

## SECTION **BR**

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**When you read wiring diagrams:**

- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

**When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES".**

# PRECAUTIONS AND PREPARATION

## Precautions

### SUPPLEMENTAL RESTRAINT SYSTEM "AIR BAG"

The Supplemental Restraint System "Air Bag" helps to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bags (located in the center of the steering wheel and on the instrument panel on the passenger side), sensors, a control module, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF section** of this Service Manual.

#### WARNING:

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- All SRS electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the SRS "Air Bag".

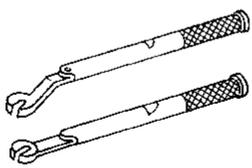
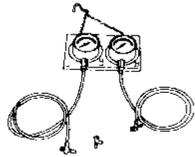
### BRAKE SYSTEM

- Use brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of hydraulic system.
- Use flare nut wrench when removing or installing brake tubes.
- Always torque brake lines when installing.

#### WARNING:

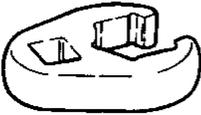
Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder draffs caused by friction.

### Special Service Tools

Tool number (Kent-Moore No.) Tool name	Description
GG94310000 ( - ) Flare nut wrench	 Removing and installing each brake piping
KV991V0010 ( - ) Brake fluid pressure gauge	 Measuring brake fluid pressure

# PRECAUTIONS AND PREPARATION

## Commercial Service Tools

Tool name	Description	
Flare nut crows foot		GI MA
Torque wrench		EM LC

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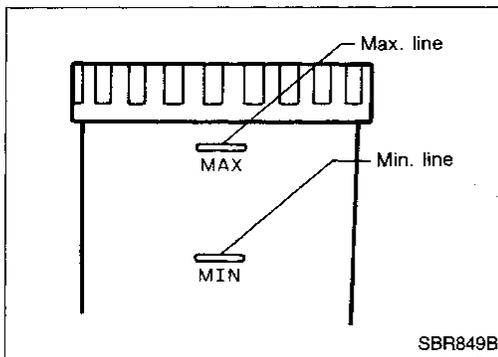
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## CHECK AND ADJUSTMENT



### Checking Brake Fluid Level

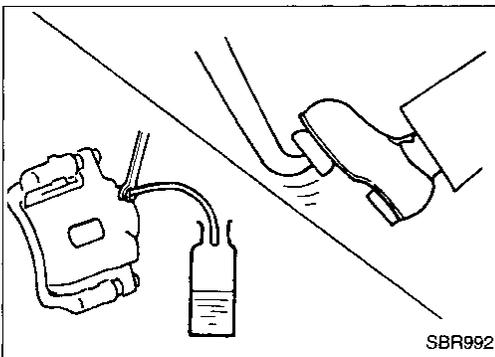
- Check fluid level in reservoir tank. It should be between Max. and Min. lines on reservoir tank.
- If fluid level is extremely low, check brake system for leaks.
- When brake warning lamp comes on even when parking brake lever is released, check brake system for leaks.

### Checking Brake Line

#### CAUTION:

If leakage occurs around joints, retighten or, if necessary, replace damaged parts.

1. Check brake lines (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for oil leakage by fully depressing brake pedal while engine is running.



### Changing Brake Fluid

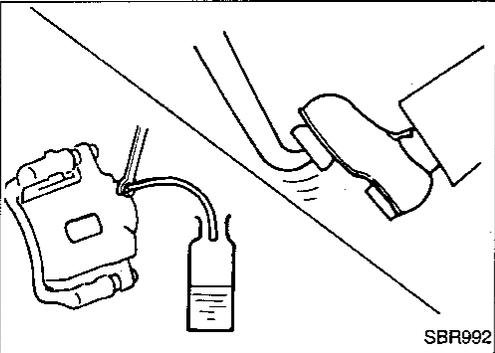
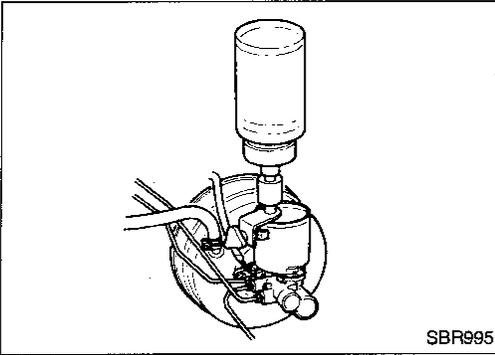
#### CAUTION:

- Refill with new brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

1. Connect a vinyl tube to each air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.
3. Refill until new brake fluid comes out of each air bleeder valve.

Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to BR-5.

# AIR BLEEDING



## Bleeding Procedure

### CAUTION:

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
- Fill reservoir with new brake fluid "DOT 3". Make sure it is full at all times while bleeding air out of system.
- Place a container under master cylinder to avoid spillage of brake fluid.

1. Connect a transparent vinyl tube to air bleeder valve.
2. Fully depress brake pedal several times.
3. With brake pedal depressed, open air bleeder valve to release air.
4. Close air bleeder valve.
5. Release brake pedal slowly.
6. Repeat steps 2. through 5. until clear brake fluid comes out of air bleeder valve.

- Bleed air in the following order.

Right rear brake

↓  
Left front brake

↓  
Left rear brake

↓  
Right front brake

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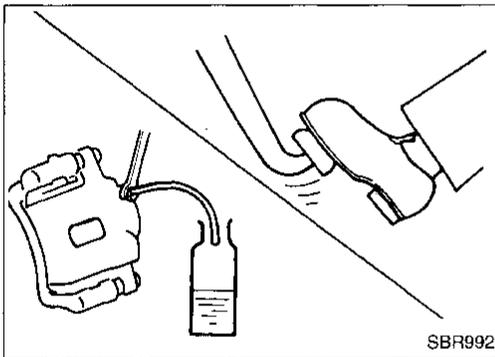
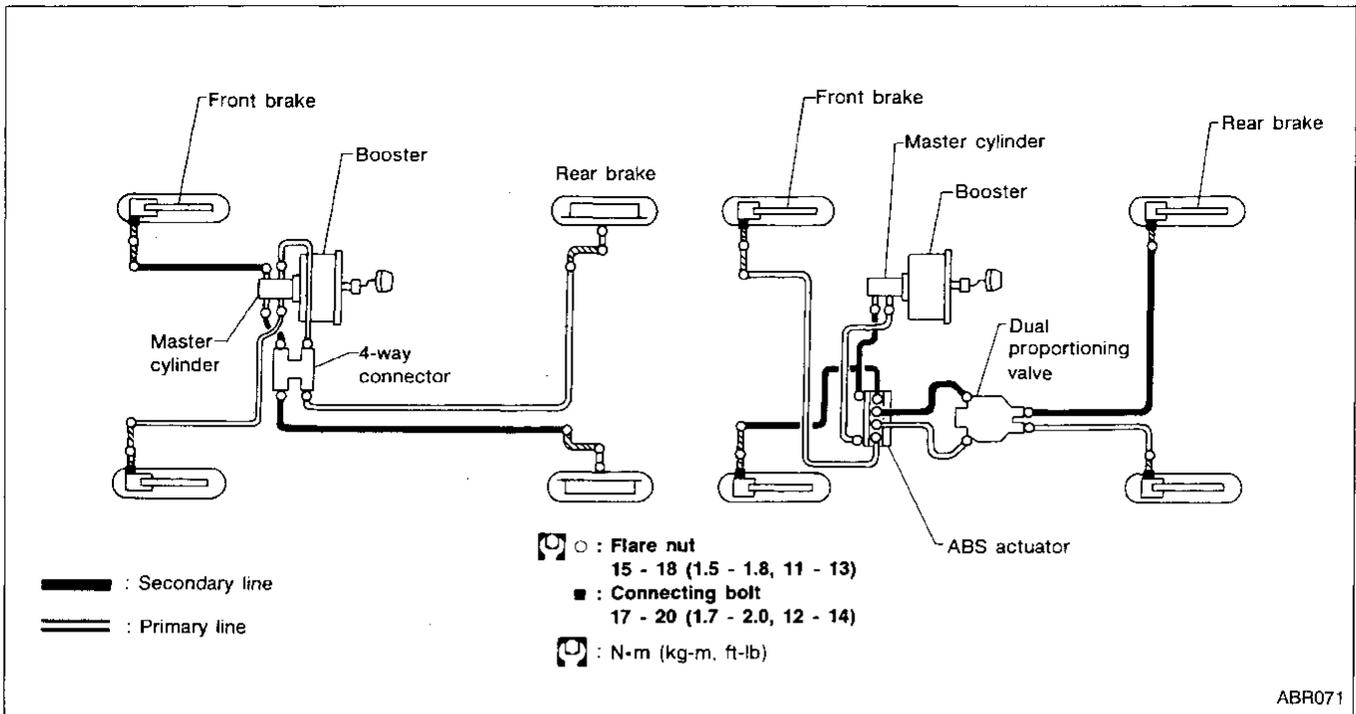
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# BRAKE HYDRAULIC LINE



## Removal

### CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- All hoses must be free from excessive bending, twisting and pulling.

1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.
3. Remove flare nut securing brake tube to hose, then withdraw lock spring.
4. Cover openings to prevent entrance of dirt whenever disconnecting hydraulic line.

## Inspection

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

## Installation

### CAUTION:

- Refill with new brake fluid "DOT 3".
- Never reuse drained brake fluid.

1. Tighten all flare nuts and connecting bolts.

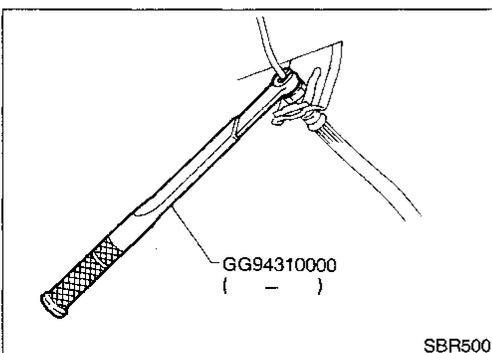
#### Flare nut:

: 15 - 18 N·m (1.5 - 1.8 kg·m, 11 - 13 ft·lb)

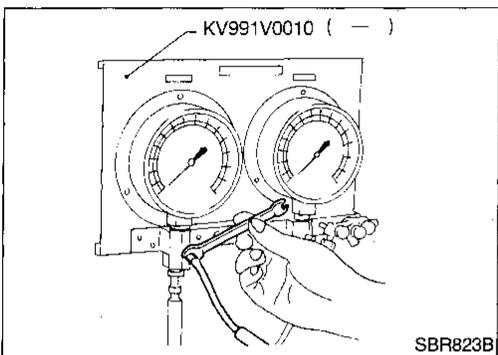
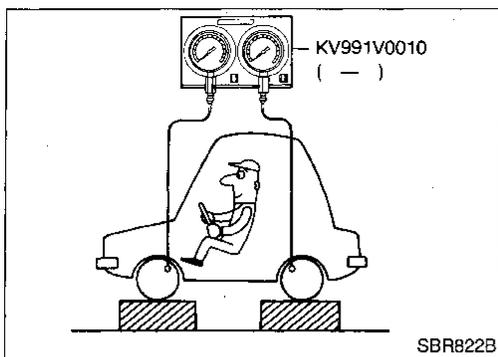
#### Connecting bolt:

: 17 - 20 N·m (1.7 - 2.0 kg·m, 12 - 14 ft·lb)

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to BR-5.



# CONTROL VALVE



## Proportioning Valve

### INSPECTION

#### CAUTION:

- Carefully monitor brake fluid level at master cylinder.
- Use new brake fluid "DOT 3".
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on paint areas, wash it away with water immediately.
- Depress pedal slowly when raising front brake pressure.
- Check rear brake pressure 2 seconds after front brake pressure reaches specified value.
- For models with ABS, disconnect harness connectors from ABS actuator relay before checking.

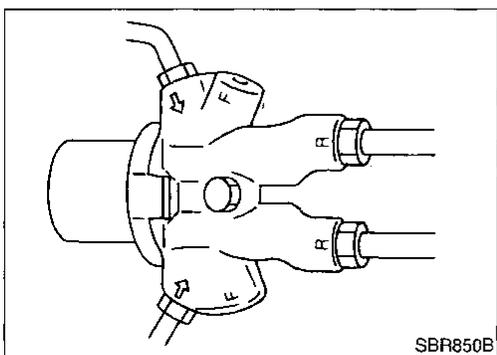
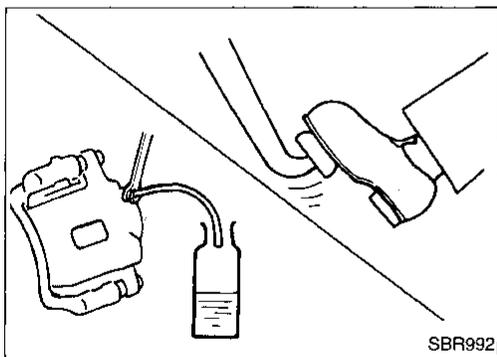
1. Connect Tool to air bleeders of front and rear brakes on either LH and RH side.
2. Bleed air from the Tool.
3. Check rear brake pressure by depressing brake pedal (increasing front brake pressure).

Unit: kPa (kg/cm<sup>2</sup>, psi)

	Without ABS	With ABS
Applied pressure (Front brake) D <sub>1</sub>	5,394 (55, 782)	5,884 (60, 853)
Output pressure (Rear brake) D <sub>2</sub>	2,452 - 2,844 (25 - 29, 356 - 412)	3,334 - 3,727 (34 - 38, 483 - 540)

If output pressure is out of specifications, replace dual proportioning valve (separated type) or master cylinder assembly (built-in type).

4. Bleed air after disconnecting the Tool. Refer to BR-5.



### REMOVAL (Separated type)

#### CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve by depressing brake pedal.

3. Loosen flare nut.
4. Remove proportioning valve mounting bolt, then remove flare nut.

## **CONTROL VALVE**

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### **Proportioning Valve (Cont'd)**

#### **INSTALLATION (Separated type)**

##### **CAUTION:**

- Refill with new brake fluid "DOT 3".
  - Never reuse drained brake fluid.
1. Temporarily fit flare nut to proportioning valve.
  2. Tighten proportioning valve mounting bolt, then tighten flare nut.

##### **Flare nut:**

**□: 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)**

3. Refill until new brake fluid comes out of each air bleeder valve.
4. Bleed air. Refer to BR-5.

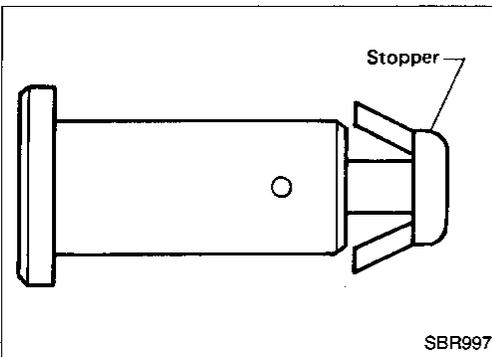
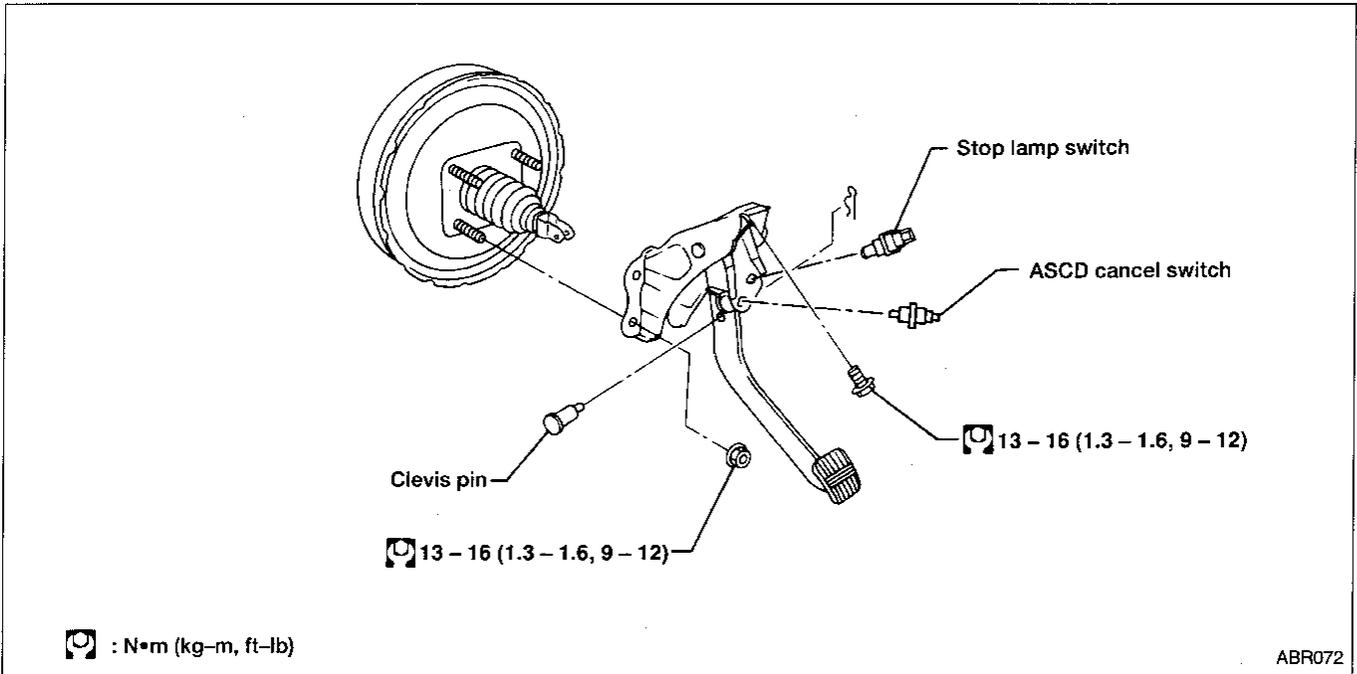
#### **REMOVAL AND INSTALLATION (Built-in type)**

**Always replace together with master cylinder as an assembly.**

- Refer to BR-11.

# BRAKE PEDAL AND BRACKET

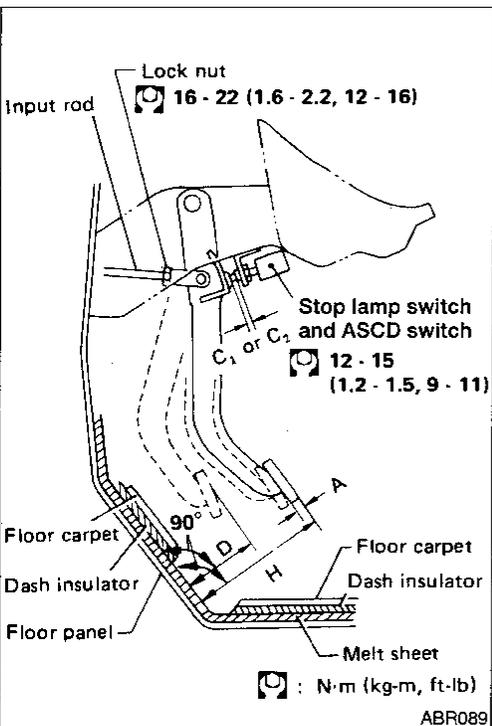
## Removal and Installation



### Inspection

Check brake pedal for following items:

- Brake pedal bend
- Clevis pin deformation
- Crack of any welded portion
- Crack or deformation of clevis pin stopper



### Adjustment

Check brake pedal free height from dash reinforcement panel.

- H: Free height  
Refer to SDS, BR-60.
- D: Depressed height  
Refer to SDS, BR-60.  
Under force of 490 N (50 kg, 110 lb)  
with engine running
- C<sub>1</sub>, C<sub>2</sub>: Clearance between pedal stopper and threaded end of stop lamp switch and ASCD switch  
0.3 - 1.0 mm (0.012 - 0.039 in)
- A: Pedal free play  
1.0 - 3.0 mm (0.039 - 0.118 in)

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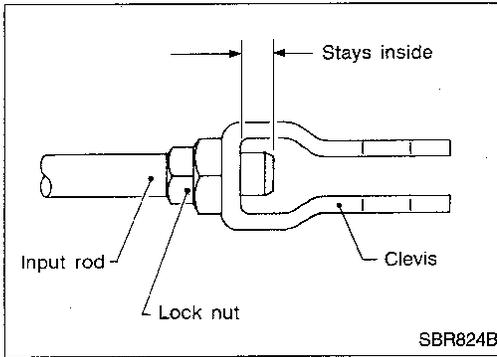
## BRAKE PEDAL AND BRACKET

### Adjustment (Cont'd)

If necessary, adjust brake pedal free height.

1. Loosen lock nut and adjust pedal free height by turning brake booster input rod. Tighten lock nut.

**Make sure that tip of input rod stays inside of clevis.**

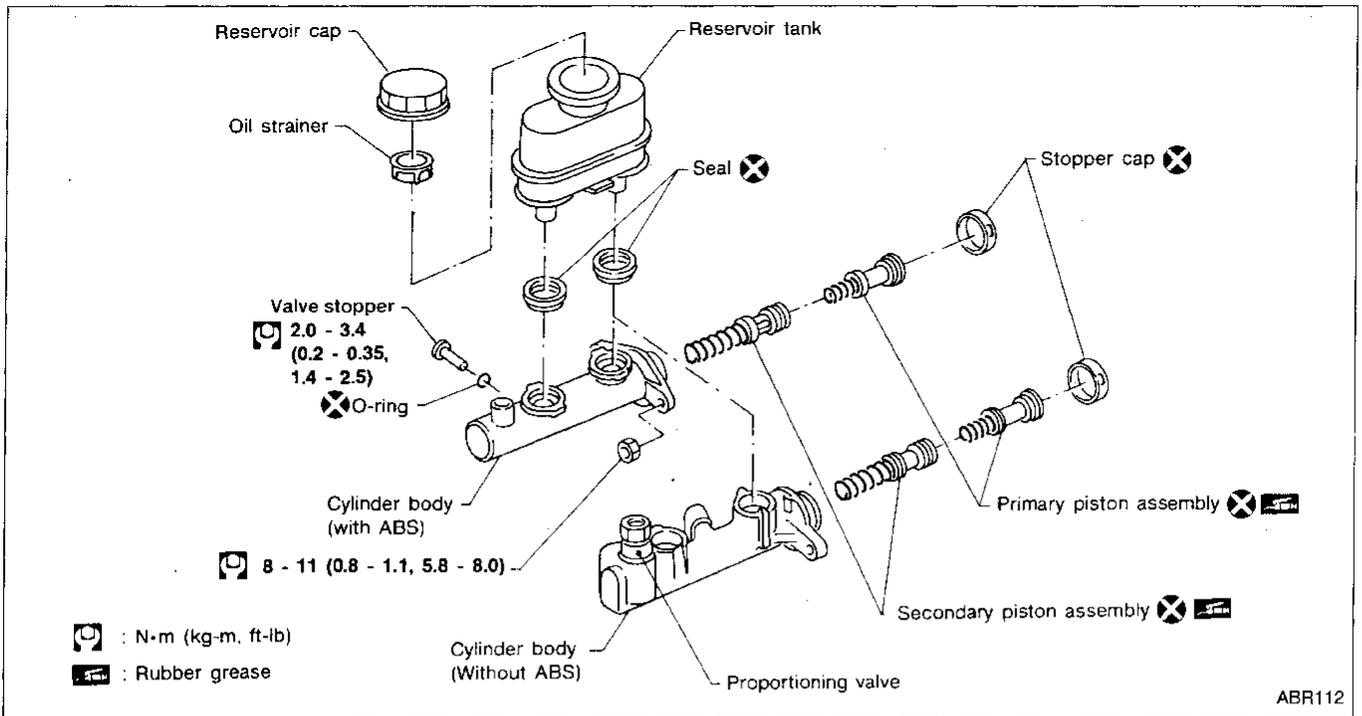


2. Loosen lock nut and adjust clearance "C<sub>1</sub>" and "C<sub>2</sub>" with stop lamp switch and ASCD switch respectively. Then tighten lock nuts.
3. Check pedal free play.

