# SECTION BRAKE CONTROL SYSTEM

А

В

С

D

Ε

# CONTENTS

### ABS

BASIC INSPECTION7
DIAGNOSIS AND REPAIR WORKFLOW
FUNCTION DIAGNOSIS10
ABS10System Diagram10System Description10Component Parts Location12Component Description13CONSULT-III Function (ABS)13
COMPONENT DIAGNOSIS17
C1101, C1102, C1103, C1104 WHEEL SEN- SOR-1
C1105, C1106, C1107, C1108 WHEEL SEN- SOR-2
DTC C1109 BATTERY VOLTAGE [ABNOR- MAL]

DTC Logic29 Diagnosis Procedure29	BR
DTC C1111 PUMP MOTOR	G H
DTC C1114 MAIN RELAY	l
DTC C1115 ABS SENSOR [ABNORMAL SIG- NAL]	K
C1120, C1122, C1124, C1126 IN ABS SOL38 Description	M
C1121, C1123, C1125, C1127 OUT ABS SOL40 Description40 DTC Logic40 Diagnosis Procedure40 Component Inspection41	0
U1000 CAN COMM CIRCUIT42 Description42 DTC Logic42 Diagnosis Procedure42	Ρ
ABS WARNING LAMP43 Description43	

<b>Component Function</b>	Check	43
Diagnosis Procedure		43

BRAKE WARNING LAMP4	4
Description4	4
Component Function Check 4	4
Diagnosis Procedure 4	

ECU DIAGNOSIS ..... 45

# ABS ACTUATOR AND ELECTRIC UNIT

(CONTROL UNIT)	45
Reference Value	
Wiring Diagram - Coupe	47
Wiring Diagram - Sedan	53
Fail-Safe	58
DTC No. Index	59

SYMPTOM DIAGNOSIS ...... 61

ABS	
Symptom Table	

# **EXCESSIVE ABS FUNCTION OPERATION**

FREQUENCY	62
Diagnosis Procedure	62
UNEXPECTED PEDAL REACTION	63
Diagnosis Procedure	63

- THE BRAKING DISTANCE IS LONG ......64 Diagnosis Procedure ......64
- ABS FUNCTION DOES NOT OPERATE .......65 Diagnosis Procedure ......65

# PEDAL VIBRATION OR ABS OPERATION

SOUND OCCURS	
Diagnosis Procedure	

- NORMAL OPERATING CONDITION ......67 Description ......67
- PRECAUTION ..... 68

SENSOR ROTOR	
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	74
BASIC INSPECTION	76
DIAGNOSIS AND REPAIR WORKFLOW	76
FUNCTION DIAGNOSIS	79
TCS       System Diagram         System Description       System Description         Component Parts Location       Secondary         Component Description       Secondary         CONSULT-III Function (ABS)       Secondary	79 79 83 84
COMPONENT DIAGNOSIS	89
C1101, C1102, C1103, C1104 WHEEL SEN- SOR-1	89 89 89 89 91
C1105, C1106, C1107, C1108 WHEEL SEN- SOR-2	94 94 94 96
DTC C1109 BATTERY VOLTAGE [ABNOR- MAL]	99 99
DTC C1110 CONTROL FAILURE	01
DTC C1111 PUMP MOTOR       10         Description       10         DTC Logic       10         Diagnosis Procedure       10         Component Inspection       10	02 02 02

Diagnosis Procedure	104
Component Inspection	105

# DTC C1115 ABS SENSOR [ABNORMAL SIG-

NAL]	
Description	
DTC Logic	
Diagnosis Procedure (Early Production)	
Diagnosis Procedure (Late Production)	107
Component Inspection	109

### 

# C1121, C1123, C1125, C1127 OUT ABS SOL. 112

Description	112
DTC Logic	112
Diagnosis Procedure	
Component Inspection	113

# C1130, C1131, C1132, C1133 ENGINE SIG-

114

U1000 CAN COMM CIRCUIT	115
Description	115
DTC Logic	115
Diagnosis Procedure	115

# ABS WARNING LAMP ......116

Description1	16
Component Function Check 1	16
Diagnosis Procedure1	16

### 

TCS OFF SWITCH	
Description	
Component Function Check	118
Diagnosis Procedure	
Component Inspection	

# ECU DIAGNOSIS ..... 120

# ABS ACTUATOR AND ELECTRIC UNIT

(CONTROL UNIT)	
Reference Value	
Wiring Diagram - Coupe	122
Wiring Diagram - Sedan	129
Fail-Safe	
DTC No. Index	135
SYMPTOM DIAGNOSIS	137

TCS         137           Symptom Table         137	A
EXCESSIVE ABS FUNCTION OPERATION	
FREQUENCY       138         Diagnosis Procedure       138	В
UNEXPECTED PEDAL REACTION	С
THE BRAKING DISTANCE IS LONG	D
ABS FUNCTION DOES NOT OPERATE 141 Diagnosis Procedure	D
PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS	E
VEHICLE JERKS DURING TCS/ABS CON-	BR
<b>TROL</b> 143Diagnosis Procedure143	G
NORMAL OPERATING CONDITION	
PRECAUTION145	Н
PRECAUTIONS	I
SIONER"	J
PREPARATION147	K
PREPARATION147Special Service Tool147Commercial Service Tool147	L
ON-VEHICLE REPAIR 148	
WHEEL SENSORS	Μ
SENSOR ROTOR	Ν
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	0 P
BASIC INSPECTION153	
DIAGNOSIS AND REPAIR WORKFLOW 153 Work Flow	

INSPECTION AND ADJUSTMENT 157	
ADDITIONAL SERVICE WHEN REPLACING	Description 185
CONTROL UNIT	DTC Logic
ADDITIONAL SERVICE WHEN REPLACING	Diagnosis Flocedure
CONTROL UNIT : Description	Component Inspection 186
ADDITIONAL SERVICE WHEN REPLACING	DTC C1115 ABS SENSOR [ABNORMAL SIG-
CONTROL UNIT : Special Repair Requirement 157	NAL]
	Description
ADJUSTMENT OF STEERING ANGLE SENSOR	DTC Logia 197
NEUTRAL POSITION157	Diagnosis Procedure (Early Production)
ADJUSTMENT OF STEERING ANGLE SENSOR	Diagnosis Procedure (Late Production)
NEUTRAL POSITION : Description	Component Inspection
ADJUSTMENT OF STEERING ANGLE SENSOR	Component inspection
NEUTRAL POSITION : Special Repair Require-	DTC C1116 STOP LAMP SW191
ment157	Description 191
	DTC Logia 101
FUNCTION DIAGNOSIS159	Diagnosis Procedure 191
VDC/TCS/ABS 159	Operation of the second s
System Diagram	
System Description	CT120, CT122, CT124, CT120 IN ABS SOL 193
Component Parts Location	Description
Component Description	DIC LOGIC 193
CONSULT-III Function (ABS)	Diagnosis Frocedure 193
	Component Inspection 194
COMPONENT DIAGNOSIS170	C4424 C4422 C4425 C4427 OUT ARE SOL 405
	GT121, GT123, GT123, GT127 OUT ADS SOL. 195
C1101, C1102, C1103, C1104 WHEEL SEN-	Description
SOR-1 170	DTC Logic
Description170	Diagnosis Procedure
DTC Logic	
Diagnosis Procedure (Early Production)	C1130, C1131, C1132, C1133, C1136 EN-
Diagnosis Procedure (Late Production)172	GINE SIGNAL
Component Inspection174	Description
	DTC Logic
C1105, C1106, C1107, C1108 WHEEL SEN-	Diagnosia Brasadura 107
SOR-2 175	Special Popair Poquiroment 107
Description175	
DTC Logic175	
Diagnosis Procedure (Early Production)	
Diagnosis Procedure (Late Production)177	
Component Inspection179	Diagnosis Procedure 199
DTC C1109 BATTERY VOLTAGE [ABNOR-	Component Inspection
_	Special Repair Requirement
MAL]	
Description	
DTC Logic	
Diagnosis Procedure180	5 -
C1110, C1153, C1170 ABS ACTUATOR AND	Diagnosis Procedure
ELECTRIC UNIT (CONTROL UNIT)	Component Inspection
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	
	DTC Logic
DTC C1111 PUMP MOTOR 183	Diagnosis Procedure
Description183	Component Inspection
DTC Logic	
Diagnosis Procedure183	
Component Inspection184	

Description185DTC Logic185Diagnosis Procedure185Component Inspection186	
DTC C1115 ABS SENSOR [ABNORMAL SIG-IAL]187Description187DTC Logic187Diagnosis Procedure (Early Production)187Diagnosis Procedure (Late Production)188Component Inspection190	
DTC C1116 STOP LAMP SW191Description191DTC Logic191Diagnosis Procedure191Component Inspection192	
C1120, C1122, C1124, C1126 IN ABS SOL 193         Description       193         DTC Logic       193         Diagnosis Procedure       193         Component Inspection       194	
C1121, C1123, C1125, C1127 OUT ABS SOL. 195 Description	
C1130, C1131, C1132, C1133, C1136 EN-         GINE SIGNAL       197         Description       197         DTC Logic       197         Diagnosis Procedure       197         Special Repair Requirement       197	
DTC C1142 PRESS SEN CIRCUIT199Description199DTC Logic199Diagnosis Procedure199Component Inspection200Special Repair Requirement200	
C1143, C1144 STEERING ANGLE SENSOR201Description201DTC Logic201Diagnosis Procedure201Component Inspection202Special Repair Requirement202	
C1145, C1146 YAW RATE/SIDE G SENSOR203Description203DTC Logic203Diagnosis Procedure203Component Inspection205Special Repair Requirement205	

# 147, C1148, C1149, C1150 USV/HSV LINE.206

Description DTC Logic Diagnosis Procedure Component Inspection Special Repair Requirement	206 206 207
DTC C1154 PNP POS SIG Description	
DTC Logic	
Diagnosis Procedure	
DTC C1155 BR FLUID LEVEL LOW	.210
Description	210
DTC Logic	
Diagnosis Procedure	
Component Inspection	
Special Repair Requirement	
DTC C1156 ST ANG SEN COM CIR	
Description	
DTC Logic Diagnosis Procedure	
-	
U1000 CAN COMM CIRCUIT	
Description	
DTC Logic	
Diagnosis Procedure	214
PARKING BRAKE SWITCH	215
Description	
Component Function Check	
Diagnosis Procedure	
Component Inspection	
VDC OFF SWITCH	
Description	
Component Function Check	
Diagnosis Procedure Component Inspection	
ABS WARNING LAMP	
Description Component Function Check	
Diagnosis Procedure	
BRAKE WARNING LAMP	
Description	
Component Function Check	
Diagnosis Procedure	
VDC OFF INDICATOR LAMP	221
Description	
Component Function Check	
Diagnosis Procedure	
SLIP INDICATOR LAMP	222
Description	
Component Function Check	
Diagnosis Procedure	
ECU DIAGNOSIS	223

ABS ACTUATOR AND ELECTRIC UNIT	
(CONTROL UNIT)22	
Reference Value	
Wiring Diagram - Coupe	
Wiring Diagram - Sedan23 Fail-Safe24	
DTC No. Index	
SYMPTOM DIAGNOSIS24	47 <sup>C</sup>
VDC/TCS/ABS24	47
Symptom Table	
5 1	D
EXCESSIVE ABS FUNCTION OPERATION	
FREQUENCY	
Diagnosis Procedure24	+8
UNEXPECTED PEDAL REACTION	49
Diagnosis Procedure24	<sup>49</sup> BRC
THE BRAKING DISTANCE IS LONG	50
Diagnosis Procedure	
·	G
ABS FUNCTION DOES NOT OPERATE 2	
Diagnosis Procedure25	51
PEDAL VIBRATION OR ABS OPERATION	Н
SOUND OCCURS	52
Diagnosis Procedure	
VEHICLE JERKS DURING VDC/TCS/ABS	
CONTROL2	
Diagnosia Drosodura	
Diagnosis Procedure28	
Diagnosis Procedure	53 J
PRECAUTION	53 J 54
PRECAUTION	53 J 54
PRECAUTION	53 J 54
PRECAUTION	53 J 54 54 K
PRECAUTION	53 J 54 54 K
PRECAUTION	53 J 54 54 K 54 L
PRECAUTION       24         PRECAUTIONS       24         Precaution for Supplemental Restraint System       24         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       25         SIONER"       25         Precaution for Brake System       25         Precaution for Brake Control       25	53 J 54 54 K 54 L 54 L 54
PRECAUTION	53 J 54 54 K 54 L 54 L 54
PRECAUTION       24         PRECAUTIONS       24         Precaution for Supplemental Restraint System       24         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       25         SIONER"       25         Precaution for Brake System       25         Precaution for Brake Control       25	53 J 54 54 K 54 L 54 L 54 54 M
PRECAUTION       24         PRECAUTIONS       25         Precaution for Supplemental Restraint System       25         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       25         Precaution for Brake System       25         Precaution for Brake Control       25         PREPARATION       25         PREPARATION       25         Special Service Tool       25	53 J 54 K 54 K 54 L 54 L 54 S 56 M 56 N
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       29         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       29         Precaution for Brake System       29         Precaution for Brake Control       29         PREPARATION       29         PREPARATION       29	53 J 54 K 54 K 54 L 54 L 54 S 56 M 56 N
PRECAUTION       24         PRECAUTIONS       25         Precaution for Supplemental Restraint System       25         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       25         Precaution for Brake System       25         Precaution for Brake Control       25         PREPARATION       25         PREPARATION       25         Special Service Tool       25         Commercial Service Tool       25	53 J 54 K 54 L 54 L 54 D 56 M 56 N
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       28         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       26         SIONER"       28         Precaution for Brake System       26         Precaution for Brake Control       25         PREPARATION       25         PREPARATION       25         Special Service Tool       25         ON-VEHICLE REPAIR       25	53 J 54 K 54 K 54 L 54 D 56 M 56 N 56 N 56 N
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       29         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       20         SIONER"       26         Precaution for Brake System       26         Precaution for Brake Control       26         PREPARATION       26         Special Service Tool       26         ON-VEHICLE REPAIR       26         WHEEL SENSORS       26	53 J 54 K 54 L 54 L 56 M 56 N 56 N 57 O
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       28         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       26         SIONER"       28         Precaution for Brake System       26         Precaution for Brake Control       25         PREPARATION       25         PREPARATION       25         Special Service Tool       25         ON-VEHICLE REPAIR       25	53 J 54 K 54 L 54 L 56 M 56 N 56 N 57 O
PRECAUTION       24         PRECAUTIONS       24         Precaution for Supplemental Restraint System       25         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       26         Precaution for Brake System       25         Precaution for Brake Control       25         PREPARATION       25         PREPARATION       25         ON-VEHICLE REPAIR       25         WHEEL SENSORS       25         Removal and Installation       25	53 J 54 K 54 L 54 L 56 M 56 N 57 O 57 O
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       29         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       20         SIONER"       29         Precaution for Brake System       26         Precaution for Brake Control       26         PREPARATION       29         PREPARATION       29         Special Service Tool       26         ON-VEHICLE REPAIR       29         WHEEL SENSORS       29         Removal and Installation       29         SENSOR ROTOR       29	53 J 54 K 54 L 54 L 56 M 56 N 56 N 57 O 57 O 57 O
PRECAUTION       24         PRECAUTIONS       24         Precaution for Supplemental Restraint System       25         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       26         Precaution for Brake System       26         Precaution for Brake Control       26         PREPARATION       26         PREPARATION       26         Special Service Tool       26         Commercial Service Tool       26         ON-VEHICLE REPAIR       26         WHEEL SENSORS       26         Removal and Installation       26         Removal and Installation       26	53 J 54 K 54 L 54 L 56 M 56 N 56 N 57 O 57 O 57 O
PRECAUTION       29         PRECAUTIONS       29         Precaution for Supplemental Restraint System       29         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-       21         SIONER"       29         Precaution for Brake System       26         Precaution for Brake Control       25         Precaution for Brake Control       25         PREPARATION       26         Special Service Tool       25         Commercial Service Tool       25         ON-VEHICLE REPAIR       25         WHEEL SENSORS       26         Removal and Installation       25         ABS ACTUATOR AND ELECTRIC UNIT       26	53 J 54 K 54 L 54 L 56 M 56 N 57 O 57 O 57 O 59 P
PRECAUTION       24         PRECAUTIONS       24         Precaution for Supplemental Restraint System       25         (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-SIONER"       26         Precaution for Brake System       26         Precaution for Brake Control       26         PREPARATION       26         PREPARATION       26         Special Service Tool       26         Commercial Service Tool       26         ON-VEHICLE REPAIR       26         WHEEL SENSORS       26         Removal and Installation       26         Removal and Installation       26	53 J 54 K 54 L 54 L 56 M 56 N 56 N 57 O 57 O 57 P 59 P 59

G SENSOR	STEERING ANGLE SENSOR263
Removal and Installation262	Removal and Installation263

< BASIC INSPECTION >

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

# Work Flow

# DESCRIPTION

**Basic Concept** 

- The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.
- It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

### **CAUTION:**

Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".

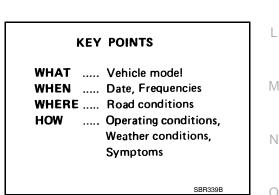
• It is essential to check symptoms right from the beginning in order to repair a malfunction completely.

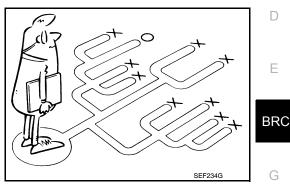
For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.

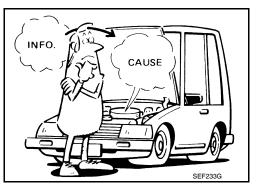
- After diagnostic, make sure to perform "ERASE MEMORY". Refer to <u>BRC-13, "CONSULT-III Function (ABS)"</u>.
- Always read "GI General Information" to confirm general precautions. Refer to <u>BRC-13, "CONSULT-III Function (ABS)"</u>.

### Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.









Revision: February 2010

INFOID:000000004204258

A

В

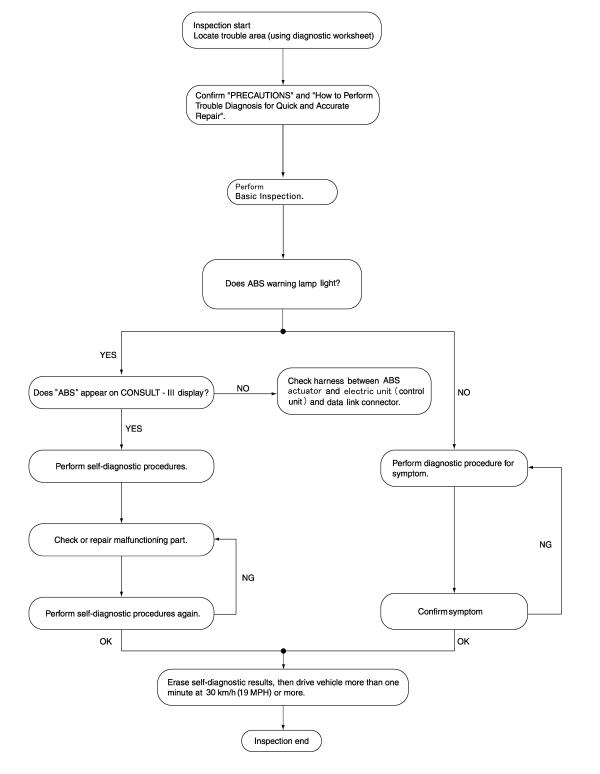
Н

Κ

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

# OVERALL SEQUENCE



WFIA0558E

# DIAGNOSIS AND REPAIR WORKFLOW

# < BASIC INSPECTION >

# **Diagnostic Work Sheet**

INFOID:000000004204259

[ABS]

А

В

С

D

Ε

BRC

G

Н

Customer name MR/MS	Model & Year Trans.		VIN Mileage		
Engine #					
Incident Date	Manuf. Date		In Service Date	9	
Symptoms	<ul> <li>Noise and vibration (from engine compartment)</li> <li>Noise and vibration (from axle)</li> </ul>	Uarning / Indicator activate		<ul> <li>Firm pedal operation</li> <li>Large stroke pedal</li> <li>operation</li> </ul>	
	□ ABS does not work (Wheels lock when braking)	<ul> <li>ABS does not work (wheels slip when braking)</li> </ul>		Lack of sense of acceleration	
Engine conditions	□ When starting □ After starting				
Road conditions	Low friction road ( Snow Gravel Other )     Bumps / potholes				
Driving conditions	<ul> <li>□ Full-acceleration</li> <li>□ High speed cornering</li> <li>□ Vehicle speed: Greater than 10 km/h (6 MPH)</li> <li>□ Vehicle speed: 10 km/h (6 MPH) or less</li> <li>□ Vehicle is stopped</li> </ul>				
Applying brake conditions	Suddenly     Gradually				
Other conditions	Operation of electrical equipment     Shift change     Other descriptions				

LFIA0176E

J

Κ

L

Μ

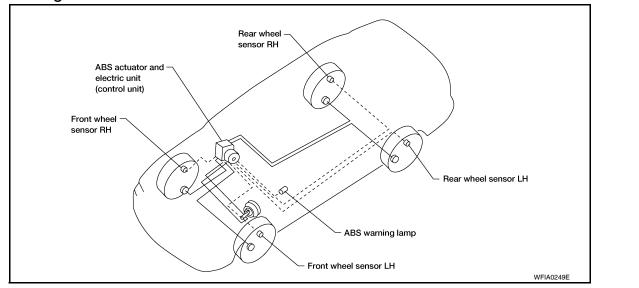
Ν

Ο

Ρ

# FUNCTION DIAGNOSIS

System Diagram



ABS

# System Description

INFOID:000000004204261

[ABS]

INFOID:000000004204260

# ABS SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON and the condition of the vehicle will be fail-safe which is the same condition of vehicles without ABS system.

### NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

# CAUTION:

# If the Fail-Safe function is activated, then perform self-diagnosis for ABS control system.

### PURPOSE

The Anti-lock Brake System (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:

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

# OPERATION

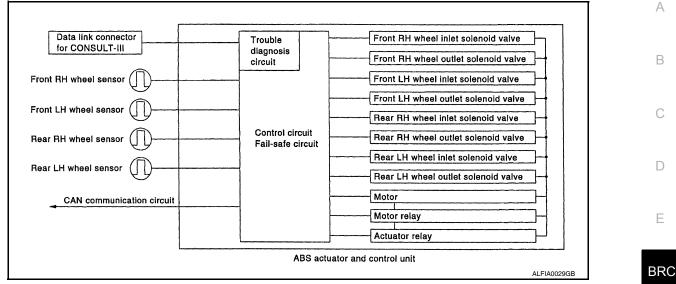
- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds after turning the ignition switch ON. The system performs another test the first time the vehicle reaches 6 km/h (4 MPH). A mechanical noise may be heard a sthe 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.
- Dyring ABS operation, a mechanical noise may be heard. This is a normal condition.

### FAIL SAFE

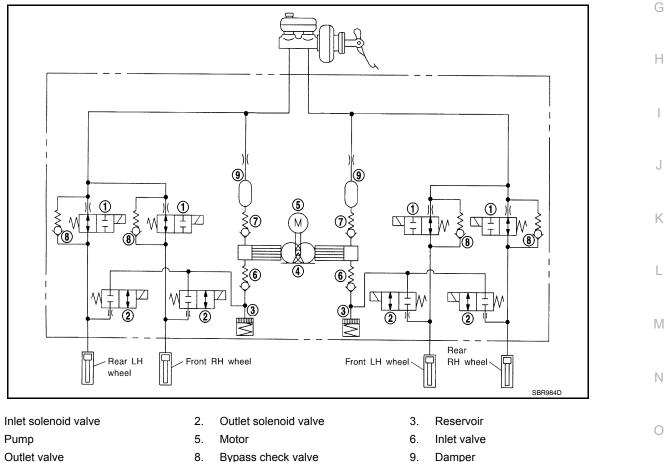
If trouble occurs in the ABS, the ABS warning lamp in the combination meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

# < FUNCTION DIAGNOSIS >

# ELECTRICAL COMPONENTS



# HYDRAULIC CIRCUIT DIAGRAM



- 4.
- 7. Outlet valve

- Bypass check valve
- 9. Damper

[ABS]

Ρ

# **OPERATION THAT IS NOT "SYSTEM ERROR"**

# ABS

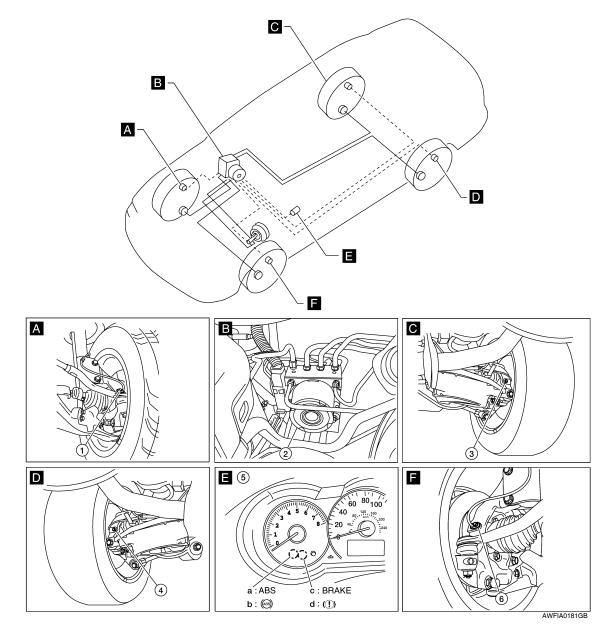
1.

- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating sound may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

# **BRC-11**

**Component Parts Location** 

INFOID:000000004204262



- 1. Front wheel sensor RH E41
- 4. Rear wheel sensor LH B43
- 2. ABS actuator and electric unit (control 3. unit) E26
- 5. Combination meter M24
  - a. US models
  - b. Canada models
  - c. US models
  - d. Canada models

- Rear wheel sensor RH B43
- 6. Front wheel sensor LH E19

# < FUNCTION DIAGNOSIS >

# Component Description

INFOID:000000004204263

[ABS]

		Λ
	- 1	-

BRC

Κ

L

Ο

Component parts		Reference
	Pump	DDC 20 "Decerimtion"
ADC activator and alastria unit (control unit)	Motor	BRC-30, "Description"
ABS actuator and electric unit (control unit)	Actuator relay (Main relay)	BRC-32, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor	BRC-17, "Description"	
ABS warning lamp	BRC-43, "Description"	
Brake warning lamp	BRC-44, "Description"	

ABS

# CONSULT-III Function (ABS)

INFOID:000000004204264

# FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU part number	ABS actuator and electric unit (control unit) part number can be read.
Function test	Performed by CONSULT-III instead of a technician to determine whether each system is "OK" or "NG".
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

# SELF-DIAGNOSIS RESULTS

**Operation Procedure** 

- 1. Turn ignition switch OFF.
- 2. Connect CONSULT-III to data link connector.
- 3. Turn ignition switch ON.
- 4. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- 5. After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the CONSULT-III screen.
- 6. The self-diagnostic results are displayed.
  - Check ABS warning lamp. If "NO FAILURE" is displayed. Refer to <u>BRC-43, "Component Function</u> <u>Check"</u>.
- 7. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component. Refer to "Display Item List".
- 8. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute. CAUTION:

When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle P is driven at approximately 30 km/h (19 MPH) or more for approximately 1 minute.

### Erase Memory

- 1. Turn ignition switch OFF.
- Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory. If "ABS" is not indicated, go to <u>GI-51, "CONSULT-III Data Link Connector (DLC) Circuit"</u>.

### **CAUTION:** If the diagnostic memory is not erased, re-perform the operation from step 4.

3. Perform self-diagnosis again, and make sure that diagnostic memory is erased.

4. Drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp and brake warning lamp turn OFF.

# NOTE:

Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

### **Display Item List**

Display item	Malfunction detecting condition	Check item	
RR RH SENSOR-1 [C1101] <sup>*1</sup>	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-17, "Diagno-	
RR LH SENSOR-1 [C1102] <sup>*1</sup>	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	sis Procedure (Ear- ly Production)" or BRC-19, "Diagno- sis Procedure (Late Production)" (Note 1)	
FR RH SENSOR-1 [C1103] <sup>*1</sup>	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.		
FR LH SENSOR-1 [C1104] <sup>*1</sup>	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.		
RR RH SENSOR-2 [C1105] <sup>*1</sup>	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		
RR LH SENSOR-2 [C1106] <sup>*1</sup>	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-22, "Diagno- sis Procedure (Ear- ly Production)" or	
FR RH SENSOR-2 [C1107] <sup>*1</sup>	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-24, "Diagno- sis Procedure (Late Production)" (Note 1)	
FR LH SENSOR- 2 [C1108] <sup>*1</sup>	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		
BATTERY VOLTAGE [ABNORMAL] [C1109]	[ABNORMAL] When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal		
CONTROLLER FAILURE [C1110] <sup>*2</sup>	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-29, "Diagno- sis Procedure"	
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-30, "Diagno-	
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"	
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-32, "Diagno-	
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"	
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-34, "Diagno- sis Procedure (Ear- ly Production)" or BRC-35, "Diagno- sis Procedure (Late Production)" (Note 1)	
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"	
FR LH OUT ABS SOL [C1121]	When the control unit detects a maltunction in the front left outlet solehold circuit		

# < FUNCTION DIAGNOSIS >

FUNCTION DIAGNOSIS > [, 100]						
Display item	Malfunction detecting condition	Check item				
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"				
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"				
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"				
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"				
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"				
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"				
CAN COMM CIRCUIT [U1000] <sup>*3</sup>	When there is a malfunction in the CAN communication circuit.	BRC-42, "Diagno- sis Procedure"				

\*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp turns off when driving the vehicle over 30 km/h (19 MPH) for approximately 1 minute in accordance with SELF-DIAGNOSIS PROCEDURE.

\*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then, check the ABS actuator and electric unit (control unit) and circuit.

\*3: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communiation circuit first. Refer to <u>BRC-42, "Diagnosis Procedure"</u>.

### DATA MONITOR

Display Item List

### **CAUTION:**

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

ltem	Data	a monitor item sele	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor sig- nal is displayed.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (con- trol unit) is displayed.
FR RH IN SOL (ON/OFF)	_	×	×	Front RH IN ABS solenoid (ON/OFF) status is displayed.
FR RH OUT SOL (ON/OFF)	_	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
FR LH IN SOL (ON/OFF)	_	×	×	Front LH IN ABS solenoid (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	_	×	×	Front LH OUT ABS solenoid (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	_	×	×	Rear RH IN ABS solenoid (ON/OFF) status is displayed.

[ABS]

Н

RR RH OUT SOL (ON/OFF)	—	×	×	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	_	×	× Rear LH IN ABS solenoid (ON/OFF) status is dis- played.	
RR LH OUT SOL (ON/OFF)	—	×	×	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	—	×	×	ABS motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	_	×	×	ABS actuator relay signal (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	—	×	×	ABS warning lamp (ON/OFF) status is displayed.

### ×: Applicable

-: Not applicable

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

### ACTIVE TEST

### **CAUTION:**

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp and brake warning lamp are ON.
- ABS warning lamp and brake warning lamp are ON during active test.

### Operation Procedure

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch "BACK" to restart the process.

### Solenoid Valve

### NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below. • When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addi-

- tion, when performing an active test of the TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "UP", "KEEP", and "DOWN" on the display screen. For ABS solenoid valve (ACT), touch "UP", "ACT UP", "ACT KEEP" and confirm that solenoid valves (IN, OUT) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

 $^{\ast:}$  ON for 1 to 2 seconds after the touch, and then OFF

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

### ABS Motor

Touch "ON" and "OFF" on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

# < COMPONENT DIAGNOSIS >

# COMPONENT DIAGNOSIS C1101, C1102, C1103, C1104 WHEEL SENSOR-1

# Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204266

INFOID:000000004204265

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.		Е
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>	BRC
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.		G
DTC CC	NFIRMATION PROCE	DURE		
1.снес	CK SELF-DIAGNOSIS RE	SULTS		Η
Check th	e self-diagnosis results.			
	Self-diagnosis	results		I
	RR RH SENS	OR-1		
	RR LH SENS	OR-1		J
	FR RH SENS	OR-1		
	FR LH SENS	OR-1		K
ls above	displayed on the self-diag	nosis display?		1 1
YES		procedure. Refer to <u>BRC-17, "Diagnosis Proce</u>	dure (Early Production)" or	
NO	<u>BRC-19, "Diagnosis P</u> >> Inspection End.	rocedure (Late Production)".		L
	sis Procedure (Early	Production)	INFOID:00000004204267	
C			INFOID.00000004204267	M
CAUTIO		acer terminale		
	heck between wheel sei	isor terminais.		
	CK CONNECTOR			Ν
		onnect ABS actuator and electric unit (control un or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and		
		, loose, etc., Repair or replace it if any malfuncti		0
	spection result normal?			
YES	>> GO TO 2			
~	>> Repair or replace as n	•		Ρ
2.CHEC	CK WHEEL SENSOR OUT	IPUT SIGNAL		
2. Con	nect ABS active wheel ser on the ABS active wheel	heel sensor of malfunction code No. nsor tester (J-45741) to wheel sensor using app sensor tester power switch.	ropriate adapter.	



[ABS]

А

В

С

D

### < COMPONENT DIAGNOSIS >

[ABS]

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

- YES >> GO TO 3
- NO >> Replace wheel sensor. Refer to <u>BRC-71, "Removal and Installation"</u>.

**3.**CHECK TIRE

Check air pressure, wear and size.

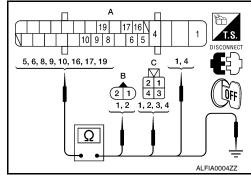
Are air pressure, wear and size within standard?

- YES >> GO TO 4 NO >> • Adjust a
  - >> Adjust air pressure, or replace tire.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6</u>, "Inspection" (front) or <u>RAX-6</u>, "On-vehicle Service" (rear). Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).
- **5.**CHECK WHEEL SENSOR HARNESS
- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground	
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground	
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground	
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground	
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground	

# Power supply circuit

- : Continuity should exist.
- : Continuity should exist.
- Signal circuit Ground circuit
- : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

# < COMPONENT DIAGNOSIS >

[ABS]

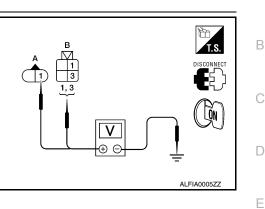
А

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6. Check wheel sensor power supply circuit

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage	
Front RH (A)				
Front LH (A)	1		8 V or more	
Rear LH (B)		_	8 V 01 1101e	
Rear RH (B)	3			



# Is the inspection result normal?

NO	>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74, "Removal and Installa-</u> tion".	Bł
Diagn	osis Procedure (Late Production)	
CAUTI	• • • •	(
	check between wheel sensor terminals. INECTOR INSPECTION	
2. Dis	n ignition switch OFF. connect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors. eck terminals for deformation, disconnection, looseness or damage.	
	ispection result normal?	
YES NO	>> GO TO 2 >> Repair or replace as necessary.	
-	CK WHEEL SENSOR OUTPUT SIGNAL	
2. Co 3. Tur	connect connectors from wheel sensor of malfunction code No. nnect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter. n on the ABS active wheel sensor tester power switch. TE:	
The bat 4. Spi	e green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the tery in the ABS active wheel sensor tester before proceeding. In the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel as tester. The red SENSOR indicator should flash on and off to indicate an output signal.	
rete	ne red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and est.	
	e ABS active wheel sensor tester detect a signal?	
YES	>> GO TO 3	
NO	>> Replace wheel sensor. Refer to <u>BRC-71, "Removal and Installation"</u> .	
3.CHE	CK TIRE	
Check a	air pressure, wear and size.	
<u>Is the ir</u>	nspection result normal?	
YES NO	<ul> <li>&gt;&gt; GO TO 4</li> <li>&gt;&gt; • Adjust air pressure, or replace tire.</li> <li>• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".</li> </ul>	

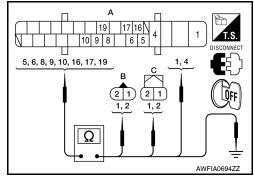
Is the inspection result normal?

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front) or RAX-7, "Removal and Installation" (rear).

5. CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and mal-2. functioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal	Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground	
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground	
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground	
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground	
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground	

Power supply circuit

# : Continuity should exist.

- Signal circuit
- : Continuity should exist.
- **Ground circuit**
- : Continuity should not exist.
- Is the inspection result normal?

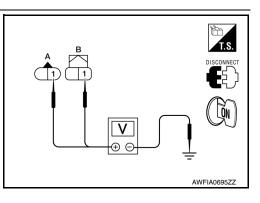
YES >> GO TO 6 NO

- >> Repair or replace malfunctioning components.
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	
Rear RH (B)	*		



Is the inspection result normal?

- YES >> Inspection End.
- >> Replace ABS actuator and electric unit (control unit). Refer to BRC-74, "Removal and Installa-NO tion".

# < COMPONENT DIAGNOSIS > Component Inspection

INFOID:000000004204268

[ABS]

А

В

# 1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SENSOR", and check the vehicle speed.

	Wheel sensor	Vehicle speed (DATA MONITOR)	C
	FR LH SENSOR	Nearly matches the speedometer display ( $\pm 10\%$ or less)	
	FR RH SENSOR		
	RR LH SENSOR		
	RR RH SENSOR		
Is the ir	nspection result normal?		F
YES	>> Inspection End		
NO		edure. Refer to <u>BRC-17, "Diagnosis Procedure (Early Production)"</u> or <u>BRC-</u>	
	<u>19, "Diagnosis Procec</u>	lure (Late Production)".	BRC
			BRC

G

Н

J

Κ

L

Μ

Ν

Ο

Ρ

# < COMPONENT DIAGNOSIS >

# C1105, C1106, C1107, C1108 WHEEL SENSOR-2

# Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204270

INFOID:000000004204269

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1108	FR LH SENSOR-2	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	

# DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-22</u>, "<u>Diagnosis Procedure (Early Production)</u>" or <u>BRC-24</u>, "<u>Diagnosis Procedure (Late Production)</u>".

NO >> Inspection End.

Diagnosis Procedure (Early Production)

### CAUTION:

Do not check between wheel sensor terminals.

**1.**CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connectors from wheel sensor of malfunction code No.

- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

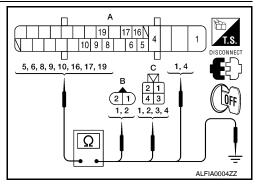
### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

INFOID:0000000005923384

< COMPONENT DIAGNOSIS > [ABS	]
4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active when sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads an retest.	
Does the ABS active wheel sensor tester detect a signal?	
YES >> GO TO 3 NO >> Replace wheel sensor. Refer to <u>BRC-71, "Removal and Installation"</u> .	
3. CHECK TIRE	
Check air pressure, wear and size.	_
Are air pressure, wear and size within standard?	
YES >> GO TO 4	
<ul> <li>NO &gt;&gt; • Adjust air pressure, or replace tire.</li> <li>• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".</li> </ul>	
4.CHECK WHEEL BEARINGS	F
Check wheel bearing axial end play. Refer to FAX-6, "Inspection" (front) or RAX-6, "On-vehicle Service" (rear)	).
Is the inspection result normal?	
YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-7</u> <u>"Removal and Installation"</u> (rear).	<u>7.</u>
5. CHECK WHEEL SENSOR HARNESS	

- 1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



А

В

D

Ε

BRC

Н

J

Κ

Ρ

	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

**Power supply circuit** Signal circuit **Ground circuit** 

### : Continuity should exist.

: Continuity should exist.

: Continuity should not exist.

# Is the inspection result normal?

YES >> GO TO 6

- NO >> • Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **BRC-23**

# < COMPONENT DIAGNOSIS >

# **6.**CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 v or more
Rear RH (B)	3		

# 

### Is the inspection result normal?

YES >> Inspection end.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74</u>, "<u>Removal and Installa-</u> tion".

# **Diagnosis Procedure (Late Production)**

### **CAUTION:**

### Do not check between wheel sensor terminals.

# **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check terminals for deformation, disconnection, looseness or damage.

### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

 Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
 NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

### Does the ABS active wheel sensor tester detect a signal?

- YES >> GO TO 3
- NO >> Replace wheel sensor. Refer to <u>BRC-71, "Removal and Installation"</u>.

# **3.**CHECK TIRE

Check air pressure, wear and size.

# Is the inspection result normal?

YES >> GO TO 4 NO >> • Adjust a

- >> Adjust air pressure, or replace tire.
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6, "Inspection"</u> (front) or <u>RAX-6, "On-vehicle Service"</u> (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

# **BRC-24**

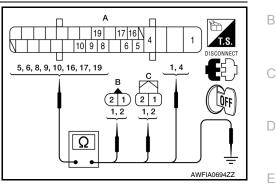
INFOID:000000005923385

# < COMPONENT DIAGNOSIS >

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# **5.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	Ground circuit		BRC	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground	G	
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground	-	
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground	Н	
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground	-	
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground		

Power supply circuit Signal circuit Ground circuit

- : Continuity should exist.
- : Continuity should exist.
- : Continuity should not exist.

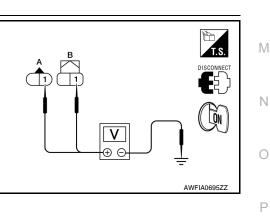
Is the inspection result normal?

- YES >> GO TO 6 NO >> • Repair of
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V 01 11016
Rear RH (B)			



Is the inspection result normal?

YES >> Inspection End.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74. "Removal and Installa-</u> tion".

[ABS]

А

Κ

L

< COMPONENT DIAGNOSIS >

Component Inspection

INFOID:000000005923386

[ABS]

# 1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SENSOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer dis-
RR LH SENSOR	play (±10% or less)
RR RH SENSOR	

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-22</u>, "<u>Diagnosis Procedure (Early Production</u>)" or <u>BRC-24</u>, "<u>Diagnosis Procedure (Late Production</u>)".

