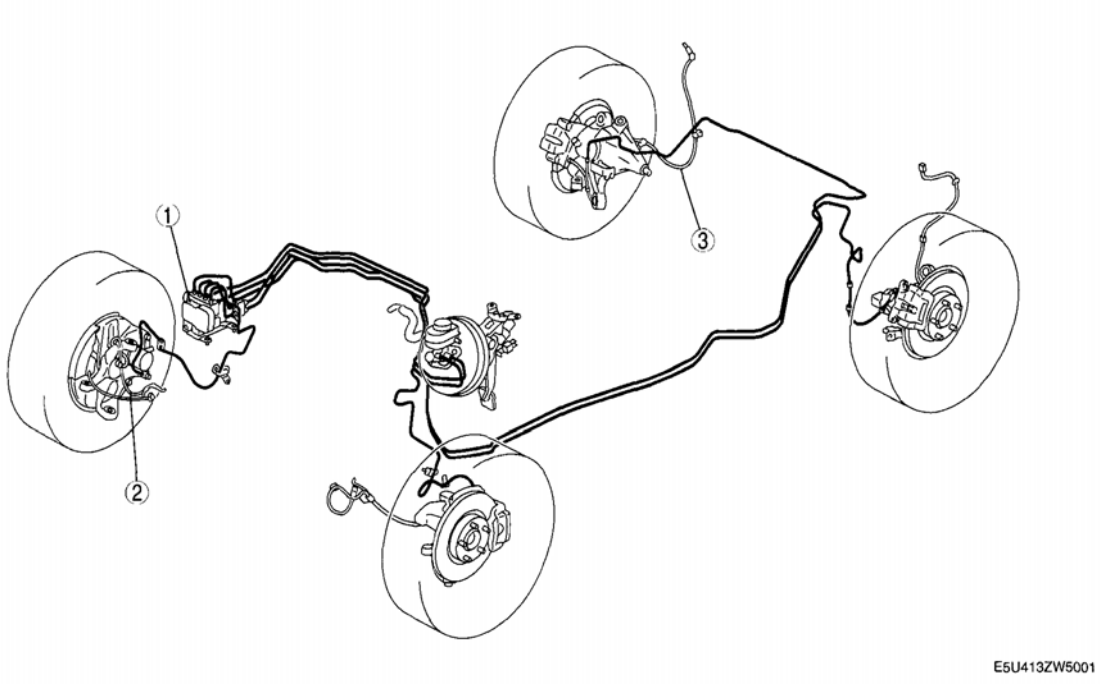
2008 BRAKES

Antilock Brake System - MX-5 Miata

ABS LOCATION INDEX



1	ABS HU/CM
2	Front ABS wheel-speed sensor
3	Rear ABS wheel-speed sensor

Fig. 1: Identifying Location Of ABS Components
Courtesy of MAZDA MOTORS CORP.

