Clean or replace Inspect for correct usage or replace Inspect and adjust  Replace Replace Clean or deburr  -Inspect, repair or replace	BR-18, 26, 34 BR-18, 26 34  BR-6, 16  BR-18, 34 BR-18, 34 BR-18, 34  BR-26
Squealing and squeaking noise when brakes are not applied	Maladjustment of brake pedal or booster push rod Poor return of brake booster or master cylinder or wheel cylinder (Disc brake) Rusted or stuck piston Improper positioning of pad in caliper Rotor rubbing against caliper housing Improper installation of disc brake pad support plate Pad wear and pad wear indicator making contact with the rotor (Drum brake) Weak, damaged or incorrect shoe hold-down springs Grooved backing plate ledges Bent or warped backing plate causing interference with drum Improper machining of drum causing interference with backing plate or shoe Other brake system components: Loose or extra parts in brakes Rear drum adjustment too tight causing lining to glaze Worn, damaged or insufficiently lubricated wheel bearings	Inspect and adjust Inspect, repair or replace  Inspect and lubricate as necessary Repair or replace Repair or replace Repair or replace Replace  Replace Repair or replace Repair or replace Replace drum  Inspect, repair or replace as necessary	BR-6, 16 BR-9, 15 26  BR- 18, 34 BR-18, 34 BR-18, 34 BR-18, 34 BR-18, 34  BR-26, 42 BR-26, 42 BR-26, 42 BR-26, 42

## TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove foreign material	
	Loose wheel nuts	Tighten to correct torque Replace if stud holes are elongated	
	Maladjustment of brake pedal or booster push rod	Inspect and adjust	BR-6, 16
	worn, damaged or dry wheel bearings (Disc brake)	Inspect and lubricate or replace	
	Loose or missing anti-rattle spring or pad support plate or rimping on outer pad	Inspect, repair or replace	BR-21, 37
	Failure of shim		
	Wear on slide bushing		
	Loose installation bolt	Inspect , replace if necessary	BR-21, 37
	Poor return of piston (Drum brake)	Inspect , replace if necessary	BR-21, 37
	Loose or extra parts	Inspect , tighten if necessary Inspect , repair or replace	BR-21, 37 BR-21, 37
		Inspect and repair	BR-26, 42



## CHECKS AND ADJUSTMENTS

### CHECK AND ADJUSTMENT OF BRAKE PEDAL

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

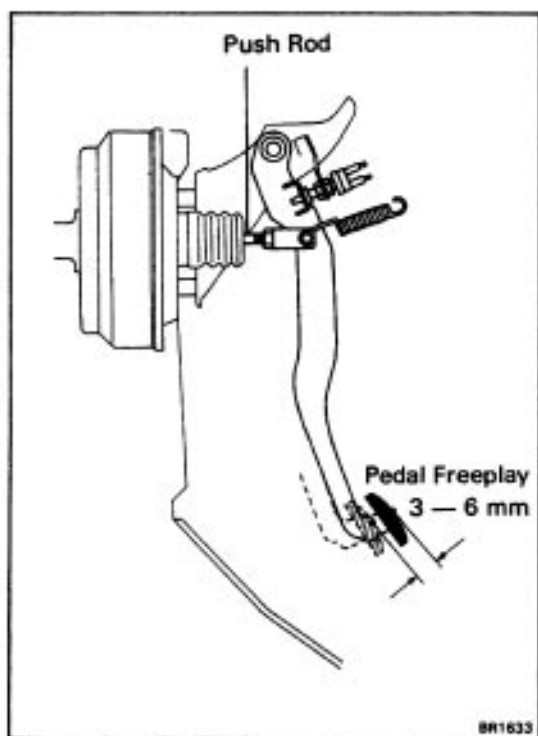
Pedal height from asphalt sheet:

**177.5 – 187.5 mm (6.988 – 7.382 in.)**

If incorrect, adjust the pedal height.

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

- If necessary, remove the instrument lower finish panel and air duct.
- Loosen the stop light switch lock nut.
- Sufficiently loosen the stop light switch.
- Loosen the push rod lock nut.
- Adjust the pedal height by turning the pedal push rod.
- Return the stop light switch until it lightly contacts the pedal stopper.
- Tighten the two lock nuts.
- Check that the stop lights light when the brake pedal depressed.
- After adjusting the pedal height, check and adjust the pedal freeplay.



#### 3. CHECK THAT PEDAL FREEPLAY IS CORRECT

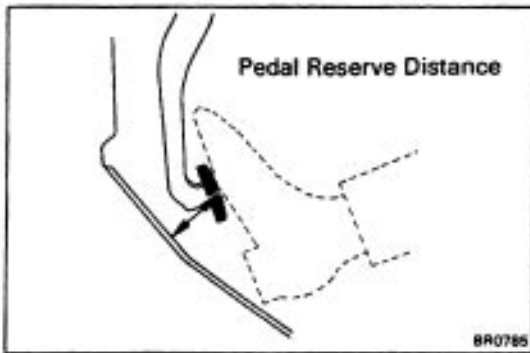
- Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
- Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

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

HINT: The freeplay to the first resistance is due to the play between the clevis and pin. And it is 1.3 mm (0.04–0.12 in.) on the pedal.

#### 4. IF NECESSARY, ADJUST PEDAL FREEPLAY

- If incorrect, adjust the pedal freeplay by turning the pedal push rod.
- Start the engine and confirm that pedal freeplay exists.
- After adjusting the pedal freeplay, check the pedal height.
- Install the air duct and instrument lower finish panel.

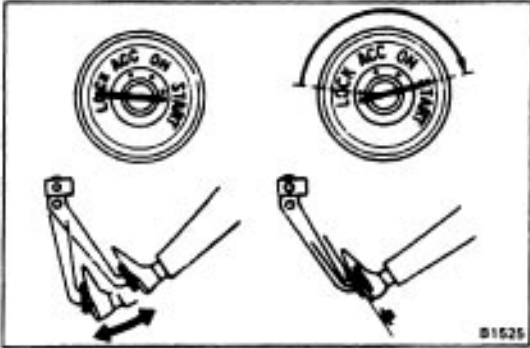


## 5. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT

Release the parking brake. With engine running, depress the pedal and measure the pedal reserve distance, as shown.

**Pedal reserve distance from asphalt sheet at 50 kg (110.2 lb): More than 85 mm, (3.35 in.)**

If incorrect, troubleshoot the brake system.



## OPERATIONAL TEST OF BRAKE BOOSTER

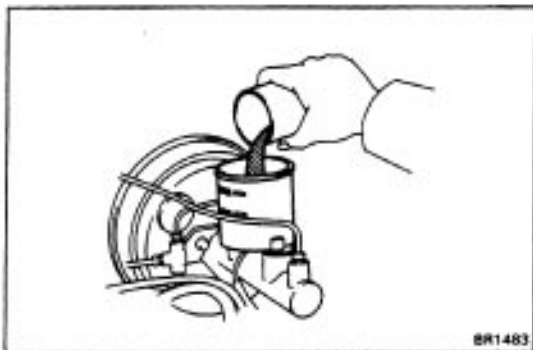
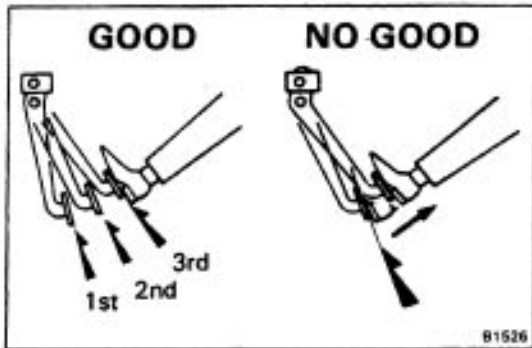
HINT: If there is leakage or lack of vacuum, repair before testing. If available, use a brake booster tester to check the booster operating condition.

### 1. OPERATING CHECK

- Depress the brake pedal several times with the engine stopped, 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 down furthest the first time, but gradually rises after the second or third time, 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

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

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

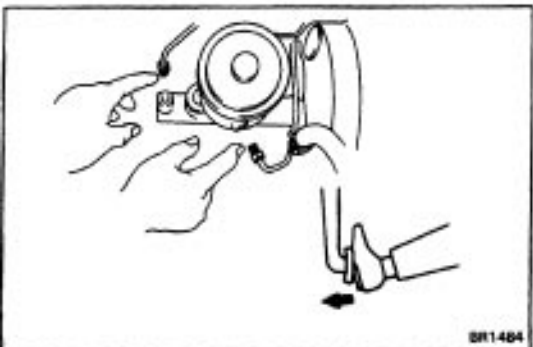
### 1. FILL BRAKE RESERVOIR WITH BRAKE FLUID

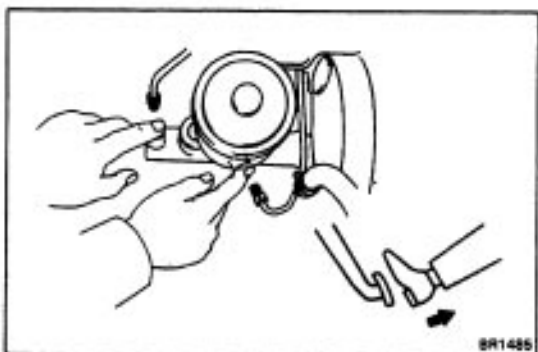
Check the fluid level in the reservoir. If necessary, add brake fluid.

### 2. BLEED MASTER CYLINDER

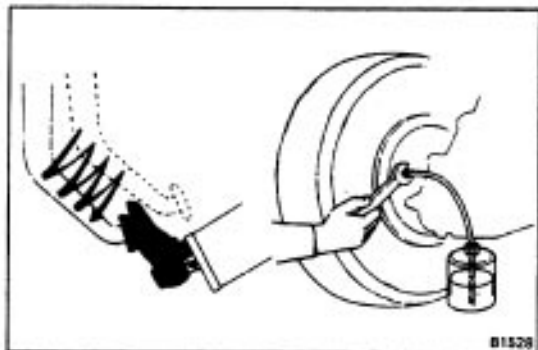
HINT: If the master cylinder was disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

- Disconnect the brake tubes from the master cylinder.
- Depress the brake pedal and hold it.





- (c) Block off the outer holes with your fingers, and release the brake pedal.
- (d) Repeat (b) and (c) three or four times.



### 3. BEGIN BLEEDING AIR FROM BRAKE OR WHEEL CYLINDER WITH LONGEST HYDRAULIC LINE

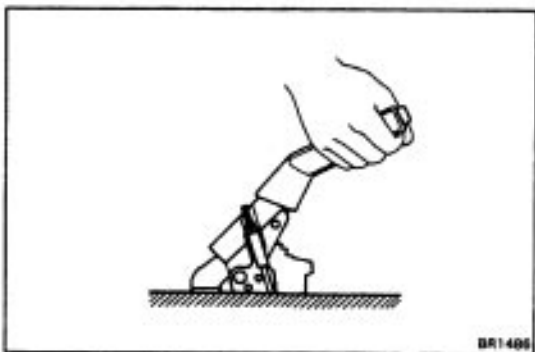
- (a) Connect the vinyl tube to the brake or wheel cylinder bleeder plug, and insert the other end of tube in a half full container of brake fluid.
- (b) Slowly pump the brake pedal several times.
- (c) While having an assistant press on the pedal, loosen the bleeder plug until fluid starts to run out. Then close the bleeder plug.
- (d) Repeat (b) and (c) until there are no more air bubbles in the fluid.
- (e) Tighten the bleeder plug.

**Bleeder plug tightening torque:**

**85 kg-cm (74 in.-lb, 8.3 N-m)**

### 4. REPEAT PROCEDURE FOR EACH WHEEL

## CHECK AND ADJUSTMENT OF PARKING BRAKE



### 1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way up, and count the number of clicks.

**Parking brake lever travel at 20 kg (44.1 lb, 196 N):**

**5 – 8 clicks**

If incorrect, adjust the parking brake.

### 2. IF NECESSARY, ADJUST PARKING BRAKE LEVER TRAVEL

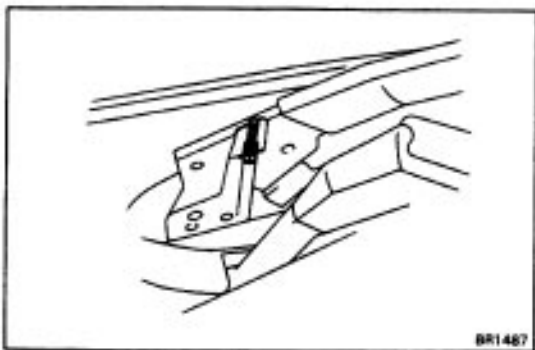
HINT: Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

For shoe clearance adjustment, see steps 8 and 9 on page [BR-32](#) or step 8 on page 48.

- (a) Remove the console box.
- (b) Loosen the lock nut and turn the adjusting nut until the lever travel is correct.
- (e) Tighten the lock nut.

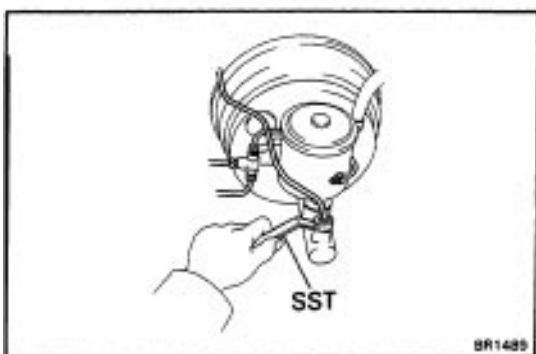
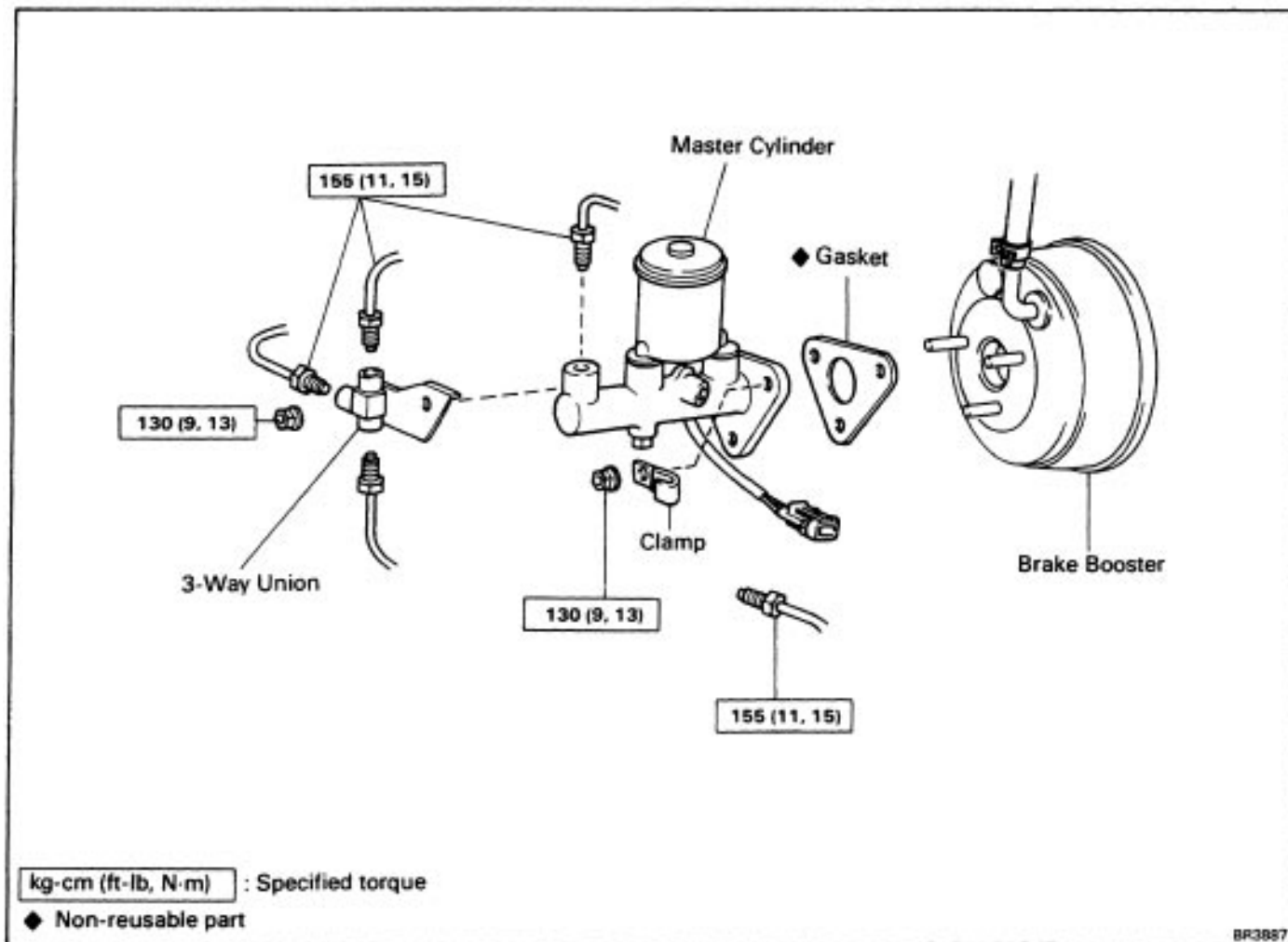
**Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)**

- (d) Install the console box.

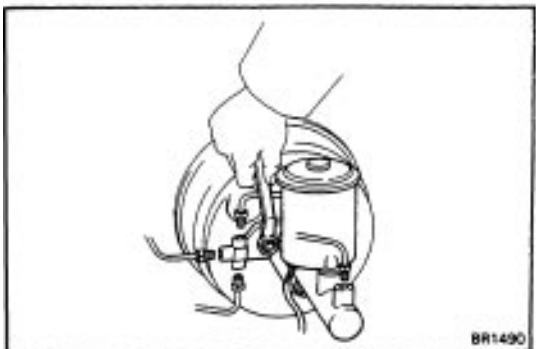


## MASTER CYLINDER

### REMOVAL OF MASTER CYLINDER



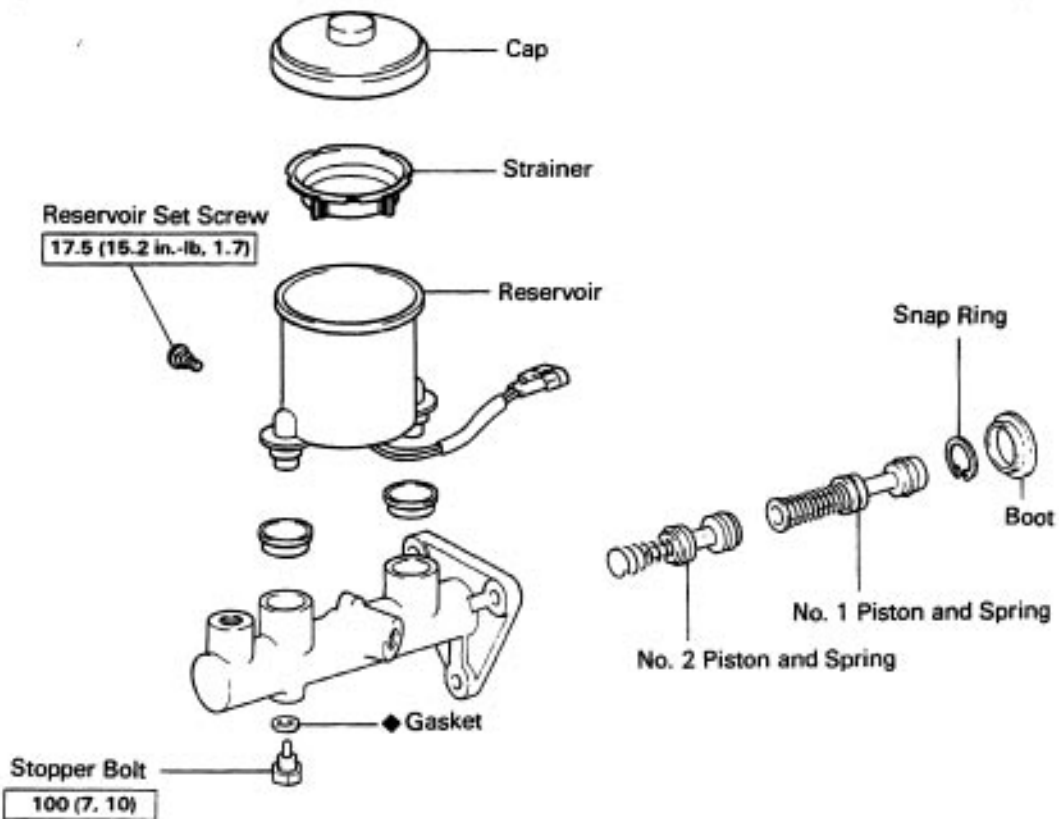
1. **DISCONNECT LEVEL WARNING SWITCH CONNECTOR**
2. **TAKE OUT FLUID WITH SYRINGE**  
**NOTICE:** Do not let brake fluid remain on a painted surface. Wash it off immediately.
3. **DISCONNECT BRAKE TUBES**  
 Using SST, disconnect brake tubes from the master cylinder.  
 SST 09751-36011



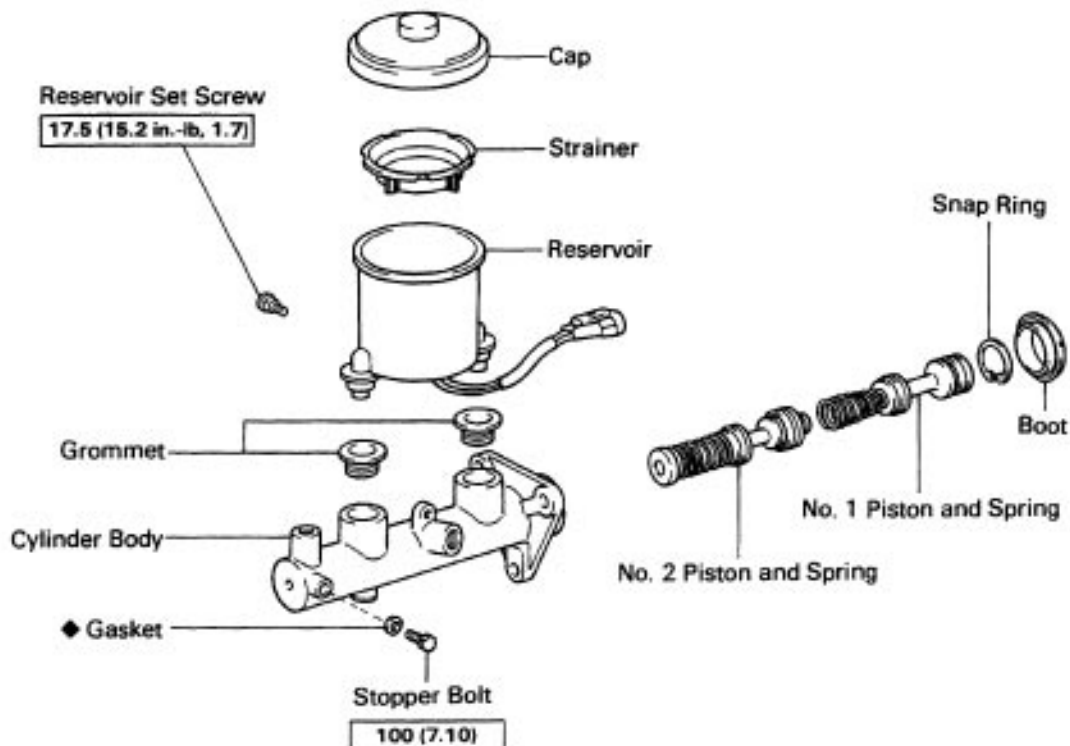
4. **REMOVE MASTER CYLINDER**
  - (a) Remove the three nuts and 3-way union.
  - (b) Remove the clamp.
  - (c) Remove the master cylinder from the brake booster and remove the gasket.

## COMPONENTS

w/o A.B.S.

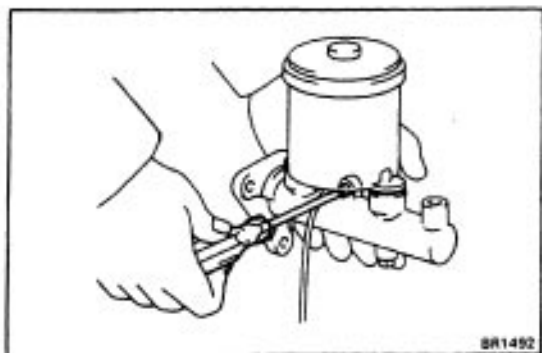


w/ A.B.S.



kg-cm (ft-lb, N-m) : Specified torque

◆ Non-reusable part



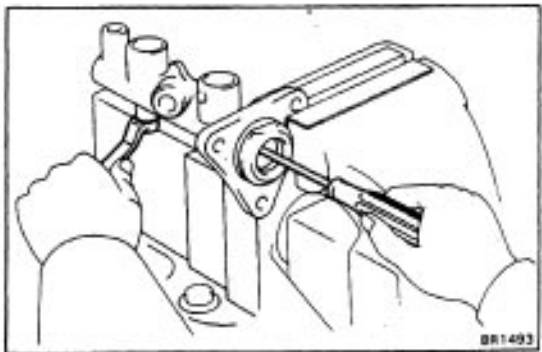
## DISASSEMBLY OF MASTER CYLINDER

### 1. REMOVE RESERVOIR

- (a) Remove the set screw and pull out the reservoir.
- (b) Remove the cap and strainer from the reservoir.

### 2. REMOVE TWO GROMMETS

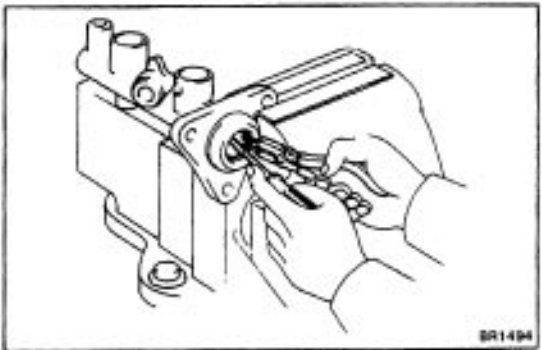
### 3. PLACE CYLINDER IN VISE



### 4. REMOVE PISTON STOPPER BOLT

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

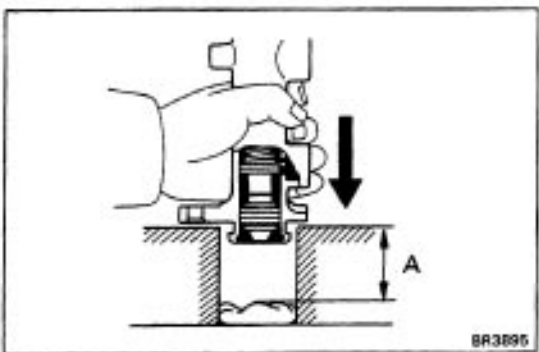
HINT: Tape the screwdriver tip before use.



### 5. REMOVE TWO PISTONS AND SPRINGS

- (a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.
- (b) Remove the No. 1 piston and spring hand, pulling straight out, not at an angle.

**NOTICE:** If pulled out at an angle, there is possibility of damaging the cylinder bore.



- (c) Place a rag and two wooden blocks on the work table and lightly tap the cylinder flange against the blocks until the piston drops out of the cylinder.

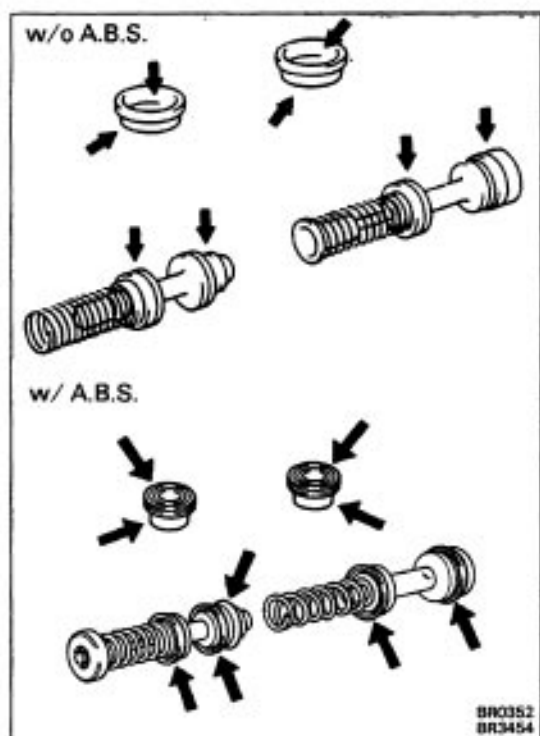
HINT: Make sure the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.)

## INSPECTION OF MASTER CYLINDER COMPONENTS

HINT: Clean the disassembled parts with compressed air.

1. **INSPECT CYLINDER BORE FOR RUST OR SCORING**
2. **INSPECT CYLINDER FOR WEAR OR DAMAGE**

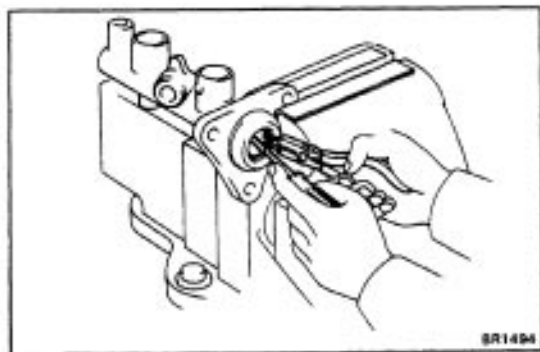
If necessary, clean or replace the cylinder.



## ASSEMBLY OF MASTER CYLINDER

(See page [BR-10](#))

1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO RUBBER PARTS INDICATED BY ARROWS



2. INSTALL TWO SPRINGS AND PISTONS

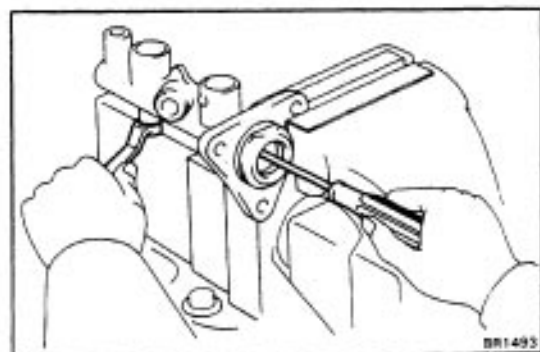
**CAUTION:** Be careful not to damage the rubber lips on the pistons.

- (a) Insert the two springs and pistons straight in, not at an angle.

**NOTICE:** If insert at an angle, there is possibility of damaging the cylinder bore.

- (b) Push in the piston with a screwdriver and install the snap ring with snap ring pliers.

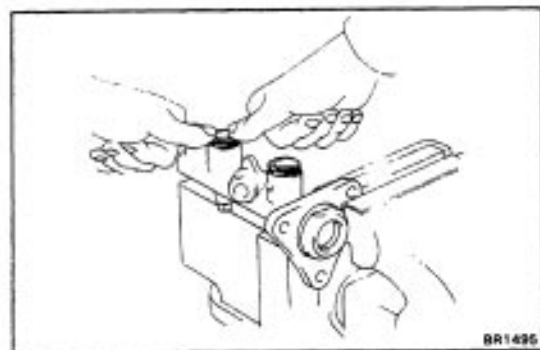
**HINT:** Tape the screwdriver tip before use.



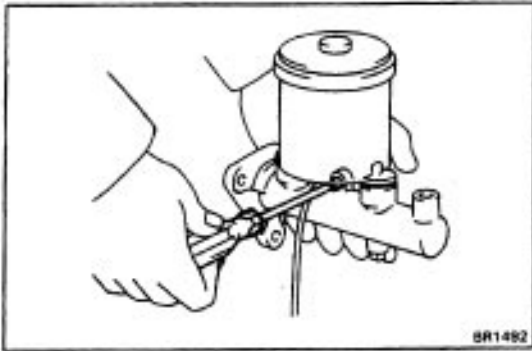
3. INSTALL PISTON STOPPER BOLT

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

**Torque:** 100 kg-cm (7 ft-lb, 10 N-m)



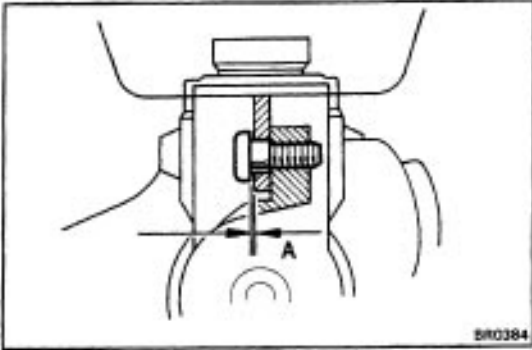
4. INSTALL TWO GROMMETS



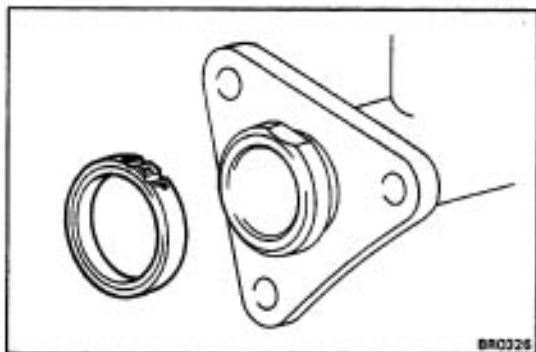
## 5. INSTALL RESERVOIR

- (a) Install the cap and strainer to the reservoir.
- (b) Push the reservoir onto the cylinder.
- (c) Install the set screw while pushing on the reservoir.

**Torque: 17.5 kg-cm (15.2 in.-lb, 1.7 N-m)**



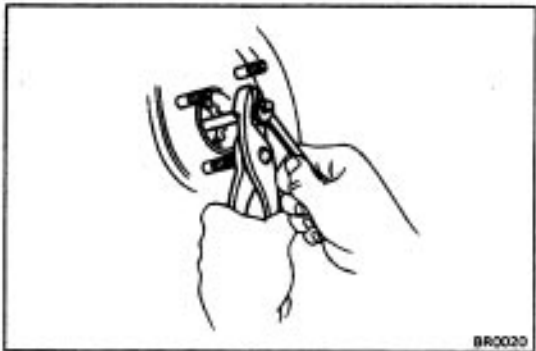
**NOTICE:** Because the master cylinder and reservoir tank union is a grommet type, the set screw is designed to not separate the reservoir from the cylinder and will not tighten down the reservoir. Therefore, there is a clearance at point A. Do not insert washers or an equivalent when tightening.



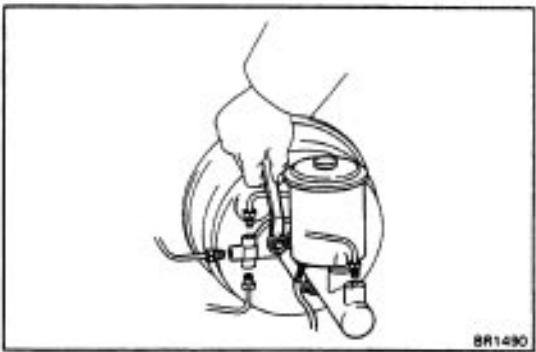
## INSTALLATION OF MASTER CYLINDER

(See page [BR-9](#))

1. CLEAN OUT GROOVE ON LOWER INSTALLATION SURFACE OF MASTER CYLINDER
2. CONFIRM THAT "UP" MARK ON MASTER CYLINDER BOOT IS IN CORRECT POSITION



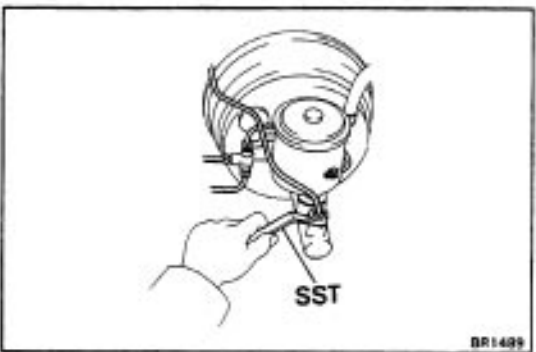
3. ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER  
(See page [BR-16](#))



4. INSTALL MASTER CYLINDER

Set the new gasket and install the master cylinder, clamp and 3-way union on the brake booster with three nuts.

Torque: 130 kg-cm (9 ft-lb, 13 N<sub>·</sub>m)



5. CONNECT BRAKE TUBES

Using SST, connect. the brake tubes to the master cylinder.

Torque the union nuts.

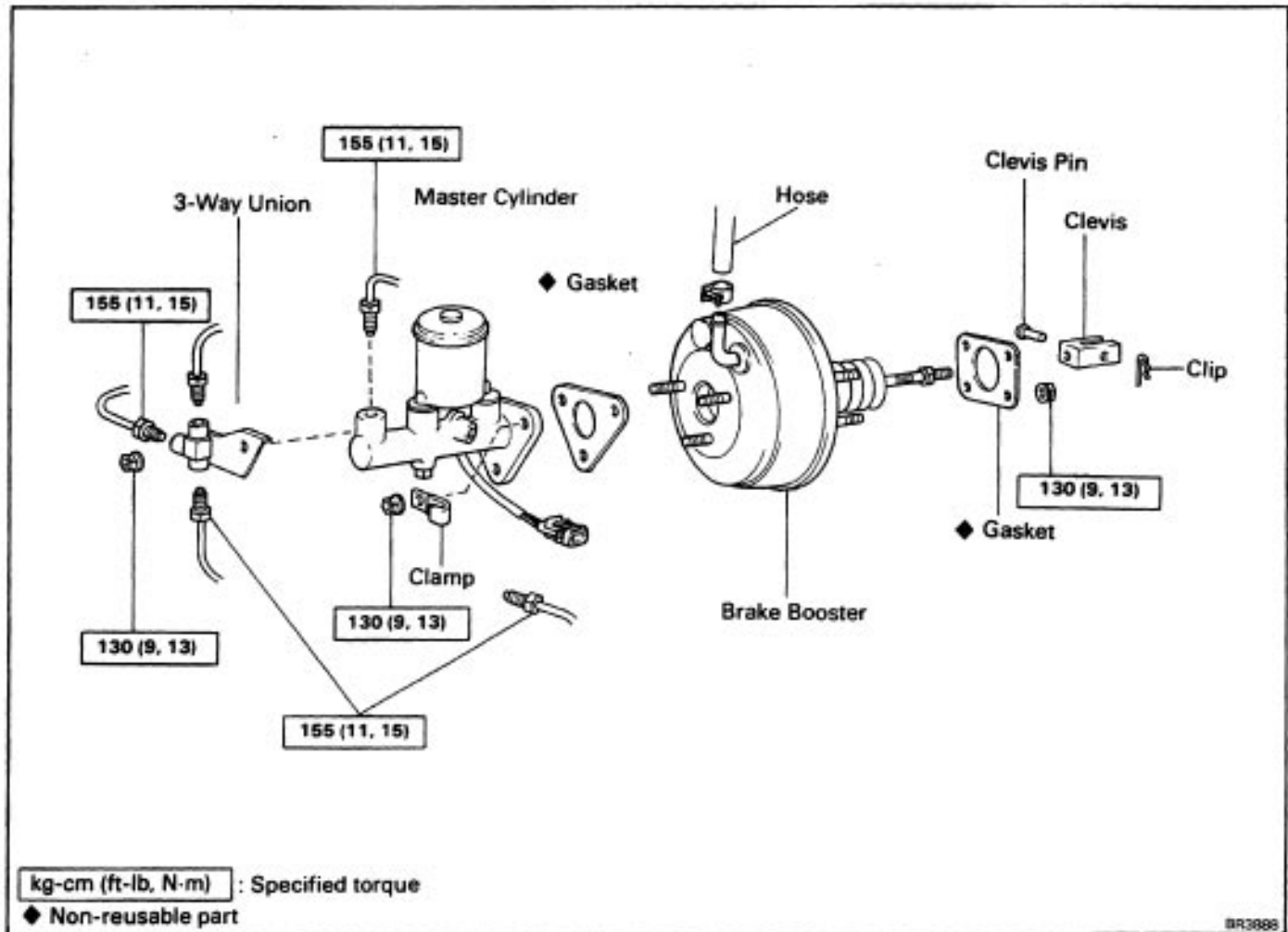
SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N - m)

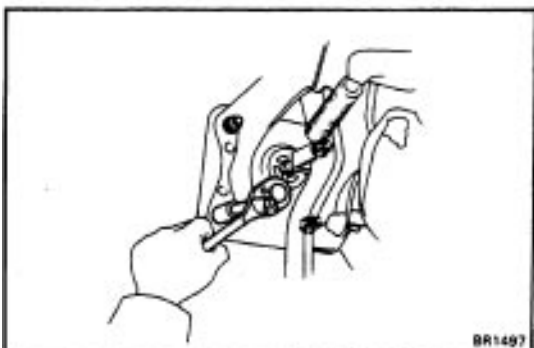
6. CONNECT LEVEL WARNING SWITCH CONNECTOR
7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM  
(See page [BR-7](#))
8. CHECK FOR FLUID LEAKAGE
9. CHECK AND ADJUST BRAKE PEDAL  
(See page [BR-6](#))

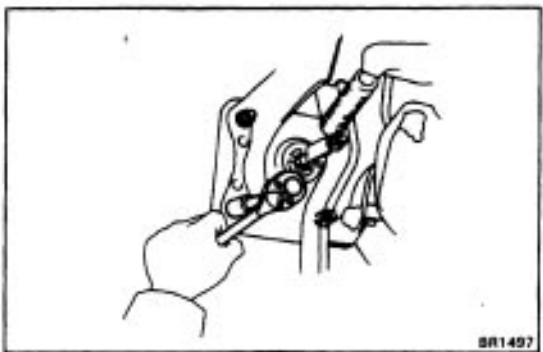
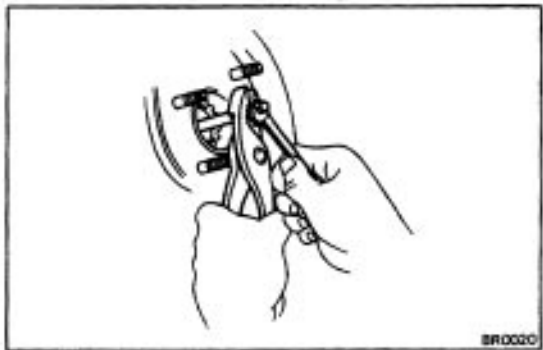
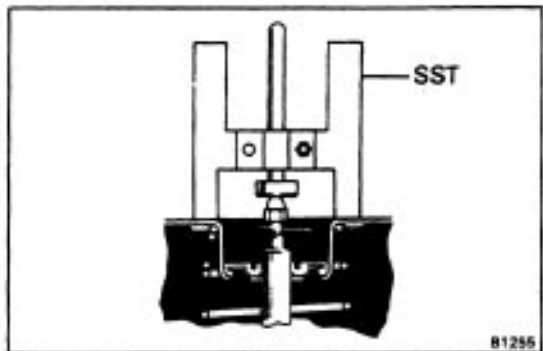
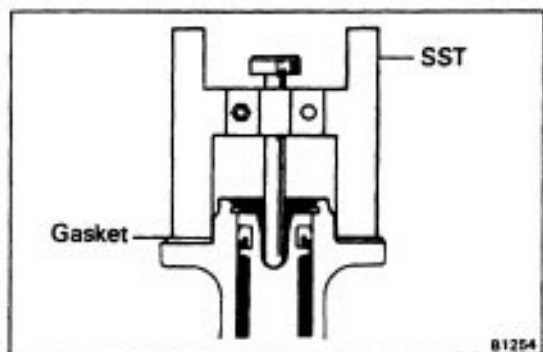
# BRAKE BOOSTER

## REMOVAL OF BRAKE BOOSTER



1. REMOVE MASTER CYLINDER  
(See page [BR-9](#))
2. DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER
3. REMOVE PEDAL RETURN SPRING
4. REMOVE CLIP AND CLEVIS PIN
5. REMOVE BRAKE BOOSTER, GASKET AND CLEVIS
  - (a) Remove the four nuts and clevis.
  - (b) Pull out the brake booster and gasket.





