2008 BRAKES

Symptom Troubleshooting (DSC/RSC) - Mazda CX-9

SYSTEM WIRING DIAGRAM [DSC/RSC]

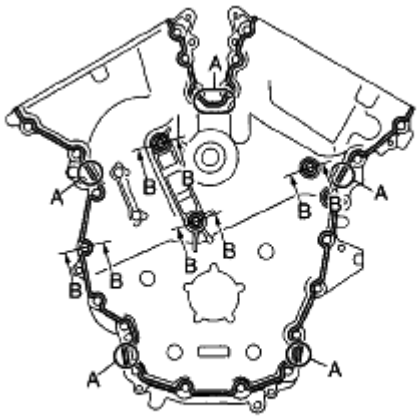

Fig. 1: Brakes System Wiring Diagram (DSC/RSC)
Courtesy of MAZDA MOTORS CORP.

FOREWORD [DSC/RSC]

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)

PRECAUTION [DSC/RSC]

1. The ABS warning light and/or BRAKE system warning light and/or DSC indicator light and/or TCS OFF light illuminate even when the system is normal.

PRECAUTION CHART [DSC/RSC]

Warning lights that may illuminate and/or flash	Condition under which the light may illuminate	Conditions under which the light will go out	ABS, EBD, TCS, DSC, and RSC control
	Under any of the following conditions: • When the front wheels are jacked up, stuck, or placed on a chassis roller, and only the front wheel ABS		• ABS: Disables control. • EBD: 1. Disable control, in cases where the light may illuminate, only when

• ABS warning light • BRAKE system warning light • DSC indicator light • TCS OFF light	wheel speed sensors are spun for **20 s or more.**	After turning ignition switch off, vehicle is driven at speed **greater than 10 km/h {6.2 mph}** and normal operation is confirmed.	DSC/RSC HU/CM detects that wheel speed sensors determine that two or more wheels are malfunctioning. 2. Enables control, if wheel speed sensors determine three or more wheels are functioning correctly. • TCS: Disables control. • DSC: Disables control. • RSC: Disables control.
	Parking brake is not fully released while driving.		
	Brake drag.		
	Sudden acceleration/deceleration.		
	Left/right or front/rear tires are different. (Size, radius, tire pressure, or wear is other than that listed on tire label.)		
	Battery voltage at DSC/RSC HU/CM ignition terminal drops **below approx. 10 V.**	Battery voltage rises **above approx. 10 V.**	ABS: Disables control. EBD: Enables control. TCS: Disables control. DSC: Disables control. RSC: Disables control.
• Brake system warning light	Brake fluid amount is low.	Brake fluid level lower than recommended amount.	ABS: Enables control. EBD: Enables control. TCS: Enables control. DSC: Disables control. RSC: Disables control.

2. Precautions during servicing of DSC/RSC

   The DSC/RSC is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.

   1. Malfunction in electrical system
      - The control module has an on-board diagnostic function. With this function, the ABS warning light and/or BRAKE system warning light and/or DSC indicator light and/or TCS OFF light will illuminate when there is a problem in the electrical system.

        Also, past and present malfunctions are in the control module. This function can find malfunctions that do not occur during periodic inspections. Connect the M-MDS to the DLC-2, the stored malfunctions will be displayed in the order of occurrence. To find out the causes of DSC/RSC malfunctions, use these on-board diagnostic results.

      - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the wiring harness.

        The control module usually operates normally. Be careful when searching for the cause of malfunction.

- After repair, it is necessary to clear the DTC from the control module memory.

  Also, if the DSC/RSC related parts have been replaced, verify that no DTC is displayed after repairs.

- After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the control module, the ABS warning light may not go out even when the ignition switch is turned to the ON position. In this case, drive the vehicle at a speed of **more than 10 km/h {6.2 mph}** , make sure the ABS warning light goes out, and then clear the DTC.
- When repairing, if the DSC/RSC related connectors are disconnected and the ignition switch is turned to the ON position, the control module will mistakenly detect a fault and record it as a malfunction.