ABS SYSTEM WIRING DIAGRAM

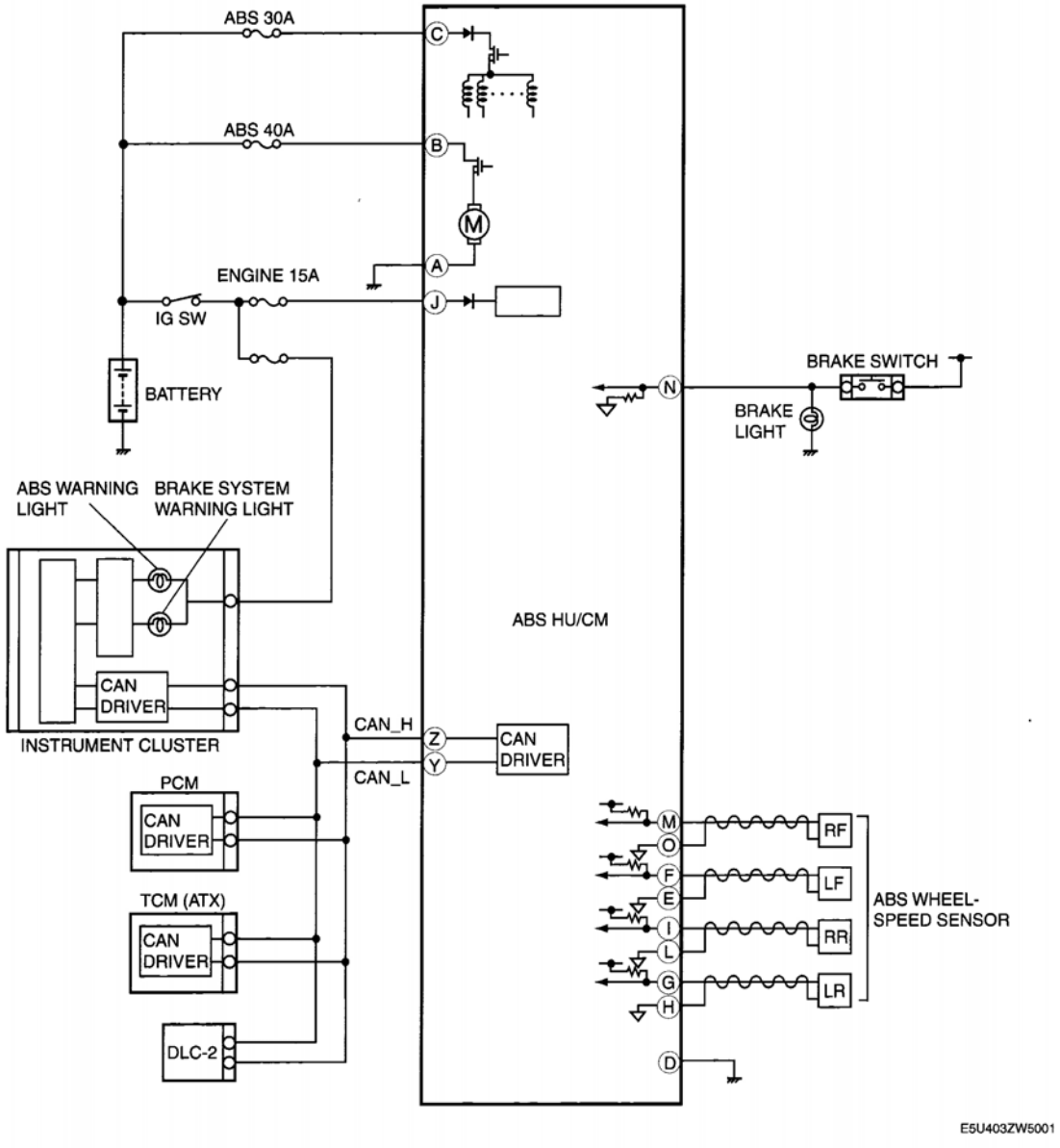


Fig. 2: ABS System Wiring Diagram
Courtesy of MAZDA MOTORS CORP.

ABS SYSTEM INSPECTION

ABS HYDRAULIC UNIT ON-VEHICLE INSPECTION

Preparation

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position and verify that the ABS warning light goes out after **approx.**

3s .

3. Turn the ignition switch off.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to neutral.
6. Release the parking brake.
7. Verify that all four wheels rotate.
8. Rotate the wheels by hand, and verify there is no brake drag.
    - If there is any brake drag, perform regular brake inspection.
    - If there is no brake drag, perform ABS HU/CM operation inspection.

Operation Inspection

1. Perform "Preparation".
2. Connect the M-MDS or equivalent to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

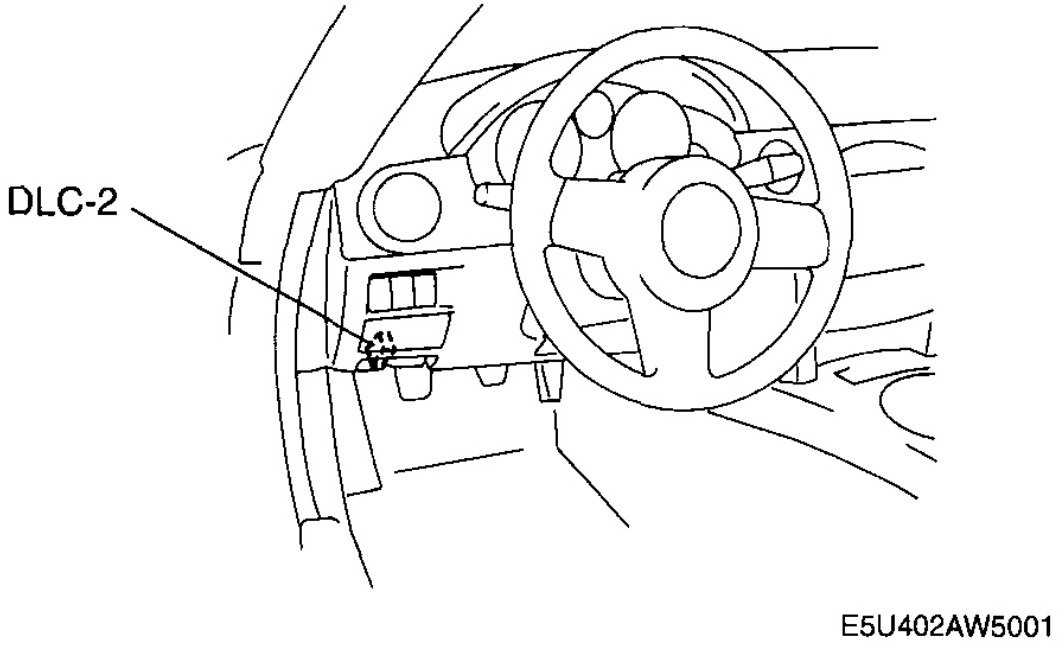


Fig. 3: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

ACTIVE COMMAND MODE INSPECTION REFERENCE TABLE

Operation	Command name			Command

condition	PMP_MOTOR	RF_OUTLET	RF_INLET	transmission type
Brake pressure retention	OFF	OFF	ON	Manual
Brake pressure reduction	ON	ON	ON	

The **ACTIVE COMMAND MODE INSPECTION REFERENCE TABLE** above shows an example of a right front wheel inspection.

CAUTION:
- **To protect the ABS HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