### [ABS] < COMPONENT DIAGNOSIS > DTC C1109 BATTERY VOLTAGE [ABNORMAL] А Description INFOID:000000004204273 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000004204274 DTC DETECTION LOGIC DTC Display item Malfunction detected condition Possible cause D Harness or connector BATTERY VOLTAGE When the ABS actuator and electric unit (control unit) C1109 ABS actuator and electric unit [ABNORMAL] power supply voltage is lower than normal. (control unit) Е DTC CONFIRMATION PROCEDURE 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. BRC Self-diagnosis results BATTERY VOLTAGE [ABNORMAL] Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-27, "Diagnosis Procedure"</u>. Н >> INSPECTION END NO **Diagnosis** Procedure INFOID:000000004204275 INSPECTION PROCEDURE **1.**CHECK CONNECTOR 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal. Κ 2. Reconnect connector and perform self-diagnosis. Is the inspection result normal? >> INSPECTION END YES NO >> GO TO 2 2.check abs actuator and electric unit (control unit) power supply circuit and **GROUND CIRCUIT** Μ Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26. 1. Check voltage between ABS actuator and electric unit (control 2. unit) harness connector E26 terminal 18 and ground. Ν Ο ÔN Ρ ALFIA0006ZZ

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

# < COMPONENT DIAGNOSIS >

[ABS]

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
18		Ignition switch ON	Battery voltage (Approx. 12 V)
10	_	Ignition switch OFF	Approx. 0 V

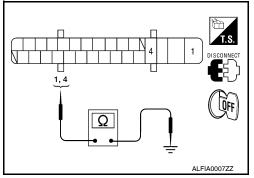
- 3. Turn ignition switch OFF.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

# Is the inspection result normal?

NO

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



# **DTC C1110 CONTROL FAILURE**

# < COMPONENT DIAGNOSIS >

# DTC C1110 CONTROL FAILURE

# DTC Logic

[ABS]

# INFOID:000000004204276

А

### DTC DETECTION LOGIC В DTC Display item Malfunction detected condition Possible cause When there is an internal malfunction in the ABS actuator · ABS actuator and electric unit C1110 CONTROLLER FAILURE and electric unit (control unit). (control unit) DTC CONFIRMATION PROCEDURE D 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. Е Self-diagnosis results CONTROLLER FAILURE BRC Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-29, "Diagnosis Procedure"</u>. >> INSPECTION END NO **Diagnosis** Procedure INFOID:000000004204277 INSPECTION PROCEDURE Н **1.**REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) CAUTION: Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than that applicable. J >> Replace ABS actuator and electric unit (control unit). Refer to BRC-74, "Removal and Installation". Κ L

Μ

N

 $\sim$ 

Ρ

# DTC C1111 PUMP MOTOR

< COMPONENT DIAGNOSIS >

# DTC C1111 PUMP MOTOR

# Description

INFOID:000000004204278

[ABS]

# PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

### MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204279

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for ac- tuator motor relay is open.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>
CIIII		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)

# DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-30, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

# **Diagnosis** Procedure

INFOID:000000004204280

# INSPECTION PROCEDURE

# 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

# DTC C1111 PUMP MOTOR

### < COMPONENT DIAGNOSIS >

 Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **3.** CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **Component Inspection**

# **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

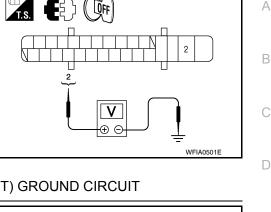
### NOTE:

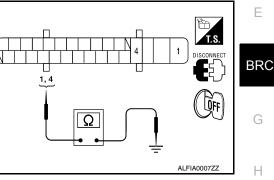
A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-30, "Diagnosis Procedure"</u>.





Κ

L

Ν

Ο

Ρ

[ABS]

# DTC C1114 MAIN RELAY

# Description

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204283

INFOID:000000004204284

INFOID:000000004204282

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1114 MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

MAIN RELAY

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-32, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

# INSPECTION PROCEDURE

1.CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

# Is the inspection result normal?

YES >> Inspection end.

# 2. CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

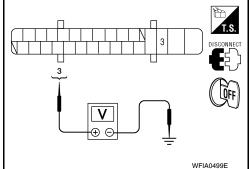
ABS actuator and electric unit (control unit)	Ground	Voltage
3	—	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



# **DTC C1114 MAIN RELAY**

### < COMPONENT DIAGNOSIS >

# $\overline{\mathbf{3.}}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1.4		Yes

Is the inspection result normal?

- YES >> • Replace ABS actuator and electric unit (control unit). Refer to BRC-74, "Removal and Installation". · Perform the self-diagnosis, and make sure that the
  - result shows "NO DTC IS DETECTED".
- NO >> • Repair or replace malfunctioning components. Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# Component Inspection

# 1. CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table 2. below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

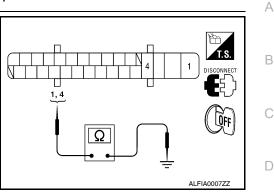
### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-32, "Diagnosis Procedure".



Е

BRC

Н

Κ

L

Μ

Ν

Ρ

INFOID:000000004204285

[ABS]

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

# < COMPONENT DIAGNOSIS >

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

# Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204287

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When wheel sensor input signal is malfunctioning.	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-34</u>, "<u>Diagnosis Procedure (Early Production)</u>" or <u>BRC-35</u>, "<u>Diagnosis Procedure (Late Production)</u>".

NO >> Inspection end.

Diagnosis Procedure (Early Production)

# **CAUTION:**

# Do not check between wheel sensor terminals.

**1.**CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2

- NO >> Adjust air pressure, or replace tire.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 2. CHECK SENSOR AND SENSOR ROTOR

Check sensor rotor for damage.

Check wheel sensor for damage, disconnection or looseness.

### Is the inspection result normal?

YES >> GO TO 3

- NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
- Reconnect connectors and the perform the self-diagnosis. Refer to <u>BRC-13</u>, "CONSULT-III Function (<u>ABS</u>)".

### Is the inspection result normal?

YES >> Inspection end.

INFOID:000000005923387

INFOID:000000004204286

[ABS]

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

< COMPONENT DIAGNOSIS >

[ABS]

А

В

D

Е

Κ

L

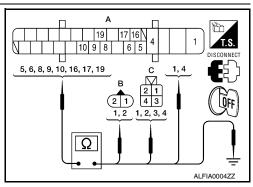
Μ

Ρ

### NO >> GO TO 4

**4.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit Signal circuit

- : Continuity should exist. : Continuity should exist.
- Ground circuit
- : Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 5 NO
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 5.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Replace wheel sensor that resulted in malfunction by self-diagnosis.
- 2. Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then perform self-diagnosis.

# Is above displayed on the self-diagnosis display?

- YES >> Inspection end.
- NO >> • Replace ABS actuator and electric unit (control unit). Refer to BRC-74, "Removal and Installa-Ν tion".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# Diagnosis Procedure (Late Production)

# CAUTION:

# Do not check between wheel sensor terminals.

# **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors. 2.
- Check terminals for deformation, disconnection, looseness or damage. 3.

# Is the inspection result normal?

NO >> Repair or replace as necessary. INFOID:000000005923414

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

# < COMPONENT DIAGNOSIS >

[ABS]

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

### Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace wheel sensor. Refer to <u>BRC-71, "Removal and Installation"</u>.

3.CHECK TIRE

Check air pressure, wear and size.

Is the inspection result normal?

- YES >> GO TO 4 NO >> • Adjust a
  - >> Adjust air pressure, or replace tire.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **4.**CHECK WHEEL BEARINGS

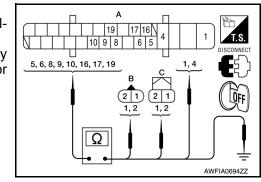
Check wheel bearing axial end play. Refer to <u>FAX-6, "Inspection"</u> (front) or <u>RAX-6, "On-vehicle Service"</u> (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

**5.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

< COMPONEN		15 ABS SEN	SOR [ABNOR	MAL SIGNAL] [ABS]	
Signal ci		: Continuity sho : Continuity sho	ould exist.		A
Ground Is the inspection YES >> GO	result normal?	: Continuity sho	ould not exist.		В
NO >>• Re • Pe	epair or replace m	ignosis, and mak	e sure that the resu	ult shows "NO DTC IS DETECTED".	С
tor. 2. Turn ignition		l electric unit (cor	ntrol unit) connec-	B T.S.	D
<ol> <li>Check betward ground.</li> </ol>	een wheel senso	r connector pow	er supply terminal		E
Wheel	Wheel sensor	Ground	Voltage		BR
Front RH (A)	-				
Front LH (A)	- 1	_	8 V or more	-	G
Rear LH (B) Rear RH (B)	_			AWFIA0695ZZ	G
Is the inspection YES >> Insp	ection End. lace ABS actuate	or and electric ur	nit (control unit). R	efer to <u>BRC-74, "Removal and Installa-</u>	Н
Component I	nspection			INFOID:00000005923415	I
1.CHECK DATA	A MONITOR				J

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SENSOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer dis-
RR LH SENSOR	play (±10% or less)
RR RH SENSOR	

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-22</u>, "<u>Diagnosis Procedure (Early Production)</u>" or <u>BRC-</u> N 24, "<u>Diagnosis Procedure (Late Production)</u>".

0

Ρ

### Revision: February 2010

#### < COMPONENT DIAGNOSIS >

### C1120, C1122, C1124, C1126 IN ABS SOL

### Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

### DTC Logic

INFOID:000000004204291

INFOID:000000004204290

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1120	FR LH IN ABS SOL	When the control unit detects a malfunction in the front LH inlet solenoid circuit.	
C1122	FR RH IN ABS SOLWhen the control unit detects a malfunction in the front RH inlet solenoid circuit.		ABS actuator and electric unit
C1124	RR LH IN ABS SOL	LH IN ABS SOL When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR RH IN ABS SOL
RR LH IN ABS SOL
RR RH IN ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-38</u>, "Diagnosis Procedure".

NO >> Inspection end.

#### **Diagnosis** Procedure

INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

INFOID:000000004204292

#### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

### $\mathbf{3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4		Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**



- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

#### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve			L
Operation (Note)	UP	KEEP	DOWN	
FR RH IN SOL	OFF	ON	ON	M
FR RH OUT SOL	OFF	OFF	ON*	

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

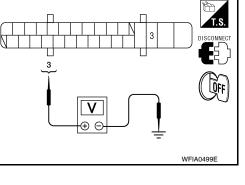
#### NOTE:

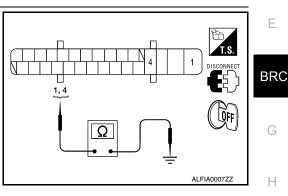
A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-38. "Diagnosis Procedure"</u>.





[ABS]

А

В

D

Κ

Ρ

### C1121, C1123, C1125, C1127 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

### C1121, C1123, C1125, C1127 OUT ABS SOL

### Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

### DTC Logic

INFOID:000000004204295

INFOID:000000004204294

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1121	FR LH OUT ABS SOL	When the control unit detects a malfunction in the front LH outlet solenoid circuit.	ABS actuator and electric unit
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	(control unit)
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

### DTC CONFIRMATION PROCEDURE

### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH OUT ABS SOL
FR RH OUT ABS SOL
RR LH OUT ABS SOL
RR RH OUT ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u>.

NO >> Inspection end.

#### **Diagnosis** Procedure

INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

INFOID:000000004204296

### C1121, C1123, C1125, C1127 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

### $\mathbf{3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**



- 1. Select each test menu item on "ACTIVE TEST".
- On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

#### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve			L
Operation (Note)	UP	KEEP	DOWN	
FR RH IN SOL	OFF	ON	ON	M
FR RH OUT SOL	OFF	OFF	ON*	_

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

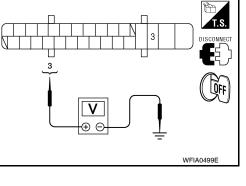
#### NOTE:

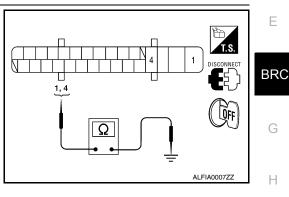
A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

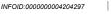
#### Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-40. "Diagnosis Procedure"</u>.







[ABS]

А

В

D

Κ

Ν

0

Р

### U1000 CAN COMM CIRCUIT

### Description

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.

### DTC Logic

INFOID:000000004204299

INFOID:000000004204300

INFOID:000000004204298

[ABS]

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	<ul> <li>CAN communication line</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

### 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Refer to <u>GI-50, "Description"</u>.

NO >> Inspection end.

### **ABS WARNING LAMP**

### < COMPONENT DIAGNOSIS >

## ABS WARNING LAMP

# Description

INFOID:000000004204301

[ABS]

А

Condition	APS warning lamp
Ignition switch OFF	ABS warning lamp
For 2 seconds after turning ON ignition switch	
2 seconds later after turning ON ignition switch	×
	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFOID:000000004204302
CHECK ABS WARNING LAMP OPERATION	
Check that the lamp illuminates for approximately 2 s	aconds after the ignition switch is turned ON
s the inspection result normal?	econds after the ignition switch is turned ON.
YES >> Inspection End	•
NO >> Go to diagnosis procedure. Refer to <u>BRC</u>	C-43, "Diagnosis Procedure".
Diagnosis Procedure	INFOID:000000004204303
CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) are applied as a set of the elect	self-diagnosis. Refer to <u>BRC-13, "CONSULT-III Function</u>
s the inspection result normal?	
YES >> GO TO 2	
NO >> Check items displayed by self-diagnosis.	
2. CHECK COMBINATION METER	
Check if the indication and operation of combination r	meter are normal. Refer to MWI-4. "Work Flow".
s the inspection result normal?	
•	(control unit). Refer to BRC-74, "Removal and Installa-
tion".	
NO >> Repair or replace combination meter. Ref	fer to <u>MWI-179, "Removal and Installation"</u> .

Ν

0

Ρ

### **BRAKE WARNING LAMP**

#### < COMPONENT DIAGNOSIS >

### BRAKE WARNING LAMP

### Description

INFOID:000000004204304

×: ON –: OFF

[ABS]

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
Ignition switch ON	× (Note 2)
EBD function is malfunctioning.	×

#### NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

### **Component Function Check**

INFOID:000000004204305

### **1.**BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates after the ignition switch is turned ON, and turns OFF after the engine is started.

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <u>BRC-44. "Diagnosis Procedure"</u>.

### **2.**BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> Inspection End

NO >> Check parking brake switch. Refer to <u>BRC-215, "Diagnosis Procedure"</u>.

#### **Diagnosis** Procedure

INFOID:000000004204306

#### 1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake lever (M/T models) or the parking brake pedal (CVT models).

Is the inspection result normal?

YES >> GO TO 2

NO >> Check parking brake switch. Refer to <u>BRC-215, "Diagnosis Procedure"</u>.

2.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-13</u>, "<u>CONSULT-III Function</u> (<u>ABS</u>)".

Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-4</u>, "Work Flow". Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace combination meter. Refer to <u>MWI-179</u>, "Removal and Installation".

< ECU DIAGNOSIS >

# ECU DIAGNOSIS

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004204307 B

### VALUES ON THE DIAGNOSIS TOOL

#### **CAUTION:**

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation	_	
FR LH SENSOR		0 [km/h]	Vehicle stopped	E	
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10 % or less)	Vehicle running (Note 1)	BR	
STOP LAMP SW	Brake pedal operation	When brake pedal is de- pressed	ON		
STOP LAWF SW		When brake pedal is not depressed	OFF	G	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	Н	
SLCT LVR POSI	CVT shift position	P position R position N position D position	P R N D		
	Darking brake quitab	Parking brake switch is ON active			
PARK BRAKE SW	Parking brake switch	Parking brake switch is inactive	OFF	0	
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or ac- tuator relay is inactive (in fail-safe mode)	ON	K	
RR LH IN SOL RR LH OUT SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF	M	
		When the motor relay and motor are operating	ON	- N	
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are not operat- ing	OFF		
ACTUATOR RLY		When the actuator relay is operating	ON	0	
(Note 2)	Actuator relay operation	When the actuator relay is not operating	OFF	P	
	ABS warning lamp	When ABS warning lamp is ON	ON	-	
ABS WARN LAMP	(Note 3)	When ABS warning lamp is OFF	OFF	-	
	ABS operation	ABS is active	ON		
ABS SIGNAL	ABS operation	ABS is inactive	OFF	-	

А

С

#### < ECU DIAGNOSIS >

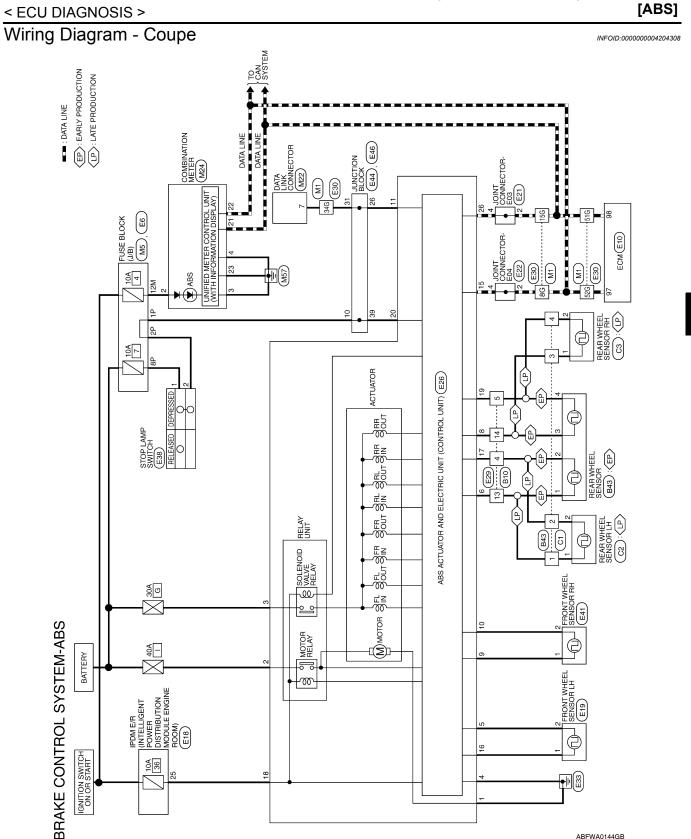
Monitor item		Data mo	onitor	
Monitor item	Display content	Condition	Reference value in normal operation	
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON	
ADS I AIL SIG		ABS is normal	OFF	

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Note 3: On and off timing for warning lamp and indicator lamp. Refer to BRC-13, "CONSULT-III Function (ABS)".

< ECU DIAGNOSIS >



ABFWA0144GB

А

В

С

D

Ε

BRC

Н

J

Κ

L

Μ

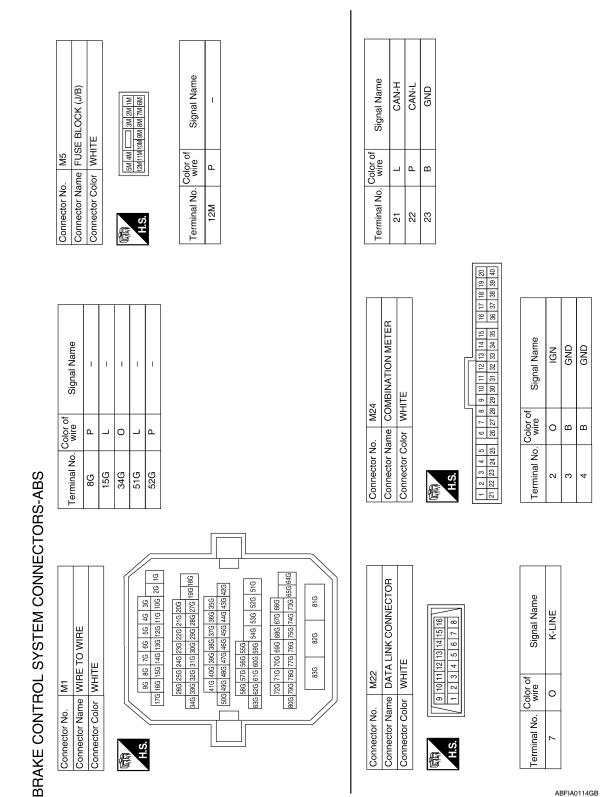
Ν

Ο

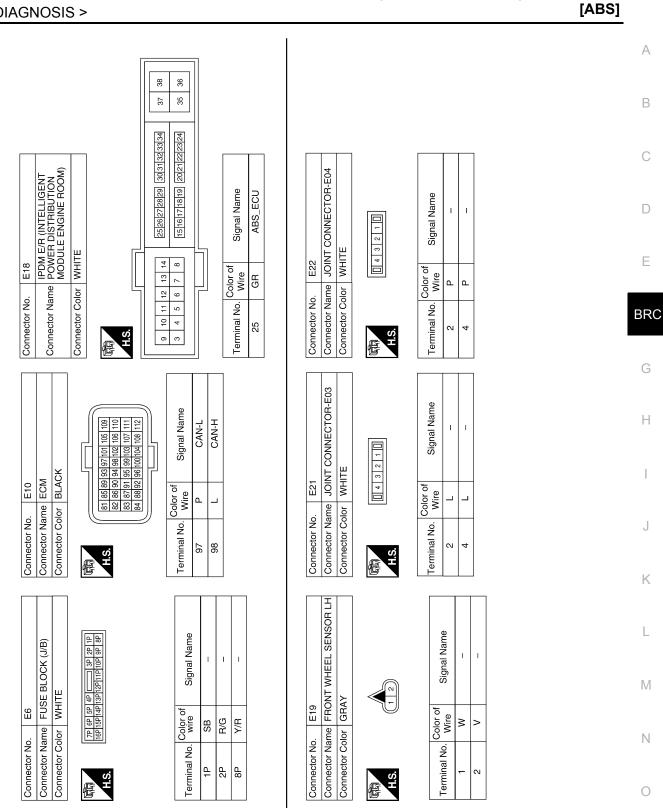
Ρ

#### < ECU DIAGNOSIS >

[ABS]



ABFIA0114GB



ABFIA0109GB

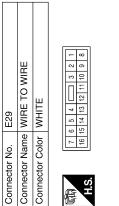
Ρ

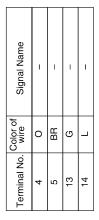
# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

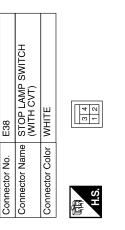
< ECU DIAGNOSIS >

#### < ECU DIAGNOSIS >

[ABS]



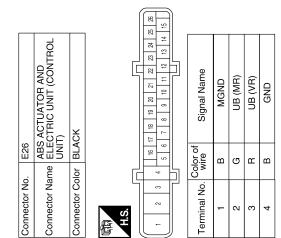




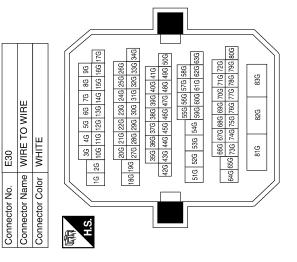


	Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	CAN-L	DP FL	DS RL	IGN	DS RR	BLS	CAN-H	
-	Color of wire	>	თ	_	в	Ľ	GR	٩	Ν	0	GR	BR	SB	F	
	Terminal No.	5	9	80	6	10	÷	15	16	17	18	19	20	26	

Signal Name	I	I	I	I	I	
Color of wire	Ч	L	0	L	Ч	
Terminal No.	98	15G	34G	51G	52G	



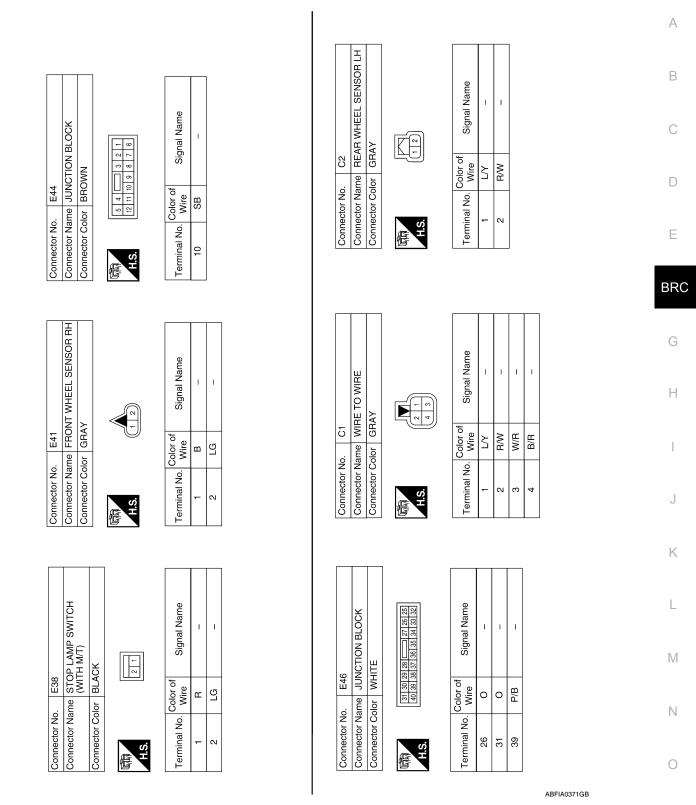
E



ABFIA0110GB

< ECU DIAGNOSIS >

[ABS]



Ρ

#### < ECU DIAGNOSIS >

REAR WHEEL SENSOR (EARLY PRODUCTION)

Connector Name Connector No.

Connector Name WIRE TO WIRE

Connector No. B10

B43

(EARLY PR	ЗRAY	- C - C - C - C - C - C - C - C				PC	_	PC
_	olor (			Color	Wire	Γ	N⁄A V	W/R
	Connector Color GRAY	品.S.H		T Color of	l erminal No.	1	2	3
1	-					1		1
ITE		2 3 <b>1</b> 4 5 6 7 9 10 11 12 13 14 15 16		olyriar ivarire	Н	I	I	I
lor WH		1 2 3 8 9 10	Color of	Wire	R/W	B/R	۲	W/R
Connector Color WHITE		同 H.S.	Torminal No Color of		4	5	13	14

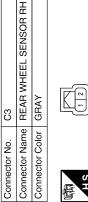
SIG\_LH POWER\_RH

SIG\_RH

B/B

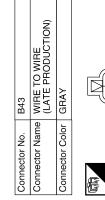
4

Signal Name POWER\_LH









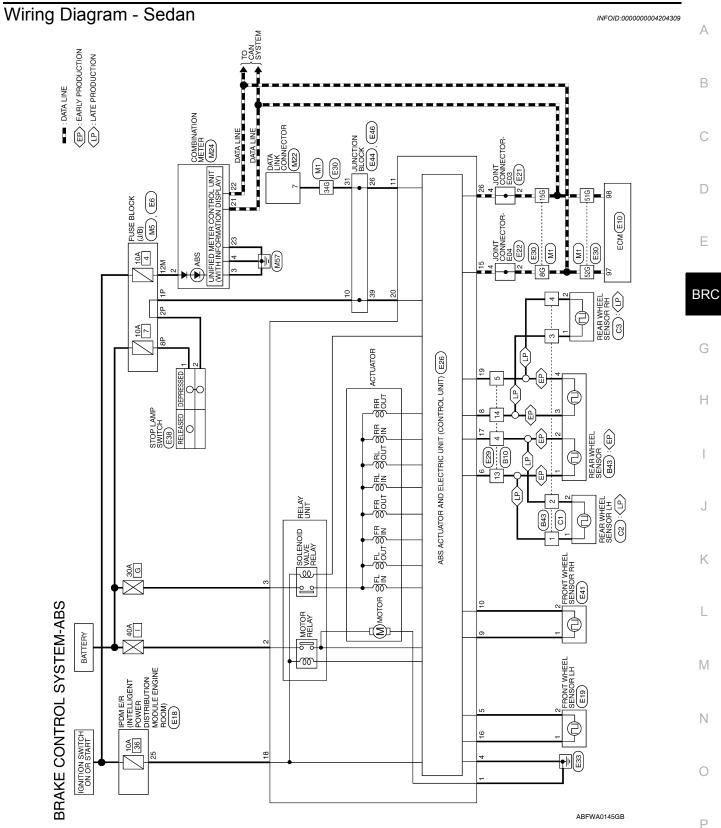
)	Signal Name	I	I	ļ	I
	Color of Wire	LY	R/W	W/R	B/R
	Terminal No.	٦	2	Е	4

3 4

H.S

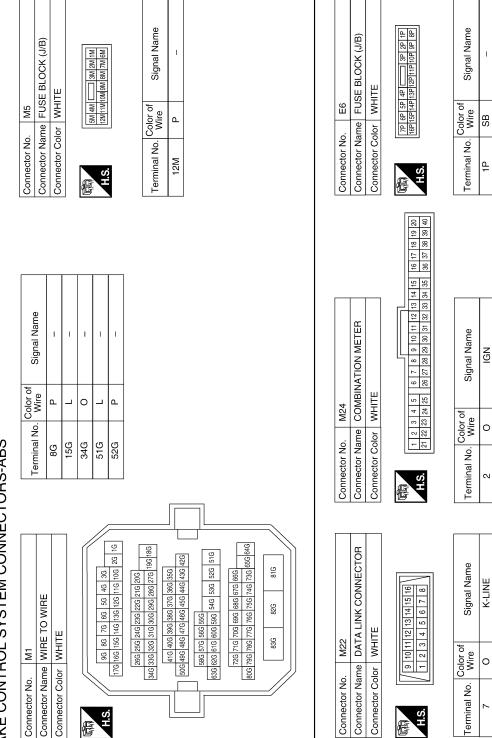
ABFIA0361GB

< ECU DIAGNOSIS >



[ABS]

#### < ECU DIAGNOSIS >



BRAKE CONTROL SYSTEM CONNECTORS-ABS

ABFIA0362GB

H.S.

E

H.S. E

L

R/G

<sup>2</sup> 8

CAN-H CAN-L

21 23 23

4

GND

GND GND

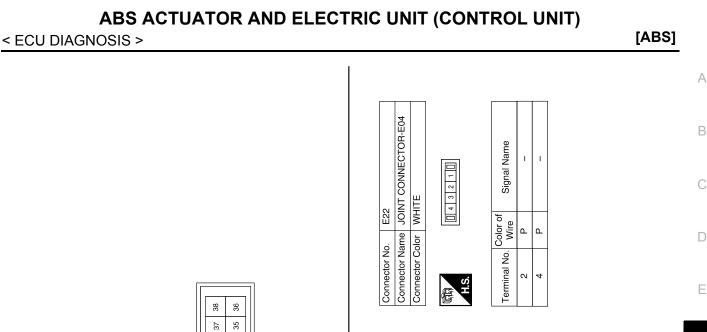
ш ш \_ ٩ В

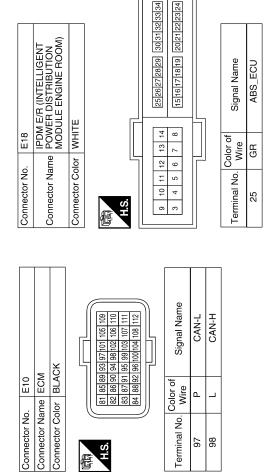
6

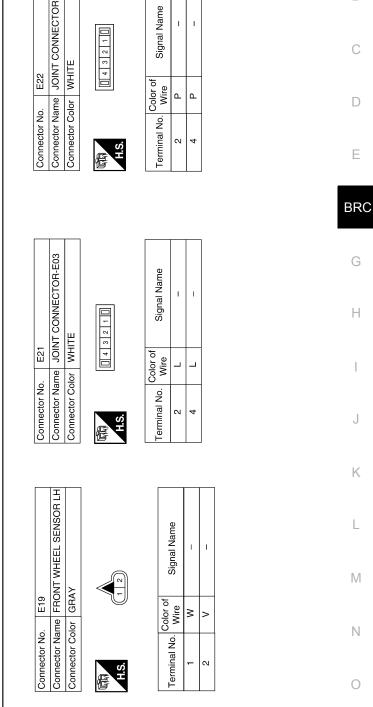
T

T

Y/R







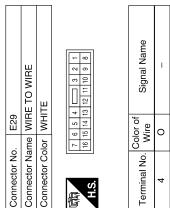
ABFIA0085GB

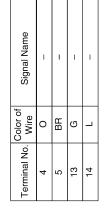
Ρ

Revision: February 2010

#### < ECU DIAGNOSIS >

[ABS]



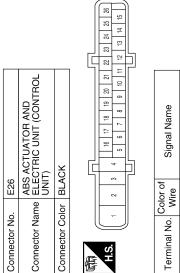




Signal Name	I	I	
Color of wire	н	ГG	
Terminal No.	Ļ	2	

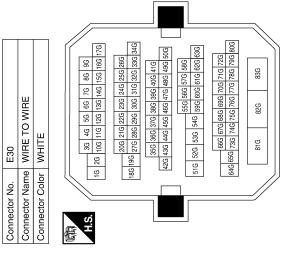
Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	CAN-L	DP FL	DS RL	IGN	DS RR	BLS	CAN-H
Color of wire	>	σ	_	в	ГG	GR	٩	Ν	0	GR	ВВ	SB	L
Terminal No.	5	9	80	6	10	11	15	16	17	18	19	20	26

Signal Name	I	I	I	I	I	
Color of Wire	٩.	L	0	L	Ч	
Terminal No.	8G	15G	34G	51G	52G	



H.S. E

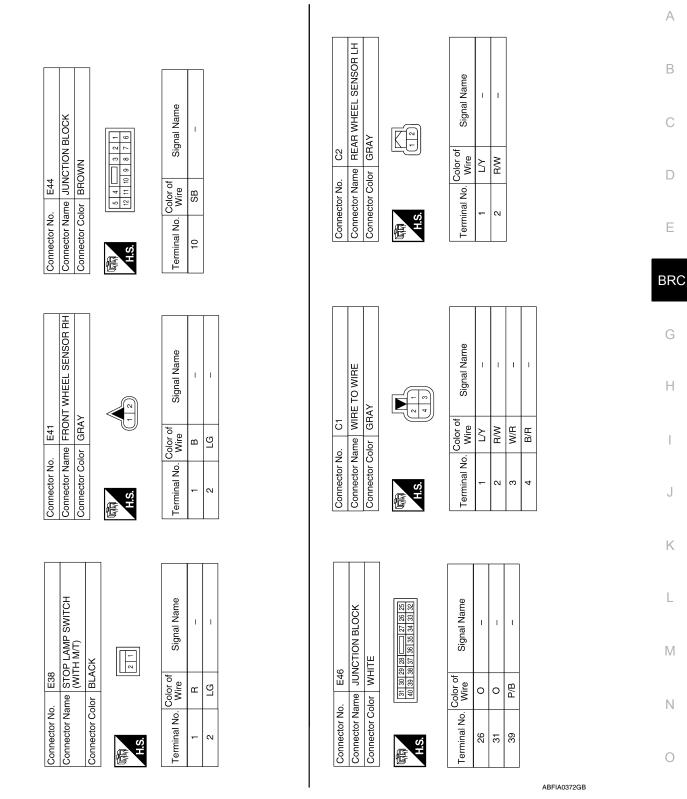
Signal Name	MGND	UB (MR)	UB (VR)	GND
Color of Wire	В	g	В	В
Terminal No. Color of Wire	1	2	3	4



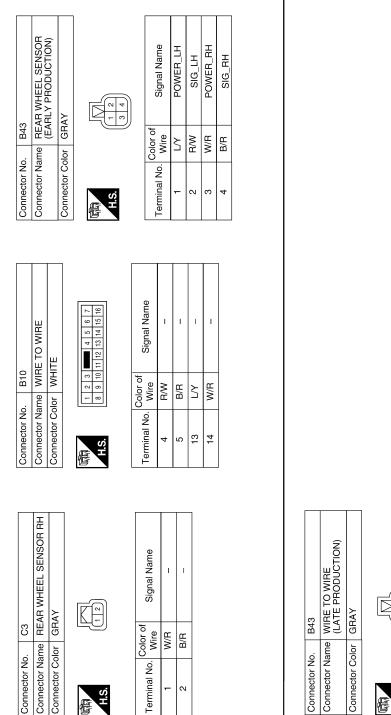
ABFIA0086GB

< ECU DIAGNOSIS >

[ABS]



Ρ



Signal Name

Color of Wire W/R

Terminal No.

**K**[∾]

H.S

佢

GRAY

Connector Color

ខ

Connector No.

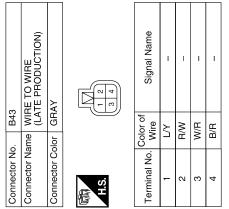
I. 1

B/B

N



< ECU DIAGNOSIS >



ABFIA0363GB

INFOID:000000004204310

### ABS SYSTEM

Fail-Safe

In case of electrical malfunctions with ABS, the ABS warning lamp will turn on. Simultaneously, the ABS switches to the fail-safe mode.

- In case of a malfunction with ABS, the result of a fail-safe mode will be normal braking without the aid of ABS.
  - NOTE:

#### **BRC-58**

#### < ECU DIAGNOSIS >

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

#### CAUTION:

### If the Fail-Safe function is activated, then perform self-diagnosis for ABS control system.

DTC No. Index

INFOID:000000004204311 B

#### CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

Display item	Malfunction detecting condition	Check item	
RR RH SENSOR-1 [C1101] <sup>*1</sup>	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-17, "Diagno-	D
RR LH SENSOR-1 [C1102] <sup>*1</sup>	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	sis Procedure (Ear- ly Production)" or BRC-19, "Diagno-	E
FR RH SENSOR-1 [C1103] <sup>*1</sup>	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	sis Procedure (Late Production)"	
FR LH SENSOR-1 [C1104] <sup>*1</sup>	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	(Note 1)	BRC
RR RH SENSOR-2 [C1105] <sup>*1</sup>	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		G
RR LH SENSOR-2 [C1106] <sup>*1</sup>	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-22, "Diagno- sis Procedure (Ear- ly Production)" or BRC-24, "Diagno-	Н
FR RH SENSOR-2 [C1107] <sup>*1</sup>	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	sis Procedure (Late Production)" (Note 1)	I
FR LH SENSOR- 2 [C1108] <sup>*1</sup>	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		J
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-27, "Diagno- sis Procedure"	K
CONTROLLER FAILURE [C1110] <sup>*2</sup>	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-29, "Diagno- sis Procedure"	
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-30, "Diagno-	L
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"	M
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-32, "Diagno-	
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"	Ν
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-34, "Diagno- sis Procedure (Ear- ly Production)" or BRC-35, "Diagno- sis Procedure (Late Production)" (Note 1)	O P
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"	
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"	
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"	

[ABS]

А

С

#### < ECU DIAGNOSIS >

Display item	Malfunction detecting condition	Check item
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-38, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-40, "Diagno- sis Procedure"
CAN COMM CIRCUIT [U1000] <sup>*3</sup>	When there is a malfunction in the CAN communication circuit.	BRC-42, "Diagno- sis Procedure"

\*1: Be sure to confirm the ABS warning lamp illuminates when the ignition switch is turned ON after repairing the shorted sensor circuit, but the lamp turns off when driving the vehicle over 30 km/h (19 MPH) for approximately 1 minute in accordance with SELF-DIAGNOSIS PROCEDURE.

\*2: When "CONTROLLER FAILURE" is displayed, check to see if the ABS warning lamp is burned out, and check the circuit between the ABS warning lamp and ABS actuator and electric unit (control unit) for open or short. Then, check the ABS actuator and electric unit (control unit) and circuit.

\*3: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communiation circuit first. Refer to LAN-8, "System Description".

# SYMPTOM DIAGNOSIS ABS

### Symptom Table

If ABS warning lamp turns ON, perform self-diagnosis.

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	BRC-62, "Diagno- sis Procedure"
4)	Wheel sensor and rotor system	<u></u>
Unexpected pedal reaction	Brake pedal stroke	BRC-63, "Diagno-
	Make sure the braking force is sufficient when the ABS is not operating.	sis Procedure"
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-64, "Diagno- sis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-65, "Diagno- sis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-66, "Diagno-
occurs (Note 2)	ABS actuator and electric unit (control unit)	sis Procedure"

ABS

#### NOTE:

• 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

А

Н

J

Κ

L

Μ

Ν

0

Ρ

### **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

#### < SYMPTOM DIAGNOSIS >

### EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:000000004204313

[ABS]

### **1.**CHECK START

Check front and rear brake force distribution using a brake tester.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-8</u>, "<u>Removal and Installation</u>", Rear: <u>RAX-7</u>, "<u>Removal and Installation</u>".

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 $\mathbf{3}$ . Check wheel sensor and sensor rotor

Check the following.

- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor.
  - Repair harness.

### **4.**CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the inspection result normal?

- YES >> Normal
- NO >> Perform self-diagnosis. Refer to <u>BRC-10. "System Description"</u>.

### **UNEXPECTED PEDAL REACTION**

< SYMPTOM DIAGNOSIS >	[ABS]
UNEXPECTED PEDAL REACTION	
Diagnosis Procedure	INFOID:000000004204314
1.CHECK BRAKE PEDAL STROKE	
Check brake pedal stroke. Refer to <u>BRC-10, "System Description"</u> .	
Is the stroke too big?	
<ul> <li>YES &gt;&gt; • Bleed air from brake tube and hose. Refer to <u>BR-16. "Bleeding Brake Sy</u></li> <li>• Check brake pedal, brake booster, and master cylinder for mount play, lo fluid leakage, etc. Refer to brake pedal: <u>BR-44. "Brake Pedal"</u>, brake bo der: <u>BR-45. "Brake Booster"</u>.</li> <li>NO &gt;&gt; GO TO 2</li> </ul>	oseness, brake system
2.CHECK FUNCTION	
Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. C normal in this condition.Connect connector after inspection.	Check if braking force is
Is the inspection result normal?	
YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" BRC-61. "Symptom Table".	of symptom 1. Refer to
NO >> Check brake system.	

J

Κ

L

Μ

Ν

Ο

Ρ

G

[ABS]

А

В

С

D

Е

BRC

### THE BRAKING DISTANCE IS LONG

**Diagnosis** Procedure

INFOID:000000004204315

#### **CAUTION:**

The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.

