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## **CONTENTS**

TYPE 1	Component Description19
BASIC INSPECTION7	TCS20 System Diagram20
APPLICATION NOTICE7 Application Notice	System Description20
	ABS21
DIAGNOSIS AND REPAIR WORKFLOW8Work Flow8Diagnostic Work Sheet11	System Diagram21 System Description21
•	EBD22
INSPECTION AND ADJUSTMENT12	System Diagram22
ADDITIONAL SERVICE WHEN REPLACING	System Description22
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description	DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]23 CONSULT-III Function (ABS)23 COMPONENT DIAGNOSIS28
ADJUSTMENT OF STEERING ANGLE SENSOR	APPLICATION NOTICE28
NEUTRAL POSITION12	Application Notice28
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description	C1101, C1102, C1103, C1104 WHEEL SEN- SOR-1
CALIBRATION OF DECEL G SENSOR13	Component Inspection31
CALIBRATION OF DECEL G SENSOR : Description13	Special Repair Requirement31
CALIBRATION OF DECEL G SENSOR : Special Repair Requirement13	C1105, C1106, C1107, C1108 WHEEL SEN- SOR-232
FUNCTION DIAGNOSIS15	Description32 DTC Logic32
APPLICATION NOTICE15	Diagnosis Procedure32
Application Notice15	Component Inspection34 Special Repair Requirement34
VDC16	
System Diagram16	C1109 POWER AND GROUND SYSTEM35
System Description17	Description35 DTC Logic35
Component Parts Location18	DTO Logic33

Diagnosis Procedure	35	DTC Logic	56
Special Repair Requirement		Diagnosis Procedure	56
		Component Inspection	
C1110, C1170 ABS ACTUATOR AND ELEC-		Special Repair Requirement	57
TRIC UNIT (CONTROL UNIT)		04440 04444 077777110 41101 7 0711007	
DTC Logic		C1143, C1144 STEERING ANGLE SENSOR	
Diagnosis Procedure		Description	
Special Repair Requirement	37	DTC Logic	
C1111 ADC MOTOD MOTOD DELAY CVC		Diagnosis Procedure	
C1111 ABS MOTOR, MOTOR RELAY SYS-		Component Inspection	
TEM		Special Repair Requirement	59
Description		C1145, C1146 YAW RATE/SIDE G SENSOR	61
DTC Logic	38	Diagnosis Procedure	
Diagnosis Procedure	38	Diagnosis Procedure	61
Component Inspection		C1155 BRAKE FLUID LEVEL SWITCH	. 63
Special Repair Requirement	39	Description	
C1113, C1145, C1146 YAW RATE/SIDE/DE-		DTC Logic	
CEL G SENSOR	40	Diagnosis Procedure	
		Component Inspection	
Description		Special Repair Requirement	
DTC Logic		opoda riopaii rioquiionioni	
Diagnosis Procedure		C1156 ST ANG SEN COM CIR	. 66
Component Inspection		Description	66
Special Repair Requirement	41	DTC Logic	66
C1115 WHEEL SENSOR	43	Diagnosis Procedure	
Description		-	
DTC Logic		C1160 DECEL G SEN SET	
Diagnosis Procedure		Description	
Component Inspection		DTC Logic	
Special Repair Requirement		Diagnosis Procedure	67
opecial repair requirement	75	C11C2 CT ANCLE CEN CAFE	
C1116 STOP LAMP SWITCH	46	C1163 ST ANGLE SEN SAFE	
Description		Description	
DTC Logic		DTC Logic	
Diagnosis Procedure		Diagnosis Procedure	68
Special Repair Requirement		C1164, C1165, C1166, C1167 CV/SV SYS-	
		TEM	. 69
C1120, C1122, C1124, C1126 IN ABS SOL	48	Description	
Description	48	DTC Logic	
DTC Logic			
Diagnosis Procedure	48	Diagnosis Procedure	
Component Inspection		Component Inspection	
Special Repair Requirement	50	Special Repair Requirement	/ 1
04104 04100 0410F 04107 OUT ADC COL		C1170 VARIANT CODING	. 72
C1121, C1123, C1125, C1127 OUT ABS SOL		Diagnosis Procedure	
Description		Diagnosis i roccauro	. , _
DTC Logic		U1000 CAN COMM CIRCUIT	. 73
Diagnosis Procedure		Description	
Component Inspection		DTC Logic	
Special Repair Requirement	53	Diagnosis Procedure	
04100 04101 04100 04100 D1		Special Repair Requirement	
C1130, C1131, C1132, C1133, C1136 EN-			
GINE SIGNAL		VDC OFF SWITCH	. 74
Description		Description	74
DTC Logic		Component Function Check	
Diagnosis Procedure		Diagnosis Procedure	
Special Repair Requirement	54	Component Inspection	
C1140 ACTUATOR BLV		·	
C1140 ACTUATOR RLY		ABS WARNING LAMP	. 76
Description	56		

Description76	Description104	
Component Function Check	PRECAUTION 105	Δ
BRAKE WARNING LAMP77	PRECAUTIONS 105	
Description77	Precaution for Supplemental Restraint System	Е
Component Function Check77	(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	
Diagnosis Procedure77	SIONER"105 Precaution for Brake System105	C
VDC OFF INDICATOR LAMP78	Precaution for Brake Control	
Description78	Precaution for CAN System106	
Component Function Check	PREPARATION108	
Diagnosis Procedure78	PREPARATION108	
SLIP INDICATOR LAMP79	PREPARATION108	
Description79	Special Service Tool108	Е
Component Function Check	Commercial Service Tool108	
Diagnosis Procedure79	REMOVAL AND INSTALLATION109	
ECU DIAGNOSIS80	WHEEL SENSORS109	3F
APPLICATION NOTICE80	Removal and Installation109	
Application Notice80		C
• •	SENSOR ROTOR110	
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)81	Removal and Installation110	
Reference Value81	ACTUATOR AND ELECTRIC UNIT (ASSEM-	$\vdash$
Wiring Diagram - Without Hill Descent Control/Hill	BLY)111	
Start Assist86	Removal and Installation111	
Fail-Safe93	STEERING ANGLE SENSOR113	
DTC No. Index94	Removal and Installation113	
SYMPTOM DIAGNOSIS96	G SENSOR114	J
APPLICATION NOTICE96	Removal and Installation114	
Application Notice96	TYPE 2	
VDC/TCS/ABS97	BASIC INSPECTION 115	K
Symptom Table97	APPLICATION NOTICE	
EVERGIVE ARC FUNCTION OPERATION	APPLICATION NOTICE115 Application Notice15	L
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY98		
Diagnosis Procedure98	DIAGNOSIS AND REPAIR WORKFLOW 116	
	Work Flow	N
UNEXPECTED PEDAL REACTION99	Diagnostic Work Sheet119	
Diagnosis Procedure99	INSPECTION AND ADJUSTMENT120	
THE BRAKING DISTANCE IS LONG100	ADDITIONAL SERVICE WHEN REPLACING	Ν
Diagnosis Procedure100	CONTROL UNIT120	
ABS FUNCTION DOES NOT OPERATE 101	ADDITIONAL SERVICE WHEN REPLACING	C
Diagnosis Procedure101	CONTROL UNIT: Description120	
PEDAL VIBRATION OR ABS OPERATION	ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Special Repair Requirement 120	
SOUND OCCURS102	·	F
Diagnosis Procedure	ADJUSTMENT OF STEERING ANGLE SENSOR	
VEHICLE JERKS DURING VDC/TCS/ABS	NEUTRAL POSITION120 ADJUSTMENT OF STEERING ANGLE SENSOR	
CONTROL103	NEUTRAL POSITION : Description120	
Diagnosis Procedure	ADJUSTMENT OF STEERING ANGLE SENSOR	
· ·	NEUTRAL POSITION : Special Repair Require-	
NORMAL OPERATING CONDITION104	ment120	

CALIBRATION OF DECEL G SENSOR		C1110, C1170 ABS ACTUATOR AND ELEC	
CALIBRATION OF DECEL G SENSOR : De		TRIC UNIT (CONTROL UNIT)	145
tion		DTC Logic	
CALIBRATION OF DECEL G SENSOR : Sp		Diagnosis Procedure	
Repair Requirement	121	Special Repair Requirement	145
FUNCTION DIAGNOSIS	123	C1111 ABS MOTOR, MOTOR RELAY SYS	
APPLICATION NOTICE	123	TEM  Description	
Application Notice	123	DTC Logic	
VID 0		Diagnosis Procedure	
VDC		Component Inspection	
System Diagram		Special Repair Requirement	
System Description		Special nepall nequirement	147
Component Parts Location		C1113, C1145, C1146 YAW RATE/SIDE/DE	<u>=</u> -
Component Description	127	CEL G SENSOR	
TOC	400	Description	
TCS		DTC Logic	
System Diagram		Diagnosis Procedure	
System Description	128	Component Inspection	
ABS	120	Special Repair Requirement	
System Diagram		Special Repail Requirement	149
System Description		C1115 WHEEL SENSOR	151
System Description	129	Description	
EBD	130	DTC Logic	
System Diagram		Diagnosis Procedure	
System Description		Component Inspection	
•		Special Repair Requirement	
<b>DIAGNOSIS SYSTEM [ABS ACTUATOR</b>			
AND ELECTRIC UNIT (CONTROL UNIT)	] 131	C1116 STOP LAMP SWITCH	154
CONSULT-III Function (ABS)	- 131	Description	154
, ,		DTC Logic	154
COMPONENT DIAGNOSIS	136	Diagnosis Procedure	154
ADDI IOATION NOTICE		Special Repair Requirement	
APPLICATION NOTICE			
Application Notice	136	C1120, C1122, C1124, C1126 IN ABS SOL	
C1101, C1102, C1103, C1104 WHEEL SE	=NL	Description	
SOR-1		DTC Logic	156
		Diagnosis Procedure	
Description		Component Inspection	
DTC Logic		Special Repair Requirement	158
Diagnosis Procedure		C1101 C1102 C1105 C1107 OUT ABC CC	N 450
Component Inspection		C1121, C1123, C1125, C1127 OUT ABS SC	
Special Repair Requirement	139	Description	
C1105, C1106, C1107, C1108 WHEEL SE	=N_	DTC Logic	
SOR-2		Diagnosis Procedure	
Description		Component Inspection	
•		Special Repair Requirement	161
DTC Logic		C1130, C1131, C1132, C1133, C1136 EN-	
Diagnosis Procedure	140		100
Component Inspection		GINE SIGNAL	
Special Repair Requirement	142	Description	
<b>C1109 POWER AND GROUND SYSTEM</b>	143	DTC Logic	
Description		Diagnosis Procedure	162
DTC Logic		Special Repair Requirement	162
Diagnosis Procedure		C1140 ACTUATOR RLY	164
Special Repair Requirement		Description	
opolia riopai rioquilomoni		DTC Logic	
		Diagnosis Procedure	

Special Repair Requirement165
C1143, C1144 STEERING ANGLE SENSOR 166         Description       166         DTC Logic       166         Diagnosis Procedure       166         Component Inspection       167         Special Repair Requirement       167
C1145, C1146 YAW RATE/SIDE G SENSOR169 Diagnosis Procedure
C1155 BRAKE FLUID LEVEL SWITCH171Description171DTC Logic171Diagnosis Procedure171Component Inspection172Special Repair Requirement172
C1156 ST ANG SEN COM CIR       174         Description       174         DTC Logic       174         Diagnosis Procedure       174
C1160 DECEL G SEN SET       175         Description       175         DTC Logic       175         Diagnosis Procedure       175
C1163 ST ANGLE SEN SAFE       176         Description       176         DTC Logic       176         Diagnosis Procedure       176
C1164, C1165, C1166, C1167 CV/SV SYS-         TEM       177         Description       177         DTC Logic       177         Diagnosis Procedure       177         Component Inspection       178         Special Repair Requirement       179
<b>C1170 VARIANT CODING180</b> Diagnosis Procedure180
U1000 CAN COMM CIRCUIT       181         Description       181         DTC Logic       181         Diagnosis Procedure       181         Special Repair Requirement       181
VDC OFF SWITCH         182           Description         182           Component Function Check         182           Diagnosis Procedure         182           Component Inspection         183
ABS WARNING LAMP         184           Description         184           Component Function Check         184

PRECAUTION211	REMOVAL AND INSTALLATION	216
PRECAUTIONS 211	WHEEL SENSORS	216
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	Removal and Installation	216
SIONER"211	SENSOR ROTOR	217
Precaution for Brake System211	Removal and Installation	217
Precaution for Brake Control211 Precaution for CAN System212	ACTUATOR AND ELECTRIC UNIT (ASS	
PREPARATION214	Removal and Installation	
PREPARATION 214	STEERING ANGLE SENSOR	220
Special Service Tool214	Removal and Installation	220
Commercial Service Tool215	G SENSOR	221
	Removal and Installation	

#### **APPLICATION NOTICE**

< BASIC INSPECTION > [TYPE 1]

## **BASIC INSPECTION**

## **APPLICATION NOTICE**

Application Notice

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	

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#### **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [TYPE 1]

#### DIAGNOSIS AND REPAIR WORKFLOW

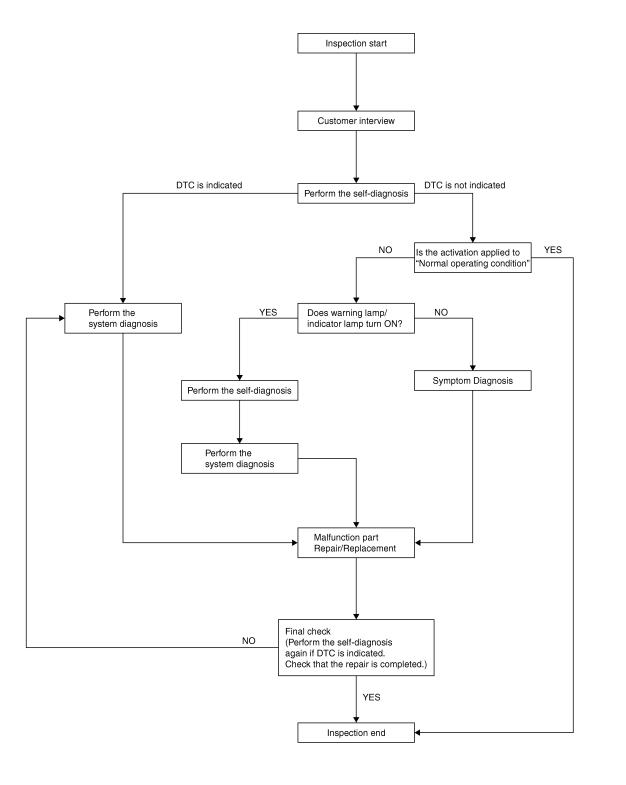
Work Flow

#### 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 adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

< BASIC INSPECTION > [TYPE 1]

**OVERALL SEQUENCE** 



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#### **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 <a href="BRC-11">BRC-11</a>, "Diagnostic Work Sheet".

< BASIC INSPECTION > [TYPE 1]

## 2. PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)". Is there any DTC displayed?

YES >> GO TO 3 NO >> GO TO 4

#### 3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-94, "DTC No. Index".

>> GO TO 7

#### 4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-104</u>, <u>"Description"</u>.

#### Is the symptom a normal operation?

YES >> INSPECTION END

NO >> GO TO 5

#### ${f 5.}$ CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-76, "Description".
- Brake warning lamp: Refer to BRC-77, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-78</u>, "<u>Description</u>".
- SLIP indicator lamp: Refer to BRC-79, "Description".

#### Is ON/OFF timing normal?

YES >> GO TO 6 NO >> GO TO 2

#### 6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

#### 7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

#### 8. FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)".

#### Is no other DTC present and the repair completed?

YES >> INSPECTION END

NO >> GO TO 3

#### **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [TYPE 1]

## Diagnostic Work Sheet

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

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**BRC-11** 

## INSPECTION AND ADJUSTMENT

#### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description

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After replacing the ABS actuator and electric unit (control unit), perform the following procedures:

- · Neutral position adjustment for the steering angle sensor
- · Calibration of the decel G sensor

< BASIC INSPECTION >

## ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Special Repair Requirement

### 1.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement", GO TO 2

#### 2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

# >> Refer to <u>BRC-13. "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement".</u> ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description

INFOID:0000000003081158

Refer to the table below to determine if adjustment of steering angle sensor neutral position is required.

×: 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	-
Tire rotation	_
Adjusting wheel alignment	×

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

< BASIC INSPECTION >	[TYPE 1]	
>> GO TO 2		
2.perform the neutral position adjustme	ENT FOR THE STEERING ANGLE SENSOR	Α
<ol> <li>On the CONSULT-III screen, touch "WORK SUPP</li> <li>Touch "START".</li> </ol>	ORT" and "ST ANG SEN ADJUSTMENT" in order.	
CAUTION:		В
Do not touch steering wheel while adjusting st	eering angle sensor.	
3. After approximately 10 seconds, touch "END". <b>NOTE:</b>		С
After approximately 60 seconds, it ends automatic	ally.	
4. Turn ignition switch OFF, then turn it ON again.	•	
CAUTION: Be sure to perform above operation.		D
be sure to perform above operation.		
>> GO TO 3		Е
3.CHECK DATA MONITOR		
Run vehicle with front wheels in straight-ahead po	sition then ston	
2. Select "DATA MONITOR". Then make sure "STR		BF
Is the steering angle within the specified range?		
YES >> GO TO 4		
NO >> Perform the neutral position adjustment fo	r the steering angle sensor again, GO TO 1	G
4.ERASE THE SELF-DIAGNOSIS MEMORY		
<ul> <li>Erase the self-diagnosis memory of the ABS actuator a</li> <li>ABS actuator and electric unit (control unit): Refer to</li> <li>ECM: Refer to <u>EC-68</u>. "CONSULT-III Function (ENG)</li> </ul>	BRC-23, "CONSULT-III Function (ABS)".	Н
Are the memories erased?	······································	
YES >> INSPECTION END		- 1
NO >> Check the items indicated by the self-diag	nosis.	
CALIBRATION OF DECEL G SENSOR		J
CALIBRATION OF DECEL G SENSOR : D	Description INFOID:000000000001160	
	•	
Refer to the table below to determine if calibration of the	•	K
Cityostian	×: Required –: Not required	
Situation	Calibration of decel G sensor	L
Removing/Installing ABS actuator and electric unit (control unit)	<del>-</del>	
Replacing ABS actuator and electric unit (control unit)	×	
Removing/Installing steering angle sensor	×	V
Replacing steering angle sensor	×	
Removing/Installing steering components	×	N
Replacing steering components	×	11
Removing/Installing suspension components	×	
Replacing suspension components	×	С
Change tires to new ones	_	
Tire rotation	_	_
Adjusting wheel alignment	×	Р

## CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

#### CALIBRATION OF DECEL G SENSOR

#### **CAUTION:**

To calibrate the decel G sensor, make sure to use CONSULT-III (Calibration cannot be done without CONSULT-III)

< BASIC INSPECTION > [TYPE 1]

## 1. ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

#### 2.PERFORM CALIBRATION OF DECEL G SENSOR

- 1. On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.
- 2. Touch "START".
- 3. After approximately 10 seconds, touch "END".

#### NOTE:

After approximately 60 seconds, it 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 "DECEL G SEN" is within  $\pm$ .

#### Is the inspection result normal?

YES >> GO TO 4

NO >> Perform calibration of decel G sensor again, GO TO 1

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

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

- ABS actuator and electric unit (control unit): Refer to BRC-23, "CONSULT-III Function (ABS)".
- ECM: Refer to EC-68. "CONSULT-III Function (ENGINE)".

#### Are the memories erased?

YES >> INSPECTION END

NO >> Check the items indicated by the self-diagnosis.

