# SECTION BRAKE CONTROL SYSTEM

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< BASIC INSPECTION >

INFOID:000000001690790

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-11, "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u>.

BRC-7

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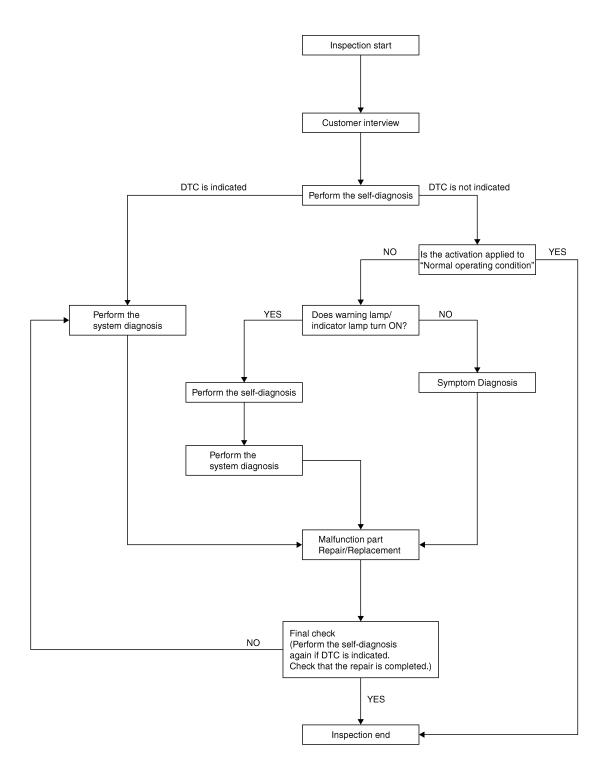
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# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

OVERALL SEQUENCE



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#### DETAILED FLOW

# 1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-10</u>, "<u>Diagnostic Work Sheet</u>".

# DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]

< BASIC INSPECTION > [VD0/100/AB0]
2.PERFORM THE SELF-DIAGNOSIS
Check the DTC display with the self-diagnosis function. Refer to BRC-21, "CONSULT-III Function (ABS)".
Is there any DTC displayed?
YES >> GO TO 3
NO >> GO TO 4
3.PERFORM THE SYSTEM DIAGNOSIS
Perform the diagnosis applicable to the displayed DTC. Refer to <u>BRC-106, "DTC No. Index"</u> .
>> GO TO 7
<b>4.</b> CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION
Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-11
"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.
<ul> <li>ABS warning lamp: Refer to <u>BRC-81, "Description"</u>.</li> </ul>
Brake warning lamp: Refer to <u>BRC-82, "Description"</u> .
<ul> <li>VDC OFF indicator lamp: Refer to <u>BRC-83, "Description"</u>.</li> <li>SLIP indicator lamp: Refer to <u>BRC-84, "Description"</u>.</li> </ul>
Is ON/OFF timing normal?
YES >> GO TO 6
NO >> GO TO 2
<b>6.</b> PERFORM THE DIAGNOSIS BY SYMPTOM
Perform the diagnosis applicable to the symptom.
>> GO TO 7
<b><i>I</i></b> .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, eras
the self-diagnosis memory. Refer to <u>BRC-21, "CONSULT-III Function (ABS)"</u> .
Is no other DTC present and the repair completed?
YES >> INSPECTION END NO >> GO TO 3

Ρ

# DIAGNOSIS AND REPAIR WORKFLOW

# < BASIC INSPECTION >

# Diagnostic Work Sheet

INFOID:000000001690791

[VDC/TCS/ABS]

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

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	D ADJUSTMENT
< BASIC INSPECTION >	[VDC/TCS/ABS]
INSPECTION AND ADJUSTMENT	
ADDITIONAL SERVICE WHEN REPLACI	ING CONTROL UNIT
ADDITIONAL SERVICE WHEN REPLACIN	IG CONTROL UNIT : Description
<ul><li>After replacing the ABS actuator and electric unit (control</li><li>Neutral position adjustment for the steering angle sen</li><li>Calibration of the decel G sensor</li></ul>	
ADDITIONAL SERVICE WHEN REPLACIN quirement	IG CONTROL UNIT : Special Repair Re-
<b>1.</b> PERFORM THE NEUTRAL POSITION ADJUSTMEN	NT FOR THE STEERING ANGLE SENSOR
Perform the neutral position adjustment for the steering	angle sensor.
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor.	
	EL G SENSOR : Special Repair Requirement".
Perform calibration of the decel G sensor.	<u>EL G SENSOR : Special Repair Requirement"</u> . ENSOR NEUTRAL POSITION
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12. "CALIBRATION OF DECI</u> ADJUSTMENT OF STEERING ANGLE S	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12. "CALIBRATION OF DECI</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description WFOID:0000001690794 Reering angle sensor neutral position is required.
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12. "CALIBRATION OF DECI</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description <sup>INFOID:00000001690794</sup> teering angle sensor neutral position is required. ×: Required –: Not required
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12. "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description <sup>INFOID:00000001690794</sup> teering angle sensor neutral position is required. ×: Required –: Not required
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Perform calibration of the decel G sensor.  >> Refer to BRC-12, "CALIBRATION OF DECI ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description Preoring angle sensor neutral position is required. X Required -: Not required Adjustment of steering angle sensor neutral position
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12. "CALIBRATION OF DECI</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SEI Refer to the table below to determine if adjustment of st <u>Situation</u> Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description <i>WFOID:00000001690794</i> reeering angle sensor neutral position is required. <u>X: Required -: Not required</u> Adjustment of steering angle sensor neutral position <u>—</u> <u>X</u> <u>X</u> <u>X</u> <u>X</u>
Perform calibration of the decel G sensor. >> Refer to <u>BRC-12</u> , "CALIBRATION OF DECI ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Replacing steering components	EL G SENSOR : Special Repair Requirement". ENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description weering angle sensor neutral position is required. x: Required -: Not required Adjustment of steering angle sensor neutral position 
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# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

>> GO TO 2

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

- 1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
- Touch "START".
   CAUTION:

#### Do not touch steering wheel while adjusting steering angle sensor.

3. After approximately 10 seconds, touch "END". NOTE:

After approximately 60 seconds, it ends automatically.

4. Turn ignition switch OFF, then turn it ON again. CAUTION:

#### Be sure to perform above operation.

>> GO TO 3

# **3.**CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4

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

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

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

- ABS actuator and electric unit (control unit): Refer to <u>BRC-21, "CONSULT-III Function (ABS)"</u>.
- ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function</u> (<u>ENGINE)"</u> (VK56DE).

Are the memories erased?

- YES >> INSPECTION END
- NO >> Check the items indicated by the self-diagnosis.

# CALIBRATION OF DECEL G SENSOR

# CALIBRATION OF DECEL G SENSOR : Description

INFOID:000000001690796

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

×: Required –: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:000000001690797

#### CALIBRATION OF DECEL G SENSOR CAUTION: To calibrate the decel G sensor, make sure to use CONSULT-III

# **INSPECTION AND ADJUSTMENT**

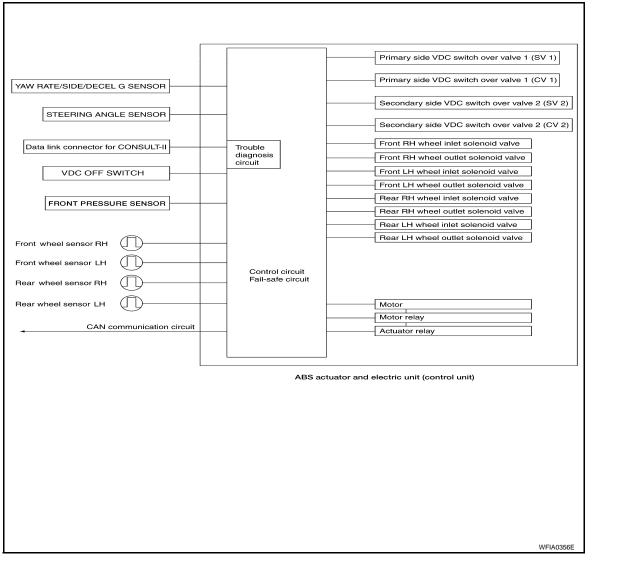
INSPECTION AND ADJUSTMENT	
< BASIC INSPECTION > [VDC/TCS/ABS]	
Calibration cannot be done without CONSULT-III)	
1. ALIGN THE VEHICLE STATUS	
Stop vehicle with front wheels in straight-ahead position.	
>> GO TO 2	
2.PERFORM CALIBRATION OF DECEL G SENSOR	_
<ol> <li>On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.</li> <li>Touch "START".</li> </ol>	
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	
I. Run vehicle with front wheels in straight-ahead position, then stop.	•
2. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±.	
s 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-21, "CONSULT-III Function (ABS)"</u> .	
ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function</u> (ENGINE)" (VK56DE).	
Are the memories erased?	
YES >> INSPECTION END	
NO >> Check the items indicated by the self-diagnosis.	

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# FUNCTION DIAGNOSIS

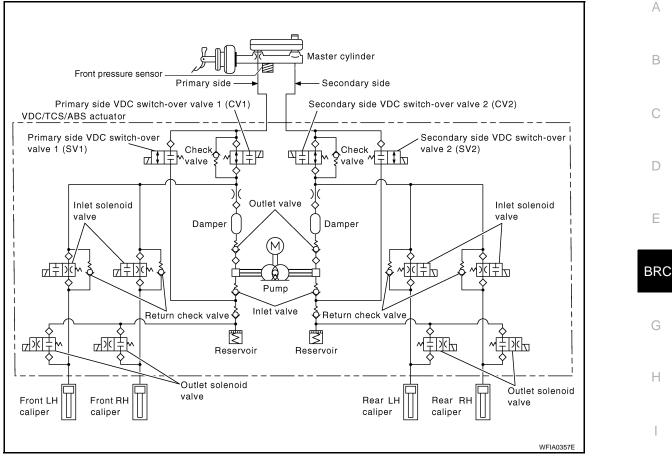
System Diagram



INFOID:000000001690798

#### < FUNCTION DIAGNOSIS >

#### HYDRAULIC CIRCUIT DIAGRAM



VDC

# System Description

INFOID:000000001690799

[VDC/TCS/ABS]

- 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-III is available.
- Active booster, delta stroke sensor, rear pressure sensor and stop lamp relay are available onvehicles equipped with VK56DE only.

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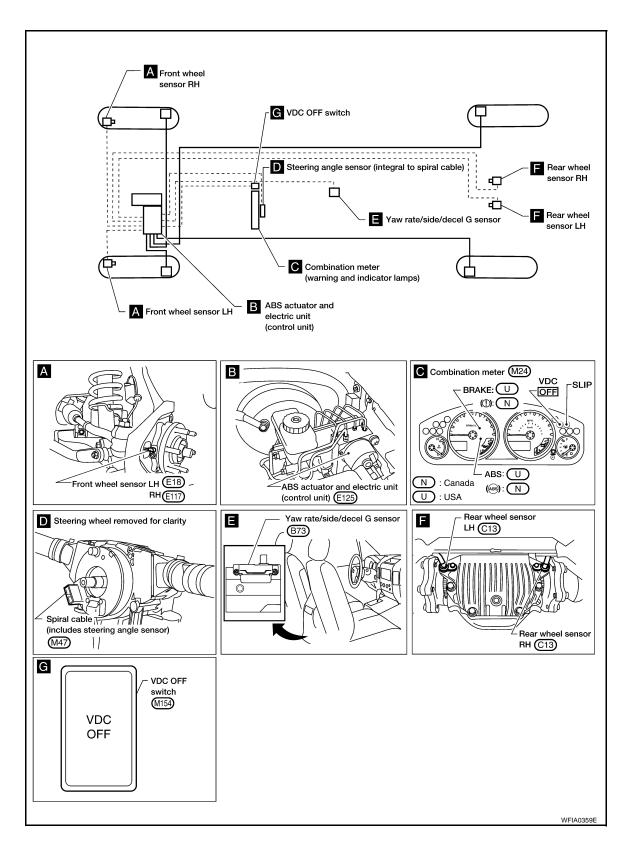
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# **Component Parts Location**

INFOID:000000001690800

[VDC/TCS/ABS]



# VDC

# < FUNCTION DIAGNOSIS >

# **Component Description**

INFOID:000000001690801

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Compo	nent parts	Reference	
	Pump	BRC-35, "Description"	В
	Motor Actuator relay	BRC-53, "Description"	
ABS actuator and electric unit (control unit)	Solenoid valve	BRC-45, "Description"	— C
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-69, "Description"	D
Wheel sensor		BRC-26, "Description"	_ 0
Yaw rate/side/decel G sensor		BRC-37, "Description"	
Steering angle sensor	ng angle sensor		E
VDC OFF switch	BRC-79, "Description"		
ABS warning lamp		BRC-81, "Description"	BR(
Brake warning lamp	BRC-82, "Description"		
VDC OFF indicator lamp		BRC-83, "Description"	
SLIP indicator lamp	BRC-84, "Description"	G	
Front pressure sensor		PPC 55 "Description"	
Rear pressure sensor*	BRC-55, "Description"		
Active booster*	BRC-73, "Description"	— H	
Delta stroke sensor*	BRC-76, "Description"		

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# < FUNCTION DIAGNOSIS >

# TCS



#### System Diagram INFOID:000000001690802 Transfer Steering Combination ECM тсм control unit angle sensor meter (With 4WD) Injector operation signal CAN communication Front pressure sensor Front wheel Rear pressure sensor sensor RH Active booster ABS actuator and electric unit Rear wheel Delta stroke sensor (control unit) sensor RH Yaw rate/side/decel G sensor VDC OFF switch Rear wheel sensor LH Front wheel sensor LH

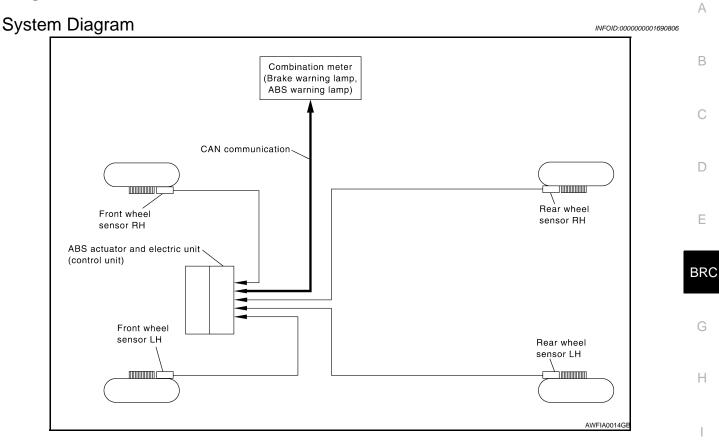
# System Description

INFOID:000000001690803

AWFIA001

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and A/T gear position to ensure the optimum slippage ratio at drive wheels by computing wheel speed signals from 4 wheel sensors. When ABS actuator and electric unit (control unit) detects a spin at drive wheels (rear wheels), it compares wheel speed signals from all 4 wheels. At this time, LH and RH rear brake fluid pressure are controlled, while fuel being cut to engine and throttle valve being closed to reduce engine torque by the control unit. Further more, throttle position is continuously controlled to ensure the optimum engine torque at all times.
- During TCS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.
- Active booster, delta stroke sensor, rear pressure sensor and stop lamp relay are available on vehicles equipped with VK56DE only.

# ABS



# System Description

INFOID:000000001690807

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

# EBD



#### System Diagram INFOID:000000001690810 Combination meter (Brake warning lamp, ABS warning lamp) CAN communication Rear wheel Front wheel sensor RH sensor RH ABS actuator and electric unit-(control unit) Front wheel sensor LH Rear wheel sensor LH 10000000

**EBD** 

# System Description

INFOID:000000001690811

AWFIA0014

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

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

< FUNCTION DIAGNOSIS >

# [VDC/TCS/ABS]

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

# CONSULT-III Function (ABS)

INFOID:000000001690814

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# FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU part number	ABS actuator and electric unit (control unit) part number can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.

### SELF-DIAG RESULTS MODE

#### **Operation Procedure**

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

#### How to Erase Self-diagnosis Results

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

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

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

#### Display Item List Refer to <u>BRC-106, "DTC No. Index"</u>.

#### DATA MONITOR MODE

Display Item List

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

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

### < FUNCTION DIAGNOSIS >

# [VDC/TCS/ABS]

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

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

### < FUNCTION DIAGNOSIS >

# [VDC/TCS/ABS]

ltom	Dat			
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
CV1 (ON/OFF)	_	_	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed.
CV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed.
SV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) sta- tus is displayed.
SV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) sta- tus is displayed.
VDC FAIL SIG (ON/OFF)	_	_	×	VDC fail signal (ON/OFF) status is displayed.
TCS FAIL SIG (ON/OFF)	-	-	×	TCS fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status is displayed.
EBD SIGNAL (ON/OFF)	-	-	×	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	-	-	×	ABS operation (ON/OFF) status is displayed.
TCS SIGNAL (ON/OFF)	-	-	×	TCS operation (ON/OFF) status is displayed.
VDC SIGNAL (ON/OFF)	-	-	×	VDC operation (ON/OFF) status is displayed.
EBD WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) sta- tus is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.
R POSI SIG	-	-	×	Shift position judged by PNP switch signal.
2WD/4WD	-	-	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
BST OPER SIG	-	_	×	Active booster operation (ON/OFF) status is displayed.
PRESS SENSOR	×	_	×	Brake pressure detected by pres- sure sensor is displayed.
CRANKING SIG	-	_	×	The input state of the key SW START position signal is displayed.
PRESS SEN 2	-	_	×	Brake pressure detected by pres- sure sensor is displayed.
DELTA S SEN	-	-	×	The amount of stroke sensor move- ments in the active booster detected by DELTA S SEN is displayed.

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

#### < FUNCTION DIAGNOSIS >

#### [VDC/TCS/ABS]

ltem	Data	a monitor item sele	ction	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
RELEASE SW NO	-	_	×	Release switch signal (ON/OFF) status is displayed. "ON" indicates that the brake pedal is depressed. "OFF"" is that the brake pedal is re- leased.
RELEASE SW NC	-	_	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicates that the brake pedal is depressed on. "ON" is that the brake pedal is released.
OHB FAIL	_	_	×	OHB fail status is displayed.
HBA FAIL	_	_	×	HBA fail status is displayed.
OHB SIG	_	_	×	OHB operation (ON/OFF) status is displayed.
HBA SIG	_	_	×	HBA operation (ON/OFF) status is displayed.
PRES CTRL ACC	_	_	×	This item is not used for this model.
PRES FAIL ACC	_	_	×	This item is not used for this model.
STP OFF RLY	_	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

 $\times$ : Applicable

-: Not applicable

#### ACTIVE TEST MODE

#### **CAUTION:**

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp on.
- ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

#### NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

#### SOLENOID VALVE

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addition, when performing an active test of the VDC/TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "UP", "KEEP", and "DOWN" on the display screen. For ABS solenoid valve (ACT), touch "UP", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

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

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

#### < FUNCTION DIAGNOSIS >

[VDC/TCS/ABS]

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

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

#### ABS MOTOR

Touch "ON" and "OFF" on screen. Make sure motor relay and actuator relay operates as shown in table BRC below.

#### 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.

UP	DOWN
ON	OFF
ON	OFF
$50\pm5$ bar	0 bar
$50\pm5$ bar	0 bar
OFF	OFF
	ON ON 50 ± 5 bar 50 ± 5 bar

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#### < COMPONENT DIAGNOSIS >

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

# Description

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

# DTC Logic

INFOID:000000001690816

# DTC DETECTION LOGIC

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

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-26, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

#### CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

**1.**CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunctioning code.

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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.

BRC-26

INFOID:000000001690817

[VDC/TCS/ABS]

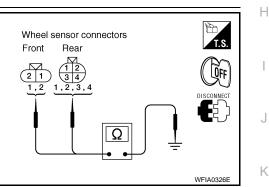
# C1101, C1102, C1103, C1104 WHEEL SENSOR-1

#### [VDC/TCS/ABS] < COMPONENT DIAGNOSIS > 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. А NOTE: If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest. В Does the ABS active wheel sensor tester detect a signal? YES >> GO TO 3 NO >> Replace the wheel sensor. Refer to BRC-121, "Removal and Installation". **3.**CHECK TIRES Check for inflation pressure, wear and size of each tire. D Are tire pressure and size correct and is tire wear within specifications? YES >> GO TO 4 NO >> Adjust tire pressure or replace tire(s). Е **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 and Service" (rear). BRC Is the inspection result normal? YES >> GO TO 5 NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front) or RAX-8, "Removal and Installation" (rear). 5. CHECK WIRING HARNESS FOR SHORT CIRCUIT Н 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Wheel sensor connectors 2. Check continuity between wheel sensor harness connector ter-Front Rear minals and ground.

#### Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 6
- NO >> Repair the circuit.



# 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117 or C13.

Wheel sensor	ABS actuato electric unit (co		Wheel sensor		Continuity	Μ
	Connector	Terminal	Connector	Terminal		
Front LH		45	E18	1		Ν
		46	E18	2	-	
Front RH		34	E117	1	Yes	
	E125	33		2		0
Rear LH	E 125	37		3	165	
		36	C13	4		Р
Rear RH		42	Ť	1		
		43	Ť	2		

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-123. "Removal and Instal-</u><u>lation"</u>.
- NO >> Repair the circuit.

# BRC-27

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

#### < COMPONENT DIAGNOSIS >

#### Component Inspection

INFOID:000000001690818

[VDC/TCS/ABS]

# **1.**CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-26, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000001690819

### **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-11, "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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

#### < COMPONENT 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 В signals (rectangular wave) and transmits them to the ABS actuator and electric unit (control unit).

# **DTC** Logic

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INFOID:000000001690820

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

# 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	К
RR RH SENSOR-2	I.
RR LH SENSOR-2	
FR RH SENSOR-2	L
FR LH SENSOR-2	
Is above displayed on the self-diagnosis display?	М
<ul> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to <u>BRC-29, "Diagnosis Procedure"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> </ul>	IVI
Diagnosis Procedure	Ν
CAUTION: Do not check between wheel sensor terminals.	0
INSPECTION PROCEDURE	0
1.CONNECTOR INSPECTION	
Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunction- ing code.	Ρ
Check the terminals for deformation, disconnection, looseness or damage.	
Is the inspection result normal?	

YES >> GO TO 2

NO >> Repair or replace as necessary.

# **BRC-29**

[VDC/TCS/ABS]

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С

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

#### < COMPONENT DIAGNOSIS >

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

#### NOTE:

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

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

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-122, "Removal and Installation"</u>.

# 3.CHECK TIRES

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

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

- YES >> GO TO 4
- NO >> Adjust tire pressure or replace tire(s).

**4.**CHECK WHEEL BEARINGS

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

Is the inspection result normal?

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

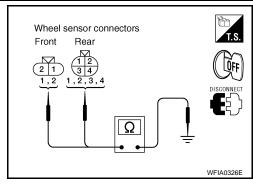
**5.**CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

#### Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 6
- NO >> Repair the circuit.



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

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117, or C13.

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

# < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Wheel sensor	ABS actuat electric unit (co		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal	,	
Front III		45	E18	1		
Front LH		46		E18	2	
	-	34		1		
Front RH	<b>F</b> 405	33	E117	2	M	
<b>D</b>	E125	37		3	Yes	
Rear LH		36	040	4		
D DU	-	42	C13	1		
Rear RH		43		2		
n "DATA MONITOR", s	SOLOCT "ER I H SEN					
SOR", and check the ve	hicle speed.			LH SENSOR , a	and "RR RH SE	
SOR", and check the ve	hicle speed.	Cle speed (DATA MC		LH SENSOR , a	and "RR RH SE	
SOR", and check the ve Wheel sensor FR LH SENSOR	hicle speed.			LH SENSUR , a	and "RR RH SE	
SOR", and check the ver Wheel sensor FR LH SENSOR FR RH SENSOR	hicle speed. Vehic	cle speed (DATA MC	DNITOR)	LH SENSOR , a	and "RR RH SE	
SOR", and check the ver Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR	hicle speed. Vehic	cle speed (DATA MC	DNITOR)	LI SENSUR , a	and "RR RH SEI	
SOR", and check the ver Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	hicle speed. Vehic Nearly m play (±10	cle speed (DATA MC	DNITOR)	LT SENSUR , a	and "RR RH SEI	
SOR", and check the vel Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO	hicle speed. Vehic Nearly m play (±10 normal?	cle speed (DATA MC natches the speedor 0% or less)	DNITOR) meter dis-		and "RR RH SE	
SOR", and check the vel Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO	hicle speed. Vehic Nearly m play (±10 normal? DN END osis procedure. Re	cle speed (DATA MC natches the speedor 0% or less)	DNITOR) meter dis-		INFOID:0000000001690	
SOR", and check the vel Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO NO >> Go to diagno Special Repair Reco	hicle speed. Vehic Nearly m play (±10 hormal? N END osis procedure. Re quirement	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29, '</u>	DNITOR) meter dis- "Diagnosis Proce	<u>dure"</u> .		
SOR", and check the ver Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO NO >> Go to diagne	hicle speed. Vehic Nearly m play (±10 NEND osis procedure. Re quirement TEERING ANGLE position adjustmen unit). Refer to BR(	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29, '</u> SENSOR NEU nt for the steerin	DNITOR) meter dis- "Diagnosis Proce TRAL POSITION ng angle sensor	dure". when replacing	INFOID:00000000169	
Wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR S the inspection result n YES >> INSPECTIO NO >> Go to diagno Special Repair Rec ADJUSTMENT OF S Always perform neutral and electric unit (control	hicle speed. Vehic Nearly m play (±10 NEND osis procedure. Re quirement TEERING ANGLE position adjustmen unit). Refer to BR(	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29, '</u> SENSOR NEU nt for the steerin	DNITOR) meter dis- "Diagnosis Proce TRAL POSITION ng angle sensor	dure". when replacing	INFOID:00000000169	
SOR", and check the velocity wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR S the inspection result n YES >> INSPECTIO NO >> Go to diagno Special Repair Rec Aby Spector neutral and electric unit (control POSITION : Description	hicle speed. Vehic Vehic Nearly m play (±10 Normal? N END osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to BR0	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29, '</u> SENSOR NEU nt for the steerii C-11, "ADJUSTN	DNITOR) meter dis- "Diagnosis Proce TRAL POSITION ng angle sensor	dure". when replacing	INFOID:00000000169	
SOR", and check the velocity wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO NO >> Go to diagno Special Repair Rec ADJUSTMENT OF S Navays perform neutral and electric unit (control POSITION : Description >> GO TO 2	hicle speed. Vehic Vehic Nearly m play (±10 Normal? N END osis procedure. Re puirement TEERING ANGLE position adjustmen unit). Refer to BRC ECEL G SENSOR on of decel G sens	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29.</u> ' SENSOR NEU nt for the steerin C-11. "ADJUSTN	DNITOR) meter dis- "Diagnosis Proce TRAL POSITION ng angle sensor MENT OF STEER	dure". when replacing	INFOID:00000000169	
SOR", and check the velocity wheel sensor FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> INSPECTIO NO >> Go to diagno Special Repair Rec Abays perform neutral and electric unit (control POSITION : Description >> GO TO 2 CALIBRATION OF DI Always perform calibrati	hicle speed. Vehic Vehic Nearly m play (±10 Normal? N END osis procedure. Re puirement TEERING ANGLE position adjustmen unit). Refer to BRC ECEL G SENSOR on of decel G sens	cle speed (DATA MC natches the speedor 0% or less) efer to <u>BRC-29.</u> ' SENSOR NEU nt for the steerin C-11. "ADJUSTN	DNITOR) meter dis- "Diagnosis Proce TRAL POSITION ng angle sensor MENT OF STEER	dure". when replacing	INFOID:00000000165	

#### < COMPONENT DIAGNOSIS >

# C1109 POWER AND GROUND SYSTEM

# Description

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

## DTC Logic

INFOID:000000001690826

INFOID-000000001690827

INFOID:000000001690825

## DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

#### 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

#### INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-21</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

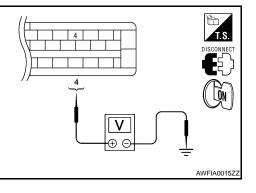
YES >> GO TO 2

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

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

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

	or and elec- ontrol unit)		Condition	Voltage
Connector	Terminal			
E125	1	Ground	Ignition switch: ON	Battery voltage
E125 4	Gibunu	Ignition switch: OFF	Approx. 0V	



4. Turn ignition switch OFF.

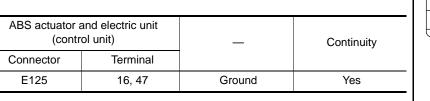
#### BRC-32

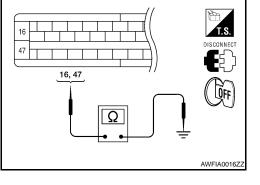
# C1109 POWER AND GROUND SYSTEM

#### < COMPONENT DIAGNOSIS >

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

#### [VDC/TCS/ABS]





#### Is the inspection result normal?

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

#### Special Repair Requirement

# 1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-11, "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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

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

# DTC Logic

INFOID:000000001690829

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-34, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> tion".

# Special Repair Requirement

INFOID:000000001690831

INFOID:000000001690830

**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-11. "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

### Description

PUMP

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

#### MOTOR

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

# DTC Logic

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111 PUMP MOTOR		During the actuator motor operating with ON, when th actuator motor turns OFF, or when the control line for a tuator motor relay is open.	
CIIII		<ul> <li>During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	
отс сс	ONFIRMATION PROCE	DURE	
<b>1.</b> СНЕС	CK SELF-DIAGNOSIS RE	ESULTS	
Check th	ne self-diagnosis results.		
	Calf diamania	require	
	Self-diagnosis PUMP MO		
ls above	displayed on the self-dia		
YES NO		procedure. Refer to <u>BRC-35, "Diagnosis Proced</u>	ure".
Diagno	osis Procedure		INFOID:00000000169083
INSPEC	TION PROCEDURE		
-	CK CONNECTOR		
<b>1.</b> снес			
1. Turr 2. Disc 3. Che	n ignition switch OFF. connect ABS actuator and ck terminal for deformation	electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma	lfunction is found, repair c
1. Turn 2. Disc 3. Che repla	n ignition switch OFF. connect ABS actuator and ck terminal for deformation ace terminal. onnect connectors and t		•
1. Turr 2. Disc 3. Che repla 4. Rec <u>(AB</u> Is any ite	n ignition switch OFF. connect ABS actuator and ock terminal for deformation ace terminal. onnect connectors and t <u>S)"</u> . em indicated on the self-d	on, disconnect, looseness, and so on. If any ma hen perform the self-diagnosis. Refer to <u>BRC-2</u>	•
1. Turn 2. Disc 3. Che repla 4. Rec <u>(AB</u> Is any ite	n ignition switch OFF. connect ABS actuator and ock terminal for deformation ace terminal. onnect connectors and t <u>S)"</u> . em indicated on the self-d >> GO TO 2	on, disconnect, looseness, and so on. If any ma hen perform the self-diagnosis. Refer to <u>BRC-2</u>	

[VDC/TCS/ABS]

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INFOID:000000001690833

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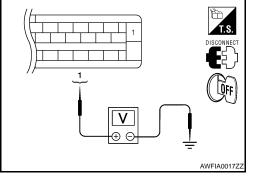
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# C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT 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) harness connector terminal and ground.