## INSTALLATION OF BRAKE BOOSTER

(See page [BR-15](#))

### 1. ADJUST LENGTH OF BOOSTER PUSH ROD

- Set the SST on the master cylinder with the gasket, and then lower the pin until it slightly touches the piston.

SST 09737-00010

- Turn the SST upside down and set it on the booster.

- Measure the clearance between the booster push rod and pin head (SST).

**Clearance: 0 mm (0 in.)**

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

### 2. INSTALL BRAKE BOOSTER, GASKET AND CLEVIS

- Install the clevis lock nut and clevis to the brake booster.

- Install the brake booster and gasket.

- Install and torque the booster mounting nuts.

**Torque: 130 kg-cm (9 ft-lb, 13 N·m)**

### 3. CONNECT CLEVIS TO BRAKE PEDAL

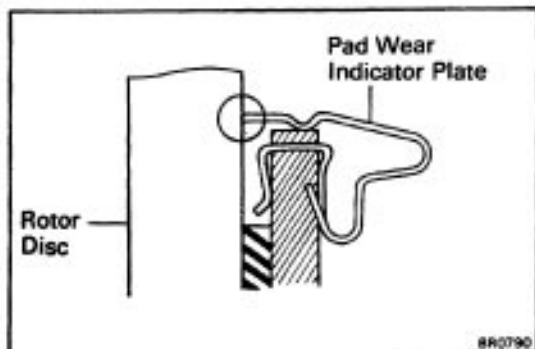
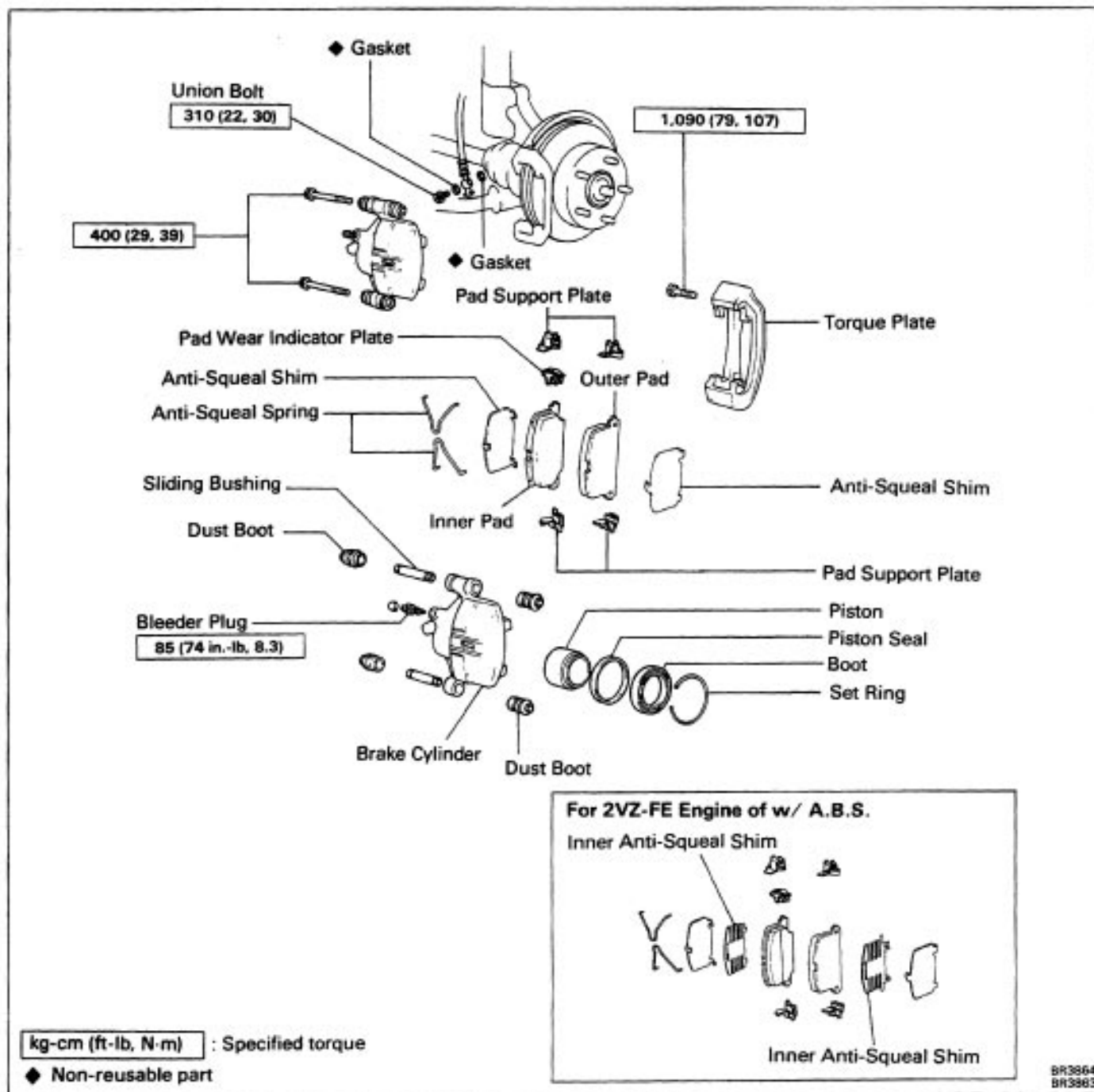
Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

### 4. INSTALL PEDAL RETURN SPRING

### 5. INSTALL INSTRUMENT LOWER FINISH PANEL

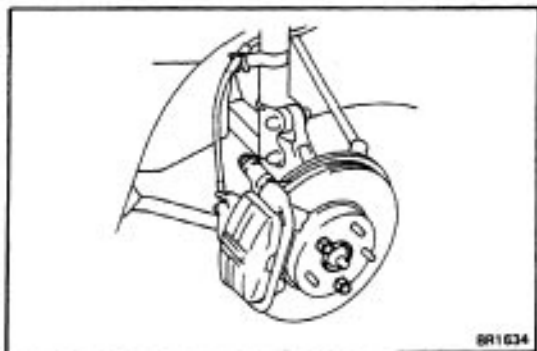
6. **INSTALL MASTER CYLINDER**  
(See page [BR-14](#))
7. **CONNECT VACUUM HOSE TO BRAKE BOOSTER**
8. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**  
(See page [BR-7](#))
9. **CHECK FOR FLUID LEAKAGE**
10. **CHECK AND ADJUST BRAKE PEDAL**  
(See page [BR-6](#))  
Check and adjust the brake pedal, then tighten the clevis lock nut.  
Torque: 260 kg-cm (19 ft-lb, 25 N-m)
11. **PERFORM OPERATIONAL CHECK**  
(See page [BR-7](#))

## FRONT BRAKE COMPONENTS



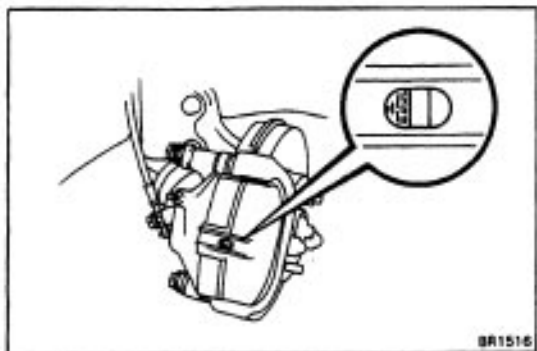
## REPLACEMENT OF BRAKE PADS

**HINT:** If a squealing noise occurs from the front brakes while driving, check the pad wear indicator. If there are traces of the indicator contacting the rotor disc, the brake pad should be replaced.



### 1. REMOVE FRONT WHEEL

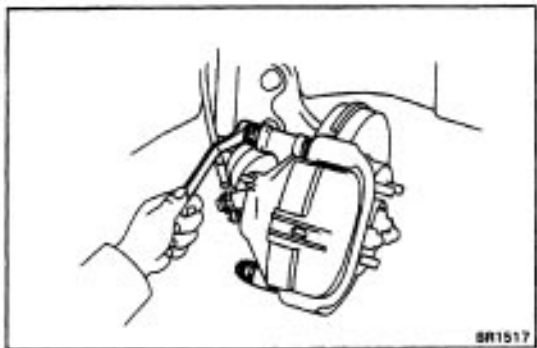
Remove the wheel and temporarily fasten the rotor disc with the hub nuts.



### 2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the cylinder inspection hole and replace pads if not within specification.

**Minimum thickness: 1.0 mm (0.039 in.)**

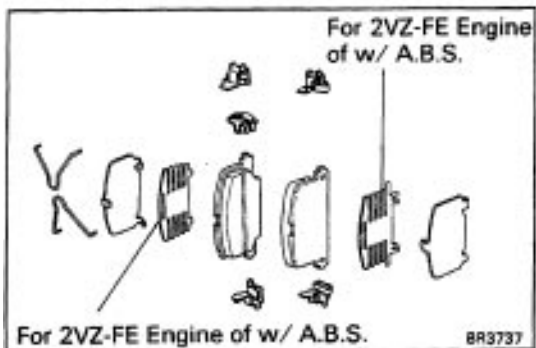
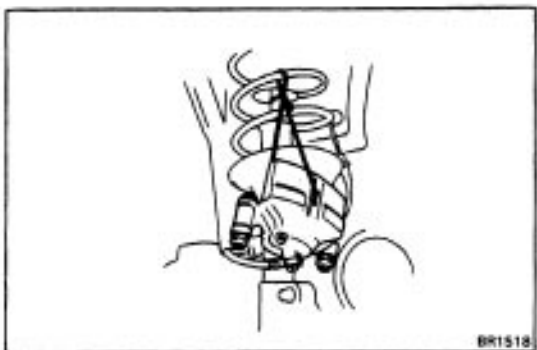


### 3. REMOVE CYLINDER FROM TORQUE PLATE

(a) Remove two installation bolts from the torque plate.

(b) Remove the brake cylinder and suspend it so the hose is not stretched.

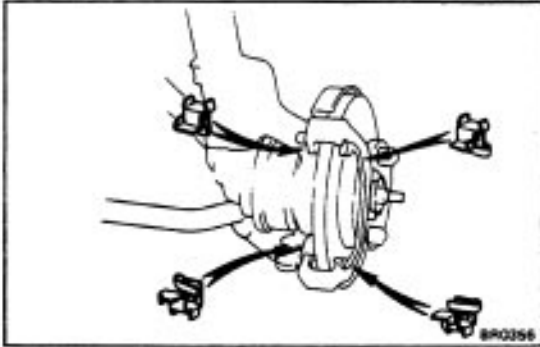
**HINT:** Do not disconnect the brake hose.



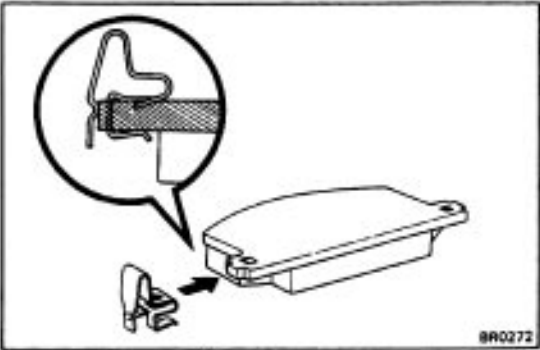
### 4. REMOVE FOLLOWING PARTS:

- Two anti-squeal springs.
- Two brake pads
- Two or four anti-squeal shims
- Two pad wear indicator plates
- Four pad support plates

5. **CHECK ROTOR DISC THICKNESS**  
(See step 2 on page [BR-23](#))
6. **CHECK ROTOR DISC RUNOUT**  
(See step 3 on page [BR-23](#))

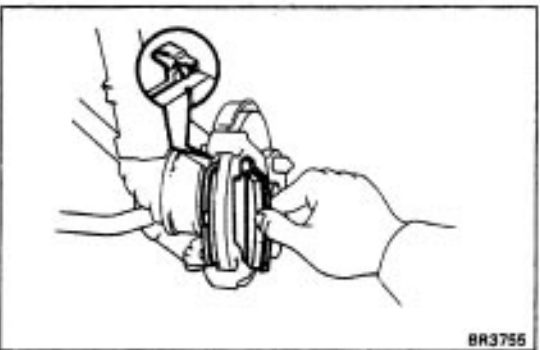


7. **INSTALL PAD SUPPORT PLATES**



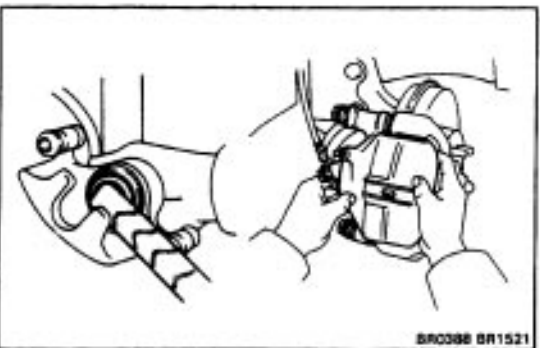
8. **INSTALL NEW PADS**

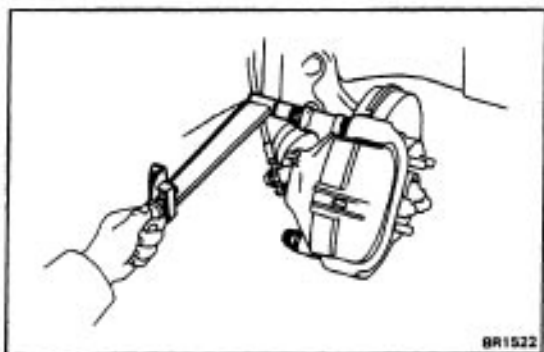
- (a) Install new pad wear indicator plate to inner pad.  
NINT: Be sure the arrow on the pad wear indicator plate is pointing in the direction of the disc rotation.
  - (b) (Except 2VZ-FE Engine of w/ A.B.S.)  
Install the one anti-squeal shim to the each pad.
  - (c) (For 2VZ-FE Engine of w/ A.B.S.)  
Install the two anti-squeal shims to the each pad.
- HINT: Apply disc brake grease to both side of the inner anti-squeal shim of the outside pad.
- (d) Install the pads onto each support plate.  
**NOTICE: Do not allow oil or grease to get on the rubbing face.**
  - (e) Install the two anti-squeal springs.



9. **INSTALL CYLINDER**

- (a) Draw out a small amount of brake fluid from the reservoir.
  - (b) Press in piston with a hammer handle or an equivalent.
- HINT: Always change the pad on one wheel at a time as there is a possibility of the opposite piston flying out.
- (c) Insert the brake cylinder carefully –so the boot is not wedged.



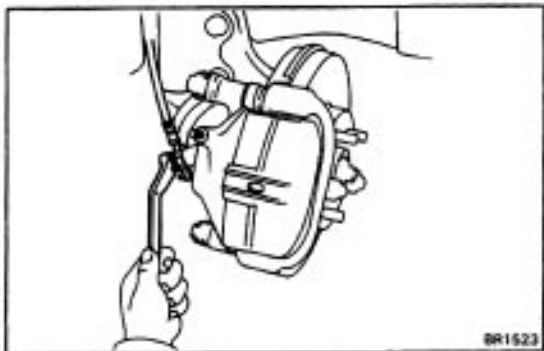


(d) Install and torque two installation bolts.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

#### 10. INSTALL FRONT WHEEL

#### 11. CHECK THAT FLUID LEVEL IS MAX LINE

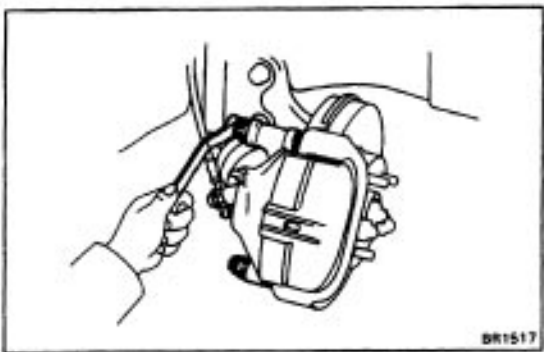


### REMOVAL OF CYLINDER

(See page [BR-18](#))

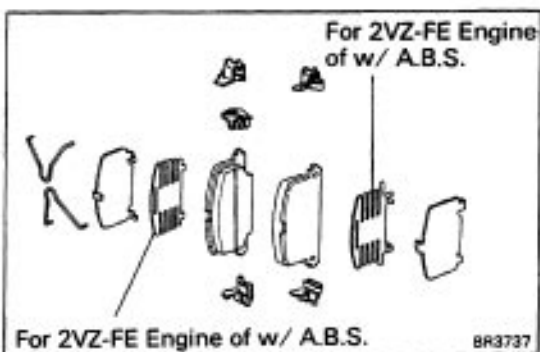
#### 1. DISCONNECT BRAKE LINE

Remove the union bolt and disconnect the brake line. Use a container to catch the brake fluid.



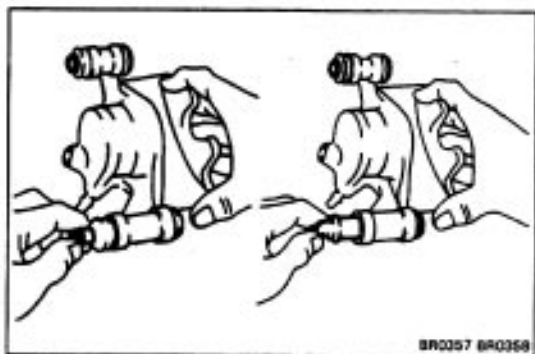
#### 2. REMOVE CYLINDER FROM TORQUE PLATE

Remove the two installation bolts and cylinder.



#### 3. REMOVE PADS

(See step 4 on page [BR-19](#))

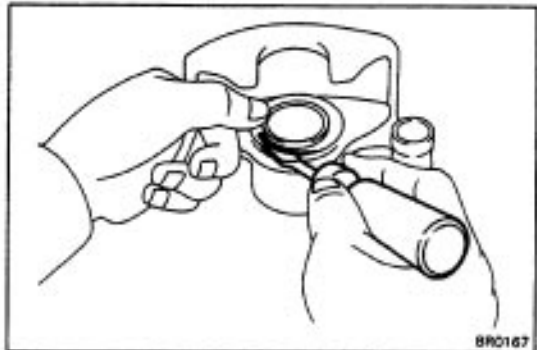


## DISASSEMBLY OF CYLINDER

(See page [BR-18](#))

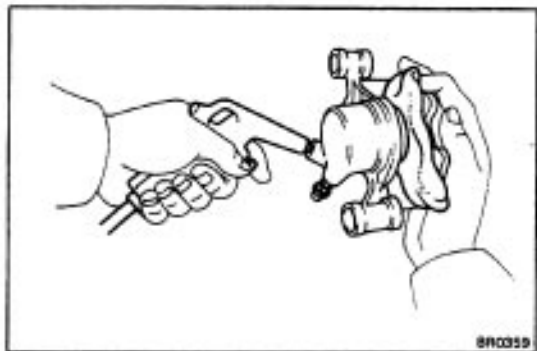
### 1. REMOVE FOLLOWING PARTS:

- (a) Two sliding bushings
- (b) Four dust boots



### 2. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

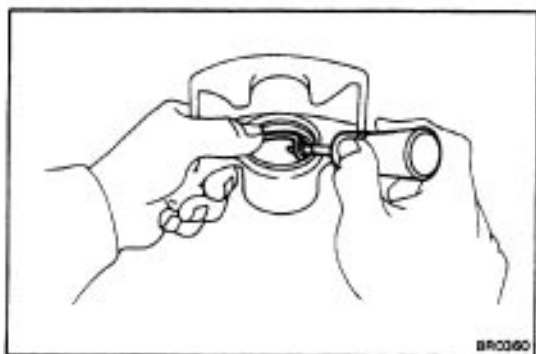
Using a screwdriver, remove the cylinder boot set ring and cylinder boot.



### 3. REMOVE PISTON FROM CYLINDER

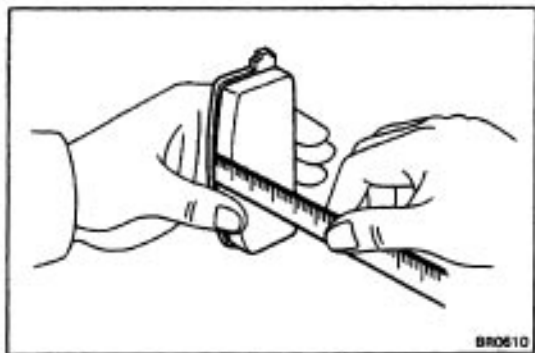
- (a) Put a piece of cloth or an equivalent between the piston and cylinder.
- (b) Use compressed air to remove the piston from the cylinder.

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



### 4. REMOVE PISTON SEAL FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seal.



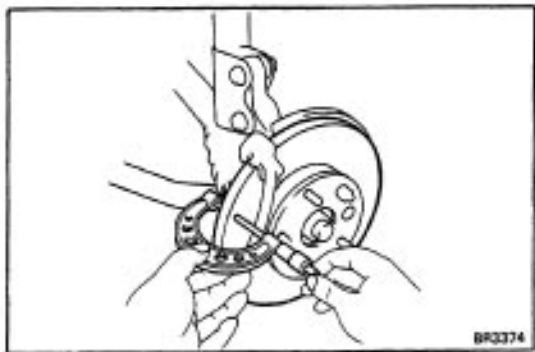
## INSPECTION AND REPAIR OF FRONT BRAKE COMPONENTS

### 1. MEASURE PAD LINING THICKNESS

**Standard thickness: 10.0 mm (0.394 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

Replace the pad if the thickness is less than the minimum or if it shows sign of uneven wear.

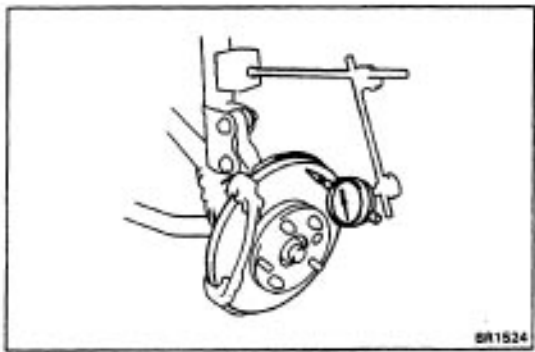


### 2. MEASURE ROTOR DISC THICKNESS

**Standard thickness: 25.0 mm (4.984 in.)**

**Minimum thickness: 24.0 mm (0.945 in.)**

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.



### 3. MEASURE ROTOR DISC RUNOUT

**HINT:** Before measuring the runout, confirm that the front hub bearing play is within specification.

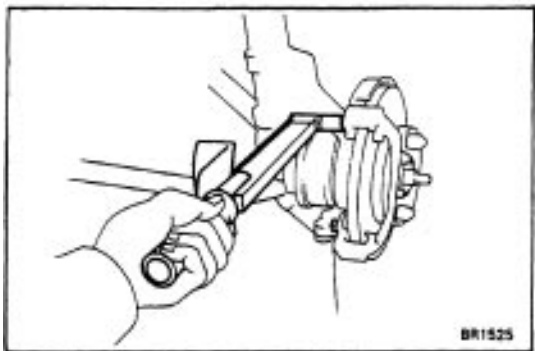
Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

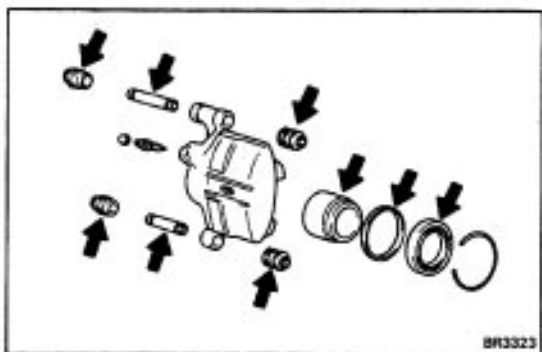
**Maximum disc runout: 4.07 mm (0.0028 in.)**

If the runout is greater than the maximum, inspect and adjust it following the procedure below:

Then replace the disc if necessary.

- (a) Remove the torque plate from the knuckle.
- (b) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.
- (c) Check that the hub bearing play is within specification, and replace the bearing if not within specification. (See page [FA-7](#))
- (d) Install the rotor disc and measure the disc runout, then shift the rotor disc one fifth of a turn and measure the disc runout. Similarly measure the runout at each position, and select the position where the runout is minimum.
- (e) In this position, if the runout is within specification, install the torque plate and torque the mounting bolts.  
**Torque: 1,090 kg-cm (79 ft-lb, 107 N-m)**
- (f) If not within specification, replace the rotor disc, and repeat (d) and (e).

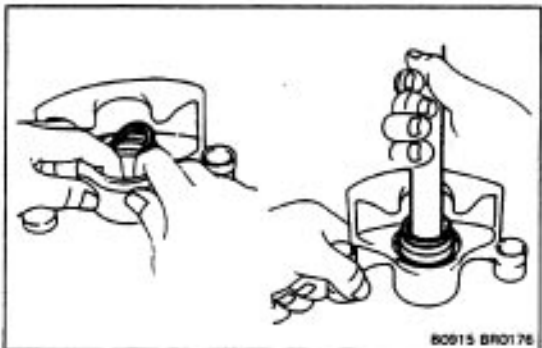




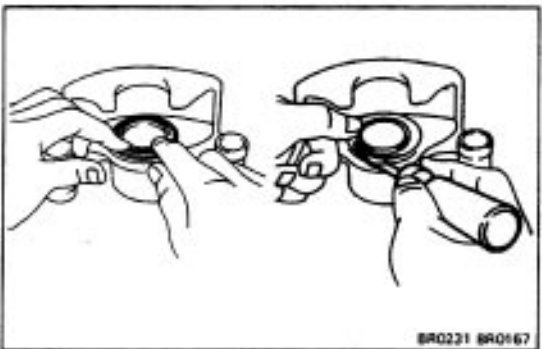
## ASSEMBLY OF CYLINDER

(See page [BR-18](#))

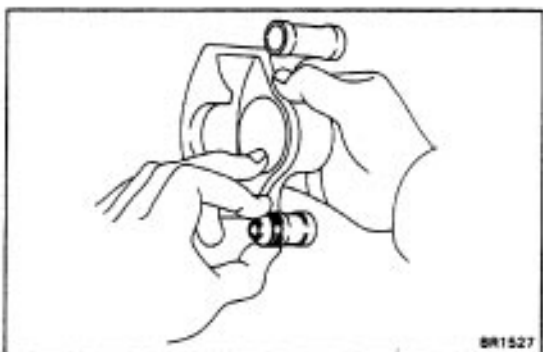
1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED WITH ARROWS



2. INSTALL PISTON SEAL AND PISTON IN CYLINDER

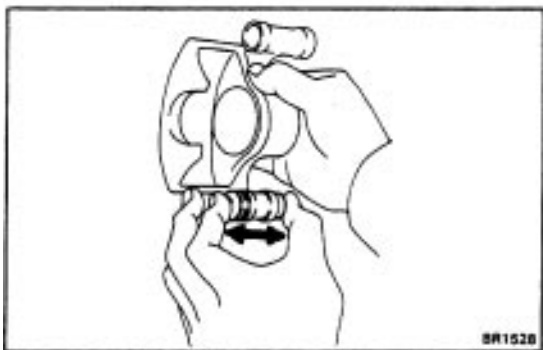


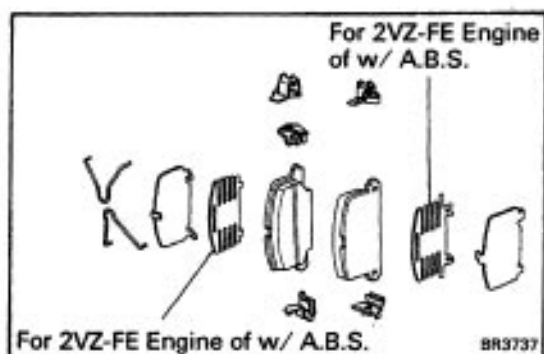
3. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER



4. INSTALL DUST BOOTS AND SLIDING BUSHING

- (a) Install the dust boots into the brake cylinder.
- (b) Insure that the boot is secured firmly to the brake cylinder groove.
- (c) Install the bushing into the boots.
- (d) Insure that the boot is secured firmly to the bushing groove.

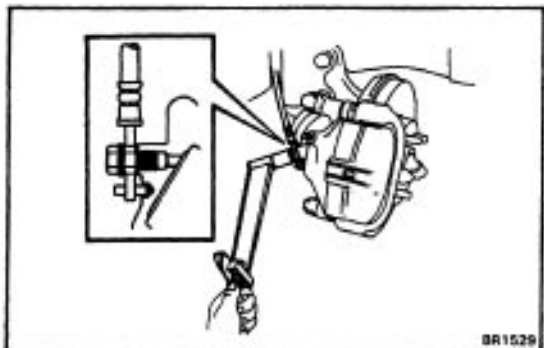




## INSTALLATION OF CYLINDER

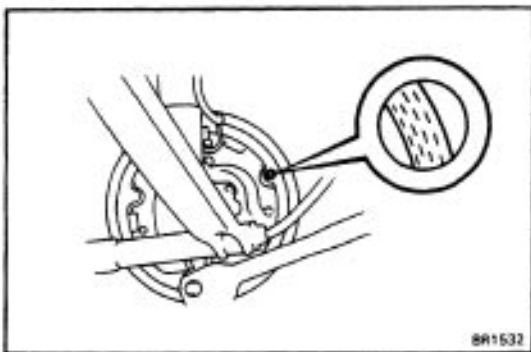
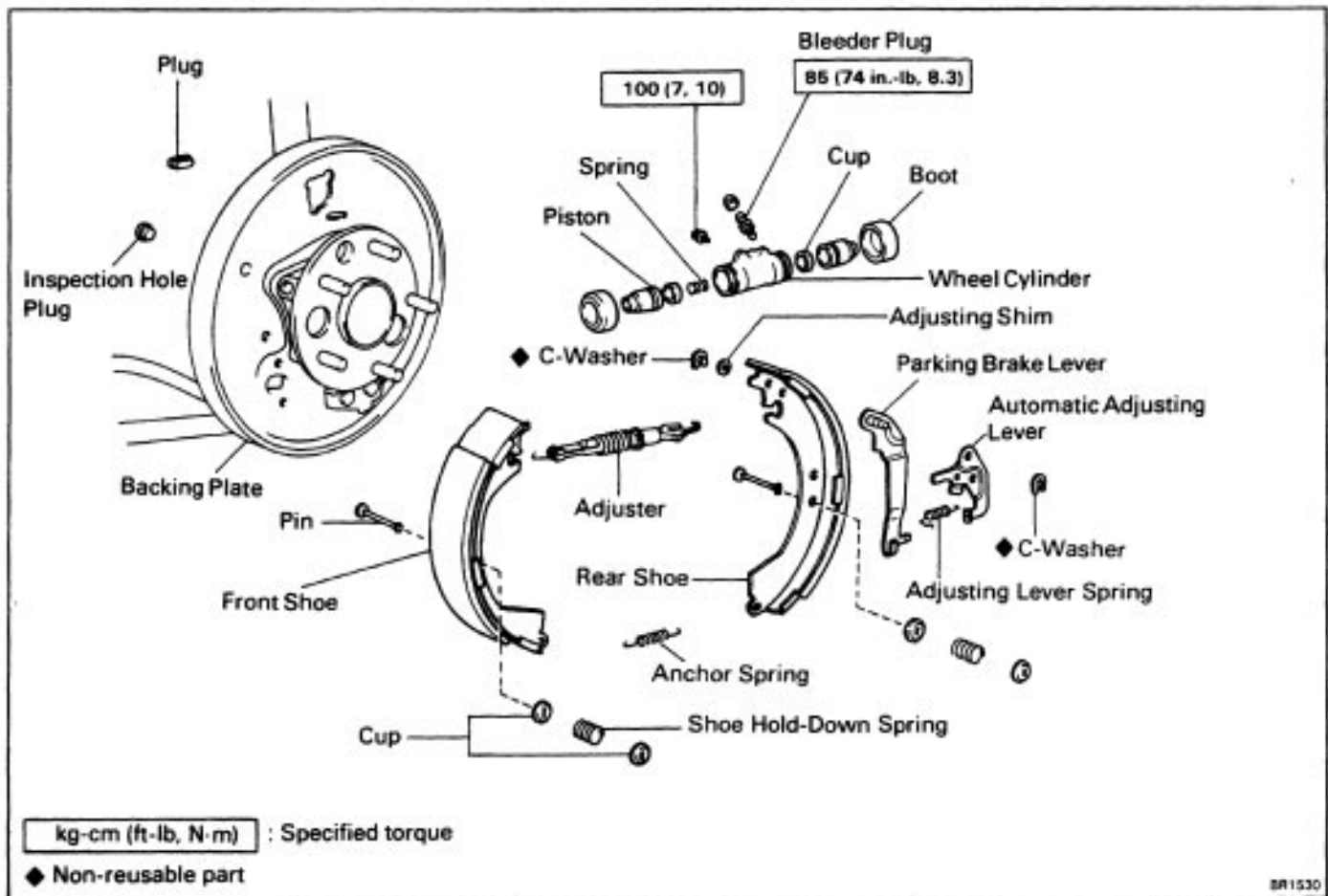
(See page [BR-18](#))

1. **INSTALL PADS**  
(See Steps 7 and 8 on page [BR-20](#))
2. **INSTALL CYLINDER**  
(See step 9 on page [BR-20](#))



3. **INSTALL FLEXIBLE HOSE TO BRAKE CYLINDER**  
Set the flexible hose and new gaskets in position and install the union bolt.  
Torque: 310 kg-em(22 ft-lb, 30 N·m)
4. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**  
(See page [BR-7](#))
5. **CHECK FOR LEAKS**

# REAR BRAKE Drum Brake COMPONENTS



## REMOVAL OF REAR BRAKE

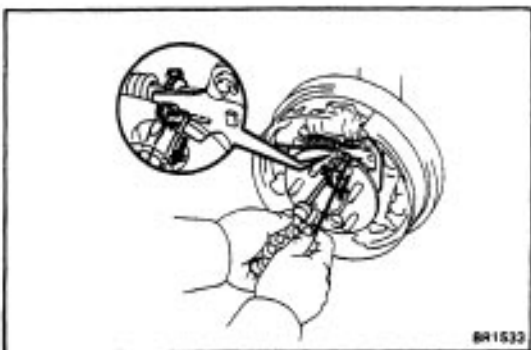
### 1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining the thickness through the hole.

If less than minimum, replace the shoes.

**Minimum thickness: 1.0 mm (0.039 in.)**

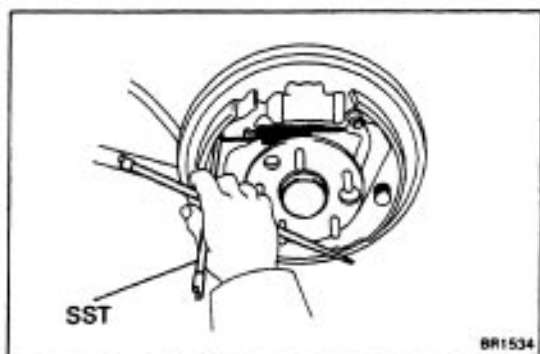
### 2. REMOVE REAR WHEEL



### 3. REMOVE BRAKE DRUM

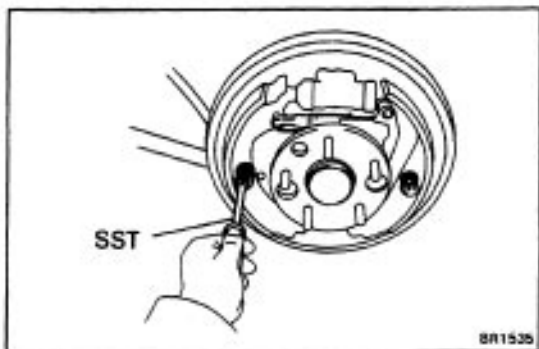
**HINT:** If the brake drum cannot be removed easily, perform the following steps.

- Insert a bent wire or an equivalent through the hole in the brake drum, and hold the automatic adjusting lever away from the adjuster.
- Using a screwdriver, reduce the brake shoe adjustment by turning the adjuster.



#### 4. REMOVE FRONT SHOE

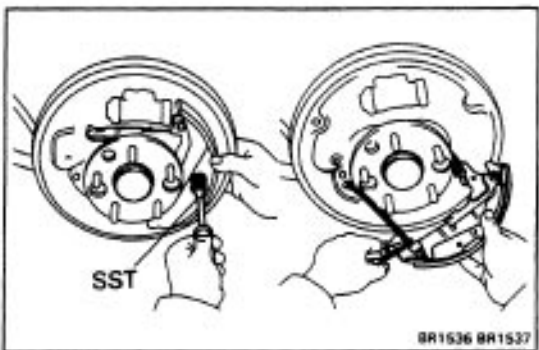
- (a) Using SST, disconnect the return spring.  
SST 09703-30010



- (b) Using SST, remove the shoe hold-down spring, cups and pin.

SST 09718-00010

- (c) Disconnect the anchor spring from the front shoe and remove the front shoe.  
(d) Remove the anchor spring from the rear shoe.

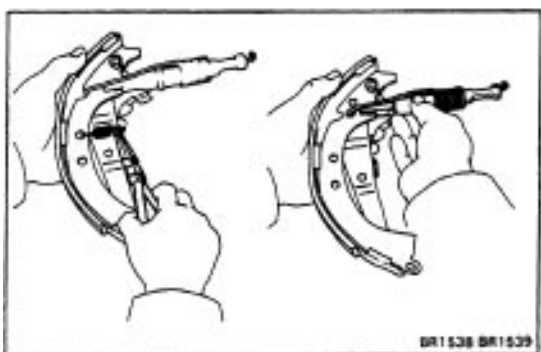


#### 5. REMOVE REAR SHOE

- (a) Using SST, remove the shoe hold-down spring, cups and pin.

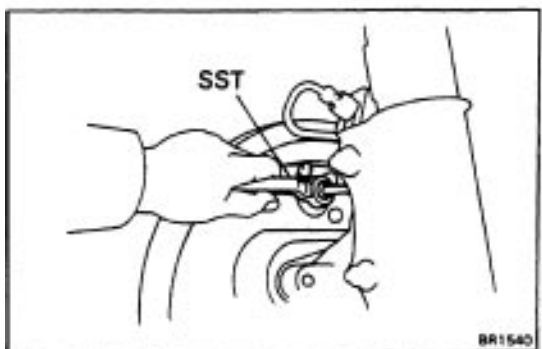
SST 09718-00010

- (b) Using a screwdriver, disconnect the parking brake cable from the anchor plate.  
(c) Using pliers, disconnect the parking brake cable from the lever and remove the rear shoe together with the adjuster.



#### 6. REMOVE ADJUSTER FROM REAR SHOE

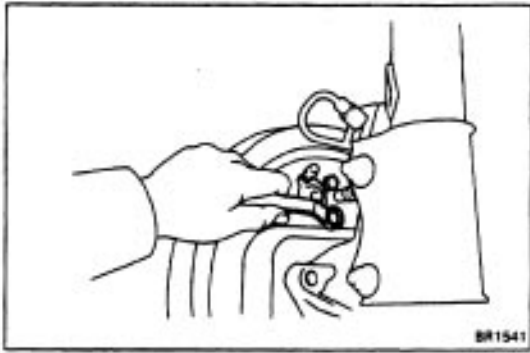
- (a) Remove the adjusting lever spring.  
(b) Remove the adjuster together with the return spring.



#### 7. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

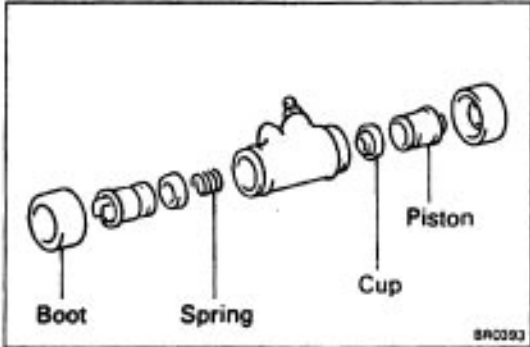
Using SST, disconnect the brake line. Use a container to catch the brake fluid.

SST 09751-36011



## 8. REMOVE WHEEL CYLINDER

Remove the two bolts and the wheel cylinder.



## 9. IF NECESSARY, DISASSEMBLE WHEEL CYLINDER

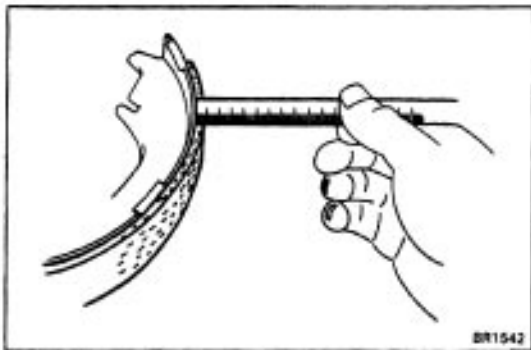
Remove the following parts from the wheel cylinder.

- Two boots
- Two pistons
- Two piston cups
- Spring \_

# INSPECTION AND REPAIR OF REAR BRAKE COMPONENTS

## 1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



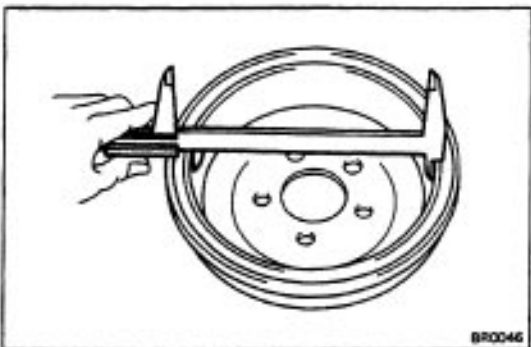
## 2. MEASURE BRAKE SHOE LINING THICKNESS

**Standard thickness: 5.0 mm (0.197 in. )**

**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.

HINT: If any of the brake shoes have to be replaced, replace all of the rear shoes in order to maintain even braking.

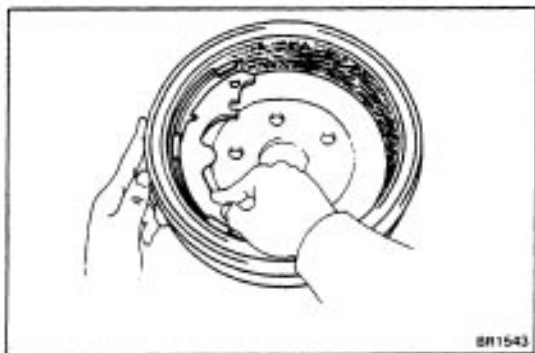


## 3. MEASURE BRAKE DRUM INSIDE DIAMETER

**Standard inside diameter: 228.6 mm (9.000 in.)**

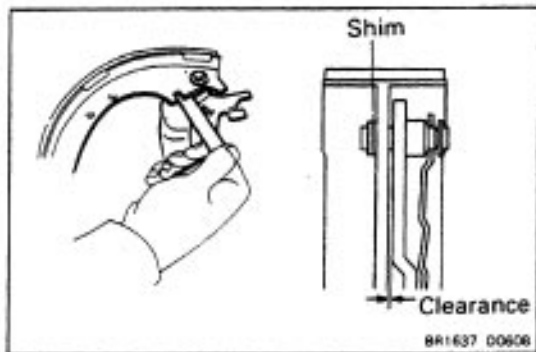
**Maximum inside diameter: 230.6 mm (9.079 in.)**

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.



