SECTION BRAKE CONTROL SYSTEM

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CONTENTS

ABS

BASIC INSPECTION6
DIAGNOSIS AND REPAIR WORKFLOW
SYSTEM DESCRIPTION9
ABS9System Diagram9System Description9Component Parts Location10Component Description11
EBD12System Diagram12System Description12Component Parts Location13Component Description14
DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]15 CONSULT Function
DTC/CIRCUIT DIAGNOSIS18
C1101, C1102, C1103, C1104 WHEEL SEN- SOR
C1105, C1106, C1107, C1108 WHEEL SEN-
Description
C1109 POWER AND GROUND SYSTEM26 Description

DTC Logic26 Diagnosis Procedure26	BRC
C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)	G
C1111 ABS MOTOR, MOTOR RELAY SYS- TEM	l
C1113 G SENSOR	K
C1115 WHEEL SENSOR	L
C1120, C1122, C1124, C1126 IN ABS SOL38 Description	M
C1121, C1123, C1125, C1127 OUT ABS SOL40 Description	0
C1140 ACTUATOR RELAY SYSTEM42 Description	Ρ
U1000 CAN COMM CIRCUIT44 Description44	

DTC Logic
U1010 CONTROL UNIT (CAN)
POWER SUPPLY AND GROUND CIRCUIT 46 Description
BRAKE FLUID LEVEL SWITCH48Description48Component Function Check48Diagnosis Procedure48Component Inspection49
PARKING BRAKE SWITCH50Description50Component Function Check50Diagnosis Procedure50Component Inspection50
ABS WARNING LAMP52Description52Component Function Check52Diagnosis Procedure52
BRAKE WARNING LAMP53Description53Component Function Check53Diagnosis Procedure53
ECU DIAGNOSIS INFORMATION 54
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
SYMPTOM DIAGNOSIS
EXCESSIVE ABS FUNCTION OPERATION FREQUENCY
UNEXPECTED PEDAL REACTION
THE BRAKING DISTANCE IS LONG
ABS FUNCTION DOES NOT OPERATE 61 Diagnosis Procedure 61
PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

NORMAL OPERATING CONDITION		
PRECAUTION64		
PRECAUTIONS 64 Precaution for Supplemental Restraint System 64 (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- 64 SIONER" 64 Precaution for Procedure without Cowl Top Cover 64 64 Precaution for Brake System 64 Precaution for Brake Control 65		
REMOVAL AND INSTALLATION		
WHEEL SENSOR66		
FRONT WHEEL SENSOR 66 FRONT WHEEL SENSOR : Exploded View 66 FRONT WHEEL SENSOR : Removal and Installation 66		
REAR WHEEL SENSOR 66 REAR WHEEL SENSOR : Exploded View 67 REAR WHEEL SENSOR : Removal and Installation 67		
SENSOR ROTOR68		
FRONT SENSOR ROTOR 68 FRONT SENSOR ROTOR : Exploded View 68 FRONT SENSOR ROTOR : Removal and Installation 68		
REAR SENSOR ROTOR 68REAR SENSOR ROTOR : Exploded View68REAR SENSOR ROTOR : Removal and Installa- tion68		
ABS ACTUATOR AND ELECTRIC UNIT		
(CONTROL UNIT)		
G SENSOR		
BASIC INSPECTION72		
DIAGNOSIS AND REPAIR WORKFLOW		
INSPECTION AND ADJUSTMENT		
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION		

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Require- ment
SYSTEM DESCRIPTION78
VDC
TCS82System Diagram82System Description82Component Parts Location82Component Description85
ABS86System Diagram86System Description86Component Parts Location86Component Description89
EBD90System Diagram90System Description90Component Parts Location90Component Description93
DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)]94 CONSULT Function
DTC/CIRCUIT DIAGNOSIS99
C1101, C1102, C1103, C1104 WHEEL SEN- SOR
C1105, C1106, C1107, C1108 WHEEL SEN- SOR 102 Description 102 DTC Logic 102 Diagnosis Procedure 102 Special Repair Requirement 106
C1109 POWER AND GROUND SYSTEM 107 Description
C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Special Repair Requirement109	
C1111 ABS MOTOR, MOTOR RELAY SYS-	A
Description	В
C1113, C1145, C1146 YAW RATE/SIDE/DE- CEL G SENSOR	0
Description	D
C1115 WHEEL SENSOR 115	E
Description	BRC
C1116 STOP LAMP SWITCH	G
DTC Logic	Н
C1118 AWD SYSTEM	J
C1120, C1122, C1124, C1126 IN ABS SOL 127 Description	K
Special Repair Requirement	
C1121, C1123, C1125, C1127 OUT ABS SOL. 129 Description	Μ
Special Repair Requirement	Ν
C1130 ENGINE SIGNAL	O
C1140 ACTUATOR RELAY SYSTEM	

C1143, C1144 STEERING ANGLE SENSOR . 134

Description	134
DTC Logic	134
Diagnosis Procedure	134
Special Repair Requirement	135
C1155 BRAKE FLUID LEVEL SWITCH	. 136
Description	
DTC Logic	136
Diagnosis Procedure	136
Component Inspection	138
Special Repair Requirement	138
C1164 C1165 CV SYSTEM	130
Description	139
DTC Logic	
Diagnosis Procedure	
Special Repair Requirement	140
CAACE CAACT ON OVETEM	
	. 141
	141
Dic Logic Diagnosis Procedure	1/1
Special Repair Requirement	141
C1176 STOP LAMP SW2	. 143
Description	143
DTC Logic	143
Diagnosis Procedure	143
Component Inspection	146
Special Repair Requirement	146
U1000 CAN COMM CIRCUIT	. 147
Description	147
DTC Logic	147
Diagnosis Procedure	147
Special Repair Requirement	147
U1010 CONTROL UNIT (CAN)	. 148
Description	148
DTC Logic	148
Diagnosis Procedure	148
Special Repair Requirement	148
POWER SUPPLY AND GROUND CIRCUIT	149
Description	
Diagnosis Procedure	149
Special Repair Requirement	150
	454
	. 151
Component Function Check	
Diagnosis Procedure	151
Component Inspection	
	151
	151
VDC OFF SWITCH	151 . 153
VDC OFF SWITCH Description	151 . 153 153
VDC OFF SWITCH Description Component Function Check	151 153 153 153
VDC OFF SWITCH Description Component Function Check Diagnosis Procedure	151 153 153 153 153
VDC OFF SWITCH Description Component Function Check Diagnosis Procedure Component Inspection Special Repair Requirement	151 153 153 153 153 154

4 4	ABS WARNING LAMP155 Description
4	Component Function Check
D	Special Repair Requirement
6 6	BRAKE WARNING LAMP
6	Description
6	Component Function Check 156
8 8	Diagnosis Procedure
9	VDC WARNING LAMP158
9	Description
9 9	Diagnosis Procedure 158
0	Special Repair Requirement
1	VDC OFF INDICATOR LAMP159
1	Description
1 1	Component Function Check
2	Special Repair Requirement 159
3	ECU DIAGNOSIS INFORMATION
3	
3 3	(CONTROL UNIT) 161
6	Reference Value
6	Wiring Diagram -BRAKE CONTROL SYSTEM 164
7	Fail-Safe
7	DIC Index
7 7	SYMPTOM DIAGNOSIS168
7	EXCESSIVE ABS FUNCTION OPERATION
Q	FREQUENCY
8	Diagnosis Procedure
8	UNEXPECTED PEDAL REACTION
8 8	
9	Diagnosis Procedure
9	-
9 0	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure171
9 0 1	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure171 PEDAL VIBRATION OR ABS OPERATION
9 0 1 1	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure
9 0 1 1 1	ABS FUNCTION DOES NOT OPERATE 171 Diagnosis Procedure 171 PEDAL VIBRATION OR ABS OPERATION 172 Diagnosis Procedure 172
9 0 1 1 1 1	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure171 PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS
9 0 1 1 1 1 1 3 3 3	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure
9 0 1 1 1 1 1 3 3 3 4	ABS FUNCTION DOES NOT OPERATE171 Diagnosis Procedure
9 0 1 1 1 1 3 3 3 4 4	ABS FUNCTION DOES NOT OPERATE171Diagnosis Procedure171PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS172Diagnosis Procedure172VEHICLE JERKS DURING173Diagnosis Procedure173NORMAL OPERATING CONDITION174Description174PRECAUTION175PRECAUTIONS175

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TEN- SIONER"				
REMOVAL AND INSTALLATION 177				
WHEEL SENSOR177				
FRONT WHEEL SENSOR				
REAR WHEEL SENSOR				
SENSOR ROTOR179				

A	FRONT SENSOR ROTOR : Exploded View 179 FRONT SENSOR ROTOR : Removal and Instal-	
	lation179	
В	REAR SENSOR ROTOR	
С	tion179	
	ABS ACTUATOR AND ELECTRIC UNIT	
D	(CONTROL UNIT)180	
	Exploded View	
	Removal and Installation180	
Е	YAW RATE/SIDE/DECEL G SENSOR 182	
	Exploded View182	
	Removal and Installation182	
BRO	STEERING ANGLE SENSOR183	
	Exploded View183	
~	Removal and Installation183	
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BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000007350355

OVERALL SEQUENCE



DETAILED FLOW

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[ABS]

1.COLLECT THE INFORMATION FROM THE CUSTOMER	Λ
Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-8</u> , " <u>Diagnostic Work Sheet</u> ".	A
	В
>> GO TO 2.	
Z.PERFORM THE SELF-DIAGNOSIS	C
Perform self-diagnosis with CONSULT.	C
Is there any DTC displayed?	
YES >> Record or print self-diagnosis results and freeze frame data (FFD). GO TO 3.	D
3. PERFORM THE SYSTEM DIAGNOSIS	
Perform the diagnosis applicable to the displayed DTC of "ABS" with CONSULT Refer to BRC-57 "DTC	Е
Index".	
>> GO TO 7.	BR
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-63</u> ,	G
<u>"Description"</u> .	
YES >> GO TO 8	
NO >> GO TO 5.	Н
5. CHECK THE WARNING LAMP FOR ILLUMINATION	
Check that the warning lamp illuminate.	
 ABS warning lamp: Refer to <u>BRC-52</u>, "<u>Description</u>". 	
Brake warning lamp: Refer to <u>BRC-53, "Description"</u> .	
Is ON/OFF timing normal?	J
YES >> GO TO 6.	
6 DEDECIDENTIE DIACNOSIS BY SYMPTOM	K
Derform the diagnosis applicable to the diaplayed DTC of "ADC" with CONCLUT	
Perform the diagnosis applicable to the displayed DTC of ABS with CONSULT.	
>> GO TO 7	L
7. REPAIR OR REPLACE THE MAI FUNCTIONING PARTS	
Renair or replace the specified malfunctioning parts	M
Repair of replace the specified manufactioning parts.	
>> GO TO 8.	N
8.MEMORY CLEAR	IN
Perform self-diagnosis memory clear for "ABS" with CONSULT.	
	0
>> GO TO 9.	
9.FINAL CHECK	Ρ
Perform the again, and check that the malfunction is repaired completely.	
Is no other DTC present and the repair completed?	
YES >> INSPECTION END	
NO $>>$ GO TO 3.	

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

Diagnostic Work Sheet

INFOID:000000007350356

[ABS]

Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Date	
Symptoms	 Noise and vibration (from engine compartment) Noise and vibration (from axle) 	Warning / Indicator activate		 Firm pedal operation Large stroke pedal operation
	ABS does not work (Wheels lock when braking)	Lack of sense of acceleration		
Engine conditions	U 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			

SFIA3264E

SYSTEM DESCRIPTION ABS

System Diagram



ABS

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 is available.

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[ABS]

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[ABS]



- ABS warning lamp 1.
- 4. ABS actuator and electric unit (control unit)
- Rear wheel sensor (AWD models) 7.
- Combination meter Α.
- D. Steering knuckle
- В. Center console

Front wheel sensor

Ε. Rear axle

5.

- G sensor (AWD models) 3.
- 6. Rear wheel sensor (2WD models)
- C. Engine room (right side)

< SYSTEM DESCRIPTION >

Component Description

Component parts		Reference
	Pump	PPC 20 "Description"
APS actuator and electric unit (control unit)	Motor	BRC-29, Description
ABS actuator and electric unit (control unit)	Actuator relay (Main relay)	BRC-42, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-31, "Description"
ABS warning lamp		BRC-52, "Description"
Brake warning lamp		BRC-53, "Description"

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[ABS]

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< SYSTEM DESCRIPTION > EBD

System Diagram

INFOID:000000007350361

[ABS]



EBD

System Description

INFOID:000000007350362

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

Component Parts Location

INFOID:000000007350363

[ABS]



EBD

1.

4.

7.

Α.

E. Rear axle

Ρ

Component Description

INFOID:000000007350364

[ABS]

Component parts		Reference
	Pump	BPC-20 "Description"
	Motor	BRC-29, Description
	Actuator relay (Main relay)	BRC-42, "Description"
	Solenoid valve	BRC-38, "Description"
Wheel sensor		BRC-18, "Description"
G sensor (AWD models)		BRC-31, "Description"
ABS warning lamp		BRC-52, "Description"
Brake warning lamp		BRC-53, "Description"

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

< SYSTEM DESCRIPTION >

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

CONSULT Function

INFOID:000000007350365

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FUNCTION

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

Diagnostic test mode	Function	
Self diagnostic result	Self-diagnostic results can be read and erased quickly.	Г
Data monitor	Input/Output data in the ABS actuator and electric unit (control unit) can be read.	L
Active test	Diagnostic test mode is which CONSULT drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.	F
ECU identification	ABS actuator and electric unit (control unit) part number can be read.	

SELF DIAGNOSTIC RESULT

Operation Procedure

Before performing the self-diagnosis for "ABS" with CONSULT, 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 for "ABS" with CONSULT, 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 <u>BRC-57, "DTC Index"</u>.

DATA MONITOR

Display Item List

 \times : Applicable \blacksquare : Optional item

	SELECT MC	SELECT MONITOR ITEM		NЛ
Monitor item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	Remarks	IVI
FR LH SENSOR [km/h (MPH)]	×	×		Ν
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed	0
RR LH SENSOR [km/h (MPH)]	×	×	Wheel speed	0
RR RH SENSOR [km/h (MPH)]	×	×		Ρ
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status	
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)	

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

< SYSTEM DESCRIPTION >

Monitor item (Unit)

SELECT MONITOF

ECU INPUT

RITEM	
I SIGNALS	Remarks
×	Vahiela on loval surfaça ar an slana
×	
×	
×	

	SIGNALS	MAIN SIGNALS	
DECEL G-SEN1 (On/Off) (AWD models)	×	×	Vehicle on level surface or on slope
DECEL G-SEN2 (On/Off) (AWD models)	×	×	
FR RH IN SOL (On/Off)	▼	×	
FR RH OUT SOL (On/Off)	▼	×	
FR LH IN SOL (On/Off)	▼	×	
FR LH OUT SOL (On/Off)	▼	×	Operation status of each solenoid valve
RR RH IN SOL (On/Off)	▼	×	
RR RH OUT SOL (On/Off)	▼	×	
RR LH IN SOL (On/Off)	▼	×	
RR LH OUT SOL (On/Off)	▼	×	
MOTOR RELAY (On/Off)	▼	×	Motor and motor relay operation
ACTUATOR RLY (On/Off)	▼	×	Actuator relay operation
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp
EBD SIGNAL (On/Off)	▼	▼	EBD operation
ABS SIGNAL (On/Off)	▼	▼	ABS operation
EBD FAIL SIG (On/Off)	▼	▼	EBD fail-safe signal
ABS FAIL SIG (On/Off)	▼	▼	ABS fail-safe signal

ACTIVE TEST

CAUTION:

- Never 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 and brake warning lamp are on.
- ABS warning 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" in "ABS" with CONSULT is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" in "ABS" with CONSULT is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

· Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

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

< SYSTEM DESCRIPTION >

Tost itom	Display itom	Display			A	
lest tient	Display item	Up	Keep	Down		
	FR RH IN SOL	Off	On	On	_	
TR RT SOL	FR RH OUT SOL	Off	Off	On*	B	
	FR LH IN SOL	Off	On	On		
FR LH SOL	FR LH OUT SOL	Off	Off	On*	С	
	RR RH IN SOL	Off	On	On		
KK KH SOL	RR RH OUT SOL	Off	Off	On*		
	RR LH IN SOL	Off	On	On	D	
	RR LH OUT SOL	Off	Off	On*		

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

ABS MOTOR

 Select "On" and "Off" of "ACTIVE TEST" in "ABS" with CONSULT on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Dis	play
rest item	Display item	On	Off
	MOTOR RELAY	On	Off
ABS MOTOR	ACTUATOR RLY (Note)	On	On

NOTE:

A brief moment of On/Off condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number can be read.

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[ABS]

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C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS C1101, C1102, C1103, C1104 WHEEL SENSOR

Description

INFOID:000000007350366

[ABS]

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

DTC Logic

INFOID:000000007350367

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 short circuit. Current signal from sensor is outside limits.	
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	Harness or connectorWheel sensor
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	ABS actuator and electric unit (control unit)
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute. 1. Perform self-diagnosis for "ABS" with CONSULT. 2.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

>> Proceed to diagnosis procedure. Refer to BRC-18, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

CAUTION:

Never check between wheel sensor harness connector terminals.

1.CHECK WHEEL SENSOR

- 1. Turn the ignition switch OFF.
- Check wheel sensor for damage. 2.

Is the inspection result normal?

YES >> GO TO 3. >> GO TO 2. NO

2.REPLACE WHEEL SENSOR (1)

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-66</u>, "FRONT WHEEL SENSOR : Exploded View". Rear: Refer to <u>BRC-67</u>, "REAR WHEEL SENSOR : Exploded View".
- 2. Erase self-diagnosis result for "ABS".
- Turn the ignition switch OFF, and wait 10 seconds or more. 3.
- 4. Start the engine.
- Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 5.
- 6. Stop the vehicle.

BRC-18

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CTICI, CTICZ, CTICS, CTIC4 WILLEE CENCON
< DTC/CIRCUIT DIAGNOSIS > [ABS]
7. Perform self-diagnosis for "ABS" with CONSULT.
<u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u>
YES >> GO TO 3.
NO >> INSPECTION END
3. CHECK CONNECTOR
 Turn the ignition switch OFF. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness. Check wheel sensor harness connector for disconnection or looseness.
Is the inspection result normal?
YES >> GO TO 5.
NO >> Repair of replace error-detected parts, securely lock the harness connector, and GO TO 4.
4.PERFORM SELF-DIAGNOSIS (1)
1. Erase self-diagnosis result for "ABS" with CONSULT.
 I urn the ignition switch OFF, and wait 10 seconds or more. Start the engine
 Start the engine. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle.
6. Perform self-diagnosis for "ABS" with CONSULT.
<u>Is DTC "C1101", "C1102", "C1103" or "C1104" detected?</u>
YES >> GO TO 5.
NO >> INSPECTION END
5. CHECK TERMINAL
 Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.
Is the inspection result normal?
YES >> GO TO 7.
NO >> Repair or replace error-detected parts and GO TO 6.
6. PERFORM SELF-DIAGNOSIS (2)
1. Connect ABS actuator and electric unit (control unit) harness connector.
2. Connect wheel sensor harness connector.
 Erase self-diagnosis result for "ABS". Turn the ignition switch OEE and wait 10 seconds or more.
5 Start the engine
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
7. Stop the vehicle.
8. Pertorm self-diagnosis for "ABS" with CONSULT.
Is DTC "C1101", "C1102", "C1103" or "C1104" detected?
YES >> GO TO 7.
I .CHECK WHEEL SENSOR HARNESS
1. Turn the ignition switch OFF.
 Disconnect ABS actuator and electric unit (control unit) harness connector. Disconnect wheel sensor harness connector.
 Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sen-

 Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit)		Wheel	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
	21	E39 (Front RH wheel)	3	
E36	23	E22 (Front LH wheel)	1	Evisted
	11	B41 (Rear RH wheel)	7	LAISted
	26	B44 (Rear LH wheel)	5	

Measurement connector and terminal for signal circuit

ABS actuator and ele	ectric unit (control unit)	Wheel sensor		unit (control unit) Wheel sensor		Continuity
Connector	Terminal	Connector	Terminal	Continuity		
	12	E39 (Front RH wheel)	4			
E36	27	E22 (Front LH wheel)	2	Evistod		
	15	B41 (Rear RH wheel)	8	LAISIEU		
	30	B44 (Rear LH wheel)	6			

Is the inspection result normal?

YES	>> GO TO 9.
-----	-------------

NO >> Repair or replace error-detected parts and GO TO 8.

8. PERFORM SELF-DIAGNOSIS (3)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- 6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 7. Stop the vehicle.
- 8. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

- YES >> GO TO 9.
- NO >> INSPECTION END

9.REPLACE WHEEL SENSOR

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-66, "FRONT WHEEL SENSOR : Exploded View"</u>.
- Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- 5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 6. Stop the vehicle.
- 7. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69</u>, "Exploded View".
- NO >> INSPECTION END

C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 WHEEL SENSOR

Description

ABS unit continually monitors wheel speed sensors to detect abnormal signals.

DTC Logic

INFOID:000000007350371

INFOID:000000007350370

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signals.	Sensor not installed currentlySensor rotor or encoder dam-	D
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signals.	 aged Sensor rotor loose on axle Electrical interference 	E
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signals.	Wheel not turning - e.g. vehi- cle driven on 2WD dynamom-	
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signals.	eter Sensor damaged ABS unit damaged 	BRO

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.	1
2.DTC REPRODUCTION PROCEDURE	I
 Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute. Perform self-diagnosis for "ABS" with CONSULT. 	J
<u>Is DTC "C1105", "C1106", "C1107" or "C1108" detected?</u>	
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-21, "Diagnosis Procedure"</u> . NO >> INSPECTION END	K
Diagnosis Procedure	580
CAUTION:	
Never check between wheel sensor harness connector terminals.	
1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM	M
Check ABS actuator and electric unit (control unit) power supply system. Refer to BRC-46, "Diagnosis Proce	}-
<u>dure"</u> .	
Is the inspection result normal?	Ν
YES >> GO TO 2.	
NO >> Repair or replace error-detected parts.	
2.CHECK TIRE	0
1. Turn the ignition switch OFF.	_
Check tire air pressure, wear and size. Refer to <u>WT-49, "Tire Air Pressure"</u>.	_
Is the inspection result normal?	Р
YES >> GO TO 5.	
NO >> Adjust air pressure or replace tire and GO TO 3.	
3.CHECK DATA MONITOR (1)	
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine 	_

BRC-21

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В

С

C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" 4 and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4. NO >> GO TO 5.

4.PERFORM SELF-DIAGNOSIS (1)

- Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 1.
- 2. Stop the vehicle.
- Perform self-diagnosis for "ABS" with CONSULT. 3.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK WHEEL SENSOR

- 1. Turn the ignition switch OFF.
- 2. Check wheel sensor for damage.

3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

CAUTION:

Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified toraue.

• Front: Refer to BRC-66, "FRONT WHEEL SENSOR : Exploded View".

Rear: Refer to <u>BRC-67</u>, "REAR WHEEL SENSOR : Exploded View".

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 6.

O.REPLACE WHEEL SENSOR (1)

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-66, "FRONT WHEEL SENSOR : Exploded View"</u>. Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" 5. and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. 6.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7. NO

>> GO TO 19.

PERFORM SELF-DIAGNOSIS (2)

(P)With CONSULT.

- Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 1.
- 2. Stop the vehicle.
- Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

- YES >> GO TO 19.
- NO >> INSPECTION END

C1105 C1106 C1107 C1100 WHEEL SENSOD

< DTC/CIRCUIT DIAGNOSIS > [ABS
3. CHECK CONNECTOR
. Turn the ignition switch OFF.
2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
 Check wheel sensor harness connector for disconnection or looseness.
the inspection result normal?
YES >> GO TO 11.
NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.
CHECK DATA MONITOR (2)
Erase self-diagnosis result for "ABS" with CONSULT.
Turn the ignition switch OFF, and wait 10 seconds or more.
Start the engine.
and "RR RH SENSOR" with CONSULT
NOTE:
Set the "DATA MONITOR" recording speed to "10 msec".
Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
egarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detectin
neel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the diffe
<u>ICE WITHIN 5%, respectively?</u>
YES >> GO TO 10.
$\mathbf{O} = \mathbf{O} = \mathbf{O} + $
U.PERFORM SELF-DIAGNOSIS (3)
Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
Stop the vehicle.
Perform self-diagnosis for "ABS" with CONSULT.
DTC "C1105", "C1106", "C1107" or "C1108" detected?
YES >> GO TO 11.
Turn the ignition switch OFF.
Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator
and electric unit (control unit) pin terminals for damage or loose connection with namess connector.
loose connection with harness connector.
the inspection result normal?
$(FS \rightarrow GO TO 1)$
IO >> Repair or replace error-detected parts and GO TO 12.
Connect ABS actuator and electric unit (control unit) namess connector.
Erase self-diagnosis result for "ABS" with CONSULT.
Turn the ignition switch OFF, and wait 10 seconds or more.
Start the engine.
Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOF
and "KK KH SENSUK" WITH CUNSULI.
Set the "DATA MONITOR" recording speed to "10 msec"
Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
egarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detection
heel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the diffe
nce within 5%, respectively?
YES >> GO TO 13.
NO >> GO TO 14.

