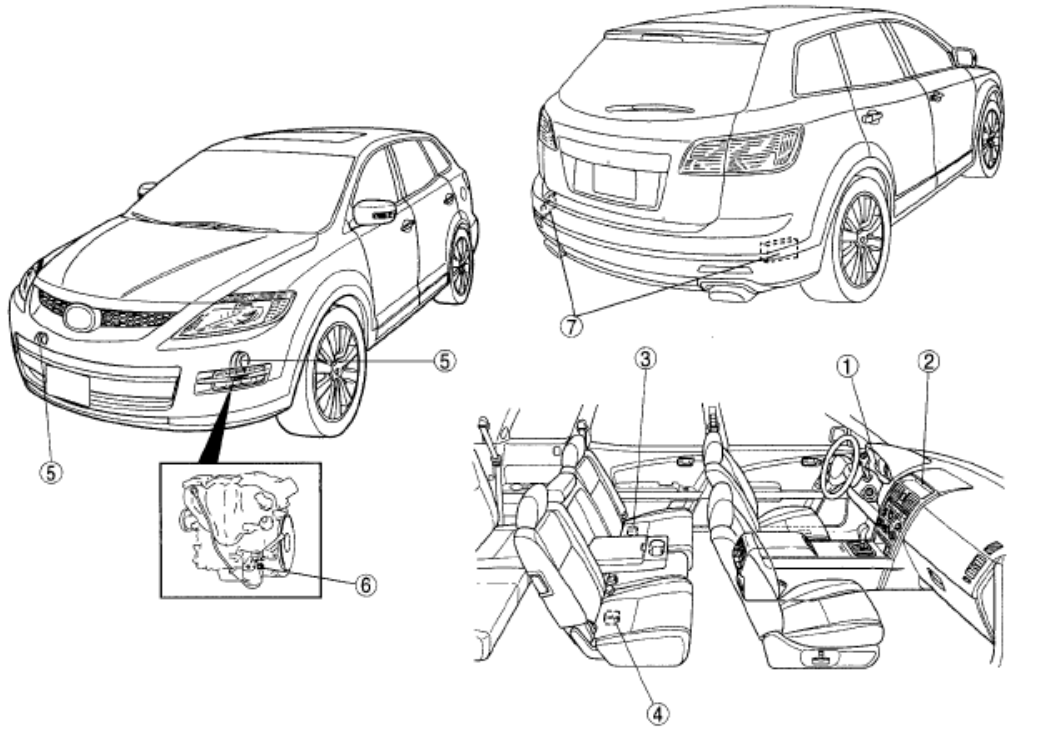
2008 BODY & ACCESSORIES

Instrumentation/Driver Info - Mazda CX-9

INSTRUMENTATION/DRIVER INFO. LOCATION INDEX



1	Instrument cluster (See 09-22-3 INSTRUMENT CLUSTER REMOVAL/INSTALLATION) (See 09-22-4 INSTRUMENT CLUSTER CONFIGURATION) (See 09-22-4 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY) (See 09-22-5 INSTRUMENT CLUSTER INSPECTION) (See 09-22-6 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE)
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3	Fuel gauge sender unit (See 09-22-12 FUEL GAUGE SENDER UNIT REMOVAL/INSTALLATION) (See 09-22-14 FUEL GAUGE SENDER UNIT INSPECTION)
4	Fuel gauge sender sub-unit (AWD) (See 09-22-12 FUEL GAUGE SENDER UNIT REMOVAL/INSTALLATION) (See 09-22-14 FUEL GAUGE SENDER UNIT INSPECTION)
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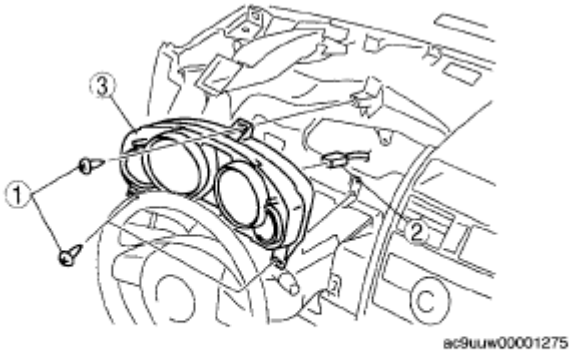
Fig. 1: Identifying Instrumentation/Driver Info. Components Location
Courtesy of MAZDA MOTORS CORP.

INSTRUMENT CLUSTER REMOVAL/INSTALLATION

CAUTION:

- **When replacing the instrument cluster, the configuration procedure must be performed before removing the instrument cluster. Replacing the instrument cluster without performing the configuration procedure will result in system malfunction.**

1. Perform the instrument cluster configuration when replacing it. (See **INSTRUMENT CLUSTER CONFIGURATION**.)
2. Disconnect the negative battery cable.
3. Remove the following parts:
    1. Decoration panel (See **DECORATION PANEL REMOVAL/INSTALLATION** .)
    2. Front console box mat (See **FRONT CONSOLE BOX MAT REMOVAL/INSTALLATION** .)
    3. Indicator panel (See **INDICATOR PANEL REMOVAL/INSTALLATION** .)
    4. Front console box (See **FRONT CONSOLE BOX REMOVAL/INSTALLATION** .)
    5. Center panel (See **CENTER PANEL REMOVAL/INSTALLATION** .)
    6. Upper column cover (See **COLUMN COVER REMOVAL/INSTALLATION** .)
    7. Meter hood (See **METER HOOD REMOVAL/INSTALLATION** .)
4. Remove in the order indicated in the table.



ac9uuw00001275

1	Screw
2	Connector
3	Instrument cluster

Fig. 2: Identifying Instrument Cluster Components
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.
6. When replacing the instrument cluster of vehicles with the immobilizer system, perform the following procedure:
    - See **IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING [KEYLESS ENTRY SYSTEM]** .

CAUTION:

- **The removed instrument cluster should be placed with the display side up to prevent grease from leaking from the meters.**

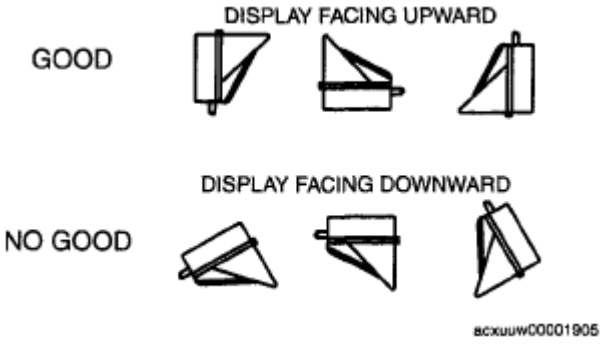


Fig. 3: Identifying Proper Position Of Instrument Cluster Display
Courtesy of MAZDA MOTORS CORP.

INSTRUMENT CLUSTER CONFIGURATION

NOTE:

- **Use the IDS (laptop PC) because the PDS (Pocket PC) does not support the INSTRUMENT CLUSTER CONFIGURATION.**
- **If all the following conditions are met, the odometer data (total traveled distance) in the previous instrument cluster is automatically transferred to a new instrument cluster during the configuration. If any of the conditions are not met, odometer-data transfer cannot be performed.**

  Previous instrument cluster

  - **No malfunction (Configuration data can be read using the M-MDS.)**

  New instrument cluster

  - **Odometer display is less than 100 km**
  - **Odometer has no malfunction**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select "Module Programming".
3. Select "Programmable Module Installation".
4. Select "IC" and perform procedures according to directions on the M-MDS screen.
   - If odometer data is to be transferred to a new instrument cluster, perform the following procedure:
     1. Select "Programmable Parameters" from the menu.

2. Select "Odometer Write", and perform the procedure following the screen.

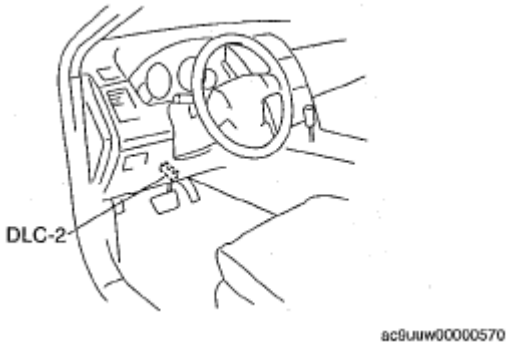


Fig. 4: Identifying Data Link Connector 2
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **During the odometer data writing procedure, As-Built Data (VIN and Vehicle Data) input is requested. Obtain the As-Built Sheet for the vehicle, and input the necessary data.**

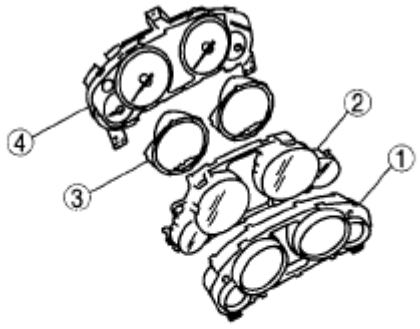
5. Retrieve DTCs by the M-MDS, then verify that there is no DTC present.
   - If a DTC (s) is detected, perform the applicable DTC inspection. (See **DTC TABLE [INSTRUMENT CLUSTER]** .)

INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY

CAUTION:

- **Do not drop the instrument cluster or damage the printed board. This will lead to a system malfunction.**

1. Disassemble in the order indicated in the table.



1	Cover
2	Lens
3	Glass ring
4	Instrument cluster unit

Fig. 5: Identifying Instrument Cluster Unit, Cover, Lens & Glass Ring
Courtesy of MAZDA MOTORS CORP.

2. Assemble in the reverse order of disassembly.

INSTRUMENT CLUSTER INSPECTION

SPEEDOMETER

Using the input/output check mode

1. Inspect the speedometer by setting it to check code 12 of the input/output check mode. (See **INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE**.)

Using a speedometer tester

1. Adjust the tire pressure to the specification.
2. Using a speedometer tester, verify that the tester reading is as indicated in the table below.

SPEEDOMETER TESTER INDICATION AND ALLOWABLE RANGE REFERENCE

Speedometer tester indication (km/h)	Allowable range (km/h)
20	17-23
40	38-43
60	57-63
80	77-83
100	97-103
120	116-124
140	136-144

SPEEDOMETER TESTER INDICATION AND ALLOWABLE RANGE REFERENCE

Speedometer tester indication (mph)	Allowable range (mph)
10	8-12
20	18-22
30	28-32
40	38-42
50	48-52
60	58-62
70	68-72
80	77-83

3. Verify that the speedometer reading is within the range indicated in the table.
   - If the speedometer does not move or the indication is not within the allowable range, inspect the PCM, TCM, and related wiring harnesses.
     - If the PCM, TCM, and related wiring harnesses are normal, replace the instrument cluster.

