

BRAKE SYSTEM

SECTION **BR**

CONTENTS

PRECAUTIONS	3	Inspection.....	18
Supplemental Restraint System (SRS) "AIR		Assembly	18
BAG" and "SEAT BELT PRE-TENSIONER".....	3	Installation.....	19
Precautions for Brake System.....	3	BRAKE BOOSTER	20
Precautions When Working On ABS.....	4	On-vehicle Service.....	20
Wiring Diagrams and Trouble Diagnosis.....	4	OPERATING CHECK	20
PREPARATION	5	AIRTIGHT CHECK	20
Commercial Service Tools	5	Removal.....	20
NOISE, VIBRATION AND HARSHNESS (NVH)		Inspection.....	20
TROUBLESHOOTING	6	OUTPUT ROD LENGTH CHECK	20
NVH Troubleshooting Chart.....	6	Installation.....	21
ON-VEHICLE SERVICE	7	VACUUM HOSE	22
Checking Brake Fluid Level.....	7	Removal and Installation	22
Checking Brake Line	7	Inspection.....	22
Changing Brake Fluid	7	HOSES AND CONNECTORS	22
Brake Burnishing Procedure.....	7	CHECK VALVE	22
Bleeding Brake System	8	VACUUM PUMP	23
BRAKE HYDRAULIC LINE	9	Removal.....	23
Hydraulic Circuit.....	9	Installation.....	24
Removal.....	9	Inspection.....	24
Inspection.....	10	Component	25
Installation.....	10	Disassembly.....	25
DUAL PROPORTIONING VALVE	11	Assembly	25
Dual Proportioning Valve	11	FRONT DISC BRAKE	27
INSPECTION.....	11	Component	27
REMOVAL AND INSTALLATION (BUILT-IN TYPE).....	11	Pad Replacement	27
BRAKE PEDAL AND BRACKET	12	Removal.....	28
Removal and Installation	12	Disassembly.....	28
Inspection.....	12	Inspection.....	28
Adjustment	12	CALIPER.....	28
MASTER CYLINDER (NABCO)	14	ROTOR.....	29
Removal.....	14	Assembly	30
Disassembly.....	15	Installation.....	30
Inspection.....	15	REAR DISC BRAKE (CAM & STRUT TYPE)	31
Assembly	15	Component	31
Installation.....	16	Pad Replacement	31
MASTER CYLINDER [BOSCH (NABCO)]	17	Removal.....	33
Removal.....	17	Disassembly.....	33
Disassembly.....	17	Inspection.....	34

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CONTENTS (Cont'd)

CALIPER.....	34
ROTOR.....	35
Assembly	35
Installation.....	38
REAR DISC BRAKE (BALL & RAMP TYPE)	39
Component	39
Pad Replacement.....	39
Removal.....	41
Disassembly.....	41
Inspection.....	41
CALIPER.....	41
ROTOR.....	42
Installation.....	42
PARKING BRAKE CONTROL	43
Components.....	43
Removal and Installation	43
Inspection.....	43
Adjustment.....	44

ABS	
DESCRIPTION	45
Purpose.....	45
ABS (Anti-Lock Brake System) Operation	45
ABS Hydraulic Circuit	45
System Components	46
System Description.....	46
SENSOR.....	46
CONTROL UNIT	46
ABS ACTUATOR AND ELECTRIC UNIT.....	46
Component Parts and Harness Connector	
Location	48
Schematic	49
Wiring Diagram - ABS -	50

ON BOARD DIAGNOSTIC SYSTEM	
DESCRIPTION	54
Trouble Diagnosis Chart by Symptom.....	54
CHECK ITEMS LIST	54
ABS actuator and electric unit Input/Output	
Signal Standard	54
SPECIFICATIONS DEFINED BY CONSULT-II	54
CONSULT-II Functions	55
CONSULT-II FUNCTION APPLICATION TABLE.....	55

SELF-DIAGNOSIS	56
DATA MONITOR.....	58
ACTIVE TEST	60
TROUBLE DIAGNOSIS - BASIC INSPECTION	62
ABS Actuator and Electric Unit.....	62
Basic Inspection 1 Brake Fluid Level and	
Leakage Inspection.....	62
Basic Inspection 2 Inspection for Loose Power	
Supply Terminal	62
Basic Inspection 3 ABS Warning Lamp	
Inspection.....	63
TROUBLE DIAGNOSES FOR SELF-DIAGNOSTIC	
ITEMS.....	64
Wheel Sensor System	64
ABS Warning Lamp Does Not Illuminate. (ABS	
Warning Lamp Does Not Come on When the	
Ignition Switch is Turned ON.).....	65
ABS Warning Lamp Illuminates with Ignition ON,	
but Does Not Illuminates Off After a Few	
Seconds. (ABS Warning Lamp has been	
Illuminated.)	65
TROUBLE DIAGNOSES FOR SYMPTOMS	66
1. ABS Works Frequently	66
2. Unexpected Pedal Action	66
3. Longer Stopping Distance	67
4. ABS Does Not Work.....	68
5. Pedal Vibration and Noise.....	68
REMOVAL AND INSTALLATION	70
Wheel Sensors	70
ABS Actuator and Electric Unit.....	71
REMOVAL.....	71
INSTALLATION.....	71
Sensor Rotor.....	72
REMOVAL.....	72
INSTALLATION.....	72
SERVICE DATA AND SPECIFICATIONS (SDS)	73
General Specifications.....	73
Disc Brake	73
Brake Pedal	73
Parking Brake	74

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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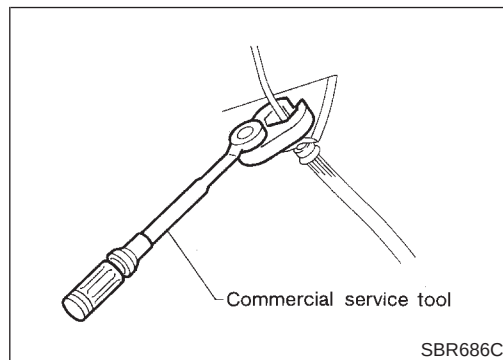
The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL N16 is as follows (The composition varies according to the destination and optional equipment.):

- For a frontal 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), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

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 should 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, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow or/and orange harness connector.



Precautions for Brake System

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- Recommended fluid is brake fluid "DOT 4".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.
- To clean or wash all parts of master cylinder, disc brake caliper and wheel cylinder, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- Always torque brake lines when installing.
- 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-7.

WARNING:

- Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

PRECAUTIONS

Precautions When Working On ABS

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- Use recommended tyres in combination with ABS.
- Please fit tyres or studded tyres, etc. with the same size.
- If different sizes of tyres, or tyres other than the ones recommended for use with the ABS, are fitted, stopping distance will increase and control and stability could deteriorate.
- When changing brake pads, please use Nissan genuine parts.
- When fitting radios etc, do not position the radio itself, antenna, or antenna cables within an area of about 100 mm (3.94 in) of the control unit.
- When doing any work that requires electro-welding, first remove the control unit.
- Please take care when taking a power supply for the audio, lamps etc., not to take this from any ABS-related harness. (Please refer to the electrical wiring diagrams for ABS-related harnesses)

Wiring Diagrams and Trouble Diagnosis

NJBR0003

When you read wiring diagrams, refer to the following:

- GI-12, "HOW TO READ WIRING DIAGRAMS"
- EL-12, "POWER SUPPLY ROUTING"

When you perform trouble diagnosis, refer to the following:

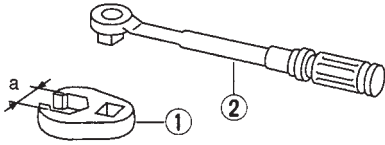
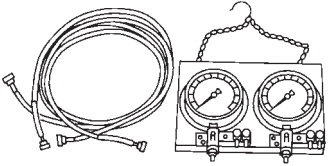
- GI-33, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSIS"
- GI-22, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"
- On board self-diagnosis is available everywhere except for Europe.

PREPARATION

Commercial Service Tools

Commercial Service Tools

NJBR0004

Tool name	Description	
1 Flare nut crowfoot 2 Torque wrench	 Removing and installing each brake piping a: 10 mm (0.39 in) NT360	GI MA EM
Brake fluid pressure gauge	 Measuring brake fluid pressure NT151	LC EC FE

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NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting Chart

NVH Troubleshooting Chart

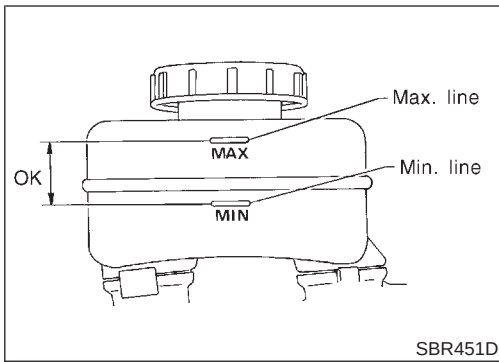
NJBR0005S01

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

Reference page			BR-27, 31	BR-27, 31	BR-27, 31	—	—	BR-29, 35	—	—	—	BR-29, 35	AX-3	SU-4, AX-3	SU-4	SU-4	ST-5
SUSPECTED PARTS (Possible cause)			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	DRIVE SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	STEERING
Symptom	BRAKE	Noise	X	X	X	—	—	—	—	—	—	—	X	X	X	X	X
		Shake	—	—	—	X	—	—	—	—	—	—	X	X	X	X	X
		Shimmy, Judder	—	—	—	X	X	X	X	X	X	X	—	X	X	X	X

X: Applicable

—: Not Applicable



Checking Brake Fluid Level

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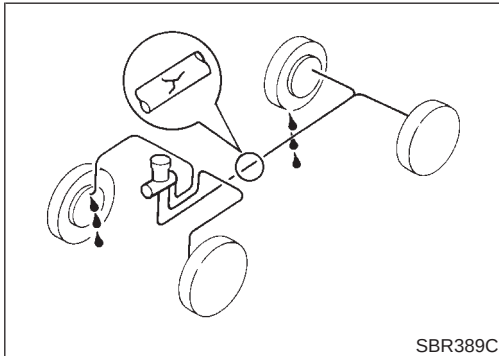
- Check fluid level in reservoir tank. It should be between Max and Min lines on reservoir tank.
- If fluid level is extremely low, check brake system for leaks.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for leaks.

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Checking Brake Line

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CAUTION:

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

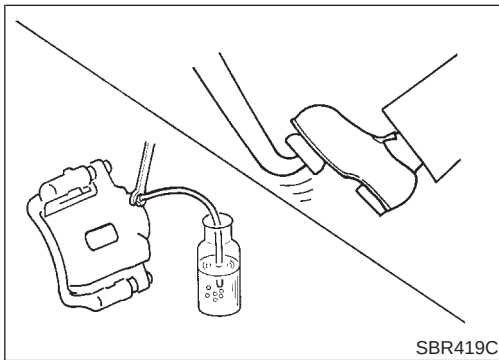
1. Check brake lines (tubes and hoses) for cracks, deterioration or other damage. Replace any damaged parts.
2. Check for oil leakage by fully depressing brake pedal while engine is running.

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Changing Brake Fluid

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CAUTION:

- Refill with new brake fluid "DOT 4".
- 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.

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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 while keeping reservoir level higher than minimum line by adding new brake fluid.
 4. Repeat until new brake fluid comes out of each air bleeder valve.
- Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to "Bleeding Brake System", BR-8.

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Brake Burnishing Procedure

NJBR0036

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.

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CAUTION:

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

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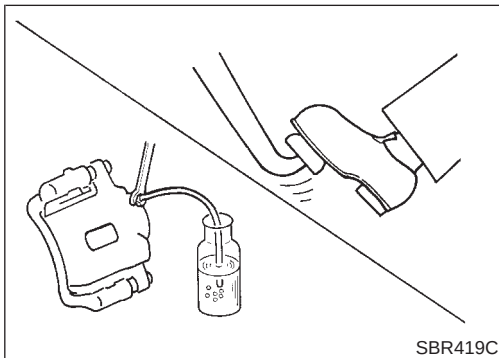
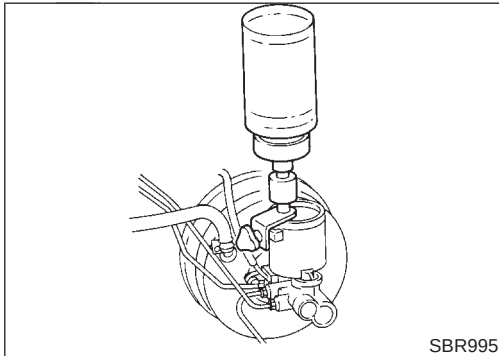
1. Drive the vehicle on a straight smooth road at 50 km/h (31 MPH).
2. Use medium brake pedal/foot effort to bring the vehicle to a complete stop from 50 km/h (31 MPH). Adjust brake pedal/foot

ON-VEHICLE SERVICE

Brake Burnishing Procedure (Cont'd)

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.



Bleeding Brake System

NJBR0009

CAUTION:

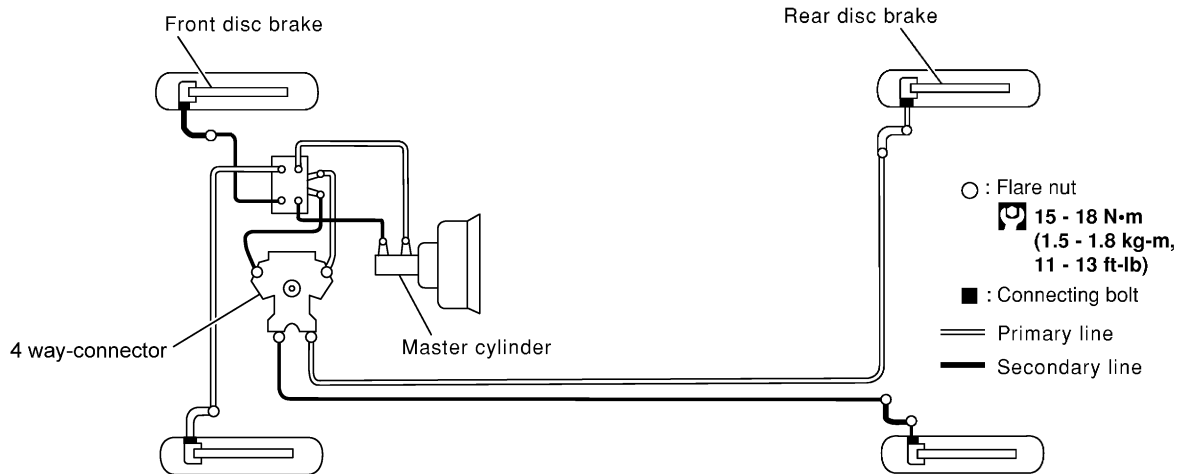
- Carefully monitor brake fluid level at master cylinder during bleeding operation.
 - Fill reservoir with new brake fluid "DOT 4". Make sure it is full at all times while bleeding air out of system.
 - Place a container under master cylinder to avoid spillage of brake fluid.
 - For models with ABS, turn ignition switch OFF and disconnect ABS actuator connectors or battery ground cable.
-
- Bleed air in the following order.
Right rear brake → Left front brake → Left rear brake → 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 2. through 5. until clear brake fluid comes out of air bleeder valve.

Hydraulic Circuit

NJBR0010

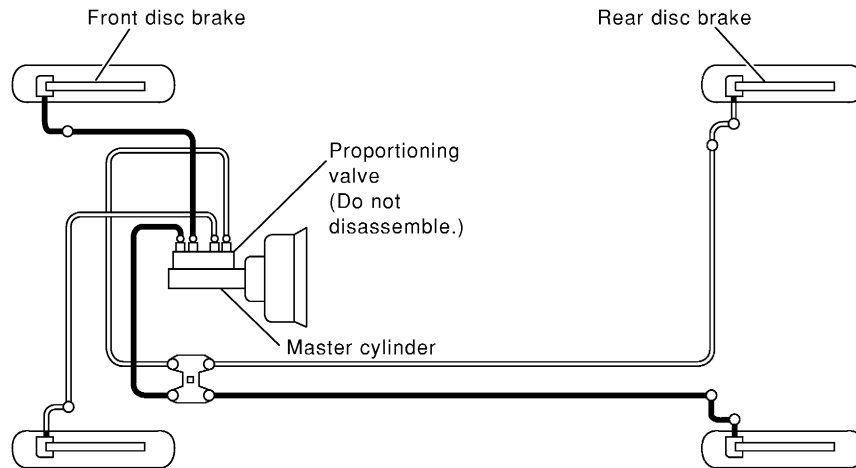
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With ABS models



Without ABS models

(Models with dual proportioning valve built into master cylinder) (built-in type)



YBR317

Removal

NJBR0011

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.
 - For ball & ramp type rear caliper, care should be taken as not to let air enter the body.
1. Remove flare nut connecting brake tube and hose, then withdraw lock spring.

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BRAKE HYDRAULIC LINE

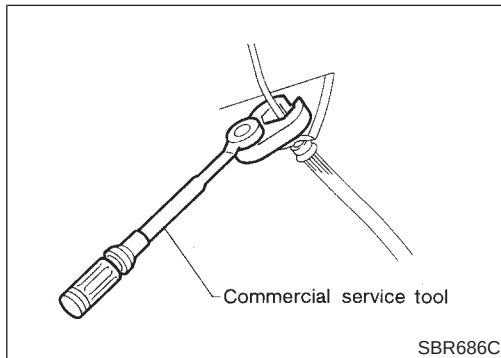
Removal (Cont'd)

2. Cover openings to prevent entrance of air and dirt whenever disconnecting brake line.

Inspection

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

NJBR0012



Installation

CAUTION:

- Refill with new brake fluid "DOT 4".
- Never reuse drained brake fluid.

1. Tighten all flare nuts and connecting bolts.

Specification:

Flare nut

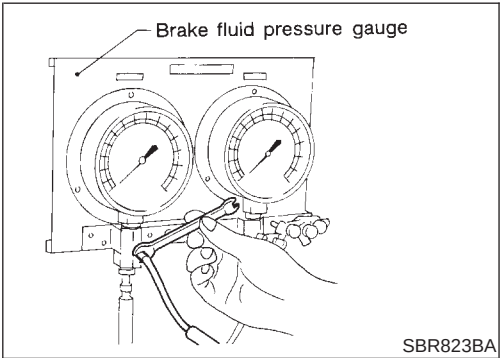
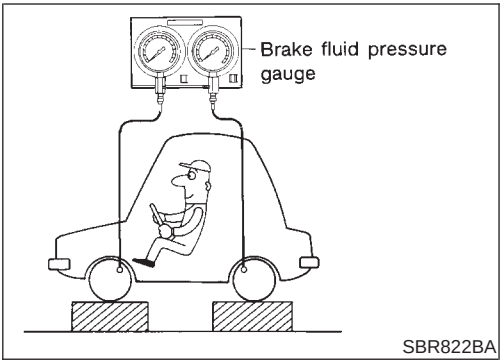
15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)

Connecting bolt

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

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to "Bleeding Brake System", BR-8.

NJBR0013



Dual Proportioning Valve INSPECTION

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NJBR0149S01

CAUTION:

- Carefully monitor brake fluid level at master cylinder.
- Use new brake fluid "DOT 4".
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on paint areas, wash it away with water immediately.
- Depress pedal slowly when raising front brake pressure.
- Check rear brake pressure at least 2 seconds after front brake pressure reaches specified value.

1. Connect brake fluid pressure gauge to air bleeders of front and rear brakes on either LH or RH side.
2. Bleed air from the tool.
3. Check fluid pressure by depressing brake pedal.

Unit: kPa (bar, kg/cm², psi)

Applied pressure (Front brake)	5,884 (58.8, 60, 853.2)
Output pressure (Rear brake)	3,430 - 4,800 (34.3 - 45, 35 - 45.70, 497 - 649.5)

If output pressure is out of specifications, replace the master assembly (built-in type).

4. Bleed air after disconnecting the Tool. Refer to "Bleeding Brake System", BR-8.

REMOVAL AND INSTALLATION (BUILT-IN TYPE)

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Always replace together with master cylinder as an assembly.

- Refer to "MASTER CYLINDER (NABCO)", BR-14.

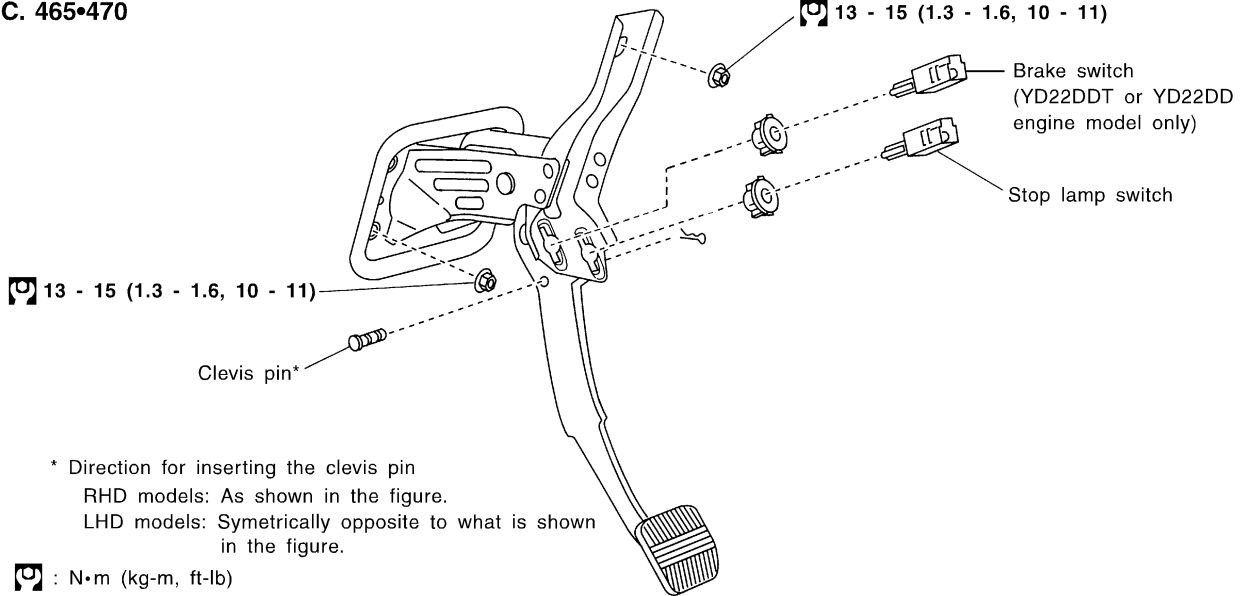
BRAKE PEDAL AND BRACKET

Removal and Installation

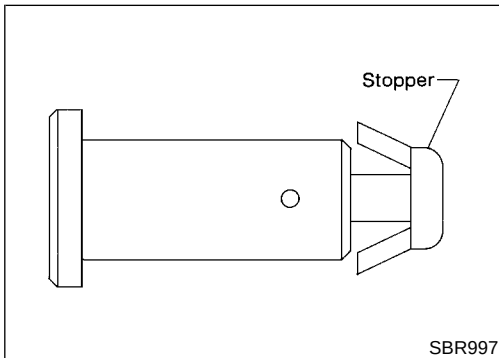
Removal and Installation

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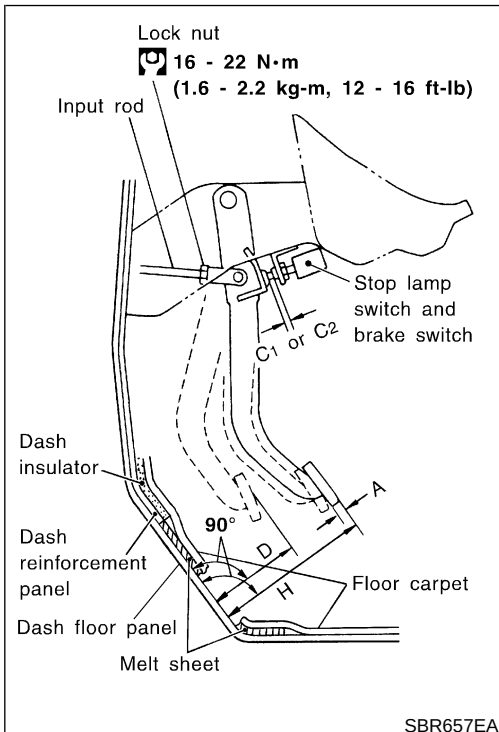


Inspection

NJBR0016

Check brake pedal for following items.