C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

13.PERFORM SELF-DIAGNOSIS (4)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> GO TO 14.

NO >> INSPECTION END

14.CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and the ground.

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
	12, 21	Ground	Not existed	
ABS actuator and elec Connector E36	27, 23			
L30	BS actuator and electric unit (control unit) Connector Terminal E36 27, 23 15, 11 30, 26	Giouna	NOT EXISTED	
E36	30, 26	-		

Is the inspection result normal?

- YES >> GO TO 15.
- NO >> Repair or replace error-detected parts and GO TO 15.
- 15.CHECK DATA MONITOR (4)
- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16.

NO >> GO TO 17.

16.PERFORM SELF-DIAGNOSIS (5)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> GO TO 17.

NO >> INSPECTION END

17.REPLACE WHEEL SENSOR

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-66</u>, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.

BRC-24

C1105, C1106, C1107, C1108 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS > [ABS]	
 Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE: 	А
Set the "DATA MONITOR" recording speed to "10 msec". 6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	B
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel speed detected by the parmal wheel speed speed detected by the parmal wheel speed detected by the parma dete	D
ence within 5%, respectively?	
YES >> GO TO 18.	C
18 dependences (6)	
1 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute	D
2. Stop the vehicle.	
3. Perform self-diagnosis for "ABS" with CONSULT.	E
$\frac{18 \text{ DTC CT105}}{\text{YES}} > \text{GO TO 19}$	
NO >> INSPECTION END	BR
19. REPLACE SENSOR ROTOR	
1. Replace sensor rotor. Front: Pofer to RPC 68. "EPONT SENSOR POTOR : Exploded View."	G
 Rear: Refer to <u>BRC-68, "REAR SENSOR ROTOR : Exploded View"</u>. 	0
2. Erase self-diagnosis result for "ABS" with CONSULT.	
4. Start the engine.	Н
5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
7. Perform self-diagnosis for "ABS" with CONSULT.	
Is DTC "C1105", "C1106", "C1107" or "C1108" detected?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69. "Exploded View"</u> .	J
	K
	TX.
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C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000007350375

INFOID:000000007350376

INFOID:000000007350374

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 is lower than normal and vehicle speed is greater than 6km/h (4 MPH). Power supply is greater than normal limits.	 Harness or connector ABS actuator and electric unit (control unit) Fuse Vehicle electrical power system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1109" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-26, "Diagnosis Procedure"</u>.
- NO >> INSPECTION ĔND

Diagnosis Procedure

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

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

1. Check voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and ele	ectric unit (control unit)	Condition		Voltage	
Connector Terminal		_	Condition	vollage	
E36	16	Ground	Ignition switch: OFF	Approx. 0 V	

2. Turn the ignition switch ON.

CAUTION:

Never start the engine.

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

ABS actuator and ele	ectric unit (control unit)		Condition	Voltago
Connector	Terminal		Condition	voltage
E36	16	Ground	Ignition switch: ON	Battery voltage

[ABS]

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT D	IAGNOSIS >				[ABS]
Is the inspection re YES >> GO TC NO >> GO TC	sult normal? 94. 93.				A
3.CHECK ABS AC	TUATOR AND ELE	ECTRIC UNIT (CONTROL UN	IIT) POWER SUPP	
 Turn the ignitio Check 10A fus Disconnect IPE Check continui 	n switch OFF. ible link (59). DM E/R harness cor ty between ABS act	nnector. tuator and elec	tric unit (contro	l unit) harness conr	nector and IPDM E/R. C
ABS actuator and	electric unit (control unit			/K Terminal	continuity D
E36	16	CO	F15	59	Existed
Lot the inspection re				33	Existed
NO >> Repair 4.CHECK ABS AC 1. Turn the ignitio 2. Check continui	<u>R SUPPLY -"</u> . or replace error-def CTUATOR AND ELE n switch OFF. ty between ABS act	tected parts. ECTRIC UNIT (tuator and elec	CONTROL UN	IIT) GROUND CIRC	CUIT BR
ABS actuator and ele	ectric unit (control unit)		Continuity	-	
Connector	Terminal	—	Continuity	_	H
E36	3	Ground	Existed		1
Is the inspection re YES >> Replac NO >> Repair	sult normal? e ABS actuator and or replace error-det	l electric unit (c tected parts (ch	control unit). Re neck ABS earth	fer to <u>BRC-69, "Ex</u> bolt for tightness a	<u>ploded View"</u> . Ind corrosion). J
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					O

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< DTC/CIRCUIT DIAGNOSIS >

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:000000007350378

INFOID:000000007350377

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	Internal failure of control unit components. ABS solenoid valve or motor power supply/ ground abnormality.

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1110" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-28, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007350379

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

CAUTION:

Replace ABS actuator and electric unit (control unit) when self-diagnostic result shows items other than those applicable.

>> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69, "Exploded View"</u>.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

PUMP

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

MOTOR

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

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction	detected condition	Possible cause	
C1111 PUMP MOTOR		During the actuator moto actuator motor turns OFF tuator motor relay is oper	During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for actuator motor relay is open.		BR
CIIII	FUMP MOTOR	During the actuator moto actuator motor turns ON, is shorted to ground.	r operating with OFF, when the or when the control line for relay	(control unit)	G
DTC CC	ONFIRMATION PROCE	DURE			
1.PREC	CONDITIONING				Н
If "DTC C	CONFIRMATION PROCE	DURE" has been prev	iously conducted, always	turn the ignition switch OFF	
and wait	at least 10 seconds befor	e conducting the next	test.		
					I
2 рто					
	REPRODUCTION PROCI				J
1. Turn 2 Perfe	the ignition switch OFF to orm self-diagnosis for "AB	ON. S" with CONSULT			
Is DTC "	C1111" detected?				k
YES	>> Proceed to diagnosis	procedure. Refer to B	RC-29, "Diagnosis Proced	ure".	
NO	>> INSPECTION END				
Diagno	sis Procedure			INFOID:00000007350382	L
1.снес	CK CONNECTOR				
1. Turn	the ignition switch OFF.				N
2. Disc	connect ABS actuator and	electric unit (control u	nit) harness connector.		
Is the ins	spection result normal?		55, elc.		ľ
YES	>> GO TO 2.				
NO	>> Replace or repair erro	r-detected parts.			
2.снес	CK ABS MOTOR AND MC	TOR RELAY POWER	R SUPPLY		C
Check vo	oltage between the ABS a	ctuator and electric ur	nit (control unit) harness co	onnector and ground.	
					F
ABS act	tuator and electric unit (control u	nit)	Voltage		

ABS actuator and ele	ectric unit (control unit)		Voltage	
Connector	Connector Terminal		voltage	
E36 1		Ground	Battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

INFOID:000000007350380

INFOID:000000007350381

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6. "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

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

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal		Continuity	
E36	3	Ground	Existed	
	4	Cround		

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69</u>, "Exploded View".

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

< DTC/CIRCUIT DIAGNOSIS >

C1113 G SENSOR

Description

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

DTC Logic

INFOID:000000007350385

INFOID:000000007350384

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1113	G SENSOR	G sensor is malfunctioning, or signal line of G sensor is open or shorted.	 Harness or connector ABS actuator and electric unit (control unit) G sensor Electrical interference Vehicle driven on AWD rolling road 	E

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1113" detected?

YES	>> Proceed to diagnosis	procedure. Refer	to BRC-31, "	Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect G sensor harness connector.
- 4. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2.CHECK G SENSOR POWER SUPPLY

1. Check voltage between G sensor harness connector and ground.

G se	ensor		Condition	
Connector	Terminal		Condition	voltage
B32	1	Ground	Ignition switch: OFF	Approx. 0 V

 Turn the ignition switch ON. CAUTION:

Never start the engine.

3. Check voltage between G sensor harness connector and ground.

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INFOID:000000007350386

C1113 G SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

G se	ensor		Condition	Voltago	
Connector	Terminal		Condition	vollage	
B32	1	Ground	Ignition switch: ON	Battery voltage	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK G SENSOR POWER SUPPLY CIRCUIT

- 1. Turn the ignition switch OFF.
- 2. Check 10A fusible link (59).
- 3. Disconnect IPDM E/R harness connector.
- 4. Check continuity between G sensor harness connector and IPDM E/R.

G sensor		IPDM E/R		continuity
Connector	Terminal	Connector	Terminal	continuity
B32	1	E15	59	Existed

Is the inspection result normal?

NO >> Repair or replace error-detected parts.

4.CHECK G SENSOR HARNESS

Check continuity between G sensor harness connector and ABS actuator and electric unit (control unit) harness connector.

ABS actuator and electric unit (control unit)		G sensor		continuity
Connector	Terminal	Connector	Terminal	continuity
	13	B32	2	
E36	29		3	Evistod
	14		4	LAISIEU
	28		5	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.REPLACE G SENSOR

- 1. Replace G sensor. Refer to <u>BRC-71, "Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.

CAUTION: Never start the engine.

5. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1113" detected?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69</u>, "Exploded View".
- NO >> INSPECTION END

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-18</u>, "Wiring Diagram - IGNITION <u>POWER SUPPLY -"</u>.

< DTC/CIRCUIT DIAGNOSIS >

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

INFOID:000000007350389

INFOID:000000007350388

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	D
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	Harness or connector not a pos- sible cause. Other possible causes tire radius (due to wrong size or pressure) interference.	E
DTC CC	NFIRMATION PROCEI	DURE		
1.PREC	ONDITIONING			BR
If "DTC C and wait	CONFIRMATION PROCED at least 10 seconds before	DURE" has been previously conducted, always e conducting the next test.	turn the ignition switch OFF	G
2.dtc	>> GO TO 2. REPRODUCTION PROCE	DURE		Н
1. Start 2. Perfo Is DTC "(YES NO	the engine and drive the orm self-diagnosis for "AB <u>C1115"detected?</u> >> Proceed to diagnosis p >> INSPECTION END	vehicle at 30 km/h (19 MPH) or more for approx S" with CONSULT. procedure. Refer to <u>BRC-33, "Diagnosis Proced</u>	imately 1 minute. <u>ure"</u> .	1
Diagno	sis Procedure		INFOID:00000007666581	J
CAUTIO For whe	<mark>N:</mark> el sensor, never check b XK ABS ACTUATOR AND	etween terminals. ELECTRIC UNIT (CONTROL UNIT) POWER S	SUPPLY SYSTEM	K
Check Al	BS actuator and electric u	nit (control unit) power supply system. Refer to	BRC-46, "Diagnosis Proce-	L
Is the ins YES NO 2.CHEC	pection result normal? >> GO TO 2. >> Repair or replace error K TIRE	-detected parts.		Μ
1. Turn 2. Cheo	the ignition switch OFF. ck tire air pressure, wear a	and size. Refer to <u>WT-49, "Tire Air Pressure"</u> .		Ν
Is the ins YES NO 3. CHEC	<u>pection result normal?</u> >> GO TO 5. >> Adjust air pressure or CK DATA MONITOR (1)	replace tire and GO TO 3.		O
 Eras Turn Start Sele and NOT Set t 	e self-diagnosis result for the ignition switch OFF, a the engine. ct "ABS" and "DATA MON "RR RH SENSOR" with C E: he "DATA MONITOR" rec	"ABS" with CONSULT. nd wait 10 seconds or more. NITOR", check "FR LH SENSOR", "FR RH SE ONSULT. ording speed to "10 msec".	NSOR", "RR LH SENSOR"	

BRC-33

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C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.

NO >> GO TO 5.

4.PERFORM SELF-DIAGNOSIS (1)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1115" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK WHEEL SENSOR

- 1. Turn the ignition switch OFF.
- 2. Check wheel sensor for damage.
- 3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

CAUTION:

Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.

- Front: Refer to <u>BRC-66, "FRONT WHEEL SENSOR : Exploded View"</u>.
- Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> GO TO 6.

6.REPLACE WHEEL SENSOR (1)

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-66</u>, "FRONT WHEEL SENSOR : Exploded View".
- Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.

NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1115" detected?

YES >> GO TO 19.

NO >> INSPECTION END

8. CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- 3. Check wheel sensor harness connector for disconnection or looseness.

BRC-34

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS > [A	BS]
Is the inspection result normal?	
YES >> GO TO 11. NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.	
9. CHECK DATA MONITOR (2)	
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. 	
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENS and "RR RH SENSOR" with CONSULT. NOTE: 	OR"
Set the "DATA MONITOR" recording speed to "10 msec".5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detected	<u>cting</u>
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the di	<u>iffer-</u>
YES >> GO TO 10.	_
NO >> GO TO 11.	ī
10. Perform self-diagnosis (3)	
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
 Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT 	
Is DTC "C1115" detected?	
YES >> GO TO 11.	
NO >> INSPECTION END	
11.CHECK TERMINAL	
1. Turn the ignition switch OFF.	
 Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actu and electric unit (control unit) pin terminals for damage or loose connection with harness connector. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damag loose connection with harness connector. 	lator Je or
Is the inspection result normal?	
YES >> GO TO 14.	
12 current parts and GO TO TZ.	
 Connect ABS actuator and electric unit (control unit) harness connector. Connect wheel sensor harness connector 	
 Erase self-diagnosis result for "ABS" with CONSULT. 	
4. Turn the ignition switch OFF, and wait 10 seconds or more.	
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENS and "RR RH SENSOR" with CONSULT. 	OR"
NOTE:	
7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detected	cting
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the dence within 5%, respectively?	iffer-
YES >> GO TO 13.	
NU >> GU IU 14. 13 DEDEODMORE E DIA ONOCIO (4)	
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle 	
 Perform self-diagnosis for "ABS" with CONSULT. 	

Revision: 2013 February

Is DTC "C1115" detected?

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 14. NO >> INSPECTION END

14.CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

ABS actuator and electric unit (control unit) Connector Terminal		Wheel	Continuity	
		Connector	Terminal	Continuity
E36	21	E39 (Front RH wheel)	3	
	23	E22 (Front LH wheel)	1	Existed
	11	B41 (Rear RH wheel)	7	LAISIEU
	26	B44 (Rear LH wheel)	5	

Measurement connector and terminal for signal circuit

ABS actuator and electric unit (control unit)		Wheel	Continuity	
Connector	Terminal	Connector	Terminal	Continuity
E36	12	E39 (Front RH wheel)	t RH wheel) 4	
	27	E22 (Front LH wheel)	2	Evisted
	15	B41 (Rear RH wheel)	8	Existed
	30	B44 (Rear LH wheel)	6	

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

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal	—	Continuity
E36	12, 21	Ground	Not existed
	27, 23		
	15, 11		
	30, 26		

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace error-detected parts and GO TO 15.

15.CHECK DATA MONITOR (4)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:
 - Set the "DATA MONITOR" recording speed to "10 msec".
- 7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16. NO >> GO TO 17.
C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS > [ABS	<u> </u>
16.perform self-diagnosis (5)	-
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	-
 Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT. 	
Is DTC "C1115" detected?	
YES >> GO TO 17.	
17 REPLACE WHEEL SENSOR	
1 Replace wheel sensor	-
- Front: Refer to <u>BRC-66, "FRONT WHEEL SENSOR : Exploded View"</u> .	
 Rear: Refer to <u>BRC-67, "REAR WHEEL SENSOR : Exploded View"</u>. Erase self-diagnosis result for "ABS" with CONSULT. 	
3. Turn the ignition switch OFF, and wait 10 seconds or more.	
4. Start the engine.	,,
and "RR RH SENSOR" with CONSULT.	
6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel speed detected by the parmal wheel speed detected by the parma whee	1
ence within 5%, respectively?	-
YES >> GO TO 18.	
NO $>>$ GO IO 19. 19 DEDECRM OF LE DIA CALCOLO (2)	
IO.PERFORM SELF-DIAGNOSIS (6)	_
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle 	
3. Perform self-diagnosis for "ABS" with CONSULT.	
Is DTC "C1115" detected?	
YES >> GO TO 19.	
19 REDIACE SENSOR ROTOR	
	-
 Front: Refer to <u>BRC-68, "FRONT SENSOR ROTOR : Exploded View"</u>. 	
- Rear: Refer to <u>BRC-68</u> , " <u>REAR SENSOR ROTOR : Exploded View</u> ".	
 Erase self-diagnosis result for ABS . Turn the ignition switch OFF, and wait 10 seconds or more. 	
4. Start the engine.	
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. 	
7. Perform self-diagnosis for "ABS" with CONSULT.	
Is DTC "C1115" detected?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69, "Exploded View"</u> .	

< DTC/CIRCUIT DIAGNOSIS >

C1120, C1122, C1124, C1126 IN ABS SOL

Description

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

DTC Logic

INFOID:000000007350393

INFOID:000000007350392

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.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1120", "C1122", "C1124" or "C1126" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-38, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007350394

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.

2. Disconnect ABS actuator and electric unit (control unit) harness connector.

3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2. CHECK SOLENOID VALVE POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltago
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -"</u>.

BRC-38

C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

3.CHECK SOLENOID VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E36	3	Ground	Existed	
	4	Ground	LAISIEU	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69, "Exploded View"</u>.

NO >> Repair or replace error-detected parts.

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C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000007350397

INFOID:000000007350396

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.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1121", "C1123", "C1125" or "C1127" detected?

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

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007350398

1.CHECK CONNECTOR

1. Turn the ignition switch OFF.

2. Disconnect ABS actuator and electric unit (control unit) harness connector.

3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2. CHECK SOLENOID VALVE POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltago
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -"</u>.

BRC-40

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

3.CHECK SOLENOID VALVE GROUND CIRCUIT

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E36	3	Ground	Existed	
	4	Ground	LAISIEU	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69, "Exploded View"</u>.

NO >> Repair or replace error-detected parts.

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< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RELAY SYSTEM

Description

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

DTC Logic

INFOID:000000007350401

INFOID:000000007350400

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140		During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	 Harness or connector ABS actuator and electric up
	C1140 ACTUATOR RLY	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1140" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-42, "Diagnosis Procedure"</u>.
- NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000007350402

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2. CHECK ACTUATOR RELAY POWER SUPPLY

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

ABS actuator and ele	ctric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

$\mathbf{3}.$ CHECK ACTUATOR RELAY GROUND CIRCUIT

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

BRC-42

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -"</u>.

C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

ABS actuator and electric unit (control unit)			Continuity
Connector	Terminal		Continuity
E36	3	Ground	Existed
	4	Ground	LAISted

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69, "Exploded View"</u>.

NO >> Repair or replace error-detected parts.

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U1000 CAN COMM CIRCUIT

Description

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

DTC Logic

INFOID:000000007350405

INFOID:000000007350404

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)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "U1000" detected?

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

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007350406

1.PERFORM ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "U1000" detected?

- YES >> Proceed to LAN-16. "Trouble Diagnosis Flow Chart".
- NO >> INSPECTION END

U1010 CONTROL UNIT (CAN)

Description

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

DTC Logic

INFOID:000000007350408

DTC DETECTION LOGIC

DTC	Items	Diagnostic item is detected when	Possible cause	
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit) error	BRC
DTC CONFI	RMATION PROCEDURE			
1.PRECOND	DITIONING			G
If "DTC CONI	FIRMATION PROCEDURE	" has been previously conducted, always turn t	he ignition switch OFF	
and wait at le	ast 10 seconds before cond	ducting the next test.		Н
>> G	60 TO 2.			
2.DTC REPI	RODUCTION PROCEDUR	E		I
1. Turn the	ignition switch OFF to ON.			
2. Performs	o" detected?	h CONSULI.		J
YES >> P	Proceed to diagnosis proced	Jure. Refer to <u>BRC-45. "Diagnosis Procedure"</u> .		
NO >> II	NSPECTION END	-		IZ.
Diagnosis	Procedure		INFOID:000000007350409	rx.
1.ABS ACTU	JATOR AND ELECTRIC UI	NIT (CONTROL UNIT)		I
Check that th	ere is no malfunction in AB	S actuator and electric unit (control unit) harnes	s connector or discon-	L
nection.	ion result permal?			
YES >> R	eplace ABS actuator and e	electric unit (control unit). Refer to BRC-69. "Ex	ploded View".	IVI
NO >> R	Repair or replace error-dete	cted parts.		
				Ν
				0

INFOID:000000007350407

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

POWER SUPPLY AND GROUND CIRCUIT

Description

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

Diagnosis Procedure

INFOID:000000007667124

INFOID:000000007667123

[ABS]

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY

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

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E36	16	Ground	Approx. 0 V

4. Turn the ignition switch ON. CAUTION:

Never start the engine.

5. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal		voltage
E36	16	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

- 1. Turn the ignition switch OFF.
- 2. Check 10Ă fuse (59).
- 3. Disconnect IPDM E/R harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

ABS actuator and electric unit (control unit)		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E36	16	E15	59	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-18, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

 $\mathbf{3.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

1. Turn the ignition switch OFF.

2. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and electric unit (control unit)			Voltogo
Connector	Terminal	—	voltage
E36	1	Ground	Battery voltage
E30	2	Ground	Ballery Vollage

 Turn the ignition switch ON. CAUTION:

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Never start the engine.

4. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal	_	voltage
E36	1	Ground	Battony voltago
E30	2	Ground	ballery vollage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

4. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

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

ABS actuator and	electric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	3	Ground	Existed
ls the inspection	4		

NO >> Repair or replace error-detected parts.

[ABS]

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BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

BRAKE FLUID LEVEL SWITCH

Description

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

Component Function Check

1.CHECK BRAKE FLUID LEVEL SWITCH OPERATION

Operate the brake fluid level switch. Then check that the brake warning lamp in the combination meter turns on/off correctly.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Proceed to diagnosis procedure. Refer to <u>BRC-48, "Diagnosis Procedure"</u>.

Diagnosis Procedure

INFOID:000000007350412

1.CHECK BRAKE FLUID LEVEL

Check brake fluid level. Refer to BR-11, "Inspection".

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Refill brake fluid. Refer to <u>BR-11, "Refilling"</u>.

2.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect brake fluid level switch harness connector and combination meter harness connector.
- 3. Check terminal for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminal.
- 4. Reconnect harness connectors and then perform component function check. Refer to <u>BRC-48, "Compo-</u> <u>nent Function Check"</u>.

Is the inspection result normal?

- YES >> Poor connection of harness connector terminal. Replace or repair harness connector.
- NO >> GO TO 3.

3.CHECK BRAKE FLUID LEVEL SWITCH

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

Brake fluid level switch	Condition	Continuity	
Terminal	Condition		
1-2	When brake fluid is full in the reservoir tank.	Not existed	
1-2	When brake fluid is empty in the reservoir tank.	Existed	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Brake fluid level switch is malfunction. Replace reservoir tank.

4.CHECK BRAKE FLUID LEVEL SWITCH CIRCUIT

- 1. Disconnect combination meter harness connector.
- Check continuity between brake fluid level switch harness connector and combination meter harness connector.

INFOID:000000007350411

BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

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Continuit	ion meter Brake fluid level switch		Combina	
Continuity	Terminal	Connector	Terminal	Connector
Existed	1	E37	27	M34

3. Check continuity between combination meter harness connector and ground.

Combination meter			Continuity
Connector	Terminal		Continuity
M34	27	Ground	Not existed

4. Check continuity between brake fluid level switch harness connector and ground.

Brake fluid level switch			Continuity
Connector	Terminal		Continuity
E37	2	Ground	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection

1.CHECK BRAKE FLUID LEVEL SWITCH

1. Turn the ignition switch OFF.

Disconnect brake fluid level switch harness connector. 2.