TACHOMETER

Using the input/output check mode

1. Inspect the tachometer by setting it to check code 13 of the input/output check mode. (See **INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE**.)

USING M-MDS

CAUTION:
- **If the engine speed exceeds the allowable range, the engine could be damaged. Therefore, when inspecting the tachometer, do not allow the engine speed to exceed the allowable range indication on the tachometer.**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (laptop PC)
     1. Select "DataLogger".
     2. Select "Modules".
     3. Select "IC".
   - When using the PDS (Pocket PC)
     1. Select "Module Tests".
     2. Select "IC".
     3. Select "DataLogger".
3. Compare the data monitor item (IC_TACHO) with the tachometer indication.
   - If the tachometer does not operate properly, inspect the PCM and related wiring harnesses.

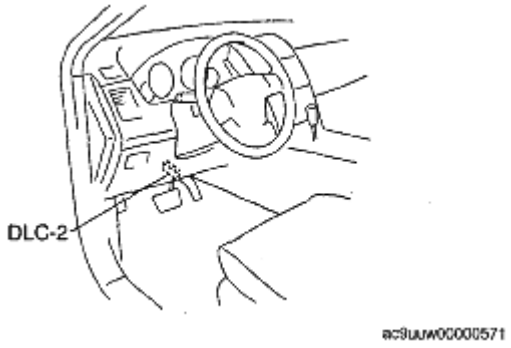


Fig. 6: Identifying Data Link Connector 2
Courtesy of MAZDA MOTORS CORP.

- If the PCM and related harnesses do not have any malfunction, replace the instrument cluster.

FUEL GAUGE

1. Inspect the fuel gauge by setting it to check code 23 of the input/output check mode. (See **INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE**.)

WATER TEMPERATURE GAUGE

1. Inspect the water temperature gauge by setting it to check code 25 of the input/output check mode. (See **INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE**.)

INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE

NOTE:
- **In this mode, it is possible to verify the items in the following chart.**

CHECK CODE TABLE

CHECK CODE TABLE

Check code	Check item	Related items
08	TNS relay	• Lights-on reminder warning alarm • Each illumination light
12	Speedometer	Speedometer
13	Tachometer	Tachometer
14	Buzzer	Buzzer
16	Fuel-level warning light	Fuel-level warning light
22	Fuel gauge sender unit	Fuel gauge
23	Fuel gauge	Fuel gauge
25	Water temperature gauge	Water temperature gauge
	• Odometer/tripmeter (LCD)	• Odometer/tripmeter (LCD)

26	• Warning and indicator light	• Warning and indicator light
55	Panel light control switch (dimmer switch)	Panel light control switch (dimmer switch)
57	Panel light control	Illumination light bulb

NOTE:

- **Check codes which are not listed may be indicated, but they cannot be inspected.**
- **The check codes are displayed in numerical order. (While performing the inspection, if you want to inspect a check code with a number smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)**
- **If a speed signal is input to the instrument cluster (the wheels are rotated), the input/output check mode will be cancelled.**
- **The check codes can be fast-forwarded by pushing and holding the odometer/tripmeter switch for 1 s or more.**

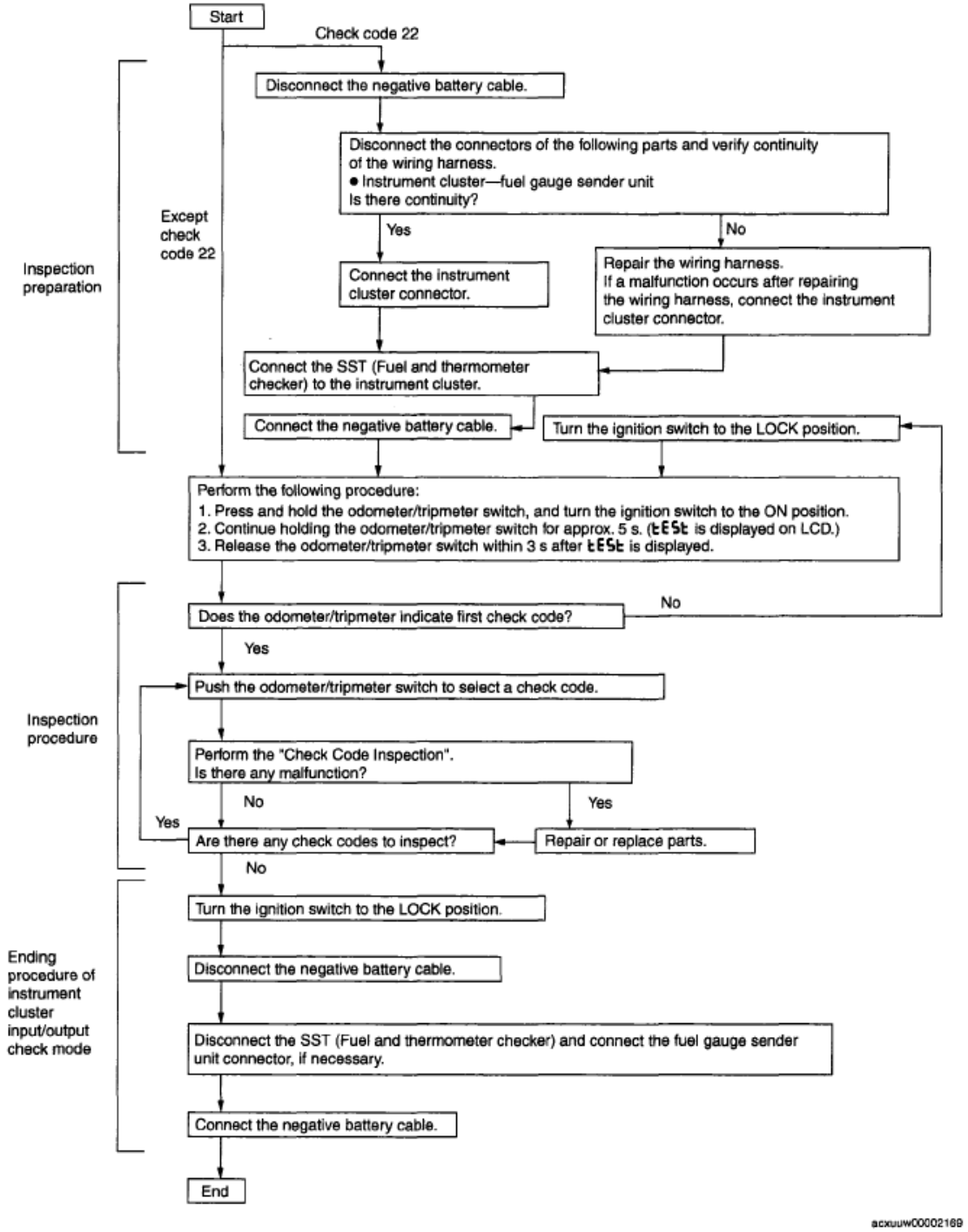


Fig. 7: Instrument Cluster Input/Output Check Mode Procedure Chart
Courtesy of MAZDA MOTORS CORP.

CHECKING ORDER

NOTE:

- **When inspecting more than two check codes, begin with the code with the**

highest ranking.

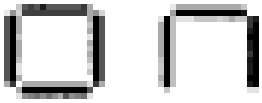
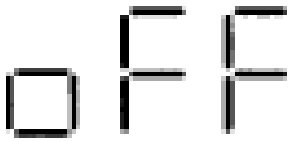
CHECKING ORDER

Priority order of inspection	Check code
1	22
2	08, 12, 13, 14, 16, 23, 25, 26, 55, 57

CHECK CODE INSPECTION

Check code 08

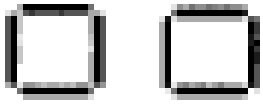
CHECK CODE INSPECTION CHART (CHECK CODE 08)

Check code 08		TNS relay ON/OFF signal	
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Turn the headlight switch to the TNS position. (TNS relay ON)		Go to the next step.
			Verify that the voltage of instrument cluster terminal 1K is **B+.** • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: ○ TNS relay ○ Wiring harness (Battery-TNS relay-instrument cluster)
2	Turn the headlight switch off. (TNS relay OFF)		Verify that the voltage of the instrument cluster terminal 1K is **1.0 V or less.** • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the following parts: ○ TNS relay ○ Wiring harness (TNS relay-instrument cluster)

			Input signal to the instrument cluster is normal.

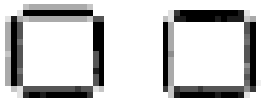
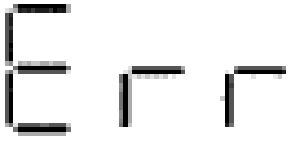
Check code 12

CHECK CODE INSPECTION CHART (CHECK CODE 12)

Check code 12		Speedometer display signal	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 12, wait for **approx. 2 s.**		The speedometer needle moves full scale then returns to approx. **60 km/h or 60 mph.**	The speedometer is normal.
		Except above	Replace the instrument cluster.
		-	

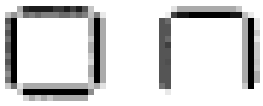
Check code 13

CHECK CODE INSPECTION CHART (CHECK CODE 13)

Check code 13		Tachometer operation signal	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 13, wait for **approx. 2 s.**		The tachometer needle moves full scale then returns to **approx. 3,000 rpm.**	The tachometer is normal.
		Except above	Replace the instrument cluster.
		-	

Check code 14

CHECK CODE INSPECTION CHART (CHECK CODE 14)

Check code 14		Buzzer operation signal	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 14, wait for **approx. 2 s.**		The buzzer sounds.	The buzzer is normal.
		The buzzer does not sound.	Replace the instrument cluster.

