SECTION BRAKE CONTROL SYSTEM

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VDC/TCS/ABS	
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< BASIC INSPECTION >

[VDC/TCS/ABS]

BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000009883578

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

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OVERALL SEQUENCE Inspection start Customer interview DTC is indicated DTC is not indicated Perform the self-diagnosis NO YES Is the activation applied to "Normal operating condition" Perform the YES Does warning lamp/ NO system diagnosis indicator lamp turn ON? Symptom Diagnosis Perform the self-diagnosis Perform the system diagnosis Malfunction part Repair/Replacement Final check NO (Perform the self-diagnosis again if DTC is indicated. Check that the repair is completed.) YES Inspection end JSFIA0010GB

DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis work sheet. Refer to <u>BRC-7</u>, "<u>Diagnostic Work Sheet</u>".

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-24</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-90, "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-108,</u> "Description".

Is the symptom a normal operation?

YES >> Inspection End

NO >> GO TO 5

5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-80, "Description".
- · Brake warning lamp: Refer to BRC-81, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-82</u>, "Description".

• SLIP indicator lamp: Refer to <u>BRC-84, "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-24, "CONSULT Function (ABS)"</u>.

Is no other DTC present and the repair completed?

YES >> Inspection End NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000009883579

[VDC/TCS/ABS]

Customer name MR/MS	Model & Year	Model & Year			
Engine #	Trans.		Mileage		
Incident Date	Manuf. Date	Manuf. Date		9	
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	Low friction road (□Snow □Gravel □Other) Bumps / potholes			
Driving conditions		□ High speed cornering □ Vehicle speed: Greater than 10 km/h (6 MPH) □ Vehicle speed: 10 km/h (6 MPH) or less			
Applying brake conditions	□ Suddenly □ Gradually				
Other conditions	□ Operation of electrical equipment □ Shift change □ Other descriptions				

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INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000009883580

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

Neutral position adjustment for the steering angle sensor

Calibration of the decel G sensor

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

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

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement", GO TO 2

2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

>> Refer to <u>BRC-9. "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement"</u>. 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)	×
Removing/Installing steering angle sensor	x
Replacing steering angle sensor	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	×
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		А
2.PERFORM THE NEUTRAL POSITION ADJUSTME	NT FOR THE STEERING ANGLE SENSOR	
 On the CONSULT screen, touch "WORK SUPPOR Touch "START". CAUTION: 	T" and "ST ANGLE SENSOR ADJUSTMENT" in order.	В
Do not touch steering wheel while adjusting ste 3. After approximately 10 seconds, touch "END". NOTE:	eering angle sensor.	С
 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.	D
Be sure to perform above operation.		Е
>> GO TO 3		
3.CHECK DATA MONITOR		
1. Run vehicle with front wheels in straight-ahead pos	sition, then stop.	BRC
2. Select "DATA MONITOR". Then make sure "STR A	NGLE SIG" is within 0±2.5°.	
Is the steering angle within the specified range? YES >> GO TO 4		G
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 a	nd electric unit (control unit) and FCM	Н
ABS actuator and electric unit (control unit): Refer to		
• ECM: Refer to EC-49, "CONSULT Function".		1
Are the memories erased?		
YES >> Inspection End NO >> Check the items indicated by the self-diagn	nosis	
CALIBRATION OF DECEL G SENSOR		J
CALIBRATION OF DECEL G SENSOR : D	escription	К
Refer to the table below to determine if calibration of the	e decel G sensor is required	ΓX.
	×: Required –: Not required	
Situation	Calibration of decel G sensor	L
Removing/Installing ABS actuator and electric unit (control unit)	_	
Replacing ABS actuator and electric unit (control unit)	x	M
Removing/Installing steering components	_	1 4 1
Replacing steering components	_	

CALIBRATION OF DECEL G SENSOR CAUTION:

Removing/Installing suspension components

Removing/Installing yaw rate/side/decel G sensor

Replacing yaw rate/side/decel G sensor

Replacing suspension components

Change tires to new ones

Adjusting wheel alignment

Tire rotation

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

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INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

(Calibration cannot be done without CONSULT)

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

2.PERFORM CALIBRATION OF DECEL G SENSOR

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

After approximately 60 seconds, it ends automatically.

- 4. Turn ignition switch OFF, then turn it ON again.
- CAUTION: Be sure to perform above operation.

>> GO TO 3

3. CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.

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

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.

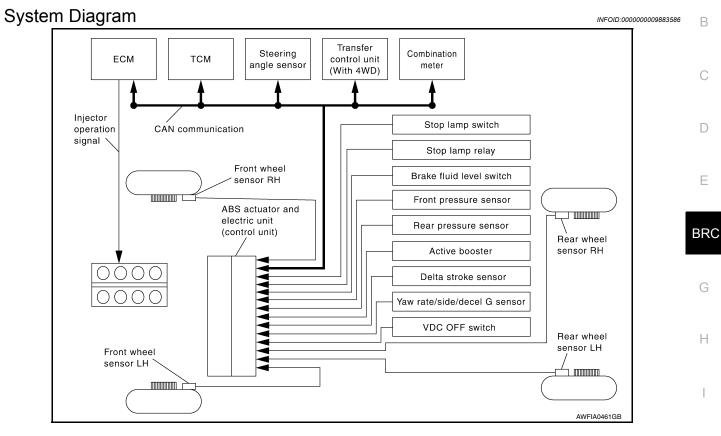
ABS actuator and electric unit (control unit): Refer to <u>BRC-24, "CONSULT Function (ABS)</u>".

ECM: Refer to <u>EC-49</u>, "CONSULT Function".

Are the memories erased?

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

SYSTEM DESCRIPTION VDC



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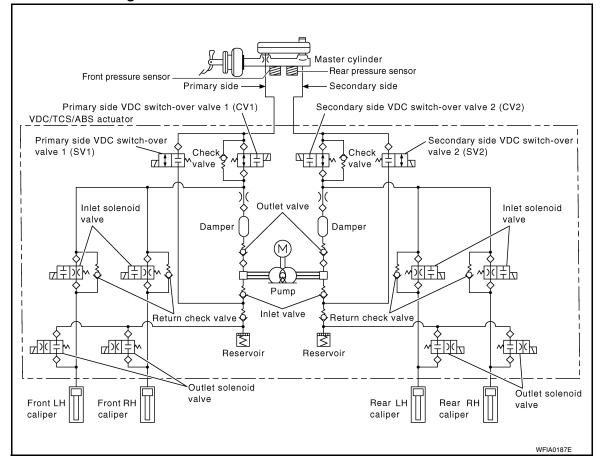
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Hydraulic Circuit Diagram



System Description

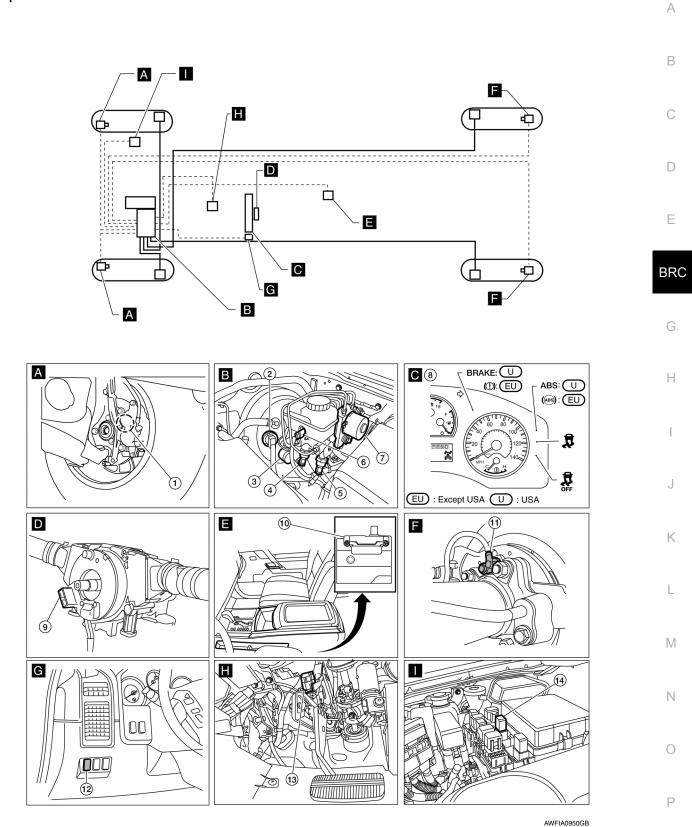
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- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure sensors. Using information from yaw rate/side/decel G sensor and wheel sensor, VDC judges driving condition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

INFOID:000000009883587

Component Parts Location

INFOID:000000009883589



VDC

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (con- 8. trol unit) E125
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor M17 (view with steering wheel removed)

Revision: August 2013

BRC-13

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- 10. Yaw rate/side/decel G sensor M108 11. Rear wheel sensor LH C11 Rear wheel sensor RH C10

VDC

12. VDC OFF switch M148

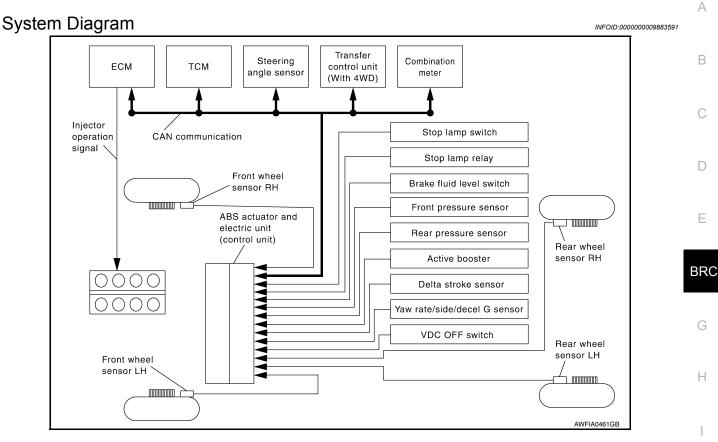
13. Stop lamp switch E38 (column shift), 14. Stop lamp relay E12 E42 (floor shift)

Component Description

INFOID:000000009883590

Component parts		Reference	
	Pump	BRC-38. "Description"	
	Motor	BRC-36, Description	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-54, "Description"	
	Solenoid valve	BRC-47, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-68, "Description"	
Wheel sensor		BRC-29, "Description"	
Yaw rate/side/decel G sensor		BRC-40, "Description"	
Stop lamp switch		BRC-45, "Description"	
Front pressure sensor		DDC 56 "Description"	
Rear pressure sensor		BRC-56, "Description"	
Steering angle sensor		BRC-59, "Description"	
Brake fluid level switch		BRC-62, "Description"	
Active booster		BRC-71, "Description"	
Delta stroke sensor		BRC-74, "Description"	
VDC OFF switch		BRC-78, "Description"	
ABS warning lamp		BRC-80, "Description"	
Brake warning lamp	BRC-81, "Description"		
VDC OFF indicator lamp		BRC-82, "Description"	
SLIP indicator lamp		BRC-84, "Description"	

TCS



System Description

INFOID:000000009883592

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

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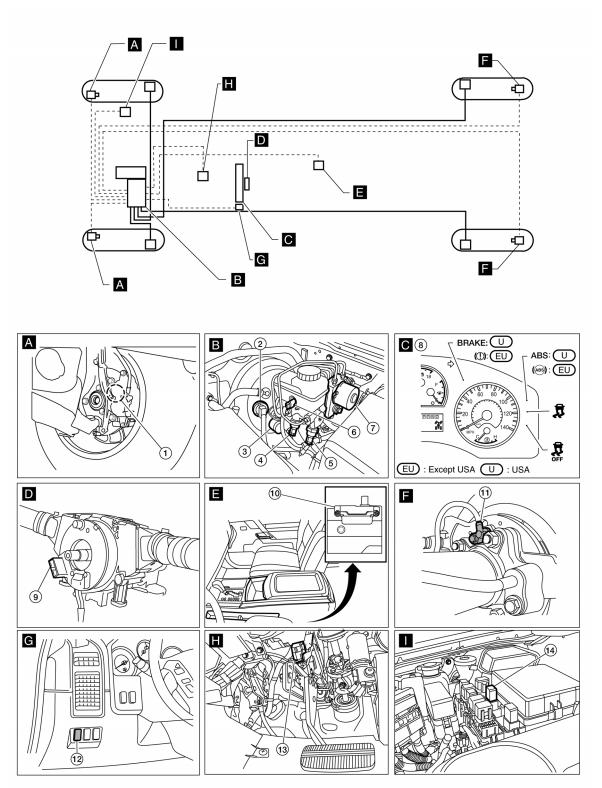
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TCS

Component Parts Location

INFOID:000000009883593

[VDC/TCS/ABS]



AWFIA0950GB

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (con- 8. trol unit) E125
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor M17 (view with steering wheel removed)

Revision: August 2013

BRC-16

[VDC/TCS/ABS]

- 10. Yaw rate/side/decel G sensor M108 11. Rear wheel sensor LH C11
 - 11. Rear wheel sensor LH C11 Rear wheel sensor RH C10

TCS

 Stop lamp switch E38 (column shift), 14. Stop lamp relay E12 E42 (floor shift)

Component Description

12. VDC OFF switch M148

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INFOID:000000009883594

Component parts		Reference	С
	Pump	BRC-38, "Description"	
	Motor		D
ABS actuator and electric unit (control unit)	Actuator relay	BRC-54, "Description"	
	Solenoid valve	BRC-47, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-68, "Description"	E
Wheel sensor		BRC-29. "Description"	
Yaw rate/side/decel G sensor		BRC-40, "Description"	BRC
Stop lamp switch		BRC-45, "Description"	
Front pressure sensor			G
Rear pressure sensor		BRC-56. "Description"	G
Steering angle sensor		BRC-59, "Description"	
Brake fluid level switch		BRC-62, "Description"	Н
Active booster		BRC-71, "Description"	
Delta stroke sensor		BRC-74, "Description"	
VDC OFF switch		BRC-78, "Description"	
ABS warning lamp	BRC-80, "Description"		
Brake warning lamp	BRC-81, "Description"	J	
VDC OFF indicator lamp	BRC-82, "Description"		
SLIP indicator lamp	BRC-84, "Description"		

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System Diagram INFOID:000000009883595 Transfer Steering Combination ECM тсм control unit angle sensor meter (With 4WD) Injector Stop lamp switch operation CAN communication signal Stop lamp relay Front wheel Brake fluid level switch sensor RH Front pressure sensor ABS actuator and electric unit Rear pressure sensor (control unit) Rear wheel Active booster sensor RH Delta stroke sensor Yaw rate/side/decel G sensor VDC OFF switch Rear wheel sensor LH Front wheel sensor LH חחחחחחח ר