**Make sure that stop lamps go off when pedal is released.**

4. Check brake pedal's depressed height while engine is running.  
If depressed height is below specified value, check brake system for leaks, accumulation of air or any damage to components (master cylinder, etc.); then make necessary repairs.

# MASTER CYLINDER



## Removal

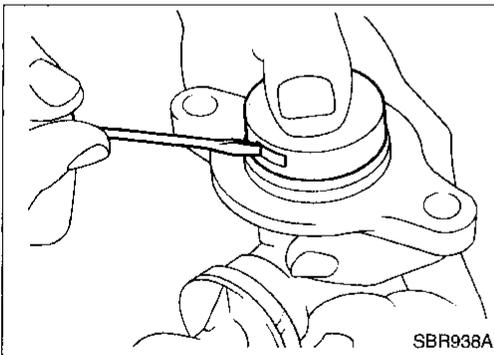
### CAUTION:

Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

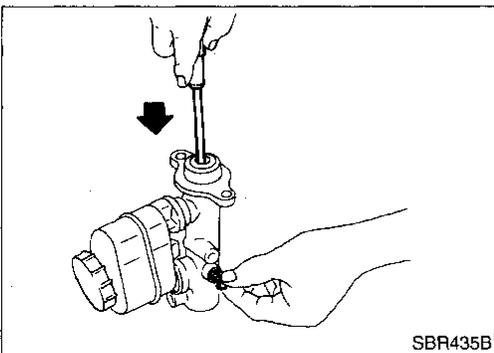
1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
3. Remove brake pipe flare nuts.
4. Remove master cylinder mounting nuts.

## Disassembly

1. Bend claws of stopper cap outward.



2. Remove valve stopper while piston is pushed into cylinder. (Models with ABS only)



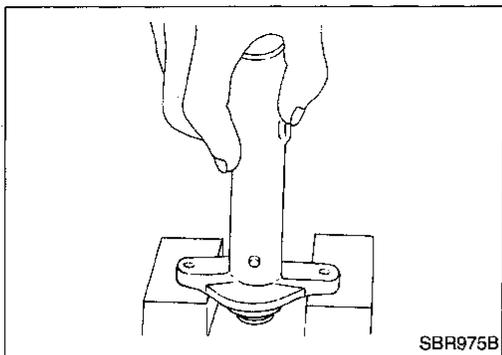
## MASTER CYLINDER

### Disassembly (Cont'd)

3. Remove piston assemblies.

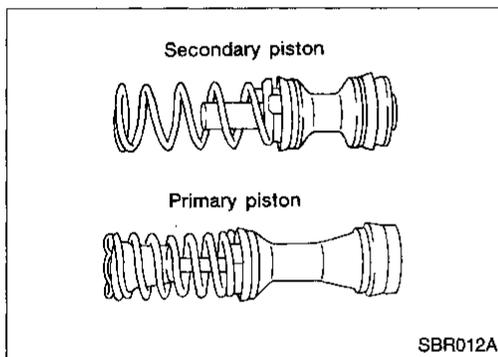
If it is difficult to remove secondary piston assembly, tap flange with mallet or equivalent and pull out secondary piston.

4. Draw out reservoir tank.



### Inspection

Check master cylinder inner wall for pin holes or scratches. Replace if damaged.

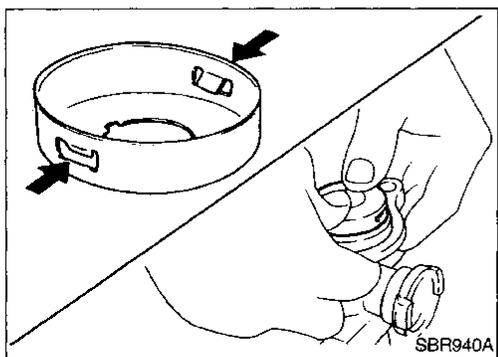
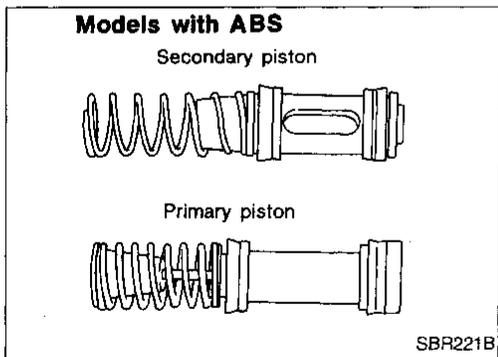


### Assembly

1. Insert secondary piston assembly. Then insert primary piston assembly.

● Pay attention to direction of piston cups in figure at left. Also, insert pistons squarely to avoid scratches on cylinder bore.

● Pay attention to alignment of secondary piston slit with valve stopper mounting hole of cylinder body (For models with ABS only).



2. Install stopper cap.

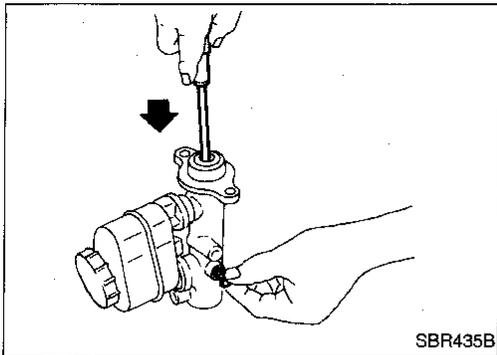
Before installing stopper cap, ensure that claws are bent inward.

3. Push reservoir tank seals.

4. Push reservoir tank into master cylinder.

## MASTER CYLINDER

### Assembly (Cont'd)



5. Install valve stopper while piston is pushed into cylinder.  
(Models with ABS only)

### Installation

#### CAUTION:

- Refill with new brake fluid "DOT 3".
  - Never reuse drained brake fluid.
1. Place master cylinder onto brake booster and secure mounting nuts lightly.
  2. Fit flare nuts to master cylinder.
  3. Tighten mounting nuts.  
⚙️: 8 - 11 N·m (0.8 - 1.1 kg-m, 5.8 - 8.0 ft-lb)
  4. Tighten flare nuts.  
⚙️: 15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
  5. Bleed air. Refer to BR-5.

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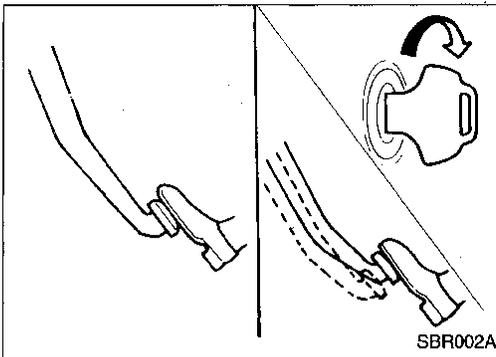
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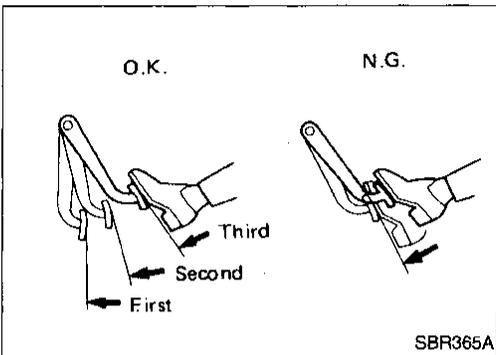
# BRAKE BOOSTER



## On-vehicle Service

### OPERATING CHECK

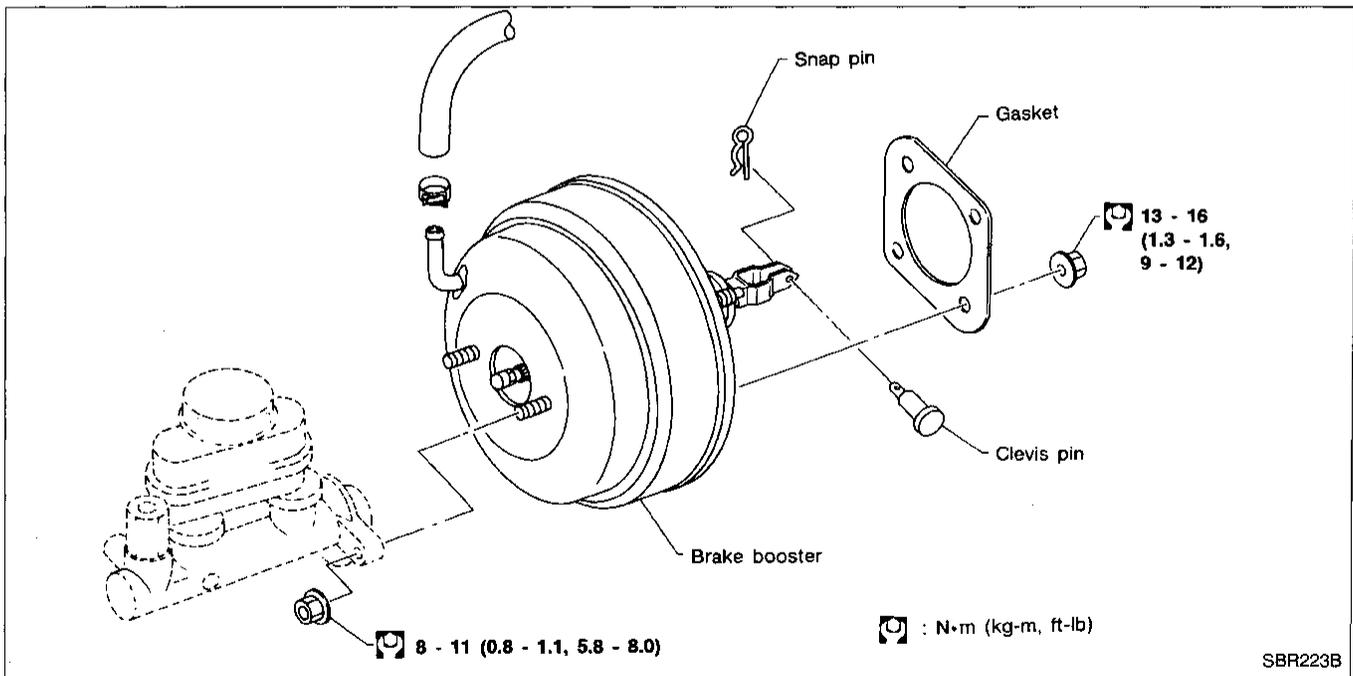
- Depress brake pedal several times with engine off, and check that there is no change in pedal stroke.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.



### AIRTIGHT CHECK

- Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. If pedal goes further down the first time and gradually rises after second or third time, booster is airtight.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. If there is no change in pedal stroke after holding pedal down **30 seconds**, brake booster is airtight.

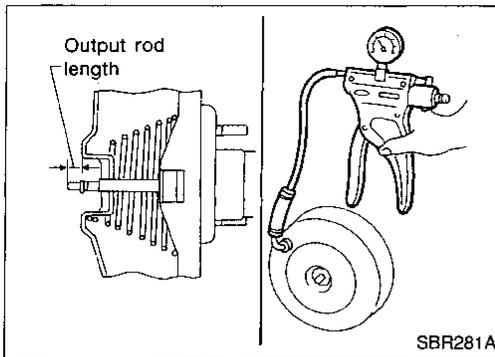
## Removal



### CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Be careful not to deform or bend brake pipes, during removal of booster.
- It is necessary to remove ABS actuator and actuator bracket first because space around booster is limited.

# BRAKE BOOSTER



## Inspection

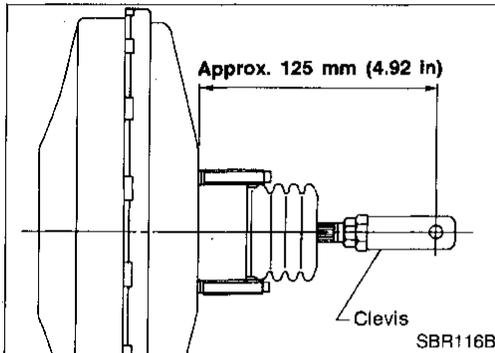
### OUTPUT ROD LENGTH CHECK

1. Apply vacuum of  $-66.7$  kPa ( $-500$  mmHg,  $-19.69$  inHg) to brake booster with a handy vacuum pump.
2. Check output rod length.

**Specified length:**

**10.275 - 10.525 mm (0.4045 - 0.4144 in)**

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BR  
ST  
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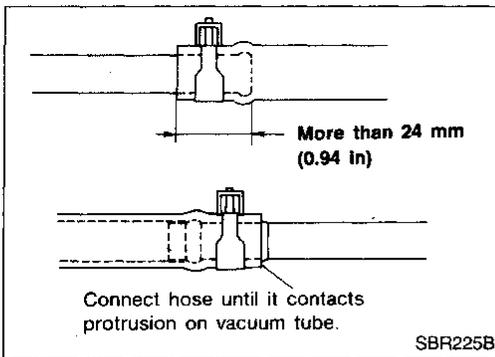
## Installation

### CAUTION:

- Be careful not to deform or bend brake pipes, during installation of booster.
- Replace clevis pin if damaged.
- Refill with new brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Take care not to damage brake booster mounting bolt thread when installing. Due to the acute angle of installation, the threads can be damaged on the metal surrounding the dash panel holes.

1. Before fitting booster, temporarily adjust clevis to dimension shown.
2. Fit booster, then secure mounting nuts (brake pedal bracket to brake booster) lightly.
3. Connect brake pedal and booster input rod with clevis pin.
4. Secure mounting nuts.  
**Torque: 13 - 16 N·m (1.3 - 1.6 kg-m, 9 - 12 ft-lb)**
5. Install master cylinder. Refer to BR-13.
6. Bleed air. Refer to BR-5.

# VACUUM HOSE

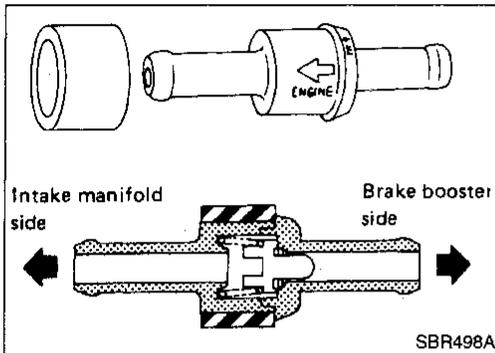


## Removal and Installation

### CAUTION:

When installing vacuum hoses, pay attention to the following points.

- Do not apply any oil or lubricants to vacuum hose and check valve.
- Insert vacuum tube into vacuum hose as shown.

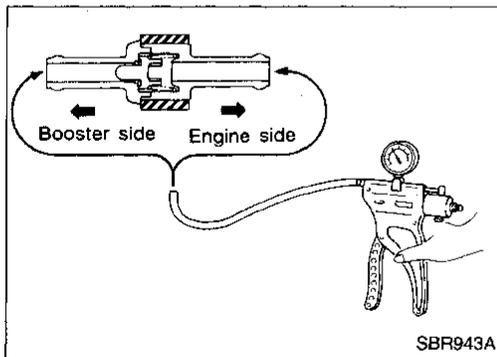


- Install check valve, paying attention to its direction.

## Inspection

### HOSES AND CONNECTORS

Check vacuum lines, connections and check valve for airtightness, improper attachment, chafing and deterioration.



### CHECK VALVE

Check vacuum with a vacuum pump.

Connect to booster side	Vacuum should exist.
Connect to engine side	Vacuum should not exist.

## Pad Replacement

### WARNING:

Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.

### CAUTION:

- When cylinder body is open, do not depress brake pedal or piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.
- If shims are rusted or show peeling of the rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.

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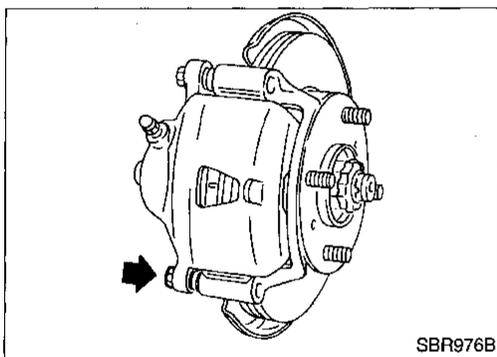
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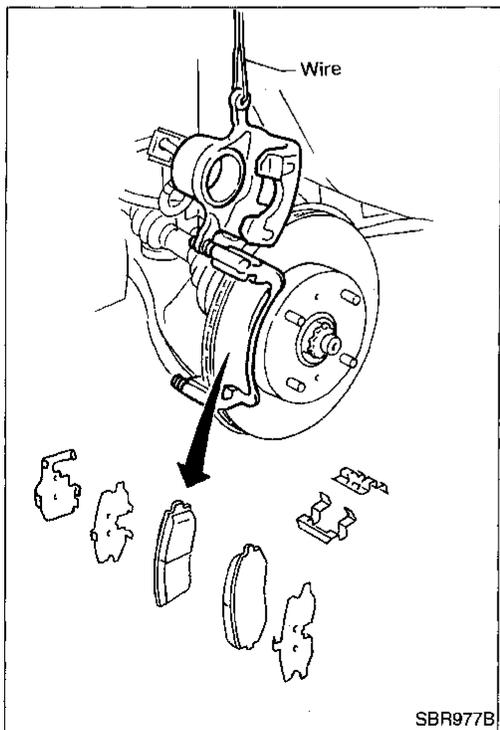
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1. Remove master cylinder reservoir cap.
2. Remove lower pin bolt.



3. Open cylinder body upward. Then remove pad retainers and inner and outer shims.

**Standard pad thickness:**

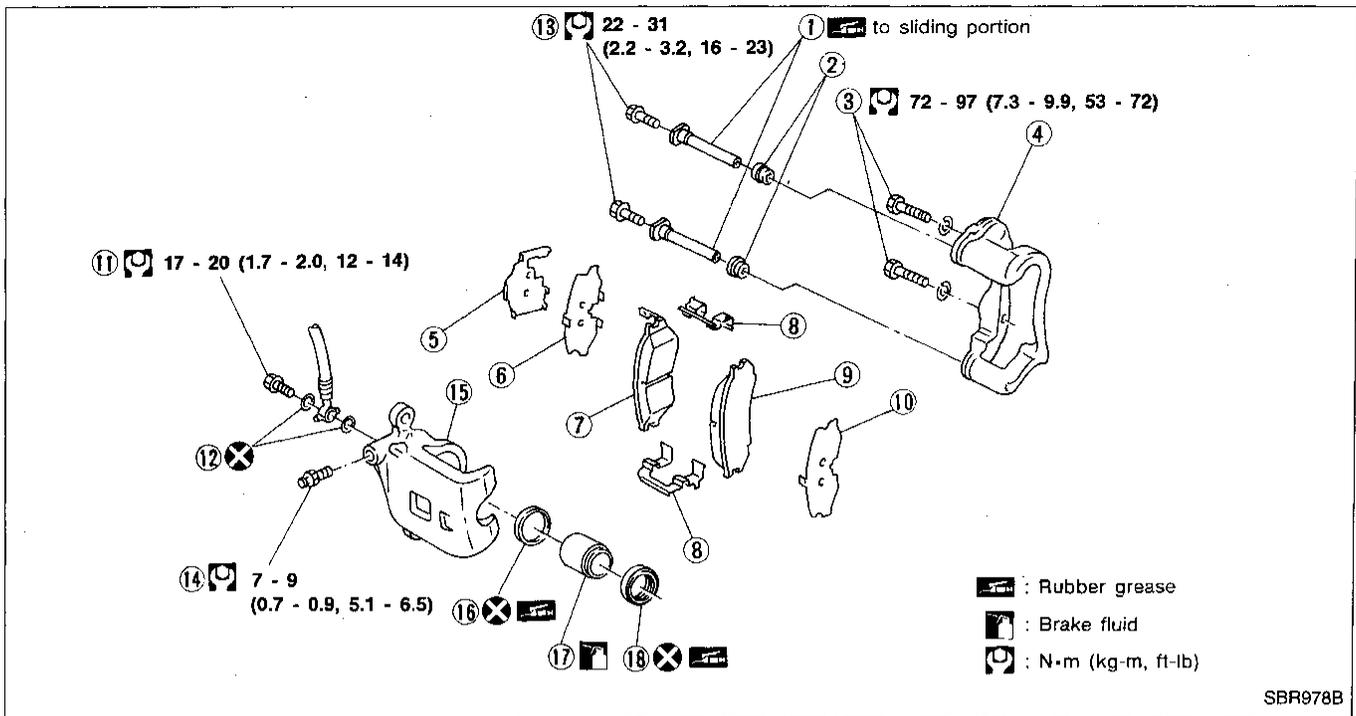
11.0 mm (0.433 in)

**Pad wear limit:**

2.0 mm (0.079 in)

- Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.