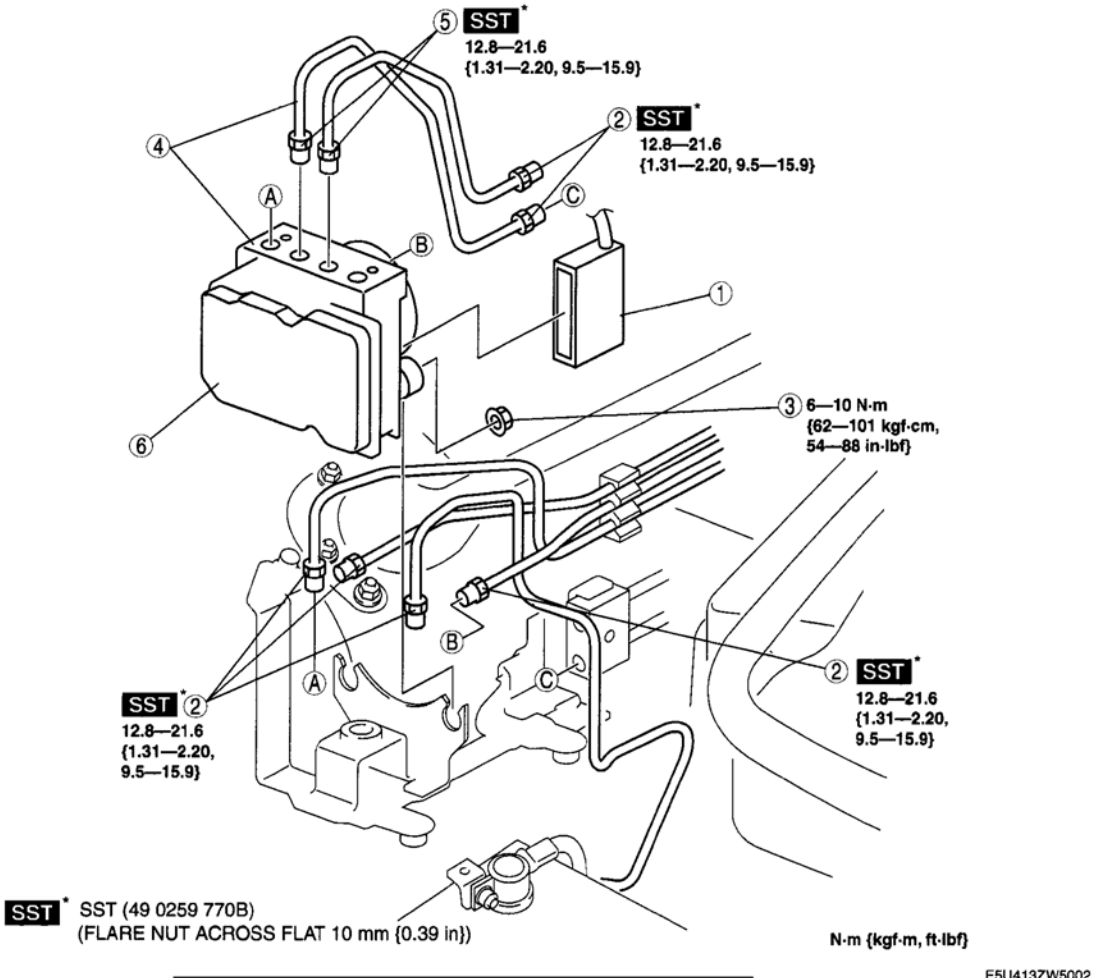
NOTE:
- **When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.**

4. Send the command while depressing the brake pedal and attempting to rotate the wheel being inspected.
5. Performing the inspection above determines the following:
   - The ABS HU/CM brake lines are normal.
   - The ABS HU/CM hydraulic system is not significantly abnormal (including inside ABS HU/CM).
   - The ABS HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
   - The ABS HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
     - However, the following items cannot be verified.
     - Malfunction of ABS HU/CM input system wiring harnesses and parts
     - Extremely small leaks in the ABS HU/CM internal hydraulic system
     - Malfunction with intermittent occurrence of the above items

ABS HU/CM REMOVAL/INSTALLATION

CAUTION:
- **When replacing the DSC HU/CM with a new one, configuration procedure must be performed before removing the DSC HU/CM. If configuration is not completed before removing the DSC HU/CM, DTC B2477 will be detected.**
- **The internal parts of the ABS HU/CM could be damaged if dropped. Be careful not to drop the ABS HU/CM. Replace the ABS HU/CM if it is subjected to an impact.**

1. Perform ABS configuration. (See **ABS CONFIGURATION** .)
2. Remove in the order indicated in **Fig. 4** .
3. Install in the reverse order of removal.



1	ABS HU/CM connector
2	Brake pipe
3	Nut
4	ABS HU/CM, brake pipe
5	Brake pipe (ABS HU/CM—brake pipe joint)
6	ABS HU/CM

Fig. 4: Identifying ABS HU/CM Steps (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

ABS HU/CM CONNECTOR REMOVAL NOTE

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

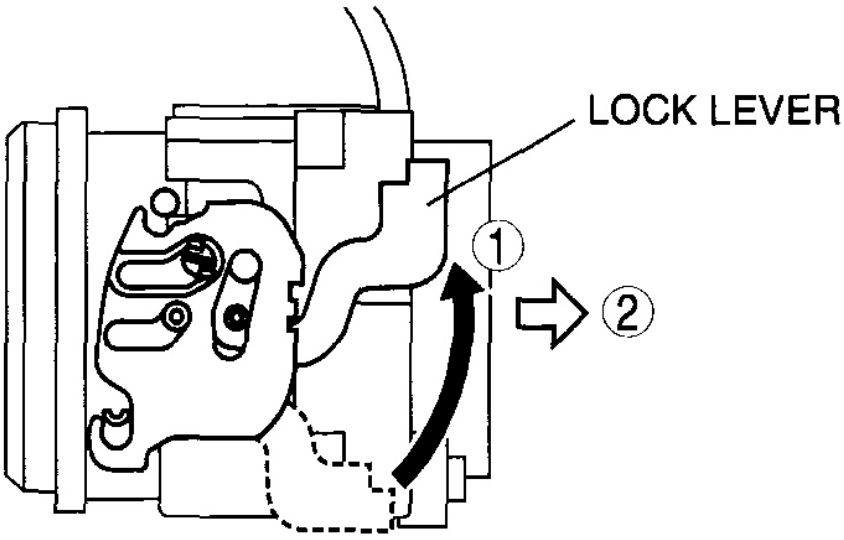


Fig. 5: Identifying Lock Lever Position
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE REMOVAL NOTE