ABS

System Description

INFOID:000000009883596

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

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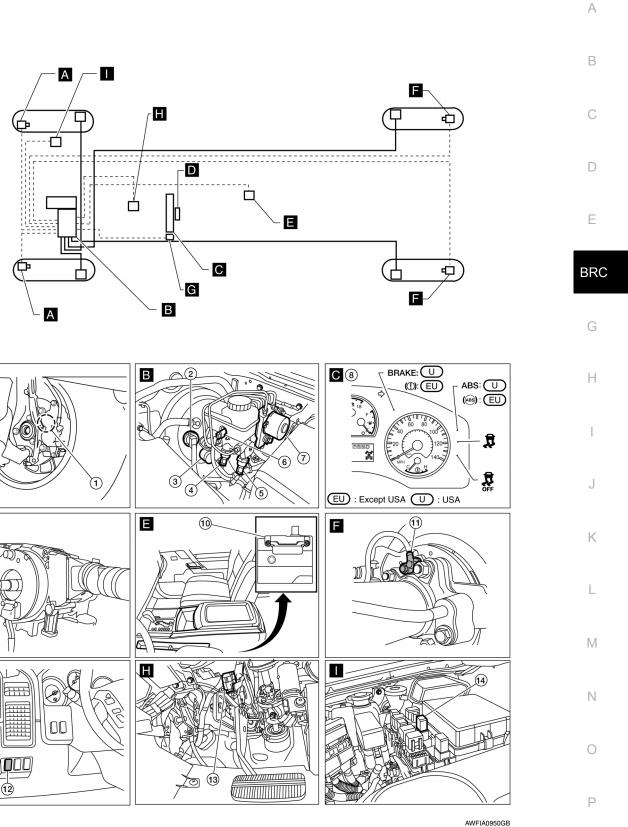
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Component Parts Location

[VDC/TCS/ABS]

INFOID:000000009883597



ABS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (con- 8. trol unit) E125
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor M17 (view with steering wheel removed)

Revision: August 2013

BRC-19

- 10. Yaw rate/side/decel G sensor M108 11. Rear wheel sensor LH C11
 - 11. Rear wheel sensor LH C11 Rear wheel sensor RH C10

12. VDC OFF switch M148

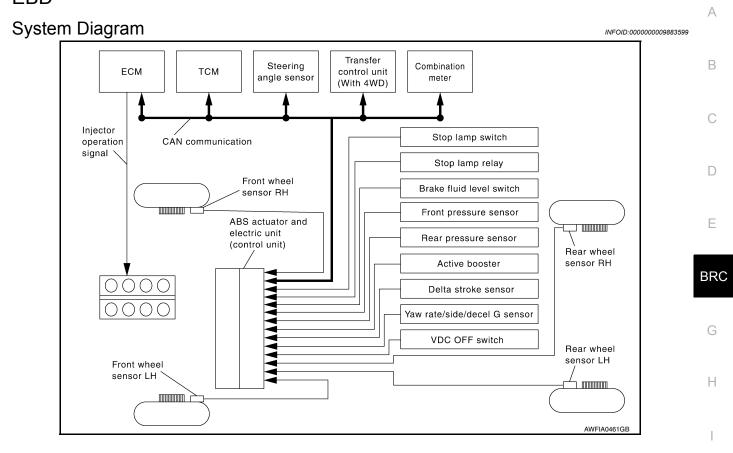
 Stop lamp switch E38 (column shift), 14. Stop lamp relay E12 E42 (floor shift)

Component Description

INFOID:000000009883598

Component parts		Reference	
	Pump	BRC-38. "Description"	
	Motor	BRC-36, Description	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-54, "Description"	
	Solenoid valve	BRC-47, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-68, "Description"	
Wheel sensor		BRC-29, "Description"	
Yaw rate/side/decel G sensor		BRC-40, "Description"	
Stop lamp switch		BRC-45, "Description"	
Front pressure sensor		DDC 56 "Description"	
Rear pressure sensor		BRC-56, "Description"	
Steering angle sensor		BRC-59, "Description"	
Brake fluid level switch		BRC-62, "Description"	
Active booster		BRC-71, "Description"	
Delta stroke sensor		BRC-74, "Description"	
VDC OFF switch		BRC-78, "Description"	
ABS warning lamp		BRC-80, "Description"	
Brake warning lamp	BRC-81, "Description"		
VDC OFF indicator lamp		BRC-82, "Description"	
SLIP indicator lamp		BRC-84, "Description"	

[VDC/TCS/ABS]



EBD

System Description

INFOID:000000009883600

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

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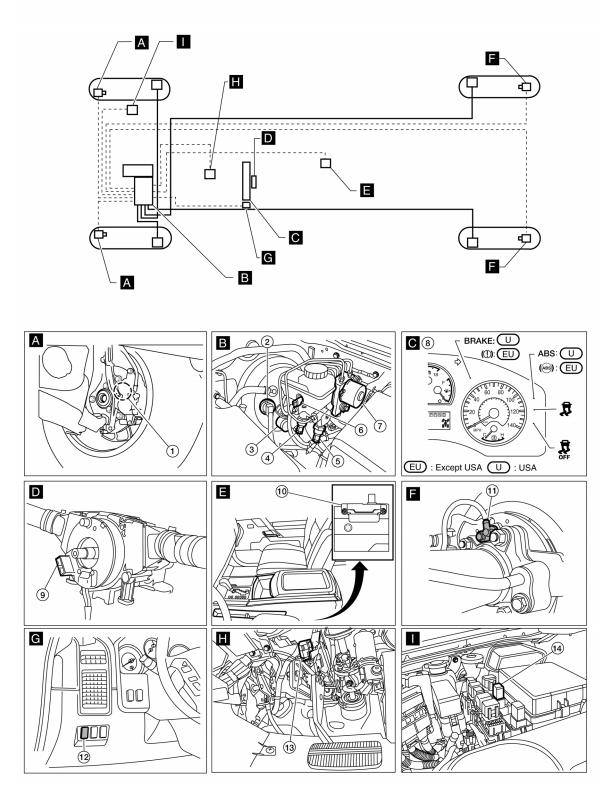
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Component Parts Location

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[VDC/TCS/ABS]



EBD

AWFIA0950GB

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (con- 8. trol unit) E125
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor M17 (view with steering wheel removed)



[VDC/TCS/ABS]

- 10. Yaw rate/side/decel G sensor M108 11. Rear wheel sensor LH C11
 - 11. Rear wheel sensor LH C11 Rear wheel sensor RH C10

EBD

 Stop lamp switch E38 (column shift), 14. Stop lamp relay E12 E42 (floor shift)

Component Description

12. VDC OFF switch M148

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Compo	Reference	С	
	Pump	BRC-38, "Description"	_
	Motor		D
ABS actuator and electric unit (control unit)	Actuator relay	BRC-54, "Description"	_ D
	Solenoid valve	BRC-47, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-68, "Description"	E
Wheel sensor		BRC-29, "Description"	
Yaw rate/side/decel G sensor		BRC-40, "Description"	BR
Stop lamp switch		BRC-45, "Description"	_
Front pressure sensor		BRC-56, "Description"	G
Rear pressure sensor		BRC-56, Description	G
Steering angle sensor		BRC-59, "Description"	
Brake fluid level switch		BRC-62, "Description"	H
Active booster		BRC-71, "Description"	
Delta stroke sensor		BRC-74, "Description"	_
VDC OFF switch		BRC-78, "Description"	- 1
ABS warning lamp	BRC-80, "Description"		
Brake warning lamp		BRC-81, "Description"	J
VDC OFF indicator lamp	BRC-82, "Description"		
SLIP indicator lamp	BRC-84, "Description"		

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< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

CONSULT Function (ABS)

INFOID:000000009883603

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 Monitor	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-diagnostic Result

 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-90, "DTC No. Index"</u>.

DATA MONITOR

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item	Data	monitor item sel	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR RH IN SOL (On/Off)	-	×	×	Front RH IN ABS solenoid (On/Off) status is displayed.
FR RH OUT SOL (On/Off)	-	×	×	Front RH OUT ABS solenoid (On/Off) status is displayed.
FR LH IN SOL (On/Off)	-	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.
FR LH OUT SOL (On/Off)	-	×	×	Front LH OUT ABS solenoid (On/Off) status is displayed.
RR RH IN SOL (On/Off)	-	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	-	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	_	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	-	×	×	Rear LH OUT ABS solenoid (On/Off) status is displayed.
EBD WARN LAMP (On/Off)	-	_	×	Brake warning lamp (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	_	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	_	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	_	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	_	×	×	VDC OFF Lamp (On/Off) status is displayed.
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 (V) supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR (1, 2, 3, 4, 5)	×	×	×	Gear position (1, 2, 3, 4, 5) judged by transmission range switch signal is displayed.
SLCT LVR POSI (P, N, D)	×	×	×	Shift position (P, N, D) judged by transmission range switch signal.
ENGINE SPEED (rpm)	×	×	×	Engine speed (rpm) judged by CAN communication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate (d/s) detected by yaw rate sensor is displayed.
R POSI SIG (On/Off)	-	_	×	Reverse shift position (On/Off) judged by transmis- sion range switch signal.
N POSI SIG (On/Off)	-	_	×	Shift position judged by transmission range switch signal.
P POSI SIG (On/Off)	_	_	×	Shift position judged by transmission range switch signal.
CV1 (On/Off)	-	_	×	Front side switch-over solenoid valve (cut valve) (On/ Off) status is displayed.

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Item	Data	a monitor item sel	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
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 com- munication 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.
BST OPER SIG (On/Off)	-	_	×	Active booster operation (On/Off) status is displayed.
PRESS SENSOR (bar)	×	_	×	Brake pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)	-	_	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	-	_	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	-	_	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	-	_	×	VDC operation (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	-	_	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	-	_	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	_	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	_	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	_	×	Brake fluid level switch (On/Off) status is displayed.
PRESS SEN2 (bar)	-	_	×	Brake pressure detected by pressure sensor is displayed.
DELTA S SEN (mm)	-	_	×	The amount of stroke sensor movements in the active booster detected by DELTA S SEN is displayed.
RELEASE SW NO (On/Off)	-	_	×	Release switch signal (On/Off) status is displayed. "On" indicates that the brake pedal is depressed. "Off" indicates that the brake pedal is released.
RELEASE SW NC (On/Off)	-	_	×	Release switch signal (On/Off) status is displayed. "Off" indicates that the brake pedal is depressed. "On" indicates that the brake pedal is released.
OHB FAIL (On/Off)	-	_	×	OHB fail status is displayed.
HBA FAIL (On/Off)	-	_	×	HBA fail status is displayed.

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[VDC/TCS/ABS]

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Item	Data	monitor item sel	ection	
(Unit) ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
OHB SIG (On/Off)	-	-	×	OHB operation (On/Off) status is displayed.
HBA SIG (On/Off)	-	-	×	HBA operation (On/Off) status is displayed.
STP OFF RLY (On/Off)	-	-	×	Stop lamp relay signal (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

Conditions	Description	
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be per- formed. Refer to <u>BRC-8, "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u> .	G
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-9.</u> "CALIBRATION OF DECEL G SENSOR : Description".	Н

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 "MAIN SIGNALS" for each test item.
- For ABS solenoid valve, touch "Up", "Keep", and "Down" on the display screen. For ABS solenoid valve (ACT), touch "Up", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

Operation		ABS solenoid valve			ABS solenoid valve (ACT)			
Op	eration	Up	Keep	Down	Up	ACT UP	ACT KEEP	
	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 SUL	RR RH OUT SOL	Off	Off	On*	_	_	_	

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Operation		AE	S solenoid va	alve	ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
RR LH SOL	RR LH IN SOL	Off	On	On	_	—	—
KK LH SOL	RR LH OUT SOL	Off	Off	On*	_	—	—
	RR RH IN SOL	Off	On	On	Off	Off	Off
REAR SOL	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
REAR SUL	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off
	FR RH IN SOL	_	_	—	Off	Off	Off
	FR RH OUT SOL	_	_	—	Off	Off	Off
FR RH ABS SOLENOID (ACT)	CV1	_			Off	On	On
	SV1	_	_	_	Off	On*	Off
	FR LH IN SOL	_	_	_	Off	Off	Off
	FR LH OUT SOL	_	_		Off	Off	Off
FR LH ABS SOLENOID (ACT)	CV1	_	_		Off	On	On
	SV1	_	_		Off	On*	Off
	RR RH IN SOL	_	_		Off	Off	Off
	RR RH OUT SOL	_	_	_	Off	Off	Off
RR RH ABS SOLENOID (ACT)	CV2				Off	On	On
	SV2		_		Off	On*	Off
	RR LH IN SOL	_	—		Off	Off	Off
	RR LH OUT SOL	_	—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	CV2	_	_	_	Off	On	On
	SV2	_	_	—	Off	On*	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 operates as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

BOOSTER DRIVE

• Touch "Up" and "Down" on the screen. Check that booster drive operates as shown in table below. CAUTION:

Perform active test subject to the conditions below.

- Do not operate brake pedal during active test.
- Make sure the engine revolution is over 500 rpm.
- Make sure the vehicle is not moving.

Operation	Up	Down
BST OPER SIG	On	Off
PRESS SENSOR	50 ± 5 bar	0 bar
PRESS SEN2	50 ± 5 bar	0 bar
STOP LAMP SW	On	Off
STP OFF RLY	Off	Off

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

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

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.		E
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	BRC
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric unit (control unit)	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open. Or when the sensor power voltage is outside the standard.		G
DTC CC	NFIRMATION PROCE	DURE		
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS		Η
Check th	e self-diagnosis results.			
	Self-diagnosis			
	RR RH SENS			1
	RR LH SENS			0
	FR RH SENS			
	displayed on the self-diag			Κ
YES		procedure. Refer to <u>BRC-29, "Diagnosis Proced</u>	ure".	L
Diagno	sis Procedure		INFOID:00000009883606	
0				D. 4
Degerdin	a Wiring Diagram inform	tion refer to PRC 02 "Wiring Diagram"		M
Regardin	ig winng Diagram informa	ation, refer to <u>BRC-92. "Wiring Diagram"</u> .		
CAUTIO	N·			Ν
	heck between wheel se	nsor terminals.		
1.com	NECTOR INSPECTION			0
1. Disc		and electric unit (control unit) connector and whe	eel sensor of malfunctioning	0
		nation, disconnection, looseness or damage.		Р
Is the ins	pection result normal?			
	>> GO TO 2			
-	>> Repair or replace as n	•		
	CK WHEEL SENSOR OU			
		nsor tester (J-45741) to wheel sensor using app sensor tester power switch.	ropriate adapter.	

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

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-113, "Removal and Installation"</u>.

3.CHECK TIRES

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

Is the inspection result normal?

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5. "On-Vehicle Inspection and Service"</u> (front) or <u>RAX-5.</u> "On-Vehicle Inspection" (rear).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-6, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

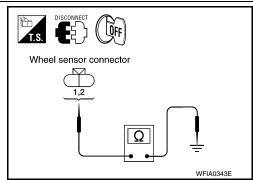
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor connector terminals and ground.

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.

Wheel sensor	ABS actuato electric unit (co		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
- Franklik		45	F40	2	
Front LH	46 E18	ETO	1		
Front RH	E125	34	E117	2	
		33		1	Yes
Rear LH		37	C11	1	165
		36	CII	2	
Rear RH		42	C10	1	
		43		2	

Is the inspection result normal?

