

BRAKE SYSTEM

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

SUPPLEMENTAL RESTRAINT SYSTEM (SRS) "AIR BAG" AND "SEAT BELT PRE-TENSIONER"

The Supplemental Restraint System "Air Bag" and "Seat Belt Pre-tensioner", used along with a seat belt, help 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 bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS** section in this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or for the complete harness, for easy identification.

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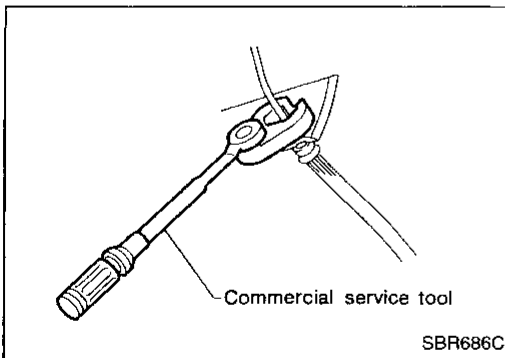
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BRAKE SYSTEM

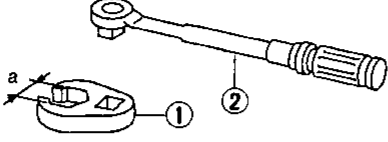
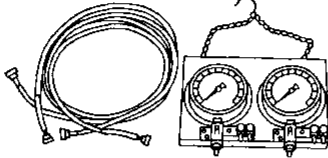
- Use brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean master cylinder parts, disc brake caliper parts or wheel cylinder parts, 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 and installing brake tubes.
- Always torque brake lines when installing.

WARNING:

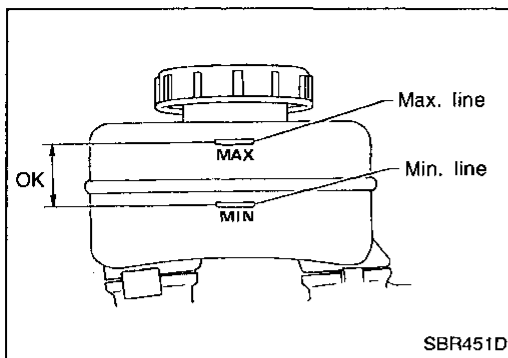
- Clean brakes with a vacuum dust collector to minimize risk of health hazard from powder caused by friction.

PRECAUTIONS AND PREPARATION

Commercial Service Tools

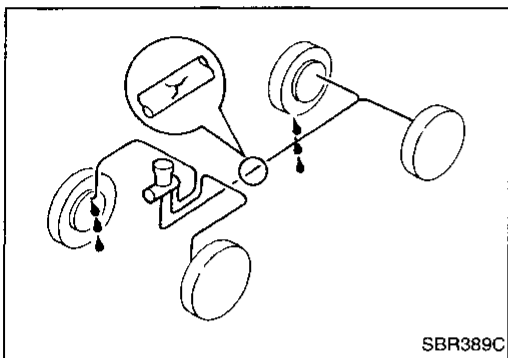
Tool name	Description
① Flare nut crowfoot ② Torque wrench	<p>Removing and installing each brake piping</p>  <p>NT360</p> <p>a: 10 mm (0.39 in)</p>
Brake fluid pressure gauge	<p>Measuring brake fluid pressure</p>  <p>NT151</p>

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.

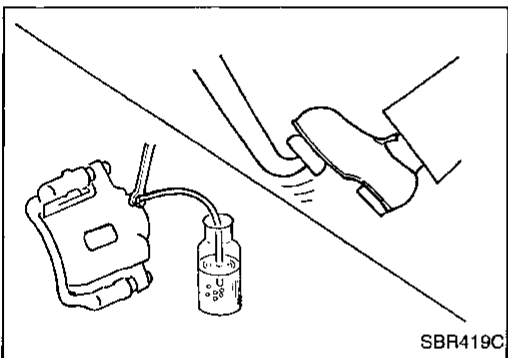


Checking Brake Line

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".
- Always keep fluid level higher than minimum line on reservoir tank.
- 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. Clean inside of reservoir tank, and refill with new brake fluid.
2. Connect a vinyl tube to each air bleeder valve.
3. Drain brake fluid from each air bleeder valve by depressing brake pedal.
4. Refill until brake fluid comes out of each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to "Bleeding Brake System", BR-6.

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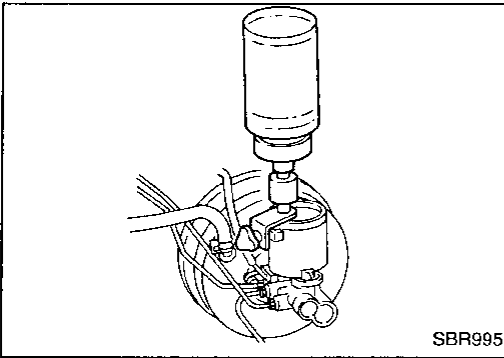
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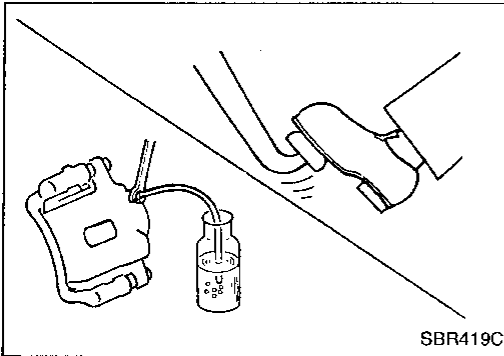


Bleeding Brake System

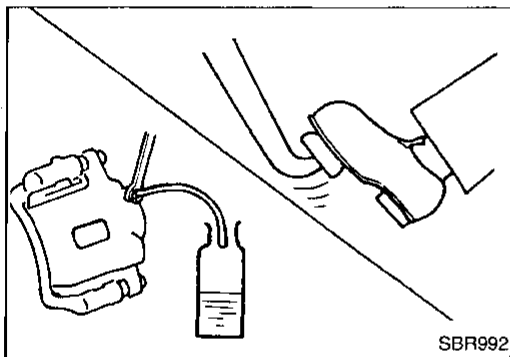
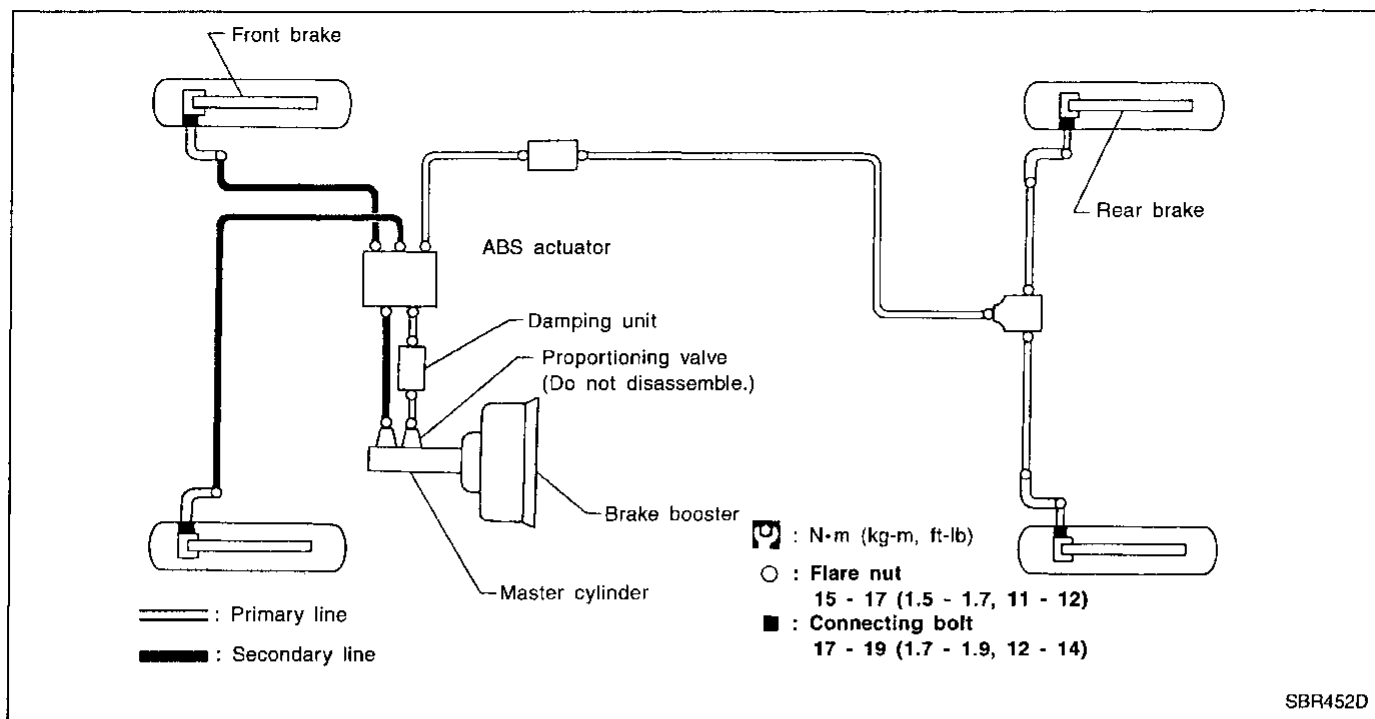
CAUTION:

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
 - If master cylinder is suspected to have air inside, bleed air from master cylinder first. Refer to "Installation", "MASTER CYLINDER", BR-13.
 - 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.
 - For models with ABS, turn ignition switch OFF and disconnect ABS actuator connector or battery cable.
 - Bleed air in the following order:
Right rear brake→Left rear brake→Right front brake→Left front brake.
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.
 7. Tighten air bleeder valve.

 : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)



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.

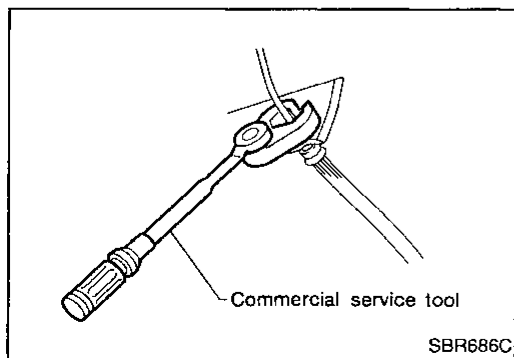
Flare nut:

○ : 15 - 17 N·m (1.5 - 1.7 kg·m, 11 - 12 ft·lb)

Connecting bolt:

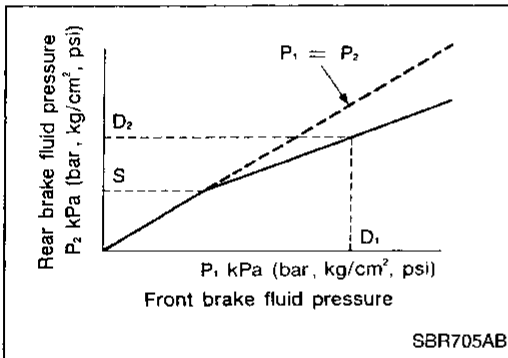
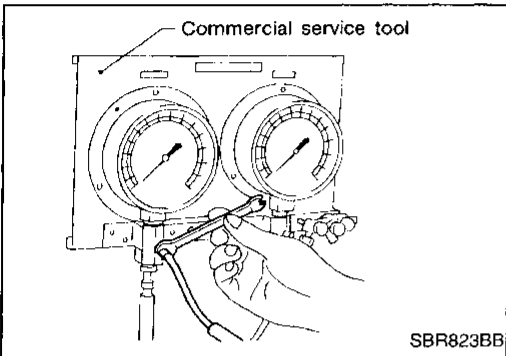
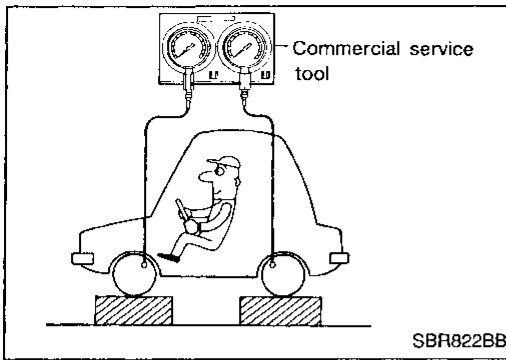
■ : 17 - 19 N·m (1.7 - 1.9 kg·m, 12 - 14 ft·lb)

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to "Bleeding Brake System", BR-6.



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

Unit: kPa (kg/cm², psi)

Applied pressure (Front brake)	D ₁	5,394 (55, 782)
Output pressure (Rear brake)	D ₂	3,138 - 3,531 (32 - 36, 455 - 512)

- If output pressure is out of specifications, replace master cylinder assembly (built-in type).
4. Bleed air after disconnecting the tool. Refer to "Bleeding Brake System", BR-6.

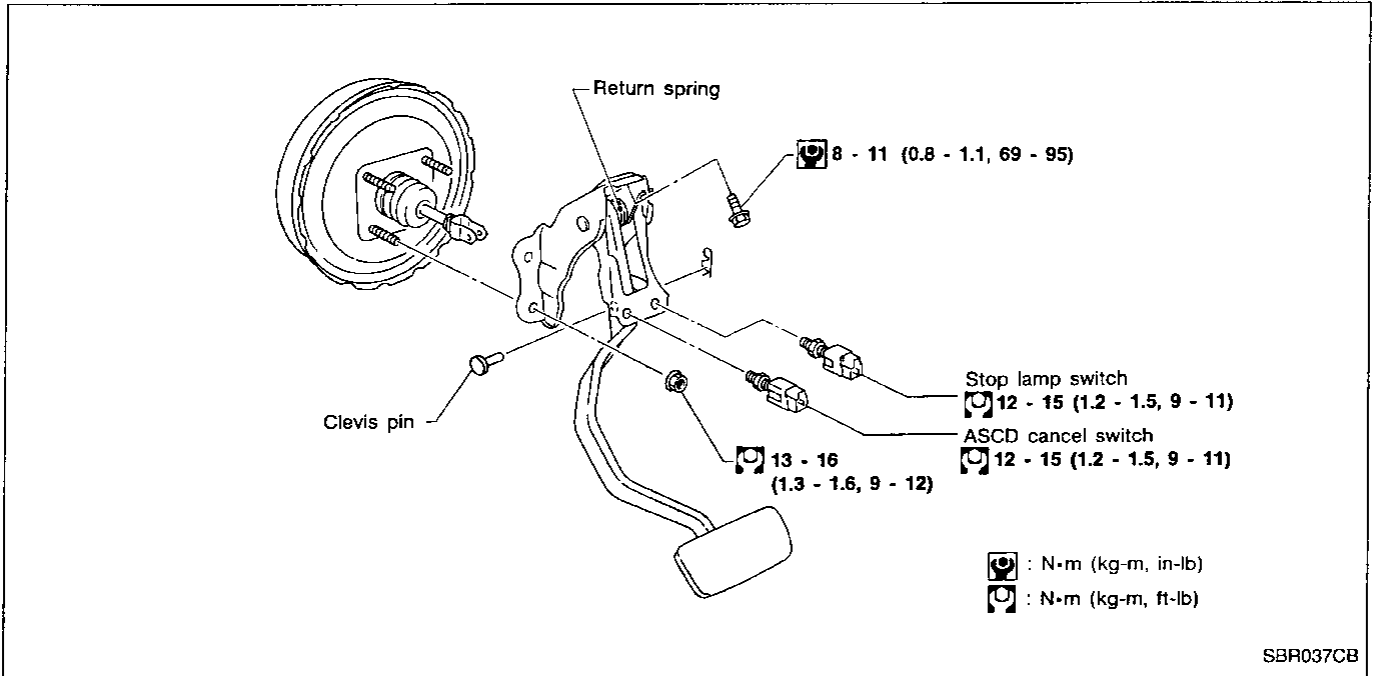
REMOVAL AND INSTALLATION (Built-in type)

Always replace together with master cylinder as an assembly.

- Refer to "MASTER CYLINDER", BR-11.

BRAKE PEDAL AND BRACKET

Removal and Installation



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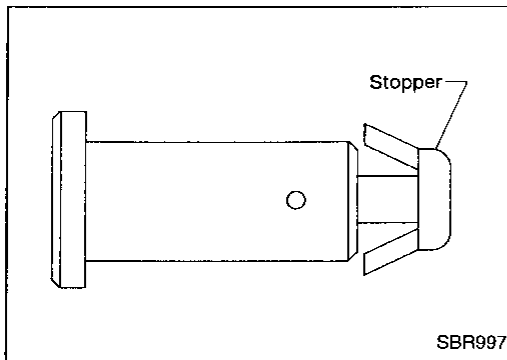
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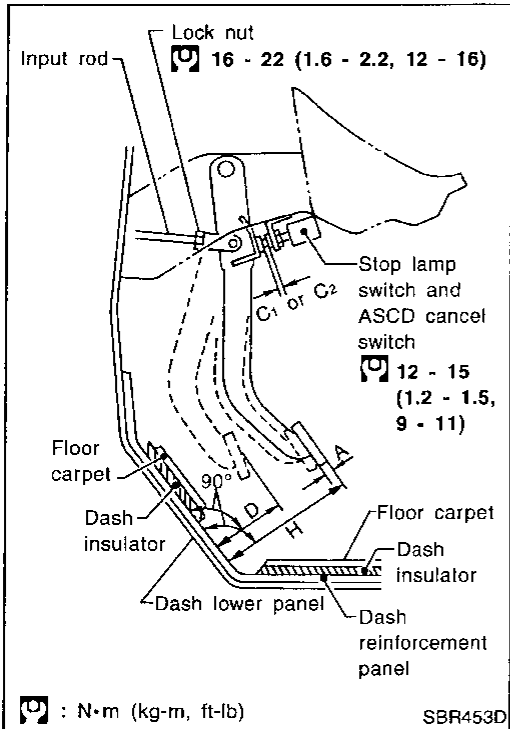
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Inspection

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-63.
- D: Depressed height**
Refer to SDS, BR-63.
Under force of 490 N (50 kg, 110 lb) with engine running
- C₁, C₂: Clearance between pedal stopper and threaded end of stop lamp switch and ASCD cancel 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)

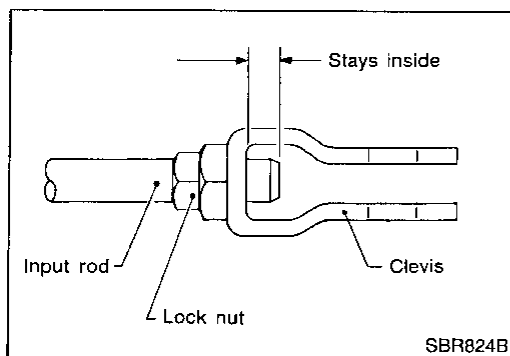
BRAKE PEDAL AND BRACKET

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. Then tighten lock nut.

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



2. Loosen lock nut and adjust clearance "C₁" and "C₂" with stop lamp switch and ASCD cancel switch respectively. Then tighten lock nuts.

3. Check pedal free play.

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

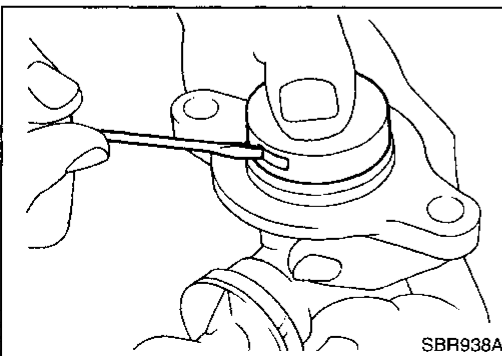
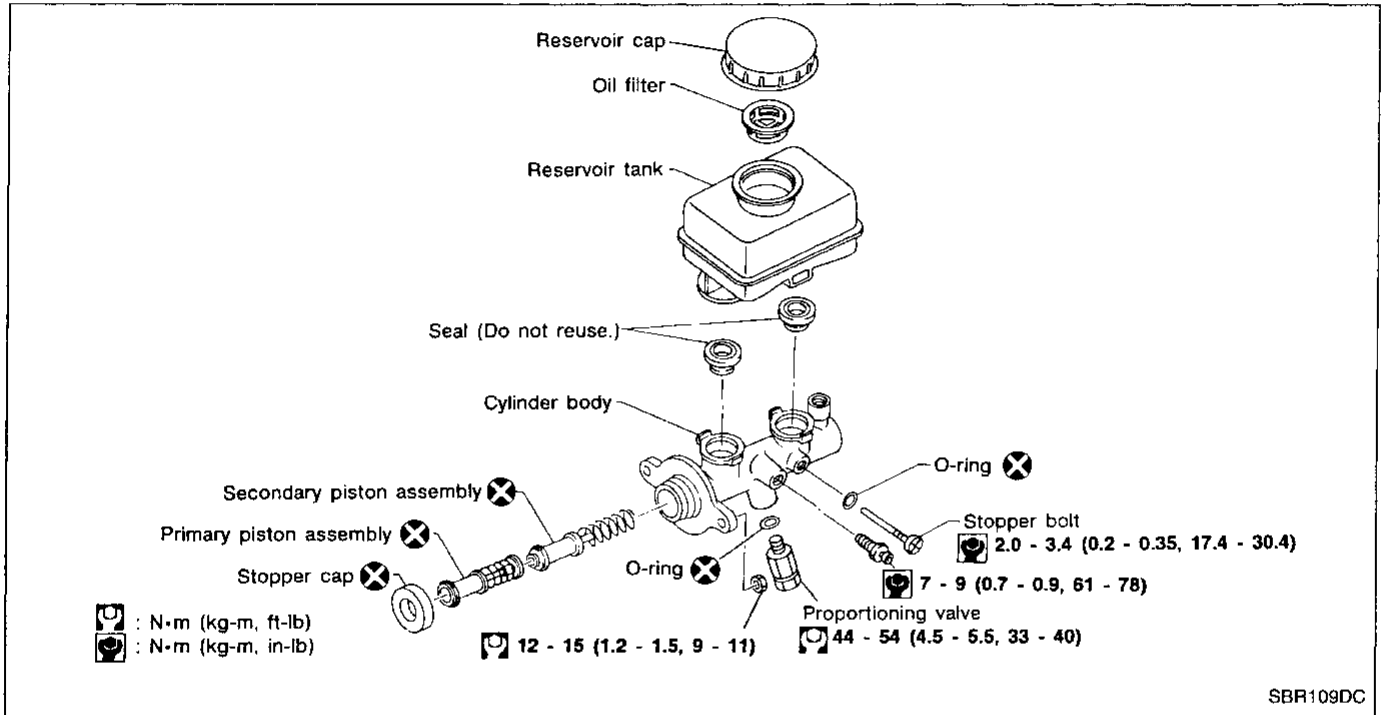
4. Check brake pedal's depressed height while engine is running. If depressed height is below specifications, check brake system. If leaks, accumulation of air or any damage to components (master cylinder, etc.) are found, make necessary repairs.

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.
 - In the case of brake fluid leakage from the master cylinder, disassemble the cylinder. Then check piston cups for deformation or scratches and replace necessary parts.
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.

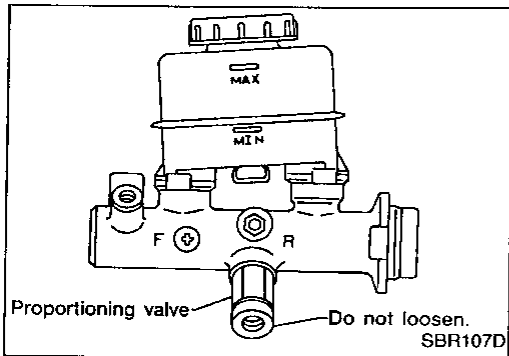
MASTER CYLINDER

Disassembly (Cont'd)

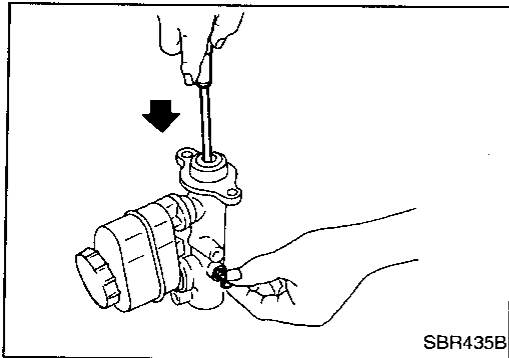
2. Remove proportioning valve.

