SECTION BRAKE CONTROL SYSTEM

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APPLICATION NOTICE

BASIC INSPECTION APPLICATION NOTICE

Application Notice

INFOID:00000007356658

Service information	Remarks	C
TYPE 1	VDC/TCS/ABS (VQ40DE)	C
TYPE 2	VDC/TCS/ABS (VK56DE)	

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< BASIC INSPECTION >

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000007356659

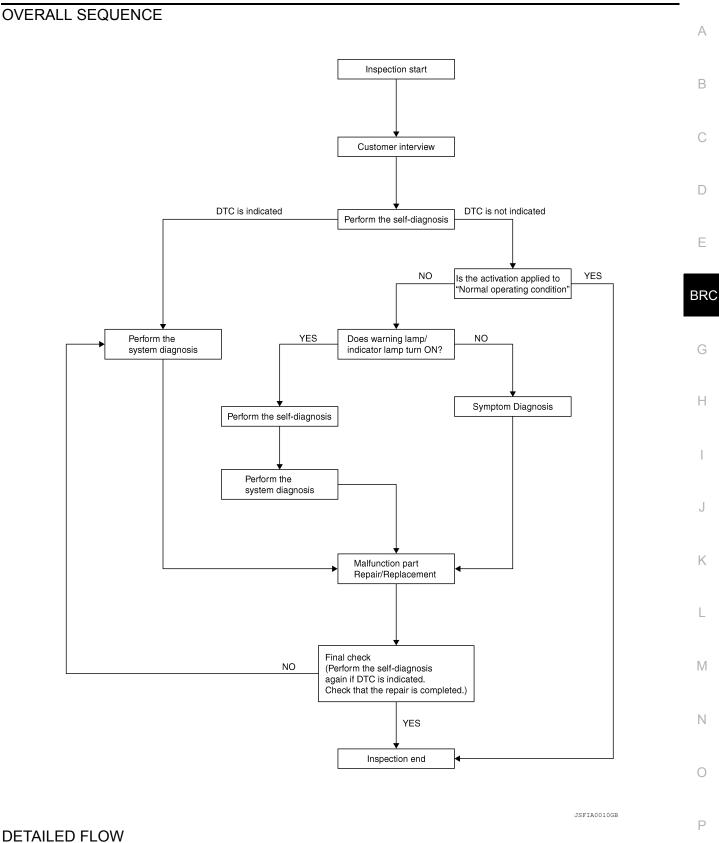
PRECAUTIONS FOR DIAGNOSIS

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

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TYPE 1]



1.COLLECT THE INFORMATION FROM THE CUSTOMER

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

>> GO TO 2

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[TYPE 1]

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to <u>BRC-29</u>, "CONSULT Function (ABS)". Is there any DTC displayed?

YES >> GO TO 3

NO >> GO TO 4

3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to <u>BRC-86, "DTC No. Index"</u>.

>> GO TO 7

4.CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-104</u>, <u>"Description"</u>.

Is the symptom a normal operation?

YES >> Inspection End.

NO >> GO TO 5

5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.

- ABS warning lamp: Refer to BRC-76, "Description".
- · Brake warning lamp: Refer to BRC-77, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-78, "Description".</u>

• SLIP indicator lamp: Refer to <u>BRC-80, "Description"</u>.

Is ON/OFF timing normal?

YES >> GO TO 6

NO >> GO TO 2

O.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

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

Is no other DTC present and the repair completed?

YES >> Inspection End. NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000007356660

[TYPE 1]

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

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INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

INSPECTION AND ADJUSTMENT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:000000007356661

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

Neutral position adjustment for the steering angle sensor

Calibration of the decel G sensor

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

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

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement", GO TO 2

2.PERFORM CALIBRATION OF THE DECEL G SENSOR

Perform calibration of the decel G sensor.

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

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

×: Required –: Not required

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

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

CAUTION:

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

>> GO TO 2	
2.PERFORM THE NEUTRAL POSITION ADJUSTME	ENT FOR THE STEERING ANGLE SENSOR
	RT" and "ST ANGLE SENSOR ADJUSTMENT" in order.
Do not touch steering wheel while adjusting st 3. After approximately 10 seconds, touch "END".	eering angle sensor.
NOTE:	
After approximately 60 seconds, it ends automatic 4. Turn ignition switch OFF, then turn it ON again.	ally.
CAUTION:	
Be sure to perform above operation.	
>> GO TO 3	
3. CHECK DATA MONITOR	
1. Run vehicle with front wheels in straight-ahead po	
2. Select "DATA MONITOR". Then make sure "STR A	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	r the steering angle sensor again, GO TO 1
4. ERASE THE SELF-DIAGNOSIS MEMORY	
Erase the self-diagnosis memory of the ABS actuator a • ABS actuator and electric unit (control unit): Refer to • ECM: Refer to <u>EC-77, "CONSULT Function"</u> .	
Are the memories erased?	
YES >> Inspection End.	
NO >> Check the items indicated by the self-diage CALIBRATION OF DECEL G SENSOR	nosis.
CALIBRATION OF DECEL G SENSOR : D	Description
Refer to the table below to determine if calibration of th	ne decel G sensor is required.
	×: Required –: Not required
Situation	Calibration of decel G sensor
Removing/Installing ABS actuator and electric unit (control unit)	_
Replacing ABS actuator and electric unit (control unit)	×
Removing/Installing steering components	_
Replacing steering components	—
Removing/Installing suspension components	—
Replacing suspension components	_
Change tires to new ones	
Tire rotation	_
Adjusting wheel alignment	_

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

CALIBRATION OF DECEL G SENSOR CAUTION:

Removing/Installing yaw rate/side/decel G sensor

Replacing yaw rate/side/decel G sensor

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

INFOID:000000007356666

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INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

(Calibration cannot be done without CONSULT)

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

2.PERFORM CALIBRATION OF DECEL G SENSOR

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

After approximately 60 seconds, it ends automatically.

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

>> GO TO 3

3. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> GO TO 4

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

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

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

ECM: Refer to <u>EC-77, "CONSULT Function"</u>.

Are the memories erased?

YES >> Inspection End.

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

APPLICATION NOTICE

< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION APPLICATION NOTICE

Application Notice

INFOID:000000007818414 B

Service information	Remarks	C
TYPE 1	VDC/TCS/ABS (VQ40DE)	C
TYPE 2	VDC/TCS/ABS (VK56DE)	

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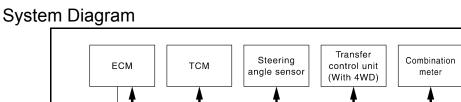
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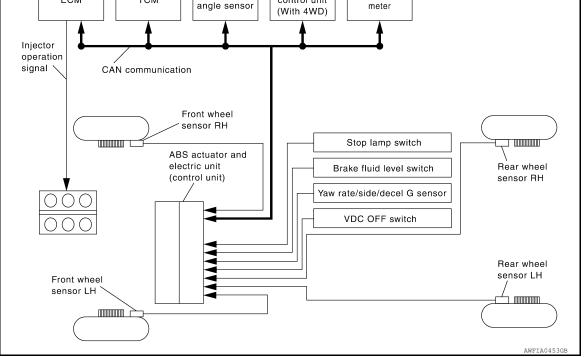
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VDC

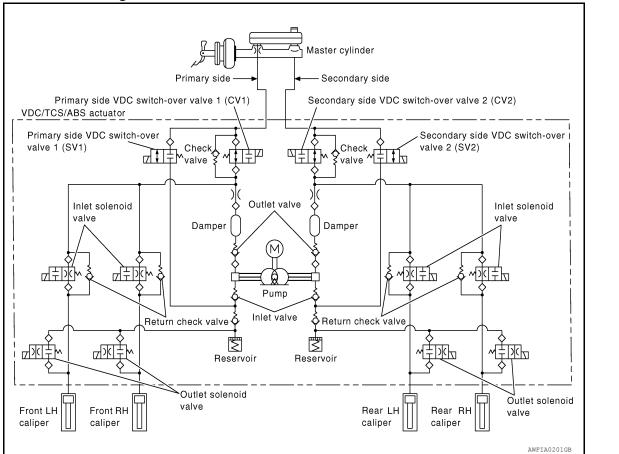
< SYSTEM DESCRIPTION >

VDC





Hydraulic Circuit Diagram



INFOID:000000007356668

INFOID:000000007356669

2012 Pathfinder

< SYSTEM DESCRIPTION >

System Description

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

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August 2012

Component Parts Location

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VDC

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 2. Brake fluid level switch E21
- 5. Steering angle sensor (behind spiral cable) M47

- AWFIA0844GB
- 3. ABS actuator and electric unit (control unit) E125
 - Yaw rate/side/decel G sensor B73

6.

BRC-18

< SYSTEM DESCRIPTION >			[TYPE 1]
 Rear wheel sensor LH C13 Stop lamp switch E38 	8. Rear wheel sensor RH C13	9.	VDC OFF switch M154
Component Description			INFOID:00000007356672
Compo	onent parts		Reference
	Pump		BRC-43, "Description"
	Motor		BRC-43, Description
ABS actuator and electric unit (control unit)	Actuator relay		BRC-59, "Description"
	Solenoid valve		BRC-52, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)		BRC-70, "Description"

VDC

Wheel sensor

Stop lamp switch

VDC OFF switch

ABS warning lamp Brake warning lamp

SLIP indicator lamp

VDC OFF indicator lamp

Steering angle sensor Brake fluid level switch

Yaw rate/side/decel G sensor

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BRC-61, "Description"

BRC-64, "Description"

BRC-74, "Description" BRC-76, "Description"

BRC-77, "Description"

BRC-78, "Description"

BRC-80, "Description"

< SYSTEM DESCRIPTION >

TCS



System Diagram INFOID:000000007818423 Transfer Steering Combination ECM тсм control unit angle sensor meter (With 4WD) Injector operation signal CAN communication Front wheel sensor RH Stop lamp switch ABS actuator and electric unit Rear wheel Brake fluid level switch (control unit) sensor RH Yaw rate/side/decel G sensor VDC OFF switch Rear wheel sensor LH Front wheel sensor LH AWFIA0453

TCS

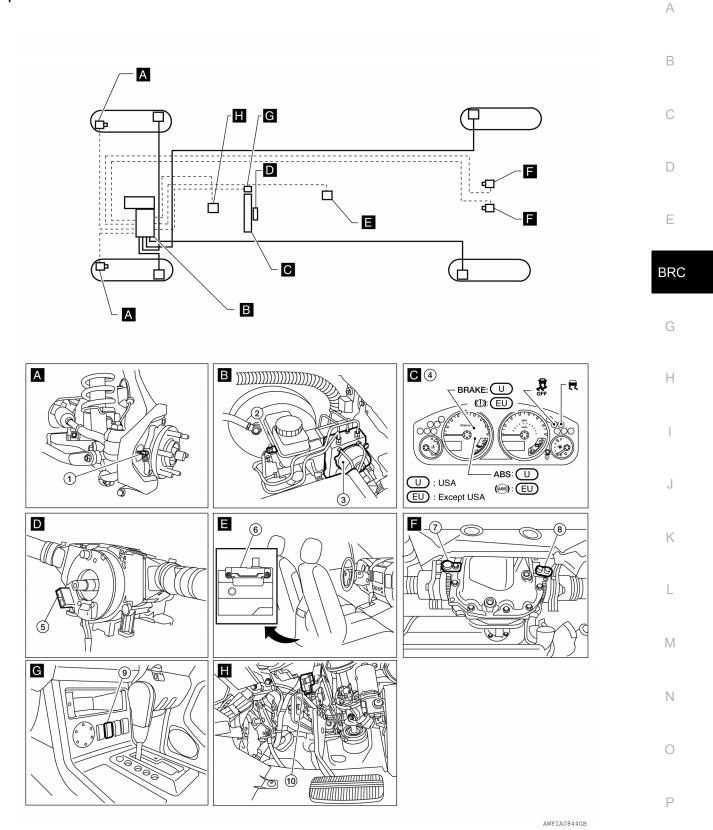
System Description

INFOID:000000007356674

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

Component Parts Location

INFOID:000000007818426



TCS

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

6.

BRC-21

< SYSTEM DESCRIPTION >

10. Stop lamp switch E38

Component Description

Rear wheel sensor RH C13

8.

TCS

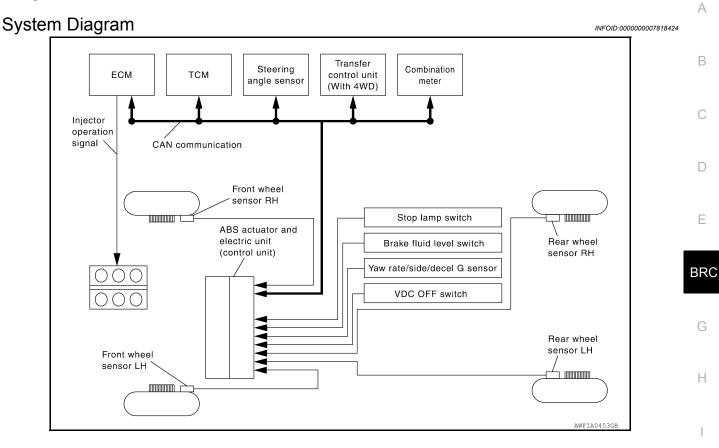
9. VDC OFF switch M154

INFOID:000000007818427

Compo	nent parts	Reference
	Pump	PBC 42 "Description"
	Motor	BRC-43, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-59, "Description"
	Solenoid valve	BRC-52, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-70. "Description"
Wheel sensor		BRC-34, "Description"
Yaw rate/side/decel G sensor		BRC-45, "Description"
Stop lamp switch		BRC-50, "Description"
Steering angle sensor		BRC-61, "Description"
Brake fluid level switch		BRC-64, "Description"
VDC OFF switch		BRC-74, "Description"
ABS warning lamp		BRC-76, "Description"
Brake warning lamp	BRC-77, "Description"	
VDC OFF indicator lamp		BRC-78, "Description"
SLIP indicator lamp		BRC-80, "Description"

< SYSTEM DESCRIPTION >

ABS



ABS

System Description

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

Component Parts Location

INFOID:000000007818428

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ABS

- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Combination meter M24
- 2. Brake fluid level switch E21
- 5. Steering angle sensor (behind spiral cable) M47

- AWFIA0844GB
- 3. ABS actuator and electric unit (control unit) E125
 - Yaw rate/side/decel G sensor B73

6.



< SYSTEM DESCRIPTION >

7. Rear wheel sensor LH C13

10. Stop lamp switch E38

Component Description

INFOID:000000007818429

			В
Compo	nent parts	Reference	_
	Pump	BRC-43, "Description"	C
	Motor		0
ABS actuator and electric unit (control unit)	Actuator relay	BRC-59, "Description"	
	Solenoid valve	BRC-52, "Description"	D
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-70, "Description"	
Wheel sensor		BRC-34, "Description"	E
Yaw rate/side/decel G sensor	BRC-45, "Description"	_	
Stop lamp switch		BRC-50, "Description"	BRC
Steering angle sensor	BRC-61, "Description"		
Brake fluid level switch		BRC-64, "Description"	
VDC OFF switch		BRC-74, "Description"	G
ABS warning lamp		BRC-76, "Description"	
Brake warning lamp		BRC-77, "Description"	—
VDC OFF indicator lamp		BRC-78, "Description"	
SLIP indicator lamp		BRC-80, "Description"	

ABS

9.

VDC OFF switch M154

Rear wheel sensor RH C13

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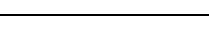
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< SYSTEM DESCRIPTION >

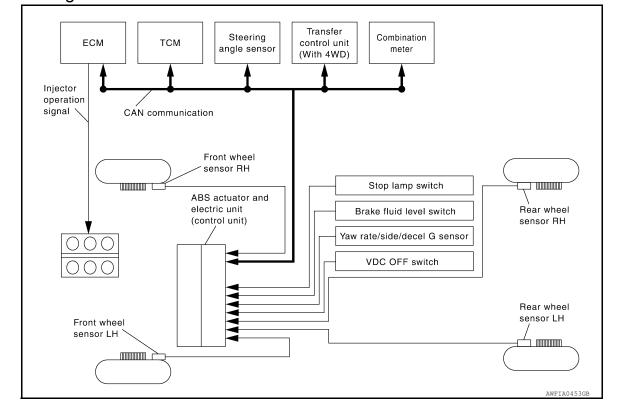
EBD



EBD

INFOID:000000007818425

System Diagram



System Description

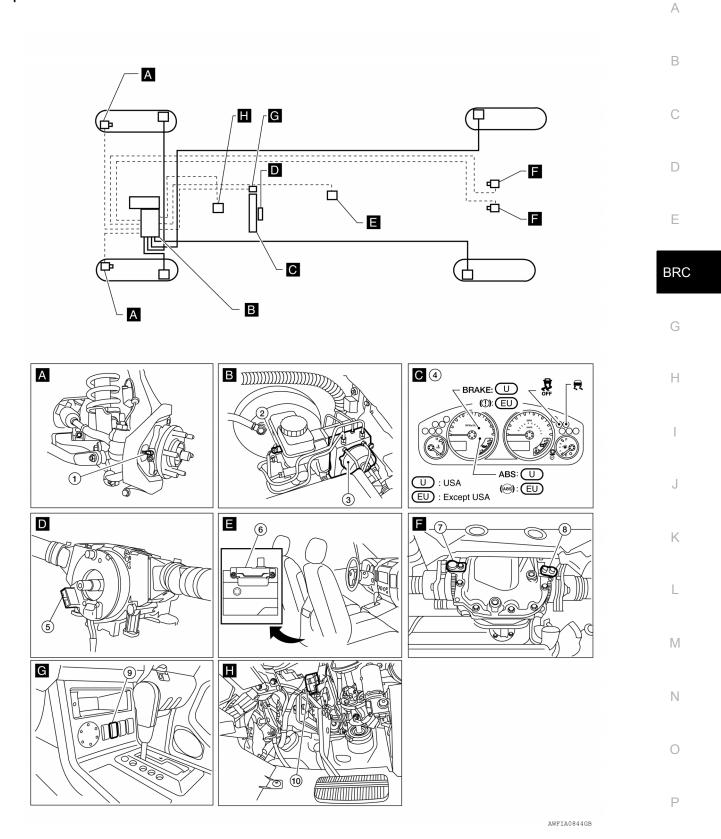
INFOID:000000007356682

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

Component Parts Location

[TYPE 1]

INFOID:000000007818430



EBD

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

6.

BRC-27

< SYSTEM DESCRIPTION >

7. Rear wheel sensor LH C13

10. Stop lamp switch E38

Component Description

Rear wheel sensor RH C13

EBD

8.

9. VDC OFF switch M154

INFOID:000000007818431

Component parts		Reference
	Pump	PBC 42 "Description"
	Motor	BRC-43, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-59, "Description"
	Solenoid valve	BRC-52, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-70, "Description"
Wheel sensor		BRC-34, "Description"
Yaw rate/side/decel G sensor		BRC-45, "Description"
Stop lamp switch		BRC-50, "Description"
Steering angle sensor		BRC-61, "Description"
Brake fluid level switch		BRC-64, "Description"
VDC OFF switch		BRC-74, "Description"
ABS warning lamp		BRC-76, "Description"
Brake warning lamp	BRC-77, "Description"	
VDC OFF indicator lamp		BRC-78, "Description"
SLIP indicator lamp		BRC-80, "Description"

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

< SYSTEM DESCRIPTION >

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

CONSULT Function (ABS)

FUNCTION

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

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

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

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

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

Display Item List Refer to <u>BRC-86, "DTC No. Index"</u>.

DATA MONITOR

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

[TYPE 1]

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

< SYSTEM DESCRIPTION >

[TYPE 1]

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

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

< SYSTEM DESCRIPTION >

[TYPE 1]

Item	Data monitor item selection		ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
CV1 (On/Off)	-	_	×	Front side VDC switch-over solenoid valve (cut valve) (On/Off) status is displayed.
CV2 (On/Off)	-	_	×	Rear side VDC switch-over solenoid valve (cut-valve) (On/Off) status is displayed.
SV1 (On/Off)	_	_	×	Front side VDC switch-over solenoid valve (suction valve) (On/Off) status is displayed.
SV2 (On/Off)	_	_	×	Rear side VDC switch-over solenoid valve (suction valve) (On/Off) status is displayed.
2WD/4WD (2WD/4WD)	_	_	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
ACCEL POS SIG (%)	×	_	×	Throttle valve open/close status judged by CAN com- munication signal is displayed.
SIDE G-SENSOR (m/s ²)	×	_	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	_	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	_	×	Brake pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)	-	_	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	-	_	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	-	_	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	-	_	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	-	_	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	-	_	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	-	_	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	_	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	_	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	_	×	Brake fluid level switch (On/Off) status is displayed.

×: Applicable

-: Not applicable

WORK SUPPORT

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

ACTIVE TEST CAUTION:

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

< SYSTEM DESCRIPTION >

[TYPE 1]

- 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. (solenoid valve and ABS motor only)

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select the menu item 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.
- To perform test again, touch BACK.

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	—	—	_
	FR RH OUT SOL	Off	Off	On*	—	_	_
FR LH SOL	FR LH IN SOL	Off	On	On	—	_	_
TR EIT SOL	FR LH OUT SOL	Off	Off	On*	—	_	_
RR RH SOL	RR RH IN SOL	Off	On	On	—	_	_
NY NI SOL	RR RH OUT SOL	Off	Off	On*	—	—	_
RR LH SOL	RR LH IN SOL	Off	On	On	—	—	_
NN EIT SOL	RR LH OUT SOL	Off	Off	On*	—	_	_
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
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	_	_	_	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	_	_	_	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	_	—	_	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	_	_	_	Off	Off	Off
	RR RH IN SOL	_	—	—	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH OUT SOL		—	—	Off	Off	Off
	RR LH IN SOL		—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL		—		Off	Off	Off

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

ABS MOTOR

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

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

APPLICATION NOTICE

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS **APPLICATION NOTICE**

Application Notice

Service information	Remarks	
TYPE 1	VDC/TCS/ABS (VQ40DE)	
TYPE 2	VDC/TCS/ABS (VK56DE)	

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[TYPE 1]

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

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

DTC Logic

INFOID:000000007356688

INFOID:000000007356687

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open. Or when the sensor power voltage is outside the standard.	Harness or connectorWheel sensor
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	ABS actuator and electric uni (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-34, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356689

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

CAUTION:

Do not check between wheel sensor terminals.

- **1.**CONNECTOR INSPECTION
- Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunctioning code.
- 2. Check the terminals for deformation, disconnection, looseness or damage.
- Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

< DTC/CIRCUIT DIAGN	NOSIS >		[IYPE 1]
battery in the ABS a 3. Spin the wheel of th sensor tester. The re	ctive wheel sensor tester before the vehicle by hand and observe	e POWER indicator does not illu proceeding. the red SENSOR indicator on th sh on and off to indicate an outpu	e ABS active wheel
NOTE: If the red SENSOR retest.	indicator illuminates but does n	not flash, reverse the polarity of t	he tester leads and
YES >> GO TO 3	eel sensor tester detect a signal? wheel sensor. Refer to <u>BRC-110</u>	_	
3. CHECK TIRES			
Check the inflation press	sure, wear and size of each tire.		
s the inspection result n YES >> GO TO 4 NO >> Adjust tire p	ormal? ressure or replace tire(s).		
4. CHECK WHEEL BEA	RINGS		
Check wheel bearing ax On-Vehicle Inspection a		Dn-Vehicle Inspection and Servic	e" (front) or <u>RAX-6.</u>
s the inspection result n	ormal?		
	eplace as necessary. Refer to <u>Fand</u> Installation" (rear).	AX-10. "Removal and Installatio	. ,
CHECK WIRING HAI	RNESS FOR SHORT CIRCUIT		
tor and wheel senso 2. Check continuity be	uator and electric unit (control unit control unit connector of malfunction code etween front wheel sensor connector termination context and	No. ector termi-	
Continuity shou	lld not exist.	$\begin{array}{c c} A & & 1 \\ \hline 2 & 1 \\ 1, 2 & 1, 2, 3, 4 \end{array}$	
ls the inspection result n YES >> GO TO 6 NO >> Repair the c	ormal?		
6. CHECK WIRING HAP	RNESS FOR OPEN CIRCUIT		AWFIA046422
	tween ABS actuator and electric	e unit (control unit) connector and	d the malfunctioning
Wheel sensor	ABS actuator and electric unit (control unit)	Wheel sensor	Continuity

Wheel sensor	ABS actuat electric unit (co		Wheel sensor		Continuity	
	Connector	Terminal	Connector	Terminal		Ν
Front LH		45	E18	1		
		46	LIO	2		0
Front RH	*	34	E117	1		
	E125	33		2	Yes	
Rear LH		37		3	165	Ρ
		36	C13	4		
Rear RH	Ť	42		1		
		43		2		

Is the inspection result normal?

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-112</u>, "<u>Removal and Instal-</u><u>lation</u>".

NO >> Repair the circuit.

Component Inspection

INFOID:000000007356690

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-34, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007356691

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

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

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

INFOID:000000007356693

INFOID:000000007356692

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.	Harness or connectorWheel sensor	BRC
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	ABS actuator and electric unit (control unit)	G
C1108	FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		Н

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	K
RR RH SENSOR-2	N.
RR LH SENSOR-2	
FR RH SENSOR-2	L
FR LH SENSOR-2	
Is above displayed on the self-diagnosis display?	B. //
 YES >> Proceed to diagnosis procedure. Refer to <u>BRC-37, "Diagnosis Procedure"</u>. NO >> Inspection End. 	Μ
Diagnosis Procedure	432 N
Regarding Wiring Diagram information, refer to <u>BRC-88, "Wiring Diagram - With VQ40DE"</u> .	0
CAUTION: Do not check between wheel sensor terminals.	Р
1.CONNECTOR INSPECTION	
1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor connector of ma functioning code.	 -
2. Check the terminals for deformation, disconnection, looseness or damage.	
Is the inspection result normal?	

YES >> GO TO 2

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С

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel 3. 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 BRC-110, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-6, "On-Vehicle Inspection and Service" (front) or RAX-6, "On-Vehicle Inspection and Service" (rear).

Is the inspection result normal?

YES >> GO TO 5

>> Repair or replace as necessary. Refer to FAX-10, "Removal and Installation" (front) or RAX-7, NO "Removal and Installation" (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 front wheel sensor connector terminals (A) or rear wheel sensor connector terminals (B) and around.

Continuity should not exist.

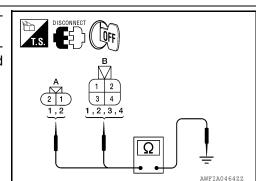
Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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



C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	,
Frend III		45	F 40	1	
Front LH		46	E18	2	
	-	34	E 447	1	Ma a
Front RH		33	E117	2	
D	E125	37		3	Yes
Rear LH		36	C13	4	
Door DH	-	42		1	
Rear RH		43		2	
CHECK DATA MONI on "DATA MONITOR", s OR", and check the ve	select "FR LH SEN	ISOR", "FR RH	SENSOR", "RR	LH SENSOR", a	and "RR RH SEN
Wheel sensor	Vehic	le speed (DATA MC	DNITOR)		
Wheel sensor FR LH SENSOR	Vehic	le speed (DATA MC	DNITOR)		
	Nearly m	atches the speedor			
FR LH SENSOR	Nearly m				
FR LH SENSOR FR RH SENSOR	Nearly m	atches the speedor			
FR LH SENSOR FR RH SENSOR RR LH SENSOR	Nearly m play (±10	atches the speedor			
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E	Nearly m play (±10	atches the speedor % or less)	neter dis-	<u>dure"</u> .	
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E	Nearly m play (±10 normal? End. osis procedure. Re	atches the speedor % or less)	neter dis-	<u>dure"</u> .	INFOID:00000000781843
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno Special Repair Rec	Nearly m play (±10 normal? End. osis procedure. Re quirement	atches the speedor % or less) fer to <u>BRC-47, '</u>	neter dis-		INFOID:00000000781843
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno	Nearly m play (±10 iormal? End. osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to <u>BRC</u>	atches the speedor % or less) fer to <u>BRC-47, '</u> SENSOR NEU nt for the steerin	neter dis- <u>Diagnosis Proce</u> TRAL POSITION ng angle sensor	when replacing	the ABS actuato
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (control POSITION : Description >> GO TO 2	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to BRC	atches the speedor % or less) fer to <u>BRC-47, '</u> SENSOR NEU nt for the steerin	neter dis- <u>Diagnosis Proce</u> TRAL POSITION ng angle sensor	when replacing	the ABS actuato
FR LH SENSOR FR RH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagne Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (control POSITION : Description	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to BRC	atches the speedor % or less) fer to <u>BRC-47, '</u> SENSOR NEU nt for the steerin	neter dis- <u>Diagnosis Proce</u> TRAL POSITION ng angle sensor	when replacing	the ABS actuato
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (control POSITION : Description >> GO TO 2	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to BRC ECEL G SENSOR on of decel G sens	atches the speedor % or less) fer to <u>BRC-47, '</u> SENSOR NEU at for the steerin <u>C-12, "ADJUSTN</u> sor when replaci	TRAL POSITION ng angle sensor <u>MENT OF STEEF</u>	when replacing RING ANGLE SE	the ABS actuato
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (control POSITION : Description >> GO TO 2 2.CALIBRATION OF D Always perform calibrati	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmer unit). Refer to BRC ECEL G SENSOR on of decel G sens	atches the speedor % or less) fer to <u>BRC-47, '</u> SENSOR NEU at for the steerin <u>C-12, "ADJUSTN</u> sor when replaci	TRAL POSITION ng angle sensor <u>MENT OF STEEF</u>	when replacing RING ANGLE SE	the ABS actuato

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000007356698

INFOID:000000007356697

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356699

Regarding Wiring Diagram information, refer to <u>BRC-88, "Wiring Diagram - With VQ40DE"</u>.

1.CONNECTOR INSPECTION

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

Is any item indicated on the self-diagnosis display?

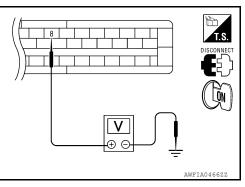
YES >> GO TO 2

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

,			J	
ABS actuator and electric unit (control unit)		_	Condition	Voltage
Connector Terminal				
E125	8	Ground	Ignition switch: ON	Battery voltage
L125	0	Ground	Ignition switch: OFF	Approx. 0V





2012 Pathfinder

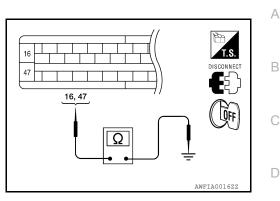
C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

4. Turn ignition switch OFF.

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

	and electric unit ol unit)	_	Continuity
Connector	Terminal		
E125	16, 47	Ground	Yes



Is the inspection result normal?

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

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

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[TYPE 1]

C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < DTC/CIRCUIT DIAGNOSIS > [TYPE 1]

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

DTC Logic

INFOID:000000007356701

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356702

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installa-</u> tion".