3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch	Condition	Continuity	
Terminal	Condition	Continuity	
1 0	When brake fluid is full in the reservoir tank.	Not existed	
1 – 2	When brake fluid is empty in the reservoir tank.	Existed	
the increation recult normal?			K

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reservoir tank. Refer to <u>BR-28, "Disassembly and Assembly"</u>. BRC

INFOID:000000007350413

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PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

PARKING BRAKE SWITCH

Description

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Component Function Check

1. CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/ off correctly.

Condition	Brake warning lamp illumination status
When the parking brake switch is opera- tion	ON
When the parking brake switch is not oper- ation.	OFF

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to diagnosis procedure. Refer to <u>BRC-50, "Diagnosis Procedure"</u>.

Diagnosis Procedure

1.CHECK PARKING BRAKE SWITCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect parking brake switch harness connector.
- 3. Check continuity between parking brake switch connector terminal and ground.

Parking brake switch		Condition	Continuity
Terminal	_	Condition	
1	Ground	When the parking brake switch is operated.	Existed
I		When the parking brake switch is not operated.	Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace parking brake switch.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>tion".

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Repair or replace combination meter.

Component Inspection

1. CHECK PARKING BRAKE SWITCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect parking brake switch harness connector.
- 3. Check continuity between parking brake switch connector terminal and ground.

INFOID:000000007350414

INFOID:000000007350415

INFOID:000000007350416

INFOID:000000007350417

PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[ABS]

Parking brake sw	vitch	Condition	Continuity
Terminal		Condition	Continuity
1 Ground	When the parking brake switch is operated.	Existed	
	When the parking brake switch is not operated.	Not existed	
Is the inspection result normal?			
YES >> INSPECTION END			
NO >> Replace parking brake switch. Refer to <u>PB-6, "Exploded View"</u> .			

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ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007350418

[ABS]

×: ON -: OFF

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

Component Function Check

INFOID:000000007350419

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

Diagnosis Procedure

INFOID:000000007350420

1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" with CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-69</u>, "Exploded View".

NO >> Repair or replace combination meter.

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Description

[ABS]

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INFOID:000000007350421

	×: ON –: OFF B
Condition	Brake warning lamp (Note 1)
Ignition switch OFF	-
For 1 second after turning ignition switch ON	× (Note 2)
1 second later after turning ignition switch ON	× (Note 2)
EBD function is malfunctioning.	× D
 NOTE: 1: Brake warning lamp will turn on in case of parking brake oper (when brake fluid is insufficient). 2: After starting engine, brake warning lamp is turned off. 	eration (when switch is ON) or of brake fluid level switch operation $\ensuremath{\mathbb{E}}$
Component Function Check	INF0ID:00000007350422
1. BRAKE WARNING LAMP OPERATION CHECK 1	BRO
Check that the lamp illuminates for approximately 1 set Is the inspection result normal? YES >> GO TO 2. NO >> Proceed to diagnosis procedure. Refer to E	G <u>BRC-53, "Diagnosis Procedure"</u> .
2. BRAKE WARNING LAMP OPERATION CHECK 2	11
Check that the brake warning lamp in the combination ring brake pedal.Is the inspection result normal?YESYES>> INSPECTION ENDNO>> Check parking brake switch. Refer to BRC	meter turns ON/OFF correctly when operating the park-
Diagnosis Procedure	INF01D:00000007350423
1.CHECK PARKING BRAKE SWITCH	K
Check that the brake warning lamp in the combination ring brake pedal.	meter turns ON/OFF correctly when operating the park- $_$
YES $>>$ GO TO 2. NO $>>$ Check parking brake switch. Refer to <u>BRC</u> 2. CHECK SELF-DIAGNOSIS	-50, "Diagnosis Procedure". M
Perform self-diagnosis for "ABS" with CONSULT.	
Is the inspection result normal?	Ν
YES >> GO TO 3. NO >> Check items displayed by self-diagnosis.	0
3. CHECK COMBINATION METER	0
Check if the indication and operation of combination r tion".	neter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>
Is the inspection result normal?YES>> Replace ABS actuator and electric unit (coNO>> Repair or replace combination meter.	ntrol unit). Refer to BRC-69, "Exploded View".

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000007350424

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	
		Vehicle stopped	0 [km/h (MPH)]	
FR LH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	
		Vehicle stopped	0 [km/h (MPH)]	
FR RH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	
		Vehicle stopped	0 [km/h (MPH)]	
RR LH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	
		Vehicle stopped	0 [km/h (MPH)]	
RR RH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	
	Otan lange switch size of status	When brake pedal is depressed	On	
STOP LAWP SW	Stop lamp switch signal status	When brake pedal is not depressed	Off	
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	
DECEL G-SEN1	Pacal & datacted by & sonsor	Changes according to an indication	On	
(Note 2)	Decer O delected by O sensor	shown by the G sensor	Off	
DECEL G-SEN2	Decel C detected by C concer	Changes according to an indication	On	
(Note 2)	Decer G delected by G sensor	shown by the G sensor	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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	
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
FR RH OUT SOL		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
FR LH IN SOL		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
	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 INFORMATION >

[ABS]

		Data monitor		
Monitor item	Display content	Condition	Reference value in A normal operation	
FR LH OUT SOL		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On B	
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off BR	
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
		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	
		When the motor relay and motor are not operating	Off	
ACTUATOR RLY		When the actuator relay is operating	On K	
(Note 3)	Actuator relay operation	When the actuator relay is not operating	Off	
ABS WARN LAMP	ABS warning lamp	When ABS warning lamp is ON	On	
	(Note 4)	When ABS warning lamp is OFF	Off	
		EBD is active	On	
EBD SIGNAL	EBD operation	EBD is inactive	Off	
		ABS is active	On	
ABS SIGNAL	Abo operation	ABS is inactive	Off	
		In EBD fail-safe	On N	
EBD FAIL SIG	בסט זמוו-sale signal	EBD is normal	Off	
	APS foil offo signal	In ABS fail-safe	On	
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	Off	

NOTE:

- 1: Confirm tire pressure is normal.
- 2: Only AWD models.
- 3: Every 20 seconds momentary switch to Off.
- 4: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-52, "Description".

< ECU DIAGNOSIS INFORMATION >

Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:000000007350425

For connector terminal arrangements, harness layouts, and alphabets in a \bigcirc (option abbreviation; if not described in wiring diagram), refer to <u>GI-12, "Connector Information"</u>.



Fail-Safe

ABS, EBD SYSTEM

Revision: 2013 February

INFOID:000000007350426

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< ECU DIAGNOSIS INFORMATION >

In case of electrical malfunctions with the ABS, ABS warning lamp will turn ON. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp will turn ON. Simultaneously, the ABS become one of the following conditions of the fail-safe function.

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

 For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without ABS, EBD system.

DTC Index

DTC	Items (CONSULT screen terms)	Reference	
C1101	RR RH SENSOR-1		E
C1102	RR LH SENSOR-1		
C1103	FR RH SENSOR-1	BRC-16, DTC LOGIC	BRC
C1104	FR LH SENSOR-1		BRO
C1105	RR RH SENSOR-2		
C1106	RR LH SENSOR-2	PPC 21 "DTC Logic"	G
C1107	FR RH SENSOR-2	BRC-21, DTC Logic	
C1108	FR LH SENSOR-2		Ц
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-26, "DTC Logic"	11
C1110	CONTROLLER FAILURE	BRC-28, "DTC Logic"	
C1111	PUMP MOTOR	BRC-29, "DTC Logic"	
C1113	G SENSOR	BRC-31, "DTC Logic"	
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-33, "DTC Logic"	
C1120	FR LH IN ABS SOL	BRC-38, "DTC Logic"	J
C1121	FR LH OUT ABS SOL	BRC-40, "DTC Logic"	
C1122	FR RH IN ABS SOL	BRC-38, "DTC Logic"	K
C1123	FR RH OUT ABS SOL	BRC-40, "DTC Logic"	
C1124	RR LH IN ABS SOL	BRC-38, "DTC Logic"	
C1125	RR LH OUT ABS SOL	BRC-40, "DTC Logic"	L
C1126	RR RH IN ABS SOL	BRC-38, "DTC Logic"	
C1127	RR RH OUT ABS SOL	BRC-40, "DTC Logic"	M
C1140	ACTUATOR RLY	BRC-42, "DTC Logic"	
U1000	CAN COMM CIRCUIT	BRC-44, "DTC Logic"	
U1010	CONTROL UNIT (CAN)	BRC-45, "DTC Logic"	N

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[ABS]

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

[ABS]

SYMPTOM DIAGNOSIS EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:000000007350428

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to <u>BR-48. "General Specifications"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.

- Front
- 2WD models: Refer to FAX-7, "Inspection".
- AWD models: Refer to FAX-33, "Inspection".
- Rear
- 2WD models: Refer to <u>RAX-4, "Inspection"</u>.
- AWD models: Refer to RAX-11, "Inspection"
- Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

 $\mathbf{3}.$ Check wheel sensor and sensor rotor

Check the following.

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

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace wheel sensor or sensor rotor.
 - 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 for "ABS" with CONSULT.
- NO >> Normal

UNEXPECTED PEDAL REACTION

UNEXPECTED PEDAL REACTION A Diagnosis Procedure INFOID:00000007350429 1.CHECK BRAKE PEDAL STROKE B Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment". B
Diagnosis Procedure INFOID:00000007350429 1.CHECK BRAKE PEDAL STROKE B Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment". B
1. CHECK BRAKE PEDAL STROKE B Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment". B
Check brake pedal stroke. Refer to <u>BR-8</u> , "Inspection and Adjustment".
Is the stroke too large?
 YES >> • Bleed air from brake tube and hose. Refer to <u>BR-12</u>, "<u>Bleeding Brake System</u>". • Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc.
 Brake pedal: Refer to <u>BR-8, "Inspection and Adjustment"</u>. Master cylinder: Refer to <u>BR-13, "Inspection"</u>. Brake booster: Refer to <u>BR-14, "Inspection"</u>.
NO $>>$ GO TO 2.
2.CHECK FUNCTION
Disconnect ABS actuator and electric unit (control unit) harness connector to deactivate ABS. Check if braking force is normal in this condition. Connect harness connector after inspection.
Is the inspection result normal?
YES >> Normal
NO >> Check brake system.

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THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000007350430

[ABS]

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >	[ABS]	
ABS FUNCTION DOES NOT OPERATE		Λ
Diagnosis Procedure	INFOID:000000007350431	~
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY		В
Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when drivi	ing.	С
Is the inspection result normal?		
YES >> Normal NO >> Perform self-diagnosis for "ABS" with CONSULT.		D

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PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:000000007350432

[ABS]

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). 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 for "ABS" with CONSULT.

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

NORMAL OPERATING CONDITION

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when ABS is activated.	This is a normal condi-	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	tion due to the ABS acti- vation.	С
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 a normal, and it is caused by the ABS operation check.	D

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PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

WARNING:

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover

INFOID:000000007669016

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.





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WARNING:

Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- Brake fluid use refer to MA-15, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.
- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.

PRECAUTIONS

< PRECAUTION >

- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control

- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- 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 estimate causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.



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INFOID:000000007350441

[ABS]

< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View



- 1. Front LH wheel sensor
- A. Yellow line (slant line)

Refer to <u>GI-4, "Components"</u> for symbol in the figure.

NOTE:

The above figure (front side) shows left side. Right side is the mirror image.

FRONT WHEEL SENSOR : Removal and Installation

INFOID:000000007350443

REMOVAL

Pay attention to the following when removing sensor.

- CAUTION:
- Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.
- Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.
- When you see the harness of the wheel sensor from the front side of the vehicle ensure that the yellow lines (A) are not twisted.

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

REAR WHEEL SENSOR

INFOID:000000007350442

WHEEL SENSOR

< REMOVAL AND INSTALLATION >

REAR WHEEL SENSOR : Exploded View

А

INFOID:000000007350444



- 1. Rear LH wheel sensor
- A. 2WD models B. AWD models

Refer to <u>GI-4, "Components"</u> for symbol in the figure.

NOTE:

The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

REMOVAL

Pay attention to the following when removing sensor. **CAUTION:**

- Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.
- Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

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SENSOR ROTOR

< REMOVAL AND INSTALLATION >

SENSOR ROTOR FRONT SENSOR ROTOR

FRONT SENSOR ROTOR : Exploded View

Refer to FAX-9, "Exploded View" (2WD models), FAX-35, "Exploded View" (AWD models).

FRONT SENSOR ROTOR : Removal and Installation

REMOVAL

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub and bearing assembly. Refer to <u>FAX-9</u>, "<u>Removal and Installation</u>" (2WD models), <u>FAX-35</u>, "<u>Removal and Installation</u>" (AWD models).

INSTALLATION

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub and bearing assembly. Refer to <u>FAX-9. "Removal and Installation"</u> (2WD models), <u>FAX-35. "Removal and Installation"</u> (AWD models). **REAR SENSOR ROTOR**

REAR SENSOR ROTOR : Exploded View

Refer to RAX-5, "Exploded View" (2WD models), RAX-13, "Exploded View" (AWD models).

REAR SENSOR ROTOR : Removal and Installation

2WD MODELS

Removal

Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub and bearing assembly. Refer to <u>RAX-5, "Removal and Installation"</u>.

Installation

Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub and bearing assembly. Refer to <u>RAX-5</u>, "<u>Removal and Installation</u>".

AWD MODELS

For removal and installation of sensor rotor, refer to RAX-17. "Disassembly and Assembly".

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ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000007350450

[ABS]

А



- 5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
- 6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
- 7. Remove ABS actuator and electric unit (control unit) from vehicle.

INSTALLATION

BRC-69

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

Note the following, and install in the reverse order of removal.

• Before servicing, disconnect the battery cable from negative terminal.

• To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.

- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-12, "Bleeding Brake System"</u>.
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure harness connector is securely locked.

G SENSOR

Exploded View

INFOID:000000007350452

[ABS]

А



1. G sensor

2. Bracket

C: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

REMOVAL CAUTION:

H Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.

- Remove center console assembly. Refer to <u>IP-22, "Exploded View"</u>.
- 2. Disconnect G sensor harness connector.
- 3. Remove mounting nuts. Remove G sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

• Never drop or strike G sensor, or never use power tool etc., because G sensor is sensitive to the impact.

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< BASIC INSPECTION >

[VDC/TCS/ABS]

BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Work Flow

INFOID:000000007350454

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to <u>BRC-76, "ADJUSTMENT OF STEERING ANGLE</u> <u>SENSOR NEUTRAL POSITION : Description"</u>.
DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

[VDC/TCS/ABS]





1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to <u>BRC-75</u>, "Diagnostic Work Sheet".

>> GO TO 2.

DIAGNOSIS AND REPAIR WORKFLOW

< BASIC INSPECTION >

2.PERFORM THE SELF-DIAGNOSIS

Perform self-diagnosis with CONSULT.

Is there any DTC displayed?

YES >> Record or print self-diagnosis results and freeze frame data (FFD) GO TO 3.

NO >> GO TO 4.

3. PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC of "ABS" with CONSULT. Refer to <u>BRC-166, "DTC Index"</u>.

>> GO TO 7.

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to <u>BRC-174.</u> "Description".

Is the symptom a normal operation?

YES >> GO TO 8.

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-155, "Description"</u>.
- Brake warning lamp: Refer to <u>BRC-156, "Description"</u>.
- VDC warning lamp: Refer to BRC-158, "Description".
- VDC OFF indicator lamp: Refer to <u>BRC-159, "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 displayed DTC of "ABS" with CONSULT.

>> GO TO 7.

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8.

8.MEMORY CLEAR

Perform self-diagnosis memory clear for "ABS" with CONSULT.

>> GO TO 9.

9.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely.

Is no other DTC present and the repair completed?

YES >> INSPECTION END

NO >> GO TO 3.

DIAGNOSIS AND REPAIR WORKFLOW

Operation of electrical equipment

□ Shift change □ Other descriptions

< BASIC INSPECTION >

Other conditions

Diagnostic Work Sheet

INFOID:000000007350455

[VDC/TCS/ABS]

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Customer name MR/MS	Model & Year		VIN	
Engine #	Trans.		Mileage	
Incident Date	Manuf. Date		In Service Dat	e
Symptoms	 ☐ Noise and vibration (from engine compartment) ☐ Noise and vibration (from axle) 	UWarning / 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			1
Road conditions	Low friction road (Snow Gra Bumps / potholes	avel DOther)		
Driving conditions	Full-acceleration High speed cornering Vehicle speed: Greater than 10 ki Vehicle speed: 10 km/h (6 MPH) Vehicle is stopped	m/h (6 MPH) or less		
Applying brake conditions	□ Suddenly □ Gradually			

SFIA3265E

INSPECTION AND ADJUSTMENT

< BASIC INSPECTION >

INSPECTION AND ADJUSTMENT ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:000000007350456

In case of doing work that applies to the list below, make sure to adjust neutral position of steering angle sensor before running vehicle.

×: Required -: Not required

Situation	Adjustment of steering angle sensor neutral position
Removing/Installing steering angle sensor	×
Replacing steering angle sensor	×
Removing/Installing steering wheel	×
Replacing steering wheel	×
Removing/Installing steering components	×
Replacing steering components	×
Removing/Installing suspension components	×
Replacing suspension components	×
Change tires to new ones	_
Tire rotation	_
Adjusting wheel alignment	×

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION CAUTION:

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

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2.

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

- 1. Select "ABS", "WORK SUPPORT" and "ST ANGLE SENSOR ADJUSTMENT" in order with CONSULT.
- 2. Select "START". CAUTION:

Never touch steering wheel while adjusting steering angle sensor.

- After approximately 10 seconds, select "END".
 NOTE: After approximately 60 seconds, it ends automatically.
- 4. Turn the ignition switch OFF, then turn it ON again.
- CAUTION: Be sure to perform above operation.

>> GO TO 3.

3.CHECK DATA MONITOR

- 1. Run vehicle with front wheels in straight-ahead position, then stop.
- 2. Select "ABS", "DATA MONITOR" and "STR ANGLE SIG" in order with CONSULT, and check steering angle sensor signal.

STR ANGLE SIG $: 0\pm 2.5^{\circ}$

INSPECTION AND ADJUSTMENT

[V	DC/	TCS	ABS]
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< BASIC INSPECTION >	[VDC/TCS/ABS]
Is the steering angle within the specified range?	
YES >> GO TO 4. NO >> Perform the neutral position adjustment for the steering angle sensor again, 4. ERASE THE SELF-DIAGNOSIS MEMORY	, GO TO 1.
 Erase the self-diagnosis memories for "ABS" and "ENGINE" with CONSULT. "ABS": Refer to <u>BRC-94</u>, "<u>CONSULT Function</u>". "ENGINE": Refer to <u>EC-107</u>, "<u>CONSULT Function</u>". 	B
Are the memories erased?	С
YES >> INSPECTION END NO >> Check the items indicated by the self-diagnosis.	D
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< SYSTEM DESCRIPTION > SYSTEM DESCRIPTION VDC

System Diagram

INFOID:000000007350458



System Description

INFOID:000000007350459

- Vehicle Dynamics Control system detects driver's steering operation amount and brake pedal travel from steering angle sensor and pressure 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 VDC warning lamp.
- Electrical system diagnosis by CONSULT is available.

Component Parts Location

INFOID:000000007350460

FOR USA

- 1.
- 4. VDC OFF indicator lamp
- 7. ABS actuator and electric unit (control unit)
- 10. Rear wheel sensor (2WD models)
- 5. VDC warning lamp
- 8. Front wheel sensor
- 11. Rear wheel sensor (AWD models)
- Yaw rate/side/decel G sensor 6.
- VDC OFF switch 9.



VDC

Revision: 2013 February

- Back of spiral cable assembly Α.
- D. Engine room (right side)
- G. Rear axle

В. Combination meter Ε. Steering knuckle

VDC

- C. Center console
- F. Instrument driver lower panel

[VDC/TCS/ABS]

EXCEPT FOR USA



- Steering angle sensor 1. VDC OFF indicator lamp
- 2. 5.
- ABS warning lamp VDC warning lamp
- 3. Brake warning lamp
- 6. Yaw rate/side/decel G sensor

4.

BRC-80

VDC

[VDC/TCS/ABS]

INFOID:000000007350461

7.	ABS actuator and electric unit (con- trol unit)	8.	Front wheel sensor	9.	VDC OFF switch	А
10.	Rear wheel sensor (2WD models)	11.	Rear wheel sensor (AWD models)			
Α.	Back of spiral cable assembly	В.	Combination meter	C.	Center console	R
D.	Engine room (right side)	Ε.	Steering knuckle	F.	Instrument driver lower panel	D
G.	Rear axle					

Component Description

< SYSTEM DESCRIPTION >

Compo	Reference	D	
	Pump	PDC 110 "Description"	_
	Motor	BRC-110, "Description"	_
	Actuator relay (Main relay)	BRC-132, "Description"	- E
ABS actuator and electric unit (control unit)	Solenoid valve	BRC-127, "Description"	_
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"	BRC
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"	
Wheel sensor	BRC-99, "Description"		
Yaw rate/side/decel G sensor		BRC-112, "Description"	G
Steering angle sensor		BRC-134, "Description"	
VDC OFF switch		BRC-153, "Description"	—
ABS warning lamp	BRC-155, "Description"		
Brake warning lamp	BRC-156, "Description"		
VDC OFF indicator lamp	BRC-159, "Description"	- I	
VDC warning lamp	BRC-158, "Description"		
			_

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TCS

System Diagram

INFOID:000000007350462



TCS

System Description

INFOID:000000007350463

- Traction Control System is a function that electronically controls engine torque, brake fluid pressure and CVT shift 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 VDC warning lamp.
- Electrical system diagnosis by CONSULT is available.

Component Parts Location

INFOID:000000007350464

FOR USA





TCS

(A)

- 1. Steering angle sensor
- 4. VDC OFF indicator lamp
- 7. ABS actuator and electric unit (control unit)
- 10. Rear wheel sensor (2WD models)
- 2. ABS warning lamp
- 5. VDC warning lamp
- 8. Front wheel sensor
- 11. Rear wheel sensor (AWD models)
- Brake warning lamp 3.

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Yaw rate/side/decel G sensor 6.

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VDC OFF switch 9.

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- Back of spiral cable assembly Α.
- D. Engine room (right side)
- G. Rear axle

EXCEPT FOR USA

В. Combination meter Steering knuckle

TCS

- C. Center console
- F. Instrument driver lower panel

[VDC/TCS/ABS]

Ε.



- Steering angle sensor 1. VDC OFF indicator lamp
- 2. ABS warning lamp VDC warning lamp 5.
- 6. Yaw rate/side/decel G sensor

4.

INFOID:000000007350465

7.	ABS actuator and electric unit (con- trol unit)	8.	Front wheel sensor	9.	VDC OFF switch	А
10.	Rear wheel sensor (2WD models)	11.	Rear wheel sensor (AWD models)			
Α.	Back of spiral cable assembly	В.	Combination meter	C.	Center console	R
D.	Engine room (right side)	Ε.	Steering knuckle	F.	Instrument driver lower panel	D
G.	Rear axle					

TCS

Component Description

Compo	Reference	D		
	Pump	PPC 110 "Description"		
	Motor	BRC-110, Description	_	
APS actuator and algoritic unit (control unit)	Actuator relay (Main relay)	BRC-132, "Description"		
	Solenoid valve	BRC-127, "Description"		
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"	BRC	
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"		
Wheel sensor	BRC-99, "Description"			
Yaw rate/side/decel G sensor	BRC-112, "Description"	G		
Steering angle sensor	BRC-134, "Description"			
VDC OFF switch		BRC-153, "Description"	— Н	
ABS warning lamp	BRC-155, "Description"			
Brake warning lamp	BRC-156, "Description"			
VDC OFF indicator lamp	BRC-159, "Description"			
VDC warning lamp	BRC-158, "Description"			

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System Diagram

INFOID:000000007350466

Combination meter (Brake warning lamp, ABS warning lamp, VDC OFF indicator lamp, VDC warning lamp) Steering ECM тсм angle sensor Injector operation signal CAN communication AWD communication line AWD control unit (With AWD) Front RH wheel sensor Yaw rate/side/decel G sensor Rear RH wheel VDC OFF switch sensor ABS actuator and electric unit (control unit) С С С Rear LH Front LH wheel wheel sensor sensor JSFIA1113GB

ABS

System Description

INFOID:000000007350467

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

Component Parts Location

INFOID:000000007350468

FOR USA



ABS

- 7. ABS actuator and electric unit (control unit)
- 10. Rear wheel sensor (2WD models)
- 8. Front wheel sensor
- 11. Rear wheel sensor (AWD models)
- VDC OFF switch 9.

