SECTION BRAKE CONTROL SYSTEM

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APPLICATION NOTICE

BASIC INSPECTION APPLICATION NOTICE

Application Notice

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[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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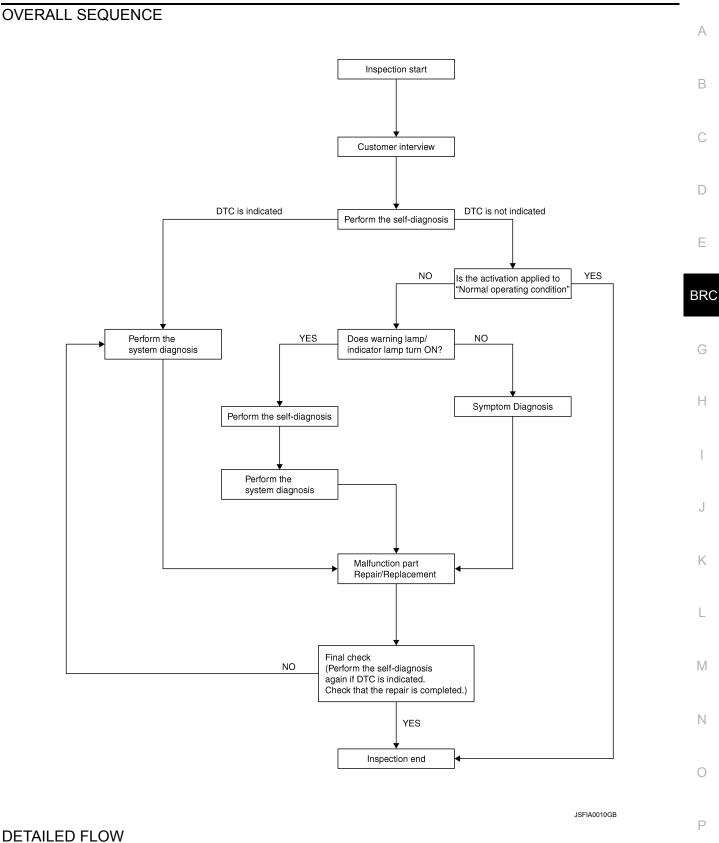
PRECAUTIONS FOR DIAGNOSIS

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>, "<u>Diagnostic Work Sheet</u>".

>> GO TO 2

Revision: October 2015

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)". <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-91, "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-109</u>, <u>"Description"</u>.

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-81, "Description".
- · Brake warning lamp: Refer to BRC-82, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-83</u>, "Description".

• SLIP indicator lamp: Refer to <u>BRC-85, "Description"</u>.

Is ON/OFF timing normal?

YES >> GO TO 6

NO >> GO TO 2

O.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-29</u>, "<u>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

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[TYPE 1]

Customer name MR/MS	Model & Year	Model & Year		VIN	
Engine #	Trans.		Mileage		
Incident Date	Manuf. Date	Manuf. Date			
Symptoms	 □ Noise and vibration (from engine compartment) □ Noise and vibration (from axle) 	U Warning / Indicator activate		Firm pedal operation Large stroke pedal operation	
	☐ TCS does not work (Rear wheels slip when accelerating)	ABS does not work (Wheels lock when braking)		Lack of sense of acceleration	
Engine conditions	When starting After starting	□ When starting □ After starting			
Road conditions	□ Low friction road (□Snow □Grave □ 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 >

[TYPE 1]

INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000007327671

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 (4WD models)

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 (4WD MODELS)

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.

 \times : 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)	х
Removing/Installing steering angle sensor	х
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	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 >

>> GO TO 2	
2. PERFORM THE NEUTRAL POSITION ADJUSTME	INT FOR THE STEERING ANGLE SENSOR
	RT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
Do not touch steering wheel while adjusting steering. After approximately 10 seconds, touch "END". NOTE:	eering angle sensor.
After approximately 60 seconds, it ends automatica 4. Turn ignition switch OFF, then turn it ON again. CAUTION: Be sure to perform above operation.	ally.
>> GO TO 3	
3. CHECK DATA MONITOR	
 Run vehicle with front wheels in straight-ahead post Select "DATA MONITOR". Then make sure "STR A 	
s the steering angle within the specified range? YES >> GO TO 4 NO >> Perform the neutral position adjustment for LERASE THE SELF-DIAGNOSIS MEMORY	r the steering angle sensor again, GO TO 1
Erase the self-diagnosis memory of the ABS actuator a	and electric unit (control unit) and ECM.
 ABS actuator and electric unit (control unit): Refer to ECM: Refer to <u>EC-499, "CONSULT Function"</u>. 	
Are the memories erased?	
YES >> Inspection End	
NO >> Check the items indicated by the self-diagr CALIBRATION OF DECEL G SENSOR	nosis.
CALIBRATION OF DECEL G SENSOR : D	Description
Refer to the table below to determine if calibration of th	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	_

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

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

Adjusting wheel alignment

Removing/Installing yaw rate/side/decel G sensor

Replacing yaw rate/side/decel G sensor

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CAUTION:

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 0.08G.

Is the inspection result normal?

YES >> GO TO 4

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

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

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

ECM: Refer to <u>EC-499, "CONSULT Function".</u>

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:000000007815414 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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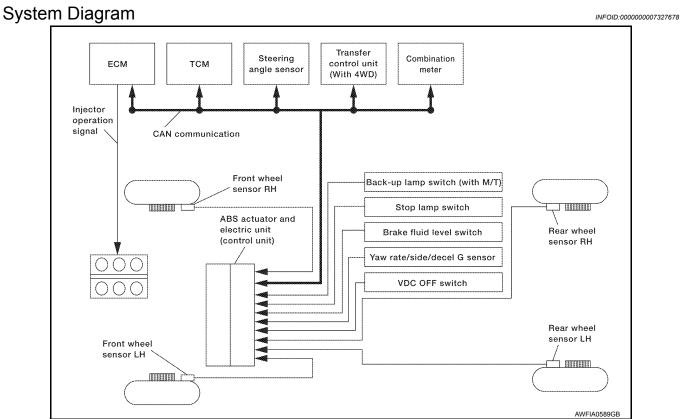
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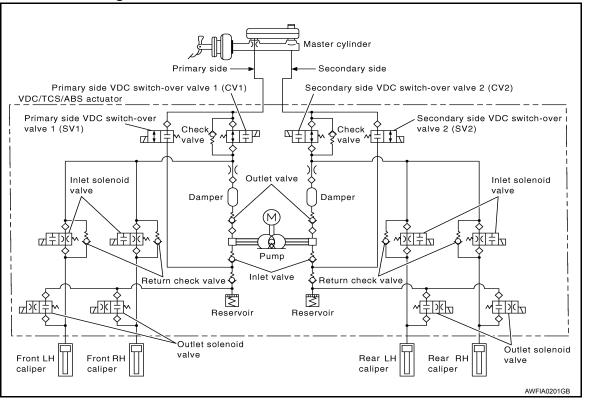
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VDC



VDC

Hydraulic Circuit Diagram



INFOID:000000007327679

[TYPE 1]

System Description

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

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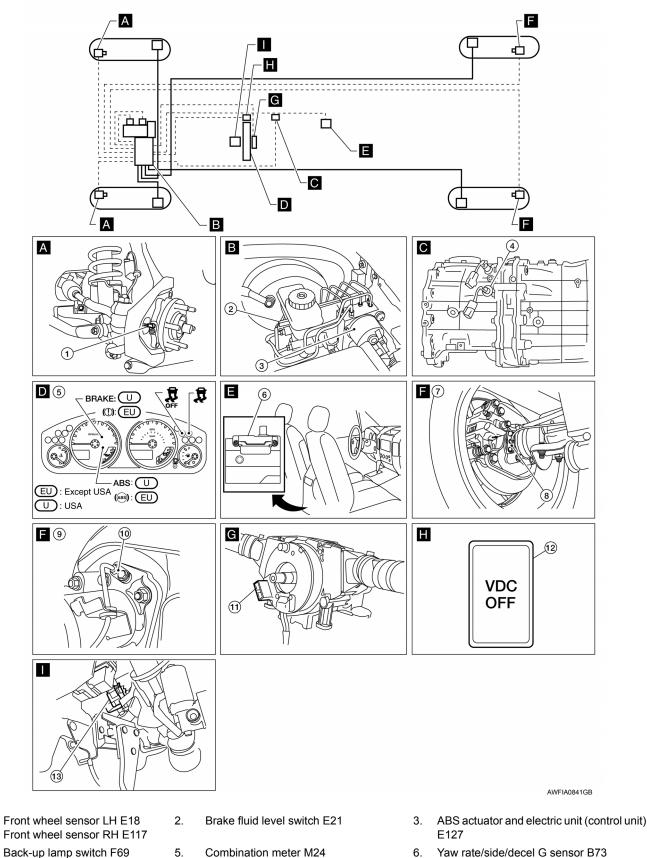
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Component Parts Location

INFOID:000000007327681



VDC

7. C200 rear axle

1.

4.

Combination meter M24

8.

Rear wheel sensor LH C11 Rear wheel sensor RH C10

Revision: October 2015

BRC-18

9.

M226 rear axle

2012 Frontier NAM

- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 13. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39

Component Description

 Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

VDC

[TYPE 1]

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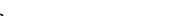
Component parts		Reference		
	Pump	DDC 44 "Deceription"		
	Motor	BRC-44, "Description"	D	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-60, "Description"		
	Solenoid valve	BRC-53, "Description"		
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-74, "Description"		
Wheel sensor		BRC-48. "Description"	BRC	
Yaw rate/side/decel G sensor		BRC-46, "Description"		
Stop lamp switch	BRC-51, "Description"			
Steering angle sensor		BRC-65, "Description"	G	
Brake fluid level switch	BRC-65. "Description"			
VDC OFF switch		BRC-79, "Description"	н	
ABS warning lamp	BRC-81, "Description"	_ 11		
Brake warning lamp	BRC-82, "Description"			
VDC OFF indicator lamp		BRC-83, "Description"		
SLIP indicator lamp	BRC-85, "Description"			

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TCS



System Diagram INFOID:000000007815425 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 100000000 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 AWFIA05

TCS

System Description

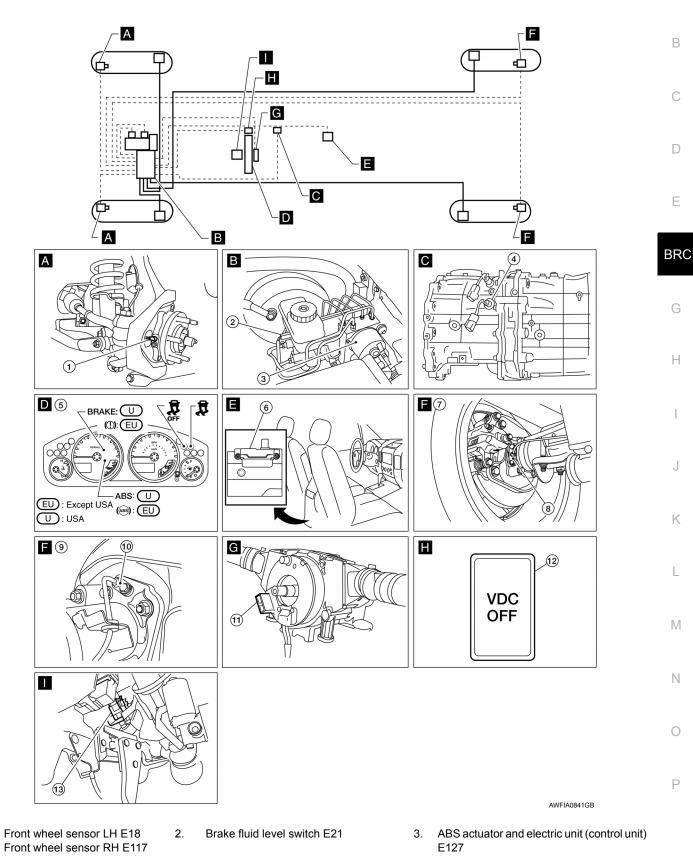
INFOID:000000007327684

- 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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INFOID:000000007815426



- 4. Back-up lamp switch F69
- 7. C200 rear axle

1.

5. Combination meter M24

8.

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

Revision: October 2015

BRC-21

2012 Frontier NAM

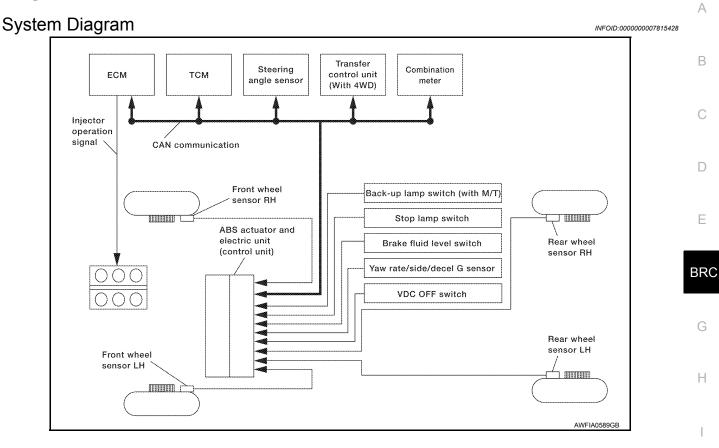
- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 13. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39

Component Description

INFOID:000000007815427

Compo	Component parts	
	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-74, "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-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp	BRC-82, "Description"	
VDC OFF indicator lamp		BRC-83, "Description"
SLIP indicator lamp		BRC-85, "Description"

ABS



ABS

System Description

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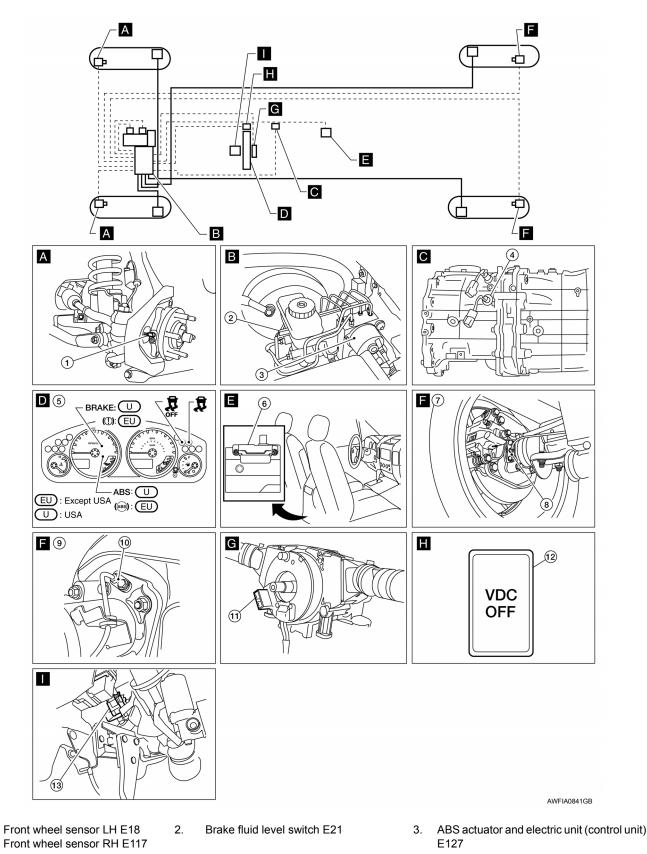
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- Anti-Lock Braking System is a function that detects wheel revolution while braking, electronically controls braking force, and prevents wheel locking during sudden braking. It improves handling stability and maneuverability for avoiding obstacles.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

Component Parts Location

INFOID:000000007815429

[TYPE 1]



5. Combination meter M24

8.

Rear wheel sensor LH C11 Rear wheel sensor RH C10

Back-up lamp switch F69

C200 rear axle

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BRC-24

2012 Frontier NAM

Yaw rate/side/decel G sensor B73

M226 rear axle

6.

9.

- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 13. Stop lamp switch (with M/T) E38 Stop lamp switch (with A/T) E39

Component Description

 Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

ABS

[TYPE 1]

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В

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INFOID:000000007815430

Compo	Reference		
	Pump	PPC 44 "Description"	_
	Motor	BRC-44, "Description"	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-74. "Description"	
Wheel sensor	Wheel sensor		
Yaw rate/side/decel G sensor	BRC-46, "Description"	BRC	
Stop lamp switch	BRC-51, "Description"		
Steering angle sensor		BRC-65. "Description"	G
Brake fluid level switch	BRC-65. "Description"		
VDC OFF switch		BRC-79, "Description"	—
ABS warning lamp	BRC-81, "Description"	_ !!	
Brake warning lamp	BRC-82, "Description"		
VDC OFF indicator lamp		BRC-83, "Description"	
SLIP indicator lamp	BRC-85, "Description"		

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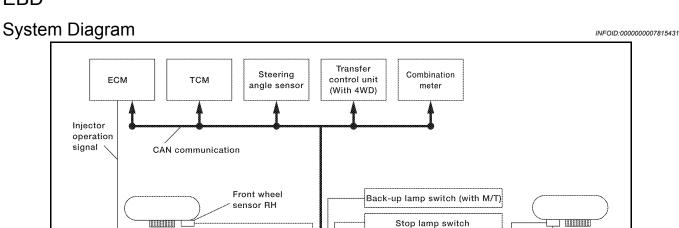
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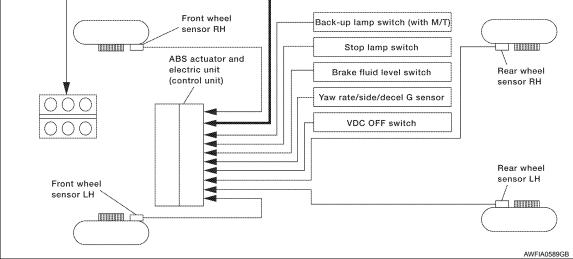
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Injector

signal

EBD





EBD

System Description

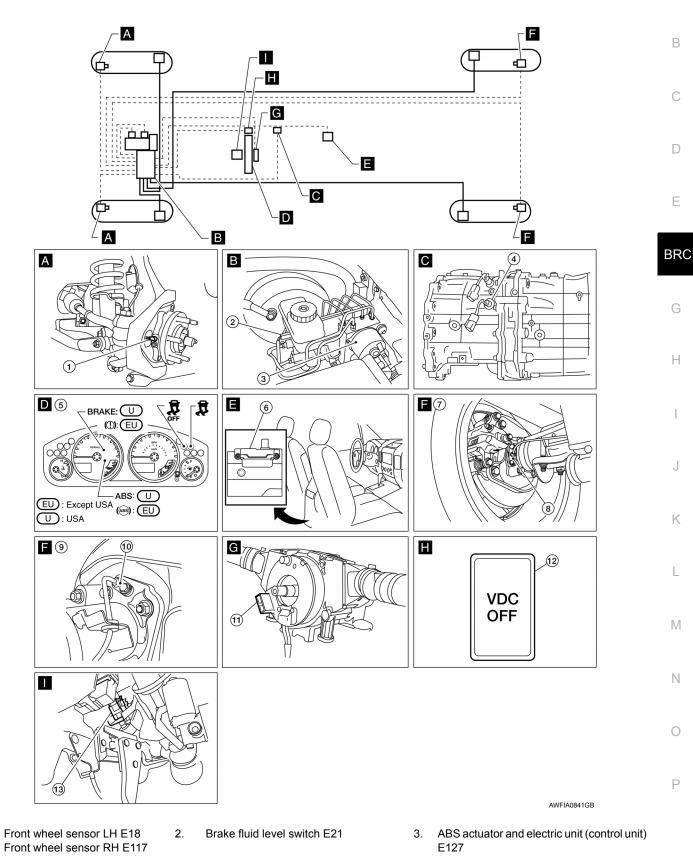
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- Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid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

Component Parts Location

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EBD

- 4. Back-up lamp switch F69
- 7. C200 rear axle

1.

5. Combination meter M24

8.

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle



- 10. Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)

EBD

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

Component Description

INFOID:000000007815433

Compo	nent parts	Reference
	Pump	PBC 44 "Description"
	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-74, "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-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp	BRC-82, "Description"	
VDC OFF indicator lamp	BRC-83, "Description"	
SLIP indicator lamp	BRC-85, "Description"	

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	The ABS actuator and electric unit (control unit) self diagnostic results are displayed.	- D
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.	
		BR

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, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-91, "DTC No. Index"</u>.

DATA MONITOR

Item (Unit)	Data	a monitor item sele		
	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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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
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)	×	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.

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

< SYSTEM DESCRIPTION >

[TYPE 1]

Item		a monitor item sele	_		
(Unit)	ECU INPUT MAIN SIGNALS SIGNAL		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) sta- tus 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 ²)	×	_	×	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.	
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.	

×: 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		AE	3S solenoid va	alve	ABS solenoid valve (ACT)		
		Up	Кеер	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 SOL	FR LH OUT SOL	Off	Off	On*	_	_	_
RR RH SOL	RR RH IN SOL	Off	On	On	_	—	_
KK KH JUL	RR RH OUT SOL	Off	Off	On*	_	_	_
RR LH SOL	RR LH IN SOL	Off	On	On	_	_	_
RR LH SOL	RR LH OUT SOL	Off	Off	On*	_	_	_
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	_	—	—	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	_	_	—	Off	Off	Off
	FR LH IN SOL	_	_	—	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	_	_	—	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	_	_	—	Off	Off	Off
KK KH ABS SOLENOID (ACT)	RR RH OUT SOL	_	_	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	_	_	—	Off	Off	Off
RR LEI ABS SOLENOID (ACT)	RR LH OUT SOL	_	_	—	Off	Off	Off
	RR RH IN SOL	Off	On	On	Off	Off	Off
REAR SOL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
KEAR SUL	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off

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

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 operates 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:000000007815415

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:000000007327698

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DTC DETECTION LOGIC

DTC	Display item	Display item Malfunction detected condition		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.	Harness or connectorWheel sensor	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.		
				\sim

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-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT</u> <u>CONTROL/HILL START ASSIST"</u>.

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.
- 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-114</u>, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-6</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-18</u>, "Rear Axle Bearing" (M226 rear).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-12</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-23</u>, "<u>Removal and Installation</u>" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

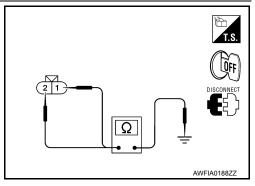
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor connector terminals and ground.

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	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH	- E127	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-116, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

YES

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

>> Go to diagnosis procedure. Refer to <u>BRC-35, "Diagnosis Procedure"</u>. 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 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 (4WD MODELS)

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

>> END

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INFOID:000000007327700

INFOID:000000007327701

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:000000007327703

INFOID:000000007327702

[TYPE 1]

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.	Harness or connectorWheel sensor
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:000000007815434

Regarding Wiring Diagram information, refer to <u>BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT</u> <u>CONTROL/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?

Revision: October 2015



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 Turn on the ABS active wheel sensor tester power switch. 2. 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-114, "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-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear). Is the inspection result normal? YES >> GO TO 5 >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, NO "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear). 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. AWFIA0188ZZ 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. Ο

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

Wheel sensor	ABS actuato electric unit (cor		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	F10 1	
	E127	46	EIO	2	Yes
Front RH Rear LH Rear RH		34	E117	1	
		33		2	
		36	C11 1	1	
		37			
		43	C10	1	
		42	C10	2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal and Instal-</u><u>lation"</u>.

NO >> Repair the circuit.

Component Inspection

INFOID:000000007815435

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-48. "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007815436

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 (4WD MODELS)

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:000000007327707 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:000000007327708 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:00000007327709 Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/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. Disconnect ABS actuator and electric unit (control unit) connec-2. tor. Check voltage between ABS actuator and electric unit (control 3. Ρ unit) connector E127 terminal 8 and ground.

