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### **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

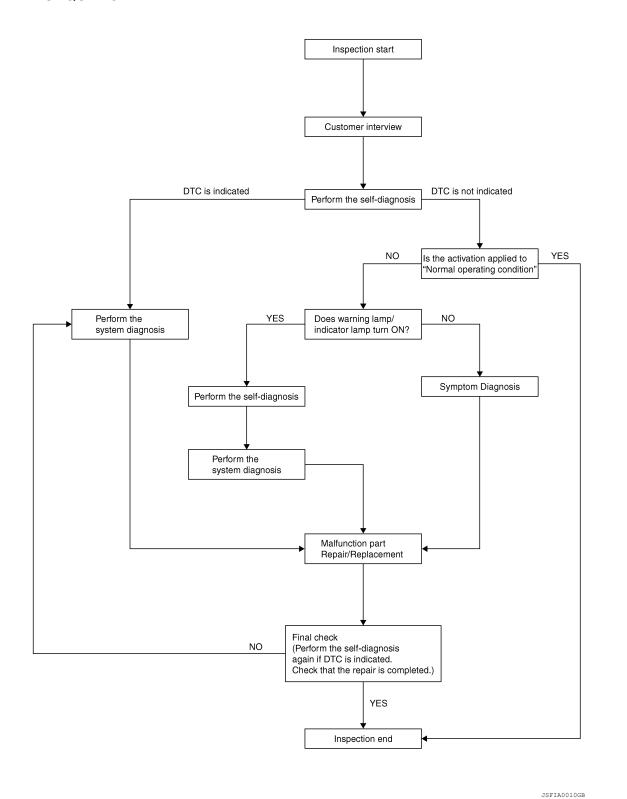
Work Flow

#### PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) 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".

**[TYPE 1]** < BASIC INSPECTION >

**OVERALL SEQUENCE** 



**DETAILED FLOW** 

## 1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis work sheet. Refer to BRC-11, "Diagnostic Work Sheet".

>> GO TO 2

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

< BASIC INSPECTION > [TYPE 1]

## 2.perform the self-diagnosis

Check the DTC display with the self-diagnosis function. Refer to BRC-29, "CONSULT 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-88, "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-107</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-78, "Description".
- Brake warning lamp: Refer to BRC-79, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-80, "Description"</u>.
- SLIP indicator lamp: Refer to BRC-82, "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-29</u>, "CONSULT Function (ABS)".

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

YES >> Inspection End

NO >> GO TO 3

## **DIAGNOSIS AND REPAIR WORKFLOW**

[TYPE 1] < BASIC INSPECTION >

Customer name MR/MS	Model &Year		VIN		
Engline #	Trans.		Mileage		
Incident Date	Manuf. Date		In Service Date	e	
Symptoms	□ Noise and vibration (from engine compartment) □ Noise and vibration (from axle)	☐ Warning/Indicator activate		Firm pedal operation Large stroke pedal operation	
	☐ TCS dose not work (Drive wheels slip when accelerating)	ABS dose not work (Wheels lock wher braking)		□ lack of sense of acceleration	
Engine conditions	☐ When starting ☐ After starting	<b>I</b>		<u> </u>	
Road conditions	□ Low friction road (□ Snow □ Gr	ravel  Other )			
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 ki ☐ Vehicle speed: 10 km/h (6 MPH) ☐ Vehicle is stopped				
Applying brake conditions	☐ Suddenly ☐ Gradually				
Other conditions	☐ Operation of electrical equipment☐ Shift change☐ Other descriptions	t			
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< BASIC INSPECTION > [TYPE 1]

## 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

## 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 <a href="BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION:

INFOID:0000000011067958

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

x: 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	×
Battery disconnection	×

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

## ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

Revision: August 2014 BRC-12 2015 Xterra

< BASIC INSPECTION >	[111 = 1]
>> GO TO 2	
2.PERFORM THE NEUTRAL POSITION ADJUSTME	NT FOR THE STEERING ANGLE SENSOR
	RT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
Do not touch steering wheel while adjusting storage 3. After approximately 10 seconds, touch "END".  NOTE:	eering angle sensor.
After approximately 60 seconds, it ends automaticates.  4. Turn ignition switch OFF, then turn it ON again.  CAUTION:	ally.
Be sure to perform above operation.	
>> GO TO 3	
3.CHECK DATA MONITOR	
Run vehicle with front wheels in straight-ahead post	sition then ston
<ol> <li>Select "DATA MONITOR". Then make sure "STR A</li> </ol>	
Is the steering angle within the specified range?	
YES >> GO TO 4	without a spinor and a spinor spinor CO TO 4
NO >> Perform the neutral position adjustment for 4.ERASE THE SELF-DIAGNOSIS MEMORY	rine steering angle sensor again, GO TO 1
Erase the self-diagnosis memory of the ABS actuator a • ABS actuator and electric unit (control unit): Refer to	and electric unit (control unit) and ECM. BRC-29 "CONSULT Function (ABS)"
• ECM: Refer to EC-53, "CONSULT Function".	<u>Sito 20, Gontoger Panalan (1120)</u> .
Are the memories erased?	
YES >> Inspection End	
NO >> Check the items indicated by the self-diagram CALIBRATION OF DECEL G SENSOR	10SIS.
CALIBRATION OF DECEL G SENSOR : D	Description INFOID:0000000011067960
Refer to the table below to determine if calibration of th	le decel G sensor is required.
	×: Required –: Not required
Situation	Calibration of decel G sensor
Removing/Installing ABS actuator and electric unit (control unit)	<del>-</del>
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering components	
Replacing steering components	_
Removing/Installing suspension components	_
Replacing suspension components	<del>-</del>
Change tires to new ones	_

CALIBRATION OF DECEL G SENSOR: Special Repair Requirement

INFOID:0000000011067961

×

#### CALIBRATION OF DECEL G SENSOR

Removing/Installing yaw rate/side/decel G sensor

Replacing yaw rate/side/decel G sensor

#### **CAUTION:**

Tire rotation

Adjusting wheel alignment

To calibrate the decel G sensor, make sure to use CONSULT

**BRC-13 Revision: August 2014** 2015 Xterra

#### **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION > [TYPE 1]

#### (Calibration cannot be done without CONSULT)

### 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 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.
- Select "DATA MONITOR". Then make sure "DECEL G-SEN" is within ±0.08G.

#### 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 <u>BRC-29</u>, "CONSULT Function (ABS)".
- ECM: Refer to EC-53, "CONSULT Function".

#### Are the memories erased?

YES >> Inspection End

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

### **APPLICATION NOTICE**

< SYSTEM DESCRIPTION > [TYPE 1]

## SYSTEM DESCRIPTION

## **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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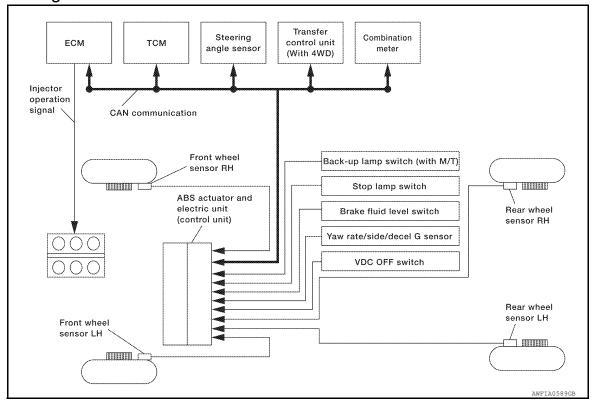
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#### VDC

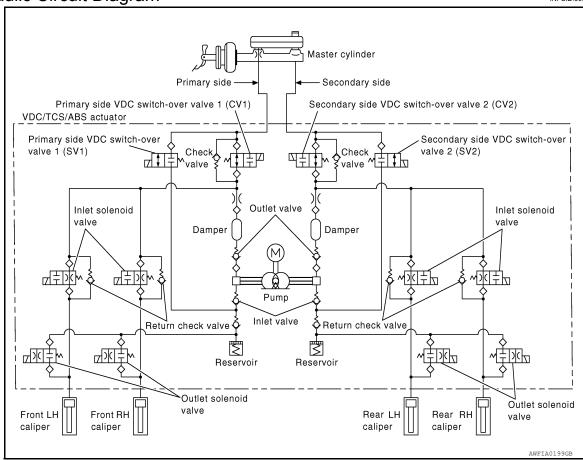
## System Diagram





## Hydraulic Circuit Diagram





#### [TYPE 1]

## **System Description**

INFOID:0000000011067965

- 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 is available.

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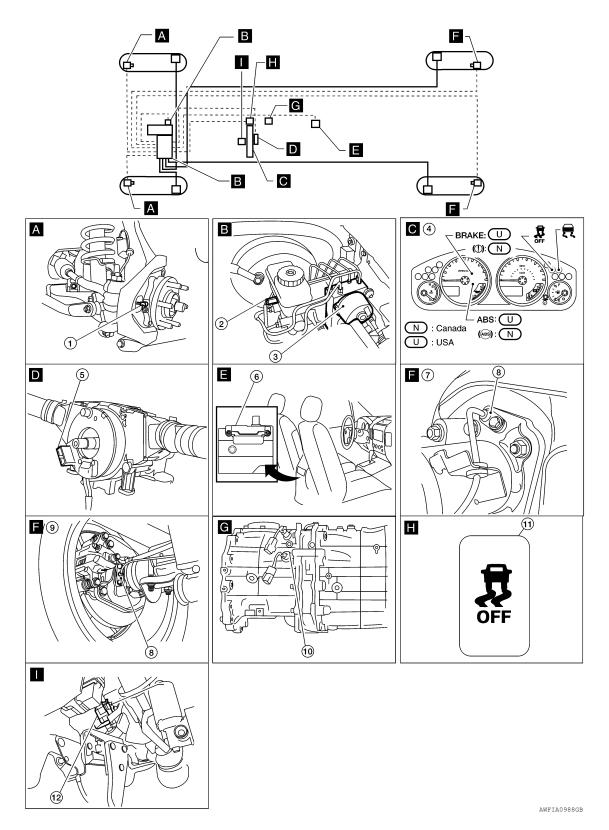
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## **Component Parts Location**



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. 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

< SYSTEM DESCRIPTION > [TYPE 1]

. M226 rear axle 8. Rear wheel sensor LH C11 9. C200 rear axle Rear wheel sensor RH C10

10. Back-up lamp switch F6911. VDC OFF switch M15412. Stop lamp switch E38 (with M/T) Stop lamp switch E39 (with A/T)

Component Description

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Component parts		Reference
	Pump	PDC 44 "Description"
	Motor	BRC-44, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"
The detactor and disease and (control and)	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"
Wheel sensor	BRC-48, "Description"	
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-62, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-76, "Description"
ABS warning lamp	BRC-78, "Description"	
Brake warning lamp		BRC-79, "Description"
VDC OFF indicator lamp		BRC-80, "Description"
SLIP indicator lamp		BRC-82, "Description"

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**[TYPE 1]** 

#### TCS

System Diagram

INFOID:0000000011067968 Transfer Steering Combination **ECM** TCM control unit angle sensor meter (With 4WD) Injector operation signal CAN communication Front wheel Back-up lamp switch (with M/T) sensor RH Stop lamp switch ABS actuator and electric unit Rear wheel Brake fluid level switch (control unit) sensor RH Yaw rate/side/decel G sensor VDC OFF switch Rear wheel sensor LH Front wheel sensor LH 

## **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 is available.

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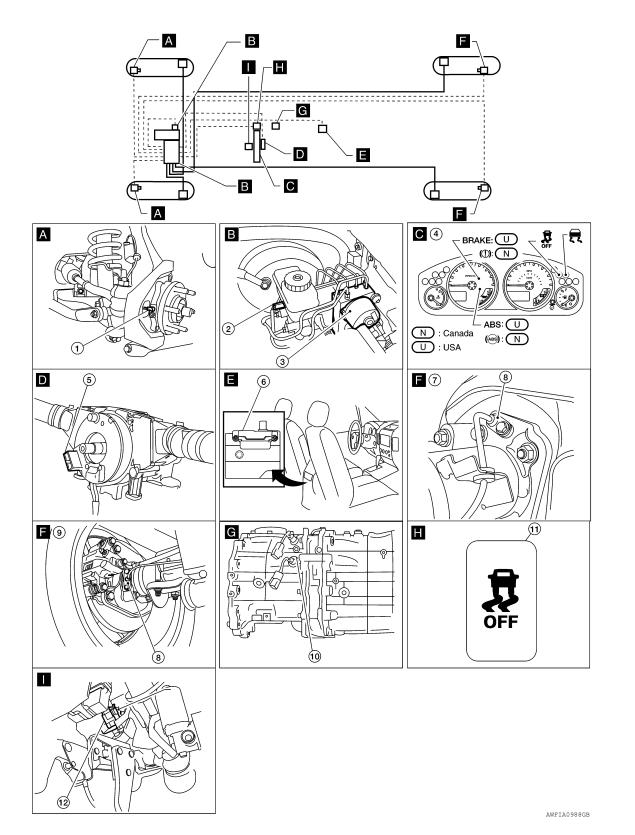
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## **Component Parts Location**



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. 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

7. M226 rear axle 8. Rear wheel sensor LH C11 9. C200 rear axle Rear wheel sensor RH C10

10. Back-up lamp switch F6911. VDC OFF switch M15412. Stop lamp switch E38 (with M/T) Stop lamp switch E39 (with A/T)

## **Component Description**

Component parts		Reference
	Pump	BRC-44, "Description"
	Motor	BRC-44, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"
, and all all all all all all all all all al	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"
Wheel sensor	BRC-48, "Description"	
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-62, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-76, "Description"
ABS warning lamp	BRC-78, "Description"	
Brake warning lamp	BRC-79. "Description"	
VDC OFF indicator lamp		BRC-80, "Description"
SLIP indicator lamp		BRC-82, "Description"

[TYPE 1]

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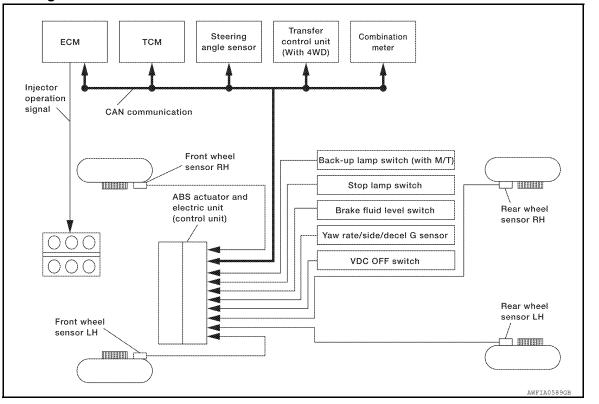
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### **ABS**

System Diagram



## **System Description**

INFOID:0000000011067973

 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 is available.

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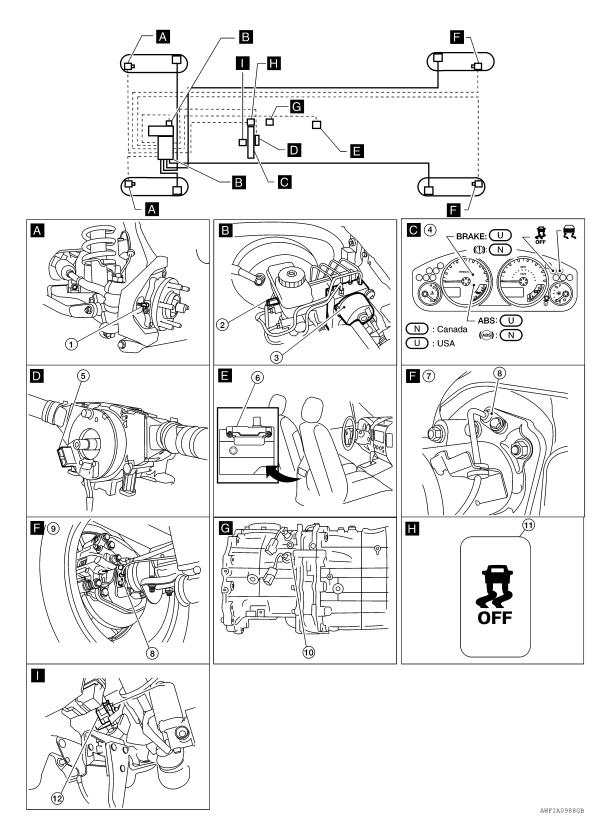
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## **Component Parts Location**



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

< SYSTEM DESCRIPTION >	[TYPE 1]
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M226 rear axleRear wheel sensor LH C11C200 rear axleRear wheel sensor RH C10

10. Back-up lamp switch F69
 11. VDC OFF switch M154
 12. Stop lamp switch E38 (with M/T)
 Stop lamp switch E39 (with A/T)

## **Component Description**

INFOID:0000000011067975

Component parts		Reference
	Pump	DDC 44 "Description"
	Motor	BRC-44, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60. "Description"
The dotate and electric and (control and)	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-62, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-76, "Description"
ABS warning lamp		BRC-78, "Description"
Brake warning lamp		BRC-79, "Description"
VDC OFF indicator lamp		BRC-80, "Description"
SLIP indicator lamp		BRC-82, "Description"

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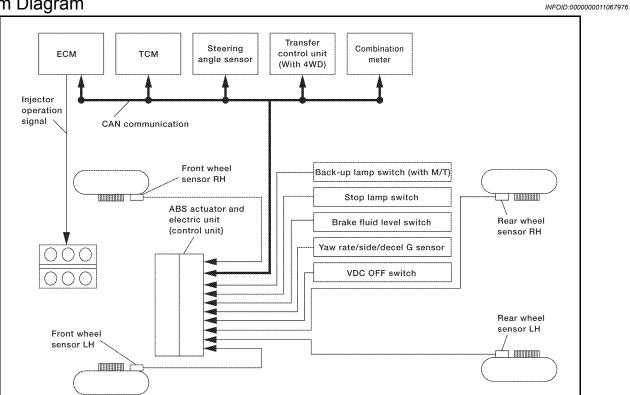
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[TYPE 1]

### **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 is available.

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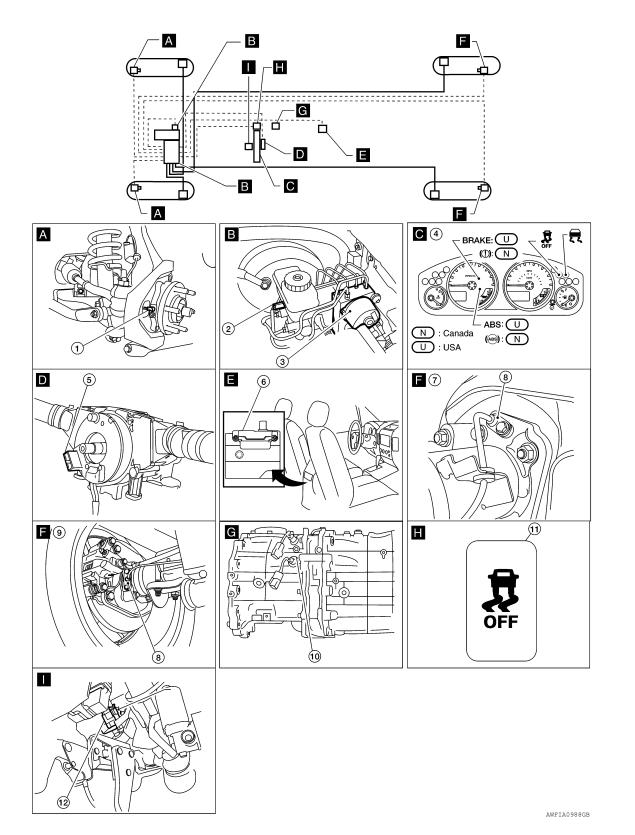
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## **Component Parts Location**

INFOID:0000000011067978



- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. 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

Revision: August 2014 BRC-27 2015 Xterra

C200 rear axle

7. M226 rear axle 8. Rear wheel sensor LH C11

Rear wheel sensor RH C10

10. Back-up lamp switch F6911. VDC OFF switch M15412. Stop lamp switch E38 (with M/T) Stop lamp switch E39 (with A/T)

## **Component Description**

Compo	Component parts	
	Pump	PDC 44 "Description"
	Motor	BRC-44, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"
7 LDG distractor and stocking and (control and)	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-62, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-76, "Description"
ABS warning lamp	BRC-78, "Description"	
Brake warning lamp	BRC-79, "Description"	
VDC OFF indicator lamp		BRC-80, "Description"
SLIP indicator lamp		BRC-82, "Description"

### < SYSTEM DESCRIPTION >

[TYPE 1]

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

**CONSULT Function (ABS)** 

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#### **FUNCTION**

CONSULT can display each diagnostic item using the following direct diagnostic modes.

Direct Diagnostic Mode	Description
ECU Identification	The ABS actuator and electric unit (control unit) part number is displayed.
Self Diagnostic Result	The ABS actuator and electric unit (control unit) self diagnostic results are displayed.
Data Monitor	The ABS actuator and electric unit (control unit) input/output data is displayed in real time
Active Test	The ABS actuator and electric unit (control unit) activates outputs to test components.
Work support	The settings for ABS actuator and electric unit (control unit) functions can be changed.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

#### SELF DIAGNOSTIC RESULT

#### 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-88, "DTC No. Index".

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Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration detected by decel G-sensor is displayed.

Revision: August 2014 BRC-29 2015 Xterra

< SYSTEM DESCRIPTION >

[TYPE 1]

Item	Data	a monitor item sele			
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
FR RH IN SOL (ON/OFF)	-	×	×	Front RH IN ABS solenoid (ON/ OFF) status is displayed.	
FR RH OUT SOL (ON/OFF)	-	×	×	Front RH OUT ABS solenoid (ON/ OFF) status is displayed.	
FR LH IN SOL (ON/OFF)	-	×	×	Front LH IN ABS solenoid (ON/ OFF) status is displayed.	
FR LH OUT SOL (ON/OFF)	-	×	×	Front LH OUT ABS solenoid (ON/ OFF) status is displayed.	
RR RH IN SOL (ON/OFF)	-	×	×	Rear RH IN ABS solenoid (ON/ OFF) status is displayed.	
RR RH OUT SOL (ON/OFF)	-	×	×	Rear RH OUT ABS solenoid (ON/ OFF) status is displayed.	
RR LH IN SOL (ON/OFF)	-	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.	
RR LH OUT SOL (ON/OFF)	-	×	×	Rear LH OUT ABS solenoid (ON/ OFF) status is displayed.	
EBD WARN LAMP (ON/OFF)	-	-	×	Brake warning lamp (ON/OFF) status is displayed.	
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.	
MOTOR RELAY (ON/OFF)	-	×	×	ABS motor relay signal (ON/OFF) status is displayed.	
ACTUATOR RLY (ON/OFF)	-	×	×	ABS actuator relay signal (ON/OFF) status is displayed.	
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (ON/OFF) status is displayed.	
OFF LAMP (ON/OFF)	-	×	×	OFF Lamp (ON/OFF) status is displayed.	
OFF SW (ON/OFF)	×	×	×	VDC OFF switch (ON/OFF) status is displayed.	
SLIP LAMP (ON/OFF)	-	×	×	SLIP indicator lamp (ON/OFF) status is displayed.	
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.	
GEAR (1, 2, 3, 4, 5)	×	×	×	Gear position determined by TCM is displayed.	
SLCT LVR POSI (P, R, N, D)	×	×	×	Shift position judged by PNP switch signal.	
ENGINE SPEED (rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.	
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.	
R POSI SIG (ON/OFF)	-	-	×	Shift position judged by PNP switch signal.	
N POSI SIG (ON/OFF)	-	-	×	Shift position judged by PNP switch signal.	
P POSI SIG (ON/OFF)	-	-	×	Shift position judged by PNP switch signal.	