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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

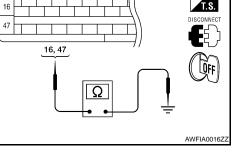
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and 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-123, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

# Component Inspection



INFOID:000000001690835

# **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

# Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-35, "Diagnosis Procedure"</u>.

# Special Repair Requirement

INFOID:000000001690836

**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-11. "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

# BRC-36

[VDC/TCS/ABS]

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

### < COMPONENT DIAGNOSIS >

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

### Description

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

## DTC Logic

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[VDC/TCS/ABS]

### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D				
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector					
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)     Your rate/cide/docel G sonsor	(control unit)	(control unit)	(control unit)	(control unit)	E
C1146	SIDE G-SEN CIRCUIT	Side G sensor is malfunctioning, or circuit of side G sensor is open or shorted.		BRC				

### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results	
G-SENSOR	
YAW RATE SENSOR	
SIDE G-SEN CIRCUIT	
Is above displayed on the self-diagnosis display?	
YES >> Proceed to diagnosis procedure. Refer to BRC-37. "Diagnosis	s Procedure

NO >> INSPECTION END

### Diagnosis Procedure

#### **CAUTION:**

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

### INSPECTION PROCEDURE

**1**.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

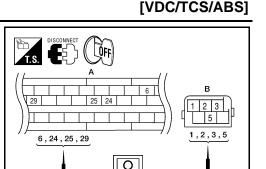
NO >> Repair or replace as necessary.

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

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

### < COMPONENT DIAGNOSIS >

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



ABS actuator and electric unit (control unit)			Yaw rate/side/	Continuit	
	Connector	Terminal	Connector	Terminal	
		6	B: M108	3	
	A: E125	24		5	Yes
4	A. E120	25		1	res
		29		2	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

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

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

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

Vehicle condition	YAW RATE SEN	SIDE G-SENSOR	DECEL G-SEN
venicle condition	(DATA MONITOR)	(DATA MONITOR)	(DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-123, "Removal and Instal-</u> lation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-126, "Removal and Installation"</u>.

# **Component Inspection**

INFOID:000000001690840

INFOID:000000001690841

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# **1.**CHECK DATA MONITOR

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

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-37, "Diagnosis Procedure"</u>.

## Special Repair Requirement

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

# **BRC-38**

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

#### < COMPONENT 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-11, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description</u>".

#### >> GO TO 2

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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[VDC/TCS/ABS]

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# C1115 WHEEL SENSOR

# Description

INFOID:000000001690842

[VDC/TCS/ABS]

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:000000001690843

### DTC DETECTION LOGIC

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

# DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

### CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

**1.**CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunctioning code.

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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-122</u>, "Removal and Installation".

**3.**CHECK TIRES

# BRC-40

# **C1115 WHEEL SENSOR**

[VDC/TCS/ABS]

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

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

YES >> GO TO 4

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

**4.**CHECK WHEEL BEARINGS

< COMPONENT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5

minals and ground.

Is the inspection result normal?

>> GO TO 6

>> Repair the circuit.

1.

2.

YES

NO

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

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

tor and wheel sensor connector of malfunction code No.

Disconnect ABS actuator and electric unit (control unit) connec-Wheel sensor connectors Check continuity between wheel sensor harness connector ter-Front Rear BRC  $\frac{12}{34}$ 1.2.3.4 Ę WFIA0326E

## 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

Continuity should not exist.

Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the 1. malfunctioning wheel sensor harness connector E18, E117 or C13.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal		
Front III		45	F10	1		
Front LH		46	46 E18 2	2	- - -	
Front RH		34	E117	1		
	E125	33		2		
Rear LH	E125	37		3	Yes	
		36	C13	4		
Deer DU	1	42		1		
Rear RH		43		2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-123, "Removal and Installation".

NO >> Repair the circuit.

## Component Inspection

# **1.**CHECK DATA MONITOR

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

Vehicle speed (DATA MONITOR)

INFOID:000000001690845

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# **C1115 WHEEL SENSOR**

### < COMPONENT DIAGNOSIS >

# FR LH SENSOR

FR RH SENSOR

RR LH SENSOR

Nearly matches the speedometer display (±10% or less)

RR RH SENSOR

Is the inspection result normal?

YES >> INSPECTION END

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

### Special Repair Requirement

INFOID:000000001690846

# **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-11. "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

# C1116 STOP LAMP SWITCH

# Description

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

# DTC Logic

INFOID:000000001690848

INFOID:000000001690847

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## DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	on Possible cause	
C1116	<ul> <li>STOP LAMP SW</li> <li>When stop lamp switch circuit is open.</li> <li>Harness or connector</li> <li>Stop lamp switch</li> <li>ABS actuator and electric unit (control unit)</li> </ul>			
TC CC	ONFIRMATION PROC	CEDURE		
1.снес	CK SELF-DIAGNOSIS I	RESULTS		E
Check th	ne self-diagnosis results	S		
	Ū			
	Self-diagno	sis results		
	STOP LA	MP SW		
	displayed on the self-d			
YES NO	>> Proceed to diagnos >> INSPECTION END	is procedure. Refer to <u>BRC-43, "Diag</u>	nosis Procedure".	
-				
Jiaght	sis Procedure		INFOID:000000001690849	
NSPEC	TION PROCEDURE			
1.con	NECTOR INSPECTION	J		
I. Disc	connect the ABS actuate	or and electric unit (control unit) conne	ctor E125 and stop lamp switch connec-	
tor E		· · · · · · · · · · · · · · · · · · ·		
	ck the terminals for defessed and the section result normal?	ormation, disconnection, looseness or	damage.	
YES	>> GO TO 2			
NO	>> Repair or replace as	s necessary.		
2.stop	P LAMP SWITCH INSP	ECTION		
Check th	ne voltage between the	ABS actuator and electric unit (con-		
rol unit)	harness connector E12	25 terminal 41 and body ground.		
Е	Brake pedal depressed	: Battery voltage	Disconnect	
		(approx. 12V)		
E	Brake pedal not depres	ssed :Approx. 0V		
s the ins	spection result normal?			
YES		nosis again. If the same results		
		3S actuator and electric unit (control -123, "Removal and Installation".		
NO	>> GO TO 3		AWFIA0019ZZ	
)	P LAMP RELAY CIRCU			

# C1116 STOP LAMP SWITCH

### < COMPONENT DIAGNOSIS >

- Disconnect the stop lamp relay harness connector E12. 1.
- 2. Check the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (B) terminal 41 and stop lamp relay harness connector E12 (A) terminal 4.

### Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-7, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.

# Special Repair Requirement

B 4 41 Ω AWFIA0020ZZ

INFOID:000000001690850

[VDC/TCS/ABS]

# 1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

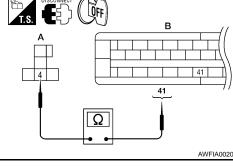
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-11, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> 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-12, "CALIBRATION OF DECEL G SENSOR : Description".

>> END



# < COMPONENT DIAGNOSIS > C1120, C1122, C1124, C1126 IN ABS SOL

# Description

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

Malfunction detected condition

When the control unit detects a malfunction in the front

# **DTC** Logic

DTC

C1120

### DTC DETECTION LOGIC

Display item

FR LH IN ABS SOL

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 CC	NFIRMATION PROCE	DURE		G
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS		
Check th	e self-diagnosis results.			Н
	Self-diagnosis			1
	FR LH IN AB			1
	FR RH IN AB			
	RR LH IN AB			J
	RR RH IN AB			
	displayed on the self-dia	procedure. Refer to <u>BRC-45, "Diagnosis Proce</u>	duro"	Κ
NO	>> INSPECTION END	procedure. Refer to <u>BRC-45. Diagnosis Proce</u>		
Diagno	sis Procedure		INFOID:000000001690853	L
INSPEC	TION PROCEDURE			
	CK CONNECTOR			в. Л
	ignition switch OFF.			Μ
		electric unit (control unit) connector.		
		n, disconnection, looseness, and so on. If any r	malfunction is found, repair or	Ν
	ace terminal.	nen perform the self-diagnosis. Refer to BRC	-21 CONSULT-III Function	
<u>(ABS</u>		Terrer perform the ben aldghoold. Refer to <u>pre</u>		$\sim$
<u>Is any ite</u>	m indicated on the self-d	iagnosis display?		0
-	>> GO TO 2			
~		nnector terminal. Repair or replace connector.		Ρ
Z.CHEC	CK SOLENOID, VDC SW	TCH-OVER VALVE AND ACTUATOR RELAY	POWER SUPPLY CIRCUIT	

LH inlet solenoid circuit.

# [VDC/TCS/ABS]

INFOID:000000001690851

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Possible cause

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# C1120, C1122, C1124, C1126 IN ABS SOL

### < COMPONENT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

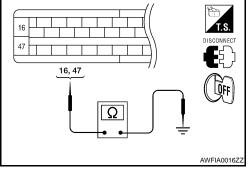
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

# Component Inspection



INFOID:000000001690854

# **1.**CHECK ACTIVE TEST

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

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

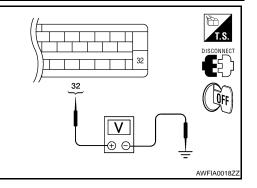
\*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> INSPECTION END

# BRC-46

# [VDC/TCS/ABS]



# C1120, C1122, C1124, C1126 IN ABS SOL

#### < COMPONENT DIAGNOSIS > >> Go to diagnosis procedure. Refer to <u>BRC-45, "Diagnosis Proce</u>dure". 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-11, "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-12, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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# **BRC-47**

[VDC/TCS/ABS]

INFOID:000000001690855

# C1121, C1123, C1125, C1127 OUT ABS SOL

### < COMPONENT 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:000000001690857

INFOID:000000001690858

INFOID:000000001690856

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

NO >> INSPECTION END

Diagnosis Procedure

### INSPECTION PROCEDURE

### 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-21</u>, <u>"CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

### **BRC-48**

# C1121, C1123, C1125, C1127 OUT ABS SOL

### < COMPONENT 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) harness connector terminal and ground.

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

Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

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

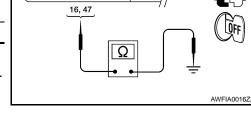
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-123, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

# Component Inspection



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INFOID:000000001690859

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# 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 2. table below.

		AE	S solenoid va	alve	ABS	solenoid valv	e (ACT)
Operation		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR RH ABS SOLE- NOID (ACT)	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
NEAN SUE	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

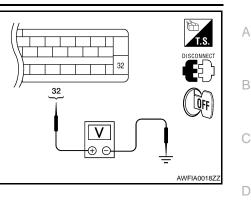
\*: ON for 1 to 2 seconds after the touch, and then OFF

Is the inspection result normal?

YES >> INSPECTION END



# [VDC/TCS/ABS]



# C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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

# Special Repair Requirement

INFOID:000000001690860

[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-11. "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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

### < COMPONENT 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 unit (control unit) judges that engine fuel cut system is malfunctioning.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
C1132	ENGINE SIGNAL 3		(control unit)	
C1133	ENGINE SIGNAL 4		<ul> <li>ECM</li> <li>CAN communication line</li> </ul>	
C1136	ENGINE SIGNAL 6			BRC

## DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

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

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

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-51, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

### Diagnosis Procedure

### INSPECTION PROCEDURE

# **1.**CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-74. "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542. "CONSULT-III Function</u> (ENGINE)" (VK56DE).
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-21, "CONSULT-III Func-</u> N tion (ABS)".

Is any item indicated on the self-diagnosis display?

- YES >> Repair or replace the affected part.
- NO >> INSPECTION END

## 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-11</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL <u>POSITION : Description</u>".

# BRC-51

INFOID:000000001690861

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INFOID:000000001690863

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[VDC/TCS/ABS]

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

# C1140 ACTUATOR RLY

# Description

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

# **DTC Logic**

INFOID:000000001690866

### DTC DETECTION LOGIC

DTC	Display item		Malfunct	ion detected condition	on	Possible cause	D
C1140	ACTUATOR RLY	AB	ABS actuator relay or circuit malfunction.			<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	Е
DTC CC	NFIRMATION PR	OCEDU	RE				
<b>1.</b> CHEC	CK SELF-DIAGNOS	IS RESUL	TS				BRC
Check th	e self-diagnosis res	ults.					BRO
		gnosis resul	ts				G
		ATOR RLY					
	displayed on the se	-					Н
	>> Proceed to diagr >> INSPECTION EI		edure. Refer to	BRC-53, "Diagr	nosis Proced	<u>ure"</u> .	
Diagno	sis Procedure					INFOID:000000001690867	
INSPECTION PROCEDURE							
<b>1.</b> CHEC	CK CONNECTOR						J
·	ignition switch OFF						
2. Disc	onnect ABS actuato	r and elec					IZ.
		mation, di	sconnection, lo	oseness, and so	on. If any m	alfunction is found, repair or	K
	ace terminal. onnect connectors a	and then	perform the se	elf-diagnosis. Re	fer to BRC-	21, "CONSULT-III Function	
<u>(AB</u>							L
<u>Is any ite</u>	em indicated on the s	self-diagn	<u>osis display?</u>				
-	>> GO TO 2						
•	>> Poor connection			•			M
	CK SOLENOID, VDC	SWITCH	I-OVER VALVE	AND ACTUATO	OR RELAY P	OWER SUPPLY CIRCUIT	
	ignition switch OFF				11	1 And	Ν
2. Disc tor.	onnect ABS actuato	r and elec		or unit) connec-			
3. Che	ck voltage between			ric unit (control			
unit)	harness connector	terminal a	and ground.				0
450				1			
	uator and electric unit (co	,		Voltage			Р
		minal					
		32	Ground	Battery voltage			
Is the ins	pection result norma	<u>al?</u>				AWFIA0018ZZ	

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

INFOID:000000001690865

[VDC/TCS/ABS]

**BRC-53** 

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# C1140 ACTUATOR RLY

### < COMPONENT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

### Component Inspection

# **1.**CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

Is the inspection result normal?

YES >> INSPECTION END

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

### Special Repair Requirement

INFOID:000000001690869

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

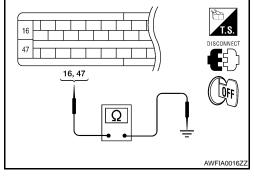
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-11, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

### >> 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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END



INFOID:000000001690868

[VDC/TCS/ABS]

# C1142 PRESS SENSOR

# Description

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:000000001690871

INFOID:000000001690870

### DTC DETECTION LOGIC

DTC	Display item		Malfunctio	n detected condition		Possi	ble cause	D
C1142	PRESS SEN CIRCU		Pressure sensor signal line is open or shorted, or pres-		<ul> <li>Harness or</li> <li>Pressure se</li> <li>ABS actuato (control unit)</li> </ul>	ensor or and electric unit	E	
DTC CC	NFIRMATION PI	ROCEDURE						
<b>1.</b> CHEC	K SELF-DIAGNO	SIS RESULTS	6					BRC
Check th	e self-diagnosis re	sults.						
								G
		agnosis results						
		SEN CIRCUIT						Н
	displayed on the s	-						П
	>> Proceed to diag		ure. Refer to	BRC-55, "Diagno	osis Proced	<u>lure"</u> .		
-	sis Procedure							
Diagno							INFOID:0000000001690872	
FRONT	PRESSURE SEN	SOR INSPEC	CTION PROC	EDURE				.1
1.con	NECTOR INSPECT	ION						0
1. Turn	the ignition switch	OFF.						
	onnect the front pre							K
	or E125 and inspection result norm		s for deforma	lion, disconnection	on, loosene	ess, or damag	ye.	
-	>> GO TO 2							L
-	>> Repair connect	or.						
2.FROM	IT PRESSURE SE	NSOR CIRCL	JIT INSPECT	ION				М
	sure the continuity				DISCONNECT			IVI
	(control unit) harn sensor harness co			nd front pres-	<b>T.S.</b>	(TIP)		
Sule	Sensor namess co		(D).			A	В	Ν
ABS act	uator and electric unit					20 19 18	3	
	(control unit)	Front pres	sure sensor	Continuity				$\bigcirc$
Connec	ctor Terminal	Connector	Terminal		18, 1	19, 20	1, 2, 3	0
	18		3			Ω		
A: E12		B: E31	1	Yes		۲ <u> </u>	<u>_</u>	Ρ
	20		2				AWFIA0021ZZ	

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

### [VDC/TCS/ABS]

## BRC-55

С

# C1142 PRESS SENSOR

### < COMPONENT DIAGNOSIS >

	electric unit (control nit)	_	Continuity
Connector Terminal			
	18		
A: E125	19	Ground	No
	20		

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

# **3.**FRONT PRESSURE SENSOR INSPECTION

- 1. Reconnect the front pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SENSOR" is normal.

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 >> Replace the front pressure sensor.

### REAR PRESSURE SENSOR INSPECTION PROCEDURE

### **1**.CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- Disconnect the rear pressure sensor connector E32 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

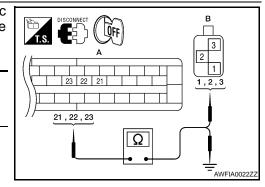
### Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair connector.

# 2.REAR PRESSURE SENSOR CIRCUIT INSPECTION

 Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) and rear pressure sensor harness connector E32 (B).

ear pressure sensor Continuity	Rear press	ABS actuator and electric unit (control unit)		
ector Terminal	Connector	Terminal	Connector	
1		21		
E32 3 Yes	B: E32	22	A: E125	
2	-	23		



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

	electric unit (control nit)	_	Continuity
Connector Terminal			
	21		
A: E125	22	Ground	No
	23		

# BRC-56

# C1142 PRESS SENSOR

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]	
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REAR PRESSURE SENSOR INSPECTION Reconnect the rear pressure sensor and ABS Use "DATA MONITOR" to check if the status	S actuator and elec of "PRESS SEN2"	ctric unit (control unit) conn is normal.	ectors.
Condition	PRESS SEN2 (DATA MONITOR)	-	
Nith ignition switch turned ON and brake pedal released.	Approx. 0 bar	_	
Nith ignition switch turned ON and brake pedal depressed.	Positive value	_	
the inspection result normal? YES >> Inspection End. NO >> Replace the rear pressure sensor.		_	
omponent Inspection			INFOID:000000001690873
.CHECK DATA MONITOR			
n "DATA MONITOR" select "PRESS SENSOR"	and "PRESS SEN	2" and check the brake flu	lid pressure
n "DATA MONITOR", select "PRESS SENSOR"	and "PRESS SEN	I2" and check the brake flu	lid pressure.
n "DATA MONITOR", select "PRESS SENSOR" Condition	PRESS SENSOR and PRESS SENSOR (DATA MONITOR)	I2" and check the brake flu	iid pressure.
	PRESS SENSOR and PRESS SEN2	I2" and check the brake flu _	iid pressure.
Condition	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar	I2" and check the brake flu - - -	iid pressure.
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. the inspection result normal?	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar	I2" and check the brake flu - - - -	iid pressure.
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. <u>the inspection result normal?</u> YES >> INSPECTION END	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value	<b>-</b>  	iid pressure.
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. <u>the inspection result normal?</u> YES >> INSPECTION END NO >> Go to diagnosis procedure. Refer to <u>1</u>	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value	<b>-</b>  	
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. <u>the inspection result normal?</u> YES >> INSPECTION END	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value	<b>-</b>  	IId pressure.
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. <u>the inspection result normal?</u> YES >> INSPECTION END NO >> Go to diagnosis procedure. Refer to <u>1</u>	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value BRC-55, "Diagnos	s Procedure".	
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. <u>the inspection result normal?</u> YES >> INSPECTION END YO >> Go to diagnosis procedure. Refer to <u>pecial Repair Requirement</u>	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value BRC-55, "Diagnos COR NEUTRAL PC	<u>s Procedure"</u> . SITION	INFOID:00000001690874
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. the inspection result normal? YES >> INSPECTION END YO >> Go to diagnosis procedure. Refer to <u>Pecial Repair Requirement</u> .ADJUSTMENT OF STEERING ANGLE SENS ways perform neutral position adjustment for the delectric unit (control unit). Refer to <u>BRC-11, "</u> //	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value BRC-55, "Diagnos COR NEUTRAL PC	<u>s Procedure"</u> . SITION	INFOID:00000001690874
Condition With ignition switch turned ON and brake pedal released. With ignition switch turned ON and brake pedal depressed. the inspection result normal? YES >> INSPECTION END YO >> Go to diagnosis procedure. Refer to <u>pecial Repair Requirement</u> .ADJUSTMENT OF STEERING ANGLE SENS Iways perform neutral position adjustment for the electric unit (control unit). Refer to <u>BRC-11, "ADJUSTION : Description"</u> .	PRESS SENSOR and PRESS SEN2 (DATA MONITOR) Approx. 0 bar Positive value BRC-55, "Diagnos COR NEUTRAL PC	<u>s Procedure"</u> . SITION	INFOID:00000001690874

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# C1143, C1144 STEERING ANGLE SENSOR

### Description

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

# DTC Logic

INFOID:000000001690876

INFOID:000000001690875

### DTC DETECTION LOGIC

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

# DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ST ANG SEN CIRCUIT

ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

**Diagnosis** Procedure

### INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-21, "CONSULT-III Function</u> (<u>ABS)"</u>

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

**2.**CHECK STEERING ANGLE SENSOR HARNESS

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

INFOID:000000001690877

# C1143, C1144 STEERING ANGLE SENSOR

### < COMPONENT DIAGNOSIS >

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

### [VDC/TCS/ABS]

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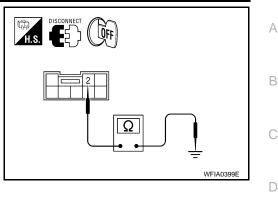
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Steering a	ngle sensor		Continuity
Connector	Connector Terminal		Continuity
M17	2	Ground	Yes



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

Steering a	ngle sensor		Voltage
Connector	Terminal		voltage
M17	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

# 3.CHECK DATA MONITOR

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

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

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-</u> <u>125. "Removal and Installation"</u>.

# Component Inspection

## **1.**CHECK DATA MONITOR

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

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

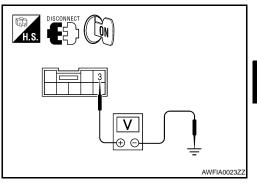
### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-58, "Diagnosis Procedure"</u>.

### Special Repair Requirement

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



INFOID:000000001690878

# BRC-59

# C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-11, "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

C1145, C1146 Y	AW RATE/SIDE G SENS	OR
< COMPONENT DIAGNOSIS >		[VDC/TCS/ABS]
C1145, C1146 YAW RATE/SIDE	G SENSOR	
Diagnosis Procedure		INFOID:000000001730977
CAUTION: Sudden turns (such as spin turns, acceler cause the yaw rate/side/decel G sensor sys operation can be resumed after restarting t	stem to indicate a problem. This	
INSPECTION PROCEDURE		
<b>1.</b> SELF-DIAGNOSIS RESULT CHECK		
Check self-diagnosis results.		
Self-diagnosis results		
YAW RATE SENSOR		
SIDE G-SEN CIRCUIT		1
G-SENSOR		
or other moving surface, and start engine. Is the above displayed in the self-diagnosis dis YES >> GO TO 2.		
NO >> Inspection End.		
2.CONNECTOR INSPECTION		
Disconnect the ABS actuator and electric unit	(control unit) connector E125 and	yaw rate/side/decel G sensor
connector B73. Check the terminals for deformation, disconne	ction, looseness or damage.	
<u>OK or NG</u>	,	
OK >> GO TO 3.		
NG >> Repair or replace as necessary.		
3.YAW RATE/SIDE/DECEL G SENSOR HAR		
<ol> <li>Turn off the ignition switch and disconnect and electric unit (control unit) connector E</li> <li>Check continuity between the ABS actua rate/side/decel G sensor connector B73.</li> </ol>	125.	
ABS actuator and electric unit (control unit) harness connector E125	Yaw rate/side/decel G sensor harness connector B73	Continuity

6	3
24	5
25	1
29	2

# OK or NG

OK >> GO TO 4.

NG >> Repair or replace as necessary.

4. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

Yes

Yes Yes Yes Ο

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# **BRC-61**

<sup>1.</sup> Connect the yaw rate/side/decel G sensor connector B73 and ABS actuator and electric unit (control unit) connector E125.

# C1145, C1146 YAW RATE/SIDE G SENSOR

### < COMPONENT DIAGNOSIS >

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

Vehicle status	Yaw rate sensor (Data monitor standard)	Side G sensor (Data monitor standard)	Decel G Sensor (Data monitor standard)
When stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G
Right turn	Negative value	Negative value	-
Left turn	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

OK or NG

OK >> Inspection End.

NG >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-126, "Removal and Installation"</u>.

# 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**

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INFOID:000000001690880

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### DTC DETECTION LOGIC

DTC	Display item		Malfunction	n detected condition		Possible cause	D
C1155	BR FLUID LEVEL LC	W the AB		or communication line b ectric unit (control unit) a n or shorted.		<ul><li>Harness or connector</li><li>Brake fluid level switch</li><li>Brake fluid level</li></ul>	E
DTC CC	DTC CONFIRMATION PROCEDURE						
<b>1.</b> CHEC	K SELF-DIAGNOS	SIS RESULTS					BRC
Check the self-diagnosis results.						DKC	
	-						
	Self-di	agnosis results					G
	BR FLU	IID LEVEL LOW					
-	displayed on the s	-					Н
	>> Proceed to diag >> INSPECTION E		ure. Refer to <u>E</u>	<u> 3RC-63, "Diagnosis</u>	<u>s Procedu</u>	<u>ure"</u> .	
_							
Diagno	sis Procedure					INFOID:000000001690882	I
INSPECTION PROCEDURE							
1.CONNECTOR INSPECTION				J			
1. Disconnect ABS actuator and electric unit (control unit) connector E125 and brake fluid level switch con-							
nector E21.					17		
2. Check the terminals for deformation, disconnection, looseness or damage.					K		
	pection result norn	<u>nal?</u>					
-	>> GO TO 2 >> Repair or repla	ce as necessa	nrv/				L
~			•	EL SWITCH AND	ABS AC	TUATOR AND ELECTRIC	
	ONTROL UNIT)						M
Check continuity between ABS actuator and electric unit (control					IVI		
unit) harness connector E125 (A) and brake fluid level switch							
harn	ess connector E21	(B).			<b> .</b> 5		Ν
	uator and electric unit				8		
	(control unit)	Brake fluid	level switch	Continuity			$\bigcirc$
Connec	tor Terminal	Connector	Terminal	· //	8		0
A: E12	25 8	B: E21	1	Yes			
2. Cheo	ck continuity betwe	en ABS actua	tor and electri	c unit (control	Į		Ρ

**BRC-63** 

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

ABS actuator and ele	S actuator and electric unit (control unit)		Continuity
Connector	Terminal		Continuity
A: E125	8	Ground	No

Is the inspection result normal?



[VDC/TCS/ABS]

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# **C1155 BRAKE FLUID LEVEL SWITCH**

< COMPONENT DIAGNOSIS >

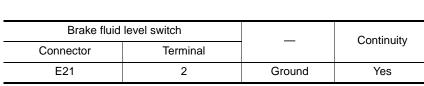
AWFIA0026Z

YES >> GO TO 3

E21 and ground.

NO >> Repair or replace malfunctioning components.

# 3.CHECK BRAKE FLUID LEVEL SWITCH GROUND



Check continuity between brake fluid level switch harness connector

Is the inspection result normal?

#### YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

# **4.**CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

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

### Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-123, "Removal and Installation".
- NO >> Replace brake fluid level switch.

## **Component Inspection**

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity	
Terminal	Condition	Continuity	
1 – 2	When brake fluid is full in the reservoir tank.	No	
1 - 2	When brake fluid is empty in the reservoir tank.	Yes	
Is the inspection result normal?			

YES >> INSPECTION END

NO >> Replace brake fluid level switch.

# Special Repair Requirement

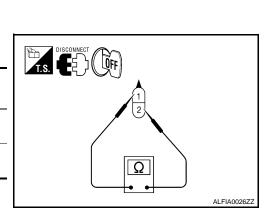
#### INFOID:000000001690884

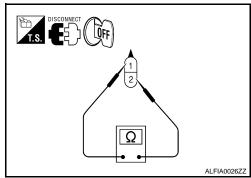
INFOID-000000001690883

### **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-11, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

**BRC-64** 





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# C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >	[VDC/TCS/ABS]
>> GO TO 2	
2. CALIBRATION OF DECEL G SENSOR	
Always perform calibration of decel G sensor when replacing the ABS actuator and e Refer to <u>BRC-12</u> . "CALIBRATION OF DECEL G SENSOR : Description".	electric unit (control unit).

