# **BRAKE SYSTEM**

# $\mathsf{BR}$

# CONTENTS

| PRECAUTION                               | 2  |
|--|----|
| Supplemental Restraint System (SRS) "AIR |    |
| BAG"                                     |    |
| Precautions for Brake System             | 2  |
| Wiring Diagrams and Trouble Diagnosis    | 2  |
| PREPARATION                              |    |
| Special Service Tools                    |    |
| Commercial Service Tools                 | 3  |
| NOISE, VIBRATION AND HARSHNESS (NVH)     |    |
| TROUBLESHOOTING                          | 4  |
| NVH Troubleshooting Chart                | 4  |
| ON-VEHICLE SERVICE                       |    |
| Checking Brake Fluid Level               |    |
| Checking Brake Line                      | 5  |
| Changing Brake Fluid                     |    |
| Bleeding Brake System                    | 6  |
| BRAKE HYDRAULIC LINE                     |    |
| Hydraulic Circuit                        |    |
| Removal                                  |    |
| Inspection                               |    |
| Installation                             | 8  |
| PROPORTIONING VALVE (2WD)                |    |
| Inspection                               |    |
| Removal and Installation (Built-in type) |    |
| LOAD SENSING VALVE (4WD)                 |    |
| Inspection                               | 10 |
| Removal and Installation                 |    |
| BRAKE PEDAL AND BRACKET                  | 13 |
| Removal and Installation                 |    |
| Inspection                               |    |
| Adjustment                               |    |
| MASTER CYLINDER                          |    |
| Removal                                  |    |
| Disassembly                              |    |
| Inspection                               |    |
| Assembly                                 |    |
|  |    |
| BRAKE BOOSTER                            | 18 |
| On-vehicle Service                       | 18 |

| OPERATING CHECK            | 18 |
|----------------------------|----|
| AIRTIGHT CHECK             | 18 |
| Removal                    | 18 |
| Inspection                 | 18 |
| OUTPUT ROD LENGTH CHECK    | 18 |
| Installation               | 19 |
| VACUUM PIPING              | 20 |
| Vacuum Hose                |    |
| Removal and Installation   | 20 |
| Inspection                 | 20 |
| HOSES AND CONNECTORS       |    |
| CHECK VALVE                | 20 |
| FRONT DISC BRAKE           | 21 |
| Components                 | 21 |
| Pad Replacement            |    |
| Removal                    | 22 |
| Disassembly                | 23 |
| Inspection                 | 23 |
| CALIPER                    | 23 |
| ROTOR                      | 23 |
| Assembly                   | 24 |
| Installation               |    |
| Brake Burnishing Procedure | 24 |
| REAR DRUM BRAKE            | 25 |
| Components                 | 25 |
| Removal                    | 25 |
| Inspection                 | 26 |
| WHEEL CYLINDER             | 26 |
| Wheel Cylinder Overhaul    | 27 |
| Inspection                 | 27 |
| DRUM                       | 27 |
| LINING                     | 27 |
| Installation               |    |
| PARKING BRAKE CONTROL      | 29 |
| Components                 |    |
| Removal and Installation   | 29 |
| Inspection                 | 29 |
| Adjustment                 | 30 |

# CONTENTS (Cont'd)

| ABS  |
|--|
| DESCRIPTION                                  |
| Purpose                                      |
| Operation                                    |
| ABS Hydraulic Circuit                        |
| System Components                            |
| System Description                           |
| SENSOR                                       |
| CONTROL UNIT                                 |
| G SENSOR (4WD MODELS ONLY)                   |
| ACTUATOR                                     |
| Component Parts and Harness Connector        |
| Location35                                   |
| Circuit Diagram for Quick Pinpoint Check     |
| Wiring Diagram — ABS —                       |
| ON BOARD DIAGNOSTIC SYSTEM                   |
| DESCRIPTION                                  |
| Self-diagnosis41                             |
| FUNCTION41                                   |
| SELF-DIAGNOSIS PROCEDURE41                   |
| HOW TO READ SELF-DIAGNOSTIC RESULTS          |
| (MALFUNCTION CODES)42                        |
| HOW TO ERASE SELF-DIAGNOSTIC RESULTS         |
| (MALFUNCTION CODES)42                        |
| CONSULT                                      |
| CONSULT APPLICATION TO ABS                   |
| ECU (ABS CONTROL UNIT) PART NUMBER<br>MODE43 |
| CONSULT Inspection Procedure                 |
| SELF-DIAGNOSIS PROCEDURE                     |
| SELF-DIAGNOSIS PROCEDORE                     |
| DATA MONITOR PROCEDURE                       |
| ACTIVE TEST PROCEDURE                        |
| DATA MONITOR MODE                            |
| ACTIVE TEST MODE48                           |
| TROUBLE DIAGNOSIS - INTRODUCTION             |
| How to Perform Trouble Diagnoses for Quick   |
| and Accurate Repair49                        |
| INTRODUCTION49                               |
| TROUBLE DIAGNOSIS — BASIC INSPECTION         |
| Preliminary Check50                          |
| Ground Circuit Check52                       |
| ACTUATOR MOTOR GROUND                        |
| CONTROL UNIT GROUND                          |
| ACTUATOR GROUND                              |
| TROUBLE DIAGNOSIS — GENERAL                  |
| DESCRIPTION                                  |

| Malfunction Code/Symptom Chart53                 |        |
|--|--------|
| WHEEL SENSOR OR ROTOR54                          | MA     |
| Diagnostic Procedure54                           |        |
| ABS ACTUATOR SOLENOID VALVE                      | டுக    |
| Diagnostic Procedure56                           | EM     |
| SOLENOID VALVE RELAY                             |        |
| Diagnostic Procedure58                           | LC     |
| MOTOR RELAY OR MOTOR                             | сø     |
| Diagnostic Procedure61                           |        |
| LOW VOLTAGE                                      | EC     |
| Diagnostic Procedure65                           | -0     |
| G SENSOR   |        |
| Diagnostic Procedure66                           | FE     |
| Electrical Components Inspection                 |        |
| G SENSOR   |        |
| CONTROL UNIT                                     | CL     |
| Diagnostic Procedure69                           |        |
| TROUBLE DIAGNOSES FOR SYMPTOMS70                 | Mihr   |
| 1. ABS Works Frequently70                        | IMI U  |
| 2. Unexpected Pedal Action                       |        |
| 3. Long Stopping Distance                        | AT     |
| 4. ABS Does Not Work                             | 000    |
| 5. Pedal Vibration and Noise                     |        |
| 6. Warning Lamp Does Not Come On When            | ŢŢ     |
| Ignition Switch Is Turned On                     |        |
| 7. Warning Lamp Stays On When Ignition Switch    |        |
| Is Turned On                                     | PD     |
|  |        |
| Removal and Installation78<br>FRONT WHEEL SENSOR |        |
| REAR WHEEL SENSOR                                | AX     |
| FRONT SENSOR ROTOR                               |        |
| REAR SENSOR ROTOR                                | SU     |
| CONTROL UNIT                                     | 90     |
| G SENSOR   |        |
| ACTUATOR   | BR     |
| ACTUATOR RELAYS82                                |        |
|  |        |
| SERVICE DATA AND SPECIFICATIONS (SDS)            | ST     |
| General Specifications83                         |        |
| Disc Brake                                       | 6      |
| Drum Brake83                                     | RS     |
| Brake Pedal83                                    |        |
| Parking Brake Control                            | BT     |
| ·  | DI     |
|  |        |
|  | HA     |
|  | 0 00 0 |
|  |        |
|  | SC     |

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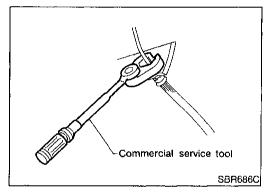
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#### PRECAUTION

## Supplemental Restraint System (SRS) "AIR BAG"

The Supplemental Restraint System "AIR BAG", used along with a seat belt, 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 bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **RS section** of 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 NISSAN 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.



#### **Precautions for Brake System**

NABR0002

Never reuse drained brake fluid.

Use 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 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.

#### Wiring Diagrams and Trouble Diagnosis

NABR0003

When you read wiring diagrams, refer to the followings:

- "HOW TO READ WIRING DIAGRAMS" in GI section
- "POWER SUPPLY ROUTING" for power distribution circuit in EL section
- When you perform trouble diagnosis, refer to the followings:
- "HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS" in GI section
- "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section

#### PREPARATION

Special Service Tools

|  | Special Servic                                       |  | NABR0004 | GI             |
|--|--|--|----------|----------------|
| The actual shapes of Kent<br>Tool number<br>(Kent-Moore No.)<br>Tool name      | t-Moore tools may differ from those of special servi | ce tools illustrated here.   |          | MZ             |
| HT72480000 or<br>HT72210000<br>(J25852-B)<br>Rear axle shaft bearing<br>puller | NT161  | Removing rear wheel sensor rotor   |          | en<br>LC       |
|  | Commercial Se  | ervice Tools   | NABR0005 | EC             |
| Tool name  | Description  |  |          | FE             |
| 1 Flare nut crowfoot<br>2 Torque wrench  | a<br>2<br>NT360                                      | Removing and installing each brake piping<br>a: 10 mm (0.39 in)                          |          | CL<br>MT       |
| Brake fluid pressure<br>gauge  |  | Measuring brake fluid pressure   |          | AT<br>TF       |
| Rear wheel sensor rotor drift  | NT151  | Installing rear wheel sensor rotor<br>a: 75 mm (2.95 in) dla.<br>b: 63 mm (2.48 in) dia. |          | PD<br>AX<br>SU |
|  | NT509  |  |          | BR             |
|  |  |  | I        | ST             |
|  |  |  |          | RS             |
|  |  |  |          | BT             |
|  |  |  |          | HA             |
|  |  |  |          | SC             |
|  |  |  |          |                |
|  |  |  |          | IDX            |
|  | BR-3   |  | 116      | 5              |

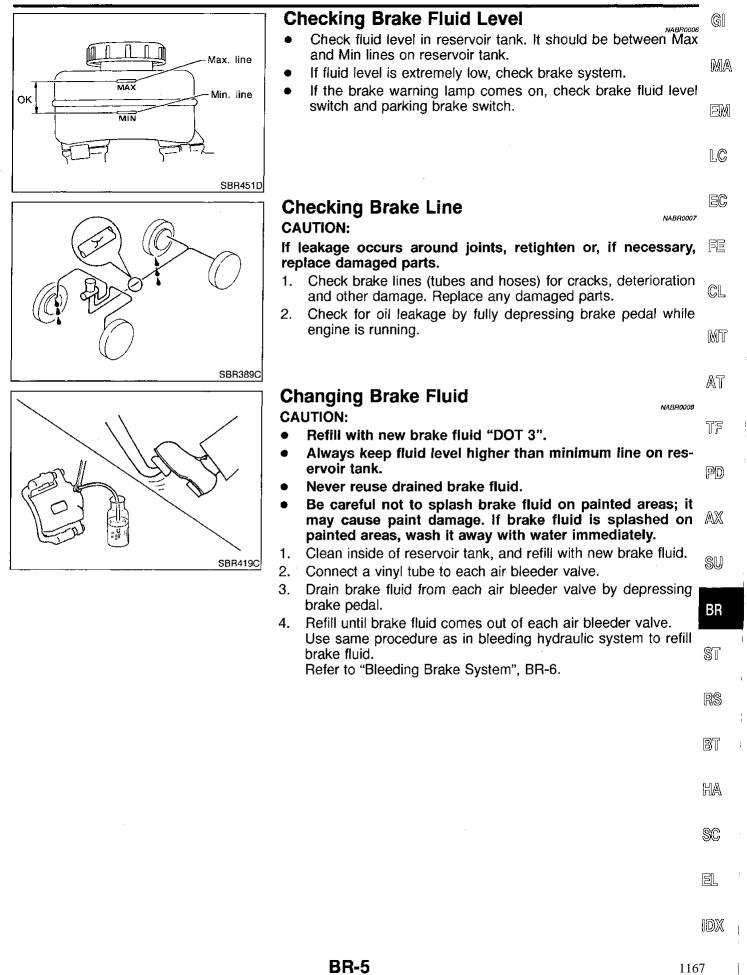
#### NABR0085

# NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING NVH Troubleshooting Chart

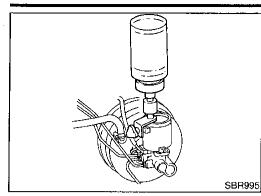
| Use the cl               | hart below        | to help you find | the                       |                               |                       |               |                         | ub<br>svm            |                      |                           |                          | -                  |                           |                   |                   | ir or             | r rei             | olac              | e th              | iese              | NAB.<br>BOG E     | 70085S01          |
|--------------------------|-------------------|------------------|---------------------------|-------------------------------|-----------------------|---------------|-------------------------|----------------------|----------------------|---------------------------|--------------------------|--------------------|---------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Reference                |                   |                  | BR-21, 27                 | BR-21, 27                     | BR-25                 | BR-21         |                         |                      | BR-23, 27            | 1                         |                          |                    | BR-24                     | BR-27             | NVH in PD section | NVH in PD section | NVH in AX section | NVH in AX section | NVH in SU section | NVH in SU section | NVH in SU section | NVH in ST section |
| Possible ca<br>and SUSPI | iuse<br>ECTED PAR | ſS               | Linings or pads - damaged | Linings or pads - uneven wear | Return spring damaged | Shims damaged | Rotor or drum imbalance | Rotor or drum damage | Rotor or drum runout | Rotor or drum deformation | Rotor or drum deflection | Rotor or drum rust | Rotor thickness variation | Drum out of round | PROPELLER SHAFT   | DIFFERENTIAL      | DRIVE SHAFT       | AXLE              | SUSPENSION        | TIRES             | ROAD WHEEL        | STEERING          |
|                          |                   | Noise            | ×                         | ×                             | ×                     | ×             |                         |                      |                      |                           |                          |                    |                           |                   | ×                 | ×                 | ×                 | ×                 | ×                 | ×                 | ×                 | ×                 |
| Symptom                  | BRAKE             | Shake            |                           |                               |                       |               | ×                       |                      |                      |                           |                          |                    |                           |                   | ×                 |                   | ×                 | ×                 | ×                 | ×                 | ×                 | ×                 |
|                          |                   | Shimmy, Judder   |                           |                               |                       |               | ×                       | ×                    | ×                    | ×                         | ×                        | ×                  | ×                         | ×                 |                   |                   |                   | ×                 | ×                 | ×                 | ×                 | ×                 |

 $\times$ : Applicable

#### **ON-VEHICLE SERVICE**



#### Bleeding Brake System



#### **ON-VEHICLE SERVICE**

### Bleeding Brake System CAUTION:

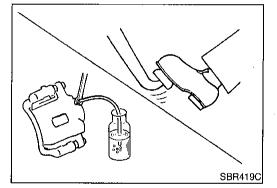
=NABR0009

- 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", "MAS-TER CYLINDER", BR-17.
- 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 connectors or battery ground cable.
- Bleed air in the following order.
- 1. LSV air bleeder (4WD models)
- 2. Left rear brake
- 3. Right rear brake
- 4. Left front brake
- 5. Right front brake



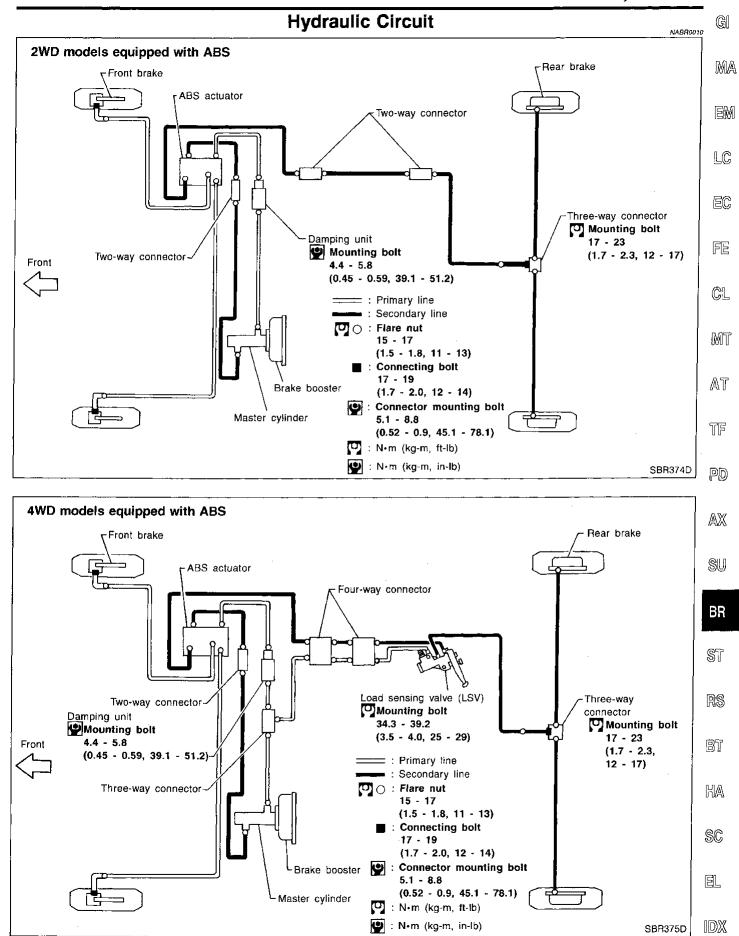
- 2. Fully depress brake pedal several times.
- 3. With brake pedal depressed, open air bleeder valve to release air.
- 4. Close air bleeder valve.
- 5. Release brake pedal slowly.
- 6. Repeat steps 2. through 5. until clear brake fluid comes out of air bleeder valve.
- 7. Tighten air bleeder valve.

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



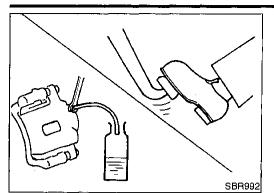
#### BRAKE HYDRAULIC LINE

Hydraulic Circuit



#### Removal

#### **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.

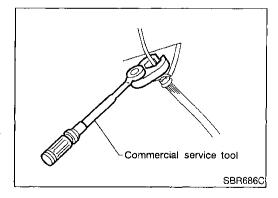
NABROOT1

NABR0013

- All hoses must be free from excessive bending, twisting and pulling.
- 1. Connect vinyl tube to air bleeder valve.
- 2. Drain brake fluid from each air bleeder valve by depressing brake pedal.
- 3. Remove flare nut connecting brake tube and hose, then withdraw lock spring.
- 4. Cover openings to prevent entrance of dirt whenever disconnecting brake line.

#### Inspection

Check brake lines (tubes and hoses) for cracks, deterioration and 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:

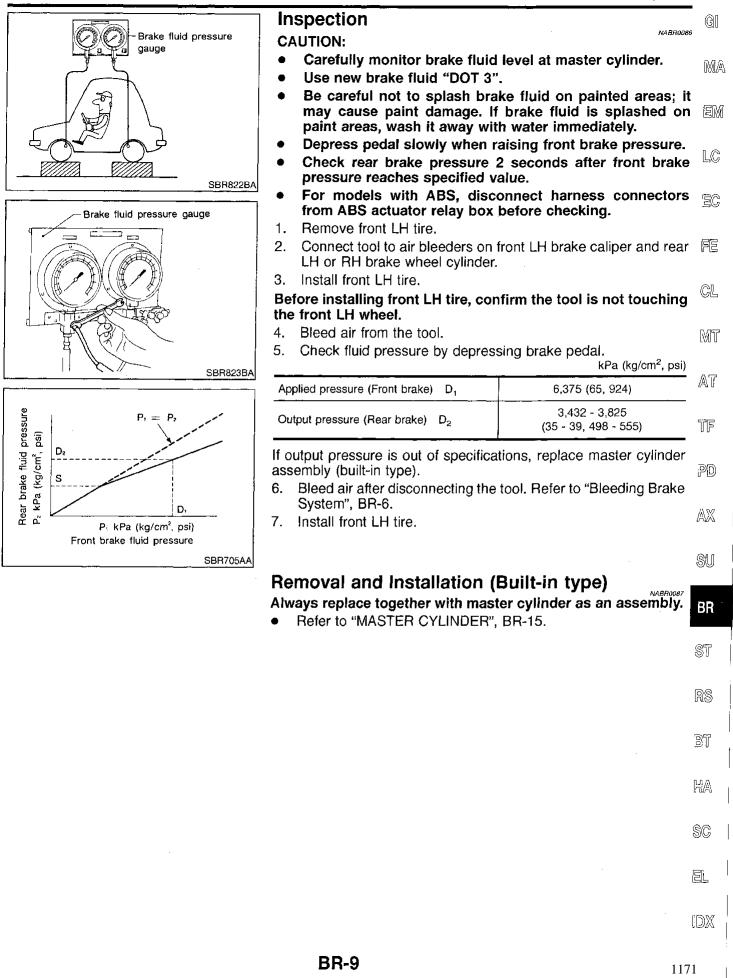
[<sup>1</sup>] : 15 - 17 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb) Connecting bolt:

- ◯ : 17 19 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 "Bleeding Brake System", BR-6.

