BRAKE SYSTEM

SECTION BR

CONTENTS

CONTENTS (Cont'd)

CONTENTS (Cont'd)

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

NHBR0127

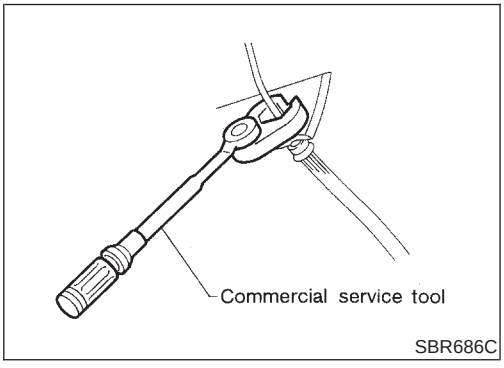
The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER” used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. The SRS system composition which is available to INFINITI I35 is as follows:

- 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), seat belt pre-tensioners, a diagnosis sensor unit, crash zone sensor, 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), 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 INFINITI 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 and/or orange harness connector (and by yellow harness protector or yellow insulation tape before the harness connectors).**



Precautions for Brake System

NHBR0002

- **Recommended fluid is brake fluid “DOT 3”.**
- **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-8.

WARNING:

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

Wiring Diagrams and Trouble Diagnosis

NHBR0003

When you read wiring diagrams, refer to the following:

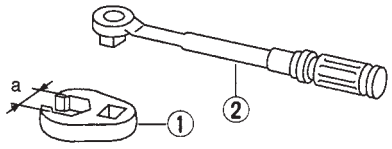
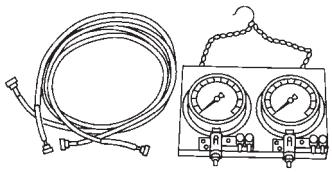
- “HOW TO READ WIRING DIAGRAMS” in GI section
- “POWER SUPPLY ROUTING” for power distribution circuit in EL section

When you perform trouble diagnosis, refer to the following:

- “HOW TO FOLLOW TEST GROUP IN TROUBLE DIAGNOSIS” in GI section
- “HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT” in GI section
- For trouble diagnoses of models with TCS. Refer to BR-37.
- For trouble diagnoses of models with VDC. Refer to BR-96.

Commercial Service Tools

NHBR0004

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

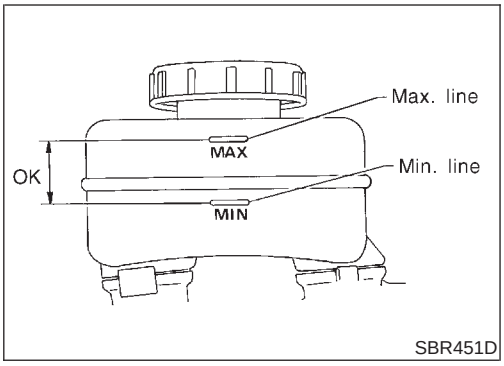
NVH Troubleshooting Chart

NHBR0005S01

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

Reference page			BR-23, 27	BR-23, 27	BR-23, 27	—	—	BR-25, 31	—	—	—	BR-26, 32	NVH in AX section	NVH in AX section	NVH in SU section	NVH in SU section	NVH in SU section	NVH in ST section
Possible cause and SUSPECTED PARTS			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	SUSPENSION	TIRES	ROAD WHEEL	STEERING
Symptom	BRAKE	Noise	X	X	X								X	X	X	X	X	X
		Shake				X							X	X	X	X	X	X
		Shimmy, Judder				X	X	X	X	X	X	X		X	X	X	X	X

X: Applicable

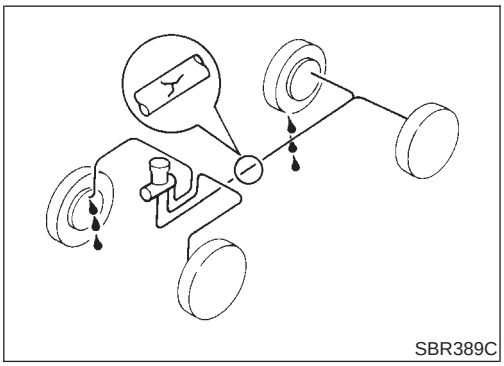


SBR451D

Checking Brake Fluid Level

NHBR0006

- 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.


SBR389C

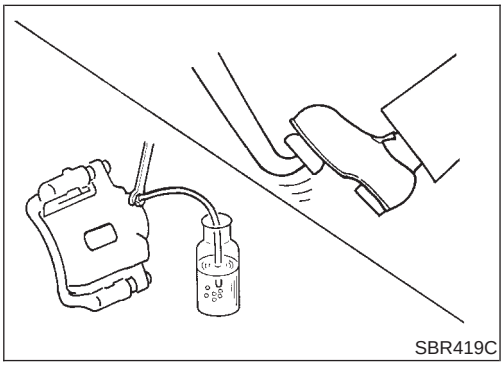
Checking Brake Line

NHBR0007

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.


SBR419C

Changing Brake Fluid

NHBR0008

CAUTION:

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

1. Clean inside of reservoir tank, and refill with new brake fluid.
2. Connect a vinyl tube to each air bleeder valve.
3. Drain brake fluid from each air bleeder valve by depressing brake pedal.
4. Refill until brake fluid comes out of each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid. Refer to “Bleeding Brake System”, BR-9.

Brake Burnishing Procedure

NHBR0036

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

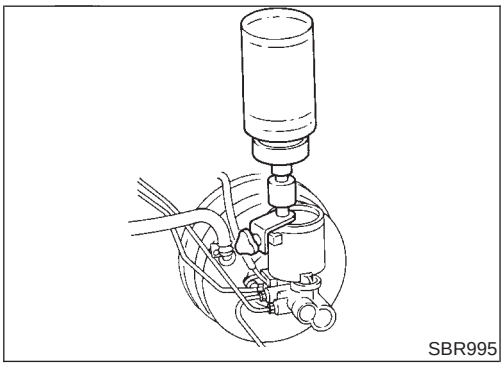
CAUTION:

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

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

pressure such that vehicle stopping time equals 3 to 5 seconds.

3. To cool the brake system, drive the vehicle at 50 km/h (31 MPH) for 1 minute without stopping.
4. Repeat steps 1 to 3, 10 times or more to complete the burnishing procedure.

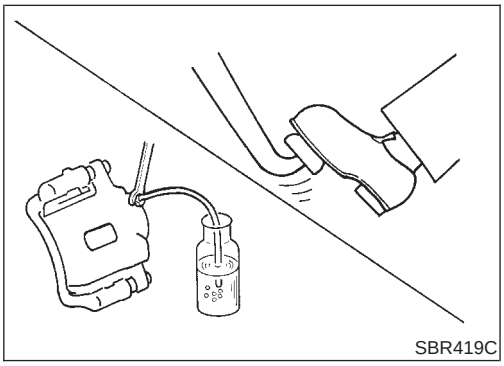

SBR995

Bleeding Brake System

NHBR0009

CAUTION:

- **Carefully monitor brake fluid level at master cylinder during bleeding operation.**
- **Fill reservoir with new brake fluid "DOT 3". Make sure it is full at all times while bleeding air out of system.**
- **Place a container under master cylinder to avoid spillage of brake fluid.**
- **For models with ABS, turn ignition switch OFF and disconnect ABS actuator connectors or battery ground cable.**

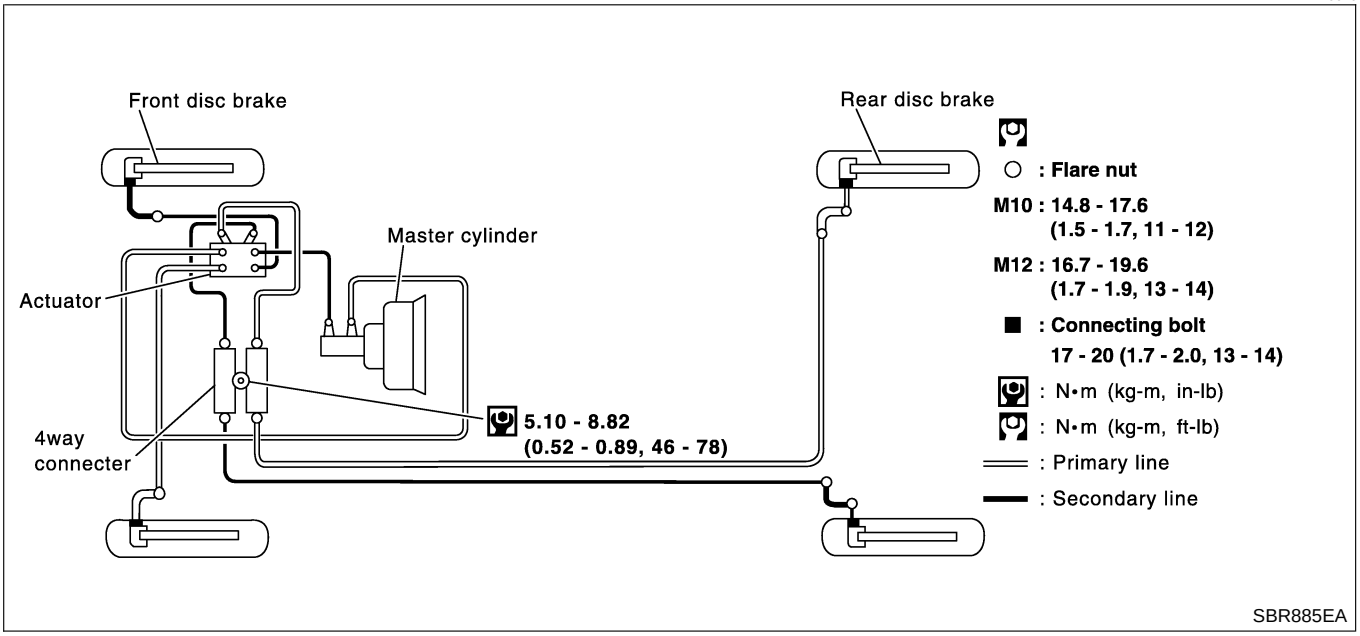

SBR419C

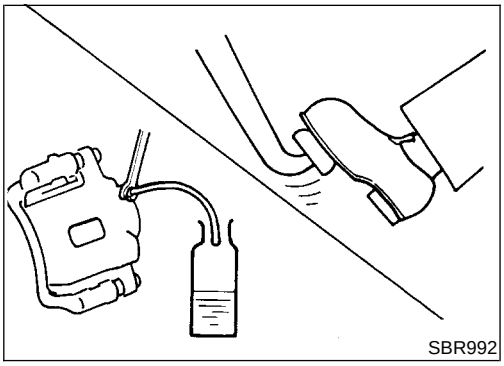
- Bleed air in the following order.
  Right rear brake → Left front brake → Left rear brake → Right front brake

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

NHBR0010





Removal

NHBR0011

CAUTION:

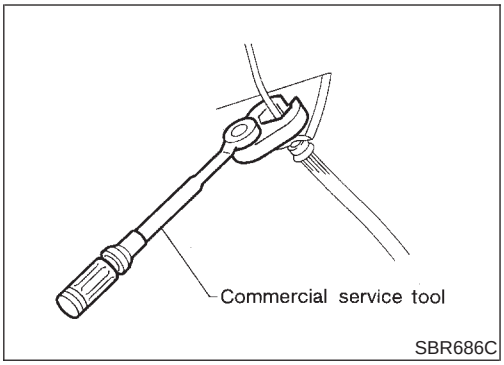
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **All hoses must be free from excessive bending, twisting and pulling.**

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

Inspection

NHBR0012

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



Installation

NHBR0013

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Never reuse drained brake fluid.**

1. Tighten all flare nuts and connecting bolts.

   Specification:

   Flare nut

   M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)

   M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)

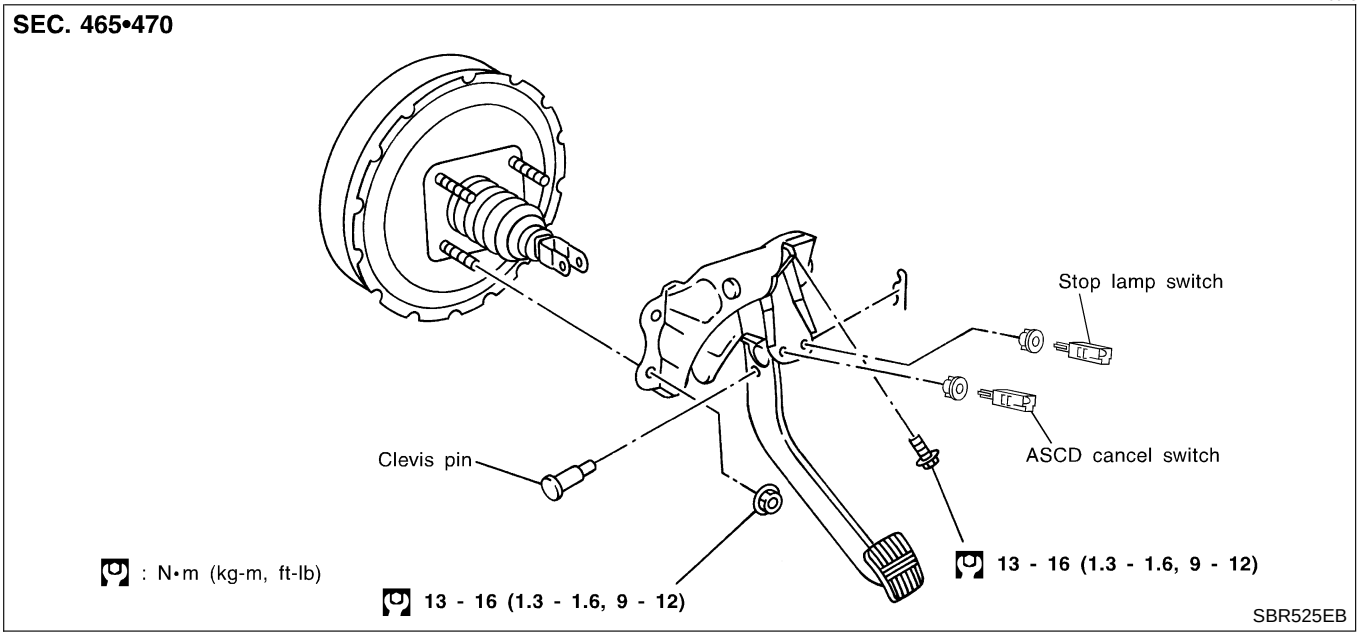
   Connecting bolt

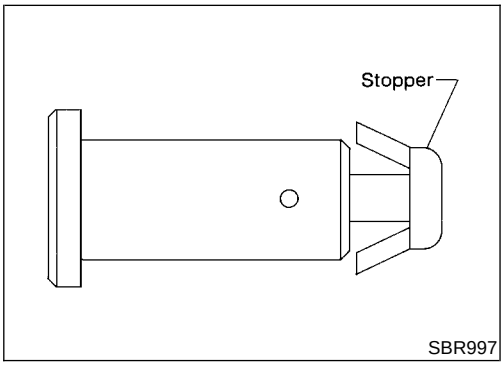
   17 - 20 N·m (1.8 - 2.0 kg-m, 13 - 14 ft-lb)

2. Refill until new brake fluid comes out of each air bleeder valve.
3. Bleed air. Refer to “Bleeding Brake System”, BR-9.

Removal and Installation

NHBR0015



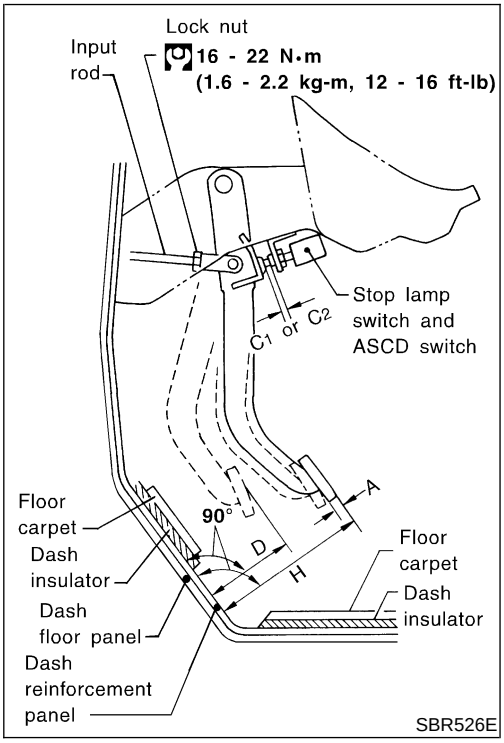


Inspection

NHBR0016

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

NHBR0017

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

H: Free height

Refer to SDS, BR-174.

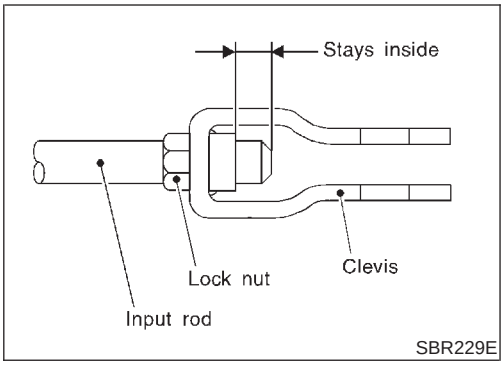
C_1, C_2: Clearance between pedal stopper and threaded end of stop lamp switch and ASCD switch

0.74 - 1.96 mm (0.0291 - 0.0772 in)

D: Depressed height

82.5 mm (3.248 in)

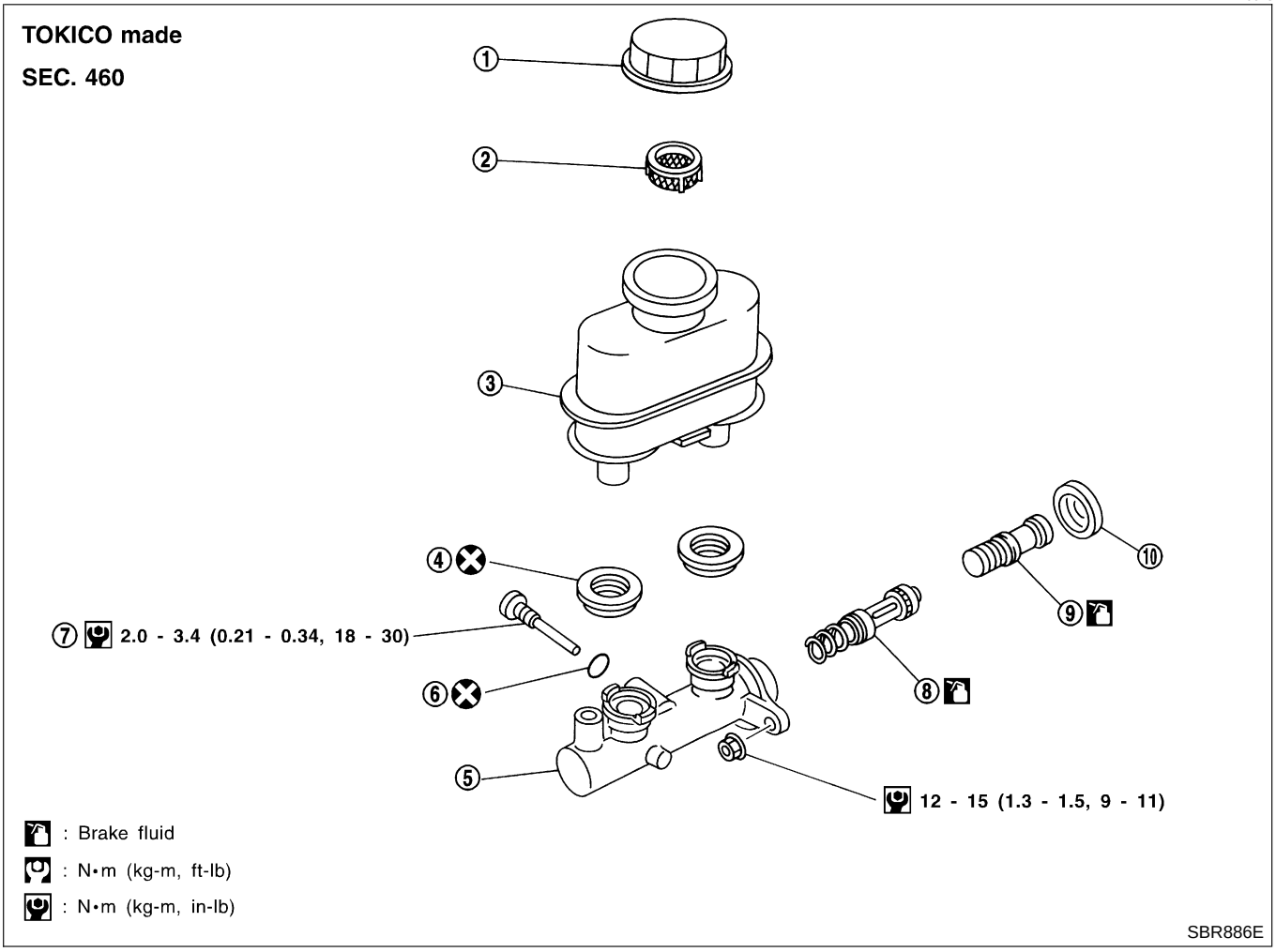
Under force of 490 N (50 kg, 110 lb) with engine running.



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.

Removal

NHBR0018

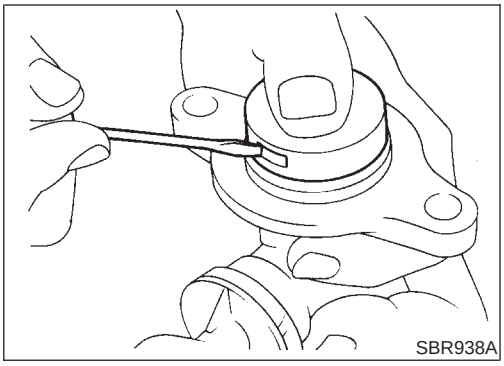


1. Reservoir cap
2. Oil filter
3. Reservoir tank
4. Seal
5. Cylinder body
6. O-ring
7. Piston stopper
8. Secondary piston assembly
9. Primary piston assembly
10. Stopper cap

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.

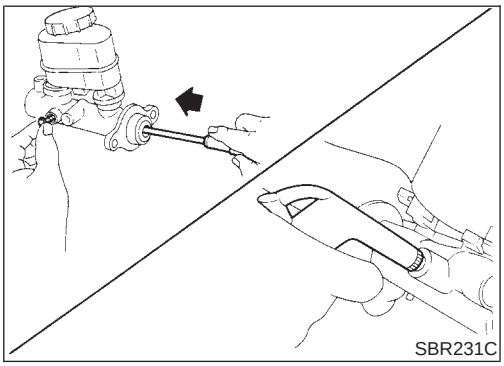
1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
3. Remove brake pipe flare nuts.
4. Remove master cylinder mounting nuts.


SBR938A

Disassembly

NHBR0019

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


SBR231C

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.

Inspection

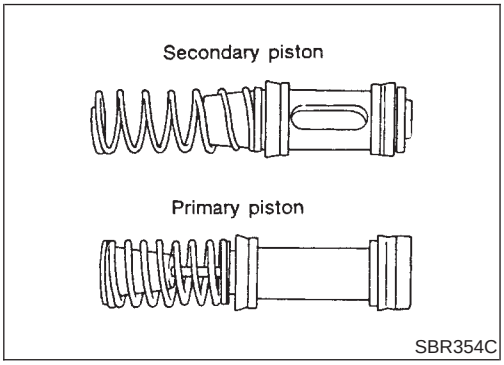
NHBR0020

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.

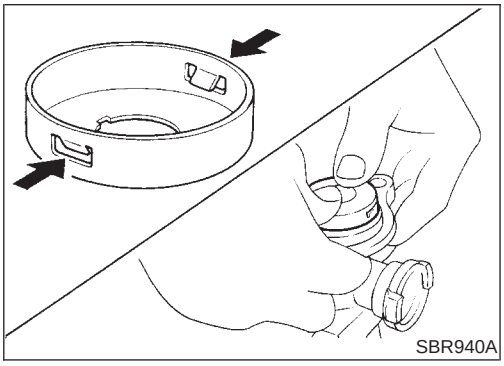


SBR354C

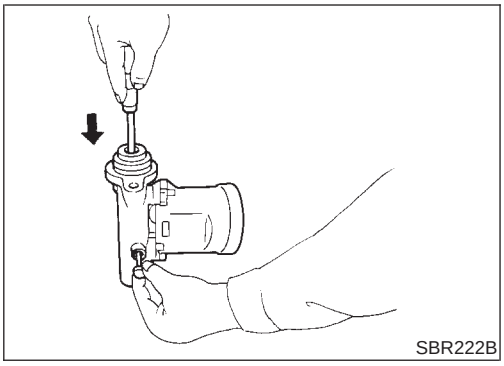
Assembly

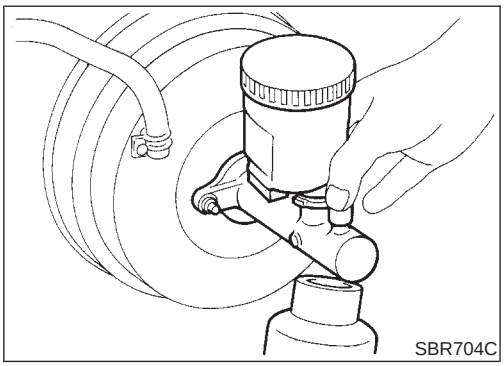
NHBR0021

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.


SBR940A

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.


SBR222B


SBR704C

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

Installation

NHBR0022

CAUTION:

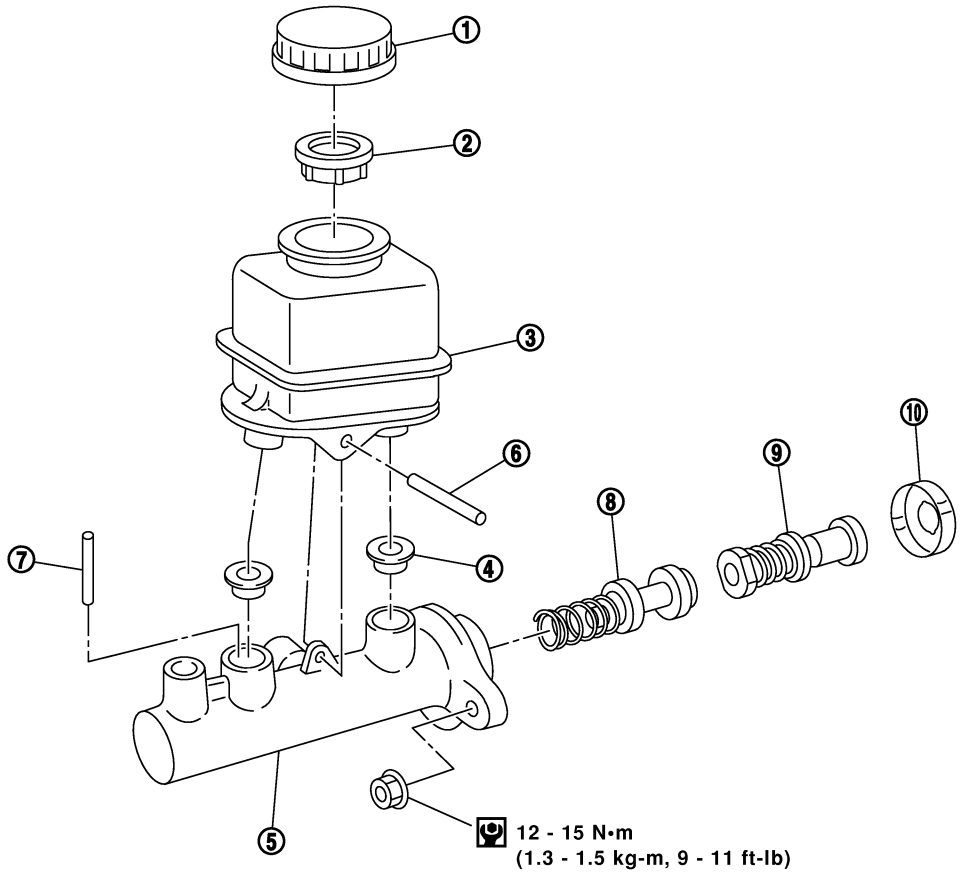
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Place master cylinder onto brake booster and secure mounting nuts lightly.
2. Torque mounting nuts.
   : 12 - 15 N·m (1.3 - 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.
   M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)
   M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)
8. Bleed air from brake system. Refer to "Bleeding Brake System", BR-9.

Removal

NHBR0095

BOSCH (NABCO) made
SEC. 460

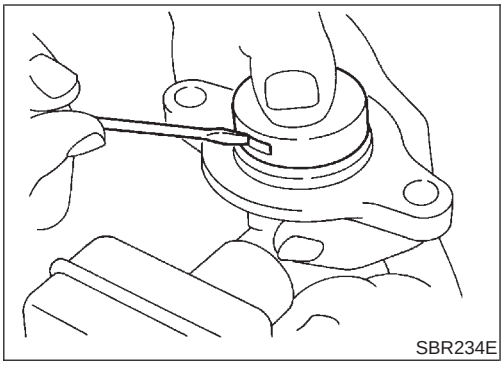


SBR976E

1. Reservoir cap
2. Oil filter
3. Reservoir tank
4. Seal
5. Cylinder body
6. Spring pin
7. Piston stopper pin
8. Secondary piston assembly
9. Primary piston assembly
10. Stopper cap

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.

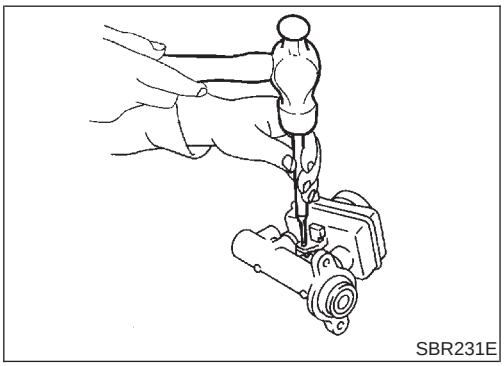
1. Connect a vinyl tube to air bleeder valve.
2. Drain brake fluid from each air bleeder valve, depressing brake pedal to empty fluid from master cylinder.
3. Remove brake pipe flare nuts.
4. Remove master cylinder mounting nuts.


SBR234E

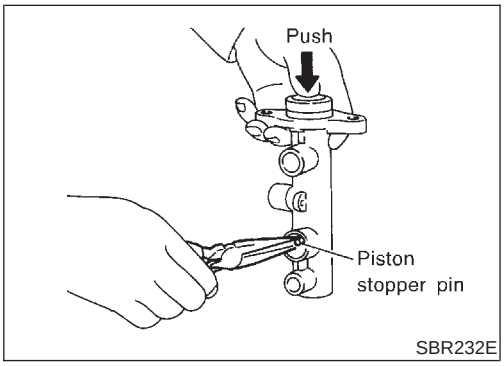
Disassembly

NHBR0096

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


SBR231E

2. Drive out spring pin from cylinder body.
3. Draw out reservoir tank and seals.



SBR232E

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

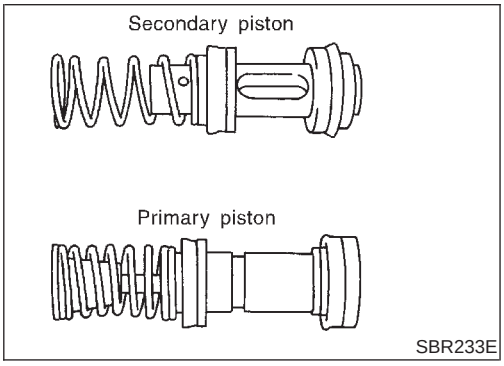
NHBR0097

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.



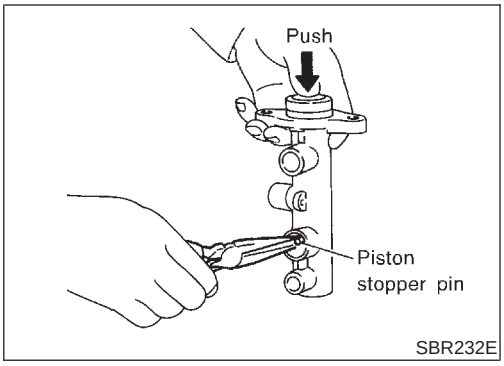
SBR233E

Assembly

NHBR0098

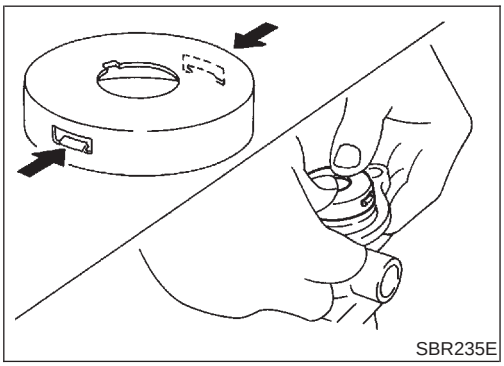
1. Insert secondary piston assembly. Then insert primary piston assembly.

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



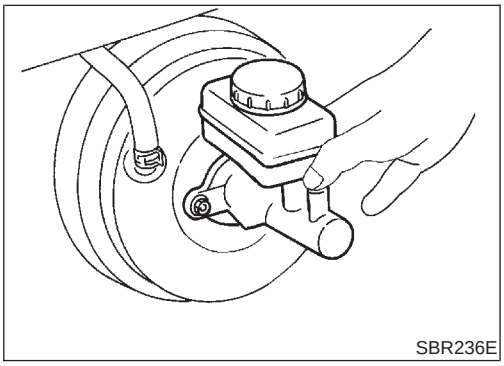
SBR232E

2. Install piston stopper pin while piston is pushed into cylinder.
3. Push reservoir tank seals and reservoir tank into cylinder body.
4. Install spring pin.


SBR235E

5. Install stopper cap.

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


SBR236E

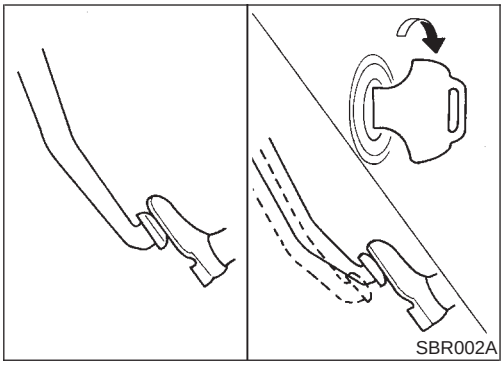
Installation

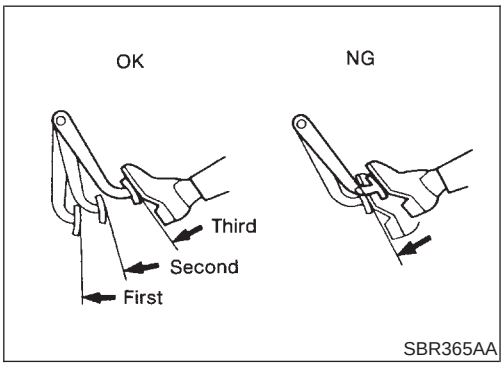
NHBR0099

CAUTION:

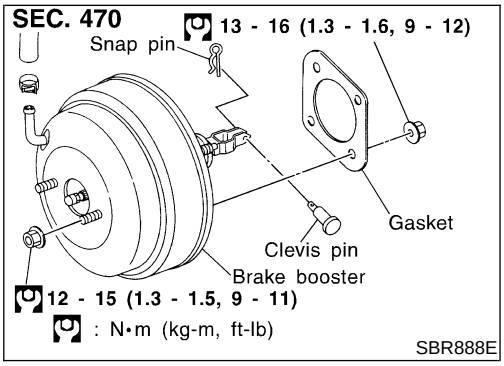
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

1. Place master cylinder onto brake booster and secure mounting nuts lightly.
2. Torque mounting nuts.
   : 12 - 15 N·m (1.3 - 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.
   M10: 14.8 - 17.6 N·m (1.5 - 1.7 kg-m, 11 - 12 ft-lb)
   M12: 16.7 - 19.6 N·m (1.7 - 1.9 kg-m, 13 - 14 ft-lb)
8. Bleed air from brake system.

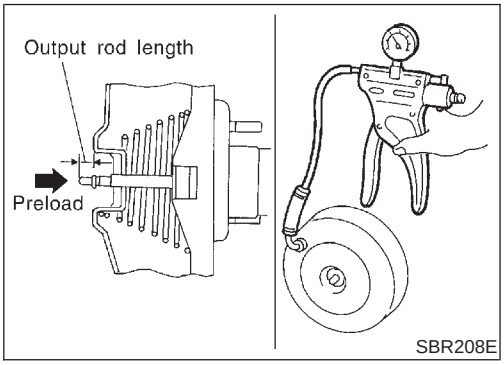

SBR002A



SBR365AA



SBR888E



SBR208E

On-vehicle Service

NHBR0023

OPERATING CHECK

NHBR0023S01

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

NHBR0023S02

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

NHBR0024

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

NHBR0025

OUTPUT ROD LENGTH CHECK

NHBR0025S01

1. Apply vacuum of −66.7 kPa (−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:

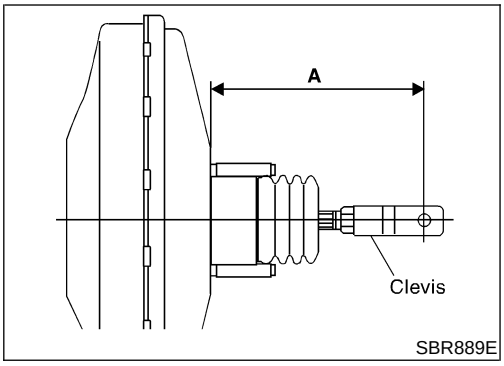
10.275 - 10.525 mm (0.4045 - 0.4144 in)

Installation

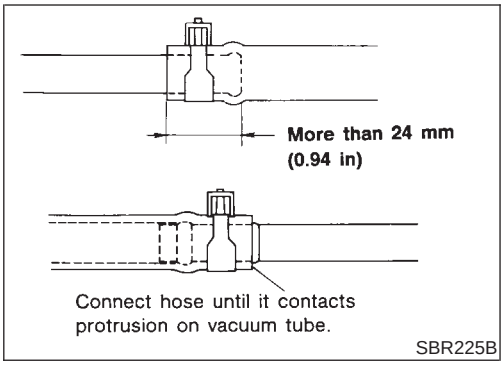
NHBR0026

CAUTION:

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



1. Before fitting booster, temporarily adjust clevis to dimension "A" shown.
   Specification:
   130 mm (5.12 in)
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:
   15.7 - 21.6 N·m (1.6 - 2.2 kg-m, 12 - 15 ft-lb)
5. Install master cylinder. Refer to "Installation" in "MASTER CYLINDER", BR-16 or BR-19.
6. Bleed air. Refer to "Bleeding Brake System", BR-9.



Removal and Installation

NHBR0027

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.**

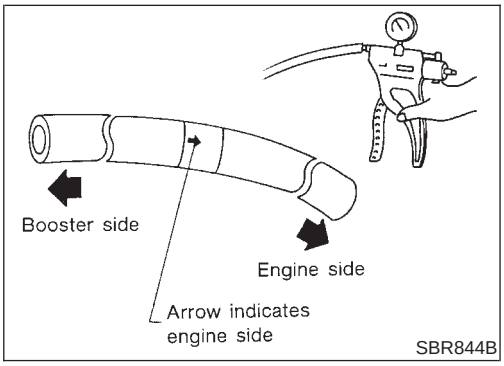
Inspection

NHBR0028

HOSES AND CONNECTORS

NHBR0028S01

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



CHECK VALVE

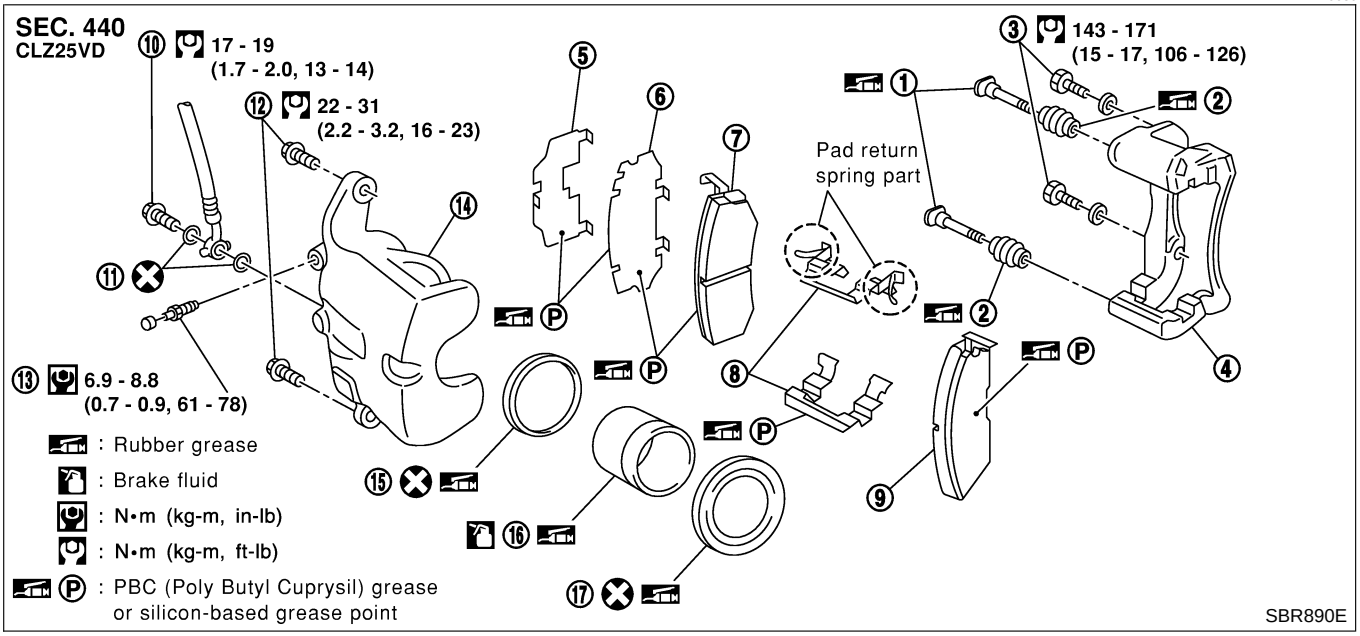
NHBR0028S02

Check vacuum with a vacuum pump.

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

Component

NHBR0030



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

Pad Replacement

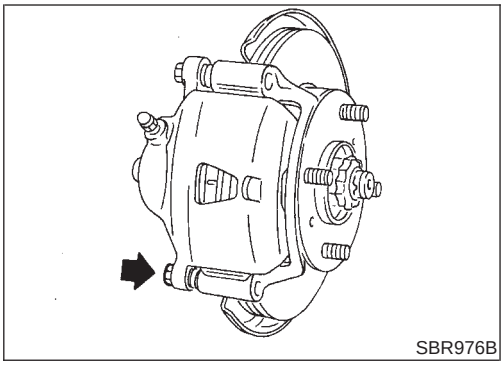
NHBR0029

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-8.

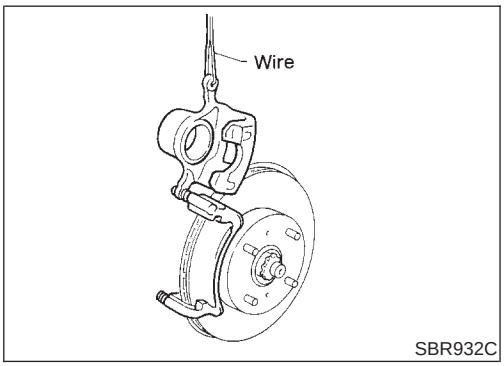


SBR976B

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

Standard pad thickness:
9.5 mm (0.374 in)
Pad wear limit:
2.0 mm (0.079 in)

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



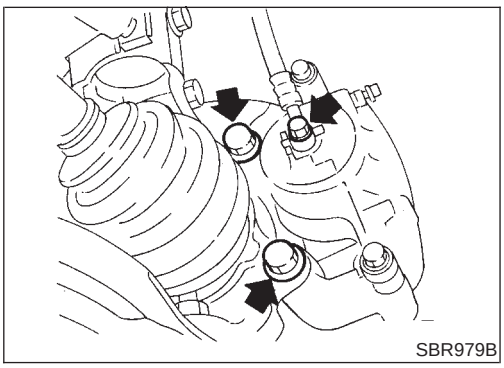
SBR932C

Removal

NHBR0031

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.



SBR979B

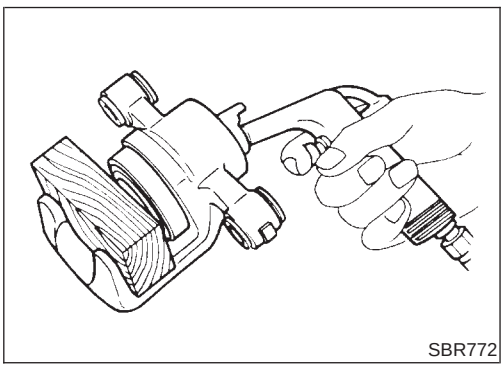
Disassembly

NHBR0032

WARNING:
Do not place your fingers in front of piston.