>> END

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# C1156 ST ANG SEN COM CIR

# Description

INFOID:000000001690885

[VDC/TCS/ABS]

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:000000001690886

INFOID-000000001690887

### DTC DETECTION LOGIC

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

## DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

### INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Self-diagnosis results	
CAN COMM CIRCUIT	
ST ANG SEN COM CIR	

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

# C1160 DECEL G SEN SET

# Description

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

# **DTC Logic**

INFOID:000000001690889

INFOID:000000001690888

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### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	<ul> <li>Decel G sensor calibration</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	E
DTC CC	<b>DNFIRMATION PROCE</b>	DURE		
<b>1.</b> CHE	CK SELF-DIAGNOSIS RE	SULTS		BRC
Check th	ne self-diagnosis results.			
				G
	Self-diagnosis			
<del></del>	DECEL G SEI			Н
-	displayed on the self-diag		d	11
YES NO	>> INSPECTION END	procedure. Refer to <u>BRC-67, "Diagnosis Procec</u>	<u>ure</u> .	
Diagno	sis Procedure			
Diagne			INFOID:000000001690890	
INSPEC	TION PROCEDURE			J
<b>1</b> .PERF	FORM SELF-DIAGNOSIS			
Perform	ABS actuator and electric	unit (control unit) self-diagnosis.		IZ.
				K
	elf-diagnosis results			
	ECEL G SEN SET			L
<u>Do self-c</u> YES	-	anything other than shown above? acement for the item indicated.		
NO		decel G sensor. Refer to <u>BRC-12, "CALIBRATI</u>	ON OF DECEL G SENSOR	M
0	: Description". GO TO	2		
2.PERF	FORM SELF-DIAGNOSIS	AGAIN		
		and then to ON and erase self-diagnosis resul	lts.	Ν
		ectric unit (control unit) self-diagnosis again.		
<u>Are any</u> YES	self-diagnosis results disp	layed <u>?</u> e/decel G sensor. Refer to <u>BRC-126, "Removal</u> ;	and Installation"	0
NO	>> INSPECTION END			
				P
				P

[VDC/TCS/ABS]

# C1163 ST ANGLE SEN SAFE

### Description

INFOID:000000001690891

[VDC/TCS/ABS]

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:000000001690892

### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

### Diagnosis Procedure

INFOID:000000001690893

INSPECTION PROCEDURE

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

Adjust steering angle sensor neutral position. Refer to <u>BRC-11. "ADJUSTMENT OF STEERING ANGLE SEN-</u> SOR NEUTRAL POSITION : Description".

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> INSPECTION END

NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-21, "CONSULT-</u> <u>III Function (ABS)"</u>.

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

### < COMPONENT 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:000000001690895

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INFOID:000000001690896

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### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

# 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
CV1	
CV2	
SV1	
SV2	
Is above displayed on the self-diagnosis display?	

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-69</u>, "<u>Diagnosis Procedure</u>". NO >> INSPECTION END

### Diagnosis Procedure

### INSPECTION PROCEDURE

# 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or Preplace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-21, "CONSULT-III Function</u> (<u>ABS)"</u>.
- Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

# BRC-69

INFOID:000000001690894

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

### < COMPONENT DIAGNOSIS >

### [VDC/TCS/ABS]

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

### 1. Turn ignition switch OFF.

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installation</u>".

NO >> Repair or replace malfunctioning components.

## **Component Inspection**

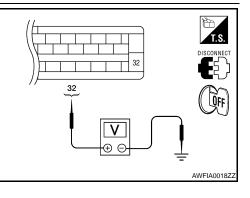
# **1.**CHECK ACTIVE TEST

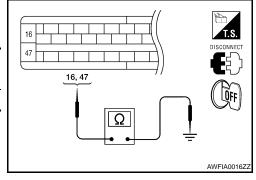
- 1. Select each test menu item on "ACTIVE TEST".
- 2. On the display, touch "UP", "ACT UP", and "ACT KEEP", and check that the system operates as shown in the table below.

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

**BRC-70** 

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





INFOID:000000001690897

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C1164, C1165, C1166, C1167 CV/SV SYSTEM
< COMPONENT DIAGNOSIS > [VDC/TCS/ABS]
<u>Is the inspection result normal?</u> YES >> INSPECTION END NO >> Go to diagnosis procedure. Refer to <u>BRC-69, "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-11, "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-12, "CALIBRATION OF DECEL G SENSOR : Description"</u> .
>> END

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# C1170 VARIANT CODING

**Diagnosis Procedure** 

INFOID:000000001731004

[VDC/TCS/ABS]

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

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

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123, "Removal and Installa-</u> tion".
- NO >> Inspection End.

### C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

#### < COMPONENT 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:000000001690900

INFOID:000000001690899

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1178	ABS ACTIVE BOOSTER SV NG	Active booster solenoid is malfunctioning, or signal linactive booster servo is open or shorted.	ne of
C1181	ABS ACTIVE BOOSTER RE- SPONSE NG	Active booster response is malfunctioning, or signal of active booster response is open or shorted.	line <ul> <li>Harness or connector</li> <li>Active booster</li> </ul>
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 elec (control unit)	
C1189	ABS BRAKE BOOSTER DE- FECT	Brake booster is defective or malfunctioning.	
DTC CC	NFIRMATION PROCE	DURE	
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis i	results	
	ABS ACTIVE BOOS	TER SV NG	
	ABS ACTIVE BOOSTER	RESPONSE NG	
	ABS BRAKE RELEA	SE SW NG	
	ABS BRAKE BOOST	ER DEFECT	
<u>Is above</u>	displayed on the self-diag	nosis display?	
	>> Proceed to diagnosis p >> INSPECTION END	procedure. Refer to <u>BRC-73, "Diagnosis Pro</u>	<u>ocedure - VK56DE"</u> .
Diagno	sis Procedure - VK5	6DE	INFOID:00000001690901
	TION PROCEDURE		
1.CON	NECTOR INSPECTION		
2. Disc		connector E49 and ABS actuator and elects for deformation, disconnection, looseness	
Is the ins	pection result normal?		-
	>> GO TO 2		
-	>> Repair connector.		
	VE BOOSTER CIRCUIT IN		

[VDC/TCS/ABS]

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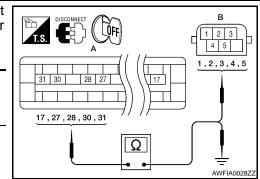
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## C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

### < COMPONENT DIAGNOSIS >

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

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



[VDC/TCS/ABS]

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

ABS actuator and electric unit (control unit)		_	Continuity	
Connector	Terminal			
	17			
	27	Ground	No	
A: E125	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.
- 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 >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-123, "Removal and Instal-</u> lation".

NO >> Replace the active booster. Refer to <u>BR-22, "Removal and Installation"</u>.

## Component Inspection

INFOID:000000001690902

### **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

## C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

INFOID:000000001690903

<u>Is the ir</u>	nspection result normal?
YES	>> INSPECTION END
NO	>> Go to diagnosis procedure. Refer to <u>BRC-73</u> , "Diagnosis Procedure - VK56DE".

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-11, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description</u>".

>> GO TO 2

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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## C1179 ABS DELTA S SEN NG

### Description

INFOID:000000001690904

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:000000001690905

INFOID:000000001690906

### 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.	<ul> <li>Harness or connector</li> <li>Delta stroke sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results

ABS DELTA S SEN NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-76, "Diagnosis Procedure - VK56DE"</u>.

NO >> INSPECTION END

Diagnosis Procedure - VK56DE

### INSPECTION PROCEDURE

### **1**.CONNECTOR INSPECTION

1. Turn the ignition switch OFF.

 Disconnect the delta stroke sensor connector E114 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

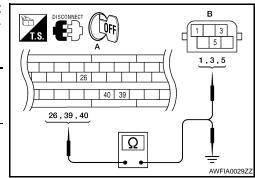
Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair connector.

2.Delta stroke sensor circuit inspection

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

it Delta stro	Delta stroke sensor	
Connector	Terminal	
	1	
B: E114	3	Yes
	5	
	Connector	Delta stroke sensor       Connector     Terminal       1     1       B: E114     3



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

## C1179 ABS DELTA S SEN NG

### < COMPONENT DIAGNOSIS >

[VDC/TCS/ABS]

	d electric unit (contro unit)	DI	Continuity	
Connector	Terminal		Containing	
	26			-
A: E125	39	Ground	No	
	40			_
	n result normal?			
YES >> GO NO >> Rep		rnaaa ar aannaatar		
- '	OKE SENSOR I	arness or connector	•	
		sensor and ABS ac heck if the status of		c unit (control unit) connectors. is normal.
Con	dition	DELTA S SEI		
When brake peda	-	1.05–1.80 mr		
When brake peda	n result normal?	0.00 mm (+0.6/-	0.4)	
•	place the ABS ad		unit (control unit)	. Refer to <u>BRC-123. "Removal and Instal-</u>
	place the delta st	troke sensor.		
NO >> Rep Component		troke sensor.		INFOID:000000001690907
Component	Inspection	troke sensor.		INFOID:000000001690907
Component 1.снеск рат	Inspection A MONITOR		LTA S SEN" is n	
Component 1.снеск рат	Inspection A MONITOR	troke sensor.	LTA S SEN" is no	
Component 1.CHECK DAT Use "DATA MO	Inspection A MONITOR	t if the status of "DE	N	
Component 1.CHECK DAT Use "DATA MO Con	Inspection A MONITOR NITOR" to check	if the status of "DE DELTA S SEM (DATA MONITO	N DR)	
Component 1.CHECK DAT Use "DATA MO Con When brake peda	Inspection A MONITOR NITOR" to check dition	t if the status of "DE DELTA S SEN (DATA MONITO 1.05–1.80 mr	N DR) n	
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda	Inspection A MONITOR NITOR" to check dition I is depressed. I is released.	if the status of "DE DELTA S SEM (DATA MONITO	N DR) n	
Component 1.CHECK DAT Use "DATA MOI Con When brake peda When brake peda Is the inspectior	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. n result normal?	t if the status of "DE DELTA S SEN (DATA MONITO 1.05–1.80 mr	N DR) n	
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda Sthe inspection YES >> INS	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. h result normal? SPECTION END	t if the status of "DE DELTA S SEM (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/-	N DR) n 0.4)	
Component 1.CHECK DAT Use "DATA MOI Con When brake peda When brake peda When brake peda Is the inspection YES >> INS NO >> Go	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. I result normal? SPECTION END to diagnosis pro	t if the status of "DE DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to <u>BF</u>	N DR) n 0.4)	ormal. <u>s Procedure - VK56DE"</u> .
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda When brake peda Is the inspection YES >> INS NO >> Go Special Repa	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. D result normal? SPECTION END to diagnosis pro air Requirem	t if the status of "DE DELTA S SEM (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to BF ent	N DR) n 0.4) RC-76, "Diagnosi:	ormal. <u>s Procedure - VK56DE"</u> .
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda When brake peda Is the inspection YES >> INS NO >> Go Special Repa	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. D result normal? SPECTION END to diagnosis pro air Requirem	t if the status of "DE DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to <u>BF</u>	N DR) n 0.4) RC-76, "Diagnosi:	ormal. <u>s Procedure - VK56DE"</u> .
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda Is the inspection YES >> INS NO >> Go Special Repa 1.ADJUSTMEI Always perform	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. D result normal? SPECTION END to diagnosis pro air Requirem NT OF STEERIN I neutral position t (control unit). R	E if the status of "DE DELTA S SEM (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- Cedure. Refer to BF ent IG ANGLE SENSO	N DR) n 0.4) R NEUTRAL PO e steering angle	ormal. <u>s Procedure - VK56DE"</u> .
Component 1.CHECK DAT Use "DATA MOI Con When brake peda When brake peda When brake peda Is the inspection YES >> INS NO >> Go Special Repa 1.ADJUSTMEI Always perform and electric unit POSITION : De	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. D result normal? SPECTION END to diagnosis pro air Requirem NT OF STEERIN I neutral position t (control unit). R scription".	E if the status of "DE DELTA S SEM (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- Cedure. Refer to BF ent IG ANGLE SENSO	N DR) n 0.4) R NEUTRAL PO e steering angle	ormal. <u>s Procedure - VK56DE"</u> . INFOID:00000001890908 SITION sensor when replacing the ABS actuator
Component 1.CHECK DAT Use "DATA MO Con When brake peda When brake peda When brake peda Is the inspection YES >> INS NO >> Go Special Repa 1.ADJUSTMEI Always perform and electric unit POSITION : De >> GO	Inspection A MONITOR NITOR" to check dition I is depressed. I is released. D result normal? SPECTION END to diagnosis pro air Requirem NT OF STEERIN I neutral position t (control unit). R scription".	t if the status of "DE DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to BF ent IG ANGLE SENSO adjustment for the efer to BRC-11, "AD	N DR) n 0.4) R NEUTRAL PO e steering angle	ormal. <u>s Procedure - VK56DE"</u> . INFOID:00000001890908 SITION sensor when replacing the ABS actuator

## 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:000000001690910

INFOID:000000001690911

### DTC DETECTION LOGIC

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

### Diagnosis Procedure

### INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

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

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

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

### Special Repair Requirement

INFOID:000000001690912

## **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-11, "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

[VDC/TCS/ABS]

## **VDC OFF SWITCH**

## < COMPONENT 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**

### 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

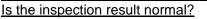
>> Go to diagnosis procedure. Refer to <u>BRC-79, "Diagnosis Procedure"</u>. NO

### **Diagnosis** Procedure

## 1.CHECK VDC OFF SWITCH

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

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



YES >> GO TO 2

NO >> Replace VDC OFF switch.

2. CHECK VDC OFF SWITCH HARNESS

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

2. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) and VDC OFF switch connector M257 (B).

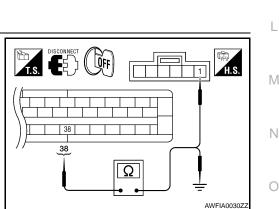
ABS actuator and electric unit (control unit) VDC OFF s		F switch	Continuity	
Connector	Terminal	Connector	or Terminal	
A: E125	38	B: M257	1	Yes

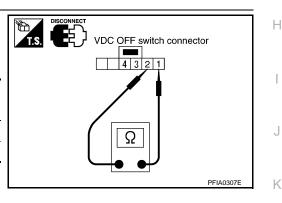
3. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) and ground.

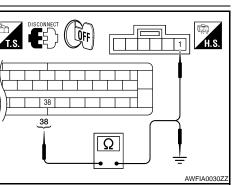
ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		
A: E125	38	Ground	No

**BRC-79** 

Is the inspection result normal?







INFOID:000000001690913

[VDC/TCS/ABS]

INFOID:000000001690914

INFOID:000000001690915

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## **VDC OFF SWITCH**

#### < COMPONENT DIAGNOSIS >

### NO >> Repair or replace harness.

## **3.**CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M257 and ground.

VDC OFF switch			Continuity
Connector	Terminal		Continuity
M257	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-23</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

Component Inspection

### INSPECTION PROCEDURE

**1.**CHECK VDC OFF SWITCH

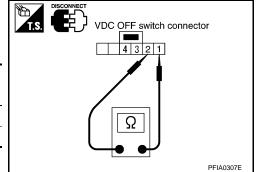
- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.



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INFOID:000000001690916

## **ABS WARNING LAMP**

### < COMPONENT DIAGNOSIS >

## ABS WARNING LAMP

## Description

INFOID:000000001690917

	×: ON –: OFF
Condition	ABS warning lamp
Ignition switch OFF	_
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	_
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFOID:000000001690918
1. CHECK ABS WARNING LAMP OPERATION	
Check that the lamp illuminates for approximately 1 second a	after the ignition switch is turned ON.
Is the inspection result normal? YES >> INSPECTION END	
NO $>>$ Go to diagnosis procedure. Refer to <u>BRC-81, "D</u>	liagnosis Procedure".
Diagnosis Procedure	-
	INFOID:000000001690919
1.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) self-dia	gnosis. Refer to BRC-21. "CONSULT-III Function
<u>(ABS)"</u> .	
Is the inspection result normal?	
YES >> GO TO 2 NO >> Check items displayed by self-diagnosis.	
2. CHECK COMBINATION METER	
	no normal Defar to MWL 22 "Diagnosis Deserio
Check if the indication and operation of combination meter a tion.	are normal. Refer to <u>mm-23, Diagnosis Descrip-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (control	unit). Refer to BRC-123, "Removal and Installa-
tion".	
NO >> Replace combination meter. Refer to <u>MWI-94. "I</u>	<u>Removal and Installation"</u> .

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## [VDC/TCS/ABS]

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### **BRAKE WARNING LAMP**

#### < COMPONENT DIAGNOSIS >

## BRAKE WARNING LAMP

## Description

INFOID:000000001690920

×: ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	_
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (Note 2)
EBD function is malfunctioning.	×

#### NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

### **Component Function Check**

### **1.**BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> INSPECTION END

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

### Diagnosis Procedure

## 1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

INFOID:000000001690921

INFOID:000000001690922

## **VDC OFF INDICATOR LAMP**

### < COMPONENT DIAGNOSIS >

## VDC OFF INDICATOR LAMP

## Description

INFOID:000000001690923

Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFOID:000000001690924
1.VDC OFF INDICATOR LAMP OPERATION CHEC	K 1
Check that the lamp illuminates for approximately 1 se	econd after the ignition switch is turned ON.
Is the inspection result normal?	
YES >> GO TO 2	
NO >> Go to diagnosis procedure. Refer to BRC	
2.VDC OFF INDICATOR LAMP OPERATION CHEC	K 2
Check that the VDC OFF indicator lamp in the combir VDC OFF switch.	nation meter turns ON/OFF correctly when operating the
Is the inspection result normal?	
YES >> INSPECTION END	
NO >> Check VDC OFF switch. Refer to <u>BRC-79</u>	<u>), "Diagnosis Procedure"</u> .
Diagnosis Procedure	INFOID:000000001690925
1. CHECK VDC OFF SWITCH	
	nation meter turns ON/OFF correctly when operating the
VDC OFF switch.	
Is the inspection result normal? YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to BRC-79	), "Diagnosis Procedure".
2.CHECK SELF-DIAGNOSIS	
	self-diagnosis. Refer to BRC-21, "CONSULT-III Function
( <u>ABS)"</u> .	
Is the inspection result normal?	
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	
<b>3.</b> CHECK COMBINATION METER	
Check if the indication and operation of combination r tion".	meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-</u>
Is the inspection result normal?	

NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

## **BRC-83**

[VDC/TCS/ABS]

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## SLIP INDICATOR LAMP

### < COMPONENT DIAGNOSIS >

## SLIP INDICATOR LAMP

## Description

INFOID:000000001690926

[VDC/TCS/ABS]

×: ON -: OFF

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

### **Component Function Check**

INFOID:000000001690927

### **1.**CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

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

## Diagnosis Procedure

INFOID:000000001690928

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

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-21, "CONSULT-III 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-23</u>, "<u>Diagnosis Descrip-</u> tion".

#### Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> <u>tion</u>".
- NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

< ECU DIAGNOSIS >

**ECU DIAGNOSIS** 

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

**Reference Value** 

INFOID:000000001690929 В

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[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.

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
FR LH SENSOR W		0 [km/h (MPH)]	Vehicle stopped
	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
R RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
R LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
R RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
	Stop lamp switch signal status	When brake pedal is depressed	ON
STOP LAMP SW		When brake pedal is released	OFF
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON
OFF SW V		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF
	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s
AW RATE SEN	sensor	When vehicle turning	-75 to 75 d/s
	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 >

## [VDC/TCS/ABS]

	Display content	Data monitor		
Monitor item		Condition	Reference value in normal operation	
		Vehicle stopped	Approx. 0 m/s <sup>2</sup>	
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s <sup>2</sup> )	
		Vehicle turning left	Positive value (m/s <sup>2</sup> )	
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°	
STRANGLE SIG	sensor	Steering wheel turned	$-720$ to $720^{\circ}$	
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	
		With engine stopped	0 rpm	
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display	
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	ON	
	Diake nuid level switch signal status	When brake fluid level switch OFF	OFF	
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FR RH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FK KH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
FR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FR LH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
KK KH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	

### < ECU DIAGNOSIS >

[VDC/TCS/ABS]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON
RR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON
RR LH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Operation status of each solenoid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON
RR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Motor and motor relay operation	When the motor relay and motor are operating	ON
MOTOR RELAY		When the motor relay and motor are not operating	OFF
	Actuator relay operation	When the actuator relay is operating	ON
ACTUATOR RLY		When the actuator relay is not operating	OFF
	ABS warning lamp (Note 3)	When ABS warning lamp is ON	ON
ABS WARN LAMP		When ABS warning lamp is OFF	OFF
OFF LAMP	VDC OFF indicator lamp (Note 3)	When VDC OFF indicator lamp is ON	ON
		When VDC OFF indicator lamp is OFF	OFF
SLIP LAMP	SLIP indicator lamp (Note 3)	When SLIP indicator lamp is ON	ON
		When SLIP indicator lamp is OFF	OFF
4WD FAIL REQ (Note 2)	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON
		When transfer control unit is normal	OFF
BST OPER SIG	Not applied but displayed		OFF
EBD SIGNAL	EBD operation	EBD is active	ON
		EBD is inactive	OFF
ABS SIGNAL	ABS operation	ABS is active	ON
		ABS is inactive	OFF
TCS SIGNAL	TCS operation	TCS is active	ON
		TCS is inactive	OFF
VDC SIGNAL	VDC operation	VDC is active	ON
		VDC is inactive	OFF
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON
		EBD is normal	OFF
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	
		ABS is normal	OFF

### < ECU DIAGNOSIS >

Display content		Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation			
		In TCS fail-safe	ON			
TCS FAIL SIG	TCS fail-safe signal	TCS is normal	OFF			
		In VDC fail-safe	ON			
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF			
CRANKING SIG	Crank apprection	Crank is active	ON			
CRAINKING SIG	Crank operation	Crank is inactive	OFF			
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
CV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
SV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
SV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G			
	G-Sensor	Vehicle running	-1.7 to 1.7 G			
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON			
	(Note 3)	When EBD warning lamp is OFF	OFF			
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	ON			
		A/T shift position = other than N position	OFF			
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	ON			
		A/T shift position = other than P position	OFF			
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	ON			
		A/T shift position = other than R position	OFF			
2WD/4WD	Drive axle	2WD model	2WD			
		4WD model	4WD			
PRESS SEN2	Brake fluid pressure detected by rear pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar			
	sure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar			



### < ECU DIAGNOSIS >

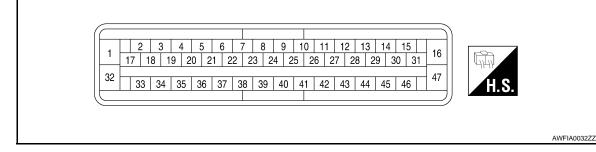
 - /
[VDC/TCS/ABS]

		Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation			
DELTA S SEN	Value detected by delta strake concer	When brake pedal is depressed	1.05 - 1.80 mm			
DELIA 3 SEIN Value	Value detected by delta stroke sensor	When brake pedal is released	0.00 mm (+0.6/-0.4)			
RELEASE SWITCH		When brake pedal is depressed	ON			
NO	Active booster signal status	When brake pedal is released	OFF			
RELEASE SWITCH		When brake pedal is depressed	OFF			
NC	Active booster signal status	When brake pedal is released	ON			

#### NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only 4WD models.
- 3: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to <u>BRC-81, "Description"</u>.
- Brake warning lamp: Refer to <u>BRC-82, "Description"</u>.
- VDC OFF indicator lamp: Refer to <u>BRC-83, "Description"</u>.
- SLIP indicator lamp: Refer to BRC-84, "Description".

### TERMINAL LAYOUT



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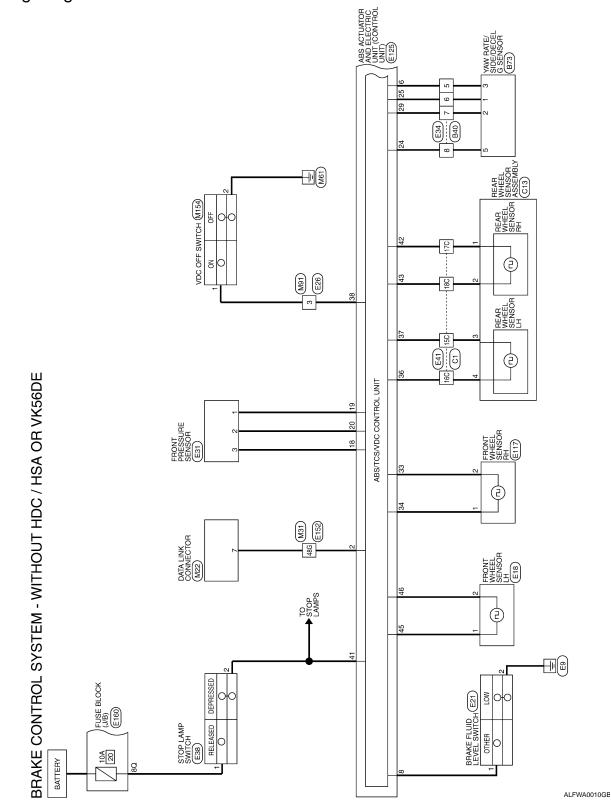
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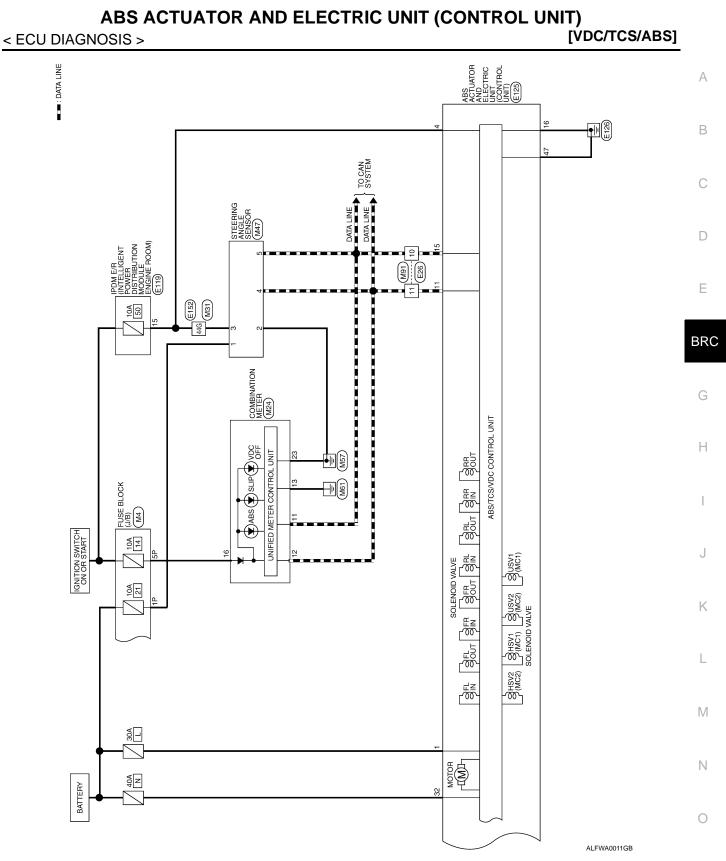
### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) NOSIS > [VDC/TCS/ABS]

< ECU DIAGNOSIS >

Wiring Diagram - Without HDC/HSA or VK56DE

INFOID:000000001690930





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#### **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)** [VDC/TCS/ABS] < ECU DIAGNOSIS >

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 Connector Name COMBINATION METER Signal Name I I I Connector Color WHITE Connector No. M24 Color of Wire W/G GВ ٩ \_ Terminal No. Ξ 23 13 12 23 H.S. 佢 Connector No. M22 Connector Name DATA LINK CONNECTOR Signal Name 9 10 11 12 13 14 15 16 1 2 3 4 5 6 7 8 ī 9 2 3 4 5 Connector Color WHITE Color of Wire ≥ Terminal No. H.S. E Signal Name 
 7P
 6P
 5P
 4P
 \_\_\_\_\_\_3P
 2P
 1P

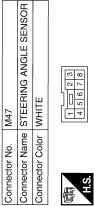
 16P
 15P
 14P
 13P
 12P
 1P
 8P
 8P
 Connector Name FUSE BLOCK (J/B) I. Т Connector Color WHITE Color of Wire ₹ W/G R/B Connector No. Terminal No. Ē 5Р H.S.

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BRC (WITHOUT HDC / HSA OR VK56DE) CONNECTORS

			[		
M31	_	WHITE	50 443 30 26 16 103 86 76 65	210 6000 1910 1850 170 1610 1850 1400 1850 170 1610 1850 1400 1850 1700 1850 1850 1850 1850 1850 1850 1850 18	746 746 776 776 776 776 776 776
Connector No.	Connector Name	Connector Color	低雨 H.S.		

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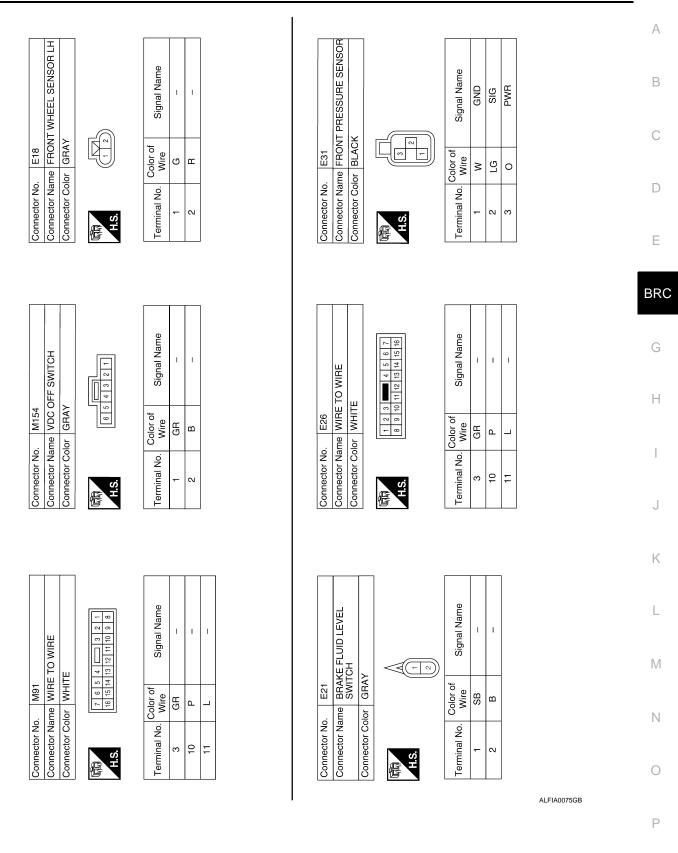


Signal Name	BATT	GND	POWER	CAN-H	CAN-L
Color of Wire	R/Y	в	W/R	L	٩.
Terminal No.	-	2	З	4	5

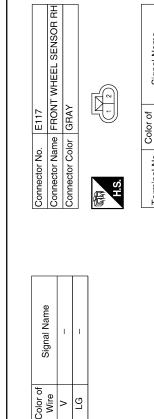
Signal Name	I	1	
Color of Wire	W/R	M	
Terminal No.	44G	48G	

### < ECU DIAGNOSIS >

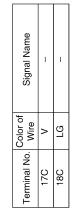
(VDC/TCS/ABS)

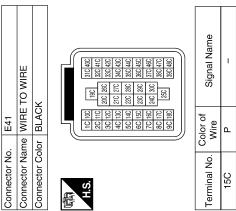


< ECU DIAGNOSIS >









Signal Name	-	-	
Color of Wire	Ч	Ļ	
Terminal No.	15C	16C	

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Connector No.	E38
Connector Name	Connector Name STOP LAMP SWITCH
Connector Color WHITE	WHITE
面词 H.S.	34

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



Signal Name	I	I	I	-	
Color of Wire	≻	8	0	BR	
Terminal No.	ى ك	9	7	8	

Signal Name

Color of Wire

Terminal No.