1. Place an alignment mark on the brake pipe and ABS HU/CM.

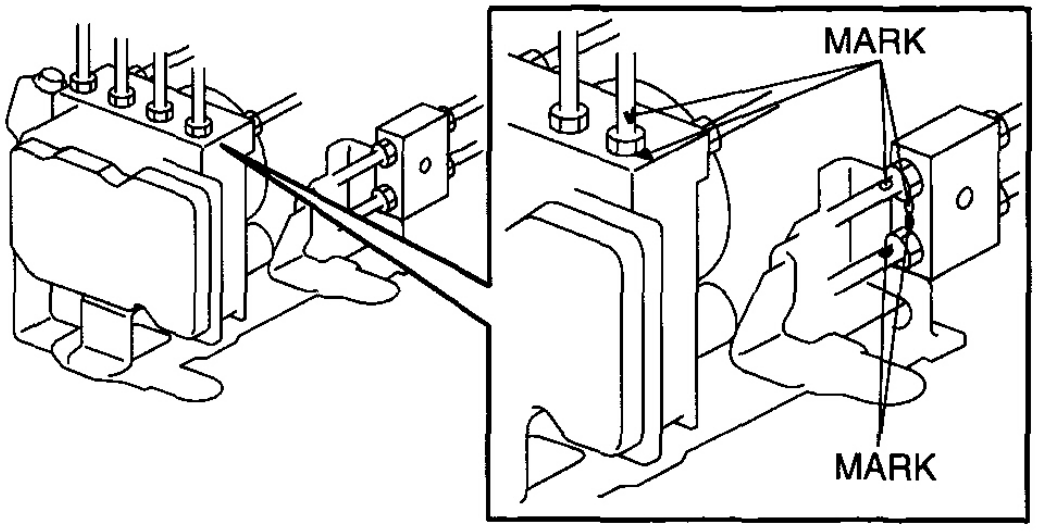


Fig. 6: Placing Alignment Mark On Brake Pipe & ABS HU/CM
Courtesy of MAZDA MOTORS CORP.

2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

BRAKE PIPE (ABS HU/CM-BRAKE PIPE JOINT) INSTALLATION NOTE

1. Align with the mark made before removing the brake pipe and temporarily install the brake pipe to the ABS HU/CM.

CAUTION:
- **If the brake pipe is tightened to the specified torque, it may be difficult to install it to the vehicle. Therefore, only temporarily tighten the brake pipe so that it can still be moved.**

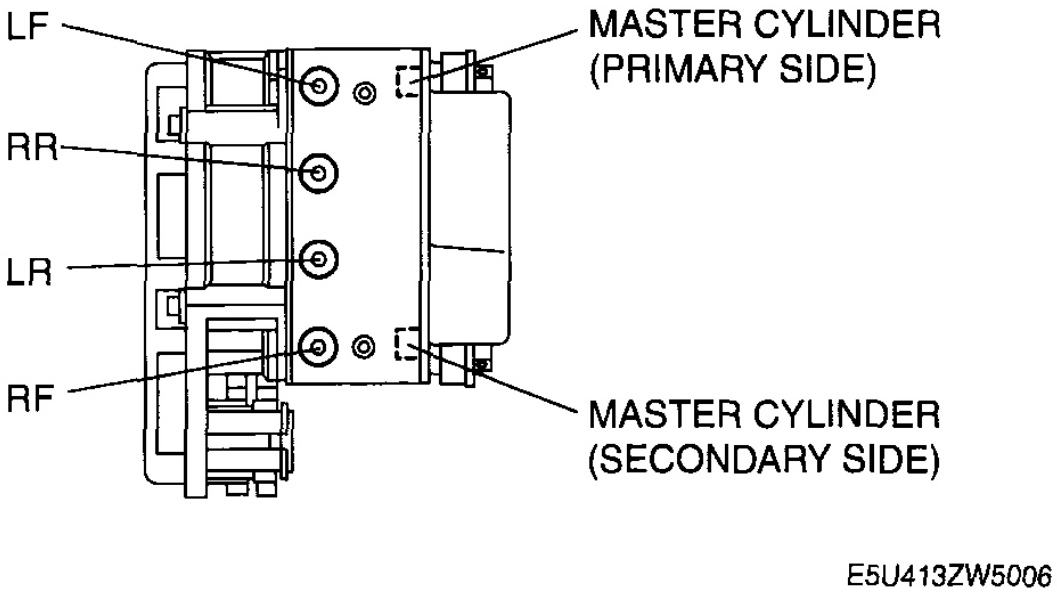


Fig. 7: Identifying Aligning Marks
Courtesy of MAZDA MOTORS CORP.

BRAKE PIPE INSTALLATION NOTE

1. Align the marks made before removal and install the brake pipe to the ABS HU/CM and brake pipe joint referring to **Fig. 7** .
2. Tighten the brake pipe to the specified torque using the **SST** (49 0259 770B).