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

[VDC/TCS/ABS] < DTC/CIRCUIT DIAGNOSIS > YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation". А NO >> Repair the circuit. Component Inspection INFOID:000000009883607 В **1.**CHECK DATA MONITOR On "DATA MONITOR", select "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR", and "RR RH SEN-SOR", and check the vehicle speed. Vehicle speed (DATA MONITOR) Wheel sensor D FR LH SENSOR FR RH SENSOR Nearly matches the speedometer display (±10% or less) Е **RR LH SENSOR RR RH SENSOR** Is the inspection result normal? BRC YES >> Inspection End >> Go to diagnosis procedure. Refer to <u>BRC-29, "Diagnosis Procedure"</u>. NO Special Repair Requirement INFOID:000000009883608 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-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-9, "CALIBRATION OF DECEL G SENSOR : Description". Κ >> END L Μ Ν

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

INFOID:000000009883610

INFOID:000000009883609

[VDC/TCS/ABS]

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-32, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883611

Regarding Wiring Diagram information, refer to <u>BRC-92, "Wiring Diagram"</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

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> Repair or replace as necessary.	
CHECK WHEEL SENSOR OUTPUT SIGNAL	
. Connect ABS active wheel sensor tester (J-45741) to wheel sensor tester power switch.	sor using appropriate adapter.
NOTE: The green POWER indicator should illuminate. If the POWER in battery in the ABS active wheel sensor tester before proceeding.	ndicator does not illuminate, replace the
Spin the wheel of the vehicle by hand and observe the red SEN sensor tester. The red SENSOR indicator should flash on and off NOTE:	
If the red SENSOR indicator illuminates but does not flash, rev retest.	erse the polarity of the tester leads and
Does the ABS active wheel sensor tester detect a signal?	
YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to <u>BRC-113, "Removal</u>	and Installation".
CHECK TIRES	
Check the inflation pressure, wear and size of each tire.	
s the inspection result normal?	
YES >> GO TO 4 NO >> Adjust tire pressure or replace tire(s).	
CHECK WHEEL BEARINGS	
Check wheel bearing axial end play. Refer to <u>FAX-5, "On-Vehicle Ir</u> <u>On-Vehicle Inspection"</u> (rear).	ispection and Service" (front) or RAX-5.
s the inspection result normal?	
YES >> GO TO 5	
NO >> Repair or replace as necessary. Refer to <u>FAX-6, "Rem</u> <u>"Removal and Installation"</u> (rear).	noval and Installation" (front) or RAX-7.
CHECK WIRING HARNESS FOR SHORT CIRCUIT	
 Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Check continuity between wheel sensor connector terminals 	
and ground.	Wheel sensor connector
Continuity should not exist.	
s the inspection result normal?	
YES >> GO TO 6	
NO >> Repair the circuit.	
	WFIA0343E
CHECK WIRING HARNESS FOR OPEN CIRCUIT	
. Check continuity between ABS actuator and electric unit (contro	l unit) connector and the malfunctioning

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Wheel sensor	ABS actuato electric unit (cor		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	2	
		46	LIU	1	
Front RH		34	E117	2	
		33		1	Yes
Rear LH	- L 125	37	C11	1	165
		36	CII	2	
Dear DH	42 C10 43 C10	42	C10	1	
		010	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:000000009883612

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-42. "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000009883613

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-8. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

INFOID:000000009883614 Supplies electric power to the ABS actuator and electric unit (control unit). В DTC Logic INFOID:00000009883615 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-35, "Diagnosis Procedure"</u>. Н >> Inspection End NO **Diagnosis** Procedure INFOID:000000009883616 Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram". 1.CONNECTOR INSPECTION 1. Turn ignition switch OFF. Κ Disconnect ABS actuator and electric unit (control unit) connector. 2. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals. L 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-24, "CONSULT Function (ABS)". Is any item indicated on the self-diagnosis display? Μ 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 Ν GROUND CIRCUIT 1. Turn ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) connector. 2. 3. Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 4 and ground. Ρ ABS actuator and electric unit (control unit) Condition Voltage 4 LÕN Connector Terminal Battery voltage Ignition switch: ON F125 4 Ground

Approx. 0V

BRC-35

Ignition switch: OFF

Revision: August 2013

	C1109 POWER	AND	GROUND	SYSTEN
< DTC/CIRCUIT DIAGNO	SIS >			

C1109 POWER AND GROUND SYSTEM

Description

А

[VDC/TCS/ABS]

AWFIA0015Z

2014 Titan NAM

C1109 POWER AND GROUND SYSTEM

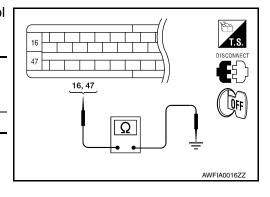
< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

4. Turn ignition switch OFF.

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

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



Is the inspection result normal?

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

Special Repair Requirement

INFOID:000000009883617

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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

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

DTC Logic

INFOID:000000009883618

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	- 9				
DTC DE	TECTION LOGIC				
DTC	Display item	Malfunction detected condition	Possible cause		
C1110	CONTROLLER FAILURE	When there is an internal malfunction in the ABS actuator and electric unit (control unit).	ABS actuator and electric unit		
C1170	VARIANT CODING	n a case where VARIANT CODING is different. (control unit)			
DTC CC	ONFIRMATION PROCE	DURE			
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS			
Check th	ne self-diagnosis results.				
	Self-diagnosis				
	CONTROLLER F				
·	VARIANT CO				
	displayed on the self-diag				
YES NO	> Proceed to diagnosis> Inspection End	procedure. Refer to <u>BRC-37, "Diagnosis Proced</u>	<u>ure"</u> .		
Diagno	sis Procedure		INFOID:00000000988361		
Oracia	<u>tion"</u> .	r and electric unit (control unit). Refer to <u>BRC-</u>	116, "Removal and Installa		
Specia	I Repair Requiremer	nt	INFOID:0000000988362		
1.ADJL	ISTMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION			
and elec		adjustment for the steering angle sensor when fer to <u>BRC-8, "ADJUSTMENT OF STEERING A</u>			
	>> GO TO 2				
2.CALI	BRATION OF DECEL G S	SENSOR			
Always p	perform calibration of dece	el G sensor when replacing the ABS actuator an OF DECEL G SENSOR : Description".	d electric unit (control unit)		
	>> END				

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:000000009883621

[VDC/TCS/ABS]

PUMP

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

MOTOR

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

DTC Logic

INFOID:000000009883622

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
		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-38, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883623

Regarding Wiring Diagram information, refer to <u>BRC-92, "Wiring Diagram"</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-24</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-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 operates as shown in table below.

Operation	On	Off	K
MOTOR RELAY	On	Off	
ACTUATOR RLY	On	On	

Is the inspection result normal?

YES >> Inspection End

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

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

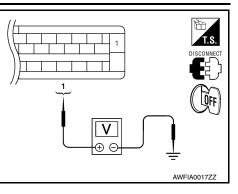
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

BRC-39

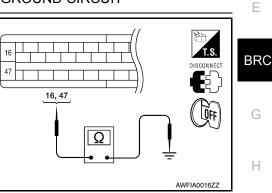


[VDC/TCS/ABS]

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INFOID:000000009883624

INFOID:000000009883625

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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:000000009883627

INFOID:000000009883626

[VDC/TCS/ABS]

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-40, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883628

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

CAUTION:

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

1.CONNECTOR INSPECTION

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

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

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Connector Terminal Connector Terminal 6 4 1 1 1 25 29 3 2 3 29 3 29 3 2 29 3 3 2 3 21 29 3 3 3 21 29 3 3 3 21 29 3 3 3 22 3 3 3 3 22 3 3 3 3 22 29 3 3 3 23 29 3 3 3 24 Proform teplate newards/decel G sensor and ABS actuator and electric unit (control unit) co. Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-116. "Removalaton". 25 >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removalaton". 3 26 27 Stepped the ABS actuator and electric un	ctor Terminal	nit) Ya	w rate/side/d	ecel G sensor	Continuity
E125 24 M108 1 25 29 3 the inspection result normal? YES >> GO TO 3 NO >> Repair or replace as necessary. YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) co. Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-116. "Remova tato". *** *** YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Remova tato". *** *** *** *** *** *** *** Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Remova tato". *** *** *** Replace the yaw rate/side/decel G sensor and perform calibration of decel G-senses BRC-119. "Removal and Installation". *** *** *** Replace the yaw rate/side/decel G sensor in "DATA MONITOR" *** *** *** *** *** *** *** *** *** *** *** *** *** ***	1	Conne	ctor	Terminal	Continuity
E125 25 M108 2 ite inspection result normal? 29 3 ES >> GO TO 3 3 O >> Repair or replace as necessary. YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) co Perform the yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-116. "Remova</u> tion". the inspection result normal? ES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116. "Remova</u> lation". O >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116. "Remova</u> lation". O >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense <u>BRC-119. "Removal and Installation".</u> Omponent Inspection MM06 CHECK DATA MONITOR CHECK DATA MONITOR lect "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SENSOR DECEL (OATA MONITOR) (DATA MONITOR) Vehicle condition YAW RATE SEN (DATA MONITOR) (DATA MONITOR) Vehicle condition YAW RATE SEN (DATA MONITOR) OATA MONITOR) Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning left Positive value Positive value - Positive Spee	6			4	
25 2 29 3 the inspection result normal? YES >> GO TO 3 O >> Repair or replace as necessary. .YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) comportion. Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-11. "Comportion". the inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removariation". vol >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sensor BRC-119. "Removal and Installation". vomponent Inspection vaw .CHECK DATA MONITOR elect "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" in "DATA MONITOR" and chertede/decel G sensor signal. Vehicle condition YAW RATE SEN SIDE G-SENSOR DECEL QUATA MONITOR) Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning right Negative value Negative value - Speed up - - Negative value - Negative value - Speed up - - Negative value - Negative value - Negat				1	No.
the inspection result normal? YES >> GO TO 3 NO >> Repair or replace as necessary. YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) control tion". The inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removal ation". NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removal lation". NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removal lation". NO >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removal lation". NO >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". Omponent Inspection ////////////////////////////////////		M10	8	2	Yes
YES >> GO TO 3 NO >> Repair or replace as necessary. YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) co Perform the yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-41, "Compon- tion".</u> the inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Remova- lation".</u> NO >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Remova- lation".</u> NO >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sens <u>BRC-119, "Removal and Installation".</u> Omponent Inspection	29			3	
YES >> GO TO 3 WO YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) co Perform the yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-11, "Componition".</u> YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal lation".</u> YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal lation".</u> YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal lation".</u> YES >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense <u>BRC-119, "Removal and Installation".</u> YEE >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense <u>BRC-119, "Removal and Installation".</u> YEE >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense <u>BRC-119, "Removal and Installation".</u> OMPONENT INSPECTION	tion result normal?		·		
YAW RATE/SIDE/DECEL G SENSOR INSPECTION Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) co Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-41, "Component inon". the inspection result normal? YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Remova lation". 40 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00					
Connect the yaw rate/side/decel G sensor and ABS actuator and electric unit (control unit) contron the yaw rate/side/decel G sensor component inspection. Refer to BRC-41, "Componention". the inspection result normal? 'ES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal lation". 10 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119, "Removal and Installation". 00 >> Generation G (DATA MONITOR) 00 >> SiDE G-SENSOR (DATA MONITOR) 01 YAW RATE SEN (DATA MONITOR) (DATA MONITOR) 02 >> Goto diagnosis procedure is the deg/s is t		•			
Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-41. "Component inspection result normal? (FS) >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removalation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". (O) >> CHECK DATA MONITOR (CHECK DATA MONITOR (CHECK DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) (DATA MONITOR) Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning left Positive value - Negative Speed down -	E/SIDE/DECEL G SENS	OR INSPECTION			
YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116. "Removal lation". NO >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". Omponent Inspection	the yaw rate/side/decel (
Iation". NO >> Replace the yaw rate/side/decel G sensor and perform calibration of decel G-sense BRC-119. "Removal and Installation". component Inspection		or and electric unit ((control uni	it). Refer to BRC	-116, "Removal and Inst
Component Inspection	l <u>ation"</u> . Replace the yaw rate/sid	de/decel G sensor	•		
CHECK DATA MONITOR elect "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" in "DATA MONITOR" and cher ide/decel G sensor signal. Vehicle condition YAW RATE SEN (DATA MONITOR) SIDE G-SENSOR (DATA MONITOR) DECEL Q (DATA MONITOR) Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning right Negative value Negative value - Speed up - - Negative Speed down - - Negative Speed down - - Negative YES >> Inspection End NO > So to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure". Special Repair Requirement - - -					INFOID:00000000988
velect "YAW RATE SEN", "SIDE G-SENSOR", "DECEL G-SEN" in "DATA MONITOR" and cher ide/decel G sensor signal. vehicle condition YAW RATE SEN (DATA MONITOR) SIDE G-SENSOR (DATA MONITOR) DECEL C (DATA MONITOR) Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning right Negative value Negative value - Turning left Positive value Positive value - Speed up - - Negative Speed down - - Positive sthe inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-40. "Diagnosis Procedure".	·				NAL OID.00000000988
Vehicle condition YAW RATE SEN (DATA MONITOR) SIDE G-SENSOR (DATA MONITOR) DECEL O (DATA MO Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning right Negative value Negative value - Turning left Positive value Positive value - Speed up - - Negative Speed down - - Positive the inspection result normal? - Positive Positive VO >> Go to diagnosis procedure. Refer to BRC-40. "Diagnosis Procedure". -	DATA MONITOR				
Vehicle condition YAW RATE SEN (DATA MONITOR) SIDE G-SENSOR (DATA MONITOR) DECEL O (DATA MO Stopped -4 to +4 deg/s -1.1 to +1.1 m/s -0.11 G to Turning right Negative value Negative value -0.11 G to Turning left Positive value Positive value - Speed up - - Negative Speed down - - Positive Stepection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".		SENSOR", "DECEI	L G-SEN"	in "DATA MONI"	TOR" and check yaw ra
Vehicle condition(DATA MONITOR)(DATA MONITOR)(DATA MOStopped-4 to +4 deg/s-1.1 to +1.1 m/s-0.11 G toTurning rightNegative valueNegative value-Turning leftPositive valuePositive value-Speed upNegativeSpeed downPositivethe inspection result normal? NO>> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure".Image: Condition of the inspection of the inspec	sensor signal.				
Vehicle condition(DATA MONITOR)(DATA MONITOR)(DATA MOStopped-4 to +4 deg/s-1.1 to +1.1 m/s-0.11 G toTurning rightNegative valueNegative value-Turning leftPositive valuePositive value-Speed upNegativeSpeed downPositivethe inspection result normal?-PositiveYES>> Inspection End NO>> Go to diagnosis procedure. Refer to BRC-40. "Diagnosis Procedure".	ΥΔ	V RATE SEN	SIDE (G-SENSOR	DECEL G-SEN
Turning right Negative value Negative value - Turning left Positive value Positive value - Speed up - - Negative Speed down - - Negative the inspection result normal? - Positive Positive VO >> Go to diagnosis procedure. Refer to BRC-40. "Diagnosis Procedure". Procedure Image: Content of the second se	condition	-			(DATA MONITOR)
Turning left Positive value Positive value - Speed up - - Negative Speed down - - Positive the inspection result normal? - - Positive tress >> Inspection End - > Speed down - version Speed down - - Positive the inspection result normal? - - Positive version Speed down - - Positive pecial Repair Requirement magnetic state - -	opped -4	to +4 deg/s	-1.1 t	o +1.1 m/s	-0.11 G to +0.11 G
Speed up - - Negative Speed down - - Positive the inspection result normal? - - Positive (ES >> Inspection End NO >> Go to diagnosis procedure. Refer to BRC-40, "Diagnosis Procedure". - - pecial Repair Requirement /// /// ///	ing right Ne	gative value	Nega	ative value	-
Speed down - Positive the inspection result normal? Positive Positive YES >> Inspection End Positive NO >> Go to diagnosis procedure. Refer to BRC-40. "Diagnosis Procedure". Positive pecial Repair Requirement Image: Comparison of the procedure of t	ning left Po	sitive value	Posi	tive value	-
the inspection result normal? YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u> . pecial Repair Requirement	ed up	-		-	Negative value
YES >> Inspection End NO >> Go to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u> . pecial Repair Requirement	ed down	-		-	Positive value
 YES >> Inspection End IO >> Go to diagnosis procedure. Refer to <u>BRC-40, "Diagnosis Procedure"</u>. Decial Repair Requirement 					
NO >> Go to diagnosis procedure. Refer to <u>BRC-40. "Diagnosis Procedure"</u> . pecial Repair Requirement					
		e. Refer to <u>BRC-40</u>	<u>), "Diagnos</u>	sis Procedure".	
	epair Requirement				INFOID:00000000988
.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION					
	MENT OF STEERING AN	IGLE SENSOR NE	UTRAL P	OSITION	
lways perform neutral position adjustment for the steering angle sensor when replacing the A	orm neutral position adju-	stment for the stee	ering angle	sensor when r	eplacing the ABS actuat
nd electric unit (control unit). Refer to BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOF	unit (control unit). Refer to				
OSITION : Description".					
	Description".				
>> GO TO 2	· · · ·				
CALIBRATION OF DECEL G SENSOR	GO TO 2				
lways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (GO TO 2	SOR			
Refer to BRC-9, "CALIBRATION OF DECEL G SENSOR : Description".	GO TO 2 TION OF DECEL G SEN orm calibration of decel G	sensor when repla			d electric unit (control un
	GO TO 2 TION OF DECEL G SEN orm calibration of decel G	sensor when repla			d electric unit (control un
	GO TO 2 TION OF DECEL G SEN orm calibration of decel G	sensor when repla			d electric unit (control un