I. Т

R/B

-N

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< ECU DIAGNOSIS >

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

E119

Connector No.

Connector Name

WHITE

Connector Color

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[VDC/TCS/ABS]

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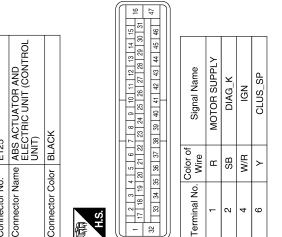
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Terminal No.	Color of Wire	Signal Name
42	>	RR_RH_SIG
43	ГG	RR_RH_PWR
45	σ	FR_LH_PWR
46	۳	FR_LH_SIG
47	в	MOTOR GND

Signal Name	FLUID LEVEL SW	CAN-H	CAN-L	VALVE ECU GND	DRIV1_SENSEP	DRIV1_GND	DRIV1_SIG	CLUS_GND	CAN2-L	CAN2-H	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	RR_LH_PWR	RR_LH_SIG	VDC OFF SW	STOP_LAMP_SW
Color of Wire	GR	L	Р	В	0	W	ГG	BR	Ν	0	Y	M	В	L	Р	GR	SB
Terminal No.	80	11	15	16	18	19	20	24	25	29	32	33	34	36	37	38	41



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ABS\_IGN\_SUPPLY

W/R

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Signal Name

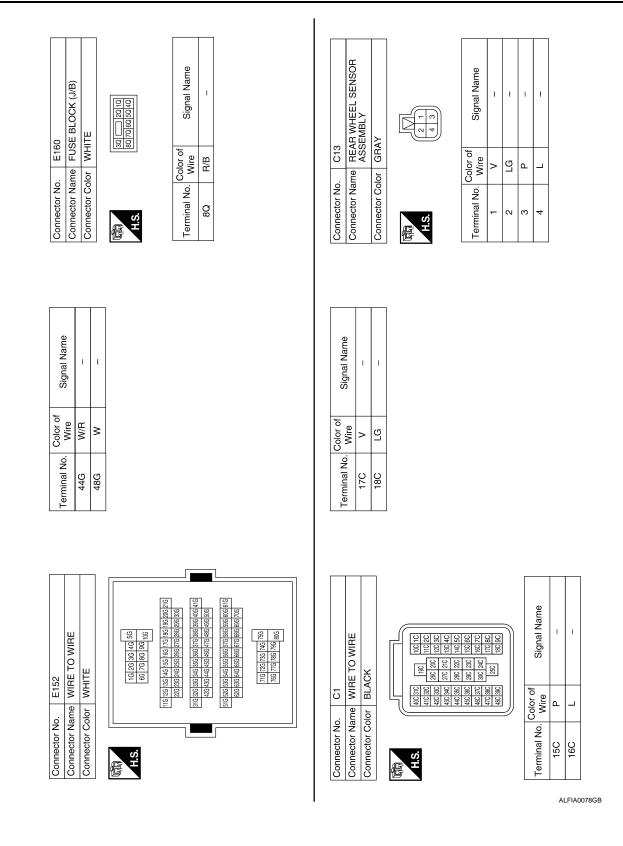
Color of Wire

Terminal No.

佢	H.S.

#### < ECU DIAGNOSIS >

[VDC/TCS/ABS]



ABS ACTUATOR AND ELECTRIC UNIT (CONTROL U	JNIT)
< ECU DIAGNOSIS >	[VDC/TCS/ABS]

Connector No.	). B73	~
Connector Name		YAW RATE/SIDE/DECEL G SENSOR
Connector Color	_	BLACK
百百 H.S.		
Terminal No.	Color of Wire	Signal Name
-	≥	CAN-L

Connector No. B40 Connector Name WIRE TO WIRE Connector Color WHITE

	Signal Name	I	I	I	1
	Color of Wire	۲	8	0	BR
H.S.	Terminal No.	5	9	7	8

CAN-H CLU\_P CLU\_GND

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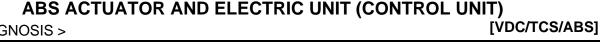
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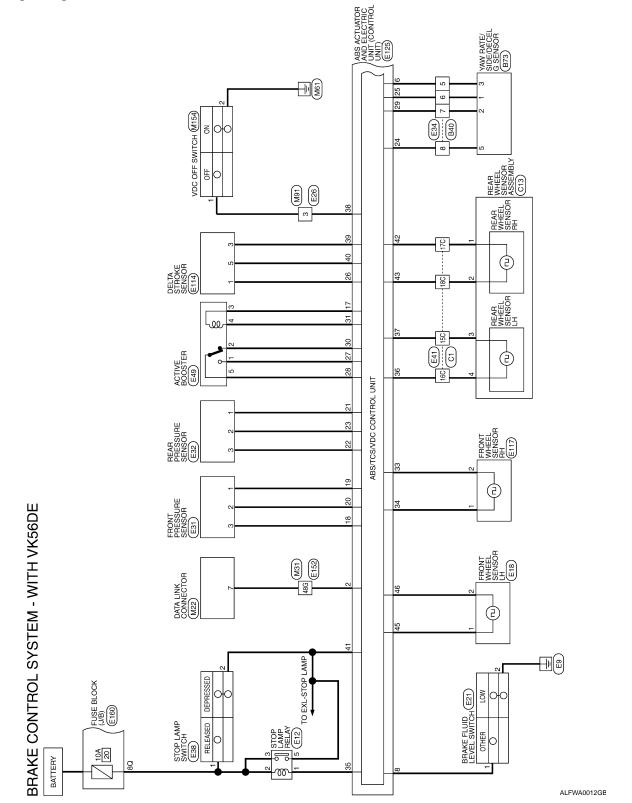
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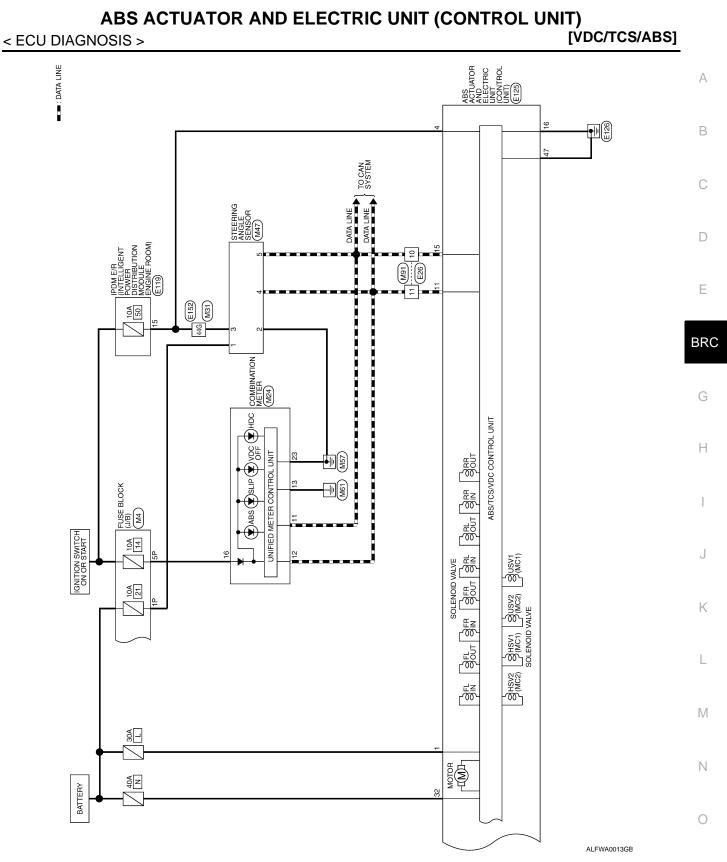
< ECU DIAGNOSIS >

INFOID:000000001731005



Wiring Diagram - With VK56DE

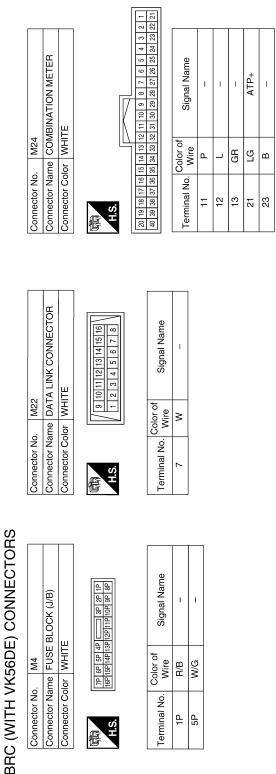


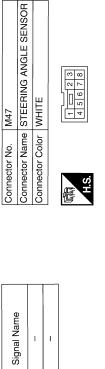


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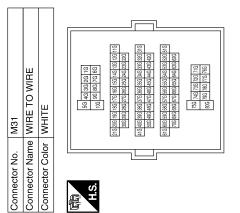
[VDC/TCS/ABS]





Signal Name	BATT	GND	POWER	CAN-H	CAN-L
Color of Wire	R/Y	в	W/R	L	Ч
Terminal No.	٢	2	З	4	5

Terminal No. Color of Signal Name 44G W/R – 48G W –

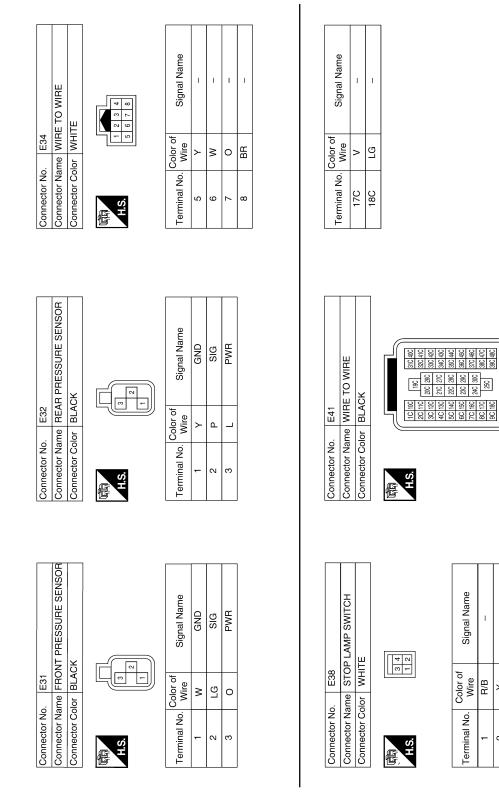


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ABS ACTUATOR AND E	LECTRIC UNIT (CONTROL UNIT) [VDC/TCS/ABS]	
Connector No.     E12       Connector Name     STOP LAMP RELAY       Connector Color     BLUE       Connector Color     BLUE       Terminal No.     Color of signal Name       2     R/B     -       3     R/B     -       5     G     -	Connector No.       E26         Connector Name WIRE TO WIRE       WIRE TO WIRE         Connector Color       Wire       Color         Connector Color       Color of 0 1 12 0 11 12 0 14 16 0 0       Color         Connector       Signal Name       Color       Color         Connector       Color of 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Connector No.     M154       Connector Name     VDC OFF SWITCH       Connector Name     VDC OFF SWITCH       Connector Color     GRAY       Connector Color     GRAY       Time     Image: Signal Name       1     GR       2     B	Connector No. E21 Connector Name BRAKE FLUID LEVEL Connector Name BRAKE FLUID LEVEL Connector Color GRAY Connector Name Connector Color GRAY Connector Color GRAY Color Of Color Of Col	C
Connector No.     M91       Connector Name     WIRE TO WIRE       Connector Color     WHITE       Connector Color     WHITE       Main     To main       Main     Signal Name       To main     Main       To main     L		
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### < ECU DIAGNOSIS >

[VDC/TCS/ABS]



Signal Name I. T 31C 40C 32C 41C 33C 42C 35C 44C 35C 44C 37C 46C 37C 46C 39C 46C 39C 48C Color of Wire ٩ \_ Terminal No. 16C 15C

Signal Name

Color of Wire

Terminal No.

B/B

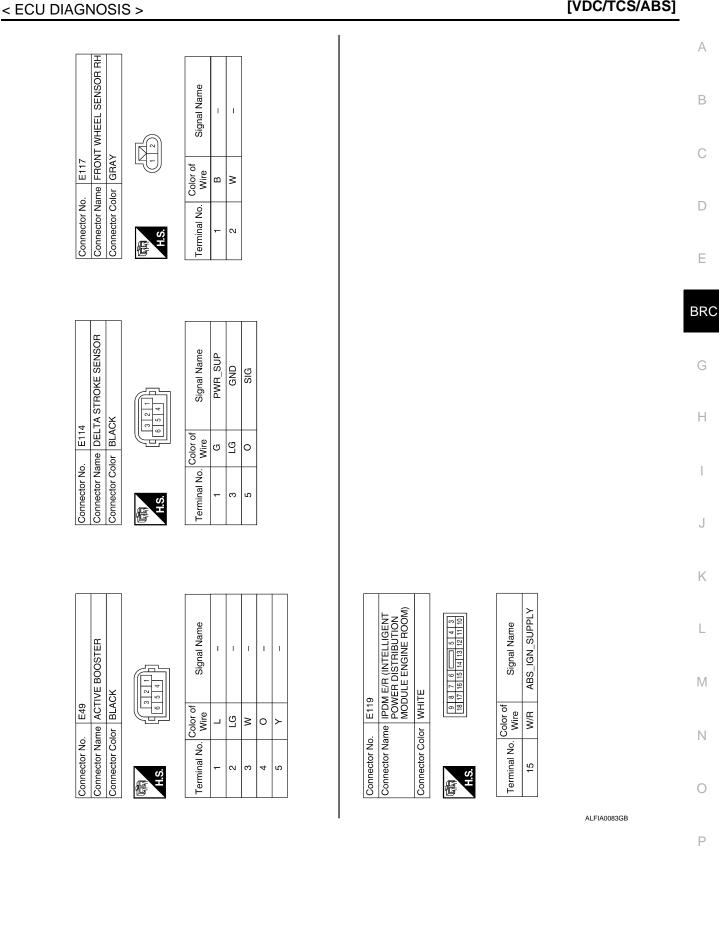
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**BRC-102** 

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

## **BRC-104**

<b>ABS ACTUATOR</b>	AND ELECTRIC	UNIT (	

Connector No.. E160 Connector Name FUSE BLOCK (J/B) Connector Color WHITE

Signal Name Т I

Color of Wire W/R ≥

Terminal No. 44G 48G

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### < ECU DIAGNOSIS >

Signal Name	BPFS_NC	BST_PWM	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	BRK_OUT (OFF)	RR_LH_PWR	RR_LH_SIG	VDC OFF SW	DELS_GND	DELS_SIGN	STOP_LAMP_SW	RR_RH_SIG	RR_RH_PWR	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	ГG	0	≻	×	ш	>	_	٩	GR	ГG	0	SB	>	ГG	ŋ	щ	В
Terminal No.	30	31	32	33	34	35	36	37	38	39	40	41	42	43	45	46	47

Signal Name	FLUID LEVEL SW	CAN-H	CAN-L	VALVE ECU GND	BST_PWR	DRIV1_SENSEP	DRIV1_GND	DRIV1_SIG	DRIV2_GND	DRIV2_SP	DRIV2_SIG	CLUS_GND	CAN2-L	DELS_SENSEP	BPFS_NO	BPFS_SIG	CAN2-H
Color of Wire	GR	_	٩	в	3	0	8	Ľ	≻	_	٩	BR	8	U	_	≻	0
Terminal No.	8	11	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

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

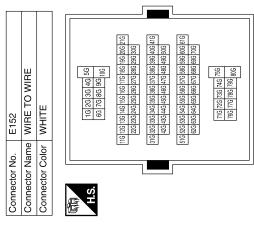
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	16	47	))			
	2 3 4 5 6 7 8 9 10 11 12 13 14 15 18 19 20 21 22 23 24 25 26 27 28 29 30 31	33 34 35 36 37 38 39 40 41 42 43 44 45 46	_	Signal Name	MOTOR SUPPLY	DIAG K
	4 5 6 8 8 9 20 21 23	5 36 37		Color of Wire	ш	SB
	1 2 3 4	32 33 34 3		Terminal No.	ł	2

Connector No.	E152
Connector Name	Connector Name WIRE TO WIRE
Connector Color WHITE	WHITE
ł	

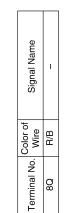
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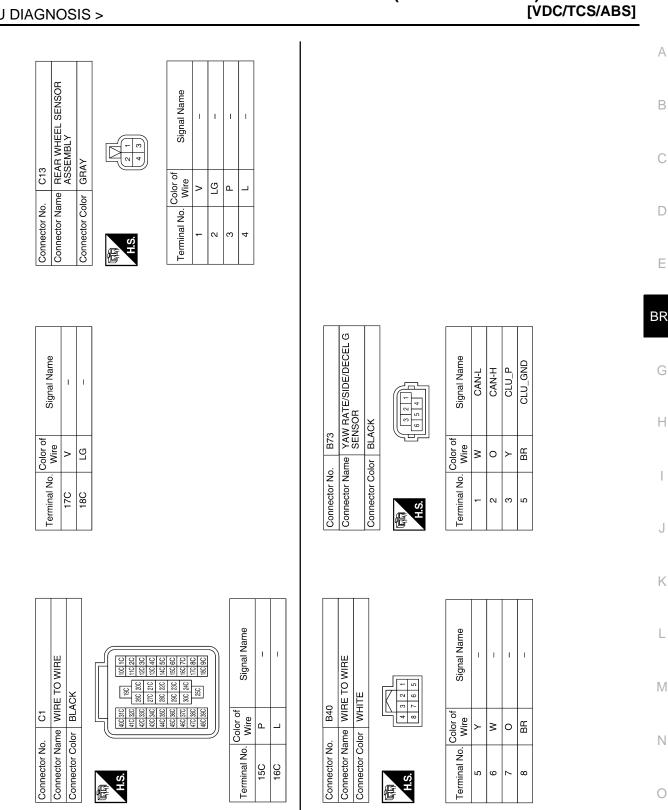
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Fail-Safe

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### **CAUTION:**

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

**BRC-105** 

**ABS/EBD SYSTEM** 

# **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)**

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#### < ECU DIAGNOSIS >

[VDC/TCS/ABS]

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

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

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

#### VDC/TCS SYSTEM

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

### DTC No. Index

INFOID:000000001690932

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		
C1102	RR LH SENSOR-1		
C1103	FR RH SENSOR-1	BRC-26, "Description"	
C1104	FR LH SENSOR-1		
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2	RRC 20 "Description"	
C1107	FR RH SENSOR-2	BRC-29, "Description"	
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-32, "Description"	
C1110	CONTROLLER FAILURE	BRC-34, "DTC Logic"	
C1111	PUMP MOTOR	BRC-35, "Description"	
C1113	G-SENSOR	BRC-37, "Description"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-40, "Description"	
C1116	STOP LAMP SW	BRC-43, "Description"	
C1120	FR LH IN ABS SOL	BRC-45, "Description"	
C1121	FR LH OUT ABS SOL	BRC-48, "Description"	
C1122	FR RH IN ABS SOL	BRC-45, "Description"	
C1123	FR RH OUT ABS SOL	BRC-48, "Description"	
C1124	RR LH IN ABS SOL	BRC-45, "Description"	
C1125	RR LH OUT ABS SOL	BRC-48, "Description"	
C1126	RR RH IN ABS SOL	BRC-45, "Description"	
C1127	RR RH OUT ABS SOL	BRC-48, "Description"	
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-51, "Description"	
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		
C1140	ACTUATOR RLY	BRC-53, "Description"	
C1142	PRESS SEN CIRCUIT	BRC-55, "Description"	
C1143	ST ANG SEN CIRCUIT		
C1144	ST ANG SEN SIGNAL	BRC-58, "Description"	

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,		
[V	DC/TCS	/ABS]

	Reference	Items (CONSULT screen terms)	DTC
— A	DDC 27 "Deceription"	YAW RATE SENSOR	C1145
	BRC-37, "Description"	SIDE G-SEN CIRCUIT	C1146
В	BRC-63, "Description"	BR FLUID LEVEL LOW	C1155
	BRC-66, "Description"	ST ANG SEN COM CIR	C1156
	BRC-67, "Description"	DECEL G SEN SET	C1160
С	BRC-68, "Description"	ST ANGL SEN SAFE	C1163
		CV1	C1164
D	PPC 60 "Description"	CV2	C1165
	BRC-69, "Description"	SV1	C1166
		SV2	C1167
E	BRC-34, "DTC Logic"	VARIANT CORDING	C1170
	BRC-73, "Description"	ABS ACTIVE BOOSTER SV NG	C1178
BRC	BRC-76, "Description"	ABS DELTA S SEN NG	C1179
		ABS ACTIVE BOOSTER RESPONSE NG	C1181
	BRC-73, "Description"	ABS BRAKE RELEASE SW NG	C1184
G		ABS BRAKE BOOSTER DEFECT	C1189
	BRC-78, "Description"	CAN COMM CIRCUIT	U1000

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# SYMPTOM DIAGNOSIS VDC/TCS/ABS

## Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-109, "Diag-</u> nosis Procedure"	
	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-110, "Diagno-	
	Make sure the braking force is sufficient when the ABS is not operating.	sis Procedure"	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-111, "Diagno- sis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-112, "Diagno- sis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-113, "Diagno-	
occurs (Note 2)	ABS actuator and electric unit (control unit)	sis Procedure"	
	ABS actuator and electric unit (control unit)		
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	BRC-114, "Diagno- sis Procedure"	
	ECM		

#### NOTE:

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY < SYMPTOM DIAGNOSIS > [VDC/TCS/ABS]	1
< SYMPTOM DIAGNOSIS > [VDC/TCS/ABS] EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	-
Diagnosis Procedure	34
1.CHECK START	74
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: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-5, "On-Vehicle Inspection and Service".	5
<u>Is the inspection result normal?</u> YES >> GO TO 3	
NO >> Repair or replace malfunctioning components.	į
3.CHECK WHEEL SENSOR AND SENSOR ROTOR	_
<ul> <li>Check the following.</li> <li>Wheel sensor installation for damage.</li> <li>Sensor rotor installation for damage.</li> <li>Wheel sensor connector connection.</li> <li>Wheel sensor harness inspection.</li> </ul>	
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; GO TO 4</li> <li>NO &gt;&gt; • Replace wheel sensor or sensor rotor. Refer to <u>BRC-121, "Removal and Installation"</u>.</li> <li>• Repair harness.</li> </ul>	
4. CHECK ABS WARNING LAMP DISPLAY	
Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. Is the ABS warning lamp illuminated?	-
YES >> Perform self-diagnosis. Refer to <u>BRC-21, "CONSULT-III Function (ABS)"</u> . NO >> Normal	

# UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:000000001690935

[VDC/TCS/ABS]

#### **1.**CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-7, "Brake Pedal Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-9, "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-7</u>, "<u>Brake Pedal Inspection and Adjustment</u>" (brake pedal), <u>BR-30</u>, "<u>Disassembly and Assembly</u>" (master cylinder), <u>BR-7</u>, "<u>Brake Booster Inspection</u>" (brake booster).

NO >> GO TO 2

# 2. CHECK FUNCTION

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

Is the inspection result normal?

- YES >> Normal
- NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

**Diagnosis Procedure** 

#### **CAUTION:**

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

**1.**CHECK FUNCTION

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

Is the inspection result normal?

>> Normal YES

NO >> Check brake system. INFOID:000000001690936

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# ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

[VDC/TCS/ABS]

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#### **CAUTION:**

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

**1.**CHECK ABS WARNING LAMP DISPLAY

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

YES >> Normal

NO >> Perform self-diagnosis. Refer to <u>BRC-21, "CONSULT-III Function (ABS)"</u>.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS < SYMPTOM DIAGNOSIS > [VDC/TCS/ABS
PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS
Diagnosis Procedure
<ul> <li>CAUTION:</li> <li>Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.</li> <li>When shifting gears</li> <li>When driving on slippery road</li> <li>During cornering at high speed</li> <li>When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]</li> <li>When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]</li> </ul>
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-21, "CONSULT-III Function (ABS)"</u> .
<b>3.</b> SYMPTOM CHECK 3
Check symptoms when electrical component (headlamps, etc.) switches are operated.
Do symptoms occur?
YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is move it farther away.
NO >> Normal

BRC-113

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

< SYMPTOM DIAGNOSIS >

# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:000000001690939

[VDC/TCS/ABS]

**1.**SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Normal. NO >> GO TO 2

2. CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-21, "CONSULT-III Func-tion (ABS)"</u>.

Are self-diagnosis results indicated?

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

NO >> GO TO 3

**3.**CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.
- Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4

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

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

- YES >> Check the corresponding items.
  - ECM: Refer to <u>EC-74</u>, "<u>CONSULT-III Function (ENGINE</u>)" (VQ40DE) or <u>EC-542</u>, "<u>CONSULT-III</u> <u>Function (ENGINE</u>)" (VK56DE).
  - TCM: Refer to <u>TM-35</u>, "CONSULT-III Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-123</u>, "<u>Removal and Installa-</u> tion".

# NORMAL OPERATING CONDITION

#### < SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

# Description

[VDC/TCS/ABS]

INFOID:000000001690940

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Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.		
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	This is a normal condi- tion due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.		
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is normal, and it is caused by the ABS op- eration check.	
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because	
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).	E
The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal	
VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal con- dition is restored, there is no malfunction. At	
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).	is no malfunction. At that time, erase the self- diagnosis memory.	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)	
VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warn- ing lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.	

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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

#### WARNING:

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

#### Precaution for Brake System

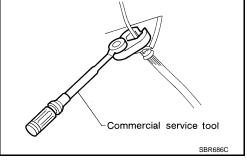
#### **CAUTION:**

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



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

#### Precaution for Brake Control



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- 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.

# BRC-116

# PRECAUTIONS

#### < PRECAUTION >

#### [VDC/TCS/ABS]

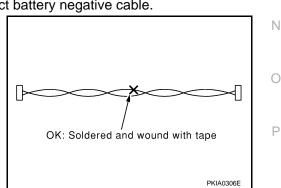
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level,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

#### NOTE:

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

#### Precaution for CAN System

- 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).



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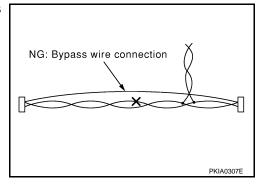
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# PRECAUTIONS

#### < 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.)



# PREPARATION

# < PREPARATION > PREPARATION

# PREPARATION

# Special Service Tool

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester		Checking operation of ABS active wheel sen- sors
ST30031000		Removing sensor rotor
( — ) Bearing puller	ZZA0700D	
ST30720000 (J-25405) Drift	a b ZZA0701D	Installing rear sensor rotor a: 77 mm (0.03 in) dia. b: 55 mm (2.17 in) dia.
ST27863000 ( — ) Drift	ZZA0632D	Installing rear sensor rotor a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.
KV40104710 ( — ) Drift	ZZA0832D	Installing rear sensor rotor a: 76 mm (2.99 in) dia. b: 68.5 mm (2.697 in) dia.

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#### < PREPARATION >

# Commercial Service Tool

INFOID:000000001297876

Tool name	Description
<ol> <li>Flare nut crowfoot</li> <li>Torque wrench</li> </ol>	Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)

S-NT360

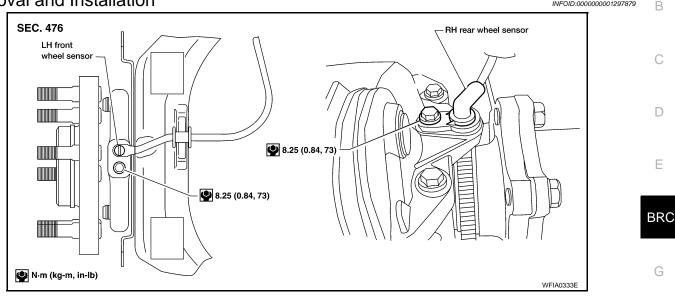
**BRC-120** 

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[VDC/TCS/ABS]

# < REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION**

**Removal and Installation** 



#### REMOVAL

- Remove wheel and tire using power tool. 1.
- Remove wheel sensor bolt. NOTE: When removing front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to BR-29, "Removal and Installation of Brake Caliper and Disc Rotor". • When removing rear wheel sensor, first remove spare tire. 3. Pull out the wheel sensor, being careful to turn it as little as possible. **CAUTION:** • Be careful not to damage sensor edge and sensor rotor teeth. Κ
  - Do not pull on the sensor harness.
- Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

#### INSTALLATION

Installation is in the reverse order of removal. When installing wheel and tire, refer to WT-36, "Rotation". CAUTION:

Inspect wheel sensor O-ring, replace sensor assembly if damaged.

Μ Clean wheel sensor hole and mounting surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle.

#### NOTE:

Apply a coat of suitable grease to the wheel sensor O-ring and mounting hole.

Tighten wheel sensor bolt to specification.

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# SENSOR ROTOR

### Removal and Installation

[VDC/TCS/ABS]

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#### FRONT

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

#### REAR

Removal

 Remove side flange from final drive assembly. Refer to <u>DLN-407, "Removal and Installation"</u> (R200) or <u>DLN-444, "Removal and Installation"</u> R(230). CAUTION:

Discard side oil seal.