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



Adjustment

NJBR0017

Check brake pedal free height from metal panel. Adjust if necessary.

H: Free height

Refer to SDS, BR-73.

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

0.74 - 1.96 mm (0.0291 - 0.0772 in)

D: Depressed height

LHD (M/T): More than 90 mm (3.54 in)

LHD (A/T): More than 95 mm (3.74 in)

RHD (M/T): More than 90 mm (3.54 in)

RHD (A/T): More than 95 mm (3.74 in)

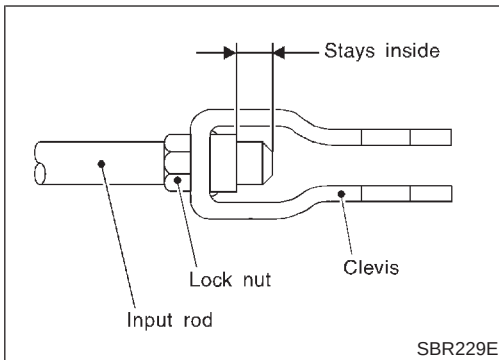
Under force of 490 N (50 kg, 110 lb) with engine running

A: Pedal free play at pedal pad

1.0 - 3.0 mm (0.039 - 0.118 in)

BRAKE PEDAL AND BRACKET

Adjustment (Cont'd)



1. Loosen lock nut and adjust pedal free height by turning brake booster input rod. Then tighten lock nut.
2. Check pedal free play.
Make sure that stop lamps go off when pedal is released.
3. Check brake pedal's depressed height while engine is running. If lower than specification, check brake system for leaks, accumulation of air or any damage to components (master cylinder, wheel cylinder, etc.); then make necessary repairs.

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MASTER CYLINDER (NABCO)

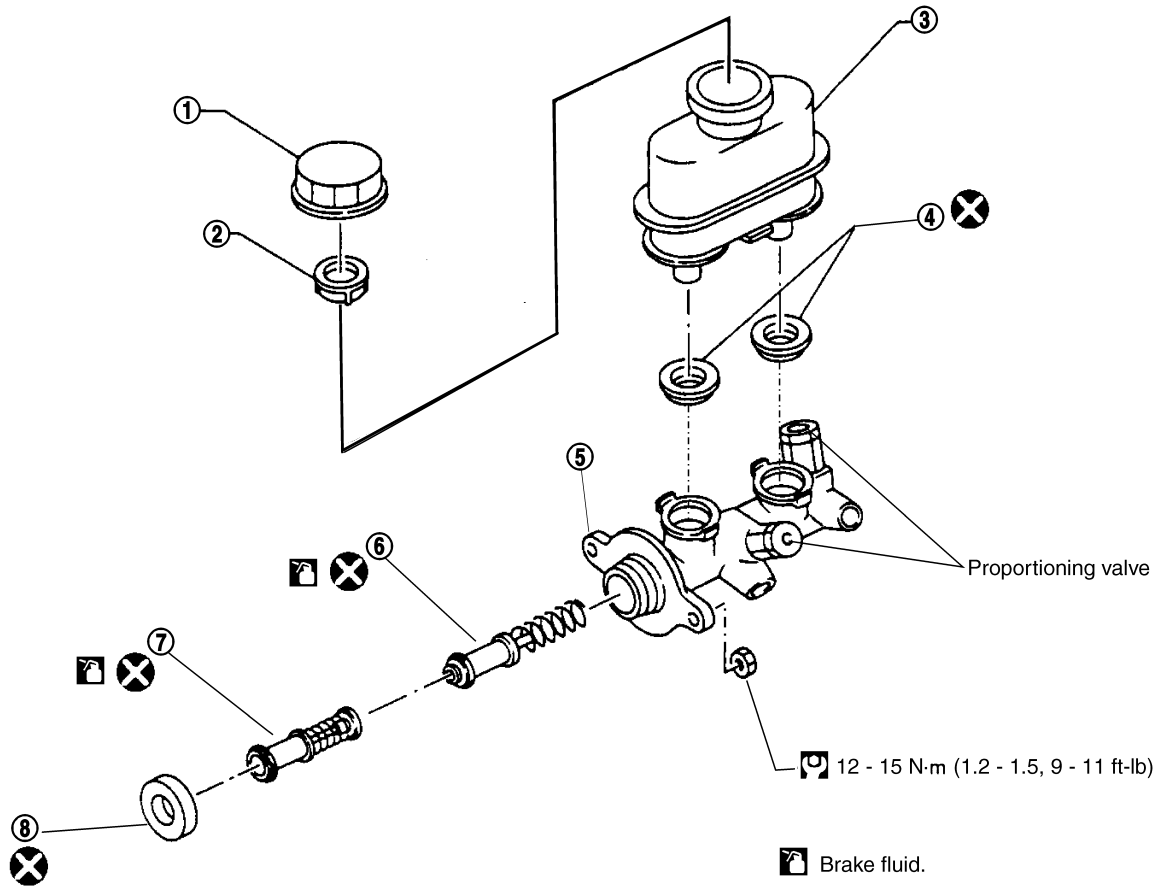
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Removal

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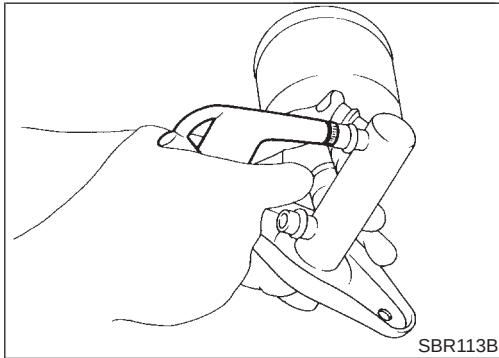
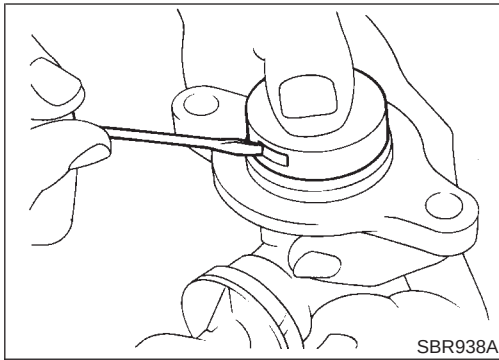
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|-------------------|------------------------------|----------------------------|
| 1. Reservoir cap | 4. Seal | 7. Primary piston assembly |
| 2. Oil filter | 5. Cylinder body | 8. Stopper cap |
| 3. Reservoir tank | 6. Secondary piston assembly | |

CAUTION:

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

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



Disassembly

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1. Bend claws of stopper cap outward and remove stopper cap.

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2. Remove valve 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.

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Inspection

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Check for the following items.
Replace any part if damaged.

Master cylinder:

- Pin holes or scratches on inner wall.

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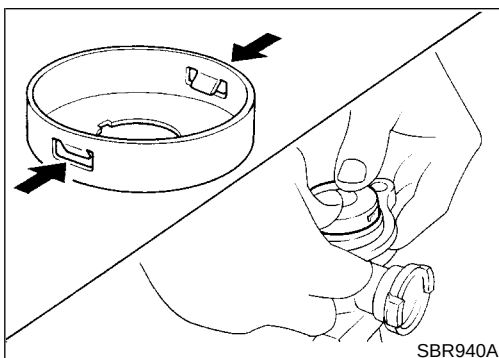
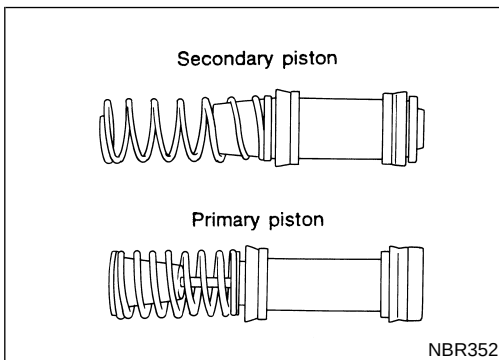
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Piston:

- Deformation of or scratches on piston cups.

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Assembly

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

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

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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.

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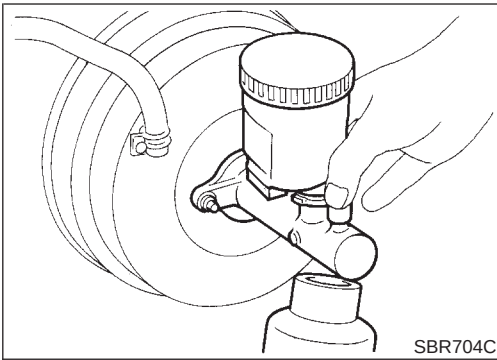
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MASTER CYLINDER (NABCO)

Installation

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Installation

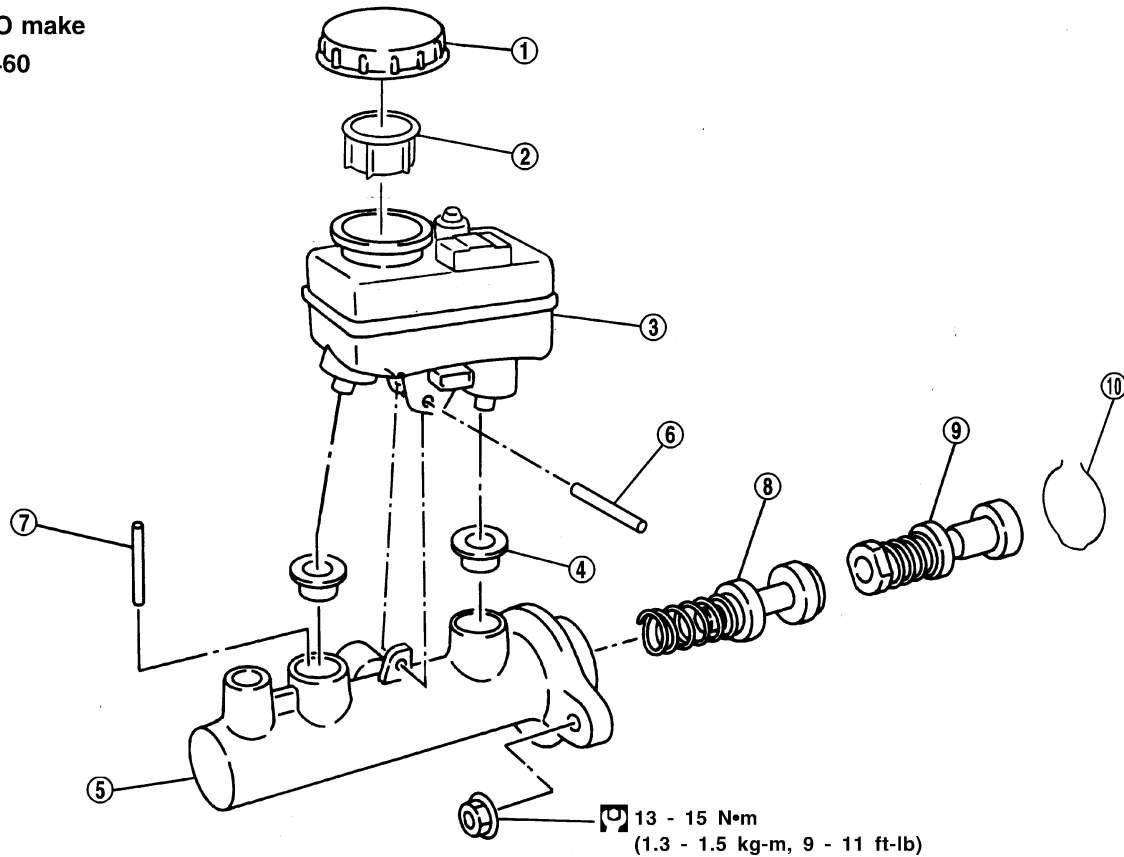
CAUTION:

- Refill with new brake fluid "DOT 4".
 - 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 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
 8. Bleed air from brake system. Refer to "Bleeding Brake System", BR-8.

Removal

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NABCO make
SEC. 460



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- | | | |
|---------------------------------|-----------------------|------------------------------|
| 1. Reservoir cap | 5. Cylinder body | 8. Secondary piston assembly |
| 2. Oil filter (ABS models only) | 6. Elastic pin | 9. Primary piston assembly |
| 3. Reservoir tank | 7. Piston stopper pin | 10. Circlip |
| 4. Seal | | |

CAUTION:

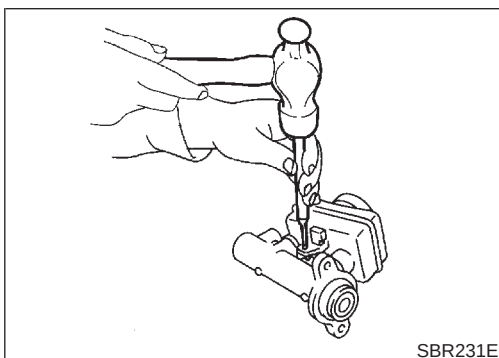
Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

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

Disassembly

1. Drive out elastic pin from cylinder body.
2. Remove reservoir tank and seals.

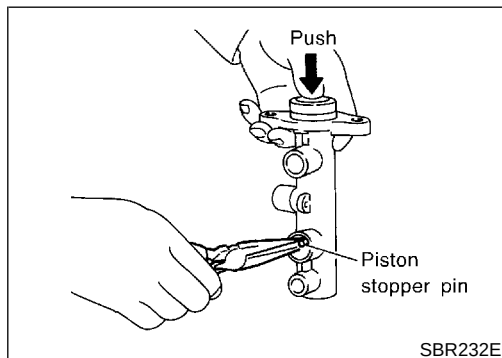
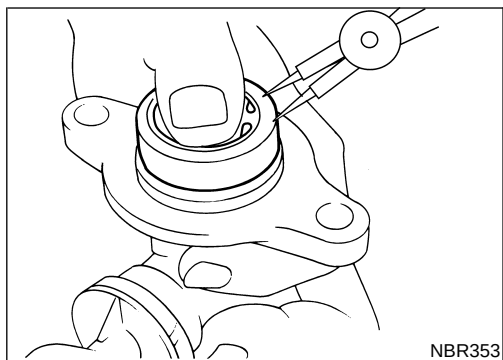
NJBR0118



SBR231E

MASTER CYLINDER [BOSCH (NABCO)]

Disassembly (Cont'd)



3. Remove the circlip with suitable pliers while piston is pushed into cylinder.
4. Remove piston stopper pin while piston is pushed into cylinder.
5. Remove piston assemblies.
If it is difficult to remove secondary piston assembly, gradually apply compressed air through fluid outlet.

Inspection

Check for the following items.

Replace any part if damaged.

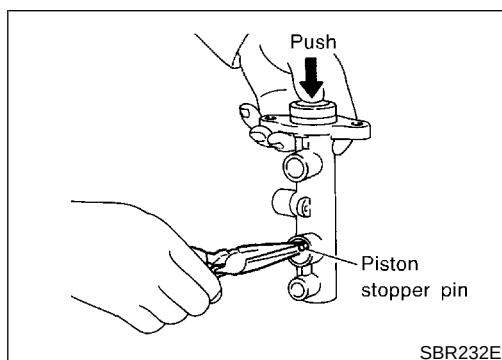
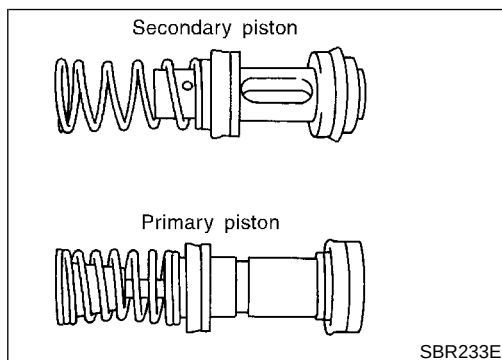
Master cylinder:

- Pin holes or scratches on inner wall.

Piston:

- Deformation of or scratches on piston cups.

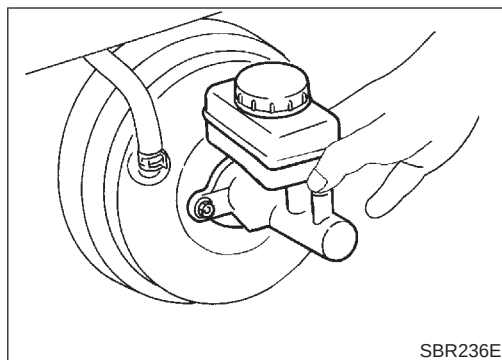
NJBR0119



Assembly

1. Insert secondary piston assembly. Then insert primary piston assembly.
NJBR0120
- **Pay attention to alignment of secondary piston slit with valve stopper mounting hole of cylinder body.**

2. Install piston stopper pin while piston is pushed into cylinder. Then secure the primary and secondary piston assemblies with circlip.
3. Push reservoir tank seals and reservoir tank into cylinder body.
4. Install elastic pin.



Installation

NJBR0121

CAUTION:

- Refill with new brake fluid "DOT 4".
 - Never reuse drained brake fluid.
1. Place master cylinder onto brake booster and secure mounting nuts lightly.
 2. Torque mounting nuts.
🔧 : 13 - 15 N·m (1.3 - 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 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)
 8. Bleed air from brake system.

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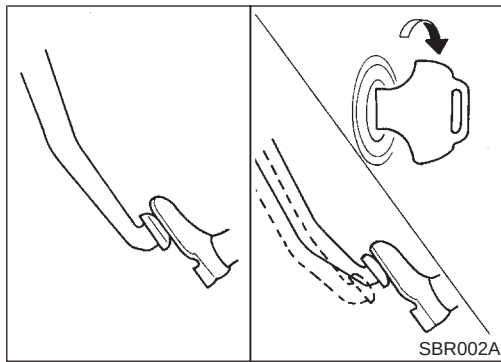
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BRAKE BOOSTER

On-vehicle Service



On-vehicle Service

NJBR0023

OPERATING CHECK

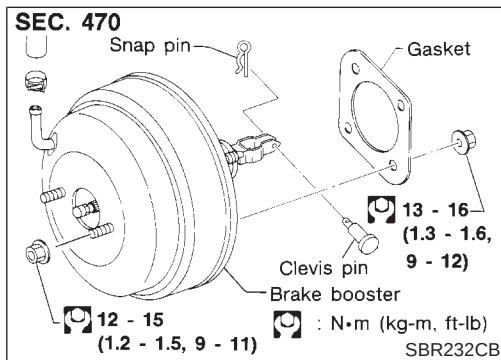
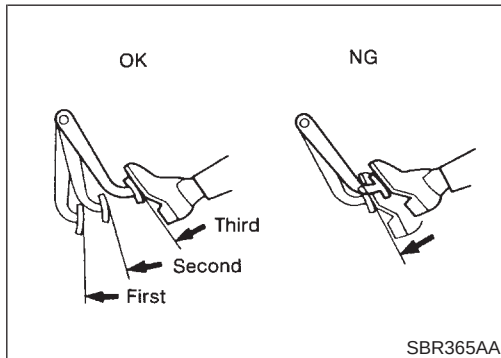
NJBR0023S01

1. Stop engine and depress brake pedal several times. Check that pedal stroke does not change.
2. Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

AIRTIGHT CHECK

NJBR0023S02

1. Start engine, and stop it after one or two minutes. Depress brake pedal several times slowly. The pedal should go further down the first time, and then it should gradually rise thereafter.
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**.

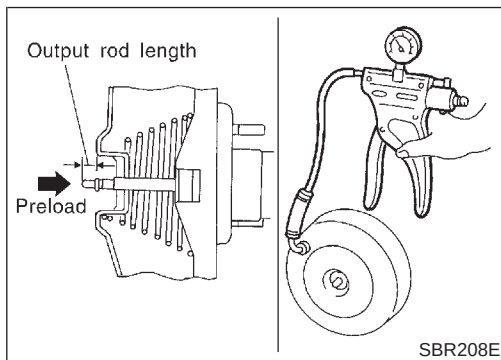


Removal

NJBR0024

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

NJBR0025

OUTPUT ROD LENGTH CHECK

NJBR0025S01

1. Apply vacuum of -66.7 kPa (-667 mbar, -500 mmHg, -19.69 inHg) to brake booster with a handy vacuum pump.
2. Add preload of 19.6 N (2 kg, 4.4 lb) to output rod.
3. Check output rod length.

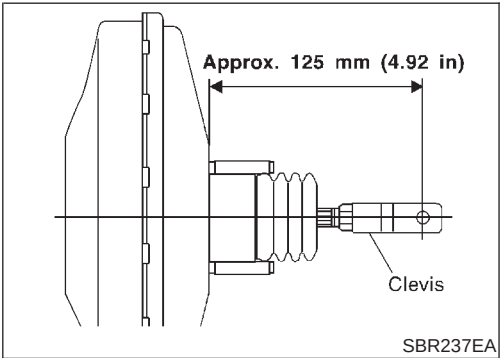
Specified length:

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 4".
- Never reuse drained brake fluid.
- Take care not to damage brake booster mounting bolt thread when installing. Due to the acute angle of installation, the threads can be damaged with the dash panel.



1. Before fitting booster, temporarily adjust clevis to dimension shown.
2. Fit booster, then secure mounting nuts (brake pedal bracket to master cylinder) 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-19.
6. Bleed air. Refer to "Bleeding Brake System", BR-8.

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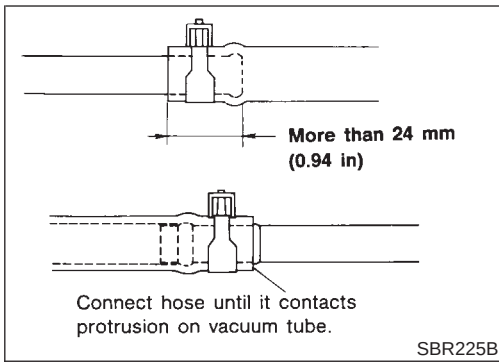
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VACUUM HOSE

Removal and Installation



Removal and Installation

NJBR0027

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.