C1109 POWER AND GROUND SYSTEM

Revision: October 2015

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[TYPE 1]

C1109 POWER AND GROUND SYSTEM

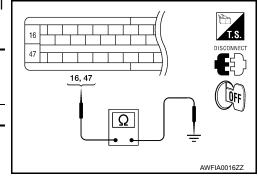
< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and elec- tric unit (control unit)			Condition	Voltage
Connector	Terminal			
F127	8	Ground	Ignition switch: ON	Battery voltage
L121	8 Giouna	Ground	Ignition switch: OFF	Approx. 0V

4. Turn ignition switch OFF.

5. Check continuity between ABS actuator and electric unit (control unit) connector E127 terminals 16, 47 and ground.

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
E127	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:000000007815437

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 (4WD MODELS)

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:000000007327711

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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 un
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	(control unit)
DTC CC	ONFIRMATION PROCE	DURE	
1 .CHEC	CK SELF-DIAGNOSIS RE	ESULTS	
Check th	ne self-diagnosis results.		
	Self-diagnosis		
	CONTROLLER		
	VARIANT CC		
	displayed on the self-dia		uro"
YES NO	>> Inspection End	procedure. Refer to <u>BRC-43, "Diagnosis Procedu</u>	<u>ure</u> .
Diagno	sis Procedure		
			INFOID:0000000073277
1.REPL	ACE ABS ACTUATOR A	ND ELECTRIC UNIT (CONTROL UNIT)	
	>> Replace ABS actuato tion".	or and electric unit (control unit). Refer to <u>BRC-1</u>	16, "Removal and Installa
Specia	I Repair Requireme	nt	INFOID:0000000078154
		ANGLE SENSOR NEUTRAL POSITION	
and elec		adjustment for the steering angle sensor when r er to <u>BRC-12. "ADJUSTMENT OF STEERING AI</u>	
	>> GO TO 2		
		SENSOR (4WD MODELS)	
		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:000000007327714

[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:000000007327715

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for ac- tuator motor relay is open.	 Harness or connector ABS actuator and electric unit
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-44, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327716

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/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 E127 terminal 1 and ground.

ABS actuator and electric unit (control unit)			Voltage	
Connector	Terminal		voltage	
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "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, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

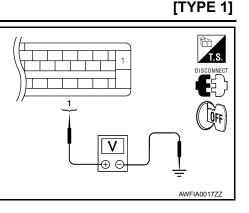
>> GO TO 2

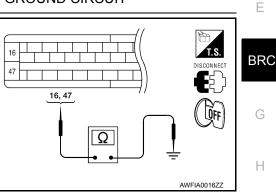
2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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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INFOID:000000007815439

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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:000000007327720

INFOID:000000007327719

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:000000007327721

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring <u>Diagram - VDC WITHOUT HILL DESCENT</u> <u>CONTROL/HILL START ASSIST</u>".

CAUTION:

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may cause the yaw rate/side/decel G sensor system to indicate a malfunction. This is not a malfunction if normal operation can be resumed after restarting the engine.
- If vehicle is on turn table at entrance to parking garage, or on other moving surface, SLIP indicator lamp may illuminate and CONSULT self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn table or other moving surface, and start engine. Results will return to normal.

1.CONNECTOR INSPECTION

- 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 E127 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 3, 2, 4, 1.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity
	18		3	
	19	– B73 (B) –	2	Yes
E127 (A)	22		4	Tes
	29		1	
3.YAW RATE/SIDE/I Perform the yaw rate/ s the inspection resu YES >> Replace <u>lation"</u> .	replace as necessary. DECEL G SENSOR IN /side/decel G sensor co <u>lt normal?</u> the ABS actuator and o the yaw rate/side/dece ection	SPECTION omponent inspection. electric unit (control u	nit). Refer to <u>BRC</u>	"Component Inspection". -116. "Removal and Instal- al and Installation".
Select "YAW RATE S side/decel G sensor s Vehicle condition		SEN SID	" in "DATA MONI" E G-SENSOR FA MONITOR)	TOR" and check yaw rate/ DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 de	, , ,	1 to +1.1 m/s	-0.08 G to +0.08 G
Turning right	Negative v	5	gative value	
Turning left	Positive v		ositive value	
Speed up	-		-	Negative value
Speed down			_	Positive value
s the inspection resu YES >> Inspectio		er to <u>BRC-46, "Diag</u> n	osis Procedure".	
Special Repair R	equirement			INFOID:000000007815440
1. ADJUSTMENT OF	- STEERING ANGLE	SENSOR NEUTRAL	POSITION	
and electric unit (cont POSITION : Descripti >> GO TO 2	rol unit). Refer to <u>BRC</u> on".	12, "ADJUSTMĔNT		eplacing the ABS actuator
	ration of decel G sense LIBRATION OF DECE			d electric unit (control unit).

[TYPE 1]

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C1115 WHEEL SENSOR

Description

INFOID:000000007327724

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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:000000007327725

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007815441

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/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?

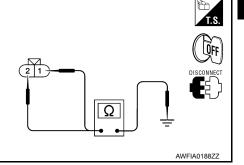
C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
NO >> Replace the wheel sensor. Refer to <u>BRC-114</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> , " <u>On-Vehicle</u> " "Rear Axle Bearing" (C200 rear), or <u>RAX-18</u> , "Rear Axle Bearing" (M2	
Is the inspection result normal?	
YES >> GO TO 5	
NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , "Rer "Removal and Installation" (C200 rear), or <u>RAX-23</u> , "Rem	
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT	
 Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Check continuity between wheel sensor connector terminals 	ED T.S.
and ground.	(H)
Continuity should not exist.	
Is the inspection result normal?	

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



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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	- Yes	
	E127	46		2		L
Front RH		34	E117	1		
		33		2		N
Rear LH		36	C11	1		
		37		2		
Rear RH		43	C10	1		Ν
		42		2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "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:000000007815442

C1115 WHEEL SENSOR

[TYPE 1]

Wheel sensor	Vehicle speed (DATA MONITOR)	
FR LH SENSOR	Nearly matches the speedometer dis-	
FR RH SENSOR		
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-48, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007815443

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

 $2. {\sf CALIBRATION OF DECEL G SENSOR (4WD MODELS)}$

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

Description

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

DTC Logic

INFOID:000000007327730

INFOID:000000007327729

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1116	STOP LAMP SW	When stop lamp switch circuit is open.	 Harness or connector Stop lamp switch ABS actuator and electric unit (control unit) 	Е
DTC CC	NFIRMATION PROCE	DURE		
1. CHEC	K SELF-DIAGNOSIS RE	SULTS		BRC
Check th	e self-diagnosis results.			
				G
	Self-diagnosis			
	STOP LAMP	-		Н
	displayed on the self-diag	procedure. Refer to <u>BRC-51, "Diagnosis</u>	Procedure"	
	>> Inspection End			
Diagno	sis Procedure		INFOID:00000007327731	I
-				
Regardin	ng Wiring Diagram inform	ation, refer to <u>BRC-93, "Wiring Diagram</u>		J
	DL/HILL START ASSIST".			
				К
1.com	NECTOR INSPECTION			
		and electric unit (control unit) connector a		I
		nation, disconnection, looseness or dama	age.	
	pection result normal? >> GO TO 2			
-	>> Repair or replace as n	iecessary.		M
2.stop	LAMP SWITCH INSPEC	TION		
	nect the stop lamp switch			Ν
		he ABS actuator and electric unit terminal 39 and body ground.		
(001)				0
B	rake pedal depressed	: Battery voltage		
	rake pedal released	(approx. 12V) : Approx. 0V		_
	pection result normal?			Ρ
	-	is again. If the same results		
0	appear, replace ABS	actuator and electric unit (control	AWFIA0191ZZ	
NO	unit). Refer to <u>BRC-11</u> >> GO TO 3	6, "Removal and Installation".		
-	LAMP SWITCH CIRCUI	TINSPECTION		

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C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

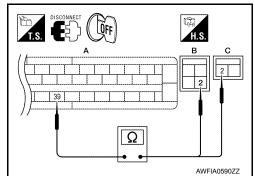
- 1. Disconnect the stop lamp switch connector.
- Check the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2 (with A/T) or E38 (C) terminal 2 (with M/T).

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:000000007815444

[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</u> <u>POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

DTC DETECTION LOGIC

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

DTC 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-53, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-93. "Wiring Diagram - VDC WITHOUT HILL DESCENT</u> <u>CONTROL/HILL START ASSIST"</u>.

1.CHECK CONNECTOR

- 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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INFOID:000000007327735

INFOID:000000007327733

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 E127 terminal 32 and ground.

ABS actuator and ele	ctric unit (control unit)		Voltage
Connector Terminal			voltage
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E127	16, 47	Ground	Yes	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "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 SOL	FR RH OUT SOL	Off	Off	On*
	FR LH IN SOL	Off	On	On
FR LH SOL	FR LH OUT SOL	Off	Off	On*
RR RH SOL	RR RH IN SOL	Off	On	On
KK KH SOL	RR RH OUT SOL	Off	Off	On*
	RR LH IN SOL	Off	On	On
RR LH SOL	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

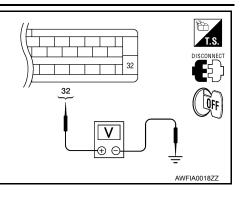
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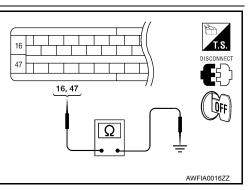
INFOID:000000007327736

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</u> <u>POSITION : Description"</u>.

BRC-54





[TYPE 1]

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2	А
2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)	
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:000000007327739

INFOID:000000007327738

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:000000007817651

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/HILL START ASSIST</u>".

1.CHECK CONNECTOR

- 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 E127 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)	ol unit) Voltage		
Connector	Terminal		voltage	
E127	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

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47

Check continuity between ABS actuator and electric unit (control unit) connector E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E127	16, 47	Ground	Yes	

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "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	9	
	Operation	Up	Keep	Down	_
	FR RH IN SOL	Off	On	On	L
FR RH SOL	FR RH OUT SOL	Off	Off	On*	
	FR LH IN SOL	Off	On	On	
FR LH SOL	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?

YES >> Inspection End

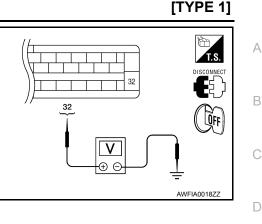
>> Go to diagnosis procedure. Refer to BRC-74, "Diagnosis Procedure". NO

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

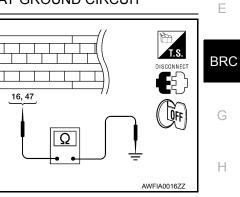
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".**

BRC-57



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>> GO TO 2

 $2. {\tt CALIBRATION OF DECEL G SENSOR (4WD MODELS)}$

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 : <u>Description</u>".

>> 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 B line.

DTC Logic

INFOID:000000007327744

INFOID:000000007327743

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	Ľ
C1130	ENGINE SIGNAL 1			
C1131	ENGINE SIGNAL 2	Based on the signal from ECM, ABS actuator and electric	 Harness or connector ABS actuator and electric unit 	E
C1132	ENGINE SIGNAL 3	unit (control unit) judges that engine fuel cut system is	(control unit)	
C1133	ENGINE SIGNAL 4	malfunctioning.	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

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-499. "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:000000007327745

[TYPE 1]

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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:000000007327747

INFOID:000000007327746

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ACTUATOR RLY

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007817653

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/HILL START ASSIST</u>".

1.CHECK CONNECTOR

- 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)".

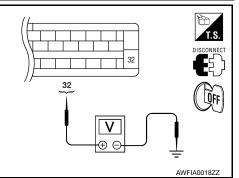
Is any item indicated on the self-diagnosis display?

- 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

- 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 E127 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage	
Connector	Terminal			
E127	32	Ground	Battery voltage	
Is the inspection rea	sult 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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116. "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

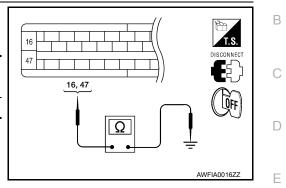
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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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C1142 PRESS SENSOR

DTC Description

[TYPE 1]

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1142	PRESS SEN CIRCUIT (Pressure sensor circuit)	When a malfunction is detected in pressure sensor.

POSSIBLE CAUSE

NOTE:

Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
 Harness or connector Air inclusion in the brake piping Stop lamp switch system ABS actuator and electric unit (control unit) power supply system Fuse Fusible link Battery 	 Stop lamp switch system ABS actuator and electric unit (control unit) Brake system ABS actuator and electric unit (control unit) power supply system Fuse Fusible link Battery Air inclusion in the brake piping

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn the ignition switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

() With CONSULT

- Turn the ignition switch OFF.
- NOTE: Wait at least 10 seconds after turning ignition switch OFF. 2. Start the engine.
- Start the engli NOTE:

Wait at least 10 seconds after starting the engine.

3. Perform "Self Diagnostic Result" of "ĂBS".

Is DTC "C1142" detected?

YES-1 >> "C1142" is displayed as "CRNT": Proceed to <u>BRC-62, "Diagnosis Procedure"</u>.

- YES-2 >> "C1142" is displayed as "PAST": Inspection End (Erase "Self Diagnostic Result" of "ABS").
- NO-1 >> To check malfunction symptom before repair: Refer to GI-46, "Intermittent Incident".
- NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

1.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-51, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace stop lamp switch system.

2. CHECK BRAKE FLUID LEAKAGE

INFOID:000000012379233

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[TYPE 1]
Check the brake fluid leakage. Refer to BR-18, "On Board Inspection".	
Is the inspection result normal?	
YES >> GO TO 3.	
NO >> Repair or replace brake fluid leakage part.	
3.CHECK BRAKE PIPING	
Check the brake piping. Refer to <u>BR-12, "Hydraulic Circuit"</u> .	
Is the inspection result normal?	
YES >> GO TO 4. NO >> Repair or replace brake piping.	
Front: Refer to BR-24, "Removal and Installation of Front Brake Piping and Brak	e Hose".
Rear: Refer to <u>BR-25</u> , "Removal and Installation of Rear Brake Piping and Brake	<u>e Hose"</u> .
4.CHECK BRAKE PEDAL	
Check the brake pedal.	
Brake pedal height: Refer to <u>BR-16, "Inspection and Adjustment"</u> .	
Brake pedal assembly: Refer to <u>BR-20, "Exploded View"</u> . Is the inspection result normal?	
<u>Is the inspection result normal?</u> YES >> GO TO 5.	
NO >> Adjust the brake pedal height or replace brake pedal assembly.	
 Adjust the brake pedal: Refer to <u>BR-16, "Inspection and Adjustment".</u> 	
• Replace the brake pedal: Refer to <u>BR-20, "Removal and Installation"</u> .	
5. CHECK BRAKE MASTER CYLINDER	
Check the brake master cylinder. Refer to BR-11, "On Board Inspection".	
Is the inspection result normal?	
YES >> GO TO 6. NO >> Repair or replace brake master cylinder. Refer to <u>BR-28</u> , "Removal and Installation	o"
6.CHECK BRAKE BOOSTER	<u> </u>
Check the brake booster. Refer to <u>BR-9. "Inspection"</u> .	
<u>Is the inspection result normal?</u> YES >> GO TO 7.	
NO >> Repair or replace brake booster. Refer to <u>BR-30, "Removal and Installation"</u> .	
7. CHECK VACUUM PIPING	
Check the vacuum piping. Refer to <u>BR-10, "Inspection"</u> .	
Is the inspection result normal?	
YES >> GO TO 8.	
NO >> Repair or replace vacuum piping. Refer to <u>BR-32, "Removal and Installation"</u> .	
8.CHECK FRONT DISC BRAKE	
Check the front disc brake caliper. Refer to <u>BR-35, "Exploded View of Brake Caliper"</u> .	
Is the inspection result normal?	
YES >> GO TO 9.	
NO >> Repair or replace front disc brake caliper. Refer to <u>BR-35</u> , "Removal and Installation iper and Disc Rotor".	on of Brake Cal-
9.CHECK REAR DISC BRAKE	
Check the rear disc brake. Refer to <u>BR-40, "Exploded View of Brake Caliper"</u> .	
<u>Is the inspection result normal?</u>	
 YES >> GO TO 10. NO >> Repair or replace rear disc brake. Refer to <u>BR-40, "Removal and Installation of Brace</u> 	ake Caliper and
Disc Rotor".	
10. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY .	AND GROUND

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-41.</u> "<u>Diagnosis Procedure</u>".

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair / replace harness, connector, fuse, or fusible link.

11.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

- 1. Erase "Self Diagnostic Result" of "ABS".
- Turn the ignition switch OFF.
 NOTE: Wait at least 10 seconds after turning ignition switch OFF.
- 3. Start the engine.

NOTE:

Wait at least 10 seconds after starting the engine.

- 4. Start the engine and drive the vehicle for a short period of time.
- NOTE: Vehicle must be driven after repair or replacement to erase the previous DTCs.
- 5. Stop the vehicle.
- Perform "Self Diagnostic Result" of "ABS".

Is DTC "C1142" detected?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116</u>, "<u>Removal and Instal-</u><u>lation</u>".
- NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

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

DTC Logic

INFOID:000000007327752

INFOID:000000007327753

INFOID:000000007327751

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ST ANG SEN CIRCUIT

ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/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.
- 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>, "<u>CONSULT Function</u> (<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 STEERING ANGLE SENSOR HARNESS

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C1143, C1144 STEERING ANGLE SENSOR

Ground

Continuity

Yes

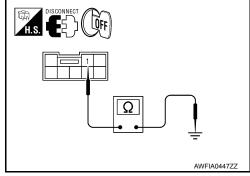
< DTC/CIRCUIT DIAGNOSIS >

Steering angle sensor

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

Terminal

1



4. Turn ignition switch ON.

Connector

M47

5. Check voltage between steering angle sensor connector M47 terminal 2 and ground.

H.S. CONNECT	
	AWFIA0448ZZ

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-66. "Component Inspection"</u>. <u>Is the inspection result normal?</u>

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116. "Removal and Installa-</u> tion".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-118</u>, "Removal and Installation".

Component Inspection

INFOID:000000007327754

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-65, "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>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

INFOID:000000007817658

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".

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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:000000007327757

INFOID:000000007327756

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-68, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327758

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/HILL START ASSIST</u>".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

YES >> GO TO 2

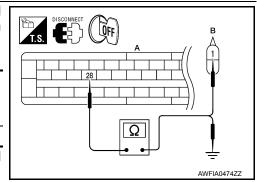
NO >> Repair or replace as necessary.

2.check harness between brake fluid level switch and abs actuator and electric unit (control unit)

 Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and brake fluid level switch connector E21 (B) terminal 1.

ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	28	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and ground.



C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127 (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-69, "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-116, "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.
- 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

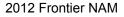
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".**

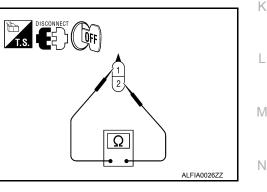
>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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-69





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[TYPE 1]

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INFOID:000000007817663

>> 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:000000007327762

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1156	ST ANG SEN COM CIR	When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric unit (control unit).	 Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit) 	BR(
DTC CC	ONFIRMATION PROC	EDURE		
1. CHEC	CK SELF-DIAGNOSIS R	ESULTS		Н
Check th	ne self-diagnosis results.			
	Self-diagnosi			I
	ST ANG SEN			
<u>Is above displayed on the self-diagnosis display?</u> YES >> Proceed to diagnosis procedure. Refer to <u>BRC-71, "Diagnosis Procedure"</u> .			J	
NO	>> Inspection End			
Diagno	sis Procedure		INFOID:00000007327763	Κ
1. coni	NECTOR INSPECTION			
1. Turn	ignition switch OFF.			L
		d electric unit (control unit) connector. tion, disconnection, looseness, and so on. If any	malfunction is found ropair	
	eplace terminals.	tion, disconnection, looseness, and so on. If any		M
4. Rec	onnect connector and pe	erform self-diagnosis. Refer to <u>BRC-29, "CONSU</u>	LT Function (ABS)".	1 1 1
	Self-diagnosi	s results		N
	CAN COMM	CIRCUIT		14
	ST ANG SEN	COM CIR		
	displayed on the self-dia			0
<u>ls above</u> YES NO		agnosis display? ouble Diagnosis Flow Chart".		С

INFOID:000000007327761

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C1160 DECEL G SEN SET

Description

INFOID:000000007327764

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:000000007327765

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

DECEL G SEN SET

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-72, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327766

1.PERFORM SELF-DIAGNOSIS

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

Self-diagnosis results

DECEL G SEN SET

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

- YES >> Perform repair or replacement for the item indicated.
- NO >> Perform calibration of decel G sensor. Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR <u>: Description"</u>. GO TO 2

2. PERFORM SELF-DIAGNOSIS AGAIN

- Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to <u>BRC-29, "CON-SULT Function (ABS)"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to <u>BRC-29</u>, "<u>CONSULT</u> <u>Function (ABS)</u>".

Are any self-diagnosis results displayed?

- YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-119. "Removal and Installation"</u>.
- NO >> Inspection End

< DTC/CIRCUIT DIAGNOSIS >

C1163 ST ANGLE SEN SAFE

Description

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

DTC Logic

INFOID:000000007327768

INFOID:000000007327767

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position
DTC CC	NFIRMATION PROCE	DURE	
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis		
	ST ANGL SEN		
	displayed on the self-dia		e e els vee ll
	>> Inspection End	procedure. Refer to <u>BRC-73, "Diagnosis Pro</u>	<u>cedure</u> .
	sis Procedure		INFOID:00000007327769
4			INFOID.00000001327789
1. ADJU	STMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION	
		al position. Refer to <u>BRC-12. "ADJUSTMEN</u>	T OF STEERING ANGLE SEN-
<u>SOR NE</u>	UTRAL POSITION : Desc	<u>cription</u> .	
	>> GO TO 2		
	ATOR LAMP CHECK		
Check th	at VDC OFF indicator lan	np is off.	
	DFF indicator lamp off?	F	
	>> Inspection End		
NO	>> Perform ABS actuator Function (ABS)".	r and electric unit (control unit) self-diagnosis	s. Refer to <u>BRC-29, "CONSULT</u>

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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:000000007327771

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007817664

Regarding Wiring Diagram information, refer to <u>BRC-93</u>, "Wiring Diagram - VDC WITHOUT HILL DESCENT <u>CONTROL/HILL START ASSIST</u>".

1.CHECK CONNECTOR

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

Is any item indicated on the self-diagnosis display?

INFOID:000000007327770

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

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

- 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 E127 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Connector Terminal		vollage
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector Terminal			Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "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", "ACT UP", and "ACT KEEP", and check that the system operates as shown in the table below.

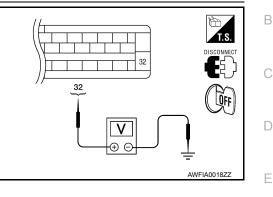
Operation		ABS solenoid valve (ACT)		ACT)
U	Deration	Up	ACT UP	ACT KEEP
	FR RH IN SOL	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	Off	Off	Off
	FR LH IN SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	Off	ACT UP Off Off	Off
	RR RH IN SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL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

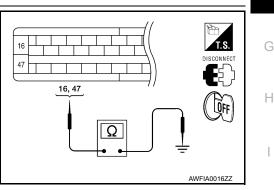
*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-74, "Diagnosis Procedure"</u>.





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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Special Repair Requirement

INFOID:000000007817665

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 (4WD MODELS)

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

C1187 DIFFERENTIAL LOCK CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1187	ABS DIFLOCK CONTROL- LER NG	Differential lock controller malfunction.	 Harness or connector CAN communication line Differential lock control unit ABS actuator and electric unit (control unit)
DTC CC	NFIRMATION PROCE	DURE	
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis	roou life	
	ABS DIFLOCK CONT		
ls above	displayed on the self-diad		
YES		procedure. Refer to <u>BRC-77, "Diagnosis I</u>	Procedure".
Diagno	sis Procedure		INFOID:00000007327777
1.con	NECTOR INSPECTION		
	ignition switch OFF.		
		electric unit (control unit) connector. on, disconnection, looseness, and so on.	If any malfunction is found repair
or re	place terminals.		· · ·
4. Rec	onnect connector and per	form self-diagnosis. Refer to <u>BRC-29, "CC</u>	<u>DNSULT Function (ABS)"</u> .
	Self-diagnosis	results	
	ABS DIFLOCK CONT	ROLLER NG	
	displayed on the self-diag		
YES NO	>> Refer to <u>LAN-14. "Tro</u> >> Inspection End	<u>uble Diagnosis Flow Chart"</u> .	(

INFOID:000000007327776

INFOID:000000007327775

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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:000000007327779

INFOID:000000007327780

DTC DETECTION LOGIC

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

Diagnosis Procedure

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect the 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)".