# FRONT DISC BRAKE

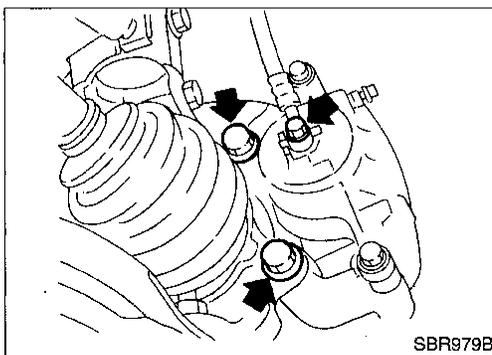


- |                             |                   |                 |
|-----------------------------|-------------------|-----------------|
| ① Main pin                  | ⑦ Inner pad       | ⑬ Main pin bolt |
| ② Pin boot                  | ⑧ Pad retainer    | ⑭ Bleed valve   |
| ③ Torque member fixing bolt | ⑨ Outer pad       | ⑮ Cylinder body |
| ④ Torque member             | ⑩ Outer shim      | ⑯ Piston seal   |
| ⑤ Shim cover                | ⑪ Connecting bolt | ⑰ Piston        |
| ⑥ Inner shim                | ⑫ Copper washer   | ⑱ Piston boot   |

## Removal

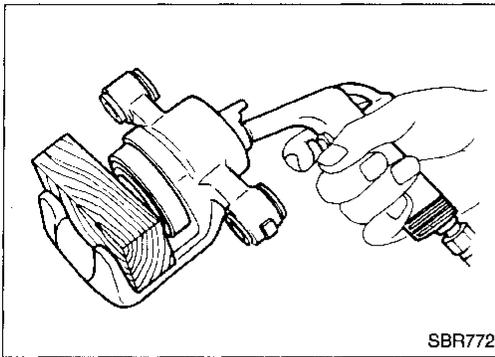
### WARNING:

Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.



Remove torque member fixing bolts and connecting bolt.

**It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.**



## Disassembly

### WARNING:

Do not place your fingers in front of piston.

### CAUTION:

Do not scratch or score cylinder wall.

1. Push out piston with dust seal with compressed air.
2. Remove piston seal with a suitable tool.

## Inspection — Caliper

### CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign objects. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign objects may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

### CAUTION:

Use brake fluid to clean. Never use mineral oil.

### PISTON

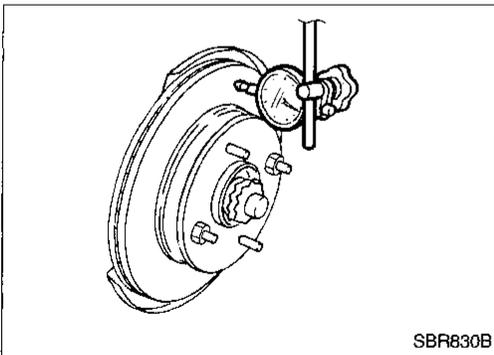
### CAUTION:

Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign objects are stuck to sliding surface.

Check piston for score, rust, wear, damage or presence of foreign objects. Replace if any of the above conditions are observed.

### SLIDE PIN, PIN BOLT AND PIN BOOT

Check for wear, cracks, rust or other damage. Replace if any of the above conditions are observed.



## Inspection — Rotor

### RUNOUT

1. Secure rotor to wheel hub with at least two nuts (M12 × 1.25).
2. Check runout using a dial indicator.

Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to section FA (“Front Wheel Bearing”, “ON-VEHICLE SERVICE”).

#### Maximum runout:

**0.07 mm (0.0028 in)**

3. If the runout is out of specification, find minimum runout position as follows:
  - a. Remove nuts and rotor from wheel hub.
  - b. Shift the rotor one hole and secure rotor to wheel hub with nuts.
  - c. Measure runout.
  - d. Repeat steps a. to c. so that minimum runout position can be found.
4. If the runout is still out of specification, turn rotor with on-car brake lathe (“MAD, DL-8700”, “AMMCO 700 and 705” or equivalent).

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## FRONT DISC BRAKE

### Inspection — Rotor (Cont'd)

#### THICKNESS

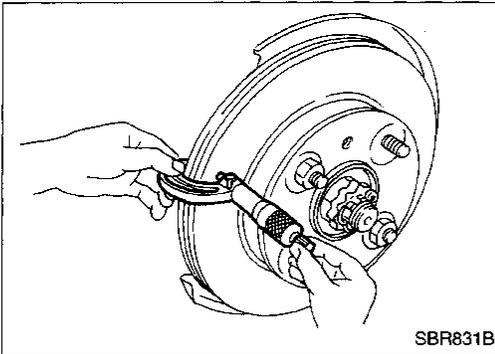
Thickness variation (At least 8 positions):

Maximum 0.01 mm (0.0004 in)

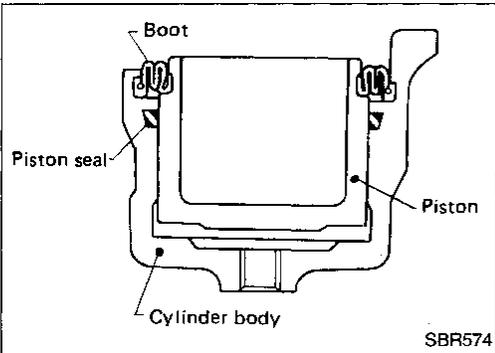
If thickness variation exceeds the specification, turn rotor with on-car brake lathe.

**Rotor repair limit:**

20.0 mm (0.787 in)



SBR831B



SBR574

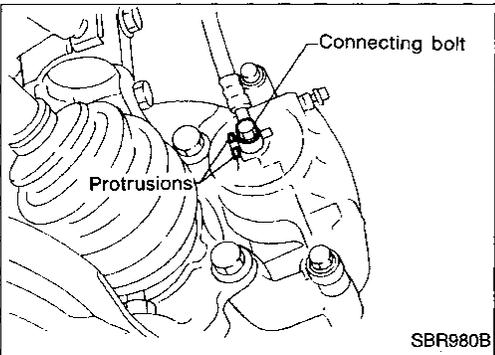
### Assembly

1. Insert piston seal into groove on cylinder body.
2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.
3. Properly secure piston boot.

### Installation

#### CAUTION:

- Refill with new brake fluid "DOT 3".
  - Never reuse drained brake fluid.
1. Install caliper assembly.
  2. Install brake hose to caliper securely.
  3. Install all parts and secure all bolts.
  4. Bleed air. Refer to BR-5.



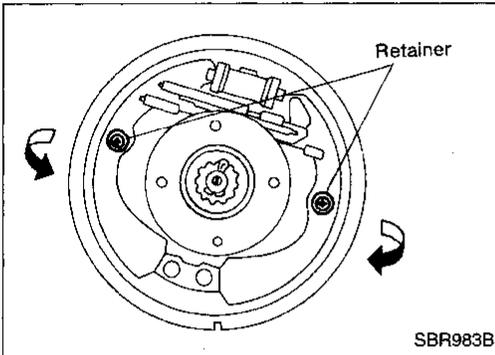
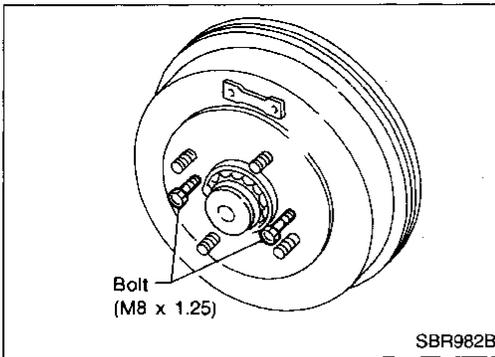
SBR980B



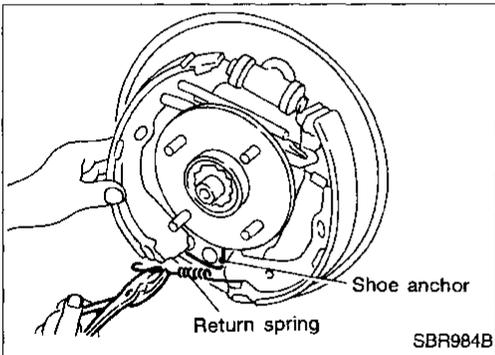
## REAR DRUM BRAKE

### Removal (Cont'd)

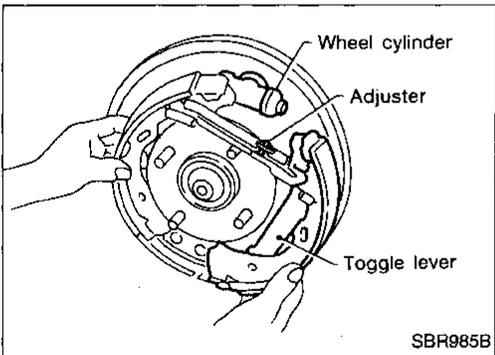
- b. Tighten the two bolts gradually.



2. Push in shoe hold-down pins from behind the back plate. While pushing in the retainer, turn it and remove the shoe hold-down pins.
3. Pull out brake shoes in the direction of the arrows as illustrated.

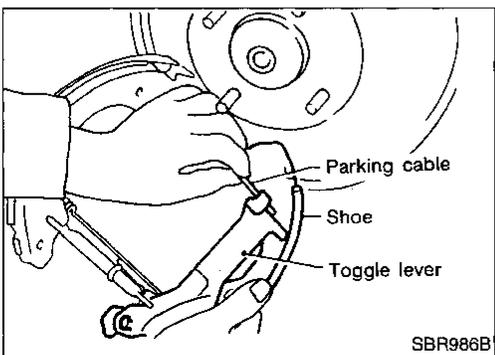


4. Using pliers, remove the lower return spring from shoe.



5. Separate shoes, one at a time, from wheel cylinder, and remove them from back plate with the adjuster assembly still on as shown.

**Be careful not to scratch or damage wheel cylinder boot.**

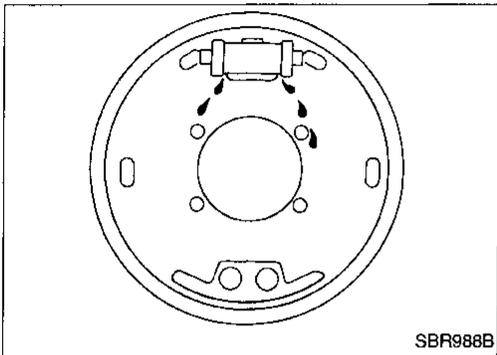
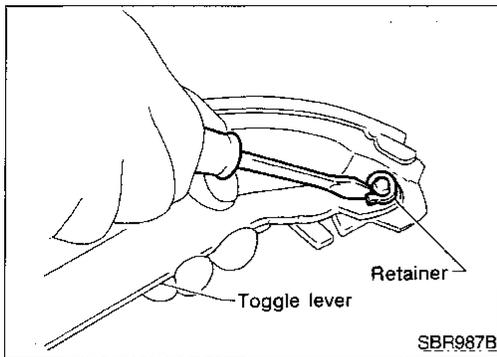


6. Disconnect parking brake cable from toggle lever.  
**Be careful not to damage parking brake cable when separating it.**
7. Remove adjuster return spring and shoe return spring.

# REAR DRUM BRAKE

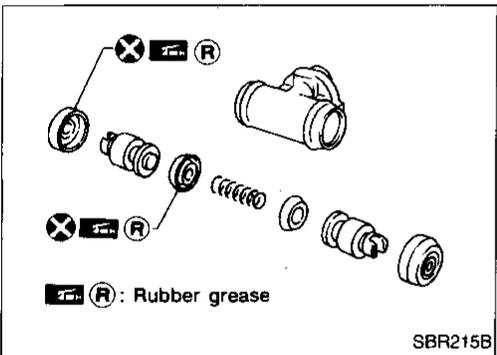
## Removal (Cont'd)

8. Remove retainer ring with a suitable tool. Then separate toggle lever and brake shoe.



## Inspection — Wheel Cylinder

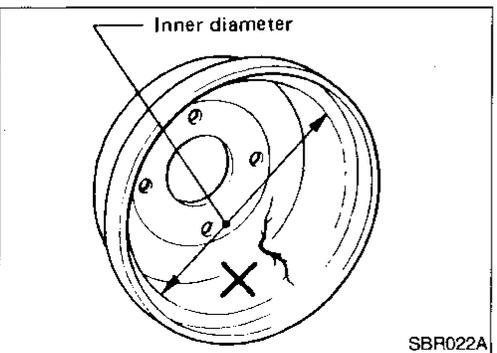
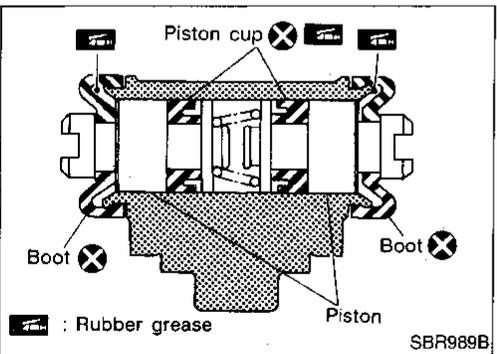
- Check wheel cylinder for leakage.
- Check for wear, damage and loose conditions. Replace if any such condition exists.



## Wheel Cylinder Overhaul

Check all internal parts for wear, rust and damage. Replace if necessary.

Pay attention so as not to scratch cylinder when installing pistons.



## Inspection — Drum

**Maximum inner diameter:**

**230 mm (9.06 in)**

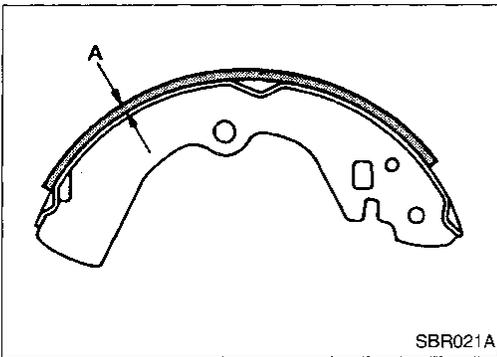
**Out-of-roundness:**

**0.03 mm (0.0012 in) or less**

- Contact surface should be fine finished with No. 120 to 150 emery paper.
- Using a drum lathe, lathe brake drum if it shows scoring, partial wear or stepped wear.
- After brake drum has been completely reconditioned or replaced, check drum and shoes for proper contact pattern.

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# REAR DRUM BRAKE



## Inspection — Lining

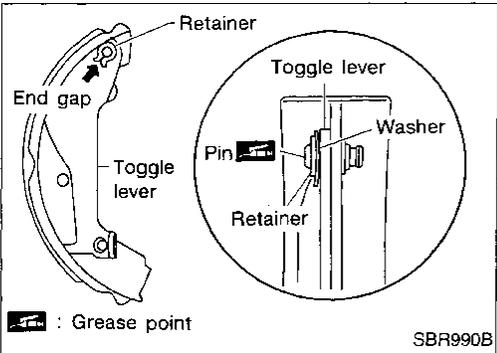
Check lining thickness.

**Standard lining thickness:**

4.1 mm (0.161 in)

**Lining wear limit (A):**

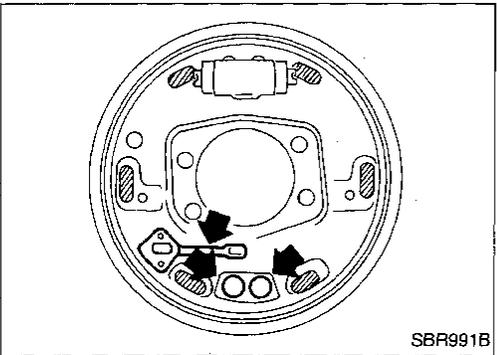
1.5 mm (0.059 in)



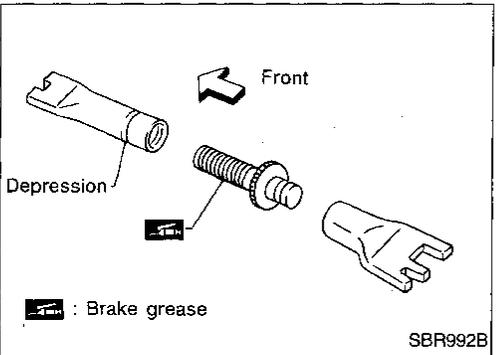
## Installation

**Always perform shoe clearance adjustment. Refer to BR-34.**

1. Fit toggle lever to brake shoe with retainer ring.



2. Apply brake grease to the contact areas shown at left.

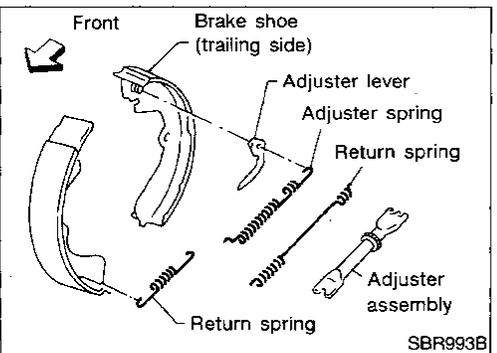


3. Shorten adjuster by rotating it.

● **Pay attention to direction of adjuster.**

Wheel	Screw	Depression
Left	Left-hand thread	Yes
Right	Right-hand thread	No

4. Apply brake grease to adjuster as shown.

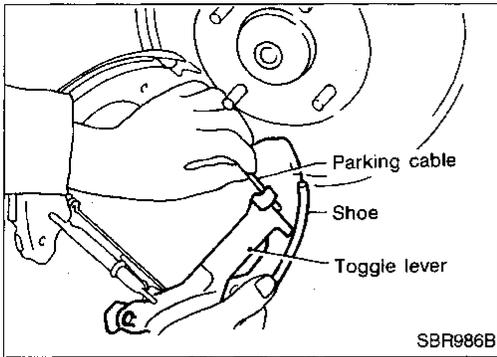


5. Install adjuster and adjuster lever; then install upper return spring and adjuster spring as shown.

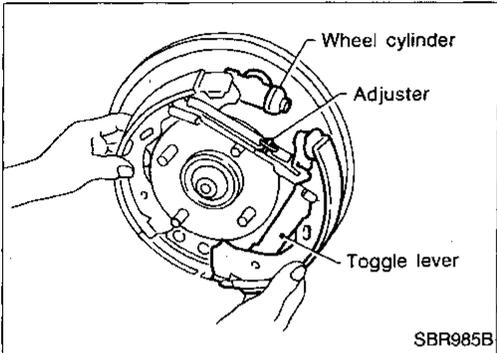
## REAR DRUM BRAKE

### Installation (Cont'd)

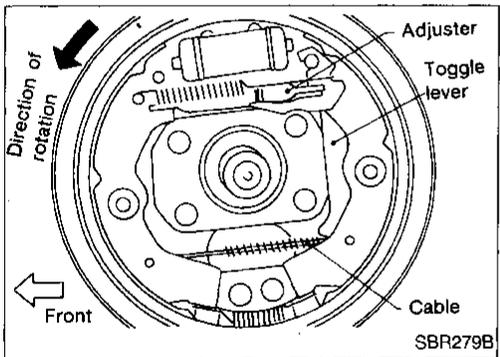
6. Connect parking brake cable to toggle lever.  
**Be careful not to damage brake cable.**



7. Install shoes on wheel cylinder one at a time.  
**Do not allow the piston to spring away when assembling.**
8. Install lower return spring.



9. Secure shoe installation with shoe hold-down pins and retainer.
10. Check to make sure all parts are installed properly.  
**Pay attention to direction of adjuster assembly.**
11. Install brake drum.
12. When installing new wheel cylinder, bleed air. Refer to BR-5.
13. Adjust parking brake. Refer to BR-34.



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# REAR DISC BRAKE

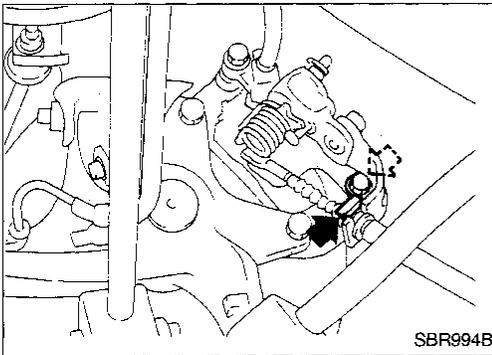
## Pad Replacement

### WARNING:

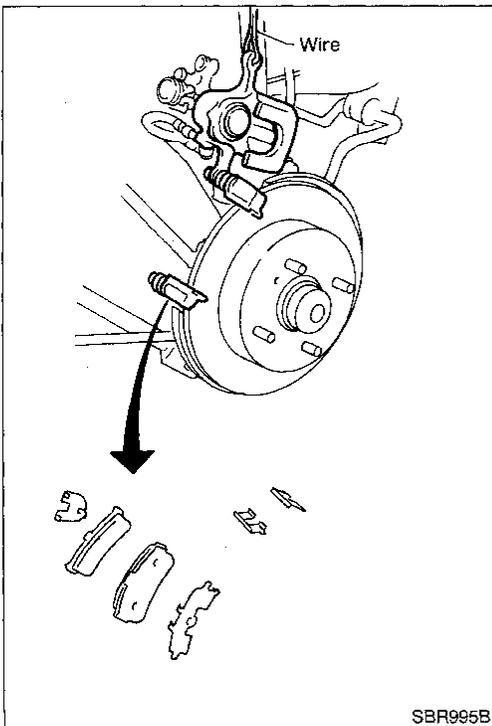
Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.

### CAUTION:

- When cylinder body is open, do not depress brake pedal, or piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.
- If shims are rusted or show peeling of rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
- Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.



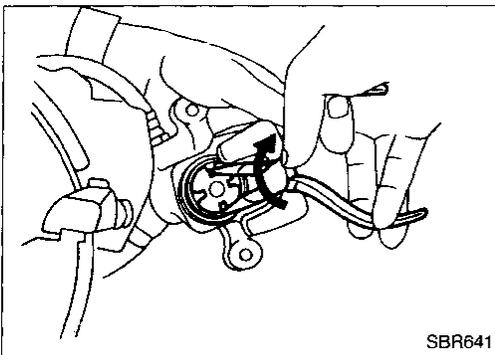
1. Remove master cylinder reservoir cap.
2. Remove brake cable lock spring.
3. Disconnect cable.
4. Remove lower pin bolt.



