SECTION BRC
BRAKE CONTROL SYSTEM

CONTENTS

TYPE 1

BASIC INSPECTION 7

APPLICATION NOTICE 7
Application Notice 7

DIAGNOSIS AND REPAIR WORKFLOW 8
Work Flow 8
Diagnostic Work Sheet 11

INSPECTION AND ADJUSTMENT 12

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 12
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 12
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement 12

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION 12
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description 12
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement 12

CALIBRATION OF DECEL G SENSOR 13
CALIBRATION OF DECEL G SENSOR : Description 13
CALIBRATION OF DECEL G SENSOR : Special Repair Requirement 13

SYSTEM DESCRIPTION 15

APPLICATION NOTICE 15
Application Notice 15

VDC 16
System Diagram 16
Hydraulic Circuit Diagram 16
System Description 17
Component Parts Location 18
Component Description 19

TCS 20
System Diagram 20
System Description 20
Component Parts Location 21
Component Description 22

ABS 23
System Diagram 23
System Description 23
Component Parts Location 24
Component Description 25

EBD 26
System Diagram 26
System Description 26
Component Parts Location 27
Component Description 28

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)] 29
CONSULT Function (ABS) 29

DTC/CIRCUIT DIAGNOSIS 34

APPLICATION NOTICE 34
Application Notice 34

C1101, C1102, C1103, C1104 WHEEL SENSOR-1 35
Description 35
DTC Logic 35
Diagnosis Procedure 35
Component Inspection 37
Special Repair Requirement 37

C1105, C1106, C1107, C1108 WHEEL SENSOR-2 38
Description 38
DTC Logic 38

Diagnosis Procedure 38
Component Inspection 40
Special Repair Requirement 40

C1109 POWER AND GROUND SYSTEM 41
Description 41
DTC Logic 41
Diagnosis Procedure 41
Special Repair Requirement 42

C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 43
DTC Logic 43
Diagnosis Procedure 43
Special Repair Requirement 43

C1111 ABS MOTOR, MOTOR RELAY SYSTEM 44
Description 44
DTC Logic 44
Diagnosis Procedure 44
Component Inspection 45
Special Repair Requirement 45

C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR 46
Description 46
DTC Logic 46
Diagnosis Procedure 46
Component Inspection 47
Special Repair Requirement 47

C1115 WHEEL SENSOR 48
Description 48
DTC Logic 48
Diagnosis Procedure 48
Component Inspection 49
Special Repair Requirement 50

C1116 STOP LAMP SWITCH 51
Description 51
DTC Logic 51
Diagnosis Procedure 51
Special Repair Requirement 52

C1120, C1122, C1124, C1126 IN ABS SOL 53
Description 53
DTC Logic 53
Diagnosis Procedure 53
Component Inspection 54
Special Repair Requirement 54

C1121, C1123, C1125, C1127 OUT ABS SOL.. 56
Description 56
DTC Logic 56
Diagnosis Procedure 56
Component Inspection 57
Special Repair Requirement 57

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL 59
Description 59
DTC Logic 59
Diagnosis Procedure 59

C1140 ACTUATOR RLY 60
Description 60
DTC Logic 60
Diagnosis Procedure 60
Component Inspection 61
Special Repair Requirement 61

C1142 PRESS SENSOR 62
DTC Description 62
Diagnosis Procedure 62

C1143, C1144 STEERING ANGLE SENSOR... 65
Description 65
DTC Logic 65
Diagnosis Procedure 65
Component Inspection 66
Special Repair Requirement 66

C1155 BRAKE FLUID LEVEL SWITCH 68
Description 68
DTC Logic 68
Diagnosis Procedure 68
Component Inspection 69
Special Repair Requirement 69

C1156 ST ANG SEN COM CIR 71
Description 71
DTC Logic 71
Diagnosis Procedure 71

C1160 DECEL G SEN SET 72
Description 72
DTC Logic 72
Diagnosis Procedure 72

C1163 ST ANGLE SEN SAFE 73
Description 73
DTC Logic 73
Diagnosis Procedure 73

C1164, C1165, C1166, C1167 CV/SV SYSTEM 74
Description 74
DTC Logic 74
Diagnosis Procedure 74
Component Inspection 75
Special Repair Requirement 76

C1187 DIFFERENTIAL LOCK CONTROL UNIT 77
Description 77
DTC Logic 77
Diagnosis Procedure 77

U1000 CAN COMM CIRCUIT 78
Description 78
DTC Logic 78

Diagnosis Procedure 78

VDC OFF SWITCH 79
Description 79
Component Function Check 79
Diagnosis Procedure 79
Component Inspection 80
Special Repair Requirement 80

ABS WARNING LAMP 81
Description 81
Component Function Check 81
Diagnosis Procedure 81
Special Repair Requirement 81

BRAKE WARNING LAMP 82
Description 82
Component Function Check 82
Diagnosis Procedure 82
Special Repair Requirement 82

VDC OFF INDICATOR LAMP 83
Description 83
Component Function Check 83
Diagnosis Procedure 83
Special Repair Requirement 84

SLIP INDICATOR LAMP 85
Description 85
Component Function Check 85
Diagnosis Procedure 85
Special Repair Requirement 85

ECU DIAGNOSIS INFORMATION 86

APPLICATION NOTICE 86
Application Notice 86

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 87
Reference Value 87
Fail-Safe 91
DTC No. Index 91

WIRING DIAGRAM 93

BRAKE CONTROL SYSTEM - VDC 93
Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST 93

SYMPTOM DIAGNOSIS 101

APPLICATION NOTICE 101
Application Notice 101

VDC/TCS/ABS 102
Symptom Table 102

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY 103
Diagnosis Procedure 103

UNEXPECTED PEDAL REACTION 104
Diagnosis Procedure 104

THE BRAKING DISTANCE IS LONG 105
Diagnosis Procedure 105

ABS FUNCTION DOES NOT OPERATE 106
Diagnosis Procedure 106

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS 107
Diagnosis Procedure 107

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL 108
Diagnosis Procedure 108

NORMAL OPERATING CONDITION 109
Description 109

PRECAUTION 110

PRECAUTIONS 110
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 110
Precaution for Brake System 110
Precaution for Brake Control 111
Precaution for CAN System 111

PREPARATION 113

PREPARATION 113
Special Service Tool 113
Commercial Service Tool 113

UNIT REMOVAL AND INSTALLATION ... 114

WHEEL SENSOR 114
Removal and Installation 114

SENSOR ROTOR 115
Removal and Installation 115

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY) 116
Removal and Installation 116

STEERING ANGLE SENSOR 118
Removal and Installation 118

YAW RATE/SIDE/DECEL G SENSOR 119
Removal and Installation 119

TYPE 2

BASIC INSPECTION 120

APPLICATION NOTICE 120
Application Notice 120

DIAGNOSIS AND REPAIR WORKFLOW 121
Work Flow 121

Diagnostic Work Sheet 124

INSPECTION AND ADJUSTMENT 125

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT 125
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description 125
ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement ... 125

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION 125
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description 125
ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement 125

CALIBRATION OF DECEL G SENSOR 126
CALIBRATION OF DECEL G SENSOR : Description 126
CALIBRATION OF DECEL G SENSOR : Special Repair Requirement 126

SYSTEM DESCRIPTION 128

APPLICATION NOTICE 128
Application Notice 128

Hill descent control 129
System Diagram 129
Hydraulic Circuit Diagram 129
System Description 130
Component Parts Location 131
Component Description 132

Hill start assist 133
System Diagram 133
System Description 133
Component Parts Location 134
Component Description 135

VDC 136
System Diagram 136
System Description 136
Component Parts Location 137
Component Description 138

TCS 139
System Diagram 139
System Description 139
Component Parts Location 140
Component Description 141

ABS 142
System Diagram 142
System Description 142
Component Parts Location 143
Component Description 144

EBD 145
System Diagram 145
System Description 145
Component Parts Location 146
Component Description 147

DIAGNOSIS SYSTEM [ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)] 148
CONSULT Function (ABS) 148

DTC/CIRCUIT DIAGNOSIS 153

APPLICATION NOTICE 153
Application Notice 153

C1101, C1102, C1103, C1104 WHEEL SENSOR-1 154
Description 154
DTC Logic 154
Diagnosis Procedure 154
Component Inspection 156
Special Repair Requirement 156

C1105, C1106, C1107, C1108 WHEEL SENSOR-2 157
Description 157
DTC Logic 157
Diagnosis Procedure 157
Component Inspection 159
Special Repair Requirement 159

C1109 POWER AND GROUND SYSTEM 160
Description 160
DTC Logic 160
Diagnosis Procedure 160
Special Repair Requirement 161

C1110, C1170 ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 162
DTC Logic 162
Diagnosis Procedure 162
Special Repair Requirement 162

C1111 ABS MOTOR, MOTOR RELAY SYSTEM 163
Description 163
DTC Logic 163
Diagnosis Procedure 163
Component Inspection 164
Special Repair Requirement 164

C1113, C1145, C1146 YAW RATE/SIDE/DECEL G SENSOR 165
Description 165
DTC Logic 165
Diagnosis Procedure 165
Component Inspection 166
Special Repair Requirement 166

C1115 WHEEL SENSOR 167
Description 167
DTC Logic 167

Diagnosis Procedure 167
Component Inspection 168
Special Repair Requirement 169

C1116 STOP LAMP SWITCH 170
Description 170
DTC Logic 170
Diagnosis Procedure 170
Special Repair Requirement 171

C1120, C1122, C1124, C1126 IN ABS SOL ... 172
Description 172
DTC Logic 172
Diagnosis Procedure 172
Component Inspection 173
Special Repair Requirement 173

C1121, C1123, C1125, C1127 OUT ABS SOL. 175
Description 175
DTC Logic 175
Diagnosis Procedure 175
Component Inspection 176
Special Repair Requirement 176

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL 178
Description 178
DTC Logic 178
Diagnosis Procedure 178

C1140 ACTUATOR RLY 179
Description 179
DTC Logic 179
Diagnosis Procedure 179
Component Inspection 180
Special Repair Requirement 180

C1142 PRESS SENSOR 181
DTC Description 181
Diagnosis Procedure 181

C1143, C1144 STEERING ANGLE SENSOR.. 184
Description 184
DTC Logic 184
Diagnosis Procedure 184
Component Inspection 185
Special Repair Requirement 185

C1155 BRAKE FLUID LEVEL SWITCH 187
Description 187
DTC Logic 187
Diagnosis Procedure 187
Component Inspection 188
Special Repair Requirement 188

C1156 ST ANG SEN COM CIR 190
Description 190
DTC Logic 190
Diagnosis Procedure 190

C1160 DECEL G SEN SET 191
Description 191
DTC Logic 191
Diagnosis Procedure 191

C1163 ST ANGLE SEN SAFE 192
Description 192
DTC Logic 192
Diagnosis Procedure 192

C1164, C1165, C1166, C1167 CV/SV SYSTEM 193
Description 193
DTC Logic 193
Diagnosis Procedure 193
Component Inspection 194
Special Repair Requirement 195

C1187 DIFFERENTIAL LOCK CONTROL UNIT 196
Description 196
DTC Logic 196
Diagnosis Procedure 196

U1000 CAN COMM CIRCUIT 197
Description 197
DTC Logic 197
Diagnosis Procedure 197

Hill descent control SWITCH 198
Description 198
Component Function Check 198
Diagnosis Procedure 198
Component Inspection 199
Special Repair Requirement 199

VDC OFF SWITCH 200
Description 200
Component Function Check 200
Diagnosis Procedure 200
Component Inspection 201
Special Repair Requirement 201

ABS WARNING LAMP 202
Description 202
Component Function Check 202
Diagnosis Procedure 202
Special Repair Requirement 202

BRAKE WARNING LAMP 203
Description 203
Component Function Check 203
Diagnosis Procedure 203
Special Repair Requirement 203

Hill descent control INDICATOR LAMP 204
Description 204
Component Function Check 204
Diagnosis Procedure 204
Special Repair Requirement 204

VDC OFF INDICATOR LAMP 205

Description 205
Component Function Check 205
Diagnosis Procedure 205
Special Repair Requirement 206

SLIP INDICATOR LAMP 207
Description 207
Component Function Check 207
Diagnosis Procedure 207
Special Repair Requirement 207

ECU DIAGNOSIS INFORMATION 208

APPLICATION NOTICE 208
Application Notice 208

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) 209
Reference Value 209
Fail-Safe 213
DTC No. Index 214

WIRING DIAGRAM 216

BRAKE CONTROL SYSTEM - VDC 216
Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST 216

SYMPTOM DIAGNOSIS 224

APPLICATION NOTICE 224
Application Notice 224

VDC/TCS/ABS 225
Symptom Table 225

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY 226
Diagnosis Procedure 226

UNEXPECTED PEDAL REACTION 227
Diagnosis Procedure 227

THE BRAKING DISTANCE IS LONG 228
Diagnosis Procedure 228

ABS FUNCTION DOES NOT OPERATE 229
Diagnosis Procedure 229

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS 230
Diagnosis Procedure 230

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL 231
Diagnosis Procedure 231

NORMAL OPERATING CONDITION 232
Description 232

PRECAUTION 233

PRECAUTIONS 233
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 233
Precaution for Brake System 233
Precaution for Brake Control 234
Precaution for CAN System 234

PREPARATION 236

PREPARATION 236
Special Service Tool 236
Commercial Service Tool 236

UNIT REMOVAL AND INSTALLATION ...237

WHEEL SENSOR 237
Removal and Installation 237

SENSOR ROTOR 238
Removal and Installation 238

ACTUATOR AND ELECTRIC UNIT (ASSEMBLY) 239
Removal and Installation 239

STEERING ANGLE SENSOR 241
Removal and Installation 241

YAW RATE/SIDE/DECEL G SENSOR 242
Removal and Installation 242

BASIC INSPECTION

APPLICATION NOTICE

Application Notice

INFOID:0000000007327668

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

DIAGNOSIS AND REPAIR WORKFLOW

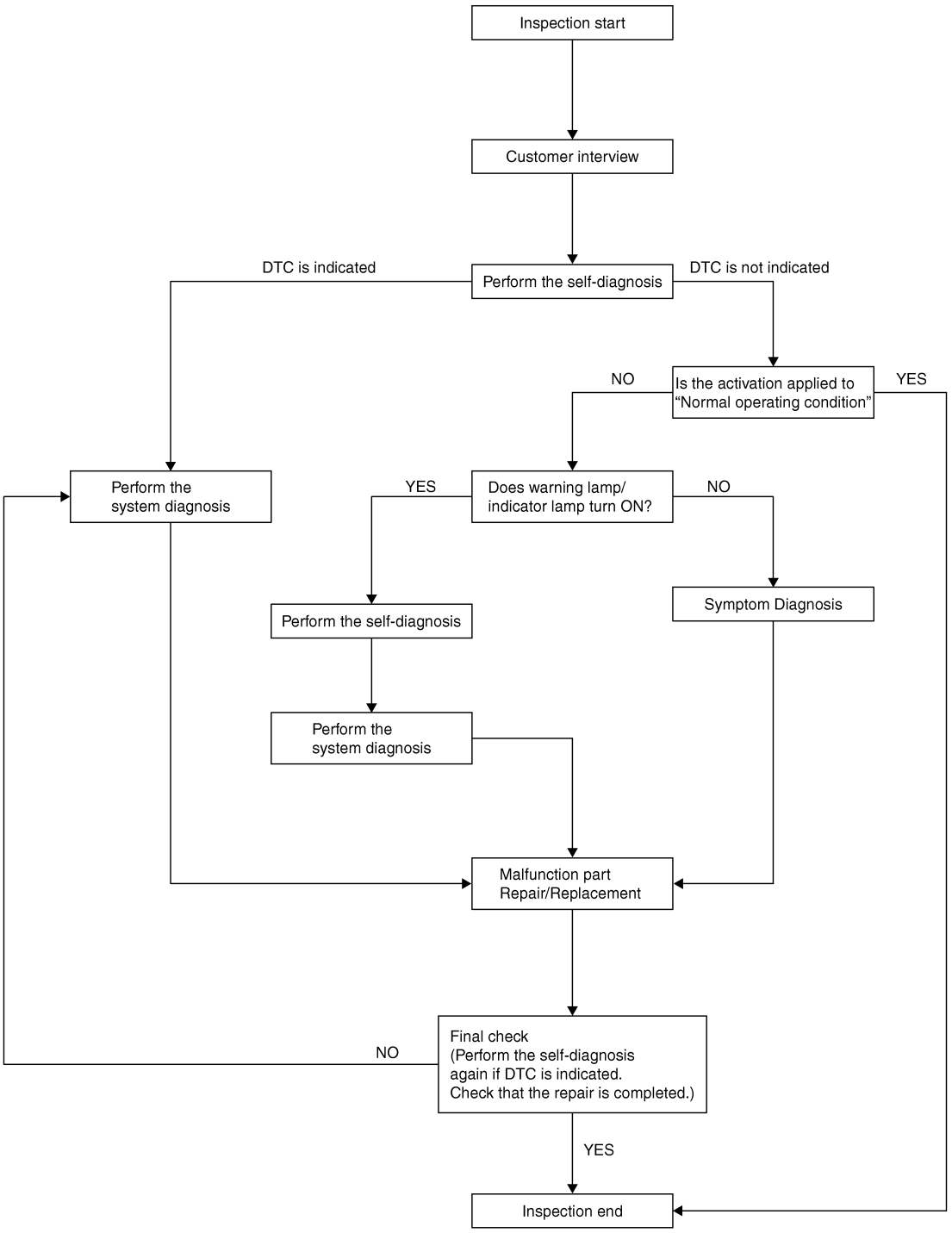
Work Flow

INFOID:0000000007327669

PRECAUTIONS FOR DIAGNOSIS

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

OVERALL SEQUENCE



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DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

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

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-29, "CONSULT Function (ABS)".

Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-91, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-109, "Description".

Is the symptom a normal operation?

YES >> Inspection End
NO >> GO TO 5

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.
- ABS warning lamp: Refer to BRC-81, "Description".
- Brake warning lamp: Refer to BRC-82, "Description".
- VDC OFF indicator lamp: Refer to BRC-83, "Description".
- SLIP indicator lamp: Refer to BRC-85, "Description".

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

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

Is no other DTC present and the repair completed?

YES >> Inspection End
NO >> GO TO 3

Diagnostic Work Sheet

INFOID:0000000007327670

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
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work (Wheels lock when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

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INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000007327671

After replacing the ABS actuator and electric unit (control unit), perform the following procedures:
- Neutral position adjustment for the steering angle sensor
- Calibration of the decel G sensor (4WD models)

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000007327672

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

Perform the neutral position adjustment for the steering angle sensor.

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

2.PERFORM CALIBRATION OF THE DECEL G SENSOR (4WD MODELS)

Perform calibration of the decel G sensor.

>> Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:0000000007327673

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

×: Required –: Not required

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

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

INFOID:0000000007327674

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

>> GO TO 3

3. CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1

4. ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-29, "CONSULT Function (ABS)".
- ECM: Refer to EC-499, "CONSULT Function".

Are the memories erased?

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

CALIBRATION OF DECEL G SENSOR

CALIBRATION OF DECEL G SENSOR : Description

INFOID:0000000007327675

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

×: Required –: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:0000000007327676

CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

(Calibration cannot be done without CONSULT)

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

2.PERFORM CALIBRATION OF DECEL G SENSOR

1. On the CONSULT screen, touch “WORK SUPPORT” and “DECEL G SEN CALIBRATION” in order.
2. Touch “START”.
3. After approximately 10 seconds, touch “END”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “DATA MONITOR”. Then make sure “DECEL G SEN” is within ± 0.08G.

Is the inspection result normal?

YES >> GO TO 4
NO >> Perform calibration of decel G sensor again, GO TO 1

4.ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-29, "CONSULT Function (ABS)".
- ECM: Refer to EC-499, "CONSULT Function".

Are the memories erased?

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

SYSTEM DESCRIPTION

APPLICATION NOTICE

Application Notice

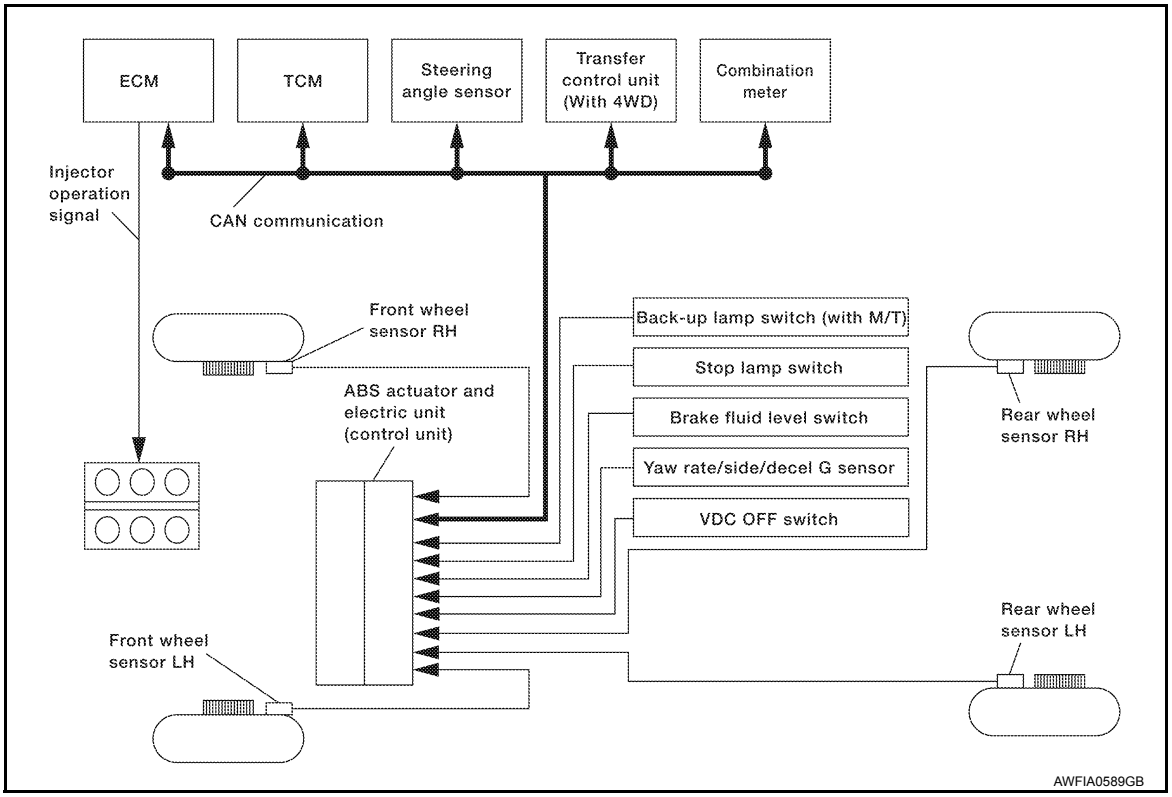
INFOID:0000000007815414

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

VDC

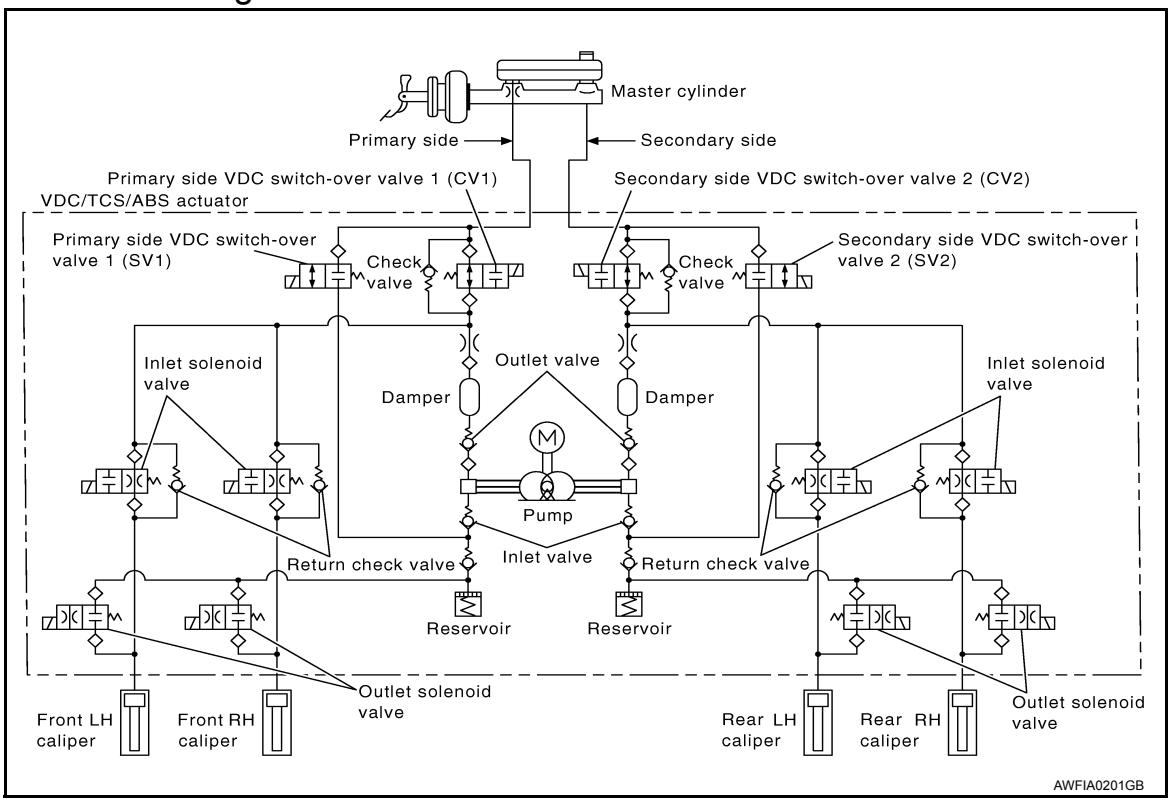
System Diagram

INFOID:0000000007327678



Hydraulic Circuit Diagram

INFOID:0000000007327679



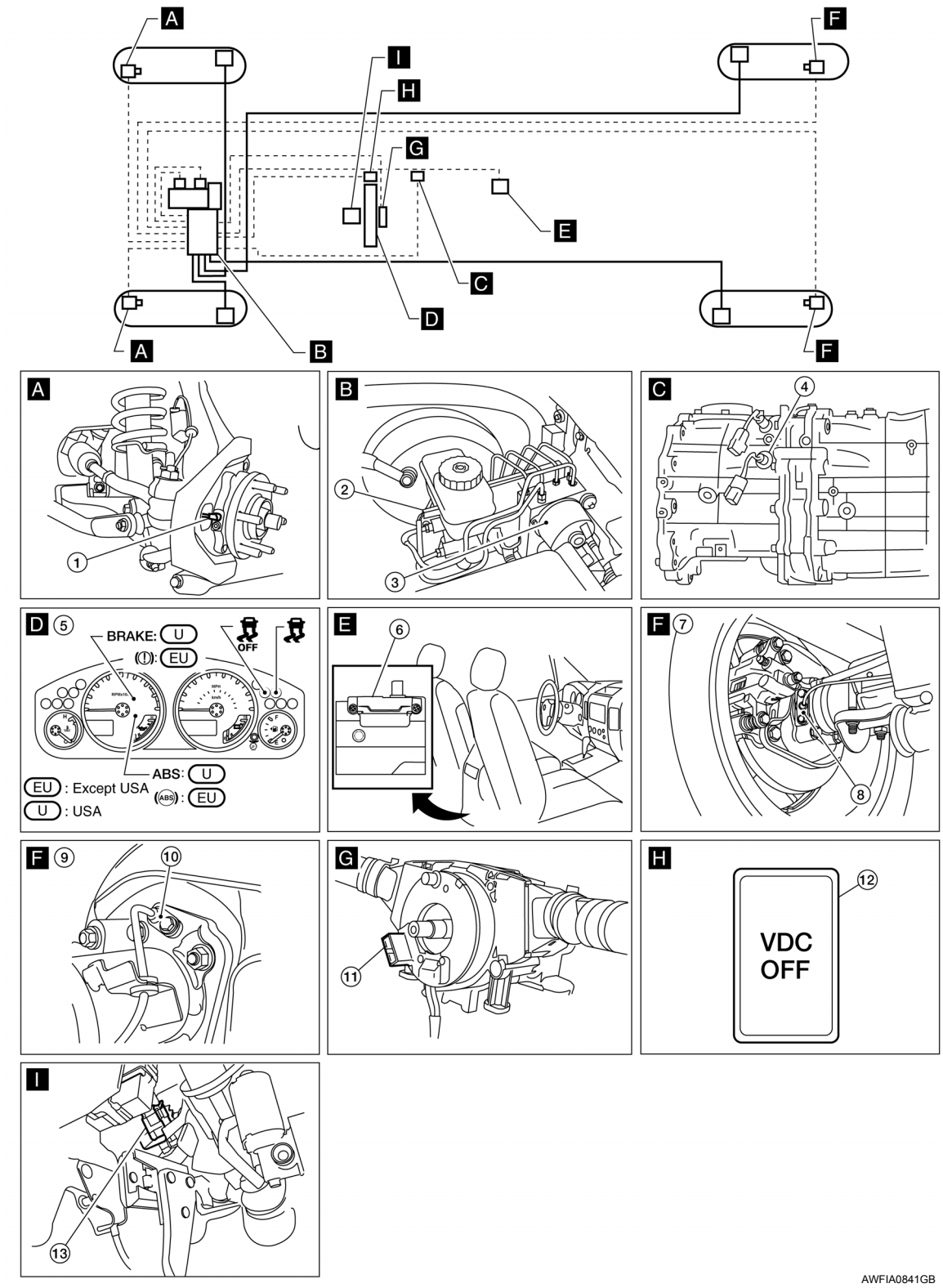
System Description

INFOID:0000000007327680

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

Component Parts Location

INFOID:0000000007327681



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1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Back-up lamp switch F69
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch (with M/T) E38
Stop lamp switch (with A/T) E39

Component Description

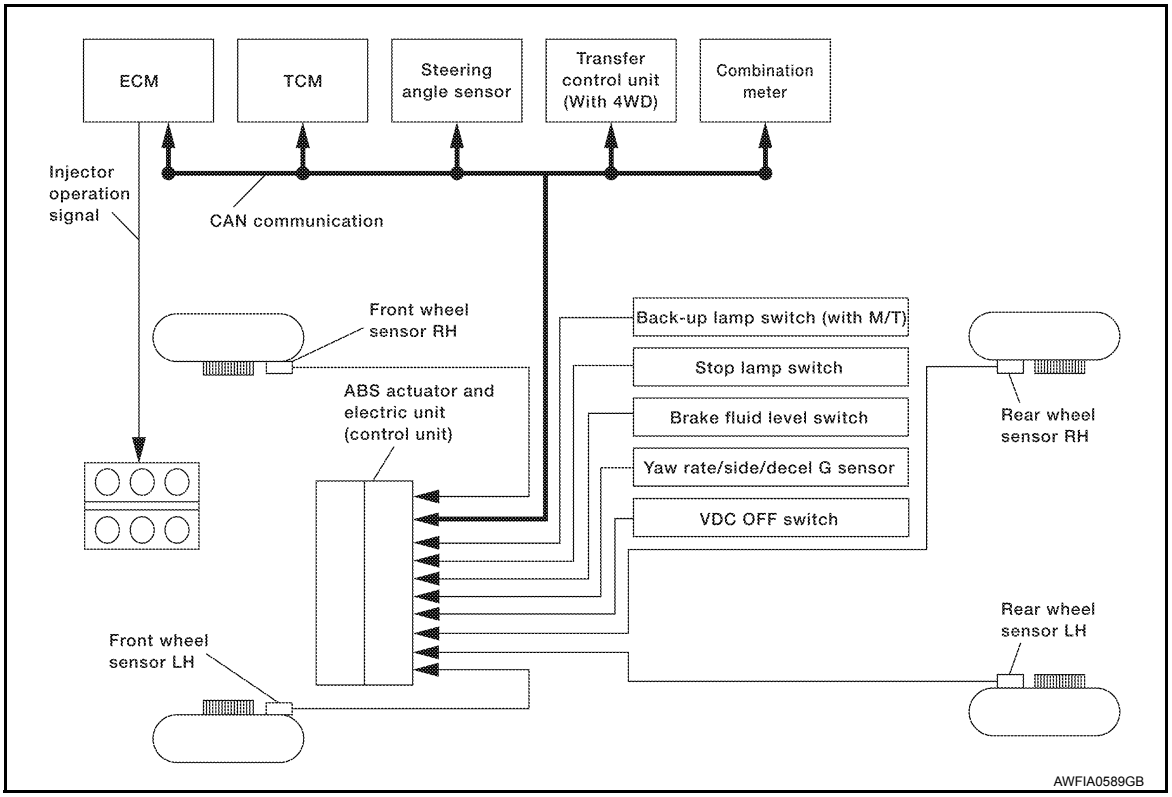
INFOID:0000000007327682

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-44, "Description"
	Motor	
	Actuator relay	BRC-60, "Description"
	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-74, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp		BRC-82, "Description"
VDC OFF indicator lamp		BRC-83, "Description"
SLIP indicator lamp		BRC-85, "Description"