WARNING:

- **If the DSC/RSC sensor initialization procedure is not completed, it could result in an unexpected accident due to the DSC/RSC being inoperative. Therefore, after the DSC/RSC HU/CM or combined sensor is replaced, always perform the DSC/RSC sensor initialization precedure to ensure proper DSC/RSC operation. (See DSC/RSC SENSOR INITIALIZATION PROCEDURE .)**

- To protect the control module, make sure the ignition is off before connecting or disconnecting the control module connector.

2. Malfunctions in hydraulic system
   - Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in a DSC/RSC component or the conventional brake system.
   - The hydraulic unit contains delicate mechanical parts. If foreign material gets into the component, the DSC/RSC may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the DSC/RSC does not. Make sure foreign material does not enter when servicing the DSC/RSC (e.g. brake fluid replacement, pipe removal).

INTERMITTENT CONCERN TROUBLESHOOTING

Vibration method

- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the following steps.

NOTE:

- **There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Inspect the following:**
  - **Connectors not fully seated.**
  - **Wire harnesses not having full play.**

- **Wires laying across brackets or moving parts.**
- **Wires routed too close to hot parts.**

- **An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.**
- **The connector joints, points of vibration, and places where wiring harnesses pass through the firewall, body and other panels are the major areas to be inspected.**

Inspection method for switch connectors or wires

1. Connect the M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

NOTE:
- **If the engine starts and runs, perform the following steps at idle.**

3. Access PIDs for the switch you are inspecting.
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

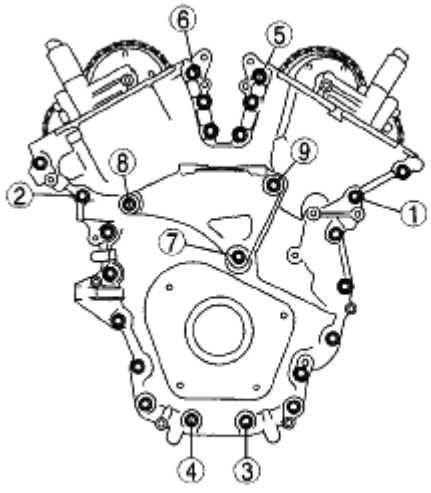

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Fig. 2: Identifying DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

Inspection method for sensor connectors or wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

NOTE:

- **If the engine starts and runs, perform the following steps at idle.**

3. Access PIDs for the switch you are inspecting.
4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.

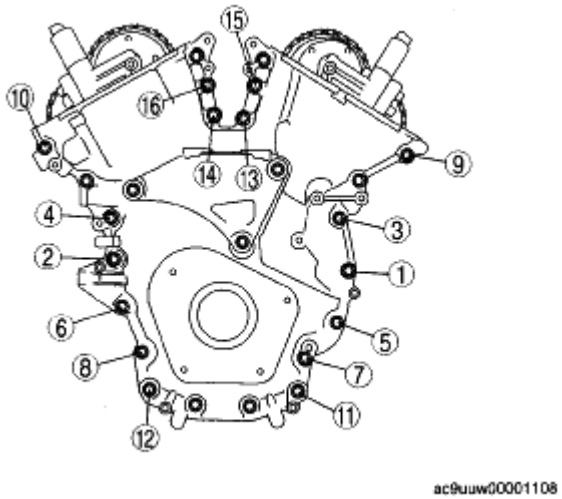

Fig. 3: Shaking Connector Or Wiring Harness
Courtesy of MAZDA MOTORS CORP.

Inspection method for sensors

1. Connect the M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

NOTE:

- **If engine starts and runs, perform the following steps at idle.**

3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If the PID value is unstable or a malfunction occurs, inspect for poor connection and/or poorly mounted sensor.

Malfunction data monitor method

1. Perform the malfunction reappearance test according to malfunction reappearance mode and malfunction data monitor. The malfunction cause is found in the malfunction data.