CAUTION:

Do not loosen valve tip when removing proportioning valve.



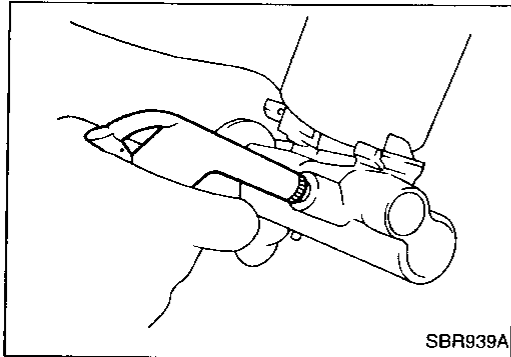
3. Remove valve stopper while piston is pushed into cylinder.



4. Remove piston assemblies.

If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.

5. Draw out reservoir tank.



Inspection

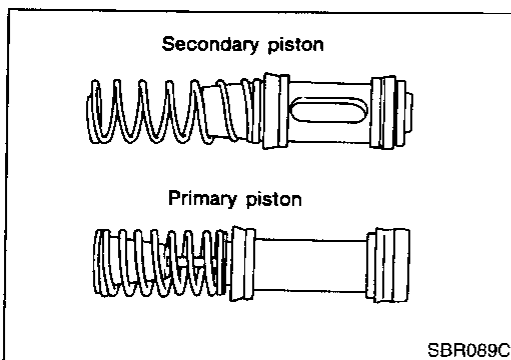
Check master cylinder inner wall for pin holes or scratches. Replace if damaged.

Assembly

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

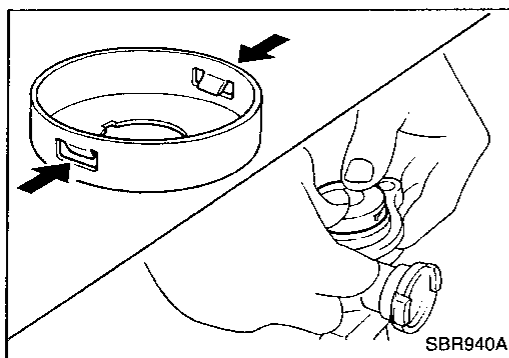
- Pay attention to direction of piston cups in figure at left. Also, insert pistons squarely to avoid scratches on cylinder bore.

- Pay attention to alignment of secondary piston slit with valve stopper mounting hole of cylinder body.



MASTER CYLINDER

Assembly (Cont'd)

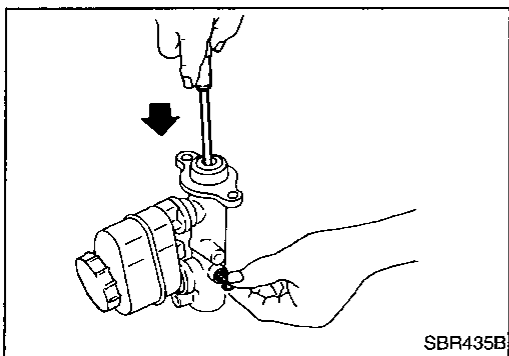


2. Install stopper cap.

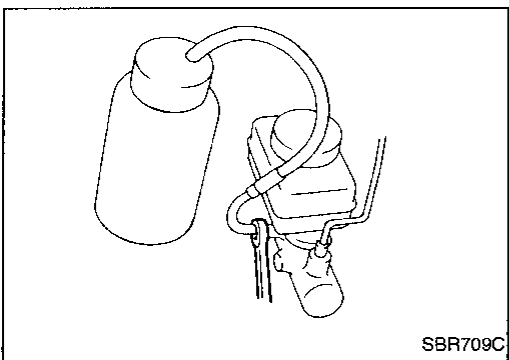
Before installing stopper cap, ensure that claws are bent inward.

3. Push reservoir tank seals into cylinder body.

4. Push reservoir tank into cylinder body.



5. Install valve stopper while piston is pushed into cylinder.




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. Torque mounting nuts.

 : 12 - 15 N·m (1.2 - 1.5 kg-m, 9 - 11 ft-lb)

3. Fit brake lines to master cylinder.

4. Torque flare nuts.

 : 15 - 17 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

5. Fill up reservoir tank with new brake fluid.

6. Connect a vinyl tube to air bleeder of master cylinder.

7. Open air bleeder of master cylinder


8. Have driver slowly depress brake pedal and hold.

9. Close air bleeder.

10. Have driver release brake pedal slowly.

11. Repeat steps 7. through 10. until no air bubbles come out of air bleeder.

12. Torque air bleeder.

 : 7 - 9 N·m (0.7 - 0.9 kg-m, 61 - 78 in-lb)

13. Bleed air from each caliper. Refer to "Bleeding Brake System", BR-6.

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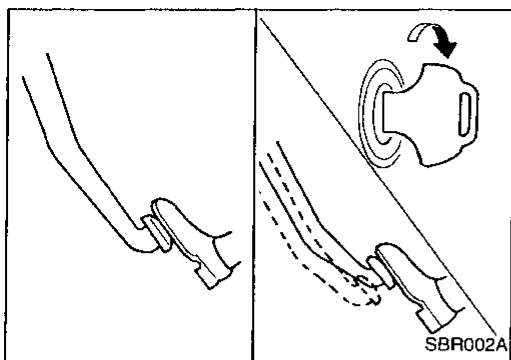
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BRAKE BOOSTER



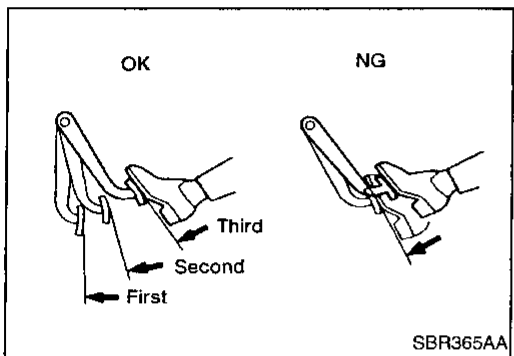
On-vehicle Service

OPERATING CHECK

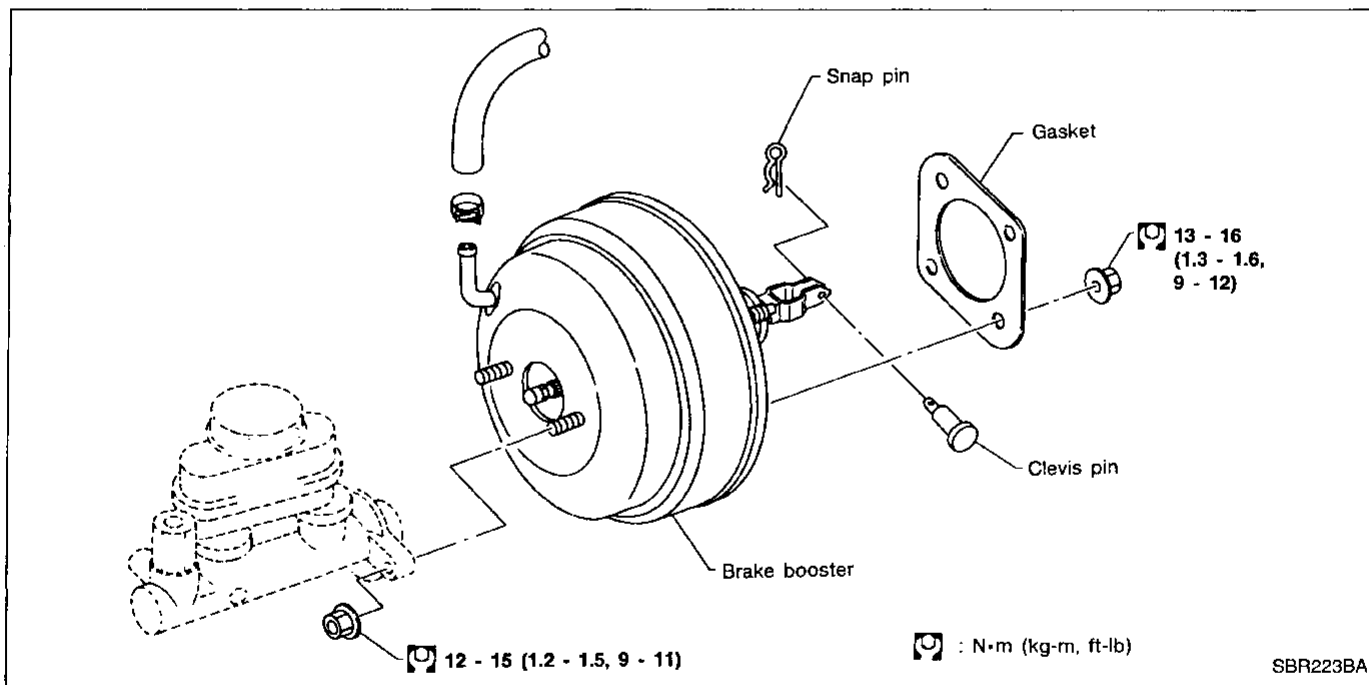
- Depress brake pedal several times with engine off. After exhausting vacuum, make sure there is no change in pedal stroke.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

AIRTIGHT CHECK

- Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. Booster is airtight if pedal stroke is less each time.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for **30 seconds**.



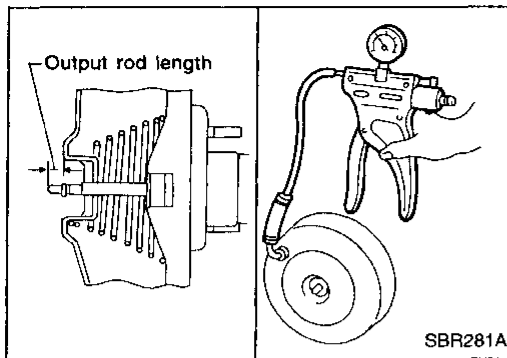
Removal



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.

BRAKE BOOSTER



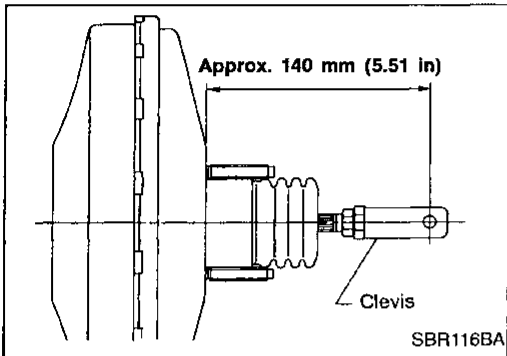
Inspection

OUTPUT ROD LENGTH CHECK

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

Specified length:

10.275 - 10.525 mm (0.4045 - 0.4144 in)



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 narrow angle of installation, the threads can be damaged by the dash panel.

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 "Installation" in "MASTER CYLINDER", BR-13.
6. Adjust brake pedal if necessary. Refer to "Adjustment" in "BRAKE PEDAL AND BRACKET", BR-9.
7. Secure lock nut for clevis.
Torque: 16 - 22 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)
8. Bleed air. Refer to "Bleeding Brake System", BR-6.

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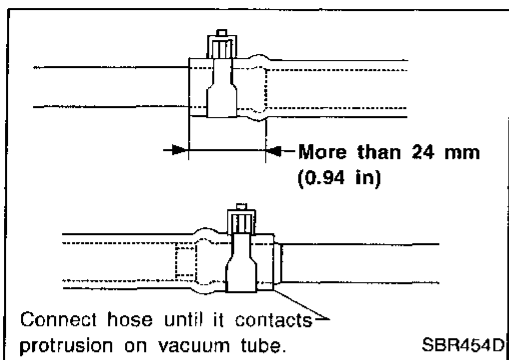
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VACUUM HOSE

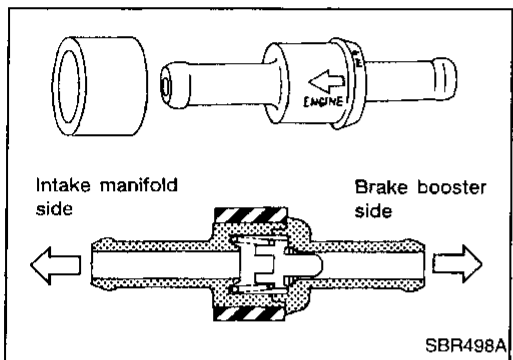


Removal and Installation

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.

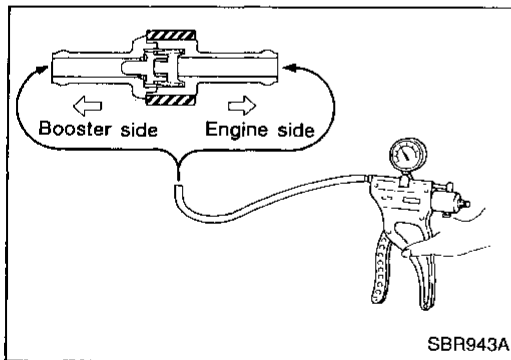


- Install check valve, paying attention to its direction.

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 the hazard of airborne particles or other materials.

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

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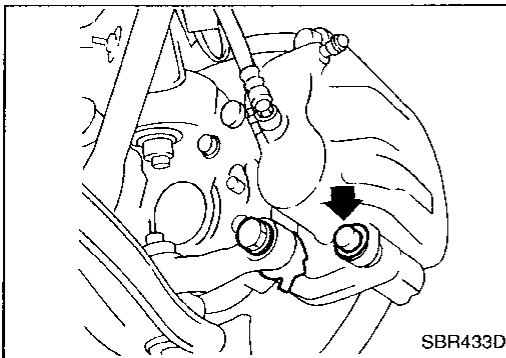
RS

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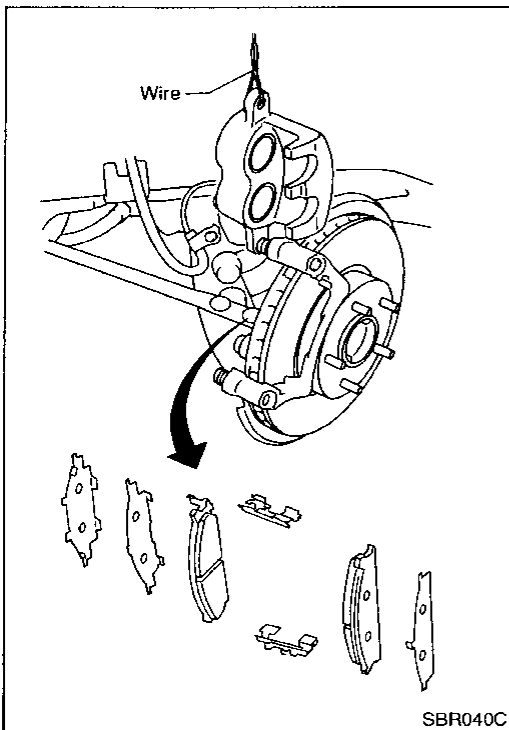
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1. Remove master cylinder reservoir cap.
2. Remove lower pin bolt.



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

Standard pad thickness:

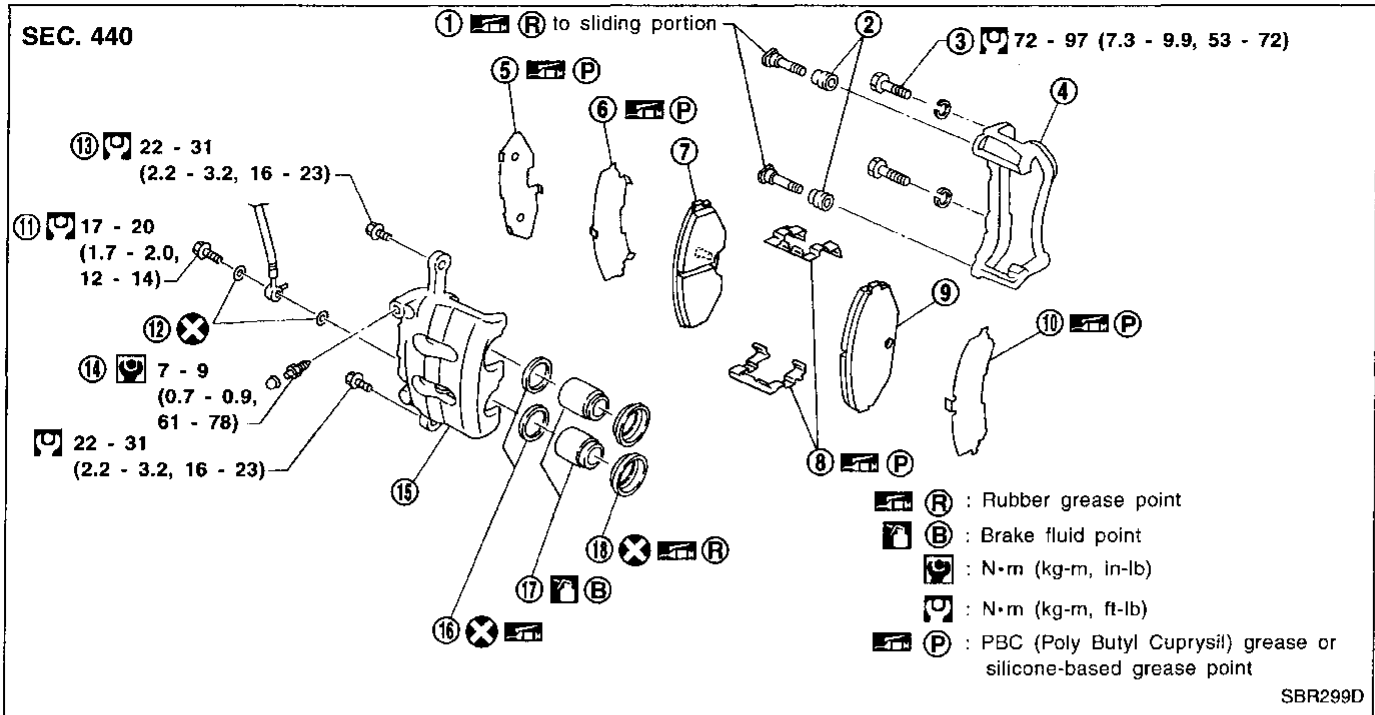
9.5 mm (0.374 in)

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 |

FRONT DISC BRAKE

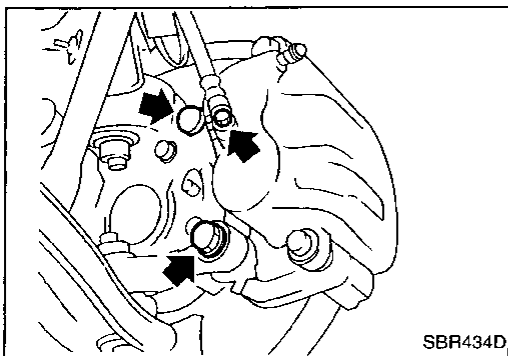
Removal

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

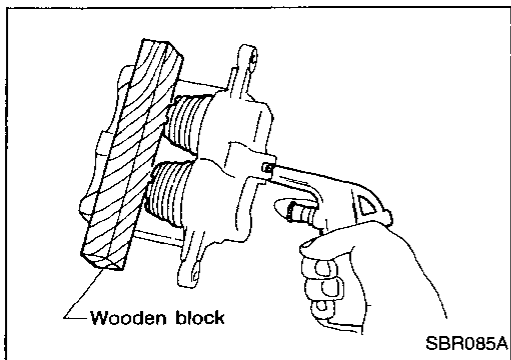
CAUTION:

Suspend caliper assembly with wire so as not to stretch brake hose.



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

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

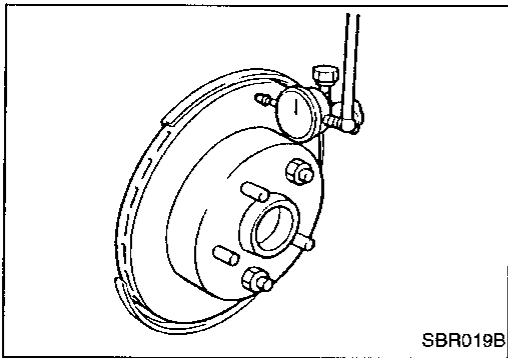
CAUTION:

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

MAIN PIN, PIN BOLT AND PIN BOOT

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

FRONT DISC BRAKE



Inspection — Rotor

RUNOUT

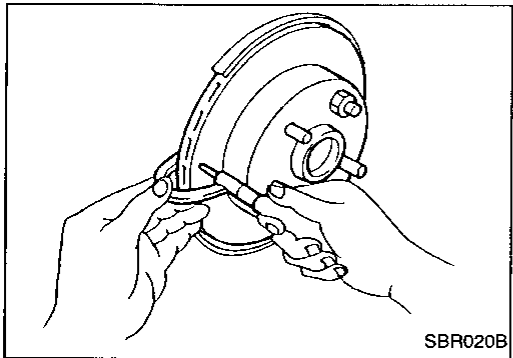
1. Secure rotor to wheel hub with at least two nuts (M12 × 1.25).
2. Check runout using a dial indicator.

Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to “Front Wheel Bearing” in FA section.

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).



THICKNESS

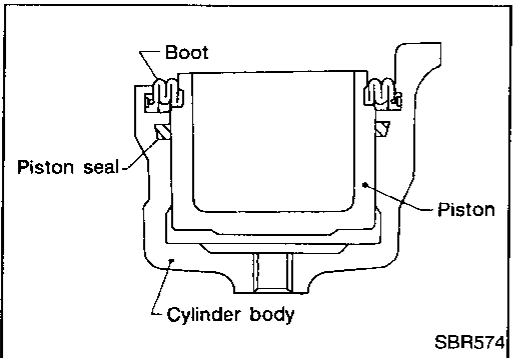
Thickness variation (At least 8 positions):

Maximum 0.01 mm (0.0004 in)

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

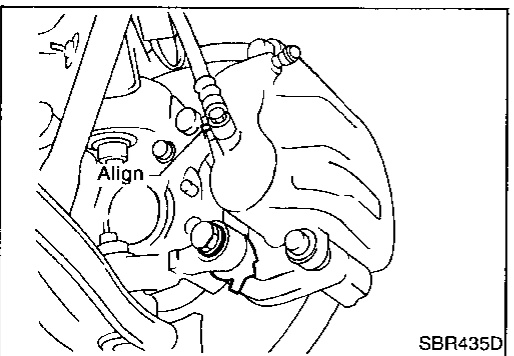
Rotor repair limit:

26.0 mm (1.024 in)



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 “Bleeding Brake System”, BR-6.

Pad Replacement

WARNING:

Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

- When cylinder body is open, do not depress brake pedal, otherwise 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.

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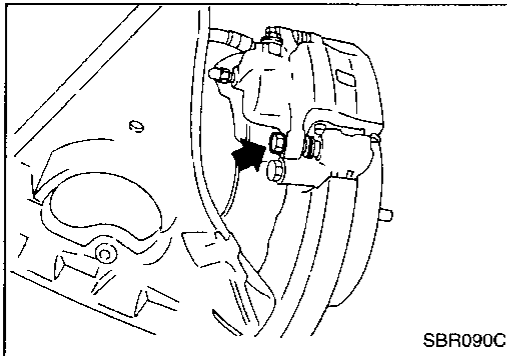
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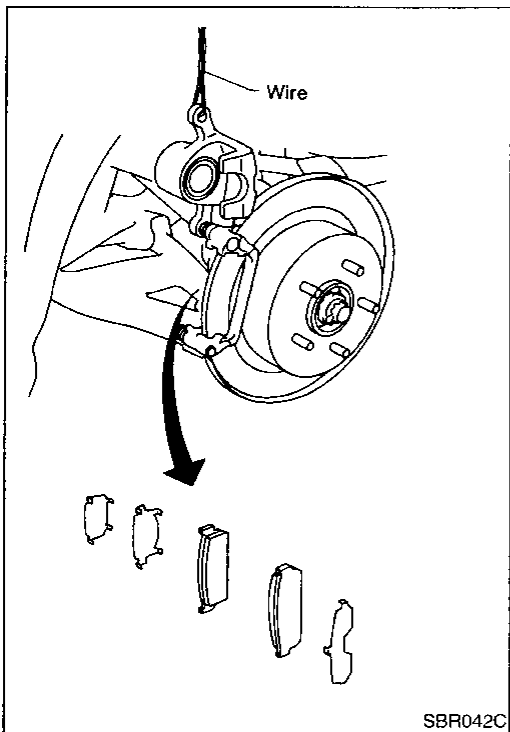
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1. Remove master cylinder reservoir cap.
2. Remove lower pin bolt.