TCS

System Diagram

INFOID:0000000007815425



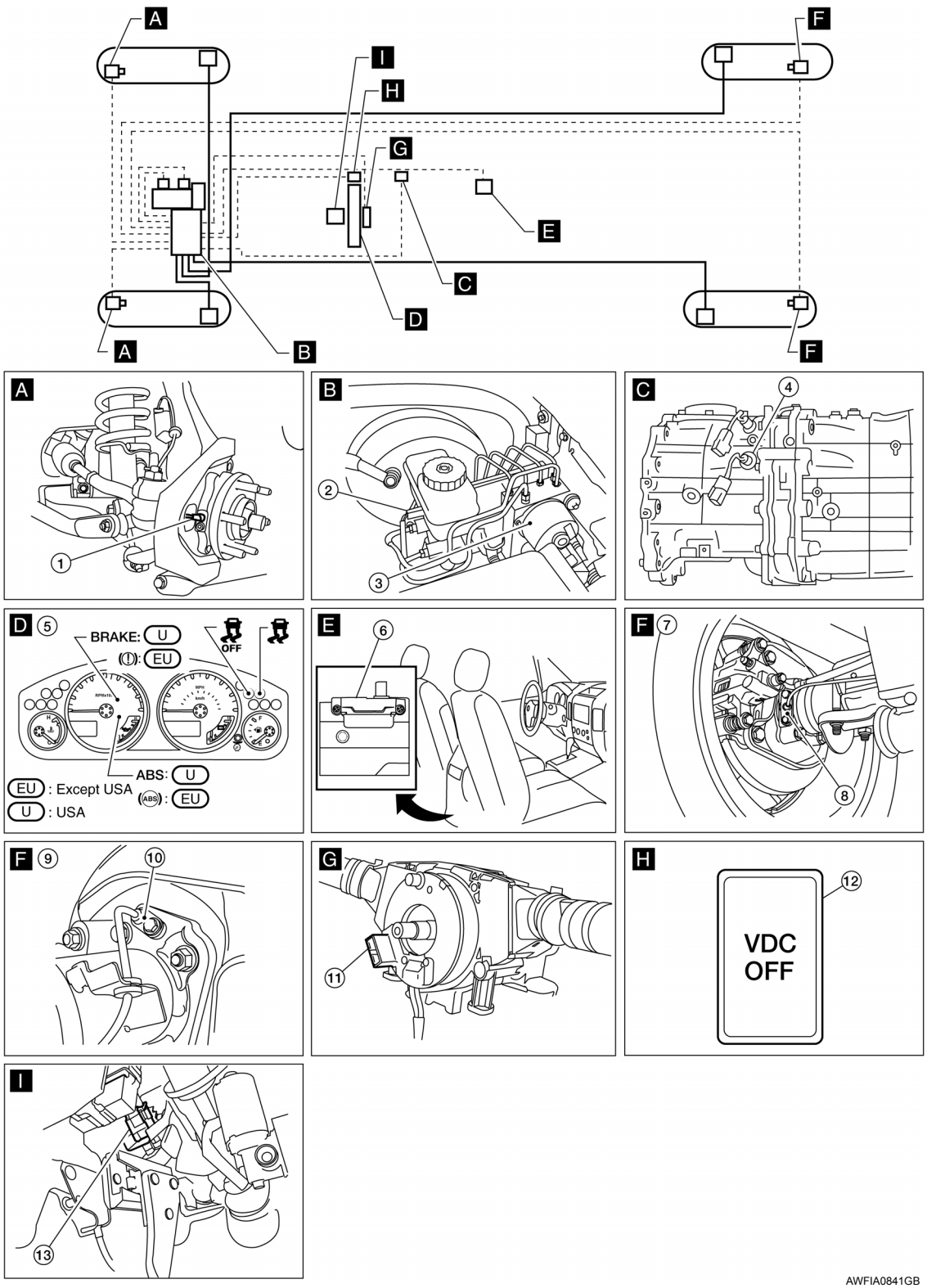
System Description

INFOID:0000000007327684

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

Component Parts Location

INFOID:0000000007815426



AWFIA0841GB

1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Back-up lamp switch F69
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch (with M/T) E38
Stop lamp switch (with A/T) E39

Component Description

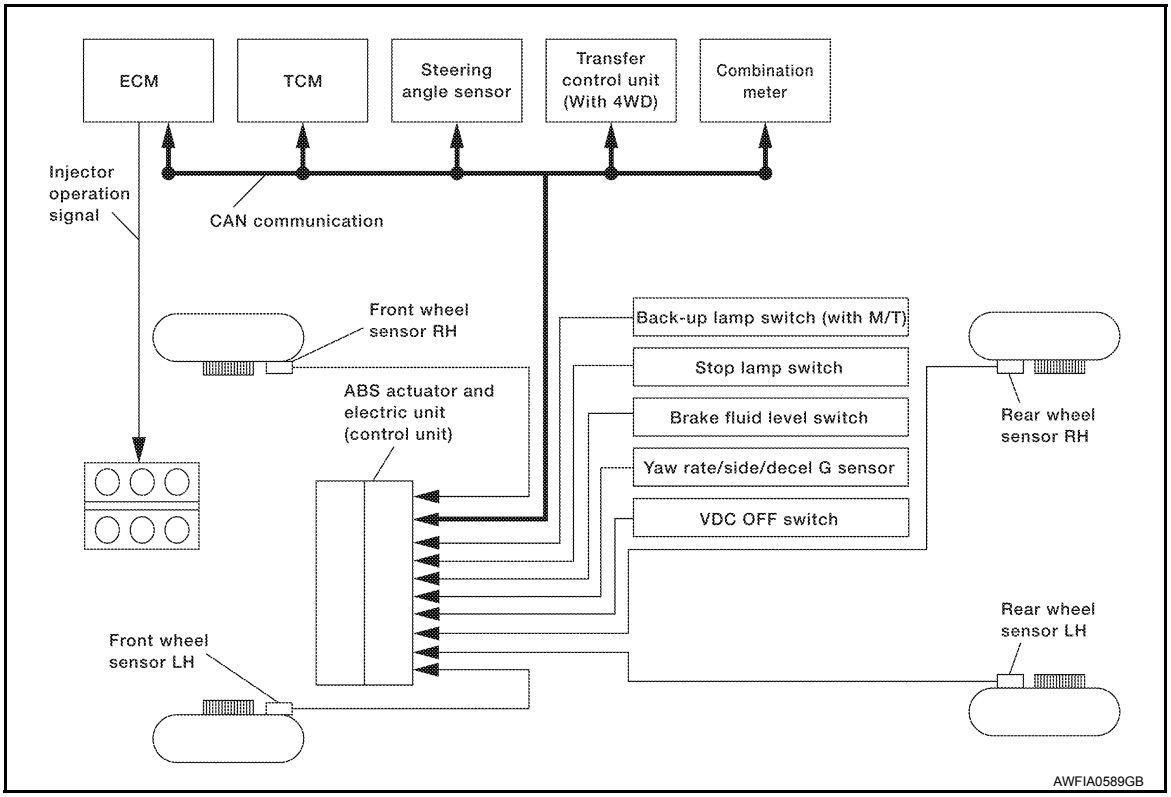
INFOID:0000000007815427

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-44, "Description"
	Motor	
	Actuator relay	BRC-60, "Description"
	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-74, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp		BRC-82, "Description"
VDC OFF indicator lamp		BRC-83, "Description"
SLIP indicator lamp		BRC-85, "Description"

ABS

System Diagram

INFOID:0000000007815428



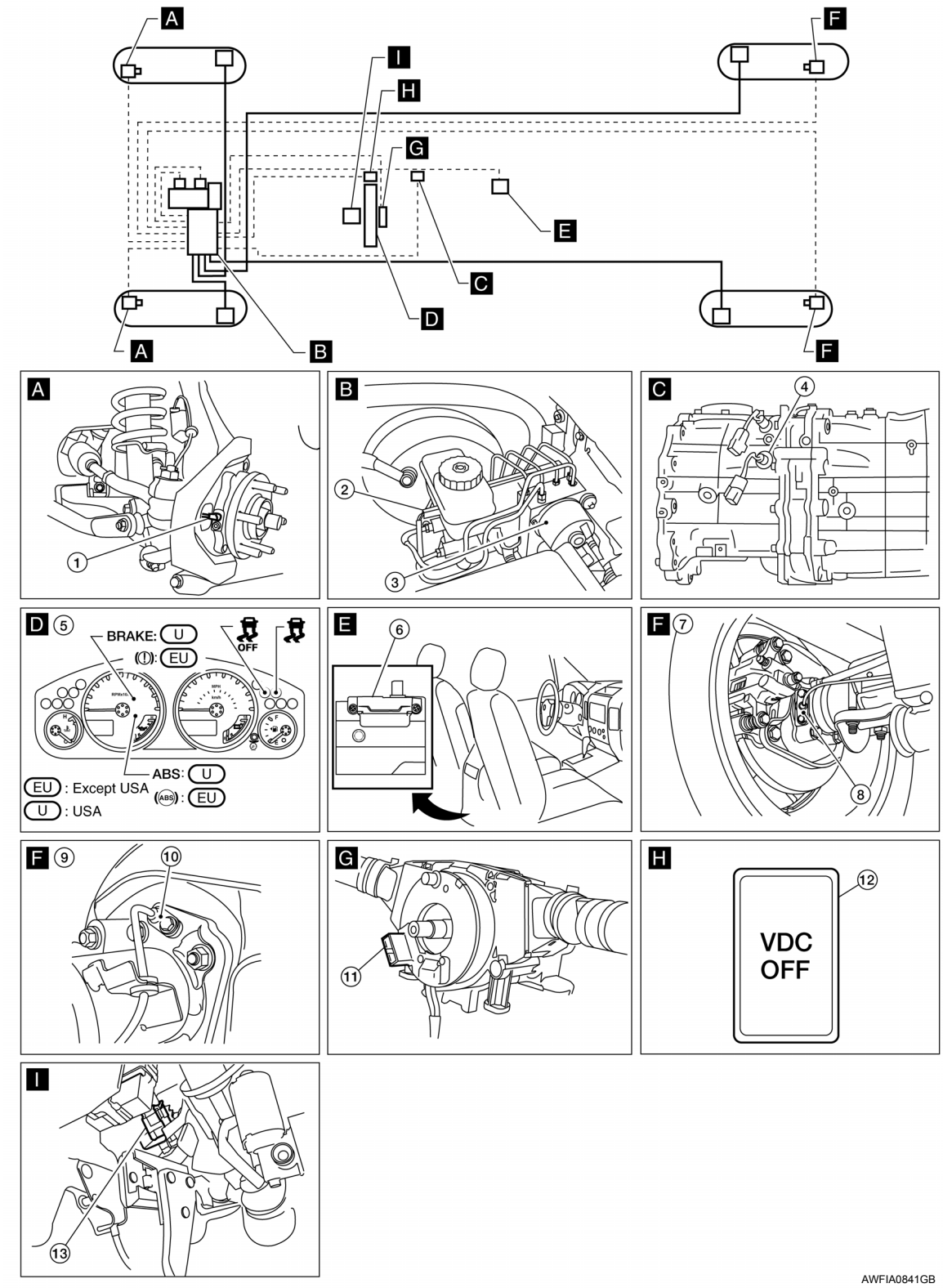
System Description

INFOID:0000000007327688

- 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:0000000007815429



1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Back-up lamp switch F69
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch (with M/T) E38
Stop lamp switch (with A/T) E39

Component Description

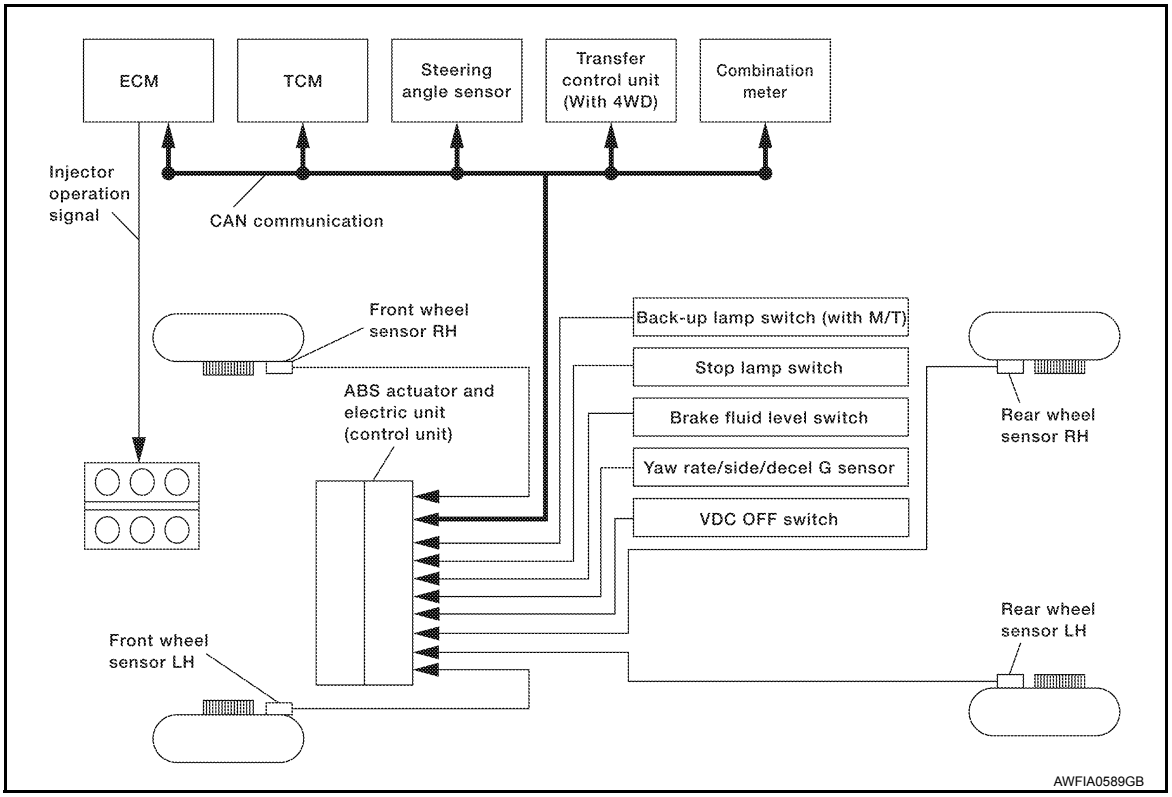
INFOID:0000000007815430

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-44, "Description"
	Motor	
	Actuator relay	BRC-60, "Description"
	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-74, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp		BRC-82, "Description"
VDC OFF indicator lamp		BRC-83, "Description"
SLIP indicator lamp		BRC-85, "Description"

EBD

System Diagram

INFOID:0000000007815431



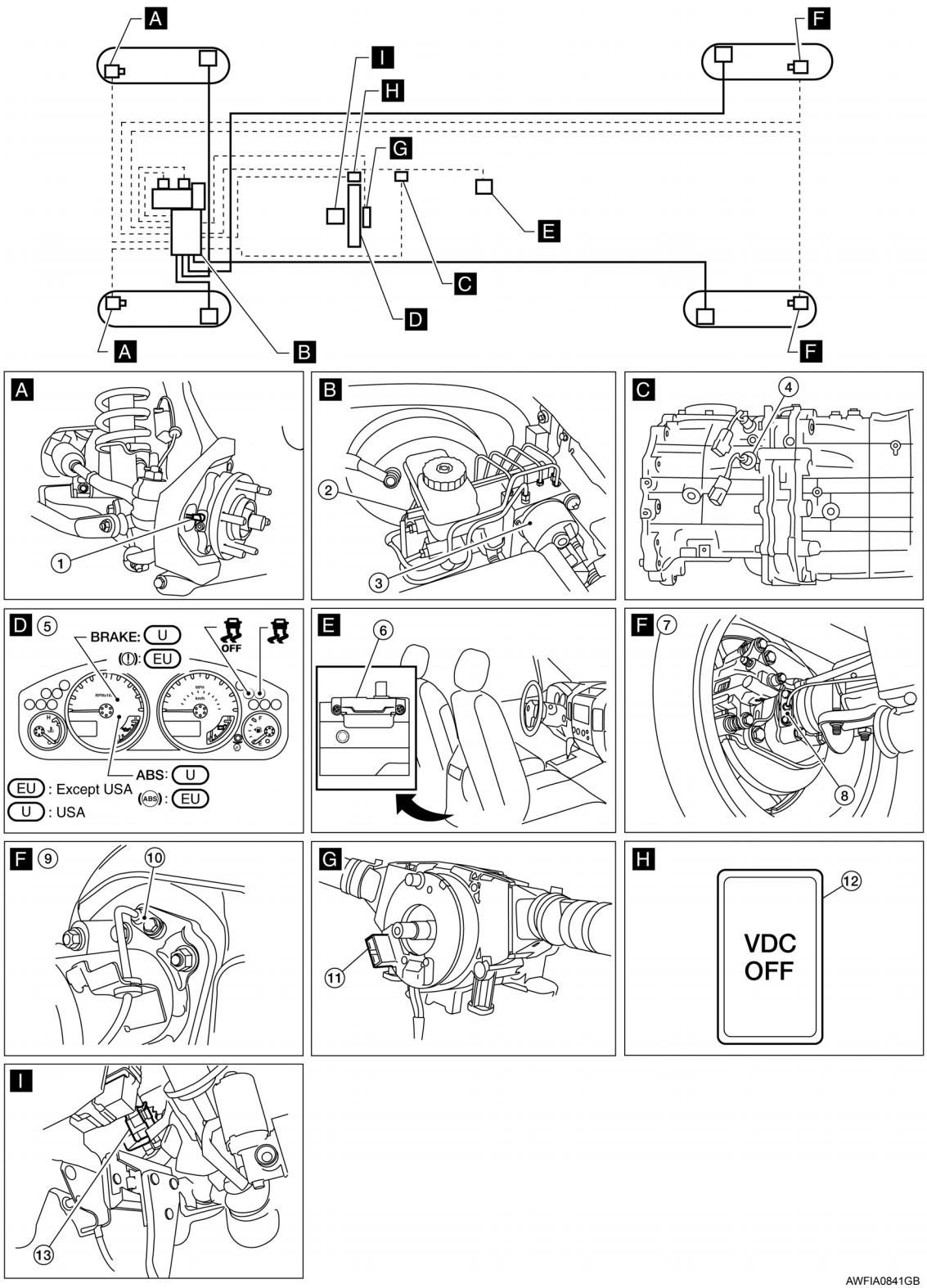
System Description

INFOID:0000000007327692

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

Component Parts Location

INFOID:0000000007815432



AWFIA0841GB

1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Back-up lamp switch F69
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch (with M/T) E38
Stop lamp switch (with A/T) E39

Component Description

INFOID:0000000007815433

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-44, "Description"
	Motor	
	Actuator relay	BRC-60, "Description"
	Solenoid valve	BRC-53, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-74, "Description"
Wheel sensor		BRC-48, "Description"
Yaw rate/side/decel G sensor		BRC-46, "Description"
Stop lamp switch		BRC-51, "Description"
Steering angle sensor		BRC-65, "Description"
Brake fluid level switch		BRC-65, "Description"
VDC OFF switch		BRC-79, "Description"
ABS warning lamp		BRC-81, "Description"
Brake warning lamp		BRC-82, "Description"
VDC OFF indicator lamp		BRC-83, "Description"
SLIP indicator lamp		BRC-85, "Description"

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

CONSULT Function (ABS)

INFOID:0000000007327695

FUNCTION

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

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicable diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
   - VDC OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-91, "DTC No. Index".

DATA MONITOR

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

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

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

×: Applicable

–: Not applicable

WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Description".

ACTIVE TEST

CAUTION:

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

NOTE:

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

Test Item

SOLENOID VALVE

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

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH SOL	FR RH IN SOL	Off	On	On	—	—	—
	FR RH OUT SOL	Off	Off	On*	—	—	—
FR LH SOL	FR LH IN SOL	Off	On	On	—	—	—
	FR LH OUT SOL	Off	Off	On*	—	—	—
RR RH SOL	RR RH IN SOL	Off	On	On	—	—	—
	RR RH OUT SOL	Off	Off	On*	—	—	—
RR LH SOL	RR LH IN SOL	Off	On	On	—	—	—
	RR LH OUT SOL	Off	Off	On*	—	—	—
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	—	—	—	Off	Off	Off
	FR RH OUT SOL	—	—	—	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	—	—	—	Off	Off	Off
	FR LH OUT SOL	—	—	—	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	—	—	—	Off	Off	Off
	RR RH OUT SOL	—	—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	—	—	—	Off	Off	Off
	RR LH OUT SOL	—	—	—	Off	Off	Off
REAR SOL	RR RH IN SOL	Off	On	On	Off	Off	Off
	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off

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

ABS MOTOR

- Touch “On” and “Off” on screen. Make sure motor relay and actuator relay operates as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

DTC/CIRCUIT DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000007815415

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

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000007327697

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:0000000007327698

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327699

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
NOTE:
If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3
NO >> Replace the wheel sensor. Refer to BRC-114, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

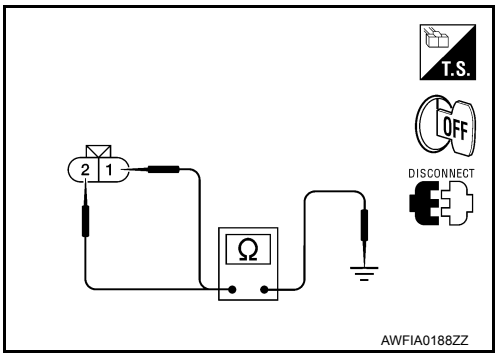
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair the circuit.

Component Inspection

INFOID:0000000007327700

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007327701

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000007327702

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:0000000007327703

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-35, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007815434

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3
NO >> Replace the wheel sensor. Refer to BRC-114, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

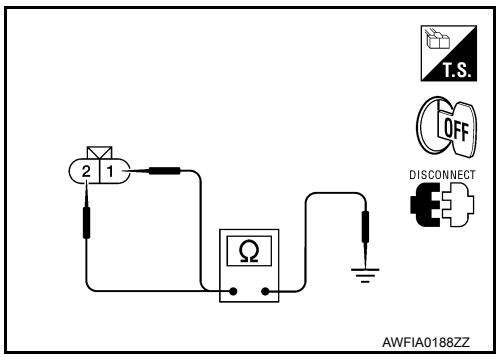
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

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

NO >> Repair the circuit.

Component Inspection

INFOID:0000000007815435

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End

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

Special Repair Requirement

INFOID:0000000007815436

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000007327707

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

DTC Logic

INFOID:0000000007327708

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-41, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327709

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

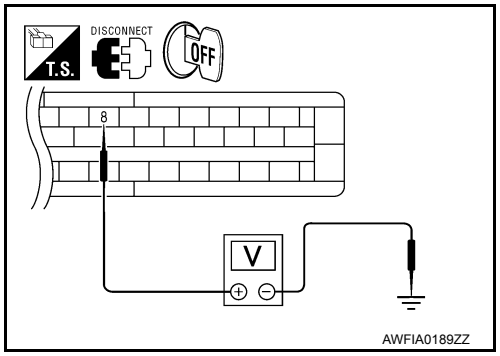
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

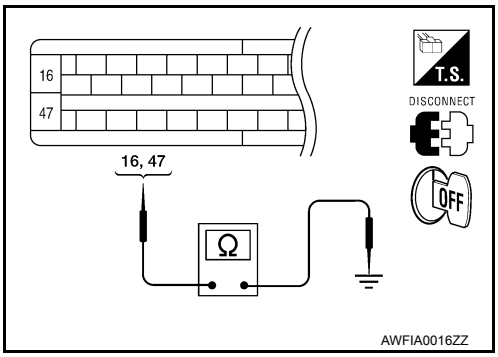
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 8 and ground.



ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E127	8	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0V

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

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



Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.

NO >> Repair or replace malfunctioning components.

Special Repair Requirement

INFOID:0000000007815437

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

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

DTC Logic

INFOID:0000000007327711

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-43, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327712

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

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

Special Repair Requirement

INFOID:0000000007815438

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000007327714

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:0000000007327715

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-44, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327716

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

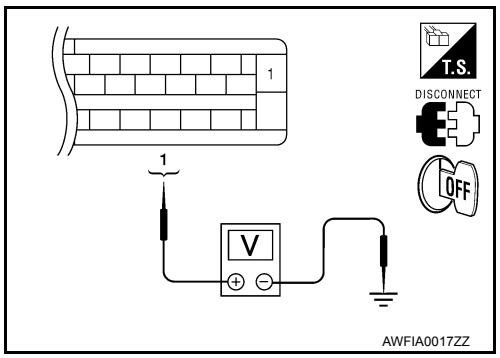
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-29,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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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



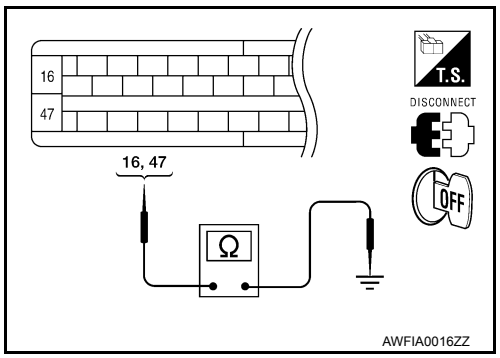
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

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

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327717

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch On and Off on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-44, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007815439

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

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

Description

INFOID:0000000007327719

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

DTC Logic

INFOID:0000000007327720

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-46, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327721

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:

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

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

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

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

Check continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 3, 2, 4, 1.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	18	B73 (B)	3	Yes
	19		2	
	22		4	
	29		1	

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace as necessary.

3. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-47, "Component Inspection".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-119, "Removal and Installation".

Component Inspection

INFOID:0000000007327722

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-46, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007815440

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1115 WHEEL SENSOR

Description

INFOID:0000000007327724

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:0000000007327725

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-48, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007815441

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

NO >> Replace the wheel sensor. Refer to BRC-114, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

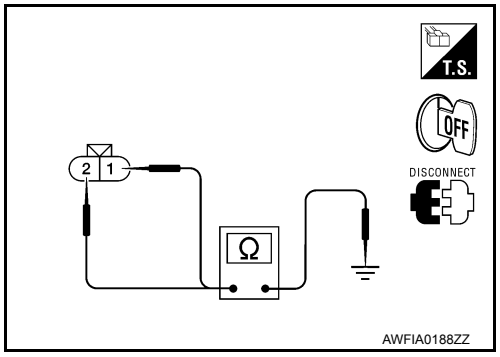
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair the circuit.

Component Inspection

INFOID:0000000007815442

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-48, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007815443

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1116 STOP LAMP SWITCH

Description

INFOID:0000000007327729

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

DTC Logic

INFOID:0000000007327730

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-51, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327731

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

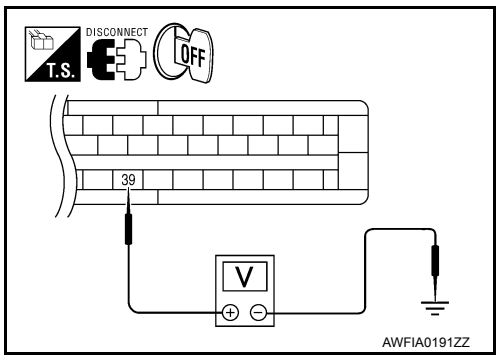
YES >> GO TO 2
NO >> Repair or replace as necessary.

2.STOP LAMP SWITCH INSPECTION

1. Connect the stop lamp switch connector.
2. Check the voltage between the ABS actuator and electric unit (control unit) connector E127 terminal 39 and body ground.

Brake pedal depressed : Battery voltage (approx. 12V)

Brake pedal released : Approx. 0V

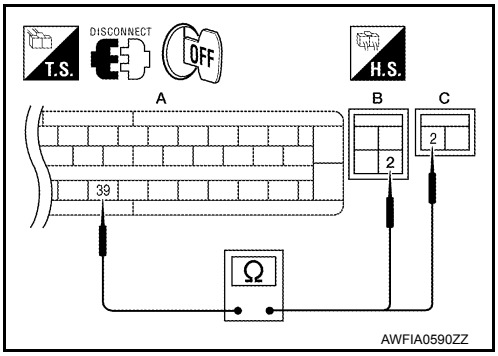


Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> GO TO 3

3.STOP LAMP SWITCH CIRCUIT INSPECTION

1. Disconnect the stop lamp switch connector.
2. Check the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2 (with A/T) or E38 (C) terminal 2 (with M/T).



Continuity should exist.

Is the inspection result normal?

YES >> Refer to BRC-8, "Work Flow".
NO >> Repair or replace malfunctioning components.

Special Repair Requirement

INFOID:0000000007815444

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000007327733

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:0000000007327734

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.	• ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-53, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327735

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK CONNECTOR

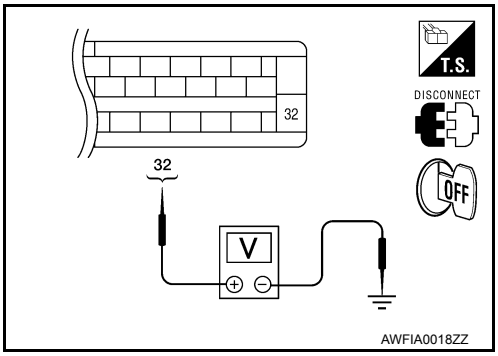
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



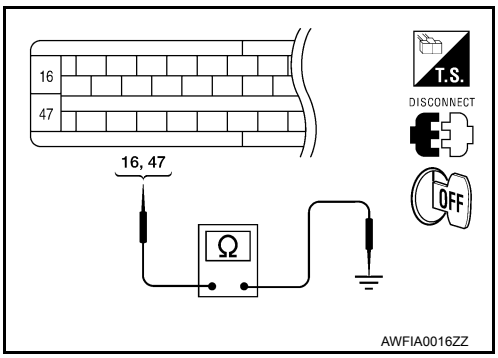
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3. CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327736

1. CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-53, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817649

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000007327738

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:0000000007327739

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.	• ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-56, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817651

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK CONNECTOR

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

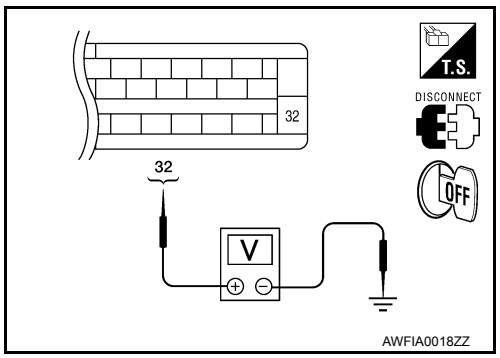
Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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

ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage



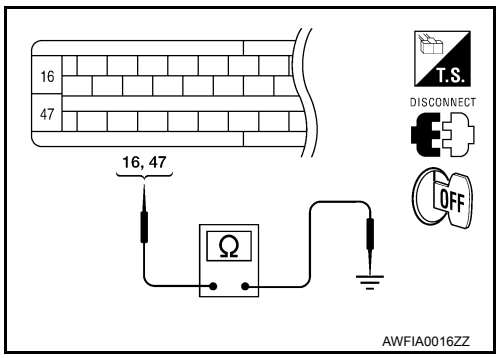
Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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

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



Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007817652

1.CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-74, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817650

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

INFOID:0000000007327743

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

DTC Logic

INFOID:0000000007327744

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-59, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327745

1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-499, "CONSULT Function".
2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

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

C1140 ACTUATOR RLY

Description

INFOID:0000000007327746

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

DTC Logic

INFOID:0000000007327747

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	• Harness or connector • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-60, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817653

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK CONNECTOR

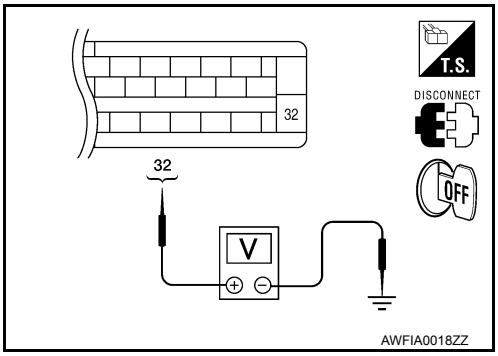
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



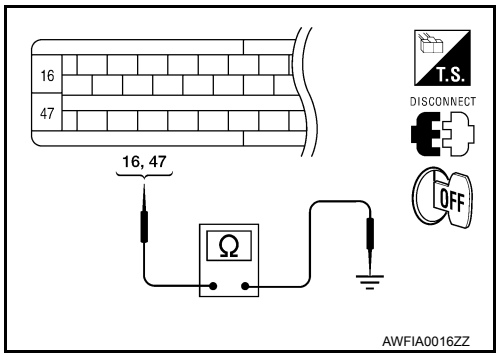
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007817654

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch On and Off on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-44, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817655

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1142 PRESS SENSOR

DTC Description

INFOID:0000000012379232

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1142	PRESS SEN CIRCUIT (Pressure sensor circuit)	When a malfunction is detected in pressure sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Air inclusion in the brake piping • Stop lamp switch system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Stop lamp switch system • ABS actuator and electric unit (control unit) • Brake system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Air inclusion in the brake piping

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.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
3. Perform “Self Diagnostic Result” of “ABS”.

Is DTC “C1142” detected?

YES-1 >> “C1142” is displayed as “CRNT”: Proceed to BRC-62, "Diagnosis Procedure".
YES-2 >> “C1142” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-46, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012379233

1.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-51, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace stop lamp switch system.

2.CHECK BRAKE FLUID LEAKAGE

Check the brake fluid leakage. Refer to BR-18, "On Board Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace brake fluid leakage part.

3.CHECK BRAKE PIPING

Check the brake piping. Refer to BR-12, "Hydraulic Circuit".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace brake piping.
- Front: Refer to BR-24, "Removal and Installation of Front Brake Piping and Brake Hose".
- Rear: Refer to BR-25, "Removal and Installation of Rear Brake Piping and Brake Hose".