C1115 WHEEL SENSOR

Description

INFOID:000000009883631

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:000000009883632

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-42, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883633

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

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.

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

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

Does the ABS active wheel sensor tester detect a signal?

- YES >> GO TO 3
- NO >> Replace the wheel sensor. Refer to <u>BRC-113</u>, "Removal and Installation".

C1115 WHEEL SENSOR

[VDC/TCS/ABS]

WFIA0343E

3.CHECK TIRES А Check the inflation pressure, wear and size of each tire. Is the inspection result normal? YES >> GO TO 4 В NO >> Adjust tire pressure or replace tire(s). **4.**CHECK WHEEL BEARINGS Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front) or RAX-5, "On-Vehicle Inspection" (rear). Is the inspection result normal? D YES >> GO TO 5 >> Repair or replace as necessary. Refer to FAX-6, "Removal and Installation" (front) or RAX-7, NO "Removal and Installation" (rear). Ε 5.check wiring harness for short circuit 1. Disconnect ABS actuator and electric unit (control unit) connec-йй Т.S. tor and wheel sensor connector of malfunction code No. QFF BRC 2. Check continuity between wheel sensor connector terminals and ground. Wheel sensor connector Continuity should not exist. Is the inspection result normal? YES >> GO TO 6 Ω Н

NO >> Repair the circuit.

< DTC/CIRCUIT DIAGNOSIS >

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		K
Front III		45	F10	2	Yes	_
Front LH		46	E18	1		1
Front RH	-	34	E117	2		
		33		1		
Rear LH	E125	37	C11	1	fes	\mathbb{N}
		36		2		
Rear RH		42	010	1		N
		43	C10	2		Ν

Is the inspection result normal?

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

INFOID:000000009883634

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C1115 WHEEL SENSOR

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-42, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000009883635

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

$2. {\sf calibration of decelg sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "<u>CALIBRATION OF DECEL G SENSOR</u> : <u>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:000000009883637

INFOID:000000009883636

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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 CC	NFIRMATION PROCE	DURE	
1. CHEC	CK SELF-DIAGNOSIS RE	SULTS	В
Check th	e self-diagnosis results.		
	Self-diagnosis	requite	
	Stop LAMP		
Is above	displayed on the self-diac		l
YES	>> Proceed to diagnosis	procedure. Refer to <u>BRC-45. "Diagnos</u>	is Procedure".
NO	>> Inspection End		
Diagno	sis Procedure		INFOID:00000009883638
Regardir	ng Wiring Diagram informa	ition, refer to <u>BRC-92, "Wiring Diagram</u>	<u>n"</u> .
4			
	NECTOR INSPECTION		
		and electric unit (control unit) connecto nation, disconnection, looseness or da	
	spection result normal?		
-	>> GO TO 2		
NO 2 STOR	>> Repair or replace as n PLAMP SWITCH INSPEC	-	I
		BS actuator and electric unit (con-	
	connector E125 terminal		
	arake pedal depressed	: Battery voltage	
	iake pedal depressed	(approx. 12V)	
E	rake pedal released	: Approx. 0V	
-	spection result normal?		
YES		is again. If the same results actuator and electric unit (control	
	unit). Refer to BRC-11	6. "Removal and Installation".	- AWFIA0019ZZ
	>> GO TO 3		
J.510F	PLAMP RELAY CIRCUIT	INSPECTION	

C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

1. Disconnect the stop lamp relay connector.

 Check the continuity between the stop lamp relay connector E12 (A) terminal 4 and ABS actuator and electric unit (control unit) connector E125 (B) terminal 41.

Continuity should exist.

Is the inspection result normal?

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

Special Repair Requirement

INFOID:000000009883639

[VDC/TCS/ABS]

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-8</u>, <u>"ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

INFOID:000000009883641

INFOID:00000009883640

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-47, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

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-24</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.

 $\mathbf{2}$.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

[VDC/TCS/ABS]

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INFOID:000000009883642

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-47, "Diagnosis Procedure"</u>.

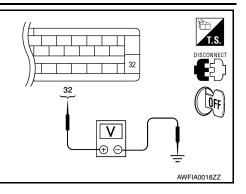
Special Repair Requirement

INFOID:000000009883644

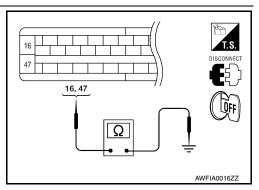
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-8</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description</u>".

BRC-48



[VDC/TCS/ABS]



INFOID:000000009883643

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

>> GO TO 2	А
2. CALIBRATION OF DECEL G SENSOR	
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</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:000000009883646

INFOID:000000009883645

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-50, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883647

Regarding Wiring Diagram information, refer to <u>BRC-92, "Wiring Diagram"</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-24</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.

 $\mathbf{2}$.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-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	
		Up	Кеер	Down	
	FR RH IN SOL	Off	On	On	L
FR RH SOL	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	_
	FR LH OUT SOL	Off	Off	On*	N
RR RH SOL	RR RH IN SOL	Off	On	On	
	RR RH OUT SOL	Off	Off	On*	N
RR LH SOL	RR LH IN SOL	Off	On	On	_
	RR LH OUT SOL	Off	Off	On*	_

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

Is the inspection result normal?

- >> Inspection End YES
- >> Go to diagnosis procedure. Refer to BRC-68, "Diagnosis Procedure". NO

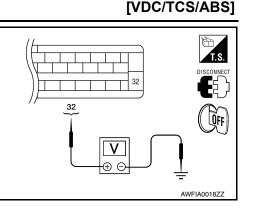
Special Repair Requirement

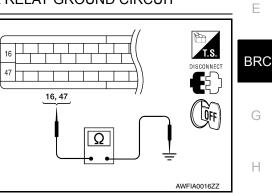
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL **POSITION : Description".**

BRC-51







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>> GO TO 2

 $2. {\sf calibration of decelg sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

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

DTC Logic

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
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 	
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			BR

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the 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-53, "Diagnosis Procedure"</u>.

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-49. "CONSULT Function"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-24, "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:000000009883652

[VDC/TCS/ABS]

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:000000009883654

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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-54, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883655

Regarding Wiring Diagram information, refer to BRC-92. "Wiring Diagram".

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-24</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

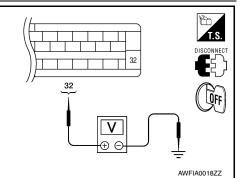
2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 3



C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-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 operates as shown in table below.

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-38, "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-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>K</u><u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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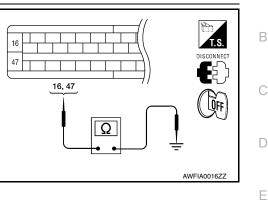
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[VDC/TCS/ABS]

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C1142 PRESS SENSOR

Description

INFOID:000000009883658

The front and rear pressure sensors convert the brake fluid pressure to an electric signal and transmit it to the ABS actuator and electric unit (control unit).

DTC Logic

INFOID:000000009883659

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1142	PRESS SEN CIRCUIT	Pressure sensor signal line is open or shorted, or pres- sure sensor is malfunctioning.	 Harness or connector Pressure sensor ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

PRESS SEN CIRCUIT

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-56. "Diagnosis Procedure (Front Pressure Sensor)"</u> or <u>BRC-57. "Diagnosis Procedure (Rear Pressure Sensor)"</u>.

NO >> Inspection End

Diagnosis Procedure (Front Pressure Sensor)

Regarding Wiring Diagram information, refer to BRC-92. "Wiring Diagram".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

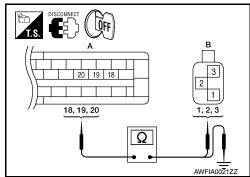
YES >> GO TO 2

NO >> Repair connector.

2.FRONT PRESSURE SENSOR CIRCUIT INSPECTION

 Measure the continuity between the ABS actuator and electric unit (control unit) connector E125 (A) and front pressure sensor connector E31 (B).

-		and electric unit ol unit)	Front press	sure sensor	Continuity
	Connector	Terminal	Connector	Terminal	
		18		3	
	A: E125	19	B: E31	1	Yes
		20		2	



2. Measure the continuity between the ABS actuator and electric unit (control unit) connector E125 (A) and body ground.

INFOID:000000009883660

[VDC/TCS/ABS]

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

	unit)	control	_	Continuity		A
Connector	Termir	nal		,		
	18					В
A: E125	19	(Ground	No		
	20					С
s the inspection	on result norn	nal?				
	D TO 3					
•		ce harness or		-		C
3. FRONT PR						
					ric unit (control unit) connectors. BRC-58, "Component Inspection (Front	E
Pressure 3		ENSOR CON			BRC-36, Component Inspection (Front	
Is the inspection	on result norn	nal?				
	spection End					BR
NO >> Re	eplace the fro	nt pressure s	ensor.			
Diagnosis F	Procedure	(Rear Pres	ssure Se	ensor)	INFOID:00000009883661	G
Pegarding Wir	ing Diggram	information r	ofor to BRC	C-92, "Wiring Diac	Iram"	
	ing Diagram				<u>11</u> .	Η
1						
1.CONNECT		-				
	nition switch					
2. Disconneo	9 INA 1431 NG			actuator and alact	rie unit (control unit) connectore	
Inspect the	e terminals fo	r deformation	and ABS a	actuator and elect ction, looseness,	ric unit (control unit) connectors. or damage.	
 Inspect the Is the inspection 	e terminals fo	r deformation	, disconne	actuator and elect ction, looseness,	ric unit (control unit) connectors. or damage.	J
Is the inspection YES >> Get	e terminals fo on result norn O TO 2	r deformation <u>nal?</u>	and ABS a , disconne	actuator and elect ction, looseness,	ric unit (control unit) connectors. or damage.	J
I <u>s the inspection</u> YES >> Generation NO >> Re	e terminals fo <u>on result norn</u> O TO 2 epair connect	r deformation <u>nal?</u> or.	, disconne	ction, looseness,	ric unit (control unit) connectors. or damage.	J
Is the inspection YES >> Generation NO >> Reconstruction	e terminals fo <u>on result norn</u> O TO 2 epair connect	r deformation <u>nal?</u> or.	, disconne	ction, looseness,	ric unit (control unit) connectors. or damage.	J
Is the inspection YES >> Go NO >> Re 2. REAR PRE	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity	r deformation nal? or. SOR CIRCUI between the	, disconner T INSPEC ABS actu	ction, looseness, TION lator and electric	ric unit (control unit) connectors. or damage.	J K
Is the inspection YES >> Go NO >> Re 2.REAR PRE 1. Measure for unit (contribution)	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity ol unit) connect	r deformation nal? or. SOR CIRCUI between the	, disconner T INSPEC ABS actu	ction, looseness, TION		J K L
Is the inspection YES >> Go NO >> Re 2.REAR PRE	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity ol unit) connect	r deformation nal? or. SOR CIRCUI between the	, disconner T INSPEC ABS actu	ction, looseness, TION lator and electric	or damage.	J K
Is the inspection YES >> Go NO >> Re 2.REAR PRE 1. Measure for unit (contribution)	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B).	r deformation nal? or. SOR CIRCUI between the ector E125 (A	T INSPEC ABS actu and rear	ction, looseness, TION lator and electric	or damage.	L
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure for unit (controportion connector	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B).	r deformation nal? or. SOR CIRCUI between the ector E125 (A	T INSPEC ABS actu and rear	ction, looseness, TION lator and electric pressure sensor Continuity	or damage.	J K L
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure for unit (contropy ABS actuator a	e terminals fo on result norn O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B).	r deformation nal? or. SOR CIRCUI between the ector E125 (A	T INSPEC ABS actu and rear	ction, looseness, TION lator and electric pressure sensor Continuity	or damage.	M
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure to unit (contro- connector ABS actuator a (contro- Connector	e terminals fo on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B).	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector	T INSPEC ABS actu and rear	Ction, looseness,	or damage.	L
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure to unit (controint connector ABS actuator a (controint)	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). Ind electric unit of unit) Terminal 21 22	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres	T INSPEC ABS actu and rear sure sensor Terminal	ction, looseness, TION lator and electric pressure sensor Continuity	or damage.	M
s the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure to unit (contro- connector ABS actuator a (contro- Connector A: E125	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). Ind electric unit of unit) Terminal 21 22 23	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	Ction, looseness,	or damage.	L M
s the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure 1 unit (contro- connector ABS actuator a (contro- Connector A: E125 2. Measure t	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). nd electric unit d unit) Terminal 21 22 23 he continuity	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	Ction, looseness,	or damage.	L M
s the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure to unit (contro- connector ABS actuator a (contro- Connector A: E125	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). nd electric unit d unit) Terminal 21 22 23 he continuity	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	Ction, looseness,	or damage.	L M C
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure for unit (controconnector ABS actuator a (contro	e terminals fo on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). Ind electric unit of unit) Terminal 21 22 23 he continuity nd.	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32 between the	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	Ction, looseness,	or damage.	L M N
s the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure funit (contro- connector ABS actuator a (contro- Connector A: E125 2. Measure to body grou	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). nd electric unit d unit) Terminal 21 22 23 he continuity	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32 between the	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	Ction, looseness,	or damage.	M
Is the inspection YES >> Ge NO >> Re 2.REAR PRE 1. Measure for unit (controconnector ABS actuator a (contro	e terminals for on result norm O TO 2 epair connect SSURE SEN the continuity ol unit) conne E32 (B). Ind electric unit d unit) Terminal 21 22 23 he continuity nd.	r deformation nal? or. SOR CIRCUI between the ector E125 (A Rear pres Connector B: E32 between the	T INSPEC ABS actu and rear sure sensor Terminal 1 3 2	ction, looseness, TION lator and electric pressure sensor Continuity I Yes ator and electric u	or damage.	L M N

22

23

A: E125

Ground

No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

3.REAR PRESSURE SENSOR INSPECTION

- 1. Reconnect the rear pressure sensor and ABS actuator and electric unit (control unit) connectors.
- Perform the "PRESS SEN2" component inspection. Refer to <u>BRC-58</u>, "Component Inspection (Rear Pressure Sensor)".