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.

INFOID:000000007327778

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		F
VDC OFF switch: pressed and released	OFF		
Is the inspection result normal?YES>> Inspection EndNO>> Go to diagnosis procedu	ure. Refer to <u>BRC-79, "Diagnosis Pro</u>	cedure".	BRC
Diagnosis Procedure		INFOID:000000007327783	G

Regarding Wiring Diagram information, refer to <u>BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT</u> <u>CONTROL/HILL START ASSIST"</u>.

1.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to <u>BRC-80, "Component Inspection"</u>. <u>Is the inspection result normal?</u>

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 E127 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.

ABS actuator and electric unit (control unit)		VDC OF	F switch	Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	6	M154 (B)	1	Yes

 Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Connector Terminal		Continuity
E127 (A)	6	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

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[TYPE 1]

INFOID:000000007327781

INFOID:000000007327782

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VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between VDC OFF switch connector M154 and ground.

VDC OF	F switch		Continuity
Connector	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-116, "Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Component Inspection

1.CHECK VDC OFF SWITCH

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

VDC OFF switch terminals	Condition	Continuity
1 – 2	VDC OFF switch pressed.	Yes
1-2	VDC OFF switch 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>.

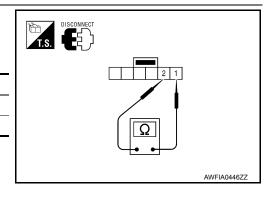
>> GO TO 2

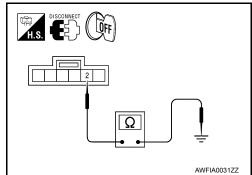
2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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:000000007327784

INFOID:000000007817666

ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007327786

[TYPE 1]

А

	×: ON –: OFF	В
Condition	ABS warning lamp	
Ignition switch OFF	-	
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:000000007327787	Е
1. CHECK ABS WARNING LAMP OPERATION		
Check that the lamp illuminates for approximately 2 se	conds after the ignition switch is turned ON.	BR
Is the inspection result normal?		
YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	81, "Diagnosis Procedure".	G
Diagnosis Procedure	INFOID:00000007327788	-
1.CHECK SELF-DIAGNOSIS		Н
	self-diagnosis. Refer to BRC-29, "CONSULT Function	
<u>(ABS)"</u> .		1
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	neter are normal. Refer to MWI-24, "Diagnosis Descrip-	
tion".		Κ
Is the inspection result normal?		
YES >> Replace ABS actuator and electric unit (c tion".	control unit). Refer to <u>BRC-116, "Removal and Installa-</u>	
NO >> Replace combination meter. Refer to <u>MWI</u>	-89, "Removal and Installation"	L
Special Repair Requirement	INFOID:000000007817667	
		M
1.ADJUSTMENT OF STEERING ANGLE SENSOR N		
	eering angle sensor when replacing the ABS actuator ISTMENT OF STEERING ANGLE SENSOR NEUTRAL	Ν
>> GO TO 2		0
2. CALIBRATION OF DECEL G SENSOR (4WD MOD	DELS)	
Always perform calibration of decel G sensor when represent to BRC-13, "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:000000007327790

×: ON –: OFF

ITYPE 11

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

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:000000007327791

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-82, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007327792

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-116</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007817668

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</u> <u>POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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:000000007327794

	×: ON –: OFF
Condition	VDC OFF indicator lamp
Ignition switch OFF	_
For 2 seconds after turning ON ignition switch	x
2 seconds later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	x
VDC/TCS function is malfunctioning.	_
ABS function is malfunctioning.	-
EBD function is malfunctioning.	-
Component Function Check	INFOID:000000007327795
1.VDC OFF INDICATOR LAMP OPERATION CHECK 1	
Check that the lamp illuminates for approximately 2 seco	
Is the inspection result normal?	~
YES >> GO TO 2	
NO >> Go to diagnosis procedure. Refer to <u>BRC-83</u>	-
2.VDC OFF INDICATOR LAMP OPERATION CHECK 2	
Check that the VDC OFF indicator lamp in the combinati	on meter turns ON/OFF correctly when operating the
VDC OFF switch.	
Is the inspection result normal?	
YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-79.</u> "	Diagnosis Procedure".
Diagnosis Procedure	
	INFOID:00000007327796
1. CHECK VDC OFF SWITCH	
Check that the VDC OFF indicator lamp in the combinati	on meter turns ON/OFF correctly when operating the
VDC OFF switch. Is the inspection result normal?	
YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to <u>BRC-79</u> , "	Diagnosis Procedure".
2.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) se	If-diagnosis. Refer to BRC-29, "CONSULT Function
<u>(ABS)"</u>	
Is the inspection result normal?	
YES >> GO TO 3 NO >> Check items displayed by self-diagnosis.	
3. CHECK COMBINATION METER	
Check if the indication and operation of combination met tion".	ter are normal. Reter to <u>MWI-24, "Diagnosis Descrip-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (cor tion".	ntrol unit). Refer to <u>BRC-116, "Removal and Installa-</u>
NO >> Replace combination meter Refer to MWI-8	9 "Removal and Installation"

NO >> Replace combination meter. Refer to <u>MWI-89</u>, "<u>Removal and Installation</u>".

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VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000007817669

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 (4WD MODELS)

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:000000007327798

[TYPE 1]

А

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:0000000732779
1. CHECK SLIP INDICATOR LAMP OPERATION	
Check that the lamp illuminates for approximately 2 set Is the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-8	
Diagnosis Procedure	INFOID:00000007327800
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) : (ABS)".	self-diagnosis. Refer to <u>BRC-29, "CONSULT Function</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 m tion".	eter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>
Is the inspection result normal?	
	ontrol unit). Refer to <u>BRC-116, "Removal and Installa-</u>
NO >> Replace combination meter. Refer to MWI-	-89, "Removal and Installation".
Special Repair Requirement	INFOID:0000000781767
1.ADJUSTMENT OF STEERING ANGLE SENSOR N	IEUTRAL POSITION
Always perform neutral position adjustment for the sto and electric unit (control unit). Refer to <u>BRC-12, "ADJU</u> <u>POSITION : Description"</u> .	eering angle sensor when replacing the ABS actuator STMENT OF STEERING ANGLE SENSOR NEUTRAL
>> GO TO 2	

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

>> END

ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

Application Notice

INFOID:000000007815418

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	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)
	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
FR RH IN SOL Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On	
	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
FR RH OUT SOL Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
FR LH IN SOL Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On	
	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
	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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INFOID:000000007327803

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
	On existing 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
RR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each 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
	On antion status of each sciencid up in	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
RR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
	On another status of a site sciencial value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
RR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
		When EBD warning lamp is ON	On
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lown quitch gignel status	When brake pedal is depressed	On
STOP LAWP SW	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
		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	When SLIP indicator lamp is ON	On
	(Note 2)	When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		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 RATE 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
R P031 31G	PNP switch signal ON/OFF condition	A/T shift position = other than R position	Off
N POSI SIG	DND quitch gignel ON/OFF condition	A/T shift position = N position	On
N POSI 31G	PNP switch signal ON/OFF condition	A/T shift position = other than N position	Off
		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
2V2	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	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
214/0/414/0		2WD model	2WD
2WD/4WD	Drive axle	4WD model	4WD
	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %
ACCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %

< ECU DIAGNOSIS INFORMATION >

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
		Vehicle stopped	Approx. 0 m/s ²
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s ²)
		Vehicle turning left	Positive value (m/s ²)
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°
STR ANGLE 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
FRESS SENSOR	sure sensor	With ignition switch turned ON and brake pedal depressed	-40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	On
EBD SIGNAL		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
ADS SIGNAL	Abs operation	ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
ICS SIGNAL	103 operation	TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
VDC SIGNAL	VDC Operation	VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
LDD I AIL SIG		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
ADO I AIL OIO		ABS is normal	Off
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
VDO I AIL OIO		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
	Brake huld level switch signal status	When brake fluid level switch OFF	Off
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	On
BLOOK OW		Differential lock switch OFF	Off
DLOCK CHG SW	Differential lock mode switch signal status	When differential lock mode switch is en- gaged	On
BLOOK ONG SW	Differential lock mode switch signal status	When differential lock mode switch is dis- engaged	Off

NOTE:

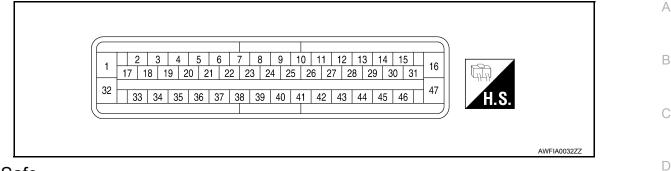
- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-81, "Description".
- Brake warning lamp: Refer to BRC-82, "Description".
- VDC OFF indicator lamp: Refer to BRC-83, "Description".
- SLIP indicator lamp: Refer to BRC-85, "Description".

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

INFOID:000000007327804

TERMINAL LAYOUT



Fail-Safe

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CAUTION:

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

ABS/EBD SYSTEM

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

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

- 1. For ABS malfunction, only the EBD is operative and the condition of the vehicle is the same condition of ^G 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 SLIP indicator lamp is turned on and the condition of the vehicle is the same as the condition of vehicles without TCS/VDC system. In case of an electrical malfunction with the TCS/VDC system, the ABS control continues to operate normally without TCS/VDC control.

DTC No. Index

INFOID:000000007327805

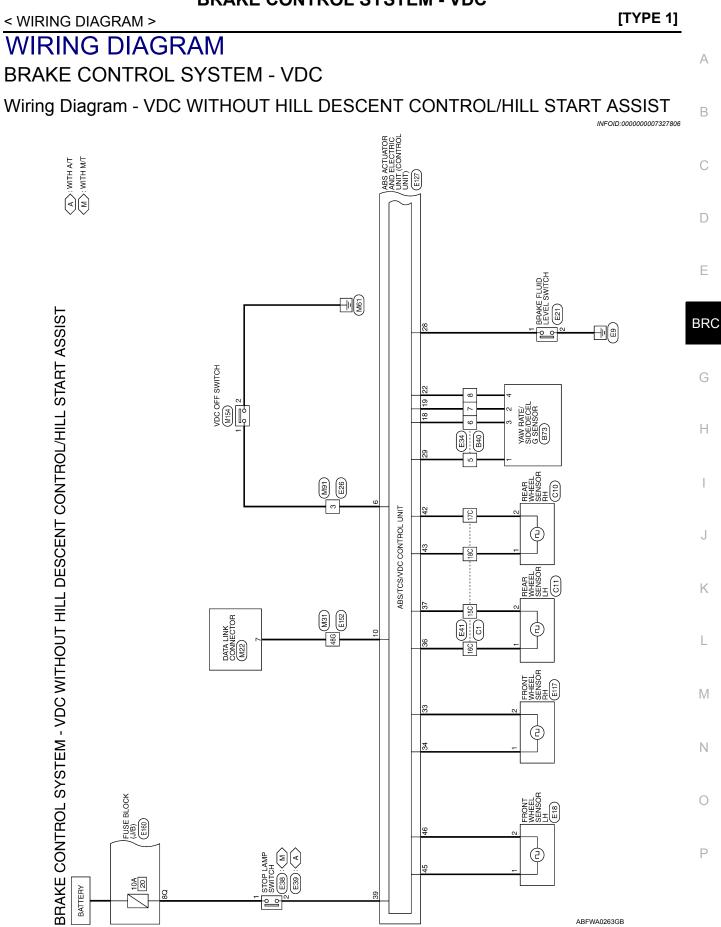
Reference	Items (CONSULT screen terms)	DTC
	RR RH SENSOR-1	C1101
	RR LH SENSOR-1	C1102
BRC-35. "Description"	FR RH SENSOR-1	C1103
	FR LH SENSOR-1	C1104
	RR RH SENSOR-2	C1105
DDC 20 "Deceription"	RR LH SENSOR-2	C1106
BRC-38, "Description"	FR RH SENSOR-2	C1107
	FR LH SENSOR-2	C1108
BRC-41, "Description"	BATTERY VOLTAGE [ABNORMAL]	C1109
BRC-43, "DTC Logic"	CONTROLLER FAILURE	C1110
BRC-44, "Description"	PUMP MOTOR	C1111
BRC-46. "Description"	G-SENSOR	C1113
BRC-48, "Description"	ABS SENSOR [ABNORMAL SIGNAL]	C1115
BRC-51, "Description"	STOP LAMP SW	C1116
BRC-53, "Description"	FR LH IN ABS SOL	C1120
BRC-56. "Description"	FR LH OUT ABS SOL	C1121
BRC-53, "Description"	FR RH IN ABS SOL	C1122
BRC-56. "Description"	FR RH OUT ABS SOL	C1123
BRC-53, "Description"	RR LH IN ABS SOL	C1124

BRC-91

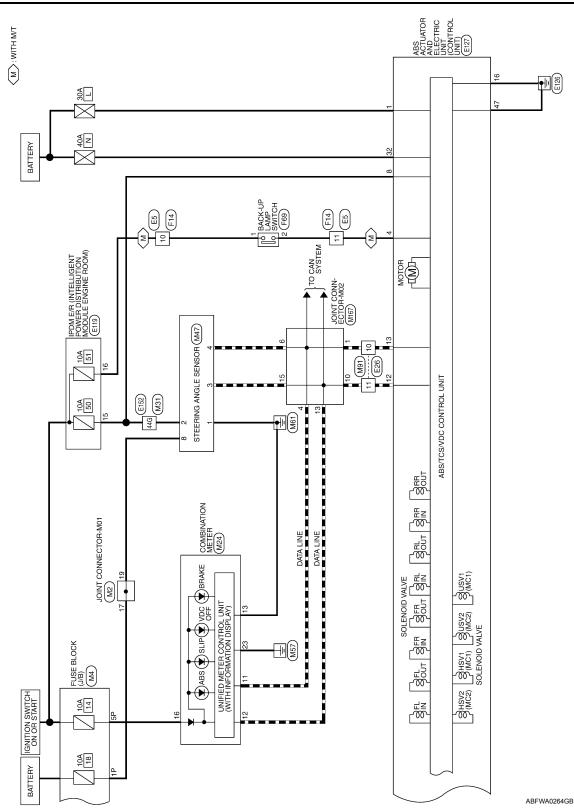
< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Items (CONSULT screen terms)	Reference
C1125	RR LH OUT ABS SOL	BRC-56, "Description"
C1126	RR RH IN ABS SOL	BRC-53, "Description"
C1127	RR RH OUT ABS SOL	BRC-56, "Description"
C1130	ENGINE SIGNAL 1	
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	BRC-59, "Description"
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-60, "Description"
C1142	PRESS SEN CIRCUIT	BRC-62, "DTC Description"
C1143	ST ANG SEN CIRCUIT	BRC-65. "Description"
C1144	ST ANG SEN SIGNAL	BRC-05, Description
C1145	YAW RATE SENSOR	BRC-46, "Description"
C1146	SIDE G-SEN CIRCUIT	BIC-40, Description
C1155	BR FLUID LEVEL LOW	BRC-68, "Description"
C1156	ST ANG SEN COM CIR	BRC-71, "Description"
C1160	DECEL G SEN SET	BRC-72, "Description"
C1163	ST ANGL SEN SAFE	BRC-73, "Description"
C1164	CV1	
C1165	CV2	BBC 74 "Description"
C1166	SV1	BRC-74, "Description"
C1167	SV2	
C1170	VARIANT CODING	BRC-43, "DTC Logic"
C1187	ABS DIFLOCK CONTROLLER NG	BRC-77, "Description"
U1000	CAN COMM CIRCUIT	BRC-78, "Description"



< WIRING DIAGRAM >



Color of Wire R/B		Connector Name FUSE BLOCK (J/B) Connector Color WHITE	me FUSE I lor WHITE	BLOCK (J/B)	000	Connector No. Connector Name Connector Color	· MI22 me DATA L lor WHITE	Connector No. M22 Connector Name DATA LINK CONNECTOR Connector Color WHITE
	7 8 9 10	国 H.S.	7P 6P 5P 4	7P (6P (5P (4P () 3P (2P (1P ((0P (9P (3P (2P (1P (10P (9P (3P (2P (1P (10P (9P (3P (3P (2P (1P (10P (3P (3P (3P (3P (3P (3P (3P (3P (3P (3	9	面词 H.S.	9 10 11	9 10 11 12 13 14 15 16 1 2 3 4 5 6 7 8
17 R/B R	Signal Name	Terminal No.	Color of Wire	Signal Name		Terminal No.	Color of Wire	Signal Name
	1 1	1P 5P	R/B W/G	1 1		7	×	1
Connector No. M24 Connector Name COMBINATION METER	ON METER	Connector No. M31 Connector Nama WIBE TO WIBE	. M31 ma WIRF	TO WIRE	010	Connector No.	. M47	M47 STEEDING ANGLE SENSOD
Connector Color WHITE		Connector Color	lor WHITE		00	Connector Color	lor WHITE	
		国 H.S.	201	5G 4G 3C 2C 1G 10G 9G 8G 7G 6G		品.S.H	38	
19 18 17 16 15 14 13 12 11 10 9 39 38 37 36 35 34 33 32 31 30 22	9 8 7 6 5 4 3 2 1 29 28 27 26 25 24 23 22 21		21G 20G 19G 180 30G 29G 280	21G 20G 19G 18G 17G 16G 15G 14G 13G 12G 11G 30G 29G 28G 27G 26G 25G 25G 22G		Terminal No.	Color of Wire	Signal Name
			416 406 396 38	6 376 366 356 346 336 326 316		-	в	GND
Terminal No. Wire Si	Signal Name		50G 49G 48	506 496 476 466 456 446 436 426		2	W/R	POWER
	CAN-I		61G 60G 59G 58	G 57G 56G 55G 54G 53G 52G 51G		ε	_	CAN-H
	CAN-H		70G 69G 68	70G 69G 68G 67G 66G 65G 64G 63G 62G		4	۹.	CAN-L
GR 1	GROUND		75	756 746 736 756 746		8	æ	BATT
W/G	RUN START		8	80G 79G 78G 77G 76G				
23 B PC	POWER GND							
		Terminal No.	Color of Wire	Signal Name				
		44G	N/R	I				
		48G	×	1				
M	K	J	I	G	BR	E	D	B

BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

[TYPE 1]

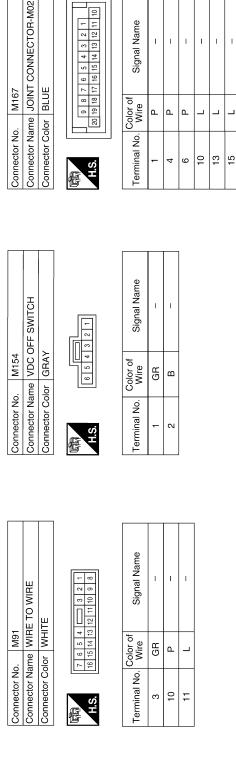
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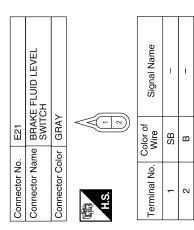
Revision: October 2015

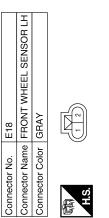
< WIRING DIAGRAM >

BRAKE CONTROL SYSTEM - VDC

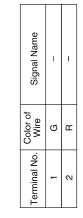


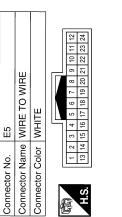






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E5

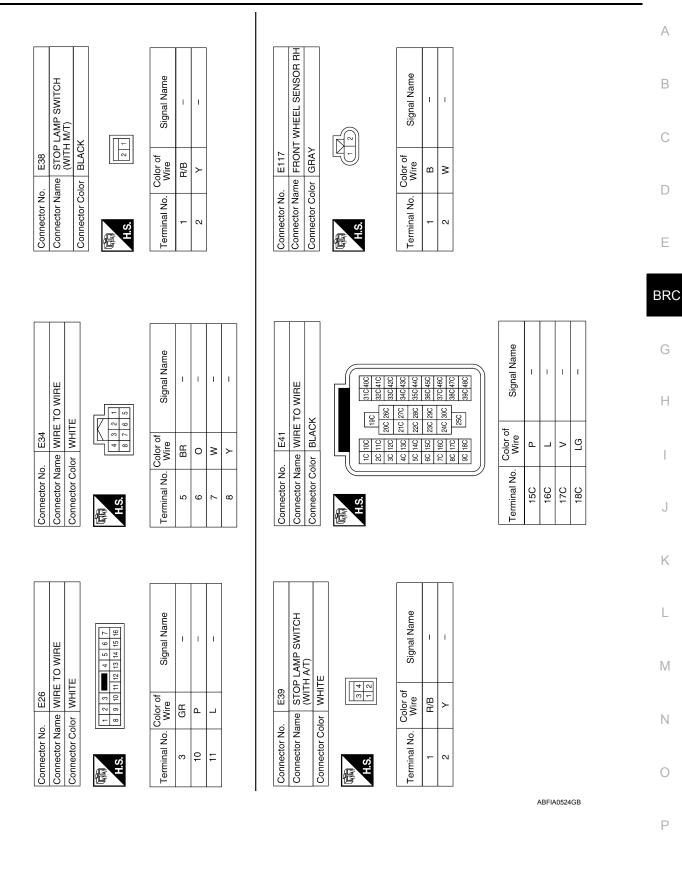
Signal Name	1	1	
Color of Wire	W/G	SB	
Terminal No.	10	11	

ABFIA0523GB

BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

[TYPE 1]



E127

Connector No.

E119

Connector No.