4.CHECK BRAKE PEDAL

Check the brake pedal.
- Brake pedal height: Refer to BR-16, "Inspection and Adjustment".
- Brake pedal assembly: Refer to BR-20, "Exploded View".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust the brake pedal height or replace brake pedal assembly.
- Adjust the brake pedal: Refer to BR-16, "Inspection and Adjustment".
- Replace the brake pedal: Refer to BR-20, "Removal and Installation".

5.CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-11, "On Board Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace brake master cylinder. Refer to BR-28, "Removal and Installation".

6.CHECK BRAKE BOOSTER

Check the brake booster. Refer to BR-9, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace brake booster. Refer to BR-30, "Removal and Installation".

7.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace vacuum piping. Refer to BR-32, "Removal and Installation".

8.CHECK FRONT DISC BRAKE

Check the front disc brake caliper. Refer to BR-35, "Exploded View of Brake Caliper".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace front disc brake caliper. Refer to BR-35, "Removal and Installation of Brake Caliper and Disc Rotor".

9.CHECK REAR DISC BRAKE

Check the rear disc brake. Refer to BR-40, "Exploded View of Brake Caliper".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace rear disc brake. Refer to BR-40, "Removal and Installation of Brake Caliper and Disc Rotor".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-41, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness, connector, fuse, or fusible link.

11. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

1. Erase “Self Diagnostic Result” of “ABS”.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
4. Start the engine and drive the vehicle for a short period of time.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
5. Stop the vehicle.
6. Perform “Self Diagnostic Result” of “ABS”.

Is DTC “C1142” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000007327751

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:0000000007327752

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-65, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327753

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

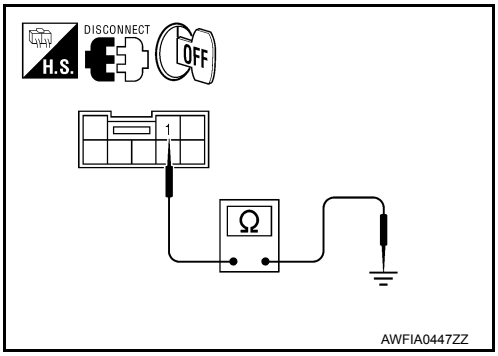
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect steering angle sensor connector.
4. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
5. Reconnect connectors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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

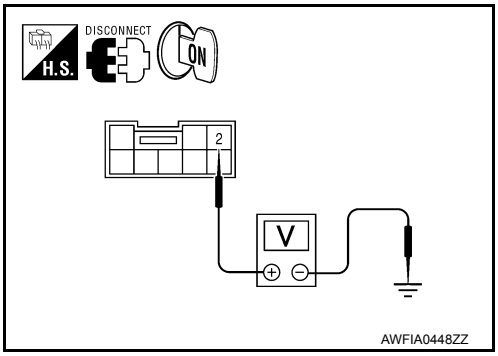
2.CHECK STEERING ANGLE SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Check continuity between steering angle sensor connector M47 terminal 1 and ground.



Steering angle sensor		—	Continuity
Connector	Terminal		
M47	1	Ground	Yes

4. Turn ignition switch ON.
5. Check voltage between steering angle sensor connector M47 terminal 2 and ground.



Steering angle sensor		—	Voltage
Connector	Terminal		
M47	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK DATA MONITOR

Perform the steering angle sensor component inspection. Refer to BRC-66, "Component Inspection".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-118, "Removal and Installation".

Component Inspection

INFOID:0000000007327754

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-65, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817658

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000007327756

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

DTC Logic

INFOID:0000000007327757

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000007327758

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

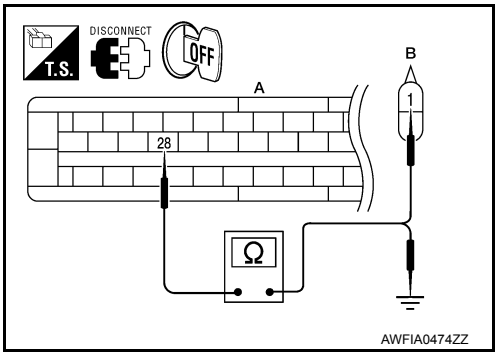
1. Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

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

1. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and brake fluid level switch connector E21 (B) terminal 1.



ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	28	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and ground.

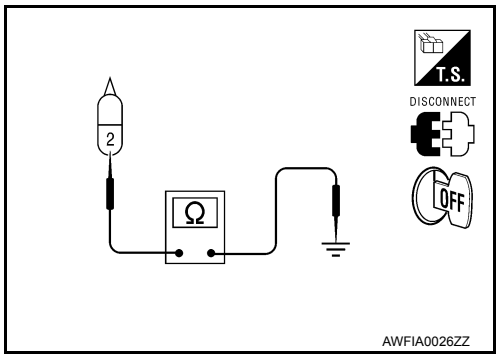
ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E127 (A)	28	Ground	No

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

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



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

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. Refer to BRC-69, "Component Inspection".

Is the inspection result normal?

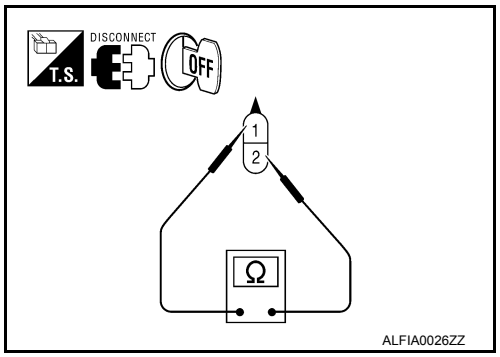
YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace brake fluid level switch.

Component Inspection

INFOID:0000000007327759

1.CHECK BRAKE FLUID LEVEL SWITCH

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



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

Is the inspection result normal?

YES >> Inspection End
NO >> Replace brake fluid level switch.

Special Repair Requirement

INFOID:0000000007817663

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1156 ST ANG SEN COM CIR

Description

INFOID:0000000007327761

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

DTC Logic

INFOID:0000000007327762

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-71, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327763

1.CONNECTOR INSPECTION

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

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

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Inspection End

C1160 DECEL G SEN SET

Description

INFOID:0000000007327764

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

DTC Logic

INFOID:0000000007327765

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
DECEL G SEN SET

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-72, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327766

1.PERFORM SELF-DIAGNOSIS

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

Self-diagnosis results
DECEL G SEN SET

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

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

2.PERFORM SELF-DIAGNOSIS AGAIN

1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to BRC-29, "CONSULT Function (ABS)".
2. Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to BRC-29, "CONSULT Function (ABS)".

Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-119, "Removal and Installation".
NO >> Inspection End

C1163 ST ANGLE SEN SAFE

Description

INFOID:0000000007327767

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:0000000007327768

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-73, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327769

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> Inspection End
NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

INFOID:0000000007327770

CV1, CV2 (CUT VALVE)

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

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

INFOID:0000000007327771

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 • ABS actuator and electric unit (control unit)
C1165	CV2	VDC switch-over solenoid valve (CV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
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.	
C1167	SV2	VDC switch-over solenoid valve (SV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-74, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817664

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK CONNECTOR

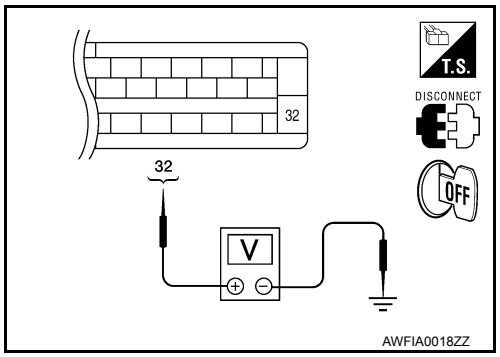
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to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

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



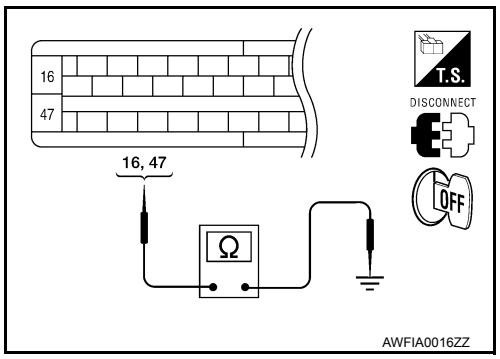
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327773

1.CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-74, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817665

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

INFOID:0000000007327775

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

DTC Logic

INFOID:0000000007327776

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-77, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327777

1.CONNECTOR INSPECTION

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

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Inspection End

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007327778

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:0000000007327779

DTC DETECTION LOGIC

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

Diagnosis Procedure

INFOID:0000000007327780

1.CONNECTOR INSPECTION

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

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

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

VDC OFF SWITCH

Description

INFOID:0000000007327781

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

Component Function Check

INFOID:0000000007327782

1.CHECK VDC OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-79, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327783

Regarding Wiring Diagram information, refer to BRC-93, "Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK VDC OFF SWITCH

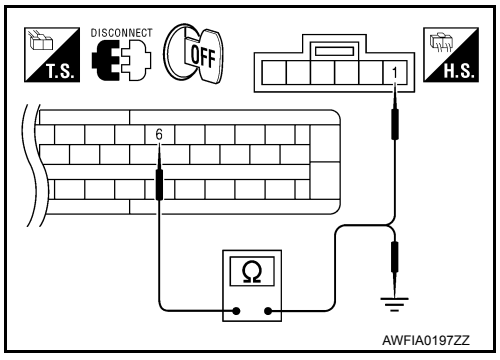
Perform the VDC OFF switch component inspection. Refer to BRC-80, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.



ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	6	M154 (B)	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and ground.

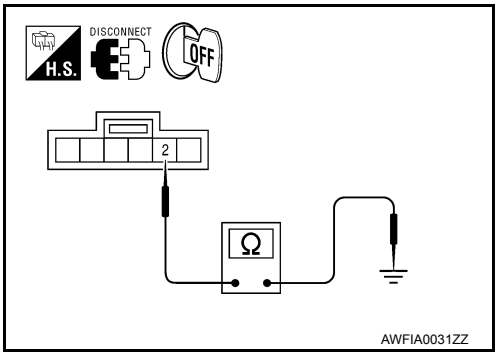
ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E127 (A)	6	Ground	No

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 and ground.



VDC OFF switch		—	Continuity
Connector	Terminal		
M154	2	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

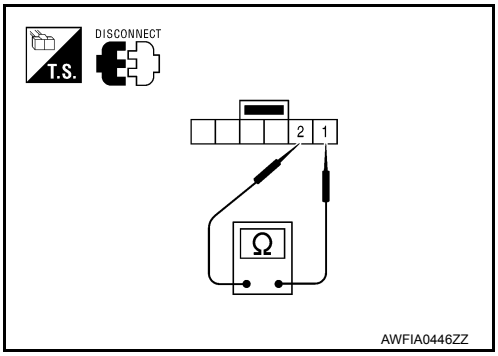
YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Component Inspection

INFOID:0000000007327784

1. CHECK VDC OFF SWITCH

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



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

Is the inspection result normal?

YES >> Inspection End
NO >> Replace VDC OFF switch.

Special Repair Requirement

INFOID:0000000007817666

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

ABS WARNING LAMP

Description

INFOID:0000000007327786

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327787

1.CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-81, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327788

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817667

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

BRAKE WARNING LAMP

Description

INFOID:0000000007327790

×: ON –: OFF

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

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake 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:0000000007327791

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-82, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327792

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. refer to BRC-29, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817668

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

VDC OFF INDICATOR LAMP

Description

INFOID:0000000007327794

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327795

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Go to diagnosis procedure. Refer to BRC-83, "Diagnosis Procedure".

2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> Inspection End
NO >> Check VDC OFF switch. Refer to BRC-79, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327796

1.CHECK VDC OFF SWITCH

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check VDC OFF switch. Refer to BRC-79, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 3
NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817669

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

SLIP INDICATOR LAMP

Description

INFOID:0000000007327798

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327799

1.CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-85, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327800

1.CHECK SELF-DIAGNOSIS

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817671

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

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

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

>> END

ECU DIAGNOSIS INFORMATION

APPLICATION NOTICE

Application Notice

INFOID:0000000007815418

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

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000007327803

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

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

CONSULT MONITOR ITEM

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

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	On
		When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is released	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	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
SLIP LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
ENGINE SPEED	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G sensor	When vehicle is stopped	Approx. 0 d/s
		When vehicle turning	−75 to 75 d/s
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	On
		A/T shift position = other than R position	Off
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	On
		A/T shift position = other than N position	Off
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	On
		A/T shift position = other than P position	Off
CV1	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
CV2	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
SV1	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
SV2	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
2WD/4WD	Drive axle	2WD model	2WD
		4WD model	4WD
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Accelerator pedal depressed (ignition switch is ON)	0 - 100 %

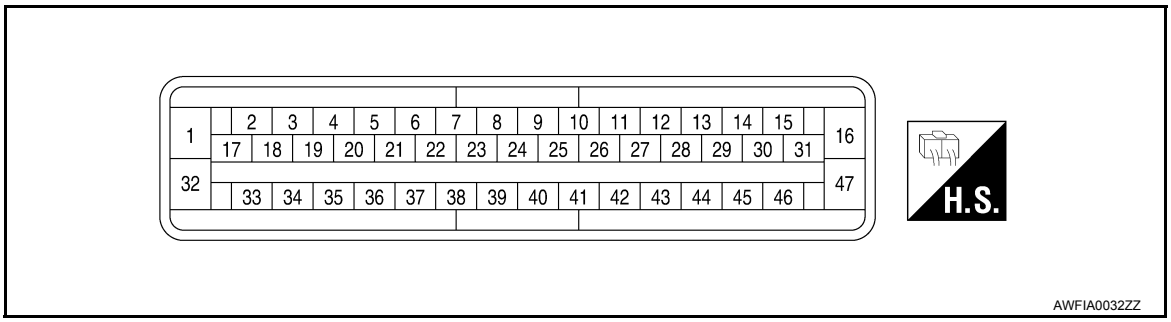
Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0±2.5°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by front pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	–40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
		TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
		VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	On
		Differential lock switch OFF	Off
DLOCK CHG SW	Differential lock mode switch signal status	When differential lock mode switch is engaged	On
		When differential lock mode switch is disengaged	Off

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.

- ABS warning lamp: Refer to BRC-81, "Description".
- Brake warning lamp: Refer to BRC-82, "Description".
- VDC OFF indicator lamp: Refer to BRC-83, "Description".
- SLIP indicator lamp: Refer to BRC-85, "Description".

TERMINAL LAYOUT



Fail-Safe

INFOID:0000000007327804

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

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp and SLIP indicator lamp will turn on. In case of an electrical malfunction with the EBD system, the BRAKE warning lamp, ABS warning lamp and SLIP indicator lamp will turn on.
The system will revert to one of the following conditions of the Fail-Safe function.

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

VDC/TCS SYSTEM

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

DTC No. Index

INFOID:0000000007327805

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-35, "Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-38, "Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-41, "Description"
C1110	CONTROLLER FAILURE	BRC-43, "DTC Logic"
C1111	PUMP MOTOR	BRC-44, "Description"
C1113	G-SENSOR	BRC-46, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-48, "Description"
C1116	STOP LAMP SW	BRC-51, "Description"
C1120	FR LH IN ABS SOL	BRC-53, "Description"
C1121	FR LH OUT ABS SOL	BRC-56, "Description"
C1122	FR RH IN ABS SOL	BRC-53, "Description"
C1123	FR RH OUT ABS SOL	BRC-56, "Description"
C1124	RR LH IN ABS SOL	BRC-53, "Description"

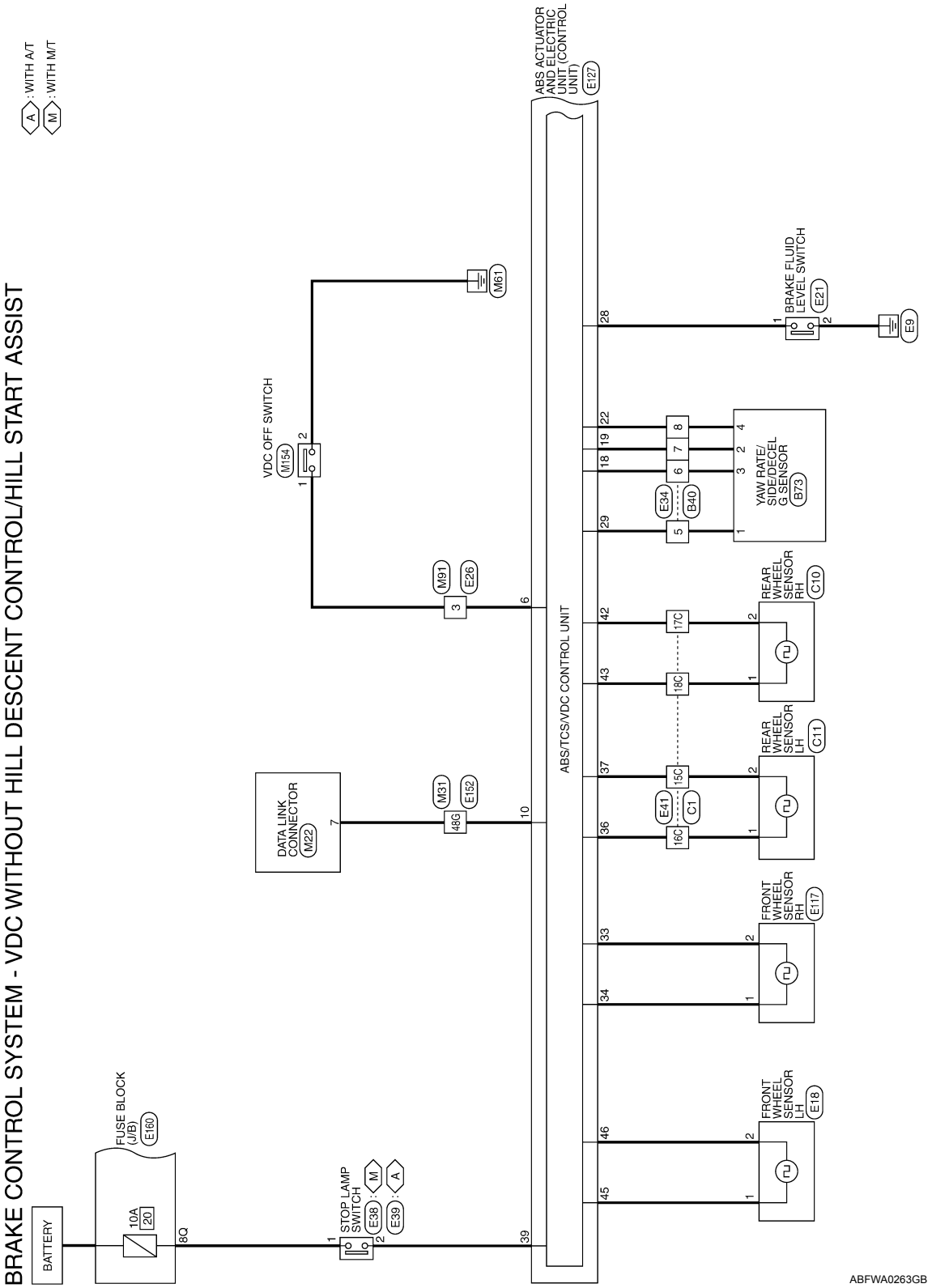
DTC	Items (CONSULT screen terms)	Reference
C1125	RR LH OUT ABS SOL	BRC-56, "Description"
C1126	RR RH IN ABS SOL	BRC-53, "Description"
C1127	RR RH OUT ABS SOL	BRC-56, "Description"
C1130	ENGINE SIGNAL 1	BRC-59, "Description"
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-60, "Description"
C1142	PRESS SEN CIRCUIT	BRC-62, "DTC Description"
C1143	ST ANG SEN CIRCUIT	BRC-65, "Description"
C1144	ST ANG SEN SIGNAL	
C1145	YAW RATE SENSOR	BRC-46, "Description"
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-68, "Description"
C1156	ST ANG SEN COM CIR	BRC-71, "Description"
C1160	DECEL G SEN SET	BRC-72, "Description"
C1163	ST ANGL SEN SAFE	BRC-73, "Description"
C1164	CV1	BRC-74, "Description"
C1165	CV2	
C1166	SV1	
C1167	SV2	
C1170	VARIANT CODING	BRC-43, "DTC Logic"
C1187	ABS DIFLOCK CONTROLLER NG	BRC-77, "Description"
U1000	CAN COMM CIRCUIT	BRC-78, "Description"

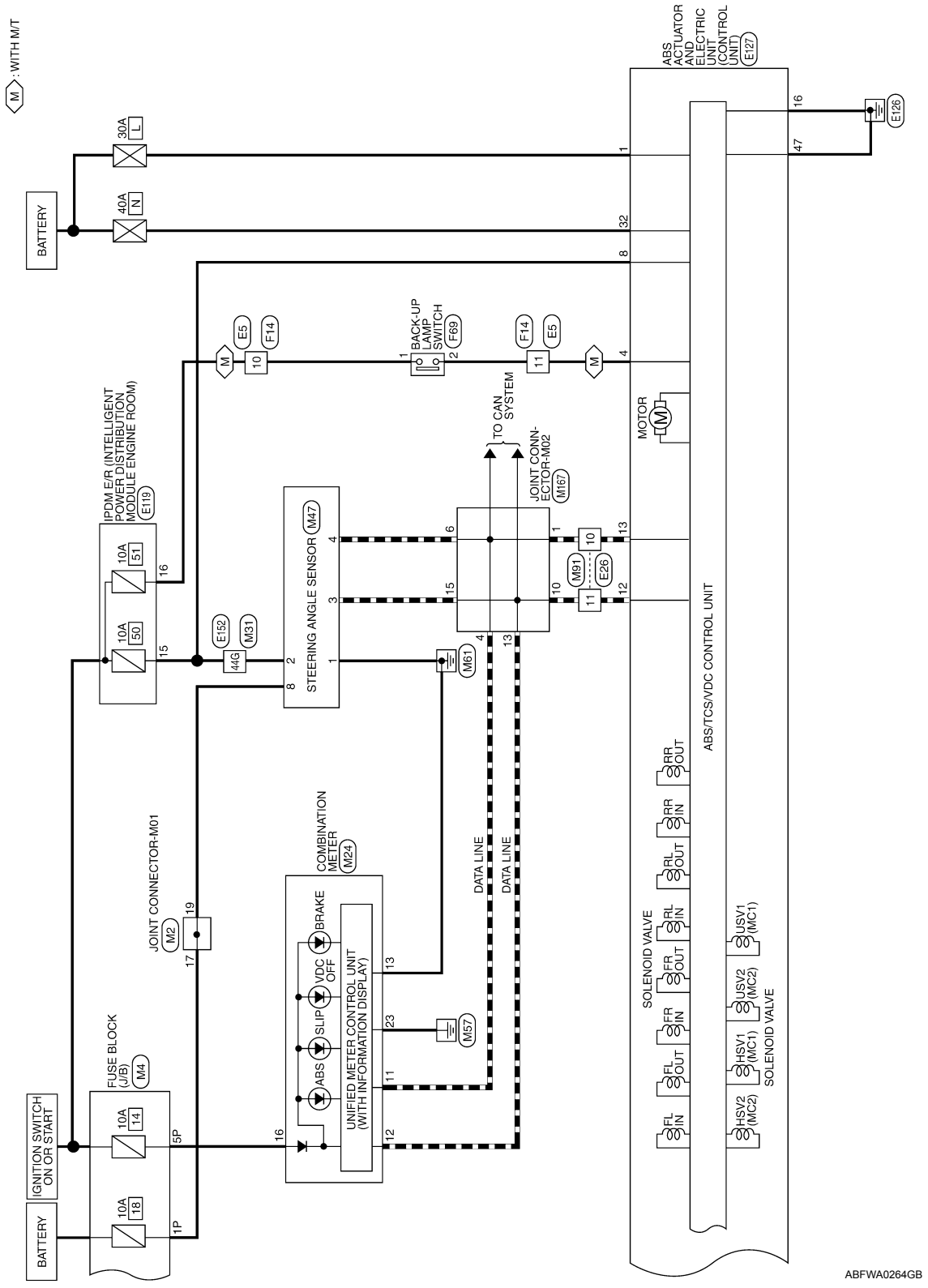
WIRING DIAGRAM

BRAKE CONTROL SYSTEM - VDC

Wiring Diagram - VDC WITHOUT HILL DESCENT CONTROL/HILL START ASSIST

INFOID:0000000007327806




M : WITH M/T
BATTERY
30A L
40A N
IGNITION SWITCH ON OR START
BATTERY
10A 18
10A 14
FUSE BLOCK (J/B) M4
1P
5P
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E119
10A 51
10A 50
15
16
E152
44G
M31
STEERING ANGLE SENSOR M47
JOINT CONNECTOR-M01
M2
17
19
COMBINATION METER M24
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
BRAKE
VDC OFF
SLIP
ABS
DATA LINE
DATA LINE
M57
M61
BACK-UP LAMP SWITCH F69
E5
F14
10
11
TO CAN SYSTEM
JOINT CONNECTOR-M02
M167
M91
E26
MOTOR
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) E127
ABS/TCS/VDC CONTROL UNIT
SOLENOID VALVE
FL IN
FL OUT
FR IN
FR OUT
RL IN
RL OUT
RR IN
RR OUT
HSV1 (MC1)
HSV2 (MC2)
USV1 (MC1)
USV2 (MC2)
E126
ABFWA0264GB

BRAKE CONTROL SYSTEM CONNECTORS - VDC WITHOUT HILL DESCENT CONTROL / HILL START ASSIST

Connector No.	M2
Connector Name	JOINT CONNECTOR-M01
Connector Color	BLUE

H.S.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Terminal No.	Color of Wire	Signal Name
17	R/B	–
19	R	–

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

H.S.

7P	6P	5P	4P		3P	2P	1P
16P	15P	14P	13P	12P	11P	10P	9P	8P

Terminal No.	Color of Wire	Signal Name
1P	R/B	–
5P	W/G	–

Connector No.	M22
Connector Name	DATA LINK CONNECTOR
Connector Color	WHITE

H.S.

9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

Terminal No.	Color of Wire	Signal Name
7	W	–

Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
11	P	CAN-L
12	L	CAN-H
13	GR	GROUND
16	W/G	RUN START
23	B	POWER GND

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

			5G		4G	3G	2G	1G											
				10G	9G	8G	7G	6G											
21G	20G	19G	18G	17G	16G	15G	14G	13G	12G	11G									
30G	29G	28G	27G	26G	25G	24G	23G	22G											
41G	40G	39G	38G	37G	36G	35G	34G	33G	32G	31G									
	50G	49G	48G	47G	46G	45G	44G	43G	42G										
61G	60G	59G	58G	57G	56G	55G	54G	53G	52G	51G									
	70G	69G	68G	67G	66G	65G	64G	63G	62G										
				75G	74G	73G	72G	71G											
					80G	79G	78G	77G	76G										

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

Connector No.	M47
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE

H.S.

8		1	2
	3	4	

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	W/R	POWER
3	L	CAN-H
4	P	CAN-L
8	R	BATT

ABFIA0522GB

Connector No.	M167
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE

H.S.

9	8	7	6	5	4	3	2	1
20	19	18	17	16	15	14	13	12	11	10
---	---	---	---	---	---	---	---	---	---	---

Terminal No.	Color of Wire	Signal Name
1	P	–
4	P	–
6	P	–
10	L	–
13	L	–
15	L	–

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

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	SB	–
2	B	–

Connector No.	M154
Connector Name	VDC OFF SWITCH
Connector Color	GRAY

H.S.

6	5	4	3	2	1

Terminal No.	Color of Wire	Signal Name
1	GR	–
2	B	–

Connector No.	E18
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY

H.S.

1	2

Terminal No.	Color of Wire	Signal Name
1	G	–
2	R	–

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8
---	---	---	---	---	---	---	---	---

Terminal No.	Color of Wire	Signal Name
3	GR	–
10	P	–
11	L	–

Connector No.	E5
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
10	W/G	–
11	SB	–

ABFIA0523GB

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

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	Y	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	–
2	W	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
5	BR	–
6	O	–
7	W	–
8	Y	–

Connector No.	E41
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
15C	P	–
16C	L	–
17C	V	–
18C	LG	–

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
3	GR	–
10	P	–
11	L	–

Connector No.	E39
Connector Name	STOP LAMP SWITCH (WITH A/T)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	Y	–

ABFIA0524GB

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
15	W/R	ABS IGN SUPPLY
16	W/G	REVERSE LAMP

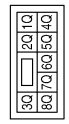
Connector No.	E127
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
1	R	MOTOR SUPPLY
2	–	–
3	–	–
4	V	REV SW
5	–	–
6	GR	VDC OFF SW
7	–	–
8	W/R	IGN
9	–	–
10	SB	DIAG_K
11	–	–
12	L	CAN-H
13	P	CAN-L
14	–	–
15	–	–
16	B	VALVE ECU GND
17	–	–
18	O	CAN2-H
19	W	CAN2-L
20	–	–
21	–	–
22	Y	CLUS_SUP
23	–	–
24	–	–
25	–	–
26	–	–
27	–	–
28	GR	FLUID_LEVEL_SW
29	BR	CLUS_GND
30	–	–
31	–	–
32	Y	VALVE ECU SUPPLY
33	W	FR_RH_SIG
34	B	FR_RH_PWR
35	–	–
36	L	RR_LH_PWR
37	P	RR_LH_SIG
38	–	–
39	SB	STOP_LAMP_SW
40	–	–
41	–	–
42	V	RR_RH_SIG
43	LG	RR_RH_PWR
44	–	–
45	G	FR_LH_PWR
46	R	FR_LH_SIG
47	B	MOTOR GND

ABFIA0525GB

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

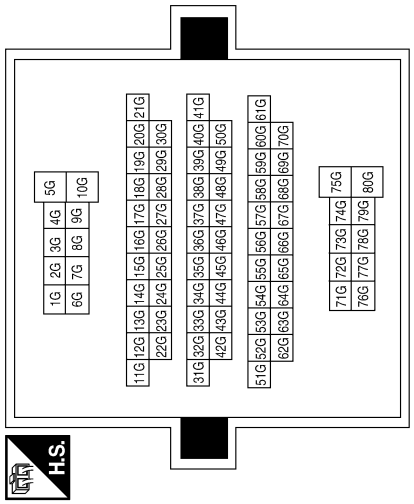
H.S.



Terminal No.	Color of Wire	Signal Name
8Q	R/B	–

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

H.S.



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

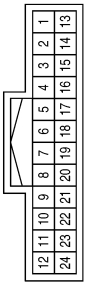
Connector No.	F69
Connector Name	BACK-UP LAMP SWITCH
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	W/G	–
2	SB	–

Connector No.	F14
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
10	W/G	–
11	SB	–

ABFIA0526GB

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
15C	P	–
16C	L	–
17C	V	–
18C	LG	–

Connector No.	C10
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	V	–

Connector No.	C11
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–

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

H.S.

Terminal No.	Color of Wire	Signal Name
5	BR	–
6	O	–
7	W	–
8	Y	–

Connector No.	B73
Connector Name	YAW RATE/SIDE/DECEL G SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	CLU GND
2	W	CAN-H
3	O	CAN-L
4	Y	CLU P

ABFIA0527GB

SYMPTOM DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000007815419

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

VDC/TCS/ABS

Symptom Table

INFOID:0000000007327808

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

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	BRC-103, "Diagnosis Procedure"
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-104, "Diagnosis Procedure"
	Make sure the braking force is sufficient when the ABS is not operating.	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-105, "Diagnosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-106, "Diagnosis Procedure"
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	BRC-107, "Diagnosis Procedure"
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-108, "Diagnosis Procedure"
	TCM	
	ECM	

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000007327809

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-6, "Rear Axle Bearing" (C200) or RAX-18, "Rear Axle Bearing" (M226).

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

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

Is the inspection result normal?

YES >> GO TO 4
NO >>
- Replace wheel sensor or sensor rotor. Refer to BRC-114, "Removal and Installation" or BRC-115, "Removal and Installation".
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".
NO >> Inspection End.

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000007327810

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-16, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-18, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to BR-16, "Inspection and Adjustment" (brake pedal), BR-11, "On Board Inspection" (master cylinder), BR-9, "Inspection" (brake booster).

NO >> GO TO 2

2.CHECK FUNCTION

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

Is the inspection result normal?

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

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000007327811

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

1.CHECK FUNCTION

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

Is the inspection result normal?

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

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000007327812

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

1.CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform self-diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000007327813

CAUTION:

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

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

1.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

YES >> GO TO 3
NO >> Perform self -diagnosis. Refer to BRC-29, "CONSULT Function (ABS)".

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000007327814

1.SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 2

2.CHECK SELF-DIAGNOSIS RESULTS

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

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 3

3.CHECK CONNECTOR

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

Are self-diagnosis results indicated?

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

4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM: Refer to EC-499, "CONSULT Function".
- TCM: Refer to TM-156, "CONSULT Function (TRANSMISSION)".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-116, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000007327815

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

PRECAUTION

PRECAUTIONS

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

INFOID:0000000007327816

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

WARNING:

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

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

WARNING:

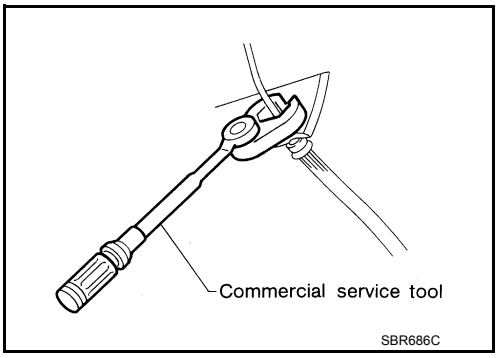
- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious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

Precaution for Brake System

INFOID:0000000007327817

CAUTION:

- **Refer to MA-18, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) and MA-20, "FOR MEXICO : Fluids and Lubricants" (Mexico). For recommended brake fluid.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.**
- **Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.**
- **Use flare nut wrench when removing and installing brake tube.**
- **If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.**
- **Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.**
- **Always torque brake lines when installing.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.**
  Refer to BR-34, "Brake Burnishing" (front disc brake) or BR-39, "Brake Burnishing" (rear disc brake).