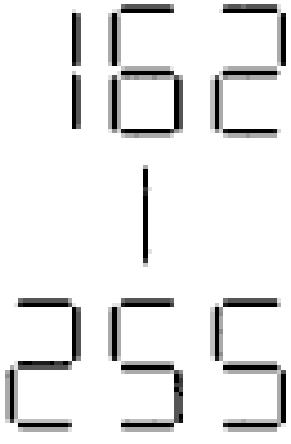
Check code 16

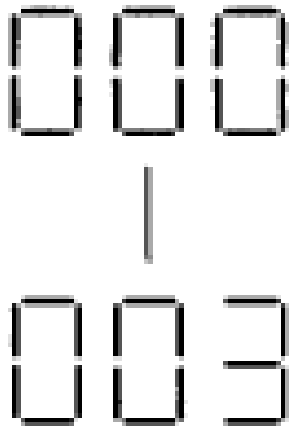
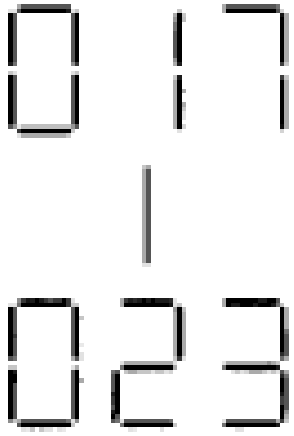
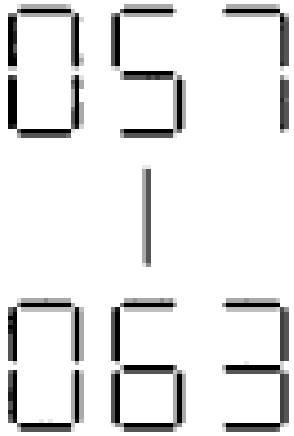
CHECK CODE INSPECTION CHART (CHECK CODE 16)

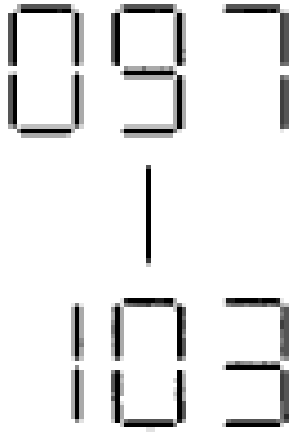
Check code 16		Fuel-level warning light flashing signal	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 16, wait for **approx. 2 s.**	 (FLASHING)	Fuel-level warning light flashes **three times.**	The fuel-level warning light is normal.
		Except above	Replace the instrument cluster.

Check code 22

CHECK CODE INSPECTION CHART (CHECK CODE 22)

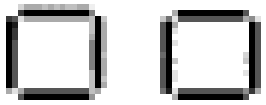
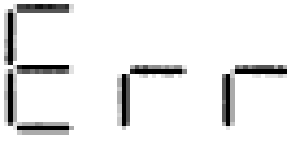
Check code 22		Fuel level signal	
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**
1	Select check code 22 with the fuel gauge sender unit connector disconnected.		Go to the next step.
		Except above	Go to the Step 6.

2	Connect terminals 1D and 1R of the instrument cluster.		Go to the next step.
		Except above	Go to the Step 6.
3	Using the **SST** (Fuel and thermometer checker) or resistor, input **20 ohms** between instrument cluster terminals 1D and 1R.		Go to the next step.
		Except above	Go to the Step 6.
4	Using the **SST** (Fuel and thermometer checker) or resistor, input **60 ohms** between instrument cluster terminals 1D and 1R.		Go to the next step.
		Except above	Go to the Step 6.

5	Using the **SST** (Fuel and thermometer checker) or resistor, input **100 ohms** between instrument cluster terminals 1D and 1R.		Inspect the fuel gauge sender unit.
		Except above	Go to the next step.
6	Inspect the wiring harness and connector between instrument cluster and fuel gauge sender unit. • If there is any malfunction, repair or replace the wiring harness or connector. • If there is no malfunction, replace the instrument cluster.		

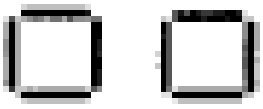
Check code 23

CHECK CODE INSPECTION CHART (CHECK CODE 23)

Check code 23		**Fuel gauge operation signal**	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
After selecting check code 23, wait for **approx. 2 s.**		The fuel gauge indicates status in the following order **approx. every 2 s.** • F --> 1/2 --> E --> F (fixed)	The fuel gauge is normal.
		Except above	Replace the instrument cluster.
		Replace the instrument cluster.	

Check code 25

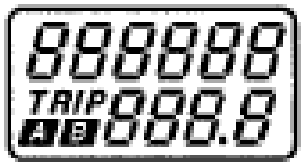
CHECK CODE INSPECTION CHART (CHECK CODE 25)

<table>
<tr><th colspan="2">Check code 25</th><th colspan="2">Water temperature gauge operation signal</th></tr>
<tr><th>INSPECTION CONDITION</th><th>DISPLAY</th><th colspan="2">ACTION</th></tr>
<tr><td rowspan="3">After selecting check code 25, wait for approx. 2 s.</td><td rowspan="2">  </td><td>The water temperature gauge indicates status in the following order approx. every 2 s.
• H --> Center --> C --> H (fixed)</td><td>The water temperature gauge is normal.</td></tr>
<tr><td>Except above</td><td>Replace the instrument cluster.</td></tr>
<tr><td>  </td><td colspan="2">Replace the instrument cluster</td></tr>
</table>

Check code 26

CHECK CODE INSPECTION CHART (CHECK CODE 26)

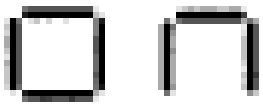
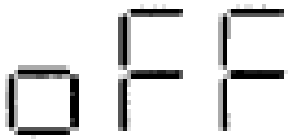
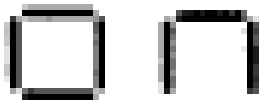
<table>
<tr><th colspan="2">Check code 26</th><th colspan="2">Odometer/tripmeter display signal</th></tr>
<tr><th>INSPECTION CONDITION</th><th>DISPLAY</th><th colspan="2">ACTION</th></tr>
<tr><td></td><td></td><td>• Display is normal.
• Warning and indicator light illuminated.
○ Generator warning light
○ DSC indicator light
○ ABS warning light
○ Brake system warning light
○ Cruise set indicator light (1)
○ Cruise main indicator light (1)</td><td></td></tr>
</table>

Select check code 26.		○ TCS OFF light ○ Selector indicator light ○ Door ajar warning light ○ Seat belt warning light ○ Air bag system warning light ○ Turn indicator light ○ Oil pressure warning light ○ MIL ○ Keyless indicator light (2) ○ Keyless warning light (2) ○ Security light ○ Washer fluid-level warning light ○ ETC warning light ○ Fuel cap warning light ○ AWD warning light ○ AT warning light	• The odometer/tripmeter is normal. • Warning and indicator is normal.
		Except above	Replace the instrument cluster.
(1) Flashing alternates (2) Flashing alternates			

Check code 55

CHECK CODE INSPECTION CHART (CHECK CODE 55)

Check code 55	Dimmer switch ON/OFF signal

STEP	INSPECTION CONDITION	DISPLAY	ACTION
1	After selecting the check code 55, press and hold the dimmer switch. (Dimmer switch ON)		Go to the next step.
			Replace the instrument cluster.
2	Release the dimmer switch. (Dimmer switch OFF)		Replace the instrument cluster.
			Input signal to the instrument cluster is normal.

Check code 57

CHECK CODE INSPECTION CHART (CHECK CODE 57)

Check code 57		Panel light control signal	
INSPECTION CONDITION	**DISPLAY**	**ACTION**	
Turn the headlight switch to the TNS position. After selecting check code 57, wait for **approx. 2 s.**		Illumination light (hazard warning switch, center panel unit, etc.) flashes **three times.**	The panel light control signal is normal.
		Except above	Verify that the voltage of instrument cluster terminal 1I is **B+.** • If the voltage is as specified, replace the instrument cluster. • If the voltage is not as specified, inspect the

	 (FLASHING)		following parts: ○ Illumination light (hazard warning switch, center panel unit, etc.) ○ Wiring harness (Instrument cluster-illumination lights-TNS relay)

FUEL GAUGE SENDER UNIT REMOVAL/INSTALLATION

FUEL GAUGE SENDER UNIT

1. Remove the fuel gauge sender unit. (See **FUEL PUMP UNIT REMOVAL/INSTALLATION [MZI-3.7]** .)
2. Install in the reverse order of removal.

FUEL GAUGE SENDER SUB-UNIT

WARNING:

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure".**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel gauge sender sub-unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

CAUTION:

- **Because the fuel tank is constructed such that the fuel level is higher than the installation surface of the fuel pump, fuel leakage could occur. If the fuel gauge indicates a fuel level of half or more, perform the following Steps 1-6 to drain approx. 10-15 L {11-15 US gal, 8.8-13 Imp gal} of fuel.**
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**

1. Level the vehicle.
2. Complete the "BEFORE SERVICE PRECAUTION". (See **BEFORE SERVICE PRECAUTION [MZI-3.7]** .)
3. Disconnect the negative battery cable.
4. Remove the engine cover. (See **ENGINE COVER REMOVAL/INSTALLATION [MZI-3.7]** .)
5. Remove the fuel line schrader valve cap.
6. Connect a long hose to the disconnected schrader valve cap and drain the fuel into a container used for collecting gasoline.

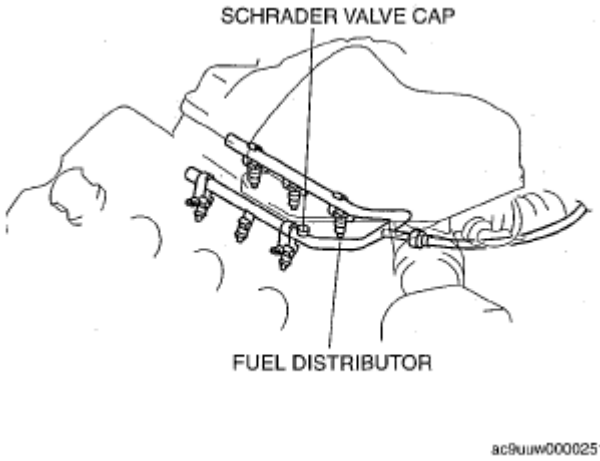


Fig. 8: Identifying Fuel Line Schrader Valve Cap & Fuel Distributor
Courtesy of MAZDA MOTORS CORP.

7. Start the fuel pump using the following procedure.

Using M-MDS

1. Connect the negative battery cable.
2. Connect the M-MDS to the DLC-2.
3. Using the simulation function "FP", start the fuel pump.