2. Using tool and a suitable puller, remove sensor rotor from side flange.

#### Tool number : ST30031000 ( - )

Installation

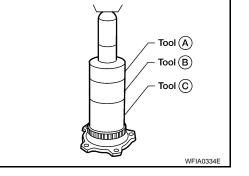
 Install new sensor rotor on side flange using Tools and a press. Make sure sensor rotor is fully seated. CAUTION:

Do not reuse the old sensor rotor.

#### **Tool numbers**

A: ST30720000 (J-25405)

- B: ST27863000 ( )
- C: KV40104710 ( )



 Install side flange to final drive assembly. Refer to <u>DLN-407</u>, <u>"Removal and Installation"</u> R(200) or<u>DLN-444</u>, <u>"Removal and Installation"</u> (R230).

#### **CAUTION:**

Do not reuse the side oil seal. The side oil seal must be replaced every time the side flange is removed from the final drive assembly.

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

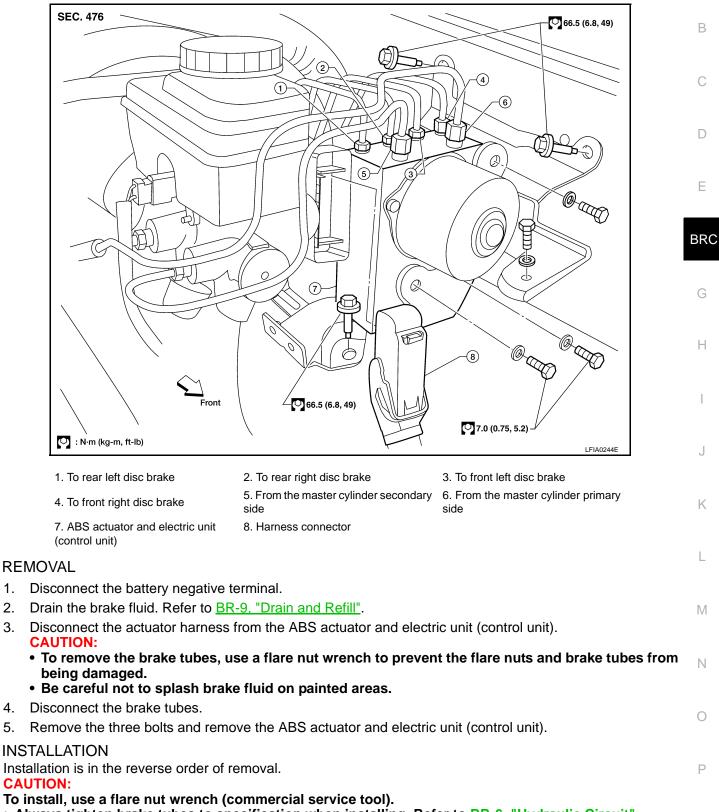
# < REMOVAL AND INSTALLATION >

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

[VDC/TCS/ABS]

INFOID:000000001297881

Removal and Installation



- Always tighten brake tubes to specification when installing. Refer to <u>BR-6, "Hydraulic Circuit"</u>.
- Never reuse drained brake fluid.

4. 5.

 After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to BR-9. "Bleeding Brake System". NOTE:

# **BRC-123**

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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

In the case that ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

# STEERING ANGLE SENSOR 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. CAUTION:

In the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-131, "ADJUSTMENT OF STEERING ANGLE SENSOR</u> <u>NEUTRAL POSITION : Special Repair Requirement"</u>.

#### INSTALLATION

1. Installation is in the reverse order of removal.

< REMOVAL AND INSTALLATION >

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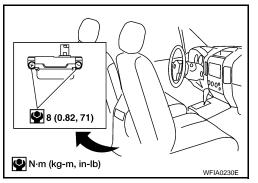
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# G SENSOR

### Removal and Installation

#### REMOVAL

- 1. Remove center console. Refer to <u>IP-15, "Exploded View"</u>.
- Remove yaw rate/side/decel G sensor attaching nuts as shown.
   The location of the sensor is the same for all models. CAUTION:
  - Do not use power tools to remove or install yaw rate/side/ decel G sensor.
  - Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



INSTALLATION

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

After performing the above work, calibrate the decel G sensor. Refer to <u>BRC-132</u>, <u>"CALIBRATION OF DECEL</u> <u>G SENSOR : Special Repair Requirement"</u>.

INFOID:000000001297883

< BASIC INSPECTION >

INFOID:000000001690941

# BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-131</u>, "ADJUSTMENT OF STEERING ANGLE <u>SENSOR NEUTRAL POSITION : Description</u>".

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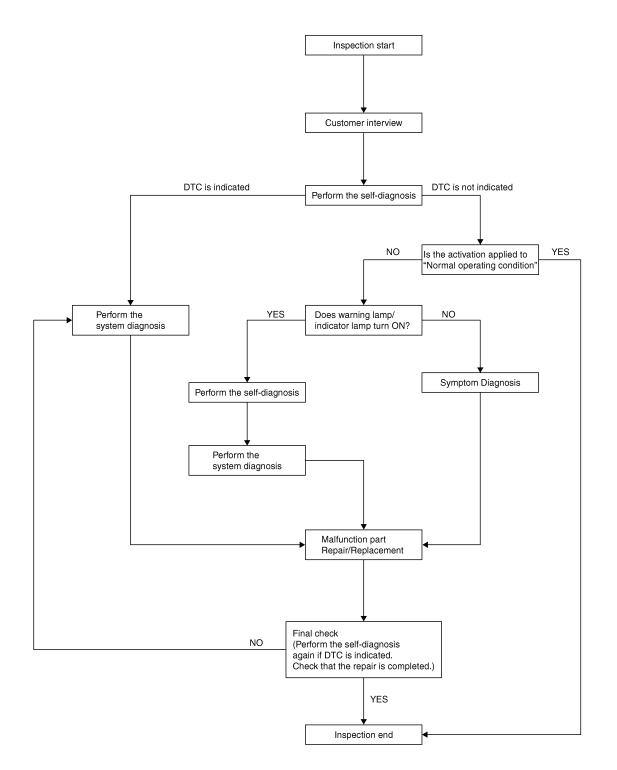
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**BRC-127** 

## **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION >

OVERALL SEQUENCE



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#### DETAILED FLOW

# **1**.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-130</u>, <u>"Diagnostic Work Sheet"</u>.

### **BRC-128**

# **DIAGNOSIS AND REPAIR WORKFLOW**

< BASIC INSPECTION > [HDC/HSA/VDC/TCS/ABS]	
>> GO TO 2	
2. PERFORM THE SELF-DIAGNOSIS	А
Check the DTC display with the self-diagnosis function. Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u> .	
Is there any DTC displayed?	В
YES >> GO TO 3 NO >> GO TO 4	
3. PERFORM THE SYSTEM DIAGNOSIS	С
Perform the diagnosis applicable to the displayed DTC. Refer to <u>BRC-218, "DTC No. Index"</u> .	
>> GO TO 7	D
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-227</u> , <u>"Description"</u> .	Ε
Is the symptom a normal operation?	
YES >> INSPECTION END NO >> GO TO 5	BR
5. Check the warning LAMP and Indicator LAMP for Illumination	
Check that the warning lamp and indicator lamp illuminate.	G
<ul> <li>ABS warning lamp: Refer to <u>BRC-201, "Description"</u>.</li> <li>Brake warning lamp: Refer to <u>BRC-202, "Description"</u>.</li> </ul>	
<ul> <li>VDC OFF indicator lamp: Refer to <u>BRC-203, "Description"</u>.</li> </ul>	Н
<ul> <li>SLIP indicator lamp: Refer to <u>BRC-204, "Description"</u>.</li> </ul>	
Is ON/OFF timing normal?	
YES >> GO TO 6	
NO >> GO TO 2	
6.PERFORM THE DIAGNOSIS BY SYMPTOM	J
Perform the diagnosis applicable to the symptom.	
>> GO TO 7	Κ
<b>7.</b> REPAIR OR REPLACE THE MALFUNCTIONING PARTS	
Repair or replace the specified malfunctioning parts.	L
>> GO TO 8	
8.FINAL CHECK	M
Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u> .	
Is no other DTC present and the repair completed?	Ν
YES >> INSPECTION END NO >> GO TO 3	
NO >> GO TO 3	0

#### DIAGNOSIS AND REPAIR WORKFLOW [HDC/HSA/VDC/TCS/ABS]

#### < BASIC INSPECTION >

# **Diagnostic Work Sheet**

INFOID:000000001690942

Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Dat	e
Symptoms	<ul> <li>☐ Noise and vibration         <ul> <li>(from engine compartment)</li> <li>□ Noise and vibration                 (from axle)</li> </ul> </li> </ul>	U Warning / Indicator activate		<ul> <li>Firm pedal operation</li> <li>Large stroke pedal</li> <li>operation</li> </ul>
	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	rel □Other )		
Driving conditions	Full-acceleration     High speed cornering     Vehicle speed: Greater than 10 km     Vehicle speed: 10 km/h (6 MPH) o     Vehicle is stopped			
Applying brake conditions	□ Suddenly □ Gradually			
Other conditions	<ul> <li>Operation of electrical equipment</li> <li>Shift change</li> <li>Other descriptions</li> </ul>			

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INSPECTION AN	DADJUSIMENI
< BASIC INSPECTION >	[HDC/HSA/VDC/TCS/ABS]
INSPECTION AND ADJUSTMENT	
ADDITIONAL SERVICE WHEN REPLAC	ING CONTROL UNIT
ADDITIONAL SERVICE WHEN REPLACIN	NG CONTROL UNIT : Description
<ul><li>After replacing the ABS actuator and electric unit (contr</li><li>Neutral position adjustment for the steering angle ser</li><li>Calibration of the decel G sensor</li></ul>	
ADDITIONAL SERVICE WHEN REPLACIN	IG CONTROL UNIT : Special Repair Re-
quirement	INFOID:000000001690944
<b>1.</b> PERFORM THE NEUTRAL POSITION ADJUSTME	NT FOR THE STEERING ANGLE SENSOR
Perform the neutral position adjustment for the steering	angle sensor.
Special Repair Requirement", GO TO 2	STEERING ANGLE SENSOR NEUTRAL POSITION :
	SOR
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-132. "CALIBRATION OF DEC</u>	CEL G SENSOR : Special Repair Requirement".
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INSOR NEUTRAL POSITION : Description INFOID:00000001690945 teering angle sensor neutral position is required.
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID:00000001699945 teering angle sensor neutral position is required. X: Required -: Not required
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INSOR NEUTRAL POSITION : Description INFOID:00000001690945 teering angle sensor neutral position is required.
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132, "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st <u>Situation</u> Removing/Installing ABS actuator and electric unit (control unit)	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INSOR NEUTRAL POSITION : Description INFOID: 000000001690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position —
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132, "CALIBRATION OF DEG</u> ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st <u>Situation</u> Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit)	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INFOID: 00000001690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position 
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INSOR NEUTRAL POSITION : Description INFOLD: 00000000 1690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position X
Perform calibration of the decel G sensor.  >> Refer to <u>BRC-132</u> , "CALIBRATION OF DECADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st  Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INFOID:00000001690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position X
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INFOID:00000001690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position Adjustment of steering angle sensor neutral position X
Perform calibration of the decel G sensor. >> Refer to <u>BRC-132</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S ADJUSTMENT OF STEERING ANGLE SE Refer to the table below to determine if adjustment of st Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Replacing steering components	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION INFOID:00000001690945 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position 
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# ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

# **INSPECTION AND ADJUSTMENT**

< BASIC INSPECTION >

>> GO TO 2

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

- 1. On the CONSULT-III screen, touch "WORK SUPPORT" and "ST ANG SEN ADJUSTMENT" in order.
- Touch "START".
   CAUTION:

#### Do not touch steering wheel while adjusting steering angle sensor.

3. After approximately 10 seconds, touch "END". NOTE:

After approximately 60 seconds, it ends automatically.

4. Turn ignition switch OFF, then turn it ON again. CAUTION:

#### Be sure to perform above operation.

>> GO TO 3

# **3.**CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4

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

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

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

- ABS actuator and electric unit (control unit): Refer to <u>BRC-141, "CONSULT-III Function (ABS)</u>".
- ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function</u> (<u>ENGINE)"</u> (VK56DE).

Are the memories erased?

- YES >> INSPECTION END
- NO >> Check the items indicated by the self-diagnosis.

# CALIBRATION OF DECEL G SENSOR

# CALIBRATION OF DECEL G SENSOR : Description

INFOID:000000001690947

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

×: Required –: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:000000001690948

#### CALIBRATION OF DECEL G SENSOR CAUTION: To calibrate the decel G sensor, make sure to use CONSULT-III

# **INSPECTION AND ADJUSTMENT**

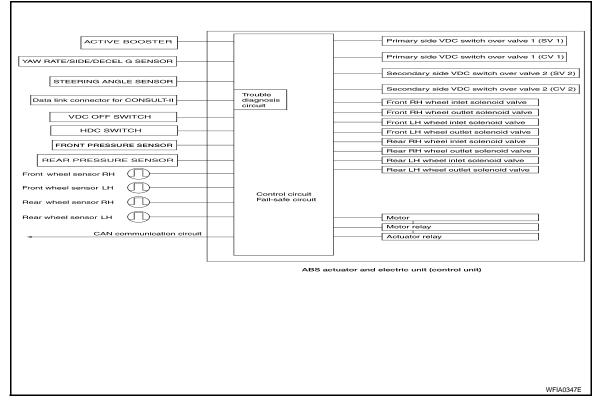
Calibration cannot be done without CONSULT-III) ALIGN THE VEHICLE STATUS	< BASIC INSPECTION >	[HDC/HSA/VDC/TCS/ABS]
ALIGN THE VEHICLE STATUS  Top vehicle with front wheels in straight-ahead position.		
Stop vehicle with front wheels in straight-ahead position.         >> GO TO 2         2.PERFORM CALIBRATION OF DECEL G SENSOR         . On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order.         . Touch "START".         . After approximately 10 seconds, touch "END".         NOTE:         After approximately 60 seconds, it ends automatically.         . Turn ignition switch OFF, then turn it ON again.         CAUTION:         Be sure to perform above operation.         >> GO TO 3         CHECK DATA MONITOR         . Run vehicle with front wheels in straight-ahead position, then stop.         . Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±.         st he inspection result normal?         YES       >> GO TO 4         NO       >> Perform calibration of decel G sensor again, GO TO 1         4.ERASE THE SELF-DIAGNOSIS MEMORY         Frase 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-141, "CONSULT-III Function (ABS)".         ECM: Refer to EC-74, "CONSULT-III Function (ENGINE)" (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u>(VK56DE).         We the memories erased?         YES       &gt;&gt; INSPECTION END   </u>		
>> GO TO 2 PERFORM CALIBRATION OF DECEL G SENSOR On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order. Touch "START". After approximately 10 seconds, touch "END". NOTE: After approximately 60 seconds, it ends automatically. Turn ignition switch OFF, then turn it ON again. CAUTION: Be sure to perform above operation. >> GO TO 3 CHECK DATA MONITOR Run vehicle with front wheels in straight-ahead position, then stop. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±. sthe inspection result normal? YES >> GO TO 4 NO >> Perform calibration of decel G sensor again, GO TO 1 LERASE THE SELF-DIAGNOSIS MEMORY Trase 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-141, "CONSULT-III Function (ABS)".</u> ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u> (VK56DE). We the memories erased? YES >> INSPECTION END		
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>> GO TO 3 3.CHECK DATA MONITOR Run vehicle with front wheels in straight-ahead position, then stop. 3. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±. 5. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±. 5. Stein 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-141. "CONSULT-III Function (ABS)"</u> . ECM: Refer to <u>EC-74. "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542. "CONSULT-III Function (ENGINE)"</u> (VK56DE). Are the memories erased? YES >> INSPECTION END		
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YES       >> GO TO 4         NO       >> Perform calibration of decel G sensor again, GO TO 1         I.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-141, "CONSULT-III Function (ABS)"</u> .         ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u> (VK56DE).         Are the memories erased?         YES       >> INSPECTION END	2. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within $\pm$ .	
NO >> Perform calibration of decel G sensor again, GO TO 1 <b>1</b> .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-141, "CONSULT-III Function (ABS)"</u> . ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u> (VK56DE). Are the memories erased? YES >> INSPECTION END	Is the inspection result normal?	
<ul> <li>LERASE THE SELF-DIAGNOSIS MEMORY</li> <li>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-141, "CONSULT-III Function (ABS)"</u>. ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u> (VK56DE).</li> <li>Are the memories erased?</li> <li>YES &gt;&gt; INSPECTION END</li> </ul>		
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ABS actuator and electric unit (control unit): Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u> . ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function (ENGINE)"</u> (VK56DE). Are the memories erased? YES >> INSPECTION END		
ECM: Refer to <u>EC-74, "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542, "CONSULT-III Function</u> ( <u>ENGINE)"</u> (VK56DE). Are the memories erased? YES >> INSPECTION END		
Are the memories erased? YES >> INSPECTION END	<ul> <li>ECM: Refer to EC-74, "CONSULT-III Function (ENGINE)" (VQ40DE) or EC</li> </ul>	C-542, "CONSULT-III Function
YES >> INSPECTION END		

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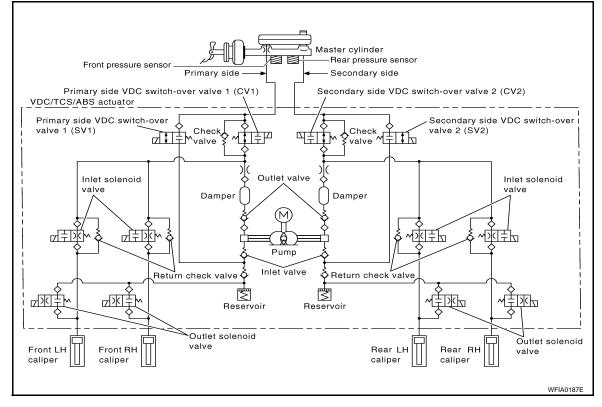
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# < FUNCTION DIAGNOSIS > FUNCTION DIAGNOSIS VDC

# System Diagram



# HYDRAULIC CIRCUIT DIAGRAM



# **BRC-134**

#### [HDC/HSA/VDC/TCS/ABS]

< FUNCTION DIAGNOSIS >	
System Description	

#### INFOID:000000001690950

- 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-III is available.

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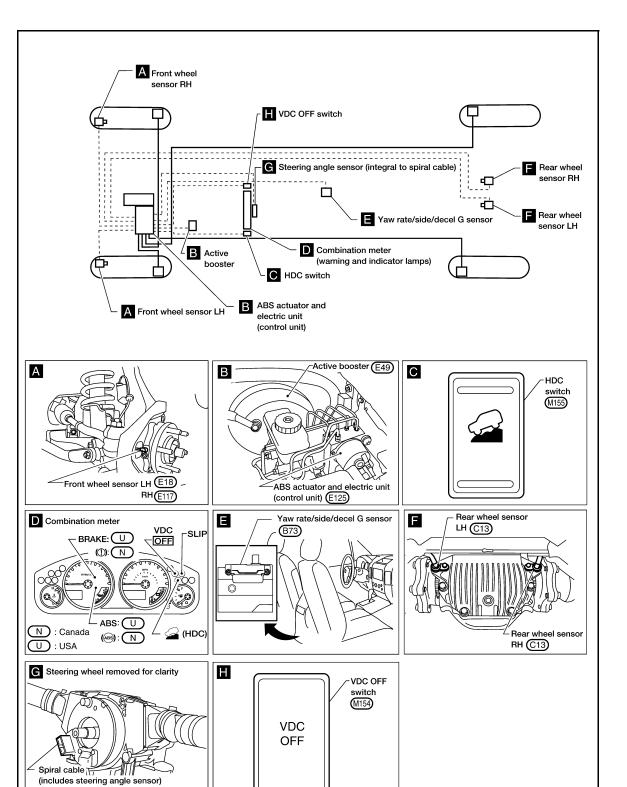
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# **Component Parts Location**

INFOID:000000001690951



WFIA0348E

# VDC

# [HDC/HSA/VDC/TCS/ABS]

# < FUNCTION DIAGNOSIS > Component Description

INFOID:000000001690952

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Component parts		Reference	
	Pump		В
	Motor	BRC-155, "Description"	
ABS actuator and electric unit (control unit)	Actuator relay	BRC-173, "Description"	
	Solenoid valve	BRC-165, "Description"	U
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-189, "Description"	D
Wheel sensor		BRC-160, "Description"	
Yaw rate/side/decel G sensor		BRC-157, "Description"	
Steering angle sensor		BRC-178, "Description"	E
VDC OFF switch		BRC-199, "Description"	
ABS warning lamp		BRC-201, "Description"	BR0
Brake warning lamp		BRC-202, "Description"	
VDC OFF indicator lamp		BRC-203, "Description"	
SLIP indicator lamp		BRC-204, "Description"	G
Front pressure sensor		PPC 175 "Deparieties"	
Rear pressure sensor		BRC-175, "Description"	
Active booster		BRC-193, "Description"	— H
Delta stroke sensor		BRC-196, "Description"	

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# < FUNCTION DIAGNOSIS >

# TCS



Rear wheel sensor LH

AWFIA001

INFOID:000000001690953

TCS

System Diagram Transfer Steering Combination ECM тсм control unit angle sensor meter (With 4WD) Injector operation signal CAN communication Front pressure sensor Front wheel Rear pressure sensor sensor RH Active booster ABS actuator and electric unit Rear wheel Delta stroke sensor (control unit) sensor RH Yaw rate/side/decel G sensor VDC OFF switch 

System Description

Front wheel sensor LH

INFOID:000000001690954

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

System Diagram

# ABS



[HDC/HSA/VDC/TCS/ABS]

# CAN communication Rear wheel Front wheel sensor RH sensor RH ABS actuator and electric unit (control unit) Front wheel sensor LH Rear wheel sensor LH AWFIA0014

ABS

# System Description

INFOID:000000001690958

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

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# EBD



Rear wheel sensor LH

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# System Diagram INFOID:000000001690961 Combination meter (Brake warning lamp, ABS warning lamp) CAN communication Rear wheel Front wheel sensor RH sensor RH ABS actuator and electric unit-(control unit)

**EBD** 

# AWFIA0014 System Description INFOID:000000001690962 • Electric Brake force Distribution is a following function. ABS actuator and electric unit (control unit) detects

- subtle slippages between the front and rear wheels during braking. Then it electronically controls the rear braking force (brake fluid pressure) to reduce rear wheel slippage. Accordingly, it improves vehicle stability.
- Electrical system diagnosis by CONSULT-III is available.

Front wheel sensor LH

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

< FUNCTION DIAGNOSIS >

#### [HDC/HSA/VDC/TCS/ABS]

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

# CONSULT-III Function (ABS)

INFOID:000000001690965

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# FUNCTION

CONSULT-III can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function				
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-III.	D			
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.				
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.				
Active test	Diagnostic test mode is which CONSULT-III drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.				
ECU part number	ABS actuator and electric unit (control unit) part number can be read.	BRC			
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.				

#### SELF-DIAG RESULTS MODE

#### **Operation Procedure**

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

#### How to Erase Self-diagnosis Results

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

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

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

#### Display Item List Refer to <u>BRC-218, "DTC No. Index"</u>.

#### DATA MONITOR MODE

Display Item List

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

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

#### < FUNCTION DIAGNOSIS >

## [HDC/HSA/VDC/TCS/ABS]

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

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

#### < FUNCTION DIAGNOSIS >

## [HDC/HSA/VDC/TCS/ABS]

lite and	Data	a monitor item sele			
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks	
CV1 (ON/OFF)	-	_	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed.	
CV2 (ON/OFF)	-	_	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed.	
SV1 (ON/OFF)	-	_	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) sta- tus is displayed.	
SV2 (ON/OFF)	-	_	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) sta- tus is displayed.	
VDC FAIL SIG (ON/OFF)	-	_	×	VDC fail signal (ON/OFF) status is displayed.	
TCS FAIL SIG (ON/OFF)	-	_	×	TCS fail signal (ON/OFF) status is displayed.	
ABS FAIL SIG (ON/OFF)	-	_	×	ABS fail signal (ON/OFF) status is displayed.	
EBD FAIL SIG (ON/OFF)	-	_	×	EBD fail signal (ON/OFF) status is displayed.	
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status is displayed.	
EBD SIGNAL (ON/OFF)	-	_	×	EBD operation (ON/OFF) status is displayed.	
ABS SIGNAL (ON/OFF)	-	_	×	ABS operation (ON/OFF) status is displayed.	
TCS SIGNAL (ON/OFF)	-	_	×	TCS operation (ON/OFF) status is displayed.	
VDC SIGNAL (ON/OFF)	-	_	×	VDC operation (ON/OFF) status is displayed.	
EBD WARN LAMP	-	_	×	Brake warning lamp (ON/OFF) sta- tus is displayed.	
SLCT LVR POSI	×	×	×	Shift position judged by PNP switch signal.	
R POSI SIG	-	_	×	Shift position judged by PNP switch signal.	
2WD/4WD	-	_	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.	
BST OPER SIG	-	_	×	Active booster operation (ON/OFF) status is displayed.	
PRESS SENSOR	×	_	×	Brake pressure detected by pres- sure sensor is displayed.	
CRANKING SIG	-	_	×	The input state of the key SW START position signal is displayed.	
PRESS SEN 2	-	_	×	Brake pressure detected by pres- sure sensor is displayed.	
DELTA S SEN	-	_	×	The amount of stroke sensor move- ments in the active booster detected by DELTA S SEN is displayed.	

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

#### < FUNCTION DIAGNOSIS >

#### [HDC/HSA/VDC/TCS/ABS]

ltem	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
RELEASE SW NO	_	_	×	Release switch signal (ON/OFF) status is displayed. "ON" indicates that the brake pedal is depressed. "OFF"" is that the brake pedal is re- leased.
RELEASE SW NC	_	_	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicates that the brake pedal is depressed on. "ON" is that the brake pedal is released.
OHB FAIL	_	-	×	OHB fail status is displayed.
HBA FAIL	_	_	×	HBA fail status is displayed.
OHB SIG	_	-	×	OHB operation (ON/OFF) status is displayed.
HBA SIG	_	_	×	HBA operation (ON/OFF) status is displayed.
PRES CTRL ACC	_	_	×	This item is not used for this model.
PRES FAIL ACC	_	_	×	This item is not used for this model.
STP OFF RLY	_	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

×: Applicable

-: Not applicable

#### ACTIVE TEST MODE

#### **CAUTION:**

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp or brake warning lamp on.
- ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp are on during active test.

#### NOTE:

- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

#### SOLENOID VALVE

- When performing an active test of the ABS function, select the "MAIN SIGNALS" for each test item. In addition, when performing an active test of the VDC/TCS function, select the item menu for each test item.
- For ABS solenoid valve, touch "UP", "KEEP", and "DOWN" on the display screen. For ABS solenoid valve (ACT), touch "UP", "ACT UP", "ACT KEEP" and confirm that solenoid valves operate as shown in the table below.

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

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

#### < FUNCTION DIAGNOSIS >

#### [HDC/HSA/VDC/TCS/ABS]

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

\*: 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 BRC below.

#### 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
STOP LAMP SW	ON	OFF
BST OPER SIG	ON	OFF
PRESS SENSOR	$50\pm5$ bar	0 bar
PRESS SEN 2	$50\pm5$ bar	0 bar
STP OFF RLY	OFF	OFF

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#### < COMPONENT DIAGNOSIS >

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

### Description

INFOID:000000001731032

[HDC/HSA/VDC/TCS/ABS]

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:000000001731033

### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-146, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

#### CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

**1.**CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunctioning code.

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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.

INFOID:000000001731034

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

#### < COMPONENT DIAGNOSIS >

-	
	[HDC/HSA/VDC/TCS/ABS]

< COMPONENT DIAGNOSIS >	[
<ol> <li>Spin the wheel of the vehicle by hand and observe the red SEN sensor tester. The red SENSOR indicator should flash on and off NOTE:</li> <li>If the red SENSOR indicator illuminates but does not flash, rev</li> </ol>	to indicate an output signal.
retest.	
Does the ABS active wheel sensor tester detect a signal?	
YES >> GO TO 3	
NO >> Replace the wheel sensor. Refer to <u>BRC-237</u> , "Removal a	and Installation".
3.CHECK TIRES	
Check for inflation pressure, wear and size of each tire.	
Are tire pressure and size correct and is tire wear within specifications	5?
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 In</u> <u>"On-Vehicle Inspection and Service"</u> (rear).	spection and Service" (front) or RAX-5.
Is the inspection result normal?	
YES >> GO TO 5	
NO >> Repair or replace as necessary. Refer to <u>FAX-8, "Rem</u> <u>"Removal and Installation"</u> (rear).	oval and Installation" (front) or RAX-8,
5. CHECK WIRING HARNESS FOR SHORT CIRCUIT	
1. Disconnect ABS actuator and electric unit (control unit) connec-	
tor and wheel sensor connector of malfunction code No.	Wheel sensor connectors
2. Check continuity between wheel sensor harness connector ter-	Front Rear
minals and ground.	$ \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array} \\ 2 \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\$
Continuity should not exist.	
Is the inspection result normal?	
YES >> GO TO 6	Ω
NO >> Repair the circuit.	
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## 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117 or C13.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	M
	Connector	Terminal	Connector	Terminal		
Front LH		45	E18	1		N
		46	EIO	2		
Front RH		34	E117	1		
	E125	33	EIII	2	Yes	0
Rear LH	E125	37		3	165	
		36	C13	4		Р
Rear RH		42		1		
Neal NN		43		2		

Is the inspection result normal?

- YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-234</u>, "<u>Removal and Instal-</u><u>lation</u>".
- NO >> Repair the circuit.

#### C1101, C1102, C1103, C1104 WHEEL SENSOR-1 [HDC/HSA/VDC/TCS/ABS]

#### < COMPONENT DIAGNOSIS >

#### Component Inspection

INFOID:000000001731035

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

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

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

Is the inspection result normal?