Inspection method for connector terminal

1. Inspect the connection condition of each female terminal.
2. Insert the male terminal, and fit the female terminal side to female terminal. Inspect if the malfunction is

in the female terminal.

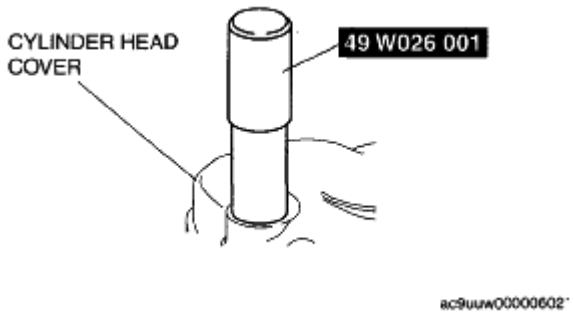

Fig. 4: Inspecting Connection
Courtesy of MAZDA MOTORS CORP.

SYMPTOM TROUBLESHOOTING [DSC/RSC]

- Verify the symptoms, and perform troubleshooting according to the appropriate number.

SYMPTOM TROUBLESHOOTING [DSC/RSC]

No.	Symptom
1	Any of the following lights do not illuminate when the ignition switch is turned to the ON position. • ABS warning light • BRAKE system warning light • DSC indicator light • TCS OFF light
2	Any of the following lights remain on: • ABS warning light. • BRAKE system warning light • DSC indicator light • TCS OFF light
3	There is a malfunction in the system even though ABS warning light, BRAKE system warning light, DSC indicator light and TCS OFF light do not illuminate.
4	ABS or TCS(1) operates frequently.
	TCS does not work correctly.
5	DSC(1) operates frequently.
	DSC does not work correctly.
6	RSC(1) operates frequently.
	RSC does not work correctly.
(1) DSC/RSC system contains traction control, dynamic stability control and roll stability control function; DSC indicator light illuminates and goes out while DSC/RSC is operating.	

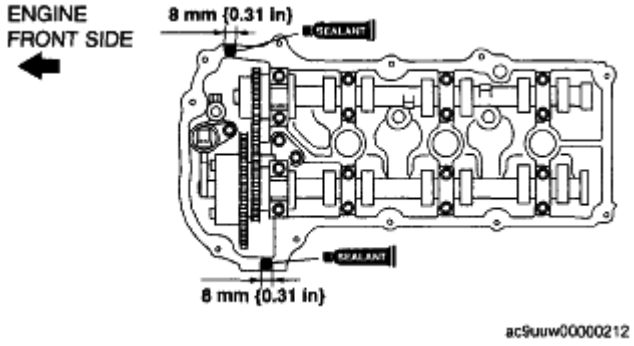

Fig. 5: Symptom Troubleshooting Chart
Courtesy of MAZDA MOTORS CORP.

NO.1 ANY OF THE FOLLOWING LIGHTS DO NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT) [DSC/RSC]

TROUBLESHOOTING CHART

1	**Any of the following lights do not illuminate when the ignition switch is turned to the ON position: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light).**
[TROUBLESHOOTING HINTS] • Inspect each light in the instrument cluster for malfunction • Poor connection at DSC/RSC HU/CM connector	

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	**INSPECT FOR DTCS IN DSC/RSC HU/CM** • Inspect the DTC for the ON-BOARD DIAGNOSTIC SYSTEM. • Have DTCs been stored in memory?	Yes	Perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)
		No	Go to the next step.
2	**INSPECT WHETHER MALFUNCTION IS IN INSTRUMENT CLUSTER SYSTEM OR OTHER SYSTEM** • Do other warning and indicator lights illuminate when the ignition switch is turned to the ON position?	Yes	Go to the next step.
		No	Inspect or repair the instrument cluster (power supply system, ground system).

