

BRAKE SYSTEM

SECTION **BR**

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PRECAUTIONS

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

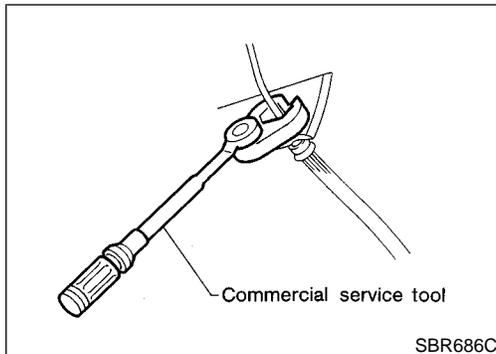
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The supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), seat belt pre-tensioners, a diagnosis sensor unit, a crash zone sensor (4WD models), 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. For removal of Spiral Cable and Air Bag Module, refer to *RS-16*.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses (except "SEAT BELT PRE-TENSIONER") covered with yellow insulation either just before the harness connectors or for the complete harness are related to the SRS.



Precautions for Brake System

NGBR0002

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

WARNING:

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

Wiring Diagrams and Trouble Diagnosis

NGBR0003

When you read wiring diagrams, refer to the followings:

- "HOW TO READ WIRING DIAGRAMS" refer to *GI-10*.
- "POWER SUPPLY ROUTING" for power distribution circuit refer to *EL-9*.

When you perform trouble diagnosis, refer to the followings:

- "HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS" refer to *GI-34*.
- "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" refer to *GI-23*.

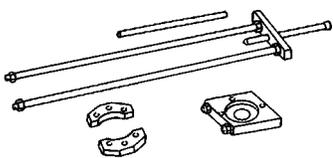
PREPARATION

Special Service Tools

Special Service Tools

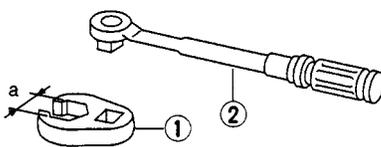
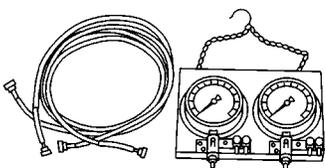
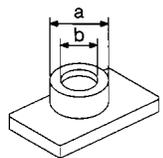
NGBR0004

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV40106500 (JS25852-B) Wheel bearing puller NT724	 <p data-bbox="950 346 1291 373">Removing rear wheel sensor rotor</p>

Commercial Service Tools

NGBR0005

Tool name	Description
1 Flare nut crowfoot 2 Torque wrench NT360	 <p data-bbox="950 682 1380 735">Removing and installing each brake piping a: 10 mm (0.39 in)</p>
Brake fluid pressure gauge NT151	 <p data-bbox="950 892 1258 919">Measuring brake fluid pressure</p>
Rear wheel sensor rotor drift NT509	 <p data-bbox="950 1123 1282 1197">Installing rear wheel sensor rotor a: 75 mm (2.95 in) dia. b: 63 mm (2.48 in) dia.</p>

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

NVH Troubleshooting Chart

NGBR0085S01

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

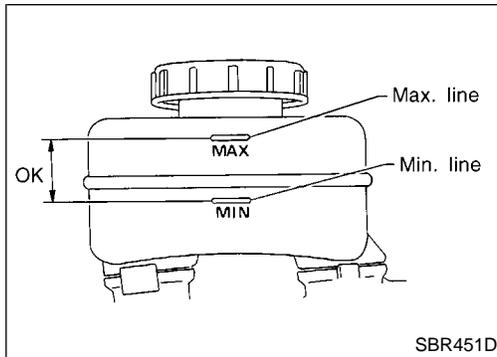
Symptom		Possible cause and SUSPECTED PARTS	Reference page															
			GI	MA	EM	LC	EC	FE	CL	MT	AT	TF	PD	AX	SU	BR	ST	
BRAKE	Noise	Linings or pads - damaged																BR-25
	Shimmy, Judder	Linings or pads - uneven wear																BR-19, 25
		Return spring damaged																BR-23
		Shims damaged																BR-18
		Rotor or drum imbalance																—
		Rotor or drum damage																—
		Rotor or drum runout																BR-21, 25
		Rotor or drum deformation																—
		Rotor or drum deflection																—
		Rotor or drum rust																—
		Rotor thickness variation																BR-21
		Drum out of round																BR-25
		PROPELLER SHAFT																NVH, PD-4.
		DIFFERENTIAL																NVH, PD-14, PD-40, PD-62.
		DRIVE SHAFT																NVH, AX-3.
		AXLE																NVH, AX-3.
		SUSPENSION																NVH, SU-3.
		TIRES																NVH, SU-3.
		ROAD WHEEL																NVH, SU-3.
		STEERING																NVH, ST-5.

x: Applicable

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ON-VEHICLE SERVICE

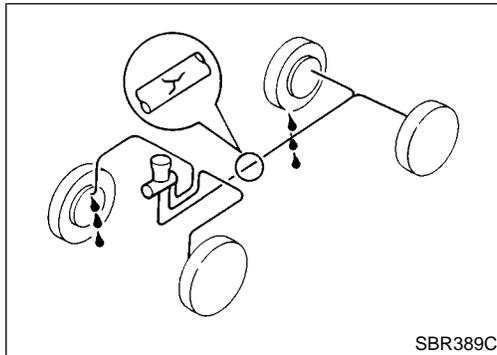
Checking Brake Fluid Level



Checking Brake Fluid Level

NGBR0006

- Check fluid level in reservoir tank. It should be between Max and Min lines on reservoir tank.
- If fluid level is extremely low, check brake system.
- If the brake warning lamp comes on, check brake fluid level switch and parking brake switch.



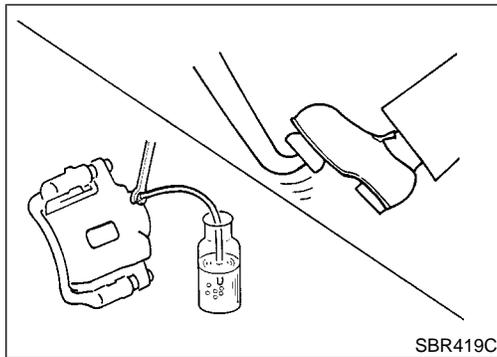
Checking Brake Line

NGBR0007

CAUTION:

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

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



Changing Brake Fluid

NGBR0008

CAUTION:

- Refill with new brake fluid "DOT 3".
- Always keep fluid level higher than minimum line on reservoir tank.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

1. Clean inside of reservoir tank, and refill with new brake fluid.
2. Connect a vinyl tube to each air bleeder valve.
3. Drain brake fluid from each air bleeder valve by depressing brake pedal.
4. Refill until brake fluid comes out of each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid.

Refer to "Bleeding Brake System", BR-8.

Brake Burnishing Procedure

=NGBR0120

Burnish the brake contact surfaces according to the following procedure after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage.

CAUTION:

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).
2. Use medium brake pedal/foot effort to bring the vehicle to a pressure such that vehicle stopping time equals to 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.

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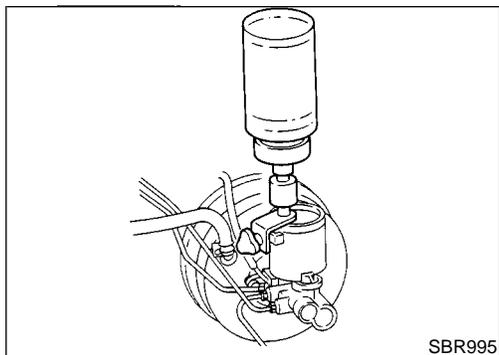
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ON-VEHICLE SERVICE

Bleeding Brake System

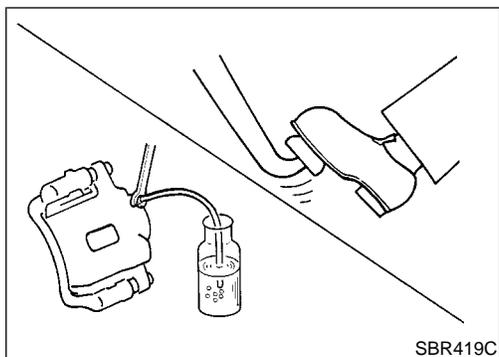


Bleeding Brake System

=NGBR0009

CAUTION:

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
- If master cylinder is suspected to have air inside, bleed air from master cylinder first. Refer to "Installation", "MASTER CYLINDER", BR-15.
- 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.
- Turn ignition switch OFF and disconnect ABS actuator connectors or battery ground cable.
- Bleed air in the following order.
 1. Left rear brake
 2. Right rear brake
 3. Left front brake
 4. Right front brake



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

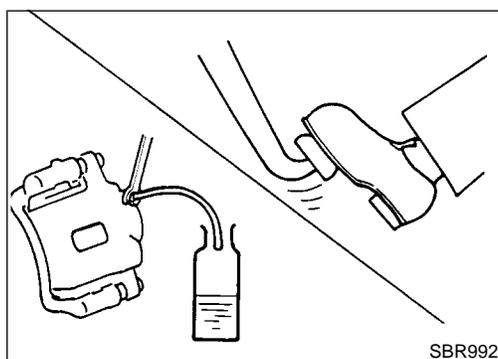
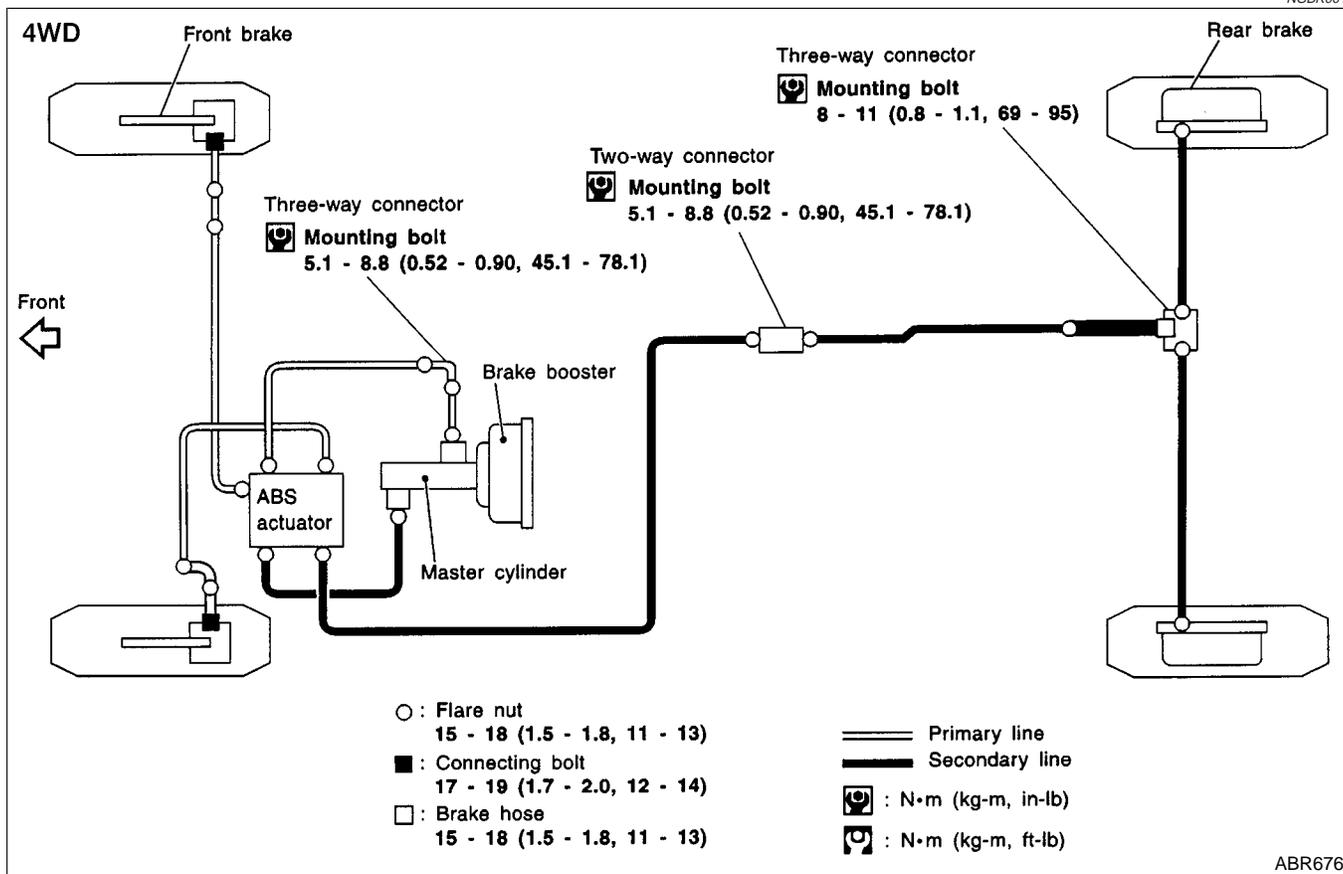
 : 7 - 9 N·m (0.7 - 0.9 kg·m, 61 - 78 in·lb)

BRAKE HYDRAULIC LINE

Hydraulic Circuit

Hydraulic Circuit

NGBR0010



Removal

NGBR0011

CAUTION:

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

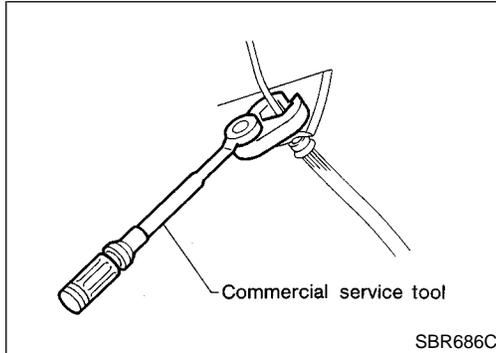
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BRAKE HYDRAULIC LINE

Inspection

Inspection

Check brake lines (tubes and hoses) for cracks, deterioration and other damage. Replace any damaged parts. NGBR0012



Installation

CAUTION:

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

1. Tighten all flare nuts and connecting bolts.

Flare nut:

 : 15 - 17 N·m (1.5 - 1.8 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-8.

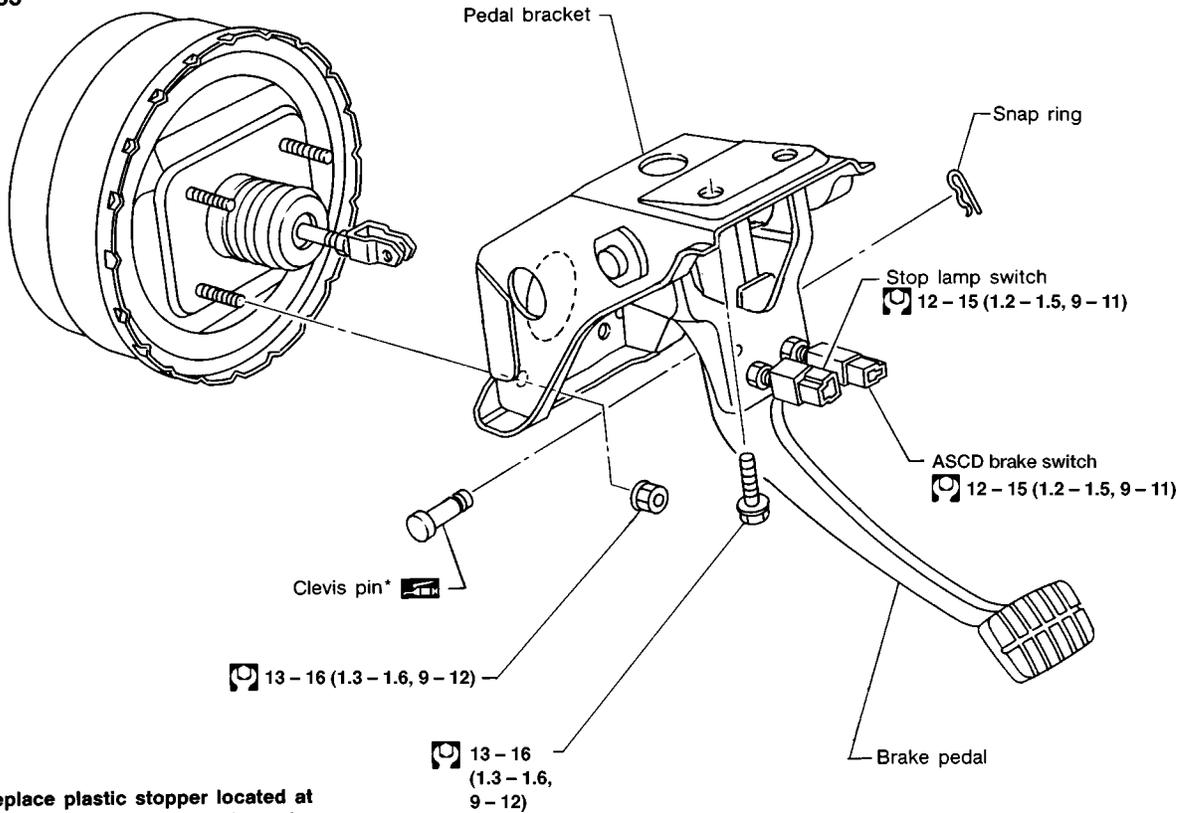
BRAKE PEDAL AND BRACKET

Removal and Installation

Removal and Installation

NGBR0016

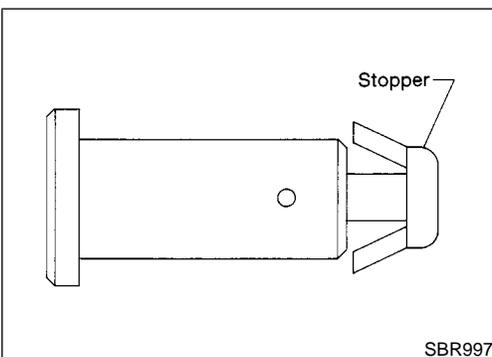
SEC. 465



* Replace plastic stopper located at the end of clevis pin if deformed or damaged.

: N·m (kg-m, ft-lb)

ABR824



Inspection

Check brake pedal for following items.

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

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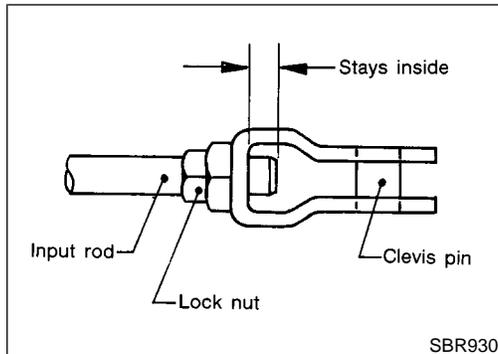
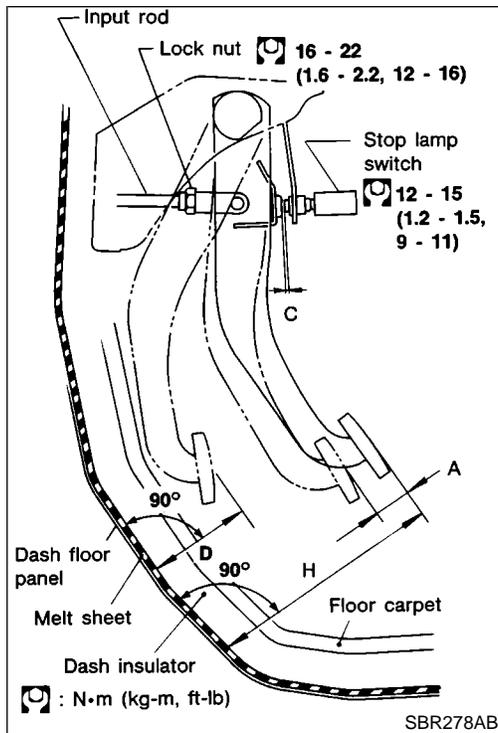
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BRAKE PEDAL AND BRACKET

Adjustment



Adjustment

NGBR0018

Check brake pedal free height from metal floor.

H: Free height

Refer to SDS (BR-73).

D: Depressed height

Refer to SDS (BR-73).

Under force of 490 N (50 kg, 110 lb) with engine running

C₁, C₂: Clearance between pedal stopper and threaded end of stop lamp switch and ASCD switch

0.3 - 1.0 mm (0.012 - 0.039 in)

A: Pedal free play

1 - 3 mm (0.04 - 0.12 in)

If necessary, adjust brake pedal free height.

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

Make sure that tip of input rod stays inside.

