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CONTENTS

TYPE 1	C1105, C1106, C1107, C1108 WHEEL SEN-	BRC
BASIC INSPECTION8	SOR-2	
	DTC Logic27	G
APPLICATION NOTICE8	Diagnosis Procedure27	O
Application Notice8	Component Inspection29	
DIAGNOSIS AND REPAIR WORKFLOW9	C1109 POWER AND GROUND SYSTEM30	Н
Work Flow9	Description30	
Diagnostic Work Sheet11	DTC Logic30	
FUNCTION DIAGNOSIS12	Diagnosis Procedure30	
APPLICATION NOTICE12	C1110, C1113, C1170 ABS ACTUATOR AND	
Application Notice	ELECTRIC UNIT (CONTROL UNIT)32	J
Application Notice12	DTC Logic32	J
ABS13	Diagnosis Procedure32	
System Diagram13		
System Description14	C1111 ABS MOTOR, MOTOR RELAY SYS-	K
Component Parts Location15	TEM33	
Component Description16	Description33	
·	DTC Logic33	L
EBD17	Diagnosis Procedure33	
System Diagram17	Component Inspection34	
System Description17	C1115 WHEEL SENSOR35	M
Component Parts Location18	Description35	
Component Description19	DTC Logic35	
DIAGNOSIS SYSTEM [ABS ACTUATOR	Diagnosis Procedure35	Ν
AND ELECTRIC UNIT (CONTROL UNIT)]20	Component Inspection	14
CONSULT-III Function (ABS)20	Component inspection30	
CONSOLT-III FUNCTION (ABS)20	C1120, C1122, C1190 IN ABS SOL38	
COMPONENT DIAGNOSIS23	Description38	0
	DTC Logic38	
APPLICATION NOTICE23	Diagnosis Procedure38	
Application Notice23	Component Inspection39	Р
C1101, C1102, C1103, C1104 WHEEL SEN-	C1121, C1123, C1191 OUT ABS SOL41	
SOR-124	Description41	
Description24	DTC Logic41	
DTC Logic24	Diagnosis Procedure41	
Diagnosis Procedure24	Component Inspection42	
Component Inspection26		

C1140 ACTUATOR RLY	. 44	PRECAUTIONS	67
Description		Precaution for Supplemental Restraint System	
DTC Logic		(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	
Diagnosis Procedure		SIONER"	67
Component Inspection		Precaution for Brake System	
	. 10	Precaution for Brake Control	
U1000 CAN COMM CIRCUIT	. 46	Precaution for CAN System	
Description	. 46	r recadion for CAN System	00
DTC Logic		PREPARATION	69
Diagnosis Procedure		-	
•		PREPARATION	69
ABS WARNING LAMP	. 47	Special Service Tool	69
Description	. 47	Commercial Service Tool	
Component Function Check	. 47		
Diagnosis Procedure		REMOVAL AND INSTALLATION	70
BRAKE WARNING LAMP	40	WHEEL SENSOR	70
Description		Removal and Installation	
•		Nemoval and installation	10
Component Function Check		SENSOR ROTOR	71
Diagnosis Procedure	. 48	Removal and Installation	
ECU DIAGNOSIS	40		
	. 73	ACTUATOR AND ELECTRIC UNIT (ASSEM-	1
APPLICATION NOTICE	. 49	BLY)	72
Application Notice		Removal and Installation	
, pp. 33.00		TYPE 2	
ABS ACTUATOR AND ELECTRIC UNIT			
(CONTROL UNIT)	. 50	BASIC INSPECTION	74
Reference Value	. 50		
Wiring Diagram - ABS	. 52	APPLICATION NOTICE	
Fail-Safe	. 57	Application Notice	74
DTC No. Index	. 58	DIA CALCOIO AND DEDAID WORKELOW	
		DIAGNOSIS AND REPAIR WORKFLOW	
SYMPTOM DIAGNOSIS	. 59	Work Flow	
A DDI 10 A TIONI NOTICE		Diagnostic Work Sheet	77
APPLICATION NOTICE		FUNCTION DIAGNOSIS	72
Application Notice	. 59	TONOTION DIAGNOSIS	70
ABS	60	APPLICATION NOTICE	78
Symptom Table		Application Notice	78
	. 00	• •	
EXCESSIVE ABS FUNCTION OPERATION		ABLS	
FREQUENCY	. 61	System Diagram	
Diagnosis Procedure		System Description	
•		Component Parts Location	
UNEXPECTED PEDAL REACTION	. 62	Component Description	81
Diagnosis Procedure	. 62		
		ABS	
THE BRAKING DISTANCE IS LONG		System Diagram	
Diagnosis Procedure	. 63	System Description	
ARC FUNCTION DOES NOT ORERATE		Component Parts Location	
ABS FUNCTION DOES NOT OPERATE		Component Description	84
Diagnosis Procedure	. 64	EDD	
PEDAL VIBRATION OR ABS OPERATION		EBD	
SOUND OCCURS	CF	System Diagram	
		System Description	
Diagnosis Procedure	. 65	Component Parts Location	
NORMAL OPERATING CONDITION	66	Component Description	87
Description		DIACNOSIS SVETEM IADS ACTUATOS	
Description	. 00	DIAGNOSIS SYSTEM [ABS ACTUATOR	
PRECAUTION	. 67	AND ELECTRIC UNIT (CONTROL UNIT)]	
		CONSULT-III Function (ABS)	88

COMPONENT DIAGNOSIS92	C1130, C1131, C1136 ENGINE SIGNAL 115	
ADDI ICATION NOTICE	Description115	Α
APPLICATION NOTICE92	DTC Logic115	
Application Notice92	Diagnosis Procedure115	
C1101, C1102, C1103, C1104 WHEEL SEN-	C1140 ACTUATOR RLY116	В
SOR-193	Description116	
Description93	DTC Logic116	
DTC Logic93	Diagnosis Procedure116	С
Diagnosis Procedure93	Component Inspection117	
Component Inspection95	·	
C440E C440C C4407 C4400 WHEEL CEN	C1142 PRESS SENSOR118	D
C1105, C1106, C1107, C1108 WHEEL SEN-	Description118	
SOR-296	DTC Logic118	
Description	Diagnosis Procedure	Е
DTC Logic96 Diagnosis Procedure96	Component Inspection119	
Component Inspection98	C1155 BRAKE FLUID LEVEL SWITCH 120	
Component inspection90	Description120	BR
C1109 POWER AND GROUND SYSTEM99	DTC Logic120	JIK
Description99	Diagnosis Procedure120	
DTC Logic99	Component Inspection121	G
Diagnosis Procedure99	C4464 C4465 C4465 C4467 CV/CV CVC	G
C1110, C1113, C1160, C1170 ABS ACTUA-	C1164, C1165, C1166, C1167 CV/SV SYS-	
· · · · · · · · · · · · · · · · · · ·	TEM	
TOR AND ELECTRIC UNIT (CONTROL UNIT)	Description	Н
101	DTC Logic122 Diagnosis Procedure122	
DTC Logic101 Diagnosis Procedure101	Component Inspection123	
Diagnosis Procedure101	Component inspection123	
C1111 ABS MOTOR, MOTOR RELAY SYS-	C1187 DIFFERENTIAL LOCK CONTROL	
TEM102	UNIT125	
Description102	Description125	J
DTC Logic102	DTC Logic125	
Diagnosis Procedure102	Diagnosis Procedure125	
Component Inspection103	U1000 CAN COMM CIRCUIT126	K
C1115 WHEEL SENSOR104	Description126	
Description	DTC Logic126	
DTC Logic	Diagnosis Procedure126	L
Diagnosis Procedure104	•	
Component Inspection	ABS WARNING LAMP127	
·	Description127	M
C1116 STOP LAMP SWITCH107	Component Function Check127	
Description107	Diagnosis Procedure127	
DTC Logic	BRAKE WARNING LAMP128	Ν
Diagnosis Procedure107	Description128	
C1120, C1122, C1124, C1126 IN ABS SOL109	Component Function Check128	
Description	Diagnosis Procedure128	0
DTC Logic	•	
Diagnosis Procedure	SLIP INDICATOR LAMP129	
Component Inspection110	Description129	Р
	Component Function Check129	-
C1121, C1123, C1125, C1127 OUT ABS SOL.112	Diagnosis Procedure129	
Description	ECU DIAGNOSIS 130	
DTC Logic		
Diagnosis Procedure	APPLICATION NOTICE130	
Component Inspection113	Application Notice130	

ABS ACTUATOR AND ELECTRIC UNIT	TYPE 3
(CONTROL UNIT)131	
Reference Value131	BASIC INSPECTION158
Wiring Diagram - ABLS135	APPLICATION NOTICE158
Fail-Safe140	Application Nation
DTC No. Index141	Application Notice156
SYMPTOM DIAGNOSIS143	VVork Flow 159
APPLICATION NOTICE143	Diagnostic Work Sheet 162
Application Notice143	INSPECTION AND ADJUSTMENT163
ABLS/ABS 144	ADDITIONAL SERVICE WHEN REPLACING
Symptom Table144	CONTROL UNIT163
EXCESSIVE ABS FUNCTION OPERATION	ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description
FREQUENCY 145	ADDITIONAL SERVICE WHEN BEDLACING
Diagnosis Procedure145	CONTROL UNIT: Special Repair Requirement 163
UNEXPECTED PEDAL REACTION 146	
Diagnosis Procedure146	ADJUSTMENT OF STEERING ANGLE SENSOR
•	NEUTRAL POSITION163
THE BRAKING DISTANCE IS LONG 147	NEUTRAL BOOKTION B. 1.11
Diagnosis Procedure147	ADJUSTMENT OF STEERING ANGLE SENSOR
ABS FUNCTION DOES NOT OPERATE 148	
Diagnosis Procedure148	
•	
PEDAL VIBRATION OR ABS OPERATION	CALIBRATION OF DECEL G SENSOR 164
SOUND OCCURS 149	
Diagnosis Procedure149	tion
NORMAL OPERATING CONDITION 150	CALIBRATION OF DECEL G SENSOR : Special
Description150	
·	FUNCTION DIAGNOSIS166
PRECAUTION151	APPLICATION NOTICE166
PRECAUTIONS 151	
Precaution for Supplemental Restraint System	Application Notice
(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	VDC167
SIONER"151	
Precaution for Brake System151	
Precaution for Brake Control151	
Precaution for CAN System152	
•	
PREPARATION153	
PREPARATION 153	System Diagram
Special Service Tool	·
Commercial Service Tool	•
Commercial Service 1001153	Component Description173
REMOVAL AND INSTALLATION154	
MULEEL OFNOOD	System Diagram174
WHEEL SENSOR	Cyclom Bocomption
Removal and Installation154	Component and Education
SENSOR ROTOR155	Component Description176
Removal and Installation155	
	System Diagram177
ACTUATOR AND ELECTRIC UNIT (ASSEM-	System Description
BLY) 156	Component Parts Location 178
Removal and Installation156	Component Description
	- r

Hill descent control180	Special Repair Requirement	204
System Description180	O4445 WHEEL SENSOR	000
Component Parts Location187	C1115 WHEEL SENSOR	
Component Description182	Description	
Hill start as sist	DTC Logic	
Hill start assist183		
System Description183		
Component Parts Location184		208
Component Description185	5 C1116 STOP LAMP SWITCH	200
DIAGNOSIS SYSTEM [ABS ACTUATOR	Description	
	•	
AND ELECTRIC UNIT (CONTROL UNIT)]186	· · · · · · · · · · · · · · · · ·	
CONSULT-III Function (ABS)186	Special Repair Requirement	
COMPONENT DIAGNOSIS194	special Repail Requirement	210
OOMI ONLINI DIAGROOM	C1120, C1122, C1124, C1126 IN ABS SOL	211
APPLICATION NOTICE19		
Application Notice19	· ·	
7	Diagnosis Procedure	
C1101, C1102, C1103, C1104 WHEEL SEN-	Component Inspection	
SOR-1192	2 Special Repair Requirement	
Description192	2	
DTC Logic192		L. 214
Diagnosis Procedure192		
Component Inspection194		
Special Repair Requirement194		
	Component Inspection	215
C1105, C1106, C1107, C1108 WHEEL SEN-	Special Repair Requirement	
SOR-2195	5	
Description195		
DTC Logic195		217
Diagnosis Procedure195		217
Component Inspection197		217
Special Repair Requirement197	<u> </u>	
	Special Repair Requirement	
C1109 POWER AND GROUND SYSTEM198	8	
Description198		
DTC Logic198		
Diagnosis Procedure198		
Special Repair Requirement199		
CAAAO CAATO ADO ACTUATOD AND ELEO	Component Inspection	
C1110, C1170 ABS ACTUATOR AND ELEC-	Special Repair Requirement	220
TRIC UNIT (CONTROL UNIT)200		2 004
DTC Logic200		
Diagnosis Procedure200		
Special Repair Requirement200	DTC Logic	
C4444 ARC MOTOR MOTOR RELAVIOUS	Diagnosis Procedure	
C1111 ABS MOTOR, MOTOR RELAY SYS-	Component Inspection	
TEM201		222
Description	CAACE DO AVE ELLIIN LEVEL CWITCH	224
DTC Logic	'	
Diagnosis Procedure20		
Component Inspection202		
Special Repair Requirement202	Diagnosis Procedure	
C4442 C444E C444C VANI DATE/OIDE/DE	Component Inspection	
C1113, C1145, C1146 YAW RATE/SIDE/DE-	Special Repair Requirement	225
CEL G SENSOR203	C11EE ST ANG SEN COM CID	227
Description203	Description	
DTC Logic203	DTCLogio	
Diagnosis Procedure203	DTC Logic	
Component Inspection	Diagnosis Procedure	221

C1160 DECEL G SEN SET	228	Hill descent control INDICATOR LAMP	243
Description	228	Description	
DTC Logic		Component Function Check	
Diagnosis Procedure		Diagnosis Procedure	
C1163 ST ANGLE SEN SAFE	229	ECU DIAGNOSIS	244
Description			
DTC Logic		APPLICATION NOTICE	244
Diagnosis Procedure		Application Notice	244
C1164, C1165, C1166, C1167 CV/SV	SYS-	ABS ACTUATOR AND ELECTRIC UNIT	
TEM		(CONTROL UNIT)	245
Description		Reference Value	
DTC Logic		Wiring Diagram - VDC	
Diagnosis Procedure		Fail-Safe	
		DTC No. Index	
Component Inspection		DTO NO. IIIddx	250
Special Repair Requirement		SYMPTOM DIAGNOSIS	258
C1187 DIFFERENTIAL LOCK CONTR		APPLICATION NOTICE	258
UNIT		Application Notice	
Description		/ ipplication (votice	200
DTC Logic		VDC/TCS/ABS	259
Diagnosis Procedure	233	Symptom Table	
U1000 CAN COMM CIRCUIT	234	EXCESSIVE ABS FUNCTION OPERATION	
Description	234		000
DTC Logic		FREQUENCY	
Diagnosis Procedure		Diagnosis Procedure	260
Special Repair Requirement		UNEXPECTED PEDAL REACTION	264
		Diagnosis Procedure	
Hill descent control SWITCH		Diagnosis i recodure	201
Description	235	THE BRAKING DISTANCE IS LONG	262
Component Function Check	235	Diagnosis Procedure	262
Diagnosis Procedure	235	-	
Component Inspection	236	ABS FUNCTION DOES NOT OPERATE	
VDC OFF SWITCH	007	Diagnosis Procedure	263
	_	PEDAL VIBRATION OR ABS OPERATION	
Description			
Component Function Check		SOUND OCCURS	
Diagnosis Procedure		Diagnosis Procedure	264
Component Inspection	238	VEHICLE JERKS DURING VDC/TCS/ABS	
ABS WARNING LAMP	239	CONTROL	265
Description			
Component Function Check		Diagnosis Procedure	200
Diagnosis Procedure		NORMAL OPERATING CONDITION	266
Diagnosis Procedure	239	Description	
BRAKE WARNING LAMP	240	Description	200
Description		PRECAUTION	267
Component Function Check			
Diagnosis Procedure		PRECAUTIONS	267
Diagnosis i roccuure	240	Precaution for Supplemental Restraint System	
VDC OFF INDICATOR LAMP	241	(SRS) "AIR BAG" and "SEAT BELT PRE-TEN-	
Description	241	SIONER"	267
Component Function Check		Precaution for Brake System	
Diagnosis Procedure		Precaution for Brake Control	
•		Precaution for CAN System	
SLIP INDICATOR LAMP	242	·	
Description		PREPARATION	270
Component Function Check			
Diagnosis Procedure		PREPARATION	270
_			

Special Service Tool270	ACTUATOR AND ELECTRIC UNIT (ASSEM-
Commercial Service Tool271	BLY)274
REMOVAL AND INSTALLATION272	Removal and Installation274
	STEERING ANGLE SENSOR276
WHEEL SENSOR	Removal and Installation276
Removal and installation272	G SENSOR277
SENSOR ROTOR	Removal and Installation277

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APPLICATION NOTICE

< BASIC INSPECTION > [TYPE 1]

BASIC INSPECTION

APPLICATION NOTICE

Application Notice

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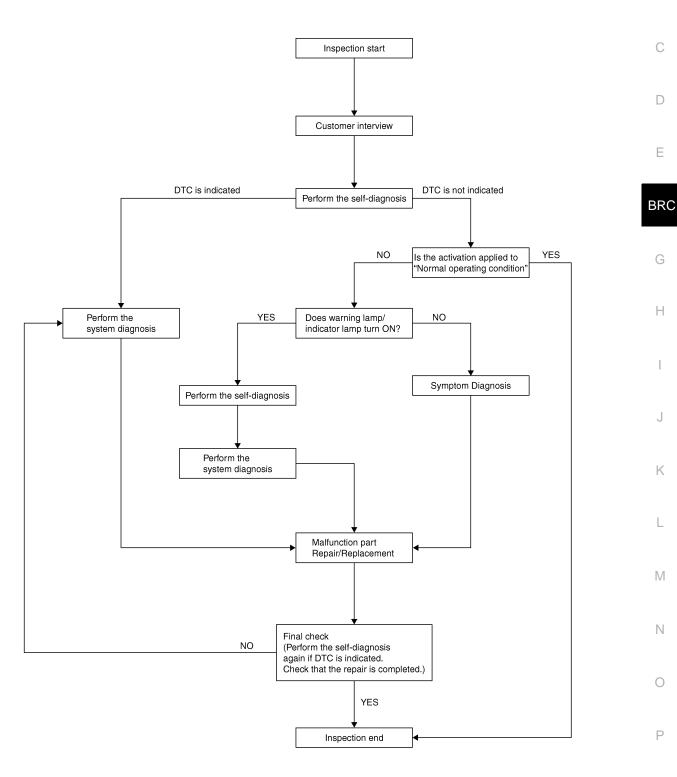
Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

< BASIC INSPECTION > [TYPE 1]

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

OVERALL SEQUENCE



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DETAILED FLOW

1.collect the information from the customer

< BASIC INSPECTION > [TYPE 1]

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

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-20, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3 NO >> GO TO 4

3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-58, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-66</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-47, "Description".
- Brake warning lamp: Refer to BRC-48, "Description".

Is ON/OFF timing normal?

YES >> GO TO 6 NO >> GO TO 2

6. PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8. FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-20, "CONSULT-III Function (ABS)".

Is no other DTC present and the repair completed?

YES >> INSPECTION END

NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION > [TYPE 1]

Diagnostic Work Sheet

INFOID:0000000003221043

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Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Dat	е
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

BRC-11

FUNCTION DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000003248340

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

ABS

System Diagram

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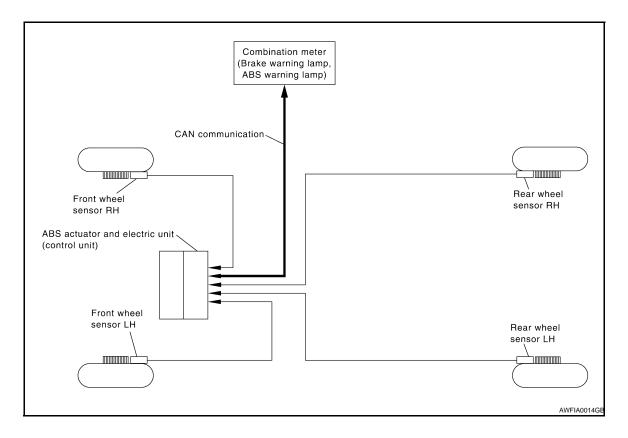
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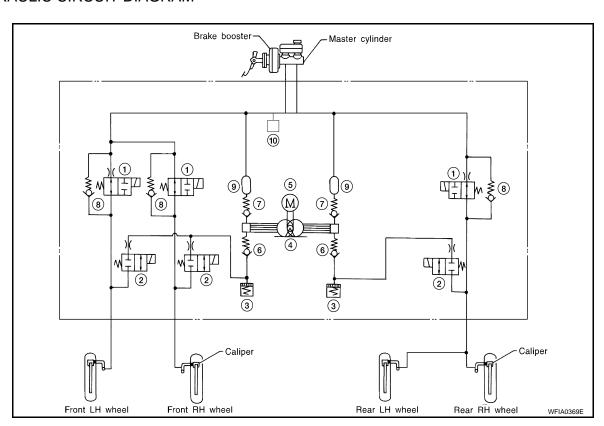
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HYDRAULIC CIRCUIT DIAGRAM



1. Inlet solenoid valve

Outlet solenoid valve

3. Reservoir

4. Pump

Motor

6. Inlet valve

7. Outlet valve

8. Bypass check valve

Damper

10. Pressure switch

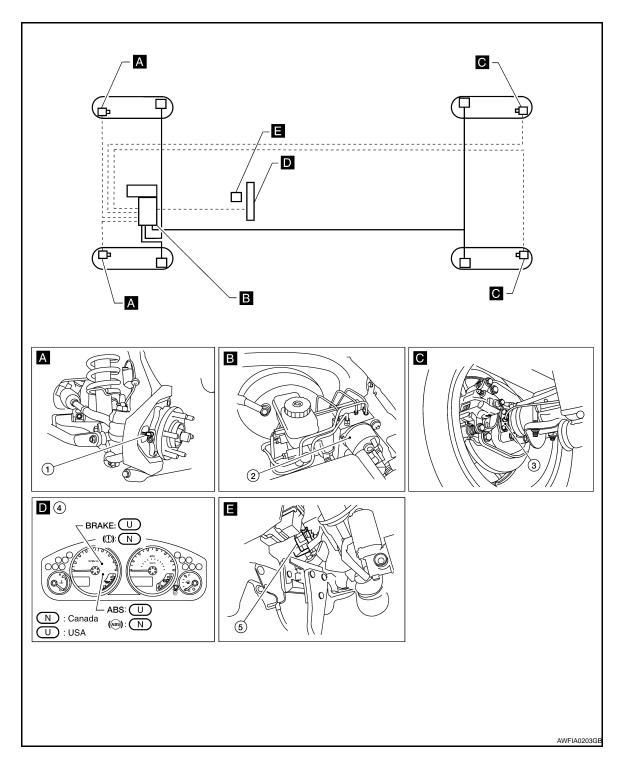
System Description

INFOID:0000000003247440

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

Component Parts Location

INFOID:0000000003248450



- Front wheel sensor LH E18
 Front wheel sensor RH E117
- 4. Combination meter M24
- 2. ABS actuator and electric unit (control unit) E125
- Stop lamp switch E38

Rear wheel sensor LH C11 Rear wheel sensor RH C10 В

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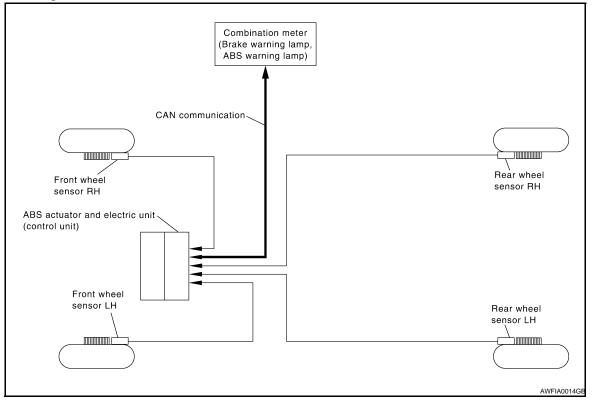
Component Description

INFOID:0000000003248451

Component parts		Reference
	Pump	BRC-33, "Description"
ADC - trota - ad alastria varit (- adal varit)	Motor	BRC-33, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-44, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-24, "Description"
Stop lamp switch		_
ABS warning lamp		BRC-47, "Description"
Brake warning lamp		BRC-48, "Description"

EBD

System Diagram



System Description

INFOID:0000000003247442

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

• Electrical system diagnosis by CONSULT-III is available.