1.

4.

- A. Back of spiral cable assembly
- D. Engine room (right side)
- G. Rear axle

B. Combination meterE. Steering knuckle

ABS

- C. Center console
- F. Instrument driver lower panel

[VDC/TCS/ABS]

EXCEPT FOR USA



- Steering angle sensor
 VDC OFF indicator lamp
- ABS warning lamp
 VDC warning lamp
- J. Brake
 - 6. Yaw rate/side/decel G sensor

BRC-88

2012 ROGUE

ABS

[VDC/TCS/ABS]

7.	ABS actuator and electric unit (con- trol unit)	8.	Front wheel sensor	9.	VDC OFF switch	А
10.	Rear wheel sensor (2WD models)	11.	Rear wheel sensor (AWD models)			
Α.	Back of spiral cable assembly	В.	Combination meter	C.	Center console	B
D.	Engine room (right side)	Ε.	Steering knuckle	F.	Instrument driver lower panel	
G.	Rear axle					

Component Description

< SYSTEM DESCRIPTION >

INFOID:000000007350469

С

Compo	Reference	D				
	Pump	BRC-110, "Description"				
	Motor	<u></u>	F			
ABS actuator and electric unit (control unit)	Actuator relay (Main relay)	BRC-132, "Description"				
	Solenoid valve	BRC-127, "Description"				
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"	BRC			
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"				
Wheel sensor	BRC-99, "Description"					
Yaw rate/side/decel G sensor	BRC-112, "Description"	G				
Steering angle sensor		BRC-134, "Description"				
VDC OFF switch		BRC-153, "Description"	Н			
ABS warning lamp	BRC-155, "Description"					
Brake warning lamp	BRC-156, "Description"					
VDC OFF indicator lamp	BRC-159, "Description"					
VDC warning lamp	VDC warning lamp					

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System Diagram

INFOID:000000007350470



EBD

System Description

INFOID:000000007350471

- 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 is electronically controls the rear braking force (brake fluid pressure) to reducing and reduces rear wheel slippage. Accordingly it improves vehicle stability.
- Electrical system diagnosis by CONSULT is available.

Component Parts Location

INFOID:000000007350472

FOR USA

Revision: 2013 February





4. VDC OFF indicator lamp

1.

- 7. ABS actuator and electric unit (control unit)
- 10. Rear wheel sensor (2WD models)
- 5. VDC warning lamp
- 8. Front wheel sensor
- 11. Rear wheel sensor (AWD models)
- Yaw rate/side/decel G sensor 6.
- VDC OFF switch 9.

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- Back of spiral cable assembly Α.
- D. Engine room (right side)
- G. Rear axle

- В. Combination meter Ε. Steering knuckle
- C. Center console
- F. Instrument driver lower panel

EXCEPT FOR USA



- Steering angle sensor 1. VDC OFF indicator lamp 4.
- 5.
 - VDC warning lamp
- 3. Brake warning lamp
- 6. Yaw rate/side/decel G sensor

Revision: 2013 February

BRC-92



EBD

[VDC/TCS/ABS]

INFOID:000000007350473

7.	ABS actuator and electric unit (con- trol unit)	8.	Front wheel sensor	9.	VDC OFF switch	А
10.	Rear wheel sensor (2WD models)	11.	Rear wheel sensor (AWD models)			
Α.	Back of spiral cable assembly	В.	Combination meter	C.	Center console	R
D.	Engine room (right side)	Ε.	Steering knuckle	F.	Instrument driver lower panel	D
G.	Rear axle					

Component Description

< SYSTEM DESCRIPTION >

Compo	Reference	D	
	Pump	PPC 110 "Departmention"	
	Motor	BRC-110, Description	_
APS actuator and algotric unit (control unit)	Actuator relay (Main relay)	BRC-132, "Description"	
	Solenoid valve	BRC-127, "Description"	
	VDC switch-over valve (CV1, CV2)	BRC-139, "Description"	BRC
	VDC switch-over valve (SV1, SV2)	BRC-141, "Description"	
Wheel sensor	BRC-99, "Description"		
Yaw rate/side/decel G sensor	BRC-112, "Description"	G	
Steering angle sensor	BRC-134, "Description"		
VDC OFF switch	BRC-153, "Description"	Н	
ABS warning lamp	BRC-155, "Description"		
Brake warning lamp	BRC-156, "Description"		
VDC OFF indicator lamp	BRC-159, "Description"		
VDC warning lamp	BRC-158, "Description"		

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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

CONSULT Function

INFOID:000000007350474

FUNCTION

CONSULT 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.
Self diagnostic result	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 drives some actuators apart from the ABS actuator and electric unit (control unit) and also shifts some parameters in a specified range.
ECU identification	ABS actuator and electric unit (control unit) part number can be read.

WORK SUPPORT

Item	Description
ST ANGLE SENSOR ADJUSTMENT	Adjusts the neutral position of the steering angle sensor.

SELF DIAGNOSTIC RESULT

Operation Procedure

Before performing the self-diagnosis for "ABS" with CONSULT, 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 for "ABS" with CONSULT, 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 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, VDC 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).
- VDC OFF switch should not stay "ON" position.

Display Item List Refer to <u>BRC-166, "DTC Index"</u>.

DATA MONITOR MODE

Display Item List

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

			x: Applicable ▼: Optional item	
	SELECT MO	ONITOR ITEM		
Monitor item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	Remarks	
FR LH SENSOR [km/h (MPH)]	×	×		
FR RH SENSOR [km/h (MPH)]	×	×	Wheel speed	
RR LH SENSOR [km/h (MPH)]	×	×		
RR RH SENSOR [km/h (MPH)]	×	×		
STOP LAMP SW (On/Off)	×	×	Stop lamp switch signal status	
BATTERY VOLT (V)	×	×	Battery voltage supplied to the ABS actuator and electric unit (control unit)	
GEAR	×	×	Gear position determined by TCM	
OFF SW (On/Off)	×	×	VDC OFF switch	
YAW RATE SEN (d/s)	×	×	Yaw rate detected by yaw rate/side/decel G sensor	
DECEL G-SEN (G)	×	×	Decel G detected by yaw rate/side/decel G sensor	
ACCEL POS SIG (%)	×	•	Throttle actuator opening/closing is displayed (Linked with accelerator pedal)	
SIDE G-SENSOR (m/s ²)	×	•	Transverse G detected by yaw rate/side/decel G sensor	
STR ANGLE SIG (°)	×	•	Steering angle detected by steering angle sensor	
ENGINE RPM [tr/min (rpm)]	×	•	Engine speed	
FLUID LEV SW (On/Off)	×	•	Brake fluid level switch signal status	
FR RH IN SOL (On/Off)	•	×		
FR RH OUT SOL (On/Off)	•	×		
FR LH IN SOL (On/Off)	•	×		
FR LH OUT SOL (On/Off)	•	×	Operation status of each solenoid value	
RR RH IN SOL (On/Off)	▼	×	Operation status of each solenolu valve	
RR RH OUT SOL (On/Off)	▼	×		
RR LH IN SOL (On/Off)	▼	×		
RR LH OUT SOL (On/Off)	▼	×		
MOTOR RELAY (On/Off)	▼	×	Motor and motor relay operation	
ACTUATOR RLY (On/Off)	▼	×	Actuator relay operation	

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

	SELECT MONITOR ITEM			
Monitor item (Unit)	ECU INPUT SIGNALS	MAIN SIGNALS	Remarks	
ABS WARN LAMP (On/Off)	▼	×	ABS warning lamp	
OFF LAMP (On/Off)	▼	×	VDC OFF indicator lamp	
SLIP/VDC LAMP (On/Off)	▼	×	VDC warning lamp	
N POSI SIG (On/Off)	▼	▼	N range status	
P POSI SIG (On/Off)	▼	▼	P range status	
R POSI SIG (On/Off)	▼	▼	R range status	
CRAKING SIG (On/Off)	▼	▼	CAN mask request for cranking	
CV1 (On/Off)	▼	▼	Cut valve 1 monitor	
CV2 (On/Off)	▼	▼	Cut valve 2 monitor	
SV1 (On/Off)	▼	▼	Suction valve 1 monitor	
SV2 (On/Off)	▼	▼	Suction valve 2 monitor	
STOP LAMP SW2 (On/Off)	▼	▼	ASCD brake switch signal status	
EBD SIGNAL (On/Off)	▼	▼	EBD operation	
ABS SIGNAL (On/Off)	▼	▼	ABS operation	
TCS SIGNAL (On/Off)	▼	▼	TCS operation	
VDC SIGNAL (On/Off)	▼	▼	VDC operation	
EBD FAIL SIG (On/Off)	▼	▼	EBD fail-safe status	
ABS FAIL SIG (On/Off)	▼	▼	ABS fail-safe status	
TCS FAIL SIG (On/Off)	▼	▼	TCS fail-safe status	
VDC FAIL SIG (On/Off)	▼	▼	VDC fail-safe status	
4WD MODE MON (On/Off)	▼	▼	AWD mode monitor	

ACTIVE TEST MODE

CAUTION:

- Never 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 warning lamp and brake warning lamp are on.
- ABS warning lamp, VDC warning lamp and brake warning lamp are on during active test.
- Erase memory of ICC system after implementing active test.

NOTE:

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

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- 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" in "ABS" with CONSULT is displayed 10 seconds after operation start.
- After "TEST IS STOPPED" in "ABS" with CONSULT is displayed, to perform test again.

Test Item

ABS SOLENOID VALVE

• Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

Test item	Display item	Display			
lest lielli		Up	Keep	Down	D
	FR RH IN SOL	Off	On	On	
	FR RH OUT SOL	Off	Off	On*	F
FR RH 30L	CV1	Off	Off	Off	
	SV1	Off	Off	Off	
	FR LH IN SOL	Off	On	On	BRC
	FR LH OUT SOL	Off	Off	On*	
	CV2	Off	Off	Off	
	SV2	Off	Off	Off	G
	RR RH IN SOL	Off	On	On	
	RR RH OUT SOL	Off	Off	On*	Н
	CV2	Off	Off	Off	
	SV2	Off	Off	Off	
	RR LH IN SOL	Off	On	On	
	RR LH OUT SOL	Off	Off	On*	
KK LH SOL	CV1	Off	Off	Off	J
	SV1	Off	Off	Off	

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

ABS SOLENOID VALVE (ACT)

• Select "Up", "Keep" and "Down" of "ACTIVE TEST" in "ABS" with CONSULT. Then use screen monitor to check that solenoid valve operates as shown in solenoid valve operation chart.

To at its m	Disalau itaa		Display		
lest item	Display item	Up	ACT UP	ACT KEEP	
	FR RH IN SOL	Off	Off	Off	IV
FR RH ABS SOLENOID	FR RH OUT SOL	Off	Off	Off	
(ACT)	CV1	Off	On	On	N
	SV1	Off	On*	Off	
-	FR LH IN SOL	Off	Off	Off	
FR LH ABS SOLENOID	FR LH OUT SOL	Off	Off	Off	0
(ACT)	CV2	Off	On	On	
	SV2	Off	On*	Off	P
	RR RH IN SOL	Off	Off	Off	
RR RH ABS SOLENOID	RR RH OUT SOL	Off	Off	Off	
(ACT)	CV2	Off	On	On	
	SV2	Off	On*	Off	

Revision: 2013 February

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

< SYSTEM DESCRIPTION >

[VDC/TCS/ABS]

Test item	Display itom	Display			
	Display item	Up	ACT UP	ACT KEEP	
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	Off	Off	Off	
	RR LH OUT SOL	Off	Off	Off	
	CV1	Off	On	On	
	SV1	Off	On*	Off	

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

ABS MOTOR

• Select "On" and "Off" of "ACTIVE TEST" in "ABS" with CONSULT on screen. Make sure motor relay and actuator relay operates as shown in table below.

Test item	Display item	Display	
	Display item	On	Off
ABS MOTOR	MOTOR RELAY	On	Off
	ACTUATOR RLY	On	On

NOTE:

A brief moment of On/Off condition occurs every 20 seconds after ignition switch turned ON. This is not malfunction because it is an operation for checking.

ECU IDENTIFICATION

ABS actuator and electric unit (control unit) part number can be read.

6.

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS C1101, C1102, C1103, C1104 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	
C1101	RR RH SENSOR-1	Circuit of rear RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.		Ε
C1102	RR LH SENSOR-1	Circuit of rear LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	Harness or connectorWheel sensor	BR
C1103	FR RH SENSOR-1	Circuit of front RH wheel sensor is open or short circuit. Current signal from sensor is outside limits.	ABS actuator and electric unit (control unit)	
C1104	FR LH SENSOR-1	Circuit of front LH wheel sensor is open or short circuit. Current signal from sensor is outside limits.		G
DTC CC	NFIRMATION PROCE	DURE		
1.PREC	CONDITIONING			Н
If "DTC C and wait	CONFIRMATION PROCEI at least 10 seconds befor	DURE" has been previously conducted, always e conducting the next test.	turn the ignition switch OFF	
-	>> GO TO 2.			
2.dtc1	REPRODUCTION PROCE	EDURE		J
1. Start 2. Perfe	the engine and drive the orm self-diagnosis for "AB C1101" "C1102" "C1103"	vehicle at 30 km/h (19 MPH) or more for approx S" with CONSULT. or "C1104" detected?	imately 1 minute.	K
YES	>> Proceed to diagnosis	procedure. Refer to <u>BRC-99, "Diagnosis Proced</u>	ure".	
NO	>> INSPECTION END			
Diagno	sis Procedure		INFOID:00000007666810	
CAUTIO	N:			M
	IECK DETWEEN WNEEL SEN IK WHEEL SENSOR	sor narness connector terminals.		
1 Turn	the ignition switch OFF			N
2. Che	ck wheel sensor for dama	ge.		I N
Is the ins	spection result normal?			
YES NO	>> GO TO 3. >> GO TO 2.			0
2.REPL	ACE WHEEL SENSOR (1)		
1. Repl - Fron	ace wheel sensor. t: Refer to <u>BRC-177, "FR(</u>	ONT WHEEL SENSOR : Exploded View".		Ρ
- Keal 2. Eras	r: Refer to <u>BRC-178, "REA</u> se self-diagnosis result for	AK VVITEEL SEINSOK : EXPloded VIEW". "ABS".		
3. Turn	the ignition switch OFF, a	nd wait 10 seconds or more.		
4. Start 5. Drive	. the engine. e the vehicle at approx. 30) km/h (19 MPH) or more for approx. 1 minute.		

Stop the vehicle.

BRC-99

[VDC/TCS/ABS]

INFOID:000000007350475

INFOID:000000007350476

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C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

7. Perform self-diagnosis for "ABS" with CONSULT. Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK CONNECTOR

1. Turn the ignition switch OFF.

- 2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- 3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 4.

4.PERFORM SELF-DIAGNOSIS (1)

- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine.
- 4. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 5. Stop the vehicle.
- 6. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts and GO TO 6.

6. PERFORM SELF-DIAGNOSIS (2)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS".
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- 6. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 7. Stop the vehicle.
- 8. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1101", "C1102", "C1103" or "C1104" detected?

YES >> GO TO 7.

NO >> INSPECTION END

7.CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

C1101, C1102, C1103, C1104 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Measurement connect	ctor and terminal for power	r supply circuit			
ABS actuator and ele	ectric unit (control unit)	Wheel s	ensor		
Connector	Terminal	Connector	Terminal	Continuity	
	21	E39 (Front RH wheel)	3		
500	23	E22 (Front LH wheel)	1	- • • •	
E36	11	B41 (Rear RH wheel)	7	Existed	
	26	B44 (Rear LH wheel)	5		
Measurement connect	ctor and terminal for signal	circuit			
ABS actuator and ele	ectric unit (control unit)	Wheel s	ensor		
Connector	Terminal	Connector	Terminal	Continuity	
	12	E39 (Front RH wheel)	4		
	27	E22 (Front LH wheel)	2		
E36	15	B41 (Rear RH wheel)	8	Existed	
	30	B44 (Rear LH wheel)	6		
Is the inspection res	ult normal?				
8.PERFORM SELF	F-DIAGNOSIS (3)	unit (control unit) harne	o.		
 Connect wheel Erase self-diagr Turn the ignition Start the engine 	sensor harness con nosis result for "ABS n switch OFF, and wa	nector. ". ait 10 seconds or more			
 Drive the vehicle Stop the vehicle 	e at approx. 30 km/h	(19 MPH) or more for	approx. 1 minute.		
8. Perform self-dia	gnosis for "ABS" wit	n CONSULI. 1104" detected?			
	<u>a</u>	1104 delected?			
NO >> INSPEC	TION END				
9.REPLACE WHEE	EL SENSOR				
Replace wheels Front: Refer to F	Sensor.	WHEEL SENSOR · Ex	oloded View"		
- Rear: Refer to E	BRC-178, "REAR WI	HEEL SENSOR : Expl	oded View".		
2. Erase self-diagr	nosis result for "ABS	" with CONSULT.			
 i urn the ignition Start the engine 	i switch OFF, and wa	alt 10 seconds or more			
5. Drive the vehicle	e at approx. 30 km/h	(19 MPH) or more for	approx. 1 minute.		
6. Stop the vehicle					
1. Perform self-dia	gnosis for "ABS" wit	n CONSULI.			
<u>IS DIC "C1101", "C1</u>	102", "C1103" or "C	<u>1104" detected?</u>	it) Defente DDO 400) "Evaladed \/;"	
NO >> INSPEC	TION END	electric unit (control un	it). Relef to <u>BRC-18(</u>		
Special Repair F	Requirement			INF010-0000007250470	
				ini 012.0000000/330479	
1. ADJUSTMENT C	F STEERING ANG	LE SENSOR NEUTRA	L POSITION		
Always perform the	neutral position adiu	stment for the steering	g angle sensor, wher	replacing the ABS actua	

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

>> END

< DTC/CIRCUIT DIAGNOSIS >

C1105, C1106, C1107, C1108 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

INFOID:000000007350481

INFOID:000000007350480

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1105	RR RH SENSOR-2	Signal from rear RH wheel sensor does not match other 3 wheel speed signal.	Sensor not installed currentlySensor rotor or encoder dam-
C1106	RR LH SENSOR-2	Signal from rear LH wheel sensor does not match other 3 wheel speed signal.	 aged Sensor rotor loose on axle Electrical interference
C1107	FR RH SENSOR-2	Signal from front RH wheel sensor does not match other 3 wheel speed signal.	• Wheel not turning - e.g. vehi- cle driven on 2WD dynamom-
C1108	FR LH SENSOR-2	Signal from front LH wheel sensor does not match other 3 wheel speed signal.	eter • Sensor damaged • ABS unit damaged

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

Start the engine and drive the vehicle at 30 km/h (19 MPH) or more for approximately 1 minute.
 Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-102</u>, "<u>Diagnosis Procedure</u>". NO >> INSPECTION END

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007666815

CAUTION:

Never check between wheel sensor harness connector terminals.

1.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) POWER SUPPLY SYSTEM

Check ABS actuator and electric unit (control unit) power supply system. Refer to <u>BRC-149</u>, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK TIRE

- 1. Turn the ignition switch OFF.
- 2. Check tire air pressure, wear and size. Refer to WT-49, "Tire Air Pressure".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust air pressure or replace tire and GO TO 3.

3.CHECK DATA MONITOR (1)

1. Erase self-diagnosis result for "ABS" with CONSULT.

2. Turn the ignition switch OFF, and wait 10 seconds or more.

BRC-102

< DTC/CIRCUIT DIAGNOSIS > [VDC/TCS/ABS]	
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. 	A
Set the "DATA MONITOR" recording speed to "10 msec".5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.	В
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?	С
YES >> GO TO 4. NO >> GO TO 5.	
4.PERFORM SELF-DIAGNOSIS (1)	D
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT. Is DTC "C1105", "C1106", "C1107" or "C1108" detected? 	E
YES >> GO TO 5.	BR
NO >> INSPECTION END 5 CHECK WHEEL SENSOR	
1 Turn the ignition switch OEE	G
 Check wheel sensor for damage. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole. CAUTION: 	Н
Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified	
Front: Refer to <u>BRC-177, "FRONT WHEEL SENSOR : Exploded View"</u> .	
Rear: Refer to <u>BRC-178, "REAR WHEEL SENSOR : Exploded View"</u> . Is the inspection result normal?	
YES >> GO TO 8. NO >> GO TO 6.	J
6.REPLACE WHEEL SENSOR (1)	K
 Replace wheel sensor. Front: Refer to <u>BRC-177, "FRONT WHEEL SENSOR : Exploded View"</u>. Rear: Refer to <u>BRC-178, "REAR WHEEL SENSOR : Exploded View"</u>. 	
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. 	L
 Start the engine. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE: 	M
Set the "DATA MONITOR" recording speed to "10 msec". 6 Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor	Ν
Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting	
wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the differ- ence within 5%, respectively? YES >> GO TO 7.	0
NO >> GO TO 19.	D
1.PERFORM SELF-DIAGNOSIS (2)	P
 With CONSULT. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT. <u>Is DTC "C1105", "C1106", "C1107" or "C1108" detected?</u> YES >> GO TO 19. 	

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> INSPECTION END

8.CHECK CONNECTOR

1. Turn the ignition switch OFF.

- 2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- 3. Check wheel sensor harness connector for disconnection or looseness.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts, securely lock the harness connector, and GO TO 9.

9.CHECK DATA MONITOR (2)

- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

- 5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.
- Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?
- YES >> GO TO 10.
- NO >> GO TO 11.

10.PERFORM SELF-DIAGNOSIS (3)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.

3. Perform self-diagnosis for "ABS" with CONSULT.

- Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
- YES >> GO TO 11.
- NO >> INSPECTION END

11.CHECK TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector and then check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 3. Disconnect wheel sensor harness connector and check each wheel sensor pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

- YES >> GO TO 14.
- NO >> Repair or replace error-detected parts and GO TO 12.

12.CHECK DATA MONITOR (3)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 13. NO >> GO TO 14.

Revision: 2013 February

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

13.PERFORM SELF-DIAGNOSIS (4) А 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. 2. Perform self-diagnosis for "ABS" with CONSULT. 3. В Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> GO TO 14. NO >> INSPECTION END 14.CHECK WHEEL SENSOR HARNESS 1. Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. 2. D Disconnect wheel sensor harness connector. 3. 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and the ground. Е ABS actuator and electric unit (control unit) Continuity Connector Terminal BRC 12, 21 27,23 E36 Ground Not existed 15, 11 30, 26 Is the inspection result normal? Н YES >> GO TO 15. NO >> Repair or replace error-detected parts and GO TO 15. 15. CHECK DATA MONITOR (4) 1. Connect ABS actuator and electric unit (control unit) harness connector. Connect wheel sensor harness connector. 2. Erase self-diagnosis result for "ABS" with CONSULT. 4. Turn the ignition switch OFF, and wait 10 seconds or more. 5. Start the engine. 6. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. Κ NOTE: Set the "DATA MONITOR" recording speed to "10 msec". Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor. L Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively? Μ YES >> GO TO 16. NO >> GO TO 17. **16.**PERFORM SELF-DIAGNOSIS (5) Ν 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. 2. Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT. 3. Is DTC "C1105", "C1106", "C1107" or "C1108" detected? YES >> GO TO 17. NO >> INSPECTION END 17.REPLACE WHEEL SENSOR 1. Replace wheel sensor. Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View". Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View". Erase self-diagnosis result for "ABS" with CONSULT. 2.

- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.

BRC-105

< DTC/CIRCUIT DIAGNOSIS >

 Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 18.

NO >> GO TO 19.

18.PERFORM SELF-DIAGNOSIS (6)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1105", "C1106", "C1107" or "C1108" detected?

YES >> GO TO 19.

