# SECTION BRAKE CONTROL SYSTEM

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# **APPLICATION NOTICE**

# BASIC INSPECTION APPLICATION NOTICE

# **Application Notice**

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INFOID:00000007360893

[TYPE 1]

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

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< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

#### Work Flow

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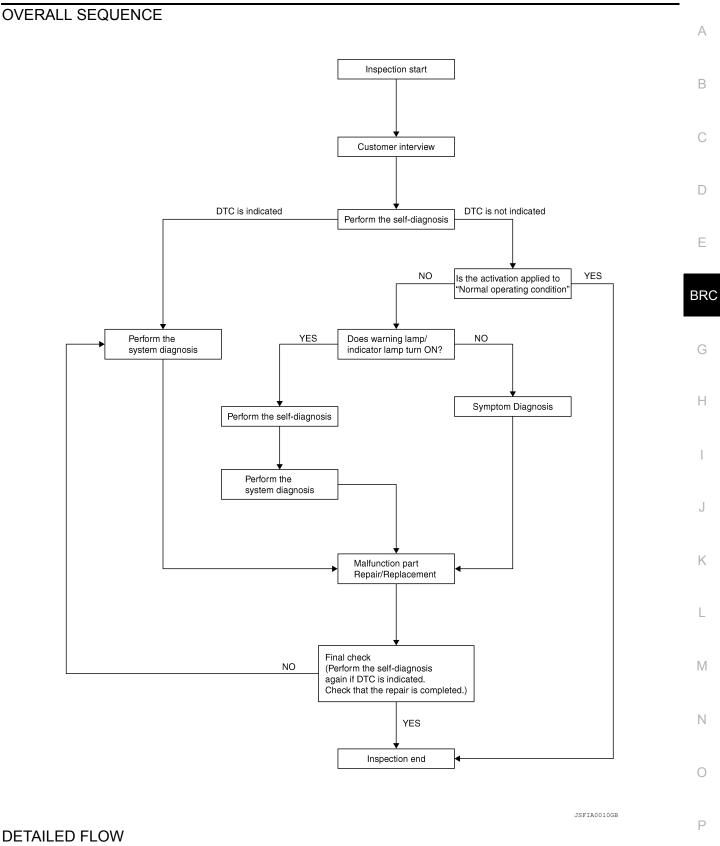
#### PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u>.

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

**[TYPE 1]** 



# 1.COLLECT THE INFORMATION FROM THE CUSTOMER

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

#### >> GO TO 2

Revision: December 2011

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TYPE 1]

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-29</u>, "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-106,</u> "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 BRC-77, "Description".
- · Brake warning lamp: Refer to BRC-78, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-79</u>, "Description".

• SLIP indicator lamp: Refer to BRC-81. "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, "CONSULT Function (ABS)"</u>.

Is no other DTC present and the repair completed?

YES >> Inspection End NO >> GO TO 3

# DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

# Diagnostic Work Sheet

INFOID:000000007360895

[TYPE 1]

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

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### **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

# INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

# ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000007360896

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

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

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	
Replacing ABS actuator and electric unit (control unit)	x
Removing/Installing steering angle sensor	x
Replacing steering angle sensor	×
Removing/Installing steering components	×
Replacing steering components	×
Removing/Installing suspension components	x
Replacing suspension components	×
Change tires to new ones	_
Tire rotation	_
Adjusting wheel alignment	×
Battery disconnection	x

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

#### ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

**1.**ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

ENT FOR THE STEERING ANGLE SENSOR
RT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
eering angle sensor.
cally.
sition, then stop. ANGLE SIG" is within 0±2.5°.
r the steering angle sensor again, GO TO 1
and electric unit (control unit) and ECM.
BRC-29. "CONSULT Function (ABS)".
nosis.
Accoriation (
Description
ne decel G sensor is required.
×: Required –: Not required Calibration of decel G sensor
×
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 Replacing yaw rate/side/decel G sensor
 ×

 CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

#### CALIBRATION OF DECEL G SENSOR CAUTION:

Removing/Installing yaw rate/side/decel G sensor

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

Adjusting wheel alignment

INFOID:000000007360901

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# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

#### (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.

2. Select "DATA MONITOR". Then make sure "DECEL G-SEN" is within  $\pm 0.08$ G.

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

ECM: Refer to EC-52, "CONSULT Function".

Are the memories erased?

YES >> Inspection End

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

# **APPLICATION NOTICE**

#### < SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION APPLICATION NOTICE

# **Application Notice**

INFOID:000000007830183

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

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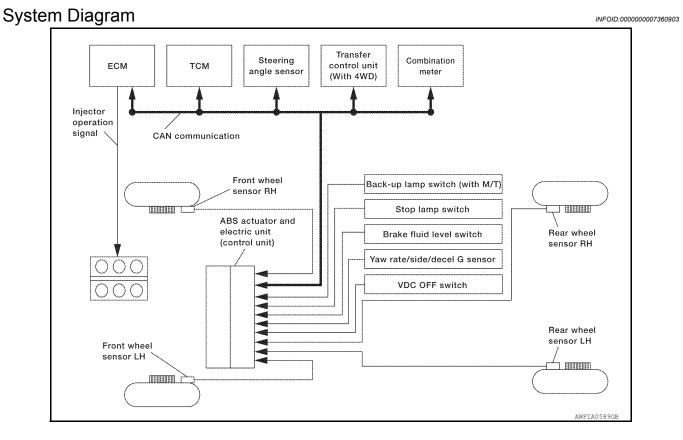
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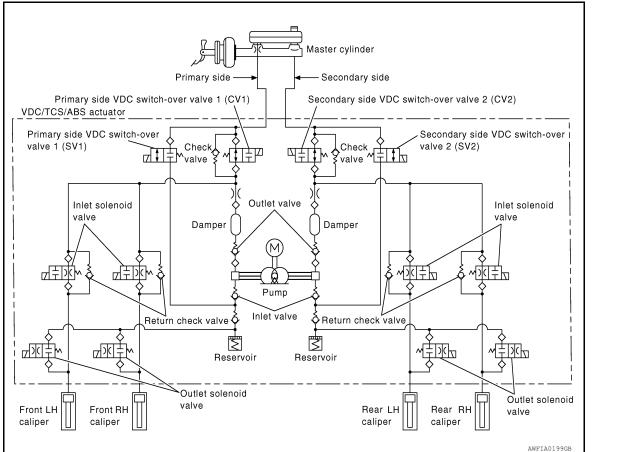
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# VDC



# Hydraulic Circuit Diagram



INFOID:000000007360904

# 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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**[TYPE 1]** 

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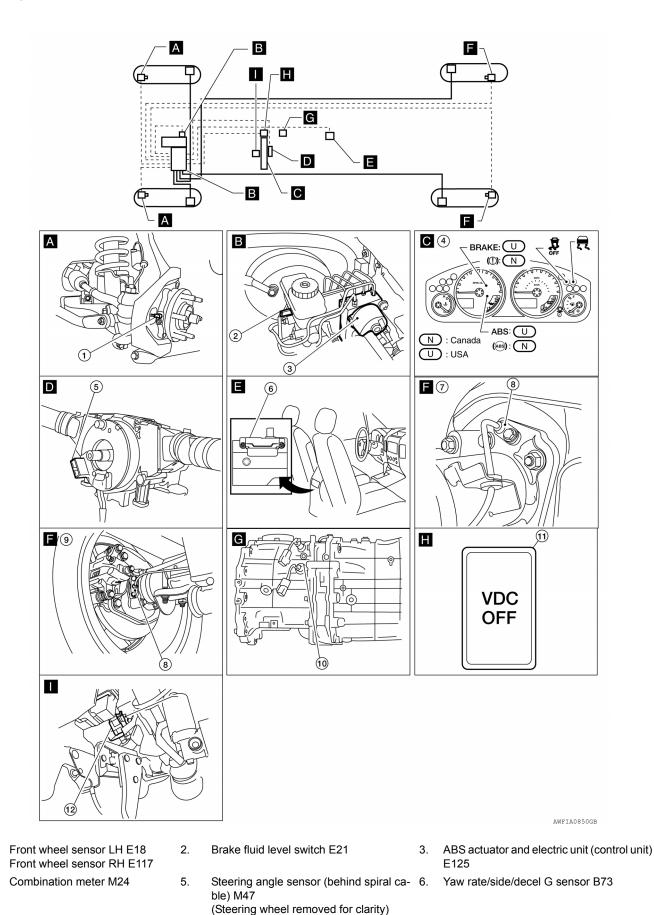
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Revision: December 2011

# **Component Parts Location**

INFOID:000000007360906

**[TYPE 1]** 



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**BRC-18** 

< SYSTEM DESCRIPTION >			[TYPE 1]	_	
7. M226 rear axle	8.	Rear wheel sensor LH C11 Rear wheel sensor RH C10	9.	C200 rear axle	/
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)	

VDC

# **Component Description**

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INFOID:000000007360907

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Component parts		Reference	С
	Pump	BRC-44, "Description"	
	Motor		D
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"	
	Solenoid valve	BRC-53, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"	E
Wheel sensor		BRC-35, "Description"	
Yaw rate/side/decel G sensor	BRC-46, "Description"	BR	
Stop lamp switch	BRC-51, "Description"		
Steering angle sensor		BRC-62, "Description"	
Brake fluid level switch		BRC-65, "Description"	G
VDC OFF switch		BRC-75, "Description"	
ABS warning lamp	BRC-77, "Description"	Н	
Brake warning lamp	BRC-78, "Description"		
VDC OFF indicator lamp	BRC-79, "Description"		
SLIP indicator lamp		BRC-81, "Description"	

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# TCS



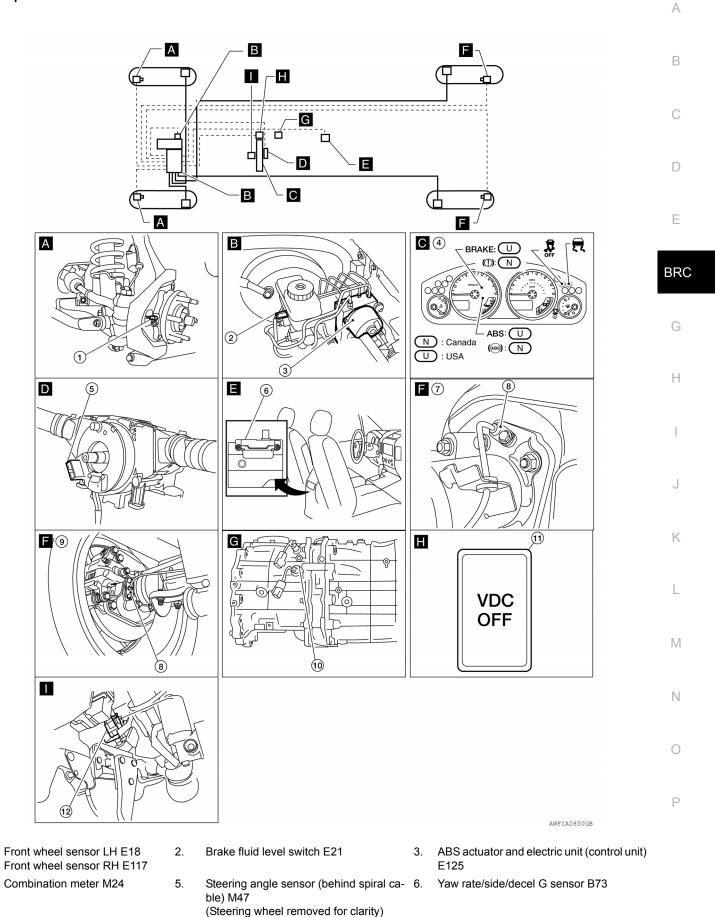
#### System Diagram INFOID:000000007830192 Transfer Steering Combination ECM TCM control unit angle sensor meter (With 4WD) Injector operation signal **CAN** communication Front wheel Back-up lamp switch (with M/T) sensor RH Stop lamp switch ABS actuator and electric unit Rear wheel Brake fluid level switch (control unit) sensor RH Yaw rate/side/decel G sensor VDC OFF switch -Rear wheel sensor LH Front wheel sensor LH 1.000000

# System Description

INFOID:000000007360909

- 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.

# **Component Parts Location**



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BRC-21

10. Back-up lamp switch F69

**Component Description** 

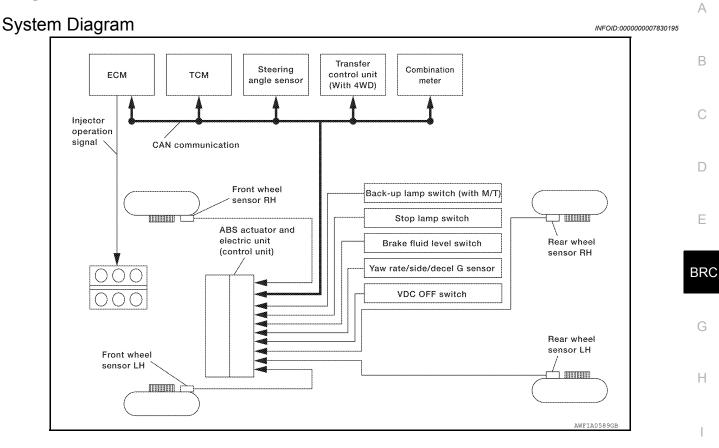
- 7. M226 rear axle
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
   VDC OFF switch M154
- 9. C200 rear axle

12. Stop lamp switch E38 (with M/T) Stop lamp switch E39 (with A/T)

INFOID:000000007830194

Compo	Reference	
	Pump	BRC-44, "Description"
	Motor	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"
	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-75, "Description"
ABS warning lamp		BRC-77, "Description"
Brake warning lamp	BRC-78, "Description"	
VDC OFF indicator lamp	BRC-79, "Description"	
SLIP indicator lamp	BRC-81, "Description"	

# ABS



ABS

# System Description

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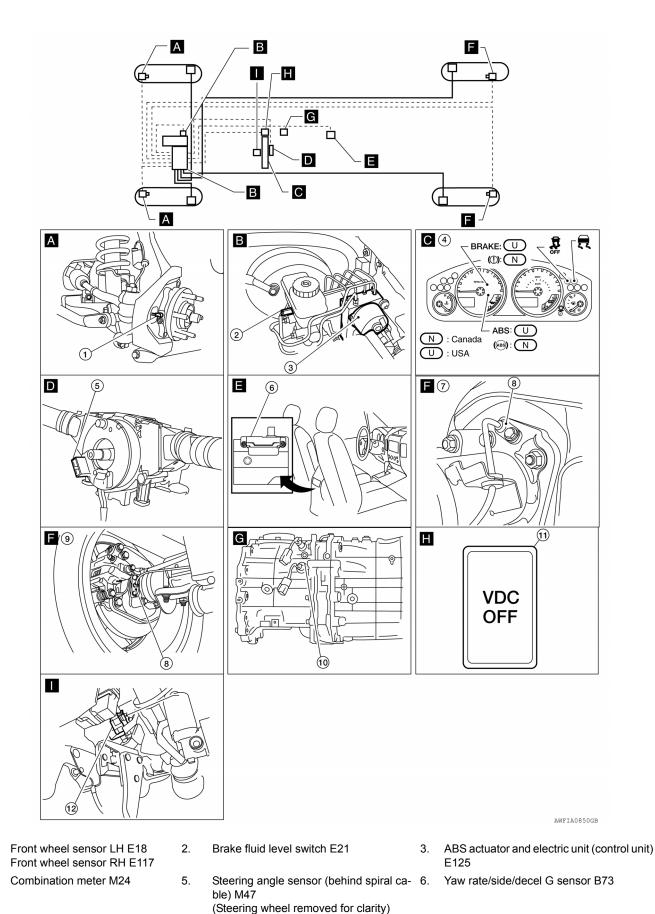
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- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.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

# **Component Parts Location**

INFOID:000000007830196

**[TYPE 1]** 



1.

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BRC-24

< SYSTEM DESCRIPTION	[TYPE 1]			
7. M226 rear axle	8.	Rear wheel sensor LH C11 Rear wheel sensor RH C10	9.	C200 rear axle
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)

ABS

# **Component Description**

op lamp switch E39 (with A/I)

INFOID:000000007830197

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Component parts		Reference	С
	Pump Motor	BRC-44, "Description"	_
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"	— D
	Solenoid valve	BRC-53, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-71, "Description"	E
Wheel sensor		BRC-48, "Description"	
Yaw rate/side/decel G sensor	BRC-46, "Description"	BRC	
Stop lamp switch	BRC-51, "Description"		
Steering angle sensor		BRC-62, "Description"	
Brake fluid level switch		BRC-65, "Description"	— G
VDC OFF switch		BRC-75, "Description"	
ABS warning lamp		BRC-77, "Description"	Н
Brake warning lamp		BRC-78, "Description"	
VDC OFF indicator lamp		BRC-79, "Description"	
SLIP indicator lamp		BRC-81, "Description"	

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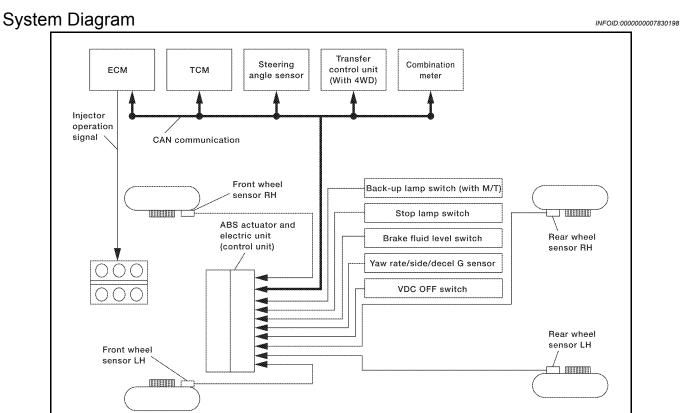
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# EBD



# System Description

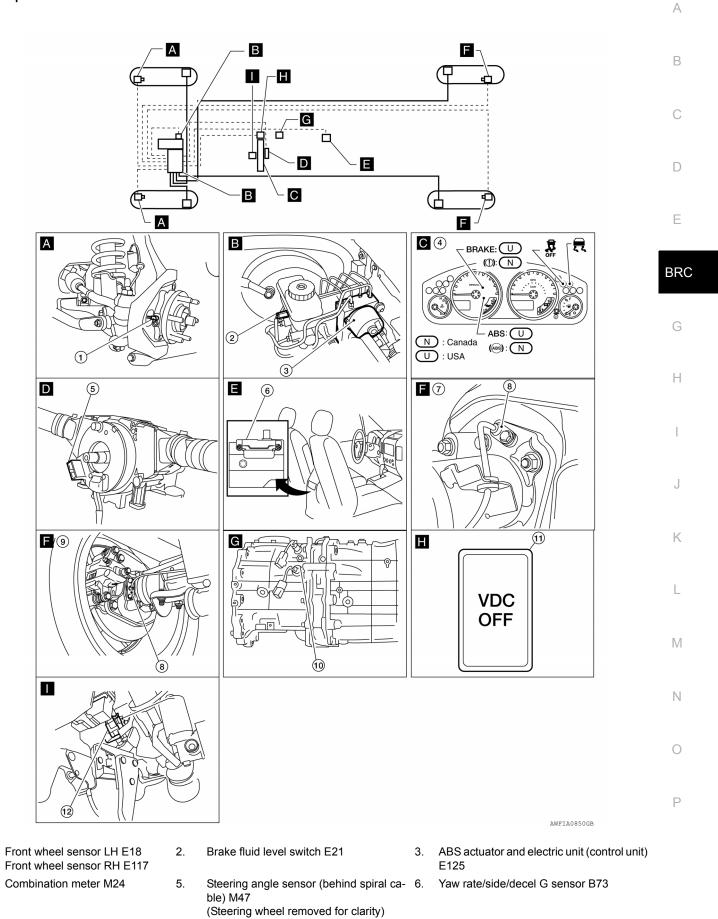
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- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid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

# **Component Parts Location**

INFOID:000000007830199



EBD

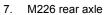
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**BRC-27** 

10. Back-up lamp switch F69

**Component Description** 



- 8. Rear wheel sensor LH C11 Rear wheel sensor RH C10 VDC OFF switch M154 11.
- C200 rear axle 9.

12. Stop lamp switch E38 (with M/T) Stop lamp switch E39 (with A/T)

INFOID:000000007830200

Component parts		Reference
	Pump Motor	BRC-44, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"
	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-75, "Description"
ABS warning lamp	BRC-77, "Description"	
Brake warning lamp	BRC-78. "Description"	
VDC OFF indicator lamp	BRC-79, "Description"	
SLIP indicator lamp	BRC-81, "Description"	

EBD

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

< SYSTEM DESCRIPTION >

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

# **CONSULT Function (ABS)**

#### 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	he 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.			
		BF		

#### SELF DIAGNOSTIC RESULT

#### **Operation Procedure**

 Before performing the self-diagnosis, start engine and drive vehicle at 30 km/h (19 MPH) or more for G 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
   Ievel switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-88, "DTC No. Index"</u>.

#### DATA MONITOR

ltom	Data	a monitor item sele	ection	
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.

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**[TYPE 1]** 

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

#### < SYSTEM DESCRIPTION >

[TYPE 1]

Item	Data monitor item selection				
(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) sta- tus 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) sta- tus is displayed.	
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is dis- played.	
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 com- munication 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.	

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

#### < SYSTEM DESCRIPTION >

[TYPE 1]

Item	Data	a monitor item sele			
(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 sig- nal 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 pres- sure 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.	
EBD FAIL SIG (ON/OFF)	-	_	×	EBD fail signal (ON/OFF) status is displayed.	
ABS FAIL SIG (ON/OFF)	_	_	×	ABS fail signal (ON/OFF) status is displayed.	
TCS FAIL SIG (ON/OFF)	-	_	×	TCS fail signal (ON/OFF) status is displayed.	
VDC FAIL SIG (ON/OFF)	-	_	×	VDC fail signal (ON/OFF) status is displayed.	
CRANKING SIG (ON/OFF)	_	_	×	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.	

×: Applicable

-: Not applicable

#### WORK SUPPORT

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

#### < SYSTEM DESCRIPTION >

[TYPE 1]

Conditions	Description		
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be per- formed. Refer to <u>BRC-12</u> , "ADJUSTMENT OF STEERING AN- <u>GLE SENSOR NEUTRAL POSITION : Description"</u> .		
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-13</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		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Кеер	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	—	—	—
FR RH SUL	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	—	—	_
	RR RH OUT SOL	Off	Off	On*	_	—	_
RR LH SOL	RR LH IN SOL	Off	On	On	—	_	_
	RR LH OUT SOL	Off	Off	On*	—	—	_
	RR RH IN SOL	Off	On	On	Off	Off	Off
REAR SOL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
REAR JUL	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off
FR RH ABS SOLENOID (ACT)	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 IN SOL	_	—	—	Off	Off	Off
RR RH 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

\*: On for 1 to 2 seconds after the touch, and then Off

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

#### < SYSTEM DESCRIPTION >

[TYPE 1]

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	В
ACTUATOR RLY	On	On	

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# DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE

# **Application Notice**

INFOID:000000007830184

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

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

### DTC Logic

INFOID:000000007360923

INFOID:000000007360922

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### Diagnosis Procedure

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

2. Turn on the ABS active wheel sensor tester power switch. **NOTE:** 

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

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

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

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-111, "Removal and Installation"</u>.

**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. "On-Vehicle Inspection and Service"</u> (front), <u>RAX-7.</u> "Rear Axle Bearing".

Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8. "Removal and Installation"</u> (front), <u>RAX-13.</u> "Removal and Installation".

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

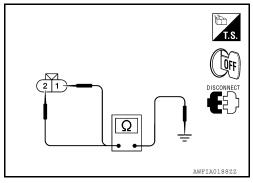
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor connector terminals and ground.

#### Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



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

1. Check continuity between ABS actuator and electric unit (control unit) 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	E125	45	E18	1	
		46		2	
Front RH		34	E117	1	
		33		2	Yes
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

#### C1101, C1102, C1103, C1104 WHEEL SENSOR-1 **[TYPE 1]** < DTC/CIRCUIT DIAGNOSIS > >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-113, "Removal and Instal-YES lation". А NO >> Repair the circuit. Component Inspection INFOID:000000007360925 В **1.**CHECK DATA MONITOR On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed. Wheel sensor Vehicle speed (DATA MONITOR) D FR LH SENSOR FR RH SENSOR Nearly matches the speedometer display (±10% or less) Е **RR LH SENSOR RR RH SENSOR** Is the inspection result normal? BRC YES >> Inspection End >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure". NO Special Repair Requirement INFOID:000000007360926 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator Н and electric unit (control unit). Refer to BRC-12, "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". Κ >> END L Μ Ν

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

#### DTC Logic

INFOID:000000007360928

INFOID:000000007830201

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	When the circuit in the rear RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
C1106	RR LH SENSOR-2	When the circuit in the rear LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	ABS actuator and electric unit (control unit)
C1108	FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007830202

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-</u> <u>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?

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

**[TYPE 1]** < DTC/CIRCUIT DIAGNOSIS > YES >> GO TO 2 NO >> Repair or replace as necessary. А 2.CHECK WHEEL SENSOR OUTPUT SIGNAL 1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter. В 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: D 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? Е YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to BRC-111, "Removal and Installation". 3.check tires BRC 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 Н Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-7 "Rear Axle Bearing". Is the inspection result normal? YFS >> GO TO 5 >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-13, NO "Removal and Installation". 5.CHECK WIRING HARNESS FOR SHORT CIRCUIT Disconnect ABS actuator and electric unit (control unit) connec-1. tor and wheel sensor connector of malfunction code No. Κ 2. Check continuity between wheel sensor connector terminals and around. L Continuity should not exist. Is the inspection result normal? YES >> GO TO 6 Μ NO >> Repair the circuit. AWFTA018877 Ν 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1.

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

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-113, "Removal and Instal-</u><u>lation"</u>.

NO >> Repair the circuit.

Component Inspection

INFOID:000000007830203

### **1.**CHECK DATA MONITOR

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

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-48. "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000007830204

#### **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-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

#### C1109 POWER AND GROUND SYSTEM А Description INFOID:000000007360932 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000007360933 DTC DETECTION LOGIC DTC Malfunction detected condition Possible cause Display item D Harness or connector BATTERY VOLTAGE When the ABS actuator and electric unit (control unit) C1109 ABS actuator and electric unit [ABNORMAL] power supply voltage is lower than normal. (control unit) Е DTC CONFIRMATION PROCEDURE 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. BRC Self-diagnosis results BATTERY VOLTAGE [ABNORMAL] Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-41, "Diagnosis Procedure"</u>. Н >> Inspection End NO **Diagnosis** Procedure INFOID 000000007360934 Regarding Wiring Diagram information, refer to BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-TROL/HILL START ASSIST". **1.**CONNECTOR INSPECTION Κ Turn ignition switch OFF. 1. 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 connectors and then perform the self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)". Μ Is any item indicated on the self-diagnosis display? YES >> GO TO 2 NO >> Poor connection of connector terminals. Repair or replace connector. Ν 2.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY CIRCUIT AND GROUND CIRCUIT 1. Turn ignition switch OFF. Ο Disconnect ABS actuator and electric unit (control unit) connector. 2.

Ρ

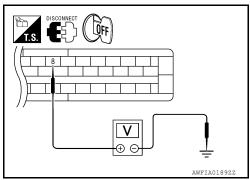
[TYPE 1]

## C1109 POWER AND GROUND SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

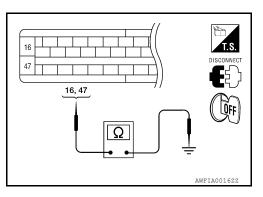
3. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 8 and ground.