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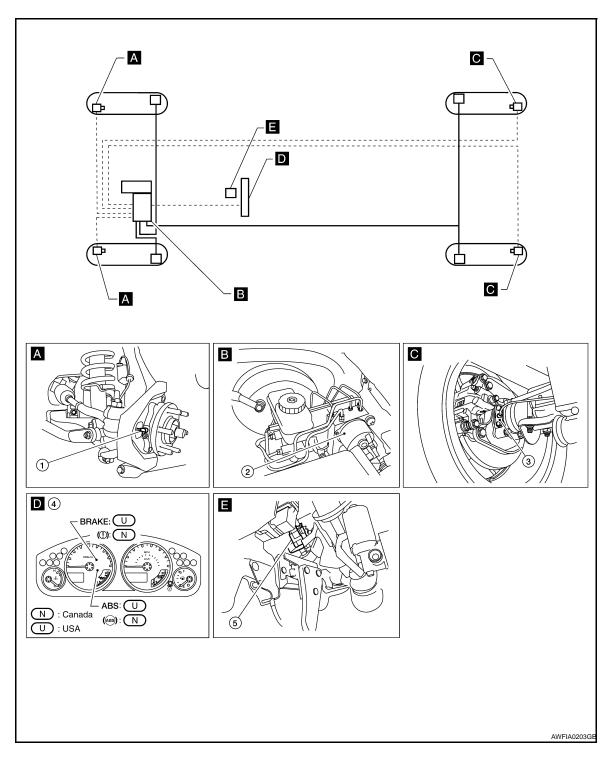
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Component Parts Location

INFOID:0000000003292896



- Front wheel sensor LH E18
 Front wheel sensor RH E117
- 4. Combination meter M24
- ABS actuator and electric unit (con- 3. trol unit) E125
- 5. Stop lamp switch E38
- Rear wheel sensor LH C11 Rear wheel sensor RH C10

Component Description

INFOID:0000000003292897

Component parts		Reference
ADC networks and algebric unit (control with)	Pump	BRC-33, "Description"
	Motor	BIXC-33, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-44, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-24, "Description"
Stop lamp switch		_
ABS warning lamp		BRC-47, "Description"
Brake warning lamp		BRC-48, "Description"

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

< FUNCTION DIAGNOSIS >

[TYPE 1]

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

CONSULT-III Function (ABS)

INFOID:0000000003247443

FUNCTION

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

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

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

Display Item List

Refer to BRC-58, "DTC No. Index".

DATA MONITOR MODE

Display Item List

ltem	Data monitor item selection			
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.

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

< FUNCTION DIAGNOSIS > [TYPE 1]

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Item	Data	a monitor item sele	ection	
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
ACCEL POS SIG (%)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.
ENGINE SPEED (rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.
STOP LAMP SW (ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
ABS WARN LAMP (ON/OFF)	-	×	×	ABS warning lamp (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.
FR RH IN SOL (ON/OFF)	-	×	×	Front RH IN ABS solenoid (ON/OFF) status is displayed.
FR RH OUT SOL (ON/OFF)	-	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL (ON/OFF)	-	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL (ON/OFF)	-	×	×	Rear LH OUT ABS solenoid (ON/ OFF) status is displayed.
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 FAIL SIG (ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.
EBD SIGNAL (ON/OFF)	-	-	×	EBD operation (ON/OFF) status is displayed.
ABS SIGNAL (ON/OFF)	-	-	×	ABS operation (ON/OFF) status is displayed.
EBD WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) status is displayed.
CRANKING SIG	-	-	×	The input state of the key SW START position signal is displayed.

^{×:} Applicable

ACTIVE TEST MODE

CAUTION:

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

NOTE:

^{-:} Not applicable

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

< FUNCTION DIAGNOSIS >

[TYPE 1]

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

Test Item

SOLENOID VALVE

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

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

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

ABS MOTOR

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

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

APPLICATION NOTICE

< COMPONENT DIAGNOSIS >

[TYPE 1]

COMPONENT DIAGNOSIS

APPLICATION NOTICE

Application Notice

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INFOID:0000000003248341

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:000000003247445

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-24, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247447

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-70, "Removal and Installation".

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

DISCONNECT AWFIAD188ZZ

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity		
	Connector	Terminal	Connector	Terminal	•		
Front LH		45	E18	1			
TIOHELIT		46	EIO	E10	2		
Front RH	<u> </u>	34	E117	1			
FIOHL KIT	E125	33			2	Yes	
Rear LH	E 125	36		1	165		
Real LFI		37		2			
Poor DU		43	C10	1			
Rear RH		42	CIU	2			

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-72, "Removal and Installation".</u>

NO >> Repair the circuit.

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

[TYPE 1]

Component Inspection

INFOID:0000000003247448

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-24, "Diagnosis Procedure".

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INFOID:0000000003247452

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-27, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

BRC-27

2.check wheel sensor output signal

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-70, "Removal and Installation".

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

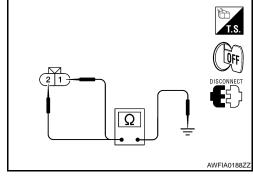
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

< COMPONENT DIAGNOSIS >

[TYPE 1]

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

INFOID:0000000003247453

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-27, "Diagnosis Procedure".

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C1109 POWER AND GROUND SYSTEM

Description INFOID:000000003247455

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

DTC Logic

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 BRC-30, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003288842

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-20, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

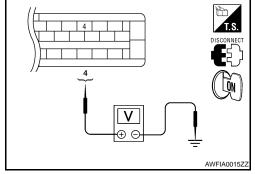
YES >> GO TO 2

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

$2. \mathsf{CHECK}$ abs actuator and electric unit (control unit) power supply circuit and ground circuit

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

ABS actuator and electric unit (control unit)		_	Condition	Voltage
Connector	Terminal	•		
F125	4	Ground	Ignition switch: ON	Battery voltage
L125	4	4 Glound	Ignition switch: OFF	Approx. 0V



4. Turn ignition switch OFF.

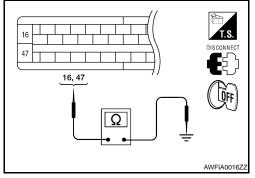
C1109 POWER AND GROUND SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 1]

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

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C1110, C1113, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< COMPONENT DIAGNOSIS >

[TYPE 1]

C1110, C1113, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

DTC Logic

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
C1113	G-SENSOR	G-sensor is malfunctioning.	(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
G-SENSOR
VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Refer to BRC-32, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247460

INSPECTION PROCEDURE

 ${f 1}.$ replace abs actuator and electric unit (control unit)

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description INFOID:000000003247462

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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
OIIII	TOWN WOTON	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)

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DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-33, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247464

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, 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-20, "CONSULT-III Function</u> (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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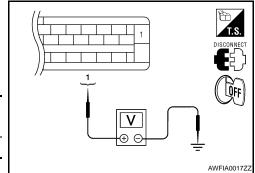
C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 1]

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

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check abs actuator and electric unit (control unit) ground circuit

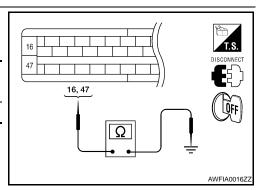
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003247465

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 BRC-33, "Diagnosis Procedure".

C1115 WHEEL SENSOR

Description

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2. CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

NOTE:

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

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

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-70, "Removal and Installation".

3.CHECK TIRES

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INFOID:0000000003247474

[TYPE 1]

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO

>> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (C200 rear axle), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

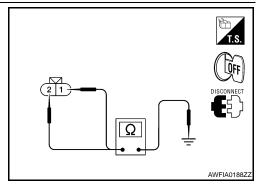
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-72</u>, "<u>Removal and Installation</u>".

NO >> Repair the circuit.

Component Inspection

INFOID:0000000003247475

1. CHECK DATA MONITOR

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

Wheel sensor	Vehicle speed (DATA MONITOR)

	C1115 WHEEL SENSOR	
< COMPONENT DIAGNOSIS:	>	[TYPE 1]
FR LH SENSOR		Α
FR RH SENSOR	Nearly matches the speedometer dis-	
RR LH SENSOR	play (±10% or less)	
RR RH SENSOR		В
Is the inspection result normal?	<u> </u>	
YES >> INSPECTION END NO >> Go to diagnosis pro	cedure. Refer to BRC-35, "Diagnosis Procedure".	C
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C1120, C1122, C1190 IN ABS SOL

Description INFOID:000000003247481

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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 BRC-38, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247483

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

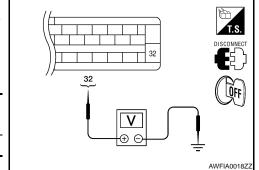
2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

< COMPONENT 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) harness connector terminal and ground.

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-72</u>, "<u>Removal and Installation"</u>.

NO >> Repair or replace malfunctioning components.

16, 47 16, 47 AWFIA0016ZZ

Component Inspection

1. CHECK ACTIVE TEST

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

Operation		AE	3S solenoid va	alve	ABS solenoid valve (ACT)		
		UP	KEEP	DOWN	UP	ACTUA- TOR UP	ACTUA- TOR KEEP
FR RH SOL	FR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR RH ABS SOLE- NOID (ACT)	FR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
FR LH SOL	FR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
FR LH ABS SOLE- NOID (ACT)	FR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR RH SOL RR RH ABS SOLE- NOID (ACT)	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
RR LH SOL	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
RR LH ABS SOLE- NOID (ACT)	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR RH IN SOL	OFF	ON	ON	OFF	OFF	OFF
REAR SOL	RR RH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF
	RR LH IN SOL	OFF	ON	ON	OFF	OFF	OFF
	RR LH OUT SOL	OFF	OFF	ON*	OFF	OFF	OFF

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

Is the inspection result normal?

YES >> INSPECTION END

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NO >> Go to diagnosis procedure. Refer to BRC-38, "Diagnosis Procedure".

C1121, C1123, C1191 OUT ABS SOL

Description INFOID:000000003247486

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-41, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 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-20, "CONSULT-III Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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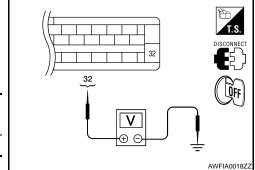
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- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check voltage between ABS actuator and electric unit (control unit) harness connector terminal and ground.

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

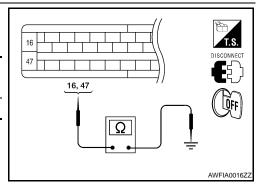
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003247489

Component Inspection

1. CHECK ACTIVE TEST

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

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

Is the inspection result normal?

YES >> INSPECTION END

C1121, C1123, C1191 OUT ABS SOL

< COMPONENT DIAGNOSIS > [TYPE 1]

NO >> Go to diagnosis procedure. Refer to <u>BRC-41</u>, "<u>Diagnosis Procedure</u>".

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C1140 ACTUATOR RLY

Description INFOID:000000003247495

Activates or deactivates each solenoid valve 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
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	Harness or connector ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ACTUATOR RLY	

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247497

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-20, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

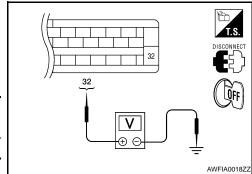
NO >> Poor connection of connector terminal. Repair or replace connector.

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

1. Turn ignition switch OFF.

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

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

C1140 ACTUATOR RLY

< COMPONENT DIAGNOSIS >

[TYPE 1]

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

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

Is the inspection result normal?

>> Replace ABS actuator and electric unit (control unit). YES Refer to BRC-72, "Removal and Installation".

>> Repair or replace malfunctioning components. NO

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INFOID:0000000003247498

Component Inspection

1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-44, "Diagnosis Procedure". **BRC**

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U1000 CAN COMM CIRCUIT

Description INFOID:000000003247526

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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

INFOID:0000000003247528

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

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

YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".

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

ABS WARNING LAMP

Description INFOID:000000003248453

×: ON –: OFF

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Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000003248454

1. CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-127. "Diagnosis Procedure".

INFOID:0000000003248455

Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-20, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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BRAKE WARNING LAMP

Description INFOID:000000003248456

 \times : ON -: OFF

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

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- · 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000003248457

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003248458

1. CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-72, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

APPLICATION NOTICE

< ECU DIAGNOSIS > [TYPE 1]

ECU DIAGNOSIS

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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< ECU DIAGNOSIS > [TYPE 1]

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-III MONITOR ITEM

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		0 [km/h (MPH)]	Vehicle stopped	
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
CTOD LAMP CVV	Cton lower quitab circual status	When brake pedal is depressed	ON	
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is released	OFF	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
ED DH IN SOL	Operation status of each colonaid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) 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	
ED DIL OUT COL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
FR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
ED I H IN COL	Operation status of each calenaid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
FR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
ED LILOUT COL		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) 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	

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

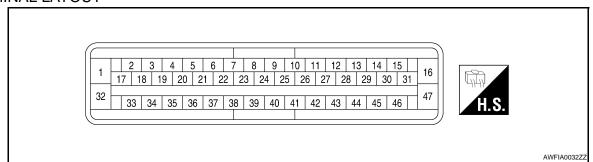
< ECU DIAGNOSIS > [TYPE 1]

		Data monitor			
Monitor item	Display content	Condition	Reference value in normal operation		
REAR IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
KLAK IN SOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
REAR OUT SOL	Operation status of each coloneid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON		
REAR OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF		
MOTOR RELAY	Material	When the motor relay and motor are operating	ON		
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are not operating	OFF		
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	ON		
ACTUATOR RET	Actuator relay operation	When the actuator relay is not operating	OFF		
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON		
ADS WARN LAWF	(Note 2) When ABS warning lamp is OFF		OFF		
EBD SIGNAL	EBD operation	EBD is active	ON		
LDD SIGNAL	LBD operation	EBD is inactive	OFF		
ABS SIGNAL	ABS operation	ABS is active	ON		
ADO OIOINAL	7.50 Operation	ABS is inactive	OFF		
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON		
LDD I AIL SIG	LDD Idii-sale signal	EBD is normal	OFF		
ABS FAIL SIG	ARS fail eafo signal	In ABS fail-safe	ON		
ADO FAIL SIG	ABS fail-safe signal	ABS is normal	OFF		
CRANKING SIG	Crank operation	Crank is active	ON		
CRAINNING SIG	Ciank operation	Crank is inactive	OFF		
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON		
LDD WAINN LAWP	(Note 3)	When EBD warning lamp is OFF	OFF		

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-47, "Description".
- Brake warning lamp: Refer to BRC-48, "Description".

TERMINAL LAYOUT



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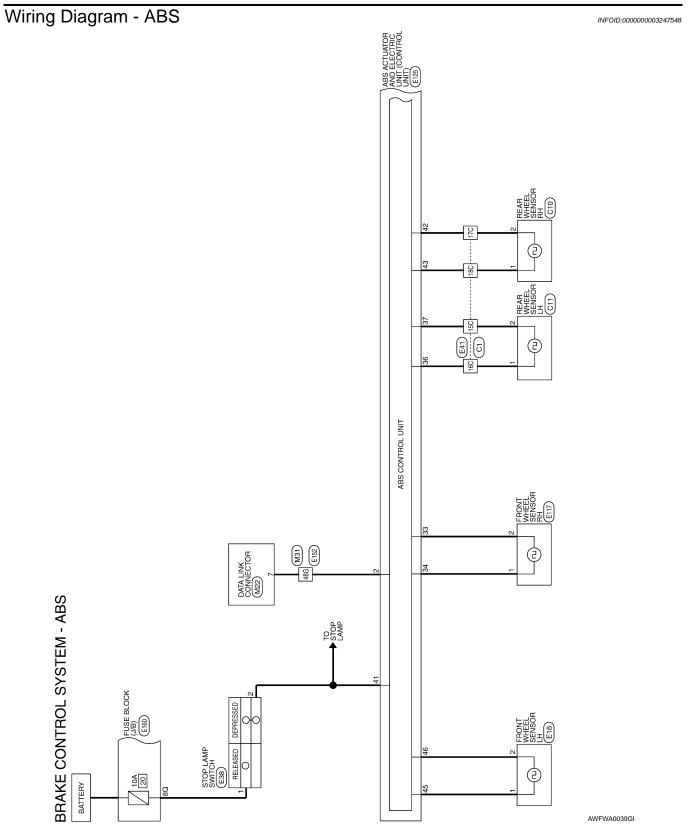
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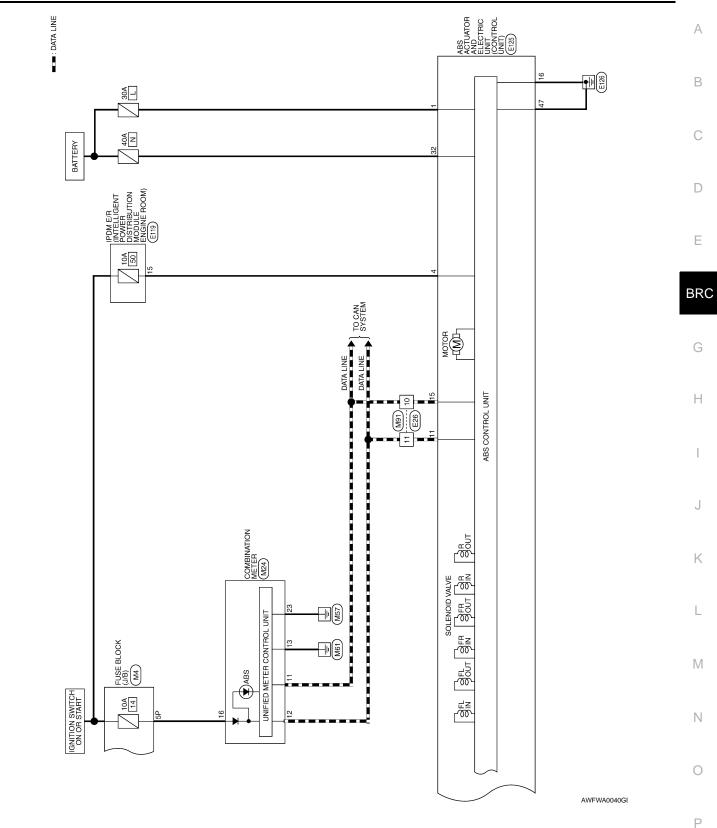
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< ECU DIAGNOSIS > [TYPE 1]



Connector No. M24
Connector Name COMBINATION METER
Connector Color WHITE

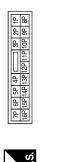
Connector No. M22
Connector Name DATA LINK CONNECTOR

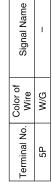
Connector Color WHITE

BRAKE CONTROL SYSTEM CONNECTORS - ABS

Connector No.	M4
Connector Name	Connector Name FUSE BLOCK (J/B)
Connector Color WHITE	WHITE







11 10 9 8 7 6 5 4 3 2 1	Signal Name	CAN_L	CAN_H	GROUND	RUN START	GND (POWER)	
8 2 2 7	Color of Wire	Ь	_	GR	W/G	В	
H.S. (20 19 18 17 16 15 14 (40 29 38 37 38 58 34	Terminal No.	11	12	13	16	23	

Signal Name

Color of Wire ≷

Terminal No.



Signal Nam
Color of Wire P
Terminal No. Wire 10 P

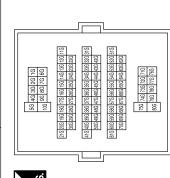
Signal Name	1	
Color of Wire	W	
Terminal No.	48G	

Connector Name | WIRE TO WIRE

M31

Connector No.

Connector Color WHITE





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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 1]

E38 STOP LAMP SWITCH (WITH M/T) BLACK	Signal Name	
	Color of Wire RJ/B V V V V V V V V V V V V V V V V V V V	
Connector No. Connector Name Connector Color H.S.	Terminal No. 15C 15C 16C 18C 18C	
me WIRE TO WIRE or WHITE 2 3 4 5 6 7 2 3	Signal Name Co WIRE Co Signal Name Co Signa	
Connector Name WIRE TO WIRE Connector Color WHITE 2 3 10 11 12 13 14 15 16	Connector No. E41 Connector Name WIRE TO WIRE Connector Color BLACK LC 100 100 2001000 200100 200100 200100 200100 200100 200100 200100 200100 200	
Connector Name Connector Color H.S.	Connector No. Connector Nar. Connector Connector Nar. Connector Col. H.S.	
NSORLH	OH CHI CHI CHI CHI CHI CHI CHI CHI CHI CH	
r wheel se	Signal Name Signal Name STOP LAMP SWITCH WHITE Signal Name Name Signal Name NB	
Connector Name FRONT WHEEL SENSOR LH Connector Color GRAY H.S.	N K K K K K K K K K K K K K K K K K K K	
Connector No. Connector Color H.S.	Connector No. Connector Name Connector Color Terminal No. Connector Color The Parameter Col	
	AWFIAO	152GB

< ECU DIAGNOSIS >

Wire Signal Name
VALVE EC
VALVE EC
VALVE EC FR_R FR_RH RR_LL
VALVE EC FR_RI FR_LI RR_LI
FR_R RR_LL
R. H.
RR_L
RR_L
RR_L
STOP_LAMP_SW
RR_RH_SIG
RR_RH_PWR
FR_LH_PWR
FR_LH_SIG
MOTOR GND

Connector No.	E119
ctor Name	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	WHITE





	Signal Name	ABS IGN SUPPLY	
Color of	Wire	W/R	
	Terminal No.	15	

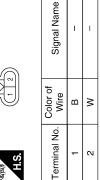
IGN SUPPLY

	Signal Name	-	CAN-H	I	1
	Color of Wire	ı	٦	ı	ı
	Terminal No. Wire	10	11	12	13

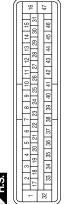
Signal Name	ı	CAN-H	_	-	1	CAN-L	VALVE ECU GNE	-	-	-	-	-	_	-	-	_	-	-	-
Color of Wire	1	Τ	1	1	1	Д	В	_	_	ı	ı	_	ı	_	_	_	_	-	_
Terminal No.	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

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





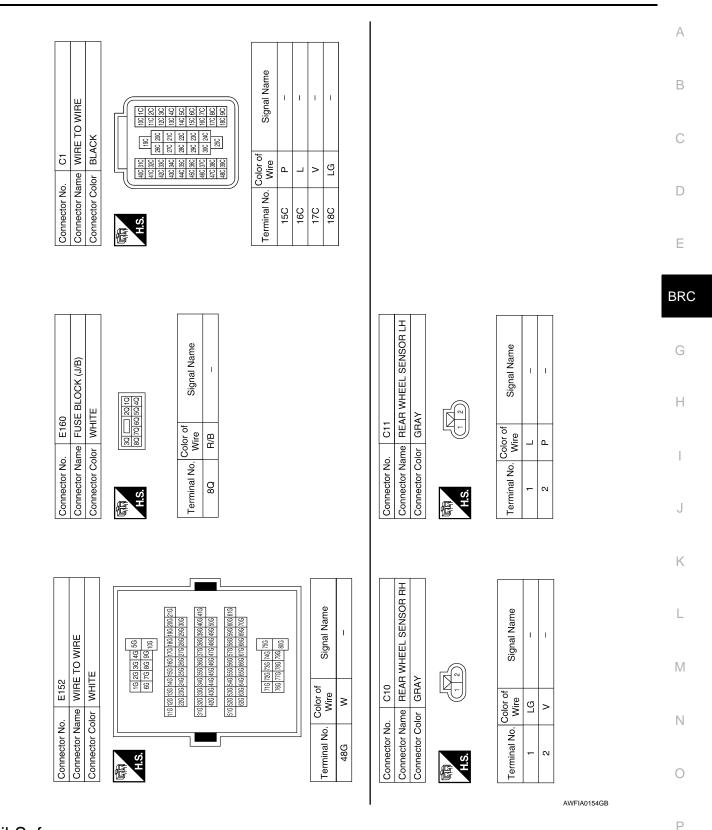
Connector No.	E125
Connector Name	Connector Name ELECTRIC UNIT (CONTROL UNIT)
Connector Color BLACK	BLACK



Signal Name	MOTOR SUPPLY	DIAG_K	I	NSI	1	ı	1	I	I
Color of Wire	œ	SB	_	W/R	_	_	ı	ı	-
Terminal No. Wire	-	2	8	4	2	9	7	8	6

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< ECU DIAGNOSIS > [TYPE 1]



Fail-Safe

CAUTION:

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

ABS/EBD SYSTEM

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

INFOID:0000000003247549

< ECU DIAGNOSIS > [TYPE 1]

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

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

DTC No. Index

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	BRC-24, "Description"
C1103	FR RH SENSOR-1	BRG-24, Description
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	BRC-27, "Description"
C1107	FR RH SENSOR-2	BRC-27. Description
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-30, "Description"
C1110	CONTROLLER FAILURE	BRC-32, "DTC Logic"
C1111	PUMP MOTOR	BRC-33, "Description"
C1113	G-SENSOR	BRC-32, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-35, "Description"
C1120	FR LH IN ABS SOL	BRC-38, "Description"
C1121	FR LH OUT ABS SOL	BRC-41, "Description"
C1122	FR RH IN ABS SOL	BRC-38, "Description"
C1123	FR RH OUT ABS SOL	BRC-41, "Description"
C1140	ACTUATOR RLY	BRC-44, "Description"
C1170	VARIANT CODING	BRC-32, "DTC Logic"
C1190	R-EV	BRC-38, "Description"
C1191	R-AV	BRC-41, "Description"
U1000	CAN COMM CIRCUIT	BRC-46, "Description"

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS > [TYPE 1]

SYMPTOM DIAGNOSIS

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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ABS

Symptom Table

If ABS warning lamp turns ON, perform self-diagnosis.

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-61, "Diagno- sis Procedure"	
4	Wheel sensor and rotor system	<u> </u>	
	Brake pedal stroke		
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-63, "Diagno- sis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-64, "Diagno- sis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-65, "Diagno-	
occurs (Note 2)	ABS actuator and electric unit (control unit)	sis Procedure"	

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

[TYPE 1] < SYMPTOM DIAGNOSIS > **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY** Α Diagnosis Procedure INFOID:0000000003247553 1.CHECK START В 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 D Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-7, "Rear Axle Bearing" (C200) or RAX-19, "Rear Axle Bearing" (M226). Is the inspection result normal? Е YES >> GO TO 3 NO >> Repair or replace malfunctioning components. 3.CHECK WHEEL SENSOR AND SENSOR ROTOR **BRC** 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? Н YES >> GO TO 4 NO >> • Replace wheel sensor or sensor rotor. Refer to BRC-70, "Removal and Installation". Repair harness. 4. CHECK ABS WARNING LAMP DISPLAY Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. Is the ABS warning lamp illuminated? YES >> Perform self-diagnosis. Refer to BRC-20, "CONSULT-III Function (ABS)". NO >> Normal K L M Ν Р

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000003247554

1. CHECK BRAKE PEDAL STROKE

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

Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-9, "Bleeding Brake System".
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-7</u>, "<u>Brake Pedal Inspection and Adjustment</u>" (brake pedal), <u>BR-30</u>, "<u>Disassembly and Assembly</u>" (master cylinder), <u>BR-7</u>, "<u>Brake Booster Inspection</u>" (brake booster).