#### 4. INSPECT REAR BRAKE LINING AND DRUM FOR PROPER CONTACT

If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.



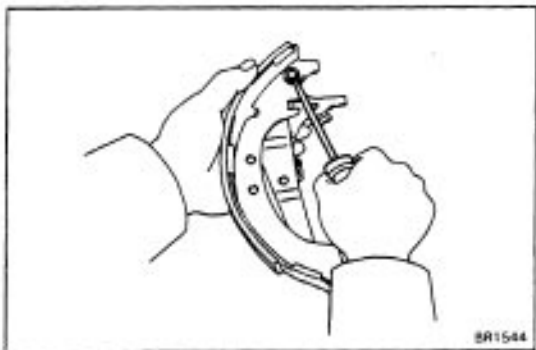
#### 5. MEASURE CLEARANCE BETWEEN BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

**Standard clearance: Less than 0.35 mm (0.0138 in.)**

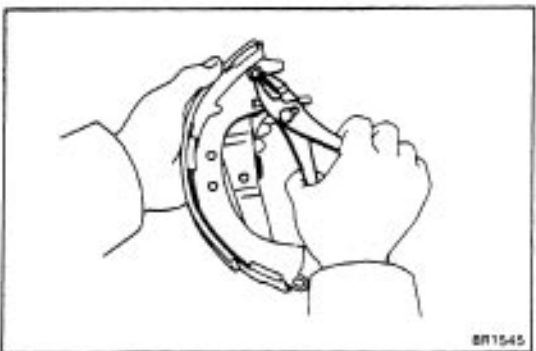
If the clearance is not within specification, replace the shim with one of the correct size.

Thickness		mm (in.)
0.2	(0.008)	0.5 (0.020)
0.3	(0.012)	0.6 (0.024)
0.4	(0.016)	0.9 (0.035)



#### 6. IF NECESSARY, REPLACE SHIM

(a) Remove the parking brake lever, and install the correct size shim.



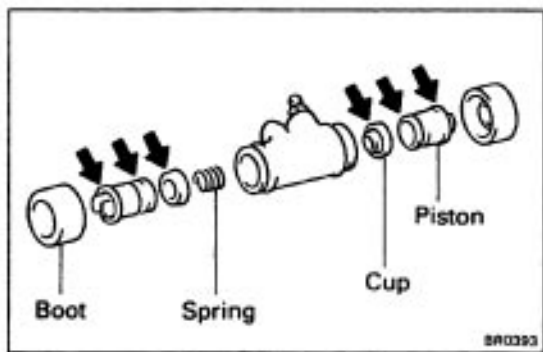
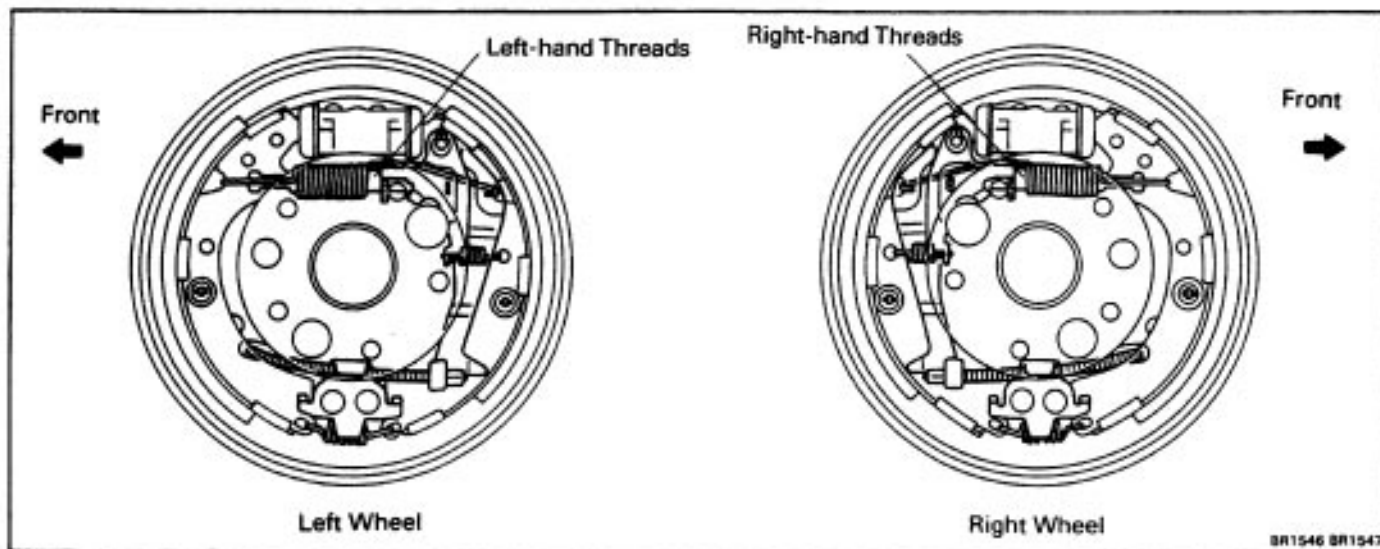
(b) Install the parking brake lever with a new C-washer.

(c) Remeasure the clearance.

## INSTALLATION OF REAR BRAKE

(See page [BR-26](#))

HINT: Assemble the parts in the correct direction as shown.



### 1. ASSEMBLE WHEEL CYLINDER

(a) Apply lithium soap base glycol grease to the cups and pistons as shown.

(b) Assemble the wheel cylinder.

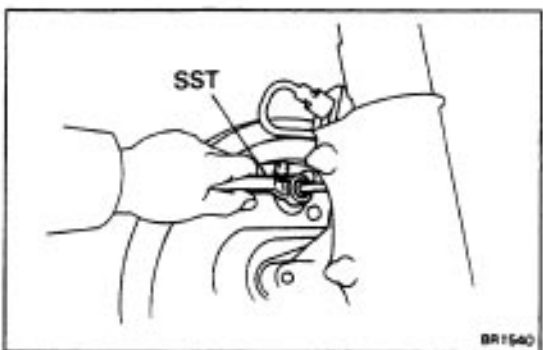
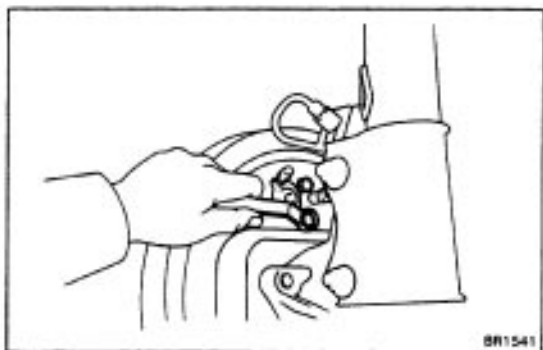
HINT: Install in proper direction only.

- Spring
- Two cups
- Two pistons
- Two boots .

### 2. INSTALL WHEEL CYLINDER

Install the wheel cylinder on the backing plate with two bolts.

**Torque: 100 kg-cm (7 ft-lb, 10 N-m)**

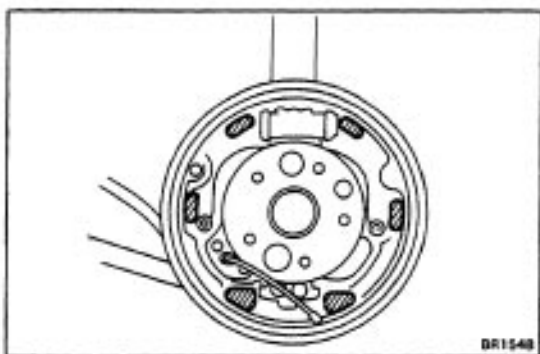


### 3. CONNECT BRAKE TUBE TO WHEEL CYLINDER

Using SST, connect the brake tube.

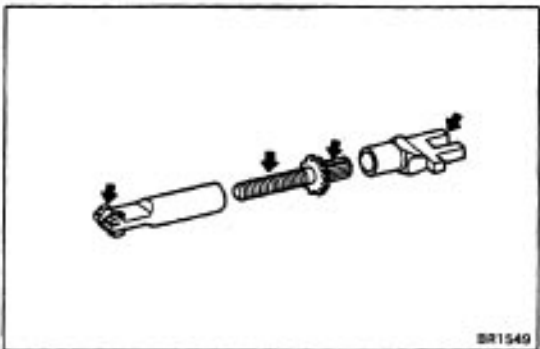
SST 09751-36011

**Torque: 155 kg-crn (11 ft-lb, 15 N-m)**

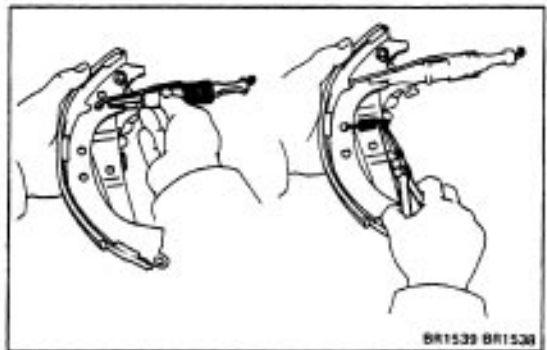


#### 4. APPLY HIGH TEMPERATURE GREASE TO BACKING PLATE AND ADJUSTER

- (a) Apply high temperature grease to the brake shoe contact surfaces as shown.

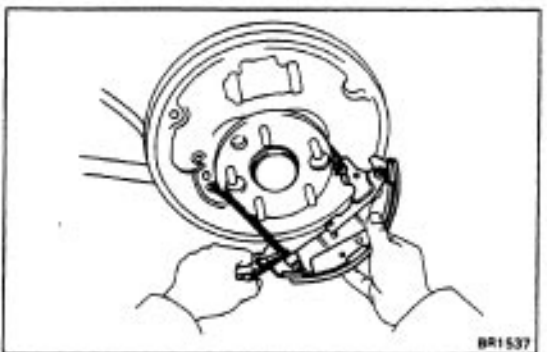


- (b) Apply high temperature grease to the adjuster bolt threads and ends.



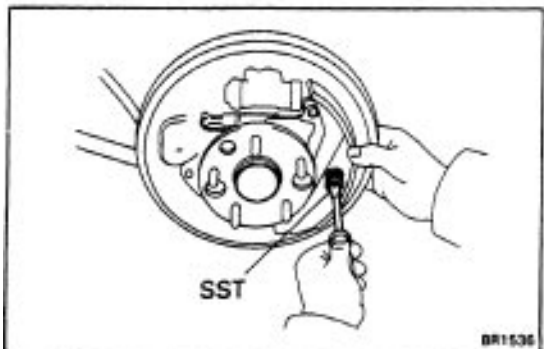
#### 5. INSTALL ADJUSTER ONTO REAR SHOE

Set the adjuster and return spring in place and install the adjusting lever spring.



#### 6. INSTALL REAR SHOE

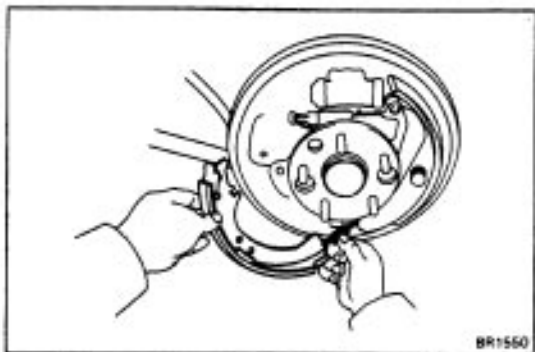
- (a) Using pliers, connect the parking brake cable to the lever.
- (b) Pass the parking brake cable through the notch in the anchor plate.
- (c) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the other end in the anchor plate.



- (d) Using SST, install the shoe hold-down spring, cups and pin.

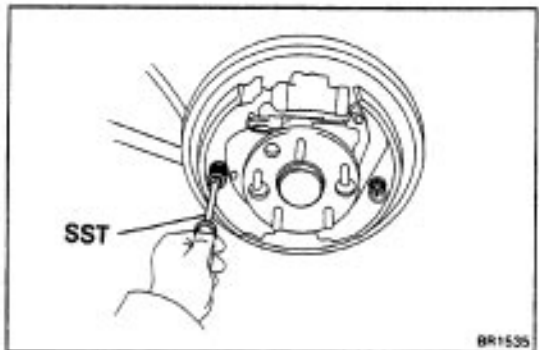
SST 09718- 10

**NOTICE:** Do not allow oil or grease to get on the rubbing face.



## 7. INSTALL FRONT SHOE

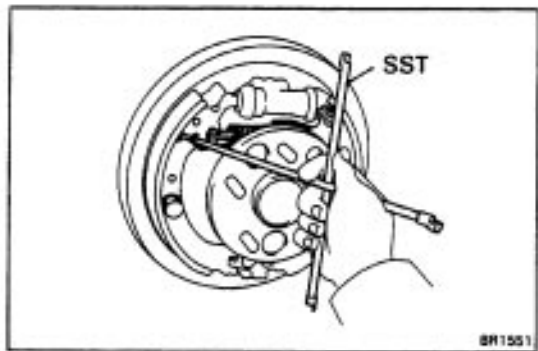
- (a) Install the anchor spring between the front and rear shoes.
- (b) Set the front shoe in place with the end of the shoe inserted in the wheel cylinder and the adjuster in place.



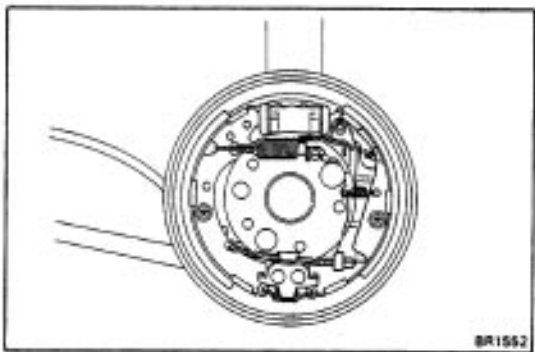
- (c) Using SST, install the shoe hold-down spring, cups and pin.

SST 09718-00010

**NOTICE: Do not allow oil or grease to get on the rubbing face.**

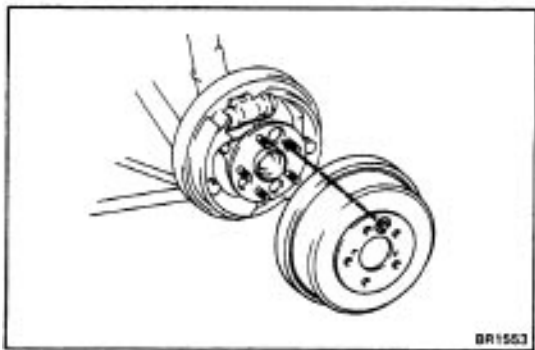


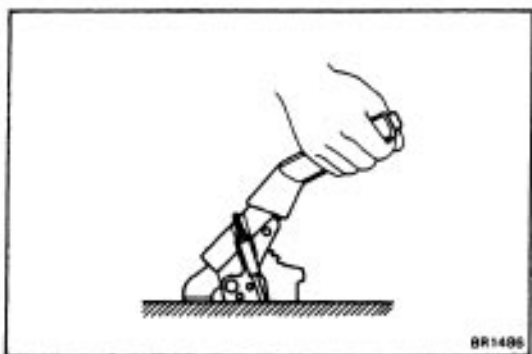
- (d) Using SST, connect the return spring.  
SST 09703-30010



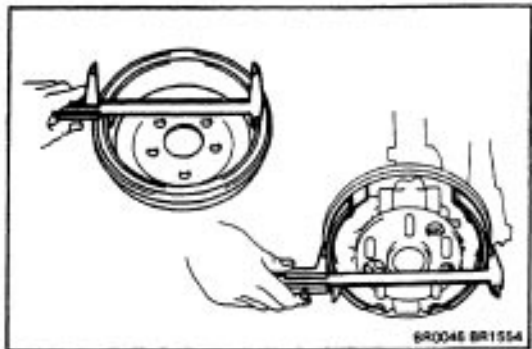
## 8. CHECK OPERATION OF AUTOMATIC ADJUSTING MECHANISM

- (a) Move the parking brake lever of the rear shoe back and forth, as shown. Check that the adjuster turns. If the adjuster does not turn, check for incorrect installation of the rear brakes.
- (b) Adjust the adjuster length to the shortest possible amount.
- (c) Align the adjusting hole on the brake drum and largest hole on the axle carrier, install the brake drum.





- (d) Pull the parking brake lever all the way up until a clicking sound can no longer be heard.



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

- (a) Remove the brake drum.  
(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.  
Shoe clearance: 0.6 mm (0.024 in.)  
If incorrect, check the parking brake system.

**10. INSTALL BRAKE DRUM**

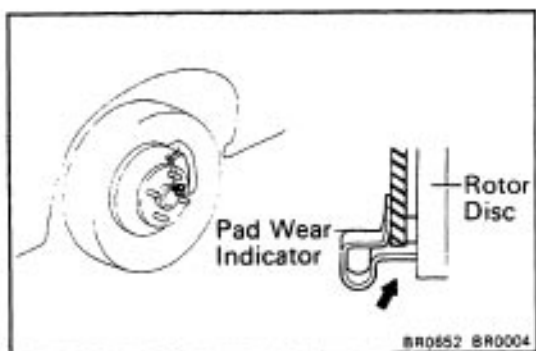
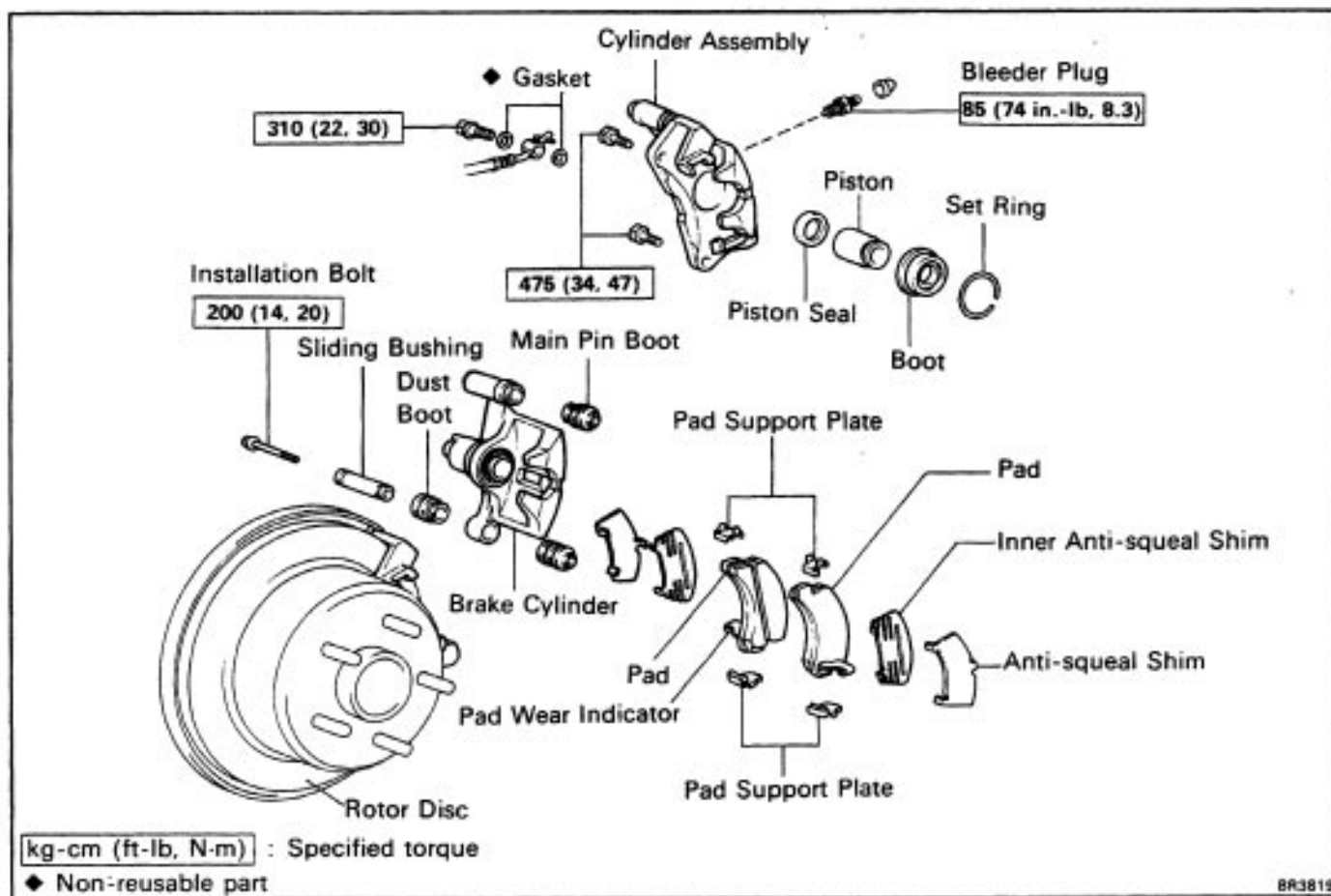
**11. INSTALL REAR WHEEL**

**12. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**

(See page [BR-7](#))

**13. CHECK FOR FLUID LEAKAGE**

## REAR BRAKE Disc Brake COMPONENTS

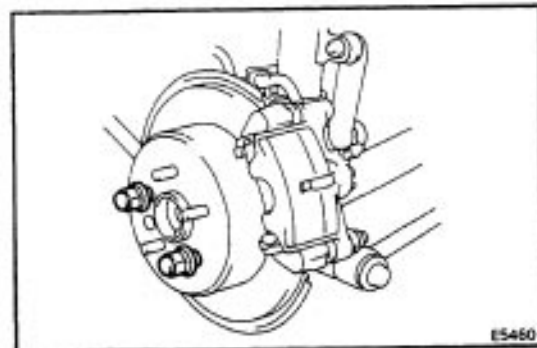


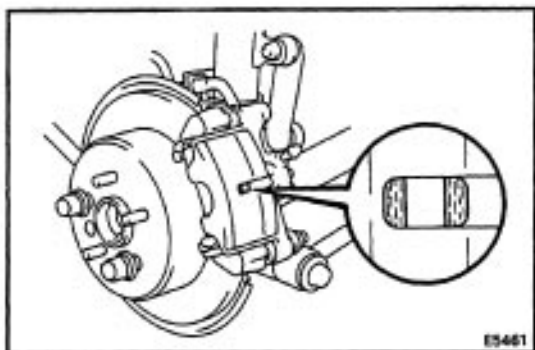
## REPLACEMENT OF BRAKE PADS

**HINT:** If a squealing noise occurs from the brakes while driving, check the pad wear indicator. If there are traces of the indicator contacting the rotor disc, the brake pad should be replaced.

### 1. REMOVE REAR WHEEL

Remove the wheel and temporarily fasten the rotor disc with the hub nuts.

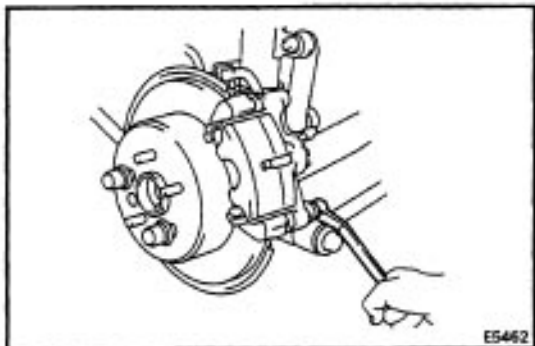




## 2. INSPECT PAD LINING THICKNESS

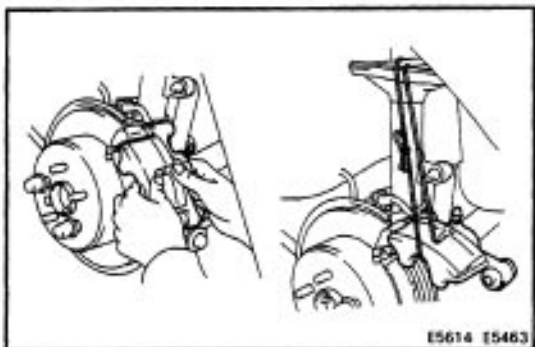
Check the pad thickness through the cylinder inspection hole and replace pads if not within specification.

**Minimum thickness: 1.0 mm (0.039 in.)**



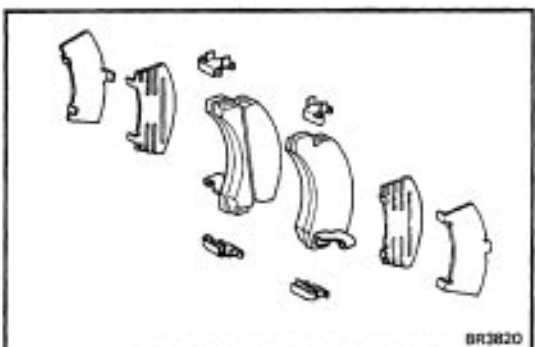
## 3. REMOVE CYLINDER FROM TORQUE PLATE

(a) Remove the installation bolt from the torque plate.



(b) Remove the brake cylinder and suspend it so the hose is not stretched.

HINT: Do not disconnect the brake hose.



## 4. REMOVE FOLLOWING PARTS:

- (a) Two brake pads
- (b) Four anti-squeal shims
- (c) Four pad support plates

## 5. CHECK ROTOR DISC THICKNESS

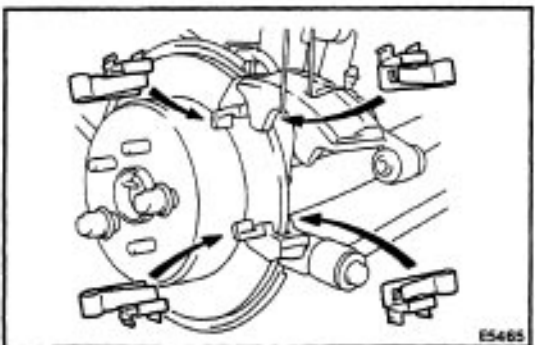
(See step 2 on page [BR-39](#))

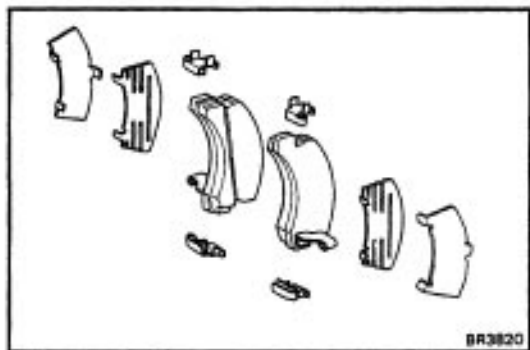
## 6. CHECK ROTOR DISC RUNOUT

(See step 3 on page [BR-39](#))

## 7. INSTALL PAD SUPPORT PLATES

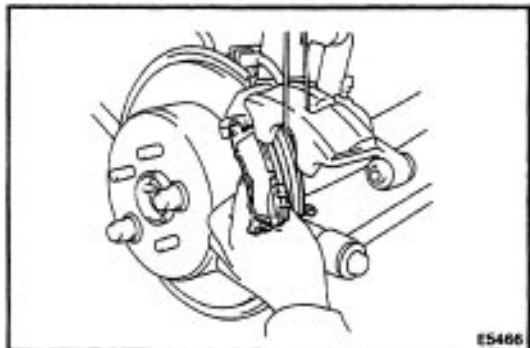
Install the four pad support plates.





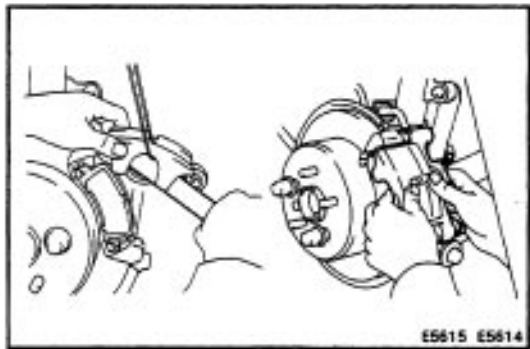
## 8. INSTALL NEW PADS

- (a) Install the two anti-squeal shims to the each pad.  
 HINT: Apply disc brake grease to the both side of the inner anti-squeal shim.



- (b) Install the two pads so the wear indicator plate is at the bottom side.

**NOTICE:** Do not allow oil or grease to get on the rubbing face.



## 9. INSTALL CYLINDER

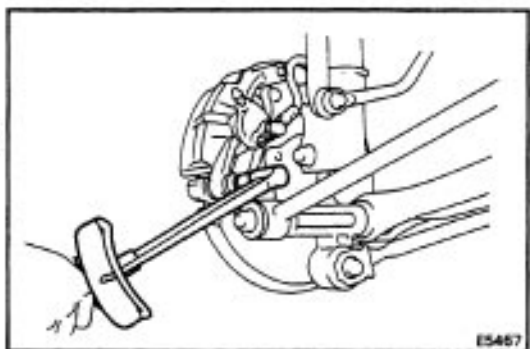
- (a) Draw out a small amount of brake fluid from the reservoir.  
 (b) Press in piston with a hammer handle or an equivalent.

HINT: Always change the pad on one wheel at a time as there is a possibility of the opposite piston flying out.

- (c) Insert the brake cylinder carefully so the boot is not wedged.

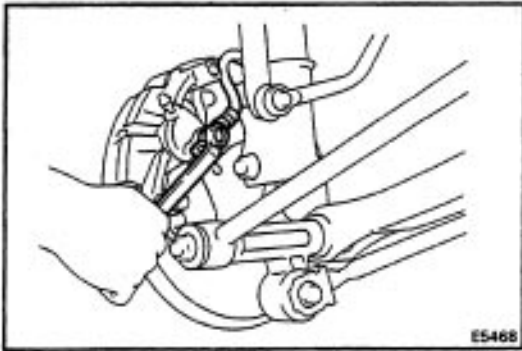
- (d) Install and torque the installation bolt.

Torque: 200 kg-cm (14 ft-lb, 20 N-m)



## 10. INSTALL REAR WHEEL

## 11. FILL BRAKE FLUID

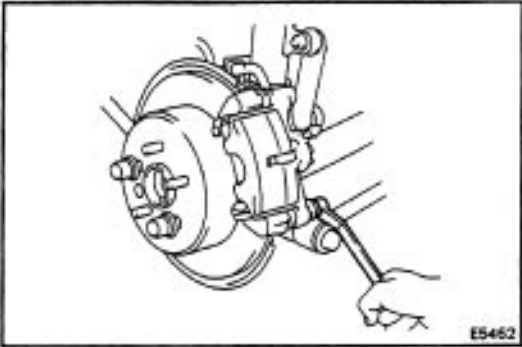


## REMOVAL OF CYLINDER

(See page [BR-34](#))

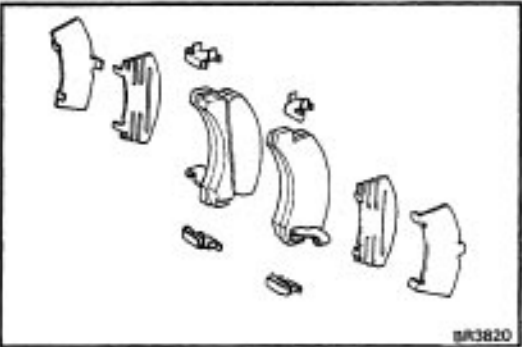
### 1. DISCONNECT BRAKE HOSE

Remove the union bolt and disconnect the brake hose.  
Use a container to catch the brake fluid.



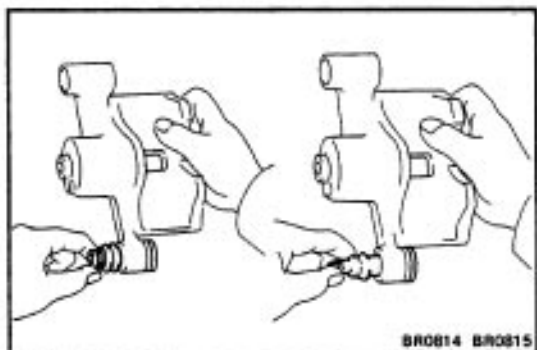
### 2. REMOVE CYLINDER FROM TORQUE PLATE

Remove the installation bolt and cylinder.



### 3. REMOVE PADS

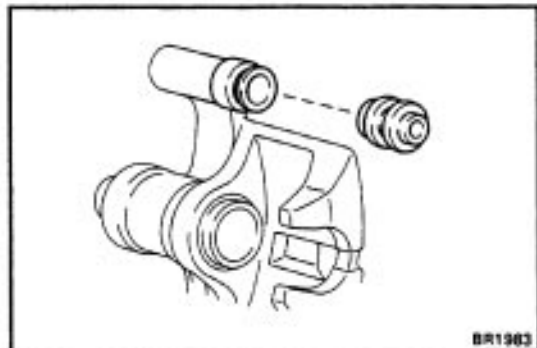
(See step 4 on page [BR-35](#))



## DISASSEMBLY OF CYLINDER

(See page [BR-34](#))

### 1. REMOVE SLIDING BUSHING AND DUST BOOTS



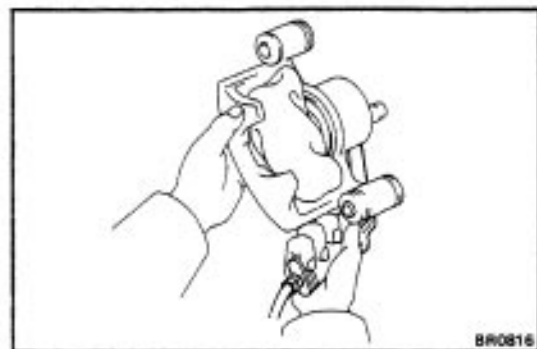
### 2. REMOVE MAIN PIN BOOT

Pull out the main pin boot.



### 3. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

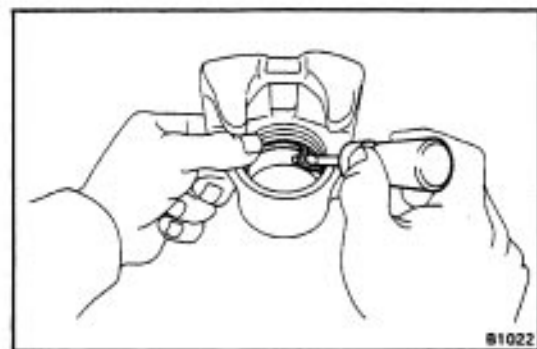
Using a screwdriver, remove the cylinder boot set ring and cylinder boot.



### 4. REMOVE PISTON FROM CYLINDER

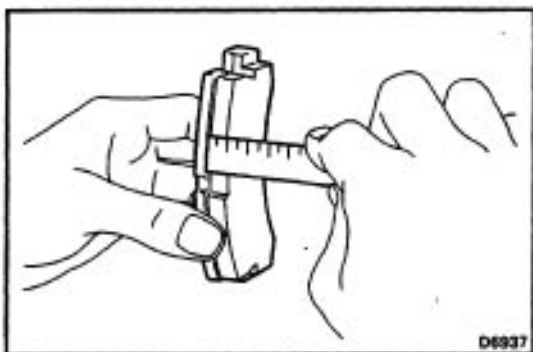
- (a) Put a piece of cloth or an equivalent as shown.
- (b) Use compressed air to remove the piston from the cylinder.

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



### 5. REMOVE PISTON SEAL FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seal.



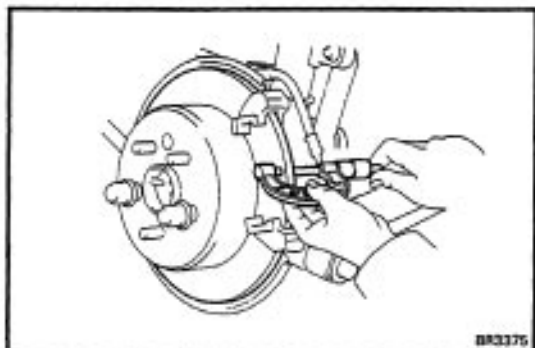
## INSPECTION AND REPAIR OF REAR BRAKE COMPONENTS

### 1. MEASURE PAD LINING THICKNESS

**Standard thickness: 10.0 mm (0.394 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

Replace the pad if the thickness is less than the minimum or if it shows sign of uneven wear.

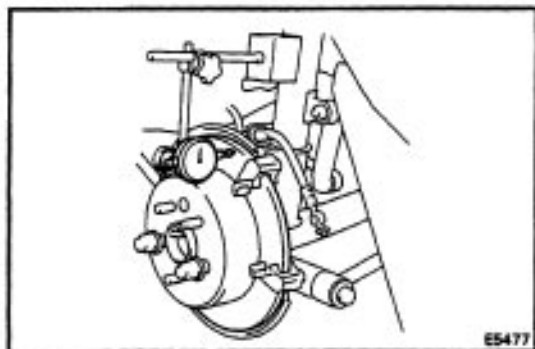


### 2. MEASURE ROTOR DISC THICKNESS

**Standard thickness: 10.0 mm (0.394 in.)**

**Minimum thickness: 9.0 mm (0.354 in.)**

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.



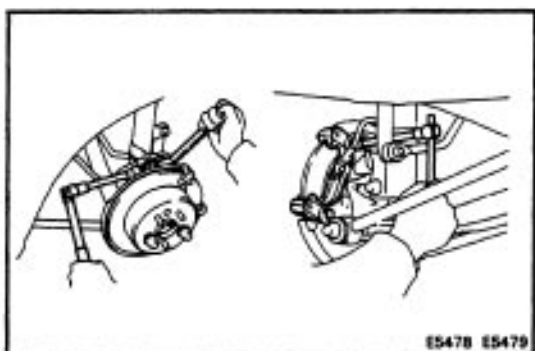
### 3. MEASURE ROTOR DISC RUNOUT

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

**Maximum. disc runout: 0.15 mm (0.0059 in.)**

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

HINT: Before measuring the runout, confirm that the hub bearing play is within specification.



### 4. IF NECESSARY, REPLACE ROTOR DISC

(a) Remove the axle carrier mounting bolt and nut of upper side.

(b) Remove the torque plate.

(c) Remove the hub nuts of the temporarily installed disc and pull off the rotor disc.

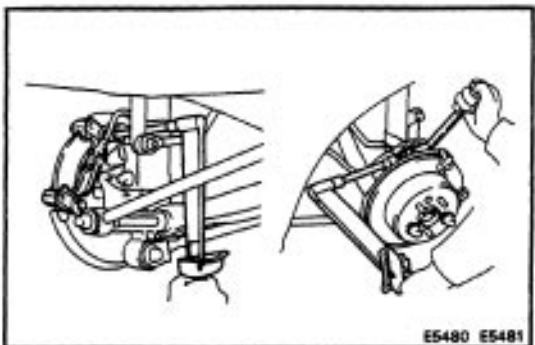
(d) Install a new rotor disc and loosely install the hub nuts.

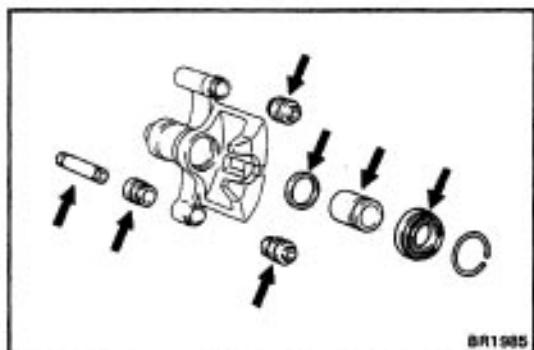
(e) Install the torque plate and tighten the mounting bolt.

**Torque: 475 kg-cm (34 ft-lb, 47 N-m)**

(f) Install the axle carrier mounting bolt and nut of upper side.

**Torque: 2,600 kg-cm (188 ft-lb, 255 N-m)**



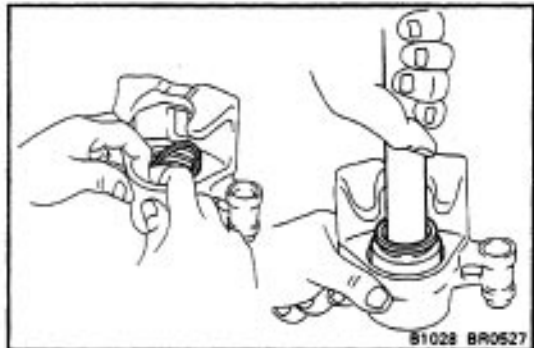


## ASSEMBLY OF CYLINDER

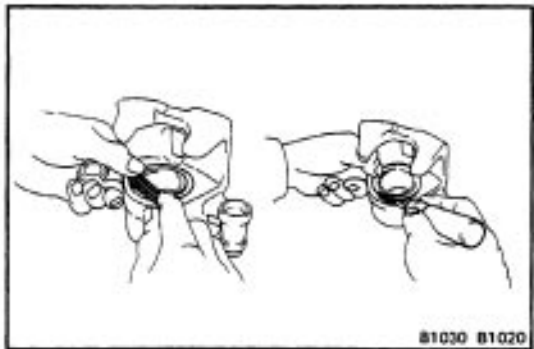
(See page [BR-34](#))

### 1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO FOLLOWING PARTS:

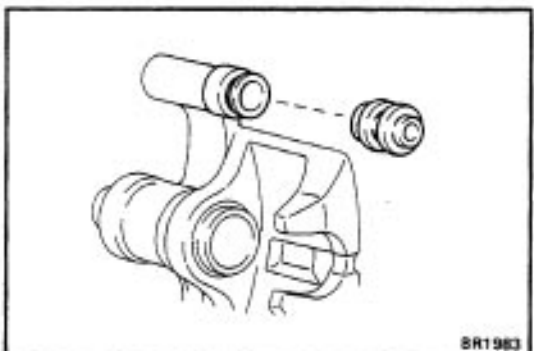
- (a) Main pin boot
- (b) Sliding bushing and dust boots
- (e) Piston, piston seal and cylinder boot



### 2. INSTALL PISTON SEAL AND PISTON IN CYLINDER

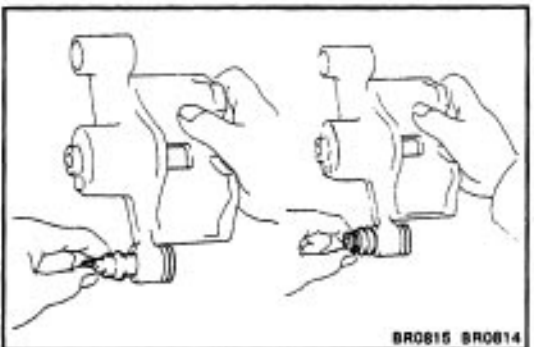


### 3. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER



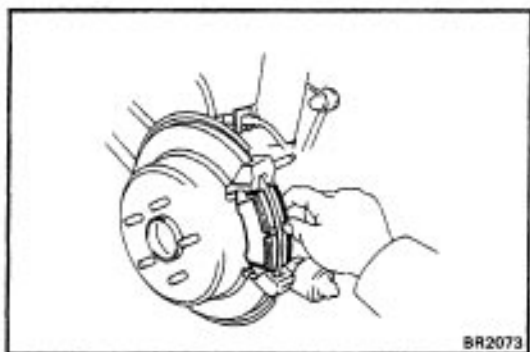
### 4. INSTALL MAIN PIN BOOT

Install the main pin boot in place.