Without using M-MDS

1. Insert a flathead screwdriver into tab part of the check connector and remove the check connector cap.

CAUTION:
- **Connecting to the wrong check connector terminal may only to cause malfunction. Carefully connect the specified terminal.**

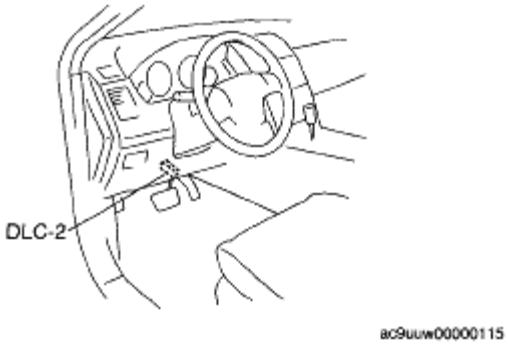


Fig. 9: Identifying Data Link Connector 2
Courtesy of MAZDA MOTORS CORP.

2. Using a jumper wire, short the following check connector terminals.
   - Terminal A and terminal C
   - Terminal E and body ground
3. Connect the negative battery cable.
4. Turn the ignition switch to ON position to operate the fuel pump.

CAUTION:

- **The fuel pump could be damaged if it is operated (fuel pump idling) while there is no fuel in the fuel tank. Verify the amount of fuel being discharged from the hose and stop operation of the fuel pump when essentially no fuel is being discharged.**

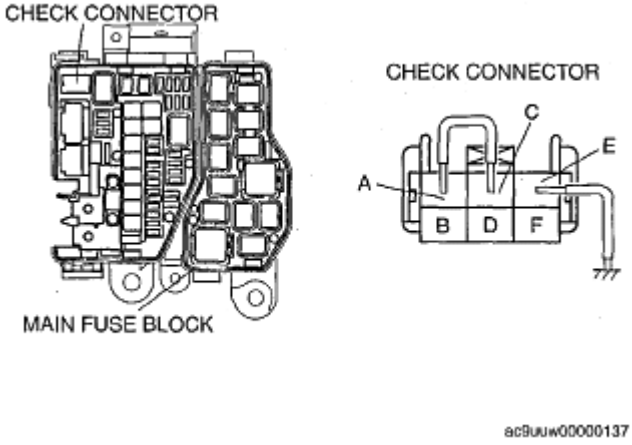
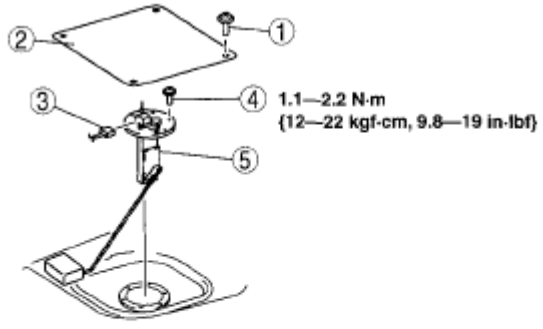


Fig. 10: Identifying Check Connector Terminals
Courtesy of MAZDA MOTORS CORP.

8. When essentially no fuel is being discharged, stop operation of the fuel pump.
9. Disconnect the negative battery cable.
10. Remove the following parts:

1. Second-row seat (RH) (See **SECOND-ROW SEAT REMOVAL/INSTALLATION** .)
2. Edge cover (See **LONG SLIDER REMOVAL/INSTALLATION** .)
3. Long slider cover (See **LONG SLIDER REMOVAL/INSTALLATION** .)
4. Rear heat duct No.4 (See **REAR HEAT DUCT COMPONENT REMOVAL/INSTALLATION** .)

11. Remove in the order indicated in the table.



1	Screw
2	Service hole cover
3	Connector
4	Screw
5	Fuel gauge sender sub-unit

Fig. 11: Identifying Fuel Gauge Sender Sub-Unit Components & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

12. Install in the reverse order of removal.
13. Complete the "AFTER SERVICE PRECAUTION". (See **AFTER SERVICE PRECAUTION [MZI-3.7]** .)

FUEL GAUGE SENDER UNIT INSPECTION

1. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and C (fuel gauge sender unit) or A and B (fuel gauge sender sub-unit) of the unit and the position of the float are as indicated in the figure.

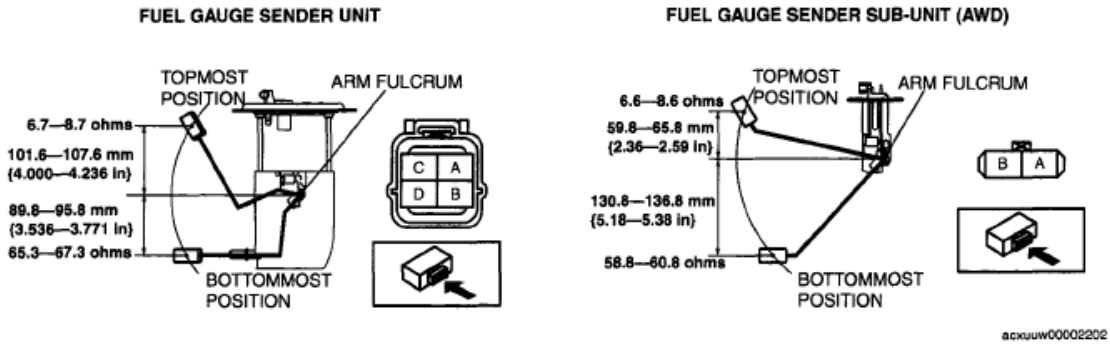


Fig. 12: Identifying Topmost & Bottommost Positions Of Float & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

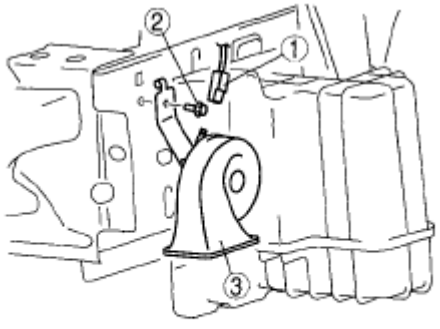
- If they are not as indicated, replace the fuel gauge sender unit or fuel gauge sender sub-unit.

OIL PRESSURE SWITCH INSPECTION

1. Verify that the oil pressure warning light illuminates when the ignition switch is at the ON position.
2. Verify that the oil pressure warning light goes out when the engine is started.
    - If the oil pressure warning light does not illuminate or remains illuminated, inspect the BCM and related wiring harness.
        - If the BCM and related wiring harness are normal, inspect the oil pressure. (See **OIL PRESSURE INSPECTION [MZI-3.7]** .)
            - If the oil pressure is normal, replace the oil pressure switch.

HORN REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Slightly bend back the mudguard.
3. Remove in the order indicated in the table.



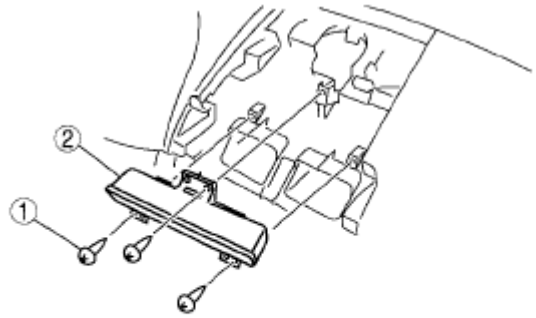
1	Connector
2	Bolt
3	Horn

Fig. 13: Identifying Horn Components
Courtesy of MAZDA MOTORS CORP.

4. Install in the reverse order of removal.

INFORMATION DISPLAY REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the following parts:
    1. Front console box mat (See **FRONT CONSOLE BOX MAT REMOVAL/INSTALLATION** .)
    2. Indicator panel (See **INDICATOR PANEL REMOVAL/INSTALLATION** .)
    3. Decoration panel (See **DECORATION PANEL REMOVAL/INSTALLATION** .)
    4. Front console box (See **FRONT CONSOLE BOX REMOVAL/INSTALLATION** .)
    5. Center panel (See **CENTER PANEL REMOVAL/INSTALLATION** .)
3. Remove in the order indicated in the table.



1	Screw
2	Information display
3	Connector

Fig. 14: Identifying Information Display Components
Courtesy of MAZDA MOTORS CORP.

4. Install in the reverse order of removal.

INFORMATION DISPLAY INPUT/OUTPUT CHECK MODE

NOTE:

- **In this mode, it is possible to verify the items in the following chart.**

CHECK CODE TABLE

CHECK CODE TABLE

Check code	Check item	Related items

01	Information display	CAN system • DTC U2516: CAN system communication error
02	• Audio unit • Climate control unit	CAN system • DTC U0184: Communication error to audio unit • DTC U0164: Communication error to climate control unit
04	TNS relay	• TNS relay • TNS signal wiring harness
06	Ignition switch	Ignition switch
07	Dimmer cancel switch (Instrument cluster)	• Instrument cluster • Related wiring harness
-	LCD	LCD

NOTE:

- **The check codes are displayed in numerical order. (While performing the inspection, if you want to inspect a check code with a number smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)**

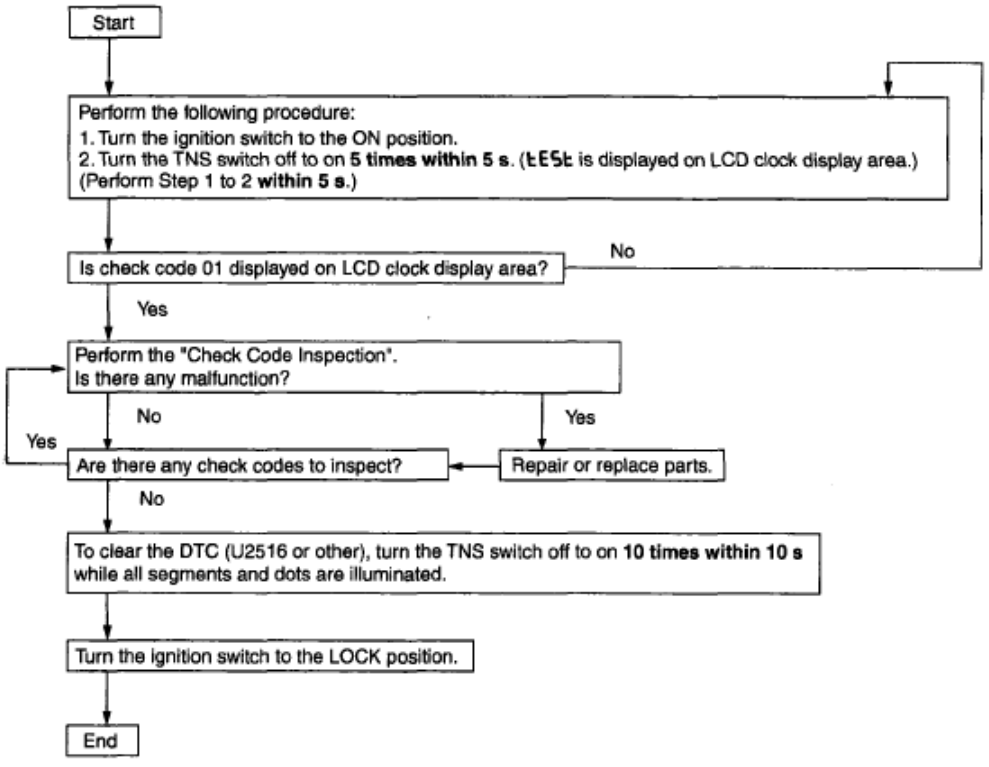


Fig. 15: Information Display Input/Output Check Mode Procedure Chart

Courtesy of MAZDA MOTORS CORP.