## **APPLICATION NOTICE**

< FUNCTION DIAGNOSIS > [TYPE 1]

## **FUNCTION DIAGNOSIS**

## **APPLICATION NOTICE**

Application Notice

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	

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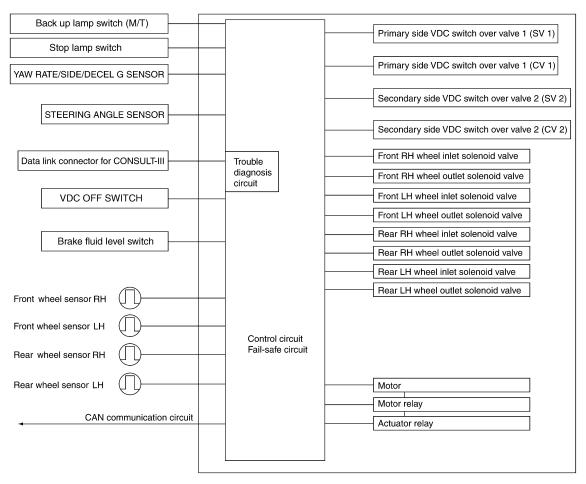
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#### VDC

## System Diagram

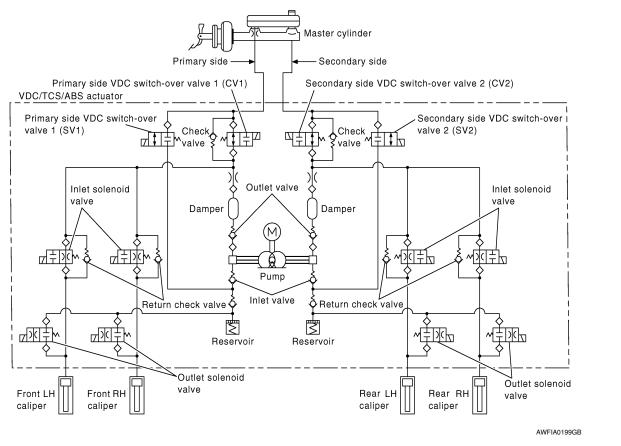
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ABS actuator and electric unit (control unit)

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#### HYDRAULIC CIRCUIT DIAGRAM



System Description

INFOID:0000000003081164

- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor. Using information from yaw rate/side/decel G sensor and wheel sensor, VDC judges driving condition (conditions of under steer and over steer) to improve vehicle driving stability by controlling brake application to 4 wheels and engine output.
- During VDC operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

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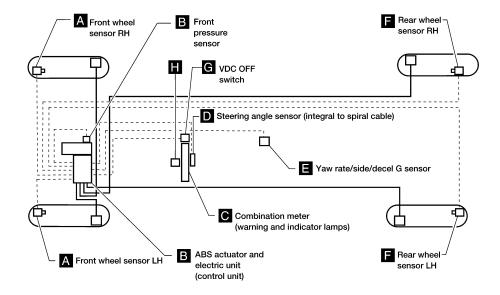
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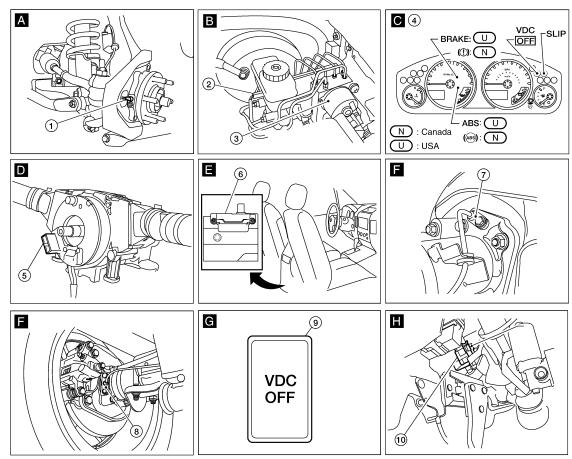
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## Component Parts Location





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- Front wheel sensor LH E18
   Front wheel sensor RH E117
- Combination meter M24
- 2. Brake fluid level switch E21
- Steering angle sensor (behind spiral ca- 6. ble) M47 (Steering wheel removed for clarity)
- ABS actuator and electric unit (control unit) E125
- Yaw rate/side/decel G sensor B73

< FUNCTION DIAGNOSIS > [TYPE 1]

- Rear wheel sensor (M226 rear axle) LH C11 Rear wheel sensor (M226 rear axle) RH C10
- Stop lamp switch E38
   (Lower instrument panel LH removed for clarity)
- Rear wheel sensor (C200 rear axle) LH 9. VDC OFF switch M154 C11
   Rear wheel sensor (C200 rear axle) RH C10

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INFOID:0000000003081166

#### **Component Description**

Component parts		Reference
	Pump	PDC 29 "Description"
	Motor	BRC-38, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-56, "Description"
7.20 dotador ana cicoliio anii (control anii)	Solenoid valve	BRC-48, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-69, "Description"
Wheel sensor		BRC-29, "Description"
Yaw rate/side/decel G sensor		BRC-40, "Description"
Steering angle sensor		BRC-58, "Description"
Brake fluid level switch		BRC-63, "Description"
Stop lamp switch		BRC-46, "Description"
VDC OFF switch		BRC-74, "Description"
ABS warning lamp		BRC-76, "Description"
Brake warning lamp		BRC-77, "Description"
VDC OFF indicator lamp		BRC-78, "Description"
SLIP indicator lamp		BRC-79, "Description"

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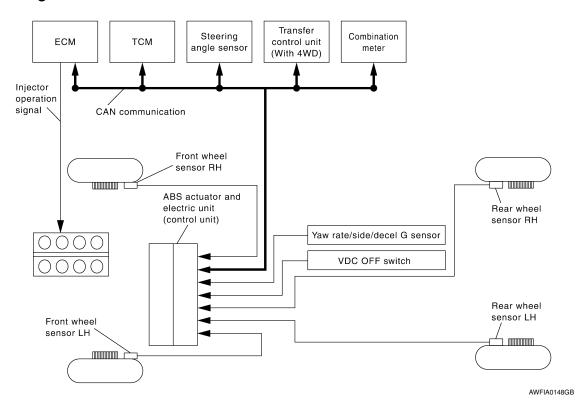
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#### TCS

#### System Diagram

INFOID:0000000003081167

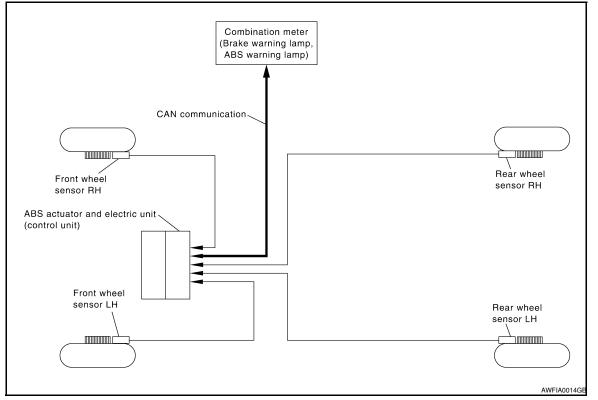


#### System Description

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and A/T gear position to ensure the optimum slippage ratio at drive wheels by computing wheel speed signals from 4 wheel sensors. When ABS actuator and electric unit (control unit) detects a spin at drive wheels (rear wheels), it compares wheel speed signals from all 4 wheels. At this time, LH and RH rear brake fluid pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

#### **ABS**

System Diagram



System Description

INFOID:0000000003081170

 Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.

• Electrical system diagnosis by CONSULT-III is available.

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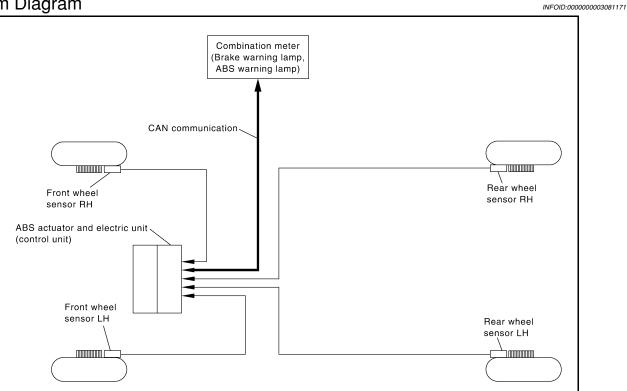
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#### **EBD**

System Diagram



#### System Description

- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly, it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

< FUNCTION DIAGNOSIS > [TYPE 1]

## DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

CONSULT-III Function (ABS)

INFOID:0000000003081173

#### **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.		
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.		

#### **SELF-DIAG RESULTS MODE**

Operation Procedure

1. Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

How to Erase Self-diagnosis Results

 After erasing DTC memory, start engine and 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.

#### **CAUTION:**

## If memory cannot be erased, perform applicable diagnosis. NOTE:

- 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.
- 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).
- VDC OFF switch should not stay "ON" position.

Display Item List

Refer to BRC-94, "DTC No. Index".

DATA MONITOR MODE

Display Item List

lk	Data	a monitor item sele			
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
GEAR	×	×	×	Gear position judged by PNP switch signal is displayed.	
FR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.	
FR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.	
RR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.	

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[TYPE 1]

Item	Data	a monitor item sele			
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
RR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.	
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.	
N POSI SIG	-	-	×	Shift position judged by PNP switch signal.	
P POSI SIG	-	-	×	Shift position judged by PNP switch signal.	
ACCEL POS SIG (%)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.	
ENGINE SPEED (rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.	
STR ANGLE SIG (deg)	×	-	×	Steering angle detected by steering angle sensor is displayed.	
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.	
SIDE G-SENSOR (m/s <sup>2</sup> )	×	-	×	Transverse acceleration detected by side G-sensor is displayed.	
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.	
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.	
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (ON/OFF) status is displayed.	
SLIP LAMP (ON/OFF)	-	×	×	SLIP indicator lamp (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.	
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.	
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.	
OFF LAMP (ON/OFF)	_	×	×	OFF Lamp (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.	

< FUNCTION DIAGNOSIS > [TYPE 1]

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Item		a monitor item sele		Remarks	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Hemarks	
CV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed.	
CV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed.	
SV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.	
SV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.	
VDC FAIL SIG (ON/OFF)	-	-	×	VDC fail signal (ON/OFF) status is displayed.	
TCS FAIL SIG (ON/OFF)	_	-	×	TCS fail signal (ON/OFF) status is displayed.	
ABS FAIL SIG (ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.	
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.	
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status 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 WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) status is displayed.	
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.	
R POSI SIG	-	-	×	Shift position judged by PNP switch signal.	
2WD/4WD	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.	
CRANKING SIG	-	-	×	The input state of the key SW START position signal is displayed	
RELEASE SW NO	-	-	×	Release switch signal (ON/OFF) status is displayed. "ON" indicates that the brake pedal is depressed. "OFF"" is that the brake pedal is released.	
RELEASE SW NC	-	-	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicates that the brake pedal is depressed on. "ON" is that the brake pedal is released.	
OHB FAIL	_	_	×	OHB fail status is displayed.	
HBA FAIL	_	_	×	HBA fail status is displayed.	

**BRC-25** 

< FUNCTION DIAGNOSIS >

[TYPE 1]

ltem	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
OHB SIG	_	_	×	OHB operation (ON/OFF) status is displayed.
HBA SIG	-	_	×	HBA operation (ON/OFF) status is displayed.
PRES CTRL ACC	_	_	×	This item is not used for this model.
PRES FAIL ACC	_	_	×	This item is not used for this model.
STP OFF RLY	-	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

<sup>×:</sup> Applicable

#### **ACTIVE TEST MODE**

#### **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, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp 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.

#### Test Item

#### SOLENOID VALVE

- 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 operate as shown in the table below.

Operation		AE	BS solenoid va	alve	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
TILATI OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

<sup>-:</sup> Not applicable

< FUNCTION DIAGNOSIS >

[TYPE 1]

**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	ON	ON

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[TYPE 1]

## **COMPONENT DIAGNOSIS**

## **APPLICATION NOTICE**

**Application Notice** 

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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

< COMPONENT DIAGNOSIS >

[TYPE 1]

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

Description INFOID:0000000003081175

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:0000000003081176

#### 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?

>> Proceed to diagnosis procedure. Refer to BRC-29, "Diagnosis Procedure". YES

NO >> INSPECTION END

#### Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the 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

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

3. 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.

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#### 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 the wheel sensor. Refer to <u>BRC-109</u>, "Removal and Installation".

#### CHECK TIRES

Check for inflation pressure, wear and size of each tire.

#### Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

#### 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-8</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-20</u>, "Rear Axle Bearing" (M226 rear axle).

#### 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), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear axle), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear axle).

#### 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

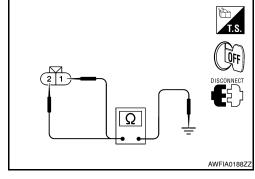
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

#### Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



#### 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

Wheel sensor		ABS actuator and electric unit (control unit)		Wheel sensor	
	Connector	Terminal	Connector	Terminal	
Front I H	ear LH	45	E18	1	
FIOIIL LEI		46	E10	2	
Front RH		34	E117	1	Yes
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	l

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-111">BRC-111</a>, "Removal and Installation".

NO >> Repair the circuit.

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

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

#### Component Inspection

INFOID:0000000003081178

#### 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 <a href="BRC-29">BRC-29</a>, "Diagnosis Procedure".

#### Special Repair Requirement

INFOID:0000000003081179

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#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

#### 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

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[TYPE 1]

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

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1105	RR RH SENSOR-2	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.		
C1106	RR LH SENSOR-2	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.	<ul><li> Harness or connector</li><li> Wheel sensor</li></ul>	
C1107	FR RH SENSOR-2	When the circuit in the front 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.	ABS actuator and electric uni (control unit)	
C1108	FR LH SENSOR-2	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.		

#### 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 BRC-32, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:0000000003081182

#### **CAUTION:**

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

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

< COMPONENT DIAGNOSIS >

[TYPE 1]

## 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 2. 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 the wheel sensor. Refer to BRC-109, "Removal and Installation".

#### 3. CHECK TIRES

Check for inflation pressure, wear and size of each tire.

#### Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

#### 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-8</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-20</u>, "Rear Axle Bearing" (M226 rear axle).

#### 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), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear axle), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear axle).

#### CHECK WIRING HARNESS FOR SHORT CIRCUIT

- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

#### Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

### 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

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[TYPE 1]

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	- E18	1	Yes
FIUIIL LIT	E125	46		2	
Front RH		34	E117	1	
FIOIIL NO		33		2	
Rear LH		36	C11	1	
neai ln		37		2	
Rear RH		43	C10	1	
neai nn		42		2	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-111">BRC-111</a>, "Removal and Installation".

NO >> Repair the circuit.

#### Component Inspection

INFOID:0000000003081183

#### 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 <a href="BRC-32">BRC-32</a>, "Diagnosis Procedure".

#### Special Repair Requirement

INFOID:0000000003081184

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

#### 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### **C1109 POWER AND GROUND SYSTEM**

< COMPONENT DIAGNOSIS >

[TYPE 1]

#### C1109 POWER AND GROUND SYSTEM

Supplies electric power to the ABS actuator and electric unit (control unit).

DTC Logic

#### 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.	Harness or connector     ABS actuator and electric unit (control unit)

#### 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 <a href="BRC-35">BRC-35</a>, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081187

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <a href="BRC-23">BRC-23</a>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

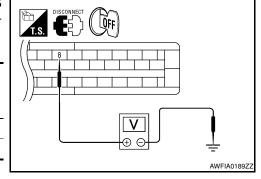
YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

## 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Turn ignition switch ON or OFF and check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuate tric unit (co		_	Condition	Voltage
Connector	Terminal			
F125	8	Ground	Ignition switch: ON	Battery voltage
L125			Ignition switch: OFF	Approx. 0V



Turn ignition switch OFF.

**BRC-35** 

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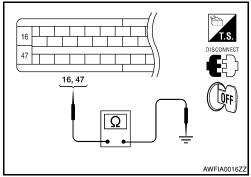
#### **C1109 POWER AND GROUND SYSTEM**

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

5. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

	and electric unit ol unit)	_	Continuity	
Connector	Terminal			
E125	16, 47	Ground	Yes	



#### Is the inspection result normal?

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

#### Special Repair Requirement

INFOID:0000000003081188

### 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-13</u>, "CALIBRATION OF <u>DECEL G SENSOR</u>: <u>Description</u>".

>> END

# C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [TYPE 1]

# C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

#### 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).	ABS actuator and electric unit (control unit)
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	(Control dint)

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
VARIANT CODING

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-37</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

## Diagnosis Procedure

#### INSPECTION PROCEDURE

1. REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

>> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-111">BRC-111</a>, "Removal and Installation".

## Special Repair Requirement

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2.calibration of decel G sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### **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> </ul>
Ciiii	TOWN WOTON	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	<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	_
PUMP MOTOR	

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

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

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081194

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-23, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

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

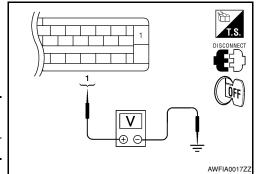
## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

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

ABS actuator and ele	ectric unit (control unit)	_	Voltage
Connector	Terminal	_	voltage
E125	1	Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3.check abs actuator and electric unit (control unit) ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)	_	Continuity
Connector	Terminal		Continuity
E125	16, 47	Ground	Yes

# 16 16 17 DISCONNECT Ω OF THE PROPERTY OF THE

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

## 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	ON	ON

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".

## Special Repair Requirement

## ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

## >> GO TO 2

## 2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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## C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

Description INFOID:0000000003081197

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	ABS actuator and electric unit (control unit)
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	Yaw rate/side/decel G sensor

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G-SENSOR
YAW RATE SENSOR
SIDE G-SEN CIRCUIT

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

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

NO >> INSPECTION END

## Diagnosis Procedure

**CAUTION:** 

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may
  cause the yaw rate/side/decel G sensor system to indicate a malfunction. This is not a malfunction if
  normal operation can be resumed after restarting the engine.
- 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.

#### INSPECTION PROCEDURE

## 1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.

Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

## 2.YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

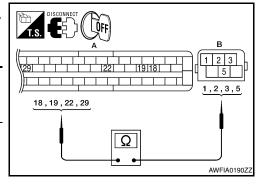
## C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

### < COMPONENT DIAGNOSIS >

[TYPE 1]

Check continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 2, 1, 3, 5.

	and electric unit ol unit)	Yaw rate/side/decel G sensor		Continuity
Connector Terminal		Connector	Terminal	
	18		2	
E125 (A)	19	B73 (B)	1	Yes
E123 (A)	22		3	ies
	29		5	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

## 3.YAW RATE/SIDE/DECEL G SENSOR INSPECTION

Connect the yaw rate/side/decel G sensor connector and ABS actuator and electric unit (control unit) connector.

2. Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.08 G to +0.08 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-111">BRC-111</a>, "Removal and Installation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-114, "Removal and Installation".

## Component Inspection

INFOID:0000000003081200

## 1. CHECK DATA MONITOR

Select "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" in "DATA MONITOR" and check yaw rate/side/decel G sensor signal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.08 G to +0.08 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000003081201

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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## C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

### < COMPONENT DIAGNOSIS >

[TYPE 1]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

## C1115 WHEEL SENSOR

Description INFOID:0000000003081202

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:0000000003081203

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

## CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ABS SENSOR [ABNORMAL SIGNAL]

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

>> Proceed to diagnosis procedure. Refer to BRC-43, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

>> Repair or replace as necessary. NO

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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.

3. 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.

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

NO >> Replace the wheel sensor. Refer to BRC-109, "Removal and Installation".

3.CHECK TIRES

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Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

## 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>On-Vehicle Inspection and Service</u>" (front), <u>RAX-8</u>, "<u>Rear Axle Bearing</u>" (C200 rear axle), or <u>RAX-20</u>, "<u>Rear Axle Bearing</u>" (M226 rear axle).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair

>> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear axle), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear axle).

## 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

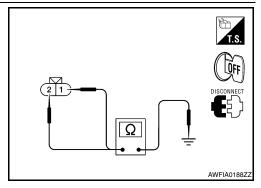
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



## 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

 Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal		
Front LH		45	45			
FIOHLEH	E125	46	- E18	2		
Front RH		34	E117	1		
FIUIIL NEI		33		2	Yes	
Rear LH	L123	36	C11	1	162	
neai Ln		37		2		
Rear RH		43	010	1		
neal nn		42	C10	2		

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-111, "Removal and Installation"</u>.

NO >> Repair the circuit.

## Component Inspection

INFOID:0000000003081205

## 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)

## **C1115 WHEEL SENSOR**

< COMPONENT DIAGNOSIS >	[TYPE 1]	
FR LH SENSOR		
FR RH SENSOR	Nearly matches the speedometer dis-	1
RR LH SENSOR	play (±10% or less)	
RR RH SENSOR		[
Is the inspection result normal?		
YES >> INSPECTION END NO >> Go to diagnosis proce	dure. Refer to BRC-43, "Diagnosis Procedure".	(
Special Repair Requirement	nt INFOID:00000000000001206	
1.ADJUSTMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION	
Always perform neutral position a and electric unit (control unit). RefePOSITION: Description.	djustment for the steering angle sensor when replacing the ABS actuator er to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL	E
>> GO TO 2  2.CALIBRATION OF DECEL G S	SENSOR	ВІ
Always perform calibration of dece	el G sensor when replacing the ABS actuator and electric unit (control unit).  OF DECEL G SENSOR: Description".	
>> END		ŀ
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## C1116 STOP LAMP SWITCH

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	Harness or connector     Stop lamp switch     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

## CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-46">BRC-46</a>, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081209

#### INSPECTION PROCEDURE

## 1. CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and stop lamp switch connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

## 2 STOP LAMP SWITCH INSPECTION

- 1. Connect the stop lamp switch harness connector.
- Check the voltage between the ABS actuator and electric unit (control unit) harness connector E125 terminal 39 and body ground.

Brake pedal depressed : Battery voltage

(approx. 12V)

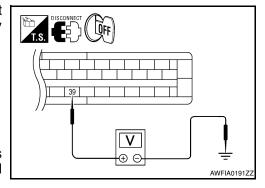
Brake pedal not depressed : Approx. 0V

#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-111, "Removal and Installation".

NO >> GO TO 3

 $3.\mathsf{stop}$  Lamp switch circuit inspection



### C1116 STOP LAMP SWITCH

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

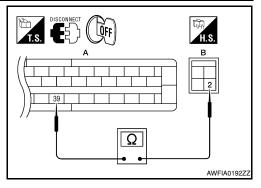
- 1. Disconnect the stop lamp switch harness connector.
- 2. Check the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 39 and stop lamp switch harness connector E38 (B) terminal 2.

#### Continuity should exist.

#### Is the inspection result normal?

YES >> Refer to BRC-8, "Work Flow".