### 5. INSTALL SLIDING BUSHING AND DUST BOOTS

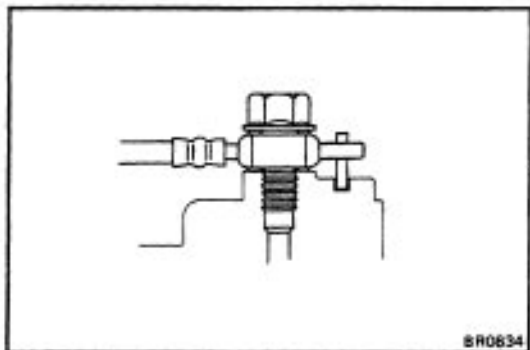
- (a) Install the sliding bushing and dust boots into the brake cylinder.
- (b) Insure that the boots are secured firmly to the brake cylinder groove.



## INSTALLATION OF CYLINDER

(See page [BR-34](#))

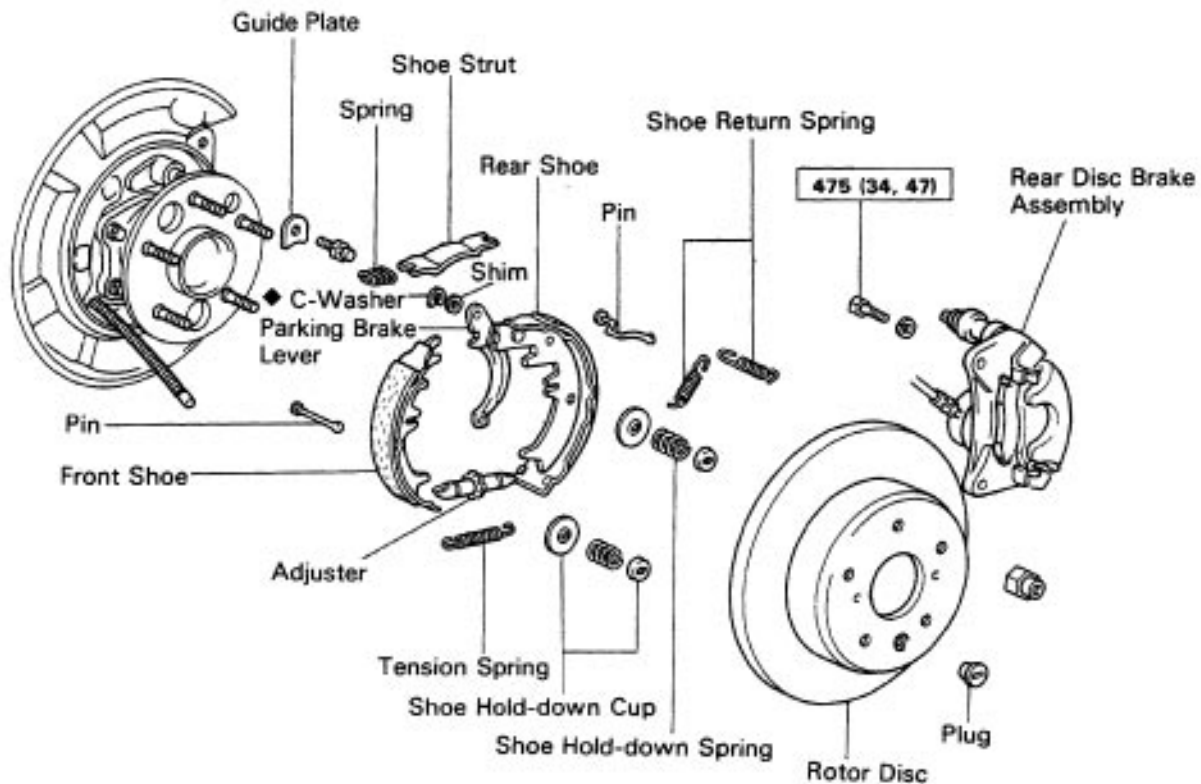
1. **INSTALL PADS**  
(See steps 7 and 8 on pages [BR-35](#) and 36)
2. **INSTALL CYLINDER**  
(See step 9 on page [BR-36](#))



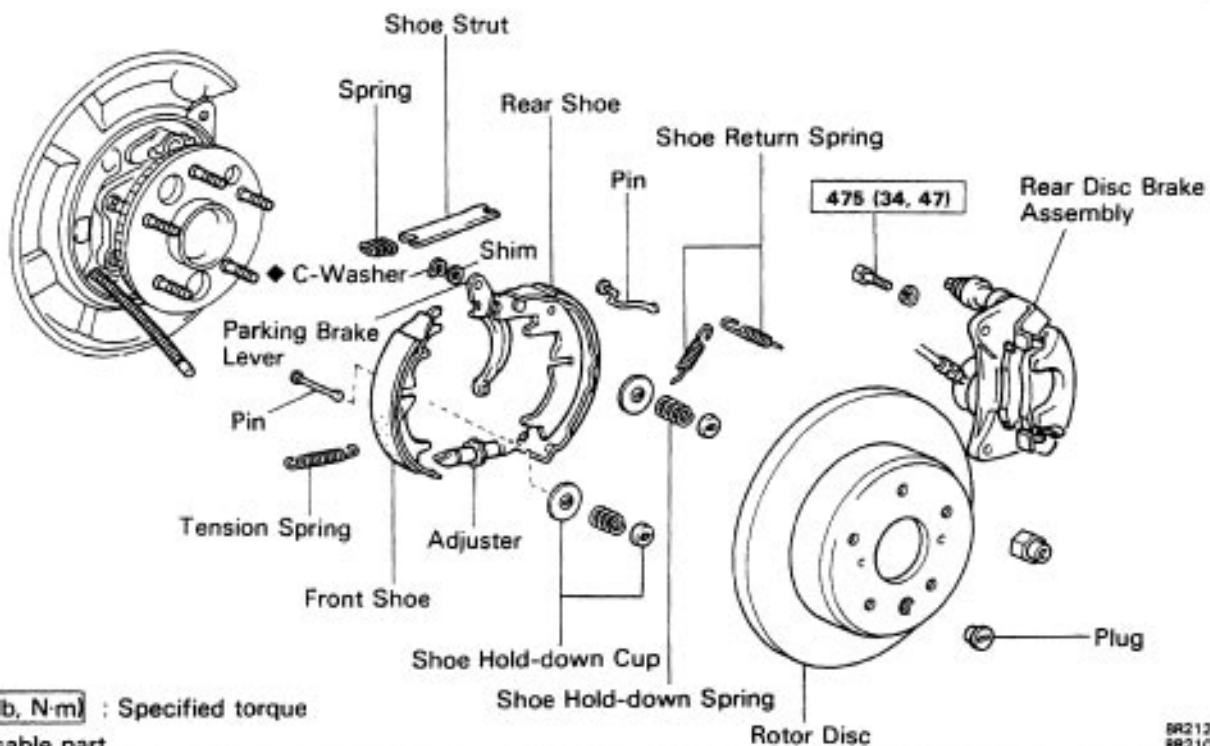
3. **INSTALL FLEXIBLE HOSE TO BRAKE CYLINDER**  
Set the flexible hose and new gaskets in position and install the union bolt and torque it.  
**Torque: 310 kg-cm (22 ft-lb, 30 N-m)**
4. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**  
(See page [BR-7](#))
5. **CHECK FOR LEAKS**

## Parking Brake (For Rear Disc Brake) COMPONENTS

2WD (w/o A.B.S.) and 4WD

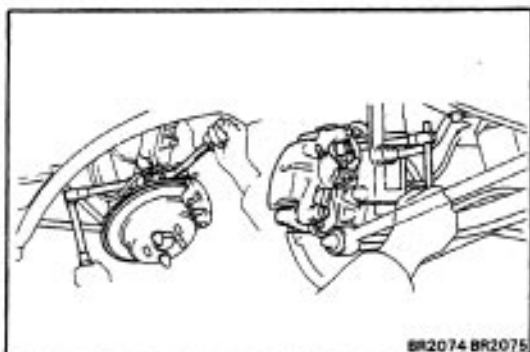


2WD (w/ A.B.S.)



kg-cm (ft-lb, N-m) : Specified torque

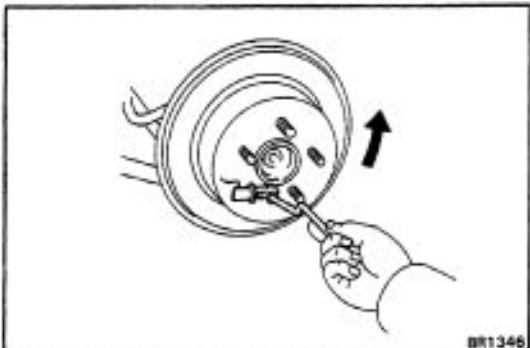
◆ Non-reusable part



## DISASSEMBLY OF PARKING BRAKE

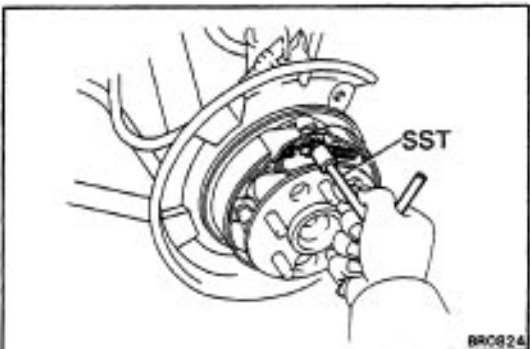
### 1. REMOVE REAR DISC BRAKE ASSEMBLY

- Remove the axle carrier mounting bolt and nut of upper side.
- Remove the two mounting bolts and remove the disc brake assembly.
- Suspend the disc brake so the hose is not stretched.



### 2. REMOVE ROTOR DISC

HINT: If the rotor disc cannot be removed easily, return the shoe adjuster until the wheel turns freely.

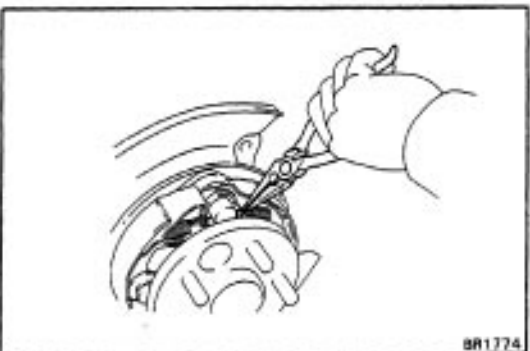


### 3. REMOVE SHOE RETURN SPRINGS

[2WD (w/o A.B.S.) and 4WD]

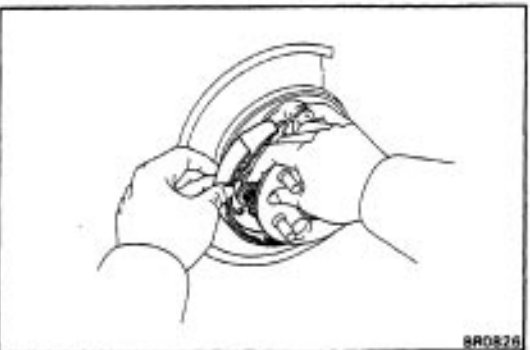
Using SST, remove the shoe return springs.

SST 09717-20010



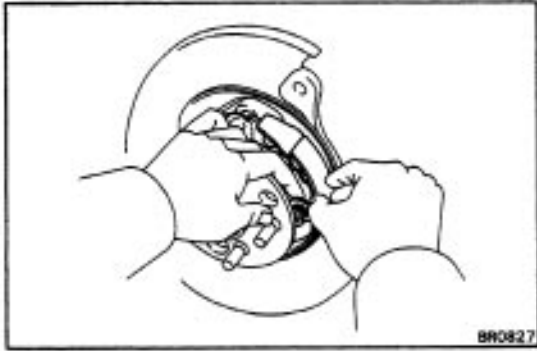
[2WD (w/ A.B.S.)]

Using needle-nose pliers, remove the shoe return springs.



### 4. REMOVE FRONT SHOE, ADJUSTER AND TENSION SPRING

- Slide out the front shoe and remove the shoe adjuster.
- Remove the shoe strut with spring.
- Disconnect the tension spring and remove the front shoe.



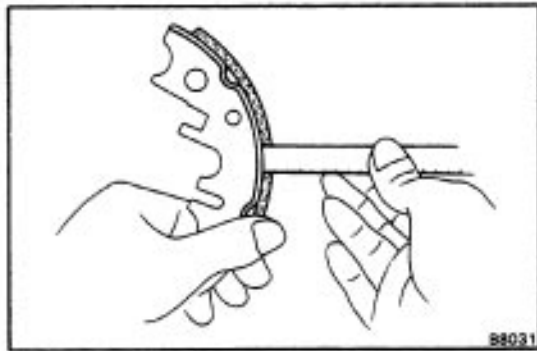
## 5. REMOVE REAR SHOE

- (a) Slide out the rear shoe.
- (b) Remove the tension spring from the rear shoe.
- (c) Disconnect the parking brake cable from the parking brake shoe lever.
- (d) Remove the shoe hold-down spring cups, springs and pins.

# INSPECTION AND REPAIR OF PARKING BRAKE COMPONENTS

## 1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.

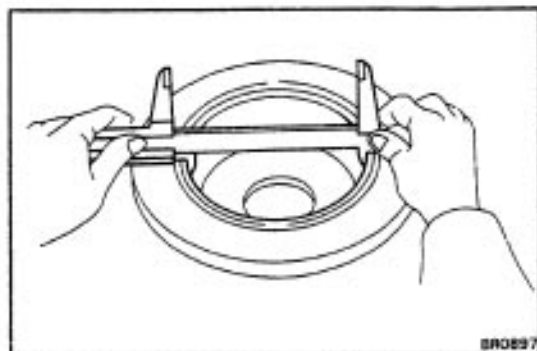


## 2. MEASURE BRAKE SHOE LINING THICKNESS

**Standard thickness: 2.0 mm (0.079 in.)**

**Minimum thickness: 1.0 mm (0.039 in.)**

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

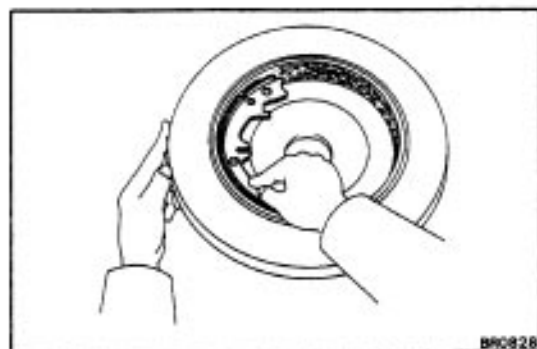


## 3. MEASURE BRAKE DISC INSIDE DIAMETER

**Standard inside diameter: 170 mm (6.69 in.)**

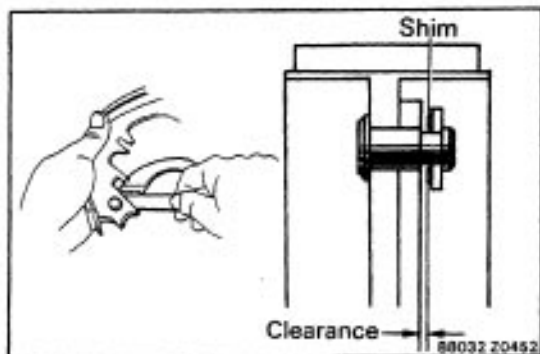
**Maximum inside diameter: 171 mm (6.73 in.)**

If the disc is scored or worn, the brake disc may be lathed to the maximum inside diameter.



## 4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

If the contact between the brake lining and disc is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

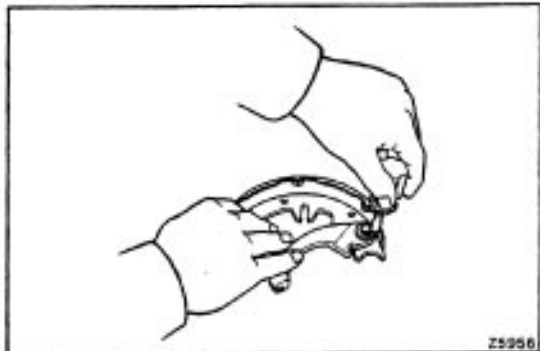


**5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER**

Using a feeler gauge, measure the clearance.

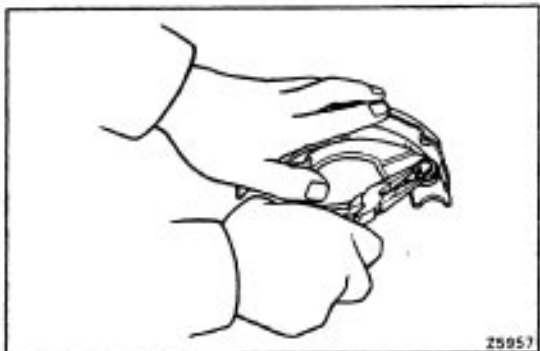
**Standard clearance: Less than 0.35 mm (0.0138 in.)**

If the clearance is not within specification, replace the shim with one of the correct size.



**6. IF NECESSARY, REPLACE SHIM**

(a) Remove the parking brake lever, and install the correct size shim. .



(b) Install the parking brake lever with a new C-washer.

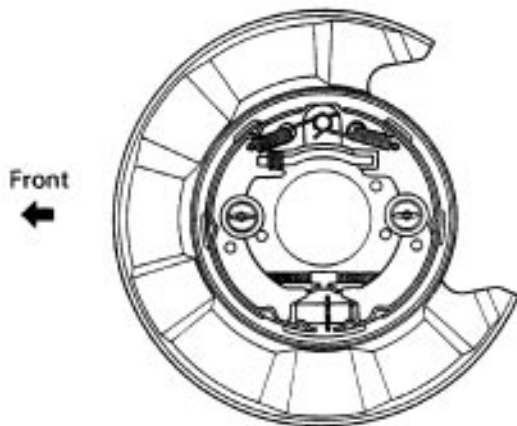
(c) Remeasure the clearance.

## ASSEMBLY OF PARKING BRAKE

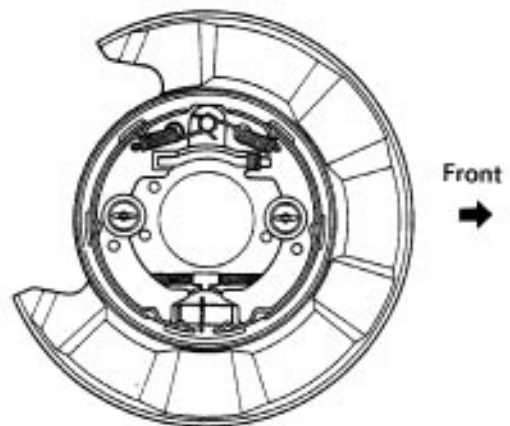
(See page [BR-42](#))

HINT: Assemble the parts in the correct direction as shown.

2WD (w/o A. B. S. y and 4WD

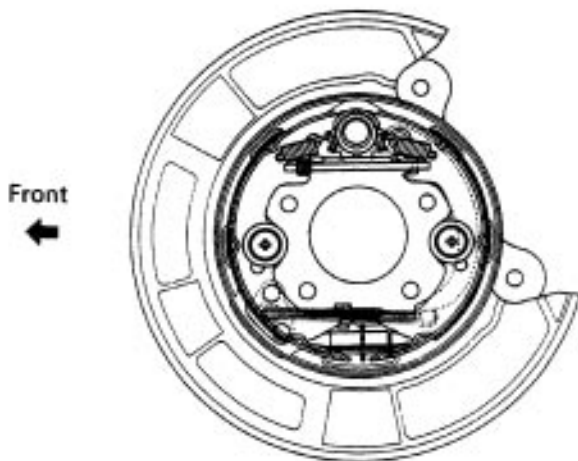


Left Wheel

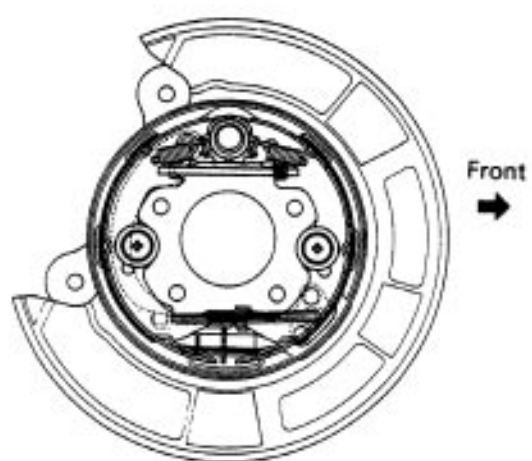


Right Wheel

2WD (w/ A.B.S.)

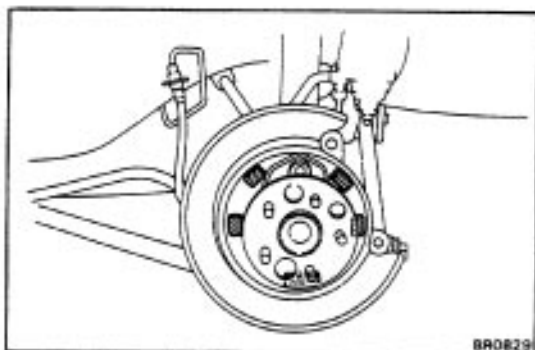


Left Wheel



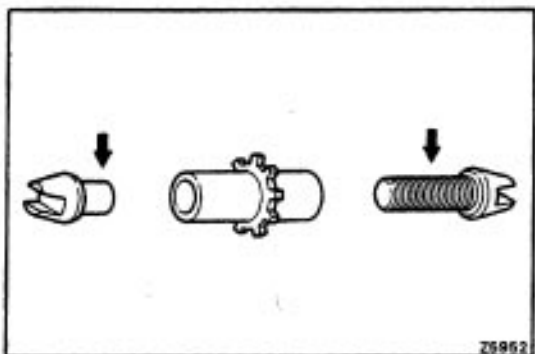
Right Wheel

BR0898 BR0898-R  
K0841-R K0841

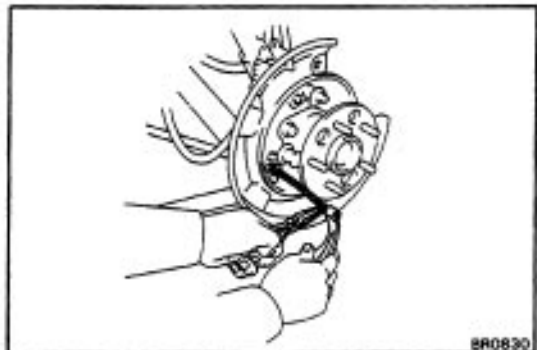


1. **APPLY HIGH TEMPERATURE GREASE ON BACKING PLATE AS SHOWN**

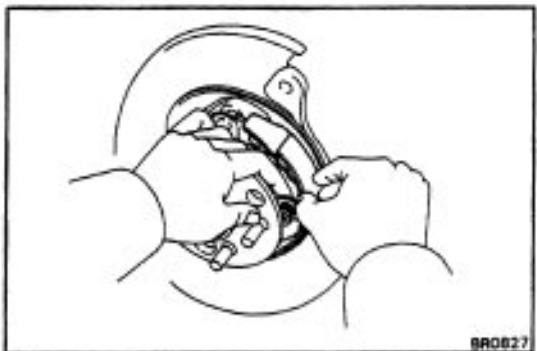
Apply high temperature grease to the sliding surfaces of the shoe.



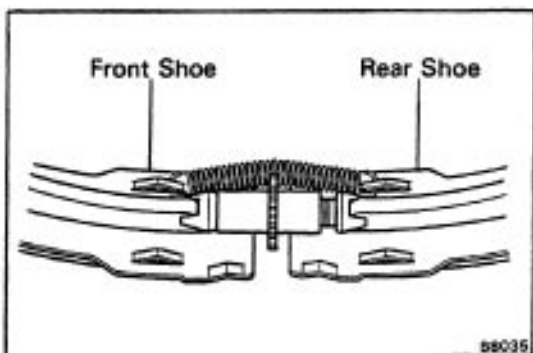
2. **APPLY HIGH TEMPERATURE GREASE TO ADJUSTER AS SHOWN**



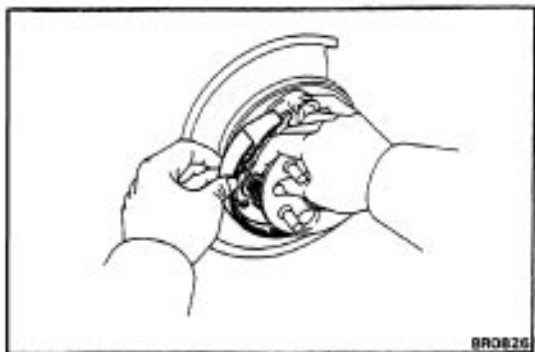
3. **CONNECT PARKING BRAKE CABLE TO PARKING BRAKE LEVER**
  - (a) Install the shoe hold-down springs, cups and pins.
  - (b) Connect the parking brake cable to the parking brake lever of the rear shoe.



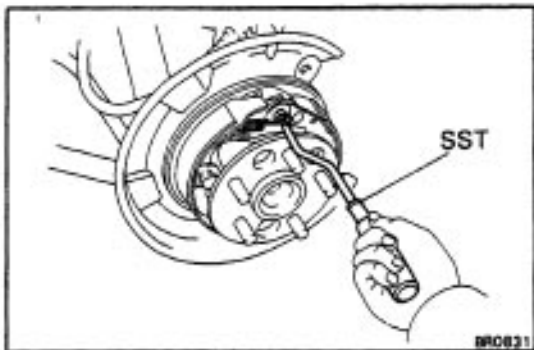
4. **INSTALL REAR SHOE**  
Slide in the rear shoe between the shoe hold-down spring cup and the backing plate.  
**NOTICE:** Do not allow oil or grease to get on the rubbing face.



5. **INSTALL TENSION SPRING, FRONT SHOE AND ADJUSTER**
  - (a) Install the tension spring to the rear shoe.
  - (b) Install the front shoe to the tension spring.
  - (c) Install the adjuster between the front and rear shoes.
  - (d) Install the shoe strut with spring.



- (e) Slide in the front shoe between the shoe hold-down spring cup and the backing plate.



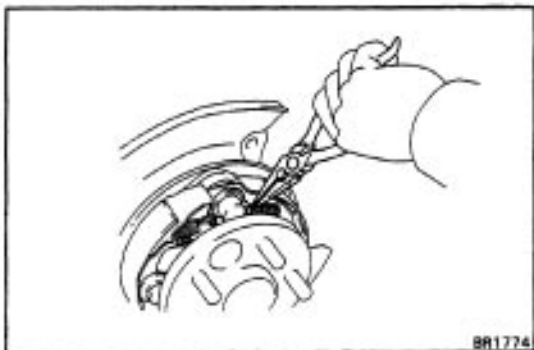
## 6. INSTALL SHOE RETURN SPRINGS

[2WD (w/o A.B.S.) and 4WD]

Using SST, install the front return spring and then install the rear return spring.

(See page [BR-46](#))

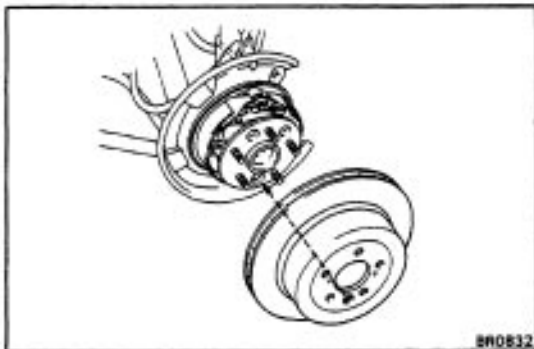
SST 09718-20010



[2WD (w/o A.B.S.)]

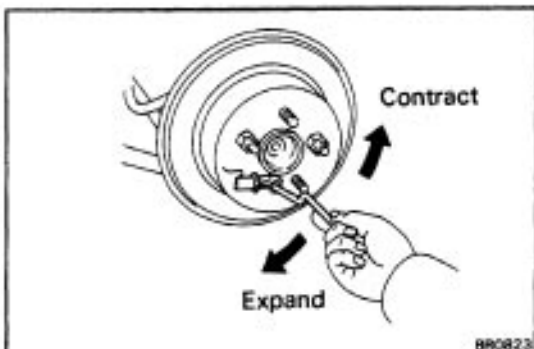
Using needle-nose pliers, install the shoe return springs.

(See page [BR-46](#))



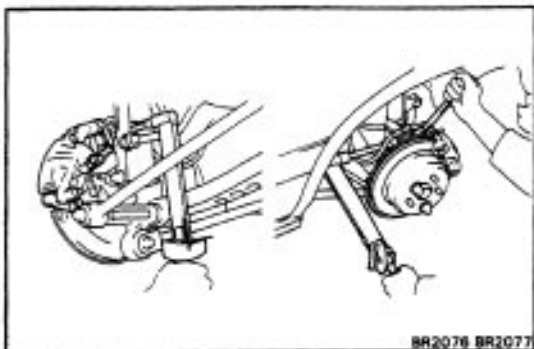
## 7. INSTALL ROTOR DISC

- Before installing, polish the disc and shoe surfaces with sandpaper.
- Align the hole on the rear axle shaft flange and service hole on the disc.



## 8. ADJUST PARKING BRAKE SHOE CLEARANCE

- Temporarily install the hub nuts.
- Remove the hole plug.
- Turn the adjuster and expand the shoes until the rotor disc locks.
- Return the adjuster eight notches.
- Install the hole plug.



## 9. INSTALL REAR DISC BRAKE ASSEMBLY

- Install the disc brake assembly and torque the two mounting bolts.

**Torque: 475 kg-cm (34 ft-lb, 47 N-m)**

- Install the axle carrier bolt and nut of upper side.

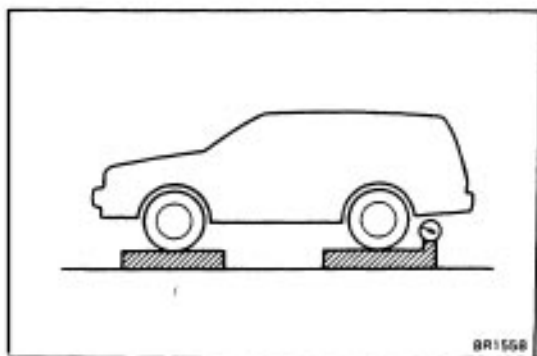
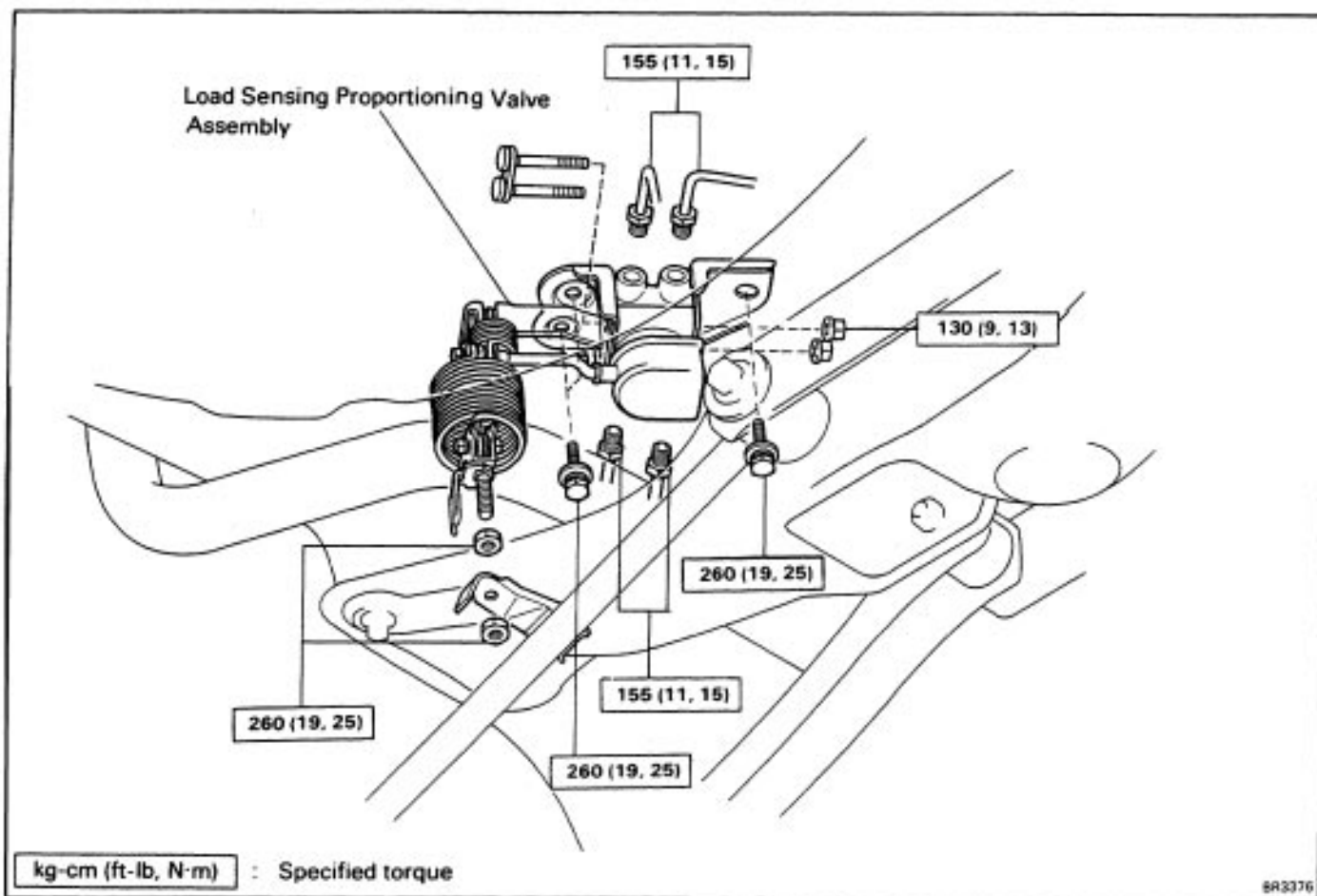
**Torque: 2,600 kg-cm (188 ft-lb, 255 N-m)**

**10. INSTALL REAR WHEEL****11. SETTLING PARKING BRAKE SHOES AND DISC**

- (a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (b) With the parking brake release button pushed in, pull on the lever with 9 kg (19.8 lb, 88 N) of force.
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure two or three times.

**12. RECHECK AND ADJUST PARKING BRAKE LEVER TRAVEL**

## LOAD SENSING PROPORTIONING VALVE (LSPV) COMPONENTS



## CHECK AND ADJUSTMENT OF FLUID PRESSURE

### 1. SET REAR AXLE LOAD

- Set the vehicle unladen.
- Measure the rear axle load and note the value.
- Set the rear axle load.

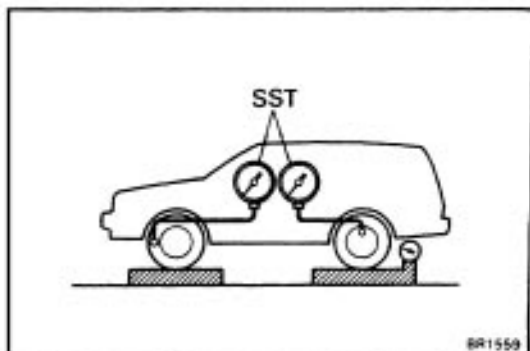
Rear axle load:  $RW + 100 \text{ kg}$  (220 lb)

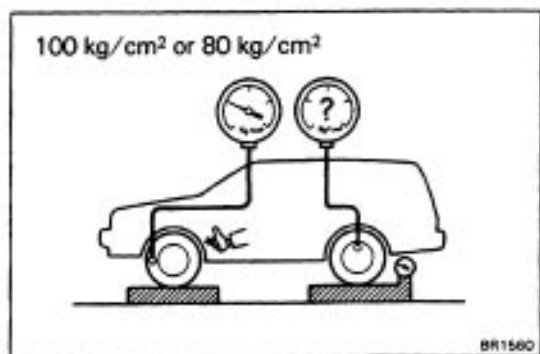
RW: Rear axle unladen weight

(Measurement taken in step (b))

### 2. INSTALL LSPV GAUGE (SST) AND BLEED BRAKE SYSTEM

SST 09709-29017



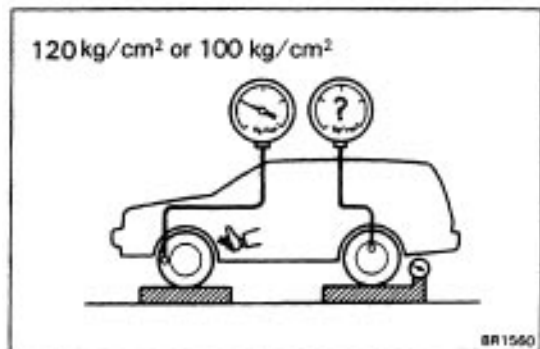


3. **RAISE FRONT BRAKE PRESSURE TO 100 kg/cm<sup>2</sup> (1,422 psi, 9,807 kPa) OR 80 kg/cm<sup>2</sup> (1,138 psi, 7,845 kPa) AND CHECK REAR BRAKE PRESSURE**

Brake pressure: **kg/cm<sup>2</sup> (psi, kPa)**

	Front brake pressure	Rear brake pressure
w/ A.B.S.	100 (1,422, 9,807)	65.9 — 78.9 (937 — 1,122, 6,463 — 7,737)
w/o A.B.S.	21 $\frac{1}{2}$ -FE 100 (1,422, 9,807)	63.7 — 76.7 (906 — 1,091, 6,247 — 7,522)
	Others 80 (1,138, 7,845)	41.0 — 54.0 (583 — 768, 4,021 — 5,296)

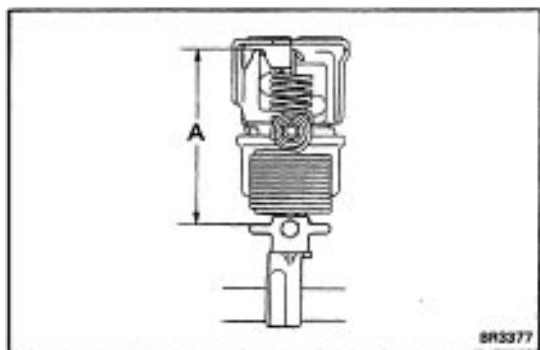
HINT: The brake pedal should not be depressed twice and/or returned while setting to the specified pressure. Read the value of rear pressure two seconds after adjusting the specified fluid pressure.



4. **RAISE FRONT BRAKE PRESSURE TO 120 kg/cm<sup>2</sup> (1,705 psi, 11,768 kPa) OR 100 kg/cm<sup>2</sup> (1,422 psi, 9,807 kPa) AND CHECK REAR BRAKE PRESSURE**

Brake pressure: **kg/cm<sup>2</sup> (psi, kPa)**

	Front brake pressure	Rear brake pressure
w/ A.B.S.	120 (1,707, 11,768)	73.3 — 86.3 (1,043 — 1,227, 7,188 — 8,463)
w/o A.B.S.	2VZ-FE 120 (1,707, 11,768)	71.1 — 84.1 (1,011 — 1,196, 6,973 — 8,247)
	Others 100 (1,422, 9,807)	48.4 — 61.4 (688 — 873, 4,746 — 6,021)



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

(a) Adjust the fluid pressure by changing the spring length.

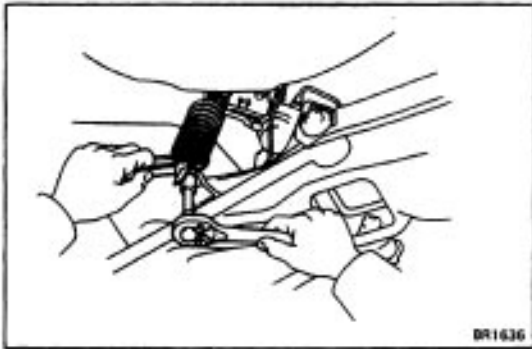
**Low pressure – Shorten A**

**High pressure – Lengthen A**

**Initial set length: 2VZ-FE 167.6 mm (6.598 in.)**

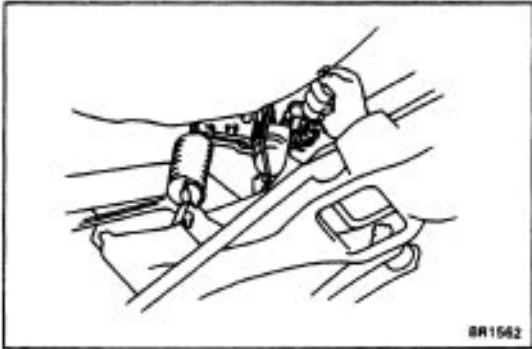
**Others 166.9 mm (6.571 in.)**

HINT: 1 mm (0.04 in.) displacement of the spring length changes the fluid pressure about 1.0 kg/cm<sup>2</sup> (14.2 psi, 98 kPa).



(b) Tighten the nuts.

**Torque: 260 kg-cm (19 ft-lb, 25 N-m)**



(c) In the event pressure cannot be adjusted by the spring length, raise or lower the valve body.

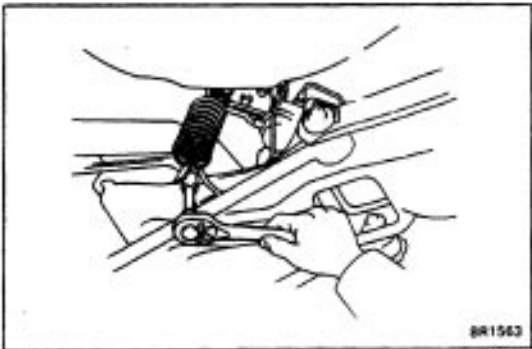
**Low pressure – Lower**

**High pressure – Raise**

HINT: 1 mm (0.04 in.) displacement of the valve body changes the fluid pressure about 7.2 kg /cm<sup>2</sup> (102.4 psi, 706 kPa).

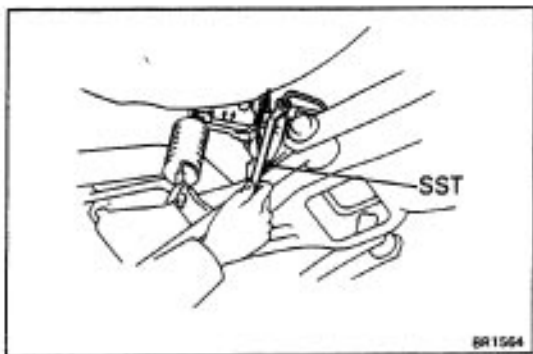
(d) Torque the nuts.

**Torque: 130 kg-cm (9 ft-lb, 13 N-m)**



(e) Adjust the fluid pressure by changing the spring length again.

If it cannot be adjusted, replace the valve assembly.



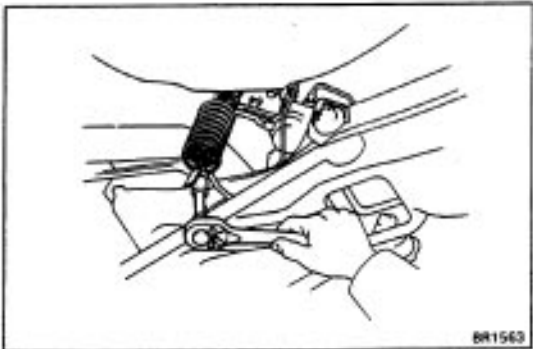
## REMOVAL OF LSPV

(See page BR-50)

### 1. DISCONNECT BRAKE TUBES

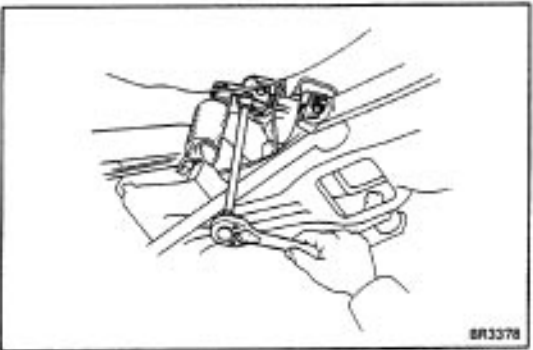
Using SST, disconnect the brake tubes from the valve body.