2. Adjust clearance "C₁" and "C₂" with stop lamp switch and ASCD switch respectively. Then tighten lock nuts.

3. Check pedal free play.

Make sure that stop lamp is off when pedal is released.

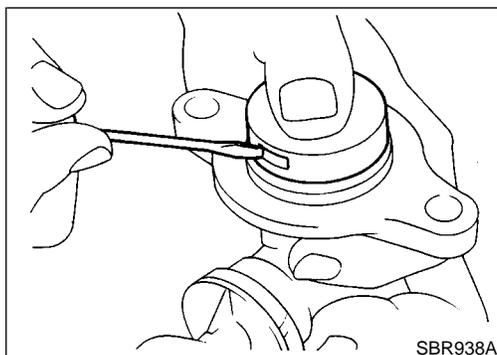
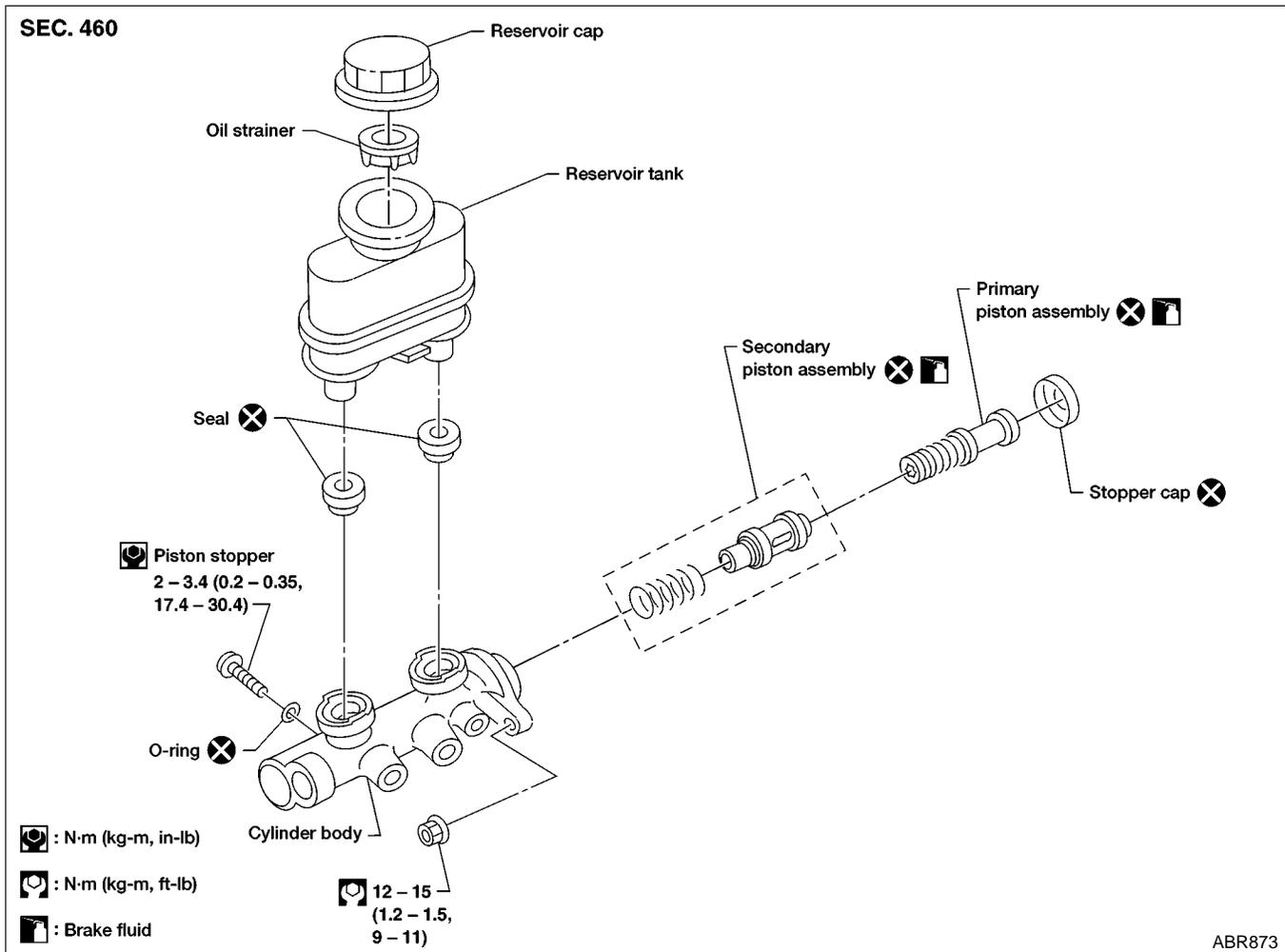
4. Check brake pedal's depressed height while engine is running. If depressed height is below specified value, check brake system for leaks, accumulation of air or any damage to components (master cylinder, wheel cylinder, etc.). Then make necessary repairs.

Removal

NGBR0019

CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
 - In the case of brake fluid leakage from the master cylinder, disassemble the cylinder. Then check piston cups for deformation and scratches and replace necessary parts.
1. Connect a vinyl tube to air bleeder valve.
 2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
 3. Remove brake pipe flare nuts.
 4. Remove master cylinder mounting nuts.



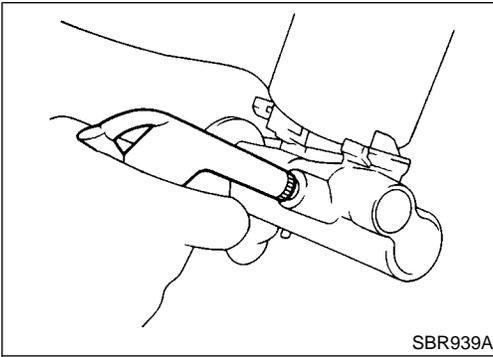
Disassembly

NGBR0020

1. Bend claws of stopper cap outward.

MASTER CYLINDER

Disassembly (Cont'd)



2. Remove piston stopper while piston is pushed into cylinder.
3. Remove piston assemblies.

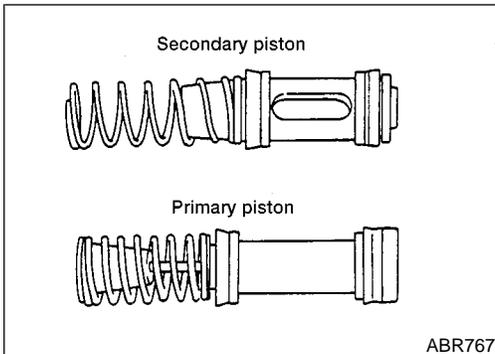
If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.

4. Draw out reservoir tank.

Inspection

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

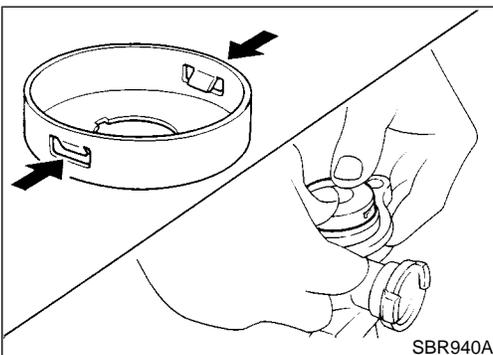
NGBR0021



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.

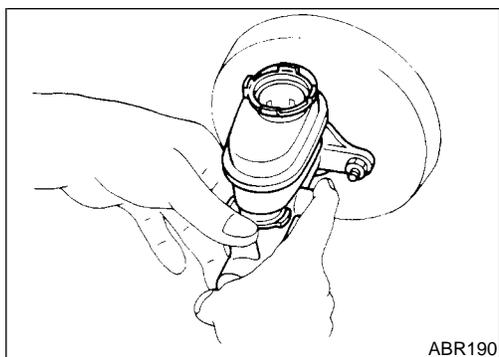
NGBR0022



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.



Installation

=NGBR0023

CAUTION:

- Refill with new brake fluid “DOT 3”.
 - Never reuse drained brake fluid.
1. Place master cylinder onto brake booster and secure mounting nuts lightly.
 2. Torque mounting nuts.
🔩 : 12 - 15 N·m (1.2 - 1.5 kg-m, 9 - 11 ft-lb)
 3. Fill up reservoir tank with new brake fluid.
 4. Plug all ports on master cylinder with fingers to prevent air suction while releasing brake pedal.
 5. Have driver depress brake pedal slowly several times until no air comes out of master cylinder.
 6. Fit brake lines to master cylinder.
 7. Tighten flare nuts.
🔩 : 15 - 17 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
 8. Bleed air. Refer to “Bleeding Brake System”, BR-8.

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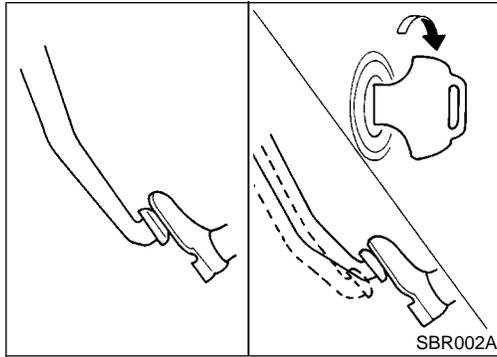
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BRAKE BOOSTER

On-vehicle Service



On-vehicle Service

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OPERATING CHECK

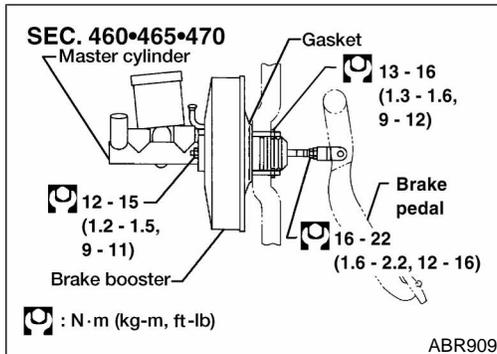
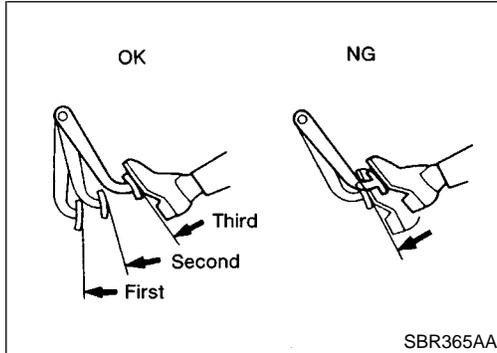
NGBR0024S01

1. Depress brake pedal several times with engine off. After 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

NGBR0024S02

1. Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. Booster is airtight if pedal stroke is less each time.
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**.

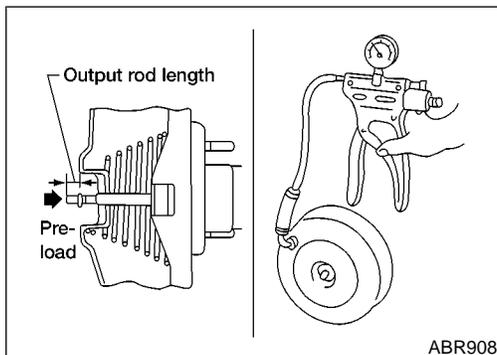


Removal

NGBR0025

CAUTION:

- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Be careful not to deform or bend brake pipes, during removal of booster.



Inspection

NGBR0026

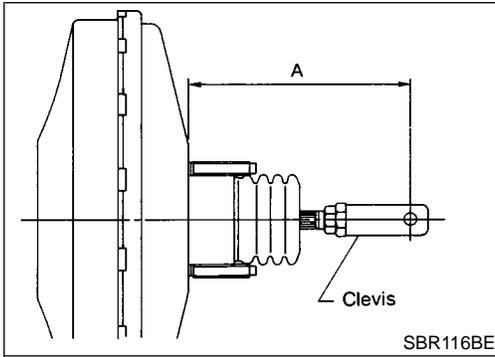
OUTPUT ROD LENGTH CHECK

NGBR0026S01

1. Apply vacuum of -66.7 kPa (-500 mmHg , -19.69 inHg) to brake booster with a hand vacuum pump.
2. Add preload of 19.6 N (2.0 kg , 4.4 lb) to output rod length.
3. Check output rod length.

Specified length:

10.275 - 10.525 mm (0.4045 - 0.4144 in)



Installation

CAUTION:

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

A: 138.5 mm (5.45 in)

1. Before fitting booster, temporarily adjust clevis to dimension shown.
2. Fit booster, then secure mounting nuts (brake pedal bracket to brake booster) lightly.
3. Connect brake pedal and booster input rod with clevis pin.
4. Secure mounting nuts.

Specification: 13 - 16 N·m (1.3 - 1.6 kg-m, 9 - 12 ft-lb)

5. Install master cylinder. Refer to "Installation" in "MASTER CYLINDER", BR-15.
6. Adjust brake pedal height and free play. Refer to "Adjustment" in "BRAKE PEDAL AND BRACKET", BR-12.
7. Secure lock nut for clevis.

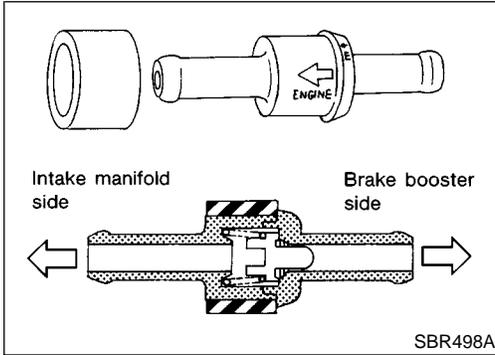
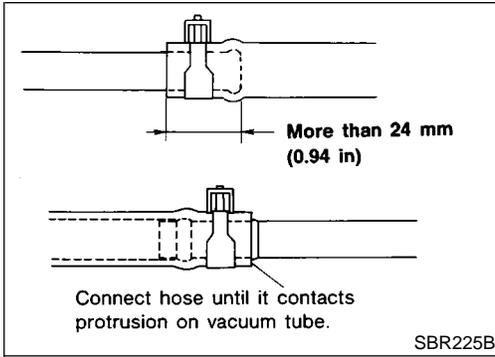
⚙️ : 16 - 22 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)

8. Bleed air. Refer to "Bleeding Brake System", BR-8.

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VACUUM PIPING

Removal and Installation



Removal and Installation

NGBR0029

CAUTION:

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

- Do not apply any oil or lubricants to vacuum hose and check valve.
- Insert vacuum tube into vacuum hose as shown.
- Install check valve, paying attention to its direction.

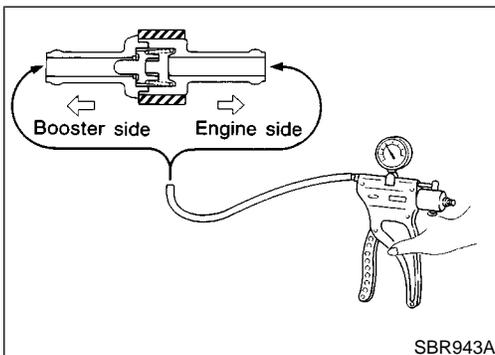
Inspection

NGBR0030

HOSES AND CONNECTORS

NGBR0030S01

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



CHECK VALVE

NGBR0030S02

Check vacuum with a vacuum pump.

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

Pad Replacement

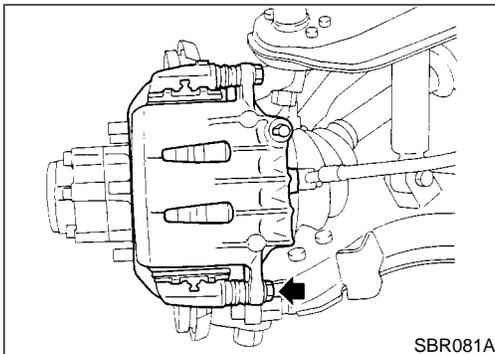
NGBR0032

WARNING:

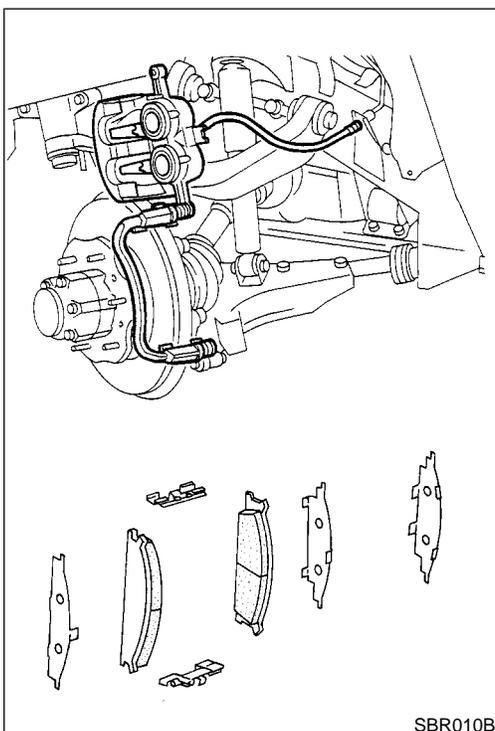
Clean brakes with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

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



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



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

Standard pad thickness:

11 mm (0.43 in)

Pad wear limit:

2.0 mm (0.079 in)

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

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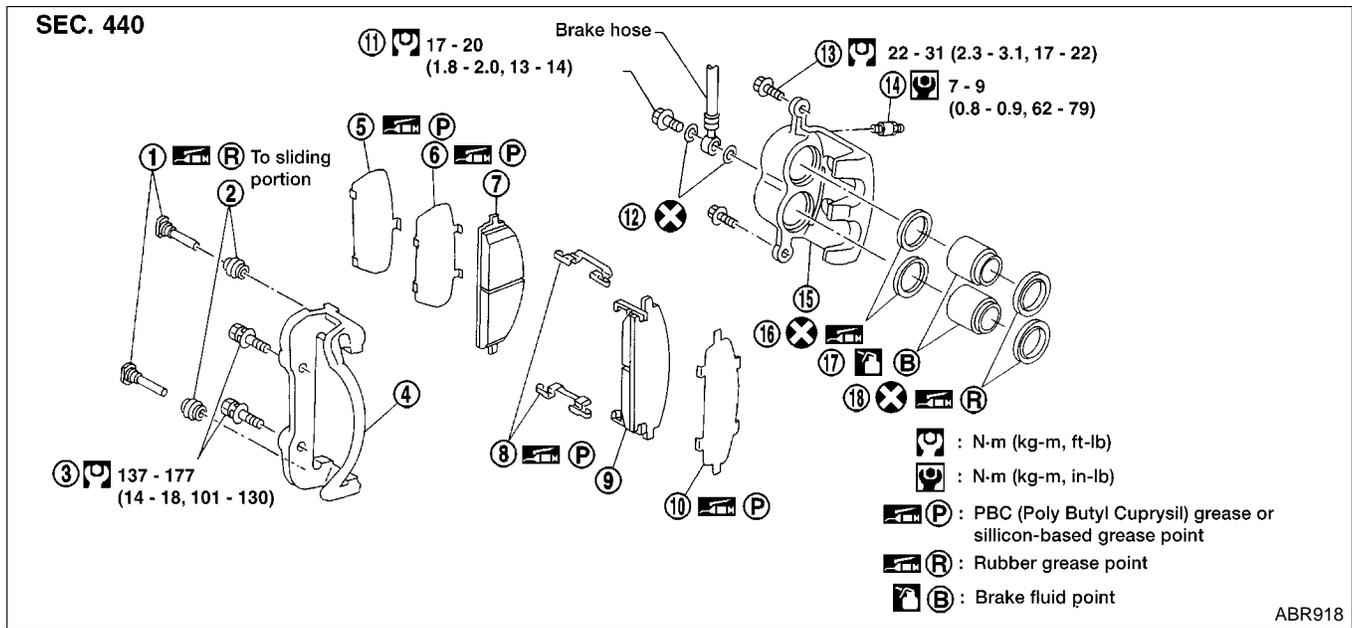
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FRONT DISC BRAKE

Pad Replacement (Cont'd)



Removal

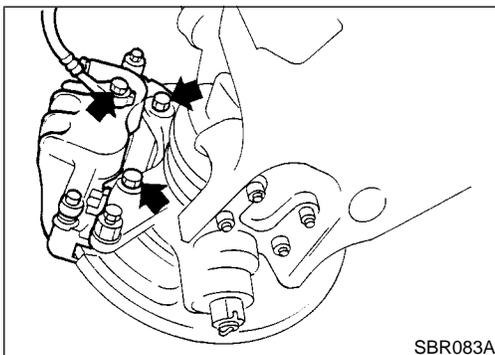
NGBR0033

WARNING:

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

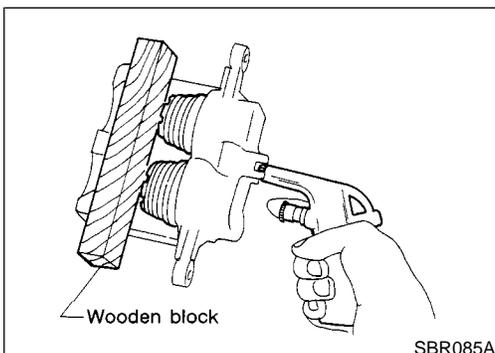
CAUTION:

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



Remove torque member fixing bolts and connecting bolt.