NO >> Repair or replace malfunctioning components.



#### INFOID:0000000003081210

## Special Repair Requirement

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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

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
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.	
C1124	RR LH IN ABS SOL When the control unit detects a malfunction in the rear 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 <a href="BRC-48">BRC-48</a>, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081213

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

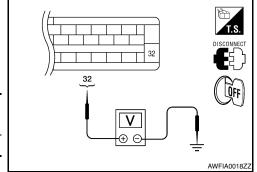
2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

#### < COMPONENT DIAGNOSIS >

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

ABS actuator and ele	ectric unit (control unit)	_	Voltage	
Connector	Terminal	_	voltage	
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# ${f 3.}$ check solenoid, vdc switch-over valve and acuator relay ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal	_	Continuity	
E125	16, 47	Ground	Yes	

## Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

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## Component Inspection

## 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.

Operation		AE	ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP	
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	

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

#### Is the inspection result normal?

YES >> INSPECTION END

[TYPE 1]

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

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

NO >> Go to diagnosis procedure. Refer to <a href="BRC-48">BRC-48</a>, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:00000000003081215

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

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
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 BRC-51, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <a href="BRC-23">BRC-23</a>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

2.check solenoid, vdc switch-over valve and actuator relay power supply circuit

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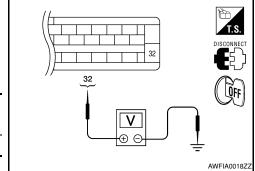
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- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and electric unit (control unit)			Voltage	
Connector	Terminal		voltage	
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

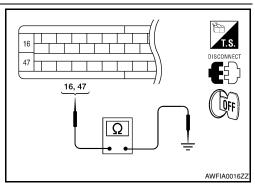
ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal	_	Continuity
E125	16, 47	Ground	Yes

## Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit).

Refer to BRC-111, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003081219

## Component Inspection

## 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.

		AE	SS solenoid va	alve	ABS solenoid valve (ACT)		e (ACT)
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
TILATI JOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

#### Is the inspection result normal?

YES >> INSPECTION END

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

#### [TYPE 1] < COMPONENT DIAGNOSIS > >> Go to diagnosis procedure. Refer to BRC-51, "Diagnosis Procedure". Α Special Repair Requirement INFOID:00000000003081220 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION В Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description". C >> GO TO 2 2.calibration of decel g sensor D Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit).

>> END

Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

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## C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

ABS actuator and electric unit (control unit) and ECM exchange the engine signal with CAN communication line.

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1130	ENGINE SIGNAL 1			
C1131	ENGINE SIGNAL 2	······································	Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is (control unit)	<ul><li>Harness or connector</li><li>ABS actuator and electric unit</li></ul>
C1132	ENGINE SIGNAL 3			,
C1133	ENGINE SIGNAL 4		<ul><li>ECM</li><li>CAN communication line</li></ul>	
C1136	ENGINE SIGNAL 6			

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1
ENGINE SIGNAL 2
ENGINE SIGNAL 3
ENGINE SIGNAL 4
ENGINE SIGNAL 6

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-54">BRC-54</a>, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:00000000003081223

#### INSPECTION PROCEDURE

#### 1. CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-68</u>, "<u>CONSULT-III Function</u> (<u>ENGINE</u>)".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-23, "CONSULT-III Func-</u>tion (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> INSPECTION END

## Special Repair Requirement

INFOID:0000000003081224

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[TYPE 1]

# $\overline{2}$ .calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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## C1140 ACTUATOR RLY

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	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	Harness or connector     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	_
ACTUATOR RLY	

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

YES >> Proceed to diagnosis procedure. Refer to BRC-56, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:00000000003081227

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

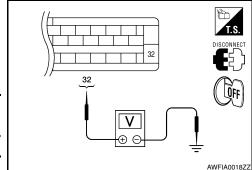
NO >> Poor connection of connector terminal. Repair or replace connector.

## 2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

Turn ignition switch OFF.

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

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E125	32	Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check solenoid, vdc switch-over valve and acuator relay ground circuit

## C1140 ACTUATOR RLY

#### < COMPONENT DIAGNOSIS >

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Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E125	16, 47	Ground	Yes

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#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

## Component Inspection

INFOID:0000000003081228

## 1. CHECK ACTIVE TEST

- 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	ON	ON

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <a href="BRC-56">BRC-56</a>, "Diagnosis Procedure".

## Special Repair Requirement

INFOID:0000000003081229

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-13</u>, "CALIBRATION OF <u>DECEL G SENSOR</u>: <u>Description</u>".

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## C1143, C1144 STEERING ANGLE SENSOR

Description INFOID:0000000003081235

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	Harness or connector     Steering angle sensor
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	4WAS control unit (4WAS models)     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

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

YES >> Proceed to diagnosis procedure. Refer to BRC-58, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081237

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)"

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

## 2 .CHECK STEERING ANGLE SENSOR HARNESS

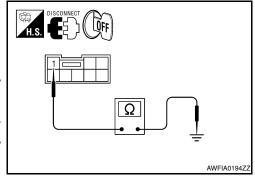
## C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

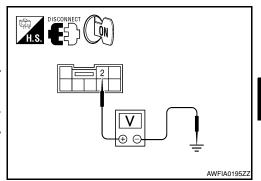
- Turn ignition switch OFF.
- Disconnect steering angle sensor connector.
- Check continuity between steering angle sensor harness connector M47 terminal 1 and ground.

Steering angle sensor			Continuity
Connector	Terminal	_	Continuity
M47	1	Ground	Yes



- Turn ignition switch ON.
- Check voltage between steering angle sensor harness connector M47 terminal 2 and ground.

Steering angle sensor			Voltage
Connector	Terminal		voltage
M47	2	Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3. CHECK DATA MONITOR

- Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
- 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 >> Replace ABS actuator and electric unit (control unit). Refer to BRC-111, "Removal and Installation".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-113, "Removal and Installation".

## Component Inspection

INFOID:00000000003081238

## 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

>> Go to diagnosis procedure. Refer to <u>BRC-58</u>, "<u>Diagnosis Procedure</u>".

## Special Repair Requirement

.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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## C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

[TYPE 1]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

## C1145, C1146 YAW RATE/SIDE G SENSOR

## Diagnosis Procedure

INFOID:00000000003081240

#### **CAUTION:**

Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may cause the yaw rate/side/decel G sensor system to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.

#### INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR
SIDE G-SEN CIRCUIT
G-SENSOR

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#### **CAUTION:**

If vehicle is on turntable 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 turntable or other moving surface, and start engine. Results will return to normal.

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

## 2. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

## ${f 3}$ . YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

- 1. Turn off the ignition switch.
- Check continuity between the ABS actuator and electric unit (control unit) connector E125 and the yaw rate/side/decel G sensor connector B73.

ABS actuator and electric unit (control unit) harness connector E125	Yaw rate/side/decel G sensor harness connector B73	Continuity
18	2	Yes
19	1	Yes
22	3	Yes
29	5	Yes

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

## 4. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

- 1. Connect the yaw rate/side/decel G sensor connector B73 and ABS actuator and electric unit (control unit) connector E125.
- 2. Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

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Vehicle status	Yaw rate sensor (Data monitor standard)	Side G sensor (Data monitor standard)	Decel G Sensor (Data monitor standard)
When stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.08 G to +0.08 G
Right turn	Negative value	Negative value	-
Left turn	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-114, "Removal and Installation".

## C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:0000000003081241

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 INFOID:0000000003081242

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
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.	Harness or connector     Brake fluid level switch     Brake fluid level	E

#### 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?

>> Proceed to diagnosis procedure. Refer to BRC-63, "Diagnosis Procedure". YES

NO >> INSPECTION END

## Diagnosis Procedure

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

- Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
- Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

## 2.CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SWITCH AND ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

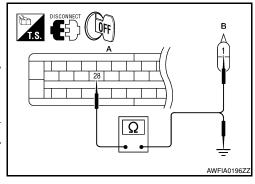
Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 28 and brake fluid level switch harness connector E21 (B) terminal 1.

	and electric unit ol unit)	Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	28	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 28 and ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		Continuity
E125 (A)	28	Ground	No

Is the inspection result normal?



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#### < COMPONENT DIAGNOSIS >

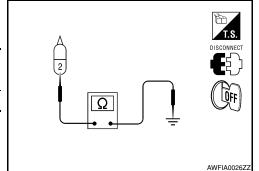
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check brake fluid level switch ground

Check continuity between brake fluid level switch harness connector E21 terminal 2 and ground.

Brake fluid level switch			Continuity
Connector	Terminal		Continuity
E21	2	Ground	Yes



#### Is the inspection result normal?

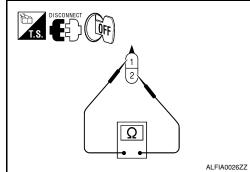
YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

## 4. CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

Brake fluid level switch	Condition	Continuity
Terminal	Condition	
1 – 2	When brake fluid is full in the reservoir tank.	No
	When brake fluid is empty in the reservoir tank.	Yes



#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results

appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111</u>, "Removal and <u>Installation"</u>.

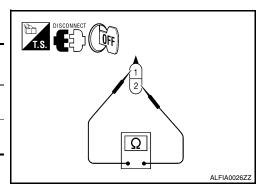
NO >> Replace brake fluid level switch.

# Component Inspection

# 1. CHECK BRAKE FLUID LEVEL SWITCH

- Turn ignition switch OFF.
- 2. Disconnect brake fluid level switch connector.
- 3. Check continuity between brake fluid level switch terminals.

Brake fluid level switch	Condition	Continuity
Terminal	Odridition	
1 – 2	When brake fluid is full in the reservoir tank.	No
	When brake fluid is empty in the reservoir tank.	Yes



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake fluid level switch.

## Special Repair Requirement

INFOID:0000000003081245

INFOID:0000000003081244

## ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

## C1155 BRAKE FLUID LEVEL SWITCH

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< COMPONENT DIAGNOSIS >	[TYPE 1]
>> GO TO 2	
2.calibration of decel g sensor	Α

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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## C1156 ST ANG SEN COM CIR

Description INFOID:0000000003081246

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

#### 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 unit (control unit).	Harness or connector     CAN communication line     Steering angle sensor     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

## 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?

YES >> Proceed to diagnosis procedure. Refer to BRC-66, "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081248

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, 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
ST ANG SEN COM CIR

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

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".

NO >> INSPECTION END

YES >> Perform repair or replacement for the item indicated.

>> Perform calibration of decel G sensor. Refer to <u>BRC-13, "CALIBRATION OF DECEL G SENSOR</u> : <u>Description"</u>. GO TO 2

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## 2. PERFORM SELF-DIAGNOSIS AGAIN

- 1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results.
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis again.

#### Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-114, "Removal and Installation".

NO >> INSPECTION END

NO

## C1163 ST ANGLE SEN SAFE

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position

## DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANGL SEN SAFE

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-68">BRC-68</a>. "Diagnosis Procedure".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081254

### INSPECTION PROCEDURE

## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-12</u>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

#### Is VDC OFF indicator lamp off?

NO

YES >> INSPECTION END

>> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-23, "CONSULT-III Function (ABS)"</u>.

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# C1164, C1165, C1166, C1167 CV/SV SYSTEM

## CV1, CV2 (CUT VALVE)

The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

#### SV1, SV2 (SUCTION VALVE)

The suction valve supplies the brake fluid from the master cylinder to the pump, when VDC/TCS is activated.

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1164	CV1	VDC switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1165	CV2	VDC switch-over solenoid valve (CV2) 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
C1166	SV1	VDC switch-over solenoid valve (SV1) 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)
C1167	SV2	VDC switch-over solenoid valve (SV2) 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
CV1
CV2
SV1
SV2

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-69</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

## Diagnosis Procedure

INFOID:0000000003081257

## INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

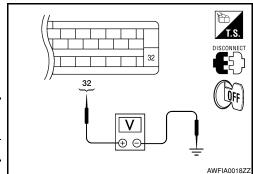
**BRC-69** 

#### < COMPONENT DIAGNOSIS >

# 2.check solenoid, vdc switch-over valve and actuator relay power supply circuit

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

Connector Terminal	vollage
	Voltage
E125 32 Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

>> Repair or replace malfunctioning components. NO

## ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

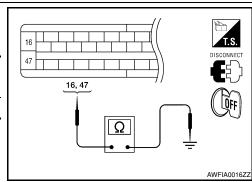
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		Continuity
E125	16, 47	Ground	Yes

## Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-111, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003081258

## Component Inspection

## 1. CHECK ACTIVE TEST

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

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL FR RH ABS SOLE- NOID (ACT)	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL FR LH ABS SOLE- NOID (ACT)	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL RR RH ABS SOLE- NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL RR LH ABS SOLE- NOID (ACT)	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
REAR SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

## C1164, C1165, C1166, C1167 CV/SV SYSTEM

#### [TYPE 1] < COMPONENT DIAGNOSIS > Is the inspection result normal? Α >> INSPECTION END YES NO >> Go to diagnosis procedure. Refer to BRC-69, "Diagnosis Procedure". Special Repair Requirement INFOID:0000000003081259 В ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description". D >> GO TO 2 2. CALIBRATION OF DECEL G SENSOR Е Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit).

>> END

Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

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### C1170 VARIANT CODING

< COMPONENT DIAGNOSIS >

[TYPE 1]

## C1170 VARIANT CODING

Diagnosis Procedure

INFOID:0000000003081260

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

**VARIANT CODING** 

Is the above displayed in the self-diagnosis display items?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111</u>, "Removal and Installation".

NO >> Inspection End.

[TYPE 1]

#### U1000 CAN COMM CIRCUIT

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

#### 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.	CAN communication line     ABS actuator and electric unit (control unit)

# Diagnosis Procedure

INFOID:0000000003081273

INFOID:0000000003081274

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

 Turn ignition switch OFF, disconnect the ABS actuator and electric unit (control unit) connector, and check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal.

2. Reconnect connector and perform self-diagnosis.

#### Is "CAN COMM CIRCUIT" displayed in self-diagnosis display items?

YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".

NO >> Connector terminal is loose, damaged, open, or shorted.

#### Special Repair Requirement

#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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#### **VDC OFF SWITCH**

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

#### Component Function Check

INFOID:0000000003081276

#### 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 <a href="BRC-74">BRC-74</a>, "Diagnosis Procedure".

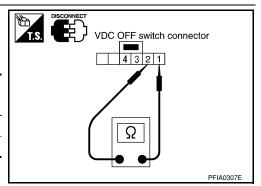
#### Diagnosis Procedure

INFOID:0000000003081277

# 1. CHECK VDC OFF SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

VDC OFF switch	Condition	Continuity
Terminal	Condition	
1 – 2	When VDC OFF switch is pressed.	Yes
1 – 2	When VDC OFF switch is released.	No



#### Is the inspection result normal?

YES >> GO TO 2

NO >> Replace VDC OFF switch.

#### 2. CHECK VDC OFF SWITCH HARNESS

- Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.

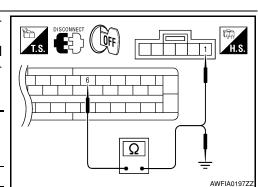
ABS actuator and electric unit (control unit)		VDC OF	F switch	Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	6	M154 (B)	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 6 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal	_	Continuity
E125 (A)	6	Ground	No

#### Is the inspection result normal?

YES >> GO TO 3



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#### < COMPONENT DIAGNOSIS >

NO >> Repair or replace harness.

# 3. CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 terminal 2 and ground.

VDC OFF switch			Continuity
Connector	Terminal		Continuity
M154	2	Ground	Yes

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#### Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

# 4. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23</u>, "<u>Diagnosis Description</u>".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-111">BRC-111</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

#### Component Inspection

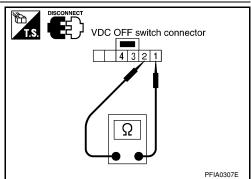
INFOID:0000000003081278

#### INSPECTION PROCEDURE

# 1. CHECK VDC OFF SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

VDC OFF switch	Condition	Continuity
Terminal	Condition	Continuity
1 – 2	When VDC OFF switch is pressed.	Yes
1 – 2	When VDC OFF switch is released.	No



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.

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#### **ABS WARNING LAMP**

×: ON -: OFF

Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

#### Component Function Check

INFOID:0000000003081280

# 1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <a href="BRC-76">BRC-76</a>. "Diagnosis Procedure".

# Diagnosis Procedure

INFOID:0000000003081281

#### 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-23</u>. "CONSULT-III Function (ABS)".

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-111">BRC-111</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90. "Removal and Installation".

[TYPE 1]

#### **BRAKE WARNING LAMP**

Description INFOID:0000000003081282

×: ON -: OFF

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Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (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:0000000003081283

#### 1.BRAKE WARNING LAMP OPERATION CHECK

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-77, "Diagnosis Procedure".

# Diagnosis Procedure

INFOID:0000000003081284

#### 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-111, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

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#### VDC OFF INDICATOR LAMP

×: ON -: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

#### Component Function Check

INFOID:0000000003081286

#### 1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <a href="BRC-78">BRC-78</a>, "Diagnosis Procedure".

#### 2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch. Refer to <a href="BRC-74">BRC-74</a>, "Diagnosis Procedure".

#### Diagnosis Procedure

INFOID:0000000003081287

#### 1. CHECK VDC OFF SWITCH

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check VDC OFF switch. Refer to <u>BRC-74</u>, "<u>Diagnosis Procedure</u>".

#### 2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-23</u>, "CONSULT-III Function (ABS)".

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111, "Removal and Installation"</u>.

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

[TYPE 1]

#### SLIP INDICATOR LAMP

×: ON –: OFF

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Condition	SLIP indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

#### Component Function Check

INFOID:0000000003081289

#### 1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <a href="BRC-79">BRC-79</a>, "Diagnosis Procedure".

# Diagnosis Procedure

INFOID:0000000003081290

#### 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-23, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-111, "Removal and Installation".</u>

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

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#### **APPLICATION NOTICE**

< ECU DIAGNOSIS > [TYPE 1]

# **ECU DIAGNOSIS**

# **APPLICATION NOTICE**

Application Notice

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

INFOID:0000000003081291

[TYPE 1] < ECU DIAGNOSIS >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value INFOID:0000000003081292

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#### 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
		0 [km/h (MPH)]	Vehicle stopped
R LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
R RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
CTOD LAMB CW	Characteristics of the characteristics	When brake pedal is depressed	ON
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is released	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
055.014	VDQ QEE . II L QWQEE	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF
/AN DATE OF N	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s
YAW RATE SEN	sensor	When vehicle turning	-75 to 75 d/s
ACCEL DOC CIO	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %
ACCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %
		Vehicle stopped	Approx. 0 m/s <sup>2</sup>
SIDE G-SENSOR	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> )

< ECU DIAGNOSIS > [TYPE 1]

		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation		
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°		
31 h ANGLE 3IG	sensor	Steering wheel turned	–720 to 720°		
		With engine stopped	0 rpm		
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachometer display		
FLUID LEV SW	ID LEV SW Brake fluid level switch signal status When brake fluid level switch ON		ON		
120.5 227 017	Drake hald level emilen eighal etalde	When brake fluid level switch OFF	OFF		
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
7777117117 002	Operation status of each sciencia valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
FR RH OUT SOL	Operation status of each calencid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
111111111111111111111111111111111111111	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
FR LH IN SOL	Operation status of each calencid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
FR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
ED LILOUT COL	Organica status of each calcusid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
FR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
DD DH IN COL	Operation status of each calencid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
RR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
RR RH OUT SOL	Operation status of each calencid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
III NA OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
DD I H IN COL	Operation status of each salamaid well-	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
RR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		

< ECU DIAGNOSIS > [TYPE 1]

	<b>-</b>	Data monitor  Reference value in			
Monitor item	Condition				
RR LH OUT SOL Operation status of each solenoid valve		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
TITLET GOT GOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON		
WOTOTTTLEAT	Motor and motor relay operation	When the motor relay and motor are not operating	OFF		
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON		
ROTORIONTILI	Actuator relay operation	When the actuator relay is not operating	OFF		
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON		
ADO WALIN LAWE	(Note 3)	When ABS warning lamp is OFF	OFF		
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON		
ZI F LAWIF	(Note 3)	When VDC OFF indicator lamp is OFF	OFF		
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON		
DLIT LAIVIT	(Note 3)	When SLIP indicator lamp is OFF	OFF		
IWD FAIL REQ Note 2)	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON		
Note 2)		When transfer control unit is normal	OFF		
EDD CICNIAI	EPD approxima	EBD is active	ON		
EBD SIGNAL	EBD operation	EBD is inactive	OFF		
ABS SIGNAL	ABS operation	ABS is active	ON		
ADS SIGNAL	Abs operation	ABS is inactive	OFF		
CS SIGNAL	TCS energian	TCS is active	ON		
ICS SIGNAL	TCS operation	TCS is inactive	OFF		
/DC SIGNAL	VDC operation	VDC is active	ON		
7DC SIGNAL	VDC operation	VDC is inactive	OFF		
BD FAIL SIG	ERD fail cafe signal	In EBD fail-safe	ON		
LDD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF		
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON		
NDO I AIL OIG	אט ומוו־פמוב signal	ABS is normal	OFF		
CS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON		
US I AIL SIG	100 iaii-saie sigilai	TCS is normal	OFF		
/DC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	ON		
DO I AIL SIG	VDO Idii-Sale Signal	VDC is normal	OFF		
CRANKING SIG	Crank operation	Crank is active	ON		
DITANING SIG	Oralik Operation	Crank is inactive	OFF		
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON		
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF		

< ECU DIAGNOSIS > [TYPE 1]

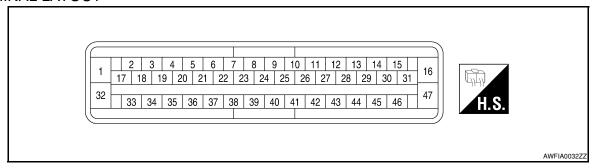
-		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation		
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON		
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF		
SV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON		
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF		
SV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON		
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF		
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G		
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G		
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON		
LDD WAITIN LAWI	(Note 3)	When EBD warning lamp is OFF	OFF		
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	ON		
N I OSI SIG	1 141 Switch Signal OlyOf 1 Condition	A/T shift position = other than N position	OFF		
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	ON		
1 1 031 310	1 141 SWILCH SIGNAL ON/OFF CONDITION	A/T shift position = other than P position	OFF		
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	ON		
111 001010	1 141 SWILCH SIGNAL ON/OFF CONDITION	A/T shift position = other than R position	OFF		
2WD/4WD	Drive axle	2WD model	2WD		
2 V V D/4 V V D	Drive axie	4WD model	4WD		

#### NOTE:

- 1: Confirm tire pressure is normal.
- · 2: Only 4WD models.
- 3: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-76. "Description".
- Brake warning lamp: Refer to BRC-77, "Description".
- VDC OFF indicator lamp: Refer to BRC-78, "Description".
- SLIP indicator lamp: Refer to BRC-79, "Description".