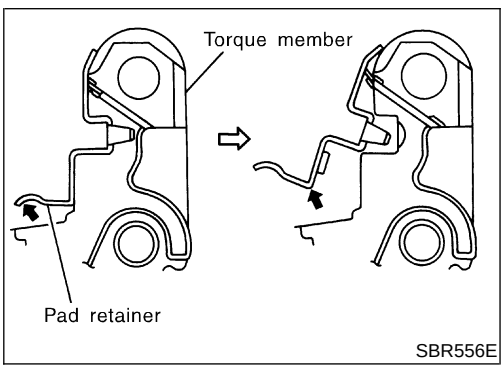
CAUTION:
Do not scratch or score cylinder wall.

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



SBR772

CAUTION:
When removing the pad retainer from the torque member, lift it up and out in the direction of the arrows in the figure.



SBR556E

Inspection

NHBR0033

CALIPER

NHBR0033S01

Cylinder Body

NHBR0033S0101

- 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

NHBR0033S0102

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

NHBR0033S0103

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

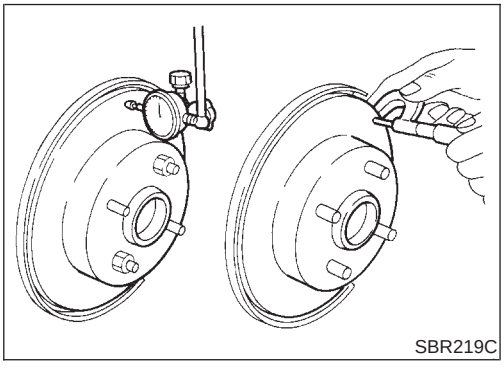
ROTOR

NHBR0033S02

Rubbing Surface

NHBR0033S0201

Check rotor for roughness, cracks or chips.


SBR219C

Runout

NHBR0033S0202

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).

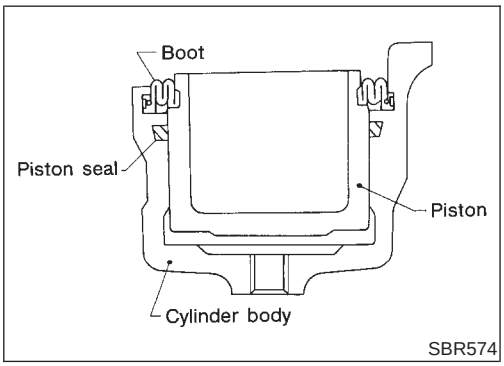
Thickness

NHBR0033S0203

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.

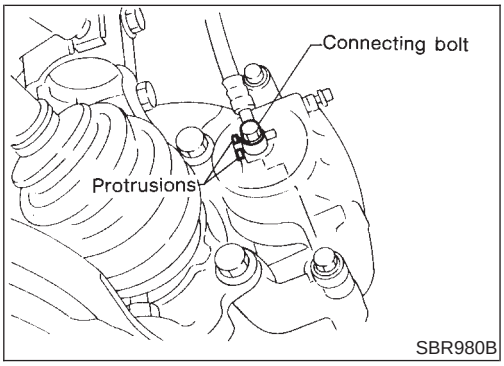
Rotor repair limit:
22.0 mm (0.866 in)



Assembly

NHBR0034

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.



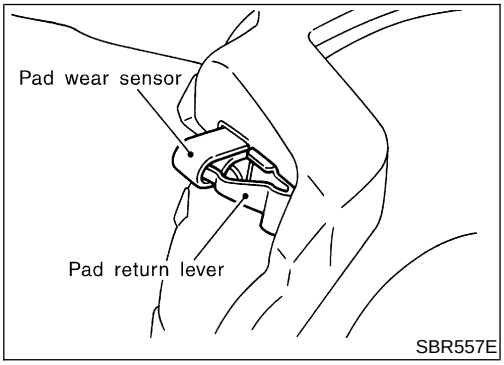
Installation

NHBR0035

CAUTION:

- **Refill with new brake fluid "DOT 3".**
- **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-9.

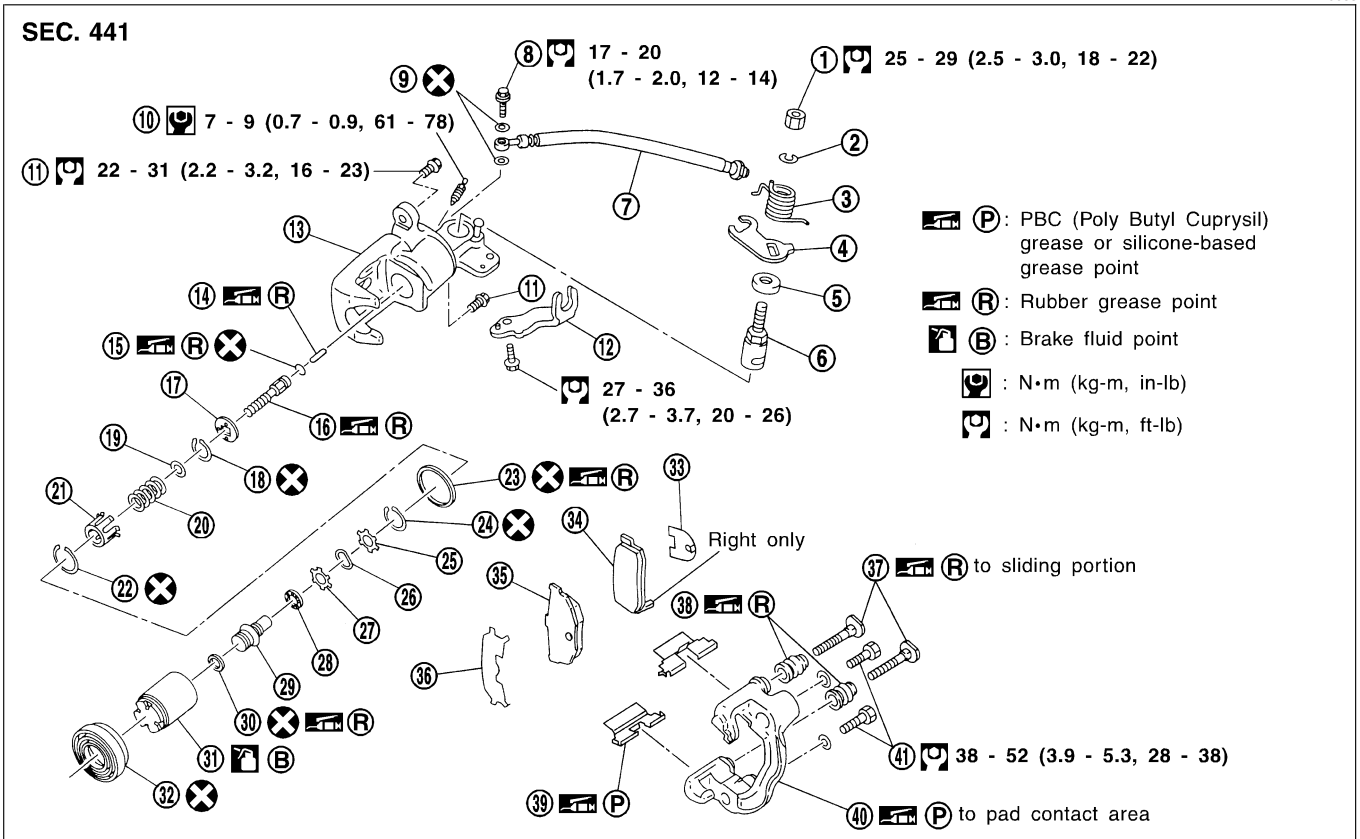


CAUTION:

The upper pad retainer is built so the pad returns to its original position. Be careful to install the pad-return lever securely to the pad wear sensor, as shown in the left figure.

Component

NHBR0038



1. Nut
2. Washer
3. Return spring
4. Parking brake lever
5. Cam boot
6. Cam
7. Brake hose
8. Connecting bolt
9. Copper washer
10. Bleed screw
11. Pin bolt
12. Cable mounting bracket
13. Cylinder
14. Strut
15. O-ring
16. Push rod
17. Key plate
18. Ring C
19. Seat
20. Spring
21. Spring cover
22. Ring B
23. Piston seal
24. Ring A
25. Spacer
26. Wave washer
27. Spacer
28. Ball bearing
29. Adjust nut
30. Cup
31. Piston
32. Dust seal
33. Inner shim
34. Inner pad
35. Outer pad
36. Outer shim
37. Pin
38. Pin boot
39. Pad retainer
40. Torque member
41. Torque member fixing bolt

Pad Replacement

NHBR0037

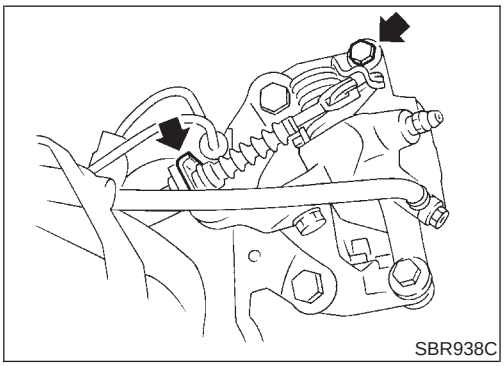
WARNING:

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

CAUTION:

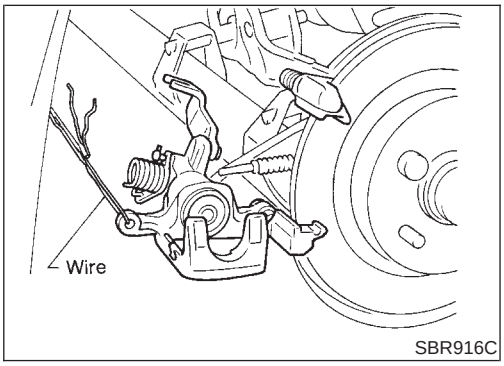
- **When cylinder body is open, do not depress brake pedal because piston will pop out.**
- **Be careful not to damage piston boot or get oil on rotor. Always replace shims in replacing pads.**
- **If shims are rusted or show peeling of rubber coat, replace them with new shims.**

- **It is not necessary to remove connecting bolt except for 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-8.

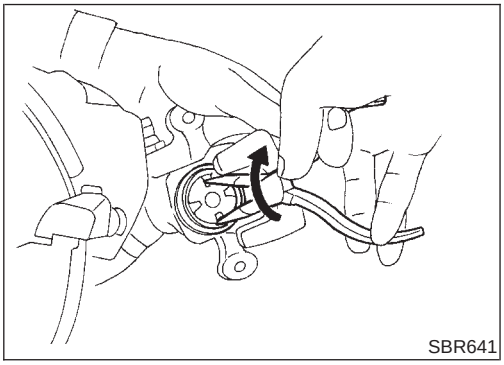

SBR938C

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.

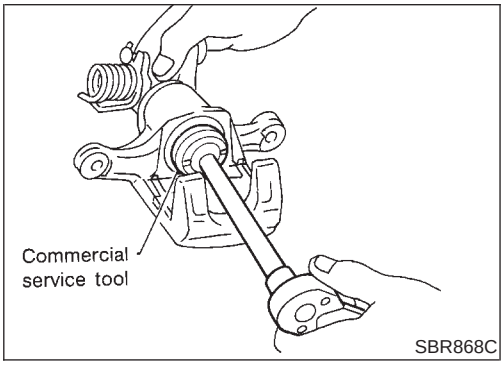
   Standard pad thickness:
   10 mm (0.39 in)
   Pad wear limit:
   1.5 mm (0.059 in)



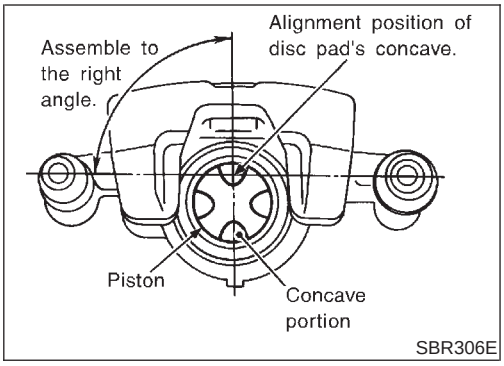
SBR916C


SBR641

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.

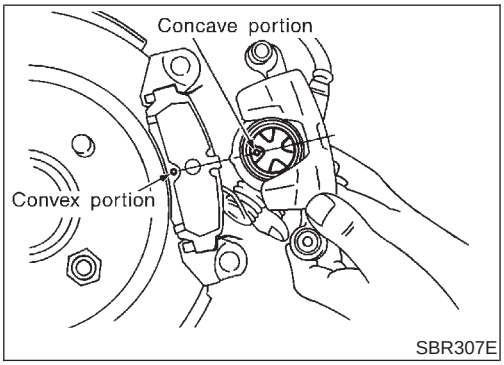


SBR868C



SBR306E

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



SBR307E

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.

Removal

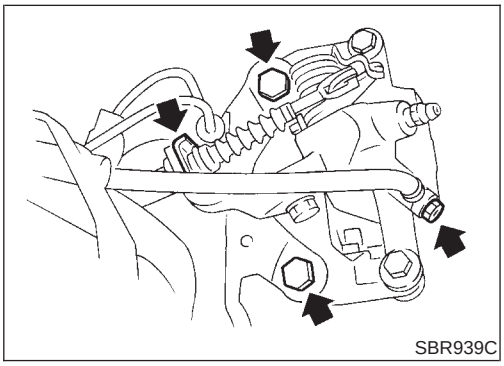
NHBR0039

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.

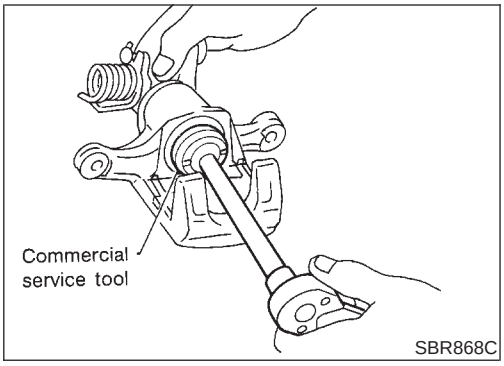
It is not necessary to remove connecting bolt except for disassembly or replacement of caliper assembly. In this case, suspend caliper assembly with wire so as not to stretch brake hose.


SBR939C

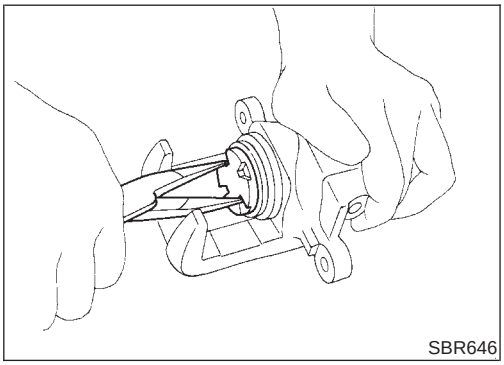
Disassembly

NHBR0040

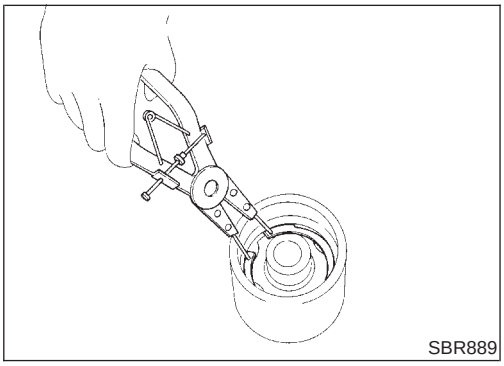
1. Remove piston by turning it counterclockwise with suitable commercial service tool or long nose pliers.



SBR868C


SBR646

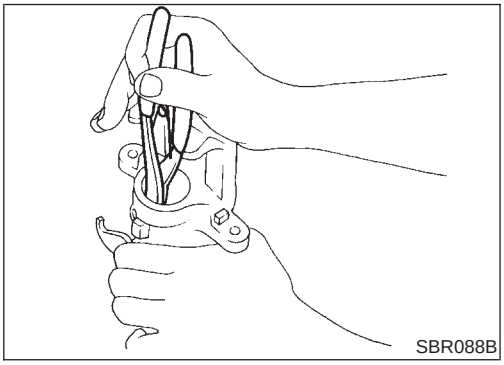
2. Pry off ring A from piston with suitable pliers and remove adjusting nut.


SBR889

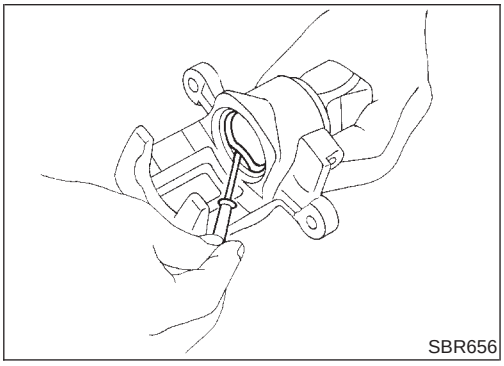
3. Disassemble cylinder body.

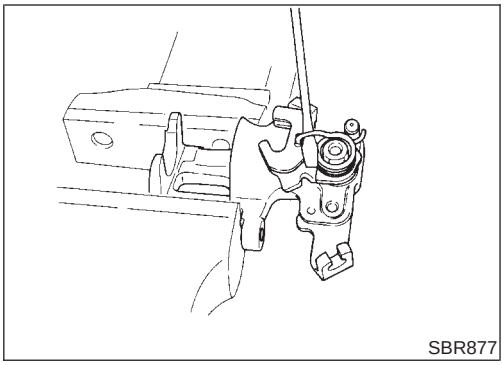
a. Pry off ring B with suitable pliers, then remove spring cover, spring and seat.

b. Pry off ring C, then remove key plate, push rod and rod.


SBR088B

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


SBR656


SBR877

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

Inspection

NHBR0041

CALIPER

NHBR0041S01

CAUTION:

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

Cylinder Body

NHBR0041S0101

- 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

NHBR0041S0102

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

Piston

NHBR0041S0103

CAUTION:

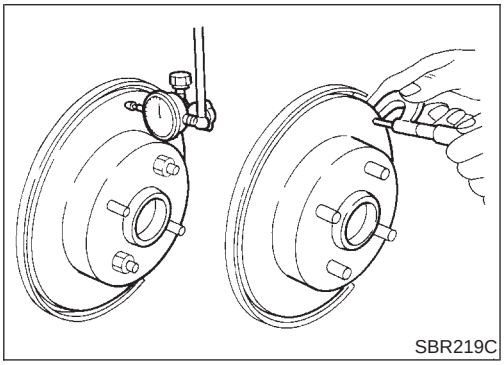
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

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

NHBR0041S0104

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


SBR219C

ROTOR

NHBR0041S02

Rubbing Surface

NHBR0041S0201

Check rotor for roughness, cracks or chips.

Runout

NHBR0041S0202

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").

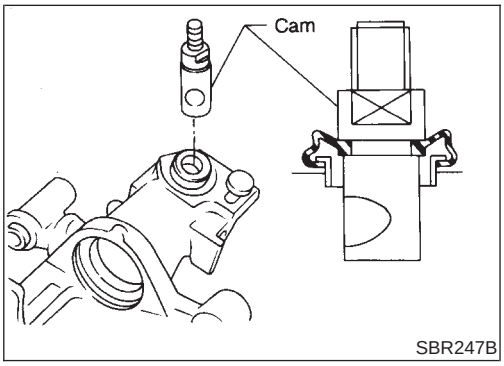
3. Change relative positions of rotor and wheel hub so that runout is minimized.

Maximum runout:
0.07 mm (0.0028 in)

Thickness

NHBR0041S0203

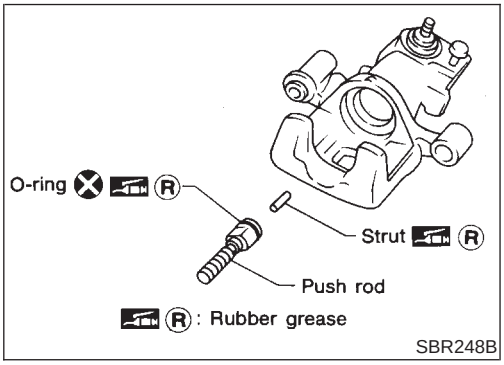
Rotor repair limit:
Standard thickness
9 mm (0.35 in)
Minimum thickness
8 mm (0.315 in)
Thickness variation (At least 8 portions)
Maximum 0.02 mm (0.0008 in)



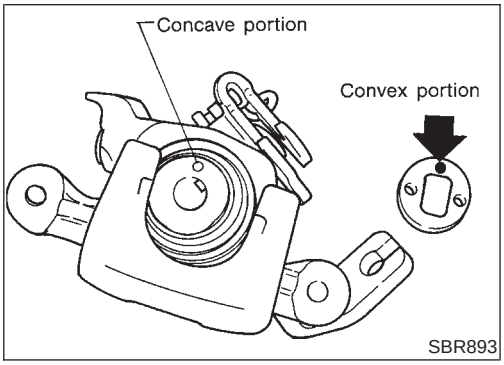
Assembly

NHBR0042

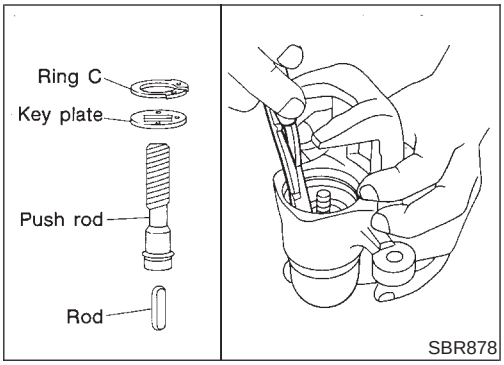
1. Insert cam with depression facing towards open end of cylinder.



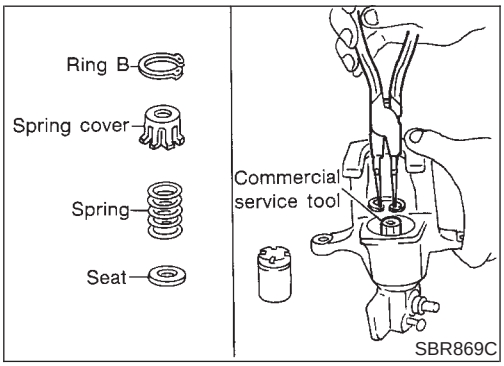
2. Generously apply rubber grease to strut and push rod to make insertion easy.



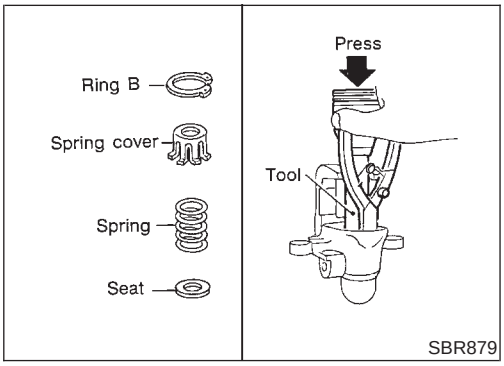
3. Fit push rod into square hole in key plate. Also match convex portion of key plate with concave portion of cylinder.

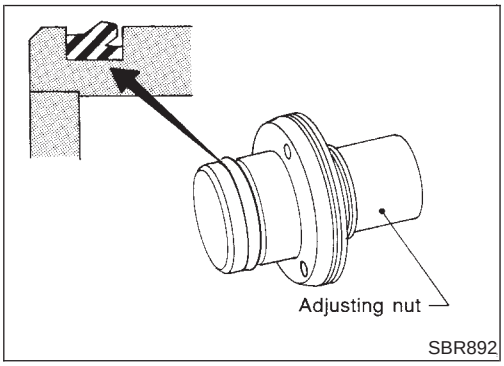


4. Install ring C with a suitable tool.

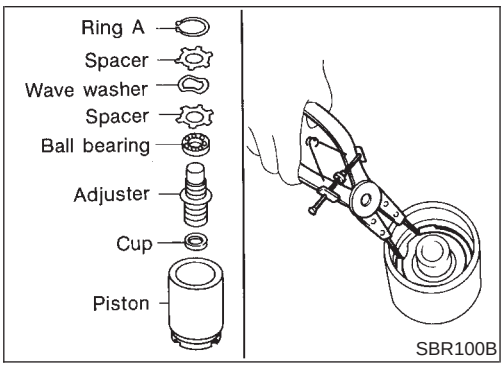


5. Install seat, spring, spring cover and ring B with suitable press and drift.



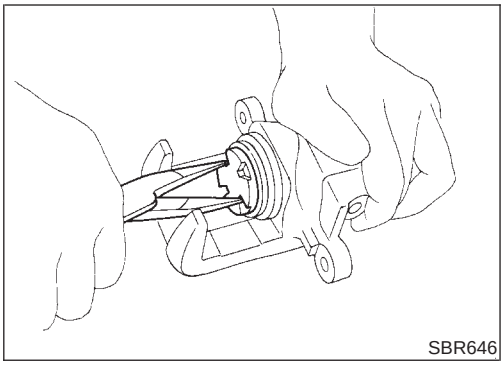


6. Install cup in the specified direction.

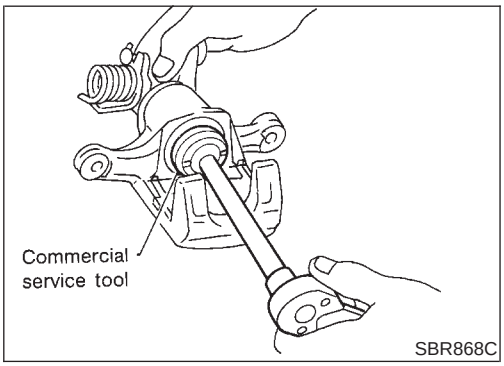


7. Install cup, adjuster, bearing, spacers, washers and ring A with a suitable tool.

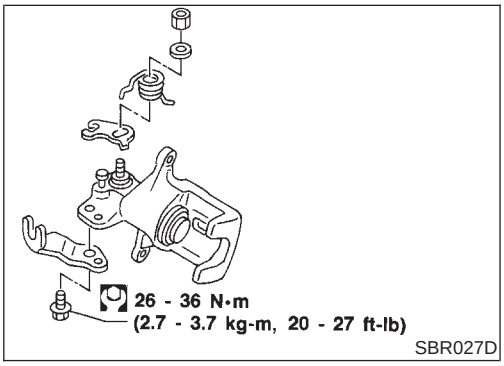
Assembly (Cont'd)


SBR646

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 pilers, or suitable tool.

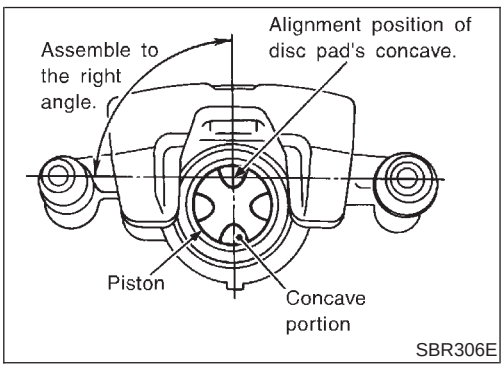


SBR868C



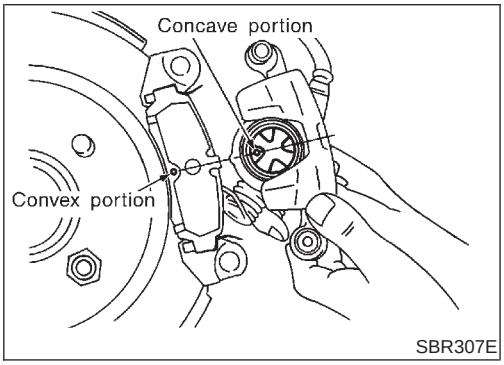
SBR027D

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



SBR306E

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



SBR307E

Installation

NHBR0043

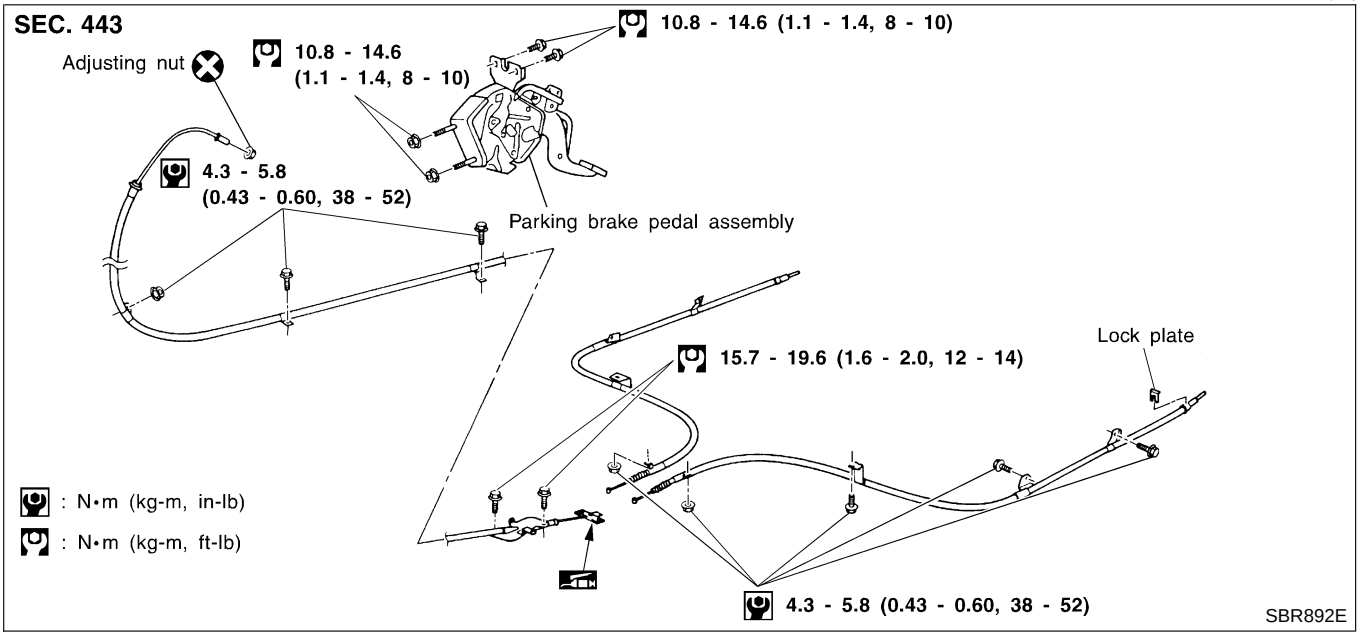
CAUTION:

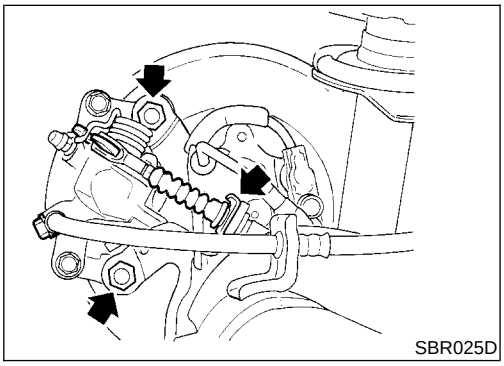
- **Refill with new brake fluid "DOT 3".**
- **Never reuse drained brake fluid.**

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-9.

Components

NHBR0128





Removal and Installation

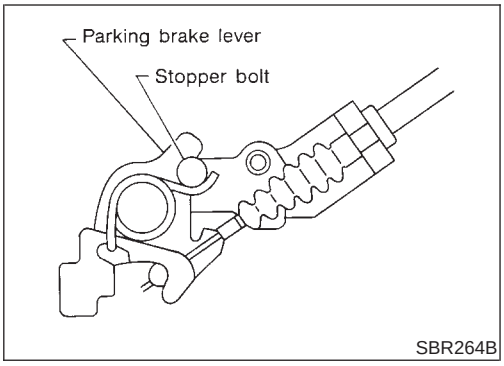
NHBR0129

1. To remove parking brake cable, first remove center console.
2. To remove parking brake pedal, remove lower instrument panel on driver side.
3. Disconnect warning switch connector.
4. Remove bolts, slacken off and remove adjusting nut.
5. Remove lock plate and disconnect cable.

Inspection

NHBR0130

1. Check parking brake pedal assembly 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.



Adjustment

=NHBR0131

Pay attention to the following points after adjustment.

1) There is no drag when control lever is being released.
2) Be sure that toggle lever returns to stopper when parking brake pedal is released.

1. Loosen parking brake cable.
2. Depress brake pedal fully more than five times.
3. Operate control pedal 10 times or more with a full stroke [203.5 mm (8.01 in)].
4. Adjust control lever or pedal by turning adjusting nut.
5. Depress pedal with specified amount of force. Check lever stroke and ensure smooth operation.

   Number of notches:

   4 - 5 [196 N (20 kg, 44 lb)]
6. Bend warning lamp switch plate. Warning lamp should come on when lever is depressed “A” notches. It should go off when the lever is fully released.

   Number of “A” notches: 1

Purpose

NHBR0048

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

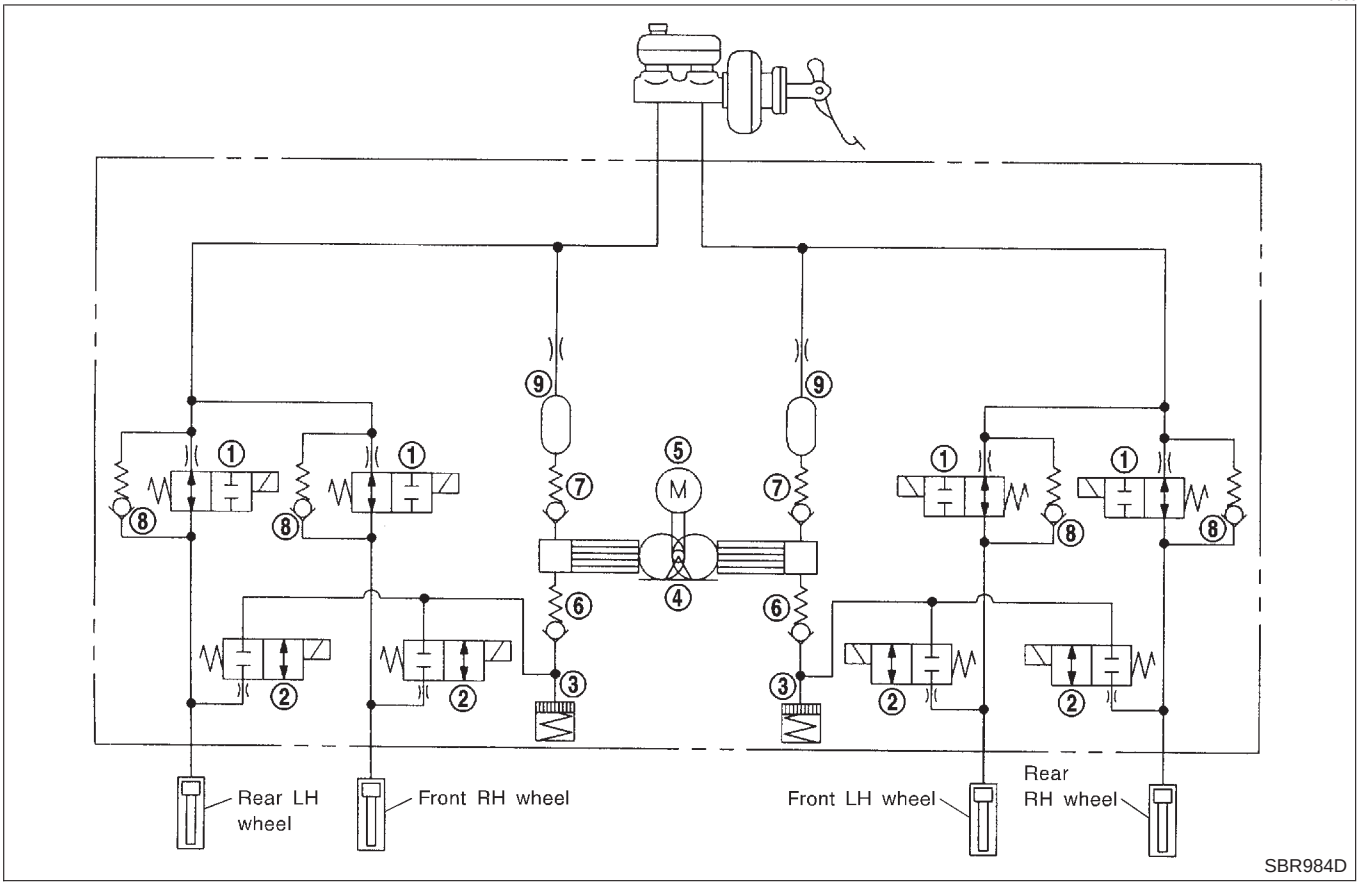
ABS (Anti-Lock Brake System) Operation

NHBR0049

- 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

NHBR0050



1. Inlet solenoid valve
2. Outlet solenoid valve
3. Reservoir
4. Pump
5. Motor
6. Inlet valve
7. Outlet valve
8. Bypass check valve
9. Damper

TCS (Traction Control System) Operation

=NHBR0145

- This system is designed to limit wheel slip during acceleration by cutting fuel to selected cylinders and changing transmission shift schedule.
  The ABS/TCS control unit monitors wheel speed slips through the ABS wheel sensors and determines the desired torque reduction needed to minimize wheel spin.
  The torque reduction by the ABS/TCS control unit may result in a combination of fuel cutoff, throttle control, and change shift timing of the transmission.
  The torque reduction is sent from the ABS/TCS control unit through the data link to the ECM and TCM. The ECM will cut off fuel and/or close throttle valve little bit, and/or TCM change shift schedule to achieve torque reduction.
  The TCS will be enabled when the TCS switch is in the ON position (TCS OFF indicator not illuminated), and if the catalytic converter temperature is within normal operating range.
- This system has a self-diagnostic function. When the ignition switch is initially turned “ON”, the SLIP indicator lamp and TCS OFF indicator lamp light. If there is no problem with the ABS and TCS, both indicator lamps will go out as soon as the engine starts.
- The TCS OFF switch cancels the TCS function. The TCS OFF indicator lamp then lights to indicate that the TCS is not operating.
- This system utilizes a fuel-cut function to control drive torque. If fuel cut continues for an extended period of time during high-speed operations, the catalyst may melt and deteriorate. During continued TCS operations, the system will sometimes suspend the drive torque control function, preventing catalyst melting and deterioration.

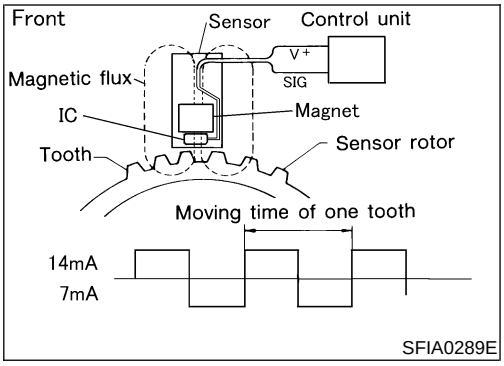
System Components

NHBR0146

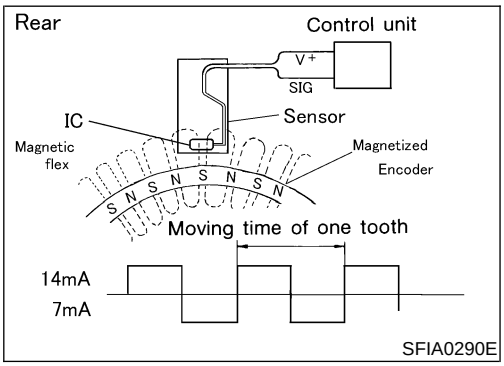
ABS ACTUATOR AND ELECTRIC UNIT TERMINALS AND REFERENCE VALUE (MEASURED BETWEEN EACH TERMINAL AND 16 OR 30).

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y	POWER SOURCE	–	BATTERY VOLTAGE
14	L/R	ABS WARNING LAMP IN COMBINATION METER	WHEN ABS WARNING LAMP IS ACTIVE	BATTERY VOLTAGE
			WHEN ABS WARNING LAMP IS NOT ACTIVE	APPROX. 0V
15	BR	POWER SOURCE	–	BATTERY VOLTAGE
16	B	GROUND	–	–
29	GY	POWER SOURCE	IGN ON	BATTERY VOLTAGE
			IGN OFF	APPROX. 0V
17	R/G	STOP LAMP SWITCH	WHEN BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE
			WHEN BRAKE PEDAL RELEASED	APPROX. 0V
6	OR	DATA LINK CONNECTOR	–	–
30	B	GROUND	–	–

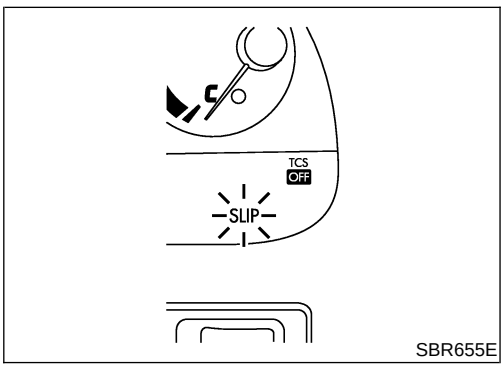
SBR931E



SFIA0289E



SFIA0290E



SBR655E

System Description

NHBR0147

SENSOR

NHBR0147S01

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. the element contains a magnet and IC. The front wheel sensors are installed on the front of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increase as the wheel speed increases.

CONTROL UNIT

NHBR0147S02

ABS Function

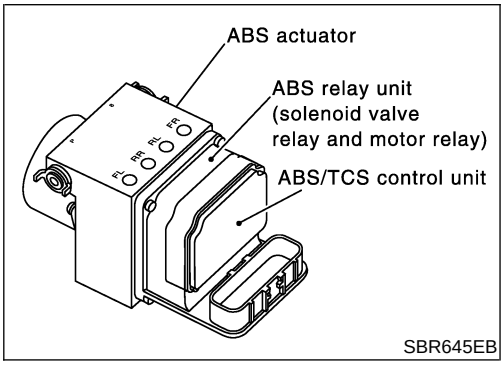
NHBR0147S0201

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 warning lamp is turned on. In this condition, the ABS will be deactivated, and the vehicle's brake system reverts to normal operation.

TCS Function

NHBR0147S0202

Drive wheel slippage is detected by the 4-wheel rotating speed signal. When the wheel slip becomes excessive, the TCS operates, causing the SLIP indicator lamp to flash. And, at the same time, fuel-cut and throttle opening signals are sent to the ECM and a signal requiring a change in the shift schedule is sent to the TCM. When the TCS OFF switch is used to cancel TCS function, the TCS OFF indicator lamp will light. (TCS does not activate.) In case of a malfunction in the TCS, both the SLIP indicator lamp and the TCS OFF indicator lamp will light, while shutting down the TCS system operation. The vehicle will operate in the same way as a vehicle not equipped with the TCS.