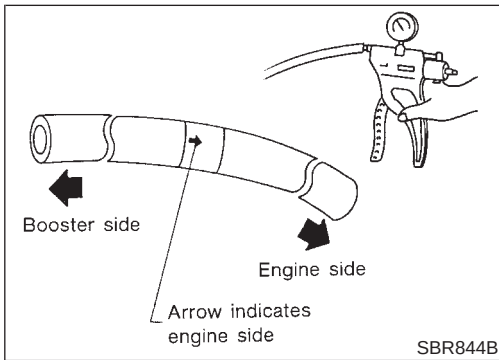
Inspection

NJBR0028

HOSES AND CONNECTORS

NJBR0028S01

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



CHECK VALVE

NJBR0028S02

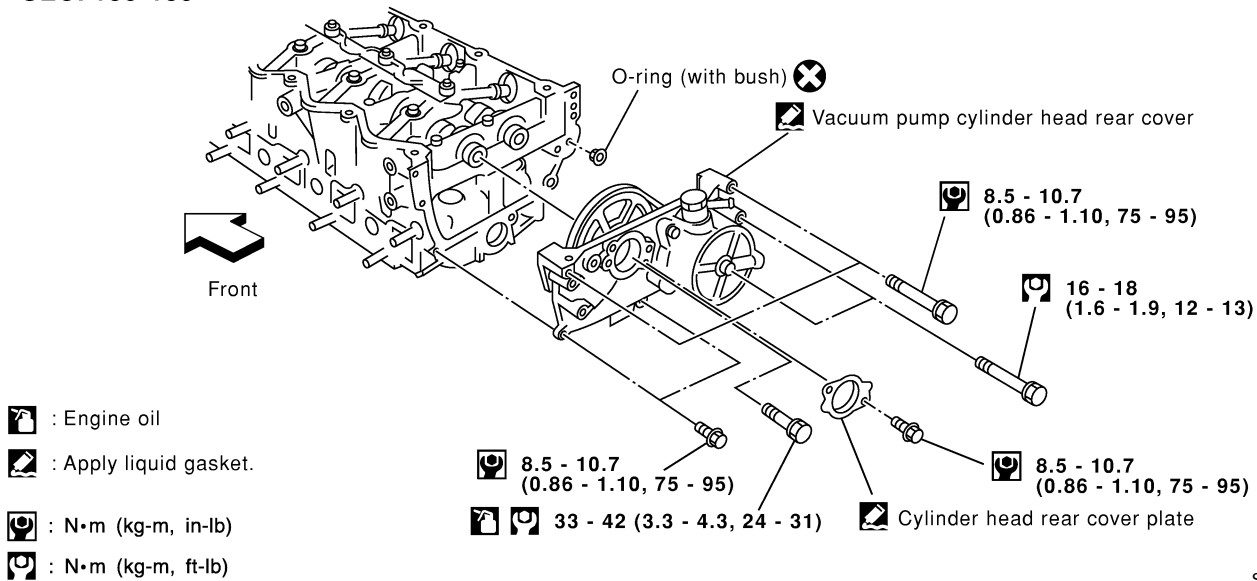
Check vacuum with a vacuum pump.

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

Removal

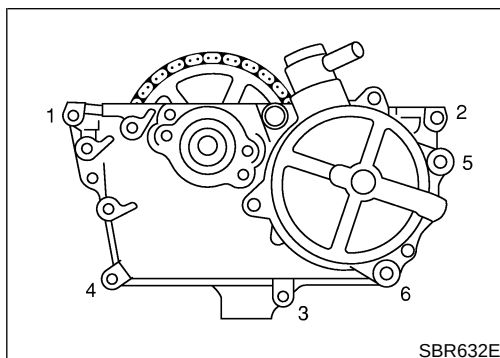
NJBR0123

SEC. 130-135



SBR631E

- Remove parts shown below.
 - Air duct, air cleaner case (upper)
 - Engine cover
 - Rocker cover
 - Exhaust manifold cover
 - EGR tube
- Disconnect vacuum hose from vacuum pump.
- Remove cylinder head rear cover plate.
 - Use a tool such as seal cutter (SST) to remove.
- Loosen and remove rear cam sprocket installation bolts.
 - Camshaft should not be attached. Using engine inner resistance, loosen installation bolts.

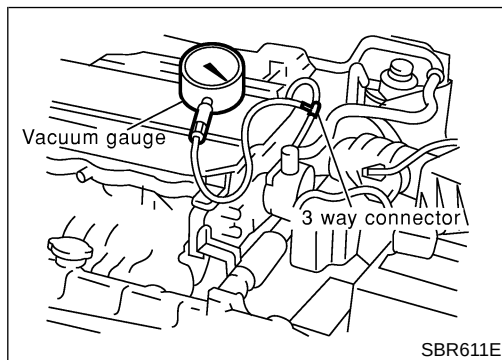
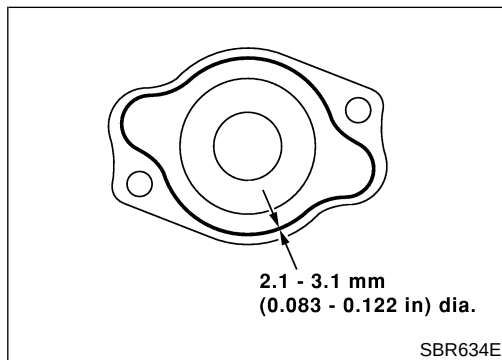
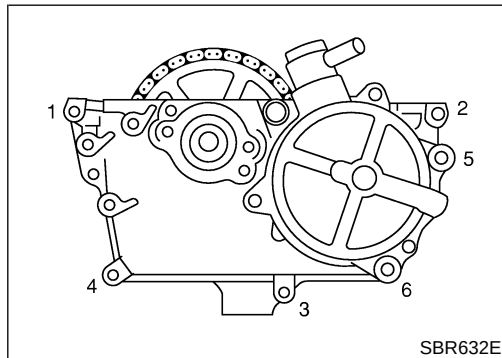
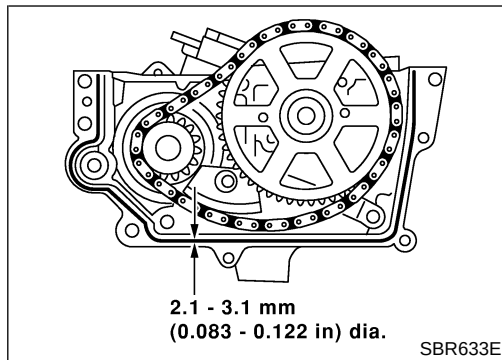


SBR632E

- Remove vacuum pump and cylinder head rear cover assembly.
 - Remove and install vacuum pump, sprocket, drive chain, and chain guide as an assembly.
 - Loosen mounting bolts in the reverse order of the numbers shown in the figure to the left.
 - Remove only bolts that are shown in the figure. (Be especially careful not to remove M6 bolts on the vacuum pump.)
 - Use a tool such as a seal cutter (SST).

VACUUM PUMP

Installation



Installation

NJBR0124

1. Assemble vacuum pump and cylinder head rear cover assembly, referring to "Component" in the next page.
2. Install vacuum pump and cylinder head rear cover assembly to cylinder head.
 - a. Apply ThreeBond 1207C (KP510 00150) without breaks to the location shown in the figure to the left.
 - b. Tighten the mounting bolts in the numerical order shown by the figure to the left.
3. Install rear cam sprocket installation bolts.
4. Remove sprocket retaining two M6 bolts.
 - M6 bolts will be used for installation.
5. Tighten rear cam sprocket installation bolts.
 - Camshaft should not be fixed. Using engine inner resistance, tighten installation bolts.
6. Install cylinder head rear cover plate.
 - Apply ThreeBond 1207C (KP510 00150) without breaks to the location shown by the figure to the left.
7. Install parts in the reverse order of removal.

CAUTION:

If the engine is started with vacuum pump released (vacuum hose disconnected), it causes increase of blowby gas amount, and engine damage may result. When starting the engine, be sure to close vacuum circuit.

Inspection

NJBR0125

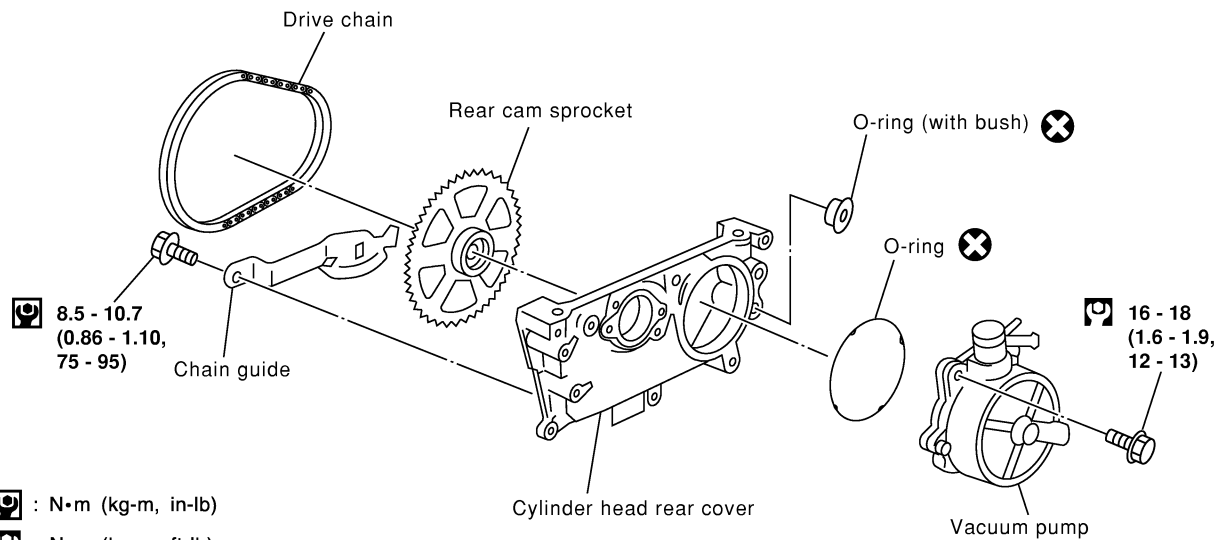
- Remove vacuum hose. Then, connect vacuum gauge with three-way connector.
- Install three-way connector to the area where vacuum pump negative pressure can be directly measured. (The figure shown an example.)
- Start the engine, then measure negative pressure.

Standard: -86.6 to -101.3 kPa (-866 to -1,013 mbar, -650 to -760 mmHg, -25.59 to -29.92 inHg)
- If it is not within standard, inspect for suction of air in the middle of route and measure it again.
- If it is still not within standard value, replace the vacuum pump.

Component

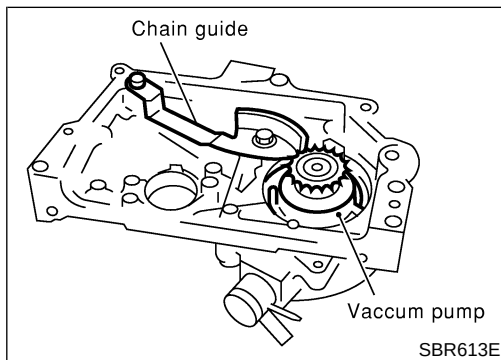
NJBR0126

SEC. 130-135



SBR612E

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Disassembly

Disassemble the components, referring to the "Component", then remove vacuum pump.

NJBR0136

CAUTION:

Do not disassemble vacuum pump. (Do not loosen three M6 bolts.)

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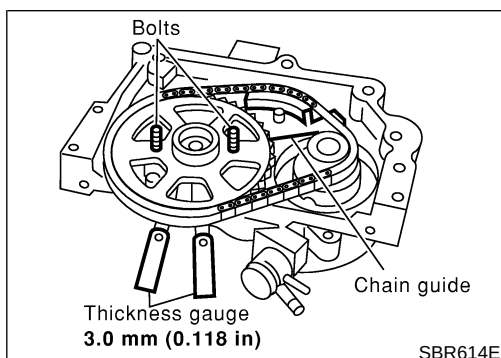
Assembly

Install all parts to cylinder head rear cover as follows.

NJBR0127

1. Install vacuum pump.
2. Install chain guide temporarily.
 - Adjust the chain guide position by the method explained in step 5.

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3. Install rear cam sprocket.
 - Installation direction of sprocket is not specified.
 - Insert 2 thickness gauges [3.0 mm (0.118 in)] between cover and rear cam sprocket (shown in the figure). Insert 2 bolts [M6, thread length: 35 - 40 mm (1.38 - 1.57 in)] into sprocket to retain it to cover.
 - Use thickness gauges [3.0 mm (0.118 in)] for chain alignment between vacuum pump sprocket and cam sprocket.
4. Attach drive chain to rear cam sprocket and vacuum pump sprocket.
5. Tighten chain guide installation bolt while pressing chain guide

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VACUUM PUMP

Assembly (Cont'd)

lightly [approximately 9.8 N (1.0 kg, 2.2 lb)].

6. Remove thickness gauges (2).
- Leave sprocket retaining bolts (M6) until installation.

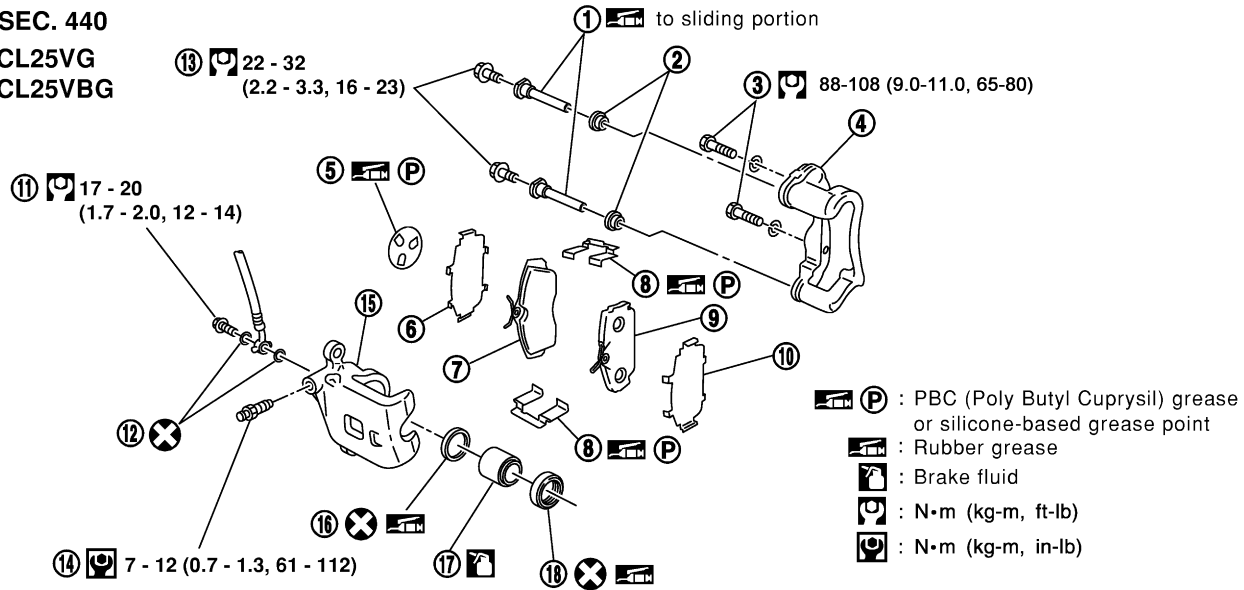
Component

NJBR0030

SEC. 440

CL25VG

CL25VBG



NBR429

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

Pad Replacement

NJBR0029

WARNING:

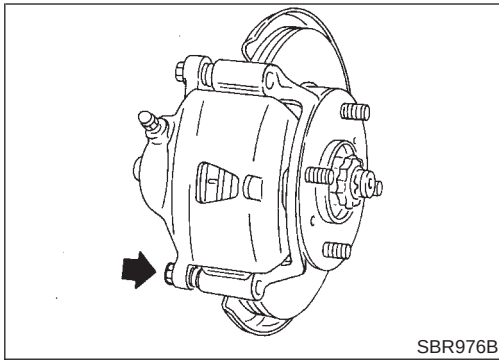
Clean brake pads with a vacuum dust collector to minimize the hazard of airborne particles or other materials.

CAUTION:

- When cylinder body is open, do not depress brake pedal because 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.
- 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-7.

FRONT DISC BRAKE

Pad Replacement (Cont'd)



1. Remove master cylinder reservoir cap.
2. Remove pin bolt.
3. Open cylinder body upward. Then remove pad with retainers, inner and outer shims.

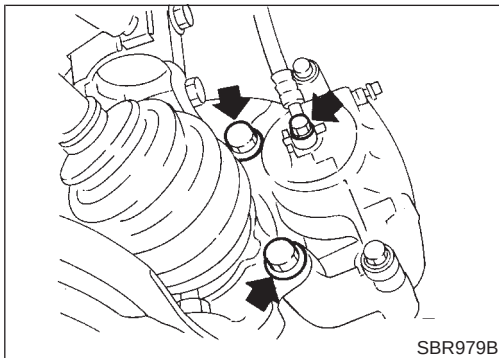
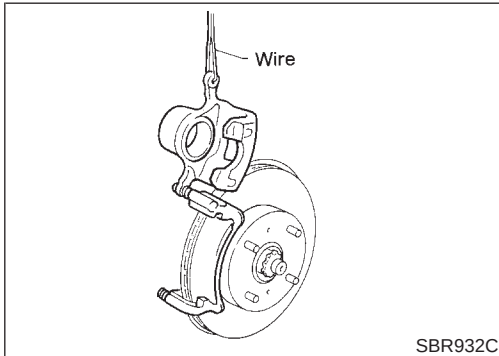
Standard pad thickness:

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.



Removal

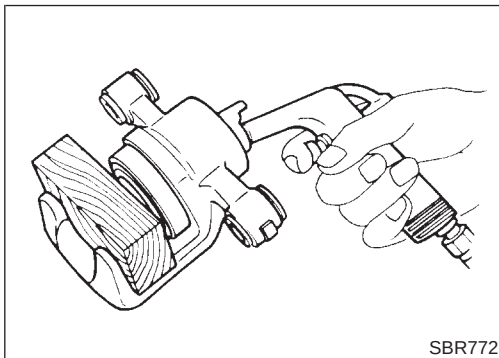
NJBR0031

WARNING:

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

Remove torque member fixing bolts and connecting bolt.

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



Disassembly

NJBR0032

WARNING:

Do not place your fingers in front of piston.

CAUTION:

Do not scratch or score cylinder wall.

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

Inspection

NJBR0033

CALIPER

NJBR0033S01

Cylinder Body

NJBR0033S0101

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials 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

NJBR0033S0102

CAUTION:

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

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

Slide Pin, Pin Bolt and Pin Boot

NJBR0033S0103

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

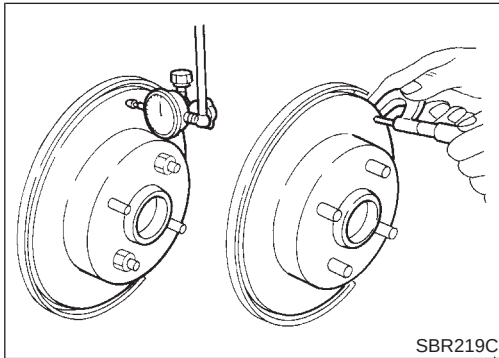
ROTOR

NJBR0033S02

Rubbing Surface

NJBR0033S0201

Check rotor for roughness, cracks or chips.

**Runout**

NJBR0033S0202

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

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

Maximum runout:

0.07 mm (0.0028 in)

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

Thickness

NJBR0033S0203

Thickness variation (At least 8 positions):

Maximum 0.01 mm (0.0004 in)

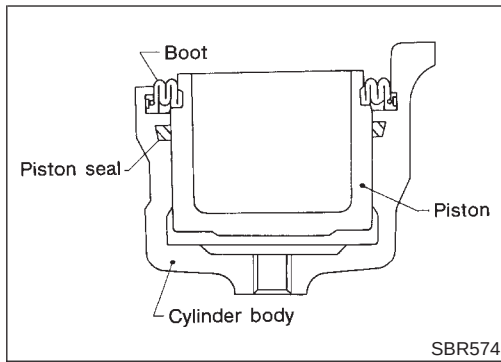
If thickness variation exceeds the specification, turn rotor with on-car brake lathe.

Rotor repair limit:

20.0 mm (0.787 in)

FRONT DISC BRAKE

Assembly



Assembly

NJBR0034

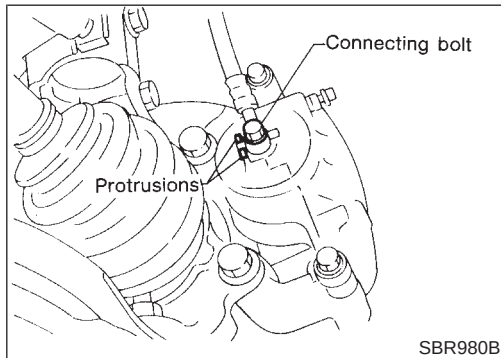
1. Insert piston seal into groove on cylinder body.
2. With piston boot fitted to piston, insert piston boot into groove on cylinder body and install piston.
3. Properly secure piston boot.

Installation

NJBR0035

CAUTION:

- Refill with new brake fluid "DOT 4".
 - Never reuse drained brake fluid.
1. Install brake hose to caliper securely.
 2. Install all parts and secure all bolts.
 3. Bleed air. Refer to "Bleeding Brake System", BR-8.