NO >> INSPECTION END

19.REPLACE SENSOR ROTOR

- 1. Replace sensor rotor.
- Front: Refer to BRC-179, "FRONT SENSOR ROTOR : Exploded View".
- Rear: Refer to <u>BRC-179</u>, "REAR SENSOR ROTOR : Exploded View".
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- 5. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 6. Stop the vehicle.
- 7. Perform self-diagnosis for "ABS" with CONSULT.
- Is DTC "C1105", "C1106", "C1107" or "C1108" detected?
- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.
- NO >> INSPECTION END

Special Repair Requirement

INFOID:000000007350484

[VDC/TCS/ABS]

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

>> END

< DTC/CIRCUIT DIAGNOSIS >

C1109 POWER AND GROUND SYSTEM

Description

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

DTC Logic

INFOID:000000007350486

INFOID:000000007350485

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DTC DETECTION LOGIC

DTC	Displa	ay item		Malfunction detected con	dition	Possible cause
C1109	BATTERY VO [ABNORMAL]	LTAGE	When the power su greater th	ABS actuator and electric upply is lower than normal. Po an normal limits.	nit (control unit) wer supply is	 Harness or connector ABS unit Fuse Vehicle electrical power system
DTC CC	ONFIRMATIO	ON PROCE	DURE			
1.PREC		١G				
If "DTC (CONFIRMATI		DURE" ha	as been previously cond	ducted. alwavs to	urn the ignition switch OFF
and wait	at least 10 se	econds befor	e conduc	ting the next test.	, ,,	5
2	>> GO TO 2.					
Z.DTC	REPRODUC	TION PROCE	EDURE			
1. Turr	the ignition s	switch OFF to	ON.			
Is DTC "	C1109" detec	ted?	5 with C			
YES	>> Proceed t	to diagnosis r	procedure	e. Refer to BRC-107. "D	iagnosis Proced	lure".
NO	>> INSPECT	ION END				
Diagno	osis Proced	dure				INFOID:00000007350487
1						
I.CHEC	CK CONNEC	TOR				
1. Turr	n the ignition s	witch OFF.	electric u	nit (control unit) harnes	s connector	
3. Che	ck terminal fo	r deformation	n, disconr	nection, looseness, etc.	s connector.	
Is the ins	spection resul	t normal?				
YES	>> GO TO 2.					
	>> Repair or	replace errol	r-detected	d parts.		
			ELECTR		NII) POWER S	UPPLY
1. Che	ck voltage be	tween ABS a	ctuator a	nd electric unit (control	unit) harness co	onnector and ground.
ABS	actuator and ele	ectric unit (contro	ol unit)			
C	onnector	Termir	nal		Condition	Voltage
	E36	16		Ground	Ignition switch: O	FF Approx. 0 V
2. Turr	n the ignition s	witch ON.				
	JTION:	naino				
3. Che	ck voltage be	tween ABS a	ctuator a	nd electric unit (control	unit) harness co	nnector and ground.
	- 3				,	5
ABS actuator and electric unit (control unit)						Voltage
C	onnector	Termir	nal			
	E36	16		Ground	Ignition switch: C	N Battery voltage

Is the inspection result normal?

C1109 POWER AND GROUND SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

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

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

1. Turn the ignition switch OFF.

2. Check 10Å fusible link (59).

3. Disconnect IPDM E/R harness connector.

4. Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R.

ABS actuator and ele	ectric unit (control unit)	IPDI	continuity	
Connector	Terminal	Connector	Terminal	continuity
E36	16	E15	59	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-18, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

${f 4.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND CIRCUIT

1. Turn the ignition switch OFF.

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal			
F36	3	Ground	Existed	
230	4	Ground	LAISted	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts (check ABS earth bolt for tightness and corrosion).

Special Repair Requirement

INFOID:000000007666816

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u><u>76</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END
C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) [VDC/TCS/ABS]

< DTC/CIRCUIT DIAGNOSIS >

C1110 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Description

ABS unit is continuously monitoring ECU hardware and software for correct operation.

DTC Logic

INFOID:000000007350490

INFOID:000000007350489

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DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1110	CONTROLLER FAILURE	Possible internal failure of control unit components.	Internal failure of control unit components. ABS solenoid valve or motor power supply / ground abnormal.
DTC CC	INFIRMATION PROCE	DURE	
1.PREC	CONDITIONING		
If "DTC C	CONFIRMATION PROCE	DURE" has been previously conducted, always	s turn the ignition switch OFF
and wait	at least 10 seconds befor	e conducting the next test.	
	>> GO TO 2.		
2. DTC I	REPRODUCTION PROC	EDURE	
1. Turn	the ignition switch OFF to	DON.	
2. Perfe	orm self-diagnosis for "AB C1110" detected?	S" with CONSULT.	
YES	>> Proceed to diagnosis	procedure. Refer to BRC-109, "Diagnosis Proc	edure".
NO	>> INSPECTION END		
Diagno	sis Procedure		INFOID:00000007350491
1.REPL	ACE ABS ACTUATOR A	ND ELECTRIC UNIT (CONTROL UNIT)	
CAUTIO Replace than tho	N: ABS actuator and elecose applicable.	tric unit (control unit) when self-diagnostic	result shows items other
.	>> Replace ABS actuator	r and electric unit (control unit). Refer to <u>BRC-1</u>	80, "Exploded View".
Specia	l Repair Requirement	nt	INFOID:000000007350492
1.ADJU	ISTMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION	
Always p tor and e <u>76, "ADJ</u>	perform the neutral position electric unit (control unit) on USTMENT OF STEERIN	n adjustment for the steering angle sensor, wh r steering angle sensor and removing steering G ANGLE SENSOR NEUTRAL POSITION : Sp	en replacing the ABS actua- angle sensor. Refer to <u>BRC-</u> pecial Repair Requirement".
	>> FND		

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C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:000000007350493

[VDC/TCS/ABS]

PUMP

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

MOTOR

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

DTC Logic

INFOID:000000007350494

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1111		During the actuator motor operating with ON, when the actuator motor turns OFF, or when the control line for tuator motor relay is open.	Harness or connector ABS actuator and electric unit
		During the actuator motor operating with OFF, when the actuator motor turns ON, or when the control line for relay is shorted to ground.	(control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1111" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-110, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000007350495

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		vollage
E36	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6. "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

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

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

ABS actuator and ele	ectric unit (control unit)		Continuity	
Connector	Terminal			
F36	3	Ground	Evisted	
230	4	Ground	LAISIEU	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u>76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

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INFOID:000000007350497

[VDC/TCS/ABS]

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

< DTC/CIRCUIT DIAGNOSIS >

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

Description

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

DTC Logic

INFOID:000000007350499

INFOID:000000007350498

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
C1113	G SENSOR		Harness or connector	
C1145	YAW RATE SENSOR		ABS actuator a control unit)	ABS actuator and electric unit (control unit)
C1146	SIDE G-SEN CIRCUIT	Yaw rate/side/decel G sensor is malfunctioning, or signal line of yaw rate/side/decel G sensor is open or shorted.	 Yaw rate/side/decel G sensor Electrical interference Vehicle driven on AWD rolling road 	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1113", "C1145" or "C1146" detected?

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

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect yaw rate/side/decel G sensor harness connector.
- 4. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

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

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

ABS actuator and ele	ectric unit (control unit)	Yaw rate/side/	decel G sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	13		4	
E36	14	14 B38	5	Existed
E30	28		2	LXISLED
	29		6	

Is the inspection result normal?

INFOID:000000007350500

[VDC/TCS/ABS]

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK YAW RATE/SIDE/DECEL G SENSOR HARNESS CONNECTOR

Check continuity between yaw rate/side/decel G sensor harness connector and ground.

Yaw rate/side	Continuity	
Connector	Terminal	Continuity
	2 – 4	
	2 – 5	
B 38	2 – 6	Not ovisted
D30	4 – 5	NOT EXISTED
	4 - 6	
	5 6	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.CHECK YAW RATE/SIDE/DECEL G SENSOR 1

- 1. Connect yaw rate/side/decel G sensor harness connector.
- 2. Connect ABS actuator and electric unit (control unit) harness connector.
- 3. Turn the ignition switch ON. CAUTION:

Never start the engine.

 Move yaw rate/side/decel G sensor as shown in the figure to check the output of before and after moving the sensor with the "ABS", "DATA MONITOR" and "DECEL G-SEN" in order with CONSULT.

Condition	DATA MONITOR	
Horizontal	Approx. 0 G	
Vertical	Approx. +1 G	



YES >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-182, "Exploded View"</u>.

5.CHECK YAW RATE/SIDE/DECEL G SENSOR 2

1. Turn the ignition switch OFF.

2. Connect following terminals between yaw rate/side/decel G sensor and harness connector.

Yaw rate/side/decel G	Harness	connector
sensor	Connector	Terminal
2		2
4	B38 -	4
5		5
6		6

3. Turn the ignition switch ON.

4. Check voltage between yaw rate/side/decel G sensor harness connector. CAUTION:

Never short out the terminals while measuring voltages.







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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Yaw rate/side/	decel G sensor	Voltago
connector	Terminal	vollage
B38	5 – 2	2.5 – 4.5 V
D30	6 – 2	0.5 – 2.5 V

Is the inspection result normal?

YES >> Replace ABS actuator end electric unit (control unit) Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Replace yaw rate/side/decel G sensor. Refer to <u>BRC-182, "Exploded View"</u>.

Special Repair Requirement

INFOID:000000007350502

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u><u>76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

< DTC/CIRCUIT DIAGNOSIS >

C1115 WHEEL SENSOR

Description

INFOID:000000007350503

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	ETECTION LOGIC		INFOID:00000000735050
DTC	Display item	Malfunction detected condition	Possible cause
C1115	ABS SENSOR [ABNORMAL SIGNAL]	Miss-match between the 4 wheel speed sensor signals.	Harness or connector not a pos- sible cause. Other possible causes tire radius (due to wrong size or pressure) interference.
	ONFIRMATION PROCE	EDURE	
I.PREC			
f "DTC (and wait	at least 10 seconds before	DURE" has been previously conducted, always bre conducting the next test.	turn the ignition switch OFF
2 DTC	>> GO TO 2.		
	t the engine and drive the	vebicle at 30 km/b (19 MPH) or more for approx	vimately 1 minute
2. Perf	orm self-diagnosis for "A	BS" with CONSULT.	Annalely I minute.
<u>s DTC "</u>	C1115" detected?		ale and the
YES NO	>> INSPECTION END	procedure. Refer to <u>BRC-115, "Diagnosis Proce</u>	aure".
Diagno	sis Procedure		INFOID:0000000766681
	N:		
For whe	el sensor, never check	between terminals.	
1.CHEC	CK ABS ACTUATOR ANI	D ELECTRIC UNIT (CONTROL UNIT) POWER	SUPPLY SYSTEM
Check A dure".	BS actuator and electric	unit (control unit) power supply system. Refer to <u>I</u>	BRC-149, "Diagnosis Proce
ls the ins	spection result normal?		
YES	>> GO TO 2.	or detected parts	
	SK TIRF	bi-delected parts.	
1. Turn	the ignition switch OFF.		
2. Che	ck tire air pressure, wear	and size. Refer to WT-49, "Tire Air Pressure".	
s the ins	spection result normal?		
NO	 >> Adjust air pressure o 	r replace tire and GO TO 3.	
3.сне	CK DATA MONITOR (1)		
1. Eras	e self-diagnosis result fo	r "ABS" with CONSULT.	
2. Turn 3. Star	the ignition switch OFF, the engine.	and wait 10 seconds or more.	
4. Sele	ct "ABS" and "DATA MC	NITOR", check "FR LH SENSOR", "FR RH SE	NSOR", "RR LH SENSOR
and NO1	TR RE SENSUR WITH		
• •			

Set the "DATA MONITOR" recording speed to "10 msec".

BRC-115

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >

5. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 4.

NO >> GO TO 5.

4.PERFORM SELF-DIAGNOSIS (1)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1115" detected?

YES >> GO TO 5.

NO >> INSPECTION END

5.CHECK WHEEL SENSOR

- 1. Turn the ignition switch OFF.
- 2. Check wheel sensor for damage.
- 3. Remove dust and foreign matter adhered to the sensor rotor with a vacuum dust collector through the wheel sensor mounting hole.

CAUTION:

Install wheel sensor with no backlash and float, and tighten the mounting bolt to the specified torque.

- Front: Refer to <u>BRC-177, "FRONT WHEEL SENSOR : Exploded View"</u>.
- Rear: Refer to <u>BRC-178, "REAR WHEEL SENSOR : Exploded View"</u>.

Is the inspection result normal?

- YES >> GO TO 8.
- NO >> GO TO 6.

6.REPLACE WHEEL SENSOR (1)

- 1. Replace wheel sensor.
- Front: Refer to <u>BRC-177, "FRONT WHEEL SENSOR : Exploded View"</u>.
- Rear: Refer to <u>BRC-178, "REAR WHEEL SENSOR : Exploded View"</u>.
- 2. Erase self-diagnosis result for "ABS" with CONSULT.
- 3. Turn the ignition switch OFF, and wait 10 seconds or more.
- 4. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:

Set the "DATA MONITOR" recording speed to "10 msec".

6. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 7.

NO >> GO TO 19.

7. PERFORM SELF-DIAGNOSIS (2)

- 1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.
- 2. Stop the vehicle.
- 3. Perform self-diagnosis for "ABS" with CONSULT.
- Is DTC "C1115" detected?

YES >> GO TO 19.

NO >> INSPECTION END

8. CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
 - Check wheel sensor harness connector for disconnection or looseness.

3.

BRC-116

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VDC/TCS/ABS]
Is the inspection result normal?	
YES >> GO TO 11.	
NO >> Repair or replace error-detected parts, securely lock the har	ness connector, and GO TO 9.
9. CHECK DATA MONITOR (2)	
1. Erase self-diagnosis result for "ABS" with CONSULT.	
 Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine 	
4. Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "F	R RH SENSOR", "RR LH SENSOR"
and "RR RH SENSOR" with CONSULT.	
NOTE: Set the "DATA MONITOR" recording speed to "10 msec"	
5. Read a value (wheel speed) of both normal wheel sensors and error	r-detecting wheel sensor.
Regarding the deference at 30 km/h (19 MPH) between the wheel sp	beed detected by the error detecting
wheel sensor and the maximum/minimum wheel speed detected by the	e normal wheel sensors, is the differ-
YES \rightarrow GO TO 10	
NO >> GO TO 11.	
10. PERFORM SELF-DIAGNOSIS (3)	
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1	minute.
2. Stop the vehicle.	
3. Perform self-diagnosis for ABS with CONSULT.	
$YES \rightarrow GO TO 11$	
NO >> INSPECTION END	
11.CHECK TERMINAL	
1. Turn the ignition switch OFF.	
2. Disconnect ABS actuator and electric unit (control unit) harness cor	nnector and then check ABS actuator
 Disconnect wheel sensor harness connector and check each wheel 	ection with namess connector.
loose connection with harness connector.	gg
Is the inspection result normal?	
YES >> GO TO 14.	
12 curck para monitop (2)	
 Connect ABS actuator and electric unit (control unit) harness connect Connect wheel sensor harness connector 	ctor.
 Erase self-diagnosis result for "ABS" with CONSULT. 	
4. Turn the ignition switch OFF, and wait 10 seconds or more.	
 Start the engine. Select "ABS" and "DATA MONITOR". check "FR LH SENSOR". "F 	R RH SENSOR". "RR LH SENSOR"
and "RR RH SENSOR" with CONSULT.	·····
NOTE: Set the "DATA MONITOR" recording speed to "10 msec"	
 Read a value (wheel speed) of both normal wheel sensors and error 	r-detecting wheel sensor.
Regarding the deference at 30 km/h (19 MPH) between the wheel sp	beed detected by the error detecting
wheel sensor and the maximum/minimum wheel speed detected by the	e normal wheel sensors, is the differ-
$\frac{\text{ence with min 5\%, respectively }}{\text{VES}} > 500 \text{ TO } 13$	
NO >> GO TO 14.	
13. PERFORM SELF-DIAGNOSIS (4)	
1. Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1	minute.
2. Stop the vehicle.	-

3. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1115" detected?

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 14.

NO >> INSPECTION END

14.CHECK WHEEL SENSOR HARNESS

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Disconnect wheel sensor harness connector.
- 4. Check continuity between ABS actuator and electric unit (control unit) harness connector and wheel sensor harness connector. (Check continuity when steering wheel is steered to RH and LH, or center harness in wheel housing is moved.)

Measurement connector and terminal for power supply circuit

ABS actuator and ele	ectric unit (control unit)	Wheel	sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	21	E39 (Front RH wheel)	3	
E36	23	E22 (Front LH wheel)	1	Existed
L30	11	B41 (Rear RH wheel)	7	LAISIEU
	26	B44 (Rear LH wheel)	5	

Measurement connector and terminal for signal circuit

ABS actuator and ele	ectric unit (control unit)	Wheel	sensor	Continuity
Connector	Terminal	Connector	Terminal	Continuity
	12	E39 (Front RH wheel)	4	
F36	27	E22 (Front LH wheel)	2	Evisted
230	15	B41 (Rear RH wheel)	8	LAISIEU
	30	B44 (Rear LH wheel)	6	

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

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
	12, 21		
E36	27, 23	Ground	Not ovisted
L30	15, 11	Ground	NOT EXISTED
	30, 26		

Is the inspection result normal?

YES >> GO TO 15.

NO >> Repair or replace error-detected parts and GO TO 15.

15.CHECK DATA MONITOR (4)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect wheel sensor harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.
- Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSOR", "RR LH SENSOR" and "RR RH SENSOR" with CONSULT. NOTE:
 - Set the "DATA MONITOR" recording speed to "10 msec".
- 7. Read a value (wheel speed) of both normal wheel sensors and error-detecting wheel sensor.

Regarding the deference at 30 km/h (19 MPH) between the wheel speed detected by the error detecting wheel sensor and the maximum/minimum wheel speed detected by the normal wheel sensors, is the difference within 5%, respectively?

YES >> GO TO 16. NO >> GO TO 17.

C1115 WHEEL SENSOR

< DTC/CIRCUIT DIAGNOSIS >	[VDC/TCS/ABS]
16.PERFORM SELF-DIAGNOSIS (5)	
 Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute. Stop the vehicle. 	
3. Perform self-diagnosis for "ABS" with CONSULT.	
s DTC "C1115" detected?	
YES >> GO TO 17.	
17 REDIACE WHEEL SENSOR	
Front: Refer to BRC-177, "FRONT WHEEL SENSOR : Exploded View".	
Rear: Refer to BRC-178, "REAR WHEEL SENSOR : Exploded View".	
2. Erase self-diagnosis result for "ABS" with CONSULT.	
 Furn the ignition switch OFF, and wait 10 seconds or more. Start the angine 	
 Select "ABS" and "DATA MONITOR", check "FR LH SENSOR", "FR RH SENSO 	R". "RR LH SENSOR"
and "RR RH SENSOR" with CONSULT.	, <u></u> <u>c</u>
NOTE:	
Set the "DATA MONITOR" recording speed to "10 msec".	el sensor
. Read a value (where speed) of both horizontal where sensors and error-detecting where λ and λ and λ are detected detected.	by the error detection
heel sensor and the maximum/minimum wheel speed detected by the normal wheel	sensors is the differ-
nce within 5%, respectively?	
YES >> GO TO 18.	
NO >> GO TO 19.	
8. PERFORM SELF-DIAGNOSIS (6)	
Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
. Stop the vehicle. Perform self-diagnosis for "ABS" with CONSULT	
s DTC "C1115" detected?	
VES GO TO 10	
NO >> INSPECTION END	
9. REPLACE SENSOR ROTOR	
Penlace sensor rotor	
Front: Refer to BRC-179. "FRONT SENSOR ROTOR : Exploded View"	
Rear: Refer to BRC-179, "REAR SENSOR ROTOR : Exploded View"	
Erase self-diagnosis result for "ABS".	
. I urn the ignition switch OFF, and wait 10 seconds or more.	
Drive the vehicle at approx. 30 km/h (19 MPH) or more for approx. 1 minute.	
. Stop the vehicle.	
. Perform self-diagnosis for "ABS" with CONSULT.	
s DTC "C1115" detected?	
YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "E</u> NO >> INSPECTION END	xploded View".
Special Repair Requirement	INFOID:000000007350507
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION	

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

< DTC/CIRCUIT DIAGNOSIS >

C1116 STOP LAMP SWITCH

Description

INFOID:000000007350508

[VDC/TCS/ABS]

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

DTC Logic

INFOID:000000007350509

INFOID:000000007666821

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1116	STOP LAMP SW	When a stop lamp switch signal is not input where the brake pedal is depressed.	 Harness or connector Stop lamp switch ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1116" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-120, "Diagnosis Procedure"</u>.

NO >> INSPECTION END

Diagnosis Procedure

NOTE:

DTC "C1116" may be detected when the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle. This is not a malfunction.

1.INTERVIEW FROM THE CUSTOMER

Check if the brake pedal and the accelerator pedal are simultaneously depressed for 1 minute or more while driving the vehicle.

Is there such a history?

YES	>> GO TO 2.

NO >> GO TO 3.

2. PERFORM SELF-DIAGNOSIS

- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine. CAUTION:

Never start the vehicle.

- 4. Depress the brake pedal several times.
- 5. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1116" detected?

- YES >> GO TO 3.
- NO >> INSPECTION END
- **3.**STOP LAMP FOR ILLUMINATION

Depress brake pedal and check that stop lamp turns ON.

Does stop lamp turn ON? YES >> GO TO 5. NO >> Check stop lamp system. GO TO 4. • Xenon type: Refer to EXL-79, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Halogen type: Refer to EXL-199, "Wiring Diagram - BCM -". • Location to Extended	A B C D E
YES >> GO TO 5. NO >> Check stop lamp system. GO TO 4. • Xenon type: Refer to <u>EXL-79</u> , "Wiring Diagram - BCM -". • Halogen type: Refer to <u>EXL-199</u> , "Wiring Diagram - BCM -". 4. CHECK DATA MONITOR (1) 1. Erase self-diagnosis result for "ABS" with CONSULT. 2. Turn the ignition switch OFF, and wait 10 seconds or more. 3. Start the engine. CAUTION: Never start the vehicle.	A B C D E
 4.CHECK DATA MONITOR (1) 1. Erase self-diagnosis result for "ABS" with CONSULT. 2. Turn the ignition switch OFF, and wait 10 seconds or more. 3. Start the engine. CAUTION: Never start the vehicle. 	C D E
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine. CAUTION: Never start the vehicle. 	C D E
A Colort "ADC" "DATA MONITOD" and "CTOD LAMD SN/" according to this order with CONCLUT Chool	E
4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Ref</u> erence Value".	BR
Is the inspection result normal? YES >> INSPECTION END NO >> GO TO 5.	
5. CHECK STOP LAMP SWITCH CLEARANCE	
 Turn the ignition switch OFF. Check stop lamp switch clearance. Refer to <u>BR-8. "Inspection and Adjustment"</u>. <u>Is the inspection result normal?</u> 	G
NO >> Adjust stop lamp switch clearance. Refer to <u>BR-8, "Inspection and Adjustment"</u> . GO TO 6. 6. CHECK DATA MONITOR (2)	Н
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine. 	I
 CAUTION: Never start the vehicle. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Ref</u>erence Value". 	J
Is the inspection result normal? YES >> INSPECTION END	
7. CHECK STOP LAMP SWITCH	L
Check stop lamp switch. Refer to <u>BRC-124</u> , "Component Inspection (Stop Lamp Switch)". <u>Is the inspection result normal?</u>	M
NO >> Replace stop lamp switch. Refer to <u>BR-19, "Exploded View"</u> . GO TO 8. 8. CHECK DATA MONITOR (3)	Ν
 Erase self-diagnosis result for "ABS" with CONSULT. Turn the ignition switch OFF, and wait 10 seconds or more. Start the engine. 	0
 Never start the vehicle. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Ref</u>erence Value". 	Ρ
Is the inspection result normal? YES >> INSPECTION END NO >> GO TO 9. Q CHECK STOP LAMP BELAY	

< DTC/CIRCUIT DIAGNOSIS >

Check stop lamp relay. Refer to BRC-124, "Component Inspection (Stop Lamp Relay)".

Is the inspection result normal?

- YES >> GO TO 11.
- NO >> Replace stop lamp relay. GO TO 10.
- **10.**CHECK DATA MONITOR (4)
- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine. CAUTION:

Never start the vehicle.

4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Reference Value"</u>.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> GO TO 11.

11. CHECK CONNECTOR AND TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- 4. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 5. Disconnect stop lamp switch harness connector.
- 6. Check stop lamp switch harness connector for disconnection or looseness.
- 7. Check stop lamp switch pin terminals for damage or loose connection with harness connector.
- 8. Disconnect stop lamp relay harness connector.
- 9. Check stop lamp relay harness connector for disconnection or looseness.
- 10. Check stop lamp relay pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 13.

NO >> Repair or replace error-detected parts. GO TO 12.

12. CHECK DATA MONITOR (5)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect stop lamp switch harness connector.
- 3. Connect stop lamp relay harness connector.
- 4. Erase self-diagnosis result for "ABS" with CONSULT.
- 5. Turn the ignition switch OFF, and wait 10 seconds or more.
- 6. Start the engine.