WARNING:

- **Clean dust on the caliper and brake pad with a vacuum dust collector to minimize the hazard of air borne particles or other materials.**

Precaution for Brake Control

INFOID:0000000007327818

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

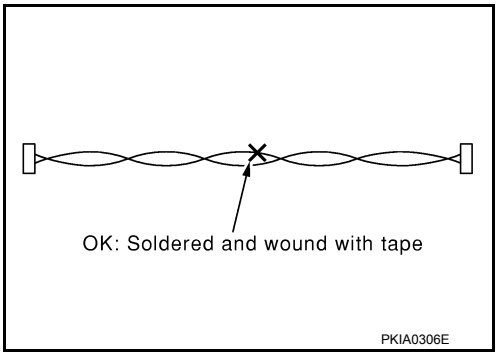
NOTE:
VDC OFF indicator lamp is on when VDC OFF switch is on.

Precaution for CAN System

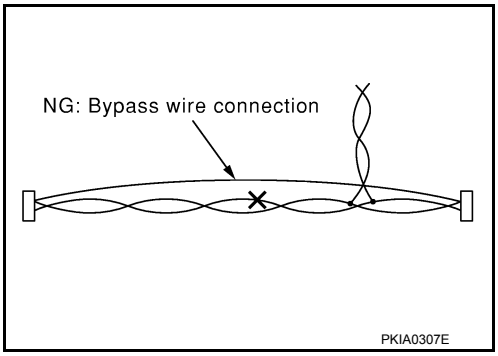
INFOID:0000000007327819

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.

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



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



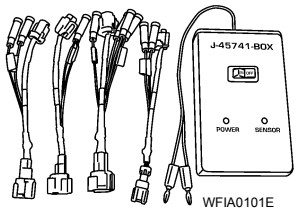
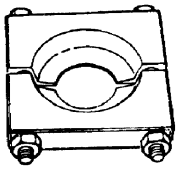
PREPARATION

PREPARATION

Special Service Tool

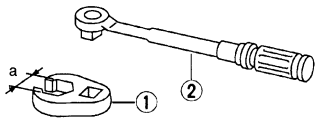
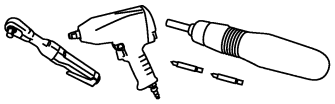
INFOID:0000000007327820

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

Tool number (Kent-Moore No.) Tool name		Description
KV991J0080 (J-45741) ABS active wheel sensor tester	 WFIA0101E	Checking operation of ABS active wheel sensors
ST30031000 (—) Bearing puller	 ZZA0700D	Removing sensor rotor

Commercial Service Tool

INFOID:0000000007327821

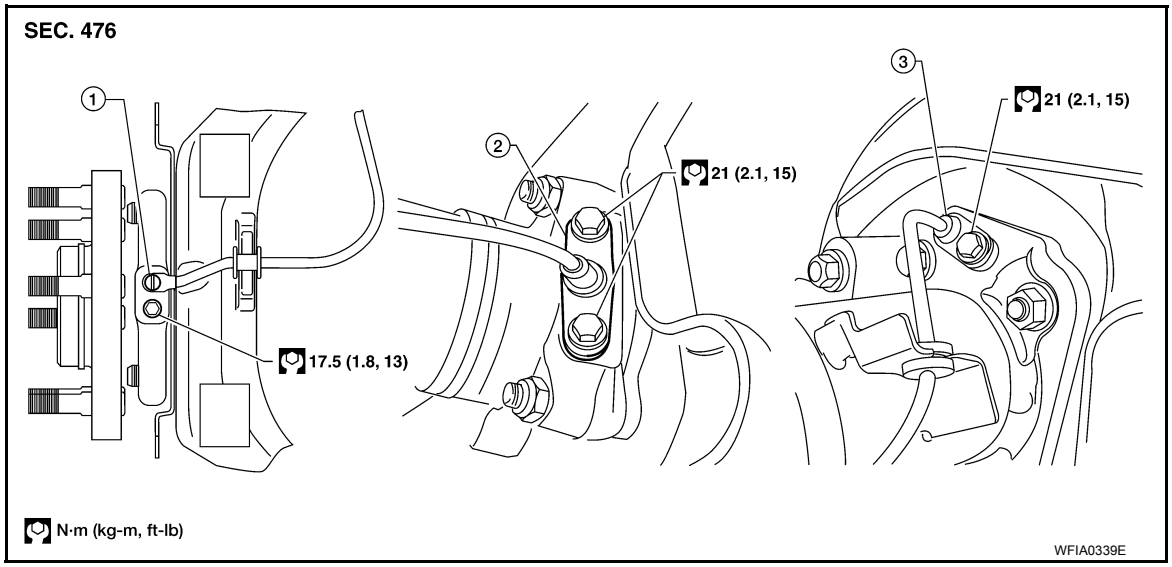
Tool name		Description
1. Flare nut crowfoot 2. Torque wrench	 S-NT360	Removing and installing brake piping **a: 10 mm (0.39 in)/12 mm (0.47 in)**
Power tool	 PIIB1407E	Loosening nuts, screws and bolts

UNIT REMOVAL AND INSTALLATION

WHEEL SENSOR

Removal and Installation

INFOID:0000000007327822



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

REMOVAL

1. Remove wheel sensor bolt.
   - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-35, "Removal and Installation of Brake Caliper and Disc Rotor".
2. Pull the wheel sensor straight out, being careful to turn it as little as possible.
   CAUTION:
   - **Be careful not to damage the wheel sensor edge and sensor rotor teeth.**
   - **Do not pull on the wheel sensor harness.**
3. Disconnect wheel sensor harness connector, then remove the wheel sensor harness from the mounts to remove the wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- Before installing wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.

SENSOR ROTOR

Removal and Installation

INFOID:0000000007327823

FRONT

Removal and Installation

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

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to RAX-7, "Removal and Installation".

REAR (M226)

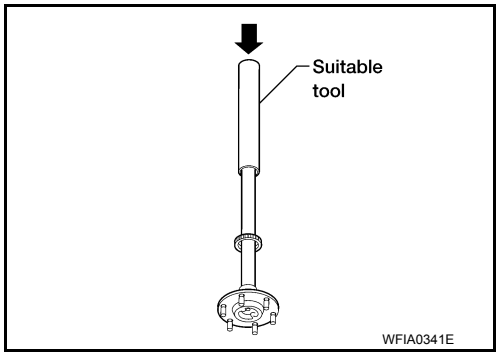
Removal

1. Remove the axle shaft assembly. Refer to RAX-19, "Removal and Installation".
2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

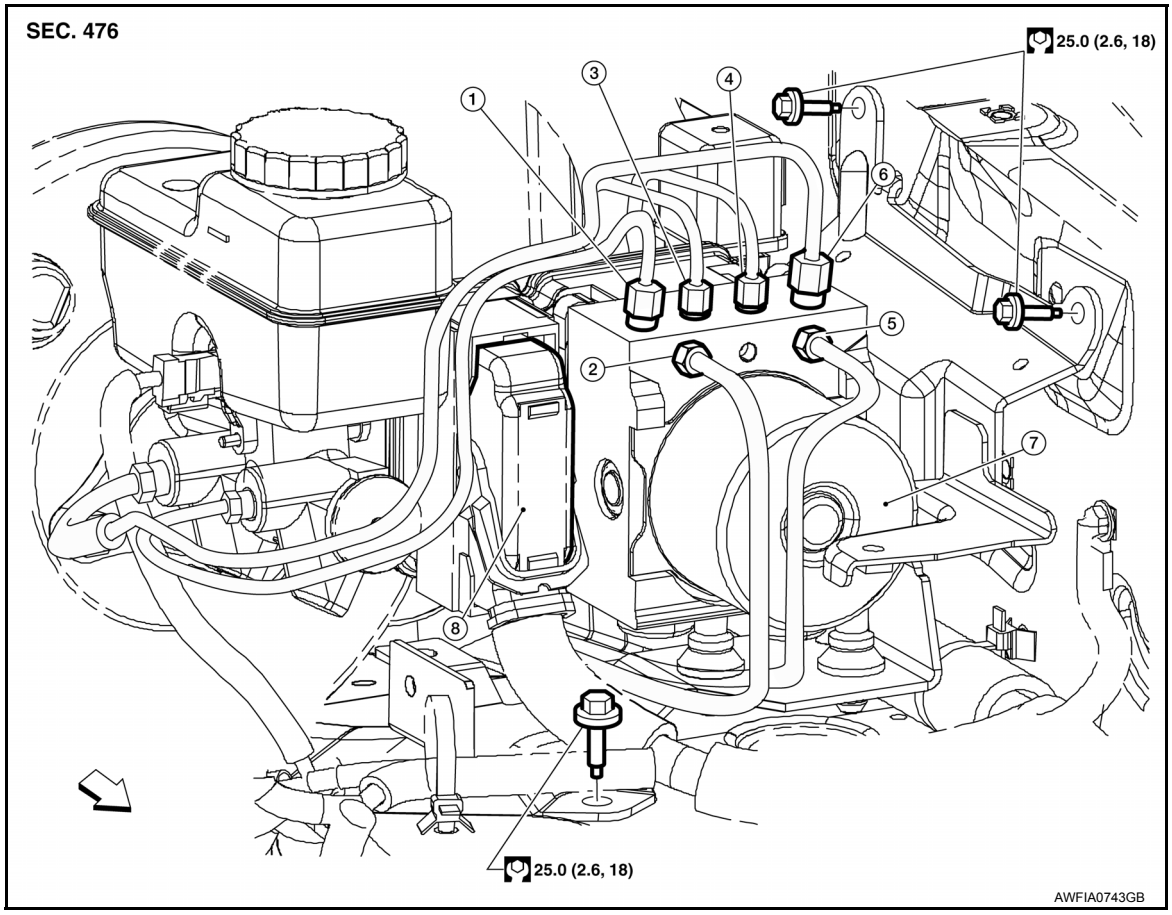
1. Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.
   CAUTION:
   Do not reuse the old sensor rotor.
2. Install the axle shaft assembly. Refer to RAX-19, "Removal and Installation".
   CAUTION:
   Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.



ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:0000000007327824



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

⇦ Front

REMOVAL

CAUTION:

- **To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **Do not remove actuator by holding harness.**

NOTE:

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

1. Disconnect negative battery terminal. Refer to PG-80, "Removal and Installation".
2. Remove air cleaner case assembly. Refer to EM-25, "Exploded View" (QR25DE) or EM-140, "Exploded View" (QV40DE).
3. Disconnect harness connector from ABS actuator and electric unit (control unit).
4. Separate brake tubes from ABS actuator and electric unit (control unit).
5. Remove bolts and ABS actuator and electric unit (control unit) with the bracket from the vehicle.
6. Remove bolt and bracket from the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

- Install bracket and bolt to ABS actuator and electric unit (control unit).

ABS actuator and electric unit (control unit) bolt : 7.0 N·m (0.7 kg-m, 62 in-lb)

- After work is completed, bleed air from brake tube. Refer to BR-18, "Bleeding Brake System".
- Adjust the neutral position of steering angle sensor. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".
- Perform calibration of the decel G sensor (4WD models). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Description".

CAUTION:

- **To install, use flare nut crowfoot and torque wrench.**
- **Replace the ABS actuator if it has been dropped or sustained an impact.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **Do not install actuator by holding harness.**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000007327825

REMOVAL

1. Remove the spiral cable. Refer to SR-13, "Removal and Installation".
2. Remove the screws and remove the steering angle sensor from the spiral cable.

INSTALLATION

Installation is in the reverse order of removal.

- Reset the neutral position of the steering angle sensor. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

CAUTION:

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the steering angle sensor. Refer to BRC-12, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

YAW RATE/SIDE/DECEL G SENSOR

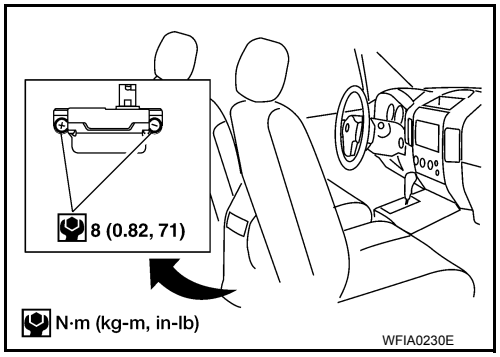
Removal and Installation

INFOID:0000000007327826

REMOVAL

1. Remove center console rear base. Refer to IP-14, "Exploded View".
2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
   - The location of the yaw rate/side/decel G sensor is the same for all models.

   CAUTION:
   - **Do not use power tools to remove or install yaw rate/side/decel G sensor.**
   - **Do not drop or strike the yaw rate/side/decel G sensor.**
3. Disconnect harness connector and remove the yaw rate/side/decel G sensor.



INSTALLATION

Installation is in the reverse order of removal.

NOTE:

After performing the above work, calibrate the yaw rate/side/decel G sensor (4WD models). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

BASIC INSPECTION

APPLICATION NOTICE

Application Notice

INFOID:0000000007815420

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

DIAGNOSIS AND REPAIR WORKFLOW

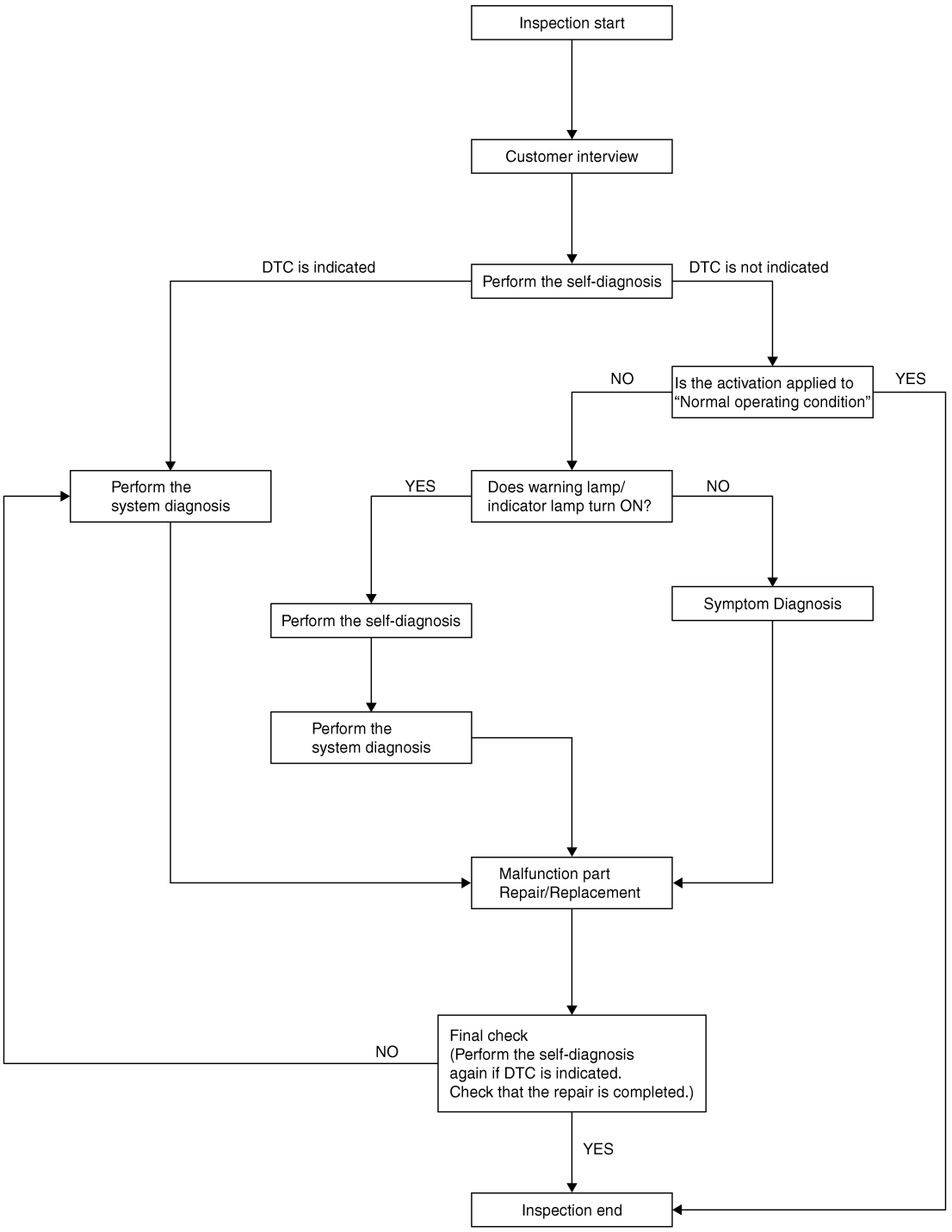
Work Flow

INFOID:0000000007327828

PRECAUTIONS FOR DIAGNOSIS

If steering angle sensor, steering system parts, suspension system parts, ABS actuator and electric unit (control unit) or tires have been replaced, or if wheel alignment has been adjusted, be sure to adjust neutral position of steering angle sensor before driving. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

OVERALL SEQUENCE



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DETAILED FLOW

1.COLLECT THE INFORMATION FROM THE CUSTOMER

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the diagnosis worksheet. Refer to BRC-124, "Diagnostic Work Sheet".

>> GO TO 2

2.PERFORM THE SELF-DIAGNOSIS

Check the DTC display with the self-diagnosis function. Refer to BRC-148, "CONSULT Function (ABS)".

Is there any DTC displayed?

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

3.PERFORM THE SYSTEM DIAGNOSIS

Perform the diagnosis applicable to the displayed DTC. Refer to BRC-214, "DTC No. Index".

>> GO TO 7

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

Check that the symptom is a normal operation that is not considered a system malfunction. Refer to BRC-232, "Description".

Is the symptom a normal operation?

YES >> Inspection End
NO >> GO TO 5

5.CHECK THE WARNING LAMP AND INDICATOR LAMP FOR ILLUMINATION

Check that the warning lamp and indicator lamp illuminate.
- ABS warning lamp: Refer to BRC-202, "Description".
- Brake warning lamp: Refer to BRC-203, "Description".
- VDC OFF indicator lamp: Refer to BRC-205, "Description".
- SLIP indicator lamp: Refer to BRC-207, "Description".
- Hill descent control indicator lamp: Refer to BRC-204, "Description".

Is ON/OFF timing normal?

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

6.PERFORM THE DIAGNOSIS BY SYMPTOM

Perform the diagnosis applicable to the symptom.

>> GO TO 7

7.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the specified malfunctioning parts.

>> GO TO 8

8.FINAL CHECK

Perform the self-diagnosis again, and check that the malfunction is repaired completely. After checking, erase the self-diagnosis memory. Refer to BRC-148, "CONSULT Function (ABS)".

Is no other DTC present and the repair completed?

YES >> Inspection End
NO >> GO TO 3

Diagnostic Work Sheet

INFOID:0000000007327829

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
	☐ TCS does not work (Rear wheels slip when accelerating)	☐ ABS does not work (Wheels lock when braking)	☐ Lack of sense of acceleration
Engine conditions	☐ When starting ☐ After starting		
Road conditions	☐ Low friction road (☐Snow ☐Gravel ☐Other) ☐ Bumps / potholes		
Driving conditions	☐ Full-acceleration ☐ High speed cornering ☐ Vehicle speed: Greater than 10 km/h (6 MPH) ☐ Vehicle speed: 10 km/h (6 MPH) or less ☐ Vehicle is stopped		
Applying brake conditions	☐ Suddenly ☐ Gradually		
Other conditions	☐ Operation of electrical equipment ☐ Shift change ☐ Other descriptions		

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INSPECTION AND ADJUSTMENT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Description

INFOID:0000000007327830

After replacing the ABS actuator and electric unit (control unit), perform the following procedures:
- Neutral position adjustment for the steering angle sensor
- Calibration of the decel G sensor (4WD models)

ADDITIONAL SERVICE WHEN REPLACING CONTROL UNIT : Special Repair Requirement

INFOID:0000000007327831

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

Perform the neutral position adjustment for the steering angle sensor.

>> Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement", GO TO 2

2.PERFORM CALIBRATION OF THE DECEL G SENSOR (4WD MODELS)

Perform calibration of the decel G sensor.

>> Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description

INFOID:0000000007327832

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

×: Required –: Not required

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

ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement

INFOID:0000000007327833

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

>> GO TO 3

3. CHECK DATA MONITOR

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

Is the steering angle within the specified range?

YES >> GO TO 4
NO >> Perform the neutral position adjustment for the steering angle sensor again, GO TO 1

4. ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-148, "CONSULT Function (ABS)".
- ECM: Refer to EC-499, "CONSULT Function".

Are the memories erased?

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

CALIBRATION OF DECEL G SENSOR

CALIBRATION OF DECEL G SENSOR : Description

INFOID:0000000007327834

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

×: Required –: Not required

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

CALIBRATION OF DECEL G SENSOR : Special Repair Requirement

INFOID:0000000007327835

CALIBRATION OF DECEL G SENSOR (4WD MODELS)

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

(Calibration cannot be done without CONSULT)

1.ALIGN THE VEHICLE STATUS

Stop vehicle with front wheels in straight-ahead position.

>> GO TO 2

2.PERFORM CALIBRATION OF DECEL G SENSOR

1. On the CONSULT screen, touch “WORK SUPPORT” and “DECEL G SEN CALIBRATION” in order.
2. Touch “START”.
3. After approximately 10 seconds, touch “END”.
   NOTE:
   After approximately 60 seconds, it ends automatically.
4. Turn ignition switch OFF, then turn it ON again.
   CAUTION:
   Be sure to perform above operation.

>> GO TO 3

3.CHECK DATA MONITOR

1. Run vehicle with front wheels in straight-ahead position, then stop.
2. Select “DATA MONITOR”. Then make sure “DECEL G SEN” is within ± 0.08G.

Is the inspection result normal?

YES >> GO TO 4
NO >> Perform calibration of decel G sensor again, GO TO 1

4.ERASE THE SELF-DIAGNOSIS MEMORY

Erase the self-diagnosis memory of the ABS actuator and electric unit (control unit) and ECM.
- ABS actuator and electric unit (control unit): Refer to BRC-148, "CONSULT Function (ABS)".
- ECM: Refer to EC-499, "CONSULT Function".

Are the memories erased?

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

SYSTEM DESCRIPTION

APPLICATION NOTICE

Application Notice

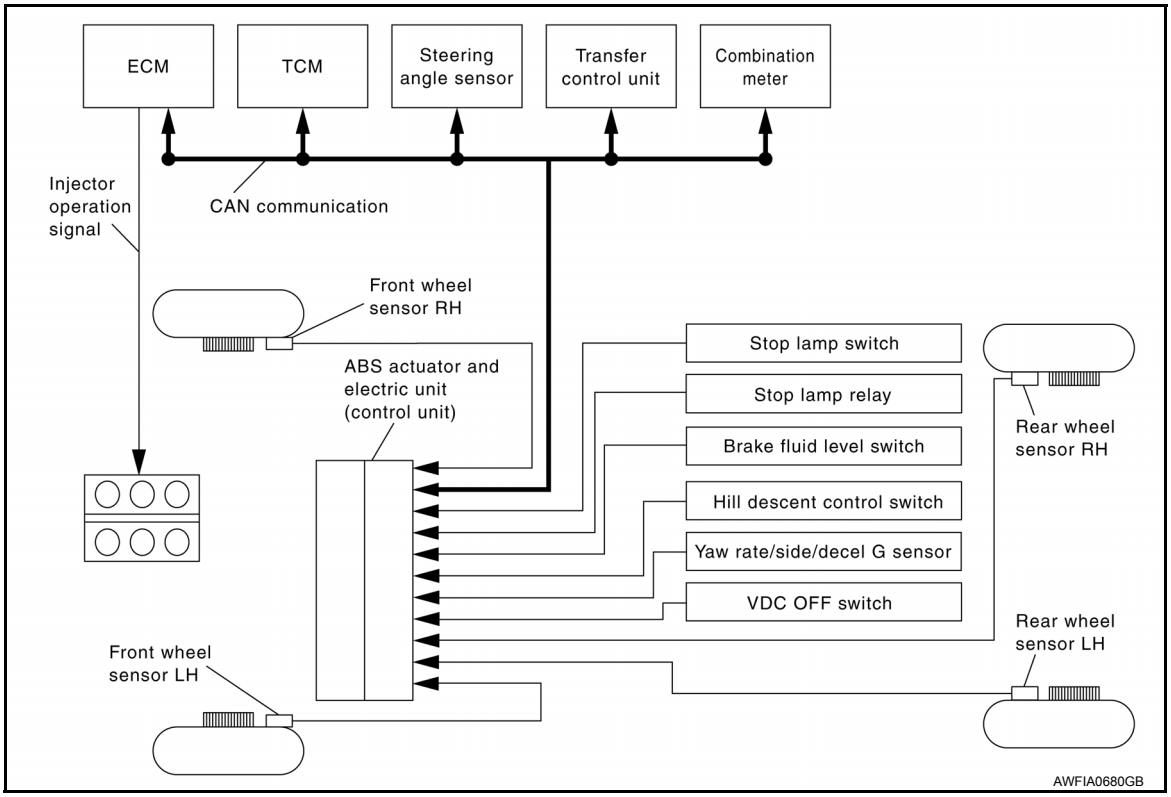
INFOID:0000000007815421

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

HILL DESCENT CONTROL

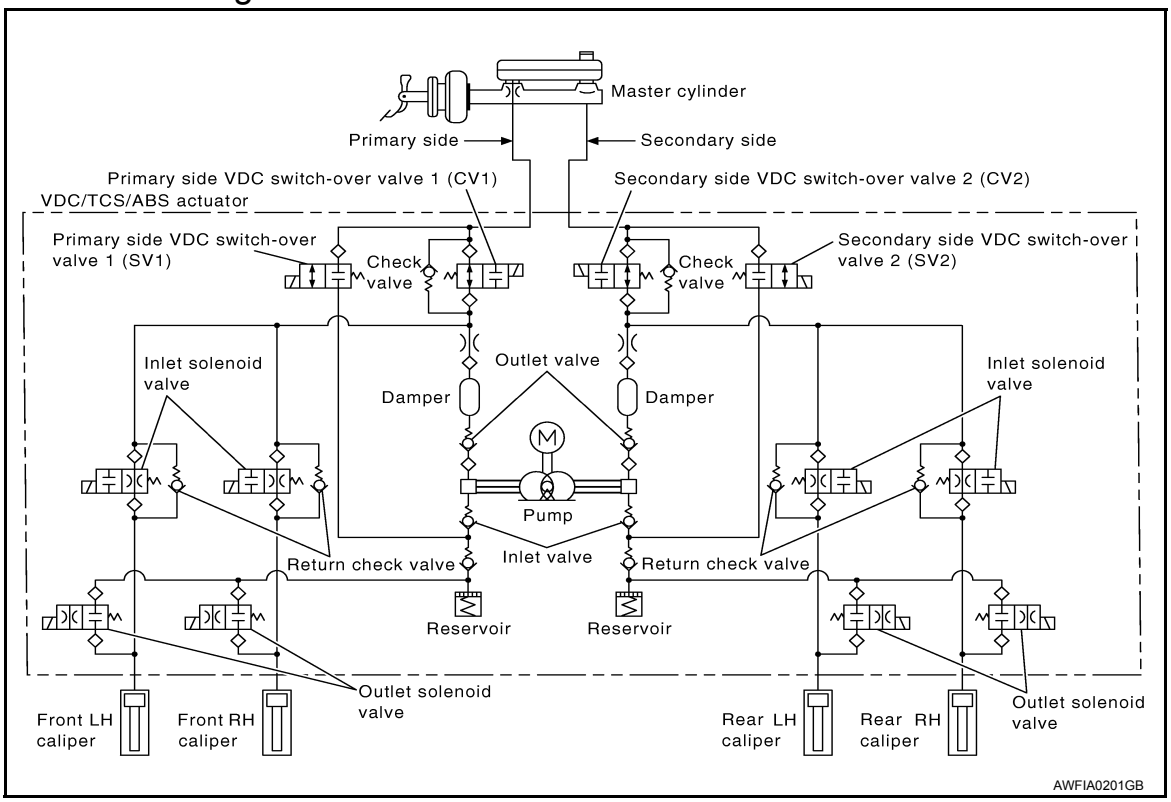
System Diagram

INFOID:0000000007327837



Hydraulic Circuit Diagram

INFOID:0000000007327838



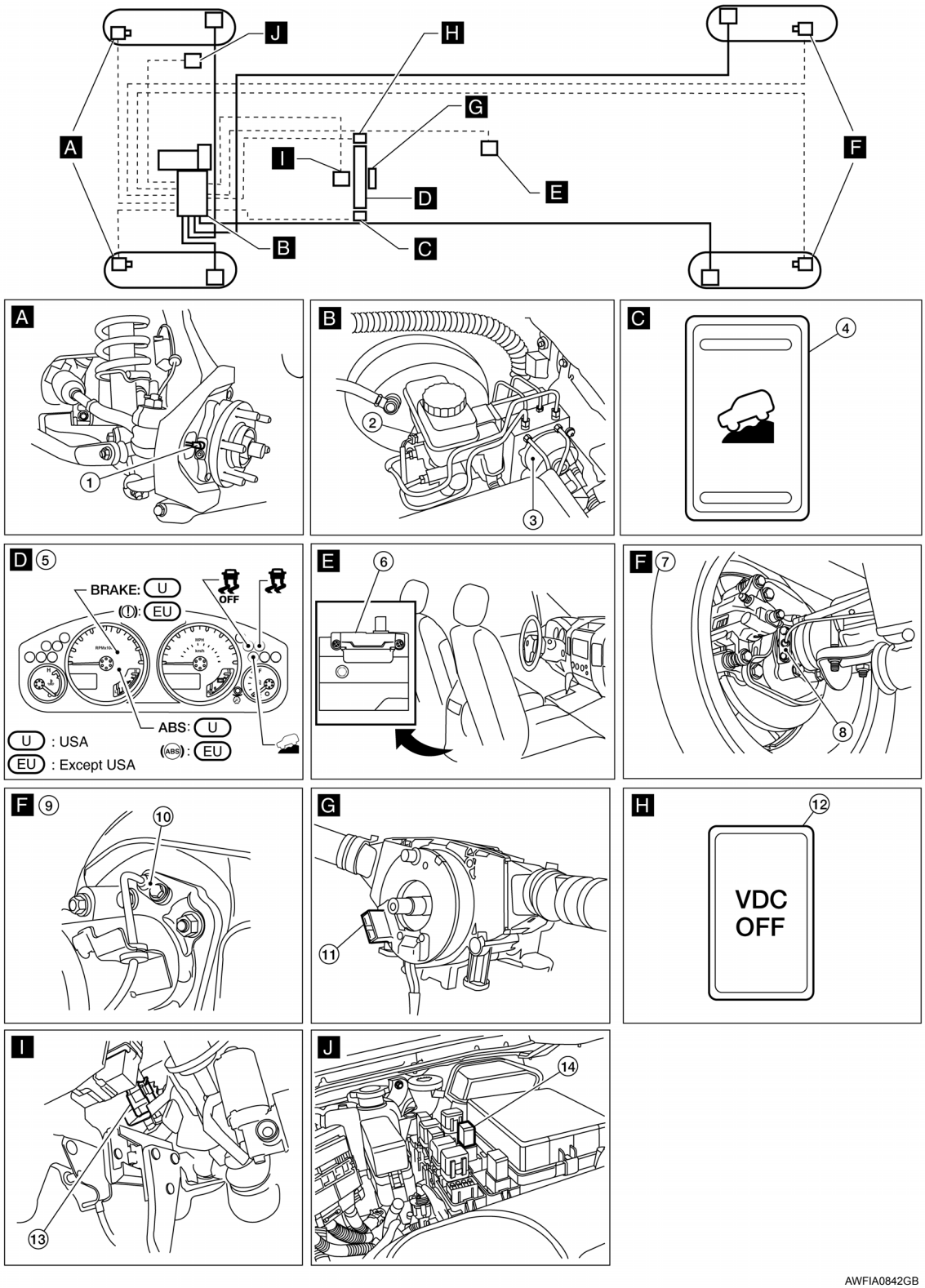
System Description

INFOID:0000000007327839

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

Component Parts Location

INFOID:0000000007327840



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1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