ABS actuator and elec- tric unit (control unit)			Condition	Voltage
Connector	Terminal			
F125	8	Ground	Ignition switch: ON	Battery voltage
E 125	0	Gibulia	Ignition switch: OFF	Approx. 0V



- 4. Turn ignition switch OFF.
- 5. Check continuity between ABS actuator and electric unit (control unit) connector E125 terminals 16, 47 and ground.

ABS actuator and electric unit (control unit) Connector Terminal			Continuity
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:000000007830205

**[TYPE 1]** 

## **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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : 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**

INFOID:000000007360936

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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 u	
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	(control unit)	
DTC CC	ONFIRMATION PROCE	DURE		
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	ESULTS		
Check th	ne self-diagnosis results.			
	Self-diagnosis	results		
	CONTROLLER F			
	VARIANT CO	-		
	displayed on the self-dia			
YES NO	>> Proceed to diagnosis >> Inspection End	procedure. Refer to <u>BRC-43. "Diagnosis Procedu</u>	<u>ire"</u> .	
	·			
Diagno	sis Procedure		INFOID:0000000073605	
1.REPL	ACE ABS ACTUATOR A	ND ELECTRIC UNIT (CONTROL UNIT)		
	>> Replace ABS actuate	or and electric unit (control unit). Refer to <u>BRC-1</u>	13 "Removal and Installa	
	tion".			
Specia	I Repair Requireme	nt	INFOID:0000000078302	
<b>1.</b> ADJU	ISTMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION		
		adjustment for the steering angle sensor when r		
	tric unit (control unit). Ref <u>DN : Description"</u> .	er to <u>BRC-12, "ADJUSTMENT OF STEERING AI</u>	NGLE SENSOR NEUTRA	
<u>- 001110</u>	<u>. Booonplion</u> .			
	>> GO TO 2			
	BRATION OF DECEL G	SENSOR		
		el G sensor when replacing the ABS actuator and	d electric unit (control unit	
		OF DECEL G SENSOR : Description".		
	>> END			

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### Description

INFOID:000000007360939

[TYPE 1]

#### PUMP

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

#### MOTOR

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

#### DTC Logic

INFOID:000000007360940

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-44, "Diagnosis Procedure"</u>.

NO >> Inspection End

**Diagnosis** Procedure

INFOID:000000007360941

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

#### **1.**CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. 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-29</u>, "CONSULT Function (<u>ABS</u>)".

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

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	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-113, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

#### **Component Inspection**

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

1. On "ACTIVE TEST", select "ABS MOTOR".

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

Operation	On	Off	K
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

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

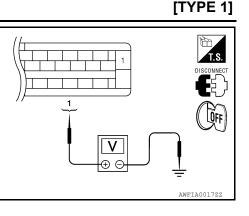
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

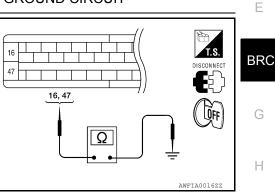
#### >> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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









INFOID:000000007360942

INFOID:000000007830207

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

### DTC Logic

INFOID:000000007360945

INFOID:000000007360944

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007360946

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

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor 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. YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

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

#### < DTC/CIRCUIT DIAGNOSIS >

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.

	ectric unit (control unit)	Yaw rate/side	/decel G sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	18		3	
<b>E</b> 405	19	070	2	
E125	22	B73	4	Yes
	29		1	
3.YAW RATE/SIDE/I Perform the yaw rate/ Is the inspection resu YES >> Replace to Iation".	It normal? the ABS actuator and o the yaw rate/side/dece ection	ISPECTION omponent inspection. electric unit (control u	nit). Refer to <u>BRC</u>	"Component Inspection". -113. "Removal and Instal al and Installation".
Select "YAW RATE S side/decel G sensor s		DR", "DECEL G-SEN	" IN "DATA MONIT	OR" and check yaw rate
Vehicle condition	YAW RATE			DECEL G-SEN
Vehicle condition	YAW RATE (DATA MON	ITOR) (DAT	TA MONITOR)	(DATA MONITOR)
Vehicle condition Stopped	YAW RATE (DATA MON -4 to +4 de	ITOR) (DAT eg/s -1.1	TA MONITOR) 1 to +1.1 m/s	
Vehicle condition Stopped Turning right	YAW RATE (DATA MON -4 to +4 do Negative v	ITOR) (DAT eg/s -1. alue Ne	TA MONITOR) 1 to +1.1 m/s gative value	(DATA MONITOR)
Vehicle condition Stopped Turning right Turning left	YAW RATE (DATA MON -4 to +4 de	ITOR) (DAT eg/s -1. alue Ne	TA MONITOR) 1 to +1.1 m/s	(DATA MONITOR) -0.08 G to +0.08 G - -
Vehicle condition Stopped Turning right Turning left Speed up	YAW RATE (DATA MON -4 to +4 do Negative v	ITOR) (DAT eg/s -1. alue Ne	TA MONITOR) 1 to +1.1 m/s gative value	(DATA MONITOR) -0.08 G to +0.08 G - - Negative value
Vehicle condition Stopped Turning right Turning left Speed up Speed down	YAW RATE (DATA MON -4 to +4 do Negative v Positive va -	ITOR) (DAT eg/s -1. alue Ne	TA MONITOR) 1 to +1.1 m/s gative value	(DATA MONITOR) -0.08 G to +0.08 G - -
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio NO >> Go to dia	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - - - It normal? n End gnosis procedure. Ref	ITOR) (DAT eg/s -1. alue Ne alue Po	TA MONITOR)  1 to +1.1 m/s  gative value  sitive value	(DATA MONITOR) -0.08 G to +0.08 G - - Negative value
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - - - It normal? n End gnosis procedure. Ref	ITOR) (DAT eg/s -1. alue Ne alue Po	TA MONITOR)  1 to +1.1 m/s  gative value  sitive value	(DATA MONITOR) -0.08 G to +0.08 G - - Negative value
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio NO >> Go to dia Special Repair R 1.ADJUSTMENT OF	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - It normal? n End gnosis procedure. Ref equirement	ITOR) (DAT eg/s -1. alue Ne alue Po er to <u>BRC-46, "Diagn</u> SENSOR NEUTRAL	TA MONITOR)  1 to +1.1 m/s  1 to +1.	(DATA MONITOR) -0.08 G to +0.08 G Negative value Positive value
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio NO >> Go to dia Special Repair R ADJUSTMENT OF Always perform neutrand electric unit (cont POSITION : Descripti	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - - - - - - - - - - - - - - - - - -	ITOR) (DAT eg/s -1. alue Ne alue Po er to <u>BRC-46, "Diagn</u> SENSOR NEUTRAL t for the steering ang	TA MONITOR)  1 to +1.1 m/s  1 to +1.	(DATA MONITOR) -0.08 G to +0.08 G - - Negative value Positive value
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio NO >> Go to dia Special Repair R Always perform neutrand electric unit (cont POSITION : Descripti >> GO TO 2	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - - - - - - - - - - - - - - - - - -	ITOR) (DAT eg/s -1. alue Ne alue Po er to <u>BRC-46, "Diagn</u> SENSOR NEUTRAL t for the steering ang	TA MONITOR)  1 to +1.1 m/s  1 to +1.	(DATA MONITOR) -0.08 G to +0.08 G Negative value Positive value INFOID:0000000783024
Vehicle condition Stopped Turning right Turning left Speed up Speed down Is the inspection resu YES >> Inspectio NO >> Go to dia Special Repair R ADJUSTMENT OF Always perform neutrand electric unit (cont POSITION : Descripti	YAW RATE (DATA MON -4 to +4 do Negative v Positive va - - - - - - - - - - - - - - - - - - -	ITOR) (DAT eg/s -1. alue Ne alue Po er to <u>BRC-46, "Diagn</u> SENSOR NEUTRAL t for the steering ang	TA MONITOR)  1 to +1.1 m/s  1 to +1.	(DATA MONITOR) -0.08 G to +0.08 G Negative value Positive value INFOID:0000000783024

[TYPE 1]

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#### < DTC/CIRCUIT DIAGNOSIS >

## C1115 WHEEL SENSOR

#### Description

INFOID:000000007830210

**ITYPE 11** 

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:000000007360950

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007830211

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-</u> <u>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.
- 2. Turn on the ABS active wheel sensor tester power switch.
- NOTE:

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

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

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

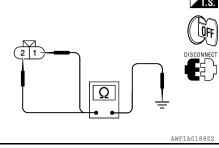
Does the ABS active wheel sensor tester detect a signal?

## **C1115 WHEEL SENSOR**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
NO >> Replace the wheel sensor. Refer to <u>BRC-111</u> , "Removal a	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 "Rear Axle Bearing".	Inspection and Service" (front), RAX-7.
<u>Is the inspection result normal?</u>	
YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8. "Rer</u> "Removal and Installation".	noval and Installation" (front), <u>RAX-13.</u>
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT	
<ol> <li>Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.</li> <li>Check continuity between wheel sensor connector terminals</li> </ol>	t.s.
and ground.	Hei
Continuity should not exist.	
Is the inspection result normal?	

YES >> GO TO 6

NO >> Repair the circuit.



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

1. Check continuity between ABS actuator and electric unit (control unit) 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	<b>E10</b>	1		_		
FIONLER		46	E18	2		L		
Front RH		34	<b>E117</b>	1				
	E125	33	E117	EII/		2	Yes	N
Rear LH	E125	36	011	1	Tes			
Redi LH		37	C11	2				
Rear RH		43	C10	1		Ν		
		42	010	2				

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-113, "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.

## **BRC-49**

INFOID:000000007830212

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## C1115 WHEEL SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Wheel sensor	Vehicle speed (DATA MONITOR)
FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer display ( $\pm 10\%$ or less)
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> Inspection End

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

#### Special Repair Requirement

INFOID:000000007830209

## 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-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

>> GO TO 2

## $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR}$

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

>> END

## **C1116 STOP LAMP SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

## C1116 STOP LAMP SWITCH

## Description

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

## DTC Logic

INFOID:000000007360955

INFOID:000000007360954

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	E
DTC CO	NFIRMATION PROCEI	DURE		
<b>1</b> .CHEC	K SELF-DIAGNOSIS RE	SULTS		BRC
Check th	e self-diagnosis results.			
				G
	Self-diagnosis			
<del></del>	STOP LAMP	-		Н
	displayed on the self-diag		Dropoduro"	11
	>> Inspection End	procedure. Refer to <u>BRC-51, "Diagnosis</u>	<u>Procedure</u> .	
	sis Procedure		INFOID:00000007360956	I
Diagite			WW CID.000000000000000000000000000000000000	
	g Wiring Diagram informa	tion, refer to <u>BRC-90, "Wiring Diagram -</u>	- WITHOUT HILL DESCENT CON-	J
				К
	ECTOR INSPECTION			TX .
		and electric unit (control unit) connector a	and stop lamp switch connector	
		nation, disconnection, looseness or dam		L
	pection result normal?			
-	>> GO TO 2 >> Repair or replace as n	acassan/		M
_	LAMP SWITCH INSPEC	•		
				Ν
	nect the stop lamp switch ck the voltage between th	The ABS actuator and electric unit		I N
	trol unit) connector E125 t			
R	rake pedal depressed	: Battery voltage		0
	rake pedal released	: OV		
	pection result normal?			Р
	•	is again. If the same results		
	appear, replace ABS	actuator and electric unit (control		
NO	unit). Refer to <u>BRC-11</u>	3. "Removal and Installation".		
-	LAMP SWITCH CIRCUIT		AWFIA0191ZZ	

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## C1116 STOP LAMP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

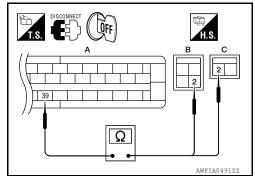
- 1. Disconnect the stop lamp switch connector.
- Check the continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2 (with A/T) or E38 (C) terminal 2 (with M/T).

#### Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-8, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.

#### Special Repair Requirement



INFOID:000000007830213

**[TYPE 1]** 

## **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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

#### DTC Logic

DTC DETECTION LOGIC

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

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-53, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-90, "Wiring Diagram - WITHOUT HILL DESCENT CON-</u> TROL/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.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (<u>ABS</u>)".

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

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[TYPE 1]

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

 ${f 3.}$  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 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-113, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

### **Component Inspection**

## **1.**CHECK ACTIVE TEST

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

Operation		ABS solenoid valve		
		Up	Кеер	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*

\*: 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 <u>BRC-53</u>, "Diagnosis Procedure".

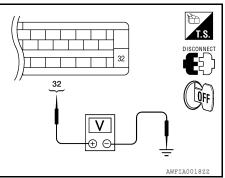
#### Special Repair Requirement

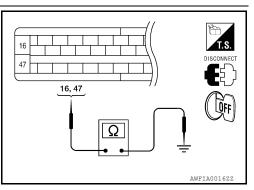
#### **1**.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

## BRC-54







[TYPE 1]

INFOID:000000007830214

INFOID:000000007360961

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

< DTC/CIRCUIT DIAGNOSIS >

	А
>> GO TO 2 2.CALIBRATION OF DECEL G SENSOR	A
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-13. "CALIBRATION OF DECEL G SENSOR : Description"</u> .	В
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## C1121, C1123, C1125, C1127 OUT ABS SOL

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

#### DTC Logic

INFOID:000000007360964

INFOID:000000007360963

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

#### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007830216

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

#### **1**.CONNECTOR INSPECTION

- 1. 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 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

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

#### < DTC/CIRCUIT DIAGNOSIS >

- Turn ignition switch OFF. 1.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 and ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$  check solenoid, vdc switch-over valve and 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-113, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

#### Component Inspection

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

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

Operation			ABS solenoid valve		
		Up	Кеер	Down	
	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 OUT SOL	Off	Off	On*	- N
RR RH SOL	RR RH IN SOL	Off	On	On	_
	RR RH OUT SOL	Off	Off	On*	N
RR LH SOL	RR LH IN SOL	Off	On	On	_
	RR LH OUT SOL	Off	Off	On*	_

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

Is the inspection result normal?

>> Inspection End YES

>> Go to diagnosis procedure. Refer to BRC-71, "Diagnosis Procedure". NO

## Special Repair Requirement

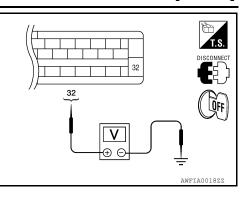
## 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".** 

#### **BRC-57**



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< DTC/CIRCUIT DIAGNOSIS >

#### >> GO TO 2

 $2. {\sf CALIBRATION} \ {\sf OF} \ {\sf DECEL} \ {\sf G} \ {\sf SENSOR}$ 

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 DECEL G SENSOR : Description".

>> END

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

#### DTC Logic

INFOID:000000007360969

INFOID:000000007360968

#### DTC DETECTION LOGIC

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

#### 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-59</u>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

## 1.CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-52, "CONSULT Function"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29, "CONSULT Func-</u> tion (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> Inspection End

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INFOID:000000007360970

#### < DTC/CIRCUIT DIAGNOSIS >

## C1140 ACTUATOR RLY

## Description

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

#### DTC Logic

INFOID:000000007360972

INFOID:000000007360971

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007830218

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

## **1**.CONNECTOR INSPECTION

- 1. 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.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-29</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

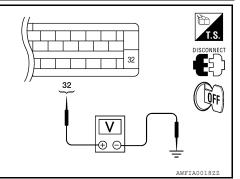
- YES >> GO TO 2
- NO >> Poor connection of connector terminals. Repair or replace connector.

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 ele	ectric unit (control unit)	ntrol unit) Voltage	
Connector	Terminal	_	voltage
E125	32	Ground	Battery voltage
	14 10		

Is the inspection result normal?



## C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 3
- NO >> Repair or replace malfunctioning components.

 $\mathbf{3.}$  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 <u>BRC-113, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

#### Component Inspection

**1.**CHECK ACTIVE TEST

1. On "ACTIVE TEST", select "ABS MOTOR".

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

Operation	On	Off	
MOTOR RELAY	On	Off	Н
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

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

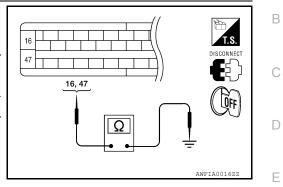
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

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

>> END



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## C1143, C1144 STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1143, C1144 STEERING ANGLE SENSOR

#### Description

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[TYPE 1]

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:000000007360977

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

#### 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 <u>BRC-62, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007360978

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

## **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. 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 <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 >

- 1. Turn ignition switch OFF.
- 2. Disconnect steering angle sensor connector.
- 3. 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 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>. <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-113</u>, "<u>Removal and Installa-</u> <u>tion</u>".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-115</u>, "Removal and Installation".

#### **Component Inspection**

## **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±2.5 °
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-62</u>, "Diagnosis Procedure".

### Special Repair Requirement

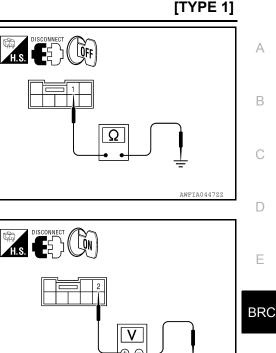
#### **1.**ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

#### >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR



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## C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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 DECEL G SENSOR : Description".

>> END

#### < DTC/CIRCUIT DIAGNOSIS >

## C1155 BRAKE FLUID LEVEL SWITCH

#### Description

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

#### **DTC Logic**

INFOID:000000007360982

INFOID:000000007360981

#### DTC DETECTION LOGIC

DTC	Display item		Malfunction de	etected condition	Possible cause	
C1155	BR FLUID LEVEL LO	W the AE		ommunication line between ic unit (control unit) and brake shorted.	<ul> <li>Harness or connector</li> <li>Brake fluid level switch</li> <li>Brake fluid level</li> </ul>	E
DTC CC	ONFIRMATION PR	ROCEDURE				
<b>1.</b> снес	CK SELF-DIAGNOS	SIS RESULTS	6			BF
Check th	ne self-diagnosis rea	sults.				
		agnosis results				0
		ID LEVEL LOW				
	displayed on the s	-				ŀ
YES NO	>> Proceed to diag	inosis proced	ure. Refer to $BR($	C-65, "Diagnosis Proced	<u>ure"</u> .	
	osis Procedure					
Diagne					INFOID:0000000736098	
			efer to <u>BRC-90. "</u>	Wiring Diagram - WITH	OUT HILL DESCENT CON-	
	ng Wiring Diagram i ILL START ASSIST		efer to <u>BRC-90, "</u>	Wiring Diagram - WITH	OUT HILL DESCENT CON-	
TROL/H	ILL START ASSIST	<u>.</u> .	efer to <u>BRC-90, "</u>	Wiring Diagram - WITH	OUT HILL DESCENT CON-	
TROL/H		<u>.</u> .	efer to <u>BRC-90, "</u>	Wiring Diagram - WITH	OUT HILL DESCENT CON-	ŀ
TROL/H 1.CONI 1. Disc	ILL START ASSIST	". ION or and electric	c unit (control uni	t) connector and brake f	OUT HILL DESCENT CON-	
TROL/H 1.CONI 1. Disc 2. Che	ILL START ASSIST	". ION or and electric deformation,	c unit (control uni			
TROL/H 1.CONI 1. Disc 2. Che Is the ins	ILL START ASSIST	". ION or and electric deformation,	c unit (control uni	t) connector and brake f		
TROL/H 1.CONI 1. Disc 2. Che Is the ins	ILL START ASSIST NECTOR INSPECT connect ABS actuated took the terminals for spection result norm	"- TON or and electric deformation, nal?	c unit (control uni disconnection, lo	t) connector and brake f		ŀ
TROL/H 1. Disc 2. Che Is the ins YES NO	NECTOR INSPECT connect ABS actuate tok the terminals for spection result norm >> GO TO 2 >> Repair or replace	". TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control uni disconnection, lc ary.	t) connector and brake f poseness or damage.		ŀ
1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC	NECTOR INSPECT connect ABS actuate tok the terminals for spection result norm >> GO TO 2 >> Repair or replace	". TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control uni disconnection, lc ary.	t) connector and brake f poseness or damage.	luid level switch connector.	K
1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC UNIT (CO 1. Che	ILL START ASSIST NECTOR INSPECT connect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	". TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAP en ABS actua	c unit (control uni disconnection, lo ary. KE FLUID LEVEL	t) connector and brake f ooseness or damage.	luid level switch connector.	ŀ
1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC UNIT (CC 1. Che unit)	ILL START ASSIST NECTOR INSPECT connect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replace CK HARNESS BET ONTROL UNIT) ck continuity betwee ) connector E125 (A	". TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAR wEEN BRAR	c unit (control uni disconnection, lo ary. KE FLUID LEVEL	t) connector and brake f ooseness or damage.	luid level switch connector.	ľ
1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC UNIT (CC 1. Che unit)	ILL START ASSIST NECTOR INSPECT connect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	". TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAR wEEN BRAR	c unit (control uni disconnection, lo ary. KE FLUID LEVEL	t) connector and brake f ooseness or damage.	luid level switch connector.	ľ
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1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC UNIT (CC 1. Che unit) conr	ILL START ASSIST NECTOR INSPECT connect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe ) connector E125 (A nector E21 (B) term	"- TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAR WEEN BRAR en ABS actua ) terminal 28 inal 1.	c unit (control uni disconnection, lo ary. KE FLUID LEVEL ator and electric u and brake fluid lo	t) connector and brake f ooseness or damage.		F L M
1.CONI 1. Disc 2. Che Is the ins YES NO 2.CHEC UNIT (CC 1. Che unit) conr	ILL START ASSIST NECTOR INSPECT connect ABS actuate teck the terminals for spection result norm >> GO TO 2 >> Repair or replace CK HARNESS BET ONTROL UNIT) teck continuity betwee connector E125 (A nector E21 (B) term tuator and electric unit (control unit) ctor Terminal	"- TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAR WEEN BRAR en ABS actua ) terminal 28 inal 1.	c unit (control uni disconnection, lo ary. KE FLUID LEVEL ator and electric u and brake fluid lo	t) connector and brake froseness or damage.		Ч 1 1

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



**[TYPE 1]** 

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## C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## $\mathbf{3}.$ 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-66, "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-113, "Removal and Installation".
- NO >> Replace brake fluid level switch.

#### Component Inspection

## 1. CHECK BRAKE FLUID LEVEL SWITCH

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

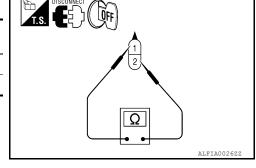
Brake fluid level switch terminals	Condition	Continuity
1-2	Brake fluid reservoir is full.	No
1 – 2	Brake fluid reservoir is empty.	Yes

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

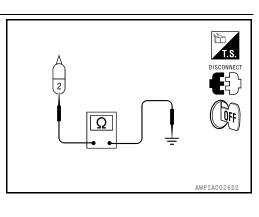
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".** 

#### >> 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".

**BRC-66** 



## 2012 Xterra

INFOID:000000007830222

INFOID:000000007360984

C	1155 BRAKE FLUID LEVEL SWITCH		
< DTC/CIRCUIT DIAGNOSIS	;>	[TYPE 1]	
>> END		A	
		В	
		С	
		D	
		E	
		BRC	
		G	
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		К	
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		M	
		N	
		0	

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## C1156 ST ANG SEN COM CIR

#### Description

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

#### DTC Logic

INFOID:000000007360987

INFOID:000000007360988

#### 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 <u>BRC-68, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

#### **1**.CONNECTOR INSPECTION

- 1. 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 <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

INFOID:000000007360986

< DTC/CIRCUIT DIAGNOSIS >

## C1160 DECEL G SEN SET

## Description

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

## DTC Logic

INFOID:000000007360990

INFOID:000000007360989

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D	
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	<ul> <li>Decel G sensor calibration</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	E	
DTC CC	NFIRMATION PROCE	DURE			
<b>1</b> .CHEC	K SELF-DIAGNOSIS RE	SULTS		BRC	
Check th	e self-diagnosis results.				
				G	
	Self-diagnosis				
	DECEL G SEI			Н	
	<u>Is above displayed on the self-diagnosis display?</u> YES >> Proceed to diagnosis procedure. Refer to <u>BRC-69, "Diagnosis Procedure"</u> .				
	>> Inspection End		<u></u> .		
Diagno	sis Procedure		INFOID:00000007360991		
1 DEDE	ORM SELF-DIAGNOSIS				
Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29, "CONSULT Function</u>					
<u>(ABS)"</u> .	ABS actuator and electri	c unit (control unit) self-diagnosis. Refer to $BR$	C-29, CONSULT FUNCTION		
· · ·				Κ	
	If-diagnosis results				
	ECEL G SEN SET			1	
	-	anything other than shown above? acement for the item indicated.			
	>> Perform calibration of	decel G sensor. Refer to BRC-13, "CALIBRATI	ON OF DECEL G SENSOR		
0	: Description". GO TO			M	
	ORM SELF-DIAGNOSIS				
	the ignition switch to OFI <u>T Function (ABS)"</u> .	<sup>-</sup> and then to ON and erase self-diagnosis resul	ts. Refer to <u>BRC-29, "CON-</u>	Ν	
2. Perfo		ectric unit (control unit) self-diagnosis again. Re	efer to <u>BRC-29, "CONSULT</u>		
	self-diagnosis results disp	layed?		0	
YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-116, "Removal and Installation"</u> .					
NO	>> Inspection End			Ρ	

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#### < DTC/CIRCUIT DIAGNOSIS >

## C1163 ST ANGLE SEN SAFE

#### Description

INFOID:000000007360992

[TYPE 1]

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:000000007360993

#### DTC DETECTION LOGIC

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

#### 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 <u>BRC-70. "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007360994

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

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

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> Inspection End

NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, "<u>CONSULT</u> <u>Function (ABS)</u>".

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

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#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	E
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.		BRC
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)	G
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.		Η

#### DTC CONFIRMATION PROCEDURE

## 1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2
above displayed on the self-diagnosis display?
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-71, "Diagnosis Procedure"</u> . NO >> Inspection End
Diagnosis Procedure

INFOID:000000007830223 Ν

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

## **1**.CONNECTOR INSPECTION

- 1. 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 connectors and then perform the self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

[TYPE 1]

INFOID:000000007360995

INFOID:000000007360997

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

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

 $\mathbf{2}$ .check solenoid, vdc switch-over valve and actuator relay power supply circuit

- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. 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.

 ${f 3.}$  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 <u>BRC-113</u>, "<u>Removal and Installation</u>".

NO >> Repair or replace malfunctioning components.

#### **Component Inspection**

## **1.**CHECK ACTIVE TEST

- 1. 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.

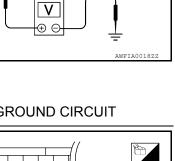
Operation		ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
	FR RH OUT SOL	Off	Off	Off
	FR LH IN SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	Off	Off	Off
	RR RH IN SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off
KITEH ABS SOLENOID (ACT)	RR LH OUT SOL	Off	Off	Off

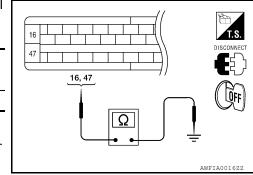
\*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

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





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INFOID:000000007360998

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

< DTC/CIRCUIT DIAGNOSIS >

#### Special Repair Requirement

[TYPE 1]

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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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). D Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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Revision: December 2011

## U1000 CAN COMM CIRCUIT

#### Description

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

#### DTC Logic

INFOID:000000007361001

INFOID:000000007361002

#### DTC DETECTION LOGIC

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

#### Diagnosis Procedure

## **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 <u>BRC-29</u>, "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.