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#### **PROPORTIONING VALVE (2WD)**

Inspection



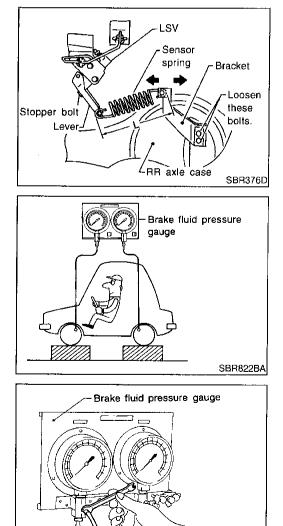
#### Inspection

#### 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.

NABR0014

- 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.



- Ensure vehicle is unladen condition\*.
   \*Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- 2. Have a driver sit in the driver's seat and one person sit on the rear end. Then have the person on the rear end slowly get off the vehicle. This is necessary to stabilize suspension deflection.
- 3. Gradually depress brake pedal and attach a lever to the stopper bolt, then adjust length "L" as follows:
  - Length "L": Approx. 194 mm (7.64 in)
- 4. Remove front LH tire.
- 5. Connect tool to air bleeders on front LH brake caliper and rear LH or RH brake wheel cylinder.

6. Install front LH tire.

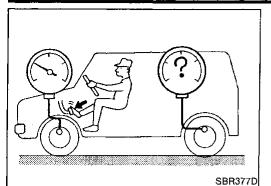
Before installing front LH tire, confirm the tool is not touching the front LH wheel.

7. Bleed air from Tool.

SBR823BA

#### LOAD SENSING VALVE (4WD)

Inspection (Cont'd)



 Raise front brake pressure to 4,904 kPa (50 kg/cm<sup>2</sup>, 711 psi) and 9,807 kPa (100 kg/cm<sup>2</sup>, 1,422 psi) and check rear brake pressure.

Rear brake pressure: Refer to table below.

MA

G

EM

- . .
- LC
- 9. Set down weight slowly over axle center so that sensor spring length becomes the same as when in loaded condition (Refer to table below). Check rear brake pressure in the same way described in step 6.

|   |  |  | U  | nit: kPa (kg/cm <sup>2</sup> , psi)                |          |
|---|--|--|--|--|----------|
|   |  | Sensor spring<br>length "L"*<br>mm (in)      | Front brake pres-<br>sure<br>4,904 (50, 711) | Front brake pres-<br>sure<br>9,807<br>(100, 1,422) | CL<br>MT |
| Rear  | Without<br>weight                            | 194 (7.64)                                   | 1,667 - 2,648<br>(17.0 - 27.0,<br>242 - 384) | 3,874 - 4,854<br>(39.5 - 49.5,<br>562 - 704)       | AT       |
| brake<br>pressure With<br>weight 235 (9.25) | 2,207 - 3,580<br>(22.5 - 36.5,<br>320 - 519) | 4,413 - 5,786<br>(45.0 - 59.0,<br>640 - 839) | TF   |  |          |

\*: Depressed brake pedal.

- 10. Bleed air after disconnecting the tool. Refer to "Bleeding Brake PD System", BR-6.
- 11. Install front LH tire.

#### Removal and Installation

#### CAUTION:

SBR378D

- Refill with 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 ST painted areas, wash it away with water immediately.
- Do not reuse Load Sensing Valve once it is disassembled.
- Replace damaged Load Sensing Valve as an assembly.
- When disassembling, apply multi-purpose grease to all rubbing areas.

HA

BT

SC

DX

BR

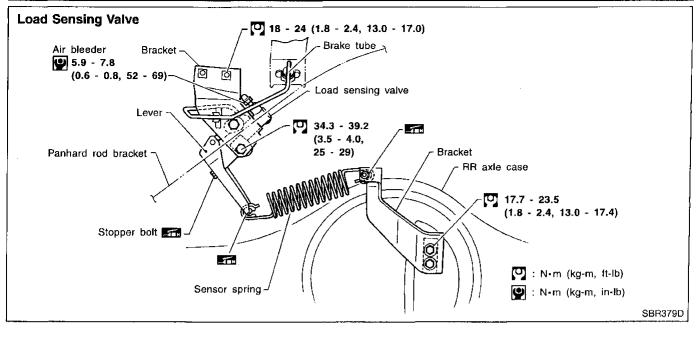
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SU

AX

#### LOAD SENSING VALVE (4WD)

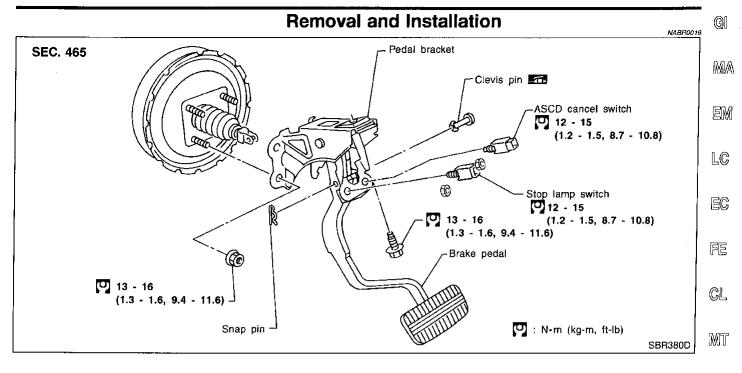
Removal and Installation (Cont'd)



- 1. Tighten all flare nuts and mounting bolts. Flare nut:
  - [□] : 15 17 N·m (1.5 1.8 kg-m, 11 13 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.

#### **BRAKE PEDAL AND BRACKET**

Removal and Installation



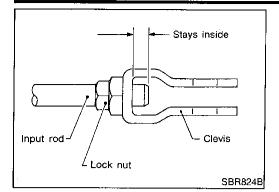
|  | Inspection   | AT  |
|--|--|-----|
|  | <ul> <li>Check brake pedal for following items.</li> <li>Brake pedal bend</li> </ul>   | TF  |
|  | <ul> <li>Clevis pin deformation</li> <li>Crack of any welded portion</li> <li>Crack or deformation of clevis pin stopper</li> </ul>                          | PD  |
|  |  | AX  |
| ·····  | Adjustment   | SU  |
| Input rod - 16 - 22 (1.6 - 2.2, 12 - 16)   | Check brake pedal free height from dash lower panel.<br>H: Free height   | BR  |
| Ator   | Refer to SDS (BR-83).<br>D: Depressed height   | Si  |
| Stop lamp  | Refer to SDS (BR-83).<br>Under force of 490 N (50 kg, 110 lb) with engine<br>running   | RS  |
| $C_{1} \circ C_{2}$ switch and<br>$C_{2} \circ C_{2}$ switch and<br>ASCD switch<br>O 12 - 15<br>(1.2 - 1.5,<br>9 - 11) | C <sub>1</sub> , C <sub>2</sub> : Clearance between pedal stopper and<br>threaded end of stop lamp switch and ASCD switch<br>0.3 - 1.0 mm (0.012 - 0.039 in) | BT  |
|  | A: Pedal free play<br>1 - 3 mm (0.04 - 0.12 in)  | HA  |
| Floor carpet<br>Dash insulator   | If necessary, adjust brake pedal free height.  | SC  |
| Dash lower panel   |  | ĒL  |
| िः N•m (kg-m, ft-ib)   |  | 16V |

SBR463CC

1DX

#### Adjustment (Cont'd)

#### **BRAKE PEDAL AND BRACKET**



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.

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

#### Make sure that stop lamp is 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, wheel cylinder, etc.). Then make necessary repairs.

#### MASTER CYLINDER

|   |   | Removal   |           |
|---|---|---|-----------|
|   | emoval  | NABR0019  | GI        |
| CA<br>●   | UTION:<br>Be careful not to splash brake flu<br>may cause paint damage. If brak<br>painted areas, wash it away with v | e fluid is splashed on  |           |
| •   | In the case of brake fluid leakage fr<br>disassemble the cylinder. Then   | om the master cylinder, check piston cups for                       |           |
| 1.<br>2.  | Drain brake fluid from each air bleede  | alve.<br>r valve, depressing brake                                  | LC        |
| 3.<br>4.  | pedal to empty fluid from master cyli<br>Remove brake pipe flare nuts.<br>Remove master cylinder mounting nu          |   | EC        |
| SEC. 460  | (   | ) Reservoir cap<br>) Oil filter                                     | FE        |
|   |   | Float<br>Reservoir tank<br>Seal                                     | GL        |
|   |   | ) Cylinder body<br>) O-ring<br>) Piston stopper                     | MŤ        |
|   | 3   | Secondary piston assembly<br>Primary piston assembly<br>Stopper cap | AT        |
|   |   |   | TF.       |
|   | M-ODFD-O-MARD-O   |   | pd<br>AX  |
| 6 - Ch  |   | • • •   | SU        |
|   |   |   | BR        |
| 00  | () 🐼 🖸  | 🕑 : N•m (kg-m, in-lb)   | ST        |
| (8) (9) 2 - 2.9<br>(0.2 - 0.3, 17.4 - 26.0) (7) 12 - 15 |   |   | RS        |
| (1.2 - 1.5,   | 9 - 11)   | SBR879D   | BT        |
|   | Bend claws of stopper cap outward.  | NABR0020  | HA        |
|   |   |   | SC        |
| SBR938A   |   |   | el<br>IDX |
| · · · · · · · · · · · · · · · · · · ·                   |   |   |           |

T

Disassembly (Cont'd)

#### **MASTER CYLINDER**

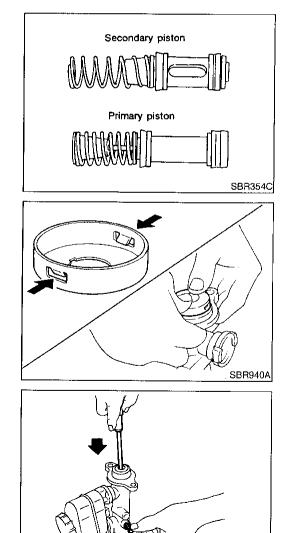
- SBR231C
- Remove piston stopper while piston is pushed into cylinder.
   Remove piston assemblies.

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

4. Draw out reservoir tank.

#### Inspection

Check master cylinder inner wall for pin holes and 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.
- 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.

SBR435B

Installation

NABHO023

GI

MA

EM

[],C

EC

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CL

MT

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TF

PD

AX

SU

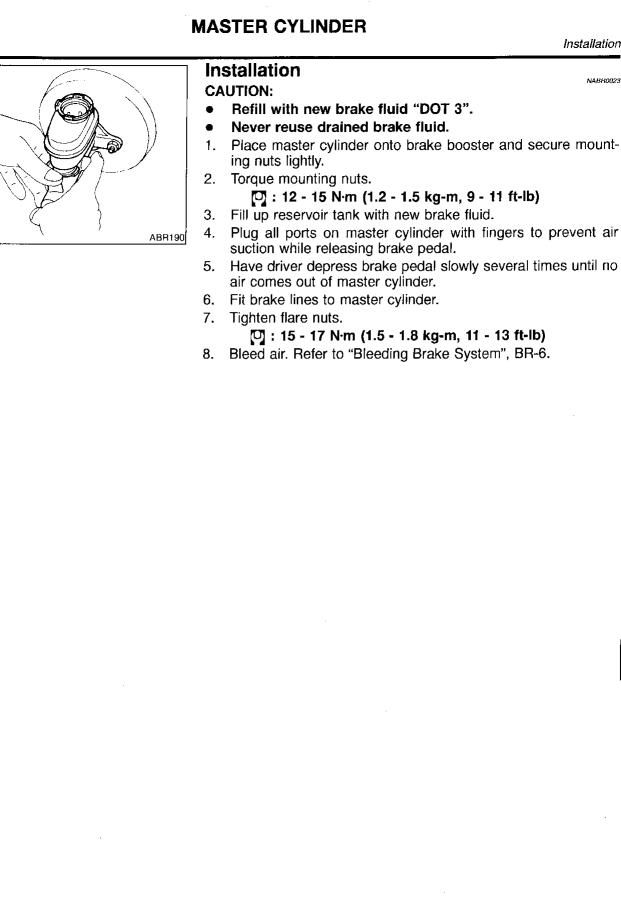
BR

ST

RS

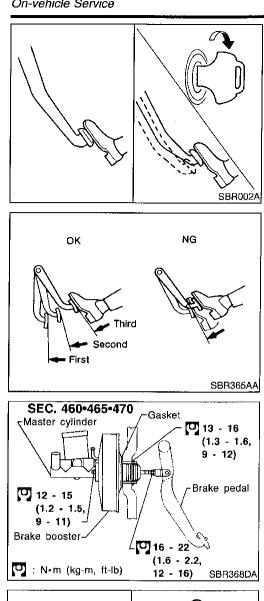
BT

HA



EL

SC



#### BRAKE BOOSTER

#### **On-vehicle Service OPERATING CHECK**

- Depress brake pedal several times with engine off. After 1. exhausting vacuum, make sure there is no change in pedal stroke.
- 2. Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

#### **AIRTIGHT CHECK**

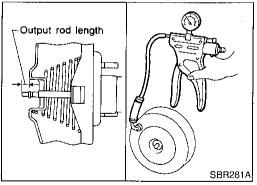
- VABR0024\$02 Start engine, and stop it after one or two minutes. Depress 1. brake pedal several times slowly. Booster is airtight if pedal stroke is less each time.
- 2. Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for 30 seconds.

#### Removal

CAUTION:

NABR0025

- 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.



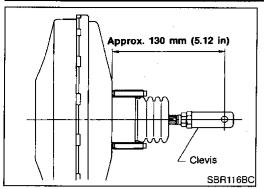
#### Inspection **OUTPUT ROD LENGTH CHECK**

NABR0026

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

**Specified length:** 10.275 - 10.525 mm (0.4045 - 0.4144 in)

#### **BRAKE BOOSTER**



|  | Installation      |             |
|--|-------------------|-------------|
| Installation   | G                 | <b>)</b> [] |
| CAUTION:   | =NABR0027         | ,           |
| <ul> <li>Be careful not to deform or bend brake pipes of<br/>lation of booster.</li> </ul>   | during instal-    | 1A          |
| <ul> <li>Replace clevis pin if damaged.</li> </ul>   |                   |             |
| <ul> <li>Refill with new brake fluid "DOT 3".</li> </ul>   | 1                 | M           |
| Never reuse drained brake fluid.   |                   |             |
| <ul> <li>Take care not to damage brake booster m<br/>thread when installing. Due to the narro<br/>installation, the threads can be damaged l<br/>panel.</li> </ul> | by the dash       |             |
| 1. Before fitting booster, temporarily adjust clevis shown.  | to dimension      | C           |
| <ol> <li>Fit booster, then secure mounting nuts (brake per<br/>brake booster) lightly.</li> </ol>  | dal bracket to 月  |             |
| 3. Connect brake pedal and booster input rod with  |                   | -           |
| <ol><li>Secure mounting nuts.</li></ol>  | C                 | L           |
| Specification: 13 - 16 N·m (1.3 - 1.6 kg-m,  | •                 |             |
| <ol> <li>Install master cylinder. Refer to "Installation"<br/>CYLINDER", BR-17.</li> </ol>   | in "MASTER $_{M}$ | T           |
| <ol> <li>Adjust brake pedal height and free play. Refer to<br/>in "BRAKE PEDAL AND BRACKET", BR-13.</li> </ol>   | "Adjustment"      | T           |
| <ol><li>Secure lock nut for clevis.</li></ol>  |                   |             |
| [] : 16 - 22 N⋅m (1.6 - 2.2 kg-m, 12 - 16 ft-ll  | ר היות            |             |
| 8. Bleed air. Refer to "Bleeding Brake System", BR   | - <b>6.</b>       | -           |
|  | <b>D</b>          | 5)          |
|  | P                 | J           |
|  |                   | 0           |
|  | AX                | X           |
|  |                   |             |
|  | SL                | J           |
|  |                   |             |

BR

ST

RS

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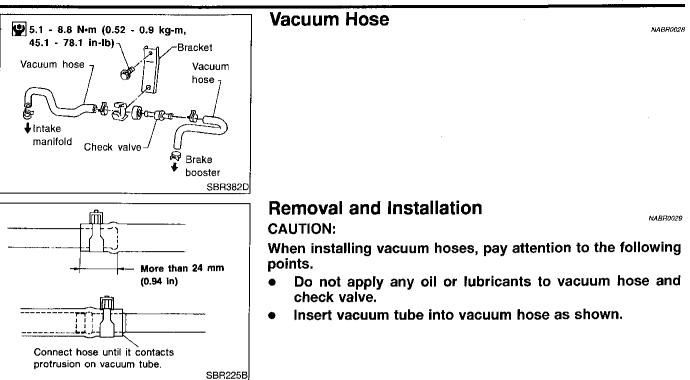
HA

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#### **VACUUM PIPING**

Vacuum Hose

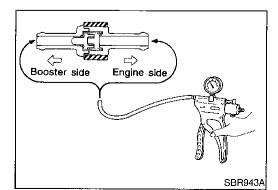


- Intake manifold Brake booster side SBR498A
- Install check valve, paying attention to its direction.

#### Inspection HOSES AND CONNECTORS

NABR0030

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



#### CHECK VALVE

Check vacuum with a vacuum pump.

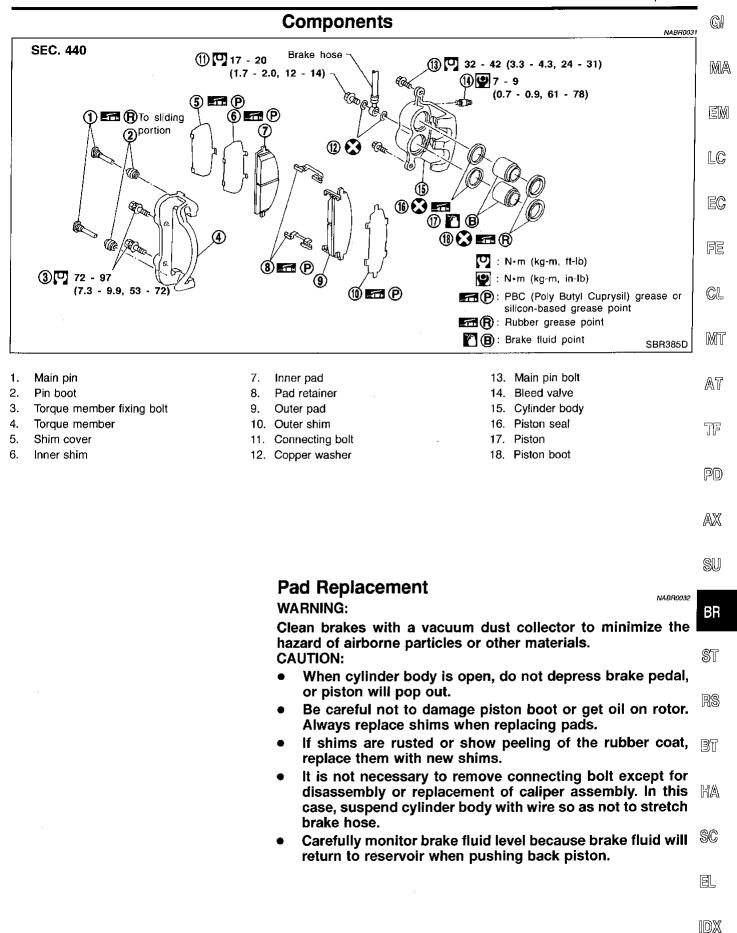
NABR0030502

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

**BR-20** 

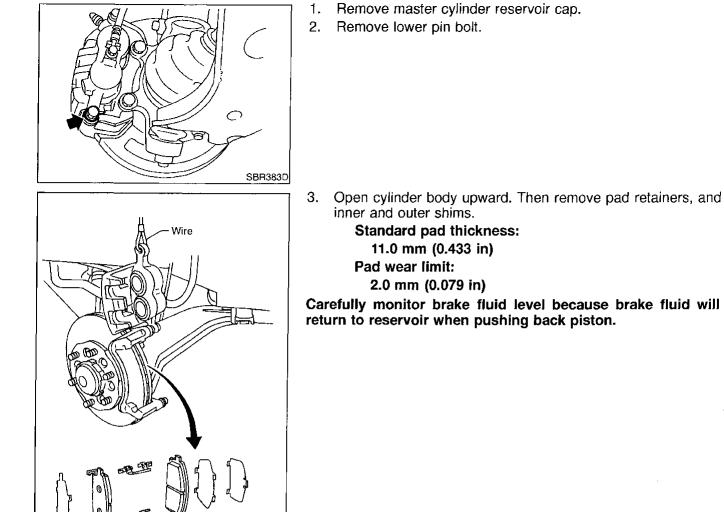
#### FRONT DISC BRAKE

Components



#### Pad Replacement (Cont'd)

#### FRONT DISC BRAKE



SBR384D

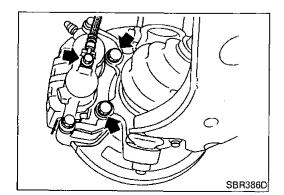
#### Removal

WARNING:

NABR0033

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.