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



Disassembly

NGBR0034

WARNING:

Do not place your fingers in front of piston.

CAUTION:

Do not scratch or score cylinder wall.

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

Inspection

CALIPER

NGBR0035

Cylinder Body

NGBR0035S01

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

CAUTION:

Use brake fluid to clean. Never use mineral oil.

Piston

NGBR0035S0102

CAUTION:

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

Check pistons for uneven surface, chips or cracks. Replace if any of these conditions are observed.

Slide Pin, Pin Bolt and Pin Boot

NGBR0035S0103

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

ROTOR

NGBR0035S02

Runout

NGBR0035S0201

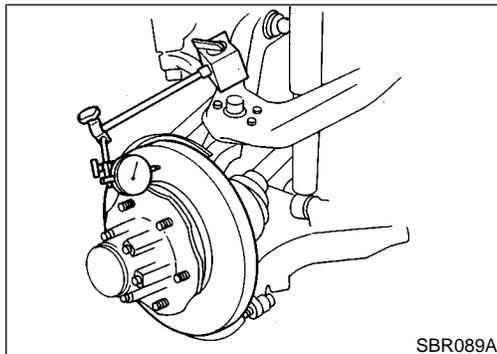
1. Check runout using a dial indicator.

Make sure that wheel bearing axial end play is within the specifications before measuring. Refer to AX-4 "Front Wheel Bearing" in AX section. ("Front Wheel Bearing", "ON VEHICLE SERVICE").

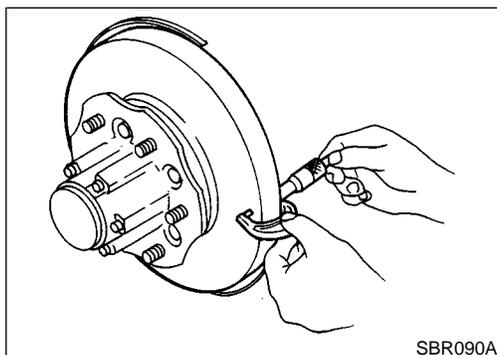
Maximum runout:

0.07 mm (0.0028 in)

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



SBR089A



SBR090A

Thickness

NGBR0035S0202

Thickness variation (At least 8 positions):

Maximum 0.02 mm (0.0008 in)

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

Rotor repair limit:

26.0 mm (1.024 in)

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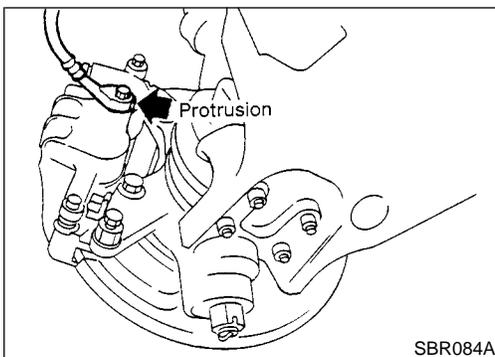
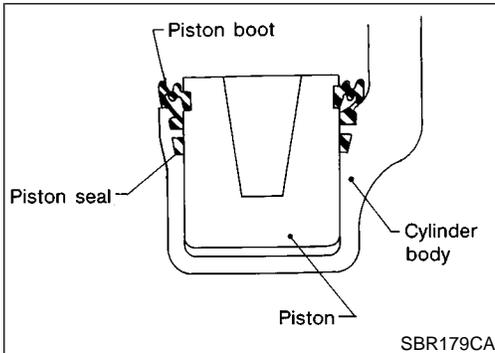
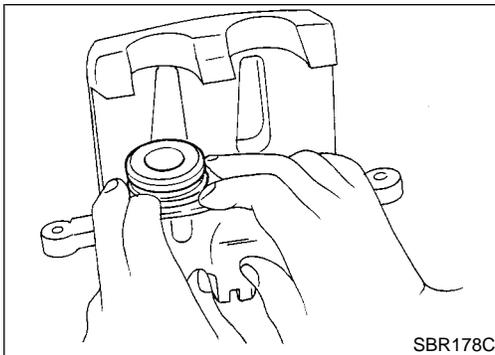
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FRONT DISC BRAKE

Assembly



Assembly

NGBR0036

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

CAUTION:

- Secure dust seal property.
- Lubricate with new brake fluid before installing plastic pistons into cylinder body.

Installation

NGBR0037

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-8.

Brake Burnishing Procedure

NGBR0088

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.

CAUTION:

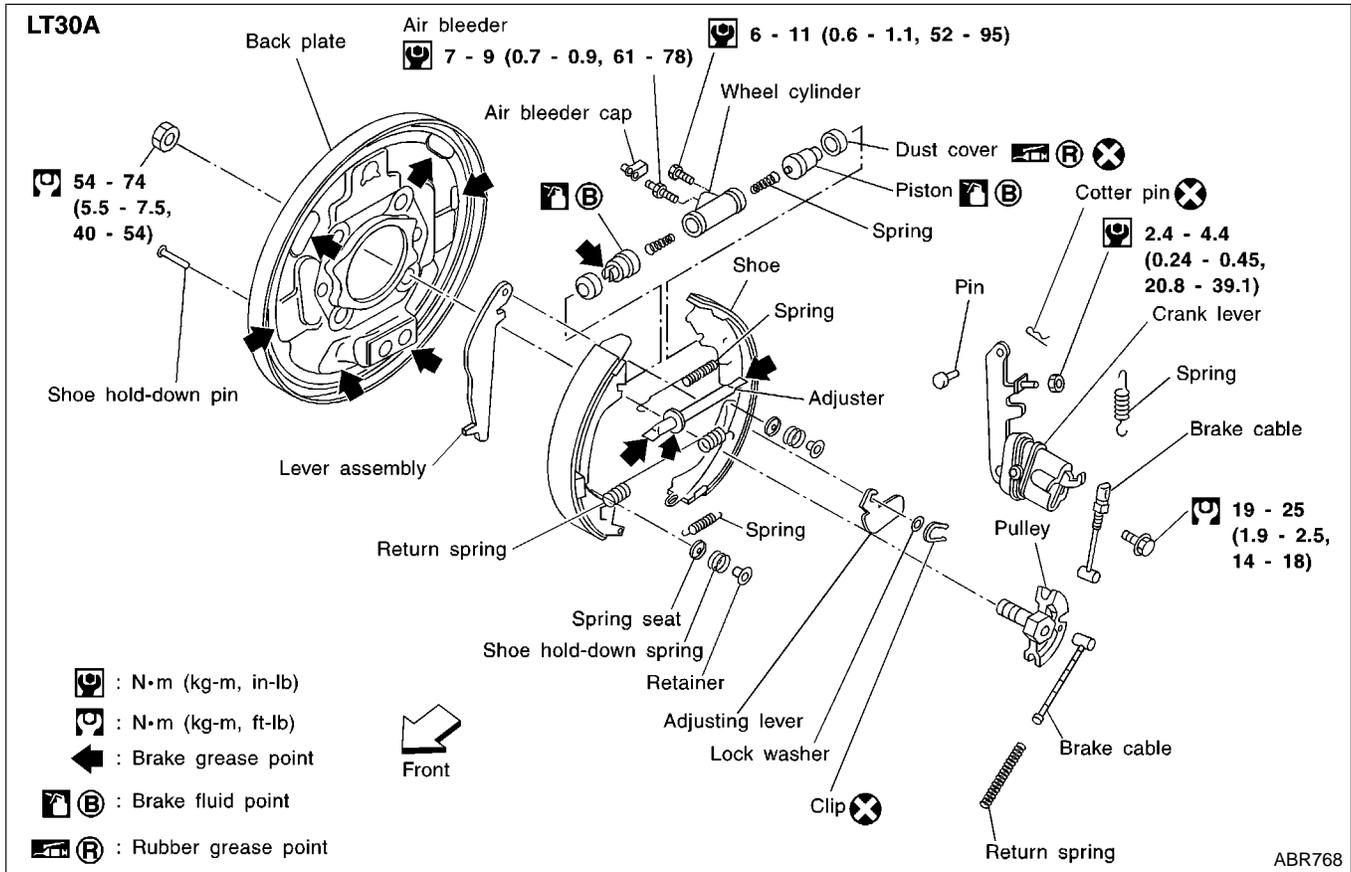
Only perform this procedure under safe road and traffic conditions. Use extreme caution.

1. Drive the vehicle on a straight smooth road at 50 km/h (31 MPH).
2. 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

NGBR0038



Removal

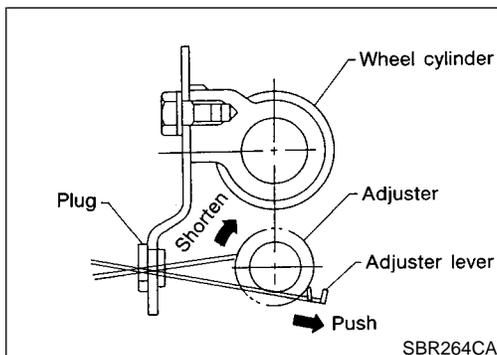
NGBR0039

WARNING:

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

CAUTION:

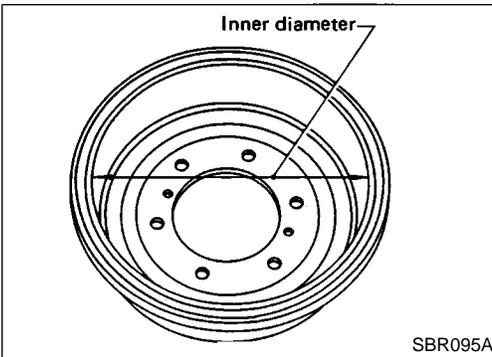
Make sure parking brake lever is released completely.



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

REAR DRUM BRAKE

Inspection



Inspection

DRUM

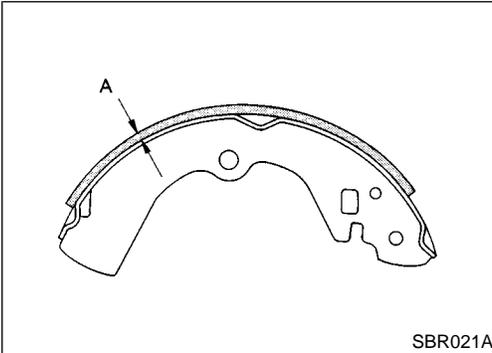
NGBR0042

NGBR0042S01

Maximum inner diameter (Repair limit):

LT30A 296.5 mm (11.67 in)

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



LINING

NGBR0042S02

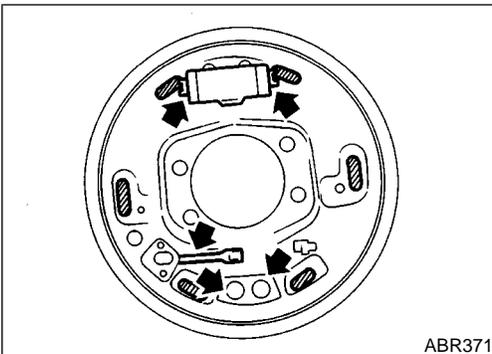
Check lining thickness.

Standard lining thickness:

LT30A 5.8 mm (0.228 in)

Lining wear limit (A):

LT30A 1.5 mm (0.059 in)



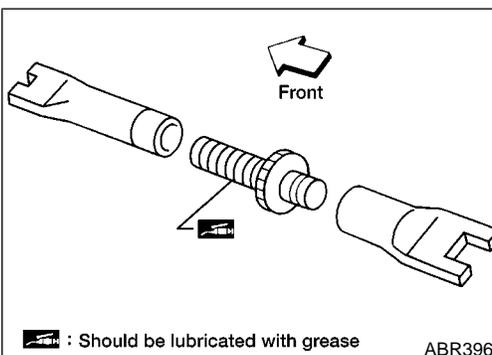
Installation

NGBR0043

Always perform shoe clearance adjustment. Refer to BR-28.

- Burnish the brake contact surfaces after refinishing or replacing drums or rotors, after replacing pads or linings, or if a soft pedal occurs at very low mileage. Refer to "Brake Burnishing Procedure", "ON-VEHICLE SERVICE", BR-22

1. Fit toggle lever to brake shoe with retainer clip.
2. Apply brake grease to the contact areas shown at left.



3. Shorten adjuster by rotating it.

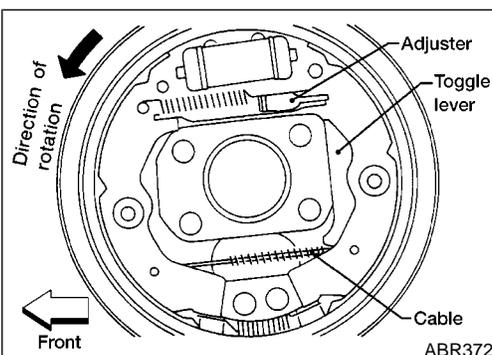
- Pay attention to direction of adjuster.

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

4. Connect parking brake cable to toggle lever.

5. Install all parts.

Be careful not to damage wheel cylinder piston boots.



6. Check all parts are installed properly.

- After installations completed, adjust shoe-to-drum clearance.

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-8.

9. Adjust parking brake. Refer to "Adjustment", "PARKING BRAKE CONTROL", BR-28.

- Install all the parts by referring to the figure below.

- After installing crank lever on back plate, make sure that there

BR-25

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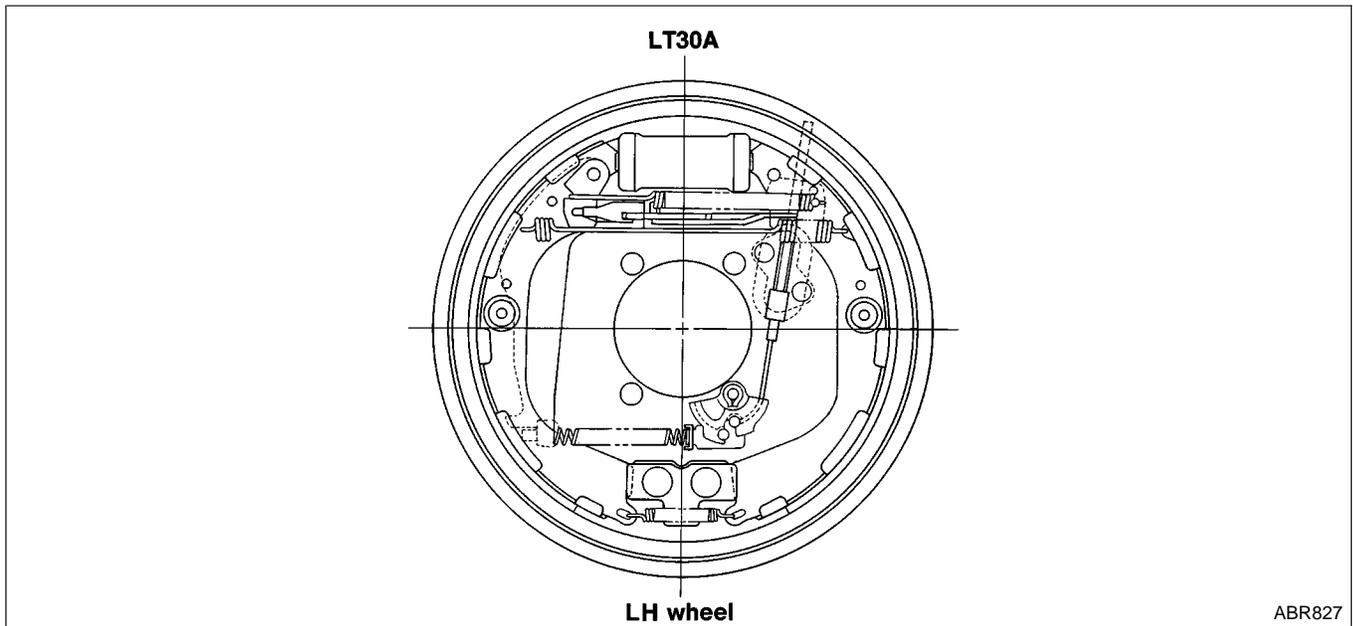
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REAR DRUM BRAKE

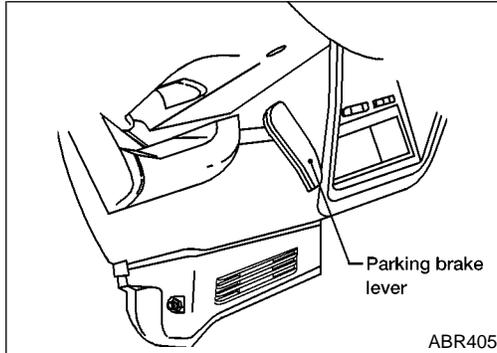
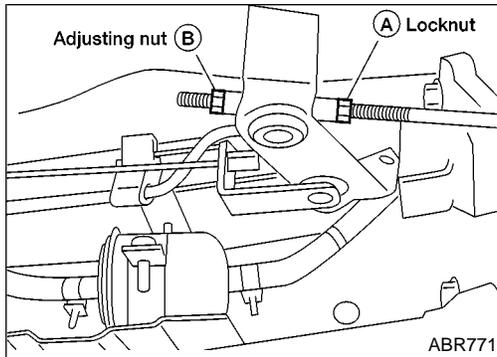
Installation (Cont'd)

is no play between crank lever and back plate. If play exists, adjust bolt A and lock nut B.



PARKING BRAKE CONTROL

Adjustment



Adjustment

Adjust parking brake as follows:

NGBR0047

1. Fully release parking brake lever.
2. Loosen A and rotate B until parking brake cable loosens.
3. Depress brake pedal several times until clicking sound does not occur from rear brakes.
4. Adjust clearance between rear brake shoe and drum.
5. Adjust parking lever stroke by rotating B.
6. Pull parking brake lever with specified force. Check lever stroke and ensure smooth operation.
7. Readjust clearance between rear brake shoe and drum.

Purpose

NGBR0089

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.