**1.**CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

- YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to <u>BRC-61, "Symptom Table"</u>.
- NO >> Check brake system.

### ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >	[ABS]
ABS FUNCTION DOES NOT OPERATE	
Diagnosis Procedure	INFOID:000000004204316
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY	
Make sure that the ABS warning lamp turns OFF after ignition switch is turned on or whe	n driving.
Is the inspection result normal?	
YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of	symptom 1. Refer to

>> Perform self-diagnosis. Refer to BRC-13, "CONSULT-III Function (ABS)".

BRC-61, "Symptom Table".

NO

Ε

D

А

В

С

BRC

G

Н

J

Κ

L

Μ

Ν

Ο

Ρ

### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

#### < SYMPTOM DIAGNOSIS >

### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

**Diagnosis** Procedure

INFOID:000000004204317

[ABS]

#### CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

#### **1**.SYMPTOM CHECK 1

Check if there is pedal vibration or operation sound when the engine is started.

Do symptoms occur?

YES >> GO TO 2

NO >> Perform self -diagnosis. Refer to <u>BRC-13, "CONSULT-III Function (ABS)"</u>.

2.SYMPTOM CHECK 2

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

- YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
- NO >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-61, "Symptom Table".

### NORMAL OPERATING CONDITION

#### < SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

### Description

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated.	This is a normal condi-
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	tion due to ABS activa- tion.
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.

# BRC

### G

#### Н

I

J

Κ

L

M

Ν

0

Ρ

[ABS]

INFOID:000000004204318

А

В

С

D

# PRECAUTION PRECAUTIONS

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

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. 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. Information necessary to service the system safely is included in the SR and SB section of this Service Man-

#### ual. 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 SR 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 harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

#### Precaution for Brake System

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

#### WARNING:

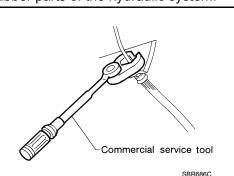
# Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

### Precaution for Brake Control

INFOID:000000004204321

INFOID:000000004204320

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic



### **BRC-68**

### PRECAUTIONS

< P	RECA	UTIO	V >
-----	------	------	-----

servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.

- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspensionrelated parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

Е

А

В

[ABS]

Н

Κ

L

Μ

Ν

Ο

Ρ

# PREPARATION PREPARATION

### Special Service Tool

INFOID:000000004204322

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

Tool number (Kent-Moore No.) Tool name		Description
 (J-45741) ABS active wheel sensor tester	Verlaolole	Checking operation of ABS active wheel sen- sor

### **Commercial Service Tool**

INFOID:000000004204323

Tool name		Description
<ol> <li>Flare nut crowfoot</li> <li>Torque wrench</li> </ol>		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

### WHEEL SENSORS

#### < ON-VEHICLE REPAIR >

# ON-VEHICLE REPAIR WHEEL SENSORS

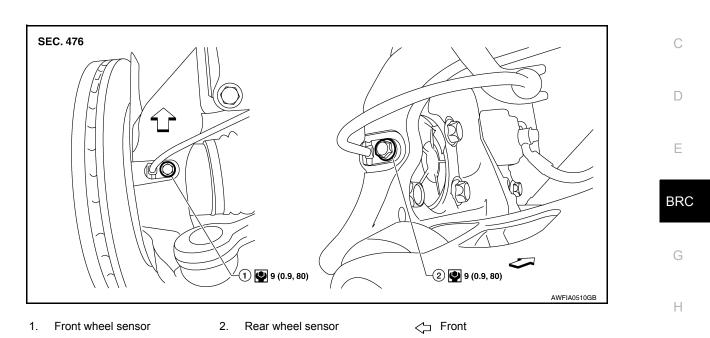
Removal and Installation

INFOID:000000004505065

А

J

L



#### CAUTION:

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub, first remove the wheel sensor from the wheel hub. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.
- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole in the wheel hub for the wheel sensor, or if a foreign object is caught in the surface of the mating surface for the sensor rotor. Fix as necessary and then install the wheel sensor.

#### FRONT WHEEL SENSOR

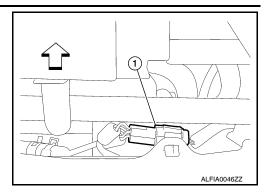
#### Removal

-		
1.	Remove front wheel and tire. Refer to WT-68, "Adjustment".	ъл
2.	Partially front wheel fender protector. Refer to EXT-20, "Removal and Installation".	M
3.	Remove wheel sensor bolt and wheel sensor.	
4.	Remove harness wire from mounts and disconnect wheel sensor harness connector.	Ν
	allation allation is in the reverse order of removal.	
RE	AR WHEEL SENSOR	0
Ren	noval	
1.	Remove rear wheel and tire. Refer to WT-68, "Adjustment".	Ρ

### WHEEL SENSORS

### < ON-VEHICLE REPAIR >

- 2. Disconnect wheel sensor harness connector (1).
  - < : Front



- 3. Remove harness wire clips from rear suspension member.
- 4. Remove wheel sensor bolt and wheel sensor from rear wheel hub and bearing assembly.

#### Installation

Installation is in the reverse order of removal.

# **SENSOR ROTOR**

#### < ON-VEHICLE REPAIR >

# SENSOR ROTOR

#### Removal and Installation

The front and rear wheel sensor rotors are an integral part of the wheel hubs and can not be disassembled. When replacing the sensor rotor, replace the wheel hub. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

G

Н

J

Κ

Μ

Ν

Ο

Ρ

Е

Revision: February 2010

A INFOID:000000004505066

В

С

D

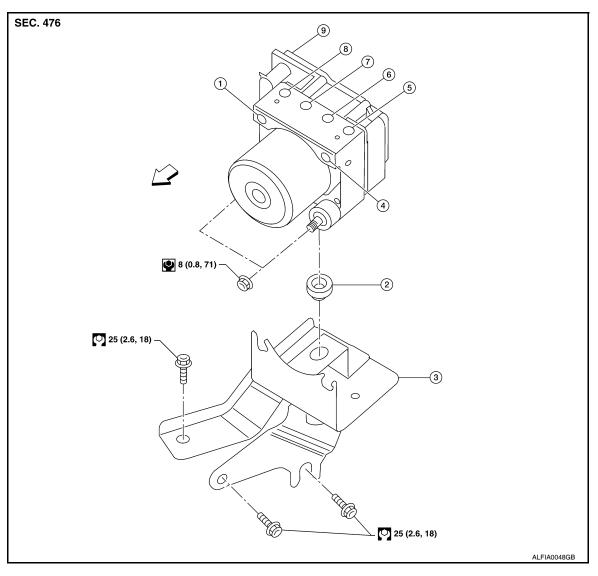
# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### < ON-VEHICLE REPAIR >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

# Exploded View

INFOID:000000004505069



- 1. From master cylinder secondary side 2. From master cylinder primary side
- Grommet
- 5. To front LH brake caliper

To front RH brake caliper

- 7. To rear LH brake caliper
- <⊐ Front

4.

#### Removal and Installation

#### **CAUTION:**

- Be careful of the following.
- Before servicing, disconnect the battery cable from negative terminal.

8.

- To remove brake pipe, use a suitable tool (flare nut wrench) to prevent flare nuts and brake tube from being damaged. To install, use suitable tool (flare nut torque wrench).
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install ABS actuator and electric unit (control unit) by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-16, "Bleeding Brake System"</u>.
- After installing harness connector on the ABS actuator and electric unit (control unit), make sure connector is securely locked.

#### **BRC-74**

#### 2009 Altima

- 3. Bracket
- 6. To rear RH brake caliper
- 9. ABS actuator and electric unit (control unit)

INFOID:000000004505070

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< (	ON-VEHICLE REPAIR > [ABS]	
F	n the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-157, "ADJUSTMENT OF STEERING ANGLE SENSOR</u> NEUTRAL POSITION : Special Repair Requirement".	А
RE	EMOVAL	
1.	Remove front wiper arms. Refer to <u>WW-119, "FRONT WIPER ARMS : Removal and Installation"</u> .	В
2.	Remove cowl top. Refer to EXT-19, "Removal and Installation".	
3.	Disconnect washer hose.	С
4.	Disconnect the battery negative terminal.	0
5.	Remove tower bar, if equipped. Refer to FSU-13, "Exploded View".	
6.	Disconnect ABS actuator and electric unit (control unit) connector.	D
7.	Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit) using a suitable tool.	
8.	Remove ABS actuator and electric unit (control unit) nuts.	Е
	Remove ABS actuator and electric unit (control unit).	
10	. Remove bracket as necessary.	
	STALLATION stallation is in the reverse order of removal.	BRC
		G
		Н
		I
		J
		K
		K
		L

M

Ν

0

Ρ

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

## Work Flow

INFOID:000000004204328

[TCS/ABS]

#### DESCRIPTION

**Basic Concept** 

- The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in vehicle thoroughly.
- It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

#### **CAUTION:**

Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".

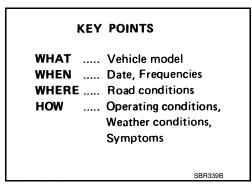
• It is essential to check symptoms right from beginning in order to repair a malfunction completely.

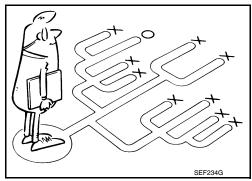
For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.

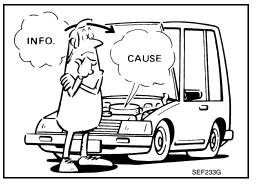
- After diagnostic, make sure to perform "ERASE MEMORY". Refer to <u>BRC-84, "CONSULT-III Function (ABS)"</u>.
- Always read "GI General Information" to confirm general precautions. Refer to <u>GI-28, "General Precautions"</u>.

Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.



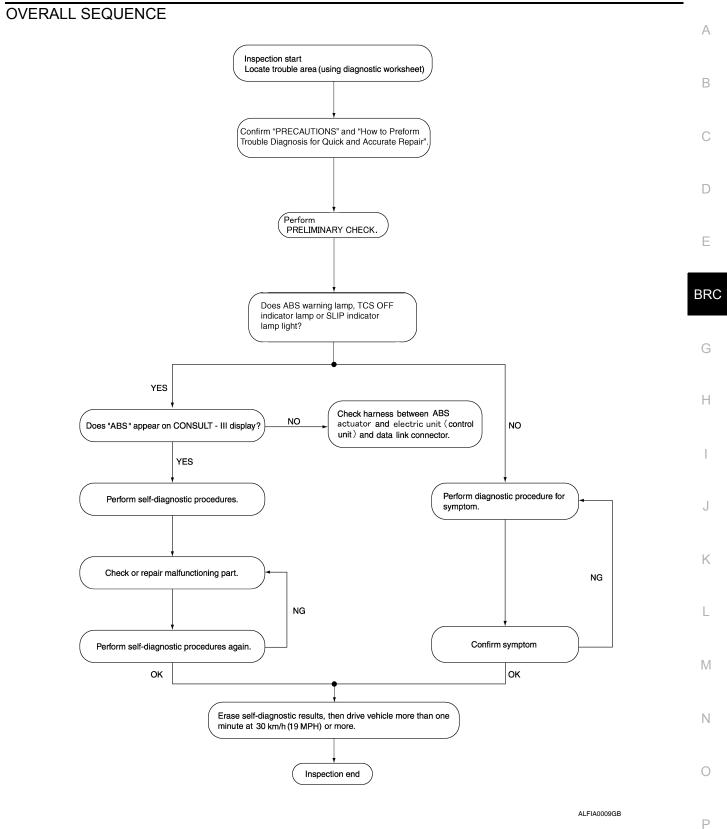




# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TCS/ABS]



# **DIAGNOSIS AND REPAIR WORKFLOW**

# < BASIC INSPECT Diagnostic We

INFOID:000000004204329

[TCS/ABS]

ECTION >		
/ork Sheet		

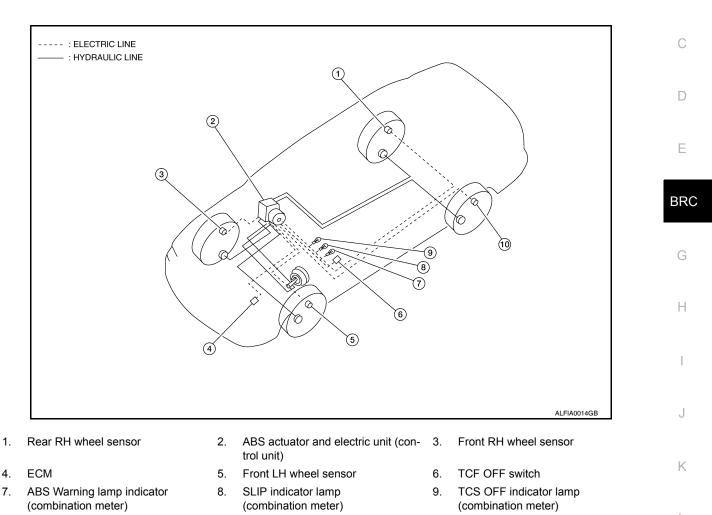
Customer name MR/MS	Model & Year		VIN			
Engine #	Trans.	Trans.				
Incident Date	Manuf. Date	Manuf. Date				
Symptoms	ms Disc and vibration Urice and vibration (from engine compartment) Citrate activate (from axle)			<ul> <li>Firm pedal operation</li> <li>Large stroke pedal</li> <li>operation</li> </ul>		
	<ul> <li>TCS does not work</li> <li>(Rear wheels slip when accelerating)</li> </ul>	ABS does not work (wheels slip when braking)		Lack of sense of acceleration		
Engine conditions	□ When starting □ After starting			1		
Road conditions	□ Low friction road (□Snow □Grave □ Bumps / potholes	□ Low friction road (□Snow □Gravel □Other) □ Bumps / potholes				
Driving conditions	□ Full-acceleration □ High speed cornering □ Vehicle speed: Greater than 10 km/t □ Vehicle speed: 10 km/h (6 MPH) or t □ Vehicle is stopped					
Applying brake conditions	□ Suddenly □ Gradually					
Other conditions	<ul> <li>Operation of electrical equipment</li> <li>Shift change</li> <li>Other descriptions</li> </ul>					

SFIA0791E

# FUNCTION DIAGNOSIS

# System Diagram

INFOID:00000004204330



TCS

10. Rear LH wheel sensor

# System Description

#### CAUTION:

#### If the Fail-Safe function is activated, perform the Self Diagnosis for ABS/TCS system.

#### ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp and SLIP indicator lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp, ABS warning lamp and SLIP indicator lamp will turn on.

The system will revert to one of the following conditions of the Fail-Safe function.

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of vehicles without ABS/TCS system.
- 2. For EBD malfunction, the EBD and ABS become inoperative, and the condition of the vehicle is the same as the condition of vehicles without ABS/TCS or EBD system.

#### TCS SYSTEM

In case of TCS system malfunction, the SLIP indicator lamp is turned on and the condition of the vehicle is the same as the condition of vehicles without TCS system. In case of an electrical malfunction with the TCS system, the ABS control continues to operate normally without TCS control.

INFOID:000000004204331

M

Ν

Ο

А

### < FUNCTION DIAGNOSIS >

#### PURPOSE

The Anti-lock Brake System (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:

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

#### OPERATION

- When the vehicle speed is less than 10 km/h (6 MPH) this system does not work.
- The ABS has self-test capabilities. The system turns on the ABS warning lamp for 2 seconds 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 a sthe 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.

#### FAIL SAFE

If trouble occurs in the ABS or TCS, the ABS warning lamp in the combination meter comes on. At the same time, the vehicle stops the ABS control and braking becomes the same as that of a vehicle without ABS.

#### ABS FUNCTION

- The Anti-Lock Brake System detects wheel revolution while braking and improves handling stability during sudden braking by electrically preventing wheel lockup. Maneuverability is also improved for avoiding obstacles.
- If the electrical system malfunctions, the Fail-Safe function is activated, the ABS becomes inoperative and the ABS warning lamp turns on.
- The electrical system can be diagnosed using CONSULT-III.
- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

#### EBD FUNCTION

- Electronic Brake Distribution is a function that detects subtle slippages between the front and rear wheels during braking, and it improves handling stability by electronically controlling the brake fluid pressure which results in reduced rear wheel slippage.
- If the electrical system malfunctions, the Fail-Safe function is activated, the EBD and ABS become inoperative, and the ABS warning lamp and BRAKE warning lamp are turned on.
- The electrical system can be diagnosed using CONSULT-III.
- During EBD operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting the vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without EBD when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

#### TCS FUNCTION

- Spinning of the drive wheels is detected by the ABS/TCS control unit using inputs from the wheel speed sensors. If wheel spin occurs, the drive wheel right and left brake fluid pressure control and engine fuel cut are conducted while the throttle value is restricted to reduce the engine torque and decrease the amount of wheel spin. In addition, the throttle opening is controlled to achieve the optimum engine torque.
- Depending on road condition, the vehicle may have a sluggish feel. This is normal, because optimum traction has the highest priority during TCS operation.
- TCS may be activated during sudden vehicle acceleration, wide open throttle acceleration, sudden transmission shifts or when the vehicle is driven on a road with a varying surface friction coefficient.
- The SLIP indicator lamp flashes to inform the driver of TCS operation.

#### WHEEL SENSORS

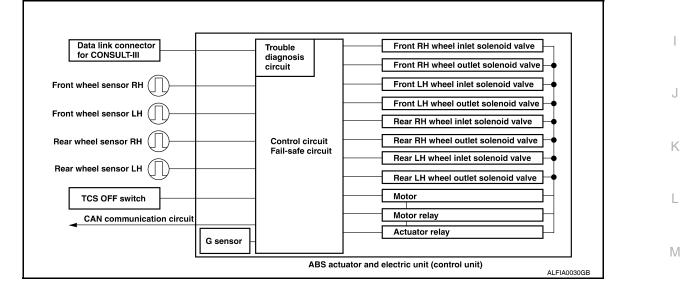
TCS

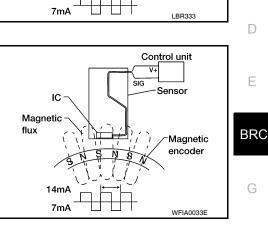
#### < FUNCTION DIAGNOSIS >

The front sensor units consist of a gear-shaped sensor rotor and a sensor element. The element contains a magnet around which a coil is wound. 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 increases as the wheel speed increases.

The rear sensor units consist of wheel hubs with a series of internal magnets and a sensor element. The rear wheel sensors are installed on the inner side of the wheel knuckles. As the wheel rotates, the sensor generates a square-wave signal. The frequency increases as the wheel speed increases.

# ELECTRICAL COMPONENTS





Ν

#### [TCS/ABS]

А

В

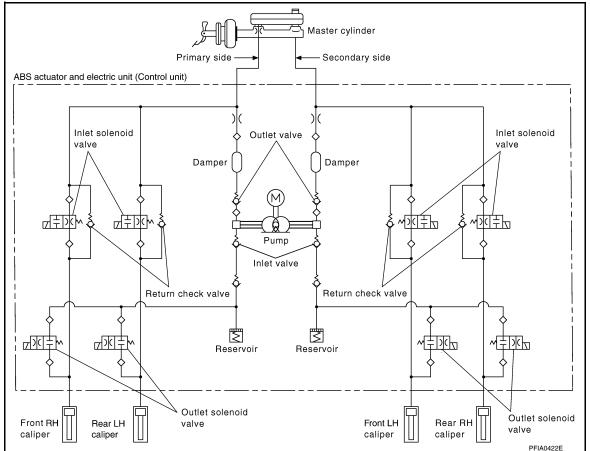
Н

Control unit

<u>۷</u>

#### < FUNCTION DIAGNOSIS >

#### HYDRAULIC CIRCUIT DIAGRAM



TCS

#### OPERATION THAT IS NOT "SYSTEM ERROR"

#### ABS/TCS

- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating sound may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

#### CAN Communication Refer to <u>LAN-8. "System Description"</u>.

#### INFOID:000000004204332

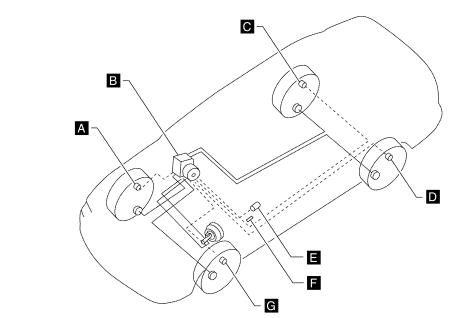
А

В

С

D

Е



TCS



G

Н

J

Κ

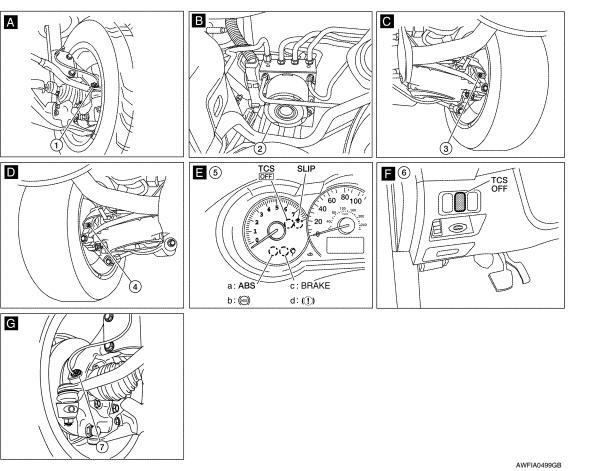
L

Μ

Ν

Ο

Ρ



1.	Front wheel sensor RH E41	2.	ABS actuator and electric unit (control unit) E26 (engine removed for clarity)	3.	Rear wheel sensor RH B43
4.	Rear wheel sensor LH B43	5.	Combination meter M24 a: US models b: Canada models c: US models d: Canada models	6.	TCS OFF switch M72

7. Front wheel sensor LH E19

< FUNCTION DIAGNOSIS >

# **Component Description**

INFOID:000000004204333

[TCS/ABS]

Compo	Reference	
	Pump	PRC 102 "Description"
	Motor	BRC-102, "Description"
ABS actuator and electric unit (control unit)	Actuator relay (Main relay)	BRC-104, "Description"
	Solenoid valve	BRC-110, "Description"
Wheel sensor	BRC-89, "Description"	
TCS OFF switch	BRC-118, "Description"	
ABS warning lamp	BRC-116, "Description"	
Brake warning lamp	BRC-117, "Description"	

# CONSULT-III Function (ABS)

#### SELF-DIAGNOSIS RESULTS

#### **Operation Procedure**

- Turn ignition switch ON. 1.
- 2. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the 3. CONSULT-III screen.
- The self-diagnostic results are displayed. 4.
  - Check ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn off. If "NO FAILURE" is displayed, refer to BRC-116, "Description".
- 5. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component.Refer to "Display Item List".
- 6. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute. **CAUTION:**

When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn off even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.

#### Erase Memory

- Turn ignition switch OFF. 1.
- 2 Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory. If "ABS" is not indicated, go to GI-50, "Description". CAUTION:

#### If the diagnostic memory is not erased, re-perform the operation from step 6 above.

- Perform self-diagnosis again, and make sure that diagnostic memory is erased.
- 4. Drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn off.

#### NOTE:

#### **BRC-84**

INFOID:000000004204334

# TCS

#### < FUNCTION DIAGNOSIS >

- Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or with brake fluid level switch operation (when brake fluid is insufficient).
- TCS OFF switch should not stay in the "ON" position.

#### **Display Item List**

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	BRC-89, "Diagno-
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<u>sis Procedure (Ear-</u> <u>ly Production)"</u> or <u>BRC-91, "Diagno-</u>
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	sis Procedure (Late Production)"
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	(Note)
RR RH SENSOR-2 [C1105]	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
RR LH SENSOR-2 [C1106]	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	<u>BRC-94, "Diagno-</u> <u>sis Procedure (Ear-</u> <u>ly Production)"</u> or
FR RH SENSOR-2 [C1107]	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-96, "Diagno- sis Procedure (Late Production)"
FR LH SENSOR- 2 [C1108]	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-99, "Diagno- sis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-101, "Diagno- sis Procedure"
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-102, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY [C1114]	Actuator solenoid valve relay is ON, even if control unit sends OFF signal. Actuator solenoid valve relay is OFF, even if control unit sends ON signal.	BRC-104, "Diagno- sis Procedure"
ABS SENSOR [C1115]	Teeth damage on sensor rotor or improper installation of wheel sensor.	BRC-106, "Diagno- sis Procedure (Ear- ly Production)" or BRC-107, "Diagno- sis Procedure (Late Production)"
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"

А

#### < FUNCTION DIAGNOSIS >

#### [TCS/ABS]

Display item	Malfunction detecting condition	Check item
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
ENGINE SIGNAL 1 [C1130]	Fuel cut control abnormal.	
ENGINE SIGNAL 2 [C1131]	Electric throttle control abnormal.	BRC-114, "Diagno-
ENGINE SIGNAL 3 [C1132]	ECM CAN communication abnormal.	sis Procedure"
ENGINE SIGNAL 4 [C1133]	ECM communication to ABS actuator and electric unit (control unit) abnormal.	
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-115, "Diagno- sis Procedure"

Note: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage.

#### DATA MONITOR

Display Item List CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

Item	Data	a monitor item sele	ection		
(Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks	
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor sig- nal is displayed.	
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor sig- nal is displayed.	
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor sig- nal is displayed.	
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.	
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.	
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (con- trol unit) is displayed.	
GEAR	×	×	×	Gear position judged by transmission range switch sig- nal is displayed.	
SLCT LVR POSI	×	×	×	Shift position judged by transmission range switch signal.	
OFF SW (ON/OFF)	×	×	×	TCS OFF switch (ON/OFF) status is displayed.	
FR RH IN SOL (ON/OFF)	_	×	×	Front RH IN ABS solenoid (ON/OFF) status is displayed.	
FR RH OUT SOL (ON/OFF)	_	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.	
FR LH IN SOL (ON/OFF)	_	×	×	Front LH IN ABS solenoid (ON/OFF) status is dis- played.	
FR LH OUT SOL (ON/OFF)	_	×	×	Front LH OUT ABS solenoid (ON/OFF) status is displayed.	

#### < FUNCTION DIAGNOSIS >

RR RH IN SOL (ON/OFF)	_	×	×	Rear RH IN ABS solenoid (ON/OFF) status is displayed.
RR RH OUT SOL (ON/OFF)	_	×	×	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	_	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	_	×	×	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	_	×	×	ABS motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	_	×	×	ABS actuator relay signal (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	_	×	×	TCS OFF lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	_	×	×	SLIP indicator lamp (ON/OFF) status is displayed.
	·			

×: Applicable

-: Not applicable

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

# ACTIVE TEST

#### **CAUTION:**

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, TCS indicator lamp, SLIP indicator lamp and brake warning lamp are on.
- ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

#### **Operation Procedure**

NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch "BACK" to restart the process.

#### Solenoid Valve

#### NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below. • When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addi-

- tion, when performing an active test of the TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "UP", "KEEP", and "DOWN" on the display screen. For ABS solenoid valve (ACT), touch "UP", "ACT UP", "ACT KEEP" and confirm that solenoid valves (IN, OUT) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ABS Motor

[TCS/ABS]

Н

J

L

Ο

Ρ

Touch "ON" and "OFF" on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### < COMPONENT DIAGNOSIS >

# COMPONENT DIAGNOSIS C1101, C1102, C1103, C1104 WHEEL SENSOR-1

# Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204336

INFOID:000000004204335

# DTC DETECTION LOGIC

DTO			8 11
DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
DTC CC	NFIRMATION PROCE	DURE	
<b>1</b> .CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	_		
	Self-diagnosis	results	
	RR RH SENS	OR-1	
	RR LH SENS	OR-1	
	FR RH SENS	OR-1	
	FR LH SENS	OR-1	
	displayed on the self-diag		
YES		procedure. Refer to <u>BRC-89, "Diagnosis Proce</u> rocedure (Late Production)".	<u>dure (Early Production)"</u> or
NO	>> Inspection End.		
Diagno	sis Procedure (Early	/ Production)	INFOID:00000004204337
CAUTIO	N		
	heck between wheel se	nsor terminals.	
<b>1.</b> CHEC	CK CONNECTOR		
Turn iani	tion switch OFF and disco	onnect ABS actuator and electric unit (control ur	nit) connector E26 and mal-
functioni	ng wheel sensor connecto	onnect ABS actuator and electric unit (control ur or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and	RR-LH). Check terminal to
functioni see if it is	ng wheel sensor connectors deformed, disconnected		RR-LH). Check terminal to
functioni see if it is <u>Is the ins</u>	ng wheel sensor connectors deformed, disconnected spection result normal?	or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and	RR-LH). Check terminal to
functioni see if it is <u>Is the ins</u> YES	ng wheel sensor connectors deformed, disconnected spection result normal? >> GO TO 2	or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and , loose, etc., Repair or replace it if any malfunction	RR-LH). Check terminal to
functioni see if it is <u>Is the ins</u> YES NO	ng wheel sensor connectors deformed, disconnected spection result normal? >> GO TO 2 >> Repair or replace as n	or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and , loose, etc., Repair or replace it if any malfunction ecessary.	RR-LH). Check terminal to
functioni see if it is <u>Is the ins</u> YES NO <b>2.</b> CHEC	ng wheel sensor connectors deformed, disconnected spection result normal? >> GO TO 2 >> Repair or replace as n CK WHEEL SENSOR OU	or E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and , loose, etc., Repair or replace it if any malfunction ecessary.	RR-LH). Check terminal to



#### [TCS/ABS]

А

В

С

D

#### < COMPONENT DIAGNOSIS >

[TCS/ABS]

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.

NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

- YES >> GO TO 3
- NO >> Replace wheel sensor. Refer to <u>BRC-148</u>, "Removal and Installation".

**3.**CHECK TIRE

Check air pressure, wear and size.

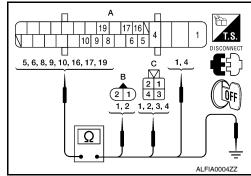
Are air pressure, wear and size within standard?

- YES >> GO TO 4 NO >> • Adjust a
  - >> Adjust air pressure, or replace tire.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6</u>, "Inspection" (front) or <u>RAX-6</u>, "On-vehicle Service" (rear). Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).
- **5.**CHECK WHEEL SENSOR HARNESS
- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

# Power supply circuit

- : Continuity should exist.
- : Continuity should exist.
- Signal circuit Ground circuit
- : Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

#### < COMPONENT DIAGNOSIS >

[TCS/ABS]

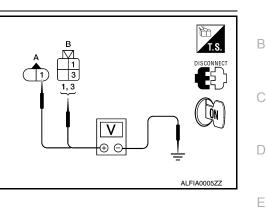
А

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6. Check wheel sensor power supply circuit

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V OF INDIE
Rear RH (B)	3		



#### Is the inspection result normal?

YES >> Inspection result normal? YES >> Inspection end. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installa-</u>	BR
tion". Diagnosis Procedure (Late Production)	DIX
CAUTION: Do not check between wheel sensor terminals.	G
1.CONNECTOR INSPECTION	Н
<ol> <li>Turn ignition switch OFF.</li> <li>Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.</li> <li>Check terminals for deformation, disconnection, looseness or damage.</li> <li><u>Is the inspection result normal?</u></li> <li>YES &gt;&gt; GO TO 2</li> </ol>	I
YES >> GO TO 2 NO >> Repair or replace as necessary.	J
2. CHECK WHEEL SENSOR OUTPUT SIGNAL	J
<ol> <li>Disconnect connectors from wheel sensor of malfunction code No.</li> <li>Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.</li> <li>Turn on the ABS active wheel sensor tester power switch.</li> <li>NOTE:</li> </ol>	K
<ul> <li>The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.</li> <li>Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.</li> </ul>	L
<b>NOTE:</b> If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.	Μ
Does the ABS active wheel sensor tester detect a signal?	Ν
YES >> GO TO 3 NO >> Replace wheel sensor. Refer to <u>BRC-148, "Removal and Installation"</u> .	
	0
Check air pressure, wear and size.	
Is the inspection result normal? YES >> GO TO 4 NO >> • Adjust air pressure, or replace tire. • Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".	Ρ
4.CHECK WHEEL BEARINGS	
Check wheel bearing axial end play. Refer to <u>FAX-6, "Inspection"</u> (front) or <u>RAX-6, "On-vehicle Service"</u> (rear).	

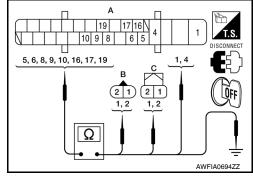
**Revision: February 2010** 

< COMPONENT DIAGNOSIS >

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front) or RAX-7, "Removal and Installation" (rear).

5. CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and mal-2. functioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal circuit Gro		ound circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

**Power supply circuit** 

#### : Continuity should exist.

Signal circuit

- : Continuity should exist.
- **Ground circuit**

- : Continuity should not exist.

Is the inspection result normal?

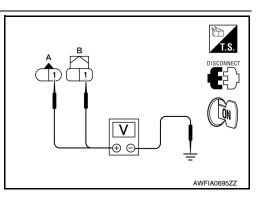
YES >> GO TO 6 NO

- >> Repair or replace malfunctioning components.
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6. CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	o v or more
Rear RH (B)	-		



Is the inspection result normal?

YES >> Inspection End.

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-151, "Removal and Installa-NO tion".

# < COMPONENT DIAGNOSIS > Component Inspection

[TCS/ABS]

1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

	Wheel sensor	Vehicle speed (DATA MONITOR)	C
	FR LH SENSOR		C
	FR RH SENSOR	Nearly matches the speedometer dis-	
	play (±10% or less)	D	
	RR RH SENSOR		
Is the in	spection result normal?		_
YES	>> Inspection End.		
NO		edure. Refer to <u>BRC-89, "Diagnosis Procedure (Early Production)"</u> or <u>BRC-</u>	
	<u>91, "Diagnosis Procec</u>	dure (Late Production)".	BF
			DR

G

А

В

Н

J

Κ

L

Μ

Ν

Ο

Ρ

#### < COMPONENT DIAGNOSIS >

# C1105, C1106, C1107, C1108 WHEEL SENSOR-2

#### Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204340

INFOID:000000004204339

ITCS/ABS1

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1108	FR LH SENSOR-2	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-94</u>, "<u>Diagnosis Procedure (Early Production)</u>" or <u>BRC-96</u>, "<u>Diagnosis Procedure (Late Production)</u>".

NO >> Inspection End.

Diagnosis Procedure (Early Production)

#### CAUTION:

Do not check between wheel sensor terminals.

**1.**CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connectors from wheel sensor of malfunction code No.

- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

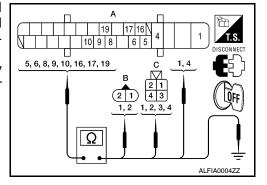
#### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

INFOID:0000000005923393

< COMPONENT DIAGNOSIS >	[TCS/ABS]
4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on sensor tester. The red SENSOR indicator should flash on and off to indicate an out <b>NOTE:</b>	
If the red SENSOR indicator illuminates but does not flash, reverse the polarity or retest.	_
Does the ABS active wheel sensor tester detect a signal?	В
YES >> GO TO 3 NO >> Replace wheel sensor. Refer to <u>BRC-148, "Removal and Installation"</u> .	С
3.CHECK TIRE	
Check air pressure, wear and size.	
Are air pressure, wear and size within standard?	D
YES >> GO TO 4	
<ul> <li>NO &gt;&gt; • Adjust air pressure, or replace tire.</li> <li>• Perform the self-diagnosis, and make sure that the result shows "NO DT(</li> </ul>	C IS DETECTED".
4.CHECK WHEEL BEARINGS	
Check wheel bearing axial end play. Refer to FAX-6, "Inspection" (front) or RAX-6, "On-v	vehicle Service" (rear). BRC
Is the inspection result normal?	
YES >> GO TO 5	
NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , " <u>Removal and Installat</u> " <u>Removal and Installation</u> " (rear).	tion" (front) or <u>RAX-7.</u> <sub>G</sub>
5. CHECK WHEEL SENSOR HARNESS	

- 1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



Н

J

Κ

Ρ

	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

**Power supply circuit** Signal circuit **Ground circuit** 

#### : Continuity should exist.

: Continuity should exist.

: Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

- >> Repair or replace malfunctioning components. NO
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

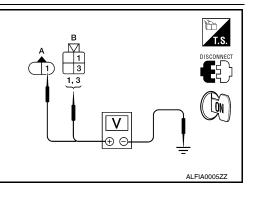
# **BRC-95**

#### < COMPONENT DIAGNOSIS >

#### 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connec-
- tor.2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V OI MOIE
Rear RH (B)	3		



#### Is the inspection result normal?

YES >> Inspection end.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installa-</u> tion".

#### Diagnosis Procedure (Late Production)

INFOID:000000005923394

#### **CAUTION:**

#### Do not check between wheel sensor terminals.

# **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

#### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

#### Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace wheel sensor. Refer to <u>BRC-148, "Removal and Installation"</u>.

# **3.**CHECK TIRE

Check air pressure, wear and size.

#### Is the inspection result normal?

YES >> GO TO 4 NO >> • Adjust a

- >> Adjust air pressure, or replace tire.
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6, "Inspection"</u> (front) or <u>RAX-6, "On-vehicle Service"</u> (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

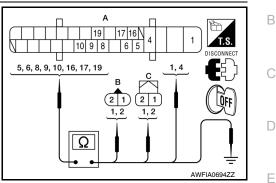
# **BRC-96**

#### < COMPONENT DIAGNOSIS >

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# **5.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit	BRC
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground	G
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground	-
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground	Η
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground	-
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground	

Power supply circuit Signal circuit Ground circuit

- : Continuity should exist.
- : Continuity should exist.
- : Continuity should not exist.

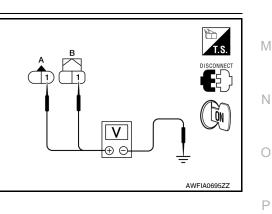
Is the inspection result normal?

- YES >> GO TO 6 NO >> • Repair of
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)	1		8 V or more
Front LH (A)			
Rear LH (B)		—	8 V 01 11010
Rear RH (B)			



Is the inspection result normal?

YES >> Inspection End.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151</u>, "<u>Removal and Installa-</u> tion".

[TCS/ABS]

А

Κ

L

#### < COMPONENT DIAGNOSIS >

Component Inspection

[TCS/ABS]

INFOID:000000005923395

# 1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer dis-
RR LH SENSOR	play (±10% or less)
RR RH SENSOR	

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-94</u>, "Diagnosis Procedure (Early Production)" or <u>BRC-96</u>, "Diagnosis Procedure (Late Production)".

#### А Description INFOID:000000004204343 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000004204344 DTC DETECTION LOGIC DTC Display item Malfunction detected condition Possible cause D Harness or connector BATTERY VOLTAGE When the ABS actuator and electric unit (control unit) C1109 ABS actuator and electric unit [ABNORMAL] power supply voltage is lower than normal. (control unit) Е DTC CONFIRMATION PROCEDURE 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. BRC Self-diagnosis results BATTERY VOLTAGE [ABNORMAL] Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-99, "Diagnosis Procedure"</u>. Н >> INSPECTION END NO **Diagnosis** Procedure INFOID:000000004204345 INSPECTION PROCEDURE **1.**CHECK CONNECTOR 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal. Κ 2. Reconnect connector and perform self-diagnosis. Is the inspection result normal? >> INSPECTION END YES NO >> GO TO 2 2.check abs actuator and electric unit (control unit) power supply circuit and **GROUND CIRCUIT** Μ Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26. 1. Check voltage between ABS actuator and electric unit (control 2. unit) harness connector E26 terminal 18 and ground. Ν Ο

DTC C1109 BATTERY VOLTAGE [ABNORMAL]

# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

**Revision: February 2010** 

l On

ALFIA0006ZZ

Ρ

[TCS/ABS]

# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

#### < COMPONENT DIAGNOSIS >

[TCS/ABS]

OFF

ALFIA0007ZZ

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
		Ignition switch ON Battery voltage (Approx. 12 V	
10		Ignition switch OFF	Approx. 0 V

- 3. Turn ignition switch OFF.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

#### Is the inspection result normal?

NO

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

1,4

0

# DTC C1110 CONTROL FAILURE

#### < COMPONENT DIAGNOSIS >

# DTC C1110 CONTROL FAILURE

# DTC Logic

INFOID:000000004204346

А

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)
DTC CC	NFIRMATION PROCE	DURE	
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	ESULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis		
ls above	displayed on the self-dia		
YES		procedure. Refer to <u>BRC-101, "Diagnosis Proce</u>	dure".
Diagno	sis Procedure		INFOID:00000004204347
NSPEC	TION PROCEDURE		
		ND ELECTRIC UNIT (CONTROL UNIT)	
		ctric unit (control unit) when self-diagnostic	result shows items other
unan una	t applicable.		
	>> Replace ABS actuato tion".	or and electric unit (control unit). Refer to <u>BRC-1</u>	151, "Removal and Installa-

Ν

0

Ρ

# DTC C1111 PUMP MOTOR

< COMPONENT DIAGNOSIS >

# DTC C1111 PUMP MOTOR

# Description

INFOID:000000004204348

[TCS/ABS]

#### PUMP

The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

#### MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

#### DTC Logic

INFOID:000000004204349

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1111		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for ac- tuator motor relay is open.	Harness or connector     ABS actuator and electric unit	
onn		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)	

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-102, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### **Diagnosis** Procedure

INFOID:000000004204350

#### INSPECTION PROCEDURE

# 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

# 2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

# DTC C1111 PUMP MOTOR

#### < COMPONENT DIAGNOSIS >

 Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **3.** CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**

#### **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

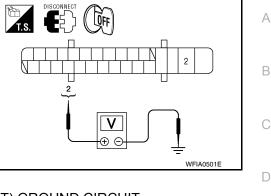
NOTE:

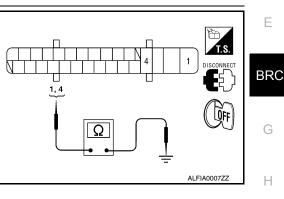
A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-102, "Diagnosis Procedure"</u>.