Special Repair Requirement

INFOID:000000007818436

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1111	PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.	 Harness or connector ABS actuator and electric unit 	
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)	
DTC CC	ONFIRMATION PROCE	EDURE		
1. снес	CK SELF-DIAGNOSIS RI	ESULTS		
Check th	ne self-diagnosis results.			
	0-16-11			
	Self-diagnosis PUMP MO			
ls above	e displayed on the self-dia			
YES NO		procedure. Refer to <u>BRC-43</u> , "Diagnosis Proced	ure".	
NO				
-	osis Procedure		INFOID:00000007356706	
Diagno	osis Procedure	nation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagno	osis Procedure	nation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagnc Regardir	osis Procedure	nation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagno Regardir 1.conr 1. Turn	ng Wiring Diagram inform			
Diagno Regardir 1. CONI 1. Turn 2. Disc 3. Che	osis Procedure ng Wiring Diagram inform NECTOR INSPECTION ignition switch OFF. connect ABS actuator and ck terminal for deformati	ation, refer to <u>BRC-88, "Wiring Diagram - With V</u> d electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma	<u>Q40DE"</u> .	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Che repla	osis Procedure ng Wiring Diagram inform NECTOR INSPECTION in ignition switch OFF. connect ABS actuator and ck terminal for deformati ace terminal.	d electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma	Q40DE". Ifunction is found, repair or	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Che repla	Desis Procedure The Wiring Diagram inform NECTOR INSPECTION The ignition switch OFF. Sconnect ABS actuator and the connect of the formation ace terminal for deformation ace terminal. Sconnect connectors and	d electric unit (control unit) connector.	Q40DE". Ifunction is found, repair or	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Che repla 4. Recu (ABS Is any ite	ng Wiring Diagram inform NECTOR INSPECTION n ignition switch OFF. connect ABS actuator and ck terminal for deformati ace terminal. onnect connectors and <u>S)"</u> .	d electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma then perform the self-diagnosis. Refer to <u>BR(</u>	Q40DE". Ifunction is found, repair or	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Che repla 4. Recu (ABS 1s any ite YES	AND SIS Procedure AND SIS Procedure AND SIGNATION Diagram inform NECTOR INSPECTION A ignition switch OFF. connect ABS actuator and ck terminal for deformati ace terminal. onnect connectors and S)". Em indicated on the self-or >> GO TO 2	d electric unit (control unit) connector. on, disconnect, looseness, and so on. If any ma then perform the self-diagnosis. Refer to <u>BR(</u>	Q40DE". Ifunction is found, repair or	

INFOID:000000007356704

INFOID:000000007356705

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

Voltage	
Battery voltage	
	AWI

16 47

16, 47

Ω

Is the inspection result normal?

ABS actuator and electric unit (control unit)

YES >> GO TO 3

Connector

E125

NO >> Repair or replace malfunctioning components.

Terminal

1

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

Ground

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "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-43</u>, "Diagnosis Procedure".

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

August 2012



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INFOID:000000007818442

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

< DTC/CIRCUIT DIAGNOSIS >

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

Description

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

DTC Logic

INFOID:000000007356710

INFOID:000000007356709

[TYPE 1]

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector	
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)	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		Н
G-SENSOR		
YAW RATE SENSOR		1
SIDE G-SEN CIRCUIT		1
Is above displayed on the self-diagnosis display?		
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-45, "Diagnosis Procedure"</u> . NO >> Inspection End.		J
Diagnosis Procedure	INFOID:000000007356711	K

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

CAUTION:

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

1.CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.
- 2.YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

Check continuity between the ABS actuator and electric unit (control unit) connector E125 and the yaw rate/ side/decel G sensor connector B73.

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

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace as necessary.

3.YAW RATE/SIDE/DECEL G SENSOR INSPECTION

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

2. Perform yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-46, "Component Inspection"</u>. Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace the ABS actuator and electric unit (control unit). Refer to BRC-112, "Removal and Installation".
- NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-115</u>, "Removal and Installation".

Component Inspection

INFOID:000000007356712

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 >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-115, "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000007818443

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

C1115 WHEEL SENSOR

Description

INFOID:000000007356714

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

DTC Logic

INFOID:000000007356715

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When wheel sensor input signal is malfunctioning.	 Harness or connector Wheel sensor ABS actuator and electric unit (control unit) 	E
DTC CC	ONFIRMATION PROC	EDURE		
1 .CHE	CK SELF-DIAGNOSIS R	ESULTS	E	BR
Check th	ne self-diagnosis results.			
	Self-diagnosi			G
	ABS SENSOR [ABN			
YES	displayed on the self-dia >> Proceed to diagnosis	-	<u>edure"</u> .	Η
NO	>> Inspection End.			
Diagno	sis Procedure		INFOID:00000007818470	
Regardir	ng Wiring Diagram inforn	nation, refer to <u>BRC-88, "Wiring Diagram - With</u>	VQ40DE".	J
Ū				
CAUTIO				K
	check between wheel s NECTOR INSPECTION	ensor terminais.		
		and electric unit (control unit) connector and w	heel sensor connector of mal-	L
func	tioning code.			
		rmation, disconnection, looseness or damage.		M
YES	spection result normal? >> GO TO 2			
NO	>> Repair or replace as	•		NI
2. CHE0	CK WHEEL SENSOR OU	JTPUT SIGNAL		Ν
2. Turr	on the ABS active whee	ensor tester (J-45741) to wheel sensor using ap el sensor tester power switch.	propriate adapter.	0
	green POWER indicato	r should illuminate. If the POWER indicator do eel sensor tester before proceeding.	es not illuminate, replace the	
3. Spin	the wheel of the vehicles or tester. The red SENS	e by hand and observe the red SENSOR indicators indicator should flash on and off to indicate		Ρ
	ne red SENSOR indicate	or illuminates but does not flash, reverse the po	plarity of the tester leads and	
		or tester detect a signal?		
YES NO	>> GO TO 3 >> Replace the wheel s	ensor. Refer to <u>BRC-110, "Removal and Installa</u>	ition".	

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3.CHECK TIRES

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

Is the inspection result normal?

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

Check wheel bearing axial end play. Refer to <u>FAX-6, "On-Vehicle Inspection and Service"</u> (front) or <u>RAX-6,</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-10, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

5.check wiring harness for short circuit

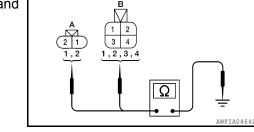
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between front wheel sensor connector terminals (A) or rear wheel sensor connector terminals (B) and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



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6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuato electric unit (cor		Wheel sen	isor	Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E10	1	
		46	E18	2	
Front RH	E125	34	E117	1	
			2	Yes	
Rear LH	ETZ5	37		3	165
		36	C13	4	
Rear RH		42		1	
		43		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Instal-</u> lation".

NO >> Repair the circuit.

Component Inspection

1.CHECK DATA MONITOR

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

BRC-48

INFOID:000000007818471

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

DTC/CIRCUIT DIAGNOSI		PE 1]
Wheel sensor	Vehicle speed (DATA MONITOR)	
R LH SENSOR		
R RH SENSOR	Nearly matches the speedometer dis-	
R LH SENSOR	play (±10% or less)	
RR RH SENSOR		
the inspection result norma	<u>al?</u>	
(ES >> Inspection End.		
NO >> Go to diagnosis p	procedure. Refer to <u>BRC-47, "Diagnosis Procedure"</u> .	
pecial Repair Require	ement INFOID:000000	0007818445
.ADJUSTMENT OF STEEF	RING ANGLE SENSOR NEUTRAL POSITION	
lways perform neutral posit	tion adjustment for the steering angle sensor when replacing the ABS act	tuator
nd electric unit (control unit).	. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU"	TRAL
OSITION : Description".		
>> GO TO 2		
CALIBRATION OF DECEL	L G SENSOR	
	f decel G sensor when replacing the ABS actuator and electric unit (control	l unit)
	TION OF DECEL G SENSOR : Description".	unity.
>> END		

C1116 STOP LAMP SWITCH

Description

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

DTC Logic

INFOID:000000007356720

INFOID:000000007356719

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-50, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356721

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.

2.STOP LAMP SWITCH INSPECTION

Check voltage between ABS actuator and electric unit (control unit) connector E125 terminal 39 and body ground.

Brake pedal depressed : Battery voltage

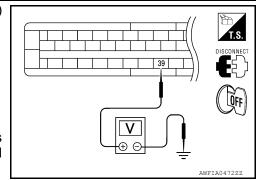
(approx. 12V) : Approx. 0V

Brake pedal released

Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.



C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.calibration of decel g sensor

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

>> END

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[TYPE 1]

INFOID:000000007818444

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August 2012

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

INFOID:000000007356724

INFOID:000000007356723

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-52, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356725

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

1.CONNECTOR INSPECTION

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and ele	nd electric unit (control unit) Continuity		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-112, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

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

Orecetien			ABS solenoid valv	e	1
	Operation	Up	Keep	Down	
FR RH SOL	FR RH IN SOL	Off	On	On	L
FR RH SOL	FR RH OUT SOL	Off	Off	On*	
FR LH SOL	FR LH IN SOL	Off	On	On	
	FR LH OUT SOL	Off	Off	On*	N
RR RH SOL	RR RH IN SOL	Off	On	On	
	RR RH OUT SOL	Off	Off	On*	N
RR LH SOL	RR LH IN SOL	Off	On	On	
	RR LH OUT SOL	Off	Off	On*	

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

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Go to diagnosis procedure. Refer to <u>BRC-52, "Diagnosis Procedure"</u>.

Special Repair Requirement

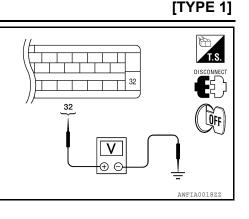
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

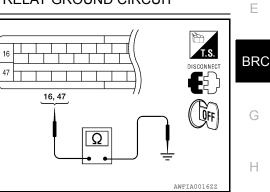
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

BRC-53



INFOID:000000007818450





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>> GO TO 2

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

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

>> END

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000007356729

INFOID:000000007356728

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-55, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

1.CONNECTOR INSPECTION

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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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INFOID:000000007818472

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

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

2. On the display, touch "Up", "Keep", and "Down", and check that the system operates as shown in the table below.

Operation			ABS solenoid valve	9
Open	allon	Up	Keep	Down
FR RH SOL	FR RH IN SOL	Off	On	On
FR RH SOL	FR RH OUT SOL	Off	Off	On*
50,111,001	FR LH IN SOL	Off	On	On
FR LH SOL	FR LH OUT SOL	Off	Off	On*
	RR RH IN SOL	Off	On	On
RR RH SOL	RR RH OUT SOL	Off	Off	On*
RR LH SOL	RR LH IN SOL	Off	On	On
RR LH SOL	RR LH OUT SOL	Off	Off	On*

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

Is the inspection result normal?

YES >> Inspection End.

>> Go to diagnosis procedure. Refer to <u>BRC-55, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007818451

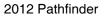
INFOID:000000007818473

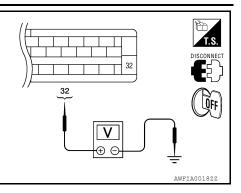
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

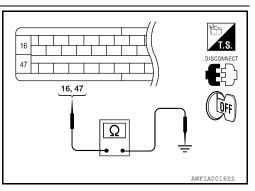
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description</u>".

NO

BRC-56









[TYPE 1]

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS > [T]	YPE 1]
>> GO TO 2	A
2.CALIBRATION OF DECEL G SENSOR Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (contro Refer to <u>BRC-13</u> , "CALIBRATION OF DECEL G SENSOR : Description".	ol unit). B
Refer to <u>BRC-13</u> , "CALIBRATION OF DECEL G SENSOR : Description".	
>> END	С
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C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

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

DTC Logic

INFOID:000000007356734

INFOID:000000007356733

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356735

1.CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-77. "CONSULT Function"</u>.
- 2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u>, <u>"CONSULT Func-tion (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

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

C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RLY

Description

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

DTC Logic

INFOID:000000007356737

INFOID:000000007356736

DTC DETECTION LOGIC

DTC	Display item	Malfunc	tion detected condition	Possible cause	D
C1140	ACTUATOR RLY	ABS actuator relay o	r circuit malfunction.	 Harness or connector ABS actuator and electric unit (control unit) 	E
DTC CC	NFIRMATION PROCE	DURE			
1 .CHEC	K SELF-DIAGNOSIS RE	ESULTS			BR
Check th	e self-diagnosis results.				DIX
	Self-diagnosis				G
ls ahove	displayed on the self-dia				
	>> Proceed to diagnosis		BRC-59, "Diagnosis F	Procedure".	Н
	>> Inspection End.				
Diagno	sis Procedure			INFOID:00000007818468	
Regardir	ig Wiring Diagram inform	ation, refer to BRC-	-88, "Wiring Diagram - '	With VQ40DE".	J
U					-
1.com	NECTOR INSPECTION				IZ.
1. Turn	ignition switch OFF.				K
	onnect ABS actuator and			any malfunction is found ropair or	
	ace terminal.			any malfunction is found, repair or	L
4. Reco (ABS		then perform the	self-diagnosis. Refer t	o BRC-29, "CONSULT Function	
	m indicated on the self-d	iagnosis display?			M
YES	>> GO TO 2				
~	>> Poor connection of co		• •		Ν
		TICH-OVER VALVE		LAY POWER SUPPLY CIRCUIT	
	ignition switch OFF. onnect ABS actuator and	l electric unit (contr	ol unit) connec-		\cap
tor.					0
	ck voltage between ABS connector E125 termina		tric unit (control		
-/					Ρ
ABS act	uator and electric unit (control	unit)	Voltage		
	nector Terminal				
	125 32 spection result normal?	Ground	Battery voltage		

August 2012

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C1140 ACTUATOR RLY

16 47

16, 47

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< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and ele	Continuity		
Connector	Terminal		
E125	16, 47	Ground	Yes

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:000000007818469

WFIA0016Z

OFF

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-43</u>, "Diagnosis Procedure".

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

August 2012

INFOID:000000007818452

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

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

DTC Logic

INFOID:000000007356742

INFOID:000000007356741

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1143	ST ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	 Harness or connector Steering angle sensor ABS actuator and electric unit (control unit) 	
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.		
DTC CC	ONFIRMATION PROCE	DURE		
1. CHE0	CK SELF-DIAGNOSIS RE	SULTS		
Check th	ne self-diagnosis results.			
	Self-diagnosis	resulte		
	ST ANG SEN C			
	ST ANG SEN S			
ls above	displayed on the self-diag	gnosis display?		
YES NO	>> Proceed to diagnosis >> Inspection End.	procedure. Refer to <u>BRC-61, "Diagnosis Proced</u>	lure".	
NO	>> Inspection Lifu.			
-	osis Procedure		INFOID:000000007356743	
-	·		INFOID:000000007356743	
Diagno	osis Procedure	ation, refer to BRC-88, "Wiring Diagram - With V		
Diagno	osis Procedure	ation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagno Regardir	osis Procedure	ation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagno Regardir 1.coni	ng Wiring Diagram informa	ation, refer to <u>BRC-88, "Wiring Diagram - With V</u>		
Diagno Regardir 1.CONI 1. Turr 2. Disc	ng Wiring Diagram informa NECTOR INSPECTION	electric unit (control unit) connector.		
Diagno Regardir 1. CONI 1. Turn 2. Disc 3. Disc	ng Wiring Diagram informa NECTOR INSPECTION ignition switch OFF. connect ABS actuator and connect steering angle ser	electric unit (control unit) connector.	' <u>Q40DE"</u> .	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Disc 4. Che repla	besis Procedure ang Wiring Diagram information NECTOR INSPECTION a ignition switch OFF. connect ABS actuator and connect steering angle ser ck terminal for deformation ace terminal.	electric unit (control unit) connector. nsor connector. n, disconnection, looseness, and so on. If any m	'Q40DE". alfunction is found, repair or	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Disc 4. Che repla	ng Wiring Diagram information NECTOR INSPECTION ignition switch OFF. connect ABS actuator and connect steering angle ser ck terminal for deformation ace terminal. onnect connectors and t	electric unit (control unit) connector.	'Q40DE". alfunction is found, repair or	
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Diagno Regardir 1.CONI 1. Turr 2. Disc 3. Disc 3. Disc 4. Che repla 5. Rec (ABS (ABS) (ABS) (ABS)	AND	electric unit (control unit) connector. nsor connector. n, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BR</u> iagnosis display?	'Q40DE". alfunction is found, repair or	
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Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Disc 4. Che repla 5. Rec (ABS NO YES NO 2.CHEC	ng Wiring Diagram information NECTOR INSPECTION ignition switch OFF. connect ABS actuator and connect steering angle ser ck terminal for deformation ace terminal. onnect connectors and the sem indicated on the self-di >> GO TO 2 >> Poor connection of co CK STEERING ANGLE SI	electric unit (control unit) connector. nsor connector. n, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BR(</u> <u>iagnosis display?</u> onnector terminal. Repair or replace connector.	'Q40DE". alfunction is found, repair or	
Diagno Regardir 1.CONI 1. Turn 2. Disc 3. Disc 4. Che repla 5. Rec (ABS NO YES NO 2.CHEC 1. Turn	Ang Wiring Diagram information NECTOR INSPECTION A ignition switch OFF. Sonnect ABS actuator and connect steering angle ser ck terminal for deformation ace terminal. onnect connectors and the solution steering angle ser ck terminal for deformation ace terminal for deformation ace terminal. onnect connectors and the solution steering angle ser ck terminal for deformation ace terminal for deformation ace terminal for deformation ace terminal for deformation ace terminal for deformation ace terminal for deformation ace terminal for def	electric unit (control unit) connector. nsor connector. n, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRG</u> <u>iagnosis display?</u> onnector terminal. Repair or replace connector. ENSOR HARNESS	'Q40DE". alfunction is found, repair or	

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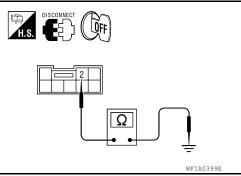
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C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between steering angle sensor connector M47 3. terminal 2 and ground.

Steering a	ngle sensor	Continuit	
Connector	Terminal		Continuity
M47	2	Ground	Yes



- Turn ignition switch ON. 4.
- Check voltage between steering angle sensor connector M47 5. terminal 3 and ground.

terminal 3 and	ground.			
Steering angle sensor			Voltage	
Connector	Terminal		voltage	
M47	3	Ground	Battery voltage	

Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.



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

Perform the steering angle sensor component inspection. Refer to BRC-62, "Component Inspection". 2.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-112, "Removal and Installation".
- NO >> Replace steering angle sensor. Refer to <u>BRC-114</u>, "Removal and Installation".

Component Inspection

INFOID:000000007356744

AWFIA0023Z

1.CHECK DATA MONITOR

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

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	0±2.5 °
Turn 90 ° to left	Approx. +90 °
Turn 90 ° to right	Approx. –90 °

Is the inspection result normal?

YES >> Inspection End.

>> Replace steering angle sensor. Refer to <u>BRC-114, "Removal and Installation"</u>. NO

Special Repair Requirement

INFOID:000000007818453

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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

>> END

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August 2012

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:000000007356747

INFOID:000000007356746

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-64, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356748

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

1.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

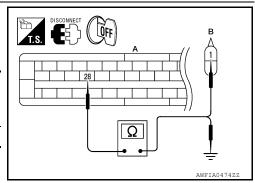
NO >> Repair or replace as necessary.

2. CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SWITCH AND ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

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

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

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



C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3. CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check continuity between brake fluid level switch connector E21 terminal 2 and ground.

Brake fluid	level switch		Continuity	
Connector	Terminal			
E21	2	Ground	Yes	

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Perform brake fluid level switch component inspection. Refer to BRC-65, "Component Inspection".

Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-112, "Removal and Installation".
- NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace brake fluid level switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

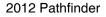
>> GO TO 2

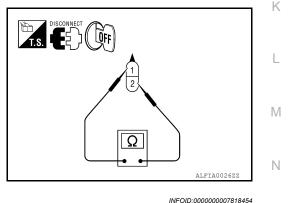
2.CALIBRATION OF DECEL G SENSOR

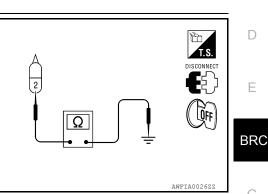
Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Description".



BRC-65









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INFOID:000000007356749

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[TYPE 1]

>> END

C1156 ST ANG SEN COM CIR

Description

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

DTC Logic

INFOID:000000007356752

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause			
C1156	ST ANG SEN COM CIR	When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric unit (control unit).	 Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit) 	BR(
DTC CC	ONFIRMATION PROC	EDURE				
1. CHEC	CK SELF-DIAGNOSIS R	ESULTS		Н		
Check th	ne self-diagnosis results.					
	Self-diagnosi			I		
	ST ANG SEN					
YES	<u>s above displayed on the self-diagnosis display?</u> YES >> Proceed to diagnosis procedure. Refer to <u>BRC-67, "Diagnosis Procedure"</u> .					
NO	>> Inspection End.					
Diagno	sis Procedure		INFOID:00000007356753	Κ		
1 .coni	NECTOR INSPECTION					
	ignition switch OFF.			L		
		d electric unit (control unit) connector. tion, disconnection, looseness, and so on. If any	malfunction is found repair			
or re	eplace terminals.		•	M		
4. Rec	onnect connector and pe	erform self-diagnosis. Refer to <u>BRC-29, "CONSU</u>	LT Function (ABS)".			
	Self-diagnosi	s results		N		
	CAN COMM	CIRCUIT		14		
	ST ANG SEN	COM CIR				
	displayed on the self-dia	agnosis display?		С		
<u>ls above</u> YES NO	displayed on the self-dia			0		

INFOID:000000007356751

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C1160 DECEL G SEN SET

Description

INFOID:000000007356754

[TYPE 1]

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:000000007356755

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

DECEL G SEN SET

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356756

1.PERFORM SELF-DIAGNOSIS

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

Self-diagnosis results

DECEL G SEN SET

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

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

2. PERFORM SELF-DIAGNOSIS AGAIN

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

Are any self-diagnosis results displayed?

- YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-115. "Removal and Installation"</u>.
- NO >> Inspection End.

C1163 ST ANGLE SEN SAFE

Description

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

DTC Logic

INFOID:000000007356758

INFOID:000000007356757

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position	
DTC CC	NFIRMATION PROCE	DURE		E
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS		
Check th	e self-diagnosis results.			BRC
	Self-diagnosis ST ANGL SEN			G
ls above	displayed on the self-diag			
YES		procedure. Refer to <u>BRC-69, "Diagnosis Proce</u>	edure".	Н
Diagno	sis Procedure		INFOID:00000007356759	
1 AD.IU	STMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION		
		al position. Refer to <u>BRC-12, "ADJUSTMENT</u>	OF STEERING ANGLE SEN-	
	UTRAL POSITION : Desc			J
-	>> GO TO 2 CATOR LAMP CHECK			Κ
		an is off		
	at VDC OFF indicator lan <u>DFF indicator lamp off?</u>			L
	>> Inspection End.			
NO	>> Perform ABS actuator <u>Function (ABS)</u> ".	and electric unit (control unit) self-diagnosis. I	Refer to <u>BRC-29, "CONSULT</u>	M
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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

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

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

INFOID:000000007356761

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-70, "Diagnosis Procedure"</u>. NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007818458

Regarding Wiring Diagram information, refer to <u>BRC-88, "Wiring Diagram - With VQ40DE"</u>.

1.CONNECTOR INSPECTION

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

Is any item indicated on the self-diagnosis display?

INFOID:000000007356760

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

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

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

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

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

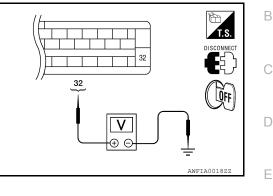
Operation		ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP
	FR RH IN SOL	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	Off	Off	Off
	FR LH IN SOL	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH OUT SOL	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	Off	Off	Off
	RR RH OUT SOL	Off	Off	Off
RR LH ABS SOLENOID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

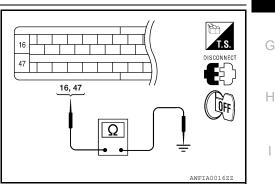
*: On for 1 to 2 seconds after the touch, and then Off

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-70, "Diagnosis Procedure"</u>.





INFOID:000000007356763

[TYPE 1]

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

Special Repair Requirement

INFOID:000000007818459

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

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

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

>> END

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. ^C Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:000000007356766

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
U1000	CAN COMM CIRCUIT	When ABS actuator and electric unit (control unit) is not transmitting or receiving CAN communication signal for 2 seconds or more.	 CAN communication line ABS actuator and electric unit (control unit) 	BR
Diagno	sis Procedure		INFOID:00000007356767	
1.com	NECTOR INSPECTION			G
 Disc Cheo or re 		r and electric unit (control unit) connector. rmation, disconnection, looseness, and so on. If t	here is a malfunction, repair	Н
	•	ved in self-diagnosis display items?		
YES	>> Print out the self-dia	gnostic results, and refer to <u>LAN-14, "Trouble Dia</u> s sloose, damaged, open, or shorted.	<u>gnosis Flow Chart"</u> .	
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				J
				J

INFOID:000000007356765

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VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF SWITCH

Description

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

Component Function Check

1.CHECK VDC OFF SWITCH OPERATION

Press and release the VDC OFF switch, then press and release the VDC OFF switch again and check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly.

Condition	VDC OFF indicator lamp illumination status
VDC OFF switch: pressed and released	ON
VDC OFF switch: pressed and released	OFF

Is the inspection result normal?

YES >> Inspection End.

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

Diagnosis Procedure

INFOID:000000007356770

Regarding Wiring Diagram information, refer to BRC-88, "Wiring Diagram - With VQ40DE".

1.CHECK VDC OFF SWITCH

Perform the VDC OFF switch component inspection. Refer to BRC-75. "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2

NO >> Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

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

ABS actuator and electric unit (control unit)		VDC OF	F switch	Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	6	M154 (B)	1	Yes

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

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

INFOID:000000007356769

INFOID:00000007356768

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between VDC OFF switch connector M154 and ground.

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

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installa-</u> tion".

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

Component Inspection

1.CHECK VDC OFF SWITCH

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

VDC OFF switch terminals	Condition	Continuity
1-2	When VDC OFF switch is pressed.	Yes
ι <i>-</i> Ζ	When VDC OFF switch is released.	No

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

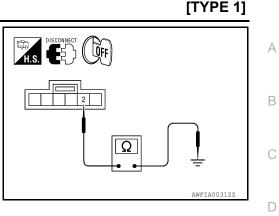
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL</u> <u>POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END



INFOID:000000007818462

INFOID:000000007356771

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ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007356773

×: ON –: OFF

[TYPE 1]

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

Component Function Check

INFOID:000000007356774

1.CHECK ABS WARNING LAMP OPERATION

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

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-76, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007356775

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007818463

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

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

>> END

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 1]

BRAKE WARNING LAWP		А
Description	INFOID:000000007356777	
	×: ON –: OFF	D
Condition	Brake warning lamp (Note 1)	В
Ignition switch OFF		
Ignition switch ON	× (Note 2)	С
EBD function is malfunctioning.	×	
NOTE:		
 1: Brake warning lamp will turn on in case of parking brake ope (when brake fluid is insufficient). 	ration (when switch is ON) or of brake fluid level switch operation	D
• 2: After starting engine, brake warning lamp is turned off.		Е
Component Function Check	INFOID:00000007356778	
1. BRAKE WARNING LAMP OPERATION CHECK		BRC
Check that the lamp illuminates after the ignition swi started.	itch is turned ON, and turns OFF after the engine is	
Is the inspection result normal?		G
YES >> Inspection End. NO >> Go to diagnosis procedure. Refer to <u>BRC-7</u>	77, "Diagnosis Procedure".	
Diagnosis Procedure	INFOID:00000007356779	Н
1.CHECK SELF-DIAGNOSIS		I
Perform ABS actuator and electric unit (control unit) s (ABS)".	self-diagnosis. Refer to <u>BRC-29, "CONSULT Function</u>	I
Is the inspection result normal?		J
YES >> GO TO 2		
NO >> Check items displayed by self-diagnosis.		
2.CHECK COMBINATION METER		Κ
Check if the indication and operation of combination m tion".	eter are normal. Refer to MWI-25, "Diagnosis Descrip-	
Is the inspection result normal?		L
	ontrol unit). Refer to <u>BRC-112, "Removal and Installa-</u>	
NO >> Replace combination meter. Refer to \underline{MWI} -	89. "Removal and Installation".	\mathbb{M}
Special Repair Requirement	INFOID:00000007818464	
1 . ADJUSTMENT OF STEERING ANGLE SENSOR N	EUTRAL POSITION	Ν
Always perform neutral position adjustment for the ste and electric unit (control unit). Refer to <u>BRC-12, "ADJU</u> <u>POSITION : Description"</u> .		0
>> GO TO 2		Р
2. CALIBRATION OF DECEL G SENSOR		
Always perform calibration of decel G sensor when rep Refer to <u>BRC-13</u> , "CALIBRATION OF DECEL G SENS		

>> END

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

INFOID:000000007356781

×: ON –: OFF

[TYPE 1]

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

Component Function Check

INFOID:000000007356782

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2

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

2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Check VDC OFF switch. Refer to <u>BRC-74. "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007356783

1.CHECK VDC OFF SWITCH

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check VDC OFF switch. Refer to <u>BRC-74. "Diagnosis Procedure"</u>.

2. CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.calibration of decel g sensor

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

>> END

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INFOID:000000007818465

SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

SLIP INDICATOR LAMP

Description

INFOID:000000007356785

INFOID:000000007356786

INFOID:000000007356787

×: ON –: OFF

[TYPE 1]

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

Component Function Check

1.CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-80. "Diagnosis Procedure"</u>.

Diagnosis Procedure

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112</u>, "<u>Removal and Installa-</u> tion".