YES >> INSPECTION END

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

#### Special Repair Requirement

INFOID:000000001731036

#### **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-11, "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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

#### < COMPONENT 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

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INFOID:000000001731037

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

### 1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	IZ.
RR RH SENSOR-2	K
RR LH SENSOR-2	
FR RH SENSOR-2	L
FR LH SENSOR-2	
Is above displayed on the self-diagnosis display?	вл
<ul> <li>YES &gt;&gt; Proceed to diagnosis procedure. Refer to <u>BRC-149, "Diagnosis Procedure"</u>.</li> <li>NO &gt;&gt; INSPECTION END</li> </ul>	M
Diagnosis Procedure	Ν
CAUTION: Do not check between wheel sensor terminals. INSPECTION PROCEDURE	0
1.CONNECTOR INSPECTION	
Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunction- ing code. Check the terminals for deformation, disconnection, looseness or damage.	Ρ
Is the inspection result normal?	

YES >> GO TO 2

NO >> Repair or replace as necessary.

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

#### < COMPONENT DIAGNOSIS >

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

#### NOTE:

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

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

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

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

### 3.CHECK TIRES

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

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

- YES >> GO TO 4
- NO >> Adjust tire pressure or replace tire(s).

**4.**CHECK WHEEL BEARINGS

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

Is the inspection result normal?

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

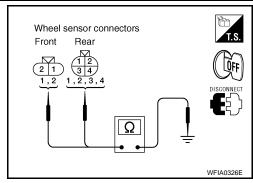
**5.**CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

#### Continuity should not exist.

Is the inspection result normal?

- YES >> GO TO 6
- NO >> Repair the circuit.



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

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117, or C13.

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

# < COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

Wheel sensor		ABS actuator and electric unit (control unit)		ensor	Continuity	
	Connector	Terminal	Connector	Terminal		
Front LH		45	E18	1		
		46	LIU	2		
Front RH		34	E117	1		
	E125	33		2	Yes	
Rear LH		37		3		
		36	C13	4		
Rear RH		42		1		
		43		2		
NO >> Repair the of Component Inspection 1.CHECK DATA MONI On "DATA MONITOR", SOR", and check the ve	ction TOR select "FR LH SEN	ISOR", "FR RH	SENSOR", "RR	LH SENSOR",	INFOID:000000001731040 and "RR RH SEN-	
Wheel sensor	Vehic	le speed (DATA MC	ONITOR)			
FR LH SENSOR						
FR RH SENSOR		atches the speedo	meter dis-			
RR LH SENSOR	play (±10	% or less)				
RR RH SENSOR						
Is the inspection result r YES >> INSPECTIC NO >> Go to diagn		fer to <u>BRC-149</u>	, "Diagnosis Proc	edure".		
Special Repair Rec	quirement				INFOID:000000001731041	
<b>1.</b> ADJUSTMENT OF S						
Always perform neutral and electric unit (control POSITION : Description	position adjustmer I unit). Refer to <u>BRC</u>	nt for the steeri	ing angle sensor	when replacing	the ABS actuator	
>> GO TO 2						
>> GO TO 2 2.CALIBRATION OF D	ECEL G SENSOR					
<b>^</b>	ion of decel G sens			ator and electric	c unit (control unit).	
2.CALIBRATION OF D Always perform calibrat	ion of decel G sens			ator and electric	c unit (control unit).	

#### < COMPONENT DIAGNOSIS >

### C1109 POWER AND GROUND SYSTEM

#### Description

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

#### DTC Logic

INFOID:000000001690977

INFOID-000000001690978

INFOID:000000001690976

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

**1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (<u>ABS)</u>".

Is any item indicated on the self-diagnosis display?

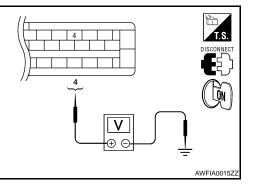
YES >> GO TO 2

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

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

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

	ABS actuator and elec- tric unit (control unit)		Condition	Voltage
Connector	Terminal			
E125	1	Ground	Ignition switch: ON	Battery voltage
L123	4	Gibunu	Ignition switch: OFF	Approx. 0V



4. Turn ignition switch OFF.

### C1109 POWER AND GROUND SYSTEM

Continuity

Yes

#### < COMPONENT DIAGNOSIS >

ABS actuator and electric unit (control unit)

Terminal

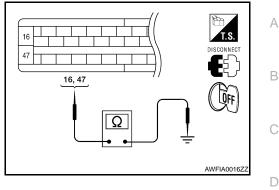
16, 47

Connector

E125

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

### [HDC/HSA/VDC/TCS/ABS]



Is the inspection result normal?

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

#### Special Repair Requirement

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

Ground

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

#### >> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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#### C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < COMPONENT DIAGNOSIS > [HDC/HSA/VDC/TCS/ABS]

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

### DTC Logic

INFOID:000000001690980

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installa-</u> tion".

#### Special Repair Requirement

INFOID:000000001690982

INFOID:000000001690981

**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-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

#### >> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT DIAGNOSIS >

### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### Description

PUMP

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

#### MOTOR

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

### DTC Logic

#### DTC DETECTION LOGIC

	Display item	Malfunction detected condition	Possible cause
C1111 PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	
		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 CC	ONFIRMATION PROCE	DURE	
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	ESULTS	
Check th	ne self-diagnosis results.		
	Self-diagnosis		
ls above	e displayed on the self-dia		
YES NO		procedure. Refer to <u>BRC-155, "Diagnosis Proce</u>	dure".
NO	>> INSPECTION END		
_	sis Procedure		INFOID:00000000169098
Diagno			INFOID:00000000169098
Diagno INSPEC	osis Procedure		INFOID:00000000169098
Diagno INSPEC 1.CHEC 1. Turr 2. Disc 3. Che	DSIS Procedure TION PROCEDURE CK CONNECTOR ignition switch OFF. connect ABS actuator and ick terminal for deformation	l electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma	
Diagno INSPEC 1.CHEC 1. Turn 2. Disc 3. Che repla	DSIS Procedure CTION PROCEDURE CK CONNECTOR in ignition switch OFF. connect ABS actuator and ick terminal for deformation ace terminal. onnect connectors and the		Ifunction is found, repair o
Diagno INSPEC 1.CHEC 1. Turn 2. Disc 3. Che repla 4. Rec (AB) Is any ite	DSIS Procedure CTION PROCEDURE CK CONNECTOR in ignition switch OFF. connect ABS actuator and ick terminal for deformation ace terminal. onnect connectors and the S)".	on, disconnect, looseness, and so on. If any ma	Ifunction is found, repair o
Diagno INSPEC 1.CHEC 1. Turn 2. Disc 3. Che repla 4. Rec (AB) Is any ite	DSIS Procedure CTION PROCEDURE CK CONNECTOR in ignition switch OFF. connect ABS actuator and ick terminal for deformation ace terminal. onnect connectors and the S)". em indicated on the self-dentity >> GO TO 2	on, disconnect, looseness, and so on. If any ma	Ifunction is found, repair o

[HDC/HSA/VDC/TCS/ABS]

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### C1111 ABS MOTOR, MOTOR RELAY SYSTEM

#### < COMPONENT 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) harness connector terminal and ground.

c unit (con-	
Voltage	
attery voltage	
	AWFIA0017ZZ

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

 $\mathbf{3}$ . Check abs actuator and electric unit (control unit) ground circuit

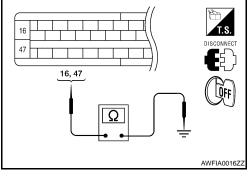
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

### Component Inspection



INFOID:000000001690986

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

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-155. "Diagnosis Procedure"</u>.

### Special Repair Requirement

INFOID:000000001690987

**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-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL 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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

### [HDC/HSA/VDC/TCS/ABS]

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

#### < COMPONENT DIAGNOSIS >

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

#### Description

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

### DTC Logic

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[HDC/HSA/VDC/TCS/ABS]

#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector	
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	(control unit)	E
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	BRC

#### 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 B	RC-157, "Diagnosis Procedure".

NO >> INSPECTION END

#### Diagnosis Procedure

#### **CAUTION:**

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

#### INSPECTION PROCEDURE

**1**.CONNECTOR INSPECTION

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

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

#### **BRC-157**

#### C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR INT DIAGNOSIS > [HDC/HSA/VDC/TCS/ABS]

Continuity

Yes

#### < COMPONENT DIAGNOSIS >

ABS actuator and electric unit

(control unit)

Connector

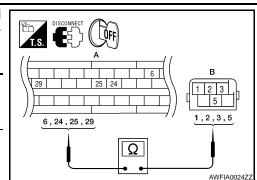
Check continuity between the ABS actuator and electric unit (control unit) connector E125 (A) and the yaw rate/side/decel G sensor connector M108 (B).

Connector

Yaw rate/side/decel G sensor

Terminal

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	•			
	29		2	
A. L 125	25	B. 10100	1	
A: E125	24	B: M108	5	
	0		3	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

Terminal

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

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

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

Vehicle condition	YAW RATE SEN (DATA MONITOR)	SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G
Turning right	Negative value	Negative value	-
Turning left	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

#### Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Instal-</u> lation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-238</u>, "Removal and Installation".

### **Component Inspection**

INFOID:000000001690991

INFOID:000000001690992

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

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

Vehicle condition YAW RATE SEN (DATA MONITOR)		SIDE G-SENSOR (DATA MONITOR)	DECEL G-SEN (DATA MONITOR)	
Stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G	
Turning right	Negative value	Negative value	-	
Turning left	Positive value	Positive value	-	
Speed up	-	-	Negative value	
Speed down	-	-	Positive value	

#### Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-157, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

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

### **BRC-158**

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

#### < COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

#### >> GO TO 2

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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### C1115 WHEEL SENSOR

#### Description

INFOID:000000001731042

[HDC/HSA/VDC/TCS/ABS]

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:000000001731043

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#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

#### CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

**1.**CONNECTOR INSPECTION

Disconnect the ABS actuator and electric unit (control unit) connector E125 and wheel sensor of malfunctioning code.

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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-237</u>, "Removal and Installation".

**3.**CHECK TIRES

### C1115 WHEEL SENSOR

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

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

YES >> GO TO 4

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

**4.**CHECK WHEEL BEARINGS

< COMPONENT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 5

minals and ground.

Is the inspection result normal?

>> GO TO 6

1.

2.

YES

NO

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

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No. Wheel sensor connectors Check continuity between wheel sensor harness connector ter-Front Rear  $\frac{12}{34}$ 1.2.3.4 Ę

>> Repair the circuit.

Continuity should not exist.

### 6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

1. Check continuity between ABS actuator and electric unit (control unit) harness connector E125 and the malfunctioning wheel sensor harness connector E18, E117 or C13.

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal		
Front III	E125	45	– E18 –	1		_
Front LH		46		2		
Front RH		34	E117	1	- Yes	
		33		2		
Rear LH		37		3		
		36	C13	4		I
Deer DU		42		1		1
Rear RH		43		2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-234, "Removal and Installation".

NO >> Repair the circuit.

#### Component Inspection

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

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

Wheel sensor
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Vehicle speed (DATA MONITOR)

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### **C1115 WHEEL SENSOR**

#### < COMPONENT DIAGNOSIS >

### FR LH SENSOR

FR RH SENSOR

Nearly matches the speedometer display (±10% or less)

RR LH SENSOR

Is the inspection result normal?

YES >> INSPECTION END

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

#### Special Repair Requirement

INFOID:000000001731046

### **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-11. "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-12</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

#### < COMPONENT DIAGNOSIS >

## C1116 STOP LAMP SWITCH

## Description

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

# DTC Logic

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### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected conditio	n 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)		E
отс сс	NFIRMATION PROC	EDURE		
1.снес	K SELF-DIAGNOSIS F	RESULTS		В
Check th	e self-diagnosis results.			
				(
	Self-diagnos			
	STOP LAN	-		
	displayed on the self-di		n in Dro	
	>> Proceed to diagnosi >> INSPECTION END	s procedure. Refer to <u>BRC-163, "Diag</u>	Inosis Procedure".	
	sis Procedure			
Jiagrio			INFOID:000000001691000	
NSPEC	TION PROCEDURE			
1.con	NECTOR INSPECTION			
		r and electric unit (control unit) connec	ctor E125 and stop lamp switch connec-	
tor E 2. Che		rmation, disconnection, looseness or	damage	
	pection result normal?			
	>> GO TO 2			
-	>> Repair or replace as	-		
	LAMP SWITCH INSPE			
		ABS actuator and electric unit (con- 5 terminal 41 and body ground.		
		o terminar 41 and body ground.		
B	rake pedal depressed			
	rake nodel not depres	(approx. 12V)		
	rake pedal not depres	sed . Approx. ov		(
	pection result normal?	osis again. If the same results		
120	appear, replace AB	S actuator and electric unit (control		
NO	unit). Refer to <u>BRC-</u> >> GO TO 3	234, "Removal and Installation".	AWFIA0019ZZ	
	~~ 00 10 0			

### C1116 STOP LAMP SWITCH

#### < COMPONENT DIAGNOSIS >

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

#### Continuity should exist.

Is the inspection result normal?

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

### Special Repair Requirement

[HDC/HSA/VDC/TCS/ABS]

INFOID:000000001691001

### **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-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL 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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

#### < COMPONENT DIAGNOSIS >

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

#### Description

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

### DTC Logic

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INFOID:000000001691004

#### 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)	
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-165, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

#### INSPECTION PROCEDURE

#### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or N replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (<u>ABS)</u>".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

#### **BRC-165**

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

#### < COMPONENT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

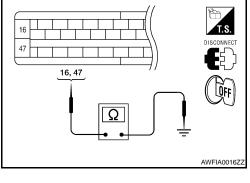
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

### Component Inspection



INFOID:000000001691005

### **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.

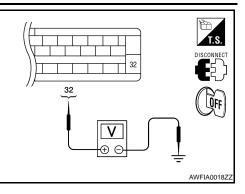
Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL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

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

Is the inspection result normal?

YES >> INSPECTION END

### [HDC/HSA/VDC/TCS/ABS]



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

### < COMPONENT DIAGNOSIS > [HDC/HS NO >> Go to diagnosis procedure. Refer to <u>BRC-165</u>, "Diagnosis Procedure".

#### Special Repair Requirement

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

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131, "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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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[HDC/HSA/VDC/TCS/ABS]

INFOID:000000001691006

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

#### < COMPONENT 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:000000001691008

INFOID:000000001691009

INFOID:000000001691007

#### 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 uni	
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-168</u>, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

#### INSPECTION PROCEDURE

#### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (<u>ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

#### **BRC-168**

[HDC/HSA/VDC/TCS/ABS]

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

#### < COMPONENT 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) harness connector terminal and ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

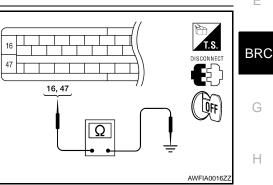
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-234, "Removal and Installation".
- NO >> Repair or replace malfunctioning components.

#### Component Inspection





Select each test menu item on "ACTIVE TEST". 1.

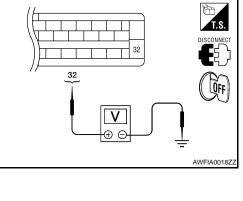
On the display, touch "UP", "KEEP", and "DOWN", and check that the system operates as shown in the 2. table below.

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

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

Is the inspection result normal?

YES >> INSPECTION END



[HDC/HSA/VDC/TCS/ABS]

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INFOID:000000001691010

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

< COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

NO >> Go to diagnosis procedure. Refer to <u>BRC-168</u>, "Diagnosis Procedure".

#### Special Repair Requirement

INFOID:000000001691011

### **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-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

#### >> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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

#### < COMPONENT 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 unit (control unit) judges that engine fuel cut system is malfunctioning.	<ul> <li>Harness or connector</li> <li>ABS actuator and electric unit</li> </ul>	E	
C1132	ENGINE SIGNAL 3		(control unit)		
C1133	ENGINE SIGNAL 4		5	ECM     CAN communication line	
C1136	ENGINE SIGNAL 6			BR	

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diag	nosis results
ENGINE	E SIGNAL 1
ENGINE	E SIGNAL 2
ENGINE	E SIGNAL 3
ENGINE	E SIGNAL 4
ENGINE	E SIGNAL 6

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-171, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

### **1.**CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-74. "CONSULT-III Function (ENGINE)"</u> (VQ40DE) or <u>EC-542. "CONSULT-III Function</u> (<u>ENGINE)"</u> (VK56DE).
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-141. "CONSULT-III</u> N <u>Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

- YES >> Repair or replace the affected part.
- NO >> INSPECTION END

#### 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-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

### BRC-171

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

< COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

#### < COMPONENT DIAGNOSIS >

### C1140 ACTUATOR RLY

### Description

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

### **DTC Logic**

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#### DTC DETECTION LOGIC

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s found, repair or K
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YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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INFOID:000000001691016	

[HDC/HSA/VDC/TCS/ABS]

#### **BRC-173**

### C1140 ACTUATOR RLY

#### < COMPONENT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

#### Component Inspection

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

- 1. On "ACTIVE TEST", select "ABS MOTOR".
- 2. Touch ON and OFF on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-173, "Diagnosis Procedure"</u>.

#### Special Repair Requirement

INFOID:000000001691020

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

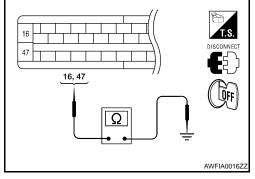
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

#### >> 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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END



[HDC/HSA/VDC/TCS/ABS]

INFOID:000000001691019

### C1142 PRESS SENSOR

### Description

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:000000001691022

INFOID:000000001691021

#### DTC DETECTION LOGIC

DTC	Display item		Malfunctio	n detected condition		Possib	e cause	D
C1142	PRESS SEN CIRCUI		Pressure sensor signal line is open or shorted, or pressure sensor is malfunctioning.       •			<ul> <li>Harness or c</li> <li>Pressure ser</li> <li>ABS actuator (control unit)</li> </ul>		E
DTC CC	NFIRMATION PI	ROCEDURE						
<b>1.</b> CHEC	K SELF-DIAGNO	SIS RESULTS	;					BRC
Check th	e self-diagnosis re	sults.						
								G
		agnosis results						
		SEN CIRCUIT						Ц
	displayed on the s							Н
	>> Proceed to diag		ure. Refer to	BRC-175, "Diagno	sis Proced	<u>ure"</u> .		
-								
Diagno	sis Procedure						INFOID:000000001691023	
FRONT	PRESSURE SEN	SOR INSPEC	TION PROC	EDURE				1
1.CON	NECTOR INSPECT	ION						0
1. Turn	the ignition switch	OFF.						
	onnect the front pre							K
	or E125 and inspection result norn		s for deforma		n, ioosenes	s, or damag	е.	
	>> GO TO 2							L
-	>> Repair connect	or.						
2.FROM	IT PRESSURE SE	NSOR CIRCL	JIT INSPECT	ION				M
	sure the continuity				DISCONNECT	$\sim$		IVI
	(control unit) harn sensor harness co			nd front pres-	Ĩ <u>.s.</u> <b>€</b> ₽) (	ÛFF		
Sule	Sensor Harriess Co		<u>, D).</u>			<b>A</b>	В	Ν
ABS act	uator and electric unit	En en el en en el				19 18		
	(control unit)	Front pres	sure sensor	Continuity			1	0
Connec	ctor Terminal	Connector	Terminal		18, 19,	20	1, 2, 3	0
	18		3	 -		Ω		
A: E12		B: E31	1	Yes	ر	<b>•</b> •	<u>_</u>	Ρ
	20		2				AWFIA0021ZZ	

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

# [HDC/HSA/VDC/TCS/ABS]

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### C1142 PRESS SENSOR

#### < COMPONENT DIAGNOSIS >

	electric unit (control nit)	_	Continuity	
Connector	Terminal			
	18			
A: E125	19	Ground	No	
	20			

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

## **3.**FRONT PRESSURE SENSOR INSPECTION

- 1. Reconnect the front pressure sensor and ABS actuator and electric unit (control unit) connectors.
- 2. Use "DATA MONITOR" to check if the status of "PRESS SENSOR" is normal.

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 >> Replace the front pressure sensor.

#### REAR PRESSURE SENSOR INSPECTION PROCEDURE

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

- 1. Turn the ignition switch OFF.
- Disconnect the rear pressure sensor connector E32 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

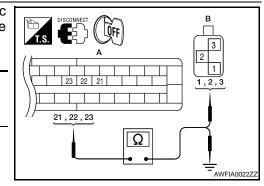
#### Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair connector.

### 2.REAR PRESSURE SENSOR CIRCUIT INSPECTION

1. Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) and rear pressure sensor harness connector E32 (B).

ABS actuator and electric unit (control unit)		t Rear pressure sensor		Continuity
Connecto	r Terminal	Connector	Terminal	
	21		1	
A: E125	22	B: E32	3	Yes
	23	-	2	



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

ABS actuator and electric unit (control unit)		_	Continuity
Connector	Terminal		
	21		
A: E125	22	Ground	No
	23		

### **BRC-176**

### **C1142 PRESS SENSOR**

< COMPONENT DIAGNOSIS >		[HDC/HSA/VDC/TCS/ABS]
Is the inspection result normal?		
YES >> GO TO 3		
NO >> Repair or replace harness or connect	or.	
<b>3.</b> REAR PRESSURE SENSOR INSPECTION		
<ol> <li>Reconnect the rear pressure sensor and ABS</li> <li>Use "DATA MONITOR" to check if the status of</li> </ol>		
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 >> Replace the rear pressure sensor.		
Component Inspection		INFOID:000000001691024
1.CHECK DATA MONITOR		
On "DATA MONITOR", select "PRESS SENSOR"	and "PRESS SEN2"	" and check the brake fluid pressure.
Condition	PRESS SENSOR and 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>E</u>	BRC-175, "Diagnosis	s Procedure".
Special Repair Requirement		INFOID:000000001691025
<b>1.</b> ADJUSTMENT OF STEERING ANGLE SENSE	OR NEUTRAL POS	ITION
Always perform neutral position adjustment for the and electric unit (control unit). Refer to <u>BRC-131</u> <u>TRAL POSITION : Description</u> ".		
>> GO TO 2		
2. CALIBRATION OF DECEL G SENSOR		
		Contractor and algoritic unit (control unit)
Always partern calibration of decal C concer who	n ronloona tha ADC	
Always perform calibration of decel G sensor whe Refer to <u>BRC-132</u> , "CALIBRATION OF DECEL G		
Refer to BRC-132, "CALIBRATION OF DECEL G		

#### < COMPONENT 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:000000001691027

INFOID:000000001691028

INFOID:000000001691026

#### DTC DETECTION LOGIC

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

### DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ST ANG SEN CIRCUIT

ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

**Diagnosis** Procedure

#### INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- 4. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (<u>ABS)"</u>

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

**2.**CHECK STEERING ANGLE SENSOR HARNESS

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

[HDC/HSA/VDC/TCS/ABS]

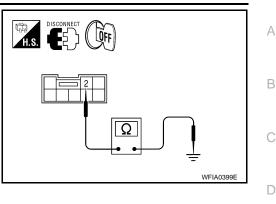
### C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

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

### [HDC/HSA/VDC/TCS/ABS]

Steering angle sensor			Continuity
Connector	Terminal		Continuity
M17	2	Ground	Yes



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

Steering angle sensor			Voltage
Connector	Terminal		voltage
M17	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

## $\mathbf{3.}$ CHECK DATA MONITOR

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234</u>, "<u>Removal and Installa-</u> tion".

**BRC-179** 

NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to <u>BRC-</u> <u>236. "Removal and Installation"</u>.

### Component Inspection

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

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

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	±2.5 °
3	
Turn 90 ° to right	Approx. +90 °
Turn 50 to light	Арргох. 100
Turn 90 ° to left	
	Approx. –90 °

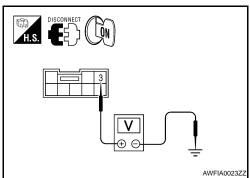
#### Is the inspection result normal?

YES >> INSPECTION END

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

#### Special Repair Requirement

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



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INFOID:000000001691029

INFOID:000000001691030

### C1143, C1144 STEERING ANGLE SENSOR

#### < COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL 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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1145, C1146 \	AW RATE/SIDE G SENS	OR
< COMPONENT DIAGNOSIS >		[HDC/HSA/VDC/TCS/ABS]
C1145, C1146 YAW RATE/SIDE	G SENSOR	
Diagnosis Procedure		ا INFOID:000000001731030
<b>CAUTION:</b> Sudden turns (such as spin turns, accele cause the yaw rate/side/decel G sensor sy operation can be resumed after restarting t	stem to indicate a problem. Thi	s is not a problem if normal
INSPECTION PROCEDURE		(
<b>1.</b> SELF-DIAGNOSIS RESULT CHECK		
Check self-diagnosis results.		[
Self-diagnosis results YAW RATE SENSOR		E
SIDE G-SEN CIRCUIT		
G-SENSOR		BI
CAUTION:		
If vehicle is on turntable at entrance to parl lamp may illuminate and CONSULT-II self-d However, in this case there is no malfunct or other moving surface, and start engine. Is the above displayed in the self-diagnosis dis YES >> GO TO 2.	iagnosis may indicate yaw rate on in yaw rate sensor system. Results will return to normal.	sensor system malfunction.
NO >> Inspection End.		
2.CONNECTOR INSPECTION		
Disconnect the ABS actuator and electric unit	(control unit) connector E125 and	yaw rate/side/decel G sensor
connector B73.		-
Check the terminals for deformation, disconne	ction, looseness or damage.	
OK or NG OK >> GO TO 3.		
NG >> Repair or replace as necessary.		ł
3. YAW RATE/SIDE/DECEL G SENSOR HAP	RNESS INSPECTION	
<ol> <li>Turn off the ignition switch and disconnect and electric unit (control unit) connector E</li> <li>Check continuity between the ABS actual rate/side/decel G sensor connector B73.</li> </ol>	t yaw rate/side/decel G sensor cor 125.	
ABS actuator and electric unit (control unit) harness connector E125	Yaw rate/side/decel G sensor harness connector B73	Continuity

E125			
6	3	Yes	
24	5	Yes	0
25	1	Yes	
29	2	Yes	P

OK or NG

OK >> GO TO 4.

NG >> Repair or replace as necessary.

4. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

# BRC-181

<sup>1.</sup> Connect the yaw rate/side/decel G sensor connector B73 and ABS actuator and electric unit (control unit) connector E125.

# C1145, C1146 YAW RATE/SIDE G SENSOR

#### < COMPONENT DIAGNOSIS >

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

Vehicle status	Yaw rate sensor (Data monitor standard)	Side G sensor (Data monitor standard)	Decel G Sensor (Data monitor standard)
When stopped	-4 to +4 deg/s	-1.1 to +1.1 m/s	-0.11 G to +0.11 G
Right turn	Negative value	Negative value	-
Left turn	Positive value	Positive value	-
Speed up	-	-	Negative value
Speed down	-	-	Positive value

OK or NG

OK >> Inspection End.

NG >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-238, "Removal and Installation"</u>.

#### < COMPONENT DIAGNOSIS >

# C1155 BRAKE FLUID LEVEL SWITCH

## Description

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

## DTC Logic

INFOID:000000001691032

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INFOID:000000001691031

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#### DTC DETECTION LOGIC

DTC	Display item		Malfunctio	n detected condition	Possible cause	D
C1155	BR FLUID LEVEL LO	W the ABS		or communication line between ectric unit (control unit) and brake n or shorted.	<ul><li>Harness or connector</li><li>Brake fluid level switch</li><li>Brake fluid level</li></ul>	Е
DTC CC	NFIRMATION PR	ROCEDURE				
<b>1.</b> CHEC	CK SELF-DIAGNOS	SIS RESULTS				BRC
Check th	e self-diagnosis re	sults.				BRU
	0					
	Self-di	agnosis results				G
	BR FLU	IID LEVEL LOW				
	displayed on the se	-				Н
	>> Proceed to diag		ire. Refer to <u>I</u>	<u> 3RC-183, "Diagnosis Proce</u>	<u>edure"</u> .	
		IND				
Diagno	sis Procedure				INFOID:000000001691033	
INSPEC	TION PROCEDUR	RE				
1.com	NECTOR INSPECT	ION				J
1. Disc	onnect ABS actuat	or and electric	unit (control	unit) connector E125 and	brake fluid level switch con-	
	or E21.	defermation	diagonanation			К
	spection result norm		lisconnection	n, looseness or damage.		
	>> GO TO 2					
-	>> Repair or replace	ce as necessa	ry.			L
<b>2.</b> CHEC	CK HARNESS BET	WEEN BRAK	E FLUID LE	/EL SWITCH AND ABS AG	CTUATOR AND ELECTRIC	
UNIT (CO	ONTROL UNIT)					M
	ck continuity betwe				(M)	
	harness connecto ess connector E21		nd brake fluid	d level switch	ØFF B ∧	
		(-).				Ν
ABS act	uator and electric unit	Brake fluid I	evel switch			
	(acentral unit)	Drake nulu i		Continuity		
	(control unit)		_			0
	ctor Terminal	Connector B: E21	Terminal			0

**BRC-183** 

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
A: E125	8	Ground	No

Is the inspection result normal?



# **C1155 BRAKE FLUID LEVEL SWITCH**

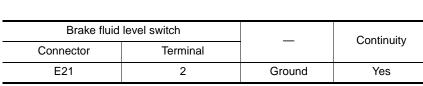
< COMPONENT DIAGNOSIS >

YES >> GO TO 3

E21 and ground.

NO >> Repair or replace malfunctioning components.

# 3.CHECK BRAKE FLUID LEVEL SWITCH GROUND



Is the inspection result normal?

#### YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

# **4.**CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

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

#### Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-234, "Removal and Installation".
- NO >> Replace brake fluid level switch.

## **Component Inspection**

# 1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity		
Terminal	Condition	Continuity		
1-2	When brake fluid is full in the reservoir tank.	No		
1 – 2	When brake fluid is empty in the reservoir tank.	Yes		
le the inequation regult normal?				

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake fluid level switch.