L

Ν

Ο

Ρ

#### [TCS/ABS]

# DTC C1114 MAIN RELAY

## Description

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204353

INFOID:000000004204354

INFOID:000000004204352

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1114 MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
		During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

MAIN RELAY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-104, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

2. Reconnect connector and perform self-diagnosis.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

# 2.CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

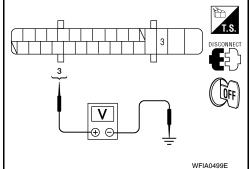
ABS actuator and electric unit (control unit)	Ground	Voltage
3	—	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO >> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".



# **DTC C1114 MAIN RELAY**

#### < COMPONENT DIAGNOSIS >

# $\overline{\mathbf{3.}}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

- YES >> • Replace ABS actuator and electric unit (control unit). Refer to BRC-151, "Removal and Installation". · Perform the self-diagnosis, and make sure that the
  - result shows "NO DTC IS DETECTED".
- NO >> • Repair or replace malfunctioning components. Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# Component Inspection

# **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table 2. below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

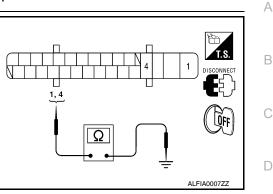
#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-104, "Diagnosis Procedure".



BRC

Н

Κ

L

Μ

Ν

Ρ

Е

#### [TCS/ABS]

INFOID:000000004204355

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### < COMPONENT DIAGNOSIS >

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204357

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When wheel sensor input signal is malfunctioning.	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-106</u>, "Diagnosis Procedure (Early Production)" or <u>BRC-107</u>, "Diagnosis Procedure (Late Production)".

NO >> Inspection end.

Diagnosis Procedure (Early Production)

#### **CAUTION:**

#### Do not check between wheel sensor terminals.

**1.**CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

YES >> GO TO 2

- NO >> Adjust air pressure, or replace tire.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### 2.CHECK SENSOR AND SENSOR ROTOR

Check sensor rotor for damage.

• Check wheel sensor for damage, disconnection or looseness.

#### Is the inspection result normal?

YES >> GO TO 3

- NO >> Repair wheel sensor mount or replace sensor rotor. Then perform the self-diagnosis.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 3. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.
- Reconnect connectors and the perform the self-diagnosis. Refer to <u>BRC-13</u>, "CONSULT-III Function (<u>ABS</u>)".

#### Is the inspection result normal?

YES >> Inspection end.

INFOID:000000005923396

INFOID:000000004204356

ITCS/ABS1

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

< COMPONENT DIAGNOSIS >

**ITCS/ABS1** 

А

В

D

Е

Κ

L

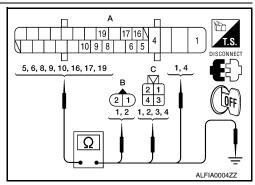
Μ

Ρ

#### NO >> GO TO 4

**4.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit Signal circuit Ground circuit

- : Continuity should exist. : Continuity should exist.
- : Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 5 NO
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 5.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Replace wheel sensor that resulted in malfunction by self-diagnosis.
- Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then 2. perform self-diagnosis.

#### Is above displayed on the self-diagnosis display?

- YES >> Inspection end.
- >> Replace ABS actuator and electric unit (control unit). Refer to BRC-74, "Removal and Installa-NO Ν tion".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### Diagnosis Procedure (Late Production)

#### **CAUTION:**

#### Do not check between wheel sensor terminals.

# **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors. 2.
- Check terminals for deformation, disconnection, looseness or damage. 3.

#### Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.

INFOID:000000005923397

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### < COMPONENT DIAGNOSIS >

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.

#### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace wheel sensor. Refer to <u>BRC-148</u>, "Removal and Installation".

3.CHECK TIRE

Check air pressure, wear and size.

Is the inspection result normal?

- YES >> GO TO 4 NO >> • Adjust a
  - >> Adjust air pressure, or replace tire.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **4.**CHECK WHEEL BEARINGS

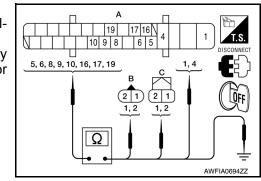
Check wheel bearing axial end play. Refer to <u>FAX-6, "Inspection"</u> (front) or <u>RAX-6, "On-vehicle Service"</u> (rear). <u>Is the inspection result normal?</u>

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

**5.**CHECK WHEEL SENSOR HARNESS

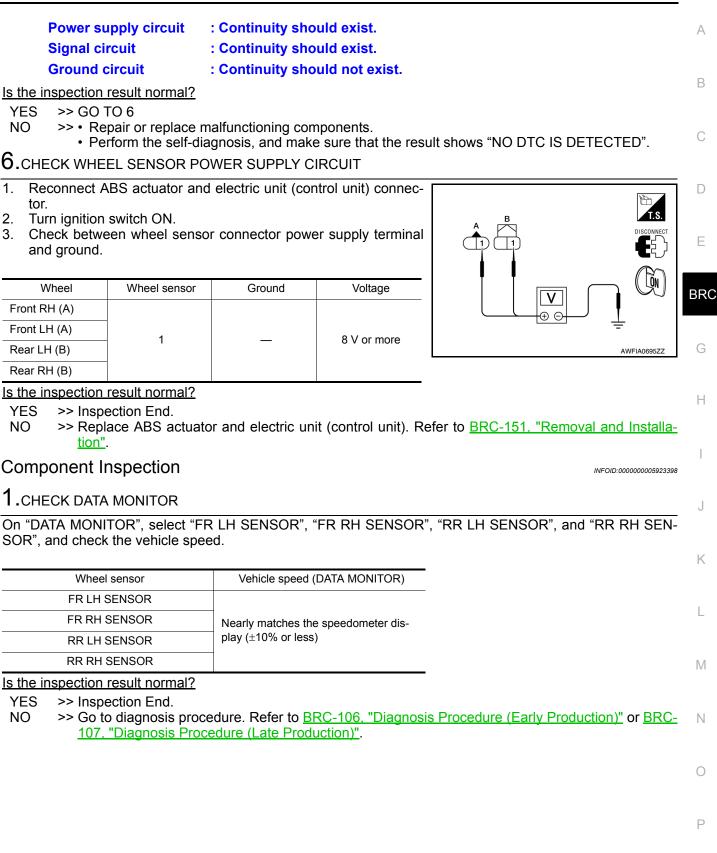
- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



Power supp		oply circuit Signal circuit		Ground circuit		
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

## DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

### < COMPONENT DIAGNOSIS >



### < COMPONENT DIAGNOSIS >

## C1120, C1122, C1124, C1126 IN ABS SOL

### Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

## DTC Logic

INFOID:000000004204361

INFOID:000000004204360

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1120	FR LH IN ABS SOL	When the control unit detects a malfunction in the front LH inlet solenoid circuit.	
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	ABS actuator and electric unit
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	(control unit)
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

## DTC CONFIRMATION PROCEDURE

### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH IN ABS SOL
FR RH IN ABS SOL
RR LH IN ABS SOL
RR RH IN ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-110, "Diagnosis Procedure"</u>.

NO >> Inspection end.

### **Diagnosis** Procedure

## INSPECTION PROCEDURE

## **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

INFOID:000000004204362

## C1120, C1122, C1124, C1126 IN ABS SOL

### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

## $\mathbf{3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

### **Component Inspection**



- 1. Select each test menu item on "ACTIVE TEST".
- On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

#### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve			
	UP	KEEP	DOWN	-
FR RH IN SOL	OFF	ON	ON	M
FR RH OUT SOL	OFF	OFF	ON*	-

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

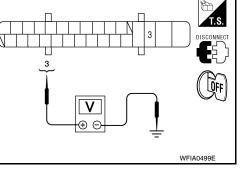
### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-110, "Diagnosis Procedure"</u>.

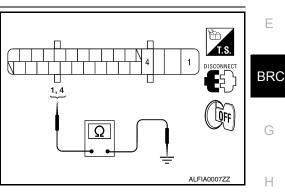


[TCS/ABS]

А

В

D



Κ

0

## C1121, C1123, C1125, C1127 OUT ABS SOL

### < COMPONENT DIAGNOSIS >

## C1121, C1123, C1125, C1127 OUT ABS SOL

### Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

### DTC Logic

INFOID:000000004204365

INFOID:000000004204364

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1121	FR LH OUT ABS SOL	When the control unit detects a malfunction in the front LH outlet solenoid circuit.	
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	ABS actuator and electric unit
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	(control unit)
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

### DTC CONFIRMATION PROCEDURE

### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
FR LH OUT ABS SOL
FR RH OUT ABS SOL
RR LH OUT ABS SOL
RR RH OUT ABS SOL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-112, "Diagnosis Procedure"</u>.

NO >> Inspection end.

### Diagnosis Procedure

INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2. CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

INFOID:000000004204366

## C1121, C1123, C1125, C1127 OUT ABS SOL

### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

## $\mathbf{3.}$ CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

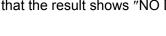
ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	—	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

### Component Inspection



INFOID:000000004204367

## **1.**CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)	ABS solenoid valve			
	UP	KEEP	DOWN	_
FR RH IN SOL	OFF	ON	ON	Ν
FR RH OUT SOL	OFF	OFF	ON*	_

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

#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

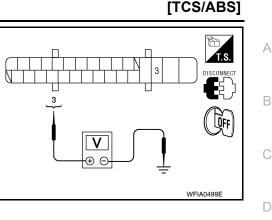
YES >> Inspection end.

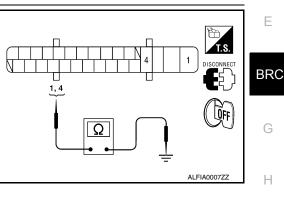
NO >> Go to diagnosis procedure. Refer to <u>BRC-112, "Diagnosis Procedure"</u>.

Ν

Ο

Κ





## C1130, C1131, C1132, C1133 ENGINE SIGNAL

### < COMPONENT DIAGNOSIS >

## C1130, C1131, C1132, C1133 ENGINE SIGNAL

### Description

DTC Logic

DTC DETECTION LOGIC DTC Detection Logic

DTC CONFIRMATION PROCEDURE DTC Confirmation Procedure

### **Diagnosis** Procedure

### INSPECTION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Self-diagnosis results	
ENGINE SIGNAL 1	
ENGINE SIGNAL 2	
ENGINE SIGNAL 3	
ENGINE SIGNAL 4	

Is above displayed on the self-diagnosis display?

YES >> GO TO 2

NO >> Inspection end.

## 2. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-1173, "CONSULT-III Function"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-84, "CONSULT-III Func-tion (ABS)"</u>.

Is the inspection result normal?

- YES >> Inspection end. NO >> • Repair or repl
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

INFOID:000000004204368

INFOID:000000004204369

INFOID:000000004204370

## U1000 CAN COMM CIRCUIT

## Description

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. <sup>C</sup> Each control unit transmits/receives data but selectively reads required data only.

## DTC Logic

INFOID:000000004204373

### DTC DETECTION LOGIC

				F
DTC	Display item	Malfunction detected condition	Possible cause	
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	<ul> <li>CAN communication line</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	BR
Diagno	sis Procedure		INFOID:00000004204374	
INSPEC	TION PROCEDURE			G
<b>1.</b> CHEC	K CONNECTOR			
chec		l disconnect ABS actuator and electric unit (c , disconnection, looseness, and so on. If any m		Η
	onnect connector and per	form self-diagnosis.		
	Self-diagnosis	results		
	CAN COMM CI	RCUIT		J
YES	displayed on the self-diac >> Refer to <u>LAN-26, "CAI</u> >> Inspection end.	nosis display? N System Specification Chart".		K
				L
				M
				Ν
				-
				0

INFOID:000000004204372

А

D

Ρ

## ABS WARNING LAMP

### < COMPONENT DIAGNOSIS >

## ABS WARNING LAMP

## Description

INFOID:000000004204375

[TCS/ABS]

×: ON –: OFF

Condition	ABS warning lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	x

### **Component Function Check**

INFOID:000000004204376

## 1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON. <u>Is the inspection result normal?</u>

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-116. "Diagnosis Procedure"</u>.

### Diagnosis Procedure

INFOID:000000004204377

## **1.**CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-84, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-38</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installa-</u> tion".
- NO >> Repair or replace combination meter.

## **BRAKE WARNING LAMP**

< COMPONENT D	AGNOSIS >
---------------	-----------

## BRAKE WARNING LAMP

Description	INFOID:000000004204378
	×: ON –: OFF
Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
Ignition switch ON	× (Note 2)
EBD function is malfunctioning.	×
<ul> <li>NOTE:</li> <li>1: Brake warning lamp will turn on in case of parking brake op (when brake fluid is insufficient).</li> <li>2: After starting engine, brake warning lamp is turned off.</li> </ul>	peration (when switch is ON) or of brake fluid level switch operation
Component Function Check	INFOID:00000004204379
<b>1.</b> BRAKE WARNING LAMP OPERATION CHECK 1	
· · ·	witch is turned ON, and turns OFF after the engine is
started. <u>Is the inspection result normal?</u>	
YES >> GO TO 2	
NO >> Go to diagnosis procedure. Refer to BRC	
2.BRAKE WARNING LAMP OPERATION CHECK 2	
	meter turns ON/OFF correctly when operating the park-
ing brake lever (M/T models) or the parking brake ped	lal (CVT models).
Is the inspection result normal?	
YES >> Inspection End NO >> Check parking brake switch. Refer to BRC	C-215, "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000004204380
1.CHECK PARKING BRAKE SWITCH	
	meter turns ON/OFF correctly when operating the park-
ing brake lever (M/T models) or the parking brake ped <u>Is the inspection result normal?</u>	iai (CVT models).
YES >> GO TO 2	
NO >> Check parking brake switch. Refer to <u>MW</u>	/I-49, "Diagnosis Procedure".
2.CHECK SELF-DIAGNOSIS	
	self-diagnosis. Refer to <u>BRC-84, "CONSULT-III Function</u>
ls the inspection result normal?	
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	
3.CHECK COMBINATION METER	
Check if the indication and operation of combination r tion".	meter are normal. Refer to <u>MWI-38, "Diagnosis Descrip-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit ( tion".	control unit). Refer to BRC-151, "Removal and Installa-
NO >> Repair or replace combination meter. Ref	er to MWI-179, "Removal and Installation".

## **TCS OFF SWITCH**

### < COMPONENT DIAGNOSIS >

## TCS OFF SWITCH

### Description

TCS OFF switch can deactivate (turn OFF) the TCS function by pressing the TCS OFF switch.

### Component Function Check

**1**.CHECK TCS OFF SWITCH OPERATION

Turn ON/OFF the TCS OFF switch and check that the TCS OFF indicator lamp in the combination meter turns ON/OFF correctly.

Condition	TCS OFF indicator lamp illumination status
TCS OFF switch: ON	ON
TCS OFF switch: OFF	OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-118, "Diagnosis Procedure"</u>.

### **Diagnosis** Procedure

### INSPECTION PROCEDURE

**1**.CHECK TCS OFF SWITCH

Perform the TCS OFF switch component inspection. Refer to BRC-119, "Component Inspection".

Is the inspection result normal?

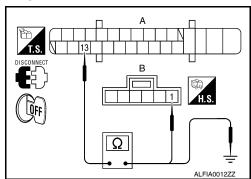
YES >> GO TO 2

NO >> Replace TCS OFF switch.

2.check tcs off switch harness

- 1. Disconnect ABS actuator and electric unit (control unit) connector E26.
- Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 13 and TCS OFF switch connector M72 (B) terminal 1.

ABS actuator and electric unit (control unit)	TCS OFF switch	Continuity
13	1	Yes



3. Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 13 and ground.

ABS actuator and electric unit (control unit)	Body ground	Continuity
13	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK TCS OFF SWITCH GROUND

INFOID:000000004204381

INFOID:000000004204382

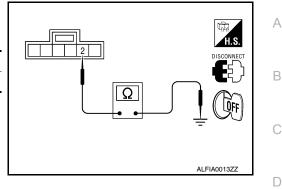
INFOID:000000004204383

## **TCS OFF SWITCH**

### < COMPONENT DIAGNOSIS >

Check continuity between TCS OFF switch connector M72 terminal 2 and ground.

TCS OFF switch	Body ground	Continuity
2	Ground	Yes



[TCS/ABS]

INFOID:000000004204384

Ε

BRC

L

Μ

Ν

Ο

Ρ

### Is the inspection result normal?

YES >> Inspection end.

NO >> Repair or replace malfunctioning components.

**Component Inspection** 

### INSPECTION PROCEDURE

1. CHECK TCS OFF SWITCH

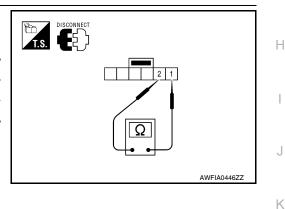
- 1. Disconnect TCS OFF switch connector.
- 2. Check continuity between TCS OFF switch terminals.

TCS OFF switch terminals	Condition	Continuity
1 – 2	TCS OFF switch pressed.	Yes
1 – 2	TCS OFF switch released.	No

Is the inspection result normal?

YES >> Inspection end.

NO >> Replace TCS OFF switch.



< ECU DIAGNOSIS >

**ECU DIAGNOSIS** 

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004204385

### VALUES ON THE DIAGNOSIS TOOL

### **CAUTION:**

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
FR LH SENSOR		0 [km/h]	Vehicle stopped	
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10 % or less)	Vehicle running (Note 1)	
STOP LAMP SW	Brake pedal operation	When brake pedal is de- pressed	ON	
		When brake pedal is not depressed	OFF	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
		TCS OFF switch ON (When TCS OFF indica- tor lamp is ON)	ON	
OFF SW	TCS OFF switch ON/OFF	TCS OFF switch OFF (When TCS OFF indica- tor lamp is OFF)	OFF	
	With engine running	With engine stopped	0 rpm	
ENGINE RPM		Engine running	Almost in accor- dance with tachome- ter display	
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR LH IN SOL	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or ac- tuator relay is inactive (in fail-safe mode)	ON	
RR LH OUT SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF	
		When the motor relay and motor are operating	ON	
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are not operat- ing	OFF	
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON	
(Note 2)		When the actuator relay is not operating	OFF	
	ABS warning lamp	When ABS warning lamp is ON	ON	
ABS WARN LAMP	(Note 3)	When ABS warning lamp is OFF	OFF	

### < ECU DIAGNOSIS >

### [TCS/ABS]

		Data monitor		
Monitor item	Display content	Display content Condition		Α
OFF LAMP	TCS OFF indicator lamp	When TCS OFF indica- tor lamp is ON	ON	В
(Note 3)	When TCS OFF indica- tor lamp is OFF	OFF		
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	С
(Note 3)	(Note 3)	When SLIP indicator lamp is OFF	OFF	C

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

Note 3: On and off timing for warning lamp and indicator lamp. Refer to <u>BRC-84, "CONSULT-III Function (ABS)"</u>.

BRC

Е

Н

J

Κ

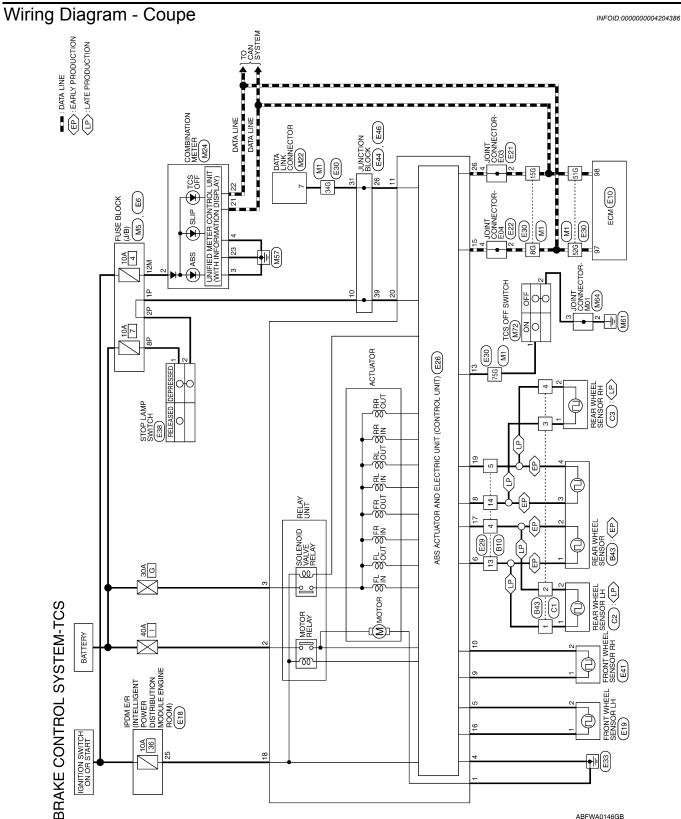
Μ

Ν

Ο

Ρ

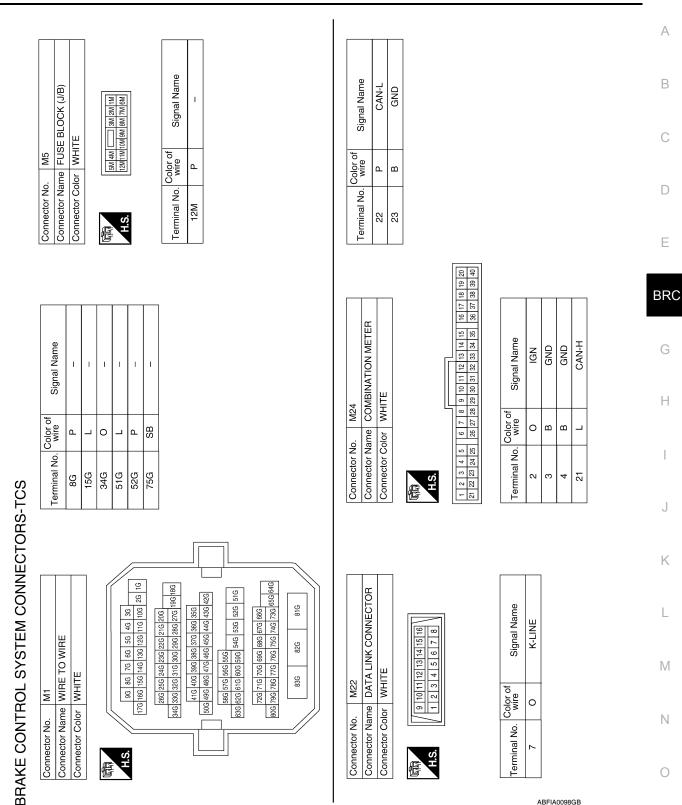
### < ECU DIAGNOSIS >



ABFWA0146GB

### < ECU DIAGNOSIS >

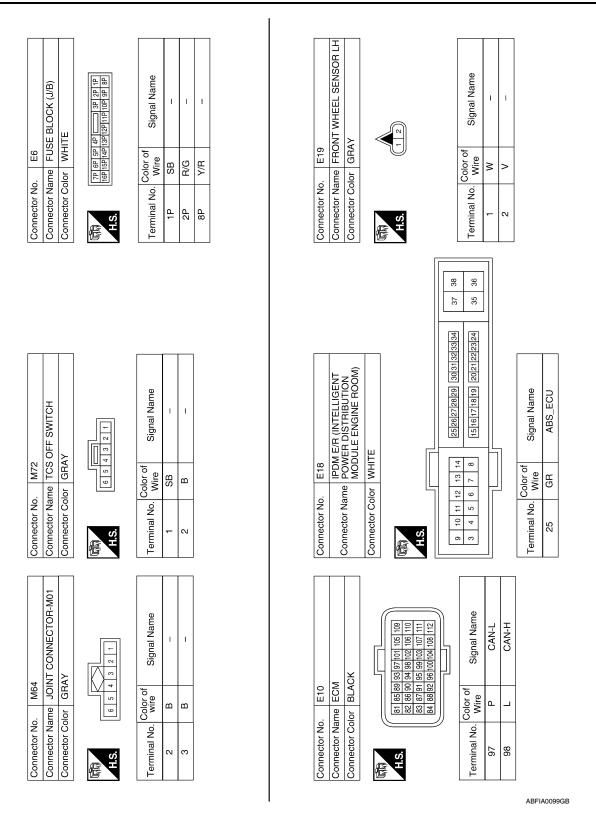
[TCS/ABS]



Ρ

ABFIA0098GB

### < ECU DIAGNOSIS >



< ECU DIAGNOSIS >

Connector Name JOINT CONNECTOR-E04

Connector Name JOINT CONNECTOR-E03

E21

Connector No.

Connector Color WHITE

E22

Connector No.

Connector Color WHITE

043210

E

佢

[TCS/ABS]

А

В

С

D

Ε

BRC

G

Н

J

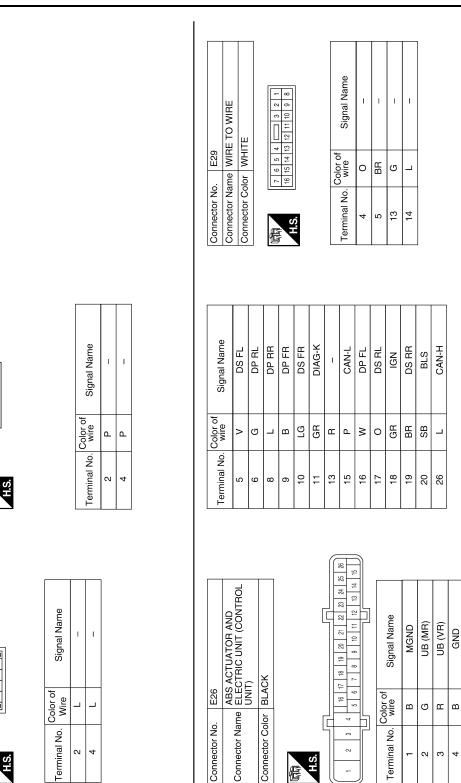
Κ

L

Μ

Ν

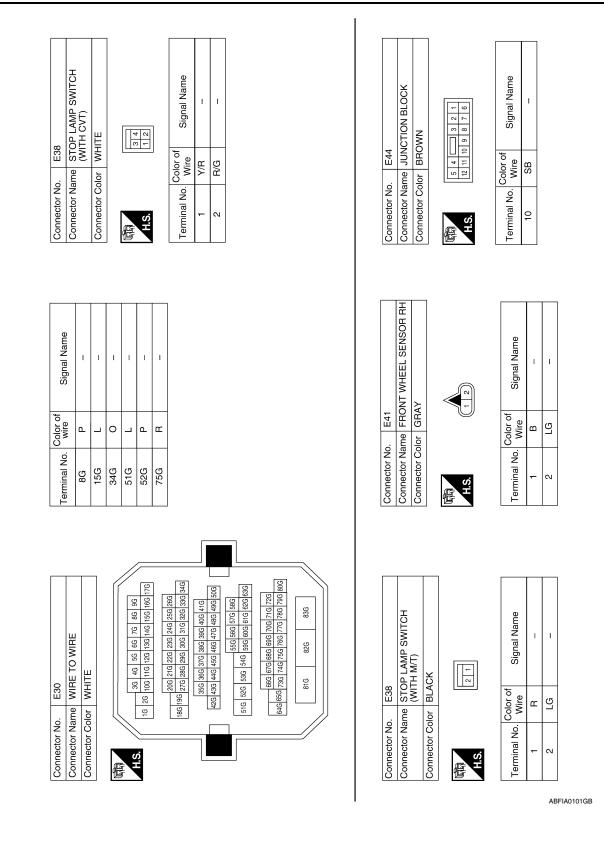
Ο



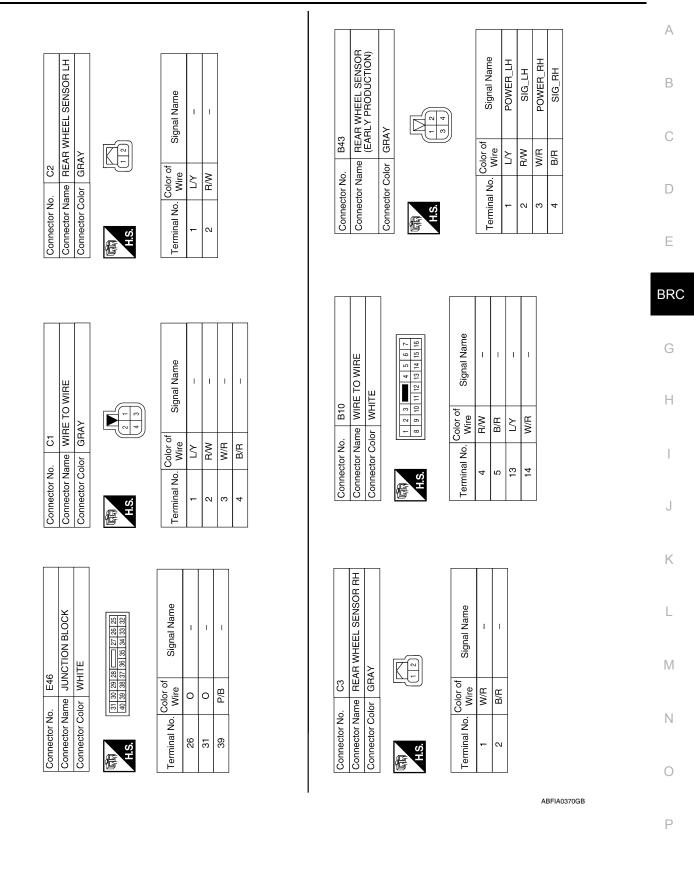
ABFIA0100GB

Ρ

### < ECU DIAGNOSIS >



< ECU DIAGNOSIS >



Connector No.	B43
Connector Name	WIRE TO WIRE (LATE PRODUCTION)
Connector Color	GRAY
。 旧·S·H	

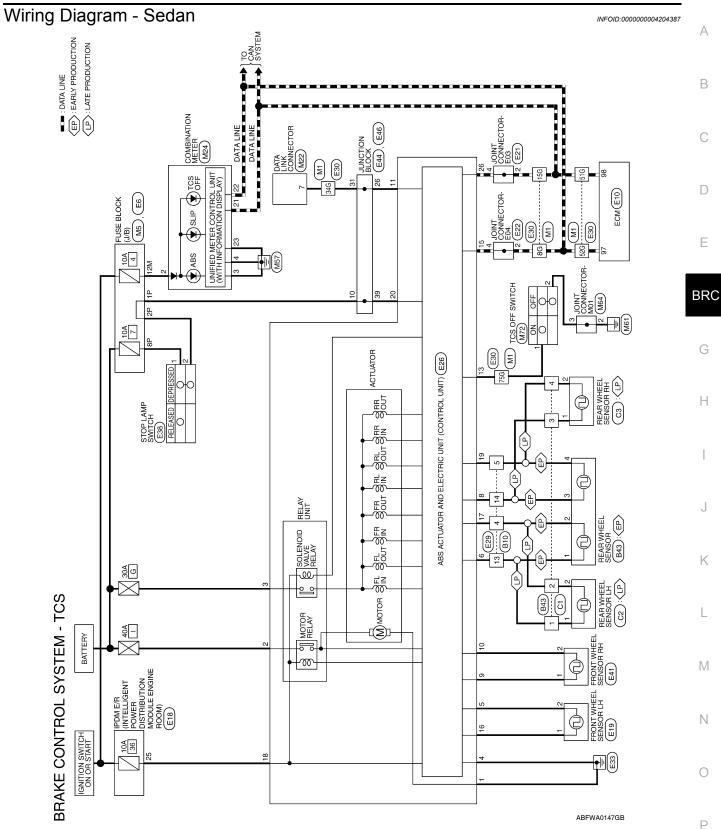
(3 4)	Signal Name	I	I	Ι
2	Color of Wire	ΓV	R/W	W/R
	Terminal No.	F	2	е

B/B

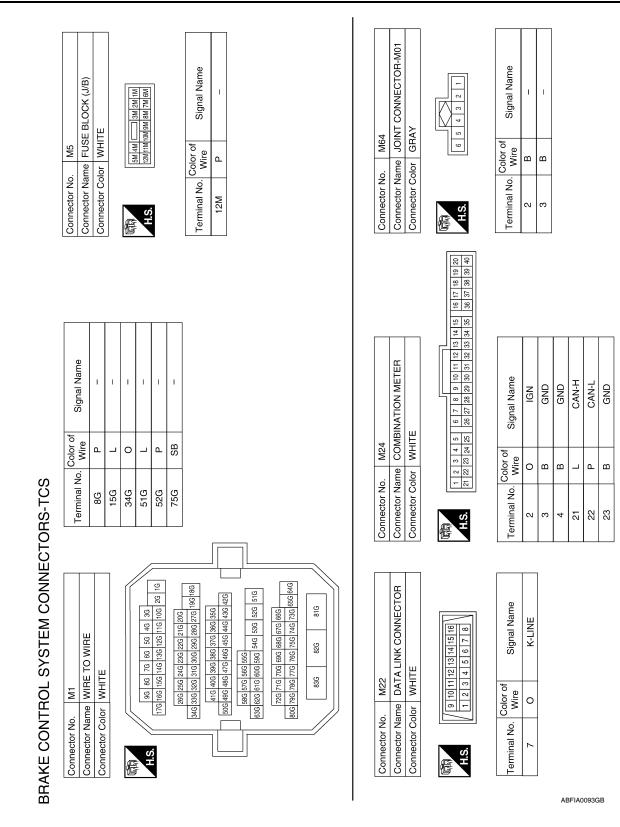
4

ABFIA0364GB

< ECU DIAGNOSIS >

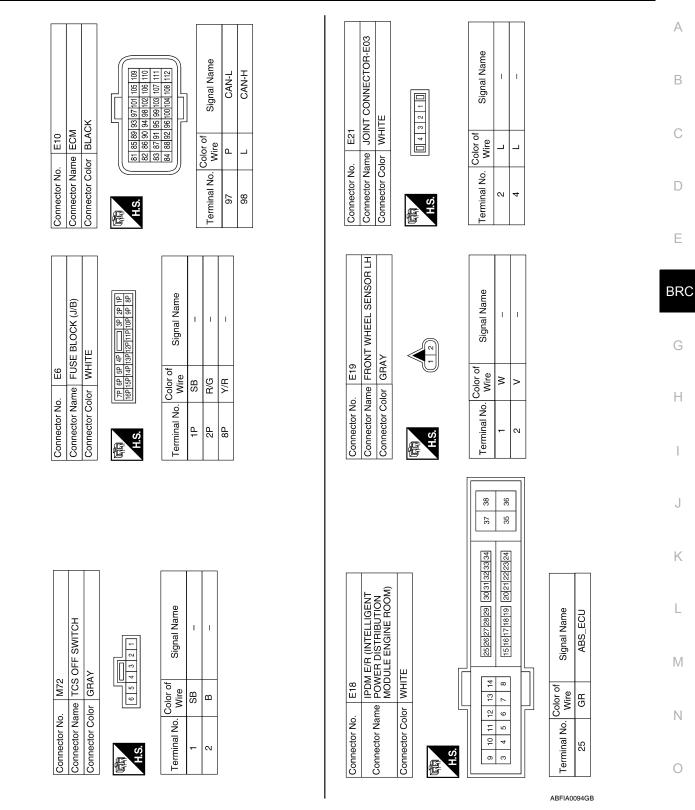


### < ECU DIAGNOSIS >



### < ECU DIAGNOSIS >

[TCS/ABS]

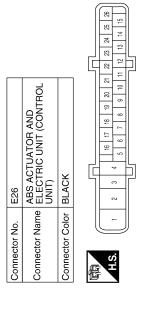


Ρ

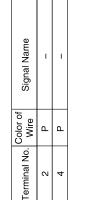
### < ECU DIAGNOSIS >

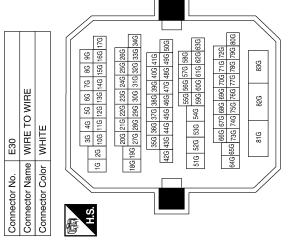
Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	ASR AUS (TCS)	CAN-L	DP FL	DS RL	DZ	DS RR	BLS	CAN-H
Color of Wire	>	g	_	в	LG	GR	В	٩	Μ	0	GR	BR	SB	Γ
Terminal No.	5	9	80	ი	10	÷	13	15	16	17	18	19	20	26

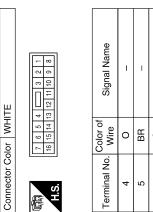
Signal Name	I	I	I	I	I	I
Color of Wire	Ч	L	0	Γ	Ь	œ
Terminal No.	8G	15G	34G	51G	52G	75G



Signal Name	MGND	UB (MR)	UB (VR)	GND
Color of Wire	В	ŋ	В	В
Terminal No.	-	2	3	4







Signal Name	I	I	Ι	I	
Color of Wire	0	ВВ	ŋ	_	
Terminal No. Wire	4	5	13	14	

Ι 

ABFIA0095GB

Connector Name JOINT CONNECTOR-E04

E22

Connector No.

WHITE

Connector Color

H.S.

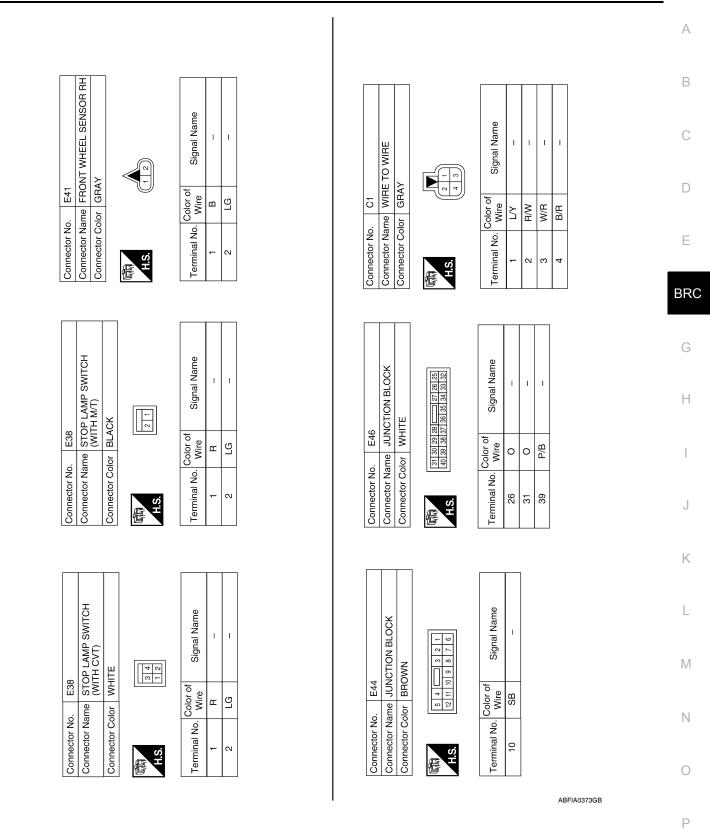
佢

Connector Name WIRE TO WIRE

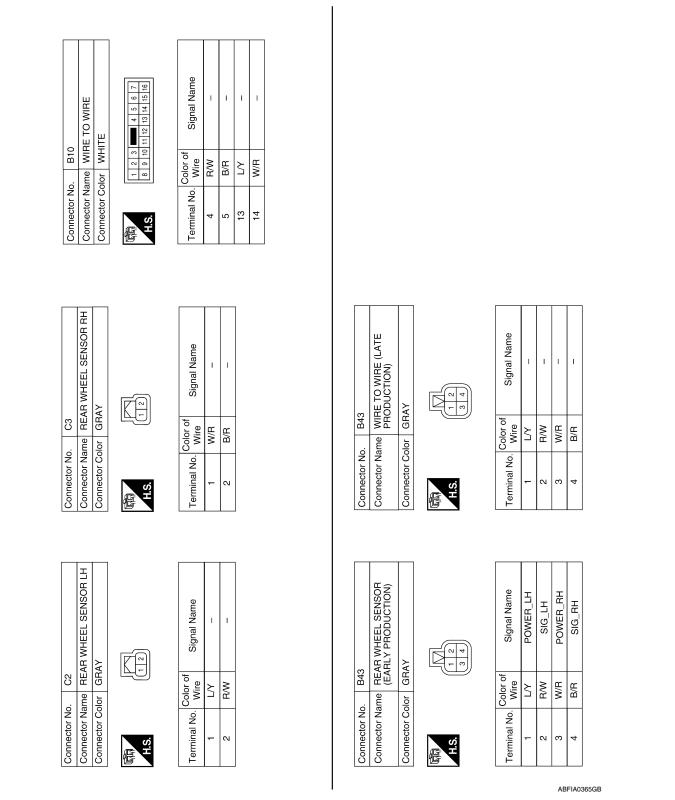
E29

Connector No.

### < ECU DIAGNOSIS >



< ECU DIAGNOSIS >



## Fail-Safe

#### INFOID:000000004204388

### ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, TCS OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the TCS/ABS become one of the following conditions of the fail-safe function.

### **BRC-134**

### < ECU DIAGNOSIS >

# • For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

#### **NOTE:** ABS self-diagnosis sound may be heard. That is a normal con

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" tests are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

### TCS

In case of malfunction in the TCS/ABS system, TCS OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without TCS control.