3	**VERIFY THAT DSC/RSC HU/CM CONNECTOR IS CONNECTED** • Is the DSC/RSC HU/CM securely connected?	Yes	Go to the next step.
		No	Connect the DSC/RSC HU/CM connector securely, then go to the next step.
4	**VERIFY THAT DSC/RSC HU/CM CONNECTOR TERMINAL OR RELATED CONNECTOR TERMINALS ARE CONNECTED** • Are DSC/RSC HU/CM connector terminal, instrument cluster connector terminal, or related connector terminals securely connected?	Yes	Go to the next step.
		No	Securely connect the DSC/RSC HU/CM connector terminal and related connector terminals.
5	**INSPECT INSTRUMENT CLUSTER** • Inspect the instrument cluster. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .) • If the instrument cluster normal	Yes	Replace the DSC/RSC HU/CM. (see **DSC/RSC HU/CM REMOVAL/INSTALLATION** .)
		No	Replace the instrument cluster. (See **INSTRUMENT CLUSTER REMOVAL/INSTALLATION** .)

NO.2 ANY OF THE FOLLOWING LIGHTS REMAIN ON: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT) [DSC/RSC]

TROUBLESHOOTING CHART

2	**Any of the following lights remain on: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light)**

[TROUBLESHOOTING HINTS]

- Brake fluid amount is low
- Parking brake does not release
- No connection at DSC/RSC HU/CM connector

  (When HU/CM connector is disconnected, ABS warning light and BRAKE system warning light illuminate)

- DSC/RSC HU/CM detected malfunction (Input and output device malfunction)
- DSC/RSC HU/CM detects low voltage in power supply
- DSC/RSC HU/CM ground malfunction

  (When DSC/RSC HU/CM ground is not securely connected, ABS warning light and BRAKE system warning light illuminate but diagnostic trouble code does not displayed)

- DSC/RSC HU/CM does not operate (DSC/RSC HU/CM malfunction)

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	**INSPECT BRAKE FLUID AMOUNT AND VERIFY THAT PARKING BRAKE RELEASES** • Is the brake fluid amount normal? • Is the parking brake pedal released?	Yes	Go to the next step.
		No	Add brake fluid or release parking brake pedal.
2	**INSPECT DTCS IN INSTRUMENT CLUSTER** • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM. • Has DTC U2064 been recorded in memory?	Yes	Go to the next step.
		No	Inspect the instrument cluster. (See **INSTRUMENT CLUSTER INSPECTION** .)
3	**INSPECT DTCS IN DSC/RSC HU/CM** • Inspect the DTC for the ON-BOARD DIAGNOSTIC SYSTEM. • Have DTCs been stored in memory?	Yes	Perform inspection using appropriate DTC. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)
		No	Go to the next step.
4	**INSPECT WHETHER MALFUNCTION IS IN CONTROL MODULE CONNECTOR, TERMINAL OR OTHER** • Do the ABS warning light and BRAKE system warning light go out after **4 s** when the ignition switch is turned to the ON position?	Yes	Temporary poor connection in control module connector. Inspect DSC/RSC HU/CM connector, then go to Step 7. Inspect DSC/RSC HU/CM connector terminal, then go to Step 8.
		No	Go to the next step.
5	**INSPECT BATTERY** • Is the battery voltage normal?	Yes	Go to the next step.
		No	Inspect the battery and charging system. (See **BATTERY INSPECTION [MZI-3.7]** .) (See **GENERATOR INSPECTION [MZI-3.7]** .)
6	**INSPECT CHARGING SYSTEM** • Is the battery voltage normal with electrical load (A/C, headlight, etc.) on and engine idling?	Yes	Go to the next step.
		No	Inspect the charging system (drive belt tension, generator, etc.). (See **GENERATOR INSPECTION [MZI-3.7]** .)
	VERIFY THAT DSC/RSC HU/CM	Yes	Go to the next step.