NO >> GO TO 2

2. CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000003247555

CAUTION:

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

1. CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000003247556

[TYPE 1]

CAUTION:

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

1. CHECK ABS WARNING LAMP DISPLAY

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

YES >> Normal

NO >> Perform self-diagnosis. Refer to BRC-20, "CONSULT-III Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

[TYPE 1] < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000003247557 **CAUTION:** В 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] D 1.SYMPTOM CHECK 1 Check that there are pedal vibrations when the engine is started. Е Do vibrations occur? YES >> GO TO 2 NO >> Inspect the brake pedal. BRC 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 BRC-20, "CONSULT-III Function (ABS)". Н 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 >> Normal J K L M Ν Р

NORMAL OPERATING CONDITION

Description INFOID:000000003248465

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated.	This is a normal condition due to the ABS activation.	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.		
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.	
The ABS warning 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	
ABS warning lamp may illuminate when running on a special road that is extremely slanted (e.g. bank in a circuit course).	road. If the normal condition is restored, there is no malfunction. At that time, erase the self-diagnosis memory.	

< PRECAUTION > [TYPE 1]

PRECAUTION

PRECAUTIONS

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

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

WARNING:

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

Precaution for Brake System

CAUTION:

- Refer to MA-12, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- · Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-27, "Brake Burnishing"</u> (front disc brake) or <u>BR-29, "Brake Burnishing"</u> (rear disc brake).

WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

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Commercial service tool

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< PRECAUTION > [TYPE 1]

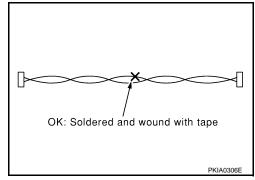
• When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, 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.

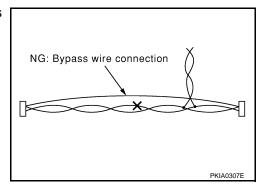
Precaution for CAN System

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- 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 > [TYPE 1]

PREPARATION

PREPARATION

Special Service Tool

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester	J-45741-BOX O-POWIN SCHOOL	Checking operation of ABS active wheel sensors

Commercial Service Tool

INFOID:0000000003221199

Tool name		Description	<u>.</u>
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)	
	S-NT360		

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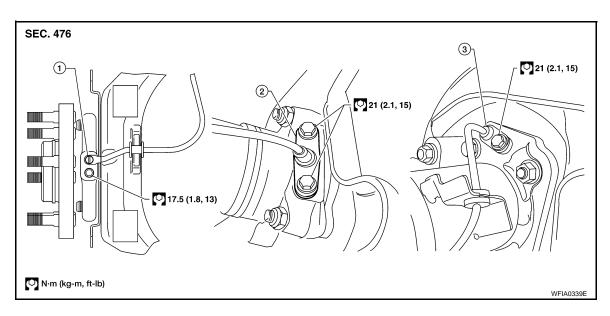
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INFOID:0000000003303113

REMOVAL AND INSTALLATION

WHEEL SENSOR

Removal and Installation



- 1. Front wheel sensor
- 2. Rear wheel sensor (C200)
- 3. Rear wheel sensor (M226)

REMOVAL

- 1. Remove wheel sensor bolt(s).
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-26, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

CAUTION:

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

INSTALLATION

- Before installing wheel sensors,
- Inspect and replace sensor assembly if damaged.
- 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.
- Replace wheel sensor O-ring, then apply a coat of suitable grease to the O-ring and sensor hole.
- Installation is in the reverse order of removal.

SENSOR ROTOR

Removal and Installation

INFOID:0000000003303114

FRONT

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

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to RAX-8, "Removal and Installation".

REAR (M226)

Removal

 Remove axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u>. NOTE:

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

2. Pull the sensor rotor of off the axle shaft using Tool and a press.

Tool number : ST30031000 (—)

Installation

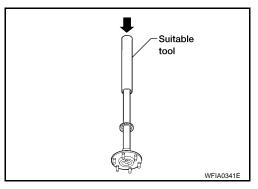
1. Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated.

Do not reuse the old sensor rotor.

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

CAUTION:

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



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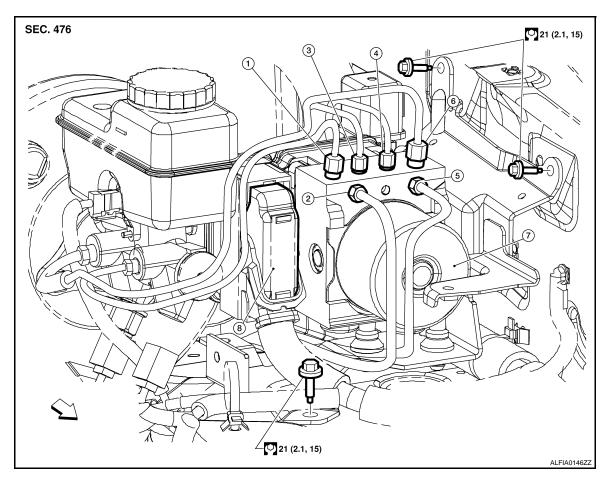
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- To rearFrom the master cylinder secondary 2. side
- To rear right
- 3. To rear left

To front right

- To front left
- From the master cylinder primary
- ABS actuator and electric unit (control unit) 8. Harness connector

REMOVAL

- 1. Disconnect the negative battery terminal.
- 2. Drain the brake fluid. Refer to BR-9, "Drain and Refill".
- 3. Remove air cleaner case. Refer to EM-135, "Exploded View".
- 4. 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.
- 5. Disconnect the brake tubes.
- 6. Remove the three bolts and remove the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

To install, use a flare nut wrench (commercial service tool).

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

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

ACTUATOR AND LEECTRIC CHIT (ACCEMBET)		
< REMOVAL AND INSTALLATION >	[TYPE 1]	
 After installation of the ABS actuator and electric unit (control unit), refill brake system brake fluid. Then bleed the air from the system. Refer to <u>BR-9</u>, "<u>Bleeding Brake System</u>". 	n with new	А
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APPLICATION NOTICE

< BASIC INSPECTION > [TYPE 2]

BASIC INSPECTION

APPLICATION NOTICE

Application Notice

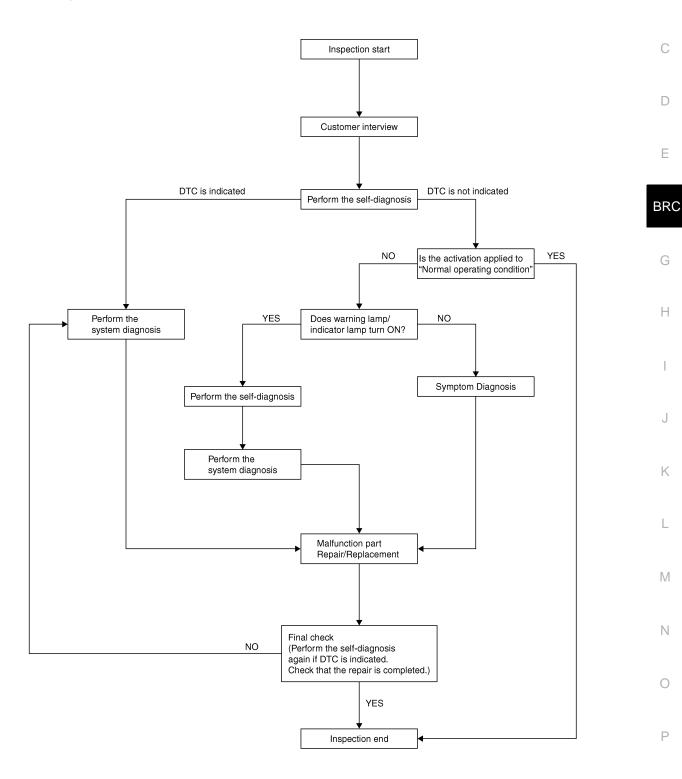
Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

< BASIC INSPECTION > [TYPE 2]

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

OVERALL SEQUENCE



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DETAILED FLOW

1.collect the information from the customer

< BASIC INSPECTION > [TYPE 2]

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-77, "Diagnostic Work Sheet".

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-88, "CONSULT-III Function (ABS)".

Is there any DTC displayed?

YES >> GO TO 3 NO >> GO TO 4

3.perform the system diagnosis

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-141, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-150</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-127, "Description".
- Brake warning lamp: Refer to BRC-128, "Description".
- SLIP indicator lamp: Refer to <u>BRC-129</u>, "<u>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 checking, erase the self-diagnosis memory. Refer to BRC-88, "CONSULT-III Function (ABS)".

Is no other DTC present and the repair completed?

YES >> INSPECTION END

NO >> GO TO 3

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION > [TYPE 2]

Diagnostic Work Sheet

INFOID:0000000003248043

Customer name MR/MS	Model & Year		VIN		
Engine #	Trans.		Mileage		
Incident Date	Manuf. Date		In Service Dat	е	
Symptoms	□ Noise and vibration (from engine compartment) □ Warning / Indicator activate □ Noise and vibration (from axle)			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				

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FUNCTION DIAGNOSIS

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

ABLS

System Diagram

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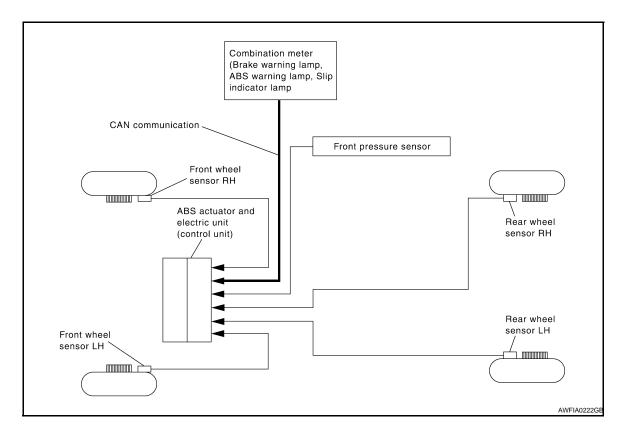
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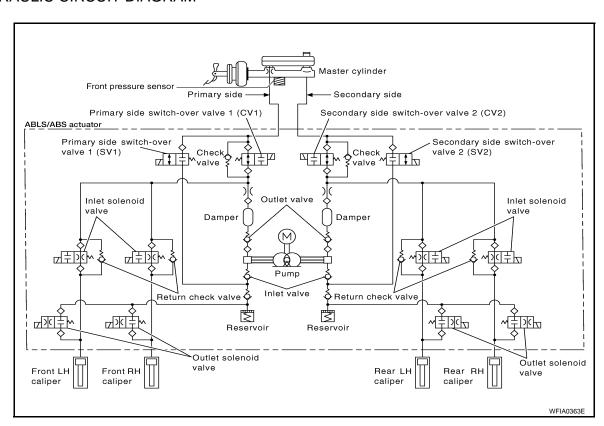
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HYDRAULIC CIRCUIT DIAGRAM



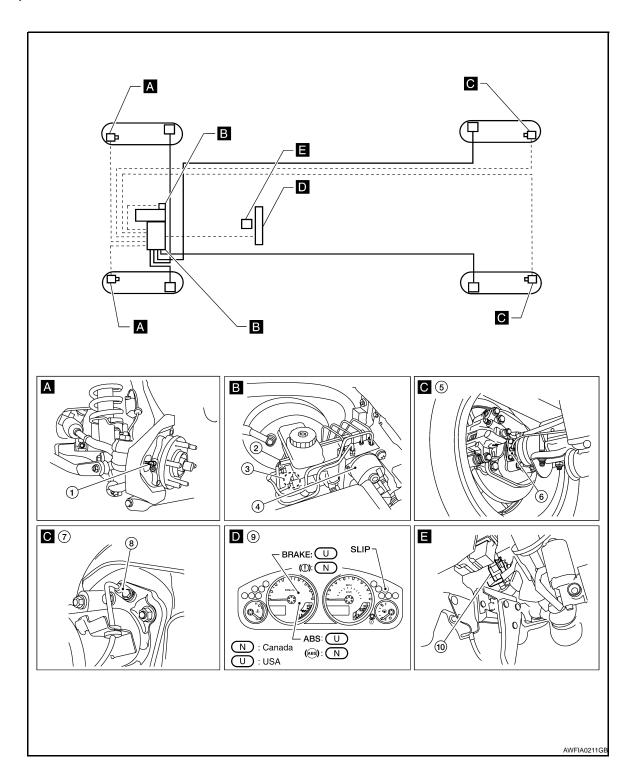
System Description

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Active brake limited slip is a function to improve vehicle traction. Spinning of the drive wheels is detected by
the ABS actuator and electric unit (control unit) using inputs from the wheel speed sensors. If wheel spin
occurs, the ABLS system brakes the spinning wheel which distributes the driving power to the other drive
wheel.

- During ABLS operation, it informs driver of system operation by flashing SLIP indicator lamp.
- Electrical system diagnosis by CONSULT-III is available.

Component Parts Location



- Front wheel sensor LH E18
 Front wheel sensor RH E117
- 4. ABS actuator and electric unit (control unit) E125
- 7. M226 rear axle

2. Brake fluid level switch E21

Rear wheel sensor LH C11

Rear wheel sensor LH C10

C200 rear axle

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- 3. Front pressure sensor E31
 -
- 6. Rear wheel sensor LH C11 Rear wheel sensor LH C10
- 9. Combination meter M24

10. Stop lamp switch

Component Description

INFOID:0000000003248471

Compo	Component parts	
	Pump	PDC 102 "Description"
	Motor	BRC-102, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-116, "Description"
7.20 detailer and electric ann (estimer ann)	Solenoid valve	BRC-109, "Description"
	Switch-over valve (CV1, CV2, SV1, SV2)	BRC-122, "Description"
Wheel sensor	BRC-104, "Description"	
ABS warning lamp		BRC-127, "Description"
Brake warning lamp		BRC-128, "Description"
SLIP indicator lamp		BRC-129, "Description"
Front pressure sensor	BRC-118, "Description"	
Brake fluid level switch	BRC-120, "Description"	
Stop lamp switch	BRC-107, "Description"	

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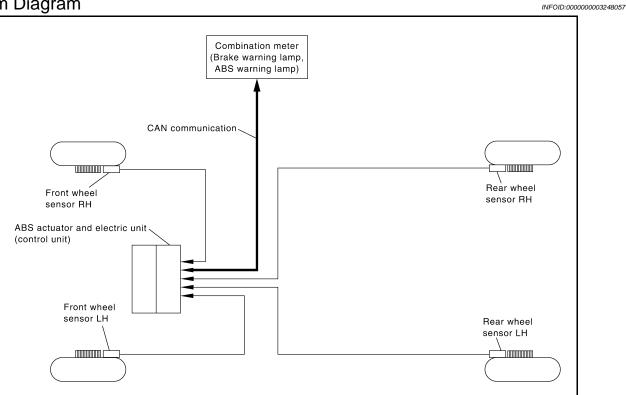
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System Diagram

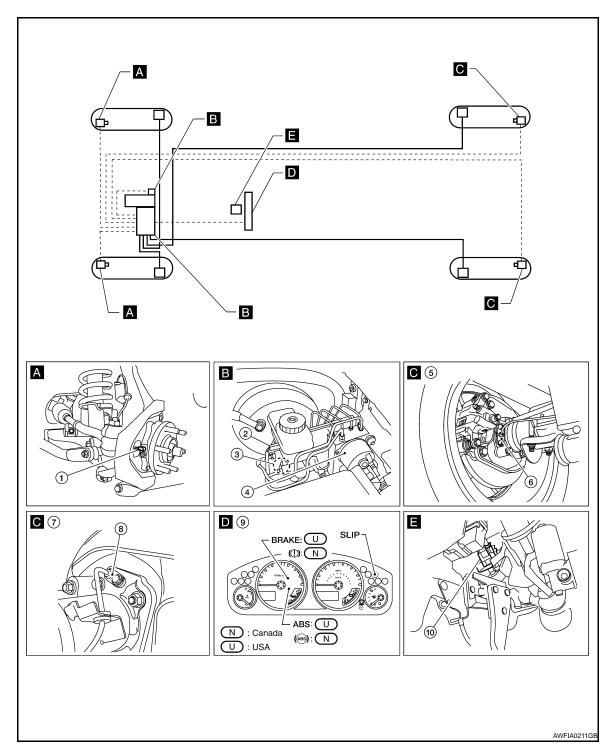


System Description

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

Component Parts Location

INFOID:0000000003292545



- Front wheel sensor LH E18 Front wheel sensor RH E117
- ABS actuator and electric unit (control unit) E125
- 7. M226 rear axle
- 10. Stop lamp switch

- Brake fluid level switch E21
- 5. C200 rear axle
 - Rear wheel sensor LH C11 Rear wheel sensor LH C10
- Front pressure sensor E31
- Rear wheel sensor LH C11 Rear wheel sensor LH C10
- Combination meter M24

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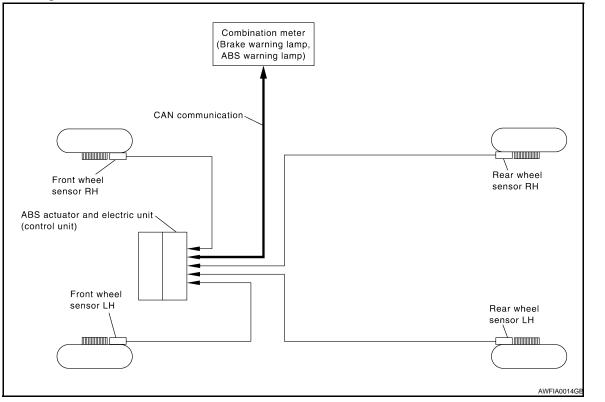
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< FUNCTION DIAGNOSIS > Component Description

Compo	Component parts	
	Pump	PPC 102 "Description"
	Motor	BRC-102, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-116, "Description"
(00	Solenoid valve	BRC-109, "Description"
	Switch-over valve (CV1, CV2, SV1, SV2)	BRC-122, "Description"
Wheel sensor	BRC-104, "Description"	
ABS warning lamp		BRC-127, "Description"
Brake warning lamp	BRC-128, "Description	
SLIP indicator lamp	indicator lamp	
Front pressure sensor		BRC-118, "Description"
Brake fluid level switch		BRC-120, "Description"
Stop lamp switch		BRC-107, "Description"

EBD

System Diagram



System Description

INFOID:0000000003248060

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

• Electrical system diagnosis by CONSULT-III is available.

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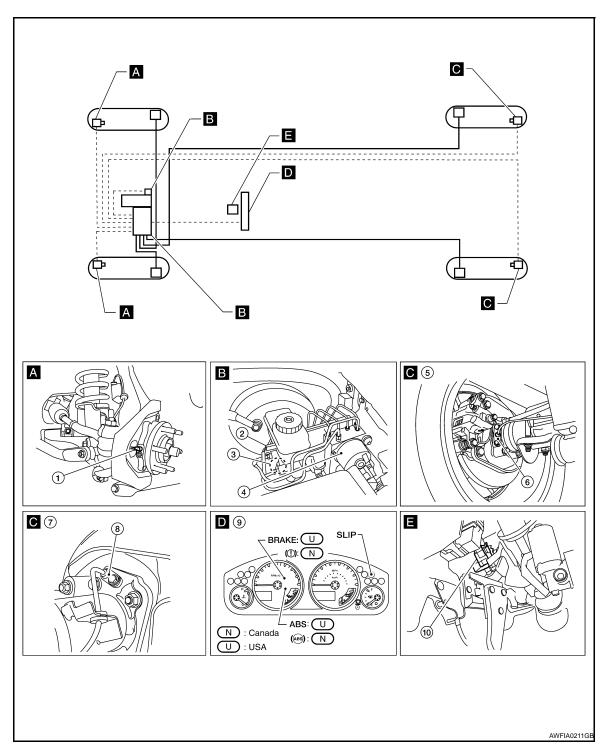
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Component Parts Location



- Front wheel sensor LH E18
 Front wheel sensor RH E117
- ABS actuator and electric unit (control unit) E125
- 7. M226 rear axle
- 7. WZZOTCAI AXIC

- 2. Brake fluid level switch E21
- 5. C200 rear axle
 - Rear wheel sensor LH C11 Rear wheel sensor LH C10
- 3. Front pressure sensor E31
- 6. Rear wheel sensor LH C11 Rear wheel sensor LH C10
- 9. Combination meter M24

Component Description

INFOID:0000000003292548

Component parts		Reference
	Pump	BRC-102, "Description"
	Motor	BRC-102, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-116, "Description"
, 120 dotado, ana olosino ann (como, ann)	Solenoid valve	BRC-109, "Description"
	Switch-over valve (CV1, CV2, SV1, SV2)	BRC-122, "Description"
Wheel sensor	BRC-104, "Description"	
ABS warning lamp		BRC-127, "Description"
Brake warning lamp	arning lamp BRC-128.	
SLIP indicator lamp		BRC-129, "Description"
Front pressure sensor	BRC-118, "Description"	
Brake fluid level switch		BRC-120, "Description"
Stop lamp switch		BRC-107, "Description"

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

< FUNCTION DIAGNOSIS > [TYPE 2]

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

CONSULT-III Function (ABS)

INFOID:0000000003248061

FUNCTION

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

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

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

Display Item List

Refer to BRC-141, "DTC No. Index".

DATA MONITOR MODE

Display Item List

ltem	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
FR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front RH wheel sensor signal is displayed.
FR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by front LH wheel sensor signal is displayed.
RR RH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear RH wheel sensor signal is displayed.
RR LH SENSOR (km/h, MPH)	×	×	×	Wheel speed calculated by rear LH wheel sensor signal is displayed.
BATTERY VOLT (V)	×	×	×	Voltage supplied to ABS actuator and electric unit (control unit) is displayed.

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

< FUNCTION DIAGNOSIS > [TYPE 2]

Item		a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
CCEL POS SIG %)	×	-	×	Throttle valve open/close status judged by CAN communication signal is displayed.
ENGINE SPEED rpm)	×	×	×	Engine speed judged by CAN communication signal is displayed.
STOP LAMP SW ON/OFF)	×	×	×	Stop lamp switch (ON/OFF) status is displayed.
ABS WARN LAMP ON/OFF)	_	×	×	ABS warning lamp (ON/OFF) status is displayed.
SLIP LAMP ON/OFF)	_	×	×	SLIP indicator lamp (ON/OFF) 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.
R RH IN SOL ON/OFF)	-	×	×	Front RH IN ABS solenoid (ON/ OFF) status is displayed.
R RH OUT SOL ON/OFF)	-	×	×	Front RH OUT ABS solenoid (ON/OFF) status is displayed.
RR LH IN SOL ON/OFF)	-	×	×	Rear LH IN ABS solenoid (ON/OFF) status is displayed.
RR LH OUT SOL ON/OFF)	-	×	×	Rear LH OUT ABS solenoid (ON/ OFF) status is displayed.
MOTOR RELAY ON/OFF)	-	×	×	ABS motor relay signal (ON/OFF) status is displayed.
CTUATOR RLY ON/OFF)	-	×	×	ABS actuator relay signal (ON/OFF) status is displayed.
CV1 ON/OFF)	-	-	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status is displayed.
CV2 ON/OFF)	-	-	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status is displayed.
SV1 ON/OFF)	-	-	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.
SV2 ON/OFF)	-	-	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) status is displayed.
CS FAIL SIG ON/OFF)	-	-	×	TCS fail signal (ON/OFF) status is displayed.
.BS FAIL SIG ON/OFF)	-	-	×	ABS fail signal (ON/OFF) status is displayed.
BD FAIL SIG ON/OFF)	-	-	×	EBD fail signal (ON/OFF) status is displayed.
LUID LEV SW DN/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status is displayed.

ltem	Data	a monitor item sele		
(Unit)	(Unit) ECU INPUT MAIN SELECTIC		SELECTION FROM MENU	Remarks
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.
EBD WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) status is displayed.
2WD/4WD	_	_	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
CRANKING SIG	_	_	×	The input state of the key SW START position signal is displayed.
DECEL G-SEN (G)	×	×	×	Longitudinal acceleration detected by decel G-sensor is displayed.
PRESS SENSOR (bar)	×	-	×	Brake pressure detected by pressure sensor is displayed.
DLOCK SW (ON/OFF)	_	-	×	Condition of differential lock mode switch is displayed.
DLOCK CHG SW (ON/OFF)	_	-	×	Condition of differential lock position switch is displayed.

^{×:} Applicable

ACTIVE TEST MODE

< FUNCTION DIAGNOSIS >

CAUTION:

- Do not perform active test while driving vehicle.
- Make sure to completely bleed air from brake system.
- The active test cannot be performed with the ABS warning lamp, SLIP indicator lamp or brake warning lamp on.
- ABS warning lamp, SLIP indicator lamp and brake warning lamp are on during active test.
- When active test is performed while depressing the pedal, the pedal depression amount will change. This is normal. (Only solenoid valve and ABS motor.)
- "TEST IS STOPPED" is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" is displayed, to perform test again, touch BACK.