### If the Fail-Safe function is activated, then perform self-diagnosis for TCS/ABS control system.

### DTC No. Index

INFOID:000000004204389

[TCS/ABS]

А

В

С

D

F

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	BRC-89, "Diagno-
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	sis Procedure (Ear- ly Production)" or BRC-91, "Diagno-
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.	sis Procedure (Late Production)"
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	(Note)
RR RH SENSOR-2 [C1105]	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
RR LH SENSOR-2 [C1106]	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-94, "Diagno- sis Procedure (Ear- ly Production)" or
FR RH SENSOR-2 [C1107]	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	se sis Procedure (Late Production)"
FR LH SENSOR- 2 [C1108]	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-99, "Diagno- sis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-101, "Diagno- sis Procedure"
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-102, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY [C1114]	Actuator solenoid valve relay is ON, even if control unit sends OFF signal. Actuator solenoid valve relay is OFF, even if control unit sends ON signal.	BRC-104, "Diagno- sis Procedure"
ABS SENSOR [C1115]	Teeth damage on sensor rotor or improper installation of wheel sensor.	BRC-106. "Diagno- sis Procedure (Ear- ly Production)" or BRC-107. "Diagno- sis Procedure (Late Production)"
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"

### < ECU DIAGNOSIS >

### [TCS/ABS]

Display item	Malfunction detecting condition	Check item
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	BRC-110, "Diagno- sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	BRC-112, "Diagno- sis Procedure"
ENGINE SIGNAL 1 [C1130]	Fuel cut control abnormal.	
ENGINE SIGNAL 2 [C1131]	Electric throttle control abnormal.	<u>BRC-114, "Diagno-</u>
ENGINE SIGNAL 3 [C1132]	ECM CAN communication abnormal.	sis Procedure"
ENGINE SIGNAL 4 [C1133]	ECM communication to ABS actuator and electric unit (control unit) abnormal.	
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-115, "Diagno- sis Procedure"

Note: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage.

## SYMPTOM DIAGNOSIS TCS

## Symptom Table

If ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp turn ON, perform self-diagnosis.

TCS

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	BRC-138, "Diag- nosis Procedure"
4	Wheel sensor and rotor system	<u></u>
Linevineeted nodel reaction	Brake pedal stroke	BRC-139, "Diag-
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-140, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-141, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-142, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
Vahiala jarka during TCS/APS control	ABS actuator and electric unit (control unit)	BRC-143, "Diag-
Vehicle jerks during TCS/ABS control	ECM	nosis Procedure"

### NOTE:

• 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

•	2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it).	
	However, this is normal.	
-	When shifting gears	
-	When driving on slippery road	J
-	During cornering at high speed	0
-	When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]	

- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

L

Κ

M

Ν

0

Ρ

INFOID:000000004204390

А

В

## **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

### < SYMPTOM DIAGNOSIS >

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:000000004204391

[TCS/ABS]

## **1.**CHECK START

Check front and rear brake force distribution using a brake tester.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-6. "Inspection"</u>, Rear: <u>RAX-6. "On-vehicle Service"</u>.

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

**3.**CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor.
  - · Repair harness.

### **4.**CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. <u>Is the inspection result normal?</u>

- YES >> System normal.
- NO >> Perform self-diagnosis. Refer to <u>BRC-13, "CONSULT-III Function (ABS)</u>".

## UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS >	
	_

## UNEXPECTED PEDAL REACTION

	Λ
Diagnosis Procedure	A
1. CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to <u>BR-13, "Inspection and Adjustment"</u> .	
Is the stroke too big?	
YES >> • Bleed air from brake tube and hose. Refer to <u>BR-16. "Bleeding Brake System"</u> .	С
<ul> <li>Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: <u>BR-13</u>, "<u>Inspection and Adjustment</u>", brake booster and master cylinder: <u>BR-10</u>, "<u>On Board Inspection</u>".</li> <li>NO &gt;&gt; GO TO 2.</li> </ul>	D
2. CHECK FUNCTION	
Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition.Connect connector after inspection.	E
Is the inspection result normal?	
YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-62, "Diagnosis Procedure".	BRC
NO >> Check brake system.	G

Н

[TCS/ABS]

J

Κ

L

Μ

Ν

0

Ρ

## THE BRAKING DISTANCE IS LONG

**Diagnosis** Procedure

INFOID:000000004204393

### **CAUTION:**

The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.

**1.**CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

- YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-62, "Diagnosis Procedure".
- NO >> Check brake system.

## ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >	TCS/ABS]	
ABS FUNCTION DOES NOT OPERATE		Δ
Diagnosis Procedure	DID:000000004204394	$\square$
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY		В
Make sure that the ABS warning lamp turns OFF after ignition switch is turned on or when driving.		С
Is the inspection result normal?		
YES >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom BRC-62, "Diagnosis Procedure".	1. Refer to	D
NO >> Perform self-diagnosis. Refer to <u>BRC-13, "CONSULT-III Function (ABS)"</u> .		

BRC

G

Н

J

Κ

L

M

Ν

0

Ρ

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

### < SYMPTOM DIAGNOSIS >

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

**1.**SYMPTOM CHECK 1

Check if there is pedal vibration or operation sound when the engine is started.

Do symptoms occur?

YES >> GO TO 2

NO >> Perform self -diagnosis. Refer to <u>BRC-84, "CONSULT-III Function (ABS)"</u>.

2.SYMPTOM CHECK 2

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

- YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
- NO >> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to <u>BRC-13, "CONSULT-III Function (ABS)"</u>.

INFOID:000000004204395

VEHICLE JERKS DURING TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [TCS/ABS]	
VEHICLE JERKS DURING TCS/ABS CONTROL	
Diagnosis Procedure	A
<b>1.</b> SYMPTOM CHECK	В
Check if the vehicle jerks during TCS/ABS control.	
<u>Is the inspection result normal?</u> YES >> Normal.	С
NO >> GO TO 2	
2. CHECK SELF-DIAGNOSIS RESULTS	D
Perform self-diagnostic of ABS actuator and electric unit (control unit). Refer to <u>BRC-84</u> , <u>"CONSULT-III Func-tion (ABS)"</u> .	
Are self-diagnosis results indicated?	Е
YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.	
NO >> GOTO 3	BRC
<ul> <li>3.CHECK CONNECTOR</li> <li>• Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check</li> </ul>	
terminal for deformation, disconnection, looseness, etc.	G
<ul> <li>Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.</li> <li>Are self-diagnosis results indicated?</li> </ul>	
YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.	Н
NO >> GO TO 4 4.CHECK ECM AND CVT SELF-DIAGNOSIS RESULTS	
Perform ECM and CVT self-diagnosis. Refer to EC-1173, "CONSULT-III Function" and TM-121, "CONSULT-III	
Function (TRANSMISSION)". Are self-diagnosis results indicated?	
YES >> Check the corresponding items.	J
<ul> <li>ECM: Refer to <u>EC-1160, "Diagnosis Description"</u>.</li> <li>CVT: Refer to <u>TM-119, "Diagnosis Description"</u>.</li> </ul>	LZ.
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-151, "Removal and Installa-</u> tion".	K
	I
	L
	N /I
	Μ
	NI
	Ν
	0
	0
	Р

## NORMAL OPERATING CONDITION

### < SYMPTOM DIAGNOSIS >

## NORMAL OPERATING CONDITION

## Description

INFOID:000000004204397

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when TCS or ABS is activated.	This is a normal condi- tion due to the TCS or ABS activation.
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	
The brake pedal moves and generates noises, when TCS is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a normal, and it is caused by the ABS operation check.
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because TCS places the highest priority on the optimum traction (stability).
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	
The ABS warning lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal road. If the normal con- dition is restored, there is no malfunction. At that time, erase the self- diagnosis memory.
The ABS warning lamp, TCS OFF indicator lamp and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the TCS function before performing an inspec- tion on a chassis dyna- mometer.)
TCS OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a TCS sys- tem error but results from characteristic change of tire.

А

В

Ε

Н

Κ

# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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. 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. Information necessary to service the system safely is included in the SR 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 SR 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 harnesses or harness connectors.

#### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

#### WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

## Precaution for Brake System

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torgue wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

#### WARNING:

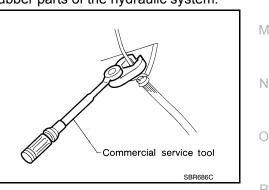
# Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

# Precaution for Brake Control

INFOID:000000004204400

INFOID:000000004204399

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic



# **BRC-145**

# PRECAUTIONS

#### < PRECAUTION >

servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.

- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspensionrelated parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

# PREPARATION

# PREPARATION PREPARATION

< PREPARATION >

# **Special Service Tool**

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

Tool number (Kent-Moore No.) Tool name	Description	С
 (J-45741) ABS active wheel sensor tester	Checking operation of ABS active wheel sen- sor	D
		BRC
Commercial Service Tool	INFOID:000000004204402	
Commercial Service Tool	INFOID:00000004204402	G
Commercial Service Tool	INFOID:000000004204402 Description	G
		G H

S-NT360

INFOID:000000004204401

А

В

J

Κ

L

Μ

Ν

Ο

Ρ

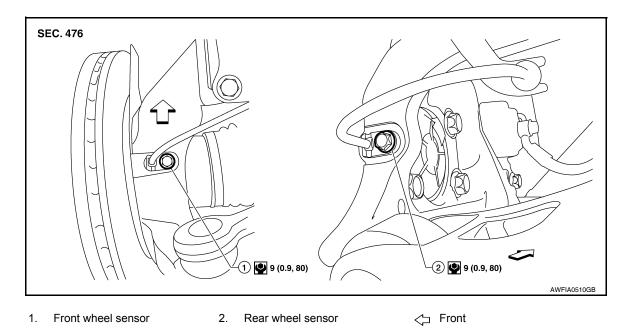
# WHEEL SENSORS

#### < ON-VEHICLE REPAIR >

# ON-VEHICLE REPAIR WHEEL SENSORS

Removal and Installation

INFOID:000000004505076



#### **CAUTION:**

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub, first remove the wheel sensor from the wheel hub. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.
- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of
  the sensor or to the inside of the hole in the wheel hub for the wheel sensor, or if a foreign object is
  caught in the surface of the mating surface for the sensor rotor. Fix as necessary and then install the
  wheel sensor.

#### FRONT WHEEL SENSOR

#### Removal

- 1. Remove front wheel and tire. Refer to WT-68. "Adjustment".
- 2. Partially front wheel fender protector. Refer to EXT-20, "Removal and Installation".
- 3. Remove wheel sensor bolt and wheel sensor.
- 4. Remove harness wire from mounts and disconnect wheel sensor harness connector.

#### Installation

Installation is in the reverse order of removal.

#### REAR WHEEL SENSOR

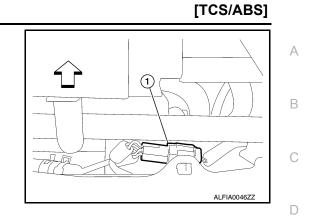
#### Removal

1. Remove rear wheel and tire. Refer to WT-68, "Adjustment".

# WHEEL SENSORS

#### < ON-VEHICLE REPAIR >

- 2. Disconnect wheel sensor harness connector (1).
  - <>: Front



- 3. Remove harness wire clips from rear suspension member.
- 4. Remove wheel sensor bolt and wheel sensor from rear wheel hub and bearing assembly.

#### Installation

Installation is in the reverse order of removal.

BRC

G

Н

Κ

L

Μ

- Ν
- 0

Р

< ON-VEHICLE REPAIR >

# SENSOR ROTOR

#### Removal and Installation

The front and rear wheel sensor rotors are an integral part of the wheel hubs and can not be disassembled. When replacing the sensor rotor, replace the wheel hub. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

INFOID:000000004505077

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### < ON-VEHICLE REPAIR >

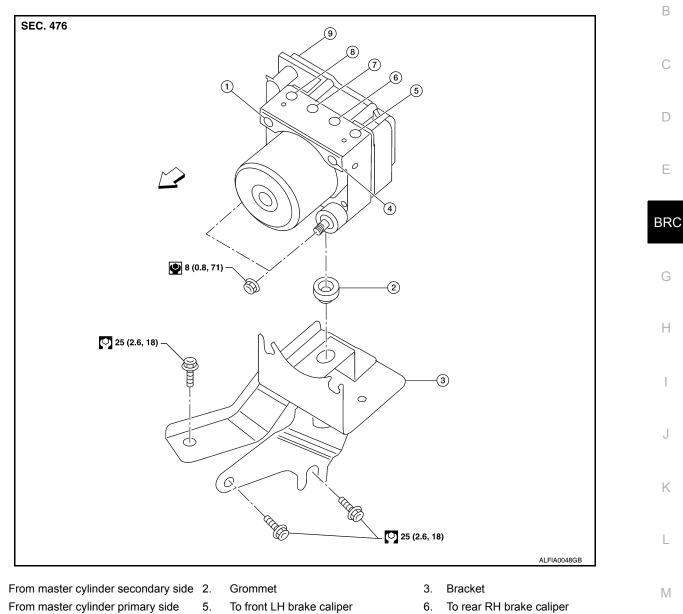
# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

# **Exploded View**

INFOID:000000004505078

А

[TCS/ABS]



7. To rear LH brake caliper

← Front

1.

4.

## Removal and Installation

#### **CAUTION:**

- Be careful of the following.
- Before servicing, disconnect the battery cable from negative terminal.

8.

- To remove brake pipe, use a suitable tool (flare nut wrench) to prevent flare nuts and brake tube from being damaged. To install, use suitable tool (flare nut torque wrench).
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.

To front RH brake caliper

9.

unit)

ABS actuator and electric unit (control

- Do not remove and install ABS actuator and electric unit (control unit) by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-16, "Bleeding Brake System"</u>.
- After installing harness connector on the ABS actuator and electric unit (control unit), make sure connector is securely locked.

#### **BRC-151**

INFOID:000000004505079

Ν

Ρ

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### < ON-VEHICLE REPAIR >

[TCS/ABS]

 In the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-157, "ADJUSTMENT OF STEERING ANGLE SENSOR</u> <u>NEUTRAL POSITION : Special Repair Requirement"</u>.

#### REMOVAL

- 1. Remove front wiper arms. Refer to <u>WW-119, "FRONT WIPER ARMS : Removal and Installation"</u>.
- 2. Remove cowl top. Refer to EXT-19, "Removal and Installation".
- 3. Disconnect washer hose.
- 4. Disconnect the battery negative terminal.
- 5. Remove tower bar, if equipped. Refer to FSU-13, "Exploded View".
- 6. Disconnect ABS actuator and electric unit (control unit) connector.
- 7. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit) using a suitable tool.
- 8. Remove ABS actuator and electric unit (control unit) nuts.
- 9. Remove ABS actuator and electric unit (control unit).
- 10. Remove bracket as necessary.

#### INSTALLATION

Installation is in the reverse order of removal.

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

#### PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been ajusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-157</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR <u>NEUTRAL POSITION : Description</u>".

#### DESCRIPTION

**Basic Concept** 

- The most important point to perform trouble diagnosis is to understand systems (control and mechanism) in E vehicle thoroughly.
- It is also important to clarify customer complaints before inspection.

First of all, reproduce symptom, and understand it fully.

Ask customer about his/her complaints carefully. In some cases, they will be necessary to check symptom by driving vehicle with customer.

#### **CAUTION:**

Customers are not professionals. Do not assume "maybe customer means..." or "maybe customer mentioned this symptom".

SEF234G

CAUSE

INFO.

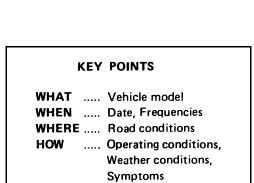
• It is essential to check symptoms right from beginning in order to repair a malfunction completely.

For an intermittent malfunction, it is important to reproduce symptom based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairs are performed without any symptom check, no one can judge if malfunction has actually been eliminated.

- After diagnostic, make sure to perform "ERASE MEMORY". Refer to <u>BRC-163, "CONSULT-III Function (ABS)"</u>.
- Always read "GI General Information" to confirm general precautions. Refer to <u>GI-3</u>.

#### Asking Complaints

- Complaints against malfunction vary depending on each person. It is important to clarify customer complaints.
- Ask customer about what symptoms are present and under what conditions. Use information to reproduce symptom while driving.
- It is also important to use diagnostic sheet so as not to miss information.



А

[VDC/TCS/ABS]

INFOID:000000004204407 B

Η

BRC



K

L

SEF233G

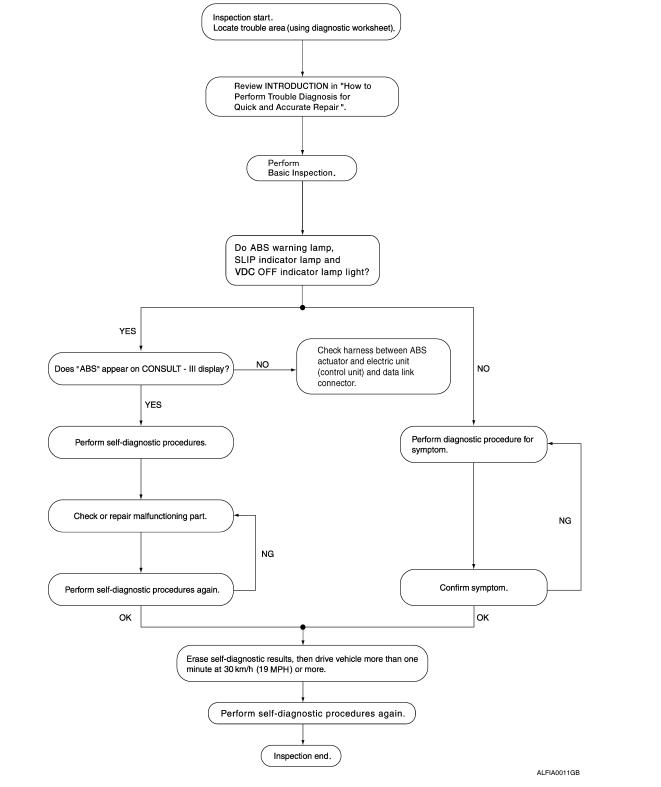
Ρ

SBR339B

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

#### OVERALL SEQUENCE



## DETAILED FLOW

# 1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-156</u>, "<u>Diagnostic Work</u> <u>Sheet</u>".

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >	[VDC/TCS/ABS]
>> GO TO 2.	
2. PERFORM THE SELF-DIAGNOSIS	1
Check the DTC display with the self-diagnosis function. Refer to BRC-163, "CONS	ULT-III Function (ABS)"
Is there any DTC displayed?	
YES >> GO TO 3. NO >> GO TO 4.	
<b>3.</b> PERFORM THE SYSTEM DIAGNOSIS	(
Perform the diagnosis applicable to the displayed DTC. Refer to BRC-244, "DTC N	lo. Index".
>> GO TO 7.	I
4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCT	TION
Check that the symptom is a normal operation that is not considered a system malf <u>"CONSULT-III Function (ABS)"</u> .	function. Refer to <u>BRC-163.</u>
Is the symptom is a normal operation?	В
YES >> INSPECTION END NO >> GO TO 5.	D
<b>5.</b> CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION	
Check that the warning lamp and indicator lamp illuminate.	(
<ul> <li>ABS warning lamp: Refer to <u>BRC-219</u>, "<u>Description</u>".</li> <li>Brake warning lamp: Refer to <u>BRC-220</u>, "<u>Description</u>".</li> </ul>	
VDC OFF indicator lamp: Refer to <u>BRC-221, "Description"</u> .	
<ul> <li>SLIP indicator lamp: Refer to <u>BRC-222, "Description"</u>.</li> <li><u>Is ON/OFF timing normal?</u></li> </ul>	
YES $>>$ GO TO 6.	
NO >> GO TO 2.	
<b>6.</b> PERFORM THE DIAGNOSIS BY SYMPTOM	
Perform the diagnosis applicable to the symptom.	
>> GO TO 7.	
<b>7.</b> REPAIR OR REPLACE THE MALFUNCTIONING PARTS	
Repair or replace the specified malfunctioning parts.	
>> GO TO 8.	
8.FINAL CHECK	1
Perform the self-diagnosis again, and check that the malfunction is repaired complete self diagnosis memory Refer to REC 163. "CONSULT III Experime (ARS)"	etely. After checking, erase
the self-diagnosis memory. Refer to <u>BRC-163, "CONSULT-III Function (ABS)"</u> . Is no other DTC present and the repair completed?	I
YES >> Inspection End	
NO >> GO TO 3.	
	(

Ρ

# DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

# **Diagnostic Work Sheet**

INFOID:000000004204408

[VDC/TCS/ABS]

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

SFIA3265E

INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLAC		А
ADDITIONAL SERVICE WHEN REPLACIN		В
After replacing the ABS actuator and electric unit (contisteering angle sensor.	rol unit), perform the neutral position adjustment for the	0
ADDITIONAL SERVICE WHEN REPLACIN	NG CONTROL UNIT : Special Repair Re-	С
1.PERFORM THE NEUTRAL POSITION ADJUSTME		D
Perform the neutral position adjustment for the steering	g angle sensor.	Е
>> Refer to <u>BRC-157, "ADJUSTMENT OF S</u>	STEERING ANGLE SENSOR NEUTRAL POSITION :	
Description". ADJUSTMENT OF STEERING ANGLE S		BRC
ADJUSTMENT OF STEERING ANGLE SE	ENSOR NEUTRAL POSITION : Description	G
In case of doing work that applies to the list below mal	ke sure to adjust neutral position of steering angle sen-	G
sor before running vehicle.		
	×: Required –: Not required	Н
Situation	Adjustment of steering angle sensor neutral position	
Removing/Installing ABS actuator and electric unit (control unit)	—	
Replacing ABS actuator and electric unit (control unit)	×	
Removing/Installing steering angle sensor	x	
Replacing steering angle sensor	x	J
Removing/Installing steering components	×	
Replacing steering components	x	К
Removing/Installing suspension components	×	1.4
Replacing suspension components	×	
Change tires to new ones	_	L
Tire rotation	_	
Adjusting wheel alignment	×	M
ADJUSTMENT OF STEERING ANGLE SE	NSOR NEUTRAL POSITION : Special Re-	IVI
pair Requirement	NFOID:00000004204412	Ν
ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION	
CAUTION:		
To adjust neutral position of steering angle sensor,	, make sure to use CONSULT-III	0
(Adjustment cannot be done without CONSULT-III)		
1.ALIGN THE VEHICLE STATUS		D
Stop vehicle with front wheels in straight-ahead position	n.	Г
>> GO TO 2.		
2.PERFORM THE NEUTRAL POSITION ADJUSTME	ENT FOR THE STEERING ANGLE SENSOR	
<ol> <li>On the CONSULT-III screen, touch "WORK SUPP"</li> <li>Touch "START".</li> </ol>	ORT", then "ST ANG SEN ADJUSTMENT".	
Revision: February 2010 BRC	2009 Altima	

**INSPECTION AND ADJUSTMENT** 

< BASIC INSPECTION >

[VDC/TCS/ABS]

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

#### CAUTION:

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

3. After approximately 10 seconds, touch "END".

- NOTE: After approximately 60 seconds, the adjustment ends automatically.4. Turn ignition switch OFF, then turn it ON again.
  - CAUTION: Be sure to perform above operation.

>> GO TO 3.

3. CHECK DATA MONITOR

- 1. Run vehicle with front wheels in straight-ahead position, then stop.
- 2. Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within 0±2.5°.

Is the steering angle within the specified range?

- YES >> GO TO 4.
- NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1.

**4.**ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memories of the ABS actuator and electric unit (control unit) and ECM.

- ABS actuator and electric unit (control unit): Refer to BRC-163, "CONSULT-III Function (ABS)".
- ECM: Refer to <u>BRC-163</u>, "CONSULT-III Function (ABS)".

Are the memories erased?

- YES >> INSPECTION END
- NO >> Check the items indicated by the self-diagnosis.

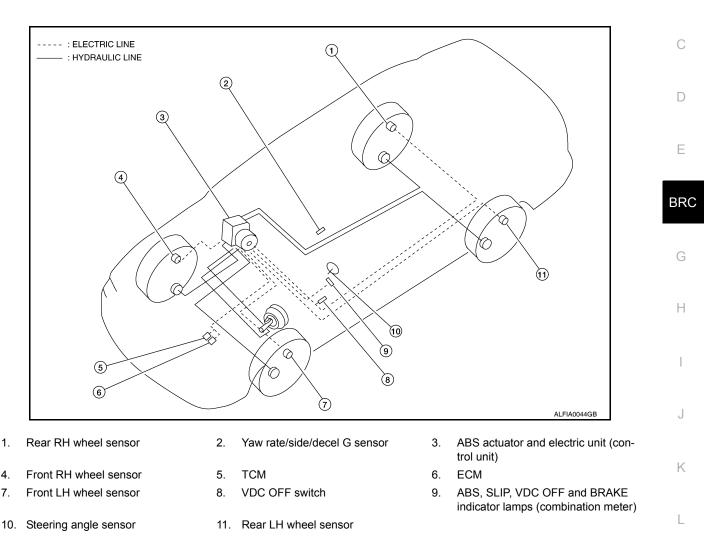
# < FUNCTION DIAGNOSIS > FUNCTION DIAGNOSIS VDC/TCS/ABS

# System Diagram

А

[VDC/TCS/ABS]

INFOID:000000004204413



# System Description

INFOID:000000004204414

#### ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/TCS/ABS become one of the following conditions of the fail-safe function.

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

#### NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

#### VDC / TCS

In case of malfunction in the VDC/TCS/ABS system, VDC OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without VDC/TCS control.

#### If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

## **BRC-159**

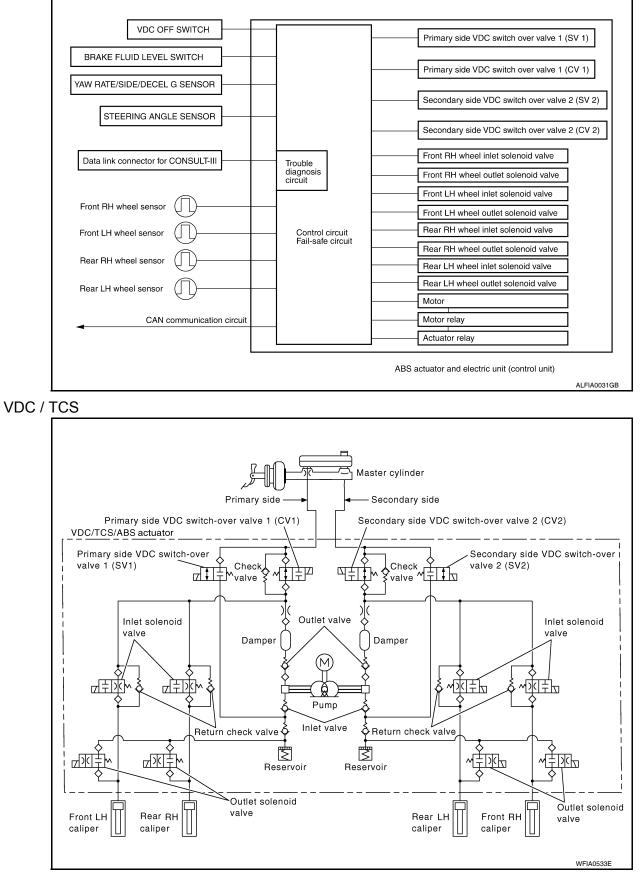
M

Ο

Ρ

#### < FUNCTION DIAGNOSIS >

#### ELECTRICAL COMPONENTS



# OPERATION THAT IS NOT "SYSTEM ERROR"

Operation That Is Not "System Error"

#### < FUNCTION DIAGNOSIS >

В

D

Κ

L

M

Ν

Ρ

#### ABS

- When starting engine or just after starting vehicle, brake pedal may vibrate or the motor operating sound may be heard from engine room. This is a normal states of the operation check.
- During ABS operation, brake pedal lightly vibrates and a mechanical sound may be heard. This is normal.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

TCS

- Depending on road circumstances, driver may have a sluggish feel. This is normal, because optimum traction has highest priority under TCS operation.
- When vehicle is passing through a road where surface friction varies, downshifting or depressing accelerator pedal fully may activate TCS temporarily.

VDC

- During VDC operation, body and brake pedal lightly vibrate and mechanical sounds may be heard. This is normal.
- If vehicle is rotated on turn table, or rolled and rocked on ship, ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may turn on. In this case, start engine on normal road again. If ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp turn off after restart, it is normal.
- When starting TCS or VDC under rapid acceleration or hard turn, operating sound by brake pedal is generated. However, this is not malfunction. This is because TCS and VDC are functioning normally.
- VDC may not operate normally or ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn on when driving special roads with extremely steep slant (banks on circuit road and so on.) However, it is not malfunction when returning to a normal state after restarting the engine. In that case, be sure to erase the memory of self-diagnosis. Refer to <u>BRC-163</u>, "CONSULT-III Function (ABS)".
- Yaw rate /side G sensor malfunction may occur under hard turn like spin turn, rapid acceleration turn, drift run, etc., when VDC function is OFF (VDC OFF switch is turned on). It is not malfunction if it is possible to return to a normal position after restarting engine. Then erase the memory of self-diagnosis. Refer to <u>BRC-163</u>, "CONSULT-III Function (ABS)".
- VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on. This is not a VDC system error but results from characteristic change of tires.

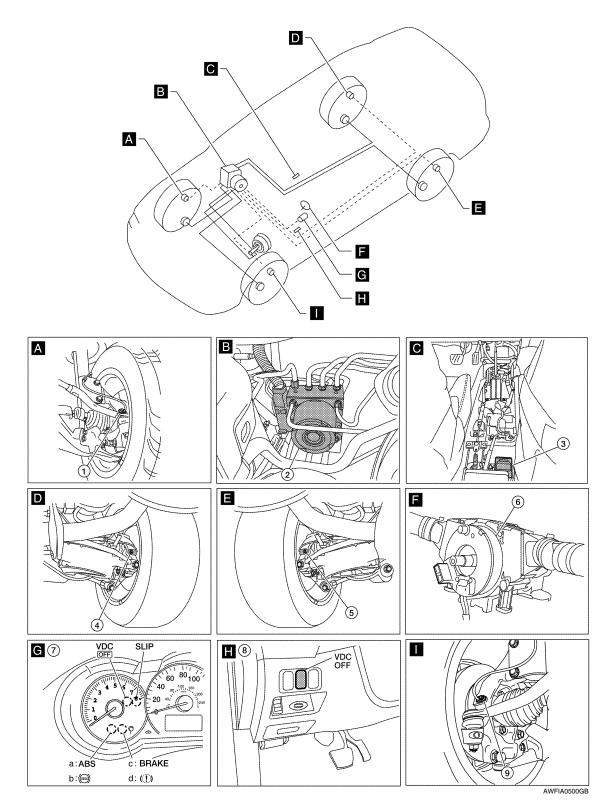
#### CAN Communication

Refer to LAN-8, "System Description".

# Component Parts Location

INFOID:000000004204415

[VDC/TCS/ABS]



1. Front wheel sensor RH E41

2. ABS actuator and electric unit 3. (control unit) E26

Yaw rate/side/decel G sensor M55

#### < FUNCTION DIAGNOSIS >

- 4. Rear wheel sensor RH B43
- 7. Combination meter M24
  - a: US models
  - b: Canada models
  - c: US models
  - d: Canada models

# **Component Description**

Rear wheel sensor LH B43

8. VDC OFF switch M72

5.

- [VDC/TCS/ABS]
- 6. Steering angle sensor (behind spiral cable) (Steering wheel removed for clarity) M53 A
  9. Front wheel sensor LH E19

В

INFOID:000000004204416

INFOID:000000004204417

Κ

L

Μ

Component parts		Reference	D
	Pump	RRC 192 "Description"	
	Motor	BRC-183, "Description"	
APS actuator and alastria unit (control unit)	Actuator relay (Main relay)	BRC-185, "Description"	E
ABS actuator and electric unit (control unit)	Solenoid valve	BRC-193, "Description"	
	Pressure sensor	BRC-199, "Description"	BRO
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-217, "Description"	
Wheel sensor		BRC-170, "Description"	
Yaw rate/side G sensor		BRC-203, "Description"	G
Steering angle sensor		BRC-201, "Description"	
VDC OFF switch		BRC-217, "Description"	
ABS warning lamp		BRC-219, "Description"	Η Η
Brake warning lamp		BRC-220, "Description"	
Parking brake switch		BRC-215, "Description"	
VDC OFF indicator lamp		BRC-221, "Description"	
SLIP indicator lamp		BRC-222, "Description"	

# CONSULT-III Function (ABS)

APPLICATION ITEM	
ABS	

#### BASIC OPERATION PROCEDURE

#### WORK SUPPORT

#### Operation Procedure

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

	×: Required –: Not required
Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/Installing steering components	×
Replacing steering components	×
Removing/Installing suspension components	×
Replacing suspension components	×
Change tires to new ones	_

#### < FUNCTION DIAGNOSIS >

х

Tire rotation

Adjusting wheel alignment

#### **CAUTION:**

# To adjust neutral position of steering angle sensor, make sure to use CONSULT-III. (Adjustment cannot be done without CONSULT-III.)

- 1. Stop vehicle with front wheels in straight-ahead position.
- 2. Turn ignition switch ON and touch the CONSULT-III screen in the order of "ABS", "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT".
- 3. Touch "START".

#### CAUTION:

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

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

#### Be sure to perform above operation.

- 6. Run vehicle with front wheels in straight-ahead position, then stop.
- Select "DATA MONITOR", "ECU INPUT SIGNALS", and "STR ANGLE SIG" on CONSULT-III screen. Then make sure "STR ANGLE SIG" is within 0±2.5°. If value is more than specification, repeat steps 1 to 6.
- Erase memory of ABS actuator and electric unit (control unit) and ECM. ABS actuator and electric unit (control unit): Refer to <u>BRC-163</u>, "<u>CONSULT-III Function (ABS)</u>". ECM: Refer to <u>EC-1173</u>, "<u>CONSULT-III</u> <u>Function</u>".
- 9. Turn ignition switch OFF.

#### SELF-DIAGNOSIS RESULTS

#### Operation Procedure

- 1. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
- 2. After stopping vehicle, with the engine running, touch "ABS", "SELF-DIAG RESULTS" in order on the CONSULT-III screen.
- 3. The self-diagnostic results are displayed.
  - Check ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp if "NO FAILURE" is displayed. Refer to <u>BRC-247</u>, "Symptom Table".
- 4. Perform the appropriate inspection from display item list, and repair or replace the malfunctioning component.Refer to "Display Item List".
- 5. Start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute. CAUTION:

When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp will not turn off even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.

#### Erase Memory

- 1. Turn ignition switch OFF.
- Start engine and touch "ABS", "SELF-DIAG RESULTS", "ERASE MEMORY" in order on the CONSULT-III screen to erase the diagnostic memory. If "ABS" is not indicated, go to <u>GI-50, "Description"</u>. CAUTION:

#### If the diagnostic memory is not erased, re-perform the operation procedure starting with step 1.

- 3. Perform self-diagnosis again, and make sure that diagnostic memory is erased.
- Drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn off.

#### NOTE:

• Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

#### **BRC-164**

Malfunction detecting condition

Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is out-

Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside

#### < FUNCTION DIAGNOSIS >

#### • VDC OFF switch should not stay "ON" position.

side the standard.

the standard.

#### **Display Item List**

**RR RH SENSOR-1** 

**RR LH SENSOR-1** 

[C1101]

[C1102]

Display item

	А

Check item	
	E
	C
:-170 "De-	

[VDC/TCS/ABS]

L 1			
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is out- side the standard.		
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.		D
RR RH SENSOR-2 [C1105]	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	<u>BRC-170, "De-</u> <u>scription"</u> (Note 1)	E
RR LH SENSOR-2 [C1106]	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		BRO
FR RH SENSOR-2 [C1107]	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		G
FR LH SENSOR- 2 [C1108]	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		Н
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-180, "De- scription"	
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-182, "Diagno- sis Procedure"	-
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-183, "De-	J
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	scription"	K
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-185, "De-	-
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	scription"	L
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-187, "De- scription" (Note 1)	M
STOP LAMP SW [C1116]	When stop lamp switch circuit is open.	BRC-191, "De- scription"	- N

Ρ

#### < FUNCTION DIAGNOSIS >

# [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	<u>BRC-193, "De-</u>
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	scription"
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	
ENGINE SIGNAL 1 [C1130]		
ENGINE SIGNAL 2 [C1131]		
ENGINE SIGNAL 3 [C1132]	Major engine components are malfunctioning.	<u>BRC-197, "De-</u> scription"
ENGINE SIGNAL 4 [C1133]		
ENGINE SIGNAL 6 [C1136]		
PRESS SEN CIRCUIT [C1142]	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-199, "De- scription"
ST ANG SEN CIRCUIT [C1143]	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	BRC-201, "De-
ST ANG SEN SIGNAL [C1144]	Neutral position correction of steering angle sensor is not finished.	scription"
YAW RATE SENSOR [C1145]	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	BRC-203, "De-
SIDE G-SEN CIRCUIT [C1146]	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	scription"
USV LINE [FL-RR] [C1147]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or short- ed, or the control line is open or shorted to the power supply or the ground.	
USV LINE [FR-RL] [C1148]	VDC switch-over solenoid valve (USV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	<u>BRC-206, "De-</u>
HSV LINE [FL-RR] [C1149]	VDC switch-over solenoid valve (HSV1) on the primary side is open circuit or short- ed, or the control line is open or shorted to the power supply or the ground.	scription"
HSV LINE [FR-RL] [C1150]	VDC switch-over solenoid valve (HSV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
EMERGENCY BRAKE [C1153]	When ABS actuator and electric unit (control unit) is malfunctiong. (Pressure increase is too much or too little)	BRC-182, "DTC Logic"
PNP POS SIG [C1154]	TCM or ABS actuator and electric unit (control unit) internal malfunction.	BRC-209, "De- scription"
BR FLUID LEVEL LOW [C1155]	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	BRC-210, "De- scription"
ST ANG SEN COM CIR [C1156]	CAN communication circuit or steering angle sensor is malfunctioning.	BRC-213, "De- scription"

#### < FUNCTION DIAGNOSIS >

#### [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item	
VARIANT CODING [C1170]	In a case where variant coding is different.	BRC-182, "DTC Logic"	A
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-214, "De- scription" (Note 2)	В

Note 1: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage. Note 2: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit. Refer to LAN-17, "Trouble Diagnosis Procedure".

#### DATA MONITOR

Display Item List CAUTION:

# The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

lterer	Data	monitor item sele	ection	
Item (Unit)	ECU INPUT SIGNALS	MAIN SIG- NALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by front LH wheel sensor sig- nal is displayed.
FR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by front RH wheel sensor sig nal is displayed.
RR LH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear LH wheel sensor sig- nal is displayed.
RR RH SENSOR (km/h)	×	×	×	Wheel speed calculated by rear RH wheel sensor sig- nal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (con trol unit) is displayed.
GEAR	×	×	×	Gear position judged by transmission range switch sig nal is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by transmission range switch signal.
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.
ACCEL POS SIG (%)	×	_	×	Throttle valve open/close status judged by CAN com- munication signal is displayed.
SIDE G-SENSOR (m/s <sup>2</sup> )	×	_	×	Lateral acceleration detected by side G sensor is displayed.
STR ANGLE SIG (°)	×	_	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	_	×	Brake fluid pressure detected by pressure sensor is displayed.
ENGINE RPM (rpm)	×	_	×	Engine speed judged by CAN communication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.
FLUID LEV SW ON/OFF)	×	_	×	Brake fluid level switch (ON/OFF) status is displayed.
PARK BRAKE SW (ON/OFF)	×	_	×	Parking brake switch (ON/OFF) status is displayed.

Revision: February 2010

BRC

С

D

Е

#### < FUNCTION DIAGNOSIS >

FR RH IN SOL (ON/OFF)	_	×	×	Front RH IN ABS solenoid (ON/OFF) status is dis- played.
FR RH OUT SOL (ON/OFF)	_	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
FR LH IN SOL (ON/OFF)	_	×	×	Front LH IN ABS solenoid (ON/OFF) status is displayed.
FR LH OUT SOL (ON/OFF)	_	×	×	Front LH OUT ABS solenoid (ON/OFF) status is displayed.
RR RH IN SOL (ON/OFF)	_	×	×	Rear RH IN ABS solenoid (ON/OFF) status is displayed.
RR RH OUT SOL (ON/OFF)	_	×	×	Rear RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	_	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	_	×	×	Rear LH OUT ABS solenoid (ON/OFF) status is displayed.
MOTOR RELAY (ON/OFF)	_	×	×	ABS motor relay signal (ON/OFF) status is displayed.
ACTUATOR RLY (ON/OFF)	_	×	×	ABS actuator relay signal (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.
OFF LAMP (ON/OFF)	_	×	×	VDC OFF lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	_	×	×	SLIP indicator lamp (ON/OFF) status is displayed.
M-MODE SIG (ON/OFF)	_	—	×	M mode (ON/OFF) status judged by CAN communica- tion signal 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.
EBD FAIL SIG (ON/OFF)	_	—	×	EBD fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	_	—	×	ABS fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	_	_	×	TCS fail signal (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	_	_	×	VDC fail signal (ON/OFF) status is displayed.
CRANKING SIG (ON/OFF)	_	_	×	Cranking condition (ON/OFF) status is displayed.
USV [FL-RR] (ON/OFF)	_	_	×	Primary side USV solenoid valve (ON/OFF) status is displayed.
USV [FR-RL] (ON/OFF)	_	—	×	Secondary side USV solenoid valve (ON/OFF) status is displayed.
HSV [FL-RR] (ON/OFF)	_	_	×	Primary side HSV solenoid valve (ON/OFF) status is displayed.
HSV [FR-RL] (ON/OFF)	_	—	×	Secondary side HSV solenoid valve (ON/OFF) status is displayed.

#### < FUNCTION DIAGNOSIS >

#### [VDC/TCS/ABS]

V/R OUTPUT (ON/OFF) (Note)	—	—	×	Valve relay operation signal (ON/OFF) status is displayed.	А
M/R OUTPUT (ON/OFF)	_	_	×	Motor relay operation signal (ON/OFF) status is displayed.	

×: Applicable

-: Not applicable

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

# ACTIVE TEST

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, VDC indicator lamp, SLIP indicator lamp and brake warning lamp are on.
- ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

#### NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch "BACK" and repeat step 3.

#### Solenoid Valve

#### NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addition, when performing an active test of the VDC/TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "UP", "KEEP", and "DOWN" on the display screen. For ABS solenoid valve (ACT), touch "UP", "ACT UP", "ACT KEEP" and confirm that solenoid valves (IN, OUT, USV, HSV) operate as shown in the table below.