[TYPE 1] < SYSTEM DESCRIPTION >

Item	Data monitor item selection			
(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.
2WD/4WD (2WD/4WD)	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
ACCEL POS SIG (%)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s <sup>2</sup> )	×	-	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	-	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	-	×	Brake pressure detected by pressure sensor 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)	-	1	×	TCS operation (ON/OFF) status is displayed.
VDC SIGNAL (ON/OFF)	-	-	×	VDC operation (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	_	ı	×	ABS fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	_	ı	×	TCS fail signal (ON/OFF) status is displayed.
VDC FAIL SIG (ON/OFF)	_	_	×	VDC fail signal (ON/OFF) status is displayed.
CRANKING SIG (ON/OFF)	_	_	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (ON/OFF)	×	_	×	Brake fluid level switch (ON/OFF) status is displayed.
DLOCK SW	_		×	Indicates condition of differential lock.
DLOCK CHG SW	-	-	×	Indicates the condition of differential mode switch

**WORK SUPPORT** 

<sup>×:</sup> Applicable

<sup>-:</sup> Not applicable

< SYSTEM DESCRIPTION >

[TYPE 1]

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to <u>BRC-12</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to BRC-13. "CALIBRATION OF DECEL G SENSOR: Description".

#### **ACTIVE TEST**

#### **CAUTION:**

- Do not perform active test while driving vehicle.
- · Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, 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 solenoid valve (ACT)		
Operation		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	_	_	_
FR RH SOL	FR RH OUT SOL	Off	Off	On*	_	_	_
FR LH SOL	FR LH IN SOL	Off	On	On	_	_	_
TREITSOL	FR LH OUT SOL	Off	Off	On*	_	_	_
RR RH SOL	RR RH IN SOL	Off	On	On	_	_	_
IXIXII SOL	RR RH OUT SOL	Off	Off	On*	_	_	_
RR LH SOL	RR LH IN SOL	Off	On	On	_	_	_
RR LH SOL	RR LH OUT SOL	Off	Off	On*	_	_	_
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	_	_	_	Off	Off	Off
TRITIADS SOLLNOID (ACT)	FR RH OUT SOL	_	_	_	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	_	_	_	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	_	_	_	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	_	_	_	Off	Off	Off
INT INT ADS SOLLINOID (ACT)	RR RH OUT SOL	_	_	_	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	_	_	_	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL	_	_	_	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
KEAK SUL	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

< SYSTEM DESCRIPTION >

[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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### **APPLICATION NOTICE**

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

## **DTC/CIRCUIT 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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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## C1101, C1102, C1103, C1104 WHEEL SENSOR

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes	
C1101	RR RH SENSOR-1	<ul> <li>When power supply voltage of rear wheel sensor RH is low.</li> <li>When an open or shorted circuit is detected in rear wheel sensor RH circuit.</li> </ul>		
C1102	RR LH SENSOR-1	<ul> <li>When power supply voltage of rear wheel sensor LH is low.</li> <li>When an open or shorted circuit is detected in rear wheel sensor LH circuit.</li> </ul>	Harness or connector     Wheel sensor	
C1103	FR RH SENSOR-1	<ul> <li>When power supply voltage of front wheel sensor RH is low.</li> <li>When an open or shorted circuit is detected in front wheel sensor RH circuit.</li> </ul>	ABS actuator and electric unit (control unit)	
C1104	FR LH SENSOR-1	<ul> <li>When power supply voltage of front wheel sensor LH is low.</li> <li>When an open or shorted circuit is detected in front wheel sensor LH circuit.</li> </ul>		

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSTIC RESULT

(II) With CONSULT.

- 1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
- Perform self-diagnostic result.

#### Is DTC C1101, C1102, C1103 or C1104 detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-35</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End.

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring Diagram - <u>WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1.CONFIRM DTC

- (P) With CONSULT
- 1. Perform self-diagnostic result of ABS and record all active DTCs.
- Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <u>BRC-35, "DTC Logic"</u>.

#### Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> GO TO 2.

NO >> Refer to GI-41, "Intermittent Incident".

## 2.INSPECT WHEEL SENSOR

Inspect the suspect wheel sensor for damage or deformation.

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

## 3.HARNESS AND CONNECTOR INSPECTION

Revision: August 2014 BRC-35 2015 Xterra

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

- 1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of suspect wheel.
- Check harness, connectors and terminals for corrosion, deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

### 4.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.

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.

#### 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 5.

NO >> Replace the wheel sensor. Refer to <a href="BRC-112">BRC-112</a>, "Removal and Installation".

## 5.CHECK WIRING HARNESS FOR SHORT TO VOLTAGE

- 1. Turn ignition switch ON.
- 2. Check voltage between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Voltage
Wheel	Connector	Terminal	Ground	voltage
Front LH	E18 -	1	_	OV
		2		
Front RH	E117	1		
		2		
Rear LH	C11	1		
		2		
Rear RH	C10	1		
		2		

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair the circuit.

## 6.CHECK WIRING HARNESS FOR SHORT TO GROUND

- Turn ignition switch OFF.
- Check continuity between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor			Ground	Continuity
Wheel	Connector	Terminal	Ground	Continuity

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Front LH	E10	1		
FIOIIL LA	E18	2		
Front RH	Front RH E117	1		
Tionerari		2		No
Rear LH	C11	1	140	
iteai Lii	OTT	2		
Rear RH	C10	1		
ivedi ivii	010	2		

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair the circuit.

7. CHECK WIRING HARNESS FOR SHORT BETWEEN CIRCUITS

Check continuity between wheel sensor harness connector terminals of suspect wheel.

Wheel	l Sensor	(+)		Continuity
Wheel	Connector	Terminal	Terminal	Continuity
Front LH	E18	1		
Front RH	E117		2	No
Rear LH	C11	1 '	2	INU
Rear RH	C10		]	

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair the circuit.

8.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and harness connector of suspect wheel sensor.

Wheel sensor	ABS actuator and ele	ctric unit (control unit)	Wheel	sensor	Continuity	
vviileei serisoi	Connector	Terminal	Connector	Terminal		_
Frantill		45	F40	1		
Front LH		46	E18	2		
Front RH		34	E117	1		
FIOIIL KIT	E125	33	E117	2	Yes	
Rear LH	E125	36	C11	1		
Real Ln		37	CII	2		
Rear RH	43	C10	1	1		
		42	Ciu	2		

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair the circuit.

9.check abs actuator and electric unit (control unit) power supply circuit

1. Turn ignition switch ON.

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

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[TYPE 1]

	and electric unit ol unit)	Ground	Condition	Voltage (Approx.)
Connector	Terminal			(Αρριολ.)
E125	0		Ignition switch ON	Battery voltage
⊏125	0	_	Ignition switch OFF	0V

#### Is the inspection result normal?

YES >> GO TO 10.

NO >> Check the following:

- 10A fuse No. 50 located in the IPDM E/R
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

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

- 1. Turn ignition switch OFF.
- 2. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals and ground.

ABS actuator and ele	ectric unit (control unit)	— Continuity	
Connector	Terminal	— Continuity	Continuity
E125	1	Ground	Yes
E123	2	Giouria	165

#### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace malfunctioning components.

## 11. CHECK WHEEL SENSOR INPUT VOLTAGE

- 1. Connect ABS actuator and electric unit (control unit) connector E125.
- 2. Turn ignition switch ON.
- Check voltage between suspect wheel sensor harness connector terminals.

Wheel	Sensor	(+)		Voltage
Wheel	Connector	Terminal	Terminal	(Approx.)
Front LH	E18			
Front RH	E117	1 2	Battery voltage	
Rear LH	C11	· '	2	Ballery Vollage
Rear RH	C10			

#### Is the inspection result normal?

YES >> Replace wheel sensor. Refer to <u>BRC-112</u>, "Removal and Installation". Then, GO TO 12.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

## 12.CONFIRM REPAIR

- (P) With CONSULT
- 1. Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <u>BRC-35</u>, "<u>DTC Logic</u>".

#### Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Inspection End.

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

DTC Logic INFOID:0000000011372176

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1105	RR RH SENSOR-2	When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large.     When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.	<ul> <li>Wheel sensor</li> <li>ABS actuator and electric unit (control unit)</li> <li>Sensor rotor</li> </ul>
C1106	RR LH SENSOR-2	<ul> <li>When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large.</li> <li>When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.</li> </ul>	
C1107	FR RH SENSOR-2	<ul> <li>When distance between front wheel sensor RH and front wheel sensor RH rotor is large.</li> <li>When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.</li> </ul>	
C1108	FR LH SENSOR-2	<ul> <li>When distance between front wheel sensor LH and front wheel sensor LH rotor is large.</li> <li>When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.</li> </ul>	

#### DTC CONFIRMATION PROCEDURE

### 1. CHECK SELF-DIAGNOSTIC RESULT

(P)With CONSULT.

- Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
- Perform self-diagnostic result.

#### Is DTC C1105, C1106, C1107 or C1108 detected?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-39">BRC-39</a>, "Diagnosis Procedure".

>> Inspection End. NO

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-90. "Wiring Diagram - WITHOUT HILL DESCENT CON-TROL/HILL START ASSIST".

### 1.CONFIRM DTC

- (P) With CONSULT
- 1. Perform self-diagnostic result of ABS and record all active DTCs.
- Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <u>BRC-39</u>, "<u>DTC Logic</u>".

#### Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> GO TO 2.

NO >> Refer to GI-41, "Intermittent Incident".

### 2.CHECK TIRE PRESSURE AND TIRE WEAR

Check tires for excessive wear and proper inflation. Refer to WT-48, "Adjustment".

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

### 3.CHECK WHEEL SENSOR

Check wheel sensor for the following:

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

[TYPE 1]

## < DTC/CIRCUIT DIAGNOSIS >

- · Proper installation
- · Physical damage
- Contamination

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

### 4. CHECK SENSOR ROTOR

#### Check sensor rotor for the following:

- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

#### Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to <u>BRC-112</u>, "Removal and Installation". Then, GO TO 5.

NO >> Repair or replace as necessary.

### 5.CONFIRM REPAIR

#### (II) With CONSULT

- 1. Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <u>BRC-39</u>, "<u>DTC Logic</u>".

### Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Inspection End.

#### C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

### C1109 POWER AND GROUND SYSTEM

Description INFOID:0000000011067992

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

DTC Logic INFOID:0000000011067993

#### 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-41">BRC-41</a>, "Diagnosis Procedure".

>> Inspection End NO

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-TROL/HILL START ASSIST".

## 1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES

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

2.check abs actuator and electric unit (control unit) power supply circuit and **GROUND CIRCUIT** 

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 8 and ground.

	or and elec- ontrol unit)	_	Condition	Voltage
Connector	Terminal			
F125	8	Ground	Ignition switch: ON	Battery voltage
L 123	0	Ground	Ignition switch: OFF	Approx. 0V

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

4. Turn ignition switch OFF.

5. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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:0000000011067995

## 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)

< DTC/CIRCUIT 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 drift)

#### 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 <a href="BRC-43">BRC-43</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

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

>> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-114">BRC-114</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 BRC-13, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:000000011067999

#### **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
		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 <a href="BRC-44">BRC-44</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068001

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

### 1. CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

YES >> GO TO 2

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

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

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check voltage between the ABS actuator and electric unit (control unit) connector E125 terminal 1 and ground.

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

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#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 and ground.

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ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal			
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 <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

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### Component Inspection

### 1. CHECK ACTIVE TEST

INFOID:0000000011068002

- On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch On and Off on screen. Make sure motor relay and actuator relay operate 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-44, "Diagnosis Procedure"</u>.

### Special Repair Requirement

INFOID:0000000011068003

### ${f 1}$ . 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

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### 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

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

INFOID:0000000011068006

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

Description INFOID:000000011068004

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-46, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring <u>Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

#### **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, SLIP indicator lamp may illuminate and CONSULT 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.

### 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

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 1]** 

Check continuity between the ABS actuator and electric unit (control unit) connector E125 terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 terminals 3, 2, 4, 1.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector Terminal		Connector	Terminal	Continuity
	18	B73	3	Voc
E40E	19		2	
E125	22		4	Yes
	29		1	

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

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

Perform the yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-47, "Component Inspection"</u>. <u>Is the inspection result normal?</u>

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-114, "Removal and Installation"</u>

NO >> Replace the yaw rate/side/decel G sensor. Refer to <a href="BRC-117">BRC-117</a>, "Removal and Installation".

### Component Inspection

### 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 <u>BRC-46</u>, "<u>Diagnosis Procedure</u>".

### 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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[TYPE 1]

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

Description INFOID:000000011068009

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
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

### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-48">BRC-48</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068011

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-TROL/HILL START ASSIST"</u>.

#### **CAUTION:**

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

### 1.CONNECTOR INSPECTION

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

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

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

>> Replace the wheel sensor. Refer to BRC-112, "Removal and Installation". NO

### 3. CHECK TIRES

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

#### Is the inspection result normal?

YES >> GO TO 4

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

### 4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-7, "Rear Axle Bearing" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-13, "Removal and Installation" (rear).

### ${f 5}$ .CHECK WIRING HARNESS FOR SHORT CIRCUIT

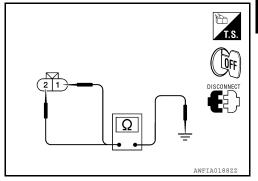
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor connector terminals and ground.

### Continuity should not exist.

### Is the inspection result normal?

>> GO TO 6 YES

NO >> Repair the circuit.



### 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIOIIL LIT	E125	46		2	Yes
Front RH		34	E117	1	
FIOH KH		33		2	
Rear LH	E125	36	C11	1	
INGAI LIT		37	OII	2	
Rear RH		43	C10	1	
Real RH		42	CIU	2	

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-114, "Removal and Installation".

NO >> Repair the circuit.

### Component Inspection

## 1. CHECK DATA MONITOR

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

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INFOID:0000000011068012

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer display (±10% or less)
RR LH SENSOR	really materies the spectrometer display (±10 % of less)
RR RH SENSOR	

#### Is the inspection result normal?

YES >> Inspection End

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

### Special Repair Requirement

INFOID:0000000011068013

## 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

[TYPE 1]

### C1116 STOP LAMP SWITCH

Description INFOID:0000000011068014

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

DTC Logic INFOID:0000000011068015

#### 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?

>> Proceed to diagnosis procedure. Refer to <a href="BRC-51">BRC-51</a>, "Diagnosis Procedure".

>> Inspection End NO

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-90. "Wiring Diagram - WITHOUT HILL DESCENT CON-TROL/HILL START ASSIST".

## 1.CONNECTOR INSPECTION

- Disconnect the ABS actuator and electric unit (control unit) connector and stop lamp 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.

### $2.\mathsf{stop}$ Lamp switch inspection

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

**Brake pedal depressed** : Battery voltage

Brake pedal released : 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-114, "Removal and Installation".

NO >> GO TO 3

### $3.\mathsf{s}$ top Lamp switch circuit inspection

Disconnect the stop lamp switch connector.

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### **C1116 STOP LAMP SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

2. Check the continuity between the ABS actuator and electric unit (control unit) connector E125 terminal 39 and stop lamp switch connector E39 terminal 2 (with A/T) or E38 terminal 2 (with M/T).

#### Continuity should exist.

#### Is the inspection result normal?

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

NO >> Repair or replace malfunctioning components.

### Special Repair Requirement

INFOID:0000000011068017

### 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

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

**Description** 

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

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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-53">BRC-53</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring <u>Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

YES >> GO TO 2

NO >> Poor connection of connector terminals. 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.

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[TYPE 1]

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 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.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068021

### 1. CHECK ACTIVE TEST

- 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.

Operation			ABS solenoid valve		
		Up	Keep	Down	
FR RH SOL	FR RH IN SOL	Off	On	On	
FR KH SOL	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	
FR LH SOL	FR LH OUT SOL	Off	Off	On*	
RR RH SOL	RR RH IN SOL	Off	On	On	
KK KH 30L	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On	On	
RR LH SOL	RR LH OUT SOL	Off	Off	On*	

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-53">BRC-53</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068022

### 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

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

# 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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[TYPE 1]

INFOID:0000000011068025

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

Description INFOID:000000011068023

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 <a href="BRC-56">BRC-56</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

YES >> GO TO 2

NO >> Poor connection of connector terminals. 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.

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 and ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 $oldsymbol{3}.$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 BRC-114, "Removal and Installa-

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068026

### 1. CHECK ACTIVE TEST

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		
		Up	Keep	Down	
FR RH SOL	FR RH IN SOL	Off	On	On	
FR KH SOL	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	
FR LH SOL	FR LH OUT SOL	Off	Off	On*	
RR RH SOL	RR RH IN SOL	Off	On	On	
KK KH SUL	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On	On	
KK LN SUL	RR LH OUT SOL	Off	Off	On*	

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

#### 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

### ${f 1}$ . 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".

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

< DTC/CIRCUIT 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".

>> END

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

**Description** 

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	Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is malfunctioning.		
_	C1131	ENGINE SIGNAL 2		<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
_	C1132	ENGINE SIGNAL 3		(control unit)	
_	C1133	ENGINE SIGNAL 4		ECM     CAN communication line	
_	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-59">BRC-59</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

### 1. CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <a href="EC-53">EC-53</a>, "CONSULT Function".

2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

YES >> Repair or replace the affected part.

NO >> Inspection End

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[TYPE 1]

INFOID:0000000011068033

### C1140 ACTUATOR RLY

Description INFOID:000000011068031

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	
och diagnosis results	
ACTUATOR RLY	
ACTOATORNET	

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-60">BRC-60</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring <u>Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

### 1. CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, <u>"CONSULT Function</u> (ABS)".

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

YES >> GO TO 2

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

## 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.
- Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 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

### **C1140 ACTUATOR RLY**

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 <a href="BRC-114">BRC-114</a>, "Removal and Installation"

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068034

### 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 operate 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-60">BRC-60</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068035

### 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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### C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

### C1143, C1144 STEERING ANGLE SENSOR

Description INFOID:000000011068036

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.	ABS actuator and electric ur (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-62, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068038

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1. CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

YES >> GO TO 2

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

### 2.CHECK STEERING ANGLE SENSOR HARNESS

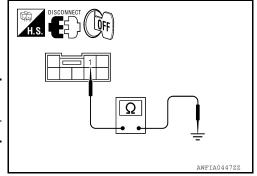
### C1143, C1144 STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

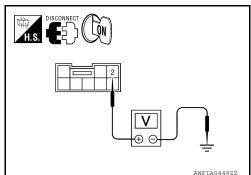
Steering angle sensor			Continuity
Connector	Terminal	_	Continuity
M47	1	Ground	Yes



4. Turn ignition switch ON.

5. Check voltage between steering angle sensor 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

Perform the steering angle sensor component inspection. Refer to <u>BRC-63, "Component Inspection"</u>. Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-116</u>, "Removal and Installation".

### Component Inspection

INFOID:0000000011068039

### 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	0±3.5 °
Turn 90 ° to left	Approx. +90 °
Turn 90 ° to right	Approx. –90 °

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-62, "Diagnosis Procedure".

### 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

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INFOID:0000000011068040

### C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

### C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

### C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:0000000111068041

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	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?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-65">BRC-65</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring <u>Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

### 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)

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

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

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

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

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3.check brake fluid level switch ground

Check continuity between brake fluid level switch 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

Perform the brake fluid level switch component inspection. Refer to <u>BRC-66</u>, "Component Inspection". 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-114, "Removal and Installation".

NO >> Replace brake fluid level switch.

### Component Inspection

## 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 terminals	Condition	Continuity
1 – 2	Brake fluid reservoir is full.	No
1 – 2	Brake fluid reservoir is empty.	Yes

#### Is the inspection result normal?

YES >> Inspection End

NO >> Replace brake fluid level switch.

## Special Repair Requirement

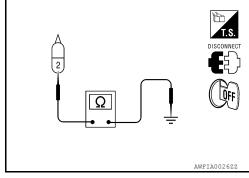
## 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

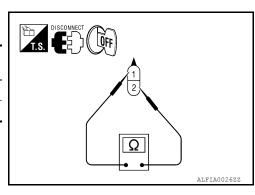
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <a href="https://example.com/BRC-12">BRC-12</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> 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".





INFOID:0000000011068045

INFOID:0000000011068044

### **C1155 BRAKE FLUID LEVEL SWITCH**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
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Revision: August 2014 BRC-67 2015 Xterra

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### C1156 ST ANG SEN COM CIR

Description INFOID:000000011068046

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-68, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068048

### 1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- Reconnect connector and perform self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

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

#### C1160 DECEL G SEN SET

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

### C1160 DECEL G SEN SET

Description INFOID:0000000011068049

The yaw rate/side/decel G sensor detects the yaw rate/side/decel G affecting the vehicle, and transmits the data to the ABS actuator and electric unit (control unit) as an analog voltage signal.

DTC Logic INFOID:0000000011068050

#### 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?

>> Proceed to diagnosis procedure. Refer to <a href="BRC-69">BRC-69</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

Self-diagnosis results **DECEL G SEN SET** 

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

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

NO >> Perform calibration of decel G sensor. Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Description", GO TO 2

### 2.PERFORM SELF-DIAGNOSIS AGAIN

Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to BRC-29, "CON-SULT Function (ABS)".

Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to BRC-29, "CONSULT Function (ABS)".

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

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-117, "Removal and Installation".

NO >> Inspection End **BRC** 

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#### **C1163 ST ANGLE SEN SAFE**

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

INFOID:0000000011068054

### C1163 ST ANGLE SEN SAFE

Description INFOID:000000011068052

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-70">BRC-70</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis 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?

YES >> Inspection End

NO

>> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <a href="https://example.com/BRC-29">BRC-29</a>, "CONSULT Function (ABS)".