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

Special Repair Requirement

INFOID:000000007818466

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

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

>> END

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

Application Notice

Service information	Remarks		C
TYPE 1	VDC/TCS/ABS (VQ40DE)		C
TYPE 2	VDC/TCS/ABS (VK56DE)		
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[TYPE 1]

INFOID:000000007818416

< ECU DIAGNOSIS INFORMATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000007356790

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

CONSULT MONITOR ITEM

CONSOLT MONITOR I		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
		0 [km/h (MPH)]	Vehicle stopped
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
		0 [km/h (MPH)]	Vehicle stopped
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON
FR RH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON
FR RH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON
FR LH IN SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF
	Operation status of each calculation	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON
FR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		Data monitor		-
Monitor item	Display content	Condition	Reference value in normal operation	- A
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	В
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	С
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	D
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	E
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	BRC
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	G
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	H
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON	-
	(Note 2)	When EBD warning lamp is OFF	OFF	-
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	ON	J
STOP LAWF SW		When brake pedal is released	OFF	-
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON	K
		When the motor relay and motor are not operating	OFF	_
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON	L
		When the actuator relay is not operating	OFF	_
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON	- M
	(Note 2)	When ABS warning lamp is OFF	OFF	_
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON	_
	(Note 2)	When VDC OFF indicator lamp is OFF	OFF	Ν
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	_
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	0
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
OLIF LAWIF	(Note 2)	When SLIP indicator lamp is OFF	OFF	Ρ
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	-
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5	-

< ECU DIAGNOSIS INFORMATION >

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
		With engine stopped	0 rpm
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display
	Yaw rate 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
R POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = R position	ON
R PUSI SIG	condition	A/T shift position = other than R position	OFF
4WD FAIL REQ	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON
(Note 3)		When transfer control unit is normal	OFF
	Transmission range switch signal ON/OFF	A/T shift position = N position	ON
N POSI SIG	condition	A/T shift position = other than N position	OFF
	Transmission range switch signal ON/OFF	A/T shift position = P position	ON
P POSI SIG	condition	A/T shift position = other than P position	OFF
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
CV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
SV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
SV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF
2\\/\/\/\/\/		2WD model	2WD
2WD/4WD	Drive axle	4WD model	4WD

< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation
	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 %
		Vehicle stopped	Approx. 0 m/s ²
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s ²)
		Vehicle turning left	Positive value (m/s ²)
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°
STIX ANGLE SIG	sensor	Steering wheel turned	–720 to +720°
PRESS SENSOR	Brake fluid pressure detected by pressure	With ignition switch turned ON and brake pedal released	Approx. 0 bar
FREDD DENDUK	sensor	With ignition switch turned ON and brake pedal depressed	–40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	ON
LDD SIGNAL		EBD is inactive	OFF
ABS SIGNAL	ABS operation	ABS is active	ON
ADS SIGNAL		ABS is inactive	OFF
TCS SIGNAL	TCS operation	TCS is active	ON
ICO SIGNAL		TCS is inactive	OFF
VDC SIGNAL	VDC operation	VDC is active	ON
VDC SIGNAL		VDC is inactive	OFF
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON
	רטט ומוי-זמוכ זועוומו	EBD is normal	OFF
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON
		ABS is normal	OFF
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON
		TCS is normal	OFF
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	ON
		VDC is normal	OFF
CRANKING SIG	Crank operation	Crank is active	ON
OLAINKIING SIG		Crank is inactive	OFF
	Brake fluid level switch signal status	When brake fluid level switch ON	ON
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF

NOTE:

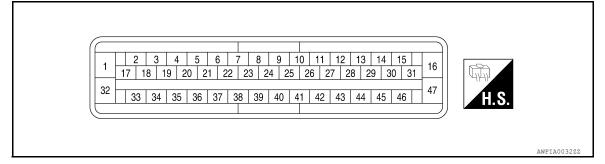
- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- · 3: Only 4WD models.
- ABS warning lamp: Refer to BRC-76, "Description".
- Brake warning lamp: Refer to BRC-77, "Description".
- VDC OFF indicator lamp: Refer to BRC-78, "Description".
- SLIP indicator lamp: Refer to BRC-80, "Description".

August 2012

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< ECU DIAGNOSIS INFORMATION >

TERMINAL LAYOUT



Fail-Safe

INFOID:000000007356791

CAUTION:

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

ABS/EBD SYSTEM

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

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

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

VDC/TCS SYSTEM

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

DTC No. Index

INFOID:000000007356792

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	BRC-34, "Description"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	BRC-37, "Description"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-40, "Description"
C1110	CONTROLLER FAILURE	BRC-42, "DTC Logic"
C1111	PUMP MOTOR	BRC-43, "Description"
C1113	G-SENSOR	BRC-45, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-47, "Description"
C1116	STOP LAMP SW	BRC-50, "Description"
C1120	FR LH IN ABS SOL	BRC-52, "Description"
C1121	FR LH OUT ABS SOL	BRC-55, "Description"
C1122	FR RH IN ABS SOL	BRC-52, "Description"
C1123	FR RH OUT ABS SOL	BRC-55, "Description"
C1124	RR LH IN ABS SOL	BRC-52, "Description"



< ECU DIAGNOSIS INFORMATION >

[TYPE 1]

DTC	Items (CONSULT screen terms)	Reference	
C1125	RR LH OUT ABS SOL	BRC-55, "Description"	A
C1126	RR RH IN ABS SOL	BRC-52, "Description"	-
C1127	RR RH OUT ABS SOL	BRC-55, "Description"	В
C1130	ENGINE SIGNAL 1		-
C1131	ENGINE SIGNAL 2		
C1132	ENGINE SIGNAL 3	BRC-58, "Description"	С
C1133	ENGINE SIGNAL 4		
C1136	ENGINE SIGNAL 6		D
C1140	ACTUATOR RLY	BRC-59, "Description"	
C1143	ST ANG SEN CIRCUIT	DDC 61 "Description"	-
C1144	ST ANG SEN SIGNAL	BRC-61, "Description"	E
C1145	YAW RATE SENSOR	DDC 45 "Description"	·
C1146	SIDE G-SEN CIRCUIT	BRC-45, "Description"	BR
C1155	BR FLUID LEVEL LOW	BRC-64, "Description"	
C1156	ST ANG SEN COM CIR	BRC-67, "Description"	•
C1160	DECEL G SEN SET	BRC-68, "Description"	G
C1163	ST ANGL SEN SAFE	BRC-69. "Description"	-
C1164	CV1		
C1165	CV2	BDC 70 "Description"	Η
C1166	SV1	BRC-70, "Description"	
C1167	SV2	1	I
C1170	VARIANT CODING	BRC-42, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-73, "Description"	

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< WIRING DIAGRAM >

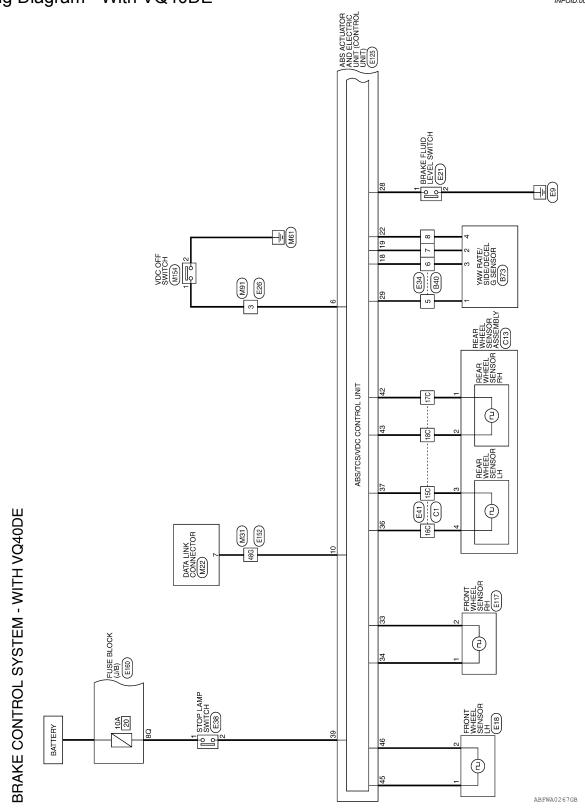
[TYPE 1]

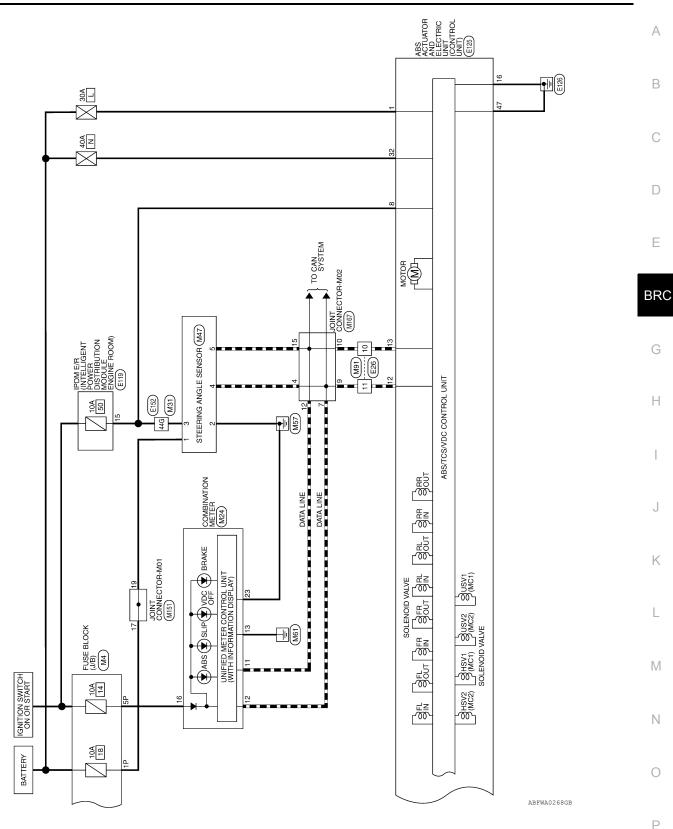
WIRING DIAGRAM

BRAKE CONTROL SYSTEM - VDC

Wiring Diagram - With VQ40DE





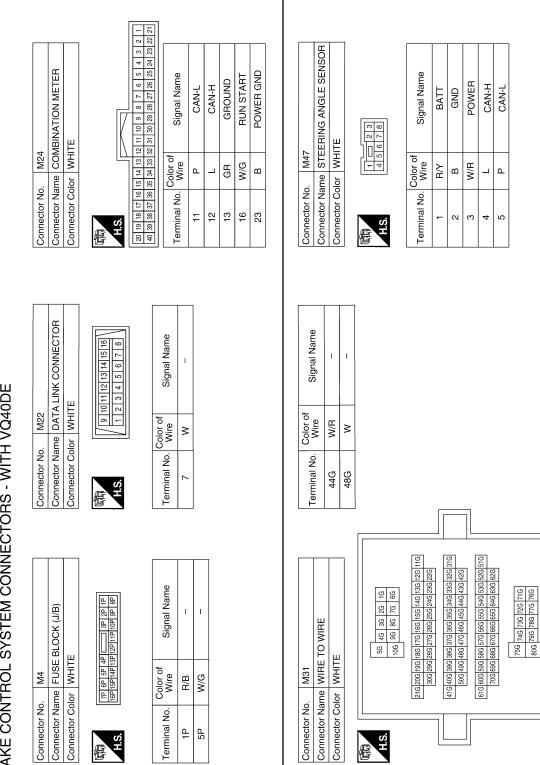


BRAKE CONTROL SYSTEM - VDC

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[TYPE 1]

August 2012



BRAKE CONTROL SYSTEM CONNECTORS - WITH VQ40DE

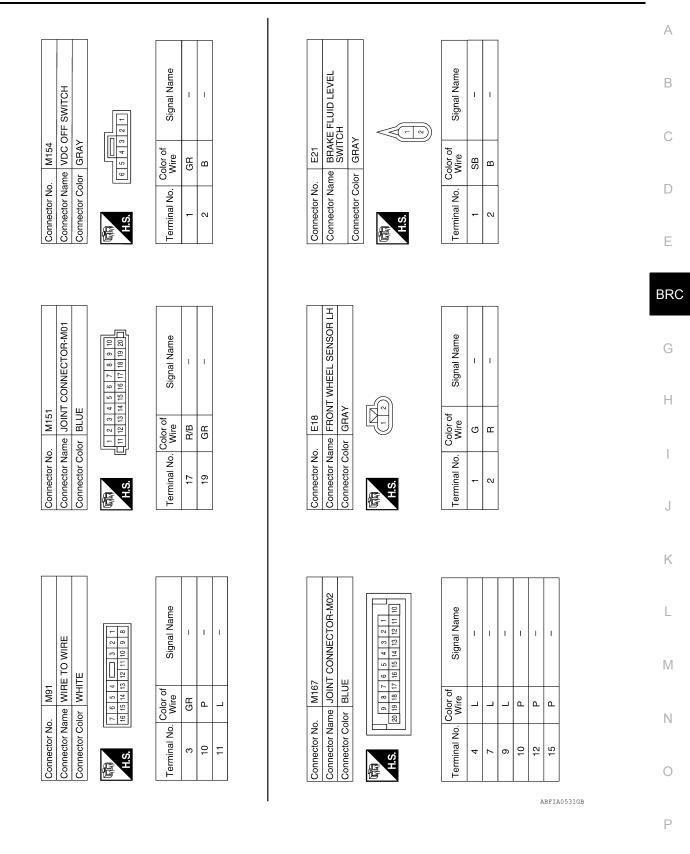
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BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

[TYPE 1]



BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >

WIRE TO WIRE Connector Name STOP LAMP SWITCH WHITE Connector Color WHITE	4321 124 H.S.	Color of Wire Signal Name Terminal No. Color of Wire BR - 1 R/B O - 2 Y	E119	FRONT WHEEL SENSOR RH GRAY Connector Name Connector Color		Color of Signal Name Terminal No. Wire	B - 15 W/R W		
Connector Name WIRE TO WIRE Connector Name Connector Name Connector Name Connector Color Connector Color	1 2 3 m 4 5 6 7 8 9 10 11 12 13 14 15 15 H.S.	Color of Signal Name Terminal No. Co Wire GR – 5 5 6	Connector No.	IE TO WIRE CK	10 100 20 100 30 100 30 100 30 100 30 100 30 100 30 100 30 400 30 400	200 200 200 400 200 300 400 200 300 200 400 200 700 200 200 200 200 200 200 200 200	25C	Color of Signat Name	

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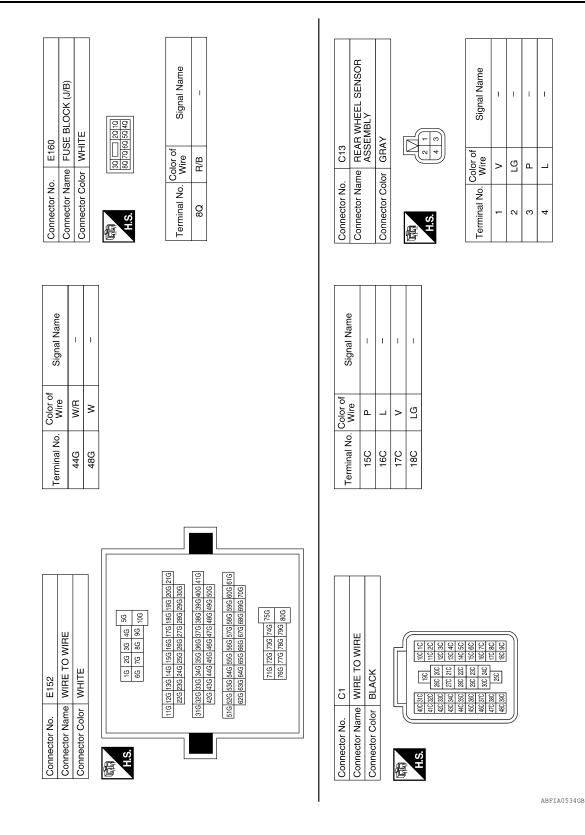
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[TYPE 1]

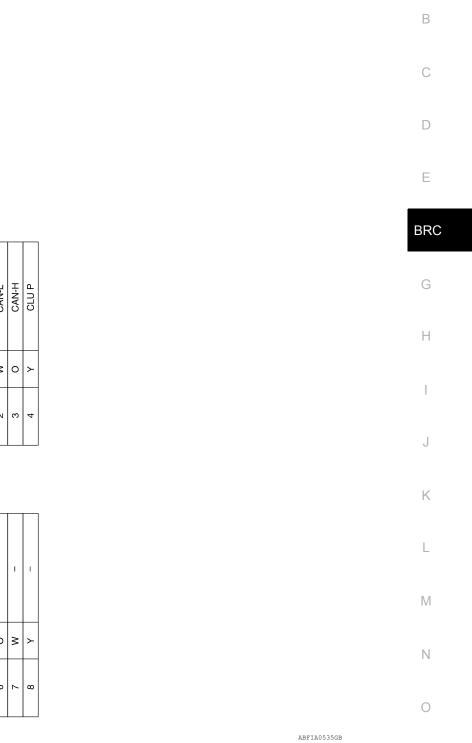
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Signal Name	CLUS GND	I	1	KL30 V	FR-RH SIG	FR-RH PWR	I	RR-LH PWR	RR-LH SIG	I	STOP LAMP SW	1	I	RR-RH SIG	ВВ-ВН Р В В В В В В В В В В В В В В В В В В В	I	FR-LH PWR	FR-LH SIG	GND P																В
Color of Wire	BR	1	1	7	×	в	1		٩	1	SB	1	1	>	ГG	1	IJ	æ	в																C
Terminal No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47																E
																		1		1															BRO
Signal Name	KL30-P	1	1	1	1	VDC OFF SW	1	IGN	1	DIAG K	I	CAN-H	CAN-L	1	I	GND V	I	CAN2-H	CAN2-L	1	1	CLUS SP	I	I	1	1	1	BRAKE LEVEL SW						I	G
Color of Wire	æ		1	1		GR		W/R		SB	1		а.	1	1	В		0	N		1	~	1	1	1		1	GR BF							Η
No. Colo						G		3		S	'				-		-		>		,			'			'	σ							
Terminal No.	-	N	ო	4	2	9	2	∞	6	10	1	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28							J
	DL									28 29 30 31 16	45 46 47																								K
	ELECTRIC UNIT (CONTROL	VQ40DE)									41 42 43 44 45 46																								L
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Connector No. E1	Connector Name EL	-	Connector Color BL					3	2 2 4 5 6	1 17 18 19 20 21 22 23 24 25 26 27	33 34 35 36 37																								Ν
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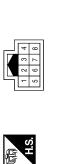


Connector Name YAW RATE/SIDE/DECEL G SENSOR Connector Color Connector No. Connector Name WIRE TO WIRE Connector Color WHITE B40 Connector No.

BLACK

B73

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Signal Name	I	I	I	I	
Color of Wire	BR	0	Μ	٢	
Terminal No.	5	9	7	8	

Signal Name CLU GND

Color of Wire

Terminal No.

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August 2012

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

INFOID:000000007818417

[TYPE 1]

Service information	Remarks
TYPE 1	VDC/TCS/ABS (VQ40DE)
TYPE 2	VDC/TCS/ABS (VK56DE)

VDC/TCS/ABS

< SYMPTOM DIAGNOSIS >

VDC/TCS/ABS Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation fre- quency	Looseness of front and rear axle	BRC-98, "Diagno- sis Procedure"	
quelley	Wheel sensor and rotor system		
	Brake pedal stroke	BRC-99, "Diagno-	
Unexpected pedal reaction	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-100, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-101, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-102, "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	BRC-103, "Diag- 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

August 2012

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

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

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[TYPE 1]

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-6</u>, "On-Vehicle Inspection and Service", Rear: <u>RAX-6</u>, "On-Vehicle Inspection and Service".

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

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

Is the inspection result normal?

YES >> GO TO 4

- NO >> Replace wheel sensor or sensor rotor. Refer to <u>BRC-110</u>, "<u>Removal and Installation</u>" (wheel sensor) or <u>BRC-111</u>, "<u>Removal and Installation</u>" (sensor rotor).
 - Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

YES >> Perform self-diagnosis. Refer to <u>BRC-29, "CONSULT Function (ABS)"</u>.

NO >> Inspection End.

UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS >	< 3	SYMP [®]	ТОМ	DIAGNOSIS >	•
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UNEXFECTED FEDAL REACTION	А
Diagnosis Procedure	~
1.CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to <u>BR-17</u> , "Inspection and Adjustment - Standard Pedal" or <u>BR-18</u> , "Inspection and Adjustment - Adjustable Pedal".	
Is the stroke too large?	С
 YES >> • Bleed air from brake tube and hose. Refer to <u>BR-20, "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-17, "Inspection and Adjustment - Standard Pedal"</u> or <u>BR-18, "Inspection and Adjustment - Adjustable Pedal"</u> (brake pedal), <u>BR-50, "Disassembly and Assembly"</u> (master cylinder), <u>BR-10, "Inspection"</u> (brake booster). 	D
NO >> GO TO 2	E
2.CHECK FUNCTION	
Disconnect ABS actuator and electric unit (control unit) connector to deactivate ABS. Check if braking force is normal in this condition. Connect connector after inspection.	BRC
Is the inspection result normal?	
YES >> Inspection End.	
NO >> Check brake system.	G
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THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000007356798

[TYPE 1]

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS > [TYPE]]
ABS FUNCTION DOES NOT OPERATE	
Diagnosis Procedure	799
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY	В
Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal?	С
 YES >> Inspection End. NO >> Perform self-diagnosis. Refer to <u>BRC-29, "CONSULT Function (ABS)"</u>. 	D

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PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

CAUTION:

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

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

1.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2

NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

YES >> GO TO 3

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

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

[TYPE 1]

INFOID:000000007356800

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL < SYMPTOM DIAGNOSIS > [TYPE 1]	
VEHICLE JERKS DURING VDC/TCS/ABS CONTROL	A
Diagnosis Procedure	~
1. SYMPTOM CHECK	В
Check if the vehicle jerks during VDC/TCS/ABS control.	
Is the inspection result normal? YES >> Inspection End. NO >> GO TO 2	С
NO >> GO TO 2 2.CHECK SELF-DIAGNOSIS RESULTS	D
Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-29</u> , "CONSULT Function (<u>ABS</u>)".	
Are self-diagnosis results indicated?	Ε
YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-29</u> , " <u>CONSULT Function (ABS)</u> ".	
NO >> GO TO 3 3.CHECK CONNECTOR	BR
 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. 	G
<u>Are self-diagnosis results indicated?</u> YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace.	Н
NO >> GO TO 4	
4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS	1
Perform ECM and TCM self-diagnosis. Refer to <u>EC-77, "CONSULT Function"</u> or <u>TM-37, "CONSULT Function</u> (<u>TRANSMISSION)"</u> .	
Are self-diagnosis results indicated?	J
 YES >> Check the corresponding items. ECM: Refer to <u>EC-77, "CONSULT Function"</u>. 	
 TCM: Refer to <u>TM-37, "CONSULT Function (TRANSMISSION)"</u>. NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-112, "Removal and Installation"</u>. 	K
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NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

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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.	T I. 1. 1	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	This is a normal condi- tion due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.		
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is normal, and it is caused by the ABS operation check.	
Depending on the road conditions, the driver may experience a sluggish feel.	This is normal, because	
TCS may activate momentarily if wheel speed changes when driving over location where friction coefficient varies, when downshifting, or when fully depressing accelerator pedal.	TCS places the highest priority on the optimum traction (stability).	
The ABS warning lamp and SLIP indicator lamp may turn ON when the vehicle is subject to strong shaking or large vibration, such as when the vehicle is rotating on a turntable or located on a ship while the engine is running.	In this case, restart the engine on a normal	
VDC may not operate normally or the ABS warning lamp and SLIP indicator lamp may illuminate, when run- ning on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal con- dition is restored, there is no malfunction. At 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.)	
SLIP indicator lamp may simultaneously turn on when low tire pressure warning lamp turns on.	This is not a VDC sys- tem error but results from characteristic change of tire.	

PRECAUTION 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.

WARNING:

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

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

WARNING:

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

INFOID:000000007356804

NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYS-TEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

- Connect both battery cables.
 NOTE: Supply power using jumper cables if battery is discharged.
- 2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
- 3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
- 4. Perform the necessary repair operation.

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PRECAUTIONS

< PRECAUTION >

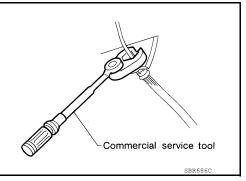
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- 5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
- 6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Brake System

CAUTION:

- Refer to <u>MA-18, "FOR USA AND CANADA : Fluids and Lubricants"</u> (United States and Canada), <u>MA-20, "FOR MEXICO : Fluids and Lubricants"</u> (Mexico) for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.



Refer to <u>BR-41, "Brake Burnishing"</u> (front disc brake) or <u>BR-46, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

Precaution for Brake Control

INFOID:000000007356806

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may
 cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not
 operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.

PRECAUTIONS

< PRECAUTION >

[TYPE 1]

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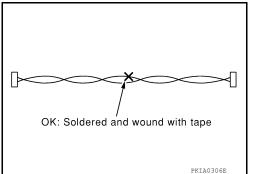
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe D 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. BRC

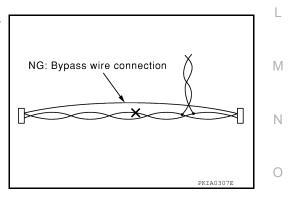
NOTE:

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).





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

PREPARATION PREPARATION

Special Service Tool

INFOID:000000007356808

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	Vertacloie	Checking operation of ABS active wheel sen- sors
ST30031000 (—) Bearing puller	22A0700D	Removing sensor rotor
ST30720000 (J-25405) Drift		Installing rear sensor rotor a: 77 mm (0.03 in) diameter b: 55 mm (2.17 in) diameter
ST27863000 (—) Drift	ZZA0832D	Installing rear sensor rotor a: 75 mm (2.95 in) diameter b: 62 mm (2.44 in) diameter
KV40104710 (—) Drift	ZZA0832D	Installing rear sensor rotor a: 76 mm (2.99 in) diameter b: 68.5 mm (2.697 in) diameter

PREPARATION

< PREPARATION >

Commercial Service Tool

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[TYPE 1]

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

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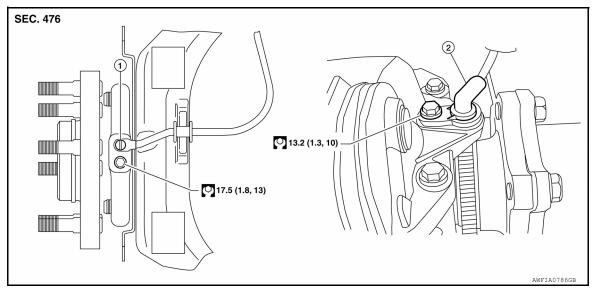
< UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION WHEEL SENSORS

Removal and Installation

INFOID:000000007356810

[TYPE 1]



1. Front wheel sensor LH 2. Rear wheel sensor RH

REMOVAL

- 1. If removing the front wheel sensor, remove the disc rotor to gain access to the front wheel sensor bolt. Refer to <u>BR-42</u>, "<u>Removal and Installation of Brake Caliper and Disc Rotor</u>".
- 2. If removing the rear wheel sensor, remove the spare tire.
- 3. Remove the wheel sensor bolt.
- Pull the wheel sensor out, being careful to turn it as little as possible. CAUTION:
 - Be careful not to damage wheel sensor edge or the sensor rotor teeth.
 - Do not pull on the wheel sensor harness.
- 5. Disconnect the wheel sensor harness connector, then remove the wheel sensor harness from the mounts and remove the wheel sensor.
 - When removing the rear wheel sensor, both sensors must be removed as they are on the same harness.

INSTALLATION

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

- Inspect wheel sensor O-ring, replace wheel sensor if damaged.
- Before installing the wheel sensor, make sure no foreign materials (such as iron fragments) are adhered to the pick-up part of the wheel sensor, to the inside of the wheel sensor hole or on the sensor rotor in the wheel hub assembly.
- Clean wheel sensor hole and mating surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle or wheel hub assembly.

NOTE:

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

SENSOR ROTOR

< UNIT REMOVAL AND INSTALLATION >

SENSOR ROTOR

Removal and Installation

FRONT WHEEL SENSOR ROTOR

The front wheel sensor rotors are built into the front wheel hub and bearing assemblies and are not removable. If damaged, replace the front wheel hub and bearing assembly. Refer to <u>FAX-10</u>, "<u>Removal and Installa-tion</u>".

REAR WHEEL SENSOR ROTOR

Removal

1. Remove the side flange from the final drive assembly. Refer to <u>DLN-423, "Removal and Installation"</u>. **CAUTION:**

Discard side oil seal.

2. Using suitable tool with Tool (puller), Remove the sensor rotor from the side flange.

```
Tool number : ST30031000 ( — )
```

Installation

1. Install the new sensor rotor on the side flange using Tools and a suitable press as shown. Make sure the sensor rotor is fully seated on the side flange.

```
Tool numbers A: ST30720000 (J-25405)
B: ST27863000 ( — )
C: KV40104710 ( — )
```

CAUTION:

Do not reuse the old sensor rotor.

 Install the side flange on the final drive assembly. Refer to <u>DLN-423, "Removal and Installation"</u>. CAUTION:

Do not reuse the side oil seal. The side oil seal must be replaced every time the side flange is ${\rm \ K}$ removed from the final drive assembly.

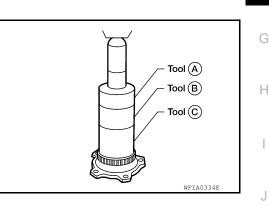
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

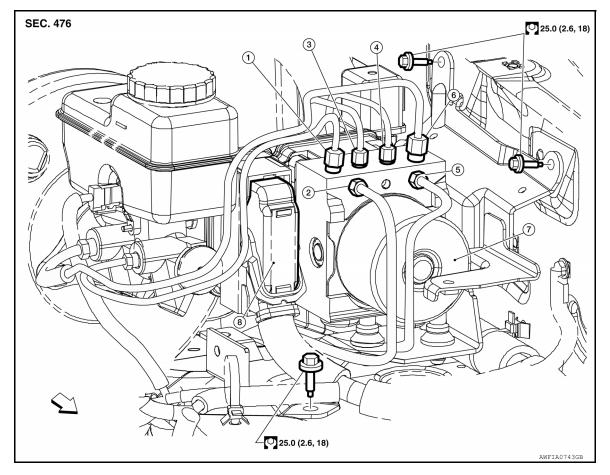
< UNIT REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:000000007356812

[TYPE 1]



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

✓ Front

NOTE:

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

REMOVAL

- 1. Disconnect the battery negative terminal.
- 2. Remove the air cleaner and air duct. Refer to EM-26, "Removal and Installation".
- 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) and bracket.
- Remove the bracket from the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

BRC-112

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< UNIT REMOVAL AND INSTALLATION >

If the ABS actuator and electric unit (control unit) is replaced, the neutral position of the steering angle sensor position must be reset. Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair A <u>Requirement</u>".

CAUTION:

- To tighten the brake tube flare nuts use a suitable tool (flare nut wrench).
- Always tighten the brake tube flare nuts to specification when installing.
- Never reuse the drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill the brake system with new brake fluid. Then bleed the air from the brake system. Refer to <u>BR-20, "Bleeding Brake System"</u>.
- If the ABS actuator and electronic unit (control unit) is replaced, the neutral position of the steering angle sensor must be reset. Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair <u>Requirement</u>".

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< UNIT REMOVAL AND INSTALLATION >

STEERING ANGLE SENSOR

Removal and Installation

REMOVAL

- 1. Remove the spiral cable. Refer to SR-7, "Removal and Installation".
- 2. Remove the screws and remove the steering angle sensor from the spiral cable.

INSTALLATION

Installation is in the reverse order of removal.

 Reset the neutral position of the steering angle sensor. Refer to <u>BRC-13, "CALIBRATION OF DECEL G</u> <u>SENSOR : Special Repair Requirement"</u>.