5. Open cylinder body upward. Then remove pad retainers, and inner and outer shims.  
**Standard pad thickness:**  
10 mm (0.39 in)  
**Pad wear limit:**  
1.5 mm (0.059 in)

# REAR DISC BRAKE

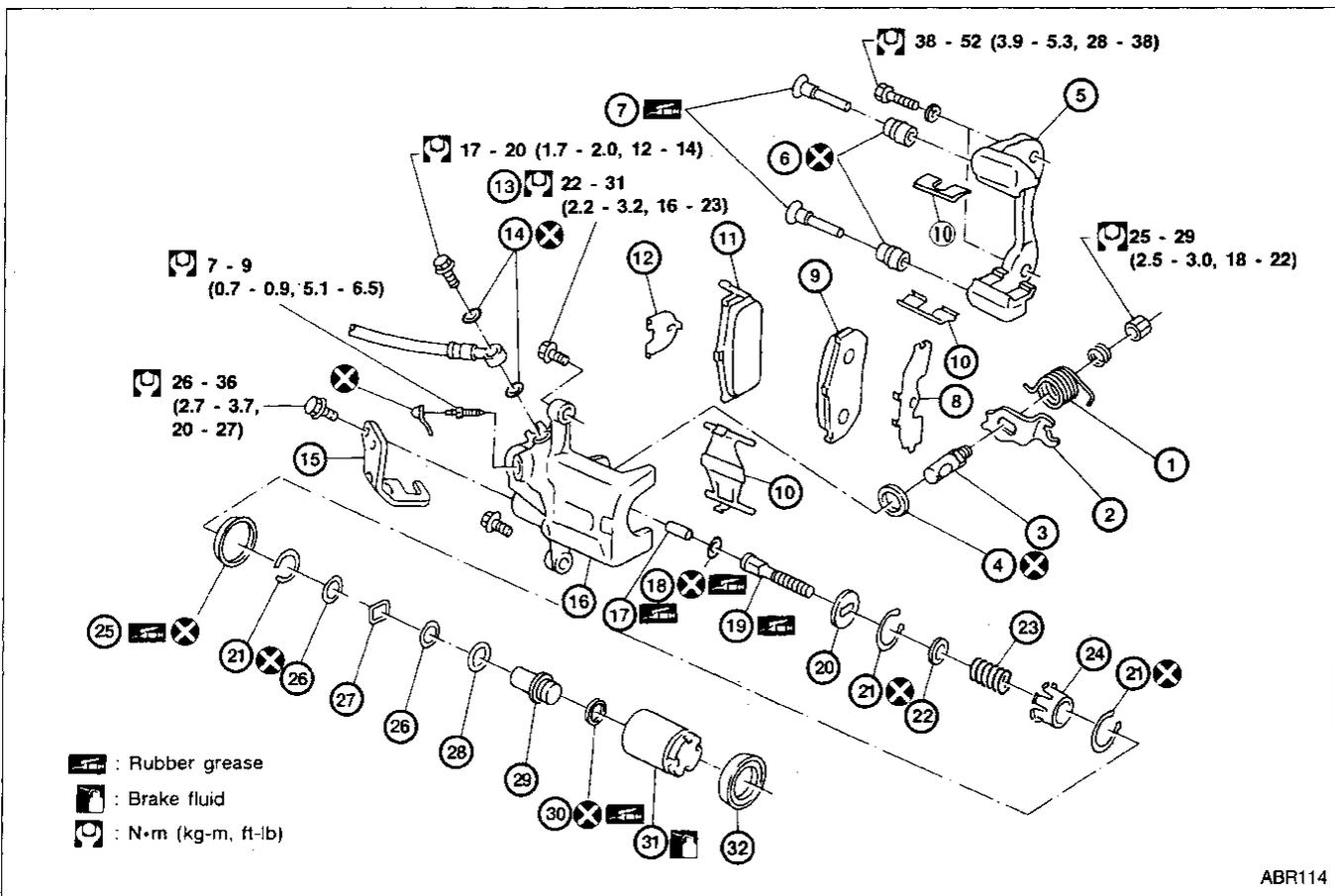
## Pad Replacement (Cont'd)



6. When installing new pads, push piston into cylinder body by turning piston clockwise.

Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.

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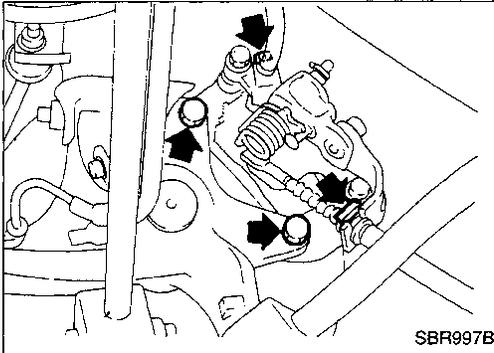
- |                 |                 |                |
|-----------------|-----------------|----------------|
| ① Spring        | ⑫ Inner shim    | ⑳ Spring       |
| ② Toggle lever  | ⑬ Pin bolt      | ㉑ Spring cover |
| ③ Cam           | ⑭ Copper washer | ㉒ Piston seal  |
| ④ Cam boot      | ⑮ Cable guide   | ㉓ Spacer       |
| ⑤ Torque member | ⑯ Cylinder      | ㉔ Wave washer  |
| ⑥ Pin boot      | ⑰ Strut         | ㉕ Bearing      |
| ⑦ Side pin      | ⑱ O-ring        | ㉖ Adjuster nut |
| ⑧ Outer shim    | ㉒ Push rod      | ㉗ Piston cup   |
| ⑨ Outer pad     | ㉓ Key plate     | ㉘ Piston       |
| ⑩ Pad retainer  | ㉔ Snap ring     | ㉙ Piston boot  |
| ⑪ Inner pad     | ㉕ Spring seat   |                |

# REAR DISC BRAKE

## Removal

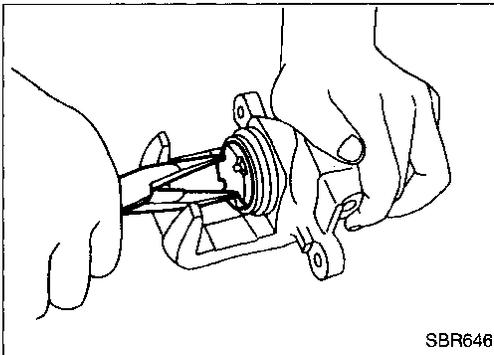
### WARNING:

Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.



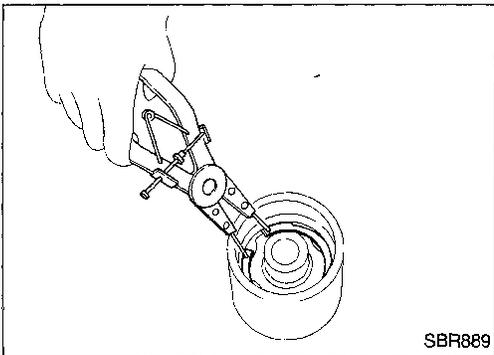
1. Remove brake cable mounting bracket bolt and lock spring.
2. Remove torque member fixing bolts and connecting bolt.

**It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.**

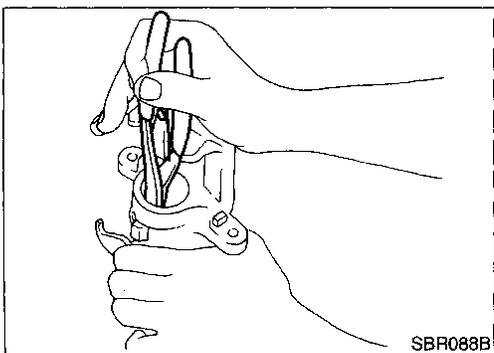


## Disassembly

1. Remove piston by turning it counterclockwise with suitable long nose pliers.



2. Pry off snap ring from piston with suitable pliers and remove adjusting nut.



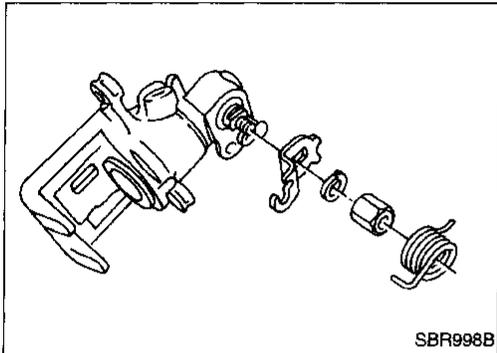
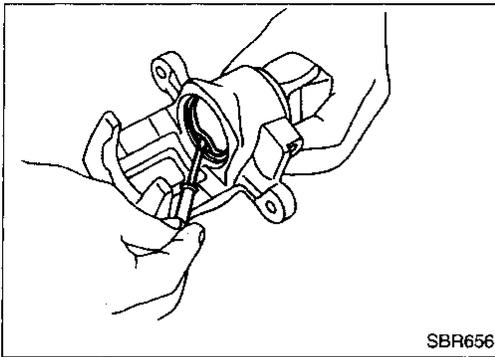
3. Disassemble cylinder body.
  - a. Pry off snap ring with suitable pliers, then remove spring cover, spring and seat.
  - b. Pry off snap ring, then remove key plate, push rod and strut.

## REAR DISC BRAKE

### Disassembly (Cont'd)

c. Remove piston seal.

**Be careful not to damage cylinder body.**



4. Remove return spring and toggle lever.

### Inspection — Caliper

#### CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign objects. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign objects may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

#### CAUTION:

Use brake fluid to clean cylinder. Never use mineral oil.

#### PISTON

#### CAUTION:

**Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign objects are stuck to sliding surface.**

Check piston for score, rust, wear, damage or presence of foreign objects. Replace if any of the above conditions are observed.

#### SLIDE PIN, PIN BOLT AND PIN BOOT

Check for wear, cracks, rust or other damage. Replace if any of the above conditions are observed.

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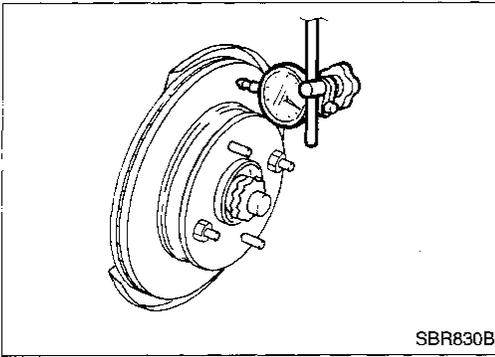
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## REAR DISC BRAKE



### Inspection — Rotor

#### RUNOUT

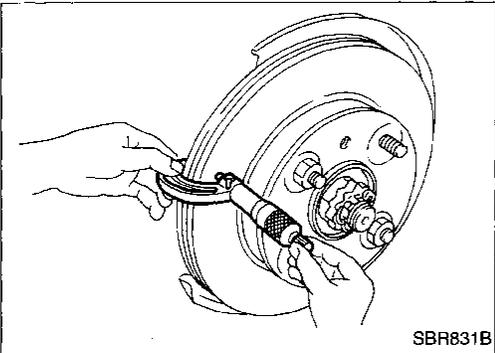
1. Secure rotor to wheel hub with two nuts (M12 x 1.25).
2. Check runout using a dial indicator.

**Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to section RA ("Rear Wheel Bearing", "ON-VEHICLE SERVICE").**

3. Change relative positions of rotor and wheel hub so that runout is minimized.

**Maximum runout :**

**0.07 mm (0.0028 in)**



#### THICKNESS

**Rotor repair limit:**

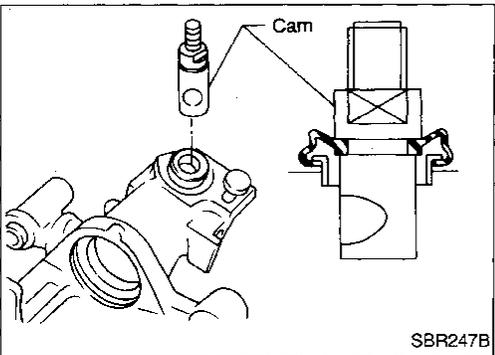
**Minimum thickness**

**8.0 mm (0.315 in)**

**Thickness variation (At least 8 portions)**

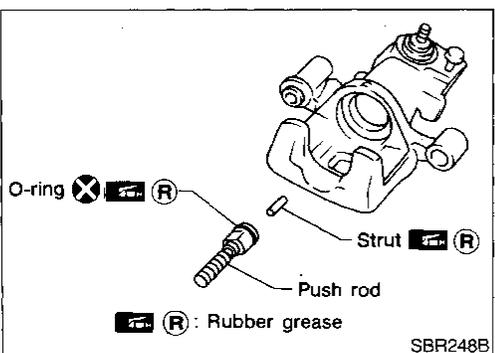
**Maximum 0.02 mm (0.0008 in)**

Replace rotor if any of the above do not meet the specifications.



#### Assembly

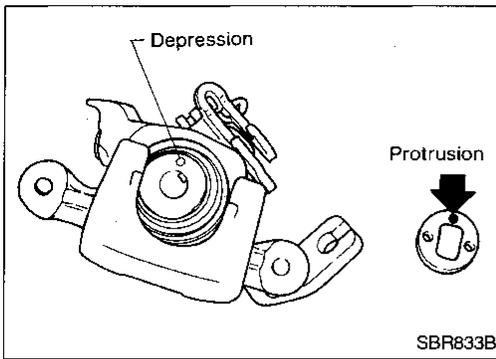
1. Insert cam with depression facing toward open end of cylinder.



2. Generously apply rubber grease to strut and push rod to make insertion easy.

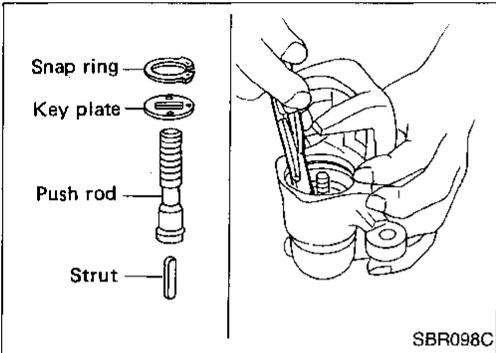
# REAR DISC BRAKE

## Assembly (Cont'd)



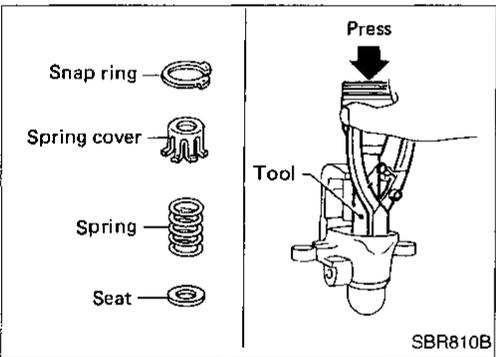
3. Mate protrusion on key plate with depression in cylinder bottom.

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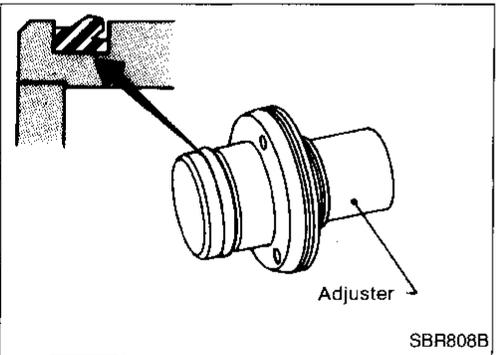
4. Install snap ring with a suitable tool.

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5. Install seat, spring, spring cover and snap ring with a suitable tool.

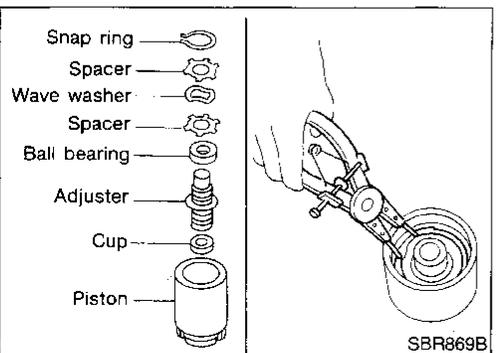
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6. Install cup in the specified direction.

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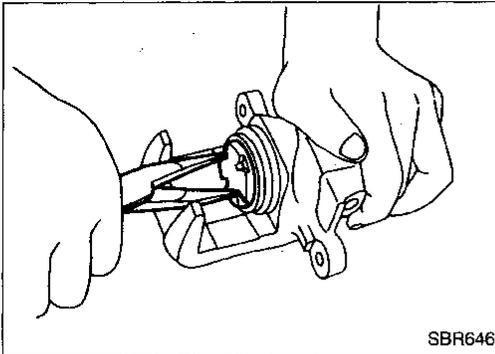


7. Install cup, adjuster, bearing, spacers, washers and snap ring with a suitable tool.

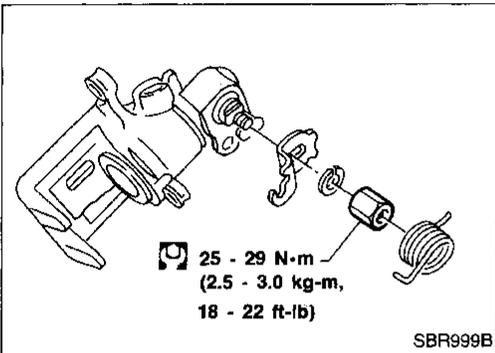
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## REAR DISC BRAKE

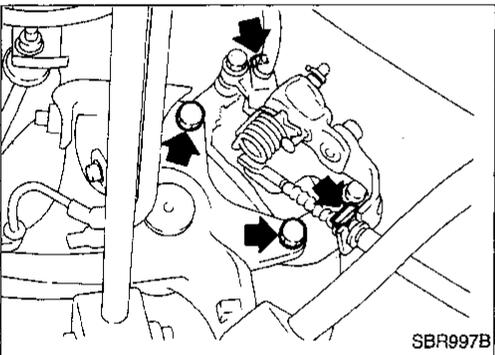
### Assembly (Cont'd)



8. Insert piston seal into groove on cylinder body.
9. With piston boot fitted to piston, insert piston boot into groove on cylinder body and fit piston by turning it clockwise with suitable long nose pliers.



10. Fit toggle lever and return spring.

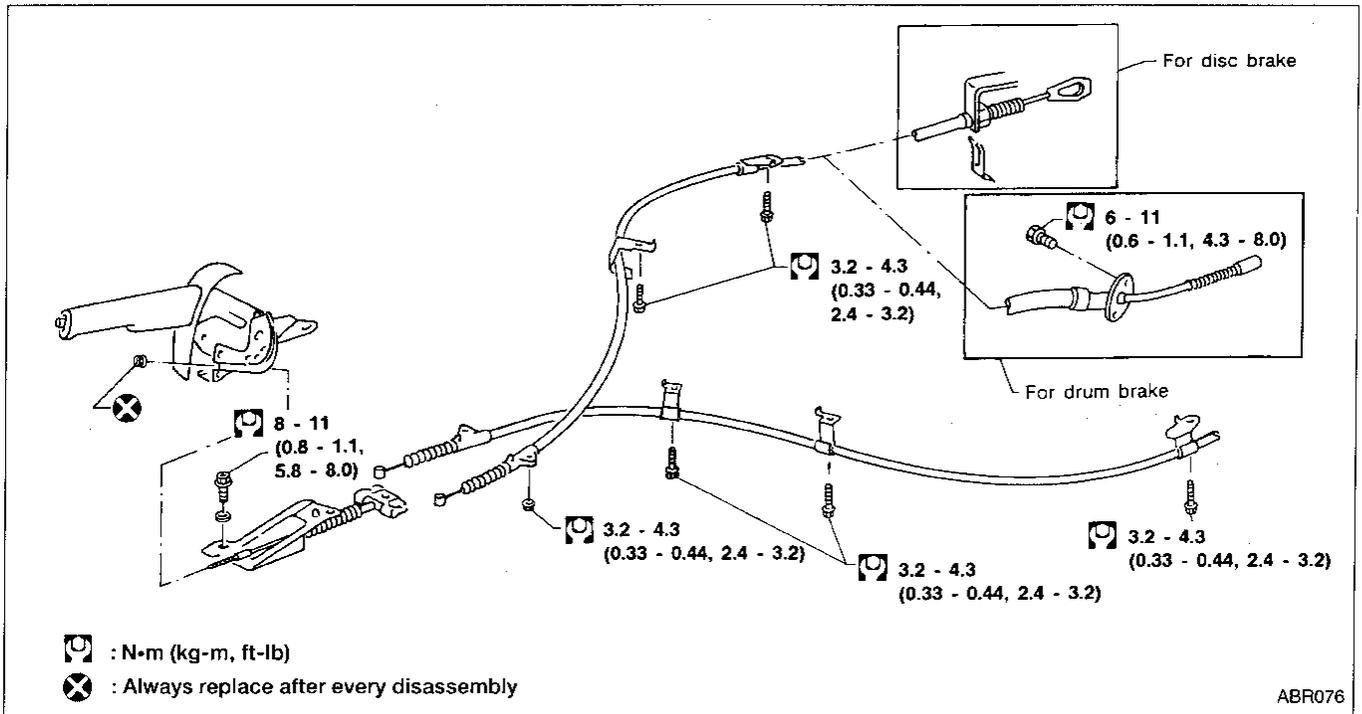


### Installation

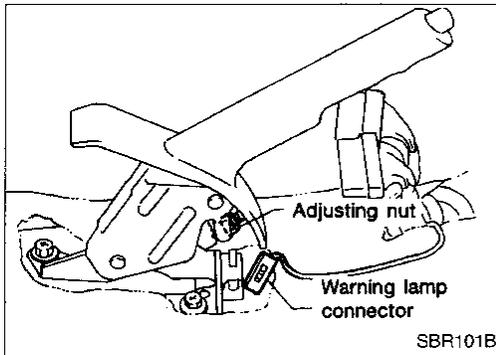
#### CAUTION:

- Refill with new brake fluid "DOT 3".
  - Never reuse drained brake fluid.
1. Install caliper assembly.
  2. Install brake hose to caliper securely.
  3. Install all parts and secure all bolts.
  4. Bleed air. Refer to BR-5.