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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INFOID:0000000011068057

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

Description INFOID:0000000011068055

#### 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.	Harness or connector     ABS actuator and electric unit (control unit)
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.	
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.	
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 <a href="BRC-71">BRC-71</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90</u>, "Wiring Diagram - <u>WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

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[TYPE 1] < DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

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

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector. 2.
- Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 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 ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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-114, "Removal and Installa-

NO >> Repair or replace malfunctioning components.

## 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 (ACT)		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off
	RR LH OUT SOL	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

NO >> Go to diagnosis procedure. Refer to <a href="BRC-71">BRC-71</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068059

INFOID:0000000011068058

 ${f 1}$  .adjustment of steering angle sensor neutral position

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

#### < DTC/CIRCUIT 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".

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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-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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#### C1187 DIFFERENTIAL LOCK CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

## C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description INFOID.0000000011372178

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

DTC Logic (INFOID:000000011372179

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1187	ABS DIFLOCK CONTROL- LER NG	Differential lock controller malfunction.	<ul> <li>Harness or connector</li> <li>CAN communication line</li> <li>Differential lock control unit</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

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

YES >> Proceed to diagnosis procedure. Refer to BRC-74, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000011372180

## 1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- 2. disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- Reconnect connector and perform self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)".

Self-diagnosis results	
ABS DIFLOCK CONTROLLER NG	

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

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

NO >> Inspection End

#### **U1000 CAN COMM CIRCUIT**

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

#### U1000 CAN COMM CIRCUIT

Description INFOID:0000000011068060

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:0000000011068062

## 1. CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect the ABS actuator and electric unit (control unit) connector.
- 3. Check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminals.
- 4. Reconnect connector and perform self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

#### 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.

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#### VDC OFF SWITCH

Description INFOID:0000000011068063

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

## Component Function Check

INFOID:0000000011068064

## 1. CHECK VDC OFF SWITCH OPERATION

Press and release the VDC OFF switch, then press and release the VDC OFF switch again 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: pressed and released	ON
VDC OFF switch: pressed and released	OFF

#### 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:0000000011068065

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST"</u>.

## 1. CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to BRC-77, "Component Inspection".

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

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	6	M154	1	Yes

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

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

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3. CHECK VDC OFF SWITCH GROUND

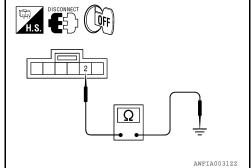
#### **VDC OFF SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

VDC OF	F switch		Continuity
Connector	Terminal	Continui	
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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

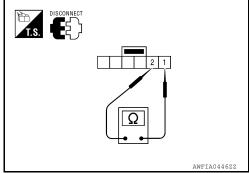
NO >> Replace combination meter. Refer to <a href="MWI-84">MWI-84</a>, "Removal and Installation".

## Component Inspection

## 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 terminals	Condition	Continuity
1 – 2	VDC OFF switch is pressed.	Yes
1 – 2	VDC OFF switch is released.	No



#### Is the inspection result normal?

YES >> Inspection End

NO >> Replace VDC OFF switch.

## 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".

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[TYPE 1]

#### ABS WARNING LAMP

**Description** 

×: ON -: OFF

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

## Component Function Check

INFOID:0000000011068069

## 1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

## Is the inspection result normal?

YES >> Inspection End

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

## Diagnosis Procedure

INFOID:0000000011068070

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT 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 <a href="MWI-24">MWI-24</a>, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068071

## $1.\mathsf{ADJUSTMENT}$ 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

#### BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

#### **BRAKE WARNING LAMP**

Description INFOID:0000000011068072

×: ON –: OFF

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

#### NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- · 2: After starting engine, brake warning lamp is turned off.

## Component Function Check

INFOID:0000000011068073

## 1.BRAKE WARNING LAMP OPERATION CHECK

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

#### Is the inspection result normal?

YES >> Inspection End

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

## Diagnosis Procedure

INFOID:0000000011068074

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT 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 <a href="MWI-24">MWI-24</a>, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "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 ${\sf g}$ 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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INFOID:0000000011068075

#### VDC OFF INDICATOR LAMP

Description INFOID:000000011068076

x: ON -: OFF

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds 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:0000000011068077

## 1. VDC OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 2 seconds 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-80">BRC-80</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-76">BRC-76</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000011068078

## 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 <a href="BRC-76">BRC-76</a>, "Diagnosis Procedure".

## 2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

#### **VDC OFF INDICATOR LAMP**

# 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 BBC-12 "AD JUSTMENT OF STEERING ANGLE SENSOR NEUTRAL

and electric unit (control unit). Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION</u>:

>> 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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#### SLIP INDICATOR LAMP

**Description** 

x: ON -: OFF

Condition	SLIP indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

## Component Function Check

INFOID:0000000011068081

## 1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-82">BRC-82</a>. "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000011068082

# 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29, "CONSULT 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-114">BRC-114</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to <a href="MWI-84">MWI-84</a>, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068083

# 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 ${\sf g}$ 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

#### **APPLICATION NOTICE**

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

# **ECU DIAGNOSIS INFORMATION**

## **APPLICATION NOTICE**

**Application Notice** 

INIEO ID:000000011060004	

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

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< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

#### 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.

CONSULT MONITOR ITEM

CONSULT MONITOR I		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)
		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)
DECEL C SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
ED DIVIN OO		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
FR 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
ED DIL OUT COL	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)		On
FR RH 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
ED LILIN COL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) 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 I H OUT SOL	Operation status of each calenaid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) 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

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
KK KH 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 solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
WWW JOE	Operation status of each solenou 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 coloneid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
AN LITHN OUL	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 OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
RR LH 001 30L	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
BD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	On
DD WARRING EARING	EDD warning lamp	When EBD warning lamp is OFF	Off
TOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
70. 27	otop lamp omton digital otatae	When brake pedal is released	Off
OTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
IOTOTT TELEVIT	Motor and motor roley operation	When the motor relay and motor are not operating	Off
CTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
BS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	On
	(Note 2)	When ABS warning lamp is OFF	Off
FF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	On
	(Note 2)	When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	On
	(Note 2)	When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
		With engine stopped	0 rpm
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachometer display

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s
TAW RATE SEN	sensor	When vehicle turning	−75 to 75 d/s
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) 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
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) 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) 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) 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
2WD/4WD	Drive axle	2WD model	2WD
2000/4000	Drive axie	4WD model	4WD
ACCEL POS SIG	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %
100221 00 010	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> )
OTD ANOLE OLO	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°
STR ANGLE SIG	sensor	Steering wheel turned	–720 to 720°
	Brake fluid pressure detected by front pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar
PRESS SENSOR	sure sensor	With ignition switch turned ON and brake pedal depressed	-40 to 300 bar
EBD SIGNAL	EPD eneration	EBD is active	On
EDD SIGNAL	EBD operation	EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
ADO OTOTAL	/ Do operation	ABS is inactive	Off

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

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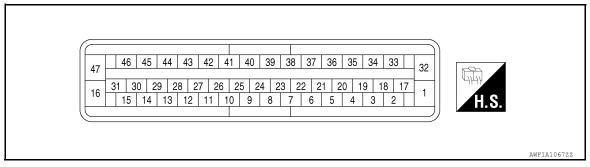
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		Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation			
TCS SIGNAL	TCC operation	TCS is active	On			
TCS SIGNAL	TCS operation	TCS is inactive	Off			
VDC SIGNAL	VDC eneration	VDC is active	On			
VDC SIGNAL	VDC operation	VDC is inactive	Off			
ABS FAIL SIG	ARS fail acfo signal	In ABS fail-safe	On			
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	Off			
TCS FAIL SIG	TCC fail acfa signal	In TCS fail-safe	On			
TCS FAIL SIG	TCS fail-safe signal	TCS is normal	Off			
VDC FAIL SIG	VDC fail cofe signal	In VDC fail-safe	On			
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	Off			
CDANIZING CIG	Crank anaration	Crank is active	On			
CRANKING SIG	Crank operation	Crank is inactive	Off			
FLUID LEV SW	Proke fluid level quitab eignel etatue	When brake fluid level switch ON	On			
FLOID LEV 3W	Brake fluid level switch signal status	When brake fluid level switch OFF	Off			

#### NOTE:

- · 1: Confirm tire pressure is normal.
- · 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-78, "Description".
- Brake warning lamp: Refer to BRC-79, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-80, "Description"</u>.
- SLIP indicator lamp: Refer to BRC-82, "Description".

#### TERMINAL LAYOUT



Fail-Safe

#### **CAUTION:**

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

#### ABS/EBD SYSTEM

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

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

- 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

Revision: August 2014 BRC-87 2015 Xterra

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

In case of TCS/VDC system malfunction, the SLIP indicator lamp is turned on and the condition of the vehicle is the same as the condition of vehicles without TCS/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	PDC 35 "DTC Locio"
C1103	FR RH SENSOR-1	BRC-35, "DTC Logic"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	DDC 20 "DTC Logic"
C1107	FR RH SENSOR-2	BRC-39, "DTC Logic"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-41, "Description"
C1110	CONTROLLER FAILURE	BRC-43, "DTC Logic"
C1111	PUMP MOTOR	BRC-44, "Description"
C1113	G-SENSOR	BRC-46, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-48, "Description"
C1116	STOP LAMP SW	BRC-51, "Description"
C1120	FR LH IN ABS SOL	BRC-53, "Description"
C1121	FR LH OUT ABS SOL	BRC-56, "Description"
C1122	FR RH IN ABS SOL	BRC-53, "Description"
C1123	FR RH OUT ABS SOL	BRC-56, "Description"
C1124	RR LH IN ABS SOL	BRC-53, "Description"
C1125	RR LH OUT ABS SOL	BRC-56, "Description"
C1126	RR RH IN ABS SOL	BRC-53, "Description"
C1127	RR RH OUT ABS SOL	BRC-56, "Description"
C1130	ENGINE SIGNAL 1	
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	BRC-59, "Description"
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-60. "Description"
C1143	ST ANG SEN CIRCUIT	BRC-62. "Description"
C1144	ST ANG SEN SIGNAL	BRC-62. Description
C1145	YAW RATE SENSOR	DDC 46 "Deceriation"
C1146	SIDE G-SEN CIRCUIT	BRC-46, "Description"
C1155	BR FLUID LEVEL LOW	BRC-65, "Description"
C1156	ST ANG SEN COM CIR	BRC-68, "Description"
C1160	DECEL G SEN SET	BRC-69, "Description"
C1163	ST ANGL SEN SAFE	BRC-70, "Description"

## < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Items (CONSULT screen terms)	Reference		
C1164	CV1			
C1165	CV2	BRC-71, "Description"		
C1166	SV1	BRC-71, Description		
C1167	SV2	_		
C1170	VARIANT CODING	BRC-43, "DTC Logic"		
U1000	CAN COMM CIRCUIT	BRC-75, "Description"		

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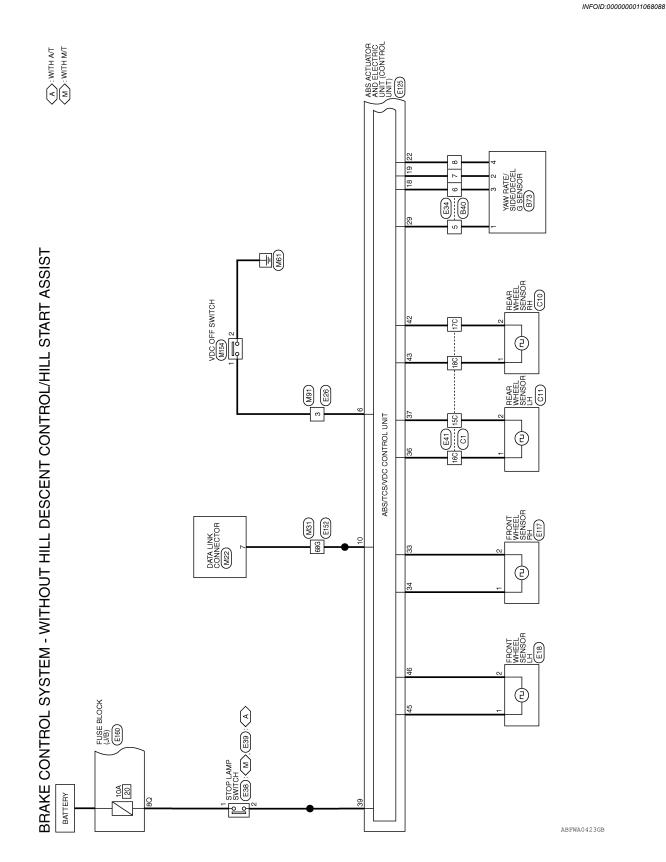
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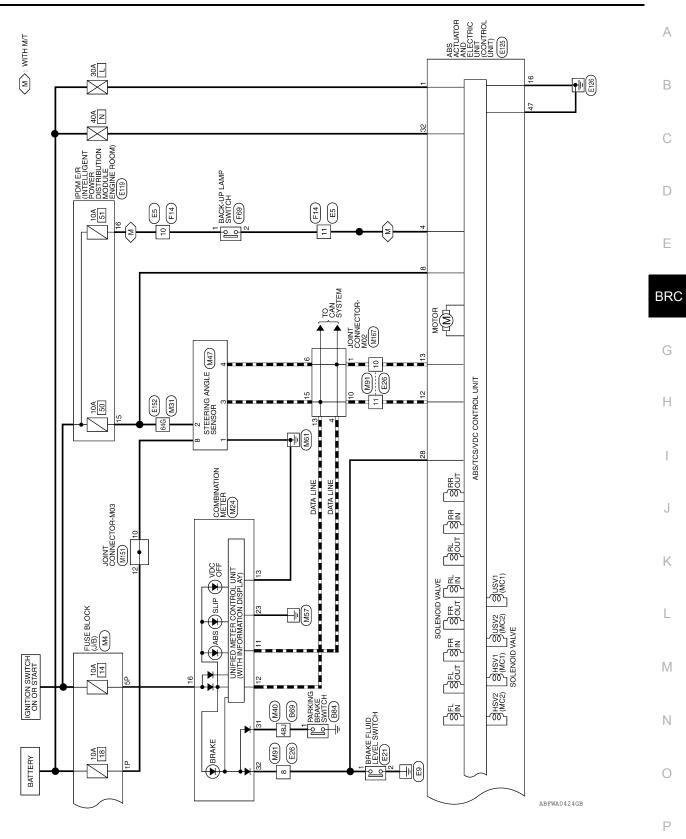
[TYPE 1]

# WIRING DIAGRAM

## **BRAKE CONTROL SYSTEM - VDC**

Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST





- A000	MAO  WIRE TO WIRE  1.1 21 31 44 51  1.2 23 24 254 254 257 258 294 30  1.1 32 33 44 354 364 377 381 394 400 411  22 23 23 24 255 264 277 281 294 30  1.1 32 33 34 354 364 377 381 394 300 611  1.1 32 33 344 354 364 377 381 394 300 611  1.1 32 33 344 354 364 377 381 394 390 817  1.1 32 33 344 354 364 377 381 394 390 817  1.1 32 33 344 354 364 377 381 394 395 300 611  1.1 32 33 344 354 364 377 381 394 395 300 817  1.1 32 33 34 35 364 357 381 394 395 300 817  1.1 32 33 34 35 364 357 364 377 381 399 300 817  1.1 32 34 394 355 364 377 381 394 395 300 817  1.1 32 34 395 364 367 364 367 368 395 300 817  1.1 32 34 34 354 364 367 368 395 300 817  1.1 32 34 34 354 364 367 368 395 300 817  1.1 32 34 34 354 364 367 368 395 300 817  1.1 32 34 34 34 34 34 34 34 34 35 364 300 817  1.1 32 34 34 34 34 34 34 34 34 34 34 34 34 34	Signal Name
r r	0. M40 ame WIRE T olor WHITE  11.1 [22] [33] [34] 222 [33] [34] 22.1 [33] [34] 22.2 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 22.1 [33] [34] 23.1 [34] [34] 24.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [34] [34] 25.1 [3	Color of Wire G
, П П Г Г	Connector No. Connector Name Connector Color H.S.  113 114 115 115 117 117 119 1119 1119 1119 1119	Terminal No.
		]
Connector No.   M22   Connector No.   M22   Connector Name   DATA LINK CONNECTOR   Connector Name   DATA LINK CONNECTOR   Connector Color   WHITE   Connector Color   Co	M31	Signal Name
M22   M22   M22   M22   M22   M22   M22   M22   M23	116   126   136   14   176   126   136   14   176   126   136   14   176   126   136   14   176   126   136   14   176   126   136   14   176   126   136   14   176   126   136   1	Color of Wire W/R
Connector No. Connector Name Connector Color H.S. Terminal No.  7	Connector No. Connector Name Connector Color H.S.  III  III  III  III  III  III  III	Terminal No. 64G
	<u> </u>	
	W24   COMBINATION METER   WHITE	
M4   M4   M4   M6   M9   M1   M1   M1   M1   M1   M1   M1		
Connector No. M4 Connector Name FUSE BLOCK Connector Color WHITE  The Part of Mare Signature of Mare S	Connector No.  Connector Name Connector Color  H.S.  H.S.  13	
 n		ABFIA0881GB

	I OK-M03		F	2 1 12 11 10	Signal Name	ı	ı			
M151	Connector Name JOIN I CONNECTOR-MU3	SEEN		8 7 6 5 4 3 18 17 16 15 14 13						
Z	ame	olor GF		9 8 20 19 18	Color of Wire	ш	R/B			
Connector No.	Connector Na	Connector Color   GREEN		H.S.	Terminal No.	10	12			
L	O WIRE			3 2 1 11 10 9 8	Signal Name	-	-	-	1	
M91	ne WIRE I	or WHITE	-	7 6 5 4 C	Solor of Wire	GR	SB	Ь	Т	
Connector No.	Connector Name WIRE 10 WIRE	Connector Color WHITE		, Si	Terminal No. Wire	3	8	10	11	
	STEERING ANGLE SENSOR		10	<u> </u>	Signal Name	ı	1	1	1	1
M47	ne SIEE	ctor Color WHITE			Color of Wire	В	W/R	7	۵	Œ
ctor No.	ctor Name	otor Col			nal No.					

Connector No.	. E5	
Connector Name WIRE TO WIRE	me WIRE	TO WIRE
Connector Color WHITE	lor WHIT	Ш
H.S.	2 3 4 5 14 15 16 17 1	6 7 8 9 10 11 12 18 19 20 21 22 23 24
Terminal No.	Color of Wire	Signal Name
10	M/G	-
11	SB	ı

			_									
/:	JOINT CONNECTOR-M02	E		16 5 4 3 2 1		Signal Name	_	ı	_	-	-	-
M16/		or BLUE		9 8 7	2	Color of Wire	Ь	Ь	Ь	L	L	٦
Connector No.	Connector Name	Connector Color		S.	<u>-</u>	Terminal No.	1	4	9	10	13	15

	VDC OFF SWITCH		3 2 1	Signal Name	ı	ı
. M154		lor GRAY	6 5 4	Color of Wire	GR	В
Connector No.	Connector Name	Connector Color	原 H.S.	Terminal No.	1	2

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Connector No.	lo. E18		Connector No.	o. E21		Connector No.	. E26	
Connector Name	_	FRONT WHEEL SENSOR LH	Connector Name		BRAKE FLUID LEVEL SWITCH	Connector Name		WIRE TO WIRE
	5		Connector Color	olor GRAY				
H.S.			原 H.S.	<u> </u>		H.S.	8 9 10 11 12 13	2 13 14 15 16
Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
-	g	ı	-	SB	ı	ო	GR	ı
2	۳	1	2	М	ı	∞	SB	1
						17	_	1
Connector No.	lo. E34		Connector No.	o. E38		Connector No.	). E39	
nnector N	Connector Name WIRE T	Connector Name WIRE TO WIRE Connector Color WHITE	Connector Name	-	STOP LAMP SWITCH (WITH M/T)	Connector Name		STOP LAMP SWITCH (WITH A/T)
			Connector Color	olor BLACK	~	Connector Color	olor WHITE	ш
H.S.	4 80	6 5 1	H.S.	<u>a</u>		₽ H.S.	& L 4 2	
Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name	Terminal No.	Color of Wire	Signal Name
2	BB	ı	-	B/B	ı	-	B/B	1
9	BG	ı	2	>	ı	2	>	ı
7	>	ı						
α	>							

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< WIRING DIAGRAM > [TYPE 1]

Connector No.	). E119	6
Connector Name		IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	olor WH	31
H.S.	9 8 7 6 0	6 ( ) 5 4 3 15 14 10 12 11 10
Terminal No.	Color of Wire	Signal Name
15	W/R	ABS IGN SUPPLY
16	9/M	REVERSE LAMP

	FRONT WHEEL SENSOR RH		[ <del>[</del> ]	Signal Name	ı	ı
E117		or GRAY		Color of Wire	В	×
Connector No.	Connector Name	Connector Color GRAY	原 H.S.	Terminal No.	-	2

	WIRE TO WIRE	)	19C 31C 40C 32C 41C 33C 42C	27C	28C 35C 44C	36C 45C	380	25C 39C 48C		Signal Name	1	ı	I	I
E41		or BLACK	1C 10C 19 2C 11C 20C 3C 12C		5C 14C 22C	6C 15C 23C		9C 18C		Color of Wire	Ь	_	^	LG
Connector No.	Connector Name	Connector Color	H.S.						リ	Terminal No.	15C	16C	17C	18C

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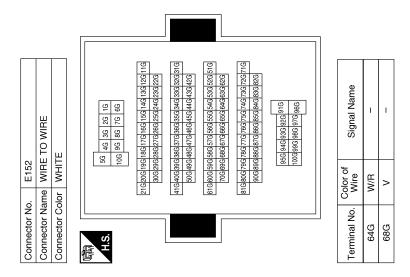
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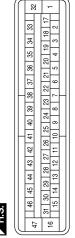
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Revision: August 2014 BRC-95 2015 Xterra



Terminal No.	Color of Wire	Signal Name
22	<b>&gt;</b>	CLUS SUP
23	_	I
24	-	I
25	ı	I
56	-	I
27	_	I
28	GR	FLUID LEVEL SW
59	BR	CLUS GND
30	_	_
31	ı	ı
32	<b>\</b>	VALVE ECU SUPPLY
33	M	FR RH SIG
34	В	FR RH PWR
35	1	ı
36	Т	RR LH PWR
37	Ь	RR LH SIG
38	1	ı
39	SB	STOP LAMP SW
40	1	1
41	ı	_
42	>	RR RH SIG
43	LG	RR RH PWR
44	ļ	_
45	G	FR LH PWR
46	В	FR LH SIG
47	В	MOTOR GND