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

Standard pad thickness:

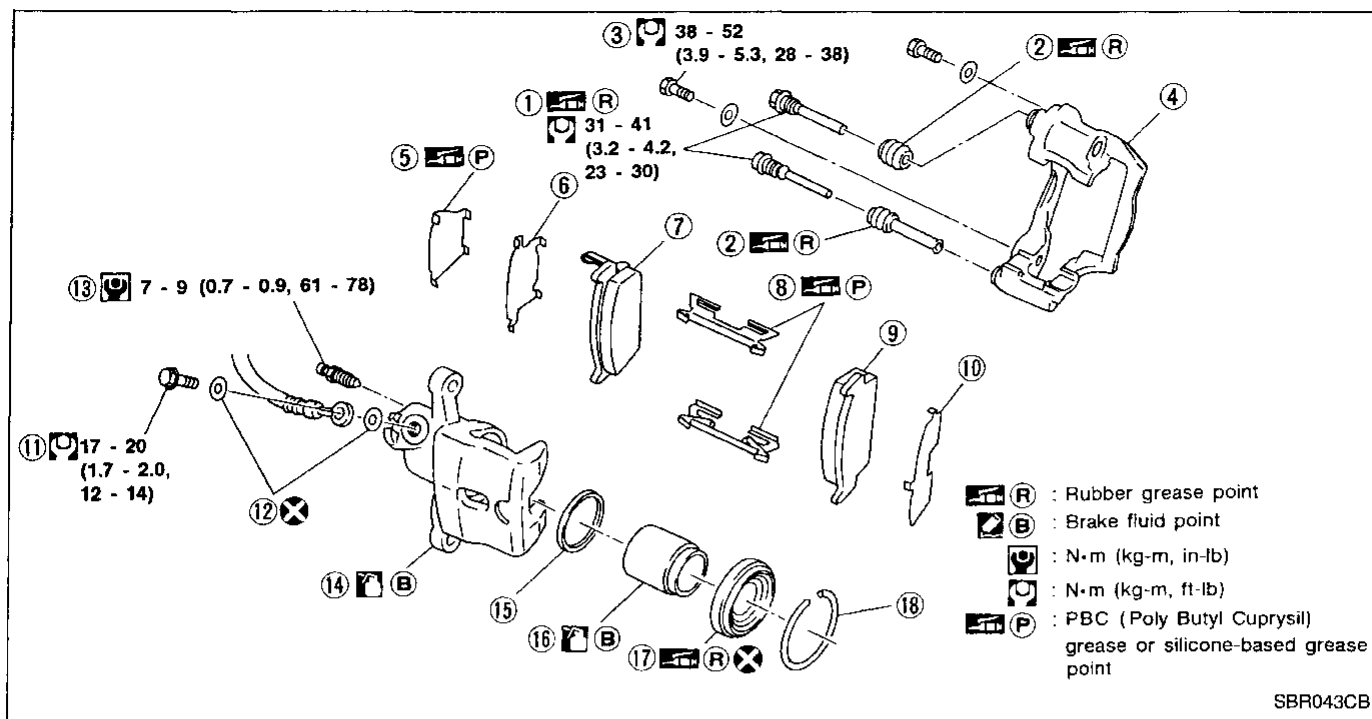
10 mm (0.39 in)

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.

REAR DISC BRAKE



- ① Main pin bolt
- ② Pin boot
- ③ Torque member fixing bolt
- ④ Torque member
- ⑤ Shim cover
- ⑥ Inner shim

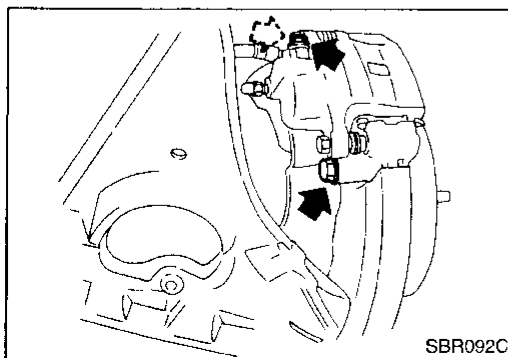
- ⑦ Inner pad
- ⑧ Pad retainer
- ⑨ Outer pad
- ⑩ Outer shim
- ⑪ Connecting bolt
- ⑫ Copper washer

- ⑬ Bleed valve
- ⑭ Cylinder body
- ⑮ Piston seal
- ⑯ Piston
- ⑰ Piston boot
- ⑱ Retainer

Removal

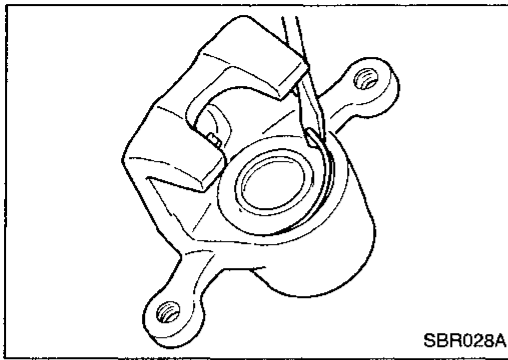
WARNING:

Clean brakes with a vacuum dust collector to minimize the hazard of airborne particles or other materials.



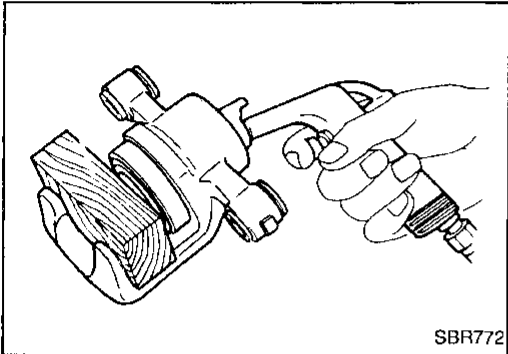
Remove torque member fixing bolts and connecting bolt. It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.

REAR DISC BRAKE



Disassembly

1. Remove piston boot retainer with a screwdriver.



WARNING:

Do not place your fingers in front of piston.

CAUTION:

Do not scratch or score cylinder wall.

2. Push out piston and piston boot with compressed air.
3. 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 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.

MAIN 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

RUBBING SURFACE

Check rotor for roughness, cracks or chips.

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REAR DISC BRAKE

Inspection — Rotor (Cont'd)

RUNOUT

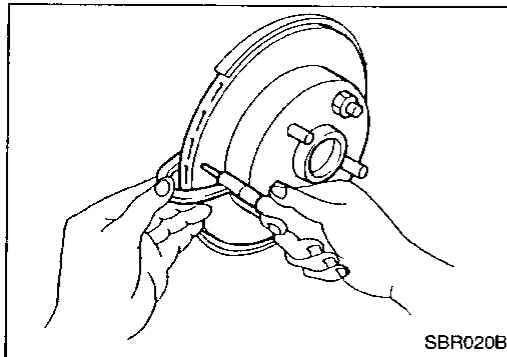
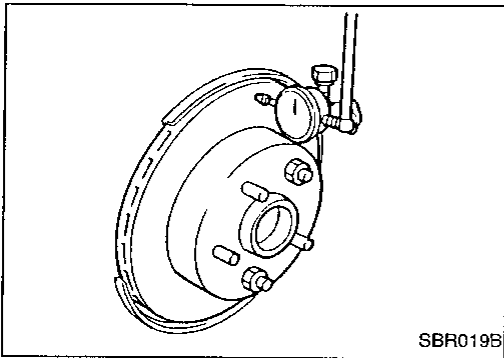
1. Secure rotor to wheel hub with two nuts (M12 x 1.25).
2. Check runout using a dial indicator.

Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to "Rear Wheel Bearing" in RA section.

Maximum runout:

0.15 mm (0.0059 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).



THICKNESS

Rotor repair limit:

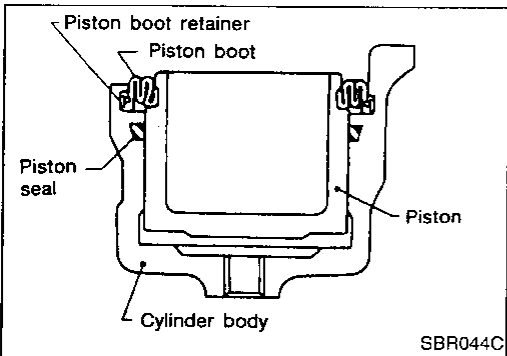
Minimum thickness

14.0 mm (0.551 in)

Thickness variation (At least 8 portions)

Maximum 0.02 mm (0.0008 in)

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



Assembly

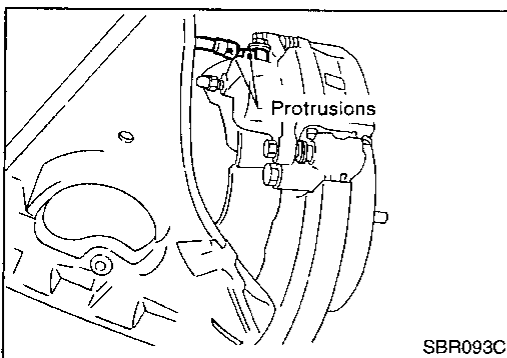
1. Insert piston seal into groove on cylinder body.
2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.
3. Properly secure piston boot.
4. Secure piston boot with retainer.

Installation

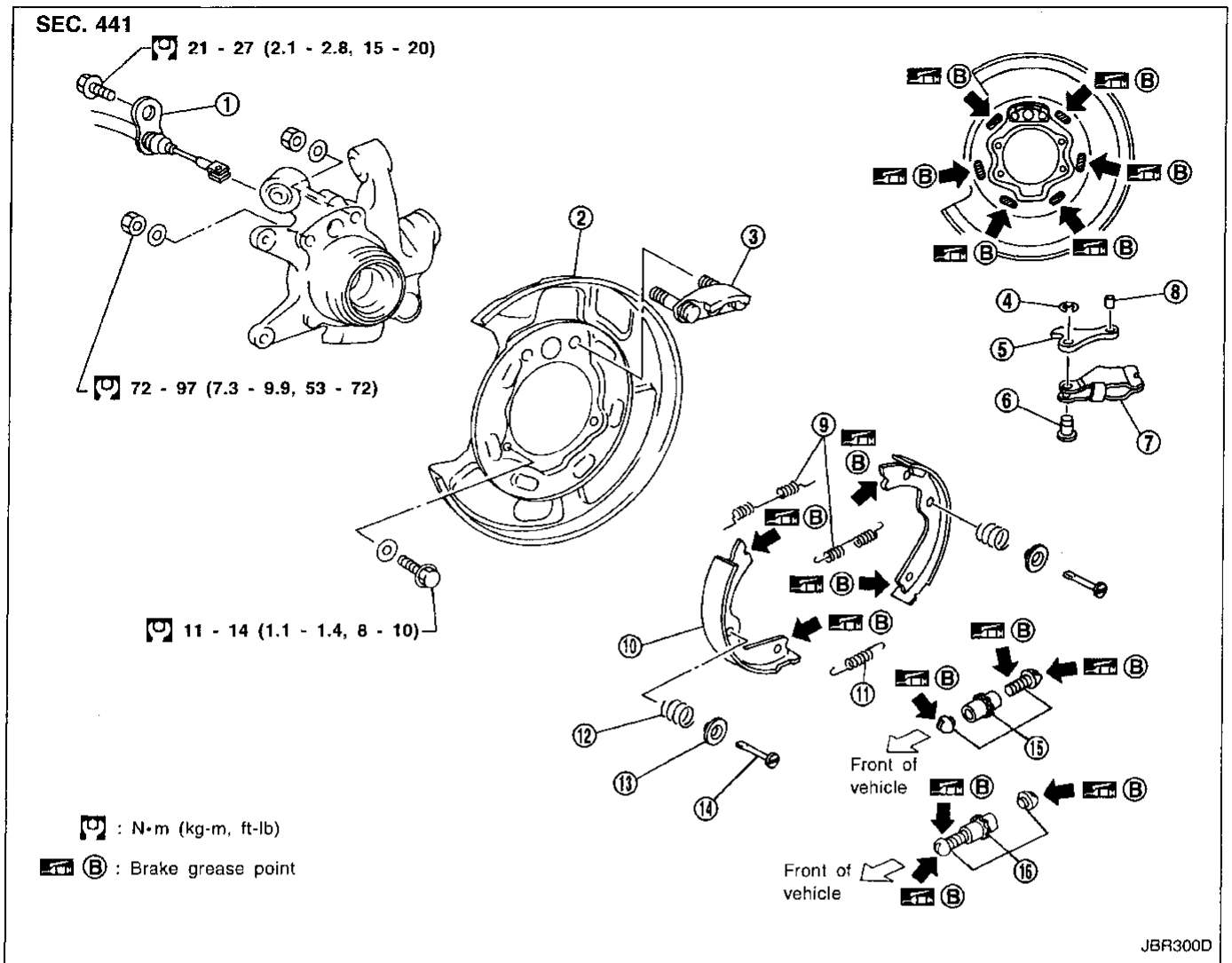
CAUTION:

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

1. Install caliper assembly.
- Do not forget to install shims and washers.**
2. Install brake hose to caliper securely.
 3. Install all parts and secure all bolts.
 4. Bleed air. Refer to "Bleeding Brake System", BR-6.



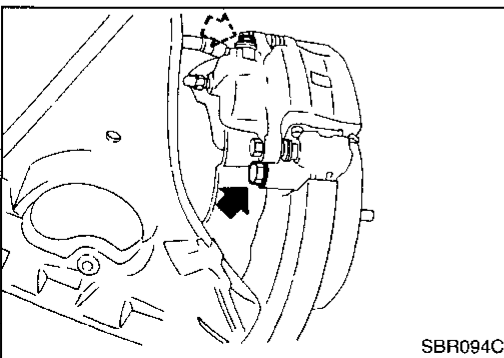
REAR DISC BRAKE — Parking Drum Brake



- ① Parking brake cable
- ② Back plate
- ③ Anchor block
- ④ E-ring
- ⑤ Lever
- ⑥ Pin

- ⑦ Toggle lever
- ⑧ Stopper pin
- ⑨ Return spring
- ⑩ Shoe
- ⑪ Adjuster spring

- ⑫ Anti-rattle spring
- ⑬ Retainer
- ⑭ Anti-rattle pin
- ⑮ Adjuster assembly LH
- ⑯ Adjuster assembly RH



Removal

WARNING:

Clean brakes with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

Make sure parking brake lever is released completely.

1. Remove torque member fixing bolts (Rear disc brake assembly mounting bolts).

Suspend caliper assembly with wire so as not to stretch brake hose.

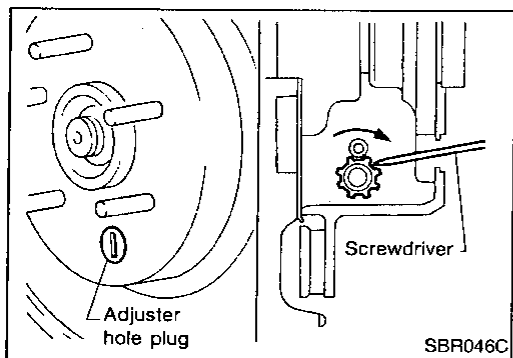
REAR DISC BRAKE — Parking Drum Brake

Removal (Cont'd)

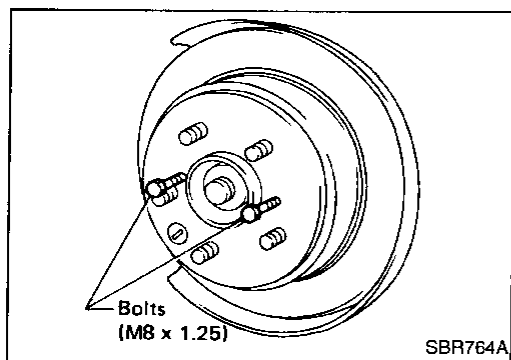
2. Release parking brake lever fully, then remove drum.

If drum is hard to remove, the following procedures should be carried out.

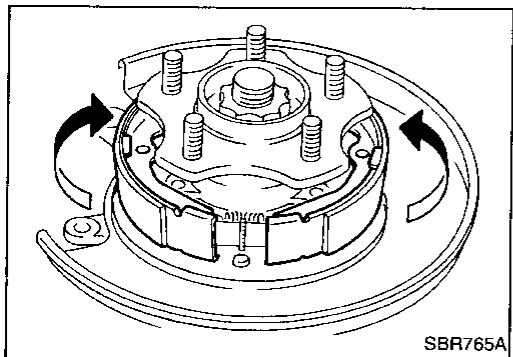
- a. Remove plug.
- b. Insert screwdriver through plug hole.
- c. Turn adjuster to make clearance between brake shoe and drum.



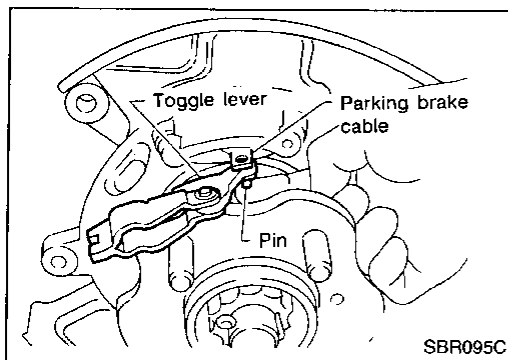
- d. Fit two bolts to the drum as shown and tighten gradually.



3. After removing retainer, remove spring by rotating shoes.
4. Remove adjuster.

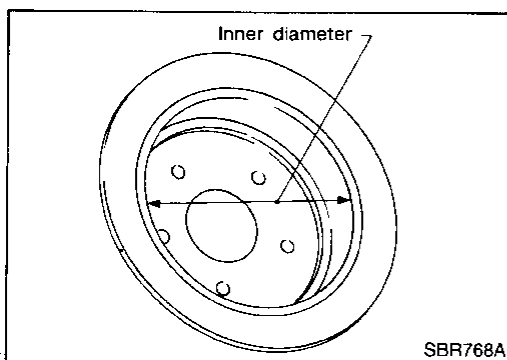


5. Disconnect parking brake cable from toggle lever after drawing out toggle lever pin.

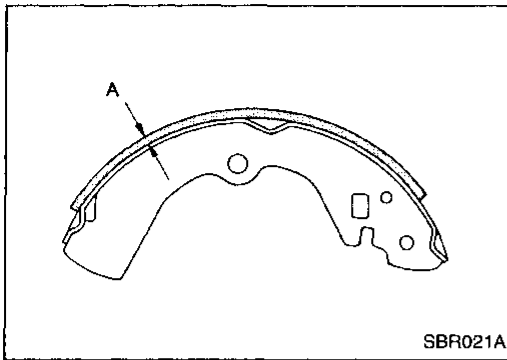


Inspection — Drum

Maximum inner diameter:
173.0 mm (6.81 in)



REAR DISC BRAKE — Parking Drum Brake



Inspection — Lining

Check lining thickness.

Standard lining thickness:

3.0 mm (0.118 in)

Lining wear limit (A):

1.5 mm (0.059 in)

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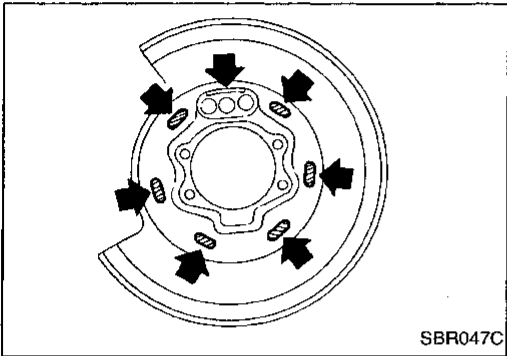
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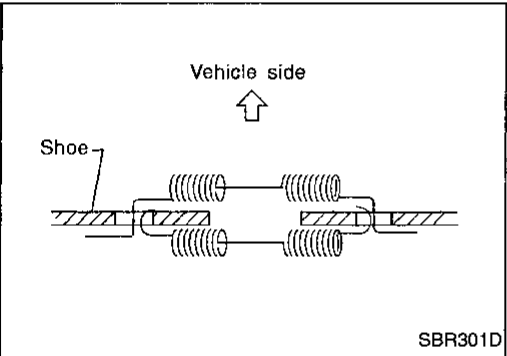
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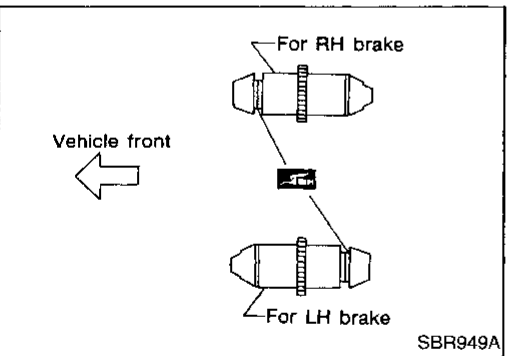


Installation

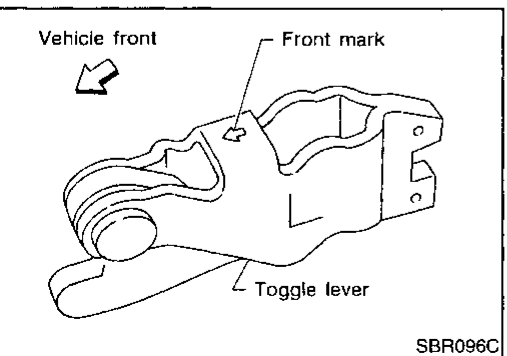
1. Apply brake grease to the contact areas shown at left.



2. Attach two upper springs to brake shoes as shown in the figure at left.



3. Shorten adjuster by rotating it.
Pay attention to direction of adjuster.



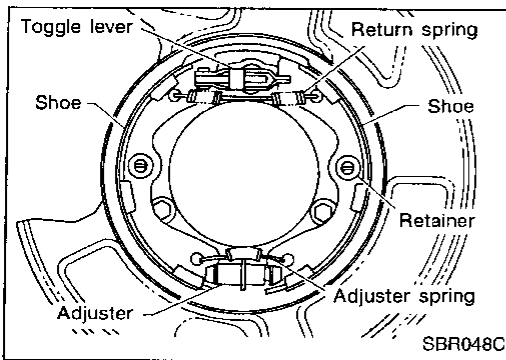
4. Connect parking brake cable to toggle lever.

Pay attention to direction of adjuster.

5. Install all parts.

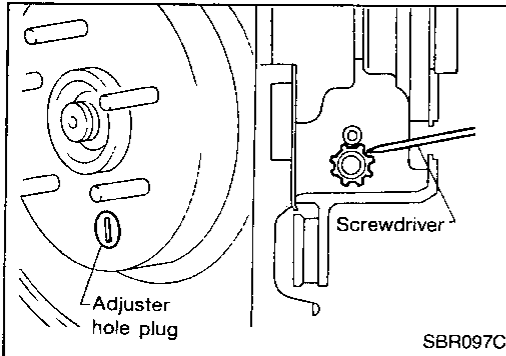
REAR DISC BRAKE — Parking Drum Brake

Installation (Cont'd)



6. Check all parts are installed properly.
Pay attention to direction of adjuster and toggle lever.
7. Install drum.
8. Install rear disc brake assembly.