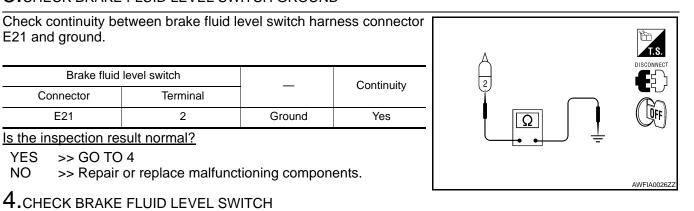
# Special Repair Requirement

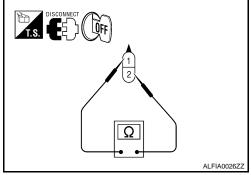
#### INFOID:000000001691035

#### **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-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

**BRC-184** 





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INFOID:000000001691034

# **C1155 BRAKE FLUID LEVEL SWITCH**

< COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

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 <u>BRC-132</u> , "CALIBRATION OF DECEL G SENSOR : Description".	В

>> END

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# C1156 ST ANG SEN COM CIR

# Description

INFOID:000000001691036

[HDC/HSA/VDC/TCS/ABS]

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:000000001691037

#### DTC DETECTION LOGIC

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

## DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-186, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000001691038

#### INSPECTION PROCEDURE

#### **1.**CHECK CONNECTOR

- 1. Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector E125, check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 2. Reconnect connector and perform self-diagnosis.

Self-diagnosis results	
CAN COMM CIRCUIT	
ST ANG SEN COM CIR	

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

# C1160 DECEL G SEN SET

# Description

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

## DTC Logic

INFOID:000000001691040

INFOID:000000001691039

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#### DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1160	DECEL G SEN SET	ABS decel G sensor adjustment is incomplete.	<ul> <li>Decel G sensor calibration</li> <li>Yaw rate/side/decel G sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>	Е
DTC CC	<b>ONFIRMATION PROCE</b>	DURE		
1.снес	CK SELF-DIAGNOSIS RE	SULTS		BRC
Check th	e self-diagnosis results.			
				G
	Self-diagnosis			
<del></del>	DECEL G SEI			Н
Is above YES	displayed on the self-diag		duro"	
NO	>> INSPECTION END	procedure. Refer to <u>BRC-187, "Diagnosis Proce</u>	<u>aure</u> .	
Diagno	sis Procedure		INFOID:000000001691041	
Diagno			IN 012.00000001051041	
	TION PROCEDURE			J
<b>1.</b> PERF	ORM SELF-DIAGNOSIS			
Perform	ABS actuator and electric	unit (control unit) self-diagnosis.		К
				r.
	elf-diagnosis results			
	ECEL G SEN SET			L
<u>Do seir-c</u> YES	•	anything other than shown above? acement for the item indicated.		
NO	>> Perform calibration of	decel G sensor. Refer to <u>BRC-132, "CALIBRAT</u>	ON OF DECEL G SENSOR	M
0	: Description". GO TO			
2.PERF	FORM SELF-DIAGNOSIS	AGAIN		
		and then to ON and erase self-diagnosis resul	ts.	Ν
	orm ABS actuator and ele self-diagnosis results disp	ctric unit (control unit) self-diagnosis again.		
YES	•	/decel G sensor. Refer to <u>BRC-238, "Removal</u> a	and Installation".	0
NO	>> INSPECTION END	Bre 200, Romovart		
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				Г

# C1163 ST ANGLE SEN SAFE

## Description

INFOID:000000001691042

[HDC/HSA/VDC/TCS/ABS]

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:000000001691043

#### DTC DETECTION LOGIC

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

#### DTC CONFIRMATION PROCEDURE

**1.**CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-188, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

#### Diagnosis Procedure

INFOID:000000001691044

INSPECTION PROCEDURE

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

Adjust steering angle sensor neutral position. Refer to <u>BRC-131. "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u>.

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> INSPECTION END

NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-141, "CON-</u> <u>SULT-III Function (ABS)"</u>.

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

#### < COMPONENT DIAGNOSIS >

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

#### Description

CV1, CV2 (CUT VALVE) The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

#### SV1, SV2 (SUCTION VALVE)

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

#### DTC Logic

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INFOID:000000001691047

#### DTC DETECTION LOGIC

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

#### 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-189, "Diagnosis Procedure"</u>. NO >> INSPECTION END

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

# 1.CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or place terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (<u>ABS)"</u>.
- Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

# BRC-189

## [HDC/HSA/VDC/TCS/ABS]

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INFOID:000000001691046

INFOID:000000001691045

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

#### < COMPONENT DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

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

#### 1. Turn ignition switch OFF.

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234</u>, "<u>Removal and Installation</u>".

NO >> Repair or replace malfunctioning components.

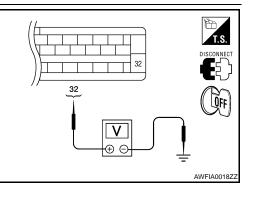
## **Component Inspection**

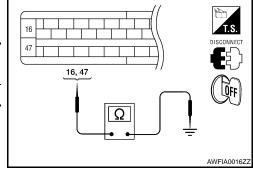
# **1.**CHECK ACTIVE TEST

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

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

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





INFOID:000000001691048

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

< COMPONENT DIAGNOSIS >       [HDC/HSAV/DC/TCS/ABS]         Is the inspection result normal?       YEs >> INSPECTION END NO >> Go to diagnosis procedure. Refer to BRC-189. "Diagnosis Procedure".         Special Repair Requirement       #************************************	C1164, C1165, C1166, C1167 CV/SV S1	
YES       >> INSPECTION END         NO       >> Go to diagnosis procedure. Refer to <u>BRC-189. "Diagnosis Procedure".</u> Special Repair Requirement       ####################################	< COMPONENT DIAGNOSIS >	[HDC/HSA/VDC/TCS/ABS]
NO >> Go to diagnosis procedure. Refer to <u>BRC-189. "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-131. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u> . <ul> <li>&gt;&gt; GO TO 2</li> <li>2.CALIBRATION OF DECEL G SENSOR</li> </ul> Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132. "CALIBRATION OF DECEL G SENSOR : Description"</u> .         >> END	· · ·	
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-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- TRAL POSITION 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-132, "CALIBRATION OF DECEL G SENSOR : Description".  &gt; END  </u></u>		edure"
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-131, "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-132, "CALIBRATION OF DECEL G SENSOR : Description".         >> END		
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-131</u> , "ADJUSTMENT OF STEERING ANGLE SENSOR NEU- TRAL POSITION : Description". >> GO TO 2 2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u> , "CALIBRATION OF DECEL G SENSOR : Description". >> END	Special Repair Requirement	INFOID:000000001691049
and electric unit (control unit). Refer to <u>BRC-131, "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-132, "CALIBRATION OF DECEL G SENSOR : Description"</u> . >> END	<b>1.</b> ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION	
>> 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-132</u> , "CALIBRATION OF DECEL <u>G SENSOR</u> ; <u>Description</u> ". >> END	and electric unit (control unit). Refer to BRC-131, "ADJUSTMENT OF STE	
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-132, "CALIBRATION OF DECEL G SENSOR : Description". >> END	>> GO TO 2	
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u> , "CALIBRATION OF DECEL G SENSOR : Description". >> END	-	
Refer to <u>BRC-132</u> , "CALIBRATION OF DECEL G SENSOR : Description".		tor and electric unit (control unit)
	>> END	
		_

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< COMPONENT DIAGNOSIS >

# C1170 VARIANT CODING

**Diagnosis Procedure** 

INFOID:000000001731031

INSPECTION PROCEDURE

1.SELF-DIAGNOSIS RESULT CHECK

Check self-diagnosis results.

Self-diagnosis results

CONTROLLER FAILURE

VARIANT CODING

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

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installa-</u> tion".
- NO >> Inspection End.

# C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

#### < COMPONENT 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

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INFOID:000000001691050

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[HDC/HSA/VDC/TCS/ABS]

DTC DETECTION LOGIC

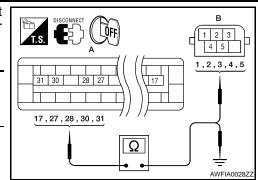
DTC	Display item	Possible cause	
C1178	ABS ACTIVE BOOSTER SV NG	Active booster solenoid is malfunctioning, or signal line of active booster servo is open or shorted.	
C1181	ABS ACTIVE BOOSTER RE- SPONSE NG	Active booster response is malfunctioning, or signal line of active booster response is open or shorted.	<ul><li>Harness or connector</li><li>Active booster</li></ul>
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)
C1189	ABS BRAKE BOOSTER DE- FECT	Brake booster is defective or malfunctioning.	
DTC CC	NFIRMATION PROCE	DURE	
<b>1.</b> CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	J.		
	Self-diagnosis r	esults	
	ABS ACTIVE BOOS	FER SV NG	
	ABS ACTIVE BOOSTER	RESPONSE NG	
	ABS BRAKE RELEA	SE SW NG	
	ABS BRAKE BOOST	ER DEFECT	
	displayed on the self-diag	• •	
	>> Proceed to diagnosis p >> INSPECTION END	procedure. Refer to <u>BRC-193. "Diagnosis Proce</u>	edure".
Diagno	sis Procedure		INFOID:000000001691052
	TION PROCEDURE		
I.CON	NECTOR INSPECTION		
2. Disc		connector E49 and ABS actuator and electric s for deformation, disconnection, looseness, or	
	pection result normal?		-
-	>> GO TO 2		
-	>> Repair connector.		
	VE BOOSTER CIRCUIT IN	ISPECTION	

#### C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER DIAGNOSIS > [HDC/HSA/VDC/TCS/ABS]

#### < COMPONENT DIAGNOSIS >

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

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



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

	electric unit (control nit)	_	Continuity	
Connector	Terminal			
	17			
	27	Ground	No	
A: E125	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.
- 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 >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Instal-</u> lation".

NO >> Replace the active booster. Refer to <u>BR-22, "Removal and Installation"</u>.

#### Component Inspection

INFOID:000000001691053

#### **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

# BRC-194

# C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< COMPONENT DIAGNOSIS >

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-193, "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-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-</u> <u>TRAL 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-132</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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[HDC/HSA/VDC/TCS/ABS]

INFOID:000000001691054

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< COMPONENT DIAGNOSIS >

# C1179 ABS DELTA S SEN NG

## Description

INFOID:000000001691055

[HDC/HSA/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:000000001691056

INFOID:000000001691057

#### 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.	<ul> <li>Harness or connector</li> <li>Delta stroke sensor</li> <li>ABS actuator and electric unit (control unit)</li> </ul>

#### DTC CONFIRMATION PROCEDURE

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

Check the self-diagnosis results.

Self-diagnosis results

ABS DELTA S SEN NG

Is above displayed on the self-diagnosis display?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-196, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

#### INSPECTION PROCEDURE

# **1.**CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the delta stroke sensor connector E114 and ABS actuator and electric unit (control unit) connector E125 and inspect the terminals for deformation, disconnection, looseness, or damage.

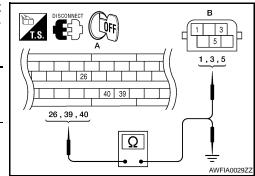
Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair connector.

#### 2.Delta stroke sensor circuit inspection

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

_	ABS actuator and electric unit (control unit)		Delta stroke sensor		Continuity
	Connector	Terminal	Connector	Terminal	
		26		1	
	A: E125	39	B: E114	3	Yes
		40	†	5	



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

## BRC-196

# C1179 ABS DELTA S SEN NG

#### < COMPONENT DIAGNOSIS >

	electric unit (contro nit)	bl	Continuity	
Connector	Terminal		Continuity	
	26			_
A: E125	39	Ground	No	
	40			
the inspection	result normal?			_
YES >> GO				
	•	arness or connector		
	KE SENSOR II			
		sensor and ABS ac heck if the status of		ric unit (control unit) connectors. " is normal.
Cond	ition	DELTA S SEN (DATA MONITO		
When brake pedal	is depressed.	1.05–1.80 mr	n	
When brake pedal	is released.	0.00 mm (+0.6/-	0.4)	
the inspection	result normal?			
latio			unit (controi unii	t). Refer to <u>BRC-234, "Removal and Instal-</u>
component I	nspection			INFOID:000000001691058
•	•			INFOID:000000001691058
.CHECK DATA	MONITOR	·//		
.CHECK DATA	MONITOR	if the status of "DE	LTA S SEN" is r	
.CHECK DATA	A MONITOR	DELTA S SEI	N	
CHECK DATA	A MONITOR IITOR" to check	DELTA S SEN (DATA MONITO	N DR)	
CHECK DATA se "DATA MON Cond When brake pedal	A MONITOR IITOR" to check ition is depressed.	DELTA S SEN (DATA MONITO 1.05–1.80 mr	N DR) n	
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal	A MONITOR IITOR" to check ition is depressed. is released.	DELTA S SEN (DATA MONITO	N DR) n	
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal the inspection	A MONITOR IITOR" to check ition is depressed. is released.	DELTA S SEN (DATA MONITO 1.05–1.80 mr	N DR) n	
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal the inspection YES >> INSI	A MONITOR IITOR" to check ition is depressed. is released. result normal? PECTION END	DELTA S SEN (DATA MONITO 1.05–1.80 mr	N DR) n 0.4)	ormal.
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal when brake pedal the inspection YES >> INSI NO >> Go t	A MONITOR IITOR" to check ition is depressed. is released. result normal? PECTION END o diagnosis pro	DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to <u>BF</u>	N DR) n 0.4)	ormal.
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal the inspection YES >> INSI NO >> Go t Special Repa	A MONITOR IITOR" to check ition is depressed. is released. result normal? PECTION END o diagnosis pro iir Requirem	DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to <u>BF</u>	N DR) n 0.4) RC-196, "Diagno	normal. Disis Procedure".
Cond When brake pedal When brake pedal s the inspection YES >> INSI NO >> Go t Special Repa .ADJUSTMEN	A MONITOR IITOR" to check ition is depressed. is released. PECTION END o diagnosis pro diagnosis pro if Requirem IT OF STEERIN neutral positior (control unit).	DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to BF ent IG ANGLE SENSO	N DR) n 0.4) R NEUTRAL PC e steering angle	normal. Disis Procedure".
CHECK DATA Use "DATA MON Cond When brake pedal When brake pedal When brake pedal Sthe inspection YES >> INSI NO >> Go t Special Repa ADJUSTMEN Iways perform nd electric unit	A MONITOR IITOR" to check ition is depressed. is released. PECTION END o diagnosis pro diagnosis pro if Requirem IT OF STEERIN neutral position (control unit).	DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to BF ent IG ANGLE SENSO	N DR) n 0.4) R NEUTRAL PC e steering angle	normal. <u>Disis Procedure"</u> . <i>INFOID:000000001691059</i> DSITION sensor when replacing the ABS actuator
CHECK DATA se "DATA MON Cond When brake pedal When brake pedal When brake pedal the inspection YES >> INSI NO >> Go t pecial Repa ADJUSTMEN Iways perform nd electric unit RAL POSITION >> GO	A MONITOR IITOR" to check ition is depressed. is released. PECTION END o diagnosis pro diagnosis pro if Requirem IT OF STEERIN neutral position (control unit).	DELTA S SEN (DATA MONITO 1.05–1.80 mr 0.00 mm (+0.6/- cedure. Refer to BF ent IG ANGLE SENSO adjustment for the Refer to BRC-131.	N DR) n 0.4) R NEUTRAL PC e steering angle	normal. <u>Disis Procedure"</u> . <i>INFOID:000000001691059</i> DSITION sensor when replacing the ABS actuator

# 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:000000001691061

INFOID:000000001691062

INFOID:000000001691060

#### DTC DETECTION LOGIC

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

#### Diagnosis Procedure

#### INSPECTION PROCEDURE

### **1.**CHECK CONNECTOR

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

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

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

#### Special Repair Requirement

INFOID:000000001691063

# **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-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> GO TO 2

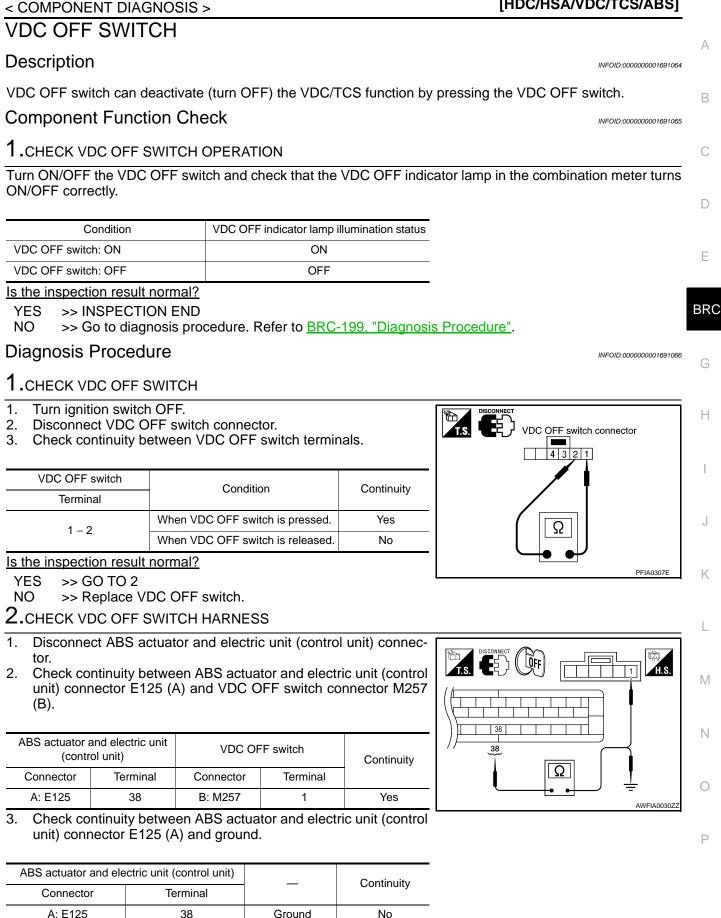
2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-132</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

# VDC OFF SWITCH

# [HDC/HSA/VDC/TCS/ABS]



Is the inspection result normal?

# **VDC OFF SWITCH**

#### < COMPONENT DIAGNOSIS >

#### NO >> Repair or replace harness.

# $3. {\sf CHECK\, VDC\, OFF\, SWITCH\, GROUND}$

Check continuity between VDC OFF switch connector M257 and ground.

VDC OF	FF switch		Continuity
Connector	Terminal		Continuity
M257	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-23</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234. "Removal and Installa-</u> tion".

NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

Component Inspection

#### INSPECTION PROCEDURE

1.CHECK VDC OFF SWITCH

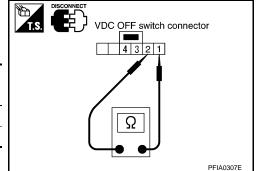
- 1. Turn ignition switch OFF.
- 2. Disconnect VDC OFF switch connector.
- 3. Check continuity between VDC OFF switch terminals.

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.



DISCONNECT CEFF

INFOID:000000001691067

# **ABS WARNING LAMP**

# [HDC/HSA/VDC/TCS/ABS]

#### **ABS WARNING LAMP** Description $\times: \mathsf{ON} -: \mathsf{OFF}$ Condition ABS warning lamp Ignition switch OFF \_ For 1 second after turning ON ignition switch $\times$ 1 second later after turning ON ignition switch \_ ABS function is malfunctioning. $\times$

EBD function is malfunctioning. ×

# **Component Function Check**

# **1.**CHECK ABS WARNING LAMP OPERATION

Check that the lamp illuminates for approximately 1 second after the ignition switch is turned ON. Is the inspection result normal?	BRC
YES >> INSPECTION END NO >> Go to diagnosis procedure. Refer to <u>BRC-201, "Diagnosis Procedure"</u> .	G
Diagnosis Procedure	
1. CHECK SELF-DIAGNOSIS	Н
Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u> (ABS)".	
Is the inspection result normal?	I
YES >> GO TO 2 NO >> Check items displayed by self-diagnosis.	
2. CHECK COMBINATION METER	J
Check if the indication and operation of combination meter are normal. Refer to <u>MWI-23, "Diagnosis Descrip-tion"</u> .	K
Is the inspection result normal?	
<ul> <li>YES &gt;&gt; Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installa-tion"</u>.</li> <li>NO &gt;&gt; Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.</li> </ul>	L

**BRC-201** 

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< COMPONENT DIAGNOSIS >

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INFOID:000000001691069

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# **BRAKE WARNING LAMP**

#### < COMPONENT DIAGNOSIS >

# BRAKE WARNING LAMP

# Description

INFOID:000000001691071

INFOID:000000001691072

INFOID:000000001691073

[HDC/HSA/VDC/TCS/ABS]

×: ON -: OFF

Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ON ignition switch	× (Note 2)
1 second later after turning ON ignition switch	× (Note 2)
EBD function is malfunctioning.	×

#### NOTE:

• 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).

• 2: After starting engine, brake warning lamp is turned off.

# **Component Function Check**

# **1.**BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-202, "Diagnosis Procedure"</u>.

# Diagnosis Procedure

# **1.**CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

# **VDC OFF INDICATOR LAMP**

#### < COMPONENT DIAGNOSIS >

# VDC OFF INDICATOR LAMP

# Description

INFOID:000000001691074

Condition	VDC OFF indicator lamp
Ignition switch OFF	_
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	X
ABS function is malfunctioning.	X
EBD function is malfunctioning.	×
Component Function Check	INFOID:00000000169107
<b>1.</b> VDC OFF INDICATOR LAMP OPERATION CHECK $^{-1}$	1
Check that the lamp illuminates for approximately 1 seco	ond after the ignition switch is turned ON.
s the inspection result normal?	
YES >> GO TO 2	)2 "Diagnosis Procedure"
NO >> Go to diagnosis procedure. Refer to <u>BRC-20</u> 2.VDC OFF INDICATOR LAMP OPERATION CHECK 2	
Check that the VDC OFF indicator lamp in the combinat VDC OFF switch.	ion meter turns ON/OFF correctly when operating the
Is the inspection result normal?	
YES >> INSPECTION END	
NO >> Check VDC OFF switch. Refer to <u>BRC-199.</u>	"Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000000169107
1.CHECK VDC OFF SWITCH	
Check that the VDC OFF indicator lamp in the combinat VDC OFF switch.	ion meter turns ON/OFF correctly when operating the
Is the inspection result normal?	
YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to <u>BRC-199.</u>	"Diagnosis Procedure".
2.CHECK SELF-DIAGNOSIS	
Perform ABS actuator and electric unit (control unit) self- (ABS)".	diagnosis. Refer to <u>BRC-141, "CONSULT-III Function</u>
ls 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 me tion".	ter are normal. Refer to MWI-23, "Diagnosis Descrip
ls the inspection result normal?	
•	ntrol unit). Refer to BRC-234, "Removal and Installa
tion".	

NO >> Replace combination meter. Refer to <u>MWI-94, "Removal and Installation"</u>.

## **BRC-203**

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#### < COMPONENT DIAGNOSIS >

# SLIP INDICATOR LAMP

# Description

INFOID:000000001691077

[HDC/HSA/VDC/TCS/ABS]

×:	ON	-:	OFF

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

# **Component Function Check**

INFOID:000000001691078

# **1.**CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

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

# Diagnosis Procedure

INFOID:000000001691079

# **1.**CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-141, "CONSULT-III 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-23</u>, "<u>Diagnosis Description</u>".

#### Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-94. "Removal and Installation"</u>.

#### ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) OSIS > [HDC/HSA/VDC/TCS/ABS]

< ECU DIAGNOSIS >

# **ECU DIAGNOSIS**

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000001691080

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#### VALUES ON THE DIAGNOSIS TOOL

#### **CAUTION:**

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

CONSULT-III MONITOR ITEM

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		0 [km/h (MPH)]	Vehicle stopped	
R LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
R RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	
	Stop lamp switch signal status	When brake pedal is depressed	ON	
STOP LAMP SW		When brake pedal is released	OFF	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5	
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D	
		VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	
	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s	
YAW RATE SEN	sensor	When vehicle turning	-75 to 75 d/s	
	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	
CCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %	

#### < ECU DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s <sup>2</sup>	
SIDE G-SENSOR		Vehicle turning right	Negative value (m/s <sup>2</sup> )	
		Vehicle turning left	Positive value (m/s <sup>2</sup> )	
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°	
STRANGLE SIG	sensor	Steering wheel turned	$-720$ to $720^{\circ}$	
PRESS SENSOR	Brake fluid pressure detected by front pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar	
PRESS SENSOR	sure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar	
		With engine stopped	0 rpm	
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display	
FLUID LEV SW	Proke fluid lovel switch signal status	When brake fluid level switch ON	ON	
FLUID LEV SVV	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF	
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FR RH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
FR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FK KH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
FR LH IN SOL		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
FR EN 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 solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor 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	

# **BRC-206**

#### < ECU DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

		Data monitor					
Monitor item	Display content	Condition	Reference value in normal operation				
RR RH OUT SOL	Operation status of each colonaid value	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor 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				
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor 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 solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT-III) or actua- tor 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				
MOTOR RELAY	Motor and motor relay oppration	When the motor relay and motor are operating	ON				
WOTOR 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				
	Actuator relay operation	When the actuator relay is not operating	OFF				
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON				
	(Note 3)	When ABS warning lamp is OFF	OFF				
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON				
	(Note 3)	When VDC OFF indicator lamp is OFF	OFF				
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON				
	(Note 3)	When SLIP indicator lamp is OFF	OFF				
4WD FAIL REQ (Note 2)	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON				
		When transfer control unit is normal	OFF				
BST OPER SIG	Not applied but displayed	_	OFF				
EBD SIGNAL	EBD operation	EBD is active	ON				
		EBD is inactive	OFF				
ABS SIGNAL	ABS operation	ABS is active	ON				
		ABS is inactive	OFF				
TCS SIGNAL	TCS operation	TCS is active	ON				
		TCS is inactive	OFF				
VDC SIGNAL	VDC operation	VDC is active	ON				
		VDC is inactive	OFF				
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON				
		EBD is normal	OFF				
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON				
	, , , , , , , , , , , , , , , , , , ,	ABS is normal	OFF				

# **BRC-207**

# < ECU DIAGNOSIS >

[HDC/HSA/VDC/TCS/ABS]

		Data monitor					
Monitor item	Display content	Condition	Reference value in normal operation				
TCS FAIL SIG	TCS foil acts signal	In TCS fail-safe	ON				
TCS FAIL SIG	TCS fail-safe signal	TCS is normal	OFF				
		In VDC fail-safe	ON				
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF				
	Oranik an anatian	Crank is active	ON				
CRANKING SIG	Crank operation	Crank is inactive	OFF				
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON				
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF				
CV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON				
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF				
SV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON				
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF				
SV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail- safe mode)	ON				
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF				
	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G				
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G				
	EBD warning lamp	When EBD warning lamp is ON	ON				
EBD WARN LAMP	(Note 3)	When EBD warning lamp is OFF	OFF				
N POSI SIG	PNP owitch signal ON/OFF and differ	A/T shift position = N position	ON				
11 2031 313	PNP switch signal ON/OFF condition	A/T shift position = other than N position	OFF				
		A/T shift position = P position	ON				
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = other than P position	OFF				
	DND switch signal ON/OFE condition	A/T shift position = R position	ON				
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = other than R position	OFF				
		2WD model	2WD				
2WD/4WD	Drive axle	4WD model	4WD				
PRESS SEN2	Brake fluid pressure detected by rear pres-	With ignition switch turned ON and brake pedal released	Approx. 0 bar				
	sure sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar				



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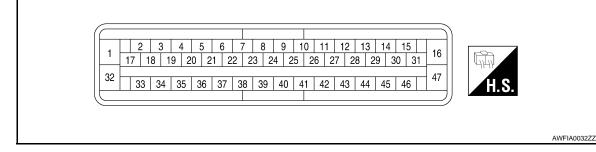
[HDC/HSA/VDC/TCS/ABS]
Data monitor

		Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation	ŀ		
DELTA S SEN	Value detected by data strake concer	When brake pedal is depressed	1.05 - 1.80 mm	E		
DELIA S SEN	Value detected by delta stroke sensor	When brake pedal is released	0.00 mm (+0.6/-0.4)			
RELEASE SWITCH		When brake pedal is depressed	ON			
NO	Active booster signal status	When brake pedal is released	OFF	(		
RELEASE SWITCH		When brake pedal is depressed	OFF			
NC	Active booster signal status	When brake pedal is released	ON			
NOTE						

#### NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only 4WD models.
- 3: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to <u>BRC-201, "Description"</u>.
- Brake warning lamp: Refer to BRC-202, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-203</u>, "Description".
- SLIP indicator lamp: Refer to BRC-204, "Description".