SST 09751-36011

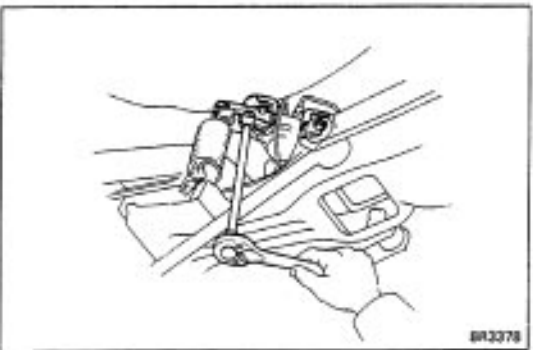


### 2. REMOVE LSPV ASSEMBLY

(a) Remove the adjusting nut and disconnect the spring from the rear suspension arm.



(b) Remove the three mounting bolts and remove the LSPV assembly.

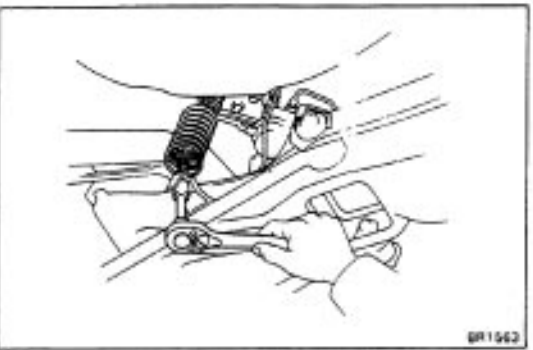


## INSTALLATION OF LSPV

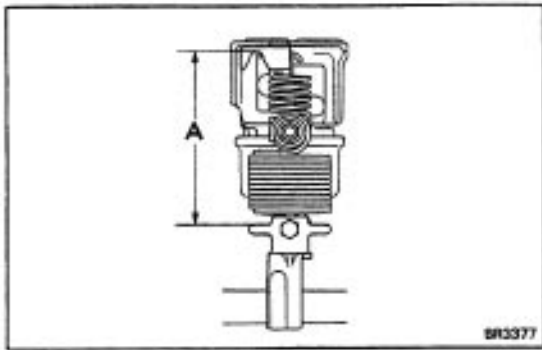
### 1. INSTALL LSPV ASSEMBLY

(a) Install the valve assembly with the three mounting bolts.

**Torque: 260 kg-cm (19 ft-lb, 25 N-m)**



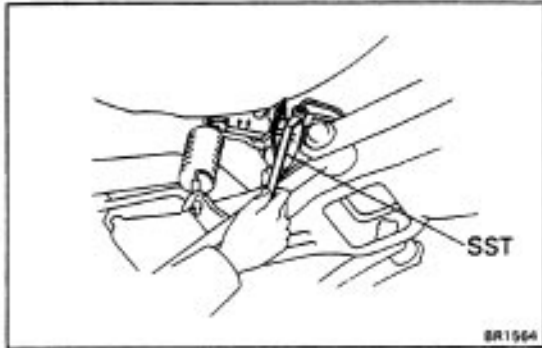
(b) Install the adjusting bolt lock nut to the adjusting bolt and then install the adjusting bolt to the rear suspension arm with the adjusting nut.



- (c) Set spring length A to initial set length and temporarily tighten the adjusting bolt lock nut.

**Initial set length: 2VZ-FE 167.6 mm (6.598 in.)**

**Others 166.9 mm (6.571 in.)**



**2. CONNECT BRAKE TUBES**

Using SST, connect the brake tubes.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N-m)

**3. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**

(See page [BR-7](#))

**4. CHECK FOR FLUID LEAKAGE**

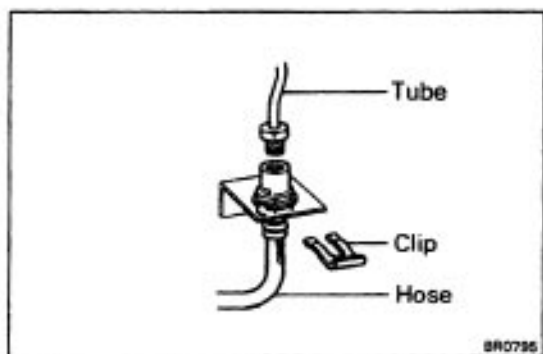
**5. CHECK AND ADJUST FLUID PRESSURE**

(See page [BR-50](#))

**6. REMOVE SST AND BLEED BRAKE SYSTEM**

SST 09709-29017

**7. CHECK FOR FLUID LEAKAGE**



## BRAKE HOSES AND TUBES

### DISCONNECT AND CONNECT HOSE AND TUBE

#### 1. DISCONNECT NOSE AND TUBE

- Disconnect the clip.
- Using a wrench to hold the hose and SST, to hold the tube, disconnect the tube and hose.

SST 09751-36011

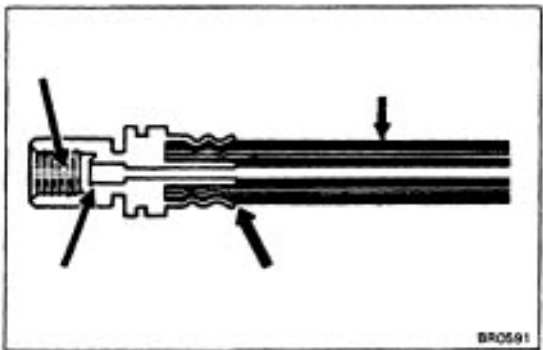
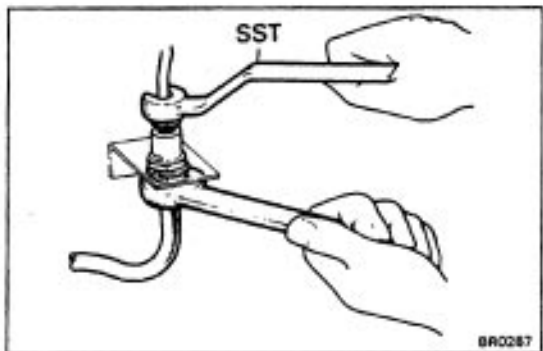
#### 2. CONNECT HOSE AND TUBE

- Connect the hose and tube by hand.
- Using a wrench to hold the hose and SST to hold the tube, torque the connection.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N-m)

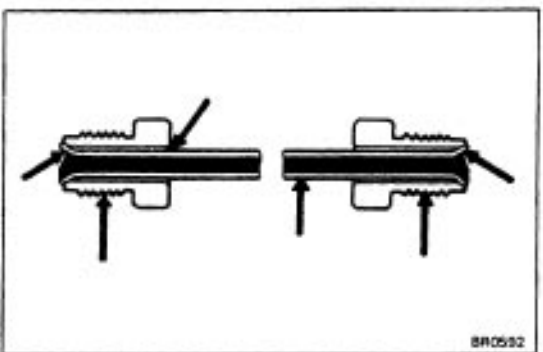
- Install a hose clip.



## INSPECTION OF BRAKE HOSES AND TUBES

#### 1. INSPECT BRAKE HOSES

- Inspect the hose for damage, cracks or swelling.
- Inspect the threads for damage.



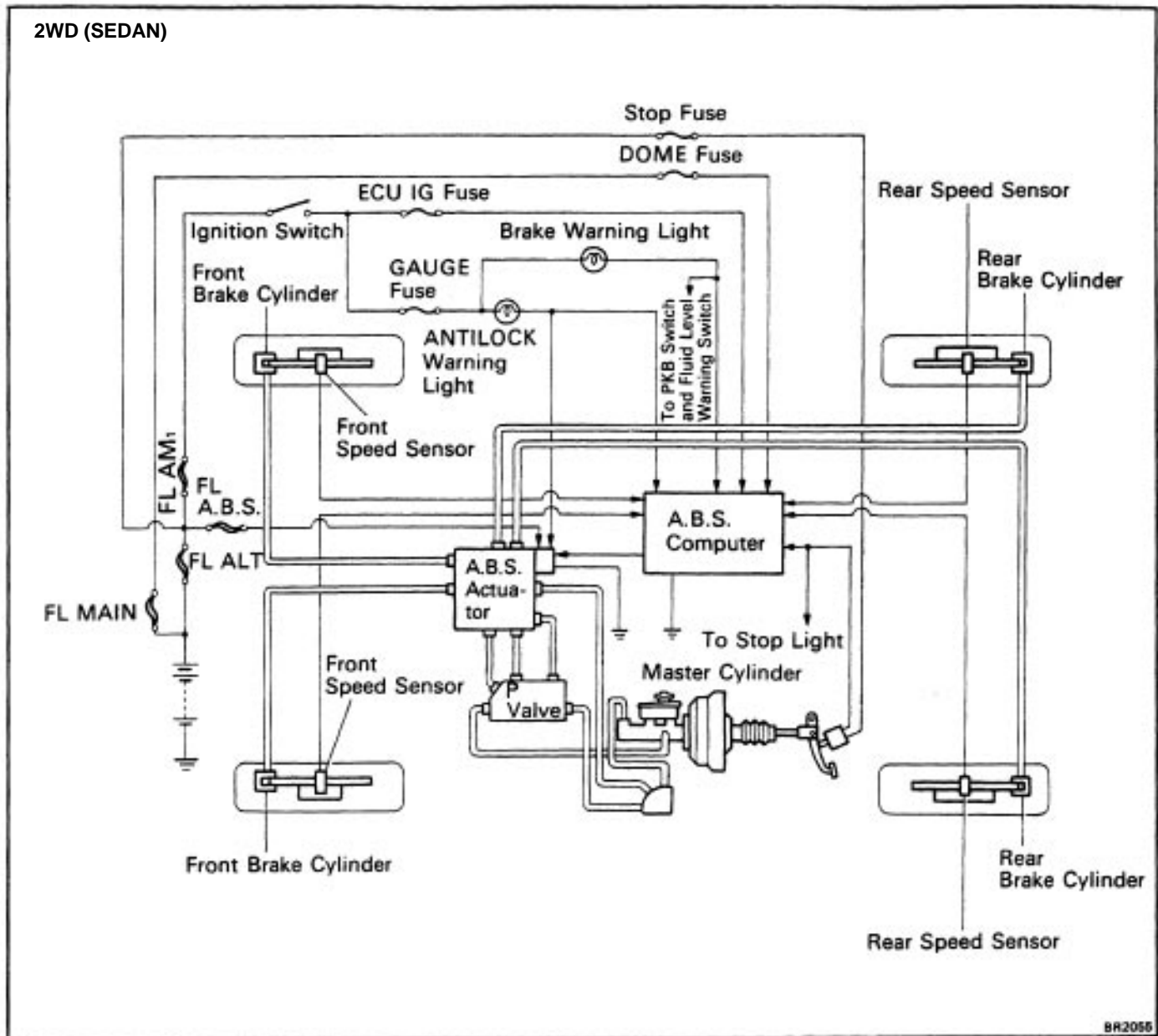
#### 2. INSPECT BRAKE TUBES

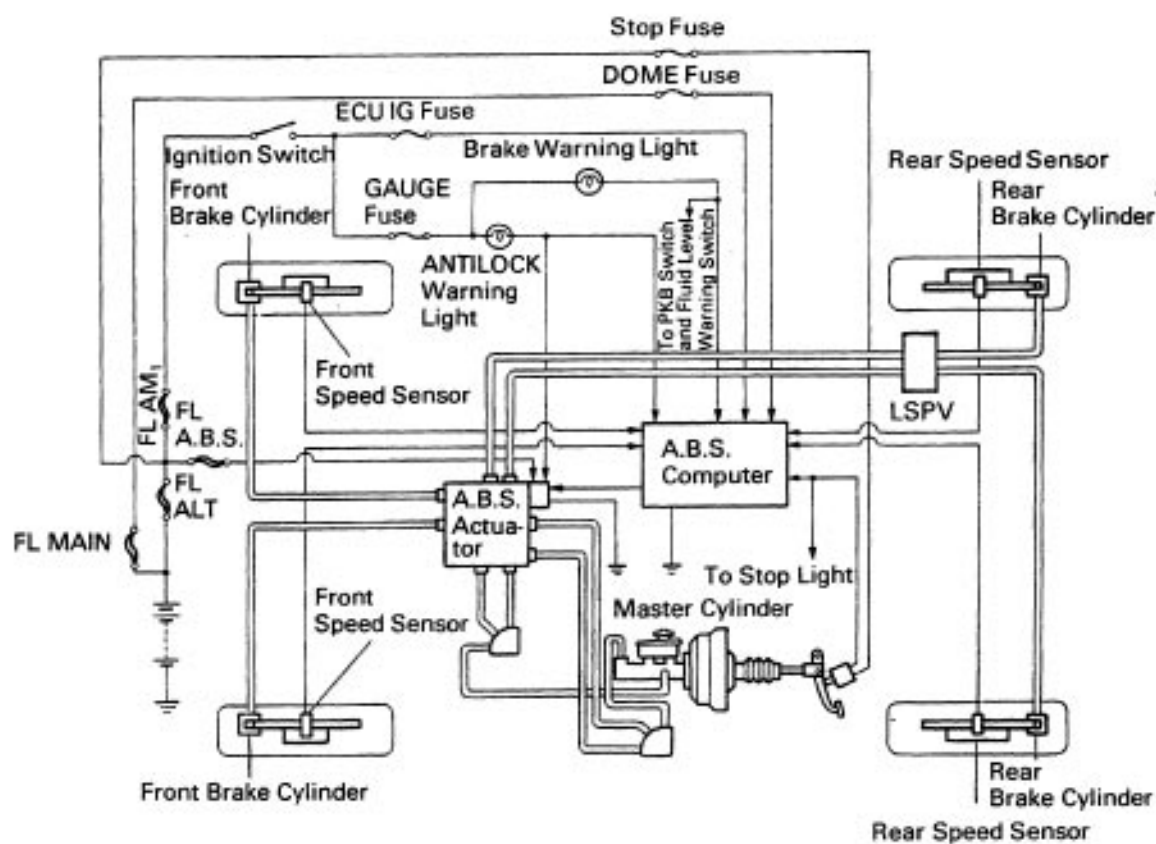
- Inspect the tube for damage, cracks, dents or corrosion.
- Inspect the threads for damage.

# ANTI-LOCK BRAKE SYSTEM (A.B.S.)

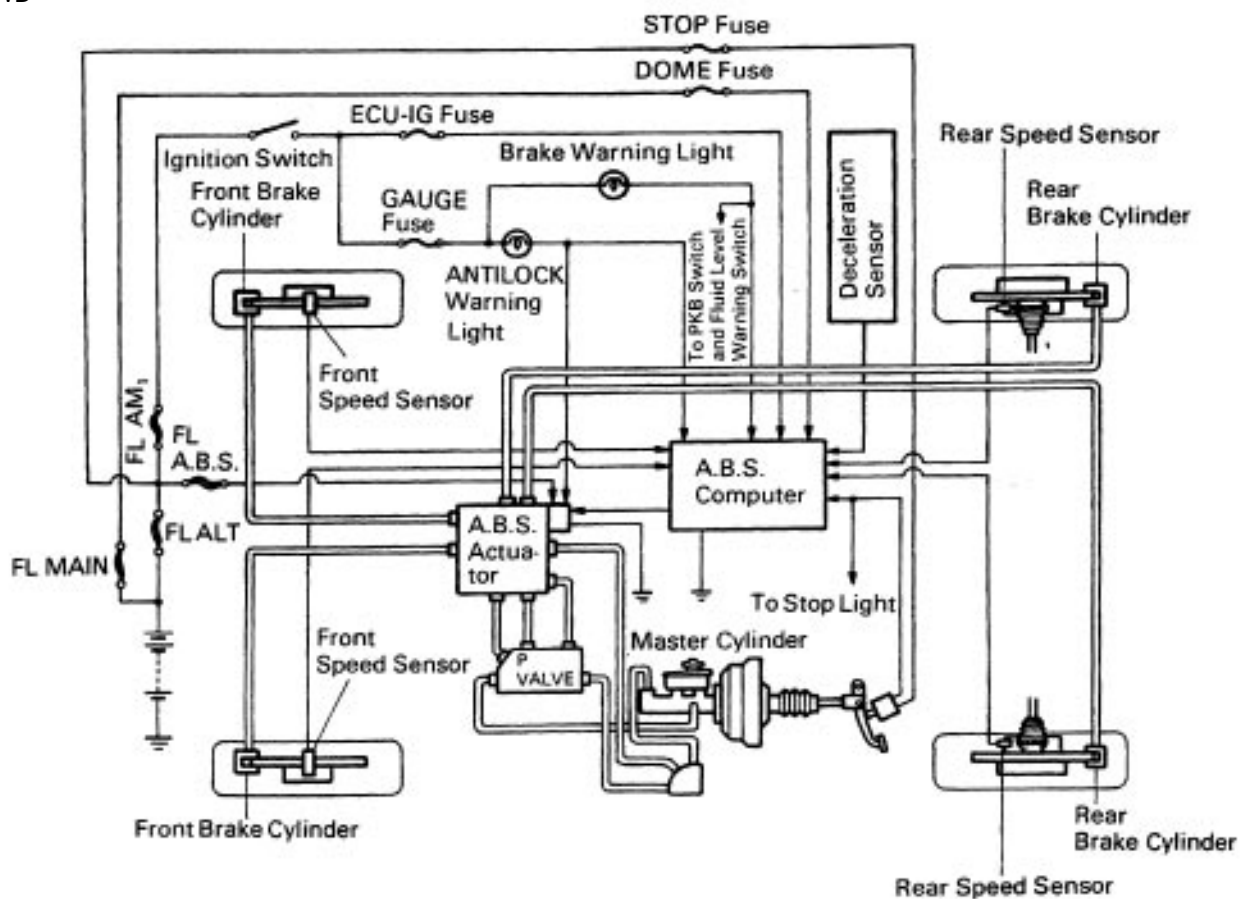
## Description

- The A.B.S. is a brake system which controls the wheel cylinder hydraulic pressure of all four wheels during sudden braking and braking on slippery road surfaces, preventing the wheels from locking. This A.B.S. provides the following benefits:
  - (1) Enables steering round an obstacle with a greater degree of certainty even when panic braking.
  - (2) Enables stopping in a panic brake while keeping the effect upon stability and steerability to a minimum, even on curves.
- The function of the A.B.S. is to help maintain directional stability and vehicle steerability on most road conditions. However, the system cannot prevent the vehicle from skidding if the cornering speed limit is exceeded.
- The A.B.S. has a longitudinal deceleration sensor to match braking characteristics to the full-time four-wheel drive. (For 4WD)
- In case a malfunction occurs, a diagnosis function and fail-safe system have been adopted for the A.B.S. to increase serviceability.



**2WD (WAGON)**

## 4WD

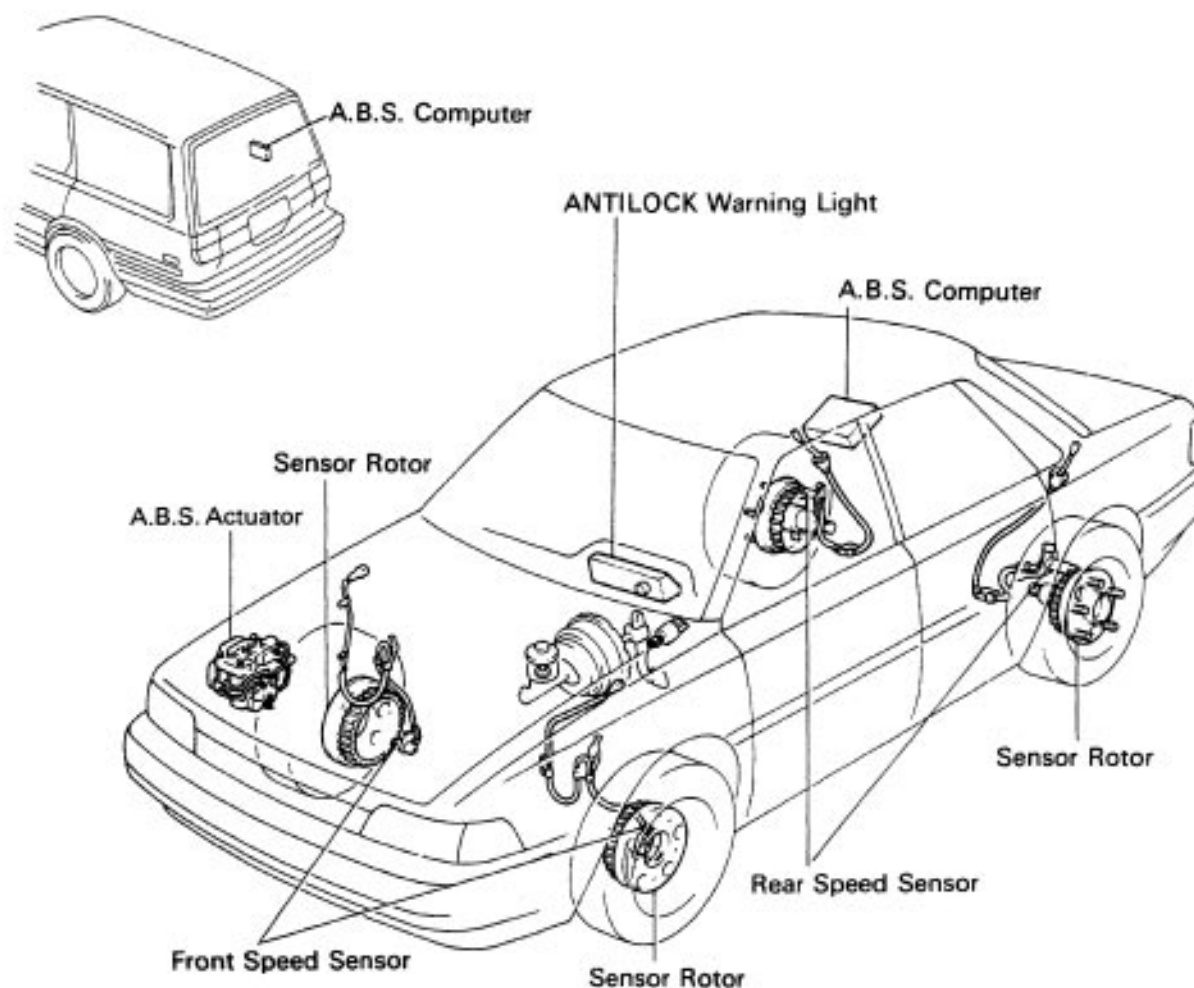


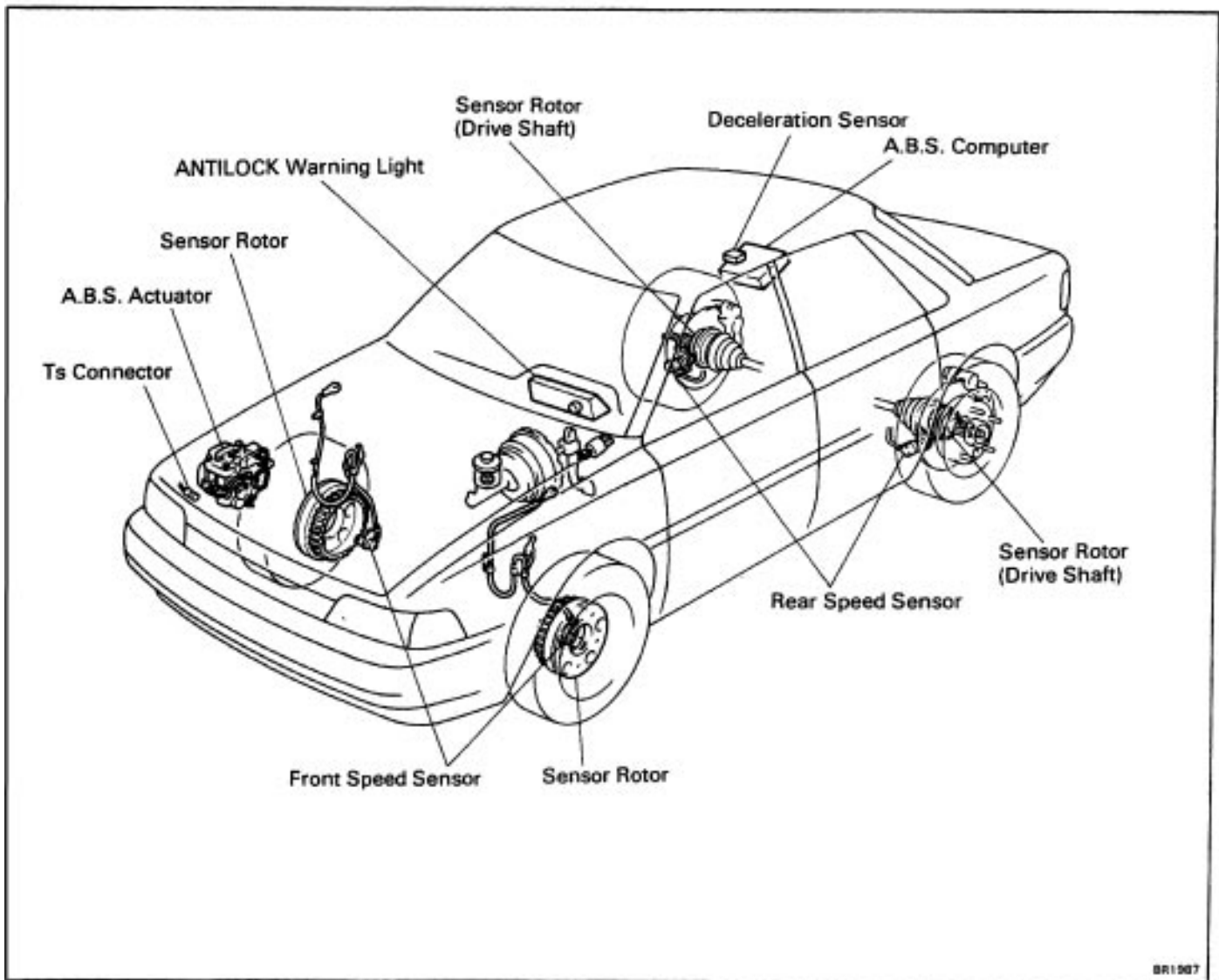
## FUNCTION OF COMPONENTS

Component	Function
Front Speed Sensor	Detects the wheel speed of each of the left and right front wheels.
Rear Speed Sensor	Detects the wheel speed of each of the left and right rear wheels.
Deceleration Sensor (For 4WD)	Detects the deceleration speed of the vehicle and sends a signal accordingly to the A.B.S. computer.
ANTI LOCK Warning Light	Lights up to alert the driver when trouble has occurred in the Anti-lock Brake System.
Actuator	Controls the brake fluid pressure to each disc brake cylinder through signals from the computer.
Anti-lock Brake System Computer	From the wheel speed signals from each sensor, it calculates acceleration, deceleration and slip values and sends signals to the actuator to control brake fluid pressure.

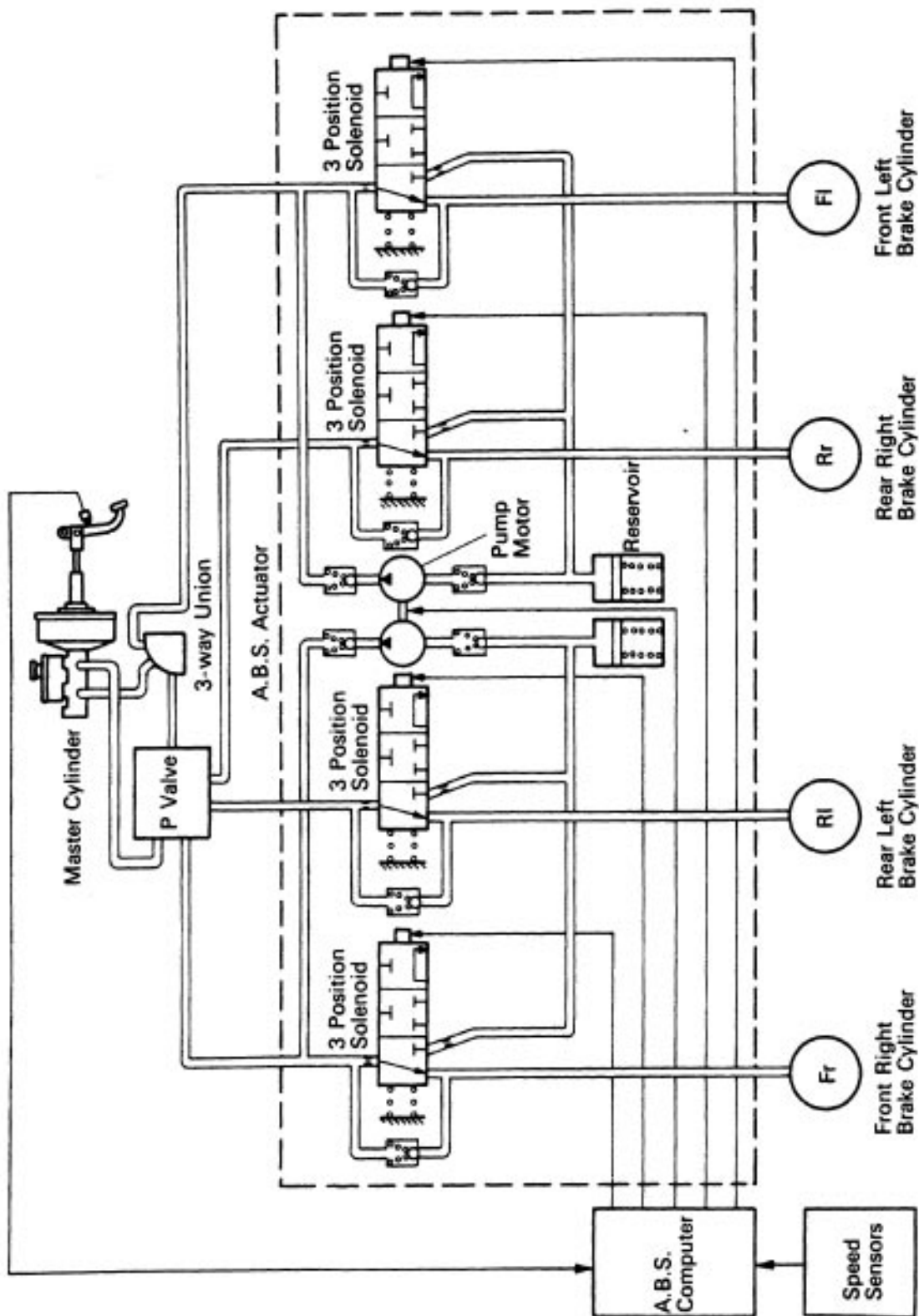
## LOCATION OF SYSTEM PARTS

### WAGON

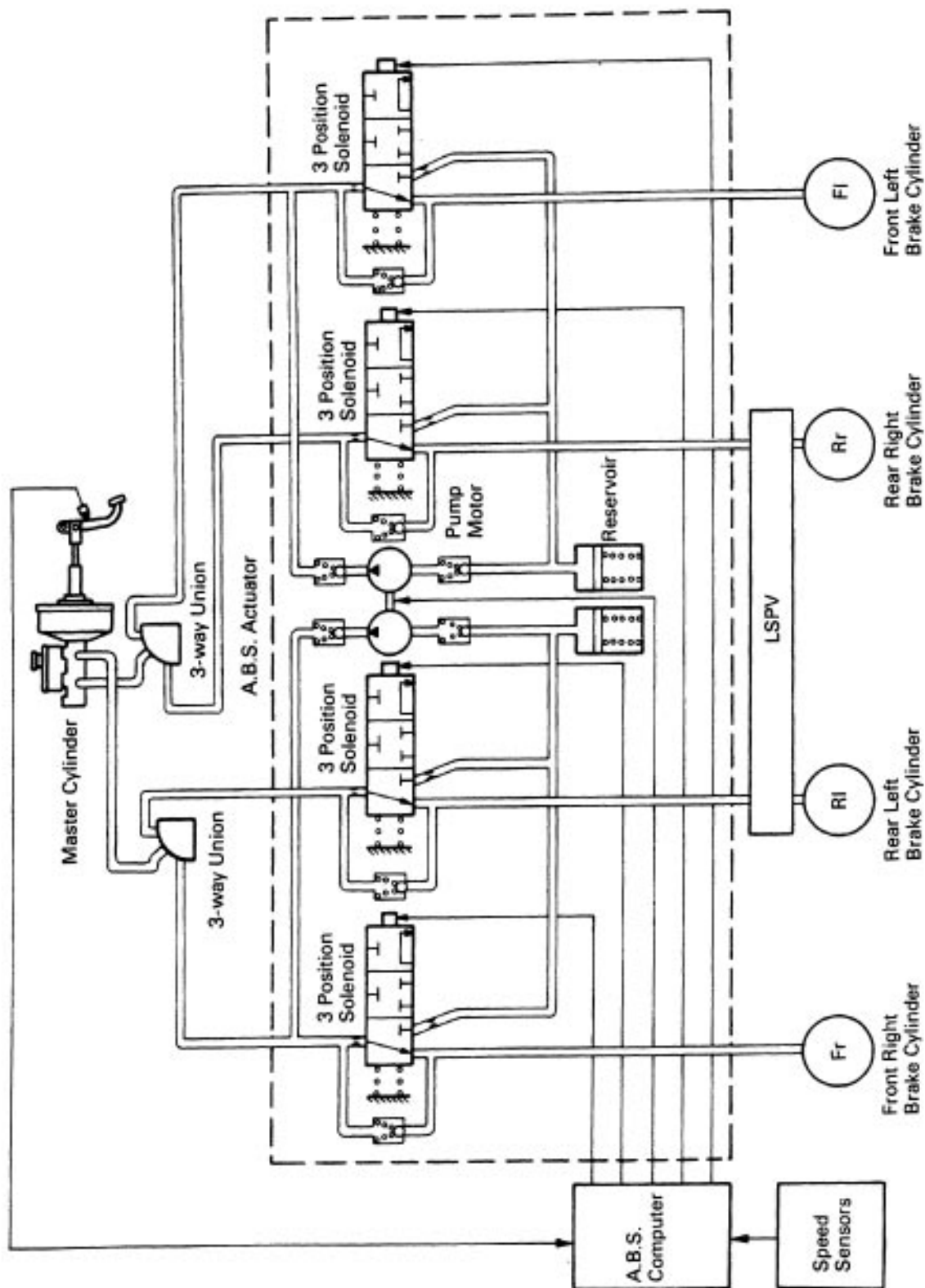




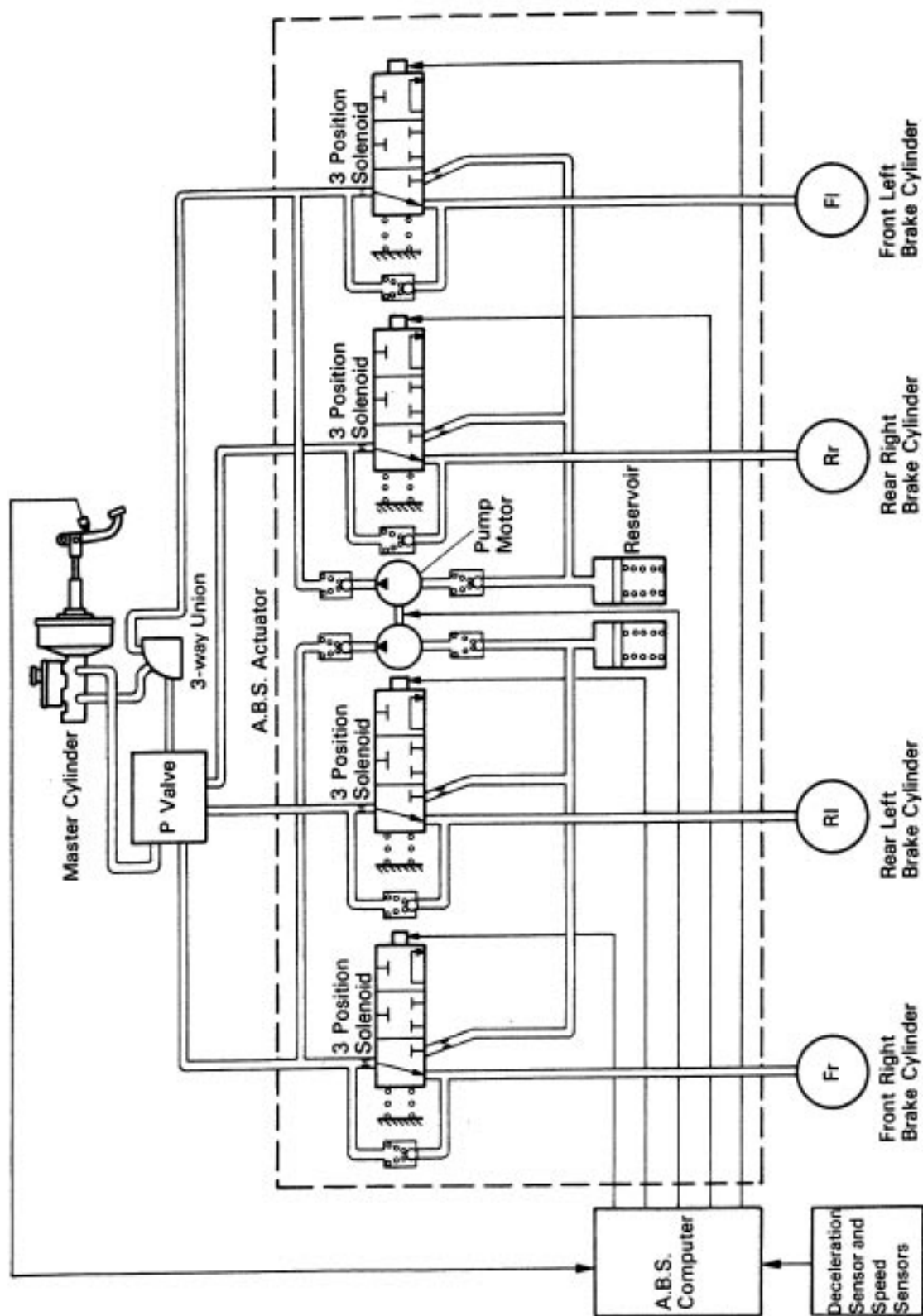
## SYSTEM DIAGRAM (2WD OF SEDAN)



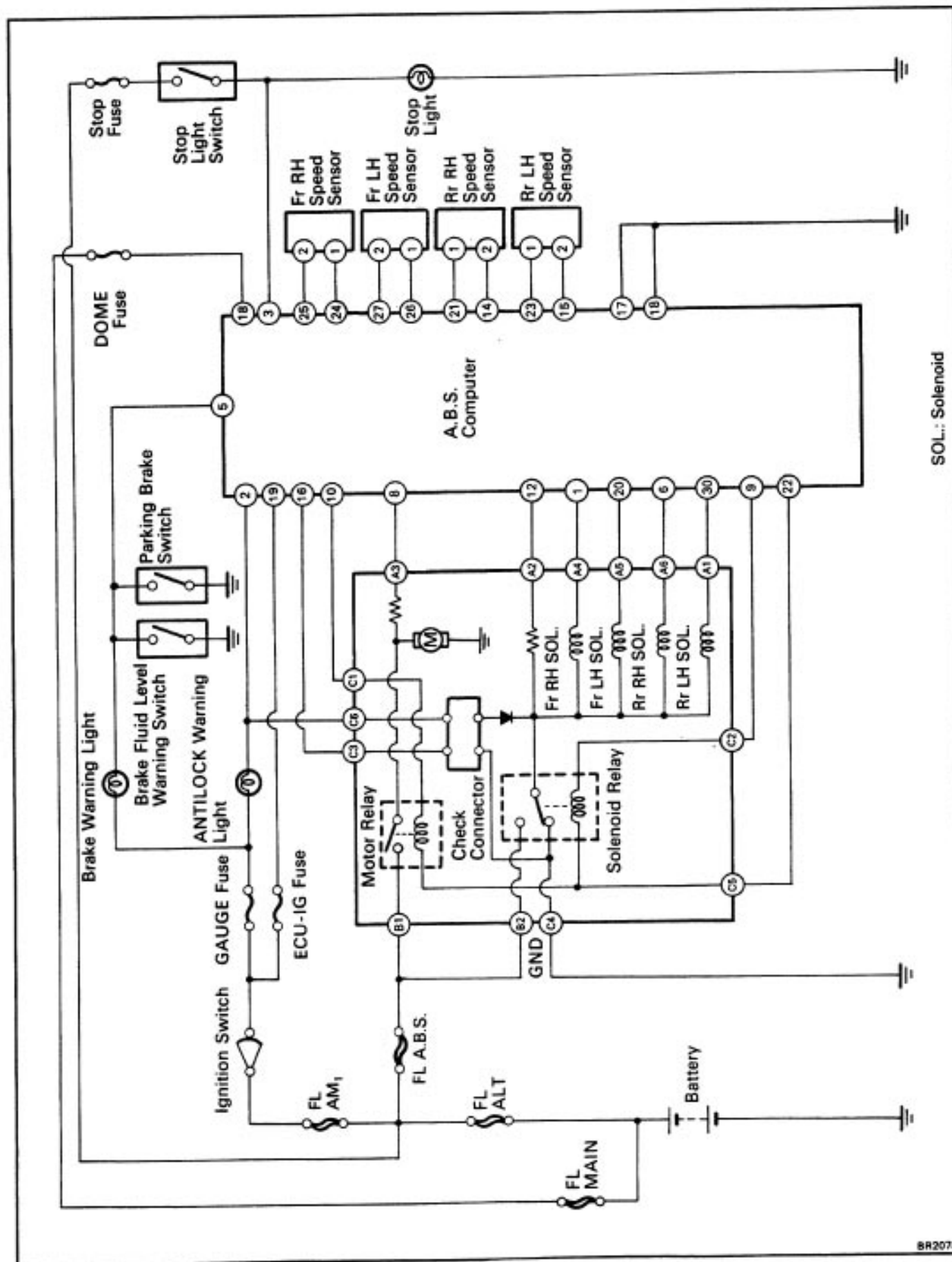
## SYSTEM DIAGRAM (2WD OF WAGON)