Operation	ABS solenoid valve			ABS solenoid valve (ACT)		
(Note)	UP	KEEP	DOWN	UP	ACT UP	ACT KEEP
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

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

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### ABS Motor

Touch "ON" and "OFF" on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

Note: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

J

Μ

Ν

Ο

P

D

Ε

#### < COMPONENT DIAGNOSIS >

# COMPONENT DIAGNOSIS C1101, C1102, C1103, C1104 WHEEL SENSOR-1

# Description

INFOID:000000004204418

**IVDC/TCS/ABS1** 

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204419

## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-1
RR LH SENSOR-1
FR RH SENSOR-1
FR LH SENSOR-1

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-170</u>, "Diagnosis Procedure (Early Production)" or <u>BRC-172</u>, "Diagnosis Procedure (Late Production)".

NO >> Inspection End.

Diagnosis Procedure (Early Production)

#### CAUTION:

#### Do not check between wheel sensor terminals.

1.CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connectors from wheel sensor of malfunction code No.

- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch. **NOTE:**

INFOID:000000004204420

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

<ul> <li>The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.</li> <li>Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.</li> </ul>					
<b>NOTE:</b> If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.	В				
Does the ABS active wheel sensor tester detect a signal?					
YES >> GO TO 3	С				
NO >> Replace wheel sensor. Refer to <u>BRC-257, "Removal and Installation"</u> .					
3.CHECK TIRE	D				
Check air pressure, wear and size.	D				
Are air pressure, wear and size within standard?					
YES >> GO TO 4	Е				
NO >> • Adjust air pressure, or replace tire.					
<ul> <li>Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".</li> </ul>					
4.CHECK WHEEL BEARINGS	BRC				
Check wheel bearing axial end play. Refer to FAX-6, "Inspection" (front) or RAX-6, "On-vehicle Service" (rear).	<u>.</u>				
Is the inspection result normal?	G				
YES >> GO TO 5	0				
NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-9</u> ,					
<u>"Wheel Bearing (Rear)"</u> (rear).	Н				
5. CHECK WHEEL SENSOR HARNESS					
1. Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.	I				
<ul> <li>2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)</li> <li>5. 6. 8. 9. 10. 16. 17. 19</li> <li>6. 8. 9. 10. 16. 17. 19</li> <li>7. 14</li> <li>9. 21</li> <li>1. 2</li> <li>1. 2</li></ul>	J				
	Κ				
	L				

	Power supply circuit		Signal	Signal circuit		Ground circuit		
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground		
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground		
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground		
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground		
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground		

# Power supply circuit Signal circuit

#### : Continuity should exist.

- : Continuity should exist.
- **Ground circuit**
- : Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> • Repair or replace malfunctioning components.

#### < COMPONENT DIAGNOSIS >

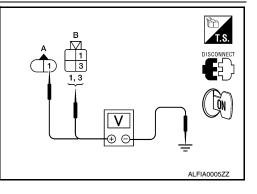
[VDC/TCS/ABS]

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **6.**CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON and check between wheel sensor harness connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 V 01 1101e
Rear RH (B)	3		



#### Is the inspection result normal?

- YES >> Inspection end.
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installa-</u> tion".

Diagnosis Procedure (Late Production)

INFOID:000000005912954

#### CAUTION:

#### Do not check between wheel sensor terminals.

**1.**CONNECTOR INSPECTION

#### 1. Turn ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check terminals for deformation, disconnection and looseness.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Disconnect connectors from wheel sensor of malfunction code No.
- 2. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 3. Turn on the ABS active wheel sensor tester power switch.
  - NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace wheel sensor. Refer to <u>BRC-257</u>, "Removal and Installation".

3.CHECK TIRE

Check air pressure, wear and size.

Is the inspection result normal?

- YES >> GO TO 4 NO >> • Adjust a
  - >> Adjust air pressure, or replace tire.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6</u>, "Inspection" (front) or <u>RAX-6</u>, "On-vehicle Service" (rear). <u>Is the inspection result normal?</u>

< COMPONENT DIAGNOSIS >

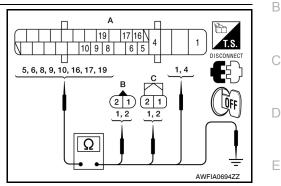
[VDC/TCS/ABS]

А

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front) or RAX-7, "Removal and Installation" (rear).

5. CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal	Signal circuit		Ground circuit		
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground	G	
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground	Н	
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground		
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground		
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground		

Power supply circuit

- : Continuity should exist.
- Signal circuit
- : Continuity should exist.
- **Ground circuit**
- : Continuity should not exist.
- Is the inspection result normal?

YES >> GO TO 6

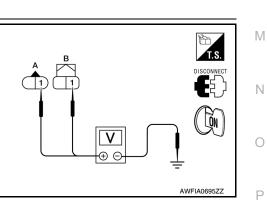
NO

- >> Repair or replace malfunctioning components.
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	
Rear RH (B)			



Is the inspection result normal?

YES >> Inspection End.

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-260, "Removal and Installa-NO tion".

## **BRC-173**

Κ

L

#### < COMPONENT DIAGNOSIS >

# Component Inspection

[VDC/TCS/ABS]

# 1. CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer dis-
RR LH SENSOR	play (±10% or less)
RR RH SENSOR	

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-170</u>, "Diagnosis Procedure (Early Production)" or <u>BRC-172</u>, "Diagnosis Procedure (Late Production)".

#### < COMPONENT DIAGNOSIS >

# C1105, C1106, C1107, C1108 WHEEL SENSOR-2

#### Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

#### DTC Logic

INFOID:000000004204423

INFOID:000000004204422

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D	
C1105	RR RH SENSOR-2	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>ABS actuator and electric unit (central unit)</li> </ul>		
C1106	RR LH SENSOR-2	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.			E
C1107	FR RH SENSOR-2	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.		BRC	
C1108	FR LH SENSOR-2	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.			

#### DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-2
RR LH SENSOR-2
FR RH SENSOR-2
FR LH SENSOR-2

Is above displayed on the self-diagnosis display?

YES	>> Proceed to diagnosis procedure. Refer to <u>BRC-175, "Diagnosis Procedure (Early Production)"</u> or	Κ
	BRC-177, "Diagnosis Procedure (Late Production)"	
NO	>> Inspection End.	

#### **Diagnosis Procedure (Early Production)**

#### **CAUTION:**

Do not check between wheel sensor terminals.

**1.**CHECK CONNECTOR

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26 and malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH). Check terminal to see if it is deformed, disconnected, loose, etc., Repair or replace it if any malfunction condition is found.

# Is the inspection result normal? O YES >> GO TO 2 NO >> Repair or replace as necessary. 2.CHECK WHEEL SENSOR OUTPUT SIGNAL P 1. Disconnect connectors from wheel sensor of malfunction code No.

Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.

3. Turn on the ABS active wheel sensor tester power switch.

#### NOTE:

The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.

А

Н

L

M

INFOID:000000005923399

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE:

If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

- YES >> GO TO 3
- NO >> Replace wheel sensor. Refer to <u>BRC-257, "Removal and Installation"</u>.

#### **3.**CHECK TIRE

Check air pressure, wear and size.

Are air pressure, wear and size within standard?

- YES >> GO TO 4
- NO >> Adjust air pressure, or replace tire.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

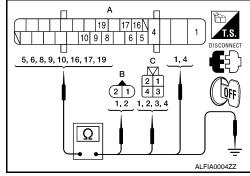
#### **4.**CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6</u>, "Inspection" (front) or <u>RAX-6</u>, "On-vehicle Service" (rear). <u>Is the inspection result normal?</u>

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front) or <u>RAX-9,</u> <u>"Wheel Bearing (Rear)"</u> (rear).

#### **5.**CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit Signal circuit Ground circuit

#### : Continuity should exist.

: Continuity should exist.

: Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

- NO >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **BRC-176**

#### < COMPONENT DIAGNOSIS >

#### [VDC/TCS/ABS]

#### 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT А 1. Reconnect ABS actuator and electric unit (control unit) connector. 2. Turn ignition switch ON and check between wheel sensor har-В ness connector power supply terminal and ground. Voltage Wheel Wheel sensor Ground LÕN Front RH (A) Front LH (A) 1 e 8 V or more D Rear LH (B) ALFIA0005ZZ Rear RH (B) 3 Is the inspection result normal? Е YES >> Inspection end. >> Replace ABS actuator and electric unit (control unit). Refer to BRC-260, "Removal and Installa-NO tion". BRC Diagnosis Procedure (Late Production) INFOID:000000005923400 CAUTION: Do not check between wheel sensor terminals. **1**.CONNECTOR INSPECTION 1. Turn ignition switch OFF. Н Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors. 2. 3. Check terminals for deformation, disconnection and looseness. Is the inspection result normal? YES >> GO TO 2 NO >> Repair or replace as necessary. 2. CHECK WHEEL SENSOR OUTPUT SIGNAL 1. Disconnect connectors from wheel sensor of malfunction code No. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter. 2. 3. Turn on the ABS active wheel sensor tester power switch. Κ NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding. L Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel 4. sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE: Μ If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest. Does the ABS active wheel sensor tester detect a signal? Ν YES >> GO TO 3 NO >> Replace wheel sensor. Refer to BRC-257, "Removal and Installation". 3.CHECK TIRE Check air pressure, wear and size. Is the inspection result normal? YES >> GO TO 4 Ρ NO >> • Adjust air pressure, or replace tire. Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED". 4.CHECK WHEEL BEARINGS Check wheel bearing axial end play. Refer to FAX-6, "Inspection" (front) or RAX-6, "On-vehicle Service" (rear). Is the inspection result normal?

YES >> GO TO 5

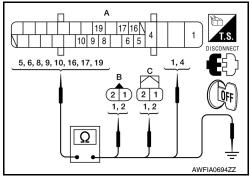
#### **BRC-177**

#### < COMPONENT DIAGNOSIS >

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

# **5.**CHECK WHEEL SENSOR HARNESS

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power sup	oply circuit	Signal	circuit	G	round circuit
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	1	19	2	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

Power supply circuit Signal circuit

- : Conti
- : Continuity should exist. : Continuity should exist.
  - : Continuity should not exist.

Ground circuit
<u>Is the inspection result normal?</u>

YES >> GO TO 6

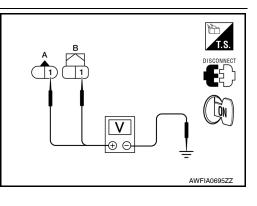
NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# 6.CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.
- 3. Check between wheel sensor connector power supply terminal and ground.

Wheel	Wheel sensor	Ground	Voltage
Front RH (A)			
Front LH (A)	1		8 V or more
Rear LH (B)		_	8 v or more
Rear RH (B)	-		



Is the inspection result normal?

YES >> Inspection End.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installa-</u> tion".

# < COMPONENT DIAGNOSIS > Component Inspection

INFOID:000000005923401

[VDC/TCS/ABS]

# 1.CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

	Wheel sensor	Vehicle speed (DATA MONITOR)		C	
	FR LH SENSOR	Nearly matches the speedometer dis- play (±10% or less)		C	
	FR RH SENSOR				
	RR LH SENSOR			D	
	RR RH SENSOR				
ls the i	nspection result normal?			F	
YES					
NO		edure. Refer to <u>BRC-175, "Diagnosi</u> edure (Late Production)".	s Procedure (Early Production)" or BRC-		
	TTT, Diagnosis Floce	<u>edule (Late Production)</u> .		BR	

G

Н

J

Κ

L

Μ

Ν

Ο

Ρ

А

В

# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

#### < COMPONENT DIAGNOSIS >

# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

#### Description

Supplies electric power to the ABS actuator and electric unit (control unit).

#### DTC Logic

INFOID:000000004204427

INFOID:000000004204428

INFOID:000000004204426

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-180, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

#### **1.**CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

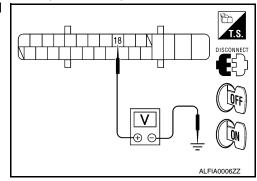
#### Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2

**2.**CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 18 and ground.



# DTC C1109 BATTERY VOLTAGE [ABNORMAL]

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage	А
		Ignition switch ON	Battery voltage (Approx. 12 V)	
16	_	Ignition switch OFF	Approx. 0 V	5
				В

- 3. Turn ignition switch OFF.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	—	Yes

#### Is the inspection result normal?

NO

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

1,4

Ω

BRC

Н

Κ

L

Μ

Ν

Ο

Ρ

С

D

Ε

**OFF** 

ALFIA0007ZZ

# C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [VDC/TCS/ABS]

# C1110, C1153, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

# DTC Logic

INFOID:000000004204429

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	
C1153	EMERGENCY BRAKE	When ABS actuator and electric unit (control unit) is mal- functioning. (Pressure increase is too much or too little)	ABS actuator and electric unit (control unit)
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

EMERGENCY BRAKE

VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-182, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

#### INSPECTION PROCEDURE

#### **1.**REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### CAUTION:

Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than that applicable.

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260. "Removal and Installa-</u> tion".

# Special Repair Requirement

INFOID:000000004204431

INFOID:000000004204430

#### **1.**ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-263</u>, "Removal and Installation".

>> END

# DTC C1111 PUMP MOTOR

< COMPONENT DIAGNOSIS >

# DTC C1111 PUMP MOTOR

# Description

PUMP The pump returns the brake fluid stored in the reservoir to the master cylinder by reducing the pressure.

MOTOR

The motor drives the pump according to the signals transmitted by the ABS actuator and electric unit (control unit).

# DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1111 PUMP MOTOR		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
CIIII		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)	
DTC CC	ONFIRMATION PROCE	DURE		
<b>1</b> .CHEC	CK SELF-DIAGNOSIS RE	ESULTS		
Check th	e self-diagnosis results.			
	Self-diagnosis			
ls abovo	PUMP MO displayed on the self-dia			
YES		procedure. Refer to <u>BRC-183, "Diagnosis Proce</u>	dure"	
NO	>> INSPECTION END			
Diagno	sis Procedure		INFOID:00000004204434	
	TION PROCEDURE			
	CK CONNECTOR			
			( ) ( ) = ( )	
cheo		d disconnect ABS actuator and electric unit (c n, disconnection, looseness, and so on. If any ma		
	onnect connector and per	form self-diagnosis.		
	spection result normal?			
YES NO	>> Inspection end. >> GO TO 2			
2. CHE		IOTOR RELAY POWER SUPPLY CIRCUIT		
		disconnect ABS actuator and electric unit (contro	ol unit) connector E26.	

INFOID:000000004204432

INFOID:000000004204433

В

А

D

# DTC C1111 PUMP MOTOR

#### < COMPONENT DIAGNOSIS >

2. Check voltage between the ABS actuator and electric unit (control unit) harness connector E26 terminal 2 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
2	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - · Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# ${f 3.}\,$ check abs actuator and electric unit (control unit) ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

>> • Replace ABS actuator and electric unit (control unit). YES Refer to BRC-260, "Removal and Installation".

- · Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**

# **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table 2. below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

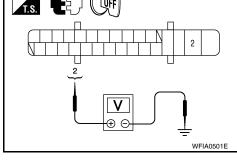
#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> INSPECTION END

>> Go to diagnosis procedure. Refer to <u>BRC-183, "Diagnosis Procedure"</u>. NO



1,4

[VDC/TCS/ABS]

INFOID:000000004204435

ALFIA0007ZZ

# DTC C1114 MAIN RELAY

#### < COMPONENT DIAGNOSIS >

# DTC C1114 MAIN RELAY

#### Description

Activates or deactivates each solenoid valve according to the signals transmitted by the ABS actuator and electric unit (control unit).

#### DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfu	nction detected condition	Possible cause	D
C1114	MAIN RELAY		inted to the ground.		E
01114	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.				
отс сс	ONFIRMATION PROCE	DURE			BR
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS			
Check th	ne self-diagnosis results.				G
	Self-diagnosis r				Η
le abovo	MAIN RELA				
	· · ·		to BRC-185, "Diagnosis Proc	cedure".	
	>> INSPECTION ĔND		<u>_</u>		
Diagno	sis Procedure			INFOID:00000004204438	J
NSPEC	TION PROCEDURE				
	CK CONNECTOR				K
		disconnect AB	S actuator and electric unit	(control unit) connector E26,	
chec	ck terminal for deformation			malfunction is found, repair or	
	ace terminal. onnect connector and perf	orm self-diagnos	iis.		L
	spection result normal?	0			
	>> Inspection end. > GO TO 2				N
<b>~</b>			POWER SUPPLY CIRCUIT		
			actuator and electric unit (cor	trol unit) connector E26	Ν
2. Che	ck voltage between ABS	actuator and ele	ectric unit (control		
unit)	) harness connector E26 te	erminal 3 and gro	pund.		0
	uator and electric unit (control uni	t) Ground	Voltage		
			Battery voltage		
	2			(P)	
	3	_	(Approx. 12 V)		Ρ
Is the ins	spection result normal?		(Approx. 12 V)		F
<u>Is the ins</u> YES					F

INFOID:000000004204436

INFOID:000000004204437

А

С

#### < COMPONENT DIAGNOSIS >

# 3. CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260</u>, "<u>Removal and Installation</u>".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- NO >> Repair or replace malfunctioning components.
   Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### Component Inspection

**1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY (Note)	ON	ON

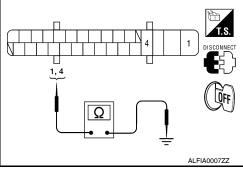
#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-185, "Diagnosis Procedure"</u>.



#### < COMPONENT DIAGNOSIS >

# DTC C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### Description

When the sensor rotor rotates, the magnetic field changes. It converts the magnetic field changes to current signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# DTC Logic

INFOID:000000004204441

INFOID:000000004204440

А

С

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
010	Display item		
C1115	C1115 ABS SENSOR [ABNORMAL SIGNAL] When wheel sensor input signal is malfunctioning.		<ul> <li>Harness or connector</li> <li>Wheel sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>
DTC CC	NFIRMATION PROCE	DURE	
<b>1.</b> CHEC	K SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis	results	
	ABS SENSOR [ABNOF		
Is above	displayed on the self-diac	-	
	· · ·	procedure. Refer to <u>BRC-187, "Diagnosis Proc</u>	cedure (Early Production)" or
NO		Procedure (Late Production)".	
	>> Inspection end.		
Diagno	sis Procedure (Early	Production)	INFOID:000000005923402
CAUTIO	N:		
4	heck between wheel se	nsor terminals.	
<b>1.</b> CHEC	CK TIRE		
Check ai	r pressure, wear and size		
-	ressure, wear and size wit	thin standard?	
	>> GO TO 2	ar rapiaca tira	
NO	<ul> <li>&gt;&gt; • Adjust air pressure,</li> <li>• Perform the self-diad</li> </ul>	or replace tire. gnosis, and make sure that the result shows "N	IO DTC IS DETECTED".
2.снес	K SENSOR AND SENSO	-	
	sensor rotor for damage.		
Check	wheel sensor for damage	, disconnection or looseness.	
	pection result normal?		
	>> GO TO 3	mount or replace concernator. Then perform t	the colf diagnostic
NO	<ul> <li>Perform the self-diad</li> </ul>	r mount or replace sensor rotor. Then perform t gnosis, and make sure that the result shows "N	IO DTC IS DETECTED".
3.CHEC	CK CONNECTOR		
		disconnect ABS actuator and electric unit (cor	atrol unit) connector E26 and
malf mina	unctioning wheel sensor o Il to see if it is deformed, o	connector E41 (FR-RH), E19 (FR-LH), B43 (RF disconnected, loose, etc., Repair or replace it it	R-RH and RR-LH). Check ter-
foun 2. Reco (ABS	onnect connectors and the	ne perform the self-diagnosis. Refer to $\underline{BRC}$	-13, "CONSULT-III Function
	pection result normal?		

Revision: February 2010

>> Inspection end.

YES

#### **BRC-187**

[VDC/TCS/ABS]

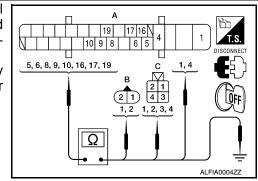
< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

#### NO >> GO TO 4

**4.**CHECK WHEEL SENSOR HARNESS

- Turn ignition switch OFF and disconnect malfunctioning wheel sensor connector E41 (FR-RH), E19 (FR-LH), B43 (RR-RH and RR-LH) and ABS actuator and electric unit (control unit) connector E26.
- 2. Check continuity between terminals. (Also check continuity when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.)



	Power supply circuit		Signal circuit		Ground circuit	
Wheel	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (A)	Wheel sensor Front (B) Rear (C)	ABS actuator and electric unit (control unit) (Signal - Ground) (A)	ABS actuator and electric unit (control unit) (A) (Signal) - Body Ground
Front RH	9	1	10	2	9, 10 - 1, 4	9, 10 - Body ground
Front LH	16	1	5	2	16, 5 - 1, 4	16, 5 - Body ground
Rear RH	8	3	19	4	8, 19 - 1, 4	8, 19 - Body ground
Rear LH	6	1	17	2	6, 17 - 1, 4	6, 17 - Body ground

#### Power supply circuit

- Signal circuit
- : Continuity should exist. : Continuity should exist.
- Ground circuit
- : Continuity should not exist.

#### Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **5.**CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- 1. Replace wheel sensor that resulted in malfunction by self-diagnosis.
- Reconnect connectors, drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute, and then perform self-diagnosis.

#### Is above displayed on the self-diagnosis display?

- YES >> Inspection end.
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-74, "Removal and Installa-</u> tion".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Diagnosis Procedure (Late Production)**

INFOID:000000005923403

#### CAUTION:

#### Do not check between wheel sensor terminals.

- 1.CONNECTOR INSPECTION
- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) and malfunctioning wheel sensor connectors.
- 3. Check terminals for deformation, disconnection and looseness.

#### Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.

#### < COMPONENT DIAGNOSIS >

**IVDC/TCS/ABS1** 

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Disconnect connectors from wheel sensor of malfunction code No. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter. 2. 3. Turn on the ABS active wheel sensor tester power switch. В NOTE: The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding. 4. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal. NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and D retest. Does the ABS active wheel sensor tester detect a signal? YES >> GO TO 3 Е NO >> Replace wheel sensor. Refer to BRC-257, "Removal and Installation". 3.CHECK TIRE BRC Check air pressure, wear and size. Is the inspection result normal? YES >> GO TO 4 NO >> • Adjust air pressure, or replace tire. Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED". **4.**CHECK WHEEL BEARINGS Н Check wheel bearing axial end play. Refer to FAX-6, "Inspection" (front) or RAX-6, "On-vehicle Service" (rear). Is the inspection result normal? YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front) or RAX-7, "Removal and Installation" (rear). 5.CHECK WHEEL SENSOR HARNESS 1. Turn ignition switch OFF. Α 2. Disconnect ABS actuator and electric unit (control unit) and mal-19 17 16 4 functioning wheel sensor connectors. Κ 10 9 8 65 3. Check continuity between terminals. (Also check continuity 5, 6, 8, 9, 10, 16, 17, 19 1,4 when steering wheel is turned right and left and when sensor harness inside the wheel house is moved.) L 2 1 2 1 1, 2 1.2 Ω Μ AWFIA0694ZZ Ν Power supply circuit Signal circuit Ground circuit ABS actuator and ABS actuator Wheel sensor ABS actuator Wheel sensor ABS actuator and electric electric unit Wheel and electric unit Front (B) and electric unit Front (B) (control unit) unit (control unit) (A) (Signal - Ground) (control unit) (A) Rear (C) (control unit) (A) Rear (C) (Signal) - Body Ground (A) Ρ Front RH 9 1 10 2 9, 10 - 1, 4 9, 10 - Body ground

16

8

6

1

1

1

Front LH

Rear RH

Rear LH

2

2

2

16, 5 - 1, 4

8, 19 - 1, 4

6, 17 - 1, 4

5

19

17

16, 5 - Body ground

8, 19 - Body ground

6, 17 - Body ground

#### < COMPONENT DIAGNOSIS >

#### Power supply circuit : Continuity should exist.

- : Continuity should exist.
- Signal circuit Ground circuit

: Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

Voltage

8 V or more

#### **6.**CHECK WHEEL SENSOR POWER SUPPLY CIRCUIT

- Reconnect ABS actuator and electric unit (control unit) connector.
- 2. Turn ignition switch ON.

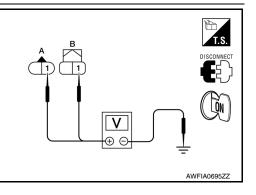
Wheel

Front RH (A)

Front LH (A)

3. Check between wheel sensor connector power supply terminal and ground.

Ground



 Rear LH (B)

 Rear RH (B)

 Is the inspection result normal?

Wheel sensor

1

YES >> Inspection End.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260. "Removal and Installa-</u> tion".

#### **Component Inspection**

INFOID:000000005923404

#### **1.**CHECK DATA MONITOR

On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed.

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer dis-
RR LH SENSOR	play (±10% or less)
RR RH SENSOR	

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-187</u>, "Diagnosis Procedure (Early Production)" or <u>BRC-188</u>, "Diagnosis Procedure (Late Production)".

# DTC C1116 STOP LAMP SW

#### < COMPONENT DIAGNOSIS >

# DTC C1116 STOP LAMP SW

# Description

The stop lamp switch tr (control unit).	ransmits the sto	o lamp switch	signal (ON/OFF)	to the ABS actuate	or and electric unit	В
DTC Logic					INFOID:000000004204445	С

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	n Possible cause	D
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	Е
DTC CC	<b>INFIRMATION PROCE</b>	DURE		
<b>1</b> .CHEC	CK SELF-DIAGNOSIS RE	SULTS		BRC
Check th	ne self-diagnosis results.			
	Self-diagnosis	reculte		G
	STOP LAMP S			
ls above	displayed on the self-diag			Н
YES		procedure. Refer to <u>BRC-191, "Diag</u>	nosis Procedure".	
NO	>> INSPECTION END	-		I
Diagno	sis Procedure		INFOID:00000004204446	I
INSPEC	TION PROCEDURE			
-	CK CONNECTOR			J
1. Turn unit any	ignition switch OFF and	26, check terminal for deformation, ir or replace terminal.	ctor E38 and ABS actuator and electric disconnection, looseness, and so on. If	K
3. Starl 4. Rep	t engine.	carefully several times, and perform	self-diagnosis.	L
YES	>> Inspection end. >> GO TO 2			Μ
<b>2.</b> CHEC	CK STOP LAMP SWITCH	CIRCUIT		
		disconnect ABS actuator and electric	c unit (control unit) connector E26.	Ν
	ck voltage between ABS harness connector E26 to	actuator and electric unit (control erminal 20 and ground.		0
				P
			↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	Г

INFOID:000000004204444

А

# DTC C1116 STOP LAMP SW

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and electric unit (control unit)	Ground	Condition	Voltage
20		Brake pedal depressed	Battery voltage (Approx. 12 V)
20		Brake pedal not depressed	Approx. 0V

Is the inspection result normal?

YES >> Perform self-diagnosis.

>> • Repair or replace stop lamp switch circuit.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### Component Inspection

NO

INFOID:000000004204447

# 1.CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.

2. Disconnect stop lamp switch connector.

3. Check continuity between stop lamp switch connector terminals.

Stop lan	np switch	Condition	Continuity
Connector	Terminals	Condition	Continuity
E38	1 2	Release stop lamp switch (When brake pedal is depressed.)	Yes
E30	E38 1 – 2		No

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace stop lamp switch.

SPECIAL REPAIR REQUIREMENT

# 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-157, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> END

# C1120, C1122, C1124, C1126 IN ABS SOL

# Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

# DTC Logic

#### DTC DETECTION LOGIC

				_
DTC	Display item	Malfunction detected condition	Possible cause	D
C1120	FR LH IN ABS SOL	When the control unit detects a malfunction in the front LH inlet solenoid circuit.		
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	ABS actuator and electric unit	E
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	(control unit)	BRC
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.		
DTC CC	<b>NFIRMATION PROCE</b>	DURE		G
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS		
Check th	e self-diagnosis results.			Н
	Self-diagnosis	results		

	Self-diagnosis results	
	FR LH IN ABS SOL	_
	FR RH IN ABS SOL	_
	RR LH IN ABS SOL	_
	RR RH IN ABS SOL	
ls above	e displayed on the self-diagnosis display?	_
YES NO	>> Proceed to diagnosis procedure. Refer to <u>BRC-1</u> >> Inspection end.	193. "Diagnosis Procedure".

#### **Diagnosis** Procedure

#### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, 1. check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal. Reconnect connector and perform self-diagnosis. Is the inspection result normal? YES >> Inspection end. NO >> GO TO 2 2.check solenoid and actuator relay power supply circuit

INFOID:000000004204448

INFOID-000000004204449

А

В

Κ

L

Μ

Ν

Ο

Ρ

# C1120, C1122, C1124, C1126 IN ABS SOL

#### < COMPONENT DIAGNOSIS >

 Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# $\mathbf{3}$ . CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installation"</u>.

- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**



ALFIA0007ZZ

OFF

# **1.**CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

#### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)		ABS solenoid valve	
Operation (Note)	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

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

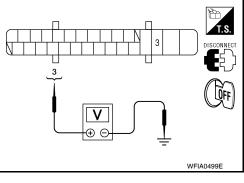
#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-193. "Diagnosis Procedure"</u>.



1,4

[VDC/TCS/ABS]

## C1121, C1123, C1125, C1127 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

# C1121, C1123, C1125, C1127 OUT ABS SOL

#### Description

The solenoid valve increases, holds or decreases the fluid pressure of each brake caliper according to the signals transmitted by the ABS actuator and electric unit (control unit).

#### DTC Logic

INFOID:000000004204453

INFOID:000000004204452

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1121	FR LH OUT ABS SOL	When the control unit detects a malfunction in the front LH outlet solenoid circuit.		
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	ABS actuator and electric unit	E
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	(control unit)	BRC
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.		

#### DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results         FR LH OUT ABS SOL         FR RH OUT ABS SOL         RR LH OUT ABS SOL         RR RH OUT ABS SOL
FR RH OUT ABS SOL RR LH OUT ABS SOL
RR LH OUT ABS SOL
RR RH OUT ABS SOL

Is above displayed on the self-diagnosis display?

YES	>> Proceed to diagnosis procedure. Refer to <u>BRC-195, "Diagnosis Procedure"</u> .
NO	>> Inspection end.

**Diagnosis** Procedure

#### INSPECTION PROCEDURE

# CHECK CONNECTOR Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal. Reconnect connector and perform self-diagnosis. Is the inspection result normal? YES >> Inspection end. NO >> GO TO 2 CHECK SOLENOID AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

Revision: February 2010

[VDC/TCS/ABS]

А

В

Н

Κ

L

Μ

Ν

Ο

Ρ

# C1121, C1123, C1125, C1127 OUT ABS SOL

#### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

NO

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# $\mathbf{3}$ . CHECK SOLENOID AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	_	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installation"</u>.

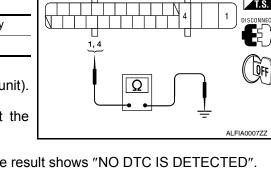
- Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**

INFOID:000000004204455

# 

[VDC/TCS/ABS]



# **1.**CHECK ACTIVE TEST

- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the table below.

#### NOTE:

The example below is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Note)		ABS solenoid valve	
	UP	KEEP	DOWN
FR RH IN SOL	OFF	ON	ON
FR RH OUT SOL	OFF	OFF	ON*

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

#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> Go to diagnosis procedure. Refer to <u>BRC-195. "Diagnosis Procedure"</u>.

# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

#### < COMPONENT DIAGNOSIS >

# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

#### Description

ABS actuator and electric unit (control unit) and ECM exchange the engine signal with CAN communication B line.

# DTC Logic

INFOID:000000004204457

INFOID:000000004204456

А

#### DTC DETECTION LOGIC

-					
DTC	Display item	Malfunction detected con	ndition	Possible cause	D
C1130	ENGINE SIGNAL 1				
C1131	ENGINE SIGNAL 2	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>		E	
C1132	ENGINE SIGNAL 3				
C1133	ENGINE SIGNAL 4			<ul> <li>ECM</li> <li>CAN communication line</li> </ul>	
C1136	ENGINE SIGNAL 6				BRC
DTC CC	NFIRMATION PROCE	DURE			
<b>1</b> .CHEC	CK SELF-DIAGNOSIS RE	SULTS			G
Check th	e self-diagnosis results.				0
	Ū				
	Self-diagnosis	results			Н
	ENGINE SIG	NAL 1			
	ENGINE SIG	NAL 2			1
	ENGINE SIG	NAL 3			I
	ENGINE SIG	NAL 4			
	ENGINE SIG	NAL 6			J
	displayed on the self-diag				
	>> Proceed to diagnosis	procedure. Refer to <u>BRC-197, "I</u>	Diagnosis Proce	dure".	K
_	>> INSPECTION END				IX.
Diagno	sis Procedure			INFOID:000000004204458	
INSPEC	TION PROCEDURE				L
	CK ENGINE SYSTEM				
		Densir er verless items indisst			M
	er to <u>EC-1173, "CONSULT</u>	Repair or replace items indicate	ea, men perform	i ECM self-diagnosis again.	
2. Perfe	orm ABS actuator and e	lectric unit (control unit) self-di	agnosis. Refer	to <u>BRC-163, "CONSULT-III</u>	
	ction (ABS)".				Ν
	spection result normal?				
	>> Inspection end. > • Repair or replace m	alfunctioning components.			0
		gnosis, and make sure that the r	esult shows "N	O DTC IS DETECTED".	0
Specia	I Repair Requireme	nt		INFOID:00000004204459	
57 5 6 6				AVE OID.00000004204439	Ρ
SPECIA	L REPAIR REQUIREM	ENT			
1.adju	STMENT OF STEERING	ANGLE SENSOR NEUTRAL P	OSITION		
Always	erform the neutral positio	n adjustment for the steering ar	ale sensor whe	an replacing the ABS actua-	

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-157</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

# **BRC-197**

>> END

#### < COMPONENT DIAGNOSIS >

# DTC C1142 PRESS SEN CIRCUIT

#### Description

The pressure sensor converts the brake fluid pressure to an electric signal and transmits it to the ABS actuator and electric unit (control unit). (The pressure sensor is integrated in the ABS actuator and electric unit (control unit).)

# DTC Logic

# DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1142	PRESS SEN CIRCUIT	Pressre sensor signal line is open or shorted, or pressre sensor is malfunctioning.	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	E
DTC CC	NFIRMATION PROC	EDURE		BF
<b>1</b> .CHEC	CK SELF-DIAGNOSIS F	RESULTS		
Check th	e self-diagnosis results			C
				G
	Self-diagnos			
<del> </del>	PRESS SEN			H
	displayed on the self-di		duro"	
YES NO	>> INSPECTION END	s procedure. Refer to <u>BRC-199, "Diagnosis Proce</u>	<u>aure</u> .	
Diagno	sis Procedure		INFOID:00000004204462	
Ũ				J
	TION PROCEDURE			
	CK STOP LAMP SWITC	H CONNECTOR		
	ignition switch OFF.	d electric unit (control unit) connector.		ŀ
	onnect stop lamp switch			
		ion, disconnection, looseness, and so on. If any m	alfunction is found, repair or	L
	ace terminal. onnect connectors secu	rely.		
6. Starl	engine.	-		Ν
		al carefully several times, and perform self-diagnor	SIS.	IV
	<pre>spection result normal? &gt;&gt; GO TO 2</pre>			
-		connector terminal. Repair or replace connector.		Ν
-	CK STOP LAMP SWITC			
	ignition switch OFF.			С
2. Disc	onnect stop lamp switch	n connector.		

3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch		Condition	Continuity
Connector	Terminal	Condition	Continuity
520	1.2	Release stop lamp switch (When brake pedal is depressed.)	Yes
E38	1 – 2	Push stop lamp switch (When brake pedal is released.)	No

INFOID:000000004204460

INFOID:000000004204461

А

В

# DTC C1142 PRESS SEN CIRCUIT

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3

NO >> Replace stop lamp switch.

**3**.CHECK STOP LAMP SWITCH CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.

2. Connect stop lamp switch connector.

3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)		Condition	Voltage
Connector	Terminal	Condition	voltage
E26	20	Brake pedal is depressed	Battery voltage
L20	20	Brake pedal is released	Approx. 0 V

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

**4.**CHECK SELF-DIAGNOSIS RESULTS

Check self-diagnosis results.

Self-diagnosis results	
PRESS SEN CIRCUIT	

#### Is above displayed on the self-diagnosis display?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installa-</u> tion".

Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

NO >> Inspection end.

#### **Component Inspection**

INFOID:000000004204463

# 1. CHECK DATA MONITOR

On "DATA MONITOR", select "PRESS SENSOR" and check the brake fluid pressure.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	- 40 to 300 bar

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-199, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000004204464

#### **1**.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-157</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> END

#### C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

# C1143, C1144 STEERING ANGLE SENSOR

#### Description

The steering angle sensor detects the rotation amount, angular velocity and direction of the steering wheel, and transmits the data to the ABS actuator and electric unit (control unit) via CAN communication.

#### DTC Logic

INFOID:000000004204466

INFOID-000000004204467

INFOID:000000004204465

А

BRC

Н

Κ

L

M

Ν

Ρ

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	<ul> <li>Steering angle sensor</li> </ul>	
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	ABS actuator and electric unit (control unit)	E

#### DTC CONFIRMATION PROCEDURE

#### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ST ANG SEN CIRCUIT

#### Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-201, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

INSPECTION	PROCEDURE

# 1.CHECK CONNECTOR

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.

2. Reconnect connector and perform self-diagnosis.

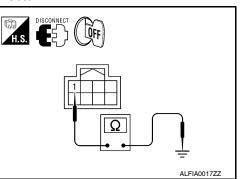
#### Is the inspection result normal?

- YES >> Inspection end.
- NO >> GO TO 2

2. CHECK STEERING ANGLE SENSOR HARNESS

- 1. Check CAN communication system. Refer to LAN-17, "Trouble Diagnosis Flow Chart".
- 2. Turn ignition switch OFF and disconnect steering angle sensor connector.
- 3. Check continuity between steering angle sensor harness connector M53 terminal 1 and ground.

Steering angle sensor	Ground	Continuity
1	—	Yes



4. Turn ignition switch ON and check voltage between steering angle sensor harness connector M53 terminal 4 and ground.

Steering angle sensor	Ground	Voltage
4	—	Battery voltage (Approx. 12 V)

Is the inspection result normal?

YES >> GO TO 3

NO

>> • Repair or replace malfunctioning components.

• Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# **3.**CHECK DATA MONITOR

- 1. Turn ignition switch OFF and connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
- 2. Select "STR ANGLE SIG" in "Data Monitor" and check steering angle sensor signal.

Steering condition	STR ANGLE SIG (Data monitor)
Driving straight	– 2.5 ° to + 2.5 °
Turn 90° to right	Approx.+ 90 °
Turn 90° to left	Approx.– 90 °

#### Is the inspection result normal?

YES >> Perform self-diagnosis.

- NO >> Replace spiral cable (steering angle sensor) and adjust neutral position of steering angle sensor. Refer to <u>BRC-263</u>, "Removal and Installation".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### Component Inspection

INFOID:000000004204468

#### **1.**CHECK DATA MONITOR

Select "STR ANGLE SIG" in "DATA MONITOR" and check steering angle sensor signal.

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	±2.5 °
Turn 90 ° to right	Approx. +90 °
Turn 90 ° to left	Approx. –90 °

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-201, "Diagnosis Procedure"</u>.

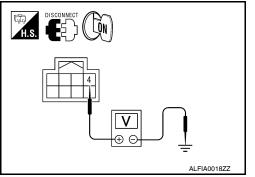
#### Special Repair Requirement

#### **1.**ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-263</u>, <u>"Removal and Installation"</u>.

#### >> END

Steering condition STR



#### C1145, C1146 YAW RATE/SIDE G SENSOR

#### < COMPONENT DIAGNOSIS >

# C1145, C1146 YAW RATE/SIDE G SENSOR

#### Description

The yaw rate/side/decel G sensor detects the yaw rate/side/decel G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

#### DTC Logic

INFOID:000000004204471

INFOID:000000004204472

INFOID:000000004204470

А

В

BRC

Н

Ν

Ρ

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	<ul><li>(control unit)</li><li>Yaw rate/side G sensor</li></ul>	E

#### DTC CONFIRMATION PROCEDURE

#### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results YAW RATE SENSOR SIDE G-SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES	>> Proceed to diagnosis procedure. Refer to <u>BRC-203, "Diagnosis Procedure"</u> .
NO	>> INSPECTION END

#### Diagnosis Procedure

#### **CAUTION:**

- Sudden turns (such as spin turns, acceleration turns), drifting, etc., when VDC function is off (VDC OFF switch "ON") may cause yaw rate/side/decel G sensor system to indicate a malfunction. However, this is not a malfunction, if normal operation can be resumed after restarting engine. Then erase memory of self-diagnosis.
- If vehicle is on turn-table at entrance to parking garage, or on other moving surface, VDC OFF indicator lamp may illuminate and CONSULT-III self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn-table or other moving surface, and start engine. Results will return to normal. And after doing spin turns or acceleration turns with VDC function is being off (VDC OFF switch "ON"), too, the results will return to a normal condition by re-starting vehicle.

#### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect yaw rate/side/decel G sensor connector M55 and ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

#### Is the inspection result normal?

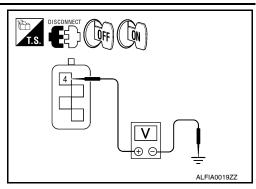
- YES >> Inspection end.
- NO >> GO TO 2

 $\mathbf{Z}$ .CHECK YAW RATE/SIDE/DECEL G SENSOR POWER SUPPLY CIRCUIT

# C1145, C1146 YAW RATE/SIDE G SENSOR

#### < COMPONENT DIAGNOSIS >

Turn ignition switch ON, then OFF and check voltage between yaw rate/side/decel G sensor harness connector M55 terminal 4 and ground.