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



Signal Name	MOTOR SUPPLY	-	_	REV SW	-	VDC OFF SW	ı	IGN	1	DIAG-K	-	CAN-H	CAN-L	-	ı	VALVE ECU GND	-	CAN2-H	CAN2-L	-	1
Color of Wire	Œ	_	_	>	_	GR	1	W/R	1	SB	_	_	۵	_	_	В	_	BG	W	_	1
Terminal No.	-	2	3	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21

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Connector No. F69 Connector Name BACK-UP LAMP SWITCH Connector Color WHITE H.S.	Terminal No. Wire Signal Name  1 W/G -	Connector No. C11 Connector Name REAR WHEEL SENSOR LH Connector Color BROWN	Terminal No. Wire Signal Name				
Connector No. F14  Connector Name WIRE TO WIRE  Connector Color WHITE	Terminal No. Wire Signal Name 10 W/G -	Connector No. C10  Connector Color GRAY  Connector Color GRAY	Terminal No. Color of Signal Name  1 LG -				
E160 FUSE BLOCK (J/B) WHITE  SQT 2010 SQT 2010	Signal Name	WIRE TO WIRE BLACK	26C 20C 27C 21C 28C 22C 29C 23C 30C 24C 25C	Signa	1 1	1	1
Connector No.  Connector Color  Connector Color  M  Connector Color  M  Connector Color  Co	Terminal No. Wire 8Q R/B	ctor No.	410 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	No.	15C P		18C LG

ABFIA0887GB

Connector No.	lo. B40	0;	Connector No. B69	Terminal No	Color of	Signal Name	
Connector N	Jame WII	Connector Name WIRE TO WIRE	Connector Name WIRE TO WIRE		WIFe		
Connector Color		WHITE	Connector Color WHITE	487	o o	ı	
	L		] [				
	1 2	2 3 4	S 4 3 9 1 1				
	2	8 7 8	100 90 81 7.7				
Terminal No.	Color of Wire	Signal Name	21J 22J 15J 16J 17J 16J 15J 14J 13J 12J 11J 32J 23J 23J 27J 26J 23J 22J 24J 23J 22J				
5	BB	1	41.1 40.1 38.1 38.1 38.1 38.1 38.1 39.1 31.1				
9	BG	ı	50/ 49/ 48/ 47/ 46/ 43/ 42/				
7	>	ı	24   20   50   57   52   54   50   50   51				
80	<b>&gt;</b>	1	701 681 681 651 661 659 649 681 621	<b>=</b> 1			
			198   178   188   189				
Connector No.	4o.   B73	, ,	Connector No.   B84				
Connector Name	ne	YAW RATE/SIDE/DECEL G	-				
Connector Color		BLACK	Connector Color   BLACK				
原 H.S.		4 Z 1	LS.				
Terminal No.	Color of Wire	Signal Name	Terminal No. Wire Signal Name				
-	BB	1	2 -				
2	3	ı					
ဧ	BG	ı					
4	>	1					

#### **APPLICATION NOTICE**

< SYMPTOM DIAGNOSIS > [TYPE 1]

# SYMPTOM 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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## VDC/TCS/ABS

Symptom Table

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

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	BRC-101, "Diag- nosis Procedure"
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-102, "Diag-
	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-103, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-104, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	BRC-105, "Diag-
	ABS actuator and electric unit (control unit)	nosis Procedure"
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-106, "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]

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

**[TYPE 1]** < SYMPTOM DIAGNOSIS > **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY** Α Diagnosis Procedure INFOID:0000000011068091 1.CHECK START В 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 D Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-7, "Rear Axle Bearing". Is the inspection result normal? Е YES >> GO TO 3 NO >> Repair or replace malfunctioning components. 3.check wheel sensor and sensor rotor **BRC** 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? Н YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to BRC-112, "Removal and Installation" or BRC-113. "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? >> Perform self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)". YES K NO >> Inspection End. L M N

#### **UNEXPECTED PEDAL REACTION**

< SYMPTOM DIAGNOSIS > [TYPE 1]

#### **UNEXPECTED PEDAL REACTION**

## Diagnosis Procedure

INFOID:0000000011068092

# 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-17, "Inspection and Adjustment".

#### Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-19, "Bleeding Brake System".
  - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-17</u>, "Inspection and Adjustment" (brake pedal), <u>BR-13</u>, "On <u>Board Inspection"</u> (master cylinder), <u>BR-11</u>, "Inspection" (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 >> Inspection End.

NO >> Check brake system.

#### THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS > [TYPE 1]

## THE BRAKING DISTANCE IS LONG

**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

Diagnosis Procedure

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 >> Inspection End.

NO >> Check brake system.

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#### **ABS FUNCTION DOES NOT OPERATE**

< SYMPTOM DIAGNOSIS >

[TYPE 1]

## **ABS FUNCTION DOES NOT OPERATE**

## Diagnosis Procedure

INFOID:0000000011068094

#### **CAUTION:**

ABS does not operate when speed is 10 km/h (6 MPH) or lower.

1. CHECK ABS WARNING LAMP DISPLAY

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

YES >> Inspection End.

NO >> Perform self-diagnosis. Refer to <a href="BRC-29">BRC-29</a>, "CONSULT Function (ABS)".

#### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

**[TYPE 1]** < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000011068095 **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] D 1.SYMPTOM CHECK 1 Check that there are pedal vibrations when the engine is started. Е Do vibrations occur? YES >> GO TO 2 NO >> Inspect the brake pedal. BRC 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 BRC-29, "CONSULT Function (ABS)". 3. SYMPTOM CHECK 3 Н 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 >> Inspection End. J K L M Ν 0 Р

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

< SYMPTOM DIAGNOSIS >

[TYPE 1]

## VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

## Diagnosis Procedure

INFOID:0000000011068096

## 1.SYMPTOM CHECK

Check if the vehicle jerks during VDC/TCS/ABS control.

#### Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 2

## 2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-29</u>, <u>"CONSULT Function (ABS)"</u>.

#### Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <a href="https://example.com/BRC-29">BRC-29</a>, "CONSULT Function (ABS)".

NO >> GO TO 3

## 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. Refer to <a href="https://example.com/BRC-29">BRC-29</a>, "CONSULT Function (ABS)".

#### Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.

NO >> GO TO 4

## 4. CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

#### Are self-diagnosis results indicated?

YES

- >> Check the corresponding items.
  - ECM: Refer to EC-53, "CONSULT Function".
  - TCM: Refer to TM-103, "CONSULT Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-114</u>, "Removal and Installation".

#### **NORMAL OPERATING CONDITION**

< SYMPTOM DIAGNOSIS > [TYPE 1]

# NORMAL OPERATING CONDITION

Description INFOID:0000000011068097

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 normal condition due to the VDC, TCS or ABS activation.	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.		
The brake pedal moves and generates noises, when TCS 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 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 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 condition 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.)	
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.	

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#### **PRECAUTIONS**

< 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.

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

#### **WARNING:**

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

Precaution for Brake System

INFOID:0000000011378942

#### **WARNING:**

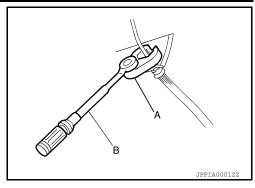
Clean any dust from the front brake and rear brake with a vacuum dust collector. Do not blow with compressed air.

- Brake fluid use refer to MA-12, "Fluids and Lubricants".
- · Do not reuse drained brake fluid.
- Do not spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, inspect the brake pedal height and play. Adjust brake pedal if it is outside the standard value.
- Always clean with new brake fluid when cleaning the brake caliper and other components.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.

### **PRECAUTIONS**

< PRECAUTION > [TYPE 1]

- Tighten the brake tube flare nut to the specified torque with a crowfoot (A) and torque wrench (B).
- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Always connect the battery terminals when moving the vehicle.
- Check that no brake fluid leakage is present after replacing the parts.
- Burnish the brake contact surfaces after refinishing or replacing disc brake rotors, after replacing brake pads, or if a soft pedal occurs at very low mileage.
- Front brake pad: Refer to BR-8, "BRAKE PAD: Inspection".
- Front disc brake rotor: Refer to BR-8, "DISC ROTOR: Inspection".
- Rear brake pad: Refer to BR-10, "BRAKE PAD: Inspection".
- Rear disc brake rotor: Refer to BR-10, "DISC ROTOR: Inspection".



INFOID:0000000011068100

### 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.
- 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 CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, 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.

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## **PRECAUTIONS**

< PRECAUTION > [TYPE 1]

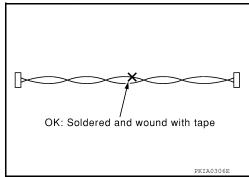
### NOTE:

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

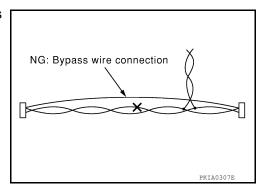
# Precaution for CAN System

INFOID:0000000011068101

- 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).



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



## **PREPARATION**

< PREPARATION > [TYPE 1]

# **PREPARATION**

# **PREPARATION**

Special Service Tool

INFOID:0000000011068102

Tool number		Description
(TechMate No.)		
Tool name		
_		Checking operation of ABS active wheel sen-
(J-45741)	990 (3MM) (See	sors
ABS active wheel sensor tester	J-45741-BOX	

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Removing sensor rotor

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## **Commercial Service Tool**

INFOID:0000000011068103

Tool name		Description	
Flare nut crowfoot     Torque wrench		Tightening brake tube flare nuts a: 10 mm (0.39 in)/12 mm (0.47 in)	
Power tool	S-NT360	Loosening nuts, screws and bolts	
	PIIB1407E		

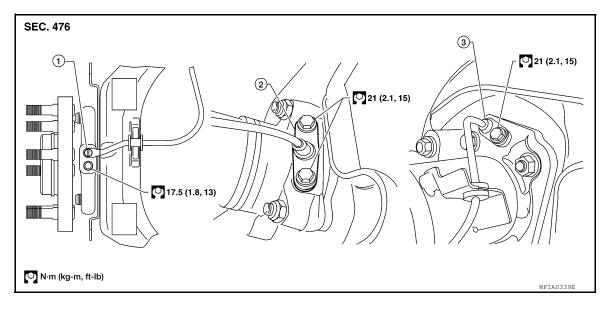
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# UNIT REMOVAL AND INSTALLATION

## WHEEL SENSORS

## Removal and Installation

INFOID:0000000011068104



- 1. Front wheel sensor
- 2. Rear wheel sensor (C200)
- Rear wheel sensor (M226)

### REMOVAL

- 1. Remove the front disc rotor, if removing the front wheel sensor. Refer to <u>BR-36</u>, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Remove the wheel sensor bolt(s).
- 3. Pull the wheel sensor straight out, being careful to turn it as little as possible.

### **CAUTION:**

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

### **INSTALLATION**

Installation is in the reverse order of removal.

- Before installing the wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.

## 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 (C200)** 

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to RAX-8, "Removal and Installation".

**REAR (M226)** 

Removal

NOTE:

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

- Remove the axle shaft assembly. Refer to <u>RAX-20</u>, "<u>Removal and Installation</u>".
- 2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 ( — )

Installation

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

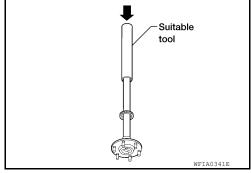
### **CAUTION:**

Do not reuse the sensor rotor.

2. Install the axle shaft assembly. Refer to RAX-20, "Removal and Installation".

### **CAUTION:**

Do not reuse the axle oil seal.



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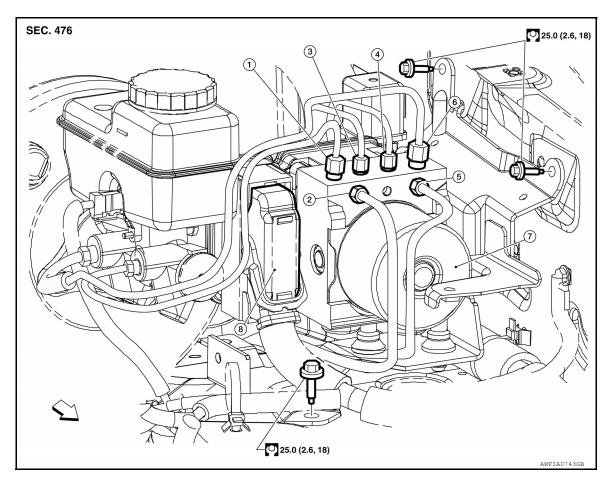
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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

## Removal and Installation



- 1. From master cylinder secondary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 4. To front right disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 7. ABS actuator and electric unit (control unit) 8.
- To rear right disc brake13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- To front left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- Harness connector
- 3. To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 6. From master cylinder primary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- ← Front

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

- 1. Disconnect the negative battery terminal. Refer to PG-77, "Removal and Installation".
- Remove air cleaner case. Refer to EM-24, "Exploded View".
- 3. Disconnect the harness connector from the ABS actuator and electric unit (control unit).
- Disconnect the brake tubes.

### **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; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- 5. Remove three bolts, then remove the ABS actuator and electric unit (control unit) and bracket.
- 6. Remove the bolt and remove the bracket from the ABS actuator and electric unit (control unit).

### INSTALLATION

## ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

### < UNIT REMOVAL AND INSTALLATION >

**[TYPE 1]** 

Installation is in the reverse order of removal.

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

ABS actuator and electric : 7.0 N·m (0.7 kg-m, 62 in-lb) unit (control unit)

### **CAUTION:**

- All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.
- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.
- The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.
- 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.
- Do not bend or twist brake hose sharply, or strongly pull it.
- When removing components, cover connections so that no dirt, dust, or other foreign matter gets in.
- · Do not reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the brake system. Refer to <a href="mailto:BR-19">BR-19</a>, "Bleeding Brake System".

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### STEERING ANGLE SENSOR

< UNIT REMOVAL AND INSTALLATION >

[TYPE 1]

## STEERING ANGLE SENSOR

### Removal and Installation

#### INFOID:0000000011068107

### **REMOVAL**

- 1. Remove the spiral cable. Refer to <u>SR-13</u>, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor from the spiral cable.

### INSTALLATION

Installation is in the reverse order of removal.

 Reset the neutral position of the steering angle sensor. Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

#### CAUTION

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the 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".

### YAW RATE/SIDE/DECEL G SENSOR

< UNIT REMOVAL AND INSTALLATION >

**[TYPE 1]** 

## YAW RATE/SIDE/DECEL G SENSOR

### Removal and Installation

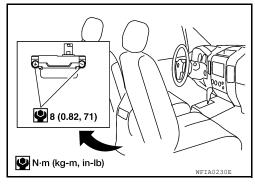
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### **REMOVAL**

- 1. Remove center console rear base. Refer to <a href="#IP-10">IP-10</a>, "Exploded View".
- 2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
  - The location of the yaw rate/side/decel G 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".

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## **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	

## **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) 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-123">BRC-123</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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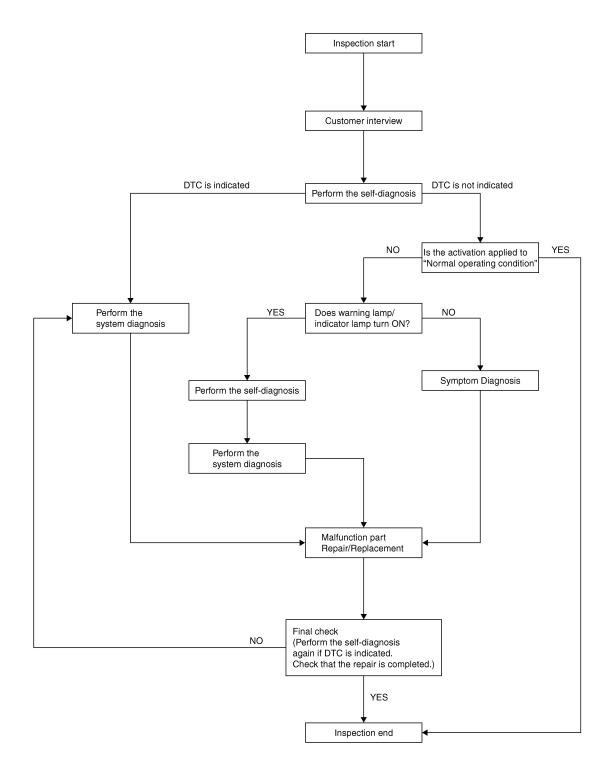
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### **OVERALL SEQUENCE**



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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 work sheet. Refer to <a href="BRC-122">BRC-122</a>, "Diagnostic Work Sheet".

## **DIAGNOSIS AND REPAIR WORKFLOW**

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-146, "CONSULT 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 <u>BRC-210, "DTC No. Index"</u> .
>> 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 BRC-229
"Description".
Is the symptom a normal operation?  YES >> Inspection End
NO >> GO TO 5
5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION
Check that the warning lamp and indicator lamp illuminate.
ABS warning lamp: Refer to <u>BRC-199</u> , " <u>Description</u> ".
<ul> <li>Brake warning lamp: Refer to <u>BRC-200, "Description"</u>.</li> <li>VDC OFF indicator lamp: Refer to <u>BRC-202, "Description"</u>.</li> </ul>
• SLIP indicator lamp: Refer to <u>BRC-204, "Description"</u> .
Hill descent control indicator lamp: Refer to <u>BRC-201</u> , " <u>Description</u> ".
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.
renorm the diagnosis applicable to the symptom.
>> GO TO 7
7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS
Repair or replace the specified malfunctioning parts.
>> CO TO 8
>> GO TO 8  8.FINAL CHECK
<u> </u>
Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-146</u> , "CONSULT Function (ABS)".
Is no other DTC present and the repair completed?
YES >> Inspection End
NO >> GO TO 3

## **DIAGNOSIS AND REPAIR WORKFLOW**

[TYPE 2]

< BASIC INSPECTION >

Diagnostic Work Sheet

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

**INSPECTION AND ADJUSTMENT** [TYPE 2] < BASIC INSPECTION > INSPECTION AND ADJUSTMENT Α ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description INFOID:0000000011068112 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 D INFOID:0000000011068113  ${f 1}$  .PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR Е Perform the neutral position adjustment for the steering angle sensor. >> Refer to BRC-123, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL BRC Special Repair Requirement", GO TO 2 2.PERFORM CALIBRATION OF THE DECEL G SENSOR Perform calibration of the decel G sensor. >> Refer to BRC-124, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Н ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description INFOID:0000000011068114 Refer to the table below to determine if adjustment of steering angle sensor neutral position is required. x: Required -: Not required Situation Adjustment of steering angle sensor neutral position K

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	X
Replacing suspension components	X
Change tires to new ones	_
Tire rotation	_
Adjusting wheel alignment	×
Battery disconnection	×

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### ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement INFOID:0000000011068115

# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

 ${f 1}$  . ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

**BRC-123 Revision: August 2014** 2015 Xterra >> GO TO 2

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

- 1. On the CONSULT screen, touch "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
- 2. Touch "START".

### **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:**

Be sure to perform above operation.

>> GO TO 3

# 3.CHECK DATA MONITOR

- 1. Run vehicle with front wheels in straight-ahead position, then stop.
- 2. Select "DATA MONITOR". Then make sure "STR ANGLE SIG" is within 0±3.5°.

### 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.

- ABS actuator and electric unit (control unit): Refer to <u>BRC-146, "CONSULT Function (ABS)"</u>.
- ECM: Refer to <u>EC-53</u>, "CONSULT Function".

### 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:0000000011068116

Refer to the table below to determine if calibration of the decel G sensor is required.

x: 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 components	_
Replacing steering components	_
Removing/Installing suspension components	_
Replacing suspension components	_
Change tires to new ones	_
Tire rotation	_
Adjusting wheel alignment	_
Removing/Installing yaw rate/side/decel G sensor	×
Replacing yaw rate/side/decel G sensor	×

## CALIBRATION OF DECEL G SENSOR: Special Repair Requirement

INFOID:0000000011068117

### CALIBRATION OF DECEL G SENSOR

#### **CAUTION:**

To calibrate the decel G sensor, make sure to use CONSULT

## **INSPECTION AND ADJUSTMENT**

INSPECTION AND ADJUSTMENT	
< BASIC INSPECTION >	[TYPE 2]
(Calibration cannot be done without CONSULT)	
1.ALIGN THE VEHICLE STATUS	Α
Stop vehicle with front wheels in straight-ahead position.	
	В
>> GO TO 2	
2.PERFORM CALIBRATION OF DECEL G SENSOR	
<ol> <li>On the CONSULT screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in C</li> <li>Touch "START".</li> </ol>	order.
3. After approximately 10 seconds, touch "END".	_
NOTE: After approximately 60 seconds, it ends automatically.	D
4. Turn ignition switch OFF, then turn it ON again.	
CAUTION: Be sure to perform above operation.	Е
De saie to perform above operation.	
>> GO TO 3	BR
3. CHECK DATA MONITOR	
Run vehicle with front wheels in straight-ahead position, then stop.	
2. Select "DATA MONITOR". Then make sure "DECEL G-SEN" is within ±0.08G.	G
Is the inspection result normal?  YES >> GO TO 4	
NO >> Perform calibration of decel G sensor again, GO TO 1	Н
4.ERASE THE SELF-DIAGNOSIS MEMORY	
Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.	
<ul> <li>ABS actuator and electric unit (control unit): Refer to <u>BRC-146, "CONSULT Function (ABS)"</u>.</li> <li>ECM: Refer to <u>EC-53, "CONSULT Function"</u>.</li> </ul>	
Are the memories erased?	J
YES >> Inspection End	
NO >> Check the items indicated by the self-diagnosis.	
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## **APPLICATION NOTICE**

[TYPE 2]

< SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION

# **APPLICATION NOTICE**

Application Notice

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

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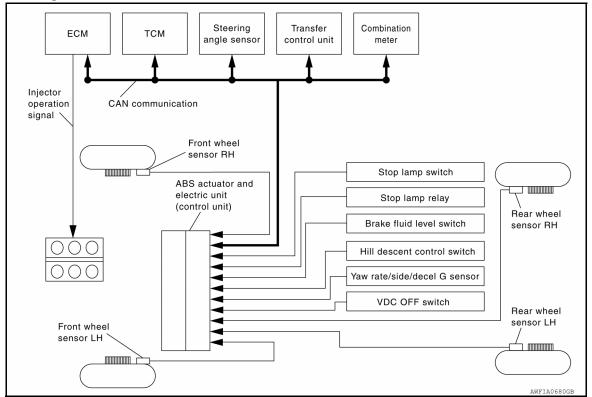
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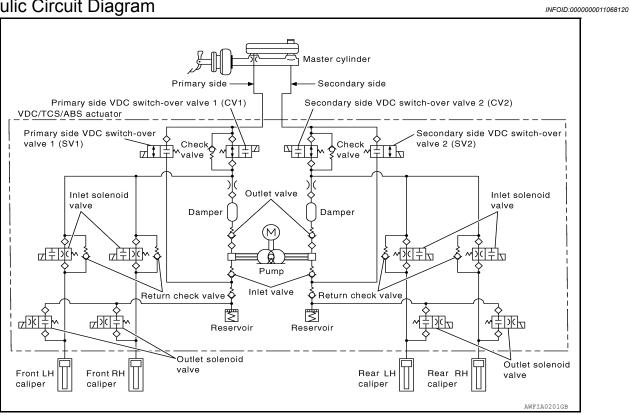
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## HILL DESCENT CONTROL

## System Diagram



# Hydraulic Circuit Diagram



## HILL DESCENT CONTROL

< SYSTEM DESCRIPTION > [TYPE 2]

# System Description

- The hill descent control system will help maintain vehicle speed when driving under 25-35 km/h (15-21 MPH) on steeper downhill grades. Hill descent control will provide braking allowing the driver to concentrate on steering while reducing the burden of brake and accelerator operation.
- To operate the system, set the 4WD switch to 4H or 4LO and push the hill descent control switch. The hill descent control indicator in the combination meter will turn on. While hill descent control is operating, the stop/tail lamps will illuminate.
- If the accelerator or brake pedal is depressed while the hill descent control system is on, the system will stop operating.
- During hill descent control operation, a mechanical noise may be heard. This is normal.
- Electrical system diagnosis by CONSULT is available.