# PARKING BRAKE CONTROL

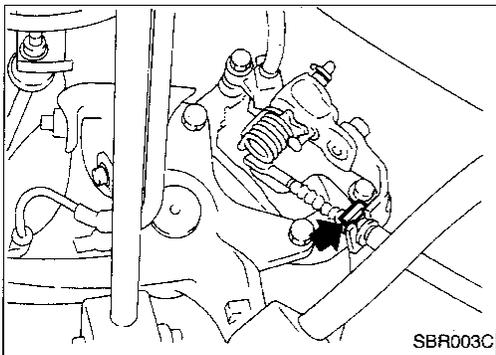


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## Removal and Installation

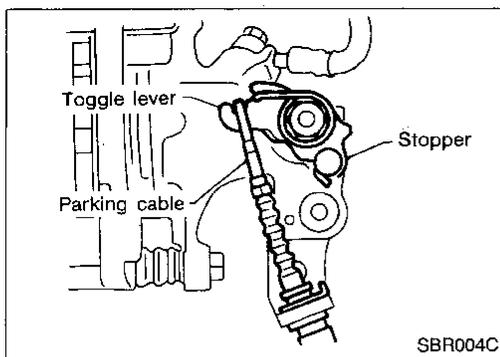
1. To remove parking brake cable, first remove center console.
2. Disconnect warning lamp connector.
3. Remove bolts, slacken off and remove adjusting nut.
4. Remove lock plate and disconnect cable (disc brake only). For drum brake models, refer to BR-21.



## Inspection

1. Check control lever for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Check warning lamp and switch. Replace if necessary.
4. Check parts at each connecting portion and, if deformed or damaged, replace.

## PARKING BRAKE CONTROL

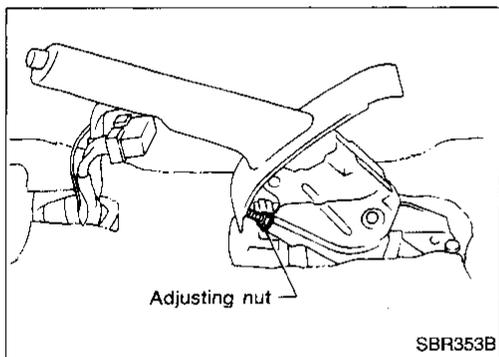


### Adjustment

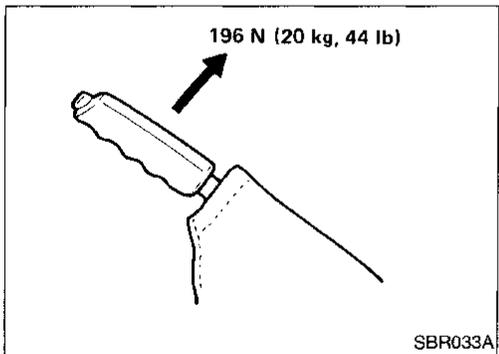
Before or after adjustment, pay attention to the following points.

- a. For rear disc brake be sure that toggle lever returns to stopper when parking brake lever is released.
- b. There is no drag when parking brake lever is released.

1. Adjust clearance between shoe and drum/pad and rotor as follows:
  - a. Release parking brake lever and loosen adjusting nut.
  - b. Depress brake pedal fully at least 10 times with engine running.



2. Pull control lever 4 - 5 notches. Then adjust control lever by turning adjusting nut.



3. Pull control lever with specified amount of force. Check lever stroke and ensure smooth operation.

#### Number of notches:

**Drum brake 7 - 8**  
**Disc brake 7 - 8**

4. Bend parking brake warning lamp switchplate so that brake warning lamp comes on when parking brake lever is pulled "A" notches.

**Number of "A" notches: 1 or less**

# ANTI-LOCK BRAKE SYSTEM

---

## Purpose

- Excessive braking in any condition (dry or wet) will adversely affect the normal turning of the vehicle's wheels and they may lock up.
- When the front wheels are locked, a vehicle cannot be controlled by the steering system.
- When the rear wheels are locked, the vehicle will enter a flat spin.

GI

MA

EM

LC

The ABS, by the use of electronic and hydraulic components, allows for control of braking force so that locking of the wheels can be avoided in the circumstances described above.

The ABS:

- 1) Ensures proper tracking performance through steering wheel operation.
- 2) Enables obstacles to be avoided through steering wheel operation.
- 3) Ensures vehicle stability by preventing flat spins.

EF &

EC

FE

CL

## Operation

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-Lock Brake System (ABS) has self-test capabilities. The system turns on the anti-lock warning light each time the engine is started. After the engine is started and the anti-lock warning light turns off, the system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs a self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the anti-lock warning light will come on.
- During ABS operation, a mechanical noise may be heard. This is a normal condition.

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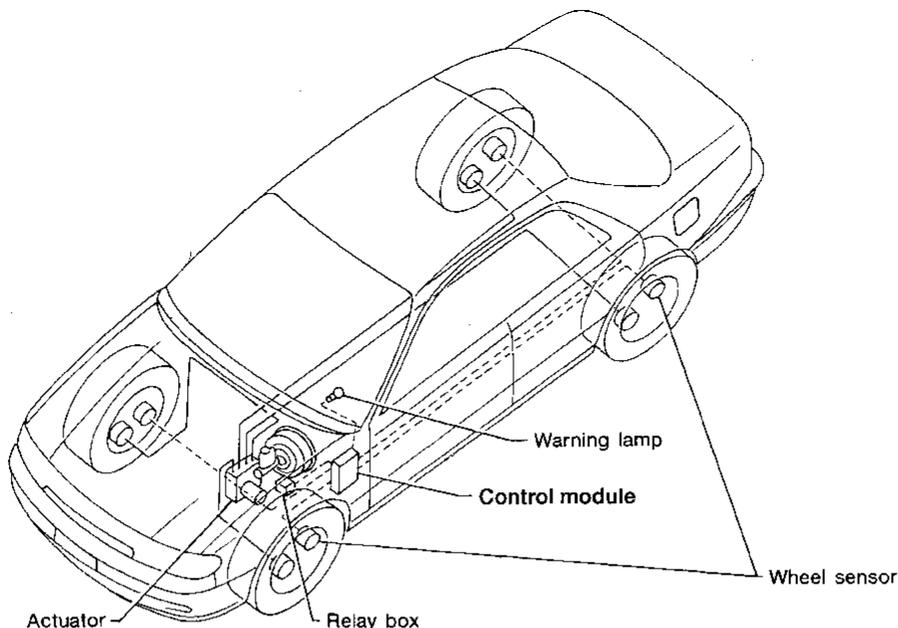
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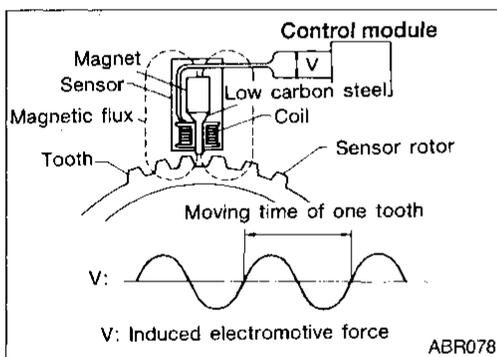
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# ANTI-LOCK BRAKE SYSTEM

## System Components



ABR077



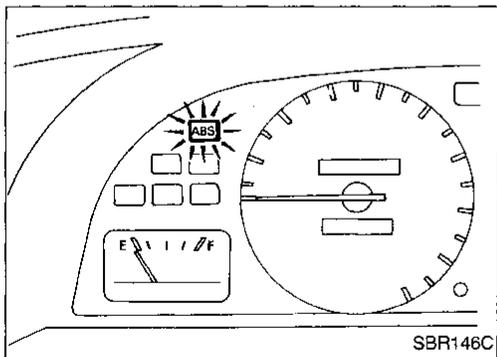
## System Description

### SENSOR

The sensor unit consists of a gear-shaped rotor and a sensor element which contains a bar magnet around which a coil is wound. The sensor is installed on the back side of the brake rotor. Sine-wave current is generated by the sensor as the wheel rotates. The frequency and voltage increase(s) as the rotating speed increases.

### CONTROL MODULE

The control module computes the rotating speed of the wheel by the signal current sent from the sensor, and supplies a DC current of about 5 amperes, about 2 amperes, or 0 amperes to the actuator solenoid valve provided for each wheel by changing its internal resistance. It also controls ON-OFF operation of the valve relay and pump relay. If any electrically detectable malfunction should occur in the system, the control module causes the warning lamp to light up. In this condition, the ABS will be deactivated by the control module, and the vehicle's braking system reverts to normal operation.



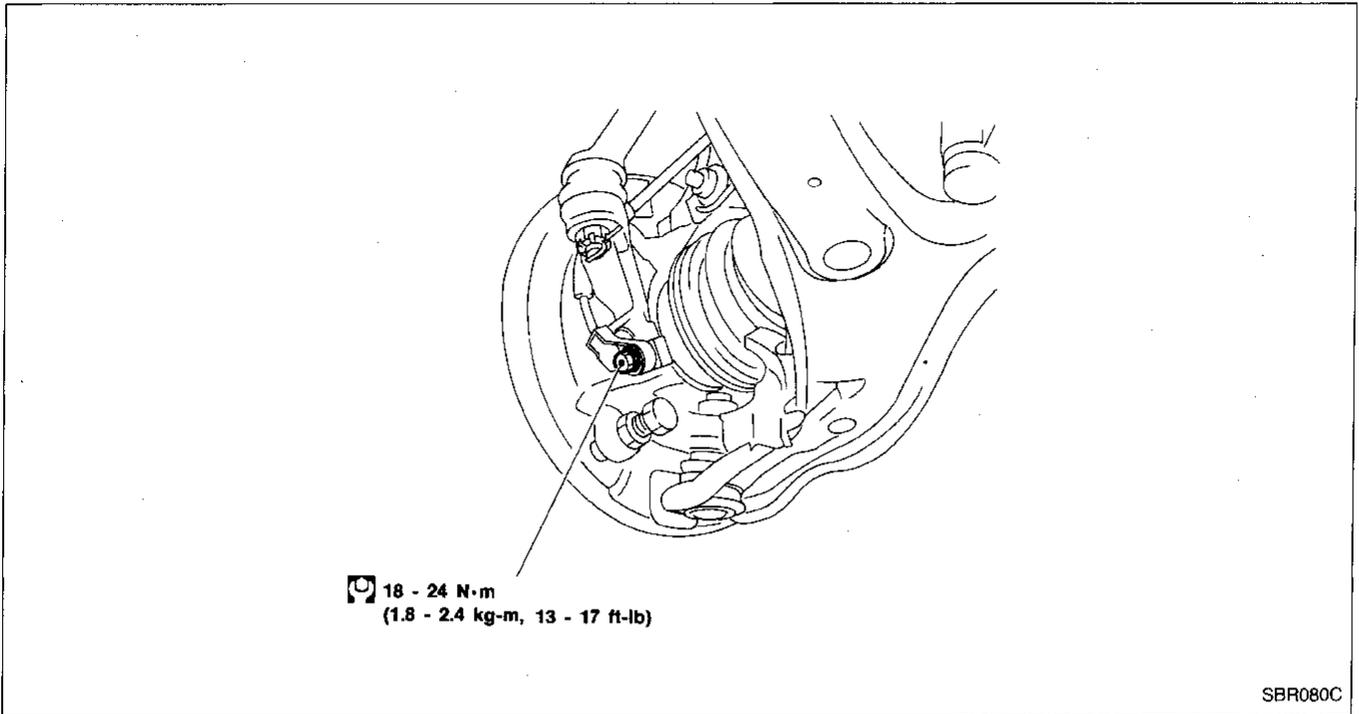
# ANTI-LOCK BRAKE SYSTEM

## Removal and Installation

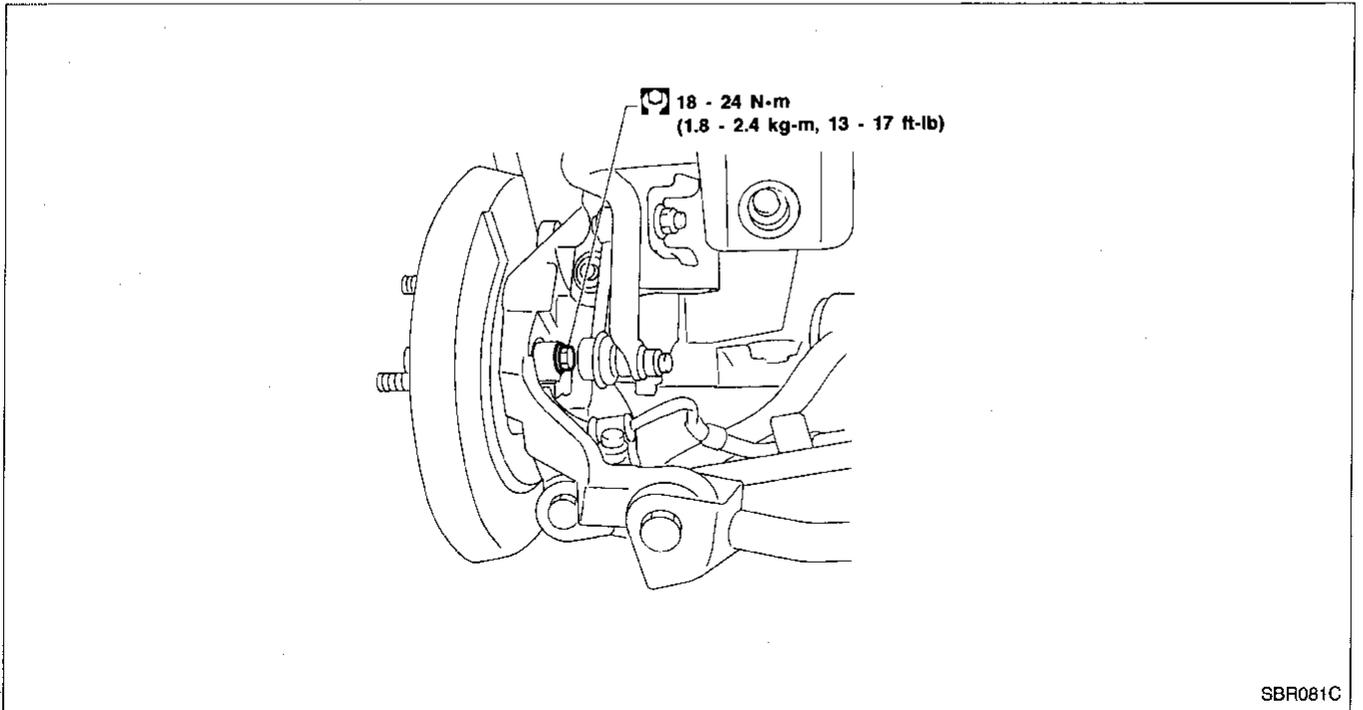
### CAUTION:

Be careful not to damage sensor edge and sensor rotor teeth.

### FRONT WHEEL SENSOR



### REAR WHEEL SENSOR



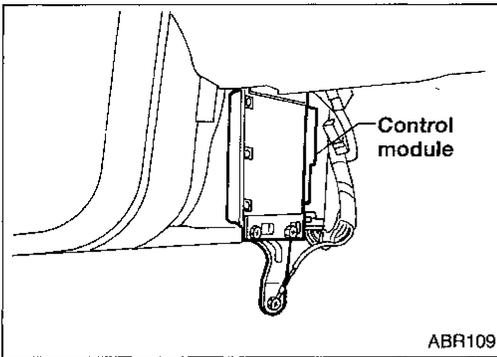
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# ANTI-LOCK BRAKE SYSTEM

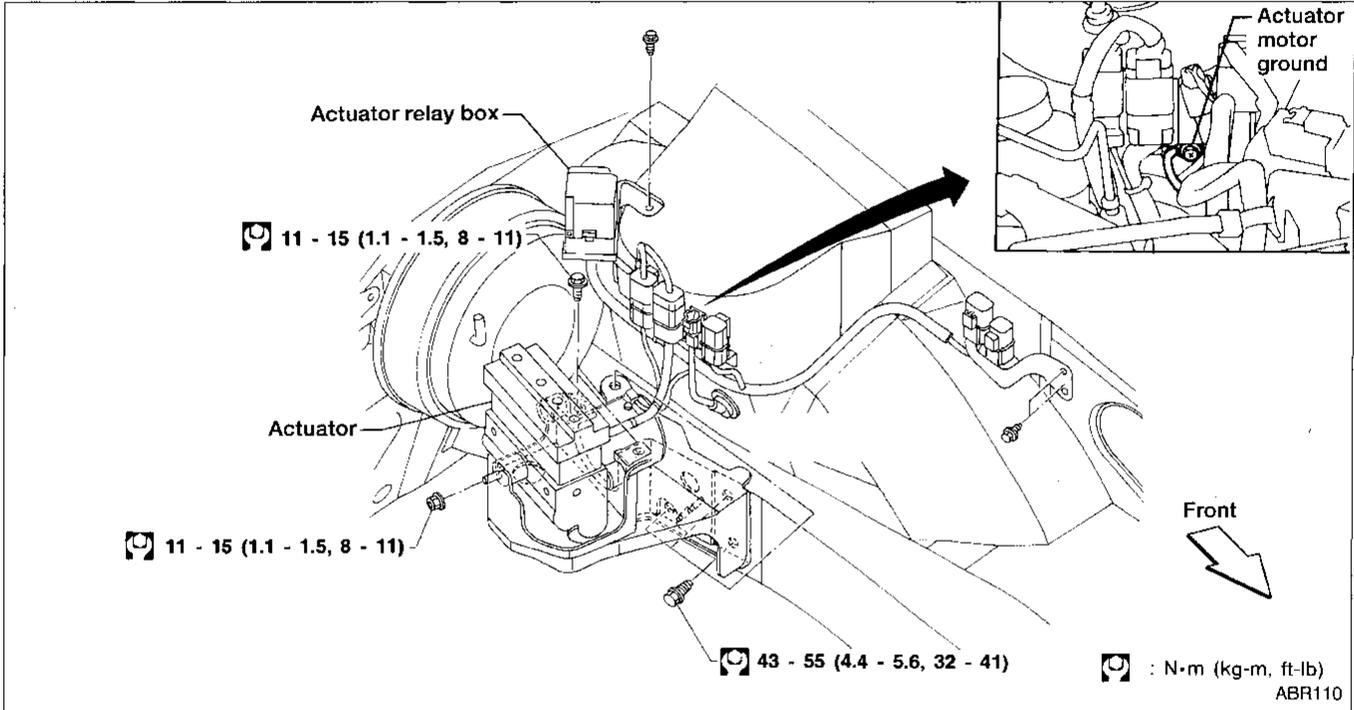
## Removal and Installation (Cont'd)

### CONTROL MODULE

Location: Driver side dash side lower.



### ACTUATOR

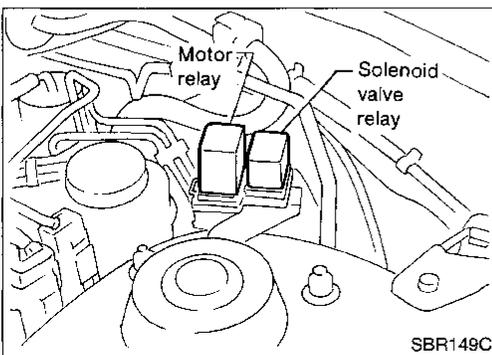


### CAUTION:

After installation, pay attention to the following points.

- Refill brake fluid and bleed air. Refer to BR-4 and BR-5, respectively.

1. Remove actuator relay assembly.
2. Drain brake fluid. Remove master cylinder.
3. Remove actuator.



### ACTUATOR RELAYS

Large: MOTOR RELAY

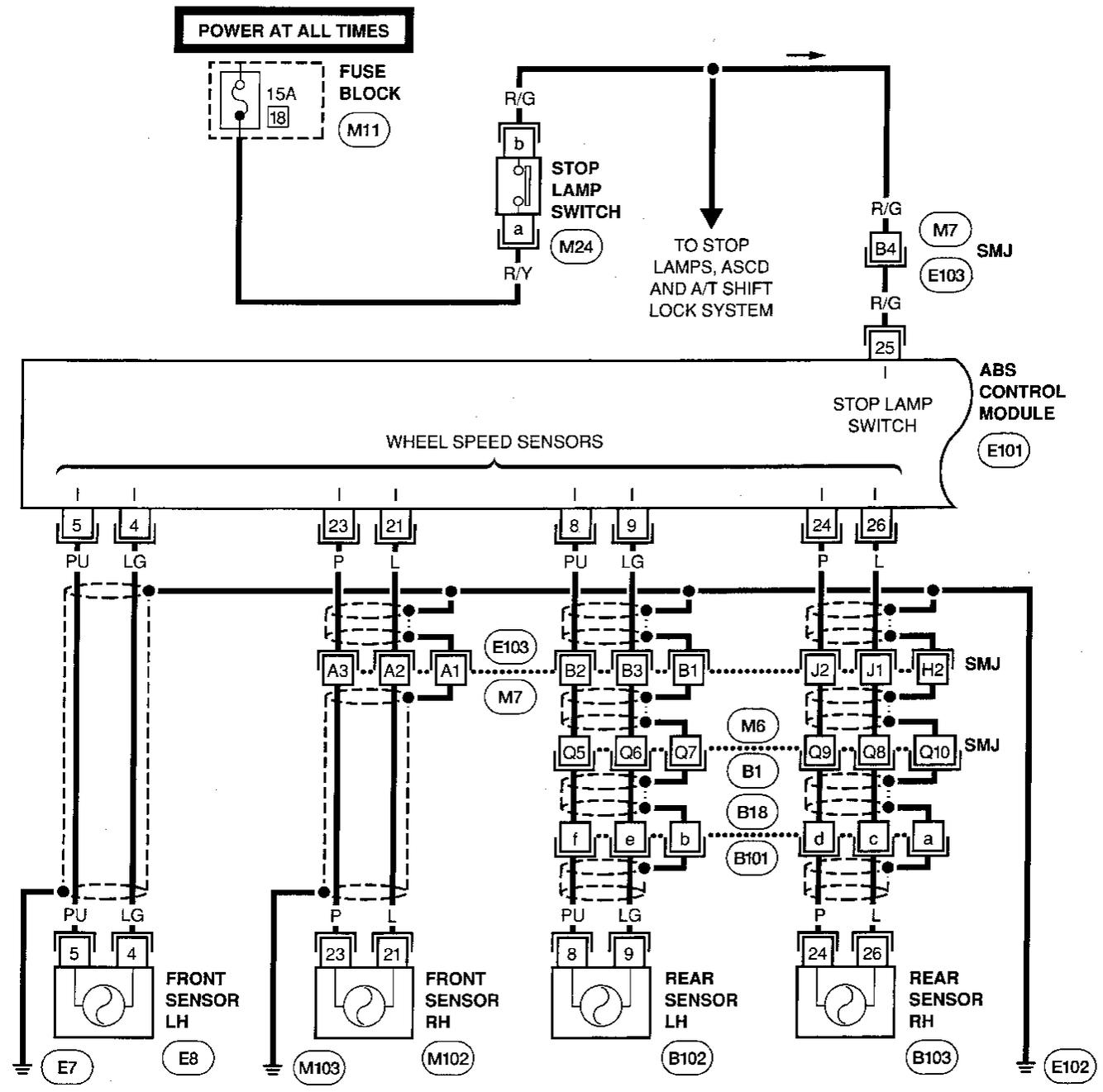
Small: SOLENOID VALVE RELAY

1. Disconnect battery cable.
2. Remove actuator relay cover.

It is not necessary to remove the two screws for relay box.