Signal Name	I	I	I	1	I	FLUID_LEVEL_SW	CLUS_GND	I	L	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	I	RR_LH_PWR	RR_LH_SIG	Ι	STOP_LAMP_SW	I	ļ	RR_RH_SIG	RR_RH_PWR	I	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	1	I	I	I	I	GR	BR	Ι	Ι	Y	Ν	В	I	L	Ρ	I	SB	I	-	۷	ГG	Ι	G	В	В
Terminal No.	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

or Name	Connector Name ELECTRIC UNIT (CONTROL UNIT)
Connector Color BLACK	BLACK
2 3 4 5 18 19 20 2	21 22 23 24 25 26 27 28 29 30 31 16
33 34 35 36	37 38 39 40 41 42 43 44 45 46 4
•	

																		_	_			
Signal Name	MOTOR SUPPLY	I	I	REV SW	I	VDC OFF SW	I	IGN	I	DIAG_K	I	CAN-H	CAN-L	I	1	VALVE ECU GND	I	CAN2-H	CAN2-L	I	I	CLUS_SUP
Color of Wire	æ	I	I	>	I	GR	1	W/R	Ι	SB	I	_	٩	I	I	В	Ι	0	M	I	I	≻
Terminal No.	-	2	e	4	5	9	7	8	6	10	11	12	13	14	15	16	17	18	19	20	21	22

Connector Name		IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	olor WHI	ITE
H.S.	9 8 7 6 1 18 17 16 15	9 8 7 6 5 4 3 18 17 16 15 14 13 12 11 10
Terminal No.	Color of Wire	Signal Name

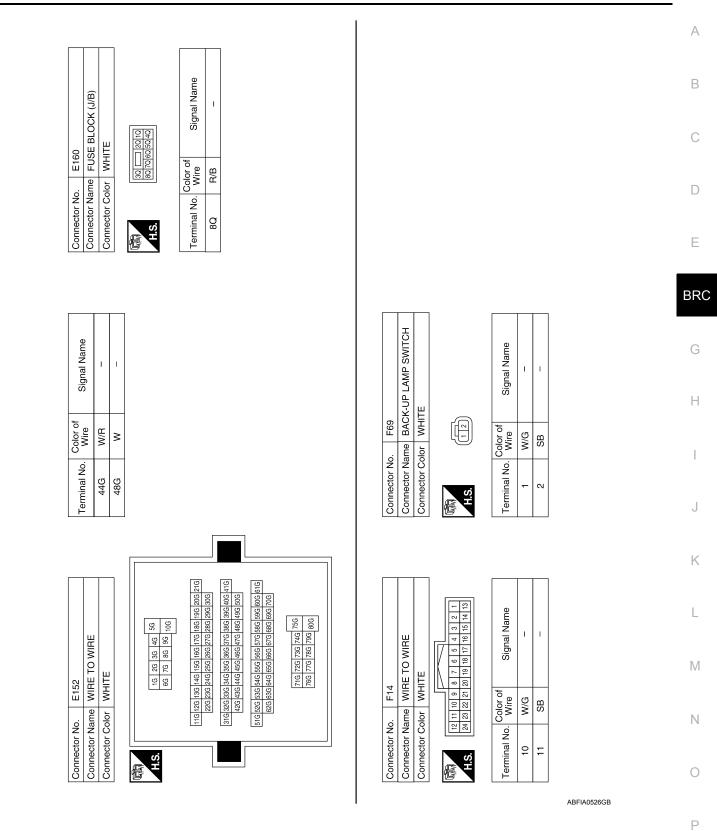
Signal Name	ABS IGN SUPPLY	REVERSE LAMP
Color of Wire	W/R	W/G
Terminal No. Wire	15	16

ABFIA0525GB

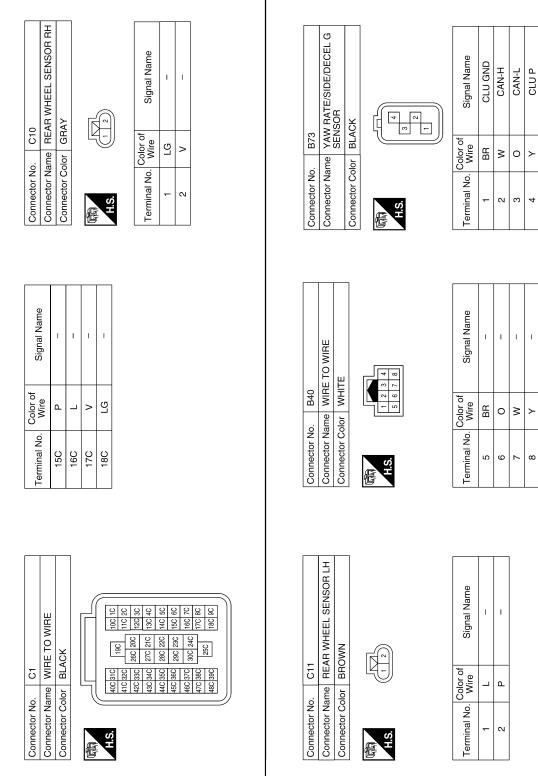


< WIRING DIAGRAM >

[TYPE 1]



< WIRING DIAGRAM >



ABFIA0527GB

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

INFOID:000000007815419

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:000000007327808

[TYPE 1]

Symptom Table

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

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-103, "Diag-</u> nosis Procedure"
4	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-104, "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-105, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-106, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-107, "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-108, "Diag-</u> nosis Procedure"
	ECM	<u></u>

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.
- When shifting gears
- When driving on slippery road
- During cornering at high speed
- When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]
- When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	
SYMPTOM DIAGNOSIS > [TYP	E 1]
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	
Diagnosis Procedure)07327809
I.CHECK START	
Check front and rear brake force distribution using a brake tester. <u>s the inspection result normal?</u> 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, "On-Venspection and Service"</u> , Rear: <u>RAX-6, "Rear Axle Bearing"</u> (C200) or <u>RAX-18, "Rear Axle Bearing"</u> (M22 <u>s the inspection result normal?</u> YES >> GO TO 3 NO >> Repair or replace malfunctioning components. 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.	
s the inspection result normal?	
 YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to <u>BRC-114</u>, "<u>Removal and Installation</u>" or <u>I15</u>, "<u>Removal and Installation</u>". • Repair harness. 	<u>3RC-</u>
LCHECK ABS WARNING LAMP DISPLAY	
Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. s the ABS warning lamp illuminated?	
YES >> Perform self-diagnosis. Refer to <u>BRC-29, "CONSULT Function (ABS)"</u> . NO >> Inspection End.	

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UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:000000007327810

[TYPE 1]

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-16, "Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-18, "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-16</u>, "<u>Inspection and Adjustment</u>" (brake pedal), <u>BR-11</u>, "<u>On Board</u> <u>Inspection</u>" (master cylinder), <u>BR-9</u>, "<u>Inspection</u>" (brake booster).

NO >> GO TO 2

2.CHECK FUNCTION

Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.

Is the inspection result normal?

- YES >> 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.

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Revision: October 2015

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.

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

INFOID:000000007327812

[TYPE 1]

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS< SYMPTOM DIAGNOSIS >[TYPE 1]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	В
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.	

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VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

< SYMPTOM DIAGNOSIS >

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:000000007327814

[TYPE 1]

1.SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 2

2. CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-29</u>, "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-499, "CONSULT Function".
 - TCM: Refer to TM-156, "CONSULT Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116</u>, "<u>Removal and Installa-</u> tion".

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

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INFOID:000000007327815

[TYPE 1]

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	T I.'. '	
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 and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal	
VDC may not operate normally or the ABS warning lamp and SLIP indicator lamp may illuminate, when run- ning on a special road that is extremely slanted (e.g. bank in a circuit course).	is no malfunction. At that time, erase the self-	
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).		
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)	
SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.	

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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.

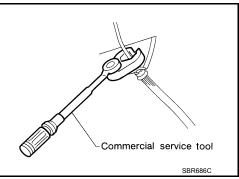
Precaution for Brake System

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CAUTION:

- Refer to <u>MA-18, "FOR USA AND CANADA : Fluids and Lubricants"</u> (United States and Canada) and <u>MA-20, "FOR MEXICO : Fluids and Lubricants"</u> (Mexico). 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-34, "Brake Burnishing"</u> (front disc brake) or <u>BR-39, "Brake Burnishing"</u> (rear disc brake). WARNING:



PRECAUTIONS

< PRECAUTION >

[TYPE 1]

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

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 K 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.

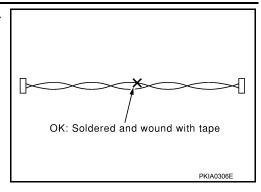
Precaution for CAN System

- 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.

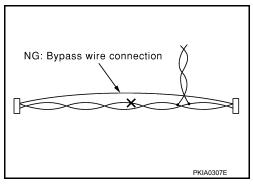
PRECAUTIONS

< PRECAUTION >

• 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 > PREPARATION PREPARATION

Special Service Tool

INFOID:000000007327820

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[TYPE 1]

Checking operation of ABS active wheel ser
Checking operation of ABS active wheel ser
Checking operation of ABS active wheel ser
sors
Removing sensor rotor
Description
Removing and installing brake piping
a: 10 mm (0.39 in)/12 mm (0.47 in)
)
Loosening nuts, screws and bolts
-

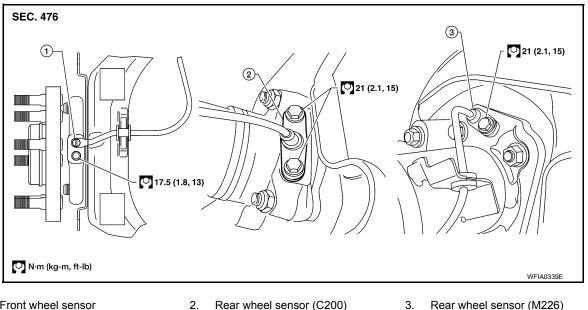
WHEEL SENSOR

< UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION WHEEL SENSOR

Removal and Installation

INFOID:000000007327822



1. Front wheel sensor

REMOVAL

- 1. Remove wheel sensor bolt.
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to <u>BR-35</u>, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. 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 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.

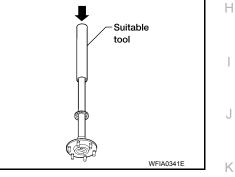
- · Before installing wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.

< UNIT REMOVAL AND INSTALLATION > [TY	PE 1]
SENSOR ROTOR	
Removal and Installation	-
FRONT	E
Removal and Installation The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace whe and bearing assembly. Refer to <u>FAX-8, "Removal and Installation"</u>	el hub
REAR (C200)	
Removal and Installation It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft ass removal procedure to replace sensor rotor. Refer to <u>RAX-7, "Removal and Installation"</u> .	embly
REAR (M226)	E
Removal	_
 Remove the axle shaft assembly. Refer to <u>RAX-19, "Removal and Installation"</u>. Pull the sensor rotor off of the axle shaft using Tool and a suitable press. 	BI
Tool number :ST30031000(—)	(
Installation	
 Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated. CAUTION: 	-
Do not reuse the old sensor rotor.	
2. Install the axle shaft assembly. Refer to <u>RAX-19, "Removal and</u>	

SENSOR ROTOR

2. Installation". **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)

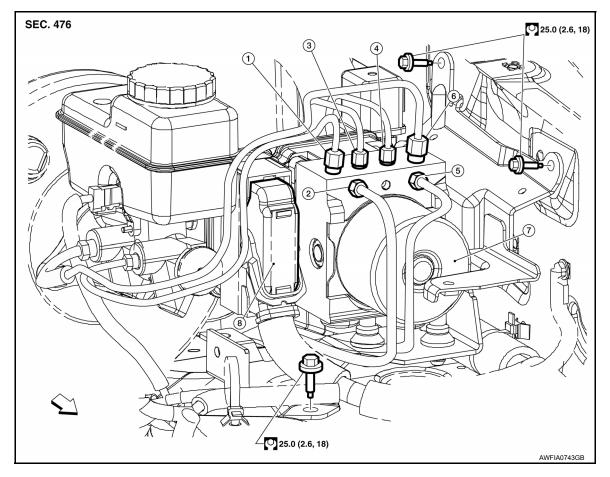
< UNIT REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:000000007327824

[TYPE 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
- 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

REMOVAL

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.
- Do not remove actuator by holding harness.

NOTE:

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

- 1. Disconnect negative battery terminal. Refer to <u>PG-80, "Removal and Installation"</u>.
- 2. Remove air cleaner case assembly. Refer to <u>EM-25</u>, "<u>Exploded View</u>" (QR25DE) or <u>EM-140</u>, "<u>Exploded View</u>" (QV40DE).
- 3. Disconnect harness connector from ABS actuator and electric unit (control unit).
- 4. Separate brake tubes from ABS actuator and electric unit (control unit).
- 5. Remove bolts and ABS actuator and electric unit (control unit) with the bracket from the vehicle.
- 6. Remove bolt and bracket from the ABS actuator and electric unit (control unit).

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

ACTUATOR AND ELECTRIC UNIT (ASSEMBLT)	
< UNIT REMOVAL AND INSTALLATION > [TYPE 1]	
INSTALLATION	
Installation is in the reverse order of removal.Install bracket and bolt to ABS actuator and electric unit (control unit).	А
ABS actuator and electric unit ∶ 7.0 N⋅m (0.7 kg-m, 62 in-lb) (control unit) bolt	В
 After work is completed, bleed air from brake tube. Refer to <u>BR-18, "Bleeding Brake System"</u>. Adjust the neutral position of steering angle sensor. Refer to <u>BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>. 	С
 Perform calibration of the decel G sensor (4WD models). Refer to <u>BRC-13, "CALIBRATION OF DECEL G</u> <u>SENSOR : Description"</u>. CAUTION: 	D
 To install, use flare nut crowfoot and torque wrench. Replace the ABS actuator if it has been dropped or sustained an impact. 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. 	Е
 Do not install actuator by holding harness. After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked. 	BRC
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< UNIT REMOVAL AND INSTALLATION >

Removal and Installation

REMOVAL

- 1. Remove the spiral cable. Refer to <u>SR-13, "Removal and Installation"</u>.
- 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 1]

- The location of the yaw rate/side/decel G sensor is the same for all models.
- **CAUTION:**

REMOVAL

- 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.



< UNIT REMOVAL AND INSTALLATION >

Removal and Installation

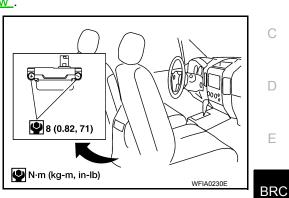
YAW RATE/SIDE/DECEL G SENSOR

INSTALLATION Installation is in the reverse order of removal. NOTE:

After performing the above work, calibrate the yaw rate/side/decel G sensor (4WD models). Refer to BRC-13. "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

INFOID:000000007327826

[TYPE 1]



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BASIC INSPECTION APPLICATION NOTICE

Application Notice

INFOID:000000007815420

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

Work Flow

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-125</u>, "ADJUSTMENT OF STEERING ANGLE С SENSOR NEUTRAL POSITION : Description".

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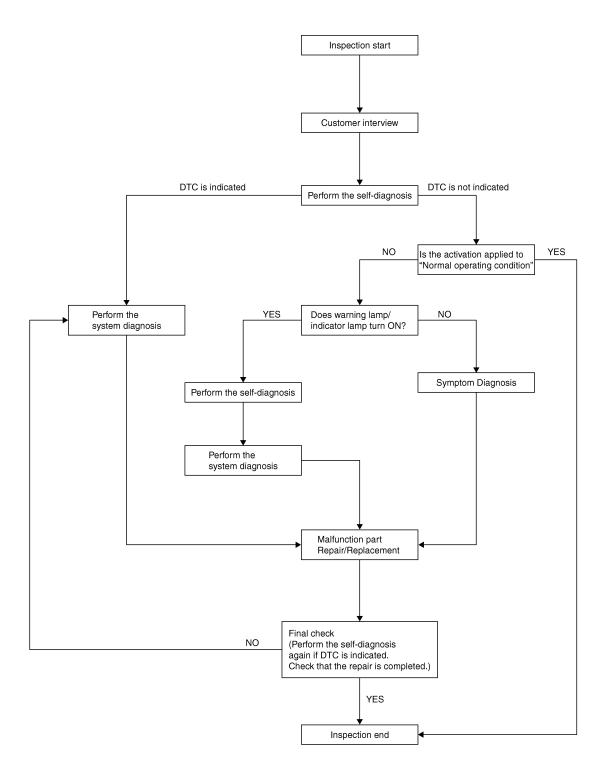
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< BASIC INSPECTION >

OVERALL SEQUENCE



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DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-124</u>, <u>"Diagnostic Work Sheet"</u>.

DIAGNOSIS AND REPAIR WORKFLOW
< BASIC INSPECTION > [TYPE 2]
>> GO TO 2
2.PERFORM THE SELF-DIAGNOSIS
Check the DTC display with the self-diagnosis function. Refer to <u>BRC-148</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 <u>BRC-214, "DTC No. Index"</u> .
Tenom the diagnosis applicable to the displayed DTC. Neler to $\underline{DTC-214}$, <u>DTC NO. Index</u> .
>> GO TO 7
4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION
Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-232</u> , <u>"Description"</u> .
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-202, "Description"</u> .
 Brake warning lamp: Refer to <u>BRC-203, "Description"</u>. VDC OFF indicator lamp: Refer to <u>BRC-205, "Description"</u>.
 SLIP indicator lamp: Refer to <u>BRC-207, "Description"</u>.
Hill descent control indicator lamp: Refer to <u>BRC-204, "Description"</u> .
Is ON/OFF timing normal?
YES >> GO TO 6 NO >> GO TO 2
6.PERFORM THE DIAGNOSIS BY SYMPTOM
Perform the diagnosis applicable to the symptom.
>> GO TO 7
I.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-148, "CONSULT Function (ABS)"</u> .
Is no other DTC present and the repair completed?
YES >> Inspection End NO >> GO TO 3

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000007327829

[TYPE 2]

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

SFIA3265E

INSPECTION AND ADJUSTMENT	
< BASIC INSPECTION >	[TYPE 2]
INSPECTION AND ADJUSTMENT	
ADDITIONAL SERVICE WHEN REPLACI	ING CONTROL UNIT
ADDITIONAL SERVICE WHEN REPLACIN	IG CONTROL UNIT Description
	INFOID:000000007327830
After replacing the ABS actuator and electric unit (contro	
 Neutral position adjustment for the steering angle sense Calibration of the decel G sensor (4WD models) 	sor
ADDITIONAL SERVICE WHEN REPLACIN	IG CONTROL UNIT : Special Repair Re-
quirement	INFOID:000000007327831
1. PERFORM THE NEUTRAL POSITION ADJUSTMEN	NT FOR THE STEERING ANGLE SENSOR
Perform the neutral position adjustment for the steering	angle sensor.
2. PERFORM CALIBRATION OF THE DECEL G SENS	SOR (4WD MODELS)
Perform calibration of the decel G sensor.	<u>CEL G SENSOR : Special Repair Requirement".</u> ENSOR NEUTRAL POSITION
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SEI	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID 00000007327832 eeering angle sensor neutral position is required.
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID:00000007327832 evering angle sensor neutral position is required. x: Required -: Not required
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st <u>Situation</u>	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID:00000007327832 evering angle sensor neutral position is required. x: Required -: Not required
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st <u>Situation</u> Removing/Installing ABS actuator and electric unit (control unit)	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007327832 evering angle sensor neutral position is required. x: Required -: Not required Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st <u>Situation</u> Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit)	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID:00000007327832 eering angle sensor neutral position is required. x: Required -: Not required Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007327832 evering angle sensor neutral position is required.
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description <i>INFOID:00000007327832</i> eering angle sensor neutral position is required. ×: Required -: Not required Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007327832 eering angle sensor neutral position is required. ×: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Replacing steering components	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description wering angle sensor neutral position is required. *: Required -: Not required Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Removing/Installing suspension components	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description NFOID:00000007327832 eering angle sensor neutral position is required. ×: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position × × × ×
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Replacing steering components Removing/Installing suspension components Replacing suspension components	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description NFOID:00000007327832 eering angle sensor neutral position is required. ×: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position × × × ×
Perform calibration of the decel G sensor. >> Refer to <u>BRC-126</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Removing/Installing suspension components Removing/Installing suspension components Replacing suspension components Replacing suspension components Replacing suspension components	CEL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description NFOID:00000007327832 eering angle sensor neutral position is required. ×: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position × × × ×

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.

< BASIC INSPECTION >

>> GO TO 2

2. Perform the Neutral Position adjustment for the steering angle sensor

- 1. On the CONSULT screen, touch "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
- Touch "START". CAUTION: Do not touch steering wheel while adjusting steering angle sensor.
 After approximately 10 seconds, touch "END".
- After approximately 10 seconds, touch "END".
 NOTE: After approximately 60 seconds, it ends automatically.
- Turn ignition switch OFF, then turn it ON again.
 CAUTION: Be sure to perform above operation.

>> GO TO 3

3.CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4

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

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

ABS actuator and electric unit (control unit): Refer to <u>BRC-148, "CONSULT Function (ABS)"</u>.

ECM: Refer to <u>EC-499, "CONSULT Function".</u>

Are the memories erased?

YES >> Inspection End

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

CALIBRATION OF DECEL G SENSOR

CALIBRATION OF DECEL G SENSOR : Description

INFOID:000000007327834

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

×: Required –: Not required

Situation	Calibration of decel G sensor
Removing/Installing ABS actuator and electric unit (control unit)	
Replacing ABS actuator and electric unit (control unit)	x
Removing/Installing steering components	-
Replacing steering components	
Removing/Installing suspension components	
Replacing suspension components	
Change tires to new ones	
Tire rotation	
Adjusting wheel alignment	-
Removing/Installing yaw rate/side/decel G sensor	×
Replacing yaw rate/side/decel G sensor	×

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:000000007327835

CALIBRATION OF DECEL G SENSOR (4WD MODELS) CAUTION:

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

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >	[TYPE 2]
(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	n order.
 Touch "START". 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	
 Run vehicle with front wheels in straight-ahead position, then stop. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ± 0.08G. 	
Is the inspection result normal?	
YES >> GO TO 4	
NO >> Perform calibration of decel G sensor again, GO TO 1	
4.ERASE THE SELF-DIAGNOSIS MEMORY	
 Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM. ABS actuator and electric unit (control unit): Refer to <u>BRC-148. "CONSULT Function (ABS)"</u>. 	
 ECM: Refer to <u>EC-499, "CONSULT Function"</u>. 	
Are the memories erased?	
YES >> Inspection End	
NO >> Check the items indicated by the self-diagnosis.	

APPLICATION NOTICE

SYSTEM DESCRIPTION APPLICATION NOTICE

Application Notice

INFOID:000000007815421

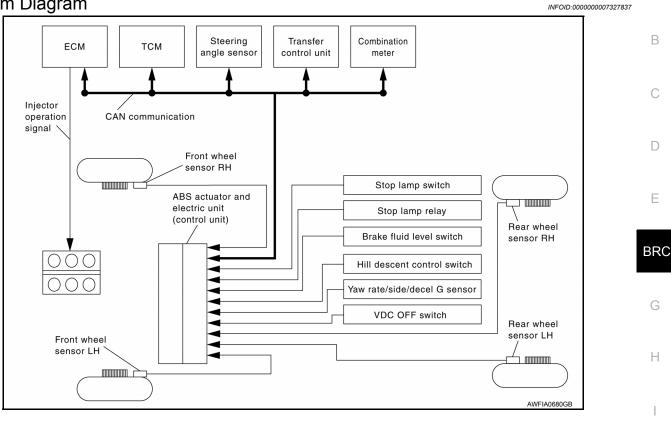
Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	

HILL DESCENT CONTROL

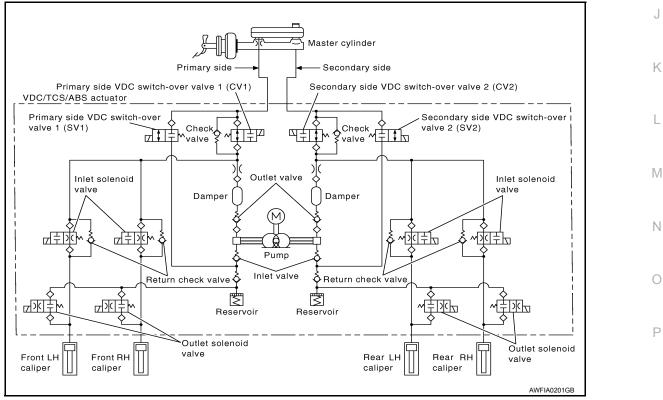
< SYSTEM DESCRIPTION >

HILL DESCENT CONTROL

System Diagram



Hydraulic Circuit Diagram



[TYPE 2]

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INFOID:000000007327838

HILL DESCENT CONTROL

< SYSTEM DESCRIPTION >

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

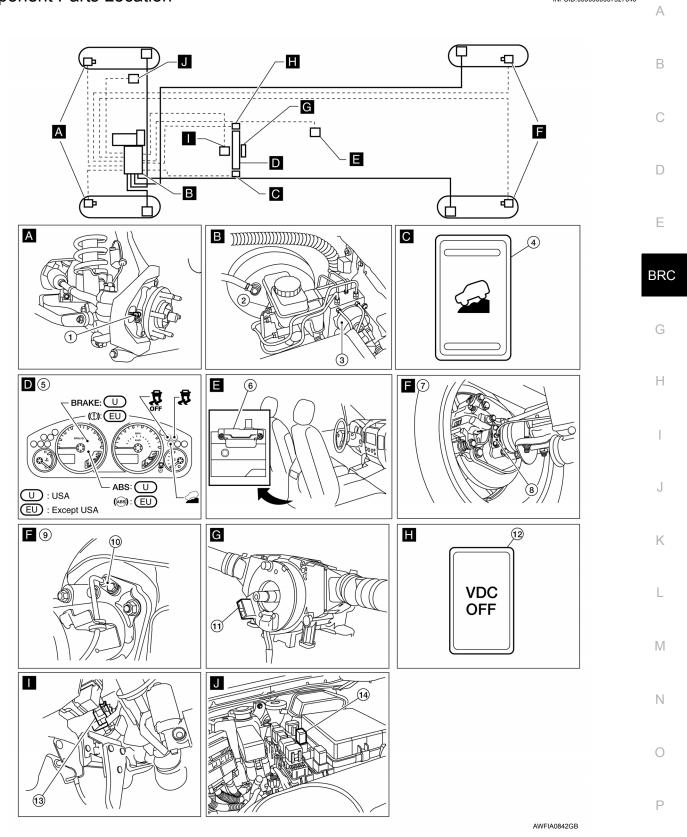
HILL DESCENT CONTROL

< SYSTEM DESCRIPTION >

Component Parts Location

[TYPE 2]





- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit)
- E127 6. Yaw rate/side/decel G sensor B73
- M226 rear axle
- 9. M226 rear axle

3.