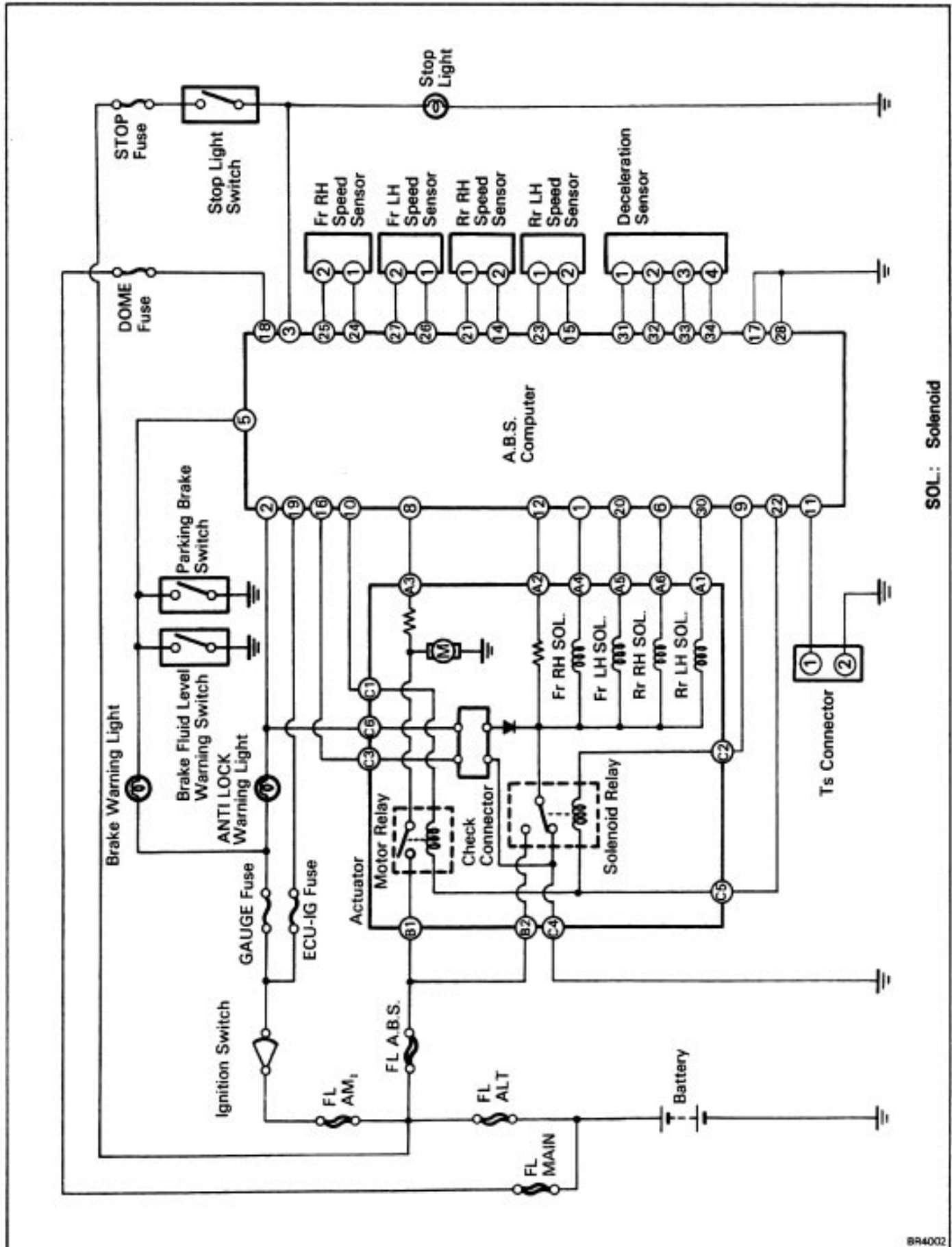
## SYSTEM DIAGRAM (4WD)



## WIRING DIAGRAM (2WD)



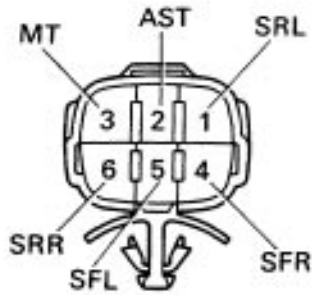
## WIRING DIAGRAM (4WD)



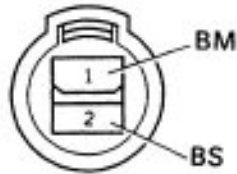
## CONNECTORS (2WD)

Brake Actuator

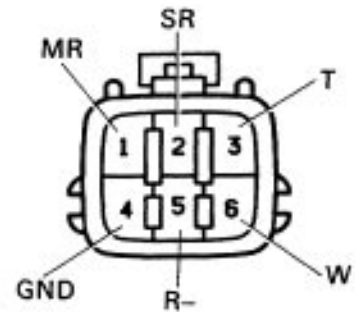
CONNECTOR A



CONNECTOR B



CONNECTOR C



Check Connector



Front Speed Sensor (LH)



Front Speed Sensor (RH)



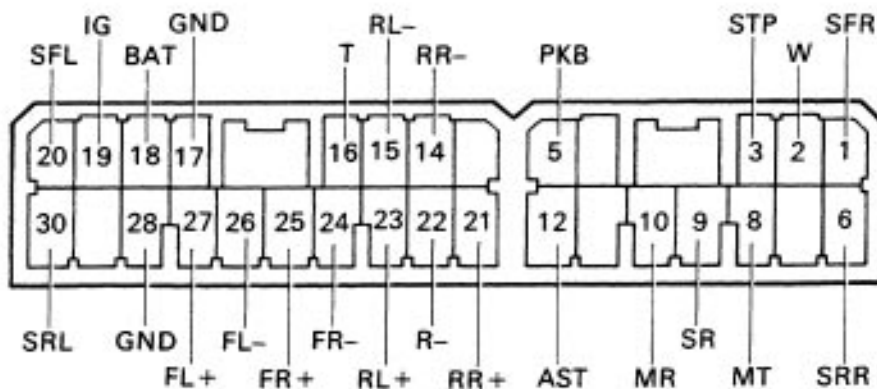
Rear Speed Sensor (LH)  
)



Rear Speed Sensor (RH)  
)

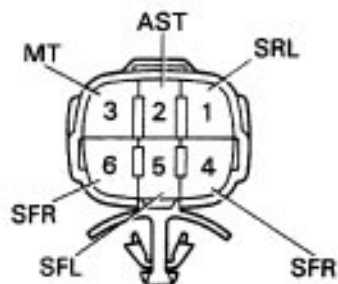


Anti-lock Brake System Computer

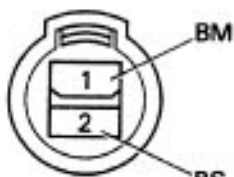


## CONNETORS (4WD)

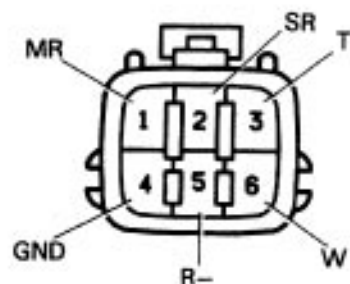
Brake Actuator  
CONNECTOR A



CONNECTOR B



CONNECTOR C



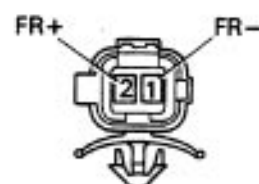
Check Connector



Front Speed Sensor (LN)



Front Speed Sensor (RH)



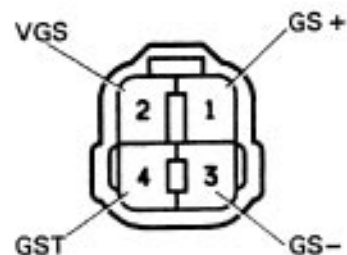
Rear Speed Sensor (LH)



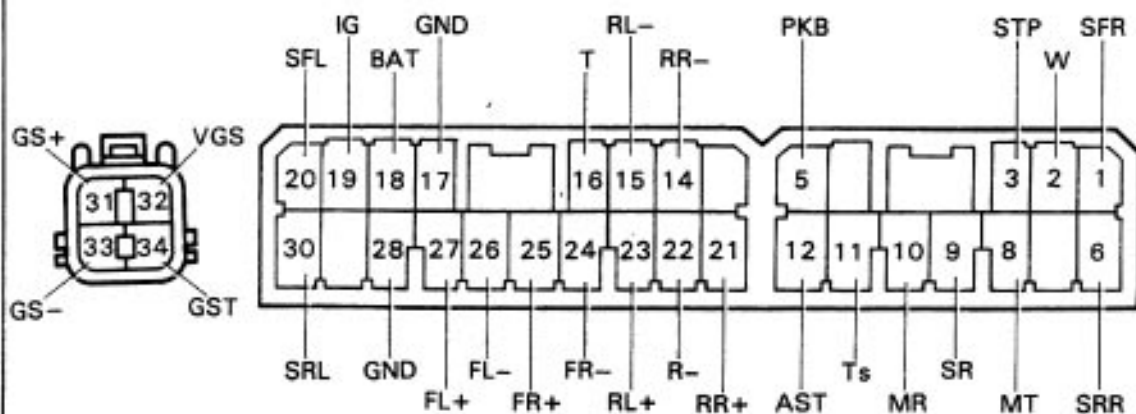
Rear Speed Sensor (RH)



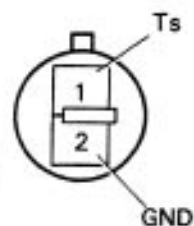
Deceleration Sensor

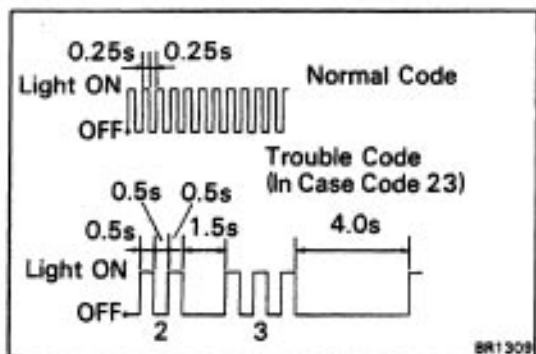


Anti-lock Brake System Computer



Ts Connector





## Diagnosis System

### DESCRIPTION

If a malfunction occurs, the system will identify the problem and the computer will store the codes for the trouble items.

At the same time, the system informs the driver of a malfunction via the "ANTILOCK" warning light in the combination meter.

By turning on the ignition switch and disconnecting the check connector, the trouble can be identified by the number of blinks (diagnostic code) of the warning light. In the event of two codes, that having the smallest number (code) will be identified first.

HINT: The warning light does not show the diagnostic codes while the vehicle is running.

### INITIAL CHECK

#### CHECK ACTUATOR OPERATION NOISE

- Start the engine and drive at a speed over 6 km/h (4 mph).
- Check that the actuator operation noise is heard.

HINT: A initial check is carried out once each time after the engine has been started and initial speed exceeds 6 km/h (4 mph). The respective functions, in order, of the 3 position solenoid and pump motor in the actuator are checked. However, if the brake pedal is depressed, the initial check is not carried out, but is started after the pedal has been released.

### INSPECTION OF DIAGNOSIS SYSTEM

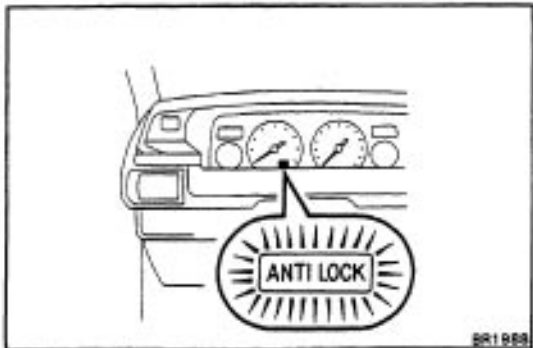
#### 1. INSPECT BATTERY VOLTAGE

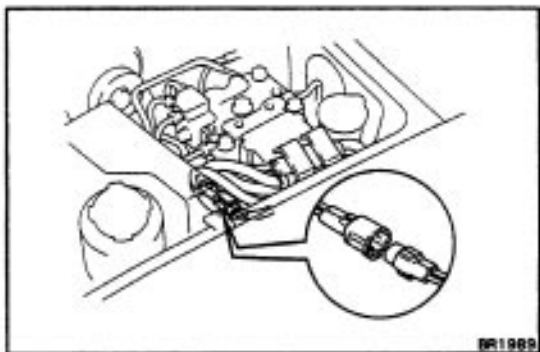
Inspect that the battery voltage is about 12 V.

#### 2. CHECK THAT WARNING LIGHT TURNS ON

- Turn the ignition switch on.
- Check that the "ANTILOCK" warning light turns on for 3 seconds.

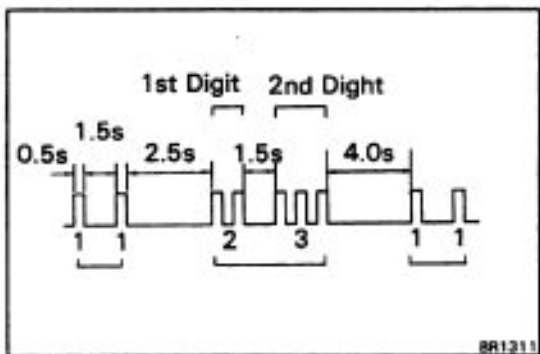
If not, inspect and repair or replace the fuse, bulb and wire harness.





### 3. READ DIAGNOSTIC CODE

- (a) Turn the ignition switch on.
- (b) Disconnect the check connector from the actuator.

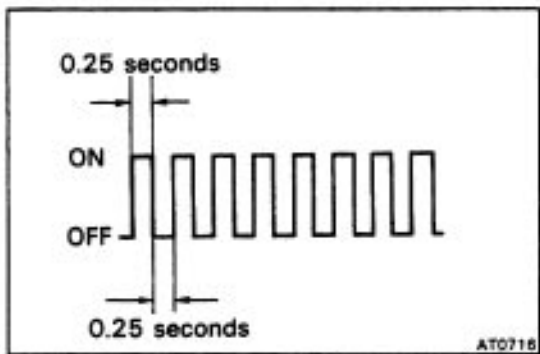


- (c) In event of a malfunction, 4 seconds later the warning light will begin to blink. Read the number of blinks. (See DIAGNOSTIC CODE on page [BR-69](#))

HINT: The first number of blinks will equal the first digit of a two digit diagnostic code. After a 1.5 second pause, the

2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 second pause between each, and indication will begin after 4.0 second pause from the smaller value and continue in order to larger.

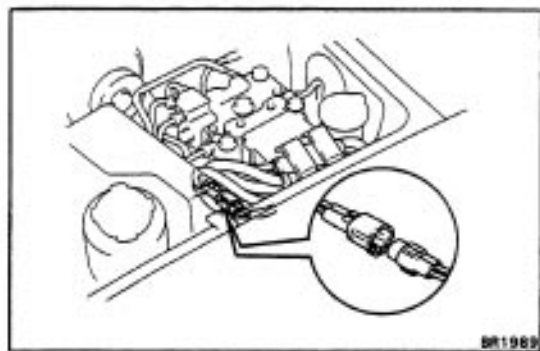
- (d) If the system is operating normally (no malfunction), the warning light will blink 2 times per second.



- (e) Repair the system.
- (f) After the malfunctioning components has been repaired, clear the diagnostic codes stored in the computer.

(See page [BR-70](#))

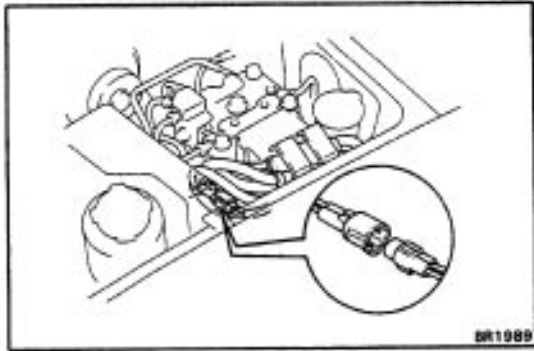
HINT: If you disconnect the battery cable while repairing, all diagnostic codes in the computer will erased.



- (g) Connect the check connector.
- (h) Turn the ignition switch on, and check that the "ANTILOCK" warning light goes off after the warning light goes on for 3 seconds.

**BR-69**

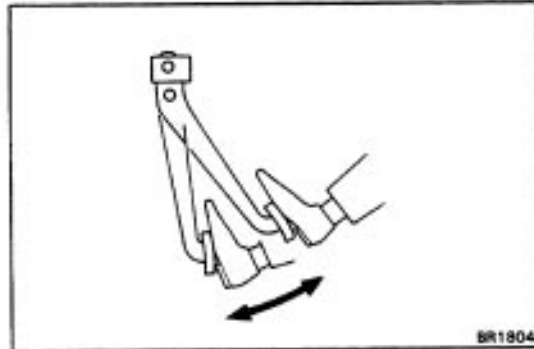
609 4725



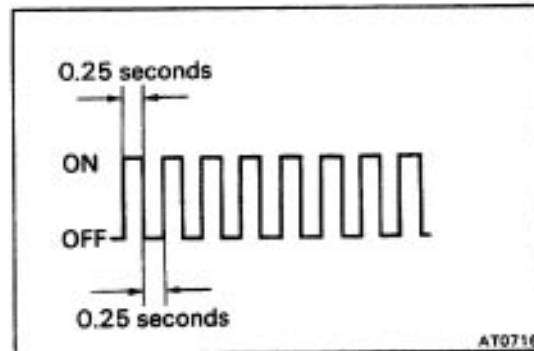
## CLEARING OF DIAGNOSTIC CODES

### CLEAR DIAGNOSTIC CODES

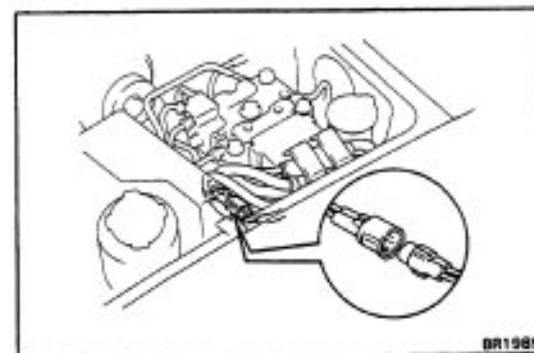
- (a) Turn the ignition switch on.
  - (b) Disconnect the check connector from actuator.
- HINT: Keep the vehicle stopped [vehicle speed 0 km/h (0 mph)].



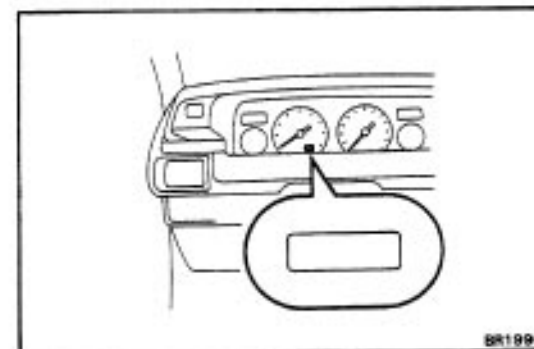
- (c) Clear the diagnostic codes stored in computer by depressing the brake pedal 8 or more times within 3 seconds.



- (d) Check that the warning light shows the normal code.



- (e) Connect the check connector.



- (f) Check that the warning light goes off.

## Troubleshooting

Problem		No.
"ANTILOCK" warning light	Always comes on after ignition switch is turned on.	1
	Does not come on for 3 seconds after ignition switch on.	2
	Comes on and off.	3
	Comes on while running.	1
Brake working	Brakes pull.	4
	Braking inefficient.	4
	A.B.S. operates at ordinary braking.	4
	A.B.S. operates just before stopping at ordinary braking.	4
	Brake pedal pulsates abnormally while A.B.S. is operating.	4
	Skidding noise occurs while A.B.S. working. (A.B.S. works inefficiently)	5

"ANTIL4CK" warning light comes on.

Disconnect check connector.  
(See page [BR-68](#))

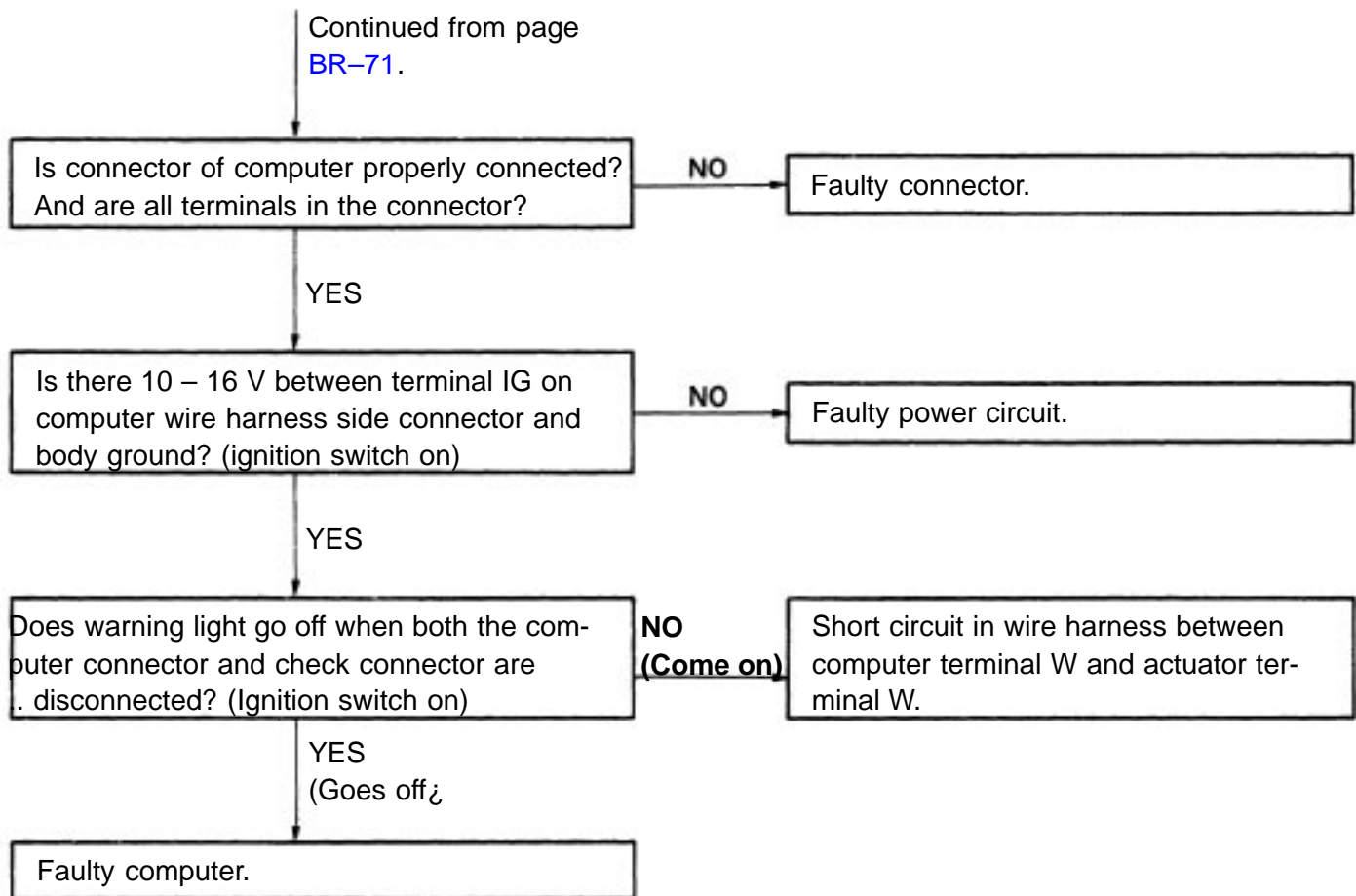
Does warning light always come on or show  
the normal code?  
(ignition switch on)

NO

See diagnostic code.  
(See page [BR-69](#))

YES

Continued on page  
[BR-72](#).



2

"ANTILOCK" warning light does not come on for 3 seconds after ignition switch on.

Disconnect check connector from actuator, and ground the terminal W of the wire harness side connector.  
(Ignition switch on)

Does warning light come on?

NO

Bulb burned out or open circuit in wire harness between warning light and actuator terminal W.

YES

Disconnect connectors from computer and actuator, and ground terminal W of computer wire harness side connector.  
(Ignition switch on)

Does warning light come on?

ON

Open circuit in wire harness between computer terminal W and warning light.

YES

With ignition switch off, disconnect actuator connectors, and check continuity between terminal W and AST on actuator side.

Reverse tester leads and check again.  
Is there one way continuity between terminals?

NO

Short circuit in actuator inside diode.

YES

Faulty computer.

HINT: If the diode is short-circuited, a malfunction at computer terminal W will occur. When inspecting the terminal, connect the computer connector, and disconnect actuator connectors. Then turn the ignition switch on, and check that the warning light goes on. If it does, the computer terminal is OK.

3 "ANTILOCK" warning light comes on and off.

- Check connector is disconnected.
- Open circuit in wire harness between computer terminal T and actuator terminal T.
- Actuator terminal GND is improperly connected or open circuit in wire harness between actuator terminal GND and body ground.
- Connect circuit in wire harness between computer terminal Ts and Ts connector. (For 4WD)

- 4
- Brakes pull.
  - Braking inefficient.
  - A.B.S. operates at ordinary braking.
  - A.B.S. operates just before stopping at ordinary braking.
  - Brake pedal pulsates abnormally while A.B.S. working.

Disconnect check connector.  
(See page [BR-68](#))

Does warning light show the diagnostic  
normal code? (Ignition switch on)

NO

See diagnostic code.  
(See page [BR-69](#))

YES

Are each speed sensors installed in place?  
And are each installation bolts tightened se-  
curely?

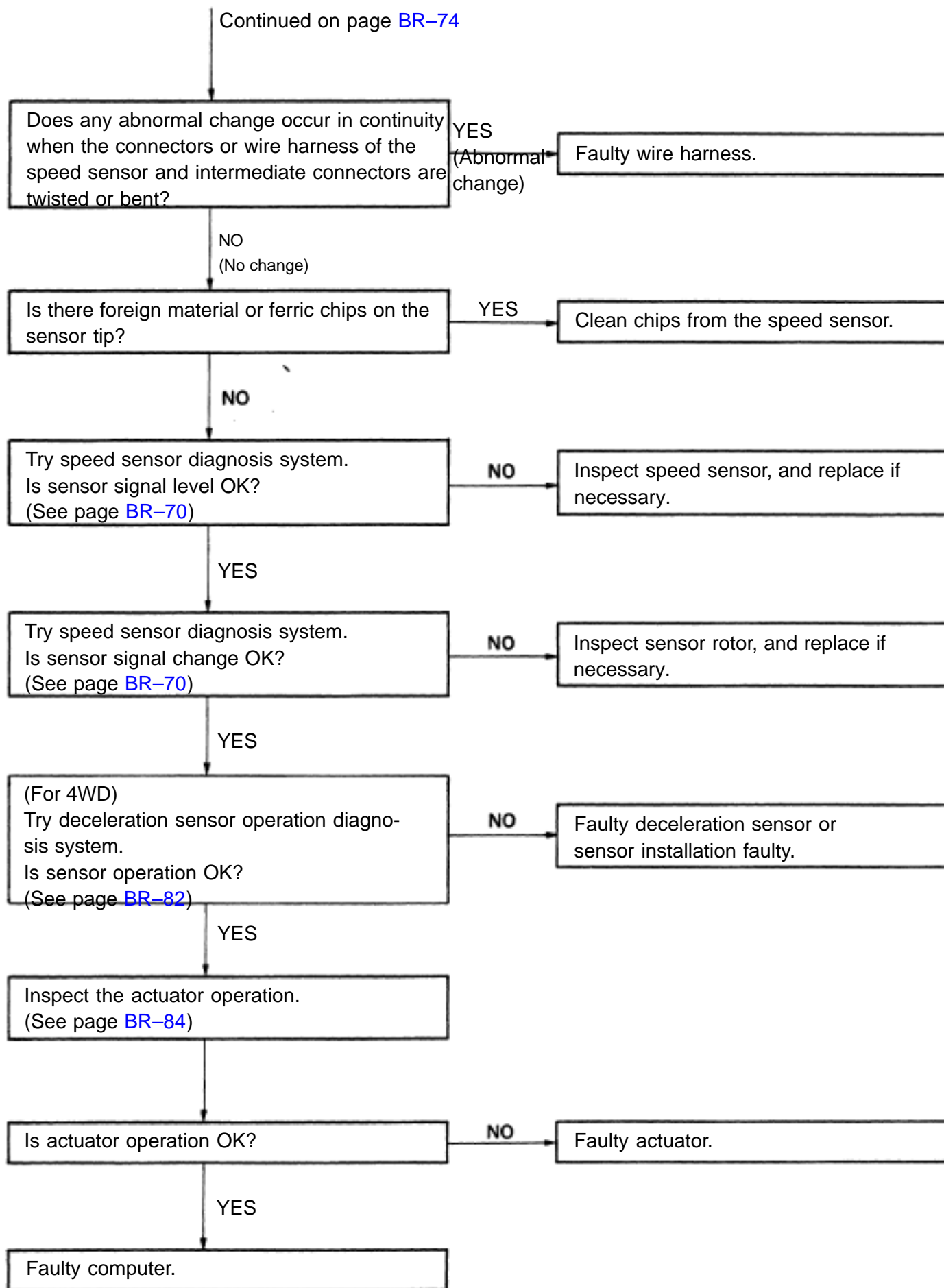
NO

Speed sensor installation faulty.

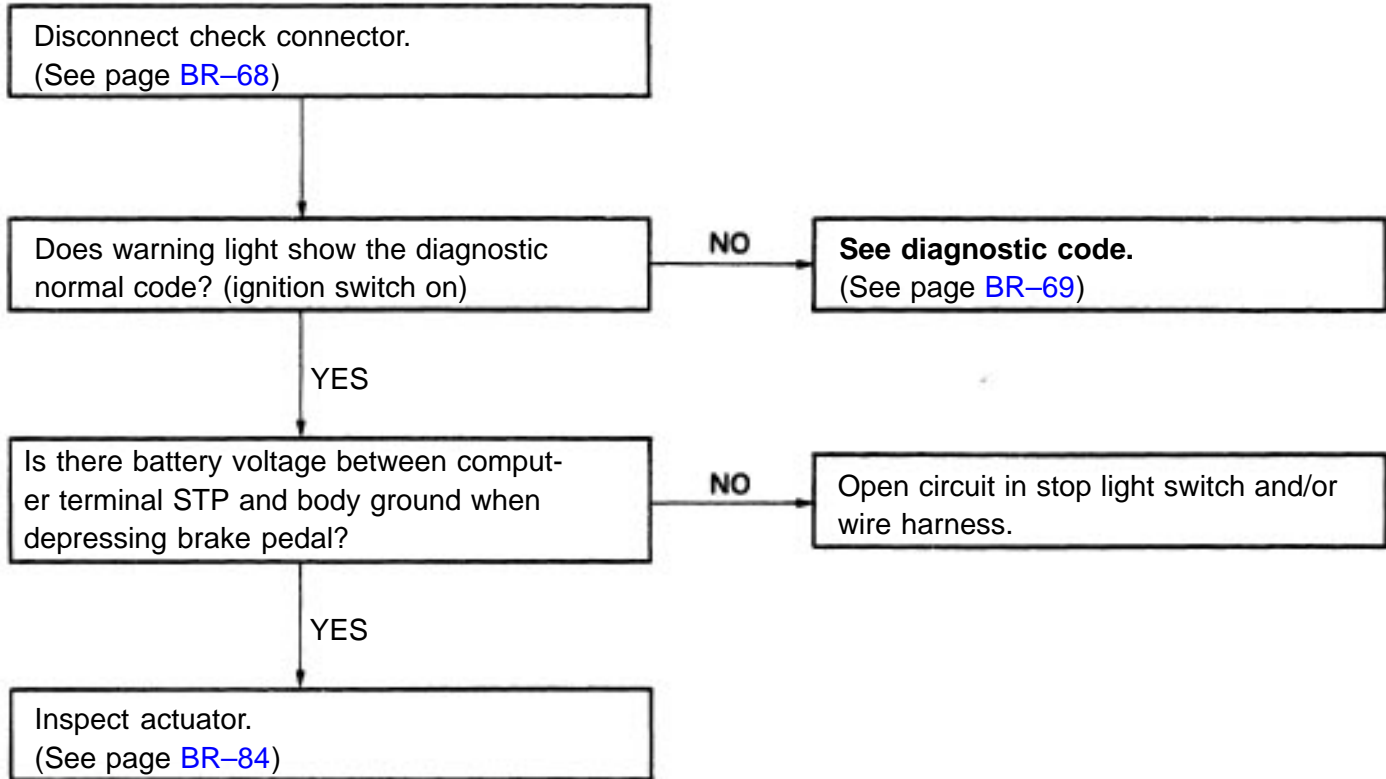
YES

Disconnect connector from computer, inspect  
continuity between each speed sensor termi-  
nals on wire harness side.  
(See page [BR-103](#))

Continued on page [BR-75](#)



<b>5</b>	Anti-lock brake system works inefficiently.
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## Speed Sensor Diagnosis System

### PRECAUTION

While checking the speed sensor diagnosis system, A.B.S. does not work and brake system works as normal brake system.

### INSPECTION OF DIAGNOSIS SYSTEM

#### 1. INSPECT BATTERY VOLTAGE

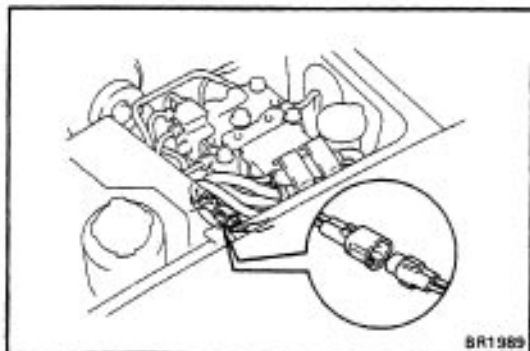
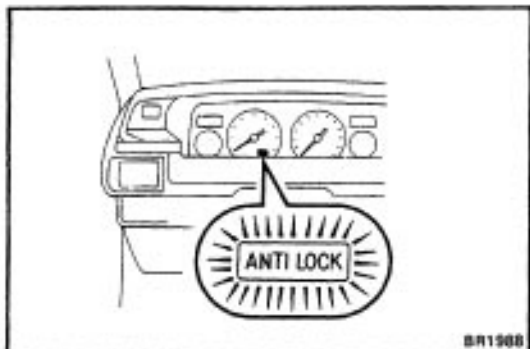
Inspect that the battery voltage is about 12 V.

#### 2. CHECK THAT WARNING LIGHT TURNS ON

- Turn the ignition switch on.
- Check that the "ANTILOCK" warning light turns on for 3 seconds.

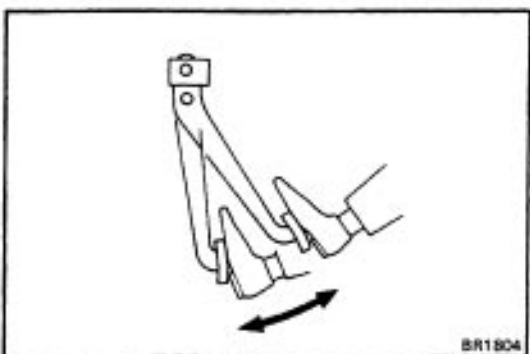
If not, inspect and repair or replace the fuse, bulb and wire harness.

- Check that the "ANTILOCK" warning light turns off.
- Turn the ignition switch off.

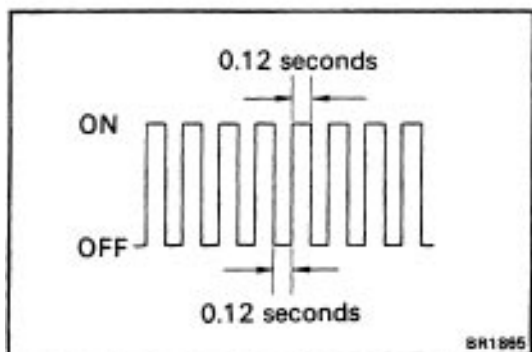


#### 3. PERFORM FOLLOWING STEPS (2WD)

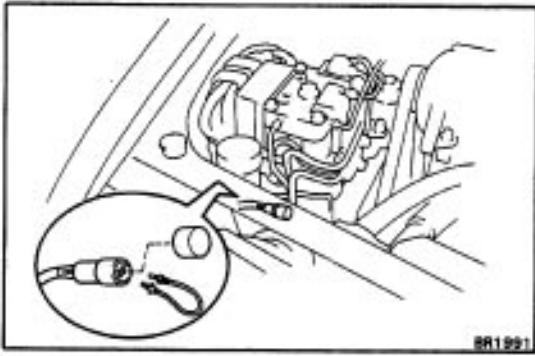
- Disconnect the check connector from the actuator.
- Pull the parking brake lever up, and start the engine.



- Depress the brake pedal 4 to 6 times within 2 seconds.



- Check that the warning light blinks about 4 times every 1 second as shown.

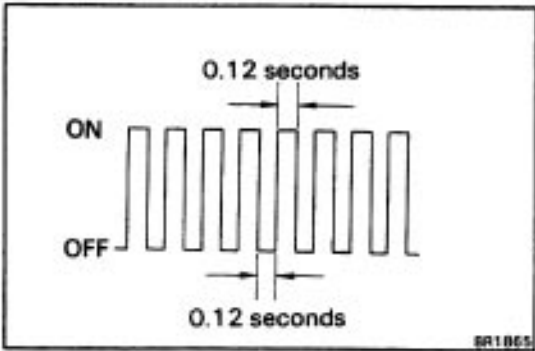


(4WD)

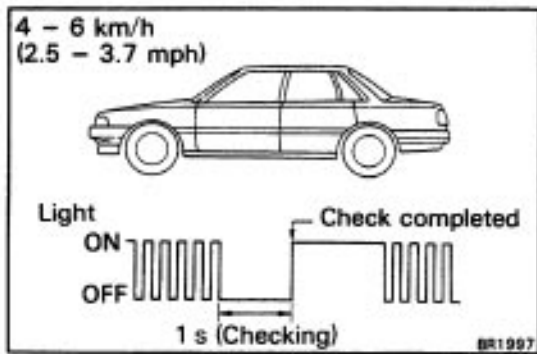
- (a) Remove the rubber cap from the Ts connector located in front of the actuator.
- (b) Connect the terminals of Ts connector.

(c) Pull the parking brake lever up, and start the engine.

**NOTICE: Do not depress the brake pedal.**



- (d) Check that the warning light blinks about 4 times every 1 second as shown.



#### 4. INSPECT SENSOR SIGNAL LEVEL

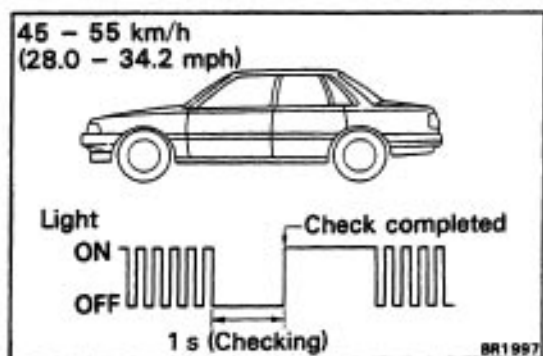
Drive the vehicle straight ahead at about 4 – 6 km/h (2.5 – 3.7 mph), and check that the warning light turns on after a 1 second pause.

If the warning light turns on without blinking when the vehicle speed is not within the specified speed range above, stop the vehicle and read the diagnostic code, and repair the malfunctioning parts.

(See step S on page [BR-79](#))

**HINT:** If the warning light turns on while the vehicle speed is within specified speed range above, the check is completed. And when the vehicle speed exceeds 6 km/h (3.7mph), the warning light will blink again. In this condition, speed sensors are OK.

**NOTICE:** While the warning light is off, do not give any shocks to vehicle such as acceleration, deceleration, braking, shift change, steering or shocks from the road condition.



## 5. INSPECT SENSOR SIGNAL CHANGE

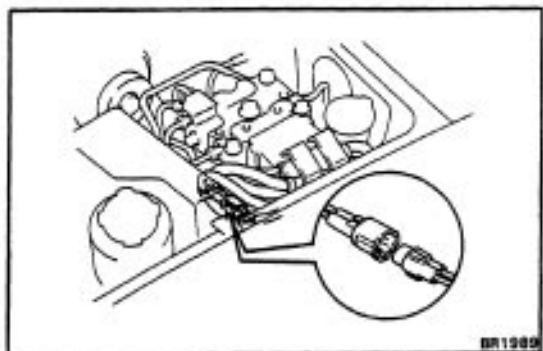
Drive the vehicle straight ahead at about 45 – 55 km/h (28.0 – 34.2 mph), and check that the warning light turns on after a 1 second pause.

If the warning light turns on without blinking when the vehicle speed is not within the specified speed range above, stop the vehicle and read the diagnostic code, and repair the malfunctioning parts.

(See step 6 on this page)

HINT: If the warning light turns on while the vehicle speed is within specified speed range above, the check is completed. And when the vehicle speed is not within specified speed range, the warning light will blink again. In this condition, sensor rotors are OK.

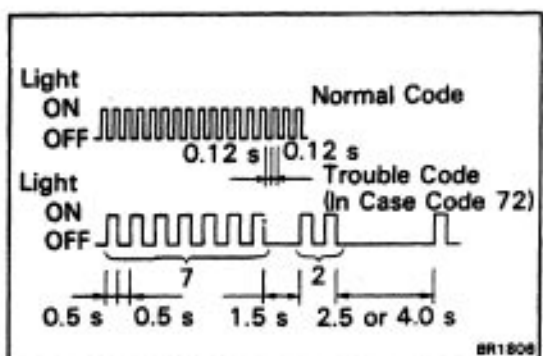
**NOTICE:** While the warning light is off, do not give any shocks to vehicle such as acceleration, deceleration, braking, shift change, steering or shocks from the road condition.



## 6. READ DIAGNOSTIC CODE

Stop the vehicle and disconnect the check connector, and warning light will begin to blink. Read the number of blinks.

(See DIAGNOSTIC CODE on page [BR-81](#))

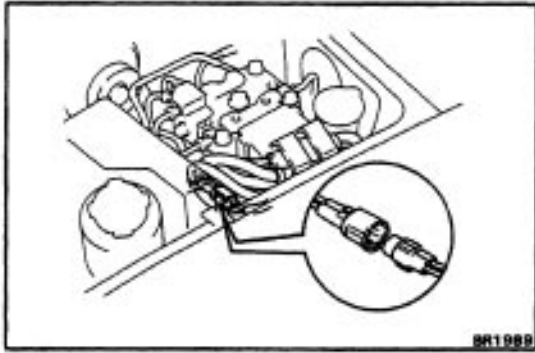


HINT: The first number of blinks will equal the first digit of a two digit diagnostic code. After a 1.5 second pause, the 2nd number of blinks will equal the 2nd number of a two digit code. If there are two or more codes, there will be a 2.5 second pause between each code, and then indication will begin again after a 4.0 second pause, continuing in order from the smaller value up to the larger one.

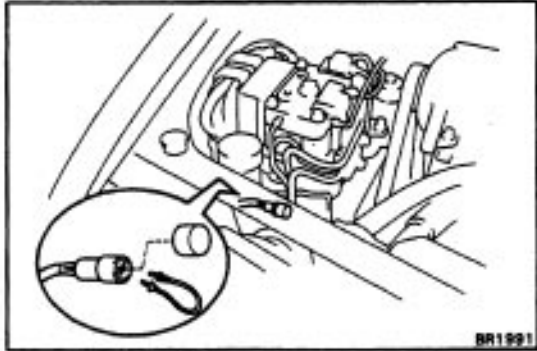
## 7. REPAIR MALFUNCTIONING PARTS

Repair or replace the malfunctioning parts.

HINT: When repairing or replacing parts, turn the ignition switch OFF.










**8. PERFORM FOLLOWING STEPS**

- (a) (2WD)  
Turn the ignition switch on.
- (4WD)  
Turn the ignition switch off.
- (b) Connect the check connector.



- (For 4WD)
- (c) Remove the short pin or wire from the Ts connector and install the rubber cap to it.
- (d) Turn the ignition switch off.