CAUTION:

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the steering angle sensor. Refer to <u>BRC-13</u>, <u>"CALIBRATION OF DECEL G SENSOR : Special Repair Requirement"</u>.

[TYPE 1]

< UNIT REMOVAL AND INSTALLATION >

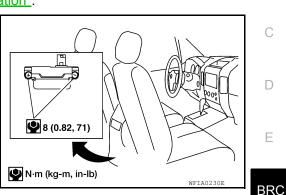
YAW RATE/SIDE/DECEL G SENSOR

Removal and Installation

REMOVAL

- 1. Remove the center console. Refer to <u>IP-22, "Removal and Installation"</u>.
- 2. Remove the yaw rate/side/decel G sensor nuts as shown. CAUTION:
 - Do not use power tools to remove or install the yaw rate/ side/decel G sensor.
 - Do not drop or strike the yaw rate/side/decel G sensor. NOTE:

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



3. Disconnect the yaw rate/side/decel G sensor connector and remove the yaw rate/side/decel G sensor.

INSTALLATION

Installation is in the reverse order of removal.

• After installing the yaw rate/side/decel G sensor, it is necessary to calibrate the yaw rate/side/decel G sensor. Refer to <u>BRC-13</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

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[TYPE 1]

INFOID:000000007356814

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BASIC INSPECTION APPLICATION NOTICE

Application Notice

INFOID:000000007818418

[TYPE 2]

Service information	Remarks
TYPE 1	VDC/TCS/ABS (VQ40DE)
TYPE 2	VDC/TCS/ABS (VK56DE)

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-121</u>, "ADJUSTMENT OF STEERING ANGLE С SENSOR NEUTRAL POSITION : Description".

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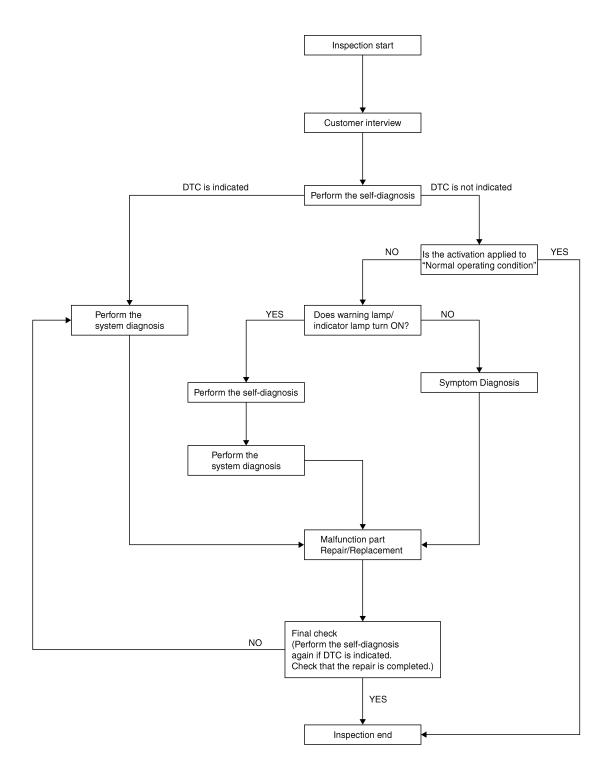
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[TYPE 2]

INFOID:000000007356816

< BASIC INSPECTION >

OVERALL SEQUENCE



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DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER $\left(1 - \frac{1}{2} \right)$

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-120</u>, <u>"Diagnostic Work Sheet"</u>.

< BASIC INSPECTION >	[TYPE 2]
>> GO TO 2	
2.PERFORM THE SELF-DIAGNOSIS	
Check the DTC display with the self-diagnosis function. Refer to BRC-138, "CONSULT Function (<u>ABS)"</u> .
Is there any DTC displayed?	
YES >> GO TO 3 NO >> GO TO 4	
NO >> GO TO 4 3.PERFORM THE SYSTEM DIAGNOSIS	
Perform the diagnosis applicable to the displayed DTC. Refer to <u>BRC-205, "DTC No. Index"</u> .	
>> GO TO 7	
4. CHECK THE SYMPTOM THAT IS NOT CONSIDERED A SYSTEM MALFUNCTION	
Check that the symptom is a normal operation that is not considered a system malfunction. Refer	to <u>BRC-223.</u>
Is the symptom a normal operation?	
YES >> Inspection End. NO >> GO TO 5	
5. CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION	
 Check that the warning lamp and indicator lamp illuminate. ABS warning lamp: Refer to <u>BRC-195, "Description"</u>. 	
 Brake warning lamp: Refer to <u>BRC-196, "Description"</u>. 	
 VDC OFF indicator lamp: Refer to <u>BRC-197, "Description"</u>. SLIP indicator lamp: Refer to <u>BRC-199, "Description"</u>. 	
Is ON/OFF timing normal?	
YES >> GO TO 6	
NO >> GO TO 2	
6. PERFORM THE DIAGNOSIS BY SYMPTOM	
Perform the diagnosis applicable to the symptom.	
>> GO TO 7	
7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS	
Repair or replace the specified malfunctioning parts.	
>> GO TO 8	
8.FINAL CHECK	
Perform the self-diagnosis again, and check that the malfunction is repaired completely. After che	cking oraco
the self-diagnosis memory. Refer to <u>BRC-138, "CONSULT Function (ABS)"</u> .	chilly, elase
-	
Is no other DTC present and the repair completed?	
<u>Is no other DTC present and the repair completed?</u> YES >> Inspection End. NO >> GO TO 3	

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000007356817

[TYPE 2]

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

SFIA3265E

INSPECTION ANI	D ADJUSTMENT
< BASIC INSPECTION >	[TYPE 2]
INSPECTION AND ADJUSTMENT	
ADDITIONAL SERVICE WHEN REPLAC	ING CONTROL UNIT
ADDITIONAL SERVICE WHEN REPLACIN	
After replacing the ABS actuator and electric unit (contr • Neutral position adjustment for the steering angle sen • Calibration of the decel G sensor	ol unit), perform the following procedures:
ADDITIONAL SERVICE WHEN REPLACIN quirement	IG CONTROL UNIT : Special Repair Re-
1.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 2.PERFORM CALIBRATION OF THE DECEL G SENS	SOR
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor.	<u>CEL G SENSOR : Special Repair Requirement"</u> . SENSOR NEUTRAL POSITION
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</u> , "CALIBRATION OF DEC ADJUSTMENT OF STEERING ANGLE S	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122. "CALIBRATION OF DEC</u> ADJUSTMENT OF STEERING ANGLE SE ADJUSTMENT OF STEERING ANGLE SE	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID 00000007356820 teering angle sensor neutral position is required.
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122. "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 INFOLD:00000007356820 teering angle sensor neutral position is required. x: Required -: Not required
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122, "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>	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007356820 teering angle sensor neutral position is required. x: Required -: Not required
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122. "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 INFOLD:000000007356820 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position —
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</u> , <u>"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) Replacing ABS actuator and electric unit (control unit)	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID-00000007356820 teering angle sensor neutral position is required. X Required -: Not required Adjustment of steering angle sensor neutral position
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122. "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) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:000000007356820 teering angle sensor neutral position is required. X: Required -: Not required Adjustment of steering angle sensor neutral position
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</u> , <u>"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) 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 NSOR NEUTRAL POSITION : Description INFOID:00000007356620 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
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122. "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) 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 NSOR NEUTRAL POSITION : Description INFOLD:00000007356820 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
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</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 <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 Replacing steering components	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOID:00000007356620 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 X X X
2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</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 <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 Removing/Installing suspension components	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007356820 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 X X X X X
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2.PERFORM CALIBRATION OF THE DECEL G SENS Perform calibration of the decel G sensor. >> Refer to <u>BRC-122</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 <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 Removing/Installing suspension components Replacing suspension components Replacing suspension components Replacing suspension components Replacing suspension components	CEL G SENSOR : Special Repair Requirement". SENSOR NEUTRAL POSITION NSOR NEUTRAL POSITION : Description INFOLD:00000007356820 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 X X X X X

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

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< BASIC INSPECTION >

>> GO TO 2

$\mathbf{2}$. PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR

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

>> GO TO 3

3.CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4

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

4.ERASE THE SELF-DIAGNOSIS MEMORY

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

ABS actuator and electric unit (control unit): Refer to <u>BRC-138, "CONSULT Function (ABS)"</u>.

ECM: Refer to <u>EC-533</u>, "CONSULT Function".

Are the memories erased?

YES >> Inspection End.

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

CALIBRATION OF DECEL G SENSOR

CALIBRATION OF DECEL G SENSOR : Description

INFOID:000000007356822

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

×: Required –: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:000000007356823

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

INSPECTION AND ADJUSTMENT

INSPECTION AND ADJUST MENT	
< BASIC INSPECTION >	[TYPE 2]
(Calibration cannot be done without CONSULT)	
1.ALIGN THE VEHICLE STATUS	
Stop vehicle with front wheels in straight-ahead position.	
>> GO TO 2	
2. PERFORM CALIBRATION OF DECEL G SENSOR	
1. On the CONSULT screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in or	der.
 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	
3. CHECK DATA MONITOR	
1. Run vehicle with front wheels in straight-ahead position, then stop. 2. Select "DATA MONITOR". Then make sure "DECEL G-SEN" is within \pm 0.08G.	
Is the inspection result normal?	
YES >> GO TO 4	
NO >> Perform calibration of decel G sensor again, GO TO 1	
4. ERASE THE SELF-DIAGNOSIS MEMORY	
Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.	
 ABS actuator and electric unit (control unit): Refer to <u>BRC-138, "CONSULT Function (ABS)"</u>. ECM: Refer to <u>EC-533, "CONSULT Function"</u>. 	
Are the memories erased?	
YES >> Inspection End.	
NO >> Check the items indicated by the self-diagnosis.	

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APPLICATION NOTICE

< SYSTEM DESCRIPTION >

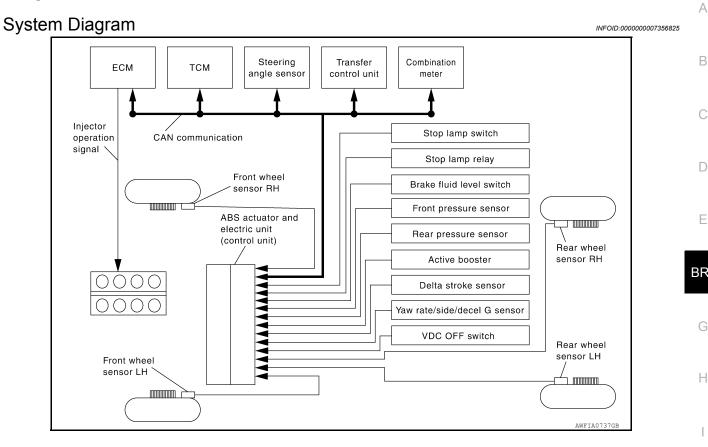
SYSTEM DESCRIPTION APPLICATION NOTICE

Application Notice

INFOID:000000007818419

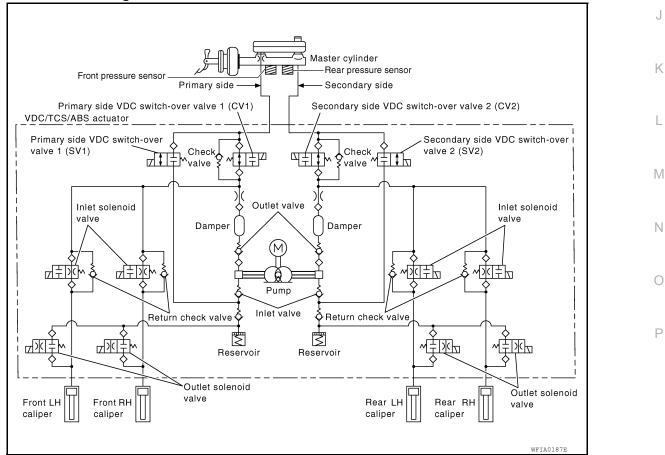
Service information	Remarks
TYPE 1	VDC/TCS/ABS (VQ40DE)
TYPE 2	VDC/TCS/ABS (VK56DE)

VDC



VDC

Hydraulic Circuit Diagram



BRC

INFOID:000000007356826

System Description

[TYPE 2]

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

Component Parts Location

[TYPE 2]

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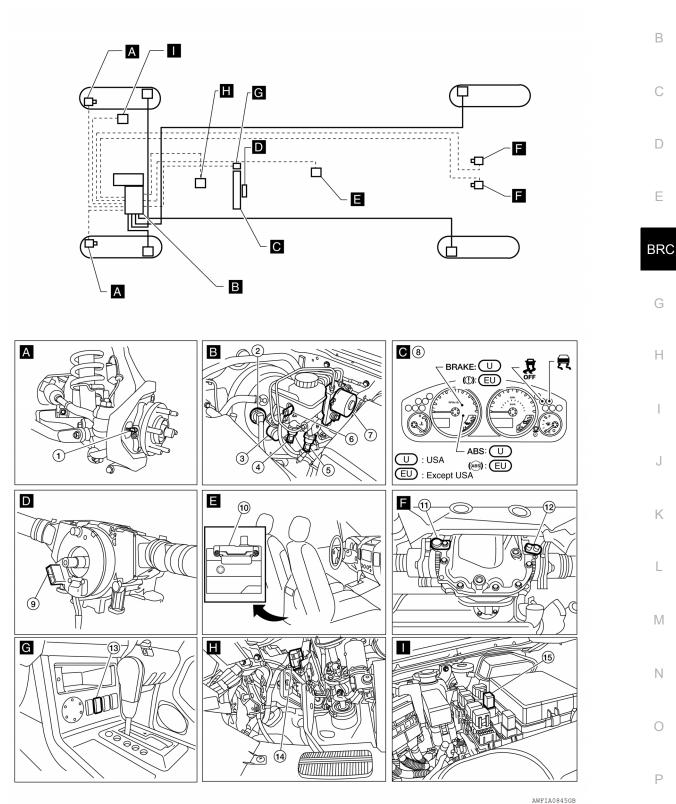
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- Front wheel sensor LH E18 1. Front wheel sensor RH E117
- Front pressure sensor E31 4.
- 7. ABS actuator and electric unit (control 8. unit) E127
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- Active booster E49 3.
- Brake fluid level switch E21 6.
- 9. Steering angle sensor (behind spiral cable) M47

August 2012

BRC-127

VDC



[TYPE 2]

10. Yaw rate/side/decel G sensor B73

Component Description

- 13. VDC OFF switch M154
- 11. Rear wheel sensor LH C13
- 14. Stop lamp switch E38

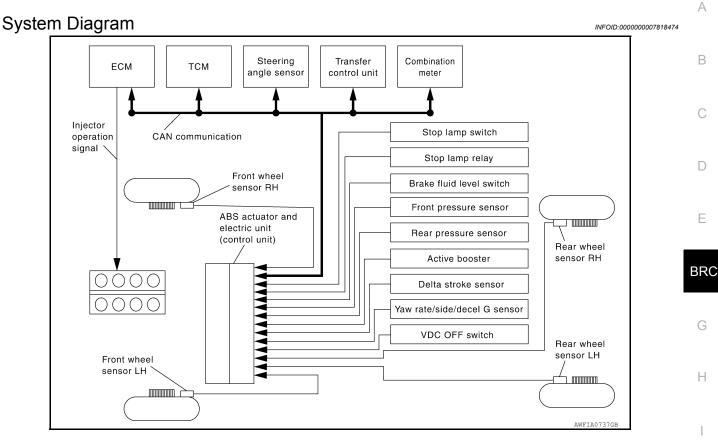
12. Rear wheel sensor RH C13

15. Stop lamp relay E12

INFOID:000000007356829

Component parts		Reference	
	Pump	DDC 152 "Deceription"	
ABS actuator and electric unit (control unit)	Motor	BRC-153, "Description"	
	Actuator relay	BRC-169, "Description"	
	Solenoid valve	BRC-162, "Description"	
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-184, "Description"	
Wheel sensor		BRC-144, "Description"	
Yaw rate/side/decel G sensor		BRC-155, "Description"	
Stop lamp switch		BRC-160, "Description"	
Front pressure sensor		DDC 171 "Decerities"	
Rear pressure sensor		BRC-171, "Description"	
Steering angle sensor		BRC-175, "Description"	
Brake fluid level switch		BRC-178, "Description"	
Active booster		BRC-187, "Description"	
Delta stroke sensor		BRC-190, "Description"	
VDC OFF switch		BRC-193, "Description"	
ABS warning lamp		BRC-195, "Description"	
Brake warning lamp		BRC-196, "Description"	
VDC OFF indicator lamp		BRC-197, "Description"	
SLIP indicator lamp		BRC-199, "Description"	

TCS



TCS

System Description

INFOID:000000007356831

[TYPE 2]

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

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Component Parts Location

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TCS

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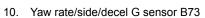
- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (control 8. unit) E127
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor (behind spiral cable) M47

August 2012

BRC-130



- 13. VDC OFF switch M154
- Component Description
- 11. Rear wheel sensor LH C13

TCS

14. Stop lamp switch E38

12. Rear wheel sensor RH C13

15. Stop lamp relay E12

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INFOID:000000007818478

[TYPE 2]

Component parts		Reference	
Pump			
	Motor	BRC-153, "Description"	0
ABS actuator and electric unit (control unit)	Actuator relay	BRC-169, "Description"	
	Solenoid valve	BRC-162, "Description"	D
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-184, "Description"	
Wheel sensor		BRC-144, "Description"	E
Yaw rate/side/decel G sensor		BRC-155, "Description"	
Stop lamp switch		BRC-160, "Description"	BRC
Front pressure sensor		BRC-171, "Description"	
Rear pressure sensor			
Steering angle sensor		BRC-175, "Description"	G
Brake fluid level switch		BRC-178, "Description"	
Active booster		BRC-187, "Description"	Н
Delta stroke sensor		BRC-190, "Description"	
VDC OFF switch		BRC-193, "Description"	
ABS warning lamp		BRC-195, "Description"	
Brake warning lamp		BRC-196, "Description"	
VDC OFF indicator lamp		BRC-197, "Description"	
SLIP indicator lamp		BRC-199, "Description"	J

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System Diagram INFOID:000000007818475 Steering Transfer Combination ECM тсм angle sensor control unit meter Injector Stop lamp switch operation CAN communication signal Stop lamp relay Front wheel Brake fluid level switch sensor RH Front pressure sensor ABS actuator and electric unit Rear pressure sensor (control unit) Rear wheel Active booster sensor RH Delta stroke sensor Yaw rate/side/decel G sensor

ABS

System Description

Front wheel sensor LH

INFOID:000000007356835

Rear wheel sensor LH

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AWFIA0737

• 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.

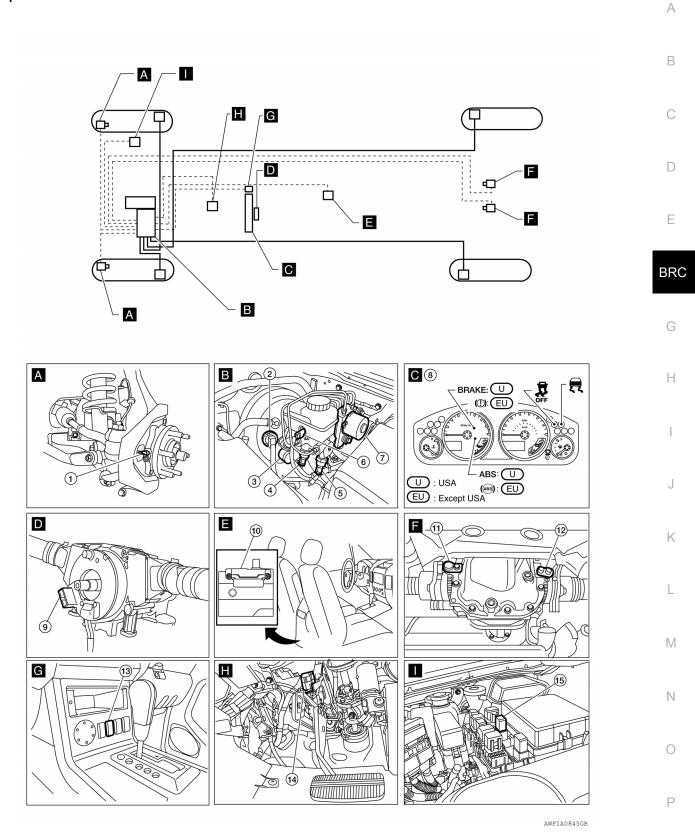
VDC OFF switch

• Electrical system diagnosis by CONSULT is available.

Component Parts Location

[TYPE 2]

INFOID:000000007818479



- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (control 8. unit) E127
- 2. Delta stroke sensor E114

5.

Rear pressure sensor E32 Combination meter M24

BRC-133

- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor (behind spiral cable) M47

August 2012

ABS



[TYPE 2]

- 10. Yaw rate/side/decel G sensor B73
- 13. VDC OFF switch M154
- 11. Rear wheel sensor LH C13
- 14. Stop lamp switch E38

12. Rear wheel sensor RH C13

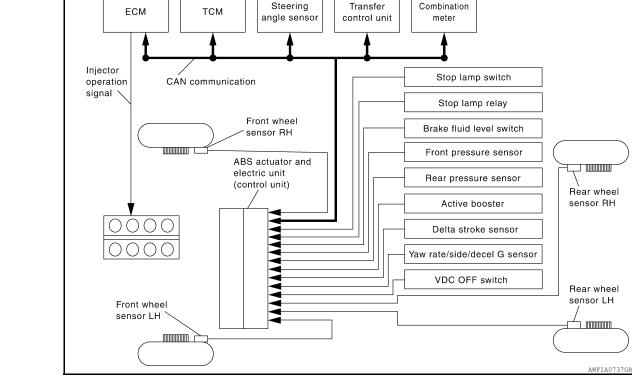
15. Stop lamp relay E12

INFOID:000000007818480

Component parts		Reference
	Pump	PDC 152 "Description"
ABS actuator and electric unit (control unit)	Motor	BRC-153, "Description"
	Actuator relay	BRC-169, "Description"
	Solenoid valve	BRC-162, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-184, "Description"
Wheel sensor		BRC-144, "Description"
Yaw rate/side/decel G sensor		BRC-155, "Description"
Stop lamp switch		BRC-160, "Description"
Front pressure sensor		PDC 171 "Description"
Rear pressure sensor		BRC-171, "Description"
Steering angle sensor		BRC-175, "Description"
Brake fluid level switch		BRC-178, "Description"
Active booster		BRC-187, "Description"
Delta stroke sensor		BRC-190, "Description"
VDC OFF switch		BRC-193, "Description"
ABS warning lamp		BRC-195, "Description"
Brake warning lamp		BRC-196, "Description"
VDC OFF indicator lamp		BRC-197, "Description"
SLIP indicator lamp		BRC-199, "Description"

Component Description

System Diagram



EBD

System Description

INFOID:000000007356839

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

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Component Parts Location

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А Η _ G þ ·---Ó D F ¢ D Ċ d F Е Æ С В А А **C** ⑧ В \square^2 ₿ BRAKE: U (I): EU \overline{O} 6 ABS: U 1 U : USA (З EU : Except USA (4 (5) D Е **F**_-(1 10 (12) 2 Г C 9 616 G Н 15 14 Ø

EBD

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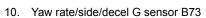
- 1. Front wheel sensor LH E18 Front wheel sensor RH E117
- 4. Front pressure sensor E31
- 7. ABS actuator and electric unit (control 8. unit) E127
- 2. Delta stroke sensor E114

5.

- Rear pressure sensor E32 Combination meter M24
- 3. Active booster E49
- 6. Brake fluid level switch E21
- 9. Steering angle sensor (behind spiral cable) M47

August 2012

BRC-136



- 13. VDC OFF switch M154
- Component Description
- 11. Rear wheel sensor LH C13

EBD

- 14. Stop lamp switch E38
- 12. Rear wheel sensor RH C13
- 15. Stop lamp relay E12

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INFOID:000000007818482	

[TYPE 2]

Compo	Component parts		
	BRC-153, "Description"	_	
	Motor		
ABS actuator and electric unit (control unit)	Actuator relay	BRC-169, "Description"	_
	Solenoid valve	BRC-162, "Description"	_
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-184, "Description"	_
Wheel sensor		BRC-144, "Description"	_
Yaw rate/side/decel G sensor		BRC-155, "Description"	
Stop lamp switch	BRC-160, "Description"		
Front pressure sensor		DDC 171 "Description"	
Rear pressure sensor	BRC-171, "Description"		
Steering angle sensor		BRC-175, "Description"	
Brake fluid level switch		BRC-178. "Description"	
Active booster		BRC-187, "Description"	-
Delta stroke sensor		BRC-190, "Description"	_
VDC OFF switch	BRC-193. "Description"	_	
ABS warning lamp		BRC-195. "Description"	
Brake warning lamp		BRC-196, "Description"	
VDC OFF indicator lamp		BRC-197, "Description"	
SLIP indicator lamp	BRC-199, "Description"		

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< SYSTEM DESCRIPTION >

[TYPE 2]

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

CONSULT Function (ABS)

INFOID:000000007356842

FUNCTION

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

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

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

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

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

Display Item List Refer to <u>BRC-205, "DTC No. Index"</u>.

DATA MONITOR

Item	Data	a monitor item sel	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front LH wheel sensor signal is displayed.
FR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by front RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, mph)	×	×	×	Wheel speed (km/h, mph) calculated by rear RH wheel sensor signal is displayed.
FR RH IN SOL (On/Off)	-	×	×	Front RH IN ABS solenoid (On/Off) status is dis- played.

< SYSTEM DESCRIPTION >

[TYPE 2]

Data monitor item selection				
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR RH OUT SOL (On/Off)	_	×	×	Front RH OUT ABS solenoid (On/Off) status is displayed.
FR LH IN SOL (On/Off)	_	×	×	Front LH IN ABS solenoid (On/Off) status is displayed.
FR LH OUT SOL (On/Off)	_	×	×	Front LH OUT ABS solenoid (On/Off) status is displayed.
RR RH IN SOL (On/Off)	_	×	×	Rear RH IN ABS solenoid (On/Off) status is displayed.
RR RH OUT SOL (On/Off)	_	×	×	Rear RH OUT ABS solenoid (On/Off) status is displayed.
RR LH IN SOL (On/Off)	_	×	×	Rear LH IN ABS solenoid (On/Off) status is displayed.
RR LH OUT SOL (On/Off)	_	×	×	Rear LH OUT ABS solenoid (On/Off) status is displayed.
EBD WARN LAMP (On/Off)	_	_	×	Brake warning lamp (On/Off) status is displayed.
STOP LAMP SW (On/Off)	×	×	×	Stop lamp switch (On/Off) status is displayed.
MOTOR RELAY (On/Off)	_	×	×	ABS motor relay signal (On/Off) status is displayed.
ACTUATOR RLY (On/Off)	_	×	×	ABS actuator relay signal (On/Off) status is displayed.
ABS WARN LAMP (On/Off)	_	×	×	ABS warning lamp (On/Off) status is displayed.
OFF LAMP (On/Off)	_	×	×	VDC OFF Lamp (On/Off) status is displayed.
OFF SW (On/Off)	×	×	×	VDC OFF switch (On/Off) status is displayed.
SLIP LAMP (On/Off)	-	×	×	SLIP indicator lamp (On/Off) status is displayed.
BATTERY VOLT (V)	×	×	×	Voltage (V) supplied to ABS actuator and electric unit (control unit) is displayed.
GEAR (1, 2, 3, 4, 5)	×	×	×	Gear position (1, 2, 3, 4, 5) judged by transmission range switch signal is displayed.
SLCT LVR POSI (P, N, D)	×	×	×	Shift position (P, N, D) judged by transmission range switch signal.
ENGINE SPEED (rpm)	×	×	×	Engine speed (rpm) judged by CAN communication signal is displayed.
YAW RATE SEN (d/s)	×	×	×	Yaw rate (d/s) detected by yaw rate sensor is displayed.
R POSI SIG (On/Off)	_	_	×	Reverse shift position (On/Off) judged by transmis- sion range switch signal.
N POSI SIG (On/Off)	_	_	×	Shift position judged by transmission range switch signal.
P POSI SIG (On/Off)	_	_	×	Shift position judged by transmission range switch signal.
CV1 (On/Off)	-	_	×	Front side VDC switch-over solenoid valve (cut valve) (On/Off) status is displayed.
CV2 (On/Off)	_	_	×	Rear side VDC switch-over solenoid valve (cut-valve) (On/Off) status is displayed.

< SYSTEM DESCRIPTION >

[TYPE 2]

Itom	Data	monitor item se	lection	
Item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
SV1 (On/Off)	-	_	×	Front side VDC switch-over solenoid valve (suction valve) (On/Off) status is displayed.
SV2 (On/Off)	-	_	×	Rear side VDC switch-over solenoid valve (suction valve) (On/Off) status is displayed.
2WD/4WD (2WD/4WD)	-	_	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
ACCEL POS SIG (%)	×	_	×	Throttle valve open/close status judged by CAN com- munication signal is displayed.
SIDE G-SENSOR (m/s ²)	×	_	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	_	×	Steering angle detected by steering angle sensor is displayed.
BST OPER SIG (On/Off)	-	_	×	Active booster operation (On/Off) status is displayed.
PRESS SENSOR (bar)	×	_	×	Brake pressure detected by front pressure sensor is displayed.
EBD SIGNAL (On/Off)	-	_	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	-	_	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	-	_	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	-	_	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	-	_	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	-	_	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	-	_	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	-	_	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	-	_	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	_	×	Brake fluid level switch (On/Off) status is displayed.
PRESS SEN2 (bar)	-	_	×	Brake pressure detected by pressure sensor is displayed.
DELTA S SEN (mm)	-	-	×	The amount of stroke sensor movements in the active booster detected by DELTA S SEN is displayed.
RELEASE SW NO (On/Off)	-	_	×	Release switch signal (On/Off) status is displayed. "On" indicates that the brake pedal is depressed. "Off" indicates that the brake pedal is released.
RELEASE SW NC (On/Off)	_	_	×	Release switch signal (On/Off) status is displayed. "Off" indicates that the brake pedal is depressed. "On" indicates that the brake pedal is released.
HBA FAIL (On/Off)	-	-	×	HBA fail status is displayed.
OHB FAIL (On/Off)	-	-	×	OHB fail status is displayed.

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

×: Applicable

-: Not applicable

WORK SUPPORT

Conditions	Description	
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be per- formed. Refer to <u>BRC-121, "ADJUSTMENT OF STEERING AN-</u> <u>GLE SENSOR NEUTRAL POSITION : Description"</u> .	BRC
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to <u>BRC-122</u> , <u>"CALIBRATION OF DECEL G SENSOR : Description"</u> .	0

ACTIVE TEST

- 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. (solenoid valve and ABS motor only)

Test Item

SOLENOID VALVE

- When performing an active test of the ABS function, select the menu item 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.

• To perform test again, touch BACK.