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

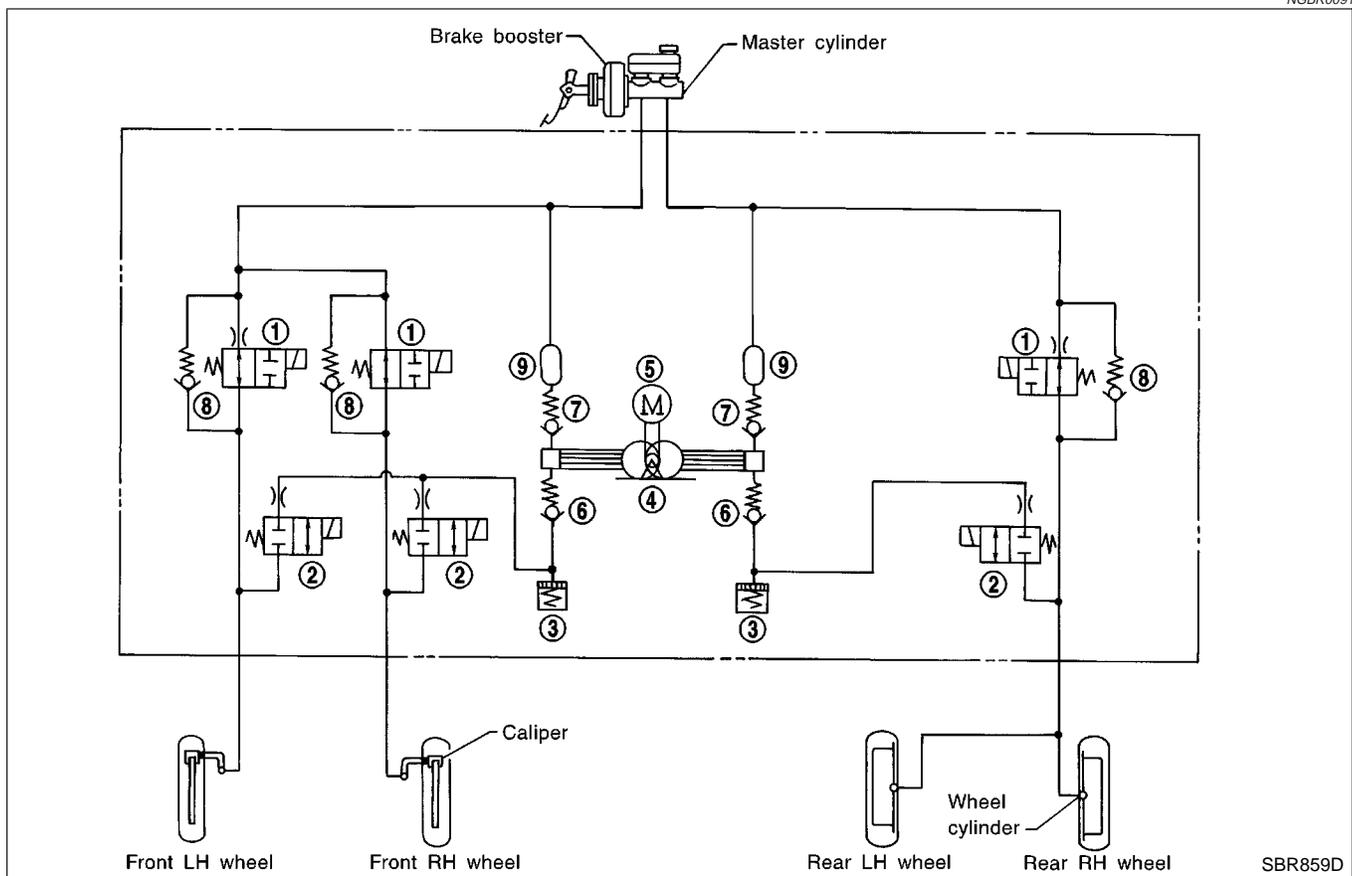
Operation

NGBR0090

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The Anti-Lock Brake System (ABS) has a self-test function. The system turns on the ABS warning lamp for 1 second each time the ignition switch is turned ON. After the engine is started, the ABS warning lamp turns off. The system performs a test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard as the ABS performs this self-test. This is a normal part of the self-test feature. If a malfunction is found during this check, the ABS warning lamp will stay on.
- While driving, a mechanical noise may be heard during ABS operation. This is a normal condition.

ABS Hydraulic Circuit

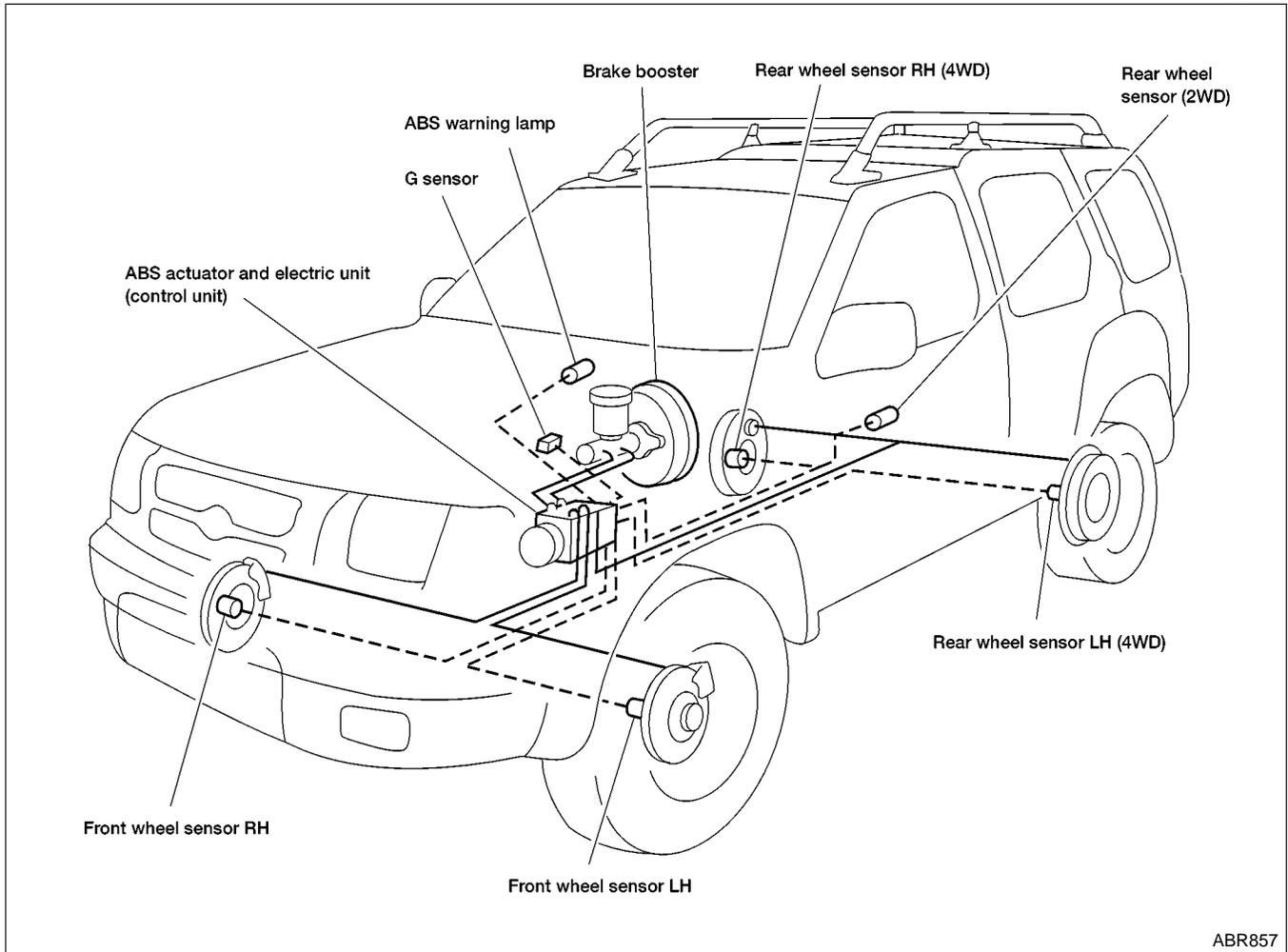
NGBR0091



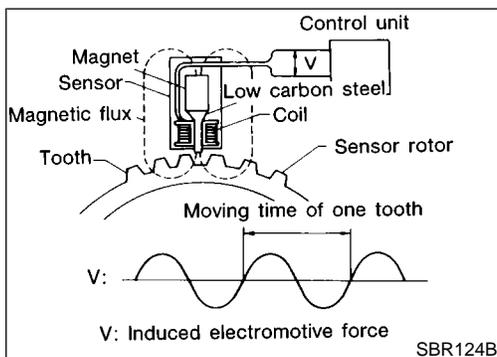
- | | | |
|--------------------------|-----------------------|----------------------------------|
| 1. Inlet solenoid valve | 4. Motor | 6. Damper |
| 2. Outlet solenoid valve | 5. Bypass check valve | 7. Solenoid valve relay actuator |
| 3. Pump | | |

System Components

NGBR0092



ABR857

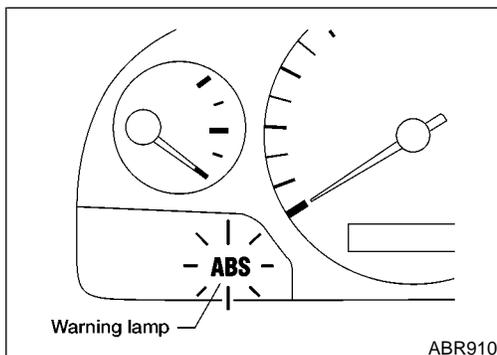


System Description
WHEEL SENSOR

NGBR0093

NGBR0093S01

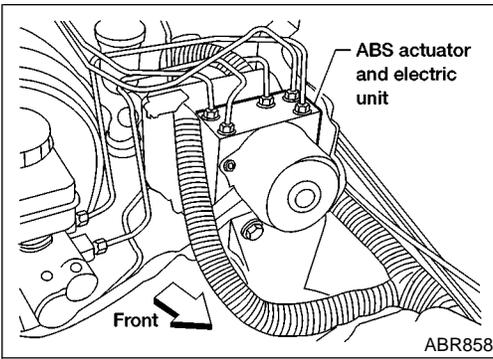
The sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a bar magnet around which a coil is wound. The front sensors are installed on the back of the front brake rotors. For 2-wheel drive systems a single sensor is installed at the companion flange of the rear axle housing and for 4-wheel drive systems there is a sensor installed at each 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 (BUILT-IN ABS ACTUATOR AND ELECTRIC UNIT)

NGBR0093S02

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. (For control unit layout, refer to ABS ACTUATOR AND ELECTRIC UNIT, BR-31.)



ABS ACTUATOR AND ELECTRIC UNIT

NGBR0093S03

The ABS actuator and electric unit contains:

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

This component controls the hydraulic circuit and increases, holds or decreases hydraulic pressure to all or individual wheels. The ABS actuator and electric unit is serviced as an assembly.

ABS Actuator Operation

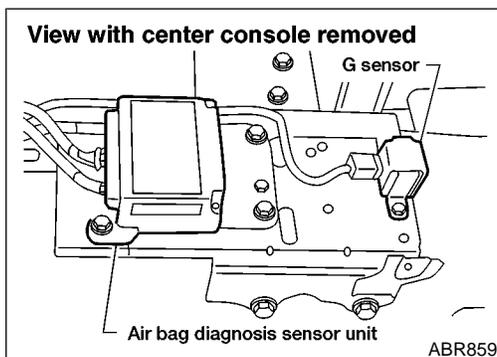
NGBR0093S0301

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

G SENSOR (4WD MODELS)

NGBR0093S05

The G sensor senses deceleration during braking to determine whether the vehicle is being driven on a high μ road (asphalt road, etc.) or a low μ road (snow-covered road, etc.). It then sends a signal to the ABS control unit.

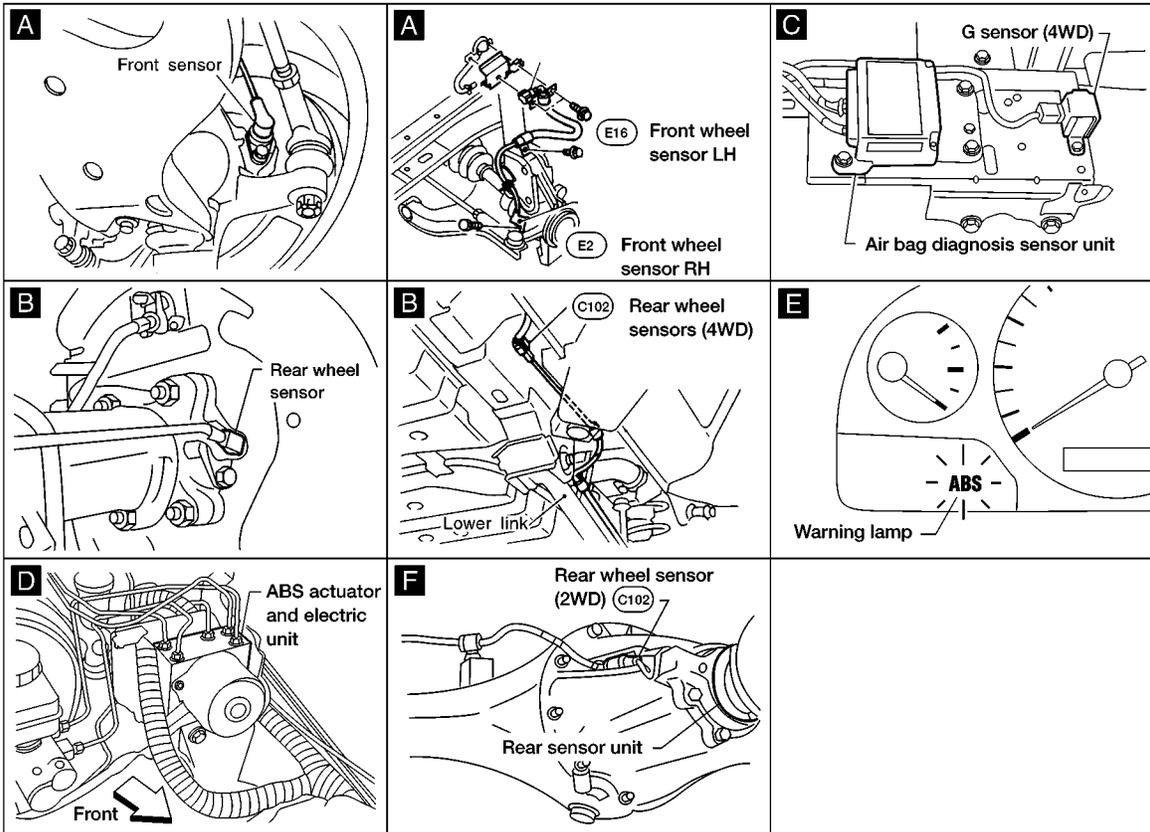
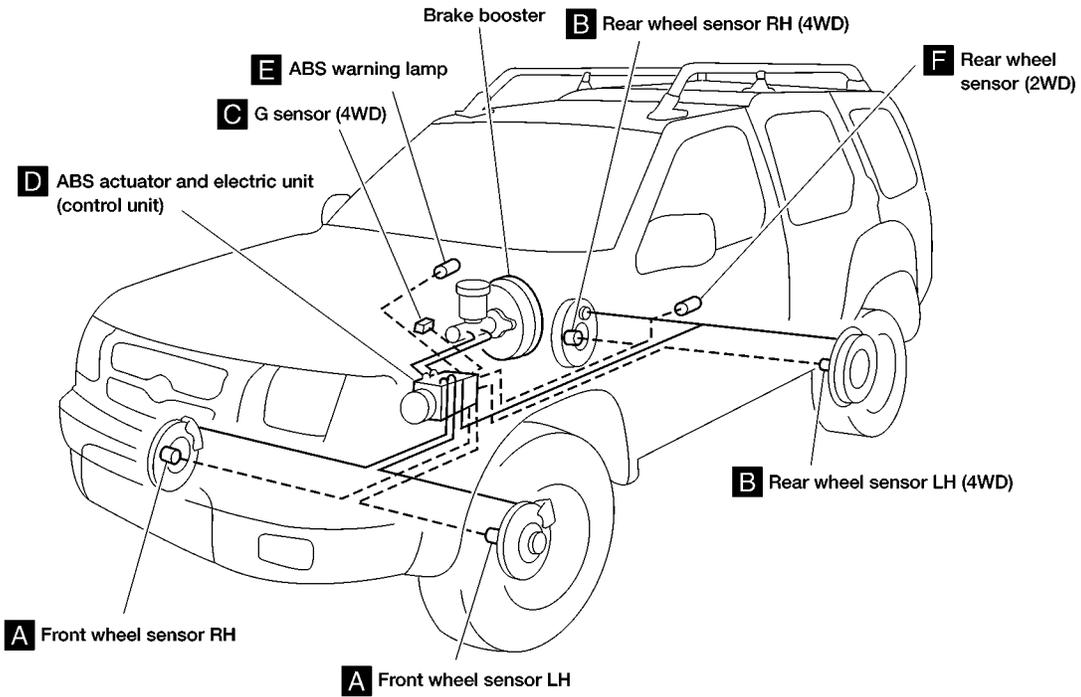


This signal is received by the ABS control unit as a variable voltage signal. The input voltage varies from 1.3V \pm 0.125V during a hard deceleration condition, to 2.5V \pm 0.125V with the vehicle stopped and to 3.7V \pm 0.125V during a hard deceleration in reverse.

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Component Parts and Harness Connector Location

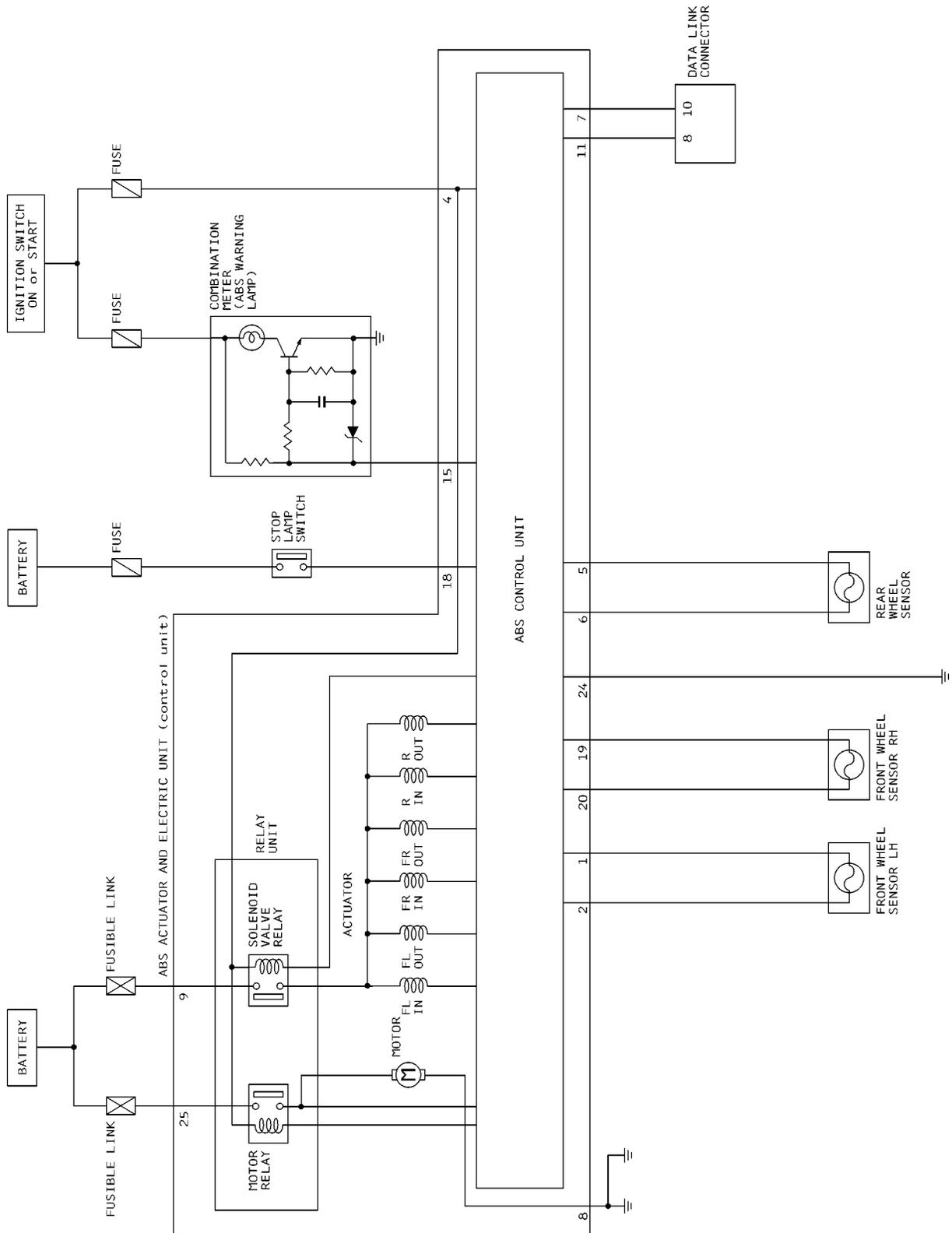
NGBR0094



Schematic 2-WHEEL DRIVE

NGBR0095

NGBR0095S01



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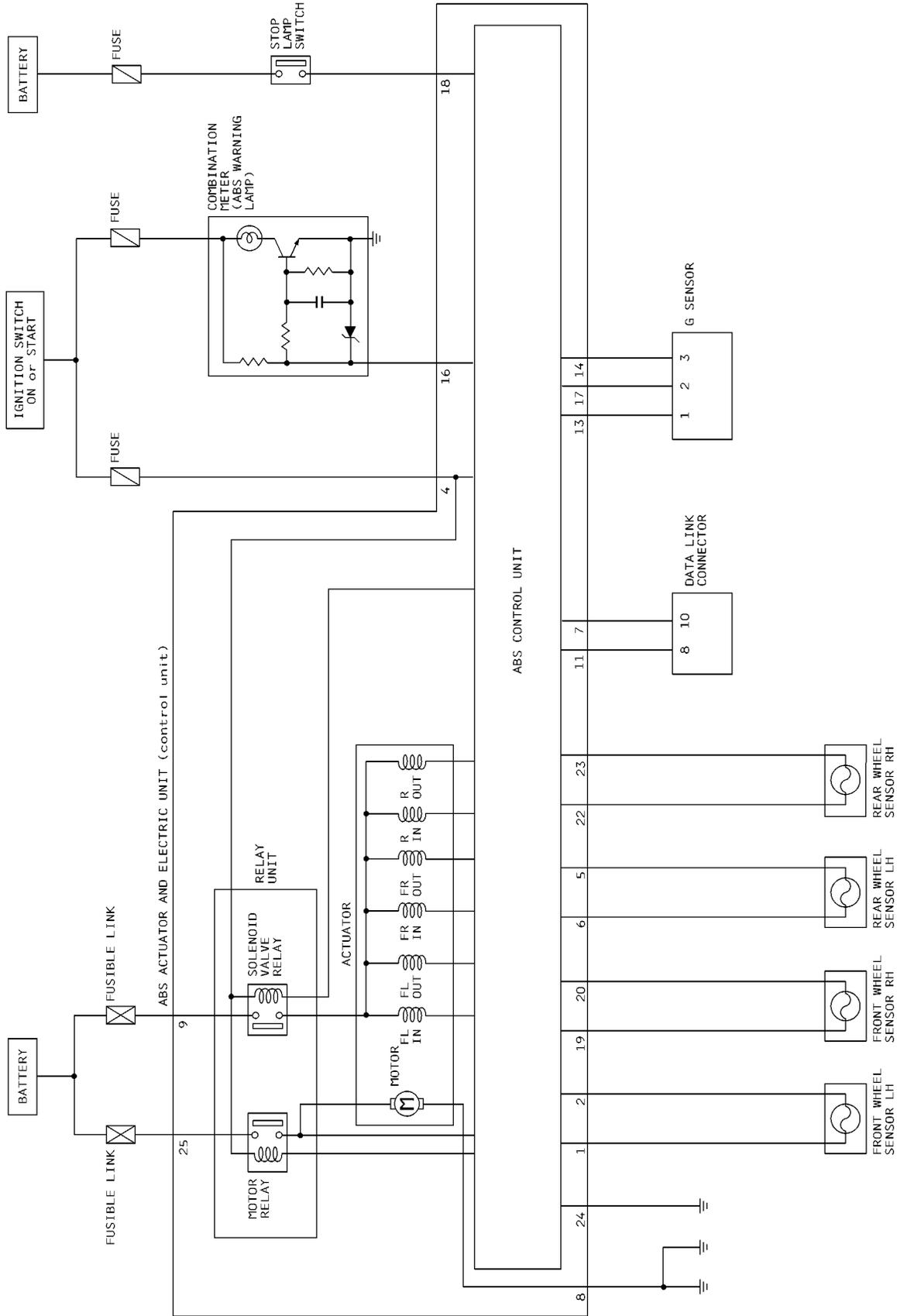
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4-WHEEL DRIVE