#### TERMINAL LAYOUT



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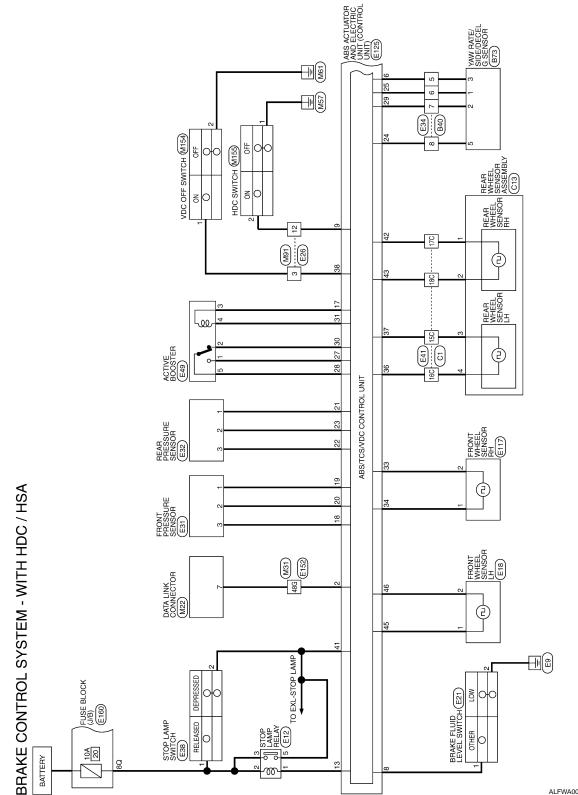
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#### **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)** [HDC/HSA/VDC/TCS/ABS]

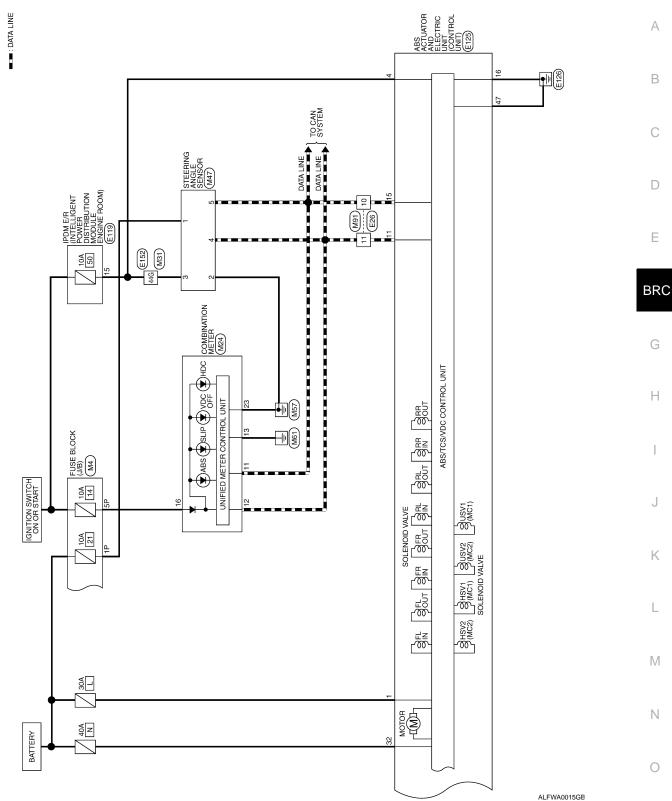
< ECU DIAGNOSIS > Wiring Diagram

INFOID:000000001691081



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#### **ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)** [HDC/HSA/VDC/TCS/ABS] < ECU DIAGNOSIS >

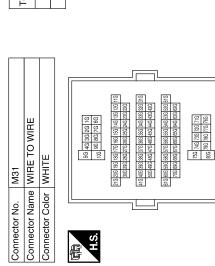
 
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 Connector Name COMBINATION METER Signal Name I I I ī I 
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 Connector Color WHITE Connector No. M24 Color of Wire W/G GВ ٩ ш \_ Terminal No. ÷ 19 13 15 33 H.S. 佢 Connector Name DATA LINK CONNECTOR Signal Name 9 10 11 12 13 14 15 16 1 2 3 4 5 6 7 8 ī 9 2 3 4 5 Connector Color WHITE M22 Color of Wire ≥ Connector No. Terminal No. H.S. E Signal Name 
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 6P
 5P
 4P
 \_\_\_\_\_\_3P
 2P
 1P

 16P
 15P
 14P
 13P
 12P
 1P
 8P
 8P
 Connector Name FUSE BLOCK (J/B) I. Т Connector Color WHITE Color of Wire ₹ W/G B/B Connector No. Terminal No. Ē 5Р H.S. 悟

BRC (WITH HDC / HSA) CONNECTORS



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Connector Name STEERING ANGLE SENSOR Connector Color WHITE Connector No.

5678	Signal Name	BATT	GND	POWER
- 4	Color of Wire	R/Y	в	W/R
品.S.H	Terminal No.	-	2	n

CAN-H CAN-L

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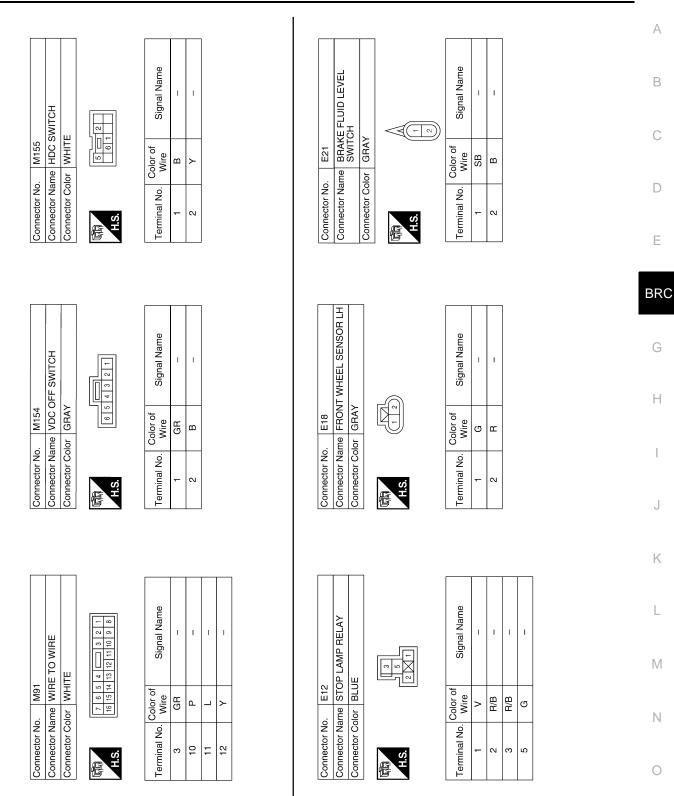
Signal Name	I	I	
Color of Wire	W/R	8	
Ferminal No.	44G	48G	

Signal Name	I	I
Color of Wire	W/R	Μ
I No.		

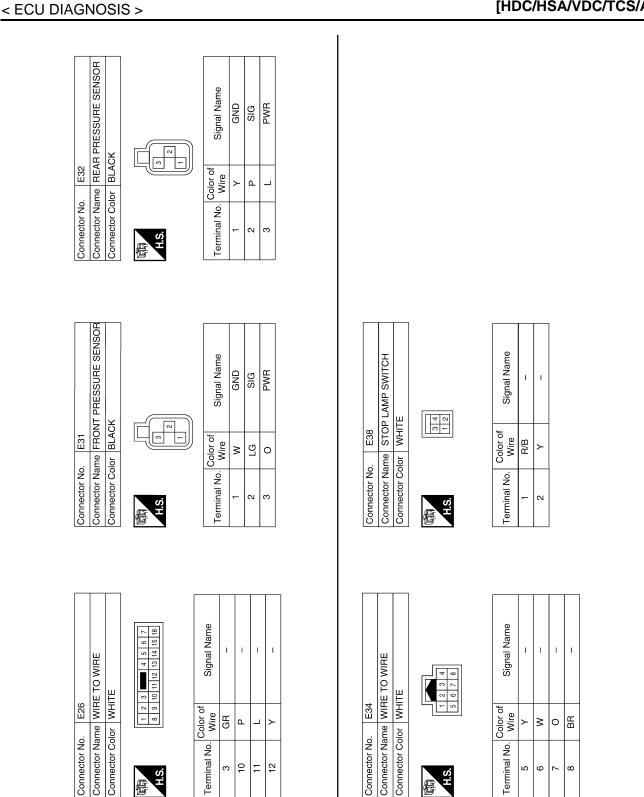
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**BRC-212** 

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < ECU DIAGNOSIS > [HDC/HSA/VDC/TCS/ABS]



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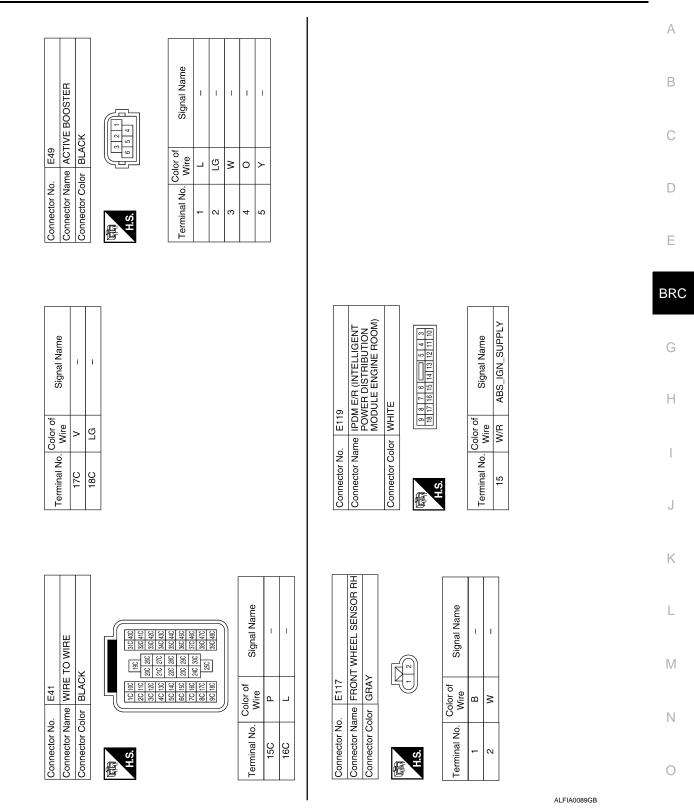
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#### < ECU DIAGNOSIS >

# [HDC/HSA/VDC/TCS/ABS]

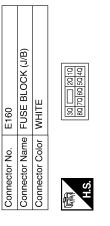


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< ECU DIAGNOSIS >

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(HD	C/HSA/VD	C/TCS/ABS]

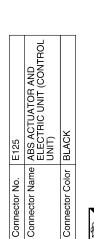
Signal Name	BPFS_SIG	CAN2-H	BPFS_NC	BST_PWM	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	RR_LH_PWR	RR_LH_SIG	VDC OFF SW	STOP_LAMP_SW	RR_RH_SIG	RR_RH_PWR	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	≻	0	ГG	0	≻	×	ш	_	٩	GR	SB	>	LG	G	щ	В
Terminal No.	28	29	30	31	32	33	34	36	37	38	41	42	43	45	46	47



Signal Name	I
Color of Wire	R/B
Terminal No.	80

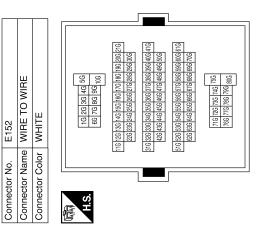
Signal Name	FLUID LEVEL SW	HDC SW	CAN-H	STOP_LAMP_SW_ON	CAN-L	VALVE ECU GND	BST_PWR	DRIV1_SENSEP	DRIV1_GND	DRIV1_SIG	DRIV2_GND	DRIV2_SP	DRIV2_SIG	CLUS_GND	CAN2-L	BPFS_NO	
Color of Wire	GR	≻	_	>	٩	в	Ν	0	N	ГG	Y	Γ	٩	BR	Μ	L	
Terminal No.	80	6	11	13	15	16	47	18	19	20	51	22	23	54	25	27	

Signal Name	I	I	
Color of Wire	W/R	×	
Terminal No.	44G	48G	

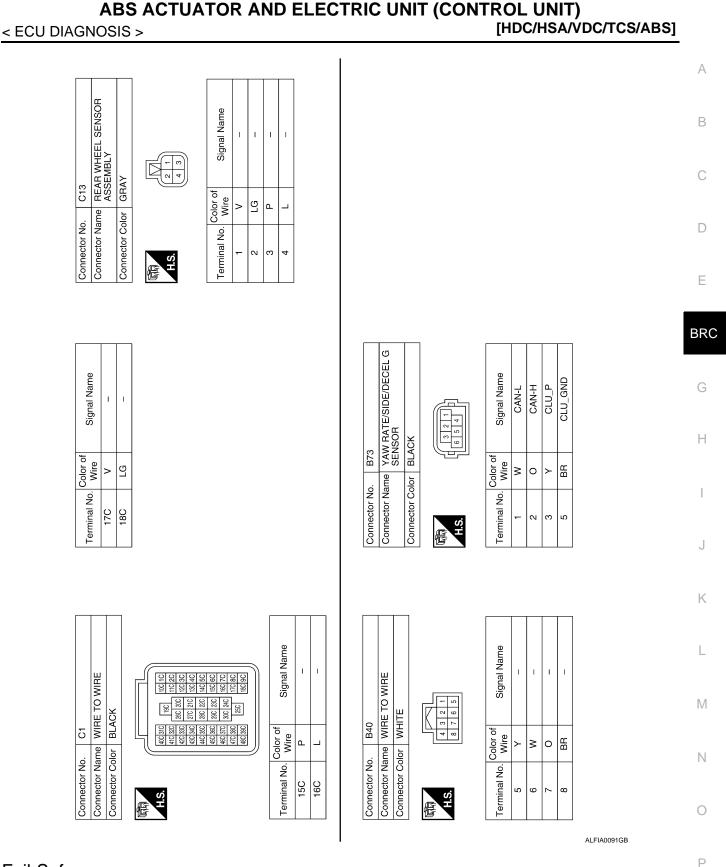




46 47							
33 34 35 36 37 38 39 40 41 42 43 44 45 46	-	Signal Name	MOTOR SUPPLY	DIAG_K	IGN	CLUS_SP	
5 36 37		Color of Wire	щ	SB	W/R	Y	
32 33 34 3		Terminal No. Wire	-	2	4	9	



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# Fail-Safe

INFOID:000000001691082

#### **CAUTION:**

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

ABS/EBD SYSTEM

# BRC-217

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

#### < ECU DIAGNOSIS >

## [HDC/HSA/VDC/TCS/ABS]

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

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

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

#### VDC/TCS SYSTEM

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

#### DTC No. Index

INFOID:000000001691083

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		
C1102	RR LH SENSOR-1		
C1103	FR RH SENSOR-1	BRC-146, "Description"	
C1104	FR LH SENSOR-1		
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2	BRC-149, "Description"	
C1107	FR RH SENSOR-2	BRC-149, Description	
C1108	FR LH SENSOR-2		
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-152, "Description"	
C1110	CONTROLLER FAILURE	BRC-154, "DTC Logic"	
C1111	PUMP MOTOR	BRC-155, "Description"	
C1113	G-SENSOR	BRC-157, "Description"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-160, "Description"	
C1116	STOP LAMP SW	BRC-163, "Description"	
C1120	FR LH IN ABS SOL	BRC-165, "Description"	
C1121	FR LH OUT ABS SOL	BRC-168, "Description"	
C1122	FR RH IN ABS SOL	BRC-165, "Description"	
C1123	FR RH OUT ABS SOL	BRC-168, "Description"	
C1124	RR LH IN ABS SOL	BRC-165, "Description"	
C1125	RR LH OUT ABS SOL	BRC-168, "Description"	
C1126	RR RH IN ABS SOL	BRC-165, "Description"	
C1127	RR RH OUT ABS SOL	BRC-168, "Description"	
C1130	ENGINE SIGNAL 1		
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-171, "Description"	
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		
C1140	ACTUATOR RLY	BRC-173, "Description"	
C1142	PRESS SEN CIRCUIT	BRC-175, "Description"	
C1143	ST ANG SEN CIRCUIT		
C1144	ST ANG SEN SIGNAL	BRC-178, "Description"	

## **BRC-218**

# ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU	DIAGNOSIS	>
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	Reference	Items (CONSULT screen terms)	DTC
— A	PPC 157 "Deparintion"	YAW RATE SENSOR	C1145
	BRC-157, "Description"	SIDE G-SEN CIRCUIT	C1146
В	BRC-183, "Description"	BR FLUID LEVEL LOW	C1155
	BRC-186, "Description"	ST ANG SEN COM CIR	C1156
	BRC-187, "Description"	DECEL G SEN SET	C1160
С	BRC-188, "Description"	ST ANGL SEN SAFE	C1163
		CV1	C1164
D	BRC-189, "Description"	CV2	C1165
		SV1	C1166
		SV2	C1167
E	BRC-154, "DTC Logic"	VARIANT CORDING	C1170
	BRC-193, "Description"	ABS ACTIVE BOOSTER SV NG	C1178
BRO	BRC-196, "Description"	ABS DELTA S SEN NG	C1179
		ABS ACTIVE BOOSTER RESPONSE NG	C1181
	BRC-193, "Description"	ABS BRAKE RELEASE SW NG	C1184
G		ABS BRAKE BOOSTER DEFECT	C1189
	BRC-198, "Description"	CAN COMM CIRCUIT	U1000

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#### < SYMPTOM DIAGNOSIS >

# SYMPTOM DIAGNOSIS VDC/TCS/ABS

## Symptom Table

INFOID:000000001691084

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

Symptom	Check item	Reference
	Brake force distribution	
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-221, "Diag-</u> nosis Procedure"
1	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-222, "Diag-
	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-223, "Diag- nosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-224, "Diag- nosis Procedure"
Pedal vibration or ABS operation sound	Brake pedal	BRC-225, "Diag-
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS con- trol	ТСМ	<u>BRC-226, "Diag-</u> nosis Procedure"
	ECM	

#### NOTE:

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY < SYMPTOM DIAGNOSIS > [HDC/HSA/VDC/TCS/A
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY
Diagnosis Procedure
1.CHECK START
Check front and rear brake force distribution using a brake tester.         Is the inspection result normal?         YES       >> GO TO 2         NO       >> Check brake system.
2. CHECK FRONT AND REAR AXLE
Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u> , " <u>On-Vel</u> <u>Inspection and Service</u> ", Rear: <u>RAX-5</u> , " <u>On-Vehicle Inspection and Service</u> ". <u>Is the inspection result normal?</u> YES >> GO TO 3
NO >> Repair or replace malfunctioning components.
3.CHECK WHEEL SENSOR AND SENSOR ROTOR
<ul> <li>Check the following.</li> <li>Wheel sensor installation for damage.</li> <li>Sensor rotor installation for damage.</li> <li>Wheel sensor connector connection.</li> <li>Wheel sensor harness inspection.</li> </ul>
Is the inspection result normal?
<ul> <li>YES &gt;&gt; GO TO 4</li> <li>NO &gt;&gt; • Replace wheel sensor or sensor rotor. Refer to <u>BRC-237, "Removal and Installation"</u>.</li> </ul>
• Repair harness.
<b>4.</b> CHECK ABS WARNING LAMP DISPLAY Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving.
Is the ABS warning lamp illuminated?
<ul> <li>YES &gt;&gt; Perform self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u>.</li> <li>NO &gt;&gt; Normal</li> </ul>

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# UNEXPECTED PEDAL REACTION

[HDC/HSA/VDC/TCS/ABS]

#### INFOID:000000001691086

# Diagnosis Procedure

# **1.**CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-7, "Brake Pedal Inspection and Adjustment".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-9, "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-7</u>, "<u>Brake Pedal Inspection and Adjustment</u>" (brake pedal), <u>BR-20</u>, "<u>Removal and Installation</u>" (master cylinder), <u>BR-7</u>, "<u>Brake Booster Inspection</u>" (brake booster).

NO >> GO TO 2

# 2. CHECK FUNCTION

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

Is the inspection result normal?

- YES >> Normal
- NO >> Check brake system.

# THE BRAKING DISTANCE IS LONG

**Diagnosis Procedure** 

**CAUTION:** 

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

**1.**CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system. [HDC/HSA/VDC/TCS/ABS]

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# ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:000000001691088

[HDC/HSA/VDC/TCS/ABS]

#### **CAUTION:**

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

**1.**CHECK ABS WARNING LAMP DISPLAY

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

YES >> Normal

NO >> Perform self-diagnosis. Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u>.

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS < SYMPTOM DIAGNOSIS > [HDC/HSA/VDC/TCS/ABS]	
PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS	А
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	B
<ul> <li>During cornering at high speed</li> <li>When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more]</li> </ul>	
• When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher]	D
1.SYMPTOM CHECK 1	
Check that there are pedal vibrations when the engine is started.	Е
Do vibrations occur? YES >> GO TO 2	
NO >> Inspect the brake pedal.	
2.SYMPTOM CHECK 2	BRC
Check that there are ABS operation noises when the engine is started.	
Do the operation noises occur?	G
YES >> GO TO 3 NO >> Perform self -diagnosis. Refer to <u>BRC-141, "CONSULT-III Function (ABS)"</u> .	
<b>3.</b> SYMPTOM CHECK 3	Н
Check symptoms when electrical component (headlamps, etc.) switches are operated.	
Do symptoms occur?	1
YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.	
NO >> Normal	J
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#### **VEHICLE JERKS DURING VDC/TCS/ABS CONTROL**

#### < SYMPTOM DIAGNOSIS >

# VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:000000001691090

[HDC/HSA/VDC/TCS/ABS]

**1.**SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Normal. NO >> GO TO 2

2. CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-141, "CONSULT-III Func-</u> tion (ABS)".

Are self-diagnosis results indicated?

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

NO >> GO TO 3

**3.**CHECK CONNECTOR

- Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.
- Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

Are self-diagnosis results indicated?

YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4

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

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

- YES >> Check the corresponding items.
  - ECM: Refer to <u>EC-74</u>, "<u>CONSULT-III Function (ENGINE</u>)" (VQ40DE) or <u>EC-542</u>, "<u>CONSULT-III</u> <u>Function (ENGINE</u>)" (VK56DE).
  - TCM: Refer to <u>TM-35</u>, "CONSULT-III Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-234. "Removal and Installa-</u> tion".

# NORMAL OPERATING CONDITION

#### < SYMPTOM DIAGNOSIS >

# NORMAL OPERATING CONDITION

# Description

[HDC/HSA/VDC/TCS/ABS]

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Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	<b>-</b>	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	This is a normal condi- tion due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.		
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is normal, and it is caused by the ABS operation check.	-
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because	_
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).	В
The ABS warning lamp, VDC OFF indicator lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal	
VDC may not operate normally or the ABS warning lamp, VDC OFF indicator lamp, and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal con- dition is restored, there is no malfunction. At that time, erase the self- diagnosis memory.	
A malfunction may occur in the yaw rate/side/decel G sensor system, when the vehicle turns sharply, such as during a spin turn, axle turn, or drift driving, while the VDC function is off (VDC OFF indicator lamp illuminated).		
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)	
VDC OFF indicator lamp and SLIP indicator lamp may simultaneously turn on when low tire pressure warn- ing lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.	

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# < PRECAUTION > PRECAUTION PRECAUTIONS

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

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

#### WARNING:

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

#### Precaution for Brake System

#### **CAUTION:**

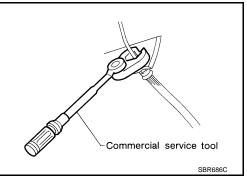
- Refer to <u>BR-9, "Drain and Refill"</u> for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-11, "Brake Burnishing"</u> (front disc brake) or <u>BR-14, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

#### Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.



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# PRECAUTIONS

#### < PRECAUTION >

#### [HDC/HSA/VDC/TCS/ABS]

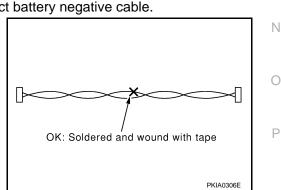
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level,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

#### NOTE:

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

#### Precaution for CAN System

- 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).



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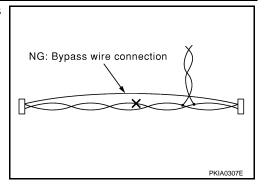
**BRC-229** 

# PRECAUTIONS

#### < PRECAUTION >

# [HDC/HSA/VDC/TCS/ABS]

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



# PREPARATION

# [HDC/HSA/VDC/TCS/ABS]

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# < PREPARATION >

# PREPARATION PREPARATION

# Special Service Tool

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester	WFIA0101E	Checking operation of ABS active wheel sen- sors
ST30031000 ( — ) Bearing puller	ZZA0700D	Removing sensor rotor
ST30720000 (J-25405) Drift	a b ZZA0701D	Installing rear sensor rotor a: 77 mm (0.03 in) dia. b: 55 mm (2.17 in) dia.
ST27863000 ( — ) Drift	ZZA0832D	Installing rear sensor rotor a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.
KV40104710 ( — ) Drift	ZZA0832D	Installing rear sensor rotor a: 76 mm (2.99 in) dia. b: 68.5 mm (2.697 in) dia.

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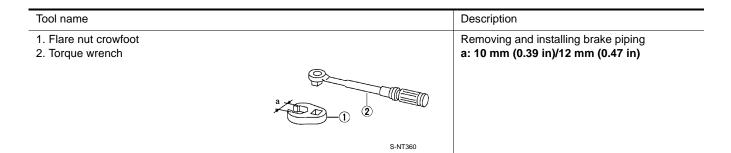
#### < PREPARATION >

# PREPARATION

## [HDC/HSA/VDC/TCS/ABS]

# **Commercial Service Tool**

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# **REMOVAL AND INSTALLATION** SENSOR ROTOR **Removal and Installation** FRONT The wheel sensor rotors are built into the wheel hubs and are not removable. If damaged, replace wheel hub and bearing assembly. Refer to FAX-8, "Removal and Installation".

#### REAR

Removal

1. Remove side flange from final drive assembly. Refer to <u>DLN-407, "Removal and Installation"</u> (R200) or DLN-444, "Removal and Installation" (R230). **CAUTION:** 

#### Discard side oil seal.

< REMOVAL AND INSTALLATION >

2. Using tool and a suitable puller, remove sensor rotor from side flange.

#### Tool number : ST30031000 ( — )

Installation

Install new sensor rotor on side flange using Tools and a press. 1. Make sure sensor rotor is fully seated. **CAUTION:** 

Do not reuse the old sensor rotor.

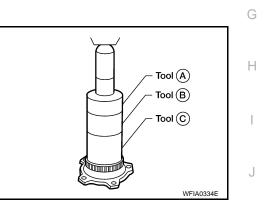
**Tool numbers** 

A: ST30720000 (J-25405)

- B: ST27863000 ( )
- C: KV40104710 ( )
- Install side flange to final drive assembly. Refer to DLN-407, 2. "Removal and Installation" (R200) or DLN-444, "Removal and Installation" (R230).

#### **CAUTION:**

Do not reuse the side oil seal. The side oil seal must be replaced every time the side flange is removed from the final drive assembly.



# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

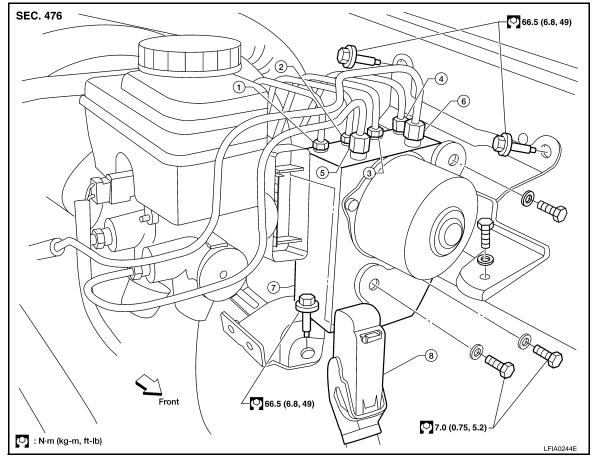
## < REMOVAL AND INSTALLATION >

[HDC/HSA/VDC/TCS/ABS]

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# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- 1. To rear left disc brake
- 4. To front right disc brake
- 2. To rear right disc brake
- 5. From the master cylinder secondary side
- 3. To front left disc brake
- 6. From the master cylinder primary side
- 7. ABS actuator and electric unit 8. Harness connector (control unit)

#### REMOVAL

- 1. Disconnect the battery negative terminal.
- 2. Drain the brake fluid. Refer to BR-9, "Drain and Refill".
- 3. Disconnect the actuator harness from the ABS actuator and electric unit (control unit). CAUTION:
  - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
  - Be careful not to splash brake fluid on painted areas.
- 4. Disconnect the brake tubes.
- 5. Remove the three bolts and remove the ABS actuator and electric unit (control unit).

#### INSTALLATION

Installation is in the reverse order of removal.

- To install, use a flare nut wrench (commercial service tool).
- Always tighten brake tubes to specification when installing. Refer to BR-6, "Hydraulic Circuit".
- Never reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-9, "Bleeding Brake System"</u>.
   NOTE:

# ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

#### < REMOVAL AND INSTALLATION >

[HDC/HSA/VDC/TCS/ABS]

In the case that ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to BRC-131, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION А : Special Repair Requirement". В С D Е BRC G Н J Κ L Μ Ν Ο Ρ

# STEERING ANGLE SENSOR

#### Removal and Installation

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[HDC/HSA/VDC/TCS/ABS]

#### REMOVAL

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

#### **CAUTION:**

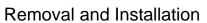
In the case that the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-131</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR <u>NEUTRAL POSITION : Special Repair Requirement</u>".

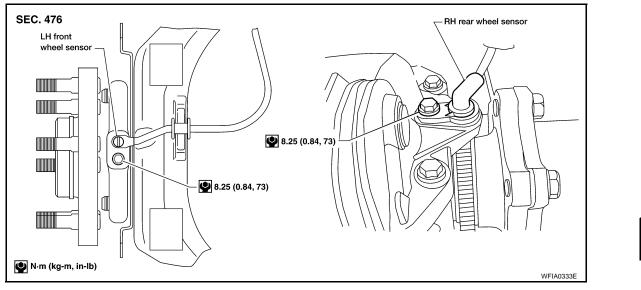
#### INSTALLATION

1. Installation is in the reverse order of removal.

### < REMOVAL AND INSTALLATION >

# WHEEL SENSORS





#### REMOVAL

1.	Remove wheel and tire using power tool.	
2.	Remove wheel sensor mounting screw. <b>NOTE:</b>	Н
	<ul> <li>When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-26</u>, "<u>Removal and Installation of Brake Caliper and Disc Rotor</u>".</li> <li>When removing rear wheel sensor, first remove spare tire.</li> </ul>	I
3.	Pull out the wheel sensor, being careful to turn it as little as possible. CAUTION:	
	<ul> <li>Be careful not to damage sensor edge and sensor rotor teeth.</li> <li>Do not pull on the sensor harness.</li> </ul>	J
4.	Disconnect wheel sensor harness electrical connector, then remove harness from mounts.	К
	STALLATION	
	tallation is in the reverse order of removal. When installing wheel and tire, refer to <u>WT-36, "Rotation"</u> . UTION:	1
• Ir • C	nspect wheel sensor O-ring, replace sensor assembly if damaged. Clean wheel sensor hole and mounting surface with brake cleaner and a lint-free shop rag. Be care- ul that dirt and debris do not enter the axle.	L
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	pply a coat of suitable grease to the wheel sensor O-ring and mounting hole.	
•	ighten wheel sensor bolt to specification.	Ν
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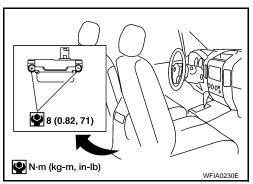
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# G SENSOR

# Removal and Installation

# REMOVAL

- 1. Remove center console. Refer to <u>IP-15, "Exploded View"</u>.
- Remove yaw rate/side/decel G sensor nuts as shown.
   The location of the sensor is the same for all models. CAUTION:
  - Do not use power tools to remove or install yaw rate/side/ decel G sensor.
  - Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



INSTALLATION

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

After performing the above work, calibrate the decel G sensor. Refer to <u>BRC-132</u>, <u>"CALIBRATION OF DECEL</u> <u>G SENSOR : Special Repair Requirement"</u>.

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