## **VDC OFF SWITCH**

## < DTC/CIRCUIT DIAGNOSIS >

## VDC OFF SWITCH

## Description

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

## **Component Function Check**

## 1. CHECK VDC OFF SWITCH OPERATION

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 la	amp illumination stat		
	h: pressed and re			N		
	h: pressed and re			FF		
			0		_	-
	on result norm spection End	<u>iai :</u>				
		procedure. R	efer to BRC-	-75, "Diagnosis	Procedure".	
Diagnosis I	-			-		
Jugnosis i	roccure				INF-OID:0000	0000007361005
			efer to <u>BRC-9</u>	0, "Wiring Diag	ram - WITHOUT HILL DESCENT	<u>۲ CON-</u>
ROL/HILL S	TART ASSIST	<u> </u> .				
4						
CHECK VE	DC OFF SWIT	СН				
Perform the V	DC OFF switc	h component	inspection. F	Refer to <u>BRC-76</u>	, "Component Inspection"	
	<u>on result norm</u>	<u>nal?</u>				
	O TO 2					
~	eplace VDC C		0			
	DC OFF SWIT					
<ol> <li>Disconnet tor.</li> </ol>	ct ABS actuate	or and electric	c unit (contro	l unit) connec-		₩.
	ntinuity betwee	en ABS actua	tor and electi	ric unit (control		H.S.
		rminal 6 and V	VDC OFF sw	vitch connector		-
M154 terr	ninal 1.					
ABS actuator a	and electric unit					
(contro		VDC OF	F switch	Continuity		
Connector	Terminal	Connector	Terminal		Ω	_
E125	6	M154	1	Yes		
3. Check co	ntinuity betwe	en ABS actua	tor and electi	ric unit (control	AWF	IA0197ZZ
	ector E125 te			, -		
	ABS actuator and	electric unit (cor	ntrol unit)		- Continuity	
	nnactor		Terminal			

Connector	Terminal		
E125	6	Ground	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

 $\mathbf{3}$ .check vdc off switch ground

No

INFOID:000000007361003

INFOID:000000007361004

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## **VDC OFF SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

#### **4.**CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-113, "Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-83, "Removal and Installation"</u>.

#### 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
	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 <u>BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

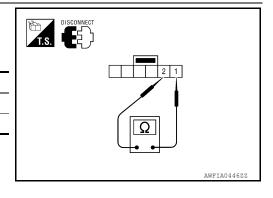
#### >> GO TO 2

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

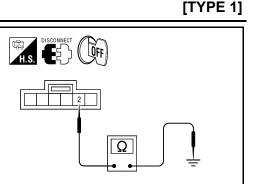
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END









INFOID:000000007361006

## **ABS WARNING LAMP**

#### < DTC/CIRCUIT DIAGNOSIS >

## ABS WARNING LAMP

## Description

INFOID:000000007361008

[TYPE 1]

А

	×: ON –: OFF	В
Condition	ABS warning lamp	
Ignition switch OFF	-	0
For 2 seconds after turning ON ignition switch	×	С
2 seconds later after turning ON ignition switch	-	
ABS function is malfunctioning.	×	D
EBD function is malfunctioning.	×	
Component Function Check	INFOID:000000007361009	Е
<b>1.</b> CHECK ABS WARNING LAMP OPERATION		
Check that the lamp illuminates for approximately 2 se	conds after the ignition switch is turned ON.	BRO
Is the inspection result normal?		
YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	77, "Diagnosis Procedure".	G
Diagnosis Procedure	INFOID:00000007361010	G
1.CHECK SELF-DIAGNOSIS		Н
Perform ABS actuator and electric unit (control unit) (ABS)".	self-diagnosis. Refer to BRC-29, "CONSULT Function	
Is the inspection result normal?		
YES >> GO TO 2		
NO >> Check items displayed by self-diagnosis.		
2. CHECK COMBINATION METER		J
Check if the indication and operation of combination m tion".	neter are normal. Refer to MWI-24, "Diagnosis Descrip-	K
Is the inspection result normal?		
	control unit). Refer to <u>BRC-113, "Removal and Installa-</u>	
NO >> Replace combination meter. Refer to <u>MWI</u>	-83, "Removal and Installation".	L
Special Repair Requirement	INFOID:00000007830226	
1. ADJUSTMENT OF STEERING ANGLE SENSOR	EUTRAL POSITION	Μ
	eering angle sensor when replacing the ABS actuator	Ν
>> GO TO 2		0
2. CALIBRATION OF DECEL G SENSOR		
Always perform calibration of decel G sensor when rep Refer to <u>BRC-13</u> , "CALIBRATION OF DECEL G SENS	placing the ABS actuator and electric unit (control unit).	Ρ

#### **BRAKE WARNING LAMP**

#### < DTC/CIRCUIT DIAGNOSIS >

## BRAKE WARNING LAMP

## Description

INFOID:000000007361012

×: ON –: OFF

**ITYPE 11** 

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:000000007361013

## **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 <u>BRC-78, "Diagnosis Procedure"</u>.

## Diagnosis Procedure

INFOID:000000007361014

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

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-113</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-83</u>, "Removal and Installation".

#### Special Repair Requirement

INFOID:000000007830227

### **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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

## **VDC OFF INDICATOR LAMP**

#### < DTC/CIRCUIT DIAGNOSIS >

## VDC OFF INDICATOR LAMP

## Description

INFOID:000000007361016

Decomption	INFOID.00000007361016	
	×: ON –: OFF	3
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:00000007361017	
1.VDC OFF INDICATOR LAMP OPERATION CHECK	K 1	RC
Check that the lamp illuminates for approximately 2 se	conds after the ignition switch is turned ON.	
Is the inspection result normal?	G	3
YES >> GO TO 2		
NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>		
2.VDC OFF INDICATOR LAMP OPERATION CHECK	< 2 H	1
Check that the VDC OFF indicator lamp in the combination VDC OFF switch.	ation meter turns ON/OFF correctly when operating the	
Is the inspection result normal?	I	
YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-75.</u>	. "Diagnosis Procedure".	I
Diagnosis Procedure	INFOID:00000007361018	,
1.CHECK VDC OFF SWITCH	K	<
Check that the VDC OFF indicator lamp in the combination VDC OFF switch.	ation meter turns ON/OFF correctly when operating the	
Is the inspection result normal?	L	-
YES >> GO TO 2		
NO >> Check VDC OFF switch. Refer to <u>BRC-75</u> .	<u>, "Diagnosis Procedure"</u> . №	Л
2.CHECK SELF-DIAGNOSIS	IV	/1
Perform ABS actuator and electric unit (control unit) (ABS)".	self-diagnosis. Refer to <u>BRC-29, "CONSULT Function</u>	J
Is the inspection result normal?		N.
YES >> GO TO 3		
NO >> Check items displayed by self-diagnosis.	C	)
3.CHECK COMBINATION METER		
Check if the indication and operation of combination m tion".	neter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>	C
Is the inspection result normal?		
YES >> Replace ABS actuator and electric unit (c tion".	control unit). Refer to BRC-113, "Removal and Installa-	
NO >> Replace combination meter. Refer to <u>MWI</u>	-83, "Removal and Installation".	

[TYPE 1]

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## VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000007830228

## 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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

 $2. {\sf CALIBRATION} \text{ of decel g sensor}$ 

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

>> END

## SLIP INDICATOR LAMP

## < DTC/CIRCUIT DIAGNOSIS >

## SLIP INDICATOR LAMP

## Description

INFOID:000000007361020

	×: 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:00000007361021
1. CHECK SLIP INDICATOR LAMP OPERATION	
Check that the lamp illuminates for approximately 2 see	
Is the inspection result normal?	
YES >> Inspection End	
NO >> Go to diagnosis procedure. Refer to <u>BRC-8</u>	31, "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007361022
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) s (ABS)".	self-diagnosis. Refer to BRC-29, "CONSULT Function
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 m tion".	eter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (continuit).	ontrol unit). Refer to BRC-113, "Removal and Installa-
NO >> Replace combination meter. Refer to <u>MWI-</u>	83. "Removal and Installation".
Special Repair Requirement	INFOID:000000007361023
1.ADJUSTMENT OF STEERING ANGLE SENSOR N	EUTRAL POSITION
Always perform neutral position adjustment for the ste and electric unit (control unit). Refer to <u>BRC-12, "ADJU</u> <u>POSITION : Description"</u> .	
>> GO TO 2	
2.CALIBRATION OF DECEL G SENSOR	
Always perform calibration of decel G sensor when rep Refer to <u>BRC-13</u> , "CALIBRATION OF DECEL G SENS	

#### >> END

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< DTC/CIRCUIT DIAGNOSIS >

#### Special Repair Requirement

INFOID:000000007830229

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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

 $2. {\sf CALIBRATION} \text{ of decel g sensor}$ 

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

>> END

## APPLICATION NOTICE < ECU DIAGNOSIS INFORMATION > ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

## **Application Notice**

Service information	Remarks	C
TYPE 1	VDC/TCS/ABS	0
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	
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[TYPE 1]

< ECU DIAGNOSIS INFORMATION >

## ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### **Reference Value**

INFOID:000000007361026

#### 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

		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 $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G	
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G	
	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	
FR RH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
	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	
FR RH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
	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	
FR LH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
FR LH OUT SOL	Operation status of each colonaid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On	
	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	- A
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	В
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	С
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On	D
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	E
RR 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	BRC
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	G
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	Н
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
	EBD warning lamp	When EBD warning lamp is ON	On	-
EBD WARN LAMP		When EBD warning lamp is OFF	Off	-
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On	J
	Stop lamp switch signal status	When brake pedal is released	Off	_
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	On	K
		When the motor relay and motor are not operating	Off	_
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On	L
		When the actuator relay is not operating	Off	_
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	On	M
	(Note 2)	When ABS warning lamp is OFF	Off	_
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	On	-
	(Note 2)	When VDC OFF indicator lamp is OFF VDC OFF switch ON	Off	N
OFF SW	VDC OFF switch ON/OFF	(When VDC OFF indicator lamp is ON)	On	-
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off	0
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	On	6
	(Note 2)	When SLIP indicator lamp is OFF	Off	P
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	_
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5	

#### < ECU DIAGNOSIS INFORMATION >

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
		With engine stopped	0 rpm
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s
IAW NATE SEN	sensor	When vehicle turning	–75 to 75 d/s
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	On
111 001 010		A/T shift position = other than R position	Off
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	On
N F031313		A/T shift position = other than N position	Off
	DND switch signal ON/OFF condition	A/T shift position = P position	On
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = other than P position	Off
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("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 ac- tive ("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 ac- tive ("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 ac- tive ("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\\\\D\/4\\\\D	Drive exte	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 %
	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %

#### < ECU DIAGNOSIS INFORMATION >

**[TYPE 1]** 

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	1
		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> )	
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°	
STRANGEL SIG	sensor	Steering wheel turned	–720 to 720°	
PRESS SENSOR	Brake fluid pressure detected by front pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar	
TALOO OLNOOK	sure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar	_
EBD SIGNAL	EBD operation	EBD is active	On	E
LDD SIGNAL		EBD is inactive	Off	E
ABS SIGNAL	ABS operation	ABS is active	On	
ADS SIGNAL		ABS is inactive	Off	
TCS SIGNAL	TCS operation	TCS is active	On	
ICS SIGNAL		TCS is inactive	Off	
VDC SIGNAL	VDC operation	VDC is active	On	
VDC SIGNAL	VDC operation	VDC is inactive	Off	
EBD FAIL SIG	EPD foil cofe signal	In EBD fail-safe	On	
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	Off	
ABS FAIL SIG	APS foil sofo signal	In ABS fail-safe	On	
ADO FAIL OIG	ABS fail-safe signal	ABS is normal	Off	
TCS FAIL SIG		In TCS fail-safe	On	
I US FAIL SIG	TCS fail-safe signal	TCS is normal	Off	
VDC FAIL SIG	VDC fail cofe signal	In VDC fail-safe	On	
VDG FAIL SIG	VDC fail-safe signal	VDC is normal	Off	
CRANKING SIG	Crank operation	Crank is active	On	
DIC DUILTUITAIT		Crank is inactive	Off	
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On	
	Brake fluid level switch signal status	When brake fluid level switch OFF	Off	

#### NOTE:

• 1: Confirm tire pressure is normal.

**Revision: December 2011** 

- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-77, "Description".
- Brake warning lamp: Refer to BRC-78, "Description".
- VDC OFF indicator lamp: Refer to BRC-79, "Description".
- SLIP indicator lamp: Refer to BRC-81, "Description".

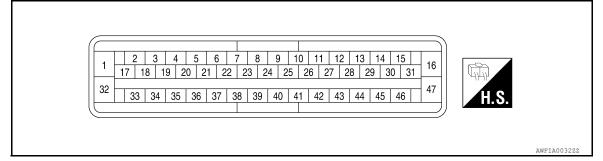
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< ECU DIAGNOSIS INFORMATION >

#### TERMINAL LAYOUT



#### Fail-Safe

INFOID:000000007361027

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

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

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

#### VDC/TCS SYSTEM

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

#### DTC No. Index

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	BRC-35, "Description"
C1103	FR RH SENSOR-1	BRC-33, Description
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PPC 28 "Description"
C1107	FR RH SENSOR-2	BRC-38, "Description"
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"

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Items (CONSULT screen terms)	Reference	0
C1124	RR LH IN ABS SOL	BRC-53, "Description"	— A
C1125	RR LH OUT ABS SOL	BRC-56, "Description"	
C1126	RR RH IN ABS SOL	BRC-53, "Description"	В
C1127	RR RH OUT ABS SOL	BRC-56, "Description"	
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2	-	С
C1132	ENGINE SIGNAL 3	BRC-59, "Description"	
C1133	ENGINE SIGNAL 4	-	D
C1136	ENGINE SIGNAL 6	-	
C1140	ACTUATOR RLY	BRC-60, "Description"	
C1143	ST ANG SEN CIRCUIT	BRC-62, "Description"	E
C1144	ST ANG SEN SIGNAL	BRC-62, Description	
C1145	YAW RATE SENSOR	BRC-46, "Description"	BRC
C1146	SIDE G-SEN CIRCUIT	BRC-40, Description	BRO
C1155	BR FLUID LEVEL LOW	BRC-65, "Description"	
C1156	ST ANG SEN COM CIR	BRC-68, "Description"	G
C1160	DECEL G SEN SET	BRC-69. "Description"	
C1163	ST ANGL SEN SAFE	BRC-70, "Description"	
C1164	CV1		— п
C1165	CV2	BRC-71, "Description"	
C1166	SV1	BRC-71, Description	I
C1167	SV2	1	
C1170	VARIANT CODING	BRC-43, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-74, "Description"	J

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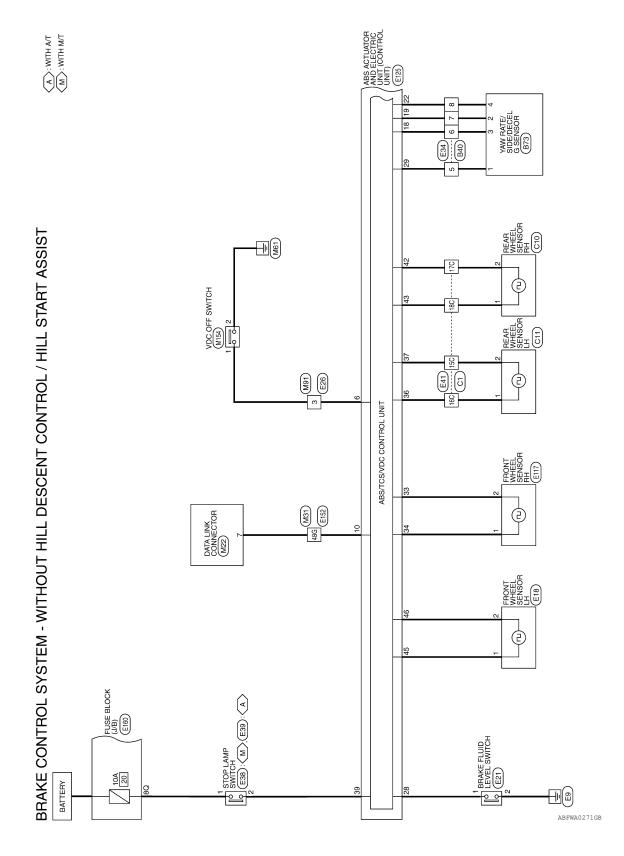
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## WIRING DIAGRAM

**BRAKE CONTROL SYSTEM - VDC** 

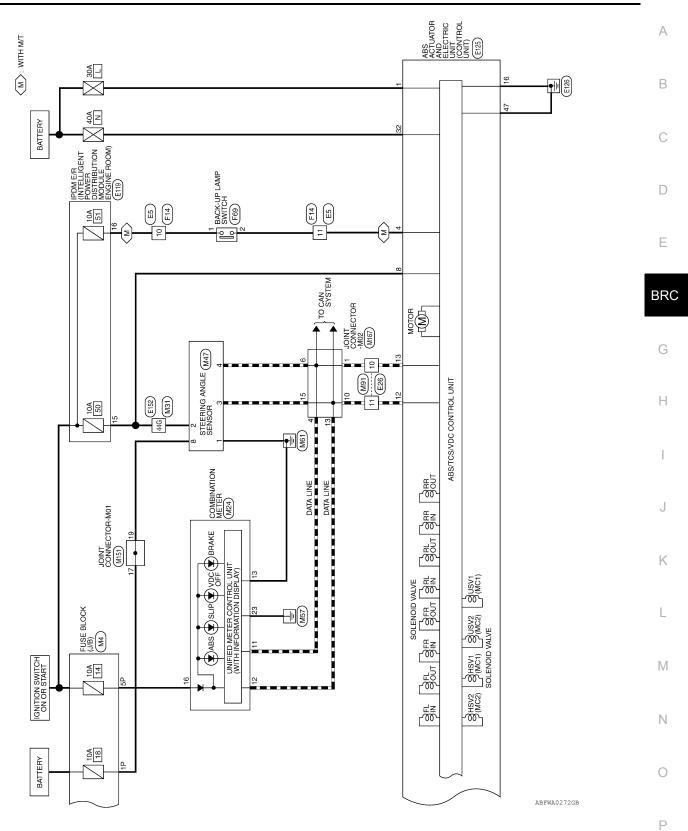
Wiring Diagram - WITHOUT HILL DESCENT CONTROL/HILL START ASSIST



## **BRAKE CONTROL SYSTEM - VDC**

< WIRING DIAGRAM >

#### **[TYPE 1]**



- START ASSIST lo. M24 lame COMBINATION METER color WHITE	15 41 13 12 11 10 9 8 7 6 5 4 3 2 1           15 41 31 22 11 10 9 8 7 6 5 4 3 2 1           15 41 31 22 11 10 9 2 32 22 21           15 Write           Nire           16 Color of           17 Color of           18 Color of           19 Color of           10 Color of           11 Color of <t< th=""><th>Mane     M47       Vame     STEERING ANGLE SENSOR       Vame     STEERING ANGLE SENSOR       Color     WHITE       0.     Wite       0.     Wine       0.     Wine       0.     Wine       0.     Wine       0.     Signal Name       0.     Wine       0.     Wine       0.     Signal Name       1     Color of       1     CAN-H       1     CAN-H       1     POWER       1     CAN-H       1     RATT</th></t<>	Mane     M47       Vame     STEERING ANGLE SENSOR       Vame     STEERING ANGLE SENSOR       Color     WHITE       0.     Wite       0.     Wine       0.     Wine       0.     Wine       0.     Wine       0.     Signal Name       0.     Wine       0.     Wine       0.     Signal Name       1     Color of       1     CAN-H       1     CAN-H       1     POWER       1     CAN-H       1     RATT
ONNECTORS - WITHOUT HILL DESCENT CONTROL / HILL START ASSIST Connector No. M22 Connector Name DATA LINK CONNECTOR Connector Name DATA LINK CONNECTOR Connector Color WHITE CONNECTOR	Terminal No.       Color of 23       Signal Name         7       W       -         12       1       1         12       1       1         12       1       1         12       1       1         12       1       1         12       1       1         12       1       1         12       1       1         13       1       1         13       1       1         13       1       1         13       1       1         12       1       1         13       1       1         13       1       1         13       1       1         13       1       1         15       1       1         15       1       1         15       1       1         13       1       1         13       1       1         13       1       1         13       1       1         15       1       1         15       1       1 <t< td=""><td>Terminal No.       Color of Wire       Signal Name         44G       W/R       -         48G       W       -         1       -         1       -         1       -         1       -         1       -         1       -         1       -         3       -         8       -</td></t<>	Terminal No.       Color of Wire       Signal Name         44G       W/R       -         48G       W       -         1       -         1       -         1       -         1       -         1       -         1       -         1       -         3       -         8       -
BRAKE CONTROL SYSTEM CONNEC Connector No. M4 Connector Name FUSE BLOCK (J/B) Connector Color WHITE	Terminal No.     Color of Signal Name       1P     R/B       1P     R/B       2P     -	Solution         M31           Connector No.         M31           Connector Name         WIRE TO WIRE           Mile         To WIRE           Connector Name         WIRE TO WIRE           Mile         To WIRE           Main         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution         Solution         Solution           Solution

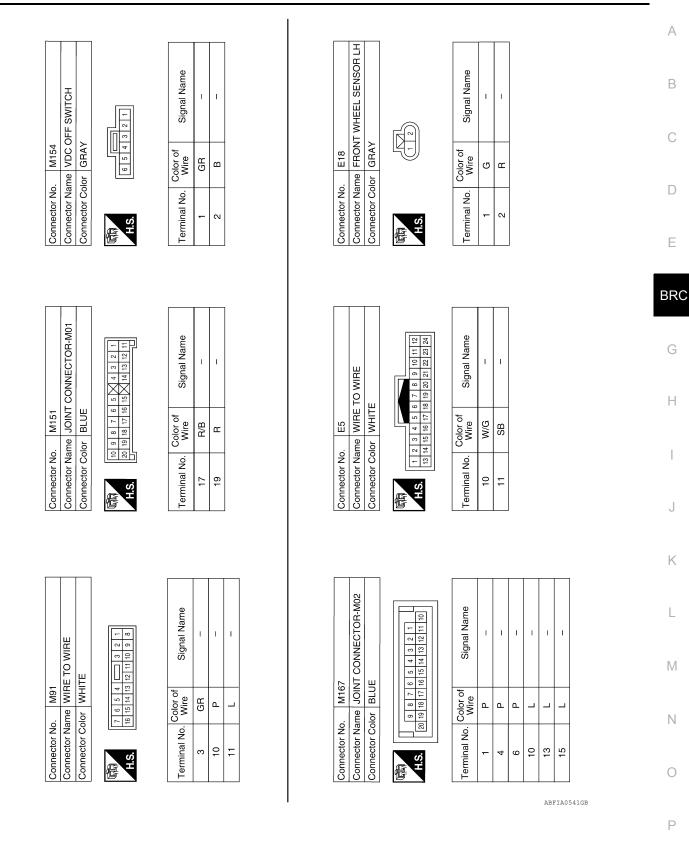
## **BRAKE CONTROL SYSTEM - VDC**

**Revision: December 2011** 

ABFIA0455GB



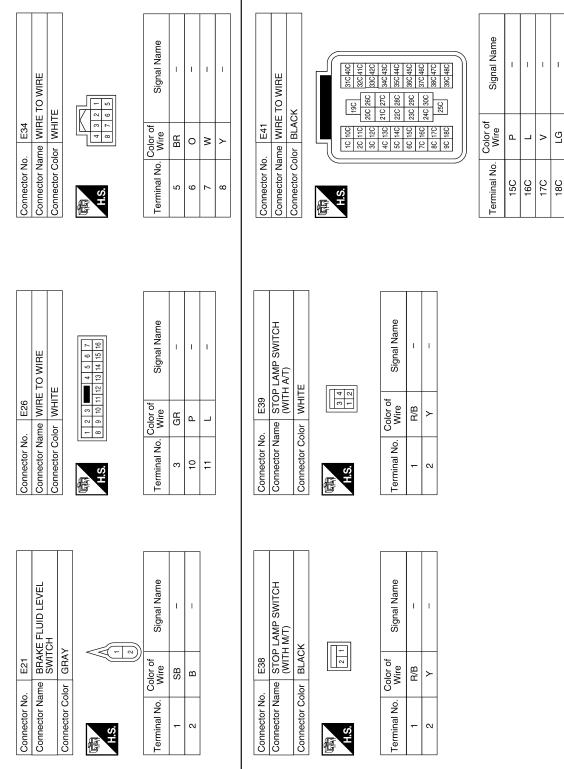
**[TYPE 1]** 



## **BRAKE CONTROL SYSTEM - VDC**

# 1

[TYPE 1]



ABFIA0542GB

## **BRAKE CONTROL SYSTEM - VDC**

## **[TYPE 1]**

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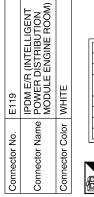
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Signal Name	CLUS_GND	Ι	I	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	I	RR_LH_PWR	RR_LH_SIG	I	STOP LAMP SW	Ι	Ι	RR_RH_SIG	RR_RH_PWR	I	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	BR	-	I	۲	×	в	I	Γ	٩	I	SB	I	-	>	ГG	I	σ	٣	в
Terminal No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

REVERSE LAMP	Signal Name	1	DIAG-K	1	CAN-H	CAN-L	I	1	VALVE ECU GND	1	CAN2-H	CAN2-L	I	I	CLUS_SUP	I	I	I	I	I	ELLID LEVEL SW
M/G	Color of Wire	1	SB	I	_	٩	I	I	ш	I	0	3	I	Ι	≻	I	Ι	I	I	I	ц С
16	Terminal No.	6	10	÷	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

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	f Signal Name	ABS IGN SUPPI	REVERSE LAN
	Color of Wire	W/R	W/G
Ņ.	Terminal No.	15	16

Signal Name

Color of Wire

Terminal No. -

	•	
Terminal No.	Color of Wire	Signal Name
15	W/R	ABS IGN SUPF
16	W/G	REVERSE LAN

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Signal Name	I	DIAG-K	I	CAN-H	CAN-L	I	1	VALVE ECU GND	I	CAN2-H	CAN2-L	I	I	CLUS_SUP	I	I	I	I	I	FLUID LEVEL SW
Color of Wire	I	SB	I	_	٩	I	I	в	I	0	Μ	I	I	¥	I	I	I	I	Ι	GR
Terminal No.	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28





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2	Μ	I
 Connector No.	. E125	
Connector Na	me ELEC	Connector Name ELECTRIC UNIT (CONTROL UNIT)
Connector Color BLACK	lor BLA(	X

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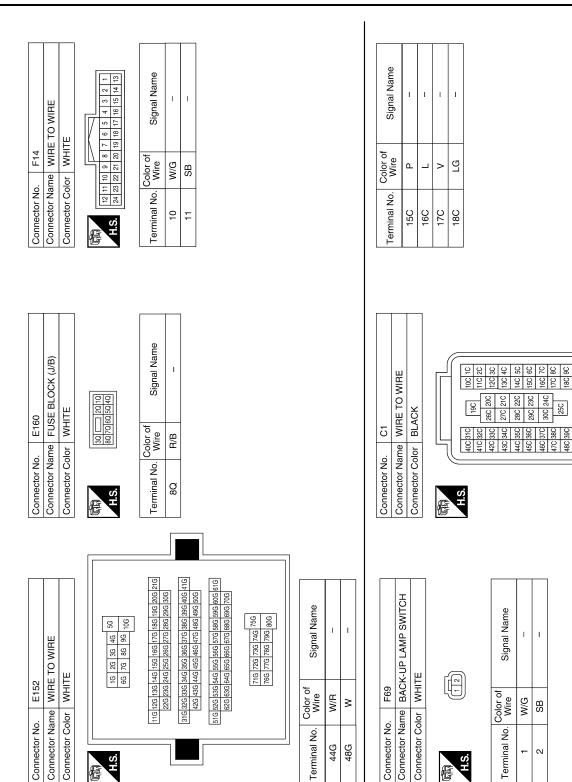
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Signal Name	MOTOR SUPPLY	I	I	REV_SW	I	VDC OFF SW	I	IGN	
Color of Wire	В	I	I	>	I	GR	Ι	W/R	
Terminal No.	F	2	3	4	5	9	7	8	

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## **BRAKE CONTROL SYSTEM - VDC**

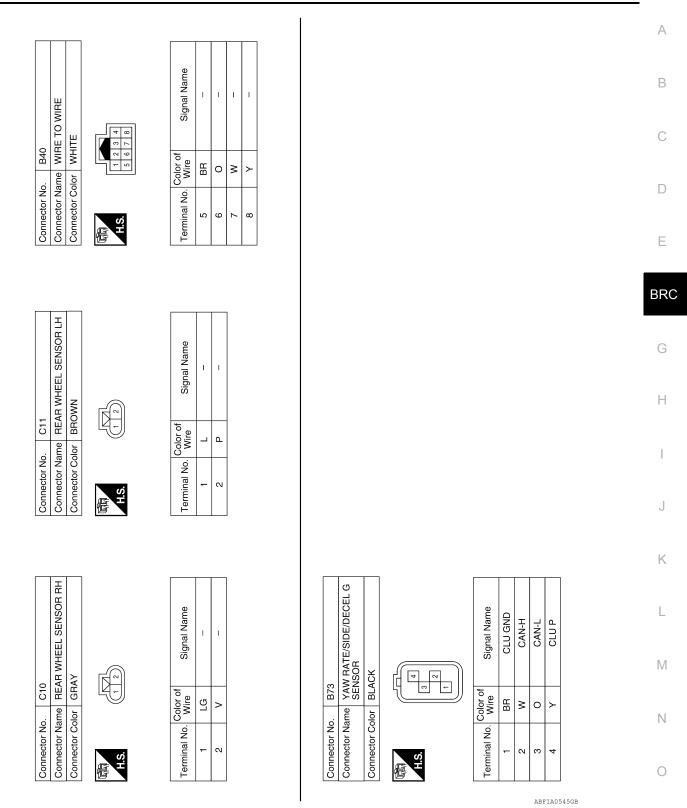
< WIRING DIAGRAM >

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## **BRAKE CONTROL SYSTEM - VDC**

< WIRING DIAGRAM >

[TYPE 1]



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## 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

#### VDC/TCS/ABS

#### < SYMPTOM DIAGNOSIS >

## VDC/TCS/ABS

## Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		-
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-100, "Diag-</u> nosis Procedure"	
900.005	Wheel sensor and rotor system	<u>neele rrecedure</u>	
Unexpected pedal reaction	Brake pedal stroke	BRC-101, "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-102, "Diag- nosis Procedure"	-
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-103, "Diag- nosis Procedure"	-
Pedal vibration or ABS operation sound	Brake pedal	BRC-104, "Diag-	-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"	
	ABS actuator and electric unit (control unit)		-
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	<u>BRC-105. "Diag-</u> nosis Procedure"	
	ECM		

#### NOTE:

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

• 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

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

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**[TYPE 1]** 

## **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY**

#### < SYMPTOM DIAGNOSIS >

## EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

#### Diagnosis Procedure

INFOID:000000007361032

[TYPE 1]

## 1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u>, "On-Vehicle Inspection and Service", Rear: <u>RAX-7</u>, "Rear Axle Bearing".