# Component Parts Location

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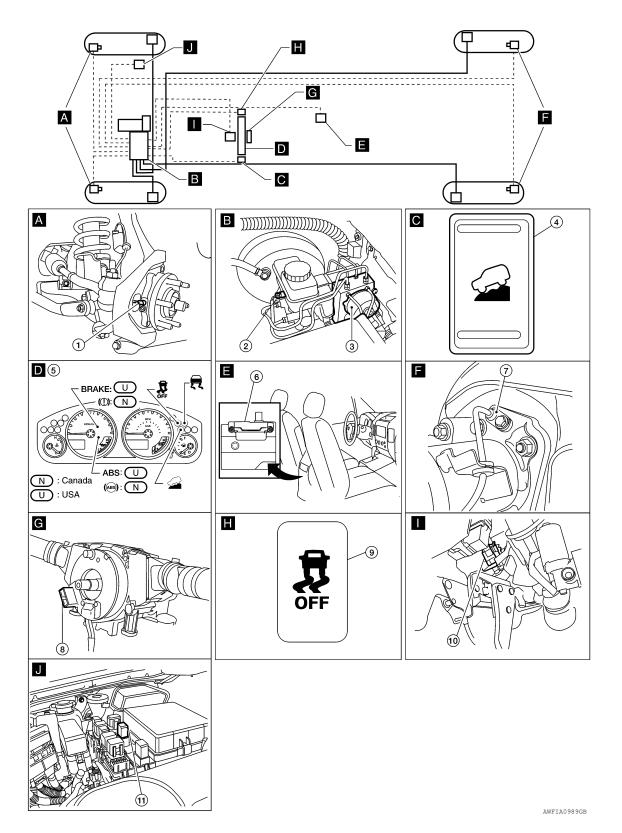
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- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- Brake fluid level switch E21
- Combination meter M24
- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

Revision: August 2014 BRC-129 2015 Xterra

## HILL DESCENT CONTROL

# < SYSTEM DESCRIPTION > [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)

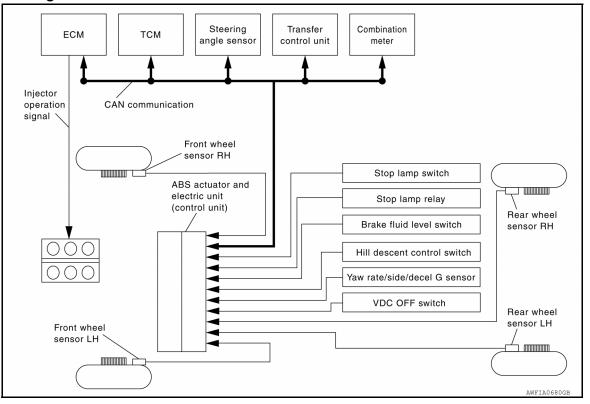
10. Stop lamp switch E39 11. Stop lamp relay E12

## **Component Description**

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

## HILL START ASSIST

System Diagram



# **System Description**

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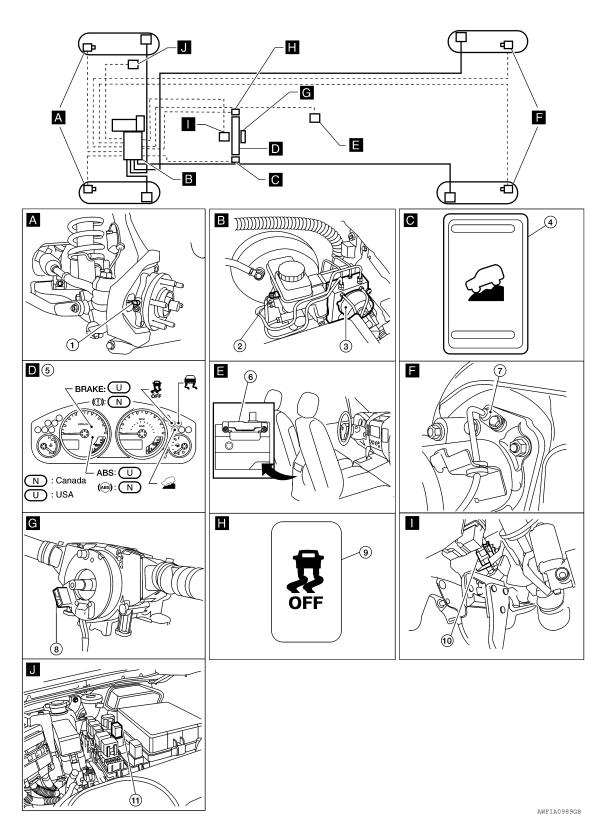
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• The hill start assist system will assist the driver by applying the brake automatically and preventing the vehicle from rolling backward when starting on an uphill.

• The maximum holding time is 2 seconds. After 2 seconds, the vehicle will begin to roll back gradually and then hill start assist will stop operating completely.

Revision: August 2014 BRC-131 2015 Xterra

# Component Parts Location



- 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
- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

## **HILL START ASSIST**

## < SYSTEM DESCRIPTION >

[TYPE 2]

7. Rear wheel sensor LH C11 Rear wheel sensor RH C10 8. Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154

ble) M47

(Steering wheel removed for clarity)

10. Stop lamp switch E39

11. Stop lamp relay E12

Component Description

INFOID:0000000011068127

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump Motor	BRC-163, "Description"
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

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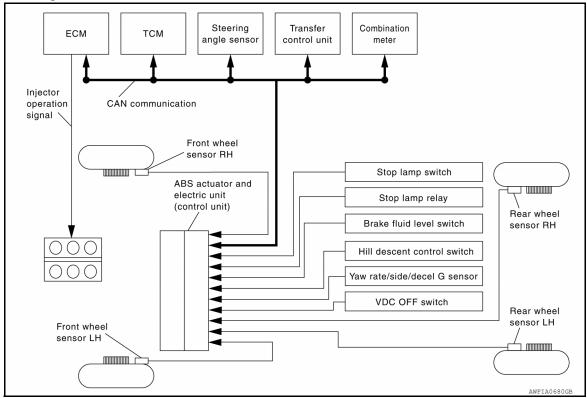
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### **VDC**

System Diagram

INFOID:0000000011068128



## **System Description**

- 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 is available.

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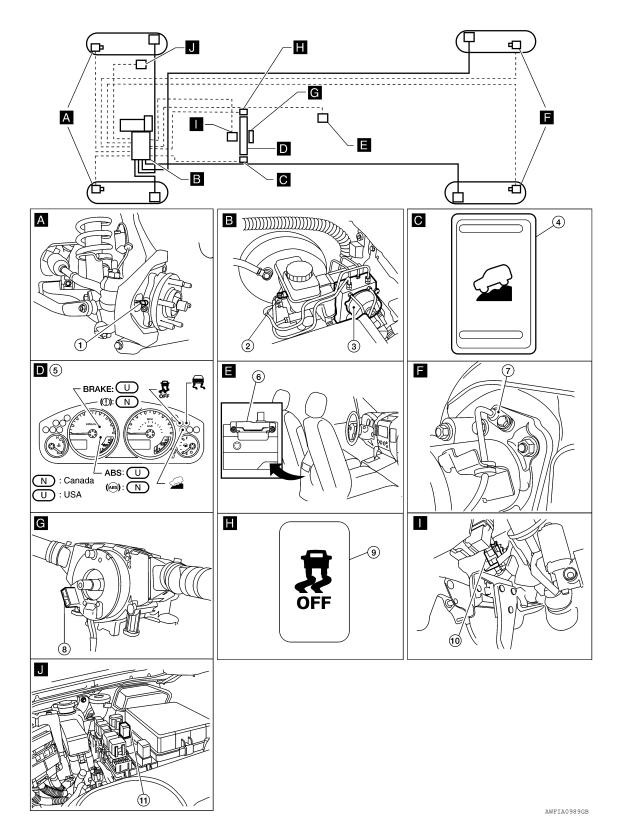
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# Component Parts Location

INFOID:0000000011068130



Front wheel sensor LH E18
 Front wheel sensor RH E117

Hill descent control switch M155 5.

. Brake fluid level switch E21

Combination meter M24

- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

Revision: August 2014

**BRC-135** 

7. Rear wheel sensor LH C11 Rear wheel sensor RH C10 8. Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154

ble) M47

(Steering wheel removed for clarity)

10. Stop lamp switch E39 11. Stop lamp relay E12

# **Component Description**

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	<u> </u>
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

**[TYPE 2]** 

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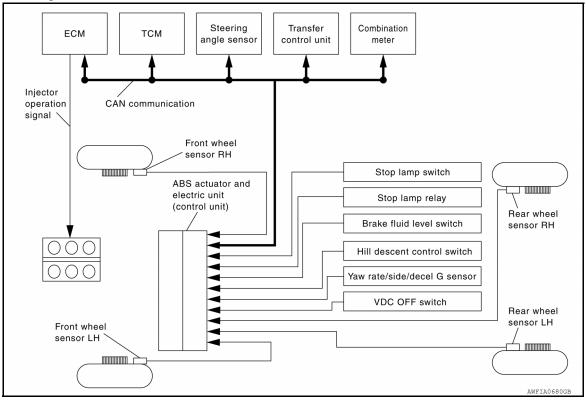
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**TCS** 

System Diagram



**System Description** 

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- 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 is available.

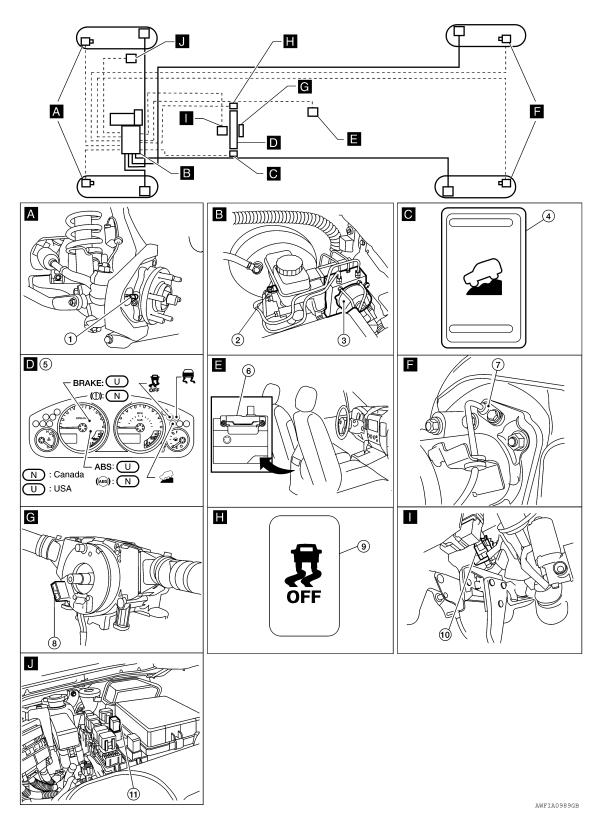
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# **Component Parts Location**



- 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
- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

< SYSTEM DESCRIPTION > [TYPE 2]

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

8. Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154

ble) M47 (Steering wheel removed for clarity)

10. Stop lamp switch E39 11. Stop lamp relay E12

## Component Description

INFOID:0000000011068135

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump Motor	BRC-163, "Description"
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

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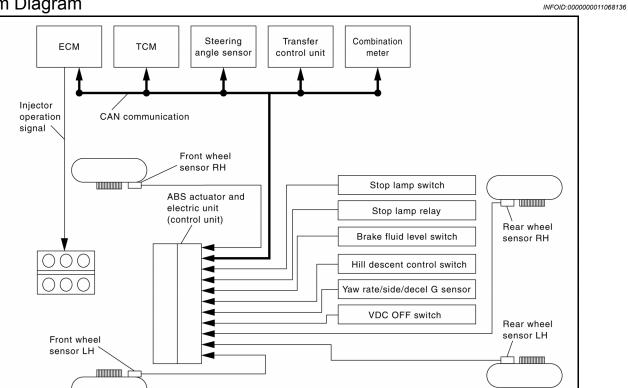
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## **ABS**

# System Diagram



## **System Description**

- 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 is available.

# **Component Parts Location**

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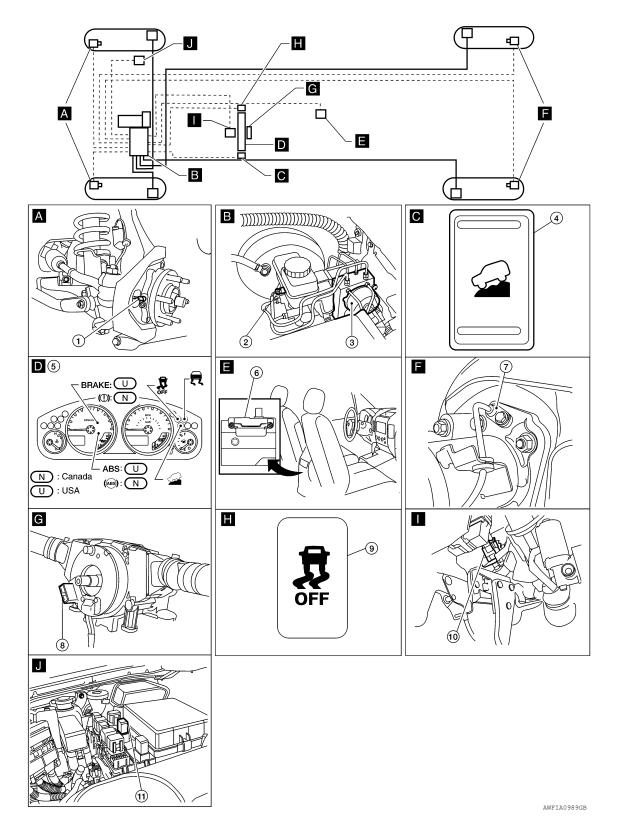
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- Front wheel sensor LH E18
   Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- Brake fluid level switch E21
- Combination meter M24
- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

7. Rear wheel sensor LH C11 Rear wheel sensor RH C10 8. Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154

ble) M47

(Steering wheel removed for clarity)

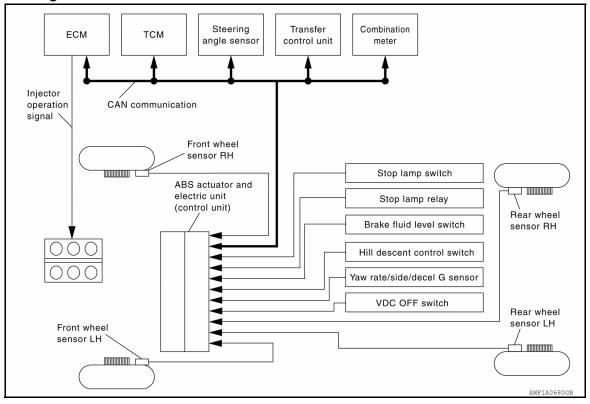
10. Stop lamp switch E39 11. Stop lamp relay E12

# **Component Description**

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump Motor	BRC-163, "Description"
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

## **EBD**

System Diagram



# **System Description**

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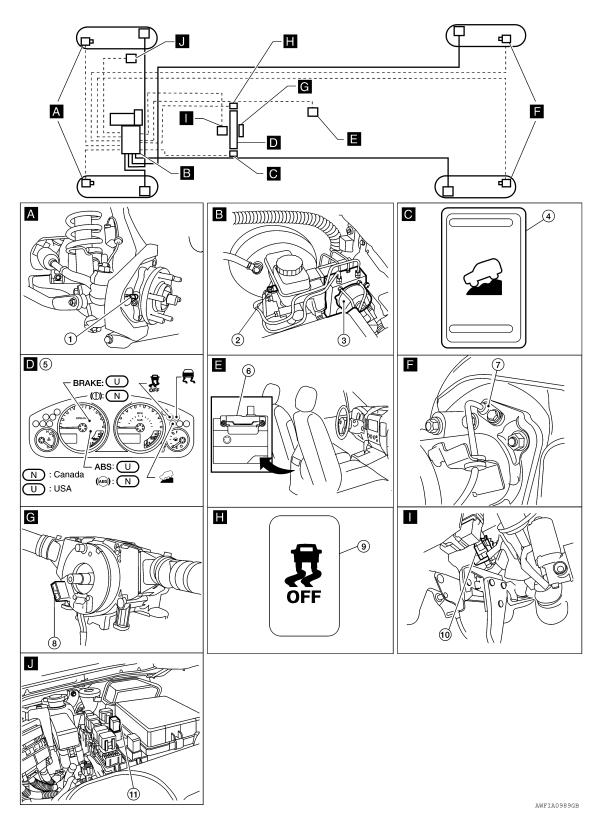
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 Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid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

Electrical system diagnosis by CONSULT is available.

Revision: August 2014 BRC-143 2015 Xterra

# **Component Parts Location**



- 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
- 3. ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73

### **EBD**

< SYSTEM DESCRIPTION > [TYPE 2]

7. Rear wheel sensor LH C11 Rear wheel sensor RH C10 8. Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154

ble) M47 (Steering wheel removed for clarity)

10. Stop lamp switch E39 11. Stop lamp relay E12

### Component Description

INFOID:0000000011068143

Component parts		Reference
	Pump	PDC 162 "Description"
	Motor	BRC-163, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-179, "Description"
The detactor and electric and (control and)	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-190, "Description"
Wheel sensor		BRC-152, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-181, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-195, "Description"
VDC OFF switch		BRC-197, "Description"
ABS warning lamp		BRC-199, "Description"
Brake warning lamp		BRC-200, "Description"
Hill descent control indicator lamp		BRC-201, "Description"
VDC OFF indicator lamp		BRC-202, "Description"
SLIP indicator lamp		BRC-204, "Description"

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#### < SYSTEM DESCRIPTION >

[TYPE 2]

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

**CONSULT Function (ABS)** 

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#### **FUNCTION**

CONSULT can display each diagnostic item using the following direct diagnostic modes.

Direct Diagnostic Mode	Description
ECU Identification	The ABS actuator and electric unit (control unit) part number is displayed.
Self Diagnostic Result	The ABS actuator and electric unit (control unit) self diagnostic results are displayed.
Data Monitor	The ABS actuator and electric unit (control unit) input/output data is displayed in real time.
Active Test	The ABS actuator and electric unit (control unit) activates outputs to test components.
Work support	The settings for ABS actuator and electric unit (control unit) functions can be changed.
CAN Diag Support Mntr	The result of transmit/receive diagnosis of CAN communication is displayed.

#### SELF DIAGNOSTIC RESULT

#### 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, 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-210, "DTC No. Index".

#### **DATA MONITOR**

Item	Dat	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration detected by decel G-sensor is displayed.

[TYPE 2] < SYSTEM DESCRIPTION >

Item		a monitor item sele	Domorko	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR RH IN SOL (On/Off)	-	×	×	Front RH IN ABS solenoid (On/Off status is displayed.
FR RH OUT SOL (On/Off)	-	×	×	Front RH OUT ABS solenoid (On/ Off) status is displayed.
FR LH IN SOL (On/Off)	-	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.
FR LH OUT SOL (On/Off)	-	×	×	Front LH OUT ABS solenoid (On/ Off) status is displayed.
RR RH IN SOL (On/Off)	-	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	-	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	-	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	-	×	×	Rear LH OUT ABS solenoid (On/ Off) status is displayed.
EBD WARN LAMP (On/Off)	-	-	×	Brake warning lamp (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	-	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	-	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	-	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	-	×	×	OFF Lamp (On/Off) status is displayed.
OFF SW (On/Off)	×	×	×	VDC OFF switch (On/Off) status is displayed.
SLIP LAMP (On/Off)	-	×	×	SLIP indicator lamp (On/Off) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is dis played.
ENGINE SPEED (rpm)	×	×	×	Engine speed judged by CAN com munication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sensor is displayed.
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.

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Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
2WD/4WD (2WD/4WD)	_	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
ACCEL POS SIG (%)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s <sup>2</sup> )	×	_	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	-	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	-	×	Brake pressure detected by pressure sensor 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.
ABS FAIL SIG (On/Off)	_	-	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	_	_	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	-	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	-	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	-	×	Brake fluid level switch (On/Off) status is displayed.
DLOCK SW (On/Off)	_	-	×	Condition of differential lock mode switch (On/Off) is displayed.
DLOCK CHG SW (On/Off)	-	-	×	Condition of differential lock position switch (On/Off) is displayed.
STP ON RLY (On/Off)	_	-	×	Stop lamp relay signal (On/Off) status is displayed.
DDS SW (Note 1) (On/Off)	_	-	×	Hill descent control switch (On/Off) status is displayed.
DDS SIG (Note 1) (On/Off)	_	_	×	Hill descent control operation (On/Off) status is displayed.
USS SIG (Note 2) (On/Off)	_	-	×	Hill start assist operation (On/Off) status is displayed.

<sup>×:</sup> Applicable

#### NOTE:

- 1: The CONSULT will display DDS (Downhill Drive Support) when referring to the Hill Descent Control system.
- · 2: The CONSULT will display USS (Uphill Start Support) when referring to the Hill Start Assist system.

### **WORK SUPPORT**

<sup>-:</sup> Not applicable

< SYSTEM DESCRIPTION > [TYPE 2]

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to BRC-123, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-124</u> . "CALIBRATION OF DECEL G SENSOR: Description".