Revision: October 2015

BRC-131

< SYSTEM DESCRIPTION >

HILL DESCENT CONTROL

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

Component Description

- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 13. Stop lamp switch E39

14. Stop lamp relay E12

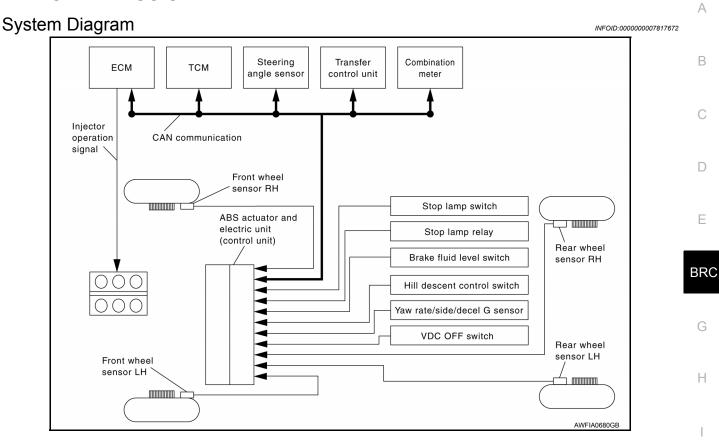
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Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	BRC-103, Description
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193. "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205. "Description"
SLIP indicator lamp		BRC-207, "Description"

HILL START ASSIST

< SYSTEM DESCRIPTION >

HILL START ASSIST



System Description

INFOID:000000007327843

- 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.
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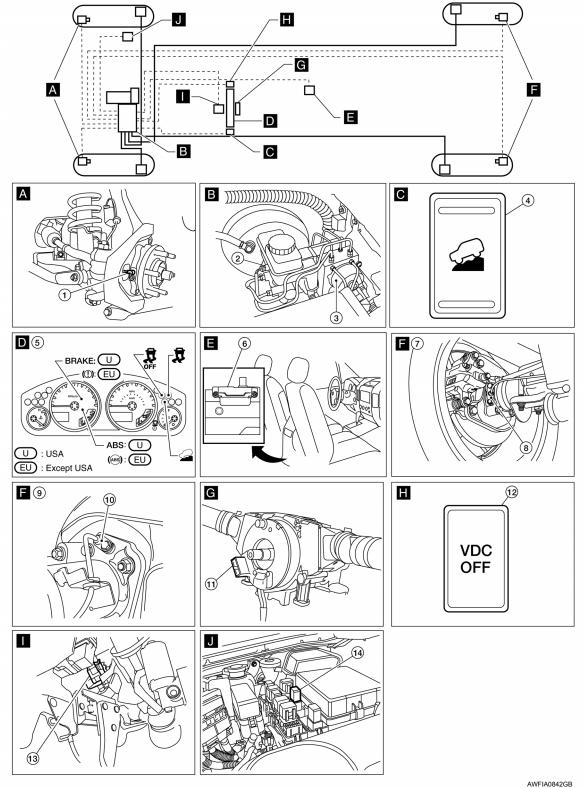
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Component Parts Location

INFOID:000000007817673

[TYPE 2]



- Front wheel sensor LH E18 1. Front wheel sensor RH E117
- Hill descent control switch M155 5. 4.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10

- ABS actuator and electric unit (control unit) 3. E127
- Yaw rate/side/decel G sensor B73 6.
- 9. M226 rear axle

Revision: October 2015

BRC-134

HILL START ASSIST

< SYSTEM DESCRIPTION >

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

Component Description

13. Stop lamp switch E39

- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
- 14. Stop lamp relay E12

[TYPE 2]

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В

INFOID:000000007817674

Component parts		Reference	С
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"	
	Motor		D
	Actuator relay	BRC-179, "Description"	D
	Solenoid valve	BRC-172, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"	E
Wheel sensor		BRC-167, "Description"	
Yaw rate/side/decel G sensor		BRC-165, "Description"	BRO
Stop lamp switch		BRC-170, "Description"	
Steering angle sensor		BRC-184, "Description"	
Brake fluid level switch		BRC-184, "Description"	— G
Hill descent control switch		BRC-198, "Description"	
VDC OFF switch		BRC-200. "Description"	Н
ABS warning lamp		BRC-202. "Description"	
Brake warning lamp		BRC-203, "Description"	
Hill descent control indicator lamp		BRC-204, "Description"	
VDC OFF indicator lamp		BRC-205, "Description"	
SLIP indicator lamp		BRC-207, "Description"	

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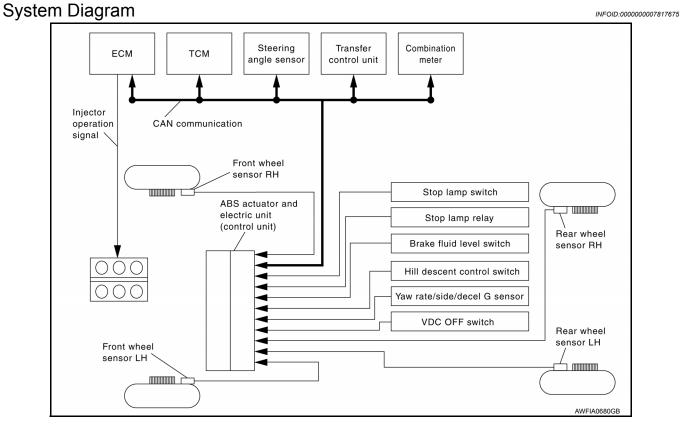
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< SYSTEM DESCRIPTION > VDC

VDC



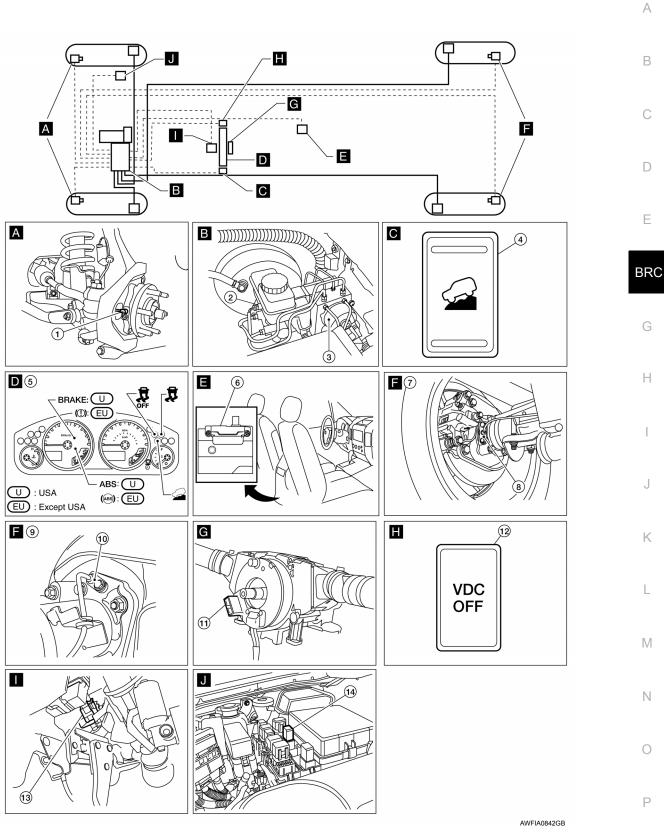
VDC

System Description

INFOID:000000007327847

- 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.





VDC

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit)
- E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

3.

Revision: October 2015

BRC-137

2012 Frontier NAM

< SYSTEM DESCRIPTION >

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

Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 11. ble) M47 (Steering wheel removed for clarity) Stop lamp relay E12

VDC

13. Stop lamp switch E39

INFOID:000000007817680

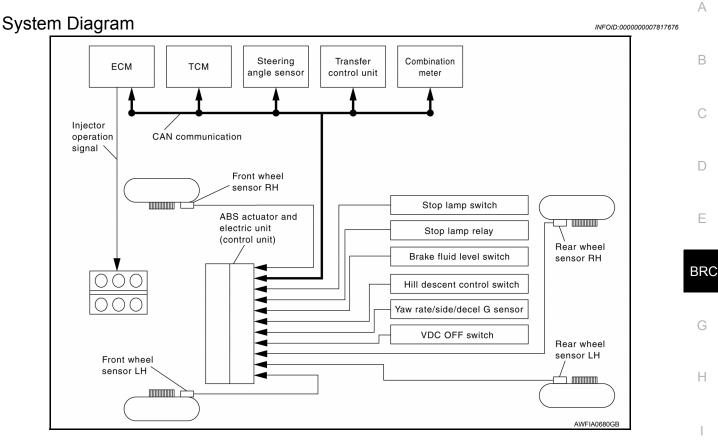
Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	
	Motor	<u>BRC-163, "Description"</u>
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200. "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

Component Description

14.

< SYSTEM DESCRIPTION >

TCS



TCS

System Description

INFOID:000000007327851

- 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.

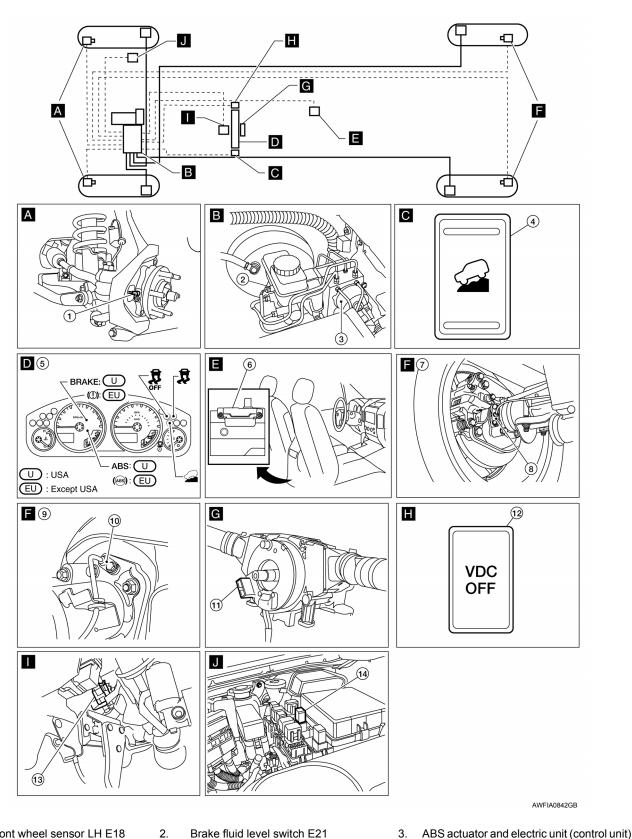
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INFOID:000000007817681



TCS

- Front wheel sensor LH E18 1. Front wheel sensor RH E117
- Hill descent control switch M155 5. 4.
- 7. C200 rear axle

- Brake fluid level switch E21
- Combination meter M24

8.

Rear wheel sensor LH C11 Rear wheel sensor RH C10

Revision: October 2015

BRC-140

2012 Frontier NAM

Yaw rate/side/decel G sensor B73

E127

M226 rear axle

6.

9.

< SYSTEM DESCRIPTION >

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

Component Description

 Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
 Stop lamp relay E12

TCS

13. Stop lamp switch E39

INFOID:000000007817682

[TYPE 2]

Component parts		Reference	С
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"	
	Motor		D
	Actuator relay	BRC-179, "Description"	D
	Solenoid valve	BRC-172, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"	E
Wheel sensor		BRC-167. "Description"	_
Yaw rate/side/decel G sensor		BRC-165, "Description"	BRC
Stop lamp switch		BRC-170, "Description"	
Steering angle sensor		BRC-184, "Description"	
Brake fluid level switch		BRC-184, "Description"	— G
Hill descent control switch		BRC-198, "Description"	
VDC OFF switch		BRC-200, "Description"	Н
ABS warning lamp		BRC-202. "Description"	
Brake warning lamp		BRC-203, "Description"	
Hill descent control indicator lamp		BRC-204, "Description"	
VDC OFF indicator lamp		BRC-205, "Description"	
SLIP indicator lamp		BRC-207, "Description"	

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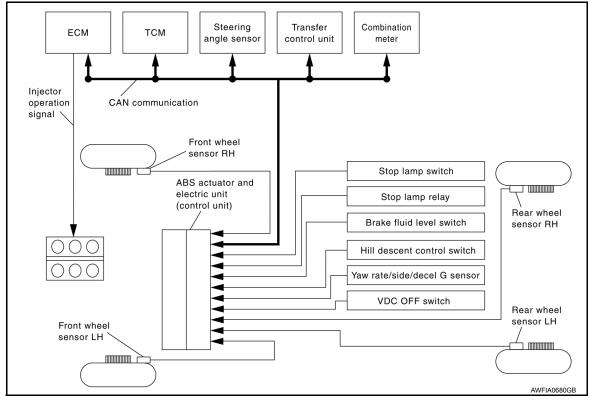
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ABS

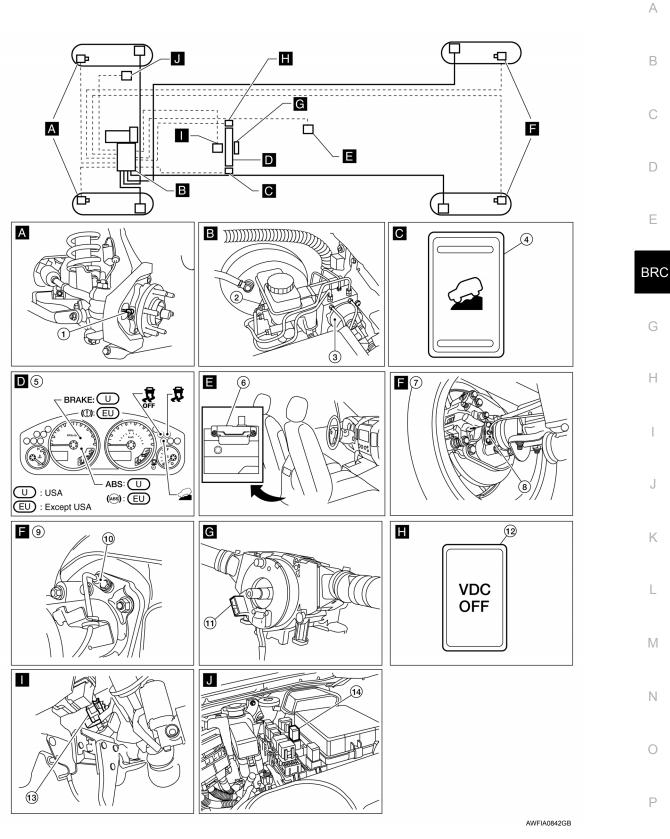
System Description

INFOID:000000007327855

- 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.

INFOID:000000007817677





ABS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Hill descent control switch M155 5.
- 7. C200 rear axle

Brake fluid level switch E21

2.

8.

Combination meter M24

- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E127
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

3.

Revision: October 2015

BRC-143

< SYSTEM DESCRIPTION >

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

- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 11. ble) M47 (Steering wheel removed for clarity) Stop lamp relay E12
- 13. Stop lamp switch E39

INFOID:000000007817684

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BBC 162 "Description"
	Motor	<u>BRC-163, "Description"</u>
	Actuator relay	BRC-179. "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

Component Description

[TYPE 2]

14.

ABS

< SYSTEM DESCRIPTION > EBD

System Diagram Steering Transfer Combination тсм ECM angle sensor control unit meter Injector CAN communication operation signal Front wheel sensor RH Stop lamp switch ABS actuator and electric unit Stop lamp relay (control unit)

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EBD

System Description

Front wheel sensor LH ~

- 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.

INFOID:000000007817678

Rear wheel

sensor RH

Rear wheel sensor LH

AWFIA06800

Brake fluid level switch

Hill descent control switch

Yaw rate/side/decel G sensor

VDC OFF switch

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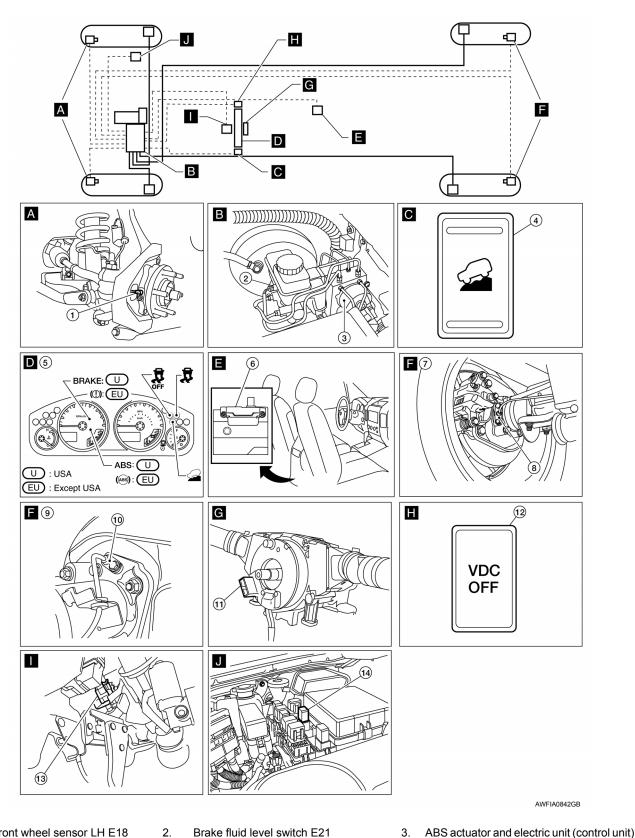
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INFOID:000000007817685



EBD

- Front wheel sensor LH E18 1. Front wheel sensor RH E117
- Hill descent control switch M155 5. 4.
- 7. C200 rear axle

Brake fluid level switch E21

Combination meter M24

8.

Rear wheel sensor LH C11 Rear wheel sensor RH C10

Revision: October 2015

BRC-146

3.

6.

9.

E127

M226 rear axle

Yaw rate/side/decel G sensor B73

2012 Frontier NAM

< SYSTEM DESCRIPTION >

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

- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47 (Steering wheel removed for clarity)
 Stop lamp relay E12
- 13. Stop lamp switch E39

INFOID:000000007817686

Component parts		Reference	С
	Pump	BRC-163, "Description"	_
	Motor		D
ABS actuator and electric unit (control unit)	Actuator relay	BRC-179, "Description"	D
	Solenoid valve	BRC-172, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"	E
Wheel sensor		BRC-167, "Description"	
Yaw rate/side/decel G sensor		BRC-165, "Description"	BRC
Stop lamp switch		BRC-170, "Description"	
Steering angle sensor		BRC-184, "Description"	
Brake fluid level switch		BRC-184, "Description"	- G
Hill descent control switch		BRC-198, "Description"	_
VDC OFF switch		BRC-200, "Description"	Н
ABS warning lamp		BRC-202, "Description"	_
Brake warning lamp		BRC-203, "Description"	_
Hill descent control indicator lamp		BRC-204, "Description"	-
VDC OFF indicator lamp		BRC-205. "Description"	_
SLIP indicator lamp		BRC-207, "Description"	

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EBD

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

< SYSTEM DESCRIPTION >

[TYPE 2]

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

CONSULT Function (ABS)

INFOID:000000007327862

FUNCTION

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

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

 After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
 CAUTION:

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

- When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
- Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-214, "DTC No. Index"</u>.

DATA MONITOR

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

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

< SYSTEM DESCRIPTION >

[TYPE 2]

Item (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)	×	×	×	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.

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

< SYSTEM DESCRIPTION >

[TYPE 2]

ltom	Data	a monitor item sele		
Item (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 ²)	×	_	×	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.

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

< SYSTEM DESCRIPTION >

Item	Dat	a monitor item sele			
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	A
DDS SIG (Note 1) (On/Off)	-	-	×	Hill descent control operation (On/ Off) status is displayed.	В
USS SIG (Note 2) (On/Off)	-	-	×	Hill start assist operation (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-125</u> , "ADJUSTMENT OF STEERING AN- GLE SENSOR NEUTRAL POSITION : Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-126.</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 Μ (ACT), touch "Up", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

Operation		AE	3S solenoid va	alve	ABS	solenoid valv	e (ACT)
Operatio	ות	Up	Кеер	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 SOL	FR LH OUT SOL	Off	Off	On*	_	_	_
RR RH SOL	RR RH IN SOL	Off	On	On	_	_	_
KK KH SUL	RR RH OUT SOL	Off	Off	On*	—	—	_
RR LH SOL	RR LH IN SOL	Off	On	On	_	—	_
	RR LH OUT SOL	Off	Off	On*	—	_	_

[TYPE 2]

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

< SYSTEM DESCRIPTION >

[TYPE 2]

Operation		AE	ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP	
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	_	—	—	Off	Off	Off	
IN NITADO SOLENOID (ACT)	FR RH OUT SOL	_	_	_	Off	Off	Off	
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	_	—	_	Off	Off	Off	
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	_	—	_	Off	Off	Off	
	RR RH 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 ABS SOLENOID (ACT)	RR LH OUT SOL	_	—	_	Off	Off	Off	
	RR RH IN SOL	Off	On	On	Off	Off	Off	
REAR SOL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off	
	RR LH IN SOL	Off	On	On	Off	Off	Off	
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off	

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

ABS MOTOR

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

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

STOP LAMP RELAY

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

Operation	On	Off
STP ON RLY	On	Off

APPLICATION NOTICE

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE

Application Notice

[Т	YPE	2]

INFOID:000000007815422

Service information	Remarks	
TYPE 1	VDC/TCS/ABS	
TYPE 2	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	
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C1101, C1102, C1103, C1104 WHEEL SENSOR-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:000000007327865

INFOID:000000007327864

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327866

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/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:**

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

< DTC/CIRCUIT DIAGNOSIS > [TYPE]	2]
 The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace t 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: 	А
If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads a retest.	nd ^B
Does the ABS active wheel sensor tester detect a signal?	
YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to <u>BRC-237, "Removal and Installation"</u> .	С
3. CHECK TIRES	D
Check the inflation pressure, wear and size of each tire.	D
Is the inspection result normal?	
YES >> GO TO 4	E
NO >> Adjust tire pressure or replace tire(s).	
4.CHECK WHEEL BEARINGS	— BRC
Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle Inspection and Service"</u> (front), <u>RAX-</u> <u>"Rear Axle Bearing"</u> (C200 rear), or <u>RAX-18, "Rear Axle Bearing"</u> (M226 rear).	<u>-6.</u>
Is the inspection result normal?	
YES >> GO TO 5	G
NO >> Repair or replace as necessary. Refer to <u>FAX-8</u> , " <u>Removal and Installation</u> " (front), <u>RAX-1</u> " <u>Removal and Installation</u> " (C200 rear), or <u>RAX-23</u> , " <u>Removal and Installation</u> " (M226 rear).	
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT	H
 Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Check continuity between wheel sensor connector terminals and ground. 	
	JJ
Is the inspection result normal? YES >> GO TO 6	,
NO >> Repair the circuit. $=$	K
	<u>z</u>
6.CHECK WIRING HARNESS FOR OPEN CIRCUIT	
 Check continuity between ABS actuator and electric unit (control unit) connector and the malfunctioni wheel sensor connector. 	U
	M

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal	-	
Front LH		45	E18	1		_
Front LH		46		2		
Front RH	E127	34	E117	1	- Yes	
		33		2		
Rear LH		36	C11	1	res	F
		37		2		
Rear RH		43	010	1		
RearRH		42	C10	2		

Is the inspection result normal?

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000007327867

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-239</u>, "<u>Removal and Instal-</u><u>lation</u>".

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.

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-154, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007327868

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-125</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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:000000007327870

INFOID:000000007327869

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D	
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.	 Harness or connector Wheel sensor 		E
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.		BRC	
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)	G	
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.		H	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	K
RR RH SENSOR-2	N
RR LH SENSOR-2	
FR RH SENSOR-2	L
FR LH SENSOR-2	
Is above displayed on the self-diagnosis display?	р. /
 YES >> Proceed to diagnosis procedure. Refer to <u>BRC-157, "Diagnosis Procedure"</u>. NO >> Inspection End 	Μ
Diagnosis Procedure	N
Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT	0

CAUTION:

Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

CONTROL/HILL START ASSIST".