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3. CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

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

Is the inspection result normal?

YES >> GO TO 4 NO >> • Replace

- >> Replace wheel sensor or sensor rotor. Refer to <u>BRC-111, "Removal and Installation"</u>.
  - Repair harness.

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

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

- YES >> Perform self-diagnosis. Refer to <u>BRC-29, "CONSULT Function (ABS)"</u>.
- NO >> Inspection End.

## UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS > [TYPE 1]	
UNEXPECTED PEDAL REACTION	٨
Diagnosis Procedure	A
1. CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to BR-15, "Inspection and Adjustment".	
<u>Is the stroke too large?</u> YES >> • Bleed air from brake tube and hose. Refer to <u>BR-17. "Bleeding Brake System"</u> .	С
<ul> <li>Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-15</u>, "<u>Inspection and Adjustment</u>" (brake pedal), <u>BR-11</u>, "<u>On</u> <u>Board Inspection</u>" (master cylinder), <u>BR-9</u>, "<u>Inspection</u>" (brake booster).</li> <li>NO &gt;&gt; GO TO 2</li> </ul>	D
2.CHECK FUNCTION Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is	E
normal in this condition. Connect connector after inspection. <u>Is the inspection result normal?</u> YES >> Inspection End.	BR
NO >> Check brake system.	G
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## THE BRAKING DISTANCE IS LONG

**Diagnosis** Procedure

INFOID:000000007361034

#### **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.

## ABS FUNCTION DOES NOT OPERATE

ABO I ONOTION BOED NOT OF ENATE				
< SYMPTOM DIAGNOSIS > [T]	(PE 1]			
ABS FUNCTION DOES NOT OPERATE	2	Δ		
Diagnosis Procedure				
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY	E	3		
Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal?	C	2		
<ul> <li>YES &gt;&gt; Inspection End.</li> <li>NO &gt;&gt; Perform self-diagnosis. Refer to <u>BRC-29, "CONSULT Function (ABS)"</u>.</li> </ul>	C	)		

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### PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

#### < SYMPTOM DIAGNOSIS >

## PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]
- **1.**SYMPTOM CHECK 1

Check that there are pedal vibrations when the engine is started.

Do vibrations occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

YES >> GO TO 3

NO >> Perform self -diagnosis. Refer to <u>BRC-29. "CONSULT Function (ABS)"</u>.

**3.**SYMPTOM CHECK 3

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

Do symptoms occur?

- YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
- NO >> Inspection End.

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [TYPE 1]	
VEHICLE JERKS DURING VDC/TCS/ABS CONTROL	А
Diagnosis Procedure	A
<b>1.</b> SYMPTOM CHECK	В
Check if the vehicle jerks during VDC/TCS/ABS control. Is the inspection result normal?	
YES >> Inspection End. NO >> GO TO 2	С
2. CHECK SELF-DIAGNOSIS RESULTS	D
Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-29</u> , "CONSULT Function (ABS)".	D
Are self-diagnosis results indicated?	Е
YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.	
NO >> GO TO 3 3.CHECK CONNECTOR	BRC
<ul> <li>Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.</li> <li>Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.</li> </ul>	G
Are self-diagnosis results indicated?	
<ul> <li>YES &gt;&gt; If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.</li> <li>NO &gt;&gt; GO TO 4</li> </ul>	Н
4. CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS	
Perform ECM and TCM self-diagnosis.	I
<u>Are self-diagnosis results indicated?</u> YES >> Check the corresponding items. • ECM: Refer to <u>EC-52, "CONSULT Function"</u> .	J
<ul> <li>TCM: Refer to <u>TM-102, "CONSULT Function (TRANSMISSION)"</u>.</li> <li>NO &gt;&gt; Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-113, "Removal and Installation"</u>.</li> </ul>	K
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## NORMAL OPERATING CONDITION

#### < SYMPTOM DIAGNOSIS >

## NORMAL OPERATING CONDITION

## Description

Symptom	Result
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	<b>-</b>
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 condi- tion due to the VDC, TCS or ABS activation.
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.	
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is normal, and it is caused by the ABS operation check.
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).
The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal
VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal con- dition is restored, there is no malfunction. At
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).	that time, erase the self- diagnosis memory.
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)
VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warn- ing lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.

## PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

#### WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

#### WARNING:

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

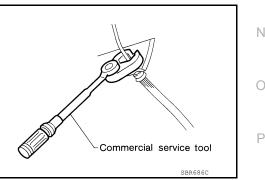
#### Precaution for Brake System

#### **CAUTION:**

- Refer to MA-13, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

## Refer to <u>BR-33, "Brake Burnishing"</u> (front disc brake) or <u>BR-38, "Brake Burnishing"</u> (rear disc brake). WARNING:

• Clean dust on caliper and brake pad with a vacuum dust collector to minimize the hazard of airborne particles or other materials.



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## PRECAUTIONS

#### < PRECAUTION >

#### 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.

#### NOTE:

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

#### Precaution for CAN System

- 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.

### PRECAUTIONS

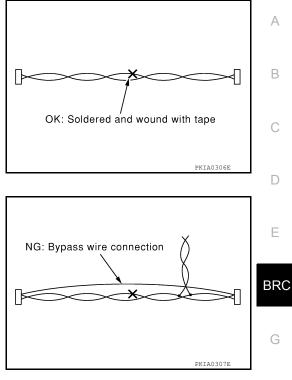
#### < PRECAUTION >

#### **[TYPE 1]**

• 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.)



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**Revision: December 2011** 

# PREPARATION PREPARATION

## Special Service Tool

INFOID:000000007361043

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

Tool number (Kent-Moore No.) Tool name		Description
 (J-45741) ABS active wheel sensor tester	WFIA0101E	Checking operation of ABS active wheel sen- sors
ST30031000 ( — ) Bearing puller	ZZA0700D	Removing sensor rotor
Commercial Service Tool		I INFOID:000000007

Tool name		Description
<ol> <li>Flare nut crowfoot</li> <li>Torque wrench</li> </ol>		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)
	S-NT360	
Power tool		Removing nuts and bolts
	PIIB1407E	

### WHEEL SENSORS

### < UNIT REMOVAL AND INSTALLATION >

# UNIT REMOVAL AND INSTALLATION WHEEL SENSORS

### Removal and Installation

INFOID:000000007361045 В

SEC. 476 (3) 21 (2.1, 15)  $(\mathbf{1})$ D **(**21 (2.1, 15) Е C Q BRC 17.5 (1.8, 13) 🔍 N·m (kg-m, ft-lb) WFIA0339E Н Front wheel sensor Rear wheel sensor (C200) Rear wheel sensor (M226) 1. 2. 3. REMOVAL Remove the front disc rotor, if removing the front wheel sensor. Refer to BR-34, "Removal and Installation of Brake Caliper and Disc Rotor". Remove the wheel sensor bolt(s). Pull the wheel sensor straight out, being careful to turn it as little as possible.

- 3.
- **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 sensors.

#### INSTALLATION

1.

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. Ν

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### SENSOR ROTOR

### Removal and Installation

INFOID:000000007361046

[TYPE 1]

#### FRONT

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

#### **REAR (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 <u>RAX-8</u>, "<u>Removal and Installation</u>".

#### REAR (M226)

Removal

#### NOTE:

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

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

#### Tool number : ST30031000 ( — )

Installation

1. 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.

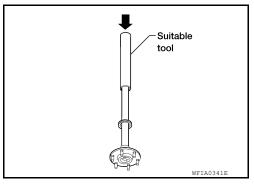
CAUTION:

#### Do not reuse the old sensor rotor.

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

**CAUTION:** 

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



### ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

### < UNIT REMOVAL AND INSTALLATION >

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

### Removal and Installation

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**[TYPE 1]** 

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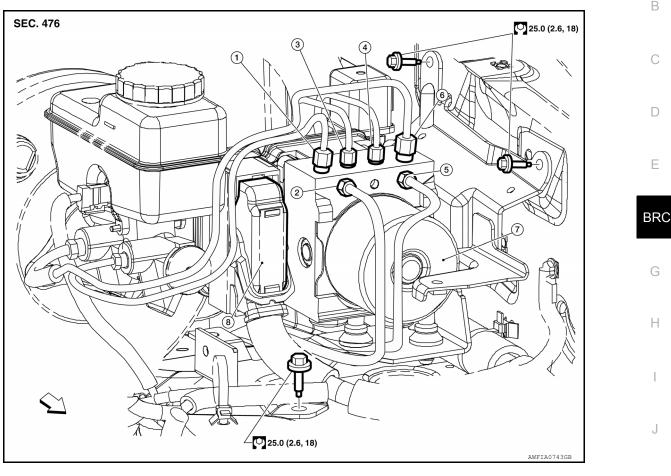
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- 1. From master cylinder secondary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- To front right disc brake 4. 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 7. ABS actuator and electric unit (control unit)
- 2 To rear right disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 5. To front left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb) 8.
  - Harness connector
- 3. To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb) From master cylinder primary side 6.
- 18.2 N·m (1.9 kg-m, 13 ft-lb) Short 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. Remove air cleaner case. Refer to EM-24, "Exploded View". Disconnect the actuator harness from the ABS actuator and electric unit (control unit). 4. 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. Remove three bolts and then the ABS actuator and electric unit (control unit) and bracket. 5. Remove the bolt and remove the bracket from the ABS actuator and electric unit (control unit). 6.

### INSTALLATION

### **BRC-113**

### 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 unit (control unit) bracket bolt 7.0 N·m (0.7 kg-m, 62 in-lb

#### 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 <u>BR-17, "Bleeding Brake System"</u>.

### **STEERING ANGLE SENSOR**

### < UNIT REMOVAL AND INSTALLATION >

SOR NEUTRAL POSITION : Special Repair Requirement".

#### STEERING ANGLE SENSOR А Removal and Installation INFOID:000000007361048 REMOVAL В Remove the spiral cable. Refer to SR-6, "Removal and Installation". 1. 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 BRC-12, "ADJUSTMENT OF STEERING D 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 BRC-12, "ADJUSTMENT OF STEERING ANGLE SEN-Е

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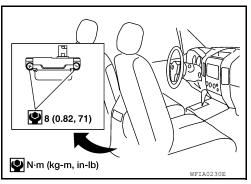
### < UNIT REMOVAL AND INSTALLATION >

# YAW RATE/SIDE/DECEL G SENSOR

### Removal and Installation

#### REMOVAL

- 1. Remove center console rear base. Refer to IP-10, "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 <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

[TYPE 1]

INFOID:000000007361049

### **APPLICATION NOTICE**

# BASIC INSPECTION APPLICATION NOTICE

## **Application Notice**

INFOID:000000007830187 B

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

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< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

### Work Flow

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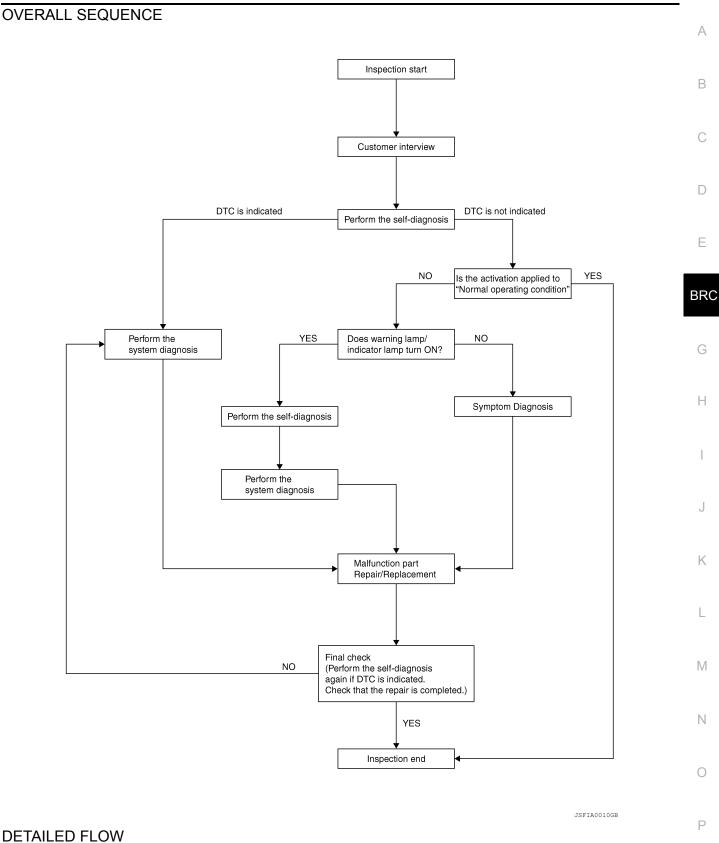
#### PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-122</u>, "ADJUSTMENT OF STEERING ANGLE <u>SENSOR NEUTRAL POSITION : Description</u>".

### DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

**[TYPE 2]** 



## 1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-121, "Diagnostic Work Sheet".

### DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-145, "CONSULT Function (ABS)"</u>.

<u>Is there any DTC displayed?</u> YES >> GO TO 3

NO >> GO TO 4

**3.** PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-207, "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-225.</u> "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-196, "Description"</u>.
- Brake warning lamp: Refer to <u>BRC-197, "Description"</u>.
- VDC OFF indicator lamp: Refer to BRC-199, "Description".
- SLIP indicator lamp: Refer to <u>BRC-201, "Description"</u>.

• Hill descent control indicator lamp: Refer to <u>BRC-198</u>, "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-145, "CONSULT Function (ABS)"</u>.

Is no other DTC present and the repair completed?

YES >> Inspection End NO >> GO TO 3

### DIAGNOSIS AND REPAIR WORKFLOW

#### < BASIC INSPECTION >

## **Diagnostic Work Sheet**

INFOID:000000007361052

**[TYPE 2]** 

Customer name MR/MS	Model & Year	Model & Year		
Engine #	Trans.	Trans.		
Incident Date	Manuf. Date		In Service Date	
Symptoms	<ul> <li>□ Noise and vibration (from engine compartment)</li> <li>□ Noise and vibration (from axle)</li> </ul>	U Warning / Indicator activate	r	n
	TCS does not work (Rear wheels slip when accelerating)	ABS does not work (Wheels lock when braking)		
Engine conditions	□ When starting □ After starting	U When starting After starting		
Road conditions	□ Low friction road (□Snow □Grav □ 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			

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### **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

# INSPECTION AND ADJUSTMENT

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

### ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000007361053

**[TYPE 2]** 

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-122</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : <u>Special Repair Requirement</u>", GO TO 2

2. PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

# >> Refer to <u>BRC-123</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

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

×: Required –: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing ABS actuator and electric unit (control unit)	_
Replacing ABS actuator and electric unit (control unit)	x
Removing/Installing steering angle sensor	x
Replacing steering angle sensor	x
Removing/Installing steering components	x
Replacing steering components	X
Removing/Installing suspension components	X
Replacing suspension components	X
Change tires to new ones	_
Tire rotation	-
Adjusting wheel alignment	X
Battery disconnection	×

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

#### ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

**1.**ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

### **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

>> GO TO 2	
2. PERFORM THE NEUTRAL POSITION ADJUSTME	ENT FOR THE STEERING ANGLE SENSOR
	RT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
Do not touch steering wheel while adjusting st	eering angle sensor.
3. After approximately 10 seconds, touch "END". <b>NOTE:</b>	
After approximately 60 seconds, it ends automatic	ally.
4. Turn ignition switch OFF, then turn it ON again.	
Be sure to perform above operation.	
>> GO TO 3	
<b>3</b> .CHECK DATA MONITOR	
1. Run vehicle with front wheels in straight-ahead po	
2. Select "DATA MONITOR". Then make sure "STR /	ANGLE SIG" is within 0±2.5°.
<u>Is the steering angle within the specified range?</u> YES >> GO TO 4	
NO >> Perform the neutral position adjustment fo	or the steering angle sensor again, GO TO 1
4. ERASE THE SELF-DIAGNOSIS MEMORY	
Erase the self-diagnosis memory of the ABS actuator a • ABS actuator and electric unit (control unit): Refer to • ECM: Refer to <u>EC-52, "CONSULT Function"</u> .	
Are the memories erased?	
YES >> Inspection End	
NO >> Check the items indicated by the self-diag CALIBRATION OF DECEL G SENSOR	nosis.
CALIBRATION OF DECEL G SENSOR : D	Description INFOID:000000007361057
Refer to the table below to determine if calibration of the	ne decel G sensor is required.
	×: Required –: Not required
Situation	Calibration of decel G sensor
Removing/Installing ABS actuator and electric unit (control unit)	—
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering 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	×

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

### CALIBRATION OF DECEL G SENSOR CAUTION:

Replacing yaw rate/side/decel G sensor

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

INFOID:000000007361058

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### **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

#### (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.

2. Select "DATA MONITOR". Then make sure "DECEL G-SEN" is within  $\pm 0.08$ G.

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-145, "CONSULT Function (ABS)</u>".

ECM: Refer to <u>EC-52</u>, "CONSULT Function".

Are the memories erased?

- YES >> Inspection End
- NO >> Check the items indicated by the self-diagnosis.

### **APPLICATION NOTICE**

### < SYSTEM DESCRIPTION >

# SYSTEM DESCRIPTION APPLICATION NOTICE

## **Application Notice**

INFOID:000000007830188

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

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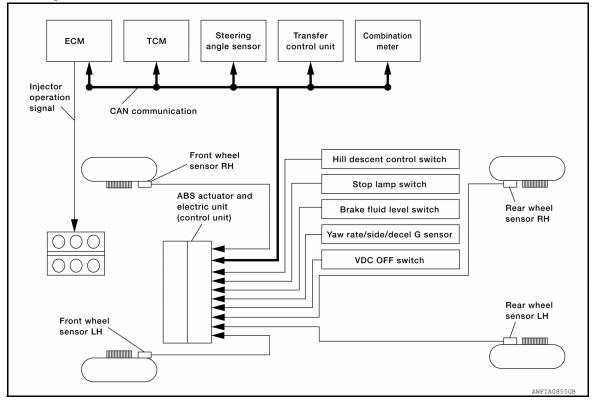
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### HILL DESCENT CONTROL

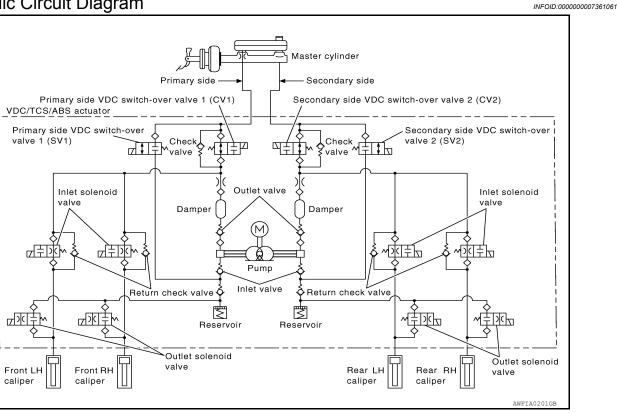
### < SYSTEM DESCRIPTION >

### HILL DESCENT CONTROL

# System Diagram



### Hydraulic Circuit Diagram



INFOID:000000007361060

### HILL DESCENT CONTROL

#### < SYSTEM DESCRIPTION >

#### System Description

INFOID:000000007361062

**[TYPE 2]** 

- 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 C operating.
- During hill descent control operation, a mechanical noise may be heard. This is normal.
- Electrical system diagnosis by CONSULT is available.

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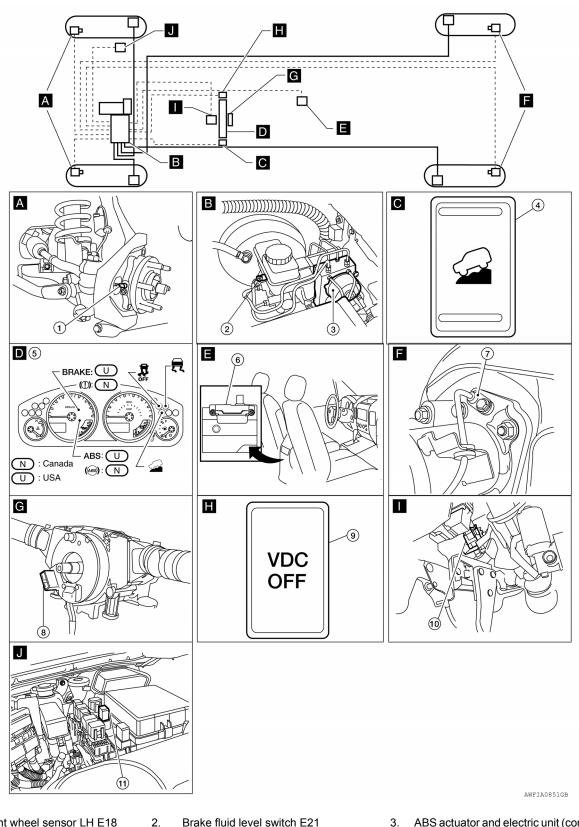
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### **Component Parts Location**

**[TYPE 2]** 

INFOID:000000007361063



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

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### HILL DESCENT CONTROL

### < SYSTEM DESCRIPTION >

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

**Component Description** 

10. Stop lamp switch E39

- Steering angle sensor (behind spiral ca-9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 11. Stop lamp relay E12

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INFOID:000000007361064

#### Component parts Reference С Pump BRC-160, "Description" Motor D BRC-176, "Description" Actuator relay ABS actuator and electric unit (control unit) Solenoid valve BRC-169, "Description" VDC switch-over valve Е BRC-187, "Description" (CV1, CV2, SV1, SV2) Wheel sensor BRC-151, "Description" BRC Yaw rate/side/decel G sensor BRC-162, "Description" Stop lamp switch BRC-167, "Description" BRC-178, "Description" Steering angle sensor Brake fluid level switch BRC-181, "Description" Hill descent control switch BRC-192, "Description" VDC OFF switch BRC-194, "Description" Н ABS warning lamp BRC-196, "Description" Brake warning lamp BRC-197, "Description" Hill descent control indicator lamp BRC-198, "Description" VDC OFF indicator lamp BRC-199, "Description" SLIP indicator lamp BRC-201, "Description" J

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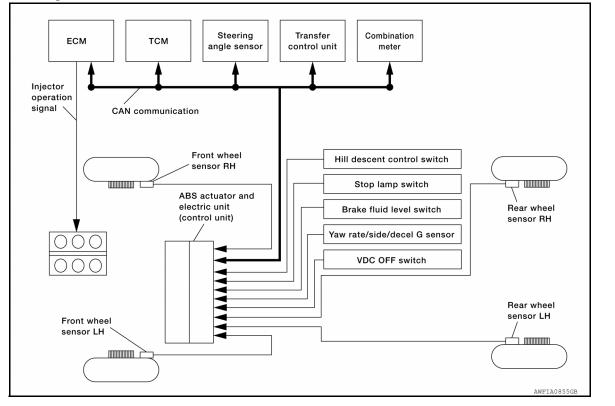
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# HILL START ASSIST

### System Diagram



### System Description

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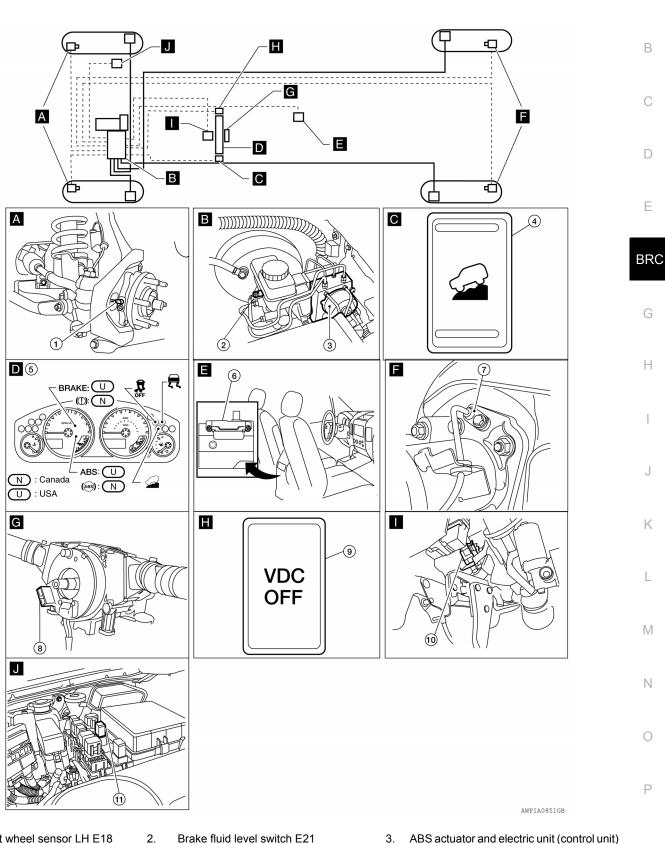
- The hill start assist system will assist the driver by applying the brake automatically and preventing the vehicle from rolling backward when starting on an uphill.
- The maximum holding time is 2 seconds. After 2 seconds, the vehicle will begin to roll back gradually and then hill start assist will stop operating completely.