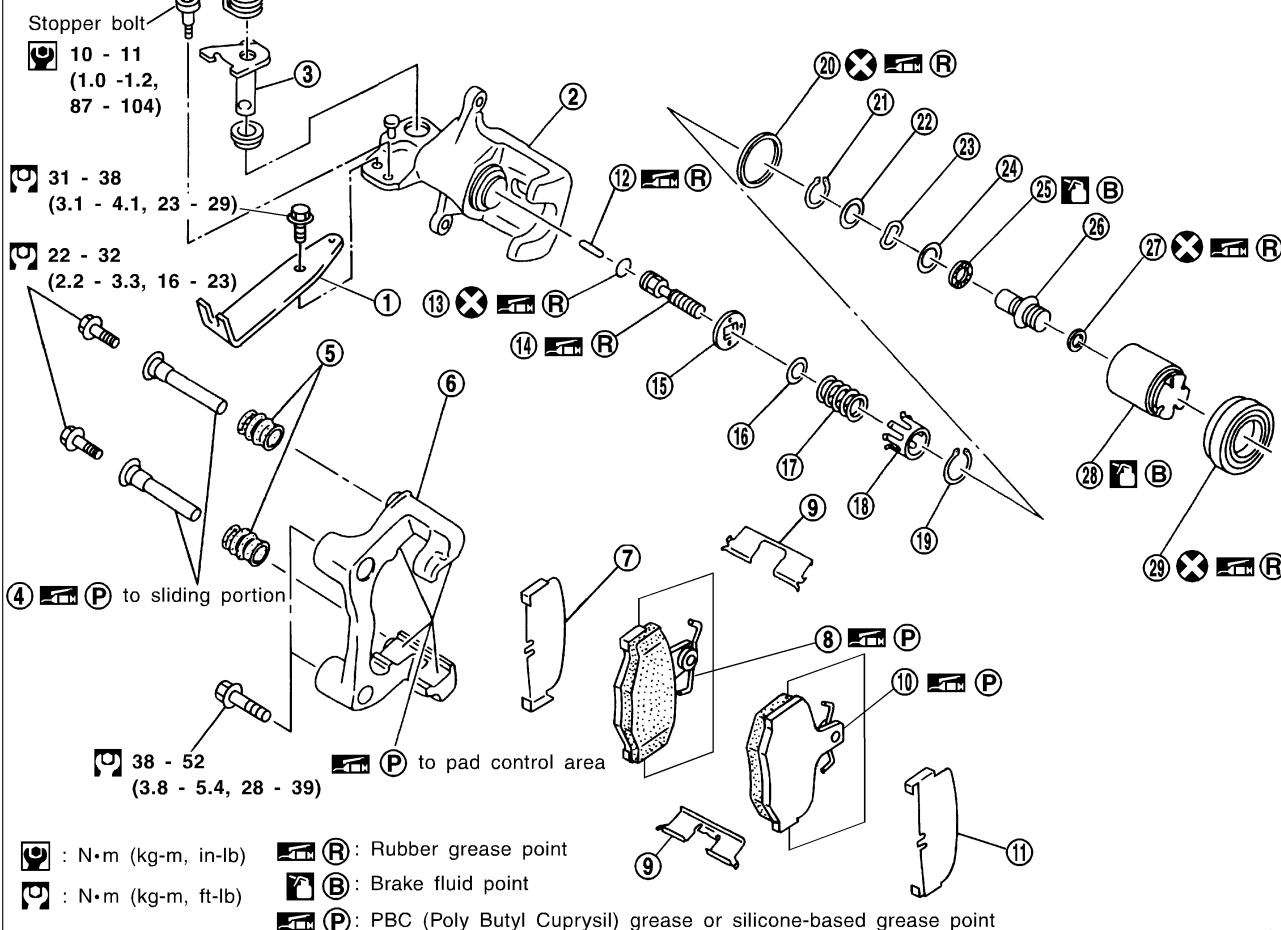
REAR DISC BRAKE (CAM & STRUT TYPE)

Component

Component

NJBR0038

SEC. 440 CL9HCG



SBR753E

- | | | |
|------------------|----------------------|-----------------|
| 1. Cable guide | 11. Outer shim | 21. Snap ring A |
| 2. Cylinder | 12. Strut | 22. Washer |
| 3. Toggle lever | 13. O-ring | 23. Wave washer |
| 4. Pin | 14. Push rod | 24. Washer |
| 5. Pin boot | 15. Key plate | 25. Bearing |
| 6. Torque member | 16. Retaining washer | 26. Adjuster |
| 7. Inner shim | 17. Spring | 27. Cup |
| 8. Inner pad | 18. Spring cover | 28. Piston |
| 9. Pad retainer | 19. Snap ring B | 29. Piston boot |
| 10. Outer pad | 20. Piston seal | |

Pad Replacement

NJBR0037

WARNING:

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

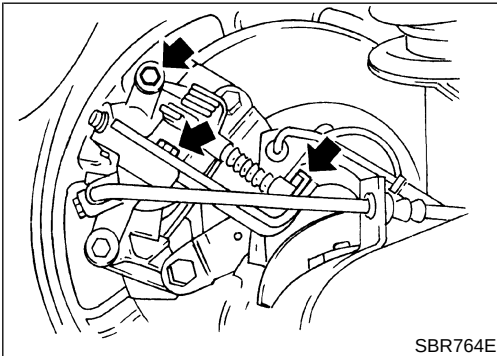
CAUTION:

- When cylinder body is open, do not depress brake pedal because piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.
- If shims are rusted or show peeling of rubber coat, replace them with new shims.

REAR DISC BRAKE (CAM & STRUT TYPE)

Pad Replacement (Cont'd)

- 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.
- 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-7.



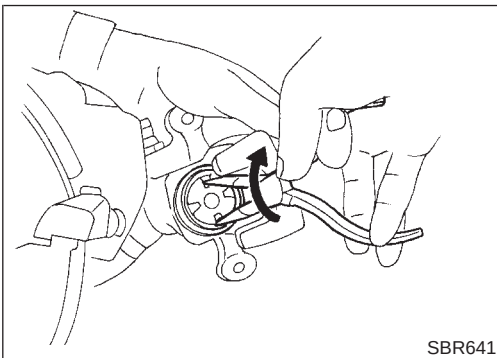
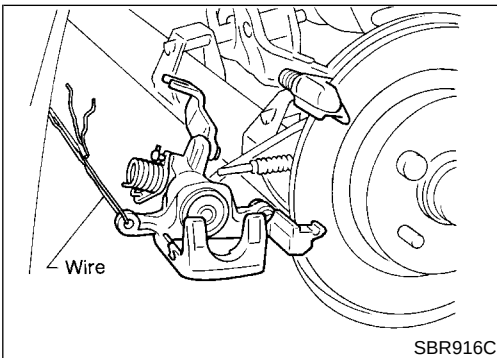
1. Remove master cylinder reservoir cap.
2. Remove brake cable mounting bolt and lock spring.
3. Release parking brake control lever, then disconnect cable from the caliper.
4. Remove upper pin bolt.
5. Open cylinder body downward. Then remove pad retainers, and inner and outer shims.

Standard pad thickness:

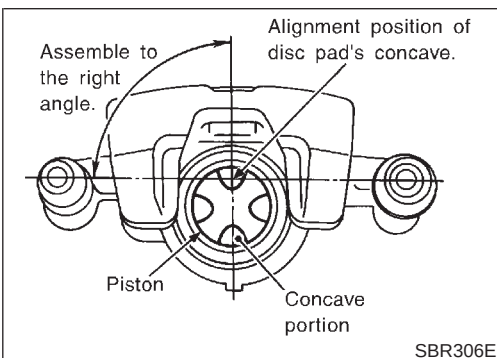
9.3 mm (0.366 in)

Pad wear limit:

2.0 mm (0.079 in)



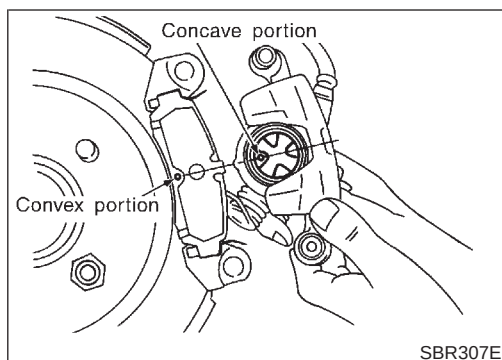
6. When installing new pads, push piston into cylinder body by gently turning piston clockwise, as shown. **Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.**



7. Adjust the piston to the right angle as shown in the figure.

REAR DISC BRAKE (CAM & STRUT TYPE)

Pad Replacement (Cont'd)



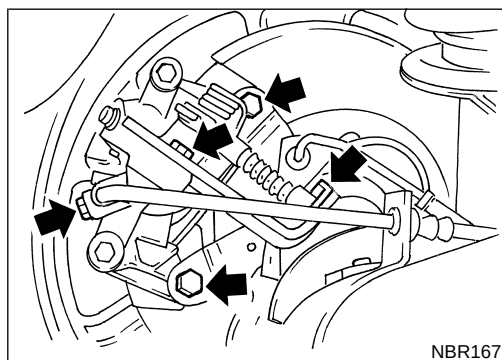
8. As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
9. Install brake cable, brake cable mounting bolt, lock spring and master cylinder reservoir cap.

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Removal

NJBR0039

WARNING:

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

1. Remove brake cable mounting bolt and lock spring.
2. Release parking brake control lever, then disconnect cable from the caliper.
3. 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.

EC

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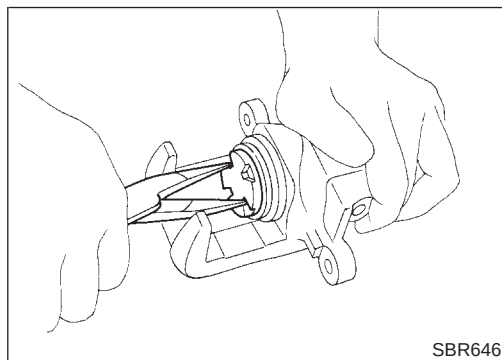
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Disassembly

NJBR0040

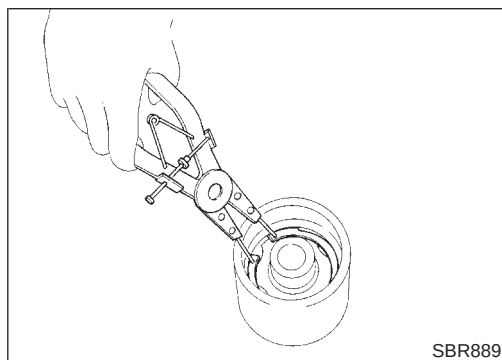
1. Remove piston by turning it counterclockwise with long nose pliers or suitable tool.

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HA



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

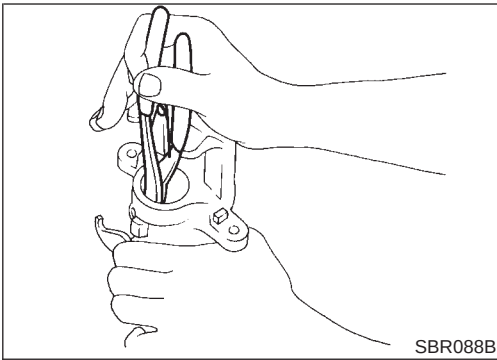
SC

EL

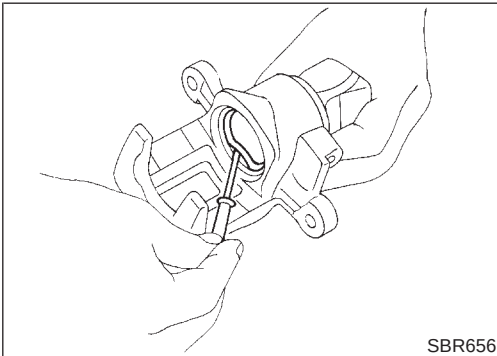
IDX

REAR DISC BRAKE (CAM & STRUT TYPE)

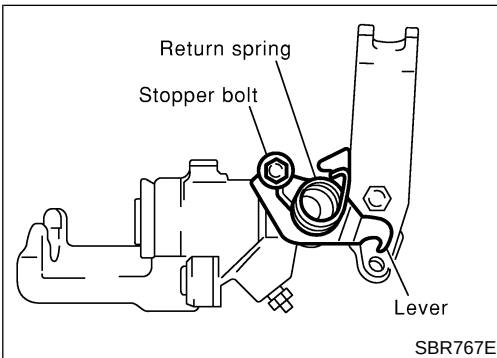
Disassembly (Cont'd)



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



- c. Remove piston seal.
Be careful not to damage cylinder body.



4. Remove return spring, toggle lever and cable guide.

Inspection

CALIPER

NJBR0041

CAUTION:

NJBR0041S01

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

Cylinder Body

NJBR0041S0101

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

Torque Member

NJBR0041S0102

Check for wear, cracks or other damage. Replace if necessary.

Piston

NJBR0041S0103

CAUTION:

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

Check piston for score, rust, wear, damage or presence of foreign materials.

Replace if any of the above conditions are observed.

Pin and Pin Boot

NJBR0041S0104

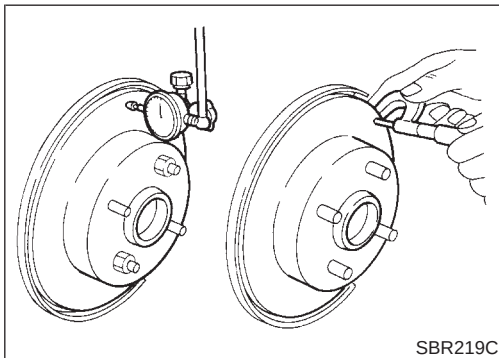
Check for wear, cracks or other damage.
Replace if any of the above conditions are observed.

GI

MA

EM

LC



ROTOR

NJBR0041S02

Rubbing Surface

NJBR0041S0201

Check rotor for roughness, cracks or chips.

EC

Runout

NJBR0041S0202

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

FE

Make sure that axial end play is within the specifications before measuring. Refer to AX section ("REAR WHEEL BEARING", "On-vehicle Service").

CL

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

MT

Maximum runout:

0.07 mm (0.0028 in)

AT

Thickness

NJBR0041S0203

Rotor repair limit:

Standard thickness

10 mm (0.39 in)

AX

Minimum thickness

9 mm (0.35 in)

SU

Thickness variation (At least 8 portions)

Maximum 0.02 mm (0.0008 in)

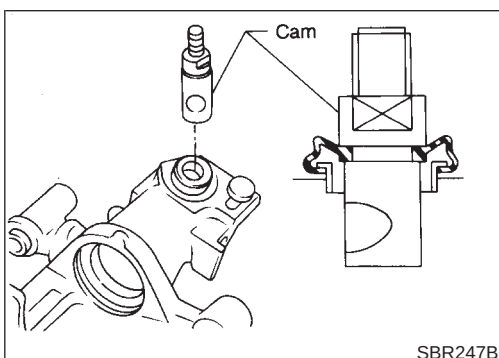
BR

ST

RS

BT

HA



Assembly

NJBR0042

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

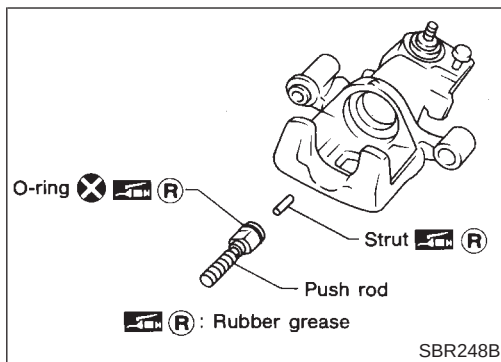
SC

EL

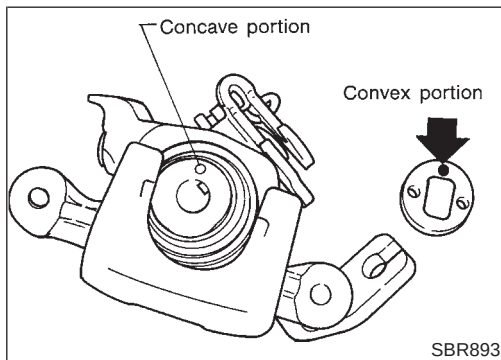
IDX

REAR DISC BRAKE (CAM & STRUT TYPE)

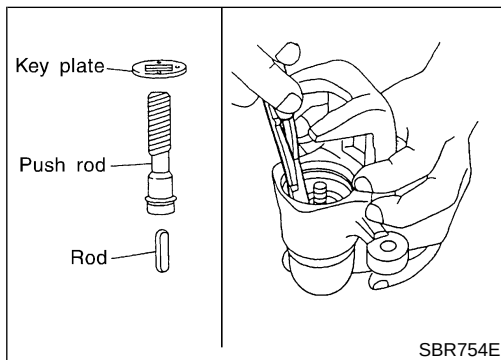
Assembly (Cont'd)



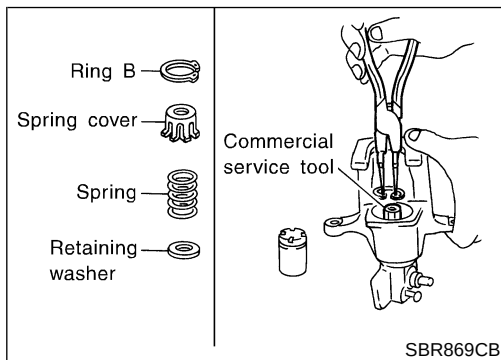
2. Generously apply rubber grease to strut and push rod to make insertion easy.



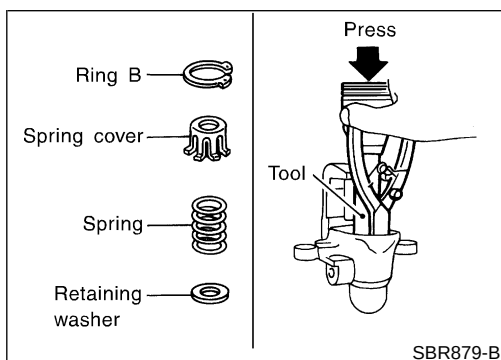
3. Fit push rod into square hole in key plate. Also match convex portion of key plate with concave portion of cylinder.



4. Install rod, push rod and key plate.

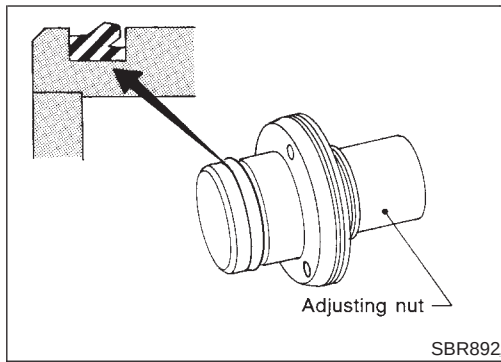


5. Install seat, spring, spring cover and ring B with suitable press and drift.

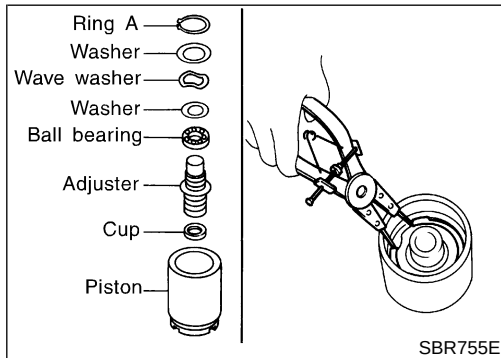


REAR DISC BRAKE (CAM & STRUT TYPE)

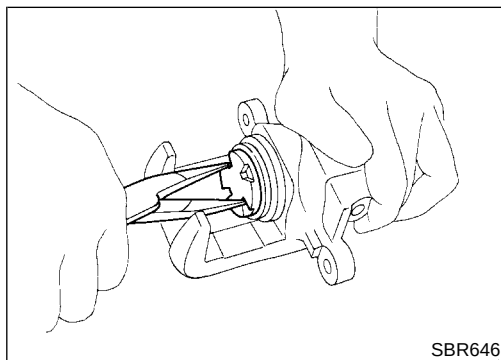
Assembly (Cont'd)



6. Install cup in the specified direction.

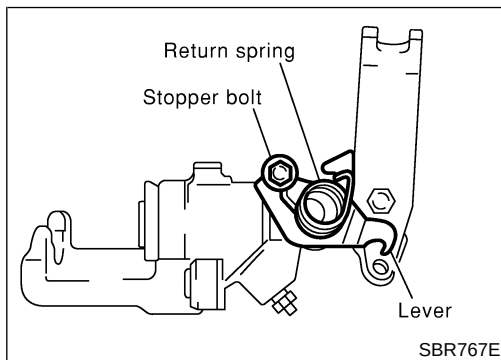


7. Install adjuster, bearing, washers and ring A with a suitable tool.

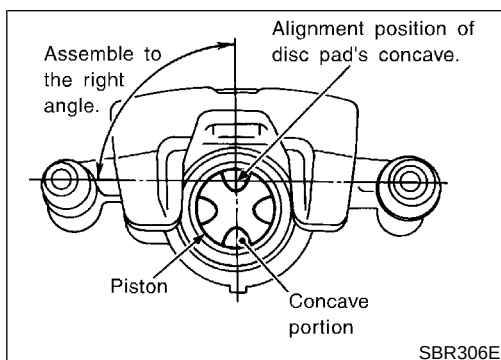


8. Insert piston seal into groove on cylinder body.

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



10. Fit toggle lever, return spring and cable guide.

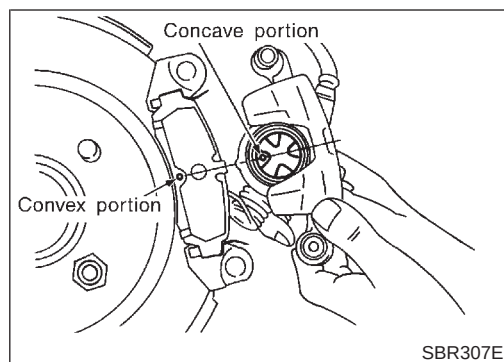


11. Adjust the piston to the right angle as shown in the figure.

GI
MA
EM
LC
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FE
CL
MT
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AX
SU
BR
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BT
HA
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EL
IDX

REAR DISC BRAKE (CAM & STRUT TYPE)

Installation



Installation

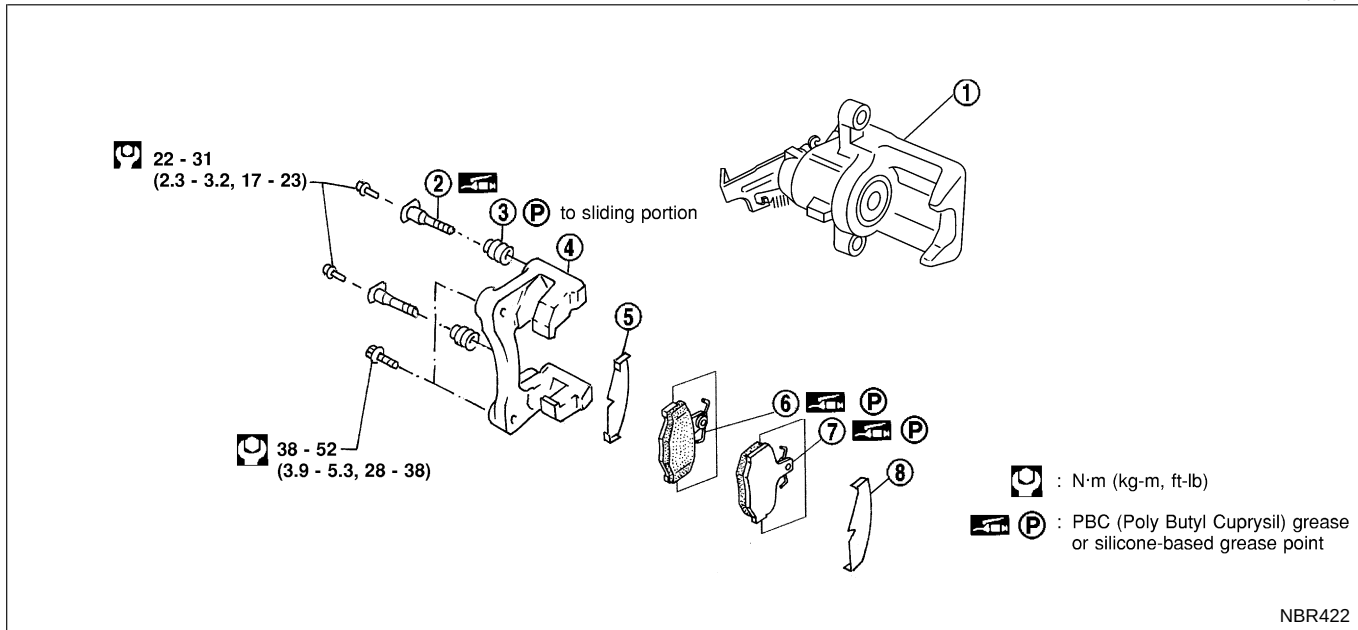
NJBR0043

CAUTION:

- Refill with new brake fluid "DOT 4".
 - Never reuse drained brake fluid.
1. Install caliper assembly.
 - As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
 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.