ABS HU/CM CONNECTOR INSTALLATION NOTE

1. After connecting the connector, verify that the lock lever Is completely pushed in.

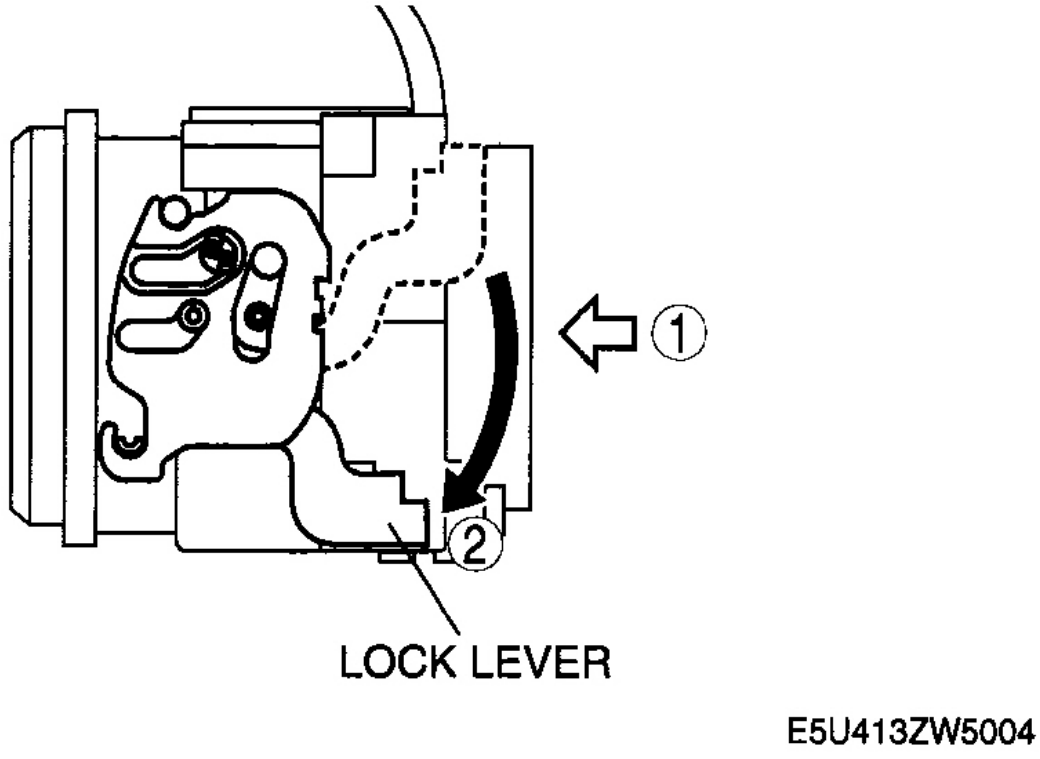


Fig. 8: Verifying Lock Lever Is Completely Pushed In
Courtesy of MAZDA MOTORS CORP.

ABS CONFIGURATION

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

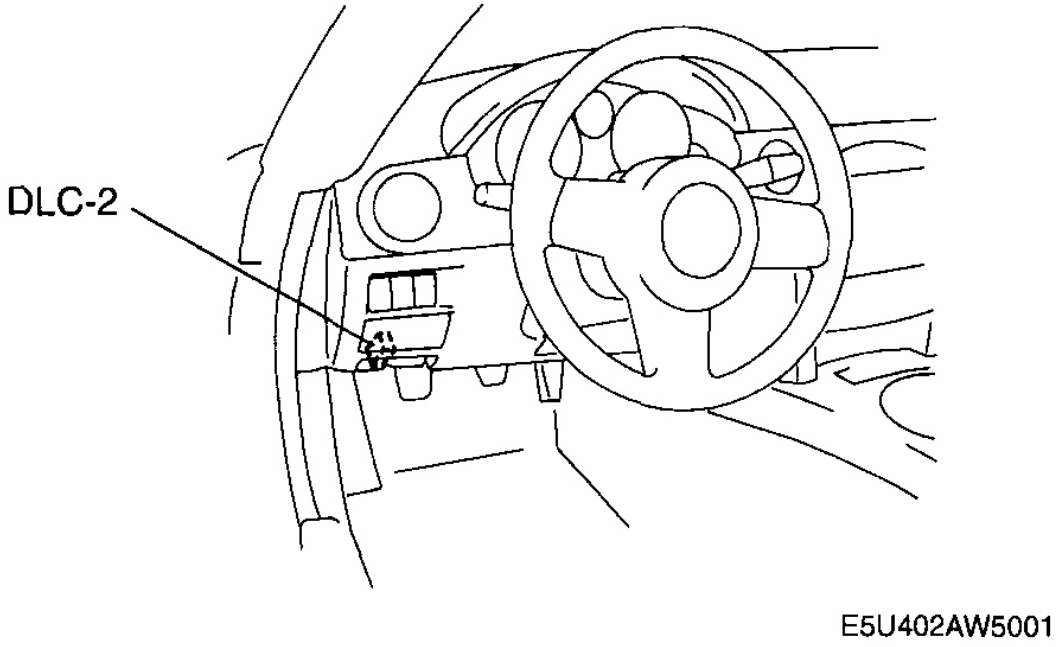


Fig. 9: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

2. After the Vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (laptop PC)
        1. Select the "Module Programming".
    - When using the PDS (Pocket PC)
        1. Select "Programming".
        2. Select "Module Programming".
3. Then, select the "Programmable Module Installation" and "ABS" from the screen menu.
4. Perform the configuration according to the directions on the screen.
5. Retrieve DTCs using the M-MDS, then verify if DTCs are present.
    - If a DTC is present, perform the applicable DTC inspection. (See **ON-BOARD DIAGNOSTIC (ABS) -- MX-5 MIATA**)

ABS HU/CM INSPECTION

1. Disconnect the ABS HU/CM connector.
2. Connect the negative battery cable.
3. Attach the tester lead to the ABS HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on **STANDARD (REFERENCE VALUE)**

TABLE .