INFOID:000000007830230

### **Component Parts Location**

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- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 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 >

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

**Component Description** 

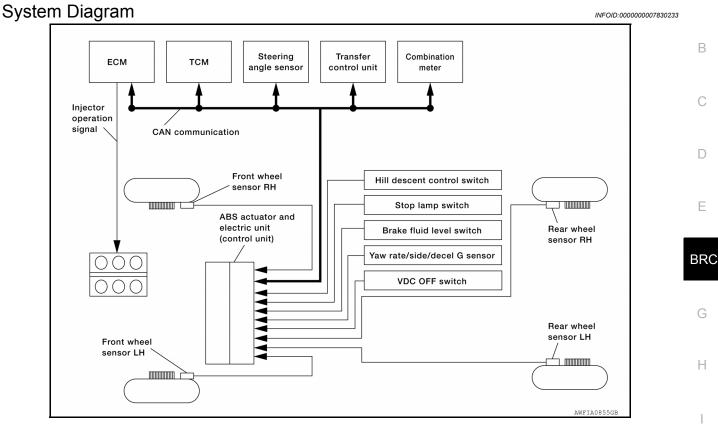
- Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 10. Stop lamp switch E39 11. Stop lamp relay E12

8.

INFOID:000000007830232

Component parts		Reference
	Pump	PPC 160 "Description"
	Motor	BRC-160, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-176, "Description"
	Solenoid valve	BRC-169, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-187, "Description"
Wheel sensor		BRC-151, "Description"
Yaw rate/side/decel G sensor		BRC-162, "Description"
Stop lamp switch		BRC-167, "Description"
Steering angle sensor		BRC-178, "Description"
Brake fluid level switch		BRC-181, "Description"
Hill descent control switch		BRC-192, "Description"
VDC OFF switch		BRC-194, "Description"
ABS warning lamp		BRC-196, "Description"
Brake warning lamp		BRC-197, "Description"
Hill descent control indicator lamp		BRC-198, "Description"
VDC OFF indicator lamp		BRC-199, "Description"
SLIP indicator lamp		BRC-201, "Description"

# VDC



VDC

### System Description

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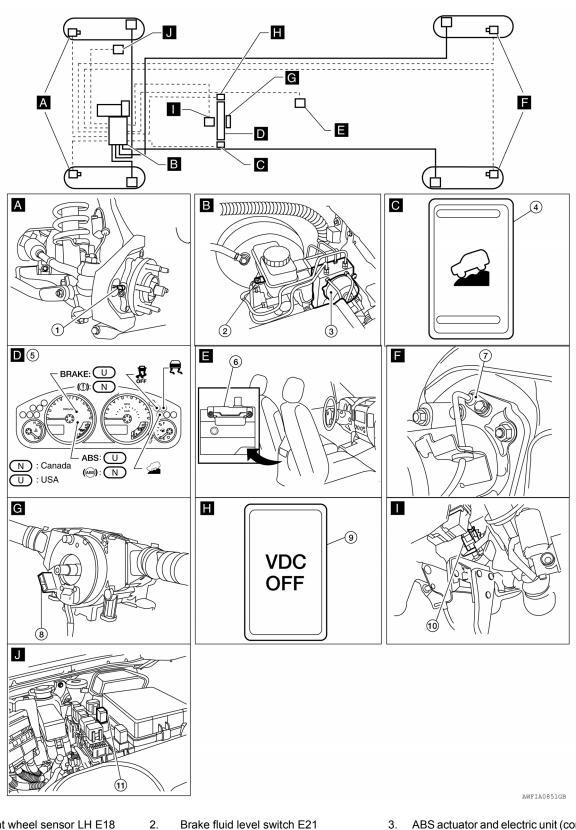
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- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor. Using information from yaw rate/side/decel G sensor and wheel sensor, VDC judges driving condition (conditions of under 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.

INFOID:000000007830234



VDC

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 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

**Component Description** 

Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
 Stop lamp relay E12

VDC

10. Stop lamp switch E39

#### INFOID:000000007830235

Component parts		Reference	С
	Pump Motor	BRC-160, "Description"	_
ABS actuator and electric unit (control unit)	Actuator relay	BRC-176, "Description"	— D
	Solenoid valve	BRC-169, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-187, "Description"	E
Wheel sensor		BRC-151, "Description"	_
Yaw rate/side/decel G sensor		BRC-162, "Description"	BRC
Stop lamp switch		BRC-167, "Description"	
Steering angle sensor		BRC-178. "Description"	
Brake fluid level switch		BRC-181. "Description"	— G
Hill descent control switch		BRC-192, "Description"	
VDC OFF switch		BRC-194. "Description"	Н
ABS warning lamp		BRC-196. "Description"	
Brake warning lamp		BRC-197, "Description"	
Hill descent control indicator lamp		BRC-198, "Description"	
VDC OFF indicator lamp		BRC-199, "Description"	
SLIP indicator lamp		BRC-201, "Description"	

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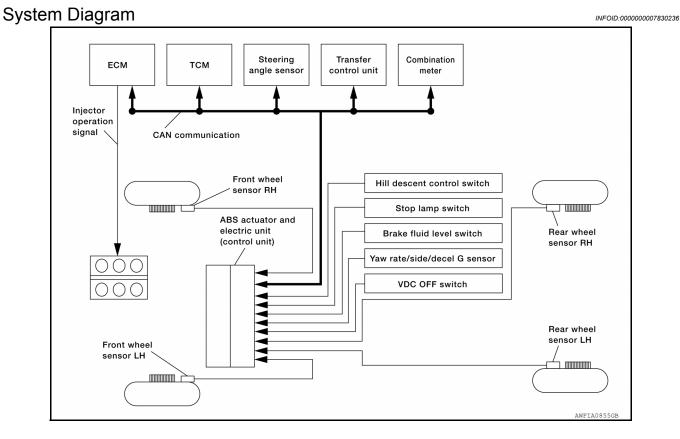
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### TCS





TCS

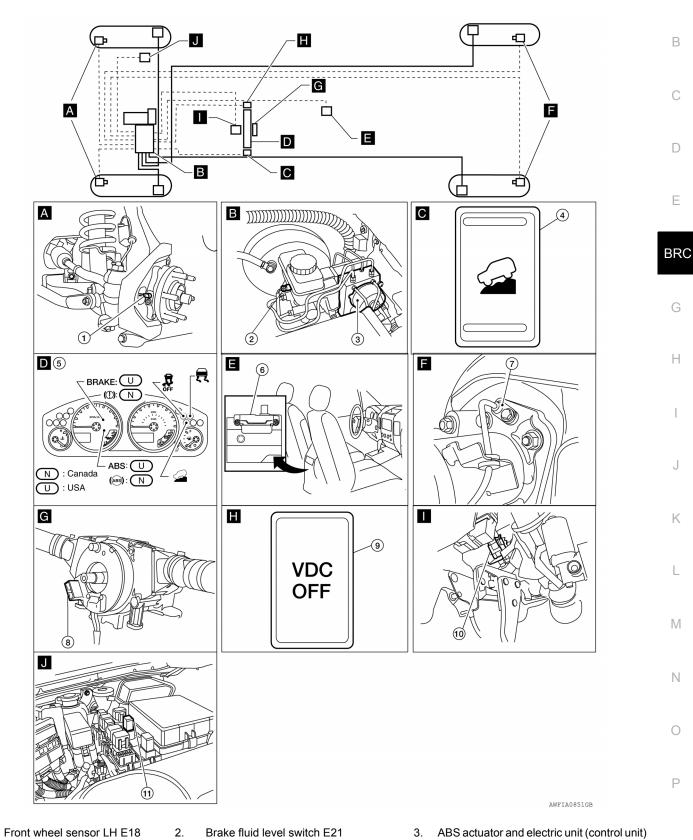
### System Description

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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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TCS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- Combination meter M24
- E125 6. Yaw rate/side/decel G sensor B73

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- 7. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity) . Stop lamp relay E12
- 10. Stop lamp switch E39

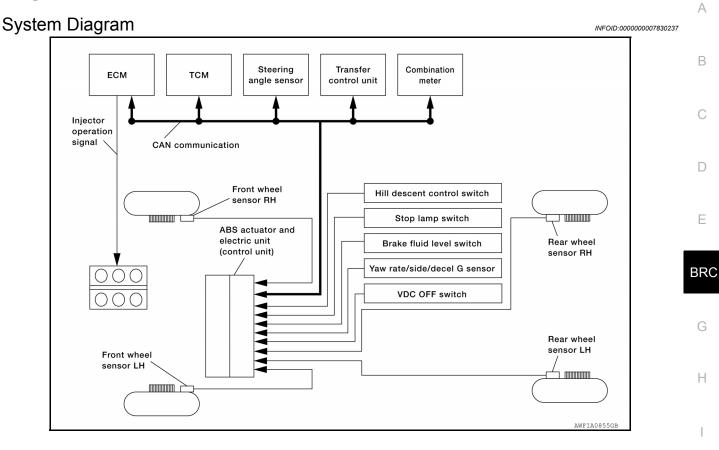
#### INFOID:000000007830240

**[TYPE 2]** 

Component parts		Reference
	Pump	PPC 160 "Description"
	Motor	<u>BRC-160, "Description"</u>
ABS actuator and electric unit (control unit)	Actuator relay	BRC-176, "Description"
	Solenoid valve	BRC-169, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-187, "Description"
Wheel sensor		BRC-151, "Description"
Yaw rate/side/decel G sensor		BRC-162, "Description"
Stop lamp switch		BRC-167, "Description"
Steering angle sensor		BRC-178. "Description"
Brake fluid level switch		BRC-181, "Description"
Hill descent control switch		BRC-192, "Description"
VDC OFF switch		BRC-194, "Description"
ABS warning lamp		BRC-196. "Description"
Brake warning lamp		BRC-197, "Description"
Hill descent control indicator lamp		BRC-198, "Description"
VDC OFF indicator lamp		BRC-199, "Description"
SLIP indicator lamp		BRC-201, "Description"

**Component Description** 

### ABS



ABS

### System Description

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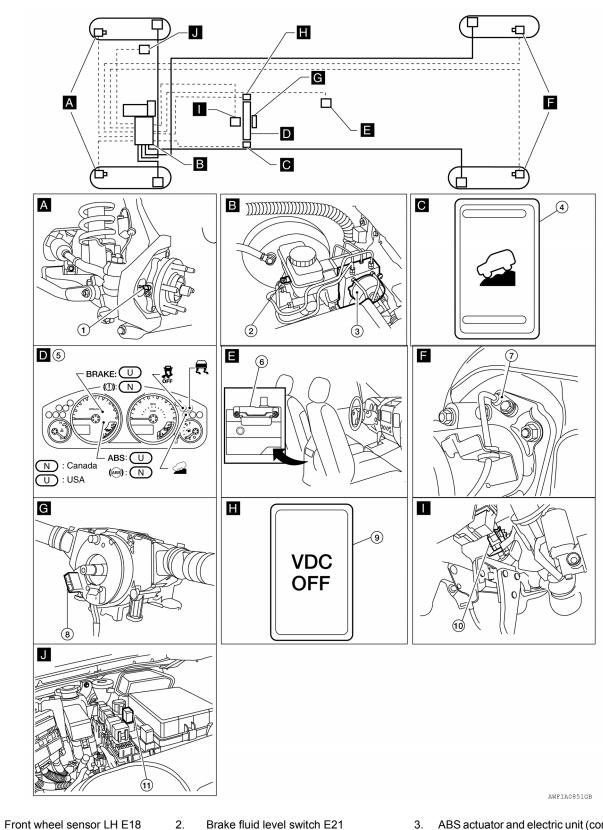
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- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.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

INFOID:000000007830241



ABS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 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

- Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
   Stop lamp relay E12
- 10. Stop lamp switch E39

SLIP indicator lamp

#### INFOID:000000007830242

Component	Description
oomponon	Dooonplion

С Component parts Reference Pump BRC-160, "Description" Motor D BRC-176, "Description" Actuator relay ABS actuator and electric unit (control unit) Solenoid valve BRC-169, "Description" VDC switch-over valve Е BRC-187, "Description" (CV1, CV2, SV1, SV2) Wheel sensor BRC-151, "Description" BRC Yaw rate/side/decel G sensor BRC-162, "Description" Stop lamp switch BRC-167, "Description" BRC-178, "Description" Steering angle sensor Brake fluid level switch BRC-181, "Description" Hill descent control switch BRC-192, "Description" VDC OFF switch BRC-194, "Description" Н ABS warning lamp BRC-196, "Description" Brake warning lamp BRC-197, "Description" Hill descent control indicator lamp BRC-198, "Description" VDC OFF indicator lamp BRC-199, "Description"

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BRC-201, "Description"

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### EBD



#### System Diagram INFOID:000000007830238 Steering Transfer Combination ECM тсм angle sensor control unit meter Injector operation signal CAN communication Front wheel Hill descent control switch 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

**EBD** 

### System Description

INFOID:000000007361082

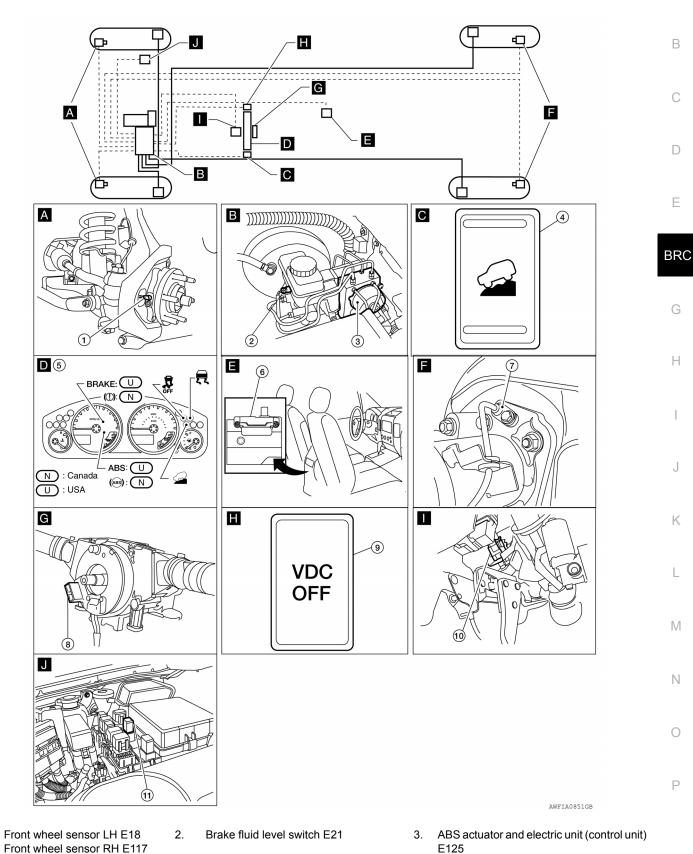
AWFIA0855

- 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.

# Component Parts Location

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#### INFOID:000000007830243



EBD

- Hill descent control switch M155 5. 4
- Combination meter M24
- E125 Yaw rate/side/decel G sensor B73 6.

1.

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11.

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

**Component Description** 

Steering angle sensor (behind spiral ca- 9. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity) Stop lamp relay E12

EBD

10. Stop lamp switch E39

INFOID:000000007830244

Component parts		Reference
	Pump	PPC 160 "Description"
	Motor	BRC-160, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-176, "Description"
	Solenoid valve	BRC-169, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-187, "Description"
Wheel sensor		BRC-151, "Description"
Yaw rate/side/decel G sensor		BRC-162, "Description"
Stop lamp switch		BRC-167, "Description"
Steering angle sensor		BRC-178, "Description"
Brake fluid level switch		BRC-181, "Description"
Hill descent control switch		BRC-192, "Description"
VDC OFF switch		BRC-194, "Description"
ABS warning lamp		BRC-196, "Description"
Brake warning lamp		BRC-197, "Description"
Hill descent control indicator lamp		BRC-198, "Description"
VDC OFF indicator lamp		BRC-199, "Description"
SLIP indicator lamp		BRC-201, "Description"

< SYSTEM DESCRIPTION >

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

# **CONSULT Function (ABS)**

#### 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.	- L
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.	E
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.	
		BF

#### 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 G 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
   Ievel switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-207, "DTC No. Index"</u>.

#### DATA MONITOR

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**[TYPE 2]** 

INFOID:000000007361085

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14	Data	a monitor item sele			
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.	

#### < SYSTEM DESCRIPTION >

ltem	Data	a monitor item sele	ection	
(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) sta- tus 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 dis- played.
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)	x	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is dis- played.
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 com- munication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate detected by yaw rate sen- sor 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.

#### < SYSTEM DESCRIPTION >

Item	Data	a monitor item sele	ction	
(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 pres- sure 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.
EBD FAIL SIG (On/Off)	-	-	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	-	_	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	-	_	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	-	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	_	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	_	×	Brake fluid level switch (On/Off) sta- tus 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) sta- tus is displayed.
DDS SW (Note 1) (On/Off)	-	_	×	Hill descent control switch (On/Off) status is displayed.

#### < SYSTEM DESCRIPTION >

Data monitor item selection Item Remarks ECU INPUT MAIN SELECTION (Unit) SIGNALS SIGNALS FROM MENU DDS SIG (Note 1) Hill descent control operation (On/ × (On/Off) Off) status is displayed. USS SIG (Note 2) Hill start assist operation (On/Off) X (On/Off) status is displayed.

×: Applicable

-: Not 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

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be per- formed. Refer to <u>BRC-122, "ADJUSTMENT OF STEERING AN-</u> <u>GLE SENSOR NEUTRAL POSITION : Description"</u> .
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-123.</u> <u>"CALIBRATION OF DECEL G SENSOR : Description"</u> .

#### 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	S solenoid va	alve	ABS	solenoid valve	e (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	—	—	_
	FR LH OUT SOL	Off	Off	On*	_	_	_
	RR RH IN SOL	Off	On	On	_	—	_
RR RH SOL	RR RH OUT SOL	Off	Off	On*	_	—	_
RR LH SOL	RR LH IN SOL	Off	On	On	—	—	_
	RR LH OUT SOL	Off	Off	On*	_	_	_

#### < SYSTEM DESCRIPTION >

[TYPE 2]

Operation		AB	S solenoid va	alve	ABS solenoid valve (ACT)		
Operation		Up	Кеер	Down	Up	ACT UP	ACT KEEP
	RR RH IN SOL	Off	On	On	Off	Off	Off
REAR SOL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
REAR SUL	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off
	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 IN SOL	_			Off	Off	Off
RR RH ABS SOLENOID (ACT)	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

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

#### ABS MOTOR

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

Operation	On	Off	
MOTOR RELAY	On	Off	Н
ACTUATOR RLY	On	On	

#### STOP LAMP 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".

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Operation	On	Off	
STP ON RLY	On	Off	
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# DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE

## **Application Notice**

INFOID:000000007830189

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

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361088

INFOID:000000007361087

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-151, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-209. "Wiring Diagram - WITH HILL DESCENT CON-</u> 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 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.

2. Turn on the ABS active wheel sensor tester power switch. **NOTE:** 

INFOID:000000007361089

[TYPE 2]

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

#### < DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

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 3
- NO >> Replace the wheel sensor. Refer to <u>BRC-230, "Removal and Installation"</u>.
- **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, "On-Vehicle Inspection and Service"</u> (front) or <u>RAX-19,</u> <u>"Rear Axle Bearing"</u> (rear).

Is the inspection result normal?

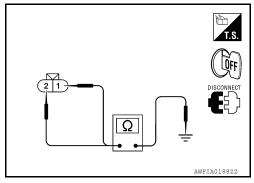
- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8. "Removal and Installation"</u> (front) or <u>RAX-24.</u> "<u>Removal and Installation</u>" (rear).
- **5.**CHECK WIRING HARNESS FOR SHORT CIRCUIT
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor connector terminals and ground.

#### Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



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

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

Wheel sensor	ABS actuato electric unit (cor		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
		46	ETO	2	Yes
Front RH		34	E117	1	
	E125	33		2	
Rear LH	E125	36	C11	1	165
		37	C11	2	
Rear RH		43	C10	1	
		42	0.10	2	

Is the inspection result normal?

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

#### **[TYPE 2]** < DTC/CIRCUIT DIAGNOSIS > YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-232, "Removal and Installation". А NO >> Repair the circuit. Component Inspection INFOID:000000007361090 В **1.**CHECK DATA MONITOR On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed. Wheel sensor Vehicle speed (DATA MONITOR) D FR LH SENSOR FR RH SENSOR Nearly matches the speedometer display (±10% or less) Е **RR LH SENSOR RR RH SENSOR** Is the inspection result normal? BRC YES >> Inspection End >> Go to diagnosis procedure. Refer to <u>BRC-151</u>, "Diagnosis Procedure". NO Special Repair Requirement INFOID:000000007361091 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator Н and electric unit (control unit). Refer to BRC-12, "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 DECEL G SENSOR : Description".

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361093

INFOID:000000007830288

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	When the circuit in the rear RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	
C1106	RR LH SENSOR-2	When the circuit in the rear LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	<ul><li>Harness or connector</li><li>Wheel sensor</li></ul>
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	ABS actuator and electric unit (control unit)
C1108	FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007830271

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

#### **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?

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

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]	
YES >> GO TO 2		
NO >> Repair or replace as necessary.		А
2.CHECK WHEEL SENSOR OUTPUT SIGNAL		
<ol> <li>Connect ABS active wheel sensor tester (J-45741) to wheel sensor</li> <li>Turn on the ABS active wheel sensor tester power switch.</li> <li>NOTE:</li> </ol>	or using appropriate adapter.	В
<ul> <li>NOTE.</li> <li>The green POWER indicator should illuminate. If the POWER in battery in the ABS active wheel sensor tester before proceeding.</li> <li>Spin the wheel of the vehicle by hand and observe the red SEN sensor tester. The red SENSOR indicator should flash on and off NOTE:</li> <li>If the red SENSOR indicator illuminates but does not flash, rev</li> </ul>	ISOR indicator on the ABS active wheel to indicate an output signal.	C
retest.		
Does the ABS active wheel sensor tester detect a signal?		Е
YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to BRC-230. "Removal	and Installation"	
NO >> Replace the wheel sensor. Refer to <u>BRC-230. "Removal</u> <b>3.</b> CHECK TIRES		
		BR
Check the inflation pressure, wear and size of each tire.	•	
Is the inspection result normal? YES >> GO TO 4		G
NO >> Adjust tire pressure or replace tire(s).		0
4.CHECK WHEEL BEARINGS		
Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Ins	spection and Service" (front) or RAX-19.	Н
<u>"Rear Axle Bearing"</u> (rear).	<u> </u>	
Is the inspection result normal?		I
YES >> GO TO 5		
NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Rem</u> <u>"Removal and Installation"</u> (rear).	oval and Installation" (front) or RAX-24.	
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT		J
1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.		V
2. Check continuity between wheel sensor connector terminals	T.S.	Κ
and ground.	(Por-	
Continuity should not evict		L
Continuity should not exist.		
Is the inspection result normal?		
YES >> GO TO 6 NO >> Repair the circuit.		M
	AWFIA0188ZZ	Ν
<b>6.</b> CHECK WIRING HARNESS FOR OPEN CIRCUIT		14
1 Check continuity between ARS actuator and electric unit (contro	(unit) connector and the malfunctioning	

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

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

#### < DTC/CIRCUIT DIAGNOSIS >

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
		46	EIO	2	
Front RH	-	34	E117	1	Yes
	E125	33		2	
Rear LH	- E125	36	C11	1	165
		37		2	
Rear RH		43	C10	1	
		42	010	2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Instal-</u> lation".

NO >> Repair the circuit.

Component Inspection

INFOID:000000007830272

## **1.**CHECK DATA MONITOR

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

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

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-164. "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000007830245

## **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-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

#### А Description INFOID:000000007361097 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000007361098 DTC DETECTION LOGIC DTC Malfunction detected condition Possible cause Display item D Harness or connector BATTERY VOLTAGE When the ABS actuator and electric unit (control unit) C1109 ABS actuator and electric unit [ABNORMAL] power supply voltage is lower than normal. (control unit) Е DTC CONFIRMATION PROCEDURE 1.CHECK SELF-DIAGNOSIS RESULTS Check the self-diagnosis results. BRC Self-diagnosis results BATTERY VOLTAGE [ABNORMAL] Is above displayed on the self-diagnosis display? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-157</u>, "Diagnosis Procedure". Н >> Inspection End NO **Diagnosis** Procedure INFOID:000000007361099 Regarding Wiring Diagram information, refer to BRC-209, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST". **1.**CONNECTOR INSPECTION Κ Turn ignition switch OFF. 1. 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 connectors and then perform the self-diagnosis. Refer to BRC-145, "CONSULT Function (ABS)". Μ Is any item indicated on the self-diagnosis display? YES >> GO TO 2 NO >> Poor connection of connector terminals. Repair or replace connector. Ν 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) connec-2. tor. Check voltage between ABS actuator and electric unit (control 3. Ρ unit) connector E125 terminal 8 and ground.

	<b>C1109 POWER A</b>	ND GROUND	SYSTEM
< DTC/CIRCUIT DIAGNO	SIS >		

# C1109 POWER AND GROUND SYSTEM

**[TYPE 2]** 

**Revision: December 2011** 

AWFIA0189Z

## C1109 POWER AND GROUND SYSTEM

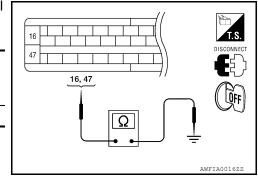
#### < DTC/CIRCUIT DIAGNOSIS >

	ABS actuator and elec- tric unit (control unit)		Condition	Voltage	
Connector	Terminal				
F125	8	Ground	Ignition switch: ON	Battery voltage	
L125	0	Ground	Ignition switch: OFF	Approx. 0V	

4. Turn ignition switch OFF.

5. 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 malfunctioning parts.
- NO >> Repair or replace malfunctioning components.

## Special Repair Requirement

INFOID:000000007830246

## **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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

## 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**

INFOID:000000007361101

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	Jylc		INFOID:000000007361101
DTC DE	TECTION 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
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	(control unit)
DTC CC	NFIRMATION PROCE	EDURE	
<b>1.</b> CHEC	K SELF-DIAGNOSIS RI	ESULTS	
Check th	e self-diagnosis results.		
L			
	Self-diagnosis		
	CONTROLLER VARIANT CO		
le above	displayed on the self-dia		
		procedure. Refer to <u>BRC-159, "Diagnosis Proce</u>	dure".
	>> Inspection End	F	
Diagno	sis Procedure		INFOID:00000007361102
1			
I.REPL	ACE ABS ACTUATOR A	ND ELECTRIC UNIT (CONTROL UNIT)	
	> Replace ABS actuate tion".	or and electric unit (control unit). Refer to <u>BRC-2</u>	232, "Removal and Installa-
Special	Repair Requireme	ent	INFOID:000000007830247
		GANGLE SENSOR NEUTRAL POSITION	
and elect		adjustment for the steering angle sensor when fer to <u>BRC-12, "ADJUSTMENT OF STEERING A</u>	
~	>> GO TO 2		
	BRATION OF DECEL G		
		el G sensor when replacing the ABS actuator an I OF DECEL G SENSOR : Description <sup>"</sup> .	d electric unit (control unit).
	>> END		

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### Description

INFOID:000000007361104

**[TYPE 2]** 

#### PUMP

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

#### MOTOR

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

## DTC Logic

INFOID:000000007361105

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-160, "Diagnosis Procedure"</u>.