Component

NJBR0141



- | | | |
|------------------|------------------|---------------|
| 1. Cylinder body | 4. Torque member | 7. Outer pad |
| 2. Pin | 5. Inner shim | 8. Outer shim |
| 3. Pin boot | 6. Inner pad | |

NOTE:

The cylinder body cannot be disassembled.

Pad Replacement

NJBR0142

WARNING:

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

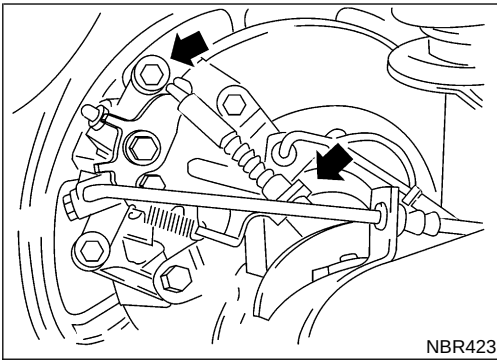
CAUTION:

- When cylinder body is open, do not depress brake pedal because piston will pop out.
- Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.
- If shims are rusted or show peeling of rubber coat, replace them with new shims.
- It is not necessary to remove connecting bolt except for replacement of caliper assembly. In this case, suspend cylinder body with wire so as not to stretch brake hose.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

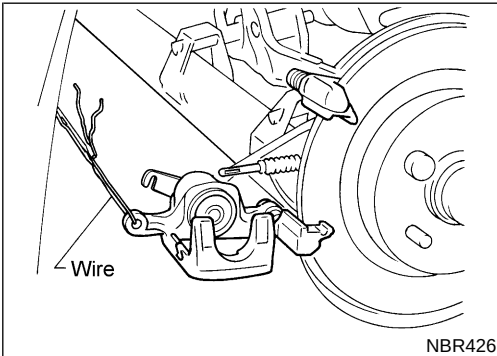
Refer to "Brake Burnishing Procedure", "ON-VEHICLE SERVICE", BR-7.

REAR DISC BRAKE (BALL & RAMP TYPE)

Pad Replacement (Cont'd)



1. Remove master cylinder reservoir cap.
2. Remove brake cable lock spring.
3. Release parking brake control lever, then disconnect cable from the caliper.
4. Remove upper pin bolt.



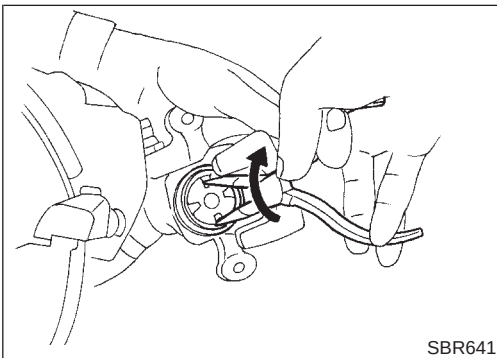
5. Open cylinder body downward. Then remove pads inner and outer shims.

Standard pad thickness:

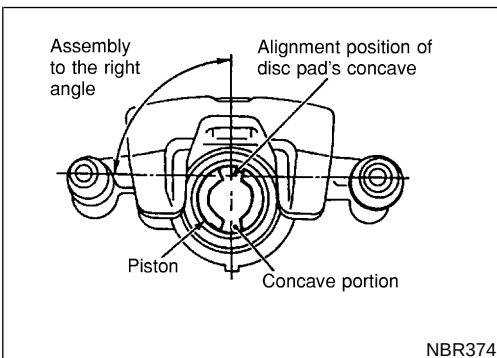
9.3 mm (0.366 in)

Pad wear limit:

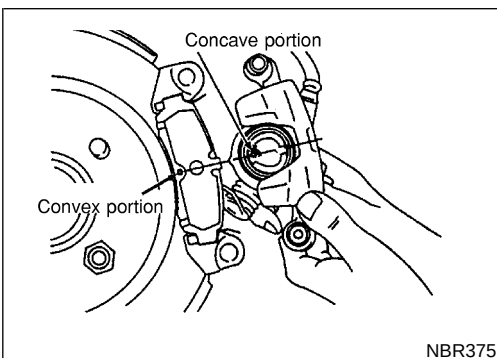
2.0 mm (0.079 in)



6. When installing new pads, push piston into cylinder body by gently turning piston clockwise, as shown.
Carefully monitor brake fluid level because brake fluid will return to reservoir when pushing back piston.



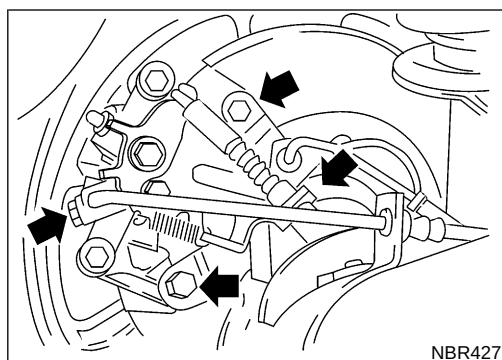
7. Adjust the piston to the right angle as shown in the figure.



8. As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
9. Install brake cable, brake cable mounting bolt, lock spring and master cylinder reservoir cap.

REAR DISC BRAKE (BALL & RAMP TYPE)

Removal



Removal

NJBR0143

WARNING:

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

1. Remove brake cable lock spring.
2. Release parking brake control lever, then disconnect cable from the caliper.
3. Remove torque member fixing bolts and connecting bolt.
4. Remove brake hose connecting bolt.
5. Plug off the brake hose and cylinder body to prevent air entering the system.

CAUTION:

Care should be taken as not to let:

- Air enter the cylinder body and brake hose.
- Brake fluid spill from the cylinder body and brake hose.

Disassembly

Remove pin bolts and pins.

NOTE:

Cylinder body can not be disassembled.

Inspection

CALIPER

CAUTION:

Do not drain any brake fluid from cylinder body. Cylinder body can not be disassembled.

Cylinder Body

Check cylinder body for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.

Torque Member

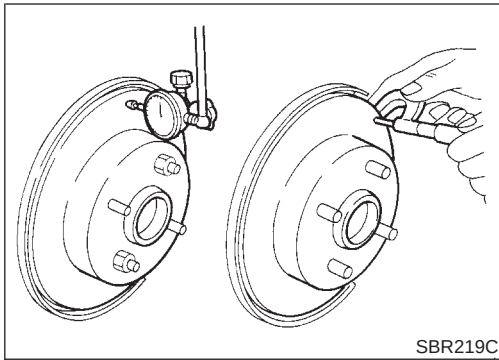
Check for wear, cracks or other damage. Replace if necessary.

Pin and Pin Boot

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

REAR DISC BRAKE (BALL & RAMP TYPE)

Inspection (Cont'd)



ROTOR

Rubbing Surface

NJBR0145S02

Check rotor for roughness, cracks or chips.

NJBR0145S0201

Runout

NJBR0145S0202

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

Make sure that axial end play is within the specifications before measuring. Refer to AX section ("REAR WHEEL BEARING", "On-vehicle Service").

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

Maximum runout:

0.07 mm (0.0028 in)

Thickness

NJBR0145S0203

Rotor repair limit:

Standard thickness

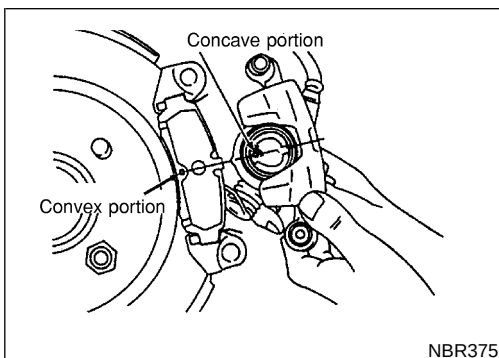
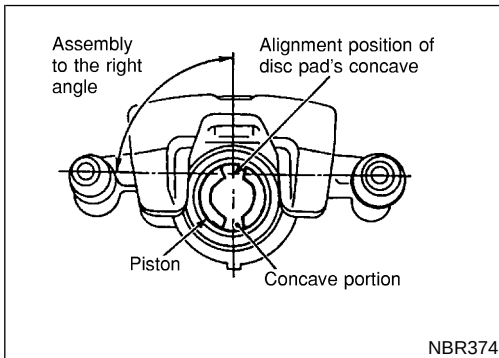
10 mm (0.39 in)

Minimum thickness

9 mm (0.35 in)

Thickness variation (At least 8 portions)

Maximum 0.02 mm (0.0008 in)



Installation

NJBR0146

CAUTION:

- Refill with new brake fluid "DOT 4".
- Never reuse drained brake fluid.
- Do not drain (factory) filled brake fluid from (new) caliper assemblies.

1. Install caliper assembly.
- As shown in the figure, align the piston's concave to the pad's convex, then install the cylinder body to the torque member.
2. Remove the plug from the cylinder body and brake hose.

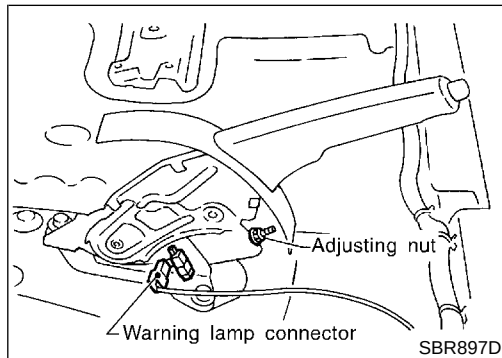
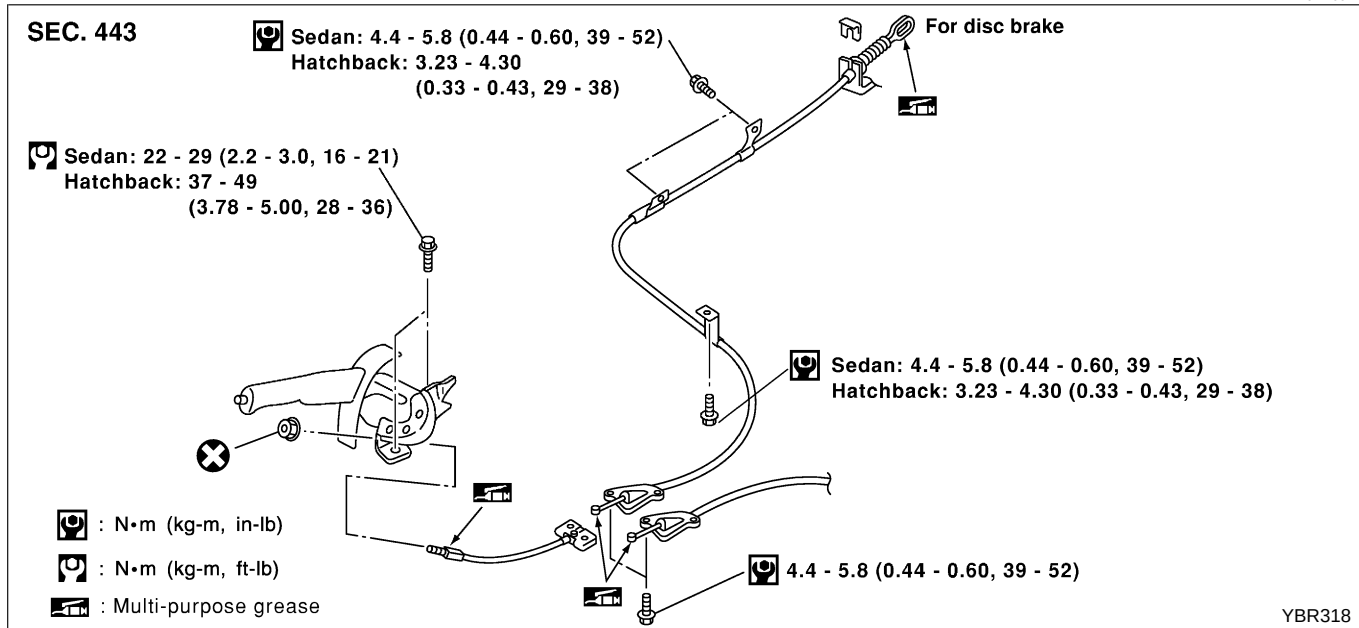
CAUTION:

Care should be taken as not to let:

- Air enter the cylinder body and brake hose.
 - Brake fluid spill from the cylinder body and brake hose.
3. Install brake hose to caliper securely.
 4. Install all parts and secure all bolts.
 5. Bleed air. Refer to "Bleeding Brake System", BR-8.

Components

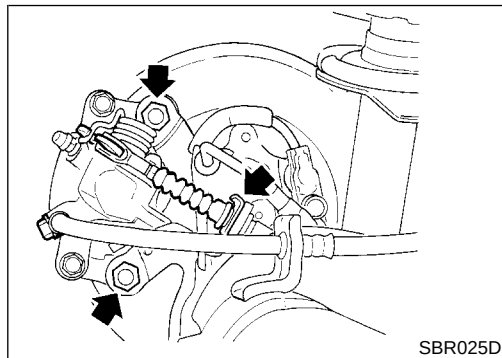
NJBR0044



Removal and Installation

NJBR0045

1. To remove parking brake cable, first remove center console.
2. Disconnect warning lamp switch connector.
3. Remove adjusting nut.
4. Remove bolts and nuts securing parking brake cable.
5. Remove parking brake device.



6. Remove lock plate and disconnect cable.

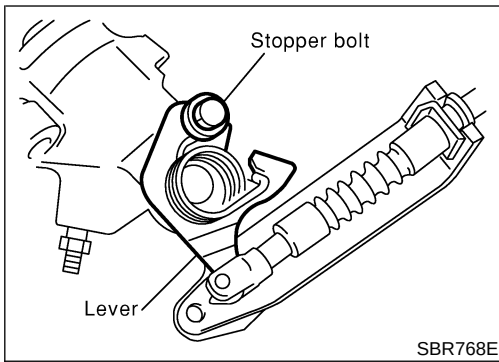
Inspection

NJBR0046

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

PARKING BRAKE CONTROL

Adjustment



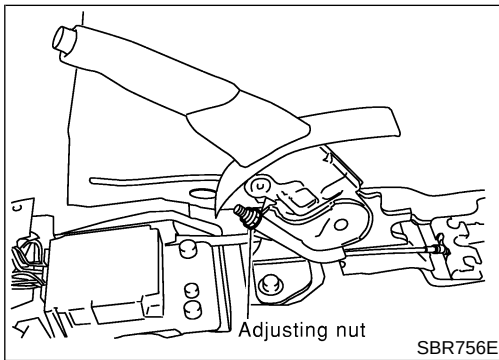
Adjustment

NJBR0047

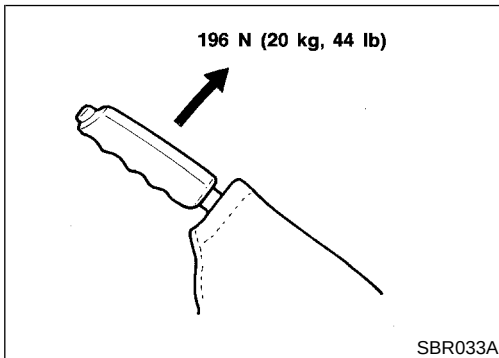
Before or after adjustment, pay attention to the following points.

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

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



2. Pull control lever 10 times or more to make a (full) lever stroke of 195 mm (7.68 in). At 4 to 6 notches, adjust the parking brake cable by turning the adjusting nut.



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

Number of notches

5 - 6

4. Bend warning lamp switch plate to ensure:
 - Warning lamp comes on when lever is lifted "A" notches.
 - Warning lamp goes out when lever is fully released.

Number of "A" notches: 1

Purpose

The ABS consists of electronic and hydraulic components. It allows for control of braking force so that locking of the wheels can be avoided. NJBR0082

The ABS:

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

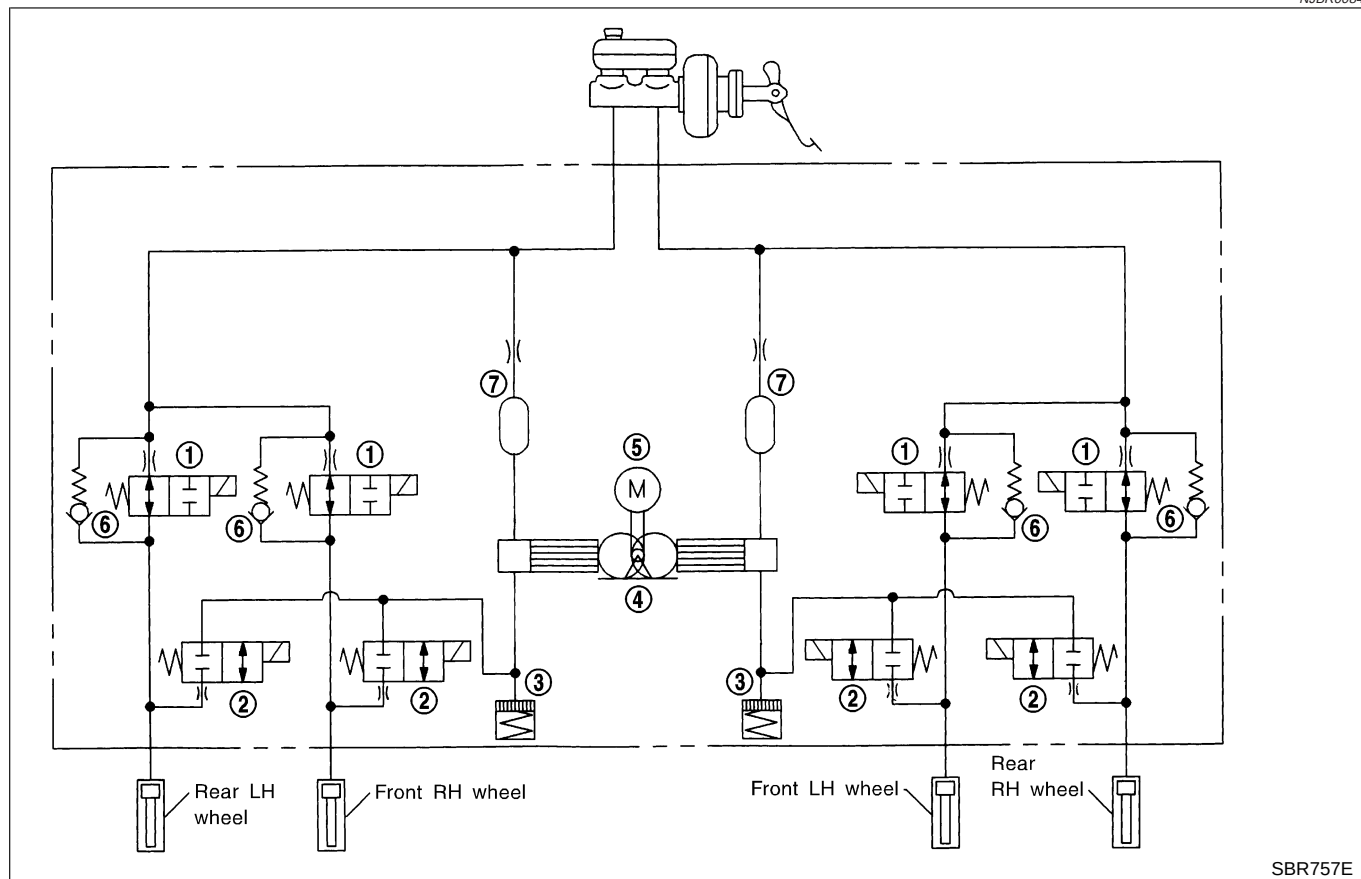
ABS (Anti-Lock Brake System) Operation

NJBR0083

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

ABS Hydraulic Circuit

NJBR0084



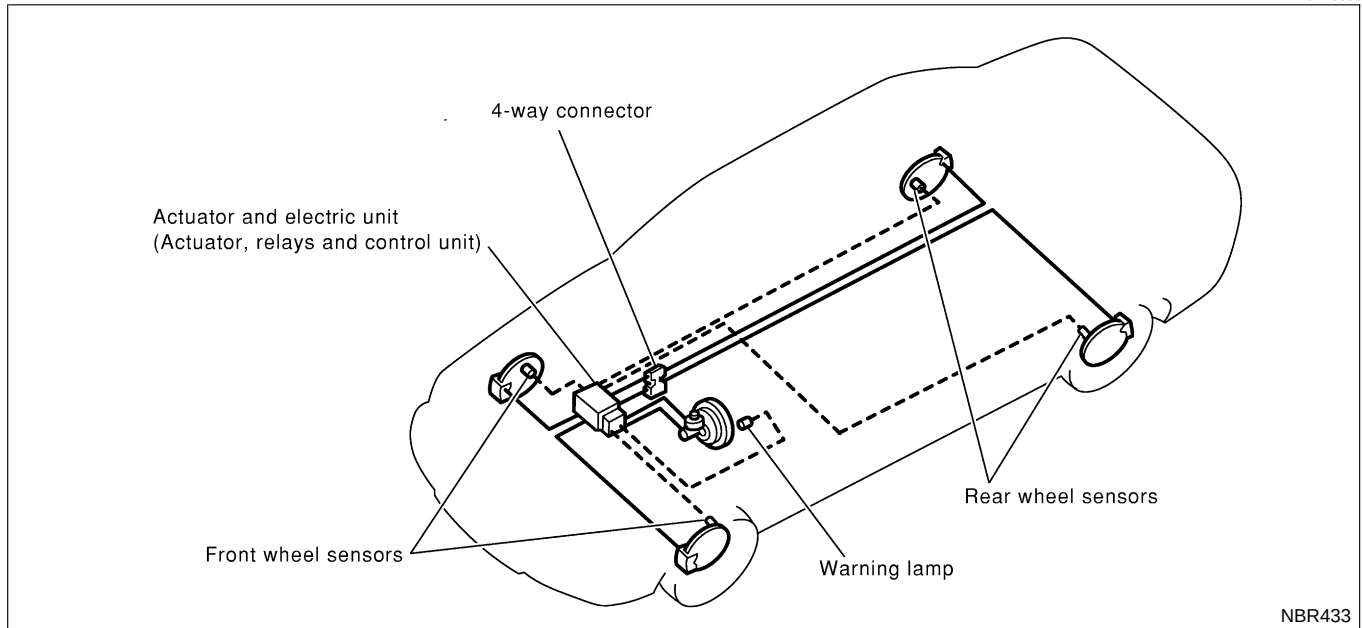
1. Inlet solenoid valve
2. Outlet solenoid valve
3. Reservoir

4. Pump
5. Motor

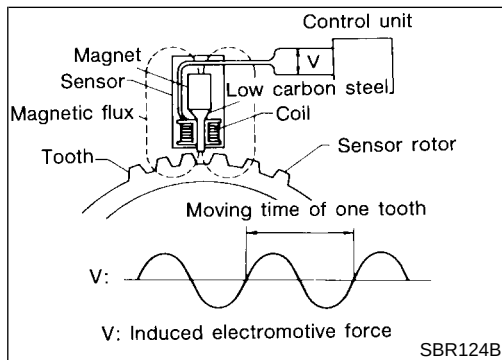
6. Bypass check valve
7. Damper

System Components

NJBR0086



NBR433



SBR124B

System Description

SENSOR

NJBR0087

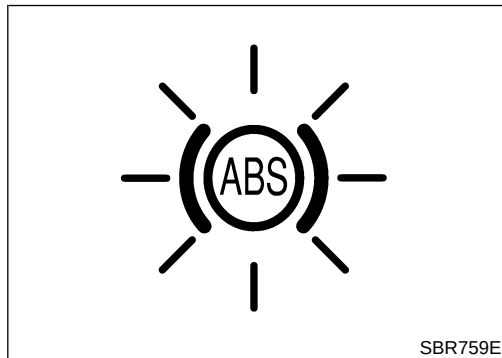
NJBR0087S01

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

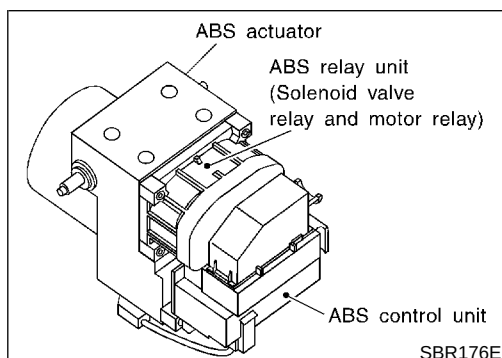
CONTROL UNIT

NJBR0087S02

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.