#### FRONT DISC BRAKE

|              |   | Disassembly   |
|--------------|---|---------------|
| TTA D        | Disassembly<br>WARNING:   | NABR0034      |
|              | Do not place your fingers in front of piston.<br>CAUTION:   |               |
|              | Do not scratch or score cylinder wall.  |               |
| Wooden block | <ol> <li>Push out piston with dust seal with compressed</li> <li>Remove piston seal with a suitable tool.</li> </ol>  | air.          |
| SBR085A      | Inspection  |               |
|              | CALIPER   | NABR0035      |
|              |   | NABR0035S01   |
|              | Cylinder Body   | NABR003550101 |
|              | <ul> <li>Check inside surface of cylinder for score, rust, v<br/>and presence of foreign objects. If any of the abo<br/>are observed, replace cylinder body.</li> </ul> |               |
|              | <ul> <li>Minor damage from rust or foreign objects may<br/>by polishing surface with a fine emery paper. Re<br/>body if necessary.</li> <li>CAUTION:</li> </ul>         |               |
|              | Use brake fluid to clean. Never use mineral oil.  |               |

#### Piston

BR0035S0102 Check piston for score, rust, wear, damage and presence of foreign TF objects. Replace if any of the above conditions are observed. CAUTION:

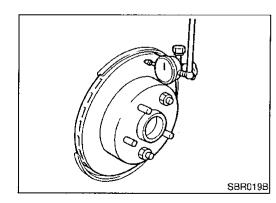
PD Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign objects are stuck to sliding surface. AX

#### Slide Pin, Pin Bolt and Pin Boot

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

| RO  | TOR NABRO035502  |       |
|-----|--|-------|
| Ru  | nout   | BR    |
| 1.  | Secure rotor to wheel hub with at least two nuts (M12 $\times$ 1.25).  |       |
| 2.  | Check runout using a dial indicator.   | 057   |
| spe | ke sure that wheel bearing axial end play is within the ecifications before measuring. Refer to "Front Wheel Bear-" in AX section. | ST    |
| шy  | Maximum runout:  | RS    |
|     | 0.1 mm (0.004 in)  |       |
| 3.  | If the runout is out of specification, find minimum runout posi-<br>tion as follows:   | BT    |
| a.  | Remove nuts and rotor from wheel hub.  | HA    |
| b.  | Shift the rotor one hole and secure rotor to wheel hub with nuts.  | LIL/A |
| c.  | Measure runout.  | SC    |
| d.  | Repeat steps a. to c. so that minimum runout position can be found.  | 00    |

If the runout is still out of specification, turn rotor with on-car EL 4. brake lathe ("MAD, DL-8700", "AMMCO 700 and 705" or equivalent). IDX



**BR-23** 

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Inspection (Cont'd)

#### FRONT DISC BRAKE

#### Thickness

Thickness variation (At least 8 positions): Maximum 0.015 mm (0.0006 in)

Insert piston seal into groove on cylinder body.

If thickness variation exceeds the specification, turn rotor with oncar brake lathe.

#### Rotor repair limit: 26.0 mm (1.024 in)

#### Assembly

1.

SBR020B

Piston

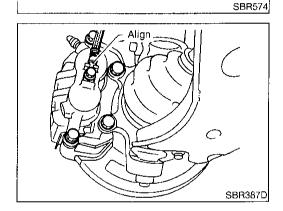
73

NABR0036

NABR0037

NABR003550202

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



Cylinder body

Boot

Piston seal

#### 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.

#### Brake Burnishing Procedure

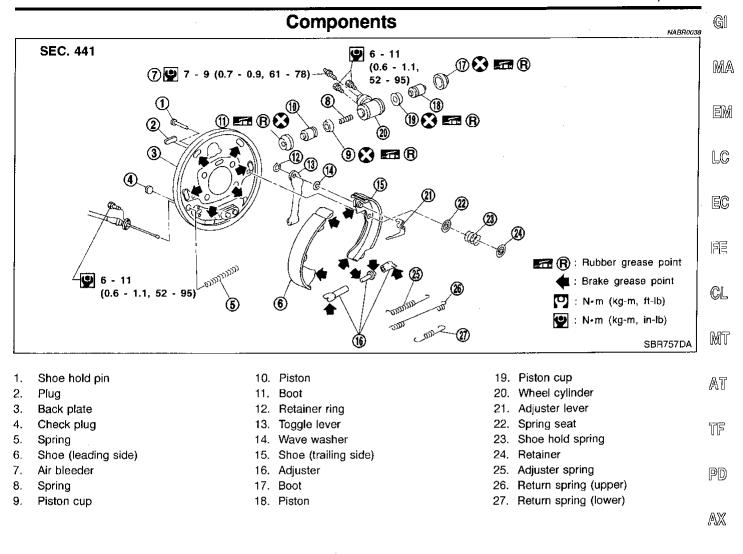
When experiencing soft brake pedal feel at very low mileage, or after replacing the rotor, burnish the brake pad contact surfaces according to the following procedures.

#### Only perform this procedure under safe road and traffic conditions. Use extreme caution.

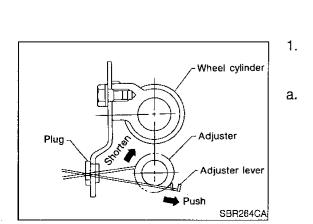
- 1. Drive the vehicle on a straight smooth road at 50 km/h (31 MPH).
- Use medium brake pedal/foot effort to bring the vehicle to a complete stop from 50 km/h (31 MPH). Adjust brake pedal/foot pressure such that vehicle stopping time equals 3 to 5 seconds.
- 3. To cool the brake system, drive the vehicle at 50 km/h (31 MPH) for 1 minute without stopping.
- 4. Repeat steps 1 to 3 10 times or more to complete the burnishing procedure.

#### **REAR DRUM BRAKE**

Components



SU



| Removal  |          |    |
|--|----------|----|
| WARNING:   | NABR0039 | BR |
| Clean brake lining with a vacuum dust collector to mini the hazard of airborne asbestos or other materials. CAUTION: | mize     | ST |
| Make sure parking brake lever is released completely.  |          | RS |
|  |          | BT |

- Release parking brake lever fully, then remove drum.
   If drum is hard to remove, the following procedures HA should be carried out.
- a. Remove plug. Then shorten adjuster to make clearance between brake shoe and drum as shown.

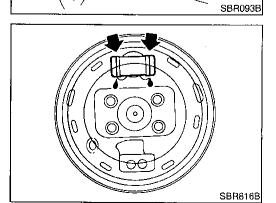
EL

IDX

Removal (Cont'd)

#### **REAR DRUM BRAKE**

Tighten the two bolts gradually. b. ø Bolts (M8 x 1.25) SBR093A 2. After removing shoe hold pin by rotating push retainer, remove leading shoe then remove trailing shoe. Remove spring by Retainer rotating shoes in direction arrow. Be careful not to damage wheel cylinder piston boots. 3. Remove adjuster. Shoe hold pin SBR266CA Disconnect parking brake cable from toggle lever. 4. Be careful not to damage parking brake cable when separating it. 0 Parking brake cable \_\_ Brake shoe (trailing side) Operating lever SBR267CA Remove retainer ring with a suitable tool. Then separate toggle 5. lever and brake shoe.



#### Inspection WHEEL CYLINDER

NABR0040 NABR0040S01

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

**BR-26** 

#### **REAR DRUM BRAKE**

ļ

|  | Wheel Cylinder Overhau   | <i>II</i> |
|--|--|-----------|
|  | <ul> <li>Wheel Cylinder Overhaul</li> <li>Check all internal parts for wear, rust and damage. Replace in</li> </ul>  | GI<br>If  |
| 6 m  | <ul> <li>Pay attention so as not to scratch cylinder when installing pis-</li> </ul>   |           |
| Ø<br>↓<br>Ø<br>(Millio<br>Ø<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D<br>)<br>(D | tons.  | EM        |
|  |  | LC        |
| SBR215B  | Inspection NABROOM2  | ĒĊ        |
|  | DRUM<br>Maximum inner diameter:<br>296.5 mm (11.67 in)   |           |
|  | Out-of-roundness:<br>0.03 mm (0.0012 in) or less   | CL        |
|  | <ul> <li>Contact surface should be fine finished with No. 120 to 150 emery paper.</li> <li>Using a drum lathe, lathe brake drum if it shows scoring, par-</li> </ul> | (Mhf      |
| SBR095A  | <ul> <li>After brake drum has been completely reconditioned or replaced, check drum and shoes for proper contact pattern.</li> </ul>                                 | 0         |
|  |  | TF .      |
|  |  | PD        |
|  |  | AX        |
|  |  | SU        |
|  | LINING NABROO42502<br>Check lining thickness.  | BR        |
|  | Standard lining thickness:<br>6.1 mm (0.240 in)<br>Lining wear limit (A):<br>1.5 mm (0.059 in)   | ST        |
|  | 1.5 mm (0.058 m)   | RS        |
| SBR021A  |  | BT        |
| REAT   | Installation<br>Always perform shoe clearance adjustment. Refer to BR-30.  | HA        |
|  | 1. Fit toggle lever to brake shoe (trailing side) with retainer ring.  | SC        |
| Contraction of the second seco   | ·  | i         |
|  | ·  | <br>  D X |
| SBR092B  | <b>BR-27</b> 118   | 89        |
|  |  |           |

#### Installation (Cont'd)

#### **REAR DRUM BRAKE**

- ABR371
- 2. Apply brake grease to the contact areas (indicated by arrows and hatching) shown at left.

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

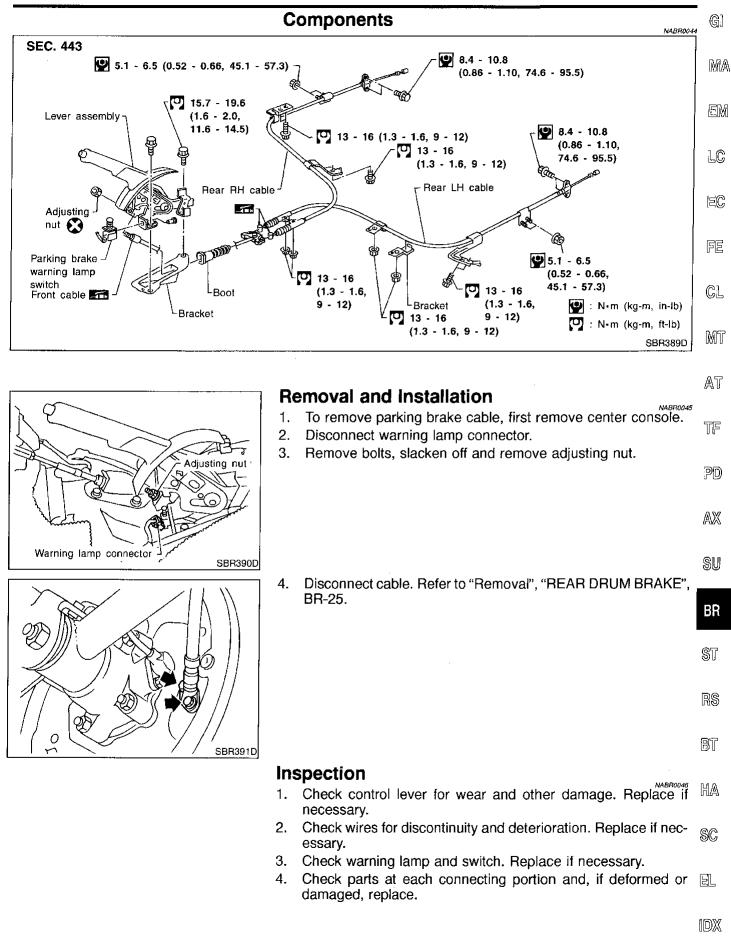
| Wheel | Screw                | Depression |  |
|-------|----------------------|------------|--|
| Left  | Left-hand thread Yes |            |  |
| Right | Right-hand thread    | No         |  |

- Adjuster Toggle lever Front Cable SBR279B
- 4. Connect parking brake cable to toggle lever.
- 5. Install all parts.

SBR217B

- Be careful not to damage wheel cylinder piston boots.6. Check all parts are installed properly.
- Pay attention to direction of adjuster assembly.
- 7. Install brake drum.
- 8. When installing new wheel cylinder or overhauling wheel cylinder, bleed air. Refer to "Bleeding Brake System", BR-6.
- 9. Adjust parking brake. Refer to "Adjustment", "PARKING BRAKE CONTROL", BR-30.

#### PARKING BRAKE CONTROL



1191

#### Adjustment

# Adjusting nut SBR042D

#### PARKING BRAKE CONTROL

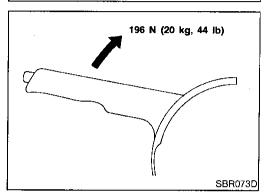
#### Adjustment

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

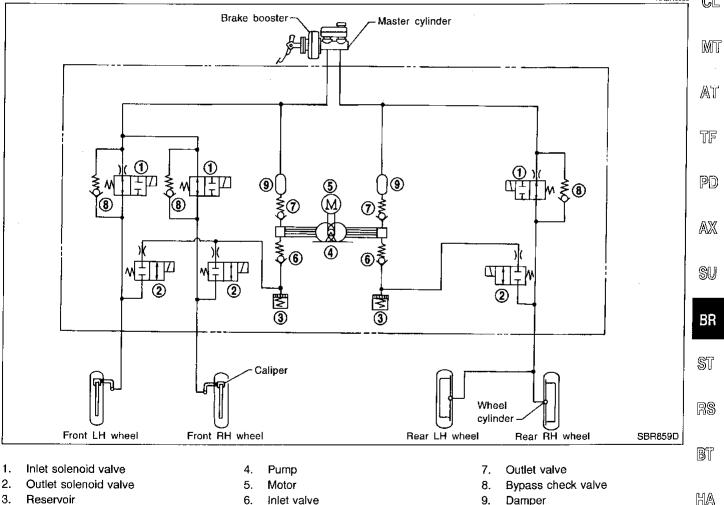
NABROO47

- 2. Pull control lever 4 5 notches. Then adjust control lever by turning adjusting nut.
- Pull control lever with specified amount of force. Check lever stroke and ensure smooth operation.
   Number of notches: 6 8

- 4. Bend warning lamp switchplate to ensure:
- Warning lamp comes on when lever is lifted "A" notches.
- Warning lamp goes out when lever is fully released. Number of "A" notches: 1 or less



#### ABS DESCRIPTION Purpose Purpose GI 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. MA 1) Improves proper tracking performance through steering wheel operation. 2) Eases obstacle avoidance through steering wheel operation. 3) Improves vehicle stability. EM Operation NABR0049 When the vehicle speed is less than 10 km/h (6 MPH) this system does not work. 1.C 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 EC 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. FE While driving, a mechanical noise may be heard during ABS operation. This is a normal condition. ABS Hydraulic Circuit NABR0050 CL



3. Reservoir 6. Inlet valve

9 Damper

SC

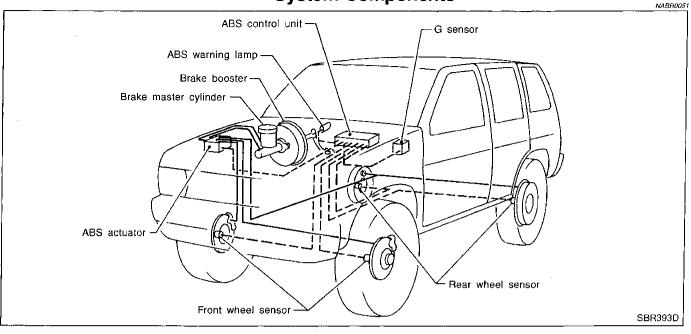
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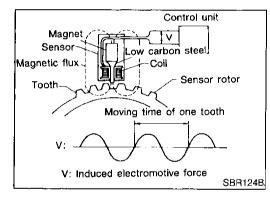
1193

#### DESCRIPTION

#### ABS

#### **System Components**

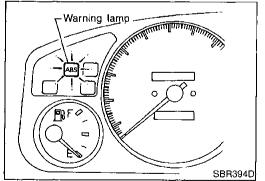




# System Description SENSOR

NABR0052

The sensor unit consists of a gear-shaped sensor rotor and a sensor element. The element contains a bar magnet around which a coil is wound. The sensor is installed on the back of the brake rotor and the back of the rear brake drum. As the wheel rotates, the sensor generates a sine-wave pattern. The frequency and voltage increase(s) as the rotating speed increases.



#### CONTROL UNIT

The control unit computes the wheel rotating speed by the signal current sent from the sensor. Then it supplies a DC current to the actuator solenoid valve. It also controls ON-OFF operation of the valve relay and motor relay. If any electrical malfunction should be detected in the system, the control unit causes the warning lamp to light up. In this condition, the ABS will be deactivated by the control unit, and the vehicle's brake system reverts to normal operation.

GI

IMA

EM

LC

EC

FE

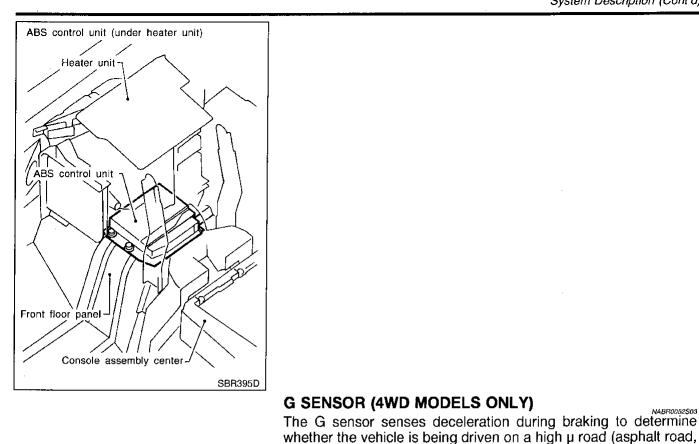
CL

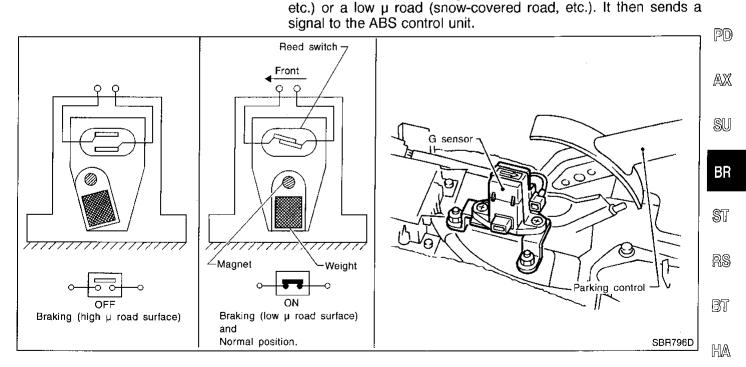
MT

AT

TF

#### DESCRIPTION





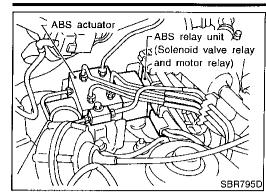
The reed switch turns on when it is affected by a magnetic field. During sudden deceleration (braking on a high µ road), the weight SC moves and the magnet in the weight moves away from the reed switch. The magnetic field then diminishes and the reed switch turns off.

ΞL

IDX

#### System Description (Cont'd)





#### ACTUATOR

The actuator contains:

- An electric motor and pump
- Two relays
- Six solenoid valves, each inlet and outlet for — LH front
  - RH front
  - Rear

These components control the hydraulic circuit. The ABS control unit directs the actuator to increase, hold or decrease hydraulic pressure to all or individual wheels.