NGBR0095S02



DESCRIPTION

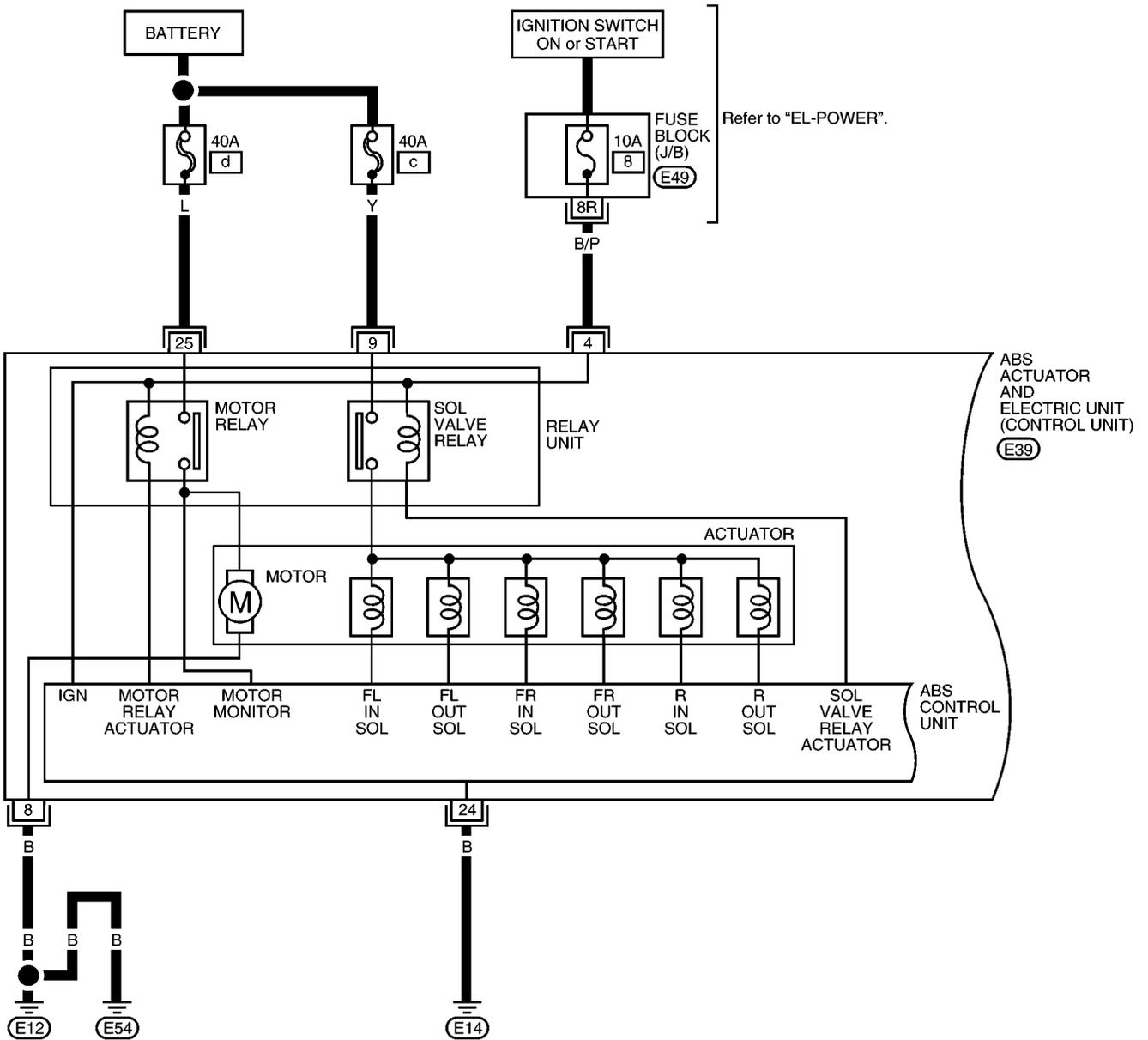
ABS

Wiring Diagram — ABS — 2WD —

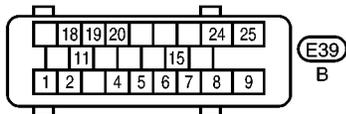
Wiring Diagram — ABS — 2WD —

NGBR0096

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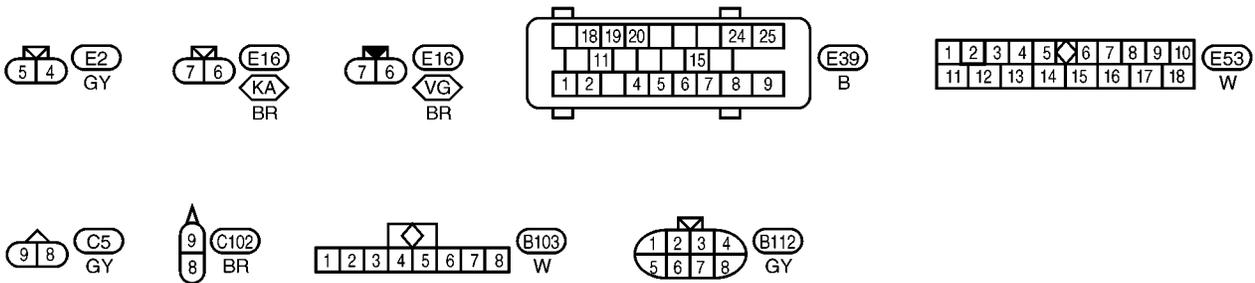
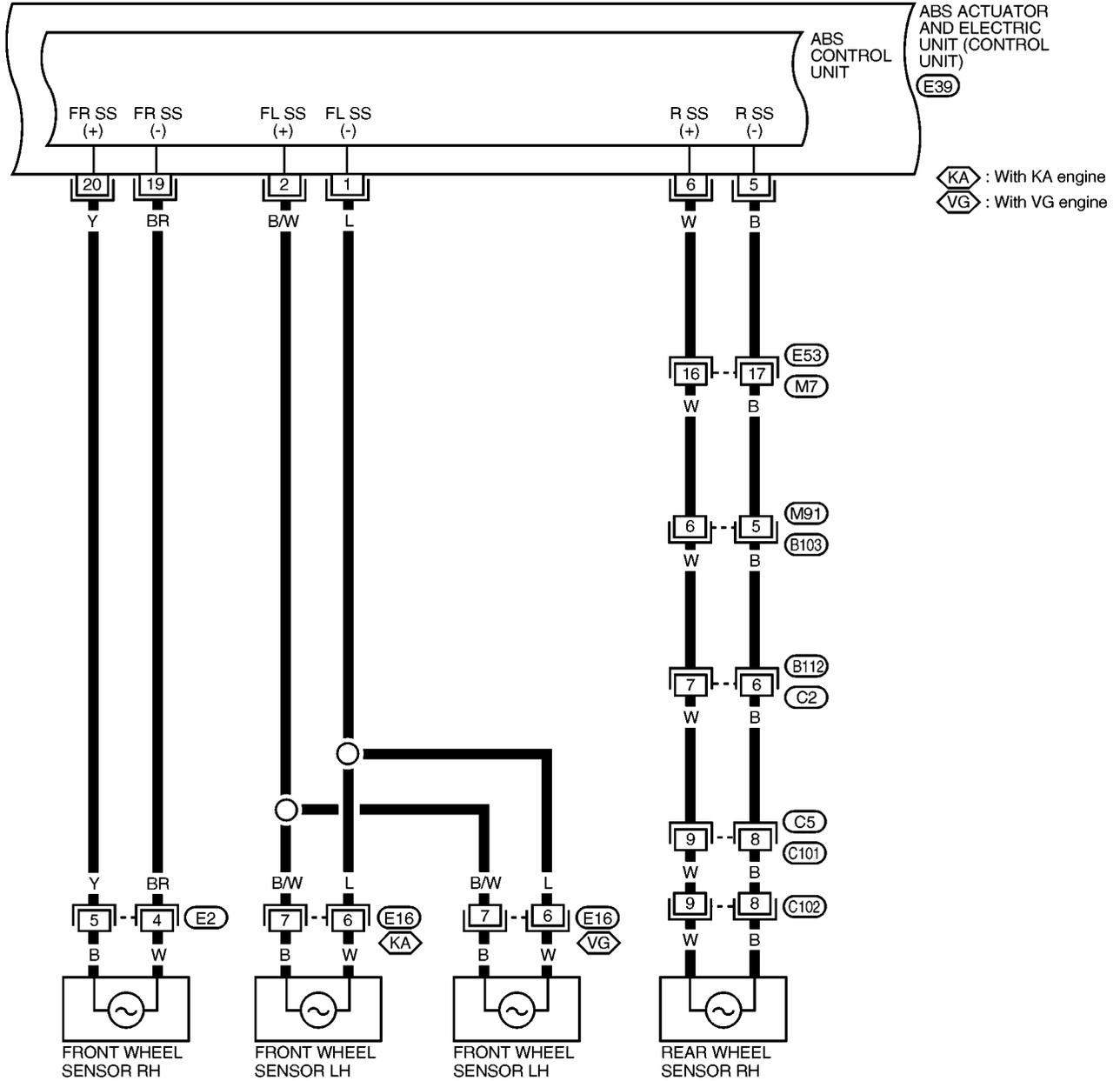
ABR817

DESCRIPTION

ABS

Wiring Diagram — ABS — 2WD — (Cont'd)

BR-ABS-02



ABR818

DESCRIPTION

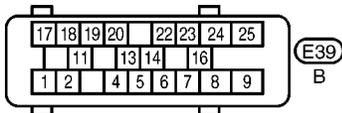
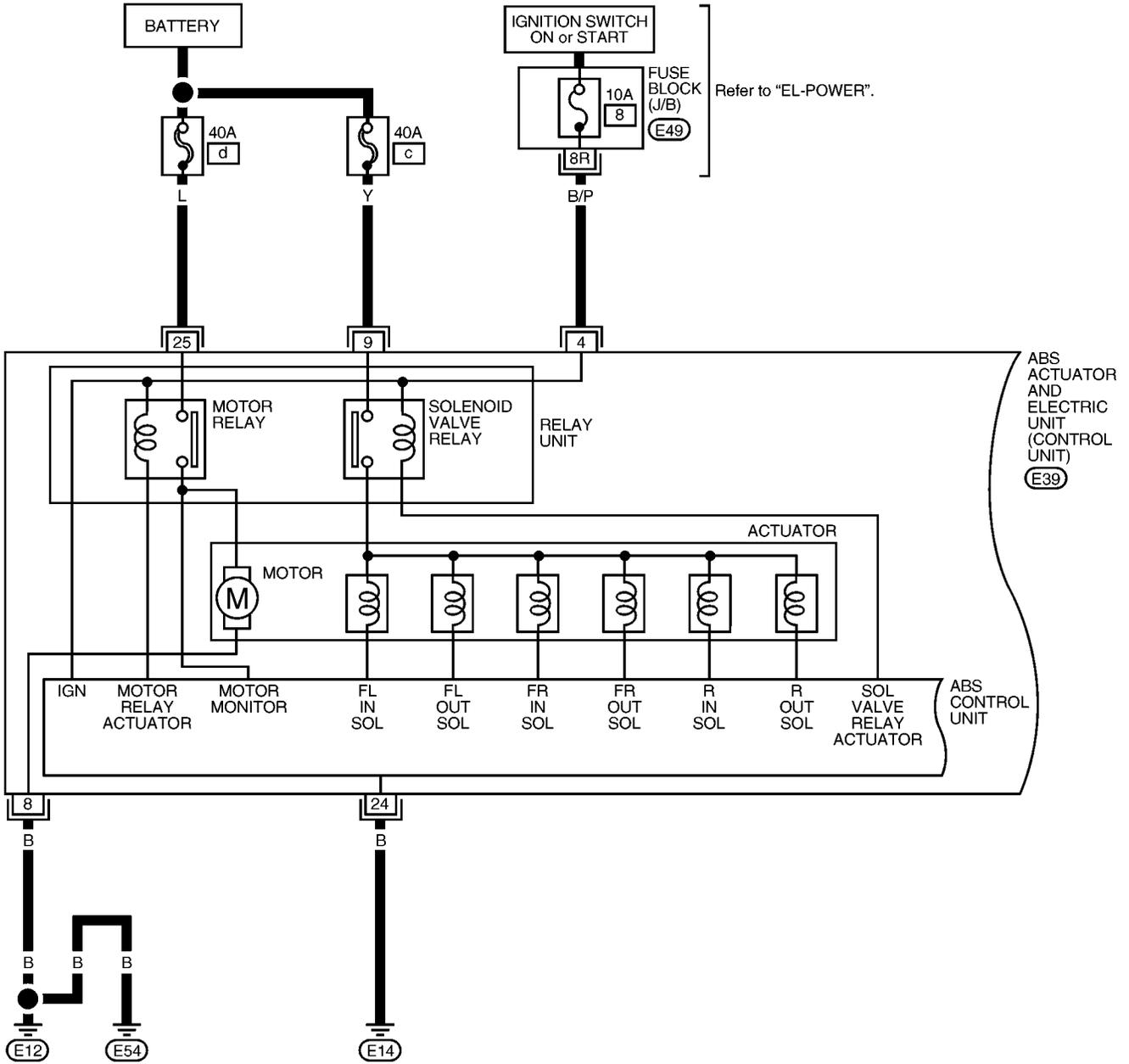
ABS

Wiring Diagram — ABS — 4WD —

Wiring Diagram — ABS — 4WD —

NGBR0122

BR-ABS-04



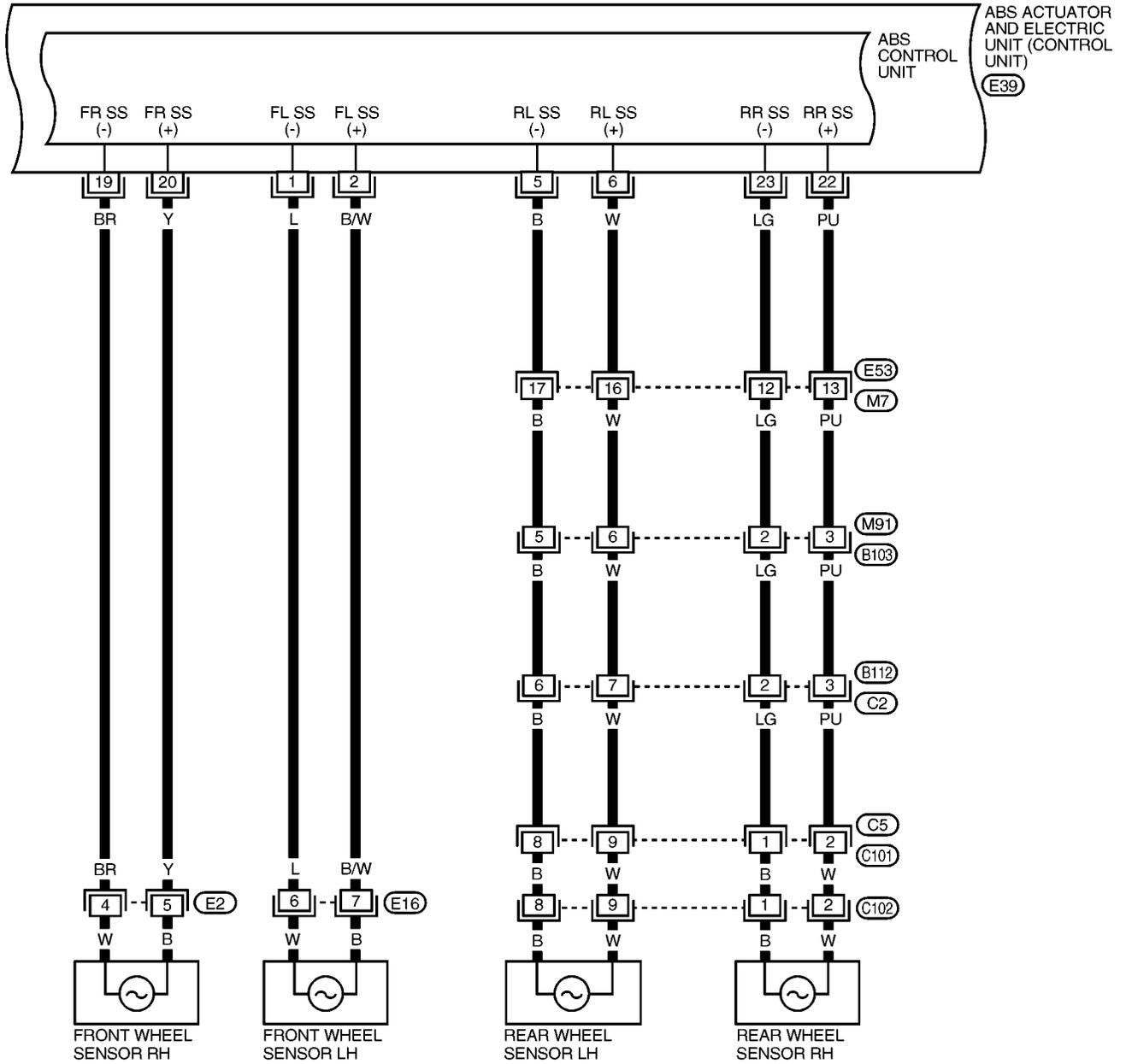
ABR821

DESCRIPTION

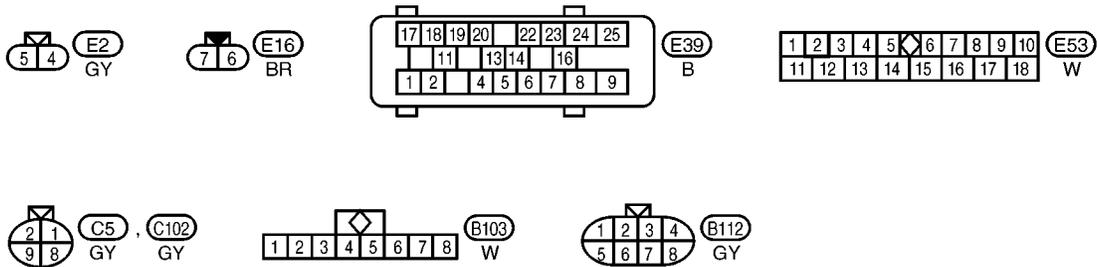
ABS

Wiring Diagram — ABS — 4WD — (Cont'd)