7	**CONNECTOR IS CONNECTED** • Is the DSC/RSC HU/CM securely connected?	No	Connect the DSC/RSC HU/CM connector securely, then go to the next step.
8	**VERIFY THAT DSC/RSC HU/CM CONNECTOR TERMINAL OR RELATED CONNECTOR TERMINALS ARE CONNECTED** • Are the DSC/RSC HU/CM connector terminal or instrument cluster connector terminal etc. related connector terminals securely connected?	Yes	Replace the DSC/RSC HU/CM. (See **DSC/RSC HU/CM REMOVAL/INSTALLATION** .)
		No	Securely connect the DSC/RSC HU/CM connector terminal and related connector terminals.

NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND TCS OFF LIGHT DO NOT ILLUMINATE [DSC/RSC]

TROUBLESHOOTING CHART

3	**There is a malfunction in the system even though the ABS warning light, BRAKE system warning light, DSC indicator light and TCS OFF light do not illuminate.**
[TROUBLESHOOTING HINTS] • There is a mechanical malfunction in system	

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	**INSPECT DSC/RSC HU/CM FOR DTCs** • Inspect the DTC for the ON-BOARD DIAGNOSTIC SYSTEM. • Have DTCs been stored in memory?	Yes	Perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)
		No	Go to the next step.
2	**INSPECT DSC/RSC SYSTEM** • Perform DSC/RSC system inspection. (See **DSC/RSC SYSTEM INSPECTION** .) • Is the system normal?	Yes	Inspect the conventional brake system.
		No	Repair or replace any malfunctioning part.

NO.4 ABS OR TCS OPERATES FREQUENTLY/TCS DOES NOT WORK CORRECTLY [DSC/RSC]

TROUBLESHOOTING CHART

4	**ABS or TCS* operates frequently./TCS* does not work correctly.** ***: DSC/RSC system function contains traction control function; DSC indicator light goes on and off while DSC/RSC is operating.**

[TROUBLESHOOTING HINTS]

- There is a difference in size or air pressure between the front and rear tires
- Incorrect ABS wheel-speed signal is input to DSC/RSC HU/CM
- There is a malfunction in the engine control system (TCS malfunction)
- Tire problem (low or high air pressure, excessive wear, different grip level by four wheels)

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	**INSPECT DTCS IN DSC/RSC HU/CM** • Inspect the DTC for the ON-BOARD DIAGNOSTIC SYSTEM. • Have DTCs been stored in memory?	Yes	Perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)
		No	Go to the next step.
2	**INSPECT TIRE SIZE AND AIR PRESSURE** • Inspect the tire size and the air pressure. • Are size and air pressure as specified?	Yes	Go to the next step.
		No	Replace with specified tires and adjust tire air pressure.
3	**INSPECT ABS WHEEL-SPEED SENSOR OUTPUT VALUE** • Inspect the output value from the ABS wheel-speed sensor. (See **FRONT ABS WHEEL-SPEED SENSOR INSPECTION** .) (See **REAR ABS WHEEL-SPEED SENSOR INSPECTION [2WD]** .)	Yes	Go to the next step.
		No	• ABS wheel-speed sensor installation inspection: Inspect the sensor for looseness and verify that it is securely installed. • Sensor rotor installation inspection: Inspect the sensor rotor for poor installation and chipping of sensor rotor teeth. (If sensor rotor is installed poorly, it may cause

	(See **REAR ABS WHEEL-SPEED SENSOR INSPECTION [AWD]** .) • Is the output value normal?		output of abnormal wave form at high speed.)
4	**VERIFY THAT TIRE CONDITION** • Verify tire condition for following: ○ Wear ○ Grip level (different by four wheels) • Are tires condition okay?	Yes	Find malfunctioning part according to "INTERMITTENT CONCERN TROUBLESHOOTING".
		No	Adjust, repair or replace tire.