#### **ABS Actuator Operation**

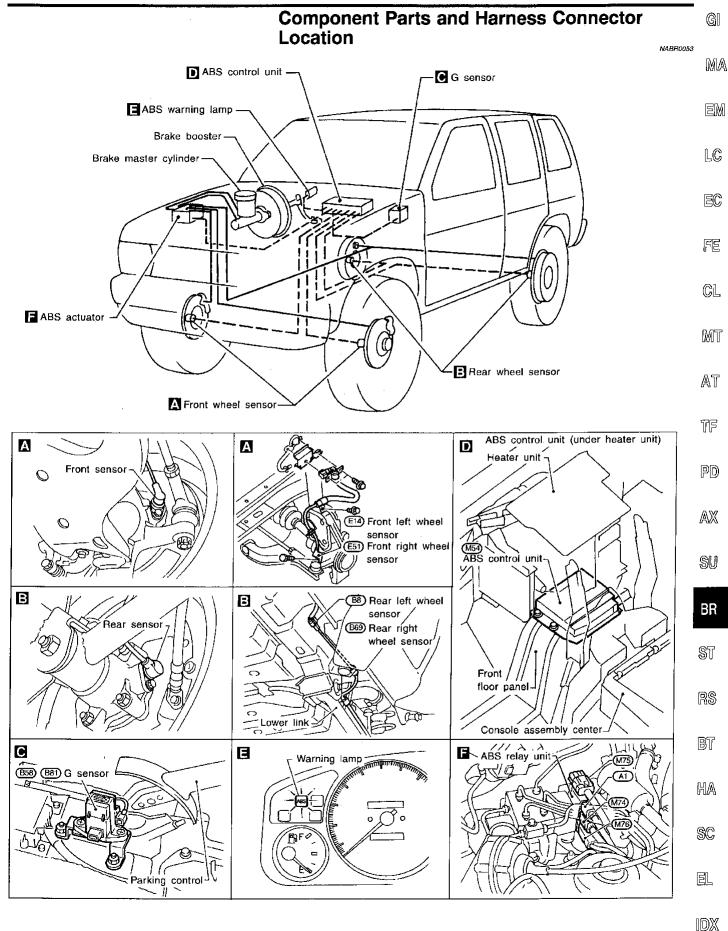
|   |             | Inlet solenoid<br>valve | Outlet solenoid<br>valve  |  |
|---|-------------|-------------------------|---|--|
| Normal brake op   | eration     | OFF (Open)              | OFF (Closed)  | Master cylinder brake fluid pressure is directly transmitted to caliper via the inlet solenoid valve.                              |
| ABS operation Pressure hold<br>Pressure decrease<br>Pressure increase | ON (Closed) | OFF (Closed)            | Hydraulic circuit is shut off to hold the caliper brake fluid pressure. |  |
|   |             | ON (Closed)             | ON (Open)   | Caliper brake fluid is sent to reservoir via the outlet<br>solenoid valve. Then it is pushed up to the master<br>cylinder by pump. |
|   |             | OFF (Open)              | OFF (Closed)  | Master cylinder brake fluid pressure is transmitted to caliper.  |

ABS

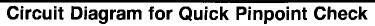
NABR0052S04

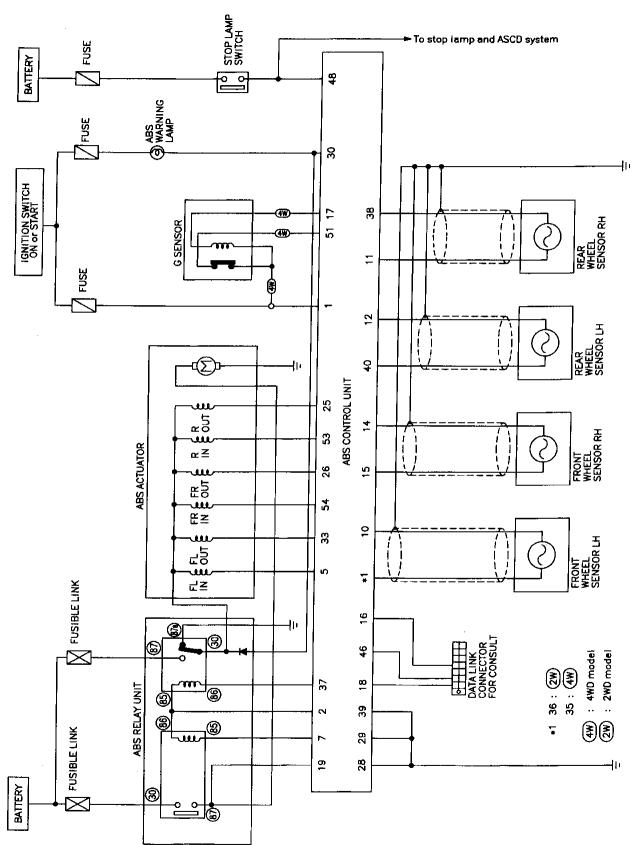
NABR0052\$0401

Component Parts and Harness Connector Location



SBR800D



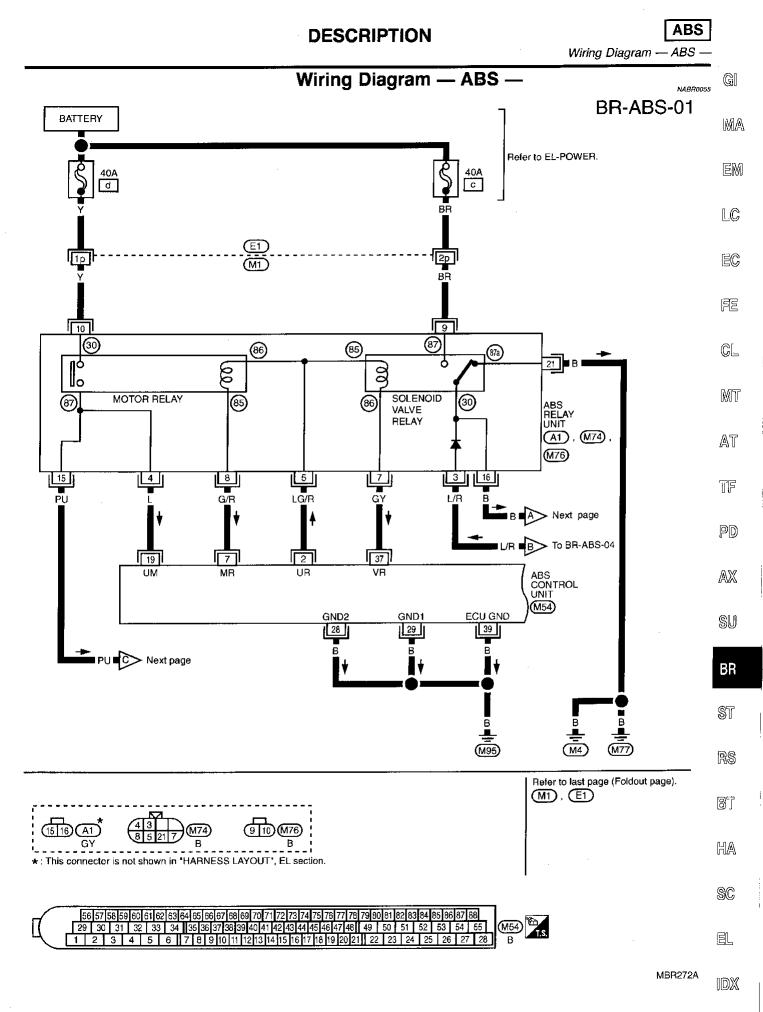


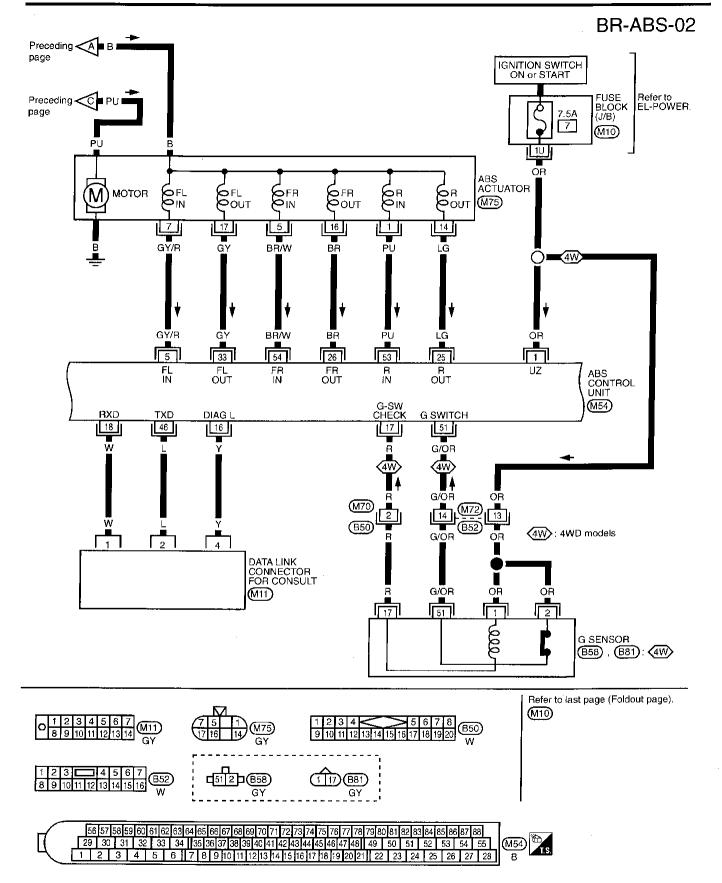
MBR231A

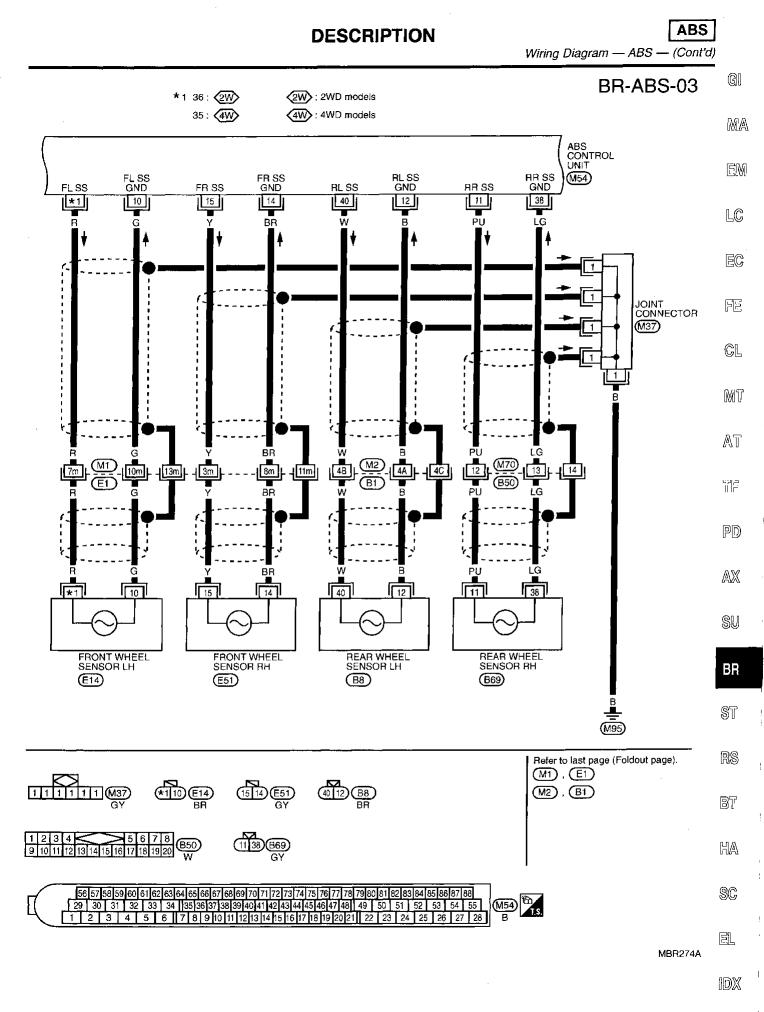
i.

ABS

NABR0054



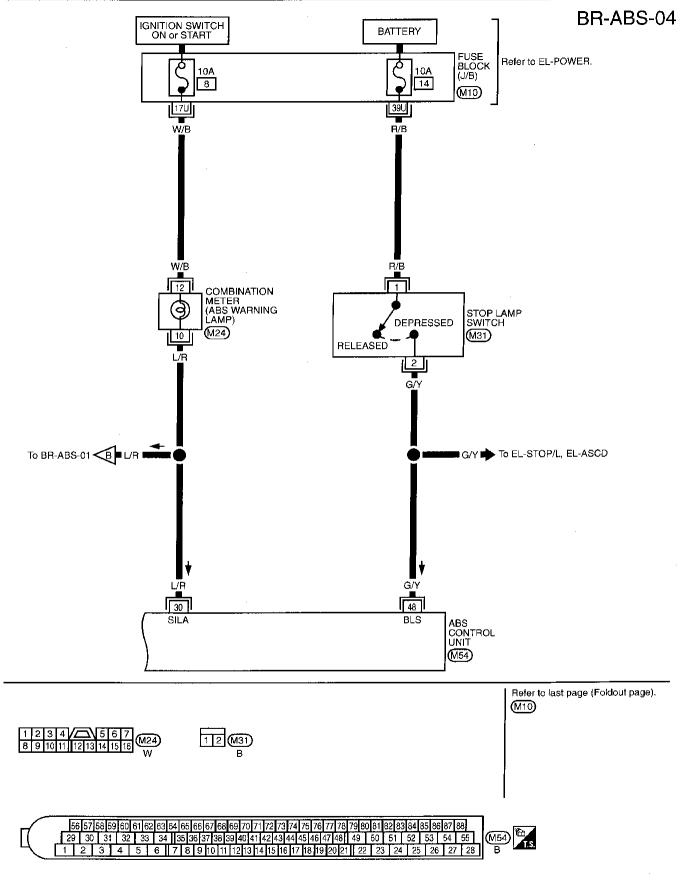




**BR-39** 

1201

## DESCRIPTION



MBR275A

ABS

ABS

Self-diagnosis

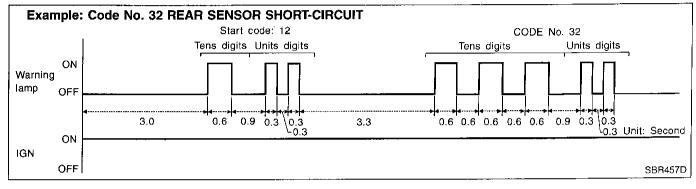
|  | Self-diagnosis   | GI  |
|--|--|-----|
|  | <ul> <li>When a problem occurs in the ABS, the warning lamp on the<br/>instrument panel comes on. To start the self-diagnostic results<br/>mode, ground the self-diagnostic (check) terminal located on</li> </ul> | MA  |
|  | "Data Link Connector for CONSULT". The location of the mal-<br>function is indicated by the warning lamp flashing.   | EM  |
|  | SELF-DIAGNOSIS PROCEDURE   | LC  |
|  | <ol> <li>Drive vehicle over 30 km/h (19 MPH) for at least one minute.</li> <li>Turn ignition switch "OFF".</li> </ol>  |     |
| Personal Instrument lower panel-   | 3. Ground terminal "4" of "Data link connector for CONSULT" with a suitable harness.   | EC  |
| La Instrument lower panel  | <ol> <li>Turn ignition switch "ON" while grounding terminal "4".</li> <li>Do not depress brake pedal.</li> </ol>   | FE  |
|  |  | CL  |
| 4 Data link connector for<br>CONSULT (Ground terminal<br>4 with a suitable harness.) |  | MT  |
| SBR406DA   |  | at  |
| Warning lamp   | 5. After 3.0 seconds, the warning lamp starts flashing to indicate the malfunction code No. (See NOTE.)  | i   |
|  | <ol> <li>Verify the location of the malfunction with the malfunction code<br/>chart. Refer to BR-53. Then make the necessary repairs fol-<br/>lowing the diagnostic procedures.</li> </ol>                         | TF  |
|  | <ol> <li>After the malfunctions are repaired, erase the malfunction<br/>codes stored in the control unit. Refer to BR-42.</li> </ol>   | PD  |
|  | <ol> <li>Rerun the self-diagnostic results mode to verify that the mal-<br/>function codes have been erased.</li> </ol>  | AX  |
| SBR394D  | 9. Disconnect the check terminal from the ground. The self-diag-   | SU  |
|  | <ol> <li>Disconnect the check terminal from the ground. The self-diagnostic results mode is now complete.</li> <li>Check warning lamp for deactivation after driving vehicle over</li> </ol>                       | BR  |
|  | 30 km/h (19 MPH) for at least one minute.<br>11. After making certain that warning lamp does not come on, test   | ST  |
|  | the ABS in a safe area to verify that it functions properly.<br>NOTE:  |     |
| Data link connector for<br>CONSULT (Disconnect                                       | The indication terminates after five minutes.<br>However, when the ignition switch is turned from "OFF" to "ON", the   | RS  |
| the harness.) WHY SBR407DA   | indication starts flashing again.  | BT  |
|  |  | HA  |
|  |  | SC  |
|  |  | EL  |
|  |  | IDX |

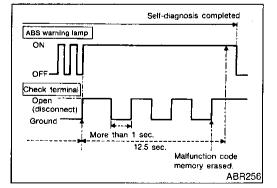


Self-diagnosis (Cont'd)

# 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.
- 2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
- 3. The indication begins with the start code 12. After that a maximum of three code numbers appear in the order of the latest one first. The indication then returns to the start code 12 to repeat (the indication will stay on for five minutes at the most).
- 4. The malfunction code chart is given on the next page.





# HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

- Disconnect the check terminal from ground (ABS warning lamp will stay lit).
- 2. Within 12.5 seconds, ground the check terminal 3 times. Each terminal ground must last more than 1 second. The ABS warning lamp goes out after the erase operation has been completed.
- 3. Perform self-diagnosis again. Refer to BR-41. Only the startcode should appear, no malfunction codes.

CONSULT

CONSULT

ABS

=NABR0057

GI

## CONSULT APPLICATION TO ABS

| ITEM   | SELF-DIAGNOSTIC<br>RESULTS | DATA MONITOR | ACTIVE TEST | M      |
|--|----------------------------|--------------|-------------|--------|
| Front right wheel sensor   | ×                          | ×            |             | <br>El |
| Front left wheel sensor  | ×                          | ×            |             |        |
| Rear right wheel sensor  | ×                          | ×            |             |        |
| Rear left wheel sensor   | ×                          | ×            | <u> </u>    |        |
| G switch (G sensor) ★  | ×                          | ×            | ×           | Ē      |
| Stop lamp switch   | —                          | ×            |             |        |
| Front right inlet solenoid valve   | ×                          | ×            | ×           | F      |
| Front right outlet solenoid valve  | ×                          | ×            | ×           |        |
| Front left inlet solenoid valve  | ×                          | ×            | ×           | - C    |
| Front left outlet solenoid valve   | ×                          | ×            | ×           |        |
| Rear inlet solenoid valve  | ×                          | ×            | ×           | — M    |
| Rear outlet solenoid valve   | ×                          | ×            | ×           | A      |
| Actuator solenoid valve relay  | ×                          | ×            |             | — A    |
| Actuator motor relay<br>ABS MOTOR is shown on the Data Monitor<br>screen.) | ×                          | ×            | ×           | Ţ      |
| ABS warning lamp   | _                          | ×            |             | <br>P[ |
| Battery voltage  | ×                          | ×            |             | _      |
| ABS operating signal   | <u> </u>                   | ×            | ×           | <br>A2 |

×: Applicable

-: Not applicable

★: 4WD models only

## ECU (ABS CONTROL UNIT) PART NUMBER MODE

Ignore the ECU part number displayed in the ECU PART NUMBER MODE. Refer to parts catalog to order BR the ECU.

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SU

RS

BT

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SC

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**CONSULT** Inspection Procedure

īπ (

CONSULT

==[ii]==== Start

SUB MODE

ENGINE

<u>AIRBAG</u> ABS

为 SELECT DIAG MODE

DATA MONITOR

ACTIVE TEST

FAILURE DETECTED

FR RH SENSOR

ERASE

[OPEN]

SELF-DIAG RESULTS

ECU PART NUMBER

📕 SELF-DIAG RESULTS 🔳 🛄

A/T

SELECT SYSTEM

NISSAN

հ

CONSULT -1

Instrument lower panel-

Data link connector for

ത

SBR408DA

SBR455D

SBR385C

SST412B

SBR950C

TIME

PRINT

0

<u>/</u>4

## CONSULT Inspection Procedure SELF-DIAGNOSIS PROCEDURE

Turn ignition switch OFF.

=NABR0058

ABS

NABR0058\$01

Connect CONSULT to Data Link Connector for CONSULT.
 Start engine.

1.

- 4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
- 5. Stop vehicle with engine running and touch "START" on CON-SULT screen.

6. Touch "ABS".

- 7. Touch "SELF-DIAG RESULTS".
- The screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.
- 8. Make the necessary repairs following the diagnostic procedures.
- 9. After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching "ERASE".
- 10. Check warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

11. Test the ABS in a safe area to verify that it functions properly. NOTE:

"SELF-DIAG RESULTS" screen shows the detected malfunction and how many times the ignition switch has been turned since the malfunction.