# ANTI-LOCK BRAKE SYSTEM

## Wiring Diagram



Refer to POWER SUPPLY ROUTING in EL Section.

(M11)

Refer to Foldout Page in EL Section for details.

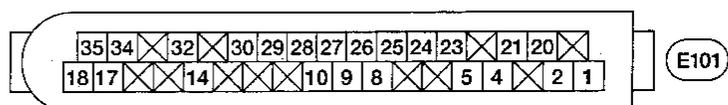
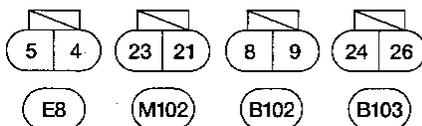
(M7) (M6)  
(E103) (B1)

a	●	b	
c	d	e	f

(B18)

b	○	a	
f	e	d	c

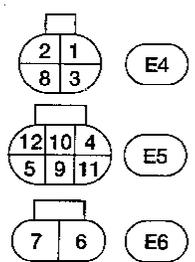
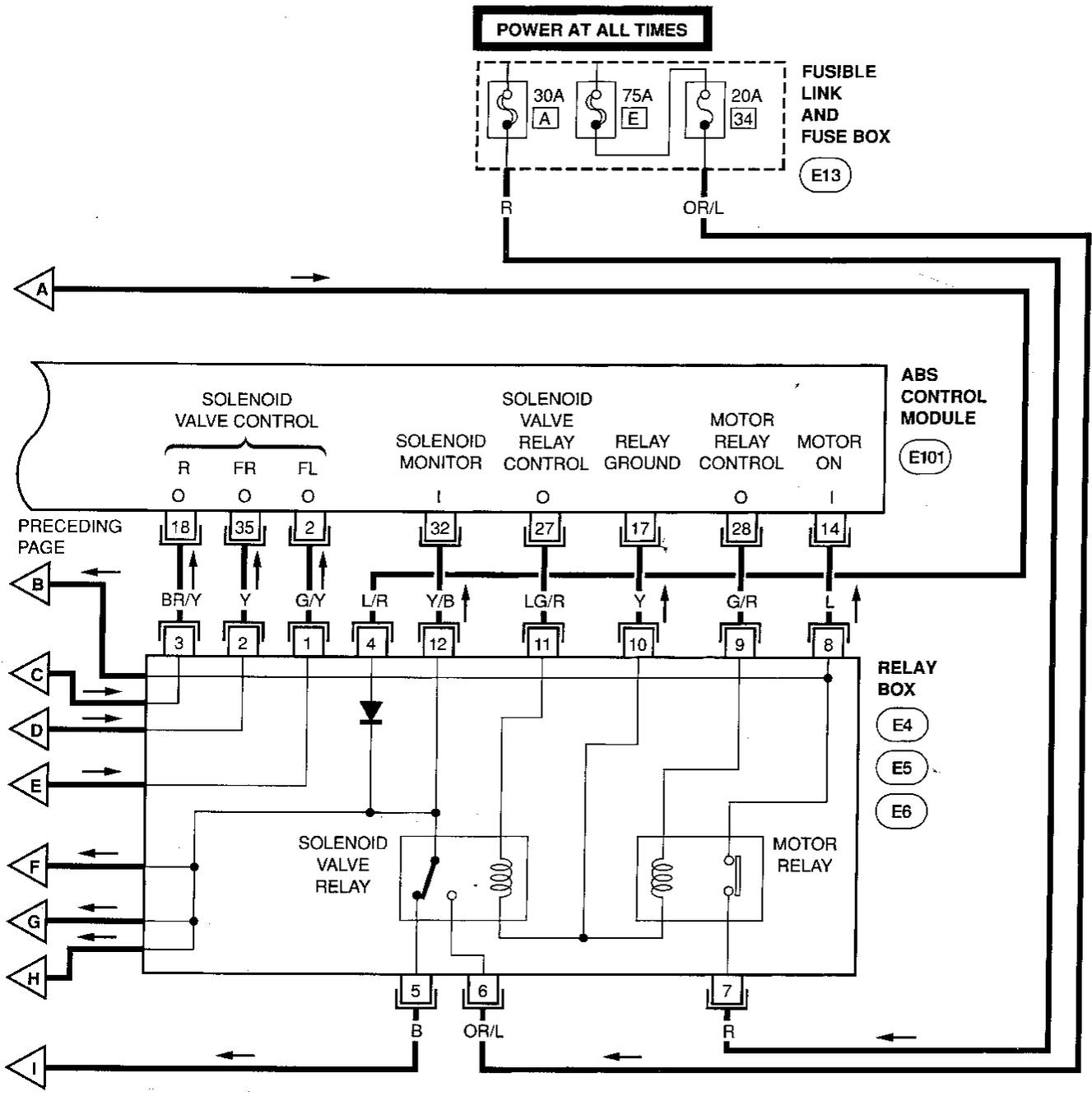
(B101)



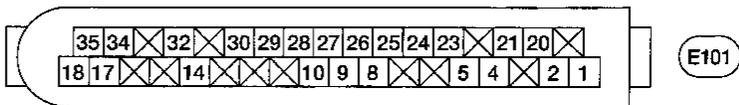


# ANTI-LOCK BRAKE SYSTEM

## Wiring Diagram (Cont'd)



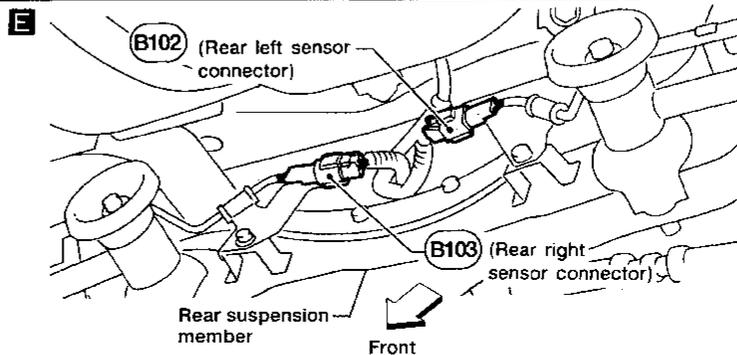
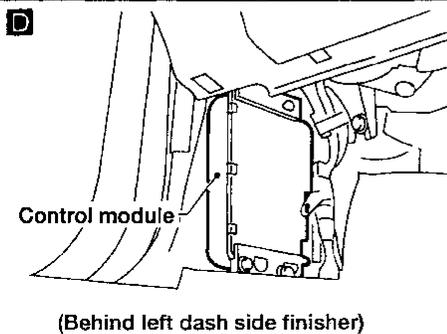
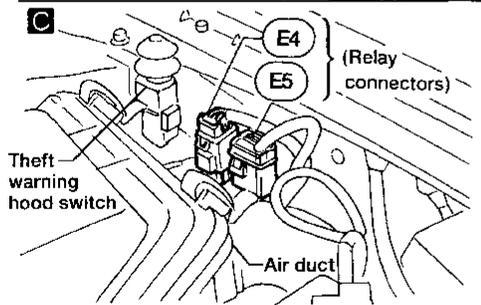
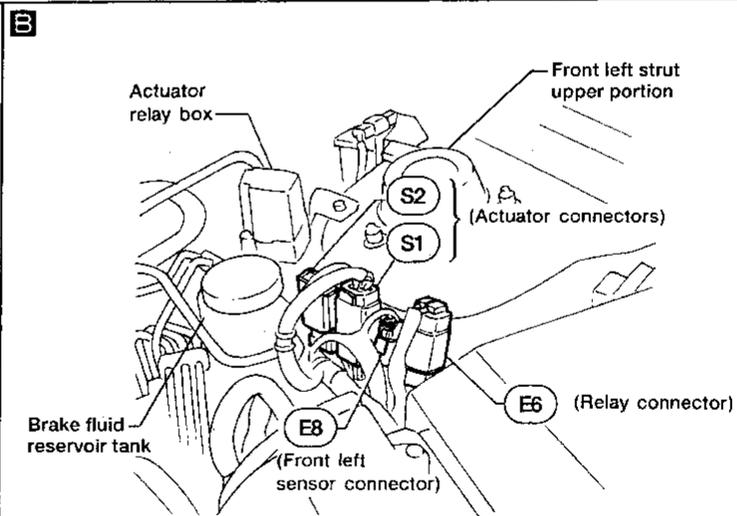
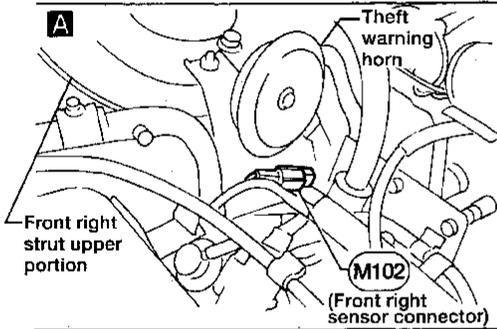
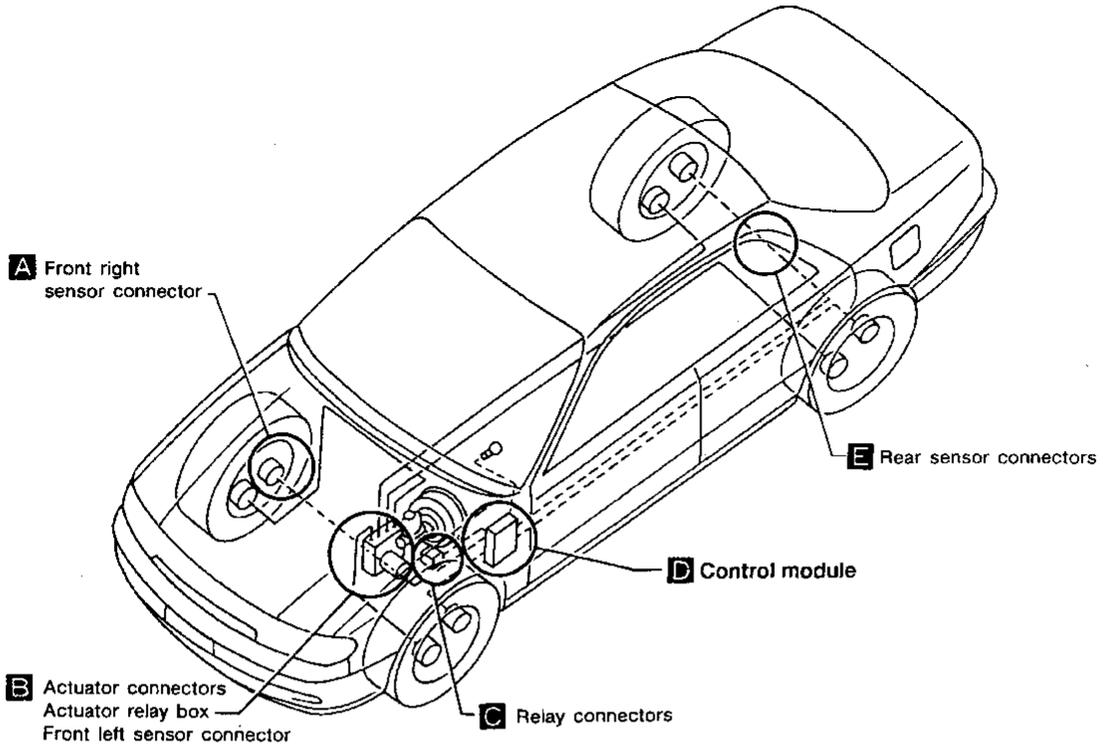
Refer to POWER SUPPLY ROUTING in EL Section. (E13)

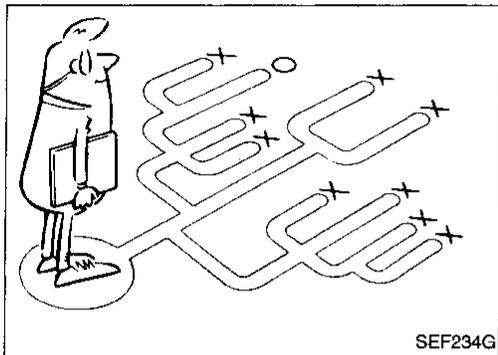
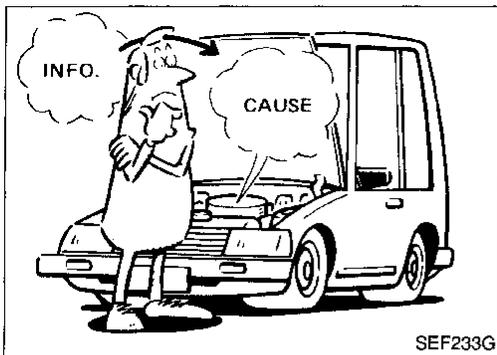


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# ANTI-LOCK BRAKE SYSTEM

## Component Parts and Harness Connector Location





## How to Perform Trouble Diagnoses for Quick and Accurate Repair

### INTRODUCTION

The ABS system has an electronic control module to control major functions. The control module accepts input signals from sensors and instantly drives actuators. It is essential that both kinds of signals are proper and stable. At the same time, it is important that there are no conventional problems such as air leaks in the booster or lines, lack of brake fluid, or other problems with brake system.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems, so a road test should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with a ABS complaint. The customer is a very good source of information on such problems; especially intermittent ones. Through the talks with the customer, find out what symptoms are present and under what conditions they occur.

Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot brake problems on an ABS controlled vehicle.

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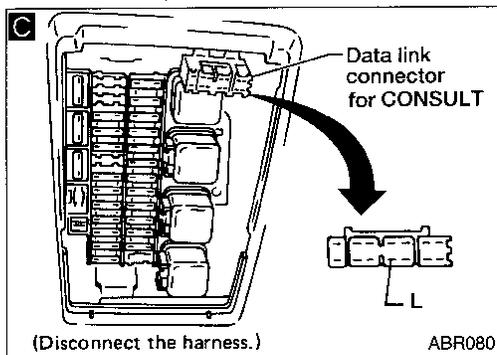
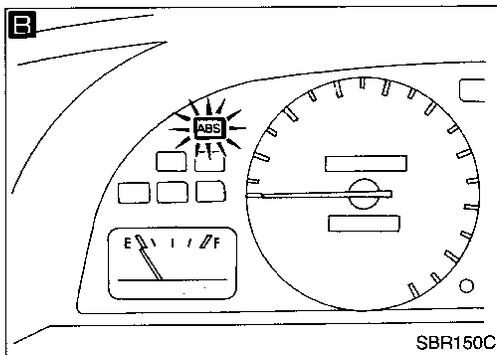
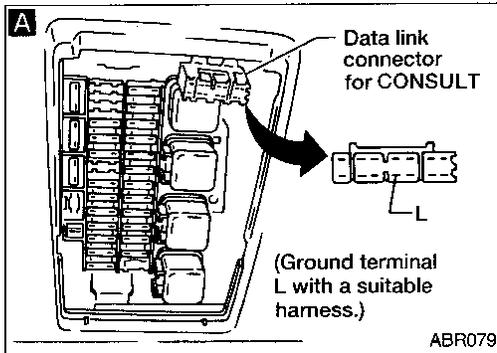
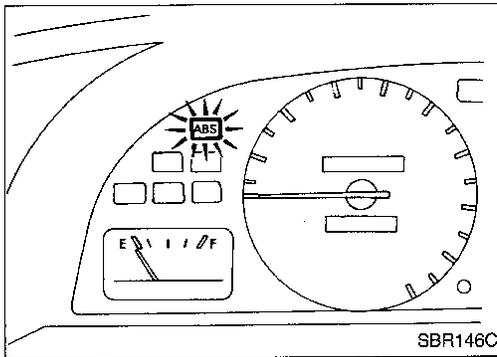
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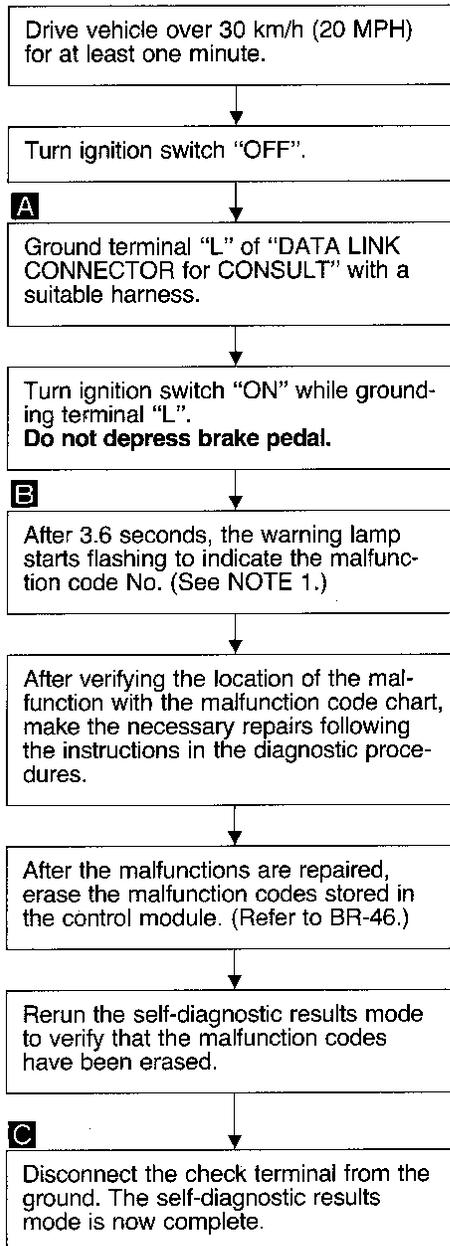
## Self-diagnosis

### FUNCTION

- When a problem occurs in the ABS, the warning lamp on the instrument panel comes on. The warning lamp is also lit by grounding the self-diagnostic (check) terminal located on the "Data Link Connector for Consult" to actuate the self-diagnostic results mode. The location of the malfunction is indicated by the warning lamp flashing on the instrument panel.



### SELF-DIAGNOSIS PROCEDURE



**NOTE 1:** The indication terminates after five minutes. However, when the ignition switch is turned from "OFF" to "ON", the indication starts flashing again.

(A)

# TROUBLE DIAGNOSES

## Self-diagnosis (Cont'd)

(A)

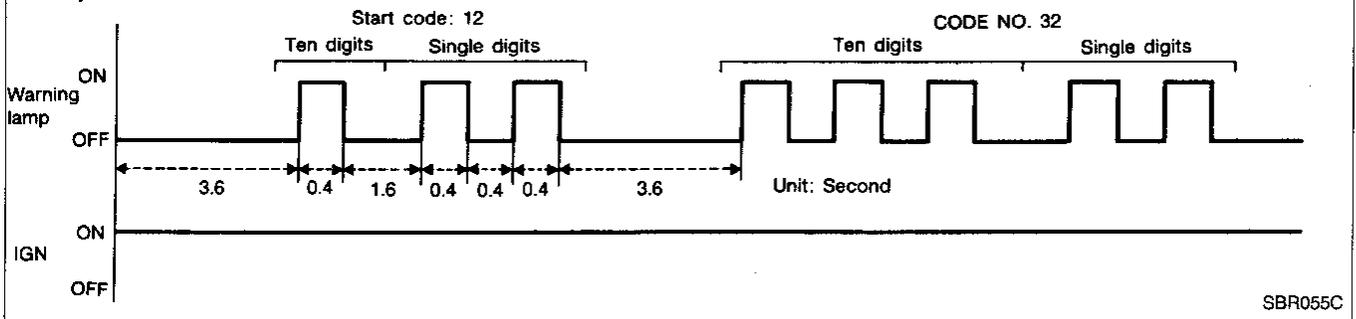
Check warning lamp for deactivation after driving vehicle over 30 km/h (20 MPH) for at least one minute.

After making certain that warning lamp does not come on, test the ABS in a safe area to verify that it functions properly.

### HOW TO READ SELF-DIAGNOSTIC RESULTS (Malfunction codes)

- Determine the code No. by counting the number of times the warning lamp flashes on and off.
- When several malfunctions occur at one time, up to three code Nos. can be stored; the latest malfunction will be indicated first.
- The indication begins with the start code 12, after which a maximum of three code Nos. appear in the order of the latest one first. The indication then returns to the start code to repeat (the indication will stay on for five minutes at the most).
- The malfunction code chart is given on the next page.

#### Example: Code No. 32 REAR RIGHT SENSOR SHORT-CIRCUIT



## TROUBLE DIAGNOSES

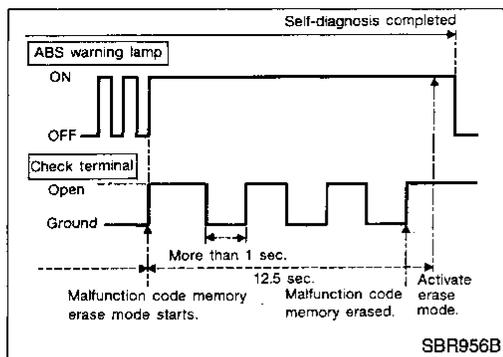
### Self-diagnosis (Cont'd)

#### HOW TO ERASE SELF-DIAGNOSTIC RESULTS (Malfunction codes)

- a. Under the self-diagnostic results mode, the malfunction memory erase mode starts when the check terminal is disconnected from the ground.
- b. The self-diagnostic results (malfunction codes) can be erased by grounding the check terminal more than three times in succession within 12.5 seconds after the erase mode starts. (Each grounding must be longer than one second.)  
The ABS warning lamp stays on while the self-diagnosis is in the erase mode, and goes out after the erase operation has been completed.