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Replace the rear pressure sensor.

Component Inspection (Front Pressure Sensor)

1.CHECK DATA MONITOR

On "DATA MONITOR", select "PRESS SENSOR" and check the brake fluid pressure.

Condition	PRESS SENSOR (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-56, "Diagnosis Procedure (Front Pressure Sensor)"</u>.

Component Inspection (Rear Pressure Sensor)

1.CHECK DATA MONITOR

On "DATA MONITOR", select "PRESS SEN2" and check the brake fluid pressure.

Condition	PRESS SEN2 (DATA MONITOR)
With ignition switch turned ON and brake pedal released.	Approx. 0 bar
With ignition switch turned ON and brake pedal depressed.	Positive value

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-57</u>, "Diagnosis Procedure (Rear Pressure Sensor)".

Special Repair Requirement

INFOID:000000009883664

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

BRC-58

INFOID:000000009883662

INFOID:00000009883663

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:000000009883666

INFOID:000000009883665

DTC DETECTION LOGIC

	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)
тс сс	ONFIRMATION PROCI	EDURE	
.CHE	CK SELF-DIAGNOSIS R	ESULTS	
heck th	ne self-diagnosis results.		
	0.16.16		
	Self-diagnosi		
	ST ANG SEN ST ANG SEN		
abovo	displayed on the self-dia		
YES		procedure. Refer to <u>BRC-59, "Diagnosis Proced</u>	ure"
NO	>> Inspection End	procedure. Refer to <u>Bree co, Blagnoois Proced</u>	<u>.</u>
Diagno	sis Procedure		INFOID:0000000988366
0			
Dogordir	a Wiring Diagram inform	action refer to PPC 02 "Wiring Diagram"	
Regardir	ng Wiring Diagram inform	nation, refer to <u>BRC-92, "Wiring Diagram"</u> .	
-		nation, refer to <u>BRC-92, "Wiring Diagram"</u> .	
.coni	NECTOR INSPECTION	nation, refer to <u>BRC-92, "Wiring Diagram"</u> .	
.CONI	NECTOR INSPECTION ignition switch OFF. connect ABS actuator and	nation, refer to <u>BRC-92, "Wiring Diagram"</u> . d electric unit (control unit) and steering angle ser tion, disconnection, looseness, and so on. If any	
. CONI	NECTOR INSPECTION i ignition switch OFF. connect ABS actuator and ck terminals for deforma eplace terminals. onnect connectors and	d electric unit (control unit) and steering angle ser	malfunction is found, repair
. CONI . Turr . Disc . Che or re . Rec . (AB: s any ite	NECTOR INSPECTION ignition switch OFF. connect ABS actuator and ck terminals for deforma eplace terminals. onnect connectors and <u>S)"</u> .	d electric unit (control unit) and steering angle ser tion, disconnection, looseness, and so on. If any then perform the self-diagnosis. Refer to <u>BRC</u>	malfunction is found, repair
. CONI	NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminals for deformate place terminals. onnect connectors and <u>S)"</u> . em indicated on the self-of >> GO TO 2	d electric unit (control unit) and steering angle ser tion, disconnection, looseness, and so on. If any then perform the self-diagnosis. Refer to <u>BRC</u> <u>diagnosis display?</u>	malfunction is found, repair
CONI	NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminals for deformate place terminals. onnect connectors and <u>S)"</u> . em indicated on the self-of >> GO TO 2	d electric unit (control unit) and steering angle ser tion, disconnection, looseness, and so on. If any then perform the self-diagnosis. Refer to <u>BRC</u> <u>diagnosis display?</u> onnector terminals. Repair or replace connector.	malfunction is found, repair

- 1. Turn ignition switch OFF.
- 2. Disconnect steering angle sensor connector.

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[VDC/TCS/ABS]

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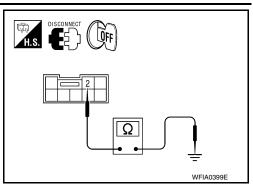
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C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check continuity between steering angle sensor connector M17 terminal 2 and ground.

Steering angle sensor			Continuity	
Connector	Terminal		Continuity	
M17	2	Ground	Yes	



4. Turn ignition switch ON.

Connector

M17

YES

NO

Steering angle sensor

 Check voltage between steering angle sensor connector M17 terminal 3 and ground.

>> Repair or replace malfunctioning components.

Terminal 3

Voltage	
Battery voltage	
nts.	

3.CHECK DATA MONITOR

Is the inspection result normal?

>> GO TO 3

1. Connect the steering angle sensor and ABS actuator and electric unit (control unit) connectors.

Ground

2. Perform the steering angle sensor component inspection. Refer to BRC-60, "Component Inspection".

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 steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-118. "Removal and Installation"</u>.

Component Inspection

INFOID:000000009883668

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1. CHECK DATA MONITOR

Select "STR ANGLE SIG" in "DATA MONITOR" and check steering angle sensor signal.

Steering condition STR ANGLE SIG (DATA MONITO		
Driving straight	±2.5 °	
Turn 90 ° to right	Approx. +90 °	
Turn 90 ° to left	Approx. –90 °	

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-59, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000009883669

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

$\overline{2.}$ CALIBRATION OF DECEL G SENSOR А Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-9, "CALIBRATION OF DECEL G SENSOR : Description". В >> END С D Е BRC G Н J Κ L Μ

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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:000000009883671

INFOID:000000009883672

INFOID:000000009883670

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

NO >> Inspection End

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

1.CONNECTOR INSPECTION

1. Disconnect ABS actuator and electric unit (control unit) and brake fluid level switch connectors.

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

Is the inspection result normal?

YES >> GO TO 2

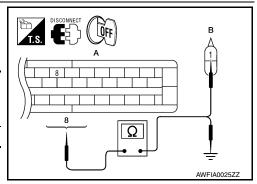
NO >> Repair or replace as necessary.

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 E125 (A) terminal 8 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		
A: E125	8	B: E21	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 8 and ground.



C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and electric unit (control unit)_____ContinuityConnectorTerminal_____ContinuityA: E1258GroundNo

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

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. refer to <u>BRC-63, "Component Inspection"</u>.

Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal and Installation"</u>.
- NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Replace brake fluid level switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

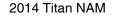
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-8. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

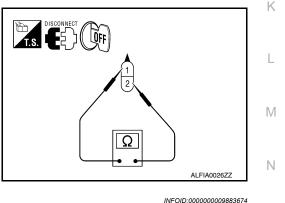
>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

BRC-63





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>> 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:000000009883676

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 CC	ONFIRMATION PROCE	EDURE	
1. CHE	CK SELF-DIAGNOSIS R	ESULTS	
Check th	ne self-diagnosis results.		
	Self-diagnosi		
	ST ANG SEN		
<u>Is above</u> YES NO	 displayed on the self-dia > Proceed to diagnosis >> Inspection End 	agnosis display? procedure. Refer to <u>BRC-65, "Diagnosis Procec</u>	dure".
Diagno	sis Procedure		INFOID:00000009883677
1 .con	NECTOR INSPECTION		
1. Turr	ignition switch OFF.		
 Disconstruction Cheoremann Orregulation 	connect ABS actuator and ck terminals for deforma eplace terminals.	d electric unit (control unit) connector. tion, disconnection, looseness, and so on. If any rform self-diagnosis. Refer to <u>BRC-24, "CONSU</u>	
	Self-diagnosi	s results	
	CAN COMM (CIRCUIT	
	ST ANG SEN	COM CIR	
ls above	displayed on the self-dia	agnosis display?	
<u>ls above</u> YES NO	displayed on the self-dia		

INFOID:000000009883675

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C1160 DECEL G SEN SET

Description

INFOID:000000009883678

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:000000009883679

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-66, "Diagnosis Procedure"</u>.

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883680

1.PERFORM SELF-DIAGNOSIS

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

Self-diagnosis results

DECEL G SEN SET

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

- YES >> Perform repair or replacement for the item indicated.
- NO >> Perform calibration of decel G sensor. Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR :</u> <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-24, "CON-SULT Function (ABS)"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to <u>BRC-24</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

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:000000009883682

INFOID:000000009883681

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position	
DTC CC	NFIRMATION PROCE	DURE		Е
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS		
Check th	e self-diagnosis results.			BRC
	Self-diagnosis			G
	ST ANGL SEN			
	displayed on the self-diag	procedure. Refer to <u>BRC-67, "Diagnosis Procec</u>	duro"	
	>> Inspection End	Discourte. Refer to <u>Disco-or, Diagnosis Proces</u>	<u>uure</u> .	Н
Diagno	sis Procedure		INFOID:00000009883683	
1 AD III		ANGLE SENSOR NEUTRAL POSITION		
	eering angle sensor neutr	al position. Refer to <u>BRC-8, "ADJUSTMENT O</u> ription".	F STEERING ANGLE SEN-	J
•	>> GO TO 2			K
2.INDIC	CATOR LAMP CHECK			I.V.
Check th	at VDC OFF indicator lam	ip is off.		
	DFF indicator lamp off?			L
	>> Inspection End >> Perform ABS actuator	and electric unit (control unit) self-diagnosis. R	Pefer to BRC-24 "CONSULT	
NO	<u>Function (ABS)"</u> .		Cici to <u>BRO 24, CONCOLL</u>	M
				NI
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С

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:000000009883685

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

NO >> Inspection End

Diagnosis Procedure

INFOID:000000009883686

Regarding Wiring Diagram information, refer to <u>BRC-92, "Wiring Diagram"</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-24. "CONSULT Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

INFOID:000000009883684

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 E125 terminal 32 and ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

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

NO >> Repair or replace malfunctioning components.

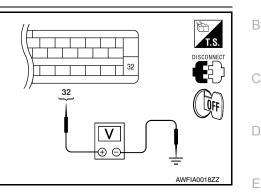
Component Inspection

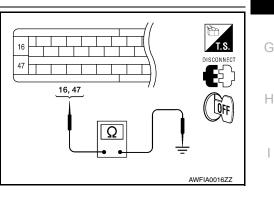
1.CHECK ACTIVE TEST

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		A	ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP	_
	FR RH IN SOL	Off	Off	Off	-
	FR RH OUT SOL	Off	Off	Off	-
FR RH ABS SOLENOID (ACT)	CV1	Off	On	On	-
	SV1	Off	On*	Off	-
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	Off	Off	Off	-
	FR LH OUT SOL	Off	Off	Off	(
	CV1	Off	On	On	-
	SV1	Off	On*	Off	-
	RR RH IN SOL	Off	Off	Off	_
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL	Off	Off	Off	-
	CV2	Off	On	On	_
	SV2	Off	On*	Off	_





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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Operation		ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP
	RR LH IN SOL	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL	Off	Off	Off
	CV2	Off	On	On
	SV2	Off	On*	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-68, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000009883688

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

Description

The active brake booster consists of a vacuum booster, an active booster control group and a delta stroke sensor. If a brake booster system malfunction occurs due to loss of vacuum, the delta stroke sensor will signal the ABS actuator and electric unit (control unit) that a booster malfunction has occurred. The active booster then applies supplemental force to the master cylinder relative to the amount of force exerted on the brake pedal.

DTC Logic

INFOID:000000009883690

INFOID:000000009883689

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	_
C1178	ABS ACTIVE BOOSTER SV	Active booster solenoid is malfunctioning, or signal line of		E
0176	NG	active booster servo is open or shorted.		
C1181	ABS ACTIVE BOOSTER RE- SPONSE NG	Active booster response is malfunctioning, or signal line of active booster response is open or shorted.	Harness or connectorActive booster	BR
C1184	ABS BRAKE RELEASE SW NG	Brake release switch is malfunctioning, or signal line of brake release switch is open or shorted.	ABS actuator and electric unit (control unit)	G
C1189	ABS BRAKE BOOSTER DE- FECT	Brake booster is defective or malfunctioning.		G
DTC CC	NFIRMATION PROCE	DURE		Н
1. CHEC	CK SELF-DIAGNOSIS RE	SULTS		
Check th	e self-diagnosis results.			1
	Self-diagnosis			
	ABS ACTIVE BOOS			J
	ABS ACTIVE BOOSTER			
	ABS BRAKE RELEA			K
	ABS BRAKE BOOST	-		
	displayed on the self-diag			
	 >> Proceed to diagnosis >> Inspection End 	procedure. Refer to <u>BRC-71, "Diagnosis Procec</u>	lure".	L
Diagno	sis Procedure		INFOID:00000009883691	
				M
Regardir	ng Wiring Diagram informa	tion, refer to <u>BRC-92, "Wiring Diagram"</u> .		
Je genen	.ggg	·····, · · · · · · · · · · · · · · · ·		Ν
1.com	NECTOR INSPECTION			
	the ignition switch OFF.			С
		and ABS actuator and electric unit (control unit) mation, disconnection, looseness, or damage.	connectors.	
•	spection result normal?	nation, disconnection, looseness, or damage.		F
	>> GO TO 2			ľ
-	>> Repair connector.			
^				

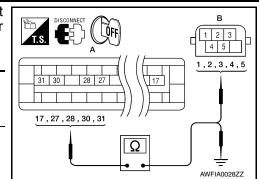


C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

 Measure the continuity between ABS actuator and electric unit (control unit) connector E125 (A) and active booster connector E49 (B).

ABS actuator and electric unit (control unit)		Active booster		Continuity
Connector	Terminal	Connector	Terminal	
A: E125	17	B: E49	3	Yes
	27		1	
	28		5	
	30		2	
	31		4	



[VDC/TCS/ABS]

2. Measure the continuity between ABS actuator and electric unit (control unit) connector E125 (A) and body ground.

ABS actuator and electric unit (control unit)		_	Continuity	
Connector	Terminal			
	17			
A: E125	27	Ground	No	
	28			
	30			
	31			

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

3.ACTIVE BOOSTER INSPECTION

1. Reconnect the active booster and ABS actuator and electric unit (control unit) connectors.

Perform the active booster component inspection. Refer to <u>BRC-72, "Component Inspection"</u>.

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 >> Replace the active booster. Refer to <u>BR-27</u>, "Removal and Installation".

Component Inspection

INFOID:000000009883692

1.CHECK DATA MONITOR

Use "DATA MONITOR" to check if the status of "RELEASE SWITCH NO" and "RELEASE SWITCH NC" is normal.