## **BR-44**

ABS

CONSULT Inspection Procedure (Cont'd)

### SELF-DIAGNOSTIC RESULTS MODE

|                                    | SELF-DIAGNOSTIC RESULTS MODE   | NABR0058SC     |
|------------------------------------|--|----------------|
| Diagnostic item                    | Diagnostic item is detected when   | Reference Page |
| FR RH SENSOR ★1<br>[OPEN]          | <ul> <li>Circuit for front right wheel sensor is open.</li> <li>(An abnormally high input voltage is entered.)</li> </ul>  | BR-54          |
| FR LH SENSOR ★1<br>[OPEN]          | <ul> <li>Circuit for front left wheel sensor is open.</li> <li>(An abnormally high input voltage is entered.)</li> </ul>   | BR-54          |
| RR RH SENSOR ★1<br>[OPEN]          | <ul> <li>Circuit for rear right sensor is open.</li> <li>(An abnormally high input voltage is entered.)</li> </ul>   | BR-54          |
| RR LH SENSOR ★1<br>[OPEN]          | <ul> <li>Circuit for rear left sensor is open.</li> <li>(An abnormally high input voltage is entered.)</li> </ul>  | BR-54          |
| FR RH SENSOR ★1<br>[SHORT]         | <ul> <li>Circuit for front right wheel sensor is shorted.</li> <li>(An abnormally low input voltage is entered.)</li> </ul>  | BR-54          |
| FR LH SENSOR ★1<br>[SHORT]         | <ul> <li>Circuit for front left wheel sensor is shorted.</li> <li>(An abnormally low input voltage is entered.)</li> </ul>   | BR-54          |
| RR RH SENSOR ★1<br>[SHORT]         | <ul> <li>Circuit for rear right sensor is shorted.</li> <li>(An abnormally low input voltage is entered.)</li> </ul>   | BR-54          |
| RR LH \$EN\$OR ★1<br>[SHORT]       | Circuit for rear left sensor is shorted.     (An abnormally low input voltage is entered.)   | BR-54          |
| ABS SENSOR ★1<br>[ABNORMAL SIGNAL] | <ul> <li>Teeth damage on sensor rotor or improper installation of wheel sensor.<br/>(Abnormal wheel sensor signal is entered.)</li> </ul>  | <b>BR</b> -54  |
| FR RH IN ABS SOL<br>[OPEN, SHORT]  | <ul> <li>Circuit for front right inlet solenoid valve is open.</li> <li>(An abnormally low output voltage is entered.)</li> </ul>  | BR-56          |
| FR LH IN ABS SOL<br>[OPEN, SHORT]  | <ul> <li>Circuit for front left inlet solenoid valve is open.</li> <li>(An abnormally low output voltage is entered.)</li> </ul>   | BR-56          |
| FR RH OUT ABS SOL<br>[OPEN, SHORT] | <ul> <li>Circuit for front right outlet solenoid valve is open.</li> <li>(An abnormally low output voltage is entered.)</li> </ul>   | BR-56          |
| FR LH OUT ABS SOL<br>[OPEN, SHORT] | <ul> <li>Circuit for front left outlet solenoid valve is open.</li> <li>(An abnormally low output voltage is entered.)</li> </ul>  | BR-56          |
| RR IN ABS SOL<br>[OPEN, SHORT]     | <ul> <li>Circuit for rear right outlet solenoid valve is shorted.</li> <li>(An abnormally high output voltage is entered.)</li> </ul>  | BR-56          |
| RR OUT ABS SOL<br>[OPEN, SHORT]    | <ul> <li>Circuit for rear left outlet solenoid valve is shorted.<br/>(An abnormally high output voltage is entered.)</li> </ul>  | BR-56          |
| ABS ACTUATOR RELAY<br>[ABNORMAL]   | <ul> <li>Actuator solenoid valve relay is ON, even if control unit sends off signal.</li> <li>Actuator solenoid valve relay is OFF, even if control unit sends on signal.</li> </ul> | BR-58          |
| ABS MOTOR RELAY<br>[ABNORMAL]      | <ul> <li>Circuit for ABS motor relay is open or shorted.</li> <li>Circuit for actuator motor is open or shorted.</li> <li>Actuator motor relay is stuck.</li> </ul>                  | BR-61          |
| BATTERY VOLT<br>[VB-LOW]           | Power source voltage supplied to ABS control unit is abnormally low.   | BR-65          |
| CONTROL UNIT                       | Function of calculation in ABS control unit has failed.  | BR-69          |
| G-SENSOR ★2<br>[ABNORMAL]          | G sensor circuit is open or shorted.   | BR-66          |

★1: If one or more wheels spin on a rough or slippery road for 40 seconds or more, the ABS warning lamp will illuminate. This does not indicate a malfunction. Only in the case of the short-circuit (Code Nos. 26, 22, 32 and 36), after repair the ABS warning lamp also SC illuminates when the ignition switch is turned "ON". In this case, drive the vehicle at speeds greater than 30 km/h (19 MPH) for approxi-mately 1 minute as specified in "SELF-DIAGNOSIS PROCEDURE", BR-41. Check to ensure that the ABS warning lamp goes out while the vehicle is being driven. EL

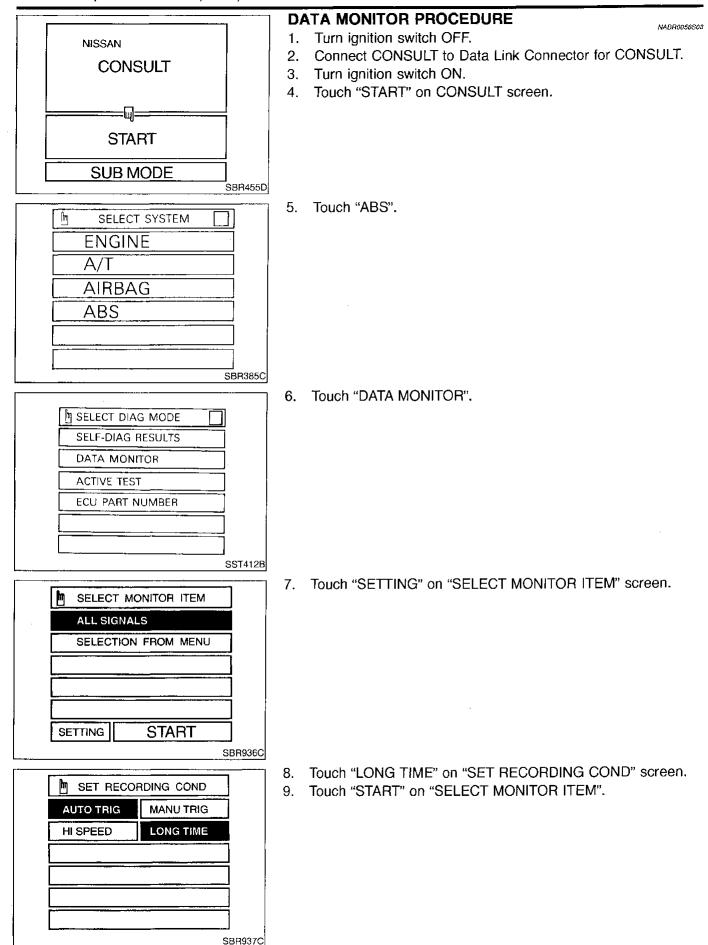
★2: 4WD models only

IDX

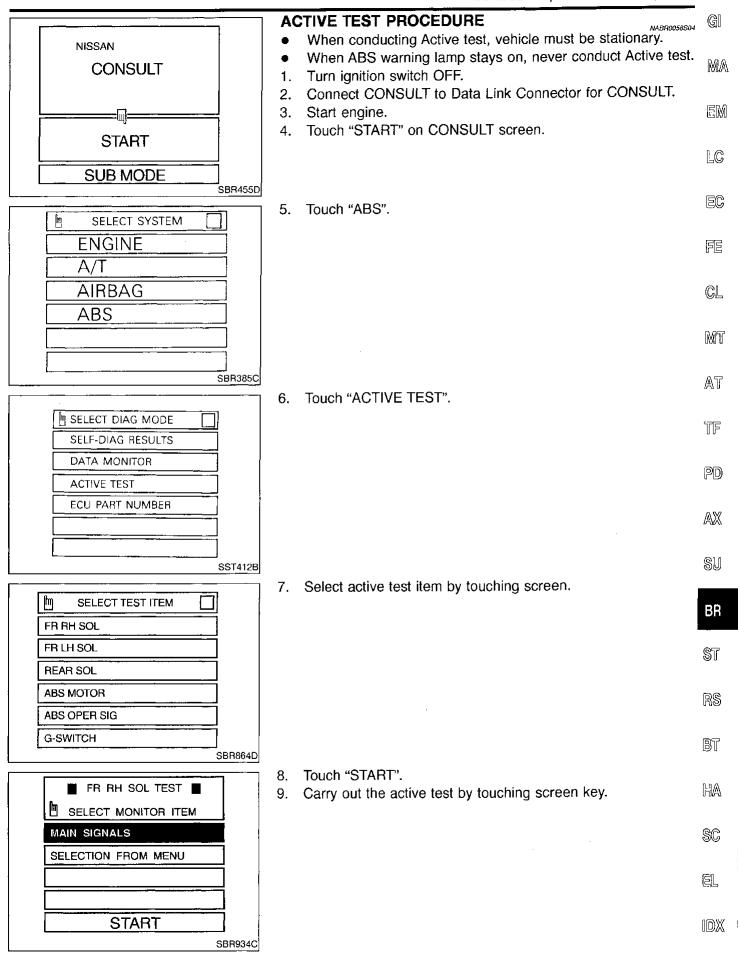
1207

ABS

CONSULT Inspection Procedure (Cont'd)



SCRIPTION ABS CONSULT Inspection Procedure (Cont'd)



CONSULT Inspection Procedure (Cont'd)

### DATA MONITOR MODE

ABS

NABR0058\$05

|   | CONDITION   | SPECIFICATION  |
|---|---|--|
| FR RH SENSOR<br>FR LH SENSOR<br>RR RH SENSOR<br>RR LH SENSOR                              | Drive vehicle.<br>(Each wheel is rotating.)   | Wheel speed signal<br>(Almost the same speed as speedometer.)  |
| STOP LAMP SW  | Brake is depressed.   | Depress the pedal: ON<br>Release the pedal: OFF  |
| G-SWITCH ★  | Vehicle is driven.<br>Vehicle is stopped.<br>Brake is applied.  | During sudden braking while driving on high µ roads (asphalt<br>roads, etc.): OFF<br>While vehicle is stopped or during constant-speed driving: ON |
| FR RH IN SOL<br>FR RH OUT SOL<br>FR LH IN SOL<br>FR LH OUT SOL<br>RR IN SOL<br>RR OUT SOL | <ol> <li>Drive vehicle at speeds over</li> <li>30 km/h (19 MPH) for at least<br/>one minute.</li> <li>Engine is running.</li> </ol> | Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF  |
| MOTOR RELAY   |   | ABS is not operating: OFF<br>ABS is operating: ON  |
| ACTUATOR RELAY  |   | Ignition switch ON (Engine stops): OFF<br>Engine running: ON   |
| WARNING LAMP  | Ignition switch is ON or engine   | ABS warning lamp is turned on: ON<br>ABS warning lamp is turned off: OFF   |
| BATTERY VOLT  | is running.   | Power supply voltage for control unit  |
| ABS OPER SIG  |   | ABS is not operating: OFF<br>ABS is operating: ON  |

★: 4WD models only

### ACTIVE TEST MODE

|                | ACTIVE                                      | EST WODE  |          | NABR0058\$06 |
|----------------|---|---|----------|--------------|
| TEST ITEM      | CONDITION                                   | JUDGEMENT   |          |              |
|                |   | Brake fluid pressure control o  | peration |              |
| FR RH SOLENOID |   |   | IN SOL   | OUT SOL      |
| FR LH SOLENOID |   | UP (Increase):  | OFF      | OFF          |
| REAR SOLENOID  | Engine is running.                          | KEEP (Hold):  | ON       | OFF          |
|                |   | DOWN (Decrease):  | ON       | ON           |
| ABS MOTOR      |   | ABS actuator motor<br>ON: Motor runs (ABS motor re<br>OFF: Motor stops (ABS motor   |          |              |
| ABS OPER SIG   | Ignition switch is ON or engine is running. | ON: Set ABS OPER SIG "ON" (ABS is operating.)<br>OFF: Set ABS OPER SIG "OFF" (ABS is not operating.)  |          | ting.)       |
| G SWITCH ★     | Ignition switch is ON.                      | G SWITCH (G SENSOR),<br>ON: Set G SWITCH MONITOR "ON" (G switch circuit is closed.)<br>OFF: Set G SWITCH MONITOR "OFF" (G switch circuit is<br>open.) |          |              |

★: 4WD models only

NOTE:

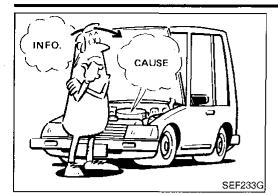
Active test will automatically stop ten seconds after the test starts. (TEST IS STOPPED monitor shows ON.)

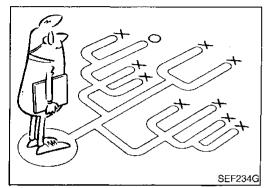
## **TROUBLE DIAGNOSIS** — INTRODUCTION

information.

**BR-49** 

How to Perform Trouble Diagnoses for Quick and Accurate Repair





## 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. It is also important to check for conventional problems: such as air leaks in booster lines, lack of brake fluid, or other problems with the 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 FE 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. Also check related service bulletins for

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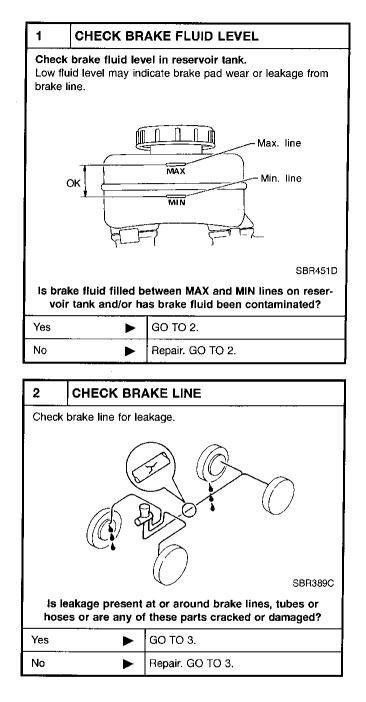
## **TROUBLE DIAGNOSIS — BASIC INSPECTION**

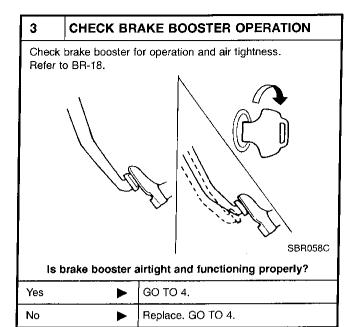
Preliminary Check

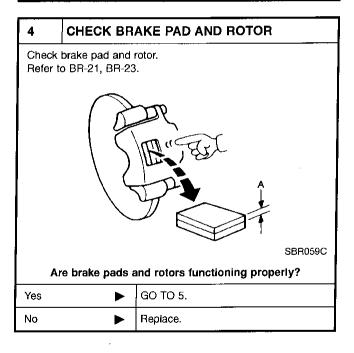
## **Preliminary Check**

#### NABR0060

ABS



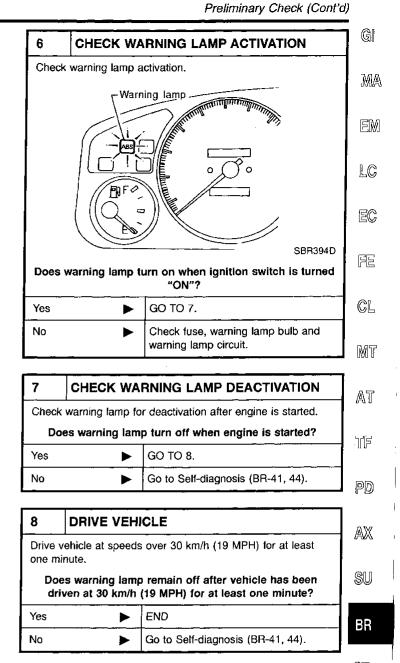




## TROUBLE DIAGNOSIS — BASIC INSPECTION

ABS

5 **RECHECK BRAKE FLUID LEVEL** Check brake fluid level in reservoir tank again. Max. line MAX Min. line OK MIN SBR451D is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated? Yes GO TO 6. ► No Fill up brake fluid. 



ST

RS

BT

HA

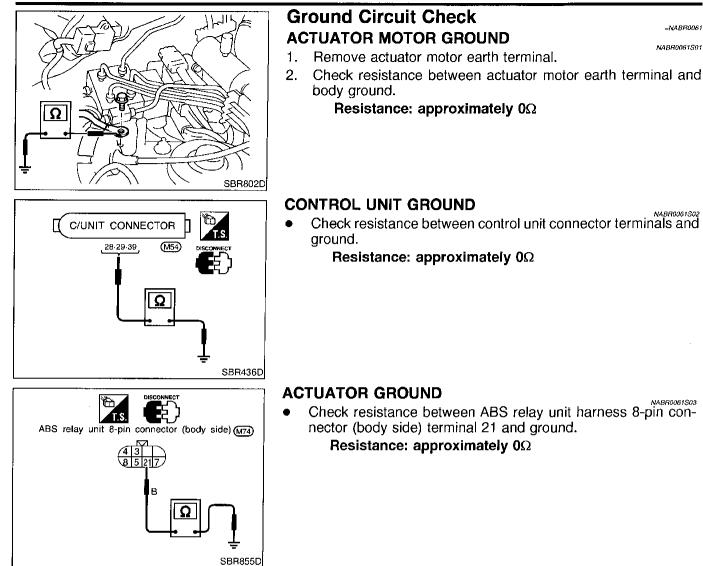
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### Ground Circuit Check

## ABS



## **TROUBLE DIAGNOSIS --- GENERAL DESCRIPTION**

Malfunction Code/Symptom Chart

ABS

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### Malfunction Code/Symptom Chart

|   | Maitunction Code/Symptom Chart   | NABR0062          |
|---|--|-------------------|
| Code No. (No. of warning lamp flashes)                          | Malfunctioning part  | Reference<br>Page |
| 45  | Actuator front left outlet solenoid valve  | BR-56             |
| 46  | Actuator front left inlet solenoid valve   | BR-56             |
| 41  | Actuator front right outlet solenoid valve   | BR-56             |
| 42  | Actuator front right inlet solenoid valve  | BR-56             |
| 55  | Actuator rear outlet solenoid valve  | BR-56             |
| 56  | Actuator rear inlet solenoid valve   | BR-56             |
| 25 ★2   | Front left sensor (open-circuit)   | BR-54             |
| 26 ★2   | Front left sensor (short-circuit)  | BR-54             |
| 21 <del>*</del> 2   | Front right sensor (open-circuit)  | BR-54             |
| 22 ★2   | Front right sensor (short-circuit)   | BR-54             |
| 31 ★2   | Rear right sensor (open-circuit)   | BR-54             |
| 32 ★2   | Rear right sensor (short-circuit)  | BR-54             |
| 35 ★2   | Rear left sensor (open-circuit)  | BR-54             |
| 36 ★2   | Rear left sensor (short-circuit)   | BR-54             |
| 18 ★2   | Sensor rotor   | BR-54             |
| 17 ★1   | G sensor and circuit   | BR-66             |
| 61 <del>★</del> 4   | Actuator motor or motor relay  | BR-61             |
| 63  | Solenoid valve relay   | BR-58             |
| 57 <del>★</del> 3   | Power supply (Low voltage)   | BR-65             |
| 71  | Control unit   | BR-69             |
| Warning lamp stays on when ignition<br>switch is turned on      | Control unit power supply circuit<br>Warning lamp bulb circuit<br>Control unit or control unit connector<br>Solenoid valve relay stuck<br>Power supply for solenoid valve relay coil | BR-76             |
| Warning lamp does not come on when ignition switch is turned on | Fuse, warning lamp bulb or warning lamp circuit<br>Control unit  | 8R-73             |
| Pedal vibration and noise                                       | _  | BR-72             |
| Long stopping distance  | <del></del>  | BR-71             |
| Unexpected pedal action   |  | BR-70             |
| ABS does not work   | ••••••••••••••••••••••••••••••••••••••   | BR-72             |
| ABS works frequently  |  | BR-70             |

★1: 4WD models only

★2: If one or more wheels spin on a rough or slippery road for 40 seconds or more, the ABS warning lamp will illuminate. This does not indicate a malfunction. Only in the case of the short-circuit (Code Nos. 26, 22, 32 and 36), after repair the ABS warning lamp also illuminates when the ignition switch is turned "ON". In this case, drive the vehicle at speeds greater than 30 km/h (19 MPH) for approximately 1 minute as specified in "SELF-DIAGNOSIS PROCEDURE", BR-41. Check to ensure that the ABS warning lamp goes out while the vehicle is being driven.

 $\pm$ 3: The trouble code "57", which refers to a low power supply voltage, does not indicate that the ABS control unit is malfunctioning.  $\blacksquare$  Do not replace the ABS control unit with a new one.

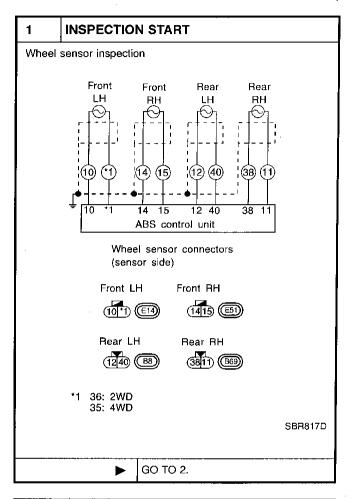
 $\star$ 4: The trouble code "61" can sometimes appear when the ABS motor is not properly grounded. If it appears, be sure to check the condition of the ABS motor ground circuit connection.

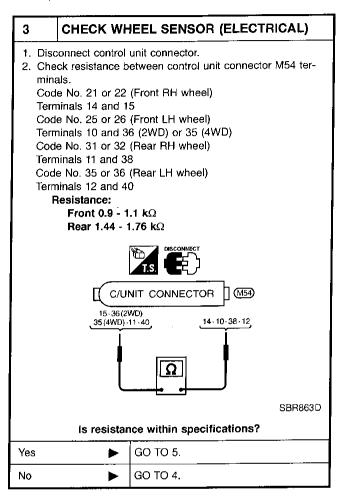
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## **Diagnostic Procedure**

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

Wheel position should be distinguished by code No. except code No. 18 (sensor rotor).





| 2              | CHECK CO        | NNECTOR   |
|----------------|-----------------|---|
| of m<br>loos   | alfunction code | ors from control unit and wheel sensor<br>No. Check terminals for damage or<br>nen reconnect connectors.<br>osis again. |
|                | Does war        | ning lamp activate again?   |
| Yes 🕨 GO TO 3. |                 |   |
|                |                 |   |

| INSPECTION END |
|----------------|

No

## WHEEL SENSOR OR ROTOR

6

Diagnostic Procedure (Cont'd)

ABS

| 4  | CHECK WHEEL SENSOR   |   |  |
|--|--|---|--|
| Check each sensor for resistance.<br><b>Resistance:</b><br>Front 0.9 - 1.1 kΩ<br>Rear 1.44 - 1.76 kΩ |  |   |  |
|  | Front RH<br>sensor (E5)<br>Front LH<br>sensor (E1)   |   |  |
|  | Rear RH<br>sensor<br>BBB<br>1<br>3811<br>Fear LH<br>sensor<br>BBB<br>1<br>4<br>4<br>4<br>4<br>4<br>4<br>5<br>1<br>36: 2WD<br>35: 4WD<br>SBR818   | D |  |
|  | Is resistance within specifications?   |   |  |
| Yes  | <ul> <li>Check the following. If NG, repair harness or connectors.</li> <li>Harness connectors M54, E51, E14, B69, B8</li> <li>Harness for open or short betweer wheel sensor connectors and control unit</li> </ul> |   |  |
| No   | Replace wheel sensor.  | 1 |  |
|  |  |   |  |
| 5  | CHECK WHEEL SENSOR (MECHANICAL)  | ٦ |  |
| Check for inflation pressure, wear and size of each tire. (See NOTE)                                 |  |   |  |
| Are tir  | e pressure and size correct and is tire wear within  |   |  |

specifications?