CHECK CODE INSPECTION

Check code 01

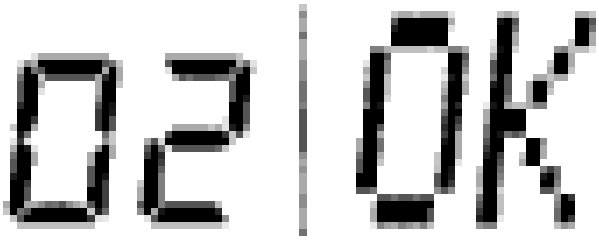
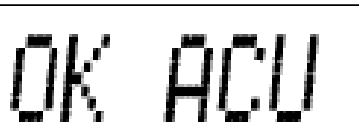
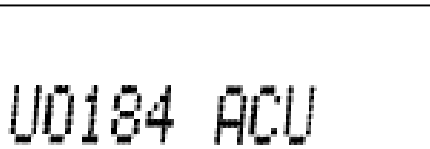
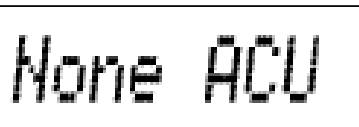
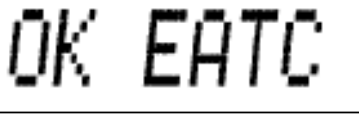
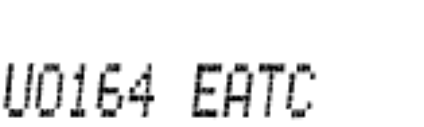
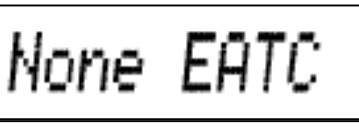
CHECK CODE INSPECTION CHART (CHECK CODE 01)

Check code 01	CAN system	
INSPECTION CONDITION	**DISPLAY**	**ACTION**
Select the check code 01.		CAN system of information display is normal.
		CAN system communication error. (DTC U2516) (See **DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM]**)

Check code 02

CHECK CODE INSPECTION CHART (CHECK CODE 02)

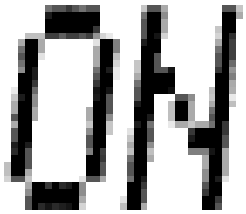
Check code 02	• Communication status to audio unit • Communication status to climate control unit	
INSPECTION CONDITION	**DISPLAY**	**ACTION**
		All communications are normal.

Select the check code 02. (The diagnostic results will be displayed once each in the order of audio unit and heater control unit.)			
	Audio unit		Communication to audio unit is normal.
			Communication error to audio unit. (DTC U0184) (See **DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM]**)
			Vehicle without audio unit.
	Climate control unit		Communication to climate control unit is normal.
			Communication error to climate control unit. (DTC U0164) (See **DTC TABLE [MULTIPLEX COMMUNICATION SYSTEM]**)
			Vehicle without climate control unit.

Check code 04

CHECK CODE INSPECTION CHART (CHECK CODE 04)

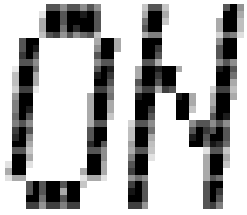
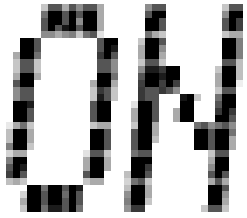
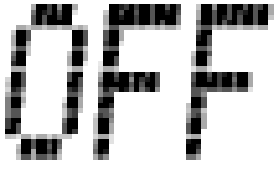
Check code 04		TNS relay ON/OFF signal	
STEP	**INSPECTION CONDITION**	**DISPLAY**	**ACTION**

1	Turn the headlight switch to the TNS position. (TNS relay ON)		Go to the next step.
			Verify that the voltage of information display terminal C is **B+.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ TNS relay ○ Wiring harness (Battery-TNS relay-information display)
2	Turn the headlight switch off. (TNS relay OFF)		Verify that the voltage of the information display terminal C is **1.0 V or less.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ TNS relay ○ Wiring harness (TNS relay-information display)
			Input signal to the information display is normal.

Check code 06

CHECK CODE INSPECTION CHART (CHECK CODE 06)

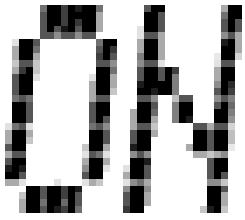
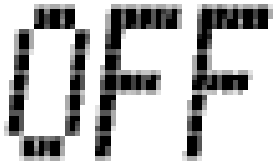
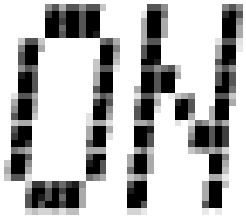
Check code 06		Ignition switch ON/OFF signal	
	INSPECTION		

STEP	CONDITION	DISPLAY	ACTION
1	Turn the ignition switch to the ON position.		Go to the next step.
			Verify that the voltage of information display terminal E is **B+.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ Ignition switch ○ Wiring harness (Battery-ignition switch-information display)
2	Turn the ignition switch off.		Verify that the voltage of the information display terminal E is **1.0 V or less.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ Ignition switch ○ Wiring harness (Battery-ignition switch-information display)
			Input signal to the information display is normal.

Check code 07

CHECK CODE INSPECTION CHART (CHECK CODE 07)

Check code 07	Dimmer cancel switch ON/OFF signal	

STEP	INSPECTION CONDITION	DISPLAY	ACTION
1	Turn the dimmer cancel switch to the ON position.		Go to the next step.
			Verify that the voltage of information display terminal F is **0 V.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ Instrument cluster ○ Wiring harness (Information display-instrument cluster)
2	Turn the dimmer cancel switch off.		Verify that the voltage of the information display terminal F is **B+.** • If the voltage is as specified, replace the information display. • If the voltage is not as specified, inspect the following parts: ○ Instrument cluster ○ Wiring harness (Information display-instrument cluster)
			Input signal to the information display is normal.

LCD

CHECK CODE INSPECTION CHART (LCD)

Check code -	LCD
DISPLAY	ACTION

	All segments and dots illuminated.	LCD is normal.
	Except above	Replace the information display.

BLIND SPOT MONITORING (BSM) CONTROL MODULE REMOVAL/INSTALLATION

CAUTION:

- **If the BSM control modules are installed with the left and right modules reversed, a DTC will be displayed and system will enter the fail-safe function. Therefore, confirm that the left/right BSM control modules are installed correctly.**

1. Disconnect the negative battery cable.
2. Remove the rear combination light. (See **REAR COMBINATION LIGHT REMOVAL/INSTALLATION** .)
3. Remove the rear bumper. (See **REAR BUMPER REMOVAL/INSTALLATION** .)
4. Pull the connector in the direction shown by the arrow (2) in the+ figure and remove it while pressing the tab in the direction shown by arrow (1).
5. Remove the nuts.
6. Remove the BSM control module.
7. Install in the reverse order of removal.
8. Perform the blind spot monitoring radar test. (See **BLIND SPOT MONITORING (BSM)** RADAR TEST.)

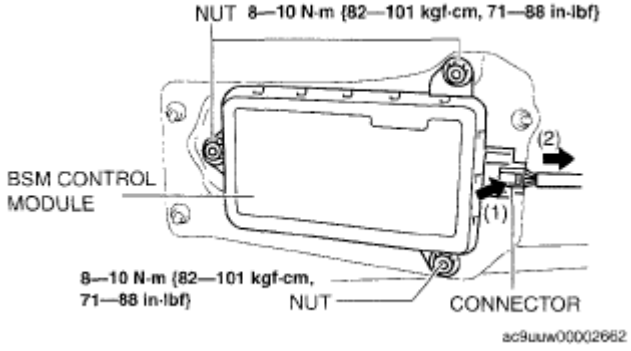


Fig. 16: View Of Blind Spot Monitoring Control Module & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

BLIND SPOT MONITORING (BSM) CONTROL MODULE INSPECTION

1. Remove the trunk box. (See **TRUNK BOX REMOVAL/INSTALLATION** .)
2. Remove the seat side box. (BSM control module (LH) only) (See **SEAT SIDE BOX REMOVAL/INSTALLATION** .)
3. Remove the trunk end trim. (BSM control module (LH) only) (Vehicles with Bose®) (See **TRUNK END**

TRIM REMOVAL/INSTALLATION .)

4. Remove the bass-box. (BSM control module (LH) only) (Vehicles with Bose®) (See **BASS-BOX REMOVAL/INSTALLATION** .)
5. Remove the BSM control module with the connector connected.
6. Measure the BSM control module terminal voltage using the short wiring harness connector in the position shown in the figure.