Shoe Clearance Adjustment



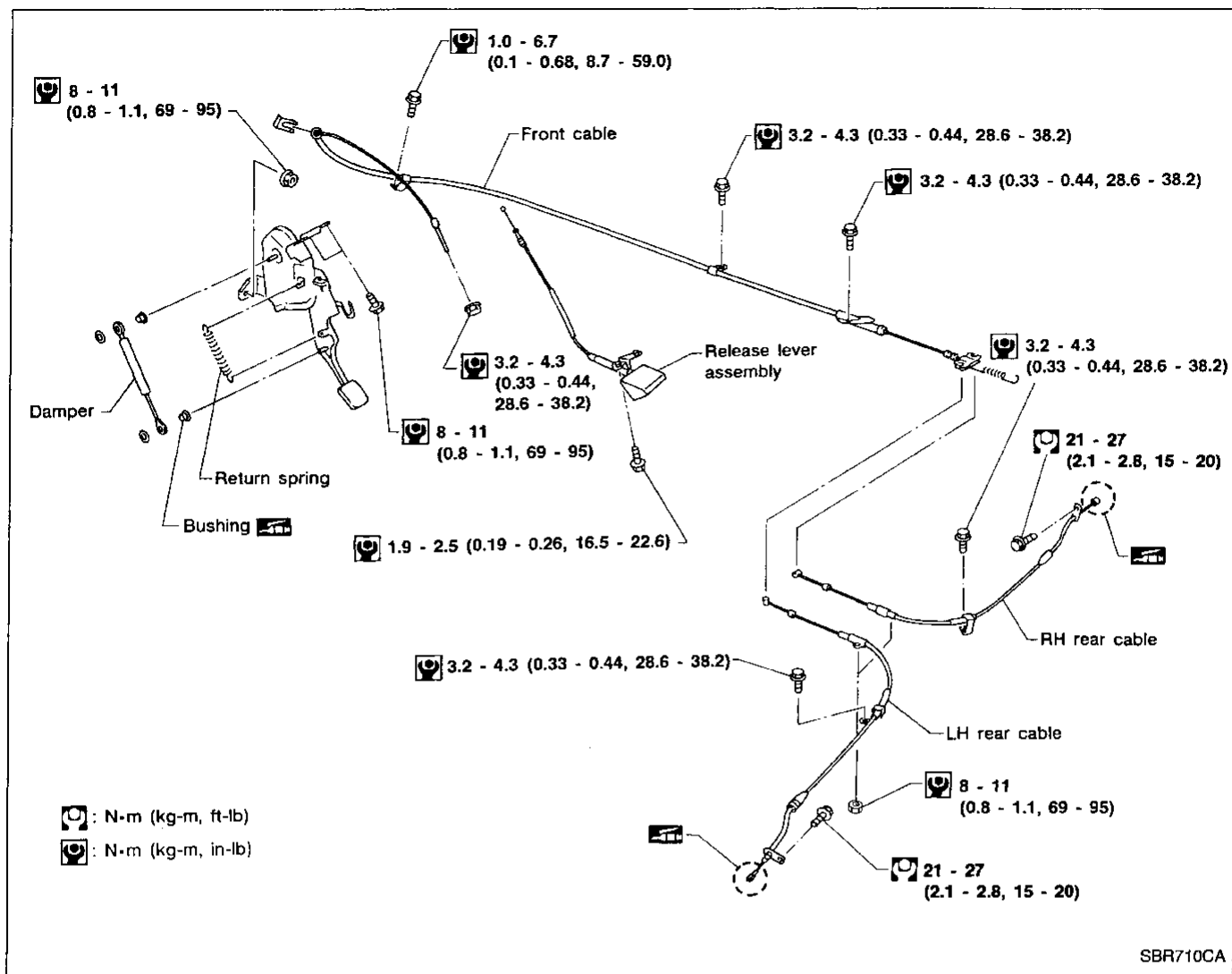
1. Remove adjuster hole plug, and turn down adjuster wheel with a screwdriver until brake is locked.
Make sure that parking control lever is released completely.
2. Return adjuster wheel 5 to 6 latches.
3. Install adjuster hole plug, and make sure that there is no drag between shoes and brake drum when rotating disc rotor.
4. Adjust parking brake cable. Refer to "Adjustment" in "PARKING BRAKE CONTROL", BR-30.

Breaking in Drum and Lining

When a new rotor/parking brake shoe is installed, or when braking performance is poor, perform the following break-in procedure.

1. Drive the unloaded vehicle on a safe, level and dry road.
2. Depress parking brake pedal with a force of 147N (15 kg, 33 lb).
3. While depressing the pedal, continue to drive the vehicle forward 100 m (328 ft) at approximately 35 km/h (22 MPH).
4. Cool down parking brake for approx. five minutes.
5. After releasing the pedal, drive the vehicle under the normal conditions for two minutes to cool down the parking drum brake.
6. Repeat steps 1 through 5 three times and then repeat only step 5 one more time.

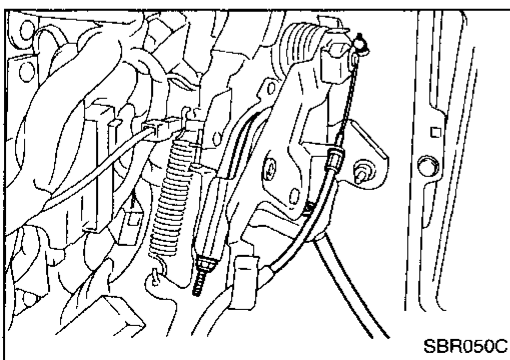
PARKING BRAKE CONTROL



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Removal and Installation

- Parking brake cables can be removed without removing pedal assembly.
- In order to remove front cable, it is necessary to remove center console. (Refer to "INSTRUMENT PANEL" in BT section.)
- In order to remove pedal assembly, it is necessary to remove instrument panel assembly and air duct. (Refer to "INSTRUMENT PANEL" in BT section.)



- The figure at left shows how front and release cables are connected to pedal assembly.

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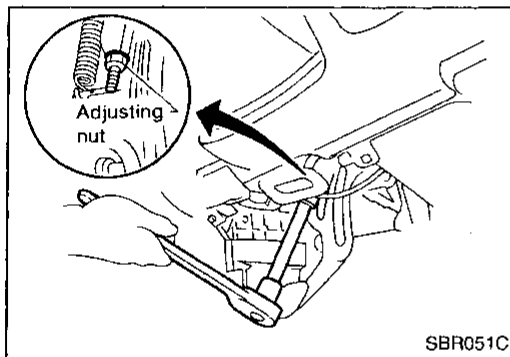
PARKING BRAKE CONTROL

Inspection

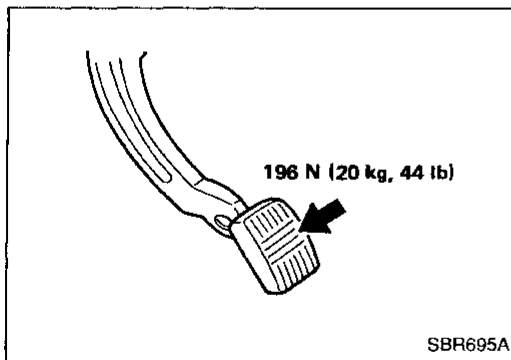
1. Check control lever for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Check warning lamp and switch. Replace if necessary.
4. Check parts at each connecting portion and, if deformed or damaged, replace.

Adjustment

On models equipped with parking drum brake, perform shoe clearance adjustment before adjusting parking brake control. Refer to "Shoe Clearance Adjustment" in "REAR DISC BRAKE — Parking Drum Brake" (BR-28).



1. Release parking brake pedal and loosen adjusting nut. Adjust parking brake by turning adjusting nut.



2. Depress parking brake pedal several times with specified amount of force. Check pedal stroke and ensure smooth operation.

Pedal stroke:

75 - 90 mm (2.95 - 3.54 in)

ANTI-LOCK BRAKE SYSTEM

Purpose

The Anti-Lock Brake System (ABS) consists of electronic and hydraulic components. It allows for control of braking force so locking of the wheels can be avoided.

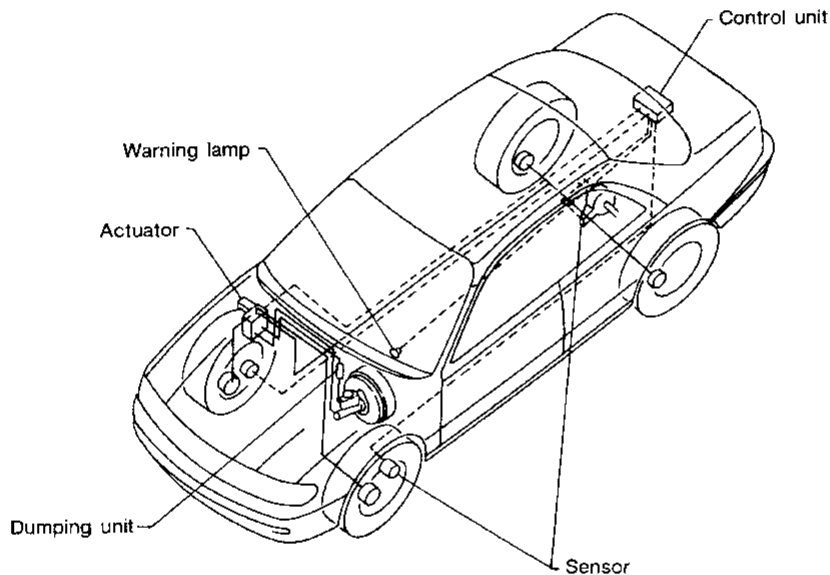
The ABS:

- 1) Improves proper tracking performance through steering wheel operation.
- 2) Eases obstacle avoidance through steering wheel operation.
- 3) Improves vehicle stability.

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 a self-test function. The system turns on the ABS warning lamp for 1 second each time the ignition switch is turned "ON". After the engine is started, the ABS warning lamp turns off. The system performs a test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs this self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will stay on.
- While driving, a mechanical noise may be heard during ABS operation. This is a normal condition.

System components



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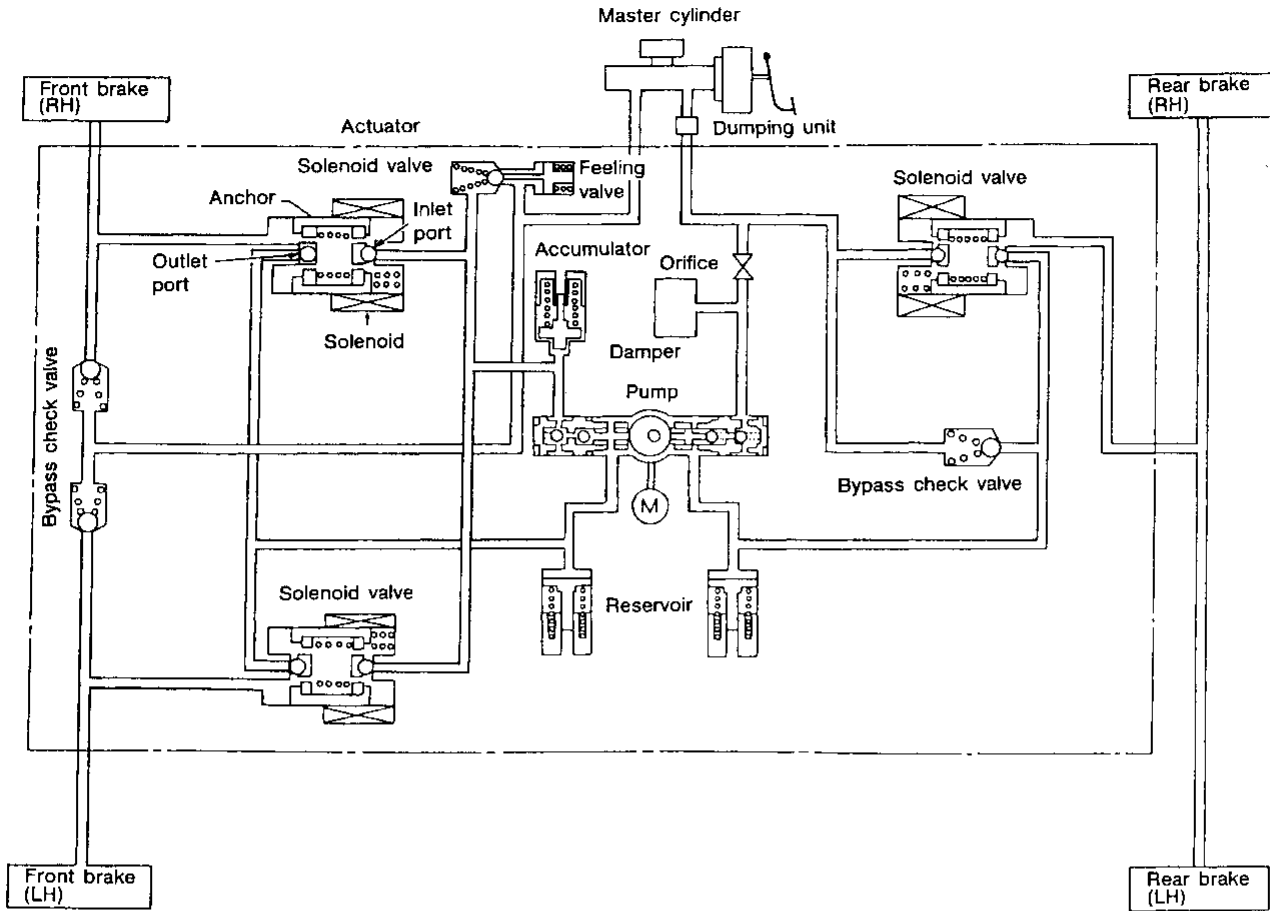
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ANTI-LOCK BRAKE SYSTEM

Operation (Cont'd)

Operation of actuator hydraulic circuit

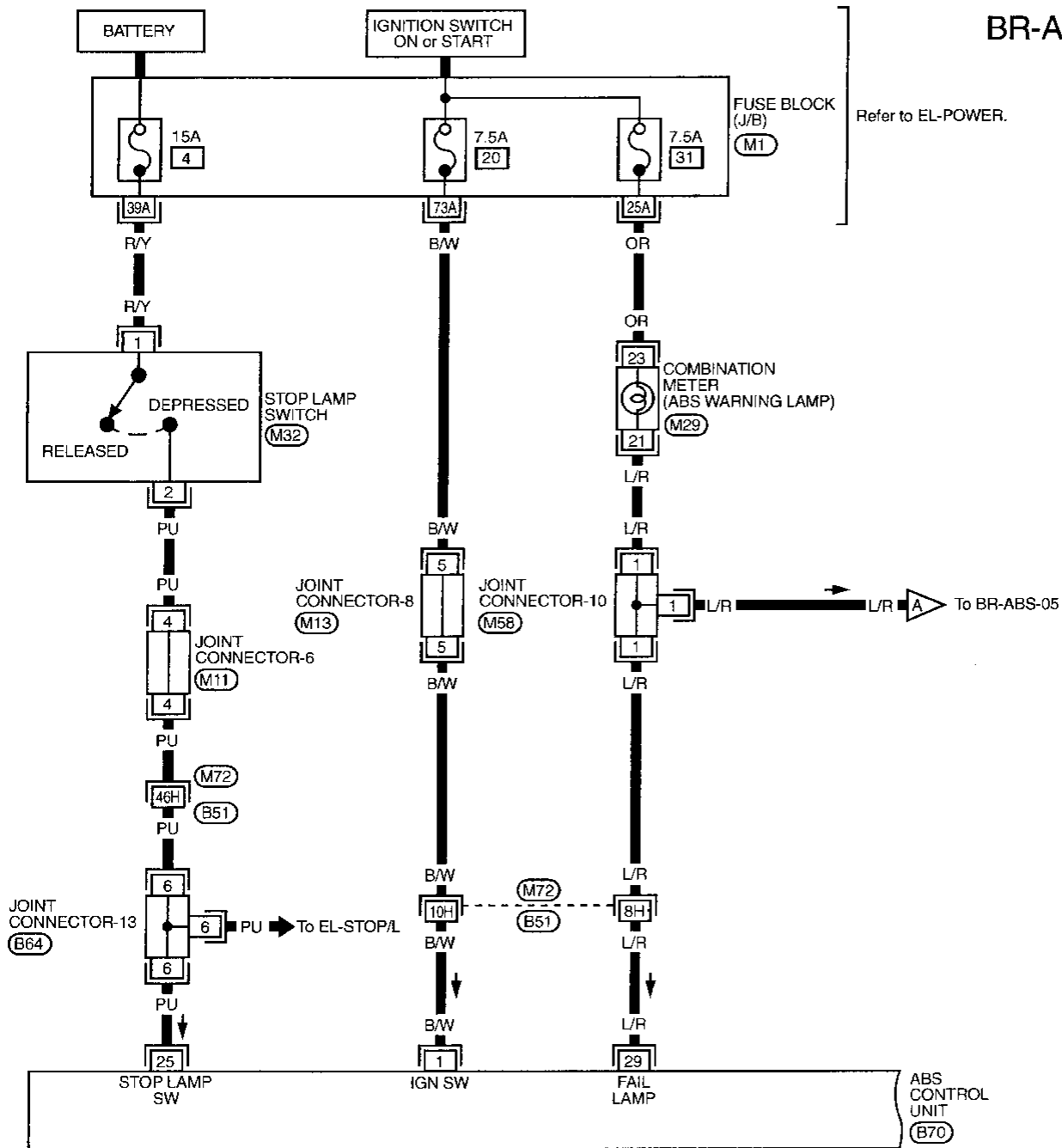


SBR104CB

ANTI-LOCK BRAKE SYSTEM

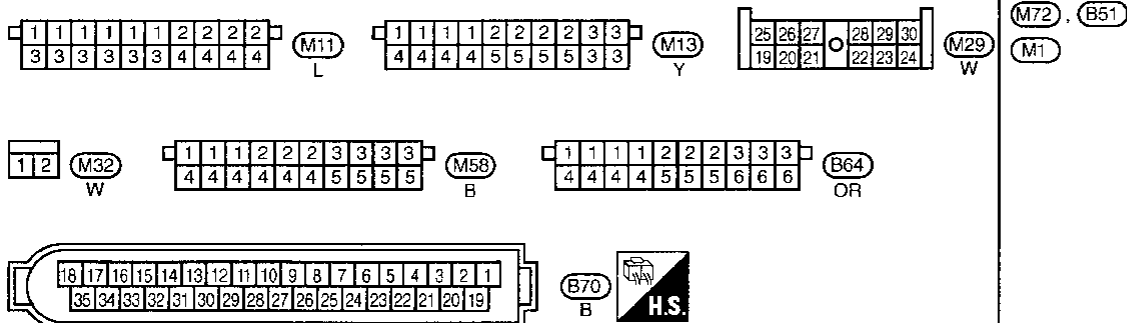
Wiring Diagram

BR-ABS-01



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Refer to last page (Foldout page).

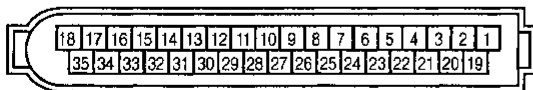
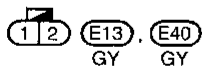
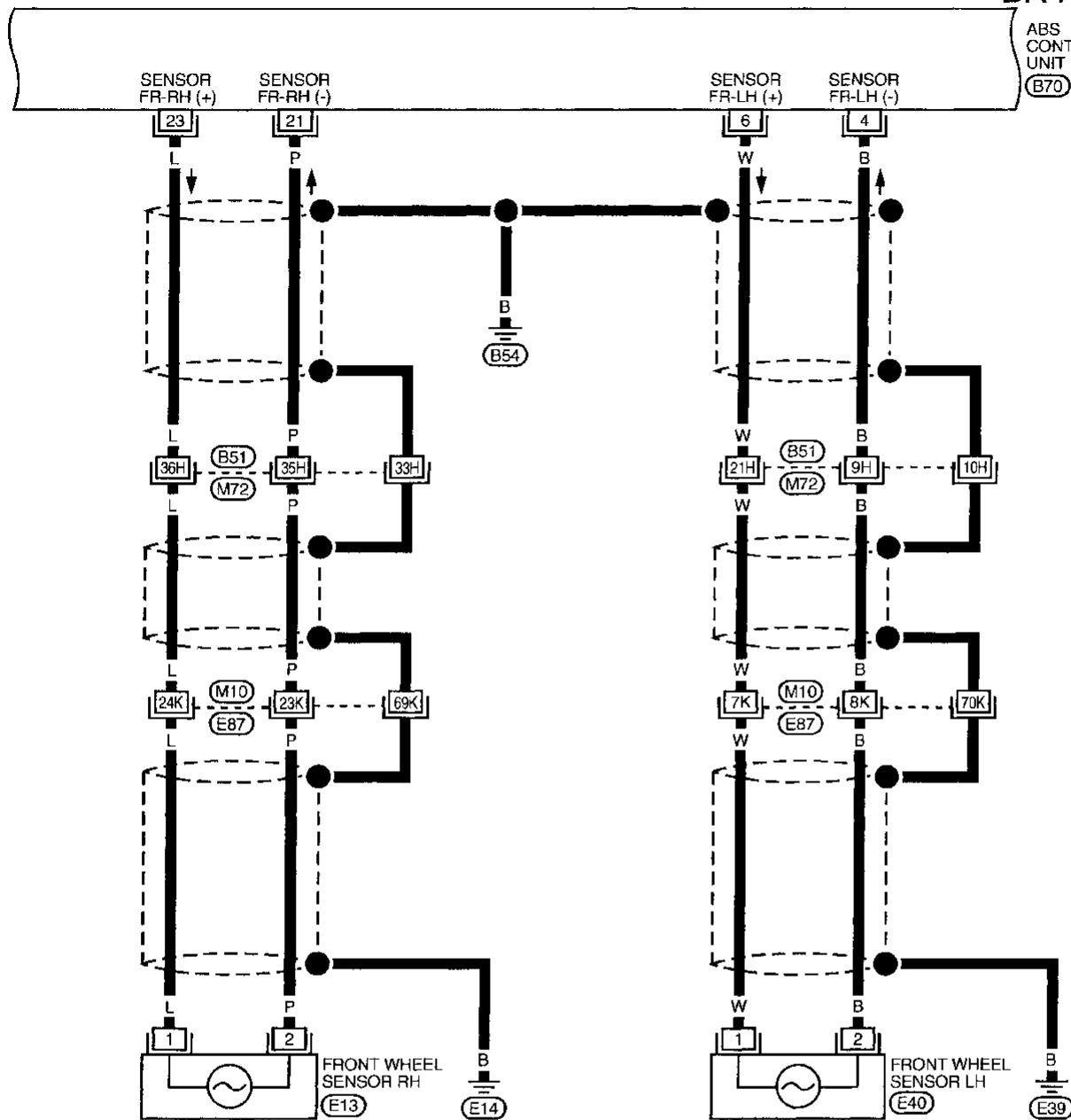


ANTI-LOCK BRAKE SYSTEM

Wiring Diagram (Cont'd)

BR-ABS-02

ABS CONTROL UNIT (B70)



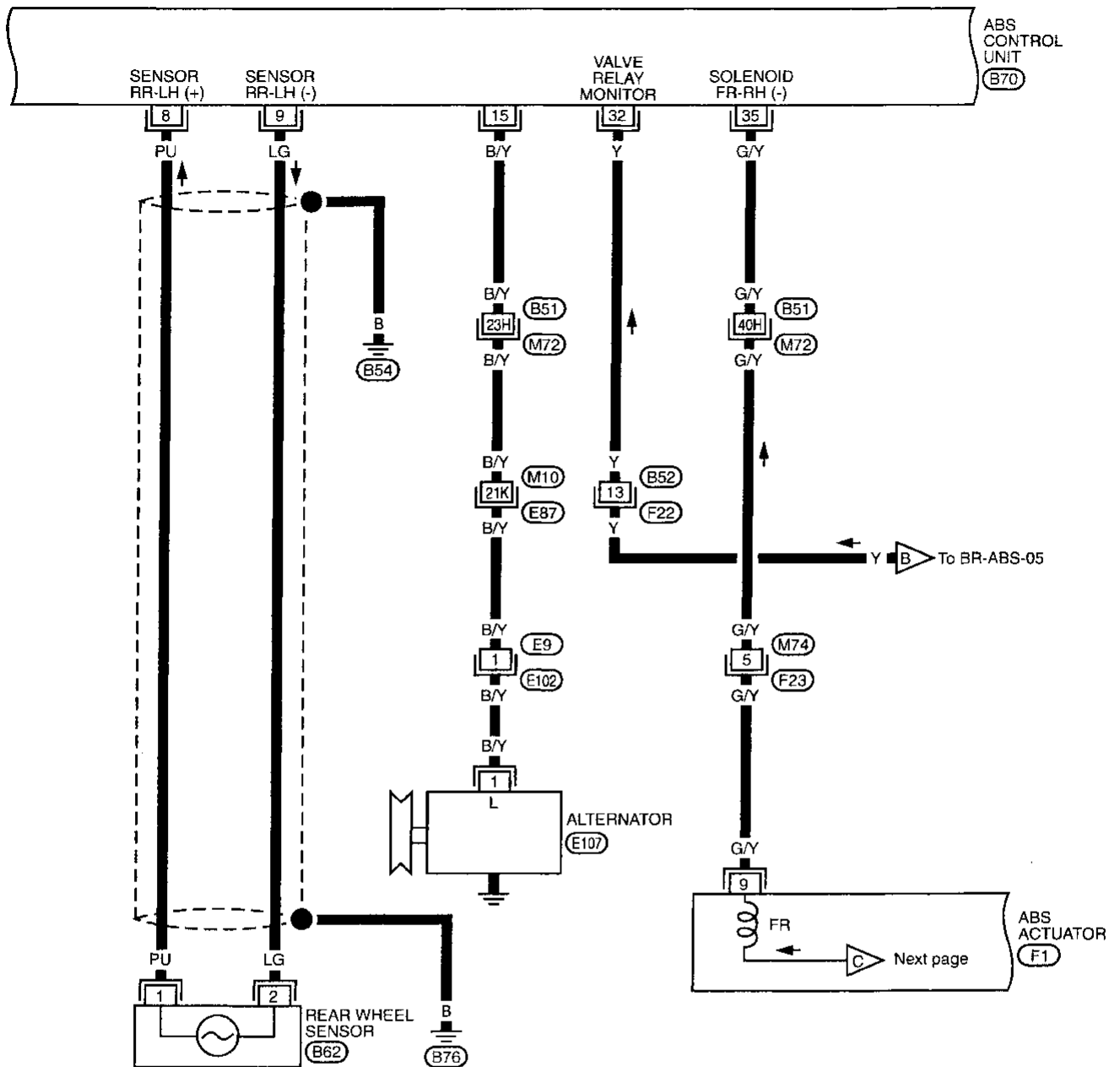
Refer to last page (Foldout page).