Test Item

SOLENOID VALVE

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

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

^{-:} Not applicable

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

< FUNCTION DIAGNOSIS >

[TYPE 2]

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

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

ABS MOTOR

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

Operation	ON	OFF
MOTOR RELAY	ON	OFF
ACTUATOR RLY	ON	ON

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COMPONENT DIAGNOSIS

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:0000000003248063

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:0000000003248064

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-93, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1.CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

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NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-154, "Removal and Installation"</u>.

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

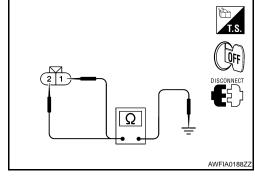
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-156</u>, "Removal and Installation".

NO >> Repair the circuit.

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

< COMPONENT DIAGNOSIS >

[TYPE 2]

Component Inspection

INFOID:0000000003248066

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-93, "Diagnosis Procedure".

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C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description INFOID:000000003248068

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-96, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248070

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.check wheel sensor output signal

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

NOTE:

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

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

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-154</u>, "Removal and Installation".

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-7</u>, "Rear Axle Bearing" (M226 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (C200 rear axle), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear axle).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

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Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	nal Connector Terminal		
Front LH		45	E18	1	
Front Lm	E425	46		2	
Front RH		34	E117	1	Yes
		33		2	
Rear LH	E125	36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

INFOID:0000000003248071

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-96, "Diagnosis Procedure".

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C1109 POWER AND GROUND SYSTEM

Description INFOID:0000000003248073

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

DTC Logic INFOID:0000000003248074

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

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 BRC-99, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

INFOID:0000000003292549

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector. 2.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or 3. replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-88, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

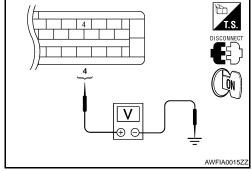
YES >> GO TO 2

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

2.check abs actuator and electric unit (control unit) power supply circuit and **GROUND CIRCUIT**

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

ABS actuator and electric unit (control unit)		_	Condition	Voltage
Connector	Terminal			
F125	4	Ground	Ignition switch: ON	Battery voltage
	4	Giodila	Ignition switch: OFF	Approx. 0V



Turn ignition switch OFF.

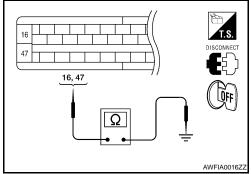
C1109 POWER AND GROUND SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 2]

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

C1110, C1113, C1160, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< COMPONENT DIAGNOSIS >

[TYPE 2]

C1110, C1113, C1160, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

INFOID:0000000003248077

DTC Logic

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).		
C1113	G-SENSOR	Longitudinal G-sensor is malfunctioning, or signal line of longitudinal G-sensor is open or shorted.	ABS actuator and electric unit (control unit)	L
C1160	DECEL G SEN SET	ABS decel sensor adjustment is incomplete.		F
C1170	VARIANT CODING	In a case where VARIANT CODING is different.		L

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
G-SENSOR
DECEL G SEN SET
VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-101, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248078

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

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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	
OTT	T GIVII WOTOK	During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-102</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248082

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, 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-88</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

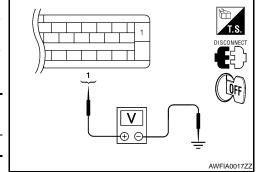
C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 2]

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

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



Is the inspection result normal?

>> GO TO 3 YES

NO >> Repair or replace malfunctioning components.

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

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

16, 47

Component Inspection

1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-102, "Diagnosis Procedure". AWFIA0016Z

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C1115 WHEEL SENSOR

Description INFOID:000000003248090

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-104</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248092

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-154, "Removal and Installation".

3.CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle <u>Inspection and Service"</u> (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear axle), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear axle).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair of

>> Repair or replace as necessary. Refer to <u>FAX-8, "Removal and Installation"</u> (front), <u>RAX-13, "Removal and Installation"</u> (C200 rear axle), or <u>RAX-24, "Removal and Installation"</u> (M226 rear axle).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

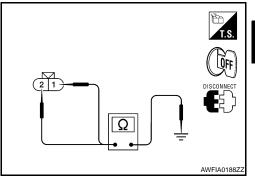
- Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuate electric unit (co		Wheel se	nsor	Continuity
	Connector	Terminal	Connector	Terminal	
Front III	E125	45	F40	1	Yes
Front LH		46	E18	2	
For a DII		34	E117	1	
Front RH		33		2	
Rear LH	E 125	36	C11	1	165
Rear Lm		37		2	
Rear RH		43	C10	1	
NEGI NII		42	C10	2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

1. CHECK DATA MONITOR

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

Wheel sensor	Vehicle speed (DATA MONITOR)

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C1115 WHEEL SENSOR

< COMPONENT DIAGNOSIS > [TYPE 2]

FR LH SENSOR	
FR RH SENSOR	Nearly matches the speedometer display (±10% or less)
RR LH SENSOR	
RR RH SENSOR	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-104. "Diagnosis Procedure"</u>.

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

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-107</u>. "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

$2.\mathsf{stop}$ Lamp switch inspection

Connect the stop lamp switch harness connector.

Check the voltage between the ABS actuator and electric unit (control unit) harness connector E125 terminal 41 and body ground.

Brake pedal depressed : Battery voltage

(approx. 12V)

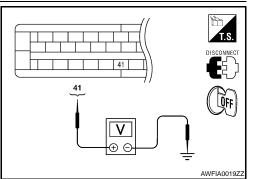
Brake pedal not depressed : Approx. 0V

Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> GO TO 3

 $3.\mathsf{stop}$ Lamp switch circuit inspection



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C1116 STOP LAMP SWITCH

< COMPONENT DIAGNOSIS >

[TYPE 2]

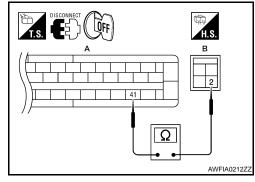
- 1. Disconnect the stop lamp switch harness connector.
- 2. Check the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 41 and stop lamp switch harness connector E38 (B) terminal 2.

Continuity should exist.

Is the inspection result normal?

YES >> Refer to <u>BRC-75</u>, "Work Flow".

NO >> Repair or replace malfunctioning components.



C1120, C1122, C1124, C1126 IN ABS SOL

Description INFOID:0000000003248099

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:0000000003248100

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1120	FR LH IN ABS SOL When the control unit detects a malfunction 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?

>> Proceed to diagnosis procedure. Refer to BRC-109, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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 BRC-88, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

BRC-109

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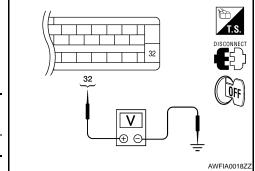
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< COMPONENT DIAGNOSIS >

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

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

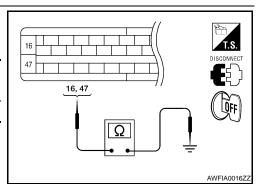
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003248102

Component Inspection

1. CHECK ACTIVE TEST

- 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.

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

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

Is the inspection result normal?

YES >> INSPECTION END

C1120, C1122, C1124, C1126 IN ABS SOL

< COMPONENT DIAGNOSIS >

[TYPE 2]

NO >> Go to diagnosis procedure. Refer to <u>BRC-109</u>. "<u>Diagnosis Procedure</u>".

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C1121, C1123, C1125, C1127 OUT ABS SOL

Description INFOID:000000003248104

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-112, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248106

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-88</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

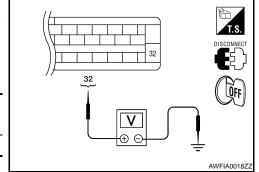
2.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY POWER SUPPLY CIRCUIT

C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

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

ABS actuator and ele	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.

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

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

ABS actuator and ele	ectric unit (control unit)	— Continuit		
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-156</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

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Component Inspection

1. CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> INSPECTION END

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NO >> Go to diagnosis procedure. Refer to BRC-112, "Diagnosis Procedure".

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C1130, C1131, C1136 ENGINE SIGNAL

Description INFOID:000000003248109

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1130	ENGINE SIGNAL 1			
C1131	31 ENGINE SIGNAL 2 Based on the signal from ECM. ABS actuator at	Based on the signal from ECM, ABS actuator and electric	 Harness or connector ABS actuator and electric unit 	
C1132	ENGINE SIGNAL 3	unit (control unit) judges that engine fuel cut system is malfunctioning.	(control unit)	
C1133	ENGINE SIGNAL 4			9
C1136	6 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 BRC-115, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248111

INSPECTION PROCEDURE

1. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-512, "CONSULT-III Function (ENGINE)".
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-88</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> INSPECTION END

C1140 ACTUATOR RLY

Description INFOID:000000003248113

Activates or deactivates each solenoid valve 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
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	Harness or connector ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ACTUATOR RLY	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-116, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248115

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-88, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

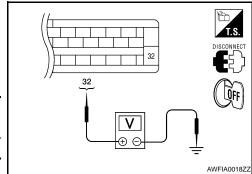
NO >> Poor connection of connector terminal. Repair or replace connector.

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

1. Turn ignition switch OFF.

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

ABS actuator and ele	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.

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

C1140 ACTUATOR RLY

< COMPONENT DIAGNOSIS >

[TYPE 2]

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

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

47 16, 47

Is the inspection result normal?

>> Replace ABS actuator and electric unit (control unit). YES Refer to BRC-156, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000003248116

1. CHECK ACTIVE TEST

- On "ACTIVE TEST", select "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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-116, "Diagnosis Procedure". **BRC**

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C1142 PRESS SENSOR

Description INFOID:000000003248419

The front pressure sensor converts the brake fluid pressure to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
PRESS SEN CIRCUIT	_

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-118, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248421

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the front 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?

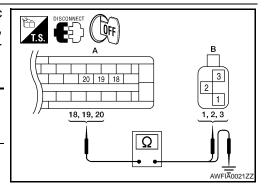
YES >> GO TO 2

NO >> Repair connector.

2.FRONT PRESSURE SENSOR CIRCUIT INSPECTION

 Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminals 18, 19, 20 and front pressure sensor harness connector E31 (B) terminals 3, 1, 2.

ABS actuator and electric unit (control unit)		Front pressure sensor		Continuity
Connector	Terminal	Connector	Terminal	
	18		3	
E125 (A)	19	E31 (B)	1	Yes
	20		2	



Measure the continuity between the ABS actuator and electric unit (control unit) harness connector E125

 (A) terminals 18, 19, 20 and body ground.

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

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness or connector.

3. FRONT PRESSURE SENSOR INSPECTION

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

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

Is the inspection result normal?

YES >> Inspection End.

NO >> Replace the front pressure sensor.

Component Inspection

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-118, "Diagnosis Procedure".

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INFOID:0000000003248422

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C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:000000003248124

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:000000003248125

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 connector Brake fluid level switch Brake 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 BRC-120, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248126

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

- 1. Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
- 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) harness connector E125 (A) terminal 8 and brake fluid level switch harness connector E21 (B) terminal 1.

ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal			
E125 (A)	8	E21 (B) 1		Yes

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

 	DISCONNECT OFF	в
-	A (
_	8 0	
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ABS actuator and ele	ectric unit (control unit)	_	Continuity	
Connector	Connector Terminal		Continuity	
E125 (A)	E125 (A) 8		No	

Is the inspection result normal?

C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check brake fluid level switch ground

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

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

Is the inspection result normal?

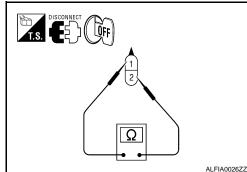
YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4. CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

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



Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

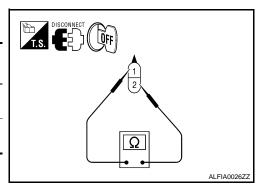
NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

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



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace brake fluid level switch.

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INFOID:0000000003248127

[TYPE 2]

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description INFOID:000000003248138

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:000000003248139

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 BRC-122, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248140

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 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-88</u>, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

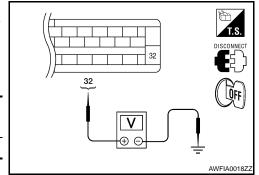
YES >> GO TO 2

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

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

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

ABS actuator and ele	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.

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

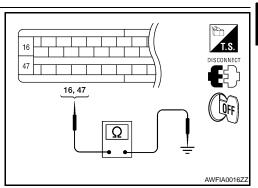
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-156</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003248141

Component Inspection

1. CHECK ACTIVE TEST

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.

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

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

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 2]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-122. "Diagnosis Procedure"</u>.

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-125, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

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INFOID:0000000003292559

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U1000 CAN COMM CIRCUIT

Description INFOID:000000003248144

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:000000003248145

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

INFOID:0000000003248146

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

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

YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".

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

ABS WARNING LAMP

Description

×: ON –: OFF

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Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000003248460

1. CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-127. "Diagnosis Procedure".

INFOID:0000000003248461

Diagnosis Procedure

INFOID:00000000003248461

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-88</u>. "CONSULT-III Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-156, "Removal and Installation"</u>.

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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BRAKE WARNING LAMP

Description INFOID:000000003248462

 \times : ON -: OFF

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

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- · 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000003248463

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-128, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003248464

1. CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-156, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

SLIP INDICATOR LAMP

Description INFOID:000000003248475

×: ON –: OFF

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

Component Function Check

INFOID:0000000003248476

1. CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-129, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003248477

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-88, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-156</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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APPLICATION NOTICE

< ECU DIAGNOSIS > [TYPE 2]

ECU DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000003248353

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[TYPE 2] < ECU DIAGNOSIS >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value INFOID:0000000003248165

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

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

	Data monitor						
Monitor item	Display content	Condition	Reference value in normal operation				
		0 [km/h (MPH)]	Vehicle stopped				
FR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)				
		0 [km/h (MPH)]	Vehicle stopped				
FR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)				
		0 [km/h (MPH)]	Vehicle stopped				
RR LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)				
		0 [km/h (MPH)]	Vehicle stopped				
RR RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)				
CTOD LAMB CW	Characteristics aireal status	When brake pedal is depressed	ON				
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is released	OFF				
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V				
400FL P00 010	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 %				
		With engine stopped	0 rpm				
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachome ter display				
FLUID LEV SW	Proke fluid level quiteb gignel status	When brake fluid level switch ON	ON				
I LOID LLV 3VV	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF				
FR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
TRIMITIN SOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
FR RH OUT SOL	Operation status of each calcandid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
FN KH OUT SUL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				

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< ECU DIAGNOSIS > [TYPE 2]

		Data monitor					
Monitor item	Display content	Condition	Reference value in normal operation				
FR LH IN SOL	Operation status of each calculated value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
FR LIT IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
FR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
TREITOUT SOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
KK KH IIV 30L	Operation status of each solenou valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
	Operation status of each calcusid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
RR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
DD LLLIN OOL	Operation status of each colonsidualus	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
RR LH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
RR LH OUT SOL		Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON				
KK LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF				
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON				
WOTOK KELAT	Wotor and motor relay operation	When the motor relay and motor are not operating	OFF				
ACTUATOR RIV	Actuator relay exerction	When the actuator relay is operating	ON				
ACTUATOR RLY	Actuator relay operation	When the actuator relay is not operating	OFF				
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON				
ADO WAIGIN LAIMP	(Note 3)	When ABS warning lamp is OFF	OFF				
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON				
CEII E/ WVII	(Note 3)	When SLIP indicator lamp is OFF	OFF				
EBD SIGNAL	EBD operation	EBD is active	ON				
	11 - 20 - 2	EBD is inactive	OFF				
ABS SIGNAL	ABS operation	ABS is active	ON				
		ABS is inactive	OFF				

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[TYPE 2] < ECU DIAGNOSIS >

Р

		Data monitor				
Monitor item	Display content	Condition	Reference value in normal operation			
TOO CIONAL	TOC analystics	TCS is active	ON			
TCS SIGNAL	TCS operation	TCS is inactive	OFF			
	EDD fail aufo signal	In EBD fail-safe	ON			
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	OFF			
ADO 5411 OLO	ADO (cil cofo circo)	In ABS fail-safe	ON			
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	OFF			
T00 F411 010	T00 (ii	In TCS fail-safe	ON			
TCS FAIL SIG	TCS fail-safe signal	TCS is normal	OFF			
		Crank is active	ON			
CRANKING SIG	Crank operation	Crank is inactive	OFF			
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF ON OFF			
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
SV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
SV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON			
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF			
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G			
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G			
	EBD warning lamp	When EBD warning lamp is ON	ON			
EBD WARN LAMP	(Note 2)	When EBD warning lamp is OFF	OFF			

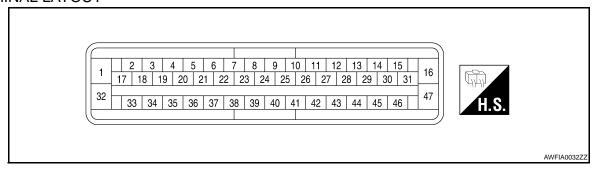
NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-127, "Description".
- Brake warning lamp: Refer to BRC-128, "Description".
- SLIP indicator lamp: Refer to BRC-129, "Description".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 2]

TERMINAL LAYOUT

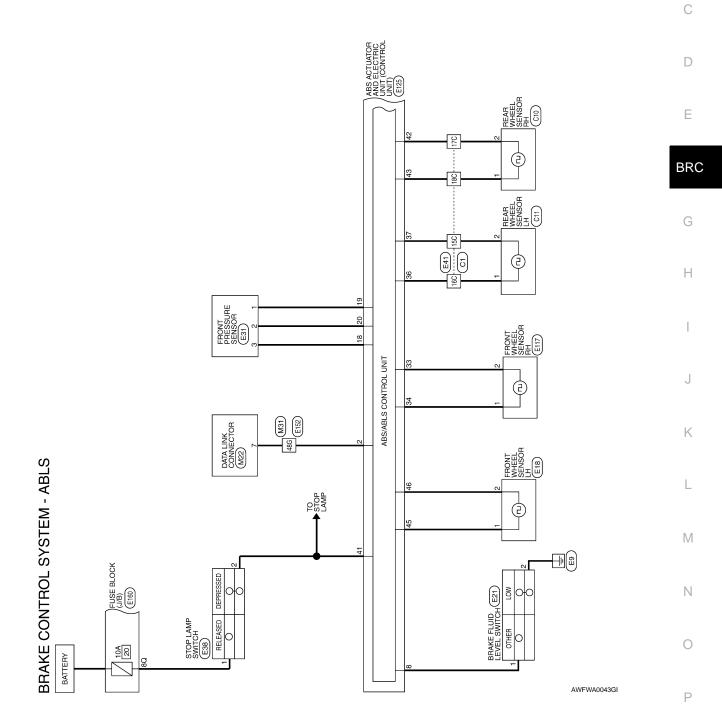


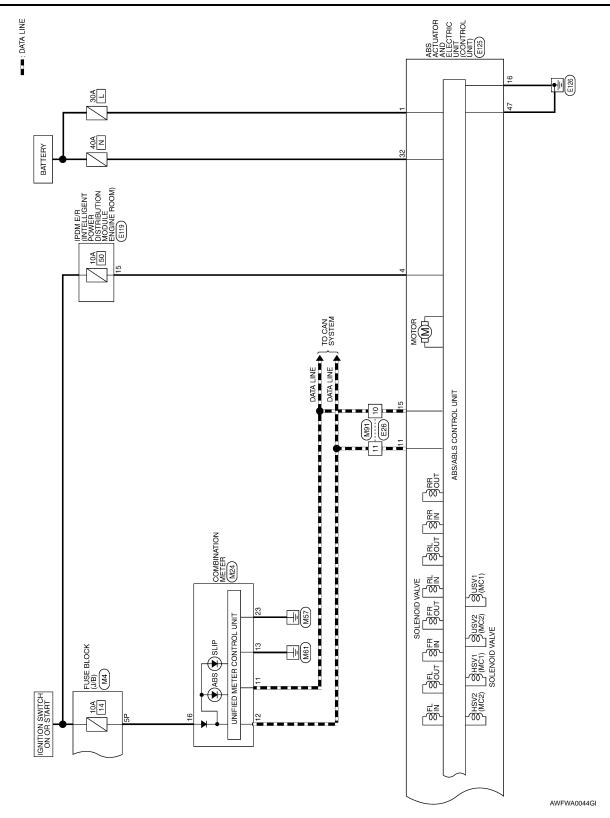
Wiring Diagram - ABLS

INFOID:0000000003248166

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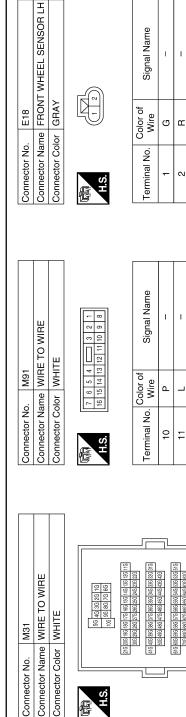
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BRAKE CONTROL SYSTEM CONNECTORS - ABLS

Connector No.	M4	Connector
Connector Name	Connector Name FUSE BLOCK (J/B)	Connector
Connector Color WHITE	WHITE	Connector

	COMBINATION METER	TE	[11 10 9 8 7 6 5 4 3 2 1 31 30 29 28 27 26 25 24 23 22 21	Signal Name	CAN-L	CAN-H	GROUND	RUN START	GND (POWER)	
M24	ne COI	or WHITE		14 13 12 34 33 32 3	Color of Wire	۵	_	GR	M/G	В	
Connector No.	Connector Name	Connector Color	i o	20 19 18 17 16 15 14 13 12 11 10 40 39 38 37 36 35 34 33 32 31 30	Terminal No.	=	12	13	16	23	

gnal Nam CAN-L CAN-H GROUND UN STAR D (POWE
Si S
Color of Wire P L C GR GR W/G
Color of Wire 11 P L L L L R GR 13 GR 23 B



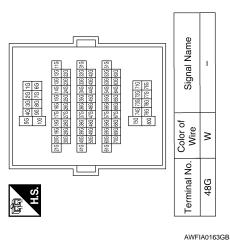
Connector Color WHITE

M31

Connector No.

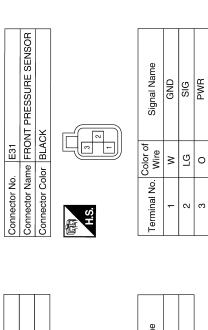
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Signal Name



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< ECU DIAGNOSIS >



L) WIRE	200 200 200 200 200 200 200 200 200 200	Signal Name	ı	ı	1	ı
	ne WIRE TO WIRE or BLACK	100 100 100 100 100 100 100 100 100 100	Color of Wire	а.		>	re
Connector No.	Connector Name Connector Color	H.S.	Terminal No.	15C	16C	17C	18C

-	Connector No. E26	E26	
AKE FLUID LEVEL	Connector Name WIRE TO WIRE	WIRE TO WIRE	<u> O</u>
MICH HILL	Connector Color WHITE	WHITE	
\AY			
		9 3 4 5 6 7	
≪ (ĭ	9 10 11 12 13 14 15 16	

Signal Name	I	-
Color of Wire	۵	Γ
Terminal No.	10	11

E38	Connector Name STOP LAMP SWITCH (WITH A/T)	WHITE	8
Connector No.	Connector Name	Connector Color WHITE	性的

STOP LAMP SV (WITH A/T)	WHITE	3 1 2 4	of Signe		
			Color of Wire	R/B	>
Connector Name	Connector Color	咸利 H.S.	Terminal No.	ļ	2

E21	BRAKE FLUID LEVEL SWITCH	GRAY	,
Connector No.	Connector Name	Connector Color GRAY	

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

E38	Connector Name STOP LAMP SWITCH (WITH M/T)	3LACK	
Connector No.	Connector Name	Connector Color BLACK	

	Signal Nam	Ι	1
8	Color of Wire	B/B	>
H.S.	Terminal No.	1	٥

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[TYPE 2] < ECU DIAGNOSIS >

Signal Name	I	VALVE ECU SUPPLY	FR_RH_SIG	FR_RH_PWR	1	RR_LH_PWR	RR_LH_SIG	1	1	I	STOP_LAMP_SW	RR_RH_SIG	RR_RH_PWR	1	FR_LH_PWR	FR_LH_SIG	MOTOR GND
Color of Wire	1	\	8	В	ı	٦	Д	1	1	1	SB	^	LG	1	G	В	В
Terminal No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

VALVE ECU GND

CAN-L

Ф ш DRIV1_SENSEP DRIV1_GND

0 ≥ DRIV1_SIG

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2 2

22 23 24 25 25 25

28 28 29 30 30

FR_LH_(s œ	46
FRLHP	1 0	44 45
RR_RH_F	PI	43
RR_RH	۸	42
STOP_LAM	SB	41
1	1	40
I	ı	39
ı	ı	38
_RR_LH_	Ь	37
RR_LH_F	٦	36
ı	1	35
FR_RH_F	В	34
FR_RH	8	33
VALVE ECU 8	>	32
Signal Na	Wire	- 5
	Color of	Terminal No.

Signal Name

Color of Wire

Terminal No.

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Connector No.	E119
Connector Name	Connector Name POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color WHITE	WHITE

Connector Name FRONT WHEEL SENSOR RH

E117

Connector No.