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
O,		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	—	—	—
FR RH SUL	FR RH OUT SOL	Off	Off	On*	_	_	_
FR LH SOL	FR LH IN SOL	Off	On	On	_	—	—
FR LH SOL	FR LH OUT SOL	Off	Off	On*	—	—	—
RR RH SOL	RR RH IN SOL	Off	On	On	—	—	—
RR RH SUL	RR RH OUT SOL	Off	Off	On*	_	_	_
	RR LH IN SOL	Off	On	On	—	—	—
RR LH SOL	RR LH OUT SOL	Off	Off	On*	_	_	_

< SYSTEM DESCRIPTION >

[TYPE 2]

Oneration		AE	S solenoid va	alve	ABS	solenoid valve	e (ACT)
Operation		Up	Keep	Down	Up	ACT UP	ACT KEEP
	FR RH IN SOL	_	—	—	Off	Off	Off
FR RH ABS SOLENOID (ACT)	FR RH OUT SOL	_	—	—	Off	Off	Off
FR RH ABS SOLENOID (ACT)	CV1	_	—	—	Off	On	On
	SV1	_	—	—	Off	On*	Off
	FR LH IN SOL	_	—	—	Off	Off	Off
	FR LH OUT SOL	_	—	—	Off	Off	Off
FR LH ABS SOLENOID (ACT)	CV1	_	_	—	Off	On	On
	SV1	_	—	—	Off	On*	Off
	RR RH IN SOL	_	_	_	Off	Off	Off
	RR RH OUT SOL	_	_	_	Off	Off	Off
RR RH ABS SOLENOID (ACT)	CV2	_	_	_	Off	On	On
	SV2	_	_		Off	On*	Off
	RR LH IN SOL	—	—	—	Off	Off	Off
	RR LH OUT SOL	—	—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	CV2	—	—	—	Off	On	On
	SV2		—	—	Off	On*	Off

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

ABS MOTOR

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

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

BOOSTER DRIVE

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

Perform active test subject to the conditions below.

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

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

DTC/CIRCUIT DIAGNOSIS APPLICATION NOTICE

Application Notice

Service information	Remarks		
TYPE 1	VDC/TCS/ABS (VQ40DE)	C	
TYPE 2	VDC/TCS/ABS (VK56DE)		
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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

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

DTC Logic

INFOID:000000007356845

INFOID:000000007356844

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.	
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open. Or when the sensor power voltage is outside the standard.	
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-144, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356846

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram - With VK56DE".

CAUTION:

Do not check between wheel sensor terminals.

- **1**.CONNECTOR INSPECTION
- Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunctioning code.
- 2. Check the terminals for deformation, disconnection, looseness or damage.
- Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

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

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

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DTC/CIRCUIT DIAG	NOSIS >		[TYPE 2]
battery in the ABS a Spin the wheel of the	indicator should illuminate. If the ctive wheel sensor tester before in vehicle by hand and observe ted SENSOR indicator should flas	proceeding. the red SENSOR indicator on th	e ABS active wheel
	t indicator illuminates but does n	ot flash, reverse the polarity of t	the tester leads and
oes the ABS active wh	eel sensor tester detect a signal?) -	
YES >> GO TO 3 NO >> Replace the	wheel sensor. Refer to BRC-229) "Pomoval and Installation"	
B. CHECK TIRES	wheel sensol. Relet to <u>BRC-228</u>		
	sure, wear and size of each tire.		
s the inspection result n			
YES >> GO TO 4			
· · · ·	ressure or replace tire(s).		
CHECK WHEEL BEA			
On-Vehicle Inspection a	、 ,	n-Vehicle Inspection and Servic	<u>e"</u> (front) or <u>RAX-6.</u>
s the inspection result n	ormal?		
	eplace as necessary. Refer to <u>F</u>	AX-10. "Removal and Installatio	<u>n"</u> (front) or <u>RAX-7.</u>
	RNESS FOR SHORT CIRCUIT		
Disconnect ABS act tor and wheel sense Check continuity be nals (A) or rear w	uator and electric unit (control un or connector of malfunction code l etween front wheel sensor connector termina	Nó. ector termi-	
ground. Continuity shou	ıld not exist.	$\begin{array}{c c} A \\ \hline 2 \\ 1 \\ 1, 2 \end{array} \qquad \begin{array}{c c} 1 \\ 3 \\ 4 \\ 1, 2, 3, 4 \end{array}$	
s the inspection result n YES >> GO TO 6	ormal?		
NO >> Repair the c	IRCUIT.		AWFIA0464ZZ
	tween ABS actuator and electric	unit (control unit) connector and	d the malfunctioning
Wheel sensor	ABS actuator and electric unit (control unit)	Wheel sensor	Continuity
	Connector Terminal	Connector Terminal	

Wheel sensor	electric unit (co	ntrol unit)			Continuity	
	Connector	Terminal	Connector	Terminal		N
Front LH		45	E18	1		
		46	LIO	2		0
Front RH	*	34	E117	1		
	E127	33		2	Yes	
Rear LH		37		3	163	Р
		36	C13	4		
Rear RH	Ť	42		1		
		43		2		

Is the inspection result normal?

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< DTC/CIRCUIT DIAGNOSIS >

INFOID:000000007356847

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-231</u>, "<u>Removal and Instal-</u><u>lation</u>".

NO >> Repair the circuit.

Component Inspection

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-144, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007356848

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-121</u>, "<u>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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

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

DTC Logic

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INFOID:000000007356849

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.	 Harness or connector Wheel sensor 	BRC
C1107	FR RH SENSOR-2	When the circuit in the front RH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.	 ABS actuator and electric unit (control unit) 	G
C1108	FR LH SENSOR-2	When the circuit in the front LH wheel sensor is short-cir- cuited. Or when the distance between the wheel sensor and sensor rotor is too large and the sensor pulse cannot be recognized by the control unit.		Н

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results		Κ
RR RH SENSOR-2		N
RR LH SENSOR-2		
FR RH SENSOR-2		L
FR LH SENSOR-2		
Is above displayed on the self-diagnosis display?		ъл
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-147, "Diagnosis Procedure"</u> . NO >> Inspection End.		Μ
Diagnosis Procedure	INFOID:000000007818483	Ν
Regarding Wiring Diagram information, refer to <u>BRC-207, "Wiring Diagram - With VK56DE"</u> .		0
CAUTION: Do not check between wheel sensor terminals. 1.CONNECTOR INSPECTION		Ρ
1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor co	onnector of mal-	
functioning code.Check the terminals for deformation, disconnection, looseness or damage.		
Is the inspection result normal?		

YES >> GO TO 2

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

NOTE: If the red SENSOR indica

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-229</u>, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-6, "On-Vehicle Inspection and Service"</u> (front) or <u>RAX-6,</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-10, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

5.check wiring harness for short circuit

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

Continuity should not exist.

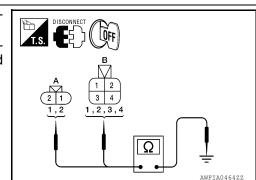
Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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



C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Wheel sensor	ABS actuat electric unit (co		Wheel se	nsor	Continuity
	Connector	Terminal	Connector	Terminal	-
		45	F 40	1	
Front LH		46	E18	2	
-		34	E 4 4 E	1	
Front RH	E 407	33	E117	2	
	E127	37		3	Yes
Rear LH		36	C13	4	
	+	42		1	
Rear RH		43		2	
Iation". NO >> Repair the c Component Inspec .CHECK DATA MONITOR", s On "DATA MONITOR", s GOR", and check the ve	tion TOR select "FR LH SEN	ISOR", "FR RH	SENSOR", "RR	LH SENSOR", a	INFOID:00000000781846 and "RR RH SEN
Wheel sensor	Vehic	le speed (DATA MC	DNITOR)		
FR LH SENSOR	Vehic	le speed (DATA MC	DNITOR)		
FR LH SENSOR FR RH SENSOR	Nearly m	atches the speedor			
FR LH SENSOR FR RH SENSOR RR LH SENSOR	Nearly m				
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR	Nearly m play (±10	atches the speedor			
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR Is the inspection result n YES >> Inspection E NO >> Go to diagne	Nearly m play (±10 normal? End. osis procedure. Re	atches the speedor % or less)	neter dis-	<u>edure"</u> .	INFOID-00000000781848
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagno Special Repair Rec	Nearly m play (±10 normal? End. osis procedure. Re quirement	atches the speedor % or less) fer to <u>BRC-157,</u>	neter dis-		INFOID:00000000781848
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagne Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmen l unit). Refer to BI	atches the speedor % or less) fer to <u>BRC-157,</u> SENSOR NEU	neter dis- "Diagnosis Proc TRAL POSITION ng angle sensor	when replacing	the ABS actuato
FR LH SENSOR FR RH SENSOR RR LH SENSOR RR RH SENSOR s the inspection result n YES >> Inspection E NO >> Go to diagn Special Repair Rec ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc >> GO TO 2	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustment of unit). Refer to Bi cription".	efer to <u>BRC-157</u> , SENSOR NEU nt for the steerin	neter dis- "Diagnosis Proc TRAL POSITION ng angle sensor	when replacing	the ABS actuato
FR LH SENSOR FR RH SENSOR RR RH SENSOR Is the inspection result n YES >> Inspection E NO >> Go to diagne Special Repair Rec 1.ADJUSTMENT OF S Always perform neutral and electric unit (contro TRAL POSITION : Desc	Nearly m play (±10 normal? End. osis procedure. Re quirement TEERING ANGLE position adjustmen of unit). Refer to Bi cription". ECEL G SENSOR on of decel G sens	atches the speedor % or less) fer to <u>BRC-157</u> , <u>SENSOR NEU</u> nt for the steerin <u>RC-121, "ADJU</u> sor when replaci	neter dis- "Diagnosis Proc TRAL POSITION ng angle sensor STMENT OF ST	when replacing EERING ANGL	the ABS actuato E SENSOR NEU

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000007356855

INFOID:000000007356854

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-150, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356856

Regarding Wiring Diagram information, refer to BRC-207, "Wiring Diagram - With VK56DE".

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-138</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

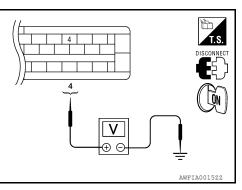
NO >> Poor connection of connector terminal. Repair or replace connector.

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

unit) connector E127 terminal 4 and ground.

ABS actuator a (contro		_	Condition	Voltage
Connector	Terminal			
F127	4	Ground	Ignition switch: ON	Battery voltage
	+	Ground	Ignition switch: OFF	Approx. 0V



[TYPE 2]

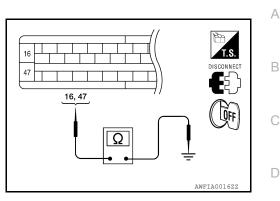
C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

4. Turn ignition switch OFF.

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

	and electric unit ol unit)	_	Continuity
Connector	Terminal		
E127	16, 47	Ground	Yes



Is the inspection result normal?

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

Special Repair Requirement

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-121, "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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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INFOID:000000007818489

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

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

DTC Logic

INFOID:000000007356858

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-152, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356859

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

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installa-</u> tion".

Special Repair Requirement

INFOID:000000007818490

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-121. "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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111	PUMP MOTOR	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for ac- tuator motor relay is open.	 Harness or connector ABS actuator and electric unit
CIIII		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)
DTC CC	ONFIRMATION PROC	EDURE	
1. CHEC	CK SELF-DIAGNOSIS F	ESULTS	
Check th	ne self-diagnosis results		
	0.15.15	<u> </u>	
	Self-diagnos PUMP M		
ls above	displayed on the self-di		
YES		s procedure. Refer to <u>BRC-153, "Diagnosis Proced</u>	dure".
Diagno	osis Procedure		INFOID:00000007356863
Regardir	ng Wiring Diagram infor	nation, refer to <u>BRC-207, "Wiring Diagram - With \</u>	/K56DE".
1. сом	NECTOR INSPECTION		
1. Turn 2. Disc 3. Che	n ignition switch OFF. connect ABS actuator ar ck terminal for deforma	d electric unit (control unit) connector. tion, disconnect, looseness, and so on. If any mal	Ifunction is found, repair or
 Turn Disc Che repla Reco 	n ignition switch OFF. connect ABS actuator ar ck terminal for deforma ace terminal. onnect connectors and		•
1. Turn 2. Disc 3. Che repla 4. Reco (ABS	n ignition switch OFF. connect ABS actuator ar ck terminal for deforma ace terminal. onnect connectors and	tion, disconnect, looseness, and so on. If any main then perform the self-diagnosis. Refer to <u>BRC-</u>	•
1. Turn 2. Disc 3. Che repla 4. Reco (ABS <u>Is any ite</u> YES	a ignition switch OFF. connect ABS actuator ar ck terminal for deforma ace terminal. onnect connectors and <u>S)"</u> . em indicated on the self- >> GO TO 2	tion, disconnect, looseness, and so on. If any main then perform the self-diagnosis. Refer to <u>BRC-</u> diagnosis display?	•
1. Turn 2. Disc 3. Che repla 4. Recu (ABS 1s any ite YES NO	a ignition switch OFF. connect ABS actuator ar ck terminal for deforma ace terminal. onnect connectors and <u>S)"</u> . em indicated on the self- >> GO TO 2 >> Poor connection of o	tion, disconnect, looseness, and so on. If any main then perform the self-diagnosis. Refer to <u>BRC-</u>	•

INFOID:000000007356861

INFOID:000000007356862

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

Voltage	
Battery voltage	
	AV

Connector	Terminal		
E127	1	Ground	Bat

Is the inspection result normal?

ABS actuator and electric unit (control unit)

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "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-153. "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007818491

INFOID:000000007356864

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-121. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

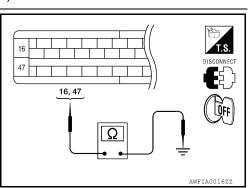
>> GO TO 2

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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

BRC-154

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

< DTC/CIRCUIT DIAGNOSIS >

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

Description

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

DTC Logic

INFOID:000000007356867

INFOID:000000007356866

[TYPE 2]

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	Harness or connector	
C1145	YAW RATE SENSOR	Yaw rate sensor is malfunctioning, or the yaw rate sensor signal line is open or shorted.	functioning, or the yaw rate sensor shorted. • ABS actuator and electric unit (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		Н
G-SENSOR		
YAW RATE SENSOR		
SIDE G-SEN CIRCUIT		1
Is above displayed on the self-diagnosis display?		
 YES >> Proceed to diagnosis procedure. Refer to <u>BRC-155, "Diagnosis Procedure"</u>. NO >> Inspection End. 		J
Diagnosis Procedure	INFOID:000000007356868	К

Regarding Wiring Diagram information, refer to BRC-207. "Wiring Diagram - With VK56DE".

CAUTION:

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

1.CONNECTOR INSPECTION

- 1. Disconnect the ABS actuator and electric unit (control unit) connector and yaw rate/side/decel G sensor connector.
- 2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.
- 2.YAW RATE/SIDE/DECEL G SENSOR HARNESS INSPECTION

Check continuity between the ABS actuator and electric unit (control unit) connector E127 and the yaw rate/ side/decel G sensor connector B73.

BRC-155

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

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and ele			Yaw rate/side/decel G sensor	
Connector			Terminal	Continuity
E127	6	B73	4	Yes
	24		1	
	25		2	Tes
	29		3	

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

 Perform yaw rate/side/decel G sensor component inspection. Refer to <u>BRC-156, "Component Inspection"</u>. Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace the ABS actuator and electric unit (control unit). Refer to BRC-231, "Removal and Installation".
- NO >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-234</u>, "Removal and Installation".

Component Inspection

INFOID:000000007356869

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 >> Replace the yaw rate/side/decel G sensor. Refer to <u>BRC-234</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007818492

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-121</u>, <u>"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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

C1115 WHEEL SENSOR

Description

INFOID:000000007356871

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

DTC Logic

INFOID:000000007356872

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause D
C1115	ABS SENSOR [ABNORMAL SIGNAL]	When wheel sensor input signal is malfunctioning.	 Harness or connector Wheel sensor ABS actuator and electric unit (control unit)
DTC CC	NFIRMATION PROCE	DURE	
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS	BR
Check th	e self-diagnosis results.		
	Calfdiagnasia		G
	Self-diagnosis ABS SENSOR [ABNOF		
ls above	displayed on the self-diag	-	Н
-		procedure. Refer to <u>BRC-157, "Diagnosis Proce</u>	edure".
	>> Inspection End.		
Diagno	sis Procedure		INFOID:00000007818486
Regardir	ng Wiring Diagram informa	ition, refer to <u>BRC-207, "Wiring Diagram - With</u>	J VK56DE".
Ū			
CAUTIO			K
	heck between wheel se	nsor terminals.	
	NECTOR INSPECTION		
	onnect the ABS actuator a tioning code.	and electric unit (control unit) connector and who	eel sensor connector of mal-
		nation, disconnection, looseness or damage.	Γ.
	pection result normal?		M
	>> GO TO 2 >> Repair or replace as n	ecessary	
•	CK WHEEL SENSOR OU	-	Ν
		nsor tester (J-45741) to wheel sensor using app	propriate adapter
2. Turn	on the ABS active wheel	sensor tester power switch.	0
NOT The		should illuminate. If the POWER indicator doe	s not illuminate replace the
batte	ery in the ABS active whee	el sensor tester before proceeding.	·
	or tester. The red SENSC	by hand and observe the red SENSOR indicat R indicator should flash on and off to indicate a	
	e red SENSOR indicator	illuminates but does not flash, reverse the pol	arity of the tester leads and
	ABS active wheel sensor	tester detect a signal?	
	>> GO TO 3	nsor. Refer to <u>BRC-229, "Removal and Installat</u>	ion"
NO	se iveplace the wheel set	BUI. NOICH IU DING-223, INCHIOVALAHU HISIAIIAI	iuii.

BRC-157

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3.CHECK TIRES

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

Is the inspection result normal?

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

Check wheel bearing axial end play. Refer to <u>FAX-6, "On-Vehicle Inspection and Service"</u> (front) or <u>RAX-6,</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-10, "Removal and Installation"</u> (front) or <u>RAX-7,</u> <u>"Removal and Installation"</u> (rear).

5.check wiring harness for short circuit

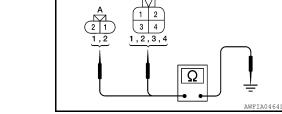
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between front wheel sensor connector terminals (A) or rear wheel sensor connector terminals (B) and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



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6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor Front LH Front RH Rear LH	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front I H		45	E18	1	
Front LH	E127	46	EIO	2	
Front LH Front RH		34	E117	1	Yes
		33		2	
		37	C13	3	
		36		4	
		42		1	
		43		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Instal-</u> lation".

NO >> Repair the circuit.

Component Inspection

1.CHECK DATA MONITOR

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

BRC-158

INFOID:000000007818487

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

R RH SENSOR Nearly matches the speedometer display (±10% or less) R RH SENSOR Play (±10% or less) the inspection result normal? ES >> Inspection End.	COTC/CIRCUIT DIAGNOSIS	S> [IYPE 2]	-
R LH SENSOR Nearly matches the speedometer display (±10% or less) R LH SENSOR play (±10% or less) R RH SENSOR play (±10% or less) R RH SENSOR play (±10% or less) R RH SENSOR meansative stress of the inspection result normal? ES >> Inspection End. O >> Go to diagnosis procedure. Refer to BRC-157, "Diagnosis Procedure". Decial Repair Requirement meansative stress of the steering angle sensor when replacing the ABS actuator d electric unit (control unit). Refer to BRC-121, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION vays perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator d electric unit (control unit). Refer to BRC-121, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description". >> GO TO 2 CALIBRATION OF DECEL G SENSOR vays perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). for to BRC-122, "CALIBRATION OF DECEL G SENSOR : Description".	Wheel sensor	Vehicle speed (DATA MONITOR)	
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ways perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). fer to <u>BRC-122</u> , "CALIBRATION OF DECEL G SENSOR : Description".		G SENSOR	
fer to BRC-122, "CALIBRATION OF DECEL G SENSOR : Description".			•
>> END			
>> END			
	>> END		

C1116 STOP LAMP SWITCH

Description

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

DTC Logic

INFOID:000000007356877

INFOID:000000007356876

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

STOP LAMP SW

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356878

Regarding Wiring Diagram information, refer to BRC-207. "Wiring Diagram - With VK56DE".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

- YES >> GO TO 2
- NO >> Repair or replace as necessary.

2.STOP LAMP SWITCH INSPECTION

Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 41 and body ground.

Brake pedal depressed

(approx. 12V) : Approx. 0V

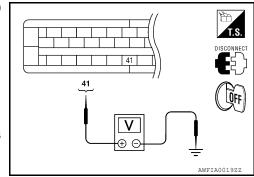
: Battery voltage

Brake pedal released

Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installation"</u>.

$$3.$$
STOP LAMP RELAY CIRCUIT INSPECTION



C1116 STOP LAMP SWITCH

< DTC/CIRCUIT DIAGNOSIS >

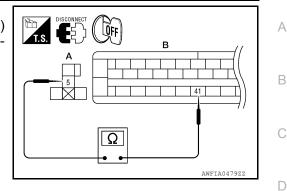
- 1. Disconnect stop lamp relay connector.
- Check continuity between stop lamp relay connector E12 (A) terminal 5 and ABS actuator and electric unit (control unit) connector E127 (B) terminal 41.

Continuity should exist.

Is the inspection result normal?

- YES >> Refer to <u>BRC-117, "Work Flow"</u>.
- NO >> Repair or replace malfunctioning components.

Special Repair Requirement



INFOID:000000007818493

[TYPE 2]

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

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August 2012

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

INFOID:000000007356881

INFOID:000000007356880

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356882

Regarding Wiring Diagram information, refer to BRC-207. "Wiring Diagram - With VK56DE".

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-138</u>, "CONSULT Function (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

ABS actuator and ele	ectric unit (control unit)		Voltage	
Connector	Terminal		voltage	
E127	32	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installation"</u>.
- NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

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

			ABS solenoid valve	е	1
	Operation	Up	Keep	Down	
	FR RH IN SOL	Off	On	On	L
FR RH SOL	FR RH OUT SOL	Off	Off	On*	
	FR LH IN SOL	Off	On	On	
FR LH SOL	FR LH OUT SOL	Off	Off	On*	N
	RR RH IN SOL	Off	On	On	
RR RH SOL	RR RH OUT SOL	Off On Off Off Off Off Off On Off On Off Off	Off	On*	N
	RR LH IN SOL	Off	On	On	
RR LH SOL	RR LH OUT SOL	Off	Off	On*	

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

Is the inspection result normal?

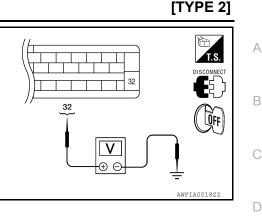
- YES >> Inspection End.
- NO >> Go to diagnosis procedure. Refer to <u>BRC-162, "Diagnosis Procedure"</u>.

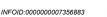
Special Repair Requirement

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-121</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-163





INFOID:000000007818494

>> GO TO 2

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000007356886

INFOID:000000007356885

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-165, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

Regarding Wiring Diagram information, refer to BRC-207. "Wiring Diagram - With VK56DE".

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-138</u>, "<u>CONSULT Function</u> (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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INFOID:000000007818496

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 32 and ground.

ABS actuator and ele	ctric unit (control unit)		Voltage	
Connector	Terminal		voltage	
E127	32	Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

Component Inspection

1.CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-184, "Diagnosis Procedure"</u>.

Special Repair Requirement

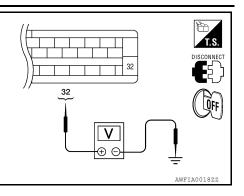
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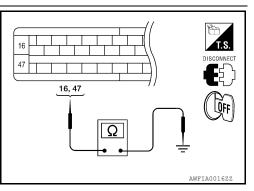
INFOID:000000007818497

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-121</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

BRC-166







[TYPE 2]

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

>> 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-122</u>, "<u>CALIBRATION OF DECEL G SENSOR</u>: <u>Description</u>".
> END
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[TYPE 2]

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August 2012

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

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

DTC Logic

INFOID:000000007356891

INFOID:000000007356890

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-168</u>, "Diagnosis Procedure".

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356892

1.CHECK ENGINE SYSTEM

- Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to <u>EC-533, "CONSULT Function"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-138</u>, "<u>CONSULT Func-</u> tion (<u>ABS</u>)".

Is any item indicated on the self-diagnosis display?

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

C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RLY

Description

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

DTC Logic

INFOID:000000007356894

INFOID:000000007356893

DTC DETECTION LOGIC

DTC	Display item	Malfunct	tion detected condition	on	Possible cause	D
C1140	ACTUATOR RLY	ABS actuator relay of	r circuit malfunction.		 Harness or connector ABS actuator and electric unit (control unit) 	E
DTC CO	NFIRMATION PROC	EDURE				
1 .CHEC	K SELF-DIAGNOSIS I	RESULTS				BRC
Check the	e self-diagnosis results					DICC
	Self-diagno					G
	ACTUAT					
YES	displayed on the self-d >> Proceed to diagnos >> Inspection End.		BRC-169, "Diac	gnosis Proced	dure".	Η
Diagno	sis Procedure				INFOID:000000007818498	I
Regardin	g Wiring Diagram infor	mation, refer to <u>BRC-</u>	207, "Wiring Dia	gram - With \	<u>/K56DE"</u> .	J
	ECTOR INSPECTION					K
 Disco 3. Chec repla Reco 	ce terminal. nnect connectors and	tion, disconnection, lo	oseness, and so	on. If any ma	alfunction is found, repair or	
<u>(ABS</u> Is any ite	n indicated on the self	-diagnosis display?				M
-	>> GO TO 2	<u>alagnoolo alopiay :</u>				
•	>> Poor connection of		•			Ν
2.CHEC	K SOLENOID, VDC S	WITCH-OVER VALVE	E AND ACTUATO	OR RELAY PO	OWER SUPPLY CIRCUIT	IN
 Disco tor. Check 	ignition switch OFF. onnect ABS actuator a k voltage between AE connector E127 termir	S actuator and elect				O
ABS actu	ator and electric unit (contr	ol unit)				
Con	nector Termina	al —	Voltage			
E	127 32	Ground	Battery voltage			
Is the ins	pection result normal?				AWFIA0018ZZ	

August 2012

YES >> GO TO 3

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C1140 ACTUATOR RLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "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-153</u>, "Diagnosis Procedure".

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

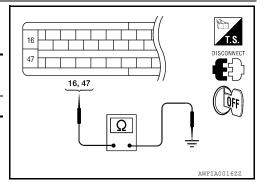
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description".

>> 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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END



INFOID:000000007818499

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:000000007356899

INFOID:000000007356898

DTC DETECTION LOGIC

DTC	Display item	I	Malfunctio	n detected condition		Possible	cause	D
C1142	PRESS SEN CIRCU		ure sensor signal ensor is malfunct	line is open or shorte tioning.	ed, or pres-	 Harness or co Pressure sens ABS actuator a (control unit) 	or	E
DTC CC	NFIRMATION P	ROCEDURE						_
	CK SELF-DIAGNO							BR
Check th	e self-diagnosis re	esults.						
	C .							G
	Self-c	liagnosis results						
	PRES	S SEN CIRCUIT						
s above	displayed on the	self-diagnosis	display?					Н
YES	>> Proceed to dia					<u>edure (Front P</u>	ressure Sen-	
			<u>s Procedure (F</u>	Rear Pressure Se	<u>ensor)"</u> .			
	>> Inspection End							1
Diagno	sis Procedure	(Front Pre	ssure Sens	sor)		II	IFOID:000000007356900	
								J
)								
kegardir	ng Wiring Diagram	information, r	eter to <u>BRC-20</u>	07, "Wiring Diagra	am - with	<u>VK56DE"</u> .		
								K
I.CON	NECTOR INSPEC	TION						
. Turn	the ignition switch	n OFF.						1
. Disc	onnect the front p	ressure senso					unit) connec-	
	ind inspect the terr		ormation, disco	onnection, loosen	ess, or dar	nage.		
	spection result nor	mal?						N
-	>> GO TO 2 >> Repair connec	tor						
	•							
	NT PRESSURE SE							Ν
	sure the continuity				DISCONNECT	P		
	(control unit) conn nector E31 (B).	ector E127 (A) and front pre	essure sensor		(LOFF)		
com						A	В	C
ABS act	uator and electric unit					0 19 18	3	
	(control unit)	Front pres	sure sensor	Continuity			2	F
Connec	ctor Terminal	Connector	Terminal		//	9, 20	1, 2, 3	
	18		3					
		1						
E127 ((A) 19	E31 (B)	1	Yes				
E127 ((A) 19 20	E31 (B)		Yes		•	AWFIA0021zz	

 Measure the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) and body ground.

BRC-171

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C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

	electric unit (control nit)	_	Continuity
Connector	Terminal		
	18		
E127 (A)	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.
- Perform the front pressure sensor (PRESS SENSOR) component inspection. Refer to <u>BRC-173, "Compo-nent Inspection (Front Pressure Sensor)"</u>.

Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-231</u>, "<u>Removal and Installation</u>".
- NO >> Replace the front pressure sensor.

Diagnosis Procedure (Rear Pressure Sensor)

INFOID:000000007356901

Regarding Wiring Diagram information, refer to <u>BRC-207, "Wiring Diagram - With VK56DE"</u>.

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

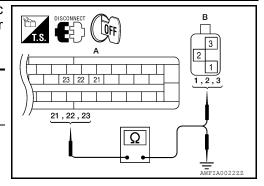
YES >> GO TO 2

NO >> Repair connector.

2.REAR PRESSURE SENSOR CIRCUIT INSPECTION

 Measure the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) and rear pressure sensor connector E32 (B).