< ECU DIAGNOSIS > [TYPE 1]

# TERMINAL LAYOUT



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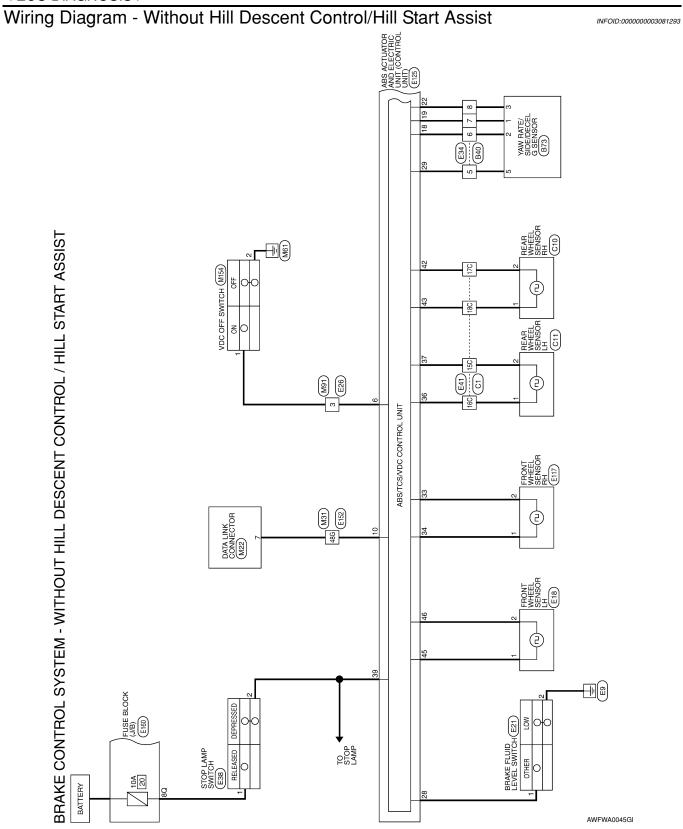
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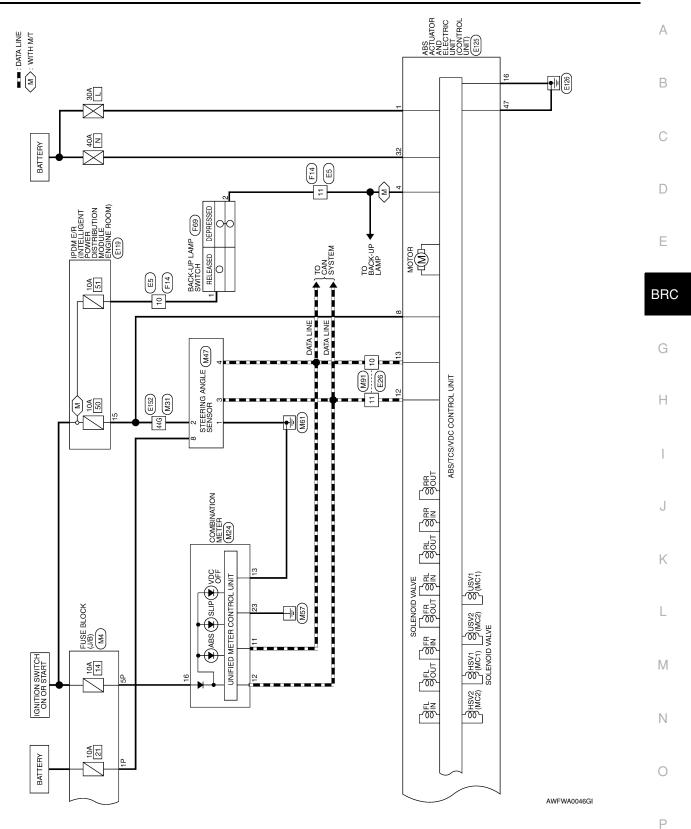
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# BRAKE CONTROL SYSTEM CONNECTORS - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST

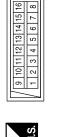
Connector No.	onnector No. M4
Connector Name	Connector Name FUSE BLOCK (J/B)
Connector Color WHITE	WHITE

nector Name FUSE BLOCK (J/B) nector Color WHITE	nector No.	M4
	nector Name	FUSE BLOCK (J/B)
	nector Color	WHITE
2P11P	7P 6P 16P 15P	5P   4P     3P   2P   1P   14P   13P   12P   19P   8P

2P 1P	Signal Name	1	1
7P 6P 5P 4P (] 3P 2P   16P   15P   14P   13P   12P   11P   10P   9P	Color of Wire	R/B	W/G
H.S.	erminal No.	1	5P

Connector No.	M22
Connector Name	Connector Name DATA LINK CONNECTOR
Connector Color WHITE	WHITE

Connector No. M24
Connector Name COMBINATION METER
Connector Color WHITE



Signal Name	I	
Color of Wire	Μ	
Ferminal No.	7	

12         11         10         9         8         7         6         5         4         3         2         1           32         31         30         29         28         27         26         25         24         23         22         21	Signal Name	CAN-L	CAN-H	GROUND	RUN START	GND (POWER)
34 33 32	Color of Wire	۵	ب	GR	W/G	В
20 19 18 17 16 15 14 13 40 39 38 37 36 35 34 33	Terminal No.	F	12	13	16	23

Connector No.	M47
Connector Name STEERING ANG	STEERING AND
Connector Color WHITE	WHITE

Connector Name STEERING ANGLE S	WHITE	3 4 5 1 1
Connector Name	Connector Color WHITE	A.S.

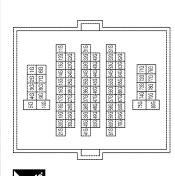
Signal Name GND POWER CAN-H	BATT
Color of Wire B W/R L	. Œ
Terminal No. 1 2 3 3	80

I	Μ	48G
	W/R	44G
Signal Nam	Color of Wire	Terminal No.

Connector Name WIRE TO WIRE Connector Color WHITE

M31

Connector No.





AWFIA0169GB

< ECU DIAGNOSIS > [TYPE 1]

			А
No. E5  Color WHITE    11   10   9   7   6   5   4   3   2   1   1   1   1   1   1   1   1   1	Signal Name	WIRE	В
Connector No. E5  Connector Name WIRE TO WIRE  Connector Color WHITE  TETTI 10 9 8 7 6 5 4 4 14 12 12 12 12 12 19 18 17 16 1		0   4   13	С
Connector No. E5 Connector Name WIRE T Connector Color WHITE	0	Connector No. E26  Connector Name WIRE T  Connector Color WHITE  A.S. Color of  10 P  11 L  11 L	D
Connector No. Connector Nan Connector Col	Terminal No.	Connector No. Connector Nar Connector Colc  H.S.  10 10 11	Е
			BR
Connector No. M154 Connector Name VDC OFF SWITCH Connector Color GRAY	Signal Name	BRAKE FLUID LEVEL SWITCH GRAY  or of Signal Name SB - B -	G
M154 e VDC OF r GRAY	Color of Wire GR B		Н
Connector No. M154 Connector Name VDC C Connector Color GRAY M.S.	Terminal No.	ctor No.	I
Conne Conne Conne	Tem	Conne Conne Termir	J
			K
HE 20	Signal Name – – – – – – – – – – – – – – – – – – –	Signal Name	L
0. M91 ame WIRE TO WIF olor WHITE 7 6 5 4		AY AY Sig	M
Connector No. M91 Connector Name WIRE TO WIRE Connector Color WHITE	No. Color of Wire GR GR	Connector No. E18 Connector Color GRAY  Connector Color of Signal Name  1 G - 2 R -	N
Connector No. Connector Name Connector Color H.S.	Terminal No. 3 10 11	Connector No. Connector Name Connector Color LLS.  1 1 2	0
	l	AWFIA0170G	В

**BRC-89** 

[TYPE 1]

< ECU DIAGNOSIS >

Connector No. Connector Name

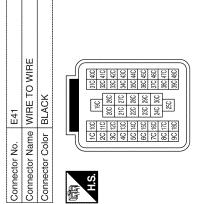
E38 STOP LAMP SWITCH	010	Connector No. Connector Name	me STOF	Connector No. E38 Connector Name STOP LAMP SWITCH
(WITH ALL)	10	Connector Color BLACK	lor BLAC	1 M/ 1)
1 3 T		H.S.	2 1	
Signal Name		Terminal No.	Color of Wire	Signal Name
1.0	<b>I</b>	-	B/B	ı
	L	2	>	ł

	T	
Connector No.	. E119	6
Connector Name		IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	lor WH	里
H.S.	9 8 7 6	14 13 12 11 10
Terminal No.	Color of Wire	Signal Name
15	W/R	ABS IGN SUPPLY
16	W/G	REVERSE LAMP

Ш		Signal Name	ï	ı
lor WHIT	1 2	Color of Wire	H/B	>
Connector Color   WHITE	H.S.	Terminal No.	-	2

	FRONT WHEEL SENSOR RH		رثاءً	Signal Name	1	I	
E117		lor GRA		Color of Wire	В	*	
Connector No.	Connector Name	Connector Color GRAY	H.S.	Terminal No.	<b>-</b>	2	

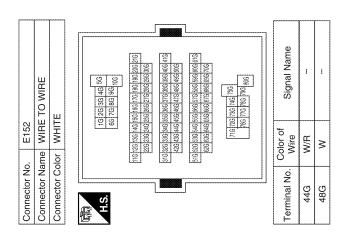
·	r	,		,	,		<b></b>	
	IE TO WIRE	TE	2 9 2	Signal Name	***	-	I	1
E34	me WIF	lor WH	4 8	Color of Wire	ВВ	0	3	>-
Connector No.	Connector Name WIRE TO WIRE	Connector Color WHITE	H.S.	Terminal No.	5	9	7	æ



Signal Name	ı	ŧ	ł	1	
Color of Wire	Ь	٦	>	re	
Terminal No.	15C	16C	17C	18C	

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< ECU DIAGNOSIS > [TYPE 1]



ON legimon	Color of	Signal Namo
dinima 140.	Wire	Olginal Maine
23	ı	ì
24	ı	ı
25	ı	tan
26	ı	***
27	ı	100
28	GR	FLUID LEVEL SW
29	BR	CLUS_GND
30	1	
31	1	ann
32	>	VALVE ECU SUPPLY
33	≯	FR_RH_SIG
34	В	FR_RH_PWR
35	ı	ana.
36		RR_LH_PWR
37	Ф	RR_LH_SIG
38	tan	ı
39	SB	STOP LAMP SW
40	1	ann.
41	ı	1
42	>	RR_RH_SIG
43	LG	RR_RH_PWR
44	ı	and the same of th
45	B	FR_LH_PWR
46	Œ	FR_LH_SIG
47	В	MOTOR GND

E125	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	BLACK	
Connector No.	Connector Name	Connector Color BLACK	



Signal Name	MOTOR SUPPLY	l	1	REV_SW	ı	VDC OFF SW	3	IGN	E	DIAG-K	and the second	CAN-H	CAN-L	I	3	VALVE ECU GND		CAN2-H	CAN2-L	week	ı	CLUS_SUP
Color of Wire	Н	ı	1	>	ı	GR	1	W/R	ı	SB	4		a.	ı	1	മ	I	0	Α	į	1	>
Terminal No.	<b>*</b>	2	က	4	5	9	7	8	6	10	7	12	13	14	15	16	17	18	19	20	21	22

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[TYPE 1]

< ECU DIAGNOSIS >

Connector No.	). F69	
Connector Name	i	BACK-UP LAMP SWITCH
Connector Color	olor WHITE	Щ
朝 H.S.		
Terminal No.	Color of Wire	Signal Name
-	W/G	ı
2	SB	-

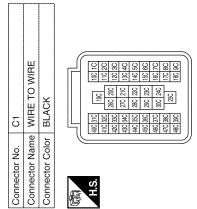
Terminal No.   Color of   Signal Name   Wire   Signal Name	ŧ	1	
Color of Wire	W/G	SB	
Terminal No.	-	2	

Connector No.	). C11	
Connector Name		REAR WHEEL SENSOR RH
Connector Color	olor GRAY	AY
是 H.S.		
Terminal No. Wire	Color of Wire	Signal Name
<del></del>	لــا	ţ
2	а	

Connector No.  Connector Name  Connector Color  (12   11   10   (24   23   22   (24   23   22   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24   23   24   (24	-		me WIRE TO WIRE	or WHITE	10 9 8 7 6 5 4 3 2 1 22 21 20 19 18 17 16 15 14 13	Color of Signal Name	9/M	SB
Connector No Connector Con	-			lor ×	24 23 22 21	Color o	W/G	SB
		Connector No	Connector Na	Connector Co	ø,	Terminal No.	10	<u>;</u>

	REAR WHEEL SENSOR LH	ΑΥ		Signal Name	4	***
C10		lor GRAY		Color of Wire	10	>
Connector No.	Connector Name	Connector Color	斯 H.S.	Terminal No.	-	2

0.	FUSE BLOCK (J/B)	丑	80 0 20 10 80 10 10 10 10 10 10 10 10 10 10 10 10 10	Signal Name	1
. E160		lor WH	30 70 80 70 80	Color of Wire	B/B
Connector No.	Connector Name	Connector Color WHITE	赋 H.S.	Terminal No.	80



Signal Name	ì	I	ŧ	
Color of Wire	ď	٦	^	LG
Terminal No.	15C	16C	17C	18C

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< ECU DIAGNOSIS > [TYPE 1]

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INFOID:0000000003081295

Connector No. B73
Connector Name YAW RATE/SIDE/DECEL G
SENSOR
Connector Color BLACK

2 4 4	Signal Name	CAN-L	CAN-H	CLU_P	CLU_GND
6 5 4	Color of Wire	3	0	Υ.	BB
H.S.	Terminal No.	-	2	ε	9

Connector No.	). B40	0
Connector Name		WIRE TO WIRE
Connector Color	ļ	WHITE
<del>a</del>	<u> </u>	
H.S.	-	က
	9	8
Terminal No.	Color of Wire	Signal Name
ഹ	BB	1
9	0	1
7	Μ	ŀ
8	>	ł

Fail-Safe

#### **CAUTION:**

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

ABS/EBD SYSTEM

< ECU DIAGNOSIS > [TYPE 1]

In case of an electrical malfunction with the ABS, the ABS warning lamp, VDC OFF indicator 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, VDC OFF indicator 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/VDC 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/VDC or EBD system.

#### VDC/TCS SYSTEM

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

DTC No. Index

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	DDC 00 UD vistis vu
C1103	FR RH SENSOR-1	BRC-29, "Description"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	DDC 00 UD vistis vu
C1107	FR RH SENSOR-2	BRC-32, "Description"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-35, "Description"
C1110	CONTROLLER FAILURE	BRC-37, "DTC Logic"
C1111	PUMP MOTOR	BRC-38, "Description"
C1113	G-SENSOR	BRC-40, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-43, "Description"
C1116	STOP LAMP SW	BRC-46, "Description"
C1120	FR LH IN ABS SOL	BRC-48, "Description"
C1121	FR LH OUT ABS SOL	BRC-51, "Description"
C1122	FR RH IN ABS SOL	BRC-48, "Description"
C1123	FR RH OUT ABS SOL	BRC-51, "Description"
C1124	RR LH IN ABS SOL	BRC-48, "Description"
C1125	RR LH OUT ABS SOL	BRC-51, "Description"
C1126	RR RH IN ABS SOL	BRC-48, "Description"
C1127	RR RH OUT ABS SOL	BRC-51, "Description"
C1130	ENGINE SIGNAL 1	
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	BRC-54, "Description"
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-56, "Description"
C1143	ST ANG SEN CIRCUIT	DDC 50 "Deceription"
C1144	ST ANG SEN SIGNAL	BRC-58, "Description"

< ECU DIAGNOSIS > [TYPE 1]

DTC	Items (CONSULT screen terms)	Reference	
C1145	YAW RATE SENSOR	PPC 40 "Description"	
C1146	SIDE G-SEN CIRCUIT	BRC-40, "Description"	
C1155	BR FLUID LEVEL LOW	BRC-63, "Description"	
C1156	ST ANG SEN COM CIR	BRC-66, "Description"	
C1160	DECEL G SEN SET	BRC-67, "Description"	
C1163	ST ANGL SEN SAFE	BRC-68, "Description"	
C1164	CV1	PPC 60 "Description"	
C1165	CV2		
C1166	SV1	BRC-69, "Description"	
C1167	SV2		
C1170	VARIANT CODING	BRC-37, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-73, "Description"	

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#### **APPLICATION NOTICE**

< SYMPTOM DIAGNOSIS >

[TYPE 1]

# SYMPTOM DIAGNOSIS

# **APPLICATION NOTICE**

**Application Notice** 

INFOID:0000000003081297

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	

< SYMPTOM DIAGNOSIS > [TYPE 1]

# 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
Excessive ABS function operation frequency	Brake force distribution	BRC-98, "Diagno- sis Procedure"
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-99, "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-100, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-101, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-102, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-103, "Diag- nosis Procedure"
	TCM	
	ECM	

#### 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. 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]

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

< SYMPTOM DIAGNOSIS >

[TYPE 1]

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

#### Diagnosis Procedure

INFOID:0000000003081299

#### 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-5</u>, "<u>On-Vehicle Inspection and Service</u>", Rear: <u>RAX-8</u>, "<u>Rear Axle Bearing</u>" (C200) or <u>RAX-20</u>, "<u>Rear Axle Bearing</u>" (M226).

#### 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. Refer to <u>BRC-109</u>, "Removal and Installation".

· 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 ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to <u>BRC-23, "CONSULT-III Function (ABS)"</u>.

NO >> Normal

#### **UNEXPECTED PEDAL REACTION**

[TYPE 1] < SYMPTOM DIAGNOSIS > **UNEXPECTED PEDAL REACTION** Α Diagnosis Procedure INFOID:0000000003081300 1. CHECK BRAKE PEDAL STROKE В Check brake pedal stroke. Refer to BR-7, "Inspection and Adjustment". Is the stroke too large? C >> • Bleed air from brake tube and hose. Refer to BR-10, "Bleeding Brake System". YES • Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to BR-7. "Inspection and Adjustment" (brake pedal), BR-32. "Disassembly and Assembly" (master cylinder), BR-24, "Removal and Installation" (brake booster). D NO >> GO TO 2

# 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.

#### Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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#### THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

M DIAGNOSIS > [TYPE 1]

#### THE BRAKING DISTANCE IS LONG

# Diagnosis Procedure

INFOID:0000000003081301

#### **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 >> Normal

NO >> Check brake system.

**ABS FUNCTION DOES NOT OPERATE** [TYPE 1] < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000003081302 **CAUTION:** В ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1. CHECK ABS WARNING LAMP DISPLAY C Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal? YES >> Normal  $\square$ NO >> Perform self-diagnosis. Refer to BRC-23, "CONSULT-III Function (ABS)". Е BRC G Н J K

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< SYMPTOM DIAGNOSIS >

[TYPE 1]

#### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

#### Diagnosis Procedure

INFOID:0000000003081303

#### **CAUTION:**

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. 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 that there are pedal vibrations when the engine is started.

#### Do vibrations occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

# 2.SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

#### Do the operation noises occur?

YES >> GO TO 3

NO >> Perform self -diagnosis. Refer to <u>BRC-23, "CONSULT-III Function (ABS)"</u>.