Connector Color GRAY



Color o	W/R	
Terminal No.	15	

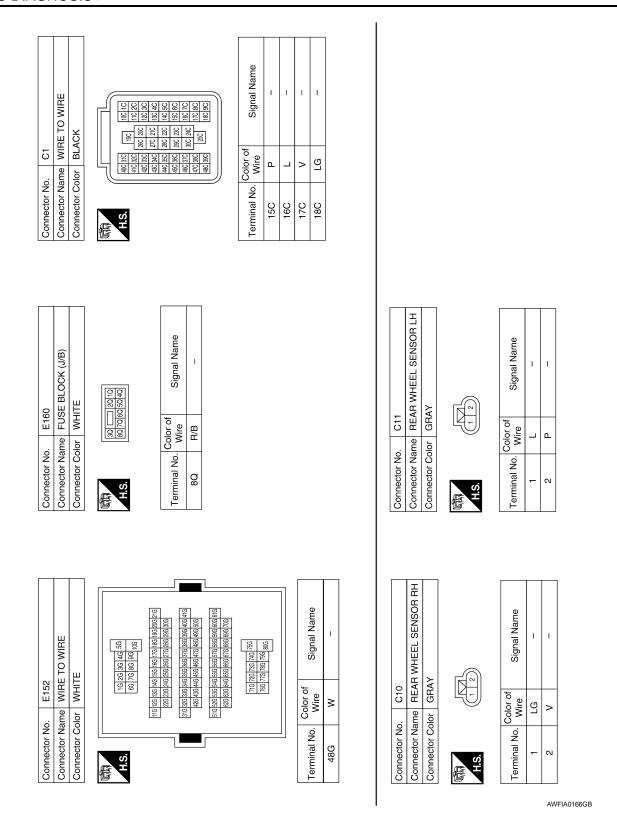
Signal Name	I	1	
Color of Wire	В	W	
Terminal No.	1	2	

Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (COI
Connector Color BLACK	BLACK
(E)	

1 2 3 4 5 6 7 8 9 10 11 2 13 14 14 14 14 14 14 14			=	0		#	Ш	
			14	3		45	Ш	
			3	ಬ		3		
			2	58		~	Н	
			Ë	27		4	Ш	
			Ξ	9		42	Ш	
		H	유			4	Н	
				33		유	Ш	
				24		5	Ш	
			۳	23		E		
		Г	_	Ω		88	H	
			9	-		37		
			2	2		36	Ш	
			4	8		52	Ш	
			-	19		**	Н	
	.		-	18		č	Ш	
			2			æ	Ш	
			Р	1	Ц		Ш	
		L	Ľ	-	5	γ	U,	1

Signal Name	MOTOR SUPPL	DIAG_K	ı	IGN	ı	ı	-	FLUID LEVEL S	I	
Color of Wire	Ж	SB	ı	W/R	1	1	1	GR	-	
Terminal No.	-	2	3	4	2	9	7	8	6	

AWFIA0165GB



Fail-Safe

CAUTION:

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

ABS/EBD SYSTEM

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

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 2]

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

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

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ABLS SYSTEM

In case of ABLS system malfunction, the SLIP indicator lamp will turn on. The condition of the vehicle is the same as the condition of vehicles without ABS/ABLS system.

DTC No. Index

	Reference	Items (CONSULT screen terms)	DTC
E		RR RH SENSOR-1	C1101
_	PPC 02 "Description"	RR LH SENSOR-1	C1102
	BRC-93, "Description"	FR RH SENSOR-1	C1103
BRC		FR LH SENSOR-1	C1104
		RR RH SENSOR-2	C1105
0	PDC 06 "Description"	RR LH SENSOR-2	C1106
G	BRC-96, "Description"	FR RH SENSOR-2	C1107
		FR LH SENSOR-2	C1108
Н	BRC-99, "Description"	BATTERY VOLTAGE [ABNORMAL]	C1109
	BRC-101, "DTC Logic"	CONTROLLER FAILURE	C1110
	BRC-102, "Description"	PUMP MOTOR	C1111
_	BRC-101, "DTC Logic"	G-SENSOR	C1113
	BRC-104, "Description"	ABS SENSOR [ABNORMAL SIGNAL]	C1115
J	BRC-107, "Description"	STOP LAMP SW	C1116
	BRC-109, "Description"	FR LH IN ABS SOL	C1120
	BRC-112, "Description"	FR LH OUT ABS SOL	C1121
K	BRC-109, "Description"	FR RH IN ABS SOL	C1122
	BRC-112, "Description"	FR RH OUT ABS SOL	C1123
	BRC-109, "Description"	RR LH IN ABS SOL	C1124
	BRC-112, "Description"	RR LH OUT ABS SOL	C1125
	BRC-109, "Description"	RR RH IN ABS SOL	C1126
M	BRC-112, "Description"	RR RH OUT ABS SOL	C1127
		ENGINE SIGNAL 1	C1130
N	BRC-115, "Description"	ENGINE SIGNAL 2	C1131
IN		ENGINE SIGNAL 6	C1136
_	BRC-116, "Description"	ACTUATOR RLY	C1140
0	BRC-118, "Description"	PRESS SEN CIRCUIT	C1142
	BRC-120, "Description"	BR FLUID LEVEL LOW	C1155
	BRC-101, "DTC Logic"	DECEL G SEN SET	C1160
— P		CV1	C1164
	DDC 422 "Deceription"	CV2	C1165
	BRC-122, "Description"	SV1	C1166
		SV2	C1167
	BRC-101, "DTC Logic"	VARIANT CODING	C1170

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 2]

DTC	Items (CONSULT screen terms)	Reference
C1187	ABS DIFLOCK CONTROLLER NG	BRC-125, "Description"
U1000	CAN COMM CIRCUIT	BRC-126, "Description"

APPLICATION NOTICE

< SYMPTOM DIAGNOSIS > [TYPE 2]

SYMPTOM DIAGNOSIS

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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ABLS/ABS

Symptom Table

If ABS warning lamp turns ON, perform self-diagnosis.

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-145, "Diag- nosis Procedure"	
4	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-146, "Diag-	
Oriexpected 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-147, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-148, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-149, "Diag-	
occurs (Note 2)	ABS actuator and electric unit (control unit)	nosis Procedure"	

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

[TYPE 2] < SYMPTOM DIAGNOSIS > **EXCESSIVE ABS FUNCTION OPERATION FREQUENCY** Α Diagnosis Procedure INFOID:0000000003248171 1.CHECK START В 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 D Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-7, "Rear Axle Bearing" (C200) or RAX-19, "Rear Axle Bearing" (M226). Is the inspection result normal? Е >> GO TO 3 YES NO >> Repair or replace malfunctioning components. 3.CHECK WHEEL SENSOR AND SENSOR ROTOR **BRC** 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? Н YES >> GO TO 4 >> • Replace wheel sensor or sensor rotor. Refer to BRC-154, "Removal and Installation" or BRC-NO 155, "Removal and Installation". · Repair harness. 4. CHECK ABS WARNING LAMP DISPLAY Make sure that the ABS warning lamp is turned off after the ignition switch is turned ON or when driving. Is the ABS warning lamp illuminated? >> Perform self-diagnosis. Refer to BRC-88, "CONSULT-III Function (ABS)". YES K NO >> Normal L M N Р

[TYPE 2]

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000003248172

1. CHECK BRAKE PEDAL STROKE

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

Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-9, "Bleeding Brake System".
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-7</u>, "<u>Brake Pedal Inspection and Adjustment</u>" (brake pedal), <u>BR-30</u>, "<u>Disassembly and Assembly</u>" (master cylinder), <u>BR-7</u>, "<u>Brake Booster Inspection</u>" (brake booster).

NO >> GO TO 2

2. CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

[TYPE 2]

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000003248173

CAUTION:

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

1. CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >

[TYPE 2]

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000003248174

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 >> Normal

NO >> Perform self-diagnosis. Refer to BRC-88, "CONSULT-III Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

[TYPE 2] < SYMPTOM DIAGNOSIS > PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS Α Diagnosis Procedure INFOID:0000000003248175 **CAUTION:** В 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] D 1.SYMPTOM CHECK 1 Check that there are pedal vibrations when the engine is started. Е Do vibrations occur? YES >> GO TO 2 NO >> Inspect the brake pedal. BRC 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 BRC-88, "CONSULT-III Function (ABS)". Н 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 >> Normal J K L M Ν Р

NORMAL OPERATING CONDITION

Description INFOID:000000003248466

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when TCS or ABS is activated.	T1::::::::::::::::::::::::::::::::::::	
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 TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS 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 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.	engine engine on a normal road. If the normal condition is restored, there	
ABS warning lamp and SLIP indicator lamp may illuminate, when running on a special road that is extremely slanted (e.g. bank in a circuit course).		
SLIP indicator lamp may turn on when low tire pressure warning lamp turns on.	This error results from characteristic change of tire.	

< PRECAUTION > [TYPE 2]

PRECAUTION

PRECAUTIONS

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

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

WARNING:

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

Precaution for Brake System

CAUTION:

- Refer to MA-12, "Fluids and Lubricants" for recommended brake fluid.
- Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.
- Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut wrench when removing and installing brake tube.
- If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.
- Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.
- Always torque brake lines when installing.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

Refer to <u>BR-27, "Brake Burnishing"</u> (front disc brake) or <u>BR-29, "Brake Burnishing"</u> (rear disc brake).

WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

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Commercial service tool

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BRC-151

< PRECAUTION > [TYPE 2]

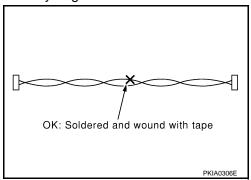
• When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, 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 SLIP indicator lamp may turn on and the TCS 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 SLIP indicator lamp to turn on, and the TCS system may not operate properly.
- When the TCS is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the TCS may not operate normally, and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.

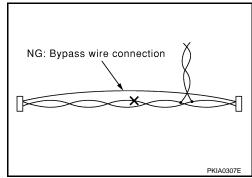
Precaution for CAN System

INFOID:0000000003248325

- 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 > [TYPE 2]

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	J-45741-BCX OPPONIE SCHOOL	Checking operation of ABS active wheel sensors

Commercial Service Tool

INFOID:0000000003248327

INFOID:0000000003248326

Tool name		Description	
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)	
	S-NT360		

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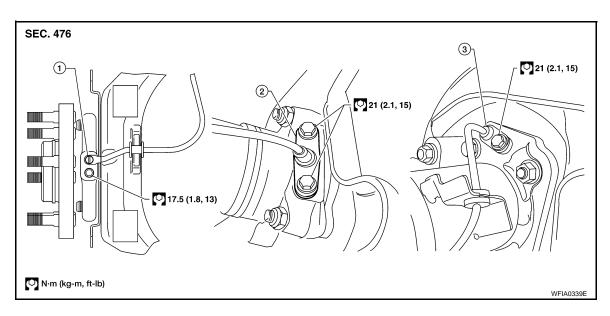
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INFOID:0000000003303116

REMOVAL AND INSTALLATION

WHEEL SENSOR

Removal and Installation



- 1. Front wheel sensor
- 2. Rear wheel sensor (C200)
- 3. Rear wheel sensor (M226)

REMOVAL

- 1. Remove wheel sensor bolt(s).
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-26, "Removal and Installation of Brake Caliper and Disc Rotor".
- 2. Pull out the sensor, being careful to turn it as little as possible.

CAUTION:

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

INSTALLATION

- Before installing wheel sensors,
- Inspect and replace sensor assembly if damaged.
- 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.
- Replace wheel sensor O-ring, then apply a coat of suitable grease to the O-ring and sensor hole.
- Installation is in the reverse order of removal.

SENSOR ROTOR

Removal and Installation

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FRONT

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

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to RAX-8, "Removal and Installation".

REAR (M226)

Removal

 Remove axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u>. NOTE:

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

2. Pull the sensor rotor of off the axle shaft using Tool and a press.

Tool number : ST30031000 (—)

Installation

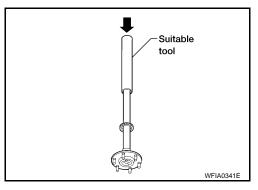
1. Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated.

Do not reuse the old sensor rotor.

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

CAUTION:

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



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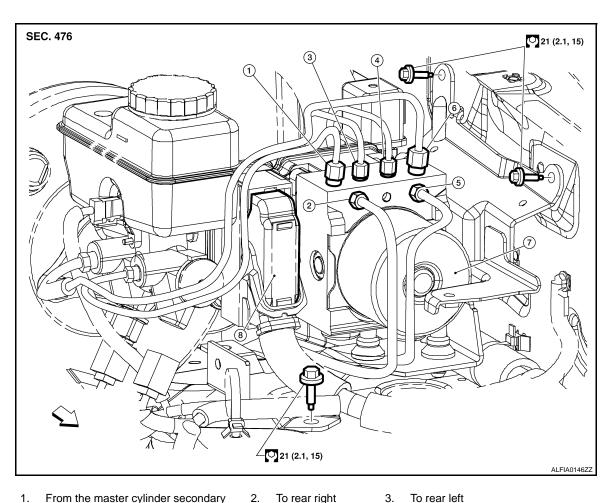
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INFOID:0000000003303118

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- From the master cylinder secondary side
- 3. To rear left

✓ Front

To front right

- 5. To front left
- From the master cylinder primary side

- ABS actuator and electric unit (control 8. unit)
- Harness connector

REMOVAL

- 1. Disconnect the negative battery terminal.
- Drain the brake fluid. Refer to BR-9, "Drain and Refill".
- 3. Remove air cleaner case. Refer to EM-135, "Exploded View".
- 4. 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.
- 5. Disconnect the brake tubes.
- Remove the three bolts and remove the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

To install, use a flare nut wrench (commercial service tool).

Always tighten brake tubes to specification when installing. Refer to BR-6, "Hydraulic Circuit".

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

[TYPE 2]

- Never reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to <u>BR-9</u>, "<u>Bleeding Brake System</u>".

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APPLICATION NOTICE

< BASIC INSPECTION > [TYPE 3]

BASIC INSPECTION

APPLICATION NOTICE

Application Notice

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION > [TYPE 3]

DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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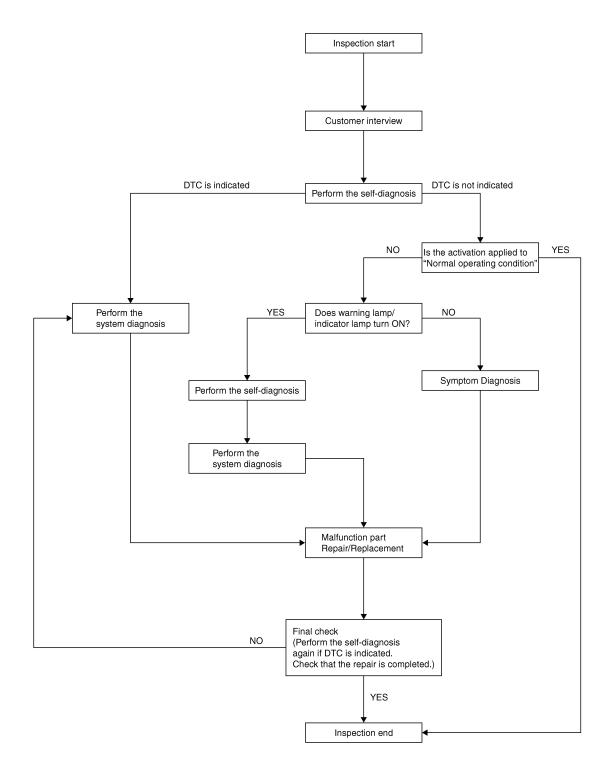
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OVERALL SEQUENCE



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DETAILED FLOW

1. COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-162, "Diagnostic Work Sheet".

DIAGNOSIS AND REPAIR WORKFLOW

DIAGNOSIS AND REPAIR WORKFLOW	
< BASIC INSPECTION >	[TYPE 3]
>> GO TO 2	
2.PERFORM THE SELF-DIAGNOSIS	
Check the DTC display with the self-diagnosis function. Refer to BRC-186, "CONSULT-III Function	<u>า (ABS)"</u> .
Is there any DTC displayed?	
YES >> GO TO 3 NO >> GO TO 4	
3. PERFORM THE SYSTEM DIAGNOSIS	
Perform the diagnosis applicable to the displayed DTC. Refer to BRC-256, "DTC No. Index".	
enorm the diagnosis applicable to the displayed DTC. Nelel to <u>DIXO-230, 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 t "Description".	o <u>BRC-266.</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-239</u>, "<u>Description"</u>. 	
 Brake warning lamp: Refer to <u>BRC-240</u>, "<u>Description</u>". 	
VDC OFF indicator lamp: Refer to <u>BRC-241, "Description"</u> . SUB indicator lamp: Refer to <u>BRC-243, "Description"</u> .	
 SLIP indicator lamp: Refer to <u>BRC-242, "Description"</u>. Hill descent control indicator lamp: Refer to <u>BRC-243, "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.	
3100	
>> GO TO 8	
8. FINAL CHECK	
Perform the self-diagnosis again, and check that the malfunction is repaired completely. After check the result of	cking, erase
the self-diagnosis memory. Refer to <u>BRC-186, "CONSULT-III Function (ABS)"</u> . Is no other DTC present and the repair completed?	
YES >> INSPECTION END	
NO >> GO TO 3	

DIAGNOSIS AND REPAIR WORKFLOW

[TYPE 3]

Diagnostic Work Sheet

INFOID:0000000003221207

Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Date	е
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

[TYPE 3] < BASIC INSPECTION > INSPECTION AND ADJUSTMENT Α ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT: Description INFOID:0000000003221208 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 D INFOID:0000000003221209 ${f 1}$.PERFORM THE NEUTRAL POSITION ADJUSTMENT FOR THE STEERING ANGLE SENSOR Е Perform the neutral position adjustment for the steering angle sensor. >> Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION BRC Special Repair Requirement", GO TO 2 2.PERFORM CALIBRATION OF THE DECEL G SENSOR Perform calibration of the decel G sensor. >> Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Special Repair Requirement". ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Н ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description INFOID:0000000003221210 Refer to the table below to determine if adjustment of steering angle sensor neutral position is required. x: Required -: Not required Adjustment of steering angle sensor neutral position Situation Removing/Installing ABS actuator and electric unit (control unit) Replacing ABS actuator and electric unit (control unit) Removing/Installing steering angle sensor Replacing steering angle sensor Removing/Installing steering components Replacing steering components × Removing/Installing suspension components × Replacing suspension components \times Change tires to new ones Tire rotation Ν Adjusting wheel alignment ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement INFOID:0000000003221211 ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION Р **CAUTION:** To adjust neutral position of steering angle sensor, make sure to use CONSULT-III (Adjustment cannot be done without CONSULT-III)

Stop vehicle with front wheels in straight-ahead position.

 ${f 1}$. ALIGN THE VEHICLE STATUS

< BASIC INSPECTION > [TYPE 3]

>> GO TO 2

2.perform the neutral position adjustment for the steering angle sensor

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

CAUTION:

Do not touch steering wheel while adjusting steering angle sensor.

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

NOTE:

After approximately 60 seconds, it ends automatically.

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

CAUTION:

Be sure to perform above operation.

>> GO TO 3

3. CHECK DATA MONITOR

- 1. Run vehicle with front wheels in straight-ahead position, then stop.
- 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-186, "CONSULT-III Function (ABS)"</u>.
- ECM: Refer to <u>EC-63</u>, "<u>CONSULT-III Function (ENGINE)</u>" (QR25DE) or <u>EC-512</u>, "<u>CONSULT-III Function (ENGINE)</u>" (VQ40DE).

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:0000000003221212

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

×: Required -: Not required

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

CALIBRATION OF DECEL G SENSOR: Special Repair Requirement

INFOID:0000000003221213

CALIBRATION OF DECEL G SENSOR

CAUTION:

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

INSPECTION AND ADJUSTMENT

[TYPE 3] < BASIC INSPECTION > (Calibration cannot be done without CONSULT-III) Α ALIGN THE VEHICLE STATUS Stop vehicle with front wheels in straight-ahead position. В >> GO TO 2 2.perform calibration of decel g sensor On the CONSULT-III screen, touch "WORK SUPPORT" and "DECEL G SEN CALIBRATION" in order. 2. Touch "START". 3. After approximately 10 seconds, touch "END". NOTE: D After approximately 60 seconds, it ends automatically. 4. Turn ignition switch OFF, then turn it ON again. **CAUTION:** Е Be sure to perform above operation. >> GO TO 3 BRC 3. CHECK DATA MONITOR Run vehicle with front wheels in straight-ahead position, then stop. Select "DATA MONITOR". Then make sure "DECEL G SEN" is within ±. Is the inspection result normal? YES >> GO TO 4 Н 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 BRC-186, "CONSULT-III Function (ABS)". • ECM: Refer to EC-63, "CONSULT-III Function (ENGINE)" (QR25DE) or EC-512, "CONSULT-III Function (ENGINE)" (VQ40DE). Are the memories erased? YES >> INSPECTION END NO >> Check the items indicated by the self-diagnosis. K L M Ν Р

[TYPE 3]

FUNCTION DIAGNOSIS

APPLICATION NOTICE

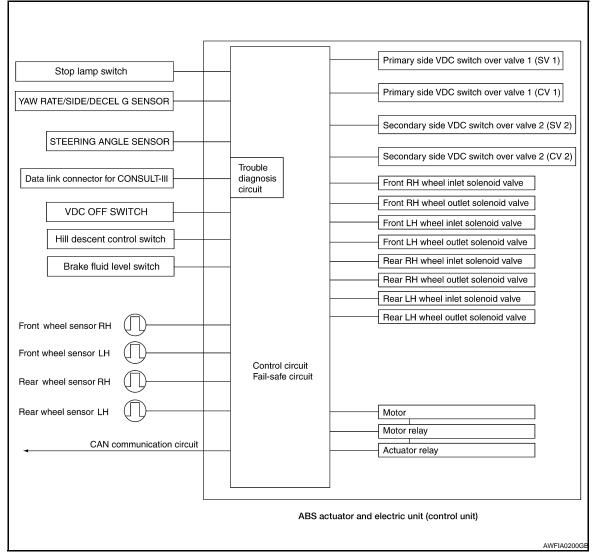
Application Notice

Service information	Remarks	
TYPE 1	ABS	
TYPE 2	ABLS/ABS	
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS	

VDC

System Diagram

INFOID:0000000003247861



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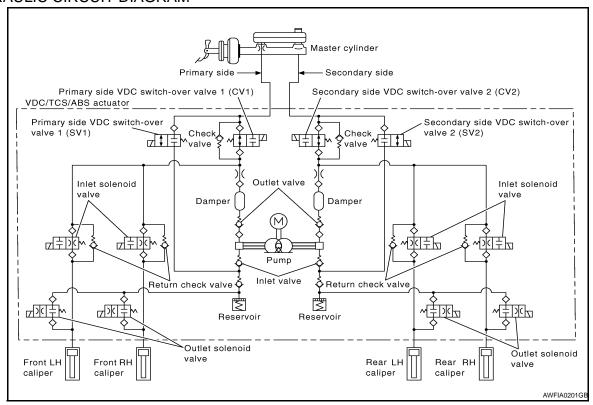
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HYDRAULIC CIRCUIT DIAGRAM



System Description

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

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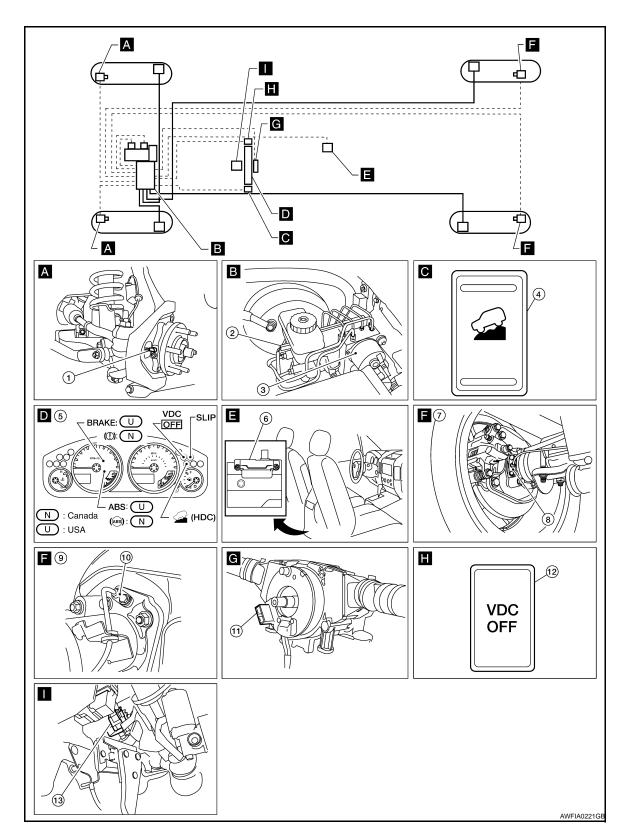
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Component Parts Location



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

[TYPE 3]

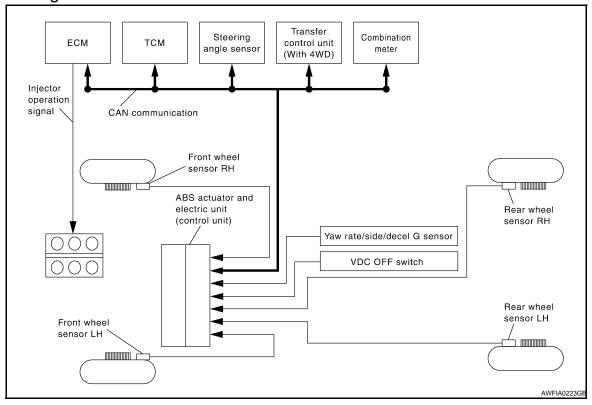
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47
 (Steering wheel removed for clarity)
- 13. Stop lamp switch E12