Adjust tire pressure or replace tire(s).

GO TO 6.

(See NOTE)

►

Yes

No

G CHECK WHEEL BEARING Check wheel bearing axial end play. (See NOTE) MA Is wheel bearing axial end play within specifications? Refer to AX section ("On-vehicle Service", "FRONT AXLE" and "REAR AXLE"). EM

| Yes 🕨 | GO TO 7.   |    |
|-------|--|----|
| -     | Check wheel bearing. Refer to AX section ("On-vehicle Service", "FRONT AXLE" and "REAR AXLE"). | LĈ |

| 7     | CHECK SEN        | NSOR ROTOR   |   |
|-------|------------------|--|---|
| Check | sensor rotor for | teeth damage. (See NOTE)   | F |
|       | is sensor        | rotor free from damage?  |   |
| Yes   | ►                | Check control unit pin terminals for<br>damage or the connection of control<br>unit harness connector. Reconnect | G |
|       |                  | control unit harness connector. Then retest.   | M |
| No    | •                | Replace sensor rotor. (See NOTE)   |   |

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## ABS ACTUATOR SOLENOID VALVE

NABR0064

ł

## Diagnostic Procedure

Malfunction code No. 41, 45, 55, 42, 46, 56

1 **INSPECTION START** ABS actuator solenoid valve inspection Fusible link C ABS relay unit BAD connectors (relay unit side) Fuse 7 34 (IGN) -[7.5A] Solenoid valve 72158 relay (Built into (M74) ABS relay unit) 109 10 (9) (5) (21) 1615 (A1) 85 87 87a To motor ABS actuator relay 386 connector 30 (actuator side) 1 16) 54 1617 ABS actuator (M75) BR-OUT FR-OUT R-R ≧ FL-IN ₿ġ 16  $(\overline{5})$ (14 12 37 33 5 26 54 25 53 ABS control unit SBR082E GO TO 2. ►

| 2         | CHECK CO   | NNECTOR                   |  |
|-----------|--|---------------------------|--|
| AB<br>neo | <ol> <li>Disconnect connectors from control unit, ABS actuator and<br/>ABS relay unit. Check terminals for damage or loose con-<br/>nections. Then reconnect connectors.</li> <li>Carry out self-diagnosis again.</li> </ol> |                           |  |
|           | DOCS War   | ning lamp activate again? |  |
| Yes       | ►  | GO TO 3.                  |  |
| No        | •  | INSPECTION END            |  |

| 3  | CHECK ABS ACTUATOR SOLENOID<br>VALVE CIRCUIT   |
|--|--|
| 2. Che<br>and<br>term<br>Res<br>(<br>(<br>(<br>(<br>Res<br>(<br>)<br>(<br>(<br>)<br>(<br>)<br>(<br>)<br>(<br>)<br>(<br>)<br>(<br>)<br>(<br>)<br>(<br>) | connect connectors from control unit and ABS relay unit.<br>ck resistance between control unit connector terminals<br>ABS relay unit 2-pin connector A1 (ABS actuator side)<br>inal.<br>istance: 3.1 - 6.2 $\Omega$<br>Code No. 41: Control unit 26, ABS relay unit 16<br>Code No. 45: Control unit 33, ABS relay unit 16<br>Code No. 55: Control unit 25, ABS relay unit 16<br>istance: 6.2 - 12.3 $\Omega$<br>Code No. 42: Control unit 54, ABS relay unit 16<br>Code No. 46: Control unit 5, ABS relay unit 16<br>Code No. 46: Control unit 5, ABS relay unit 16<br>Code No. 56: Control unit 53, ABS relay unit 16 |
|  | C/UNITCONNECTOR<br>26, 33, 25, 54, 5, 53 (MS4)<br>ABS relay unit<br>2-pin connector<br>(ABS actuator<br>side)<br>(AD 16)<br>SBR820D<br>Is resistance within specifications?  |
| Yes  | ► GO TO 6.   |
| No   | ► GO TO 4.   |

## ABS ACTUATOR SOLENOID VALVE

Diagnostic Procedure (Cont'd)

ABS

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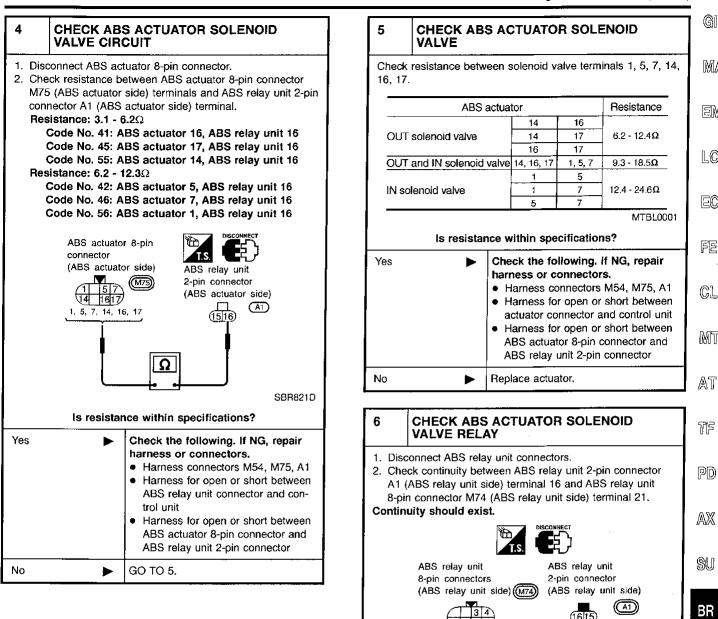
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SBR822D

Does continuity exist?

Replace ABS relay unit.

(BR-58).

►

Go to "SOLENOID VALVE RELAY"

Yes

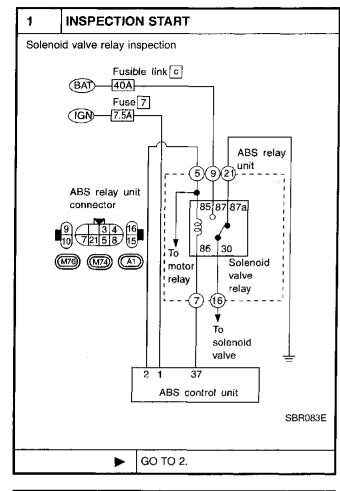
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## SOLENOID VALVE RELAY

**Diagnostic Procedure** 

Malfunction code No. 63

NABROO65



| 2   | CHECK ABS<br>SUPPLY CIR | SOLENOID VALVE POWER |  |
|---|-------------------------|----------------------|--|
| Check 40A fusible link c. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section. |                         |                      |  |
| Is fusible link OK?   |                         |                      |  |
| Yes   | ►                       | GO TO 3.             |  |
| No  | ► GO TO 9.              |                      |  |
| ······································  |                         |                      |  |
| 3   | CHECK FUSE              |                      |  |
| Check 7.5A fuse No. 7. For fuse layout, refer to "POWER<br>SUPPLY ROUTING" in EL section.       |                         |                      |  |
|   |                         |                      |  |

# Is fuse OK? Yes GO TO 4. No GO TO 13.

## 4 CHECK CONNECTOR

 Disconnect connectors from control unit and ABS actuator. Check terminals for damage or loose connection. Then reconnect connectors.
 Carry out self-diagnosis again.

### Does warning lamp activate again?

| Yes 🕨 | GO TO 5.       |
|-------|----------------|
| No 🕨  | INSPECTION END |

### 5 CHECK ABS CONTROL UNIT AND ABS RELAY UNIT GROUND CIRCUIT

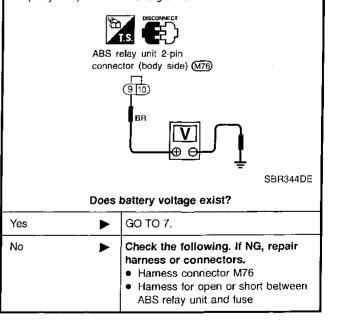
Refer to "CONTROL UNIT GROUND" and "ACTUATOR GROUND" in "Ground Circuit Check", BR-52.

### Is ground circuit OK?

| Yes | ► | GO TO 6.                       |
|-----|---|--------------------------------|
| No  |   | Repair harness and connectors. |

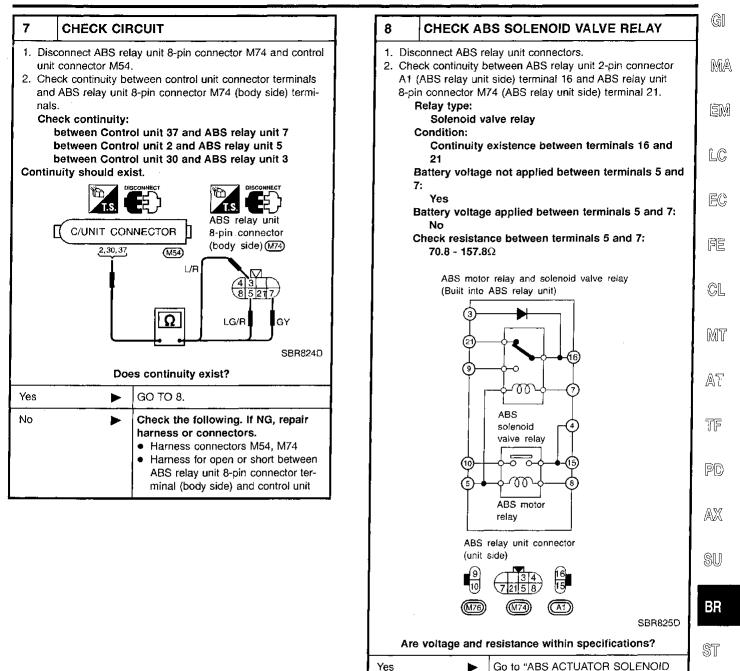
### 6 CHECK ABS SOLENOID VALVE POWER SUPPLY CIRCUIT

- 1. Disconnect connectors from ABS relay unit.
- Check voltage between ABS relay unit 2-pin connector M76 (body side) terminal 9 and ground.



## SOLENOID VALVE RELAY

ABS



No

9

Yes

No

Replace fusible link.

VALVE", BR-56.

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

INSPECTION END

GO TO 10.

►

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**REPLACE FUSIBLE LINK** 

Replace ABS relay unit.

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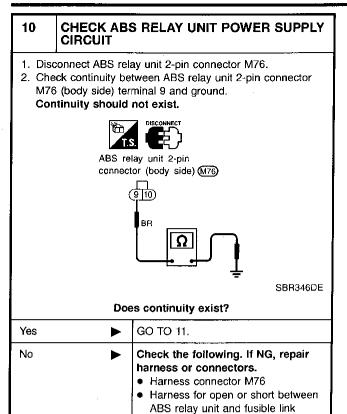
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## SOLENOID VALVE RELAY

Diagnostic Procedure (Cont'd)



## CHECK ABS SOLENOID VALVE RELAY 11 1. Disconnect ABS relay unit 2-pin connector A1. 2. Check continuity between ABS relay unit 2-pin connector A1 (ABS relay unit side) terminal 16 and ground. Continuity should not exist. ABS relay unit 2-pin connector (ABS relay unit side) (A1) (1615) SBR826D **Does continuity exist?** GO TO 12. Yes No Replace ABS relay unit.

## CHECK ABS SOLENOID VALVE 12 Check continuity between ABS relay unit 2-pin connector A1 (ABS actuator side) terminal 16 and ground. Continuity should not exist. ABS relay unit 2-pin connector (ABS actuator side) (A1) (15116) SBR827D Does continuity exist? Go to "ABS ACTUATOR SOLENOID Yes . VALVE", BR-56. Replace ABS actuator. No ►

#### **REPLACE FUSE** 13 Replace fuse. Does the fuse blow out when ignition switch is turned "ON"? Check the following. If NG, repair Yes ► harness or connectors. Harness connector M54 Harness for open or short between ABS control unit connector and fuse INSPECTION END No ►

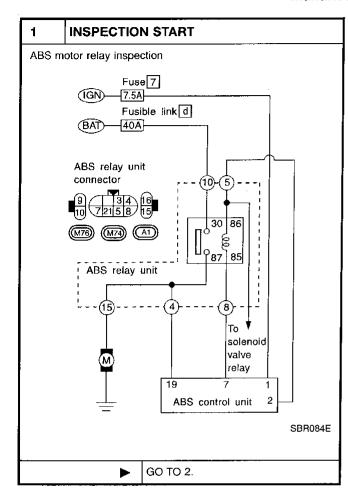
## MOTOR RELAY OR MOTOR

## Diagnostic Procedure Malfunction code No. 61

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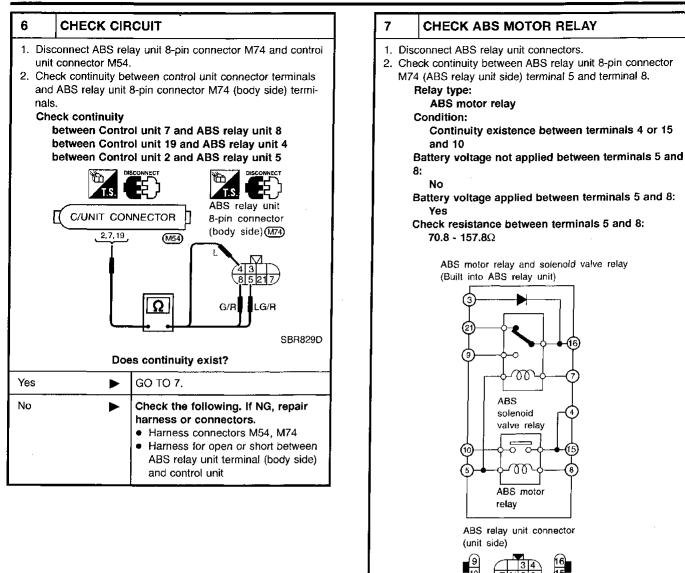


| 2   | CHECK FUSIBLE LINK |          |  |
|---|--------------------|----------|--|
| Check 40A fusible link <b>d</b> for ABS relay unit. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section. Is fusible link OK? |                    |          |  |
| Yes   | •                  | GO TO 3. |  |
| No  | ► GO TO 12.        |          |  |
|   |                    |          |  |
| 3   | CHECK FUS          | SE       |  |

| Check 7.5A fuse No. 7. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section. |   |           |
|--|---|-----------|
| Is fuse OK?  |   |           |
| Yes  |   | GO TO 4.  |
| No   | ► | GO TO 11. |

| de N      | No. 61           |   |     |
|-----------|------------------|---|-----|
| 4         | CHECK CO         | NNECTOR   | ] ™ |
| Ch<br>rea |                  |   | 5   |
| 2. 00     |                  | ning lamp activate again?   | Ŀ   |
| Yes       | •                | GO TO 5.  | 1   |
| No        | •                | INSPECTION END  | E   |
| 5         | CHECK AB         | S RELAY UNIT POWER SUPPLY   | [F  |
| 2. Ch     |                  | ay unit 2-pin connector M76.<br>een connector (body side) terminal 10   | C   |
|           | ß                |   | M   |
|           | ABS re<br>connec | elay unit 2-pin<br>etor (body side) (M76)<br>(9 10)   | A   |
|           |                  |   | TB  |
|           |                  | SBR336DE  | P   |
|           | Does I           | battery voltage exist?  | Æ   |
| Yes       | ►                | GO TO 6.  | l   |
| No        | •                | <ul> <li>Check the following. If NG, repair<br/>harness or connectors.</li> <li>Harness connector M76</li> <li>Harness for open or short between<br/>ABS relay unit and fusible link</li> </ul> | SI  |
|           |                  |   | Sī  |
|           |                  |   | R   |
|           |                  |   | BI  |
|           |                  |   | 84  |
|           |                  |   | SC  |
|           |                  |   | EL  |
|           |                  |   | D   |

.



SBR825D

Are voltage and resistance within specifications?

(M76)

| Yes | GO TO 8.                |
|-----|-------------------------|
| No  | Replace ABS relay unit. |

### 8 CHECK ABS ACTUATOR MOTOR GROUND CIRCUIT

Refer to "ACTUATOR MOTOR GROUND" in "Ground Circuit Check", BR-52.

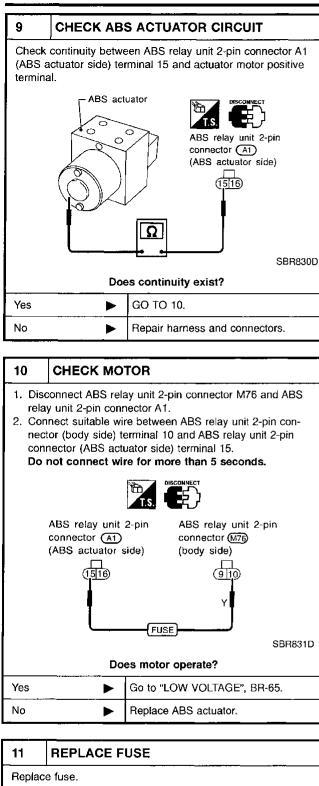
### Is ground circuit OK?

| <b>. . . . . . . . . .</b> |  |                               |  |
|----------------------------|--|-------------------------------|--|
| Yes                        |  | GO TO 9.                      |  |
| No                         |  | Repair harness and terminals. |  |

## MOTOR RELAY OR MOTOR

Diagnostic Procedure (Cont'd)

ABS



| 12     | REPLACE           | FUSIBLE LINK   | G         |
|--------|-------------------|--|-----------|
| Replac | e fusible link.   |  | ПЛ        |
| Doe    | es the fusible li | nk blow out when ignition switch is turned "ON"?   | M         |
| Yes    | •                 | GO TO 13.  | 5         |
| No     | ►                 | INSPECTION END   | ]         |
|        |                   |  | _<br>_ L( |
| 13     | CHECK AB          | S MOTOR POWER SUPPLY   |           |
|        |                   | cable and ABS relay unit 2-pin connec-   |           |
| 2. Che |                   | tween ABS relay unit 2-pin connector minal 10 and ground.  | FE        |
|        |                   | elay unit 2-pin  | CL        |
|        |                   | say unit 2-pm<br>tor (body side) (M76)   | M         |
|        |                   |  | AT        |
|        |                   | SBR340DE   | JĿ        |
|        | Doe               | s continuity exist?  | PD        |
| Yes    |                   | Check the following. If NG, repair harness or connectors.  | 5 E2      |
|        |                   | <ul> <li>Harness connector M76</li> <li>Harness for open or short between<br/>ABS relay unit and fuse</li> </ul> | AX        |
| No     | •                 | GO TO 14.  | SU        |
|        |                   |  |           |
|        |                   |  | BR        |
|        |                   |  | ST        |
|        |                   |  | RS        |
|        |                   |  | BT        |

| 11   | REPLACE FUSE |   |  |
|--|--------------|---|--|
| Replac   | e fuse.      |   |  |
| Does the fuse blow out when ignition switch is turned<br>"ON"? |              |   |  |
| Yes  |              | <ul> <li>Check the following. If NG, repair<br/>harness or connectors.</li> <li>Harness connector M54</li> <li>Harness for open or short between<br/>ABS control unit connector and<br/>fuse</li> </ul> |  |
| No   | •            | INSPECTION END  |  |

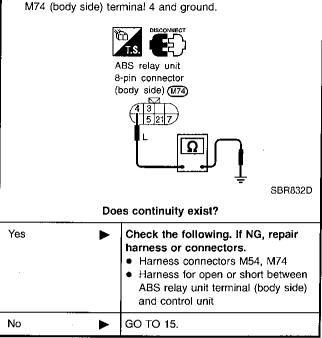
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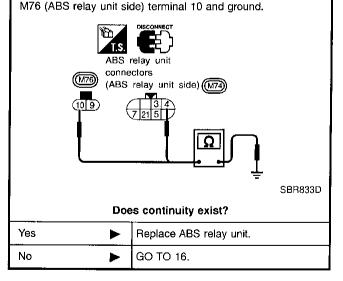
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# 14 CHECK ABS CONTROL UNIT CIRCUIT 1. Disconnect ABS relay unit 8-pin connector and control unit connector. 2. Check continuity between ABS relay unit 8-pin connector