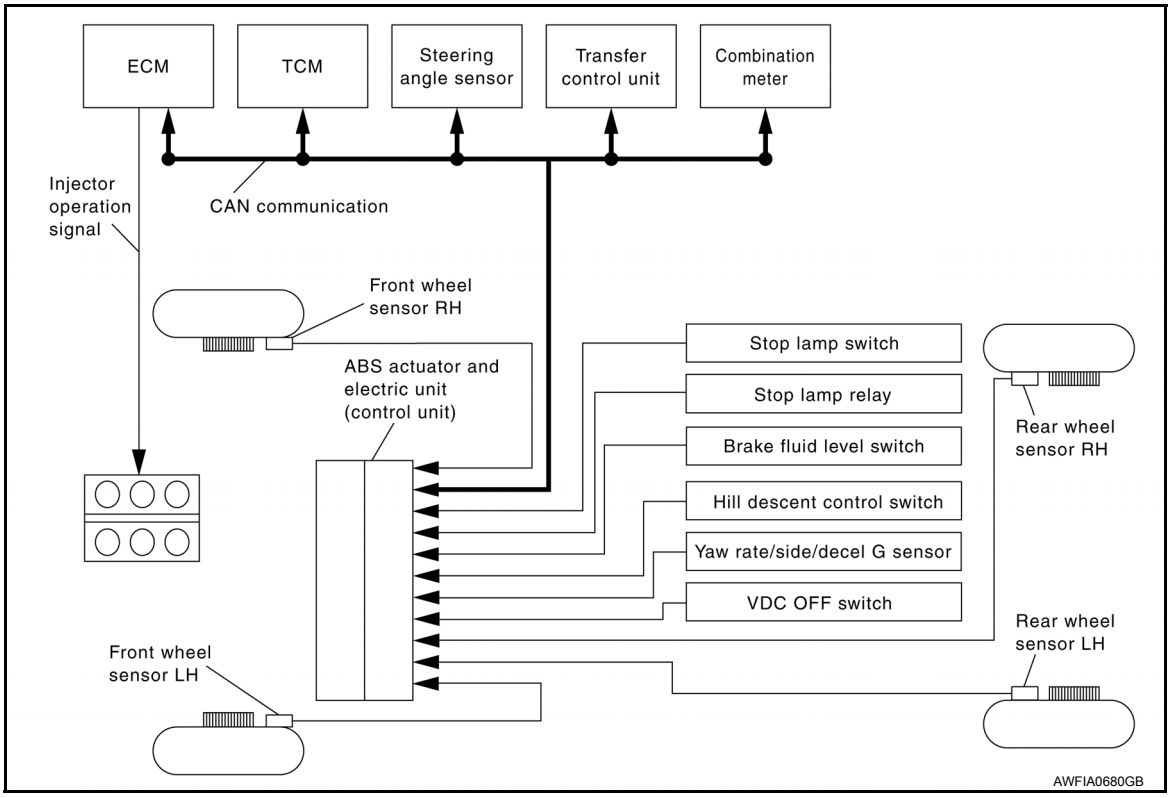
INFOID:0000000007327841

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

HILL START ASSIST

System Diagram

INFOID:0000000007817672



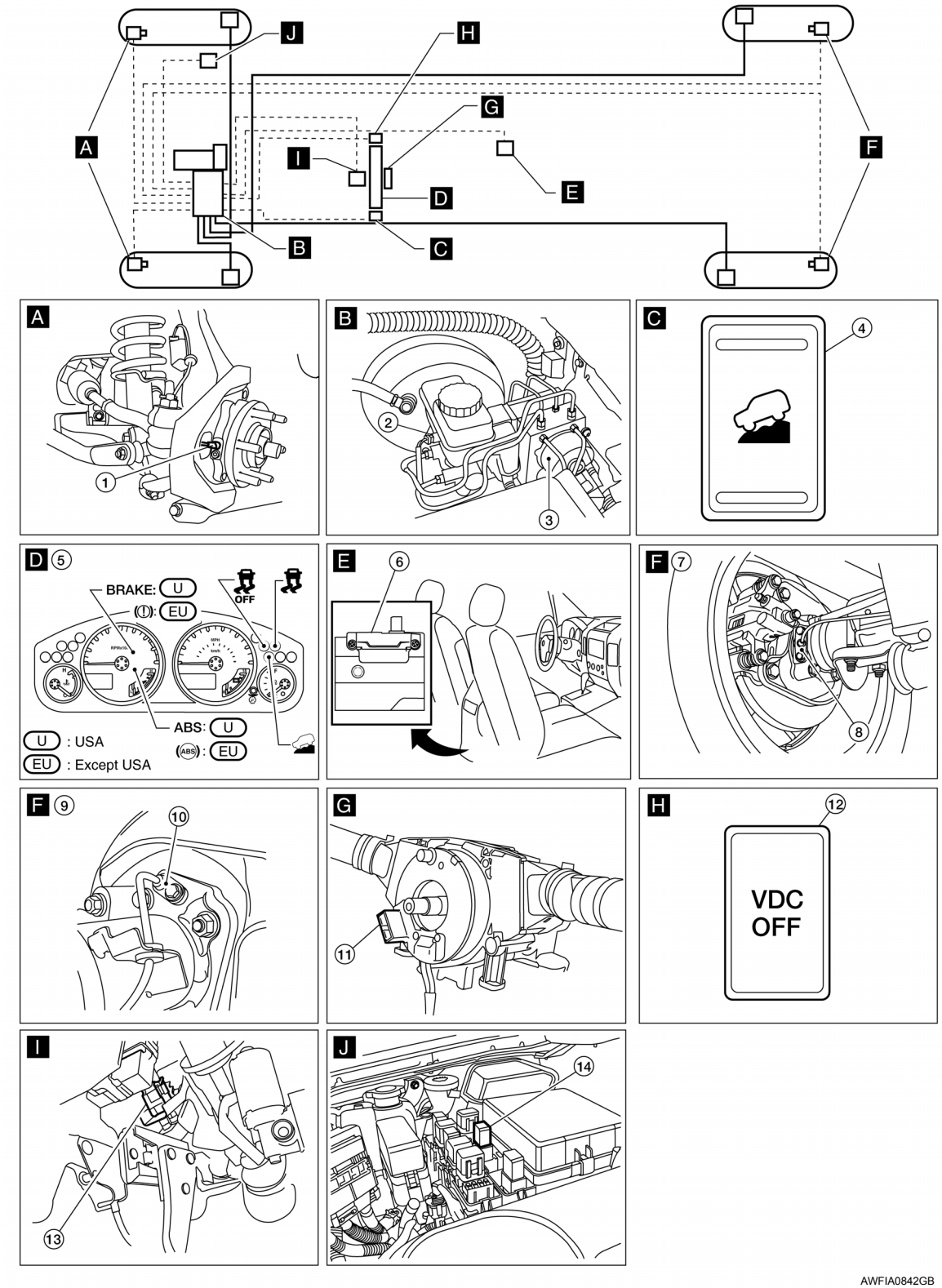
System Description

INFOID:0000000007327843

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

Component Parts Location

INFOID:0000000007817673



AWFIA0842GB

1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

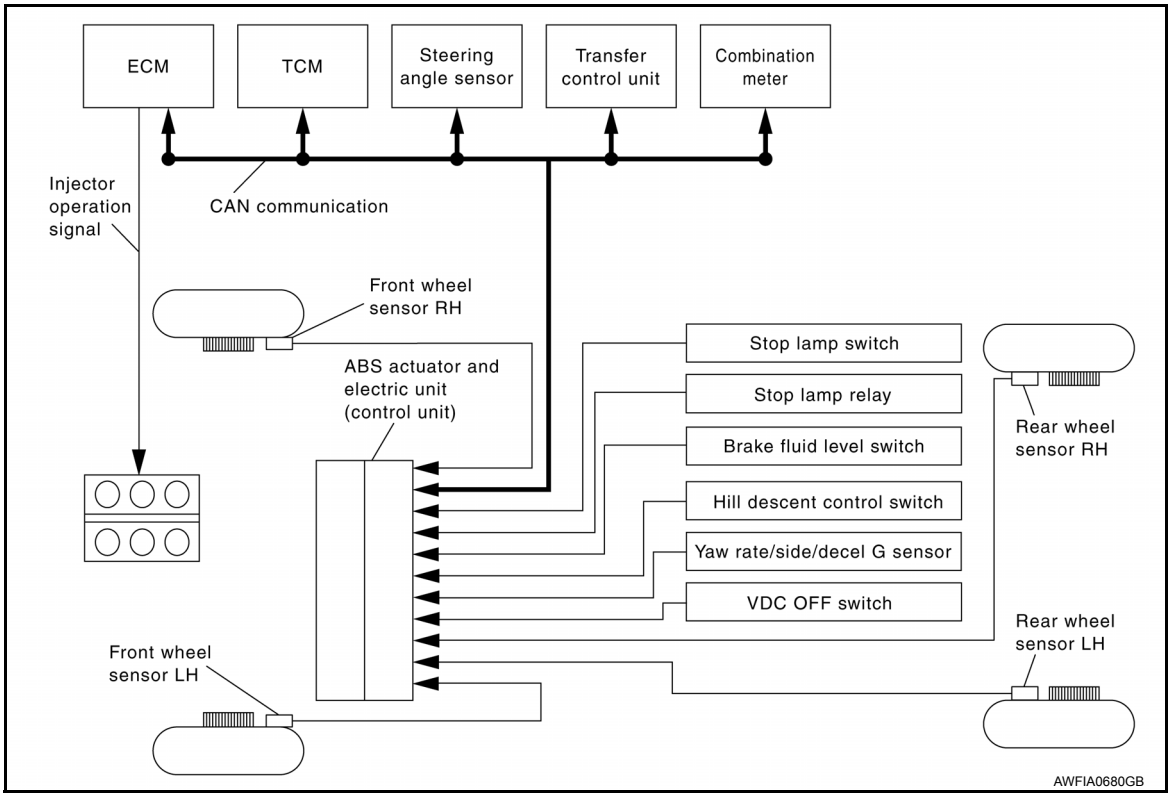
INFOID:0000000007817674

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

VDC

System Diagram

INFOID:0000000007817675



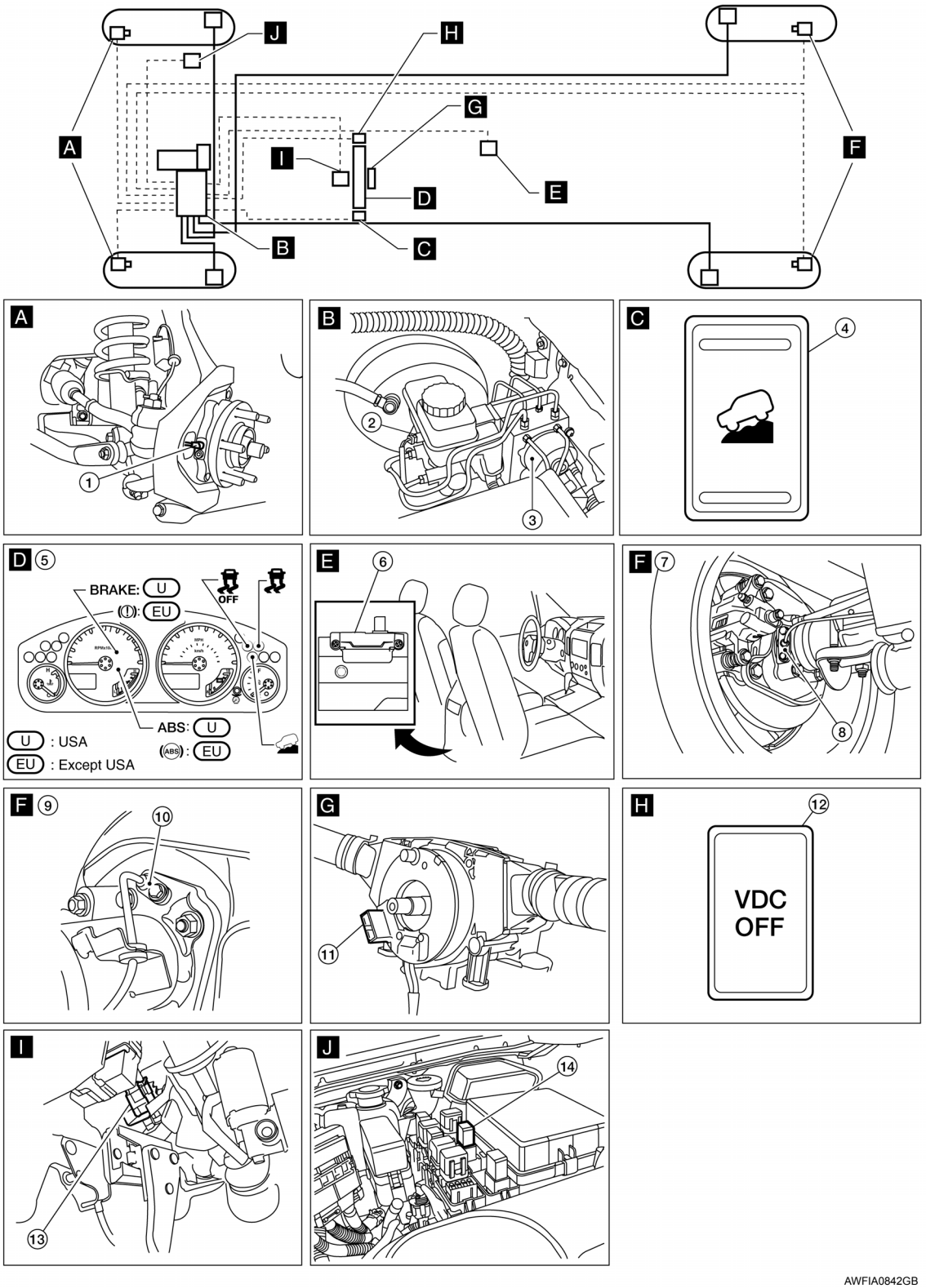
System Description

INFOID:0000000007327847

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

Component Parts Location

INFOID:0000000007817679



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1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

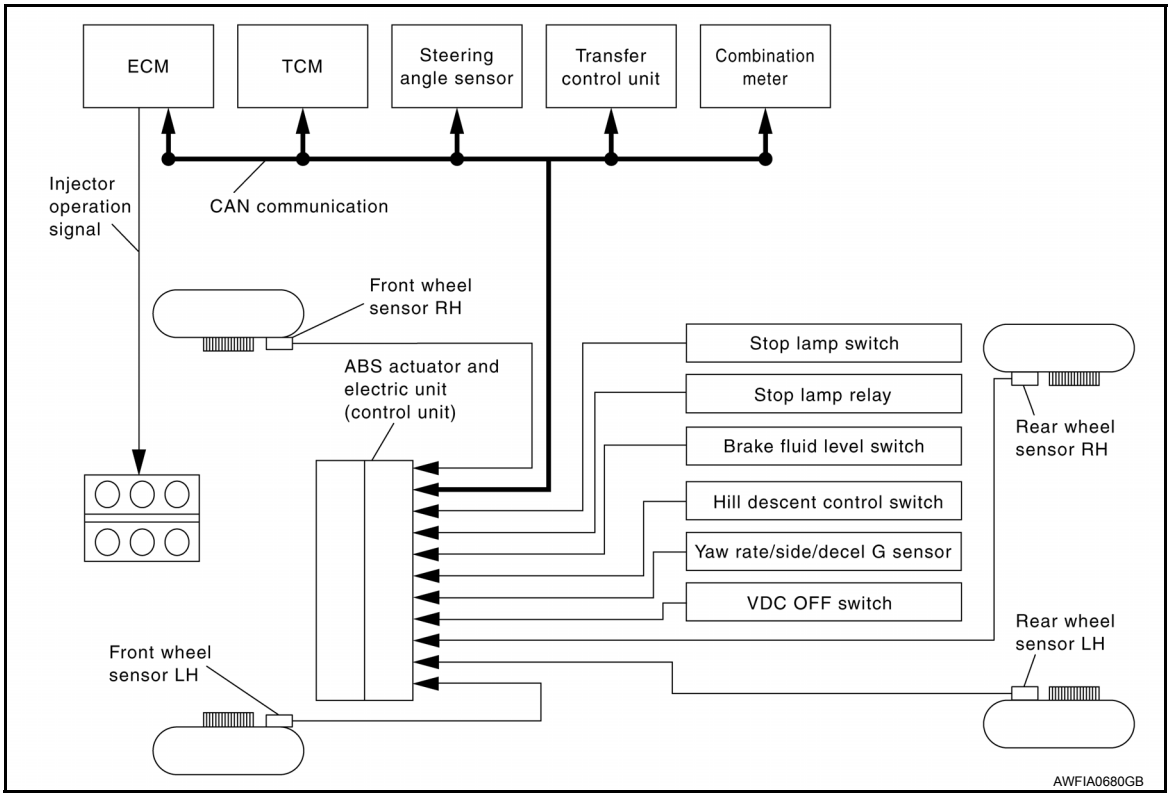
INFOID:0000000007817680

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

TCS

System Diagram

INFOID:0000000007817676



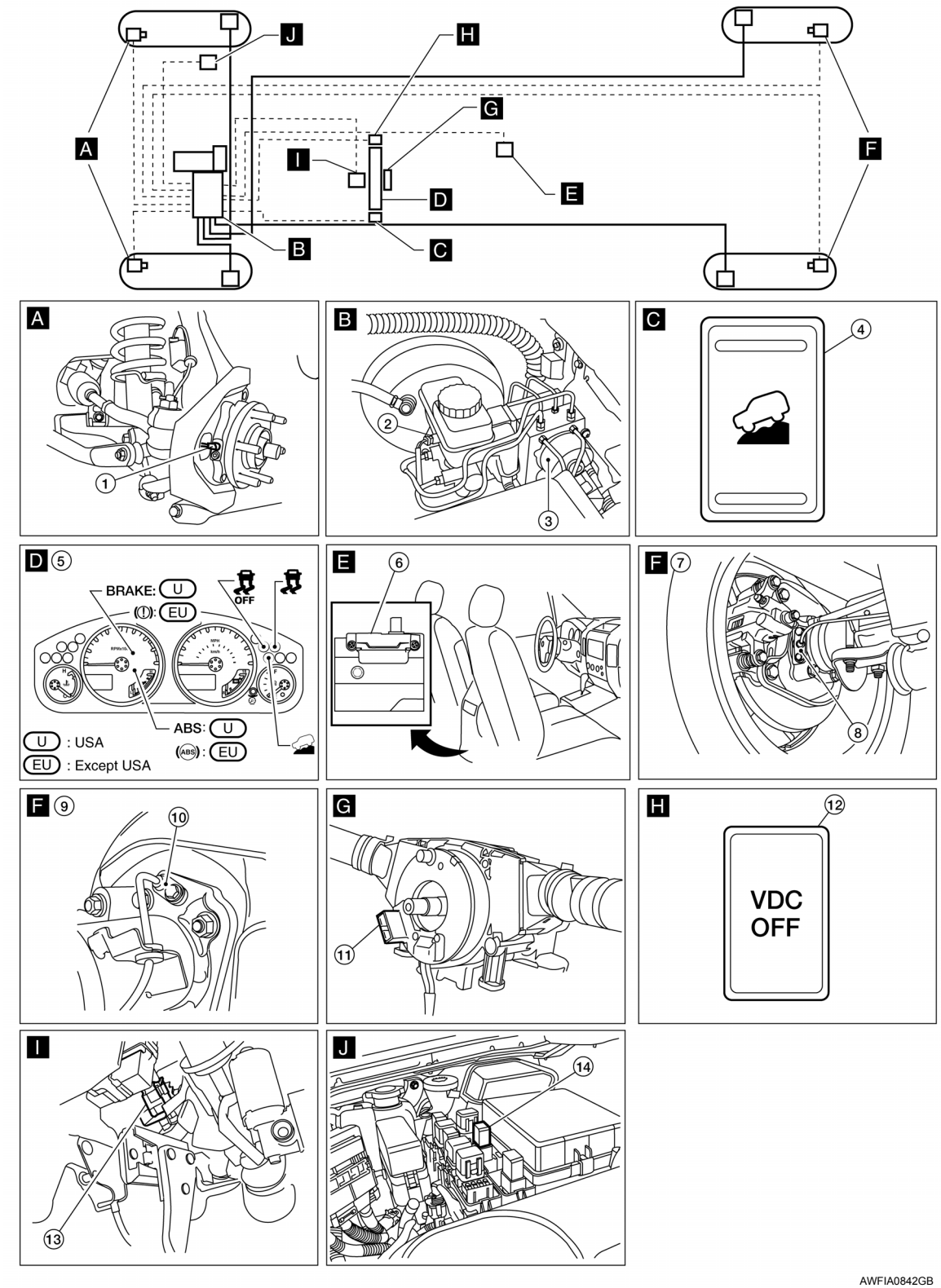
System Description

INFOID:0000000007327851

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

Component Parts Location

INFOID:0000000007817681



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1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

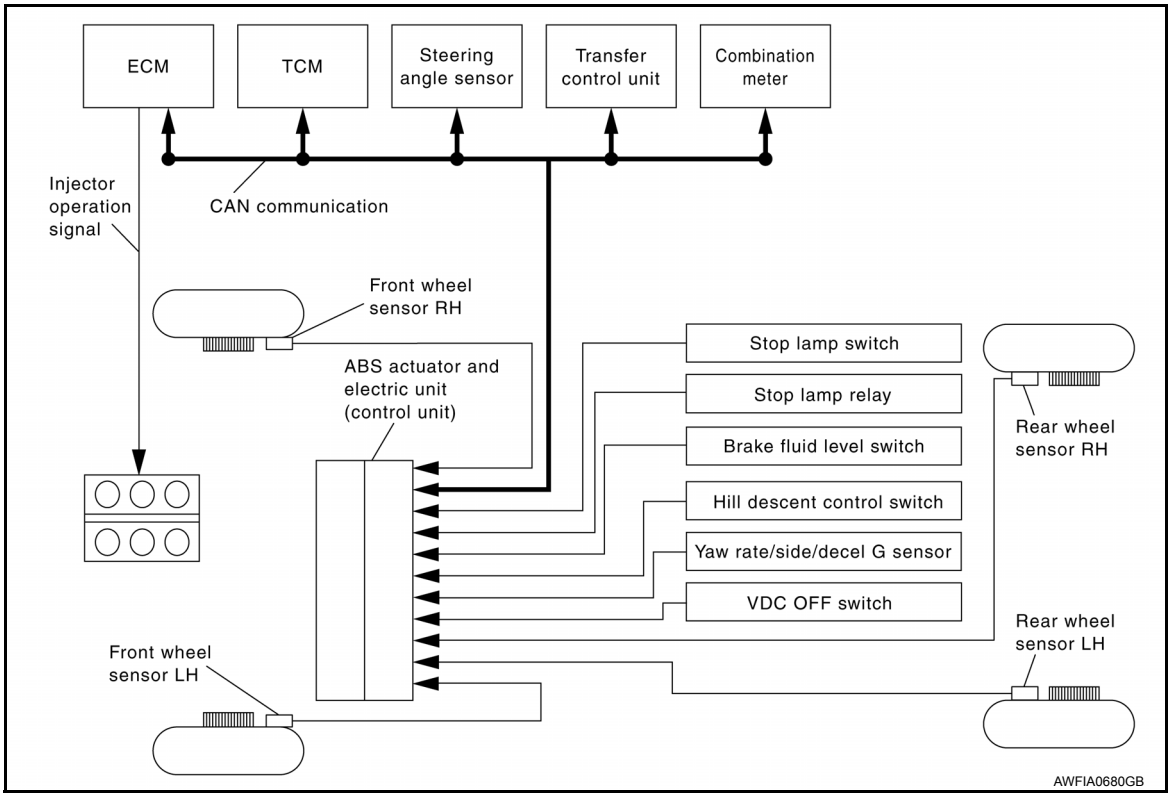
INFOID:0000000007817682

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

ABS

System Diagram

INFOID:0000000007817677



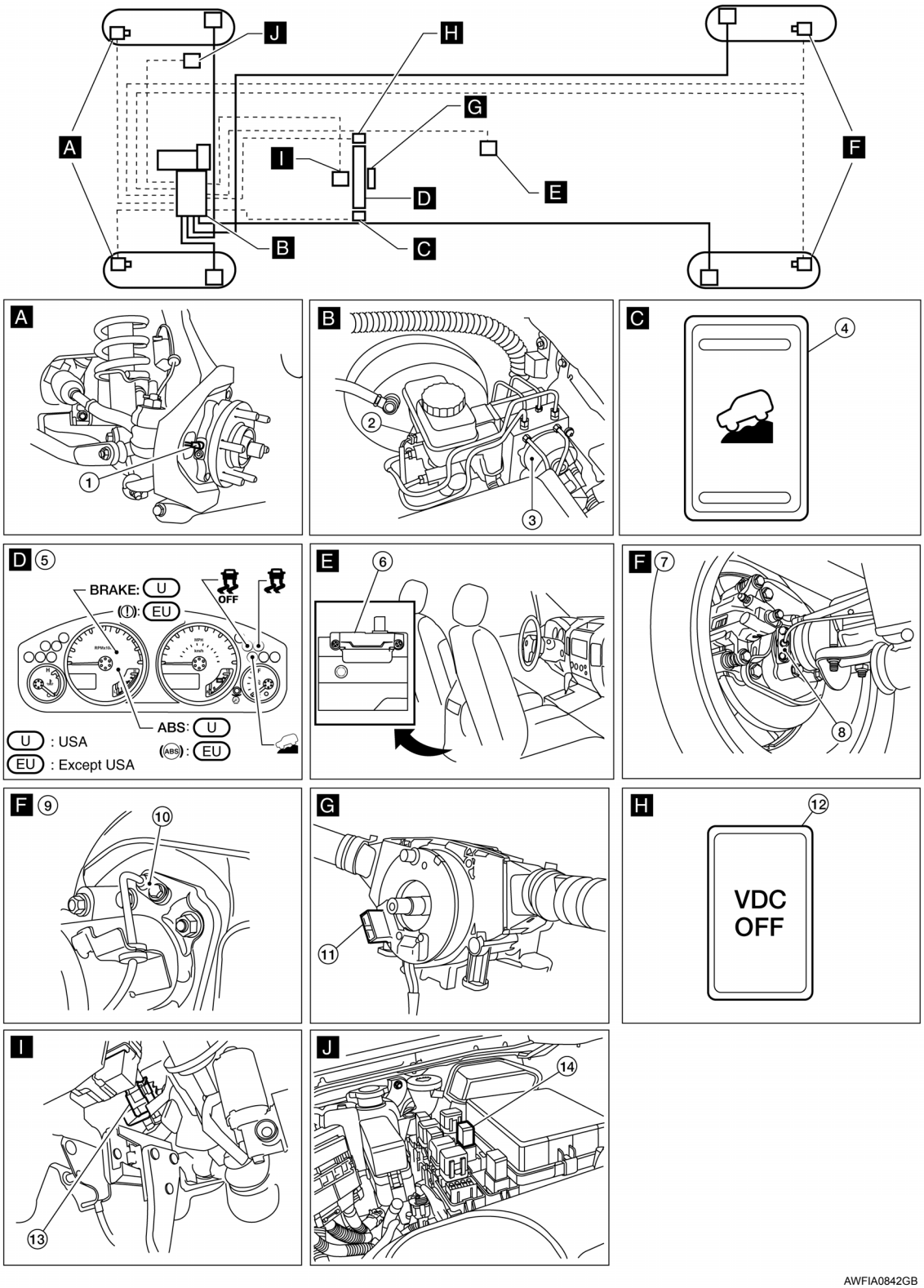
System Description

INFOID:0000000007327855

- 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:0000000007817683



AWFIA0842GB

1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

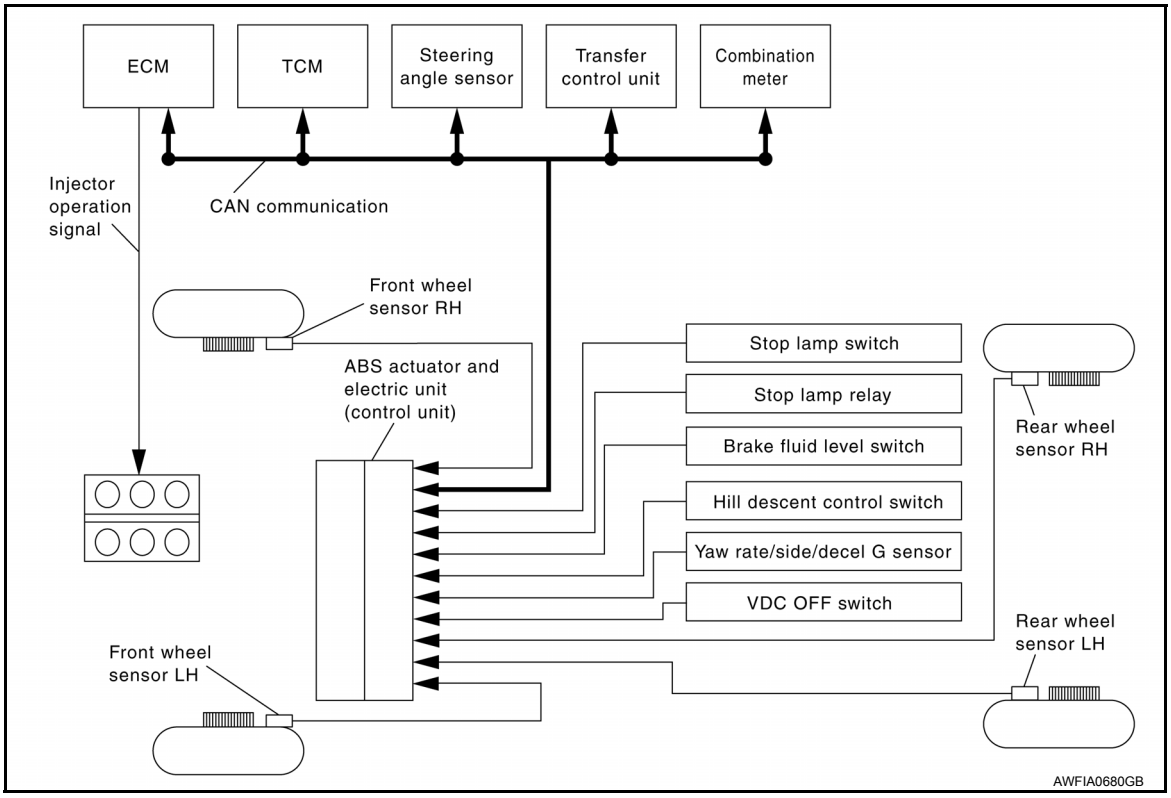
INFOID:0000000007817684

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

EBD

System Diagram

INFOID:0000000007817678



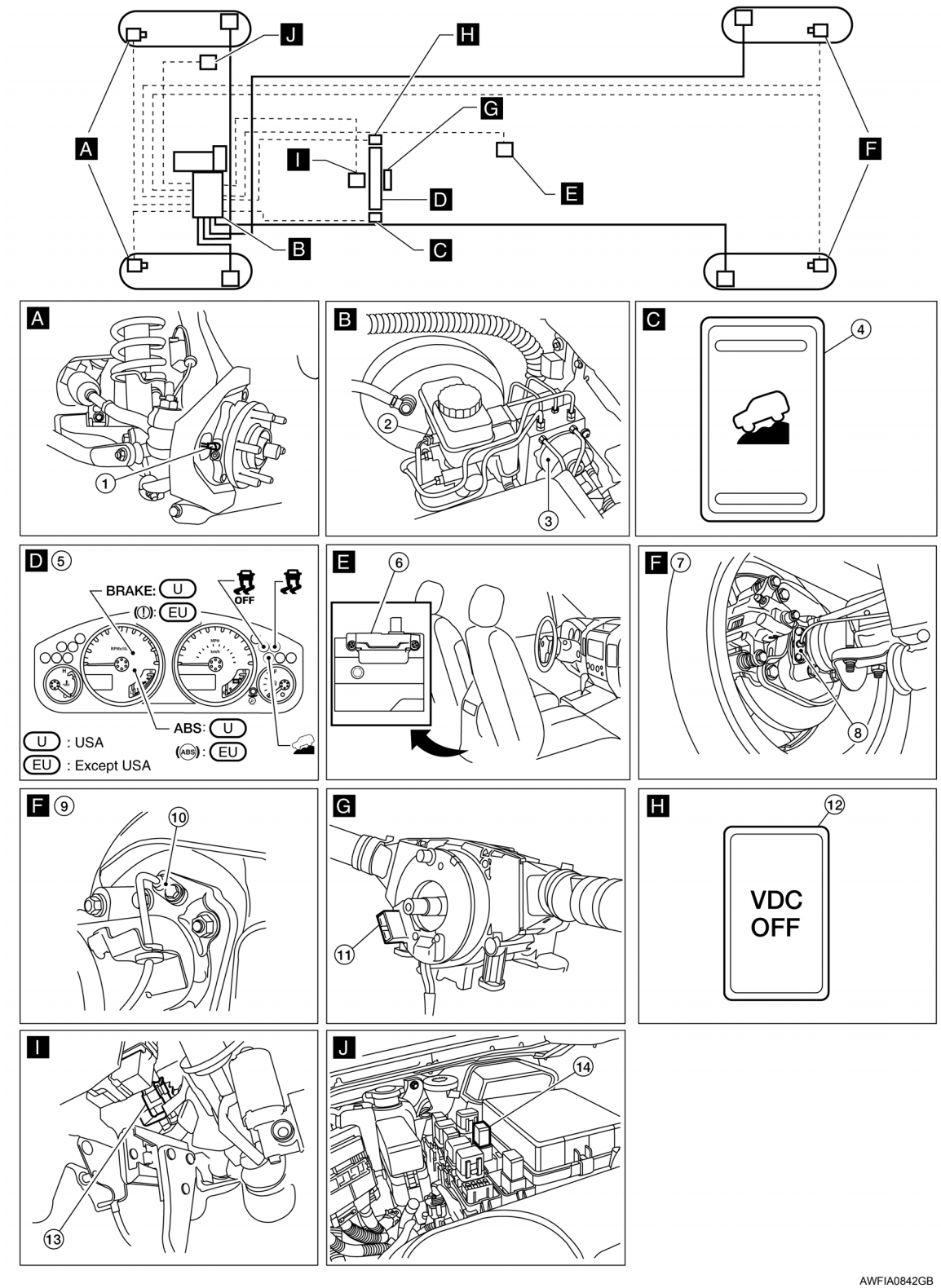
System Description

INFOID:0000000007327859

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

Component Parts Location

INFOID:0000000007817685



AWFIA0842GB

1. Front wheel sensor LH E18
   Front wheel sensor RH E117
2. Brake fluid level switch E21
3. ABS actuator and electric unit (control unit) E127
4. Hill descent control switch M155
5. Combination meter M24
6. Yaw rate/side/decel G sensor B73
7. C200 rear axle
8. Rear wheel sensor LH C11
   Rear wheel sensor RH C10
9. M226 rear axle

10. Rear wheel sensor LH C11
Rear wheel sensor RH C10
11. Steering angle sensor (behind spiral cable) M47
(Steering wheel removed for clarity)
12. VDC OFF switch M154
13. Stop lamp switch E39
14. Stop lamp relay E12

Component Description

INFOID:0000000007817686

Component parts		Reference
ABS actuator and electric unit (control unit)	Pump	BRC-163, "Description"
	Motor	
	Actuator relay	BRC-179, "Description"
	Solenoid valve	BRC-172, "Description"
	VDC switch-over valve (CV1, CV2, SV1, SV2)	BRC-193, "Description"
Wheel sensor		BRC-167, "Description"
Yaw rate/side/decel G sensor		BRC-165, "Description"
Stop lamp switch		BRC-170, "Description"
Steering angle sensor		BRC-184, "Description"
Brake fluid level switch		BRC-184, "Description"
Hill descent control switch		BRC-198, "Description"
VDC OFF switch		BRC-200, "Description"
ABS warning lamp		BRC-202, "Description"
Brake warning lamp		BRC-203, "Description"
Hill descent control indicator lamp		BRC-204, "Description"
VDC OFF indicator lamp		BRC-205, "Description"
SLIP indicator lamp		BRC-207, "Description"

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

CONSULT Function (ABS)

INFOID:0000000007327862

FUNCTION

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

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

SELF DIAGNOSTIC RESULT

Operation Procedure

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

How to Erase Self-diagnosis Results

1. After erasing DTC memory, start engine and drive vehicle at 30 km/h (19 MPH) or more for approximately 1 minute as the final inspection, and make sure that the ABS warning lamp, VDC OFF indicator lamp, SLIP indicator lamp and brake warning lamp turn OFF.
   CAUTION:
   If memory cannot be erased, perform applicable diagnosis.
   NOTE:
   - When the wheel sensor malfunctions, after inspecting the wheel sensor system, the ABS warning lamp, SLIP indicator lamp and brake warning lamp will not turn OFF even when the system is normal unless the vehicle is driving at approximately 30 km/h (19 MPH) or more for approximately 1 minute.
   - Brake warning lamp will turn ON in case of parking brake operation (when switch is ON) or of brake fluid level switch operation (when brake fluid is insufficient).
   - VDC OFF switch should not stay “ON” position.