Component Description

Component parts		Reference
	Pump Motor	BRC-201, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
Abo actuator and electric unit (control unit)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch		BRC-221, "Description"
Steering angle sensor		BRC-221, "Description"
Stop lamp switch		BRC-209, "Description"
VDC OFF switch		BRC-237, "Description"
Hill descent control switch		BRC-235, "Description"
ABS warning lamp		BRC-239, "Description"
Brake warning lamp		BRC-240, "Description"
VDC OFF indicator lamp		BRC-241, "Description"
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

TCS

System Diagram



System Description

INFOID:0000000003247866

[TYPE 3]

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

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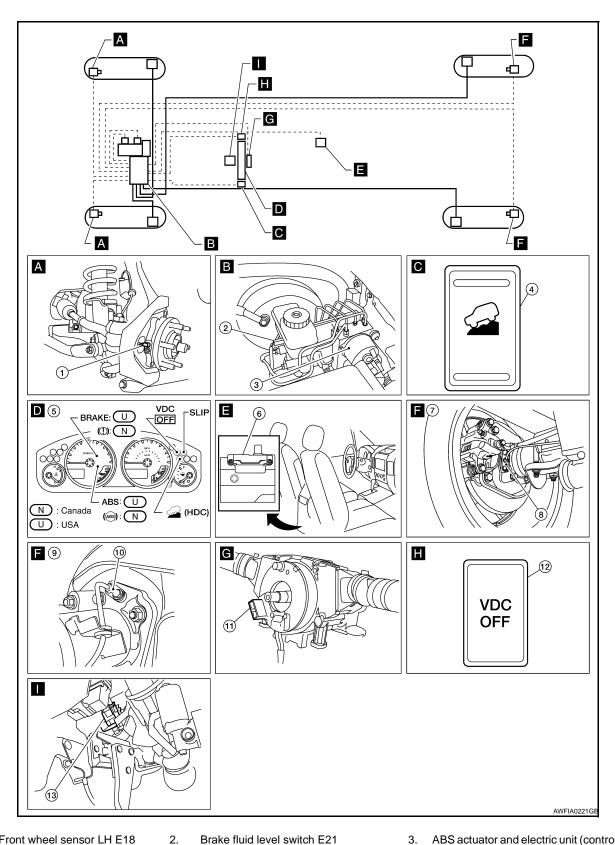
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Component Parts Location



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 3. ABS actuator and electric unit (control unit) E125
- Yaw rate/side/decel G sensor B73 6.
 - M226 rear axle

< FUNCTION DIAGNOSIS > [TYPE 3]

Rear wheel sensor LH C11
 Rear wheel sensor RH C10

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

13. Stop lamp switch E12

Component Description

INFOID:0000000003292887

Component parts		Reference
	Pump	PPC 201 "Description"
	Motor	BRC-201, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
7.55 detactor and electric anii (centrol anii)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch		BRC-221, "Description"
Steering angle sensor		BRC-221, "Description"
Stop lamp switch		BRC-209, "Description"
VDC OFF switch		BRC-237, "Description"
Hill descent control switch		BRC-235, "Description"
ABS warning lamp		BRC-239, "Description"
Brake warning lamp		BRC-240, "Description"
VDC OFF indicator lamp		BRC-241, "Description"
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

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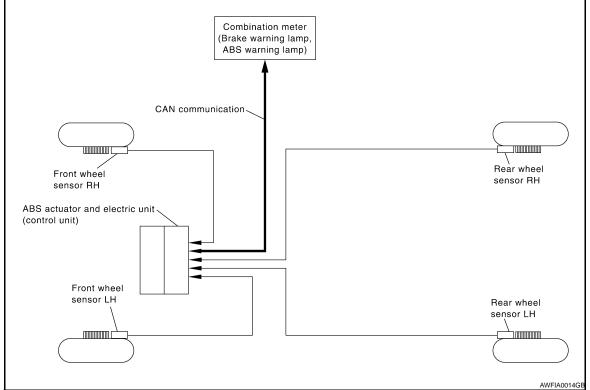
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ABS

System Diagram





System Description

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

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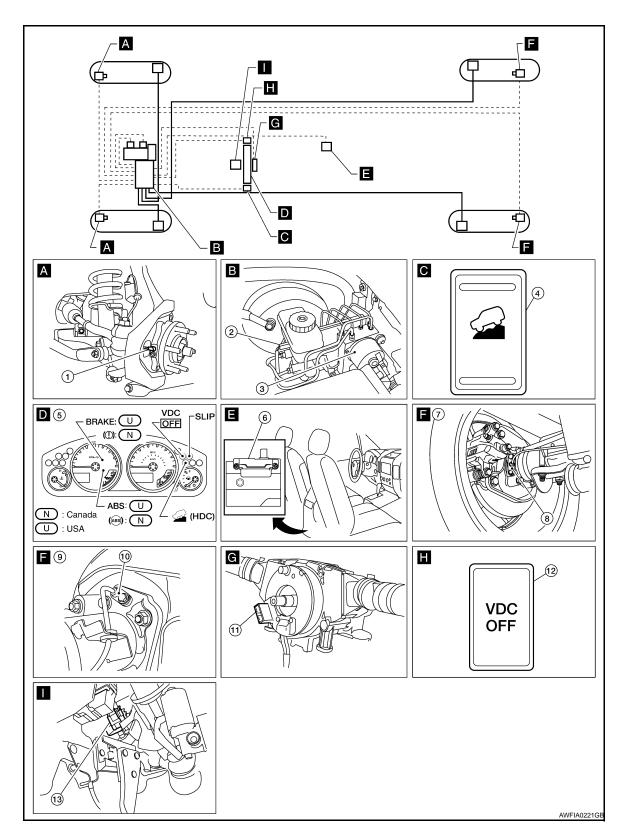
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Component Parts Location



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11
 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

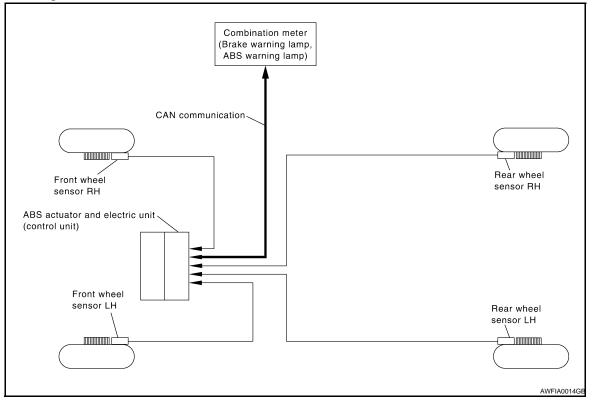
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- Steering angle sensor (behind spiral ca- 12. VDC OFF switch M154 ble) M47
 (Steering wheel removed for clarity)
- 13. Stop lamp switch E12

Component Description

Component parts		Reference
	Pump Motor	BRC-201, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
Abo actuator and electric unit (control unit)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch		BRC-221, "Description"
Steering angle sensor		BRC-221, "Description"
Stop lamp switch		BRC-209, "Description"
VDC OFF switch		BRC-237, "Description"
Hill descent control switch		BRC-235, "Description"
ABS warning lamp		BRC-239, "Description"
Brake warning lamp		BRC-240, "Description"
VDC OFF indicator lamp		BRC-241, "Description"
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

EBD

System Diagram



System Description

INFOID:0000000003247870

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

• Electrical system diagnosis by CONSULT-III is available.

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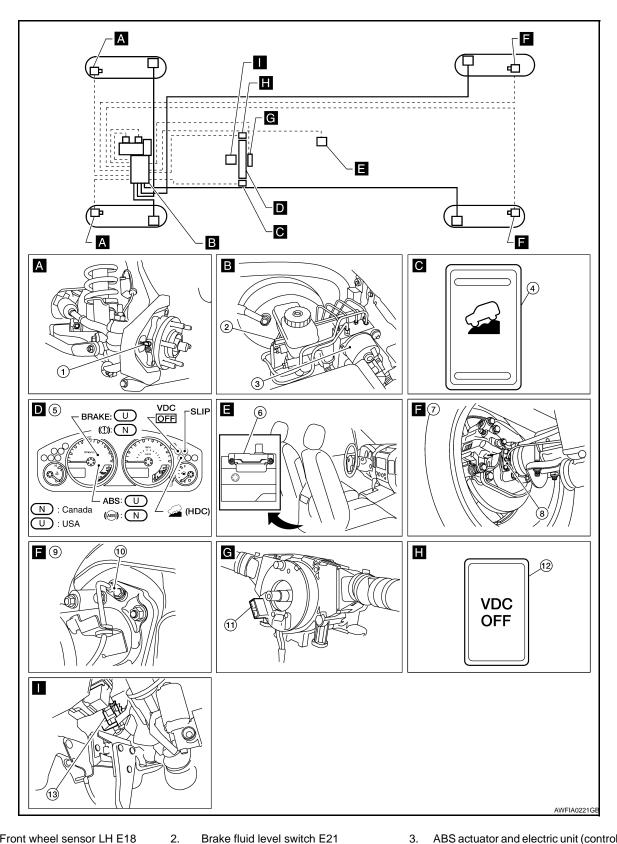
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Component Parts Location



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 3. ABS actuator and electric unit (control unit) E125
- Yaw rate/side/decel G sensor B73 6.
- M226 rear axle

< FUNCTION DIAGNOSIS > [TYPE 3]

Rear wheel sensor LH C11
 Rear wheel sensor RH C10

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

13. Stop lamp switch E12

Component Description

INFOID:0000000003292891

Component parts		Reference
	Pump	BRC-201, "Description"
	Motor	BRC-201, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
The dotation and dissille and (some and)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch		BRC-221, "Description"
Steering angle sensor		BRC-221, "Description"
Stop lamp switch		BRC-209, "Description"
VDC OFF switch		BRC-237, "Description"
Hill descent control switch		BRC-235, "Description"
ABS warning lamp		BRC-239, "Description"
Brake warning lamp		BRC-240, "Description"
VDC OFF indicator lamp		BRC-241, "Description"
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

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HILL DESCENT CONTROL

System Description

The hill descent control system will help maintain vehicle speed when driving under 25-35 km/h (15-21 MPH)

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

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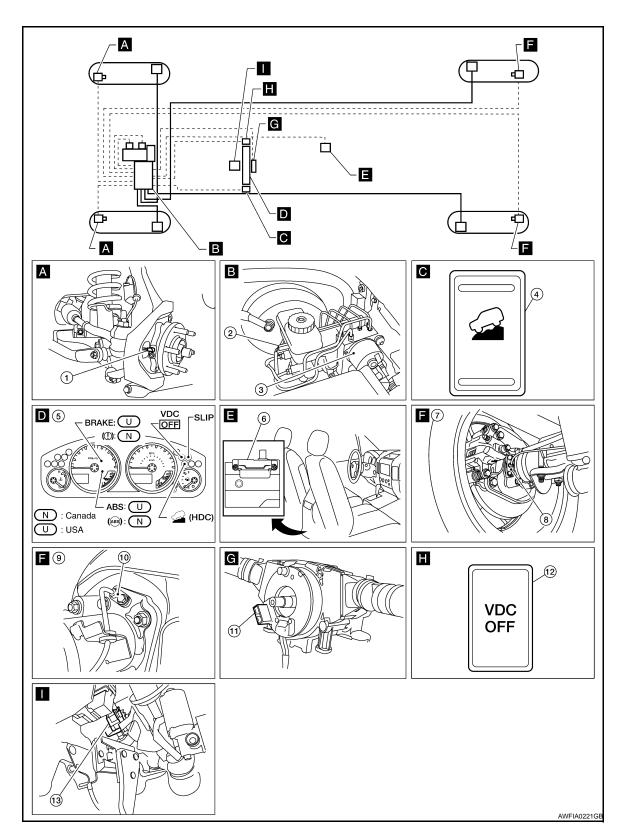
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Component Parts Location

INFOID:0000000003292892



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- ABS actuator and electric unit (control unit) E125
- 6. Yaw rate/side/decel G sensor B73
- 9. M226 rear axle

BRC-181

< FUNCTION DIAGNOSIS >

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

13. Stop lamp switch E12

Component Description

INFOID:0000000003292893

Compo	nent parts	Reference
	Pump Motor	BRC-201, "Description"
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
Abo actuator and electric unit (control unit)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch	BRC-221, "Description"	
Steering angle sensor	BRC-221, "Description"	
Stop lamp switch	BRC-209, "Description"	
VDC OFF switch	BRC-237, "Description"	
Hill descent control switch		BRC-235, "Description"
ABS warning lamp		BRC-239, "Description"
Brake warning lamp	BRC-240, "Description"	
VDC OFF indicator lamp	BRC-241, "Description"	
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

HILL START ASSIST

System Description

INFOID:0000000003248437

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

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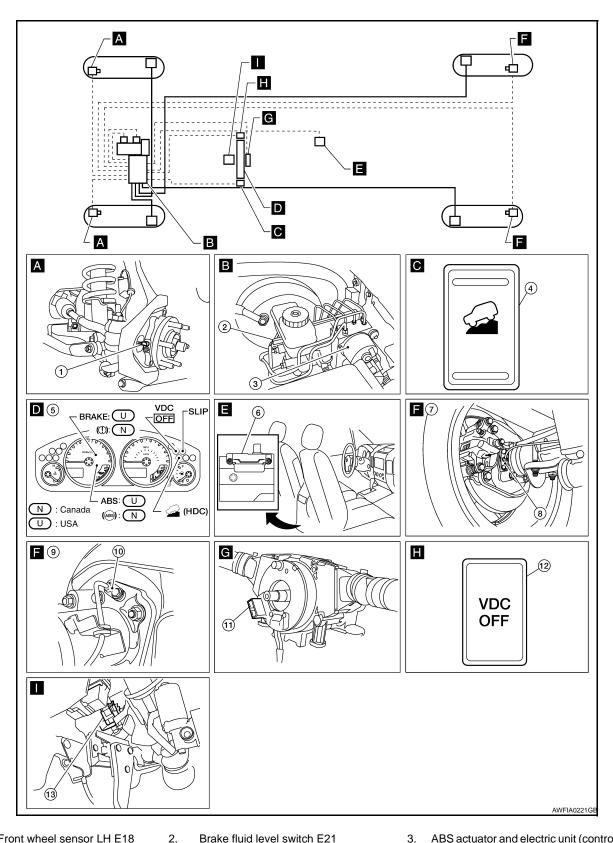
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Component Parts Location

INFOID:0000000003292894



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

- Brake fluid level switch E21
- Combination meter M24
- Rear wheel sensor LH C11 Rear wheel sensor RH C10
- 3. ABS actuator and electric unit (control unit) E125
- Yaw rate/side/decel G sensor B73 6.
 - M226 rear axle

HILL START ASSIST

< FUNCTION DIAGNOSIS >

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

(Steering wheel removed for clarity)

13. Stop lamp switch E12

Component Description

INFOID:0000000003292895

[TYPE 3]

Component parts		Reference
	Pump	BRC-201, "Description"
	Motor	BRC-201, Description
ABS actuator and electric unit (control unit)	Actuator relay	BRC-219, "Description"
The dotation and dissille and (some and)	Solenoid valve	BRC-211, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-230, "Description"
Wheel sensor		BRC-206, "Description"
Yaw rate/side/decel G sensor		BRC-203, "Description"
Brake fluid level switch	BRC-221, "Description"	
Steering angle sensor	BRC-221, "Description"	
Stop lamp switch	BRC-209, "Description"	
VDC OFF switch	BRC-237, "Description"	
Hill descent control switch		BRC-235, "Description"
ABS warning lamp	BRC-239, "Description"	
Brake warning lamp	BRC-240, "Description"	
VDC OFF indicator lamp	BRC-241, "Description"	
SLIP indicator lamp		BRC-242, "Description"
Hill descent control indicator lamp		BRC-243, "Description"

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< FUNCTION DIAGNOSIS >

[TYPE 3]

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

CONSULT-III Function (ABS)

INFOID:0000000003247871

FUNCTION

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

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

SELF-DIAG RESULTS MODE

Operation Procedure

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

How to Erase Self-diagnosis Results

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

CAUTION:

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

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

Display Item List

Refer to BRC-256, "DTC No. Index".

DATA MONITOR MODE

Display Item List

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

[TYPE 3] < FUNCTION DIAGNOSIS >

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

< FUNCTION DIAGNOSIS >

TYPE 31

Item	Data	a monitor item sel		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
CV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (cut valve) (ON/OFF) status displayed.
CV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (cut-valve) (ON/OFF) status displayed.
SV1 (ON/OFF)	-	-	×	Front side switch-over solenoid valve (suction valve) (ON/OFF) st tus is displayed.
SV2 (ON/OFF)	-	-	×	Rear side switch-over solenoid valve (suction valve) (ON/OFF) st tus is displayed.
VDC FAIL SIG (ON/OFF)	-	-	×	VDC fail signal (ON/OFF) status i displayed.
TCS FAIL SIG (ON/OFF)	_	_	×	TCS fail signal (ON/OFF) status is displayed.
ABS FAIL SIG (ON/OFF)	-	_	×	ABS fail signal (ON/OFF) status is displayed.
EBD FAIL SIG (ON/OFF)	_	-	×	EBD fail signal (ON/OFF) status is displayed.
FLUID LEV SW (ON/OFF)	×	-	×	Brake fluid level switch (ON/OFF) status is displayed.
EBD SIGNAL (ON/OFF)	-	-	×	EBD operation (ON/OFF) status i 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 i displayed.
EBD WARN LAMP	-	-	×	Brake warning lamp (ON/OFF) st tus is displayed.
SLCT LVR POSI	×	×	×	Shift position judged by PNP switt signal.
R POSI SIG	_	_	×	Shift position judged by PNP swit signal.
2WD/4WD	-	-	×	It recognizes on software whether is 2WD and whether it is in 4WD state.
CRANKING SIG	_	-	×	The input state of the key SW START position signal is displayed
RELEASE SW NO	_	-	×	Release switch signal (ON/OFF) status is displayed. "ON" indicate that the brake pedal is depressed "OFF" is that the brake pedal is I leased.
RELEASE SW NC	-	-	×	Release switch signal (ON/OFF) status is displayed. "OFF" indicat that the brake pedal is depressed on. "ON" is that the brake pedal i released.
OHB FAIL	-	_	×	OHB fail status is displayed.
HBA FAIL	_	_	×	HBA fail status is displayed.

< FUNCTION DIAGNOSIS > [TYPE 3]

Item	Data	a monitor item sele		
(Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	Remarks
OHB SIG	-	-	×	OHB operation (ON/OFF) status is displayed.
HBA SIG	-	_	×	HBA operation (ON/OFF) status is displayed.
PRES CTRL ACC	_	_	×	This item is not used for this mode
PRES FAIL ACC	_	_	×	This item is not used for this model
STP OFF RLY	-	_	×	Stop lamp relay signal (ON/OFF) status is displayed.

^{×:} Applicable

ACTIVE TEST MODE

CAUTION:

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

NOTE:

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

Test Item

SOLENOID VALVE

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

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

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

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^{-:} Not applicable

< FUNCTION DIAGNOSIS >

[TYPE 3]

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

< COMPONENT DIAGNOSIS >

[TYPE 3]

COMPONENT DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000003248358	

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

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C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description INFOID:000000003247873

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:000000003247874

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
RR RH SENSOR-1
RR LH SENSOR-1
ED DU CENCOD 4
FR RH SENSOR-1
FR LH SENSOR-1
TREFFERENCE

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247875

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-272, "Removal and Installation".

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (M226 rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.

DISCONNECT AWFIA0188ZZ

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuat electric unit (co		Wheel se	nsor	Continuity		
	Connector	Terminal	Connector	Terminal	•		
Frantill		45	F40	1			
Front LH		46	E18	2			
Front RH	-	34	E117	1	Yes		
	F405	33		2			
Rear LH	E125	36	C11	1			
		37		2			
Rear RH		43	040	1	1		
		42	C10	2			

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-274, "Removal and Installation"</u>.

NO >> Repair the circuit.

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Component Inspection

INFOID:0000000003247876

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

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

Special Repair Requirement

INFOID:0000000003247877

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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

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INFOID:0000000003247880

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-195</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

BRC-195

2.check wheel sensor output signal

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-272, "Removal and Installation".

3. CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

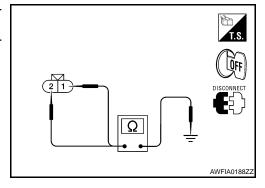
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- 2. Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuato electric unit (co		Wheel ser	nsor	Continuity	_
	Connector	Terminal	Connector	Terminal		
Front LH	4111	45	E18	1		_
FIONI LM		46	E10	2		
Front RH Rear LH	E125	34	E117	1	Yes	
		33		2		
		36		1		
		37		2		
Rear RH		43	C10	1		
		42	CIU	2		

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-195, "Diagnosis Procedure".

Special Repair Requirement

${f 1}$. 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-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

2.calibration of decel ${\sf g}$ sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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INFOID:0000000003304712

INFOID:0000000003247881

C1109 POWER AND GROUND SYSTEM

Description INFOID:000000003247883

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

DTC Logic

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 BRC-198, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247885

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-186, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

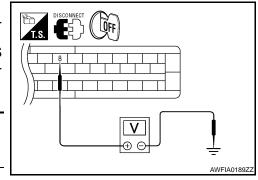
YES >> GO TO 2

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

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

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

ABS actuator and electric unit (control unit)		_	Condition	Voltage
Connector	Terminal			
F125	8	Ground	Ignition switch: ON	Battery voltage
E125 6 G		Giodila	Ignition switch: OFF	Approx. 0V



4. Turn ignition switch OFF.

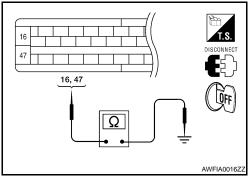
C1109 POWER AND GROUND SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 3]

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

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



Is the inspection result normal?

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

Special Repair Requirement

INFOID:0000000003304713

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-163, "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 BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

< COMPONENT DIAGNOSIS >

[TYPE 3]

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

DTC Logic

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.	(Control drift)

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 BRC-200, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247888

INSPECTION PROCEDURE

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

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

Special Repair Requirement

INFOID:0000000003304714

${f 1}$.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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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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
OIIII	TOWN WOTON	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)

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DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-201, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247892

INSPECTION PROCEDURE

1. CHECK CONNECTOR

1. Turn ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Check terminal for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-186, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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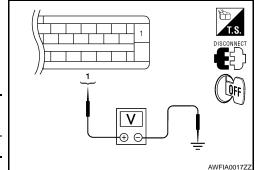
C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< COMPONENT DIAGNOSIS >

SIS > [TYPE 3]

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

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.check abs actuator and electric unit (control unit) ground circuit

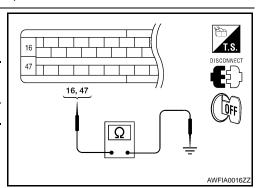
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003247893

Component Inspection

1. CHECK ACTIVE TEST

- 1. On "ACTIVE TEST", select "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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-201, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304715

${f 1}$.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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

< COMPONENT DIAGNOSIS >

[TYPE 3]

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

Description INFOID:000000003247895

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-203, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

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

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

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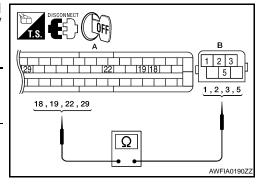
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Check continuity between the ABS actuator and electric unit (control unit) connector E125 (A) terminals 18, 19, 22, 29 and the yaw rate/ side/decel G sensor connector B73 (B) terminals 2, 1, 3, 5.

	and electric unit ol unit)	Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector Terminal		
	18		2	
E125 (A)	19	B73 (B)	1	Yes
L 125 (A)	22	B73 (B)	3	165
	29		5	



[TYPE 3]

Is the inspection result normal?

< COMPONENT DIAGNOSIS >

YES >> GO TO 3

NO >> Repair or replace as necessary.

3.YAW RATE/SIDE/DECEL G SENSOR INSPECTION

- Connect the yaw rate/side/decel G sensor connector M108 and ABS actuator and electric unit (control unit) connector E125.
- Use "DATA MONITOR" to check if the yaw rate/side/decel G sensor signals are normal.

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

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-277, "Removal and Installation".

Component Inspection

INFOID:0000000003247898

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

Is the inspection result normal?

YES >> INSPECTION END

>> Go to diagnosis procedure. Refer to BRC-203, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304716

 ${f 1}$.adjustment of steering angle sensor neutral position

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

< COMPONENT DIAGNOSIS >

[TYPE 3]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

В

>> 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-164, "CALIBRATION OF DECEL G SENSOR: Description".

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C1115 WHEEL SENSOR

Description INFOID:000000003247900

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-206</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247902

CAUTION:

Do not check between wheel sensor terminals.

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

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

NOTE:

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

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to <u>BRC-272</u>, "Removal and Installation".

3.CHECK TIRES

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

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

YES >> GO TO 4

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

4. CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to <u>FAX-5</u>, "On-Vehicle Inspection and Service" (front), <u>RAX-7</u>, "Rear Axle Bearing" (C200 rear), or <u>RAX-19</u>, "Rear Axle Bearing" (M226 rear).

Is the inspection result normal?

YES >> GO TO 5

NO >> Repair or replace as necessary. Refer to <u>FAX-8</u>, "<u>Removal and Installation</u>" (front), <u>RAX-13</u>, "<u>Removal and Installation</u>" (C200 rear), or <u>RAX-24</u>, "<u>Removal and Installation</u>" (M226 rear).