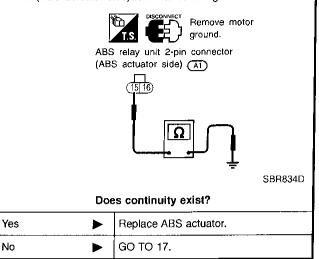


## 15 CHECK ABS MOTOR RELAY Check continuity between ABS relay unit 8-pin connector M74 (ABS relay unit side) terminal 4 and ground, 2-pin connector



### 16 CHECK ABS MOTOR POWER SUPPLY CIRCUIT

- 1. Remove motor ground.
- 2. Check continuity between ABS relay unit 2-pin connector A1 (ABS actuator side) terminal 15 and ground.



| 17                  | СНЕСК МО                           | TOR  |  |
|---------------------|------------------------------------|--|--|
| Refer to            | Refer to "10. CHECK MOTOR", BR-63. |  |  |
| Does motor operate? |                                    |  |  |
| Yes                 | •                                  | Check control unit pin terminals for<br>damage or the connection of control<br>unit harness connector.<br>Reconnect control unit harness con-<br>nector.<br>Then retest. |  |
| No                  | ►                                  | Replace ABS actuator.  |  |

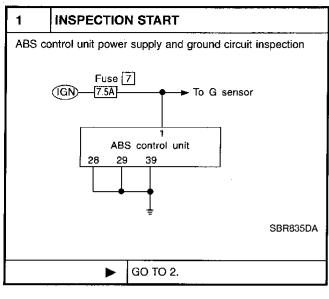
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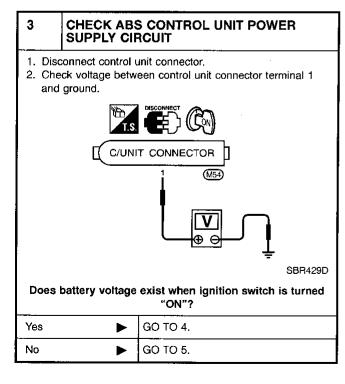
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## Diagnostic Procedure

Malfunction code No. 57



| 2  | CHECK CONNECTOR |                |  |
|--|-----------------|----------------|--|
| <ol> <li>Disconnect control unit connector. Check terminals for<br/>damage or loose connections. Then reconnect connectors.</li> <li>Carry out self-diagnosis again.</li> <li>Does warning lamp activate again?</li> </ol> |                 |                |  |
| Yes  | •               | GO TO 3.       |  |
| No   | ►               | INSPECTION END |  |



| 4  | CHECK ABS CONTROL UNIT GROUND<br>CIRCUIT |  |    |
|--|--|--|----|
| Refer to "CONTROL UNIT GROUND" in "Ground Circuit Check", BR-52. |  |  | EM |
|  | ls                                       | ground circuit OK?   | LC |
| Yes  | •  | Check control unit pin terminals for<br>damage or the connection of control<br>unit harness connector.<br>Reconnect control unit harness con-<br>nector.<br>Then retest. | EC |
| No   | •  | Repair harness and connectors.   | FE |

| 5   | CHECK FUSE                        |                                |   |
|-----|-----------------------------------|--------------------------------|---|
|     | 7.5A fuse No. 7.<br>a EL section. | . Refer to "POWER SUPPLY ROUT- | M |
|     |                                   | Is fuse OK?                    |   |
| Yes | •                                 | GO TO 6.                       | A |
| No  | ►                                 | Replace fuse.                  |   |
|     |                                   |                                | T |

|                  |  |  | 1  |
|------------------|--|--|----|
| 6                | CHECK ABS CONTROL UNIT POWER<br>SUPPLY CIRCUIT |  |    |
| Check<br>termina |  | een battery and control unit connector                                 | PD |
|                  | Do   | es continuity exist?   | AX |
| Yes              | ►  | Check battery. Refer to "BATTERY" in EL section.                       | SU |
| No               | •  | Check the following. If NG, repair                                     |    |
|                  |  | <ul><li>harness or connectors.</li><li>Harness connector M54</li></ul> | BR |

| <ul> <li>Harness for open or short between<br/>control unit and fuse</li> </ul> |  |
|---|--|
|   |  |

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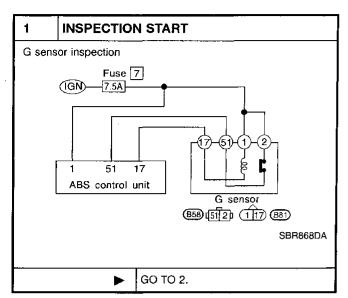
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## **Diagnostic Procedure**

Malfunction code No. 17



| 2  | CHECK FUSE |               |  |
|--|------------|---------------|--|
| Check 7.5A fuse No. 7 for control unit. For fuse layout, refer to<br>"POWER SUPPLY ROUTING" in EL section. |            |               |  |
| Is fuse OK?  |            |               |  |
| Yes  | •          | GO TO 3.      |  |
| No   | •          | Replace fuse. |  |

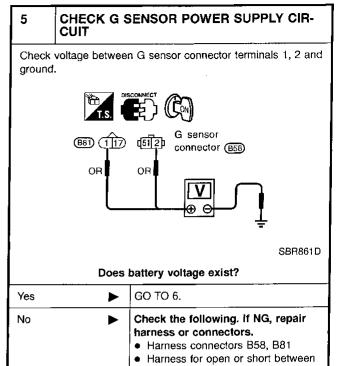
### 3 CHECK CONNECTOR

- 1. Disconnect connectors from control unit and G sensor. Check terminals for damage or loose connection. Then reconnect connectors.
- 2. Carry out self-diagnosis again.

Does warning lamp activate again?

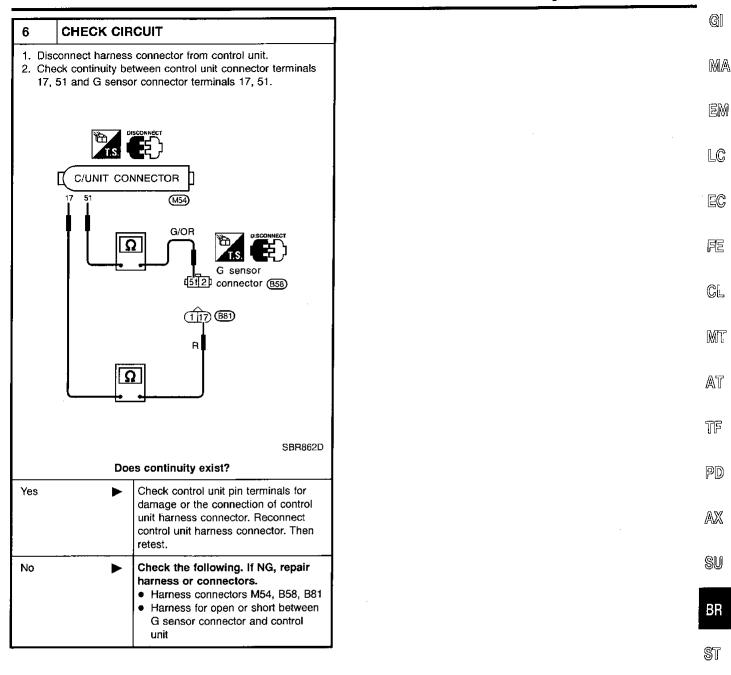
| Yes | ₹ | GO TO 4.       |
|-----|---|----------------|
| No  |   | INSPECTION END |

| 4   | CHECK G SENSOR |                   |  |
|---|----------------|-------------------|--|
| Refer to "G SENSOR" in "Electrical Components Inspection", BR-68. |                |                   |  |
| Is resistance within specifications?                              |                |                   |  |
| Yes   | •              | GO TO 5.          |  |
| No  | ►              | Replace G sensor. |  |



G sensor and fuse

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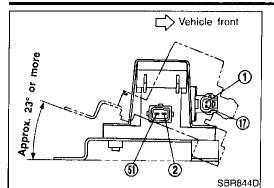
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## Electrical Components Inspection G SENSOR CAUTION:

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NABR0069S01

# The G sensor is easily damaged if it sustains an impact. Be careful not to drop or bump it.

1. Measure resistance between terminals 2 and 51 of G sensor unit connector.

| G sensor condition        | Resistance between ter-<br>minals 2 and 51 | G sensor switch condi-<br>tion |  |
|---------------------------|--|--------------------------------|--|
| Installed in vehicle      | 1.4 - 1.6 kΩ                               | "ON"                           |  |
| Tilted as shown in figure | 4.7 - 5.5 kΩ                               | "OFF"                          |  |

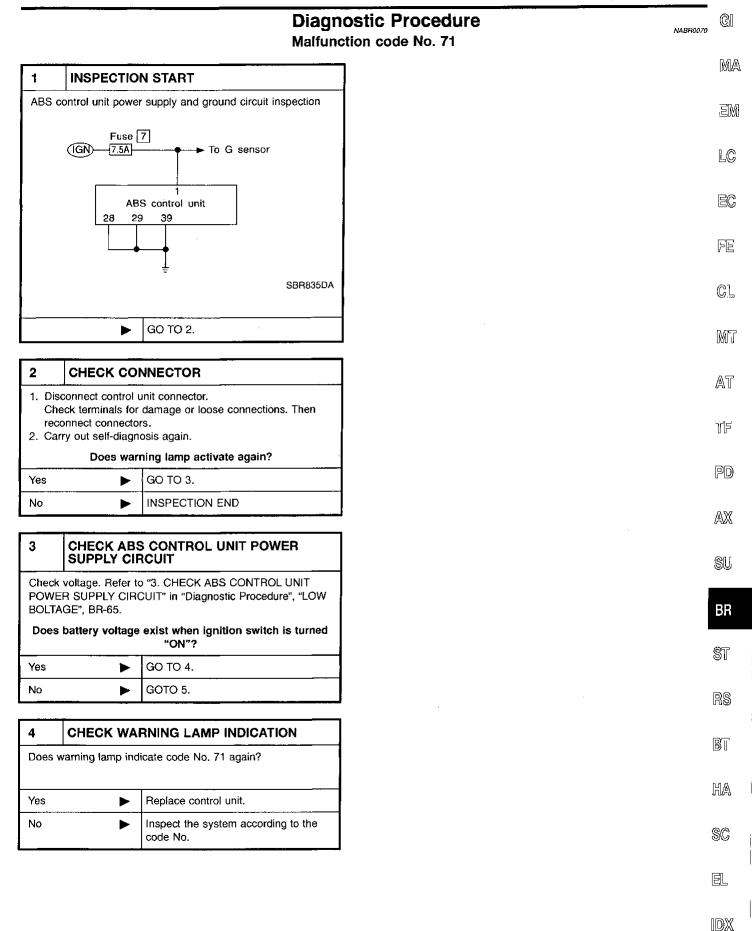
2. Measure resistance between terminals 1 and 17 of the G sensor unit connector.

Resistance: 70 - 124  $\Omega$ 

## **CONTROL UNIT**

Diagnostic Procedure

ABS



ABS

| 1  | CHECK BRAKE FLUID PRESSURE |   |  |
|--|----------------------------|---|--|
| Check brake fluid pressure distribution.<br>Refer to proportioning valve inspection. |                            |   |  |
| Is brake fluid pressure distribution normal?   |                            |   |  |
| Yes  | •                          | GO TO 2.                                      |  |
| No   | ►                          | Perform Preliminary Check.<br>Refer to BR-50. |  |

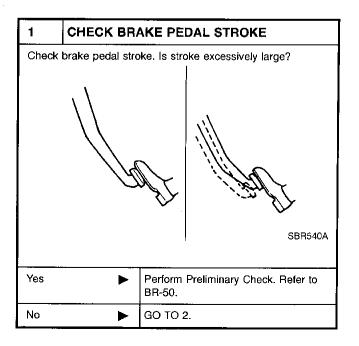
| 2                                       | CHECK WHEEL SENSOR  |  |  |
|---|---|--|--|
| loc<br>2. Pe                            | <ol> <li>Check wheel sensor connector for terminal damage or<br/>loose connections.</li> <li>Perform wheel sensor mechanical check.<br/>Refer to WHEEL SENSOR OR ROTOR, BR-54.</li> </ol> |  |  |
| Are wheel sensors functioning properly? |   |  |  |
| Vaa                                     |   |  |  |

| Yes |   | GO TO 3. |
|-----|---|----------|
| No  | ▲ | Repair.  |

| 3  | CHECK FRONT AXLE |   |  |  |
|--|------------------|---|--|--|
| Check front axles for excessive looseness. Refer to AX sec-<br>tion ("Front Wheel Bearing", "ON-VEHICLE SERVICE"). |                  |   |  |  |
| Is front axle installed properly?  |                  |   |  |  |
| Yes  | ►                | Go to "CHECK WARNING LAMP<br>INDICATION" in "2. Unexpected Pedal<br>Action", BR-71. |  |  |
| No   | ►                | Repair.   |  |  |

## 2. Unexpected Pedal Action

### NABR0072



| 2   | CHECK CONNECTOR AND PERFOR-<br>MANCE |  |  |  |  |
|---|--------------------------------------|--|--|--|--|
| Disconnect ABS relay unit 8-pin connector and check whether brake is effective. |                                      |  |  |  |  |
| Does connector function properly when brake pedal is<br>depressed?              |                                      |  |  |  |  |
| Yes   | ►                                    | GO TO 3.                                   |  |  |  |
| No  | ►                                    | Perform Preliminary Check. Refer to BR-50. |  |  |  |
|   |                                      |  |  |  |  |

## TROUBLE DIAGNOSES FOR SYMPTOMS

 3
 CHECK WARNING LAMP INDICATION

 Ensure warning lamp remains off while driving.

 Warning lamp

 Warning lamp

 Image: Check warning lamp

 Is warning lamp turned off?

 Yes

 Image: Check warning lamp

 Carry out self-diagnosis. Refer to BR-41, BR-44.

| 4   | CHECK WHEEL SENSOR |   |    |
|---|--------------------|---|----|
| <ol> <li>Check wheel sensor connector for terminal damage or<br/>loose connection.</li> <li>Perform wheel sensor mechanical check. Refer to "Diag-<br/>nostic Procedure", "WHEEL SENSOR ROTOR", BR-54.</li> </ol> |                    |   |    |
| Is wheel sensor mechanism OK?   |                    |   |    |
| Yes   | ►                  | Check control unit pin terminals for<br>damage or the connection of control<br>unit harness connector.<br>Reconnect control unit harness con- | LC |
|   |                    | nector.<br>Then retest.   | EC |
| No  | •                  | Repair.   |    |
|   |                    |   | FE |

|       |   | 3. Lor   | ng Stopping Distance |
|-------|---|--|----------------------|
| 1     | CHECK CO<br>MANCE   | NNECTOR AND PERFOR-  |                      |
| stopp | Disconnect ABS relay unit 8-pin connector and check whether<br>stopping distance is still long.<br>Does connector function properly when brake pedal is<br>depressed? |  |                      |
| Yes   | ►   | Perform Preliminary Check and air bleeding.  |                      |
| No    | ►   | Go to "CHECK WARNING LAMP<br>INDICATION" in "Diagnostic<br>Procedure", "2. Unexpected Pedal<br>Action", BR-71. |                      |

| NOTE: |  |
|-------|--|

Stopping distance may be larger than vehicles without ABS when road condition is slippery.

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2. Unexpected Pedal Action (Cont'd)

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CL

MT

SU

BR

ST

## 4. ABS Does Not Work

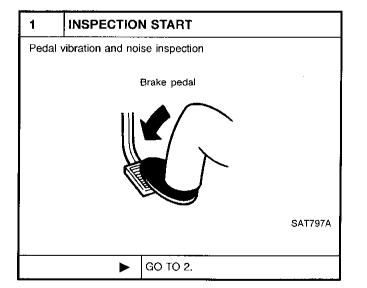
| 1                                   | CHECK WARNING LAMP INDICATION |   |  |
|-------------------------------------|-------------------------------|---|--|
| Does the ABS warning lamp activate? |                               |   |  |
| Yes                                 | ►                             | Carry out self-diagnosis. Refer to BR-41, 44.   |  |
| No                                  | •                             | Go to "CHECK WARNING LAMP<br>INDICATION" in "Diagnostic<br>Procedure", "Unexpected Pedal<br>Action", BR-71. |  |

NOTE:

ABS does not work when vehicle speed is under 10 km/h (6 MPH).

5. Pedal Vibration and Noise

NABR0075



| 2   | СНЕСК ЅҮМРТОМ |   |  |
|---|---------------|---|--|
| <ol> <li>Apply brake.</li> <li>Start engine.</li> <li>Does the symptom appear only when engine is started?</li> </ol> |               |   |  |
| Yes   | •             | Carry out self-diagnosis. Refer to BR-41, 44. |  |
| No  | ►             | GO TO 3.                                      |  |

| 3  | RECHECK SYMPTOM      |   |  |
|--|----------------------|---|--|
| Does the symptom appear when electrical equipment switches (such as headlamp) are operated?                                  |                      |   |  |
| Yes  |                      | GO TO 3.  |  |
| No   | ►                    | Go to "CHECK WARNING LAMP<br>INDICATION" in Diagnostic<br>Procedure, "Unexpected Pedal<br>Action", BR-71. |  |
|  |                      |   |  |
| 4  | 4 CHECK WHEEL SENSOR |   |  |
| Check wheel sensor shield ground. For location of shield ground, refer to wiring diagram and "HARNESS LAYOUT" in EL section. |                      |   |  |
| EL sect  |                      | diagram and "HARNESS LAYOUT" in   |  |
| EL sect  | ion.                 | or shield grounded properly?  |  |

Repair.

=NABR0074

ABS

No

5. Pedal Vibration and Noise (Cont'd)

GI

EM

LC

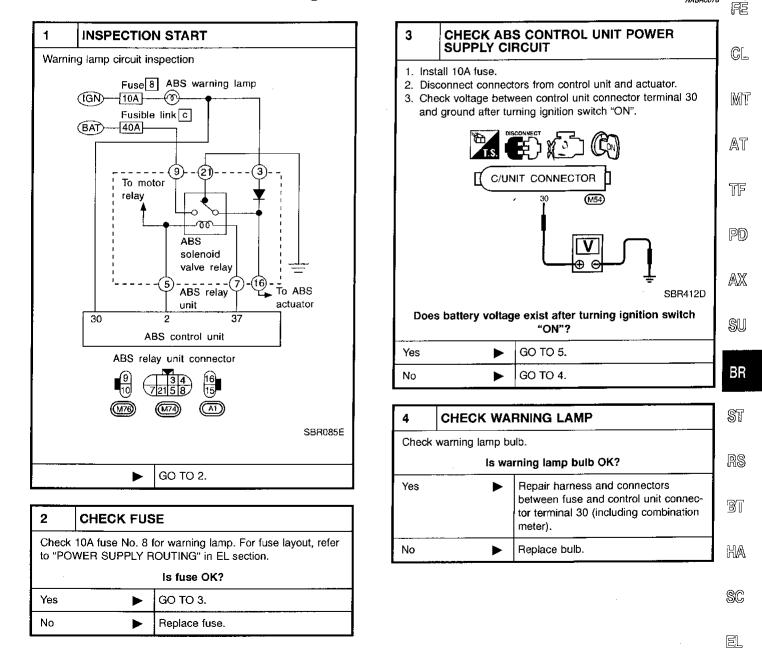
EC

#### NOTE:

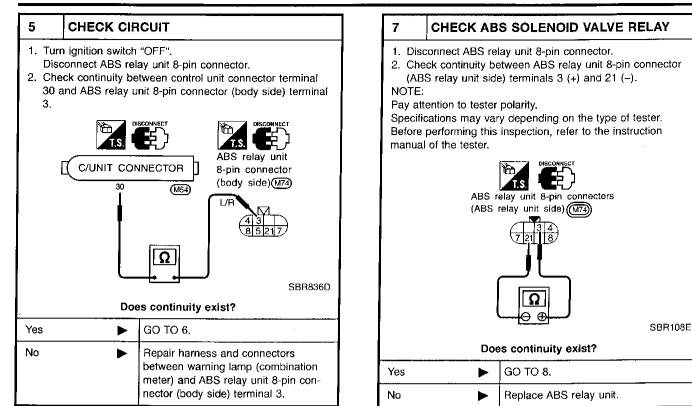
ABS may operate and cause vibration under any of the following conditions.

- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

# 6. Warning Lamp Does Not Come On When Ignition Switch Is Turned On



6. Warning Lamp Does Not Come On When Ignition Switch Is Turned On (Cont'd)

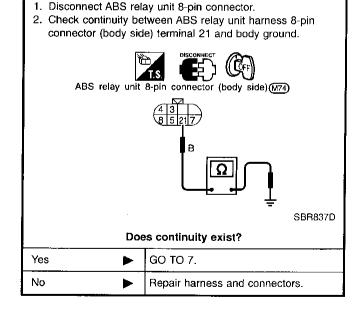


### 8 CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT

Go to "3. CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT" in "Diagnostic Procedure", "Warning Lamp Stays On When Ignition Switch Is Turned On", BR-76.