SBR759E



SBR176E

ABS ACTUATOR AND ELECTRIC UNIT

NJBR0087S03

The ABS actuator and electric unit contains:

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

This components controls the hydraulic circuit and increases, holds or decreases hydraulic pressure to all or individual wheels. The ABS actuator and electric unit can not be disassembled and can be only serviced as an assembly.

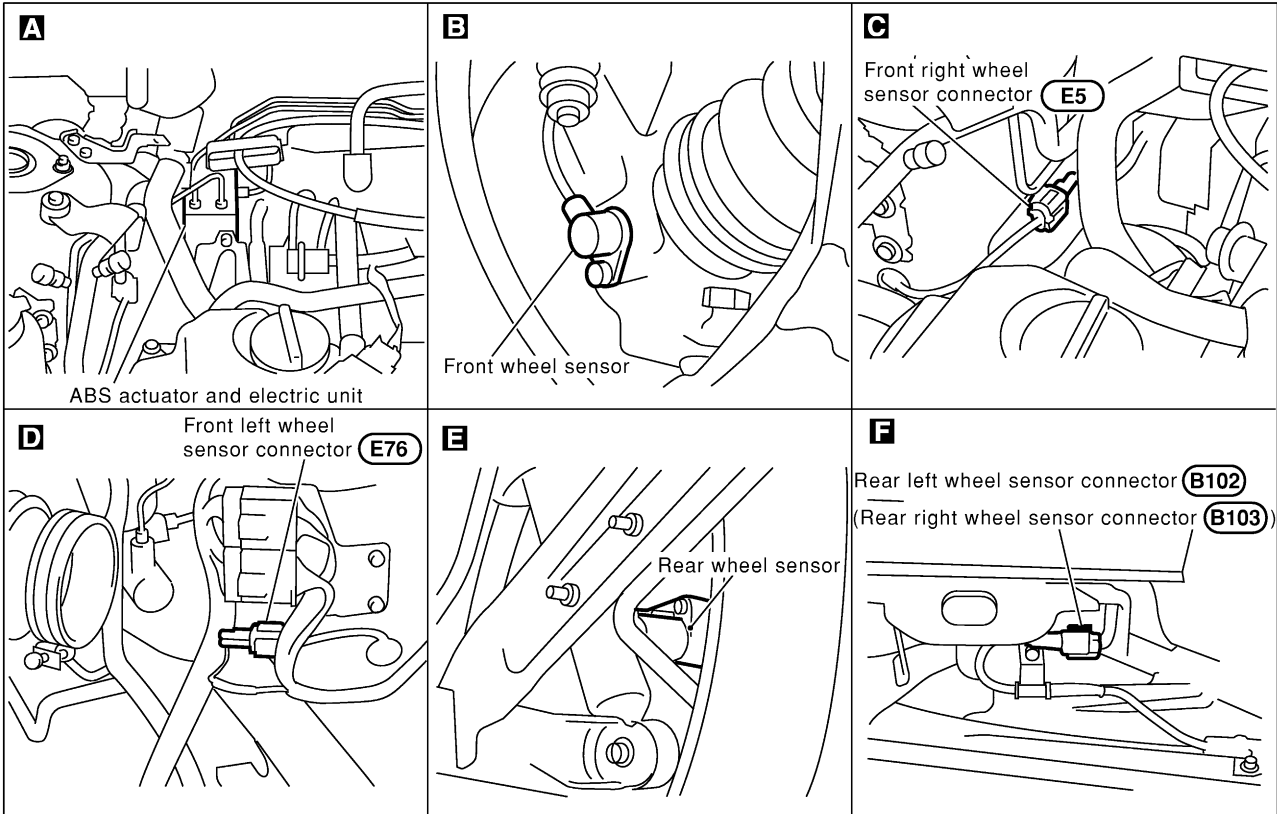
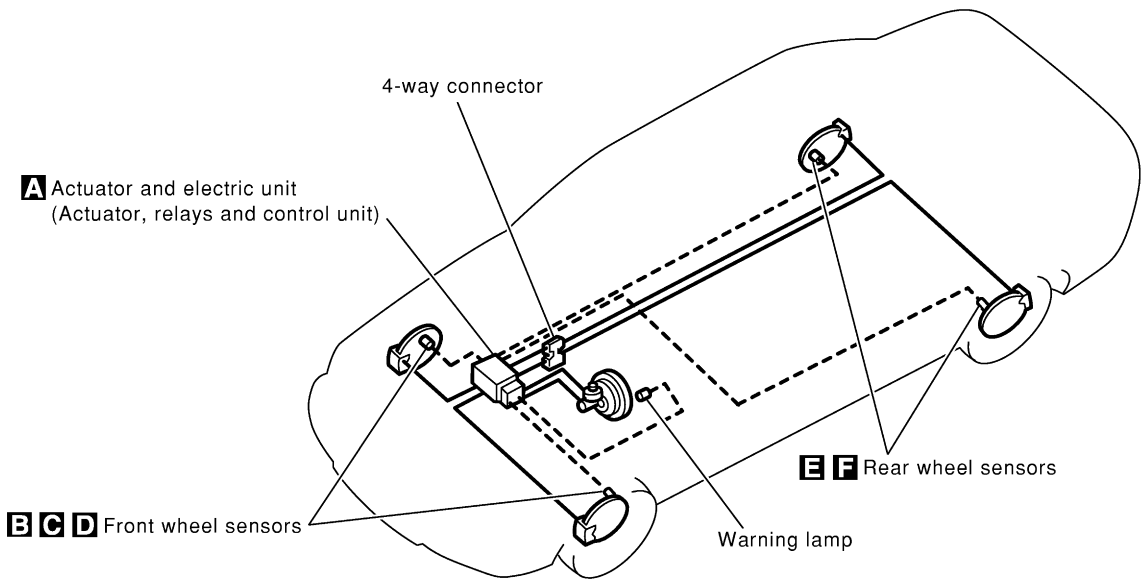
ABS Actuator Operation

NJBR0087S0301

		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.

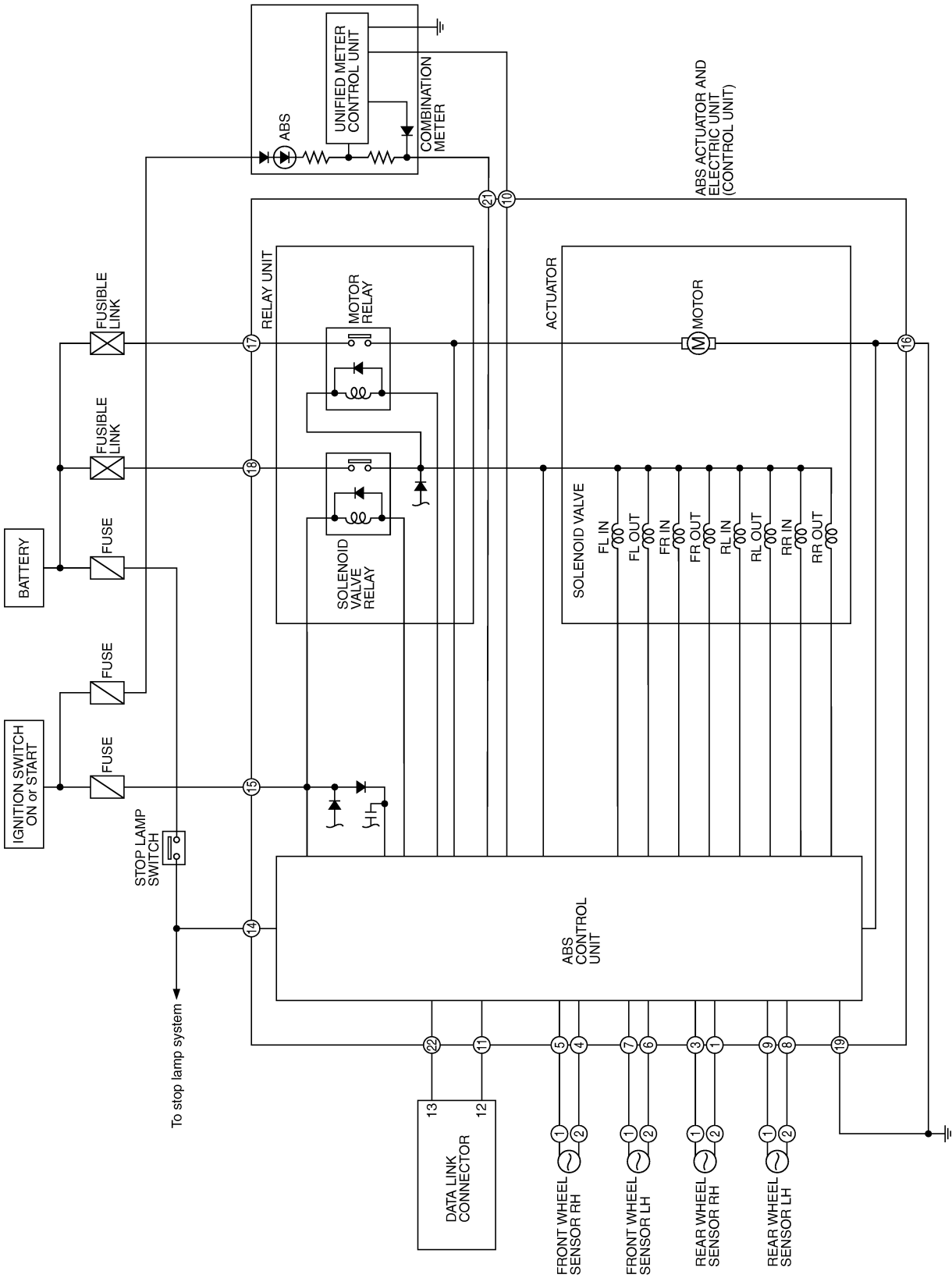
Component Parts and Harness Connector Location

NJBR0088



Schematic

NJBR0089



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

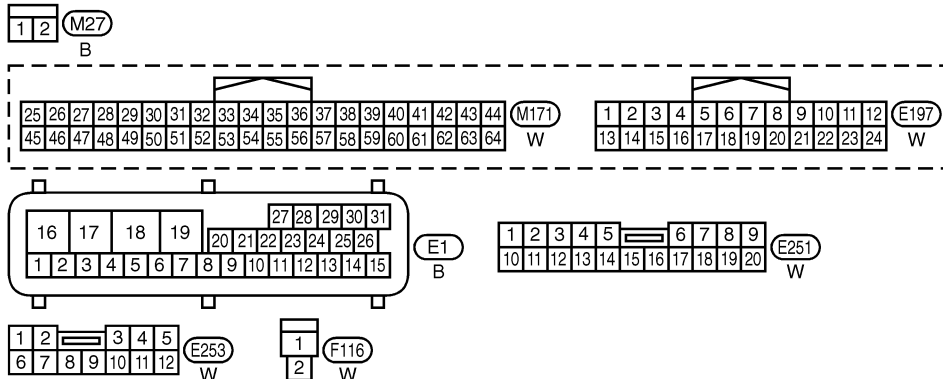
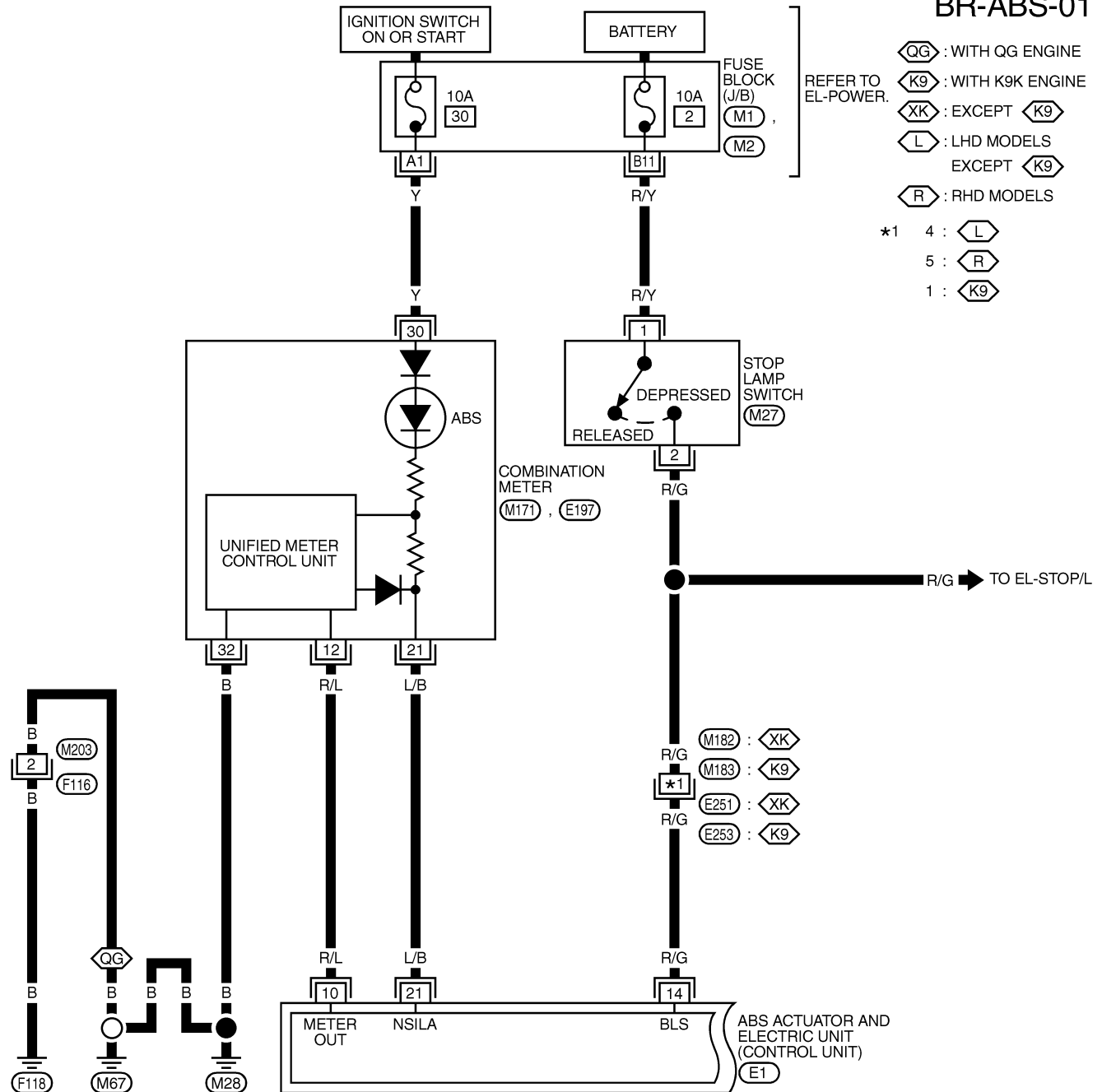
EL

IDX

Wiring Diagram — ABS —

NJBR0090

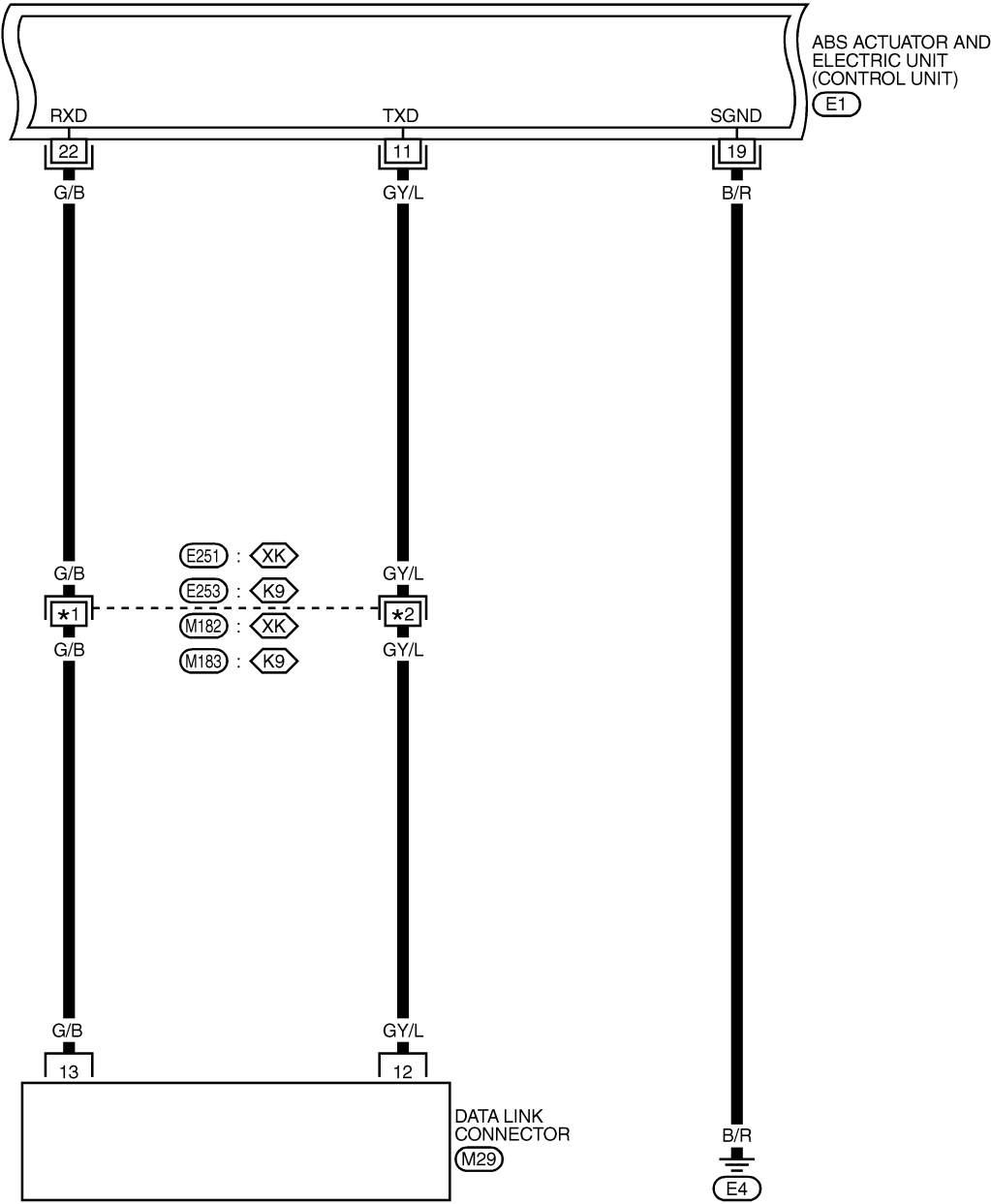
BR-ABS-01



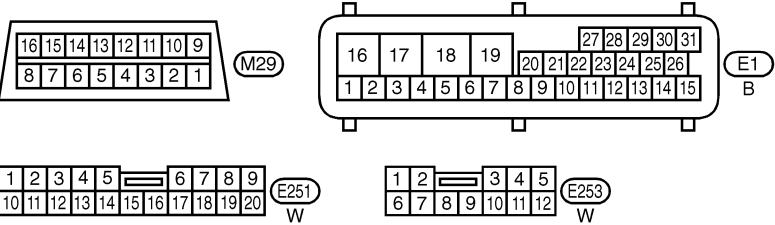
REFER TO THE FOLLOWING.
 (M1), (M2) - FUSE BLOCK-JUNCTION BOX (J/B)

YBR302

BR-ABS-02



- (K9) : WITH K9K ENGINE
- (XK) : EXCEPT (K9)
- (L) : LHD MODELS
- EXCEPT (K9)
- (R) : RHD MODELS
- *1 13 : (L)
- 6 : (R)
- 6 : (K9)
- *2 3 : (L)
- 4 : (R)
- 2 : (K9)