SBR645EB

ACTUATOR

NHBR0147S03

The actuator contains:

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

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

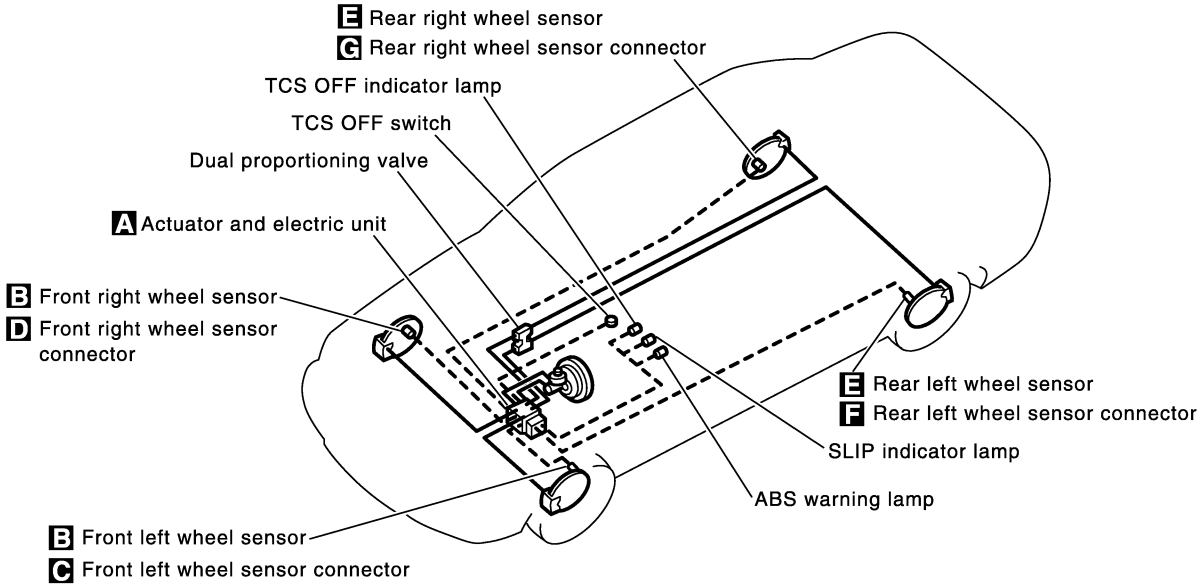
ABS Actuator Operation

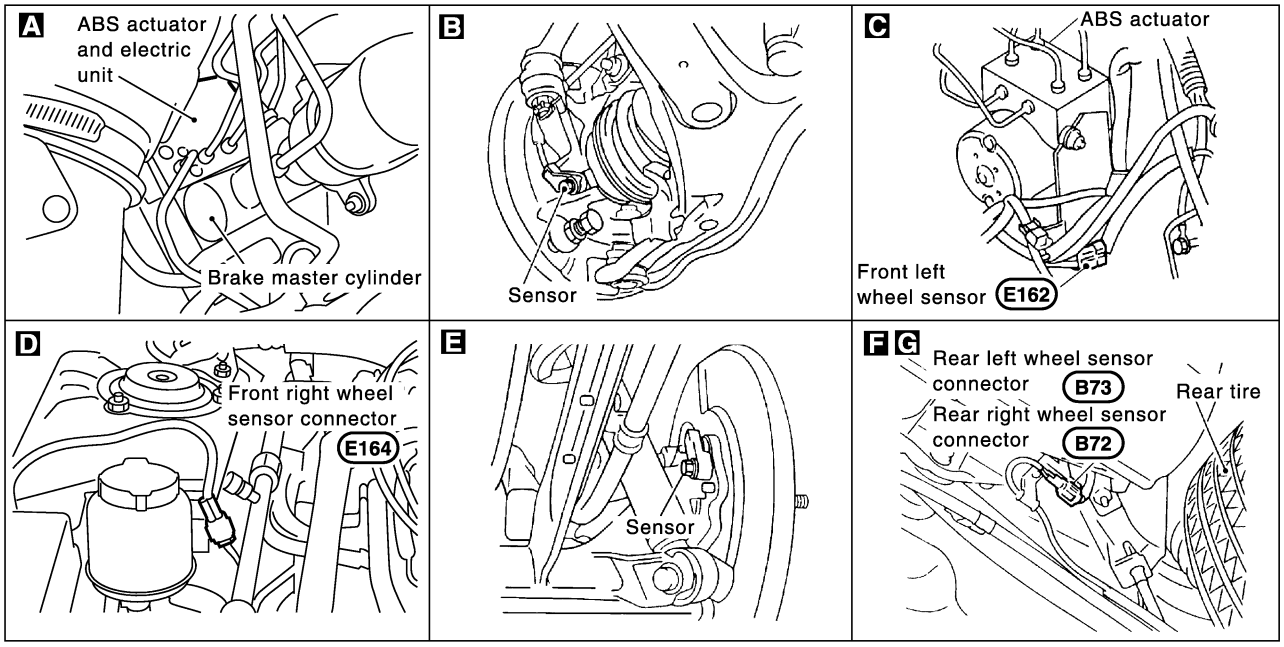
NHBR0147S0301

		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

NHBR0053

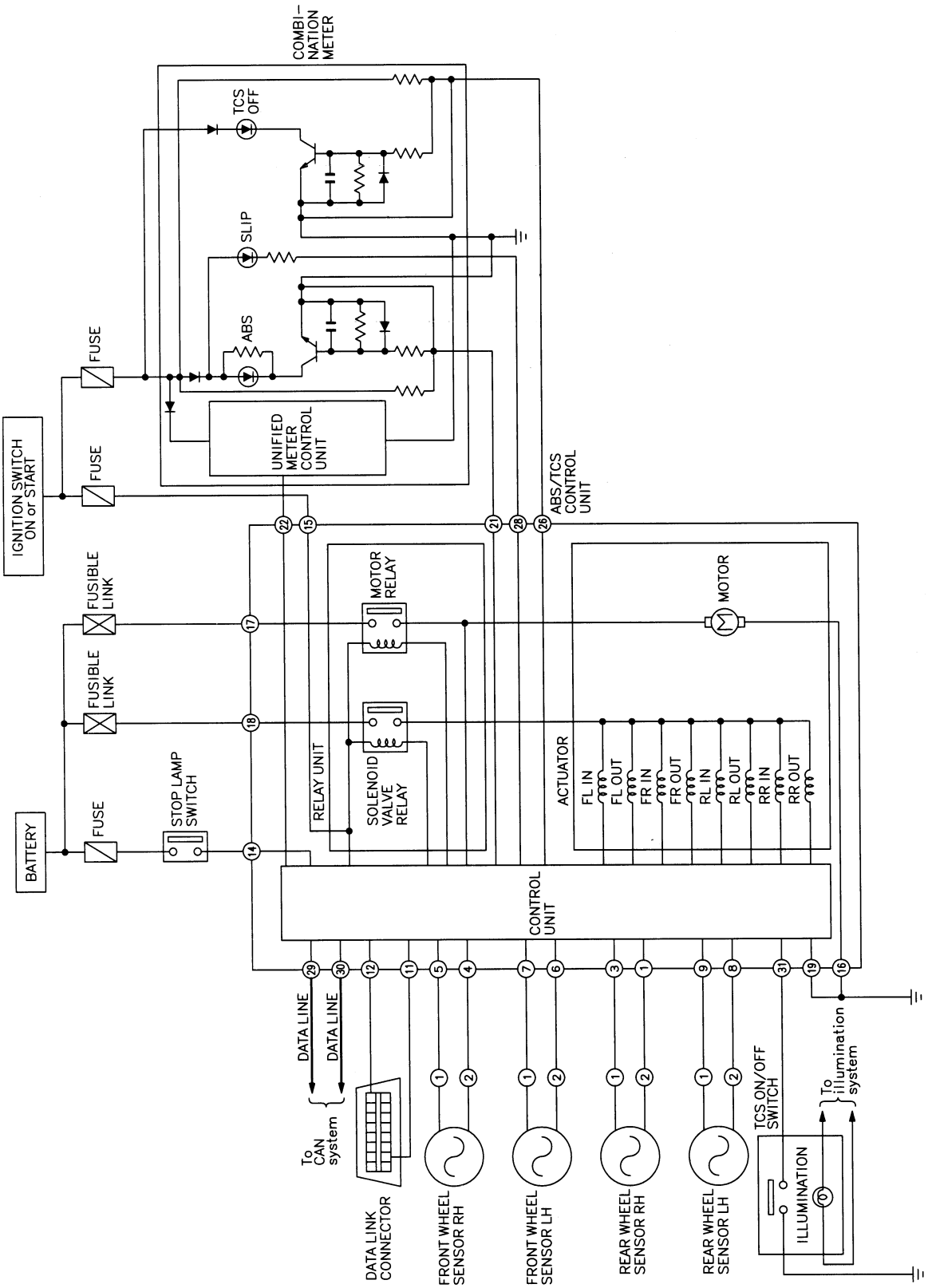




SBR036F

Schematic

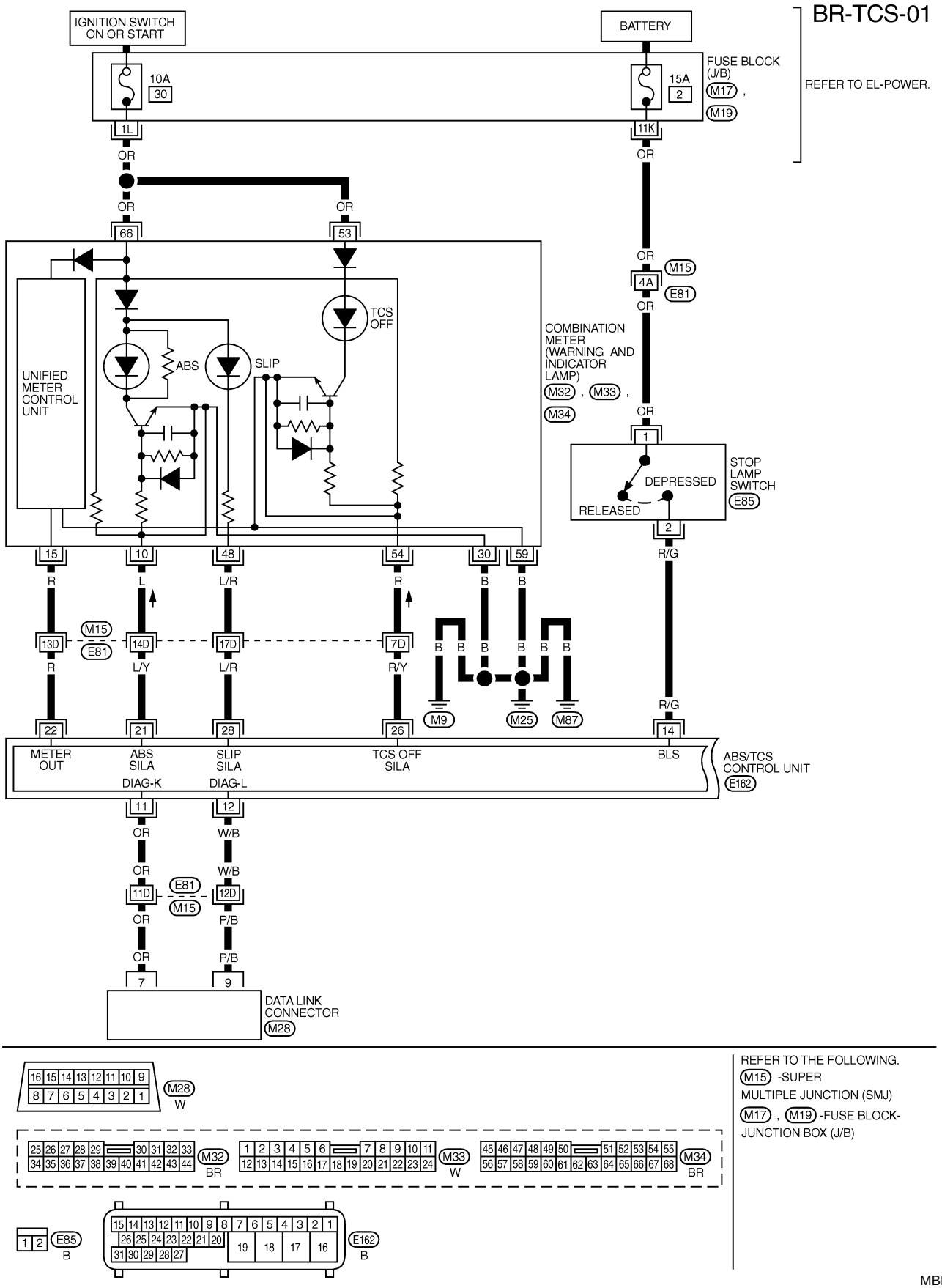
NHBR0148



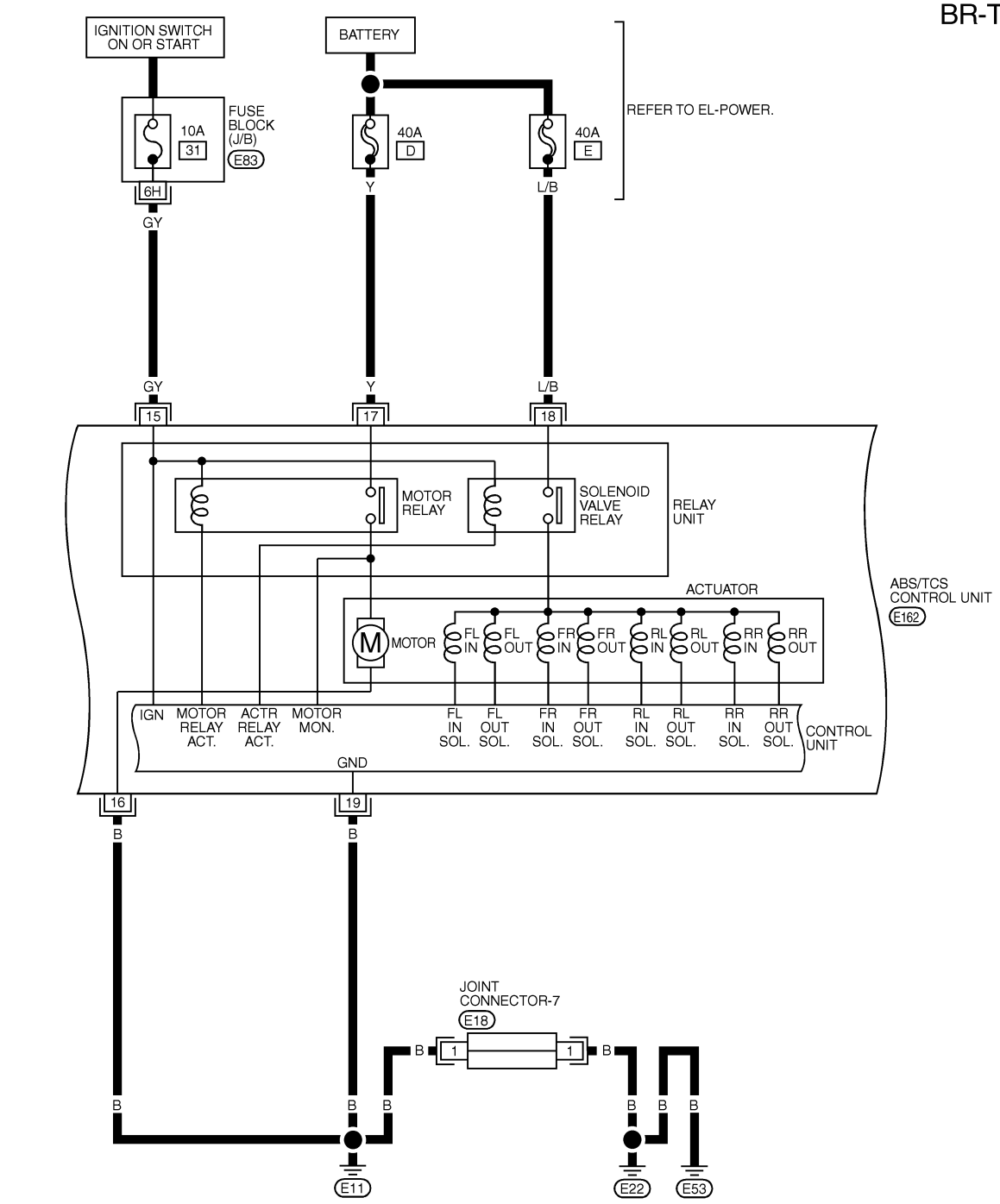
MBR519A

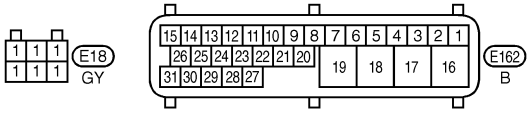
Wiring Diagram — TCS —

NHBR0149



BR-TCS-02

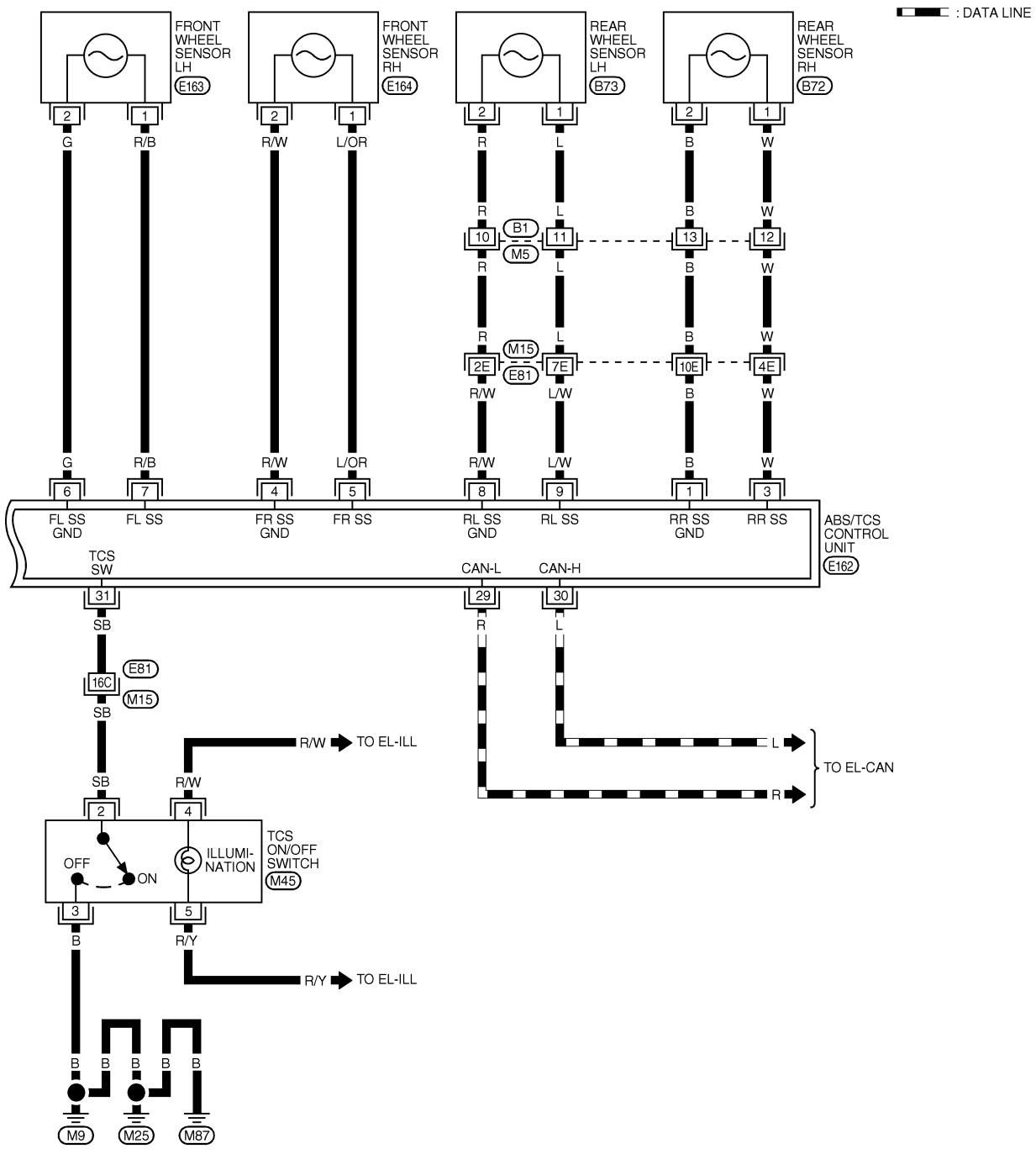


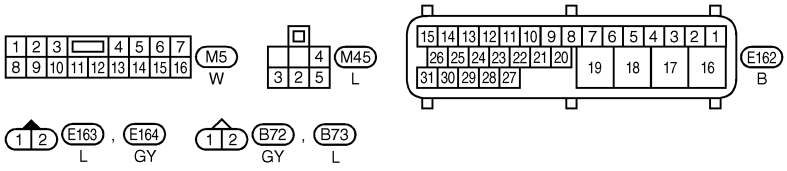


REFER TO THE FOLLOWING.
E83 -FUSE BLOCK-JUNCTION BOX (J/B)

MBR521A

BR-TCS-03





REFER TO THE FOLLOWING.
(M15) -SUPER MULTIPLE JUNCTION (SMJ)

MBR522A

WIRING DIAGRAM -TCS- (CONT'D)

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	B	REAR WHEEL SENSOR RH	WHEN VEHICLE CRUISE AT 30 KM/H (19 MPH)	PULSE FRONT: APPROX. 190 HZ REAR: APPROX. 190 HZ
3	W	REAR WHEEL SENSOR RH		
4	R/W	FRONT WHEEL SENSOR RH		
5	L/OR	FRONT WHEEL SENSOR RH		
6	G	FRONT WHEEL SENSOR LH		
7	R/B	FRONT WHEEL SENSOR LH		
8	R/W	REAR WHEEL SENSOR LH		
9	L/W	REAR WHEEL SENSOR LH		
11	OR	DATA LINK CONNECTOR	–	–
12	W/B	DATA LINK CONNECTOR	–	–
14	R/G	STOP LAMP SWITCH	WHEN BRAKE PEDAL DEPRESSED	BATTERY VOLTAGE
			WHEN BRAKE PEDAL RELEASED	APPROX. 0V
15	GY	POWER SOURCE	IGN ON	BATTERY VOLTAGE
			IGN OFF	APPROX. 0V
16	B	GROUND	–	–
17	Y	POWER SOURCE	–	BATTERY VOLTAGE
18	L/B	POWER SOURCE	–	BATTERY VOLTAGE
19	B	GROUND	–	–
21	L/Y	ABS WARNING LAMP IN	WHEN ABS WARNING LAMP IS ACTIVE	APPROX. 0V
			WHEN ABS WARNING LAMP IS NOT ACTIVE	BATTERY VOLTAGE
22	R/L	UNIFIED METER CONTROL UNIT	–	–
26	R/Y	TCS OFF INDICATOR LAMP IN	WHEN TCS OFF INDICATOR LAMP IS ACTIVE	APPROX. 0V
			WHEN TCS OFF INDICATOR LAMP IS NOT ACTIVE	BATTERY VOLTAGE
28	L/R	SLIP INDICATOR LAMP	WHEN SLIP INDICATOR LAMP IS ACTIVE	APPROX. 0V
			WHEN SLIP INDICATOR LAMP IS NOT ACTIVE	BATTERY VOLTAGE
29	R	CAN COMMUNICATION INPUT/OUTPUT SIGNAL (L)	IGNITION SWITCH ON	PBIA0224J
30	L	CAN COMMUNICATION INPUT/OUTPUT SIGNAL (H)	IGNITION SWITCH ON	PBIA0223J
31	SB	TCS ON/OFF SWITCH	WHEN TCS OFF SWITCH IS "ON (TCS IS CANCELED)"	APPROX. 0V
			WHEN TCS OFF SWITCH IS "OFF (TCS CAN BE OPERATED)"	APPROX. 4.5V

SBR904EA

CONSULT-II Functions

NHBR0151

CONSULT-II MAIN FUNCTION

NHBR0151S01

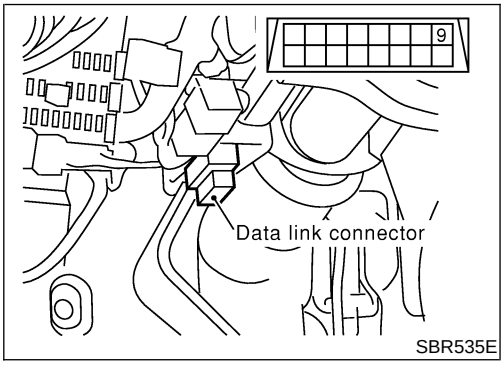
In a diagnosis function (main function), there are “SELF-DIAGNOSTIC RESULTS”, “DATA MONITOR”, “CAN DIAG SUPPORT MNTR”, “ACTIVE TEST”, “FUNCTION TEST”, “ECU PART NUMBER”.

Diagnostic test mode	Function	Reference
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.	Refer to BR-47.
DATA MONITOR	Input/Output data in the ABS actuator and electric unit (control unit) can be read.	Refer to BR-50.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	—
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.	Refer to BR-51.
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	—
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.	—

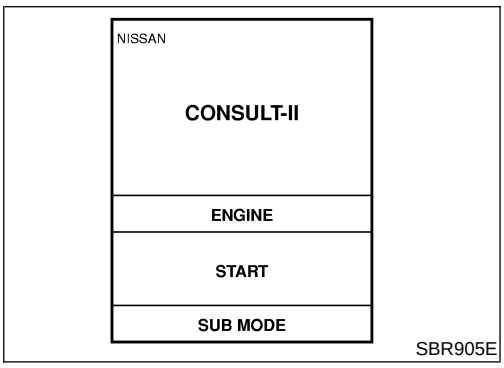
ECU (ABS/TCS CONTROL UNIT) PART NUMBER MODE

NHBR0151S02

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



SBR535E



SBR905E

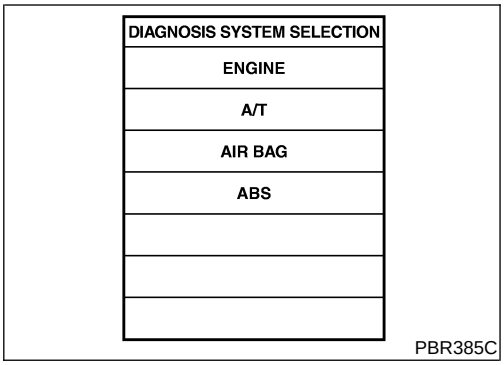
CONSULT-II Inspection Procedure

NHBR0152

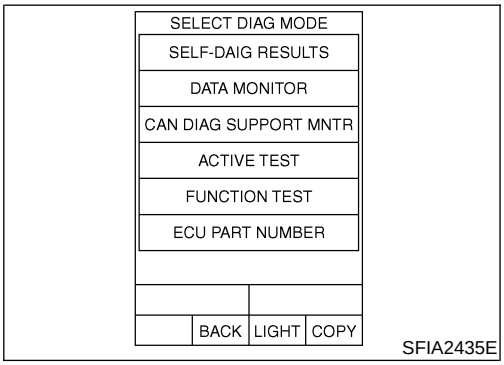
SELF-DIAGNOSIS PROCEDURE

NHBR0152S01

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Drive vehicle over 30 km/h (19 MPH) for at least one minute.
5. Stop vehicle with engine running and touch “START” on CONSULT-II screen.

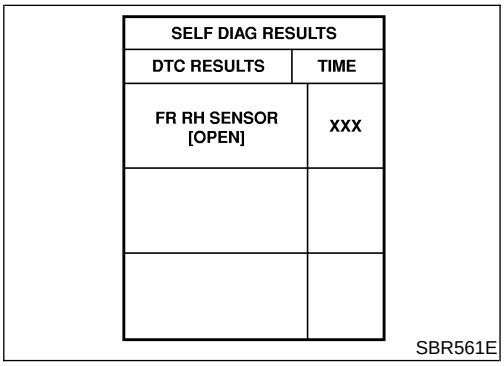


6. Touch "ABS".



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

8. Make the necessary repairs following the diagnostic procedures.



9. After the malfunctions are repaired, erase the self-diagnostic results stored in the control unit by touching "ERASE".
10. Check ABS warning lamp, SLIP indicator lamp, TCS OFF indicator lamp for deactivation after driving vehicle over 30 km/h (19 MPH) for at least one minute.

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

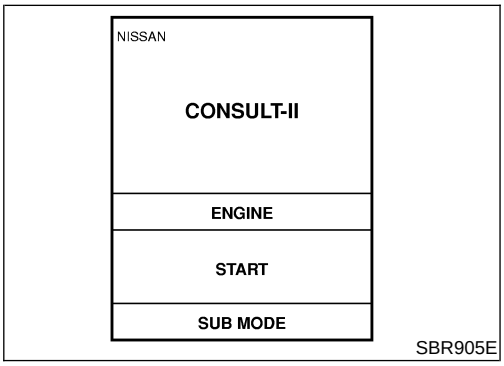
SELF-DIAGNOSTIC RESULTS MODE

=NHBR0152S02

Diagnostic item	Diagnostic item is detected when ...	Reference Page
FR RH SENSOR-1	● Circuit for front right wheel sensor is open. (An abnormally high input voltage is entered.)	BR-62
FR LH SENSOR-1	● Circuit for front left wheel sensor is open. (An abnormally high input voltage is entered.)	BR-62
RR RH SENSOR-1	● Circuit for rear right sensor is open. (An abnormally high input voltage is entered.)	BR-62
RR LH SENSOR-1	● Circuit for rear left sensor is open. (An abnormally high input voltage is entered.)	BR-62
FR RH SENSOR-2	● Circuit for front right wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-62
FR LH SENSOR-2	● Circuit for front left wheel sensor is shorted. (An abnormally low input voltage is entered.)	BR-62
RR RH SENSOR-2	● Circuit for rear right sensor is shorted. (An abnormally low input voltage is entered.)	BR-62
RR LH SENSOR-2	● Circuit for rear left sensor is shorted. (An abnormally low input voltage is entered.)	BR-62
ABS SENSOR [ABNORMAL SIGNAL]	● Teeth damage on sensor rotor or improper installation of wheel sensor. (Abnormal wheel sensor signal is entered.)	BR-62
FR RH IN ABS SOL	● Circuit for front right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR LH IN ABS SOL	● Circuit for front left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR RH IN ABS SOL	● Circuit for rear right inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR LH IN ABS SOL	● Circuit for rear left inlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR RH OUT ABS SOL	● Circuit for front right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
FR LH OUT ABS SOL	● Circuit for front left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR RH OUT ABS SOL	● Circuit for rear right outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
RR LH OUT ABS SOL	● Circuit for rear left outlet solenoid valve is open. (An abnormally low output voltage is entered.)	BR-66
ABS ACTUATOR RELAY [ABNORMAL]	● Actuator solenoid valve relay is ON, even control unit sends off signal. ● Actuator solenoid valve relay is OFF, even control unit sends on signal.	BR-66
PUMP MOTOR	● Circuit for actuator motor is open or shorted. ● Actuator motor relay is stuck.	BR-69
BATTERY VOLTAGE [ABNORMAL]	● Power source voltage supplied to ABS/TCS control unit is abnormally low or high.	BR-71
CONTROLER FAILURE	● Function of calculation in ABS/TCS control unit has failed.	BR-73
FR LH IN ABS SOL	● Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66
FR LH OUT ABS SOL	● Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66

Diagnostic item	Diagnostic item is detected when ...	Reference Page
RR RH IN ABS SOL	● Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66
RR RH OUT ABS SOL	● Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66
FR RH IN ABS SOL	● Circuit of the front LH wheel inlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66
FR RH OUT ABS SOL RR LH IN ABS SOL RR LH OUT ABS SOL	● Circuit of the front LH wheel outlet solenoid valve is open or short, or the control line is open or short to the power supply or the ground.	BR-66
ENGINE SIGNAL 1, 2, 3, 4	Engine related part has malfunction.	EC-136
CAN COMM CIRCUIT*2	● CAN communication line is open or short. ● TCS/ABS control unit internal malfunction. ● Power supply for ECM is interrupted instantane ously for approx. 0.5 seconds or more.	EL-226
A/T SIGNAL	CAN communication with TCM is not normal.	AT-209

*1: When "## ## SENSOR 2" is displayed, check power supply for TCS/ABS control unit in addition to wheel sensor circuit.
*2: When any diagnosis results is detested with "CAN COMM CIRCUIT" CAN communication circuit first.

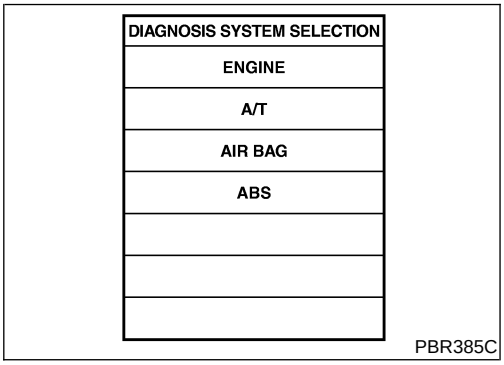


SBR905E

DATA MONITOR PROCEDURE

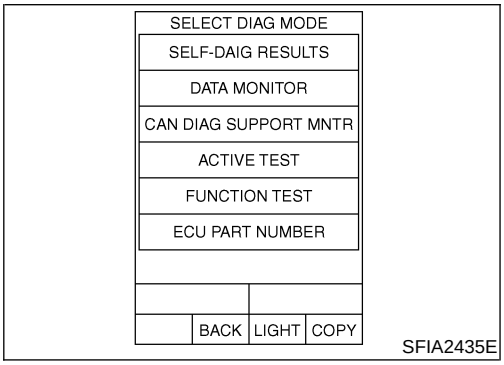
NHBR0152S03

1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector.
3. Turn ignition switch ON.
4. Touch "START" on CONSULT-II screen.



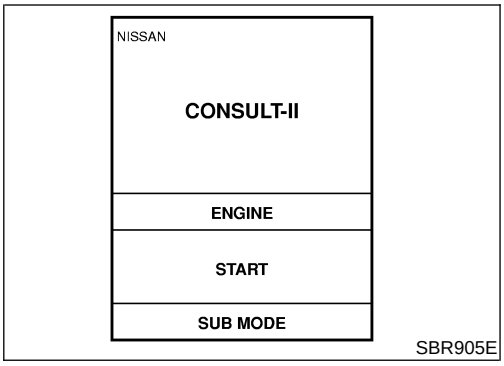
PBR385C

5. Touch "ABS".



SFIA2435E

6. Touch "DATA MONITOR".
7. Touch "SETTING" on "SELECT MONITOR ITEM" screen.
8. Touch "START" on "SELECT MONITOR ITEM".



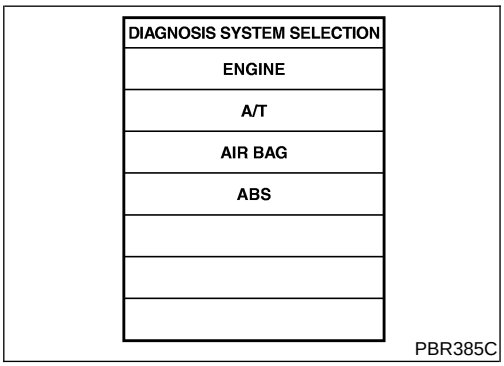
SBR905E

ACTIVE TEST PROCEDURE

NHBR0152S04

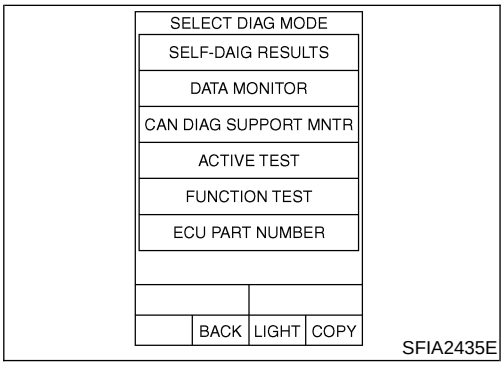
- When conducting Active test, vehicle must be stationary.
- When ABS warning lamp or SLIP indicator lamp stays on, never conduct Active test.

1. Turn ignition switch OFF.
2. Connect CONSULT-II to Data Link Connector.
3. Start engine.
4. Touch "START" on CONSULT-II screen.



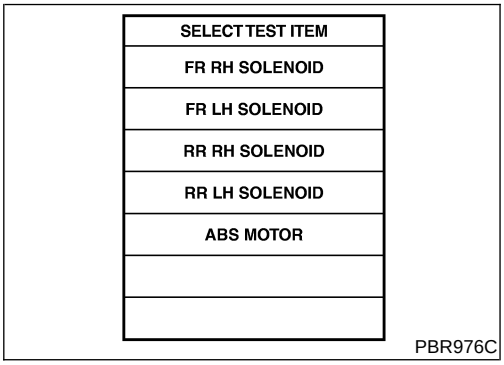
PBR385C

5. Touch "ABS".



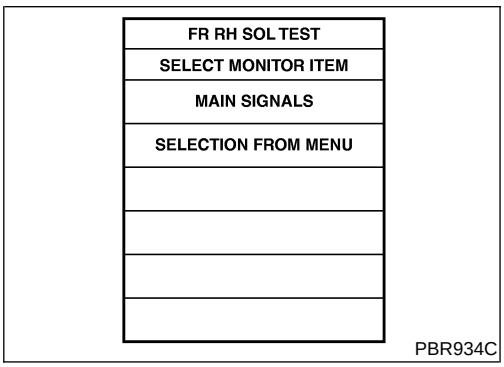
SFIA2435E

6. Touch "ACTIVE TEST".



PBR976C

7. Select active test item by touching screen.



PBR934C

8. Touch "START".
9. Carry out the active test by touching screen key.

DATA MONITOR MODE

NHBR0152S05

MONITOR ITEM	CONDITION	SPECIFICATION
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Drive vehicle. (Each wheel is rotating.)	Displays computed vehicle speed from wheel sensor signal. Almost the same speed as speedometer.
STOP LAMP SW	Turn ignition switch ON and depress brake pedal.	Depress the pedal: ON Release the pedal: OFF
ENGINE SPEED	Engine is running. (rpm)	Engine speed: 0 - 12,800 (rpm)
FR RH IN SOL FR RH OUT SOL FR LH IN SOL FR LH OUT SOL RR RH IN SOL RR RH OUT SOL RR LH IN SOL RR LH OUT SOL	Ignition switch is turned ON or engine is running.	Operating conditions for each solenoid valve are indicated. ABS is not operating: OFF
ACTUATOR RLY	Ignition switch is turned ON or engine is running.	Displays ON/OFF condition of ABS actuator relay. When turning ignition switch ON, ABS actuator relay is operated.
MOTOR RELAY		ABS is not operating: OFF ABS is operating: ON
ABS WARN LAMP		Warning lamp is turned on: ON Warning lamp is turned off: OFF
BATTERY VOLT		Power supply voltage for control unit
GEAR	A/T gear position signal detected by TCM is displayed.	Gear position: 1st: 1 2nd: 2 3rd: 3 4th: 4
NEXT GR POSI	A/T next gear position is displayed.	Gear position: 1st: 1 2nd: 2 3rd: 3 4th: 4
OFF SW	ON/OFF condition of signal from TCS switch is displayed.	TCS OFF S/W (all the time switch is pressed): ON TCS OFF S/W (released): OFF
OFF LAMP	• TCS OFF condition is displayed. • The condition of malfunctioning TCS is displayed.	TCS OFF indicator "OFF": OFF TCS OFF indicator "ON": ON
SLIP LAMP	The TCS functioning state is displayed by detecting rear wheel slip.	SLIP indicator "ON": ON SLIP indicator "OFF": OFF
SLCT LVR POSI	Shift lever position detected through TCM is displayed.	1st: 1 2nd: 2 3rd: 3 4th: 4 D range: D N range: N R range: R P range: P

ACTIVE TEST MODE

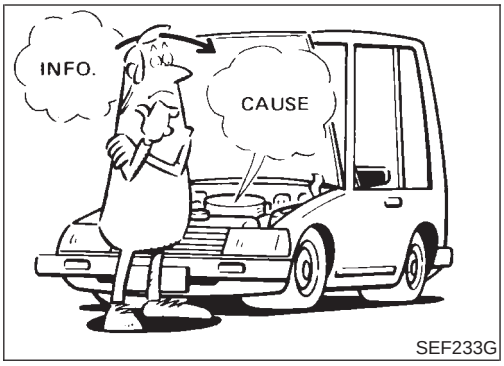
NHBR0152S06

TEST ITEM	CONDITION	JUDGEMENT		
FR RH SOL FR LH SOL RR RH SOL RR LH SOL	Ignition switch is turned ON.	Brake fluid pressure control operation		
			IN SOL	OUT SOL
		UP (Increase):	OFF	OFF
		KEEP (Hold):	ON	OFF
		DOWN (Decrease):	ON	ON*
ABS MOTOR		ABS actuator motor ON: Motor runs OFF: Motor stops		

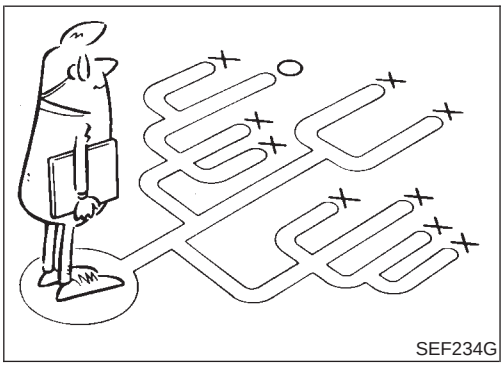
NOTE:

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

*: "ON" lasts for 1 to 2 seconds after toutching screen, then it goes to "OFF".



SEF233G


SEF234G

How to Perform Trouble Diagnoses for Quick and Accurate Repair

NHBR0153

INTRODUCTION

NHBR0153S01

The ABS/TCS system has an electronic control unit to control major functions. The control unit accepts input signals from sensors and instantly drives actuator. It is essential that both kinds of signals are proper and stable. It is also important to check for conventional incidents: such as air leaks in the booster or lines, lack of brake fluid, or other incidents with the brake system.

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

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

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

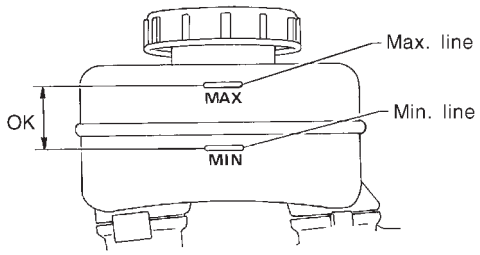
Start your diagnosis by looking for “conventional” incidents first. This is one of the best ways to troubleshoot brake incidents on an ABS/TCS controlled vehicle. Also check related Service Bulletins for information.

Preliminary Check

NHBR0155

1	CHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank.
Low fluid level may indicate brake pad wear or leakage from brake line.



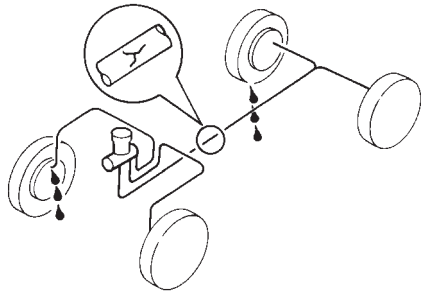
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 2.
No	▶	Repair. GO TO 2.

2	CHECK BRAKE LINE

Check brake line for leakage.



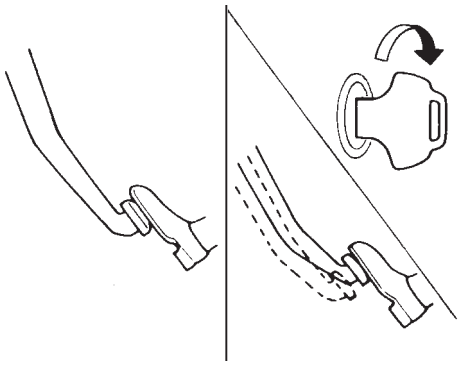
SBR389C

Is leakage present at or around brake lines, tubes or hoses or are any of these parts cracked or damaged?

Yes	▶	GO TO 3.
No	▶	Repair. GO TO 3.

3	CHECK BRAKE BOOSTER OPERATION

Check brake booster for operation and air tightness.
Refer to BR-20.



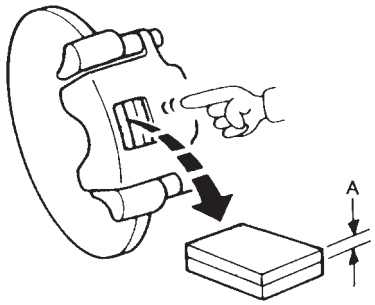
SBR058C

Is brake booster airtight and functioning properly?

Yes	▶	GO TO 4.
No	▶	Replace. GO TO 4.

4	CHECK BRAKE PAD AND ROTOR

Check brake pad and rotor.
Refer to BR-23, 25, 27, 31.



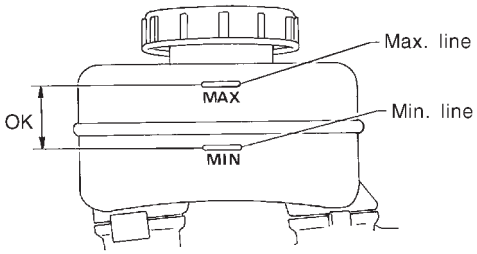
SBR059C

Are brake pads and rotors functioning properly?

Yes	▶	GO TO 5.
No	▶	Replace.

5	RECHECK BRAKE FLUID LEVEL

Check brake fluid level in reservoir tank again.



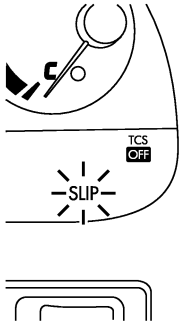
SBR451D

Is brake fluid filled between MAX and MIN lines on reservoir tank and/or has brake fluid been contaminated?

Yes	▶	GO TO 6.
No	▶	Fill up brake fluid.

6	CHECK WARNING LAMP ACTIVATION

Check warning lamp activation.



SBR655E

Does warning lamp turn on when ignition switch is turned "ON"?

Yes	▶	GO TO 7.
No	▶	Check fuse, warning lamp bulb and warning lamp circuit.

7	CHECK WARNING LAMP DEACTIVATION

Check warning lamp for deactivation after engine is started.

Does warning lamp turn off when engine is started?

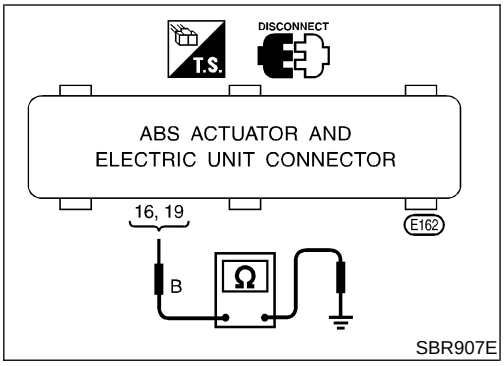
Yes	▶	GO TO 8.
No	▶	Go to Self-diagnosis. Refer to BR-47.

8	DRIVE VEHICLE

Drive vehicle at speeds over 30 km/h (19 MPH) for at least one minute.

Does warning lamp remain off after vehicle has been driven at 30 km/h (19 MPH) for at least one minute?

Yes	▶	END
No	▶	Go to Self-diagnosis. Refer to BR-47.



Ground Circuit Check

NHBR0157

ABS ACTUATOR AND ELECTRIC UNIT GROUND

NHBR0157S01

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

Continuity should exist.