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?

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

YES	>> (GO T	02	
	-	_	-	-

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?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-237, "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</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-6</u>, "<u>Rear Axle Bearing</u>" (C200 rear), or <u>RAX-18</u>, "<u>Rear Axle Bearing</u>" (M226 rear).

Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-12</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-23</u>, "<u>Removal and Installation</u>" (M226 rear).

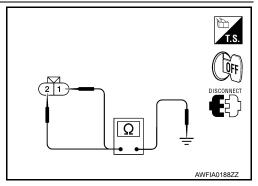
5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 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.

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel se	ensor	Continuity		
	Connector	Terminal	Connector	Terminal			
Front LH		45	E18	1			
		46	LIO	2			
Front RH	-	34	E117	1			
	E127	33		2	Yes		
Rear LH		36	C11	1	165		
		37	CH	2			
Rear RH		43	C10	1			
		42	010	2			
Iation". NO >> Repair the c Component Inspec .CHECK DATA MONITOR On "DATA MONITOR", s OR", and check the vel	tion TOR select "FR LH SEN	ISOR", "FR RH	SENSOR", "RR	LH SENSOR", a	INFOID:00000000781768		
Wheel sensor	Vehic	le speed (DATA MC	DNITOR)				
FR LH SENSOR							
FR RH SENSOR		Nearly matches the speedometer dis-					
RR LH SENSOR	play (±10)% or less)					
RR RH SENSOR							
•	ind osis procedure. Re	efer to <u>BRC-167</u>	, "Diagnosis Proc	cedure".			
Special Repair Req	luirement				INFOID:00000000781768		
.ADJUSTMENT OF S				I			
Always perform neutral and electric unit (contro <u>FRAL POSITION : Desc</u>	position adjustme I unit). Refer to <u>B</u>	nt for the steeri	ng angle sensor	when replacing			
>> GO TO 2 2.CALIBRATION OF DI	ECEL G SENSOR	(4WD MODELS	5)				
			ing the ARS actu	ator and electric			
Always perform calibration Refer to <u>BRC-126, "CAL</u>					unit (control unit)		

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000007327875

INFOID:000000007327874

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1109	BATTERY VOLTAGE [ABNORMAL]	When the ABS actuator and electric unit (control unit) power supply voltage is lower than normal.	 Harness or connector ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327876

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/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-148</u>, "CONSULT Function (<u>ABS</u>)".

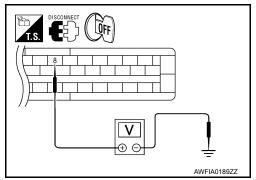
Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2. Check abs actuator and electric unit (control unit) power supply circuit and ground circuit

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 8 and ground.



[TYPE 2]

C1109 POWER AND GROUND SYSTEM

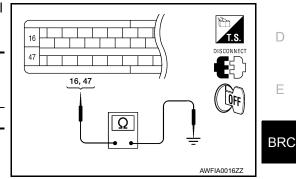
< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and elec- tric unit (control unit)			Condition	Voltage
Connector	Terminal			
F127	8	Ground	Ignition switch: ON	Battery voltage
	0	Ground	Ignition switch: OFF	Approx. 0V

4. Turn ignition switch OFF.

5. Check continuity between ABS actuator and electric unit (control unit) connector E127 terminals 16, 47 and ground.

	ABS actuator and electric unit (control unit)		Continuity
Connector	Terminal		
E127	16, 47	Ground	Yes



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[TYPE 2]

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

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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < DTC/CIRCUIT DIAGNOSIS > [TYPE 2]

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

DTC Logic

INFOID:000000007327878

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit)
C1170	VARIANT CODING	In a case where VARIANT CODING is different.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327879

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239</u>, "<u>Removal and Installa-</u> <u>tion</u>".

Special Repair Requirement

INFOID:000000007817701

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-125. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

	Display item	Malfunction detected condition	Possible cause	E
C1111 PUMP MOTOR		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	Harness or connector ABS actuator and electric unit	BI
	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	ABS actuator and electric unit (control unit)	(
DTC CC	NFIRMATION PROCE	DURE		
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS		ŀ
Check th	ne self-diagnosis results.			
	Self-diagnosis			
	PUMP MOT displayed on the self-diad			
YES NO		procedure. Refer to <u>BRC-163, "Diagnosis Proce</u>	dure".	
Diagno	sis Procedure		INFOID:000000007327883	ł
		nation, refer to <u>BRC-216, "Wiring Diagram - V</u>	DC WITH HILL DESCENT	
	ng Wiring Diagram inform OL/HILL START ASSIST"	nation, refer to <u>BRC-216, "Wiring Diagram - V</u>	DC WITH HILL DESCENT	
CONTRO		nation, refer to <u>BRC-216, "Wiring Diagram - V</u>	DC WITH HILL DESCENT	l
CONTRO 1 .CONI 1. Turn 2. Disc 3. Che	OL/HILL START ASSIST" NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminals for deformati	nation, refer to <u>BRC-216, "Wiring Diagram - V</u> electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma		
CONTRO 1. CONI 1. Turr 2. Disc 3. Che repla 4. Rec <u>(AB</u>	OL/HILL START ASSIST" NECTOR INSPECTION ignition switch OFF. connect ABS actuator and ck terminals for deformati ace terminals. onnect connectors and t <u>S)</u> ".	electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma hen perform the self-diagnosis. Refer to <u>BRC</u>	alfunction is found, repair or	
CONTRO 1. CONI 1. Turri 2. Disc 3. Che repla 4. Rec (AB) Is any ite	OL/HILL START ASSIST" NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminals for deformati ace terminals. onnect connectors and t <u>S)"</u> .	electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma hen perform the self-diagnosis. Refer to <u>BRC</u>	alfunction is found, repair or	[
CONTRO 1. CONI 1. Turr 2. Disc 3. Che repla 4. Rec <u>(AB</u>	OL/HILL START ASSIST" NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminals for deformati ace terminals. onnect connectors and t <u>S)"</u> . em indicated on the self-di >> GO TO 2	electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma hen perform the self-diagnosis. Refer to <u>BRC</u>	alfunction is found, repair or	

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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 E127 terminal 1 and ground.

r and ground.		
	Voltage	
Ground	Battery voltage	

Is the inspection result normal?

ABS actuator and electric unit (control unit)

YES >> GO TO 3

Connector

E127

NO >> Repair or replace malfunctioning components.

Terminal

1

 $\mathbf{3}$. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) connector E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector Terminal			Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239, "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
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-163, "Diagnosis Procedure"</u>.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

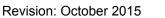
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-125</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION</u>: <u>Description</u>".

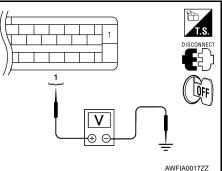
>> GO TO 2

 $2. {\sf CALIBRATION} \text{ OF DECEL G SENSOR (4WD MODELS)}$

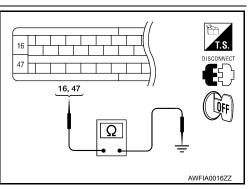
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END





[TYPE 2]



INFOID:000000007817702

INFOID:000000007327884

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

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[TYPE 2]

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DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results		Н
G-SENSOR		
YAW RATE SENSOR		1
SIDE G-SEN CIRCUIT		I
Is above displayed on the self-diagnosis display?		
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-165, "Diagnosis Procedure"</u> . NO >> Inspection End		J
Diagnosis Procedure	INFOID:000000007327888	К

Regarding Wiring Diagram information, refer to <u>BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT</u> <u>CONTROL/HILL START ASSIST</u>.

CAUTION:

- Sudden turns (such as spin turns, acceleration turns), drifting, etc. when VDC function is OFF may cause the yaw rate/side/decel G sensor system to indicate a malfunction. This is not a malfunction if normal operation can be resumed after restarting the engine.
- If vehicle is on turn table at entrance to parking garage, or on other moving surface, SLIP indicator lamp may illuminate and CONSULT self-diagnosis may indicate yaw rate sensor system malfunction. However, in this case there is no malfunction in yaw rate sensor system. Take vehicle off of turn table or other moving surface, and start engine. Results will return to normal.

1.CONNECTOR INSPECTION

- 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.

 $\mathbf{2}$. YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

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

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 3, 2, 4, 1.

ABS actuator and ele	ectric unit (control unit)	Yaw rate/side/d	lecel G sensor	- Continuity
Connector	Terminal	Connector	Terminal	Continuity
E127 (A)	18	B73 (B)	3	Yes
	19		2	
	22		4	- fes
	29		1	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

3. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

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

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-239. "Removal and Instal-</u> lation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-242, "Removal and Installation"</u>.

Component Inspection

INFOID:000000007327889

[TYPE 2]

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-165, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007817703

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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

< DTC/CIRCUIT DIAGNOSIS >

C1115 WHEEL SENSOR

Description

INFOID:000000007327891

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

DTC Logic

INFOID:000000007327892

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When wheel sensor input signal is malfunctioning.	 Harness or connector Wheel sensor ABS actuator and electric unit (control unit)
DTC CC	DNFIRMATION PROCE	DURE	
1 .CHE	CK SELF-DIAGNOSIS RE	SULTS	
Check th	ne self-diagnosis results.		
	Self-diagnosis		
	ABS SENSOR [ABNOF	-	
<u>IS above</u> YES	displayed on the self-diag	<u>prosis display?</u> procedure. Refer to <u>BRC-167, "Diagnosis Proce</u>	aduro"
NO	>> Inspection End	procedure. Refer to <u>BRC-107. Diagnosis Proce</u>	<u>edure</u> .
Diagno	osis Procedure		INFOID:000000007817707
U			
	ng Wiring Diagram inform <u>OL/HILL START ASSIST"</u> .	nation, refer to <u>BRC-216. "Wiring Diagram - \</u>	<u>/DC WITH HILL DESCENT</u>
001111	<u> </u>		
CAUTIO	N:		
	check between wheel se	nsor terminals.	
I.CON	NECTOR INSPECTION		
		and electric unit (control unit) connector and wh	eel sensor of malfunctioning
code 2. Che		nation, disconnection, looseness or damage.	
	spection result normal?		
YES	>> GO TO 2		
NO	>> Repair or replace as n	-	
	CK WHEEL SENSOR OUT	TPUT SIGNAL	
		nsor tester (J-45741) to wheel sensor using app	
2. Turr NO		and a second	propriate adapter.
		sensor tester power switch.	propriate adapter.
	green POWER indicator	should illuminate. If the POWER indicator doe	
batte	green POWER indicator ery in the ABS active whee	should illuminate. If the POWER indicator doe el sensor tester before proceeding.	s not illuminate, replace the
batte 3. Spir	green POWER indicator ery in the ABS active whee the wheel of the vehicle	should illuminate. If the POWER indicator doe	s not illuminate, replace the tor on the ABS active wheel
batte 3. Spir sens NO T	green POWER indicator ery in the ABS active whee the wheel of the vehicle sor tester. The red SENSC TE:	should illuminate. If the POWER indicator doe el sensor tester before proceeding. by hand and observe the red SENSOR indica R indicator should flash on and off to indicate a	s not illuminate, replace the tor on the ABS active wheel an output signal.
batte 3. Spir sens NO T	green POWER indicator ery in the ABS active whee the wheel of the vehicle sor tester. The red SENSC FE: e red SENSOR indicator	should illuminate. If the POWER indicator doe el sensor tester before proceeding. by hand and observe the red SENSOR indica	s not illuminate, replace the tor on the ABS active wheel an output signal.

Does the ABS active wheel sensor tester detect a signal?

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< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace the wheel sensor. Refer to <u>BRC-237</u>, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5. "On-Vehicle Inspection and Service"</u> (front), <u>RAX-6.</u> "Rear Axle Bearing" (C200 rear), or <u>RAX-18. "Rear Axle Bearing"</u> (M226 rear).

Is the inspection result normal?

- YES >> GO TO 5
- NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-12</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-23</u>, "<u>Removal and Installation</u>" (M226 rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

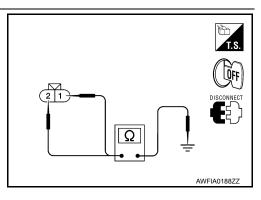
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor connector terminals and ground.

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		45	E18	1	Yes	
FIONLER	E127	46		2		
Front RH		34	E117	1		
		33		2		
Rear LH		36	C11	1	165	
		37		2	1	
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-239</u>, "<u>Removal and Instal-</u> lation".

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-168

INFOID:000000007817708

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Wheel sensor	Vehicle speed (DATA MONITOR)	
RLHSENSOR		
R RH SENSOR	Nearly matches the speedometer dis-	
R LH SENSOR	play (±10% or less)	
R RH SENSOR		
the inspection result normal	<u>?</u>	
ES >> Inspection End	pendure Deferte DDC 107 "Discressia"	
	ocedure. Refer to <u>BRC-167, "Diagnosis</u>	<u>Procedure</u> .
ecial Repair Requirer	nent	INFOID:00000007817704
ADJUSTMENT OF STEER	ING ANGLE SENSOR NEUTRAL POSIT	ION
	on adjustment for the steering angle ser	
	Refer to <u>BRC-125, "ADJUSTMENT OF</u>	
AL POSITION : Description	<u> </u>	
>> GO TO 2		
CALIBRATION OF DECEL	G SENSOR (4WD MODELS)	
	decel G sensor when replacing the ABS	
fer to <u>BRC-126, "CALIBRAT</u>	ION OF DECEL G SENSOR : Description	<u>'n"</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 unit (control unit).

DTC Logic

INFOID:000000007327897

INFOID:000000007327896

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-170, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327898

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/HILL START ASSIST</u>.

1.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.STOP LAMP SWITCH INSPECTION

- 1. Connect the stop lamp switch connector.
- 2. Check the voltage between the ABS actuator and electric unit (control unit) connector E127 terminal 39 and body ground.

Brake pedal depressed

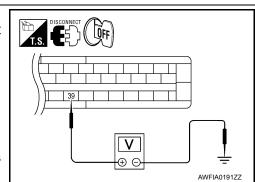
Brake pedal released

: Battery voltage (approx. 12V)

: Approx. 0V

Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239</u>, "Removal and Installation".
- NO >> GO TO 3
- 3.STOP LAMP SWITCH CIRCUIT INSPECTION



C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

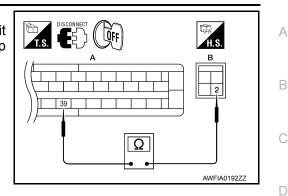
- 1. Disconnect the stop lamp switch connector.
- Check the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2.

Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-121, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.

Special Repair Requirement



INFOID:000000007817705

[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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

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< 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:000000007327901

INFOID:000000007327900

[TYPE 2]

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327902

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/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-148</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

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 E127 terminal 32 and ground.

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Connector Terminal		Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239, "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)	
		Up	Кеер	Down	
	FR RH IN SOL	Off	On	On	[
FR RH SOL	FR RH OUT SOL	Off	Off	On*	
	FR LH IN SOL	Off	On	On	
FR LH SOL	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*	

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

Is the inspection result normal?

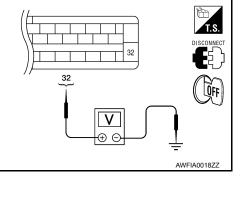
- YES >> Inspection End
- NO >> Go to diagnosis procedure. Refer to <u>BRC-172, "Diagnosis Procedure"</u>.

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-125</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description</u>".

BRC-173

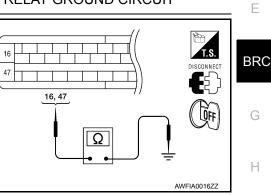


[TYPE 2]

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INFOID:000000007327903

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INFOID:000000007817706

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< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 2

 $2. {\sf CALIBRATION OF DECEL G SENSOR (4WD MODELS)}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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:000000007327906

INFOID:000000007327905

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to <u>BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT</u> CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-148</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

[TYPE 2]

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INFOID:000000007817709

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 E127 terminal 32 and ground.

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E127	16, 47	Ground	Yes	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239, "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 30L	FR RH OUT SOL	Off	Off	On*	
	FR LH IN SOL	Off	On	On	
FR LH SOL	FR LH OUT SOL	Off	Off	On*	
RR RH SOL	RR RH IN SOL	Off	On	On	
KK KH SUL	RR RH OUT SOL	Off	Off	On*	
RR LH SOL	RR LH IN SOL	Off	On	On	
	RR LH 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-179, "Diagnosis Procedure"</u>.

Special Repair Requirement

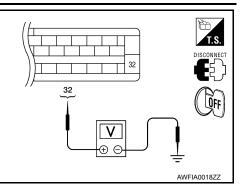
INFOID:000000007817711

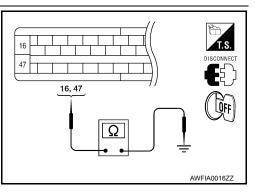
INFOID:000000007817710

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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-176







[TYPE 2]

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS > [TYPE 2]	
>> GO TO 2	А
2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)	
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u> , "CALIBRATION OF DECEL G SENSOR : Description".	В
>> END	С
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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:000000007327911

INFOID:000000007327910

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-178, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327912

1.CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-499, "CONSULT Function"</u>.
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-148</u>, "<u>CONSULT Func-</u> tion (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

- YES >> Repair or replace the affected part.
- NO >> Inspection End

C1140 ACTUATOR RLY

< 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).

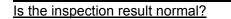
DTC Logic

INFOID:000000007327914

INFOID:000000007327913

DTC DETECTION LOGIC

DTC	Di	splay item	Malfunct	ion detected condition	on	Possible cause	D
C1140	ACTUATO	R RLY AI	ABS actuator relay or circuit malfunction.			 Harness or connector ABS actuator and electric unit (control unit) 	E
DTC CC	NFIRMA	TION PROCEDU	RE				
1. CHEC	CK SELF-D	AGNOSIS RESU	LTS				BRC
Check th	e self-diag	nosis results.					BIXO
		Self-diagnosis resu					G
	diaplayed	ACTUATOR RLY					
<u>IS above</u> YES		on the self-diagno			nocio Proco	duro"	Н
NO	>> Inspec	ed to diagnosis pro- tion End		BRC-179, Diag		<u>aure</u> .	
Diagno	sis Proc	edure				INFOID:000000007817723	I
						## 0.2.000000000000000000000000000000000	I
		Diagram information TART ASSIST".	on, refer to <u>BR</u>	C-216. "Wiring [<u> Diagram - V</u>	DC WITH HILL DESCENT	J
1 .con		NSPECTION					K
	ignition sv			1			
3. Che	ck termina					malfunction is found, repair	L
			perform the s	elf-diagnosis. Re	efer to <u>BRC</u>	-148. "CONSULT Function	M
-		ed on the self-diagr	osis display?				
YES	>> GO TC	2					
•		onnection of conne		• •			Ν
Z.CHEC	CK SOLEN	OID, VDC SWITC	H-OVER VALVE	AND ACTUATO	OR RELAY P	OWER SUPPLY CIRCUIT	
	ignition sv	vitch OFF. S actuator and ele	otria unit (contre	l unit) connoc	11-		0
z. Disc tor.				or unit) connec-		1. .	
		between ABS act E127 terminal 32		ric unit (control			Ρ
			1		·/		
ABS act	tuator and ele	ectric unit (control unit)		Voltage			
Cor	nnector	Terminal		Ŭ			



E127

32

Battery voltage

Ground

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C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

- 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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E127	16, 47	Ground	Yes	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239</u>, "Removal and Installation".

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
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-163. "Diagnosis Procedure"</u>.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

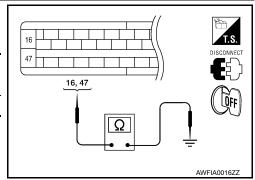
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-125. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END



INFOID:000000007817724

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1142 PRESS SENSOR

DTC Description

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition	С
C1142	PRESS SEN CIRCUIT (Pressure sensor circuit)	When a malfunction is detected in pressure sensor.	

POSSIBLE CAUSE

NOTE:

Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC	
 Harness or connector Air inclusion in the brake piping Stop lamp switch system ABS actuator and electric unit (control unit) power supply system Fuse Fusible link Battery 	 ABS actuator and electric unit (control unit) Brake system ABS actuator and electric unit (control unit) power supply system Fuse Fusible link Battery 	G H
DTC CONFIRMATION PROCEDURE		
1.PRECONDITIONING		
If "DTC CONFIRMATION PROCEDURE" has been pre and wait at least 10 seconds before conducting the new	eviously conducted, always turn the ignition switch OFF xt test.	J
>> GO TO 2.		
2. CHECK DTC DETECTION		Κ
 With CONSULT Turn the ignition switch OFF. NOTE: Wait at least 10 seconds after turning ignition switc Start the engine. 	ch OFF.	L
NOTE: Wait at least 10 seconds after starting the engine.Perform "Self Diagnostic Result" of "ABS".		M
<u>Is DTC "C1142" detected?</u> YES-1 >> "C1142" is displayed as "CRNT": Proceed YES-2 >> "C1142" is displayed as "PAST": Inspectior NO-1 >> To check malfunction symptom before repa NO-2 >> Confirmation after repair: Inspection End.	to <u>BRC-181, "Diagnosis Procedure"</u> . n End (Erase "Self Diagnostic Result" of "ABS"). air: Refer to <u>GI-46, "Intermittent Incident"</u> .	N O
Diagnosis Procedure	INFOID:000000012379235	
1. STOP LAMP SWITCH SYSTEM		Ρ
Check the stop lamp switch system. Refer to <u>BRC-170</u> <u>Is the inspection result normal?</u> YES >> GO TO 2. NO >> Repair or replace stop lamp switch system 2 CHECK REAKE ELLID LEAKACE		

Z.CHECK BRAKE FLUID LEAKAGE

INFOID:000000012379234

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C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check the brake fluid leakage. Refer to <u>BR-18, "On Board Inspection".</u>

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair or replace brake fluid leakage part.

3.CHECK BRAKE PIPING

Check the brake piping. Refer to <u>BR-12, "Hydraulic Circuit"</u>.

Is the inspection result normal?

YES >> GO TO 4. NO >> Repair o

- >> Repair or replace brake piping.
 - Front: Refer to <u>BR-24</u>, "Removal and Installation of Front Brake Piping and Brake Hose".
 - Rear: Refer to <u>BR-25</u>, "Removal and Installation of Rear Brake Piping and Brake Hose".

4.CHECK BRAKE PEDAL

Check the brake pedal.

- Brake pedal height: Refer to <u>BR-16, "Inspection and Adjustment"</u>.
- Brake pedal assembly: Refer to <u>BR-20, "Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 5. NO >> Adjust the
 - >> Adjust the brake pedal height or replace brake pedal assembly.
 - Adjust the brake pedal: Refer to <u>BR-16</u>, "Inspection and Adjustment".
 - Replace the brake pedal: Refer to <u>BR-20, "Removal and Installation"</u>.

5.CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-11, "On Board Inspection".

Is the inspection result normal?

- YES >> GO TO 6.
- NO >> Repair or replace brake master cylinder. Refer to <u>BR-28, "Removal and Installation"</u>.

6.CHECK BRAKE BOOSTER

Check the brake booster. Refer to BR-9, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace brake booster. Refer to <u>BR-30, "Removal and Installation"</u>.

7.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace vacuum piping. Refer to <u>BR-32, "Removal and Installation"</u>.

8.CHECK FRONT DISC BRAKE

Check the front disc brake caliper. Refer to <u>BR-35, "Exploded View of Brake Caliper"</u>.

Is the inspection result normal?

- YES >> GO TO 9.
- NO >> Repair or replace front disc brake caliper. Refer to <u>BR-35</u>, "Removal and Installation of Brake Caliper and Disc Rotor".

9. CHECK REAR DISC BRAKE

Check the rear disc brake. Refer to <u>BR-40, "Exploded View of Brake Caliper"</u>.

Is the inspection result normal?

- YES >> GO TO 10.
- NO >> Repair or replace rear disc brake. Refer to <u>BR-40, "Removal and Installation of Brake Caliper and</u> <u>Disc Rotor"</u>.