Condition	RELEASE SWITCH NO (DATA MONITOR)	RELEASE SWITCH NC (DATA MONITOR)
When brake pedal is depressed.	ON	OFF
When brake pedal is released.	OFF	ON

Is the inspection result normal?

YES >> Inspection End

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

Special Repair Requirement

INFOID:000000009883693

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

BRC-72

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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C1179 ABS DELTA S SEN NG

Description

INFOID:000000009883694

[VDC/TCS/ABS]

The active brake booster consists of a vacuum booster, an active booster control group and a delta stroke sensor. If a brake booster system malfunction occurs due to loss of vacuum, the delta stroke sensor will signal the ABS actuator and electric unit (control unit) that a booster malfunction has occurred. The active booster then applies supplemental force to the master cylinder relative to the amount of force exerted on the brake pedal.

DTC Logic

INFOID:00000009883695

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1179	ABS DELTA S SEN NG	Delta stroke sensor is malfunctioning, or signal line of delta stroke sensor is open or shorted.	 Harness or connector Delta stroke 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 DELTA S SEN NG

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:000000009883696

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair connector.

2.delta stroke sensor circuit inspection

 Measure the continuity between ABS actuator and electric unit (control unit) connector E125 (A) and delta stroke sensor connector E114 (B).

	and electric unit ol unit)	Delta stro	ke sensor	Continuity
Connector	Terminal	Connector	Terminal	
	26		1	
A: E125	39	B: E114	3	Yes
	40	† 	5	

C1179 ABS DELTA S SEN NG

< DTC/CIRCUIT DIAGNOSIS >

2. Measure the continuity between ABS actuator and electric unit (control unit) connector E125 (A) and body ground.

	electric unit (control nit)		Continuity	
Connector	Terminal			
	26			
A: E125	39	Ground	No	
	40			
s the inspection	result normal?			
B.DELTA STRO	air or replace harne KE SENSOR INSF	PECTION		
. Perform the s the inspection YES >> Repl lation	delta stroke sensor <u>result normal?</u> ace the ABS actua	r component insp ator and electric u	ection. Refer to <u>BI</u>	nit (control unit) connectors. <u>RC-75, "Component Inspection"</u> . efer to <u>BRC-116, "Removal and Instal-</u>
Component li				INFOID:00000009883697
-				INFOID.00000009863697
.CHECK DATA	MONITOR			
Jse "DATA MON	ITOR" to check if t	he status of "DEL	TA S SEN" is norn	ial.
	Condition			DELTA S SEN (DATA MONITOR)
When brake pedal i	s depressed.			1.05–1.80 mm
When brake pedal i	s released.			0.00 mm (+0.6/-0.4)
the inspection		,		
	ection End o diagnosis proced	ure. Refer to <u>BR</u>	<u>C-74, "Diagnosis F</u>	rocedure".
NO >> Go to			<u>C-74. "Diagnosis F</u>	rocedure".
NO >> Go ['] to Special Repa .ADJUSTMEN	o diagnosis proced ir Requiremen T OF STEERING /	t ANGLE SENSOF	R NEUTRAL POSI	INFOID:000000009883698
NO >> Go ['] to pecial Repa .ADJUSTMEN lways perform nd electric unit	o diagnosis proced ir Requirement T OF STEERING A neutral position ad (control unit). Refe	t ANGLE SENSOF ljustment for the	R NEUTRAL POSI steering angle se	INFCID:00000009883698
NO >> Go to pecial Repa .ADJUSTMEN lways perform nd electric unit OSITION : Des	o diagnosis proced ir Requirement T OF STEERING A neutral position ad (control unit). Refe cription".	t ANGLE SENSOF ljustment for the	R NEUTRAL POSI steering angle se	INFOID:00000009883698 TON nsor when replacing the ABS actuator
NO >> Go to pecial Repa .ADJUSTMEN lways perform in d electric unit OSITION : Des >> GO	o diagnosis proced ir Requirement T OF STEERING A neutral position ad (control unit). Refe cription".	t ANGLE SENSOF ijustment for the r to <u>BRC-8, "AD.</u>	R NEUTRAL POSI steering angle se	INFOID:00000009883698 TON nsor when replacing the ABS actuator
NO >> Go to Special Repa ADJUSTMEN Iways perform nd electric unit OSITION : Des >> GO CALIBRATION	o diagnosis proced ir Requirement T OF STEERING A neutral position ad (control unit). Refe cription". TO 2 N OF DECEL G SE	t ANGLE SENSOF ijustment for the r to <u>BRC-8, "ADJ</u> ENSOR G sensor when i	R NEUTRAL POSI steering angle se IUSTMENT OF ST	TION Isor when replacing the ABS actuator EERING ANGLE SENSOR NEUTRAL
NO >> Go to pecial Repa .ADJUSTMEN lways perform nd electric unit OSITION : Des >> GO .CALIBRATION	o diagnosis proced ir Requirement T OF STEERING A neutral position ad (control unit). Refe cription". TO 2 N OF DECEL G SE calibration of decel "CALIBRATION OF	t ANGLE SENSOF ijustment for the r to <u>BRC-8, "ADJ</u> ENSOR G sensor when i	R NEUTRAL POSI steering angle se IUSTMENT OF ST	TION Isor when replacing the ABS actuator EERING ANGLE SENSOR NEUTRAL

C1187 DIFFERENTIAL LOCK CONTROL UNIT

< DTC/CIRCUIT DIAGNOSIS >

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

INFOID:000000009883699

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:000000009883700

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-76</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 terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connector and perform self-diagnosis. Refer to <u>BRC-24, "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

INFOID:000000009883701

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:000000009883703

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) 	BR
Diagno	sis Procedure		INFOID:00000009883704	
1.con	NECTOR INSPECTION			G
1. Turr	ignition switch OFF.			
2. Disc		and electric unit (control unit) connector		Н
2. Disc 3. Che	connect the ABS actuator ck the terminals for defor	and electric unit (control unit) connector mation, disconnection, looseness, and so on. If t	here is a malfunction, repair	Н
2. Disc 3. Che or re	connect the ABS actuator ck the terminals for defor eplace the terminal.			Н
 Disconstruction Che or reasonant Rec 	connect the ABS actuator ck the terminals for defor eplace the terminal. onnect connector and pe	mation, disconnection, looseness, and so on. If t		H
 Disconstruction Che or reasonant Rec 	connect the ABS actuator ck the terminals for defor eplace the terminal. onnect connector and pe <u>COMM CIRCUIT</u> " display >> Print out the self-diag	mation, disconnection, looseness, and so on. If t rform self-diagnosis. Refer to <u>BRC-24, "CONSUI</u>	<u>T Function (ABS)</u> .	H

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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

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

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

Is the inspection result normal?

YES >> Inspection End

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

Diagnosis Procedure

INFOID:000000009883707

Regarding Wiring Diagram information, refer to BRC-92, "Wiring Diagram".

1.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to BRC-79. "Component Inspection".

Is the inspection result normal?

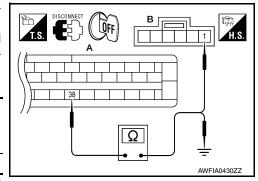
YES >> GO TO 2

NO >> Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

- 1. Disconnect ABS actuator and electric unit (control unit) connector.
- Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 38 and VDC OFF switch connector M148 (B) terminal 1.

ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
A: E125	38	B: M148	1	Yes



3. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 38 and ground.

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
A: E125	38	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3. CHECK VDC OFF SWITCH GROUND

INFOID:000000009883705

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between VDC OFF switch connector M148 terminal 2 and ground.

VDC OF	F switch		Continuity
Connector	Terminal		Continuity
M148	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-27, "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-93, "Removal and Installation"</u>.

Component Inspection

1.CHECK VDC OFF SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Replace VDC OFF switch.

Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

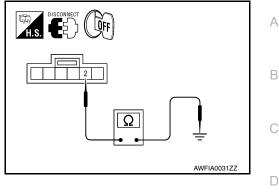
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-8, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

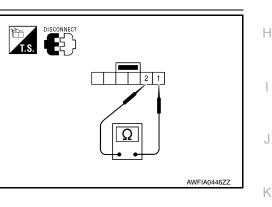
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END



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ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000009883710

[VDC/TCS/ABS]

×: ON –: OFF

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

Component Function Check

INFOID:000000009883711

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-80, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000009883712

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-24, "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-27</u>, "<u>Diagnosis Descrip-</u><u>tion</u>".

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-93</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000009883713

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Description	INFOID:00000009883714
	×: 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 op (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:000000009883715
1.BRAKE WARNING LAMP OPERATION CHECK	E
Check that the lamp illuminates after the ignition sv started.	witch is turned ON, and turns OFF after the engine is
Is the inspection result normal?	
YES >> Inspection End	
NO >> Go to diagnosis procedure. Refer to <u>BRC</u>	<u>-81, "Diagnosis Procedure"</u> .
Diagnosis Procedure	INFOID:00000009883716
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) (ABS)".	self-diagnosis. Refer to BRC-24, "CONSULT Function
Is the inspection result normal?	
YES >> GO TO 2	
NO >> Check items displayed by self-diagnosis.	
2.CHECK COMBINATION METER	
· · · ·	meter are normal. Refer to <u>MWI-27, "Diagnosis Descrip-</u>
<u>tion"</u> . <u>Is the inspection result normal?</u>	
•	control unit). Refer to BRC-116, "Removal and Installa-
NO >> Replace combination meter. Refer to <u>MW</u>	I-93. "Removal and Installation".
Special Repair Requirement	INFOID:00000009883717
1.ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION
	steering angle sensor when replacing the ABS actuator JSTMENT OF STEERING ANGLE SENSOR NEUTRAL
>> GO TO 2	

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

INFOID:000000009883718

[VDC/TCS/ABS]

×: 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:000000009883719

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to <u>BRC-82, "Diagnosis Procedure"</u>.

2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> Inspection End

NO >> Check VDC OFF switch. Refer to <u>BRC-78. "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000009883720

1.CHECK VDC OFF SWITCH

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check VDC OFF switch. Refer to <u>BRC-78. "Diagnosis Procedure"</u>.

2. CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "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-93</u>, "Removal and Installation".

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

INFOID:000000009883721

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-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

>> GO TO 2

2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). D Refer to <u>BRC-9</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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< DTC/CIRCUIT DIAGNOSIS >

SLIP INDICATOR LAMP

Description

INFOID:000000009883722

INFOID:000000009883723

INFOID:000000009883724

[VDC/TCS/ABS]

×: ON -: OFF

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

Component Function Check

1.CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to <u>BRC-84. "Diagnosis Procedure"</u>.

Diagnosis Procedure

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-24, "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-27</u>, "<u>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-93, "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000009883725

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-8. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-9</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000009883726

А

С

[VDC/TCS/ABS]

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% or less)	Vehicle running (Note 1)					
		0 [km/h (MPH)]	Vehicle stopped					
R RH SENSOR	Wheel speed	Nearly matches the speed meter display (\pm 10% or less)	Vehicle running (Note 1)					
		0 [km/h (MPH)]	Vehicle stopped					
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (\pm 10% or less)	Vehicle running (Note 1)					
		0 [km/h (MPH)]	Vehicle stopped					
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (\pm 10% or less)	Vehicle running (Note 1)					
	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G					
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G					
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
FR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF					
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
FR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF					
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
FR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF					
FR LH OUT SOL	Operation status of each colonaid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF					

< ECU DIAGNOSIS INFORMATION >

		Data monitor						
Monitor item	Display content	Condition	Reference value in normal operation					
RR RH IN SOL	Operation status of each colonaid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
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					
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					
RR LH OUT SOL	Operation status of each selenaid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON					
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF					
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON					
EDD WARIN LAWP	(Note 2)	When EBD warning lamp is OFF	OFF					
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	ON					
STOP LAWF SW	Stop lamp switch signal status	When brake pedal is released	OFF					
MOTOR RELAY	Motor and motor rolay operation	When the motor relay and motor are operating	ON					
MOTOR RELAT	Motor and motor relay operation	When the motor relay and motor are not operating	OFF					
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON					
ACTORICICIEN	Actual relay operation	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					
		1st gear	1					
GEAR	Gear position determined by TCM	2nd gear 3rd gear	2 3					
		4th gear	4					
		5th gear	5					

< ECU DIAGNOSIS INFORMATION >

		Data monitor						
Monitor item	Display content	Condition	Reference value in normal operation					
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D					
		With engine stopped	0 rpm					
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display					
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s					
	sensor	When vehicle turning	–75 to 75 d/s					
R POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = R position	ON					
K F 001 010	condition	A/T shift position = other than R position	OFF					
N POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = N position	ON					
	condition	A/T shift position = other than N position	OFF					
P POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = P position	ON					
F FUSI 31G	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					
	Drive oute	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°				
BST OPER SIG	Brake booster operation is displayed	Brake booster is active	ON				
BST OF ER SIG	Brake booster operation is displayed	Brake booster is inactive	OFF				
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 Operation	EBD is inactive	OFF				
ABS SIGNAL	APS operation	ABS is active	ON				
· · · · · · · · · · · · · · · · · · ·		ABS is inactive	OFF				
TCS SIGNAL	TCS operation	TCS is active	ON				
ICS SIGNAL		TCS is inactive	OFF				
VDC SIGNAL	VDC operation	VDC is active	ON				
VDC SIGNAL		VDC is inactive	OFF				
ABS FAIL 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				
VDO I AIL SIG		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				
		When brake fluid level switch OFF	OFF				
PRESS SEN2	Brake fluid pressure detected by rear pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar				
FILESS SLIVE	sure sensor	With ignition switch turned ON and brake pedal depressed	-40 to 300 bar				
DELTA S SEN Value detected by delta stroke sensor		When brake pedal is depressed	1.05 - 1.80 mm				
DELIA 5 SEN	Value detected by delta stroke sensor	When brake pedal is released	0.00 mm (+0.6/-0.4)				
RELEASE SW NO Active booster signal status		When brake pedal is depressed	ON				
RELEASE SWINU	Active booster signal status	When brake pedal is released	OFF				
RELEASE SW NC	Active booster signal status	When brake pedal is depressed	OFF				
NELEASE SWING	Active booster signal status	When brake pedal is released	ON				
OHB FAIL	OHB fail safe signal	OHB is active	ON				
		OHB is inactive	OFF				

< ECU DIAGNOSIS INFORMATION >

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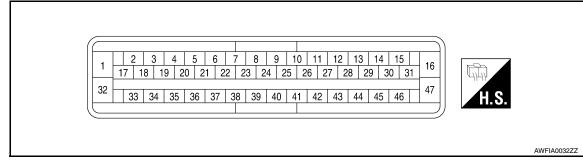
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		Data monitor						
Monitor item	Display content	Condition	Reference value in normal operation	A				
HBA FAIL		HBA is active	ON	В				
	HBA fail safe signal	HBA is inactive	OFF	D				
OHB SIG	OHP exercises	In OHB fail-safe	ON					
	OHB operation	OHB is normal	OFF	С				
HBA SIG		In HBA fail-safe	ON					
NDA SIG	HBA operation	HBA is normal	OFF	5				
STP OFF RLY	Stop Jomp rolay signal	When stop lamp relay is ON	ON	D				
STP OFF KLT	Stop lamp relay signal	When stop lamp relay is OFF	OFF					
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	ON	Е				
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch OFF	OFF					
DLOCK CHG SW	Differential lock mode switch signal status	When differential lock mode switch is en- gaged	ON	BRC				
DLOCK CHG 3W	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-80, "Description".
- Brake warning lamp: Refer to BRC-81, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-82</u>, "Description".
- SLIP indicator lamp: Refer to <u>BRC-84, "Description"</u>.