Never start the vehicle.

 Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161. "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 13.

13.CHECK STOP LAMP SWITCH CIRCUIT (1)

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

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and ele	ectric unit (control unit)			
Connector	Terminal	_	Condition	Voltage
500	0	Orecord	Brake pedal depressed	Battery voltage
E30	8	Ground	Brake pedal not depressed	d Approx. 0 V
 Turn the igniti Check voltage 	on switch ON. e between ABS actu	uator and electric	unit (control unit) harness	connector and ground.
ABS actuator and ele	ectric unit (control unit)		Que ditiere	
Connector	Terminal	—	Condition	voltage
F36	8	Ground	Brake pedal depressed	Battery voltage
200	5	Croana	Brake pedal not depressed	Approx. 0 V
YES >> Repla NO >> Repai 4.CHECK STC Disconnect st Check voltage	ore ABS actuator an or replace error-d P LAMP SWITCH op lamp switch harr between stop lam	nd electric unit (co etected parts. GO CIRCUIT (2) ness connector. p switch harness	ontrol unit). Refer to <u>BRC-1</u> TO 14. connector and ground.	80, "Exploded View".
		1	1	
Stop lai	Torminal	_	Voltage	
E115	1	Ground	Battony voltago	
s the inspection r	esult normal?			
 CHECK STC Turn the igniti Disconnect st Check continurelay harness 	OP LAMP SWITCH on switch OFF. op lamp relay harne uity between ABS a connector.	CIRCUIT (3) ess connector. actuator and elect	ric unit (control unit) harne	ess connector and stop lam
	ala atria unit (acatral uni	A)	Oton Jomn volov	
Connector	Terminal	Connecto		- Continuity
E36	8	E82	5	Existed
1. Check continu	uity between ABS a	ctuator and electr	ic unit (control unit) harnes	s connector and the ground
ABS actuator and	electric unit (control unit	t)		-
Connector	Terminal	<u> </u>	Continuity	
E36	8	Ground	Not existed	-
s the inspection re	esult normal?			-
YES >> GO T NO >> Repai	O 16. ir or replace error-d	etected parts. GO	TO 16.	
	PLAMP SWITCH			
Check continuity a	and short circuit bet	ween stop lamp re	elay harness connector ter	minal (3) and 10 A fuse (11
	esuit normal?			
NO >> Repai	r or replace error-d	etected parts. GO	TO 17.	
1 7. снеск sтс	P LAMP SWITCH	CIRCUIT (5)		

< DTC/CIRCUIT DIAGNOSIS >

1. Check continuity between stop lamp switch harness connector and stop lamp relay harness connector.

Continuity	mp relay	Stop lar	np switch	Stop lan
Continuity	Terminal	Connector	Terminal	Connector
Existed	2	E82	2	E115

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

Stop lan	np switch		Continuity
Connector	Terminal		Continuity
E115	2	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 18.

NO >> Repair or replace error-detected parts. GO TO 18.

18.CHECK DATA MONITOR (6)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect stop lamp switch harness connector.
- 3. Connect stop lamp relay harness connector.
- 4. Erase self-diagnosis result for "ABS" with CONSULT.
- 5. Turn the ignition switch OFF, and wait 10 seconds or more.
- 6. Start the engine. CAUTION:

Never start the vehicle.

 Select "ABS", "DATA MONITOR" and "STOP LAMP SW" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

Component Inspection (Stop Lamp Switch)

INFOID:000000007350511

1.CHECK STOP LAMP SWITCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check continuity between stop lamp switch connector terminals.

Stop lamp switch	Condition	Continuity
Terminal	Condition	Continuity
1 – 2	Release stop lamp switch (When brake pedal is depressed.)	Existed
	Push stop lamp switch (When brake pedal is released.)	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-19</u>, "Exploded View".

Component Inspection (Stop Lamp Relay)

- **1.**CHECK STOP LAMP RELAY
- 1. Turn the ignition switch OFF.
- 2. Disconnect stop lamp relay harness connector.
- 3. Apply 12 V to stop lamp relay connector terminal (2 and 1). CAUTION:

INFOID-000000007678385

< DTC/CIRCUIT DIAGNOSIS >

• Never make the terminals short.

• Connect the fuse between the terminals when applying the voltage.

4. Check continuity between stop lamp relay connector terminals.

Stop lamp relay	Condition	Continuity	
Terminal	Condition	Continuity	
3 5	Apply 12 V to stop lamp relay connector terminal (2 and 1)	Existed	
5 - 5	Do not apply 12 V to stop lamp relay con- nector terminal (2 and 1)	Not existed	

5. Check resistance between stop lamp relay connector terminals.

Stop lamp relay	Resistance
Terminal	
1 – 2	Approx. 50 Ω

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace stop lamp relay.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u> <u>76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

>> END

[VDC/TCS/ABS]

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C1118 AWD SYSTEM

Description

INFOID:000000007350513

INEOID:000000007350514

It transmits the value calculated by AWD control unit to ABS actuator and electric unit (control unit) with AWD communication line (line for AWD system only). ABS actuator and electric unit (control unit) controls AWD solenoid valve according to the received command value.

DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1118	4WD SYSTEM	An error is detected on AWD control unit side. (AWD control unit fail-safe mode)	 Harness or connector AWD communication line AWD control unit ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1118" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-126, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK AWD CONTROL UNIT

Perform self-diagnosis for "ALL MODE AWD/4WD" with CONSULT.

Is any error system detected?

YES >> Check the error system. Refer to <u>DLN-39, "DTC Index"</u>.

NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

Special Repair Requirement

INFOID:000000007350516

INFOID:00000007350515

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u> 76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

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).

C1120, C1122, C1124, C1126 IN ABS SOL

DTC Logic

Description

DTC DETECTION LOGIC

< DTC/CIRCUIT DIAGNOSIS >

C1120, C1122, C1124, C1126 IN ABS SOL

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

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

>> GO TO 2. 2 DTC REPRODUCTION PROCEDURE	I
 Turn the ignition switch OFF to ON. Perform self-diagnosis for "ABS" with CONSULT. DTC "C1120" "C1122" "C1124" or "C1126" detected? 	J
YES >> Proceed to diagnosis procedure. Refer to <u>BRC-127, "Diagnosis Procedure"</u> . NO >> INSPECTION END	Κ
Diagnosis Procedure	
1.CHECK CONNECTOR	L
 Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. Check terminal for deformation, disconnect, looseness, etc. 	Μ
<u>Is the inspection result normal?</u> YES >> GO TO 2. NO >> Replace or repair error-detected parts.	Ν
2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY	0
Check voltage between the ABS actuator and electric unit (control unit) harness connector and ground.	

ABS actuator and electric unit (control unit)			Voltago
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -"</u>.

BRC-127

[VDC/TCS/ABS]

INFOID:000000007350517

INEOID:000000007350518

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C1120, C1122, C1124, C1126 IN ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

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

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E36	3	- Ground Existe		
L30	4	Ground	LAISted	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:000000007350521

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

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

DTC Logic

INFOID:000000007350523

INFOID:000000007350522

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DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.	
2.DTC REPRODUCTION PROCEDURE	
 Turn the ignition switch OFF to ON. Perform self-diagnosis for "ABS" with CONSULT. 	J
Is DTC "C1121".C"C1123".C"C1125" or "C1127" detected? YES >> Proceed to diagnosis procedure. Refer to <u>BRC-129, "Diagnosis Procedure"</u> . NO >> INSPECTION END	K
Diagnosis Procedure	
1.CHECK CONNECTOR	L
 Turn the ignition switch OFF. Disconnect ABS actuator and electric unit (control unit) harness connector. Check terminal for deformation, disconnect, looseness, etc. 	M
Is the inspection result normal?	
YES >> GO TO 2. NO >> Replace or repair error-detected parts.	Ν
2. CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY	\circ
Check voltage between the ABS actuator and electric unit (control unit) harness connector and ground.	0

ABS actuator and electric unit (control unit)			Voltage
Connector	Terminal	_	vollage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -</u>".

BRC-129

Ρ

[VDC/TCS/ABS]

C1121, C1123, C1125, C1127 OUT ABS SOL

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

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

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Terminal		Continuity	
E36	3	- Ground Existe		
L30	4	Ground	Existed	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:000000007350526

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u><u>76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

< DTC/CIRCUIT DIAGNOSIS >

C1130 ENGINE SIGNAL

Description

ABS actuator and electric unit (control unit) and ECM exchange the engine signal via CAN communication $\ensuremath{\mathsf{B}}$ line.

DTC Logic

INFOID:000000007350528

INFOID:000000007350527

DTC DETECTION LOGIC

				_
DTC	Display item	Malfunction detected condition	Possible cause	D
C1130	ENGINE SIGNAL 1	ECM signals are invalid or ECM self diagnosis indicates a fault that prevents correct TCS operation.	 Harness or connector ABS actuator and electric unit (control unit) ECM CAN communication line 	E
DTC CC	NFIRMATION PROCE	DURE		BRC
1.PREC	CONDITIONING			
If "DTC C and wait	CONFIRMATION PROCE at least 10 seconds befor	DURE" has been previously conducted, always re conducting the next test.	turn the ignition switch OFF	G
_	>> GO TO 2.			Н
2.DTC	REPRODUCTION PROC	EDURE		
1. Turn 2. Perfe	the ignition switch OFF to orm self-diagnosis for "AE C1130" detected?	o ON. 8S" with CONSULT.		I
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-131, "Diagnosis Proce</u>	<u>dure"</u> .	J
Diagno	sis Procedure		INFOID:00000007350529	
1.снес	CK ENGINE SYSTEM			Κ
 Perfediag Perfediag Perfediag 	orm self-diagnosis for "EN nosis for "ENGINE" with (orm self-diagnosis for "AB	IGINE" with CONSULT. Repair or replace items i CONSULT. S" with CONSULT.	ndicated, then Perform self-	L
YES NO	>> Repair or replace the >> INSPECTION END	affected part.		M
Specia	l Repair Requireme	nt	INFOID:00000007666819	
1.adju	STMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION		Ν
Always p tor and e <u>76, "ADJ</u>	perform the neutral positic electric unit (control unit) c USTMENT OF STEERIN	n adjustment for the steering angle sensor, when or steering angle sensor and removing steering a <u>G ANGLE SENSOR NEUTRAL POSITION : Spe</u>	in replacing the ABS actua- ingle sensor. Refer to <u>BRC-</u> acial Repair Requirement [*] .	0
	>> END			Ρ

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< DTC/CIRCUIT DIAGNOSIS >

C1140 ACTUATOR RELAY SYSTEM

Description

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

DTC Logic

INFOID:000000007350532

INFOID:000000007350531

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140		During the actuator relay operating with OFF, when the actuator relay turns ON, or when the control line for the relay is shorted to the ground.	Harness or connector ABS actuator and electric unit
	NOTONTONTON	During the actuator relay operating with ON, when the actuator relay turns ON, or when the control line for the relay is open.	(control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1140" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-132, "Diagnosis Procedure"</u>.
- NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000007350533

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)	— Voltage	
Connector	Terminal		vollage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

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

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

BRC-132

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6</u>, "Wiring Diagram - BATTERY <u>POWER SUPPLY -"</u>.

C1140 ACTUATOR RELAY SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

ABS actuator and ele	ectric unit (control unit)		Question it :		А
Connector	Terminal		Continuity		
E36	3	Ground	Existed	-	В
200	4	Cround	Existed		
Is the inspection re	sult normal?				
YES >> Replac NO >> Repair	e ABS actuator and or replace error-de	d electric unit (c tected parts. (C	ontrol unit). Ref Check ABS each	fer to <u>BRC-180, "Exploded View"</u> . h bolt for tightness and corrosion).	С
Special Repair	Requirement			INF0/D:00000007350535	D
1.ADJUSTMENT	OF STEERING AN	GLE SENSOR	NEUTRAL POS	SITION	
Always perform the tor and electric unit 76, "ADJUSTMENT	e neutral position ac t (control unit) or ste T OF STEERING AI	ljustment for th eering angle ser NGLE SENSOF	e steering angle nsor and remov R NEUTRAL PC	e sensor, when replacing the ABS actua- ving steering angle sensor. Refer to <u>BRC-</u> DSITION : Special Repair Requirement".	E
					BR
>> END					
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< DTC/CIRCUIT DIAGNOSIS >

C1143, C1144 STEERING ANGLE SENSOR

Description

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

DTC Logic

INFOID:000000007350537

INFOID:000000007350536

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1143" or "C1144" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-134, "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

Diagnosis Procedure

1.CHECK VEHICLE STATE

Check vehicle for any suspension/steering misalignment or damage.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Correct any damage found.

2. CHECK CONNECTOR

1. Turn the ignition switch OFF.

- 2. Disconnect steering angle sensor harness connector.
- 3. Check terminal for deformation, disconnection, looseness, etc.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK STEERING ANGLE SENSOR POWER SUPPLY

1. Check voltage between steering angle sensor harness connector and ground.

Steering a	ngle sensor		Voltage
Connector	Terminal		voltage
M30	1	Ground	Approx. 0 V

 Turn the ignition switch ON.
 CAUTION: Never start the engine. [VDC/TCS/ABS]

INFOID:000000007350538

C1143, C1144 STEERING ANGLE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

3. Check voltage between steering angle sensor harness connector and ground.

	J	5		
Steering ar	ngle sensor		Voltago	
Connector	Terminal	1 —	voltage	
M30	1	Ground	Battery voltage	
s the inspection re	sult normal?			
YES >> GO TO	5.			
NO >> GO TO 1 autor areas	⁷ 4.			_
+.CHECK SIEER	ING ANGLE SENS	OR POWER S	SUPPLY CIRCUI	l
 Turn the ignitio Check 10 A fus Check continuit fuse (1). 	n switch OFF. (1). (1) and short circuit	between steeri	ng angle sensor	harness connector terminal (1) and 10 A
VES >> Perform	<u>suit normar?</u> n trouble diagnosis	for ignition po	wer supply Refe	r to PG-18 "Wiring Diagram - IGNITION
POWE	<u>R SUPPLY -"</u> .		wei suppiy. Reie	no <u>PG-18. Winny Diagram - IGNTTON</u>
NO >> Repair	or replace error-de	tected parts.		
D. CHECK STEER	ING ANGLE SENS	OR GROUND	CIRCUIT	
. Check continuit	ty between steering	angle sensor	harness connec	tor and ground.
Steering ar	ngle sensor		Continuity	
Connector	Terminal		Continuity	
M30	1	Ground	Exist	
s the inspection rea	sult normal?			
YES >> GO TO	⁾ 6.	to stad a sute		
J.CHECK CAN CO		1E		
Check "STRG BRA	NCH LINE CIRCUI	T". Refer to LA	<u> N-39, "Diagnosi</u>	<u>s Procedure"</u> .
s the inspection res	sult normal?			
YES >> Replac NO >> Repair	e ABS actuator and or replace error-de	tected parts.	control unit). Ref	er to <u>BRC-180, "Exploded View"</u> .
Special Repair	Requirement			
	Noquirement			INFCID:00000007350540
1.ADJUSTMENT	OF STEERING AN	GLE SENSOR	NEUTRAL POS	ITION
Always perform the or and electric unit 76, "ADJUSTMENT	neutral position ac (control unit) or ste OF STEERING A	ljustment for th ering angle se NGLE SENSO	ne steering angle ensor and removing R NEUTRAL PC	e sensor, when replacing the ABS actua- ing steering angle sensor. Refer to <u>BRC-</u> INSITION : Special Repair Requirement ["] .
>> END				

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< DTC/CIRCUIT DIAGNOSIS >

C1155 BRAKE FLUID LEVEL SWITCH

Description

Brake fluid level switch contacts close when brake fluid level is low. This is detected by the combination meter which sends the status of fluid level to the VDC unit via the CAN bus.

DTC Logic

INFOID:000000007350542

INFOID:000000007666820

INFOID:000000007350541

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1155	BR FLUID LEVEL LOW	Ignition switch ON and brake fluid signal low or not avail- able for 10 seconds.	 Brake fluid level low Brake fluid level switch failure Wiring to brake fluid level switch short circuit CAN bus failure Combination meter failure

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2. DTC REPRODUCTION PROCEDURE

- 1. Turn the ignition switch OFF to ON.
- 2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1155" detected?

- YES >> Proceed to diagnosis procedure. Refer to <u>BRC-136, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.CHECK BRAKE FLUID LEVEL

- 1. Turn the ignition switch OFF.
- 2. Check the brake fluid level. Refer to <u>BR-11, "Inspection"</u>.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Refill the brake fluid. Refer to <u>BR-11, "Refilling"</u>.
- **2.** PERFORM SELF-DIAGNOSIS (1)
- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Turn the ignition switch ON. CAUTION:

Never start the engine.

4. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "C1155" detected?

YES >> INSPECTION END

NO >> GO TO 3.

3.CHECK BRAKE FLUID LEVEL SWITCH

Check brake fluid level switch. Refer to BRC-138, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRC	UIT DIAGNO	SIS >			[VDC/TCS/ABS]
NO >> F	Replace reserv	oir tank. Refer	to <u>BR-27, "E</u>	<u>xploded View"</u> . GO	0 TO 4.
4.PERFORM	I SELF-DIAG	NOSIS (2)			
 Erase se Turn the Turn the CAUTION Never st 	lf-diagnosis re ignition switch ignition switch <mark>N:</mark> art the engine	sult for "ABS" v OFF, and wait ON. e.	with CONSUL 10 seconds	.T. or more.	
4. Perform	self-diagnosis	for "ABS" with	CONSULT.		
<u>Is DTC "C115</u>	5" detected?				
YES >> II _NO >> 0	NSPECTION I GO TO 5.	END			
5. снеск с	ONNECTOR /	AND TERMINA	\L		
 Turn the Disconne Check br Check br Disconne Disconne Check co Check co 	ignition switch ect brake fluid ake fluid level ake fluid level ect combinatio ombination me ombination me	OFF. level switch ha switch harness switch pin tern n meter harness ter harness con ter pin terminal	rness connector for s connector for ninals for dan ss connector. nnector for di ls for damage	ctor. or disconnection or nage or loose conn sconnection or loos o or loose connectio	looseness. ection with harness connector. seness. on with harness connector.
Is the inspect	ion result norr	nal?			
YES >> 0 NO >> F 6.PERFORM	GO TO 7. Repair or repla /I SELF-DIAG	ce error-detect NOSIS (3)	ed parts. GO	TO 6.	
 Connect Connect Erase se Turn the Turn the CAUTION Never st 	brake fluid lev combination n lf-diagnosis re ignition switch ignition switch N: art the engine	el switch harne neter harness o sult for "ABS" v OFF, and wait ON.	ess connector connector. with CONSUI 10 seconds	.T. or more.	
6. Perform	self-diagnosis	for "ABS" with	CONSULT.		
Is DTC "C115	5" detected?				
YES >> II		END			
7.снеск в		I EVEL SWITC	H CIRCUIT		
 Turn the Disconne Disconne Disconne Check th connector 	ignition switch ect brake fluid ect ABS actual ect combinatio e continuity be r.	OFF. level switch ha tor and electric n meter harnes etween brake fl	rness connec unit (control ss connector. luid level swit	ctor. unit) harness conn ch harness connec	ector. ctor and combination meter harness
Brake fluid	level switch	Combinati	on meter		
Connector	Terminal	Connector	Terminal	Continuity	
E37	1	M34	27	Existed	
6. Check th	e continuity be	etween brake fl	uid level swit	ch harness connec	tor and ground.
	-				

Brake fluid	level switch		Continuity
Connector	Terminal	_	Continuity
E37	1	Ground	No existed

Is the inspection result normal?

YES >> GO TO 8.

C1155 BRAKE FLUID LEVEL SWITCH

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

NO >> Repair or replace error-detected parts.

${f 8}.$ CHECK BRAKE FLUID LEVEL SWITCH GROUND

Check the continuity between brake fluid level switch harness connector and ground.

Brake fluid	level switch		Continuity	
Connector	Terminal		Continuity	
E37	2	Ground	Existed	

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9.CHECK COMBINATION METER

Check combination meter. Refer to <u>MWI-27, "CONSULT Function"</u>.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace combination meter. Refer to <u>MWI-69, "Exploded View"</u>.

Component Inspection

1. CHECK BRAKE FLUID LEVEL SWITCH

- 1. Turn the ignition switch OFF.
- 2. Disconnect brake fluid level switch connector.

3. Check continuity between brake fluid level switch connector terminals.

Brake fluid level switch		Condition	Continuity	
Connector	Terminal	Condition	Continuity	
F37	37 1 – 2	When brake fluid is full in the reservoir tank.	Not existed	
237	1-2	When brake fluid is empty in the reservoir tank.	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reservoir tank. Refer to <u>BR-27</u>, "Exploded View".

Special Repair Requirement

INFOID:000000007350545

INFOID:000000007350544

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1164, C1165 CV SYSTEM

Description

INFOID:000000007350546

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The cut valve shuts off the normal brake fluid path from the master cylinder, when VDC/TCS is activated.

DTC Logic

INFOID:000000007350547

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.	Harness or connector	
C1165	CV2	VDC switch-over solenoid valve (CV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	(control unit)	
DTC CC	ONFIRMATION PROC	CEDURE		
1. PREC	CONDITIONING			
If "DTC (and wait	CONFIRMATION PROC at least 10 seconds be	CEDURE" has been previously conducted, always fore conducting the next test.	turn the ignition switch OFF	
	>> GO TO 2.			
2. DTC	REPRODUCTION PRO	CEDURE		
1. Turn 2. Perf	the ignition switch OFI orm self-diagnosis for "	F to ON. ABS" with CONSULT.		
<u>Is DTC "</u>	C1164" or "C1165" dete	ected?		
YES NO	>> Proceed to diagnos >> INSPECTION END	is procedure. Refer to <u>BRC-139, "Diagnosis Proce</u>	edure".	

Diagnosis Procedure

.CHECK	CONNECTOR
	.CHECK

1. Turn the ignition switch OFF.

- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check terminal for deformation, disconnect, looseness, etc.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2.check vdc switch valve power supply

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

ABS actuator and ele	ectric unit (control unit)	Voltage	
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6. "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

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

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

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C1164, C1165 CV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	3	Ground	Existed
230	4	Cround	LNSIEG

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:000000007350550

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u> 76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

C1166, C1167 SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

C1166, C1167 SV SYSTEM

Description

INFOID:000000007350551

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

DTC Logic

INFOID:000000007350552

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause	
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.	Harness or connector	D
C1167	SV2	VDC switch-over solenoid valve (SV2) on the secondary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	ABS actuator and electric unit (control unit)	E
DTC CC	ONFIRMATION PROCE	DURE		BR
1.PREC	CONDITIONING			
If "DTC (and wait	CONFIRMATION PROCE at least 10 seconds befor	DURE" has been previously conducted, always re conducting the next test.	turn the ignition switch OFF	G
_	>> GO TO 2.			Н
2. DTC	REPRODUCTION PROCI	EDURE		
1. Turn 2. Perf	the ignition switch OFF to orm self-diagnosis for "AB C1166" or "C1167" detecto	o ON. 8S" with CONSULT. ed?		I
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-141, "Diagnosis Proce</u>	edure".	J
Diagno	sis Procedure		INFOID:00000007350553	
1. CHEC	CK CONNECTOR			Κ
1. Turn 2. Disc 3. Che	the ignition switch OFF. onnect ABS actuator and ck terminal for deformation	electric unit (control unit) harness connector. n, disconnect, looseness, etc.		L

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace or repair error-detected parts.

2.check vdc switch valve power supply

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

ABS actuator and ele	ABS actuator and electric unit (control unit)		Voltago
Connector	Terminal		voltage
E36	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6. "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

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

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

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C1166, C1167 SV SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		Continuity
E36	3	Ground	Existed
230	4	Cround	LNSIEG

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. (Check ABS each bolt for tightness and corrosion).