M72, B51
E87, M10

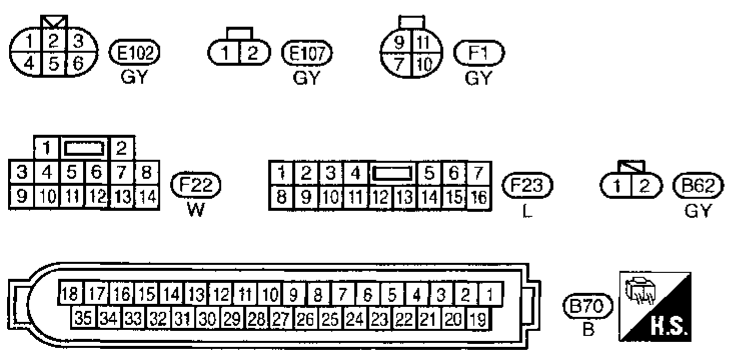
ANTI-LOCK BRAKE SYSTEM

Wiring Diagram (Cont'd)

BR-ABS-03



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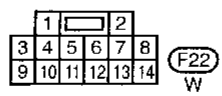
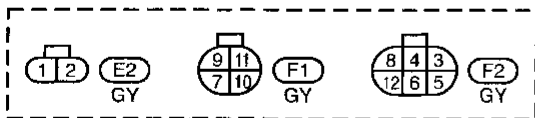
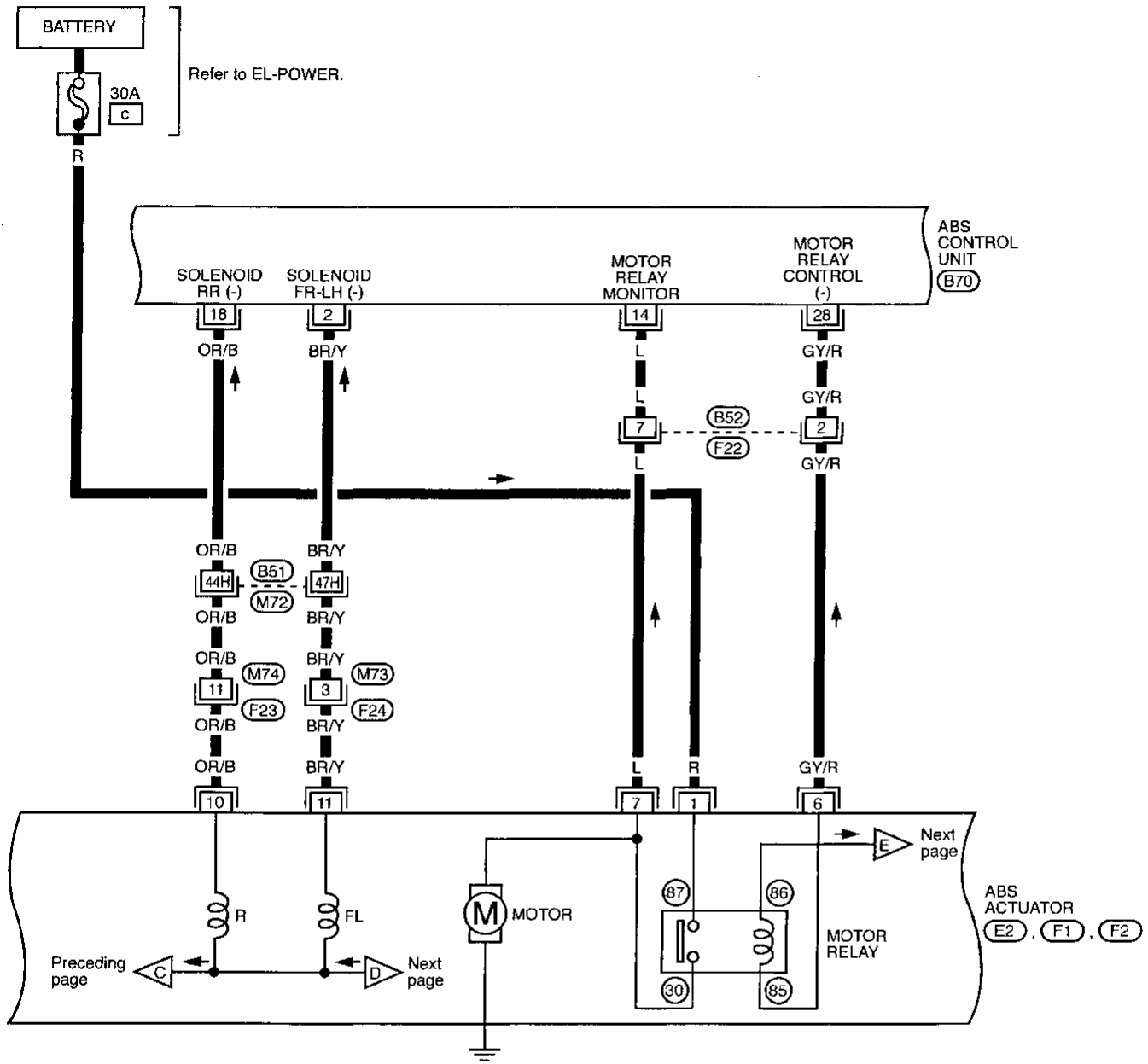


Refer to last page (Foldout page).
 (M72), (B51)
 (E87), (M10)

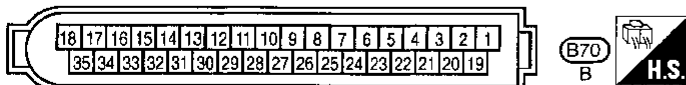
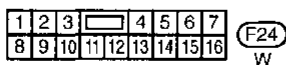
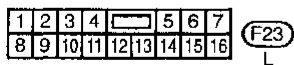
ANTI-LOCK BRAKE SYSTEM

Wiring Diagram (Cont'd)

BR-ABS-04



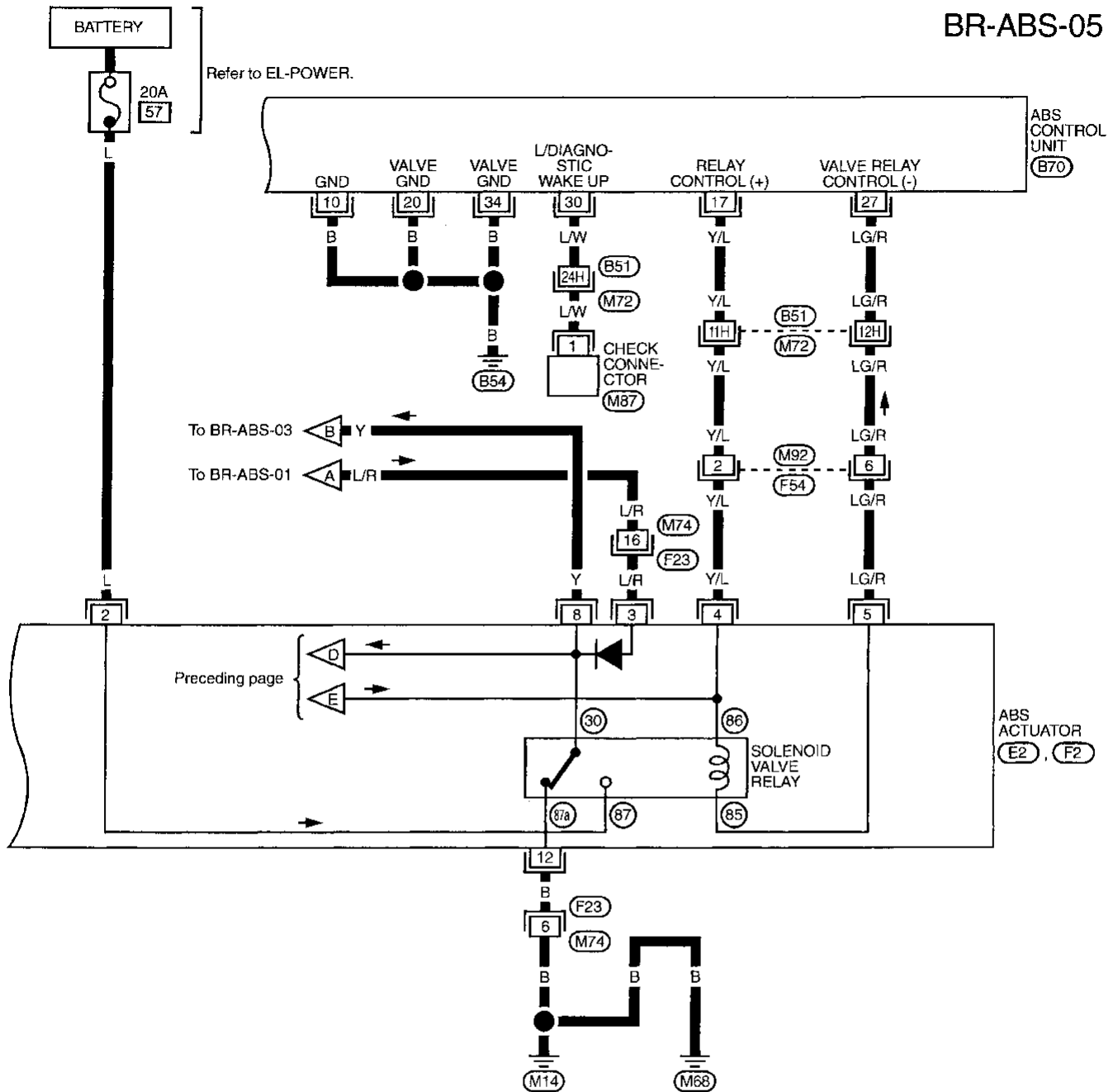
Refer to last page (Foldout page).
(M72), (B51)



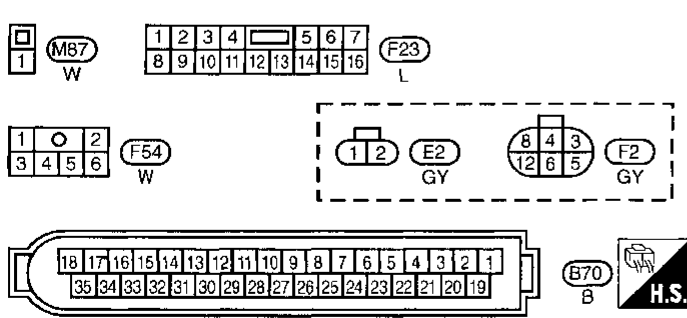
ANTI-LOCK BRAKE SYSTEM

Wiring Diagram (Cont'd)

BR-ABS-05



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Refer to last page (Foldout page).
(M72, B51)

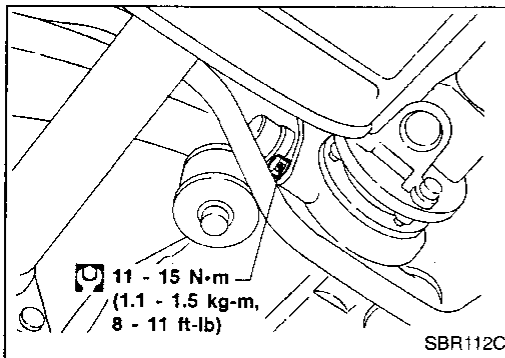
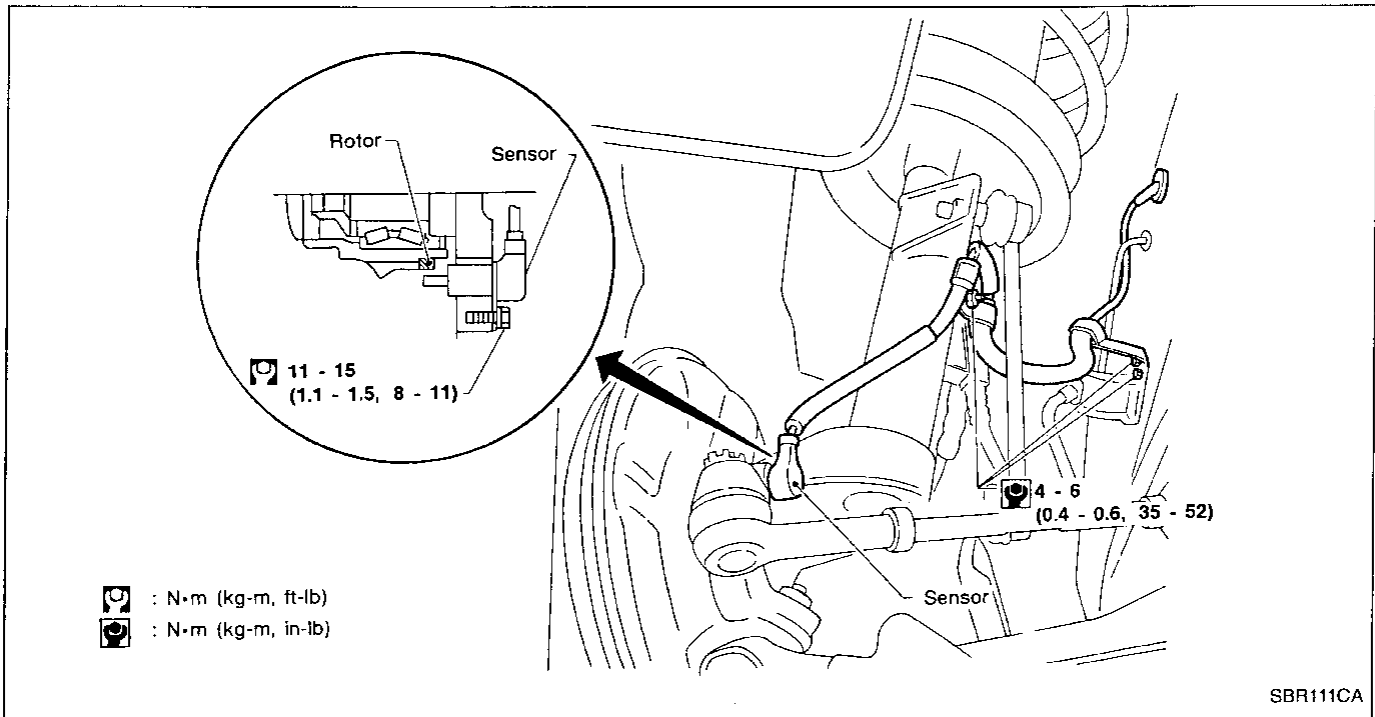
ANTI-LOCK BRAKE SYSTEM

Removal and Installation

CAUTION:

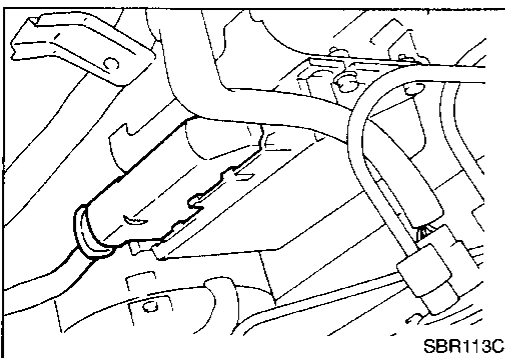
Be careful not to damage sensor edge and sensor rotor teeth. If the front wheel hub or final drive assembly needs to be removed, disconnect the ABS wheel sensor from the assembly. Then, move it away. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

FRONT WHEEL SENSOR



REAR WHEEL SENSOR

Rear wheel sensor is installed in final drive.



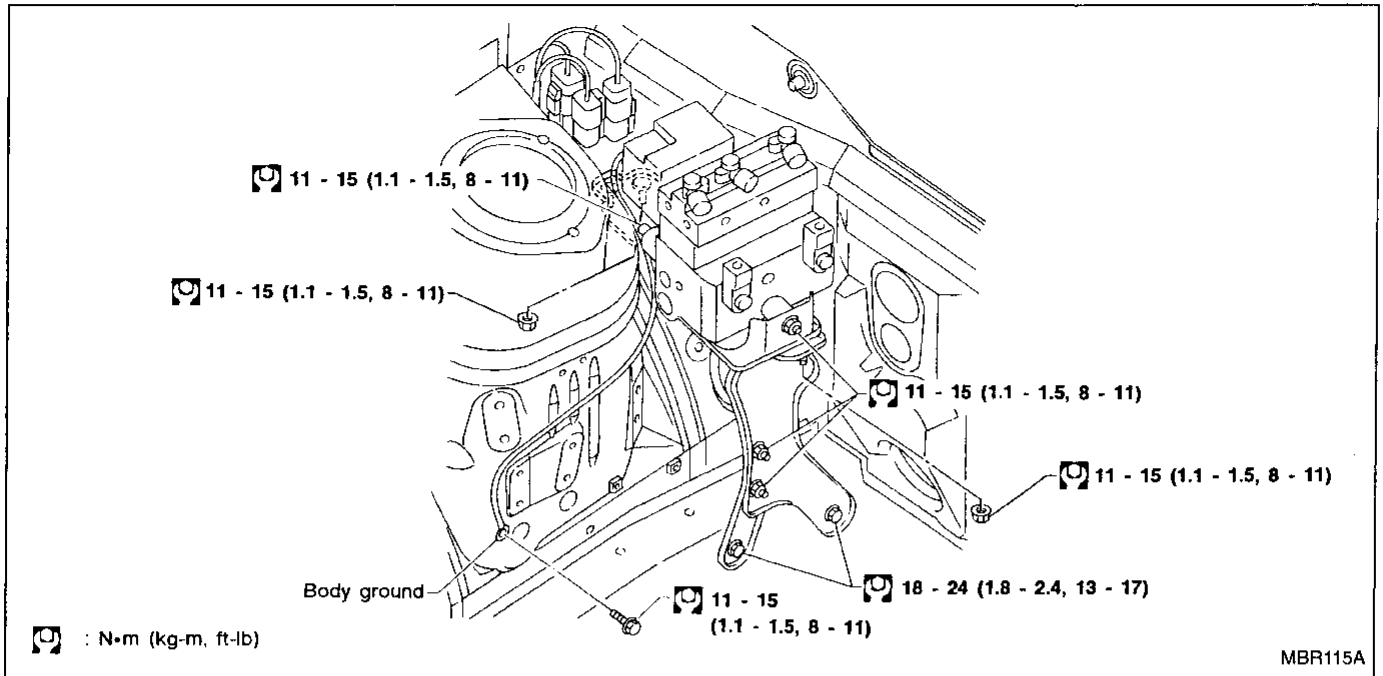
CONTROL UNIT

Control unit is located in luggage compartment.

ANTI-LOCK BRAKE SYSTEM

Removal and Installation (Cont'd)

ACTUATOR

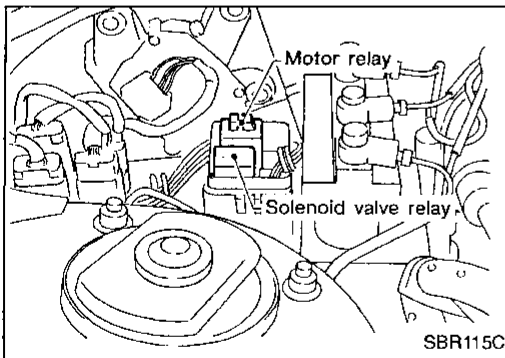


CAUTION:

After installation, pay attention to the following points.

- Refill brake fluid and bleed air. Refer to "Bleeding Brake System", BR-6.

1. Drain brake fluid. Disconnect brake tubes.
2. Remove actuator.



ACTUATOR RELAYS

4-terminals: MOTOR RELAY

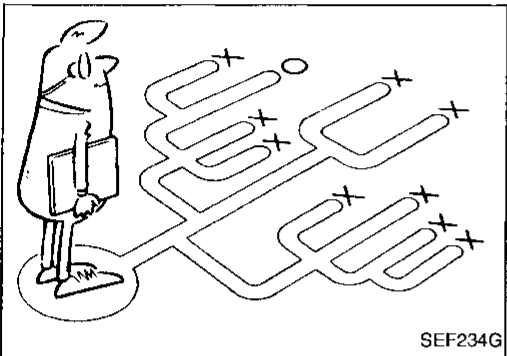
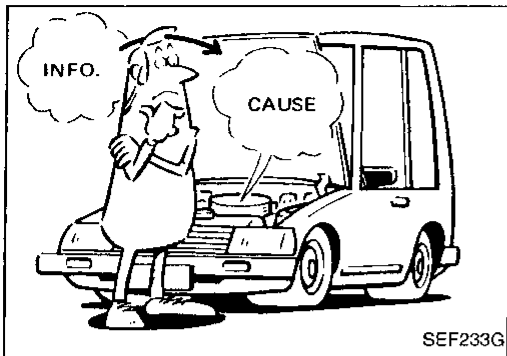
5-terminals: SOLENOID VALVE RELAY

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

TROUBLE DIAGNOSES

Contents

How to Perform Trouble Diagnoses for Quick and Accurate Repair	BR-41
Self-diagnosis	BR-42
Component Parts and Harness Connector Location	BR-45
Preliminary Check	BR-46
Ground Circuit Check	BR-47
Circuit Diagram for Quick Pinpoint Check	BR-48
Diagnostic Procedure 1	BR-49
Diagnostic Procedure 2	BR-50
Diagnostic Procedure 3	BR-53
Diagnostic Procedure 4	BR-54
Diagnostic Procedure 5	BR-56
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Diagnostic Procedure 9	BR-61
Electrical Components Inspection	BR-62



How to Perform Trouble Diagnoses for Quick and Accurate Repair

INTRODUCTION

The ABS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and instantly drives the actuators. It is essential that both kinds of signals are proper and stable. Also, it is important that there are no conventional problems as follows. Air leaks in the booster 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 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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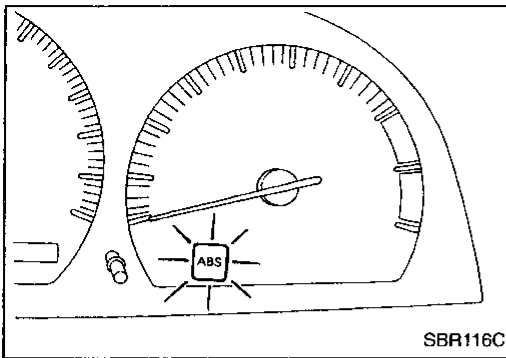
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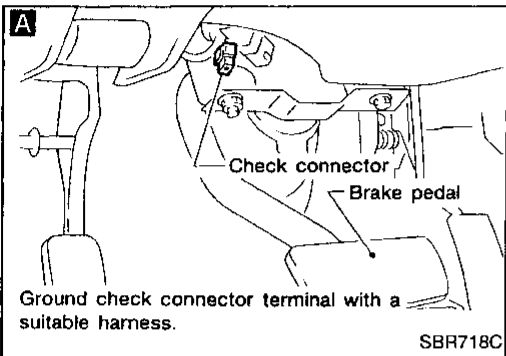
TROUBLE DIAGNOSES



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 check connector 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

Drive vehicle over 30 km/h (20 MPH) for at least one minute.