5. CHECK WIRING HARNESS FOR SHORT CIRCUIT

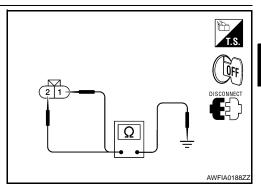
- 1. Disconnect ABS actuator and electric unit (control unit) connector and wheel sensor connector of malfunction code No.
- Check continuity between wheel sensor harness connector terminals and ground.

Continuity should not exist.

Is the inspection result normal?

YES >> GO TO 6

NO >> Repair the circuit.



6. CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuato electric unit (cor		Wheel sen	sor	Continuity
	Connector	Terminal	Connector	Terminal	
Front LH		45	E18	1	
FIORILE		46	E 10	2	
Front RH	E125	34	E117	1	Yes
1 TOTAL TATE		33		2	
Rear LH	E125	36	C11	1	
		37	OH	2	
Rear RH		43	C10	1	
iveal ivii		42	010	2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to <u>BRC-274</u>, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

1. CHECK DATA MONITOR

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

Wheel sensor	Vehicle speed (DATA MONITOR)
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< COMPONENT DIAGNOSIS >

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 BRC-206, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304717

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-163</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

C1116 STOP LAMP SWITCH

Description INFOID:000000003247905

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

DTC Logic

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-209</u>. "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace as necessary.

$2.\mathsf{stop}$ LAMP SWITCH INSPECTION

Connect the stop lamp switch harness connector.

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

Brake pedal depressed : Battery voltage

(approx. 12V)

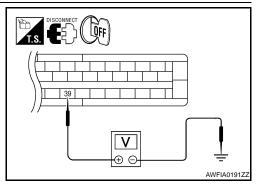
Brake pedal not depressed : Approx. 0V

Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> GO TO 3

 $3.\mathsf{stop}$ Lamp switch circuit inspection



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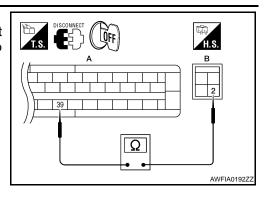
- 1. Disconnect the stop lamp switch harness connector.
- Check the continuity between the ABS actuator and electric unit (control unit) harness connector E125 (A) terminal 39 and stop lamp switch harness connector E38 (B) terminal 2.

Continuity should exist.

Is the inspection result normal?

YES >> Refer to <u>BRC-159</u>, "Work Flow".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003304718

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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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 BRC-211, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- 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-186, "CONSULT-III Function</u> (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

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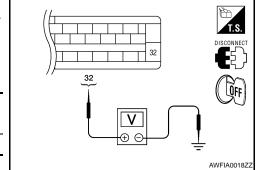
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< COMPONENT DIAGNOSIS >

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

ABS actuator and ele	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.

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

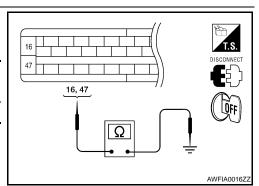
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

ABS actuator and ele	BS actuator and electric unit (control unit)			
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-274</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.



INFOID:0000000003247912

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.

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

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

Is the inspection result normal?

YES >> INSPECTION END

C1120, C1122, C1124, C1126 IN ABS SOL

COMPONENT DIAGNOSIS > [TYPE 3]
NO >> Go to diagnosis procedure. Refer to BRC-211, "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 BRC-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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C1121, C1123, C1125, C1127 OUT ABS SOL

Description INFOID:000000003247914

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

DTC Logic

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-214, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247916

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- 1. Turn ignition switch OFF.
- Disconnect ABS actuator and electric unit (control unit) connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

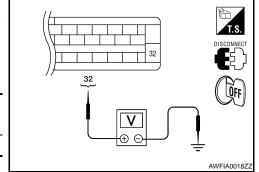
C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

[TYPE 3]

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

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



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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

ABS actuator and ele	actuator and electric unit (control unit)			
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-274</u>, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

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Component Inspection

1. CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> INSPECTION END

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C1121, C1123, C1125, C1127 OUT ABS SOL

< COMPONENT DIAGNOSIS >

[TYPE 3]

NO >> Go to diagnosis procedure. Refer to BRC-214, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304720

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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

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C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description INFOID:0000000003247919

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

DTC Logic

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		unit (control unit) judges that engine fuel cut system is (control unit)	(control unit)
C1133	ENGINE SIGNAL 4		ECM CAN communication line	
C1136	ENGINE SIGNAL 6		5 55s/iioddoff iiiio	

DTC CONFIRMATION PROCEDURE

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 BRC-217, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247921

INFOID:0000000003304721

INSPECTION PROCEDURE

1. CHECK ENGINE SYSTEM

- 1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-63, "CONSULT-III Function (ENGINE)" (Qr25DE) or EC-512, "CONSULT-III Function (ENGINE)" (VQ40DE).
- Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186</u>. "CONSULT-III <u>Function (ABS)"</u>.

Is any item indicated on the self-diagnosis display?

YES >> Repair or replace the affected part.

NO >> INSPECTION END

Special Repair Requirement

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

< COMPONENT DIAGNOSIS >

[TYPE 3]

$2. \hbox{\footnotesize calibration of decel g sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-219</u>, "<u>Diagnosis Procedure</u>".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 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 BRC-186, "CONSULT-III Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

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

Turn ignition switch OFF.

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

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

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Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

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

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< COMPONENT DIAGNOSIS >

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

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Repair or replace malfunctioning components.

16, 47 16, 47 AWFIA0016ZZ

INFOID:000000000324792

Component Inspection

1. CHECK ACTIVE TEST

- 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 BRC-219, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304722

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-163</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

2.calibration of decel g sensor

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

C1143, C1144 STEERING ANGLE SENSOR

Description INFOID:000000003247928

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

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.	Steering angle sensor
C1144	ST ANG SEN SIGNAL	Neutral position of steering angle sensor is not finished.	4WAS control unit (4WAS models) ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-221, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247930

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) connector.
- 3. Disconnect steering angle sensor connector.
- Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 5. Reconnect connectors and then perform the self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (ABS)"</u>

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2

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

2 .CHECK STEERING ANGLE SENSOR HARNESS

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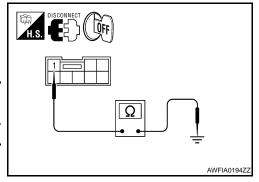
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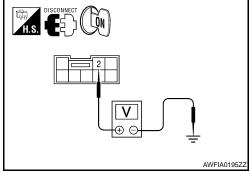
- 1. Turn ignition switch OFF.
- Disconnect steering angle sensor connector.
- Check continuity between steering angle sensor harness connector terminal and ground.

Steering angle sensor			Continuity
Connector	Terminal	_	Continuity
M47	1	Ground	Yes



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

Steering angle sensor			Voltage
Connector	Terminal	_	voltage
M47	2	Ground	Battery voltage



Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3. CHECK DATA MONITOR

- 1. Connect the steering angle sensor connector and ABS actuator and electric unit (control unit) connector.
- 2. Select "STR ANGLE SIG" in "DATA MONITOR" and check steering angle sensor signal.

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

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-274</u>, "Removal and Installation".
- NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-276, "Removal and Installation".

Component Inspection

INFOID:0000000003247931

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-221, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000003304723

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

C1143, C1144 STEERING ANGLE SENSOR

< COMPONENT DIAGNOSIS >

[TYPE 3]

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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>> 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-164, "CALIBRATION OF DECEL G SENSOR: Description".

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C1155 BRAKE FLUID LEVEL SWITCH

Description INFOID:000000003247934

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

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 connector Brake fluid level switch Brake 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 BRC-224, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247936

INSPECTION PROCEDURE

1. CONNECTOR INSPECTION

- 1. Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
- 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) harness connector E125 (A) Terminal 28 and brake fluid level switch harness connector E21 (B) terminal 1.

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

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

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

Is the inspection result normal?

C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >

[TYPE 3]

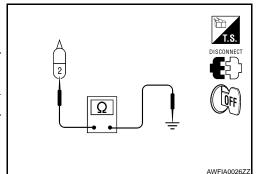
YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

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

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



Is the inspection result normal?

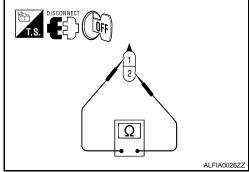
YES >> GO TO 4

NO >> Repair or replace malfunctioning components.

4. CHECK BRAKE FLUID LEVEL SWITCH

Check continuity between brake fluid level switch terminals.

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



Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

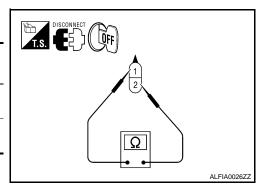
NO >> Replace brake fluid level switch.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity
Terminal	Condition	
1-2	When brake fluid is full in the reservoir tank.	No
1 – 2	When brake fluid is empty in the reservoir tank.	Yes
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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-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

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C1155 BRAKE FLUID LEVEL SWITCH

< COMPONENT DIAGNOSIS >

[TYPE 3]

>> GO TO 2

$2. \hbox{\footnotesize calibration of decel g sensor}$

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

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C1156 ST ANG SEN COM CIR

Description INFOID:0000000003247939

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results	
ST ANG SEN COM CIR	

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-227, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247941

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

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

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

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C1160 DECEL G SEN SET

Description INFOID:000000003247942

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

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 BRC-228, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247944

INSPECTION PROCEDURE

1.PERFORM SELF-DIAGNOSIS

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

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 BRC-164, "CALIBRATION OF DECEL G SENSOR : Description". GO TO 2

2.PERFORM SELF-DIAGNOSIS AGAIN

- 1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results.
- Perform ABS actuator and electric unit (control unit) self-diagnosis again.

Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-277</u>, "Removal and Installation".

NO >> INSPECTION END

C1163 ST ANGLE SEN SAFE

Description INFOID:000000003247945

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

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-229, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INSPECTION PROCEDURE

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to <u>BRC-163</u>, "ADJUSTMENT OF STEERING ANGLE <u>SENSOR NEUTRAL POSITION: Description"</u>.

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

NO

YES >> INSPECTION END

>> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186, "CON-SULT-III Function (ABS)"</u>.

BRC-229

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INFOID:0000000003247947

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description INFOID:000000003247948

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

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 BRC-230, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003247950

INSPECTION PROCEDURE

1. CHECK CONNECTOR

- Turn ignition switch OFF.
- 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-186, "CONSULT-III Function</u> (ABS)".

Is any item indicated on the self-diagnosis display?

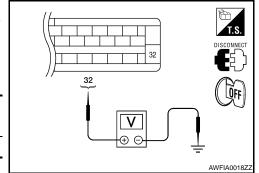
YES >> GO TO 2

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

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

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

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

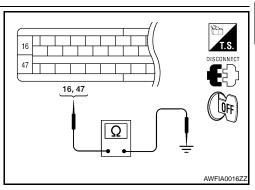
Check continuity between ABS actuator and electric unit (control unit) harness connector terminals and ground.

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

>> Repair or replace malfunctioning components. NO



INFOID:0000000003247951

Component Inspection

1. CHECK ACTIVE TEST

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

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

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

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C1164, C1165, C1166, C1167 CV/SV SYSTEM

< COMPONENT DIAGNOSIS >

[TYPE 3]

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to <u>BRC-230. "Diagnosis Procedure"</u>.

Special Repair Requirement

INFOID:0000000003304725

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-163</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

C1187 DIFFERENTIAL LOCK CONTROL UNIT

< COMPONENT DIAGNOSIS >

[TYPE 3]

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description INFOID:0000000003248486

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

DTC Logic INFOID:0000000003248487

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

>> Proceed to diagnosis procedure. Refer to BRC-233, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000003248488

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

Self-diagnosis results	
ABS DIFLOCK CONTROLLER NG	

Is above displayed on the self-diagnosis display?

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

NO >> INSPECTION END

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U1000 CAN COMM CIRCUIT

Description INFOID:000000003247954

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
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

INFOID:0000000003247956

INSPECTION PROCEDURE

1. CHECK CONNECTOR

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

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

YES >> Print out the self-diagnostic results, and refer to LAN-14, "Trouble Diagnosis Flow Chart".

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

Special Repair Requirement

INFOID:0000000003304726

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-163, "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-164, "CALIBRATION OF DECEL G SENSOR: Description".

>> END

INFOID:0000000003292883

INFOID:0000000003292884

HILL DESCENT CONTROL SWITCH

Description INFOID:0000000003292882

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

Component Function Check

1. CHECK HILL DESCENT CONTROL SWITCH OPERATION

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

Condition	Hill descent control indicator lamp illumination status
Hill descent control switch: ON	ON
Hill descent control switch: OFF	OFF

Is the inspection result normal?

YES >> INSPECTION END

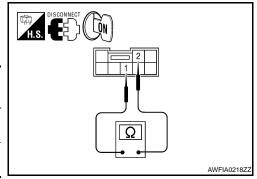
>> Go to diagnosis procedure. Refer to BRC-235, "Diagnosis Procedure". NO

Diagnosis Procedure

1. CHECK HILL DESCENT CONTROL SWITCH

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

Hill descent control switch	Condition	Continuity
Terminal	Condition	
1 – 2	When hill descent control switch is pressed.	Yes
1-2	When hill descent control switch is released.	No



Is the inspection result normal?

YES >> GO TO 2

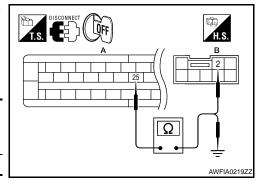
NO >> Replace hill descent control switch.

2.check hill descent control switch harness

- Disconnect ABS actuator and electric unit (control unit) connec-
- 2. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 25 and hill descent control switch connector M155 (B) terminal 2.

	and electric unit ol unit)	Hill descent	control switch	Continuity
Connector	Terminal	Connector	Terminal	
E125 (A)	25	M155 (B)	2	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E125 (A) terminal 25 and ground.



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INFOID:0000000003292885

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal	_	Continuity
E125 (A)	25	Ground	No

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace harness.

3.check hill descent control switch ground

Check continuity between hill descent control switch connector M155 terminal 1 and ground.

Hill descent control switch		_	Continuity
Connector	Terminal		Continuity
M155	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4. CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-274, "Removal and Installation".</u>

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

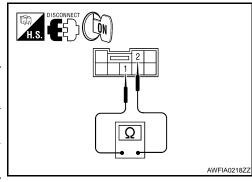
Component Inspection

INSPECTION PROCEDURE

1. CHECK HILL DESCENT CONTROL SWITCH

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

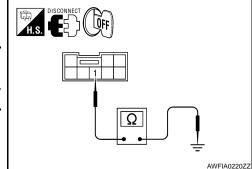
Hill descent control switch	Condition	Continuity
Terminal	Condition	Continuity
1-2	When hill descent control switch is pressed.	Yes
	When hill descent control switch is released.	No



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace hill descent control switch.



INFOID:0000000003247959

INFOID:0000000003247960

VDC OFF SWITCH

Description INFOID:000000003247958

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

Component Function Check

1. CHECK VDC OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> INSPECTION END

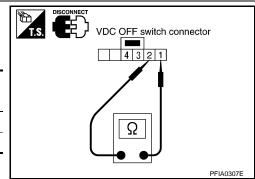
NO >> Go to diagnosis procedure. Refer to BRC-237, "Diagnosis Procedure".

Diagnosis Procedure

1. CHECK VDC OFF SWITCH

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

VDC OFF switch	Condition	Continuity
Terminal	Condition	Continuity
1 – 2	When VDC OFF switch is pressed.	Yes
1 – 2	When VDC OFF switch is released.	No
	12	



Is the inspection result normal?

YES >> GO TO 2

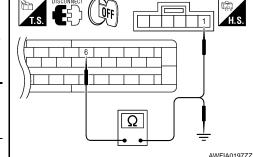
NO >> Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

- 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 OFF 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 electric unit (control unit)		_	Continuity
Connector	Terminal		Continuity
E125 (A)	6	Ground	No

Is the inspection result normal?

YES >> GO TO 3

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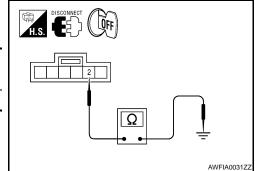
< COMPONENT DIAGNOSIS >

NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 and ground.

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



Is the inspection result normal?

YES >> GO TO 4

NO >> Repair or replace harness.

4. CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

Component Inspection

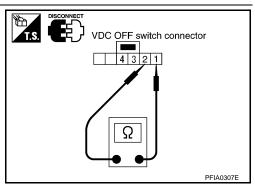
INFOID:0000000003247961

INSPECTION PROCEDURE

1. CHECK VDC OFF SWITCH

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

VDC OFF switch	Condition	Continuity
Terminal	- Condition Continu	
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.

ABS WARNING LAMP

Description INFOID:000000003247962

×: ON –: OFF

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Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ON ignition switch	×
1 second later after turning ON ignition switch	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×

Component Function Check

INFOID:0000000003247963

1. CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-239. "Diagnosis Procedure".

INFOID:0000000003247964

Diagnosis Procedure

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-274, "Removal and Installation"</u>.

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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BRAKE WARNING LAMP

Description INFOID:000000003247965

×: ON -: OFF

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

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
- · 2: After starting engine, brake warning lamp is turned off.

Component Function Check

INFOID:0000000003247966

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-240, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003247967

1. CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

VDC OFF INDICATOR LAMP

Description INFOID:000000003247968

×: ON –: OFF

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

Component Function Check

INFOID:0000000003247969

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Go to diagnosis procedure. Refer to BRC-241, "Diagnosis Procedure".

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-237</u>, "<u>Diagnosis Procedure</u>".

Diagnosis Procedure

INFOID:0000000003247970

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 BRC-237, "Diagnosis Procedure".

2. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (ABS)"</u>.

Is the inspection result normal?

YES >> GO TO 3

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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SLIP INDICATOR LAMP

Description

 \times : ON -: OFF

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

Component Function Check

INFOID:0000000003247972

1. CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-242, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003247973

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-274</u>, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

HILL DESCENT CONTROL INDICATOR LAMP

Description

×: ON –: OFF

Condition	Hill descent control indicator lamp	
Ignition switch OFF	-	
For 1 second after turning ON ignition switch	×	
1 second later after turning ON ignition switch	-	
Hill descent control function is malfunctioning.	-	

Component Function Check

INFOID:0000000003292701

1. CHECK HILL DESCENT CONTROL INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> Go to diagnosis procedure. Refer to BRC-243, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000003292702

1. CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to <u>BRC-186, "CONSULT-III Function (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 MWI-23, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation".

NO >> Replace combination meter. Refer to MWI-91, "Removal and Installation".

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APPLICATION NOTICE

< ECU DIAGNOSIS > [TYPE 3]

ECU DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000003248360

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

[TYPE 3] < ECU DIAGNOSIS >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value INFOID:0000000003247975

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

SIDE G-SENSOR

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

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
		0 [km/h (MPH)]	Vehicle stopped	
R LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
R RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
R LH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
		0 [km/h (MPH)]	Vehicle stopped	
R RH SENSOR	Wheel speed	Nearly matches the speed meter display (± 10% or less)	Vehicle running (Note 1)	
TOD LAMB CW/	Cton lower quitab airmal atatus	When brake pedal is depressed	ON	
TOP LAMP SW	Stop lamp switch signal status	When brake pedal is released	OFF	
ATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
EAR	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	
NEE SW	VDC OFF quitch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	ON	
OFF SW VDC OFF switch ON/OFF	VDC OFF SWILCH ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	OFF	
AW RATE SEN	Yaw rate detected by yaw rate/side/decel G	When vehicle is stopped	Approx. 0 d/s	
AVV KALE SEN	sensor	When vehicle turning	-75 to 75 d/s	
CCEL BOS SIC	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	
			• •	

RC

Α

В

Negative value

(m/s²)Positive value

(m/s²)

Transverse G detected by side G sensor

Vehicle turning right

Vehicle turning left

< ECU DIAGNOSIS > [TYPE 3]

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
STR ANGLE SIG	Steering angle detected by steering angle	Straight-ahead	Approx. 0°	
STR ANGLE SIG	sensor	Steering wheel turned	–720 to 720°	
		With engine stopped	0 rpm	
ENGINE SPEED	With engine running	Engine running	Almost in accordance with tachometer display	
ELLID LEV CW	Drake fluid level evitely signed status	When brake fluid level switch ON	ON	
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch OFF	OFF	
FR RH IN SOL	Operation status of each calencid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) 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	
FR RH OUT SOL	Operation status of each calenaid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
TRRITOUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
FR LH IN SOL Op	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) 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	
ED LILOUT COL	Operation status of each calencid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) 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		
DD DLLIN COL	Operation status of each calencid value	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
RR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
M KH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
NN LII IIV SUL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS > [TYPE 3]

		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC-TIVE TEST" with CONSULT-III) or actuator relay is inactive (in fail-safe mode)	ON	
WEITOUT GOL	Operation status of each solehold valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	OFF	
MOTOR RELAY	Motor and motor relay operation	When the motor relay and motor are operating	ON	
WOTOK KELKI	Motor and motor relay operation	When the motor relay and motor are not operating	OFF	
ACTUATOR RLY	ABS warning lamp	When the actuator relay is operating	ON	
CTOATOR REI	Actuator relay operation	When the actuator relay is not operating	OFF	
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	ON	
NDO WAININ LAIVIP	(Note 2)	When ABS warning lamp is OFF	OFF	
OFF LAMP	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	ON	
JI F LAWIF	(Note 2)	When VDC OFF indicator lamp is OFF	OFF	
SLIP LAMP	SLIP indicator lamp	When SLIP indicator lamp is ON	ON	
DLIF LAIVIF	(Note 2)	When SLIP indicator lamp is OFF	OFF	
WD FAIL REQ	Transfer control unit fail-safe signal	When transfer control unit is in fail-safe mode	ON	
		When transfer control unit is normal	OFF	
EBD SIGNAL EBD operation	EBD is active	ON		
	EBD is inactive	OFF		
ABS SIGNAL	ABS operation	ABS is active	ON	
IDS SIGNAL	ABS operation	ABS is inactive	OFF	
CS SIGNAL	TCS operation	TCS is active	ON	
C3 SIGNAL	103 operation	TCS is inactive	OFF	
DC SIGNAL	VDC operation	VDC is active	ON	
DC SIGNAL	VDC operation	VDC is inactive	OFF	
BD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	ON	
.DD I AIL OIG	ומון שם iaii-saie signai	EBD is normal	OFF	
BS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	ON	
LO I AIL OIG	, 150 Idii 3dio Signal	ABS is normal	OFF	
CS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	ON	
	100 Idii dalo digridi	TCS is normal	OFF	
DC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	ON	
DO I AIL OIG	V 20 Idii dale digital	VDC is normal	OFF	
RANKING SIG	Crank operation	Crank is active	ON	
A CHAIRING OIG	Grank operation	Crank is inactive	OFF	
CV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

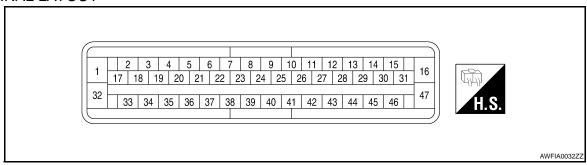
< ECU DIAGNOSIS > [TYPE 3]

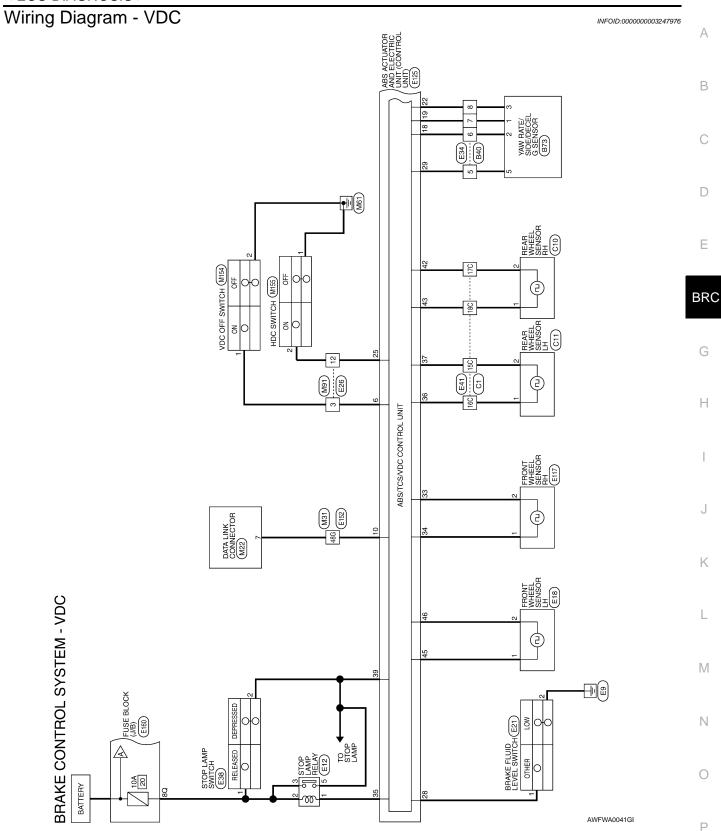
		Data monitor		
Monitor item	Display content	Condition	Reference value in normal operation	
CV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
SV1	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
SV2	VDC switch-over valve	When actuator (switch-over valve) is active ("ACTIVE TEST" with CONSULT-III) or actuator relay is inactive (when in fail-safe mode)	ON	
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	OFF	
DECEL G-SEN	Longitudinal acceleration detected by Decel	Vehicle stopped	Approx. 0 G	
DECEL G-SEN	G-Sensor	Vehicle running	-1.7 to 1.7 G	
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	ON	
LDD WAINI LAWF	(Note 3)	When EBD warning lamp is OFF	OFF	
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	ON	
111 001 010	1 W Switch signal City Ci 1 Condition	A/T shift position = other than N position	OFF	
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	ON	
1 1 001 010		A/T shift position = other than P position	OFF	
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	ON	
		A/T shift position = other than R position	OFF	
2WD/4WD	Drive axle	2WD model	2WD	
	Sitte date	4WD model	4WD	

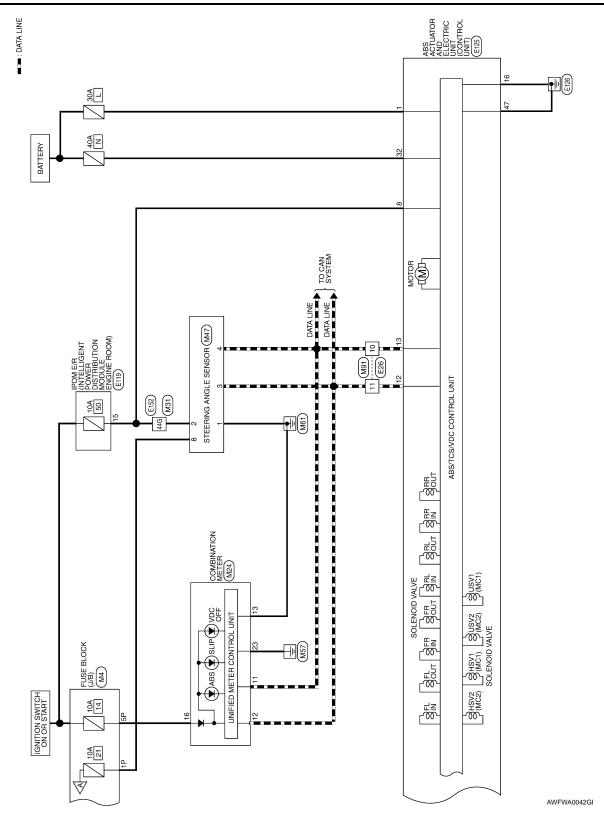
NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-239, "Description".
- Brake warning lamp: Refer to BRC-240, "Description".
- VDC OFF indicator lamp: Refer to BRC-241, "Description".
- SLIP indicator lamp: Refer to BRC-242, "Description".