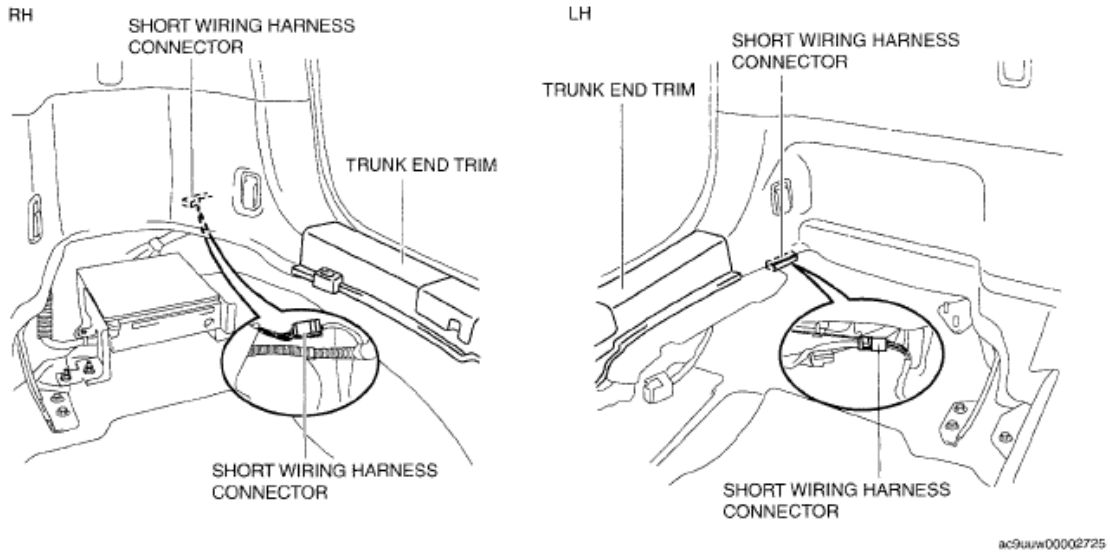


Fig. 17: Identifying Trunk End Trim & BSM Control Module Short Wiring Harness Connector
Courtesy of MAZDA MOTORS CORP.

NOTE:

- **The BSM control module connector cannot be connected to a tester due to its water-resistance processing, therefore the short wiring harness connector is used for measuring the terminal voltage.**
- **If the terminal voltage is not as indicated in the table, inspect the short wiring harness connector for continuity. (See CONTINUITY INSPECTION OF SHORT WIRING HARNESS CONNECTOR.) If the short wiring harness connector is normal, inspect the parts under "Inspection items".**
  - **If the system does not work properly even though the parts or related wiring harnesses do not have any malfunction, replace the BSM control module.**

TERMINAL VOLTAGE TABLE (REFERENCE)

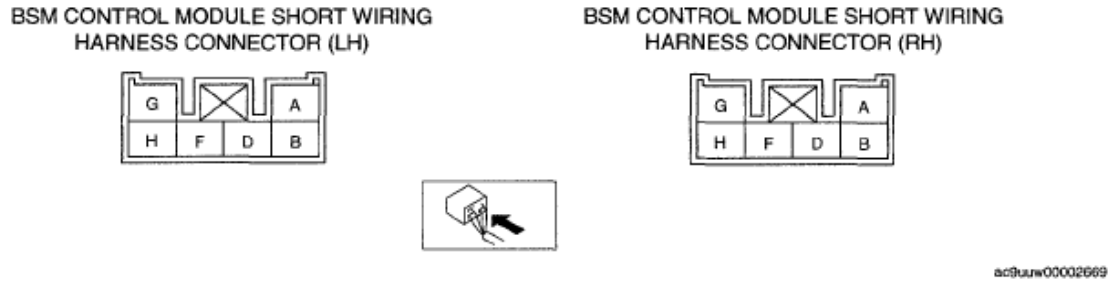


Fig. 18: Identifying BSM Control Module Short Wiring Harness Connector Terminals
Courtesy of MAZDA MOTORS CORP.

VOLTAGE SPECIFICATION

Terminal	Signal	Connected to	Measurement condition		Voltage (V)/ Continuity	Inspection item (s)
A	BCM GND	Body ground	Under any condition		1.0 or less	• Related wiring harnesses
B	BSM indicator light signal	BSM indicator light	Ignition switch is in ON position and BSM indicator light is illuminated		B+	• BSM indicator light • Related wiring harnesses
			BSM indicator light is not illuminated		1.0 or less	
C	-	-	-		-	-
D(1)	BSM OFF switch signal	BSM OFF switch	Ignition switch at ON	BSM OFF switch is pressed	1.0 or less	• BSM OFF switch • Related wiring harnesses
				BSM OFF switch is not pressed	B+	
D(2)	-	-	-		-	-
E	-	-	-		-	-
F	CAN_L	-	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.			• Related wiring harnesses
G	Power supply	fuse	Ignition switch at ON		B+	• fuse • Related wiring harnesses
			Ignition switch off		1.0 or less	
H	CAN_H	-	Because this terminal is for communication, good/no good judgment by terminal voltage is not possible.			• Related wiring harnesses

(1) BSM control module (RH) only

(2) BSM control module (LH) only

NOTE:

- **Terminal voltage of both the left and right BSM control modules is equivalent**

CONTINUITY INSPECTION OF SHORT WIRING HARNESS CONNECTOR

1. Verify that the continuity between the short wiring harness connector terminals is as indicated in the table.
    - If the continuity is not as indicated in the table, replace the short wiring harness connector.

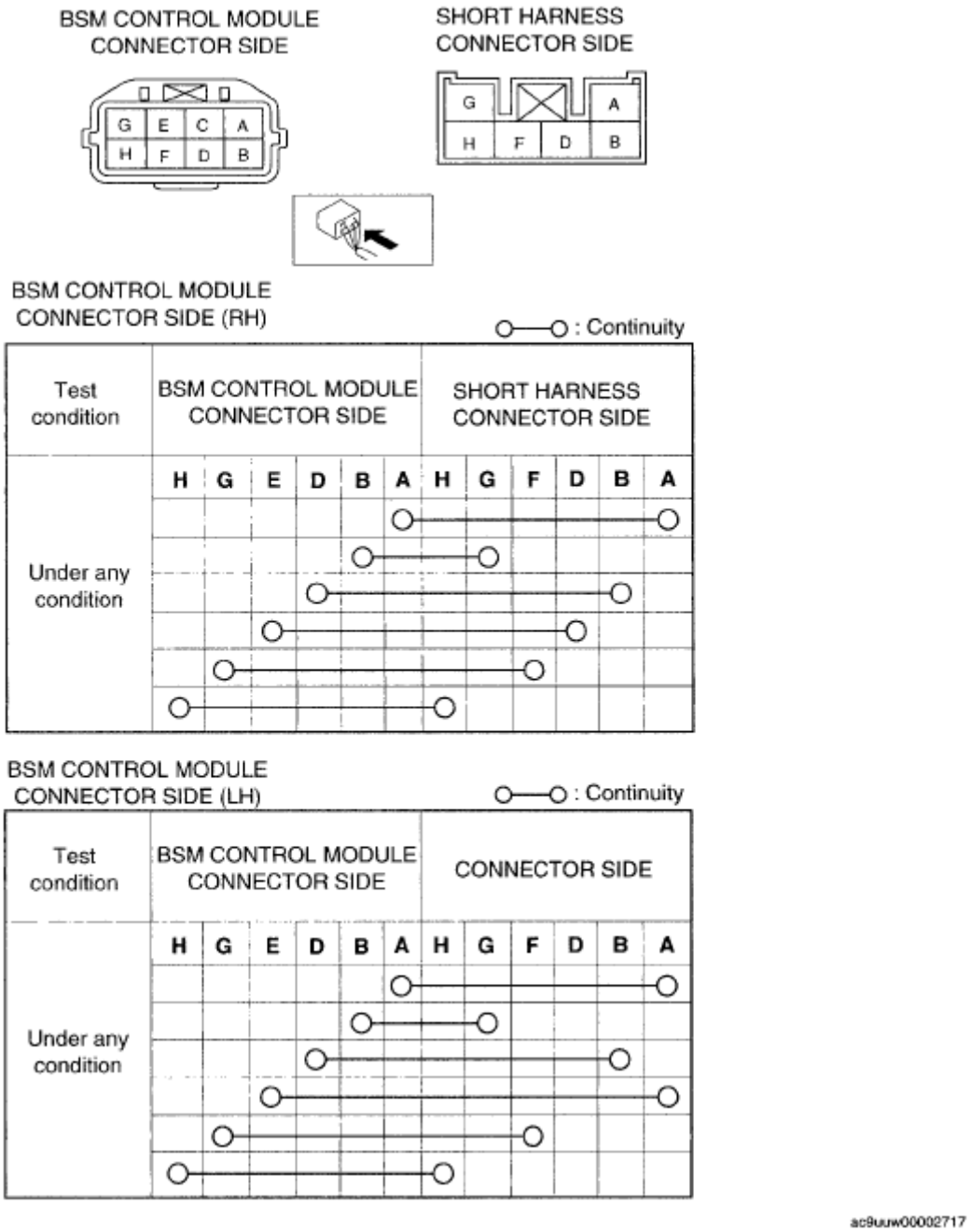


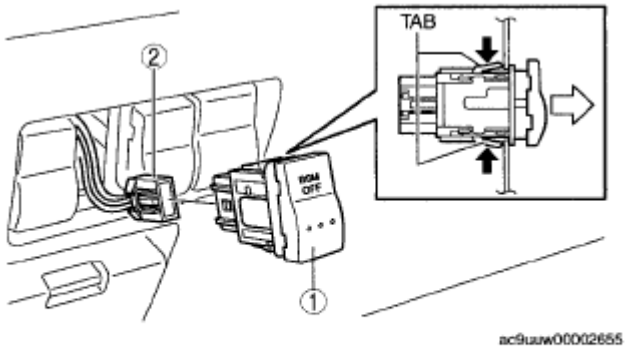
Fig. 19: BSM Control Module Short Connector Terminals Continuity Chart
Courtesy of MAZDA MOTORS CORP.

BLIND SPOT MONITORING (BSM) OFF SWITCH REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the dashboard under cover (LH). (See **DASHBOARD UNDER COVER REMOVAL/INSTALLATION** .)
3. Remove the hood release lever. (See **HOOD LATCH AND RELEASE LEVER**

REMOVAL/INSTALLATION .)

4. Remove in the order indicated in the table.



1	BSM OFF switch (See 09-22-22 BSM OFF Switch Removal Note.)
2	BSM OFF switch connector

Fig. 20: View Of Blind Spot Monitoring OFF Switch
Courtesy of MAZDA MOTORS CORP.

5. Install in the reverse order of removal.

BSM OFF SWITCH REMOVAL NOTE

1. Access the BSM OFF switch from behind of the dashboard, and squeeze the tabs of the switch.
2. Remove the BSM OFF switch from the dashboard.