#### **ACTIVE TEST**

#### **CAUTION:**

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, 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	ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP	
ED DIL COL	FR RH IN SOL	Off	On	On	_	_	_	
FR RH SOL	FR RH OUT SOL	Off	Off	On*	_	_	_	
FR LH SOL	FR LH IN SOL	Off	On	On	_	_	_	
FR LH SOL	FR LH OUT SOL	Off	Off	On*	_	_	_	
RR RH SOL	RR RH IN SOL	Off	On	On	_	_	_	
KK KH SUL	RR RH OUT SOL	Off	Off	On*	_	_	_	
RR LH SOL	RR LH IN SOL	Off	On	On	_	_	_	
RR LH SOL	RR LH OUT SOL	Off	Off	On*	_	_	_	
	RR RH IN SOL	Off	On	On	Off	Off	Off	
DEAD COL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off	
REAR SOL	RR LH IN SOL	Off	On	On	Off	Off	Off	
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off	
ED DU ADS SOLENOID (ACT)	FR RH IN SOL	_	_	_	Off	Off	Off	
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	_	_	_	Off	Off	Off	
ED LILADO COLENOID (ACT)	FR LH IN SOL	_	_	_	Off	Off	Off	
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	_	_	_	Off	Off	Off	
	RR RH IN SOL	_	_	_	Off	Off	Off	
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL	_	_	_	Off	Off	Off	
DD LLLADO COLENOID (ACT)	RR LH IN SOL	_	_	_	Off	Off	Off	
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL		_		Off	Off	Off	

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

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### < SYSTEM DESCRIPTION >

[TYPE 2]

**ABS MOTOR** 

• Touch "On" and "Off" on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

STOP LAMP ON RELAY

• Touch "On" and "Off" on screen. Make sure stop lamp relay operates as shown in table below. Brake lamps will illuminate when relay is "On".

Operation	On	Off
STP ON RLY	On	Off

### **APPLICATION NOTICE**

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

# **DTC/CIRCUIT DIAGNOSIS**

### **APPLICATION NOTICE**

**Application Notice** 

INFOID:0000000011068145	

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

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

Description INFOID:000000011068146

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 causes
C1101	RR RH SENSOR-1	<ul> <li>When power supply voltage of rear wheel sensor RH is low.</li> <li>When an open or shorted circuit is detected in rear wheel sensor RH circuit.</li> </ul>	
C1102	RR LH SENSOR-1	<ul> <li>When power supply voltage of rear wheel sensor LH is low.</li> <li>When an open or shorted circuit is detected in rear wheel sensor LH circuit.</li> </ul>	<ul><li> Harness or connector</li><li> Wheel sensor</li></ul>
C1103	FR RH SENSOR-1	<ul> <li>When power supply voltage of front wheel sensor RH is low.</li> <li>When an open or shorted circuit is detected in front wheel sensor RH circuit.</li> </ul>	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	<ul> <li>When power supply voltage of front wheel sensor LH is low.</li> <li>When an open or shorted circuit is detected in front wheel sensor LH circuit.</li> </ul>	

#### DTC CONFIRMATION PROCEDURE

### 1. CHECK SELF DIAGNOSTIC RESULT

(P)With CONSULT.

- 1. Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
- Perform self diagnostic result.

#### Is DTC C1101, C1102, C1103 or C1104 detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-152</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End.

### Diagnosis Procedure

INFOID:0000000011068148

Regarding Wiring Diagram information, refer to <u>BRC-212, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST"</u>.

#### **CAUTION:**

Do not check between wheel sensor terminals.

### 1.CONFIRM DTC

#### (P) With CONSULT

- Perform self-diagnostic result of ABS and record all active DTCs.
- Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <u>BRC-152</u>, "<u>DTC Logic</u>".

### Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> GO TO 2.

NO >> Refer to GI-41, "Intermittent Incident".

### 2.INSPECT WHEEL SENSOR

Inspect the suspect wheel sensor for damage or deformation.

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

### < DTC/CIRCUIT DIAGNOSIS >

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

# 3.HARNESS AND CONNECTOR INSPECTION

- 1. Disconnect ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of suspect wheel.
- Check harness, connectors and terminals for corrosion, deformation, disconnection, looseness or damage.

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

### 4. 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.

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.

### NOTE:

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

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

YES >> GO TO 5.

NO >> Replace the wheel sensor. Refer to <u>BRC-234, "Removal and Installation"</u>.

### 5.CHECK WIRING HARNESS FOR SHORT TO VOLTAGE

Turn ignition switch ON.

2. Check voltage between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor		Ground	Voltage	
Wheel	Connector	Terminal	Giouna	voltage
Front LH	E18	1		
FIOIIL LIT	E10	2		
Front RH  Rear LH  Rear RH	E117 -	1	_	0V
		2		
		1		
		2		
	C10	1		
Real RH	C10	2		

#### Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair the circuit.

### 6. CHECK WIRING HARNESS FOR SHORT TO GROUND

- Turn ignition switch OFF.
- 2. Check continuity between wheel sensor harness connector terminals of suspect wheel and ground.

Wheel Sensor		Ground	Continuity	
Wheel	Connector	Terminal	Ground	Continuity

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

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

Front LH	E18	1		
I TOTAL ELT	LIO	2		
Front RH	E117	1		
TIONETATI	L117	2	_	No
Rear LH	C11	1		140
real Ell	011	2		
Rear RH	C10	1		
- Tour Hi	310	2		

#### Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair the circuit.

### 7.CHECK WIRING HARNESS FOR SHORT BETWEEN CIRCUITS

Check continuity between wheel sensor harness connector terminals of suspect wheel.

Wheel Sensor		(+)	(-)	Continuity
Wheel	Connector	Terminal	Terminal	Continuity
Front LH	E18			
Front RH	E117	1	2	No
Rear LH	C11			
Rear RH	C10			

#### Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair the circuit.

### 8.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 and wheel sensor connector of wheel with DTC.

Wheel sensor	ABS actuator and ele	ctric unit (control unit)	Wheel	sensor	Continuity
Wileel Sellsol	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIOIIL LH	46	E10	2		
Front RH	34 E117	F447	1		
FIONL RH	E125	33	EIII	2	Yes
Rear LH	L120	36	C11	1	
iveai Li i		37	OII	2	
Rear RH		43	C10	1	1
		42	010	2	

#### Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair the circuit.

### $9.\mathsf{check}$ abs actuator and electric unit (control unit) power supply circuit

- 1. Turn ignition switch ON.
- 2. Check voltage between ABS actuator and electric unit (control unit) harness connector E125 terminal and ground.

	and electric unit ol unit)	Ground	Condition	Voltage (Approx.)
Connector	Terminal			(Αρρίολ.)
E125	0		Ignition switch ON	Battery voltage
E 125	8	_	Ignition switch OFF	0V

#### Is the inspection result normal?

YES >> GO TO 10.

NO >> Check the following:

- 10A fuse No. 50 located in the IPDM E/R
- Harness between ABS actuator and electric unit (control unit) and IPDM E/R

# $10.\mathsf{check}$ abs actuator and electric unit (control unit) ground circuit

Turn ignition switch OFF.

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal	1	Continuity	
E125	16	- Ground	Yes	
E125	47	Giouna	ies	

### Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace malfunctioning components.

### 11. CHECK WHEEL SENSOR INPUT VOLTAGE

- Connect ABS actuator and electric unit (control unit) connector E125.
- 2. Turn ignition switch ON.
- Check voltage between suspect wheel sensor harness connector terminals.

Wheel Sensor		(+)	(-)	Voltage
Wheel	Connector	Terminal	Terminal	(Approx.)
Front LH	E18			
Front RH	E117	4	2	Battery voltage
Rear LH	C11	· '	2	
Rear RH	C10			

#### Is the inspection result normal?

YES >> Replace wheel sensor. Refer to BRC-234, "Removal and Installation". Then, GO TO 12.

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-236, "Removal and Installation".

# 12.CONFIRM REPAIR

- (P) With CONSULT
- Clear all DTCs.
- Perform DTC confirmation procedure. Refer to <a href="BRC-152">BRC-152</a>, "DTC Logic".

### Does DTC C1101, C1102, C1103 or C1104 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-236, "Removal and Installation".

NO >> Inspection End.

### Component Inspection

CHECK DATA MONITOR

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-152</u>, "<u>Diagnosis Procedure</u>".

### Special Repair Requirement

INFOID:0000000011068150

# 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-123">BRC-123</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-124, "CALIBRATION OF DECEL G SENSOR: Description".

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

Description INFOID:0000000011068151

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:0000000011068152

#### DTC DETECTION LOGIC

DTC	Display Item	Malfunction detected condition	Possible causes
C1105	RR RH SENSOR-2	<ul> <li>When distance between rear wheel sensor RH and rear wheel sensor RH rotor is large.</li> <li>When installation of rear wheel sensor RH or rear wheel sensor RH rotor is not normal.</li> </ul>	
C1106	RR LH SENSOR-2	<ul> <li>When distance between rear wheel sensor LH and rear wheel sensor LH rotor is large.</li> <li>When installation of rear wheel sensor LH or rear wheel sensor LH rotor is not normal.</li> </ul>	<ul><li>Wheel sensor</li><li>ABS actuator and electric unit</li></ul>
C1107	FR RH SENSOR-2	<ul> <li>When distance between front wheel sensor RH and front wheel sensor RH rotor is large.</li> <li>When installation of front wheel sensor RH or front wheel sensor RH rotor is not normal.</li> </ul>	(control unit) • Sensor rotor
C1108	FR LH SENSOR-2	<ul> <li>When distance between front wheel sensor LH and front wheel sensor LH rotor is large.</li> <li>When installation of front wheel sensor LH or front wheel sensor LH rotor is not normal.</li> </ul>	

### DTC CONFIRMATION PROCEDURE

### 1. CHECK SELF DIAGNOSTIC RESULT

(P)With CONSULT.

- Start engine and drive vehicle at approximately 21 km/h (13 MPH) or more for approximately 5 minutes.
- Perform self diagnostic result.

#### Is DTC C1105, C1106, C1107 or C1108 detected?

YES >> Proceed to diagnosis procedure. Refer to BRC-157, "Diagnosis Procedure".

NO >> Inspection End.

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

#### **CAUTION:**

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

### CONFIRM DTC

- (P) With CONSULT
- Perform self-diagnostic result of ABS and record all active DTCs.
- Perform DTC confirmation procedure. Refer to <a href="BRC-157">BRC-157</a>, "DTC Logic".

#### Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> GO TO 2.

NO >> Refer to GI-41, "Intermittent Incident".

2.CHECK TIRE PRESSURE AND TIRE WEAR

Check tires for excessive wear and proper inflation. Refer to WT-54, "Tire".

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

< DTC/CIRCUIT DIAGNOSIS >

#### Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace as necessary.

# 3. CHECK WHEEL SENSOR

Check wheel sensor for the following:

- Proper installation
- Physical damage
- Contamination

#### Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace as necessary.

### 4.CHECK SENSOR ROTOR

Check sensor rotor for the following:

- Contamination
- Physical damage (missing teeth, cracks, etc.)
- Foreign material
- Looseness

#### Is the inspection result normal?

YES >> Replace the wheel sensor. Refer to <u>BRC-234, "Removal and Installation"</u>. Then, GO TO 5.

NO >> Repair or replace as necessary.

### 5.CONFIRM REPAIR

#### (P) With CONSULT

1. Clear all DTCs.

2. Perform DTC confirmation procedure. Refer to BRC-157, "DTC Logic".

#### Does DTC C1105, C1106, C1107 or C1108 reset?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Inspection End.

### Component Inspection

1. CHECK DATA MONITOR

INFOID:0000000011068154

**[TYPE 2]** 

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-167">BRC-167</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068155

### ${f 1}$ .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-123">BRC-123</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

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

< DTC/CIRCUIT 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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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#### C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

INFOID:0000000011068158

### C1109 POWER AND GROUND SYSTEM

Description INFOID.000000011068156

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

### 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-160">BRC-160</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212</u>, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".

### 1. CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <a href="BRC-146">BRC-146</a>, "CONSULT Function (ABS)".

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

YES >> GO TO 2

NO >> Poor connection of connector terminals. 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.
- Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 8 and ground.

ABS actuator and electric unit (control unit)			Condition	Voltage
Connector	Terminal	•		
F125	8	Ground	Ignition switch: ON	Battery voltage
E125	0	Giodila	Ignition switch: OFF	Approx. 0V

#### C1109 POWER AND GROUND SYSTEM

# < DTC/CIRCUIT DIAGNOSIS >

Turn ignition switch OFF.

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 malfunc-

NO >> Repair or replace malfunctioning components.

### 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-123, "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-124, "CALIBRATION OF DECEL G SENSOR: Description".

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**[TYPE 2]** 

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Display item Malfunction detected condition	
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 drift)

#### 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 BRC-162, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068161

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

>> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-236">BRC-236</a>, "Removal and Installation".

### Special Repair Requirement

INFOID:0000000011068162

### 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-123">BRC-123</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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:0000000011068163

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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	PLIMP 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
C1111	PUMP MOTOR	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)

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#### 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-163">BRC-163</a>, "Diagnosis Procedure".

NO >> Inspection End

Diagnosis Procedure

INFOID:0000000011068165

Regarding Wiring Diagram information, refer to <u>BRC-212, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".</u>

### 1. CONNECTOR INSPECTION

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- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.

3. Check terminals for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminals.

4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-146, "CONSULT Function</u> (ABS)".

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

YES >> GO TO 2

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

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

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check voltage between the ABS actuator and electric unit (control unit) connector E125 terminal 1 and ground.

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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) connector E125 terminals 16, 47 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-236</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068166

### 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 <u>BRC-163, "Diagnosis Procedure"</u>.

### Special Repair Requirement

INFOID:0000000011068167

### 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-123">BRC-123</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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

Description INFOID:0000000011068168

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

### 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-165, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212</u>, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".

#### **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, SLIP indicator lamp may illuminate and CONSULT 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.

### 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

ion is OFF may
a malfunction if
SLIP indicator
malfunction.

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Check continuity between the ABS actuator and electric unit (control unit) connector E125 terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 terminals 3, 2, 4, 1.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E125	18	B73	3	
	19		2	Yes
	22		4	165
	29		1	

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

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

Perform the yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-166</u>, "Component Inspection". Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-236</u>, "Removal and Installation"
- NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-239</u>, "Removal and Installation".

### Component Inspection

INFOID:0000000011068171

### 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 <a href="BRC-165">BRC-165</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068172

## 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-123">BRC-123</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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

Description INFOID:0000000011068173

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:0000000011068174

#### 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

### 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ABS SENSOR [ABNORMAL SIGNAL]

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

>> Proceed to diagnosis procedure. Refer to <a href="BRC-167">BRC-167</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

#### **CAUTION:**

Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

- Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning 1.
- 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 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.

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

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.

retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

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NO >> Replace the wheel sensor. Refer to BRC-234, "Removal and Installation".

### 3. CHECK TIRES

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

#### Is the inspection result normal?

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) or <u>RAX-19</u>, "Rear Axle Bearing" (rear).

#### Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front) or <u>RAX-24</u>, "<u>Removal and Installation</u>" (rear).

### ${f 5}$ .CHECK WIRING HARNESS FOR SHORT CIRCUIT

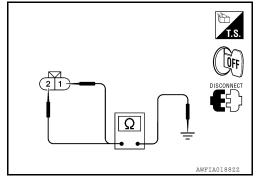
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor connector terminals and ground.

### 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) connector and the malfunctioning wheel sensor connector.

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

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Repair the circuit.

### Component Inspection

INFOID:0000000011068176

### 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.

### C1115 ABS SENSOR [ABNORMAL SIGNAL]

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

INFOID:0000000011068177

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-167">BRC-167</a>, "Diagnosis Procedure".

### 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-123, "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-124, "CALIBRATION OF DECEL G SENSOR: Description".

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INFOID:0000000011068180

### C1116 STOP LAMP SWITCH

Description INFOID:000000011068178

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 <a href="BRC-170">BRC-170</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212</u>. "Wiring <u>Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST"</u>.

### 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.

# $2.\mathsf{stop}$ lamp switch inspection

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

Brake pedal depressed : Battery voltage

Brake pedal released : 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 <a href="mailto:BRC-236">BRC-236</a>, "Removal and Installation".

NO >> GO TO 3

### 3.STOP LAMP SWITCH CIRCUIT INSPECTION

1. Disconnect the stop lamp switch connector.

Revision: August 2014 BRC-170 2015 Xterra

### C1116 STOP LAMP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

2. Check the continuity between the ABS actuator and electric unit (control unit) connector E125 terminal 39 and stop lamp switch connector E39 terminal 2.

### **Continuity should exist.**

#### Is the inspection result normal?

YES >> Refer to BRC-119, "Work Flow".

NO >> Repair or replace malfunctioning components.

### Special Repair Requirement

INFOID:0000000011068181

### $1.\mathsf{ADJUSTMENT}$ 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-123</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

# 2.CALIBRATION OF DECEL G SENSOR

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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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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INFOID:0000000011068184

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

Description INFOID:000000011068182

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-172">BRC-172</a>, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".</u>

## 1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 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-146, "CONSULT 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 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.

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

### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 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.

 $oldsymbol{3}.$ CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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-236, "Removal and Installa-

>> Repair or replace malfunctioning components. NO

### Component Inspection

INFOID:0000000011068185

1. CHECK ACTIVE TEST

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		
		Up	Keep	Down	
FR RH SOL	FR RH IN SOL	Off	On	On	
FR KH SOL	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	
	FR LH OUT SOL	Off	Off	On*	
RR RH SOL	RR RH IN SOL	Off	On	On	
KK KH SUL	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On	On	
	RR LH OUT SOL	Off	Off	On*	

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-172">BRC-172</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068186

 ${f 1}$  . 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-123, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION: Description".

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# C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT 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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

Description INFOID:0000000011068187

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

DTC Logic INFOID:0000000011068188

#### 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-175, "Diagnosis Procedure".

NO >> Inspection End

### Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

### 1.CONNECTOR INSPECTION

- 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-146, "CONSULT Function</u> (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.
- Disconnect ABS actuator and electric unit (control unit) connector.

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INFOID:0000000011068189

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Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector Terminal		_	voitage
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 ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 <a href="BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068190

### 1. CHECK ACTIVE TEST

- 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.

Operation			ABS solenoid valve		
		Up	Keep	Down	
FR RH SOL	FR RH IN SOL	Off	On	On	
	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	
	FR LH OUT SOL	Off	Off	On*	
RR RH SOL	RR RH IN SOL	Off	On	On	
	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On	On	
	RR LH OUT SOL	Off	Off	On*	

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-175">BRC-175</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068191

### ${f 1}$ .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-123">BRC-123</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

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

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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

Description INFOID:000000011068192

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	Based on the signal from ECM, ABS actuator and electric unit (control unit) judges that engine fuel cut system is malfunctioning.		
C1131	ENGINE SIGNAL 2		<ul><li>Harness or connector</li><li>ABS actuator and electric unit</li></ul>	
C1132	ENGINE SIGNAL 3		unit (control unit) judges that engine fuel cut system is malfunctioning. (control unit)  • ECM	(control unit)
C1133	ENGINE SIGNAL 4			ECM     CAN communication line
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 <u>BRC-178</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End

### Diagnosis Procedure

INFOID:0000000011068194

### 1. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <a href="EC-53">EC-53</a>, "CONSULT Function".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146</u>, "CONSULT Function (ABS)".

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

YES >> Repair or replace the affected part.

NO >> Inspection End

### C1140 ACTUATOR RLY

Description INFOID:0000000011068195

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

DTC Logic INFOID:0000000011068196

#### 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?

>> Proceed to diagnosis procedure. Refer to <a href="BRC-179">BRC-179</a>, "Diagnosis Procedure". YES

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

### 1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- 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 BRC-146, "CONSULT 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.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 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

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#### C1140 ACTUATOR RLY

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

NO >> Repair or replace malfunctioning components.

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

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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 <a href="BRC-236">BRC-236</a>, "Removal and Installation"

NO >> Repair or replace malfunctioning components.

### Component Inspection

INFOID:0000000011068198

### 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 <a href="BRC-179">BRC-179</a>, "Diagnosis Procedure".

### Special Repair Requirement

INFOID:0000000011068199

### 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-123</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</u>: 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-124, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

## C1143, C1144 STEERING ANGLE SENSOR

Description INFOID:0000000011068200

The steering angle sensor detects the rotation amount, angular velocity and direction of the steering wheel, and transmits the data to the ABS actuator and electric unit (control unit) via CAN communication.

DTC Logic INFOID:0000000011068201

#### 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.	Steering angle sensor
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	<ul> <li>ABS actuator and electric uni (control unit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

## 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?

>> Proceed to diagnosis procedure. Refer to <a href="BRC-181">BRC-181</a>, "Diagnosis Procedure". YES

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000011068202

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

## 1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)".

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

YES >> GO TO 2

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

## 2.check steering angle sensor harness

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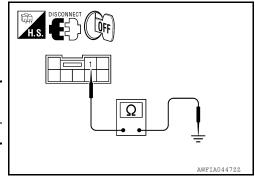
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**[TYPE 2]** 

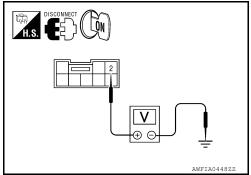
- 1. Turn ignition switch OFF.
- Disconnect steering angle sensor connector.
- Check continuity between steering angle sensor connector M47 terminal 1 and ground.

Steering a	ngle sensor		Continuity
Connector Terminal			Continuity
M47	1	Ground	Yes



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

Steering a	ngle sensor		Voltage
Connector	Terminal		
M47	2	Ground	Battery voltage
		*	



#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3. CHECK DATA MONITOR

Perform the steering angle sensor component inspection. Refer to <u>BRC-182</u>, "<u>Component Inspection</u>". <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-236">BRC-236</a>, "Removal and Installation".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-238</u>, "Removal and Installation".

## Component Inspection

INFOID:0000000011068203

## 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	0±3.5 °
Turn 90 ° to left	Approx. +90 °
Turn 90 ° to right	Approx. –90 °

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-181</u>, "<u>Diagnosis Procedure</u>".

## Special Repair Requirement

INFOID:0000000011068204

## ${f 1}$ .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-123">BRC-123</a>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

## 2.calibration of decel g sensor

## C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit).
Refer to BRC-124, "CALIBRATION OF DECEL G SENSOR: Description".