ABS actuator and electric unit (control unit)		Rear press	sure sensor	Continuity		
	Connector	Terminal	Connector	Terminal	-	
		21		1		
	E127 (A)	22	E32 (B)	3	Yes	
_		23		2		



2. Measure the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) and body ground.

C1142 PRESS SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

	electric unit (control nit)	_	Continuity	
Connector	Terminal		Continuity	
	21			
E127 (A)	22	Ground	No	
	23			
the inspection	result normal?			
YES >> GO				
•	air or replace harn			
	SURE SENSOR IN			
				unit (control unit) connectors. ction. Refer to <u>BRC-173, "Component</u>
	Rear Pressure Ser			
the inspection	result normal?			
				replace the ABS actuator and electric
	lace the rear press		Removal and Installat	<u>1011</u> .
•	nspection (Fro		Sensor)	INFOID:00000007356902
•				INFOID.00000007356902
.CHECK DATA	MONITOR			
n "DATA MONI	TOR", select "PRE	ESS SENSOR" a	nd check the brake fl	luid pressure.
	Condition			PRESS SENSOR (DATA MONITOR)
Nith ignition switch	turned ON and brake	pedal released.		Approx. 0 bar
	turned ON and brake			Positive value
the inspection	result normal?	· ·		
	ection End.			
NO >> Rep	lace the appropria	te pressure sens	or. Refer to <u>BR-50, "I</u>	Disassembly and Assembly".
omponent I	nspection (Re	ar Pressure S	Sensor)	INFOID:00000007356903
.CHECK DATA				
		ESS SEN2" and c	heck the brake fluid	Drassura
				pressure.
	Condition			PRESS SEN2
				(DATA MONITOR)
	turned ON and brake	•		Approx. 0 bar
-	turned ON and brake	pedal depressed.		Positive value
the inspection				
	ection End. lace the appropria	te pressure sens	or. Refer to <u>BR-50</u> , "I	Disassembly and Assembly".
	ir Requiremer	-		INFOID:00000007818501
	-			
	T OF STEERING	ANGLE SENSO	R NEUTRAL POSITI	ON
.ADJUSTINEN				

BRC-173

>> 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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

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

DTC Logic

INFOID:000000007356906

INFOID:000000007356905

DTC DETECTION LOGIC

C1143 S		Malfunction detected condition	Possible cause	
	T ANG SEN CIRCUIT	Neutral position of steering angle sensor is dislocated, or the steering angle sensor is malfunctioning.	 Harness or connector Steering angle sensor ABS actuator and electric unit 	
C1144 S	T ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	(control unit)	
OTC CONI	FIRMATION PROCE	EDURE		
1.снеск	SELF-DIAGNOSIS R	ESULTS		В
Check the s	self-diagnosis results.			
	Self-diagnosis			
	ST ANG SEN			
	ST ANG SEN			
s above dis	splayed on the self-dia	ignosis display?		
YES >>	Proceed to diagnosis	procedure. Refer to BRC-175, "Diagnosis Proce	edure".	
NO >>	Inspection End.			
	s Procedure		INFOID:00000007356907	
	·		INFOID:000000007356907	
Diagnosis	s Procedure	action refer to RRC 207 "Wiring Diagram With"		
Diagnosis	s Procedure	nation, refer to <u>BRC-207, "Wiring Diagram - With '</u>		
Diagnosi: Regarding \	s Procedure Wiring Diagram inform	nation, refer to <u>BRC-207, "Wiring Diagram - With </u>		
Diagnosi: Regarding \ 1.CONNE	s Procedure Wiring Diagram inform CTOR INSPECTION	nation, refer to <u>BRC-207, "Wiring Diagram - With '</u>		
Diagnosis Regarding N 1.CONNE(1. Turn igi	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF.			
Diagnosis Regarding N 1.CONNE 1. Turn igi 2. Disconi 3. Disconi	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se	d electric unit (control unit) connector. nsor connector.	<u>VK56DE"</u> .	
Diagnosis Regarding V 1. CONNE 1. Turn igu 2. Disconu 3. Disconu 4. Check	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformatio	d electric unit (control unit) connector.	<u>VK56DE"</u> .	
Diagnosis Regarding V 1.CONNEC 1. Turn igu 2. Disconu 3. Disconu 4. Check f replace 5. Reconu	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformation terminal. nect connectors and	d electric unit (control unit) connector. nsor connector.	VK56DE". alfunction is found, repair or	
Diagnosis Regarding V 1.CONNEC 1. Turn igu 2. Disconu 3. Disconu 4. Check freplace 5. Reconu (ABS)".	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformation terminal. nect connectors and	d electric unit (control unit) connector. nsor connector. on, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRC</u>	VK56DE". alfunction is found, repair or	
Diagnosis Regarding V 1.CONNE 1. Turn igi 2. Disconi 3. Disconi 4. Check f replace 5. Reconr (ABS)".	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformation terminal. nect connectors and indicated on the self-o	d electric unit (control unit) connector. nsor connector. on, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRC</u>	VK56DE". alfunction is found, repair or	
Diagnosis Regarding V 1.CONNEC 1. Turn igu 2. Disconu 3. Disconu 4. Check f replace 5. Reconu (ABS)". Is any item YES >>	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformation terminal. nect connectors and indicated on the self-or GO TO 2	d electric unit (control unit) connector. nsor connector. on, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRC</u> <u>diagnosis display?</u>	VK56DE". alfunction is found, repair or	
Diagnosis Regarding V 1.CONNEC 1. Turn igi 2. Disconi 3. Disconi 4. Check to replace 5. Reconr (ABS)". Is any item YES >> NO >>	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle set terminal for deformation terminal. nect connectors and <u>indicated on the self-or</u> GO TO 2 Poor connection of co	d electric unit (control unit) connector. nsor connector. on, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRC</u> <u>diagnosis display?</u> onnector terminal. Repair or replace connector.	VK56DE". alfunction is found, repair or	
Diagnosis Regarding N 1.CONNEC 1. Turn igi 2. Disconi 3. Disconi 4. Check t replace 5. Reconr (ABS)". Is any item YES >> NO >> 2.CHECK	s Procedure Wiring Diagram inform CTOR INSPECTION nition switch OFF. nect ABS actuator and nect steering angle se terminal for deformation terminal. nect connectors and indicated on the self-or GO TO 2	d electric unit (control unit) connector. nsor connector. on, disconnection, looseness, and so on. If any m then perform the self-diagnosis. Refer to <u>BRC</u> <u>diagnosis display?</u> onnector terminal. Repair or replace connector.	VK56DE". alfunction is found, repair or	

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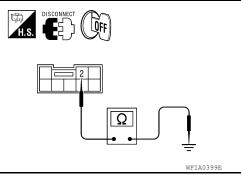
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C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. Check continuity between steering angle sensor connector M47 terminal 2 and ground.

Steering a	ngle sensor		Continuity
Connector	Terminal		Continuity
M47	2	Ground	Yes



- 4. Turn ignition switch ON.
- 5. Check voltage between steering angle sensor connector M47 terminal 3 and ground.

Steering a	ngle sensor		Voltage
Connector	Connector Terminal		voltage
M47	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.



- 1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
- 2. Perform the steering angle sensor component inspection. Refer to <u>BRC-176. "Component Inspection"</u>.

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installa-</u> tion".
- NO >> Replace steering angle sensor. Refer to <u>BRC-233, "Removal and Installation"</u>.

Component Inspection

INFOID:000000007356908

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1.CHECK DATA MONITOR

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

Steering condition	STR ANGLE SIG (DATA MONITOR)
Driving straight	0±2.5 °
Turn 90 ° to left	Approx. +90 °
Turn 90 ° to right	Approx. –90 °

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace steering angle sensor. Refer to <u>BRC-233</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007818503

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-121. "ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description"</u>.

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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C1155 BRAKE FLUID LEVEL SWITCH

Description

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

DTC Logic

INFOID:000000007356911

INFOID:000000007356910

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

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

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356912

Regarding Wiring Diagram information, refer to BRC-207. "Wiring Diagram - With VK56DE".

1.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

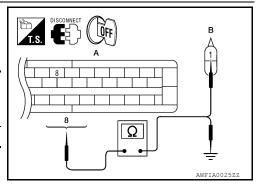
NO >> Repair or replace as necessary.

2. CHECK HARNESS BETWEEN BRAKE FLUID LEVEL SWITCH AND ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

 Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 8 and brake fluid level switch connector E21 (B) terminal 1.

ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	8	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 8 and ground.



C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E127 (A)	8	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

$\mathbf{3}$. CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check continuity between brake fluid level switch connector E21 terminal 2 and ground.

Brake fluid	level switch	_	Continuity
Connector	Terminal		
E21	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Perform brake fluid level switch component inspection. Refer to <u>BRC-179, "Component Inspection"</u>.

Is the inspection result normal?

- YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installation"</u>.
- NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace brake fluid level switch.

Special Repair Requirement

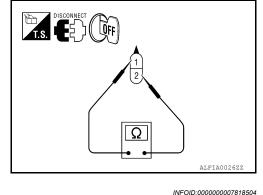
1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION</u>: <u>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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

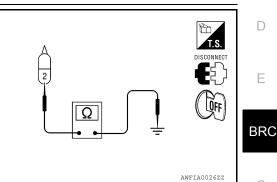


INFOID:000000007356913

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< DTC/CIRCUIT DIAGNOSIS >

C1156 ST ANG SEN COM CIR

Description

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

DTC Logic

INFOID:000000007356916

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1156	ST ANG SEN COM CIR	When steering angle sensor is not transmitting CAN communication signal to the ABS actuator and electric unit (control unit).	 Harness or connector CAN communication line Steering angle sensor ABS actuator and electric unit (control unit)
DTC CC	NFIRMATION PROCE	EDURE	
1. CHEC	CK SELF-DIAGNOSIS R	ESULTS	
Check th	e self-diagnosis results.		
	Self-diagnosi		
	ST ANG SEN		
YES	displayed on the self-dia >> Proceed to diagnosis >> Inspection End.	agnosis display? procedure. Refer to <u>BRC-181, "Diagnosis Proce</u>	edure".
Diagno	sis Procedure		INFOID:00000007356917
1.com	NECTOR INSPECTION		
1. Turn	ignition switch OFF.		
2. Disc	onnect ABS actuator and	d electric unit (control unit) connector.	unalfunation is found uppoin
	place terminals.	tion, disconnection, looseness, and so on. If any	mairunction is found, repair
		rform self-diagnosis. Refer to <u>BRC-138, "CONSI</u>	ULT Function (ABS)".
	Self-diagnosi	s results	
	CAN COMM (
	ST ANG SEN		
ls above	displayed on the self-dia		
		<u>ouble Diagnosis Flow Chart"</u> .	
	>> Inspection End.		

INFOID:000000007356915

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C1160 DECEL G SEN SET

Description

INFOID:000000007356918

ITYPE 21

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:000000007356919

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

DECEL G SEN SET

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-182, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356920

1.PERFORM SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-138, "CONSULT Function</u> (<u>ABS)"</u>.

Self-diagnosis results

DECEL G SEN SET

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

- YES >> Perform repair or replacement for the item indicated.
- NO >> Perform calibration of decel G sensor. Refer to <u>BRC-122</u>, "CALIBRATION OF DECEL G SENSOR <u>: Description"</u>. GO TO 2

2. PERFORM SELF-DIAGNOSIS AGAIN

- Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to <u>BRC-138, "CON-SULT Function (ABS)"</u>.
- Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to <u>BRC-138</u>, "<u>CONSULT</u> <u>Function (ABS)</u>".

Are any self-diagnosis results displayed?

- YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-234</u>, "Removal and Installation".
- NO >> Inspection End.

< DTC/CIRCUIT DIAGNOSIS >

C1163 ST ANGLE SEN SAFE

Description

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

DTC Logic

INFOID:000000007356922

INFOID:000000007356921

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1163	ST ANGL SEN SAFE	When steering angle sensor is in safe mode.	Adjust steering angle sensor neutral position
DTC CC	NFIRMATION PROC	EDURE	
1. CHEC	CK SELF-DIAGNOSIS R	ESULTS	
Check th	e self-diagnosis results.		
	Self-diagnos ST ANGL SE		
ls above	displayed on the self-di		
YES		s procedure. Refer to <u>BRC-183, "Diagnosis Pro</u>	ocedure".
Diagno	sis Procedure		INFOID:00000007356923
1.adju	STMENT OF STEERIN	G ANGLE SENSOR NEUTRAL POSITION	
	teering angle sensor ne R NEUTRAL POSITION	eutral position. Refer to <u>BRC-121, "ADJUSTN</u> : Description".	MENT OF STEERING ANGLE
	>> GO TO 2		
2.INDIC	CATOR LAMP CHECK		
<u>Is VDC (</u>	at VDC OFF indicator la	amp is off.	
	>> Inspection End. >> Perform ABS actuation (ABS SULT Function (ABS)	tor and electric unit (control unit) self-diagnos	sis. Refer to <u>BRC-138, "CON</u> -

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[TYPE 2]

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

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

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

INFOID:000000007356925

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-184, "Diagnosis Procedure"</u>. NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007818502

Regarding Wiring Diagram information, refer to <u>BRC-207, "Wiring Diagram - With VK56DE"</u>.

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-138</u>, "CONSULT Function (<u>ABS)</u>".

Is any item indicated on the self-diagnosis display?

INFOID:000000007356924

C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 2

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

2.check solenoid, vdc switch-over valve and actuator relay power supply circuit

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check voltage between ABS actuator and electric unit (control 3. unit) connector E127 terminal 32 and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-231, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

Component Inspection

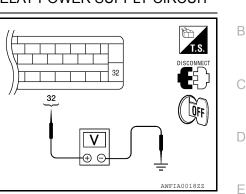
1. CHECK ACTIVE TEST

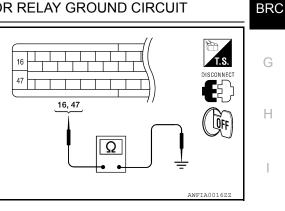
Select each test menu item on "ACTIVE TEST". 1.

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

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

32





INFOID:000000007356927

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[TYPE 2]

Operation		ABS solenoid valve (ACT)		
		Up	ACT UP	ACT KEEP
	RR LH IN SOL	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH OUT SOL	Off	Off	Off
IN EITADS SOLENOID (ACT)	CV2	Off	On	On
	SV2	Off	On*	Off

 $^{\ast:}$ On for 1 to 2 seconds after the touch, and then Off

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-184, "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:000000007818505

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-121</u>, "<u>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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

Description

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

DTC Logic

INFOID:000000007356930

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1178	ABS ACTIVE BOOSTER SV NG	Active booster solenoid is malfunctioning, or signal line active booster servo is open or shorted.	
C1181	ABS ACTIVE BOOSTER RE- SPONSE NG	Active booster response is malfunctioning, or signal lin of active booster response is open or shorted.	 Harness or connector Active booster
C1184	ABS BRAKE RELEASE SW NG	Brake release switch is malfunctioning, or signal line of brake release switch is open or shorted.	of • ABS actuator and electric unit (control unit)
C1189	ABS BRAKE BOOSTER DE- FECT	Brake booster is defective or malfunctioning.	
DTC CC	NFIRMATION PROCEI	DURE	Н
1 .CHEC	CK SELF-DIAGNOSIS RE	SULTS	
Check th	e self-diagnosis results.		
	Self-diagnosis		
	ABS ACTIVE BOOS		L
	ABS ACTIVE BOOSTER		
	ABS BRAKE RELEA	SE SW NG	К
	ABS BRAKE BOOST	ER DEFECT	
	displayed on the self-diag	· ·	
	>> Proceed to diagnosis p >> Inspection End.	procedure. Refer to <u>BRC-187, "Diagnosis Pro</u>	<mark>cedure"</mark> . ∟
Diagno	sis Procedure		INFOID:00000007356931
Regardin	ng Wiring Diagram informa	ition, refer to <u>BRC-207, "Wiring Diagram - Wi</u>	
rtegaran			N
1.com	NECTOR INSPECTION		
2. Disc		connector and ABS actuator and electric ur mation, disconnection, looseness, or damage	
Is the ins	pection result normal?		Р
-	>> GO TO 2		
-	>> Repair connector.		
Z.ACTI	VE BOOSTER CIRCUIT IN	NSPECTION	

INFOID:000000007356929

А

В

С

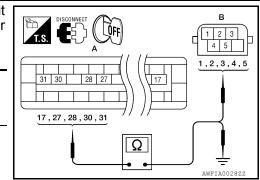
D

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

 Measure the continuity between ABS actuator and electric unit (control unit) connector E127 (A) and active booster connector E49 (B).

	and electric unit ol unit)	Active booster		Continuity	
Connector Terminal		Connector	Terminal		
	17		3		
	27	E49 (B)	1		
E127 (A)) 28		5	Yes	
	30		2		
	31	1	4		



[TYPE 2]

2. Measure the continuity between ABS actuator and electric unit (control unit) connector E127 (A) and ground.

	electric unit (control nit)	_	Continuity	
Connector	Terminal			
	17	Ground		
	27		No	
E127 (A)	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.

2. Perform the active booster component inspection. Refer to <u>BRC-188, "Component Inspection"</u>.

Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231</u>, "<u>Removal and Installation</u>".

NO >> Replace the active booster. Refer to <u>BR-35, "Removal and Installation"</u>.

Component Inspection

INFOID:000000007356932

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the active booster. Refer to <u>BR-35. "Removal and Installation"</u>.

Special Repair Requirement

INFOID:000000007818506

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

BRC-188

C1178, C1181, C1184, C1189 ABS ACTIVE BOOSTER

< DTC/CIRCUIT DIAGNOSIS >

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</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-122</u>, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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C1179 ABS DELTA S SEN NG

Description

INFOID:000000007356934

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:000000007356935

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results

ABS DELTA S SEN NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-190, "Diagnosis Procedure"</u>.

NO >> Inspection End.

Diagnosis Procedure

INFOID:000000007356936

Regarding Wiring Diagram information, refer to <u>BRC-207, "Wiring Diagram - With VK56DE"</u>.

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

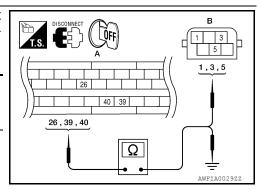
YES >> GO TO 2

NO >> Repair connector.

2. Delta stroke sensor circuit inspection

 Measure the continuity between ABS actuator and electric unit (control unit) connector E127 (A) and delta stroke sensor connector E114 (B).

_	ABS actuator and electric unit (control unit)		Delta stro	ke sensor	Continuity
-	Connector	Terminal	Connector	Terminal	
-		26		1	
	E127 (A)	39	E114 (B)	3	Yes
		40	†	5	



C1179 ABS DELTA S SEN NG

< DTC/CIRCUIT DIAGNOSIS >

2. Measure the continuity between ABS actuator and electric unit (control unit) connector E127 (A) and ground.

	electric unit (control nit)	_	Continuity	
Connector	Terminal			
	26			
E127 (A)	39	Ground	No	
	40			
3.DELTA STRO	TO 3 air or replace harn KE SENSOR INS ne delta stroke ser	PECTION	tuator and electric	Init (control unit) connectors.
Is the inspection YES >> Perfo (cont NO >> Repla	result normal? orm self-diagnosis trol unit). Refer to ace the delta strok	again. If the sa BRC-231, "Remo		replace ABS actuator and electric unit
Component Ir	nspection			INFOID:00000007356937
1 .CHECK DATA		he status of "DF	LTA S SEN" is norr	nal
	Condition			DELTA S SEN
				(DATA MONITOR)
When brake pedal i	s depressed.			(DATA MONITOR) 1.05–1.80 mm
When brake pedal i	s released.			
When brake pedal i Is the inspection YES >> Inspe NO >> Repla	s released. <u>result normal?</u> ection End. ace the delta strol		to <u>BR-35. "Remova</u>	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation".
When brake pedal i Is the inspection YES >> Inspe NO >> Repla	s released. result normal? ection End.		to <u>BR-35. "Remova</u>	1.05–1.80 mm 0.00 mm (+0.6/-0.4)
When brake pedal i Is the inspection YES >> Inspection NO >> Replace Special Repa	s released. <u>result normal?</u> ection End. ace the delta strol ir Requiremen	t	to <u>BR-35. "Remova</u> R NEUTRAL POSI	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation".
When brake pedal i <u>Is the inspection</u> YES >> Inspe NO >> Repla Special Repa 1 .ADJUSTMEN Always perform	s released. result normal? ection End. ace the delta strok ir Requiremen T OF STEERING neutral position ac (control unit). Ref	t ANGLE SENSO djustment for the	R NEUTRAL POSI	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation".
When brake pedal i Is the inspection YES >> Inspection NO >> Replay Special Repa 1.ADJUSTMEN Always perform reprint and electric unit TRAL POSITION	s released. result normal? ection End. ace the delta strok ir Requirement T OF STEERING neutral position ac (control unit). Ref L: Description".	t ANGLE SENSO djustment for the	R NEUTRAL POSI	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation". I/I and Installation". I/I and Installation in the installation i
When brake pedal i Is the inspection YES >> Inspecial NO >> Repla Special Repa 1.ADJUSTMEN Always perform r and electric unit TRAL POSITION >> GO T	s released. result normal? ection End. ace the delta strok ir Requirement T OF STEERING neutral position ac (control unit). Ref L: Description".	t ANGLE SENSO djustment for the er to <u>BRC-121.</u>	R NEUTRAL POSI	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation". I/I and Installation". I/I and Installation in the installation i
When brake pedal i Is the inspection YES >> Inspecial NO >> Repla Special Repa 1.ADJUSTMEN Always perform r and electric unit TRAL POSITION >> GO T 2.CALIBRATION Always perform c	s released. result normal? ection End. ace the delta strok ir Requirement T OF STEERING neutral position ac (control unit). Ref : Description". TO 2 N OF DECEL G Si calibration of dece	t ANGLE SENSO djustment for the er to <u>BRC-121.</u> ENSOR	R NEUTRAL POSI e steering angle se "ADJUSTMENT O	1.05–1.80 mm 0.00 mm (+0.6/-0.4) I and Installation". II and Inst

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:000000007356940

INFOID:000000007356941

DTC DETECTION LOGIC

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

Diagnosis Procedure

1.CONNECTOR INSPECTION

- 1. Turn ignition switch OFF.
- 2. Disconnect the ABS actuator and electric unit (control unit) connector.
- 3. Check the terminals for deformation, disconnection, looseness, and so on. If there is a malfunction, repair or replace the terminal.
- 4. 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.

INFOID:000000007356939

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF SWITCH

Description

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

Component Function Check

1. CHECK VDC OFF SWITCH OPERATION

Press and release the VDC OFF switch, then press and release the VDC OFF switch again and check that the VDC OFF indicator lamp in the combination meter turns ON/OFF correctly.

VDC OFF Indicator ian	np in the combin			ectry.	D
Condition	V	DC OFF indicator la	amp illumination stat	tus	
VDC OFF switch: pressed	and released	(NC		Е
VDC OFF switch: pressed	and released	C)FF		
s the inspection result	normal?				
YES >> Inspection NO >> Go to diag		e. Refer to <u>BRC</u>	-193, "Diagnosis	s Procedure".	BRC
Diagnosis Proced	ure			INFOID:00000007356944	G
		i, refer to <u>BRC-3</u>	207, "Wiring Dia	<u>gram - With VK56DE"</u> .	Н
1.CHECK VDC OFF					I
		ent inspection.	Refer to <u>BRC-19</u>	94. "Component Inspection".	1
<u>s the inspection result</u> YES >> GO TO 2	<u>normal?</u>				
	DC OFF switch				J
2.CHECK VDC OFF					
1. Disconnect ABS a			ol unit) connec-		K
tor. 2. Check continuity b			·		
unit) connector E1	27 (A) terminal				L
nector M154 (B) te	erminal 1.				
450 4 4 4 4 4					
ABS actuator and electric (control unit)	VDC	COFF switch	Continuity		M
Connector Termir	nal Connecto	r Terminal			
E127 (A) 38	M154 (B)) 1	Yes		Ν
 Check continuity b unit) connector E1 				AMEIROTJULZ	
ABS actuator and electric	unit (control unit)				0
Connector	Terminal		Continuity		
E127 (A)	38	Ground	No		Ρ

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

INFOID:000000007356942

INFOID:000000007356943

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VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between VDC OFF switch connector M154 and ground.

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

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25</u>, "<u>Diagnosis Descrip-</u> tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231, "Removal and Installa-</u> tion".

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace VDC OFF switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

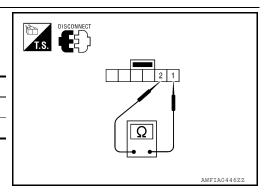
Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION : Description</u>".

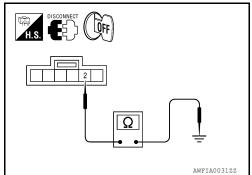
>> GO TO 2

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-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END





INFOID:000000007356945

INFOID:000000007818508

ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007356947

[TYPE 2]

А

	×: ON –: OFF	В
Condition	ABS warning lamp	
Ignition switch OFF	-	
For 2 seconds after turning ON ignition switch	×	С
2 seconds later after turning ON ignition switch	-	
ABS function is malfunctioning.	×	D
EBD function is malfunctioning.	X	
Component Function Check	INFOID:000000007356948	Е
1.CHECK ABS WARNING LAMP OPERATION		_
Check that the lamp illuminates for approximately 2 sec	conds after the ignition switch is turned ON.	BR
Is the inspection result normal?		
YES >> Inspection End.		
NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	195, "Diagnosis Procedure".	G
Diagnosis Procedure	INFC/D:000000007356949	
1.CHECK SELF-DIAGNOSIS		Н
Perform ABS actuator and electric unit (control unit) s (ABS)".	elf-diagnosis. Refer to <u>BRC-138, "CONSULT Function</u>	
Is the inspection result normal?		
YES >> GO TO 2		
NO >> Check items displayed by self-diagnosis.		
2. CHECK COMBINATION METER		J
	eter are normal. Refer to MWI-25, "Diagnosis Descrip-	
tion".		Κ
Is the inspection result normal? YES >> Replace ABS actuator and electric unit (co	ontrol unit). Refer to <u>BRC-231, "Removal and Installa-</u>	
tion"	·	L
NO >> Replace combination meter. Refer to <u>MWI-</u>	89, "Removal and Installation".	
Special Repair Requirement	INFOID:000000007818509	
1. ADJUSTMENT OF STEERING ANGLE SENSOR N	EUTRAL POSITION	M
	eering angle sensor when replacing the ABS actuator DJUSTMENT OF STEERING ANGLE SENSOR NEU-	Ν
>> GO TO 2		0
2. CALIBRATION OF DECEL G SENSOR		
	placing the ABS actuator and electric unit (control unit).	Ρ

>> END

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Description

INFOID:000000007356951

×: ON –: OFF

ITYPE 21

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

NOTE:

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

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

Component Function Check

INFOID:000000007356952

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Go to diagnosis procedure. Refer to <u>BRC-196, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007356953

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-138, "CONSULT Function</u> (<u>ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-25, "Diagnosis Descrip-</u> tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231</u>, "<u>Removal and Installa-</u> tion".
- NO >> Replace combination meter. Refer to <u>MWI-89</u>, "Removal and Installation".

Special Repair Requirement

INFOID:000000007818512

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-121</u>, <u>"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-122</u>, "CALIBRATION OF DECEL G SENSOR : <u>Description</u>".

>> END

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

[TYPE 2]

А

INFOID:000000007356955

	×: ON –: OFF
Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	-
VDC OFF switch turned ON. (VDC function is OFF.)	×
VDC/TCS function is malfunctioning.	-
ABS function is malfunctioning.	-
EBD function is malfunctioning.	-
Component Function Check	INFOID:00000007356956
1.VDC OFF INDICATOR LAMP OPERATION CHECK	۲ ۲
Check that the lamp illuminates for approximately 2 se s the inspection result normal?	econds after the ignition switch is turned ON.
YES >> GO TO 2 NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	<u>197, "Diagnosis Procedure"</u> .
2. VDC OFF INDICATOR LAMP OPERATION CHECK	₹2
Check that the VDC OFF indicator lamp in the combine VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
s the inspection result normal?	
YES >> Inspection End. NO >> Check VDC OFF switch. Refer to <u>BRC-19</u>	3. "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007356957
1.CHECK VDC OFF SWITCH	
Check that the VDC OFF indicator lamp in the combine	ation meter turns ON/OFF correctly when operating the
s the inspection result normal?	
YES >> GO TO 2	
NO >> Check VDC OFF switch. Refer to <u>BRC-19</u>	3. "Diagnosis Procedure".
2. CHECK SELF-DIAGNOSIS	
	self-diagnosis. Refer to BRC-138. "CONSULT Function
<u>is the inspection result normal?</u>	
YES >> GO TO 3	
NO >> Check items displayed by self-diagnosis.	
3. CHECK COMBINATION METER	
	neter are normal. Refer to MWI-25, "Diagnosis Descrip-
<u></u> .	
s the inspection result normal?	
<u>s the inspection result normal?</u> YES >> Replace ABS actuator and electric unit (c tion".	control unit). Refer to BRC-231, "Removal and Installa-

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

Special Repair Requirement

INFOID:000000007818510

[TYPE 2]

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-121</u>, "<u>ADJUSTMENT OF STEERING ANGLE SENSOR NEU-TRAL POSITION</u>: <u>Description</u>".

>> GO TO 2

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

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to <u>BRC-122</u>, <u>"CALIBRATION OF DECEL G SENSOR : Description"</u>.

>> END

SLIP INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

SLIP INDICATOR LAMP

Description

А

[TYPE 2]

INFOID:000000007356959

	×: ON –: OFF	В
Condition	SLIP indicator lamp	
Ignition switch OFF	_	
For 2 seconds after turning ON ignition switch	×	С
2 seconds later after turning ON ignition switch	-	
VDC/TCS function is malfunctioning.	×	D
ABS function is malfunctioning.	x	
EBD function is malfunctioning.	x	
Component Function Check	INFOID:000000007356960	E
1 .CHECK SLIP INDICATOR LAMP OPERATION		BRC
Check that the lamp illuminates for approximately 2 se	conds after the ignition switch is turned ON.	BILO
Is the inspection result normal?		
YES >> Inspection End. NO >> Go to diagnosis procedure. Refer to <u>BRC-</u>	199, "Diagnosis Procedure".	G
Diagnosis Procedure	INFOID:00000007356961	
1.CHECK SELF-DIAGNOSIS		Η
	elf-diagnosis. Refer to BRC-138, "CONSULT Function	
(ABS)".		
<u>Is the inspection result normal?</u> YES >> GO TO 2		
NO >> Check items displayed by self-diagnosis.		J
2. CHECK COMBINATION METER		
	neter are normal. Refer to MWI-25, "Diagnosis Descrip-	К
Is the inspection result normal?		
YES >> Replace ABS actuator and electric unit (c	ontrol unit). Refer to BRC-231, "Removal and Installa-	L
NO >> Replace combination meter. Refer to MWI	-89, "Removal and Installation".	
Special Repair Requirement	INFOID:00000007818511	\mathbb{M}
1. ADJUSTMENT OF STEERING ANGLE SENSOR	IEUTRAL POSITION	
Always perform neutral position adjustment for the st and electric unit (control unit). Refer to <u>BRC-121, "AI</u> <u>TRAL POSITION : Description"</u> .	eering angle sensor when replacing the ABS actuator DJUSTMENT OF STEERING ANGLE SENSOR NEU-	Ν
THE COTTON DESCIPTION.		0
>> GO TO 2		
2. CALIBRATION OF DECEL G SENSOR		
	placing the ABS actuator and electric unit (control unit).	Ρ
Refer to BRC-122, "CALIBRATION OF DECEL G SEN		

>> END

ECU DIAGNOSIS INFORMATION APPLICATION NOTICE

Application Notice

INFOID:000000007818421

Service information	Remarks
TYPE 1	VDC/TCS/ABS (VQ40DE)
TYPE 2	VDC/TCS/ABS (VK56DE)

< ECU DIAGNOSIS INFORMATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

The display shows the control unit calculation data, so a normal value might be displayed even in the event the output circuit (harness) is open or short-circuited.