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

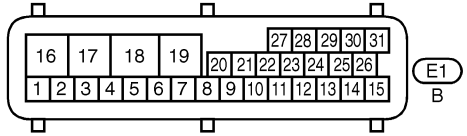
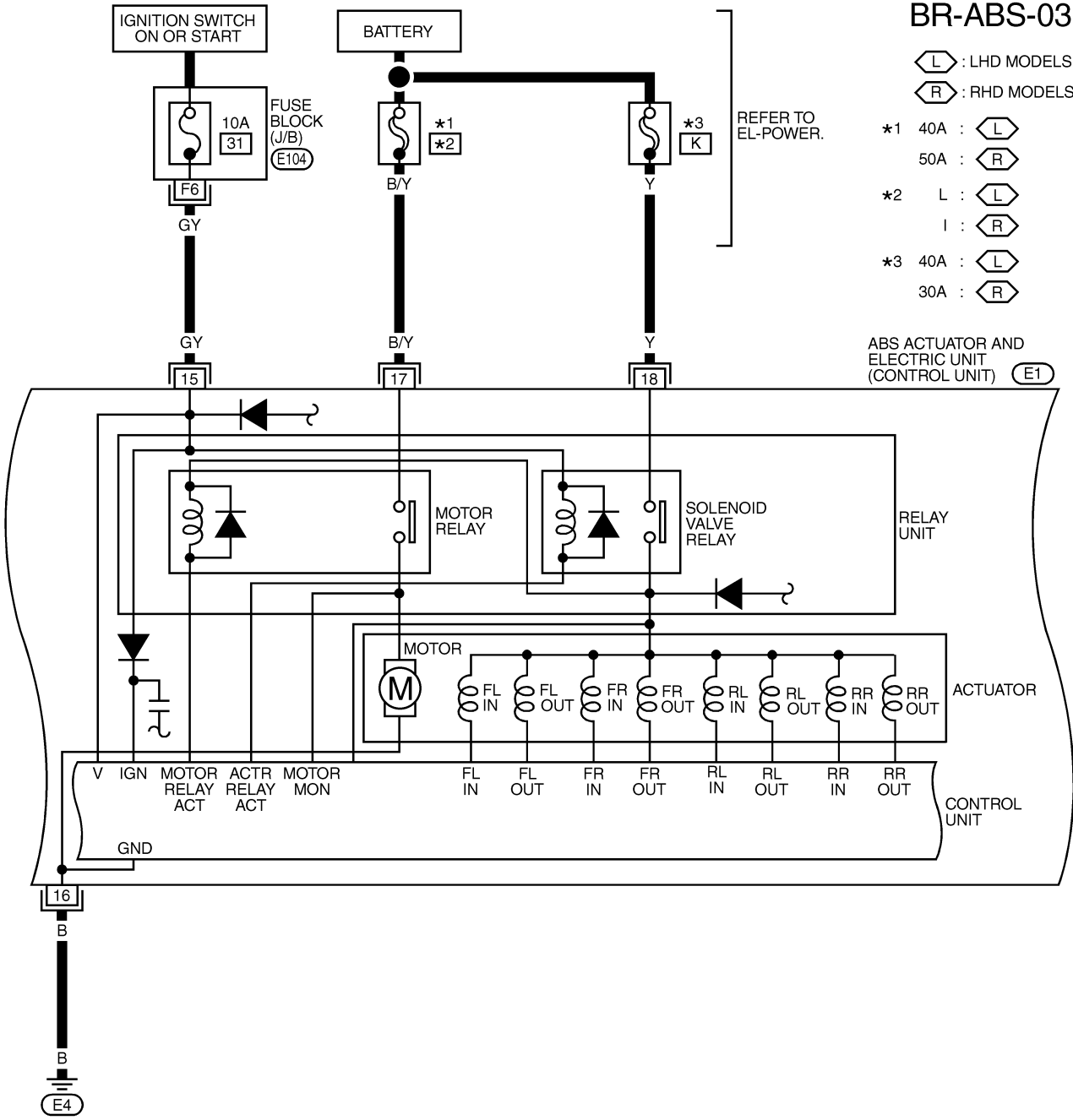
BT

HA

SC

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IDX

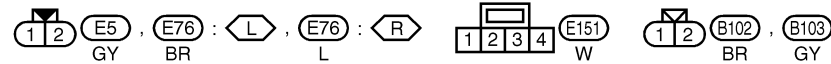
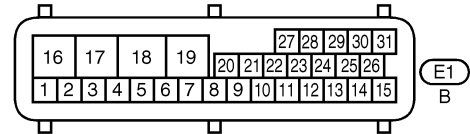
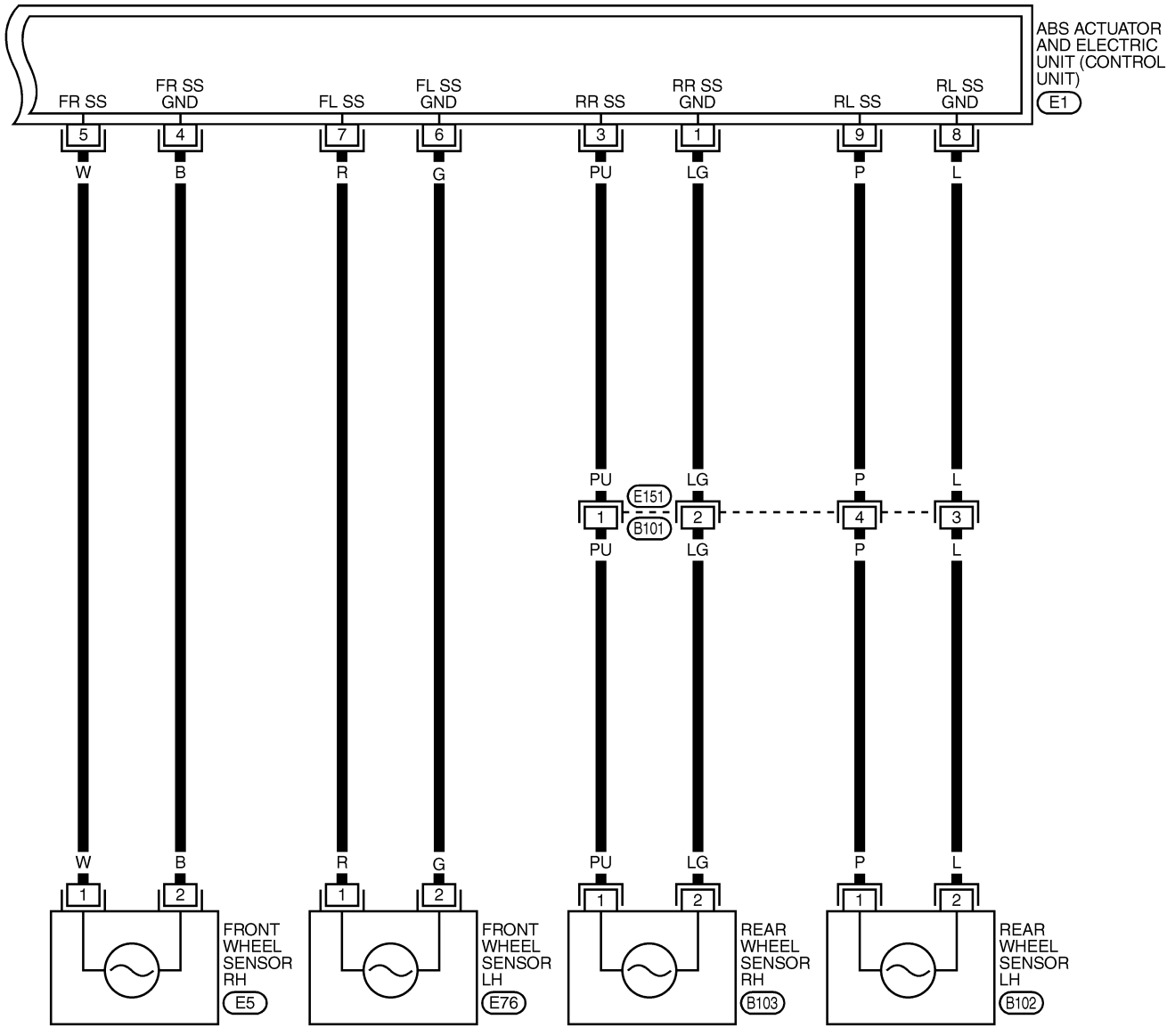


REFER TO THE FOLLOWING.

(E104) - FUSE BLOCK-
JUNCTION BOX (J/B)

BR-ABS-04

 : LHD MODELS
 : RHD MODELS



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Trouble Diagnosis Chart by Symptom

NJBR0159

NJBR0159S01

CHECK ITEMS LIST

When ABS and warning lamps illuminate, perform self-diagnosis.

Symptom	Condition	Check items	Reference page
ABS warning lamp does not illuminate with ignition ON. (ABS warning lamp check)	IGN-ON	- Blown ABS warning lamp bulb - Blown fuse between ignition and ABS warning lamp. - Open circuit of wiring between ignition and ABS warning lamp. - Malfunction in ABS system	BR-65
ABS warning lamp illuminates with ignition ON, but does not illuminates off after a few seconds. (ABS warning lamp has been illuminated.)	IGN-ON	- ABS actuator and electric unit connector disconnected - Malfunction in ABS system	BR-65

ABS actuator and electric unit Input/Output Signal Standard

NJBR0160

SPECIFICATIONS DEFINED BY CONSULT-II

NJBR0160S01

Items to be monitored	Contents	Data monitor		(Reference) Check points when result was malfunctioning
		Condition	Reference values in normal operation	
Wheel sensor FR, FL, RR, RL [km/h (MPH)]	Vehicle wheel speed	When the vehicle is stopped	0 km/h (0 MPH)	Wheel sensor and harness
		While driving (note:1)	Almost in accordance with speedometer display (within $\pm 10\%$)	
Stop lamp switch	Brake pedal status	Depress the brake pedal.	ON	Stop lamp switch and path
		Release brake pedal.	OFF	
ENGINE RPM SIGNAL [STOP/RUN]	With engine running	Engine RPM below 400 rpm	STOP	Engine RPM signal path
		Engine RPM 400 rpm or higher	RUN	
ABS inlet S/V FR, FL, RR, RL (ON/OFF)	Solenoid valve operation	Actuator and electric unit (solenoid valve) is activated (by active test mode of CONSULT-II) or actuator relay is not activated (in fail-safe mode, before starting engine)	ON	ABS solenoid valve path
ABS outlet S/V FR, FL, RR, RL (ON/OFF)		Actuator and electric unit (solenoid valve) is not activated and actuator relay is activated (vehicle stopped with Engine running)	OFF	
ABS actuator relay (ON/OFF)	Actuator relay activated	Vehicle stopped Ignition switch ON	OFF	ABS actuator relay and harness
		Vehicle stopped Engine running	ON	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

ABS

ABS actuator and electric unit Input/Output Signal Standard (Cont'd)

Items to be monitored	Contents	Data monitor		(Reference) Check points when result was malfunctioning
		Condition	Reference values in normal operation	
ABS motor relay (ON/OFF)	Motor relay and motor activated	(Ignition switch ON or engine is running): ABS inactive	OFF	ABS motor and motor relay harness
		(Ignition switch ON or engine is running): ABS active	ON	
Warning lamp (ON/OFF)	ABS warning lamp ON condition (Note 2)	ABS warning lamp ON	ON	ABS warning lamp and path
		ABS warning lamp OFF condition	OFF	
POWER VOLTAGE (V)	Battery voltage supplied to control module	Ignition switch ON	Approx. 10 - 16 V	Control unit power supply circuit

CAUTION:

1) Check air pressure of tire under normal condition.

2) ABS warning lamp ON/OFF timing

ON: When ignition switch is turned ON (before engine starts) or when malfunction is detected

OFF: After engine is started (When the system is in normal condition)

CONSULT-II Functions

CONSULT-II FUNCTION APPLICATION TABLE

NJBR0161

NJBR0161S01

Item	Self-diagnosis	Data monitor	Active test
FR RH SENSOR	×	×	-
FR LH SENSOR [OPEN]	×	×	-
RR RH SENSOR	×	×	-
RR LH SENSOR	×	×	-
Speed sensor	×	-	-
Stop lamp switch	-	×	-
FR RH IN ABS SOL	×	×	×
FR RH OUT ABS SOL	×	×	×
FR LH IN ABS SOL	×	×	×
FR LH OUT ABS SOL	×	×	×
RR RH IN ABS SOL	×	×	×
RR RH OUT ABS SOL	×	×	×
RR LH IN ABS SOL	×	×	×
RR LH OUT ABS SOL	×	×	×
ABS ACTUATOR RELAY	×	×	-
ABS MOTOR RELAY	×	×	×
ABS warning lamp	-	×	-
Battery voltage	×	×	-
Control module	×	-	-

×: Applicable

–: Not applicable

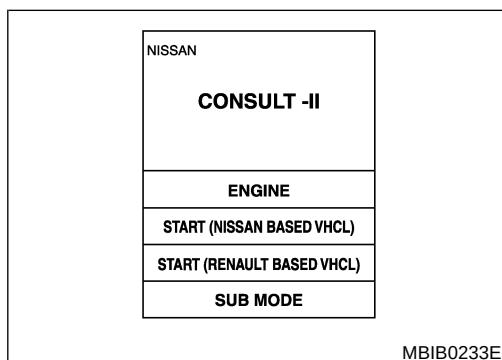
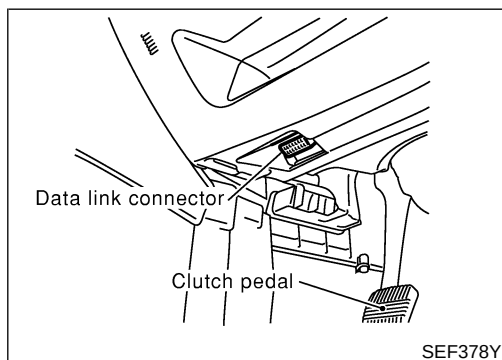
SELF-DIAGNOSIS

NJBR0161S02

Operation Procedure

NJBR0161S0201

1. After obtaining customer's information, perform BR-62, "Basic inspection".



2. After turning ignition switch OFF, connect CONSULT-II connector to data link connector on vehicle.
3. Start engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.

4. Stop vehicle. With engine at idle, touch "START (NISSAN BASED VHCL)", "ABS" and "SELF-DIAG RESULTS" on CONSULT-II screen in this order.

CAUTION:

"ABS" may not be displayed on the system selection screen in the following case: When "START (NISSAN BASED VHCL)" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 2.

5. Self-diagnosis result is displayed. (If necessary, touch "PRINT" to print self-diagnosis result.)
- If "NO MALFUNCTION" is displayed, check ABS warning lamp. Refer to BR-63, "BASIC INSPECTION 3 ABS WARNING LAMP INSPECTION".
6. Check the faulty part indicated by the chart to repair or replace.
7. Start engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.

CAUTION:

- Check again to make sure that there is NO FAILURE on other parts.
 - If wheel sensor [SHORT] is detected, ABS warning lamp does not turn off until following conditions: Vehicle is driven at Approx. 30 km/h (19 MPH) for Approx. 1 minute, even in normal conditions.
8. Turn OFF ignition switch to prepare for erasing memory.
 9. Start engine. Touch "START (NISSAN BASED VHCL)", "ABS", "SELF-DIAG RESULTS" and "ERASE MEMORY" on CONSULT-II screen in this order to erase fault memory.

CAUTION:

If memory cannot be erased, proceed to 6.

10. Drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute. Be sure ABS warning lamp is OFF.

Display Item List

NJBRO161S0202

Faulty lines	Malfunction detecting condition	Check harness	
Front RH wheel sensor [OPEN]	Either of following causes may be possible. Circuit of front RH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines.	Wheel sensor harness	GI
Front LH wheel sensor [OPEN]	Circuit of front LH wheel sensor is open, or abnormally high input voltage is caused by a short to power supply on signal lines.		MA
REAR RH wheel sensor [OPEN]	Either of following causes may be possible. Circuit of rear RH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines.		EM
REAR LH wheel sensor [OPEN]	Either of following causes may be possible. Circuit of rear LH wheel sensor is open. Abnormally high input voltage is caused by a short to power supply on signal lines.		LC
Front RH wheel sensor [short 1] or front RH wheel sensor [short 2] (Note 1), (Note 2)	At RH front wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal		EC
Front LH wheel sensor [short 1] or front left wheel sensor [open 2] (Note 1), (Note 2)	At LH front wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal		FE
Rear RH wheel sensor [SHORT] (Note 1), (Note 2)	At RH rear wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal		CL
Rear LH wheel sensor [SHORT] (Note 1), (Note 2)	At LH rear wheel sensor, following conditions occur: abnormally high or low input voltage by short to power supply or ground on signal lines, abnormal input signal		MT
FR RH IN ABS SOL [OPEN] [SHORT]	At RH front wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.	ABS solenoid valve and actuator relay harness	AT
FR LH IN ABS SOL [OPEN] [SHORT]	At LH front wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.		AX
RR RH IN ABS SOL [OPEN] [SHORT]	At RH rear wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.		SU
RR LH IN ABS SOL [OPEN] [SHORT]	At LH rear wheel ABS inlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.		BR
FR RH OUT ABS SOL [OPEN] [SHORT]	At RH front wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.		ST
FR LH OUT ABS SOL [OPEN] [SHORT]	At LH front wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.		RS
			BT
			HA
			SC
			EL
			IDX

CONSULT-II Functions (Cont'd)

Faulty lines	Malfunction detecting condition	Check harness
RR RH OUT ABS SOL [OPEN] [SHORT]	At RH rear wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.	ABS solenoid valve and actuator relay harness
RR LH OUT ABS SOL [OPEN] [SHORT]	At LH rear wheel ABS outlet solenoid valve, following conditions occur: open circuit, output voltage is abnormally lower or higher than control value by short to ground on control line.	
ABS motor [ON error]	ABS actuator motor turned ON when the ABS motor is controlled OFF.	ABS motor relay and harness
ABS motor [OFF error]	ABS actuator motor turned OFF when the ABS motor is controlled ON.	
ABS actuator relay [ON error]	ABS actuator relay turned ON when it is controlled OFF.	ABS actuator relay and harness
ABS ACTUATOR RELAY [OFF abnormal]	ABS actuator relay turned OFF when it is controlled ON.	
BATTERY VOLTAGE [ABNORMAL]	Power source voltage supplied to ABS actuator and electric unit is abnormally low.	ABS actuator and electric unit power supply circuit
CONTROL UNIT	Function of calculation in ABS actuator and electric unit has failed.	ABS actuator and electric unit, power and ground circuits

(Note 1): When vehicle was stuck on slippery road, and spin its wheels for Approx. 10 - 80 seconds (the period depends on vehicle speed). ABS warning lamp may come on. However, this is not abnormal.

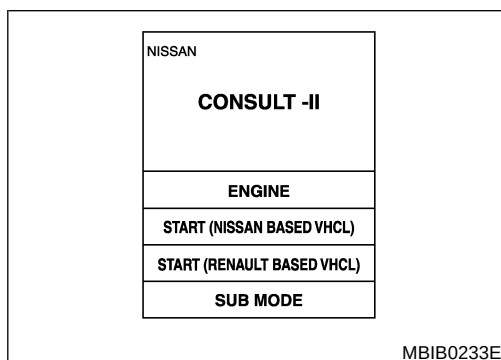
(Note 2): Repair short circuit in sensor. ABS warning lamp will come on when ignition switch is turned ON. According to self-diagnosis operation procedure, drive vehicle at Approx. 30 km/h (19 MPH). Then check ABS warning lamp goes out in about one minute.

DATA MONITOR

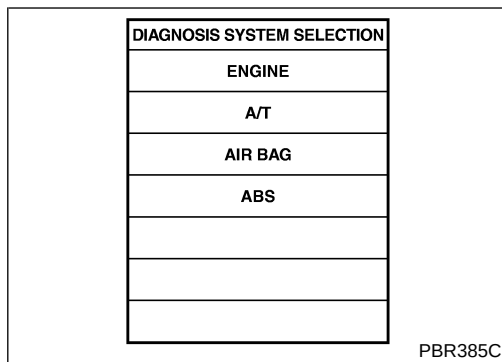
- For details of data monitor function, refer to CONSULT-II Instruction Manual. NJBR0161S03

Operation Procedure

- Turn the ignition switch to OFF. NJBR0161S0301
- Connect CONSULT-II connector to data link connector on vehicle.
- Turn ignition switch ON.



- Touch "START (NISSAN BASED VHCL)" on the display.



5. Touch "ABS" on display.

CAUTION:

"ABS" may not be displayed on the system selection screen in the following case: When "START (NISSAN BASED VHCL)" was touched just after engine is started or ignition switch is turned to ON. In this case, repeat procedure from step 2.

6. Touch "DATA MONITOR".

7. Return to monitor item selection screen. Touch any of "ECU INPUT SIGNALS", "MAIN SIGNALS", "CAN DIG SUPPORT MNTR" or "SELECTION FROM MENU". Refer to following "Data monitor item chart".

8. Touch "MONITOR START".

9. Screen of data monitor is displayed.

Display Item List

NJBRO161S0302

Item (Unit)	Monitor item selection		Remarks
	Main item	Item menu selection	
FR RH SENSOR (km/h)	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h)	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed. (Note 1)
RR RH SENSOR (km/h)	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed. (Note 1)
RR LH SENSOR (km/h)	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
STOP LAMP SW	×	×	Operating condition of ABS warning lamp by control unit is displayed.
FR RH IN SOL	×	×	Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed.
FR RH OUT SOL	×	×	Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed.
FR LH IN SOL	×	×	Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed.
FR LH OUT SOL (ON/OFF)	×	×	Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed.
RR RH IN SOL (ON/OFF)	×	×	Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed.
RR RH OUT SOL (ON/OFF)	×	×	Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed.
RR LH IN SOL (ON/OFF)	×	×	Operating condition (ON/OFF) of rear RH ABS inlet solenoid valve is displayed.

Item (Unit)	Monitor item selection		Remarks
	Main item	Item menu selection	
RR LH OUT SOL (ON/OFF)	×	×	Operating condition (ON/OFF) of rear RH ABS outlet solenoid valve is displayed.
ACTUATOR RLY (ON/OFF)	×	×	Condition of ABS actuator relay (ON/OFF) is displayed.
MOTOR RLY (ON/OFF)	×	×	Condition of ABS motor relay (ON/OFF) is displayed.
WARNING LAMP (ON/OFF)	×	×	Indicates ABS warning lamp operating condition
BATTERY VOLT	×	×	Indicates voltage supplied by ABS actuator and electric unit
Voltage	-	×	Displays values measured by voltage probe

×: Applicable

–: Not applicable

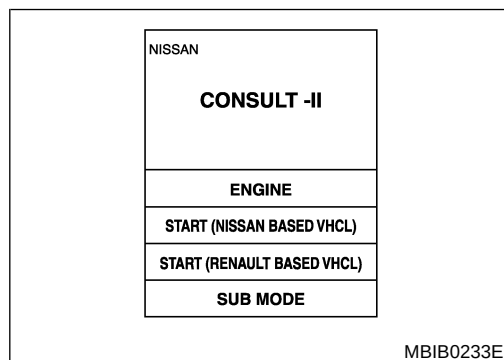
ACTIVE TEST**Operation Procedure**

NJBR0161S04

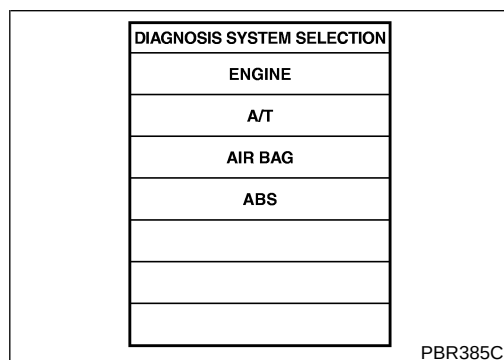
CAUTION:

NJBR0161S0401

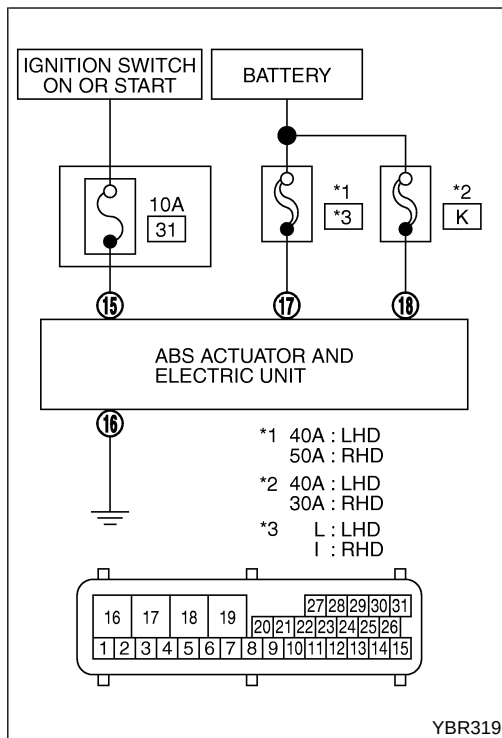
- Do not perform active test wheel running.
 - Be sure completely bleed air from brake system.
 - Active test cannot be performed with ABS warning lamp on.
1. Connect CONSULT-II to data link connector and start engine.