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**[TYPE 2]** 

INFOID:0000000011068207

## C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:000000011068205

The brake fluid level switch converts the brake fluid level to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Brake fluid level is low or communication line between the ABS actuator and electric unit (control unit) and brake fluid level switch is open or shorted.	<ul><li> Harness or connector</li><li> Brake fluid level switch</li><li> Brake fluid level</li></ul>

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
BR FLUID LEVEL LOW	

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

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-184">BRC-184</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212</u>, "Wiring Diagram - WITH HILL <u>DESCENT CONTROL/HILL START ASSIST"</u>.

## 1. CONNECTOR INSPECTION

- 1. 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)

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

ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	28	E21	1	Yes

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

#### < DTC/CIRCUIT DIAGNOSIS >

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Connector Terminal		Continuity
E125	28	Ground	No

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## 3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check continuity between brake fluid level switch 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

Perform the brake fluid level switch component inspection. Refer to BRC-185, "Component Inspection".

## 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-236, "Removal and Installation".

NO >> Replace brake fluid level switch.

## Component Inspection

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch terminals	Condition	Continuity
1 – 2	Brake fluid reservoir is full.	No
1-2	Brake fluid reservoir is empty.	Yes

#### Is the inspection result normal?

YES >> Inspection End

>> Replace brake fluid level switch.

## 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-123, "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-124, "CALIBRATION OF DECEL G SENSOR: Description".

**[TYPE 2]** 

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#### C1156 ST ANG SEN COM CIR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

#### C1156 ST ANG SEN COM CIR

Description INFOID:0000000011068210

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).	<ul> <li>Harness or connector</li> <li>CAN communication line</li> <li>Steering angle sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	

DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ST ANG SEN COM CIR	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <a href="BRC-187">BRC-187</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

1.CONNECTOR INSPECTION

- Turn ignition switch OFF.
   Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connector and perform self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)".

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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< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

## C1160 DECEL G SEN SET

Description INFOID:000000011068213

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
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)

#### 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 <a href="BRC-188">BRC-188</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000011068215

## 1.PERFORM SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146, "CONSULT Function (ABS)"</u>.

Self-diagnosis results	
DECEL G SEN SET	

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

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

NO >> Perform calibration of decel G sensor. Refer to <a href="BRC-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR : Description". GO TO 2

## 2.PERFORM SELF-DIAGNOSIS AGAIN

- Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to <u>BRC-146, "CON-SULT Function (ABS)"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to <u>BRC-146</u>, "CONSULT <u>Function (ABS)"</u>.

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

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-239, "Removal and Installation".

NO >> Inspection End

#### C1163 ST ANGLE SEN SAFE

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

#### C1163 ST ANGLE SEN SAFE

**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
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-189">BRC-189</a>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-123, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description"</u>.

>> 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-146</u>, "CON-SULT Function (ABS)".

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**[TYPE 2]** 

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

Description INFOID:000000011068219

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-190</u>, "<u>Diagnosis Procedure</u>".

NO >> Inspection End

## Diagnosis Procedure

INFOID:0000000011068221

Regarding Wiring Diagram information, refer to <u>BRC-212, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".</u>

## 1. CONNECTOR INSPECTION

- 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-146</u>, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

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

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

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.

Disconnect ABS actuator and electric unit (control unit) connector. 2.

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)		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 ACTUATOR RELAY GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 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-236, "Removal and Installa-

NO >> Repair or replace malfunctioning components.

## Component Inspection

#### INFOID:0000000011068222

## 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 (ACT)		
		Up	ACT UP	ACT KEEP
	FR RH IN SOL	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	Off	Off	Off
	FR LH IN SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
KK KH ABS SOLENOID (ACT)	RR RH OUT SOL	Off	Off	Off
	RR LH IN SOL	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL	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

>> Go to diagnosis procedure. Refer to <a href="BRC-190">BRC-190</a>, "Diagnosis Procedure". NO

## Special Repair Requirement

INFOID:0000000011068223

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

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

#### < DTC/CIRCUIT 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 <u>BRC-123</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</u>: 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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### C1187 DIFFERENTIAL LOCK CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

## C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description INFOID:000000011068224

The differential lock control unit is connected to the ABS actuator and electric unit (control unit) via 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
C1187	ABS DIFLOCK CONTROL- LER NG	Differential lock controller malfunction.	<ul> <li>Harness or connector</li> <li>CAN communication line</li> <li>Differential lock control unit</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-193, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connector and perform self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)".

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

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#### **U1000 CAN COMM CIRCUIT**

**[TYPE 2]** < DTC/CIRCUIT DIAGNOSIS >

#### U1000 CAN COMM CIRCUIT

Description INFOID:0000000011068227

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:0000000011068228

#### 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:0000000011068229

## 1. CONNECTOR INSPECTION

- Turn ignition switch OFF.
- Disconnect the ABS actuator and electric unit (control unit) connector.
- Check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminals.
- Reconnect connector and perform self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)".

#### 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". YES
- >> Connector terminal is loose, damaged, open, or shorted. NO

#### HILL DESCENT CONTROL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

## HILL DESCENT CONTROL SWITCH

Description INFOID:0000000011068230

The hill descent control switch activates (turn ON) the hill descent control function when the hill descent control switch is pressed.

## Component Function Check

INFOID:0000000011068231

## CHECK HILL DESCENT CONTROL SWITCH OPERATION

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

Condition	Hill descent control indicator lamp illumination status
Hill descent control switch: ON	ON
Hill descent control switch: OFF	OFF

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#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-195</u>, "<u>Diagnosis Procedure</u>".

## Diagnosis Procedure

INFOID:0000000011068232

Regarding Wiring Diagram information, refer to BRC-212, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

## CHECK HILL DESCENT CONTROL SWITCH

Perform the hill descent control switch component inspection. Refer to BRC-196, "Component Inspection". Is the inspection result normal?

YES >> GO TO 2

NO >> Replace hill descent control switch.

2.check hill descent control switch harness

- Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 25 and hill descent control switch connector M155 terminal 2.

ABS actuator and electric unit (control unit)		Hill descent control switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	25	M155	2	Yes

Check continuity between ABS actuator and electric unit (control unit) connector E125 terminal 25 and ground.

ABS actuator and electric unit (control unit)  Connector Terminal		_	Continuity
		_	
E125	25	Ground	No

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

## 3.CHECK HILL DESCENT CONTROL SWITCH GROUND

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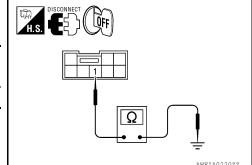
#### HILL DESCENT CONTROL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

Check continuity between hill descent control switch connector M155 terminal 1 and ground.

Hill descent	control switch	_	Continuity
Connector Terminal			Continuity
M155	1	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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-236</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

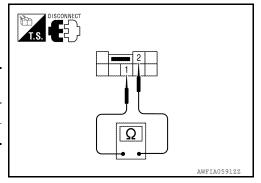
## Component Inspection

INFOID:0000000011068233

# 1. CHECK HILL DESCENT CONTROL SWITCH

- 1. Turn ignition switch OFF.
- 2. Disconnect hill descent control switch connector.
- 3. Check continuity between hill descent control switch terminals.

Hill descent control switch terminals	Condition	Continuity
1 – 2	Hill descent control switch is ON.	Yes
1 – 2	Hill descent control switch is OFF.	No



#### Is the inspection result normal?

YES >> Inspection End

NO >> Replace hill descent control switch.

## Special Repair Requirement

INFOID:0000000011068234

## 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-123">BRC-123</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-124, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### VDC OFF SWITCH

Description INFOID:0000000011068235

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

## Component Function Check

## 1. CHECK VDC OFF SWITCH OPERATION

Press and release the VDC OFF switch, then press and release the VDC OFF switch again 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: pressed and released	ON
VDC OFF switch: pressed and released	OFF

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-197">BRC-197</a>, "Diagnosis Procedure".

## Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-212</u>, "Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST".

## 1. CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to BRC-198, "Component Inspection".

#### 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.

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

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E125	6	M154	1	Yes

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

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		Continuity
E125	6	Ground	No

#### Is the inspection result normal?

YES >> GO TO 3

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NO >> Repair or replace harness.

## 3.CHECK VDC OFF SWITCH GROUND

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Check continuity between VDC OFF switch connector M154 and ground.

VDC OF	F switch	_	Continuity
Connector	Terminal		Continuity
M154	2	Ground	Yes

# DISCONNECT OFF

#### 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-236</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

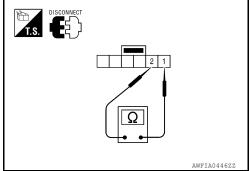
## Component Inspection

INFOID:0000000011068238

## 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 terminals	Condition	Continuity
1 – 2	VDC OFF switch is pressed.	Yes
1 – 2	VDC OFF switch is released.	No



#### Is the inspection result normal?

YES >> Inspection End

NO >> Replace VDC OFF switch.

## Special Repair Requirement

INFOID:0000000011068239

## 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-123">BRC-123</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-124, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### **ABS WARNING LAMP**

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

## **ABS WARNING LAMP**

Description

INFOID:0000000011068240

×: ON -: OFF

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

Component Function Check

INFOID:0000000011068241

## 1. CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

## Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-199">BRC-199</a>, "Diagnosis Procedure".

## Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

INFOID:0000000011068242

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146, "CONSULT 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 <a href="MWI-24">MWI-24</a>, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068243

## 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-123</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

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## 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-124, "CALIBRATION OF DECEL G SENSOR; Description".

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#### **BRAKE WARNING LAMP**

Description INFOID:000000011068244

×: ON -: OFF

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

#### NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- · 2: After starting engine, brake warning lamp is turned off.

## Component Function Check

INFOID:0000000011068245

## 1.BRAKE WARNING LAMP OPERATION CHECK

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-200, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000011068246

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146</u>, "CONSULT 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-236</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068247

## ${f 1}$ .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-123">BRC-123</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-124">BRC-124</a>, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

#### HILL DESCENT CONTROL INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

**[TYPE 2]** 

## HILL DESCENT CONTROL INDICATOR LAMP

Description INFOID:0000000011068248

×: ON -: OFF

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Condition	Hill descent control indicator lamp	
Ignition switch OFF	-	
For 2 seconds after turning ON ignition switch	×	
2 seconds later after turning ON ignition switch	-	
Hill descent control function is malfunctioning.	-	

## Component Function Check

INFOID:0000000011068249

## ${f 1}$ .CHECK HILL DESCENT CONTROL INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-201, "Diagnosis Procedure"</u>.

## Diagnosis Procedure

INFOID:0000000011068250

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)".

#### Is the inspection result normal?

YFS >> 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-236, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068251

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## ${f 1}$ . 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-123, "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-124. "CALIBRATION OF DECEL G SENSOR: Description".

>> END

**BRC** 

**BRC-201 Revision: August 2014** 2015 Xterra

[TYPE 2]

## VDC OFF INDICATOR LAMP

Description INFOID:000000011068252

x: ON -: OFF

Condition	VDC OFF indicator lamp	
Ignition switch OFF	-	
For 2 seconds after turning ON ignition switch	×	
2 seconds 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.	<del>-</del>	

## Component Function Check

INFOID:0000000011068253

## 1. VDC OFF INDICATOR LAMP OPERATION CHECK 1

Check that the lamp illuminates for approximately 2 seconds 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-202">BRC-202</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-197">BRC-197</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000011068254

## 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-197</u>, "<u>Diagnosis Procedure</u>".

## ${f 2.}$ CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146, "CONSULT Function (ABS)"</u>.

#### Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

## 3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="mailto:BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-84, "Removal and Installation".

#### VDC OFF INDICATOR LAMP

## **[TYPE 2]** < DTC/CIRCUIT DIAGNOSIS > Special Repair Requirement INFOID:0000000011068255 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-123, "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-124, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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## SLIP INDICATOR LAMP

Description INFOID:000000011068256

x: ON -: OFF

Condition	SLIP indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

## Component Function Check

INFOID:0000000011068257

## 1. CHECK SLIP INDICATOR LAMP OPERATION

Check that the lamp illuminates for approximately 2 seconds after the ignition switch is turned ON.

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <a href="BRC-204">BRC-204</a>, "Diagnosis Procedure".

## Diagnosis Procedure

INFOID:0000000011068258

## 1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146, "CONSULT 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-24, "Diagnosis Description".

#### Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-236">BRC-236</a>, "Removal and Installation".

NO >> Replace combination meter. Refer to <a href="MWI-84">MWI-84</a>, "Removal and Installation".

## Special Repair Requirement

INFOID:0000000011068259

## 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-123">BRC-123</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-124, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

## **APPLICATION NOTICE**

< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

# **ECU DIAGNOSIS INFORMATION**

## **APPLICATION NOTICE**

**Application Notice** 

INEOID:000000011068260	

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

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< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

#### 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.

CONSULT MONITOR ITEM

CONSULT MONITOR I		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)
		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)
DECEL C SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
ED DIL OUT COL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
FR RH 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
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
ED I H OUT SOL	Operation status of each calenaid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) 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

< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

Monitor item		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
KK KH 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
	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On	
RR RH 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 coloneid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
AN LITHN OUL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
	Operation status of each solopoid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
RR 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	
BD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	On
DD WAINI LAINI	EDD warning lamp	When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
Stop lamp switch signal status		When brake pedal is released	Off
OTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On
101011112111	motor and motor role, operation	When the motor relay and motor are not operating	Off
CTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
	The state of the s	When the actuator relay is not operating	Off
BS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	On
	(Note 2)	When ABS warning lamp is OFF	Off
FF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	On
	(Note 2)	When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On
-		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	On
ZEH EZAMI	(Note 2)	When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
		With engine stopped	0 rpm
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachometer display

## < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s	
TAW RATE SEN	sensor	When vehicle turning	−75 to 75 d/s	
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) 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	
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT) 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) 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) 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	
2) ( ) ( ) ( ) ( ) ( )	Drive cyle	2WD model	2WD	
2WD/4WD	Drive axle	4WD model	4WD	
ACCEL POS SIG	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	
ACCEL FOO 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> )	
OTD ANOLE OLG	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°	
STR ANGLE SIG	sensor	Steering wheel turned	–720 to 720°	
DDESS SENSOR	Brake fluid pressure detected by front pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar	
PRESS SENSOR		With ignition switch turned ON and brake pedal depressed	-40 to 300 bar	
EDD SIONAL	EDDtis	EBD is active	On	
EBD SIGNAL	EBD operation	EBD is inactive	Off	
ABS SIGNAL	ABS operation	ABS is active	On	
ABS SIGNAL	/ 150 operation	ABS is inactive	Off	

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

		Data monitor	
Monitor item Display content		Condition	Reference value in normal operation
TOO CIONAL T	TCC energica	TCS is active	On
TCS SIGNAL	TCS operation	TCS is inactive	Off
VDC CICNAL	VDC energtion	VDC is active	On
VDC SIGNAL	VDC operation	VDC is inactive	Off
ABS FAIL SIG	ADS foil acts signal	In ABS fail-safe	On
ADS FAIL SIG	ABS fail-safe signal	ABS is normal	Off
TOO FAIL OLO	TCC foil cofe signal	In TCS fail-safe	On
TCS FAIL SIG	TCS fail-safe signal	TCS is normal	Off
VDC FAIL SIG	VDC fail cofe signal	In VDC fail-safe	On
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	Off
CDANIZING CIG	Cronk appration	Crank is active	On
CRANKING SIG	Crank operation	Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
FLOID LEV SW		When brake fluid level switch OFF	Off
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	On
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch OFF	Off
DI OCK CHC 8W	Differential look mode quitch signal status	When differential lock mode switch is engaged	On
DLOCK CHG SW Diff	Differential lock mode switch signal status	When differential lock mode switch is disengaged	Off
STP ON RLY	Stop lamp on relay status	When hill descent control is operating	On
STF ON KLI	Stop lamp of relay status	When hill descent control is not operating	Off
DDS SW (Note 2)	Hill descent control quiteb ON/OFF	Hill descent control switch ON	On
DDS SW (Note 3)	Hill descent control switch ON/OFF	Hill descent control switch OFF	Off
DDS SIC (Note 2)	Hill descent control operation	Hill descent control is active	On
DDS SIG (Note 3)	Hill descent control operation	Hill descent control is inactive	Off
LICC CIC (Note 4)	Hill start assist appretion	Hill start assist is active	On
USS SIG (Note 4)	Hill start assist operation	Hill start assist is inactive	Off

#### NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-199, "Description".
- Brake warning lamp: Refer to BRC-200, "Description".
- VDC OFF indicator lamp: Refer to BRC-202, "Description".
- SLIP indicator lamp: Refer to BRC-204, "Description".
- 3: The CONSULT will display DDS (Downhill Drive Support) when referring to the Hill Descent Control system.
- 4: The CONSULT will display USS (Uphill Start Support) when referring to the Hill Start Assist system.

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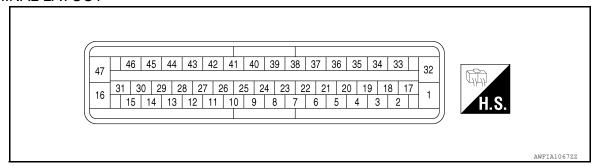
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< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

#### **TERMINAL LAYOUT**



Fail-Safe

#### **CAUTION:**

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

#### ABS/EBD SYSTEM

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

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

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of vehicles without ABS/TCS/VDC system.
- 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 SLIP indicator lamp is 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 450 IIDagariationII
C1103	FR RH SENSOR-1	BRC-152, "Description"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	DDC 157 "Description"
C1107	FR RH SENSOR-2	BRC-157, "Description"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-160, "Description"
C1110	CONTROLLER FAILURE	BRC-162, "DTC Logic"
C1111	PUMP MOTOR	BRC-163, "Description"
C1113	G-SENSOR	BRC-165, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-167, "Description"
C1116	STOP LAMP SW	BRC-170, "Description"
C1120	FR LH IN ABS SOL	BRC-172, "Description"
C1121	FR LH OUT ABS SOL	BRC-175, "Description"
C1122	FR RH IN ABS SOL	BRC-172, "Description"
C1123	FR RH OUT ABS SOL	BRC-175. "Description"
C1124	RR LH IN ABS SOL	BRC-172, "Description"

## < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

DTC	Items (CONSULT screen terms)	Reference	
C1125	RR LH OUT ABS SOL	BRC-175, "Description"	Α
C1126	RR RH IN ABS SOL	BRC-172, "Description"	•
C1127	RR RH OUT ABS SOL	BRC-175, "Description"	В
C1130	ENGINE SIGNAL 1		-
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-178, "Description"	С
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		D
C1140	ACTUATOR RLY	BRC-179, "Description"	
C1143	ST ANG SEN CIRCUIT	BRC-181, "Description"	:
C1144	ST ANG SEN SIGNAL	BRC-161, Description	Е
C1145	YAW RATE SENSOR	BRC-165, "Description"	
C1146	SIDE G-SEN CIRCUIT	BRC-105, Description	BRC
C1155	BR FLUID LEVEL LOW	BRC-184, "Description"	ыс
C1156	ST ANG SEN COM CIR	BRC-187, "Description"	:
C1160	DECEL G SEN SET	BRC-188, "Description"	G
C1163	ST ANGL SEN SAFE	BRC-189, "Description"	:
C1164	CV1		Н
C1165	CV2	BRC-190, "Description"	П
C1166	SV1	BRC-190, Description	
C1167	SV2		
C1170	VARIANT CODING	BRC-162, "DTC Logic"	-
C1187	ABS DIFLOCK CONTROLLER NG	BRC-193, "Description"	
U1000	CAN COMM CIRCUIT	BRC-194, "Description"	J

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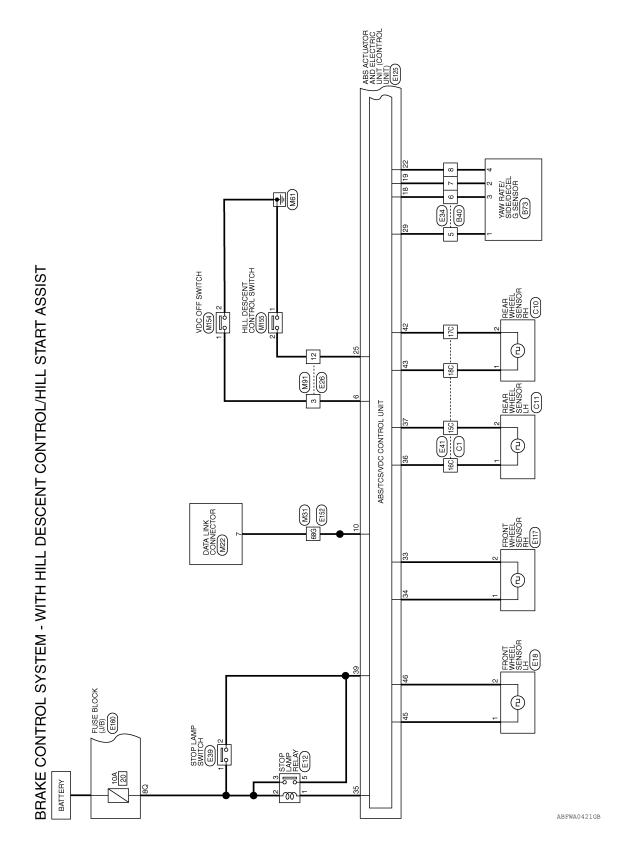
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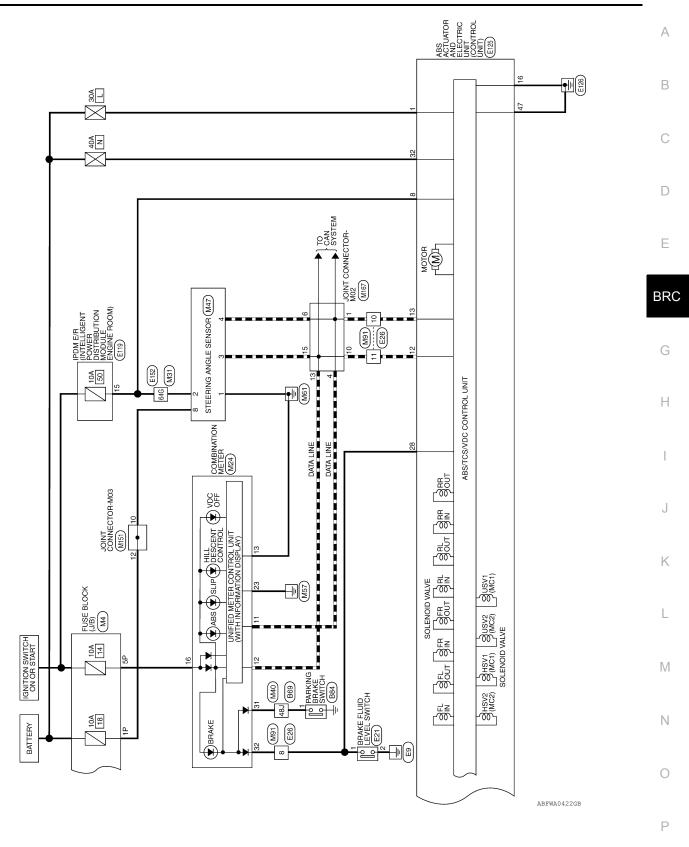
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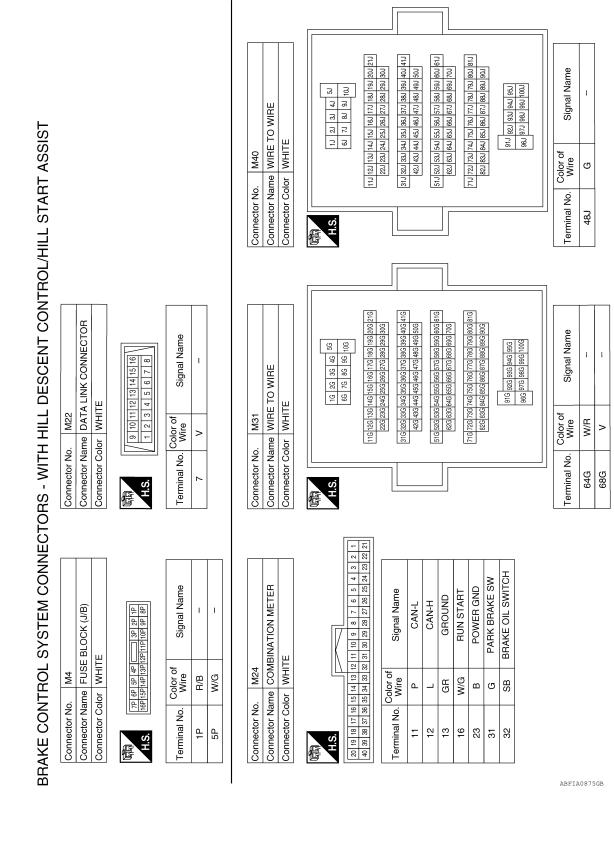
# WIRING DIAGRAM