TERMINAL LAYOUT







BRAKE CONTROL SYSTEM CONNECTORS - VDC

M22	Connector Name DATA LINK CONNECTOR	WHITE	
Connector No. M22	Connector Name	Connector Color WHITE	
	Connector Name FUSE BLOCK (J/B)	Connector Color WHITE	

Connector Name COMBINATION METER Connector Color WHITE

M24

Connector No.

nector No.	M4
nector Name	nector Name FUSE BLOCK (J/B)
nector Color WHITE	WHITE
7P 6P 15P 15P 15P 15P 15P 15P 15P 15P 15P 15	6P 5P 4P 3P 2P 1P 6P 5P 4P 4P 4P 4P 4P 4P

Signal Name	-	_	
Color of Wire	B/B	W/G	
Terminal No.	1P	5P	

Signal Name

Color of Wire

Terminal No.

≥

		7							
-	21	1							
2	23 22								
3	23		_ n				┙	lœ	
4	24		Ĕ	١.	_	᠒	æ	Щ	
S	25 24		a	ロ	-	목	ΤA	≶	
9	26		Signal Name	CAN	CAN_H	GROUND	RUN START	GND (POWER)	
7	27		Ë	l G	lO.	띴	Ξ.		
œ	28 27		Š			١٩	R	١Ξ	
თ	29							اص	
9	30 29								
Ξ	31								
42	32		اه خ				(B		
33	33		Color of Wire	₾		GR	W/G	<u>m</u>	
14	34		၂၉ > ၂				>		
5	35								
16	36 35 34 33 32 31		ž						
7	37		<u>8</u>	_	١.,	ا س ا	<i>~</i>	_	
8	38 37		<u>:</u>	Ε.	12	13	16	23	
20 19 18 17 16 15 14 13 12 11 10 9	39		Terminal No.						
20	40		<u>1</u>						

Signal Name	CAN_L	CAN_H	GROUND	RUN START	GND (POWER)	
Color of Wire	Ь	_	GR	M/G	В	
Terminal No. Wire	11	12	13	16	23	

Connector No.	M47
Connector Name	Connector Name STEERING ANGLE SENSOR
Connector Color WHITE	WHITE

Signal Name

Color of Wire

Terminal No.

Connector Name | WIRE TO WIRE

M31

Connector No.

Connector Color WHITE

W/R ≥

44G 48G

Connector Name STEERING ANGLE SENS	ш_		Signal Name	GND	POWER	CAN-H	CAN-L	BATT
me STE	I MAI I	8 8	Color of Wire	В	W/R	Γ	Ь	В
Connector Na	Connector Color	H.S.	Terminal No.	-	2	3	7	80
	_							

_ _ _	2	Signal N	GNE	POWE	CAN-	CAN	BAT	
2	∞ c	Color of Wire	В	W/R	_	Ь	В	
	师 H.S.	Terminal No.	1	2	3	4	8	

BRC

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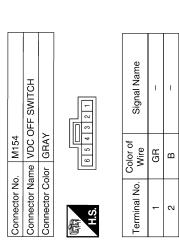
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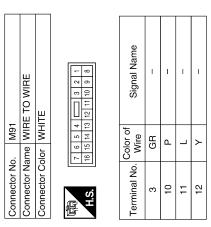
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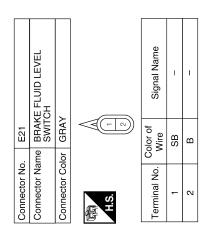
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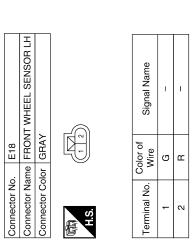
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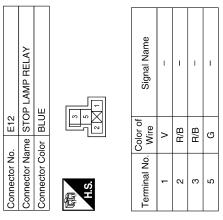
Connector No.	. M155	
Connector Name HDC SWITCH	me HDC	SWITCH
Connector Color WHITE	lor WHITI	Ш
原 H.S.	8 9 1	
Terminal No.	Color of Wire	Signal Name
1	В	I
0	λ	1











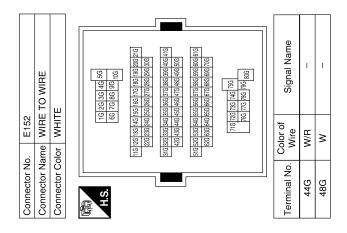
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< ECU DIAGNOSIS > [TYPE 3]

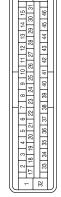
2000000	901			2	7						9		
Connector Name WIRE TO WIRE	MIRF 1	TO WIBE		Connector Name WIRF TO WIRE	lame WIRI	F TO WIRE			Connector Name	- 1	E38 STOP I AMP SWITCH	HOLLWO	_
Connector Color WHITE	WHITE) !		Connector Color WHITE	color WHI				Connector Color		WHITE		
			1	£		 			£	ַ 			1
ν <u>;</u>	8 9 10 11 1	2 3 6 7 6 7 7 8 8 9 9 9 10 11 12 13 14 15 16		H.S.	8 7 6	3 2 1			H.S.		& L 4 \(\rangle\)		
Terminal No.	Color of	Signal Name		Terminal No.	Color of	Signa	Signal Name		Terminal No.	Color of		Signal Name	
n	GR	1		5	BB				-	B/B		1	
	۵	ı		9	0				2	>		1	
11	_	1		7	Μ	I							1
12	>	1		8	>	1							
Connector No.	E41			Connector No.	lo. E117				Connector No.		E119		_
Connector Name WIRE TO WIRE	e WIRE T	ro wire		Connector Name		JT WHEEL	SENSOR RH				OM E/R (IN	ITELLIGENT	
Connector Color	r BLACK			Connector Color	-				Connector Name		WER DIST DDULE EN	POWER DISTRIBUTION MODULE ENGINE ROOM)	
4				E	Ľ				Connector Color	_	WHITE		\Box
ري. من	20 110			H.S.		5				9 8 7	9 8 7 6 6 3 5 4 3	14 3	
 				- City	0	2			H.S.	2	2	2	
<u> </u>	5C 14C 22C 28C 6C 15C 23C 23C	35C 44C 36C 45C		l erminal No.	Wire	Signal	Signal Name		Terminal No.	Color of Wire		Signal Name	
<u> </u>				2	>				15	W/R		ABS IGN SUPPLY	
	olor of												
Terminal No.	Wire	Signal Name											
15C	۵	ı											
16C	_	1											
17C	>	I											
18C	LG	1											
0		L	K	J	I	Н	G	BR	E	D	С	В	А
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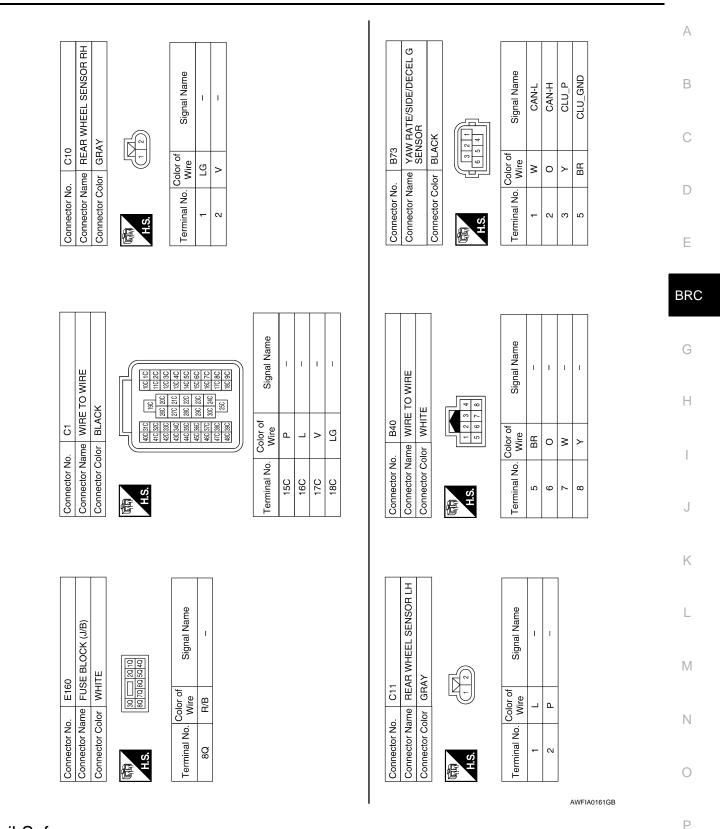


or of Signal Name	1	1	HDC_SW	1	1	R FLUID_LEVEL_SW	R CLUS_GND	1		VALVE ECU SUPPLY	/ FR_RH_SIG	FR_RH_PWR	STOP_LAMP_SW_ON	. RR_LH_PWR	PR_LH_SIG	1	B STOP_LAMP_SW	-	1	, RR_RH_SIG	3 RR_RH_PWR	_	FR_LH_PWR	FR_LH_SIG	
Color of Wire		<u>'</u>	>	1	'	GR	BR	1		>	>	m m	>	٦	Д	1	SB	1		>	LG	1	g	ш	
Terminal No.	23	24	25	26	27	28	59	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	



AWFIA0160GB

< ECU DIAGNOSIS > [TYPE 3]



Fail-Safe

CAUTION:

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

ABS/EBD SYSTEM

INFOID:0000000003247977

< ECU DIAGNOSIS > [TYPE 3]

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

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

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

HILL DESCENT CONTROL/HILL START ASSIST SYSTEM

In case of hill descent control system malfunction, the hill descent control indicator lamp will remain off even though the hill descent control switch is operated and the condition of the vehicle is the same as the condition of vehicles without hill descent control system.

In case of hill start assist system malfunction, the VDC OFF and SLIP indicator lamps are turned on and the condition of the vehicle is the same as the condition of vehicles without hill start assist system.

VDC/TCS SYSTEM

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

DTC No. Index

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	PPC 102 "Description"
C1103	FR RH SENSOR-1	BRC-192, "Description"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PDC 105 "Description"
C1107	FR RH SENSOR-2	BRC-195, "Description"
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-198, "Description"
C1110	CONTROLLER FAILURE	BRC-200, "DTC Logic"
C1111	PUMP MOTOR	BRC-201, "Description"
C1113	G-SENSOR	BRC-203, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-206, "Description"
C1116	STOP LAMP SW	BRC-209, "Description"
C1120	FR LH IN ABS SOL	BRC-211, "Description"
C1121	FR LH OUT ABS SOL	BRC-214, "Description"
C1122	FR RH IN ABS SOL	BRC-211, "Description"
C1123	FR RH OUT ABS SOL	BRC-214, "Description"
C1124	RR LH IN ABS SOL	BRC-211, "Description"
C1125	RR LH OUT ABS SOL	BRC-214, "Description"
C1126	RR RH IN ABS SOL	BRC-211, "Description"
C1127	RR RH OUT ABS SOL	BRC-214, "Description"

< ECU DIAGNOSIS > [TYPE 3]

Reference	Items (CONSULT screen terms)	DTC
	ENGINE SIGNAL 1	C1130
	ENGINE SIGNAL 2	C1131
BRC-217, "Description"	ENGINE SIGNAL 3	C1132
	ENGINE SIGNAL 4	C1133
	ENGINE SIGNAL 6	C1136
BRC-219, "Description"	ACTUATOR RLY	C1140
DDC 224 "Decemention"	ST ANG SEN CIRCUIT	C1143
BRC-221, "Description"	ST ANG SEN SIGNAL	C1144
DDC 202 "Deceriation"	YAW RATE SENSOR	C1145
BRC-203, "Description"	SIDE G-SEN CIRCUIT	C1146
BRC-224, "Description"	BR FLUID LEVEL LOW	C1155
BRC-227, "Description"	ST ANG SEN COM CIR	C1156
BRC-228, "Description"	DECEL G SEN SET	C1160
BRC-229, "Description"	ST ANGL SEN SAFE	C1163
	CV1	C1164
BRC-230, "Description"	CV2	C1165
BRC-230, Description	SV1	C1166
	SV2	C1167
BRC-200, "DTC Logic"	VARIANT CODING	C1170
BRC-233, "Description"	ABS DIFLOCK CONTROLLER NG	C1187
BRC-234, "Description"	CAN COMM CIRCUIT	U1000

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SYMPTOM DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000003248361

Service information	Remarks
TYPE 1	ABS
TYPE 2	ABLS/ABS
TYPE 3	HILL DESCENT CONTROL/HILL START ASSIST/VDC/TCS/ABS

VDC/TCS/ABS

Symptom Table

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

Symptom	Check item	Reference	
	Brake force distribution		
Excessive ABS function operation frequency	Looseness of front and rear axle	BRC-260, "Diag- nosis Procedure"	
1.5	Wheel sensor and rotor system		
Unexpected pedal reaction	Brake pedal stroke	BRC-261, "Diag-	
Offexpedied 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-262, "Diag- nosis Procedure"	
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-263, "Diag- nosis Procedure"	
Pedal vibration or ABS operation sound	Brake pedal	BRC-264, "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	TCM	BRC-265, "Diag- nosis Procedure"	
	ECM	110010 1 10000010	

NOTE:

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

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[TYPE 3]

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000003247981

1. CHECK START

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

Is the inspection result normal?

YES >> GO TO 2

NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: <u>FAX-5</u>, "<u>On-Vehicle Inspection and Service</u>", Rear: <u>RAX-7</u>, "<u>Rear Axle Bearing</u>" (C200) or <u>RAX-19</u>, "<u>Rear Axle Bearing</u>" (M226).

Is the inspection result normal?

YES >> GO TO 3

NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

Check the following.

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

Is the inspection result normal?

YES >> GO TO 4

NO >> • R

- >> Replace wheel sensor or sensor rotor. Refer to <u>BRC-272, "Removal and Installation"</u> or <u>BRC-273, "Removal and Installation"</u>.
 - Repair harness.

4. CHECK ABS WARNING LAMP DISPLAY

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

YES >> Perform self-diagnosis. Refer to <u>BRC-186</u>, "CONSULT-III Function (ABS)".

NO >> Normal

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000003247982

1. CHECK BRAKE PEDAL STROKE

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

Is the stroke too large?

YES

- >> Bleed air from brake tube and hose. Refer to BR-9, "Bleeding Brake System".
 - Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to <u>BR-7</u>, "<u>Brake Pedal Inspection and Adjustment</u>" (brake pedal), <u>BR-30</u>, "<u>Disassembly and Assembly</u>" (master cylinder), <u>BR-7</u>, "<u>Brake Booster Inspection</u>" (brake booster).

NO >> GO TO 2

2. CHECK FUNCTION

E

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

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THE BRAKING DISTANCE IS LONG

< SYMPTOM DIAGNOSIS >

[TYPE 3]

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000003247983

CAUTION:

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

1. CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

[TYPE 3] < SYMPTOM DIAGNOSIS > ABS FUNCTION DOES NOT OPERATE Α Diagnosis Procedure INFOID:0000000003247984 **CAUTION:** В ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1. CHECK ABS WARNING LAMP DISPLAY C Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when driving. Is the inspection result normal? YES >> Normal D NO >> Perform self-diagnosis. Refer to BRC-186, "CONSULT-III Function (ABS)". Е

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[TYPE 3]

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000003247985

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-186</u>, "CONSULT-III Function (ABS)".

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 >> Normal

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

[TYPE 3] < SYMPTOM DIAGNOSIS > VEHICLE JERKS DURING VDC/TCS/ABS CONTROL Α Diagnosis Procedure INFOID:0000000003247986 1.SYMPTOM CHECK В Check if the vehicle jerks during VDC/TCS/ABS control. Is the inspection result normal? YES >> Normal. NO >> GO TO 2 2.CHECK SELF-DIAGNOSIS RESULTS D Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to BRC-186, "CONSULT-III Function (ABS)". Are self-diagnosis results indicated? Е >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis. NO >> GO TO 3 BRC 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? Н YES >> If poor contact, damage, open or short circuit of connector terminal is found, repair or replace. NO >> GO TO 4 f 4 .CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS Perform ECM and TCM self-diagnosis. Are self-diagnosis results indicated? YES >> Check the corresponding items. • ECM: Refer to EC-63, "CONSULT-III Function (ENGINE)" (QR25DE) or EC-512, "CONSULT-III Function (ENGINE)" (VQ40DE). TCM: Refer to TM-204, "CONSULT-III Function (TRANSMISSION)". K NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-274, "Removal and Installation". L M N

NORMAL OPERATING CONDITION

Description INFOID:000000003247987

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

< PRECAUTION > [TYPE 3]

PRECAUTION

PRECAUTIONS

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

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

WARNING:

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

Precaution for Brake System

CAUTION:

- Refer to BR-9, "Drain and Refill" 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 BR-11, "Brake Burnishing" (front disc brake) or BR-14, "Brake Burnishing" (rear disc brake).

WARNING:

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

Precaution for Brake Control

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.

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Commercial service tool

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< PRECAUTION > [TYPE 3]

 When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.

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

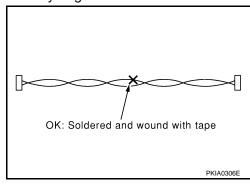
NOTE:

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

Precaution for CAN System

INFOID:0000000003221355

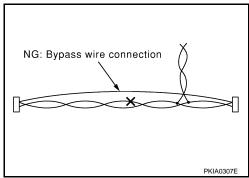
- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.
- Area to be repaired must be soldered and wrapped with tape.
 Make sure that fraying of twisted wire is within 110 mm (4.33 in).



PRECAUTIONS

< PRECAUTION > [TYPE 3]

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



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< PREPARATION > [TYPE 3]

PREPARATION

PREPARATION

Special Service Tool

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

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

PREPARATION

< PREPARATION > [TYPE 3]

Commercial Service Tool

INFOID:0000000003221357

Tool name		Description	
Flare nut crowfoot Torque wrench		Removing and installing brake piping a: 10 mm (0.39 in)/12 mm (0.47 in)	В
			С
	S-NT360		D

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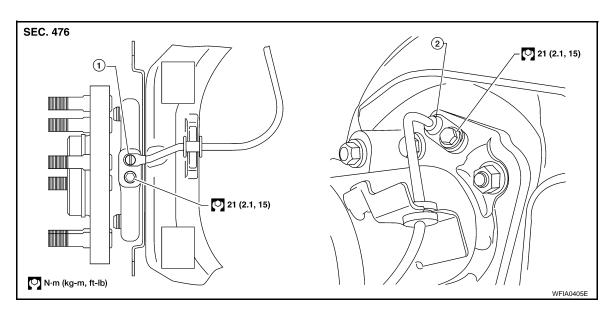
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REMOVAL AND INSTALLATION

WHEEL SENSOR

Removal and Installation



1. Front wheel sensor

2. Rear wheel sensor

REMOVAL

- Remove wheel sensor bolt.
 - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to FAX-8, "Removal and Installation".
- 2. Pull out the sensor, being careful to turn it as little as possible.

CAUTION:

- Be careful not to damage sensor edge and sensor rotor teeth.
- · Do not pull on the sensor harness.
- Disconnect wheel sensor harness electrical connector, then remove harness from mounts.

INSTALLATION

- Before installing wheel sensors,
- Inspect and replace sensor assembly if damaged.
- 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.
- Replace wheel sensor O-ring, then apply a coat of suitable grease to the O-ring and sensor hole.
- Installation is in the reverse order of removal.

SENSOR ROTOR

Removal and Installation

INFOID:0000000003303120

FRONT

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

REAR

Removal

 Remove axle shaft assembly. Refer to <u>RAX-20, "Removal and Installation"</u>. NOTE:

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

2. Pull the sensor rotor of off the axle shaft using Tool and a press.

Tool number : ST30031000 (—)

Installation

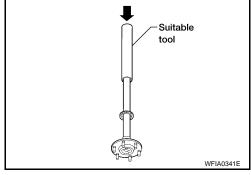
 Install new sensor rotor on axle shaft using a suitable length steel tube and a press. Make sure sensor rotor is fully seated.
 CAUTION:

Do not reuse the old sensor rotor.

2. Install axle shaft assembly. Refer to RAX-20, "Removal and <a href="Installation".

CAUTION:

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



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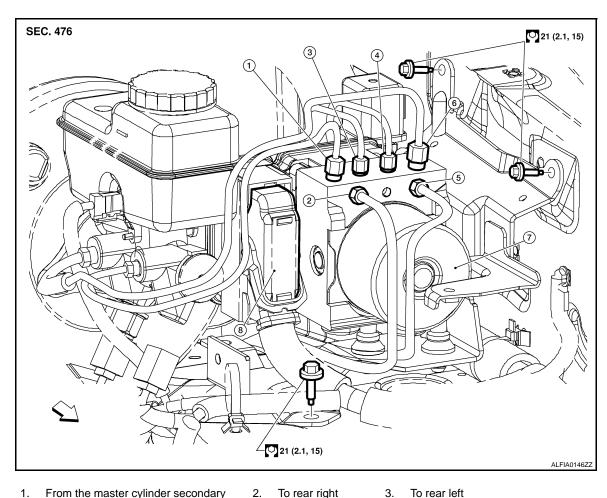
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ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation



- From the master cylinder secondary side
- 3. To rear left

To front right

- 5. To front left
- From the master cylinder primary side

- ABS actuator and electric unit (control unit)
- Harness connector <□ Front

REMOVAL

- 1. Disconnect the negative battery terminal.
- Drain the brake fluid. Refer to BR-9, "Drain and Refill".
- 3. Remove air cleaner case. Refer to EM-135, "Exploded View".
- 4. 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.
- 5. Disconnect the brake tubes.
- Remove the three bolts and remove the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

To install, use a flare nut wrench (commercial service tool).

Always tighten brake tubes to specification when installing. Refer to BR-6, "Hydraulic Circuit".

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

< REMOVAL AND INSTALLATION >

[TYPE 3]

- · Never reuse drained brake fluid.
- After installation of the ABS actuator and electric unit (control unit), refill brake system with new brake fluid. Then bleed the air from the system. Refer to BR-9, "Bleeding Brake System".

NOTE:

If the ABS actuator and electric unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to BRC-163, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: Special Repair Requirement".

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STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION >

[TYPE 3]

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000003303122

Refer to SR-6, "Removal and Installation".

NOTE:

- The steering angle sensor is an integral part of the spiral cable.
- If the ABS actuator and electronic unit (control unit) is replaced, make sure to adjust position of steering angle sensor. Refer to <u>BRC-163</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION: <u>Special Repair Requirement"</u>.

G SENSOR

Removal and Installation

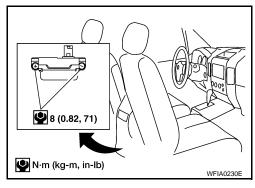
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REMOVAL

- 1. Remove center console. Refer to IP-10, "Exploded View".
- 2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
 - The location of the sensor is the same for all models.

CAUTION:

- Do not use power tools to remove or install yaw rate/side/ decel G sensor.
- Do not drop or strike the yaw rate/side/decel G sensor.
- 3. Disconnect harness connector and remove the yaw rate/side/ decel G sensor.



INSTALLATION

Installation is in the reverse order of removal.

NOTE:

After performing the above work, calibrate the yaw decel G sensor. Refer to <u>BRC-164</u>, "CALIBRATION OF <u>DECEL G SENSOR</u>: Special Repair Requirement".

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