Turn ignition switch "OFF".

A

Ground terminal "L" of check connector with a suitable harness.

Turn ignition switch "ON" while grounding terminal "L".
Do not depress brake pedal.

B

After 3.6 seconds, the warning lamp starts flashing to indicate the malfunction code No. (See NOTE below.)

After verifying the location of the malfunction with the malfunction code chart, make the necessary repairs. Be sure to follow the instructions in the diagnostic procedures.

After the malfunctions are repaired, erase the malfunction codes stored in the control unit. See "HOW TO ERASE SELF-DIAGNOSTIC RESULTS", BR-44.

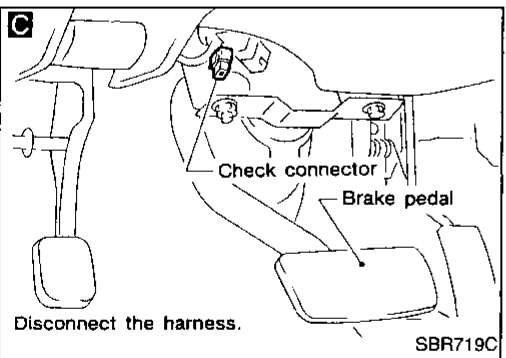
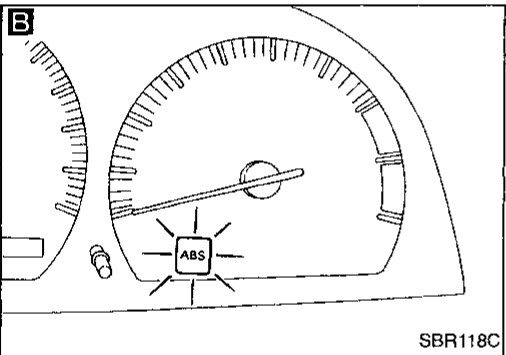
Rerun the self-diagnostic results mode to verify that the malfunction codes have been erased.

C

Disconnect the check terminal from the ground. The self-diagnostic results mode is now complete.

NOTE: 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)

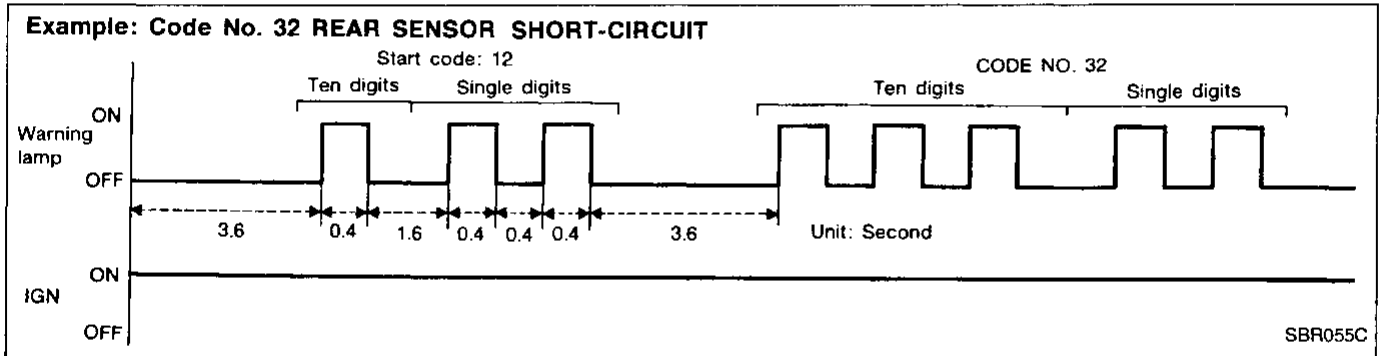
(A)

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

Make certain that warning lamp does not come on. Then, 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.



TROUBLE DIAGNOSES

Self-diagnosis (Cont'd)

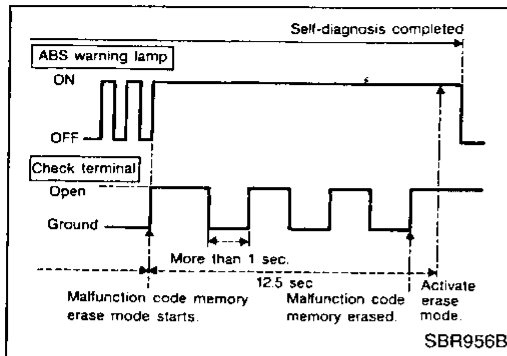
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (Malfunction codes)

1. Under the self-diagnostic results mode, the malfunction memory erase mode starts when the check terminal is disconnected from the ground.
2. 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. (Refer to BR-42.)

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 (12) should be indicated when erase operation is completed and system is functioning normally.

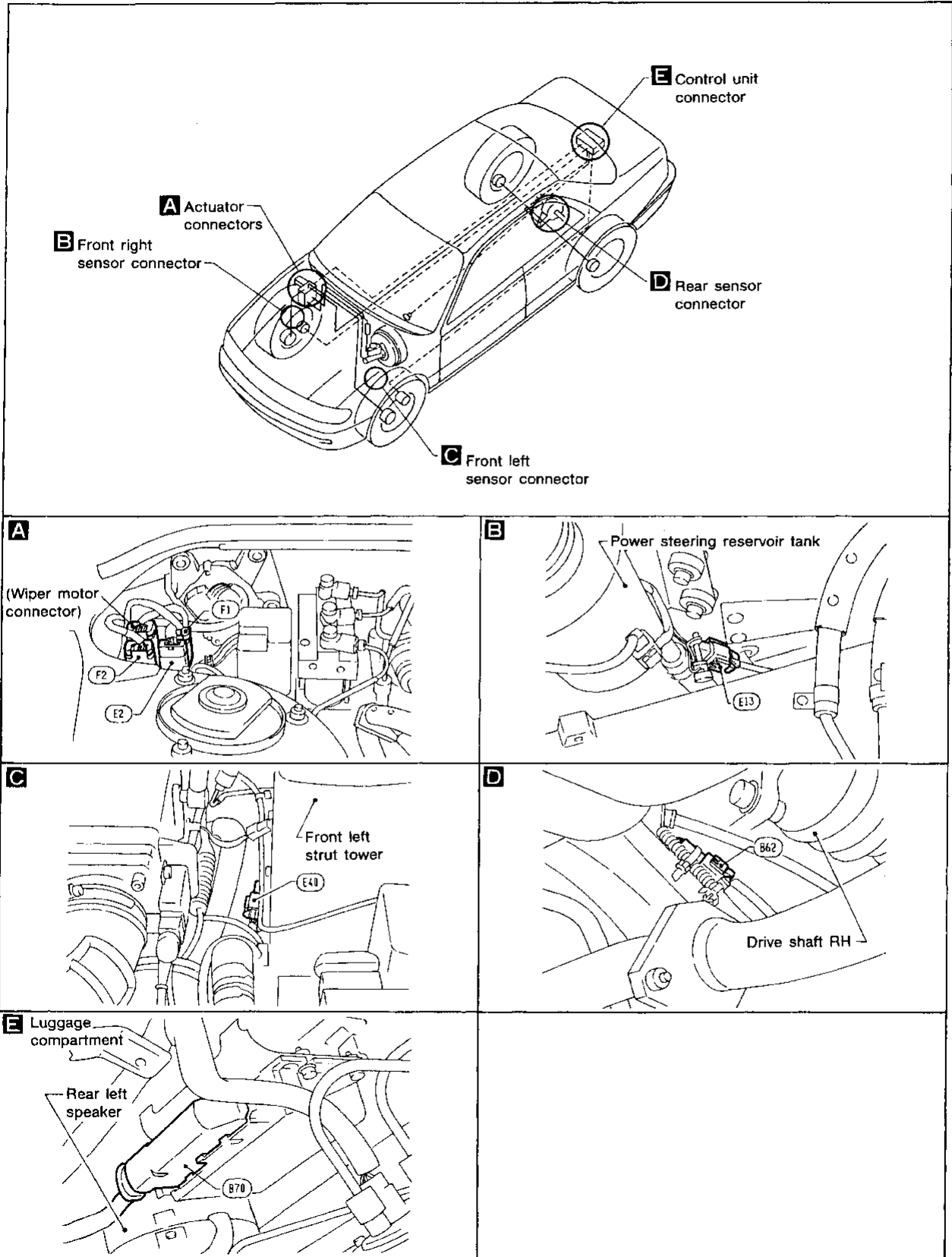


MALFUNCTION CODE CHART

Code No.	Malfunctioning part	Diagnostic procedure
12	Self-diagnosis could not detect any malfunctions	—
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
31 or 35	Rear sensor (open-circuit)	4
32 or 36	Rear 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 unit	9
Warning lamp comes on for 1 second after ignition switch is turned on	Normal operation	—
Warning lamp stays on continuously after the ignition switch is turned on	Control unit power supply circuit Warning lamp bulb circuit Control unit or control unit connector Solenoid valve relay stuck Power supply for solenoid valve relay coil	2
Warning lamp stays on, continuously during self-diagnosis	Control unit	—
Warning lamp does not come on when ignition switch is turned on	Fuse, warning lamp bulb or warning lamp circuit Control unit	1
Warning lamp does not come on during self-diagnosis, but does come on for 1 sec after ignition switch is turned on	Control unit	—

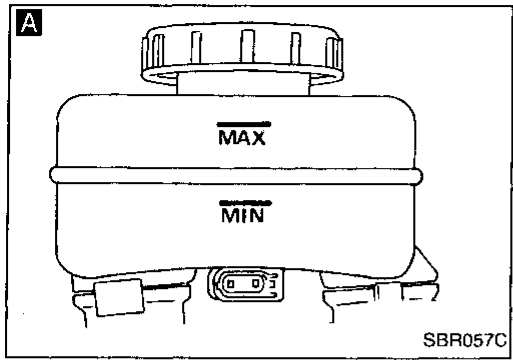
TROUBLE DIAGNOSES

Component Parts and Harness Connector Location

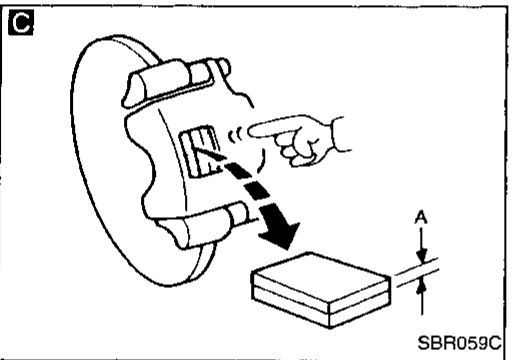
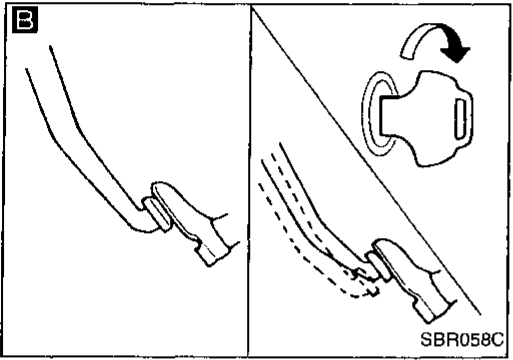
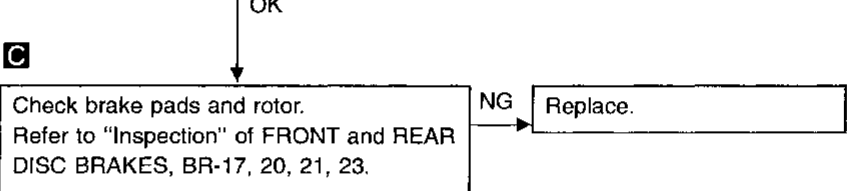
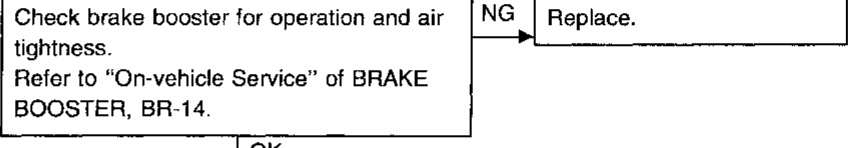
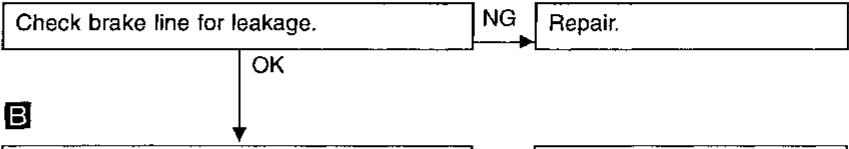
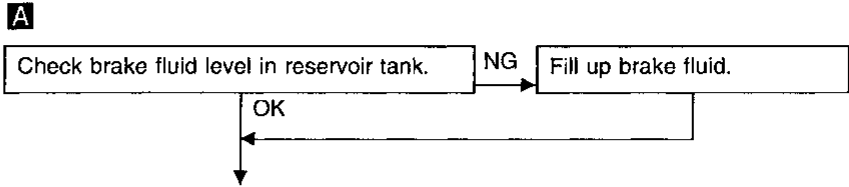


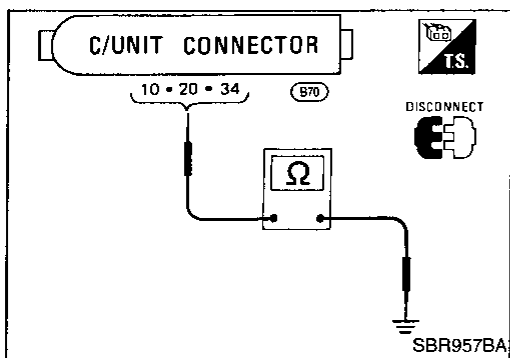
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TROUBLE DIAGNOSES



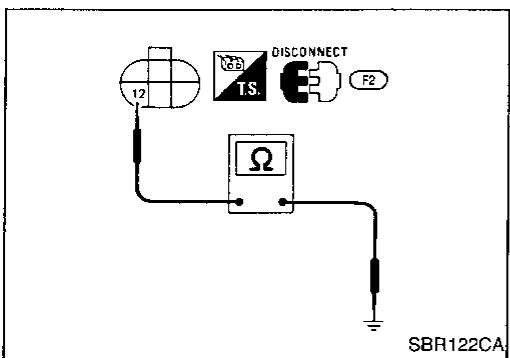
Preliminary Check





Ground Circuit Check CONTROL UNIT GROUND

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



ACTUATOR GROUND

- Check resistance between actuator harness connector terminal ⑫ and ground.
Resistance: 0Ω

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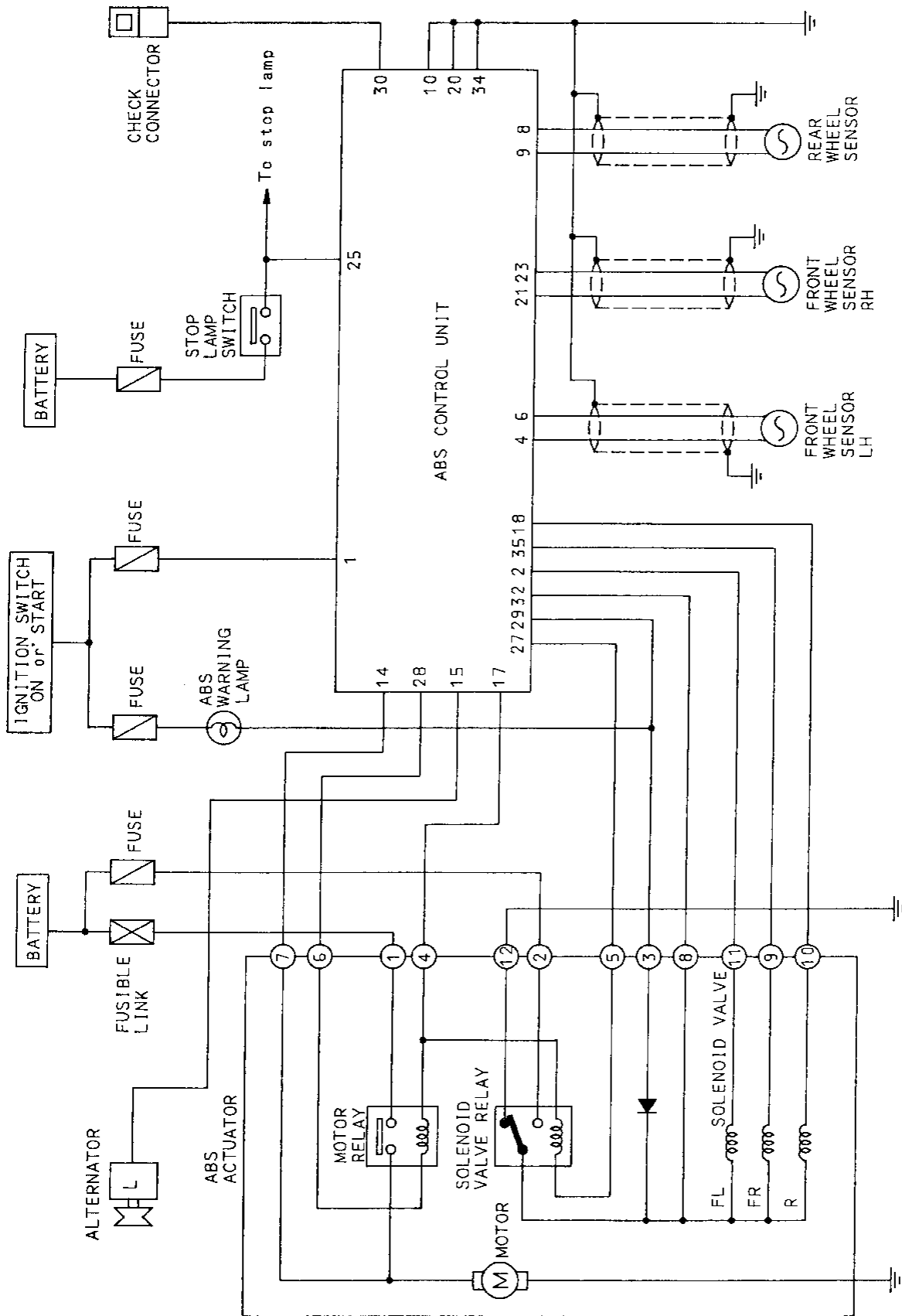
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TROUBLE DIAGNOSES

Circuit Diagram for Quick Pinpoint Check

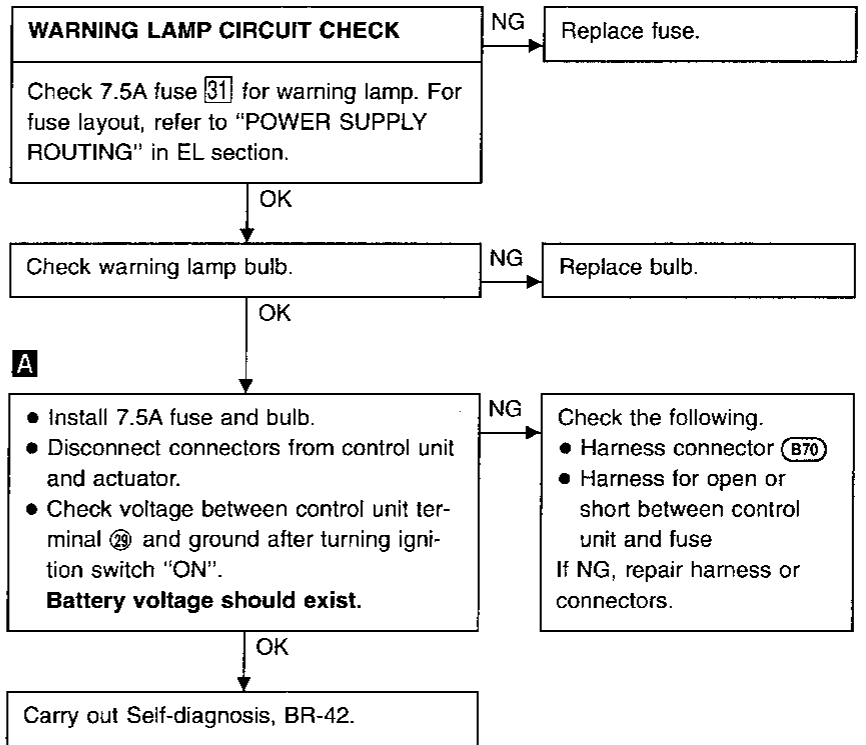
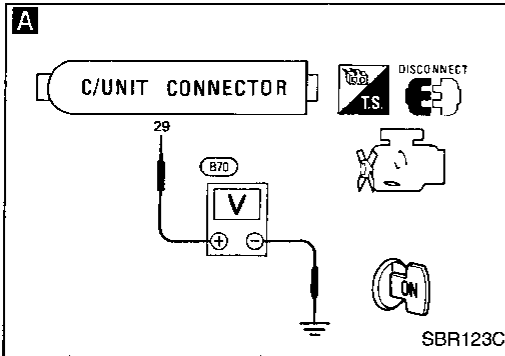


TBR009

TROUBLE DIAGNOSES

Diagnostic Procedure 1 (Not self-diagnostic item)

Warning lamp does not work before engine starts.

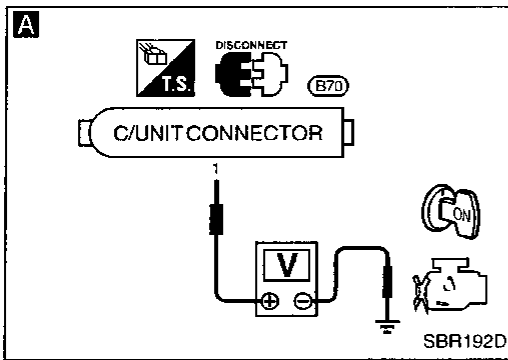


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TROUBLE DIAGNOSES

Diagnostic Procedure 2 (Not Self-diagnostic item)

Warning lamp stays on continuously.

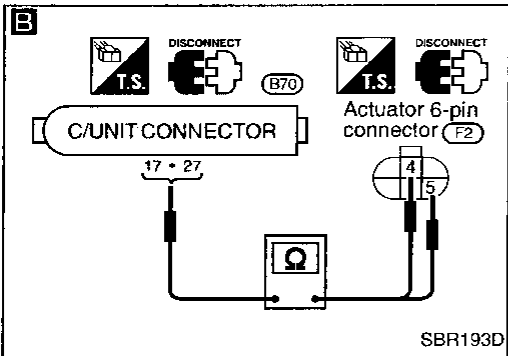


CONTROL UNIT POWER SUPPLY CIRCUIT

Check 7.5A fuse for control unit. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section.

NG → ⑧ (Go to BR-52.)

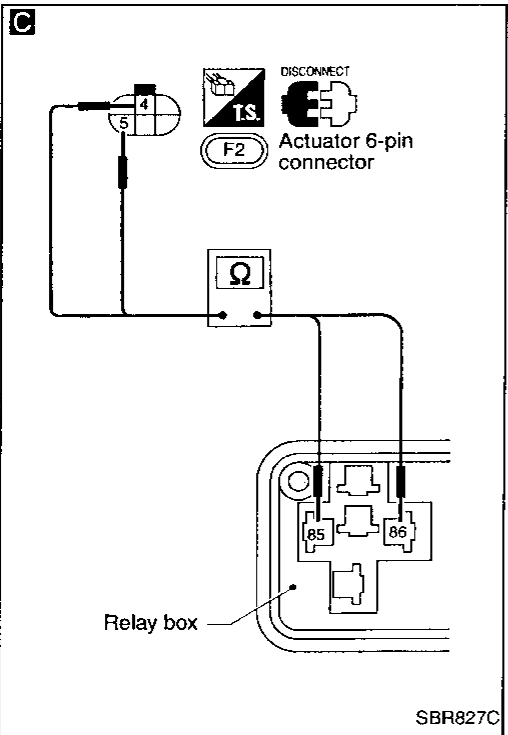
OK



• Disconnect connector from control unit.
• Check voltage between control unit connector terminal ① and ground after turning ignition switch "ON".
Battery voltage should exist.