Special Repair Requirement

INFOID:000000007350555

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u><u>76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

C1176 STOP LAMP SW2

< DTC/CIRCUIT DIAGNOSIS >

C1176 STOP LAMP SW2

Description

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON.
DTC Logic

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1176	STOP LAMP SW2	When a ASCD brake switch signal is not input where the brake pedal is depressed.	 Harness or connector ASCD brake switch ABS actuator and electric unit (control unit)
DTC CO	NFIRMATION PROCE	DURE	
1.PREC	ONDITIONING		
If "DTC C and wait	CONFIRMATION PROCE at least 10 seconds befor	DURE" has been previously conducted, always re conducting the next test.	turn the ignition switch OFF
0	>> GO TO 2.		
2.DTC F	REPRODUCTION PROC	EDURE	
 Turn Perfo 	the ignition switch OFF to orm self-diagnosis for "AB	o ON. S" with CONSULT.	
Is DTC "(C1176" detected?		
YES NO	>> Proceed to diagnosis >> INSPECTION END	procedure. Refer to <u>BRC-143, "Diagnosis Proce</u>	<u>dure"</u> .
Diagno	sis Procedure		INFOID:000000007666822
NOTE: DTC "C1 for 1 min 1	176" may be detected wh ute or more while driving	en the brake pedal and the accelerator pedal are the vehicle. This is not a malfunction.	e simultaneously depressed
Check if	the brake pedal and the	accelerator pedal are simultaneously depressed	for 1 minute or more while
driving th	e vehicle.		
Is there s	such a history?		
NO	>> GO TO 2. >> GO TO 3.		
2.PERF	ORM SELF-DIAGNOSIS		
1. Eras	e self-diagnosis result for	"ABS" with CONSULT.	
 Turn Start 	the ignition switch OFF, a the engine.	and wait 10 seconds or more.	
CAU	TION:		
4. Depr	er start the vehicle. Tess the brake pedal seve	aral times.	
5. Perfo	orm self-diagnosis for "AB	S" with CONSULT.	
Is DTC "(C1176" detected?		
NO	>> GO TO 3. >> INSPECTION END		
3. CHEC	K ASCD BRAKE SWITC	H CLEARANCE	
1. Turn	the ignition switch OFF.		

2. Check ASCD brake switch clearance. Refer to <u>BR-8. "Inspection and Adjustment"</u>.

BRC-143

INFOID:000000007350556

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< DTC/CIRCUIT DIAGNOSIS > Is the inspection result normal?

YES >> GO TO 5.

NO >> Adjust ASCD brake switch clearance. Refer to <u>BR-8</u>, "Inspection and Adjustment". GO TO 4.

4.CHECK DATA MONITOR (2)

- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine. CAUTION:

Never start the vehicle.

 Select "ABS", "DATA MONITOR" and "STOP LAMP SW2" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161. "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 5.

5.CHECK ASCD BRAKE SWITCH

Check ASCD brake switch. Refer to <u>BRC-146. "Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace ASCD brake switch. Refer to <u>BR-19</u>, "Exploded View". GO TO 6.

6.CHECK DATA MONITOR (3)

- 1. Erase self-diagnosis result for "ABS" with CONSULT.
- 2. Turn the ignition switch OFF, and wait 10 seconds or more.
- 3. Start the engine. CAUTION:

Never start the vehicle.

4. Select "ABS", "DATA MONITOR" and "STOP LAMP SW2" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Reference Value"</u>.

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 7.

7. CHECK CONNECTOR AND TERMINAL

- 1. Turn the ignition switch OFF.
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Check ABS actuator and electric unit (control unit) harness connector for disconnection or looseness.
- 4. Check ABS actuator and electric unit (control unit) pin terminals for damage or loose connection with harness connector.
- 5. Disconnect ASCD brake switch harness connector.
- 6. Check ASCD brake switch harness connector for disconnection or looseness.
- 7. Check ASCD brake switch pin terminals for damage or loose connection with harness connector.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts. GO TO 8.

8.CHECK DATA MONITOR (4)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect ASCD brake switch harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.
- 5. Start the engine.

CAUTION:

Never start the vehicle.
C1176 STOP LAMP SW2

< DTC/CIRCUIT DIAGNOSIS >

[VDC/TCS/ABS]

Select "ABS", "DATA MONITOR" and "STOP LAMP SW2" according to this order with CONSULT. Check 6 that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to BRC-161, "Reference Value".

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 9.

9.CHECK ASCD BRAKE SWITCH CIRCUIT (1)

1. Turn the ignition switch OFF.

2. Disconnect ABS actuator and electric unit (control unit) harness connector.

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

ABS actuator and ele	ectric unit (control unit)		Condition	Voltago	
Connector	Terminal	—	Condition	voltage	
E36	E26 6 Ground		Brake pedal depressed		
L30	0	Gibana	Brake pedal not depressed		

4. Turn the ignition switch ON.

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

ABS actuator and electric unit (control unit)			Condition	Voltago	(
Connector	Terminal	_	Condition	voltage	
E26 6	6	6 Ground	Brake pedal depressed	Approx. 0 V	
E30	0	Ground	Brake pedal not depressed	Battery voltage	

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. GO TO 10.

10.CHECK ASCD BRAKE SWITCH CIRCUIT (2)

- 1. Turn the ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Check continuity between ABS actuator and electric unit (control unit) harness connector and ASCD brake switch harness connector.

ABS actuator and ele	ectric unit (control unit)	ASCD brake switch		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E36	6	E112	2	Existed

4. Check continuity between ABS actuator and electric unit (control unit) harness connector and the ground. Μ

ABS actuator and ele	ectric unit (control unit)		Continuity
Connector	Terminal		
E36	6	Ground	Not existed

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace error-detected parts. GO TO 11.

11.CHECK DATA MONITOR (5)

- 1. Connect ABS actuator and electric unit (control unit) harness connector.
- 2. Connect ASCD brake switch harness connector.
- 3. Erase self-diagnosis result for "ABS" with CONSULT.
- 4. Turn the ignition switch OFF, and wait 10 seconds or more.

5. Start the engine.

CAUTION: Never start the vehicle. BRC

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C1176 STOP LAMP SW2

< DTC/CIRCUIT DIAGNOSIS >

 Select "ABS", "DATA MONITOR" and "STOP LAMP SW2" according to this order with CONSULT. Check that data monitor displays "On" or "Off" when brake pedal is depress or release. Refer to <u>BRC-161, "Reference Value"</u>.

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

Component Inspection

1.CHECK ASCD BRAKE SWITCH

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

ASCD brake switch	Condition	Continuity	
Terminal	Condition		
1 _ 2	Brake pedal is fully released.	Existed	
1 – 2	Brake pedal is slightly depressed.	Not existed	

Is the inspection result normal?

- YES >> INSPECTION END
- NO >> Replace ASCD brake switch. Refer to <u>BR-19, "Exploded View"</u>.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76</u>, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

INFOID:000000007350560

[VDC/TCS/ABS]

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle 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:000000007350562

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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)
DTC CC	NFIRMATION PROCE	DURE	
1.PREC	CONDITIONING		(
If "DTC C	CONFIRMATION PROCE	DURE" has been previously conducted, always	turn the ignition switch OFF
and wait	at least 10 seconds befor	e conducting the next test.	ł
	>> GO TO 2.		
2.DTC	REPRODUCTION PROCE	DURE	
1. Turn	the ignition switch OFF to) ON.	
2. Perf	orm self-diagnosis for "AB	S" with CONSULT.	
YES	>> Proceed to diagnosis t	procedure, Refer to BRC-147, "Diagnosis Proce	dure".
NO	>> INSPECTION END	<u> </u>	<u></u> .
Diagno	sis Procedure		INFOID:00000007350563
1.PERF	ORM ABS ACTUATOR A	ND ELECTRIC UNIT (CONTROL UNIT) SELF-	DIAGNOSIS
Perform	self-diagnosis for "ABS" w	ith CONSULT.	
Is DTC "	U1000" detected?		
YES	>> Proceed to LAN-16, "7	rouble Diagnosis Flow Chart".	Į,
Special	>> INSPECTION END	4	
Specia	i Kepali Kequilemer	it.	INFOID:00000007350564
1.ADJU	STMENT OF STEERING	ANGLE SENSOR NEUTRAL POSITION	
Always p tor and e 76, "ADJ	perform the neutral positio electric unit (control unit) o USTMENT OF STEERING	n adjustment for the steering angle sensor, whe r steering angle sensor and removing steering a G ANGLE SENSOR NEUTRAL POSITION : Spe	n replacing the ABS actua- angle sensor. Refer to <u>BRC-</u> <u>ecial Repair Requirement</u> ".
			ī

>> END

[VDC/TCS/ABS]

U1010 CONTROL UNIT (CAN)

Description

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

DTC Logic

INFOID:000000007350566

DTC DETECTION LOGIC

DTC	Items	Diagnostic item is detected when	Possible cause
U1010	CONTROL UNIT (CAN)	When detecting error during the initial diagnosis of CAN controller of ABS actuator and electric unit (control unit).	ABS actuator and electric unit (control unit) error

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

1. Turn the ignition switch OFF to ON.

2. Perform self-diagnosis for "ABS" with CONSULT.

Is DTC "U1010" detected?

YES >> Proceed to diagnosis procedure. Refer to <u>BRC-148. "Diagnosis Procedure"</u>.

NO >> INSPECTION ĔND

Diagnosis Procedure

INFOID:000000007350567

1.ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace the harnesses and connectors.

Special Repair Requirement

INFOID:000000007350568

1.ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Check that there is no malfunction in ABS actuator and electric unit (control unit) harness connector or disconnection.

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.
- NO >> Repair or replace error-detected parts.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

POWER SUPPLY AND GROUND CIRCUIT

Description

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

Diagnosis Procedure

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) IGNITION POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltago
Connector	Terminal	_	voltage
E36	16	Ground	Approx. 0 V

4. Turn the ignition switch ON.

CAUTION: Never start the engine.

5. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		voltage
E36	16	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

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

- 1. Turn the ignition switch OFF.
- 2. Check 10Ă fuse (59).
- 3. Disconnect IPDM E/R harness connector.
- Check continuity between ABS actuator and electric unit (control unit) harness connector and IPDM E/R harness connector.

ABS actuator and ele	ectric unit (control unit)	IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	Continuity
E36	16	E15	59	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for ignition power supply. Refer to <u>PG-18, "Wiring Diagram - IGNITION</u> <u>POWER SUPPLY -"</u>.

NO >> Repair or replace error-detected parts.

${f 3.}$ CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) BATTERY POWER SUPPLY

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

ABS actuator and ele	ectric unit (control unit)		Voltogo
Connector	Terminal		voltage
E36	1	Ground	Battery voltage
230	2	Ground	Dattery Voltage

 Turn the ignition switch ON. CAUTION: INFOID:000000007666811

INFOID:000000007666812

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Never start the engine.

4. Check the voltage between ABS actuator and electric unit (control unit) harness connector and ground.

ABS actuator and ele	ectric unit (control unit)		Voltage
Connector	Terminal		
E36	1	Ground	Battory voltago
L30	2	Ground	Dallery Vollage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform trouble diagnosis for battery power supply. Refer to <u>PG-6, "Wiring Diagram - BATTERY</u> <u>POWER SUPPLY -"</u>.

4.CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) GROUND

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

ABS actuator and electric unit (control unit)			Continuity	
Connector	Connector Terminal		Continuity	
E36	3	Ground	Existed	
E30	4	Ground	Existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Special Repair Requirement

INFOID:000000007666814

[VDC/TCS/ABS]

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u> 76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

PARKING BRAKE SWITCH

Description

The parking brake switch converts the status of the parking brake pedal to an electric signal and transmits it to the ABS actuator and electric unit (control unit).

Component Function Check

1. CHECK PARKING BRAKE SWITCH OPERATION

Operate the parking brake pedal. Then check that the brake warning lamp in the combination meter turns on/ off correctly.

Condit	tion		Brake warning lamp illumination status			_
When the parking brak tion	e switch is	opera-	ON			E
When the parking brake ation.	e switch is r	ot oper-	OFF			BRC
Is the inspection res	sult norm	al?				
YES >> INSPEC NO >> Procee	CTION El d to diagi	ND nosis pr	rocedure. Refer to <u>BRC-151, "Diagn</u>	osis Proced	ure".	G
Diagnosis Proc	edure				INFOID:00000007350571	
1.CHECK PARKIN	IG BRAK	E SWIT	СН			Н
 Turn the ignition Disconnect par Check continuit 	n switch (king brak ty betwee	DFF. e switcl n parki	h harness connector. ng brake switch connector terminal	and ground.		Ι
Parking brake switch						J
Terminal	_		Condition	Continuity		
	Ground	When t	he parking brake switch is operated.	Existed		
I	Ground	When t	he parking brake switch is not operated.	Not existed		K
Is the inspection res YES >> GO TO NO >> Replace 2.CHECK COMBIN	sult norm 2. e parking NATION I	<u>al?</u> brake : METER	switch.			L
Check if the indicat tion.	tion and o	operatio	on of combination meter are norma	I. Refer to <u>N</u>	IWI-27, "CONSULT Func-	Μ
Is the inspection res	sult norm	al?				
YES >> INSPE NO >> Repair	CTION El or replac	ND e comb	ination meter.			Ν
Component Ins	pection				INFOID:00000007350572	0
1.CHECK PARKIN	IG BRAK	E SWIT	СН			0
 Turn the ignition Disconnect par Check continuit 	n switch (king brak	DFF. e switcl	h harness connector.	and around		Ρ

3. Check continuity between parking brake switch connector terminal and ground.

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INFOID:000000007350569

PARKING BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Parking brake switch		Condition	Continuity	
Terminal		Condition	Continuity	
1	Ground	When the parking brake switch is operated.	Existed	
I	Ground	When the parking brake switch is not operated.	Not existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace parking brake switch. Refer to <u>PB-6. "Exploded View"</u>.

VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF SWITCH

Description

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

Component Function Check

1. CHECK VDC OFF SWITCH OPERATION

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

	,					D
Cor	dition	VDC C	FF indicator lam	p illumination status		
VDC OFF switch:	ON		ON			F
VDC OFF switch:	OFF		OFF	F		
Is the inspection	n result norn	nal?				
YES >> INS NO >> Pro	PECTION E	END gnosis proc	edure. Refer t	to <u>BRC-153, "Dia</u>	agnosis Procedure".	BR(
Diagnosis P	rocedure				INFOID:00000007350575	G
1.CHECK VDC	OFF SWIT	СН				0
 Turn the igr Disconnect Check cont 	nition switch VDC OFF s inuity betwe	OFF. switch harne en VDC OF	ess connector F switch con	r. nector terminals.		Н
VDC OFF switch						
Terminal	-	Condition		Continuity		
1 - 2	When VDC	OFF switch is	hold pressed.	Existed		J
1 - 2	When release	sing VDC OFF	switch.	Not existed		
Is the inspection	n result norn	nal?				1Z
YES >> GO	TO 2.	ala ina alfuura	otioning Don			n
		ch is maitun	ctioning. Rep	ace VDC OFF s	witch.	
	OFF SWII		-55			L
1. Disconnect	ABS actuat	or and elec	tric unit (conti E switch harr	rol unit) harness	connector. nd ABS actuator and electric unit (control	
unit) harnes	s connecto	r.	1 Switch han			M
ABS actuator and (control	d electric unit unit)	VDC	OFF switch	Continuity		NI
Connector	Terminal	Connector	Terminal			IN
E36	5	M5	1	Existed		
3. Check cont	inuity betwe	en ABS act	uator and ele	ectric unit (control	unit) harness connector and ground.	0
ABS actuator an	d electric unit (control unit)				
Connector	Te	erminal	—	Continuity		Ρ
E36		5	Ground	Not existed		

Check continuity between VDC OFF switch harness connector and ground. 4.

INFOID:000000007350573

INFOID:000000007350574

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VDC OFF SWITCH

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF switch			Continuity
Connector	Terminal		Continuity
M5	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> If the open or short in harness, repair or replace harness.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>tion".

Is the inspection result normal?

- YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.
- NO >> Repair or replace combination meter.

Component Inspection

1.CHECK VDC OFF SWITCH

1. Turn the ignition switch OFF.

2. Disconnect VDC OFF switch harness connector.

3. Check continuity between VDC OFF switch connector terminals.

VDC OFF switch	Condition	Condition	
Terminal	Condition	Condition	
1 _ 2	When VDC OFF switch is hold pressed.	Existed	
1 – 2	When releasing VDC OFF switch.	Not existed	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VDC OFF switch.

Special Repair Requirement

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u> 76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

>> END

INFOID:000000007350577

ABS WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

ABS WARNING LAMP

Description

INFOID:000000007350578

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[VDC/TCS/ABS]

	×: ON –: OFF
Condition	ABS warning lamp
Ignition switch OFF	-
For 1 second after turning ignition switch ON	×
1 second later after turning ignition switch ON	-
ABS function is malfunctioning.	×
EBD function is malfunctioning.	×
Component Function Check	INFOID:000000007350579
1. CHECK ABS WARNING LAMP OPERATION	_
Check that the lamp illuminates for approximately 1 se Is the inspection result normal? YES >> INSPECTION END NO >> Proceed to diagnosis procedure. Refer to	cond after the ignition switch is turned ON. BRC-155. "Diagnosis Procedure".
Diagnosis Procedure	INFOID:00000007350580
1.CHECK SELF-DIAGNOSIS	
Perform self-diagnosis for "ABS" with CONSULT.	
Is the inspection result normal?	
YES >> GO TO 2.	
2 OUTCOMPLETE AND A STRATED	
Check if the indication and operation of combination i tion".	meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>
Is the inspection result normal?	
YES >> Replace ABS actuator and electric unit (co NO >> Repair or replace combination meter.	ontrol unit). Refer to <u>BRC-180, "Exploded View"</u> .
Special Repair Requirement	INFOID:00000007350581
1.ADJUSTMENT OF STEERING ANGLE SENSOR	JEUTRAL POSITION
Always perform the neutral position adjustment for the tor and electric unit (control unit) or steering angle sen 76. "ADJUSTMENT OF STEERING ANGLE SENSOR	e steering angle sensor, when replacing the ABS actua- sor and removing steering angle sensor. Refer to <u>BRC-</u> <u>NEUTRAL POSITION : Special Repair Requirement</u> ".
>> END	

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BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

BRAKE WARNING LAMP

Description

INFOID:000000007350582

[VDC/TCS/ABS]

×: ON -: OFF

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

NOTE:

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

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

Component Function Check

INFOID:000000007350583

INFOID:000000007350584

1.BRAKE WARNING 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 >> Proceed to diagnosis procedure. Refer to <u>BRC-156, "Diagnosis Procedure"</u>.

2.BRAKE WARNING LAMP OPERATION CHECK 2

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Check parking brake switch. Refer to <u>BRC-151, "Diagnosis Procedure"</u>.

Diagnosis Procedure

1. CHECK PARKING BRAKE SWITCH

Check that the brake warning lamp in the combination meter turns ON/OFF correctly when operating the parking brake pedal.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check parking brake switch. Refer to <u>BRC-151, "Diagnosis Procedure"</u>.

2. CHECK SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" with CONSULT.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:000000007350585

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

BRC-156

BRAKE WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-</u>76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

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[VDC/TCS/ABS]

VDC WARNING LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC WARNING LAMP

Description

Condition VDC warning lamp Ignition switch OFF - For 1 second after turning ignition switch ON × 1 second later after turning ignition switch ON - VDC/TCS is activated. $\bigwedge_{L=3}^{\Lambda}$		×: ON ∕: Blink –: OFF
Ignition switch OFF - For 1 second after turning ignition switch ON × 1 second later after turning ignition switch ON - VDC/TCS is activated. ^	Condition	VDC warning lamp
For 1 second after turning ignition switch ON × 1 second later after turning ignition switch ON - VDC/TCS is activated. 2^{-3}_{-3}	Ignition switch OFF	-
1 second later after turning ignition switch ON – VDC/TCS is activated. ^	For 1 second after turning ignition switch ON	×
VDC/TCS is activated.	1 second later after turning ignition switch ON	-
	VDC/TCS is activated.	2
VDC/TCS function is malfunctioning.	VDC/TCS function is malfunctioning.	×
ABS function is malfunctioning.	ABS function is malfunctioning.	×
EBD function is malfunctioning.	EBD function is malfunctioning.	×

Component Function Check

1.CHECK VDC 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 >> Proceed to diagnosis procedure. Refer to <u>BRC-158, "Diagnosis Procedure"</u>.

Diagnosis Procedure

1.CHECK SELF-DIAGNOSIS

Perform self-diagnosis for "ABS" with CONSULT.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check items displayed by self-diagnosis.

2. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to <u>MWI-27, "CONSULT Func-</u>tion".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded View"</u>.

NO >> Repair or replace combination meter.

Special Repair Requirement

INFOID:000000007350593

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

>> END

INFOID:000000007350590

[VDC/TCS/ABS]

INFOID:000000007350592

VDC OFF INDICATOR LAMP

< DTC/CIRCUIT DIAGNOSIS >

VDC OFF INDICATOR LAMP

Description

[VDC/TCS/ABS]

INFOID:000000007350586

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	×: ON –: OFF
Condition	VDC OFF indicator lamp
Ignition switch OFF	-
For 1 second after turning ignition switch ON	×
1 second later after turning ignition switch ON	_
VDC OFF switch turned ON. (VDC function is OFF.)	×
Component Function Check	INFO/D:00000007350587
1.VDC OFF INDICATOR LAMP OPERATION CHECK	K 1 E
Check that the lamp illuminates for approximately 1 set Is the inspection result normal? YES >> GO TO 2. NO >> Proceed to diagnosis procedure. Refer to	BRC-159, "Diagnosis Procedure".
2.VDC OFF INDICATOR LAMP OPERATION CHECK	٢٢ (2
Check that the VDC OFF indicator lamp in the combin VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
Is the inspection result normal?YES>> INSPECTION ENDNO>> Check VDC OFF switch. Refer to BRC-15	⊦ 3. "Diagnosis Procedure".
Diagnosis Procedure	INFO/D:00000007350588
1.CHECK VDC OFF SWITCH	
Check that the VDC OFF indicator lamp in the combin VDC OFF switch.	ation meter turns ON/OFF correctly when operating the
Is the inspection result normal?	k
YES >> GO TO 2.	
NO >> Check VDC OFF switch. Refer to <u>BRC-15</u>	3. "Diagnosis Procedure".
Z.CHECK SELF-DIAGNOSIS	
Perform self-diagnosis for "ABS" with CONSULT.	
Is the inspection result normal?	N
YES >> GO TO 3. NO >> Check items displayed by self-diagnosis	
Check if the indication and exerction of combination	
tion".	meter are normal. Refer to <u>MWI-27, CONSULT Func-</u>
Is the inspection result normal?	C
YES >> Replace ABS actuator and electric unit (co NO >> Repair or replace combination meter.	ontrol unit). Refer to <u>BRC-180, "Exploded View"</u> .
Special Repair Requirement	INF0/D:00000007350589
1. ADJUSTMENT OF STEERING ANGLE SENSOR	NEUTRAL POSITION

Always perform the neutral position adjustment for the steering angle sensor, when replacing the ABS actuator and electric unit (control unit) or steering angle sensor and removing steering angle sensor. Refer to <u>BRC-76. "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement"</u>.