2. Touch "START (NISSAN BASED VHCL)" on the display.



3. Touch "ABS".
4. Touch "ACTIVE TEST".
5. Test item selection screen is displayed.
6. Touch test item.
7. Touch "START" with "MAIN SIGNALS" line inverted.
8. Active test screen is displayed.



ABS Actuator and Electric Unit

NJBR0162

Disconnect each ABS actuator and electric unit E217 connector. Confirm continuity and resistance value between each pair of ABS actuator and electric unit harness connector.

CAUTION:

Be sure ABS motor is securely grounded.

Basic Inspection 1 Brake Fluid Level and Leakage Inspection

NJBR0163

1. Check fluid level in brake reservoir tank. If fluid level is low, refill brake fluid.
2. Check area around brake piping and ABS actuator and electric unit for leaks. If a leak or oozing is detected, check as follows:
 - If connections at ABS actuator and electric unit are loose, tighten piping to the specified torque. Then check again for leaks, and be sure there is no fluid leak.
 - If the flare nuts at the connections and the threads of the ABS actuator and electric unit are damaged, replace the damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
 - If leak or oozing is detected except for ABS actuator and electric unit connections, wipe it with clean cloth. Then check again for leaks. If there is still leak or oozing, replace damaged part.
 - If leak or oozing is detected on ABS actuator and electric unit, wipe with a clean cloth. Check again for leaks, and if there is still leak or oozing, replace ABS actuator and electric unit.

CAUTION:

ABS actuator and electric unit body cannot be disassembled.

Basic Inspection 2 Inspection for Loose Power Supply Terminal

NJBR0164

Check battery for looseness on battery positive/negative terminals and ground connection.

Basic Inspection 3 ABS Warning Lamp Inspection

1. Be sure ABS warning lamp turns on when ignition switch is turned ON. If it does not turn on, check ABS warning lamp harness. NJBR0165
2. Be sure ABS warning lamp turns off after approximately 1 second when ignition switch is turned ON. If it does not turn off, perform self-diagnosis.
3. After driving the vehicle at Approx. 30 km/h (19 MHP) for a few seconds, check ABS warning lamp do not illuminate.
4. After completing the self-diagnosis, always erase the diagnosis memory.

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Wheel Sensor System

NJBR0166

1	TIRE INSPECTION
Check air pressure, wear, and size.	
Are air pressure, wear, and size within specifications?	
Yes	▶ GO TO 2.
No	▶ Adjust air pressure, or replace tire.

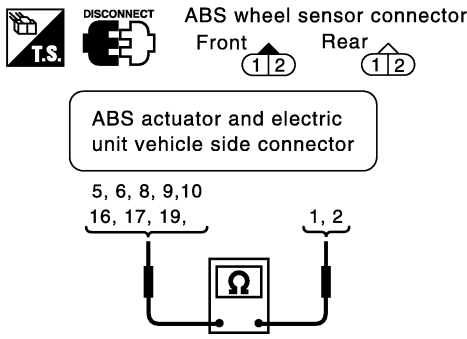
2	SENSOR ROTOR INSPECTION
Check sensor rotor tooth for damage.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Replace sensor rotor.

3	CHECK THE CONNECTOR
1. Remove both the malfunctioning wheel sensor (identified at control unit) and the ABS actuator and electric unit connector. Check the deformation of the terminal or if the connection is at the incomplete state. Then connect the connectors. 2. Operate self-diagnosis.	
ABS wheel sensor connector RR-LH RR-RH FR-LH FR-RH FR-RH (1, 2) FR-LH (1, 2) RR-RH (1, 2) RR-LH (1, 2) 17 6 19 8 5 16 10 9 ABS actuator and electric unit	
Does ABS warning lamp illuminate?	
Yes	▶ GO TO 4.
No	▶ Check is completed.

SFIA0418E

4	CHECK WHEEL SENSOR
Check internal resistance of wheel sensor.	
Resistance: 1.44 - 1.76 kΩ	
DISCONNECT T.S. ABS wheel sensor connector FR-LH FR-RH RR-LH RR-RH (1, 2) (1, 2) (1, 2) (1, 2) 1 2 Ω	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace wheel sensor.

SFIA0419E

5	CHECK WHEEL SENSOR CIRCUIT
1. Disconnect control unit connector and wheel sensor connector. 2. Check continuity between the ABS actuator and electric unit harness connector E217 terminal No.5 (R), 16 (G), 10 (W), 9 (B), 17 (P), 6 (L), 19 (PU), 8 (LG) and wheel sensor harness connector E226 No. 1 (R), 2 (G), E228 No. 1 (W), 2 (B), B104 No. 1 (P), 2 (L), B103 No. 1 (PU), 2 (LG)	
 SFIA0420E	
OK or NG	
OK	▶ Replace ABS actuator and electric unit.
NG	▶ Repair or replace the harness.

ABS Warning Lamp Does Not Illuminate. (ABS Warning Lamp Does Not Come on When the Ignition Switch is Turned ON.)

Replace the combination meter control unit.

NJBR0167

ABS Warning Lamp Illuminates with Ignition ON, but Does Not Illuminates Off After a Few Seconds. (ABS Warning Lamp has been Illuminated.)

NJBR0168

1	ABS ACTUATOR AND ELECTRIC UNIT CONNECTOR CONNECTION INSPECTION
Remove glove box on the passenger side and check ABS actuator and electric unit connector for proper connection.	
OK or NG	
OK	▶ GO TO 2. (ABS actuator and electric unit connector is properly connected.)
NG	▶ Connect the ABS actuator and electric unit connector and perform inspection again.

2	USING CONSULT-II, PERFORM SELF-DIAGNOSIS
Connect the CONSULT-II and perform self-diagnosis.	
OK or NG	
OK	▶ Normal (No self-diagnosis malfunction indicated.)
NG	▶ Perform inspection according to the trouble codes displayed on the CONSULT-II. Refer to the "DTC chart".

1. ABS Works Frequently

NJBR0170

1	INSPECTION START	
Check the wheel sensor system. ● Sensor mounting inspection ● Sensor pick-up inspection for iron chips ● Sensor rotor inspection (e.g. Number of teeth, damaged teeth) ● Sensor connector engagement inspection		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Refer to wheel sensor and rotor lines.

2	LOOSENESS INSPECTION	
Check the front and rear axle for looseness.		
Is inspection result OK?		
OK	▶	BR-66, "2. Unexpected Pedal Action"
NG	▶	Axle inspection and repair

2. Unexpected Pedal Action

NJBR0171

1	BRAKE PEDAL STROKE INSPECTION	
Check the brake pedal stroke.		
Is stroke excessively long?		
Yes	▶	Check the bleeding and brake system.
No	▶	GO TO 2.

2	PEDAL FORCE INSPECTION	
Check that the brake is effective with the pedal depressed.		
Is the pedal heavy, but effective?		
Yes	▶	Normal
No	▶	GO TO 3.

3	CONNECTOR AND PERFORMANCE INSPECTION	
Disconnect the actuator relay unit connector to deactivate the ABS function. Check that the brake is effective.		
Is the brake effective?		
Yes	▶	GO TO 4.
No	▶	Brake line inspection

4	ABS WARNING LAMP INDICATOR INSPECTION	
Check that the ABS warning lamp illuminates.		
Does the ABS warning lamp illuminate?		
Yes	▶	Perform the self-diagnosis.
No	▶	GO TO 5.

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

2. Unexpected Pedal Action (Cont'd)

5	WHEEL SENSOR INSPECTION
Check the wheel sensor system. • Sensor mounting inspection • Sensor pick-up inspection for iron chips • Sensor rotor inspection (e.g. Number of teeth, damaged teeth) • Sensor connector engagement inspection	
Is inspection result OK?	
OK	▶ Normal
NG	▶ Wheel sensor and rotor lines repair

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3. Longer Stopping Distance

NJBR0172

1	INSPECTION START
Check that the stopping distance when braking becomes longer only on a snowy or gravel road.	
Does the stopping distance when braking become longer only on a snowy or gravel road?	
Yes	▶ It may be longer than that of vehicle without ABS.
No	▶ GO TO 2.

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2	PERFORMANCE CHECK
Disconnect the actuator relay box to deactivate the ABS function.	
Is the stopping distance still longer?	
Yes	▶ • Brake line air bleeding • Brake line inspection
No	▶ GO TO 3.

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3	ABS WARNING LAMP INDICATOR INSPECTION
Check that the ABS warning lamp illuminates.	
Does the ABS warning lamp illuminate?	
Yes	▶ Perform the self-diagnosis.
No	▶ GO TO 4.

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4	WHEEL SENSOR INSPECTION
Check the wheel sensor system. • Sensor mounting inspection • Sensor pick-up inspection for iron chips • Sensor rotor inspection (e.g. Number of teeth, damaged teeth) • Sensor connector engagement inspection	
OK or NG	
OK	▶ Normal
NG	▶ Wheel sensor and rotor lines repair

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4. ABS Does Not Work

NJBR0173

1	ABS WARNING LAMP INDICATOR INSPECTION	
Check that the ABS warning lamp illuminates.		
Does the ABS warning lamp illuminate?		
Yes	▶	Perform the self-diagnosis.
No	▶	GO TO 2.

2	WHEEL SENSOR INSPECTION	
Check the wheel sensor system. ● Sensor mounting inspection ● Sensor pick-up inspection for iron chips ● Sensor rotor inspection (e.g. Number of teeth, damaged teeth) ● Sensor connector engagement inspection		
OK or NG		
OK	▶	Normal
NG	▶	Wheel sensor and rotor lines repair

5. Pedal Vibration and Noise

NJBR0174

1	SYMPTOM CHECK	
Check the brake system for pedal vibration or noise at the engine start.		
OK or NG		
OK	▶	Perform the self-diagnosis.
NG	▶	GO TO 2.

2	SYMPTOM CHECK 2	
Check the brake system for pedal vibration or noise when the pedal depressed lightly (just put a foot on).		
CAUTION:		
Under the following driving conditions, the wheel speed will fluctuates, resulting in ABS activation.		
● When shifting gears ● High speed cornering ● When a gust of wind		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Normal

3	SYMPTOM CHECK 3	
Does the symptom appear during normal braking operation?		
CAUTION:		
ABS may work in following driving conditions even if there is no sudden brake.		
● When road friction is low. ● High speed cornering ● When a gust of wind		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Normal

TROUBLE DIAGNOSES FOR SYMPTOMS

ABS

5. Pedal Vibration and Noise (Cont'd)

4	SYMPTOM CHECK 4	
Check that the symptom is reproduce when the engine speed is increased with the vehicle stopped.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	● Normal. CAUTION: This symptom may appear with vehicle stopped.

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5	SYMPTOM CHECK 5	
Check that the symptom is reproduce when any switch of electrical equipment is operated.		
OK or NG		
OK	▶	Check that there are no radio, antenna, and antenna lead-in wires (including wiring) near control unit.
NG	▶	GO TO 6.

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6	ABS WARNING LAMP INSPECTION	
Check that the ABS warning lamp turns on.		
OK or NG		
OK	▶	Perform the self-diagnosis.
NG	▶	GO TO 7.

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7	WHEEL SENSOR INSPECTION	
Check the wheel sensor system. ● Sensor mounting inspection ● Sensor pick-up inspection for iron chips (e.g. Number of teeth, damaged teeth) ● Sensor connector engagement inspection ● Wheel sensor path harness and connector inspection		
OK or NG		
OK	▶	Normal
NG	▶	Wheel sensor and rotor lines repair

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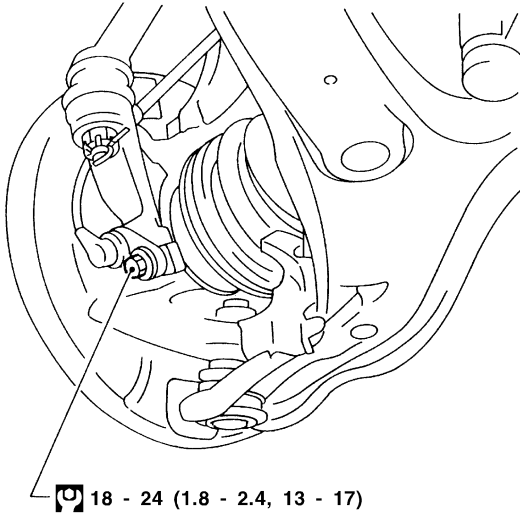
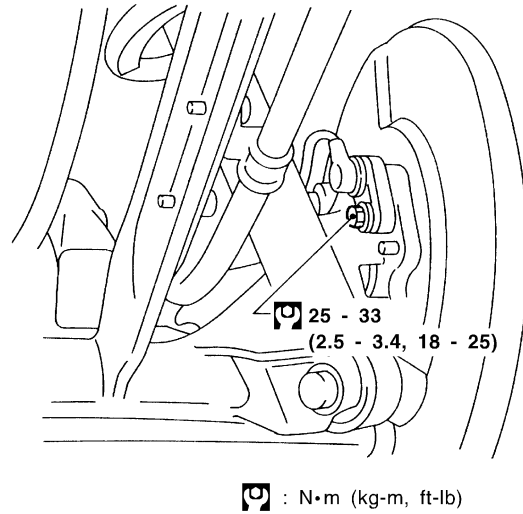
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CAUTION:

Be careful not to damage sensor edge and sensor rotor teeth. When removing the front or rear wheel hub assembly, first remove the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

Wheel Sensors

NJBR0111S01

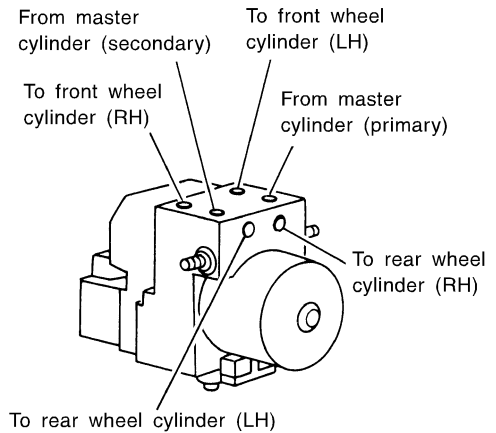
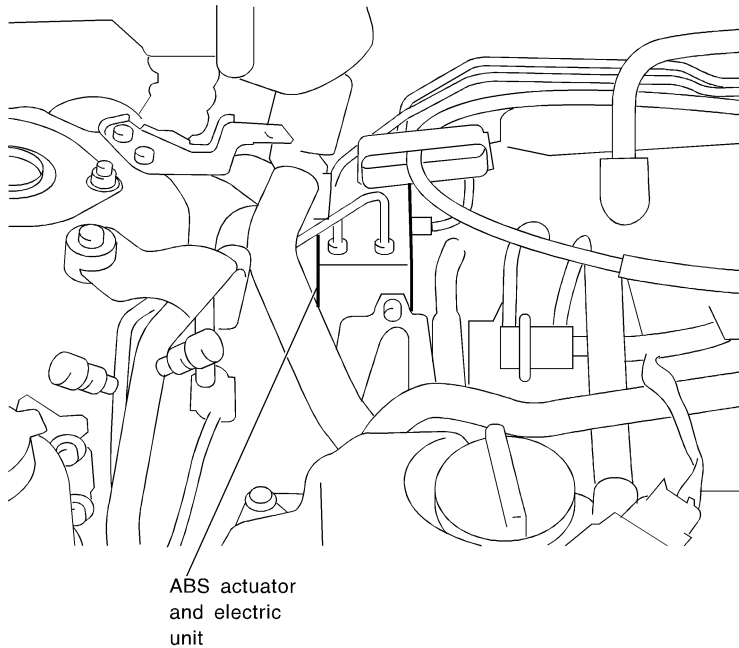
SEC. 476**Front wheel sensor****Rear wheel sensor**

SBR902D

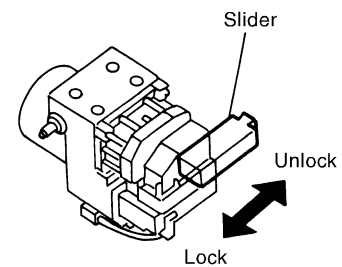
ABS Actuator and Electric Unit

NJBR0111S10

SEC. 476



The way of connector lock



SBR630E

REMOVAL

NJBR0111S1001

1. Disconnect battery cable.
2. Drain brake fluid.
3. Remove mounting bracket fixing bolts and nuts.
4. Disconnect connector, brake pipes and remove fixing nuts.

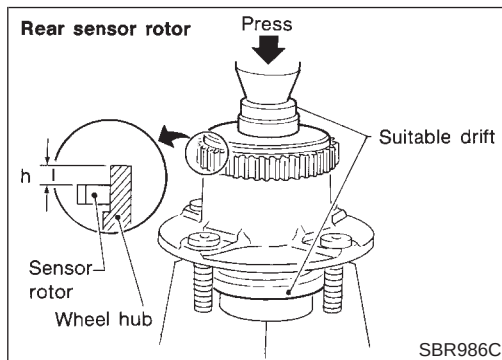
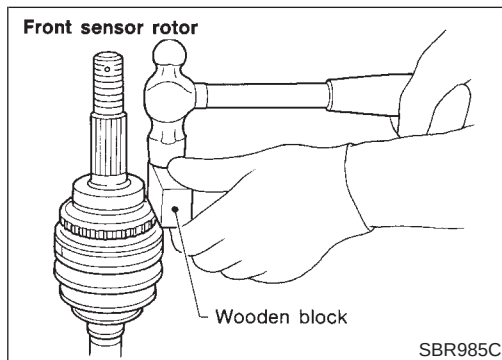
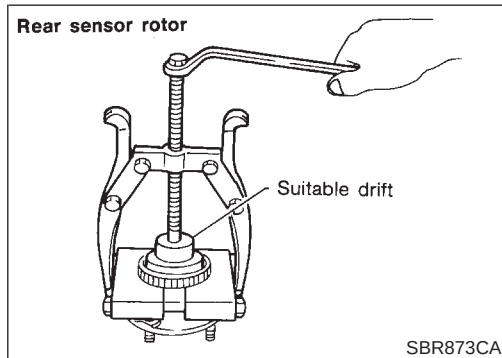
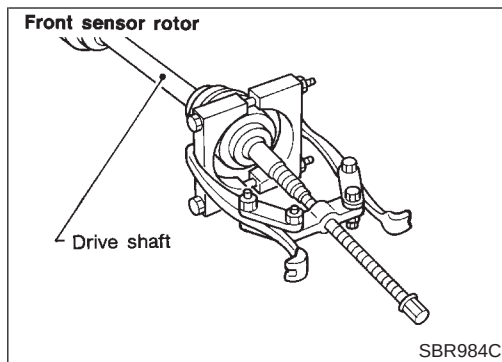
INSTALLATION

NJBR0111S1002

CAUTION:**After installation, refill brake fluid. Then bleed air.**

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

Sensor Rotor



Sensor Rotor

NJBR0111S02

REMOVAL

NJBR0111S0201

1. Remove the drive shaft and rear wheel hub. Refer to "Drive Shaft" and "Wheel Hub" in AX section.
2. Remove the sensor rotor using suitable puller, drift and bearing replacer.

INSTALLATION

NJBR0111S0202

Install the sensor rotor. For front sensor rotor, use hammer and wooden block. For rear sensor rotor, use suitable drift and press.

- Always replace sensor rotor with new one.
- Pay attention to the dimension of rear sensor rotor as show in figure.
h: 24.8 - 25.8 mm (0.976 - 1.016 in)

SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

General Specifications

NJBR0077
Unit: mm (in)

Engine			QG15DE		Except QG15DE	
ABS			Without	With		Without
Front brake	Brake model		CL25VG	CL25VBG		
	Cylinder bore diameter		57.2 (2.252)			
	Pad Length × width × thick- ness		113.1 × 45.5 × 11.0 (4.45 × 1.791 × 0.433)	108.8 × 47.7 × 11.0 (4.28 × 1.878 × 0.433)		
	Rotor outer diameter × thickness		257 × 22 (10.12 × 0.87)	280 × 22 (11.02 × 0.87)		
ABS			Without	With		Without
Rear brake	Brake model		CL9HCG	CL11HEG (Ball & Ramp type)		CL9HCG
	Cylinder bore diameter		33.96 (1.3370)	38.2 (1.504)		33.96 (1.3370)
	Pad Length × width × thick- ness		79.8 × 38.5 × 9.3 (3.142 × 1.516 × 0.37)			
	Rotor outer diameter × thickness		258 × 10 (10.16 × 0.39)			
Master cylinder	Cylinder bore diameter		23.81 (15/16)			
Control valve	Valve model		Dual proportioning valve [without ABS]			
	Split point kPa (bar, kg/cm ² , psi) × reducing ratio		3.43 (34.3 × 35 × 497) × 0.4			
Brake booster	Booster model		V255	S255		V255
	Diaphragm diameter	Primary	255 (10.04)			
		Secondary	—			
Specified brake fluid			DOT 4			

Disc Brake

NJBR0078
Unit: mm (in)

Brake model		CL25VG, CL25VBG	CL9HCG, CL11HEG
Pad wear limit	Minimum thickness	2.0 (0.078)	2.0 (0.079)
Rotor repair limit	Maximum runout	0.07 (0.0028)	0.07 (0.0028)
	Minimum thickness	20.0 (0.787)	9 (0.35)

Brake Pedal

NJBR0079
Unit: mm (in)

Free height “H”*	LHD	M/T	156.0 - 166.0 (6.14 - 6.54)
		A/T	165.0 - 175.0 (6.54 - 6.89)
	RHD	M/T	155.0 - 165.0 (6.10 - 6.50)
		A/T	164.0 - 174.0 (6.46 - 6.85)
Clearance “C” between pedal stopper and threaded end of stop lamp switch or brake switch			0.74 - 1.96 (0.0291 - 0.0772)

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

SERVICE DATA AND SPECIFICATIONS (SDS)

Parking Brake

Parking Brake

NJBR0080

Type	Center lever
Number of notches [under force of 196 N (20 kg, 44 lb)]	5 - 6
Number of notches when warning lamp switch comes on	1