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

C1142 PRESS SENSOR

CTI42 FRESS SENSOR	
< DTC/CIRCUIT DIAGNOSIS > [TYPE 2]	
Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to <u>BRC-160.</u> <u>"Diagnosis Procedure"</u> .	А
Is the inspection result normal?	
YES >> GO TO 11.	
NO >> Repair / replace harness, connector, fuse, or fusible link.	В
11.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	
 With CONSULT Erase "Self Diagnostic Result" of "ABS". Turn the ignition switch OFF. NOTE: 	С
Wait at least 10 seconds after turning ignition switch OFF.	D
3. Start the engine.	
NOTE: Wait at least 10 seconds after starting the engine.	_
4. Start the engine and drive the vehicle for a short period of time.	E
NOTE:	
Vehicle must be driven after repair or replacement to erase the previous DTCs. 5. Stop the vehicle.	BRC
6. Perform "Self Diagnostic Result" of "ABS".	
Is DTC "C1142" detected?	
YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-239, "Removal and Instal-</u> lation".	G
NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for dam- age, looseness and disconnection. Repair / replace harness, connector, or terminal.	Н
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C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:000000007327918

[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:000000007327919

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	Harness or connectorSteering angle sensor
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-184, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327920

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/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-148</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 STEERING ANGLE SENSOR HARNESS

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

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

- Turn ignition switch ON. 4.
- Check voltage between steering angle sensor connector M47 5. terminal 2 and ground.

Steering a	ngle sensor		Voltage
Connector	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 BRC-185, "Component Inspection". Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-241, "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)
	STRANGLE 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 BRC-184, "Diagnosis Procedure".

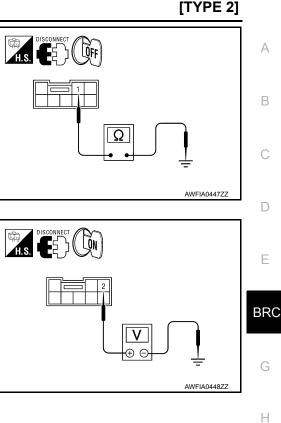
Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator Ρ and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)



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INFOID:000000007817713

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-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

< 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 actu-В ator and electric unit (control unit).

DTC Logic

INFOID:000000007327924

INFOID:000000007327923

[TYPE 2]

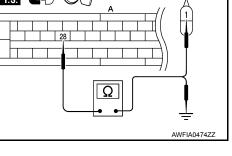
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DTC DETECTION LOGIC

DTC	Display item		Malfunction detected condition	Possible cause	D
C1155	BR FLUID LEVEL LO	W the AB	fluid level is low or communication line between 3S actuator and electric unit (control unit) and brak evel switch is open or shorted.	Harness or connector	E
DTC CC	NFIRMATION PR	ROCEDURE			
1 .CHEC	CK SELF-DIAGNOS	SIS RESULTS	8		BRC
Check th	e self-diagnosis re	sults.			DIXC
		agnosis results			G
 		ID LEVEL LOW			
	displayed on the se	-		oduro"	Н
	>> Inspection End	nosis proced	lure. Refer to <u>BRC-187, "Diagnosis Proc</u>	<u>equie</u> .	
	sis Procedure			INFOID:000000007327925	
Blagilo				INFOID.00000007327923	1
CONTRO	DL/HILL START AS	<u>SIST"</u> .	refer to <u>BRC-216, "Wiring Diagram -</u>	VDC WITH HILL DESCENT	J
<u>со́лтко</u> 1.сом	NECTOR INSPECT	<u>sist"</u> . Ion			
1. CONTRO 1. Disc 2. Che	NECTOR INSPECT onnect ABS actuate ck the terminals for	SIST". TON or and electric deformation,	refer to <u>BRC-216. "Wiring Diagram -</u> c unit (control unit) connector and brake disconnection, looseness or damage.		
1. CONTRO 1. Disc 2. Chee Is the ins YES	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2	<u>SIST"</u> . TON or and electric deformation, <u>nal?</u>	c unit (control unit) connector and brake disconnection, looseness or damage.		
1. CONTRO 1. Disc 2. Chee Is the ins YES NO	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replace	SIST". TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control unit) connector and brake disconnection, looseness or damage. ary.	fluid level switch connector.	K L M
1. CONTRO 1. Disc 2. Cheorem Is the ins YES NO 2.CHEO	DL/HILL START AS NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET	SIST". TON or and electric deformation, <u>nal?</u> ce as necessa	c unit (control unit) connector and brake disconnection, looseness or damage.	fluid level switch connector.	K L M
1. CONTRO 1. Disc 2. Check Is the ins YES NO 2.CHEC UNIT (CO	DL/HILL START AS NECTOR INSPECT onnect ABS actuate the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT)	SIST". TON or and electric deformation, <u>nal?</u> ce as necessa WEEN BRAM	c unit (control unit) connector and brake disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS A	fluid level switch connector.	K L M
1. CONTRO 1. Disc 2. Check Is the ins YES NO 2. CHEC UNIT (CO 1. Check	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	SIST". TON or and electric deformation, <u>hal?</u> ce as necessa WEEN BRAM WEEN BRAM	c unit (control unit) connector and brake disconnection, looseness or damage. ary.	fluid level switch connector.	K L M
1. CONTRO 1. Disc 2. Chee Is the ins YES NO 2. CHEC UNIT (CO 1. Chee unit)	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe	SIST". 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 disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS a ator and electric unit (control	fluid level switch connector.	K L M
CONTRO 1. Disc 2. Check Is the ins YES NO 2.CHEC UNIT (CO 1. Check unit) conr	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe connector E127 (A nector E21 (B) term	SIST". 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 disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS a ator and electric unit (control		K L M
CONTRO 1. Disc 2. Check Is the ins YES NO 2.CHEC UNIT (CO 1. Check unit) conr	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replac CK HARNESS BET ONTROL UNIT) ck continuity betwe connector E127 (A	SIST". TON or and electric deformation, <u>hal?</u> ce as necessa WEEN BRAK en ABS actua) Terminal 28 inal 1.	c unit (control unit) connector and brake disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS a ator and electric unit (control and brake fluid level switch		K L M N
CONTRO 1. Disc 2. Check Is the ins YES NO 2.CHEC UNIT (CO 1. Check unit) conr	NECTOR INSPECT onnect ABS actuate ck the terminals for spection result norm >> GO TO 2 >> Repair or replace CK HARNESS BET ONTROL UNIT) ck continuity betwee connector E127 (A nector E21 (B) term	SIST". TON or and electric deformation, <u>hal?</u> ce as necessa WEEN BRAK en ABS actua) Terminal 28 inal 1.	c unit (control unit) connector and brake disconnection, looseness or damage. ary. KE FLUID LEVEL SWITCH AND ABS A ator and electric unit (control and brake fluid level switch		K L M N

2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and ground.



C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E127 (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 BRC-188, "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-239, "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.

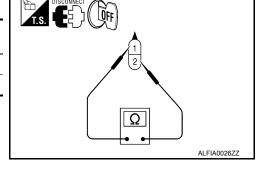
Brake fluid level switch terminal	Condition	Continuity
1 – 2	Brake fluid reservoir is full.	No
1 – 2	Brake fluid reservoir is empty.	Yes

Is the inspection result normal?

YES >> Inspection End

NO >> Replace brake fluid level switch.

Special Repair Requirement



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1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

BRC-188





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C1155 BRAKE FLUID LEVEL SWITCH

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

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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:000000007327929

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1156	ST ANG SEN COM CIR	When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric unit (control unit).	 Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <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-148. "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

INFOID:000000007327928

< 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:000000007327932

INFOID:000000007327931

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	 Decel G sensor calibration Yaw rate/side/decel G sensor ABS actuator and electric unit (control unit) 	E
DTC CC	ONFIRMATION PROCE	DURE		
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS		BRC
Check th	ne self-diagnosis results.			
				G
	Self-diagnosis			
	DECEL G SEN displayed on the self-diad			Н
YES		procedure. Refer to <u>BRC-191, "Diagnosis Proce</u>	dure"	
NO	>> Inspection End		<u></u> .	
Diagno	sis Procedure		INFOID:000000007327933	
	ORM SELF-DIAGNOSIS			
		c unit (control unit) self-diagnosis. Refer to BR	2 149 "CONSULT Eurotion	J
<u>(ABS)"</u> .		, unit (control unit) sen-diagnosis. Relet to \underline{BR}	<u>J-146, CONSULT FUNCTION</u>	
				К
	elf-diagnosis results			
	ECEL G SEN SET	anything other than shown above?		L
YES	-	accement for the item indicated.		
NO	>> Perform calibration of	decel G sensor. Refer to <u>BRC-126, "CALIBRATI</u>	ON OF DECEL G SENSOR	M
2	: Description". GO TO			IVI
	ORM SELF-DIAGNOSIS			
	T Function (ABS)".	and then to ON and erase self-diagnosis result	s. Refer to <u>BRC-148, "CON-</u>	Ν
2. Perf	orm ABS actuator and ele	ectric unit (control unit) self-diagnosis again. Re	fer to <u>BRC-148, "CONSULT</u>	
	<u>ction (ABS)"</u> . self-diagnosis results disp	laved?		0
YES		/decel G sensor. Refer to <u>BRC-242, "Removal a</u>	and Installation".	
NO	>> Inspection End			Р

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< DTC/CIRCUIT DIAGNOSIS >

C1163 ST ANGLE SEN SAFE

Description

INFOID:000000007327934

[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:000000007327935

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-192, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000007327936

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-125, "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-148, "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:000000007327938 D

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[TYPE 2]

INFOID:000000007327937

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

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

NO >> Inspection End

Diagnosis Procedure

INFOID-000000007327939 Ν

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Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 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-148, "CONSULT Function</u> (ABS)".

Is any item indicated on the self-diagnosis display?

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

- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 32 and ground.

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E127	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 E127 terminals 16, 47 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E127	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239</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.

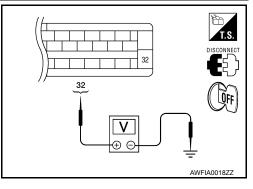
	Operation		ABS solenoid valve (ACT)		
Operation		Up	ACT UP	ACT KEEP	
	FR RH IN SOL	Off	Off	Off	
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	Off	Off	Off	
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off	
	FR LH OUT SOL	Off	Off	Off	
	RR RH IN SOL	Off	Off	Off	
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL	Off	Off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

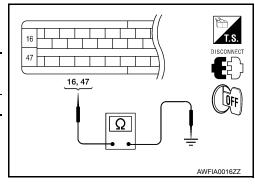
*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-193, "Diagnosis Procedure"</u>.





C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

[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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</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:000000007327942

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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:000000007327943

INFOID:000000007327944

DTC DETECTION LOGIC

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

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-196</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.
- 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-148. "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 mul-В tiplex 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:000000007327946

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	 CAN communication line ABS actuator and electric unit (control unit) 	BRC
Diagno	sis Procedure		INFOID:000000007327947	

1.CONNECTOR INSPECTION

- Turn ignition switch OFF. 1.
- 2. Disconnect the ABS actuator and electric unit (control unit) connector.
- Н 3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
- Reconnect connector and perform self-diagnosis. Refer to <u>BRC-148, "CONSULT Function (ABS)"</u>.

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

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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-198, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007327950

Regarding Wiring Diagram information, refer to <u>BRC-216</u>, <u>"Wiring Diagram - VDC WITH HILL DESCENT</u> <u>CONTROL/HILL START ASSIST</u>.

1. CHECK HILL DESCENT CONTROL SWITCH

Perform the hill descent control switch component inspection. Refer to <u>BRC-199</u>, "<u>Component Inspection</u>". <u>Is the inspection result normal?</u>

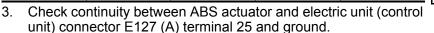
YES >> GO TO 2

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

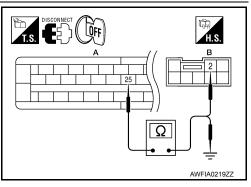


ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E127 (A)	25	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.



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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?

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-239</u>, "<u>Removal and Installa-</u> <u>tion</u>".
- NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation"

Component Inspection

1. CHECK HILL DESCENT CONTROL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Replace hill descent control switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

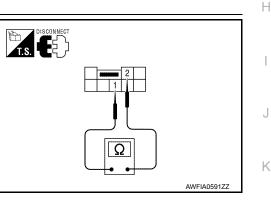
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-125</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END



=	er to <u>MWI-24, "Diagnosis Descrip-</u>
BF	BRC-239, "Removal and Installa-
G	stallation".
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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-200, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007327955

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Regarding Wiring Diagram information, refer to <u>BRC-216</u>, "Wiring Diagram - VDC WITH HILL DESCENT <u>CONTROL/HILL START ASSIST</u>".

1.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to <u>BRC-201, "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 E127 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.

ABS actuator and electric unit (control unit)		VDC OF	FF switch	Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	6	M154 (B)	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and ground.

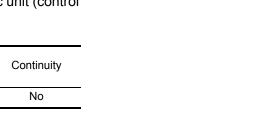
ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E127 (A)	6	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND



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INFOID:000000007327953

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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

VDC OF	FF 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 MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Component Inspection

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 pressed.	Yes
<u> </u>	VDC OFF switch 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 BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

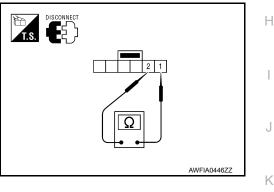
>> END

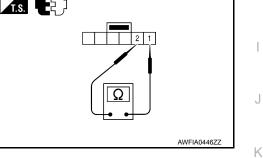




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ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007327958

×: ON –: OFF

ITYPE 21

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:000000007327959

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-202. "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007327960

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-148, "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-239</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007817718

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-125. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

[TYPE 2]

Description	INFOID:00000007327962
	×: ON –: OFF
Condition	Brake warning lamp (Note 1)
Ignition switch OFF	_
Ignition switch ON	× (Note 2)
EBD function is malfunctioning.	×
 NOTE: 1: Brake warning lamp will turn on in case of parking brake or (when brake fluid is insufficient). 2: After starting engine, brake warning lamp is turned off. 	peration (when switch is ON) or of brake fluid level switch operation
Component Function Check	INFOID:00000007327963
1. BRAKE WARNING LAMP OPERATION CHECK	
	witch 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</u>	-203, "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007327964
1.CHECK SELF-DIAGNOSIS	
	colf diagnosis refer to DDC 140 "CONCLUT Eurotian
(ABS)".	self-diagnosis. refer to <u>BRC-148, "CONSULT Function</u>
<u>Is the inspection result normal?</u>	
YES >> GO TO 2	
NO >> Check items displayed by self-diagnosis.	
2. CHECK COMBINATION METER	
Check if the indication and operation of combination r	meter are normal. Refer to MWI-24, "Diagnosis Descrip-
<u>tion"</u> .	
Is the inspection result normal?	
	control unit). Refer to <u>BRC-239, "Removal and Installa-</u>
NO >> Replace combination meter. Refer to MW	/I-89, "Removal and Installation".
Special Repair Requirement	
	INFOID:000000007817719
1 .ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION
	steering angle sensor when replacing the ABS actuator
>> 60 10 2	
2. CALIBRATION OF DECEL G SENSOR (4WD MOI	
Always perform calibration of decel G sensor when re Refer to <u>BRC-126</u> , "CALIBRATION OF DECEL G SET	eplacing the ABS actuator and electric unit (control unit).

HILL DESCENT CONTROL INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

HILL DESCENT CONTROL INDICATOR LAMP

Description

INFOID:000000007327966

×: 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:000000007327967

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-204, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007327968

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-148</u>, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <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-239</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007817720

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-125</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION</u>: <u>Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

INFOID:000000007327970

[TYPE 2]

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	×: ON –: OFF B
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.)	× D
VDC/TCS function is malfunctioning.	-
ABS function is malfunctioning.	_
EBD function is malfunctioning.	_ E
Component Function Check	INFOID:00000007327971
1.VDC OFF INDICATOR LAMP OPERATION CHECK	K 1
Check that the lamp illuminates for approximately 2 se	conds after the ignition switch is turned ON.
Is the inspection result normal?	G
YES >> GO TO 2	
NO >> Go to diagnosis procedure. Refer to BRC-	-
2.VDC OFF INDICATOR LAMP OPERATION CHECK	
Check that the VDC OFF indicator lamp in the combine VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
Is the inspection result normal?	1
YES >> Inspection End NO >> Check VDC OFF switch. Refer to <u>BRC-20</u>	0. "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007327972
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-20</u>	
2.CHECK SELF-DIAGNOSIS	M
Perform ABS actuator and electric unit (control unit) s (ABS)".	elf-diagnosis. Refer to <u>BRC-148, "CONSULT Function</u>
Is the inspection result normal?	Ν
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	0
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>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (c tion".	ontrol unit). Refer to <u>BRC-239, "Removal and Installa-</u>
NO >> Replace combination meter. Refer to <u>MWI</u>	-89, "Removal and Installation".

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000007817721

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-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-126</u>, "CALIBRATION OF DECEL G SENSOR : Description".

SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

SLIP INDICATOR LAMP

Description

INFOID:000000007327974

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.	x
EBD function is malfunctioning.	×
Component Function Check	INFOID:00000007327975
1. CHECK SLIP INDICATOR LAMP OPERATION	
Check that the lamp illuminates for approximately 2 se	econds after the ignition switch is turned ON.
Is the inspection result normal?	-
YES >> Inspection End	
NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	-207, "Diagnosis Procedure".
Diagnosis Procedure	INFOID:000000007327976
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) s	self-diagnosis. Refer to <u>BRC-148, "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	
	neter are normal. Refer to <u>MWI-24, "Diagnosis Descrip-</u>
tion".	neter are normal. Neter to <u>mm-24. Diagnosis Descrip-</u>
Is the inspection result normal?	
	control unit). Refer to <u>BRC-239, "Removal and Installa-</u>
NO >> Replace combination meter. Refer to <u>MWI</u>	I-89, "Removal and Installation".
Special Repair Requirement	INFOID:00000007817722
4	
1.ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION
	teering angle sensor when replacing the ABS actuator DJUSTMENT OF STEERING ANGLE SENSOR NEU-
<u></u>	
>> GO TO 2 2.CALIBRATION OF DECEL G SENSOR (4WD MOD	

>> END

А

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

А

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
		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	EBD warning lamp	When EBD warning lamp is ON	On
EBD WARN LAWF		When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
	STOP LAWP SW 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	
		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 (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF VDC OFF switch ON (When VDC OFF indicator lamp is ON)	Off
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
	SLIP indicator lamp	When SLIP indicator lamp is ON	On
SLIP LAMP	(Note 2)	When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

< 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 RALE SEN	sensor	When vehicle turning	-75 to 75 d/s
R POSI SIG		A/T shift position = R position	On
R POSI SIG	PNP switch signal ON/OFF condition	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
	FINE SWILLI SIGNAL ON/OFF CONULION	A/T shift position = other than N position	Off
	DND switch signal ON/OEE 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	
		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 >

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		Vehicle stopped	Approx. 0 m/s ²	
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s ²)	
		Vehicle turning left	Positive value (m/s ²)	
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°	
OTTAINEE OIG	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	
TRESS SENSOR	sure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar	
EBD SIGNAL	EBD operation	EBD is active	On	
EBD SIGNAL	EBD operation	EBD is inactive	Off	
ABS SIGNAL	ABS operation	ABS is active	On	
ADS SIGNAL		ABS is inactive	Off	
TCS SIGNAL	TCS operation	TCS is active	On	
103 SIGNAL		TCS is inactive	Off	
VDC SIGNAL	VDC operation	VDC is active	On	
VDC SIGNAL	VDC operation	VDC is inactive	Off	
	BD FAIL SIG EBD fail-safe signal	In EBD fail-safe	On	
		EBD is normal	Off	
ABS FAIL SIG	L SIG ABS fail-safe signal	In ABS fail-safe	On	
		ABS is normal	Off	
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On	
		TCS is normal	Off	
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On	
		VDC is normal	Off	
CRANKING SIG	Crank operation	Crank is active	On	
		Crank is inactive	Off	
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On	
	Drake huld level switch signal status	When brake fluid level switch OFF	Off	
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	On	
		Differential lock switch OFF	Off	
DLOCK CHG SW	Differential lock mode switch signal status	When differential lock mode switch is en- gaged	On	
	Sincientian for more switch signal status	When differential lock mode switch is dis- engaged	Off	
STP ON RLY	Ston lamp on relay status	When hill descent control is operating	On	
	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	
		Hill descent control switch OFF	Off	
DDS SIG (Note 3)	Hill descent control operation	Hill descent control is active	On	
		Hill descent control is inactive	Off	

< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
	Lill start assist anaration	Hill start assist is active	On
JSS SIG (Note 4)	Hill start assist operation	Hill start assist is inactive	Off
OTE:			
1: Confirm tire press			
•	for warning lamp and indicator lamp.		
•	Refer to <u>BRC-81, "Description"</u> .		
• •	Refer to <u>BRC-82. "Description"</u> .		
	amp: Refer to <u>BRC-83, "Description"</u> .		
	Refer to <u>BRC-85, "Description"</u> . ill display DDS (Downhill Drive Support) when	referring to the Hill Descent Control system	n
	ill display USS (Uphill Start Support) when refe		1.
		enning to the fill otart Assist system.	
ERMINAL LAY	301		
	1 17 18 19 20 21 22 23 24 25 2		
	32 33 34 35 36 37 38 39 40 41	42 43 44 45 46 47 H.S.	
			AWFIA0032ZZ
ail-Safe			INFOID:000000007327980
			14 010.000000000000000000000000000000000
AUTION:	wation is activated works we Calf Di		
	nction is activated, perform Self Di	lagnosis for ABS/ICS/VDC syste	em.
BS/EBD SYST			
	trical malfunction with the ABS, the A trical malfunction with the EBD syste		
LIP indicator lam		en, the BRARE warning lamp, ABC	s warning lamp and
	vert to one of the following conditions	of the Fail-Safe function.	
For ABS malf	unction, only the EBD is operative ar	nd the condition of the vehicle is the	e same condition of
	out ABS/TCS/VDC system.		
	unction, the EBD and ABS become in		vehicle is the same
as the condition	on of vehicles without ABS/TCS/VDC	or EBD system.	
ILL DESCENT	CONTROL/HILL START ASSIST	SYSTEM	
	cent control system malfunction, the		
	cent control switch is operated and th	ne condition of the vehicle is the sa	me as the condition
	t hill descent control system.	D indicator lamp is turned on and	the condition of the
	t assist system malfunction, the SLII e as the condition of vehicles without		
		pater lamp is turned on and the are	dition of the vehicle
	DC system malfunction, the SLIP indic condition of vehicles without TCS/VE		
	, the ABS control continues to operate		
		. ,	

< ECU DIAGNOSIS INFORMATION >

DTC No. Index

INFOID:000000007327981

[TYPE 2]

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		
C1102	RR LH SENSOR-1	PDC 154 "Description"	
C1103	FR RH SENSOR-1	BRC-154, "Description"	
C1104	FR LH SENSOR-1		
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2		
C1107	FR RH SENSOR-2	BRC-157, "Description"	
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-160, "Description"	
C1110	CONTROLLER FAILURE	BRC-162, "DTC Logic"	
C1111	PUMP MOTOR	BRC-163. "Description"	
C1113	G-SENSOR	BRC-165, "Description"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-167, "Description"	
C1116	STOP LAMP SW	BRC-170, "Description"	
C1120	FR LH IN ABS SOL	BRC-172, "Description"	
C1121	FR LH OUT ABS SOL	BRC-175, "Description"	
C1122	FR RH IN ABS SOL	BRC-172, "Description"	
C1123	FR RH OUT ABS SOL	BRC-175, "Description"	
C1124	RR LH IN ABS SOL	BRC-172, "Description"	
C1125	RR LH OUT ABS SOL	BRC-175, "Description"	
C1126	RR RH IN ABS SOL	BRC-172, "Description"	
C1127	RR RH OUT ABS SOL	BRC-175, "Description"	
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-178, "Description"	
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		
C1140	ACTUATOR RLY	BRC-179, "Description"	
C1142	PRESS SEN CIRCUIT	BRC-181, "DTC Description"	
C1143	ST ANG SEN CIRCUIT		
C1144	ST ANG SEN SIGNAL	BRC-184, "Description"	
C1145	YAW RATE SENSOR		
C1146	SIDE G-SEN CIRCUIT	BRC-165, "Description"	
C1155	BR FLUID LEVEL LOW	BRC-187, "Description"	
C1156	ST ANG SEN COM CIR	BRC-190, "Description"	
C1160	DECEL G SEN SET	BRC-191, "Description"	
C1163	ST ANGL SEN SAFE	BRC-192, "Description"	
C1164	CV1		
C1165	CV2		
C1166	SV1	BRC-193, "Description"	
C1167	SV2		
C1170	VARIANT CODING	BRC-162, "DTC Logic"	