NG → Check the following.
• Harness connector (B70)
• Harness for open or short between control unit and fuse
If NG, repair harness or connectors.

OK



SOLENOID VALVE RELAY COIL POWER SUPPLY CIRCUIT

• Turn ignition switch "OFF". Disconnect actuator 6-pin connector.
• Check continuity between control unit connector terminals and actuator 6-pin connector (body side) terminals.

Control unit	Actuator
①⑦	④
②⑧	⑤

Continuity should exist.

NG → Check the following.
• Harness connectors (B70, F2)
• Harness for open or short between actuator connector and control unit
If NG, repair harness or connectors.

OK

CIRCUIT CHECK

• Disconnect solenoid valve relay.
• Check continuity between actuator 6-pin connector (actuator side) terminals and solenoid valve relay box terminals.

Actuator	Relay box
④	⑧
⑤	⑨

Continuity should exist.

NG → Replace actuator.

OK

SOLENOID VALVE RELAY CHECK

Refer to SOLENOID VALVE RELAY in Electrical Components Inspection, BR-62.

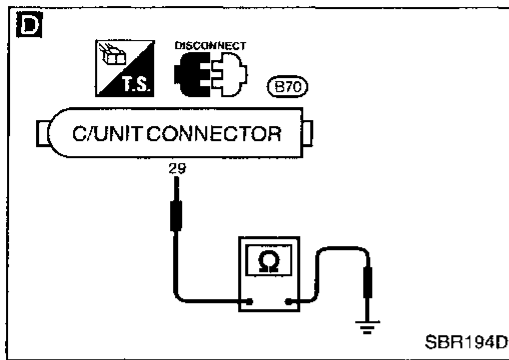
NG → Replace solenoid valve relay.

OK

④

TROUBLE DIAGNOSES

Diagnostic Procedure 2 (Not Self-diagnostic item) (Cont'd)



D

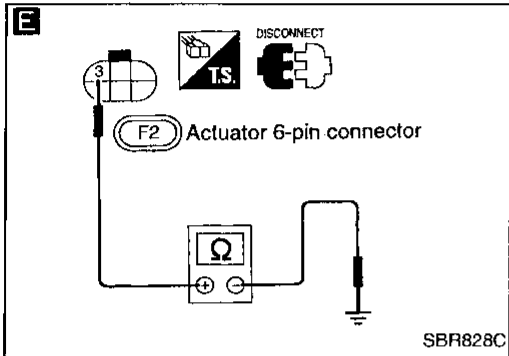
GROUND-SHORT CHECK FOR WARNING LAMP CIRCUIT.

- Turn ignition switch "OFF".
- Disconnect connectors from control unit and actuator.
- Check continuity between control unit connector terminal ② and body ground. **Continuity should not exist.**

NG → Check the following.

- Harness connector (B70)
- Harness for open or short between control unit and fuse

If NG, repair harness or connectors.



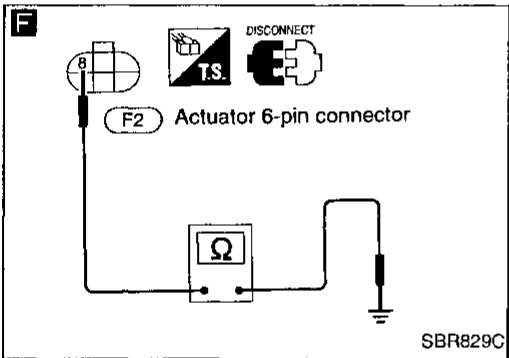
OK →

E

- Disconnect actuator 6-pin connector.
- Check continuity between actuator 6-pin connector (actuator side) terminal ③ and body ground. **Continuity should not exist.**

Note: Pay attention to tester polarity*.

NG → Replace actuator assembly.



OK →

F

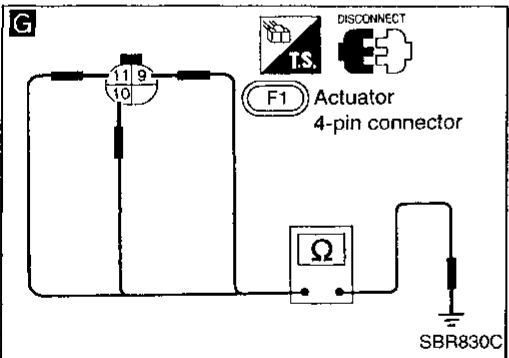
SOLENOID VALVE CHECK CIRCUIT

- Check continuity between actuator 6-pin connector (body side) terminal ⑧ and body ground. **Continuity should not exist.**

NG → Check the following.

- Harness connector (F2)
- Harness for open or short between actuator connector and control unit

If NG, repair harness or connectors.



OK →

G

SOLENOID VALVE CIRCUIT

- Disconnect actuator 4-pin connector.
- Check continuity between actuator 4-pin connector (actuator side) terminals ⑪, ⑨, ⑩ and body ground. **Continuity should not exist.**

NG → Replace actuator assembly.

OK →

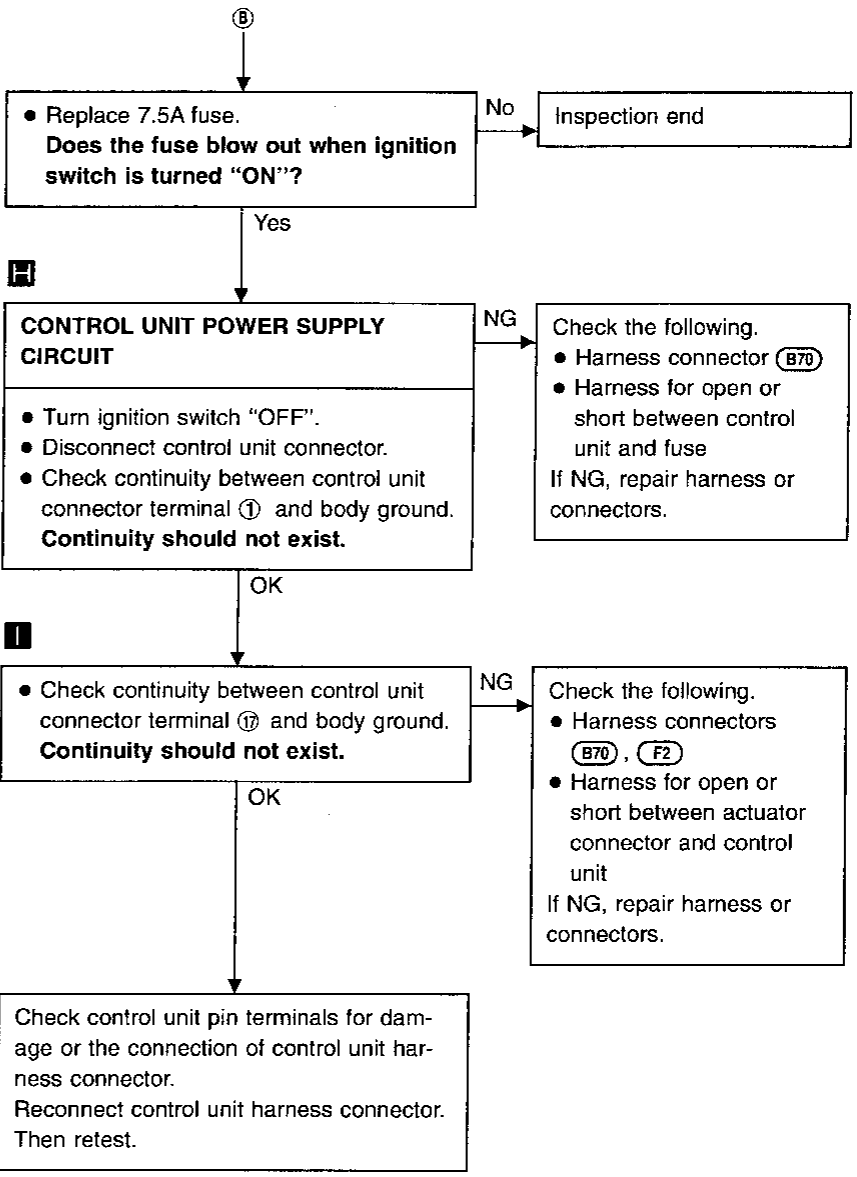
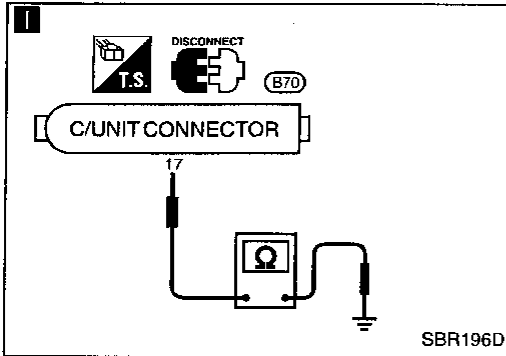
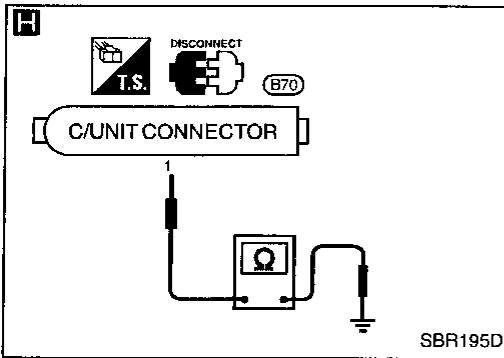
Check control unit pin terminals for damage or the connection of control unit harness connector.
Reconnect control unit harness connector. Then retest.

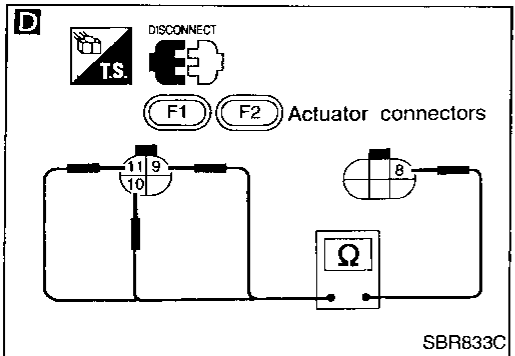
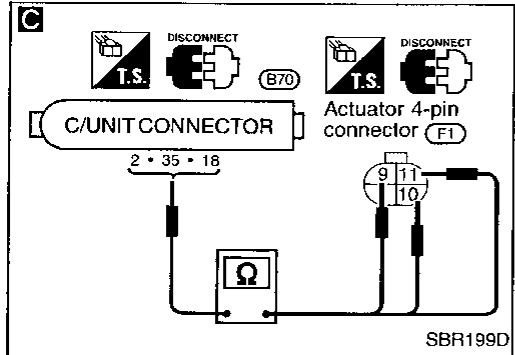
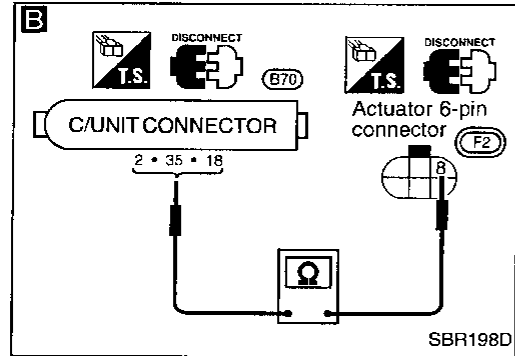
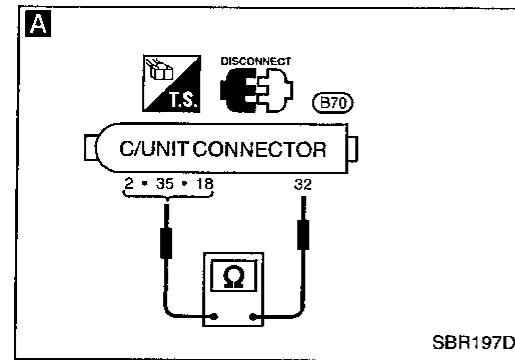
*: Specifications may vary depending on the type of tester.
Before performing this inspection, refer to the instruction manual of the tester.

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TROUBLE DIAGNOSES

Diagnostic Procedure 2 (Not Self-diagnostic item) (Cont'd)





Diagnostic Procedure 3 ACTUATOR SOLENOID VALVE (Malfunction code No. 45, 41 or 55)

A

ACTUATOR SOLENOID VALVE CHECK

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

Code No.	Terminals
45	③ - ②
41	③ - ⑤
55	② - ⑩

Resistance: 0.8 - 1.5Ω

OK → Replace control unit.

NG

B

- Disconnect actuator 6-pin connector.
- Check resistance between control unit connector terminals and actuator 6-pin connector (actuator side) terminal.

Code No.	Control unit	Actuator
45	②	⑧
41	③	⑧
55	⑩	⑧

Resistance: 0.8 - 1.5Ω

OK → Check the following.

- Harness connectors (B70), (F2)
- Harness for open or short between actuator connector and control unit

If NG, repair harness or connectors.

NG

C

- Disconnect actuator 4-pin connector.
- Check continuity between control unit connector terminals and actuator 4-pin connector (body side) terminals.

Code No.	Control unit	Actuator
45	②	⑪
41	③	⑨
55	⑩	⑩

Continuity should exist.

NG → Check the following.

- Harness connectors (B70), (F1)
- Harness for open or short between actuator connector and control unit

If NG, repair harness or connectors.

OK

D

- Disconnect actuator connectors.
- Check resistance between actuator connector (actuator side) terminals.

Code No.	Terminals
45	⑧ - ⑪
41	⑧ - ⑨
55	⑧ - ⑩

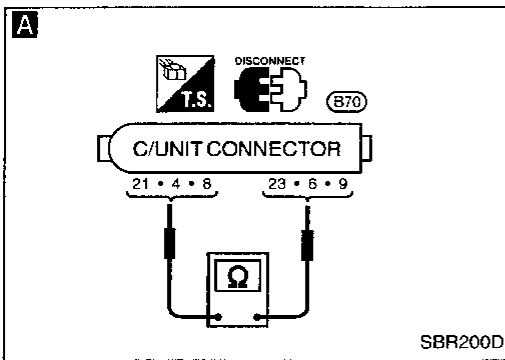
Resistance: 0.8 - 1.5Ω

OK → Check the following.

- Harness connectors (F1), (F2)
- Harness for open or short between actuator 4-pin connector and actuator 6-pin connector

If NG, repair harness or connectors.

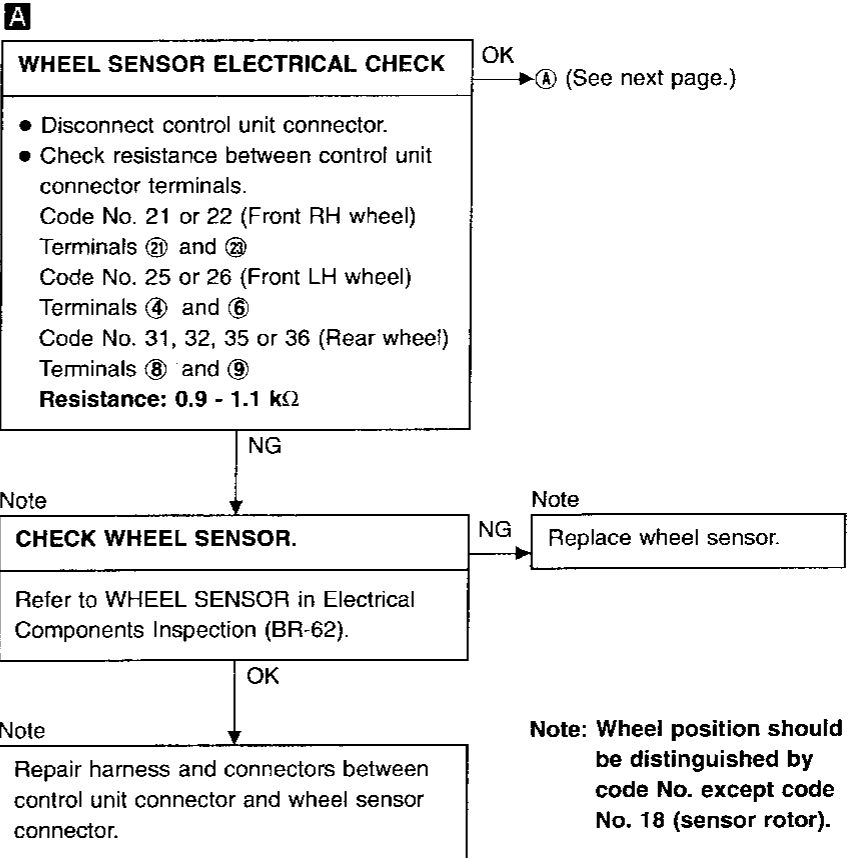
NG → Replace actuator.



Diagnostic Procedure 4

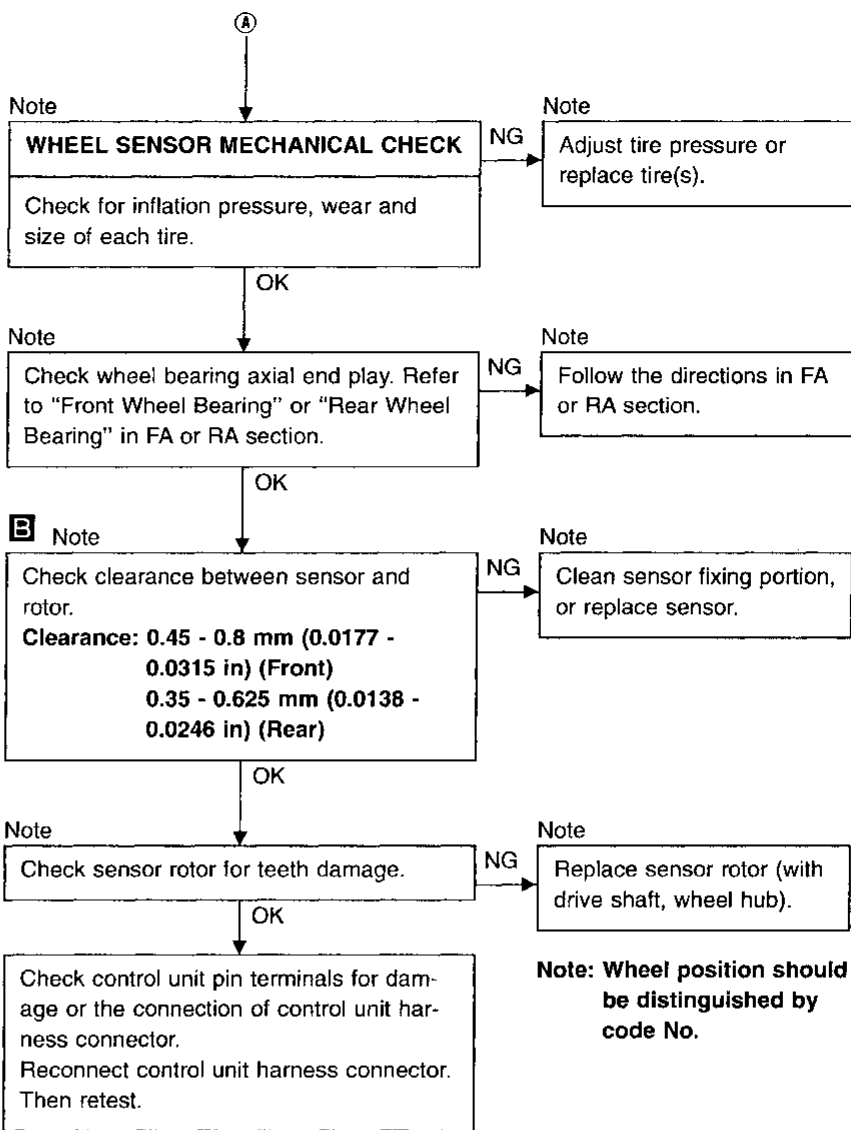
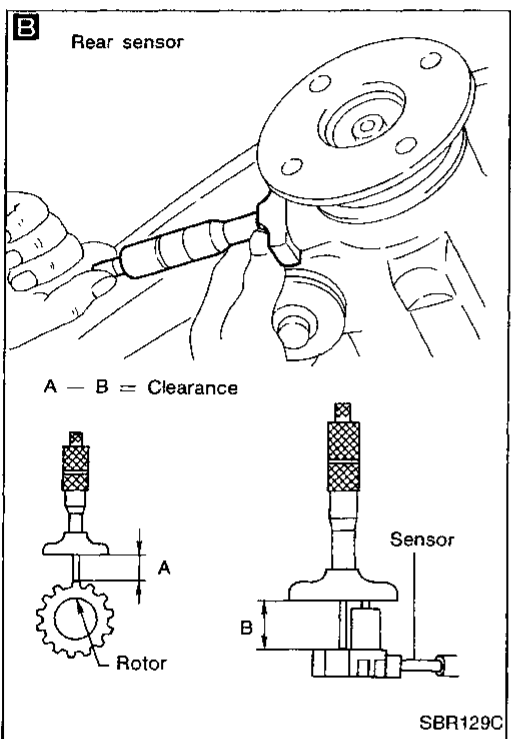
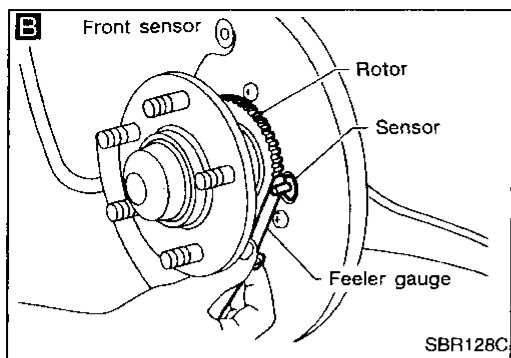
WHEEL SENSOR OR ROTOR

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



TROUBLE DIAGNOSES

Diagnostic Procedure 4 (Cont'd)



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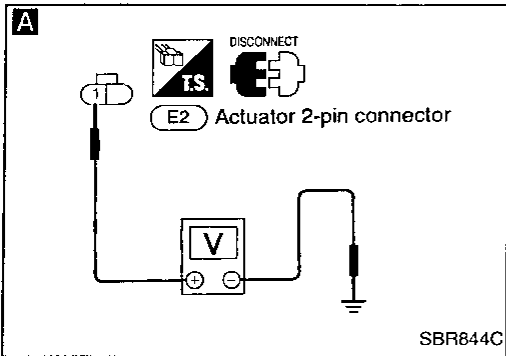
BT

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

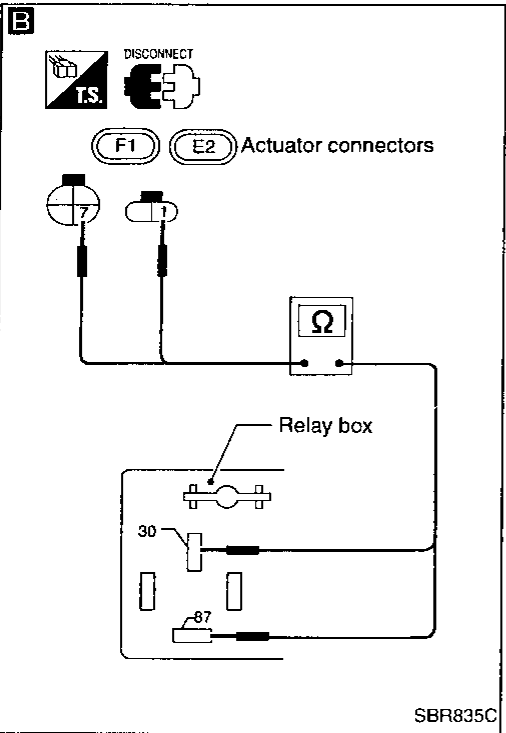


MOTOR POWER SUPPLY CIRCUIT

- Check 30A fusible link **(C)** for actuator. For fusible link layout, refer to "POWER SUPPLY ROUTING" in EL section.