STANDARD (REFERENCE VALUE)

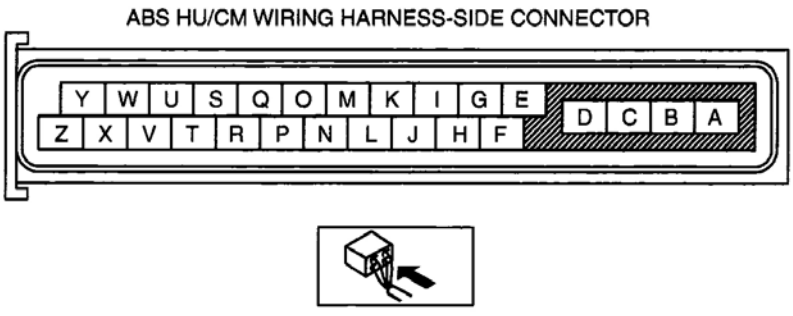


Fig. 10: Identifying ABS HU/CM Connector Terminals
Courtesy of MAZDA MOTORS CORP.

STANDARD (REFERENCE VALUE) TABLE

Terminal	Signal name	Connected to	Measured item	Measured terminal (measured condition)	Standard	Inspection Item (s)
A	Ground (ABS motor)	Ground point	Continuity	A-ground point	Continuity detected	• Wiring harness (A-ground point)
B	Power supply (ABS motor operation)	Battery	Voltage	Under any condition	B+	• Wiring harness (B-battery)
C	Power supply (solenoid)	Battery	Voltage	Under any condition	B+	• Wiring harness (C-battery)
D	Ground (ABS system)	Ground point	Continuity	D-ground point	Continuity detected	• Wiring harness (D-ground point)
E	LF wheel-speed sensor (ground)	LF ABS wheel-speed sensor	Continuity	E-LF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (E-LF ABS wheel-speed sensor connector

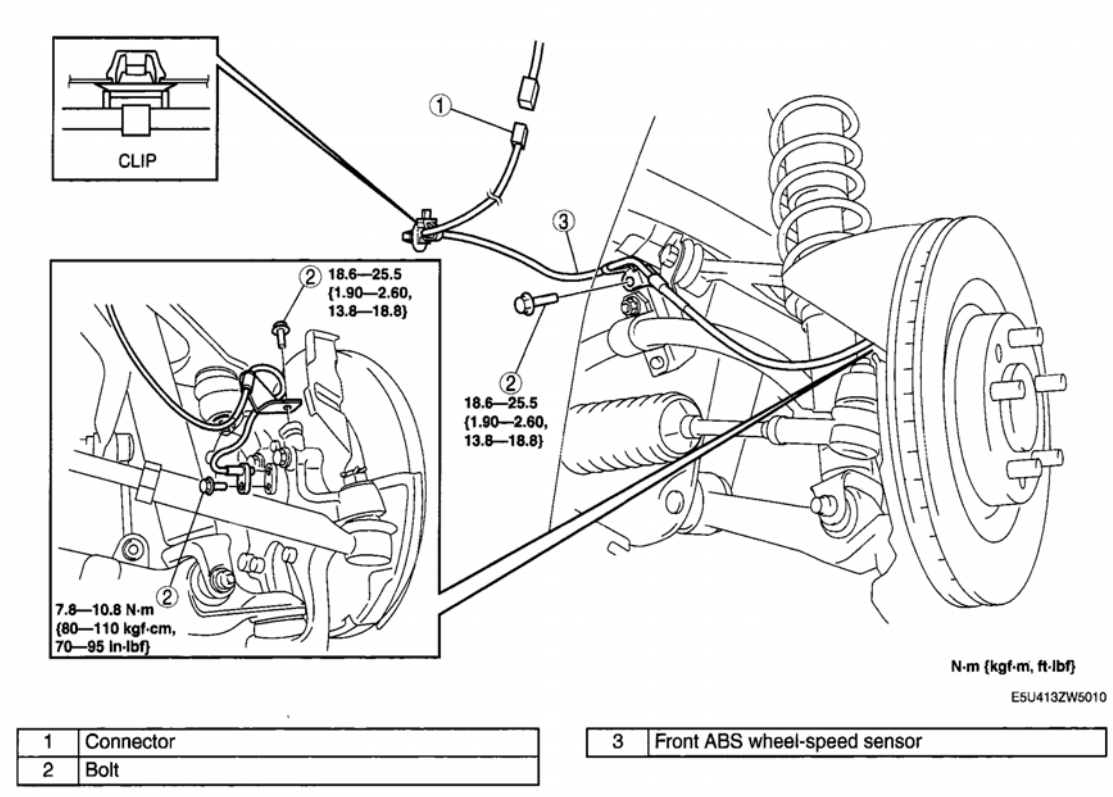
						terminal B)
F	LF wheel-speed sensor (single)	LF ABS wheel-speed sensor	Continuity	F-LF ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (F-LF ABS wheel-speed sensor connector terminal A)
G	LR wheel-speed sensor (signal)	LR ABS wheel-speed sensor	Continuity	G-LR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (G-LR ABS wheel-speed sensor connector terminal A)
H	LR wheel-speed sensor (ground)	LR ABS wheel-speed sensor	Continuity	H-LR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (H-LR ABS wheel-speed sensor connector terminal B)
I	RR wheel-speed sensor (signal)	RR ABS wheel-speed sensor	Continuity	I-RR ABS wheel-speed sensor connector terminal A	Continuity detected	• Wiring harness (I-RR ABS wheel-speed sensor connector terminal A)
J	Power supply (system)	Ignition switch	Voltage	Ignition switch at ON	B+	• Wiring harness (J-ignition switch)
				Ignition switch is off.	1 V or less	-
K	-	-	-	-	-	-
L	RR wheel-speed sensor (ground)	RR ABS wheel-speed sensor	Continuity	L-RR ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (L-RR ABS wheel-speed sensor connector terminal B)
						• Wiring