The self-diagnosis is also completed at the same time.

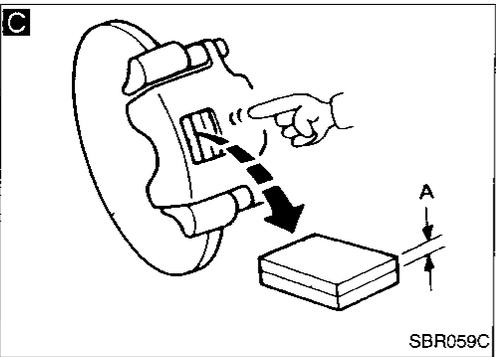
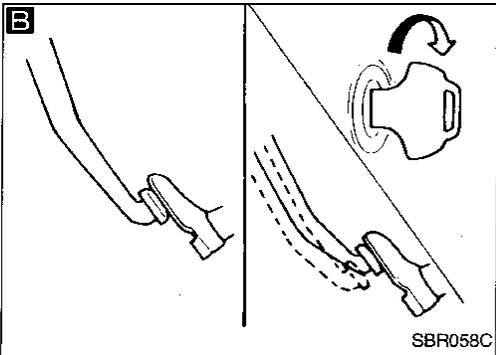
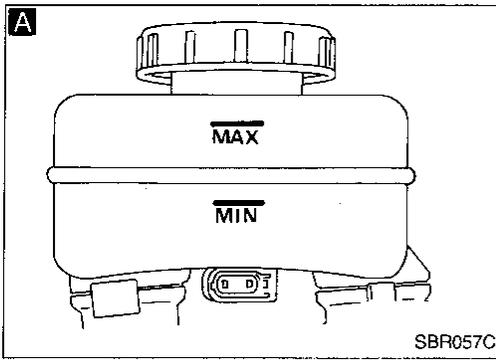
**After the erase operation is completed, it is necessary to rerun the self-diagnostic mode to verify that malfunction codes no longer appear. Only the start code should be indicated when erase operation is completed and system is functioning normally.**



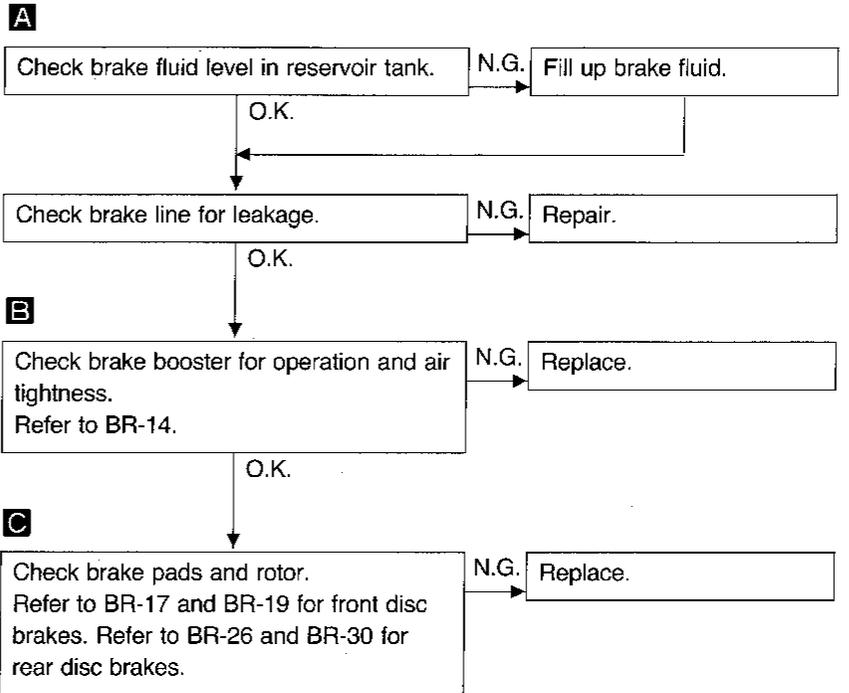
#### MALFUNCTION CODE CHART

Code No.	Malfunctioning part	Diagnostic procedure
45	Front left actuator solenoid	3
41	Front right actuator solenoid	3
55	Rear actuator solenoid	3
25	Front left sensor (open-circuit)	4
26	Front left sensor (short-circuit)	4
21	Front right sensor (open-circuit)	4
22	Front right sensor (short-circuit)	4
35	Rear left sensor (open-circuit)	4
36	Rear left sensor (short-circuit)	4
31	Rear right sensor (open-circuit)	4
32	Rear right sensor (short-circuit)	4
18	Sensor rotor	4
61	Actuator motor or motor relay	5
63	Solenoid valve relay	6
57	Power supply (Low voltage)	7
16	Stop lamp switch circuit	8
71	Control module	9
Warning lamp stays on, does not blink.	Solenoid valve relay stuck or control module power supply circuit	2
Warning lamp does not come on.	Warning lamp bulb	1

# TROUBLE DIAGNOSES

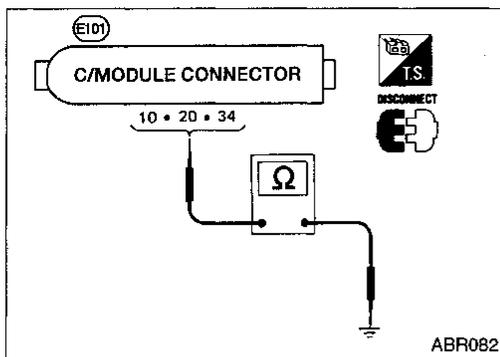


## Preliminary Check



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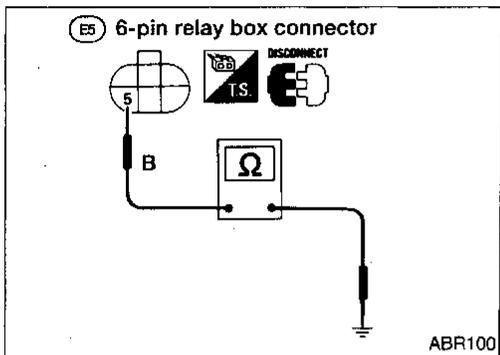
# TROUBLE DIAGNOSES



## Ground Circuit Check

### CONTROL MODULE GROUND

- Check resistance between the terminals and ground.  
**Resistance: 0Ω**



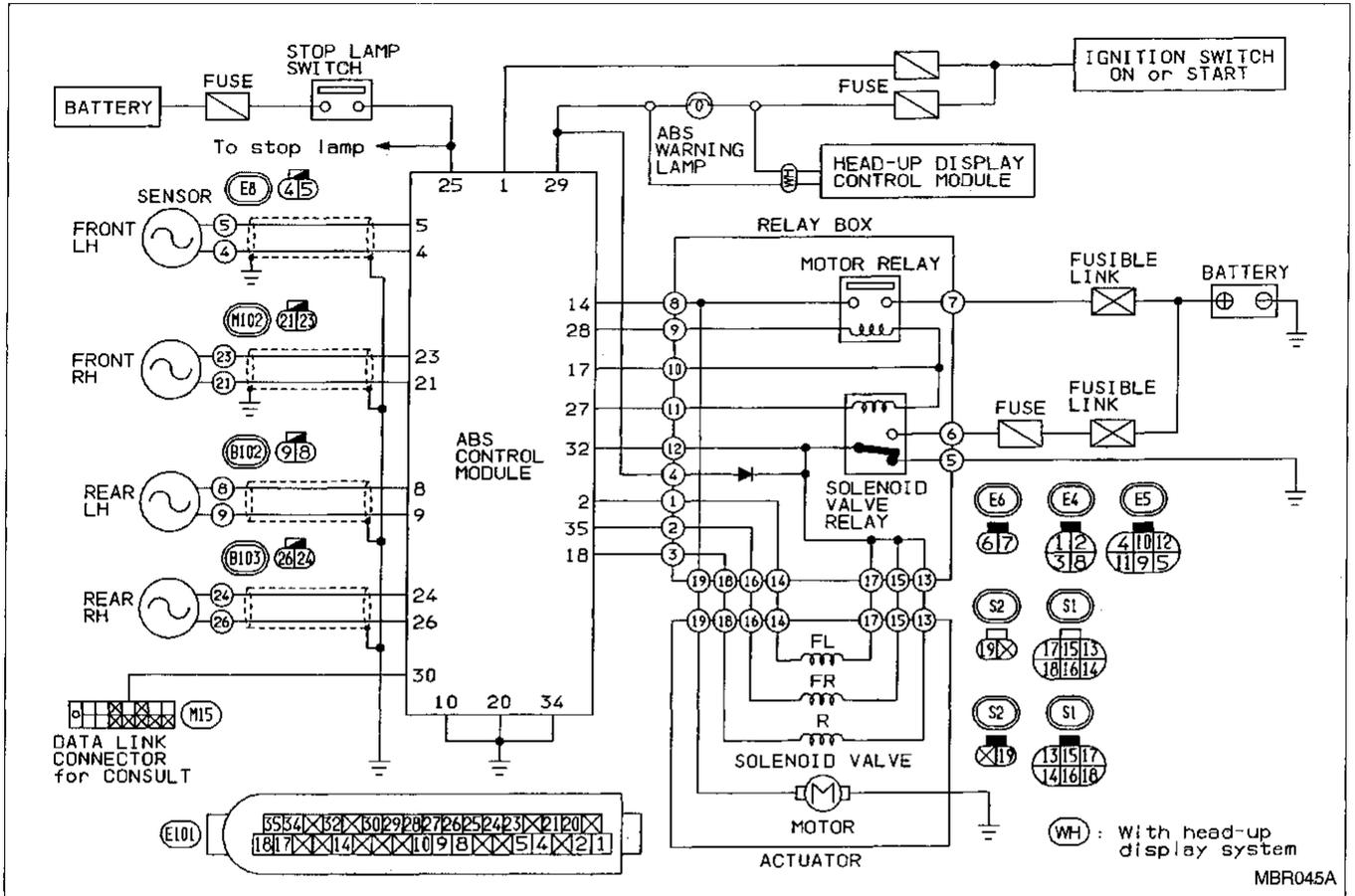
### RELAY BOX GROUND

- Check resistance between relay box harness connector terminal ⑤ and ground.  
**Resistance: 0Ω**

# TROUBLE DIAGNOSES

## Circuit Diagram for Quick Pinpoint Check

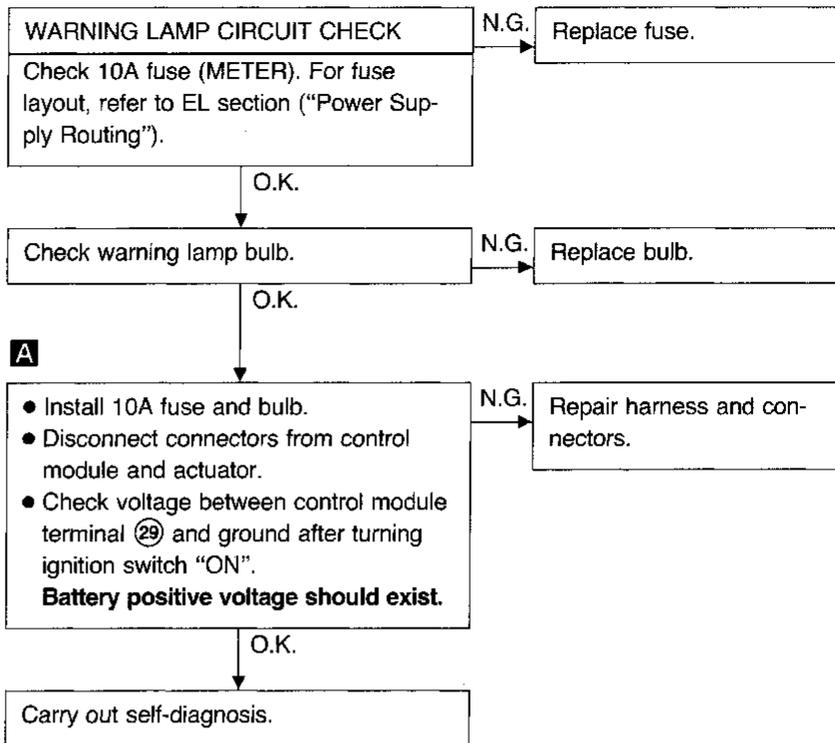
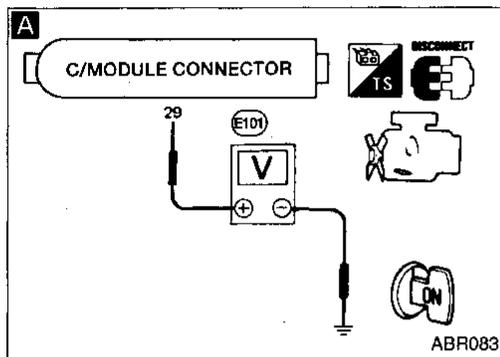
- The unit side connectors with a double circle "⊖" are connected to the harness side connectors shown on BR-42.
- The terminal numbers in the connector coincide with the circuit numbers surrounded by a single circle "○".



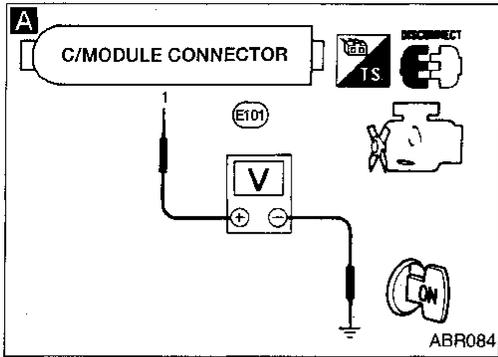
# TROUBLE DIAGNOSES

## Diagnostic Procedure 1 (Not self-diagnostic item)

Warning lamp does not work before engine starts.

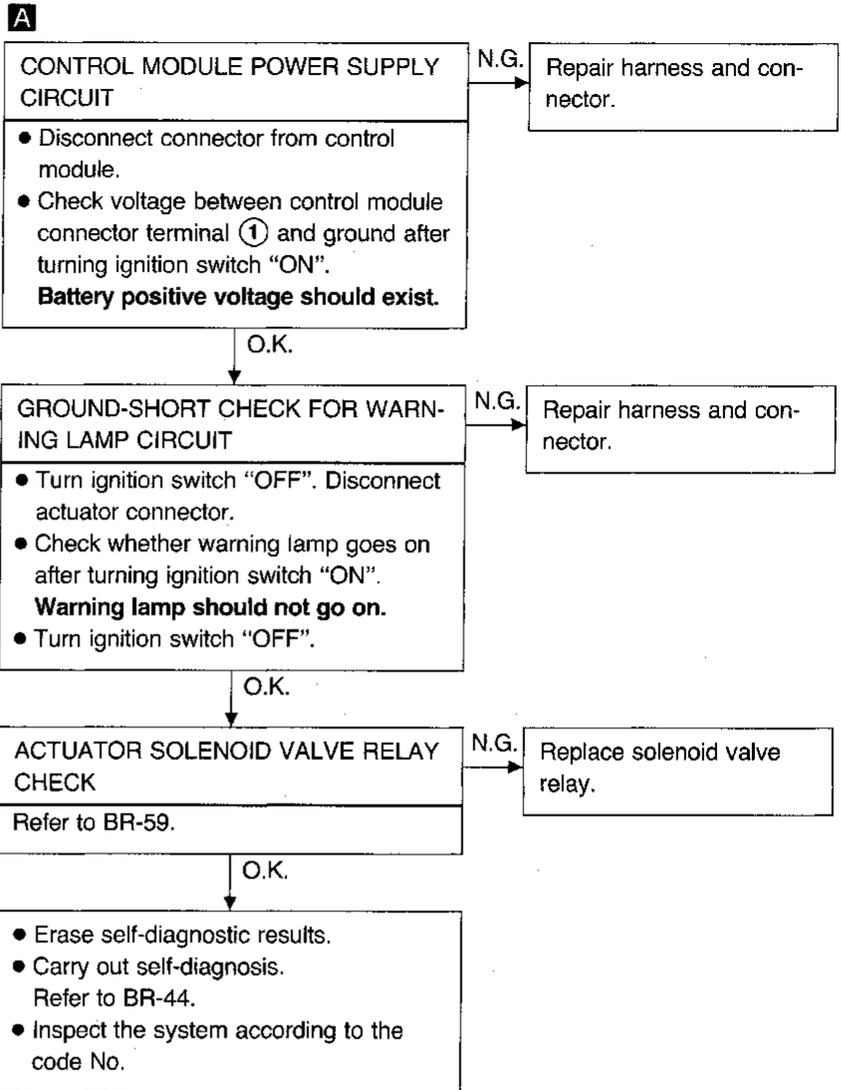


# TROUBLE DIAGNOSES



## Diagnostic Procedure 2 (Not Self-diagnostic Item)

Warning lamp does not blink but stays on continuously.



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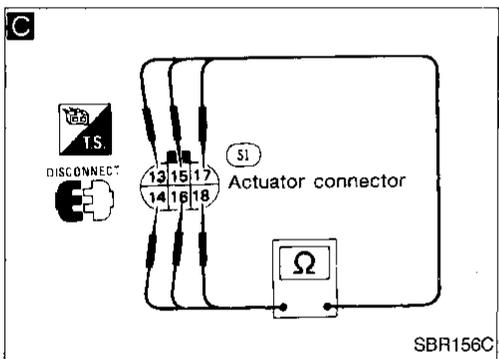
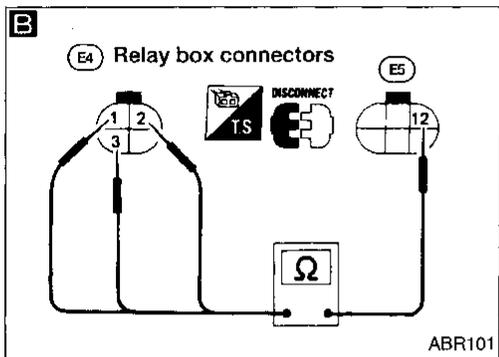
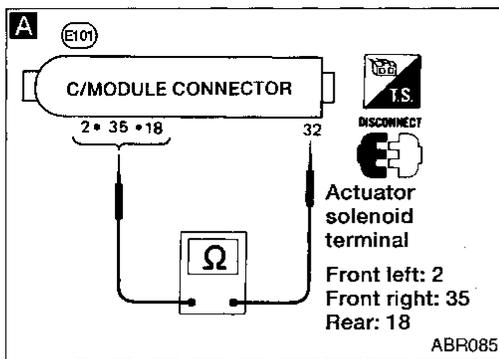
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## Diagnostic Procedure 3

### ACTUATOR SOLENOID (Malfunction code No. 45, 41 or 55)



#### A ACTUATOR SOLENOID VALVE CHECK.

- Disconnect control module connector.
- Check resistance between control module connector terminals.

Code No. 45  
Terminals ③② and ②  
Code No. 41  
Terminals ③② and ③⑤  
Code No. 55  
Terminals ③② and ①⑧  
**Resistance: 1.07 - 1.17Ω**

O.K. → Replace control module.

N.G. ↓

- Disconnect relay box connectors.
- Check resistance between relay box connector terminals.

Code No. 45  
Terminals ①② and ①  
Code No. 41  
Terminals ①② and ②  
Code No. 55  
Terminals ①② and ③  
**Resistance: 1.07 - 1.17Ω**

O.K. → Repair harness between relay box connector and control module connector.

N.G. ↓

- Disconnect actuator connector.
- Check resistance between actuator connector terminals.

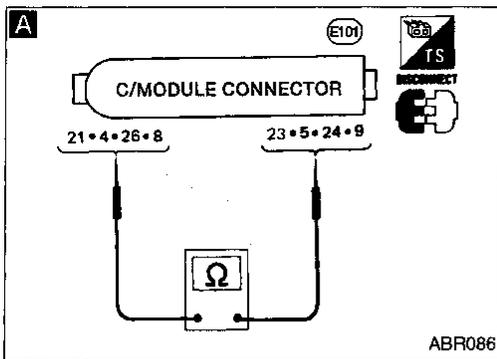
Code No. 45  
Terminals ①⑦ and ①④  
Code No. 41  
Terminals ①⑤ and ①⑥  
Code No. 55  
Terminals ①③ and ①⑧  
**Resistance: 1.07 - 1.17Ω**

O.K. → Replace relay box assembly.

N.G. ↓

Replace actuator.

# TROUBLE DIAGNOSES



## Diagnostic Procedure 4

### WHEEL SENSOR OR ROTOR

(Malfunction code No. 21, 22, 25, 26, 31, 32, 35, 36 or 18)

**A**

#### WHEEL SENSOR ELECTRICAL CHECK

- Disconnect control module connector.
  - Check resistance between control module connector terminals.
    - Code No. 21 or 22 (Front RH wheel) Terminals ②① and ②③
    - Code No. 25 or 26 (Front LH wheel) Terminals ④ and ⑤
    - Code No. 31 or 32 (Rear RH wheel) Terminals ②⑥ and ②④
    - Code No. 35 or 36 (Rear LH wheel) Terminals ⑧ and ⑨
- Resistance: 1.0 - 1.25k $\Omega$**

O.K. **A**

N.G.

Note

#### CHECK WHEEL SENSOR

Refer to BR-59.

N.G.

Note

Replace wheel sensor.

O.K.

Note

Repair harness and connectors between control module connector and wheel sensor connector.