[VDC/TCS/ABS]

Yaw rate/side/decel G sensor	Ground	Condition	Voltage
4		Ignition switch ON	Battery voltage (Approx. 12 V)
-		Ignition switch OFF	Approx. 0V

Is the inspection result normal?

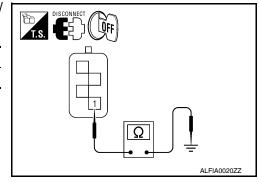
YES >> GO TO 3 NO >> • Repair o

- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

# $\mathbf{3}$ . Check yaw rate/side/decel g sensor ground supply circuit

Turn ignition switch OFF and check resistance between yaw rate/ side/decel G sensor harness connector M55 terminal 1 and ground.

Yaw rate/side/decel G sensor	Ground	Condition	Continuity
1	_	Ignition switch OFF	Yes



#### Is the inspection result normal?

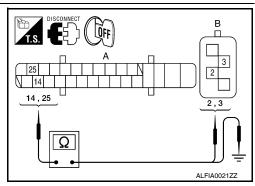
- YES >> GO TO 4 NO >> • Repair
  - >> Repair or replace malfunctioning components.
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **4.**CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS

 Check continuity between ABS actuator and electric unit (control unit) harness connector (A) E26 and yaw rate/side/decel G sensor harness connector (B) M55.

ABS actuator and electric unit (control unit)	Yaw rate/side/decel G sensor	Continuity
14	2	Yes
25	3	163

2. Check continuity between ABS actuator and electric unit (control unit) harness connector (A) E26 and ground.



# C1145, C1146 YAW RATE/SIDE G SENSOR

#### < COMPONENT DIAGNOSIS >

#### [VDC/TCS/ABS]

ABS actuator and electric unit (control un	it) Ground	Continuity
14		No
25		NO
the inspection result normal?		
(ES >> GO TO 5		
NO >> • Repair or replace malfunction	ning components	
		S "NO DTC IS DETECTED".
<ul> <li>Perform the self-diagnosis,</li> </ul>	and make sure that the result shows	s "NO DTC IS DETECTED".
Perform the self-diagnosis,     CHECK DATA MONITOR	and make sure that the result shows	
Perform the self-diagnosis,     .CHECK DATA MONITOR     Connect the Yaw rate/side/decel G se	and make sure that the result shows	
Perform the self-diagnosis,     CHECK DATA MONITOR     Connect the Yaw rate/side/decel G se     nector.	and make sure that the result shows	nd electric unit (control unit) con-
Perform the self-diagnosis,     CHECK DATA MONITOR     Connect the Yaw rate/side/decel G se     nector.     Select "YAW RATE SEN", "SIDE G-S	and make sure that the result shows	nd electric unit (control unit) con-
Perform the self-diagnosis,     CHECK DATA MONITOR     Connect the Yaw rate/side/decel G se     nector.	and make sure that the result shows	nd electric unit (control unit) con-

Venicle condition	Yaw rate sensor (Data monitor)	Side G sensor (Data monitor)	
Stopped	Approx. 0 d/s	Approx. 0 m/s <sup>2</sup>	BRC
Turning right	Negative value	Negative value	
Turning left	Positive value	Positive value	G

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260, "Removal and Installa-</u> tion".
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
  - >> Replace Yaw rate/side/decel G sensor. Refer to <u>BRC-262</u>, "Removal and Installation".
    - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### **Component Inspection**

NO

**1.**CHECK DATA MONITOR

Select "YAW RATE SEN", "SIDE G-SENSOR" in "DATA MONITOR" and check yaw rate/side/decel G sensor signal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)
Stopped	Approx. 0 d/s	Approx. 0 m/s <sup>2</sup>
Turning right	Negative value	Negative value
Turning left	Positive value	Positive value

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-203, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

#### **1**.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-263</u>, "Removal and Installation".

>> END

M

Ν

Ρ

Н

J

Κ

INFOID:000000004204473

# C1147, C1148, C1149, C1150 USV/HSV LINE

#### < COMPONENT DIAGNOSIS >

# C1147, C1148, C1149, C1150 USV/HSV LINE

#### Description

USV1, USV2 (CUT VALVE) The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

#### HSV1, HSV2 (SUCTION VALVE)

The suction valve supplies the brake fluid from the master cylinder to the pump, when VDC/TCS is activated.

#### DTC Logic

INFOID:000000004204476

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1147	USV LINE[FL-RR]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1148	USV LINE[FR-RL]	VDC switch-over solenoid valve (USV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	Harness or connector     ABS actuator and electric unit
C1149	HSV LINE[FL-RR]	VDC switch-over solenoid valve (HSV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	(control unit)
C1150	HSV LINE[FR-RL]	VDC switch-over solenoid valve (HSV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

#### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
USV LINE[FL-RR]
USV LINE[FR-RL]
HSV LINE[FL-RR]
HSV LINE[FR-RL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-206, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

# 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

#### Is the inspection result normal?

YES >> Inspection end.

NO >> GO TO 2

2.CHECK SOLENOID, VDC CHANGE-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26.

#### **BRC-206**

INFOID:000000004204477

# C1147, C1148, C1149, C1150 USV/HSV LINE

#### < COMPONENT DIAGNOSIS >

2. Check voltage between ABS actuator and electric unit (control unit) harness connector E26 terminal 3 and ground.

ABS actuator and electric unit (control unit)	Ground	Voltage
3	_	Battery voltage (Approx. 12 V)

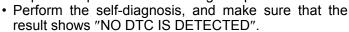
Is the inspection result normal?

YES >> GO TO 3

NO

NO

>> • Repair or replace malfunctioning components.



# ${f 3.}\,$ check solenoid, vdc change-over valve, actuator relay ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector E26 terminal 1, 4 and ground.

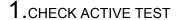
ABS actuator and electric unit (control unit)	Ground	Continuity
1, 4	—	Yes

Is the inspection result normal?

YES >> • Replace ABS actuator and electric unit (control unit). Refer to BRC-260, "Removal and Installation".

- · Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".
- >> Repair or replace malfunctioning components.
  - Perform the self-diagnosis, and make sure that the result shows "NO DTC IS DETECTED".

#### Component Inspection



- Select each test menu item on "ACTIVE TEST". 1
- On the display, touch "UP", "UP", and "KEEP", and check that the system operates as shown in the table 2. below.

#### NOTE:

The example shown is for front right wheel. The procedure for the other wheels is the same as given below.

Operation (Nate)	ABS solenoid valve (ACT)			
Operation (Note)	UP	ACT UP	ACT KEEP	_
FR RH IN SOL	OFF	OFF	OFF	- 1
FR RH OUT SOL	OFF	OFF	OFF	_
USV [FR-RL]	OFF	ON	ON	_
HSV [FR-RL]	OFF	ON*	OFF	Ν

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

#### NOTE:

A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

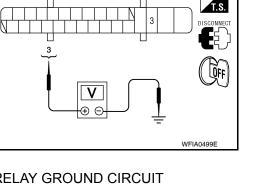
#### Is the inspection result normal?

YES >> INSPECTION END

>> Go to diagnosis procedure. Refer to BRC-206, "Diagnosis Procedure". NO

#### Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

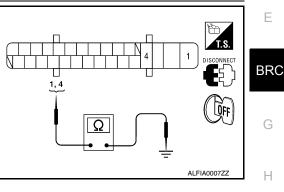


[VDC/TCS/ABS]

А

В

D



Κ

#### **BRC-207**

# C1147, C1148, C1149, C1150 USV/HSV LINE

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-157</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> END

#### < COMPONENT DIAGNOSIS >

# DTC C1154 PNP POS SIG

# Description

The transmission range switch signal is transmitted to the ABS actuator and electric unit (control unit) using the CAN communication lines.

#### DTC Logic

INFOID:000000004204481

INFOID:000000004204480

А

С

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1154	PNP POS SIG	Transmission range switch signal or communication line between the ABS actuator and electric unit (control unit) and TCM is open or shorted.	<ul><li>Harness or connector</li><li>Transmission range switch</li></ul>
отс сс	NFIRMATION PROC	EDURE	
<b>1.</b> снес	CK SELF-DIAGNOSIS R	ESULTS	
Check th	e self-diagnosis results.		
	Ū		
	Self-diagnosi	s results	
	PNP POS	SIG	
ls above	displayed on the self-dia	agnosis display?	
	>> Proceed to diagnosis >> Inspection End.	s procedure. Refer to <u>BRC-209, "Diagnosis Proce</u>	<u>dure"</u> .
Diagno	sis Procedure		INFOID:000000004204482
	CK DATA MONITOR		
I.CHEC			
Select "	SLCT LVR POSI" in "Dat	a Monitor" and check transmission range switch s	signal.
			signal.
	Selector lever position	SLCT LVR POSI (Data monitor)	signal.
	Selector lever position P position	SLCT LVR POSI (Data monitor)	signal.
	Selector lever position P position R position	SLCT LVR POSI (Data monitor) P R	signal.
	Selector lever position P position R position N position	SLCT LVR POSI (Data monitor)	signal.
	Selector lever position P position R position N position D position	SLCT LVR POSI (Data monitor) P R N	signal.
Is the ins	Selector lever position P position R position N position D position spection result normal?	SLCT LVR POSI (Data monitor) P R N	
Is the ins	Selector lever position P position R position N position D position pection result normal? >> • Replace ABS actuation".	SLCT LVR POSI (Data monitor) P R N D ator and electric unit (control unit). Refer to BRC-2	260. "Removal and Installa-
Is the ins YES	Selector lever position P position R position N position D position pection result normal? >> • Replace ABS actuation".	SLCT LVR POSI (Data monitor) P R N D	260. "Removal and Installa-
ls the ins YES NO	Selector lever position P position R position N position D position spection result normal? >> • Replace ABS actuation". • Perform the self-dia >> GO TO 2	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NC	260. "Removal and Installa-
Is the ins YES NO 2.CHEC	Selector lever position P position R position D position D position Perform the self-dia Sector C 2 CK TRANSMISSION RA	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NO         NGE SWITCH	260. "Removal and Installa-
Is the ins YES NO 2.CHEC	Selector lever position P position R position D position D position Spection result normal? >> • Replace ABS actuation". • Perform the self-diation >> GO TO 2 CK TRANSMISSION RA transmission range swite	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NO	260. "Removal and Installa-
Is the ins YES NO 2.CHEC Perform Is the ins	Selector lever position P position R position D position D position Perform the self-dia Perform the self-dia Section result normal? CK TRANSMISSION RA transmission range swite spection result normal?	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NO         NGE SWITCH         ch inspection. Refer to TM-131, "Description".	260, "Removal and Installa- D DTC IS DETECTED".
Is the ins YES NO 2.CHEC Perform Is the ins	Selector lever position P position R position D position D position Perform the self-di- Section result normal? Perform the self-di- Section result normal? CK TRANSMISSION RA transmission range swite Spection result normal? >> • Replace ABS actuation.	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NO         NGE SWITCH         ch inspection. Refer to TM-131, "Description".         ator and electric unit (control unit). Refer to BRC-2	260. "Removal and Installa- D DTC IS DETECTED". 260. "Removal and Installa-
Is the ins YES NO 2.CHEC Perform Is the ins YES	Selector lever position P position R position N position D position Spection result normal? >> • Replace ABS actuation". • Perform the self-diation of the self	SLCT LVR POSI (Data monitor)         P         R         N         D         ator and electric unit (control unit). Refer to BRC-2         agnosis, and make sure that the result shows "NO         NGE SWITCH         ch inspection. Refer to TM-131, "Description".	260. "Removal and Installa- D DTC IS DETECTED". 260. "Removal and Installa-

#### < COMPONENT DIAGNOSIS >

# DTC C1155 BR FLUID LEVEL LOW

#### Description

The brake fluid level switch converts the brake fluid level to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

#### DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	<ul><li>Harness or connector</li><li>Brake fluid level switch</li></ul>

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-210, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000004204485

#### **CAUTION:**

#### Check brake fluid level in brake reservoir tank before starting inspection.

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- Turn ignition switch OFF and disconnect brake fluid level switch connector E24 and combination meter connector M24, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Is the inspection result normal?

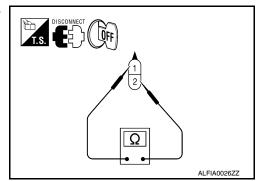
YES >> Inspection end. NO >> GO TO 2

**n**o *>>* Go io z

2. CHECK BRAKE FLUID LEVEL SWITCH

1. Turn ignition switch OFF and disconnect brake fluid level switch connector E24.

 Check continuity between brake fluid level switch connector E24 terminals 1 and 2.



INFOID:000000004204484

# DTC C1155 BR FLUID LEVEL LOW

#### < COMPONENT DIAGNOSIS >

#### [VDC/TCS/ABS]

Brake fluid level switch	Condition	Continuity
1.0	When brake fluid is full in the reservo	r tank. No
1, 2	When brake fluid is empty in the reserv	oir tank. Yes
<u>View"</u> .	osis, and make sure that the resul	ervoir tank. Refer to <u>BR-22, "Exploded</u> t shows "NO DTC IS DETECTED".
<ol> <li>Disconnect combination meter c</li> <li>Check continuity between combination terminal 27 and brake fluid level nal 1.</li> </ol>	nation meter connector M24 (A)	
<ul><li>27 - 1 :</li><li>Check continuity between comb terminal 27 and ground.</li></ul>	Continuity should exist. nation meter connector M24 (A)	
27 - Ground : s the inspection result normal?	Continuity should not exist.	
YES >> GO TO 4 NO >> • Repair or replace malf • Perform the self-diagn <b>1</b> .CHECK BRAKE FLUID LEVEL S	osis, and make sure that the result	shows "NO DTC IS DETECTED".
Check continuity between brake fluid		
erminal 2 and ground.		
<b>2 - Ground</b> : s the inspection result normal?	Continuity should exist.	
YES >> Brake fluid level switch on NO >> • Repair or replace malf	unctioning components. nosis, and make sure that the	
	L	ALFIA0028ZZ INFOID:00000004204486
Component Inspection		
Component Inspection		NA 012.00000004244400
Component Inspection  I.CHECK BRAKE FLUID LEVEL S	WITCH	IN 012.00000004204400

Brake fluid	level switch	Condition	Continuity	
Connector	Terminals	Condition	Continuity	
E24	1-2	When brake fluid is full in the reservoir tank.	No	Р
224	1-2	When brake fluid is empty in the reservoir tank.	Yes	

Is the inspection result normal?

YES >> INSPECTION END.

NO >> Replace reservoir tank.

< COMPONENT DIAGNOSIS >

Special Repair Requirement

INFOID:000000004204487

# 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-263</u>, "Removal and Installation".

>> END

#### < COMPONENT DIAGNOSIS >

# DTC C1156 ST ANG SEN COM CIR

#### Description

The steering angle sensor is connected to the ABS actuator and electric unit (control unit) in addition to CAN lines. 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.

#### DTC Logic

INFOID:000000004204489

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1156	ST ANG SEN COM CIR	When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric	<ul> <li>Harness or connector</li> <li>CAN communication line</li> <li>Steering angle sensor</li> </ul>	BRC
		unit (control unit).	ABS actuator and electric unit (control unit)	G
	ONFIRMATION PROCE	DURE		

#### **1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ST ANG SEN COM CIR	
Is above displayed on the self-diagnosis display?	1
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-213, "Diagnosis Procedure"</u> . NO >> INSPECTION END	J
Diagnosis Procedure	Κ
INSPECTION PROCEDURE	
1.CHECK CONNECTOR	L
<ol> <li>Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.</li> <li>Reconnect connector and perform self-diagnosis.</li> </ol>	Μ
Self-diagnosis results	Ν
CAN COMM CIRCUIT	
ST ANG SEN COM CIR	0
Is above displayed on the self-diagnosis display?	0
YES >> Refer to <u>LAN-7, "Precautions for Trouble Diagnosis"</u> . NO >> Inspection end.	Ρ

INFOID:000000004204488

А

D

Ε

Н

# U1000 CAN COMM CIRCUIT

#### Description

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.

#### DTC Logic

INFOID:000000004204492

INFOID:000000004204493

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	<ul> <li>CAN communication line</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

#### 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E26, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Self-diagnosis results
CAN COMM CIRCUIT

Is above displayed on the self-diagnosis display?

- YES >> Refer to LAN-7, "Precautions for Trouble Diagnosis".
- NO >> Inspection end.

# PARKING BRAKE SWITCH

#### < COMPONENT DIAGNOSIS >

# PARKING BRAKE SWITCH

# Description

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the combination meter. Then, through CAN communication, the signal is carried to the ABS actuator and electric unit (control unit).

#### Component Function Check

1. CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake. Then check that the brake warning lamp in the combination meter turns on/off cor-D rectly.

Condition	Brake warning lamp illumination status	
When the parking brake is engaged	ON	
When the parking brake is not engaged	OFF	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-215, "Diagnosis Procedure"</u>.

#### Diagnosis Procedure

#### 1. CHECK PARKING BRAKE SWITCH CIRCUIT

- 1. Disconnect combination meter connector and parking brake switch connector.
- Check continuity between combination meter harness connector 2. M24 (A) terminal 26 and parking brake switch harness connector M73 (B) terminal 1.

#### 26 - 1

#### : Continuity should exist.

3. Check continuity between combination meter harness connector M24 (A) terminal 26 and ground.

#### 26 - Ground

#### : Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair harness or connector.

2.CHECK PARKING BRAKE SWITCH

Check continuity between parking brake switch terminal 1 and switch case ground.

Component	Terminal	Condition	Continuity
Parking brake switch	1	Parking brake applied	Yes
		Parking brake released	No

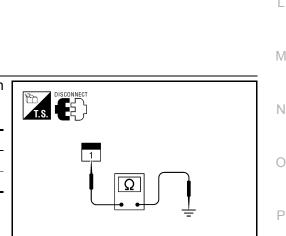
Is the inspection result normal?

YES >> Check parking brake switch case ground condition.

NO >> Replace parking brake switch.

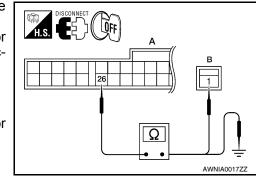
#### Component Inspection

INSPECTION PROCEDURE



AWNIA0018ZZ

INFOID:000000004204497



INFOID:000000004204494

INFOID:000000004204495

INFOID:000000004204496

А

В

Е

BRC

Н

Κ

L

Ρ

# **PARKING BRAKE SWITCH**

#### < COMPONENT DIAGNOSIS >

# 1. CHECK PARKING BRAKE SWITCH

- 1. Turn ignition switch OFF.
- 2.

Disconnect parking brake switch connector. Check continuity between parking brake switch terminal 1 and ground. 3.

Parking brake switch			Condition	Continuity
Connector	Terminal		Condition	Continuity
M73 1	Ground	When the parking brake is engaged.	Yes	
		When the parking brake is released.	No	

Is the inspection result normal?

YES >> INSPECTION END.

>> Replace parking brake switch. NO

# **VDC OFF SWITCH**

# < COMPONENT DIAGNOSIS >

# VDC OFF SWITCH

# Description

VDC OFF switch can deactivate (turn OFF) the VDC/TCS function by pressing the VDC OFF switch.

# **Component Function Check**

# 1. CHECK VDC OFF SWITCH OPERATION

Turn ON/OFF the VDC OFF switch and check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly.

Condition	VDC OFF indicator lamp illumination status
VDC OFF switch: ON	ON
VDC OFF switch: OFF	OFF
Is the inspection result normal?	

### YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-217, "Diagnosis Procedure"</u>.

### **Diagnosis** Procedure

### INSPECTION PROCEDURE

# **1**.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to <u>BRC-218. "Component Inspection"</u>. Is the inspection result normal?

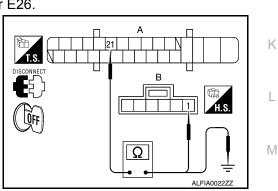
YES >> GO TO 2

NO >> Replace VDC OFF switch.

### 2.CHECK VDC OFF SWITCH HARNESS

- 1. Disconnect ABS actuator and electric unit (control unit) connector E26.
- Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 21 and VDC OFF switch connector M72 (B) terminal 1.

ABS actuator and electric unit (control unit)	VDC OFF switch	Continuity
21	1	Yes



Ν

Ο

Ρ

 Check continuity between ABS actuator and electric unit (control unit) connector E26 (A) terminal 21 and ground.

ABS actuator and electric unit (control unit)	Body ground	Continuity
21	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK VDC OFF SWITCH GROUND

INFOID:000000004204498

INFOID:000000004204499

INFOID:000000004204500

А

В

D

Е

BRC

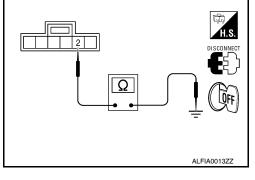
Н

# **VDC OFF SWITCH**

### < COMPONENT DIAGNOSIS >

Check continuity between VDC OFF switch connector M72 terminal 2 and ground.

VDC OFF switch	Body ground	Continuity
2	Ground	Yes



[VDC/TCS/ABS]

INFOID:000000004204501

#### Is the inspection result normal?

YES >> Inspection end.

NO >> Repair or replace malfunctioning components.

### **Component Inspection**

INSPECTION PROCEDURE

1. CHECK VDC OFF SWITCH

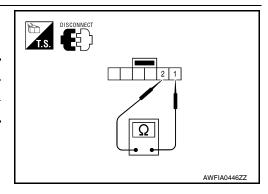
- 1. Disconnect VDC OFF switch connector.
- 2. Check continuity between VDC OFF switch terminals.

VDC OFF switch terminals	Condition	Continuity
1 – 2	VDC OFF switch pressed.	Yes
1 – 2	VDC OFF switch released.	No

Is the inspection result normal?

YES >> Inspection End

NO >> Replace VDC OFF switch.



# **ABS WARNING LAMP**

# < COMPONENT DIAGNOSIS >

# ABS WARNING LAMP

# Description

INFOID:000000004204502

А

[VDC/TCS/ABS]

Condition	ABS warning lamp
Ignition switch OFF	
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	_
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFO/D:00000004204503
CHECK ABS WARNING LAMP OPERATION	
Check that the lamp illuminates for approximately 2	seconds after the ignition switch is turned ON.
s the inspection result normal? YES >> Inspection End	
NO $>>$ Go to diagnosis procedure. Refer to BF	RC-219. "Diagnosis Procedure".
Diagnosis Procedure	INFOID:000000004204504
-	INT-OIL:00000004204504
.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit)	) self-diagnosis. Refer to BRC-163, "CONSULT-III Function
	5
<u>ABS)"</u>	<u> </u>
s the inspection result normal?	
s the inspection result normal? YES >> GO TO 2	
s the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diagnosi	
s the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diagnosi CHECK COMBINATION METER	S.
s the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diagnosi CHECK COMBINATION METER Check if the indication and operation of combination	S.
<ul> <li><u>s the inspection result normal?</u></li> <li>YES &gt;&gt; GO TO 2</li> <li>NO &gt;&gt; Check items displayed by self-diagnosi</li> <li>CHECK COMBINATION METER</li> <li>Check if the indication and operation of combination is the inspection result normal?</li> </ul>	s. n meter are normal. Refer to <u>MWI-4, "Work Flow"</u> .
s the inspection result normal?         YES       >> GO TO 2         NO       >> Check items displayed by self-diagnosi         2.CHECK COMBINATION METER         Check if the indication and operation of combination s the inspection result normal?         YES       >> Replace ABS actuator and electric uni tion".	S.

- Ν
- 0

# **BRAKE WARNING LAMP**

### < COMPONENT DIAGNOSIS >

# BRAKE WARNING LAMP

# Description

INFOID:000000004204505

[VDC/TCS/ABS]

×: ON –: OFF

Condition	Brake warning lamp (Note 1)	
Ignition switch OFF	-	
Ignition switch ON	× (Note 2)	
EBD function is malfunctioning.	×	

#### NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

· 2: After starting engine, brake warning lamp is turned off.

# **Component Function Check**

INFOID:000000004204506

# **1.**BRAKE WARNING LAMP OPERATION CHECK 1

Check that the lamp illuminates after the ignition switch is turned ON, and turns OFF after the engine is started.

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <u>BRC-220, "Diagnosis Procedure"</u>.

### 2.BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brakes.

Is the inspection result normal?

YES >> Inspection End

NO >> Check parking brake switch. Refer to <u>MWI-49, "Description"</u>.

### **Diagnosis** Procedure

INFOID:000000004204507

### **1.**CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brakes.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check parking brake switch. Refer to <u>MWI-49, "Description"</u>.

2.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-163, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-4</u>, <u>"Work Flow"</u>. <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace combination meter. Refer to <u>MWI-179</u>, "Removal and Installation".

# **VDC OFF INDICATOR LAMP**

### < COMPONENT DIAGNOSIS >

# VDC OFF INDICATOR LAMP

# Description

INFOID:000000004204508

А

0	×: ON -: OFF
Condition	VDC OFF indicator lamp
gnition switch OFF	-
For 2 seconds after turning ON ignition switch	X
2 seconds later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	X
VDC/TCS function is malfunctioning.	X
ABS function is malfunctioning.	X
EBD function is malfunctioning.	X
component Function Check	INFOID:00000004204509
.VDC OFF INDICATOR LAMP OPERATION CHEC	СК 1
heck that the lamp illuminates for approximately 2 s	econds after the ignition switch is turned ON.
the inspection result normal?	-
YES >> GO TO 2	
NO >> Go to diagnosis procedure. Refer to <u>BRC</u>	
VDC OFF INDICATOR LAMP OPERATION CHEC	CK 2
	nation meter turns ON/OFF correctly when operating the
DC OFF switch.	
the inspection result normal?	
YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-2</u>	17. "Description".
liagnosis Procedure	
	INFOID:00000004204510
.CHECK VDC OFF SWITCH	
heck that the VDC OFF indicator lamp in the combined of the co	nation meter turns ON/OFF correctly when operating the
the inspection result normal?	
YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to <u>BRC-2</u>	17, "Diagnosis Procedure".
CHECK SELF-DIAGNOSIS	
erform ABS actuator and electric unit (control unit) s	elf-diagnosis. Refer to <u>BRC-163, "CONSULT-III Function</u>
the inspection result normal?	
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	
CHECK COMBINATION METER	
heck if the indication and operation of combination r	meter are normal. Refer to MWI-4, "Work Flow".
the inspection result normal?	i
•	(control unit). Refer to BRC-260, "Removal and Installa-
tion".	· · ·
NO >> Repair or replace combination meter. Ref	ter to <u>IVIVI-179, "Removal and Installation"</u> .

# SLIP INDICATOR LAMP

### < COMPONENT DIAGNOSIS >

# SLIP INDICATOR LAMP

# Description

INFOID:000000004204511

[VDC/TCS/ABS]

x:	ON	-:	OFF
···	0.1	•	0.1

Condition	SLIP indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

# Component Function Check

INFOID:000000004204512

# 1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-222, "Diagnosis Procedure"</u>.

# Diagnosis Procedure

INFOID:000000004204513

# **1.**CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-163, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

# 2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-4</u>, <u>"Work Flow"</u>. <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260</u>, "<u>Removal and Installa-</u> tion".
- NO >> Repair or replace combination meter. Refer to <u>MWI-179</u>, "Removal and Installation".

< ECU DIAGNOSIS >

**ECU DIAGNOSIS** 

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000004204514 B

А

С

### VALUES ON THE DIAGNOSIS TOOL

### **CAUTION:**

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short - circuited.

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
FR LH SENSOR		0 [km/h]	Vehicle stopped
FR RH SENSOR RR LH SENSOR RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
STOP LAMP SW Brake pedal operation	Danka model en entien	When brake pedal is de- pressed	ON
		When brake pedal is not depressed	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
SLCT LVR POSI	CVT shift position	P position R position	P R
SLUT LVK PUSI		N position D position	N D
OFF SW VDC OFF switch ON/OFF		VDC OFF switch ON (When VDC OFF indica- tor lamp is ON)	ON
	VDC OFF SWIICH ON/OFF	VDC OFF switch OFF (When VDC OFF indica- tor lamp is OFF)	OFF
		When vehicle stop	Approx. 0 d/s
YAW RATE SEN	Yaw rate detected by yaw rate/side G sensor	When vehicle turning	-75 to 75 d/s
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with	Accelerator pedal not de- pressed (ignition switch is ON)	0 %
accelerator pedal)	accelerator pedal)	Depress accelerator ped- al (ignition switch is ON)	0 - 100 %
		Vehicle stopped	Approx. 0 m/s <sup>2</sup>
SIDE G-SENSOR Transverse G detected by a	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s <sup>2</sup> )
		Vehicle turning left	Positive value (m/s <sup>2</sup> )
		Straight-ahead	Approx. 0°
STR ANGLE SIG	Steering angle detected by steering angle sensor	Steering wheel turned	–720 to 720°
		With ignition switch turned ON and brake pedal released	Approx. 0 bar
PRESS SENSOR Brake fluid pressure dete	Brake fluid pressure detected by pressure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar

### < ECU DIAGNOSIS >

/	
[VDC/TC	CIVBCI
	S/ADS]

		Data mo	Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation				
		With engine stopped	0 rpm				
ENGINE RPM	With engine running	Engine running	Almost in accor- dance with tachome- ter display				
FLUID LEV SW	Brake fluid level switch	When brake fluid level switch ON	ON				
FLUID LEV SVV		When brake fluid level switch OFF	OFF				
PARK BRAKE SW	Derking brake switch	Parking brake switch is active	ON				
PARK BRAKE SW	Parking brake switch	Parking brake switch is inactive	OFF				
FR LH IN SOL FR LH OUT SOL FR RH IN SOL FR RH OUT SOL RR LH IN SOL	Operation status of all solenoid valve	Actuator (solenoid valve) is active ("ACTIVE TEST" with CONSULT-III) or ac- tuator relay is inactive (in fail-safe mode)	ON				
RR LH OUT SOL RR RH IN SOL RR RH IN SOL RR RH OUT SOL		When the actuator (sole- noid valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF				
		When the motor relay and motor are operating	ON				
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are not operat- ing	OFF				
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON				
(Note 2)		When the actuator relay is not operating	OFF				
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON				
	(Note 3)	When ABS warning lamp is OFF	OFF				
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indica- tor lamp is ON	ON				
	(Note 3)	When VDC OFF indica- tor lamp is OFF	OFF				
	SLIP indicator lamp	When SLIP indicator lamp is ON	ON				
SLIP LAMP	(Note 3)	When SLIP indicator lamp is OFF	OFF				
	Crow mode switch	When snow mode switch is ON	ON				
SNOW MODE SW	Snow mode switch	When snow mode switch is OFF	OFF				
BST OPER SIG	Not applied but displayed	_	OFF				
	Manual made estimated	When the manual mode is active	ON				
M-MODE SIG	Manual mode activated	When the manual mode is inactive	OFF				

### < ECU DIAGNOSIS >

 - /
[VDC/TCS/ABS]

		Data mo	Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation				
		EBD is active	ON				
EBD SIGNAL	EBD operation	EBD is inactive	OFF				
		ABS is active	ON				
ABS SIGNAL	ABS operation	ABS is inactive	OFF				
	Too an antian	TCS is active	ON				
TCS SIGNAL	TCS operation	TCS is inactive	OFF				
		VDC is active	ON				
VDC SIGNAL	VDC operation	VDC is inactive	OFF				
		In EBD fail-safe	ON				
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF				
		In ABS fail-safe	ON				
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	OFF				
		In TCS fail-safe	ON				
CS FAIL SIG TCS fail-safe signal		TCS is normal	OFF				
		In VDC fail-safe	ON				
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF				
		Crank is active	ON				
CRANKING SIG	Crank operation	Crank is inactive	OFF				
USV HSV (FL-RR, FR-RL)		When actuator (switch- over valve) is active ("AC- TIVE TEST" with CON- SULT-III) or actuator relay is inactive (when in fail-safe mode)	ON				
(Note 2)		When actuator (switch- over valve) is not active and actuator relay is ac- tive (ignition switch ON)	OFF				
V/R OUTPUT	Solenoid valve relay activated	When the solenoid valve relay is active (When igni- tion switch OFF)	ON				
(Note 2)		When the solenoid valve relay is not active (in the fail-safe mode)	OFF				
M/R OUTPUT	Actuator motor and motor relay activated	When the actuator motor and motor relay are ac- tive ("ACTIVE TEST" with CONSULT-III)	ON				
W/R OUTPUT		When the actuator motor and motor relay are inac- tive	OFF				

Note 1: Confirm tire pressure is normal.

Note 2: A brief moment of ON/OFF condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

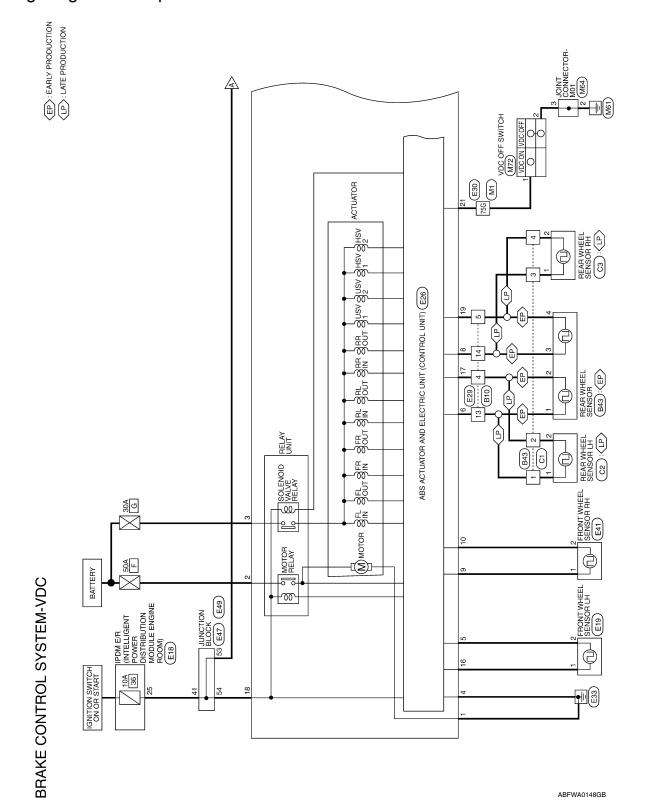
Note 3: On and off timing for warning lamp and indicator lamp. Refer to BRC-159, "System Description".

### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) [VDC/TCS/ABS]

### < ECU DIAGNOSIS >

Wiring Diagram - Coupe

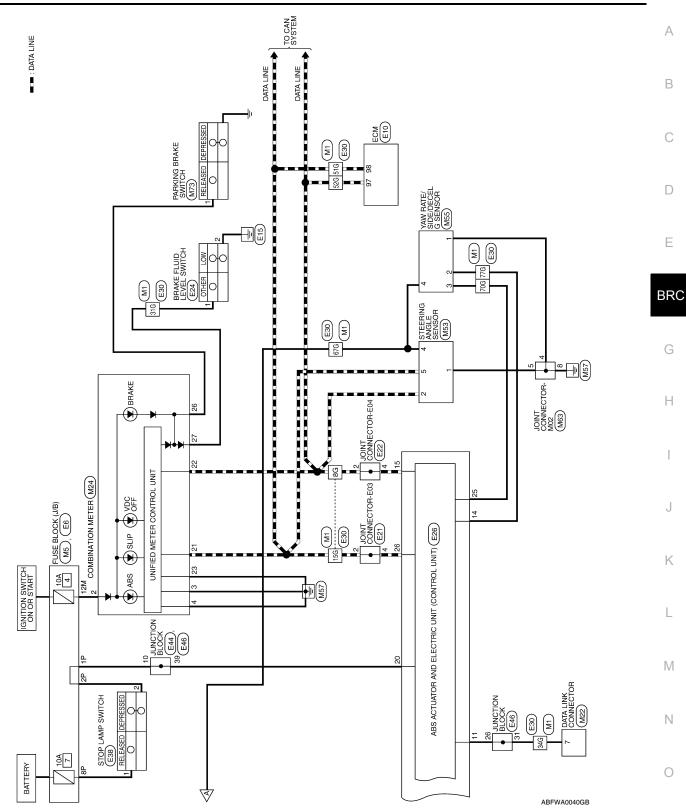
INFOID:000000004204515



ABFWA0148GB

< ECU DIAGNOSIS >

[VDC/TCS/ABS]



Ρ

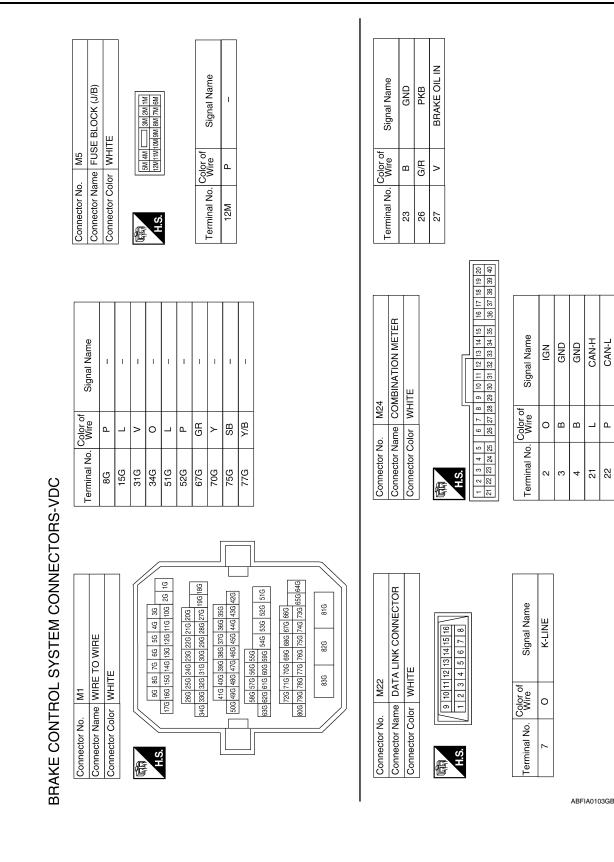


### < ECU DIAGNOSIS >

[VDC/TCS/ABS]

CAN-L

٩



**Revision: February 2010** 

### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) [VDC/TCS/ABS]

< ECU DIAGNOSIS > Signal Name Signal Name 4 3 2 1 I T L

Connector No. M73 Connector Name PARKING BRAKE SWITCH Connector Name JOINT CONNECTOR-M02 1 2 -BLACK BLUE M63 Color of Wire Color of Wire G/R В ш m 12 11 10 9 Connector Color Connector Color Connector No. Terminal No. Terminal No. ω 4 ß H.S. H.S. -E E YAW RATE/SIDE/DECEL G SENSOR Signal Name Signal Name CAN-H CAN-L Connector Name VDC OFF SWITCH GND ī ₫ T 2 6 5 4 3 BLACK 4 - 3 ld Connector Color GRAY M55 Connector No. M72 Color of Wire Color of Wire BB Y/B GВ ш ≻ ш Connector Name Connector Color Connector No. Terminal No. Terminal No. ო 4 -N N -H.S. H.S. 佢 佢 Connector Name JOINT CONNECTOR-M01 Signal Name I 1

GRAY

Connector Color

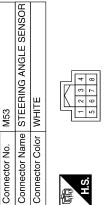
9

H.S.

E

M64

Connector No.