Malfunction Code/Symptom Chart

NHBR0158

Code No. (FAIL CODE No.)	Malfunctioning part	Warning lamp	Indicator		Fail-safe	Reference Page
		ABS	TCS OFF	SLIP		
U1000	CAN communication system failure	ON or OFF	ON	ON	X	BR-74
C1101	Rear right sensor (open-circuit)	ON	ON	ON	X	BR-62
C1102	Rear left sensor (open-circuit)	ON	ON	ON	X	BR-62
C1103	Front right sensor (open-circuit)	ON	ON	ON	X	BR-62
C1104	Front left sensor (open-circuit)	ON	ON	ON	X	BR-62
C1105	Rear right sensor (short-circuit)*2	ON	ON	ON	X	BR-62
C1106	Rear left sensor (short-circuit)*2	ON	ON	ON	X	BR-62
C1107	Front right sensor (short-circuit)*2	ON	ON	ON	X	BR-62
C1108	Front left sensor (short-circuit)*2	ON	ON	ON	X	BR-62
C1109	Power supply (Low or high voltage)	ON	ON	ON	—*1	BR-71
C1110	Control unit	ON	ON	ON	X	BR-73
C1111	Actuator motor or motor relay	ON	ON	ON	X	BR-69
C1114	Solenoid valve relay	ON	ON	ON	X	BR-66
C1120	Actuator front left inlet solenoid valve	ON	ON	ON	X	BR-66
C1121	Actuator front left outlet solenoid valve	ON	ON	ON	X	BR-66
C1122	Actuator front right inlet solenoid valve	ON	ON	ON	X	BR-66
C1123	Actuator front right outlet solenoid valve	ON	ON	ON	X	BR-66
C1124	Actuator rear left inlet solenoid valve	ON	ON	ON	X	BR-66
C1125	Actuator rear left outlet solenoid valve	ON	ON	ON	X	BR-66
C1126	Actuator rear right inlet solenoid valve	ON	ON	ON	X	BR-66
C1127	Actuator rear right outlet solenoid valve	ON	ON	ON	X	BR-66
C1130	CAN communication line or ECM*4	—*3	X	X	X	BR-74
C1131	CAN communication line or ECM*4	—*3	X	X	X	BR-74
C1132	CAN communication line or ECM*4	—*3	X	X	X	BR-74
C1133	CAN communication line or ECM*4	—*3	X	X	X	BR-74
C1135	CAN communication line or TCM*5	—*3	X	X	X	BR-74
C1155	Wheel sensor or the circuit	X	X	X	X	BR-62

X: Available —: Not available

*1: Fail-safe operation does not activate. A signal from control unit suspends TCS and ABS control operation. Brakes operate conventionally. After specified power supply voltage resumes, TCS OFF and SLIP indicator and ABS warning lamp go out, allowing for TCS and ABS control operation.

*2: If a wheel or wheels spin on bad or slippery road surfaces for a period of approximately 10 to 80 seconds, the ABS warning lamp and the TCS OFF indicator lamp light. But this is not a malfunction. When the ignition switch is turned “ON” after a shorted wheel sensor circuit has been repaired, the ABS warning lamp and the TCS OFF indicator lamp light. Drive the vehicle at about 30 km/h (19 MPH) to ensure these lamps go out within 1 minute.

*3: TCS control stops due to fail safe operation, however ABS keeps operation.

*4: For more detail, refer to BR-74.

*5: For more detail, refer to BR-75.

Malfunction Code/Symptom Chart (Cont'd)

NOTE:

When a system part have electric malfunction, ABS warning lamp is illuminated by fail-safe function. According to malfunctioning condition, both ABS and EBD system become in following conditions.

1) ABS is not operated. EBD is operated.
2) Both ABS and EBD are operated. (Same condition as the vehicle without ABS and EBD)

On the condition 1), some sound for ABS system self-diagnosis can be heard same as usual, when key switch is turned ON or first starting.

System Description

NHBR0209

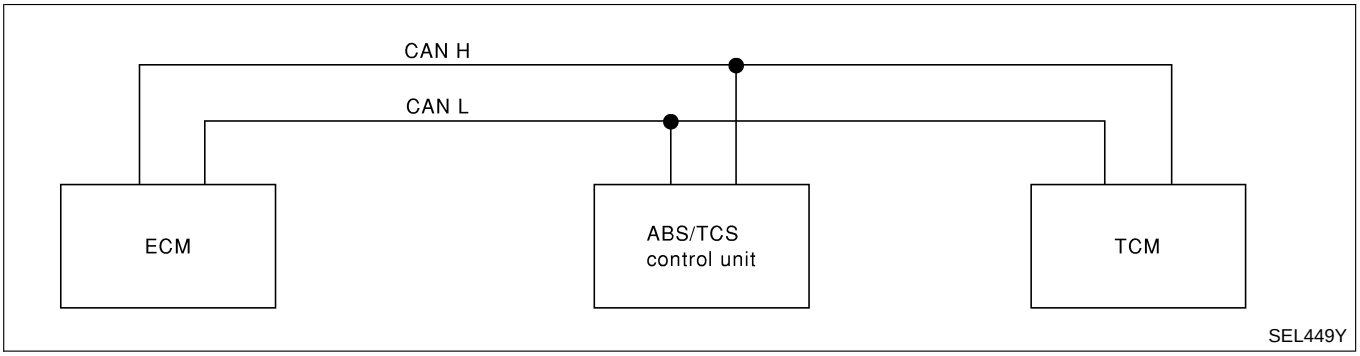
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

FOR TCS MODELS

System Diagram

NHBR0209S02

NHBR0209S0201



Input/Output Signal Chart

NHBR0209S0202

T: Transmit R: Receive

Signals	ECM	ABS/TCS control unit	TCM
Accelerator pedal position signal	T	R	R
Output shaft revolution signal	R	—	T
TCS self-diagnostic signal	R	T	—
ABS self-diagnostic signal	R	T	—

Wheel Sensor or Rotor

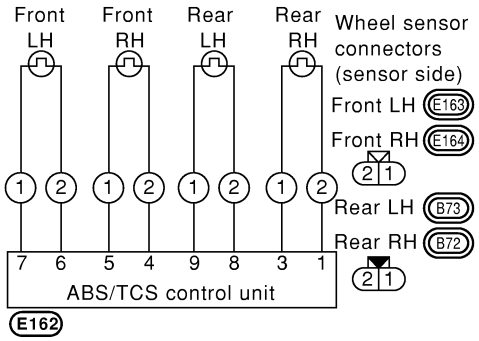
NHBR0159

DIAGNOSTIC PROCEDURE

NHBR0159S01

1	INSPECTION START

Wheel sensor inspection



SBR004F

	▶	GO TO 2.

2	CHECK CONNECTOR

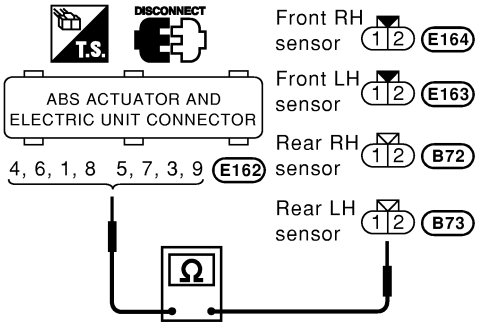
1. Disconnect connectors from control unit and wheel sensor of malfunction code No. Check terminals for damage or loose connections. Then reconnect connectors.
2. Carry out self-diagnosis again.

Does warning lamp activate again?

Yes	▶	GO TO 3.
No	▶	**INSPECTION END**

3	CHECK WHEEL SENSOR CIRCUIT

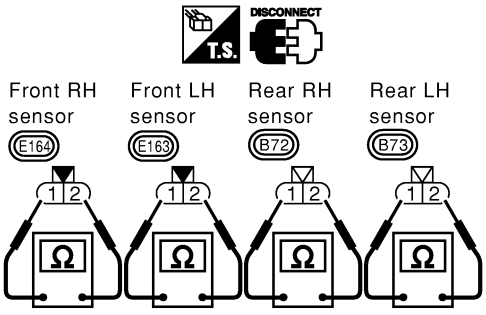
1. Disconnect control unit connector.
2. Check resistance between control unit connector terminals.
   Front RH wheel
   Terminals 4 and 5
   Front LH wheel
   Terminals 6 and 7
   Rear RH wheel
   Terminals 1 and 3
   Rear LH wheel
   Terminals 8 and 9
   Resistance: 0.8 - 1.85 kΩ



SBR909EA

Is resistance 0.8 - 1.85 kΩ?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK WHEEL SENSOR	
Check resistance of each sensor. (See NOTE) **Resistance: 0.8 - 1.85 kΩ**  SBR001FA **Is resistance 0.8 - 1.85 kΩ?**		
Yes	▶	Repair harness and connectors between control unit connector and wheel sensor connector.
No	▶	Replace wheel sensor.

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

6	CHECK WHEEL BEARING

Check wheel bearing axial end play.
Check clearance between sensor and rotor.

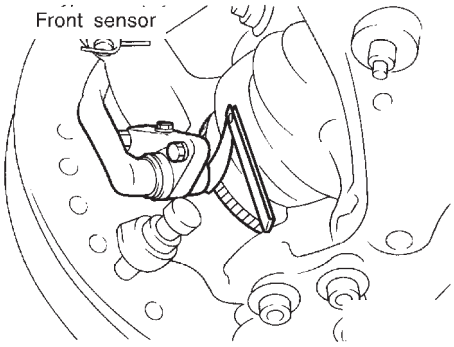
Clearance:

Front

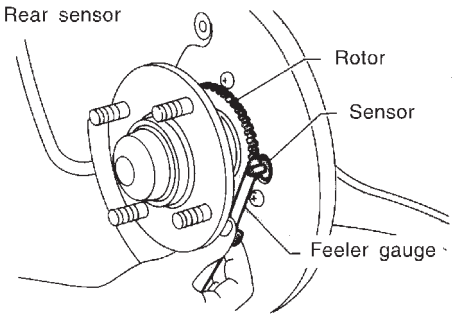
0.273 - 0.925 mm (0.0107 - 0.0364 in)

Rear

0.387 - 0.992 mm (0.0152 - 0.0391 in)



SBR605AA



SBR069CA

Is axial end play and clearance within specifications?

Yes	▶	GO TO 7.
No	▶	Clean sensor fixing portion, or replace sensor.

7	CHECK SENSOR ROTOR

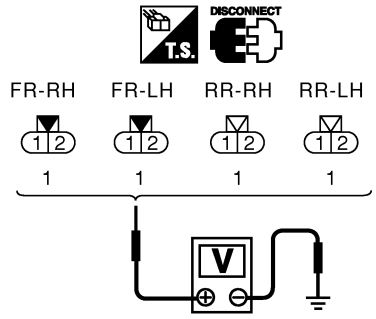
Check sensor rotor for teeth damage.

Is sensor rotor free from damage?

Yes	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.
No	▶	Replace sensor rotor.

8	CHECK POWER SUPPLY

1. Disconnect wheel sensor connector.
2. Check voltage between body side terminal of wheel sensor connectors and body ground.



SBR984E

Is voltage more than 8V?

Yes	▶	Replace wheel sensor.
No	▶	Replace ABS control unit.

ABS Actuator Solenoid Valve or Solenoid Valve Relay

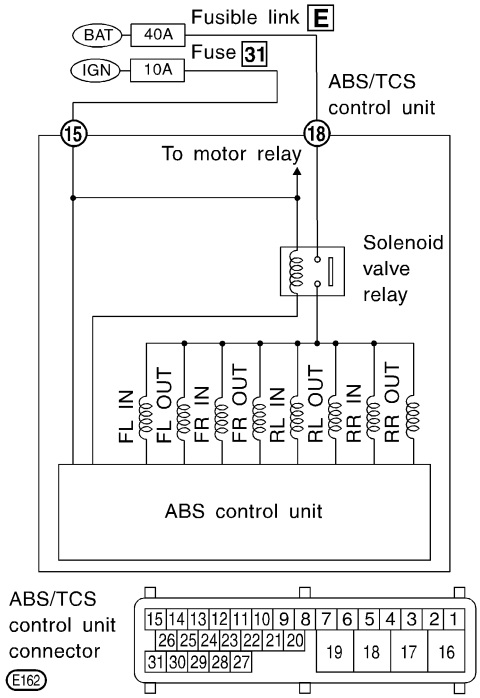
=NHBR0171

DIAGNOSTIC PROCEDURE

NHBR0171S01

1	INSPECTION START

Solenoid valve relay inspection



SBR952EA

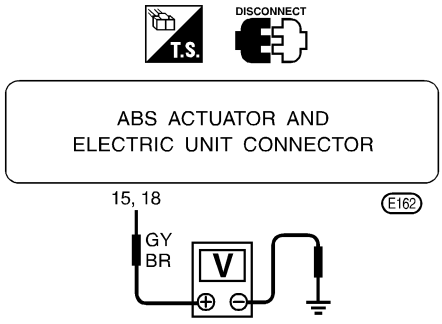
	▶	GO TO 2.

2	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
Check 40A [**E**] fusible link (ABS ACTR) for ABS solenoid valve relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section. **Is fusible link OK?**		
Yes	▶	GO TO 3.
No	▶	GO TO 7.

3	CHECK FUSE	
Check 10A fuse No. 31. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section. **Is fuse OK?**		
Yes	▶	GO TO 4.
No	▶	GO TO 9.

4	CHECK CONNECTOR	
1. Disconnect connectors from control unit and ABS actuator. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	GO TO 5.
No	▶	**INSPECTION END**

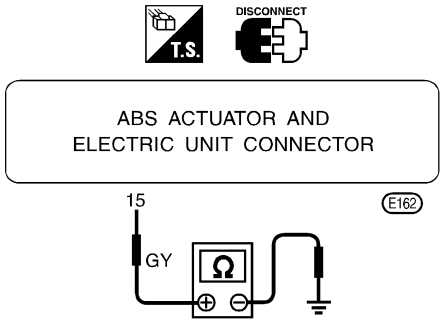
5	CHECK GROUND CIRCUIT	
Refer to ABS ACTUATOR AND ELECTRIC UNIT in Ground Circuit Check, BR-58. **Is ground circuit OK?**		
Yes	▶	GO TO 6.
No	▶	Repair harness and connectors.

6	CHECK SOLENOID VALVE POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit connector terminals 15 and 17 and ground.  SBR911EA **Does battery voltage exist?**		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

7	REPLACE FUSIBLE LINK	
Replace fusible link. **Does the fusible link blow out when ignition switch is turned "ON"?**		
Yes	▶	GO TO 8.
No	▶	**INSPECTION END**

8	CHECK RELAY UNIT POWER SUPPLY CIRCUIT FOR SHORT

1. Disconnect battery cable and ABS actuator and electric unit connector.
2. Check continuity between ABS actuator and electric unit connector terminal 15 and ground.



SBR912EA

Does continuity exist?

Yes	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.
No	▶	Replace ABS actuator and electric unit.

9	REPLACE FUSE

Replace fuse.

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

Yes	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.
No	▶	**INSPECTION END**

Motor Relay or Motor

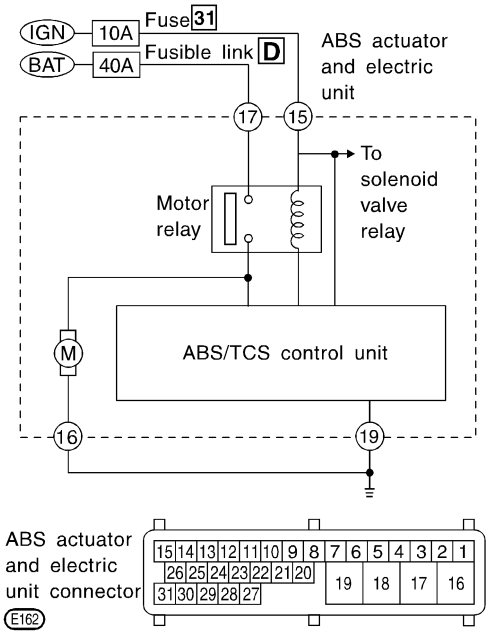
DIAGNOSTIC PROCEDURE

=NHBR0172

NHBR0172S01

1	INSPECTION START

ABS motor relay inspection



SBR953EA

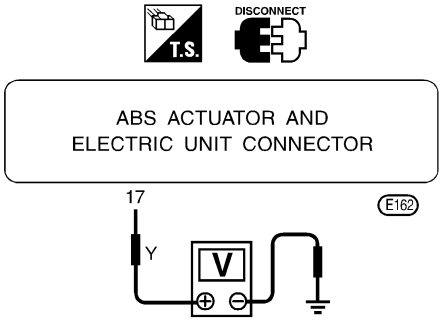
	▶	GO TO 2.

2	CHECK MOTOR POWER SUPPLY CIRCUIT	
Check 40A [**D**] fusible link (ABS MTR) for ABS motor relay. For fusible link layout, refer to POWER SUPPLY ROUTING in EL section.		
Is fusible link OK?		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

3	CHECK CONNECTOR	
1. Disconnect ABS/TCS CONTROL UNIT connector. Check terminals for damage or loose connection. Then reconnect connectors. 2. Carry out self-diagnosis again.		
Does warning lamp activate again?		
Yes	▶	GO TO 4.
No	▶	**INSPECTION END**

4	CHECK MOTOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect ABS actuator and electric unit connector.
2. Check voltage between ABS actuator and electric unit connector terminal 17 and ground.



SBR898EA

Does battery voltage exist?

Yes	▶	GO TO 5.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

5	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND CIRCUIT

Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-58.

Is ground circuit OK?

Yes	▶	Replace ABS actuator and electric unit.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

6	REPLACE FUSIBLE LINK

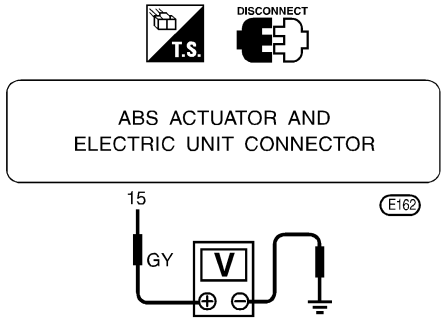
Replace fusible link.

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

Yes	▶	GO TO 7.
No	▶	**INSPECTION END**

7	CHECK ABS ACTUATOR MOTOR POWER SUPPLY CIRCUIT

1. Disconnect battery cable and ABS actuator and electric unit connector.
2. Check continuity between ABS actuator and electric unit connector terminal 15 and ground.



SBR913EA

Does continuity exist?

Yes	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fusible link If NG, repair harness or connectors.

Low Voltage

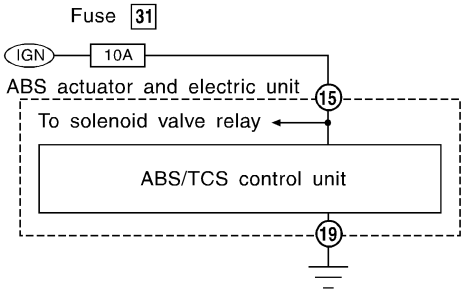
NHBR0173

DIAGNOSTIC PROCEDURE

NHBR0173S01

1	INSPECTION START

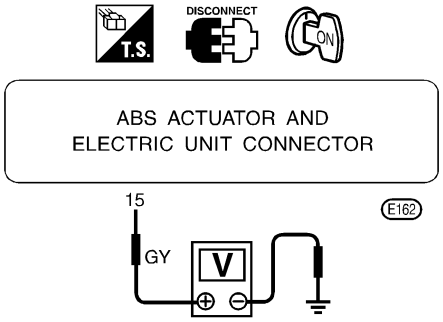
ABS actuator and electric unit power supply and ground circuit inspection



SBR914E

	▶	GO TO 2.

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

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
1. Disconnect ABS actuator and electric unit connector. 2. Check voltage between ABS actuator and electric unit connector terminal 15 and ground.  SBR915EA **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	GO TO 4.
No	▶	GO TO 5.

4	CHECK ABS ACTUATOR AND ELECTRIC UNIT GROUND	
Refer to ABS ACTUATOR AND ELECTRIC UNIT GROUND in Ground Circuit Check, BR-58. **Is ground circuit OK?**		
OK	▶	Check ABS actuator and electric unit pin terminals for damage or the connection of ABS actuator and electric unit harness connector. Reconnect ABS actuator and electric unit harness connector. Then retest.
NG	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and ground If NG, repair harness or connectors.

5	CHECK FUSE	
Check 10A fuse 31 (Engine control) for control unit. Refer to POWER SUPPLY ROUTING in EL section. **Is fuse OK?**		
Yes	▶	GO TO 6.
No	▶	Replace fuse.

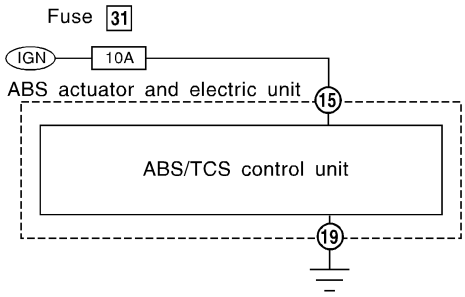
6	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check continuity between battery and ABS actuator and electric unit connector terminal 15. **Does continuity exist?**		
Yes	▶	Check battery. Refer to BATTERY in EL section.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between ABS actuator and electric unit and fuse If NG, repair harness or connectors.

Control Unit

NHBR0174

DIAGNOSTIC PROCEDURE

NHBR0174S01

1	INSPECTION START	
ABS actuator and electric unit power supply and ground circuit inspection  SBR916E		
	▶	GO TO 2.

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

3	CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT	
Check voltage. Refer to "3. CHECK ABS ACTUATOR AND ELECTRIC UNIT POWER SUPPLY CIRCUIT" in "Low Voltage", BR-71. **Does battery voltage exist when ignition switch is turned ON?**		
Yes	▶	GO TO 4.
No	▶	Repair.

4	CHECK WARNING LAMP INDICATION	
Check "SELF DIAGNOSIS RESULTS", if "CONTROLLER FAILRE" is indicated on the screen.		
Yes	▶	Replace ABS actuator and electric unit.
No	▶	Inspect the system according to the code No.

CAN Communication System

NHBR0175

INSPECTION PROCEDURE

NHBR0175S01

1	CHECK CONNECTOR	
1. Turn ignition switch OFF, disconnect the ABS actuator and electric unit connector, and check the terminal for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal. 2. Reconnect connector to perform self-diagnosis. **Is "CAN COMM CIRCUIT" displayed in the self-diagnosis display items?**		
Yes	▶	Print out the self-diagnostic results, and refer to EL-445.
No	▶	Connector terminal connection is loose, damaged, open, or shorted.

Engine System

NHBR0176

DIAGNOSTIC PROCEDURE

NHBR0176S01

1	SELF-DIAGNOSIS RESULT CHECK 1	
Check the self-diagnosis results. Self-diagnosis results: ENGINE_SIGNAL_1, ENGINE_SIGNAL_2, ENGINE_SIGNAL_3 MTBL1189 **Are any items other than above indicated in self-diagnosis results?**		
Yes	▶	Repair or replace harness or connector.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Perform the ECM self-diagnosis, and repair or replace harness or connector, then perform the ECM self-diagnosis again. 2. Perform the TCS/ABS control unit self-diagnosis again. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace harness or connector. Perform the self-diagnosis again.

A/T System

NHBR0208

DIAGNOSTIC PROCEDURE

NHBR0208S01

1	SELF-DIAGNOSIS RESULT CHECK 1	
Check the self-diagnosis results. Self-diagnosis results A/T_SIGNAL MTBL1190 **Are any items other than above indicated in self-diagnosis results?**		
Yes	▶	Repair or replace related parts.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Perform the TCM self-diagnosis, and replace harness or connector, then perform the TCM self-diagnosis again. 2. Perform the ABS/TCS control unit self-diagnosis again. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace related parts.

1. ABS Works Frequently

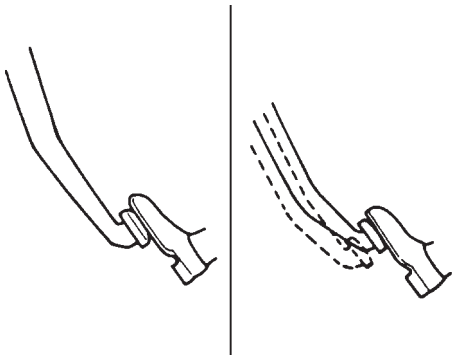
NHBR0188

1	CHECK WHEEL SENSOR	
1. Check wheel sensor connector for terminal damage or loose connections. 2. Perform wheel sensor mechanical check. Refer to “Wheel Sensor or Rotor”, BR-62. **Are wheel sensors functioning properly?**		
Yes	▶	GO TO 2.
No	▶	Repair.

2	CHECK FRONT AXLE	
Check front and rear axles for excessive looseness. Refer to AX section, “Front Wheel Bearing”, “ON-VEHICLE SERVICE” and “Rear Wheel Bearing”, “ON-VEHICLE SERVICE”. **Is front axle installed properly?**		
Yes	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-76.
No	▶	Repair.

2. Unexpected Pedal Action

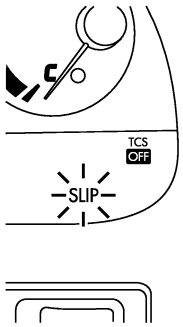
NHBR0189

1	CHECK BRAKE PEDAL STROKE	
Check brake pedal stroke. Is stroke excessively large?  SBR540A		
Yes	▶	Perform Preliminary Check. Refer to BR-55.
No	▶	GO TO 2.

2	CHECK CONNECTOR AND PERFORMANCE	
1. Disconnect ABS actuator and electric unit connector. 2. Check whether brake is effective. **Yes or No?**		
Yes	▶	GO TO 3.
No	▶	Perform Preliminary Check. Refer to BR-55.

3	CHECK WARNING LAMP INDICATION

Ensure warning lamp remains off while driving.



SBR655E

Is warning lamp turned off?

Yes	▶	GO TO 4.
No	▶	Carry out self-diagnosis. Refer to BR-47.

4	CHECK WHEEL SENSOR

1. Check wheel sensor connector for terminal damage or loose connection.
2. Perform wheel sensor mechanical check. Refer to "Wheel Sensor Rotor", BR-62.

Is wheel sensor mechanism OK?

Yes	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.
No	▶	Repair.

3. Long Stopping Distance

NHBR0190

1	CHECK CONNECTOR AND PERFORMANCE

1. Cancel ABS by removing 40A [**E**] fusible link (ABS ACTR) for ABS solenoid valve relay.
2. Check stopping distance.

OK or NG

OK	▶	Perform Preliminary Check and air bleeding.
NG	▶	Go to "3. CHECK WARNING LAMP INDICATION" in "2. Unexpected Pedal Action", BR-76.

NOTE:
Stopping distance may be longer than vehicles without ABS when road condition is slippery.

4. ABS Does Not Work

NHBR0191

1	CHECK WARNING LAMP INDICATION	
Does the ABS warning lamp activate?		
Yes	▶	Carry out self-diagnosis. Refer to BR-47.
No	▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-76.

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

5. Pedal Vibration and Noise

=NHBR0192

1	INSPECTION START
Pedal vibration and noise inspection Brake pedal  SAT797A	
▶	GO TO 2.

2	CHECK SYMPTOM
1. Apply brake. 2. Start engine. **Does the symptom appear only when engine is started?**	
Yes ▶	Carry out self-diagnosis. Refer to BR-47.
No ▶	GO TO 3.

3	RECHECK SYMPTOM
Does the symptom appear when electrical equipment switches (such as headlamp) are operated?	
Yes ▶	Check control unit pin for damage or the connection of control unit harness connector. Then reconfirm the continuity.
No ▶	Go to “3. CHECK WARNING LAMP INDICATION” in “2. Unexpected Pedal Action”, BR-76.

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

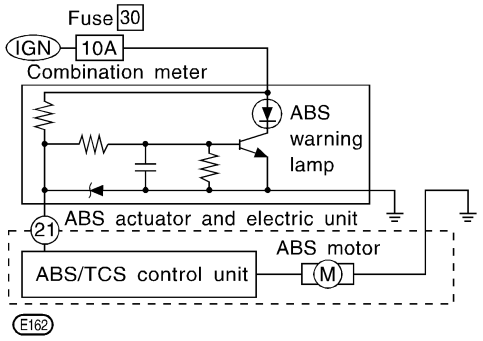
- Applying brake gradually when shifting or operating clutch.
- Low friction (slippery) road.
- High speed cornering.
- Driving over bumps and pot holes.
- Engine speed is over 5,000 rpm with vehicle stopped.

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

=NHBR0193

1	INSPECTION START

Warning lamp circuit inspection



SBR917EA

▶ GO TO 2.

2	CHECK FUSE

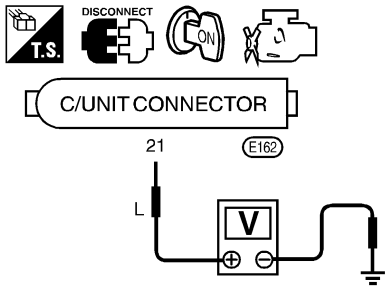
Check 10A fuse No. 30 for warning lamp. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK ABS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Check voltage between control unit connector terminal 21 and ground after turning ignition switch “ON”.



SBR918EA

Does battery voltage exist after turning ignition switch “ON”?

Yes	▶	GO TO 4.
No	▶	Repair.

4	CHECK WARNING LAMP

Check warning lamp bulb.

Is warning lamp bulb OK?

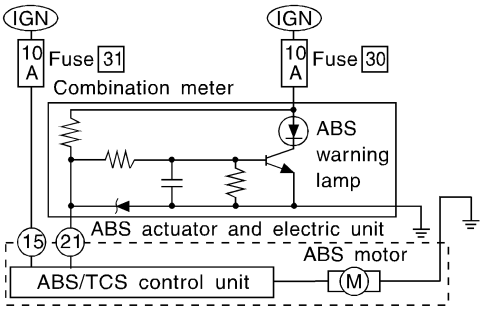
Yes	▶	Repair harness and connectors between fuse and control unit connector terminal 30 (including combination meter).
No	▶	Replace bulb.

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

=NHBR0194

1	INSPECTION START

ABS control unit inspection



SBR919E

▶ GO TO 2.

2	CHECK FUSE

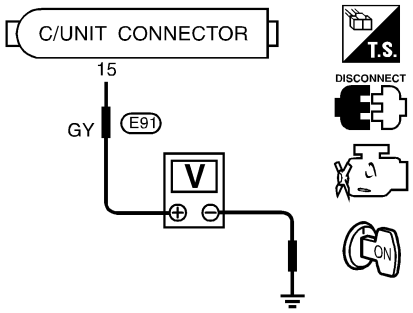
Check 10A fuse No. 31 for control unit. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	GO TO 5.

3	CHECK ABS/TCS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Disconnect connector from control unit.
2. Check voltage between control unit connector terminal 15 and ground after turning ignition switch “ON”.



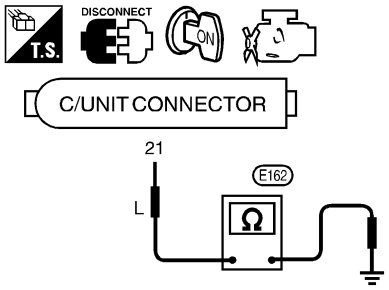
SBR920E

Does battery voltage exist?

Yes	▶	GO TO 4.
No	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.

4	CHECK WARNING LAMP GROUND CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect connectors from control unit.
3. Check continuity between control unit connector terminal 21 and body ground.



SBR921EA

Does continuity exist?

Yes	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.
No	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

5	REPLACE FUSE

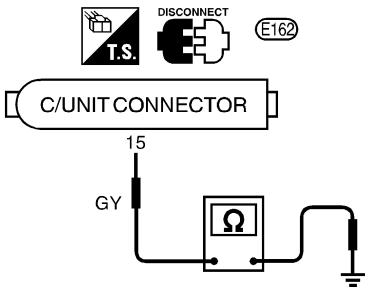
Replace 10A fuse No. 31.

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

Yes	▶	GO TO 6.
No	▶	**INSPECTION END**

6	CHECK ABS/TCS CONTROL UNIT POWER SUPPLY CIRCUIT

1. Disconnect control unit connector.
2. Check continuity between control unit connector terminal 15 and body ground.



SBR922EA

Does continuity exist?

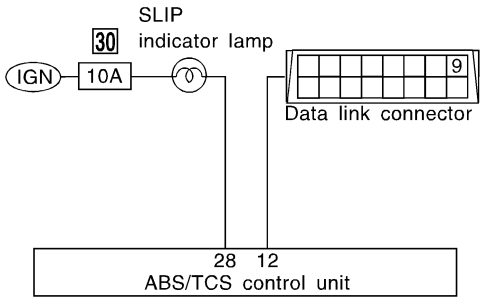
Yes	▶	**Check the following.** ● Harness connector E162 ● Harness for open or short between control unit and fuse If NG, repair harness or connectors.
No	▶	Check control unit pin terminals for damage or the connection of control unit harness connector. Reconnect control unit harness connector. Then retest.

8. SLIP Indicator Lamp Does Not Come On When Ignition Switch Is Turned On

=NHBR0195

1	INSPECTION START

Indicator lamp circuit inspection



SBR923E

▶ GO TO 2.

2	CHECK FUSE

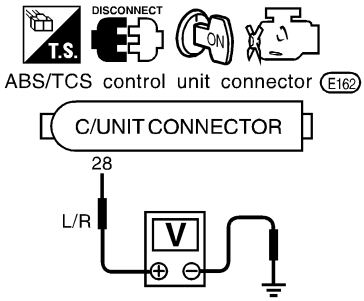
Check 10A fuse No. 30 for control unit. For fuse layout, refer to “POWER SUPPLY ROUTING” in EL section.

Is fuse OK?

Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK CONTROL UNIT POWER SUPPLY CIRCUIT

1. Install 10A fuse.
2. Disconnect connector from control unit.
3. Check voltage between control unit connector terminal 28 and ground after turning ignition switch “ON”.



SBR924EA

Does battery voltage exist?

Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK INDICATOR LAMP

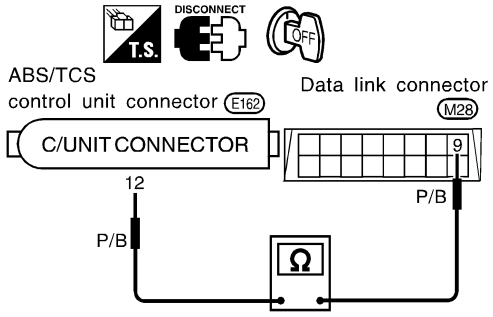
Check indicator lamp bulb.

Is indicator lamp bulb OK?

Yes	▶	Repair harness and connectors between fuse and control unit connector terminal 32 (including combination meter).
No	▶	Replace bulb.

5	CHECK CIRCUIT

1. Disconnect control unit connector.
2. Check continuity between control unit connector terminal 12 and data link connector terminal 9.



SBR925EA

Does continuity exist?

Yes	▶	GO TO 6.
No	▶	**Check the following.** ● Harness connectors E162, M28 ● Harness for open or short between control unit and data link connector

6	CHECK CONNECTOR

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

Does warning lamp activate again?

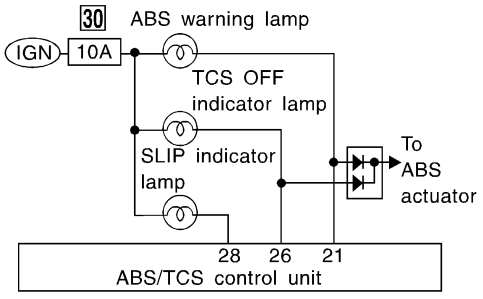
Yes	▶	Check items the self-diagnosis detected as faulty.
No	▶	**INSPECTION END**

9. TCS OFF Indicator Lamp Does Not Come On When Ignition Switch Is Turned On

NHBR0196

1	INSPECTION START

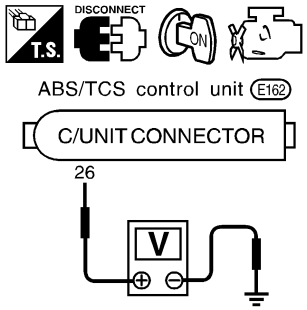
Indicator lamp circuit inspection



SBR926E

	▶	GO TO 2.

2	CHECK FUSE	
Check 10A fuse No. 30 for control unit. For fuse layout, refer to "POWER SUPPLY ROUTING" in EL section. **Is fuse OK?**		
Yes	▶	GO TO 3.
No	▶	Replace fuse.

3	CHECK CONTROL UNIT POWER SUPPLY CIRCUIT	
1. Install 10A fuse. 2. Disconnect connector from control unit. 3. Check voltage between control unit connector terminal 26 and ground after turning ignition switch "ON".  SBR927EA **Does battery voltage exist?**		
Yes	▶	GO TO 5.
No	▶	GO TO 4.

4	CHECK INDICATOR LAMP	
Check indicator lamp bulb. **Is indicator lamp bulb OK?**		
Yes	▶	Repair harness and connectors between control unit connector terminal 26 and fuse box (including combination meter).
No	▶	Replace bulb.

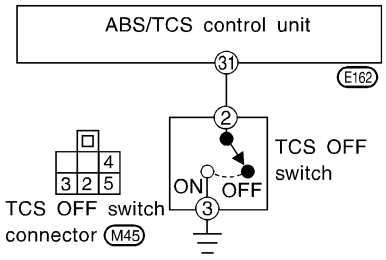
5	CHECK CONNECTOR	
1. Disconnect connector from control unit. Check terminals for damage or loose connection. Then reconnect connector. 2. Carry out self-diagnosis again. **Does warning lamp activate again?**		
Yes	▶	Check items the self-diagnosis detected as faulty.
No	▶	**INSPECTION END**

10. TCS OFF Switch Is Inoperative

=NHBR0197

1	INSPECTION START

Inspect TCS OFF switch.

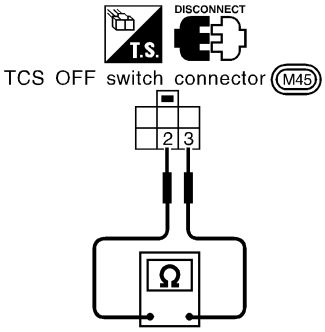


SBR928EA

	▶	GO TO 2.

2	CHECK TCS OFF SWITCH

1. Remove TCS OFF switch and disconnect TCS OFF switch connector.
2. Check continuity between terminal 2 and 3 for TCS OFF switch connector.



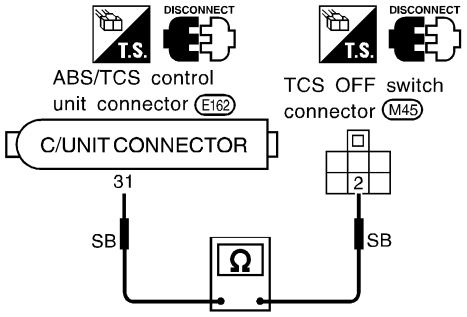
SBR544E

When TCS OFF switch is pressed:
Continuity should exist.
When TCS OFF switch is released:
Continuity should not exist.

OK	▶	GO TO 3.
NG	▶	Replace TCS OFF switch.

3	CHECK TCS OFF SWITCH POWER SUPPLY CIRCUIT

- Disconnect connector from control unit.
- Check continuity between control unit connector terminal 31 and TCS OFF switch connector terminal 2.



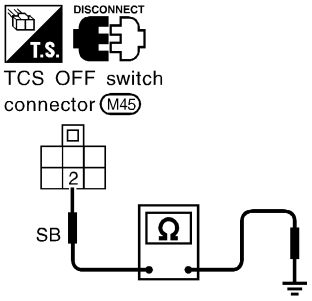
SBR929EA

Does continuity exist?

Yes	▶	GO TO 4.
No	▶	**Check the following.** • Harness connectors E162, M45 • Harness for open or short between TCS OFF switch terminal (body side) and control unit If NG, repair harness or connectors.

4	CHECK TCS OFF SWITCH POWER SUPPLY

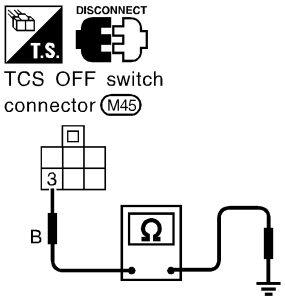
Check continuity between TCS OFF switch connector terminal 2 and ground.



SBR546E

Does continuity exist?

Yes	▶	GO TO 5.
No	▶	Repair harness and connectors.

5	CHECK TCS OFF SWITCH GROUND CIRCUIT	
Check continuity between TCS OFF switch connector terminal 3 and ground.  SBR547E **Does continuity exist?**		
Yes	▶	Connect TCS OFF switch connector and check switch operation.
No	▶	Repair harness and connectors.

11. Poor Acceleration

=NHBR0198

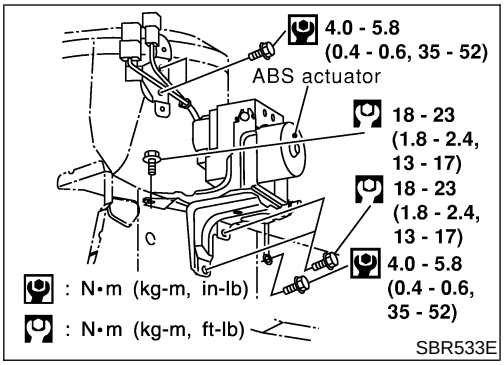
1	INSPECTION START
Engine acceleration is poor while TCS is operating. Vehicle instability is caused by unstable engine rpm operation. (Engine is shaking.)	
▶	GO TO 2.

2	CHECK PERFORMANCE
1. Cancel TCS operation using TCS OFF switch. (TCS OFF indicator lamp lights.) 2. Drive vehicle or accelerate engine. **Is engine acceleration poor or does automatic transaxle shift when TCS is not operating?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in BR section.
No ▶	GO TO 3.

3	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for TCM. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in AT section.
No ▶	GO TO 4.

4	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for ABS/TCS. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in BR section.
No ▶	GO TO 5.

5	CHECK SELF-DIAGNOSIS
Perform self-diagnostic procedures for ECM. **Does any of the following self-diagnostic items appear on the display?**	
Yes ▶	Go to “TROUBLE DIAGNOSES” in EC section.
No ▶	**INSPECTION END**



Removal

NHBR0300S01

1. Disconnect battery cable.
2. Drain brake fluid. Refer to “Changing Brake Fluid” (BR-8).
3. Remove air cleaner and duct.
4. Apply different colored paint to each pipe connector and actuator to prevent incorrect connection.
5. Disconnect harness connectors, brake pipes and remove fixing nuts and actuator ground cable.

Installation

NHBR0300S02

CAUTION:

- **After installation, refill brake fluid. Then bleed air. Refer to “Bleeding Brake System” (BR-9).**

1. Temporarily install actuator on the bracket.
2. Tighten actuator ground cable.
3. Connect brake pipes temporarily.
4. Tighten fixing nuts.
5. Tighten brake pipes.
6. Connect harness connectors and battery cable.
7. Install air cleaner and duct.

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

NHBR0245

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

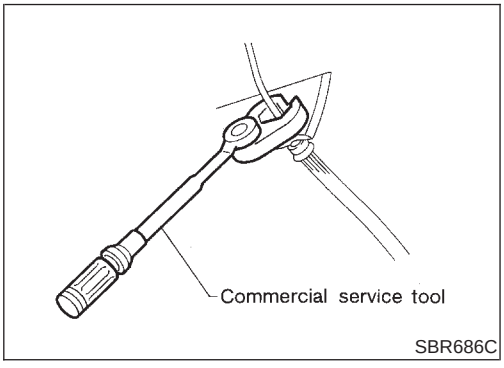
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI 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 SRS 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 harness connector.**

Precautions for Brake System

NHBR0246

- Recommended fluid is brake fluid “DOT 3”.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of hydraulic system.



- Use flare nut wrench when removing and installing brake tubes.
- Always torque brake lines when installing.
- Before working, turn the ignition switch OFF and disconnect the connectors for the VDC/TCS/ABS actuator and control unit or the battery terminals.
- 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.

WARNING:

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

Precautions for Brake Control

NHBR0248

- During the VDC/TCS/ABS operation, the brake pedal vibrates lightly and its mechanical noise may be heard. This is a normal condition.
- Just after starting the vehicle after ignition switch ON, the brake pedal may vibrate or the motor operating noise may be heard from the engine compartment. This is a normal status of the operation check.
- The stopping distance may be longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snowy (fresh deep snow) road.
- If a malfunction is indicated by the ABS warning lamp, or other warning lamps, collect the necessary information from the customer (what symptoms are present under what conditions) and find out the possible causes before starting the service. Besides the electrical system inspection, check the booster operation, brake fluid level, and oil leaks.
- If the tire size and type are used in a improper combination, or the brake pads are not NISSAN genuine parts, the stopping distance or steering stability may deteriorate.
- If there is a radio, antenna, or antenna lead-in wire (including wiring) near the control unit, the VDC/TCS/ABS function may have a malfunction or error.
- If aftermarket parts (e.g. Car stereo equipment, CD player) have been installed, check the electrical harnesses for pinches, open, and improper wiring.