BRC-159

< DTC/CIRCUIT DIAGNOSIS >

>> END

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

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:000000007350594 В

А

С

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	_
		Vehicle stopped	0 [km/h (MPH)]	E
FR LH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	BRO
		Vehicle stopped	0 [km/h (MPH)]	
FR RH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	G
		Vehicle stopped	0 [km/h (MPH)]	
RR LH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	Η
		Vehicle stopped	0 [km/h (MPH)]	
RR RH SENSOR	Wheel speed	Vehicle running (Note 1)	Nearly matches the speed meter display (± 10% or less)	J
	Stop lowp quitch signal status	When brake pedal is depressed	On	
STOP LAWP SW	Stop lamp switch signal status	When brake pedal is not depressed	Off	IZ.
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V	K
GEAR	Gear position determined by TCM	First gear (1GR) Second gear (2GR) Third gear (3GR) Forth gear (4GR) Fifth gear (5GR) Sixth gear (6GR)	1 2 3 4 5 6	L
		VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On	
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off	N
	Yaw rate detected by yaw rate/side/decel G	Vehicle stopped	Approx. 0 d/s	\circ
YAW RATE SEN	sensor	Vehicle turning	-100 to 100 d/s	0
		Vehicle stopped	–0.11 – +0.11 G	
DECEL G-SEN	Decel G detected by yaw rate/side/decel G sensor	During acceleration	Negative value	Ρ
		During deceleration	Positive value	
ACCEL POS SIG	Throttle actuator opening/closing is displayed	Accelerator pedal not depressed (igni- tion switch is ON)	0 %	_
	(linked with accelerator pedal)	Depress accelerator pedal (ignition switch is ON)	0 - 100 %	

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

	Display content	Data monitor		
Monitor item		Condition	Reference value in normal operation	
		Vehicle stopped	Approx. 0 m/s ²	
SIDE G-SENSOR	Side G detected by yaw rate/side/decel G sensor	Vehicle turning right	Negative value	
		Vehicle turning left	Positive value	
	Steering angle detected by steering angle	During straight	Approx. 0°	
STR ANGLE SIG	sensor	Steering wheel turned	–720 to 720°	
		With engine stopped	0 [tr/min (rpm)]	
ENGINE SPEED	With engine running	Engine running	Almost in accor- dance with tachome- ter display	
	Droke fluid lovel owitch signal status	When brake fluid level switch ON	On	
FLUID LEV SVV	Brake huid level switch signal status	When brake fluid level switch OFF	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
FR RH IN SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
FR RH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	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	
RR LH IN SOL		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
RR LH OUT SOL	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

		Data monitor	
Monitor item	Display content	Condition	Reference value in normal operation On Off Off On Off On
	Motor and motor relay operation	When the motor relay and motor are operating	On
MOTOR RELAT		When the motor relay and motor are not operating	Off
ACTUATOR RLY	Actuator relay operation	When the actuator relay is operating	On
(Note 2)	Actuator relay operation	When the actuator relay is not operating	Off
	ABS warning lamp	When ABS warning lamp is ON	On
ADS WARIN LAWP	(Note 3)	When ABS warning lamp is OFF	Off
	VDC OFF indicator lamp	When VDC OFF indicator lamp is ON	On
OFF LAMP	(Note 3)	When VDC OFF indicator lamp is OFF	Off
	VDC warning lamp	When VDC warning lamp is ON	On
SLIP/VDC LAWP	(Note 3)	When VDC warning lamp is OFF	Off
	EPD operation	EBD is active	On
EBD SIGNAL	EBD operation	EBD is inactive	Off
ABS SIGNAL		ABS is active	On
ABS SIGNAL	ABS operation	ABS is inactive	Off
	TOO an anti-m	TCS is active	On
ICS SIGNAL	ICS operation	TCS is inactive	Off
		VDC is active	On
VDC SIGNAL	VDC operation	VDC is inactive	Off
		In EBD fail-safe	On
EBD FAIL SIG	EBD fail-safe signal	EBD is normal	Off
		In ABS fail-safe	On
ABS FAIL SIG	ABS fail-safe signal	ABS is normal	Off
		In TCS fail-safe	On
TCS FAIL SIG	ICS fail-sate signal	TCS is normal	Off
		In VDC fail-safe	On
VDC FAIL SIG	VDC fail-safe signal	VDC is normal	Off
	Oranik an anation	Crank is active	On
CRAINKING SIG		Crank is inactive	Off
		For N range	On
N POSI SIG	N position signal	Except for N range	Off
	D position signal	For P range	On
r rugi gig	r position signal	Except for P range	Off
	B position signal	For R range	On
r 7031 31G	R position signal	Except for R range	Off
		AUTO is active	AUTO
4WD MODE MON	Axle condition	LOCK is active	LOCK
		2WD is active	2WD
		Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On
CV1	Operation status of each solenoid valve	When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

	Display content	Data monitor		
Monitor item		Condition	Reference value in normal operation	
CV2	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
SV1	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
	Operation status of each solenoid valve	Actuator (solenoid valve) is active ("AC- TIVE TEST" in "ABS" with CONSULT)	On	
SV2		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off	
STOP LAMP SM/2	Stop lamp switch signal status	When brake pedal is depressed	On	
STOP LAIVIP SW2		When brake pedal is not depressed	Off	

NOTE:

- 1: Confirm tire pressure is normal.
- 2: Every 20 seconds momentary switch to Off.
- 3: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-155, "Description".
- VDC warning lamp: Refer to <u>BRC-158, "Description"</u>.
- VDC OFF indicator lamp: Refer to <u>BRC-159, "Description"</u>.

Wiring Diagram -BRAKE CONTROL SYSTEM-

INFOID:000000007350595

For connector terminal arrangements, harness layouts, and alphabets in a \bigcirc (option abbreviation; if not described in wiring diagram), refer to <u>GI-12, "Connector Information"</u>.

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) < ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]



ABS, EBD SYSTEM

In case of electrical malfunctions with the ABS, ABS warning lamp and VDC warning lamp will turn on. In case of electrical malfunctions with the EBD, brake warning lamp, ABS warning lamp and VDC warning lamp will turn on. Simultaneously, the VDC/TCS/ABS become one of the following conditions of the fail-safe function.

< ECU DIAGNOSIS INFORMATION >

[VDC/TCS/ABS]

• For malfunction of ABS, only the EBD is activated and the condition of vehicle is the same condition of vehicles without TCS/ABS system.

NOTE:

ABS self-diagnosis sound may be heard. That is a normal condition because a self-diagnosis for "Ignition switch ON" and "The first starting" are being performed.

• For malfunction of EBD, EBD and ABS become inoperative, and the condition of vehicle is the same as the condition of vehicles without TCS/ABS, EBD system.

VDC/TCS

In case of malfunction in the VDC/TCS/ABS system, VDC warning lamp are turned on, and the condition of vehicle is the same as the condition of vehicles without VDC/TCS control.

CAUTION:

If the Fail-Safe function is activated, then perform self-diagnosis for "ABS" with CONSULT.

DTC Index

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	BRC-99, "DTC Logic"
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	
C1106	RR LH SENSOR-2	PRC 102 "DTC Logic"
C1107	FR RH SENSOR-2	BRC-102, DTC Logic
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-107, "DTC Logic"
C1110	CONTROLLER FAILURE	BRC-109, "DTC Logic"
C1111	PUMP MOTOR	BRC-110, "DTC Logic"
C1113	G SENSOR	BRC-112, "DTC Logic"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-115, "DTC Logic"
C1116	STOP LAMP SW	BRC-120, "DTC Logic"
C1118	4WD SYSTEM	BRC-126, "DTC Logic"
C1120	FR LH IN ABS SOL	BRC-127, "DTC Logic"
C1121	FR LH OUT ABS SOL	BRC-129, "DTC Logic"
C1122	FR RH IN ABS SOL	BRC-127, "DTC Logic"
C1123	FR RH OUT ABS SOL	BRC-129, "DTC Logic"
C1124	RR LH IN ABS SOL	BRC-127, "DTC Logic"
C1125	RR LH OUT ABS SOL	BRC-129, "DTC Logic"
C1126	RR RH IN ABS SOL	BRC-127, "DTC Logic"
C1127	RR RH OUT ABS SOL	BRC-129, "DTC Logic"
C1130	ENGINE SIGNAL 1	BRC-131, "DTC Logic"
C1140	ACTUATOR RLY	BRC-132, "DTC Logic"
C1143	ST ANG SEN CIRCUIT	BRC-134 "DTC Logic"
C1144	ST ANG SEN SIGNAL	DRO-134, DTO LOGIC
C1145	YAW RATE SENSOR	BBC-112 "DTC Logic"
C1146	SIDE G-SEN CIRCUIT	DICO-TTZ, DTO LOGIC
C1155	BR FLUID LEVEL LOW	BRC-136, "DTC Logic"
C1164	CV1	BRC-139 "DTC Logic"
C1165	CV2	Dito 100, Dio Logic

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

< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	Reference	Δ
C1166	SV1	RPC-141 "DTC Logic"	A
C1167	SV2	DRC-141, DTC LOGIC	
C1176	STOP LAMP SW2	BRC-143, "DTC Logic"	В
U1000	CAN COMM CIRCUIT	BRC-147, "DTC Logic"	
U1010	CONTROL UNIT(CAN)	BRC-148, "DTC Logic"	
			С

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EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:000000007350598

1.CHECK START

Check front and rear brake force distribution using a brake tester. Refer to <u>BR-48. "General Specifications"</u>. <u>Is the inspection result normal?</u>

YES >> GO TO 2.

NO >> Check brake system.

2. CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles.

- Front
- 2WD models: Refer to FAX-7, "Inspection".
- AWD models: Refer to FAX-33, "Inspection".
- Rear
- 2WD models: Refer to <u>RAX-4, "Inspection"</u>.
- AWD models: Refer to RAX-11, "Inspection"
- Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

 $\mathbf{3}$. Check wheel sensor and sensor rotor

Check the following.

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

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Replace wheel sensor or sensor rotor.
 - 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 for "ABS" with CONSULT.
- NO >> Normal

UNEXPECTED PEDAL REACTION

< SYMPTOM DIAGNOSIS >
UNEXPECTED PEDAL REACTION

NO

>> Check brake system.

	Δ
Diagnosis Procedure	Λ
1. CHECK BRAKE PEDAL STROKE	В
Check brake pedal stroke. Refer to BR-8, "Inspection and Adjustment".	
Is the stroke too large?	
 YES >> • Bleed air from brake tube and hose. Refer to <u>BR-12, "Bleeding Brake System"</u>. • Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. 	С
 Brake pedal: Refer to <u>BR-8, "Inspection and Adjustment"</u>. Master cylinder: Refer to <u>BR-13, "Inspection"</u>. Brake booster: Refer to <u>BR-14, "Inspection"</u>. 	D
NO >> GO TO 2.	Е
2. CHECK FUNCTION	
Disconnect ABS actuator and electric unit (control unit) harness connector to deactivate ABS. Check if braking force is normal in this condition. Connect harness connector after inspection.	BRC
Is the inspection result normal?	
YES >> Normal	

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THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:000000007350600

[VDC/TCS/ABS]

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

YES >> Normal

NO >> Check brake system.

ABS FUNCTION DOES NOT OPERATE

< SYMPTOM DIAGNOSIS >	[VDC/TCS/ABS]	
ABS FUNCTION DOES NOT OPERATE		Λ
Diagnosis Procedure	INFOID:000000007350601	A
CAUTION: ABS does not operate when speed is 10 km/h (6 MPH) or lower. 1.CHECK ABS WARNING LAMP DISPLAY		В
Make sure that the ABS warning lamp turns OFF after ignition switch is turned ON or when the inspection result normal?	nen driving.	С
YES >> Normal NO >> Perform self-diagnosis for "ABS" with CONSULT.		D

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PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

< SYMPTOM DIAGNOSIS >

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:000000007350602

[VDC/TCS/ABS]

CAUTION:

Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed (just place a foot on it). 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 for "ABS" with CONSULT.

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

VEHIC	CLE JERKS DURING	^	
Diagno	osis Procedure	FOID:000000007350603	L
1. SYMI	PTOM CHECK	В	3
Check if	the vehicle jerks during VDC/TCS/ABS control.		
Is the ins	spection result normal?		<u>_</u>
YES NO	>> Normal. >> GO TO 2.	C	P
2.CHE	CK SELF-DIAGNOSIS RESULTS	D)
Perform	self-diagnosis for "ABS" with CONSULT.		
Are self-	-diagnosis results indicated?		
YES NO	>> Check corresponding items, make repairs, and perform self-diagnosis for "ABS" with >> GO TO 3.	CONSULT. E	-
3.CHE	CK CONNECTOR		
Turn thand ch	he ignition switch OFF and disconnect ABS actuator and electric unit (control unit) harnes neck terminal for deformation, disconnection, looseness, etc.	BR connector	кС
Are self-	-diagnosis results indicated?	G	ì
YES NO	>> If poor contact, damage, open or short circuit of connector terminal is found, repair or >> GO TO 4.	replace.	
4. CHE0	CK ECM AND TCM SELF-DIAGNOSIS RESULTS	H	1
Perform	self-diagnosis for "ENGINE" and "TRANSMISSION" with CONSULT		
Are self-	-diagnosis results indicated?	1	
YES	 Check the corresponding items. "ENGINE": Refer to <u>EC-107, "CONSULT Function"</u>. "TRANSMISSION": Defer to TM 40, "CONSULT Function". 		
NO	 Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-180, "Exploded V</u> 	j iew".	
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< SYMPTOM DIAGNOSIS >

< SYMPTOM DIAGNOSIS >

NORMAL OPERATING CONDITION

Description

Symptom	Result	
Slight vibrations are felt on the brake pedal and the operation noises occur, when VDC, TCS or ABS is activated.	_	
Stopping distance is longer than that of vehicles without ABS when the vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.	tion due to the VDC, TCS or ABS activation.	
The brake pedal moves and generates noises, when TCS or VDC is activated due to rapid acceleration or sharp turn.		
The brake pedal vibrates and motor operation noises occur from the engine room, after the engine starts and just after the vehicle starts.	This is a 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.	riority on the optimum traction (stability).	
The ABS warning lamp and VDC 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 road. If the normal con-	
VDC may not operate normally or the ABS warning lamp and VDC warning lamp may illuminate, when run- ning on a special road that is extremely slanted (e.g. bank in a circuit course).	dition is restored, there is no malfunction. At	
A malfunction may occur in the yaw rate/side G sensor system, when the vehicle turns sharply, such as dur- ing a spin turn, axle turn, or drift driving, while the VDC function is off (VDC warning lamp illuminated).	that time, erase the self- diagnosis memory.	
The vehicle speed will not increase even though the accelerator pedal is depressed, when inspecting the speedometer on a 2-wheel chassis dynamometer.	Normal (Deactivate the VDC/TCS function be- fore performing an in- spection on a chassis dynamometer.)	

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< PRECAUTION > PRECAUTION PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" INFOID:000000007669019

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. D Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by BRC 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 "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

WARNING:

windshield.

Always observe the following items for preventing accidental activation.

- When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious iniury.
- When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.

Precaution for Procedure without Cowl Top Cover



Precaution for Brake System

INFOID:000000007350607

INFOID:000000007669020

WARNING:

Since dust covering the front and rear brakes has an affect on human body, the dust must be removed with a dust collector. Never splatter the dust with an air blow gun.

- Brake fluid use refer to MA-15, "FOR NORTH AMERICA : Fluids and Lubricants".
- Never reuse drained brake fluid.
- Never spill or splash brake fluid on painted surfaces. Brake fluid may seriously damage paint. Wipe it off immediately and wash with water if it gets on a painted surface.

PRECAUTIONS

< PRECAUTION >

- Never use mineral oils such as gasoline or light oil to clean. They may damage rubber parts and cause improper operation.
- Always loosen the brake tube flare nut with a flare nut wrench.
- Tighten the brake tube flare nut to the specified torque with crowfoot (A) and torque wrench (B).
- Always confirm the specified tightening torque when installing the brake pipes.
- Turn the ignition switch OFF and disconnect the ABS actuator and electric unit (control unit) harness connector or the battery negative terminal before performing the work.
- Check that no brake fluid leakage is present after replacing the parts.



Precaution for Brake Control

INFOID:000000007350608

- When starting engine or when starting vehicle just after starting engine, brake pedal may vibrate or motor operating noise may be heard from engine compartment. This is normal condition.
- 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 estimate causes before starting diagnostic servicing. Besides electrical system inspection, check brake booster operation, brake fluid level, and oil leaks.
- If tire size and type are used in an improper combination, or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- ABS might be out of order or malfunctions by putting a radio (wiring inclusive), an antenna and a lead-in wire near the control unit.
- VDC system may not operate normally or a VDC warning lamp may light.
- When replacing the following parts with parts other than genuine parts or making modifications: Suspensionrelated parts (shock absorber, spring, bushing, etc.), tires, wheels (other than specified sizes), brake-related parts (pad, rotor, caliper, etc.), engine-related parts (muffler, ECM, etc.) and body reinforcement-related parts (roll bar, tower bar, etc.).
- When driving with worn or deteriorated suspension, tires and brake-related parts.

Precautions for Harness Repair

INFOID:000000007350609

COMMUNICATION LINE

• Solder the repaired area and wrap tape around the soldered area. **NOTE:**

A fray of twisted lines must be within 110 mm (4.33 in).



• Bypass connection is never allowed at the repaired area. **NOTE:**

Bypass connection may cause communication error as spliced wires that are separate from the main line or twisted lines lose noise immunity.

• Replace the applicable harness as an assembly if error is detected on the shield lines of communication line.



< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION WHEEL SENSOR

FRONT WHEEL SENSOR

FRONT WHEEL SENSOR : Exploded View



REAR WHEEL SENSOR

INFOID:000000007350615

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WHEEL SENSOR

< REMOVAL AND INSTALLATION >

REAR WHEEL SENSOR : Exploded View

INFOID:000000007350617



- 1. Rear LH wheel sensor
- A. 2WD models B. AWD models

Refer to <u>GI-4, "Components"</u> for symbol in the figure.

NOTE:

The above figure (front side) shows left side. Right side is the mirror image.

REAR WHEEL SENSOR : Removal and Installation

INFOID:000000007350618

REMOVAL

Pay attention to the following when removing sensor.

CAUTION:

- Never twist sensor harness as much as possible, when removing it. Pull sensors out without pulling sensor harness.
- Take care to avoid damaging sensor edges or rotor teeth. Remove wheel sensor first before removing front or rear wheel hub. This is to avoid damage to sensor wiring and loss of sensor function.

INSTALLATION

Pay attention to the following when installing wheel sensor. Tighten installation bolts to the specified torques.

- When installing, make sure there is no foreign material such as iron chips on and in the mounting hole of the wheel sensor. Make sure no foreign material has been caught in the sensor rotor. Remove any foreign material and clean the mount.
- When installing wheel sensor, be sure to press rubber grommets in until they lock at locations shown above in the figure. When installed, harness must not be twisted.

SENSOR ROTOR		
< REMOVAL AND INSTALLATION >	[VDC/TCS/ABS]	
SENSOR ROTOR FRONT SENSOR ROTOR		A
FRONT SENSOR ROTOR : Exploded View	INFOID:000000007350619	D
Refer to <u>FAX-9, "Exploded View"</u> (2WD models), <u>FAX-35, "Exploded View"</u> (AWD models	i).	D
FRONT SENSOR ROTOR . Removal and installation	INFOID:000000007350620	С
REMOVAL Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to <u>FAX-9, "Removal and Installation"</u> (2WD models), <u>FAX-35, "Removal and Installa</u>	d bearing assembly. ation" (AWD models).	D
Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub ar Refer to <u>FAX-9. "Removal and Installation"</u> (2WD models), <u>FAX-35. "Removal and Installa</u> REAR SENSOR ROTOR	nd bearing assembly. tion" (AWD models).	E
REAR SENSOR ROTOR : Exploded View	INFOID:000000007350621	BRC
REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5. "Exploded View"</u> (2WD models), <u>RAX-16. "Exploded View"</u> (AWD model	INFOID:000000007350621 S).	BRC
REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5. "Exploded View"</u> (2WD models), <u>RAX-16. "Exploded View"</u> (AWD model REAR SENSOR ROTOR : Removal and Installation	INFOID:000000007350621 S). INFOID:000000007350622	BRC G
REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5. "Exploded View"</u> (2WD models), <u>RAX-16. "Exploded View"</u> (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS	INFOID:000000007350621 S). INFOID:000000007350622	G H
REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5. "Exploded View"</u> (2WD models), <u>RAX-16. "Exploded View"</u> (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal	INFOID:000000007350621 S). INFOID:000000007350622	BRC G
 REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5</u>, "Exploded View" (2WD models), <u>RAX-16</u>, "Exploded View" (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to <u>RAX-5</u>, "Removal and Installation". 	INFOID:000000007350621 s). INFOID:000000007350622 d bearing assembly.	G H
 REAR SENSOR ROTOR : Exploded View Refer to <u>RAX-5</u>, "Exploded View" (2WD models), <u>RAX-16</u>, "Exploded View" (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to <u>RAX-5</u>, "Removal and Installation". Installation Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub an Refer to <u>RAX-5</u>, "Removal and Installation". 	INFOID:000000007350621 s). INFOID:000000007350622 d bearing assembly.	G H
REAR SENSOR ROTOR : Exploded View Refer to RAX-5. "Exploded View" (2WD models), RAX-16. "Exploded View" (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to RAX-5. "Removal and Installation". Installation Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub an Refer to RAX-5. "Removal and Installation".	INFOID:000000007350621 s). INFOID:000000007350622 d bearing assembly.	G H J
 REAR SENSOR ROTOR : Exploded View Refer to RAX-5, "Exploded View" (2WD models), RAX-16, "Exploded View" (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to RAX-5, "Removal and Installation". Installation Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub ar Refer to RAX-5, "Removal and Installation". AWD MODELS For removal and installation of sensor rotor, refer to RAX-17, "Disassembly and Assembly 	INFOID:000000007350621 s). INFOID:000000007350622 d bearing assembly. nd bearing assembly.	G H J
 REAR SENSOR ROTOR : Exploded View Refer to RAX-5, "Exploded View" (2WD models), RAX-16, "Exploded View" (AWD model REAR SENSOR ROTOR : Removal and Installation 2WD MODELS Removal Sensor rotor cannot be disassembled. Remove the sensor rotor together with hub an Refer to RAX-5, "Removal and Installation". Installation Sensor rotor cannot be disassembled. Installation the sensor rotor together with hub ar Refer to RAX-5, "Removal and Installation". AWD MODELS For removal and installation of sensor rotor, refer to RAX-17, "Disassembly and Assembly". 	INFOID:000000007350621 s). INFOID:000000007350622 d bearing assembly. nd bearing assembly.	G H J K

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< REMOVAL AND INSTALLATION >

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Exploded View

INFOID:000000007350623

[VDC/TCS/ABS]



- 1. ABS actuator and electric unit (control 2. Connector unit)
- A. To front LH brake caliper
- D. To front RH brake caliper
- B. To rear RH brake caliper
- E. From master cylinder primary side
- C. To Rear LH brake caliper

3. Bracket

F. From master cylinder secondary side

: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:000000007350624

REMOVAL

CAUTION:

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-12, "Bleeding Brake System"</u>.
- 1. Remove cowl top. Refer to EXT-20, "Exploded View".
- 2. Disconnect ABS actuator and electric unit (control unit) harness connector.
- 3. Loosen brake tube flare nuts, then remove brake tubes from ABS actuator and electric unit (control unit).
- 4. Remove tire (front LH side).
- 5. Remove fender protector (rear): (front LH side). Refer to EXT-22, "Exploded View".
- 6. Remove ABS actuator and electric unit (control unit) bracket mounting nut.
- 7. Remove ABS actuator and electric unit (control unit) from vehicle.

INSTALLATION

BRC-180
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

< REMOVAL AND INSTALLATION >

[VDC/TCS/ABS]

Note the following, and install in the reverse order of removal.

- Before servicing, disconnect the battery cable from negative terminal.
- To remove brake tube, use a flare nut wrench to prevent flare nuts and brake tube from being damaged. To install, use flare nut crowfoot and torque wrench.
- Never apply excessive impact to ABS actuator and electric unit (control unit), such as dropping it.
- Never remove and install actuator by holding harness.
- After work is completed, bleed air from brake tube. Refer to <u>BR-12, "Bleeding Brake System".</u>
- After installing harness connector in the ABS actuator and electric unit (control unit), make sure harness connector is securely locked.
- When replacing ABS actuator and electric unit (control unit), make sure adjust neutral position of steering angle sensor. Refer to <u>BRC-76, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION :</u> <u>Description</u>".

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< REMOVAL AND INSTALLATION >

YAW RATE/SIDE/DECEL G SENSOR

Exploded View

INFOID:000000007350625

[VDC/TCS/ABS]



1. yaw rate/side/decel G sensor 2. Bracket

C: Vehicle front

Refer to GI-4, "Components" for symbol in the figure.

Removal and Installation

INFOID:000000007350626

REMOVAL

CAUTION:

Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/ decel G sensor is sensitive to the impact.

- 1. Remove center console assembly. Refer to IP-22, "Exploded View".
- 2. Disconnect yaw rate/side/decel G sensor harness connector.
- 3. Remove mounting bolts. Remove yaw rate/side/decel G sensor.

INSTALLATION

Note the following, and install in the reverse order of removal.

• Never drop or strike yaw rate/side/decel G sensor, or never use power tool etc., because yaw rate/side/decel G sensor is sensitive to the impact.

STEERING ANGLE SENSOR

< REMOVAL AND INSTALLATION >

STEERING ANGLE SENSOR

Exploded View

INFOID:000000007350627

INFOID:000000007350628



1. Steering angle sensor

C: Vehicle front

Removal and Installation

REMOVAL

- 1. Remove spiral cable assembly. Refer to <u>SR-14, "Exploded View"</u>.
- 2. Remove steering angle sensor from spiral cable assembly.

INSTALLATION

Note the following, and install in the reverse order of removal.

After work, make sure to adjust neutral position of steering angle sensor. Refer to <u>BRC-76, "ADJUSTMENT</u> <u>OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description"</u>.

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