# 3.SYMPTOM CHECK 3

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 >> Normal

#### VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

[TYPE 1] < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL Α Diagnosis Procedure INFOID:0000000003081304 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 2. CHECK SELF-DIAGNOSIS RESULTS D Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to BRC-23, "CONSULT-III Function (ABS)". Are self-diagnosis results indicated? Е >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. NO >> GO TO 3 BRC 3. CHECK CONNECTOR • Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc. Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis. 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 f 4 . CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS Perform ECM and TCM self-diagnosis. Are self-diagnosis results indicated? YES >> Check the corresponding items. ECM: Refer to <u>EC-68</u>, "<u>CONSULT-III Function (ENGINE)</u>". • TCM: Refer to TM-150, "CONSULT-III Function (TRANSMISSION)". NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-111, "Removal and Installa-K tion". L M Ν Р

# NORMAL OPERATING CONDITION

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.		
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	This is a normal condition due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC 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 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, VDC OFF indicator 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 condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.	
VDC may not operate normally or the ABS warning lamp, VDC 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).		
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).		
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 VDC/TCS function before performing an inspection on a chassis dynamometer.)	
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 tire.	

< PRECAUTION > [TYPE 1]

# **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.

Precaution for Brake System

#### **CAUTION:**

- Refer to MA-10, "Fluids and Lubricants" for recommended brake fluid.
- · Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- · Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-29, "Brake Burnishing"</u> (front disc brake) or <u>BR-31, "Brake Burnishing"</u> (rear disc brake).

#### WARNING:

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

#### Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting 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.

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Commercial service tool

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< PRECAUTION > [TYPE 1]

• 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 diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.

- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The
  noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSUT-III and check that VDC OFF indicator turns off. Additionally, perform selfdiagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

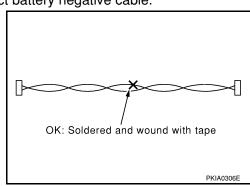
#### NOTE:

VDC OFF indicator lamp is on when VDC OFF switch is on.

# Precaution for CAN System

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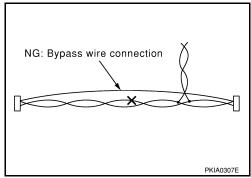
- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape.
   Make sure that fraying of twisted wire is within 110 mm (4.33 in).



#### **PRECAUTIONS**

< PRECAUTION > [TYPE 1]

 Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)



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< PREPARATION > [TYPE 1]

# **PREPARATION**

# **PREPARATION**

# Special Service Tool

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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  O POMEN MISSION  WFIA0101E	Checking operation of ABS active wheel sensors
ST30031000 ( — ) Bearing puller	ZZA0700D	Removing sensor rotor

# **Commercial Service Tool**

INFOID:0000000003260907

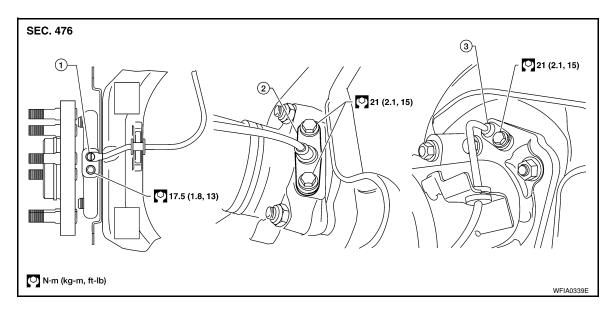
Tool name		Description
Flare nut crowfoot     Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)
	S-NT360	

INFOID:0000000003260901

# REMOVAL AND INSTALLATION

# WHEEL SENSORS

Removal and Installation



1. Front wheel sensor

- 2. Rear wheel sensor (C200)
- 3. Rear wheel sensor (M226)

### **REMOVAL**

- Remove wheel sensor bolt(s).
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to BR-28, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

#### **CAUTION:**

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- 3. Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

### INSTALLATION

- Before installing wheel sensors,
- Inspect wheel sensor assembly and replace if damaged.
- Clean wheel sensor hole and mating surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- Install a new wheel sensor O-ring, then apply a coat of suitable grease to the O-ring and sensor hole. Refer to MA-10.
- Installation is in the reverse order of removal.

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# SENSOR ROTOR

# Removal and Installation

INFOID:0000000003260902

### **FRONT**

The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>".

### **REAR**

#### Removal

#### NOTE:

It is necessary to disassemble the rear axle to replace the sensor rotor.

- 1. Remove axle shaft assembly. Refer to <u>RAX-9</u>, "<u>Removal and Installation</u>" (C200), or <u>RAX-21</u>, "<u>Removal and Installation</u>" (M226).
- 2. Pull the sensor rotor of off the axle shaft using Tool and a press.

### Tool number : ST30031000 ( — )

### Installation

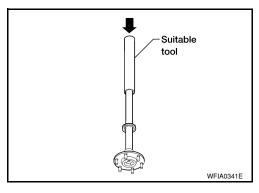
 Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated. CAUTION:

Do not reuse the old sensor rotor.

Install axle shaft assembly. Refer to <u>RAX-9</u>, "Removal and <u>Installation"</u> (C200), or <u>RAX-21</u>, "Removal and <u>Installation"</u> (M226).

### **CAUTION:**

Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.



**[TYPE 1]** 

INFOID:0000000003260903

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

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- To rear left
- To front right
- ABS actuator and electric unit (con- 8. trol unit)
- 10. Collar

- 2. To rear right
- From the master cylinder secondary
- Harness connector
- To front left
- 6. From the master cylinder primary
- 9. Grommet

### **REMOVAL**

- 1. Disconnect the negative battery terminal.
- Drain the brake fluid. Refer to BR-10, "Drain and Refill".
- Disconnect the actuator harness from the ABS actuator and electric unit (control unit). **CAUTION:** 
  - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
  - Be careful not to splash brake fluid on painted areas.
- Disconnect the brake tubes.
- Remove three bolts and then the ABS actuator and electric unit (control unit).

### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

To install, use a flare nut wrench (commercial service tool).

- Always tighten brake tubes to specification when installing. Refer to BR-19.
- Never reuse drained brake fluid.

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# **ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)**

< REMOVAL AND INSTALLATION >

[TYPE 1]

 After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-10, "Bleeding Brake System"</u>. NOTE:

If the ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

### STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION >

[TYPE 1]

# STEERING ANGLE SENSOR

# Removal and Installation

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### **REMOVAL**

- 1. Remove spiral cable. Refer to SR-6, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor.

### **CAUTION:**

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 <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

### **INSTALLATION**

1. Installation is in the reverse order of removal.

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# **G SENSOR**

# Removal and Installation

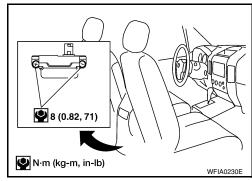
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### **REMOVAL**

- 1. Remove center console. Refer to IP-10, "Exploded View".
- 2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
  - The location of the sensor is the same for all models.

### **CAUTION:**

- Do not use power tools to remove or install yaw rate/side/ decel G sensor.
- Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/decel G sensor.



### **INSTALLATION**

Installation is in the reverse order of removal.

#### NOTE:

After performing the above work, calibrate the decel G sensor settings of the yaw rate/side/decel G sensor. Refer to <a href="https://example.com/BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement".

# **APPLICATION NOTICE**

< BASIC INSPECTION > [TYPE 2]

# **BASIC INSPECTION**

# **APPLICATION NOTICE**

Application Notice

Service information	Remarks		
TYPE 1	VDC/TCS/ABS		
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS		

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# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [TYPE 2]

# DIAGNOSIS AND REPAIR WORKFLOW

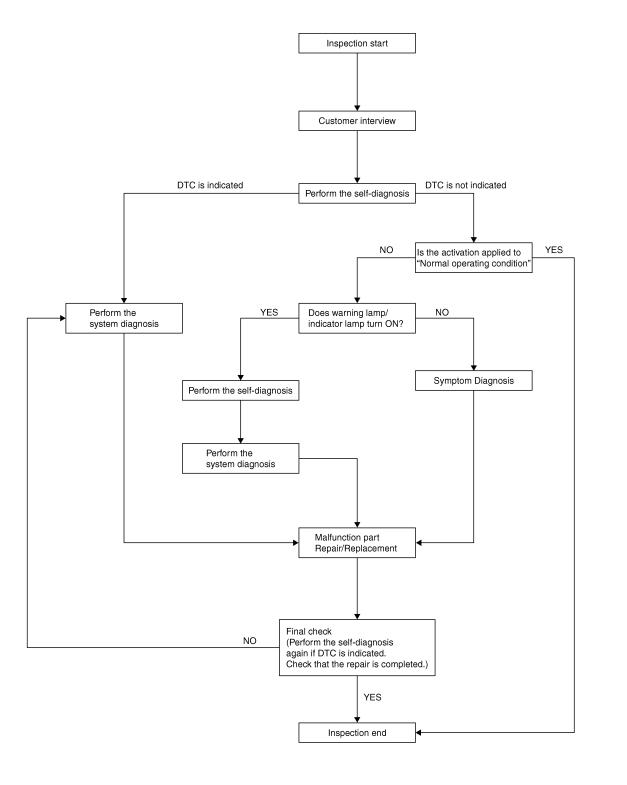
Work Flow

### 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 adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

< BASIC INSPECTION > [TYPE 2]

**OVERALL SEQUENCE** 



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# **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 <a href="BRC-119">BRC-119</a>, "Diagnostic Work Sheet".

### DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION > [TYPE 2]

>> GO TO 2

# 2. PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-131, "CONSULT-III Function (ABS)".

### Is there any DTC displayed?

YES >> GO TO 3 NO >> GO TO 4

# 3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-200, "DTC No. Index".

>> GO TO 7

# 4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-210.</u> "<u>Description</u>".

### Is the symptom a normal operation?

YES >> INSPECTION END

NO >> GO TO 5

# ${f 5.}$ CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-184, "Description".
- Brake warning lamp: Refer to BRC-185, "Description".
- VDC OFF indicator lamp: Refer to BRC-186, "Description".
- SLIP indicator lamp: Refer to BRC-187, "Description".

### Is ON/OFF timing normal?

YES >> GO TO 6 NO >> GO TO 2

# 6. PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

# 7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

# 8. FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

### Is no other DTC present and the repair completed?

YES >> INSPECTION END

NO >> GO TO 3

# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [TYPE 2]

# Diagnostic Work Sheet

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

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**BRC-119** 

# INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

# ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description

INFOID:0000000003081320

After replacing the ABS actuator and electric unit (control unit), perform the following procedures:

- · Neutral position adjustment for the steering angle sensor
- · Calibration of the decel G sensor

# ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Special Repair Requirement

# 1.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to <u>BRC-120</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</u>: <u>Special Repair Requirement</u>", GO TO 2

# 2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

# >> Refer to <a href="BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description

INFOID:0000000003081322

Refer to the table below to determine if adjustment of steering angle sensor neutral position is required.

×: 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	_
Tire rotation	_
Adjusting wheel alignment	×

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

**[TYPE 2]** < BASIC INSPECTION > >> GO TO 2 2.perform the neutral position adjustment for the steering angle sensor Α On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order. 2. Touch "START". В **CAUTION:** Do not touch steering wheel while adjusting steering angle sensor. 3. After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automatically. 4. Turn ignition switch OFF, then turn it ON again. **CAUTION:** D Be sure to perform above operation. >> GO TO 3 Е CHECK DATA MONITOR Run vehicle with front wheels in straight-ahead position, then stop. **BRC** 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 f 4.ERASE THE SELF-DIAGNOSIS MEMORY Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM. Н ABS actuator and electric unit (control unit): Refer to BRC-131, "CONSULT-III Function (ABS)". • ECM: Refer to EC-68, "CONSULT-III Function (ENGINE)". Are the memories erased? YES >> INSPECTION END NO >> Check the items indicated by the self-diagnosis. CALIBRATION OF DECEL G SENSOR CALIBRATION OF DECEL G SENSOR: Description INFOID:00000000003081324 Refer to the table below to determine if calibration of the decel G sensor is required. ×: Required -: Not required Situation Calibration of decel G sensor 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 X Removing/Installing steering components X Ν Replacing steering components × Removing/Installing suspension components × Replacing suspension components Change tires to new ones Tire rotation Adjusting wheel alignment ×

### CALIBRATION OF DECEL G SENSOR

#### **CAUTION:**

To calibrate the decel G sensor, make sure to use CONSULT-III (Calibration cannot be done without CONSULT-III)

INFOID:0000000003081325

CALIBRATION OF DECEL G SENSOR: Special Repair Requirement

< BASIC INSPECTION > [TYPE 2]

# 1. ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

# 2.PERFORM CALIBRATION OF DECEL G SENSOR

- 1. On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.
- 2. Touch "START".
- 3. After approximately 10 seconds, touch "END".

### NOTE:

After approximately 60 seconds, it 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 "DECEL G SEN" is within ±.

### Is the inspection result normal?

YES >> GO TO 4

NO >> Perform calibration of decel G sensor again, GO TO 1

# 4. ERASE THE SELF-DIAGNOSIS MEMORY

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

- ABS actuator and electric unit (control unit): Refer to BRC-131, "CONSULT-III Function (ABS)".
- ECM: Refer to EC-68, "CONSULT-III Function (ENGINE)".

### Are the memories erased?

YES >> INSPECTION END

NO >> Check the items indicated by the self-diagnosis.

# **APPLICATION NOTICE**

< FUNCTION DIAGNOSIS > [TYPE 2]

# **FUNCTION DIAGNOSIS**

# **APPLICATION NOTICE**

Application Notice

Service information	Remarks		
TYPE 1	VDC/TCS/ABS		
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS		

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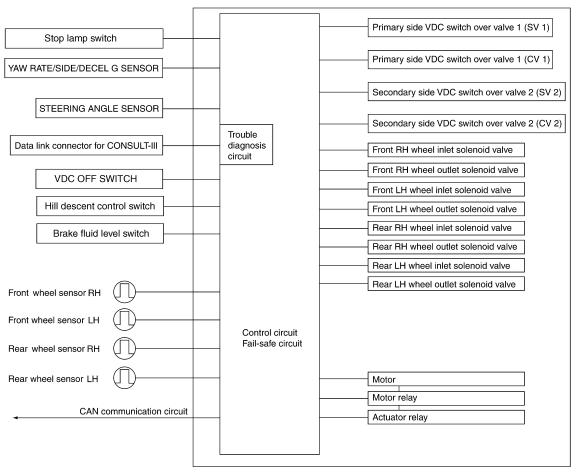
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### $\mathsf{VDC}$

# System Diagram

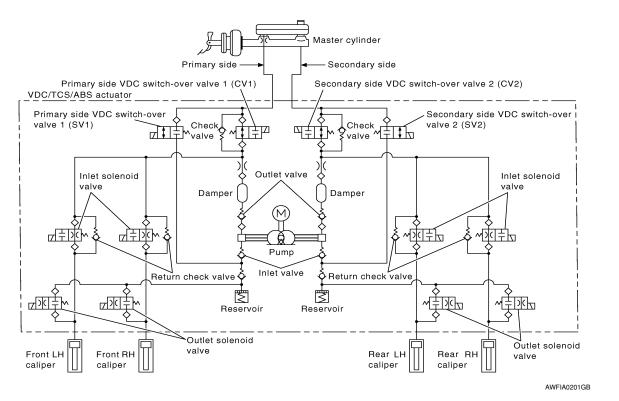
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ABS actuator and electric unit (control unit)

AWFIA0200GB

# HYDRAULIC CIRCUIT DIAGRAM



System Description

INFOID:0000000003081328

- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor. Using information from yaw rate/side/decel G sensor and wheel sensor, VDC judges driving condition (conditions of under steer and over steer) to improve vehicle driving stability by controlling brake application to 4 wheels and engine output.
- During VDC operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

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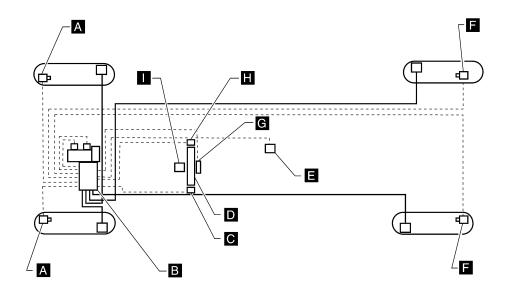
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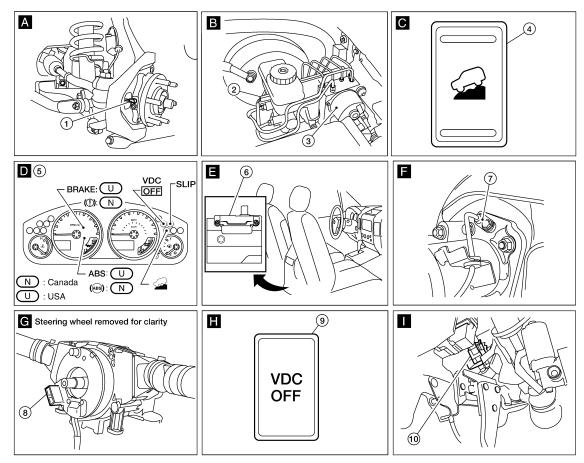
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# Component Parts Location

INFOID:0000000003081329





AWFIA0202GB

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- Brake fluid level switch E21
- Combination meter M24
- ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

< FUNCTION DIAGNOSIS > [TYPE 2]

7. Rear wheel sensor LH C11 Rear wheel sensor RH C10

- Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47
   (Steering wheel removed for clarity)
- Stop lamp switch E38
   (Lower instrument panel LH removed for clarity)

**Component Description** 

INFOID:0000000003081330

Compo	Component parts	
	Pump	DDC 14C "Deceriation"
	Motor	BRC-146, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-164, "Description"
The detailer and electric and (certifier and)	Solenoid valve	BRC-156, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-177, "Description"
Wheel sensor	BRC-151, "Description"	
Yaw rate/side/decel G sensor	BRC-148, "Description"	
Brake fluid level switch	BRC-171, "Description"	
Steering angle sensor	BRC-166, "Description"	
Stop lamp switch	BRC-154, "Description"	
VDC OFF switch		BRC-182, "Description"
ABS warning lamp	BRC-184, "Description"	
Brake warning lamp	BRC-185, "Description"	
VDC OFF indicator lamp	BRC-186, "Description"	
SLIP indicator lamp	BRC-187, "Description"	

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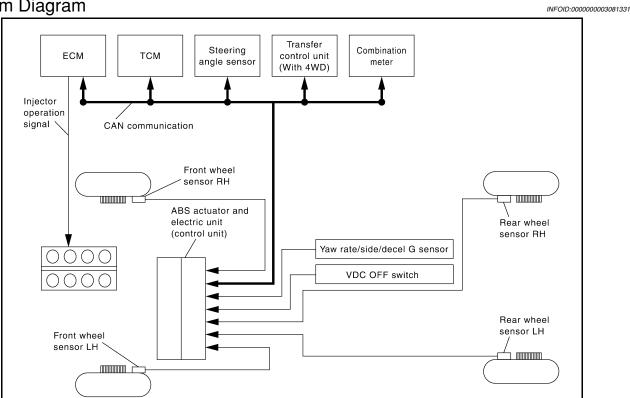
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### TCS

System Diagram



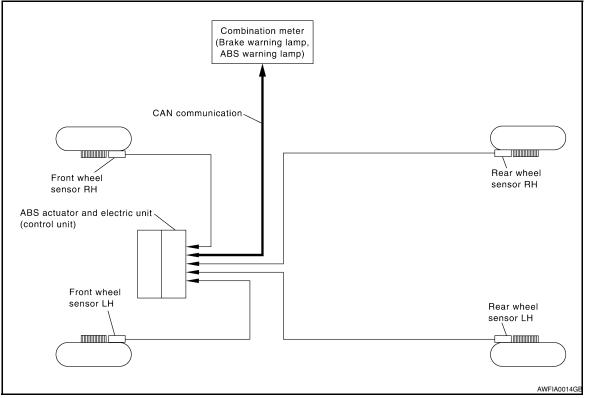
# System Description

INFOID:0000000003081332

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and A/T gear position to ensure the optimum slippage ratio at drive wheels by computing wheel speed signals from 4 wheel sensors. When ABS actuator and electric unit (control unit) detects a spin at drive wheels (rear wheels), it compares wheel speed signals from all 4 wheels. At this time, LH and RH rear brake fluid pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

# **ABS**

System Diagram



# System Description

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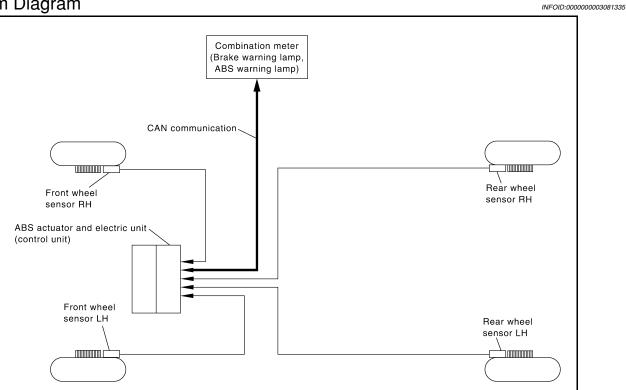
 Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.

• Electrical system diagnosis by CONSULT-III is available.

**BRC-129** 

# **EBD**

System Diagram



# **System Description**

INFOID:0000000003081336

- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly, it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

< FUNCTION DIAGNOSIS > [TYPE 2]

# DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]

CONSULT-III Function (ABS)

INFOID:0000000003081337

### **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.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

### SELF-DIAG RESULTS MODE

### **Operation Procedure**

 Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.