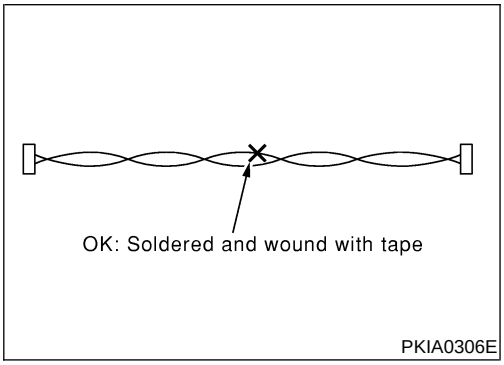
Precautions for CAN System

NHBR0249

FOR INSPECTION

NHBR0249S01

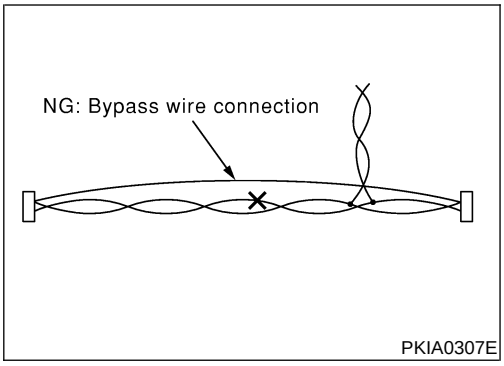
- Do not apply voltage of 7.0V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0V or less.
- Before harness inspection, turn the ignition switch off, disconnect the negative battery terminal.



FOR HARNESS REPAIR

NHBR0249S02

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)

Adjustment of Neutral Position of Steering Angle Sensor

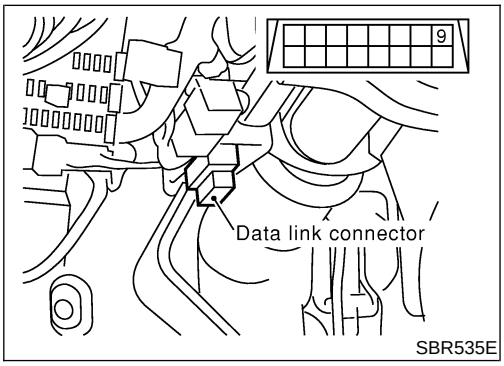
NHBR0250

- After removing/installing or replacing the VDC/TCS/ABS control unit, steering angle sensor, steering components, suspension components, and tires, or after adjusting the wheel alignment, make sure to adjust the neutral position of the steering angle sensor before running the vehicle.

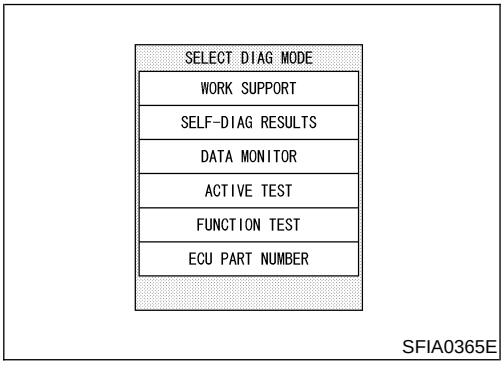
CAUTION:

To adjust the neutral position of the steering angle sensor, make sure to use CONSULT-II.
(Adjustment cannot be done other than CONSULT-II.)

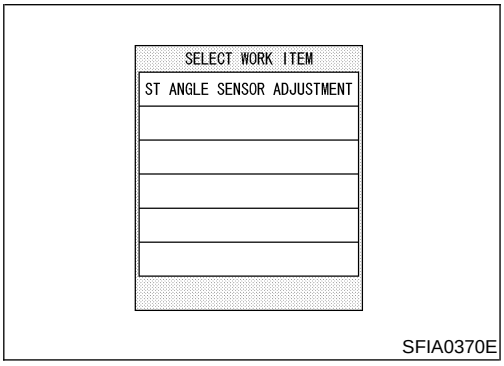
1. Stop the vehicle with the front wheels in the straight-ahead position.

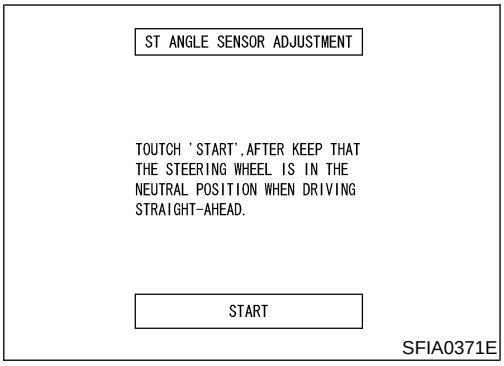


2. Connect CONSULT-II to data link connector on the vehicle, and turn the ignition switch to ON position (engine not running).

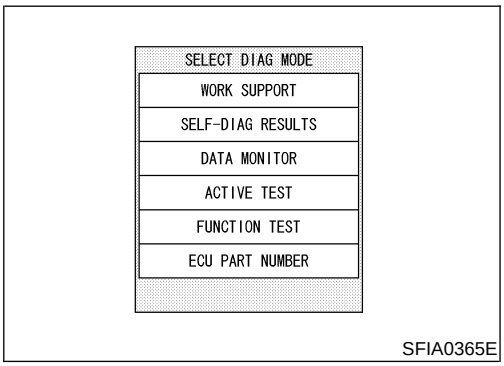


3. Touch “START”, “ABS”, “WORK SUPPORT” and “ST ANGLE SENSOR ADJUSTMENT” on the CONSULT-II screen in this order.





SFIA0371E



SFIA0365E

4. Touch "START".

CAUTION:

Do not touch the steering wheel while adjusting the steering angle sensor.

5. After approximately 10 seconds, touch "END". (After approximately 60 seconds, it ends automatically.)
6. Turn the ignition switch OFF, then turn it ON again.

CAUTION:

Make sure to carry out the above operation.

7. Run the vehicle with the front wheels in the straight-ahead position, then stop.
8. Select "DATA MONITOR", "ECU INPUT SIGNALS" on the CONSULT-II screen. Then check that the "ST ANGLE SIG" is within 0±2.5 deg. If the value is more than the specification, repeat steps 1 to 5.
9. Erase the memory of VDC/TCS/ABS control unit and ECM.
10. Turn the ignition switch OFF.

Fail-safe

NHBR0256S01

ABS SYSTEM

NHBR0256S0101

If a malfunction occurs in the electrical system, the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp in the meter will turn ON. In this condition, the VDC/TCS/ABS and EBD become one of the following conditions by the fail-safe function.

1. Only EBD operates. The same condition as that of models without VDC/TCS/ABS
2. VDC/TCS/ABS and EBD do not operate. Only normal brake operates on 4 wheels.

NOTE:
In the step 1 shown above, the self-diagnosis is carried out at the ignition switch is turned ON and when the vehicle initial starts. ABS self-diagnosis noise may be heard as usual.

VDC/TCS SYSTEM

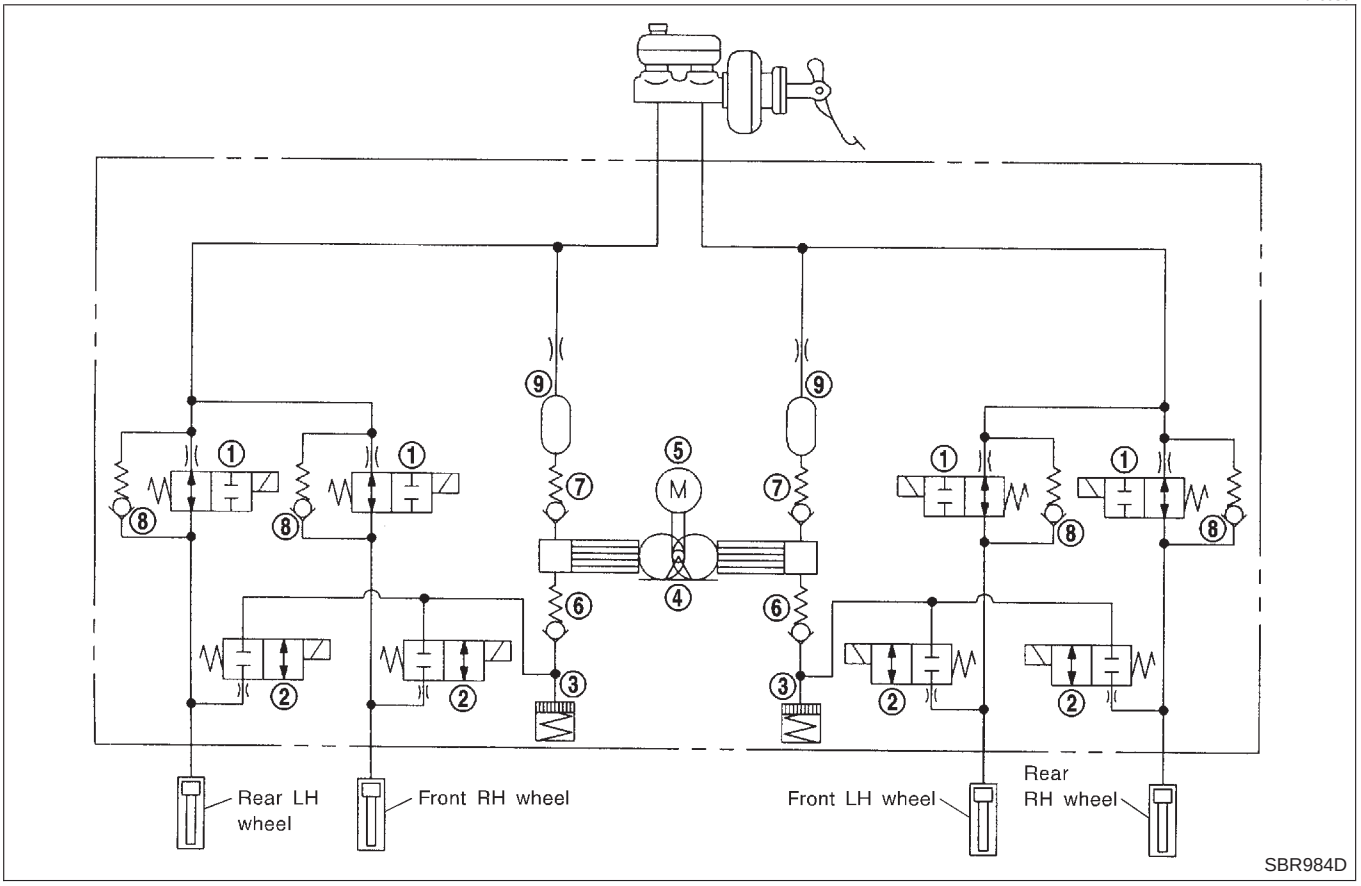
NHBR0256S0102

If a malfunction occurs in the electrical system, the VDC OFF indicator lamp and SLIP indicator lamp in the meter turn on. In this condition, VDC/TCS will be deactivated and it becomes equal to that of models without VDC/TCS. However, ABS is controlled normally.
If a malfunction occurs in the throttle control system, VDC/TCS control does not operate. Only ABS control operates normally.

CAUTION:
If the fail-safe function operates, carry out the self-diagnosis for VDC/TCS/ABS control system.

Hydraulic Circuit

NHBR0256S02



CAUTION:

- **When installing, check for twist and fracture.**
- **Make sure that there is no interference with other parts when turning the steering clockwise or counter clockwise.**
- **The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble and replace with a new one, if necessary.**

ABS Functions

NHBR0256S03

1. In cases of braking suddenly or braking on slippery road (ice road), ABS functions prevent wheels from lock, improve the stability in sudden braking, and make efficient avoidance of obstacles with steering manipulation by detecting 4-wheel speed and controlling 4-wheel brake fluid pressure.
2. EBD is integrated in VDC/TCS/ABS system.

CAUTION:

- **During ABS operation, the brake pedal lightly vibrates and its mechanical noise may be heard. This is a normal condition.**

- **When starting the engine, or just after starting the vehicle, the brake pedal may vibrate or the motor operating noise may be heard from the engine compartment. This is a normal status of the operation check.**
- **The stopping distance may be longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snowy (fresh deep snow) road.**

TCS Functions

NHBR0256S04

1. With the wheel speed sensor signals from 4 wheels, the VDC/TCS/ABS control unit detects a wheel spin. If a wheel spins, the control unit controls brake fluid pressure to the spinning wheel, and cuts the fuel to the engine. It also closes the throttle valve to reduce the engine torque. Furthermore, throttle position is controlled to the appropriate engine torque.
2. During TCS operation, it informs a driver of system operation by flashing SLIP indicator lamp.

CAUTION:

- **During TCS operation, the body and the brake pedal lightly vibrate and the mechanical noise may be heard. This is a normal condition.**
- **Depending on road circumstances, the driver may have a sluggish feel. This is not abnormal, because the optimum traction has the highest priority by TCS operation.**
- **When the vehicle is passing through a road where the surface friction coefficient varies, downshifting or depressing the accelerator pedal fully may activate TCS temporarily.**

VDC Functions

NHBR0256S05

1. In addition to the ABS/TCS function, VDC detects the driver's steering operation amount and brake operation amount from the steering angle sensor and pressure sensor. Using the information from the yaw rate/side G sensor and wheel speed sensors, VDC judges the driving condition (conditions of understeer and oversteer) to improve the stability by controlling the brake on 4 wheels and engine output.
2. During VDC operation, the SLIP indicator lamp flashes to inform the driver of the operation.

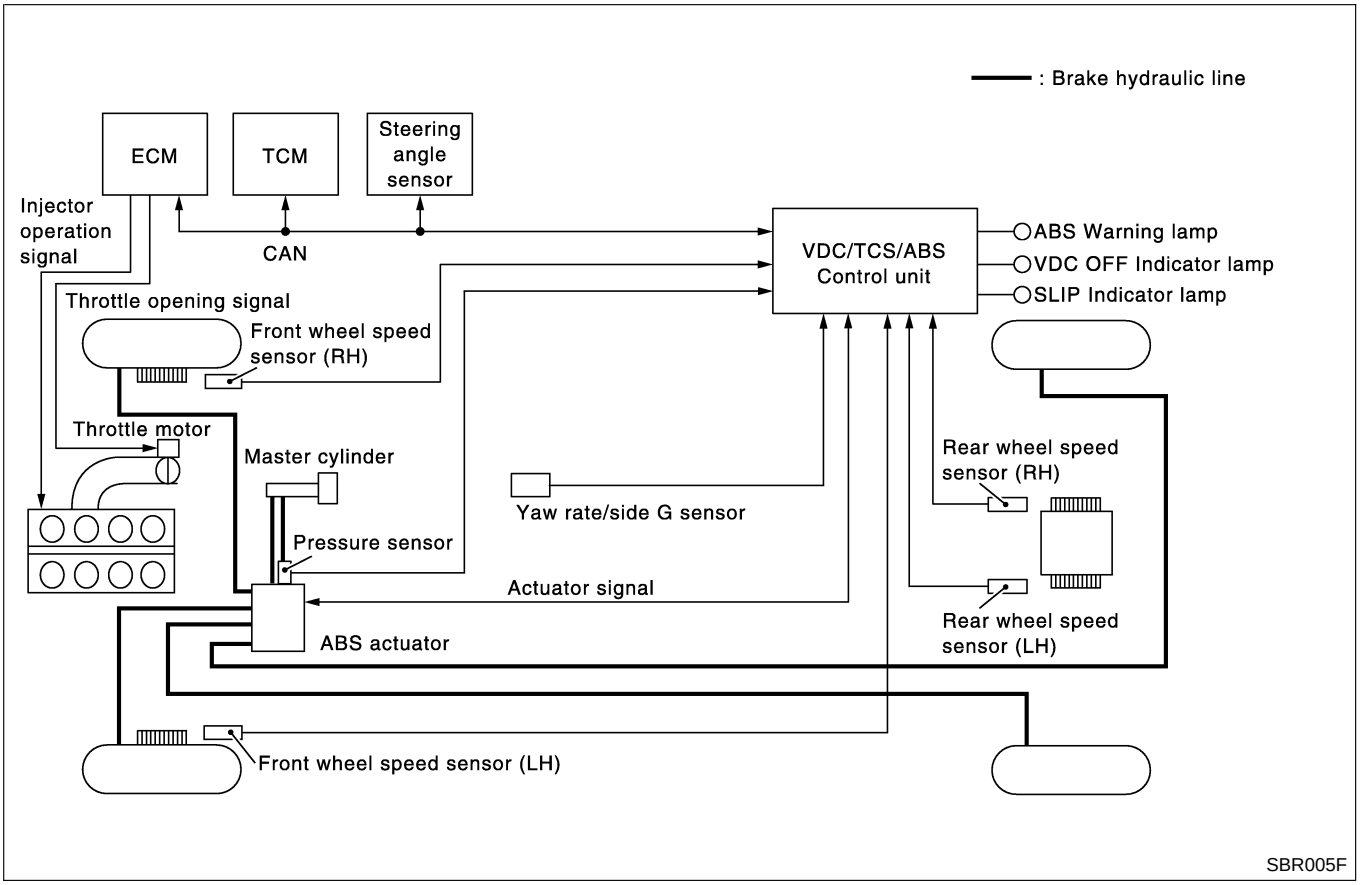
CAUTION:

- **During VDC operation, the body and the brake pedal lightly vibrate and their mechanical noise may be heard. This is a normal condition.**
- **If the vehicle is rotated on a turn table, or rolled and rocked on a ship, the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn ON. In this case, start the engine on a normal road again. If the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn OFF after the restart, it is normal.**
- **When driving in a steep slope such as a bank, the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn ON. In this case, start the engine on a**

normal road again. If the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn OFF after the restart, it is normal.

System Diagram

NHBR0256S06



System Description

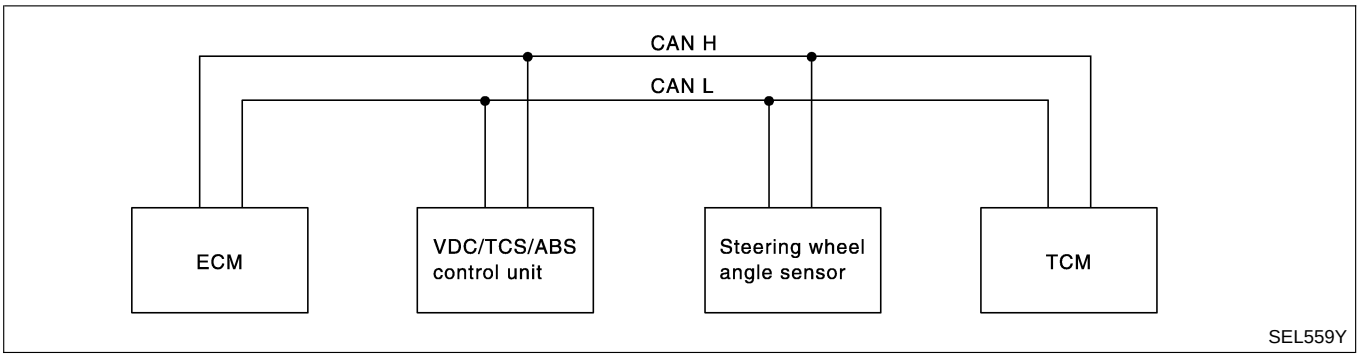
NHBR0258

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

FOR VDC MODELS

NHBR0258S01

System diagram



Input/output Signal Chart

NHBR0258S0103

T: Transmit R: Receive

Signals	ECM	Steering wheel angle sensor	VDC/TCS/ABS control unit	TCM
Output shaft revolution signal	R			T
VDC/TCS self-diagnostic signal	R		T	
ABS self-diagnostic signal	R		T	
Engine speed signal	T		R	
Accelerator pedal position signal	T		R	R
Steering wheel angle sensor signal		T	R	

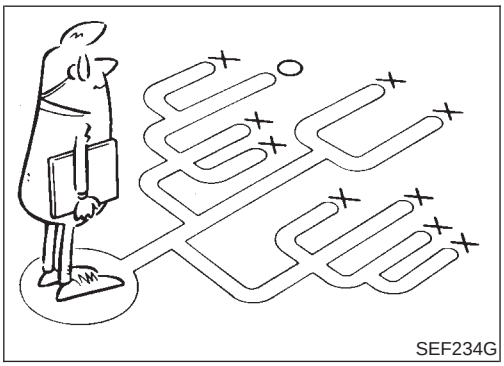
How to Perform Trouble Diagnoses for Quick and Accurate Repair

NHBR0259

INTRODUCTION

NHBR0259S01

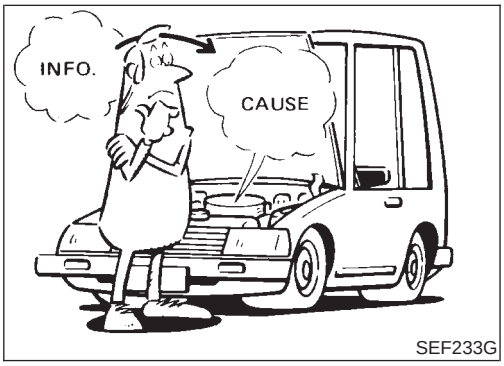
- The most important point to perform the trouble diagnosis is to understand the systems (control and mechanism) in the vehicle thoroughly.


SEF234G

- It is also important to clarify the customer complaints before inspection.
  First of all, reproduce the symptom, and understand it fully.
  Ask the customer about his/her complaints carefully. In some cases, it will be necessary to check the symptoms by driving the vehicle with the customer.

CAUTION:

Customers are not professional. It is dangerous to make an easy guess like “maybe the customer means that...,” or “maybe the customer mentions this symptom”.

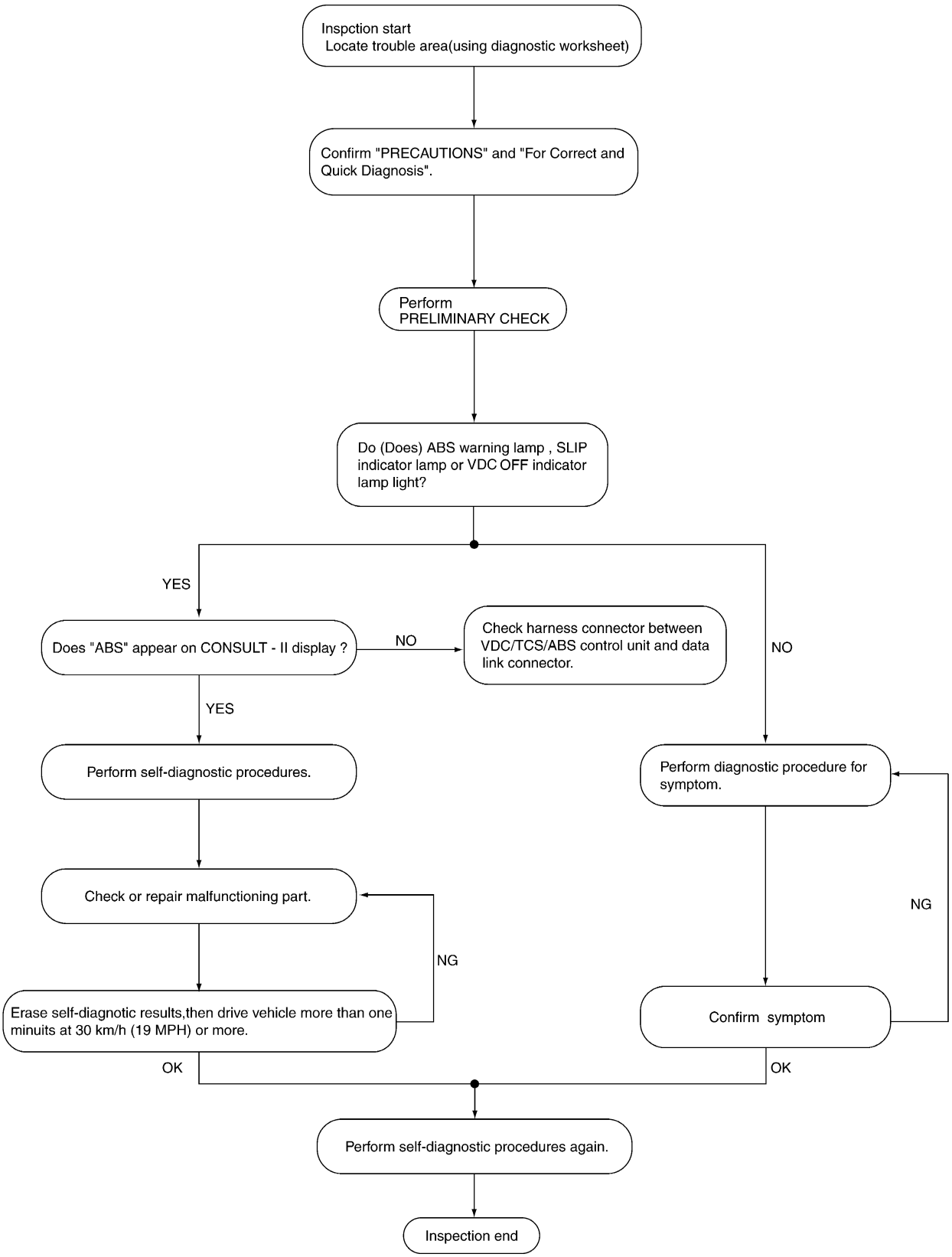


SEF233G

- It is essential to check symptoms right from the beginning in order to repair a malfunction completely.
  For an intermittent malfunction, it is important to reproduce the symptom based on an interview with the customer and past examples. Do not perform an inspection on an ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake the suspected harness or connector by hand. When repairs are performed without any travel diagnosis, repair work is not confirmed if it’s done correctly.
- After the diagnosis, make sure to carry out “erase memory”. Refer to Functions of CONSULT-II, BR-119.
- For an intermittent malfunction, move the harness or harness connector by hand to check the poor contact or false open circuit.
- Always read the “GI Section” PRECAUTIONS to check the general guidelines and to confirm the general precautions.

WORK FLOW

NHBR0259S02



SFIA0951E

KEY POINTS

WHAT ..... Vehicle model
WHEN ..... Date, Frequencies
WHERE ..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SBR339B

ASKING COMPLAINTS

NHBR0259S03

- Complaints against a malfunction vary depending on each person. It is important to clarify the customer complaints.
- Ask the customer about what symptoms are present under what conditions. Use the information to reproduce the symptom while driving.
- It is also important to use the diagnosis sheet to understand what type of trouble the customer having.

EXAMPLE OF DIAGNOSIS SHEET

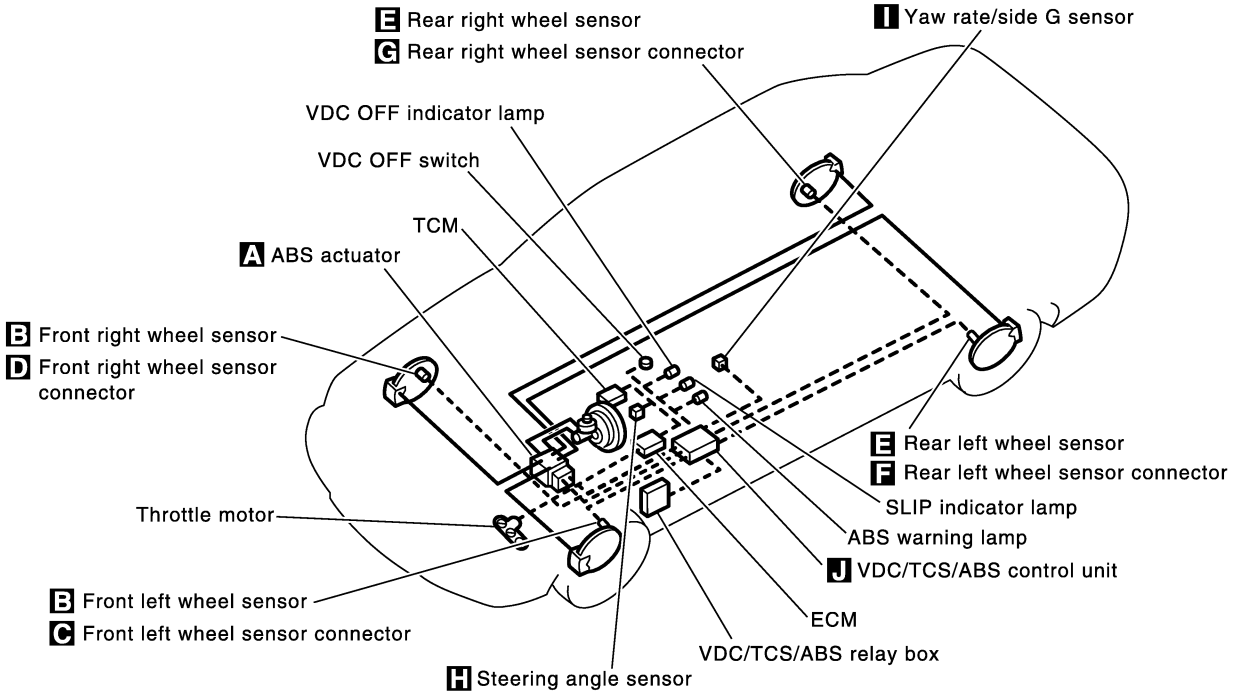
NHBR0259S04

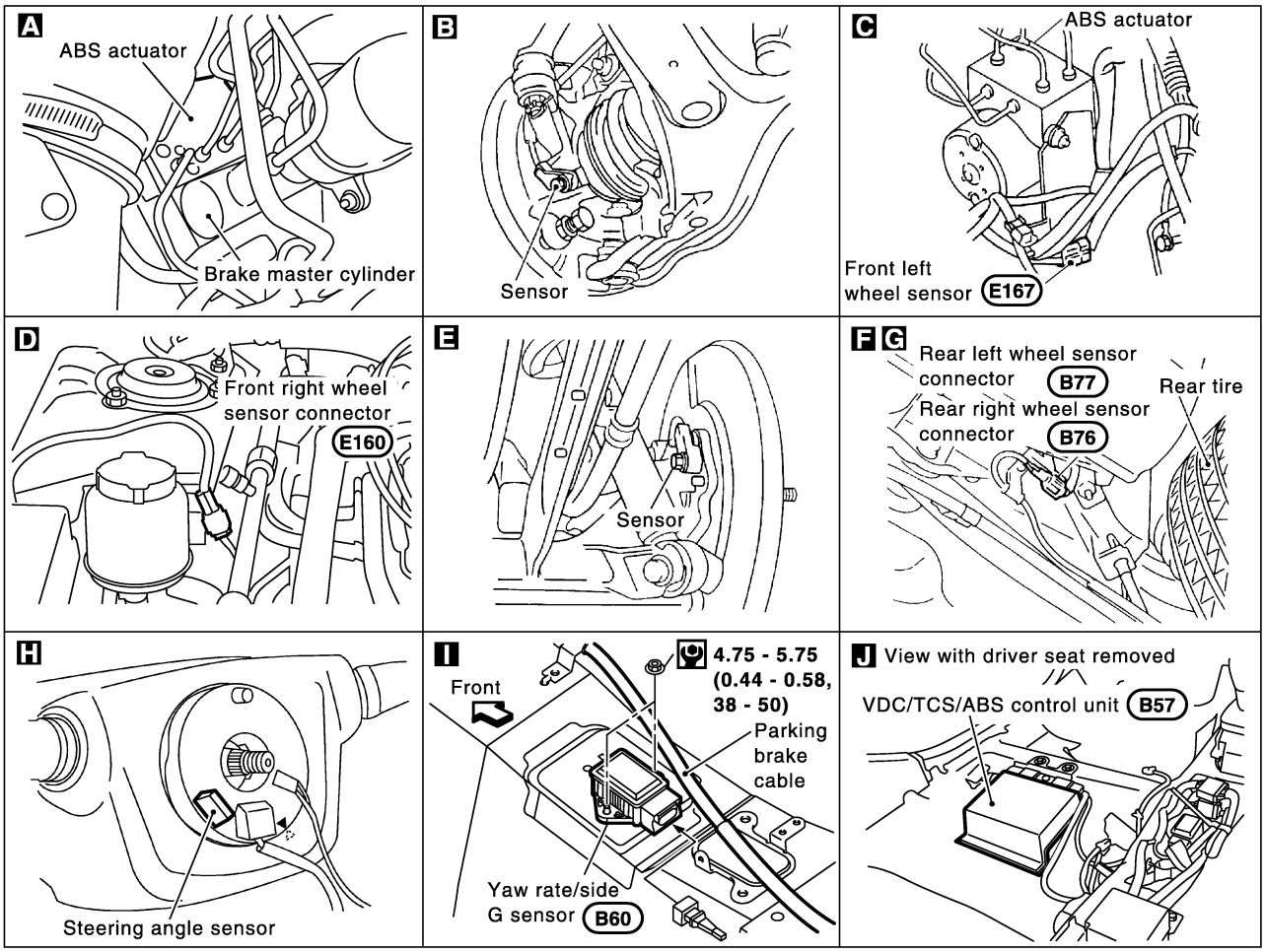
Customer name MR/MS	Model & Year		VIN
Engine #	Trans.		Mileage
Incident Date	Manuf. Date		In Service Date
Symptoms	☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle)	☐ Warning / Indicator activate	☐ Firm pedal operation Large stroke pedal operation
	☐ VDC/TCS dose not work (Rear wheels slip when accelerating)	☐ ABS dose not work. (wheels slip when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

SFIA0029E

Component Parts and Harness Connector Location

NHBR0260



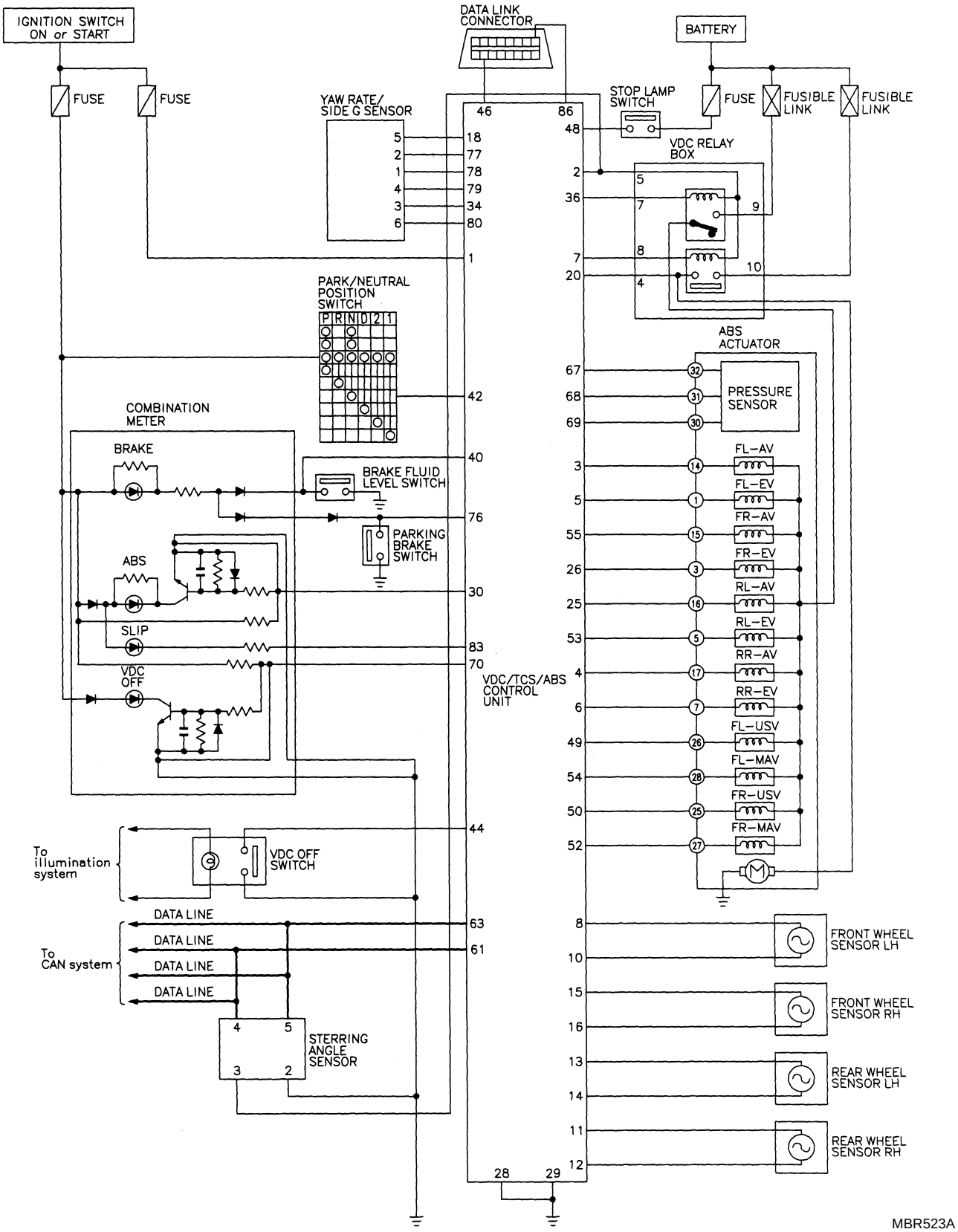


: N•m (kg-m, in-lb)