TERMINAL LAYOUT



Fail-Safe

CAUTION:

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

ABS/EBD SYSTEM

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

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

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

BRC-89

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) OSIS INFORMATION > [VDC/TCS/ABS]

< ECU DIAGNOSIS INFORMATION >

DTC No. Index

DTC	Items (CONSULT screen terms)	Reference				
C1101	RR RH SENSOR-1					
C1102	RR LH SENSOR-1					
C1103	FR RH SENSOR-1	BRC-29, "Description"				
C1104	FR LH SENSOR-1					
C1105	RR RH SENSOR-2					
C1106	RR LH SENSOR-2					
C1107	FR RH SENSOR-2	BRC-32, "Description"				
C1108	FR LH SENSOR-2					
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-35, "Description"				
C1110	CONTROLLER FAILURE	BRC-37, "DTC Logic"				
C1111	PUMP MOTOR	BRC-38, "Description"				
C1113	G-SENSOR	BRC-40, "Description"				
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-42, "Description"				
C1116	STOP LAMP SW	BRC-45, "Description"				
C1120	FR LH IN ABS SOL	BRC-47, "Description"				
C1121	FR LH OUT ABS SOL	BRC-50, "Description"				
C1122	FR RH IN ABS SOL	BRC-47, "Description"				
C1123	FR RH OUT ABS SOL	BRC-50, "Description"				
C1124	RR LH IN ABS SOL	BRC-47, "Description"				
C1125	RR LH OUT ABS SOL	BRC-50, "Description"				
C1126	RR RH IN ABS SOL	BRC-47, "Description"				
C1127	RR RH OUT ABS SOL	BRC-50, "Description"				
C1130	ENGINE SIGNAL 1					
C1131	ENGINE SIGNAL 2					
C1132	ENGINE SIGNAL 3	BRC-53, "Description"				
C1133	ENGINE SIGNAL 4					
C1136	ENGINE SIGNAL 6					
C1140	ACTUATOR RLY	BRC-54, "Description"				
C1142	PRESS SEN CIRCUIT	BRC-56, "Description"				
C1143	ST ANG SEN CIRCUIT					
C1144	ST ANG SEN SIGNAL	BRC-59, "Description"				
C1145	YAW RATE SENSOR					
C1146	SIDE G-SEN CIRCUIT	BRC-40, "Description"				
C1155	BR FLUID LEVEL LOW	BRC-62, "Description"				
C1156	ST ANG SEN COM CIR	BRC-65, "Description"				
C1160	DECEL G SEN SET	BRC-66, "Description"				
C1163	ST ANGL SEN SAFE	BRC-67, "Description"				
C1164	CV1					
C1165	CV2					
C1166	SV1	BRC-68, "Description"				
C1167	SV2					
C1170	VARIANT CODING	BRC-37, "DTC Logic"				

< ECU DIAGNOSIS INFORMATION >

(VDC/TCS/ABS]

DTC	Items (CONSULT screen terms)	Reference	
C1178	ABS ACTIVE BOOSTER SV NG	BRC-71, "Description"	А
C1179	ABS DELTA S SEN NG	BRC-74, "Description"	
C1181	ABS ACTIVE BOOSTER RESPONSE NG	BRC-71, "Description"	В
C1184	ABS BRAKE RELEASE SW NG	BRC-11, Description	
C1187	ABS DIFLOCK CONTROLLER NG	BRC-76, "Description"	
C1189	ABS BRAKE BOOSTER DEFECT	BRC-71, "Description"	С
U1000	CAN COMM CIRCUIT	BRC-77, "Description"	

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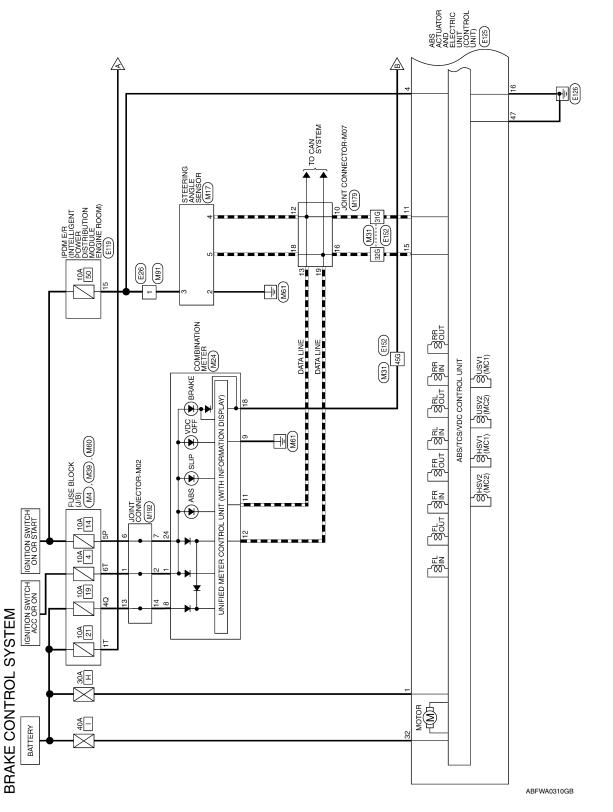
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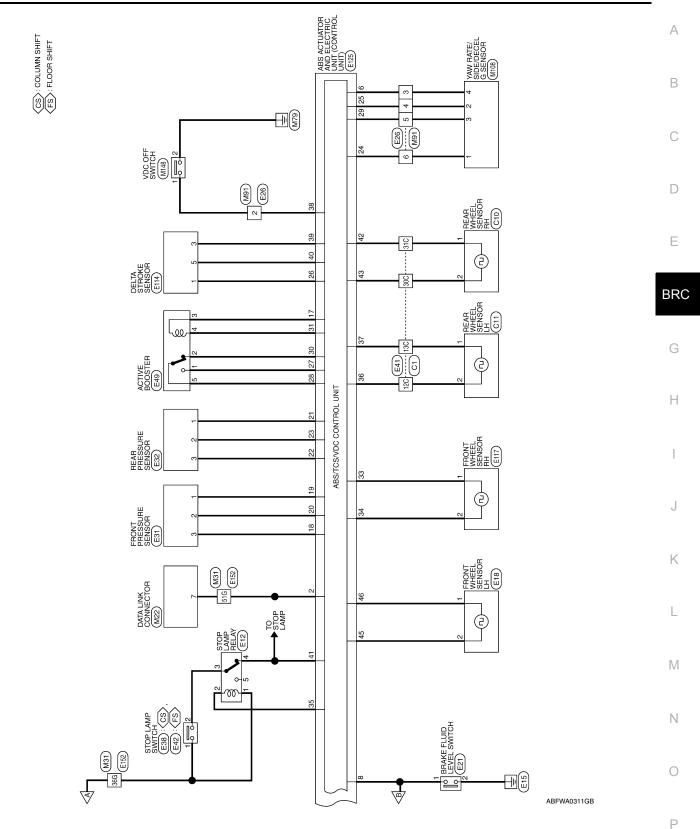
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WIRING DIAGRAM BRAKE CONTROL SYSTEM - VDC

Wiring Diagram



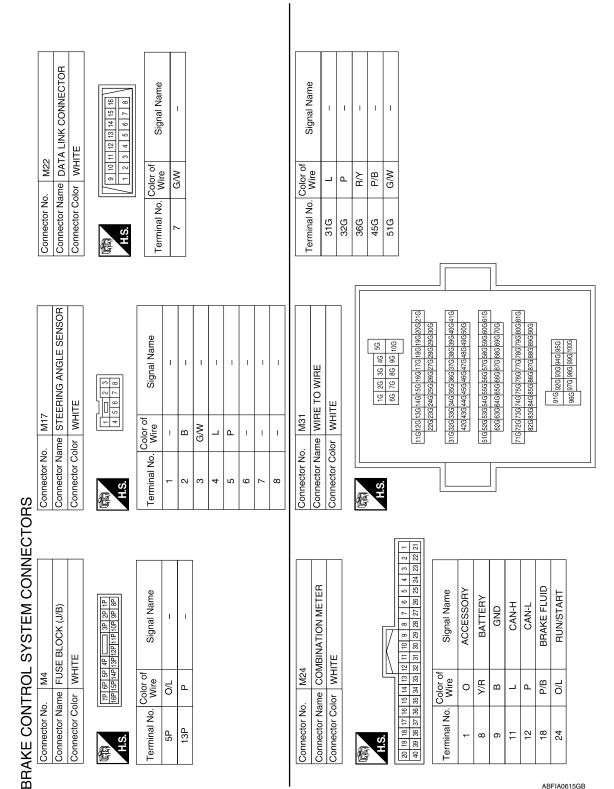
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Revision: August 2013

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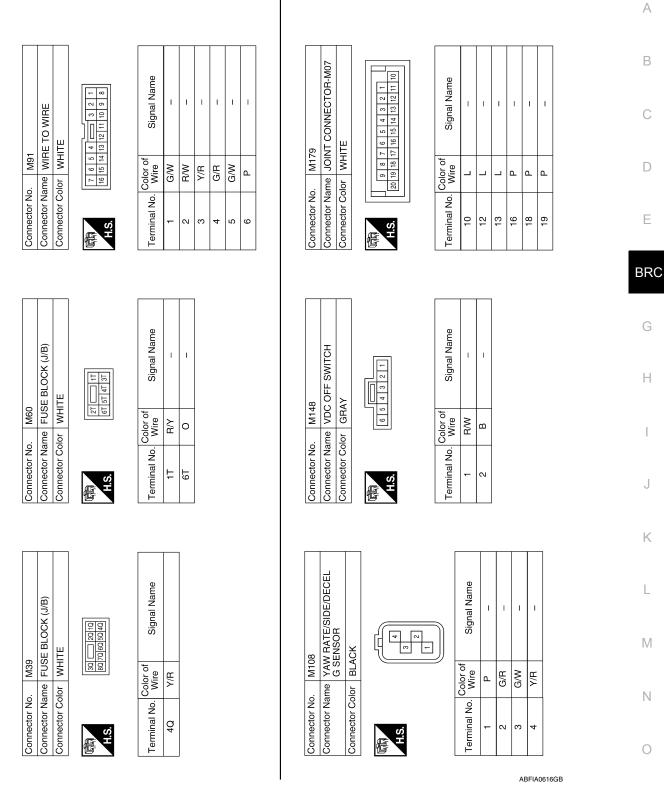
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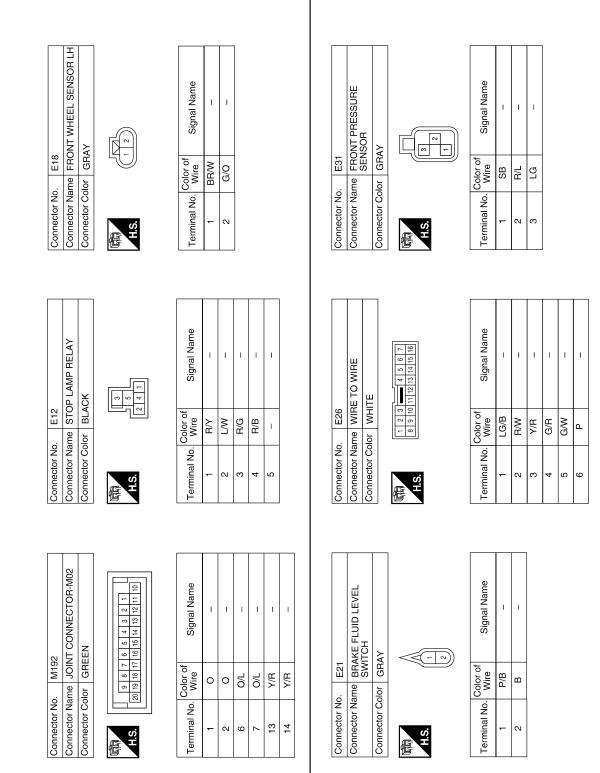
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[VDC/TCS/ABS]



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[VDC/TCS/ABS]



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0. E41 ame WIRE TO WIRE olor GRAY 10 C BC 30 40 50 100 110 10 20 30 40 90 100 110 120 130 140 150 160 170 180 190 200 210	zerjanjzarjzarjzarjzarjzarjzarjzarjzarjzarjzar	E114 DELTA STROKE SENSOR BLACK	Signal Name	E
 E41 E41 MRE MRE	20102010010010000000000000000000000000		Color of Wire W/V W/V B/B G/B	
Connector No. E41 Connector Name WIRE TO WIRE Connector Color GRAY 6 70 80 40 120 130 40	Terminal No. 12C 30C 31C	Connector No. Connector Name Connector Color	Terminal No. 1 2 3 4 4 6	E
				Bł
SWITCH IFT)	Signal Name	STER	Signal Name	(
E38 STOP LAMP SWITCH (COLUMN SHIFT) WHITE		5 4 1 1 B00		ŀ
	Color of Wire R/Y R/G	9 5	Color of Wire L/B L/A W/R W/G Y/B	
Connector No. Connector Name Connector Color	Terminal No.	Connector No. Connector Name Connector Color	Terminal No. 1 2 3 4 6 6	,
				ŀ
E32 REAR PRESSURE SENSOR GRAY	Signal Name	E42 STOP LAMP SWITCH (FLOOR SHIFT) BLACK	Signal Name	I
E32 GRAY		E42 STOP LAN (FLOOR S BLACK		Ν
	No. Color of R/G W/D W/D	e -	No. Color of R/Y R/G	ſ
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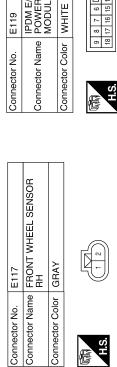
< WIRING DIAGRAM >

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Signal Name	BST SIG	CAN2 H	BST NC	BST GND	VALVE ECU SUPPLY	WSS FR SIG	WSS FR PWR	BRL OUT	WSS RL PWR	WSS RL SIG	VDC OFF SW	DEL S GND	DEL S SIGNAL	BLS	WSS RR SIG	WSS RR PWR	ļ	WSS FL PWR	WSS FL SIG	MOTOR GND
Color of Wire	Y/B	G/W	LG/R	W/G	B/Y	BR	B/B	LW	_	٩	R/W	G/B	R/Y	R/B	>	G/Y	I	G/O	BR/W	В
Terminal No.	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

Signal Name	1			I	Ι	I	CAN-L	VALVE ECU GND	BST SUPPLY	PS1 SUPPLY	PS1 GND	PS1 SIGNAL	PS2 GND	PS2 SUPPLY	PS2 SIGNAL	CLUSTER GND	CAN2 L	DEL S SUPPLY	BST NO
Color of Wire		-	L	I	I	T	Ч.	В	W/R	ГG	SB	R/L	R/G	W/L	0/M	Р	G/R	N/N	L/B
Terminal No.		2 =	-	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27