CONSULT MONITOR ITEM

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	D
		0 [km/h (MPH)]	Vehicle stopped	•
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	E
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display $(\pm 10\% \text{ or less})$	Vehicle running (Note 1)	BRC
		0 [km/h (MPH)]	Vehicle stopped	_
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	G
		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)	H
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	
FR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	J
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	К
FR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	L
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	M
FR LH IN SOL Opera	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	N
		Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	0
FR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	0
	Operation status of each calcocid using	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	P
RR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	

INFOID:000000007356964

А

В

С

< ECU DIAGNOSIS INFORMATION >

		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) or actuator relay is inactive (in fail-safe mode)	ON	
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" with CONSULT) or actuator relay is inactive (in fail-safe mode)	ON	
	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
	EBD warning lamp	When EBD warning lamp is ON	ON	
EBD WARN LAMP	(Note 2)	When EBD warning lamp is OFF	OFF	
	Step Jamp quitch signal status	When brake pedal is depressed	ON	
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is released	OFF	
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON	
MOTOR RELAT		When the motor relay and motor are not operating	OFF	
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON	
ACTORIOR NET	Actualor relay operation	When the actuator relay is not operating	OFF	
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON	
	(Note 2)	When ABS warning lamp is OFF	OFF	
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON	
	(Note 2)	When VDC OFF indicator lamp is OFF	OFF	
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
	(Note 2)	When SLIP indicator lamp is OFF	OFF	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
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	

< ECU DIAGNOSIS INFORMATION >

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		With engine stopped	0 rpm	
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display	
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s	
TAW RATE SEN	sensor	When vehicle turning	–75 to 75 d/s	
R POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = R position	ON	
117031313	condition	A/T shift position = other than R position	OFF	
N POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = N position	ON	
NT 001 010	condition	A/T shift position = other than N position	OFF	
P POSI SIG	Transmission range switch signal ON/OFF	A/T shift position = P position	ON	
1 1 001 010	condition	A/T shift position = other than P position	OFF	
CV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
CV2 VDC sw	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
SV1	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
SV2	VDC switch-over valve	When actuator (switch-over valve) is ac- tive ("ACTIVE TEST" with CONSULT) or actuator relay is inactive (when in fail- safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
	De la la	2WD model	2WD	
2WD/4WD	Drive axle	4WD model	4WD	
	Throttle actuator opening/closing is dis-	Accelerator pedal not depressed (ignition switch is ON)	0 %	
ACCEL POS SIG	played (linked with accelerator pedal)	Accelerator pedal depressed (ignition switch is ON)	0 - 100 %	
		Vehicle stopped	Approx. 0 m/s ²	
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle turning right	Negative value (m/s ²)	
		Vehicle turning left	Positive value (m/s ²)	

< ECU DIAGNOSIS INFORMATION >

Monitor item Display content Condition Reference value in normal operation in normal operation in normal operation in normal operation STR ANGLE SIG sensor Steering angle detected by steering angle sensor Straight-ahead Approx. 0;2,5" BST OPER SIG Active booster operation Active booster is not operating Off PRESS SENSOR Brake fluid pressure detected by front pressure sensor Active booster is not operating Off PRESS SENSOR Brake fluid pressure detected by front pressure sensor With ignition switch turned ON and brake pedial depressed Approx. 0 bar EBD SIGNAL EBD operation EBD is active ON ABS SIGNAL ABS operation EBD is inactive OFF ABS SIGNAL TCS operation TCS is inactive ON VDC SIGNAL VDC operation TCS is inactive OFF ABS Fail.SiG ABS fail.safe signal In EBD is normal OFF CS FAIL SIG ABS fail.safe signal In CS fail.safe ON ABS Fail.SiG CT Fail-safe signal In CS fail.safe ON VDC FAIL SIG VDC fail.safe signal In CS fail.safe ON			Data monitor		
STR ANCLE SIG sensor Steering wheel turned -720 to +720* BST OPER SIG Active booster is operating Active booster is operating On PRESS SENSOR Brake fluid pressure detected by front pressure sensor Active booster is not operating OH PRESS SENSOR Brake fluid pressure detected by front pressure sensor EBD is not pressure Pedial depressed -40 to 300 ber EBD SIGNAL EBD operation EBD is active ON -40 to 300 ber ASS SIGNAL ASS operation ASS is nactive ON -40 to 300 ber TCS SIGNAL TCS operation TCS is inactive OFF ON VDC SIGNAL VDC operation VDC is active ON ON EBD Fail_SIG ABS fail-safe signal ABS is normal OFF ABS Fail_SIG ABS fail-safe signal ABS is normal OFF CF FAIL_SIG TCS fail-safe signal In TCS fail-safe ON VDC fail_safe signal In SC fail-safe ON VDC is normal OFF CRANKING SIG Crank operation Crank is active ON <td>Monitor item</td> <td>Display content</td> <td>Condition</td> <td></td>	Monitor item	Display content	Condition		
Steering wheel turned -720 to 720* BST OPER SIC Active booster operation Active booster is not operating On PRESS SENSOR Brahe fluid pressure detected by from pressure detected		Steering angle detected by steering angle	Straight-ahead	Approx. 0±2.5°	
BST OPER SIG Active booster is not operating Off PRESS SENSOR Brake fluid pressure detected by front pressure sensor With ignition switch turned ON and brake pedal released Approx. 0 bar EBD SIGNAL EBD operation EBD is active ON ABS SIGNAL ABS operation ABS is inactive OFF ABS SIGNAL ABS operation ABS is inactive OFF TCS SIGNAL ABS operation ABS is inactive OFF VDC SIGNAL TCS operation TCS is active ON VDC SIGNAL VDC operation VDC is active ON EBD FaiL SIG EBD fail-safe signal In EBD fail-safe ON EBD FaiL SIG ABS fail-safe signal In TCS fail-safe ON TCS FaiL SIG TCS fail-safe signal In TCS fail-safe ON VDC FaiL SIG VDC fail-safe signal In TCS fail-safe ON VDC FaiL SIG VDC fail-safe signal In TCS fail-safe ON VDC FaiL SIG Crank operation Crank is inactive ON Crank operation Crank is inactive <td>STR ANGLE SIG</td> <td>sensor</td> <td>Steering wheel turned</td> <td>–720 to +720°</td>	STR ANGLE SIG	sensor	Steering wheel turned	–720 to +720°	
Active booster is not operating Off PRESS SENSOR Brake fluid pressure detected by front pressure sensor Verti quinton switch turned ON and brake pedial depressed Approx. 0 bar EBD SIGNAL EBD operation EBD is active ON ABS is active ON ON ED is active ON ABS is active ON ABS is active ON ON ABS solowal ABS operation ABS is active ON ON TCS SIGNAL CS operation TCS is active ON ON VDC SIGNAL TCS operation TCS is inactive ON ON VDC SIGNAL TCS operation TCS is inactive ON ON ABS Fail.SIG EBD fail-safe signal In ABS fail-safe ON ON ABS Fail.SIG ABS fail-safe signal In TCS inormal OFF TCS fail-safe signal TCS is normal OFF ON VDC Fail.SIG TCS fail-safe signal In TCS is active ON VDC Fail.SIG Crank operation Crank is active ON		Active beaster exerction	Active booster is operating	On	
PRESS SENSOR Brake fluid pressure detected by from pres- sure sensor Pedial released With ignition switch turned ON and brake pedial depressed -40 to 300 bar EBD SIGNAL EBD operation EBD is inactive ON ABS signAL ABS operation ABS is active ON ABS operation ABS is inactive ON TCS SIGNAL ABS operation ABS is inactive ON TCS signAL TCS operation TCS is inactive ON VDC SIGNAL VDC operation VDC is inactive ON VDC SignAL VDC operation VDC is inactive ON EBD FAIL SIG EBD fail-safe signal In EBD fail-safe ON ABS fail-safe signal In SS fail-safe ON OFF TCS Fail SIG TCS fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON CRANKING SIG Crank operation Crank is active ON FLUDD LEV SW Brake fluid pressure detected b	BST OPER SIG	Active booster operation	Active booster is not operating	Off	
Surg sensor With ignition switch turned ON and brake pedia depressed -40 to 300 bar EBD SIGNAL ABS SIGNAL ABS operation EBD operation ABS is nactive ON ABS operation ABS SIGNAL ABS operation TCS SIGNAL CS operation TCS sinactive ABS is nactive ON ON TCS operation TCS SIGNAL VDC operation VDC operation TCS is nactive ON ON VDC operation VDC SIGNAL VDC operation TCS is nactive ON ON ABS fail-safe signal In EBD fail-safe ON EBD FAIL SIG ABS fail-safe signal BS fail-safe signal OFF ABS fail-safe signal In ABS fail-safe ON TCS FAIL SIG CS FAIL SIG VDC fail-safe signal TCS fail-safe signal OFF TCS Fail SIG VDC fail-safe signal In TCS fail-safe ON VDC fail-safe signal In TCS fail-safe ON VDC fail-safe signal OFF OFF VDC fail-safe signal In TCS fail-safe ON VDC fail-safe signal OFF OFF VDC fail-safe signal OFF OFF VDC fail-safe signal OFF OFF VDC fail-safe signal OFF <		Brake fluid pressure detected by front pres-		Approx. 0 bar	
EBD SIGNALEBD operationEBD is inactiveOFFABS SIGNALABS operationABS is activeONABS signalTCS operationABS is inactiveOFFTCS SIGNALTCS operationTCS is activeONVDC SIGNALVDC operationVDC is activeOFFVDC SIGNALVDC operationVDC is activeOFFEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeONEBD FAIL SIGABS fail-safe signalIn ABS is normalOFFABS FAIL SIGABS fail-safe signalIn CS fail-safeONABS FAIL SIGABS fail-safe signalIn CS fail-safeONTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeONVDC FAIL SIGVDC fail-safe signalIn TCS fail-safeONVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeONVDC FAIL SIGCrank operationOFFIn VDC fail-safeONFLUID LEV SWBrake fluid pressure detected by rear presCrank is activeONPRESS SEN2Brake fluid pressure detected by rear presWith ignition switch turned ON and brake pedial depressedApprox. 0 barSTP OFF RLYStop Iamp relay statusStop Iamp relay is not operatingOnfDELTA S SENValue detected by delta stroke sensorWith ignition switch turned ON and brake pedial depressed40 to 300 barRELEASE SWITCH NOActive booster signal statusWhen brake pedial is depressedONFRELEASE SWITCH NCActive booster signal status <td>PRESS SENSOR</td> <td>sure sensor</td> <td></td> <td>-40 to 300 bar</td>	PRESS SENSOR	sure sensor		-40 to 300 bar	
ABS SIGNAL ABS operation ABS is nactive OFF ABS SIGNAL ABS operation ABS is nactive ON TCS SIGNAL TCS operation TCS is active ON TCS SIGNAL TCS operation TCS is active ON VDC SIGNAL VDC operation TCS is active ON VDC SIGNAL VDC operation TCS is nactive ON EBD FAIL SIG EBD fail-safe signal In EBD fail-safe ON ABS FAIL SIG ABS fail-safe signal In EBD fail-safe ON ABS FAIL SIG ABS fail-safe signal In TCS fail-safe ON TCS FAIL SIG CS fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In TOS fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON FLUID LEV SW Brake fluid level switch signal status TCrank is inactive OFF FLUID LEV SW Brake fluid pressure detected by rear pressor When brake fluid level switch OFF OFF PRESS SEN2 Brake fluid level switch s			EBD is active	ON	
ABS SIGNAL ABS operation ABS is inactive OFF TCS SIGNAL TCS operation TCS is active ON VDC SIGNAL VDC operation VDC is cative ON VDC SIGNAL VDC operation VDC is active ON EBD FAIL SIG EBD fail-safe signal In EDD fail-safe ON ABS FAIL SIG ABS fail-safe signal In ABS fail-safe ON ABS FAIL SIG ABS fail-safe signal In ABS fail-safe ON ABS FAIL SIG CS fail-safe signal In TCS fail-safe ON TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCS fail-safe signal OFF ON VDC FAIL SIG VDC fail-safe signal OFF ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal OFF ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch OF OFF FLUID LEV SW Brake fluid pressure detected by rear pressure size sensor With ignition switch turned ON and brake fluid released Approx. 0 bar PRESS SEN2 Stop lamp relay is not operatin	EBD SIGNAL	EBD operation	EBD is inactive	OFF	
TCS SIGNAL TCS SIGNAL TCS si active ABS is inactive OFF TCS SIGNAL VDC SIGNAL VDC soperation TCS is active ON VDC SIGNAL VDC SIGNAL VDC operation TCS is active ON VDC SIGNAL VDC SIGNAL VDC operation TCS is active ON VDC SIGNAL VDC SIGNAL VDC operation In EBD fail-safe ON EBD FAIL SIG ABS FAIL SIG EBD fail-safe signal In EBD fail-safe ON ABS FAIL SIG ABS FAIL SIG ABS fail-safe signal In TCS fail-safe ON TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG Crank operation In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG Crank operation Crank is active ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch ON ON PRESS SEN2 Brake fluid pressure detected by rear pressure sensor With ignition switch turned ON and brake pedal is operating Approx. 0 bar TWI ignition switch turmed ON and brake pedal is operating Onff		ADC exerction	ABS is active	ON	
TCS SIGNAL TCS operation TCS is inactive OFF VDC SIGNAL VDC operation VDC is active ON VDC SIGNAL VDC operation VDC is active ON EBD FAIL SIG EBD fail-safe signal In EBD fail-safe ON ABS FAIL SIG ABS fail-safe signal In EBD fail-safe ON ABS FAIL SIG ABS fail-safe signal In TCS fail-safe ON TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In TCS fail-safe ON CRANKING SIG Crank operation Crank is active ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch OFF OFF PRESS SEN2 Stop lamp relay status Stop lamp relay status Stop lamp relay status Approx. 0 bar	ABS SIGNAL	ABS operation	ABS is inactive	OFF	
VDC SIGNAL VDC operation VDC is active OFF VDC SIGNAL VDC operation VDC is inactive OFF EBD FAIL SIG EBD fail-safe signal In EBD fail-safe ON ABS FAIL SIG EBD fail-safe signal In ABS fail-safe ON ABS FAIL SIG ABS fail-safe signal In ABS fail-safe ON TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCs fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCs fail-safe signal In TCS fail-safe ON VDC fail-safe signal Crank safe In TCS fail-safe ON VDC fail-safe signal Crank safe In TCS fail-safe ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch OFF OFF PRESS SEN2 Brake flu		Too	TCS is active	ON	
VDC SIGNALVDC operationVDC is inactiveOFFEBD FAIL SIGEBD fail-safe signalIn EBD fail-safeONABS FAIL SIGABS fail-safe signalIn ABS fail-safeONABS FAIL SIGABS fail-safe signalIn ABS fail-safeONTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeONTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeONVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeONVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeONVDC FAIL SIGCrank operationCrank is activeONCRANKING SIGCrank operationCrank is inactiveOFFFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2Brake fluid pressure detected by rear preesure sensorStop lamp relay is not operatingOnSTP OFF RLYStop lamp relay statusStop lamp relay is not operatingOnfDELTA S SENActive booster signal statusWhen brake pedal is depressed0.00 mm (+0.6/-0.4)NCActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFNCActive booster signal statusIn HBA fail safeOnHBA FAILHBA fail safe signalIn HBA fail-safeOnHBA FAILOHB fail safe signalIn HBA fail-safeOnOHB FAILOHB fail safe signalOHEOHE	TCS SIGNAL	ICS operation	TCS is inactive	OFF	
EBD FAIL SIG EBD FAIL SIGEBD fail-safe signalVDC is inactiveOPFABS FAIL SIG ABS fail-safe signalABS fail-safe signalIn ABS fail-safeONABS FAIL SIG C FAIL SIGABS fail-safe signalIn ABS fail-safeONTCS FAIL SIG VDC fail-safe signalTCS fail-safe signalIn TCS fail-safeONVDC FAIL SIG VDC fail-safe signalVDC fail-safe signalIn VDC fail-safeONVDC FAIL SIG C rank operationCrank operationCrank is activeONFLUID LEV SW PRESS SEN2Brake fluid level switch signal statusWhen brake fluid level switch ONONFRESS SEN2 NC FF RLYBrake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLY NOStop lamp relay statusStop lamp relay is not operatingOrfDELTA S SEN NOActive booster signal statusWhen brake pedal is depressed0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is releasedONRELEASE SWITCH NCActive booster signal statusIn HBA fail-safeONHBA FAIL HBA fail safe signalIn HBA fail-safeONHBA FAIL HBA FAILOHB fail safe signalIn HBA fail-safeONOHB FAIL HBA FAILOHB fail safe signalIn HBA fail-safeOnOHB FAIL HBA FAILOHB fail safe signalOHEOHEOHB FAILOHB fail safe signalOHEOHEOHB FAILOHB fail safe signal </td <td></td> <td></td> <td>VDC is active</td> <td>ON</td>			VDC is active	ON	
EBD FAIL SIGEBD fail-safe signalEBD is normalOFFABS FAIL SIGABS fail-safe signalIn ABS fail-safeONABS FAIL SIGTCS fail-safe signalIn TCS fail-safeONTCS FAIL SIGTCS fail-safe signalIn TCS fail-safeONVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeONVDC FAIL SIGVDC fail-safe signalIn VDC fail-safeONCRANKING SIGCrank operationCrank is inactiveOFFFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONFLUID LEV SWBrake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedid releasedApprox. 0 barFRESS SEN2Brake fluid pressure detected by rear pressure sensorStop lamp relay is operatingOnSTP OFF RLYStop lamp relay statusStop lamp relay is not operatingOffDELTA S SENAute detected by delta stroke sensorWhen brake pedal is depressed0.00 mm (+0.6/-0.4)NONWhen brake pedal is depressed0.00 mm (+0.6/-0.4)NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedONHBA FAILHBA fail safe signalIn HBA fail-safeOnHBA FAILHBA fail safe signalOffOHHBA FAILHBA fail safe signalOHIn HBA fail-safeOHHBA fail safe signalOHOH <td>VDC SIGNAL</td> <td>VDC operation</td> <td>VDC is inactive</td> <td>OFF</td>	VDC SIGNAL	VDC operation	VDC is inactive	OFF	
Link and a set of a set			In EBD fail-safe	ON	
ABS FAIL SIG ABS fail-safe signal ABS is normal OFF TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON CRANKING SIG Crank operation Crank is active ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch ON ON PRESS SEN2 Brake fluid pressure detected by rear pressure sensor With ignition switch turned ON and brake pedal depressed Approx. 0 bar STP OFF RLY Stop lamp relay status Stop lamp relay is operating On DELTA S SEN Altive booster signal status When brake pedal is released 0.00 mm (+0.6/-0.4) RELEASE SWITCH NC Active booster signal status When brake pedal is released ON NO Active booster signal status When brake pedal is released OFF HBA fail safe signal In HBA fail-safe ON ON HBA fail safe signal OFF OFF OFF	EBD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF	
ABS is normal OFF TCS FAIL SIG TCS fail-safe signal In TCS fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON CRANKING SIG Crank operation Crank is active ON CRANKING SIG Crank operation Crank is active ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch OF OFF FLUID LEV SW Brake fluid pressure detected by rear pressure sensor With ignition switch turned ON and brake pedal released Approx. 0 bar PRESS SEN2 Brake fluid pressure detected by rear pressure sensor Stop lamp relay is operating On STP OFF RLY Stop lamp relay status Stop lamp relay is operating On DELTA S SEN Value detected by delta stroke sensor When brake pedal is released 0.00 mm (+0.6/-0.4) NO Active booster signal status When brake pedal is released ON NO Active booster signal status When brake pedal is released OFF NO Active booster signal status When brake pedal is released OFF NO Active booster signal status When brake pedal is released OFF ND Active boo		ABS fail-safe signal	In ABS fail-safe	ON	
TCS FAIL SIG TCS fail-safe signal TCS is normal OFF VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON VDC FAIL SIG VDC fail-safe signal In VDC fail-safe ON CRANKING SIG Crank operation Crank is active ON FLUID LEV SW Brake fluid level switch signal status When brake fluid level switch ON ON PRESS SEN2 Brake fluid pressure detected by rear pressure sensor With ignition switch turned ON and brake pedal released Approx. 0 bar STP OFF RLY Stop lamp relay status Stop lamp relay is operating On DELTA S SEN Value detected by delta stroke sensor When brake pedal is depressed 1.05 - 1.80 mm NO Active booster signal status When brake pedal is depressed 0.00 mm (+0.6/-0.4) RELEASE SWITCH NC Active booster signal status When brake pedal is depressed ON NO Active booster signal status When brake pedal is depressed ON HBA fail safe signal In HBA fail-safe On ON HBA fail safe signal OHB fail safe signal OHB fail safe signal OHB fail safe signal	ABS FAIL SIG		ABS is normal	OFF	
NumberTCS is normalOFFVDC FAIL SIG VDC fail-safe signalIn VDC fail-safeONVDC FAIL SIG CRANKING SIG FLUID LEV SWCrank operationCrank is activeONFLUID LEV SW FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2 STP OFF RLYBrake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLY NOStop lamp relay statusStop lamp relay is operatingOnDELTA S SEN NOActive booster signal statusWhen brake pedal is depressed0.00 mm (+0.6/-0.4)RELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedONHBA FAIL OHB FAILHBA fail safe signalIn HBA fail-safeOnOHB FAIL OHB FAILOHB fail safe signalIn HBA fail-safeOnOHB FAIL OHB FAILOHB fail safe signalOHB is activeON	T00 5411 010	700/11 / 1	In TCS fail-safe	ON	
VDC FAIL SIGVDC fail-safe signalVDC is normalOFFCRANKING SIGCrank operationCrank is activeONFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2Brake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay statusStop lamp relay is not operating When brake pedal is released-40 to 300 barDELTA S SENValue detected by delta stroke sensorWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFHBA fail safe signalIn HBA fail-safeOnONHBA FAILOHB fail safe signalOHB is activeOHB fail safe signal	TCS FAIL SIG	ICS fail-safe signal	TCS is normal	OFF	
CRANKING SIG Crank operationCrank operationCrank is activeONFLUID LEV SW FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2Brake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLY DELTA S SENStop lamp relay statusStop lamp relay is operatingOnDELTA S SEN NOValue detected by delta stroke sensorWhen brake pedal is depressed0.00 mm (+0.6/-0.4)RELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressed0.00 mm (+0.6/-0.4)HBA FAIL OHB FAILHBA fail safe signalIn HBA fail-safeOnOHB FAIL OHB FAILOHB fail safe signalOHB is activeOHB is activeOHOHB FAILOHB fail safe signalOHB fail safe signalOHB fail safe signalOHB is activeOH			In VDC fail-safe	ON	
CRANKING SIGCrank operationCrank is inactiveOFFFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2Brake fluid pressure detected by rear pressure sure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay is operatingOffDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmDELTA S SENValue detected by delta stroke sensorWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFHBA FAILHBA fail safe signalIn HBA fail-safeOnOHB FAILOHB fail safe signalOHB is activeOHB is activeON	VDC FAIL SIG	VDC fail-safe signal	VDC is normal	OFF	
FLUID LEV SWBrake fluid level switch signal statusCrank is inactiveOFFFLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch ONONPRESS SEN2Brake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay stop pressure detected by delta stroke sensorStop lamp relay is operatingOnDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFHBA FAILHBA fail safe signalIn HBA fail-safeOnHBA FAILOHB fail safe signalOHB is activeOHBOHB		Oracle an article	Crank is active	ON	
FLUID LEV SWBrake fluid level switch signal statusWhen brake fluid level switch OFFOFFPRESS SEN2Brake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay is operating-40 to 300 barDELTA S SENYalue detected by delta stroke sensorWhen brake pedal is depressed0.00DELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCHBA fail safe signalIn HBA fail-safeONHBA FAILOHB fail safe signalOHB is activeOHB is activeOH	CRANKING SIG	Crank operation	Crank is inactive	OFF	
PRESS SEN2Brake fluid pressure detected by rear pressure sensorWith ignition switch turned ON and brake pedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay is operating-40 to 300 barDELTA S SENAutue detected by delta stroke sensorStop lamp relay is not operatingOffDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmRELEASE SWITCH NOActive booster signal statusWhen brake pedal is releasedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCHBA fail safe signalWhen brake pedal is releasedOFFHBA FAILHBA fail safe signalIn HBA fail-safeOnOHB FAILOHB fail safe signalOHB is activeON			When brake fluid level switch ON	ON	
PRESS SEN2Brake fluid pressure detected by rear pressure sensorpedal releasedApprox. 0 barSTP OFF RLYStop lamp relay statusStop lamp relay is operating-40 to 300 barDELTA S SENStop lamp relay statusStop lamp relay is not operatingOffDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmRELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCHBA fail safe signalIn HBA fail-safeONHBA FAILOHB fail safe signalOHB is activeON	FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF	
PRESS SEN2sure sensorWith ignition switch turned ON and brake pedal depressed40 to 300 barSTP OFF RLYStop lamp relay statusStop lamp relay is operatingOnDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmDELTA S SENValue detected by delta stroke sensorWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFRELEASE SWITCH NCHBA fail safe signalIn HBA fail-safeONHBA FAILHBA fail safe signalOHB is activeON		Brake fluid pressure detected by rear pres-	•	Approx. 0 bar	
STP OFF RLYStop lamp relay statusStop lamp relay is not operatingOffDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmRELEASE SWITCH NOActive booster signal statusWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is releasedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is releasedOFFHBA FAILHBA fail safe signalIn HBA fail-safeONOHB FAILOHB fail safe signalOHB is activeON	PRESS SENZ		•	–40 to 300 bar	
Stop lamp relay is not operatingOffDELTA S SENValue detected by delta stroke sensorWhen brake pedal is depressed1.05 - 1.80 mmRELEASE SWITCH NOActive booster signal statusWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFHBA FAILHBA fail safe signalIn HBA fail-safeONHBA FAILOHB fail safe signalOHB is activeON			Stop lamp relay is operating	On	
DELTA S SENValue detected by delta stroke sensorWhen prake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NOActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFHBA FAILHBA fail safe signalIn HBA fail-safeONOHB FAILOHB fail safe signalOHB is activeON	SIP OFF KLY	Stop lamp relay status	Stop lamp relay is not operating	Off	
RELEASE SWITCH NOActive booster signal statusWhen brake pedal is released0.00 mm (+0.6/-0.4)RELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedONRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFHBA FAILHBA fail safe signalIn HBA fail-safeONOHB FAILOHB fail safe signalOHB is activeON			When brake pedal is depressed	1.05 - 1.80 mm	
NO Active booster signal status When brake pedal is released OFF RELEASE SWITCH NC Active booster signal status When brake pedal is depressed OFF When brake pedal is released ON ON HBA FAIL HBA fail safe signal In HBA fail-safe On OHB FAIL OHB fail safe signal OHB is active ON	DELIA S SEN	Value detected by delta stroke sensor	When brake pedal is released	0.00 mm (+0.6/-0.4)	
NOActive booster signal statusWhen brake pedal is releasedOFFRELEASE SWITCH NCActive booster signal statusWhen brake pedal is depressedOFFWhen brake pedal is releasedONWhen brake pedal is releasedONHBA FAILHBA fail safe signalIn HBA fail-safeOnHBA FAILOHB fail safe signalOHB is activeON	RELEASE SWITCH		When brake pedal is depressed	ON	
NC Active booster signal status When brake pedal is released ON HBA FAIL HBA fail safe signal In HBA fail-safe On OHB FAIL OHB fail safe signal OHB is active ON		Active dooster signal status	When brake pedal is released	OFF	
NC Active booster signal status When brake pedal is released ON HBA FAIL HBA fail safe signal In HBA fail-safe On HBA FAIL HBA fail safe signal HBA is normal Off OHB FAIL OHB fail safe signal OHB is active ON	RELEASE SWITCH		When brake pedal is depressed	OFF	
HBA FAIL HBA fail safe signal HBA is normal Off OHB FAIL OHB fail safe signal OHB is active ON		Active booster signal status	When brake pedal is released	ON	
OHB FAIL OHB fail safe signal			In HBA fail-safe	On	
OHB FAIL OHB fail safe signal	HBA FAIL	ныя тан sate signal	HBA is normal	Off	
OHB FAIL OHB tail sate signal OHB is inactive			OHB is active	ON	
	OHB FAIL	OHB fail safe signal	OHB is inactive	OFF	

< ECU DIAGNOSIS INFORMATION >

			Data monitor		
Monitor item	Display	content	Cor	dition	Reference value in normal operation
HBA SIG	HBA operation		HBA is active		On
			HBA is inactive		Off
OHB SIG	OHB operation		In OHB fail-safe		ON
			OHB is normal		OFF
IOTE:					
1: Confirm tire pres	sure is normal. g for warning lamp and in	dicator lamp			
3: Only 4WD mode		dicator lamp.			
•	Refer to <u>BRC-195, "Des</u>	cription".			
Brake warning lam	p: Refer to <u>BRC-196, "De</u>	escription".			
	lamp: Refer to <u>BRC-197</u>				
-	b: Refer to <u>BRC-199, "De</u>	scription".			
FERMINAL LAY	OUT				
		5 6 7 8 9 1			
	1 17 18 19 20	21 22 23 24 25	26 27 28 29 30 31		
	32 33 34 35 3	36 37 38 39 40 4	1 42 43 44 45 46	⁴⁷ H.S.	
					AWFIA0032ZZ
-ail-Safe					INFOID:000000007356965
CAUTION:					
f the Fail-Safe f	unction is activated	d, perform Self D	iagnosis for VDC	/TCS/ABS syste	m.
ABS/EBD SYST					
	ctrical malfunction w ctrical malfunction w				
SLIP indicator lar			em, me drake w	arning lamp, ADS	warning lamp and
	evert to one of the fo	llowing condition	s of the Fail-Safe f	unction.	
	function, only the El		nd the condition of	the vehicle is the	e same condition of
	out VDC/TCS/ABS s		and the second second		and the last of the
	function, the EBD ar ion of vehicles witho			e condition of the	venicle is the same
VDC/TCS SYST					
	CS system malfunct	ion the SLIP ind	icator lamn is turne	d on and the con	dition of the vehicle
	e condition of vehicle				
VDC/TCS system	n, the ABS control co	ontinues to operat	te normally without	VDC/TCS contro	l.
DTC No. Inde	x				INFOID:000000007356966
r		Items (CONCU	IT corean torma	Def	aranca
			LT screen terms)	Rete	erence
	1101	RR RH SENSOR-1			
	1102	RR LH SENSOR-1		<u>BRC-144,</u>	"Description"
	1103	FR RH SENSOR-1			
C	1104	FR LH SENSOR-1			

< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	Reference
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PDC 147 "Description"
C1107	FR RH SENSOR-2	BRC-147, "Description"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-150, "Description"
C1110	CONTROLLER FAILURE	BRC-152, "DTC Logic"
C1111	PUMP MOTOR	BRC-153, "Description"
C1113	G-SENSOR	BRC-155, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-157, "Description"
C1116	STOP LAMP SW	BRC-160, "Description"
C1120	FR LH IN ABS SOL	BRC-162, "Description"
C1121	FR LH OUT ABS SOL	BRC-165, "Description"
C1122	FR RH IN ABS SOL	BRC-162, "Description"
C1123	FR RH OUT ABS SOL	BRC-165, "Description"
C1124	RR LH IN ABS SOL	BRC-162, "Description"
C1125	RR LH OUT ABS SOL	BRC-165, "Description"
C1126	RR RH IN ABS SOL	BRC-162, "Description"
C1127	RR RH OUT ABS SOL	BRC-165, "Description"
C1130	ENGINE SIGNAL 1	
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	BRC-168, "Description"
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-169, "Description"
C1142	PRESS SEN CIRCUIT	BRC-171, "Description"
C1143	ST ANG SEN CIRCUIT	
C1144	ST ANG SEN SIGNAL	BRC-175, "Description"
C1145	YAW RATE SENSOR	
C1146	SIDE G-SEN CIRCUIT	BRC-155, "Description"
C1155	BR FLUID LEVEL LOW	BRC-178, "Description"
C1156	ST ANG SEN COM CIR	BRC-181, "Description"
C1160	DECEL G SEN SET	BRC-182, "Description"
C1163	ST ANGL SEN SAFE	BRC-183, "Description"
C1164	CV1	
C1165	CV2	
C1166	SV1	BRC-184, "Description"
C1167	SV2	
C1170	VARIANT CODING	BRC-152, "DTC Logic"
C1178	ABS ACTIVE BOOSTER SV NG	BRC-187, "Description"
C1179	ABS DELTA S SEN NG	BRC-190, "Description"
C1181	ABS ACTIVE BOOSTER RESPONSE NG	
C1184	ABS BRAKE RELEASE SW NG	BRC-187, "Description"
C1189	ABS BRAKE BOOSTER DEFECT	
U1000	CAN COMM CIRCUIT	BRC-192, "Description"

< WIRING DIAGRAM >

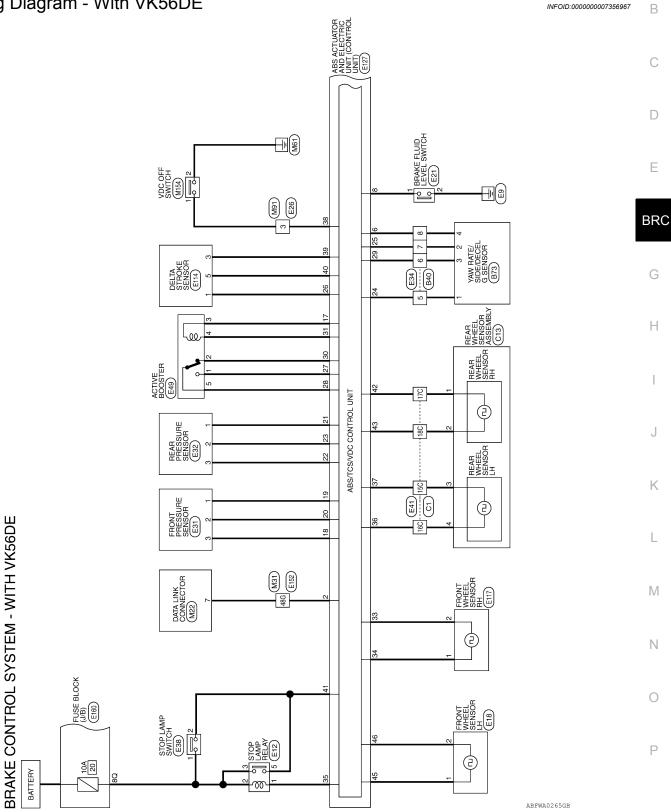
[TYPE 2]

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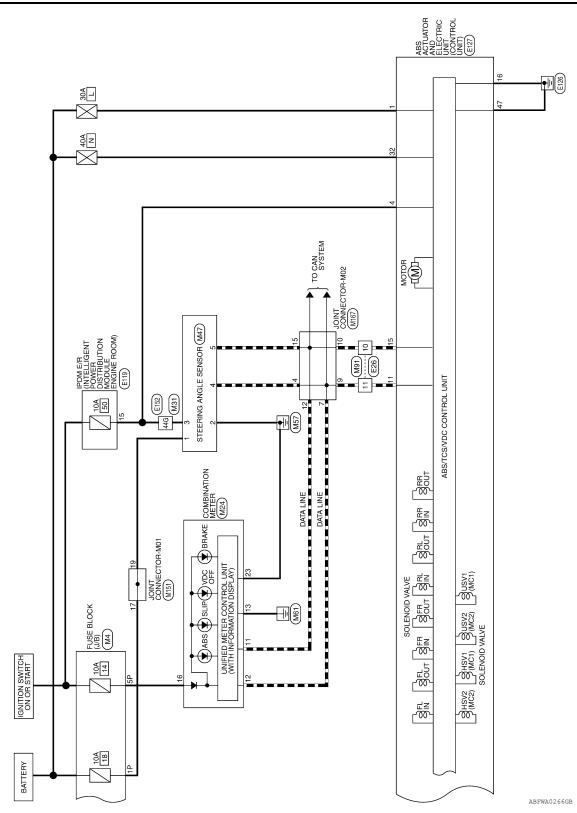
WIRING DIAGRAM

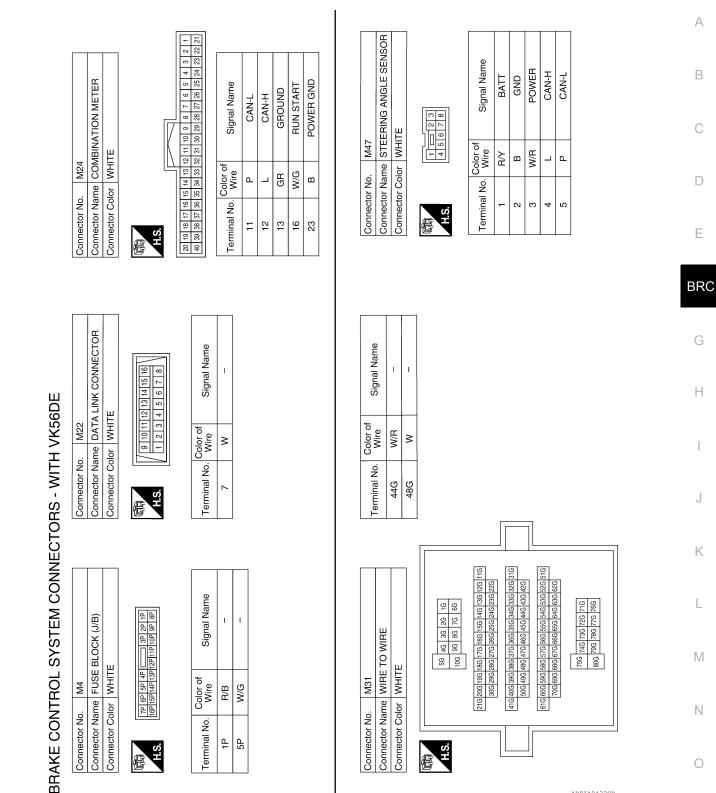
BRAKE CONTROL SYSTEM - VDC

Wiring Diagram - With VK56DE



< WIRING DIAGRAM >





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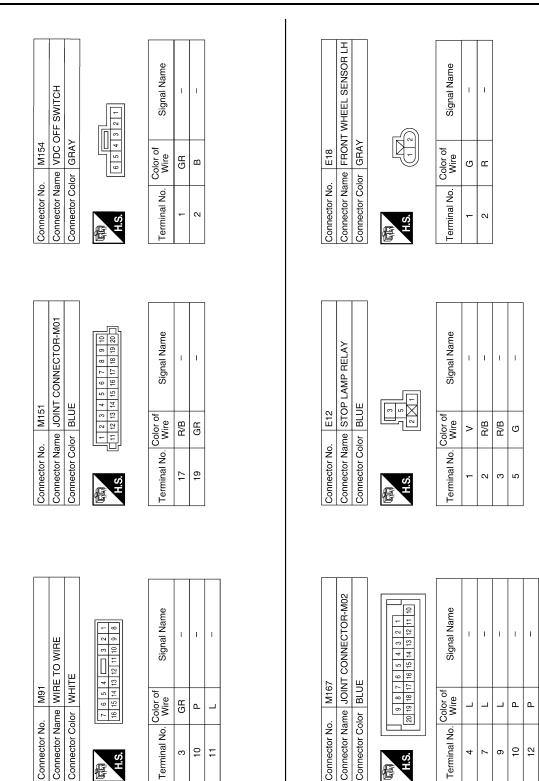
< WIRING DIAGRAM >

[TYPE 2]

August 2012



< WIRING DIAGRAM >

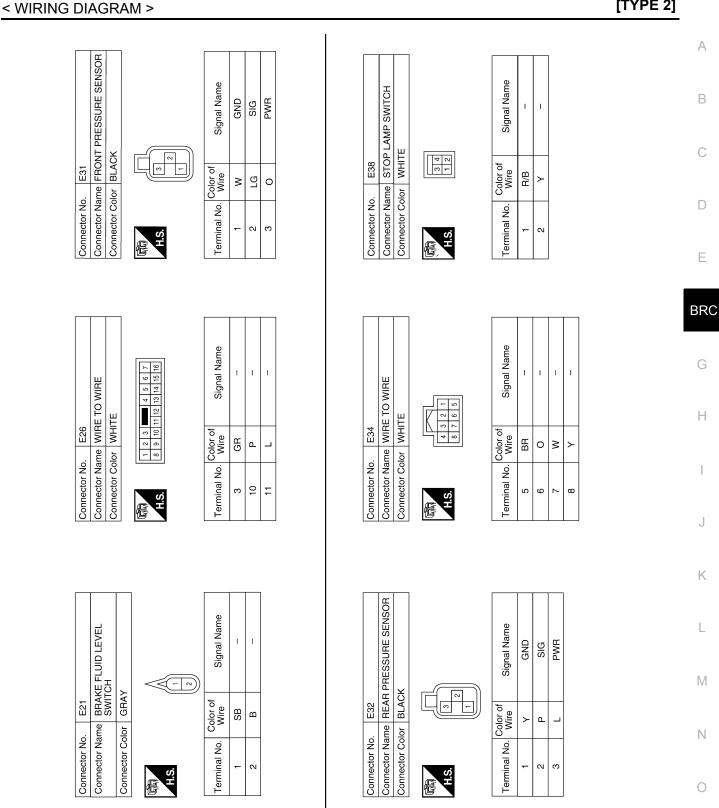


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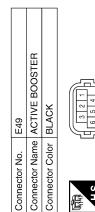
15



ABFIA0529GB

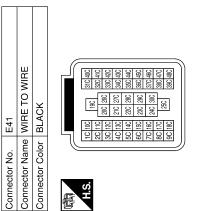
Ρ

< WIRING DIAGRAM >



Signal Name	I	I	I	I	I
Color of Wire	Г	ГG	Μ	0	Y
Terminal No. Wire	1	2	3	4	5

Signal Name	I	I	I	I	
Color of Wire	Ч	Г	٨	ГG	
Terminal No.	15C	16C	17C	18C	



Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	WHITE
(1817) 1817	9 8 7 6 5 5 4 3 18 17 16 15 14 13 12 11 10

6 14 13 12 11 10	Signal Name
9 8 7 6 18 17 16 15	Color of Wire
H.S.	Terminal No.
H.S.	<u> </u>

ABS IGN SUPPLY

W/R

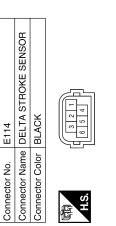
15

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E117	Connector Name FRONT WHEEL SENSOR RH	GRAY	
Connector No.	Connector Name	Connector Color GRAY	H.S.

Г

Signal Name	I	I
Color of Wire	В	M
Terminal No.	1	2



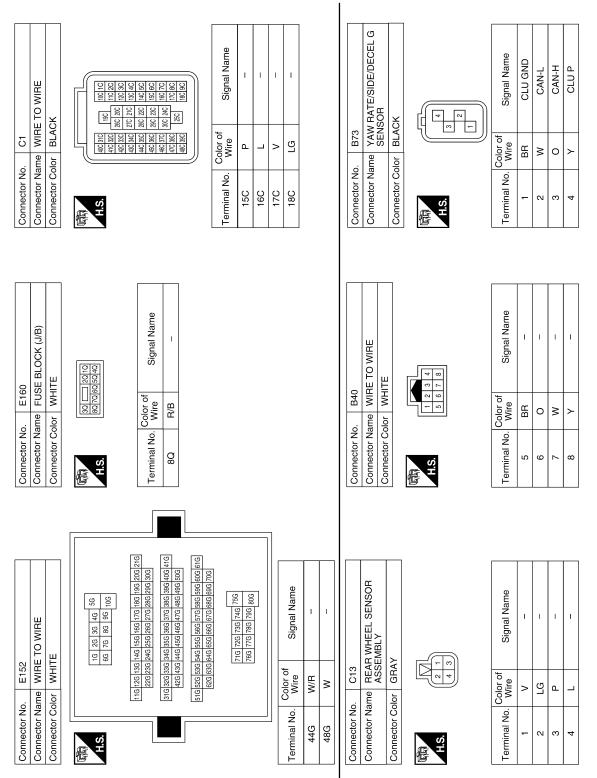
Signal Name	PWR_SUP	GND	SIG	
Color of Wire	ŋ	ГG	0	
Terminal No.	-	3	5	

ABFIA0530GB

Signal Name	CAN2-H	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	I	FR LH PWR	FR LH SIG	MOTOR GND														
	0	B	ä	VALVE	Ë	FB	BRK	RR	E	VDQ	DE	DE	STOF	RF	RR		FR	±	Ŵ														
. Wire	0	Ъ	0	≻	3	B	>	_	۵.	GR	ГG	0	SB	^	LG	Ι	ŋ	н	В														
Terminal No.	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47														
					1	1		1																				1					
Signal Name	MOTOR SUPPLY	DIAG K	I	IGN	I	CLUS SP	I	FLUID LEVEL SW	I	I	CAN-H	I	I	I	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					
Wire	щ	SB	1	W/R	1	~	1	GR	1	1	L	I	I	-	Ч	В	M	0	8	ГG	٨	_	٩	BR	8	IJ	L	~					
Terminal No.	1	7	e	4	£	9	7	ω	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28					
							ſ	31 16	47	\mathbb{D}																							
DR AND	ELECTRIC UNIT (CONTROL	K50UE)						10 11 12 13 14 15 26 27 28 29 30 3	42 43 44 45 45																								
ABS ACTUATO	LECTRIC UN	V H I W) (I I N	BLACK					7 8 9 10 22 23 24 25	39 40 4																								
_	Connector Name	_	Connector Color B					2 3 4 5 6 18 19 20 21	34 35 36																								
	Conne		Conne	Ą	- HAN	H.S.	l	1 12	32	IJ																							
																														ABFIA	A0065	igb	

BRAKE CONTROL SYSTEM - VDC

< WIRING DIAGRAM >



ABFIA0435GB

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS APPLICATION NOTICE

Application Notice

[TYPE 2]

INFOID:000000007818422 B

Service information	Remarks	C
TYPE 1	VDC/TCS/ABS (VQ40DE)	0
TYPE 2	VDC/TCS/ABS (VK56DE)	

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VDC/TCS/ABS

< SYMPTOM DIAGNOSIS >

VDC/TCS/ABS

Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation fre- quency	Looseness of front and rear axle	<u>BRC-217, "Diag-</u> nosis Procedure"	
4	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-218, "Diag-	
Unexpected pedal reaction	Make sure the braking force is sufficient when the ABS is not operating.	nosis Procedure"	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-219, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-220, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-221, "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-222, "Diag-</u> nosis Procedure"	
	ECM		

NOTE:

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY < SYMPTOM DIAGNOSIS > [TYPE 2]	
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY	-
Diagnosis Procedure)
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: FAX-6, "On-Vehicle Inspection and Service", Rear: RAX-6, "On-Vehicle Inspection and Service". Is the inspection result normal? YES >> GO TO 3 NO >> Repair or replace malfunctioning components.	2
3. CHECK WHEEL SENSOR AND SENSOR ROTOR	ł
 Check the following. Wheel sensor installation for damage. Sensor rotor installation for damage. Wheel sensor connector connection. Wheel sensor harness inspection. 	
Is the inspection result normal?	
 YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to <u>BRC-229</u>, "<u>Removal and Installation</u>" (wheel sensor) or <u>BRC-230</u>, "<u>Removal and Installation</u>" (sensor rotor). • Repair harness. 	I
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-138. "CONSULT Function (ABS)"</u>. NO >> Inspection End. 	

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UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:000000007356971

[TYPE 2]

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to <u>BR-17</u>, "Inspection and Adjustment - Standard Pedal" or <u>BR-18</u>, "Inspection and Adjustment - Adjustable Pedal".

Is the stroke too large?

- YES >> Bleed air from brake tube and hose. Refer to <u>BR-20, "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-17</u>, "Inspection and Adjustment - Standard Pedal" or <u>BR-18</u>, "Inspection and Adjustment - Adjustable Pedal" (brake pedal), <u>BR-50</u>, "Disassembly and <u>Assembly</u>" (master cylinder), <u>BR-10</u>, "Inspection" (brake booster).

NO >> GO TO 2

2. CHECK FUNCTION

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

Is the inspection result normal?

- YES >> Inspection End.
- NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Check brake system.

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ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

CAUTION:

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

1.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Perform self-diagnosis. Refer to <u>BRC-138</u>, "CONSULT Function (ABS)".

[TYPE 2]

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS < SYMPTOM DIAGNOSIS > [TYPE 2] PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS
Diagnosis Procedure
 CAUTION: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal. When shifting gears When driving on slippery road During cornering at high speed When passing over bumps or grooves [at approximately 50 mm (1.97 in) or more] When pulling away just after starting engine [at approximately 10 km/h (6 MPH) or higher] 1.SYMPTOM CHECK 1
Check that there are pedal vibrations when the engine is started.
Do vibrations occur? YES >> GO TO 2
NO >> Inspect the brake pedal. 2.SYMPTOM CHECK 2
Check that there are ABS operation noises when the engine is started.
Do the operation noises occur? YES >> GO TO 3
NO >> Perform self -diagnosis. Refer to <u>BRC-138, "CONSULT Function (ABS)"</u> . 3. SYMPTOM CHECK 3
Check symptoms when electrical component (headlamps, etc.) switches are operated. Do symptoms occur? YES >> Check if there is a radio, antenna, antenna lead wire, or wiring close to the control unit. If there is, move it farther away.
NO >> Inspection End.

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VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

< SYMPTOM DIAGNOSIS >

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

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[TYPE 2]

1.SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Inspection End.

NO >> GO TO 2

2. CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to <u>BRC-138</u>, "CONSULT Function (ABS)".

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-138, "CONSULT Function (ABS)"</u>.

NO >> GO TO 3

3.CHECK CONNECTOR

• Turn ignition switch OFF and disconnect ABS actuator and electric unit (control unit) connector and check terminal for deformation, disconnection, looseness, etc.

• Securely connect connectors and perform ABS actuator and electric unit (control unit) self-diagnosis.

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. Refer to <u>EC-533, "CONSULT Function"</u> or <u>TM-37, "CONSULT Func-</u> tion (TRANSMISSION)".

Are self-diagnosis results indicated?

- YES >> Check the corresponding items.
 - ECM: Refer to <u>EC-533</u>, "CONSULT Function".
 - TCM: Refer to TM-37, "CONSULT Function (TRANSMISSION)".
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-231. "Removal and Installa-</u> tion".

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

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[TYPE 2]

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

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PRECAUTION PRECAUTIONS

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

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

WARNING:

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

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

WARNING:

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

Precaution Necessary for Steering Wheel Rotation After Battery Disconnect

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NOTE:

- This Procedure is applied only to models with Intelligent Key system and NATS (NISSAN ANTI-THEFT SYS-TEM).
- Remove and install all control units after disconnecting both battery cables with the ignition knob in the "LOCK" position.
- Always use CONSULT to perform self-diagnosis as a part of each function inspection after finishing work. If DTC is detected, perform trouble diagnosis according to self-diagnostic results.

For models equipped with the Intelligent Key system and NATS, an electrically controlled steering lock mechanism is adopted on the key cylinder.

For this reason, if the battery is disconnected or if the battery is discharged, the steering wheel will lock and steering wheel rotation will become impossible.

If steering wheel rotation is required when battery power is interrupted, follow the procedure below before starting the repair operation.

OPERATION PROCEDURE

- Connect both battery cables.
 NOTE: Supply power using jumper cables if battery is discharged.
- 2. Use the Intelligent Key or mechanical key to turn the ignition switch to the "ACC" position. At this time, the steering lock will be released.
- 3. Disconnect both battery cables. The steering lock will remain released and the steering wheel can be rotated.
- 4. Perform the necessary repair operation.

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PRECAUTIONS

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- 5. When the repair work is completed, return the ignition switch to the "LOCK" position before connecting the battery cables. (At this time, the steering lock mechanism will engage.)
- 6. Perform a self-diagnosis check of all control units using CONSULT.

Precaution for Brake System

CAUTION:

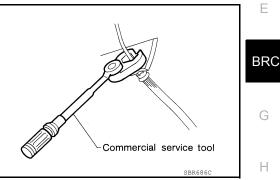
- Refer to <u>MA-18, "FOR USA AND CANADA : Fluids and Lubricants"</u> (United States and Canada), <u>MA-20, "FOR MEXICO : Fluids and Lubricants"</u> (Mexico) for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-41, "Brake Burnishing"</u> (front disc brake) or <u>BR-46, "Brake Burnishing"</u> (rear disc brake). WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.



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PRECAUTIONS

< PRECAUTION >

- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

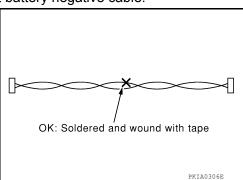
NOTE:

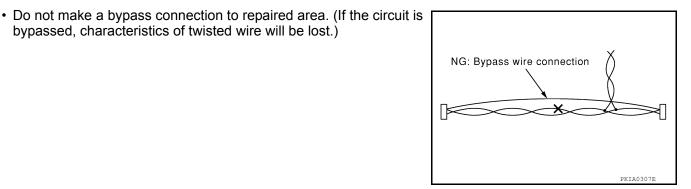
VDC OFF indicator lamp is on when VDC OFF switch is on.

bypassed, characteristics of twisted wire will be lost.)

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).





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	HILAUDOLE	Checking operation of ABS active wheel sen- sors
ST30031000		Removing sensor rotor
(—) Bearing puller	ZZA0700D	
ST30720000 (J-25405) Drift	a b	Installing rear sensor rotor a: 77 mm (0.03 in) diameter b: 55 mm (2.17 in) diameter
ST27863000 (—) Drift	ZZA0701D	Installing rear sensor rotor a: 75 mm (2.95 in) diameter b: 62 mm (2.44 in) diameter
KV40104710 (—) Drift	ZZA0832D	Installing rear sensor rotor a: 76 mm (2.99 in) diameter b: 68.5 mm (2.697 in) diameter

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< PREPARATION >

Commercial Service Tool

[TYPE 2]

Tool name		Description
1. Flare nut crowfoot 2. Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)
	S-NT360	
Power tool		Loosening nuts, screws and bolts
	PIIB1407E	

UNIT REMOVAL AND INSTALLATION WHEEL SENSORS

Removal and Installation

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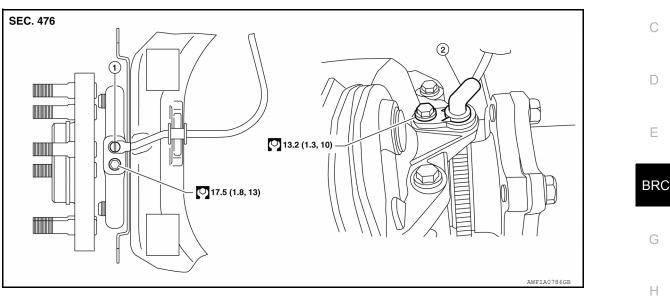
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[TYPE 2]

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1. Front wheel sensor LH Rear wheel sensor RH 2

REMOVAL

- 1. If removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor bolt. Refer to BR-47, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. If removing the rear wheel sensor, first remove the spare tire.
- 3. Remove the wheel sensor bolt.
- 4 Pull the wheel sensor out, being careful to turn it as little as possible. CAUTION:
 - · Be careful not to damage wheel sensor edge or the sensor rotor teeth.
 - · Do not pull on the wheel sensor harness.
- 5. Disconnect the wheel sensor harness connector, then remove the wheel sensor harness from the mounts and remove the wheel sensor.
 - When removing the rear wheel sensor, both sensors must be removed as they are on the same harness.

INSTALLATION

Installation is in the reverse order of removal. CAUTION:

- Inspect wheel sensor O-ring, replace wheel sensor if damaged.
- Before installing the wheel sensor, make sure no foreign materials (such as iron fragments) are adhered to the pick-up part of the wheel sensor, to the inside of the wheel sensor hole or on the sensor rotor in the wheel hub assembly.
- Clean wheel sensor hole and mating surface with brake cleaner and a lint-free shop rag. Be careful that dirt and debris do not enter the axle or wheel hub assembly.

NOTE:

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

SENSOR ROTOR

Removal and Installation

FRONT WHEEL SENSOR ROTOR The wheel sensor rotors are built into the front wheel hub and bearing assemblies and are not removable. If damaged, replace the front wheel hub and bearing assembly. Refer to <u>FAX-10</u>, "<u>Removal and Installation</u>".

REAR WHEEL SENSOR ROTOR

Removal

 Remove the side flange from the final drive assembly. Refer to <u>DLN-463, "Removal and Installation"</u>. CAUTION:

Discard side oil seal.

2. Remove the sensor rotor from the side flange, using suitable tool with Tool.

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Tool number : ST30031000 ( — )
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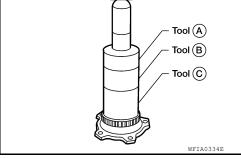
Installation

CAUTION:

1. Install the new sensor rotor on the side flange using Tools and a suitable press as shown. Make sure the sensor rotor is fully seated on the side flange.

Tool numbers	A: ST30720000 (J-25405)	
	B: ST27863000(—)	
	C: KV40104710(—)	

Do not reuse the old sensor rotor.



 Install the side flange on the final drive assembly. Refer to <u>DLN-463, "Removal and Installation"</u>. 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)

< UNIT REMOVAL AND INSTALLATION >

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



[TYPE 2]

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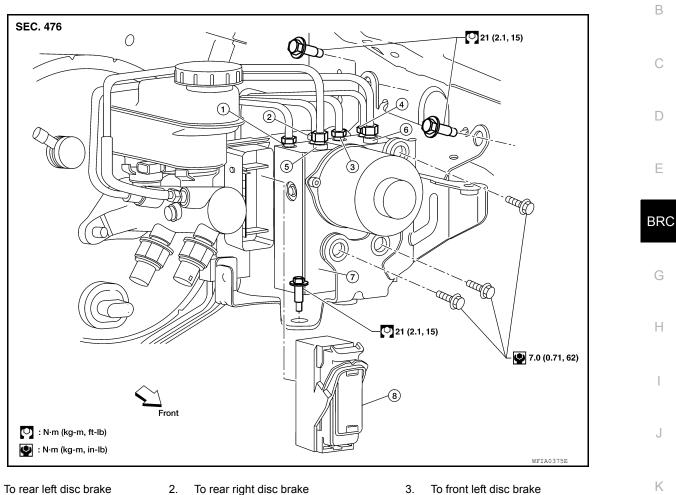
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- To rear left disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
 To front right disc brake
 - To front right disc brake 5. Fr 13.0 N·m (1.3 kg-m, 10 ft-lb) 18
- To rear right disc brake 13.0 N·m (1.3 kg-m, 10 ft-lb)
 - From master cylinder secondary side 18.2 N⋅m (1.9 kg-m, 13 ft-lb) Harness connector
- To front left disc brake
 13.0 N⋅m (1.3 kg-m, 10 ft-lb)
- From master cylinder primary side 18.2 N⋅m (1.9 kg-m, 13 ft-lb)

7. ABS actuator and electric unit 8. (control unit)

NOTE:

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

REMOVAL

- 1. Disconnect the battery negative terminal.
- 2. Disconnect the actuator harness from the ABS actuator and electric unit (control unit).
- 3. Disconnect the brake tubes.
 - CAUTION:
 - To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.
 - Be careful not to splash brake fluid on painted areas.
- 4. Remove the three bolts and remove the ABS actuator and electric unit (control unit) and bracket.
- 5. Remove the bracket from the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< UNIT REMOVAL AND INSTALLATION >

[TYPE 2]

If the ABS actuator and electric unit (control unit) is replaced, the neutral position of the steering angle sensor position must be reset. Refer to <u>BRC-122</u>, "CALIBRATION OF <u>DECEL G SENSOR</u> : <u>Special Repair</u> <u>Requirement</u>".

CAUTION:

- To tighten the brake tube flare nuts use a suitable tool (flare nut wrench).
- Always tighten the brake tube flare nuts to specification when installing.
- Never reuse the drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill the brake system with new brake fluid. Then bleed the air from the brake system. Refer to <u>BR-20, "Bleeding Brake System"</u>.
- If the ABS actuator and electronic unit (control unit) is replaced, the neutral position of the steering angle sensor must be reset. Refer to <u>BRC-122</u>, "CALIBRATION OF <u>DECEL G SENSOR</u> : <u>Special</u> <u>Repair Requirement</u>".

STEERING ANGLE SENSOR

Removal and Installation

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< UNIT REMOVAL AND INSTALLATION > STEERING ANGLE SENSOR

REMOVAL 1. Remove the spiral cable. Refer to SR-7, "Removal and Installation". 2. Remove the screws and remove the steering angle sensor from the spiral cable. **INSTALLATION** Installation is in the reverse order of removal. Reset the neutral position of the steering angle sensor. Refer to <u>BRC-122</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement". **CAUTION:** Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the steering angle sensor. Refer to BRC-122, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

< UNIT REMOVAL AND INSTALLATION >

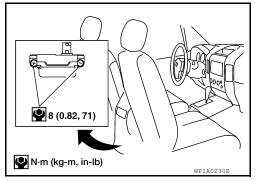
YAW RATE/SIDE/DECEL G SENSOR

Removal and Installation

REMOVAL

- 1. Remove the center console. Refer to IP-22, "Removal and Installation".
- Remove the yaw rate/side/decel G sensor nuts as shown. CAUTION:
 - Do not use power tools to remove or install the yaw rate/ side/decel G sensor.
 - Do not drop or strike the yaw rate/side/decel G sensor. NOTE:

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



3. Disconnect the yaw rate/side/decel G sensor connector and remove the yaw rate/side/decel G sensor.

INSTALLATION

Installation is in the reverse order of removal.

• After installing the yaw rate/side/decel G sensor, it is necessary to calibrate the yaw rate/side/decel G sensor. Refer to <u>BRC-122</u>, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".