SBR034F

Schmatic

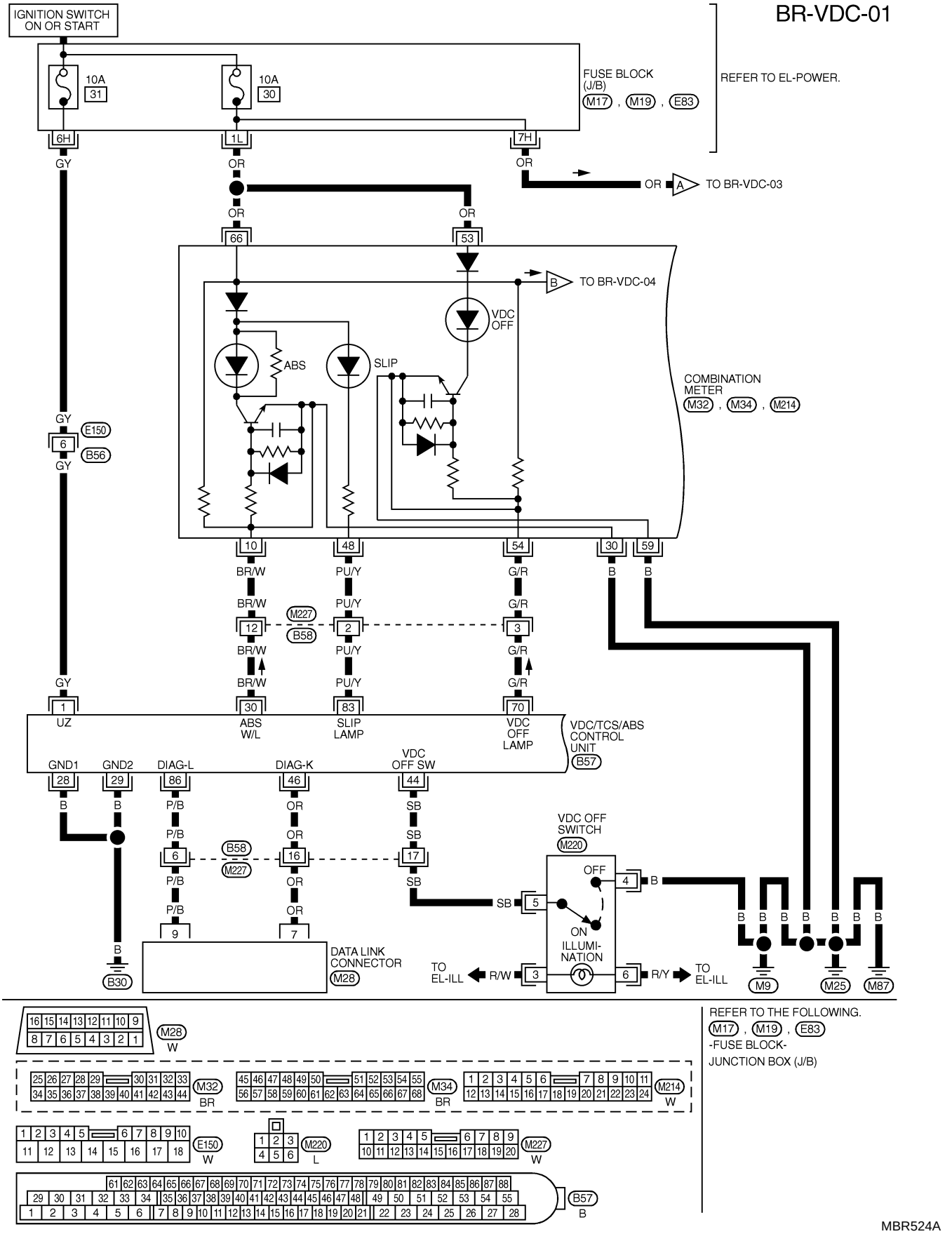
NHBR0261



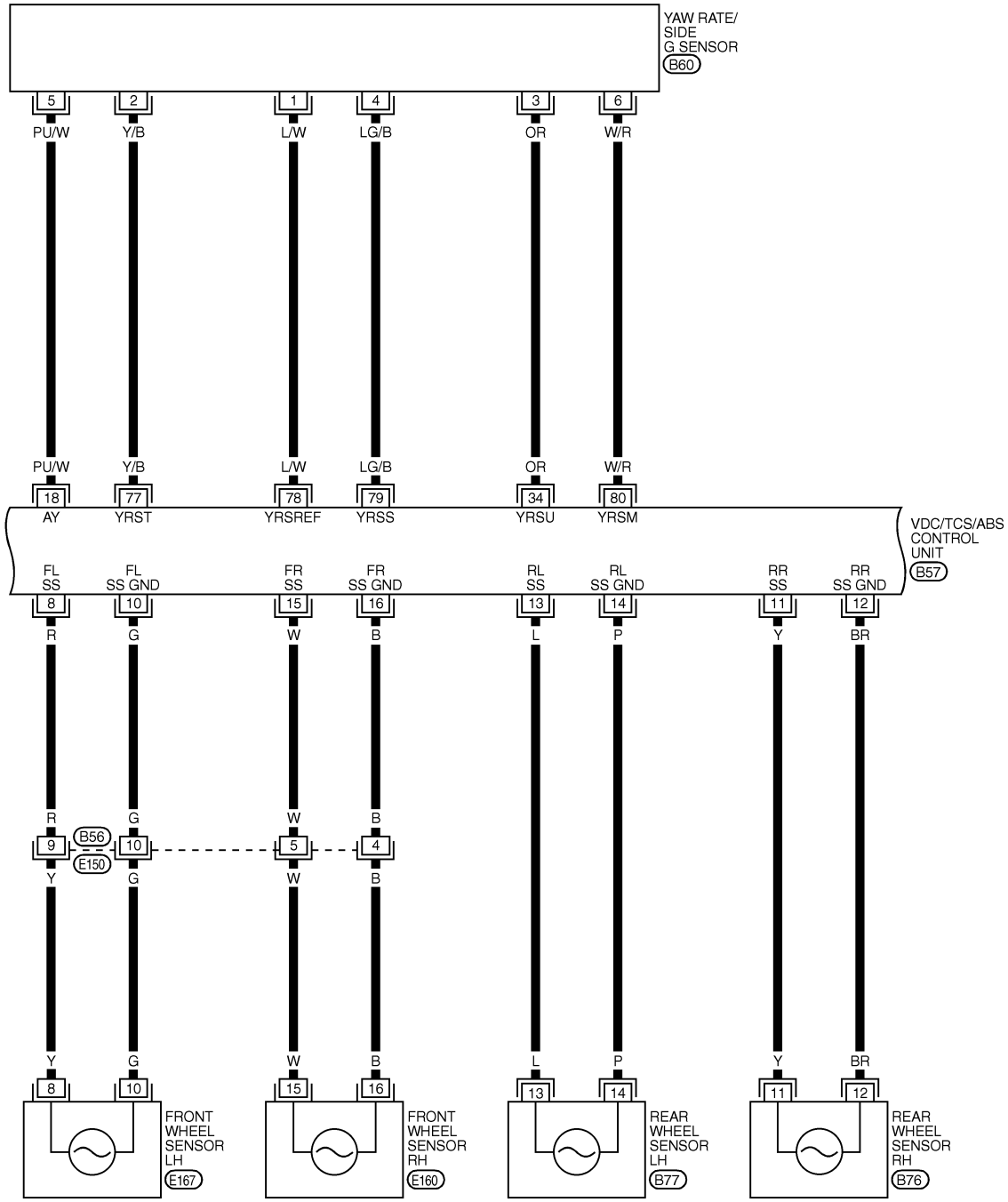
MBR523A

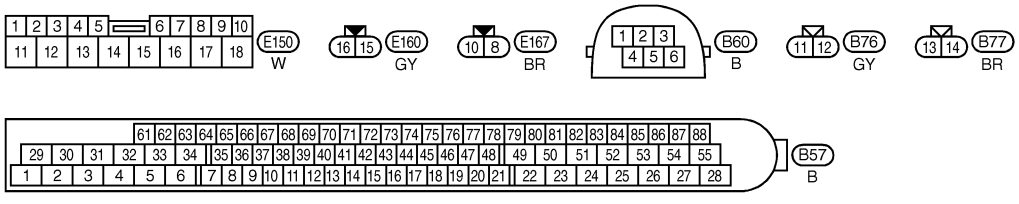
Wiring Diagram —VDC/TCS/ABS—

NHBR0262



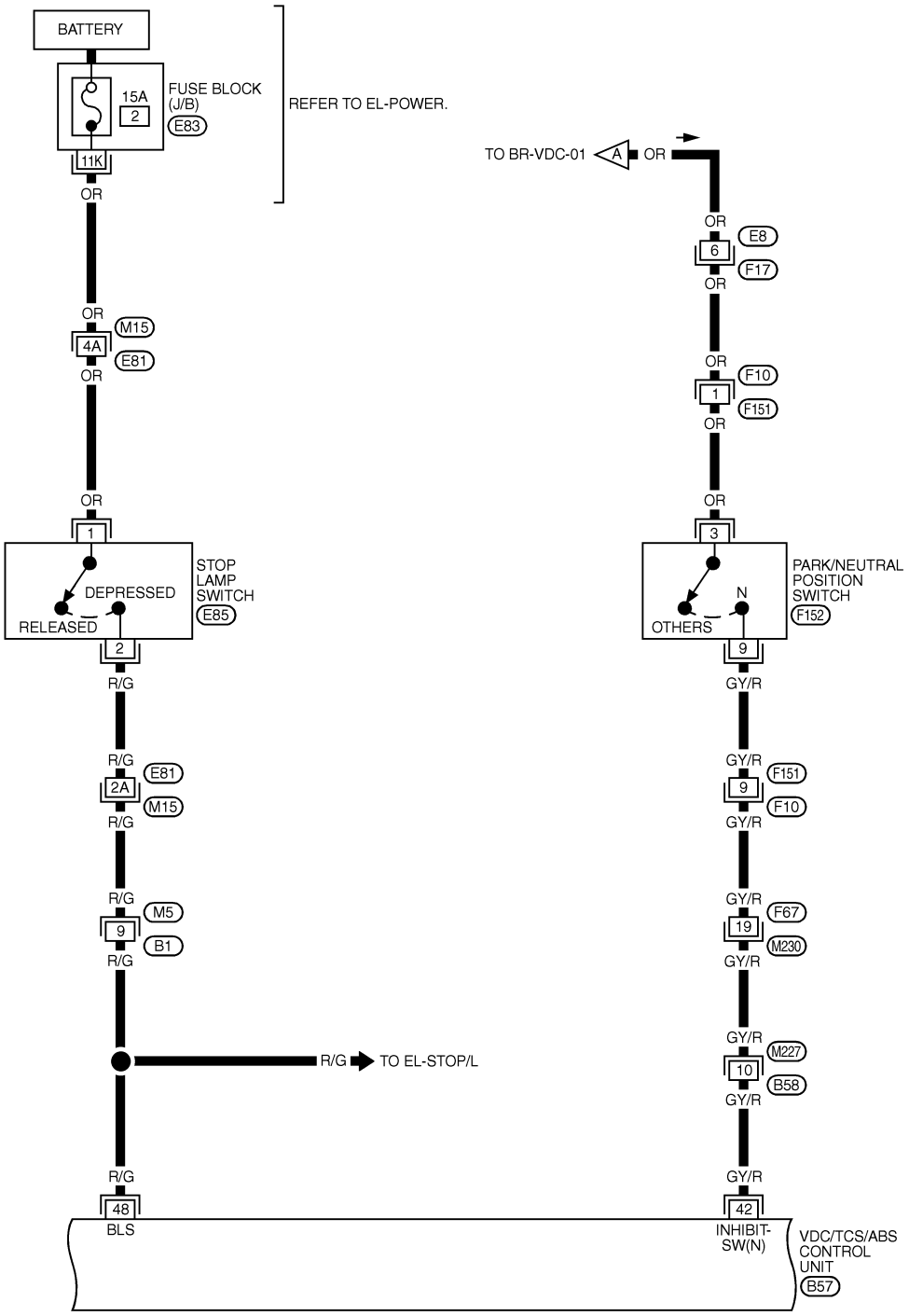
BR-VDC-02

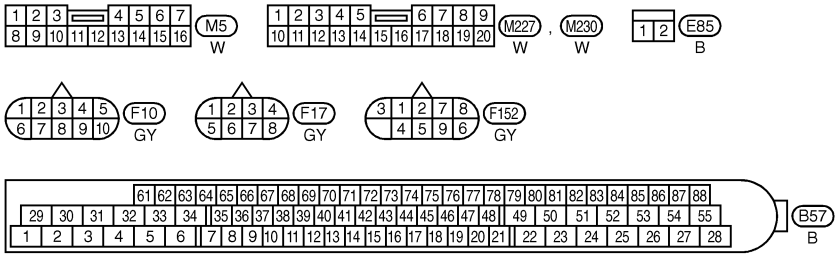




MBR525A

BR-VDC-03

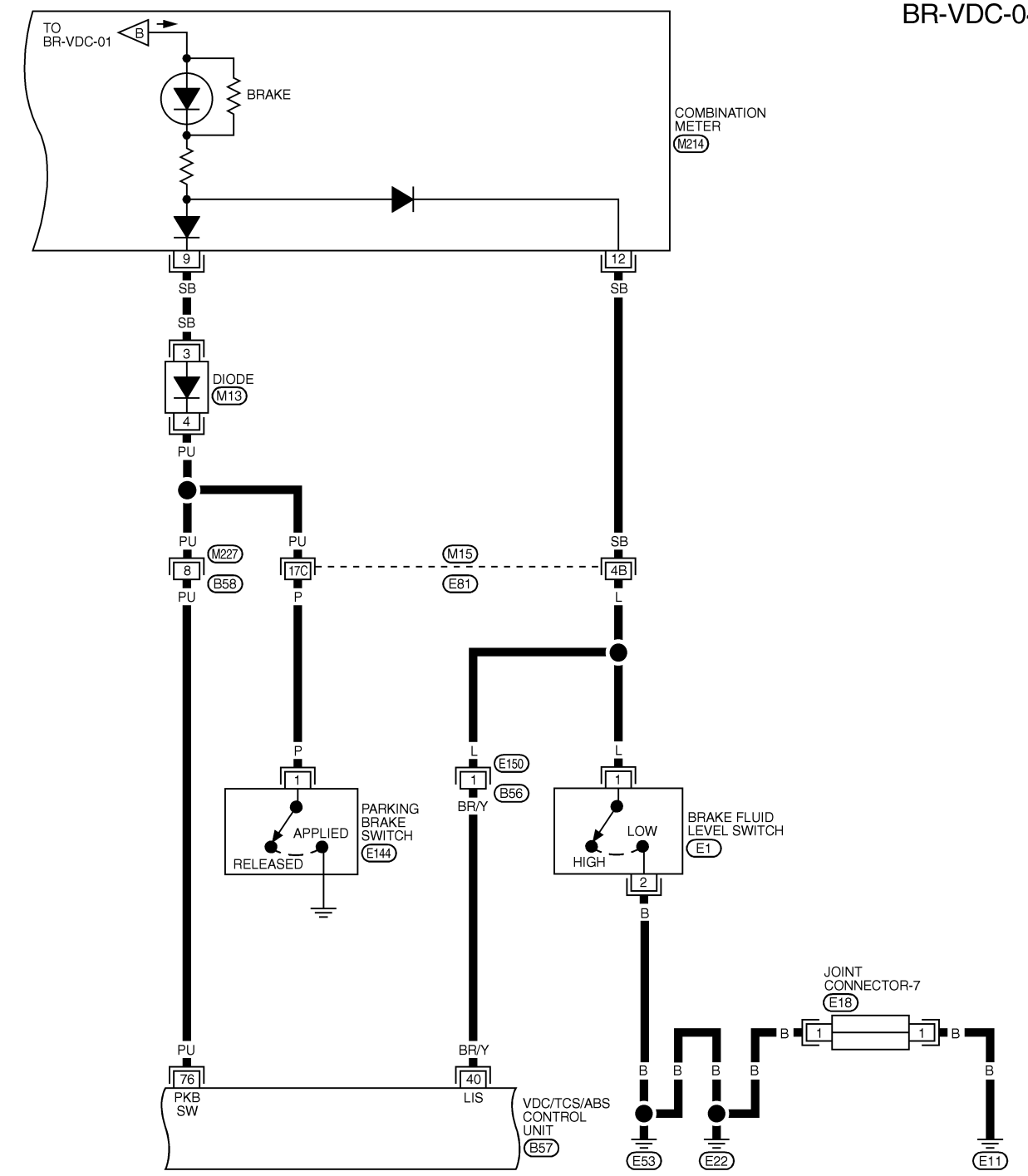


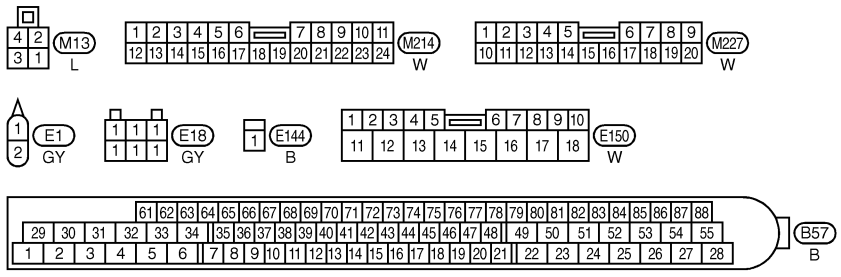


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)
E83 -FUSE BLOCK-JUNCTION BOX (J/B)

MBR526A

BR-VDC-04

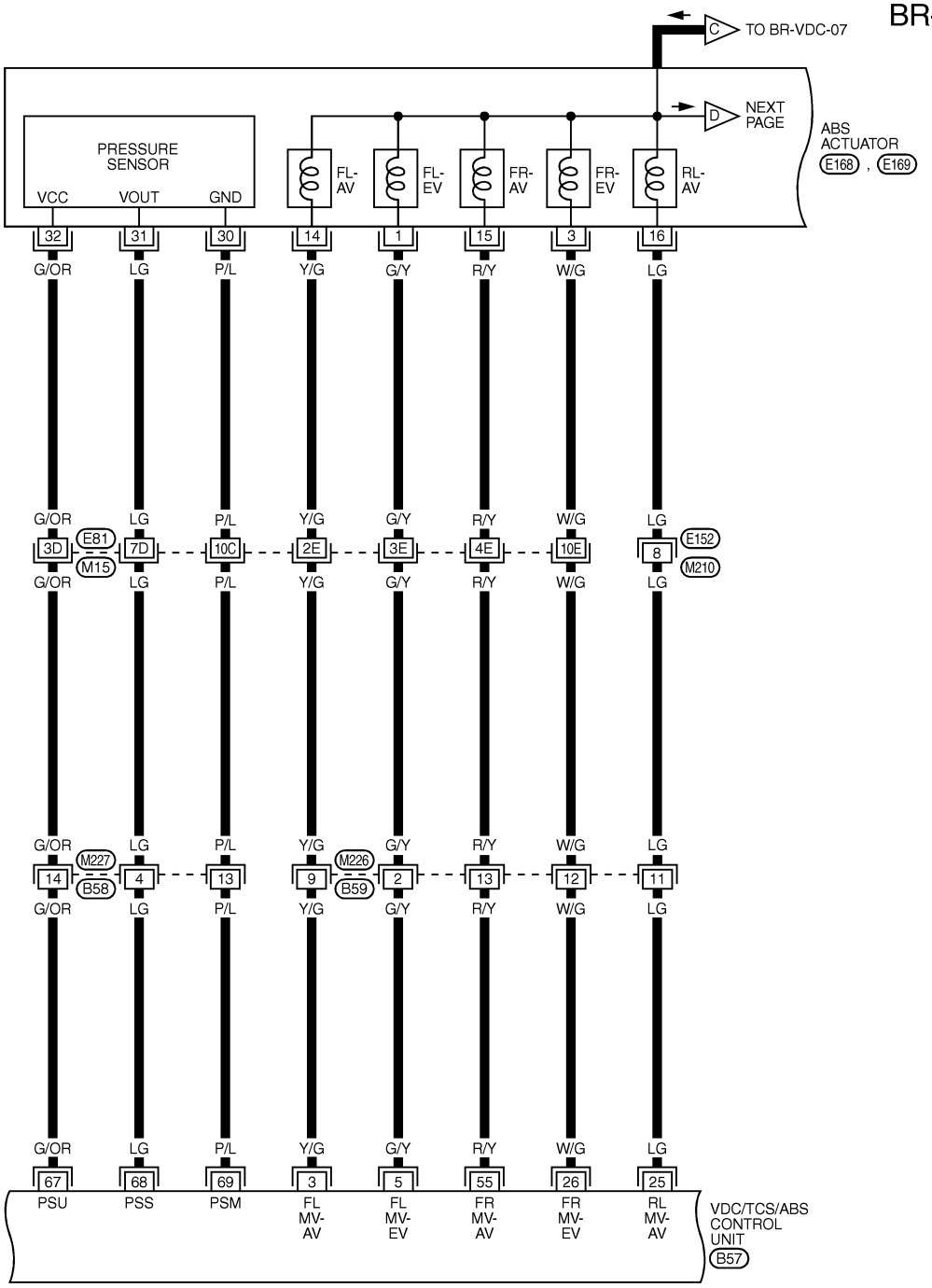


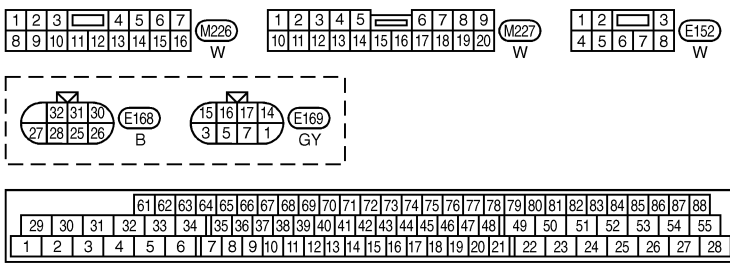


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MBR527A

BR-VDC-05

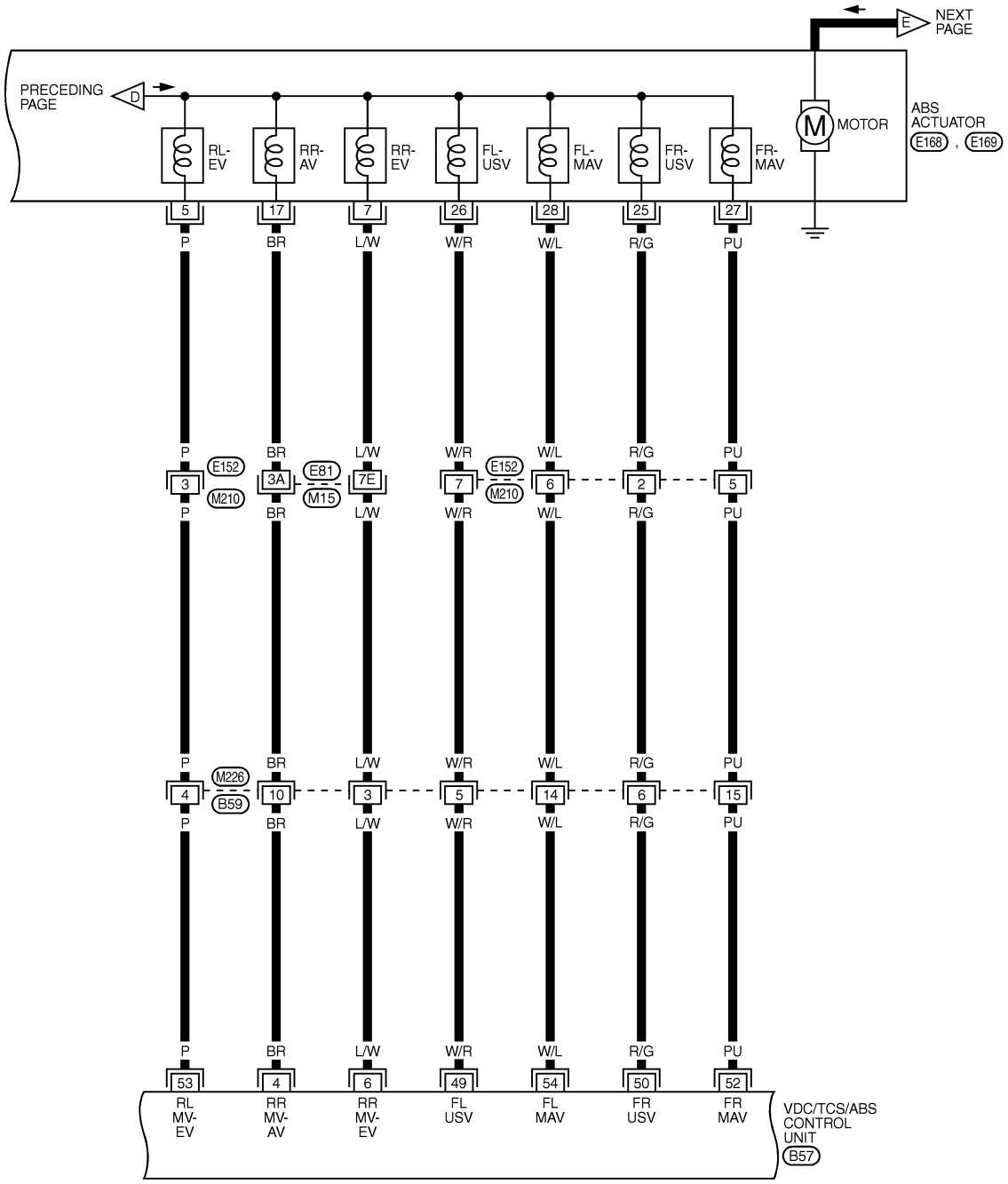


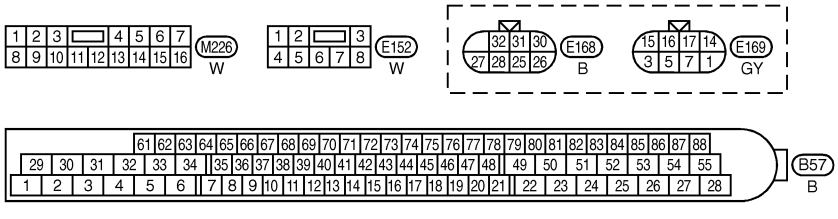


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MBR528A

BR-VDC-06

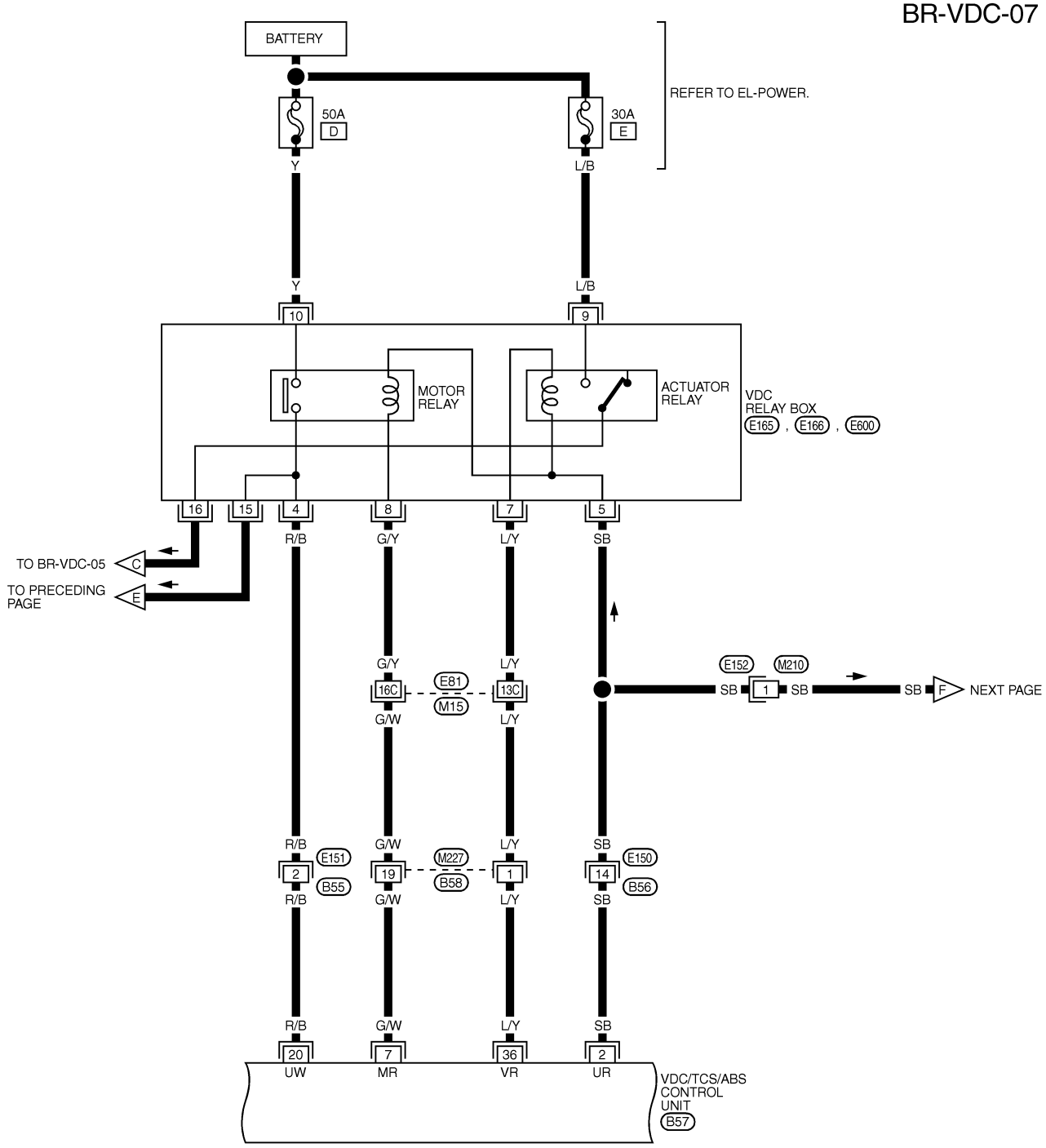


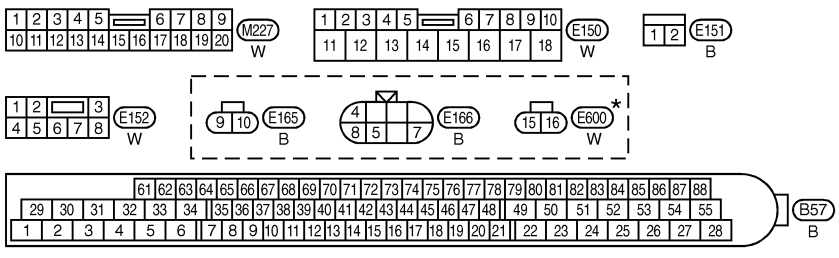


REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

MBR529A

BR-VDC-07



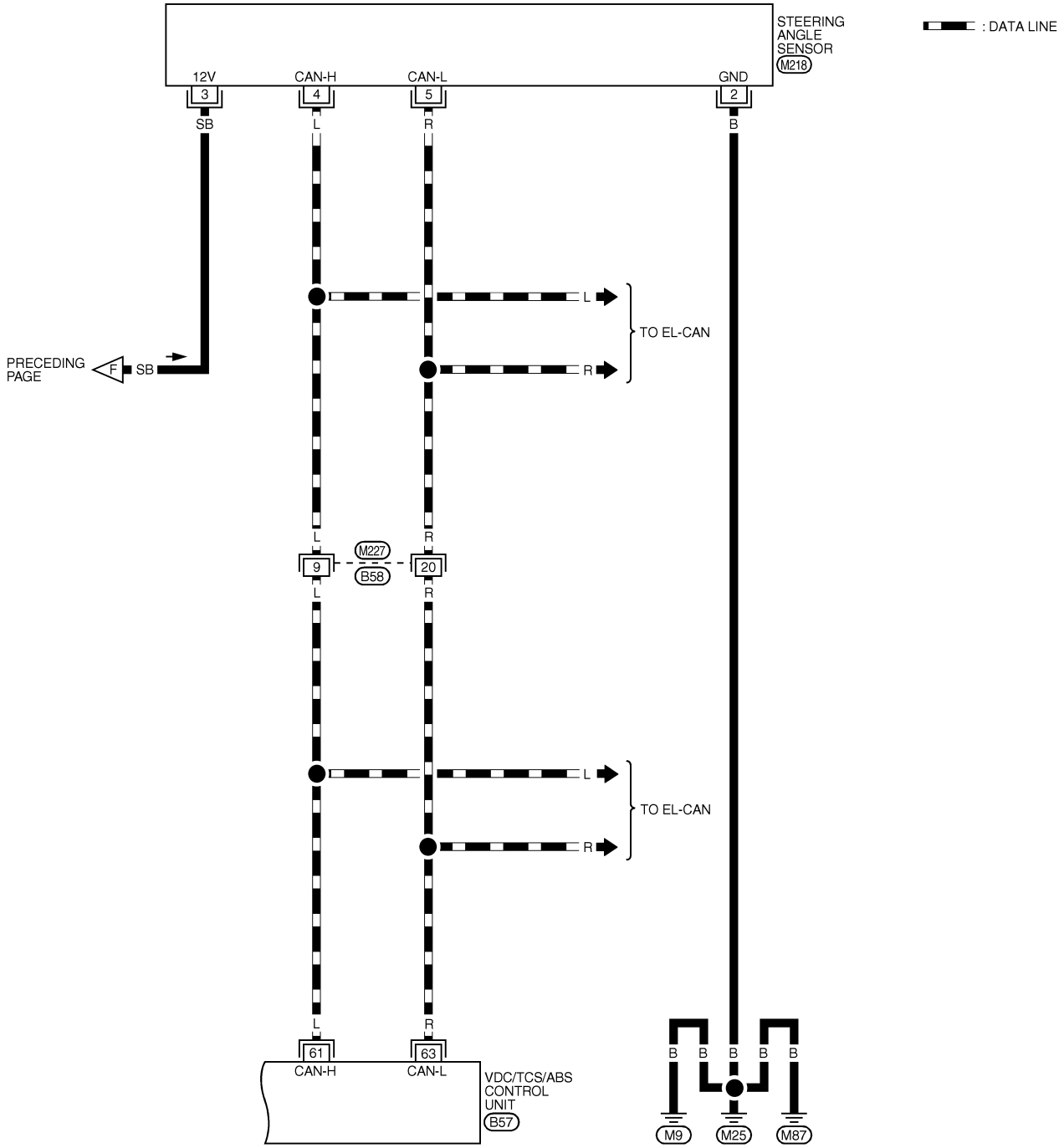


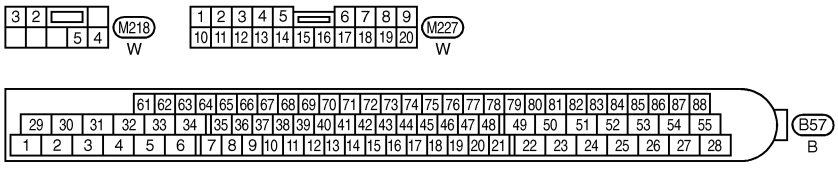
REFER TO THE FOLLOWING.
M15 -SUPER MULTIPLE JUNCTION (SMJ)

*: THIS CONNECTOR IS NOT SHOWN IS "HARNESS LAYOUT", EL SECTION.

MBR530A

BR-VDC-08





MBR531A

Control Unit Input/Output Signal Standard

NHBR0263

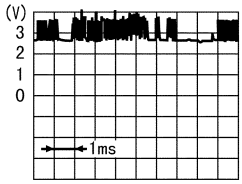
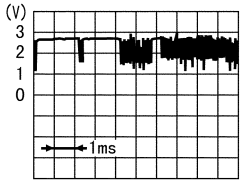
STANDARDS USING A CIRCUIT TESTER AND OSCILLOSCOPE

NHBR0263S01

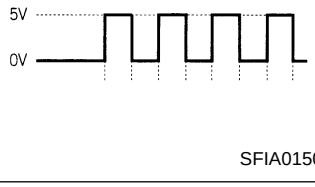
CAUTION:

Connect the connectors for the VDC/TCS/ABS control unit and actuator, and turn the ignition switch ON.

Measurement terminal		Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
+	−				
1	Body ground	Power supply	Ignition switch ON	Battery voltage (Approx. 12V)	Control unit power supply circuit
2		Actuator motor relay, actuator relay power supply and steering angle sensor power supply	Ignition switch ON	Battery voltage (Approx. 12V)	
7		Actuator motor relay	Actuator motor being driven (“Active test” mode with CONSULT-II)	Approx. 0V	Actuator motor, motor relay, and circuit
			Actuator motor while the vehicle is stopped	Battery voltage (Approx. 12V)	
36		Actuator relay	When actuator relay is active. (the engine running)	Approx. 0V	Actuator relay and circuit
			When actuator relay is inactive. (Fail-safe, engine starts.)	Battery voltage (Approx. 12V)	
20		Actuator motor monitor	When actuator relay is active. (the engine running)	Battery voltage (Approx. 12V)	Actuator motor monitor circuit
			When actuator relay is inactive. (Fail-safe, engine starts.)	Approx. 0V	
42		PNP switch	Shift lever position: N	Battery voltage (Approx. 12V)	PNP switch and circuit
			Except N	Approx. 0V	
3		Front LH wheel outlet solenoid valve	Solenoid valve activated (In “active test” mode of CONSULT-II) or actuator relay inactive (in fail-safe mode) When solenoid valve is inactive and actuator relay active (when ignition switch ON)	Approx. 0V Battery voltage (Approx. 12V)	Solenoid valve and circuit
4		Rear RH wheel outlet solenoid valve			
5		Front LH wheel inlet solenoid valve			
6		Rear RH wheel inlet solenoid valve			
25		Rear LH wheel outlet solenoid valve			
26		Front RH wheel inlet solenoid valve			
53		Rear LH wheel inlet solenoid valve			
55		Front RH wheel outlet solenoid valve			

Measurement terminal +	Measurement terminal −	Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
49	Body ground	Primary-side VDC switch-over solenoid valve 1 (USV)	When switch-over solenoid valve is active (in "active test" mode of CONSULT-II) Or, when actuator relay inactive (when fail-safe)	Approx. 0V	Switch-over solenoid valve and circuit
50		Secondary-side VDC switch-over solenoid valve 1 (USV)			
52		Secondary-side VDC switch-over solenoid valve 2 (HSV)	When switch-over solenoid valve is inactive and actuator relay is active (when ignition switch ON)	Battery voltage (Approx. 12V)	
54		Primary-side VDC switch-over solenoid valve 2 (HSV)			
8	10	Front LH wheel speed sensor	Wheel rotated (Approx. 30 km/h (19 MPH) (Note 2)	Pulse generation: Approx. 200 Hz	Wheel speed sensor and circuit
11	12	Rear RH wheel speed sensor			
13	14	Rear LH wheel speed sensor			
15	16	Front RH wheel speed sensor			
48	Body ground	Stop lamp signal	Depress brake pedal.	Battery voltage (Approx. 12V)	Stop lamp switch and circuit
			Release the brake pedal.	Approx. 0V	
44		VDC OFF switch	VDC OFF switch is pressed.	Approx. 10V	VDC OFF switch and circuit
			VDC OFF switch is released.	Approx. 12V	
61		CAN communication input/output signal (H)	Ignition switch ON	 PBIA0224J	—
63		CAN communication input/output signal (L)	Ignition switch ON	 PBIA0223J	
67		Pressure sensor	Ignition switch ON	Approx. 0V	Pressure sensor and circuit
68			When ignition switch ON and brake pedal released.	Approx. 0.6V	
69			Ignition switch ON	Approx. 0V	
18		Side G sensor	Ignition switch ON	Approx. 2.5V	Yaw rate /Side G sensor and circuit

Control Unit Input/Output Signal Standard (Cont'd)

Measurement terminal +	Measurement terminal −	Measuring point	Standard value (Note 1)		(Reference) Check items for malfunction
34	Body ground	Yaw rate/Side G sensor	Ignition switch ON	Battery voltage (Approx. 12V)	Yaw rate /Side G sensor and circuit
77			Ignition switch ON	 SFIA0150E	
78			Ignition switch ON	Approx. 2.5V	
79		Yaw rate sensor	Ignition switch ON	 SFIA0151E	Yaw rate sensor and circuit
80			Ignition switch ON	Approx. 0V	
30		ABS warning lamp	ABS warning lamp turns on (Note 3)	Approx. 0V	ABS warning lamp and circuit
			ABS warning lamp turns off (Note 3)	Battery voltage (Approx. 12V)	
70		VDC OFF indicator lamp	VDC OFF indicator lamp turns on (Note 4)	Approx. 0V	VDC OFF warning lamp and circuit
			VDC OFF indicator lamp turns off (Note 4)	Battery voltage (Approx. 12V)	
83		SLIP indicator lamp	When SLIP indicator lamp is ON (Note 5)	Approx. 0V	SLIP indicator lamp and circuit
			SLIP indicator lamp turns off (Note 5)	Battery voltage (Approx. 12V)	
40		Brake fluid level warning switch	Brake fluid is not enough	Approx. 0V	Brake fluid level warning switch and circuit
			Brake fluid is enough	Battery voltage (Approx. 12V)	
76		Parking brake signal	Apply the parking brake.	Approx. 0V	Parking brake switch and circuit
			Release the parking brake.	Battery voltage (Approx. 12V)	

(Note 1): When the standard value is checked using a circuit tester for voltage measurement, the connector terminals should not extend forcefully.

(Note 2): Check the pressure of the tire in normal condition.

(Note 3): ON/OFF timing of the ABS warning lamp

ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected.

OFF: 2 seconds after the engine started (the system is in normal condition).

(Note 4): VDC OFF indicator lamp ON/OFF timing

ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected, if the VDC OFF switch is ON.

OFF: 2 seconds after the engine started (the system is in normal condition) and VDC OFF switch is OFF.

(Note 5): ON/OFF timing of the SLIP indicator lamp

ON: When the ignition switch is turned ON (before engine start) or a malfunction is detected.

OFF: 2 seconds after the engine started (the system is in normal condition) and the VDC/TCS function is inactive.

Flashing: VDC/TCS function is active during driving.

STANDARDS WITH CONSULT-II

NHBR0263S02

CAUTION:

The displayed item is the data calculated by the control unit, so it may indicate a normal value even if an output circuit (harness) is open or shorted.

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
FR RH SENSOR FR LH SENSOR RR RH SENSOR RR LH SENSOR	Wheel speed (Note 1)	Vehicle stopped	0 [km/h (MPH)]	Wheel speed sensor circuit
		During driving	Almost in accordance with the speedometer display (within ±10%)	
ACCEL POS SIG	Open/close condition of throttle valve (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0%	Control unit communication circuit between the VDC/TCS/ABS control unit and ECM
		Accelerator pedal depressed (ignition switch is ON)	0 - 100%	
ENG RPM	With the engine running	With the engine stopped	0 rpm	Engine speed signal circuit
		Engine running	Almost in accordance with tachometer display	
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead condition	Approx. 0 deg.	Steering angle sensor and circuit
		Steering	−720 to 720 deg.	
YAW RATE SEN	Yaw rate detected by yaw rate sensor	Vehicle stopped	Approx. 0 d/s	Yaw rate sensor and circuit
		During driving	−70 to 70 d/s	
SIDE G-SENSOR	Transverse acceleration detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2	Side G sensor and circuit
		During driving	−24.3 to 24.1 m/s^2	
PRESS SENSOR	Brake fluid pressure detected by pressure sensor	With the ignition switch turned ON and brake pedal released.	Approx. 0 bar	Pressure sensor and circuit
		With the ignition switch turned ON and brake pedal depressed.	−40 to 300 bar	
BATTERY VOLT	Battery voltage supplied to the VDC/TCS/ABS control unit	Ignition switch ON	10 - 16V	VDC/TCS/ABS control unit power supply circuit and ground circuit
MOTOR RELAY	Motor relay ON/OFF condition	ABS not activated.	OFF	Motor relay and circuit
		ABS activated.	ON	
ACTUATOR RLY	Actuator relay ON/OFF condition	Ignition ON and Vehicle stopped.	OFF	Actuator relay and circuit
		Engine running and Vehicle stopped.	ON	
STOP LAMP SW	Operating status of brake pedal	Depress brake pedal.	ON	Stop lamp switch circuit
		Release the brake pedal.	OFF	

Control Unit Input/Output Signal Standard (Cont'd)

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
PARK BRAKE SW	Parking brake status	Parking brake activated	ON	Parking brake switch circuit
		Parking brake not activated	OFF	
OFF SW	VDC OFF SW ON/OFF condition	VDC OFF switch ON (When VDC OFF indicator lamp is ON.)	ON	VDC OFF switch circuit
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF.)	OFF	
ABS WARN LAMP	ABS warning lamp status (Note 2)	When ABS warning lamp is ON.	ON	ABS warning lamp circuit
		When ABS warning lamp is OFF.	OFF	
OFF LAMP	VDC OFF indicator lamp status (Note 3)	When VDC OFF indicator lamp is ON.	ON	VDC OFF indicator lamp circuit
		When VDC OFF indicator lamp is OFF.	OFF	
SLIP LAMP	SLIP indicator lamp status (Note 4)	When SLIP indicator lamp is ON	ON	SLIP indicator lamp circuit
		When SLIP indicator lamp is OFF	OFF	
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR LH IN SOL RR LH OUT SOL RR RH IN SOL RR RH OUT SOL	Solenoid valve operation	Actuator (solenoid valve) is active ("Active Test" with CONSULT-II) or actuator relay is inactive (in fail-safe mode).	ON	Solenoid valve and circuit
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON).	OFF	
USV [FR-RL] UISV [FL-RR] HSV [FR-RL] HSV [FL-RR]	VDC switch-over solenoid valve status	When the actuator (switch-over solenoid valve) is active ("Active test" with CONSULT-II) or the actuator relay is inactive (when fail-safe mode).	ON	Switch-over solenoid valve and circuit
		When the actuator (switch-over solenoid valve) is inactive or the actuator relay is active (ignition switch ON).	OFF	
V/R OUTPUT	Actuator relay activated ON/OFF	When the actuator relay is active (the engine is running).	ON	Actuator relay and circuit
		When the actuator relay is not active (before the engine get started and in the fail-safe mode).	OFF	
M/R OUTPUT	Actuator motor and motor relay status (ON/OFF)	When the actuator motor and motor relay are active ("Active test" with CONSULT-II).	ON	Actuator motor, motor relay, and circuit
		When the actuator motor and motor relay are inactive.	OFF	

Data monitor item	Contents	Data monitor		(Reference) Check items for malfunction
		Condition	Reference value in normal operation	
FLUID LEV SW	Brake fluid level warning switch status.	When brake fluid level warning switch is ON.	ON	Brake fluid level warning switch, brake warning lamp and circuit.
		When brake fluid lever warning switch is OFF.	OFF	
EBD FAIL SIG ABS FAIL SIG TCS FAIL SIG VDC FAIL SIG	System fail signal status	Malfunctions condition (When system failed)	OFF	EBD system ABS system TCS system VDC system

(Note 1): Check the pressure of the tire in normal condition.

(Note 2): ON/OFF timing of the ABS warning lamp

ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected.

OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation).

(Note 3): ON/OFF timing of the VDC OFF indicator lamp

ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected VDC OFF switch is ON.

OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation) or when VDC OFF switch is OFF.

(Note 4): SLIP indicator lamp ON/OFF timing

ON: For approximately 0.5 seconds after the ignition switch is turned ON, or when a malfunction is detected.

OFF: Approximately 0.5 seconds after the ignition switch is turned ON (when the system is in normal operation) and VDC/TCS function is not activated.

Flashing: VDC/TCS function is active during driving.

CONSULT-II Functions

NHBR0264

CONSULT-II MAIN FUNCTION

NHBR0264S01

In a diagnosis function (main function), there are "WORK SUPPORT", "SELF-DIAGNOSTIC RESULTS", "DATA MONITOR", "CAN DIAG SUPPORT MNTR", "ACTIVE TEST", "FUNCTION TEST", "ECU PART NUMBER".

Diagnostic test mode	Function	Reference
WORK SUPPORT	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	Refer to BR-94.
SELF-DIAGNOSTIC RESULTS	Self-diagnostic results can be read and erased quickly.	Refer to BR-120.
DATA MONITOR	Input/Output data in the ABS actuator and electric unit (control unit) can be read.	Refer to BR-124.
CAN DIAG SUPPORT MNTR	The results of transmit/receive diagnosis of communication can be read.	—
ACTIVE TEST	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.	Refer to BR-126.

Diagnostic test mode	Function	Reference
FUNCTION TEST	Conducted by CONSULT-II instead of a technician to determine whether each system is "OK" or "NG".	—
ECU PART NUMBER	ABS actuator and electric unit (control unit) part number can be read.	—

SELF-DIAGNOSIS

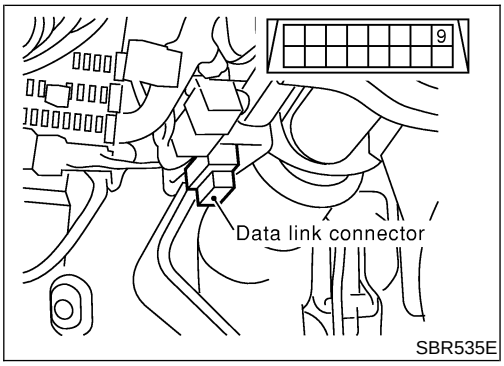
NHBR0264S02

Description

If a malfunction is detected in the system, the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp on the meter turn on. In this case, perform the self-diagnosis as follows:

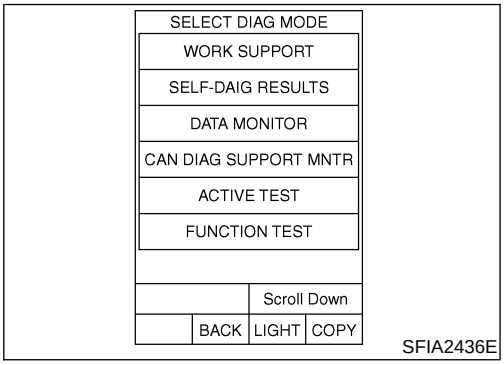
Procedure

1. Perform a Basic Inspection, BR-132, using information from the customer.



SBR535E

2. After the ignition switch is turned OFF, connect the CONSULT-II connector to the vehicle-side data link connector. (The data link connector is on the lower instrument cover).
3. Start the engine and drive at Approx. 30 km/h (19 MPH) for approx. 1 minute.



SFIA2436E

4. After stopping the vehicle, with the engine still idling, touch "START", "ABS", "SELF-DIAG RESULTS" on the CONSULT-II screen in this order.

CAUTION:

Just after starting the engine, or turning the ignition switch ON, "ABS" may not be displayed on the system selection screen even if "START" is touched. In this case, start the self-diagnosis again from step 2. If it cannot be shown after several attempts, the VDC/TCS/ABS control unit may malfunction. Repair or replace the control unit.

5. The self-diagnosis result is displayed. (If necessary, touch "PRINT" to print the self-diagnosis result.)

- When "NO FAILURE" is shown, check the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp. Refer to For Correct and Quick Diagnosis, BR-130.
- CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.

6. Go to appropriate "Inspection" chart according to "Self-Diagnostic Items to Result Mode" and repair or replace as necessary.

7. Start the engine and drive at Approx. 30 km/h (19 MPH) for Approx. 1 minute.

CAUTION:
Check again to make sure that there is NO MALFUNCTION on other parts.

8. Turn the ignition switch OFF to prepare for erasing the memory.
9. Start the engine and touch "START", "ABS", "SELF-DIAG RESULTS" and "ERASE" on CONSULT-II screen in this order to ease the memory.

CAUTION:
If the memory cannot be erased, go to step 6.

10. Drive the vehicle at Approx. 30 km/h (19 MPH) and check that the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp stay off.

CAUTION:
VDC OFF switch is not cancelled.

Self-diagnostic items to result mode

Self-Diagnostic item	Malfunction detecting condition	Check route
FR LH SENSOR – 1	Circuit of front LH wheel speed sensor is open.	Wheel speed sensor and circuit. Refer to Inspection 1 Wheel Speed Sensor and Circuit, BR-134.
RR RH SENSOR – 1	Circuit of rear RH wheel speed sensor is open.	
FR RH SENSOR – 1	Circuit of front RH wheel speed sensor is open.	
RR LH SENSOR – 1	Circuit of rear LH wheel speed sensor is open.	
FR LH SENSOR – 2	Front LH wheel speed sensor is shorted or input signal is abnormal.	
RR RH SENSOR – 2	Rear RH wheel speed sensor is shorted or input signal is abnormal.	
FR RH SENSOR – 2	Front RH wheel speed sensor is shorted or input signal is abnormal.	
RR LH SENSOR – 2	Rear LH wheel speed sensor is shorted or input signal is abnormal.	
MAIN RELAY	During the actuator relay operation with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	Actuator relay and circuit. Refer to Inspection 9 Actuator Relay and Circuit, BR-149.
	During the actuator relay operation with ON, when the actuator relay turns OFF. Or when the control line for the relay is open.	
STOP LAMP SW	Stop lamp switch circuit is open.	Stop lamp switch and circuit. Refer to Inspection 10 Stop Lamp Switch and Circuit, BR-151.
PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pressure sensor is abnormal.	Pressure sensor and circuit. Refer to Inspection 4 Pressure Sensor and the Circuit between Pressure Sensor and VDC/TCS/ABS Control Unit, BR-138.
ST ANGLE SEN CIRCUIT	Neutral position of the steering angle sensor is dislocated, or the steering angle sensor is abnormal.	Steering angle sensor and circuit. Refer to Inspection 5 Steering Angle Sensor and the Circuit between Steering Angle Sensor and VDC/TCS/ABS Control Unit, BR-140.