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IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)

E119

	Signal Name	I	I
J	Color of Wire	BR	B/R
H.S.	Terminal No.	Ļ	2

ABS IGN SUPPLY Signal Name

Color of Wire LG/B

Terminal No. 15

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

			-		ਤ
H.S.		2 3 4 5 6 7 8 9 10 11 12 13 14 15	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31		23 34 35 36 37 38 30 40 41 49 43 44 45 46
临く	IL	-	-	ĉ	8
	0	-			

Signal Name	MOTOR SUPPLY	DIAG K	1	IGN	I	CLUSTER SUPPLY	Ι	FLUID LEVEL SW	I
Color of Wire	≻	>	T	LG/B	I	Y/R	I	P/B	I
Terminal No.	-	2	3	4	5	9	7	8	9

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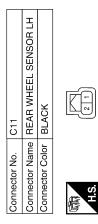
Connector Color WHITE 1000 1	Terminal No. Color of Signal Name	0 WIRE 31G	32G	36G R/V -	45C D/B	36 26 16		christen is drad volt ve	306/26/32/27/2/26/2/26/2/26/2/26/2/2/2/2/2/2/2/2	ekyraked acid az ekyadiaria	61060053053053053053053053053053053053053053	derrqeedesdetadesd	81.G (80:G) 796 (73:G) 77:G) 75:G) 7	and inclusion of 15	901 941 951 956 956		Terminal No Color of Sinnal Name Connector No.		л С	- - -	30C G/A - G/A -	atc V – 11. (21)		210[200[90[90[910] 170 [166 [156 [140 [130 [120]]	28C[28C[24C[28C]22C]	_	41C[40C]33C[38C]37C]38C]37C]38C]35C[34C]33C]32C]	44C 43C	51C 50C 49C			
Connector Color WHITE 56 46 56 56 56 56 56 56 56 56 56 56 56 56 56	Terminal No.	31G	32G			36 26 16	500	17046615641364206116	276286259246236226	1376136613561346133613261316	570 560 550 540 530 520 51C	676 666 656 646 636 626	77/6/760/750/746/756/716 1027/1667/16/72/8726/716	016	40,930,926,976,966		Terminal No	C C T					27 27 27 27	17C 16C 15C 14C 13C 12C			37C 36C 35C 34C 33C 32C	44C 43C				

< WIRING DIAGRAM >

[VDC/TCS/ABS]

Revision: August 2013

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Signal Name	I	1
Color of Wire	Ч	Γ
Terminal No.	Ļ	2

ABFIA0621GB

SYMPTOM DIAGNOSIS VDC/TCS/ABS

Symptom Table

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

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-102, "Diag-</u> nosis Procedure"
quency	Wheel sensor and rotor system	<u>1100101110000010</u>
Linevinested nodel reaction	Brake pedal stroke	BRC-103, "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-104, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-105, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-106, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
	ABS actuator and electric unit (control unit)	DD0 107 ID:
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	<u>BRC-107, "Diag-</u> nosis Procedure"
	ECM	

NOTE:

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

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

- When shifting gears

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

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

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[VDC/TCS/ABS]

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

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

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-113</u>, "Removal and Installation" or <u>BRC-115</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-24, "CONSULT Function (ABS)"</u>.
- NO >> Inspection End.

UNEXPECTED PEDAL REACTION	А
Diagnosis Procedure	A
1.CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to <u>BR-13</u> , "Inspection and Adjustment - Standard Pedal" or <u>BR-14</u> , "Inspec- tion and Adjustment - Adjustable Pedal".	
Is the stroke too large?	С
 YES >> • Bleed air from brake tube and hose. Refer to <u>BR-16, "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-13, "Inspection and Adjustment - Standard Pedal"</u> or <u>BR-14, "Inspection and Adjustment - Adjustable Pedal"</u> (brake pedal), <u>BR-25, "Removal and Installation"</u> (master cylinder), <u>BR-8, "Inspection"</u> (brake booster). 	D
NO >> GO TO 2	E
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.	BRC
Is the inspection result normal? YES >> Inspection End.	
YES >> Inspection End. NO >> Check brake system.	G

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< SYMPTOM DIAGNOSIS >

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000009883733

[VDC/TCS/ABS]

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

< SYN	IPTOM DIAGNOSIS >	[VDC/TCS/ABS]	
ABS	FUNCTION DOES NOT OPERATE		Λ
Diag	nosis Procedure	INFOID:00000009883734	~
	<mark>ION:</mark> loes not operate when speed is 10 km/h (6 MPH) or lower. ECK ABS WARNING LAMP DISPLAY		В
	sure that the ABS warning lamp turns OFF after ignition switch is turned ON or w inspection result normal?	hen driving.	С
YES	>> Inspection End.		

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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-24. "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.

[VDC/TCS/ABS]

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [VDC/TCS/ABS]
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-24, "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. Refer to <u>BRC-24</u> , " <u>CONSULT Function (ABS)</u> ".
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.
<u>Are self-diagnosis results indicated?</u> 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-49, "CONSULT Function"</u>. TCM: Refer to <u>TM-38, "CONSULT Function (TRANSMISSION)"</u>.
NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-116, "Removal and Installa-</u> tion".

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 h's 's a second so al'
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.

< 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.

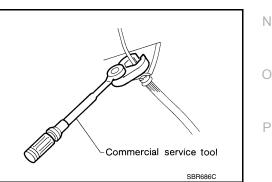
Precaution for Brake System

CAUTION:

- Always use recommended brake fluid. Refer to <u>MA-15, "FOR NORTH AMERICA : Fluids and Lubri-cants"</u> (United States and Canada), <u>MA-16, "FOR MEXICO : Fluids and Lubricants"</u> (Mexico).
- Do not 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.
- Do not 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-31, "Brake Burnishing Procedure"</u> (front disc brake) or <u>BR-35, "Removal and Installation</u> <u>of Brake Pad"</u> (rear disc brake).

WARNING:



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PRECAUTIONS

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

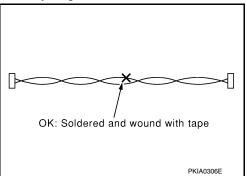
Precaution for Brake Control

INFOID:000000009883740

- 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 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.

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.
- Area to be repaired must be soldered and wrapped with tape. Make sure that fraying of twisted wire is within 110 mm (4.33 in).

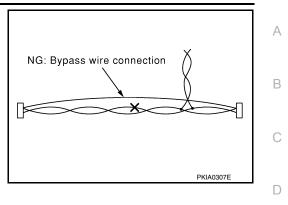


PRECAUTIONS

< PRECAUTION >

[VDC/TCS/ABS]

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



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< PREPARATION > PREPARATION PREPARATION

Special Service Tool

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester	VI-15741-BOX	Checking operation of ABS active wheel sen- sors

Commercial Service Tool

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

WHEEL SENSORS

< UNIT REMOVAL AND INSTALLATION >

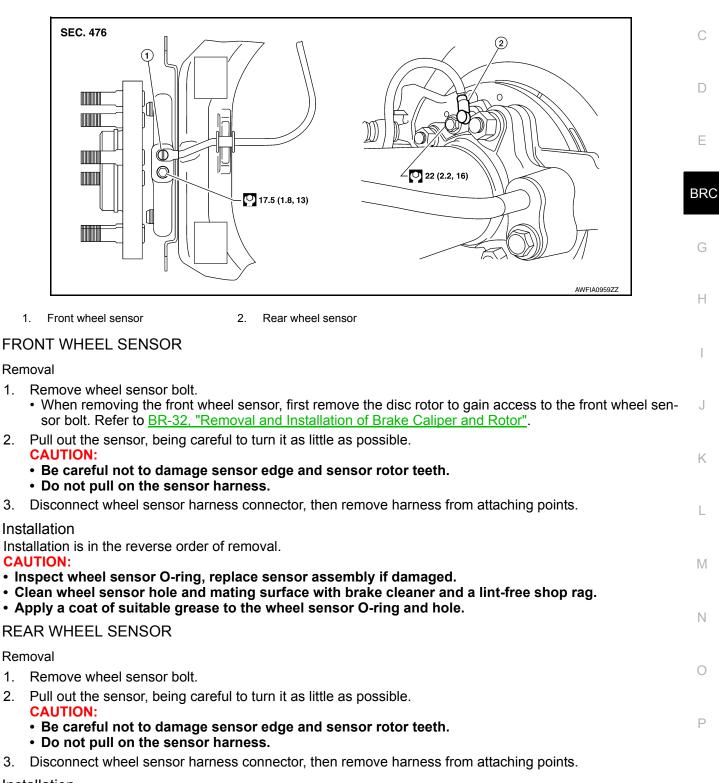
UNIT REMOVAL AND INSTALLATION WHEEL SENSORS

Removal and Installation

[VDC/TCS/ABS]

INFOID:000000009883744 B

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Installation

- 1. Installation is in the reverse order of removal.
 - **CAUTION:**
 - Inspect wheel sensor O-ring, replace sensor assembly if damaged.

BRC-113

< UNIT REMOVAL AND INSTALLATION >

- Clean wheel sensor hole and mating surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.
- Apply a coat of suitable grease to the wheel sensor O-ring and hole.

< UNIT REMOVAL AND INSTALLATION >

SENSOR ROTOR		А
Removal and Installation	INFOID:000000009883745	A
FRONT WHEEL SENSOR ROTOR		В
Removal The front wheel sensor rotor is built into the front wheel hub and bearing assembly and is not damaged, replace the front wheel hub and bearing assembly. Refer to <u>FAX-6, "Removal and Ins</u>		С
REAR WHEEL SENSOR ROTOR		
Removal Remove the rear axle shaft assembly. Refer to <u>RAX-9, "Removal and Installation"</u> . NOTE:		D
It is necessary to disassemble the rear axle shaft assembly to replace the rear wheel sensor rol	or.	Е
Installation Installation is in the reverse order of removal. CAUTION:	I	BRC
 Do not reuse the old rear wheel sensor rotor. Do not reuse the rear axle oil seal. The rear axle oil seal must be replaced every time 		DRU
shaft assembly is removed from the rear axle shaft housing.		G
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

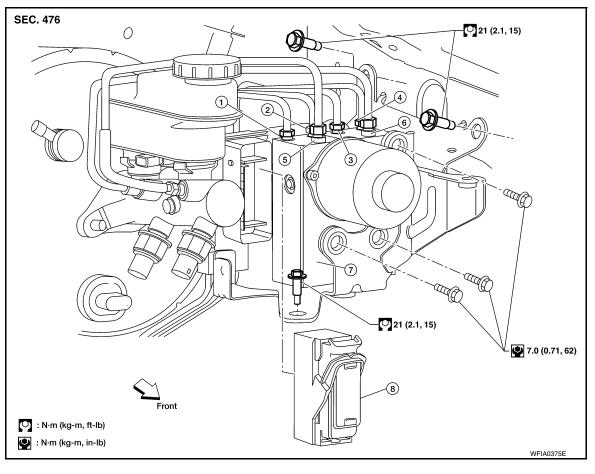
< UNIT REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:000000009883746

[VDC/TCS/ABS]



- To rear left caliper
 13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- To front right caliper
 13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- To rear right caliper
- 13.0 N·m (1.3 kg-m, 10 ft-lb)
 5. From the master cylinder secondary side 6. 18.2 N·m (1.9 kg-m, 13 ft-lb)

3.

- To front left caliper 13.0 N·m (1.3 kg-m, 10 ft-lb) From the master cylinder primary side 18.2 N·m (1.9 kg-m, 13 ft-lb)
- 7. ABS actuator and electric unit 8. Actuator harness connector (control unit)
- NOTE:

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

REMOVAL

- 1. Disconnect the negative battery terminal.
- 2. Remove the air cleaner and duct resonator assembly. Refer to EM-26, "Removal and Installation".
- 3. Partially drain brake fluid. Refer to <u>BR-16, "Drain and Refill"</u>.

2.

- 4. Disconnect the actuator harness connector from the ABS actuator and electric unit (control unit).
- 5. Disconnect the brake tubes.
 - **CAUTION:**
 - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
 - Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- 6. Remove the three bolts and remove the ABS actuator and electric unit (control unit).

INSTALLATION

BRC-116

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< UNIT REMOVAL AND INSTALLATION >

Installation is in the reverse order of removal.

- To install, use a flare nut crowfoot and torque wrench (commercial service tools).
- Always tighten brake tubes to specification when installing.
- Do not reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), perform the following.
- Refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-16, "Bleed-ing Brake System"</u>.
- Adjust the steering angle sensor. Refer to <u>BRC-8</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR <u>NEUTRAL POSITION : Special Repair Requirement</u>".
- Calibrate the yaw rate/side/decel G sensor. Refer to <u>BRC-9, "CALIBRATION OF DECEL G SENSOR :</u> <u>Special Repair Requirement"</u>.

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< UNIT REMOVAL AND INSTALLATION >

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Removal and Installation

REMOVAL

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

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

After installation of spiral cable, adjust steering angle sensor. Refer to <u>BRC-8, "ADJUSTMENT OF</u> <u>STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

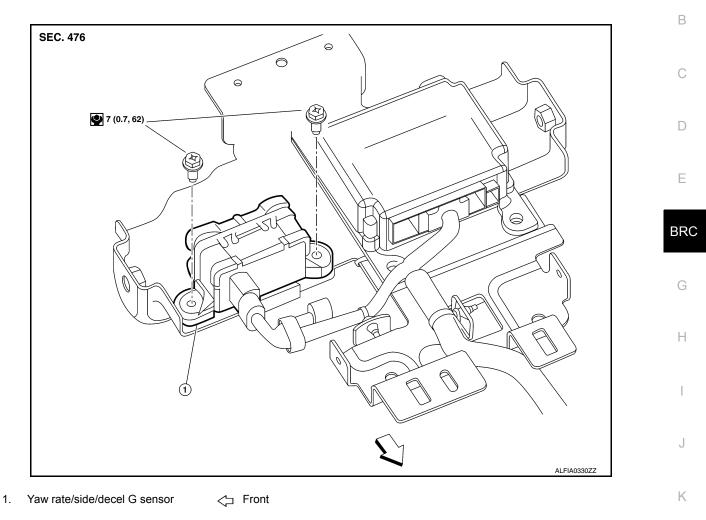
< UNIT REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

YAW RATE/SIDE G SENSOR Removal and Installation

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REMOVAL

1.	Remove center console (if equipped). Refer to IP-24, "Disassembly and Assembly".	L
2.	Remove the front center seat (if equipped). Refer to <u>SE-34</u> , "Removal and Installation - Front Seat <u>Assembly</u> ".	
3.	Remove yaw rate/side/decel G sensor nuts. CAUTION:	Μ
	 Do not use power tools to remove the yaw rate/side/decel G sensor. Do not drop or strike the yaw rate/side/decel G sensor. 	Ν
4.	Disconnect harness connector and remove the yaw rate/side/decel G sensor.	
-	STALLATION	0
	allation is in the reverse order of removal. UTION:	0
• D • A	o not drop or strike the yaw rate/side/decel G sensor. fter installation, calibrate the yaw rate/side/decel G sensor. Refer to <u>BRC-9, "CALIBRATION OF</u> <u>ECEL G SENSOR : Description"</u> .	Ρ