Display Item List

Refer to BRC-214, "DTC No. Index".

DATA MONITOR

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

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

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
CV1 (On/Off)	–	–	×	Front side switch-over solenoid valve (cut valve) (On/Off) status is displayed.
CV2 (On/Off)	–	–	×	Rear side switch-over solenoid valve (cut-valve) (On/Off) status is displayed.
SV1 (On/Off)	–	–	×	Front side switch-over solenoid valve (suction valve) (On/Off) status is displayed.
SV2 (On/Off)	–	–	×	Rear side switch-over solenoid valve (suction valve) (On/Off) status is displayed.
2WD/4WD (2WD/4WD)	–	–	×	It recognizes on software whether it is 2WD and whether it is in 4WD state.
ACCEL POS SIG (%)	×	–	×	Throttle valve open/close status judged by CAN communication signal is displayed.
SIDE G-SENSOR (m/s^2)	×	–	×	Transverse acceleration detected by side G-sensor is displayed.
STR ANGLE SIG (deg)	×	–	×	Steering angle detected by steering angle sensor is displayed.
PRESS SENSOR (bar)	×	–	×	Brake pressure detected by pressure sensor is displayed.
EBD SIGNAL (On/Off)	–	–	×	EBD operation (On/Off) status is displayed.
ABS SIGNAL (On/Off)	–	–	×	ABS operation (On/Off) status is displayed.
TCS SIGNAL (On/Off)	–	–	×	TCS operation (On/Off) status is displayed.
VDC SIGNAL (On/Off)	–	–	×	VDC operation (On/Off) status is displayed.
EBD FAIL SIG (On/Off)	–	–	×	EBD fail signal (On/Off) status is displayed.
ABS FAIL SIG (On/Off)	–	–	×	ABS fail signal (On/Off) status is displayed.
TCS FAIL SIG (On/Off)	–	–	×	TCS fail signal (On/Off) status is displayed.
VDC FAIL SIG (On/Off)	–	–	×	VDC fail signal (On/Off) status is displayed.
CRANKING SIG (On/Off)	–	–	×	The input state of the key SW START position signal is displayed.
FLUID LEV SW (On/Off)	×	–	×	Brake fluid level switch (On/Off) status is displayed.
DLOCK SW (On/Off)	–	–	×	Condition of differential lock mode switch (On/Off) is displayed.
DLOCK CHG SW (On/Off)	–	–	×	Condition of differential lock position switch (On/Off) is displayed.
STP ON RLY (On/Off)	–	–	×	Stop lamp relay signal (On/Off) status is displayed.
DDS SW (Note 1) (On/Off)	–	–	×	Hill descent control switch (On/Off) status is displayed.

Item (Unit)	Data monitor item selection			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
DDS SIG (Note 1) (On/Off)	–	–	×	Hill descent control operation (On/Off) status is displayed.
USS SIG (Note 2) (On/Off)	–	–	×	Hill start assist operation (On/Off) status is displayed.

×: Applicable

–: Not applicable

NOTE:

- 1: The CONSULT will display DDS (Downhill Drive Support) when referring to the Hill Descent Control system.
- 2: The CONSULT will display USS (Uphill Start Support) when referring to the Hill Start Assist system.

WORK SUPPORT

Conditions	Description
ST ANGLE SENSOR ADJUSTMENT	Steering angle sensor neutral position adjustment can be performed. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".
DECEL G SEN CALIBRATION	Decel G sensor calibration can be performed. Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

ACTIVE TEST

CAUTION:

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

NOTE:

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

Test Item

SOLENOID VALVE

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

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

Operation		ABS solenoid valve			ABS solenoid valve (ACT)		
		Up	Keep	Down	Up	ACT UP	ACT KEEP
FR RH ABS SOLENOID (ACT)	FR RH IN SOL	—	—	—	Off	Off	Off
	FR RH OUT SOL	—	—	—	Off	Off	Off
FR LH ABS SOLENOID (ACT)	FR LH IN SOL	—	—	—	Off	Off	Off
	FR LH OUT SOL	—	—	—	Off	Off	Off
RR RH ABS SOLENOID (ACT)	RR RH IN SOL	—	—	—	Off	Off	Off
	RR RH OUT SOL	—	—	—	Off	Off	Off
RR LH ABS SOLENOID (ACT)	RR LH IN SOL	—	—	—	Off	Off	Off
	RR LH OUT SOL	—	—	—	Off	Off	Off
REAR SOL	RR RH IN SOL	Off	On	On	Off	Off	Off
	RR RH OUT SOL	Off	Off	On*	Off	Off	Off
	RR LH IN SOL	Off	On	On	Off	Off	Off
	RR LH OUT SOL	Off	Off	On*	Off	Off	Off

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

ABS MOTOR
- Touch “On” and “Off” on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

STOP LAMP RELAY
- Touch “On” and “Off” on screen. Make sure stop lamp relay operates as shown in table below. Brake lamps will illuminate when relay is “On”.

Operation	On	Off
STP ON RLY	On	Off

DTC/CIRCUIT DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000007815422

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

C1101, C1102, C1103, C1104 WHEEL SENSOR-1

Description

INFOID:0000000007327864

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:0000000007327865

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-154, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327866

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

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

NOTE:

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

3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
NOTE:
If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3
NO >> Replace the wheel sensor. Refer to BRC-237, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

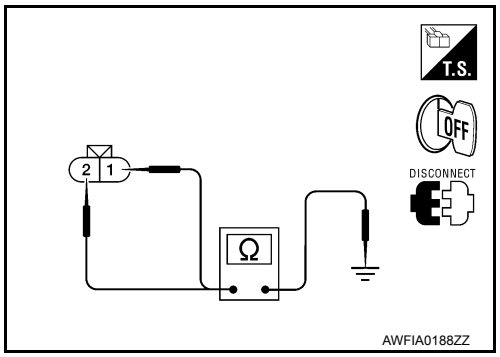
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair the circuit.

Component Inspection

INFOID:0000000007327867

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-154, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007327868

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1105, C1106, C1107, C1108 WHEEL SENSOR-2

Description

INFOID:0000000007327869

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:0000000007327870

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-157, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817687

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3
NO >> Replace the wheel sensor. Refer to BRC-237, "Removal and Installation".

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

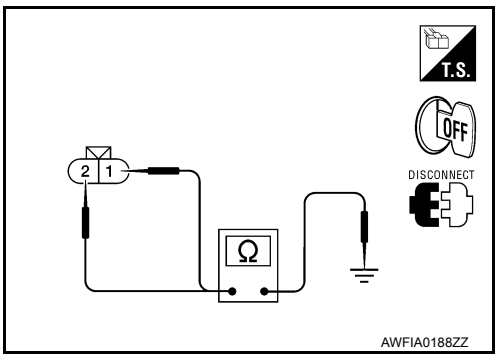
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".

NO >> Repair the circuit.

Component Inspection

INFOID:0000000007817688

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End

NO >> Go to diagnosis procedure. Refer to BRC-167, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817689

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1109 POWER AND GROUND SYSTEM

Description

INFOID:0000000007327874

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

DTC Logic

INFOID:0000000007327875

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BATTERY VOLTAGE [ABNORMAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-160, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327876

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

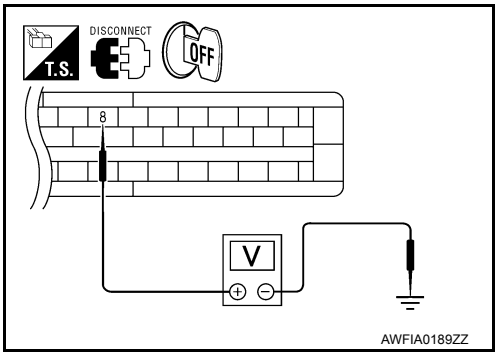
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

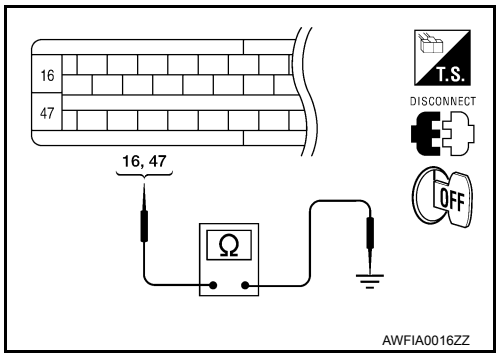
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check voltage between ABS actuator and electric unit (control unit) connector E127 terminal 8 and ground.



ABS actuator and electric unit (control unit)		—	Condition	Voltage
Connector	Terminal			
E127	8	Ground	Ignition switch: ON	Battery voltage
			Ignition switch: OFF	Approx. 0V

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

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



Is the inspection result normal?

YES >> Check battery for terminal looseness, low voltage, etc. If any malfunction is found, repair malfunctioning parts.

NO >> Repair or replace malfunctioning components.

Special Repair Requirement

INFOID:0000000007817690

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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

DTC Logic

INFOID:0000000007327878

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CONTROLLER FAILURE
VARIANT CODING

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-162, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327879

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

>> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817701

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1111 ABS MOTOR, MOTOR RELAY SYSTEM

Description

INFOID:0000000007327881

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:0000000007327882

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
PUMP MOTOR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-163, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327883

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

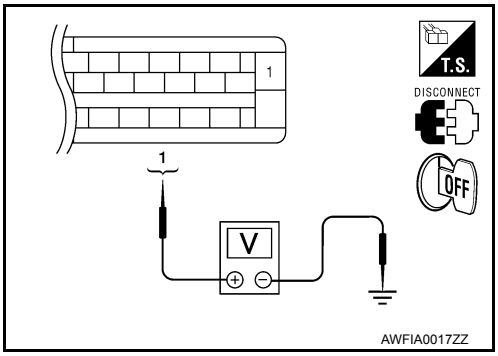
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnect, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

2.CHECK ABS MOTOR AND MOTOR RELAY POWER SUPPLY CIRCUIT

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



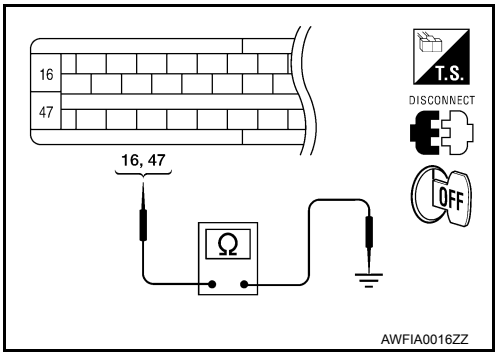
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

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

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327884

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch On and Off on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-163, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817702

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

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

Description

INFOID:0000000007327886

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

DTC Logic

INFOID:0000000007327887

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-165, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327888

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:

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

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

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

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

Check continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminals 18, 19, 22, 29 and the yaw rate/side/decel G sensor connector B73 (B) terminals 3, 2, 4, 1.

ABS actuator and electric unit (control unit)		Yaw rate/side/decel G sensor		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	18	B73 (B)	3	Yes
	19		2	
	22		4	
	29		1	

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace as necessary.

3. YAW RATE/SIDE/DECEL G SENSOR INSPECTION

Perform the yaw rate/side/decel G sensor component inspection. Refer to BRC-166, "Component Inspection".

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace the yaw rate/side/decel G sensor. Refer to BRC-242, "Removal and Installation".

Component Inspection

INFOID:0000000007327889

1. CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-165, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817703

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1115 WHEEL SENSOR

Description

INFOID:0000000007327891

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:0000000007327892

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS SENSOR [ABNORMAL SIGNAL]

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-167, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817707

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

CAUTION:
Do not check between wheel sensor terminals.

1.CONNECTOR INSPECTION

1. Disconnect the ABS actuator and electric unit (control unit) connector and wheel sensor of malfunctioning code.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

2.CHECK WHEEL SENSOR OUTPUT SIGNAL

1. Connect ABS active wheel sensor tester (J-45741) to wheel sensor using appropriate adapter.
2. Turn on the ABS active wheel sensor tester power switch.
   NOTE:
   The green POWER indicator should illuminate. If the POWER indicator does not illuminate, replace the battery in the ABS active wheel sensor tester before proceeding.
3. Spin the wheel of the vehicle by hand and observe the red SENSOR indicator on the ABS active wheel sensor tester. The red SENSOR indicator should flash on and off to indicate an output signal.
   NOTE:
   If the red SENSOR indicator illuminates but does not flash, reverse the polarity of the tester leads and retest.

Does the ABS active wheel sensor tester detect a signal?

YES >> GO TO 3

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

3.CHECK TIRES

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

Is the inspection result normal?

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

4.CHECK WHEEL BEARINGS

Check wheel bearing axial end play. Refer to FAX-5, "On-Vehicle Inspection and Service" (front), RAX-6, "Rear Axle Bearing" (C200 rear), or RAX-18, "Rear Axle Bearing" (M226 rear).

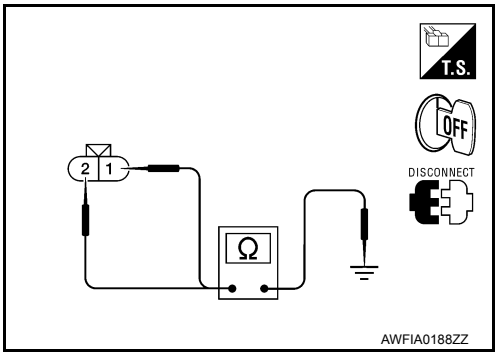
Is the inspection result normal?

YES >> GO TO 5
NO >> Repair or replace as necessary. Refer to FAX-8, "Removal and Installation" (front), RAX-12, "Removal and Installation" (C200 rear), or RAX-23, "Removal and Installation" (M226 rear).

5.CHECK WIRING HARNESS FOR SHORT CIRCUIT

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

Continuity should not exist.



Is the inspection result normal?

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

6.CHECK WIRING HARNESS FOR OPEN CIRCUIT

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

Wheel sensor	ABS actuator and electric unit (control unit)		Wheel sensor		Continuity
	Connector	Terminal	Connector	Terminal	
Front LH	E127	45	E18	1	Yes
		46		2	
Front RH		34	E117	1	
		33		2	
Rear LH		36	C11	1	
		37		2	
Rear RH		43	C10	1	
		42		2	

Is the inspection result normal?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair the circuit.

Component Inspection

INFOID:0000000007817708

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-167, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817704

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1116 STOP LAMP SWITCH

Description

INFOID:0000000007327896

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

DTC Logic

INFOID:0000000007327897

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
STOP LAMP SW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-170, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327898

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

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

Is the inspection result normal?

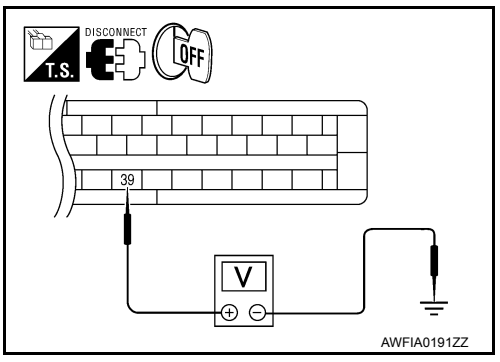
YES >> GO TO 2
NO >> Repair or replace as necessary.

2.STOP LAMP SWITCH INSPECTION

1. Connect the stop lamp switch connector.
2. Check the voltage between the ABS actuator and electric unit (control unit) connector E127 terminal 39 and body ground.

Brake pedal depressed : Battery voltage (approx. 12V)

Brake pedal released : Approx. 0V

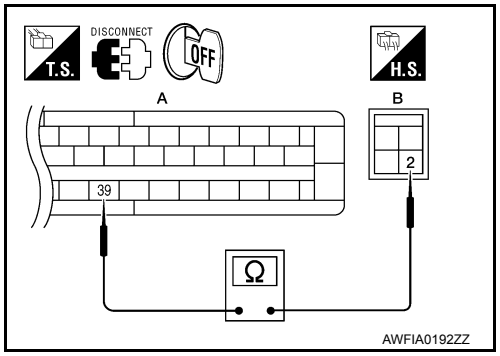


Is the inspection result normal?

YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> GO TO 3

3.STOP LAMP SWITCH CIRCUIT INSPECTION

1. Disconnect the stop lamp switch connector.
2. Check the continuity between the ABS actuator and electric unit (control unit) connector E127 (A) terminal 39 and stop lamp switch connector E39 (B) terminal 2.



Continuity should exist.

Is the inspection result normal?

YES >> Refer to BRC-121, "Work Flow".
NO >> Repair or replace malfunctioning components.

Special Repair Requirement

INFOID:0000000007817705

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1120, C1122, C1124, C1126 IN ABS SOL

Description

INFOID:0000000007327900

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:0000000007327901

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.	• ABS actuator and electric unit (control unit)
C1122	FR RH IN ABS SOL	When the control unit detects a malfunction in the front RH inlet solenoid circuit.	
C1124	RR LH IN ABS SOL	When the control unit detects a malfunction in the rear LH inlet solenoid circuit.	
C1126	RR RH IN ABS SOL	When the control unit detects a malfunction in the rear RH inlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-172, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327902

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

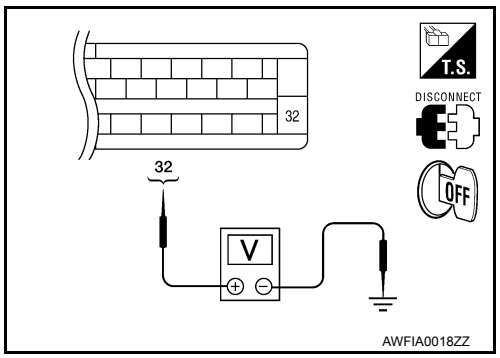
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



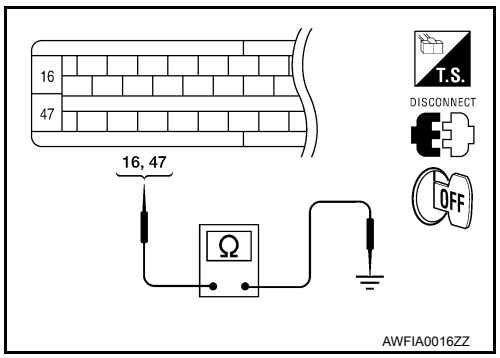
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3. CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327903

1. CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-172, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817706

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1121, C1123, C1125, C1127 OUT ABS SOL

Description

INFOID:0000000007327905

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:0000000007327906

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.	• ABS actuator and electric unit (control unit)
C1123	FR RH OUT ABS SOL	When the control unit detects a malfunction in the front RH outlet solenoid circuit.	
C1125	RR LH OUT ABS SOL	When the control unit detects a malfunction in the rear LH outlet solenoid circuit.	
C1127	RR RH OUT ABS SOL	When the control unit detects a malfunction in the rear RH outlet solenoid circuit.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-175, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817709

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

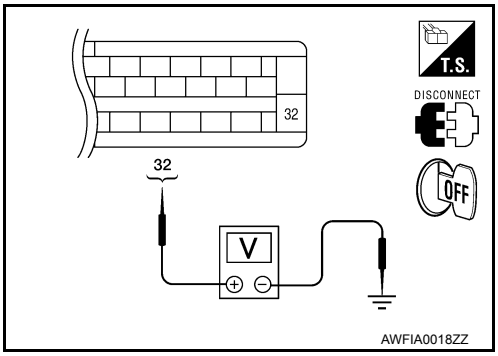
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



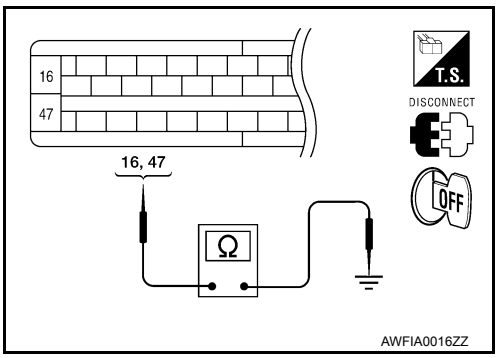
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3. CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007817710

1. CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-179, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817711

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1130, C1131, C1132, C1133, C1136 ENGINE SIGNAL

Description

INFOID:0000000007327910

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

DTC Logic

INFOID:0000000007327911

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

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

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-178, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327912

1.CHECK ENGINE SYSTEM

1. Perform ECM self-diagnosis. Repair or replace items indicated, then perform ECM self-diagnosis again. Refer to EC-499, "CONSULT Function".
2. Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

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

C1140 ACTUATOR RLY

Description

INFOID:0000000007327913

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

DTC Logic

INFOID:0000000007327914

DTC DETECTION LOGIC

DTC	Display item	Malfunction detected condition	Possible cause
C1140	ACTUATOR RLY	ABS actuator relay or circuit malfunction.	• Harness or connector • ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ACTUATOR RLY

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-179, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007817723

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

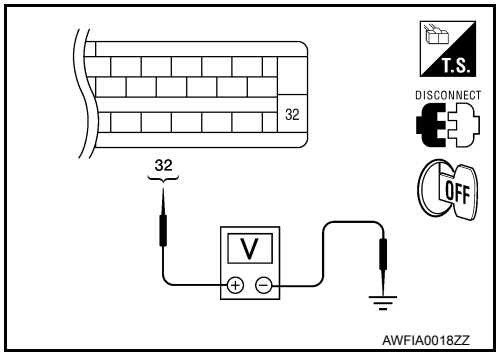
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



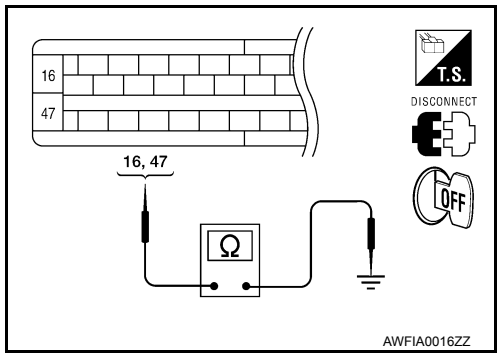
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007817724

1.CHECK ACTIVE TEST

1. On “ACTIVE TEST”, select “ABS MOTOR”.
2. Touch On and Off on screen. Make sure motor relay and actuator relay operate as shown in table below.

Operation	On	Off
MOTOR RELAY	On	Off
ACTUATOR RLY	On	On

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-163, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817712

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1142 PRESS SENSOR

DTC Description

INFOID:0000000012379234

DTC DETECTION LOGIC

DTC	Display Item (Trouble diagnosis content)	Malfunction detected condition
C1142	PRESS SEN CIRCUIT (Pressure sensor circuit)	When a malfunction is detected in pressure sensor.

POSSIBLE CAUSE

NOTE:
Confirm if DTC is PAST or CRNT. If DTC is CRNT, proceed with Diagnosis Procedure. If DTC is PAST, clear the DTC. Do not replace the ABS actuator and electric unit (control unit) for a PAST DTC.

PAST DTC	CRNT DTC
• Harness or connector • Air inclusion in the brake piping • Stop lamp switch system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery	• Stop lamp switch system • ABS actuator and electric unit (control unit) • Brake system • ABS actuator and electric unit (control unit) power supply system • Fuse • Fusible link • Battery • Air inclusion in the brake piping

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.CHECK DTC DETECTION

With CONSULT

1. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
2. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
3. Perform “Self Diagnostic Result” of “ABS”.

Is DTC “C1142” detected?

YES-1 >> “C1142” is displayed as “CRNT”: Proceed to BRC-181, "Diagnosis Procedure".
YES-2 >> “C1142” is displayed as “PAST”: Inspection End (Erase “Self Diagnostic Result” of “ABS”).
NO-1 >> To check malfunction symptom before repair: Refer to GI-46, "Intermittent Incident".
NO-2 >> Confirmation after repair: Inspection End.

Diagnosis Procedure

INFOID:0000000012379235

1.STOP LAMP SWITCH SYSTEM

Check the stop lamp switch system. Refer to BRC-170, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace stop lamp switch system.

2.CHECK BRAKE FLUID LEAKAGE

Check the brake fluid leakage. Refer to BR-18, "On Board Inspection".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair or replace brake fluid leakage part.

3.CHECK BRAKE PIPING

Check the brake piping. Refer to BR-12, "Hydraulic Circuit".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace brake piping.
- Front: Refer to BR-24, "Removal and Installation of Front Brake Piping and Brake Hose".
- Rear: Refer to BR-25, "Removal and Installation of Rear Brake Piping and Brake Hose".

4.CHECK BRAKE PEDAL

Check the brake pedal.
- Brake pedal height: Refer to BR-16, "Inspection and Adjustment".
- Brake pedal assembly: Refer to BR-20, "Exploded View".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Adjust the brake pedal height or replace brake pedal assembly.
- Adjust the brake pedal: Refer to BR-16, "Inspection and Adjustment".
- Replace the brake pedal: Refer to BR-20, "Removal and Installation".

5.CHECK BRAKE MASTER CYLINDER

Check the brake master cylinder. Refer to BR-11, "On Board Inspection".

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace brake master cylinder. Refer to BR-28, "Removal and Installation".

6.CHECK BRAKE BOOSTER

Check the brake booster. Refer to BR-9, "Inspection".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace brake booster. Refer to BR-30, "Removal and Installation".

7.CHECK VACUUM PIPING

Check the vacuum piping. Refer to BR-10, "Inspection".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace vacuum piping. Refer to BR-32, "Removal and Installation".

8.CHECK FRONT DISC BRAKE

Check the front disc brake caliper. Refer to BR-35, "Exploded View of Brake Caliper".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace front disc brake caliper. Refer to BR-35, "Removal and Installation of Brake Caliper and Disc Rotor".

9.CHECK REAR DISC BRAKE

Check the rear disc brake. Refer to BR-40, "Exploded View of Brake Caliper".

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace rear disc brake. Refer to BR-40, "Removal and Installation of Brake Caliper and Disc Rotor".

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

Check the ABS actuator and electric unit (control unit) power supply and ground circuits. Refer to BRC-160, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 11.
NO >> Repair / replace harness, connector, fuse, or fusible link.

11. CHECK ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

1. Erase “Self Diagnostic Result” of “ABS”.
2. Turn the ignition switch OFF.
   NOTE:
   Wait at least 10 seconds after turning ignition switch OFF.
3. Start the engine.
   NOTE:
   Wait at least 10 seconds after starting the engine.
4. Start the engine and drive the vehicle for a short period of time.
   NOTE:
   Vehicle must be driven after repair or replacement to erase the previous DTCs.
5. Stop the vehicle.
6. Perform “Self Diagnostic Result” of “ABS”.

Is DTC “C1142” detected?

YES >> Replace the ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Check the ABS actuator and electric unit (control unit) harness connector and terminal for damage, looseness and disconnection. Repair / replace harness, connector, or terminal.

C1143, C1144 STEERING ANGLE SENSOR

Description

INFOID:0000000007327918

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:0000000007327919

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN CIRCUIT
ST ANG SEN SIGNAL

Is above displayed on the self-diagnosis display?

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

Diagnosis Procedure

INFOID:0000000007327920

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

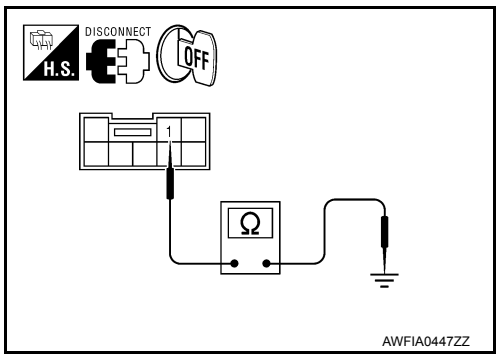
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Disconnect steering angle sensor connector.
4. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
5. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

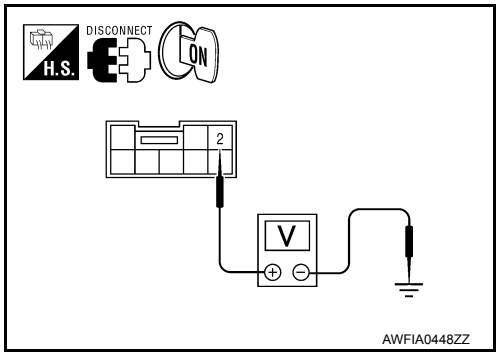
2.CHECK STEERING ANGLE SENSOR HARNESS

1. Turn ignition switch OFF.
2. Disconnect steering angle sensor connector.
3. Check continuity between steering angle sensor connector M47 terminal 1 and ground.



Steering angle sensor		—	Continuity
Connector	Terminal		
M47	1	Ground	Yes

4. Turn ignition switch ON.
5. Check voltage between steering angle sensor connector M47 terminal 2 and ground.



Steering angle sensor		—	Voltage
Connector	Terminal		
M47	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK DATA MONITOR

Perform the steering angle sensor component inspection. Refer to BRC-185, "Component Inspection".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace steering angle sensor and adjust neutral position of steering angle sensor. Refer to BRC-241, "Removal and Installation".

Component Inspection

INFOID:0000000007327921

1.CHECK DATA MONITOR

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-184, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817713

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1155 BRAKE FLUID LEVEL SWITCH

Description

INFOID:0000000007327923

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

DTC Logic

INFOID:0000000007327924

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
BR FLUID LEVEL LOW

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-187, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327925

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

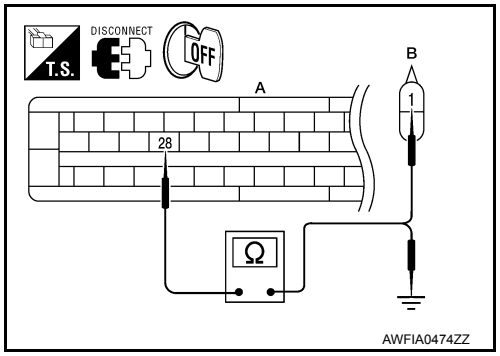
1. Disconnect ABS actuator and electric unit (control unit) connector and brake fluid level switch connector.
2. Check the terminals for deformation, disconnection, looseness or damage.

Is the inspection result normal?

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

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

1. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and brake fluid level switch connector E21 (B) terminal 1.



ABS actuator and electric unit (control unit)		Brake fluid level switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	28	E21 (B)	1	Yes

2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) Terminal 28 and ground.

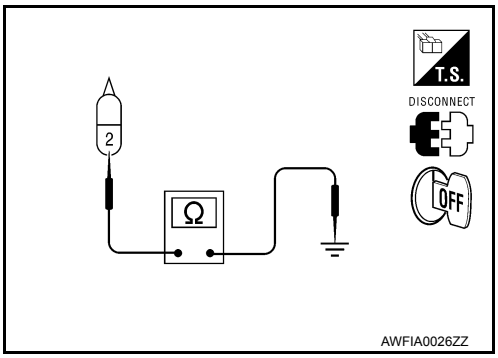
ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E127 (A)	28	Ground	No

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK BRAKE FLUID LEVEL SWITCH GROUND

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



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

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace malfunctioning components.

4.CHECK BRAKE FLUID LEVEL SWITCH

Perform the brake fluid level switch component inspection. Refer to BRC-188, "Component Inspection".

Is the inspection result normal?