BR-ABS-05



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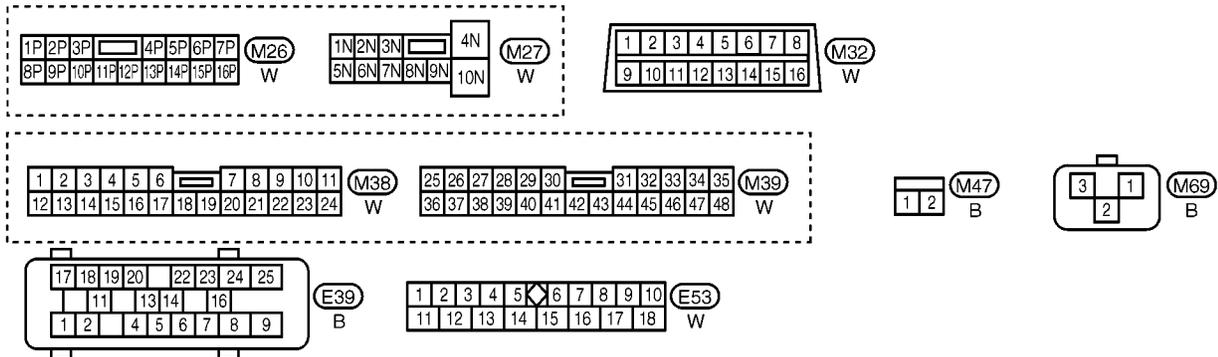
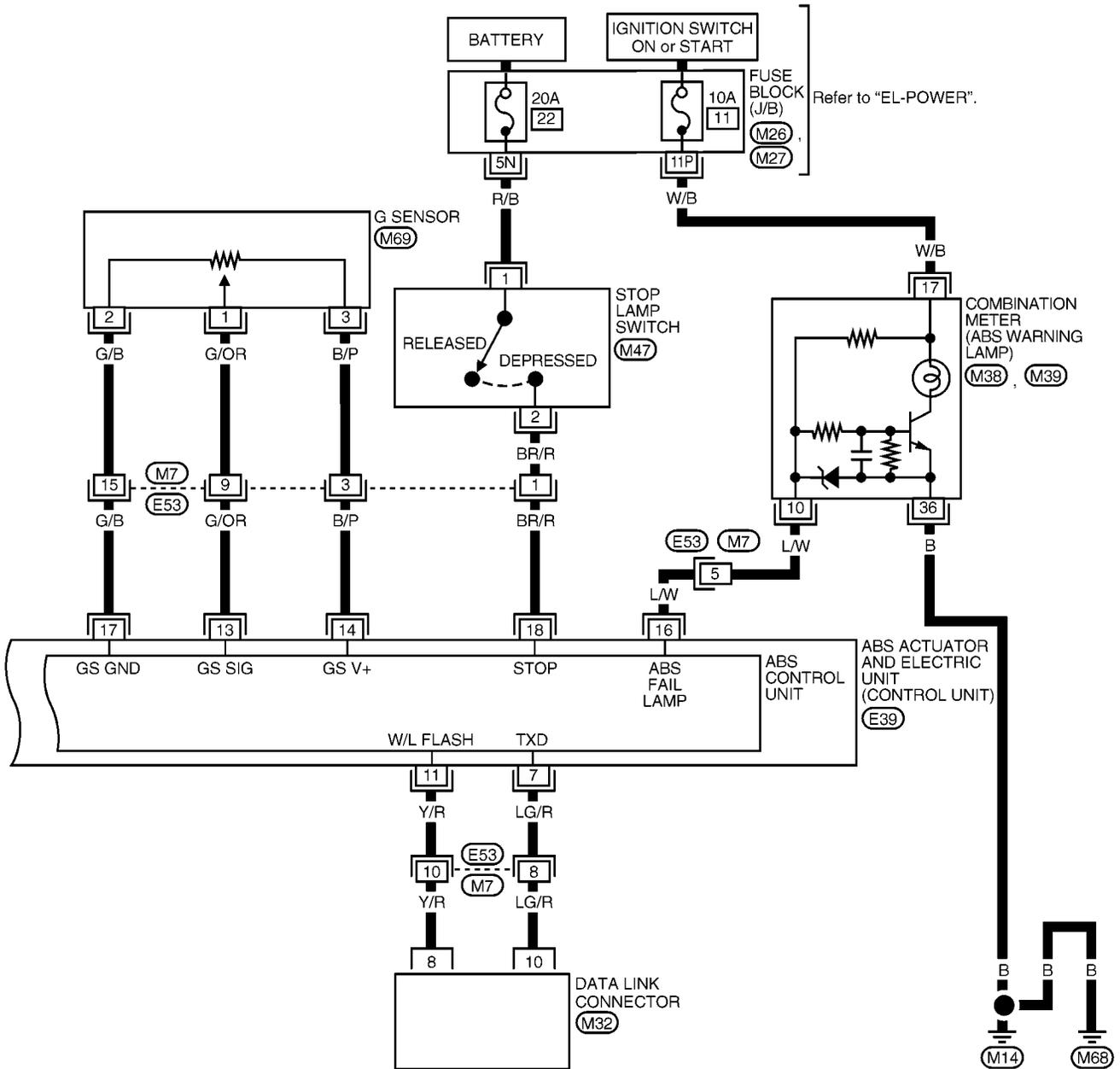
ABR822

DESCRIPTION

ABS

Wiring Diagram — ABS — 4WD — (Cont'd)

BR-ABS-06



ABR823

BR-40

Self-diagnosis

FUNCTION

NGBR0097

NGBR0097S01

- When a problem occurs in the ABS, the warning lamp on the instrument panel comes on. [To start the self-diagnostic results mode, ground the self-diagnostic (check) terminal 8 located on the "Data link connector". The location of the malfunction is indicated by the warning lamp flashing]

SELF-DIAGNOSIS PROCEDURE

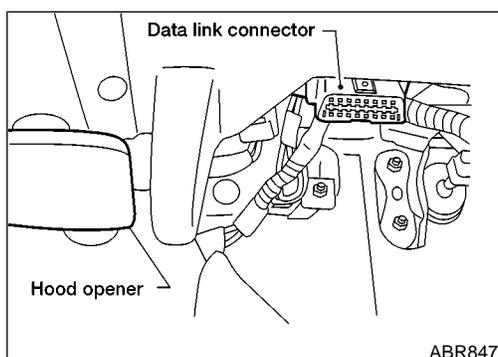
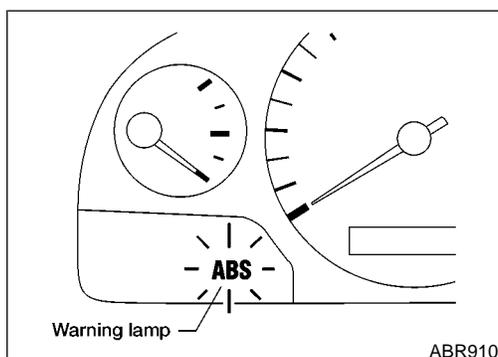
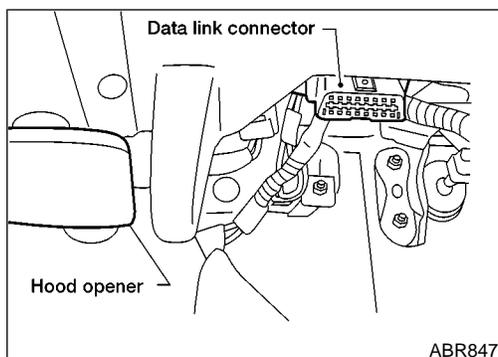
NGBR0097S02

NOTE:

CONSULT-II is not applicable to ABS.

Use on board diagnostic system with ABS warning lamp.

- Drive vehicle over 30 km/h (19 MPH) for at least one minute.
- Turn ignition switch OFF.



- Ground terminal 8 of "Data link connector for CONSULT-II" with a suitable harness.

- Turn ignition switch ON while grounding terminal 8.
Do not depress brake pedal.

- After 3.0 seconds, the warning lamp starts flashing to indicate the malfunction code No. (See NOTE.)

- Verify the location of the malfunction with the malfunction code chart. Refer to BR-48. Then make the necessary repairs following the diagnostic procedures.

- After the malfunctions are repaired, erase the malfunction codes stored in the control unit. Refer to BR-42.

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

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

- Check warning lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

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

NOTE:

The indication terminates after 5 minutes.

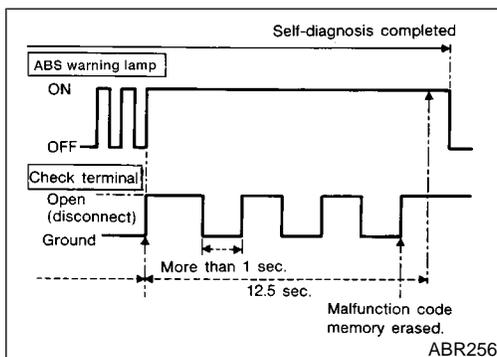
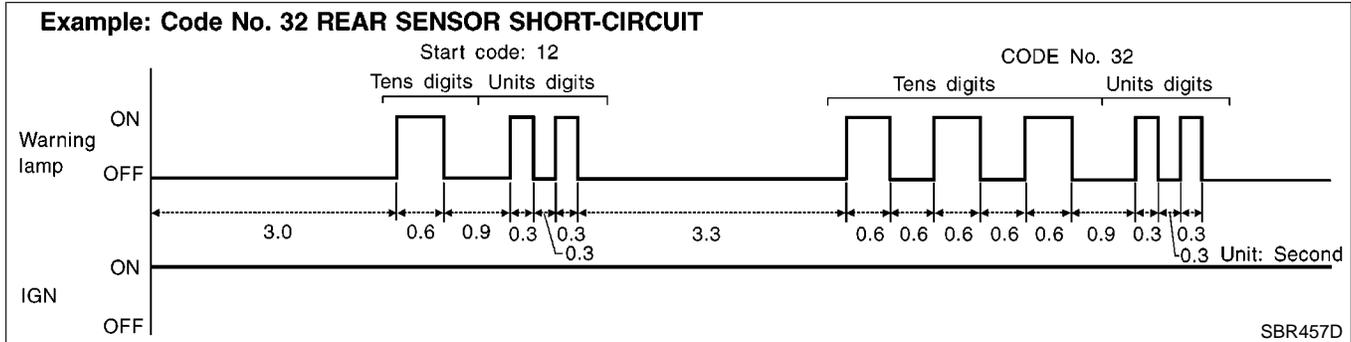
However, when the ignition switch is turned from OFF to ON, the indication starts flashing again.

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HOW TO READ SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

=NGBR0097S03

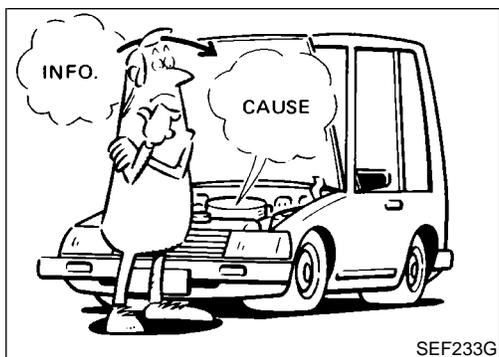
1. Determine the code No. by counting the number of times the warning lamp flashes on and off.
2. When several malfunctions occur at one time, up to three code numbers can be stored; the latest malfunction will be indicated first.
3. The indication begins with the start code 12. After that a maximum of three code numbers appear in the order of the lowest to highest. 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 page BR-48.



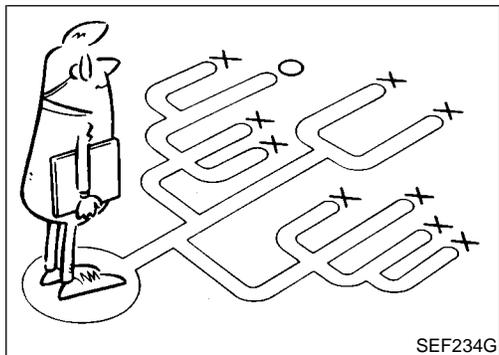
HOW TO ERASE SELF-DIAGNOSTIC RESULTS (MALFUNCTION CODES)

NGBR0097S04

1. Disconnect the check terminal from ground (ABS warning lamp will stay lit).
2. Within 12.5 seconds, ground the check terminal three 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 start-code should appear, no malfunction codes.



SEF233G



SEF234G

How to Perform Trouble Diagnoses for Quick and Accurate Repair

INTRODUCTION

NGBR0100

NGBR0100S01

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 road test should be performed.

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with an ABS complaint. The customer is a very good source of information on such problems; especially intermittent ones. By talking to 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 information.

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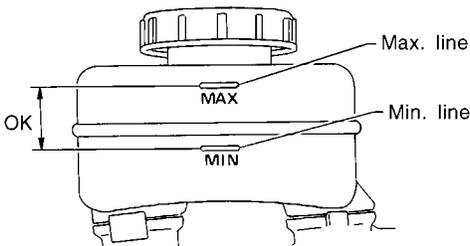
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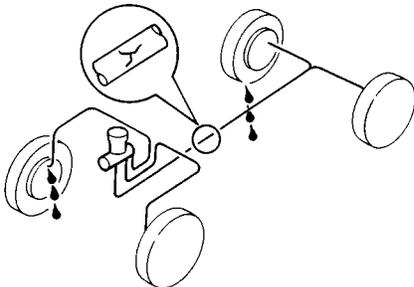
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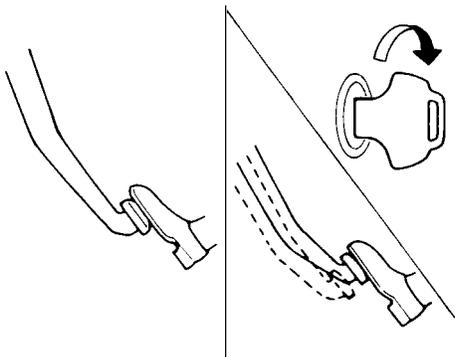
Preliminary Check

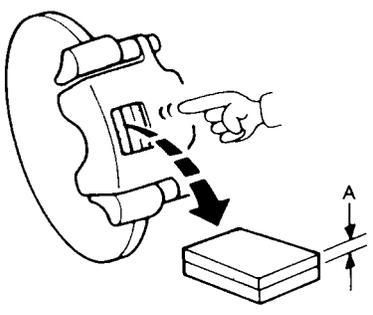
NGBR0101

1	CHECK BRAKE FLUID	
Check brake fluid for contamination.		
Has brake fluid been contaminated?		
Yes	▶	Replace. GO TO 2.
No	▶	GO TO 2.

2	CHECK BRAKE FLUID LEVEL	
Check brake fluid level in reservoir tank. Low fluid level may indicate brake pad wear or leakage from brake line.		
		
SBR451D		
Is brake fluid filled between MAX and MIN lines on reservoir tank ?		
Yes	▶	GO TO 3.
No	▶	Fill up brake fluid. GO TO 3.

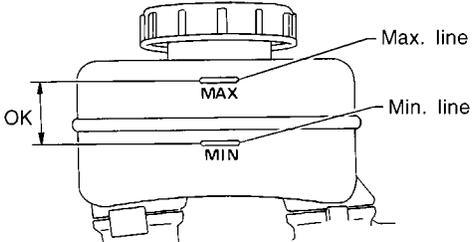
3	CHECK BRAKE LINE	
Check brake line for leakage.		
		
SBR389C		
Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?		
Yes	▶	Repair. GO TO 4.
No	▶	GO TO 4.

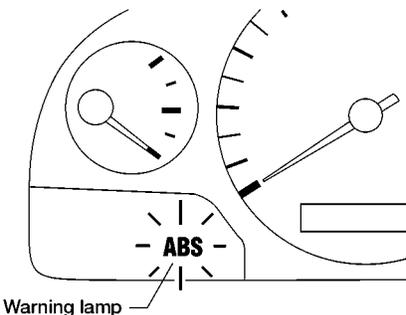
4	CHECK BRAKE BOOSTER OPERATION	
<p>Check brake booster for operation and air tightness. Refer to "On-vehicle Service", "BRAKE BOOSTER", BR-16.</p>		
		
SBR058C		
Is brake booster airtight and functioning properly?		
Yes	▶	GO TO 5.
No	▶	Replace. GO TO 5.

5	CHECK BRAKE PAD AND ROTOR	
<p>Check brake pad and rotor. Refer to BR-19, 20.</p>		
		
SBR059C		
Are brake pads and rotors functioning properly?		
Yes	▶	GO TO 6.
No	▶	Replace.

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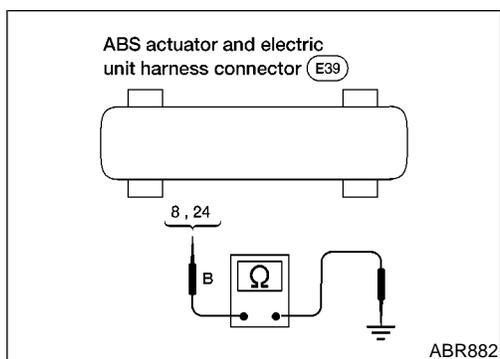
Preliminary Check (Cont'd)

6	RECHECK BRAKE FLUID LEVEL	
Check brake fluid level in reservoir tank again.		
		
SBR451D		
Is brake fluid filled between MAX and MIN lines on reservoir tank ?		
Yes	▶	GO TO 7.
No	▶	Fill up brake fluid.

7	CHECK WARNING LAMP ACTIVATION	
Check warning lamp activation.		
		
ABR838		
Does warning lamp turn on when ignition switch is turned ON?		
Yes	▶	GO TO 8.
No	▶	Check fuse, warning lamp bulb and warning lamp circuit.

8	CHECK WARNING LAMP DEACTIVATION	
Check warning lamp for deactivation after engine is started.		
Does warning lamp turn off when engine is started?		
Yes	▶	GO TO 9.
No	▶	Go to Self-diagnosis, BR-41.

9	DRIVE VEHICLE	
Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.		
Does warning lamp remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?		
Yes	▶	INSPECTION END
No	▶	Go to Self-diagnosis, BR-41.



Ground Circuit Check

ABS ACTUATOR AND ELECTRIC UNIT GROUND

=NGBR0102

NGBR0102S01

- Check continuity between ABS actuator and electric unit connector terminals and ground.

Continuity should exist.

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

ABS

Malfunction Code/Symptom Chart

Malfunction Code/Symptom Chart

NGBR0103

Code No. (No. of warning lamp flashes)	Malfunctioning part	Reference Page
12	Self-diagnosis could not detect any malfunctions.	—
17 ★1	G sensor and circuit (4WD)	BR-58
18 ★1	Sensor rotor or abnormal tire size	BR-49
21 ★1	Front right sensor	BR-49
25 ★1	Front left sensor	BR-49
31 ★1	Rear right sensor (4WD)	BR-49
35 ★1	Rear left sensor (4WD) or Rear sensor (2WD)	BR-49
57 ★2	Power supply (Low voltage)	BR-56
61 ★3	Actuator motor or motor relay	BR-54
63	Solenoid valve relay	BR-52
71	Control unit or Actuator solenoid valve	BR-52, 60
ABS works frequently	—	BR-61
Unexpected pedal action	—	BR-61
Long stopping distance	—	BR-63
ABS does not work	—	BR-63
Pedal vibration and noise	—	BR-64
Warning lamp does not come on when ignition switch is turned ON.	Fuse, warning lamp bulb or warning lamp circuit Control unit	BR-64
Warning lamp stays on when ignition switch is turned ON.	Control unit power supply circuit Warning lamp bulb circuit Control unit or control unit connector Solenoid valve relay stuck Power supply for solenoid valve relay coil	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 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.

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

★3: 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.