NG → **(B)** (Go to BR-58.)

OK



- A**
- Disconnect actuator 2-pin connector.
 - Check voltage between connector (actuator side) terminal **(1)** and ground. **Battery voltage should exist.**

NG → Check the following.

- Harness connector **(E2)**
- Harness for open or short between actuator connector and fuse

If NG, repair harness or connectors.

OK

MOTOR RELAY CIRCUIT

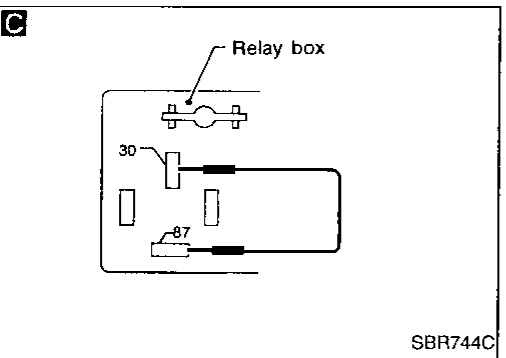
- Remove motor relay.
- Disconnect actuator connectors.
- Check continuity between actuator connector (actuator side) terminals and relay connector terminals.

Actuator connector	Relay connector
(1)	(87)
(7)	(30)

Continuity should exist.

NG → Replace actuator assembly.

OK



MOTOR CHECK

- Connect actuator connectors.
- Connect suitable wire between relay connector terminals **(87)** and **(30)**. **Motor should operate. Do not connect wire for more than 5 seconds.**

NG → Replace actuator assembly.

OK

MOTOR RELAY CHECK

Refer to ACTUATOR MOTOR RELAY in Electrical Components Inspection, BR-62.

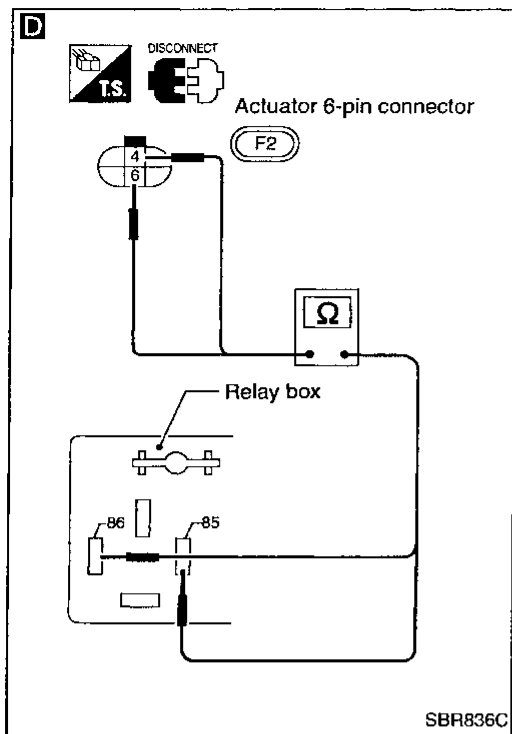
NG → Replace motor relay.

OK

(A)
(Go to next page.)

TROUBLE DIAGNOSES

Diagnostic Procedure 5 (Cont'd)



D

MOTOR RELAY CIRCUIT

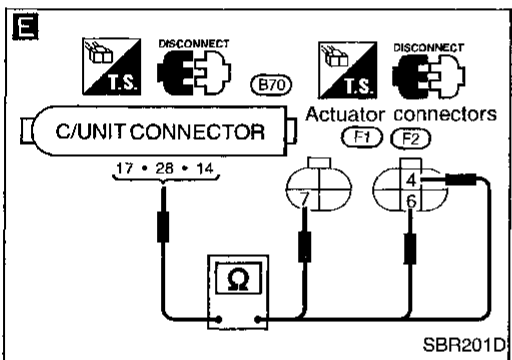
NG → Replace actuator assembly.

- Disconnect actuator 6-pin connector.
- Check continuity between actuator connector (actuator side) terminals and relay connector terminals.

Actuator connector	Relay connector
④	⑧
⑥	⑨

Continuity should exist.

OK



E

CIRCUIT CHECK

NG

- Disconnect control unit connector.
- Check continuity between control unit connector terminals and actuator connector (body side) terminals.

Control unit	Actuator connector
⑰	④
⑳	⑥
㉑	⑦

Continuity should exist.

OK

Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

NG → Check the following.

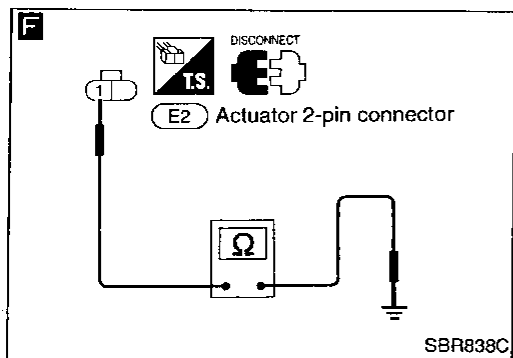
- Harness connectors B70, F1, F2
- Harness for open or short between actuator connector and control unit
- Harness for open or short between actuator 4-pin connector and actuator 6-pin connector

If NG, repair harness or connectors.

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TROUBLE DIAGNOSES

Diagnostic Procedure 5 (Cont'd)

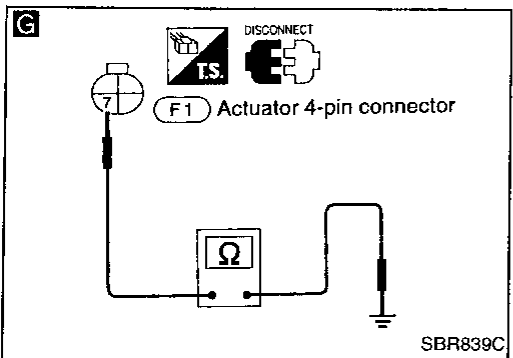


Ⓑ

• Replace fusible link.
Does the fusible link blow out when ignition switch is turned "ON"?

No → Inspection end

Yes →



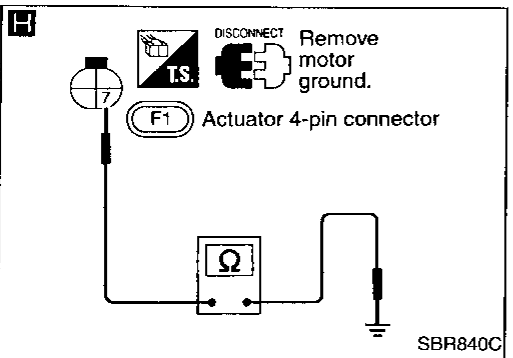
F

MOTOR POWER SUPPLY CIRCUIT

• Disconnect actuator 2-pin connector.
 • Check continuity between actuator 2-pin connector (body side) terminal ① and ground.
Continuity should not exist.

NG → Check the following.
 • Harness connector (E2)
 • Harness for open or short between actuator connector and fuse
 If NG, repair harness or connectors.

OK →



G

• Disconnect actuator 4-pin connector and control unit connector.
 • Check continuity between actuator 4-pin connector (body side) terminal ⑦ and ground.
Continuity should not exist.

NG → Check the following.
 • Harness connector (F1)
 • Harness for open or short between actuator connector and control unit
 If NG, repair harness or connectors.

OK →

H

• Remove motor ground.
 • Check continuity between actuator 4-pin connector (actuator side) terminal ⑦ and ground.
Continuity should not exist.

NG → Replace actuator assembly.

OK →

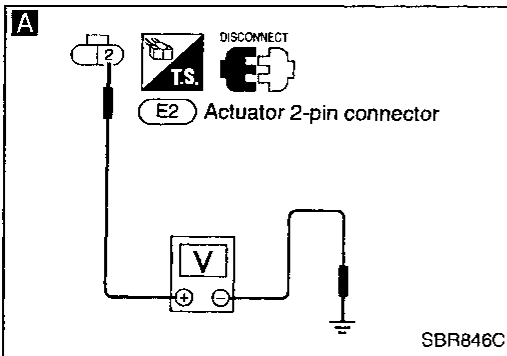
MOTOR CHECK

Go to **C** in Diagnostic Procedure 5, BR-56.

OK →

Check control unit pin terminals for damage or the connection of control unit harness connector.
 Reconnect control unit harness connector.
 Then retest.

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

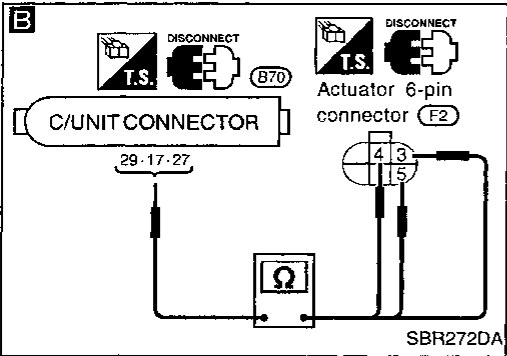


SOLENOID VALVE POWER SUPPLY CHECK

Check 20A fuse 57. For fusible link layout, refer to "POWER SUPPLY ROUTING" in EL section.

NG → ① (See next page.)

OK



1. Disconnect connectors from control unit and ABS actuator. Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.
Does warning lamp activate again?

No → Inspection end

Yes

GROUND CIRCUIT CHECK

Refer to CONTROL UNIT GROUND and ACTUATOR GROUND in Ground Circuit Check, BR-47.

NG → Check the following.

- Harness connectors
- Harness for open or short between actuator harness and ground

If NG, repair harness or connectors.

OK

SOLENOID VALVE POWER SUPPLY CHECK

1. Disconnect connector from ABS relay box.
2. Check voltage between ABS relay box 2-pin connector (body side) terminal ② and ground.
Battery voltage should exist.

NG → Check the following.

- Harness connector E2
- Harness for open or short between actuator connector and fuse

If NG, repair harness or connectors.

OK

CIRCUIT CHECK

1. Disconnect control unit connector.
2. Check continuity between control unit connector terminals and ABS relay box 6-pin connector (body side) terminals.

Control unit	ABS relay box
⑧	③
⑦	④
②	⑤

Continuity should exist.

NG → Check the following.

- Harness connectors B70, F2
- Harness for open or short between actuator connector and control unit

If NG, repair harness or connectors.

OK

SOLENOID VALVE RELAY CHECK

Refer to SOLENOID VALVE RELAY in Electrical Components Inspection, BR-62.

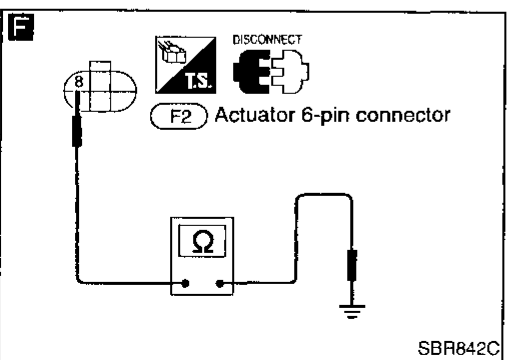
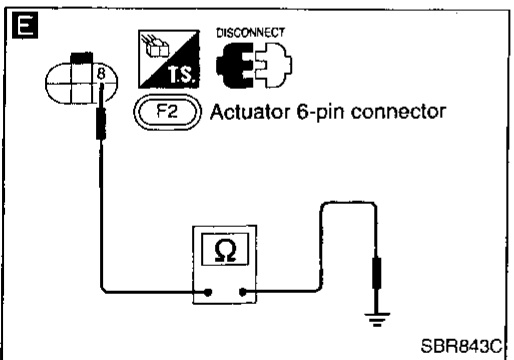
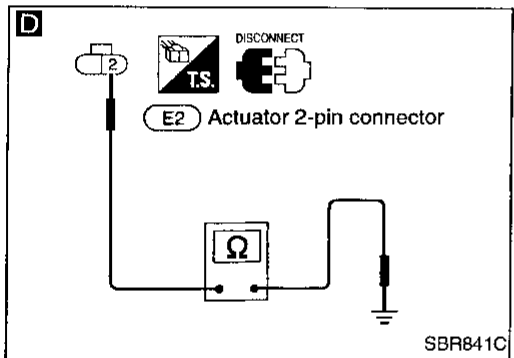
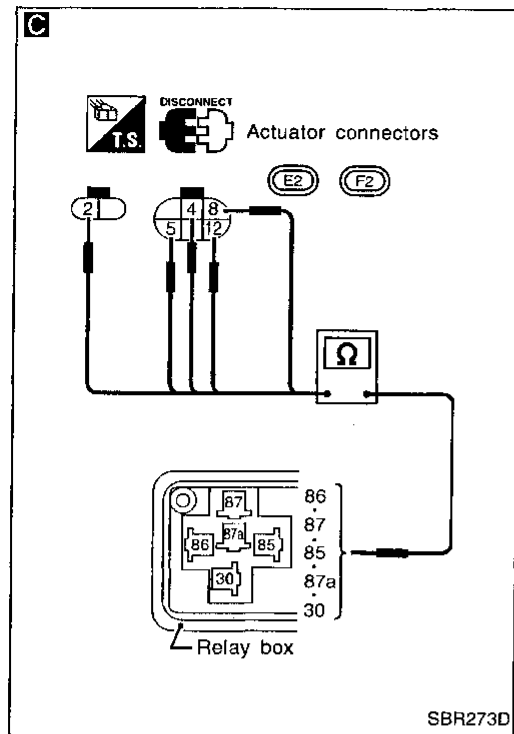
NG → Replace solenoid valve relay.

OK
B
(Go to next page.)

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TROUBLE DIAGNOSES

Diagnostic Procedure 6 (Cont'd)



B

C

SOLENOID VALVE RELAY CIRCUIT CHECK

Check continuity between ABS relay terminals and ABS actuator connector and ABS relay box connector (ABS relay box side) terminals.

ABS relay box terminal	ABS actuator connector
87	2
87a	10
85	5
86	4
30	8

Continuity should exist.

NG → • Replace ABS relay box.

OK → Go to Diagnostic Procedure 3, BR-53.

A

Replace fusible link.
Does the fusible link blow out when ignition switch is turned "ON"?

No → Inspection end

Yes

D

RELAY UNIT POWER SUPPLY CIRCUIT

1. Disconnect ABS relay box 2-pin connector.
2. Check continuity between ABS relay box 2-pin connector (body side) terminal 2 and ground.
Continuity should not exist.

NG → Check the following.
• Harness connector (E2)
• Harness for open or short between actuator connector and fuse
If NG, repair harness or connectors.

OK

E

1. Disconnect ABS relay box connectors and control unit connector.
2. Check continuity between ABS actuator 2-pin connector (ABS relay box side) terminal 8 and ground.
Continuity should not exist.

NG → Replace ABS relay box.

OK

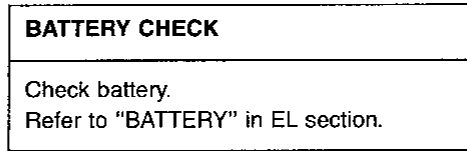
F

Check continuity between ABS actuator 2-pin connector (ABS actuator side) terminal 8 and ground.
Continuity should not exist.

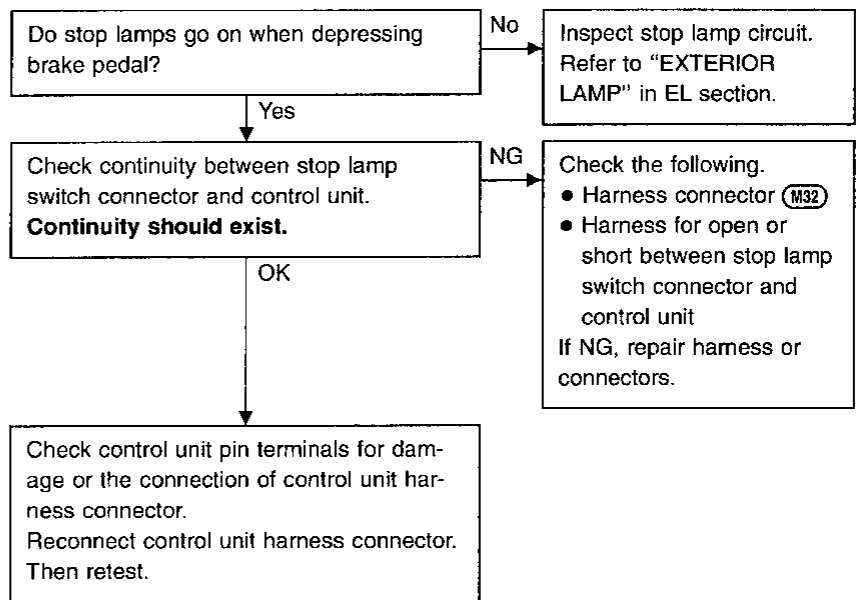
NG → Replace ABS actuator.

OK → Go to Diagnostic Procedure 3, BR-53.

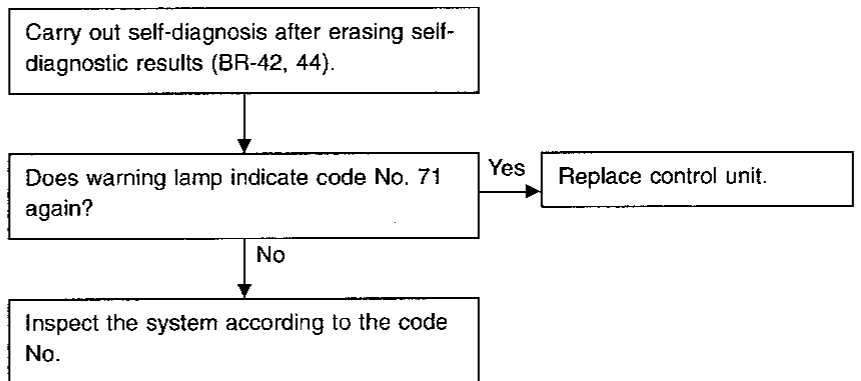
Diagnostic Procedure 7 POWER SUPPLY (Low voltage) (Malfunction code No. 57)



Diagnostic Procedure 8 STOP LAMP SWITCH CIRCUIT (Malfunction code No. 16)



Diagnostic Procedure 9 CONTROL UNIT (Malfunction code No. 71)



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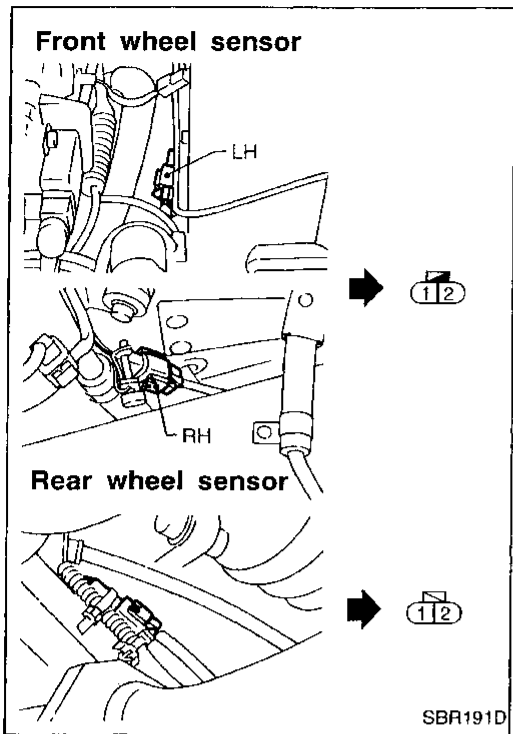
BT

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TROUBLE DIAGNOSES



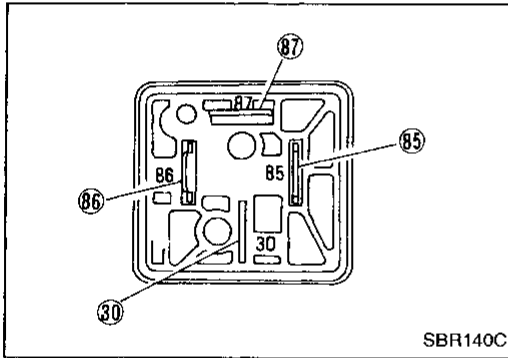
Electrical Components Inspection

WHEEL SENSOR

Check resistance between terminals ① and ②.

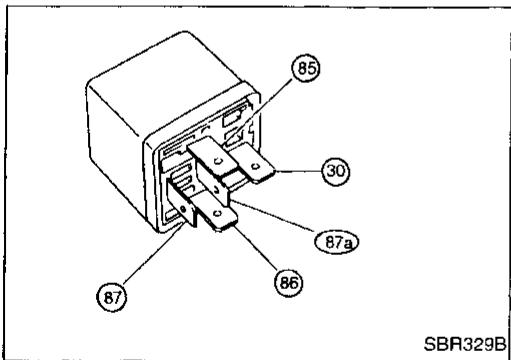
Resistance: 0.9 - 1.1 kΩ

For the locations of sensors, refer to Component Parts and Harness Connector Location.



ACTUATOR MOTOR RELAY

Condition	Continuity existence between terminals ⑩ and ⑪
Battery voltage not applied between terminals ⑤ and ⑥.	No
Battery voltage applied between terminals ⑤ and ⑥.	Yes



SOLENOID VALVE RELAY

Condition	Continuity existence between terminals ⑩ and ⑪a	Continuity existence between terminals ⑩ and ⑪
Battery voltage not applied between terminals ⑤ and ⑥.	Yes	No
Battery voltage applied between terminals ⑤ and ⑥.	No	Yes

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

Front brake	
Brake model	CL28VF disc brake
Cylinder bore diameter x number of pistons mm (in)	42.8 (1.685) x 2
Pad length x width x thickness mm (in)	127 x 56 x 9.5 (5.00 x 2.20 x 0.374)
Rotor outer diameter x thickness mm (in)	280 x 28 (11.02 x 1.10)
Rear brake	
Brake model	AD11VB disc brake
Cylinder bore diameter x number of piston mm (in)	38.2 (1.504) x 1
Pad length x width x thickness mm (in)	97.4 x 33.9 x 10 (3.835 x 1.335 x 0.39)
Rotor outer diameter x thickness mm (in)	292 x 16 (11.50 x 0.63)

Parking brake	
Brake model	DS17HE drum brake
Lining length x width x thickness mm (in)	154.1 x 25.0 x 3.0 (6.07 x 0.984 x 0.118)
Drum inner diameter mm (in)	172.0 (6.77)
Master cylinder	
Cylinder bore diameter mm (in)	25.40 (1)
Control valve	
Valve model	Proportioning valve (within master cylinder)
Split point [kPa (kg/cm ² , psi)] x reducing ratio	1,961 (20, 284) x 0.4
Brake booster	
Booster model	M215T
Diaphragm diameter mm (in)	Primary: 230 (9.06) Secondary: 205 (8.07)
Brake fluid	
Recommended brake fluid	DOT 3

Inspection and Adjustment

DISC BRAKE

Unit: mm (in)

Location	Front	Rear
Brake model	CL28VF	AD11VB
Pad wear limit Minimum thickness	2.0 (0.079)	
Rotor repair limit Minimum thickness	26.0 (1.024)	14.0 (0.551)

DRUM BRAKE

Unit: mm (in)

Location	Rear
Brake model	DS17HE
Lining wear limit Minimum thickness	1.5 (0.059)
Drum repair limit Maximum inner diameter	173.0 (6.81)
Brake shoe "backoff" adjustment	5 - 6 latches

BRAKE PEDAL

Unit: mm (in)

Free height "H"★	178 - 188 (7.01 - 7.40)
Depressed height "D" [under force of 490 N (50 kg, 110 lb) with engine running]	95 (3.74) or more
Clearance "C" between pedal stopper and threaded end of stop lamp switch or ASCD cancel switch	0.3 - 1.0 (0.012 - 0.039)
Pedal free play	1.0 - 3.0 (0.039 - 0.118)

★: Measured from surface of dash reinforcement panel to surface of pedal pad.

PARKING BRAKE

Unit: mm (in)

Control type	Foot lever
Pedal stroke [under force of 196 N (20 kg, 44 lb)]	75 - 90 (2.95 - 3.54)