## DIAGNOSTIC CODE

Code No.	Light Pattern	Diagnosis	Malfunctioning Part
	ON OFF 	All speed sensors and sensor rotors are normal	
71		Low voltage of front right speed sensor signal	<ul style="list-style-type: none"> <li>• Front right speed sensor</li> <li>• Sensor installation</li> </ul>
72		Low voltage of front left speed sensor signal	<ul style="list-style-type: none"> <li>• Front left speed sensor</li> <li>• Sensor installation</li> </ul>
73		Low voltage of rear right speed sensor signal	<ul style="list-style-type: none"> <li>• Rear right speed sensor</li> <li>• Sensor installation</li> </ul>
74		Low voltage of rear left speed sensor signal	<ul style="list-style-type: none"> <li>• Rear left speed sensor</li> <li>• Sensor installation</li> </ul>
75		Abnormal change of front right speed sensor signal	<ul style="list-style-type: none"> <li>• Front right sensor rotor</li> </ul>
76		Abnormal change of front left speed sensor signal	<ul style="list-style-type: none"> <li>• Front left sensor rotor</li> </ul>
77		Abnormal change of rear right speed sensor signal	<ul style="list-style-type: none"> <li>• Rear right sensor rotor</li> </ul>
78		Abnormal change of rear left speed sensor signal	<ul style="list-style-type: none"> <li>• Rear left sensor rotor</li> </ul>

BR11007

## Deceleration Sensor Operation Diagnosis System (For 4WD)

### PRECAUTION

While checking the deceleration sensor diagnosis system, A.B.S. does not work and brake system works as normal brake system.

### INSPECTION OF DIAGNOSIS SYSTEM

#### 1. INSPECT BATTERY VOLTAGE

Inspect that the battery voltage is about 12 V.

#### 2. CHECK THAT WARNING LIGHT TURNS ON

- (a) Turn the ignition switch on.
- (b) Check that the "ANTILOCK" warning light turns on for 3 seconds.

If not, inspect and repair or replace the fuse, bulb and wire harness.

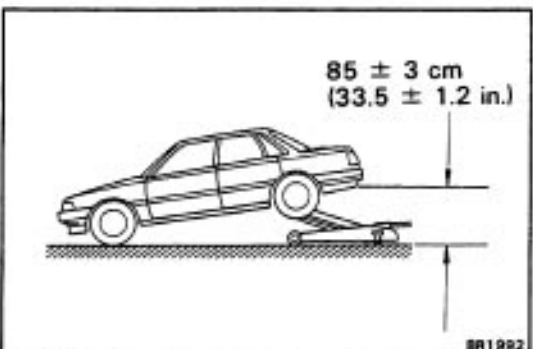
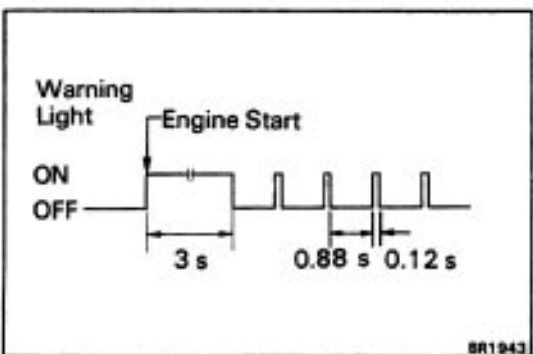
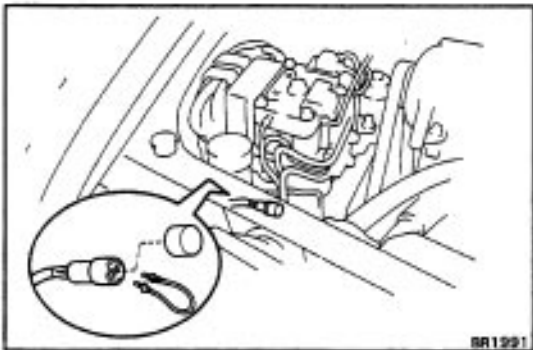
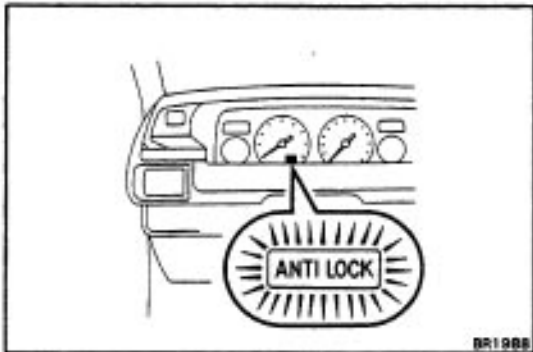
- (e) Check that the "ANTILOCK" warning light turns off.
- (d) Turn the ignition switch off.

#### 3. PERFORM FOLLOWING STEPS

- (a) Remove the rubber cap from the Ts connector located in front of the actuator.
- (b) Connect the terminals of Ts connector.
- (c) Pull the parking brake lever up and depress the brake pedal, and start the engine.

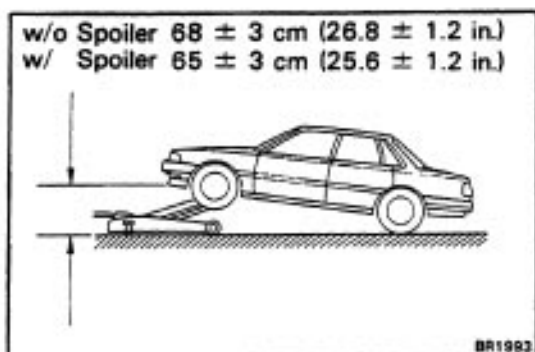
- (d) Check that the warning light blinks about 1 time every 1 second as shown.

If the warning light does not blink, inspect the parking brake switch, stop light switch, Ts connector, deceleration sensor installation and computer.



#### 4. INSPECT SENSOR DETECTION POINT

- (a) Jack up the rear side of the vehicle slowly as shown.  
HINT: When measuring the height, measure at the center of the rear bumper lower edge.
- (b) Check that the warning light does not turn on.
- (c) Jack down the vehicle and check that the warning light blinking.

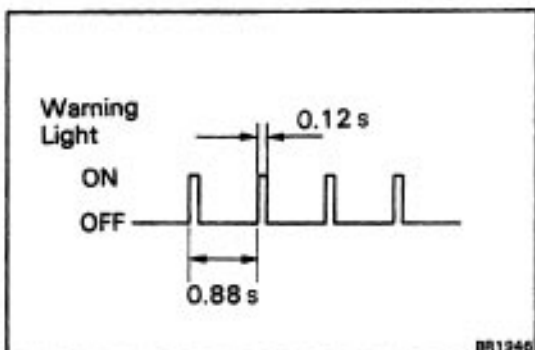


(d) Jack up the front side of the vehicle slowly as shown. HINT: When measuring the height, measure at the center of the lower body or spoiler edge of the vehicle.

(e) Check that the warning light does not turn on.

(f) Jack down the vehicle and check that the warning light blinking.

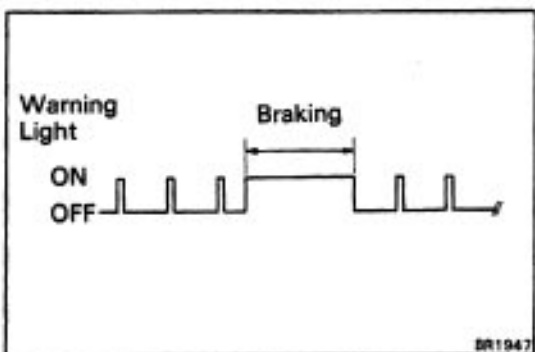
If the warning light turns on, inspect the deceleration sensor installation. And if the sensor installation is –OK, replace the deceleration sensor.



## 5. INSPECT SENSOR OPERATION

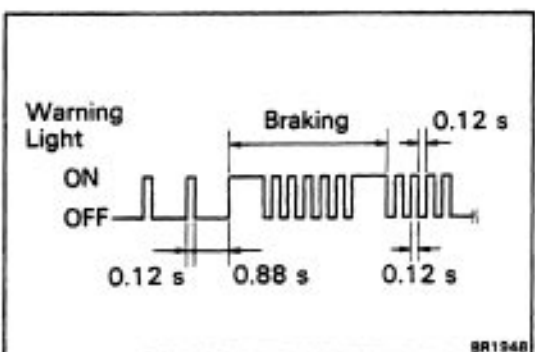
(a) Drive the vehicle straight ahead at about 10 km/h (6.2 mph) or more, lightly depress the brake pedal.

(b) Check that there is no change in the warning light pattern.



(c) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, depress the brake pedal a little strong.

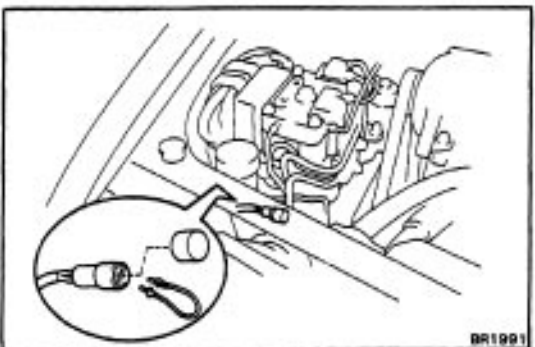
(d) Check that the warning light turns on while braking.



(e) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, depress the brake pedal strongly.

(f) Check that the warning light light pattern changes after braking as shown.

If the operation is not as specified, inspect the deceleration sensor installation. And if the sensor installation is OK, replace the deceleration sensor.



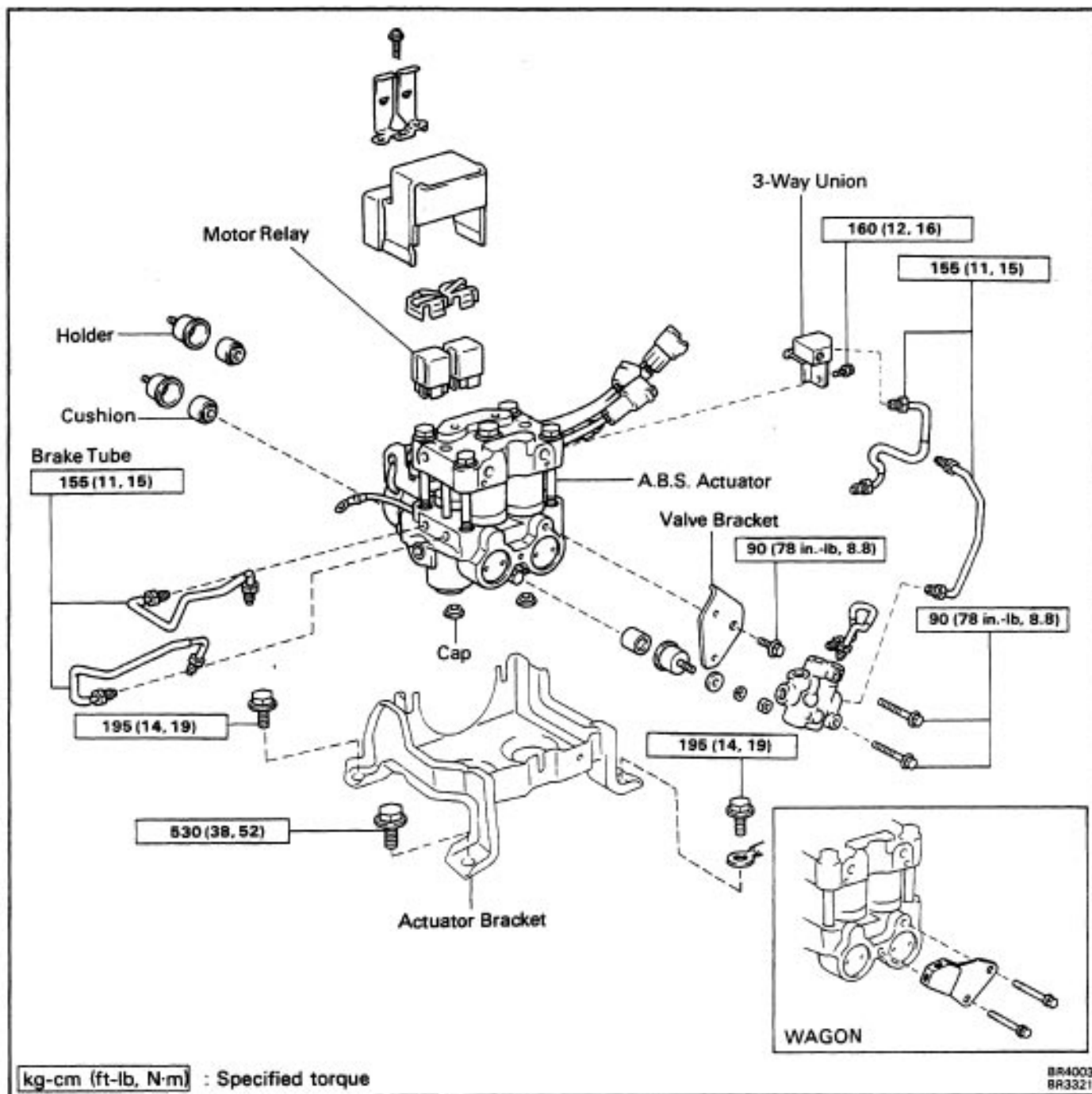
## 6. REMOVE SHORT PIN

(a) Stop the engine.

(b) Remove the short pin or wire from the Ts connector.

(c) Install the rubber cap to the Ts connector.

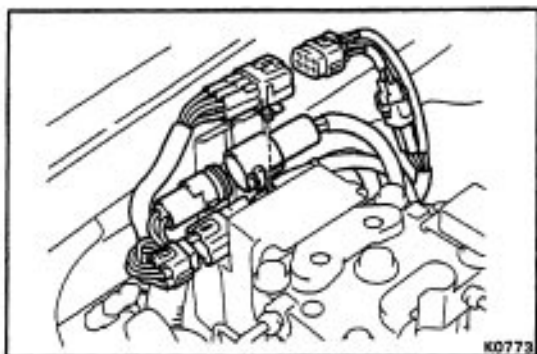
## A.B.S. Actuator COMPONENTS



## INSPECTION OF A.B.S. ACTUATOR OPERATION

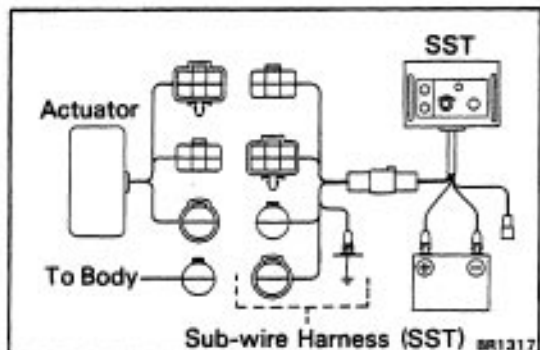
### 1. INSPECT BATTERY VOLTAGE

Battery voltage: 10 – 14.5 V



## 2. DISCONNECT CONNECTORS FROM ACTUATOR

Disconnect the three connectors from the actuator as shown.



## 3. CONNECT ACTUATOR CHECKER (SST) TO ACTUATOR

- Connect the actuator checker (SST) to the actuator and body side wire harness through the sub-wire harness (SST) as shown.

SST 09990-00150

- Connect the red cable of the checker to the battery positive (+) terminal and black to the negative (-) terminal. Connect the black cable of the sub-wire harness to the battery negative (-) terminal or body ground.

- Place the "SHEET A" (SST) on the actuator checker. SST 09990-00163

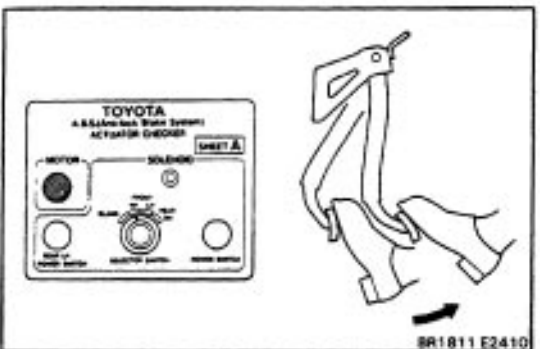
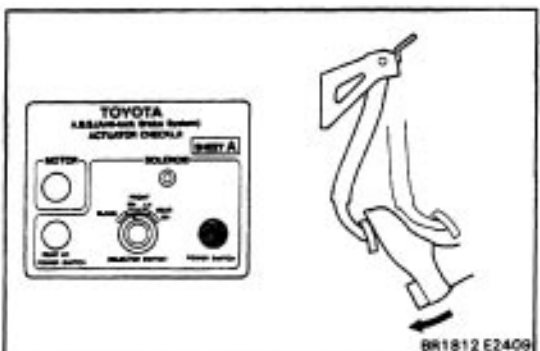
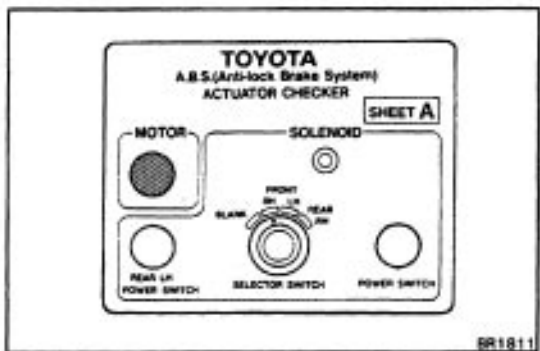
## 4. INSPECT BRAKE ACTUATOR OPERATION

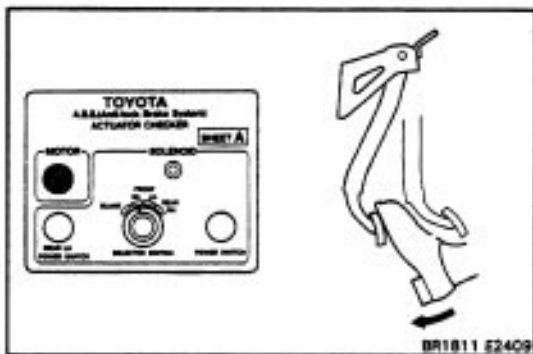
- Start the engine, and run it at idle.
- Turn the selector switch of the actuator checker to "FRONT RH" position.
- Push and hold in the MOTOR switch for a few seconds.
- Depress the brake pedal and hold it until the step 1gf is completed.
- Push the POWER SWITCH, and check that the brake pedal does not go down.

**NOTICE: Do not keep the POWER SWITCH pushing more than 10 seconds.**

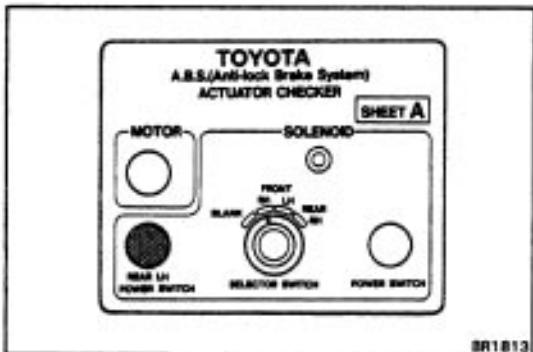
- Release the switch, and check that the pedal goes down.

- Push and hold in the MOTOR switch for a few seconds, and check that the pedal returns.
- Release the brake pedal.





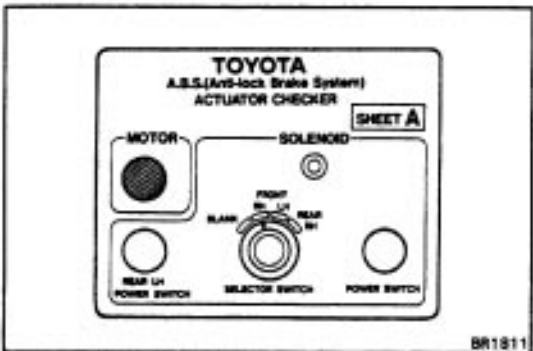
- (i) Push and hold in the MOTOR switch for a few seconds.
- (j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the MOTOR switch for a few seconds. Check that the brake pedal does not pulsate.



## 5. INSPECT FOR OTHER WHEELS

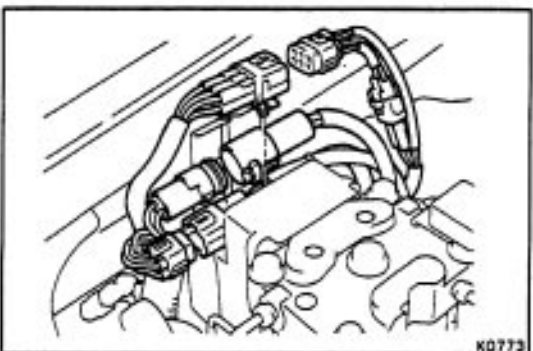
- (a) Turn the selector switch to "FRONT LH" position.
- (b) Repeating (c) to (j) of the step 4, check the actuator operation similarly.
- (c) Similarly, inspect "REAR RH" and "REAR LH" position.

HINT: When inspecting "REAR LH" position, push the REAR LH switch instead of the POWER SWITCH, and you can inspect in any the selector switch position.



## 6. PUSH MOTOR SWITCH

Push and hold in the MOTOR switch for a few seconds.



## 7. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

- (a) Remove the "SHEET A" (SST) and disconnect the actuator checker (SST) and sub-wire harness (SST) from the actuator.

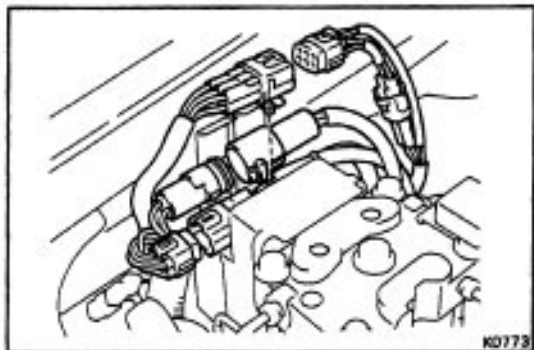
SST 09990-00150 and 09990-00163

- (b) Connect the actuator connectors.
- (e) Clear the diagnostic codes.  
(See page [BR-70](#))

## REMOVAL OF BRAKE ACTUATOR

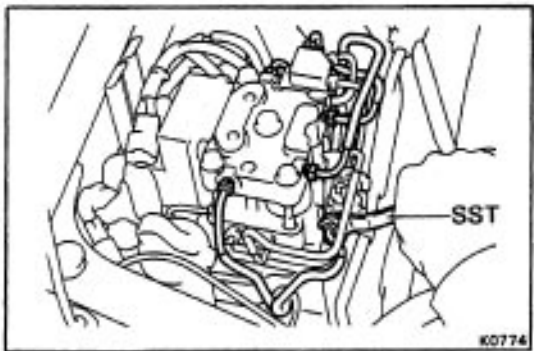
1. TAKE OUT FLUID WITH SYRINGE OR AN EQUIVALENT

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



2. DISCONNECT ACTUATOR CONNECTORS

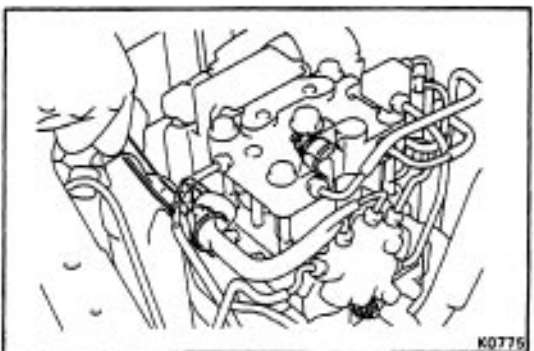
Disconnect the three connectors from the actuator.



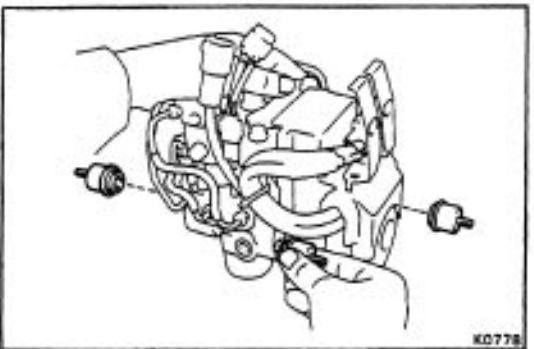
3. REMOVE ACTUATOR

(a) Using SST, disconnect the six brake tubes from the actuator as shown.

SST 09751-36011

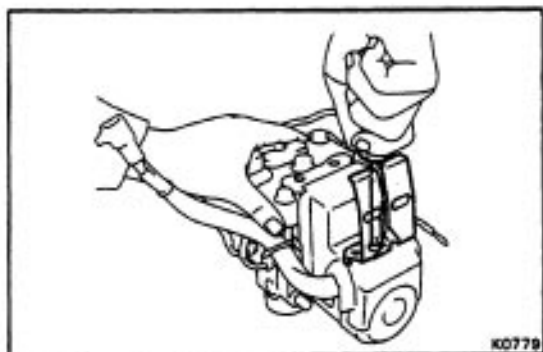


- (b) Remove the three nuts, wave washers and washers.
- (c) Remove the actuator from the actuator bracket.

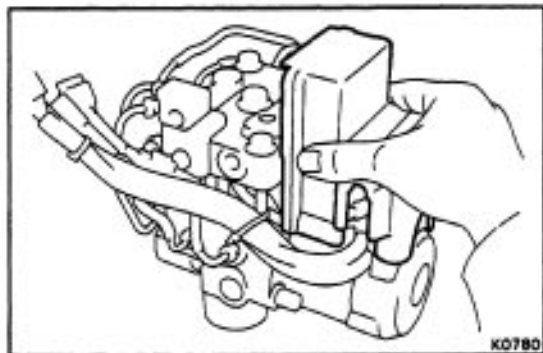


4. REMOVE THREE HOLDERS AND CUSHIONS

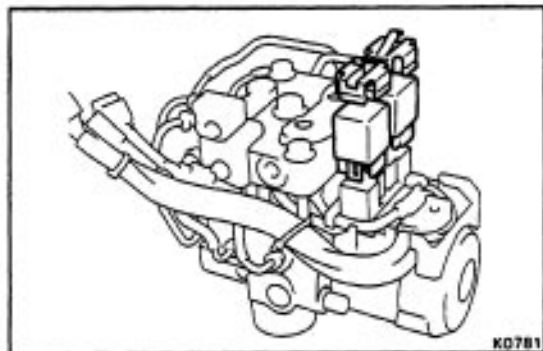
Remove the three holders and cushions.

**6. REMOVE CONTROL RELAYS**

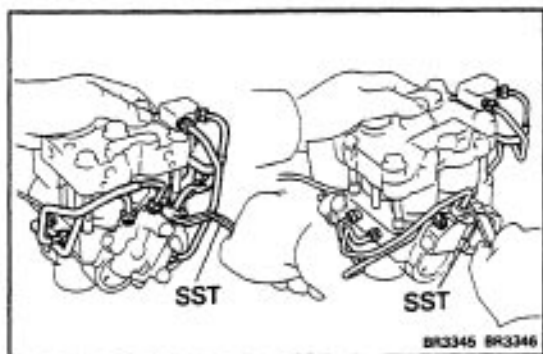
- (a) Remove the connector from the wire harness clamp.
- (b) Remove the screw and remove the wire harness clamp.



- (e) Remove the relay case.



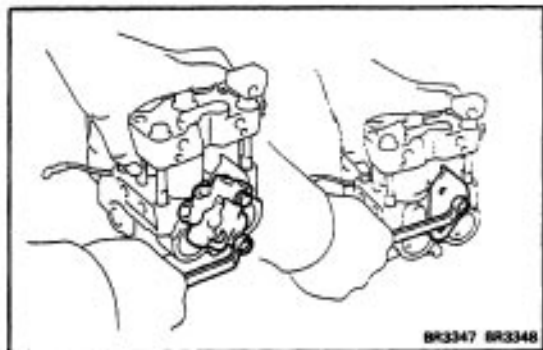
- (d) Remove the relay cap from the control relays.
- (e) Remove the two control relays from the actuator.

**6. REMOVE BRAKE TUBES****(w/o LSPV)**

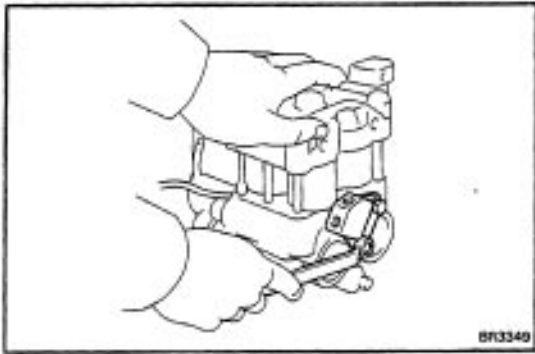
Using SST, remove the five brake tubes from the actuator.  
SST 09751-36011

**(w/ LS PV)**

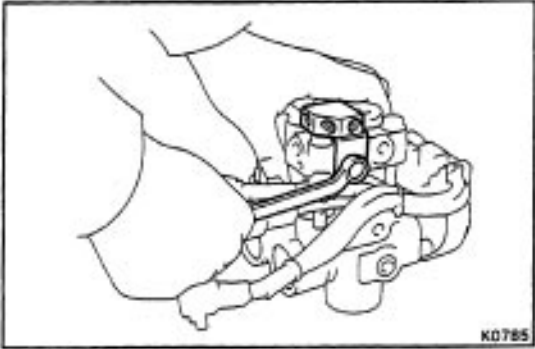
Using SST, remove the four brake tubes from actuator.  
SST 09751-36011

**7. REMOVE PROPORTIONING VALVE OR THREE-WAY UNION****(w/o LSPV)**

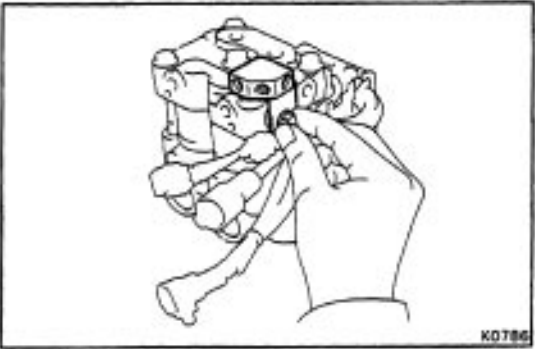
- (a) Remove the two bolt and remove the proportioning valve from the actuator.
- (b) Remove the bolt and remove the valve bracket.

**(w/ LS PV)**

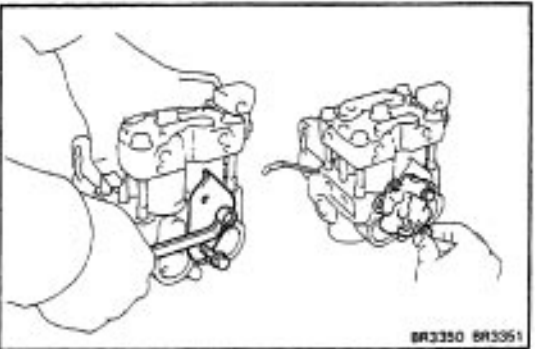
Remove the two bolts and remove the three-way union from the actuator.

**8. REMOVE THREE-WAY UNION**

Remove the bolt and three-way union.

**INSTALLATION OF BRAKE ACTUATOR****1. TEMPORARILY INSTALL FOLLOWING PARTS**

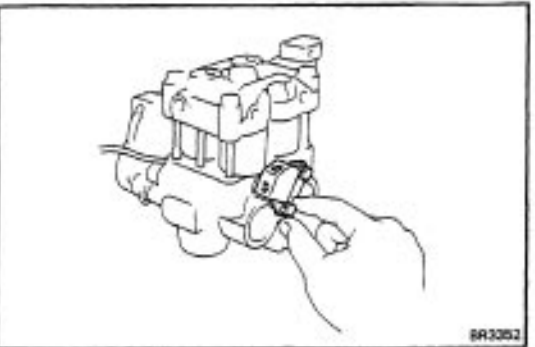
- (a) Temporarily install the three-way union with a bolt.

**(w/o LSPV)**

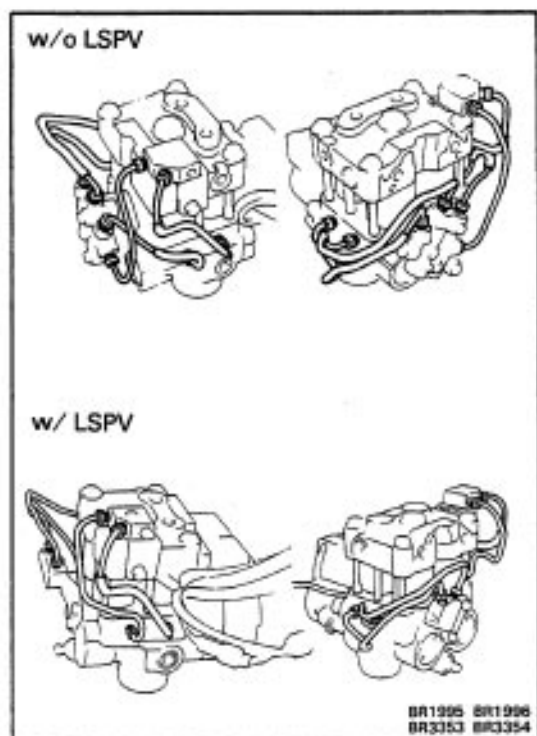
- (b) Using a proportioning valve installation bolt, install the valve bracket in place and tighten the bolt.

**Torque: 90 kg-cm (78 in.-lb, 8.8 N-m)**

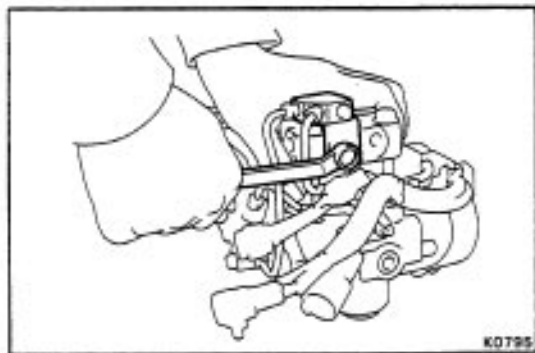
- (c) Remove the proportioning valve installation bolt.
- (d) Temporarily install the proportioning valve.

**(w/ LSPV)**

Temporarily install the three-way union.

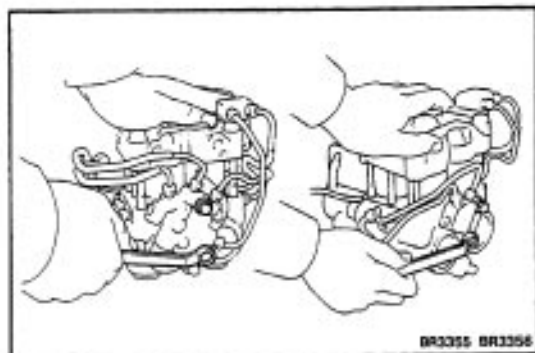


- (e) Temporarily install the five or four brake tubes as shown.

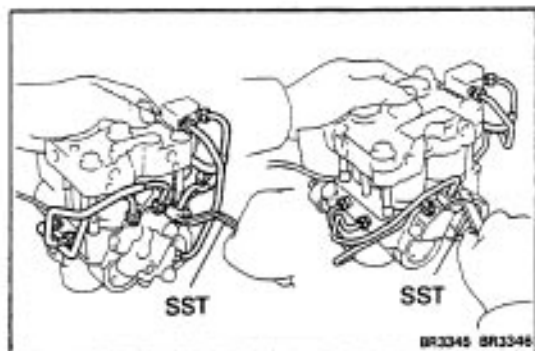


## 2. TIGHTEN FOLLOWING PARTS

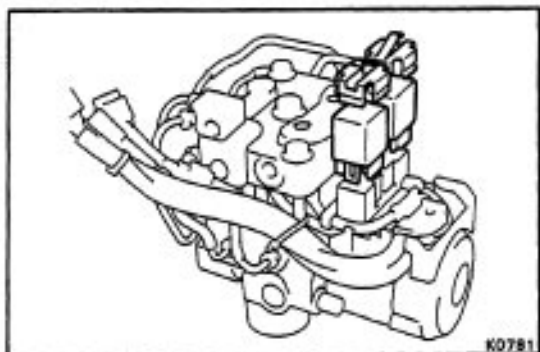
- (a) Tighten the three-way union installation bolt.  
Torque: 160 kg-cm (12 ft-lb, 16 N-m)



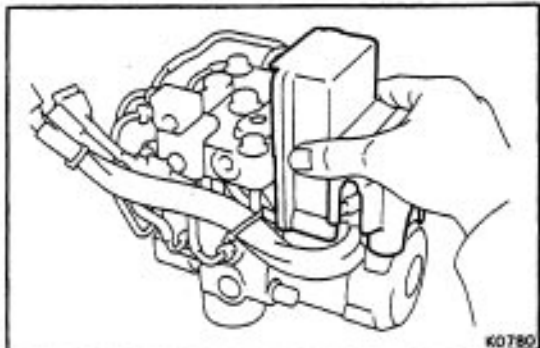
- (b) **(w/o LSPV)**  
Tighten the two proportioning valve installation bolts.  
**Torque: 90 kg-cm (78 in.-lb, 8.8 N-m )**  
**(w/ LS PV )**  
Tighten the two three-way union installation bolts.  
**Torque: 90 kg-cm (78 in.-lb, 8.8 N-m)**



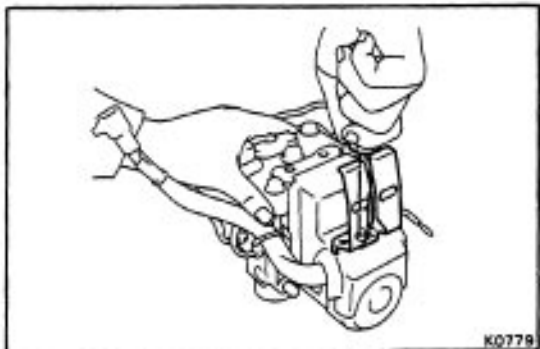
- (c) Using SST, tighten the five or four brake tubes.  
SST 09751-36011  
**Torque: 155 kg-cm (11 ft-lb, 15 N-m)**

**3. INSTALL CONTROL RELAYS**

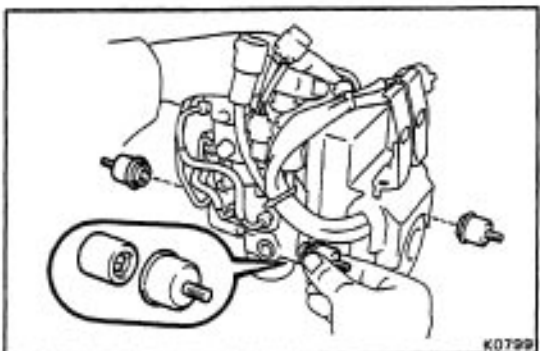
- (a) Install the two control relays in position.
- (b) Install the relay cap onto the control relays.



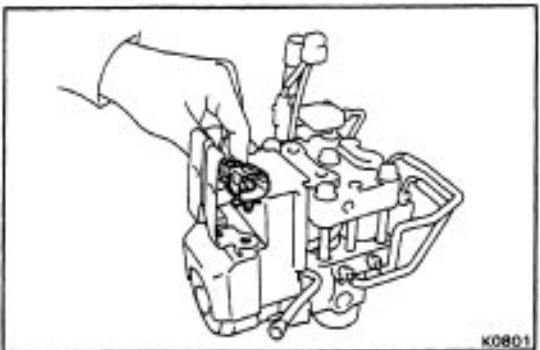
- (c) Install the relay case.



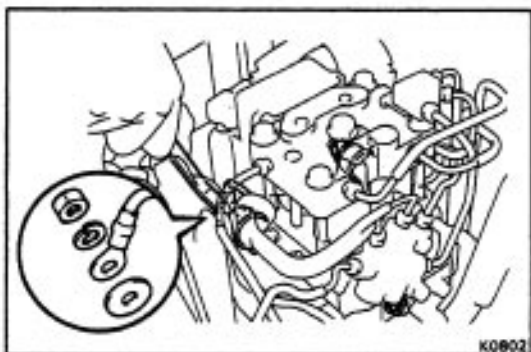
- (d) Install the wire harness clamp with a screw.

**4. INSTALL THREE CUSHIONS AND HOLDERS**

Install the three cushions to holders and install them to the actuator.

**5. INSTALL CONNECTOR TO CLAMP**

Install the connector to the wire harness clamp.

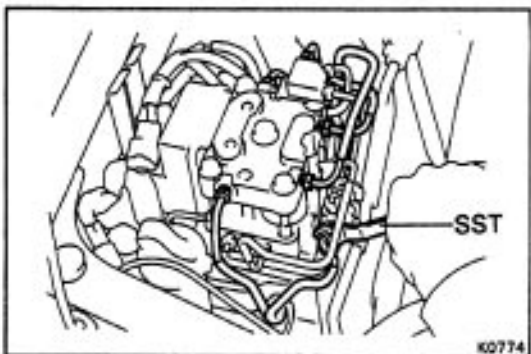


## 6. INSTALL ACTUATOR

- (a) Install the actuator to the actuator bracket in place.
- (b) Install the washers, wave washers and nuts.
- (e) Tighten the three nuts.

**Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)**

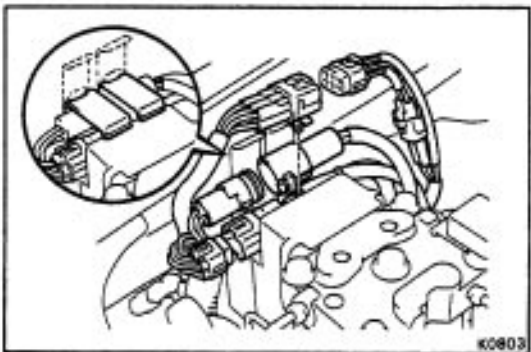
**HINT:** Before installing the front right side nut, install the motor ground terminal between the plate washer and spring washer.



- (d) Using SST, connect the six brake tubes to the actuator.

SST 09751-36011

**Torque: 155 kg-cm (11 ft-lb, 15 N-m)**



## 7. CONNECT ACTUATOR CONNECTORS

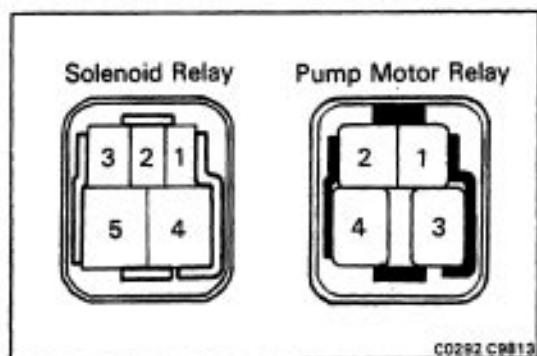
- (a) Connect the three connectors to the actuator.
- (b) Bend the wire harness clamp as shown.

## 8. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM

## 9. CHECK FOR FLUID LEAKAGE

## 10. CHECK ACTUATOR OPERATION

(See page [BR-84](#))

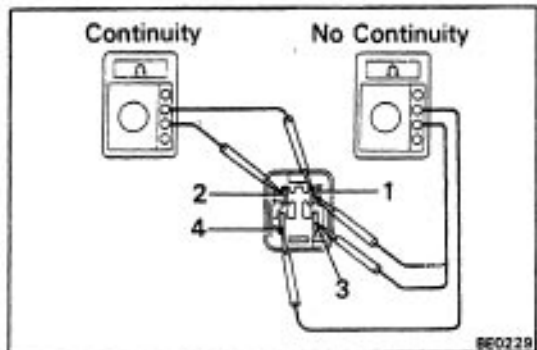


## Control Relays

### INSPECTION OF CONTROL RELAYS

#### 1. REMOVE CONTROL RELAYS

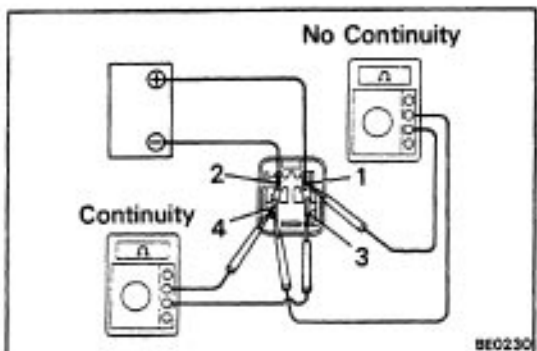
Remove the two control relays from the actuator.