< ECU DIAGNOSIS INFORMATION >

[TYPE 2]

DTC	Items (CONSULT screen terms)	Reference	
C1187	ABS DIFLOCK CONTROLLER NG	BRC-196, "Description"	А
U1000	CAN COMM CIRCUIT	BRC-197, "Description"	

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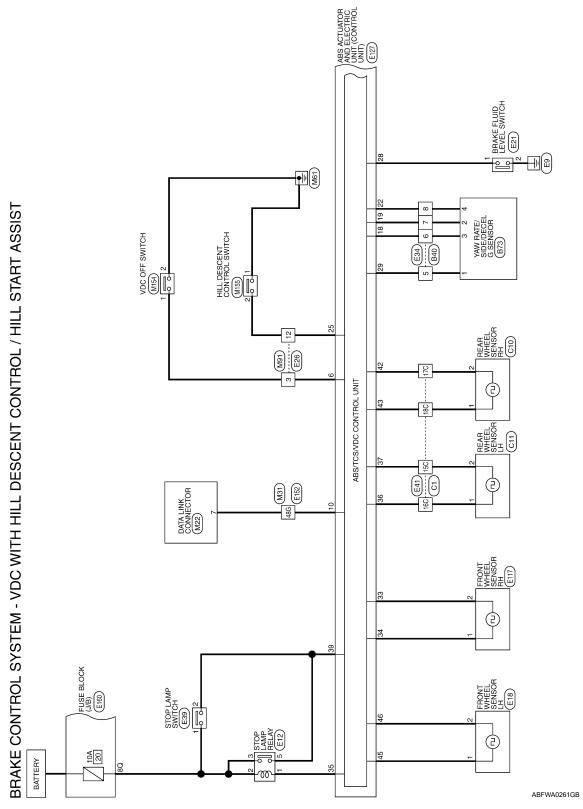
< WIRING DIAGRAM >

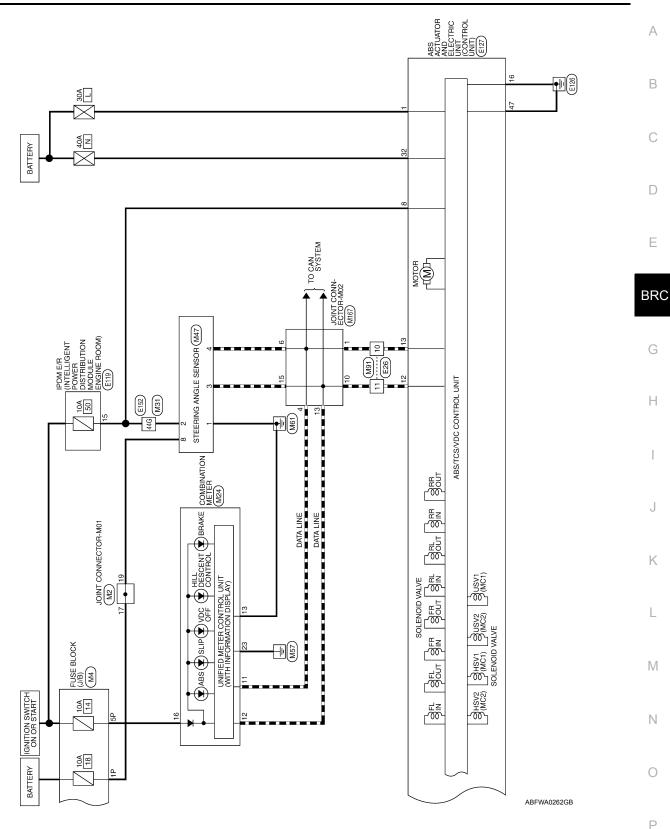
WIRING DIAGRAM

BRAKE CONTROL SYSTEM - VDC

Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST







BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

[TYPE 2]

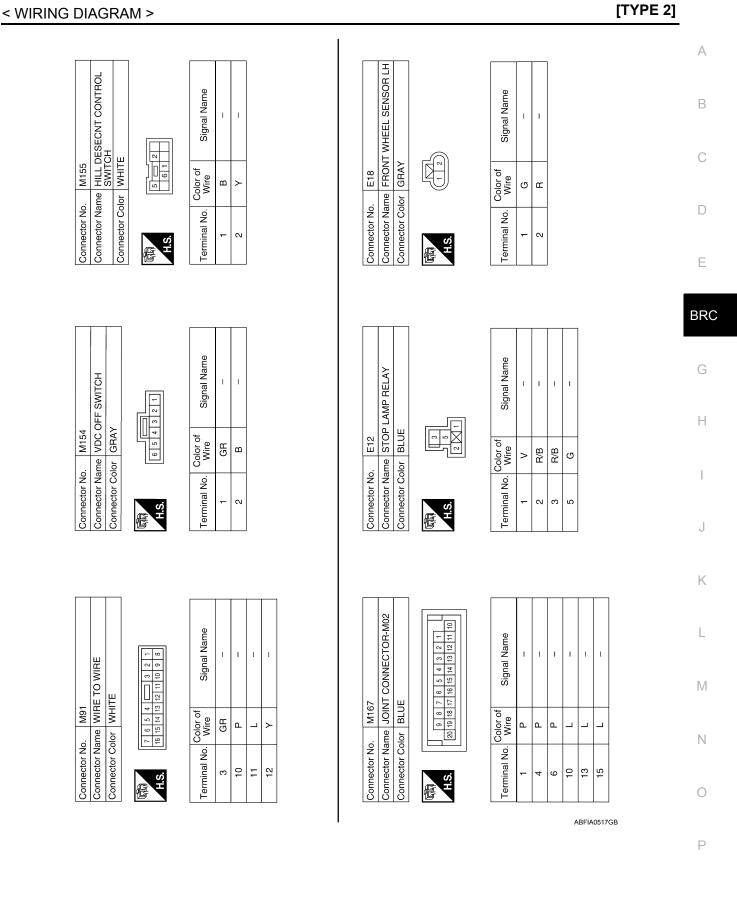
Revision: October 2015

BRC-217

Connector No. M4 Connector No. M4 Connector Name FUSE BLOCK (J/B) Connector Color WHTE Terminal No. Color of Vire Signal Name 1P R/B - 2P W/G - 5P W/G - 5D W/G - 66 86 76 76 76 76 76 77 86 61 60 62 76 76 76 77 86 77 86 76 76 77 86 77 86 76 76 77 86 77 86 76 76 77 86 76 76 77 76 76 76 76 76 77 76 76 76 77 76 77 76 77 76 76 76 77 76 76 76 76 76 <th< th=""><th>Connector No. M22 Connector Name DATA LINK CONNECTOR Connector Color WHITE</th><th>Terminal No. Color of Signal Name 7 W -</th><th>Connector No. M47 Connector Name STEERING ANGLE SENSOR Connector Name STEERING ANGLE SENSOR Connector Color WHITE Image: Steer of the st</th></th<>	Connector No. M22 Connector Name DATA LINK CONNECTOR Connector Color WHITE	Terminal No. Color of Signal Name 7 W -	Connector No. M47 Connector Name STEERING ANGLE SENSOR Connector Name STEERING ANGLE SENSOR Connector Color WHITE Image: Steer of the st
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	ector No. M4 ector Name FUSE ector Color WHIT		ector No. M31 ector Name WIRE ector Color WHIR 2005200 1006200 610600590 610600590 610600590 610600590 610600590 610600590 610600590 61000000 6100000000000000000000000000

BRAKE CONTROL SYSTEM - VDC

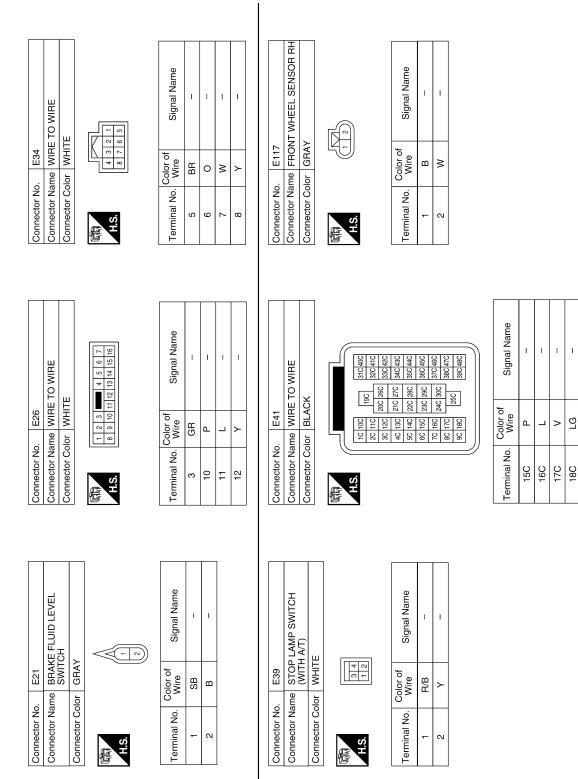
< WIRING DIAGRAM >



Revision: October 2015

BRAKE CONTROL SYSTEM - VDC

[TYPE 2]



ABFIA0518GB

of Signal Name	I	I	HDC_SW	1	I	FLUID_LEVEL_SW	CLUS_GND	1	1	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				FH_LH_SIG	MOTOR GND											B
Color of Wire	1	I	≻	1	ı	GB	BB	I	1	>	8	m	>	Γ	٩	1	SB	I	1	>	<u>د</u>	3	¢	ופ	<u>د</u>	в											D
Terminal No.	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	ç v		ç 1	46	47											E
							ſ	4 15 16 30 31 16	7 2																											1	BRC
	ELECTRIC UNIT (CONTROL	[]	CK					7 8 9 10 11 12 13 14	<u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u> <u>5</u>	05 39 40 41 42 43 44 45		Signal Name	MOTOR SLIPPI V		1					- <u>-</u>	IGN	I	DIAG_K	I	CAN-H	CAN-L	I	Ι	VALVE ECU GND	I	CAN2-H	CAN2-L	I	I	CLUS_SUP		G
		-	DIOR BLACK					4 5 6 .	2 1 2 0	20 3/		Color of Wire	ď	: 1	I	1	1	0	5		ЧŃ	I	SB	I	_	٩	1	Ι	В	I	0	Μ	Ι	I	≻		I
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TIGENT				[3			Signal Name	ABS IGN SUPPLY																												L
E119 IPDM E/R /INT			WHITE		9 8 7 6 - 5 4 18 17 16 15 14 13 12 13 11		1			_																											Μ
	Connector Name	_	Connector Color V		9 8 1			I No. Wire	W/R																												Ν
Connector No.	Connect		Connect	ą	NAPA	H.S.		Terminal No.	15																												0

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< WIRING DIAGRAM >

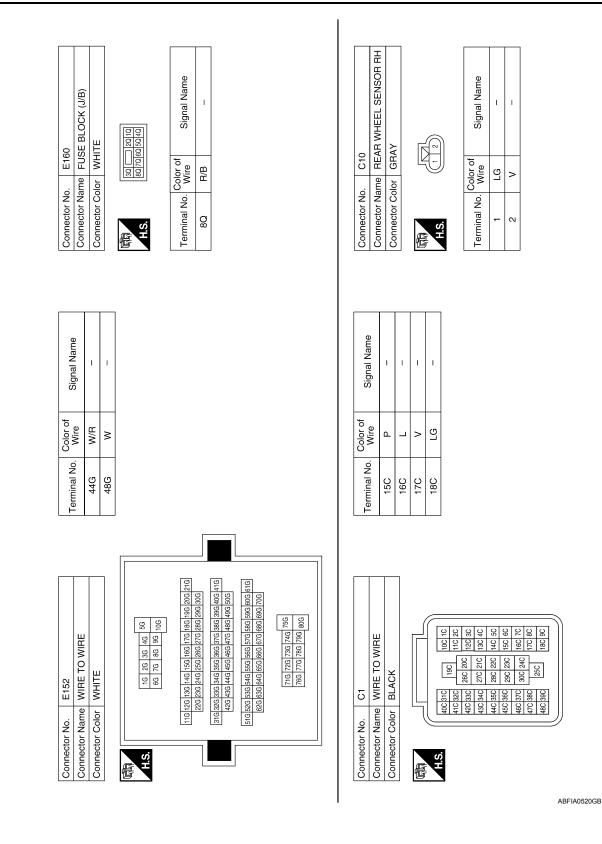
[TYPE 2]

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BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

[TYPE 2]



Terminal No. Color of Vire Signal Name 1 BR CLU GND 2 W CAN-H 3 O CAN-H 4 Y CLU P
Terminal No. Wire 3 0 0 4 Y
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A ≤ 0 B B Co Co
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Signal Name
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< WIRING DIAGRAM >

[TYPE 2]

Revision: October 2015

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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

INFOID:000000007327984

[TYPE 2]

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation fre- quency	Looseness of front and rear axle	BRC-226, "Diag- nosis Procedure"	
queries	Wheel sensor and rotor system		
Incurrented nodel reaction	Brake pedal stroke	BRC-227, "Diag-	
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-228, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-229, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-230, "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-	ТСМ	<u>BRC-231, "Diag-</u> nosis Procedure"	
	ECM	<u>nooid i roccuire</u>	

NOTE:

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

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

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

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:000000007327985

[TYPE 2]

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u>, <u>"On-Vehicle</u> <u>Inspection and Service"</u>, Rear: <u>RAX-6</u>, <u>"Rear Axle Bearing"</u> (C200) or <u>RAX-18</u>, <u>"Rear Axle Bearing"</u> (M226).

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3. CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

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

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor. Refer to <u>BRC-237</u>, "Removal and Installation" or <u>BRC-238</u>, "Removal and Installation".
 - Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

- YES >> Perform self-diagnosis. Refer to <u>BRC-148</u>, "CONSULT Function (ABS)".
- NO >> Inspection End.

UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS > [TYPE 2]	
UNEXPECTED PEDAL REACTION	A
Diagnosis Procedure	
1. CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to BR-16, "Inspection and Adjustment".	
Is the stroke too large?	
YES >> • Bleed air from brake tube and hose. Refer to <u>BR-18, "Bleeding Brake System"</u> .	С
Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system	
fluid leakage, etc. Refer to <u>BR-16, "Inspection and Adjustment"</u> (brake pedal), <u>BR-11, "On Board</u> Inspection" (master cylinder), <u>BR-9, "Inspection"</u> (brake booster).	D
NO $>>$ GO TO 2	D
2. CHECK FUNCTION	
	E
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.	BRC
NO >> Check brake system.	
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THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000007327987

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

< SYMPTOM DIAGNOSIS >	[TYPE 2]	
ABS FUNCTION DOES NOT OPERATE		Δ
Diagnosis Procedure	INFOID:000000007327988	
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY		В
Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or wher Is the inspection result normal?	n driving.	С
YES >> Inspection End. NO >> Perform self-diagnosis. Refer to <u>BRC-148, "CONSULT Function (ABS)"</u> .		D

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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-148, "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 2]
VEHICLE JERKS DURING VDC/TCS/ABS CONTROL
Diagnosis Procedure
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-148, "CONSULT Function</u> (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 <u>EC-499, "CONSULT Function"</u>.
 TCM: Refer to <u>TM-156, "CONSULT Function (TRANSMISSION)"</u>. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-239, "Removal and Installation"</u>.

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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.	T I.'. '
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 and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal
VDC may not operate normally or the ABS warning lamp and SLIP indicator lamp may illuminate, when run- ning 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.)
SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.

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INFOID:000000007327993

< PRECAUTION > PRECAUTION PRECAUTIONS

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

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

WARNING:

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

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

WARNING:

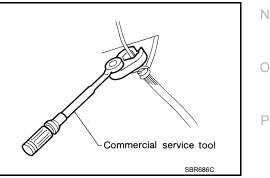
- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious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

Precaution for Brake System

CAUTION:

- Refer to <u>MA-18, "FOR USA AND CANADA : Fluids and Lubricants"</u> (United States and Canada) and <u>MA-20, "FOR MEXICO : Fluids and Lubricants"</u> (Mexico). 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-34, "Brake Burnishing"</u> (front disc brake) or <u>BR-39, "Brake Burnishing"</u> (rear disc brake). WARNING:



PRECAUTIONS

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

Precaution for Brake Control

INFOID:000000007327994

- 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.

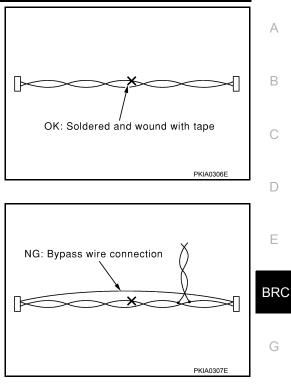
PRECAUTIONS

< PRECAUTION >

[TYPE 2]

• 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).

bypassed, characteristics of twisted wire will be lost.)



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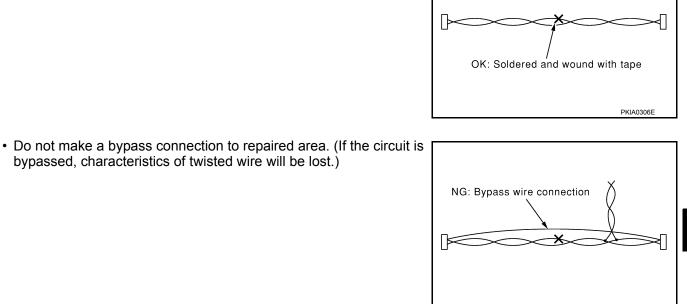
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PREPARATION PREPARATION

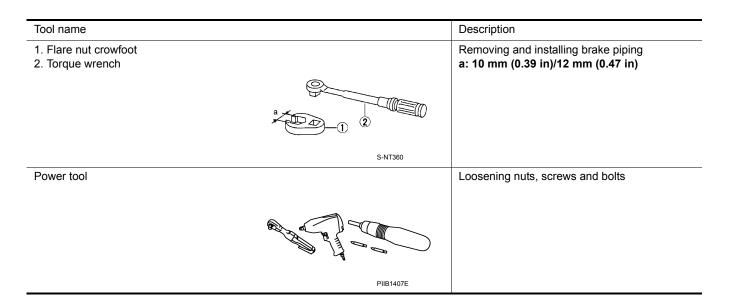
Special Service Tool

INFOID:000000007327996

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester	J-45741-BOX	Checking operation of ABS active wheel sen- sors
ST30031000 (—) Bearing puller	ZZA0700D	Removing sensor rotor

Commercial Service Tool



WHEEL SENSOR

< UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION WHEEL SENSOR

Removal and Installation

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SEC. 476 (3) 21 (2.1, 15) $(\mathbf{1})$ **1**21 (2.1, 15) C Q BRC 17.5 (1.8, 13) N·m (kg-m, ft-lb) WFIA0339E 1. Front wheel sensor Rear wheel sensor (C200) Rear wheel sensor (M226) 2. 3.

REMOVAL

- 1. Remove wheel sensor bolt.
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-35, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull the wheel sensor straight out, being careful to turn it as little as possible. **CAUTION:**
 - · Be careful not to damage the wheel sensor edge and sensor rotor teeth.
 - Do not pull on the wheel sensor harness.
- Disconnect wheel sensor harness connector, then remove the wheel sensor harness from the mounts to 3. remove the wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- Before installing 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.

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SENSOR ROTOR

Removal and Installation

FRONT

Removal and Installation

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-7</u>, "<u>Removal and Installation</u>".

REAR (M226)

Removal

- 1. Remove the axle shaft assembly. Refer to <u>RAX-19, "Removal and Installation"</u>.
- 2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

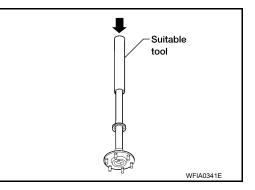
1. Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.

CAUTION:

Do not reuse the old sensor rotor.

 Install the axle shaft assembly. Refer to <u>RAX-19</u>, "<u>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.

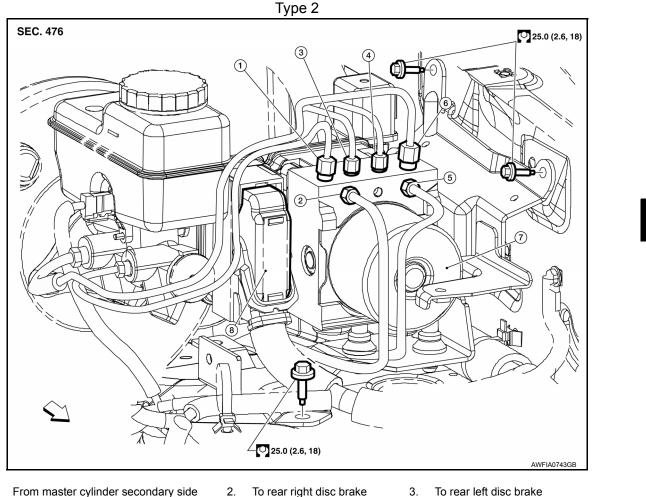


ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< UNIT REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- 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)
- 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)
 - Harness connector
- To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
- 6. From master cylinder primary side 18.2 N⋅m (1.9 kg-m, 13 ft-lb)
 <□ Front

REMOVAL

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.
- Do not remove actuator by holding harness.

NOTE:

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

1. Disconnect negative battery terminal. Refer to PG-80, "Removal and Installation".

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- 2. Remove air cleaner case assembly. Refer to <u>EM-25, "Exploded View"</u> (QR25DE) or <u>EM-140, "Exploded View"</u> (QV40DE).
- 3. Disconnect harness connector from ABS actuator and electric unit (control unit).
- 4. Separate brake tubes from ABS actuator and electric unit (control unit).
- 5. Remove bolts and ABS actuator and electric unit (control unit) with the bracket from the vehicle.
- 6. Remove bolt and bracket from the ABS actuator and electric unit (control unit).

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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< UNIT REMOVAL AND INSTALLATION >

INSTALLATION

Installation is in the reverse order of removal.

• Install bracket and bolt to ABS actuator and electric unit (control unit).

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

- After work is completed, bleed air from brake tube. Refer to <u>BR-18, "Bleeding Brake System"</u>.
- Adjust the neutral position of steering angle sensor. Refer to <u>BRC-125</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".
- Perform calibration of the decel G sensor (4WD models). Refer to <u>BRC-126, "CALIBRATION OF DECEL G</u> <u>SENSOR : Description"</u>.

CAUTION:

- To install, use flare nut crowfoot and torque wrench.
- Replace the ABS actuator if it has been dropped or sustained an impact.
- 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 install actuator by holding harness.
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.

STEERING ANGLE SENSOR

< UNIT REMOVAL AND INSTALLATION >

STEERING ANGLE SENSOR А Removal and Installation INFOID:000000007328001 REMOVAL В Remove the spiral cable. Refer to <u>SR-13</u>, "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-125, "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-125, "ADJUSTMENT OF STEERING ANGLE SEN-Ε SOR NEUTRAL POSITION : Special Repair Requirement".

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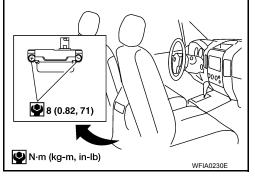
< UNIT REMOVAL AND INSTALLATION >

YAW RATE/SIDE/DECEL G SENSOR

Removal and Installation

REMOVAL

- 1. Remove center console rear base. Refer to IP-14. "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 yaw rate/side/decel G sensor (4WD models). Refer to <u>BRC-13.</u> <u>"CALIBRATION OF DECEL G SENSOR : Special Repair Requirement"</u>.

[TYPE 2]