### How to Erase Self-diagnosis Results

 After erasing DTC memory, start engine and 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.

### **CAUTION:**

# If memory cannot be erased, perform applicable diagnosis. NOTE:

- 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.
- 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).
- VDC OFF switch should not stay "ON" position.

Display Item List

Refer to BRC-200, "DTC No. Index".

DATA MONITOR MODE

Display Item List

Item	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
GEAR	×	×	×	Gear position judged by PNP switch signal is displayed.
FR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.

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< FUNCTION DIAGNOSIS >

[TYPE 2]

Itom	Data			
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
RR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.
N POSI SIG	-	_	×	Shift position judged by PNP switch signal.
P POSI SIG	-	_	×	Shift position judged by PNP switch signal.
ACCEL POS SIG (%)	×	_	×	Throttle valve open/close status judged by CAN communication signal is displayed.
ENGINE SPEED (rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.
STR ANGLE SIG (deg)	×	_	×	Steering angle detected by steering angle sensor is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.
SIDE G-SENSOR (m/s²)	×	_	×	Transverse acceleration detected by side G-sensor is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (ON/OFF) status is displayed.
SLIP LAMP (ON/OFF)	-	×	×	SLIP indicator lamp (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.
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.
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.
OFF LAMP (ON/OFF)	_	×	×	OFF Lamp (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.

[TYPE 2] < FUNCTION DIAGNOSIS >

Item	Data	a monitor item sele	ection	Domondos
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
CV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed.
CV2 (ON/OFF)	_	-	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed.
SV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.
SV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	-	-	×	VDC fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	-	-	×	TCS fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status 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 WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) status is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.
R POSI SIG	-	-	×	Shift position judged by PNP switch signal.
2WD/4WD	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
CRANKING SIG	-	-	×	The input state of the key SW START position signal is displayed.
RELEASE SW NO	-	-	×	Release switch signal (ON/OFF) status is displayed. "ON" indicates that the brake pedal is depressed. "OFF" is that the brake pedal is released.
RELEASE SW NC	-	-	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicates that the brake pedal is depressed on. "ON" is that the brake pedal is released.
OHB FAIL	-	_	×	OHB fail status is displayed.
HBA FAIL	_	_	×	HBA fail status is displayed.

**BRC-133** 

[TYPE 2]

ltem	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
OHB SIG	_	_	×	OHB operation (ON/OFF) status is displayed.
HBA SIG	_	_	×	HBA operation (ON/OFF) status is displayed.
PRES CTRL ACC	_	_	×	This item is not used for this model.
PRES FAIL ACC	_	_	×	This item is not used for this model.
STP OFF RLY	_	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

<sup>×:</sup> Applicable

### **ACTIVE TEST MODE**

< FUNCTION DIAGNOSIS >

### **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, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp 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.

### Test Item

### SOLENOID VALVE

- 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 operate as shown in the table below.

Operation		AE	3S solenoid va	alve	ABS	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP	
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	
TILATI OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF	
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF	

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

<sup>-:</sup> Not applicable

< FUNCTION DIAGNOSIS >

**[TYPE 2]** 

**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	ON	ON

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# **COMPONENT DIAGNOSIS**

# **APPLICATION NOTICE**

**Application Notice** 

INFOID:0000000003081338

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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

< COMPONENT DIAGNOSIS >

[TYPE 2]

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

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

### 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-137</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

**CAUTION:** 

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.

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

3. 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.

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#### 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 the wheel sensor. Refer to <u>BRC-216, "Removal and Installation"</u>.

# 3. CHECK TIRES

Check for inflation pressure, wear and size of each tire.

### Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

# 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-8</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-20</u>, "Rear Axle Bearing" (M226 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), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear).

# CHECK WIRING HARNESS FOR SHORT CIRCUIT

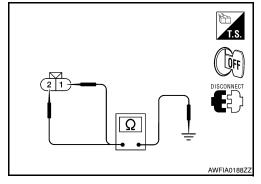
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

# Continuity should not exist.

### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



# 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

 Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front I II		45	E18	1	Yes
Front LH	E125	46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

# Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Repair the circuit.

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

# < COMPONENT DIAGNOSIS >

**[TYPE 2]** 

# Component Inspection

INFOID:0000000003081342

# 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 <a href="BRC-137">BRC-137</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003081343

# 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13. "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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**[TYPE 2]** 

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

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

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	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.	
C1106	RR LH SENSOR-2	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.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	When the circuit in the front 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.	ABS actuator and electric unit (control unit)
C1108	FR LH SENSOR-2	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.	

### 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-140</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081346

### **CAUTION:**

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

**[TYPE 2]** 

# 2. CHECK WHEEL SENSOR OUTPUT SIGNAL

- 1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
- 2. 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 the wheel sensor. Refer to <u>BRC-216</u>, "Removal and Installation".

# 3. CHECK TIRES

Check for inflation pressure, wear and size of each tire.

# Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

# 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "<u>On-Vehicle Inspection and Service</u>" (front), <u>RAX-8</u>, "<u>Rear Axle Bearing</u>" (C200 rear), or <u>RAX-20</u>, "<u>Rear Axle Bearing</u>" (M226 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), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear).

# 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

# Continuity should not exist.

### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

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# 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

 Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

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Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	Yes
Front Lm	E125	46		2	
Front RH Rear LH		34	- E117 - C11	1	
		33		2	
	- E123	36		1	
		37		2	
Rear RH		43	C10	1	
		42		2	

### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Repair the circuit.

# Component Inspection

INFOID:0000000003081347

# 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 <a href="BRC-140">BRC-140</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003081348

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

< COMPONENT DIAGNOSIS >

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# C1109 POWER AND GROUND SYSTEM

Supplies electric power to the ABS actuator and electric unit (control unit).

DTC Logic

### 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.	Harness or connector     ABS actuator and electric unit (control unit)

### 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-143</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081351

### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

### Is any item indicated on the self-diagnosis display?

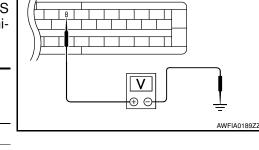
YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Turn ignition switch ON or OFF and 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			
F125	8	Ground	Ignition switch: ON	Battery voltage
	8	Ground	Ignition switch: OFF	Approx. 0V



4. Turn ignition switch OFF.

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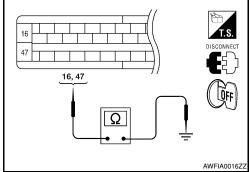
### **C1109 POWER AND GROUND SYSTEM**

### < COMPONENT DIAGNOSIS >

**[TYPE 2]** 

5. Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

	ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal		
E125	16, 47	Ground	Yes



### Is the inspection result normal?

- YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

# Special Repair Requirement

INFOID:0000000003081352

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) **[TYPE 2]** < COMPONENT DIAGNOSIS > C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) Α DTC Logic INFOID:0000000003081353 DTC DETECTION LOGIC В DTC Malfunction detected condition Possible cause Display item When there is an internal malfunction in the ABS actuator C1110 **CONTROLLER FAILURE** · ABS actuator and electric unit and electric unit (control unit). (control unit) C1170 VARIANT CODING In a case where VARIANT CODING is different. D DTC CONFIRMATION PROCEDURE 1. CHECK SELF-DIAGNOSIS RESULTS Е Check the self-diagnosis results. Self-diagnosis results **BRC CONTROLLER FAILURE** VARIANT CODING Is above displayed on the self-diagnosis display? >> Proceed to diagnosis procedure. Refer to BRC-145, "Diagnosis Procedure". YES NO >> INSPECTION END Diagnosis Procedure INFOID:0000000003081354 INSPECTION PROCEDURE 1. REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) >> Replace ABS actuator and electric unit (control unit). Refer to BRC-218, "Removal and Installa-

tion".

# Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-120</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

INFOID:00000000003081355

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>> GO TO 2

#### 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:0000000003081356

#### **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.	Harness or connector     ABS actuator and electric unit
	TOWN WOTON	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-146</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081358

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-131, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.check abs motor and motor relay power supply circuit

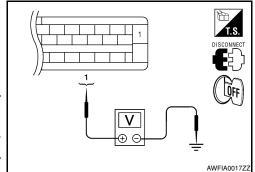
#### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

Turn ignition switch OFF.

- Disconnect ABS actuator and electric unit (control unit) connec-
- Check voltage between the ABS actuator and electric unit (control unit) harness connector terminal and ground.

ABS actuator and ele	ectric unit (control unit)	_	Voltage	
Connector	Terminal		voltage	
E125	1	Ground	Battery voltage	



#### Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

# ${f 3.}$ check abs actuator and electric unit (control unit) ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal	_	Continuity
E125	16, 47	Ground	Yes

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-218, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# 16, 47 AWFIA0016Z

#### Component Inspection

# CHECK ACTIVE TEST

- 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	ON	ON

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-146</u>, "Diagnosis Procedure".

# Special Repair Requirement

# ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-120, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description".

#### >> GO TO 2

#### 2.calibration of decel G sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-121, "CALIBRATION OF DECEL G SENSOR: Description".

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>> END

# C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	ABS actuator and electric unit (control unit)
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.	Yaw rate/side/decel G sensor

#### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
G-SENSOR
YAW RATE SENSOR
SIDE G-SEN CIRCUIT

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-148</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081363

#### **CAUTION:**

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may
  cause the yaw rate/side/decel G sensor system to indicate a malfunction. This is not a malfunction if
  normal operation can be resumed after restarting the engine.
- 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.

#### INSPECTION PROCEDURE

# 1.CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.

Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# 2.YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

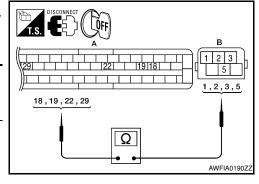
# C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

#### < COMPONENT DIAGNOSIS >

[TYPE 2]

Check continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 2, 1, 3, 5.

	and electric unit ol unit)	Yaw rate/side/	Continuity	
Connector	Terminal	Connector	Terminal	
	18	D70 (D)	2	Yes
E125 (A)	19		1	
E125 (A)	22	B73 (B)	3	
	29		5	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

# 3. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

 Connect the yaw rate/side/decel G sensor connector M108 and ABS actuator and electric unit (control unit) connector E125.

2. Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.08 G to +0.08 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-221, "Removal and Installation".

# Component Inspection

INFOID:0000000003081364

# 1. CHECK DATA MONITOR

Select "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" 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     -4 to +4 deg/s     -1.1 to +1.1 m/s       Turning right     Negative value     Negative value       Turning left     Positive value     Positive value       Speed up     -     -	
Stopped -4 to +4 deg/s -1.1 to +1.1 m/s  Turning right Negative value Negative value  Turning left Positive value Positive value	DECEL G-SEN (DATA MONITOR)
Turning right Negative value Negative value  Turning left Positive value Positive value	,
Turning left Positive value Positive value	-0.08 G to +0.08 G
9	-
Speed up	-
opeou up	Negative value
Speed down	Positive value

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-148, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003081365

 ${f 1}$  . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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# C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR

#### < COMPONENT DIAGNOSIS >

[TYPE 2]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# $2. \hbox{\it calibration of decel $G$ sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "CALIBRATION OF <u>DECEL G SENSOR</u>: <u>Description</u>".

>> END

#### C1115 WHEEL SENSOR

Description INFOID:0000000003081366

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:0000000003081367

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

#### CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ABS SENSOR [ABNORMAL SIGNAL]

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

>> Proceed to diagnosis procedure. Refer to BRC-151, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 2

>> Repair or replace as necessary. NO

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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.

3. 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.

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

NO >> Replace the wheel sensor. Refer to BRC-216, "Removal and Installation".

3.CHECK TIRES

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INFOID:0000000003081368

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Check for inflation pressure, wear and size of each tire.

Are tire pressure and size correct and is tire wear within specifications?

YES >> GO TO 4

NO >> Adjust tire pressure or replace tire(s).

#### 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-8</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-20</u>, "Rear Axle Bearing" (M226 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), <u>RAX-14</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-25</u>, "<u>Removal and Installation</u>" (M226 rear).

# 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

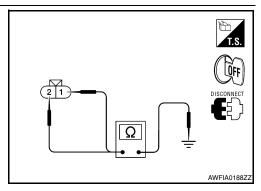
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

#### Continuity should not exist.

#### Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



#### 6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector and the malfunctioning wheel sensor harness connector.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal	·	
Front LH		45	E18	1		
FIOHLEH	E125	46	- E18	2	Yes	
Front RH		34	E117	1		
I TOTIL THE		33		2		
Rear LH		36	C11	1		
near Lii		37		2		
Rear RH		43	C10	1		
i teai i ti i		42	010	2		

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Repair the circuit.

# Component Inspection

INFOID:0000000003081369

# 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)
--------------	------------------------------

# **C1115 WHEEL SENSOR**

	OTTIS WILLE SENSON	
COMPONENT DIAGNOSIS:	<u> </u>	TYPE 2]
FR LH SENSOR		
FR RH SENSOR	Nearly matches the speedometer dis-	
RR LH SENSOR	play (±10% or less)	
RR RH SENSOR		
s the inspection result normal?		
YES >> INSPECTION END	L D ( L DDO 454 ND;	
	cedure. Refer to BRC-151, "Diagnosis Procedure".	
Special Repair Requirem	ent infold:0	00000000003081370
ADJUSTMENT OF STEERIN	G ANGLE SENSOR NEUTRAL POSITION	
	adjustment for the steering angle sensor when replacing the ABS	
and electric unit (control unit). Re POSITION : Description".	efer to <u>BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR N</u>	EUTRAL
POSITION : Description.		
>> GO TO 2		
2. CALIBRATION OF DECEL G	SENSOR	
	cel G sensor when replacing the ABS actuator and electric unit (con	ntrol unit)
	N OF DECEL G SENSOR : Description".	iti Oi Gilityi
>> END		

#### C1116 STOP LAMP SWITCH

Description INFOID:0000000003081371

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric unit (control unit).

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	Harness or connector     Stop lamp switch     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-154</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:00000000003081373

#### INSPECTION PROCEDURE

# 1. CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and stop lamp switch connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# 2 STOP LAMP SWITCH INSPECTION

Connect the stop lamp switch harness connector.

2. Check the voltage between the ABS actuator and electric unit (control unit) harness connector E125 terminal 39 and body ground.

Brake pedal depressed : Battery voltage

(approx. 12V)

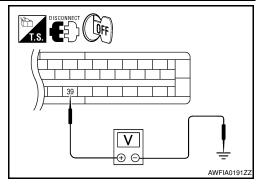
Brake pedal not depressed : Approx. 0V

#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-218, "Removal and Installation".

NO >> GO TO 3

 $3.\mathsf{stop}$  Lamp switch circuit inspection



#### C1116 STOP LAMP SWITCH

#### < COMPONENT DIAGNOSIS >

[TYPE 2]

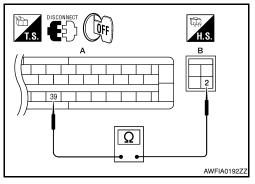
- 1. Disconnect the stop lamp switch harness connector.
- 2. Check the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 39 and stop lamp switch harness connector E38 (B) terminal 2.

#### Continuity should exist.

#### Is the inspection result normal?

YES >> Refer to EXL-4, "Work Flow".

NO >> Repair or replace malfunctioning components.



#### INFOID:0000000003081374

# Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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# C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:0000000003081375

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
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 <a href="BRC-156">BRC-156</a>, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081377

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

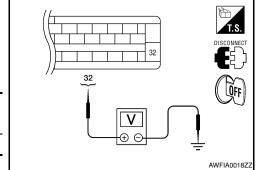
2. CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

#### < COMPONENT DIAGNOSIS >

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

ABS actuator and electric unit (control unit)		_	Voltage	
Connector	Terminal		voltage	
E125	32	Ground	Battery voltage	



**[TYPE 2]** 

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# ${f 3.}$ check solenoid, vdc switch-over valve and acuator relay ground circuit

Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E125	16, 47	Ground	Yes	

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# 16, 47 16, 47 AWFIA0016ZZ

#### Component Inspection

# 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.

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL RR RH ABS SOLE- NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
REAR SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

#### Is the inspection result normal?

YES >> INSPECTION END

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

#### < COMPONENT DIAGNOSIS >

[TYPE 2]

NO >> Go to diagnosis procedure. Refer to <a href="BRC-156">BRC-156</a>, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003081379

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-120</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-121, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# C1121, C1123, C1125, C1127 OUT ABS SOL

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
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-159</u>. "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

#### Diagnosis Procedure

INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

2.check solenoid, vdc switch-over valve and actuator relay power supply circuit

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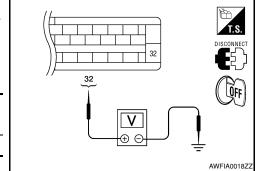
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# < COMPONENT DIAGNOSIS >

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

ABS actuator and electric unit (control unit)		_	Voltage	
Connector	Terminal		voltage	
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# ${f 3.}$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

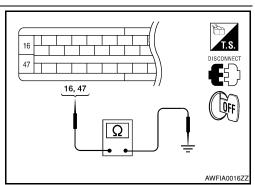
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		_	Continuity	
Connector	Terminal		Continuity	
E125	16, 47	Ground	Yes	

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003081383

**[TYPE 2]** 

# Component Inspection

# 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.

Operation		ABS solenoid valve		ABS solenoid valve (ACT)			
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
HEART OOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

#### Is the inspection result normal?

YES >> INSPECTION END

# C1121, C1123, C1125, C1127 OUT ABS SOL

**[TYPE 2]** < COMPONENT DIAGNOSIS > >> Go to diagnosis procedure. Refer to <u>BRC-159</u>, "<u>Diagnosis Procedure</u>". Α Special Repair Requirement INFOID:00000000003081384 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION В Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-120, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description". C >> GO TO 2 2.calibration of decel g sensor D Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit).

Refer to BRC-121, "CALIBRATION OF DECEL G SENSOR: Description".

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# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

ABS actuator and electric unit (control unit) and ECM exchange the engine signal with CAN communication line.

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2	Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is malfunctioning.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>
C1132	ENGINE SIGNAL 3		
C1133	ENGINE SIGNAL 4		<ul><li>ECM</li><li>CAN communication line</li></ul>
C1136	ENGINE SIGNAL 6		

#### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ENGINE SIGNAL 1
ENGINE SIGNAL 2
ENGINE SIGNAL 3
ENGINE SIGNAL 4
ENGINE SIGNAL 6

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-162">BRC-162</a>, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081387

#### INSPECTION PROCEDURE

#### 1. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-68. "CONSULT-III Function (ENGINE)".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-131, "CONSULT-III</u> Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> INSPECTION END

#### Special Repair Requirement

INFOID:0000000003081388

# ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[TYPE 2]

# $\overline{2}$ .calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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#### C1140 ACTUATOR RLY

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	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	Harness or connector     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
Self-diagnosis results	
ACTUATOR RIV	-
ACTUATOR RLY	

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

YES >> Proceed to diagnosis procedure. Refer to BRC-164, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:0000000003081391

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

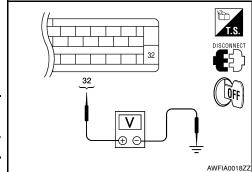
NO >> Poor connection of connector terminal. Repair or replace connector.

# 2.check solenoid, vdc switch-over valve and actuator relay power supply circuit

1. Turn ignition switch OFF.

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

ABS actuator and electric unit (control unit)		_	Voltage
Connector	Terminal		Voltage
E125	32	Ground	Battery voltage



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3. CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACUATOR RELAY GROUND CIRCUIT

#### C1140 ACTUATOR RLY

#### < COMPONENT DIAGNOSIS >

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Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		Continuity
E125	16, 47	Ground	Yes

# 16, 47

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

# Component Inspection

INFOID:0000000003081392

# 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	ON	ON

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-164, "Diagnosis Procedure".

# Special Repair Requirement

INFOID:0000000003081393

# ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "CALIBRATION OF <u>DECEL G SENSOR</u>: <u>Description</u>".

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# 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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	Harness or connector     Steering angle sensor
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	4WAS control unit (4WAS models)     ABS actuator and electric unit (control unit)

#### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

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

YES >> Proceed to diagnosis procedure. Refer to BRC-166, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081401

#### INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Disconnect steering angle sensor connector.
- 4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131, "CONSULT-III Function (ABS)"</u>

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

NO >> Poor connection of connector terminal. Repair or replace connector.

# 2 .CHECK STEERING ANGLE SENSOR HARNESS

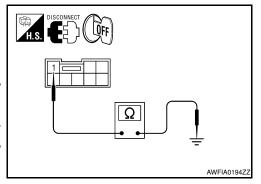
#### C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

1. Turn ignition switch OFF.

- 2. Disconnect steering angle sensor connector.
- Check continuity between steering angle sensor harness connector terminal and ground.

Steering angle sensor			Continuity
Connector	Terminal		Continuity
M47	1	Ground	Yes



4. Turn ignition switch ON.

5. Check voltage between steering angle sensor harness connector terminal and ground.

Steering angle sensor		_	Voltage
Connector	Terminal		voltage
M47	2	Ground	Battery voltage

# DISCONNECT CON AWFIA0195ZZ

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3. CHECK DATA MONITOR

- 1. 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 °
Turn 90 ° to right	Approx. +90 °
Turn 90 ° to left	Approx. –90 °

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

>> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-221, "Removal and Installation".