Wheel Sensor or Rotor DIAGNOSTIC PROCEDURE

Malfunction code No. 21, 25, 31, 35, or 18

NGBR0104

NOTE:

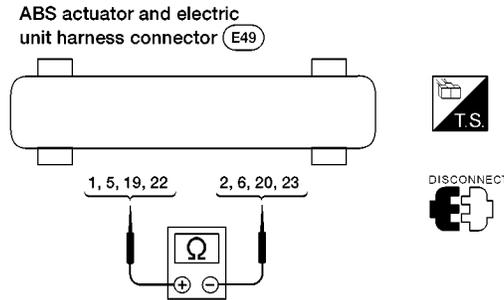
Wheel position should be distinguished by code No. except code No. 18 (sensor rotor).

1	INSPECTION START
<p>Wheel sensor inspection</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <p style="text-align: center; margin-top: 10px;">Wheel sensors shown (sensor side)</p>	
ABR883	
	GO TO 2.

2	CHECK CONNECTOR
<ol style="list-style-type: none"> 1. Disconnect connectors from ABS actuator and electric unit and wheel sensor of malfunction code No. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again. 	
Does warning lamp activate again?	
Yes	GO TO 3.
No	INSPECTION END

3 CHECK WHEEL SENSOR ELECTRICAL

1. Disconnect ABS actuator and electric unit connector.
2. Check resistance between ABS actuator and electric unit connector E39 terminals
 Code No. 21 (Front RH wheel)
 Terminals 19 and 20
 Code No. 25 (Front LH wheel)
 Terminals 1 and 2
 Code No. 31 (Rear RH wheel) (4WD)
 Terminals 22 and 23
 Code No. 35 (4WD: Rear LH wheel, 2WD: Rear wheel)
 Terminals 5 and 6



ABR919

Resistance:

Front 1.28 - 1.92 kΩ

Rear

2WD: 1.05 - 1.35 kΩ

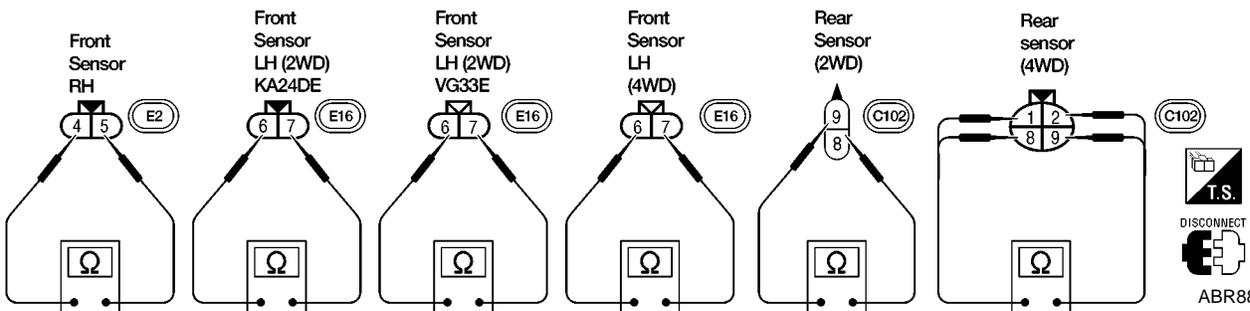
4WD: 1.28 - 1.92 kΩ

Are front and rear resistance values within range listed above?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4 CHECK WHEEL SENSOR

Check each sensor for resistance.



ABR885

Resistance:

Front 1.28 - 1.92 kΩ

Rear

2WD 1.05 - 1.35 kΩ

4WD 1.28 - 1.92 kΩ

Are front and rear resistance values within range listed above?

Yes	▶	<p>Check the following.</p> <p>If NG, repair harness or connectors.</p> <ul style="list-style-type: none"> ● Harness connectors E2, E16, C102 ● Harness for open or short between wheel sensor connectors and ABS actuator and electric unit
No	▶	Replace wheel sensor.

TROUBLE DIAGNOSES FOR SELF-DIAGNOSTIC ITEMS

ABS

Wheel Sensor or Rotor (Cont'd)

5	CHECK TIRE	
Check for inflation pressure, wear and size of each tire. (See NOTE)		
Are tire pressure and size correct and is tire wear within specifications?		
Yes	▶	GO TO 6.
No	▶	Adjust tire pressure or replace tire(s). (See NOTE)

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6	CHECK WHEEL BEARING	
Check wheel bearing axial end play. (See NOTE)		
Is wheel bearing axial end play within specifications? Refer to "On-vehicle Service", "FRONT AXLE", AX-4 and "REAR AXLE", AX-25.		
Yes	▶	GO TO 7.
No	▶	Check wheel bearing. Refer to "On-vehicle Service", "FRONT AXLE", AX-4 and "REAR AXLE", AX-25 .

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7	CHECK SENSOR ROTOR	
Check sensor rotor for teeth damage. (See NOTE)		
Is sensor rotor free from damage?		
Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	Replace sensor rotor. (See NOTE)

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ABS Actuator Solenoid Valve or Solenoid Valve Relay DIAGNOSTIC PROCEDURE

Malfunction code No. 71

=NGBR0105

1	INSPECTION START
Solenoid valve relay inspection	
ABR886	
▶	GO TO 2.

2	CHECK FUSIBLE LINK
Check 40A fusible link c . For fusible link layout, refer to "POWER SUPPLY ROUTING", EL-9 .	
Is fusible link OK?	
Yes	▶ GO TO 3.
No	▶ GO TO 6.

3	CHECK CONNECTOR
<ol style="list-style-type: none"> 1. Disconnect connector from ABS actuator and electric unit. Check terminals for damage or loose connection. Then reconnect connector. 2. Carry out self-diagnosis again. 	
Does warning lamp activate again?	
Yes	▶ GO TO 4.
No	▶ INSPECTION END

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT
Refer to "ABS ACTUATOR AND ELECTRIC UNIT GROUND" in "Ground Circuit Check", BR-47.	
Is ground circuit OK?	
Yes	▶ GO TO 5.
No	▶ Repair harness or connector.

TROUBLE DIAGNOSES FOR SELF-DIAGNOSTIC ITEMS

ABS

ABS Actuator Solenoid Valve or Solenoid Valve Relay (Cont'd)

5	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Disconnect ABS actuator and electric unit connector.</p> <p>2. Check voltage between ABS actuator and electric unit connector E39 terminal 9 and ground.</p>		
<p>Does battery voltage exist?</p>		
ABR887		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	<p>Check the following.</p> <p>If NG, repair harness or connectors.</p> <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fusible link

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6	REPLACE FUSIBLE LINK	
Replace fusible link.		
Does the fuse blow out when ignition switch is turned ON?		
Yes	▶	GO TO 7.
No	▶	INSPECTION END

7	CHECK SOLENOID VALVE RELAY POWER SUPPLY CIRCUIT FOR SHORT	
<p>1. Disconnect battery cable and ABS actuator and electric unit connector.</p> <p>2. Check continuity between ABS actuator and electric unit connector E39 terminal 9 and ground.</p>		
<p>Continuity should not exist.</p> <p>Does continuity exist?</p>		
ABR888		
Yes	▶	<p>Check the following.</p> <p>If NG, repair harness or connector.</p> <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fusible link
No	▶	Replace ABS actuator and electric unit.

Motor Relay or Motor DIAGNOSTIC PROCEDURE

Malfunction code No. 61

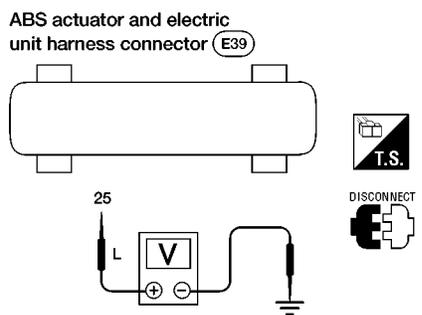
=NGBR0106

1	INSPECTION START
ABS motor relay inspection	
ABR889	
▶ GO TO 2.	

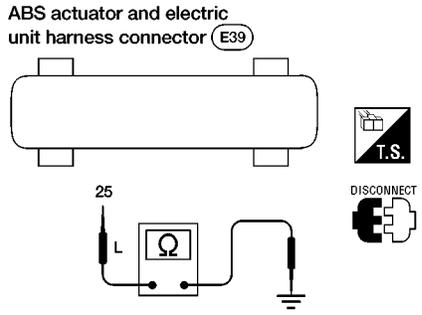
2	CHECK FUSIBLE LINK
Check 40A fusible link d . For fusible link layout, refer to "POWER SUPPLY ROUTING", EL-9 .	
Is fusible link OK?	
Yes ▶	GO TO 3.
No ▶	GO TO 6.

3	CHECK CONNECTOR
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connection. Then reconnect connector. 2. Carry out self-diagnosis again.	
Does warning lamp activate again?	
Yes ▶	GO TO 4.
No ▶	INSPECTION END

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT
Refer to "ABS ACTUATOR AND ELECTRIC UNIT GROUND" in "Ground Circuit Check", BR-47.	
Is ground circuit OK?	
Yes ▶	GO TO 5.
No ▶	Repair harness or connector.

5	CHECK MOTOR RELAY POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit connector E39 terminal 25 and ground.		
		
ABR890		
Does battery voltage exist?		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	Check the following. If NG, repair harness or connector. <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fusible link

6	REPLACE FUSIBLE LINK	
Replace fusible link.		
Does the fusible link blow out when ignition switch is turned ON?		
Yes	▶	GO TO 7.
No	▶	INSPECTION END

7	CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT FOR SHORT	
1. Disconnect battery cable and ABS actuator and electric unit connector. 2. Check continuity between ABS actuator and electric unit connector E39 terminal 25 and ground.		
		
ABR891		
Does continuity exist?		
Continuity should not exist.		
Yes	▶	Check the following. If NG, repair harness or connector. <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fusible link
No	▶	Replace ABS actuator and electric unit.

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Low Voltage DIAGNOSTIC PROCEDURE Malfunction code No. 57

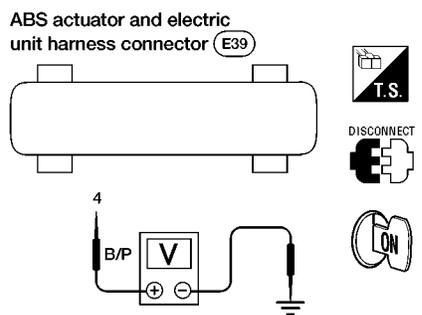
NGBR0107

1	INSPECTION START
ABS actuator and electric unit power supply and ground circuit inspection	
ABR892	
▶ GO TO 2.	

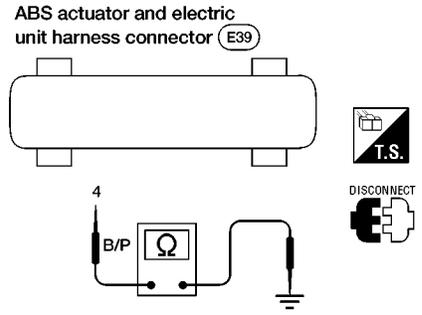
2	CHECK FUSE
Check 10A fuse No. 8. For fuse layout, refer to "POWER SUPPLY ROUTING", <i>EL-9</i> .	
Is fuse OK?	
Yes	▶ GO TO 3.
No	▶ GO TO 6.

3	CHECK CONNECTOR
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connections. Then reconnect connector. 2. Carry out self-diagnosis again.	
Does warning lamp activate again?	
Yes	▶ GO TO 4.
No	▶ INSPECTION END

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT
Refer to "ABS ACTUATOR AND ELECTRIC UNIT GROUND" in "Ground Circuit Check", BR-47.	
Is ground circuit OK?	
Yes	▶ GO TO 5.
No	▶ Repair harness or connector.

5	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
<p>1. Disconnect ABS actuator and electric unit connector.</p> <p>2. Check voltage between ABS actuator and electric unit connector E39 terminal 4 and ground.</p>		
		
ABR893		
Does battery voltage exist when ignition switch is turned ON?		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	<p>Check the following.</p> <p>If NG, repair harness or connector.</p> <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fuse

6	REPLACE FUSE	
Replace fuse.		
Does the fuse blow out when ignition switch is turned ON?		
Yes	▶	GO TO 7.
No	▶	INSPECTION END

7	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT FOR SHORT	
<p>1. Disconnect battery cable and ABS actuator and electric unit connector.</p> <p>2. Check continuity between ABS actuator and electric unit connector E39 terminal 4 and ground.</p>		
		
ABR894		
Does continuity exist?		
Continuity should not exist.		
Yes	▶	<p>Check the following.</p> <p>If NG, repair harness or connector.</p> <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fuse
No	▶	Replace ABS actuator and electric unit.

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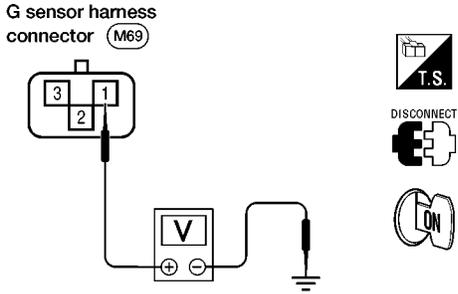
G Sensor and Circuit DIAGNOSTIC PROCEDURE Malfunction code No. 17

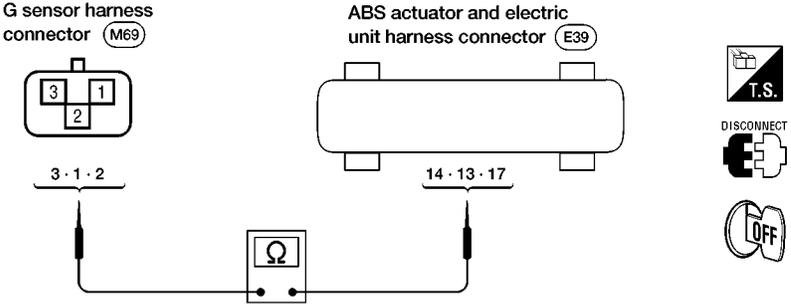
NGBR0118

1	INSPECTION START			
G sensor inspection				
<p>G sensor connector (M69)</p> <p>ABS actuator and electric unit connector (E39)</p>				
ABR895				
▶		GO TO 2.		

2	CHECK G SENSOR POWER			
<ol style="list-style-type: none"> 1. Turn ignition switch OFF and disconnect G sensor harness connector. 2. Turn ignition switch ON. 3. Check voltage between G sensor harness connector M69 terminal 3 and ground. 				
Does approx. 5V exist?				
Yes		▶	GO TO 3.	
No		▶	GO TO 4.	

ABR896

3	CHECK G SENSOR	<ol style="list-style-type: none"> 1. Turn ignition switch OFF. 2. Remove G sensor from bracket. 3. Reconnect harness connector to G sensor and hold sensor in same attitude/position as when installed in vehicle. <ul style="list-style-type: none"> ● Check voltage between G sensor connector M69 terminal 1 and ground for the following tests. There should be approx. 2.5V. 4. Turn sensor 90° with connector point up. <ul style="list-style-type: none"> ● There should be approx. 3.7V. 5. Turn sensor 180° with connector pointing down. <ul style="list-style-type: none"> ● There should be approx. 1.3V. <div style="text-align: center; margin: 20px 0;">  </div> <p style="text-align: center;">Were the voltage readings correct for steps 3, 4 and 5?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>Replace G Sensor.</td> </tr> </table>	Yes	▶	GO TO 4.	No	▶	Replace G Sensor.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>
Yes	▶	GO TO 4.							
No	▶	Replace G Sensor.							

4	CHECK G SENSOR CIRCUIT	<ol style="list-style-type: none"> 1. Disconnect ABS actuator and electric unit connector. 2. Check continuity from G sensor connector M69 terminal 3 to ABS actuator and electric unit connector E39 terminal 14. 3. Check continuity from G sensor connector M69 terminal 1 to ABS actuator and electric unit connector E39 terminal 13. 4. Check continuity from G sensor connector M69 terminal 2 to ABS actuator and electric unit connector E39 terminal 17. <div style="text-align: center; margin: 20px 0;">  </div> <p style="text-align: center;">Does continuity exist?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>Replace ABS actuator and electric unit.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>Repair harness or connector.</td> </tr> </table>	Yes	▶	Replace ABS actuator and electric unit.	No	▶	Repair harness or connector.	<p>TF</p> <p>PD</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
Yes	▶	Replace ABS actuator and electric unit.							
No	▶	Repair harness or connector.							

Control Unit DIAGNOSTIC PROCEDURE Malfunction code No. 71

=NGBR0108

1	INSPECTION START
ABS actuator and electric unit power supply and ground circuit inspection	
ABR899	
▶	GO TO 2.

2	CHECK CONNECTOR
1. Disconnect ABS actuator and electric unit connector. Check terminals for damage or loose connection. Then reconnect connector. 2. Carry out self-diagnosis again.	
Does warning lamp activate again?	
Yes	▶ GO TO 3.
No	▶ INSPECTION END

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT
Check voltage. Refer to "5. CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT" in "DIAGNOSTIC PROCEDURE", "Low Voltage", BR-56.	
Does battery voltage exist when ignition switch is turned ON?	
Yes	▶ GO TO 4.
No	▶ Repair.

4	CHECK WARNING LAMP INDICATION
Does warning lamp indicate code No. 71 again?	
Yes or No	
Yes	▶ Replace ABS actuator and electric unit.
No	▶ Inspect the system according to the code No.

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

1. ABS Works Frequently

1. ABS Works Frequently

NGBR0109

1	CHECK BRAKE FLUID PRESSURE	
Check brake fluid pressure distribution.		
Is brake fluid pressure distribution normal?		
Yes	▶	GO TO 2.
No	▶	Repair. Then perform Preliminary Check. Refer to BR-44.

GI

MA

EM

2	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connections. 2. Perform wheel sensor mechanical check. Refer to "7. CHECK SENSOR ROTOR" in "DIAGNOSTIC PROCEDURE", "Wheel Sensor or Rotor", BR-49.		
Is wheel sensor mechanism OK?		
Yes	▶	GO TO 3.
No	▶	Repair.

LC

EC

FE

CL

3	CHECK FRONT AXLE	
Check front axles for excessive looseness. Refer to "Front Wheel Bearing", "ON-VEHICLE SERVICE", AX-4 .		
Is front axle installed properly?		
Yes	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-61.
No	▶	Repair.

MT

AT

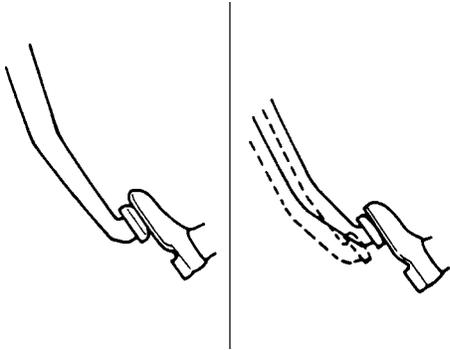
TF

PD

AX

2. Unexpected Pedal Action

NGBR0110

1	CHECK BRAKE PEDAL STROKE	
Check brake pedal stroke.		
		
Is brake pedal stroke excessively large?		
Yes	▶	Perform Preliminary Check. Refer to BR-44.
No	▶	GO TO 2.

SU

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ST

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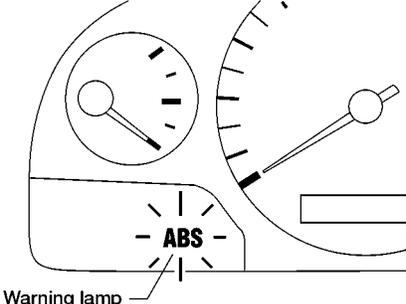
IDX

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

2. Unexpected Pedal Action (Cont'd)

2	CHECK MECHANICAL BRAKE SYSTEM PERFORMANCE	
Disconnect ABS actuator and electric unit connector and check whether brake is effective.		
Does brake system function properly when brake pedal is depressed?		
Yes	▶	GO TO 3.
No	▶	Perform Preliminary Check. Refer to BR-44.

3	CHECK WARNING LAMP INDICATION	
Ensure warning lamp remains off while driving.		
		
Is warning lamp turned off?		
Yes	▶	GO TO 4.
No	▶	Carry out self-diagnosis. Refer to BR-41.

ABR838

4	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connection. 2. Perform wheel sensor mechanical check. Refer to "7. CHECK SENSOR ROTOR" in "DIAGNOSTIC PROCEDURE", "Wheel Sensor or Rotor", BR-49.		
Is wheel sensor mechanism OK?		
Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	Repair.