BLIND SPOT MONITORING (BSM) OFF SWITCH INSPECTION

1. Remove the BSM OFF switch. (See **BLIND SPOT MONITORING (BSM)** OFF SWITCH REMOVAL/INSTALLATION.)
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the BSM OFF switch.

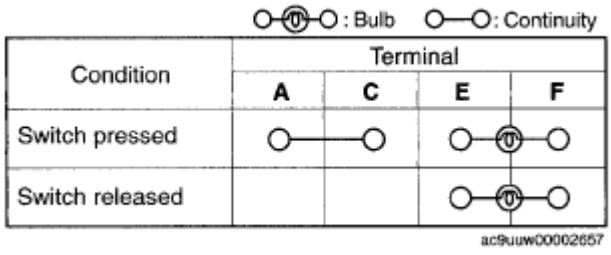


Fig. 21: Blind Spot Monitoring OFF Switch Terminals Continuity Chart
Courtesy of MAZDA MOTORS CORP.

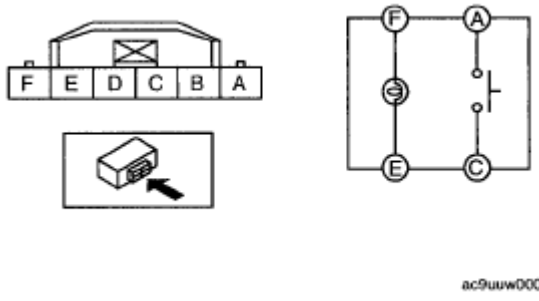


Fig. 22: Identifying Blind Spot Monitoring OFF Switch Terminals
Courtesy of MAZDA MOTORS CORP.

BLIND SPOT MONITORING (BSM) BRACKET REMOVAL/INSTALLATION

1. Disconnect the negative battery cable.
2. Remove the rear combination light. (See **REAR COMBINATION LIGHT REMOVAL/INSTALLATION** .)
3. Remove the rear bumper. (See **REAR BUMPER REMOVAL/INSTALLATION** .)
4. Remove the BSM control module. (See **BLIND SPOT MONITORING (BSM**) CONTROL MODULE REMOVAL/INSTALLATION.)
5. Remove the nuts.
6. Remove the BSM bracket.
7. Install in the reverse order of removal.

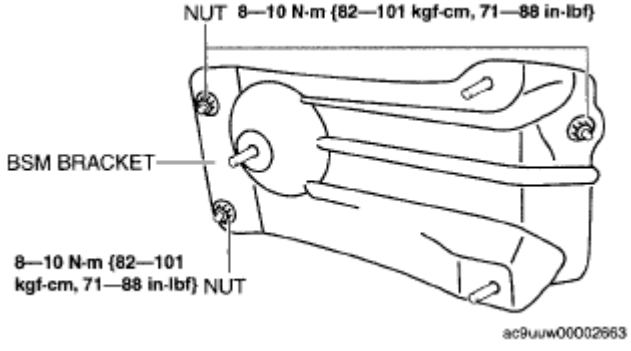


Fig. 23: Identifying Blind Spot Monitoring Bracket & Torque Specifications
Courtesy of MAZDA MOTORS CORP.

CUSTOMIZED FUNCTION SETTING PROCEDURE

1. Connect the M-MDS to the DLC-2.

NOTE:
- **The BSM can be customized using the IDS only.**

2. After vehicle identification, the following can be selected from the IDS initialization screen.

1. Select "Module Programming".

3. Then, select items from the screen menu in the following order.
    1. Select "Programmable Parameters".
    2. Select "Personality".
4. Select the item name, and than select either "Enabled/Disabled".

Items

- BSM buzzer

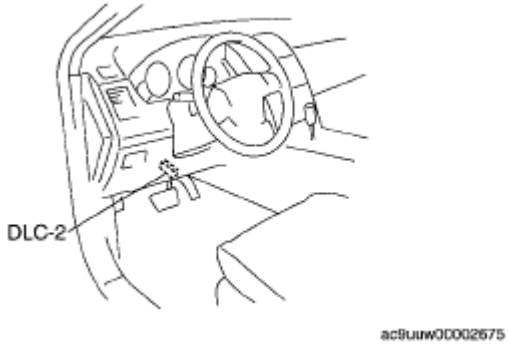


Fig. 24: Identifying Data Link Connector 2
Courtesy of MAZDA MOTORS CORP.

BLIND SPOT MONITORING (BSM) RADAR TEST

INTRODUCTION

- The BSM radar test examines the reflectivity from the SST (reflector) by forcibly emitting radar to the SST.
- One BSM control module is installed on the left and right sides. Perform the radar test for each of them.
- Perform the radar test on level ground. The correct test results cannot be obtained if the vehicle and reflector are set at different heights or different angles.
- A radar test cannot be performed correctly if obstructions which interfere with radar emitting adhere to the BSM control module or the rear bumper. Perform the following procedure before performing the radar test.
    - Verify that there is no water or dirt adhering to the radar emitting surface of the BSM control module and the rear bumper.
    - Verify that there is no problem with the radar emitting surface of the BSM control module and the rear bumper such as dirt, application of metallic stickers, or repairs using putty application.
- Perform the DTC inspection for the BSM using the M-MDS and verify that no DTCs are displayed.
    - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection. (See **DTC TABLE [BLIND SPOT MONITORING (BSM)]** .)

RADAR TEST PROCEDURE

1. Remove any occupants and unload cargo from the cabin and trunk compartment so that the vehicle is in an unloaded condition.
2. Adjust the air pressure of each tire to the specified value.
3. Park the vehicle on a flat, level surface.
4. Verify that there is no obstruction within a **3,500 mm {137.8 in}** radius from the BSM control module as shown in the figure.

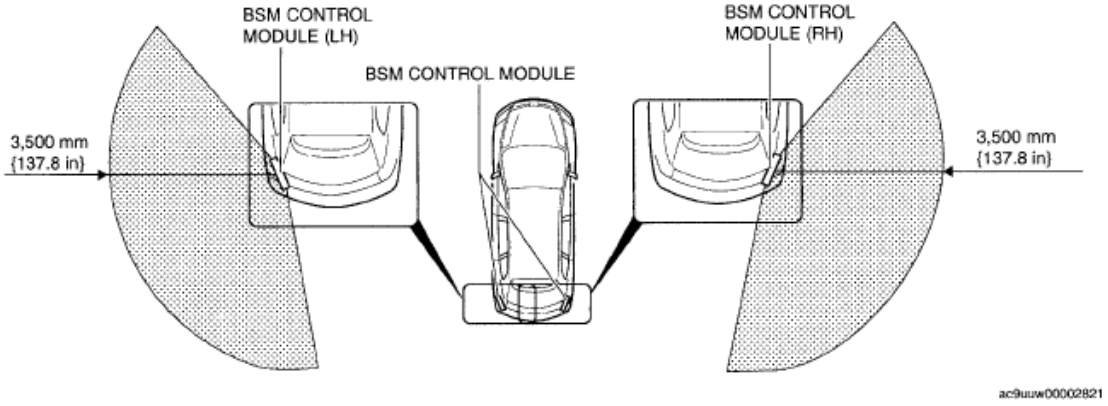


Fig. 25: Identifying BSM Control Module Radius
Courtesy of MAZDA MOTORS CORP.

CAUTION:
- **If an obstruction such as a drain lid or a person is within a 3,500 mm {137.8 in} radius from the BSM control module, it will interfere with radar emitting and skew the radar test results. Remove any obstruction which is within a 3,500 mm {137.8 in} radius from the BSM control module.**

5. Adjust the SST (plum-bob) so that it is aligned with the center of the brand emblem, determine the center position at the front of the vehicle, and mark the center position on the floor surface.

NOTE:
- **The center of the brand emblem indicates the center position at the front of the vehicle.**
- **A commercially-available plum-bob (weight: 150 g {5.29 oz}) can be substituted for the SST.**

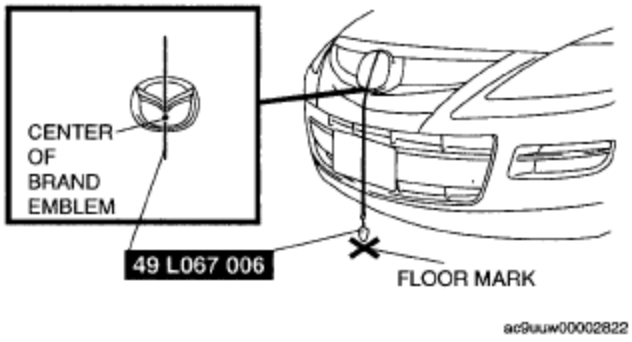


Fig. 26: Identifying Center Of Brand Emblem
Courtesy of MAZDA MOTORS CORP.

6. Adjust the SST (plum-bob) so that it is aligned with the center of the brand emblem, determine the center position at the rear of the vehicle, and mark the center position on the floor surface.

NOTE:
- **The center of the brand emblem indicates the center position at the front of the vehicle.**
- **A commercially-available plum-bob (weight: 150 g {5.29 oz}) can be substituted for the SST.**

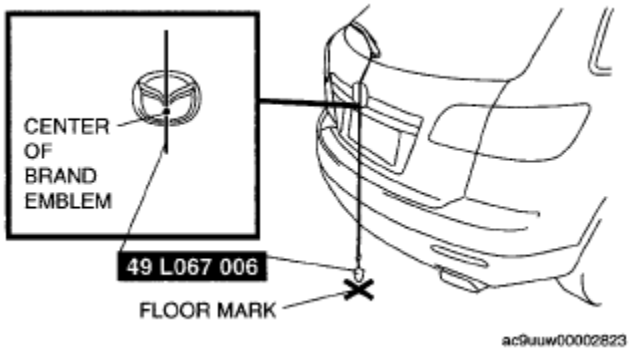


Fig. 27: Identifying Center Position Of Vehicle (Rear)
Courtesy of MAZDA MOTORS CORP.

7. Position the leveling line over the marked positions at the front and rear of the vehicle, and then mark the position on the floor surface **1,470 mm ± 8 mm {57.87 in ± 0.3 in}** from the vehicle rear.