# Component Inspection

NO

# 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-166</u>, "<u>Diagnosis Procedure</u>".

# Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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# C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

[TYPE 2]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# $2. \hbox{\it calibration of decel $G$ sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

# C1145, C1146 YAW RATE/SIDE G SENSOR

# Diagnosis Procedure

INFOID:0000000003081404

#### **CAUTION:**

Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may cause the yaw rate/side/decel G sensor system to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.

#### INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results
YAW RATE SENSOR
SIDE G-SEN CIRCUIT
G-SENSOR

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#### **CAUTION:**

If vehicle is on turntable 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 turntable or other moving surface, and start engine. Results will return to normal.

Is the above displayed in the self-diagnosis display items?

YES >> GO TO 2.

NO >> Inspection End.

# 2. CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.

Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

# ${f 3}$ . YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

- 1. Turn off the ignition switch.
- Check continuity between the ABS actuator and electric unit (control unit) connector E125 and the yaw rate/side/decel G sensor connector B73.

ABS actuator and electric unit (control unit) harness connector E125	Yaw rate/side/decel G sensor harness connector B73	Continuity
18	2	Yes
19	1	Yes
22	3	Yes
29	5	Yes

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

# 4. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

- 1. Connect the yaw rate/side/decel G sensor connector B73 and ABS actuator and electric unit (control unit) connector E125.
- 2. Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

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Vehicle status	Yaw rate sensor (Data monitor standard)	Side G sensor (Data monitor standard)	Decel G Sensor (Data monitor standard)
When stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.08 G to +0.08 G
Right turn	Negative value	Negative value	-
Left turn	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the yaw rate/side/decel G sensor. Refer to <a href="BRC-221">BRC-221</a>, "Removal and Installation".

#### C1155 BRAKE FLUID LEVEL SWITCH

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.	Harness or connector     Brake fluid level switch     Brake fluid level	_

#### 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 BRC-171, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

**INSPECTION PROCEDURE** 

1. CONNECTOR INSPECTION

- 1. Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

# 2.CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SWITCH AND ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

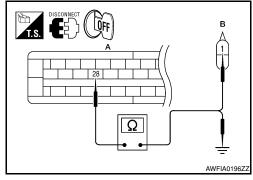
 Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) Terminal 28 and brake fluid level switch harness connector E21 (B) terminal 1.

	and electric unit ol unit)	Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	28	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 (A) Terminal 28 and ground.

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E125 (A)	28	Ground	No

Is the inspection result normal?



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#### < COMPONENT DIAGNOSIS >

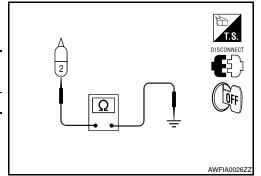
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check brake fluid level switch ground

Check continuity between brake fluid level switch harness connector E21 terminal 2 and ground.

Brake fluid level switch		_	Continuity
Connector	Terminal		Continuity
E21	2	Ground	Yes



#### Is the inspection result normal?

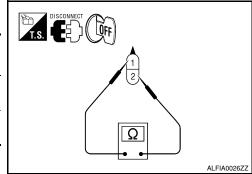
YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

# 4. CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

Brake fluid level switch	Condition	Continuity
Terminal	Condition	
1 – 2	When brake fluid is full in the reservoir tank.	No
	When brake fluid is empty in the reservoir tank.	Yes



#### Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results

appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and <u>Installation"</u>.

>> Replace brake fluid level switch.

# Component Inspection

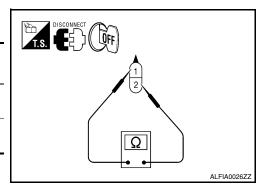
NO

INFOID:0000000003081408

# 1. CHECK BRAKE FLUID LEVEL SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect brake fluid level switch connector.
- 3. Check continuity between brake fluid level switch terminals.

Brake fluid level switch	Condition	Continuity
Terminal	Odridition	
1 – 2	When brake fluid is full in the reservoir tank.	No
	When brake fluid is empty in the reservoir tank.	Yes



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake fluid level switch.

# Special Repair Requirement

INFOID:0000000003081409

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-120</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

#### C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS > [TYPE 2]

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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# C1156 ST ANG SEN COM CIR

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

#### 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 unit (control unit).	Harness or connector     CAN communication line     Steering angle sensor     ABS actuator and electric unit (control unit)	

#### DTC CONFIRMATION PROCEDURE

# 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?

YES >> Proceed to diagnosis procedure. Refer to BRC-174, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081412

#### INSPECTION PROCEDURE

#### 1. CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, 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
ST ANG SEN COM CIR

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

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".

NO >> INSPECTION END

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INFOID:0000000003081415

#### C1160 DECEL G SEN SET

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	Decel G sensor calibration     Yaw rate/side/decel G sensor     ABS actuator and electric unit (control unit)	Е

#### DTC CONFIRMATION PROCEDURE

#### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
DECEL G SEN SET

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-175</u>. "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

#### Diagnosis Procedure

INSPECTION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

Self-diagnosis results
DECEL G SEN SET

NO

Do self-diagnosis results indicate anything other than shown above?

YES >> Perform repair or replacement for the item indicated.

>> Perform calibration of decel G sensor. Refer to <u>BRC-121, "CALIBRATION OF DECEL G SENSOR"</u>: Description", GO TO 2

# 2.PERFORM SELF-DIAGNOSIS AGAIN

- 1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results.
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis again.

#### Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-221, "Removal and Installation".

NO >> INSPECTION END

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#### C1163 ST ANGLE SEN SAFE

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

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position	

#### DTC CONFIRMATION PROCEDURE

# 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

 Self-diagnosis results
ST ANGL SEN SAFE

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

YES >> Proceed to diagnosis procedure. Refer to BRC-176, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:0000000003081418

#### INSPECTION PROCEDURE

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-120</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

#### Is VDC OFF indicator lamp off?

YES >> INSPECTION END

NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-131, "CON-SULT-III Function (ABS)"</u>.

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# C1164, C1165, C1166, C1167 CV/SV SYSTEM

#### CV1, CV2 (CUT VALVE)

The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

#### SV1, SV2 (SUCTION VALVE)

The suction valve supplies the brake fluid from the master cylinder to the pump, when VDC/TCS is activated.

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1164	CV1	VDC switch-over solenoid valve (CV1) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
C1165	CV2	VDC switch-over solenoid valve (CV2) 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
C1166	SV1	VDC switch-over solenoid valve (SV1) 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)
C1167	SV2	VDC switch-over solenoid valve (SV2) 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
CV1
CV2
SV1
SV2

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

YES >> Proceed to diagnosis procedure. Refer to BRC-177, "Diagnosis Procedure".

NO >> INSPECTION END

# Diagnosis Procedure

INFOID:0000000003081421

# INSPECTION PROCEDURE

# 1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-131</u>. "CONSULT-III Function (ABS)".

#### Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

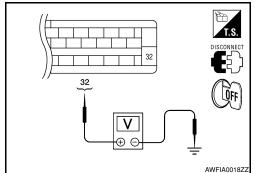
NO >> Poor connection of connector terminal. Repair or replace connector.

**BRC-177** 

# 2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

ABS actuator and ele	ectric unit (control unit)	<u></u>	Voltage	
Connector	Terminal			
E125	32	Ground	Battery voltage	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.check solenoid, vdc switch-over valve and acuator relay ground circuit

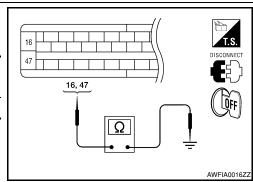
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	ectric unit (control unit)	_	Continuity	
Connector	Terminal			
E125	16, 47	Ground	Yes	

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003081422

# Component Inspection

# 1. CHECK ACTIVE TEST

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

	ABS solenoid valve			ABS solenoid valve (ACT)			
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
TILATI GOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

# C1164, C1165, C1166, C1167 CV/SV SYSTEM

#### **[TYPE 2]** < COMPONENT DIAGNOSIS > Is the inspection result normal? Α >> INSPECTION END YES NO >> Go to diagnosis procedure. Refer to <u>BRC-177</u>, "Diagnosis Procedure". Special Repair Requirement INFOID:0000000003081423 В ${f 1}$ . ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-120, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description". D >> GO TO 2 2. CALIBRATION OF DECEL G SENSOR Е Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit).

Refer to BRC-121, "CALIBRATION OF DECEL G SENSOR: Description".

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#### C1170 VARIANT CODING

< COMPONENT DIAGNOSIS >

[TYPE 2]

# C1170 VARIANT CODING

Diagnosis Procedure

INFOID:0000000003081424

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

**VARIANT CODING** 

Is the above displayed in the self-diagnosis display items?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Inspection End.

[TYPE 2]

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## U1000 CAN COMM CIRCUIT

Description INFOID:0000000003081435

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:0000000003081436

#### 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.	

## Diagnosis Procedure

INFOID:0000000003081437

INFOID:0000000003081438

#### INSPECTION PROCEDURE

## 1. CHECK CONNECTOR

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

#### Is "CAN COMM CIRCUIT" displayed in self-diagnosis display items?

>> Print out the self-diagnostic results, and refer to LAN-14. "Trouble Diagnosis Flow Chart",

NO >> Connector terminal is loose, damaged, open, or shorted.

## Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-120, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description".

>> GO TO 2

## 2.calibration of decel G sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-121, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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## **VDC OFF SWITCH**

Description INFOID:0000000003081439

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

## Component Function Check

INFOID:0000000003081440

## 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 <a href="BRC-182">BRC-182</a>. "Diagnosis Procedure".

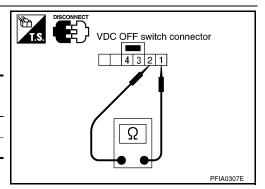
## Diagnosis Procedure

INFOID:0000000003081441

## 1. CHECK VDC OFF SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

VDC OFF switch	Condition	Continuity	
Terminal	Condition	Continuity	
1 – 2	When VDC OFF switch is pressed.	Yes	
1 – 2	When VDC OFF switch is released.	No	



#### Is the inspection result normal?

YES >> GO TO 2

NO >> Replace VDC OFF switch.

## 2. CHECK VDC OFF SWITCH HARNESS

- Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.

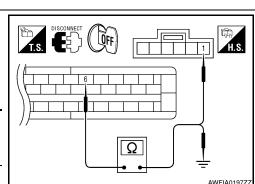
ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	6	M154 (B)	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 6 and ground.

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal	_	Continuity
E125 (A)	6	Ground	No

#### Is the inspection result normal?

YES >> GO TO 3



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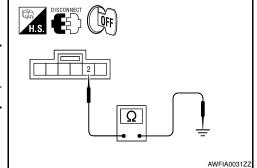
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NO >> Repair or replace harness.

# 3. CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 and ground.

VDC OFF switch			Continuity
Connector	Terminal	— Continuity	Continuity
M154	2	Ground	Yes



#### Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

## 4. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

## Component Inspection

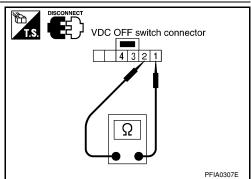
INFOID:0000000003081442

#### INSPECTION PROCEDURE

## 1. CHECK VDC OFF SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

VDC OFF switch	Condition	Continuity
Terminal	Condition	
1 – 2	When VDC OFF switch is pressed.	Yes
1 – 2	When VDC OFF switch is released.	No



#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.

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## **ABS WARNING LAMP**

×: ON -: OFF

Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

## Component Function Check

INFOID:0000000003081444

## 1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

## Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <a href="BRC-184">BRC-184</a>. "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003081445

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-131, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90. "Removal and Installation".

**[TYPE 2]** 

## **BRAKE WARNING LAMP**

Description INFOID:0000000003081446

×: ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (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:0000000003081447

INFOID:0000000003081448

1.BRAKE WARNING LAMP OPERATION CHECK

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-185</u>, "<u>Diagnosis Procedure</u>".

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

## Diagnosis Procedure

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis.

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-218, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation". **BRC** 

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## VDC OFF INDICATOR LAMP

×: ON –: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

## Component Function Check

INFOID:0000000003081450

## 1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <a href="BRC-186">BRC-186</a>, "Diagnosis Procedure".

## 2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Check VDC OFF switch. Refer to <a href="BRC-182">BRC-182</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003081451

## 1. CHECK VDC OFF SWITCH

Check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly when operating the VDC OFF switch.

#### Is the inspection result normal?

YES >> GO TO 2

NO >> Check VDC OFF switch. Refer to BRC-182, "Diagnosis Procedure".

#### 2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-218">BRC-218</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

[TYPE 2]

## SLIP INDICATOR LAMP

×: ON –: OFF

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Condition	SLIP indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

## Component Function Check

INFOID:0000000003081453

## 1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <a href="BRC-187">BRC-187</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000003081454

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

#### 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 MWI-23, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-218, "Removal and Installation".</u>

NO >> Replace combination meter. Refer to MWI-90, "Removal and Installation".

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## **APPLICATION NOTICE**

< ECU DIAGNOSIS > [TYPE 2]

# **ECU DIAGNOSIS**

# **APPLICATION NOTICE**

Application Notice

Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

INFOID:0000000003081455

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

**[TYPE 2]** < ECU DIAGNOSIS >

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value INFOID:0000000003081456

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#### 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	
		0 [km/h (MPH)]	Vehicle stopped	
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	

		Condition	normal operation	
		0 [km/h (MPH)]	Vehicle stopped	=
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	Е
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	BRC
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	G
		0 [km/h (MPH)]	Vehicle stopped	_
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	- H
STOP LAMP SW	Stop Jamp switch signal status	When brake pedal is depressed	ON	-
STOP LAWIF SW	Stop lamp switch signal status	When brake pedal is released	OFF	- 1
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	J
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5	K
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D	L
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	M
OFF 5W	VDC OFF SWILCH ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	- N
VAM DATE CEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s	- 11
YAW RATE SEN	sensor	When vehicle turning	-75 to 75 d/s	_
ACCEL BOS SIC	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	0
ACCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %	P
		Vehicle stopped	Approx. 0 m/s <sup>2</sup>	= .
SIDE G-SENSOR	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> )	_

< ECU DIAGNOSIS > [TYPE 2]

		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation		
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°		
31h ANGLE 3IG	sensor	Steering wheel turned	–720 to 720°		
		With engine stopped	0 rpm		
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachometer display		
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	ON		
T LOID LLV SVV	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF		
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
FR REIN SOL	Operation status of each solellold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
TH HI OUT SOL	Operation status of each solellold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
THEITIN GOL	Operation status of each solelloid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
ED LILOUT COL	On cratical status of each coloneid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
FR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
DD DLUN COL		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
RR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
RR RH OUT SOL	Operation status of each calculation	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
III NII OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
RR LH IN SOL	Operation status of each calencid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
NA LA IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > (TYPE 2)

	<b>-</b>	Data monitor	T	
Monitor item	Display content	Condition	Reference value in normal operation	
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
III EII OOI GOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON	
WOTOTTTLEAT	Motor and motor relay operation	When the motor relay and motor are not operating	OFF	
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON	
ROTORIONTILI	Actuator relay operation	When the actuator relay is not operating	OFF	
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON	
ADO WALIN LAWE	(Note 2)	When ABS warning lamp is OFF	OFF	
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON	
ZI F LAWIF	(Note 2)	When VDC OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
DLIF LAWIF	(Note 2)	When SLIP indicator lamp is OFF	OFF	
WD FAIL REQ	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON	
		When transfer control unit is normal	OFF	
BD SIGNAL	EBD operation	EBD is active	ON	
DD SIGNAL	LDD operation	EBD is inactive	OFF	
ABS SIGNAL	ABS operation	ABS is active	ON	
(DO OIGIVAE	Abo operation	ABS is inactive	OFF	
CS SIGNAL	TCS operation	TCS is active	ON	
OO OIGIWAE	100 operation	TCS is inactive	OFF	
/DC SIGNAL	VDC operation	VDC is active	ON	
DO GIGITALE	VDG operation	VDC is inactive	OFF	
BD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON	
DD I AIL OIG	LDD Idii Galo Signal	EBD is normal	OFF	
BS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON	
	ian sare digital	ABS is normal	OFF	
CS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON	
5517.112 010	. Co ian care digital	TCS is normal	OFF	
/DC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	ON	
2317112 010	120 Idii dalo digilal	VDC is normal	OFF	
RANKING SIG	Crank operation	Crank is active	ON	
	- am operation	Crank is inactive	OFF	
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	

## **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

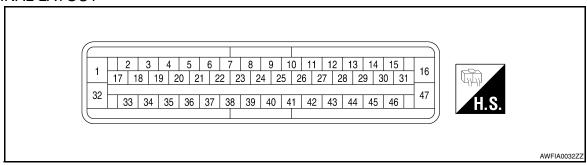
< ECU DIAGNOSIS > [TYPE 2]

-		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
SV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
SV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON
LDD WAITIN LAWI	(Note 3)	When EBD warning lamp is OFF	OFF
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	ON
N I OSI SIG	1 141 Switch Signal Oly/Ol 1 Condition	A/T shift position = other than N position	OFF
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	ON
1 1 031 310	1 NI SWILCH SIGNAL ON/OFF CONUMENT	A/T shift position = other than P position	OFF
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	ON
111 001010	1 N. Switch Signal ON/OFF Condition	A/T shift position = other than R position	OFF
2WD/4WD	Drive axle	2WD model	2WD
2 V V D/4 V V D	Dilve axie	4WD model	4WD

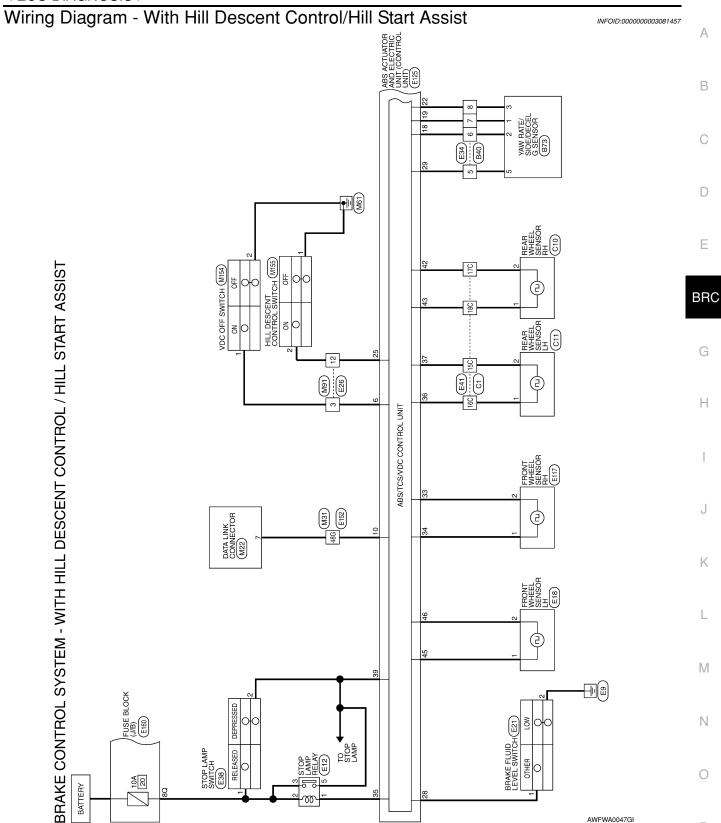
#### NOTE:

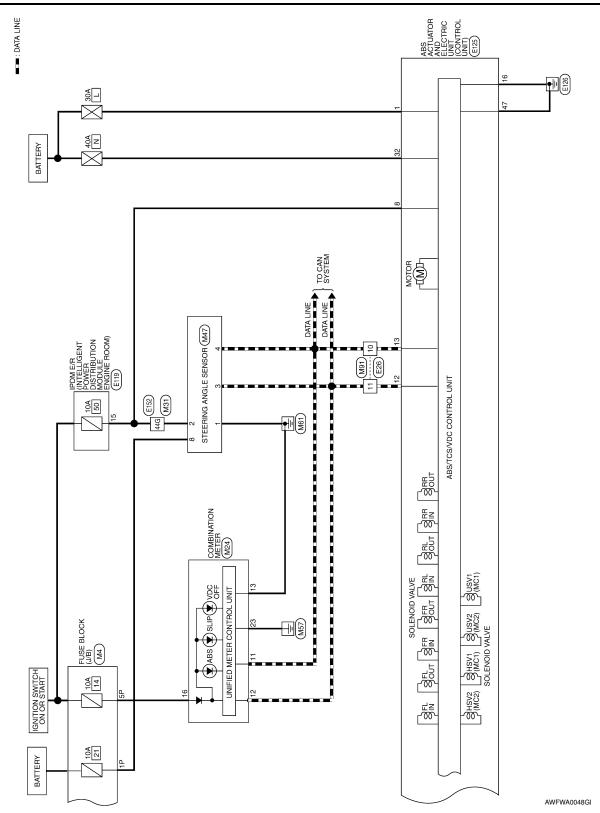
- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-184, "Description".
- Brake warning lamp: Refer to BRC-185, "Description".
- VDC OFF indicator lamp: Refer to BRC-186, "Description".
- SLIP indicator lamp: Refer to BRC-187, "Description".