#### 2. INSPECT PUMP MOTOR RELAY CONTINUITY

- Check that there is continuity between terminals 1 and 2.
- Check that there is no continuity between terminals 3 and 4.
- Check that there is no continuity between terminals 1 and 4.

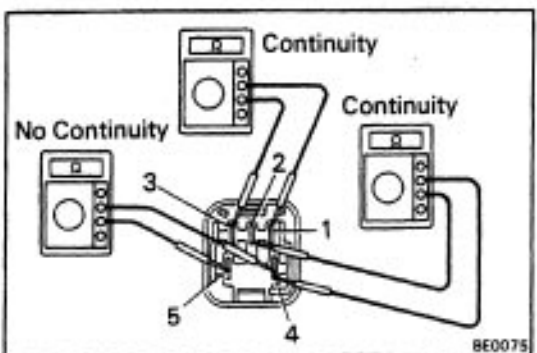
If continuity is not as specified, replace the relay.



#### 3. INSPECT PUMP MOTOR RELAY OPERATION

- Apply battery voltage to terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.
- Check that there is no continuity between terminals 1 and 4.

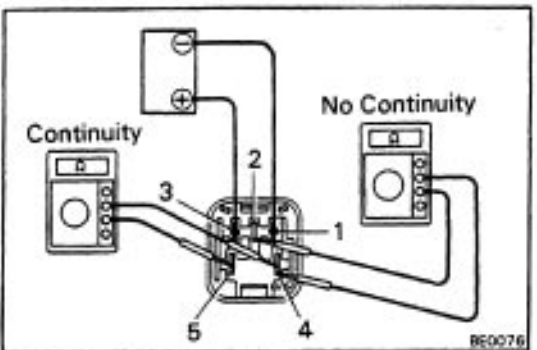
If operation is not as specified, replace the relay.



#### 4. INSPECT SOLENOID RELAY CONTINUITY

- Check that there is continuity between terminals 1 and 3.
- Check that there is continuity between terminals 2 and 4.
- Check that there is no continuity between terminals 4 and 5.

If continuity is not as specified, replace the relay.



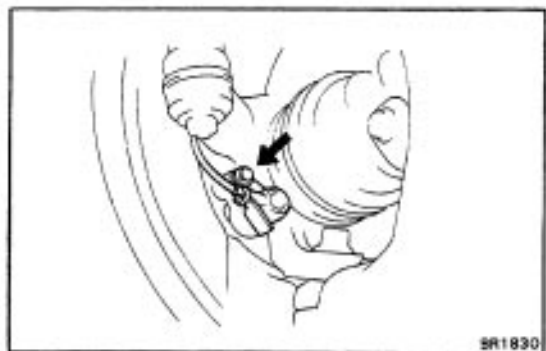
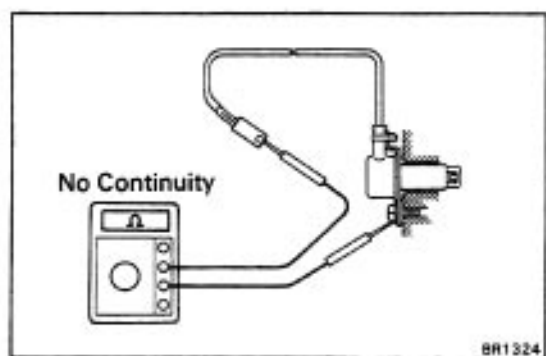
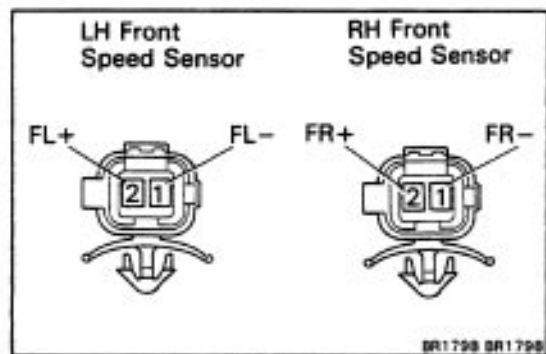
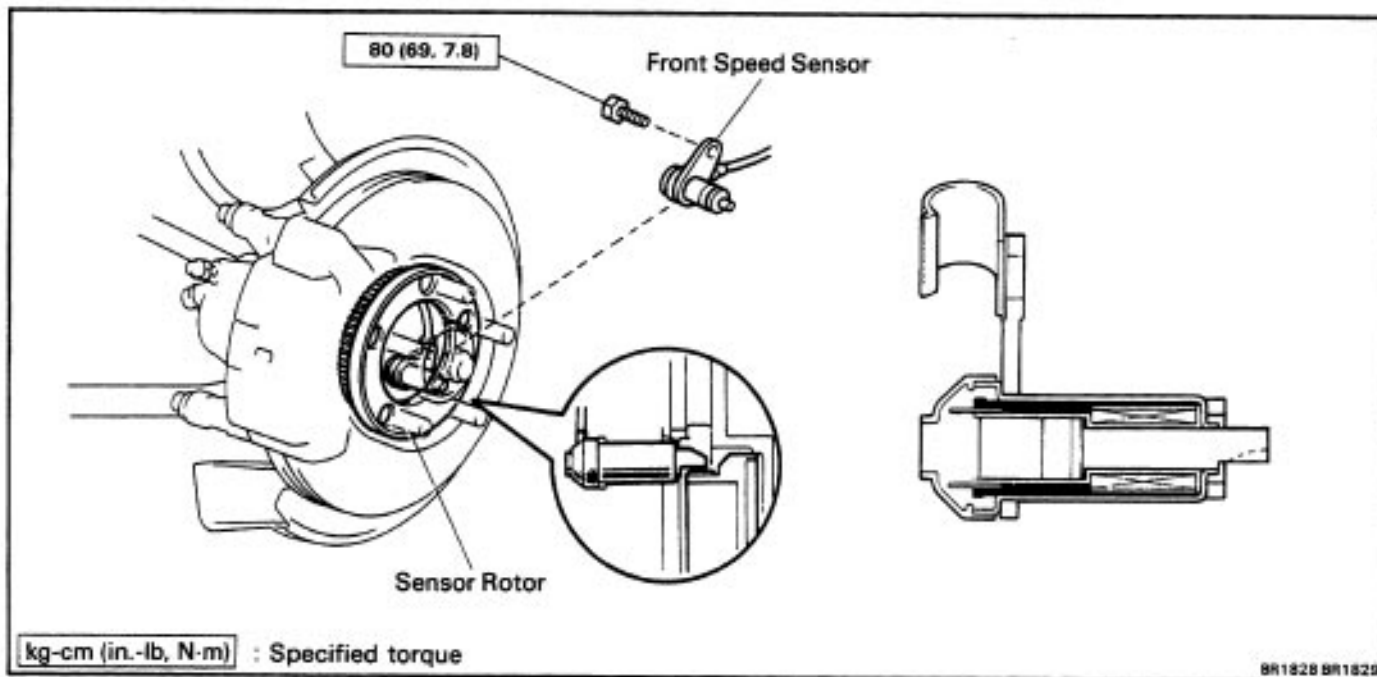
#### 5. INSPECT SOLENOID RELAY OPERATION

- Apply battery voltage to terminals 1 and 3.
- Check that there is continuity between terminals 4 and 5.
- Check that there is no continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.

#### 6. INSTALL TWO CONTROL RELAYS

## Front Speed Sensor



## INSPECTION OF FRONT SPEED SENSOR

### 1. INSPECT SPEED SENSOR

- Remove the bolt from the pipe clamp of the wire harness.
- Disconnect the speed sensor connector.
- Measure the resistance between terminals.

**Resistance: 0.85 – 1.30 K  $\Omega$**

If resistance value is not as specified, replace the sensor.

- Check that there is no continuity between each terminal and sensor body.

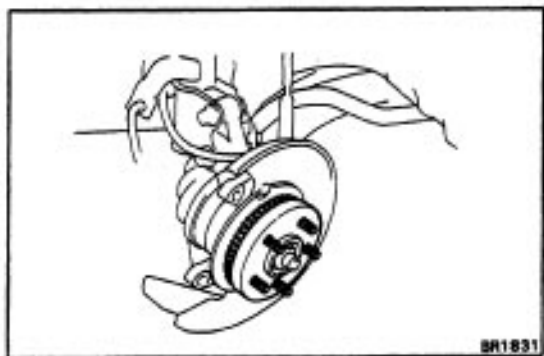
If there is continuity, replace the sensor.

- Connect the speed sensor connector.
- Install the bolt of the pipe clamp.

### 2. INSPECT SENSOR INSTALLATION

Check that the sensor installation bolt is tightened properly. If not, tighten the bolt.

**Torque: 80 kg-cm (69 in.-lb, 7.8 N-m)**



### 3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

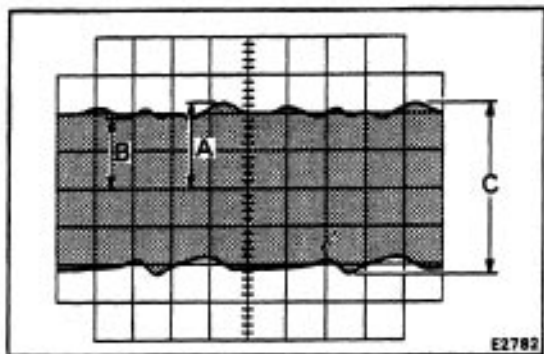
- Remove the two bolts and remove the torque plate with brake cylinder.
- Remove the rotor disc.
- Inspect the sensor rotor serrations for scratches, cracks, warping or missing teeth.
- Install the rotor disc and brake cylinder assembly with two bolts.

#### Torque:

2WD 960 kg-cm (69 ft-lb, 94 N-m)

4WD 1,090 kg-cm (79 ft-lb, 107 N-m)

**NOTICE:** To prevent damage to the serrations, do not strike the axle hub.

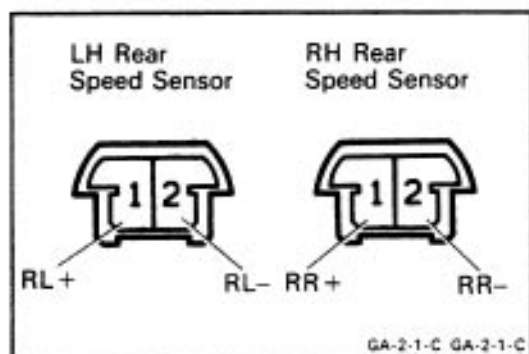
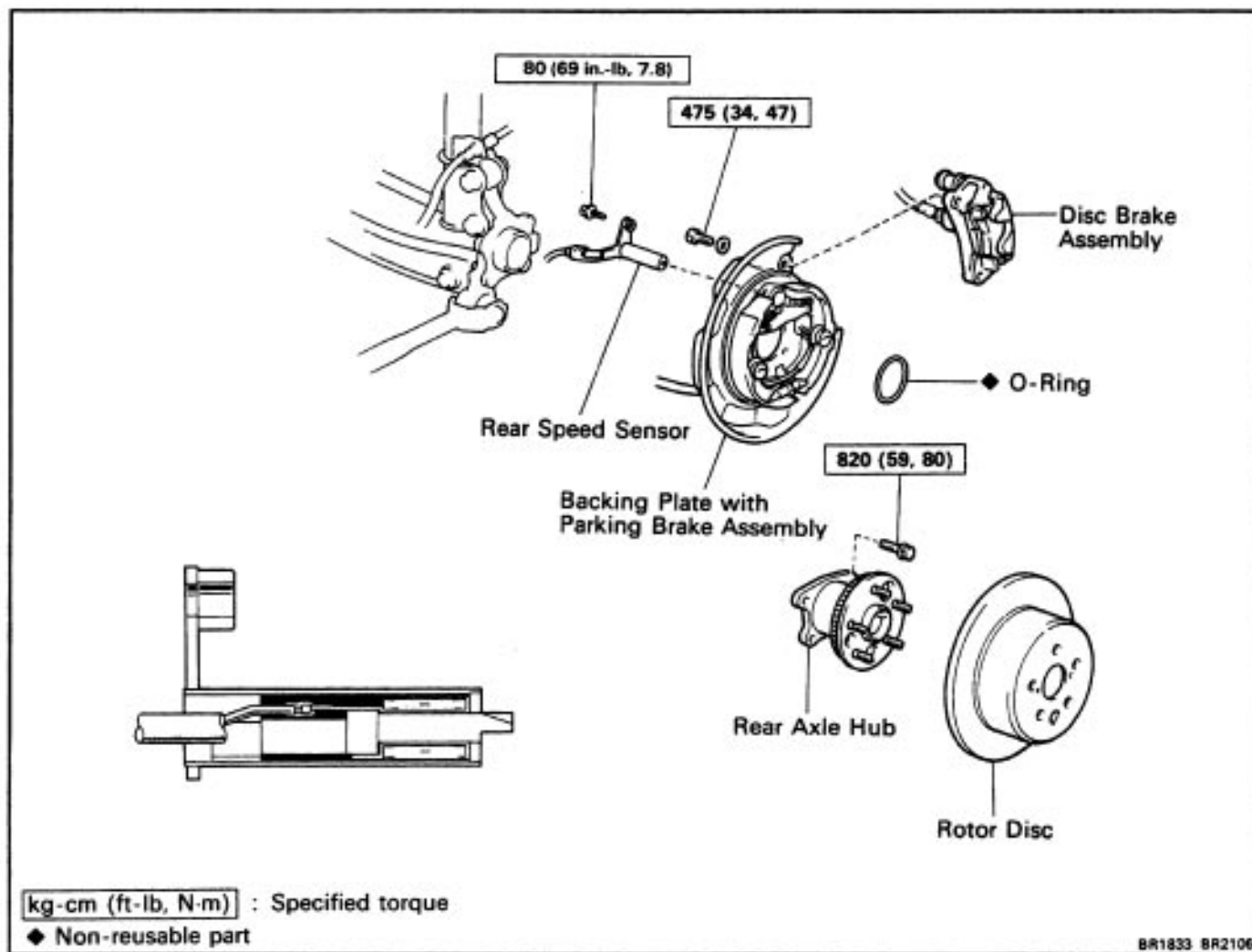


### INSPECTION OF FRONT SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERENCE)

#### INSPECT FRONT SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING AN OSCILLOSCOPE

- Connect an oscilloscope to the speed sensor connector.
- Run the vehicle at 20 km/h (12.4 mph), and inspect speed sensor output wave.
- Check that C is 0.5 V or more.  
If not as specified, replace the speed sensor.
- Check that B is 70% or more of A.  
If not as specified, replace the sensor rotor.

## Rear Speed Sensor (2WD)



## INSPECTION OF REAR SPEED SENSOR

### 1. INSPECT SPEED SENSOR

- Remove the seat cushion.
- Disconnect the speed sensor connector.
- Measure the resistance between terminals.

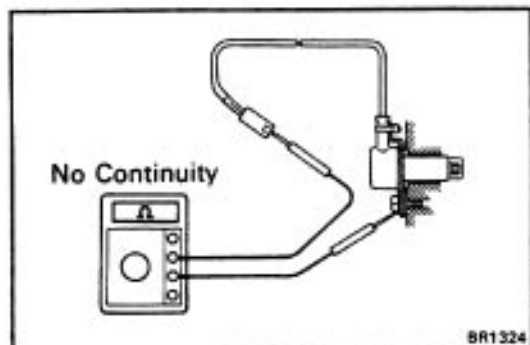
**Resistance: 0.85 – 1.50 kΩ**

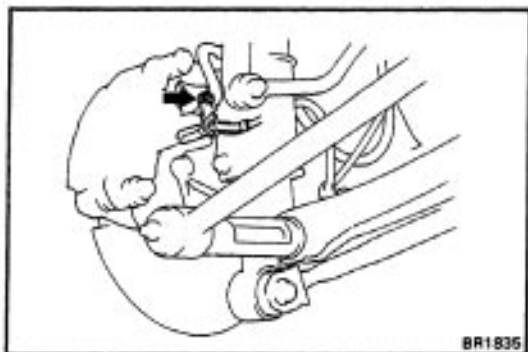
If resistance value is not as specified, replace the sensor.

- Check that there is no continuity between each terminal and sensor body.

If there is continuity, replace the sensor.

- Connect the speed sensor connector.
- Install the seat cushion.

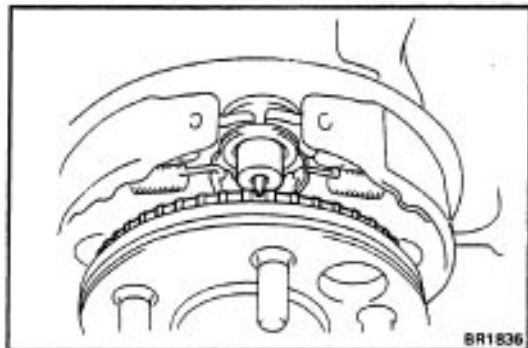




## 2. INSPECT SENSOR INSTALLATION

Check that the sensor installation bolt is tightened properly. If not, tighten the bolt.

**Torque: 80 kg-cm (69 in.-lb, 7.8 N-m)**

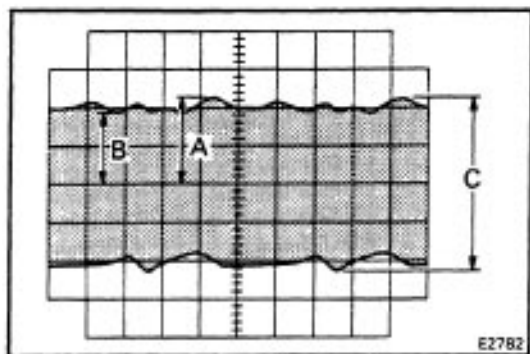


## 3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

- Remove the two bolts and remove the torque plate with brake cylinder.
- Remove the rotor disc.
- Inspect the sensor rotor serrations for scratches, cracks, warping or missing teeth.
- Install the rotor disc and brake cylinder assembly with two bolts.

**Torque: 475 kg-cm 134 ft-lb, 47 N-m)**

**NOTICE:** To prevent damage to the serrations, do not strike the axle hub.



## INSPECTION OF REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERENCE)

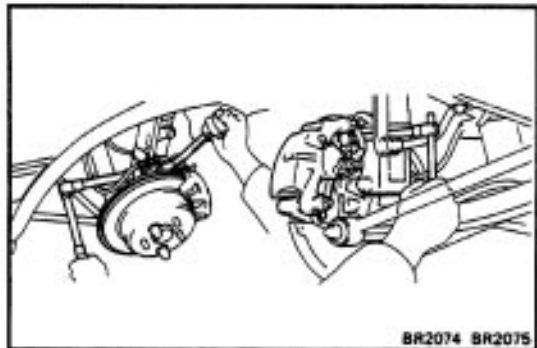
### INSPECT REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING AN OSCILLOSCOPE

- Connect an oscilloscope to the speed sensor connector.
- Run the vehicle at 20 km/h (12.4 mph), and inspect speed sensor output wave.
- Check that C is 0.5 V or more.  
If not as specified, replace the speed sensor.
- Check that B is 70% or more of A.  
If not as specified, replace the rear axle hub.

## REMOVAL OF REAR SPEED SENSOR

### 1. DISCONNECT SPEED SENSOR CONNECTOR

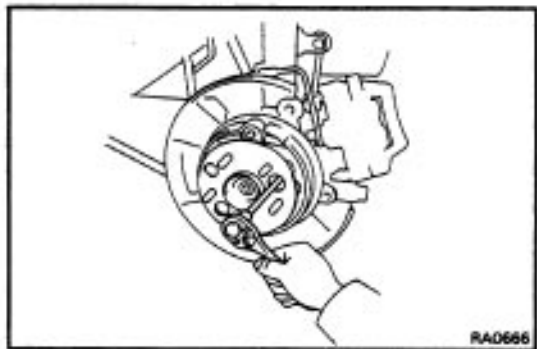
- (a) Remove the seat cushion.
- (b) Disconnect the sensor connector, and pull out the sensor wire harness.
- (e) Remove the two clamp bolts holding the sensor wire harness to the body and suspension arm.



### 2. REMOVE REAR BRAKE ASSEMBLY

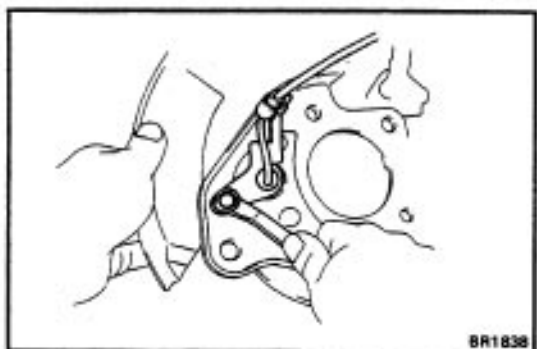
- (a) Remove the axle carrier mounting bolt and nut of upper side.
- (b) Remove the two bolts and remove the disc brake assembly.
- (c) Suspend the disc brake so the hose is not stretched.

### 3. REMOVE ROTOR DISC



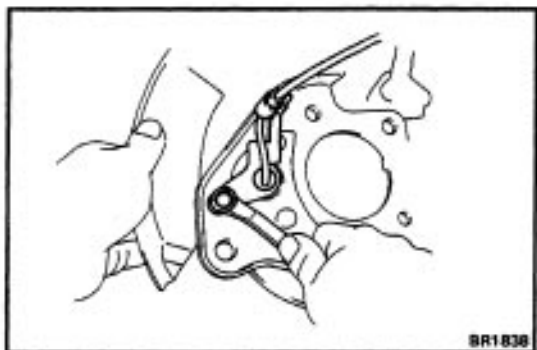
### 4. REMOVE REAR AXLE HUB

- (a) Remove the four axle hub mounting bolts.
- (b) Remove the rear axle hub.
- (c) Remove the backing plate with parking brake assembly and O-ring.



### 5. REMOVE SPEED SENSOR

Remove the bolts and remove the speed sensor from the backing plate.

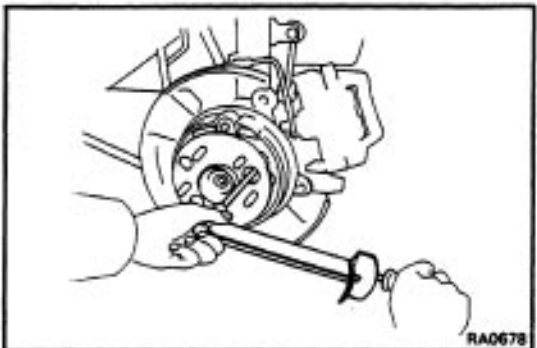


## INSTALLATION OF REAR SPEED SENSOR

### 1. INSTALL SPEED SENSOR

Install the speed sensor to the backing plate with a bolt.

**Torque: 80 kg-cm (69 in.-lb, 7.8 N-m)**



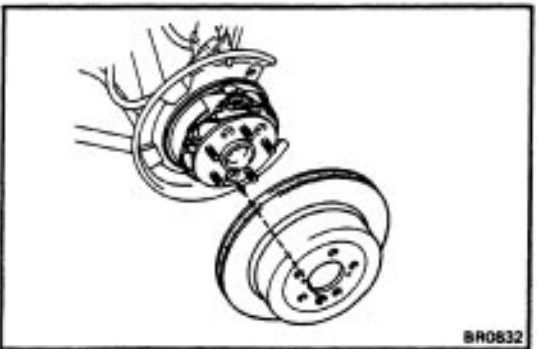
### 2. INSTALL REAR AXLE HUB

(a) Install the backing plate with parking brake assembly in place.

(b) Install a new O-ring to the axle carrier.

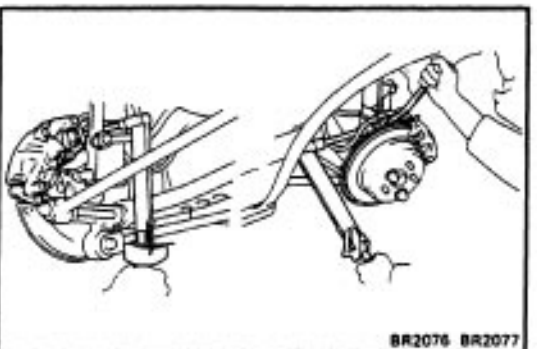
(c) Install the rear axle hub with the four bolts.

**Torque: 820 kg-cm (59 ft-lb, 80 N-m)**



### 3. INSTALL ROTOR DISC

Align the hole on the axle hub and service hole on the disc, and install the rotor disc.



### 4. INSTALL REAR BRAKE ASSEMBLY

(a) Install the disc brake assembly and torque the two mounting bolts.

**Torque: 475 kg-cm (34 ft-lb, 47 N-m)**

(b) Install the axle carrier mounting bolt and nut of upper side.

**Torque: 2,100 kg-cm (152 ft-lb, 206 N-m)**

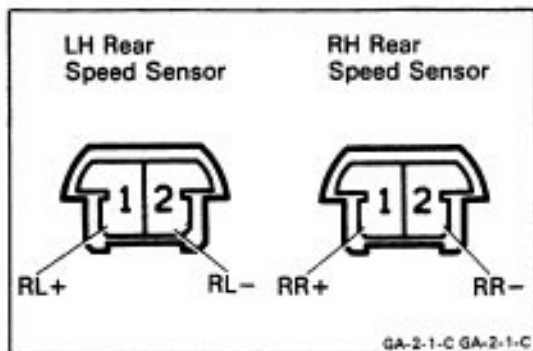
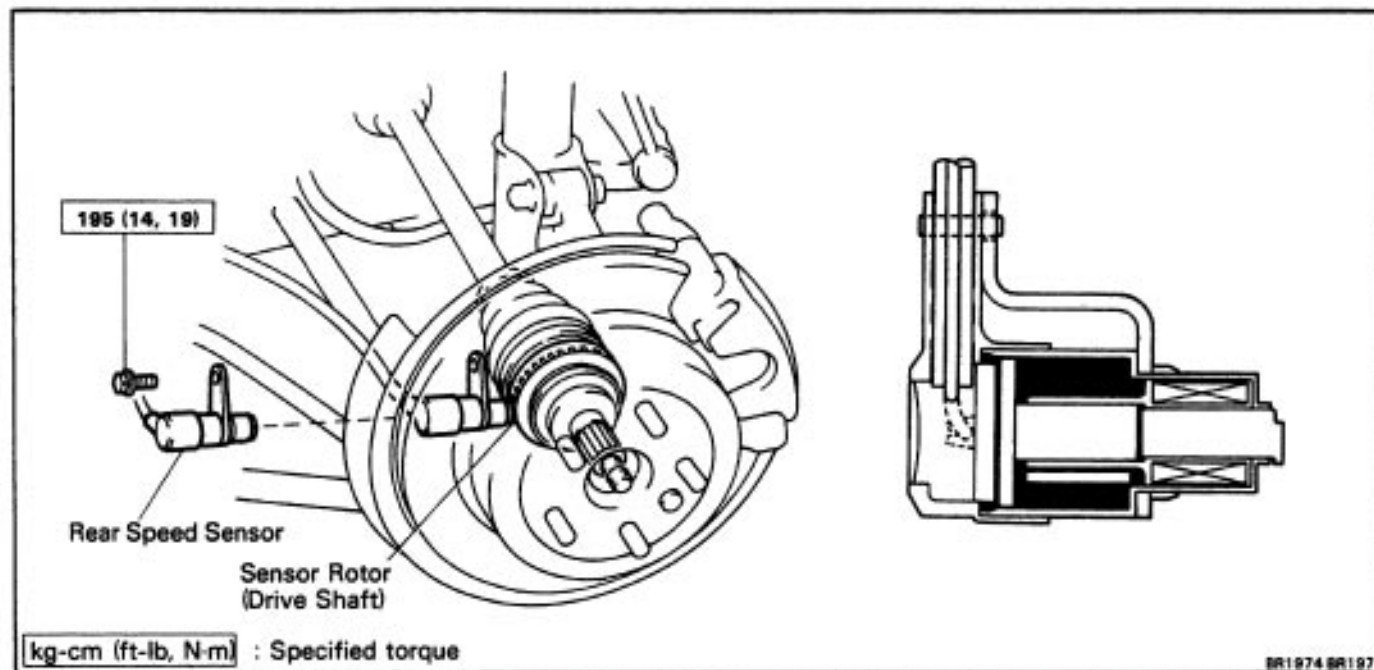
### 5. CONNECT SPEED SENSOR CONNECTOR

(a) Install the wire harness with clamps and bolts in place.

(b) Insert the wire harness connector to inside of the vehicle, and connect the connector.

(c) Install the seat cushion.

## Rear Speed Sensor (4WD)



## INSPECTION OF REAR SPEED SENSOR

### 1. INSPECT SPEED SENSOR

- Remove the rear seat cushion.
- Disconnect the speed sensor connector.
- Measure the resistance between terminals.

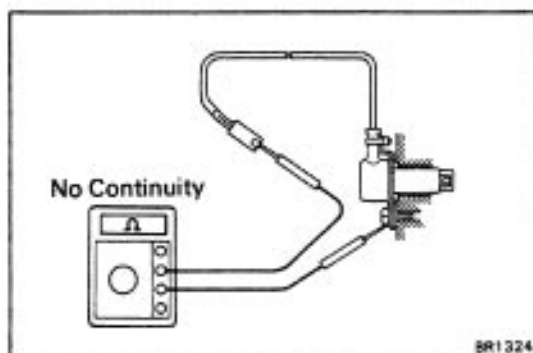
**Resistance: 0.85 – 1.50 kΩ**

If resistance value is not as specified, replace the sensor.

- Check that there is no continuity between each terminal and sensor body.

If there is continuity, replace the sensor:

- Connect the speed sensor connector.
- Install the rear seat cushion.



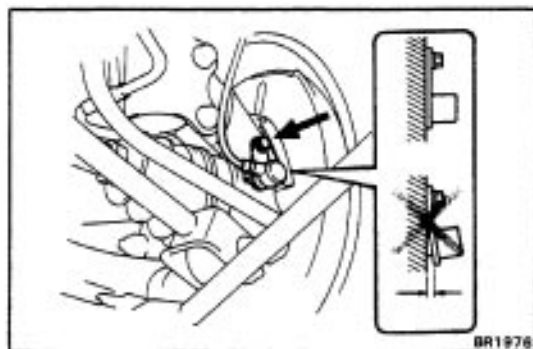
### 2. INSPECT SENSOR INSTALLATION

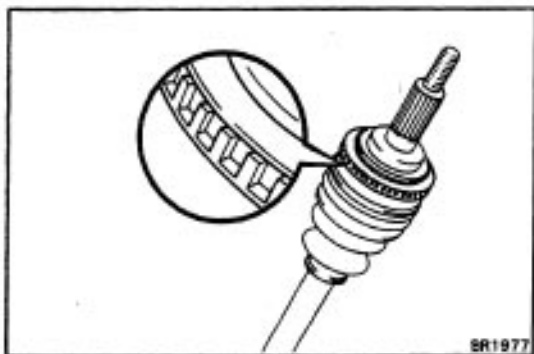
- Check that the sensor installation bolt is tightened properly. If not, tighten the bolt.

**Torque: 195 kg-cm (14 ft-lb, 19 N-m)**

- Check that there is no clearance between the sensor and rear axle carrier as shown.

If there is clearance, replace the sensor.

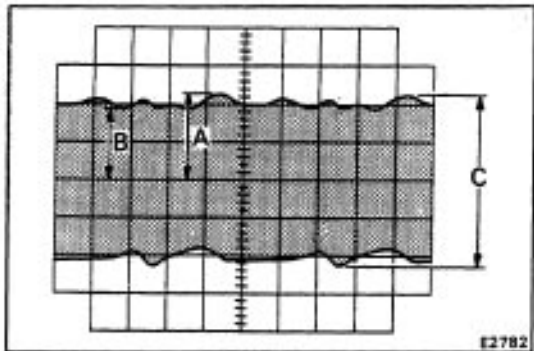




### 3. VISUALLY INSPECT SENSOR ROTOR SERRATIONS

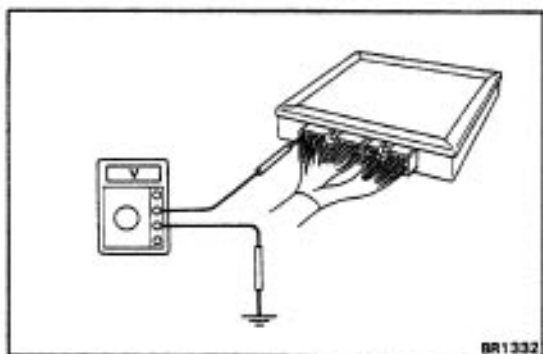
- (a) Remove the drive shaft.  
(See page [RA-21](#))
- (b) Inspect the sensor rotor serrations for scratches, cracks, warping or missing teeth.
- (c) Install the drive shaft.  
(See page [RA-26](#))

**NOTICE:** To prevent damage to the serrations, do not strike the drive shaft.



### INSPECTION OF REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS (REFERENCE) INSPECT REAR SPEED SENSOR AND SENSOR ROTOR SERRATIONS BY USING AN OSCILLOSCOPE

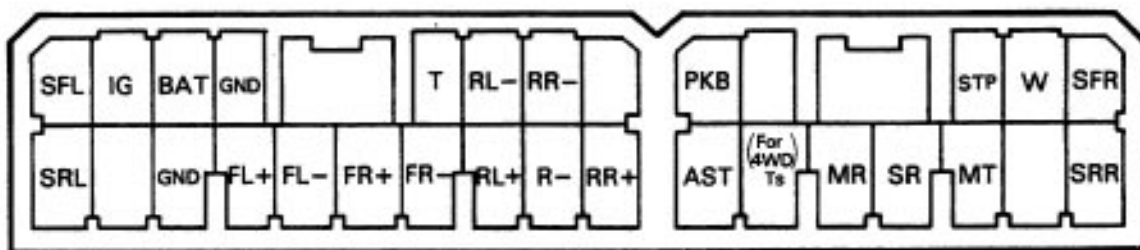
- (a) Connect an oscilloscope to the speed sensor connector.
- (b) Run the vehicle at 20 km/h (12.4 mph), and inspect speed sensor output wave.
- (c) Check that C is 0.5 V or more.  
If not as specified, replace the speed sensor.
- (d) Check that B is 60% or more of A.  
If not as specified, replace the rear drive shaft.



## Anti-lock Brake System Circuit INSPECTION OF SYSTEM CIRCUIT

### 1. INSPECT SYSTEM CIRCUIT WITH CONNECTOR CONNECTED

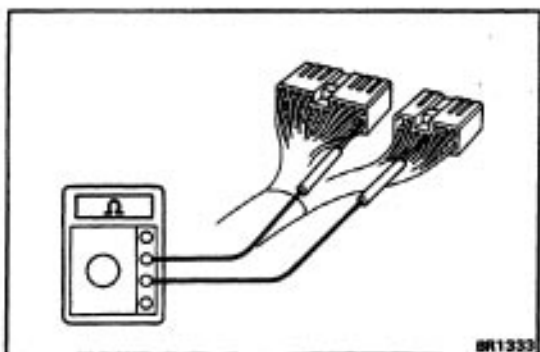
- Remove the A.B.S. computer.
- Using a voltmeter with high impedance (10 K $\Omega$ /V minimum), measure the voltage at each terminal and body ground.



E2403

Tester Connection	Condition	Voltage	Trouble Part
SFL – Body ground	Ignition switch on	Battery voltage	Actuator, control relays
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SFR – Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SRI – Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
SRR – Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
AST – Body ground	Ignition switch on	Battery voltage	
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
W – Body ground	Ignition switch on	Battery voltage	"ANTI LOCK" warning light bulb
	Ignition switch on and "ANTI LOCK" warning light goes on	About 0 V	
T – Body ground	Check connector disconnected	Battery voltage	Check connector, computer
	Check connector connected	About 0 V	

If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.



## 2. INSPECT SYSTEM CIRCUIT WITH CONNECTOR DISCONNECTED

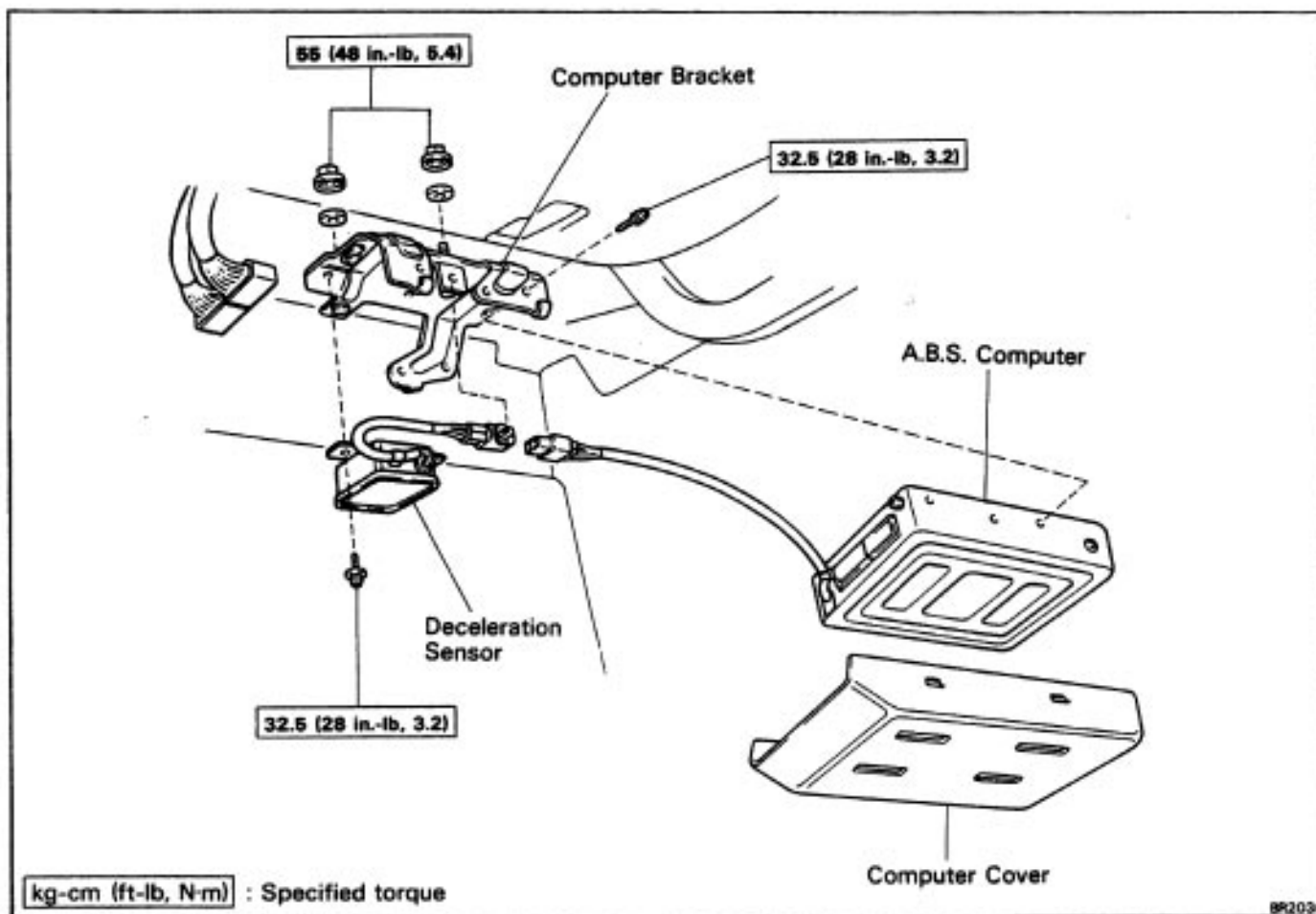
- (a) Disconnect the connectors from the computer, inspect at the wire harness side connector.

Tester Connection	Chrak Item	Condition	Voltage or Resistance Value	Trouble Part
SFR – AST	Resistance	Ignition switch off	About 6Ω	Actuator
STP – Body ground	Voltage	Ignition switch off and brake pedal depressed	Battery voltage	Stop light switch, stop light
	Continuity	Ignition switch off and brake pedal returned	Continuity	
PKB – Body ground	Voltage	Ignition switch on and PKB lever pulled	About 0 v	Parking broke switch, level warning switch
		Engine running and PKB lever returned	Battery voltage	
SRR – AST	Resistance	Ignition switch off	About 6 0	Actuator
MT – Body ground	Continuity	Ignition switch off	Continuity	
SR – R ⊖	Resistance	Ignition switch off	65–100Ω	
MR – R ⊖	Resistance	Ignition switch off	50–80Ω	
Ts – Body ground (For 4WD)	Continuity	–	No continuity	Ts connector, wiring harness
		Ts connector shorted	Continuity	
AST – Body ground	Resistance	Ignition switch off	About 5Ω	Wiring harness
RR ⊖ – Body ground	Continuity	Ignition switch off	No continuity	Rear RH speed sensor
RL ⊖ – Body ground	Continuity	Ignition switch off	No continuity	Rear LH speed sensor
T – Body ground	Continuity	Ignition switch off	Continuity	Check connector, wiring harness
GND – Body ground	Continuity	Ignition switch off	Continuity	Wiring harness
BAT – Body ground	Vortege	–	Battery voltage	FOG fuse
IG – Body ground	Voltage	Ignition switch on	Battery voltage	ECU–IG fuse
SFL – AST	Resistance	Ignition switch off	About 6Ω	Actuator
RR ⊕ – RR ⊖	Resistance	–	0.85 – 1.50 kΩ	Rear RH speed sensor
R ⊖ – Body ground	Continuity	Ignition switch off	No continuity	Wiring harness
RL ⊕ – RL ⊖	Resistance	–	0.85 – 1.50 kΩ	Rear LH speed sensor
FR ⊖ – Body ground	Continuity	–	No continuity	Front RH speed sensor
FR ⊕ – FR ⊖	Resistance	–	0.85 – 1.30 k fl	
FL ⊖ – Body ground	Continuity	–	No continuity	FrontrH speed sensor
FL ⊕ – FL ⊖	Resistance	–	0.85– 1.30kΩ	
SRL – AST	Resistance	Ignition switch off	About 6Ω	Actuator

If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.

- (b) Connect the connectors, and install the computer cover.

## REMOVAL AND INSTALLATION OF A.B.S. COMPUTER AND DECELERATION SENSOR (For 4WD)



### 1. REMOVE A.B.S. COMPUTER

- Remove the computer cover.
- Remove the five screws holding the computer to the computer bracket.
- Pull out the wire harness from the clamp on the bracket, and pull out the connector from the clamp on the bracket.
- Disconnect the three connectors, and remove the A.B.S. computer.

### 2. REMOVE DECELERATION SENSOR

Remove the two screws, and remove the deceleration sensor.

**NOTICE:** Do not drive without normal installation of deceleration sensor and computer assembly.

**3. INSTALL DECELERATION SENSOR**

- (a) Install the deceleration sensor to the bracket with the two screws.

**Torque: 32.5 kg-cm (28 in.-lb, 3.2 N-m)**

- (b) Install the connector to the clamp on the bracket.
- (c) Check that the deceleration sensor is installed properly.

**4. INSTALL A.B.S. COMPUTER**

- (a) Connect the three connectors and insert the wire harness to the clamp.
- (b) Set the computer in place, and install it with the five screws.

**Torque: 32.5 kg-cm (28 in.-lb, 3.2 N-m)**

- (c) Install the computer cover.