#### Does battery voltage exist?

| Yes 🕨 | GO TO 9.                       |
|-------|--------------------------------|
| No 🕨  | Repair harness and connectors. |



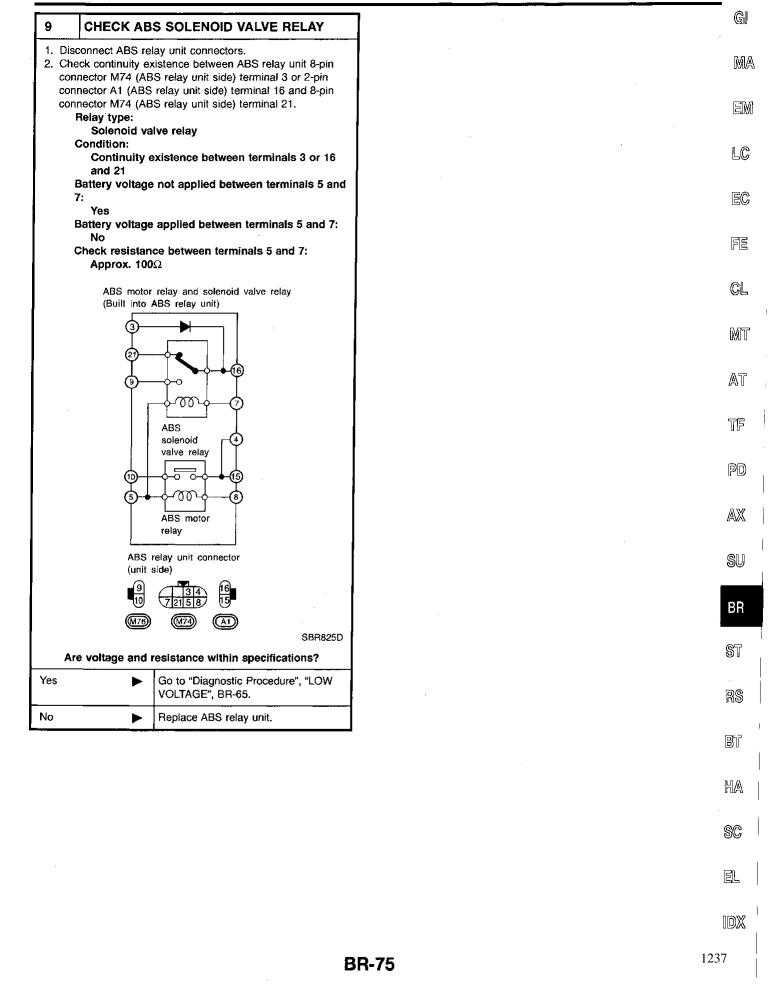
CHECK ABS RELAY UNIT GROUND CIR-

6

CUIT

6. Warning Lamp Does Not Come On When Ignition Switch Is Turned On (Cont'd)

ABS



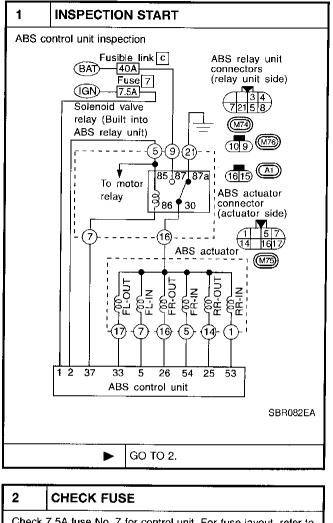
3

7. Warning Lamp Stays On When Ignition Switch Is Turned On

### 7. Warning Lamp Stays On When Ignition Switch Is Turned On

=NABR0077

ABS

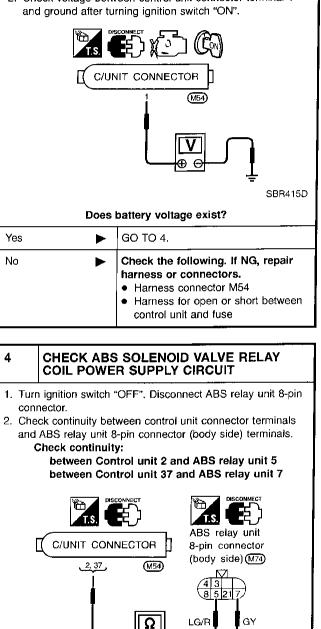


Check 7.5A fuse No. 7 for control unit. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section.

| Is fuse OK? |  |           |  |
|-------------|--|-----------|--|
| Yes         |  | GO TO 3.  |  |
| No          |  | GO TO 10. |  |

#### CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT

- 1. Disconnect connector from control unit.
- 2. Check voltage between control unit connector terminal 1 and ground after turning ignition switch "ON".



**Does continuity exist?** 

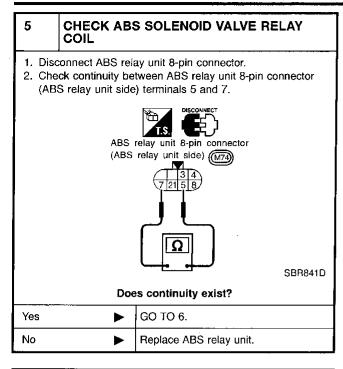
SBR840D

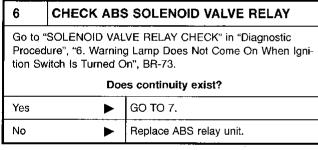
| · · · · · · · · · · · · · · · · · · · |   |   |  |
|---------------------------------------|---|---|--|
| Yes                                   | ► | GO TO 5.  |  |
| No                                    | • | <ul> <li>Check the following. If NG, repair<br/>harness or connectors.</li> <li>Harness connectors M54, M74</li> <li>Harness for open or short between<br/>solenoid valve relay unit terminal<br/>(body side) and control unit</li> </ul> |  |

## ABS

# TROUBLE DIAGNOSES FOR SYMPTOMS

7. Warning Lamp Stays On When Ignition Switch Is Turned On (Cont'd)

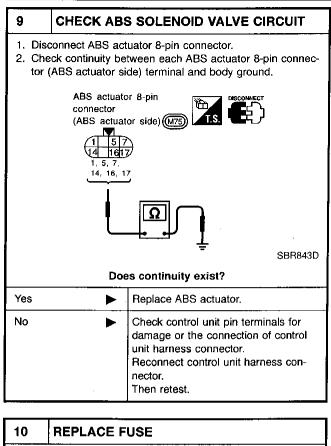


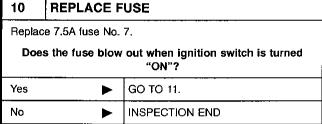


| 7 CHEC   |  | RNING LAMP GROUND CIR-   | ] <sup>GI</sup>                        |
|--|--|--|--|
| 1. Turn ignition<br>2. Disconnect  | n switch<br>connect  | "OFF".<br>tors from control unit and ABS relay unit  | M                                      |
| 8-pin conne<br>3. Check conti<br>30 and body   | inuity be  | etween control unit connector terminal   | EN                                     |
| _  | ×  |  | LC                                     |
| Ц  | C/UNIT   |  | EC                                     |
|  |  |  | FE                                     |
|  | Doe  | SBR856D  | CL                                     |
| Yes  | ▶  | Check the following. If NG, repair harness or connectors.  | MT                                     |
|  |  | <ul> <li>Harness connector M54</li> <li>Harness for open or short between<br/>control unit and fuse</li> </ul>   | At                                     |
|  |  | Some and tass  |  |
| No   |  | GO TO 8.   | TF                                     |
|  | ►<br>K ABS   |  | TF<br>PD                               |
| <ul> <li>8 CHEC</li> <li>1. Disconnect a<br/>8-pin connect</li> <li>2. Check contin<br/>(ABS relay u</li> </ul>  | actuator<br>ctor.<br>nuity bet   | GO TO 8.   |  |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin                     | actuator<br>ctor.<br>nuity bet<br>unit side)<br>tester p<br>nay vary<br>ng this in             | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.   | PD                                     |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m   | actuator<br>ctor.<br>nuity bet<br>unit side)<br>tester p<br>nay vary<br>ng this in             | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>bolarity.<br>depending on the type of tester.  | PD<br>AX                               |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin<br>manual of the te | actuator<br>ctor.<br>nuity bet<br>unit side)<br>o tester p<br>nay vary<br>ng this in<br>ester. | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>bolarity.<br>depending on the type of tester.<br>nspection, refer to the instruction                                       | PD<br>AX<br>SU                         |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin<br>manual of the te | actuator<br>ctor.<br>nuity bet<br>unit side)<br>o tester p<br>nay vary<br>ng this in<br>ester. | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>bolarity.<br>depending on the type of tester.<br>nspection, refer to the instruction<br>Disconcer<br>yunit 8-pin connector | PD<br>AX<br>SU<br>BR                   |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin<br>manual of the te | actuator<br>ctor.<br>nuity bet<br>unit side)<br>o tester p<br>nay vary<br>ng this in<br>ester. | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>bolarity.<br>depending on the type of tester.<br>nspection, refer to the instruction<br>Disconcer<br>yunit 8-pin connector | PD<br>AX<br>SU<br>BR                   |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin<br>manual of the te | actuator<br>ctor.<br>nuity bet<br>init side)<br>tester p<br>nay vary<br>ng this in<br>ester.   | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>bolarity.<br>depending on the type of tester.<br>nspection, refer to the instruction                                       | PD<br>AX<br>SU<br>BR<br>ST<br>RS       |
| 8 CHEC<br>1. Disconnect a<br>8-pin connect<br>2. Check contin<br>(ABS relay u<br>NOTE:<br>Pay attention to<br>Specifications m<br>Before performin<br>manual of the te | actuator<br>ctor.<br>nuity bet<br>init side)<br>tester p<br>nay vary<br>ng this in<br>ester.   | GO TO 8.<br>SOLENOID VALVE RELAY<br>ground terminal and ABS relay unit<br>ween ABS relay unit 8-pin connector<br>terminal 3 and body ground.<br>polarity.<br>depending on the type of tester.<br>nspection, refer to the instruction                                       | PD<br>AX<br>SU<br>BR<br>ST<br>RS<br>BT |

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#### 7. Warning Lamp Stays On When Ignition Switch Is Turned On (Cont'd)





### CHECK ABS CONTROL UNIT POWER 11 SUPPLY CIRCUIT 1. Disconnect control unit connector. 2. Check continuity between control unit connector terminal 1 and body ground. C/UNIT CONNECTOR (M54) SBR419D **Does continuity exist?** Yes Check the following. If NG, repair harness or connectors. Harness connector M54 • Harness for open or short between control unit and fuse Check control unit pin terminals for No ► damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

## **Removal and Installation**

#### **CAUTION:**

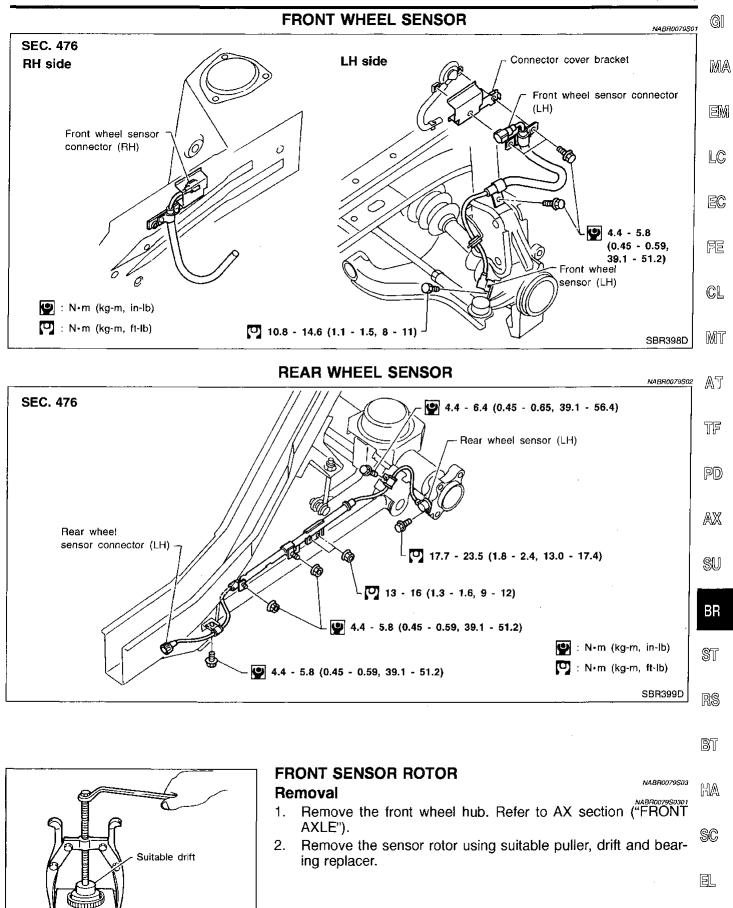
NABR0079

ABS

Be careful not to damage sensor edge and sensor rotor teeth. When removing the front or rear wheel hub assembly, disconnect the ABS wheel sensor from the assembly and move it away.

Removal and Installation (Cont'd)

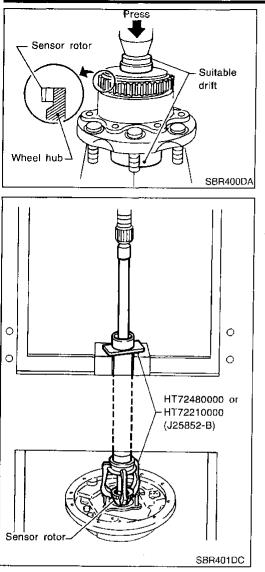
ABS



SBR873C

IDX

Removal and Installation (Cont'd)



### Installation

Removal

Install the sensor rotor using suitable drift and press.

- Always replace sensor rotor with new one.
- Pay attention to the direction of front sensor rotor as shown in figure.

### REAR SENSOR ROTOR

NABR0079S04

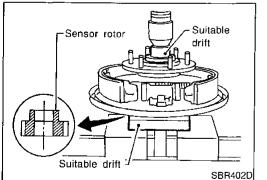
ABS

NABB007950302

Remove the sensor rotor using Tool.

NABR007950401

NABR0079\$0402



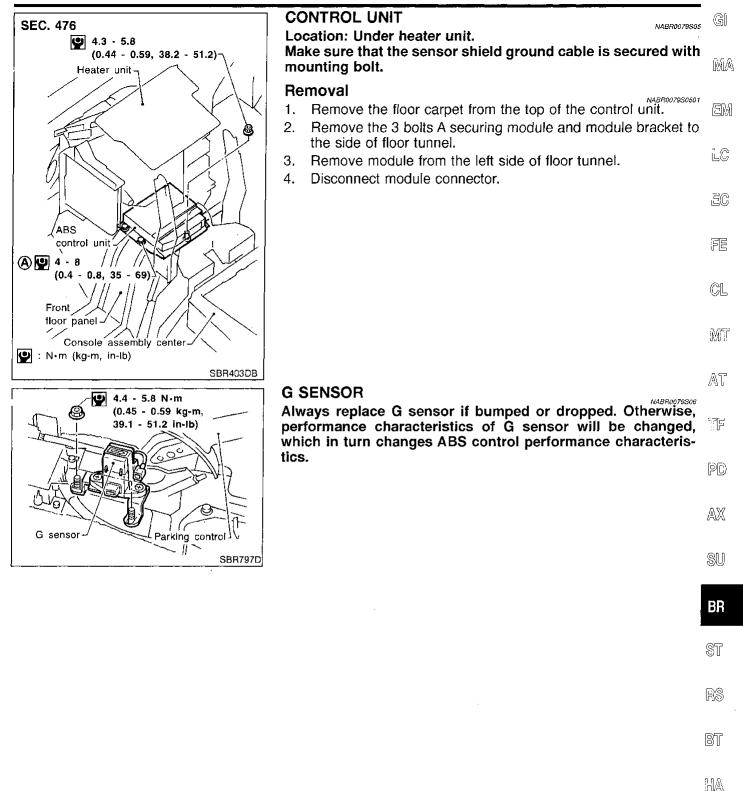
#### Installation

Install the sensor rotor using suitable drift and press.

- Always replace sensor rotor with new one.
- Pay attention to the direction of front sensor rotor as shown in figure.

Removal and Installation (Cont'd)

ABS



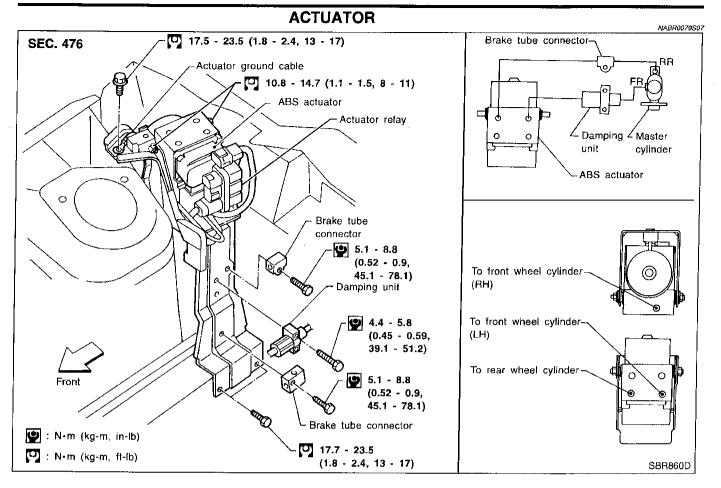
1243

SC

S.

DX

Removal and Installation (Cont'd)



#### Removal

1. Disconnect battery cable.

- 2. Drain brake fluid. Refer to "Changing Brake Fluid", BR-5.
- 3. Remove mounting bracket fixing bolts and nuts.
- 4. Disconnect connector, brake pipes and remove fixing nuts and actuator ground cable.

#### Installation

CAUTION:

After installation, refill brake fluid. Then bleed air. Refer to "Bleeding Brake System", BR-6.

1. Tighten actuator ground cable.

Place ground cable at a notch of mounting bracket.

- 2. Connect brake pipes temporarily.
- 3. Tighten fixing bolts and nuts.
- 4. Tighten brake pipes.
- 5. Connect connector and battery cable.

#### **ACTUATOR RELAYS**

1. Disconnect battery cable.

NABR0079508

NABR007950701

NABR0079\$0702

ABS

2. Remove actuator relay unit.

**BR-82** 

# SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

# **General Specifications**

|  | General Specificatio   | ons   | <sub>мавгоо</sub><br>Unit: mm (ir     |
|--|--|---|---------------------------------------|
| Applied model  | - · ·  | 2WD   | 4WD                                   |
|  | Brake model  | AD  | 31VA                                  |
| Front brake  | Cylinder bore diameter × number of pistons                     | 44.45 (1.7500) × 2                            |                                       |
|  | Pad<br>Length × width × thickness                              | 132.0 × 52.5 × 11<br>(5.20 × 2.067 × 0.43)    |                                       |
|  | Rotor outer diameter × thickness                               | <u> </u>                                      | (1.14 × 1.10)                         |
| ······································                       | Brake model  | LT30C   |                                       |
|  | Cylinder bore diameter   | 20.64 (13/16)                                 |                                       |
| Rear brake   | Lining length $\times$ width $\times$ thickness                |   | 50 × 6.1<br>97 × 0.240)               |
|  | Drum inner diameter  | 295.0   | (11.61)                               |
| Master cylinder  | Bore diameter  | 25.4  | .0 (1)                                |
|  | Valve model  | Proportioning valve<br>within master cylinder | Linkage type load<br>sensing valve    |
| Control valve  | Split point<br>kPa (kg/cm <sup>2</sup> , psi) × reducing ratio | 2,942 (30,427) × 0.2                          | (Variable) × 0.18                     |
|  | Booster model  | M215T   |                                       |
| Brake booster  | Diaphragm diameter   | Pri: 230 (9.06)<br>Sec: 205 (8.07)            |                                       |
| Recommended brake fluid                                      | · · · ·  | DC  | Т 3                                   |
| Brake model  | Disc Brake   | AD3   | Unit: mm (in)                         |
| Pad wear limit   | Minimum thickness  | 2.0 (0  | <u>-</u>                              |
| Rotor repair limit   | Minimum thickness  | 26.0 (  | · · · · · · · · · · · · · · · · · · · |
| · · · · · · · · · · · · · · · · · · ·                        | Drum Brake   |   | <sub>NABRoos2</sub><br>Unit: mm (in)  |
| Brake model  |  | LT3   | 0C                                    |
| Lining wear limit  | Minimum thickness  | 1.5 (0  | .059)                                 |
| Drum repair limit  | Maximum inner diameter   | 296.5 (11.67)                                 |                                       |
|  | Out-of-round limit   | 0.03 (0.0012)                                 |                                       |
|  | Brake Pedal  |   | <sub>мавгоовз</sub><br>Unit: mm (in)  |
| Transmission   |  | м/т   | A/T                                   |
| Free height "H"*   |  | 165 - 175<br>(6.50 - 6.89)                    | 175 - 185<br>(6.89 - 7.28)            |
| Depressed height "D"<br>Junder force of 490 N (50 kg, 110 lb | ) with engine running]   | 65 (2.56)                                     | 70 (2.76)                             |
| Clearance "C" between pedal stopp                            | er and threaded end of stop lamp switch or ASCD switch         | 0.3 - 1.0 (0.0                                | 12 - 0.039)                           |
|  | At clevis  | 1.0 - 3.0 (0.039 - 0.118)                     |                                       |
| Pedal free play  |  |   |                                       |

# SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Brake Control

# Parking Brake Control

| Control Type  | Center lever |  |  |  |
|---|--------------|--|--|--|
| Lever stroke<br>[under force of 196 N (20 kg, 44 lb)] | 6 - 8        |  |  |  |
| Lever stroke when warning switch comes on             | 1            |  |  |  |