#### TERMINAL LAYOUT



< ECU DIAGNOSIS > [TYPE 2]





# ASSIST

ASSI	M24
ILL START	Connector No.
TROL/H	
SCENT CON	
	M22
S - WITH H	Connector No.
ECTOR!	
AKE CONTROL SYSTEM CONNECTORS - WITH HILL DESCENT CONTROL/HILL START ASSI	
ITROL	o. M4
AKE CON	Connector No
BR/	

Connector No.	M22
Connector Name	Connector Name DATA LINK CONNECTO
Connector Color WHITE	WHITE

Connector Name FUSE BLOCK (J/B)

Connector Color WHITE

Connector No. M22	Connector Name DATA LINK CONNECTOR	Connector Color WHITE
-------------------	------------------------------------	-----------------------

Connector Name | COMBINATION METER

Connector Color WHITE



7P 6P 5P 4P 3P 1P 1P 1P 1P 8P

erminal No. Wire 7 W			
erminal No.	Color of Wire	Μ	
	Terminal No.	7	

Signal Name

1

Signal Name	ı	ı
Color of Wire	R/B	W/G
Terminal No.	11	5P

Signal Name	CAN-L	CAN-H	GROUND	RUN START	GND (POWER)
Color of Wire	a.		GR	W/G	В
Terminal No. Wire	=	12	13	16	23

			Connector Name   STEERING ANGLE SENSOR
GND (POWER)		M47	STEERING A
Ω.			Name
23		Connector No.	Connector

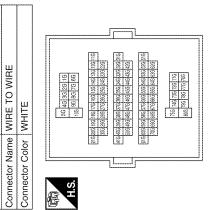
Connector No.	M47
Connector Name	Sonnector Name STEERING ANGLE
Connector Color WHITE	WHITE

<u>п</u>	2 1	Signal Name	GND	POWER	CAN-H	CAN-L	BATT
5	3 4 4	Color of Wire	83	W/R	٦	Р	Ж
	H.S.	Terminal No.	٣	2	8	4	8
		Mills.    Salar   Sala		1	1-		1 1 1

Signal Name	and .	1	
Color of Wire	W/R	8	
0.			

M31

Connector No.



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	Name HILL DESCENT CONTROL SWITCH CONTROL SWITCH Solor   WHITE    S
PES(	
M155 9 HILL DESCENT CONTROL SWITCH WHITE	
M155 9 HILL DESCENT CONTROL SWITCH WHITE	
M155  HILL DESCENT CONTROL SWITCH	WHITE
M155	HILL DESCENT CONTROL SWITCH

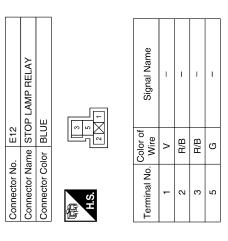
	Signal Name	-	ı
9	Color of Wire	В	Υ
H.S.	Terminal No.	1	2

	BRAKE FLUID LEVEL SWITCH	,		Signal Name	I	-
. E21		lor GRAY	(- N)	Color of Wire	SB	В
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	٥
					•	

Connector No.	M154	
Connector Name   VDC OFF SWITCH	me VDC (	DFF SWITCH
Connector Color	lor GRAY	
H.S.	6 5 4	3 2 1
Terminal No.	Color of Wire	Signal Name
1	В	-
2	В	_

FRONI WHEEL SENSOR LH
GRAY
[ <del>2</del> ]
Color of Signal Name
ı
ı

Connector No.	o. M91	
Connector Name		WIRE TO WIRE
Connector Color WHITE	olor WH	IIE
晋	9 ;	3 2
S.H.S.	16 15 14 1.	8 8 01 11 21 51
Terminal No.	Color of Wire	Signal Name
က	GR	ı
10	۵	ı
11	٦	I
12	>	ı



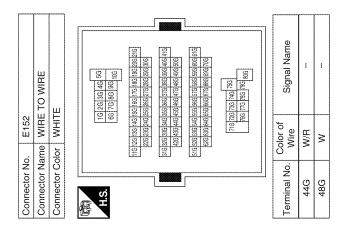
AWFIA0176GB

# **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

[TYPE 2] < ECU DIAGNOSIS >

	Α
STOP LAMP SWITCH WHITE  or of Signal Name  fire	В
### STOP LAMP S\(\text{Stgna}\) white \(\text{Stgna}\) \(\text{Stgna}\) \(\text{V}\) \(\text{Y}\) \(MDM ER (INTE POWER DISTR POWER D	С
	D
Connector No. Connector No. Connector No. Connector No. Connector No. Connector No. Connector Name Connector No. Terminal	Е
	BRC
WHITE  WHITE  WHITE  Or of Signal Name  FRONT WHEEL SENSOR RH  GRAY  Or of Signal Name  """  """  """  """  """  """  """	G
WHITE  WIRE TO WIRE  WHITE  Or of Signa  I've  A  N  N  N  N  N  N  N  N  N  N  N  N	Н
ame Olor Color Col	I
Connector Nar Connector Col Connector Nar Connector Col S	J
	K
Signal Name  Signal Name  Signal Name  Signal Name	L
F26   WHRE T   WHRE	M
Connector Nome V Connector Name V Connector Name V Connector Name V V VIII 11 L L L L L L L L L L L L L L L L L	Ν
Conne Conne Conne Lis H.S. H.S. H.S. H.S. H.S. H.S. H.S. L.S. H.S. H	0

**BRC-197** 



Signal Name	***	I	HDC_SW	1	and the same of th	FLUID LEVEL SW	CLUS_GND	ı	1	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	STOP LAMP SW ON	RR_LH_PWR	RR_LH_SIG	ı	STOP LAMP SW	-	l	RR_RH_SIG	RR_RH_PWR	I	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	1	ı	>	1	ı	GR	BB	1	1	>	≯	8	^	٦	Ф	-	SB	1	ı	^	LG	ı	G	α	В
Terminal No.	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

Connector No.	E125
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color BLACK	BLACK

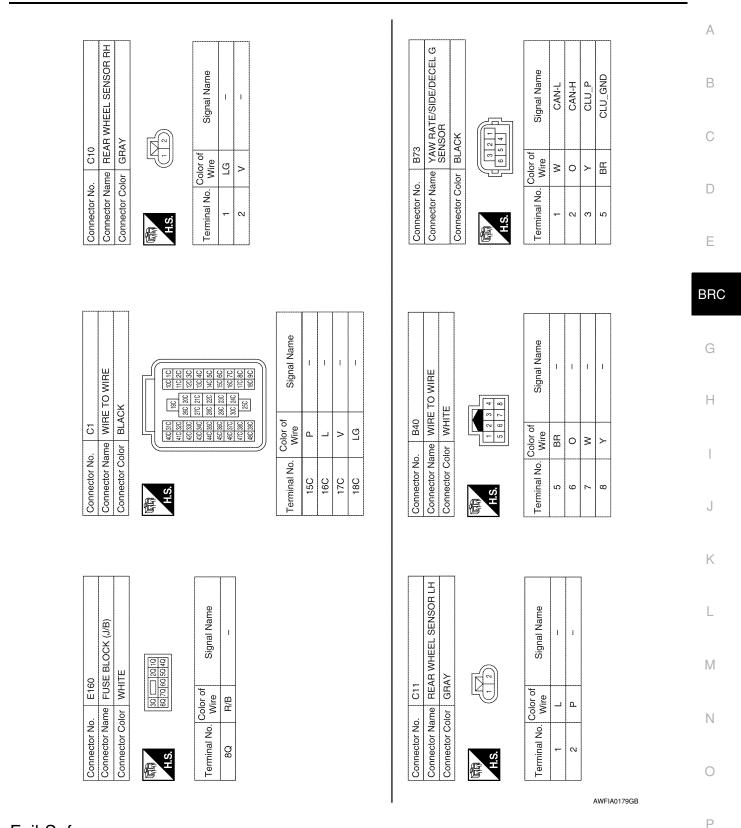


	Color of	
Terminal No.	Wire	Signal Name
<b></b>	Œ	MOTOR SUPPLY
2	ı	ı
က	-	1
4	-	ı
5	ı	l
9	GR	VDC OFF SW
7	1	3
80	W/R	IGN
6	ı	I
10	SB	DIAG-K
11		100
12	1	CAN-H
13	α.	CAN-L
14	ı	l
15	1	***
16	В	VALVE ECU GND
17	I	-
18	0	CAN2-H
19	>	CAN2-L
20	unne	and a
21	ı	ı
22	>	CLUS_SUP

AWFIA0178GB

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 2]



Fail-Safe

#### **CAUTION:**

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

ABS/EBD SYSTEM

INFOID:0000000003081458

< ECU DIAGNOSIS > [TYPE 2]

In case of an electrical malfunction with the ABS, the ABS warning lamp, VDC OFF indicator 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, VDC OFF indicator 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/VDC 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/VDC or EBD system.

#### VDC/TCS SYSTEM

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

DTC No. Index

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		
C1102	RR LH SENSOR-1	DDC 107 IIDaaasistiaali	
C1103	FR RH SENSOR-1	BRC-137, "Description"	
C1104	FR LH SENSOR-1		
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2	DDC 440 IID foto-II	
C1107	FR RH SENSOR-2	BRC-140, "Description"	
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-143, "Description"	
C1110	CONTROLLER FAILURE	BRC-145, "DTC Logic"	
C1111	PUMP MOTOR	BRC-146, "Description"	
C1113	G-SENSOR	BRC-148, "Description"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-151, "Description"	
C1116	STOP LAMP SW	BRC-154, "Description"	
C1120	FR LH IN ABS SOL	BRC-156, "Description"	
C1121	FR LH OUT ABS SOL	BRC-159, "Description"	
C1122	FR RH IN ABS SOL	BRC-156, "Description"	
C1123	FR RH OUT ABS SOL	BRC-159, "Description"	
C1124	RR LH IN ABS SOL	BRC-156, "Description"	
C1125	RR LH OUT ABS SOL	BRC-159, "Description"	
C1126	RR RH IN ABS SOL	BRC-156, "Description"	
C1127	RR RH OUT ABS SOL	BRC-159, "Description"	
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-162, "Description"	
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		
C1140	ACTUATOR RLY	BRC-164, "Description"	
C1143	ST ANG SEN CIRCUIT	DDO 400 IID II	
C1144	ST ANG SEN SIGNAL	BRC-166, "Description"	

# **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

< ECU DIAGNOSIS > [TYPE 2]

DTC	Items (CONSULT screen terms)	Reference
C1145	YAW RATE SENSOR	BRC-148, "Description"
C1146	SIDE G-SEN CIRCUIT	Bito-140, Description
C1155	BR FLUID LEVEL LOW	BRC-171, "Description"
C1156	ST ANG SEN COM CIR	BRC-174, "Description"
C1160	DECEL G SEN SET	BRC-175, "Description"
C1163	ST ANGL SEN SAFE	BRC-176, "Description"
C1164	CV1	
C1165	CV2	BRC-177, "Description"
C1166	SV1	Bhc-177, Description
C1167	SV2	
C1170	VARIANT CODING	BRC-145, "DTC Logic"
U1000	CAN COMM CIRCUIT	BRC-181, "Description"

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# SYMPTOM DIAGNOSIS

# **APPLICATION NOTICE**

**Application Notice** 

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Service information	Remarks
TYPE 1	VDC/TCS/ABS
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

## 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 frequency	Looseness of front and rear axle	BRC-204, "Diag- nosis Procedure"	
quantity	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-205, "Diag-	
onexpected 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-206, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-207, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-208, "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 control	ТСМ	BRC-209, "Diag- nosis Procedure"	
	ECM	<u></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. 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]

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**[TYPE 2]** 

## **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

## Diagnosis Procedure

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## 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-5</u>, "<u>On-Vehicle Inspection and Service</u>", Rear: <u>RAX-8</u>, "<u>Rear Axle Bearing</u>" (C200) or <u>RAX-20</u>, "<u>Rear Axle Bearing</u>" (M226).

#### 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. Refer to <u>BRC-216</u>, "Removal and Installation".

· 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 ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to <u>BRC-131</u>, "CONSULT-III Function (ABS)".

NO >> Normal

## **UNEXPECTED PEDAL REACTION**

## Diagnosis Procedure

INFOID:0000000003081463

## 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-7, "Inspection and Adjustment".

#### Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-10, "Bleeding Brake System".
  - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-7</u>, "<u>Inspection and Adjustment</u>" (brake pedal), <u>BR-32</u>, "<u>Disassembly</u> and <u>Assembly</u>" (master cylinder), <u>BR-24</u>, "<u>Removal and Installation</u>" (brake booster).

NO >> GO TO 2

## 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.

#### Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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#### THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

DIAGNOSIS > [TYPE 2]

## THE BRAKING DISTANCE IS LONG

## Diagnosis Procedure

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#### **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 >> Normal

NO >> Check brake system.

**ABS FUNCTION DOES NOT OPERATE [TYPE 2]** < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000003081465 **CAUTION:** В ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1. CHECK ABS WARNING LAMP DISPLAY C Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal? YES >> Normal  $\square$ >> Perform self-diagnosis. Refer to BRC-131, "CONSULT-III Function (ABS)". NO Е BRC G Н

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< SYMPTOM DIAGNOSIS >

[TYPE 2]

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## 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. 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 that there are pedal vibrations when the engine is started.

#### Do vibrations occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

## 2.SYMPTOM CHECK 2

Check that there are ABS operation noises when the engine is started.

#### Do the operation noises occur?

YES >> GO TO 3

NO >> Perform self -diagnosis. Refer to <u>BRC-131, "CONSULT-III Function (ABS)"</u>.

# 3.symptom check ${\mathfrak z}$

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 >> Normal

#### VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

**[TYPE 2]** < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL Α Diagnosis Procedure INFOID:0000000003081467 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 2.CHECK SELF-DIAGNOSIS RESULTS D Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to BRC-131, "CONSULT-III Function (ABS)". Are self-diagnosis results indicated? Е >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. NO >> GO TO 3 BRC 3. CHECK CONNECTOR • Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc. Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis. 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 f 4 . CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS Perform ECM and TCM self-diagnosis. Are self-diagnosis results indicated? YES >> Check the corresponding items. ECM: Refer to <u>EC-68</u>, "<u>CONSULT-III Function (ENGINE)</u>". • TCM: Refer to TM-150, "CONSULT-III Function (TRANSMISSION)". NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-218, "Removal and Installa-K tion". L M Ν

# NORMAL OPERATING CONDITION

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	This is a second second	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	This is a normal condition due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC 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 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 may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).	
The ABS warning lamp, VDC OFF indicator 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	
VDC may not operate normally or the ABS warning lamp, VDC 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).	road. If the normal con- dition is restored, there is no malfunction. At	
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).	that time, erase the self diagnosis memory.	
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 VDC/TCS function before performing an inspection on a chassis dynamometer.)	
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 tire.	

< PRECAUTION > [TYPE 2]

## **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.

Precaution for Brake System

#### CAUTION:

- Refer to BR-10, "Drain and Refill" for recommended brake fluid.
- · Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- · Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-13, "Brake Burnishing"</u> (front disc brake) or <u>BR-16, "Brake Burnishing"</u> (rear disc brake).

#### WARNING:

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

#### Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting 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.

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Commercial service tool

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< PRECAUTION > [TYPE 2]

• 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 diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.

- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The
  noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSUT-III and check that VDC OFF indicator turns off. Additionally, perform selfdiagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

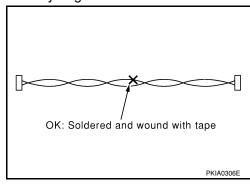
#### NOTE:

VDC OFF indicator lamp is on when VDC OFF switch is on.

## Precaution for CAN System

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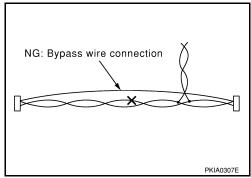
- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape.
   Make sure that fraying of twisted wire is within 110 mm (4.33 in).



## **PRECAUTIONS**

< PRECAUTION > [TYPE 2]

 Do not make a bypass connection to repaired area. (If the circuit is bypassed, characteristics of twisted wire will be lost.)



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< PREPARATION > [TYPE 2]

# **PREPARATION**

## **PREPARATION**

# Special Service Tool

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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
KV991J0080 (J-45741) ABS active wheel sensor tester	J-45741-BOX  O O O O O O O O O O O O O O O O O O	Checking operation of ABS active wheel sensors
ST30031000 ( — ) Bearing puller	ZZA0700D	Removing sensor rotor
ST30720000 (J-25405) Drift	a b ZZA0701D	Installing rear sensor rotor a: 77 mm (0.03 in) dia. b: 55 mm (2.17 in) dia.
ST27863000 ( — ) Drift	a b b b	Installing rear sensor rotor a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.
KV40104710 ( — ) Drift	a b b J	Installing rear sensor rotor a: 76 mm (2.99 in) dia. b: 68.5 mm (2.697 in) dia.

## **PREPARATION**

< PREPARATION > [TYPE 2]

# Commercial Service Tool

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Tool name		Description	
Flare nut crowfoot     Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)	В
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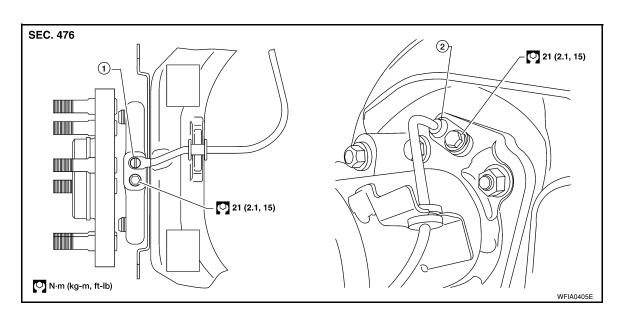
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# REMOVAL AND INSTALLATION

## WHEEL SENSORS

## Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor

#### **REMOVAL**

- 1. Remove wheel sensor bolt.
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to BR-28, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

#### **CAUTION:**

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

#### INSTALLATION

- Before installing wheel sensors,
- Inspect wheel sensor assembly and replace if damaged.
- Clean wheel sensor hole and mating surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- Install a new wheel sensor O-ring, then apply a coat of suitable grease to the O-ring and sensor hole. Refer to MA-10.
- Installation is in the reverse order of removal.

## SENSOR ROTOR

## Removal and Installation

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#### **FRONT**

The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to <u>FAX-8</u>, "Removal and Installation".

**REAR** 

Removal

#### NOTE:

It is necessary to disassemble the rear axle to replace the sensor rotor.

- 1. Remove axle shaft assembly. Refer to <u>RAX-9, "Removal and Installation"</u> (C200), or <u>RAX-21, "Removal and Installation"</u> (M226).
- 2. Pull the sensor rotor of off the axle shaft using Tool and a press.

Tool number : ST30031000 ( — )

#### Installation

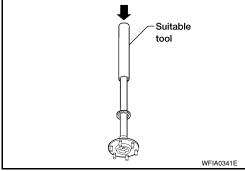
 Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated. CAUTION:

Do not reuse the old sensor rotor.

Install axle shaft assembly. Refer to <u>RAX-9</u>, "<u>Removal and Installation</u>" (C200), or <u>RAX-21</u>, "<u>Removal and Installation</u>" (M226).

#### **CAUTION:**

Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.



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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

#### Removal and Installation

- 1. To rear left
- 4. To front right
- 7. ABS actuator and electric unit (control unit) 8.
- 10. Collar

- 2. To rear right
- From the master cylinder secondary 6. side
- 8. Harness connector
- To front left
- From the master cylinder primary side
- 9. Grommet

#### **REMOVAL**

- 1. Disconnect the negative battery terminal.
- 2. Drain the brake fluid. Refer to BR-10, "Drain and Refill".
- Disconnect the actuator harness from the ABS actuator and electric unit (control unit).
  - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
  - Be careful not to splash brake fluid on painted areas.
- 4. Disconnect the brake tubes.
- 5. Remove three bolts and then the ABS actuator and electric unit (control unit).

#### INSTALLATION

Installation is in the reverse order of removal.

#### **CAUTION:**

To install, use a flare nut wrench (commercial service tool).

- Always tighten brake tubes to specification when installing. Refer to BR-19.
- Never reuse drained brake fluid.

## **ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)**

< REMOVAL AND INSTALLATION >

[TYPE 2]

 After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-10, "Bleeding Brake System"</u>.
 NOTE:

If the ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

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[TYPE 2]

## STEERING ANGLE SENSOR

#### Removal and Installation

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#### **REMOVAL**

- 1. Remove the spiral cable. Refer to SR-6, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor.

#### **CAUTION:**

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 <a href="https://example.com/BRC-120">BRC-120</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

#### **INSTALLATION**

1. Installation is in the reverse order of removal.

# **G** SENSOR

#### Removal and Installation

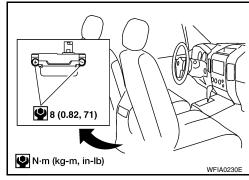
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#### **REMOVAL**

- 1. Remove center console. Refer to IP-10, "Exploded View".
- 2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
  - The location of the sensor is the same for all models.

#### **CAUTION:**

- Do not use power tools to remove or install yaw rate/side/ decel G sensor.
- Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



#### **INSTALLATION**

Installation is in the reverse order of removal.

#### NOTE:

After performing the above work, calibrate the decel G sensor settings of the yaw rate/side/decel G sensor. Refer to <a href="https://example.com/BRC-121">BRC-121</a>, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement".

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