## **BRAKE CONTROL SYSTEM - VDC**

Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST INFOID.000000011068264







	OR-M03	2 1 1 10	lame					
	CONNECTO	7 6 5 4 3	Signal Name	1	1			
M151	ne JOINT or GREE	9 8 20 19 18 1	Color of Wire	æ	B/B			
Connector No.	Connector Name JOINT CONNECTOR-M03 Connector Color GREEN	H.S.	Terminal No.	10	12			
	. TO WIRE E	12   1   10   9   8   1   1   1   1   1   1   1   1   1	Signal Name	ı	I	ı	ı	1
. M91	me WIRE lor WHIT	7 6 5 4 116 15 14 13 7	Color of Wire	GR	SB	۵	_	>
Connector No. M91	Connector Name WIRE TO WIRE Connector Color WHITE	H.S.	Terminal No. Wire	က	8	10	1	12
	ector Name STEERING ANGLE SENSOR ector Color WHITE	1 4 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	of Signal Name	1	1	ı	1	1
). M47	ector Name STEER ector Color WHITE	<u> </u>	Color of Wire	В	W/R	_	Ъ	۳
ector No.	ctor Na		nal No.	-	2	က	4	   &

Connector No.		M167
Connector Name	_	JOINT CONNECTOR-M02
Connector Color		BLUE
		F
	8	7 6 5 4 3 2 1
9. J	20 19 18	17 16 15 14 13 12 11 10
Terminal No.	Color of Wire	of Signal Name
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Connector No.		M155	
Connector Name		IL DE	HILL DESCENT CONTROL SWITCH
Connector Color WHITE	lor W	빞	
原 H.S.	(n)		
Terminal No.	Color of Wire	jo g	Signal Name
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HOLLING HALL		3 2 1	Signal Name	-	-
M154	or GRAY	6 2 4	Color of Wire	GR	<u>«</u>
Connector No. M154	Connector Color GRAY	南 H.S.	Terminal No.	Į.	٥

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	Connector No.	E21	
SENSOR LH	Connector Nan	ne BRAKE F SWITCH	Connector Name   BRAKE FLUID LEVEL   SWITCH
	Connector Color GRAY	or GRAY	,
	所 H.S.		
l Name	Terminal No.	Color of Wire	Signal Name
ı	1	SB	_
ı	8	ш	ı

	STOP LAMP SWITCH (WITH A/T)	ш		Signal Name	I	1
E39		or WHITE	<u>8 - </u>	Color of Wire	B/B	>
Connector No.	Connector Name	Connector Color	(A)	Terminal No.	1	c

	FRONT WHEEL SENSO			Signal Name	ı	-
E18		or GRAY		Color of Wire	G	В
Connector No.	Connector Name	Connector Color	H.S.	Terminal No.	-	٥

Signe			
Color of Wire	G	В	
Terminal No.	ļ	2	

WIF	WHITE	WIRE TO WIRE	E34
Connector No. E34 Connector Name WIRE TO WIRE Connector Color WHITE	Connector Color	Connector Name	Connector No.

Connector No. 626
Connector Name WIRE TO WIRE
Connector Color WHITE

Signal Nan	ı	ı	_	I
Color of Wire	BR	BG	M	<b>\</b>
Terminal No.	5	9	7	8

E12	Connector Name STOP LAMP RELAY	rue	
Connector No.	Connector Name	Connector Color BLUE	





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9	15
5	14
4	13
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2	6
-	8



Signal Name	I	I	1	ı	-
Color of Wire	GR	SB	Ь	٦	У
Terminal No.	8	8	10	11	12

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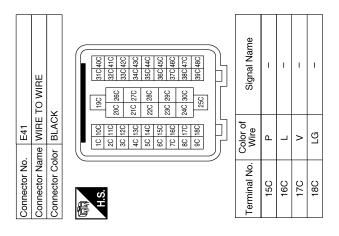
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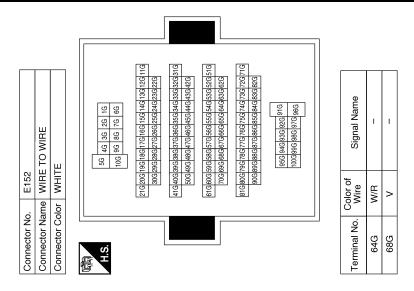
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Connector No.	. E119	6
Connector Name		IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	lor WHI	TE
原列 H.S.	9 8 7 6 <u>118 17 16 15 14 18 17 16 15 14 18 17 16 15 14 18 17 18 15 14 18 18 18 18 18 18 18 18 18 18 18 18 18 </u>	14 13 12 11 10
Terminal No.	Color of Wire	Signal Name
15	M/R	ABS IGN SUPPLY

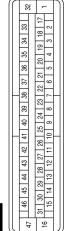
	FRONT WHEEL SENSOR RI			Signal Name	1	1
E117		GRAY		Color of Wire	В	8
Connector No.	Connector Name	Connector Color	是 H.S.	Terminal No.	-	2





Terminal No.	Color of Wire	Signal Name
21	ı	ı
22	>	CLUS SUP
23	ı	ı
24	ı	ı
25	>	HDC SW
26	_	I
27	_	ı
28	ВÐ	FLUID LEVEL SW
29	BB	CLUS GND
30	_	I
31	1	ı
32	>	VALVE ECU SUPPLY
33	Μ	FR RH SIG
34	В	FR RH PWR
32	۸	STOP LAMP SW ON
36	٦	RR LH PWR
37	Ь	RR LH SIG
38	1	_
39	SB	STOP LAMP SW
40	I	_
41	1	-
42	۸	RR RH SIG
43	LG	RR RH PWR
44	1	-
45	9	FR LH PWR
46	Ж	FR LH SIG
47	В	MOTOR GND

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



Signal Name	MOTOR SUPPLY	ı	I	I	ı	VDC OFF SW	ı	NSI	ı	DIAG-K	ı	CAN-H	CAN-L	ı	I	VALVE ECU GND	ı	CAN2-H	CAN2-L	
Color of Wire	В	1	ı	-	1	GR	ı	M/R	ı	SB	1	_	۵	1	1	В	1	BG	8	
Terminal No.	1	2	က	4	5	9	7	80	6	10	1	12	13	14	15	16	17	18	19	20

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BLACK	
Connector Color	
Connec	E

Connector Name | WIRE TO WIRE

Connector Name FUSE BLOCK (J/B)

E160

Connector No.

Connector Color | WHITE

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Connector No.



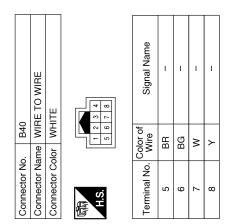


Signal Name	ı	
Color of Wire	B/B	
Terminal No.	80	

1100 100 110 200 110 200 110 200 110

29C 23C 28C 22C

25C



Connector No.	C11
Connector Name	Connector Name REAR WHEEL SENSOR LH
Connector Color   BROWN	BROWN
原 R.S.	



Color of Wire	٦	Ь
Terminal No.	-	2

Signal Name

ı 1

Con	E =

Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

C10

Connector No.



Signal Name	ı	_	
Color of Wire	LG	^	
Terminal No.	-	2	

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Connector No.   B73   Connector No.   B73   Connector Name   YAW RATE/SIDE/DECEL G   SENSOR   Connector Color   BLACK   SENSOR   Connector Color   BLACK   SI AM SSU SSU SSU SSU SSU SSU SSU SSU SSU SS	nector No. nector Color ninal No. Wiff 3 BG 4 Y		
SI SAL SSS SSZ SAL SAL SSS SSZ SAL SSZ SSZ SAL SSZ SSZ SAL SSZ SZZ SZZ SAL SSZ SZZ SZZ SZZ SZZ SZZ SZZ SZZ SZZ SZ			
	Connector No. B69  Connector Name WIRE TO WIRE  Connector Color WHITE  54 44 31 21 14  100 50 80 77 16 15 14 13 12 11  30 290 20 77 16 15 14 13 12 11  30 290 20 77 20 25 24 23 20  414 40 390 380 37 380 35 34 340 35 13  50 490 480 47 1 480 45 140 43 142  10 1 90 790 790 77 17 17 10 10 10 10 10 10 10 10 10 10 10 10 10	100   126	Signal Name

ABFIA0889GB

# **APPLICATION NOTICE**

< SYMPTOM DIAGNOSIS > [TYPE 2]

# SYMPTOM 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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# VDC/TCS/ABS

Symptom Table

If ABS warning 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-223, "Diag- nosis Procedure"
400.00	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-224, "Diag-
Offexpected 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-225, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-226, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-227, "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	TCM	BRC-228, "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]

## **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

**[TYPE 2]** < SYMPTOM DIAGNOSIS > **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY** Α Diagnosis Procedure INFOID:0000000011068267 1.CHECK START В 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 D Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service" or rear: RAX-19, "Rear Axle Bearing". Is the inspection result normal? Е YES >> GO TO 3 NO >> Repair or replace malfunctioning components. 3.check wheel sensor and sensor rotor **BRC** 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? Н YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to BRC-234, "Removal and Installation" or BRC-235, "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? >> Perform self-diagnosis. Refer to BRC-146, "CONSULT Function (ABS)". YES K NO >> Inspection End. L M N

## **UNEXPECTED PEDAL REACTION**

< SYMPTOM DIAGNOSIS > [TYPE 2]

# **UNEXPECTED PEDAL REACTION**

# Diagnosis Procedure

INFOID:0000000011068268

# 1. CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-17, "Inspection and Adjustment".

## Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-19, "Bleeding Brake System".
  - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-17</u>, "Inspection and Adjustment" (brake pedal), <u>BR-13</u>, "On <u>Board Inspection"</u> (master cylinder), <u>BR-11</u>, "Inspection" (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 >> Inspection End.

NO >> Check brake system.

## THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS > [TYPE 2]

# THE BRAKING DISTANCE IS LONG

# Diagnosis Procedure

**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 >> Inspection End.

NO >> Check brake system.

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## **ABS FUNCTION DOES NOT OPERATE**

< SYMPTOM DIAGNOSIS >

[TYPE 2]

# **ABS FUNCTION DOES NOT OPERATE**

# Diagnosis Procedure

INFOID:0000000011068270

### **CAUTION:**

ABS does not operate when speed is 10 km/h (6 MPH) or lower.

1. CHECK ABS WARNING LAMP DISPLAY

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

YES >> Inspection End.

NO >> Perform self-diagnosis. Refer to <a href="https://example.com/BRC-146">BRC-146</a>, "CONSULT Function (ABS)".

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

**[TYPE 2]** < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000011068271 **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] D 1.SYMPTOM CHECK 1 Check that there are pedal vibrations when the engine is started. Е Do vibrations occur? YES >> GO TO 2 NO >> Inspect the brake pedal. BRC 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 <a href="https://example.com/BRC-146">BRC-146, "CONSULT Function (ABS)"</a>. 3. SYMPTOM CHECK 3 Н 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 >> Inspection End. J K L M Ν 0

## VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

< SYMPTOM DIAGNOSIS >

**[TYPE 2]** 

# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

# Diagnosis Procedure

INFOID:0000000011068272

# 1.SYMPTOM CHECK

Check if the vehicle jerks during VDC/TCS/ABS control.

## Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 2

# 2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-146, "CONSULT Function (ABS)"</u>.

## Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-146</u>, "<u>CONSULT Function</u> (ABS)".

NO >> GO TO 3

# 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. Refer to <u>BRC-146</u>, "CONSULT Function (ABS)".

### Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.

NO >> GO TO 4

# 4. CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

### Are self-diagnosis results indicated?

YES :

- >> Check the corresponding items.
  - ECM: Refer to EC-53, "CONSULT Function".
  - TCM: Refer to TM-103, "CONSULT Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <a href="BRC-236">BRC-236</a>, "Removal and Installation".

# **NORMAL OPERATING CONDITION**

< SYMPTOM DIAGNOSIS > [TYPE 2]

# NORMAL OPERATING CONDITION

Description INFOID:000000011068273

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 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 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 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.)	
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.	

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Revision: August 2014 BRC-229 2015 Xterra

## **PRECAUTIONS**

< 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.

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

### **WARNING:**

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

Precaution for Brake System

INFOID:0000000011378977

#### **WARNING:**

Clean any dust from the front brake and rear brake with a vacuum dust collector. Do not blow with compressed air.

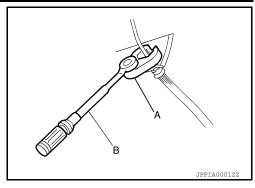
- Brake fluid use refer to MA-12, "Fluids and Lubricants".
- · Do not reuse drained brake fluid.
- Do not spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Always confirm the specified tightening torque when installing the brake pipes.
- After pressing the brake pedal more deeply or harder than normal driving, such as air bleeding, inspect the brake pedal height and play. Adjust brake pedal if it is outside the standard value.
- Always clean with new brake fluid when cleaning the brake caliper and other components.
- Do not use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.

## **PRECAUTIONS**

< PRECAUTION > [TYPE 2]

 Tighten the brake tube flare nut to the specified torque with a crowfoot (A) and torque wrench (B).

- Brake system is an important safety part. If a brake fluid leak is detected, always disassemble the affected part. If a malfunction is detected, replace part with a new one.
- Always connect the battery terminals when moving the vehicle.
- Check that no brake fluid leakage is present after replacing the parts.
- Burnish the brake contact surfaces after refinishing or replacing disc brake rotors, after replacing brake pads, or if a soft pedal occurs at very low mileage.
- Front brake pad: Refer to BR-8, "BRAKE PAD: Inspection".
- Front disc brake rotor: Refer to BR-8, "DISC ROTOR: Inspection".
- Rear brake pad: Refer to BR-10, "BRAKE PAD: Inspection".
- Rear disc brake rotor: Refer to BR-10, "DISC ROTOR: Inspection".



INFOID:0000000011068276

# 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.
- 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 CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, 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.

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## **PRECAUTIONS**

< PRECAUTION > [TYPE 2]

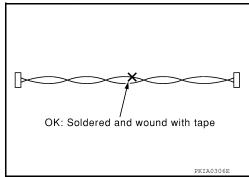
### NOTE:

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

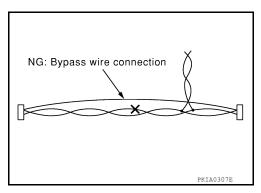
# Precaution for CAN System

INFOID:0000000011068277

- 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).



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



# **PREPARATION**

< PREPARATION > [TYPE 2]

# **PREPARATION**

# **PREPARATION**

Special Service Tool

INFOID:0000000011068278

Tool number		Description
(TechMate No.)		
Tool name		
(J-45741) ABS active wheel sensor tester	J-45741-BOX	Checking operation of ABS active wheel sensors

ST30031000 ( — ) Bearing puller



Removing sensor rotor

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# **Commercial Service Tool**

INFOID:0000000011068279

Tool name		Description	
Flare nut crowfoot     Torque wrench		Tightening brake tube flare nuts a: 10 mm (0.39 in)/12 mm (0.47 in)	
Power tool	S-NT360	Loosening nuts, screws and bolts	
Tower tool		Loosening rides, screws and boils	
	PIIB1407E		

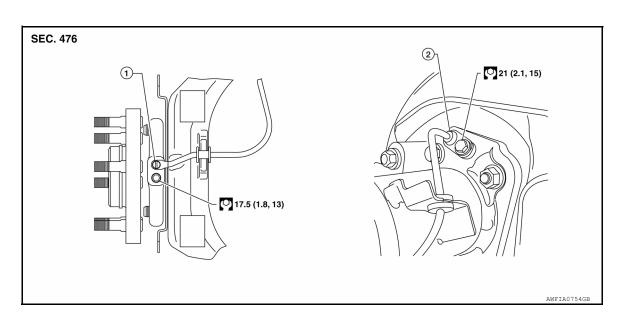
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# **UNIT REMOVAL AND INSTALLATION**

## WHEEL SENSORS

## Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor (M226)

### **REMOVAL**

- 1. Remove the front disc rotor, if removing the front wheel sensor. Refer to <u>BR-36</u>, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Remove the wheel sensor bolt(s).
- 3. Pull the wheel sensor straight out, being careful to turn it as little as possible.

# CAUTION:

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

## **INSTALLATION**

Installation is in the reverse order of removal.

- Before installing the wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.

# SENSOR ROTOR

## Removal and Installation

INFOID:0000000011068281

## **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 FAX-8, "Removal and Installation".

**REAR** 

### Removal

#### NOTE:

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

- Remove axle shaft assembly. Refer to RAX-20, "Removal and Installation" (M226).
- Pull the sensor rotor of off the axle shaft using Tool and a press.

**Tool number** : ST30031000 ( — )

### Installation

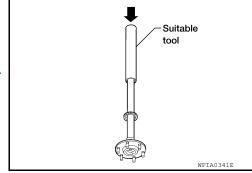
1. Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated. **CAUTION:** 

Do not reuse the sensor rotor.

2. Install axle shaft assembly. Refer to RAX-20, "Removal and Installation" (M226).

#### **CAUTION:**

Do not reuse the axle oil seal.



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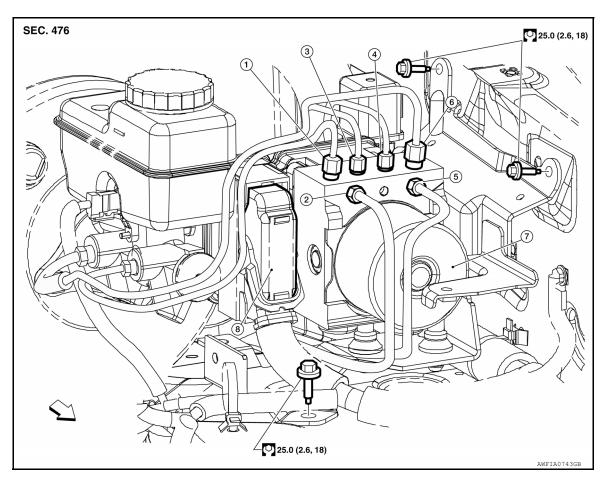
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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

## Removal and Installation



- From master cylinder secondary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 4. To front right disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 7. ABS actuator and electric unit (control unit) 8.
- To rear right disc brake13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- To front left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- Harness connector
- 3. To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 6. From master cylinder primary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- ← Front

### NOTE:

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

- 1. Disconnect the negative battery terminal. Refer to PG-77, "Removal and Installation".
- Remove air cleaner case. Refer to EM-24, "Exploded View".
- 3. Disconnect the harness connector from the ABS actuator and electric unit (control unit).
- Disconnect the brake tubes.

#### **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; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- 5. Remove three bolts, then remove the ABS actuator and electric unit (control unit) and bracket.
- 6. Remove the bolt and remove the bracket from the ABS actuator and electric unit (control unit).

### INSTALLATION

## ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

### < UNIT REMOVAL AND INSTALLATION >

[TYPE 2]

Installation is in the reverse order of removal.

 If the ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-123</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION</u>: <u>Special Repair Requirement</u>".

ABS actuator and electric : 7.0 N·m (0.7 kg-m, 62 in-lb) unit (control unit)

### **CAUTION:**

- All hoses and piping (tubes) must be free from excessive bending, twisting and pulling.
- Make sure there is no interference with other parts when turning steering both clockwise and counterclockwise.
- The brake piping is an important safety part. If a brake fluid leak is detected, always disassemble the parts. Replace applicable part with a new one, if necessary.
- 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.
- Do not bend or twist brake hose sharply, or strongly pull it.
- · When removing components, cover connections so that no dirt, dust, or other foreign matter gets in.
- · Do not reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the brake system. Refer to <a href="mailto:BR-19">BR-19</a>, "Bleeding Brake System".

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## STEERING ANGLE SENSOR

< UNIT REMOVAL AND INSTALLATION >

[TYPE 2]

# STEERING ANGLE SENSOR

## Removal and Installation

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### **REMOVAL**

- 1. Remove the spiral cable. Refer to SR-13, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor from the spiral cable.

### INSTALLATION

Installation is in the reverse order of removal.

 Reset the neutral position of the steering angle sensor. Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

#### CAUTION

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the 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".

## YAW RATE/SIDE/DECEL G SENSOR

< UNIT REMOVAL AND INSTALLATION >

[TYPE 2]

# YAW RATE/SIDE/DECEL G SENSOR

## Removal and Installation

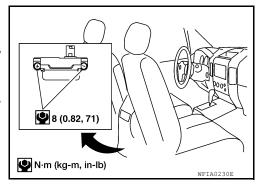
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### **REMOVAL**

- 1. Remove center console rear base. Refer to <a href="#IP-10">IP-10</a>, "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="mailto:BRC-13">BRC-13</a>, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement".

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