CONSULT-II Functions (Cont'd)

Self-Diagnostic item	Malfunction detecting condition	Check route
YAW RATE SENOR	Yaw rate sensor is abnormal, or the yaw rate sensor signal line is open or shorted.	Yaw rate/transverse acceleration sensor and circuit. Refer to Inspection 6 Yaw Rate/Side G and the Circuit between Yaw Rate/ Side G and VDC/TCS/ABS Control Unit, BR-142.
FR LH IN ABS SOL	Circuit of the front LH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	Solenoid valve and circuit. Refer to Inspection 7 Solenoid Valve, VDC Switch-over Solenoid Valve and Circuit, BR-143.
FR LH OUT ABS SOL	Circuit of the front LH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
RR RH IN ABS SOL	Circuit of the rear RH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
RR RH OUT ABS SOL	Circuit of the rear RH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
FR RH IN ABS SOL	Circuit of the front RH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
FR RH OUT ABS SOL	Circuit of the front RH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
RR LH IN ABS SOL	Circuit of the rear LH wheel inlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
RR LH OUT ABS SOL	Circuit of the rear LH wheel outlet solenoid valve is open or shorted, or the control line is open or shorted to the power supply or the ground.	
USV LINE [FL-RR]	VDC switch-over solenoid valve 1 on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	VDC switch-over solenoid valve and circuit. Refer to Inspection 7 Solenoid Valve, VDC Switch-over Solenoid Valve and Circuit, BR-143.
USV LINE [FR-RL]	VDC switch-over solenoid valve 1 on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
HSV LINE [FL-RR]	VDC switch-over solenoid valve 2 on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
HSV LINE [FR-RL]	VDC switch-over solenoid valve 2 on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
PUMP MOTOR ACTUATOR RLY (note)	During the actuator motor operation with ON, when the actuator motor turns OFF. Or when the control line for actuator motor relay is open.	Actuator motor, motor relay, and circuit. Refer to Inspection 8 Actuator Motor, Motor Relay and Circuit, BR-147.
	During the actuator motor operation with OFF, when the actuator motor turns ON. Or when the control line for relay is shorted to ground.	
ABS SENSOR [ABNORMAL SIGNAL]	Wheel speed sensor input is abnormal.	Wheel speed sensor and circuit. Refer to Inspection 1 Wheel Speed Sensor and Circuit, BR-134.

Self-Diagnostic item	Malfunction detecting condition	Check route
BATTERY VOLTAGE [ABNORMAL]	VDC/TCS/ABS control unit battery voltage is too low.	VDC/TCS/ABS control unit battery voltage circuit and ground circuit. Refer to Inspection 11 VDC/TCS/ ABS Control Unit Power Supply Circuit, BR-152.
ST ANGLE SEN SIGNAL	Neutral position correction of steering angle sensor is not finished.	Neutral position adjustment of steering angle sensor. Refer to Inspection 13 When "ST ANG SEN SIGNAL" is Indicated in the Self-Diagnosis Results, BR-155.
ST ANG SEN COM CIR	CAN communication system or steering angle sensor is abnormal.	Steering angle sensor and CAN communication circuit. Refer to Inspection 15 CAN Communication Circuit VDC/TCS/ABS Control Unit and Steering Angle Sensor, BR-157.
SIDE G-SEN CIRCUIT	Side G sensor is abnormal, or the signal line of side G sensor is open or shorted.	Yaw rate/Side G sensor and circuit. Refer to Inspection 6 Yaw Rate/ Side G and the Circuit between Yaw Rate/Side G and VDC/TCS/ABS Control Unit, BR-142.
EMERGENCY BRAKE	VDC/TCS/ABS control unit malfunction (pressure increase is too much or too little.)	VDC/TCS/ABS control unit. Refer to Inspection 12 When "EMERGENCY BRAKE" is indicated in the Self-Diagnosis Results, BR-155.
CONTROLLER FAILURE	VDC/TCS/ABS internal malfunction of control unit	VDC/TCS/ABS control unit. Refer to Inspection 3 VDC/TCS/ABS Control Unit System, BR-137.
CAN COMM CIRCUIT	• CAN communication line is open or shorted. • VDC/TCS/ABS control unit internal malfunction. • Battery voltage for EMC is interrupted instantaneously for Approx. 0.5 seconds or more.	Communication circuit between VDC/TCS/ABS control unit and units. Refer to Inspection 15 CAN Communication Circuit VDC/TCS/ABS Control Unit and Steering Angle Sensor, BR-157.
BR FLUID LEVEL LOW	Brake fluid level drops or communication line between the VDC/ TCS/ABS control unit and the brake fluid level warning switch is open or shorted.	Communication circuit between the VDC/TCS/ ABS control unit and the brake fluid level warning switch. Reservoir tank fluid. Refer to Inspection 14 Brake Fluid Level of Reservoir Tank, Communication Circuit beween VDC/TCS/ ABS Control Unit and Brake Fluid Level Warning Switch, BR-156.

Self-Diagnostic item	Malfunction detecting condition	Check route
ENGINE SIGNAL 1-4, 6	Major engine components are abnormal	Engine system. Refer to Inspection 2 Engine System, BR-136.

(note) "ACTUATOR RLY" on the CONSULT-II self-diagnosis results indicates the malfunction of the actuator motor relay and circuit.

DATA MONITOR

NHBR0264S03

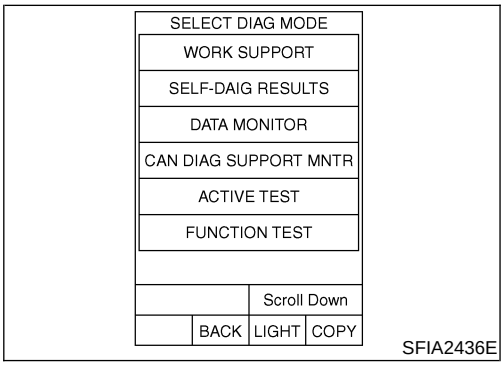
For details of the data monitor function, refer to the CONSULT-II Instruction Manual.

Procedure

1. Turn the ignition switch OFF.
2. Connect the CONSULT-II connector to the vehicle-side data link connector.
3. Turn the ignition switch ON.
4. Touch "START" on the display.
5. Touch "ABS" on the display.

CAUTION:

Just after the engine is started, or the ignition switch is turned ON, "ABS" may not be displayed on the system selection screen even if "START" is touched. In this case, start the self-diagnosis again from step 2.



SFIA2436E

6. Touch "DATA MONITOR".
7. The data monitor item selection screen is displayed, and touch one of "ECU INPUT SIGNALS", "MAIN SIGNALS" or "SELECTION FROM MENU". Refer to Data Monitor Items to be Displayed.
8. Touch "START".
9. Screen of data monitor is displayed.

Data monitor items to be displayed

Data Monitor Item (Unit)	Data Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
GEAR	×	×	×	"1" is displayed.
SLCT LVR POSI	×	×	×	"##" is displayed.
FR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front RH wheel speed sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front LH wheel speed sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear RH wheel speed sensor signal is displayed.
RR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear LH wheel speed sensor signal is displayed.
ACCEL POS SIG (%)	×	×	×	Throttle valve open/close status judged by the CAN communication signal is displayed.
ENGINE RPM (rpm)	×	×	×	Engine speed judged by the CAN communication signal is displayed.

Data Monitor Item (Unit)	Data Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
CAN COM START (ON/OFF)	—	×	×	Communication status of CAN communication is displayed.
STR ANGLE SIG (deg)	×	×	×	Steering angle detected by the steering angle sensor is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by the yaw rate sensor is displayed.
SIDE G-SENSOR (m/s^2)	×	×	×	Transverse acceleration detected by the side G sensor is displayed.
PRESS SENSOR (bar)	×	×	×	Brake fluid pressure detected by the pressure sensor is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to VDC/TCS/ABS control unit is displayed.
MOTOR RELAY (ON/OFF)	—	×	×	Motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	—	×	×	Actuator relay signal (ON/OFF) status is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	×	×	×	Parking brake switch (ON/OFF) status is displayed.
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	—	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	—	×	×	VDC OFF indicator lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	—	×	×	SLIP indicator lamp (ON/OFF) status is displayed.
FR LH IN SOL (ON/OFF)	—	×	×	Front LH wheel inlet solenoid valve (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	—	×	×	Front LH wheel outlet solenoid valve (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	—	×	×	Rear RH wheel inlet solenoid valve (ON/OFF) status is displayed.
RR RH OUT SOL (ON/OFF)	—	×	×	Rear RH wheel outlet solenoid valve (ON/OFF) status is displayed.
FR RH IN SOL (ON/OFF)	—	×	×	Front RH wheel inlet solenoid valve (ON/OFF) status is displayed.
FR RH OUT SOL (ON/OFF)	—	×	×	Front RH wheel outlet solenoid valve (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	—	×	×	Rear LH wheel inlet solenoid valve (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	—	×	×	Rear LH wheel outlet solenoid valve (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	—	—	×	Primary-side switch-over solenoid valve (ON/OFF) status is displayed. (USV)

CONSULT-II Functions (Cont'd)

Data Monitor Item (Unit)	Data Monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
USV [FR-RL] (ON/OFF)	—	—	×	Secondary-side switch-over solenoid valve (ON/OFF) status is displayed. (USV)
HSV [FL-RR] (ON/OFF)	—	—	×	Primary-side switch-over solenoid valve (ON/OFF) status is displayed. (HSV)
HSV [FR-RL] (ON/OFF)	—	—	×	Secondary-side switch-over solenoid valve (ON/OFF) status is displayed. (HSV)
V/R OUTPUT (ON/OFF)	—	—	×	Actuator relay operation signal (ON/OFF) status is displayed.
M/R OUTPUT (ON/OFF)	—	—	×	Motor relay activation signal (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	—	—	×	VDC fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	—	—	×	TCS fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	—	—	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	—	—	×	EBD fail signal (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	—	—	×	Brake fluid level warning switch (ON/OFF) status is displayed.
SNOW MODE SW (ON/OFF)	—	—	×	"OFF" is displayed.
BST OPER SIG (ON/OFF)	—	—	×	"OFF" is displayed.
M MODE SIG (ON/OFF)	—	—	×	"OFF" is displayed.
OD OFF SW (ON/OFF)	—	—	×	"OFF" is displayed.
EBD SIGNAL (ON/OFF)	—	—	×	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	—	—	×	ABS operation (ON/OFF) status is displayed.
TCS SIGNAL (ON/OFF)	—	—	×	TCS operation (ON/OFF) status is displayed.
VDC SIGNAL (ON/OFF)	—	—	×	VDC operation (ON/OFF) status is displayed.

×: Applicable
—: Not applicable

ACTIVE TEST

NHBR0264S04

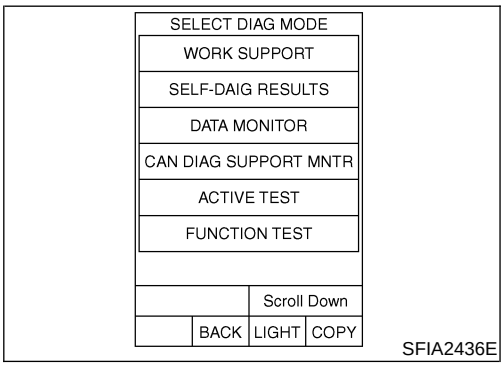
Procedure

CAUTION:

- **Do not perform active test while driving the vehicle.**
- **Make sure that completely bleed air from the brake system.**

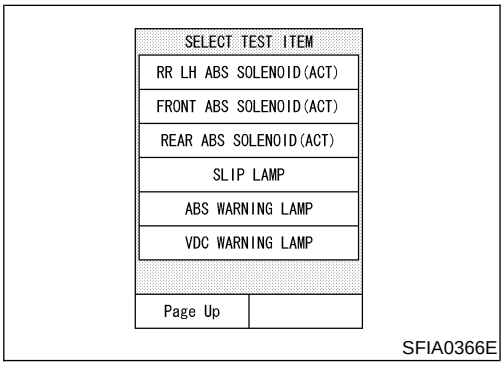
- **The active test cannot be performed with the ABS warning lamp on.**

1. Connect the CONSULT-II connector to the vehicle-side data link connector and start the engine.
2. Touch "START" on the display.



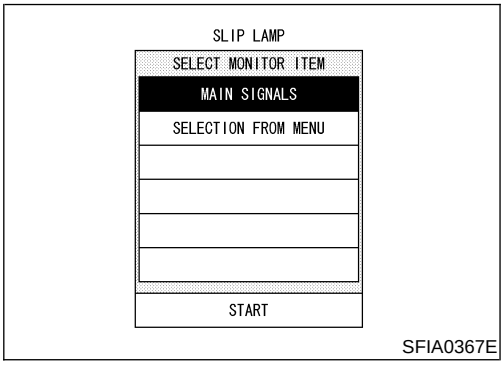
SFIA2436E

3. Touch "ABS" and "ACTIVE TEST".



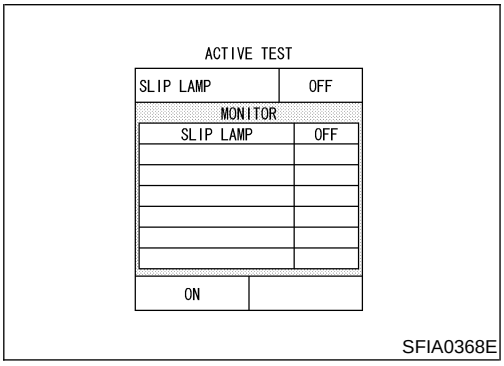
SFIA0366E

4. The test item selection screen is displayed.
5. Touch necessary test item.



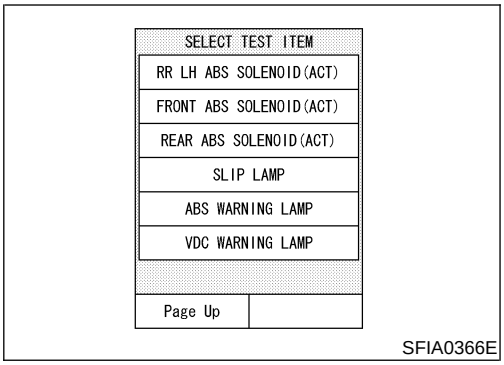
SFIA0367E

6. Touch "START" with "MAIN SIGNALS" line inverted.



SFIA0368E

7. The active test screen is displayed.



Solenoid valve

1) Select each test items without "(ACT)" for the ABS function active test, and with "(ACT)" for the VDC/TCS function active test.
2) Touch "UP", "KEEP", and "DOWN" or "UP", "ACTUATOR UP", and "ACTUATOR KEEP". And check that the solenoid valves operate as the "Solenoid Valve Operation Chart". Refer to Solenoid Valve Operation Chart.

Solenoid valve operation chart

Operation		Without "(ACT)"			With "(ACT)"		
		UP	KEEP	DOWN	UP	ACTUA-TOR UP	ACTUATOR KEEP
FR RH SOL FR RH ABS SOLE-NOID (ACT)	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FR-RL]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FR-RL]	OFF	OFF	OFF	OFF	ON*	OFF
FR LH SOL FR LH ABS SOLE-NOID (ACT)	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FL-RR]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FL-RR]	OFF	OFF	OFF	OFF	ON*	OFF
RR RH SOL RR RH ABS SOLE-NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FL-RR]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FL-RR]	OFF	OFF	OFF	OFF	ON*	OFF
RR LH SOL RR LH ABS SOLE-NOID (ACT)	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	USV [FR-RL]	OFF	OFF	OFF	OFF	ON	ON
	HSV [FR-RL]	OFF	OFF	OFF	OFF	ON*	OFF
FRONT SOLENOID FRONT ABS SOLE-NOID (ACT)	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	ON	OFF	OFF	OFF
	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	ON	OFF	OFF	OFF
REAR SOLENOID REAR ABS SOL-NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON	OFF	OFF	OFF
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON	OFF	OFF	OFF

*: ON for 1 to 2 seconds after the touch, and then OFF

NOTE:

- If the active test is performed with the brake pedal depressed, the pedal stroke may be changed. This is a normal condition.
- "TEST STOP" is displayed 6 seconds after the operation start.

- After "TEST STOP" is displayed, to perform the test again, repeat the step 6 of the operation procedure.

VDC OFF indicator lamp
Touch "ON" and "OFF" on the "VDC WARNING LAMP" screen to check that VDC OFF indicator lamp operates as follows.

Operation	ON	OFF
VDC WARNING LAMP	ON (Lamp ON)	OFF (Lamp OFF)

NOTE:
During the active test when "OFF" on the "VDC WARNING LAMP" screen is touched, all of the VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

Motor relay and actuator relay
Touch "ON" and "OFF" on the "ABS MOTOR" screen to check that the motor relay and the actuator relay operate as follows.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RELAY	ON	ON

NOTE:
- If the active test is performed with the brake pedal depressed, the pedal stroke may be changed. This is a normal condition.
- "TEST STOP" is displayed after 10 seconds from the operation start.

SLIP indicator lamp
Touch "ON" and "OFF" on the "SLIP LAMP" screen to check that the SLIP indicator lamp operates as follows.

Operation	ON	OFF
SLIP LAMP	ON (Lamp ON)	OFF (Lamp OFF)

NOTE:
During the active test when "OFF" on the "SLIP LAMP" screen is touched, all of the VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

ABS warning lamp
Touch "ON" and "OFF" on the "ABS WARNING LAMP" screen to check that the ABS warning lamp operates as follows.

Operation	ON	OFF
ABS WARNING LAMP	ON (Lamp ON)	OFF (Lamp OFF)

NOTE:
During the active test when "OFF" on the "ABS WARNING LAMP" screen is touched, all of the VDC OFF indicator lamp, SLIP indicator lamp, and ABS warning lamp flash once. This is not abnormal.

For Correct and Quick Diagnosis

NHBR0265

PRECAUTIONS FOR TROUBLE DIAGNOSIS

NHBR0265S01

- Before performing the trouble diagnosis, always read the PRECAUTIONS to confirm the general precautions.
- After replacement of VDC/TCS/ABS control unit, steering angle sensor, steering parts, suspension parts, or tires, and adjustment of alignment, always adjust the neutral position of steering angle sensor before driving.
- When the VDC/TCS/ABS control unit is replaced, check that the label on the computer unit is identical color.
- After completing the trouble diagnosis, always erase the malfunctioning memory. Functions of CONSULT-II, BR-119.
- When inspection of the continuity or voltage between units is performed, check the connector terminals for disconnection, looseness, bend, or collapse. If any malfunction is detected, repair or replace the applicable part.
- Intermittent problems may be caused by a malfunction on harness, connector, or terminal. Move the harnesses, harness connectors, or terminals by hand to make sure that there is no contact malfunction.
- If a circuit tester is used for the check, be careful not to forcibly extend any connector terminal.
- For self-diagnosis, active test, and work support of VDC/TCS/ABS control unit with CONSULT-II, stop and connect CONSULT-II and select “ABS”.
- CONSULT-II self-diagnosis results are displayed without regard to occurrence timing. In some case, the later ones (timing value is small) appear on the next screen.
- While the self-diagnosis results of CONSULT-II shows a malfunction, if CONSULT-II active test is performed, an engine system malfunction may be indicated. In this case, start the engine to resume the normal screen.
- VDC/TCS/ABS system electronically controls the brake operation and engine output. The following symptoms may be caused by the normal operations.

Symptom	Symptom description	Result
Motor operation noise	During VDC, TCS, or ABS operation, sometimes a faint noise can be heard. This is a motor operation noise in the VDC/TCS/ABS actuator.	Normal
	Just after the engine starts, the motor operating noise may be heard. This is a normal status of the system operation check.	
System operation check noise	When the engine starts, a “click” noise may be heard from the engine compartment. This is a normal status of the system operation check.	Normal
VDC/TCS operation (SLIP lamp ON)	When the vehicle is passing through a road where the surface friction coefficient varies or the wheel speed changes suddenly by downshifting or depressing of the accelerator pedal fully, TCS may be activated temporarily.	Normal Cancel the VDC/TCS function for the inspection on a chassis dynamometer.
	Before the speedometer inspection, turn VDC OFF switch off to cancel the VDC/TCS function.	
	When the accelerator pedal is depressed on a chassis dynamometer, the vehicle speed will not increase. This is not malfunction, because TCS is activated by the wheel speed difference between front and rear. The warning lamp may also illuminate to show “sensor system failure” in this case. This is not malfunction either, because the stationary front wheels are detected. Restart the engine, and drive the vehicle at 30 km/h or higher to check that the warning lamp no longer illuminates.	

Symptom	Symptom description	Result
ABS operation (Longer stopping distance)	The stopping distance may be longer for the vehicles with ABS when the vehicle is driver on snowy and rough road. When driving on the road like that, slow down the speed.	Normal
Sluggish feel	Depending on road circumstances, the driver may have a sluggish feel. This is not abnormal, because the optimum traction has the highest priority (safety first) by TCS operation. Sometimes the driver has a slight sluggish feel against the substantial accelerator pedal operation.	Normal

ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp ON/OFF timing

×: ON —: Lamp OFF

Condition	ABS warning lamp	VDC OFF indicator lamp	SLIP indicator lamp	Remarks
When the ignition switch is OFF	—	—	—	—
After the ignition switch is turned ON For approx. 0.5 seconds	×	×	×	—
Ignition switch ON Approx. 0.5 seconds later	—	—	—	—
When the VDC OFF switch turns ON (VDC/TCS function OFF).	—	×	—	Lamp goes off after approx. 2 seconds when the engine re-starts.
VDC/TCS/ABS malfunction	×	×	×	—
	×	×	—	When the VDC/TCS/ABS control unit is abnormal (power supply or ground malfunction).
When the VDC/TCS is abnormal.	—	×	×	—

×: Applicable
—: Not applicable

Preliminary Check 1: (Brake Fluid Level and Leak Inspection)

NHBR0266

1. Check the fluid level in the brake reservoir tank. If the fluid level is low, refill the brake fluid.
2. Check the area around the brake piping, VDC/TCS/ABS actuator for leaks. If a leak or oozing is detected, check as follows:

- If the connections at the VDC/TCS/ABS actuator are loose, tighten the piping to the specified torque. Then check again for leaks, and make sure that there is no fluid leak.
- If the flare nuts at the connections and the threads of the VDC/TCS/ABS actuator are damaged, replace the damaged parts. Then check again for leaks, and make sure that there is no fluid leak.
- If a leak or oozing is detected on other parts than the VDC/TCS/ABS actuator connections, wipe the applicable part with a clean cloth. Then check again for leaks, and if there is still a leak or oozing, replace the damaged part.
- If a leak or oozing is detected on the VDC/TCS/ABS actuator body, wipe the applicable part with a clean cloth. Then check again for leaks, and if there is still a leak or oozing, replace the VDC/TCS/ABS actuator body.

CAUTION:
Do not disassemble the actuator body.

3. Check the brake disc rotor and pads.

Preliminary Check 2: (Inspection for Loose Power Supply Terminal)

NHBR0268

Check the battery for looseness on the battery positive/negative terminals and ground connection. If looseness is detected, tighten the piping to the specified torque. Check that the battery voltage does not drop and the alternator is normal.

Preliminary Check 3: (Inspection for ABS Warning Lamp, VDC OFF Indicator Lamp, and SLIP Indicator Lamp)

NHBR0269

1. Check that the ABS warning lamp is ON for approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn on, check the ABS warning lamp and the circuit, and the combination meter.
2. Check that VDC OFF indicator lamp is ON for approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the VDC OFF indicator lamp and the circuit, and the combination meter.

3. Check that the SLIP indicator lamp is ON for approx. 0.5 seconds when the ignition switch is turned ON. If it does not turn ON, check the SLIP indicator lamp and the circuit.
4. With the engine running, check the VDC OFF indicator lamp turns ON and OFF when the VDC OFF switch turns ON and OFF. If it does not operate in accordance with the switch, check the VDC OFF switch and the circuit.
5. Check that the VDC OFF indicator lamp turns OFF after approx. 2 seconds delay when the VDC OFF switch turned ON (The VDC/TCS system was not operated). If the VDC OFF indicator lamp does not turn OFF in 10 seconds from the engine start, perform the self-diagnosis of VDC/TCS/ABS control unit.

Inspection 1 Wheel Speed Sensor and Circuit

NHBR0270

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
ABS SENSOR [ABNORMAL SIGNAL]
FR RH SENSOR-1
FR RH SENSOR-2
FR LH SENSOR-1
FR LH SENSOR-2
RR RH SENSOR-1
RR RH SENSOR-2
RR RH SENSOR-1
RR RH SENSOR-2

MTBL1263

Are any self-diagnosis result items above indicated?

	▶	GO TO 2.

2	CHECK THE CONNECTOR

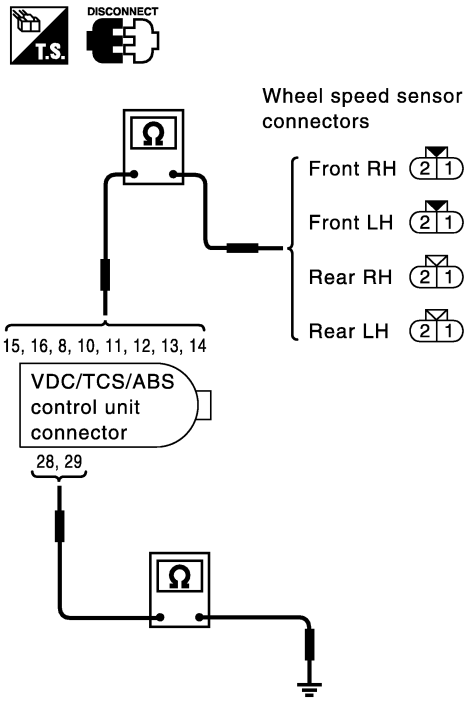
Remove connectors of the wheel speed sensor which is malfunctioning and the VDC/TCS/ABS control unit. Check whether the deformation of terminal, or incorporate connection of connectors. Then, connect connectors. In addition, check if the wheel speed sensor cable is damaged due to friction.

Does ABS warning lamp is out when driving 30 km/h (49 MPH) for approx. one minute?

Yes	▶	Check is completed.
No	▶	GO TO 3.

3	CHECK WHEEL SPEED SENSOR CIRCUIT

1. Disconnect connectors of the VDC/TCS/ABS control unit and wheel speed sensors.



SBR007F

2. Check for continuity among the VDC/TCS/ABS control unit (vehicle-side connector B57) and wheel speed sensors (vehicle-side connectors B76, B77, E160, E167), body ground.

	VDC/TCS/ABS control unit (vehicle-side connector)	Wheel speed sensor (vehicle-side connector)	Continuity (Resistance)
Front RH	15 (W)	15 (W)	Yes (0 - 0.5 Ω)
	16 (B)	16 (B)	
Front LH	8 (R)	8 (R)	Yes (0 - 0.5 Ω)
	10 (G)	10 (G)	
Rear RH	11 (Y)	11 (Y)	Yes (0 - 0.5 Ω)
	12 (BR)	12 (BR)	
Rear LH	13 (L)	13 (L)	Yes (0 - 0.5 Ω)
	14 (P)	14 (P)	

MTBL1261

	VDC/TCS/ABS control unit (vehicle-side connector)	Body ground	Continuity
Grand line	28 (B)	—	Yes
	29 (B)	—	

MTBL1262

Is inspection result OK?

Yes	▶	GO TO 4.
No	▶	Repair harness and connector between the control unit and the wheel speed sensor.

4	INSPECTION THE TIRE

Check the tire pressure, wear, size.

Check if the pressure, wear, and size are in range of the standard?

Yes	▶	GO TO 5.
No	▶	Adjusting tire pressure, and replace tire.

5	SENSOR ROTOR INSPECTION	
Check sensor rotor tooth for damage. **Is inspection result OK?**		
Yes	▶	Check the VDC/TCS/ABS control unit connector for disconnect, loose, bent and collapse terminals. Securely connect them again. Perform the VDC/TCS/ABS control unit self-diagnosis again.
No	▶	Replace sensor rotor.

Inspection 2 Engine System

NHBR0271

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1	
Check the self-diagnosis results. Self-diagnosis results CONSULT-II indication item ENGINE SYSTEM 1 ENGINE SYSTEM 2 ENGINE SYSTEM 3 ENGINE SYSTEM 4 ENGINE SYSTEM 6 MTBL1264 **Are any items other than above indicated in the self-diagnosis results?**		
Yes	▶	Repair or replace affected items.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Perform the ECM self-diagnosis and repair or replace affected items, then perform the ECM self-diagnosis again. 2. Perform the VDC/TCS/ABS control unit self-diagnosis again. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace affected items. Perform the self-diagnosis again.

Inspection 3 VDC/TCS/ABS Control Unit System

=NHBR0272

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK	
Check the self-diagnosis results. Self-diagnosis results CONSULT-II indication item CONTROLLER FAILURE MTBL1265 **Are any items other than "CONTROLLER FAILURE" indicated in the self-diagnosis results?**		
Yes	▶	Repair or replace affected items. Perform the self-diagnosis again.
No	▶	Replace the VDC/TCS/ABS control unit and perform the VDC/TCS/ABS control unit self-diagnosis again.

Inspection 4 Pressure Sensor and The Circuit Between Pressure Sensor and VDC/TCS/ABS Control Unit

=NHBR0273

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
PRESS SEN CIRCUIT

MTBL1266

Is "PRESS SEN CIRCUIT" indicated in the self-diagnosis results?

	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

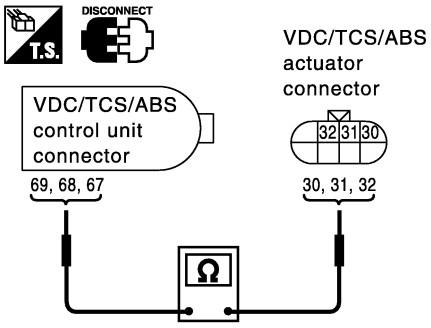
1. Disconnect connectors of the pressure sensor and the VDC/TCS/ABS control unit, and connect them again correctly.
2. Perform the VDC/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

OK	▶	Repair or replace the poorly connected connector, then perform the self-diagnosis again.
NG	▶	GO TO 3.

3	PRESSURE SENSOR CIRCUIT INSPECTION

1. Disconnect connectors of the pressure sensor and the VDC/TCS/ABS control unit.



SBR008F

2. Check for continuity between the VDC/TCS/ABS control unit (vehicle-side connector B57) and the pressure sensor (vehicle-side connector E168).

VDC/TCS/ABS control unit (vehicle-side connector)	Pressure sensor (ABS actuator vehicle-side connector)	Continuity
69 (P/L)	30 (P/L)	Yes
68 (LG)	31 (LG)	Yes
67 (G/OR)	32 (G/OR)	Yes

MTBL1267

Is inspection result OK?

OK	▶	GO TO 4.
NG	▶	Repair or replace the disconnected harness.

4	PRESSURE SENSOR INSPECTION	
Check the "PRESS SENSOR" value in "DATA MONITOR". MTBL1268 **Is inspection result OK?**		
OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Pressure sensor malfunction. Replace the VDC/TCS/ABS actuator (with the pressure sensor).

Condition	PRESS SENSOR (Data monitor)
Brake pedal depressed	Positive value
Brake pedal released	Approx. 0 bar

Inspection 5 Steering Angle Sensor and The Circuit Between Steering Angle Sensor and VDC/TCS/ABS

=NHBR0274

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
ST ANG SEN CIRCUIT

MTBL1269

Perform inspection 15.
Refer to Inspection 15 CAN Communication Circuit, VDC/TCS/ABS Control Unit and Steering Angle Sensor, BR-157.

Is "ST ANG SEN CIRCUIT" indicated in the self-diagnosis results?

	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

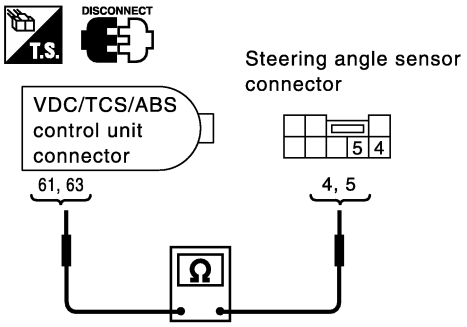
1. Repair or replace the poorly connected connector.
– Check the connector housing for disconnect, loose, bent and collapse terminals.
If any malfunction are detected, repair or replace the applicable part.
2. Perform the VDC/TCS/ABS control unit self-diagnosis again.

Is inspection result OK?

OK	▶	**INSPECTION END**
NG	▶	GO TO 3.

3	STEERING ANGLE SENSOR CURCUIT CHECK

1. Disconnect the VDC/TCS/ABS control unit connector and the steering angle sensor connector.



SBR009F

2. Check for continuity between the VDC/TCS/ABS control unit (vehicle-side connector B57) and the steering angle sensor (vehicle-side connector M218).

VDC/TCS/ABS control unit (vehicle-side connector)	Steering angle sensor (vehicle-side connector)	Continuity
61 (L)	4 (L)	Yes
63 (R)	5 (R)	Yes

MTBL1270

Is inspection result OK?

OK	▶	GO TO 4.
NG	▶	Repair or replace the disconnected harness.

4	DATA MONITOR CHECK

Perform the "STR ANGLE SIG" value in "DATA MONITOR" and check that it is in normal condition.

Steering condition	PRESS SENSOR (Data monitor)
Straight-ahead	-5 deg to +5 deg
Turn the wheel to the right by 90°	Approx. +90 deg
Turn the wheel to the left by 90°	Approx. -90 deg

MTBL1271

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Replace the spiral cable (with the steering angle sensor) and adjust the neutral position of steering angle sensor. Adjustment of Neutral Position of Steering Angle Sensor, BR-94.

Inspection 6 Yaw Rate/Side G and The Circuit Between Yaw Rate/Side G and VDC/TCS/ABS Control Unit

=NHBR0275

Inspection procedure

1 SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
YAW RATE SENSOR SIDE G-SEN CIRCUIT

MTBL1272

CAUTION:

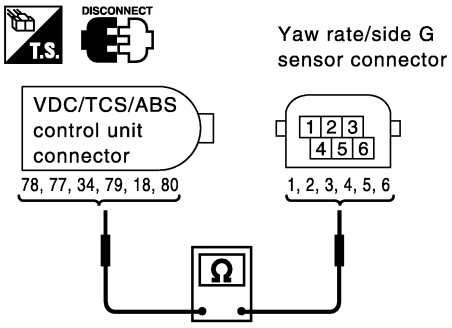
When the vehicle on a turn-table at an entrance of parking lot or on a moving unit, the VDC OFF indicator lamp turns ON, and the self-diagnosis with CONSULT-II may indicate that the yaw rate sensor system is malfunction. In this case, the yaw rate sensor is not malfunction. Move the vehicle from the turn-table or other moving unit, and restart the engine. This will return the status normal.

Are "YAW RATE SENSOR" and "SIDE G-SEN CIRCUIT" indicated in the self-diagnosis results?

▶	GO TO 2.

2 SELF-DIAGNOSIS RESULT CHECK 2

1. Disconnect connectors of the yaw rate/side G sensor and the VDC/TCS/ABS control unit.



SBR010F

2. Check for continuity between the VDC/TCS/ABS control unit (vehicle-side connector B57) and the yaw rate/side G sensor (vehicle-side connector B60).

VDC/TCS/ABS control unit (vehicle-side connector)	Yaw rate/side G-sensor (vehicle-side connector)	Continuity
78 (L/W)	1 (L/W)	Yes
77 (Y/B)	2 (Y/B)	Yes
34 (OR)	3 (OR)	Yes
79 (LG/B)	4 (LG/B)	Yes
18 (PU/W)	5 (PU/W)	Yes
80 (W/R)	6 (W/R)	Yes

MTBL1273

Is inspection result OK?

OK	▶	GO TO 3.
NG	▶	Repair or replace the disconnected harness.

3	YAW RATE/SIDE G SENSOR CIRCUIT CHECK

Check that the "YAW RATE SEN" and the "SIDE G-SENSOR" are in normal operation in "DATA MONITOR".

Vehicle status	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)
While the vehicle is stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s^2
Right turn	Negative value	Negative value
Left turn	Positive value	Positive value

MTBL1274

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	The yaw rate/side G sensor malfunction. After replacing the sensor, perform the self-diagnosis of the VDC/TCS/ABS control unit again.

Inspection 7 Solenoid Valve, VDC Switch-over Solenoid Valve and Circuit

NHBR0276

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
FR LH IN ABS SOL
FR LH OUT ABS SOL
RR RH IN ABS SOL
RR RH OUT ABS SOL
FR RH IN ABS SOL
FR RH OUT ABS SOL
RR LH IN ABS SOL
RR LH OUT ABS SOL
USV LINE [FL-RR]
USV LINE [FR-RL]
HSV LINE [FL-RR]
HSV LINE [FR-RL]

MTBL1275

Are any self-diagnosis result items above indicated?

	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

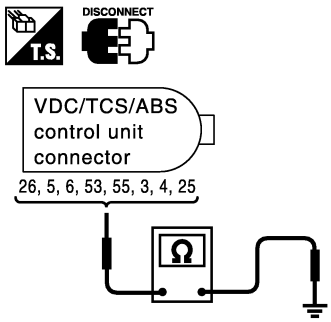
1. Disconnect the VDC/TCS/ABS control unit connector and solenoid valve connectors. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis result items indicated again?

Yes	▶	GO TO 3.
No	▶	Repair or replace the poorly connected connector.

3	SOLENOID VALVE INPUT SIGNAL CHECK

1. Disconnect the VDC/TCS/ABS control unit connector.



SBR011F

2. Check the resistance value between the VDC/TCS/ABS control unit (vehicle-side connector B57) and body ground.

VDC/TCS/ABS control unit (vehicle-side connector)	Body ground	Resistance
26 (W/G)	—	6.0 - 11Ω
5 (G/Y)	—	6.0 - 11Ω
6 (L/W)	—	6.0 - 11Ω
53 (P)	—	6.0 - 11Ω
55 (R/Y)	—	3.0 - 5.0Ω
3 (Y/G)	—	3.0 - 5.0Ω
4 (BR)	—	3.0 - 5.0Ω
25 (W/G)	—	3.0 - 5.0Ω
49 (W/R)	—	6.0 - 11.0Ω
50 (R/G)	—	6.0 - 11.0Ω
54 (W/L)	—	3.0 - 5.0Ω
52 (PU)	—	3.0 - 5.0Ω

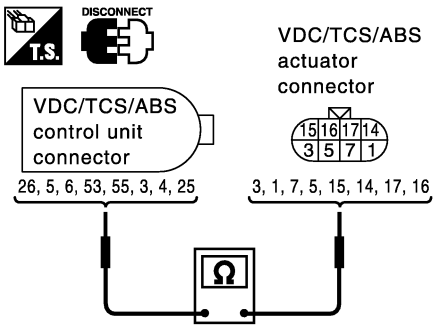
MTBL1276

Is inspection result OK?

OK	▶	Check the VDC/TCS/ABS control unit power supply circuit.
NG	▶	GO TO 4.

4 SOLENOID VALVE LINE CHECK

1. Disconnect connectors for the VDC/TCS/ABS control unit and the VDC/TCS/ABS actuator.



SBR012F

2. Check for continuity between the VDC/TCS/ABS control unit (vehicle-side connector B57) and the VDC/TCS/ABS actuator (vehicle-side connectors E168 and E169).

VDC/TCS/ABS control unit (vehicle-side connector)	ABS Actuator (vehicle-side connector)	Continuity
26 (W/G)	3 (W/G)	Yes
5 (G/Y)	1 (G/Y)	Yes
6 (L/W)	7 (L/W)	Yes
53 (P)	5 (P)	Yes
55 (R/Y)	15 (R/Y)	Yes
3 (Y/G)	14 (Y/G)	Yes
4 (BR)	17 (BR)	Yes
25 (LG)	16 (LG)	Yes
49 (W/R)	26 (W/R)	Yes
50 (R/G)	25 (R/G)	Yes
54 (W/L)	28 (W/L)	Yes
52 (PU)	27 (PU)	Yes

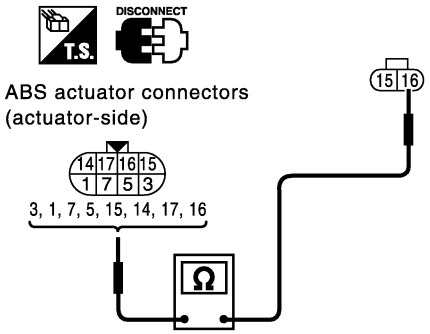
MTBL1277

Is inspection result OK?

OK	▶	GO TO 5.
NG	▶	Harness disconnection between the VDC/TCS/ABS control unit and the actuator

5	ACTUATOR SOLENOID INSPECTION

1. Disconnect the VDC/TCS/ABS actuator connector.



SBR013F

2. Check the resistance value at the VDC/TCS/ABS actuator.

ABS Actuator (actuator side)	ABS Actuator (actuator harness side)	Resistance
3 (W/G)	16	6.0 - 11Ω
1 (G/Y)	16	6.0 - 11Ω
7 (L/W)	16	6.0 - 11Ω
5 (P)	16	6.0 - 11Ω
15 (R/Y)	16	3.0 - 5.0Ω
14 (Y/G)	16	3.0 - 5.0Ω
17 (B/R)	16	3.0 - 5.0Ω
16 (LG)	16	3.0 - 5.0Ω
26 (W/R)	16	6.0 - 11.0Ω
25 (R/G)	16	6.0 - 11.0Ω
28 (W/L)	16	3.0 - 5.0Ω
27 (PU)	16	3.0 - 5.0Ω

MTBL1278

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Replace the VDC/TCS/ABS actuator assembly.

Inspection 8 Actuator Motor, Motor Relay and Circuit

=NHBR0277

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
PUMP MOTOR ACTUATOR RLY (NOTE)

MTBL1279

Are "PUMP MOTOR" and "ACTUATOR RLY" (NOTE) indicated in the self-diagnosis results?

▶	GO TO 2. **NOTE:** "ACTUATOR RLY" on the CONSULT-II self-diagnosis results indicates the malfunction of the actuator relay and circuit.

2	SELF-DIAGNOSIS RESULT CHECK 2

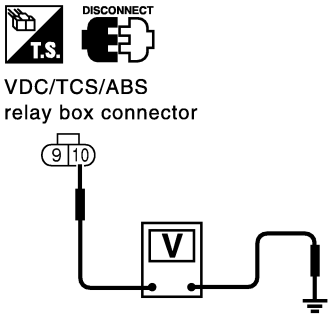
1. Disconnect connectors for the VDC/TCS/ABS control unit and the actuator. Securely connect them again.
2. Perform the self-diagnosis again.

Are any self-diagnosis items indicated again?

Yes	▶	GO TO 3.
No	▶	Repair or replace the poorly connected connector.

3	ACTUATOR MOTOR, MOTOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connector.



VDC/TCS/ABS
relay box connector

SBR014F

2. Check the voltage between the vehicle-side connector E165 and body ground.

Relay box (vehicle-side connector)	Body ground	Voltage value
10 (Y)	—	Battery voltage (approx. 12V)

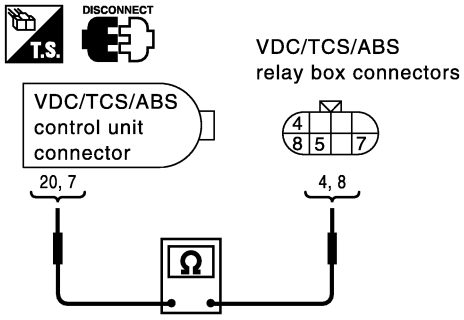
MTBL1280

Is inspection result OK?

OK	▶	GO TO 4.
NG	▶	• Check the fuse 50A. • Check for continuity between the battery and the relay box terminal No. 10.

4	ACTUATOR MOTOR AND MOTOR RELAY CIRCUIT CHECK

1. Disconnect connectors for the VDC/TCS/ABS control unit and the relay box.



SBR015F

2. Check for continuity between the VDC/TCS/ABS control unit, the relay, and the actuator (vehicle-side connectors B57 and E168).

VDC/TCS/ABS control unit (Vehicle-side connector)	Relay box (Vehicle-side connector)	Continuity
20 (R/B)	4 (R/B)	Yes
7 (G/W)	8 (G/Y)	Yes

MTBL1281

Is inspection result OK?

Yes	▶	GO TO 5.
No	▶	Harness malfunction between the VDC/TCS/ABS control unit, the relay box and the actuator.

5	MOTOR RELAY UNIT INSPECTION

Check the motor relay as a unit.

Is inspection result OK?

Yes	▶	Check the VDC/TCS/ABS control unit power supply circuit.
No	▶	Replace the motor relay.

Inspection 9 Actuator Relay and Circuit

=NHBR0278

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
MAIN RELAY

MTBL1282

Is "MAIN RELAY" indicated in the self-diagnosis results?

▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

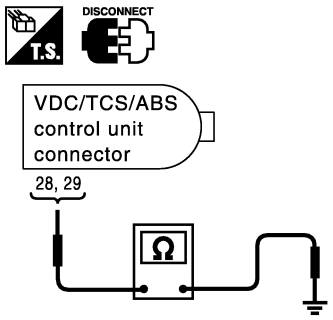
1. Disconnect the VDC/TCS/ABS control unit connector. Securely connect them again.
2. Perform the VDC/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated?

Yes	▶	GO TO 3.
No	▶	Repair or replace the poorly connected connector.

3	VDC/TCS/ABS CONTROL UNIT GROUND CIRCUIT INSPECTION

Check the VDC/TCS/ABS control unit ground circuit (vehicle-side connector B57).



SBR016F

VDC/TCS/ABS control unit (vehicle-side connector)	Body ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

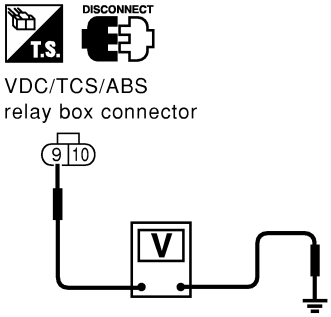
MTBL1283

Is inspection result OK?

OK	▶	GO TO 4.
NG	▶	Poorly connection on the VDC/TCS/ABS control unit connector or harness disconnection.

4	ACTUATOR RELAY POWER SUPPLY CIRCUIT INSPECTION

1. Disconnect relay box connector.



SBR017F

2. Check the voltage between the vehicle-side connector E165 and body ground.

Relay box (vehicle-side connector)	Body ground	Voltage value
9 (L/B)	—	Battery voltage (approx. 12V)

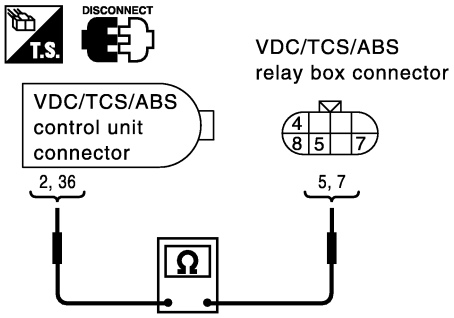
MTBL1284

Is inspection result OK?

Yes	▶	GO TO 5.
No	▶	• Check the fuse 30A. • Check for continuity between the battery and the relay box terminal No. 9. If it is not OK, replace the fuse or harness.

5	ACTUATOR RELAY POWER CIRCUIT CHECK

1. Disconnect connectors for the VDC/TCS/ABS control unit and the relay box.



SBR018F

2. Check for continuity between the VDC/TCS/ABS control unit and the relay box (vehicle-side connectors E165 and E166).

VDC/TCS/ABS control unit (vehicle-side connector)	Relay box (Vehicle-side connector)	Continuity
2 (SB)	5 (SB)	Yes
36 (L/Y)	7 (L/Y)	Yes

MTBL1285

Is inspection result OK?

OK	▶	GO TO 6.
NG	▶	Harness disconnection between the VDC/TCS/ABS control unit and the relay box.

6	ACTUATOR RELAY UNIT INSPECTION	
Check the actuator relay as a unit. **Is inspection result OK?**		
OK	▶	Check the VDC/TCS/ABS control unit power supply circuit.
NG	▶	Replace the actuator relay.

Inspection 10 Stop Lamp Switch and Circuit

NHBR0279

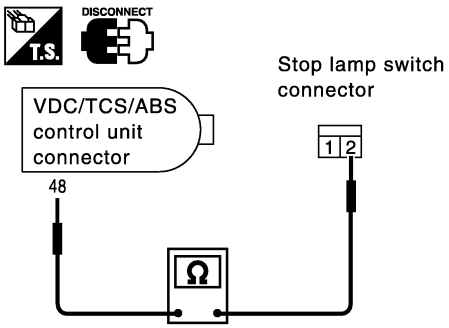
Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK	
Check the self-diagnosis results. Self-diagnosis results CONSULT-II indication item STOP LAMP SW MTBL1286 **Is "STOP LAMP SW" indicated in the self-diagnosis results?**		
	▶	GO TO 2.

2	STOP LAMP INSPECTION	
1. Disconnect connectors for the stop lamp switch and the VDC/TCS/ABS control unit. 2. Securely connect them again. 3. Start the engine. 4. Repeat depressing the brake pedal carefully several times, then perform the self-diagnosis again. **Is the same self-diagnosis item indicated?**		
Yes	▶	GO TO 3.
No	▶	Repair or replace the poorly connected connector.

3	STOP LAMP SWITCH CIRCUIT CHECK

1. Disconnect connectors for the stop lamp switch and the VDC/TCS/ABS control unit.



SBR019F

2. Check for continuity between the stop lamp switch (vehicle-side connector E85) and the VDC/TCS/ABS control unit (vehicle-side connector).

VDC/TCS/ABS control unit (vehicle-side connector)	STOP LAMP SW (Vehicle-side connector)	Continuity
48 (R/G)	2 (R/G)	Yes

MTBL1287

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Harness disconnection between the VDC/TCS/ABS control unit and the stop lamp switch.

Inspection 11 VDC/TCS/ABS Control Unit Power Supply Circuit

NHBR0280

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
BATTERY VOLTAGE [ABNORMAL]

MTBL1288

Is "BATTERY VOLTAGE [ABNORMAL]" indicated in the self-diagnosis results?

	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

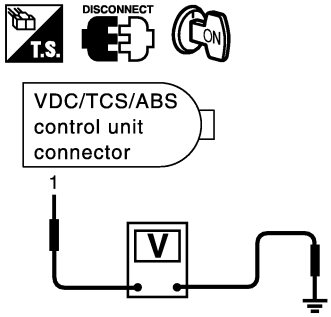
1. Disconnect the VDC/TCS/ABS control unit connector. Securely connect them again.
2. Perform the self-diagnosis.

Is the same self-diagnosis item indicated?

Yes	▶	GO TO 3.
No	▶	Repair or replace the poorly connected connector.

3	VDC/TCS/ABS CONTROL UNIT POWER SUPPLY CIRCUIT INSPECTION 1

1. Disconnect the VDC/TCS/ABS control unit connector.



SBR020F

2. Turn the ignition switch ON (engine not running), and check the voltage between the VDC/TCS/ABS control unit (vehicle-side connector B57) and body ground.

VDC/TCS/ABS control unit (vehicle-side connector)	Body ground	Voltage value
1 (G/Y)	—	Battery voltage (approx. 12V)

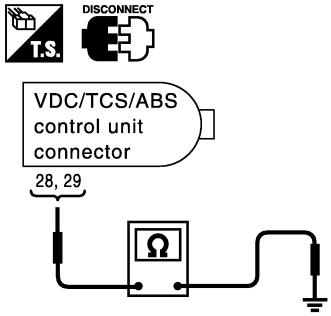
MTBL1289

Is inspection result OK?

Yes	▶	GO TO 4.
No	▶	GO TO 5.

4	VDC/TCS/ABS CONTROL UNIT GROUND CIRCUIT INSPECTION 1

Check the VDC/TCS/ABS control unit ground circuit (vehicle-side connector B57).



SBR021F

VDC/TCS/ABS control unit (vehicle-side connector)	Body ground	Continuity
28 (B)	—	Yes
29 (B)	—	Yes

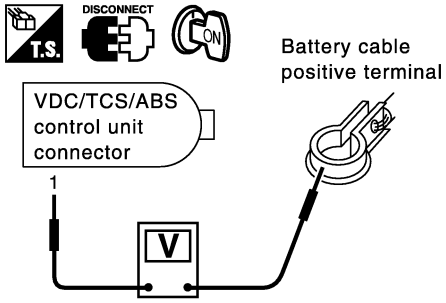
MTBL1290

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Harness disconnection or improper installation of the VDC/TCS/ABS control unit.

5	VDC/TCS/ABS CONTROL UNIT POWER SUPPLY CIRCUIT INSPECTION 2

1. Check the fuse 10A.



SBR022F

2. Check for continuity between the battery positive terminal and the VDC/TCS/ABS control unit connector B57.

VDC/TCS/ABS control unit (vehicle-side connector)	Battery terminal	Continuity
1 (GY)	positive	Yes

MTBL1291

Is inspection result OK?

Yes	▶	Check the battery for a loose terminal and low voltage or the alternator for abnormality.
No	▶	• Replace the fuse 10A. • Harness disconnection

Inspection 12 When “EMERGENCY BRAKE” Is Indicated in The Self-diagnosis Results

=NHBR0281

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
EMERGENCY BRAKE

MTBL1292

When any items other than “EMERGENCY BRAKE” is displayed in the self-diagnosis results, follow the instructions below.

CAUTION:

“EMERGENCY BRAKE” is indicated when the control unit itself is detected internal error. If this display item was indicated, replace the control unit.

Is “EMERGENCY BRAKE” is indicated in the self-diagnosis results?

▶	Replace the VDC/TCS/ABS control unit, and perform the self-diagnosis again.

Inspection 13 When “ST ANG SEN SIGNAL” is Indicated in The Self-diagnosis Results

NHBR0282

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
ST ANGLE SEN SIGNAL

MTBL1293

When any items other than “ST ANGLE SEN SIGNAL” is displayed in the self-diagnosis results:

Yes	▶	Check and repair the applicable items. Perform the self-diagnosis again.
No	▶	Perform the steering angle sensor neutral position adjustment. GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2

Turn the ignition switch OFF, and ON to erase the self-diagnosis results. And perform the VDC/TCS/ABS control unit self-diagnosis again.

Is the same self-diagnosis item indicated again?

Yes	▶	After replacing the spiral cable (with the steering angle sensor), perform the neutral position adjustment. Then conduct the self-diagnosis again.
No	▶	**INSPECTION END**

Inspection 14 Brake Fluid Level of Reservoir Tank

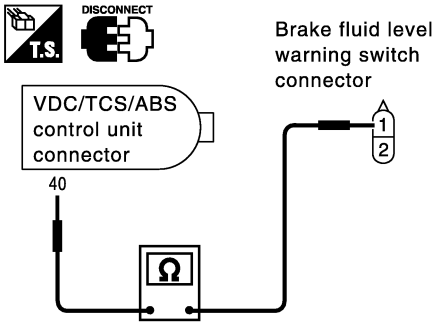
NHBR0283

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1	
Check the self-diagnosis results. Self-diagnosis results: CONSULT-II indication item: BR FLUID LEVEL LOW MTBL1294 **Does the brake warning light turn on?**		
Yes	▶	Check the pad for wear. Check the brake fluid for leakage.
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 2	
1. Disconnect connectors for the brake fluid level warning switch and the VDC/TCS/ABS control unit. 2. Securely connect connectors. Perform the VDC/TCS/ABS control unit self-diagnosis again. **Is the same self-diagnosis item indicated again?**		
Yes	▶	Poor connection of connector. Repair or replace the poorly connected connector.
No	▶	GO TO 3.

3	CIRCUIT CHECK BETWEEN BRAKE FLUID LEVEL WARNING SWITCH AND VDC/TCS/ABS CONTROL UNIT	
1. Disconnect connectors for the brake fluid level warning switch and the VDC/TCS/ABS control unit.		



SBR023F

2. Check for continuity between the brake fluid level warning switch (vehicle-side connector E1) and the VDC/TCS/ABS control unit (vehicle-side connector B57).

VDC/TCS/ABS control unit (vehicle-side connector)	Brake fluid level warning switch (vehicle-side connector)	Continuity
40 (BR/Y)	1 (L)	Yes

MTBL1295

Is inspection result OK?

OK	▶	Perform the VDC/TCS/ABS control unit self-diagnosis again.
NG	▶	Repair or replace the disconnected harness.

Inspection 15 CAN Communication System, VDC/TCS/ABS Control Unit and Steering Angle Sensor

NHBR0284

Inspection procedure

1	SELF-DIAGNOSIS RESULT CHECK 1

Check the self-diagnosis results.

Self-diagnosis results
CONSULT-II indication item
CAN COMM CIRCUIT ST ANG SEN COM CIR

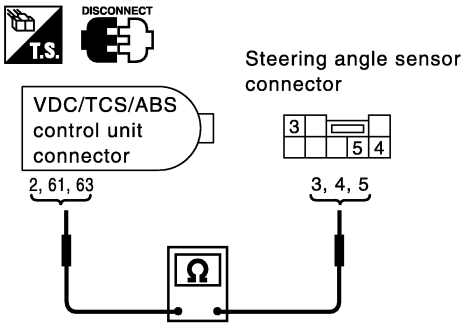
MTBL1296

Are any items other than above indicated in self-diagnosis results?

Yes	▶	Repair or replace affected items.
No	▶	GO TO 2.

2	CHECK HARNESS AND CONNECTORS BETWEEN VDC/TCS/ABS CONTROL UNIT AND STEERING ANGLE SENSOR

1. Turn the ignition switch OFF, and disconnect the battery negative terminal.
2. Disconnect the VDC/TCS/ABS control unit connector and the steering angle sensor connector.



SBR024F

3. Check the harness between the VDC/TCS/ABS control unit connector B57 and the steering angle sensor connector M218 for open and short circuit.

VDC/TCS/ABS control unit (vehicle-side connector)	Steering angle sensor (vehicle-side connector)	Continuity
2 (SB)	3 (SB)	Yes
61 (L)	4 (L)	Yes
63 (R)	5 (R)	Yes

MTBL1297

4. Check connectors for the control unit and the sensor.

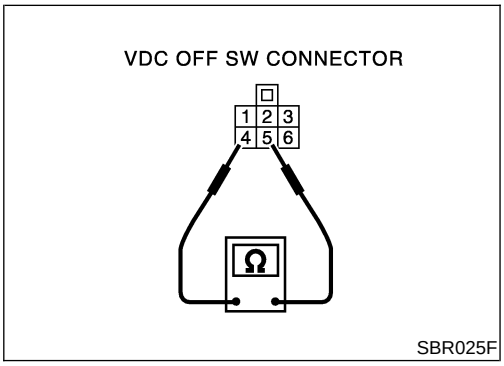
– Check the connector housing for disconnected, loose, bent, and collapsed terminals.

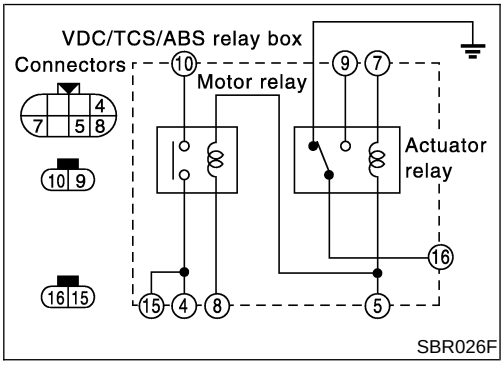
Is inspection result OK?

OK	▶	GO TO 3.
NG	▶	Repair disconnected harness or poorly connected connectors. GO TO 3.

3	SELF-DIAGNOSIS RESULT CHECK 2	
1. Connect connectors to the control unit and the sensor. 2. Connect the battery negative terminal, and turn the ignition switch ON. 3. After erasing the self-diagnosis result, start the engine to perform the self-diagnosis again. **Is only "ST ANGLE SEN COM CIR" indicated in the self-diagnosis results?**		
Yes	▶	Replace the spiral cable (with the steering angle sensor) and adjust the neutral position of the steering angle sensor. Refer to ON-VEHICLE SERVICE, BR-94.
No	▶	GO TO 4.

4	CHECK CONNECTOR	
1. Turn ignition switch OFF, disconnect the VDC/TCS/ABS control unit connector, and check the terminal for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal. 2. Reconnect connector to perform self-diagnosis. **Is "CAN COMM CIRCUIT" displayed in the self-diagnosis display items?**		
Yes	▶	Print out the self-diagnostic results, and refer to EL-458.
No	▶	Connector terminal connection is loose, damaged, open, or shorted.





Component Check

NHBR0285

VDC OFF SWITCH

NHBR0285S01

- Disconnect the VDC OFF switch connector M220. Check for continuity between the terminal No. 4 (B) and No. 5 (SB).

  4 - 5

  Pressing the switch will make a continuity, and releasing it will stop the continuity.

VDC/TCS/ABS RELAY BOX

NHBR0285S02

Disconnect the relay box connectors E165 and E600. Check for continuity, resistance value, and insulation between any pair of terminals in the relay box.

Continuity and Resistance

NHBR0285S0201

Item	VDC/TCS/ABS relay box										Condition
	40	2	4	1	9	4	41	10	5	7	8	
Actuator relay	○——×——○								Open (0V) ○——○			Between terminal No. 5 and No. 7 Open (0V)
	○——————○								12V ○——○			Between terminal No. 5 and No. 7 Add 12V
Motor relay						○——○						—
						○——×——○			Open (0V) ○——○			Between terminal No. 5 and No. 8 Open (0V)
						○——————○			12V ○——○			Between terminal No. 5 and No. 8 Add 12V
Relay coil						Approx. 100 Ω ○—WW—○ Approx. 80 Ω ○—WW—○						—

○——○ : Conductivity ○——○ : Open between terminals (0V) Approx. 100 Ω ○—WW—○ : Resistance between terminals is 100 Ω

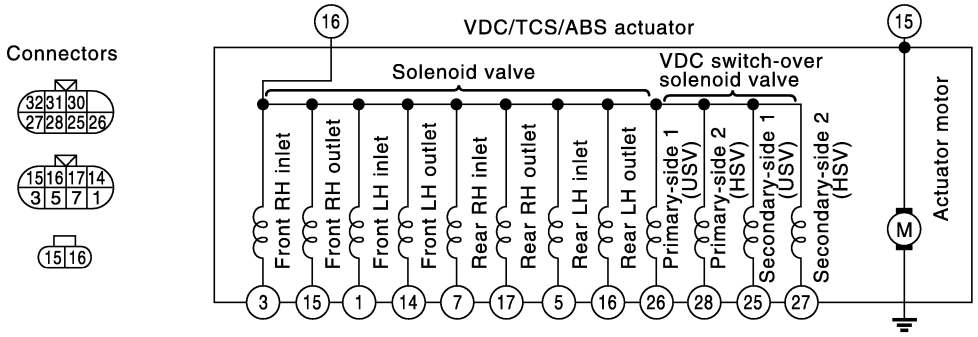
○——×——○ : Not conductivity 12V ○——○ : Add 12V between terminals

SBR029F

VDC/TCS/ABS ACTUATOR

NHBR0285S03

Take each connector off from the actuator. Then check electric circulation and resistance in between terminals.



SBR027F

CAUTION:

Confirm that the earth of actuator motor is completely removed.

Continuity and Resistance

NHBR0285S0301

Item	VDC/TCS/ABS actuator connector terminal number	Condition
	19 3 15 1 14 7 17 5 16 26 25 28 27 21 Body ground	
Solenoid valve	6.0 - 11.0Ω 3.0 - 5.0Ω 6.0 - 11.0Ω 3.0 - 5.0Ω 6.0 - 11.0Ω 3.0 - 5.0Ω 6.0 - 11.0Ω 3.0 - 5.0Ω	Check the resistance
VDC switch-over solenoid valve	6.0 -11.0Ω 6.0 -11.0Ω 3.0 - 5.0Ω 3.0 - 5.0Ω	
Actuator motor		—

(Resistance)
: Continuity: Yes
: Continuity: Yes

SBR030F

Check The Resistance

NHBR0285S0302

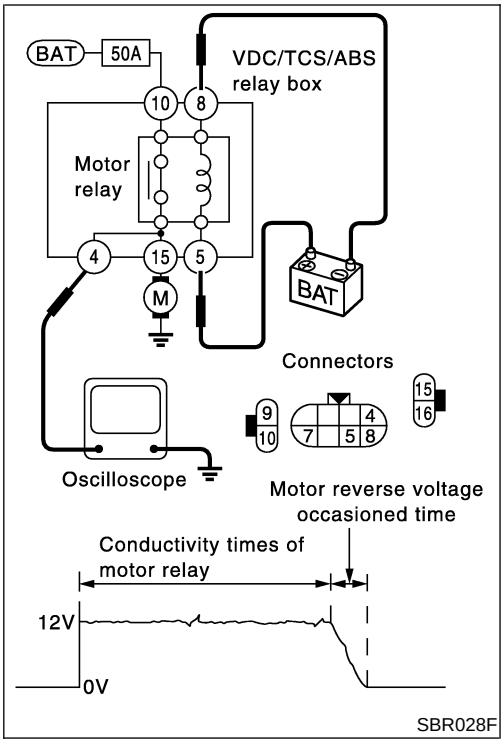
Standard value (Ω)

Solenoid valves

- **Outlet - Outlet: 6.0 - 10.0**
- **Outlet - Inlet: 9.0 - 16.0**
- **Inlet - Inlet: 12.0 - 22.0**

VDC switch-over solenoid valve

- **Primary-side 1 - Secondary-side 1: 12.0 - 22.0**
- **Primary-side 2 - Secondary-side 2: 6.0 - 10.0**
- **Primary-side 1 - Primary-side 2, Secondary-side 2: 9.0 - 16.0**
- **Secondary-side 1 - Primary-side 2, Secondary-side 2: 9.0 - 16.0**



Actuator Operation Check

NHBR0285S0303

1. Connect E165 and E166 terminals of actuator to 15 and 16 terminals of relay box.
2. Measure the motor voltage [No. 4 (R/B) terminal to body ground] with oscilloscope. Then check the motor reverse voltage occasioned time.
   The motor reverse voltage occasioned time is more than 0.1 sec.

CAUTION:

- **Perform checking of motor relay unit. Then confirm that relay functions.**
- **Driving actuator motor is within 4 sec. to prevent heating up.**
- **Standard condition of the motor reverse voltage occasioned time is: Battery voltage is 12V. temperature 20°. when the battery voltage or temperature is lower than the standard, the motor reverse voltage occasioned time becomes slightly shorter.**

Symptom 1: ABS Works Frequently

NHBR0286

Inspection procedure

1	INSPECTION START	
Check the wheel speed 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?**		
Yes	▶	GO TO 2.
No	▶	Refer to wheel speed sensor and rotor lines.

2	LOOSENESS INSPECTION	
Check the front axle for looseness. **Is inspection result OK?**		
Yes	▶	Symptom 2: Unexpected Pedal Action, BR-162.
No	▶	Axle inspection and repair

Symptom 2: Unexpected Pedal Action

NHBR0287

Inspection procedure

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.

5	WHEEL SPEED SENSOR INSPECTION	
Check the wheel speed 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?**		
Yes	▶	Normal
No	▶	Wheel speed sensor and rotor lines repair

Symptom 3: Longer Stopping Distance

NHBR0288

Inspection procedure

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.

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.

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.

4	WHEEL SPEED SENSOR INSPECTION	
Check the wheel speed 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?**		
Yes	▶	Normal
No	▶	Wheel speed sensor and rotor lines repair

Symptom 4: ABS Does Not Work

NHBR0289

Inspection procedure

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 SPEED SENSOR INSPECTION	
Check the wheel speed 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?**		
Yes	▶	Normal
No	▶	Wheel speed sensor and rotor lines repair

Symptom 5: Pedal Vibration and Noise

NHBR0290

Inspection procedure

1	SYMPTOM CHECK	
Check the brake system for pedal vibration or noise at the engine start. **Is inspection result OK?**		
Yes	▶	Perform the self-diagnosis.
No	▶	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** **Is inspection result OK?**		
Yes	▶	GO TO 3.
No	▶	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** **Is inspection result OK?**		
Yes	▶	GO TO 4.
No	▶	Normal

4	SYMPTOM CHECK 4	
Check that the symptom is reproduce when the engine speed is increased with the vehicle stopped. **Is inspection result OK?**		
Yes	▶	GO TO 5.
No	▶	Normal **CAUTION:** **This symptom may appear with vehicle stopped.**

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

6	ABS WARNING LAMP INSPECTION	
Check that the ABS warning lamp turns on. **Is inspection result OK?**		
Yes	▶	Perform the self-diagnosis.
No	▶	GO TO 7.

7	WHEEL SPEED SENSOR INSPECTION	
Check the wheel speed sensor system. ● Sensor mounting inspection ● Sensor pick-up inspection for iron chips (e.g. Number of teeth, damaged teeth) ● Sensor connector engagement inspection ● Wheel speed sensor path harness and connector inspection **Is inspection result OK?**		
Yes	▶	Normal
No	▶	Wheel speed sensor and rotor lines repair

Symptom 6: VDC OFF Indicator Lamp Does Not Illuminate

NHBR0291

Inspection procedure

1	VDC OFF INDICATOR LAMP INSPECTION	
Disconnect the VDC/TCS/ABS control unit connector. **Does the ABS warning lamp and VDC OFF indicator lamp illuminate?**		
Yes	▶	VDC/TCS/ABS control unit malfunction. Repair or replace the control unit.
No	▶	Combination meter system malfunction. Check the combination meter.

Symptom 7: SLIP Indicator Lamp Does Not Illuminate

NHBR0292

Inspection procedure

1	SLIP INDICATOR LAMP BURNED-OUT BULB INSPECTION	
Check for continuity between the power supply terminal of meter and terminal of ABS warning lamp. **Is inspection result OK?**		
OK	▶	GO TO 2.
NG	▶	Circuit malfunction in SLIP indicator lamp or combination meter

2	SLIP INDICATOR LAMP POWER CIRCUIT INSPECTION	
Disconnect the meter connector. Check that the voltage between the vehicle-side harness terminal and body ground is battery voltage (Approx. 12V). **Is inspection result OK?**		
Yes	▶	GO TO 3.
No	▶	• Fuse inspection • Inspection for harness and connectors between fuse block and meter • Check the power supply circuit (battery and ignition switch circuit).

3	SLIP INDICATOR LAMP HARNESS INSPECTION	
1. Disconnect connectors for the VDC/TCS/ABS control unit and meter vehicle-side harness. 2. Check the harness between the meter and the VDC/TCS/ABS control unit for an open/shorted circuit. **Is inspection result OK?**		
OK	▶	GO TO 4.
NG	▶	Repair or replace the disconnected harness.

4	SLIP INDICATOR LAMP CONNECTOR INSPECTION	
Check connectors for the VDC/TCS/ABS control unit and meter vehicle-side harness. **Is inspection result OK?**		
Yes	▶	Connect connectors, and perform the self-diagnosis. The vehicle harness has the intermediate connector. Refer to the vehicle wiring diagram, always check it.
No	▶	Repair or replace the disconnected connector.

Symptom 8: During VDC/TCS/ABS Control, Vehicle Behavior is Jerky

NHBR0293

Inspection procedure

1	ENGINE SPEED SIGNAL INSPECTION	
Perform “DATA MONITOR” with CONSULT-II for the VDC/TCS/ABS control unit. **Is the engine speed at idle 400 rpm or higher?**		
Yes	▶	Normal
No	▶	GO TO 2.

2	SELF-DIAGNOSIS RESULT CHECK 1	
Perform the VDC/TCS/ABS control unit self-diagnosis. **Is the self-diagnosis results displayed?**		
Yes	▶	After checking and repairing the applicable item, perform the VDC/TCS/ABS control unit self-diagnosis again.
No	▶	GO TO 3.

3	ECM SELF-DIAGNOSIS RESULT CHECK	
Perform the ECM self-diagnosis. **Is the self-diagnosis results indicated?**		
Yes	▶	Repair or replace the camshaft position sensor system.
No	▶	GO TO 4.

4	SELF-DIAGNOSIS RESULT 2	
Disconnect connectors for the VDC/TCS/ABS control unit and ECM, and reconnect them correctly to perform the self-diagnosis again. **Is inspection result OK?**		
OK	▶	GO TO 5.
NG	▶	Connector malfunction. Repair or replace the connector.

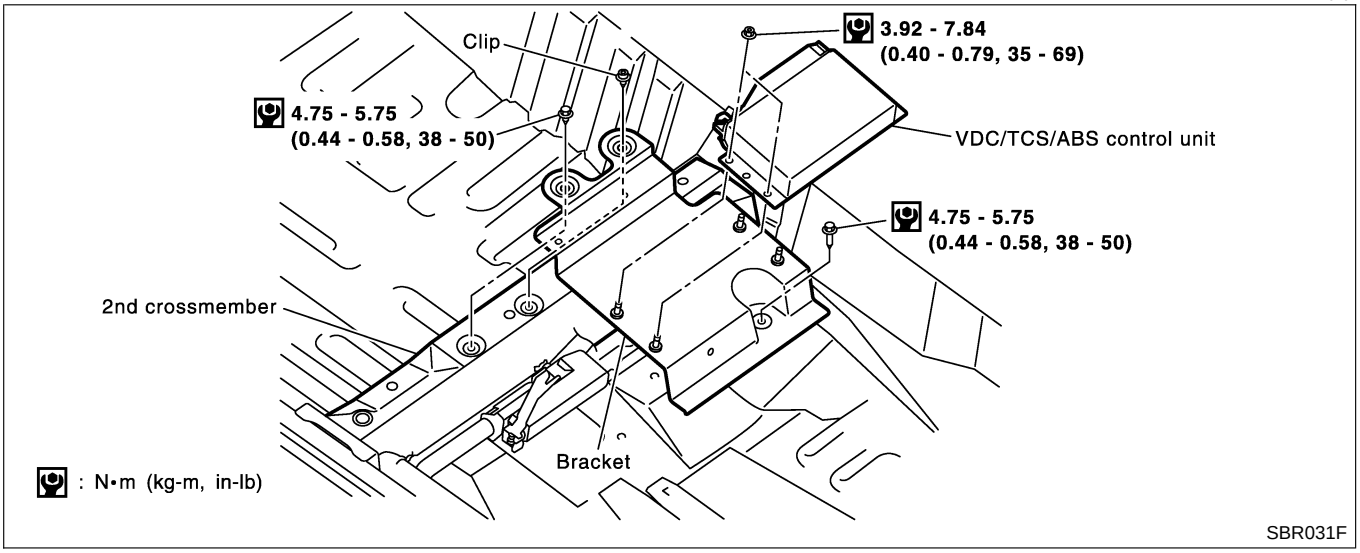
5	SELF-DIAGNOSIS RESULT CHECK 3	
Perform the TCM self-diagnosis. **Is inspection result OK?**		
OK	▶	GO TO 6.
NG	▶	Repair or replace the applicable part.

6	SELF-DIAGNOSIS RESULT CHECK 4	
Perform the VDC/TCS/ABS control unit self-diagnosis again. **Is the self-diagnosis results displayed?**		
Yes	▶	Repair or replace the applicable item.
No	▶	GO TO 7.

7	CIRCUIT CHECK BETWEEN VDC/TCS/ABS CONTROL UNIT AND ECM	
1. Disconnect connectors for the VDC/TCS/ABS control unit and ECM. 2. Check the engine speed signal harness between the VDC/TCS/ABS control unit and ECM for an open/shorted circuit. 3. Check connectors for the VDC/TCS/ABS control unit and ECM. **Is inspection result OK?**		
OK	▶	**INSPECTION END**
NG	▶	Repair or replace the applicable item and perform the VDC/TCS/ABS control unit self-diagnosis again.

Removal and Installation

NHBR0294



REMOVAL

NHBR0294S01

1. Remove the front seat LH.
2. Remove the VDC/TCS/ABS control unit.

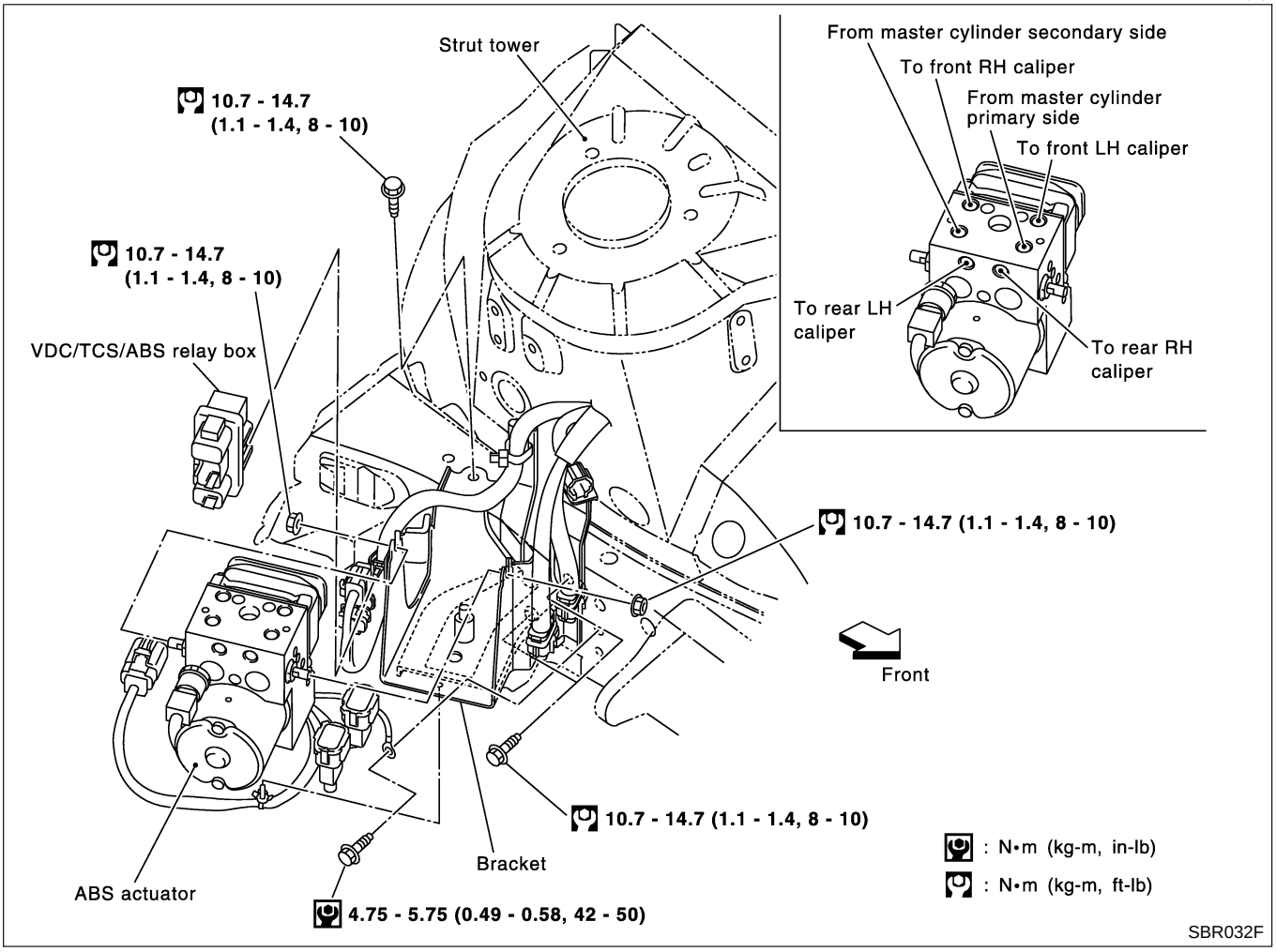
INSTALLATION

NHBR0294S02

- Installation is the reverse order of removal.

Removal and Installation

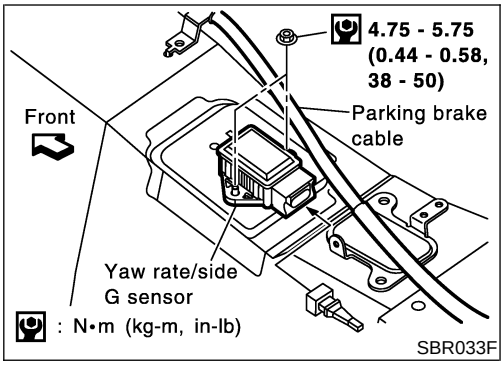
NHBR0297



Be careful of the following.

CAUTION:

- **Before servicing, disconnect the battery terminals.**
- **To remove the brake tube, use a flare nut wrench to prevent the flare nuts and brake tube from being damaged. To install, use a brake tube torque wrench.**
- **Do not remove and install the actuator by holding the harness.**
- **After completing the work, bleed the brake piping of air. Refer to Brake Burnishing Procedure, BR-8.**
- **Make sure to connect the ground terminal securely.**



Removal and Installation

NHBR0298

REMOVAL

NHBR0298S01

1. Remove the center console.
2. Disconnect the harness connector.
3. Remove the mounting bolts, and remove the yaw rate/side G sensor.

CAUTION:

Do not drop or strike the yaw rate/side G sensor, because it has little endurance against impact.

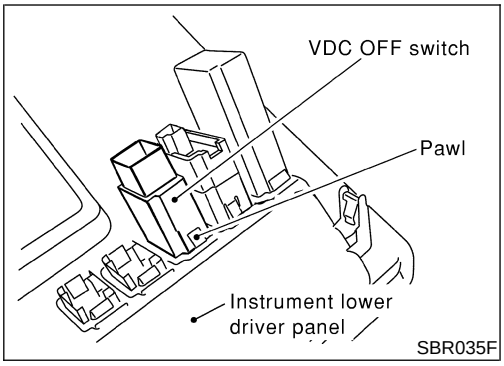
INSTALLATION

NHBR0298S02

- Installation is the reverse order of removal.

CAUTION:

Do not drop or strike the yaw rate/side G sensor, because it has little endurance against impact.



Removal and Installation

NHBR0299

REMOVAL

NHBR0299S01

1. Remove the instrument lower driver panel. Refer to INSTRUMENT LOWER DRIVER PANEL, BT-29.
2. Push the VDC OFF switch's pawls and remove the switch from the instrument lower driver panel.

INSTALLATION

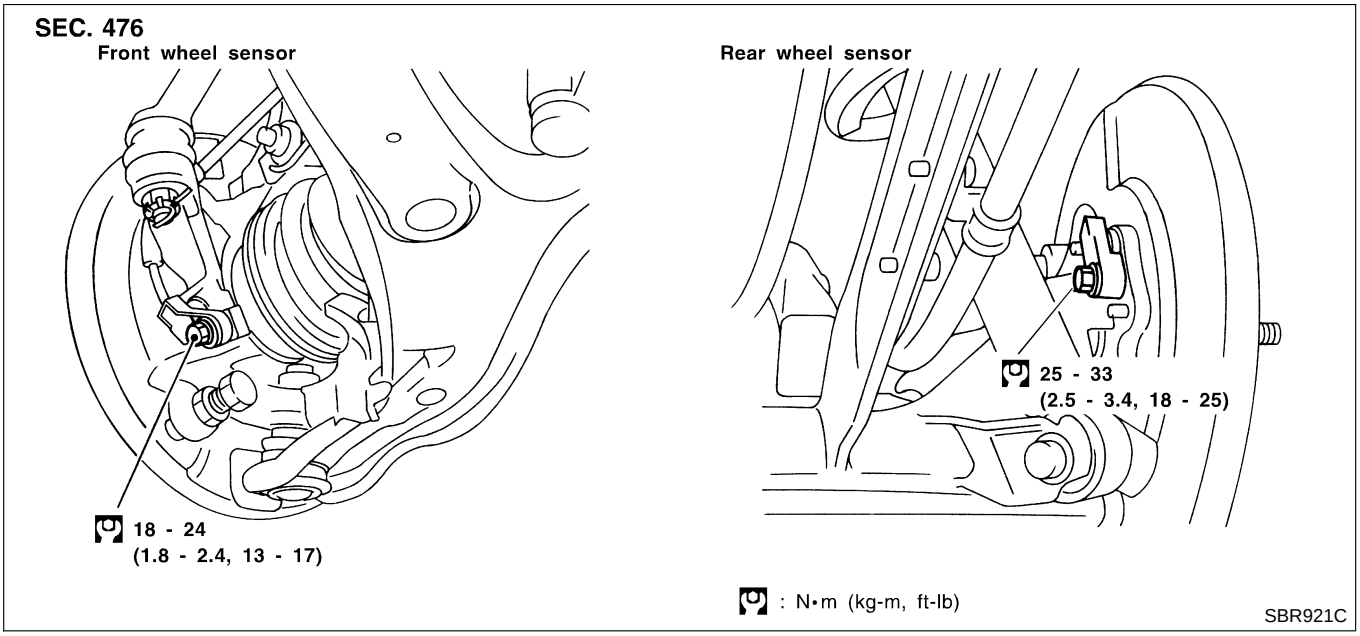
NHBR0299S02

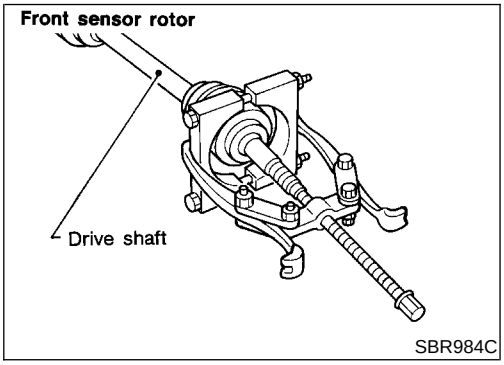
nstallation is the reverse order of removal.

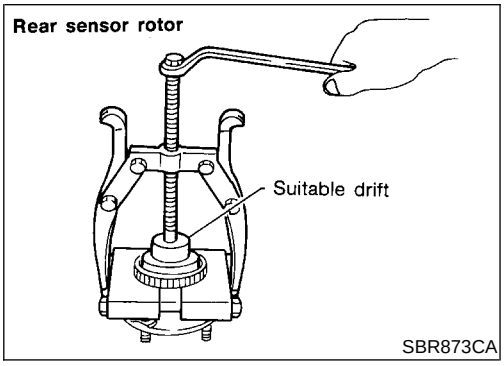
CAUTION:
Be careful not to damage sensor edge and sensor rotor teeth. When removing the front or rear wheel hub assembly, first remove the ABS wheel sensor from the assembly. Failure to do so may result in damage to the sensor wires making the sensor inoperative.

Wheel Sensors

NHBR0199S01







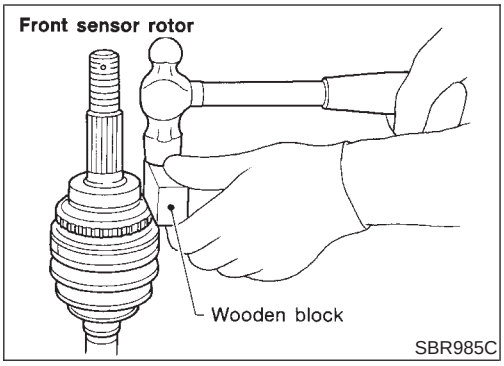
Sensor Rotor

NHBR0199S02

REMOVAL

NHBR0199S0201

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.

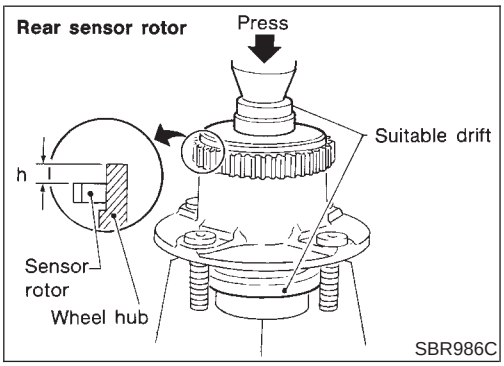


INSTALLATION

NHBR0199S0202

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: 12.5 - 13.5 mm (0.492 - 0.531 in)

General Specifications

NHBR0200

Unit: mm (in)

Front brake	Brake model		CLZ25VD disc brake
	Cylinder bore diameter		57.2 (2.252)
	Pad Length × width × thickness		125.6 × 46 × 9.5 (4.94 × 1.81 × 0.374)
	Rotor outer diameter × thickness		296 × 24 (11.65 × 0.94)
Rear brake	Brake model		CL9HE disc brake
	Cylinder bore diameter		33.96 (1.3370)
	Pad Length × width × thickness		89.1 × 39.5 × 10 (3.508 × 1.555 × 0.39)
	Rotor outer diameter × thickness		278 × 9 (10.94 × 0.35)
Master cylinder	Cylinder bore diameter		23.81 (15/16)
Brake booster	Booster model		M215T
	Diaphragm diameter	Primary	230 (9.06)
		Secondary	205 (8.07)
Recommended brake fluid			DOT 3

Disc Brake

NHBR0201

Unit: mm (in)

Brake model		CLZ25VD	CL9HE
Pad wear limit	Minimum thickness	2.0 (0.079)	1.5 (0.059)
Rotor repair limit	Maximum runout	0.07 (0.0028)	0.07 (0.0028)
	Minimum thickness	22.0 (0.866)	8.0 (0.315)

Brake Pedal

NHBR0202

Unit: mm (in)

Free height “H”*	167 - 174 (6.57 - 6.85)
Clearance “C” between pedal stopper and threaded end of stop lamp switch or ASCD switch	0.74 - 1.96 (0.0291 - 0.0772)

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

Parking Brake

NHBR0203

Control type	Foot lever
Number of notches [under force of 196 N (20 kg, 44 lb)]	4 - 5
Number of notches when warning lamp switch comes on	1

Brake Booster

NHBR0205

Unit: mm (in)

Output rod length	10.275 - 10.525 (0.4045 - 0.4144)
Clevis length (Dimension “A”)	130 (5.12)

ABS Wheel Sensor

NHBR0206

Clearance	Front	0.273 - 0.925 mm (0.0107 - 0.0364 in)
	Rear	0.385 - 0.973 mm (0.0252 - 0.0383 in)

Resistance	Front	A/T	0.8 - 1.85Ω
	Rear	A/T	0.8 - 1.85Ω
Dimension of rear sensor rotor			12.5 - 13.5 mm (0.4921 - 0.5315 in)

NOTES