NO >> Inspection End

**Diagnosis** Procedure

INFOID:000000007361106

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

## **1.**CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. 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-145</u>, "CONSULT Function (<u>ABS</u>)".

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

## C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < DTC/CIRCUIT DIAGNOSIS >

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

ABS actuator and electric unit (control unit)			Voltage	
Connector	Terminal		vonage	
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-232, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

#### **Component Inspection**

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

1. On "ACTIVE TEST", select "ABS MOTOR".

2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	On	Off	K
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-160, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

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

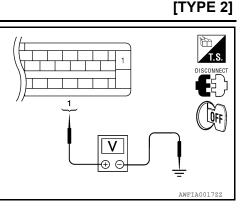
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

#### >> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

## **BRC-161**



INFOID:000000007361107

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INFOID:000000007830248

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361110

INFOID:000000007361109

#### 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-di	agnosis results
G	-SENSOR
YAW F	ATE SENSOR
SIDE G	-SEN CIRCUIT

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007361111

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-TROL/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, VDC OFF 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

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor 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.YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

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

#### < DTC/CIRCUIT DIAGNOSIS >

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 ele	ctric unit (control unit)	Yaw rate/side	/decel G sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	18		3	
F405	19		2	
E125	22	B73	4	Yes
	29		1	
3.YAW RATE/SIDE/E Perform the yaw rate/s is the inspection resul YES >> Replace the lation".	side/decel G sensor co <u>t normal?</u> he ABS actuator and he yaw rate/side/dece ection	ISPECTION omponent inspection. electric unit (control u	nit). Refer to <u>BRC-</u>	. "Component Inspection 232. "Removal and Insta I and Installation".
Select "YAW RATE S side/decel G sensor si Vehicle condition	ignal. YAW RATE	SEN SIDE	E G-SENSOR	OR" and check yaw rate
Stopped	(DATA MON -4 to +4 d	, ,	TA MONITOR)	(DATA MONITOR) -0.08 G to +0.08 G
Turning right	Negative v	- 5 -	gative value	-0.00 G 10 -0.00 G
Turning left	Positive v		ositive value	-
Speed up	-		-	Negative value
Speed down				Positive value
Is the inspection resul YES >> Inspectior NO >> Go to diag	n End gnosis procedure. Ref	er to <u>BRC-162, "Diag</u>	nosis Procedure".	
Special Repair Re 1.adjustment of	•	SENSOR NEUTRAL I	POSITION	INFOID:000000007830;
	ol unit). Refer to <u>BRC</u> on".			placing the ABS actuate GLE SENSOR NEUTRA

>> END

**[TYPE 2]** 

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#### < DTC/CIRCUIT DIAGNOSIS >

## C1115 WHEEL SENSOR

## Description

INFOID:000000007830289

**ITYPE 21** 

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:000000007361115

#### DTC DETECTION LOGIC

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

## DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007830274

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-<u>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.
- 2. Turn on the ABS active wheel sensor tester power switch.
- NOTE:

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

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

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

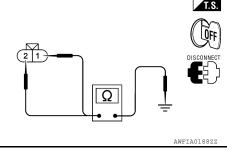
Does the ABS active wheel sensor tester detect a signal?

## **C1115 WHEEL SENSOR**

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 2]
NO >> Replace the wheel sensor. Refer to <u>BRC-230</u> , "Removal a	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 FAX-5, "On-Vehicle Ins	spection and Service" (front) or RAX-19.
<u>"Rear Axle Bearing"</u> (rear).	
Is the inspection result normal?	
YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Remo</u> <u>"Removal and Installation"</u> (rear).	oval and Installation" (front) or RAX-24.
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT	
<ol> <li>Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.</li> <li>Chark continuity between wheel sensor connector terminals</li> </ol>	
2. 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

1. 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	ĸ
	Connector	Terminal	Connector	Terminal		
Front LH		45	E18	1		
		46	EIO	2		L
Front RH	+	34	E117	1		
	E125	33	S135 33	EIII	2	Yes
Rear LH	E125	36	36 C11	1	165	
Redition	ear LH	37		2		
Rear RH	1	43	010	C10 1		Ν
		42	010	2		

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-232, "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.

## **BRC-165**

INFOID:000000007830275

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## **C1115 WHEEL SENSOR**

[TYPE 2]

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-164, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000007830250

# 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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

# $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR}$

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

>> END

#### < DTC/CIRCUIT DIAGNOSIS >

# C1116 STOP LAMP SWITCH

# Description

The stop lamp switch transmits the stop lamp switch signal (ON/OFF) to the ABS actuator and electric un	it <sub>P</sub>	2
(control unit).		ĺ

## DTC Logic

INFOID:000000007361120

INFOID:000000007361119

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	<ul> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	Е
DTC CC	NFIRMATION PROCE	DURE		
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS	E	BRC
Check th	e self-diagnosis results.			
	Colf diagnosis			G
	Self-diagnosis STOP LAMP			
ls above	displayed on the self-diag	-		Н
YES		procedure. Refer to <u>BRC-167, "Diagnos</u>	sis Procedure".	
Diagno	sis Procedure		INFOID:000000007361121	
TROL/HI	ng Wiring Diagram inform LL START ASSIST". NECTOR INSPECTION	ation, refer to <u>BRC-209. "Wiring Diag</u>	ram - WITH HILL DESCENT CON-	J
2. Che		and electric unit (control unit) connector nation, disconnection, looseness or dar		L
-	>> GO TO 2			M
-	>> Repair or replace as n PLAMP SWITCH INSPEC	•		
1. Con 2. Che	nect the stop lamp switch ck the voltage between tl			Ν
	rake pedal depressed rake pedal released	: Battery voltage : 0V		0
YES	appear, replace ABS unit). Refer to <u>BRC-23</u> >> GO TO 3	is again. If the same results actuator and electric unit (control 2, "Removal and Installation".	WFIA0191ZZ	Ρ
J.STOP	LAMP SWITCH CIRCUI	<b>FINSPECTION</b>		

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## C1116 STOP LAMP SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

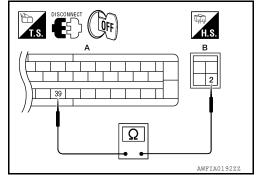
- 1. Disconnect the stop lamp switch connector.
- 2. Check the continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2.

#### Continuity should exist.

Is the inspection result normal?

- YES >> Refer to EXL-4, "Work Flow".
- NO >> Repair or replace malfunctioning components.

## Special Repair Requirement



INFOID:000000007830251

**[TYPE 2]** 

## **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-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361124

INFOID:000000007361123

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-169</u>, "Diagnosis Procedure".

NO >> Inspection End

#### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-209. "Wiring Diagram - WITH HILL DESCENT CON-</u> TROL/HILL START ASSIST".

#### **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-145</u>, "CONSULT Function (<u>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

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INFOID:000000007361125

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

#### < DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 32 and ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 ${f 3.}$  CHECK SOLENOID, VDC SWITCH-OVER VALVE AND 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		7 —	Continuity
E125	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-232, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

## Component Inspection

## 1. CHECK ACTIVE TEST

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

	Operation		ABS solenoid valve		
			Кеер	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*	

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

Is the inspection result normal?

YES >> Inspection End

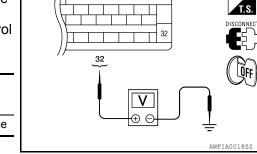
>> Go to diagnosis procedure. Refer to BRC-169, "Diagnosis Procedure". NO

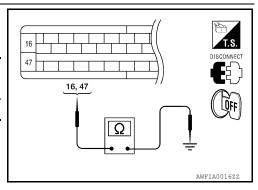
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

#### Special Repair Requirement

INFOID:000000007830252

INFOID:000000007361126





POSITION : Description".

## **BRC-170**

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

# C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2	А
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 DECEL G SENSOR : Description".	В
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## C1121, C1123, C1125, C1127 OUT ABS SOL

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361129

INFOID:000000007361128

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

## 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-172, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007830276

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

## **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-145</u>, "CONSULT Function (<u>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

# C1121, C1123, C1125, C1127 OUT ABS SOL

#### < DTC/CIRCUIT DIAGNOSIS >

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

 $\mathbf{3.}$  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 <u>BRC-232, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

## Component Inspection

## **1.**CHECK ACTIVE TEST

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

	Operation		ABS solenoid valve	1	_
Operation		Up	Кеер	Down	_
	FR RH IN SOL	Off	On	On	- 1
FR RH 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*	- I\
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*	_

\*: 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 <u>BRC-172, "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 <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

## BRC-173



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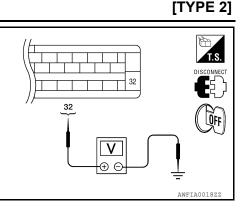


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< DTC/CIRCUIT DIAGNOSIS >

## >> GO TO 2

 $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR}$ 

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 DECEL G SENSOR : Description".

>> END

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

## DTC Logic

INFOID:000000007361134

INFOID:000000007361133

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D	
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		(control unit)		
C1132	ENGINE SIGNAL 3				
C1133	ENGINE SIGNAL 4		ECM     CAN communication line		
C1136	ENGINE SIGNAL 6			BF	

#### 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-175</u>, "Diagnosis Procedure".

NO >> Inspection End

## Diagnosis Procedure

## 1.CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-52. "CONSULT Function"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Func-</u> tion (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> Inspection End

**Revision: December 2011** 

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#### < DTC/CIRCUIT DIAGNOSIS >

# C1140 ACTUATOR RLY

## Description

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

## DTC Logic

INFOID:000000007361137

INFOID:000000007361136

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

## DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-176. "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007830269

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-<u>TROL/HILL START ASSIST</u>.

## **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-145</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

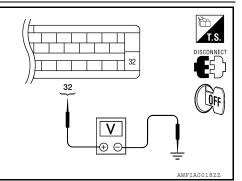
- YES >> GO TO 2
- NO >> Poor connection of connector terminal. Repair or replace connector.

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

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. 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
	14 10		

Is the inspection result normal?



## C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 3
- NO >> Repair or replace malfunctioning components.

 $\mathbf{3.}$  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 <u>BRC-232, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

#### Component Inspection

**1.**CHECK ACTIVE TEST

1. On "ACTIVE TEST", select "ABS MOTOR".

2. Touch On and Off on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	On	Off	
MOTOR RELAY	On	Off	Н
ACTUATOR RLY	On	On	

#### Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-160, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

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

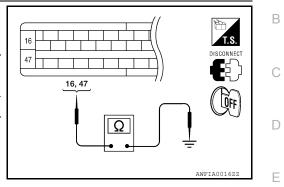
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

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

>> END



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## C1143, C1144 STEERING ANGLE SENSOR

#### < DTC/CIRCUIT DIAGNOSIS >

## C1143, C1144 STEERING ANGLE SENSOR

#### Description

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**[TYPE 2]** 

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:000000007361142

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

#### 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 <u>BRC-178, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### **Diagnosis** Procedure

INFOID:000000007361143

Regarding Wiring Diagram information, refer to <u>BRC-209, "Wiring Diagram - WITH HILL DESCENT CON-</u> <u>TROL/HILL START ASSIST"</u>.

## **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. 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 <u>BRC-145</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 >

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

Steering angle sensor		Continuity	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	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-179, "Component Inspection"</u>. <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Installa-</u> <u>tion</u>".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-</u> <u>234. "Removal and Installation"</u>.

## **Component Inspection**

## 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±2.5 °
Turn 90 ° to leftApprox. +90 °
Turn 90 ° to rightApprox. –90 °

Is the inspection result normal?

YES >> Inspection End

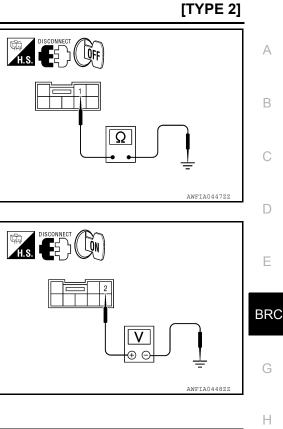
NO >> Go to diagnosis procedure. Refer to <u>BRC-178, "Diagnosis Procedure"</u>.

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

## >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR



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## C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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 DECEL G SENSOR : Description".

>> END

**BRC-180** 

#### < DTC/CIRCUIT DIAGNOSIS >

# C1155 BRAKE FLUID LEVEL SWITCH

#### Description

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

#### DTC Logic

INFOID:000000007361147

INFOID:000000007361146

#### DTC DETECTION LOGIC

DTC	Display item		Malfunction detected condition	Possible cause	
C1155	BR FLUID LEVEL LO	W the AB	fluid level is low or communication line between S actuator and electric unit (control unit) and brake evel switch is open or shorted.	<ul><li>Harness or connector</li><li>Brake fluid level switch</li><li>Brake fluid level</li></ul>	
отс со	NFIRMATION PR	ROCEDURE			
<b>1.</b> снес	K SELF-DIAGNOS	SIS RESULTS	3		В
Check th	e self-diagnosis re:	sults.			
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		agnosis results			(
<u> </u>		ID LEVEL LOW			
	displayed on the s			duro"	I
	>> Proceed to diag	nosis proced	ure. Refer to <u>BRC-181, "Diagnosis Proce</u>	<u>uure</u> .	
	sis Procedure				
Jiagrio				INFOID:000000007361148	
			refer to BRC-209. "Wiring Diagram - W	ITH HILL DESCENT CON-	
	g Wiring Diagram LL START ASSIST		refer to <u>BRC-209, "Wiring Diagram - W</u>	ITH HILL DESCENT CON-	
<u>TROL/HI</u>	<u>LL START ASSIST</u>	<u>"</u> .	refer to <u>BRC-209, "Wiring Diagram - W</u>	ITH HILL DESCENT CON-	
<u>TROL/HI</u>		<u>"</u> .	refer to <u>BRC-209, "Wiring Diagram - W</u>	ITH HILL DESCENT CON-	
TROL/HI           1.CONN           1. Disco	LL START ASSIST	TON	c unit (control unit) connector and brake f		
TROL/HI 1.CONN 1. Disco 2. Chec	LL START ASSIST	TON or and electric deformation,			
TROL/HI 1. CONN 1. Disco 2. Chec Is the ins	LL START ASSIST	TON or and electric deformation,	c unit (control unit) connector and brake f		
TROL/HI 1. Disco 2. Chec Is the ins YES	LL START ASSIST	"" TION or and electric deformation, nal?	c unit (control unit) connector and brake f disconnection, looseness or damage.		
TROL/HI 1. Disco 2. Chec Is the ins YES NO	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replace	TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control unit) connector and brake f disconnection, looseness or damage. ary.	luid level switch connector.	
TROL/HI 1. Disco 2. Chec Is the ins YES NO 2.CHEC	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replace	TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control unit) connector and brake f disconnection, looseness or damage.	luid level switch connector.	
TROL/HI         1. CONN         1. Disco         2. Chec         Is the ins         YES         NO         2. CHEC         UNIT (CC         1. Chec	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAM	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS AG	luid level switch connector.	
1.CONN 1. Disco 2. Chec Is the ins YES NO 2.CHEC UNIT (CC 1. Chec unit)	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replace K HARNESS BET ONTROL UNIT) the continuity betwee connector E125 (A	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAK en ABS actua .) Terminal 28	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS AG	luid level switch connector.	I
1.CONN 1. Disco 2. Chec Is the ins YES NO 2.CHEC UNIT (CC 1. Chec unit)	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAK en ABS actua .) Terminal 28	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS AG	luid level switch connector.	ſ
1.CONN 1. Disco 2. Chec Is the ins YES NO 2.CHEC UNIT (CC 1. Chec unit) conn	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) the continuity betwe connector E125 (A pector E21 (B) term	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAK en ABS actua ) Terminal 28 inal 1.	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS Ad tor and electric unit (control and brake fluid level switch		I
1.CONN 1. Disco 2. Chec Is the ins YES NO 2.CHEC UNIT (CC 1. Chec unit) conn ABS actu	LL START ASSIST NECTOR INSPECT onnect ABS actuate the terminals for pection result norm >> GO TO 2 >> Repair or replace K HARNESS BET ONTROL UNIT) the continuity betwee connector E125 (A	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAK en ABS actua ) Terminal 28 inal 1.	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS AG	luid level switch connector.	ſ
1.CONN 1. Disco 2. Chec Is the ins YES NO 2.CHEC UNIT (CC 1. Chec unit) conn ABS actu	LL START ASSIST NECTOR INSPECT onnect ABS actuate of the terminals for pection result norm >> GO TO 2 >> Repair or replace CK HARNESS BET ONTROL UNIT) of continuity betwee connector E125 (A pector E21 (B) term	TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAK en ABS actua ) Terminal 28 inal 1.	c unit (control unit) connector and brake f disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS A tor and electric unit (control and brake fluid level switch		ſ

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



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## C1155 BRAKE FLUID LEVEL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## $\mathbf{3}$ . 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	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-182, "Component Inspection"</u>.

#### Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Installation</u>".
- 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 <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

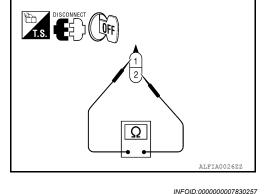
#### >> GO TO 2

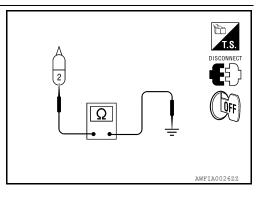
### 2. CALIBRATION OF DECEL G SENSOR

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

## BRC-182







## 

C1155 BRAKE FLUID LEVEL SWITCH		
TC/CIRCUIT DIAGNOSIS >	[TYPE 2]	
>> END		

## C1156 ST ANG SEN COM CIR

#### Description

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

#### DTC Logic

INFOID:000000007361152

INFOID:000000007361153

#### 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 <u>BRC-184, "Diagnosis Procedure"</u>.

NO >> Inspection End

## Diagnosis Procedure

**1**.CONNECTOR INSPECTION

- 1. 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 <u>BRC-145. "CONSULT Function (ABS)"</u>.

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

< DTC/CIRCUIT DIAGNOSIS >

## C1160 DECEL G SEN SET

## Description

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

### DTC Logic

INFOID:000000007361155

INFOID:000000007361154

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	<ul> <li>Decel G sensor calibration</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	E
DTC CC	<b>ONFIRMATION PROCE</b>	DURE		
<b>1</b> .CHEC	CK SELF-DIAGNOSIS RE	SULTS		BRC
Check th	ne self-diagnosis results.			
				G
	Self-diagnosis			
	DECEL G SEN			Н
YES	displayed on the self-diag	procedure. Refer to <u>BRC-185, "Diagnosis Proce</u>	odure"	
NO	>> Inspection End		<u>suare</u> .	
Diagno	sis Procedure		INFOID:00000007361156	
1 DEDE	ORM SELF-DIAGNOSIS			
		c unit (control unit) self-diagnosis. Refer to BR	C 145 "CONSULT Eurotion	J
<u>(ABS)"</u> .			C-145, CONSOLT FUNCTION	
				Κ
	elf-diagnosis results			
	ECEL G SEN SET	anything other then about the second		L
<u>Do sen-c</u> YES	-	anything other than shown above? acement for the item indicated.		
NO	>> Perform calibration of	decel G sensor. Refer to <u>BRC-123, "CALIBRAT</u>	ION OF DECEL G SENSOR	в. 4
2	: Description". GO TO			Μ
	ORM SELF-DIAGNOSIS			
	the ignition switch to OFF <u>T Function (ABS)"</u> .	and then to ON and erase self-diagnosis result	s. Refer to <u>BRC-145, "CON-</u>	Ν
2. Perf	orm ABS actuator and ele	ectric unit (control unit) self-diagnosis again. Re	fer to <u>BRC-145, "CONSULT</u>	
	<u>ction (ABS)"</u> . <u>self-diagnosis results disp</u>	laved?		0
YES	•	/decel G sensor. Refer to <u>BRC-235, "Removal a</u>	and Installation".	
NO	>> Inspection End			P

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#### < DTC/CIRCUIT DIAGNOSIS >

## C1163 ST ANGLE SEN SAFE

#### Description

INFOID:000000007361157

**[TYPE 2]** 

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:000000007361158

#### DTC DETECTION LOGIC

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

#### 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 <u>BRC-186, "Diagnosis Procedure"</u>.

NO >> Inspection End

#### Diagnosis Procedure

INFOID:000000007361159

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

Adjust steering angle sensor neutral position. Refer to <u>BRC-122, "ADJUSTMENT OF STEERING ANGLE</u> <u>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-145, "CON-</u> <u>SULT Function (ABS)"</u>.

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

#### < DTC/CIRCUIT DIAGNOSIS >

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

#### Description

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

INFOID:000000007361161

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	Е
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.		BRC
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)	G
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.		Η

#### 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?	v?

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

NO >> Inspection End

#### Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-209. "Wiring Diagram - WITH HILL DESCENT CON-</u> TROL/HILL START ASSIST".

## **1**.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

INFOID-000000007830267

[TYPE 2]

INFOID:000000007361160

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

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

 $\mathbf{2}$ .check solenoid, vdc switch-over valve and actuator relay power supply circuit

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

 ${f 3.}$  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 ele	ectric unit (control unit)		Continuity
Connector	Terminal	Terminal	
E125	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-232, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

#### **Component Inspection**

## **1.**CHECK ACTIVE TEST

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

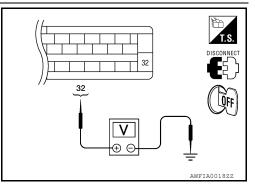
Operation		ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off
	FR LH OUT SOL	Off	Off	Off
	RR RH IN SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL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

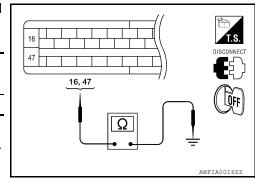
\*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

>> Go to diagnosis procedure. Refer to <u>BRC-187</u>, "Diagnosis Procedure". NO





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

< DTC/CIRCUIT DIAGNOSIS >

#### Special Repair Requirement

[TYPE 2] INFOID:000000007830259

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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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). D Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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### **C1187 DIFFERENTIAL LOCK CONTROL UNIT**

#### < DTC/CIRCUIT DIAGNOSIS >

## C1187 DIFFERENTIAL LOCK CONTROL UNIT

#### Description

INFOID:000000007361165

**ITYPE 21** 

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:000000007361166

INFOID:000000007361167

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

NO >> Inspection End

## Diagnosis Procedure

**1**.CONNECTOR INSPECTION

- 1. 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 <u>BRC-145. "CONSULT Function (ABS)"</u>.

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

#### < DTC/CIRCUIT DIAGNOSIS >

## U1000 CAN COMM CIRCUIT

### Description

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

### DTC Logic

INFOID:000000007361169

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	E
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	<ul> <li>CAN communication line</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	BRO
Diagno	sis Procedure		INFOID:00000007361170	

#### **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-145, "CONSULT Function (ABS)".

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

- YES >> Print out the self-diagnostic results, and refer to <u>LAN-14, "Trouble Diagnosis Flow Chart"</u>.
- NO >> Connector terminal is loose, damaged, open, or shorted.

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## HILL DESCENT CONTROL SWITCH

#### < DTC/CIRCUIT DIAGNOSIS >

## HILL DESCENT CONTROL SWITCH

#### Description

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

#### **Component Function Check**

## 1. 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 illumina- tion status
Hill descent control switch: ON	ON
Hill descent control switch: OFF	OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-192, "Diagnosis Procedure"</u>.

#### **Diagnosis** Procedure

INFOID:000000007361173

Regarding Wiring Diagram information, refer to <u>BRC-209, "Wiring Diagram - WITH HILL DESCENT CON-</u> <u>TROL/HILL START ASSIST"</u>.

#### 1. CHECK HILL DESCENT CONTROL SWITCH

Perform the hill descent control switch component inspection. Refer to <u>BRC-193</u>, "Component Inspection". Is the inspection result normal?

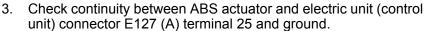
YES >> GO TO 2

NO >> Replace hill descent control switch.

#### 2. CHECK HILL DESCENT CONTROL SWITCH HARNESS

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 25 and hill descent control switch connector M155 (B) terminal 2.

ABS actuator and electric unit (control unit)		Hill descent control switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	25	M155 (B)	2	Yes

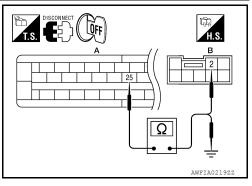


ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127 (A)	25	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.



INFOID:000000007361171

INFOID-000000007361172

## HILL DESCENT CONTROL SWITCH

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#### < DTC/CIRCUIT DIAGNOSIS >

# $\overline{\mathbf{3.}}$ CHECK HILL DESCENT CONTROL SWITCH GROUND

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?

>> GO TO 4 YES

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?

- BRC YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-232, "Removal and Installation".
- NO >> Replace combination meter. Refer to MWI-83, "Removal and Installation".

#### Component Inspection

## 1. CHECK HILL DESCENT CONTROL SWITCH

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

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

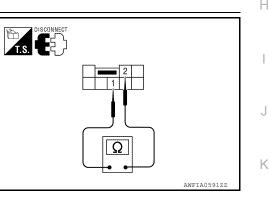
#### 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

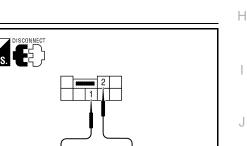
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".** 

#### >> 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 2]** 

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## **VDC OFF SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

## VDC OFF SWITCH

#### Description

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

#### **Component Function Check**

## **1**.CHECK VDC OFF SWITCH OPERATION

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 <u>BRC-194, "Diagnosis Procedure"</u>.

### **Diagnosis** Procedure

INFOID:000000007361178

Regarding Wiring Diagram information, refer to <u>BRC-209</u>, "Wiring Diagram - WITH HILL DESCENT CON-TROL/HILL START ASSIST".

## 1.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to <u>BRC-195, "Component Inspection"</u>.

Is the inspection result normal?

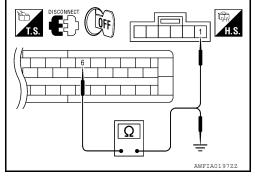
YES >> GO TO 2

NO >> Replace VDC OFF switch.

2.check vdc off switch harness

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- 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

INFOID:000000007361177

## **VDC OFF SWITCH**

#### < DTC/CIRCUIT DIAGNOSIS >

Check continuity between VDC OFF switch connector M154 and ground.