Signal Name	GND	CAN-L	IG	CAN-H
Color of Wire	В	Ь	GR	L
Terminal No.	F	2	4	5

ABFIA0104GB

Color of Wire

Terminal No. ŝ с

ш m

Ρ

Ο

А

В

С

D

Ε

BRC

G

Н

J

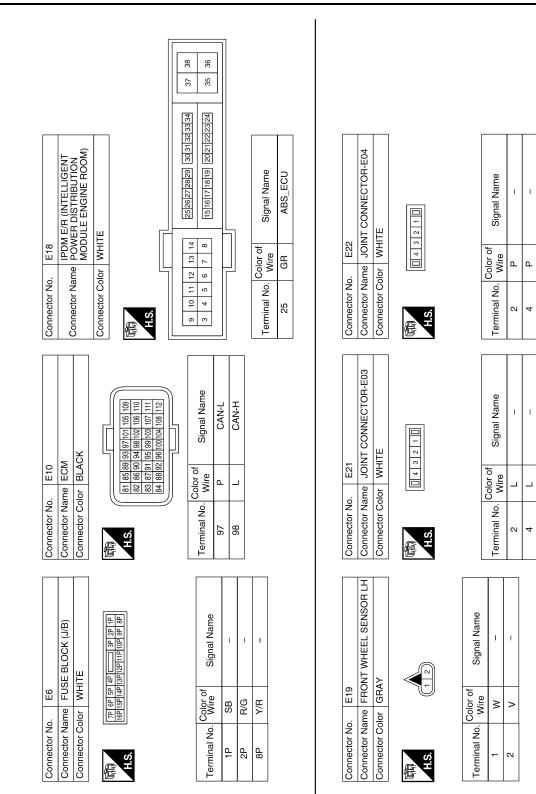
Κ

L

Μ

Ν

**Revision: February 2010** 



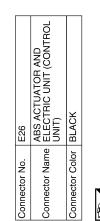
ABFIA0105GB

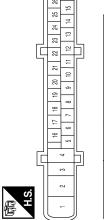
< ECU DIAGNOSIS >

ABS ACTUATOR AND ELEC	CTRIC UNIT (CONTROL UNIT)
< ECU DIAGNOSIS >	[VDC/TCS/ABS]
	1

Signal Name	DS FL	DP RL	DP RR	DP FR	DS FR	DIAG-K	CAN-M2	CAN-L	DP FL	DS RL	DZ	DS RR	BLS	ASR AUS	CAN-P2	CAN-H
Color of Wire	>	σ	_	в	ГG	GR	0	Ь	Μ	0	GR	BR	SB	В	В	L
Terminal No.	5	9	8	6	10	11	14	15	16	17	18	19	20	21	25	26

Signal Name	1	I	I	I	I	I	1	I	I	I
Color of Wire	٩	_	>	0	_	٩.	N	В	œ	0
Terminal No.	8G	15G	31G	34G	51G	52G	67G	70G	75G	77G





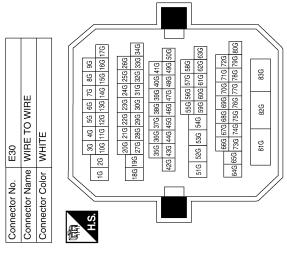
8

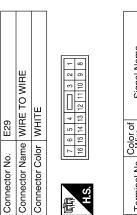
Signal Name	MGND	UB (MR)	UB (VR)	GND
Color of Wire	В	ŋ	В	В
Terminal No.	-	2	3	4

Connector No.	E24
onnector Name	Connector Name BRAKE FLUID LEVEL SWITCH
Connector Color	GRAY
E H	

	Signal Name	I
	Color of Wire	^
H.S.	Terminal No.	1

Signal Name	I	I	
Color of Wire	٨	B/Y	
Terminal No.	ł	2	





Signal Name	I	I	I	I	
Color of Wire	0	BR	ŋ	L	
Terminal No. Color of	4	5	13	14	

ABFIA0106GB

А

В

С

D

Ε

BRC

G

Н

J

Κ

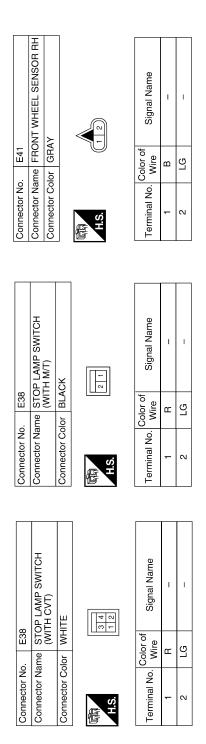
L

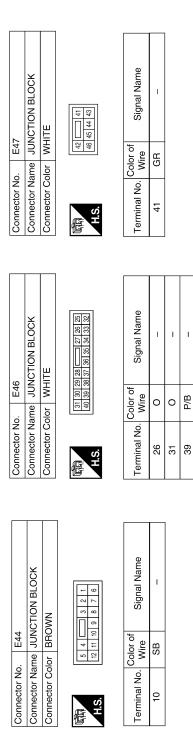
Μ

Ν

0

< ECU DIAGNOSIS >



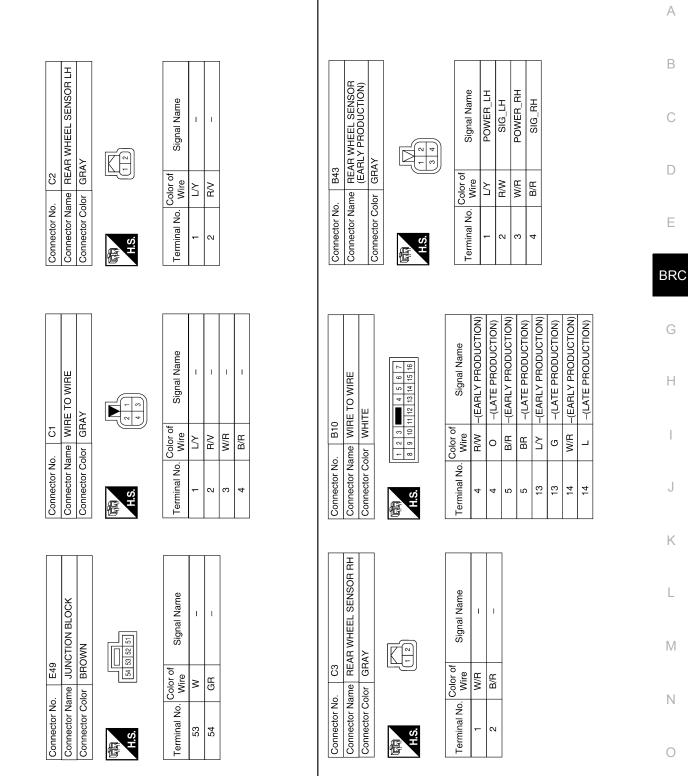


I. T

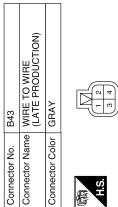
P/B

ABFIA0107GB





ABFIA0366GB

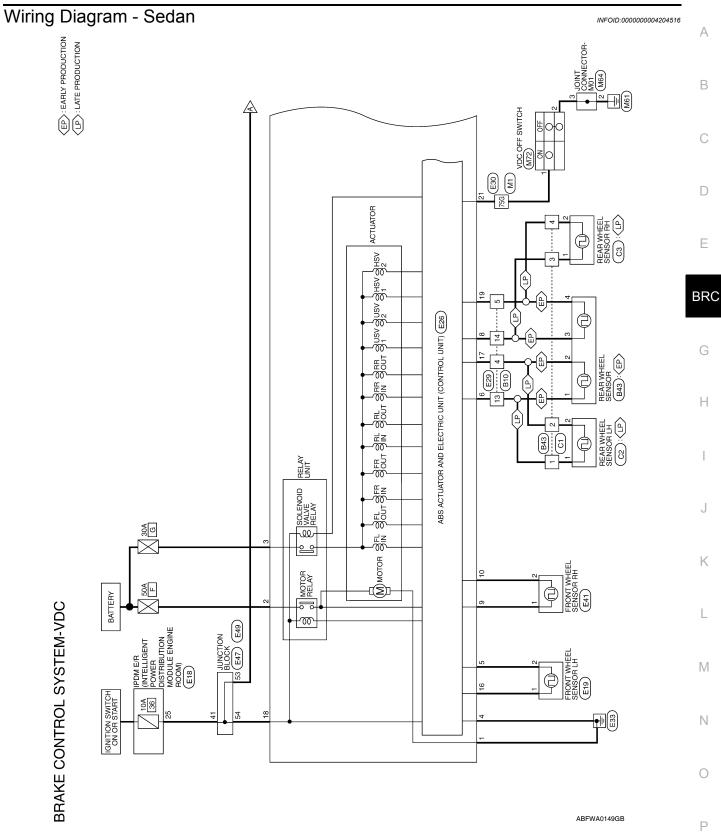


)	Signal Name	1	I	I	1
	Color of Wire	თ	0	Γ	ВВ
	Terminal No.	۰.	2	3	4

ABFIA0367GB

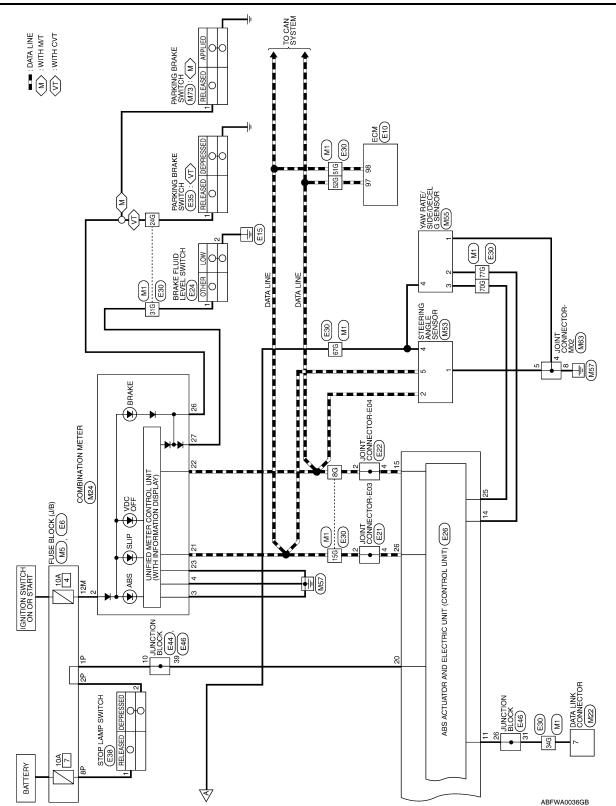
< ECU DIAGNOSIS >

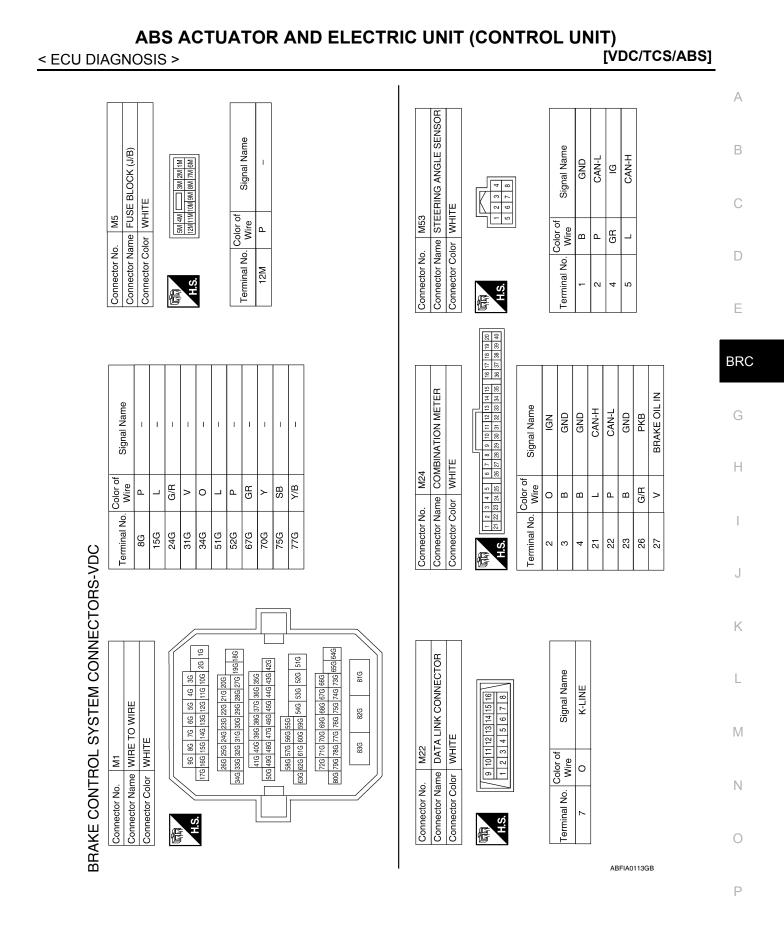
# [VDC/TCS/ABS]



### < ECU DIAGNOSIS >

., [VDC/TCS/ABS]

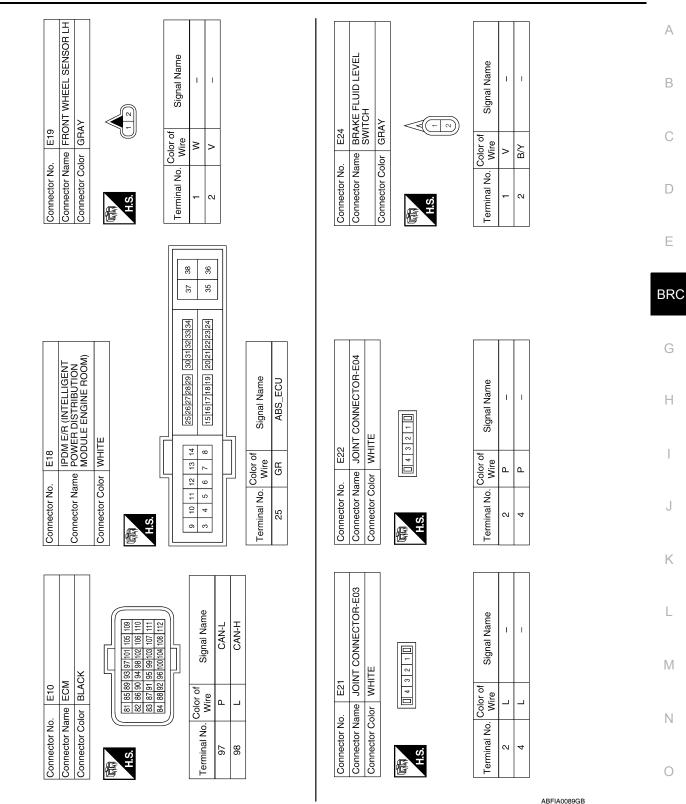




5			
M64 JOINT CONNECTOR-M01 GRAY	Signal Name	Connector No. E6 Connector Name FUSE BLOCK (J/B) Connector Color WHITE	Signal Name
	Color of Wire B B	PUSE E MMH FUSE E NOT WHITE	Color of Wire SB R/G Y/R
Connector No. Connector Name Connector Color	Terminal No. 2 3	Connector No. Connector Name Connector Color	Terminal No. 1P 8P
Connector No. M63 Connector Name JOINT CONNECTOR-M02 Connector Color BLUE	Color of Signal Name Wire Signal Name B - B - B - B - B - C - B - C - C - C -	M73 ne PARKING BRAKE SWITCH (WITH M/T) or BLACK	Color of Signal Name Wire G/R –
Connector No. Connector Name Connector Color	Terminal No. ( 5 8	Connector No. Connector Name Connector Color H.S.	Terminal No.
σ			
M55 YAW RATE/SIDE/DECEL SENSOR BLACK	Signal Name GND CAN-L CAN-H IG	M72 VDC OFF SWITCH GRAY 5 4 3 2 1 1	Signal Name
	Color of Wire B B Color of Col	0. M72 ame VDC C olor GRAY	B B Color of Wire B
Connector No. Connector Name Connector Color H.S.	Terminal No. 1 3 3	Connector No. Connector Name Connector Color	Terminal No.

### < ECU DIAGNOSIS >

(VDC/TCS/ABS)



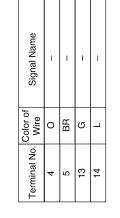
Ρ

### < ECU DIAGNOSIS >

7 6 5 4 3 2 1 16 15 14 13 12 11 10 9 8 Connector Name WIRE TO WIRE Connector Color WHITE E29 Connector No. H.S. 佢

Τ

Т

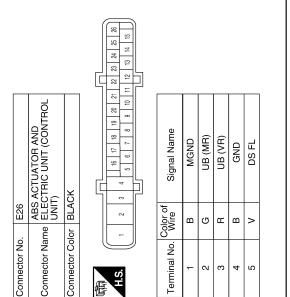


Signal Name	DP RL	DP RR	DP FR	DS FR	DIAG-K	CAN-M2	CAN-L	DP FL	DS RL	ZN	DS RR	BLS	ASR AUS	CAN-P2	CAN-H	
Color of Wire	9	Γ	в	Ľ	GR	0	Ч	N	0	GR	BR	SB	н	В	Γ	
Terminal No.	9	8	6	10	11	14	15	16	17	18	19	20	21	25	26	

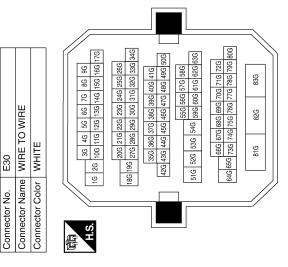
Т

Signal Name	I	1	I	I	1	1	I	I	I	I	1
Color of Wire	٩	_	G/R	>	0	_	Ч	N	В	œ	0
Ferminal No.	8G	15G	24G	31G	34G	51G	52G	67G	70G	75G	77G

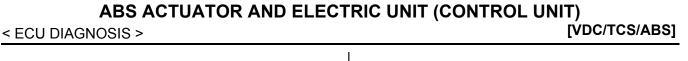
Т

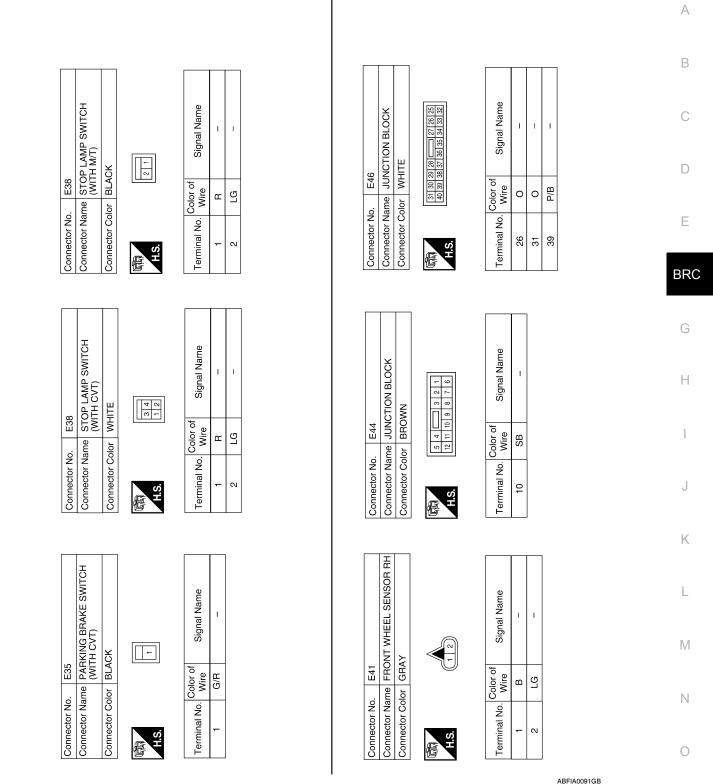


佢



ABFIA0090GB

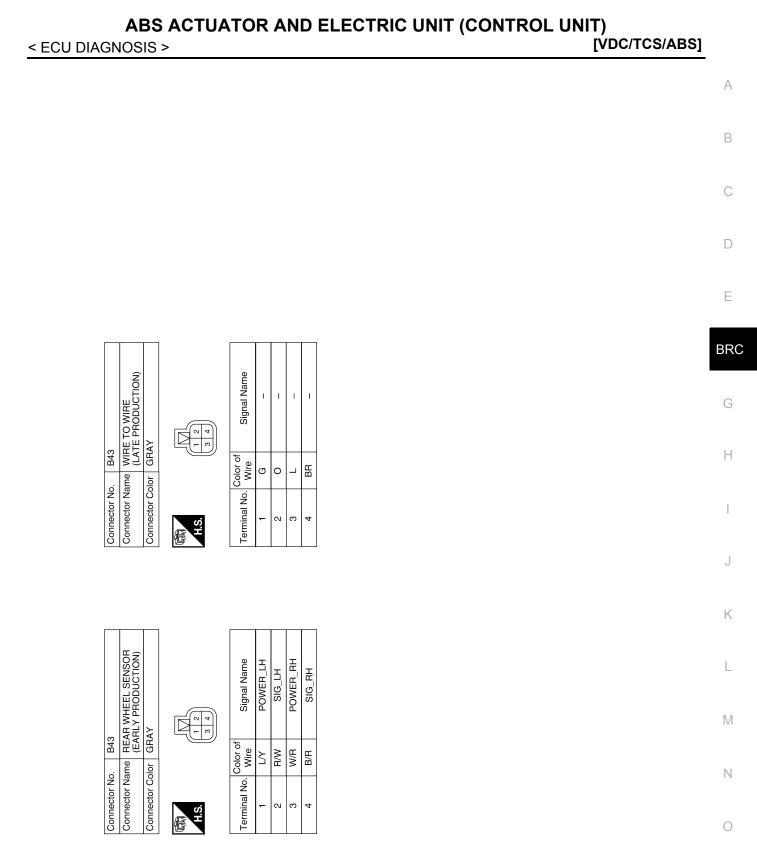




Ρ

o. C1 ame WIRE TO WIRE olor GRAY		Color of Signal Name	R/V – – – – – – – – – – – – – – – – – – –	B/R –	· B10	Connector Name WIRE TO WIRE Connector Color WHITE	1     2     3     4     5     6     7       8     9     10     11     12     13     14     15     16	Color of Signal Name Vire	R/W –(EARLY PRODUCTION)			L/Y -(EARLY PRODUCTION)	G –(LATE PRODUCTION)	W/R –(EARLY PRODUCTION)	L –(LATE PRODUCTION)
Connector No. Connector Name Connector Color	国 H.S.	Terminal No.	ი თ	4	Connector No.	Connector Name Connector Color	品 H.S.	Terminal No.	4	4	2 2	13	13	14	14
Connector No. E49 Connector Name JUNCTION BLOCK Connector Color BROWN	(項) H.S.	Terminal No.     Color of Wire     Signal Name       53     W     -	54 GR –		Connector No. C3	Connector Name REAR WHEEL SENSOR RH Connector Color GRAY	H.S.	Terminal No. Color of Signal Name	1 W/R -	2 B/R –					
Connector No. E47 Connector Name JUNCTION BLOCK Connector Color WHITE	(11) 42) 46) 45) 44) 43)	Terminal No.         Color of Wire         Signal Name           41         GR         -			Connector No. C2	Connector Name REAR WHEEL SENSOR LH Connector Color GRAY	H.S.	Terminal No. Color of Signal Name	1 L/Y -	2 R/V -					

ABFIA0368GB



ABFIA0369GB

INFOID:000000004204517

### ABS, EBD SYSTEM

Fail-Safe

In case of electrical malfunctions with the ABS, ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp will turn on. Simultaneously, the VDC/TCS/ABS become one of the following conditions of the fail-safe function.

# BRC-243

### < ECU DIAGNOSIS >

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

### NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

### VDC / TCS

In case of malfunction in the VDC/TCS/ABS system, VDC OFF indicator lamp, SLIP indicator lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without VDC/TCS control. **CAUTION:** 

### If the Fail-Safe function is activated, then perform self-diagnosis for VDC/TCS/ABS control system.

### DTC No. Index

INFOID:000000004204518

Display item	Malfunction detecting condition	Check item
RR RH SENSOR-1 [C1101]	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-170, "Diagno-
RR LH SENSOR-1 [C1102]	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	sis Procedure (Ear- ly Production)" or
FR RH SENSOR-1 [C1103]	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	BRC-172, "Diagno- sis Procedure (Late Production)"
FR LH SENSOR-1 [C1104]	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	(Note 1)
RR RH SENSOR-2 [C1105]	When the circuit in the rear RH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
RR LH SENSOR-2 [C1106]	When the circuit in the rear LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	BRC-175, "Diagno- sis Procedure (Ear- ly Production)" or BRC-177, "Diagno-
FR RH SENSOR-2 [C1107]	When the circuit in the front RH wheel sensor is short-circuited. Or when the dis- tance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	sis Procedure (Late Production)" (Note 1)
FR LH SENSOR- 2 [C1108]	When the circuit in the front LH wheel sensor is short-circuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
BATTERY VOLTAGE [ABNORMAL] [C1109]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	BRC-180, "Diagno- sis Procedure"
CONTROLLER FAILURE [C1110]	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	BRC-182, "Diagno- sis Procedure"
PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	BRC-183, "Diagno-
[C1111]	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	sis Procedure"
MAIN RELAY	During the actuator relay operating with OFF, when the actuator relay turns ON. Or when the control line for the relay is shorted to the ground.	BRC-185, "Diagno-
[C1114]	During the actuator relay operating with ON, when the actuator relay turns OFF, or when the control line for the relay is open.	sis Procedure"
ABS SENSOR [ABNORMAL SIGNAL] [C1115]	When wheel sensor input signal is malfunctioning.	BRC-187, "Diagno- sis Procedure (Ear- ly Production)" or BRC-188, "Diagno- sis Procedure (Late Production)" (Note 1)

### < ECU DIAGNOSIS >

# [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
STOP LAMP SW [C1116]	When stop lamp switch circuit is open.	BRC-191, "Diagno- sis Procedure"
FR LH IN ABS SOL [C1120]	When the control unit detects a malfunction in the front left inlet solenoid circuit.	
FR RH IN ABS SOL [C1122]	When the control unit detects a malfunction in the front right inlet solenoid circuit.	BRC-193, "Diagno-
RR LH IN ABS SOL [C1124]	When the control unit detects a malfunction in the rear left inlet solenoid circuit.	sis Procedure"
RR RH IN ABS SOL [C1126]	When the control unit detects a malfunction in the rear right inlet solenoid circuit.	
FR LH OUT ABS SOL [C1121]	When the control unit detects a malfunction in the front left outlet solenoid circuit.	
FR RH OUT ABS SOL [C1123]	When the control unit detects a malfunction in the front right outlet solenoid circuit.	BRC-195, "Diagno-
RR LH OUT ABS SOL [C1125]	When the control unit detects a malfunction in the rear left outlet solenoid circuit.	sis Procedure"
RR RH OUT ABS SOL [C1127]	When the control unit detects a malfunction in the rear right outlet solenoid circuit.	
ENGINE SIGNAL 1 [C1130]		
ENGINE SIGNAL 2 [C1131]		
ENGINE SIGNAL 3 [C1132]	Major engine components are malfunctioning.	BRC-197, "Diagno- sis Procedure"
ENGINE SIGNAL 4 [C1133]		
ENGINE SIGNAL 6 [C1136]		
PRESS SEN CIRCUIT [C1142]	Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.	BRC-199, "Diagno- sis Procedure"
ST ANG SEN CIRCUIT [C1143]	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	BRC-201, "Diagno-
ST ANG SEN SIGNAL [C1144]	Neutral position correction of steering angle sensor is not finished.	sis Procedure"
YAW RATE SENSOR [C1145]	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	BRC-203, "Diagno-
SIDE G-SEN CIRCUIT [C1146]	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	sis Procedure"
USV LINE [FL-RR] [C1147]	VDC switch-over solenoid valve (USV1) on the primary side is open circuit or short- ed, or the control line is open or shorted to the power supply or the ground.	
USV LINE [FR-RL] [C1148]	VDC switch-over solenoid valve (USV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	BRC-206, "Diagno-
HSV LINE [FL-RR] [C1149]	VDC switch-over solenoid valve (HSV1) on the primary side is open circuit or short- ed, or the control line is open or shorted to the power supply or the ground.	sis Procedure"
HSV LINE [FR-RL] [C1150]	VDC switch-over solenoid valve (HSV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
EMERGENCY BRAKE [C1153]	When ABS actuator and electric unit (control unit) is malfunctioning. (Pressure increase is too much or too little)	BRC-182, "Diagno- sis Procedure"
PNP POS SIG [C1154]	TCM or ABS actuator and electric unit (control unit) internal malfunction.	BRC-209, "Diagno- sis Procedure"
BR FLUID LEVEL LOW [C1155]	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	BRC-210, "Diagno- sis Procedure"

### < ECU DIAGNOSIS >

### [VDC/TCS/ABS]

Display item	Malfunction detecting condition	Check item
ST ANG SEN COM CIR [C1156]	CAN communication circuit or steering angle sensor is malfunctioning.	BRC-213, "Diagno- sis Procedure"
VARIANT CODING [C1170]	In a case where VARIANT CODING is different.	BRC-182, "Diagno- sis Procedure"
CAN COMM CIRCUIT [U1000]	When there is a malfunction in the CAN communication circuit.	BRC-214, "Diagno- sis Procedure" (Note 2)

Note 1: After completing repairs of shorted sensor circuit, when ignition switch is turned ON, ABS warning lamp turns on. Make sure that ABS warning lamp turns off while driving vehicle at 30 km/h (19 MPH) or more for approximately 1 minute according to self-diagnosis procedure. In addition, if wheel sensor 2 is displayed for wheels, check wheel sensor circuit and also check control unit power voltage. Note 2: When malfunctions are detected in several systems, including CAN communication circuit [U1000], troubleshoot CAN communication circuit. Refer to <u>BRC-214</u>, "<u>Diagnosis Procedure</u>".

# SYMPTOM DIAGNOSIS VDC/TCS/ABS

# Symptom Table

If ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp turn ON, perform self-diagnosis.

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	BRC-248, "Diag- nosis Procedure"
1	Wheel sensor and rotor system	<u></u>
Incorported podel reaction	Brake pedal stroke	BRC-249, "Diag-
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-250, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-251, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-252, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	BRC-253, "Diag- nosis Procedure"
	ECM	<u>neele i roocdure</u>

### NOTE:

• 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.

• 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears

- When driving on slippery road

- During cornering at high speed

- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

K

Μ

Ν

Ο

Ρ

J

В

[VDC/TCS/ABS]

INFOID:000000004204519

# **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

### < SYMPTOM DIAGNOSIS >

# EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

### Diagnosis Procedure

INFOID:000000004204520

[VDC/TCS/ABS]

# **1.**CHECK START

Check front and rear brake force distribution using a brake tester.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-6. "Inspection"</u>, Rear: <u>RAX-6. "On-vehicle Service"</u>.

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

**3.**CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

- Wheel sensor installation for damage.
- Sensor rotor installation for damage.
- Wheel sensor connector connection.
- Wheel sensor harness inspection.

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor.
  - Repair harness.

### **4.**CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.

Is the inspection result normal?

- YES >> Normal
- NO >> Perform self-diagnosis. Refer to <u>BRC-163, "CONSULT-III Function (ABS)"</u>.

# UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS >

# [VDC/TCS/ABS]

JNE	
	XPECTED PEDAL REACTION
Diagn	Iosis Procedure
	ECK BRAKE PEDAL STROKE
	brake pedal stroke. Refer to <u>BR-13, "Inspection and Adjustment"</u> .
YES	<ul> <li><u>stroke too big?</u></li> <li>&gt;&gt; Bleed air from brake tube and hose. Refer to <u>BR-16, "Bleeding Brake System"</u>.</li> <li>Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to brake pedal: <u>BR-13, "Inspection and Adjustment"</u>, brake booster and</li> </ul>
NO	master cylinder. >> GO TO 2
<b>2.</b> CHE	ECK FUNCTION
	nect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is in this condition.Connect connector after inspection.
<u>s the ir</u>	nspection result normal?
YES	>> GO TO procedure 3 "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom 1. Refer to BRC-248, "Diagnosis Procedure".
	DIVO-240, $Diagnosis ribucculic$ .
NO	>> Check brake system.
NO	

 $\mathbb{N}$ 

Ν

0

Ρ

# THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000004204522

[VDC/TCS/ABS]

### **CAUTION:**

The stopping distance on slippery road surfaces might be longer with the ABS operating than when the ABS is not operating.

**1.**CHECK FUNCTION

Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. In this condition, check stopping distance. After inspection, connect connector.

Is the inspection result normal?

- YES >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to BRC-248, "Diagnosis Procedure".
- NO >> Check brake system.

# ABS FUNCTION DOES NOT OPERATE

INFOID:000000004204523

# ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure
---------------------

### **CAUTION:**

### ABS does not operate when speed is 10 km/h (6 MPH) or lower.

**1.**CHECK ABS WARNING LAMP DISPLAY

Make sure that the ABS warning lamp turns OFF after ignition switch is turned on or when driving.

Is the inspection result normal?

- YES >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to BRC-248, "Diagnosis Procedure".
- NO >> Perform self-diagnosis. Refer to <u>BRC-163</u>, "CONSULT-III Function (ABS)".

BRC

Н

J

Κ

L

Μ

Ν

0

Ρ

А

В

С

### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

### < SYMPTOM DIAGNOSIS >

# PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

**Diagnosis** Procedure

INFOID:000000004204524

[VDC/TCS/ABS]

### **CAUTION:**

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

**1.**SYMPTOM CHECK 1

Check if there is pedal vibration or operation sound when the engine is started.

Do symptoms occur?

YES >> GO TO 2

NO >> Perform self -diagnosis. Refer to <u>BRC-163, "CONSULT-III Function (ABS)"</u>.

2.SYMPTOM CHECK 2

Check symptoms when electrical component (headlamps, etc.) switches are operated.

Do symptoms occur?

- YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
- NO >> GO TO procedure "CHECK WHEEL SENSOR AND SENSOR ROTOR" of symptom. Refer to <u>BRC-248, "Diagnosis Procedure"</u>.

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [VDC/TCS/ABS]	
VEHICLE JERKS DURING VDC/TCS/ABS CONTROL	
Diagnosis Procedure	А
1. SYMPTOM CHECK	В
Check if the vehicle jerks during VDC/TCS/ABS control. Is the inspection result normal? YES >> Normal. NO >> GO TO 2	С
2. CHECK SELF-DIAGNOSIS RESULTS	D
Perform self-diagnostic of ABS actuator and electric unit (control unit). Refer to <u>BRC-163. "CONSULT-III Func-</u> <u>tion (ABS)"</u> . <u>Are self-diagnosis results indicated?</u> YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control	E
unit) self-diagnosis. NO >> GO TO 3 <b>3.</b> CHECK CONNECTOR	BF
<ul> <li>Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.</li> <li>Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.</li> </ul>	G
Are self-diagnosis results indicated?	Н
YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4	
4.CHECK ECM AND CVT SELF-DIAGNOSIS RESULTS	1
Perform ECM and CVT self-diagnosis. Are self-diagnosis results indicated?	
YES >> Check the corresponding items. • ECM: Refer to <u>EC-1160</u> . • CVT: Refer to TM-86.	J
<ul> <li>NO &gt;&gt; Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-260</u>, "<u>Removal and Installa-tion</u>".</li> </ul>	K
	L
	N
	Ν
	0

Ρ

# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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. 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. Information necessary to service the system safely is included in the SR 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 SR 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 harnesses or harness connectors.

### PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

### WARNING:

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Brake System

- Recommended fluid is brake fluid "DOT 3".
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted surface of body. If brake fluid is splashed on painted surfaces of body immediately wipe off then with cloth and then wash it away with water.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use a flare nut wrench when removing flare nuts, and use a flare nut torque wrench when tighten brake tube flare nuts.
- When installing brake tubes, be sure to check torque.
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Before working, turn ignition switch OFF and disconnect connectors of ABS actuator and electric unit (control unit) or the battery cable from the negative terminal.

### WARNING:

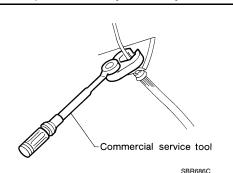
# Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

# Precaution for Brake Control

INFOID:000000004204528

INFOID:000000004204527

- Just after starting vehicle after ignition switch ON, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnostic



# **BRC-254**

# PRECAUTIONS

### < PRECAUTION >

### [VDC/TCS/ABS]

servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.

- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits, and improper wiring.
- VDC system may not operate normally or a VDC OFF indicator lamp or SLIP indicator lamp may light.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspensionrelated parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

Е

D

А

В

Н

Κ

L

Μ

Ν

Ο

Ρ

# < PREPARATION > PREPARATION PREPARATION

# Special Service Tool

INFOID:000000004204529

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

Tool number (Kent-Moore No.) Tool name		Description
 (J-45741) ABS active wheel sensor tester	J-45741-BOX	Checking operation of ABS active wheel sen- sor

# **Commercial Service Tool**

INFOID:000000004204530

Tool name		Description
<ol> <li>Flare nut crowfoot</li> <li>Torque wrench</li> </ol>		Removing and installing brake piping a: 10mm (0.39 in)/12mm (0.47 in)
	S-NT360	

# WHEEL SENSORS

### [VDC/TCS/ABS]

# < ON-VEHICLE REPAIR > **ON-VEHICLE REPAIR** WHEEL SENSORS

Removal and Installation

А

J

L

SEC. 476 D Е B BRC 1) 🕑 9 (0.9, 80) 2 🗣 9 (0.9, 80) AWFIA0510GB Н ← Front Front wheel sensor Rear wheel sensor 1. 2

### **CAUTION:**

- Be careful not to damage wheel sensor edge and sensor rotor teeth.
- When removing the front or rear wheel hub, first remove the wheel sensor from the wheel hub. Failure to do so may result in damage to the wheel sensor wires making the sensor inoperative.
- Pull out the wheel sensor, being careful to turn it as little as possible. Do not pull on the wheel sensor harness.
- Before installation, check if foreign objects such as iron fragments are adhered to the pick-up part of the sensor or to the inside of the hole in the wheel hub for the wheel sensor, or if a foreign object is Κ caught in the surface of the mating surface for the sensor rotor. Fix as necessary and then install the wheel sensor.

### FRONT WHEEL SENSOR

### Removal

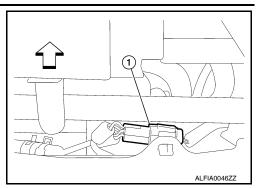
	Remove front wheel and tire. Refer to <u>WT-68. "Adjustment"</u> .	М
2.	Partially front wheel fender protector. Refer to EXT-20, "Removal and Installation".	
3.	Remove wheel sensor bolt and wheel sensor.	
4.	Remove harness wire from mounts and disconnect wheel sensor harness connector.	Ν
	allation tallation is in the reverse order of removal.	
RE	AR WHEEL SENSOR	0
NO	TE:	
lf b	oth rear wheel sensors share one harness and must be replaced as an assembly.	
Ren	noval	Ρ
1	Remove rear wheel and tire. Refer to WT-68. "Adjustment"	

emove rear wheel and tire. Refer to <u>W1-68,</u> Adjustment

# WHEEL SENSORS

### < ON-VEHICLE REPAIR >

- 2. Disconnect wheel sensor harness connector (1).
  - < : Front



- 3. Remove harness wire clips from rear suspension member.
- 4. Remove wheel sensor bolt and wheel sensor from rear wheel hub and bearing assembly.

#### Installation

Installation is in the reverse order of removal.

# **SENSOR ROTOR**

### < ON-VEHICLE REPAIR >

# SENSOR ROTOR

### Removal and Installation

The front and rear wheel sensor rotors are an integral part of the wheel hubs and can not be disassembled. When replacing the sensor rotor, replace the wheel hub. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-7</u>, "<u>Removal and Installation</u>" (rear).

G

Н

J

Κ

Μ

Ν

Ο

Ρ

Е

D

А

В

С

INFOID:000000004204532

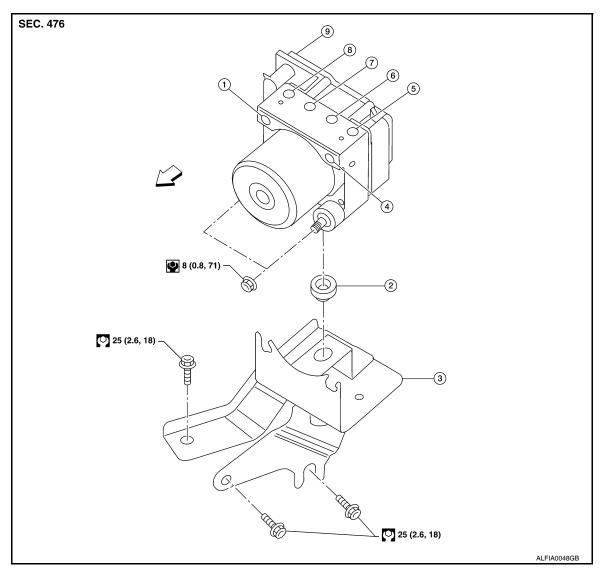
### < ON-VEHICLE REPAIR >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

# Exploded View

INFOID:000000004204533

[VDC/TCS/ABS]



- 1. From master cylinder secondary side 2. From master cylinder primary side
- Grommet
- 5. To front LH brake caliper

To front RH brake caliper

7. To rear LH brake caliper

∠⊐ Front

4.

### Removal and Installation

### **CAUTION:**

- Be careful of the following.
- Before servicing, disconnect the battery cable from negative terminal.

8.

- To remove brake pipe, use a suitable tool (flare nut wrench) to prevent flare nuts and brake tube from being damaged. To install, use suitable tool (flare nut torque wrench).
- Do not apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Do not remove and install ABS actuator and electric unit (control unit) by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-16, "Bleeding Brake System"</u>.
- After installing harness connector on the ABS actuator and electric unit (control unit), make sure connector is securely locked.

### **BRC-260**

To rear RH brake caliper

9. ABS actuator and electric unit (control unit)

3.

6.

Bracket

INFOID:000000004204534

< 0	DN-VEHICLE REPAIR > [VDC/TCS/ABS]	
р	n the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-157, "ADJUSTMENT OF STEERING ANGLE SENSOR</u> IEUTRAL POSITION : Special Repair Requirement".	A
	MOVAL	
1. 2.	Remove front wiper arms. Refer to <u>WW-119, "FRONT WIPER ARMS : Removal and Installation"</u> . Remove cowl top. Refer to <u>EXT-19, "Removal and Installation"</u> .	В
3.	Disconnect washer hose.	
4.	Disconnect the battery negative terminal.	С
5.	Remove tower bar, if equipped. Refer to FSU-13, "Exploded View".	
6.	Disconnect ABS actuator and electric unit (control unit) connector.	D
7.	Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit) using a suitable tool.	
8.	Remove ABS actuator and electric unit (control unit) nuts.	Ε
9.	Remove ABS actuator and electric unit (control unit).	
10.	. Remove bracket as necessary.	
	STALLATION tallation is in the reverse order of removal.	BR
		G
		Н
		I
		J
		Κ
		L
		M
		Ν

0

# **G SENSOR**

### Removal and Installation

**CAUTION:** 

- Do not drop or strike the yaw rate/side G sensor, because it has little endurance to impacts.
- Do not use power tools, because yaw rate/side G sensor is sensitive to impacts.
- For installation, make sure the arrow on top of the yaw rate/side G sensor is pointing to the front of the vehicle.

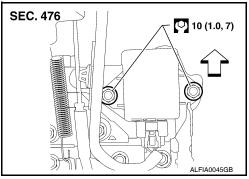
### REMOVAL

- 1. Remove the center console. Refer to IP-18, "Exploded View".
- 2. Disconnect the yaw rate/side G sensor harness connector.
- 3. Remove the yaw rate/side G sensor nuts. Remove the yaw rate/side G sensor.

### INSTALLATION

Installation is in the reverse order of removal.

- · For installation, make sure the arrow on top of the yaw rate/side G sensor is pointing to the front of the vehicle.
- < :: Front of vehicle.



INFOID:000000004204535

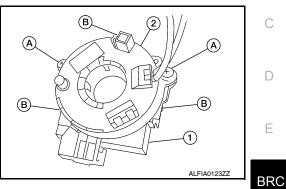
[VDC/TCS/ABS]

# STEERING ANGLE SENSOR

# Removal and Installation

### REMOVAL

- 1. Remove the spiral cable. Refer to <u>SR-8, "Removal and Installation"</u>.
- 2. Remove the two screws (A) and release the three clips (B) to remove the steering angle sensor (1) from spiral cable (2).



# INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

Perform the neutral adjustment for the steering angle sensor. Refer to <u>BRC-157, "ADJUSTMENT OF</u> <u>STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

Н

J

Κ

L

Μ

Ν

0

Ρ

INFOID:000000004204536

А

В