NO.5 DSC OPERATES FREQUENTLY/DSC DOES NOT WORK CORRECTLY [DSC/RSC]

TROUBLESHOOTING CHART

5	**DSC* operates frequently. /DSC* does not work correctly.** ***: DSC/RSC system contains dynamic stability control function; DSC indicator light illuminates and goes out and while DSC/RSC is operating.**

[TROUBLESHOOTING HINTS]

- DSC/RSC HU/CM detected malfunction (input and output device malfunction)
- Poor installation of combined sensor and/or steering angle sensor

  (If any of the above sensors are poorly installed, DSC/RSC may operate intermittently)

- When replacing the DSC/RSC HU/CM, or combined sensor, initialization is not performed.

(If initialization is not performed correctly, DSC/RSC may not work correctly)

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION
1	**INSPECT DSC/RSC HU/CM FOR DTCs** • Inspect the DTC for the ON-BOARD DIAGNOSTIC SYSTEM.	Yes	Perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)

	• Have DTCs been recorded in memory?	No	Go to the next step.
2	**VERIFY THAT EACH SENSOR IS INSTALLED** • Are the combined sensor and steering angle sensor securely installed?	Yes	Go to the next step.
		No	Install sensor securely.
*3	**VERIFY THAT EACH SENSOR IS INITIALIZED** • Was initialization performed after replacement of the DSC/RSC HU/CM, or combined sensor?	Yes	Go to the next step.
		No	Perform initialization procedure. (See **DSC/RSC SENSOR INITIALIZATION PROCEDURE** .)
4	**VERIFY THAT TIRE CONDITION** • Verify tire condition for following: ○ Air pressure ○ Wear ○ Grip level (different by four wheels) • Are tires condition okay?	Yes	Find malfunctioning part according to "INTERMITTENT CONCERN TROUBLESHOOTING".
		No	Adjust, repair or replace tire.

NO.6 RSC OPERATES FREQUENTLY/RSC DOES NOT WORK CORRECTRY [DSC/RSC]

TROUBLESHOOTING CHART

6	**RSC* operates frequently/RSC* does not work correctly** ***: DSC/RSC system contains roll stability control function; DSC indicator light illuminates and goes out and while DSC/RSC is operating.**

[TROUBLESHOOTING HINTS]

- DSC/RSC HU/CM detected malfunction (input and out put devise malfunction)
- Poor installation of combined sensor and/or steering angel sensor (If any of the above sensors are poorly installed, DSC/RSC may operate intermittently)
- When replacing the DSC/RSC HU/CM, or combined sensor, initialization is not performed (If initialization is not performed correctly, DSC/RSC may not work correctly)
- Tire problem (low or high air pressure, excessive tire wear, different grip level for four wheels)
- Poor installation or malfunction suspension parts (shock absorber, stabilizer)

DIAGNOSTIC PROCEDURE

DIAGNOSTIC PROCEDURE

STEP	INSPECTION		ACTION

1	**INSPECT DTC IN DSC/RSC HU/CM** • Inspect DTC for the ON-BOARD DIAGNOSTIC SYSTEM. • Have DTCs been stored in memory?	Yes	Perform the applicable DTC inspection (See **ON-BOARD DIAGNOSIS [DSC/RSC]** .)
		No	Go to the next step.
2	**VERIFY THAT EACH SENSOR IS INSTALLED** • Are the combined sensor and steering angle sensor securely installed?	Yes	Go to the next step.
		No	Install the suspect sensor securely.
3	**VERIFY EACH SENSOR IS INITIALIZED** • Was initialized performed after replacement of the DSC/RSC HU/CM or combined sensor?	Yes	Go to the next step.
		No	Perform initialization procedure. (See **DSC/RSC SENSOR INITIALIZATION PROCEDURE** .)
4	**VERIFY THAT TIRE CONDITION** • Verify tire condition for following: • Air pressure • Wear • Grip level (different by four wheels) • Are tires conditions okay?	Yes	Go to the next step.
		No	Adjust, repair or replace suspect tire.
5	**VERIFY SUSPENTION PART** • Verify vehicle posture. • Is there an inclination in the posture of the vehicle right and left, left and rear?	Yes	Inspect the following suspension part: • Shock absorber • Stabilizer
		No	Find malfunctioning part according to "intermittent concern troubleshooting".