M	RF wheel-speed sensor (signal)	RF ABS wheel-speed sensor	Continuity	M-RF ABS wheel-speed sensor connector terminal A	Continuity detected	harness (M-RF ABS wheel-speed sensor connector terminal A)
N	Brake switch	Brake switch	Voltage	N-brake switch (Brake pedal depressed)	B+	• Wiring harness (N-brake switch) • Brake switch
				Y-brake switch (Brake pedal not depressed)	1 V or less	
O	RF wheel-speed sensor (ground)	RF ABS wheel-speed sensor	Continuity	O-RF ABS wheel-speed sensor connector terminal B	Continuity detected	• Wiring harness (O-RF ABS wheel-speed sensor connector terminal B)
P	-	-	-	-	-	-
Q	-	-	-	-	-	-
R	-	-	-	-	-	-
S	-	-	-	-	-	-
T	-	-	-	-	-	-
U	-	-	-	-	-	-
V	-	-	-	-	-	-
W	-	-	-	-	-	-
X	-	-	-	-	-	-
Y	CAN_L	DLC-2 (CAN_L)	Continuity	Y-DLC-2 terminal CAN_L.	Continuity detected	• Wiring harness (Y-DLC-2 terminal CAN_L)
Z	CAN_H	DLC-2 (CAN_H)	Continuity	Z-DLC-2 terminal CAN_H	Continuity detected	• Wiring harness (Z-DLC-2 terminal CAN_H)

FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove the mudguard.
2. Remove in the order indicated in the table.

3. Install in the reverse order of removal.



1	Connector
2	Bolt
3	Front ABS wheel-speed sensor

Fig. 11: Identifying Front ABS Wheel-Speed Sensor (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

FRONT ABS WHEEL-SPEED SENSOR INSPECTION

INSTALLATION VISUAL INSPECTION

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   1. Excessive play of the ABS wheel-speed sensor
   2. Deformation of the ABS wheel-speed sensor

CLEARANCE INSPECTION

1. Remove the front ABS wheel-speed sensor.
2. Measure the distance between the front ABS wheel-speed sensor installation surface and the ABS sensor rotor. This is dimension A.
3. Measure the distance between the front ABS wheel-speed sensor installation surface and the tip of ABS wheel-speed sensor. This is dimension B.

4. Calculate the clearance between the front ABS wheel-speed sensor and the ABS sensor rotor using the following formula:

   Clearance (mm {in}) = A - B

5. Verify that the clearance between the ABS sensor rotor and the front ABS wheel-speed sensor is as indicated below.
   - If there is any malfunction, replace it.

   Clearance

   0.3-1.0 mm {0.012-0.057 in}

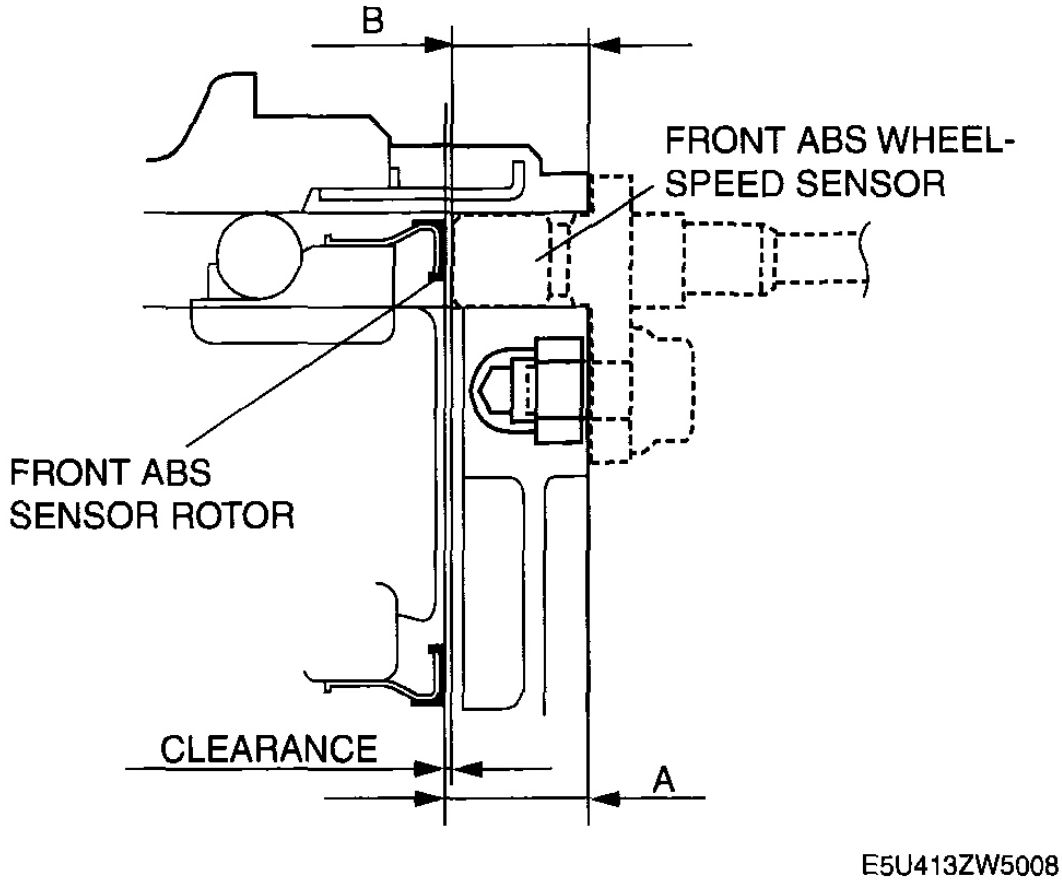


Fig. 12: Measuring Distance Between Front ABS Wheel-Speed Sensor Installation Surface & ABS Wheel-Speed Sensor Tip
Courtesy of MAZDA MOTORS CORP.