VDC OFF switch			Continuity
Connector	Terminal		Continuity
M154	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

#### **4.**CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-83, "Removal and Installation"</u>.

#### 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
<u> </u>	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

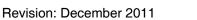
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

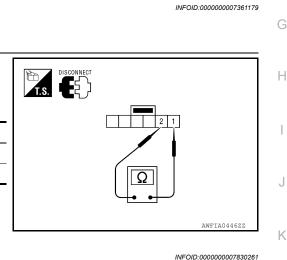
>> GO TO 2

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

>> END





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**[TYPE 2]** 

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### ABS WARNING LAMP

#### < DTC/CIRCUIT DIAGNOSIS >

## ABS WARNING LAMP

## Description

INFOID:000000007361181

**ITYPE 21** 

×: 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:000000007361182

## **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 <u>BRC-196, "Diagnosis Procedure"</u>.

#### Diagnosis Procedure

INFOID:000000007361183

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

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-24</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-83, "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000007830262

#### **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-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

>> END

< DTC/CIRCUIT DIAGNOSIS >

BRAKE	WARNING	LAMP
-------	---------	------

Description	INFOID:00000007361185
Condition	×: ON –: OFF Brake warning lamp (Note 1)
Ignition switch OFF	
Ignition switch ON	× (Note 2)
EBD function is malfunctioning.	× (1010 2)
NOTE:	
	brake operation (when switch is ON) or of brake fluid level switch operation
Component Function Check	INFOID:000000007361186
<b>1.</b> BRAKE WARNING LAMP OPERATION CH	IECK
Check that the lamp illuminates after the ign	ition 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-197, "Diagnosis Procedure".
Diagnosis Procedure	-
	INFC/ID:000000007361187
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (contro	ol unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u>
Perform ABS actuator and electric unit (contro (ABS)".	ol unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u>
Perform ABS actuator and electric unit (contro ( <u>ABS)"</u> . Is the inspection result normal?	ol unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u>
Perform ABS actuator and electric unit (contro (ABS)".	
Perform ABS actuator and electric unit (contro ( <u>ABS)</u> ". <u>Is the inspection result normal?</u> YES >> GO TO 2 NO >> Check items displayed by self-diag	
Perform ABS actuator and electric unit (contro ( <u>ABS)</u> ". <u>Is the inspection result normal?</u> YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2.</b> CHECK COMBINATION METER	gnosis.
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag 2.CHECK COMBINATION METER Check if the indication and operation of combined	
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag 2.CHECK COMBINATION METER Check if the indication and operation of combinition". Is the inspection result normal?	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag 2.CHECK COMBINATION METER Check if the indication and operation of combinition". Is the inspection result normal? YES >> Replace ABS actuator and electric	gnosis.
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2.</b> CHECK COMBINATION METER Check if the indication and operation of combinition". Is the inspection result normal? YES >> Replace ABS actuator and electric tion".	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u>
Perform ABS actuator and electric unit (control (ABS)".         Is the inspection result normal?         YES       >> GO TO 2         NO       >> Check items displayed by self-diag         2.CHECK COMBINATION METER         Check if the indication and operation of combinition".         Is the inspection result normal?         YES       >> Replace ABS actuator and electric tion".         NO       >> Replace combination meter. Refer	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> to <u>MWI-83, "Removal and Installation"</u> .
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2</b> .CHECK COMBINATION METER Check if the indication and operation of combinition". Is the inspection result normal? YES >> Replace ABS actuator and electric tion". NO >> Replace combination meter. Refer Special Repair Requirement	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> to <u>MWI-83, "Removal and Installation"</u> .
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2</b> .CHECK COMBINATION METER Check if the indication and operation of combinition". Is the inspection result normal? YES >> Replace ABS actuator and electric tion". NO >> Replace combination meter. Refer <b>Special Repair Requirement</b> <b>1</b> .ADJUSTMENT OF STEERING ANGLE SEL	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> to <u>MWI-83, "Removal and Installation"</u> . <i>INFOID</i> :000000007830263 NSOR NEUTRAL POSITION
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2</b> .CHECK COMBINATION METER Check if the indication and operation of combin tion". Is the inspection result normal? YES >> Replace ABS actuator and electric tion". NO >> Replace combination meter. Refer <b>Special Repair Requirement</b> <b>1</b> .ADJUSTMENT OF STEERING ANGLE SEL Always perform neutral position adjustment for	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> to <u>MWI-83, "Removal and Installation"</u> .
Perform ABS actuator and electric unit (contro (ABS)". Is the inspection result normal? YES >> GO TO 2 NO >> Check items displayed by self-diag <b>2.</b> CHECK COMBINATION METER Check if the indication and operation of combin tion". Is the inspection result normal? YES >> Replace ABS actuator and electric tion". NO >> Replace combination meter. Refer <b>Special Repair Requirement</b> <b>1.</b> ADJUSTMENT OF STEERING ANGLE SEL Always perform neutral position adjustment for and electric unit (control unit). Refer to BRC-12	gnosis. nation meter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u> c unit (control unit). Refer to <u>BRC-232, "Removal and Installa-</u> to <u>MWI-83, "Removal and Installation"</u> . <i>INFOID</i> :00000007830283 NSOR NEUTRAL POSITION or the steering angle sensor when replacing the ABS actuator

[TYPE 2	2]
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## HILL DESCENT CONTROL INDICATOR LAMP

#### < DTC/CIRCUIT DIAGNOSIS >

## HILL DESCENT CONTROL INDICATOR LAMP

## Description

INFOID:000000007361189

×: ON –: OFF

**ITYPE 21** 

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:000000007361190

## 1. CHECK HILL DESCENT CONTROL INDICATOR LAMP OPERATION

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

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-198, "Diagnosis Procedure"</u>.

#### Diagnosis Procedure

INFOID:000000007361191

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

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-24. "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-83</u>, "Removal and Installation".

#### Special Repair Requirement

INFOID:000000007830264

#### **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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</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 <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

## **VDC OFF INDICATOR LAMP**

### < DTC/CIRCUIT DIAGNOSIS >

# VDC OFF INDICATOR LAMP

# Description

INFOID:000000007361193

	×: ON –: OFF B
Condition	VDC OFF indicator lamp
Ignition switch OFF	_
For 2 seconds after turning ON ignition switch	× C
2 seconds later after turning ON ignition switch	_
VDC OFF switch turned ON. (VDC function is OFF.)	× D
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFOID:00000007361194
1.VDC OFF INDICATOR LAMP OPERATION CHECK	K 1
Check that the lamp illuminates for approximately 2 set	conds after the ignition switch is turned ON.
Is the inspection result normal?	G
YES >> GO TO 2	100 "Diagnasia Drasadura"
NO >> Go to diagnosis procedure. Refer to <u>BRC-</u> 2.VDC OFF INDICATOR LAMP OPERATION CHECK	
VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
Is the inspection result normal?	I
YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-194</u>	4. "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007361195
1.CHECK VDC OFF SWITCH	K
Check that the VDC OFF indicator lamp in the combination VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
Is the inspection result normal?	L
YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to <u>BRC-194</u>	
2.CHECK SELF-DIAGNOSIS	M
Perform ABS actuator and electric unit (control unit) s (ABS)".	self-diagnosis. Refer to <u>BRC-145, "CONSULT Function</u>
Is the inspection result normal?	N
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	0
<b>3.</b> CHECK COMBINATION METER	
Check if the indication and operation of combination m tion".	neter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (c	control unit). Refer to BRC-232, "Removal and Installa-
NO >> Replace combination meter. Refer to <u>MWI</u>	-83. "Removal and Installation".

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## VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000007830265

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-12</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

 $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR}$ 

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

>> END

## SLIP INDICATOR LAMP

#### SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

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

Condition

#### Description

Ignition switch OFF

[TYPE 2]

INFOID:000000007361197

А

	×: ON –: OFF	В
LIP indicator lamp		
_		
×		C
_		
×		D
×		
×		
		E

SI

INFOID:000000007361198

1. CHECK SLIP INDICATOR LAMP OPERATION BRC 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:000000007361199 Н **1.**CHECK SELF-DIAGNOSIS Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-145, "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 Descrip-Κ tion". Is the inspection result normal? YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-232, "Removal and Installa-L tion". NO >> Replace combination meter. Refer to MWI-83, "Removal and Installation". M Special Repair Requirement INFOID:000000007830266 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Ν 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".** Ο >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Ρ

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

#### >> END

#### BRC-201

# ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

## **Application Notice**

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

< ECU DIAGNOSIS INFORMATION >

# 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

		Data monitor	
Monitor item	tem 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 $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
R RH SENSOR	Wheel speed	Nearly matches the speed meter display ( $\pm$ 10% or less)	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display ( $\pm$ 10% or less)	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
JECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
		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	
		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	
		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	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
	Operation status of each colonaid 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	

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В

С

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

		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
		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
RR RH OUT SOL		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 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
	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 OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
EBD WARN LAMP		When EBD warning lamp is ON	On
EDD WARN LAWP	EBD warning lamp	When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is released	Off
MOTOR RELAY Motor a	Motor and motor relay operation	When the motor relay and motor are operating	On
		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	On
	(Note 2)	When ABS warning lamp is OFF	Off
OFF 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 (Note 2)	When SLIP indicator lamp is ON	On
		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
		1st gear	1
GEAR	Gear position determined by TCM	2nd gear 3rd gear	2 3
		4th gear	4 5
		5th gear	σ

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
		With engine stopped	0 rpm
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s
TAW NATE SEN	sensor	When vehicle turning	–75 to 75 d/s
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	On
KF031313		A/T shift position = other than R position	Off
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	On
N F 031 313		A/T shift position = other than N position	Off
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	On
r r 001010	PNP switch signal ON/OFF condition	A/T shift position = other than P position	Off
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("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 ac- tive ("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 ac- tive ("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 ac- tive ("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
Z V V U / 4 V V U		4WD model	4WD
ACCEL POS SIG	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %
	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %

#### < ECU DIAGNOSIS INFORMATION >

Monitor item         Display content         Condition         Reference value in normal operation normal operation normal operation normal operation normal operation           SIDE G-SENSOR         Transverse C detected by side G sensor         Vehicle turning right         Nagarbox value (ms <sup>2</sup> )           SIDE G-SENSOR         Steering angle detected by from pressure and turned         7-270 to 720°           PRESS SENSOR         Brack fluid pressure detected by from pressure and turned ON and brack graduated pressure and turned ON and brack graduated pressure and turned ON and brack graduated and pressure detected by from pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated and pressure detected on the pressure and turned ON and brack graduated pre			Data monitor	
SIDE G-SENSOR         Transverse G detected by side G sensor         Vehicle turning right         Negative value (m/s <sup>2</sup> )           STR ANGLE SIG         Steering angle detected by steering angle sensor         Straiph-shead         Approx. 0+2.5*           STR ANGLE SIG         Steering angle detected by steering angle detected by front pressure sensor         Straiph-shead         Approx. 0+2.5*           PRESS SENSOR         Brake fluid pressure detected by front pressure sensor         Steering wheel turned ON and brake pedia released         Approx. 0 bar           EBD SIGNAL         EBD operation         EBD is active         Onf         Approx. 0 bar           ABS SIGNAL         ABS operation         EBD is inactive         Onf         ABS is inactive         Onf           CS SIGNAL         ABS operation         TCS is inactive         Onf         TCS is inactive         Onf           VDC SIGNAL         TCS operation         TCS is inactive         Onf         TCS is inactive         Onf           VDC SigNAL         VDC operation         VDC is active         On         On         TCS is inactive         Onf           VDC SigNAL         VDC operation         TCS is inactive         Onf         TCS is inactive         Onf           VDC SigNAL         VDC operation         TCS fail-safe         On         TCS is inactive<	Monitor item	Display content	Condition	
SIDE G-SENSOR         Transverse G detected by side G sensor         Vehicle turning right         (m/s <sup>2</sup> )           STR ANGLE SIG sensor         Steering angle detected by steering angle sensor         Straight-ahead         Approx. 0:2.5.°           PRESS SENSOR         Steering angle detected by steering angle sensor         Straight-ahead         Approx. 0:2.5.°           PRESS SENSOR         Brake fluid pressure detected by front pres- sure sensor         With ignition switch turned ON and brake pedial depressed         Approx. 0 bar           EBD SIGNAL         EBD operation         EBD is active         On           ABS is inactive         Onf         ABS is inactive         Onf           TCS SIGNAL         ABS operation         ABS is inactive         Onf           TCS SIGNAL         CS operation         TCS is inactive         Onf           VDC operation         VDC is inactive         Onf         On           EBD FAIL SIG         EBD fail-safe signal         In EBD fail-safe         On           ABS is inicative         Onf         In CS fail-safe         On           TCS FAIL SIG         ABS fail-safe signal         ABS is normal         Off           ABS fail-safe         On         In CS fail-safe         On           TCS FAIL SIG         Crank operation         In CS fail-safe <td></td> <td></td> <td>Vehicle stopped</td> <td>Approx. 0 m/s<sup>2</sup></td>			Vehicle stopped	Approx. 0 m/s <sup>2</sup>
STR ANGLE SIG sensor         Steering angle detected by steering angle sensor         Straight-ahead         Approx. 0:2:5° Steering wheel turned ON and brake pedial released         Approx. 0:2:5°           PRESS SENSOR         Brake fluid pressure detected by front pres- sure sensor         With ignition switch turned ON and brake pedial depressed         -720 to 720°           EBD SIGNAL         EBD operation         EBD is inactive         On           ABS sactive         On         ABS is active         On           ABS sigNAL         ABS operation         ABS is active         On           TCS SIGNAL         CS operation         TCS is active         On           VDC SIGNAL         VDC operation         VDC is inactive         Onf           VDC SIGNAL         VDC operation         VDC is inactive         On           VDC SIGNAL         VDC operation         MDE is active         On           ABS FaiL SIG         EBD fail-safe signal         In EBD fail-safe         On           ABS FaiL SIG         CS fail-safe signal         In SS fail-safe         On           TCS fail-safe signal         In CS fail-safe         On         On           TCS fail-safe signal         In CS fail-safe         On         On           TCS fail-safe signal         In CS fail-safe         On	SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	-
STR ANGLE SIG         sensor         Steering wheel turned         -720 to 720°           PRESS SENSOR         Brake fluid pressure detected by front pressure sensor         With ignition switch turned ON and brake         Approx. 0 bar           EBD SIGNAL         EBD operation         EBD is active         On           EBD SIGNAL         ABS operation         ABS is active         On           CS SIGNAL         ABS operation         ABS is active         On           TCS siGNAL         CS operation         ABS is active         On           TCS siGNAL         CS operation         TCS is active         On           VDC SIGNAL         CS operation         VDC is active         Off           VDC SIGNAL         VDC operation         VDC is active         Off           VDC SIGNAL         VDC operation         VDC is active         Off           RBS FAIL SIG         BD fail-safe signal         In RBS fail-safe         On           RDS FAIL SIG         CS fail-safe signal         In CS fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In CS fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In CS fail-safe         On           VDC FAIL SIG         Crash sormal         Off <td< td=""><td></td><td></td><td>Vehicle turning left</td><td></td></td<>			Vehicle turning left	
Sensor         Steering wheal turned        720 to 720*           PRESS SENSOR         Brake fluid pressure detected by front press	STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. $0\pm2.5^{\circ}$
PRESS SENSOR         Brake fluid pressure detected by front pressure sensor         pedal released         Applied           EBD SIGNAL         EBD operation         EBD is active         On           ABS SIGNAL         ABS operation         EBD is active         On           ABS SIGNAL         ABS operation         ABS is active         On           TCS SIGNAL         ABS operation         ABS is active         Off           TCS SIGNAL         ABS operation         TCS is active         Off           VDC SIGNAL         TCS operation         TCS is active         On           VDC SIGNAL         VDC operation         VDC is inactive         Off           FBD FAIL SIG         EBD fail-safe signal         In EBD fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In TCS fail-safe         On           TCS FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         Crank operation         Crank is inactive         Off           FLUID LEV SW         Brake fluid level switch Signal status         Offeenti	OTTAINEE OIG	sensor	Steering wheel turned	$-720$ to $720^{\circ}$
Sufe sensor         With ignition switch turned ON and brake pedial depressed	PRESS SENSOR	Brake fluid pressure detected by front pres-		Approx. 0 bar
EBD SIGNALEBD operationEBD is inactiveOffABS SIGNALABS operationABS is activeOnABS SIGNALTCS operationTCS is activeOnTCS SIGNALTCS operationTCS is activeOnVDC SIGNALVDC operationTCS is inactiveOnVDC SIGNALVDC operationVDC is onciveOnVDC SIGNALVDC operationIn EBD fail-safeOnEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeOnEBD FAIL SIGTCS fail-safe signalIn CSS fail-safeOnABS FAIL SIGABS fail-safe signalIn CSS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGCrank operationCrank is inactiveOnFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnFLUID LEV SWDifferential lock switch ON/OFFDifferential lock switch ON/OFFOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock switch OFFOffStop lamp on relay statusWhen differential lock mode switch is dis- engagedOnOnTFP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control operationHill descent control switch OFFOffHill descent control switch ON/OFFHill descent control switch OFFOffDTS SUG (Not	FRESS SENSOR	sure sensor	•	–40 to 300 bar
LinkEBD is inactiveOffABS SIGNALABS operationABS is activeOnTCS SIGNALTCS operationTCS is inactiveOnTCS SIGNALTCS operationTCS is inactiveOnVDC SIGNALVDC operationVDC is activeOnVDC SIGNALVDC operationVDC is activeOnEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeOnEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeOnABS fail-safe signalABS fail-safe signalIn TCS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC Si normalOffVDC is normalOffVDC Si NormalOffVDC is normalOffVDC Si NormalOffVDC is normalOffVDC Si NormalOnVDC is normalOffCrank operationCrank is inactiveOffFLUID LEV SWBrake fluid level switch Signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock mode switch signal statusWhen differential lock mode switch is dis- engagedOffDLOCK CHG SWDifferent			EBD is active	On
ABS SIGNAL         ABS operation         ABS is inactive         Off           TCS SIGNAL         TCS operation         TCS is active         On           TCS SIGNAL         TCS operation         TCS is active         On           VDC SIGNAL         VDC operation         VDC is active         On           VDC SIGNAL         VDC operation         VDC is active         On           EBD Fail-safe signal         EBD fail-safe signal         In EBD fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In ABS fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In CS fail-safe         On           TCS Fail SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC is normal         Off           VDC FAIL SIG         VDC fail-safe signal         In VDC is normal         Off           VDC FAIL SIG         VDC fail-safe signal         In VDC is normal         Off           FLUID LEV SW         Brake fluid level switch signal status         When brake fluid level switch ON         On           DLOCK SW         Differential lock switch ON/OFF         Differential lock switch OFF         Off           DLOCK CHG SW         Differential	EBD SIGNAL	EBD operation	EBD is inactive	Off
TCS SIGNAL TCS operationTCS operationABS is inactiveOffTCS SIGNAL VDC operationTCS operationTCS is activeOnVDC SIGNAL VDC operationVDC operationVDC is inactiveOffEBD FAIL SIG EBD fail-safe signalEBD fail-safe signalIn EBD fail-safeOnEBD FAIL SIG ABS fail-safe signalABS fail-safe signalIn ABS fail-safeOnABS FAIL SIG ABS fail-safe signalABS fail-safe signalIn ABS fail-safeOnTCS FAIL SIG TCS fail-safe signalTCS fail-safe signalIn TCS fail-safeOnTCS FAIL SIG VDC fail-safe signalTCS fail-safe signalOffOffVDC FAIL SIG VDC fail-safe signalIn VDC fail-safeOnOffVDC FAIL SIG VDC fail-safe signalVDC fail-safe signalOffOffVDC FAIL SIG VDC fail-safe signalCrank operationCrank is activeOnCRANKING SIG FLUID LEV SW DLOCK SWBrake fluid level switch signal statusWhen brake fluid level switch ON/OFFOffDLOCK CHG SW DLOCK CHG SWDifferential lock switch ON/OFFDifferential lock switch OFFOffDLOCK CHG SW STP ON RLY DDS SW (Note 3)Hill descent control switch ON/OFFWhen differential lock mode switch is dis- engagedOnDDS SIG (Note 3) DDS SIG (Note 3)Hill descent control operationHill descent control operationOnHill descent control switch ON/OFFHill descent control is activeOnDDS SIG (Note 3)Hill descent control operationHill descent con			ABS is active	On
TCS SIGNALTCS operationTCS is inactiveOffVDC SIGNALVDC operationVDC is activeOnVDC SIGNALVDC operationVDC is inactiveOffEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeOnABS FAIL SIGABS fail-safe signalIn ABS fail-safeOnABS FAIL SIGABS fail-safe signalIn ABS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnVDC FAIL SIGTCS fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalCrank is activeOnCRANKING SIGCrank operationCrank is inactiveOffFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch OFFOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnStop lamp on relay statusWhen differential lock mode switch is engagedOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnHill descent control switch ON/OFFHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control switch OFFOffHill descent control operationHill descent control is activeOn	ABS SIGNAL	ABS operation	ABS is inactive	Off
VDC SIGNAL VDC operationVDC is inactiveOffVDC SIGNAL VDC operationVDC is inactiveOnEBD Fail-safe signalIn EBD fail-safeOnEBD Fail-safe signalIn BD fail-safeOnABS FAIL SIG ABS fail-safe signalIn ABS fail-safeOnABS FAIL SIG CS FAIL SIGABS fail-safe signalIn ABS fail-safeOnTCS FAIL SIG VDC fail-safe signalIn TCS fail-safeOnTCS FAIL SIG VDC fail-safe signalIn TCS fail-safeOnVDC FAIL SIG VDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIG VDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalCrank is activeOnVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalCrank is inactiveOnVDC fail-safe signalCrank is inactiveOnCRANKING SIG FLUID LEV SWBrake fluid level switch Signal statusWhen brake fluid level switch OFFOffDLOCK SW DIfferential lock switch ON/OFFDifferential lock switch ONOnOnDLOCK CHG SW STP ON RLYDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOriDDS SW (Note 3) DDS SW (Note 3)Hill descent control switch ON/OFFHill descent control is not operating M		700	TCS is active	On
VDC SIGNALVDC operationVDC is inactiveOffEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeOnABS FAIL SIGABS fail-safe signalIn ABS fail-safeOnABS FAIL SIGABS fail-safe signalIn ABS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalCrank is normalOffCRANKING SIG FLUID LEV SWCrank operationCrank is activeOnFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDiffOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen differential lock mode switch is disenengagedOffDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control switch OFFOffHIll descent control operationHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control switch OFFOffHII descent control operationHill descent control switch OFFOffD	TCS SIGNAL	TCS operation	TCS is inactive	Off
Lunch         VDC is inactive         Off           EBD FAIL SIG         EBD fail-safe signal         In EBD fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In ABS fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In ABS fail-safe         On           TCS FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           TCS FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           CRANKING SIG         Crank operation         Crank is active         On           FLUID LEV SW         Brake fluid level switch signal status         When brake fluid level switch OFF         Off           DLOCK SW         Differential lock mode switch signal status         When differential lock switch OFF         Off           Much Mifferential lock mode			VDC is active	On
EBD FAIL SIG         EBD fail-safe signal         EBD is normal         Off           ABS FAIL SIG         ABS fail-safe signal         In ABS fail-safe         On           ABS FAIL SIG         ABS fail-safe signal         In CS fail-safe         On           TCS FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         TCS fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           CRANKING SIG         Crank operation         Crank is active         On           FLUID LEV SW         Brake fluid level switch signal status         When brake fluid level switch ON         On           DLOCK SW         Differential lock switch ON/OFF         Differential lock switch OFF         Off           DLOCK CHG SW         Differential lock mode switch signal status         When differential lock mode switch is dis engaged         On           STP ON RLY         Stop lamp on relay status         When hill descent control is not operating         Off           DDS SW (Note 3)         Hill descent control switc	VDC SIGNAL	VDC operation	VDC is inactive	Off
Left is normalOffABS FAIL SIGABS fail-safe signalIn ABS fail-safeOnABS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnCRANKING SIGCrank operationCrank is activeOnFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFOffOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock switch OFFOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock switch oFFOnSTP ON RLYStop lamp on relay statusWhen differential lock mode switch is dis- engagedOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control is not operatingOffDDS SIG (Note 3)Hill descent control operationHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control sole switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control operationOn			In EBD fail-safe	On
ABS FAIL SIG         ABS fail-safe signal         ABS is normal         Off           TCS FAIL SIG         TCS fail-safe signal         In TCS fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           VDC FAIL SIG         VDC fail-safe signal         In VDC fail-safe         On           CRANKING SIG         Crank operation         Crank is active         On           FLUID LEV SW         Brake fluid level switch signal status         When brake fluid level switch ON         On           DLOCK SW         Differential lock switch ON/OFF         Differential lock switch ON/OFF         Off           DLOCK CHG SW         Differential lock mode switch signal status         When differential lock mode switch is engaged         On           STP ON RLY         Stop lamp on relay status         When hill descent control is operating         Off           DLS SW (Note 3)         Hill descent control switch ON/OFF         Hill descent control switch OFF         Off           DLS SIG (Note 3)         Hill descent control switch ON/OFF         Hill descent control switch OFF         Off	EBD FAIL SIG	EBD fail-safe signal	EBD is normal	Off
TCS FAIL SIG TCS fail-safe signalTCS fail-safe signalIn TCS fail-safeOnTCS FAIL SIG VDC fail-safe signalTCS fail-safe signalIn TCS fail-safeOnVDC FAIL SIG VDC fail-safe signalVDC fail-safe signalIn VDC fail-safeOnVDC fail-safe signalVDC fail-safe signalIn VDC fail-safeOnCRANKING SIG Crank operationCrank operationCrank is activeOnFLUID LEV SW FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SW DLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SW STP ON RLYStop lamp on relay statusWhen differential lock mode switch is engagedOnSTP ON RLY DDS SW (Note 3)Hill descent control switch ON/OFFOffDLS SIG (Note 3)Hill descent control operationHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn			In ABS fail-safe	On
TCS FAIL SIGTCS fail-safe signalTCS is normalOffVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnCRANKING SIGCrank operationCrank is activeOnCRANKING SIGCrank operationCrank is activeOnFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn	ABS FAIL SIG	ABS fail-safe signal	ABS is normal	Off
VDC FAIL SIGVDC fail-safe signalTCS is normalOffVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeOnCRANKING SIGCrank operationCrank is activeOnCRANKING SIGCrank operationCrank is inactiveOffFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOffDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn			In TCS fail-safe	On
VDC FAIL SIGVDC fail-safe signalVDC is normalOffCRANKING SIG CRANKING SIGCrank operationCrank is activeOnFLUID LEV SW FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SW DLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn	TCS FAIL SIG	ICS fail-safe signal	TCS is normal	Off
CRANKING SIG Crank operationCrank is normalOffCRANKING SIG FLUID LEV SWCrank operationCrank is nactiveOnFLUID LEV SW FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn			In VDC fail-safe	On
CRANKING SIGCrank operationCrank is inactiveOffFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK SWDifferential lock switch ON/OFFDifferential lock switch OFFOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is disengagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch OFFOffDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn	VDC FAIL SIG	VDC fail-safe signal	VDC is normal	Off
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FLUID LEV SW       Brake fluid level switch signal status       When brake fluid level switch OFF       Off         DLOCK SW       Differential lock switch ON/OFF       Differential lock switch OFF       Off         DLOCK CHG SW       Differential lock mode switch signal status       When differential lock mode switch is engaged       On         DLOCK CHG SW       Differential lock mode switch signal status       When differential lock mode switch is disengaged       On         STP ON RLY       Stop lamp on relay status       When hill descent control is operating       On         DDS SW (Note 3)       Hill descent control switch ON/OFF       Hill descent control switch OFF       Off         DDS SIG (Note 3)       Hill descent control operation       Hill descent control is active       On	CRAINNING SIG		Crank is inactive	Off
When brake fluid level switch OFFOffDLOCK SWDifferential lock switch ON/OFFDifferential lock switch ONOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is disengagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn		Drake fluid lavel ewitch sizes latetus	When brake fluid level switch ON	On
DLOCK SWDifferential lock switch ON/OFFDifferential lock switch OFFOffDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn	FLUID LEV SVV	Brake huld level switch signal status	When brake fluid level switch OFF	Off
DLOCK CHG SWDifferential lock mode switch signal statusDifferential lock mode switch is engagedOnDLOCK CHG SWDifferential lock mode switch signal statusWhen differential lock mode switch is engagedOnSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn		Differential look switch ON/OEE	Differential lock switch ON	On
DLOCK CHG SWDifferential lock mode switch signal statusgagedOnWhen differential lock mode switch is disengagedOffSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch OFFOnDDS SIG (Note 3)Hill descent control operationOn	DLOCK SW	Differential lock switch ON/OFF	Differential lock switch OFF	Off
When differential lock mode switch is disengagedOffSTP ON RLYStop lamp on relay statusWhen hill descent control is operatingOnDDS SW (Note 3)Hill descent control switch ON/OFFHill descent control switch ONOnDDS SIG (Note 3)Hill descent control operationHill descent control is activeOn		Differential look made quitch signal status		On
STP ON RLY       Stop lamp on relay status       When hill descent control is not operating       Off         DDS SW (Note 3)       Hill descent control switch ON/OFF       Hill descent control switch ON       On         DDS SIG (Note 3)       Hill descent control operation       Hill descent control is active       On	DLUUK UHG SW	Differential lock mode switch signal status		Off
Image: Constraint of the second control is not operating     Off       DDS SW (Note 3)     Hill descent control switch ON/OFF     Hill descent control switch ON     On       DDS SIG (Note 3)     Hill descent control operation     Hill descent control is active     On			When hill descent control is operating	On
DDS SW (Note 3)     Hill descent control switch ON/OFF     Hill descent control switch OFF       DDS SIG (Note 3)     Hill descent control operation     Hill descent control is active     On	STP ON RLY	Stop lamp on relay status	When hill descent control is not operating	Off
DDS SIG (Note 3)     Hill descent control operation     Hill descent control is active     On			Hill descent control switch ON	On
DDS SIG (Note 3) Hill descent control operation	DDS SW (NOte 3)		Hill descent control switch OFF	Off
Hill descent control operation Hill descent control operation		Hill descent control energies	Hill descent control is active	On
	רחם אוס		Hill descent control is inactive	Off