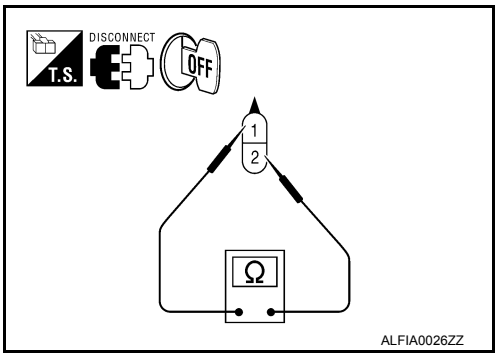
YES >> Perform self-diagnosis again. If the same results appear, replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace brake fluid level switch.

Component Inspection

INFOID:0000000007327926

1.CHECK BRAKE FLUID LEVEL SWITCH

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



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

Is the inspection result normal?

YES >> Inspection End
NO >> Replace brake fluid level switch.

Special Repair Requirement

INFOID:0000000007817714

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1156 ST ANG SEN COM CIR

Description

INFOID:0000000007327928

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

DTC Logic

INFOID:0000000007327929

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANG SEN COM CIR

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-190, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327930

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connector and perform self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

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

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Inspection End

C1160 DECEL G SEN SET

Description

INFOID:0000000007327931

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

DTC Logic

INFOID:0000000007327932

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
DECEL G SEN SET

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-191, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327933

1.PERFORM SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Self-diagnosis results
DECEL G SEN SET

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

YES >> Perform repair or replacement for the item indicated.
NO >> Perform calibration of decel G sensor. Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description". GO TO 2

2.PERFORM SELF-DIAGNOSIS AGAIN

1. Turn the ignition switch to OFF and then to ON and erase self-diagnosis results. Refer to BRC-148, "CONSULT Function (ABS)".
2. Perform ABS actuator and electric unit (control unit) self-diagnosis again. Refer to BRC-148, "CONSULT Function (ABS)".

Are any self-diagnosis results displayed?

YES >> Replace yaw rate/side/decel G sensor. Refer to BRC-242, "Removal and Installation".
NO >> Inspection End

C1163 ST ANGLE SEN SAFE

Description

INFOID:0000000007327934

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:0000000007327935

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ST ANGL SEN SAFE

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-192, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327936

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Adjust steering angle sensor neutral position. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.INDICATOR LAMP CHECK

Check that VDC OFF indicator lamp is off.

Is VDC OFF indicator lamp off?

YES >> Inspection End
NO >> Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

C1164, C1165, C1166, C1167 CV/SV SYSTEM

Description

INFOID:0000000007327937

CV1, CV2 (CUT VALVE)

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

SV1, SV2 (SUCTION VALVE)

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

DTC Logic

INFOID:0000000007327938

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 • ABS actuator and electric unit (control unit)
C1165	CV2	VDC switch-over solenoid valve (CV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	
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.	
C1167	SV2	VDC switch-over solenoid valve (SV2) on the primary side is open circuit or shorted, or the control line is open or shorted to the power supply or the ground.	

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
CV1
CV2
SV1
SV2

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-193, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327939

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CONNECTOR INSPECTION

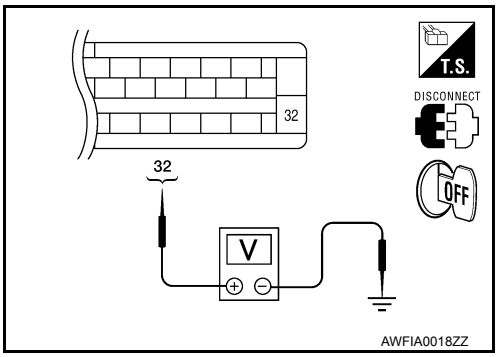
1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connectors and then perform the self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is any item indicated on the self-diagnosis display?

YES >> GO TO 2
NO >> Poor connection of connector terminals. Repair or replace connector.

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

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



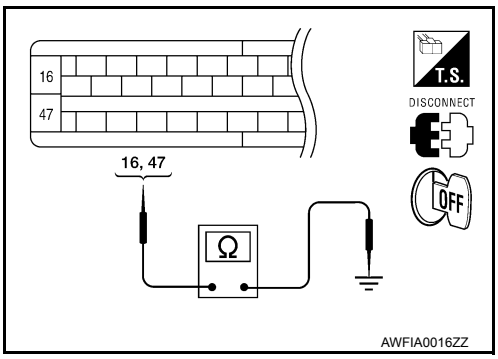
ABS actuator and electric unit (control unit)		—	Voltage
Connector	Terminal		
E127	32	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK SOLENOID, VDC SWITCH-OVER VALVE AND ACTUATOR RELAY GROUND CIRCUIT

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



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

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Repair or replace malfunctioning components.

Component Inspection

INFOID:0000000007327940

1.CHECK ACTIVE TEST

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

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-193, "Diagnosis Procedure".

Special Repair Requirement

INFOID:0000000007817715

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

C1187 DIFFERENTIAL LOCK CONTROL UNIT

Description

INFOID:0000000007327942

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

DTC Logic

INFOID:0000000007327943

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.CHECK SELF-DIAGNOSIS RESULTS

Check the self-diagnosis results.

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Proceed to diagnosis procedure. Refer to BRC-196, "Diagnosis Procedure".
NO >> Inspection End

Diagnosis Procedure

INFOID:0000000007327944

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connector and perform self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Self-diagnosis results
ABS DIFLOCK CONTROLLER NG

Is above displayed on the self-diagnosis display?

YES >> Refer to LAN-14, "Trouble Diagnosis Flow Chart".
NO >> Inspection End

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000007327945

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:0000000007327946

DTC DETECTION LOGIC

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

Diagnosis Procedure

INFOID:0000000007327947

1.CONNECTOR INSPECTION

1. Turn ignition switch OFF.
2. Disconnect the ABS actuator and electric unit (control unit) connector.
3. Check terminals for deformation, disconnection, looseness, and so on. If any malfunction is found, repair or replace terminals.
4. Reconnect connector and perform self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

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

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

HILL DESCENT CONTROL SWITCH

Description

INFOID:0000000007327948

The hill descent control switch activates (turn ON) the hill descent control function when the hill descent control switch is pressed.

Component Function Check

INFOID:0000000007327949

1.CHECK HILL DESCENT CONTROL SWITCH OPERATION

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

Condition	Hill descent control indicator lamp illumination status
Hill descent control switch: ON	ON
Hill descent control switch: OFF	OFF

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-198, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327950

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK HILL DESCENT CONTROL SWITCH

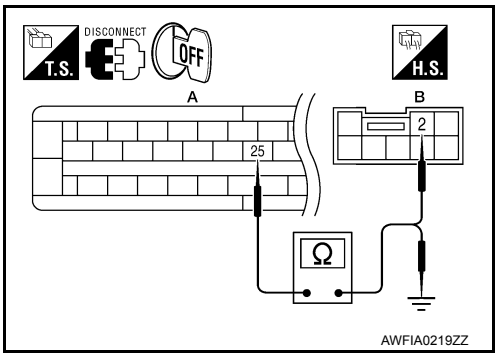
Perform the hill descent control switch component inspection. Refer to BRC-199, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Replace hill descent control switch.

2.CHECK HILL DESCENT CONTROL SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 25 and hill descent control switch connector M155 (B) terminal 2.



ABS actuator and electric unit (control unit)		Hill descent control switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	25	M155 (B)	2	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 25 and ground.

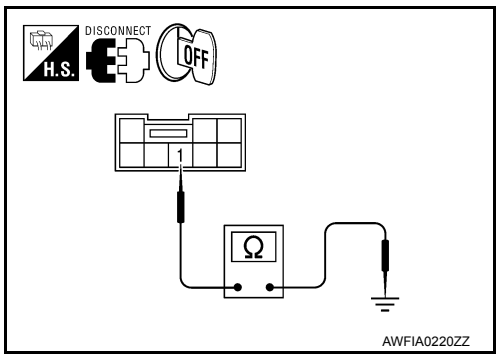
ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E127 (A)	25	Ground	No

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3.CHECK HILL DESCENT CONTROL SWITCH GROUND

Check continuity between hill descent control switch connector M155 terminal 1 and ground.



Hill descent control switch		—	Continuity
Connector	Terminal		
M155	1	Ground	Yes

Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

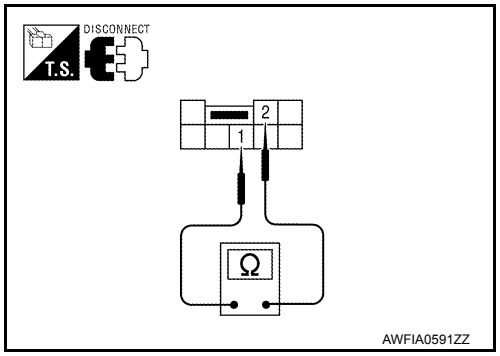
YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Component Inspection

INFOID:0000000007327951

1.CHECK HILL DESCENT CONTROL SWITCH

1. Turn ignition switch OFF.
2. Disconnect hill descent control switch connector.
3. Check continuity between hill descent control switch terminals.



Hill descent control switch terminals	Condition	Continuity
1 – 2	Hill descent control switch is ON.	Yes
	Hill descent control switch is OFF.	No

Is the inspection result normal?

YES >> Inspection End
NO >> Replace hill descent control switch.

Special Repair Requirement

INFOID:0000000007817716

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

VDC OFF SWITCH

Description

INFOID:0000000007327953

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

Component Function Check

INFOID:0000000007327954

1.CHECK VDC OFF SWITCH OPERATION

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

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-200, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327955

Regarding Wiring Diagram information, refer to BRC-216, "Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST".

1.CHECK VDC OFF SWITCH

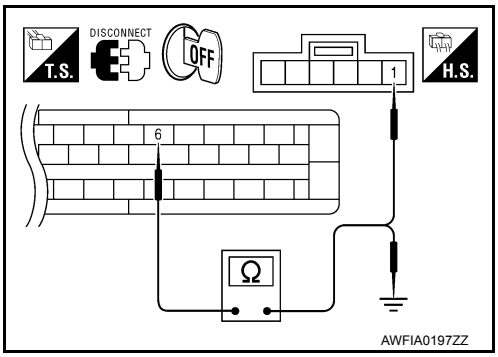
Perform the VDC OFF switch component inspection. Refer to BRC-201, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 2
NO >> Replace VDC OFF switch.

2.CHECK VDC OFF SWITCH HARNESS

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and VDC OFF switch connector M154 (B) terminal 1.



ABS actuator and electric unit (control unit)		VDC OFF switch		Continuity
Connector	Terminal	Connector	Terminal	
E127 (A)	6	M154 (B)	1	Yes

3. Check continuity between ABS actuator and electric unit (control unit) connector E127 (A) terminal 6 and ground.

ABS actuator and electric unit (control unit)		—	Continuity
Connector	Terminal		
E127 (A)	6	Ground	No

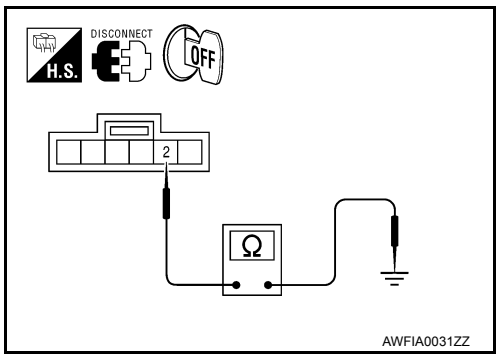
Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace harness.

3.CHECK VDC OFF SWITCH GROUND

Check continuity between VDC OFF switch connector M154 terminal 2 and ground.

VDC OFF switch		—	Continuity
Connector	Terminal		
M154	2	Ground	Yes



Is the inspection result normal?

YES >> GO TO 4
NO >> Repair or replace harness.

4. CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

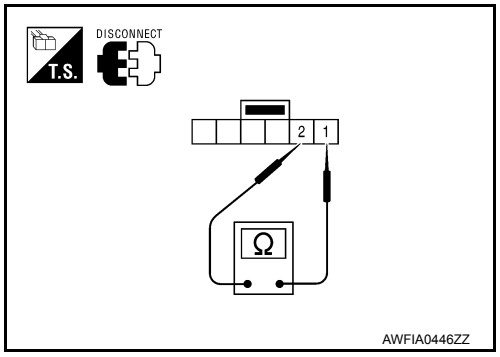
Component Inspection

INFOID:0000000007327956

1. CHECK VDC OFF SWITCH

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

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



Is the inspection result normal?

YES >> Inspection End
NO >> Replace VDC OFF switch.

Special Repair Requirement

INFOID:0000000007817717

1. ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2. CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

ABS WARNING LAMP

Description

INFOID:0000000007327958

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327959

1.CHECK ABS WARNING LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-202, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327960

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817718

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

BRAKE WARNING LAMP

Description

INFOID:0000000007327962

×: ON –: OFF

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

NOTE:

- 1: Brake warning lamp will turn on in case of parking brake 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:0000000007327963

1.BRAKE WARNING LAMP OPERATION CHECK

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-203, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327964

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. refer to BRC-148, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817719

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

HILL DESCENT CONTROL INDICATOR LAMP

Description

INFOID:0000000007327966

×: ON –: OFF

Condition	Hill descent control indicator lamp
Ignition switch OFF	–
For 2 seconds after turning ON ignition switch	×
2 seconds later after turning ON ignition switch	–
Hill descent control function is malfunctioning.	–

Component Function Check

INFOID:0000000007327967

1.CHECK HILL DESCENT CONTROL INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-204, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327968

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817720

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

VDC OFF INDICATOR LAMP

Description

INFOID:0000000007327970

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327971

1.VDC OFF INDICATOR LAMP OPERATION CHECK 1

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Go to diagnosis procedure. Refer to BRC-205, "Diagnosis Procedure".

2.VDC OFF INDICATOR LAMP OPERATION CHECK 2

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

Is the inspection result normal?

YES >> Inspection End
NO >> Check VDC OFF switch. Refer to BRC-200, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327972

1.CHECK VDC OFF SWITCH

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check VDC OFF switch. Refer to BRC-200, "Diagnosis Procedure".

2.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 3
NO >> Check items displayed by self-diagnosis.

3.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817721

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

SLIP INDICATOR LAMP

Description

INFOID:0000000007327974

×: ON –: OFF

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

Component Function Check

INFOID:0000000007327975

1.CHECK SLIP INDICATOR LAMP OPERATION

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

Is the inspection result normal?

YES >> Inspection End
NO >> Go to diagnosis procedure. Refer to BRC-207, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007327976

1.CHECK SELF-DIAGNOSIS

Perform ABS actuator and electric unit (control unit) self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

Is the inspection result normal?

YES >> GO TO 2
NO >> Check items displayed by self-diagnosis.

2.CHECK COMBINATION METER

Check if the indication and operation of combination meter are normal. Refer to MWI-24, "Diagnosis Description".

Is the inspection result normal?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".
NO >> Replace combination meter. Refer to MWI-89, "Removal and Installation".

Special Repair Requirement

INFOID:0000000007817722

1.ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION

Always perform neutral position adjustment for the steering angle sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".

>> GO TO 2

2.CALIBRATION OF DECEL G SENSOR (4WD MODELS)

Always perform calibration of decel G sensor when replacing the ABS actuator and electric unit (control unit). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

>> END

ECU DIAGNOSIS INFORMATION

APPLICATION NOTICE

Application Notice

INFOID:0000000007815423

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

ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

Reference Value

INFOID:0000000007327979

VALUES ON THE DIAGNOSIS TOOL

CAUTION:

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

CONSULT MONITOR ITEM

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

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
RR RH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR RH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH IN SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
RR LH OUT SOL	Operation status of each solenoid valve	Actuator (solenoid valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (in fail-safe mode)	On
		When the actuator (solenoid valve) is not active and actuator relay is active (ignition switch ON)	Off
EBD WARN LAMP	EBD warning lamp	When EBD warning lamp is ON	On
		When EBD warning lamp is OFF	Off
STOP LAMP SW	Stop lamp switch signal status	When brake pedal is depressed	On
		When brake pedal is released	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	Actuator relay operation	When the actuator relay is operating	On
		When the actuator relay is not operating	Off
ABS WARN LAMP	ABS warning lamp (Note 2)	When ABS warning lamp is ON	On
		When ABS warning lamp is OFF	Off
OFF LAMP	VDC OFF indicator lamp (Note 2)	When VDC OFF indicator lamp is ON	On
		When VDC OFF indicator lamp is OFF	Off
OFF SW	VDC OFF switch ON/OFF	VDC OFF switch ON (When VDC OFF indicator lamp is ON)	On
		VDC OFF switch OFF (When VDC OFF indicator lamp is OFF)	Off
SLIP LAMP	SLIP indicator lamp (Note 2)	When SLIP indicator lamp is ON	On
		When SLIP indicator lamp is OFF	Off
BATTERY VOLT	Battery voltage supplied to the ABS actuator and electric unit (control unit)	Ignition switch ON	10 – 16 V
GEAR	Gear position determined by TCM	1st gear 2nd gear 3rd gear 4th gear 5th gear	1 2 3 4 5

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
SLCT LVR POSI	A/T selector lever position	P position R position N position D position	P R N D
ENGINE SPEED	With engine running	With engine stopped	0 rpm
		Engine running	Almost in accordance with tachometer display
YAW RATE SEN	Yaw rate detected by yaw rate/side/decel G sensor	When vehicle is stopped	Approx. 0 d/s
		When vehicle turning	−75 to 75 d/s
R POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = R position	On
		A/T shift position = other than R position	Off
N POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = N position	On
		A/T shift position = other than N position	Off
P POSI SIG	PNP switch signal ON/OFF condition	A/T shift position = P position	On
		A/T shift position = other than P position	Off
CV1	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
CV2	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
SV1	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
SV2	VDC switch-over valve	When actuator (switch-over valve) is active (“ACTIVE TEST” with CONSULT) or actuator relay is inactive (when in fail-safe mode)	On
		When actuator (switch-over valve) is not active and actuator relay is active (ignition switch ON)	Off
2WD/4WD	Drive axle	2WD model	2WD
		4WD model	4WD
ACCEL POS SIG	Throttle actuator opening/closing is displayed (linked with accelerator pedal)	Accelerator pedal not depressed (ignition switch is ON)	0 %
		Accelerator pedal depressed (ignition switch is ON)	0 - 100 %

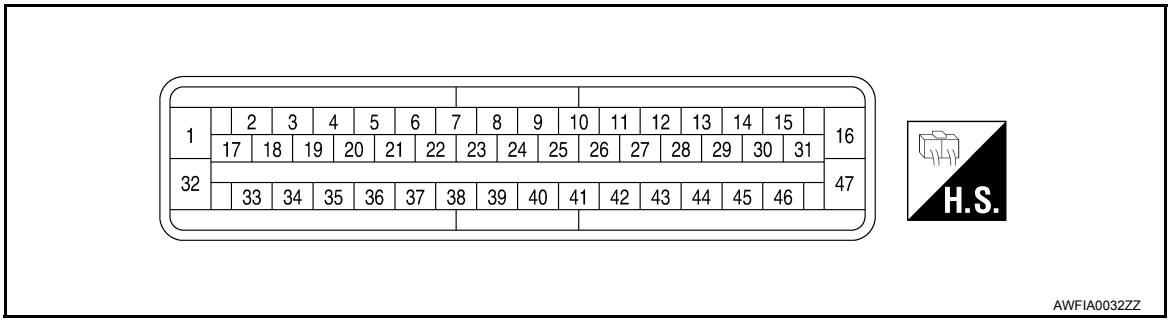
Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
SIDE G-SENSOR	Transverse G detected by side G sensor	Vehicle stopped	Approx. 0 m/s^2
		Vehicle turning right	Negative value (m/s^2)
		Vehicle turning left	Positive value (m/s^2)
STR ANGLE SIG	Steering angle detected by steering angle sensor	Straight-ahead	Approx. 0±2.5°
		Steering wheel turned	–720 to 720°
PRESS SENSOR	Brake fluid pressure detected by front pressure sensor	With ignition switch turned ON and brake pedal released	Approx. 0 bar
		With ignition switch turned ON and brake pedal depressed	–40 to 300 bar
EBD SIGNAL	EBD operation	EBD is active	On
		EBD is inactive	Off
ABS SIGNAL	ABS operation	ABS is active	On
		ABS is inactive	Off
TCS SIGNAL	TCS operation	TCS is active	On
		TCS is inactive	Off
VDC SIGNAL	VDC operation	VDC is active	On
		VDC is inactive	Off
EBD FAIL SIG	EBD fail-safe signal	In EBD fail-safe	On
		EBD is normal	Off
ABS FAIL SIG	ABS fail-safe signal	In ABS fail-safe	On
		ABS is normal	Off
TCS FAIL SIG	TCS fail-safe signal	In TCS fail-safe	On
		TCS is normal	Off
VDC FAIL SIG	VDC fail-safe signal	In VDC fail-safe	On
		VDC is normal	Off
CRANKING SIG	Crank operation	Crank is active	On
		Crank is inactive	Off
FLUID LEV SW	Brake fluid level switch signal status	When brake fluid level switch ON	On
		When brake fluid level switch OFF	Off
DLOCK SW	Differential lock switch ON/OFF	Differential lock switch ON	On
		Differential lock switch OFF	Off
DLOCK CHG SW	Differential lock mode switch signal status	When differential lock mode switch is engaged	On
		When differential lock mode switch is disengaged	Off
STP ON RLY	Stop lamp on relay status	When hill descent control is operating	On
		When hill descent control is not operating	Off
DDS SW (Note 3)	Hill descent control switch ON/OFF	Hill descent control switch ON	On
		Hill descent control switch OFF	Off
DDS SIG (Note 3)	Hill descent control operation	Hill descent control is active	On
		Hill descent control is inactive	Off

Monitor item	Display content	Data monitor	
		Condition	Reference value in normal operation
USS SIG (Note 4)	Hill start assist operation	Hill start assist is active	On
		Hill start assist is inactive	Off

NOTE:

- 1: Confirm tire pressure is normal.
- 2: On and off timing for warning lamp and indicator lamp.
- ABS warning lamp: Refer to BRC-81, "Description".
- Brake warning lamp: Refer to BRC-82, "Description".
- VDC OFF indicator lamp: Refer to BRC-83, "Description".
- SLIP indicator lamp: Refer to BRC-85, "Description".
- 3: The CONSULT will display DDS (Downhill Drive Support) when referring to the Hill Descent Control system.
- 4: The CONSULT will display USS (Uphill Start Support) when referring to the Hill Start Assist system.

TERMINAL LAYOUT



Fail-Safe

INFOID:0000000007327980

CAUTION:

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

ABS/EBD SYSTEM

In case of an electrical malfunction with the ABS, the ABS warning lamp and SLIP indicator lamp will turn on.
In case of an electrical malfunction with the EBD system, the BRAKE warning lamp, ABS warning lamp and SLIP indicator lamp will turn on.
The system will revert to one of the following conditions of the Fail-Safe function.

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

HILL DESCENT CONTROL/HILL START ASSIST SYSTEM

In case of hill descent control system malfunction, the hill descent control indicator lamp will remain off even though the hill descent control switch is operated and the condition of the vehicle is the same as the condition of vehicles without hill descent control system.
In case of hill start assist system malfunction, the SLIP indicator lamp is turned on and the condition of the vehicle is the same as the condition of vehicles without hill start assist system.

VDC/TCS SYSTEM

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

DTC No. Index

INFOID:0000000007327981

DTC	Items (CONSULT screen terms)	Reference
C1101	RR RH SENSOR-1	BRC-154, "Description"
C1102	RR LH SENSOR-1	
C1103	FR RH SENSOR-1	
C1104	FR LH SENSOR-1	
C1105	RR RH SENSOR-2	BRC-157, "Description"
C1106	RR LH SENSOR-2	
C1107	FR RH SENSOR-2	
C1108	FR LH SENSOR-2	
C1109	BATTERY VOLTAGE [ABNORMAL]	BRC-160, "Description"
C1110	CONTROLLER FAILURE	BRC-162, "DTC Logic"
C1111	PUMP MOTOR	BRC-163, "Description"
C1113	G-SENSOR	BRC-165, "Description"
C1115	ABS SENSOR [ABNORMAL SIGNAL]	BRC-167, "Description"
C1116	STOP LAMP SW	BRC-170, "Description"
C1120	FR LH IN ABS SOL	BRC-172, "Description"
C1121	FR LH OUT ABS SOL	BRC-175, "Description"
C1122	FR RH IN ABS SOL	BRC-172, "Description"
C1123	FR RH OUT ABS SOL	BRC-175, "Description"
C1124	RR LH IN ABS SOL	BRC-172, "Description"
C1125	RR LH OUT ABS SOL	BRC-175, "Description"
C1126	RR RH IN ABS SOL	BRC-172, "Description"
C1127	RR RH OUT ABS SOL	BRC-175, "Description"
C1130	ENGINE SIGNAL 1	BRC-178, "Description"
C1131	ENGINE SIGNAL 2	
C1132	ENGINE SIGNAL 3	
C1133	ENGINE SIGNAL 4	
C1136	ENGINE SIGNAL 6	
C1140	ACTUATOR RLY	BRC-179, "Description"
C1142	PRESS SEN CIRCUIT	BRC-181, "DTC Description"
C1143	ST ANG SEN CIRCUIT	BRC-184, "Description"
C1144	ST ANG SEN SIGNAL	
C1145	YAW RATE SENSOR	BRC-165, "Description"
C1146	SIDE G-SEN CIRCUIT	
C1155	BR FLUID LEVEL LOW	BRC-187, "Description"
C1156	ST ANG SEN COM CIR	BRC-190, "Description"
C1160	DECEL G SEN SET	BRC-191, "Description"
C1163	ST ANGL SEN SAFE	BRC-192, "Description"
C1164	CV1	BRC-193, "Description"
C1165	CV2	
C1166	SV1	
C1167	SV2	
C1170	VARIANT CODING	BRC-162, "DTC Logic"

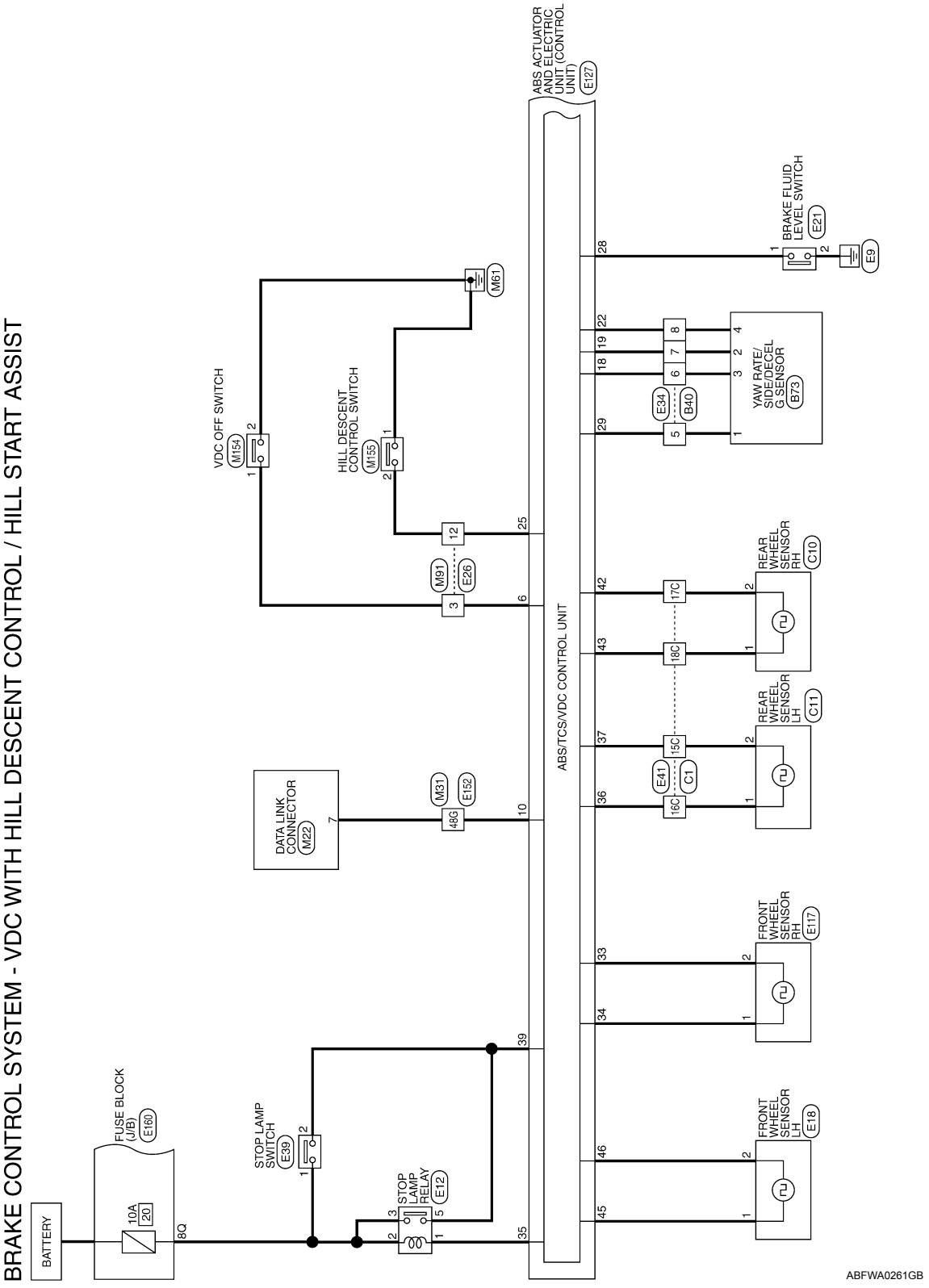
DTC	Items (CONSULT screen terms)	Reference
C1187	ABS DIFLOCK CONTROLLER NG	BRC-196, "Description"
U1000	CAN COMM CIRCUIT	BRC-197, "Description"

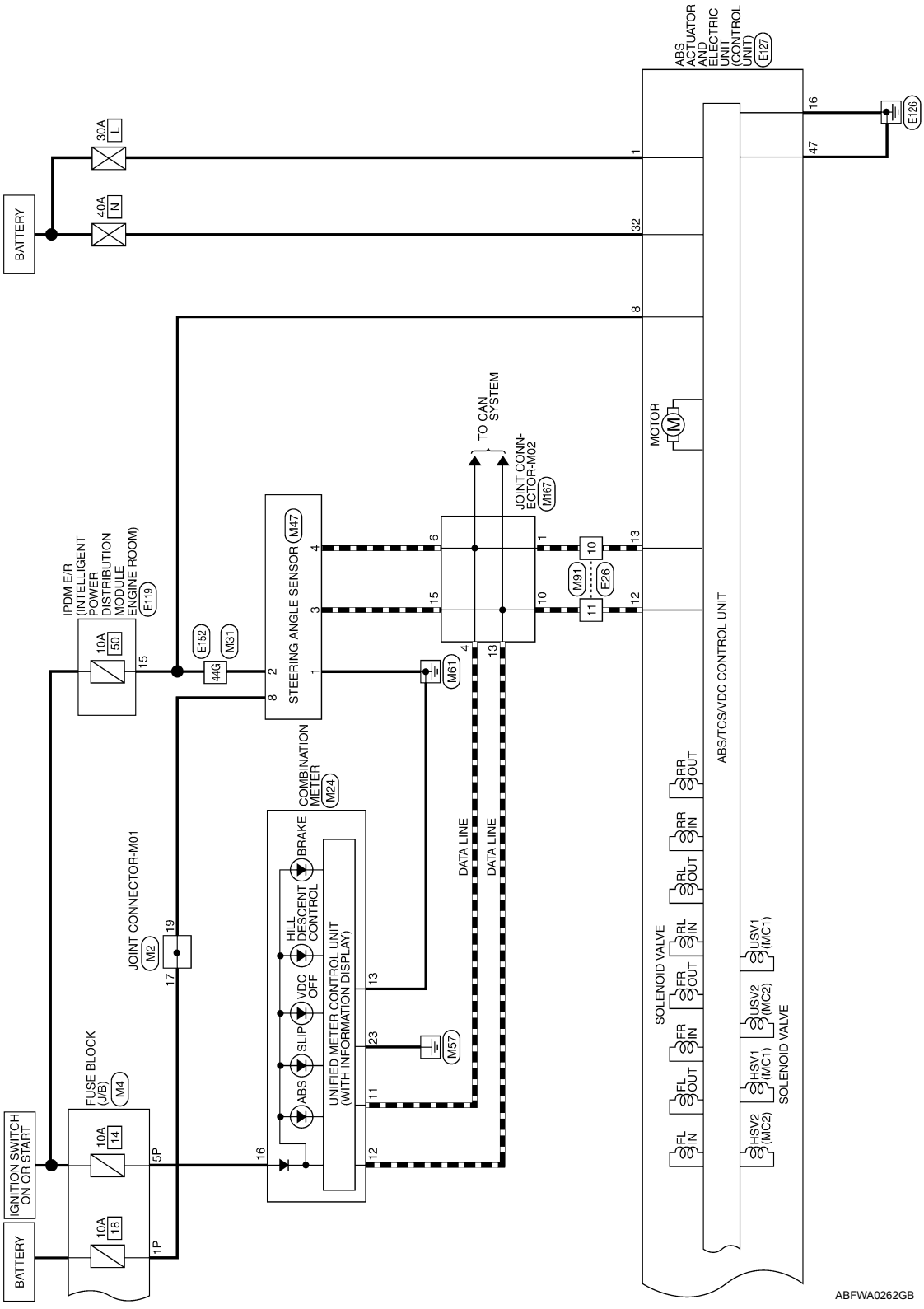
WIRING DIAGRAM

BRAKE CONTROL SYSTEM - VDC

Wiring Diagram - VDC WITH HILL DESCENT CONTROL/HILL START ASSIST

INFOID:0000000007327982

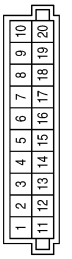



ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) E127
E126
16
47
1
32
8
30A L
40A N
BATTERY
MOTOR
TO CAN SYSTEM
JOINT CONN-ECTOR-M02 M167
M91
E26
10
11
13
12
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM) E19
10A 50
15
E152
44G
M31
STEERING ANGLE SENSOR M47
4
3
2
1
8
6
15
4
13
M61
COMBINATION METER M24
BRAKE
HILL DESCENT CONTROL
VDC OFF
SLIP
ABS
UNIFIED METER CONTROL UNIT (WITH INFORMATION DISPLAY)
DATA LINE
DATA LINE
JOINT CONNECTOR-M01 M2
19
17
13
23
11
12
M57
16
FUSE BLOCK (J/B) M4
10A 14
10A 18
5P
1P
IGNITION SWITCH ON OR START
BATTERY
ABS/TCS/VDC CONTROL UNIT
SOLENOID VALVE
RR OUT
RR IN
RL OUT
RL IN
FR OUT
FR IN
FL OUT
FL IN
USV1 (MC1)
USV2 (MC2)
HSV1 (MC1)
HSV2 (MC2)
SOLENOID VALVE
ABFWA0262GB

BRAKE CONTROL SYSTEM CONNECTORS - VDC WITH HILL DESCENT CONTROL / HILL START ASSIST

Connector No.	M2
Connector Name	JOINT CONNECTOR-M01
Connector Color	BLUE

H.S.