**Note: Wheel position should be distinguished by code No.**

GI

MA

EM

LC

EF &  
EC

FE

CL

MT

AT

FA

RA

**BR**

ST

BF

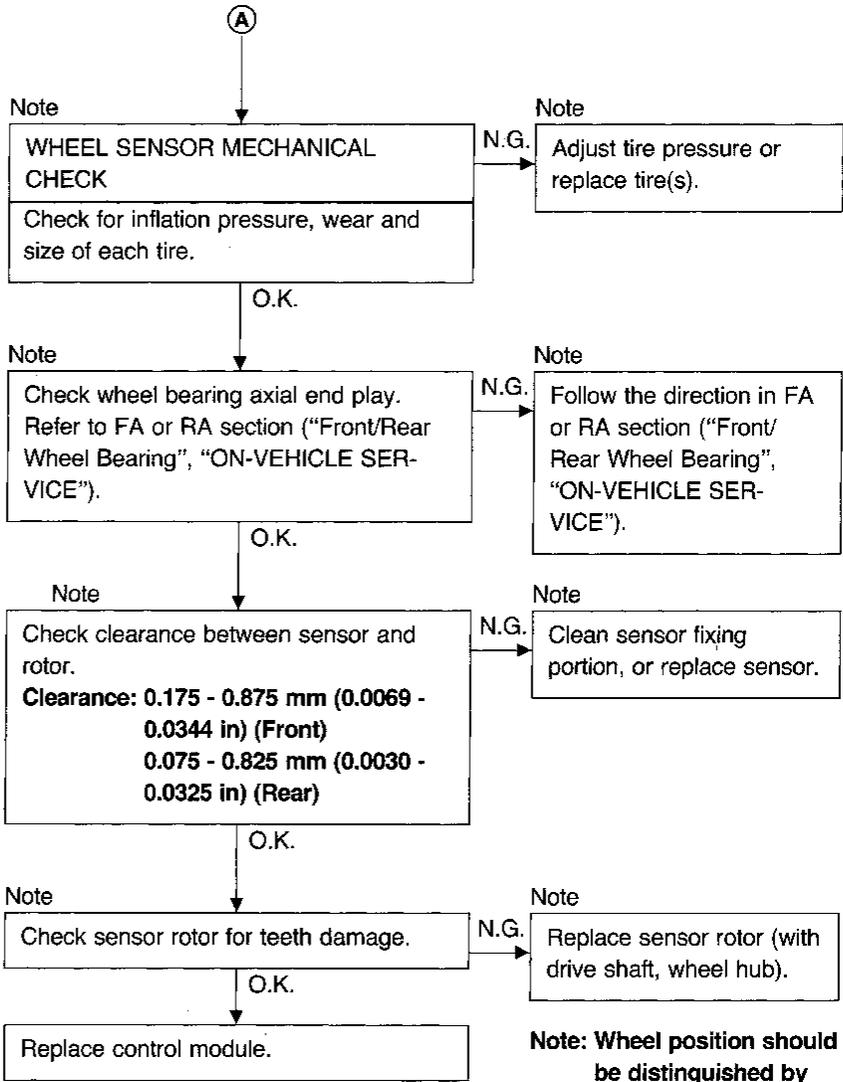
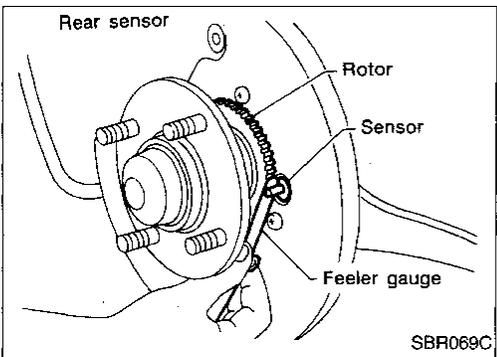
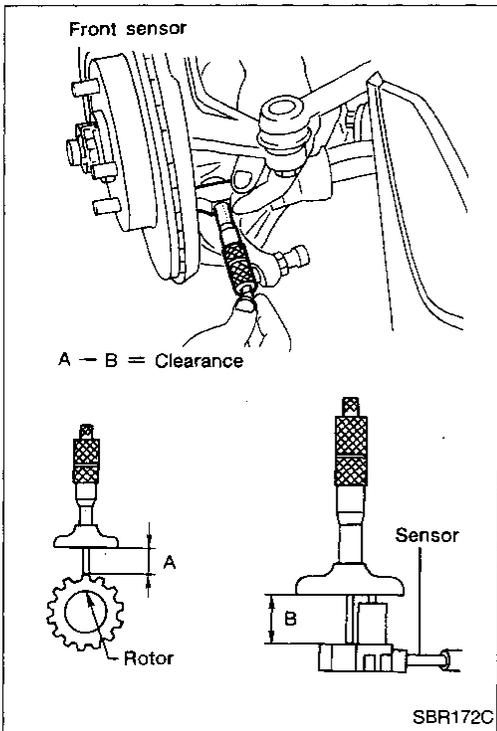
HA

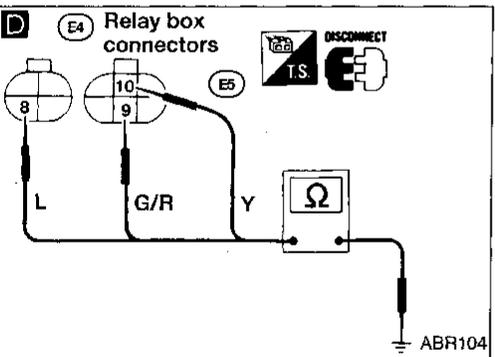
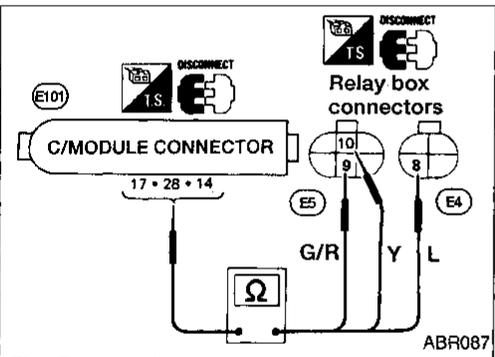
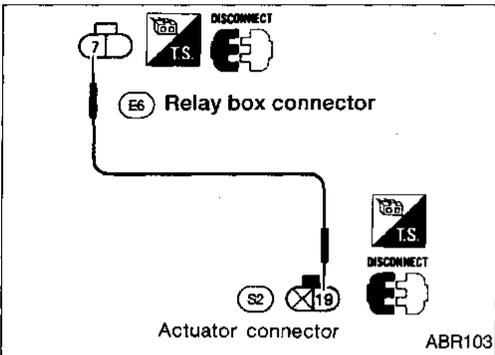
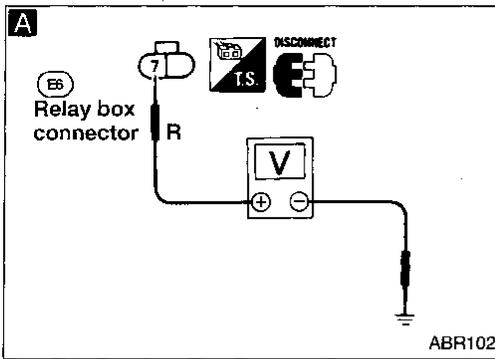
EL

IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 4 (Cont'd)





## Diagnostic Procedure 5 MOTOR RELAY OR MOTOR (Malfunction code No. 61)

**A**

**MOTOR POWER SUPPLY CHECK**

- Disconnect connectors from actuator and relay box.
- Check voltage between terminal ⑦ and ground.

**Battery positive voltage should exist.**

N.G. → Repair harness and connectors.

O.K. ↓

**MOTOR RELAY CHECK**

Refer to BR-59.

N.G. → Replace motor relay.

O.K. ↓

**MOTOR CHECK**

Check motor by connecting terminal ⑦ for relay box connector and terminal ⑱ for actuator connector with a suitable harness.

**Motor should operate.**

**Do not connect harness for more than 5 seconds.**

N.G. → Check continuity between actuator and ground. If O.K., replace actuator.

O.K. ↓

**CIRCUIT CHECK**

- Disconnect control module connector.
- Check continuity between control module connector terminals and relay box connector terminals.

Control module	Relay box
⑰	⑩
⑳	⑨
⑭	⑧

**Continuity should exist.**

N.G. → Repair harness and connectors.

O.K. ↓

**D**

Check continuity between relay box connector terminals ⑧, ⑨, ⑩ and ground.

**Continuity should not exist.**

N.G. → Repair harness and connectors.

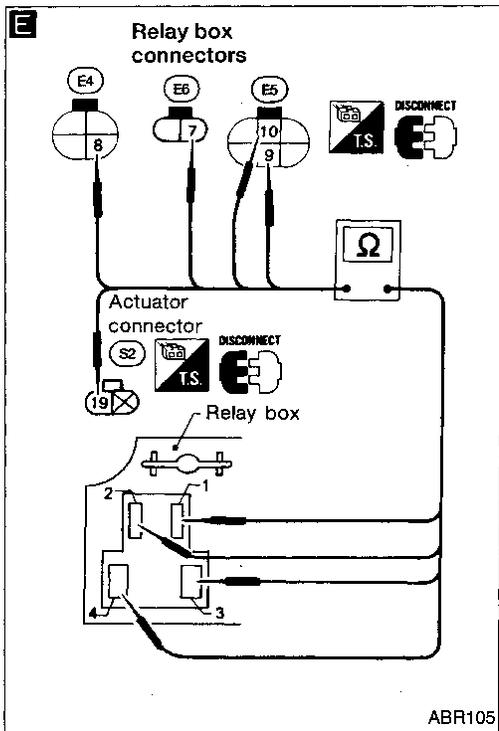
O.K. ↓

**A**

GI  
 MA  
 EM  
 LC  
 EF &  
 EC  
 FE  
 CL  
 MT  
 AT  
 FA  
 RA  
 BR  
 ST  
 BF  
 HA  
 EL  
 IDX

# TROUBLE DIAGNOSES

## Diagnostic Procedure 5 (Cont'd)



A

**E**

**RELAY BOX CHECK**

Check continuity between relay terminals and relay box connector terminals.

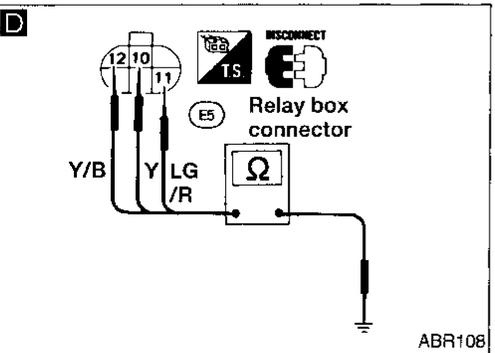
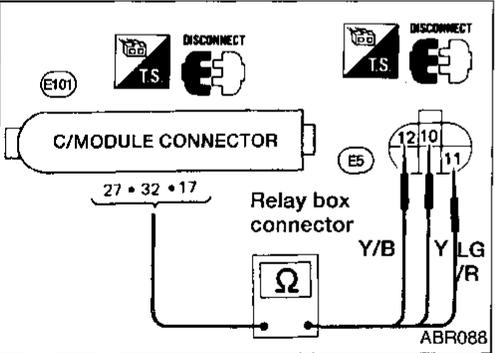
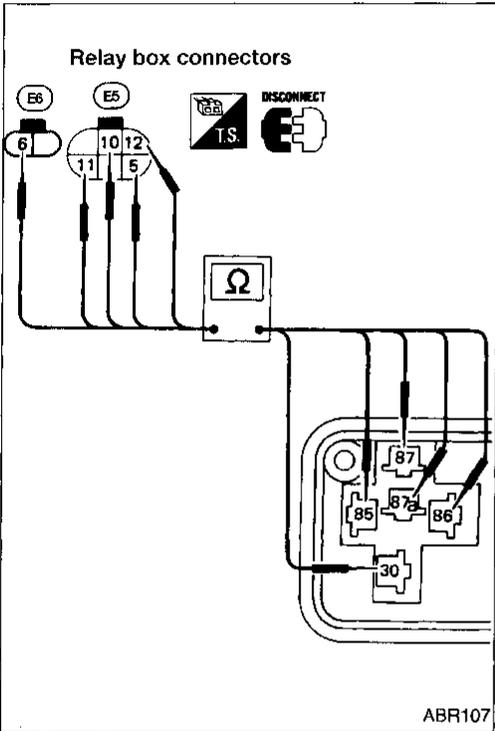
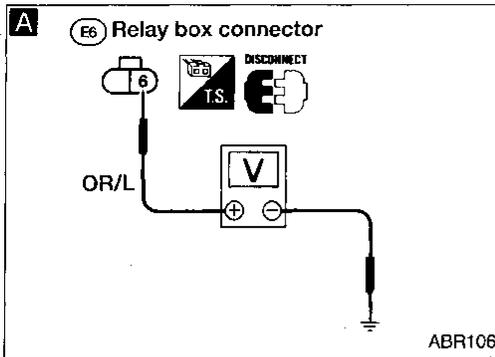
Relay terminals	Connector terminals
①	⑩
②	⑨
③	⑦
④	⑱
④	⑧

Continuity should exist.

O.K.

Replace control module.

N.G. → Replace relay box.



## Diagnostic Procedure 6 SOLENOID VALVE RELAY (Malfunction code No. 63)

**A**

**SOLENOID VALVE POWER SUPPLY CHECK**

- Disconnect connectors from actuator and relay box.
- Check voltage between terminal ⑥ and ground.

**Battery positive voltage should exist.**

N.G. → Repair harness and connector.

O.K. ↓

**SOLENOID VALVE RELAY CHECK**

Refer to BR-59.

N.G. → Replace solenoid valve relay.

O.K. ↓

**RELAY BOX CHECK**

Check continuity between relay terminals and relay box connector terminals.

Relay terminals	Connector terminals
③①	⑫
⑧⑤	⑪
⑧⑥	⑩
⑧⑦	⑥
⑧⑦a	⑤

**Continuity should exist.**

N.G. → Replace relay box.

O.K. ↓

**CIRCUIT CHECK**

- Disconnect control module connector.
- Check continuity between control module connector terminals and relay box connector terminals.

Control module	Relay box
⑬⑦	⑩
⑲⑦	⑪
⑳②	⑫

**Continuity should exist.**

N.G. → Repair harness and connectors.

O.K. ↓

**D**

Check continuity between relay box connector terminals ⑩, ⑪, ⑫ and ground.

**Continuity should not exist.**

N.G. → Repair harness and connectors.

O.K. ↓

Replace control module.

GI  
 MA  
 EM  
 LC  
 EF & EC  
 FE  
 CL  
 MT  
 AT  
 FA  
 RA  
**BR**  
 ST  
 BF  
 HA  
 EL  
 IDX

# TROUBLE DIAGNOSES

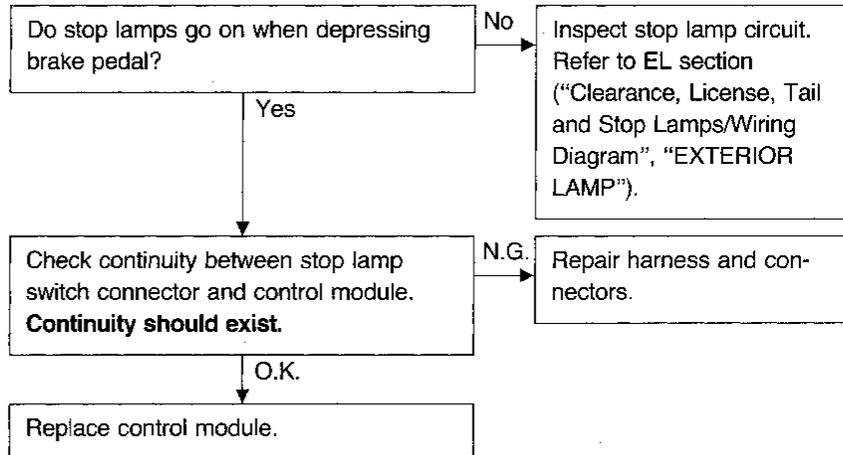
## Diagnostic Procedure 7

### POWER SUPPLY (Low voltage) (Malfunction code No. 57)

BATTERY CHECK
Check battery.
Refer to EL section ("BATTERY").

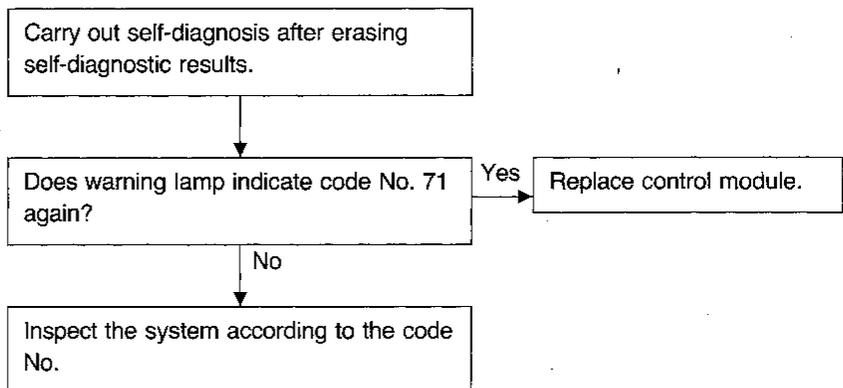
## Diagnostic Procedure 8

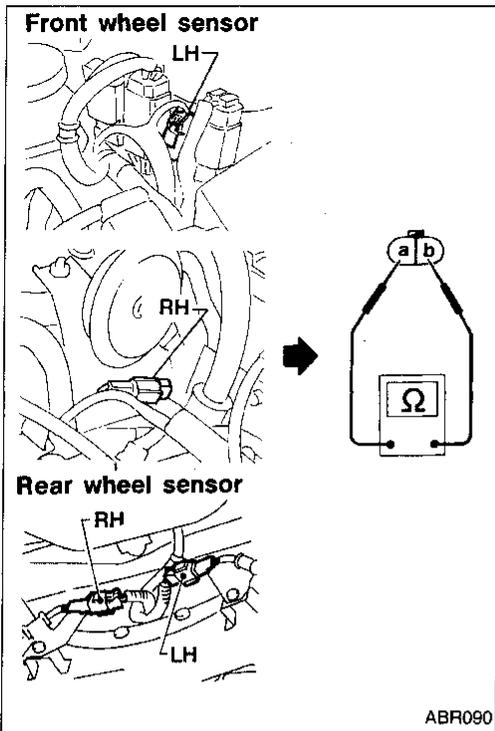
### STOP LAMP SWITCH CIRCUIT (Malfunction code No. 16)



## Diagnostic Procedure 9

### CONTROL MODULE (Malfunction code No. 71)

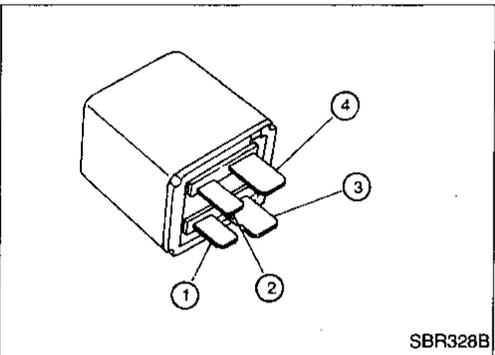




## Electrical Components Inspection

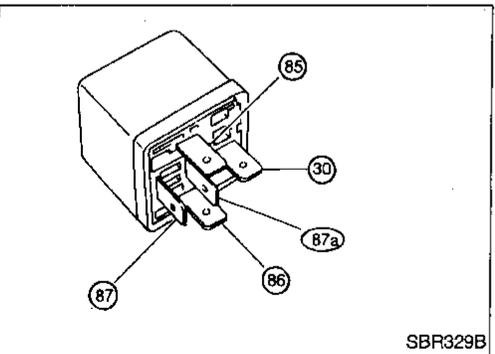
### WHEEL SENSOR

Check resistance between terminals (a) and (b).  
**Resistance: 1.0 - 1.25kΩ**



### MOTOR RELAY

Condition	Continuity existence between terminals (3) and (4)
Battery positive voltage not applied between terminals (1) and (2).	No
Battery positive voltage applied between terminals (1) and (2).	Yes



### SOLENOID VALVE RELAY

Condition	Continuity existence between terminals (30) and (87a)	Continuity existence between terminals (30) and (87)
Battery positive voltage not applied between terminals (85) and (86).	Yes	No
Battery positive voltage applied between terminals (85) and (86).	No	Yes

GI  
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EL  
IDX

# SERVICE DATA AND SPECIFICATIONS (SDS)

## General Specifications

Model	Without ABS	With ABS
<b>Front brake</b>		
Brake model	CL25VB	
Cylinder bore diameter mm (in)	57.2 (2.252)	
Pad mm (in)		
Length x width x thickness	125.6 x 45.3 x 11.0 (4.94 x 1.783 x 0.433)	
Rotor outer diameter x thickness mm (in)	280 x 22 (11.02 x 0.87)	
<b>Rear brake</b>		
Brake model	LT23E	CL9HA
Cylinder bore diameter mm (in)	19.05 (3/4)	33.96 (1.3370)
Lining or pad mm (in)		
Length x width x thickness	219.4 x 35 x 4.1 (8.64 x 1.38 x 0.161)	89.1 x 39.5 x 10 (3.508 x 1.555 x 0.39)
Drum inner diameter or rotor outer diameter x thickness mm (in)	228.6 (9)	258 x 9 (10.16 x 0.35)

Model	Without ABS	With ABS
<b>Master cylinder</b>		
Cylinder bore diameter mm (in)	23.81 (15/16)	25.40 (1)
<b>Control valve</b>		
Valve model	Dual proportioning valve (built-in type)	Dual proportioning valve (separated type)
Split point kPa (kg/cm <sup>2</sup> , psi) x reducing ratio	1,961 (20, 284) x 0.2	2,942 (30, 427) x 0.2
<b>Brake booster</b>		
Booster model	M195T	M215T
Diaphragm diameter mm (in)	Primary: 205 (8.07) Secondary: 180 (7.09)	Primary: 230 (9.06) Secondary: 205 (8.07)
Recommended brake fluid	DOT 3	

## Inspection and Adjustment

### DISC BRAKE

Brake model	CL25VB	CL9HA
Pad wear limit mm (in)		
Minimum thickness	2.0 (0.079)	1.5 (0.059)
Rotor repair limit mm (in)		
Minimum thickness	20.0 (0.787)	8.0 (0.315)

### DRUM BRAKE

Brake model	LT23E
Lining wear limit mm (in)	
Minimum thickness	1.5 (0.059)
Drum repair limit mm (in)	
Maximum inner diameter	230 (9.06)
Out-of-roundness	0.03 (0.0012)

### BRAKE PEDAL

Free height "H" mm (in)	
M/T	169 - 179 (6.65 - 7.05)
A/T	177 - 187 (6.97 - 7.36)
Depressed height "D" mm (in)	
[under force of 490 N (50 kg, 110 lb) with engine running]	90 (3.54)
Clearance between switches and pedal stopper bracket "C" mm (in)	0.3 - 1.0 (0.012 - 0.039)
Pedal free play "A" mm (in)	1.0 - 3.0 (0.039 - 0.118)

### PARKING BRAKE

Number of notches	Disc brake	Drum brake
[under force of 196 N (20 kg, 44 lb)]	7 - 8	7 - 8
Number of notches when warning lamp switch comes on	1	