3. Long Stopping Distance

=NGBR0111

1	CHECK MECHANICAL BRAKE SYSTEM PERFORMANCE	
Disconnect ABS actuator and electric unit connector and check whether stopping distance is still long.		
Does brake system function properly when brake pedal is depressed?		
Yes	▶	Perform Preliminary Check and air bleeding (if necessary).
No	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-61.

GI

MA

EM

NOTE:

Stopping distance may be longer for vehicles without ABS when road condition is slippery.

LC

EC

FE

CL

MT

4. ABS Does Not Work

NGBR0112

1	CHECK WARNING LAMP INDICATION	
Does the ABS warning lamp activate?		
Yes or No		
Yes	▶	Carry out self-diagnosis. Refer to BR-41.
No	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-61.

AT

TF

PD

NOTE:

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

AX

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BR

ST

RS

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HA

SC

EL

IDX

5. Pedal Vibration and Noise

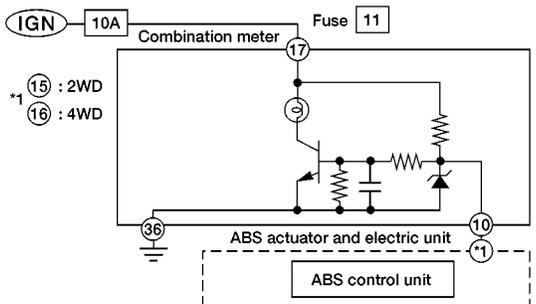
NGBR0113

1	INSPECTION START
Pedal vibration and noise inspection	
	
SAT797A	
<p>NOTE: ABS may operate and cause vibration under any of the following conditions.</p> <ul style="list-style-type: none"> ● 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. 	
▶	GO TO 2.

2	CHECK SYMPTOM
<p>1. Apply brake. 2. Start engine.</p>	
Does the symptom appear only when engine is started?	
Yes	▶ Carry out self-diagnosis. Refer to BR-41.
No	▶ Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-61.

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

NGBR0114

1	INSPECTION START																																																			
Warning lamp circuit inspection																																																				
																																																				
<p>Combination meter harness connector (M38)</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> </table> <p>ABS actuator and electric unit connector (E39)</p> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	17	18	19	20	21	22	23	24	25	10	11	12	13	14	15	16			1	2	3	4	5	6	7	8	9
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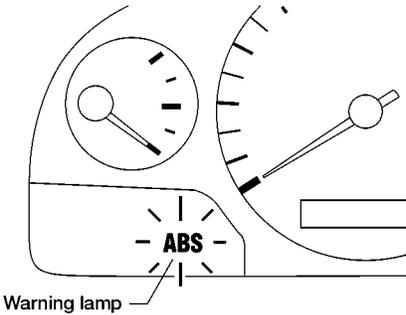
ABR900

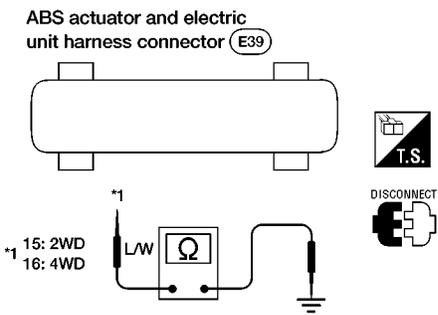
TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

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

2	CHECK FUSE
Check 10A fuse No. 11. For fuse layout, refer to "POWER SUPPLY ROUTING", <i>EL-9</i> .	
Is fuse OK?	
Yes	▶ GO TO 3.
No	▶ Replace fuse.

3	CHECK WARNING LAMP ACTIVATE
Disconnect ABS actuator and electric unit connector.	
	
ABR838	
Does the warning lamp activate?	
Yes	▶ Replace ABS actuator and electric unit.
No	▶ GO TO 4.

4	CHECK HARNESS FOR SHORT
<ol style="list-style-type: none"> 1. Disconnect ABS actuator and electric unit connector E39 and combination meter connector M38. 2. Check continuity between ABS actuator and electric unit connector E39 (body side) terminal 15 (2WD) or terminal 16 (4WD) and ground. 	
	
Continuity should not exist.	
Does continuity exist?	
Yes	▶ Repair harness or connectors.
No	▶ Check combination meter. Refer to "WARNING LAMPS", <i>EL-87</i> .

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TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

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

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

NGBR0115

1	INSPECTION START																																																				
ABS control unit inspection																																																					
<p>Combination meter harness connector (M38)</p> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td></tr> <tr><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td></tr> </table> <p>ABS actuator and electric unit connector (E39)</p> <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td></tr> <tr><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td></td><td></td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr> </table>			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	17	18	19	20	21	22	23	24	25	10	11	12	13	14	15	16			1	2	3	4	5	6	7	8	9
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ABR902																																																					
▶		GO TO 2.																																																			

2	CHECK FUSE	
Check 10A fuse No. 8. For fuse layout, refer to "POWER SUPPLY ROUTING", <i>EL-9</i> .		
Is fuse OK?		
Yes	▶	GO TO 3.
No	▶	GO TO 8.

3	CHECK HARNESS CONNECTOR	
Check ABS actuator and electric unit pin terminals for damage or bad connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.		
Does warning lamp stay on when ignition switch is turned ON?		
Yes	▶	GO TO 4.
No	▶	INSPECTION END

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT	
Refer to "ABS ACTUATOR AND ELECTRIC UNIT GROUND" in "Ground Circuit Check", BR-47.		
Is ground circuit OK?		
Yes	▶	GO TO 5.
No	▶	Repair harness or connector.

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

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

5	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
<p>1. Disconnect ABS actuator and electric unit connector.</p> <p>2. Check voltage between ABS actuator and electric unit connector E39 terminal 4 and ground.</p>		
ABR893		
Does battery voltage exist when ignition switch is turned ON?		
Yes	▶	GO TO 6.
No	▶	<p>Check the following.</p> <p>If NG, repair harness or connector.</p> <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fuse

6	CHECK WARNING LAMP	
<p>1. Disconnect ABS actuator and electric unit connector.</p> <p>2. Connect suitable wire between ABS actuator and electric unit connector E39 terminal 15 (2WD) terminal 16 (4WD) and ground.</p>		
ABR903		
Does the warning lamp deactivate?		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	GO TO 7.

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TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

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

7	CHECK ABS WARNING LAMP CONTROL CIRCUIT FOR OPEN
<p>1. Disconnect combination meter connector M38.</p> <p>2. Check continuity between combination meter connector M38 (body side) terminal 10 and ABS actuator and electric unit connector E39 (body side) terminal 15 (2WD) or terminal 16 (4WD).</p> <p>NOTE: Connect positive lead of multimeter to combination meter connector M38 (body side) terminal 10 and negative lead to ABS actuator and electric unit connector E39 (body side) terminal 15 (2WD) or terminal 16 (4WD).</p>	
<p>Continuity should exist.</p> <p>Does continuity exist?</p>	
Yes	▶ Check combination meter. Refer to "WARNING LAMPS", <i>EL-87</i> .
No	▶ Repair harness or connectors.

ABR921

8	REPLACE FUSE
Replace fuse.	
Does the fuse blow out when ignition switch is turned ON?	
Yes	▶ GO TO 9.
No	▶ INSPECTION END

9	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT FOR SHORT
<p>1. Disconnect battery cable and ABS actuator and electric unit connector.</p> <p>2. Check continuity between ABS actuator and electric unit connector E39 (body side) terminal 4 and ground.</p>	
<p>Continuity should not exist.</p> <p>Does continuity exist?</p>	
Yes	▶ Check the following. If NG, repair harness or connector. <ul style="list-style-type: none"> ● Harness connector E39 ● Harness for open or short between ABS actuator and electric unit and fuse
No	▶ Replace ABS actuator and electric unit.

ABR894

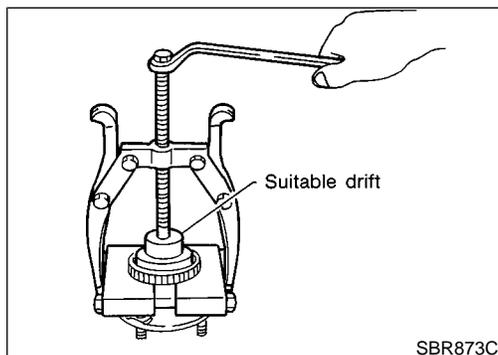
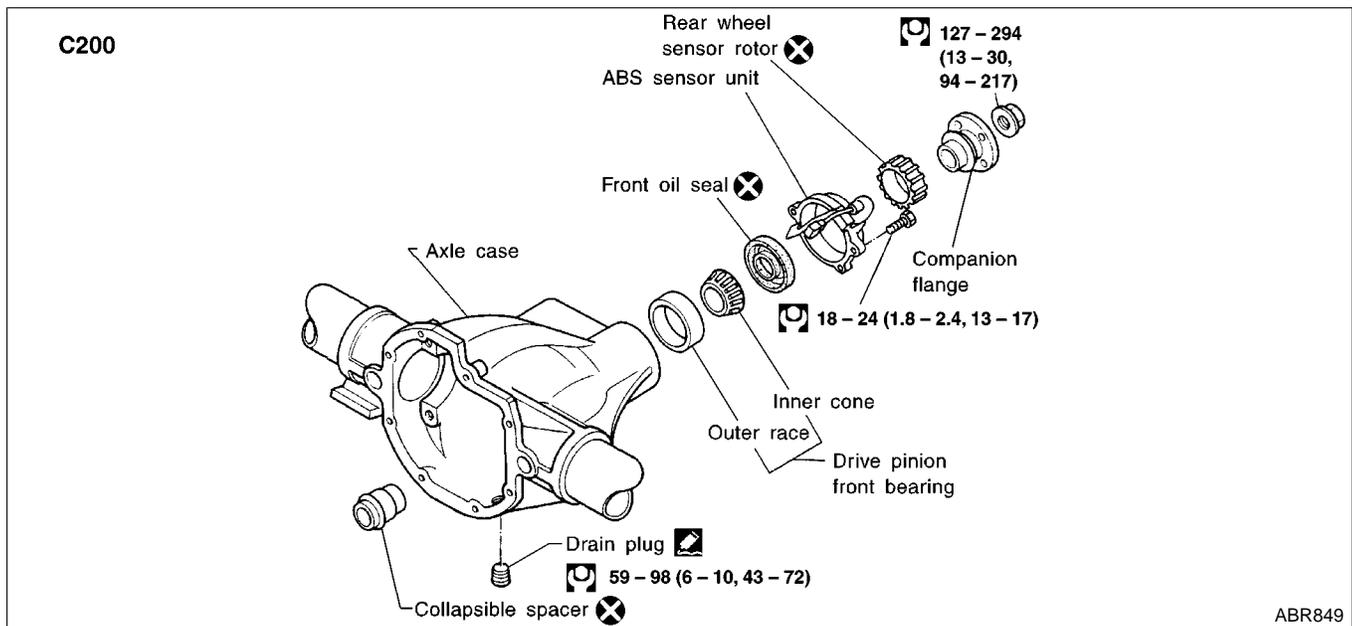
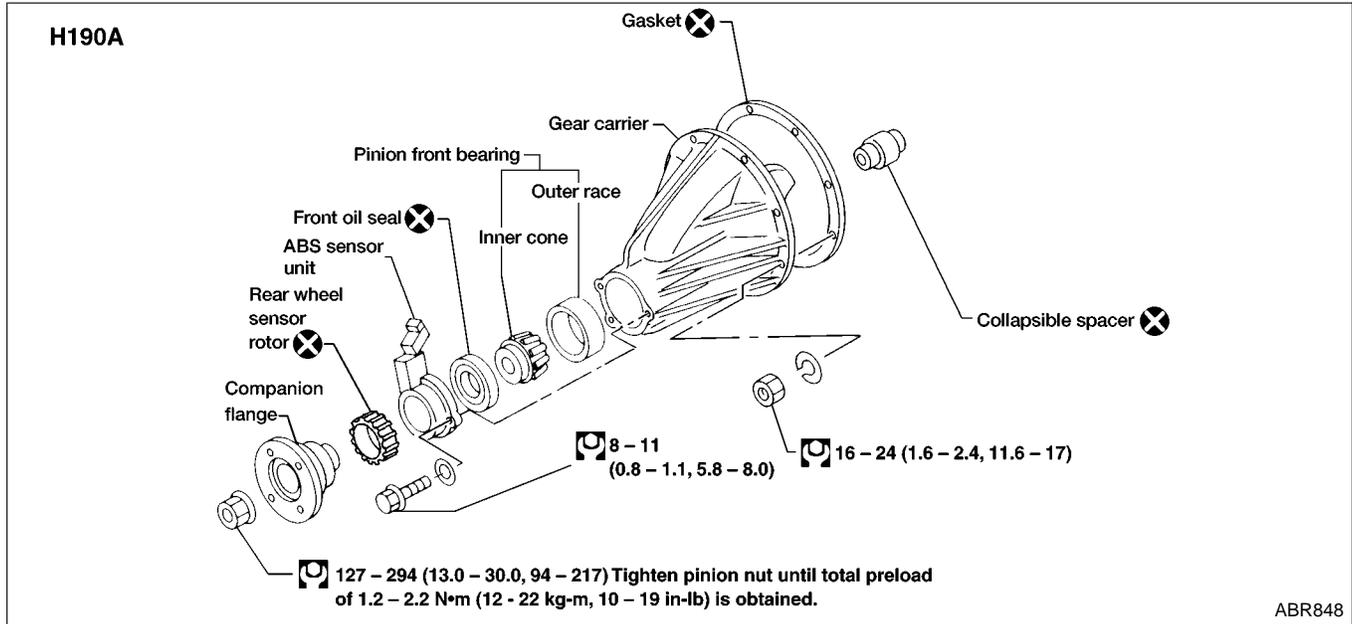
REMOVAL AND INSTALLATION

ABS

Rear Wheel Sensor (Cont'd)

2WD MODELS

=NGBR0079S0202

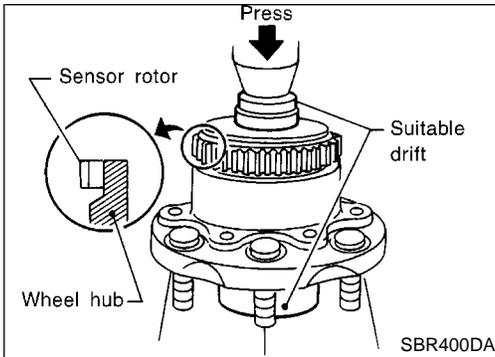


Front Sensor Rotor REMOVAL

NGBR0079S03

1. Remove the front wheel hub. Refer to **AX-11** ("FRONT AXLE").
2. Remove the sensor rotor using suitable puller, drift and bearing replacer.

NGBR0079S0301



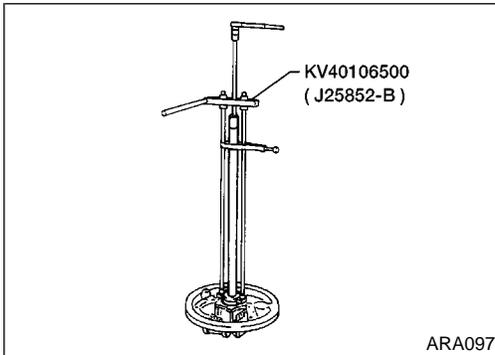
INSTALLATION

Install the sensor rotor using suitable drift and press.

NGBR0079S0302

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

GI
MA



Rear Sensor Rotor (4WD)

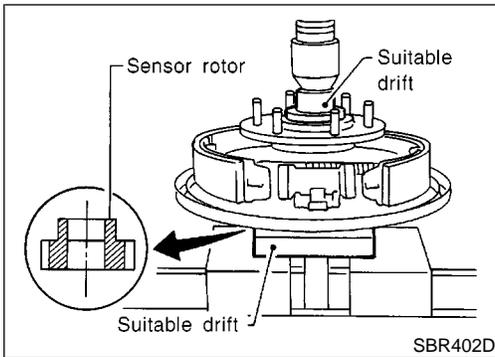
REMOVAL

NGBR0079S04

NGBR0079S0401

- Remove the sensor rotor using Tool.

EM
LC



INSTALLATION

Install the sensor rotor using suitable drift and press.

NGBR0079S0402

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

EC
FE

CL
MT

Rear Sensor Rotor (2WD)

REMOVAL AND INSTALLATION

NGBR0079S08

NGBR0079S0801

CAUTION:

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

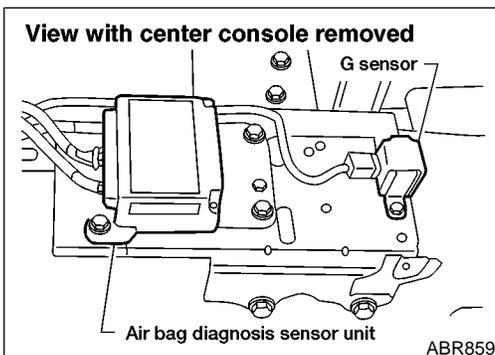
For final drive models using collapsible spacer (H190A, C200), bearing preload must be adjusted whenever companion flange is removed. Therefore, final drive overhaul is required.

AT
TF

PD
AX

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ST
RS



G Sensor

NGBR0079S06

Always replace G sensor if bumped or dropped. Otherwise, performance characteristics of G sensor will be changed, which in turn changes ABS control performance characteristics.

BT
HA

SC
EL

IDX

=NGBR0079S07

ABS Actuator and Electric Unit

SEC. 476

ABS actuator and electric unit

Front

ABS Actuator bracket

17.5 - 23.7
(1.8 - 2.4,
13 - 17)

Master cylinder (right rear)

Wheel cylinder (front left)

Wheel cylinder (right front)

Master cylinder (front right)

M/C (FR)

M/C (RR)

Connector lock

Slider

Unlock

Lock

: N·m (kg-m, ft-lb)

ABR862

REMOVAL

NGBR0079S0701

1. Disconnect battery cable.
2. Drain brake fluid. Refer to "Changing Brake Fluid", BR-6.
3. Remove mounting bracket fixing bolts and nuts.
4. Disconnect connector, brake pipes and remove fixing nuts and actuator ground cable.

INSTALLATION

NGBR0079S0702

CAUTION:

After installation, refill brake fluid. Then bleed air. Refer to "Bleeding Brake System", BR-8.

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.

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

General Specifications

Unit: mm (in)
NGBR0080

Applied model		KA24DE	VG33E
Front brake	Brake model	CL33VD	
	Cylinder bore diameter × number of pistons	46.4 (1.827) × 2	
	Pad Length × width × thickness	132.0 × 52.5 × 11 (5.20 × 2.067 × 0.43)	
	Rotor outer diameter × thickness	283 × 28(11.14 × 1.10)	
Rear brake	Brake model	LT30A	
	Cylinder bore diameter	22.23 (7/8)	
	Lining length × width × thickness	296 × 50 × 5.8 (11.65 × 1.97 × 0.228)	
	Drum inner diameter	295.0 (11.61)	
Master cylinder	Bore diameter	25.40 (1)	
Control valve	Valve model	Proportioning valve within master cylinder	
	Split point kPa (kg/cm ² , psi) × reducing ratio	2,942 (30, 427) × 0.2	
Brake booster	Booster model	M215T	
	Diaphragm diameter	Pri: 230 (9.06) Sec: 205 (8.07)	Pri: 230 (9.06) Sec: 230 (9.06)
Recommended brake fluid		DOT 3	

Disc Brake

Unit: mm (in)
NGBR0081

Brake model		CL33VD
Pad wear limit	Minimum thickness	2.0 (0.079)
Rotor repair limit	Minimum thickness	26.0 (1.024)

Drum Brake

Unit: mm (in)
NGBR0082

Brake model		LT30A
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

Unit: mm (in)
NGBR0083

Transmission		M/T	A/T
Free height "H"		191 - 201 (7.52 - 7.91)	201 - 211 (7.91 - 8.31)
Depressed height "D" [under force of 490 N (50 kg, 110 lb) with engine running]		100 (3.94)	110 (4.33)
Clearance "C" between pedal stopper and threaded end of stop lamp switch or ASCD switch		0.3 - 1.0 (0.012 - 0.039)	
Pedal free play	At pedal pad	1 - 3 (0.04 - 0.12)	

*: Measured from surface of dash lower panel to pedal pad

SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Brake Control

Parking Brake Control

NGBR0084
Unit: notch

Control Type	STICK
Lever stroke [under force of 196 N (20 kg, 44 lb)]	10 - 12
Lever stroke when warning switch comes on	1