#### < ECU DIAGNOSIS INFORMATION >

[TYPE 2]

			Data monitor	
Monitor item	Display content	Con	dition	Reference value in normal operation
USS SIG (Note 4)	Hill start assist operation	Hill start assist is ac	tive	On
000 010 (11012 4)		Hill start assist is ina	active	Off
<ul> <li>ABS warning lamp:</li> <li>Brake warning lamp</li> <li>VDC OFF indicator</li> <li>SLIP indicator lamp:</li> <li>3: The CONSULT wardstart</li> </ul>	for warning lamp and indicator lamp. Refer to <u>BRC-196, "Description"</u> . : Refer to <u>BRC-197, "Description"</u> . amp: Refer to <u>BRC-201, "Description"</u> . Refer to <u>BRC-201, "Description"</u> . ill display DDS (Downhill Drive Support) when ill display USS (Uphill Start Support) when DUT	referring to the Hill Start A	Assist system.	
	32 33 34 35 36 37 38 39 40	41 42 43 44 45 46	47 H.S.	AWFIA0032ZZ
Fail-Safe				INFOID:000000007361203
ABS/EBD SYST	nction is activated, perform Self EM trical malfunction with the ABS, the	-	-	
ndicator lamp will ABS warning lamp	turn on. In case of an electrical ma b, VDC OFF indicator lamp and SLI vert to one of the following condition	Ifunction with the EB	D system, the BR turn on.	
1. For ABS malf	unction, only the EBD is operative out ABS/TCS/VDC system.			same condition of
2. For EBD malf as the condition	unction, the EBD and ABS become on of vehicles without ABS/TCS/VE		e condition of the	vehicle is the same
and the condition	EM OC system malfunction, the VDC O of the vehicle is the same as the c unction with the TCS/VDC system	ondition of vehicles v	without TCS/VDC	system. In case of
DTC No. Inde	K			INFOID:000000007361204
D	TC Items (CONS	SULT screen terms)	Refe	erence
	101 RR RH SENSOR-			
C1	102 RR LH SENSOR-1	I		"Description"
C1	103 FR RH SENSOR-1	1	<u>BRC-151,</u>	"Description"
	104 FR LH SENSOR-1			

#### < ECU DIAGNOSIS INFORMATION >

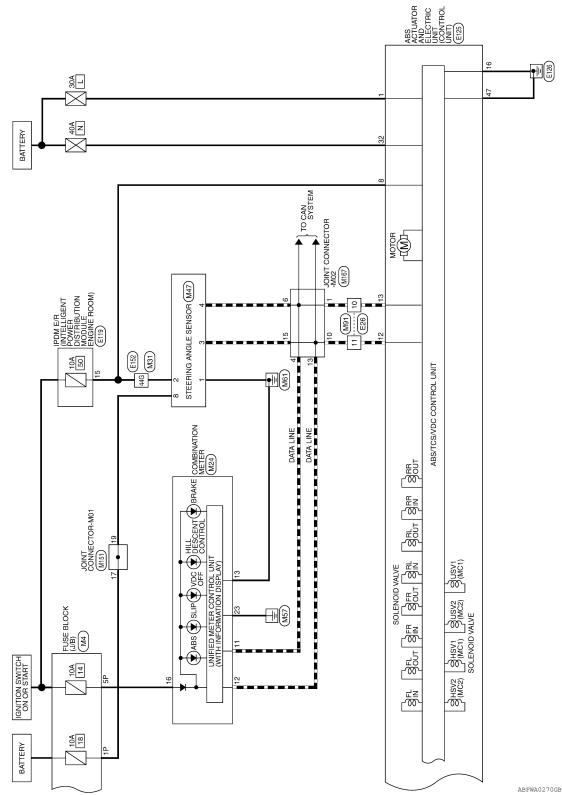
[TYPE 2]

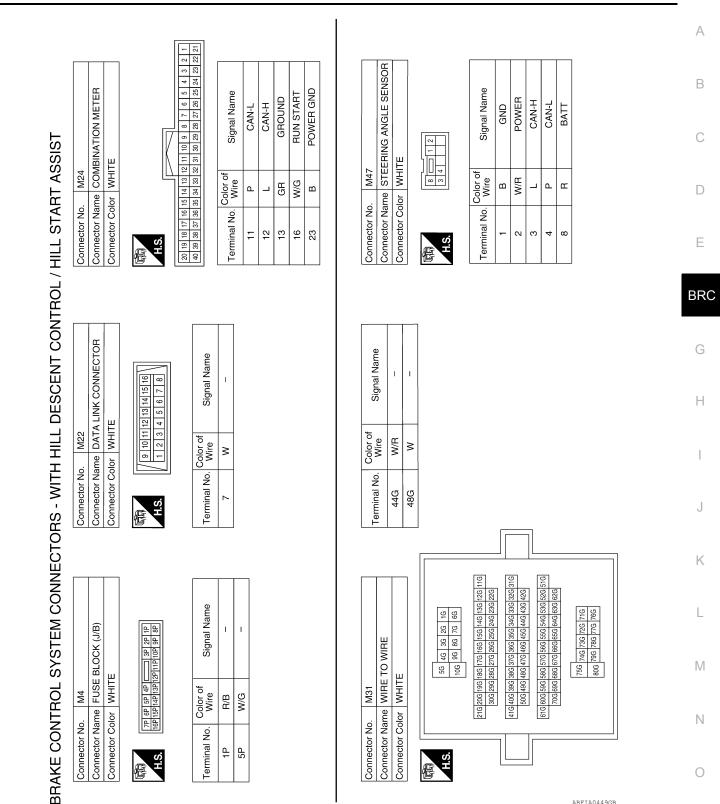
DTC	Items (CONSULT screen terms)	Reference
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	BRC-154, "Description"
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-157, "Description"
C1110	CONTROLLER FAILURE	BRC-159, "DTC Logic"
C1111	PUMP MOTOR	BRC-160, "Description"
C1113	G-SENSOR	BRC-162, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-151, "Description"
C1116	STOP LAMP SW	BRC-167, "Description"
C1120	FR LH IN ABS SOL	BRC-169, "Description"
C1121	FR LH OUT ABS SOL	BRC-172, "Description"
C1122	FR RH IN ABS SOL	BRC-169, "Description"
C1123	FR RH OUT ABS SOL	BRC-172, "Description"
C1124	RR LH IN ABS SOL	BRC-169, "Description"
C1125	RR LH OUT ABS SOL	BRC-172, "Description"
C1126	RR RH IN ABS SOL	BRC-169, "Description"
C1127	RR RH OUT ABS SOL	BRC-172, "Description"
C1130	ENGINE SIGNAL 1	
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	BRC-175, "Description"
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-176, "Description"
C1143	ST ANG SEN CIRCUIT	
C1144	ST ANG SEN SIGNAL	BRC-178. "Description"
C1145	YAW RATE SENSOR	DDC 162 "Description"
C1146	SIDE G-SEN CIRCUIT	BRC-162, "Description"
C1155	BR FLUID LEVEL LOW	BRC-181, "Description"
C1156	ST ANG SEN COM CIR	BRC-184, "Description"
C1160	DECEL G SEN SET	BRC-185, "Description"
C1163	ST ANGL SEN SAFE	BRC-186, "Description"
C1164	CV1	
C1165	CV2	
C1166	SV1	BRC-187, "Description"
C1167	SV2	
C1170	VARIANT CODING	BRC-159, "DTC Logic"
C1187	ABS DIFLOCK CONTROLLER NG	BRC-190, "Description"
U1000	CAN COMM CIRCUIT	BRC-191, "Description"

< WIRING DIAGRAM > **[TYPE 2]** WIRING DIAGRAM А **BRAKE CONTROL SYSTEM - VDC** Wiring Diagram - WITH HILL DESCENT CONTROL/HILL START ASSIST INFOLD:000000007361205 В ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (E125) С D YAW RATE/ SIDE/DECEL G SENSOR B73 9 B40 Ε BRC REAR WHEEL SENSOR RH C10 BRAKE CONTROL SYSTEM - WITH HILL DESCENT CONTROL / HILL START ASSIST 17 VDC OFF SWITCH HILL DESCENT CONTROL SWITCH (M155) 2 0 0 1 3 180 Н C11 C11 C11 C11 C11 C11 C11 12 15C ً 90 ABS/TCS/VDC CONTROL UNIT J E117 FRONT WHEEL SENSOR E117 Κ 48G E152 DATA LINK CONNECTOR M22 € L FRONT WHEEL SENSOR LLH E18 Μ Ν € Ο FUSE BLOCK (J/B) E160 STOP LAMP SWITCH E39 BRAKE FLUID LEVEL SWITCH (E21) Ρ E12 10A BATTERY **-**II(1) 00

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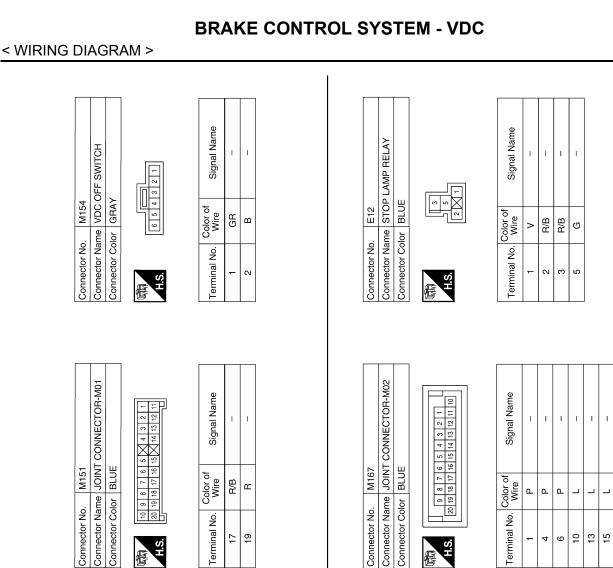


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#### < WIRING DIAGRAM >

#### **[TYPE 2]**





M151

Connector No.

Connector Color BLUE

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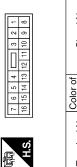
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Color of Wire

Terminal No.

R/B Щ

17 19



Signal Name	I	I	I	I	
Color of Wire	GR	٩	Γ	Y	
Terminal No. Color of Wire	e	10	11	12	

Connector No.	M155
Connector Name HILL DESCENT CONTROL SWI	HILL DESCENT CONTROL SWITCH
Connector Color WHITE	WHITE
同 H.S.	8 8 1 1 2

M167

Connector No.

Connector Color BLUE

H.S.

F

Signal Name	-	-	
Color of Wire	В	۲	
Terminal No.	1	2	

Color of Wire

Terminal No.

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> 10 13 15

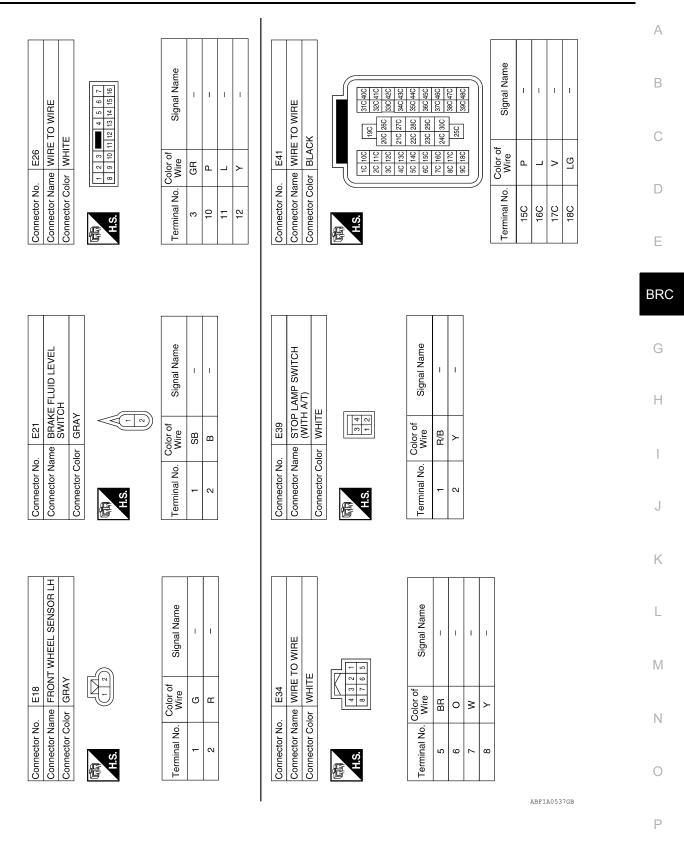
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## **BRAKE CONTROL SYSTEM - VDC**

< WIRING DIAGRAM >

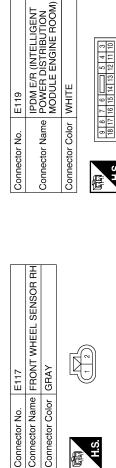
**[TYPE 2]** 



Signal Name	CLUS_GND	I	I	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	STOP LAMP SW ON	RR_LH_PWR	RR_LH_SIG	I	STOP LAMP SW	I	I	RR_RH_SIG	RR_RH_PWR	I	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	BR	I	I	≻	3	в	>	_	٩	I	SB	I	I	>	Ъ	I	σ	œ	в
Terminal No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

Signal Name	1	DIAG-K	1	CAN-H	CAN-L	I	1	VALVE ECU GND	1	CAN2-H	CAN2-L	1	I	CLUS_SUP	I	I	HDC_SW	I	I	FLUID LEVEL SW
Color of Wire	I	SB	I	_	٩	I	I	в	I	0	Ν	I	I	Y	I	I	≻	I	I	GR
Terminal No.	6	10	÷	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

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Connector Color GRAY

Connector No. E117

Signal Name	-	I
Color of Wire	В	M
Terminal No.	٢	2

ABS IGN SUPPLY Signal Name

W/R

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Terminal No. Wire

H.S.

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



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39 40 41 42 43 44 45 46		Signal Name	MOTOR SUPPLY	I	1	1	1	VDC OFF SW
36 37 38	Color of Wire	ш	ı	I	-	I	GR	
32 33 34 35		Terminal No. Color of Wire	Ļ	2	ю	4	5	9

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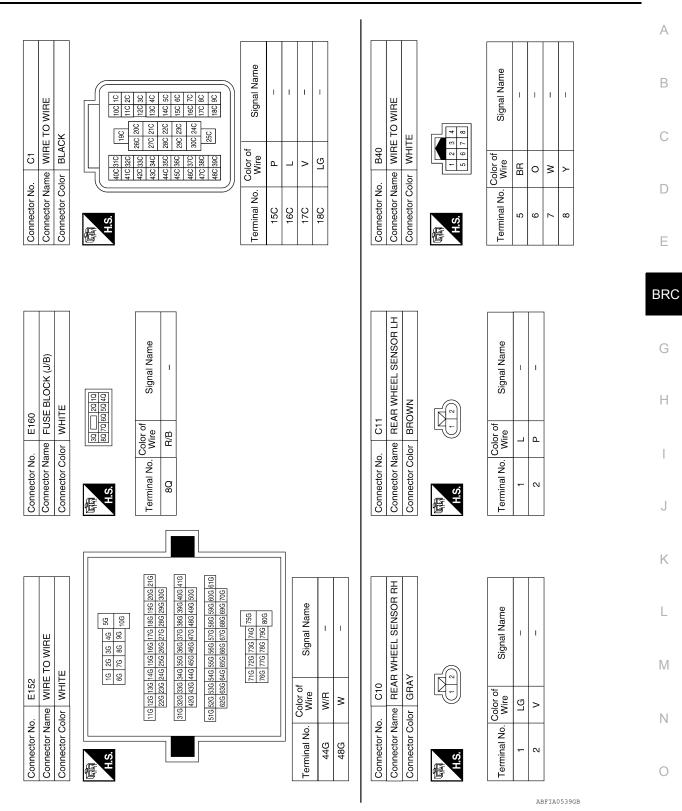
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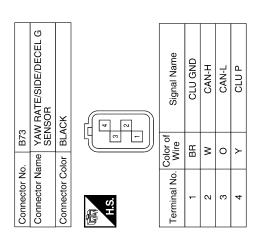




**[TYPE 2]** 



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# **APPLICATION NOTICE**

#### < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS APPLICATION NOTICE

# **Application Notice**

INFOID:000000007830191 B

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

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# VDC/TCS/ABS

# < SYMPTOM DIAGNOSIS >

# VDC/TCS/ABS

INFOID:000000007361207

**[TYPE 2]** 

# Symptom Table

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

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-219, "Diag-</u> nosis Procedure"
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-220, "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-221, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-222, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-223, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
Vehicle jerks during VDC/TCS/ABS con-	ABS actuator and electric unit (control unit)	
	ТСМ	<u>BRC-224, "Diag-</u> nosis Procedure"
	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	
< SYMPTOM DIAGNOSIS > [TYPE 2]	
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	
Diagnosis Procedure	8
1.CHECK START	
Check front and rear brake force distribution using a brake tester.	-
Is the inspection result normal?	
YES >> GO TO 2 NO >> Check brake system.	
2. CHECK FRONT AND REAR AXLE	
Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u> , "On-Vehicle <u>Inspection and Service</u> " or rear: <u>RAX-19</u> , "Rear Axle Bearing".	2
Is the inspection result normal?	
YES >> GO TO 3	
NO >> Repair or replace malfunctioning components. 3.CHECK WHEEL SENSOR AND SENSOR ROTOR	
Check the following.	-
Wheel sensor installation for damage.	
<ul> <li>Sensor rotor installation for damage.</li> <li>Wheel sensor connector connection.</li> </ul>	
Wheel sensor harness inspection.	
<u>Is the inspection result normal?</u> YES >> GO TO 4	
<ul> <li>NO &gt;&gt; • Replace wheel sensor or sensor rotor. Refer to <u>BRC-230, "Removal and Installation"</u>.</li> <li>• Repair harness.</li> </ul>	
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?	
<ul> <li>YES &gt;&gt; Perform self-diagnosis. Refer to <u>BRC-145, "CONSULT Function (ABS)"</u>.</li> <li>NO &gt;&gt; Inspection End.</li> </ul>	

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# UNEXPECTED PEDAL REACTION

**Diagnosis** Procedure

INFOID:000000007361209

**[TYPE 2]** 

## 1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-15, "Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-17, "Bleeding Brake System"</u>.
  - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-15</u>, "Inspection and Adjustment" (brake pedal), <u>BR-11</u>, "On Board Inspection" (master cylinder), <u>BR-9</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

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.

[TYPE 2]

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# ABS FUNCTION DOES NOT OPERATE

**Diagnosis** Procedure

#### CAUTION:

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

**1.**CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.

**Revision: December 2011** 

NO >> Perform self-diagnosis. Refer to <u>BRC-145</u>, "CONSULT Function (ABS)".

**[TYPE 2]** 

BRC-222

INFOID:000000007361211

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS< SYMPTOM DIAGNOSIS >[TYPE 2]PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS	
Diagnosis Procedure	A
<ul> <li>CAUTION:</li> <li>Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.</li> <li>When shifting gears</li> <li>When driving on slippery road</li> <li>During cornering at high speed</li> <li>When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]</li> <li>When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]</li> <li>1.SYMPTOM CHECK 1</li> </ul>	B C D
Check that there are pedal vibrations when the engine is started. Do vibrations occur?	E
YES >> GO TO 2 NO >> Inspect the brake pedal. 2.SYMPTOM CHECK 2	BR
Check that there are ABS operation noises when the engine is started. Do the operation noises occur? YES >> GO TO 3 NO >> Perform self -diagnosis. Refer to <u>BRC-145. "CONSULT Function (ABS)"</u> . 3.SYMPTOM CHECK 3	G
<ul> <li>Check symptoms when electrical component (headlamps, etc.) switches are operated.</li> <li><u>Do symptoms occur?</u></li> <li>YES &gt;&gt; Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.</li> <li>NO &gt;&gt; Inspection End.</li> </ul>	l
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# **VEHICLE JERKS DURING VDC/TCS/ABS CONTROL**

#### < SYMPTOM DIAGNOSIS >

# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:000000007361213

**[TYPE 2]** 

**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-145</u>, "CONSULT Function (ABS)".

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.

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.

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-52, "CONSULT Function".
  - TCM: Refer to TM-102, "CONSULT Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-232</u>, "<u>Removal and Installa-</u> tion".

# NORMAL OPERATING CONDITION

#### < SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

# Description

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[TYPE 2]

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 condi- tion 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 op- eration check.	
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because	
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).	
The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal	
VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal con- dition is restored, there is no malfunction. At	
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).	that time, erase the self- diagnosis memory.	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)	
VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warn- ing lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.	

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Man-

#### ual. WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

#### WARNING:

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

#### Precaution for Brake System

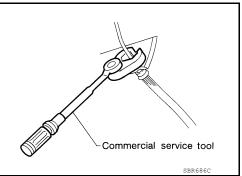
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#### CAUTION:

- Refer to MA-13, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

# Refer to <u>BR-33, "Brake Burnishing"</u> (front disc brake) or <u>BR-38, "Brake Burnishing"</u> (rear disc brake). WARNING:

• Clean dust on caliper and pad with a vacuum dust collector to minimize the hazard of airborne particles or other materials.



#### **BRC-226**

# PRECAUTIONS

#### < PRECAUTION > 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 В 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, stop-D ping 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
- Ε 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 BRC 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 Н 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 Κ 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 L 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 Μ 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.

**BRC-227** 

#### NOTE:

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

## Precaution for CAN System

- 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.

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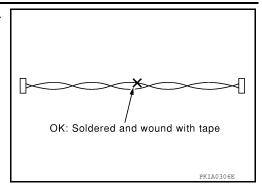
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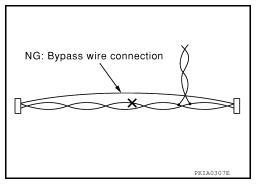
# PRECAUTIONS

#### < PRECAUTION >

• 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 >

# Special Service Tool

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

Tool number (Kent-Moore No.) Tool name		Description
 (J-45741) ABS active wheel sensor tester	VIANDAL	Checking operation of ABS active wheel sen- sors
ST30031000		Removing sensor rotor
( — ) Bearing puller		
	22A0700D	
		INFOID:00000007361
ool name		Description
Commercial Service To Tool name . Flare nut crowfoot 2. Torque wrench		
ool name . Flare nut crowfoot		Description Removing and installing brake piping
ōool name . Flare nut crowfoot 2. Torque wrench		Description Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)
ool name . Flare nut crowfoot		Description Removing and installing brake piping
ōool name . Flare nut crowfoot 2. Torque wrench		Description Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)

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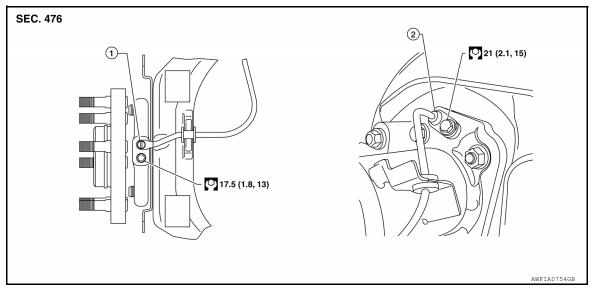
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## < UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION WHEEL SENSORS

# Removal and Installation

INFOID:000000007361221



1. Front wheel sensor

2. Rear wheel sensor (M226 )

#### REMOVAL

- 1. Remove the wheel sensor bolt(s).
  - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-34</u>, "<u>Removal and Installation of Brake Caliper and Disc Rotor</u>".
- 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.
- 3. 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

# SENSOR ROTOR

# Removal and Installation

#### 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, "Removal and Installation"</u>.

#### REAR

Removal

#### NOTE:

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

- 1. Remove axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u> (M226).
- 2. Pull the sensor rotor of off the axle shaft using Tool and a press.

#### Tool number : ST30031000 ( — )

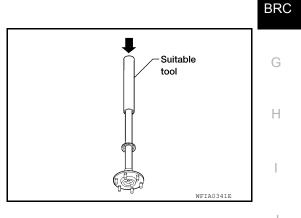
#### Installation

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

#### Do not reuse the old sensor rotor.

 Install axle shaft assembly. Refer to <u>RAX-20, "Removal and</u> <u>Installation"</u> (M226).
 CAUTION:

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



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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

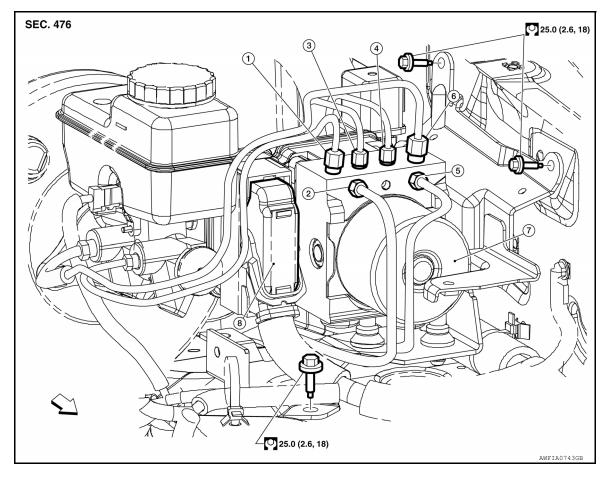
# < UNIT REMOVAL AND INSTALLATION >

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

## Removal and Installation

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**[TYPE 2]** 



- 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)
- 2. To rear right disc brake 13.0 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)
- 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.
- 2. Remove air cleaner case. Refer to EM-24, "Exploded View".
- 3. Disconnect the actuator harness from the ABS actuator and electric unit (control unit).
- 4. 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 and then 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

#### BRC-232

# 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-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special <u>Repair Requirement</u>".

ABS actuator and electric unit (control unit) bracket bolt 7.0 N⋅m (0.7 kg-m, 62 in-lb)

#### 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 BRC brake fluid. Then bleed the air from the brake system. Refer to <u>BR-17</u>, "<u>Bleeding Brake System</u>".

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#### < UNIT REMOVAL AND INSTALLATION >

#### Removal and Installation

#### REMOVAL

- 1. Remove the spiral cable. Refer to SR-6, "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, "ADJUSTMENT OF STEERING</u> <u>ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

#### 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 <u>BRC-12, "ADJUSTMENT OF STEERING ANGLE SEN-SOR NEUTRAL POSITION : Special Repair Requirement"</u>.

**[TYPE 2]** 

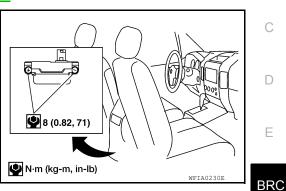
# < UNIT REMOVAL AND INSTALLATION >

# YAW RATE/SIDE/DECEL G SENSOR

# Removal and Installation

# REMOVAL

- 1. Remove center console rear base. Refer to <u>IP-10, "Exploded View"</u>.
- 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 <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

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