Terminal No.	Color of Wire	Signal Name
17	R/B	–
19	R	–

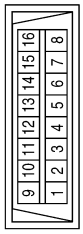
Connector No.	M4
Connector Name	FUSE BLOCK (J/B)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1P	R/B	–
5P	W/G	–

Connector No.	M22
Connector Name	DATA LINK CONNECTOR
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
7	W	–

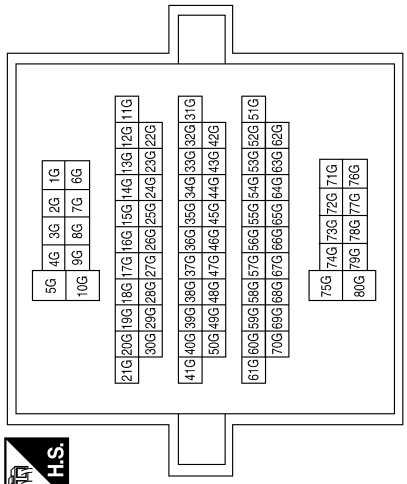
Connector No.	M24
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
11	P	CAN-L
12	L	CAN-H
13	GR	GROUND
16	W/G	RUN START
23	B	POWER GND

Connector No.	M31
Connector Name	WIRE TO WIRE
Connector Color	WHITE

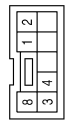
H.S.



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

Connector No.	M47
Connector Name	STEERING ANGLE SENSOR
Connector Color	WHITE

H.S.

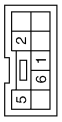


Terminal No.	Color of Wire	Signal Name
1	B	GND
2	W/R	POWER
3	L	CAN-H
4	P	CAN-L
8	R	BATT

ABFIA0516GB

Connector No.	M155
Connector Name	HILL DESECNT CONTROL SWITCH
Connector Color	WHITE

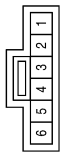
H.S.



Terminal No.	Color of Wire	Signal Name
1	B	–
2	Y	–

Connector No.	M154
Connector Name	VDC OFF SWITCH
Connector Color	GRAY

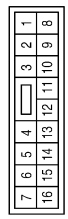
H.S.



Terminal No.	Color of Wire	Signal Name
1	GR	–
2	B	–

Connector No.	M91
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
3	GR	–
10	P	–
11	L	–
12	Y	–

Connector No.	E18
Connector Name	FRONT WHEEL SENSOR LH
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	G	–
2	R	–

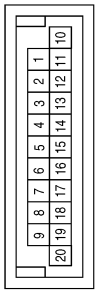
Connector No.	E12
Connector Name	STOP LAMP RELAY
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	V	–
2	R/B	–
3	R/B	–
5	G	–

Connector No.	M167
Connector Name	JOINT CONNECTOR-M02
Connector Color	BLUE

H.S.

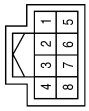


Terminal No.	Color of Wire	Signal Name
1	P	–
4	P	–
6	P	–
10	L	–
13	L	–
15	L	–

ABFIA0517GB

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

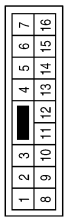
H.S.



Terminal No.	Color of Wire	Signal Name
5	BR	–
6	O	–
7	W	–
8	Y	–

Connector No.	E26
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
3	GR	–
10	P	–
11	L	–
12	Y	–

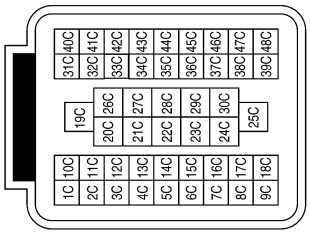
Connector No.	E117
Connector Name	FRONT WHEEL SENSOR RH
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	–
2	W	–

Connector No.	E41
Connector Name	WIRE TO WIRE
Connector Color	BLACK

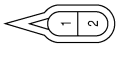
H.S.



Terminal No.	Color of Wire	Signal Name
15C	P	–
16C	L	–
17C	V	–
18C	LG	–

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

H.S.



Terminal No.	Color of Wire	Signal Name
1	SB	–
2	B	–

Connector No.	E39
Connector Name	STOP LAMP SWITCH (WITH A/T)
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R/B	–
2	Y	–

ABFIA0518GB

Connector No.	E119
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

9	8	7	6		5	4	3
18	17	16	15	14	13	12	11	10

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

Connector No.	E127
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Color	BLACK

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47

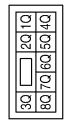
Terminal No.	Color of Wire	Signal Name
1	R	MOTOR SUPPLY
2	–	–
3	–	–
4	–	–
5	–	–
6	GR	VDC OFF SW
7	–	–
8	W/R	IGN
9	–	–
10	SB	DIAG_K
11	–	–
12	L	CAN-H
13	P	CAN-L
14	–	–
15	–	–
16	B	VALVE ECU GND
17	–	–
18	O	CAN2-H
19	W	CAN2-L
20	–	–
21	–	–
22	Y	CLUS_SUP

Terminal No.	Color of Wire	Signal Name
23	–	–
24	–	–
25	Y	HDC_SW
26	–	–
27	–	–
28	GR	FLUID_LEVEL_SW
29	BR	CLUS_GND
30	–	–
31	–	–
32	Y	VALVE ECU SUPPLY
33	W	FR_RH_SIG
34	B	FR_RH_PWR
35	V	STOP_LAMP_SW_ON
36	L	RR_LH_PWR
37	P	RR_LH_SIG
38	–	–
39	SB	STOP_LAMP_SW
40	–	–
41	–	–
42	V	RR_RH_SIG
43	LG	RR_RH_PWR
44	–	–
45	G	FR_LH_PWR
46	R	FR_LH_SIG
47	B	MOTOR GND

ABFIA0519GB

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

H.S.



Terminal No.	Color of Wire	Signal Name
8Q	R/B	–

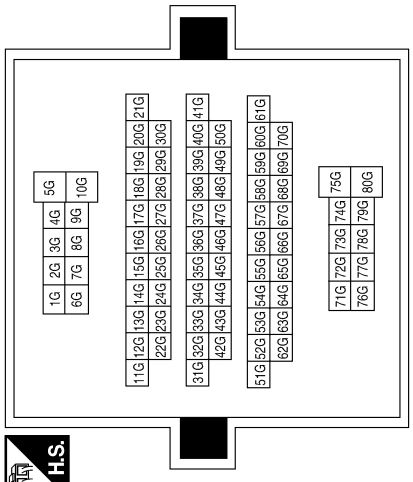
Connector No.	C10
Connector Name	REAR WHEEL SENSOR RH
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	V	–

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

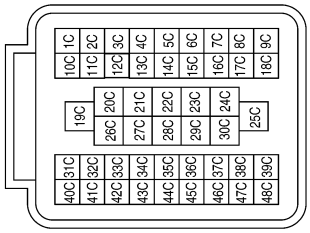
H.S.



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

Connector No.	C1
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.

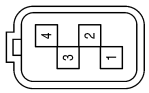


Terminal No.	Color of Wire	Signal Name
15C	P	–
16C	L	–
17C	V	–
18C	LG	–

ABFIA0520GB

Connector No.	B73
Connector Name	YAW RATE/SIDE/DECEL G SENSOR
Connector Color	BLACK

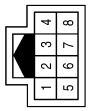
H.S.



Terminal No.	Color of Wire	Signal Name
1	BR	CLU GND
2	W	CAN-H
3	O	CAN-L
4	Y	CLU P

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

H.S.



Terminal No.	Color of Wire	Signal Name
5	BR	–
6	O	–
7	W	–
8	Y	–

Connector No.	C11
Connector Name	REAR WHEEL SENSOR LH
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–

ABFIA0521GB

SYMPTOM DIAGNOSIS

APPLICATION NOTICE

Application Notice

INFOID:0000000007815424

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

VDC/TCS/ABS

Symptom Table

INFOID:0000000007327984

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

Symptom	Check item	Reference
Excessive ABS function operation frequency	Brake force distribution	BRC-226, "Diagnosis Procedure"
	Looseness of front and rear axle	
	Wheel sensor and rotor system	
Unexpected pedal reaction	Brake pedal stroke	BRC-227, "Diagnosis Procedure"
	Make sure the braking force is sufficient when the ABS is not operating.	
The braking distance is long	Check stopping distance when the ABS is not operating.	BRC-228, "Diagnosis Procedure"
ABS function does not operate (Note 1)	ABS actuator and electric unit (control unit)	BRC-229, "Diagnosis Procedure"
Pedal vibration or ABS operation sound occurs (Note 2)	Brake pedal	BRC-230, "Diagnosis Procedure"
	ABS actuator and electric unit (control unit)	
Vehicle jerks during VDC/TCS/ABS control	ABS actuator and electric unit (control unit)	BRC-231, "Diagnosis Procedure"
	TCM	
	ECM	

NOTE:

- 1: The ABS does not operate when the speed is 10 km/h (6 MPH) or less.
- 2: Under the following conditions, ABS is activated and vibration is felt when brake pedal is lightly depressed. However, this is normal.

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

EXCESSIVE ABS FUNCTION OPERATION FREQUENCY

Diagnosis Procedure

INFOID:0000000007327985

1.CHECK START

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

Is the inspection result normal?

YES >> GO TO 2
NO >> Check brake system.

2.CHECK FRONT AND REAR AXLE

Make sure that there is no excessive play in the front and rear axles. Refer to front: FAX-5, "On-Vehicle Inspection and Service", Rear: RAX-6, "Rear Axle Bearing" (C200) or RAX-18, "Rear Axle Bearing" (M226).

Is the inspection result normal?

YES >> GO TO 3
NO >> Repair or replace malfunctioning components.

3.CHECK WHEEL SENSOR AND SENSOR ROTOR

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

Is the inspection result normal?

YES >> GO TO 4
NO >>
- Replace wheel sensor or sensor rotor. Refer to BRC-237, "Removal and Installation" or BRC-238, "Removal and Installation".
- Repair harness.

4.CHECK ABS WARNING LAMP DISPLAY

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

Is the ABS warning lamp illuminated?

YES >> Perform self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".
NO >> Inspection End.

UNEXPECTED PEDAL REACTION

Diagnosis Procedure

INFOID:0000000007327986

1.CHECK BRAKE PEDAL STROKE

Check brake pedal stroke. Refer to BR-16, "Inspection and Adjustment".

Is the stroke too large?

YES >> • Bleed air from brake tube and hose. Refer to BR-18, "Bleeding Brake System".
• Check brake pedal, brake booster, and master cylinder for mount play, looseness, brake system fluid leakage, etc. Refer to BR-16, "Inspection and Adjustment" (brake pedal), BR-11, "On Board Inspection" (master cylinder), BR-9, "Inspection" (brake booster).

NO >> GO TO 2

2.CHECK FUNCTION

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

Is the inspection result normal?

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

THE BRAKING DISTANCE IS LONG

Diagnosis Procedure

INFOID:0000000007327987

CAUTION:

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

1.CHECK FUNCTION

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

Is the inspection result normal?

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

ABS FUNCTION DOES NOT OPERATE

Diagnosis Procedure

INFOID:0000000007327988

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

1. CHECK ABS WARNING LAMP DISPLAY

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

Is the inspection result normal?

YES >> Inspection End.
NO >> Perform self-diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

PEDAL VIBRATION OR ABS OPERATION SOUND OCCURS

Diagnosis Procedure

INFOID:0000000007327989

CAUTION:

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

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

1.SYMPTOM CHECK 1

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

Do vibrations occur?

YES >> GO TO 2
NO >> Inspect the brake pedal.

2.SYMPTOM CHECK 2

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

Do the operation noises occur?

YES >> GO TO 3
NO >> Perform self -diagnosis. Refer to BRC-148, "CONSULT Function (ABS)".

3.SYMPTOM CHECK 3

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

Do symptoms occur?

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

VEHICLE JERKS DURING VDC/TCS/ABS CONTROL

Diagnosis Procedure

INFOID:0000000007327990

1.SYMPTOM CHECK

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

Is the inspection result normal?

YES >> Inspection End.
NO >> GO TO 2

2.CHECK SELF-DIAGNOSIS RESULTS

Perform self-diagnosis of ABS actuator and electric unit (control unit). Refer to BRC-148, "CONSULT Function (ABS)".

Are self-diagnosis results indicated?

YES >> Check corresponding items, make repairs, and perform ABS actuator and electric unit (control unit) self-diagnosis.
NO >> GO TO 3

3.CHECK CONNECTOR

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

Are self-diagnosis results indicated?

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

4.CHECK ECM AND TCM SELF-DIAGNOSIS RESULTS

Perform ECM and TCM self-diagnosis.

Are self-diagnosis results indicated?

YES >> Check the corresponding items.
- ECM: Refer to EC-499, "CONSULT Function".
- TCM: Refer to TM-156, "CONSULT Function (TRANSMISSION)".

NO >> Replace ABS actuator and electric unit (control unit). Refer to BRC-239, "Removal and Installation".

NORMAL OPERATING CONDITION

Description

INFOID:0000000007327991

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

PRECAUTION

PRECAUTIONS

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

INFOID:0000000007327992

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

WARNING:

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

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

WARNING:

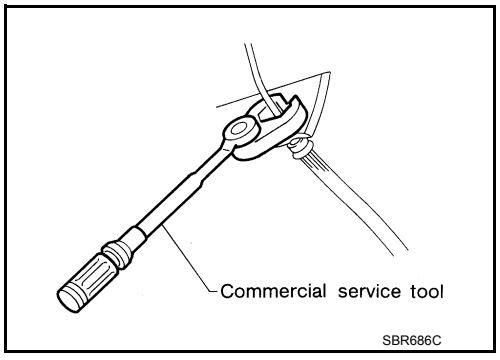
- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious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

Precaution for Brake System

INFOID:0000000007327993

CAUTION:

- **Refer to MA-18, "FOR USA AND CANADA : Fluids and Lubricants" (United States and Canada) and MA-20, "FOR MEXICO : Fluids and Lubricants" (Mexico). For recommended brake fluid.**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **To clean or wash all parts of master cylinder and disc brake caliper, use clean brake fluid.**
- **Never use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.**
- **Use flare nut wrench when removing and installing brake tube.**
- **If a brake fluid leak is found, the part must be disassembled without fail. Then it has to be replaced with a new one if a defect exists.**
- **Turn the ignition switch OFF and remove the connector of the ABS actuator and electric unit (control unit) or the battery terminal before performing the work.**
- **Always torque brake lines when installing.**
- **Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.**
  Refer to BR-34, "Brake Burnishing" (front disc brake) or BR-39, "Brake Burnishing" (rear disc brake).



WARNING:

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

Precaution for Brake Control

INFOID:0000000007327994

- During ABS operation, the brake pedal may vibrate lightly and a mechanical noise may be heard. This is normal.
- Just after starting vehicle, the brake pedal may vibrate or a motor operating noise may be heard from engine compartment. This is a normal status of operation check.
- Stopping distance may be longer than that of vehicles without ABS when vehicle drives on rough, gravel, or snow-covered (fresh, deep snow) roads.
- When an error is indicated by ABS or another warning lamp, collect all necessary information from customer (what symptoms are present under what conditions) and check for simple causes before starting diagnosis. Besides electrical system inspection, check brake booster operation, brake fluid level, and fluid leaks.
- If incorrect tire sizes or types are installed on the vehicle or brake pads are not Genuine NISSAN parts, stopping distance or steering stability may deteriorate.
- If there is a radio, antenna or related wiring near control module, ABS function may have a malfunction or error.
- If aftermarket parts (car stereo, CD player, etc.) have been installed, check for incidents such as harness pinches, open circuits or improper wiring.
- If the following components are replaced with non-genuine components or modified, the VDC OFF indicator lamp and SLIP indicator lamp may turn on or the VDC system may not operate properly. Components related to suspension (shock absorbers, struts, springs, bushings, etc.), tires, wheels (exclude specified size), components related to brake system (pads, rotors, calipers, etc.), components related to engine (muffler, ECM, etc.), components related to body reinforcement (roll bar, tower bar, etc.).
- Driving with broken or excessively worn suspension components, tires or brake system components may cause the VDC OFF indicator lamp and the SLIP indicator lamp to turn on, and the VDC system may not operate properly.
- When the TCS or VDC is activated by sudden acceleration or sudden turn, some noise may occur. The noise is a result of the normal operation of the TCS and VDC.
- When driving on roads which have extreme slopes (such as mountainous roads) or high banks (such as sharp curves on a freeway), the VDC may not operate normally, or the VDC warning lamp and the SLIP indicator lamp may turn on. This is not a problem if normal operation can be resumed after restarting the engine.
- Sudden turns (such as spin turns, acceleration turns), drifting, etc. with VDC turned off may cause the yaw rate/side/decel G sensor to indicate a problem. This is not a problem if normal operation can be resumed after restarting the engine.
- If battery is removed or steering angle sensor is disconnected, power to steering angle sensor is lost and the screen goes into steering angle sensor safe mode.
- When screen goes into steering angle sensor safe mode, perform "Adjustment of Steering Angle Sensor Neutral Position" with CONSULT and check that VDC OFF indicator turns off. Additionally, perform self-diagnosis, check that only "Steering Angle Sensor Safe Mode" is shown for self-diagnostic result, and then delete the memory. (If the self-diagnostic result shows an indication other than "Steering Angle Sensor Safe Mode", repair the relevant part and restart self-diagnosis.) The steering angle sensor is released and returns to normal condition by performing the above operation.
- When checking, if only "Steering Angle Sensor Safe Mode" is shown in the self-diagnostic result and VDC OFF indicator is off, delete history of malfunction. This happens when battery power supply is lost and the screen goes into Steering Angle Sensor Safe Mode, and then screen returns to normal mode automatically by driving the vehicle in a straight forward direction [for approximately 30 seconds at 20 km/h (12 MPH) or more] after power is supplied again.

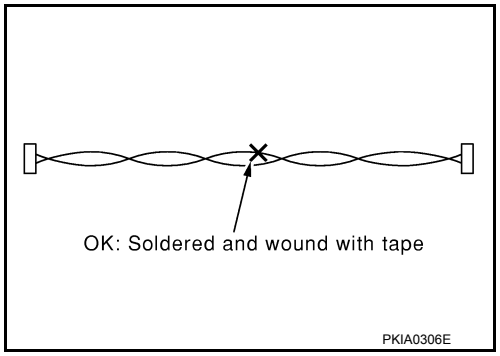
NOTE:
VDC OFF indicator lamp is on when VDC OFF switch is on.

Precaution for CAN System

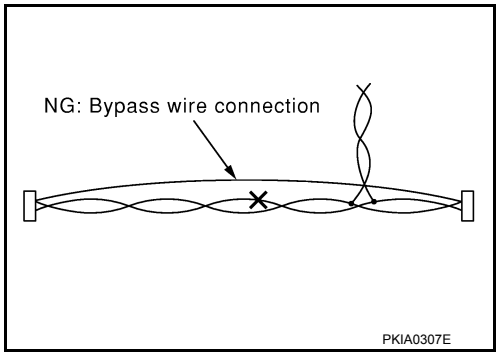
INFOID:0000000007327995

- Do not apply voltage of 7.0V or higher to terminal to be measured.
- Maximum open terminal voltage of tester in use must be less than 7.0V.
- Before checking harnesses, turn ignition switch OFF and disconnect battery negative cable.

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



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



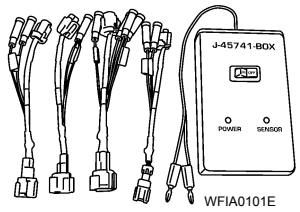
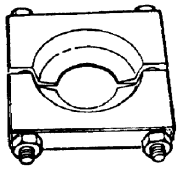
PREPARATION

PREPARATION

Special Service Tool

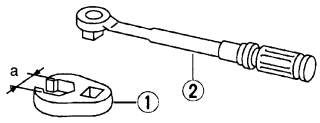
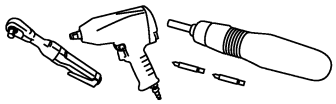
INFOID:0000000007327996

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

Tool number (Kent-Moore No.) Tool name	Description
KV991J0080 (J-45741) ABS active wheel sensor tester  WFIA0101E	Checking operation of ABS active wheel sensors
ST30031000 (—) Bearing puller  ZZA0700D	Removing sensor rotor

Commercial Service Tool

INFOID:0000000007327997

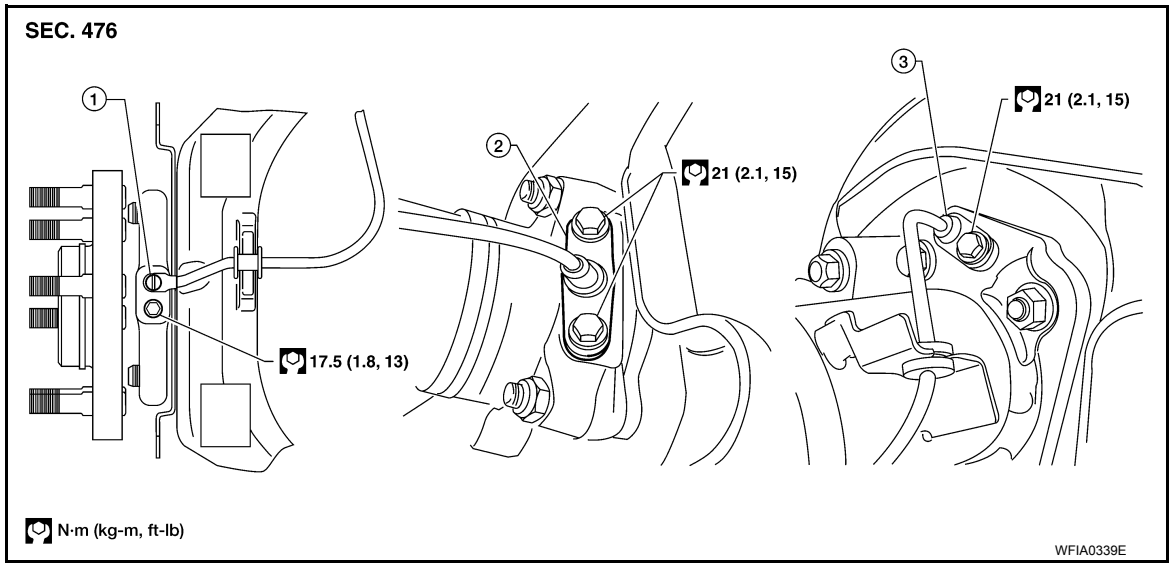
Tool name	Description
1. Flare nut crowfoot 2. Torque wrench  S-NT360	Removing and installing brake piping **a: 10 mm (0.39 in)/12 mm (0.47 in)**
Power tool  PIIB1407E	Loosening nuts, screws and bolts

UNIT REMOVAL AND INSTALLATION

WHEEL SENSOR

Removal and Installation

INFOID:0000000007327998



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

REMOVAL

1. Remove wheel sensor bolt.
   - When removing the front wheel sensor, first remove the disc rotor to gain access to the front wheel sensor. Refer to BR-35, "Removal and Installation of Brake Caliper and Disc Rotor".
2. Pull the wheel sensor straight out, being careful to turn it as little as possible.
   CAUTION:
   - **Be careful not to damage the wheel sensor edge and sensor rotor teeth.**
   - **Do not pull on the wheel sensor harness.**
3. Disconnect wheel sensor harness connector, then remove the wheel sensor harness from the mounts to remove the wheel sensor.

INSTALLATION

Installation is in the reverse order of removal.

- Before installing wheel sensors do the following:
- Inspect and replace the wheel sensor if damaged.
- Clean the wheel sensor hole and mating surface with brake cleaner and a lint-free cloth. Be careful that dirt and debris do not enter the hub and bearing assembly or the rear axle.

SENSOR ROTOR

Removal and Installation

INFOID:0000000007327999

FRONT

Removal and Installation

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

REAR (C200)

Removal and Installation

It is necessary to disassemble the rear axle to replace the sensor rotor. Perform the axle shaft assembly removal procedure to replace sensor rotor. Refer to RAX-7, "Removal and Installation".

REAR (M226)

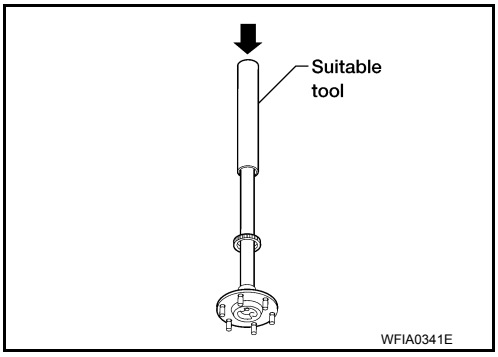
Removal

1. Remove the axle shaft assembly. Refer to RAX-19, "Removal and Installation".
2. Pull the sensor rotor off of the axle shaft using Tool and a suitable press.

Tool number : ST30031000 (—)

Installation

1. Install the new sensor rotor on the axle shaft using a suitable length steel tube and a press. Make sure the sensor rotor is fully seated.
   CAUTION:
   Do not reuse the old sensor rotor.
2. Install the axle shaft assembly. Refer to RAX-19, "Removal and Installation".
   CAUTION:
   Do not reuse the axle oil seal. The axle oil seal must be replaced every time the axle shaft assembly is removed from the axle shaft housing.

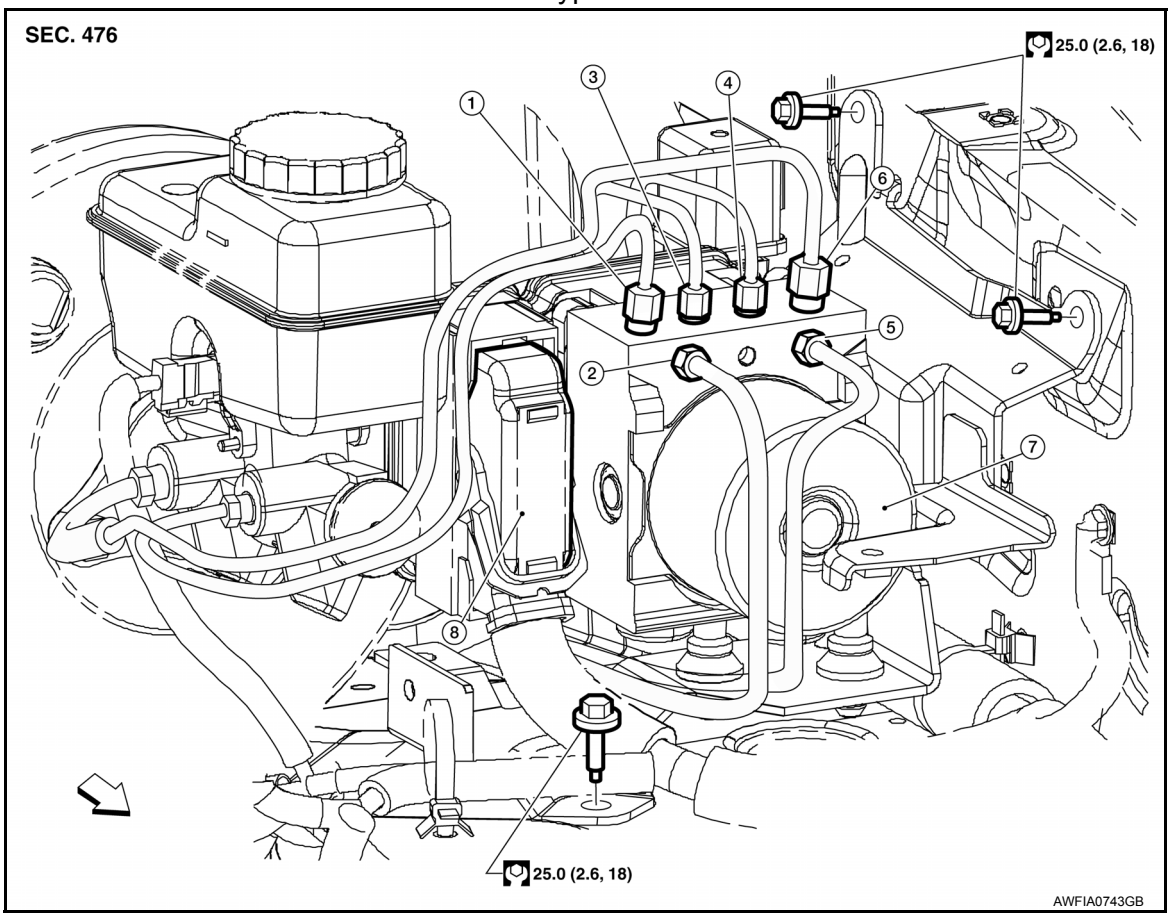


ACTUATOR AND ELECTRIC UNIT (ASSEMBLY)

Removal and Installation

INFOID:0000000007328000

Type 2



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

⇦ Front

REMOVAL

CAUTION:

- **To remove the brake tubes, use a flare nut wrench to prevent the flare nuts and brake tubes from being damaged.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **Do not remove actuator by holding harness.**

NOTE:

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

1. Disconnect negative battery terminal. Refer to PG-80, "Removal and Installation".
2. Remove air cleaner case assembly. Refer to EM-25, "Exploded View" (QR25DE) or EM-140, "Exploded View" (QV40DE).
3. Disconnect harness connector from ABS actuator and electric unit (control unit).
4. Separate brake tubes from ABS actuator and electric unit (control unit).
5. Remove bolts and ABS actuator and electric unit (control unit) with the bracket from the vehicle.
6. Remove bolt and bracket from the ABS actuator and electric unit (control unit).

INSTALLATION

Installation is in the reverse order of removal.

- Install bracket and bolt to ABS actuator and electric unit (control unit).

ABS actuator and electric unit (control unit) bolt	**: 7.0 N·m (0.7 kg-m, 62 in-lb)**

- After work is completed, bleed air from brake tube. Refer to BR-18, "Bleeding Brake System".
- Adjust the neutral position of steering angle sensor. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Description".
- Perform calibration of the decel G sensor (4WD models). Refer to BRC-126, "CALIBRATION OF DECEL G SENSOR : Description".

CAUTION:

- **To install, use flare nut crowfoot and torque wrench.**
- **Replace the ABS actuator if it has been dropped or sustained an impact.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.**
- **Do not install actuator by holding harness.**
- **After installing harness connector in the ABS actuator and electric unit (control unit), make sure connector is securely locked.**

STEERING ANGLE SENSOR

Removal and Installation

INFOID:0000000007328001

REMOVAL

1. Remove the spiral cable. Refer to SR-13, "Removal and Installation".
2. Remove the screws and remove the steering angle sensor from the spiral cable.

INSTALLATION

Installation is in the reverse order of removal.

- Reset the neutral position of the steering angle sensor. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

CAUTION:

Any time the steering angle sensor is removed and installed or replaced, you must reset the neutral position of the steering angle sensor. Refer to BRC-125, "ADJUSTMENT OF STEERING ANGLE SENSOR NEUTRAL POSITION : Special Repair Requirement".

YAW RATE/SIDE/DECEL G SENSOR

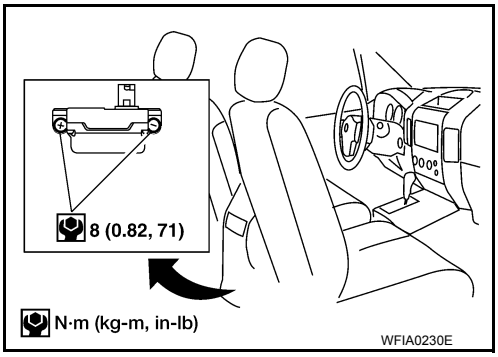
Removal and Installation

INFOID:0000000007328002

REMOVAL

1. Remove center console rear base. Refer to IP-14, "Exploded View".
2. Remove yaw rate/side/decel G sensor attaching nuts as shown.
   - The location of the yaw rate/side/decel G sensor is the same for all models.

   CAUTION:
   - **Do not use power tools to remove or install yaw rate/side/decel G sensor.**
   - **Do not drop or strike the yaw rate/side/decel G sensor.**
3. Disconnect harness connector and remove the yaw rate/side/decel G sensor.



INSTALLATION

Installation is in the reverse order of removal.

NOTE:

After performing the above work, calibrate the yaw rate/side/decel G sensor (4WD models). Refer to BRC-13, "CALIBRATION OF DECEL G SENSOR : Special Repair Requirement".