CAUTION:
- **If the center position at the vehicle rear is set first, the leveling line could be misaligned. Determine the center position at the vehicle front first, then set the center position at the vehicle rear.**

NOTE:
- **Use a commercially-available leveling line.**

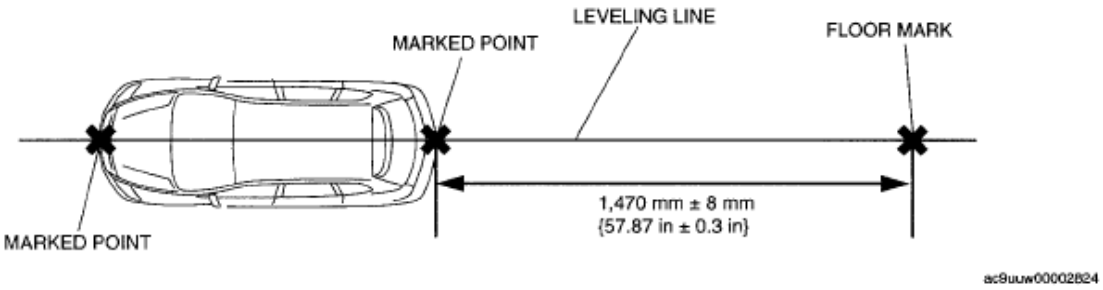


Fig. 28: Identifying Leveling Line Position
Courtesy of MAZDA MOTORS CORP.

8. Mark the position on the floor where a right angle is formed by the lines which cross at the point **1,470 mm ± 8 mm {57.87 in ± 0.3 in}** from the vehicle rear and the point **1,790 mm ± 8 mm {70.47 in ± 0.8 in}** from the vehicle side which is perpendicular to the vehicle's center line.

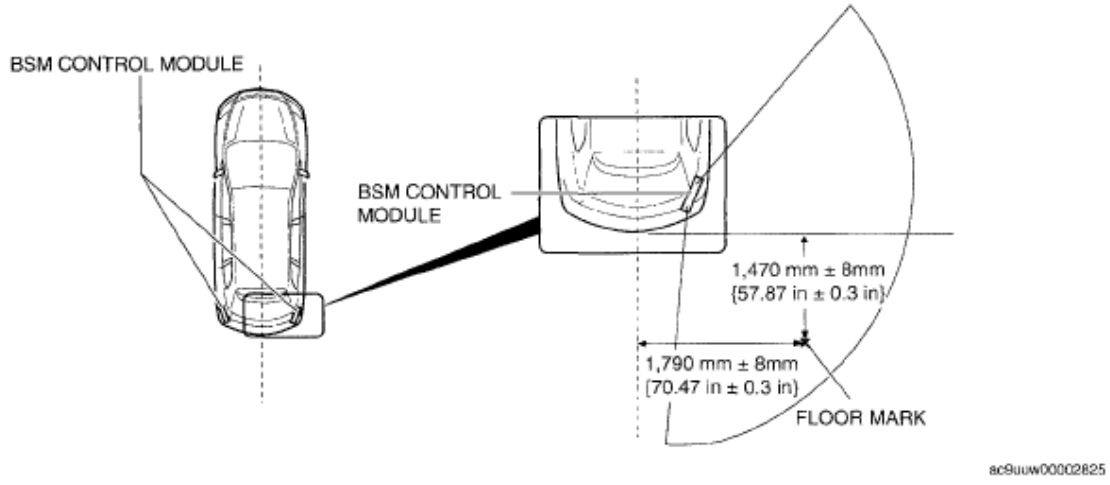


Fig. 29: Identifying BSM Control Module Radius
Courtesy of MAZDA MOTORS CORP.

9. Set the SST (reflector) installation surface level using the bubble level built into the SST (tripod).

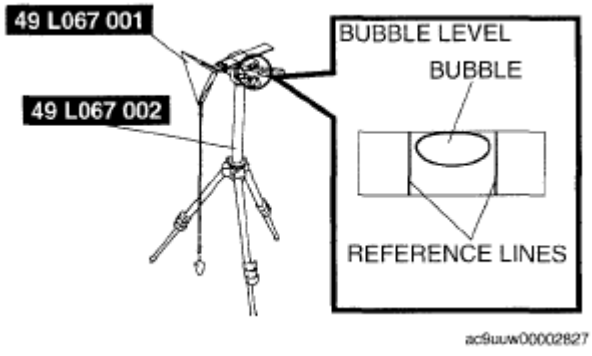


Fig. 30: Identifying SST (Reflector)

Courtesy of MAZDA MOTORS CORP.

10. Install the SSTs (reflector and plum-bob) to the SST (tripod) and adjust the height of the reflector at its center to **534 mm ± 8 mm {21.0 in ± 0.3 in}.**

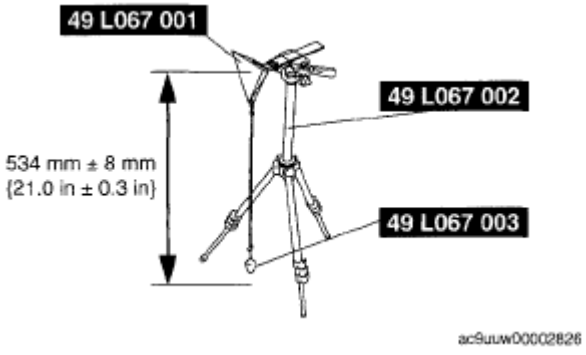


Fig. 31: Identifying Height Of Reflector
Courtesy of MAZDA MOTORS CORP.

11. Verify visually that the reflecting surface of the reflector is facing the BSM control module, and position the SST (tripod) so that the SST (plum-bob) is positioned over the marked position.

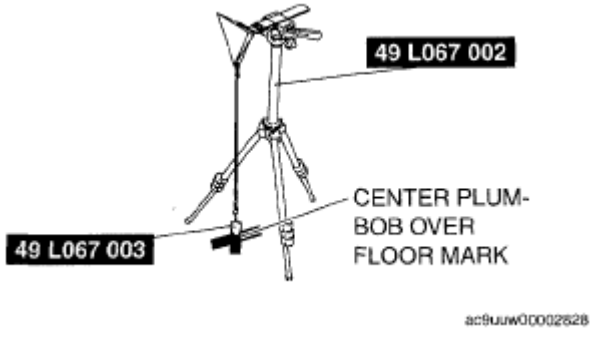


Fig. 32: Identifying Center Plumbob Over Floor Mark
Courtesy of MAZDA MOTORS CORP.

NOTE:
- **The BSM installation position is indicated in the figure.**

12. Perform the BSM radar test according to the screen instructions using the IDS.

NOTE:
- **Use the IDS (laptop PC) because the PDS (Pocket PC) does not support the blind spot monitoring (BSM) radar test.**

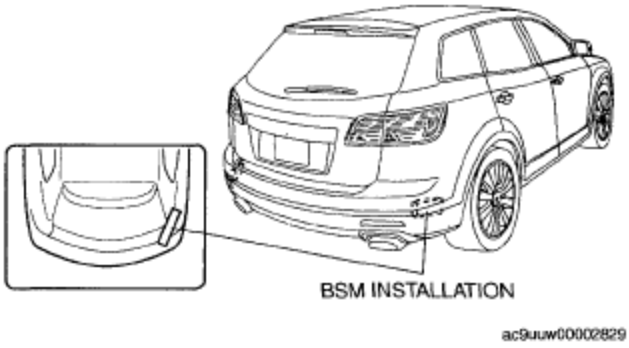


Fig. 33: Identifying BSM Installation Position
Courtesy of MAZDA MOTORS CORP.

13. Connect the M-MDS to the DLC-2.
14. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
    - When using the IDS (laptop PC)
        1. Select "Electrical".
15. Then, select items from the screen menu in the following order.
    1. Select "BSM Radar Test".
16. Perform the radar test according to the directions on the screen.
17. Verify the M-MDS display.
    - "TEST PASSED" is displayed
        - Radar is normal.
    - "TEST FAILED" is displayed
        - Perform the inspection according to the following table.

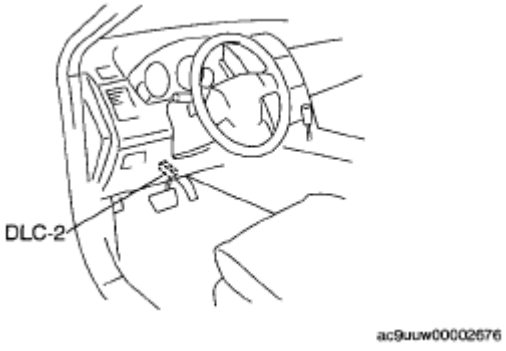


Fig. 34: Identifying Data Link Connector 2
Courtesy of MAZDA MOTORS CORP.

PROBLEM SYMPTOM CHART

Step	Inspection	Action	
	VERIFY REFLECTOR POSITION	Yes	Go to the next step.

1	• Verify if the reflector is set in the correct position. (See **BLIND SPOT MONITORING (BSM)** RADAR TEST.) • Is the reflector set in the correct position?	No	Set the reflector in the correct position and perform the BSM radar test. (See **BLIND SPOT MONITORING (BSM)** RADAR TEST.)
2	**RE-PERFORM BSM RADAR TEST** • Perform the BSM radar test. • Repeat the BSM radar test up to four times until "TEST PASSED" is displayed. (See **BLIND SPOT MONITORING (BSM)** RADAR TEST.) • Is "TEST PASSED" displayed?	Yes	BSM radar test completed.
		No	Go to the next step.
3	**VERIFY EFFECT OF REAR BUMPER** • Remove the rear bumper. (See **REAR BUMPER REMOVAL/INSTALLATION** .) • Perform the BSM radar test. • Repeat the BSM radar test up to four times until "TEST PASSED" is displayed. (See **BLIND SPOT MONITORING (BSM)** RADAR TEST.) • Is "TEST PASSED" displayed?	Yes	Replace the rear bumper. (See **REAR BUMPER REMOVAL/INSTALLATION** .)
		No	Go to the next step.
4	**INSPECT BSM CONTROL MODULE FOR INCORRECT INSTALLATION AND DISTORTION AT VEHICLE INSTALLATION SURFACE** • Inspect the BSM control module for incorrect installation and distortion at the vehicle installation surface. • Is the BSM control module installed correctly without distortion?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part, then go to the next step.
5	**PERFORM BSM RADAR TEST** • Perform the BSM radar test. • Repeat the BSM radar test up to four times until "TEST PASSED" is displayed. (See **BLIND SPOT MONITORING**	Yes	BSM radar test completed.
		No	Replace the BSM control module. (See **BLIND SPOT MONITORING (BSM)** CONTROL MODULE

	(BSM) RADAR TEST.) • Is "TEST PASSED" displayed?		REMOVAL/INSTALLATION.)