SENSOR OUTPUT VALUE INSPECTION

CAUTION:
- **Resistance inspection using other testers may cause damage to the ABS wheel-speed sensor internal circuit. Be sure to use the M-MDS or equivalent to inspect the ABS wheel-speed sensor.**

1. Turn the ignition switch off.
2. Connect the M-MDS or equivalent to the DLC-2.

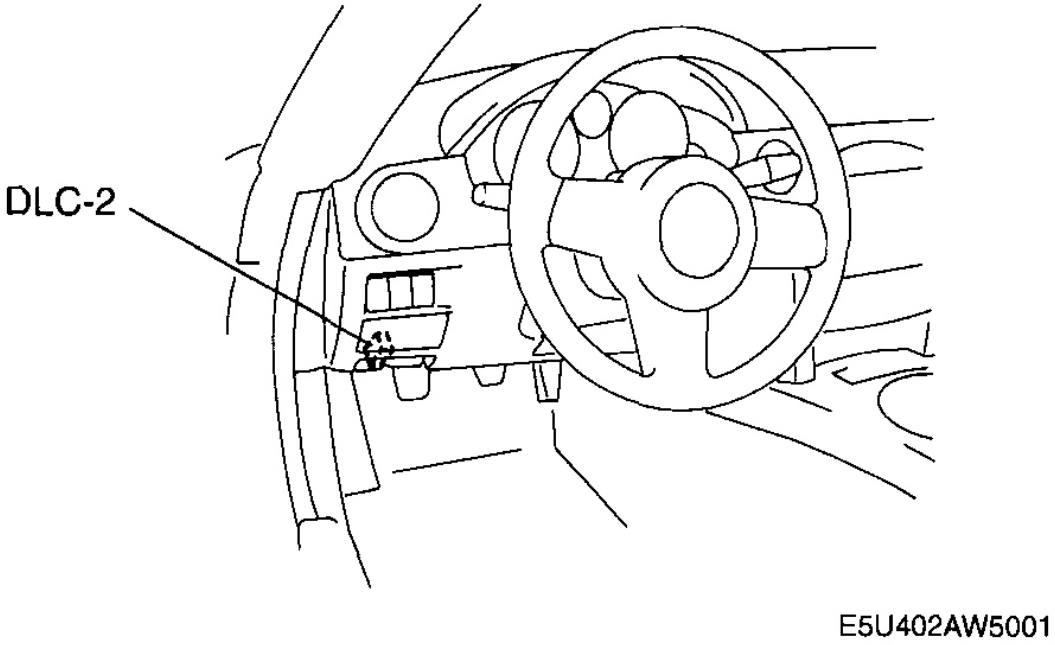


Fig. 13: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Select the following PIDs using the M-MDS or equivalent:
   - LF_WSPD

     (LF wheel-speed sensor)

   - RF_WSPD

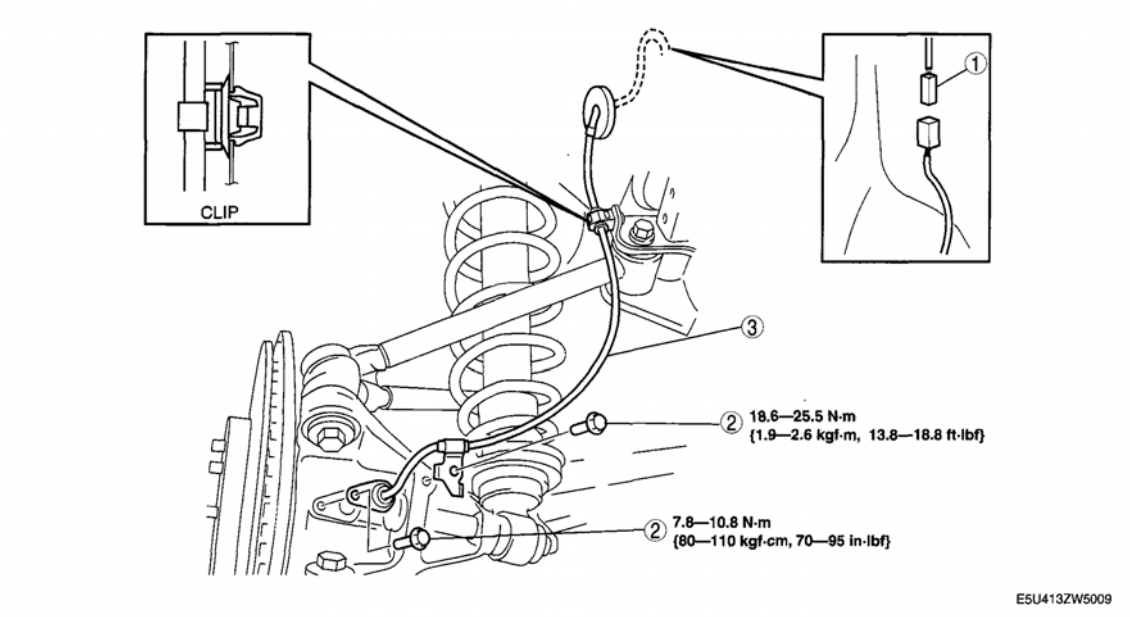
     (RF wheel-speed sensor)

4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS or equivalent shows the same value as the speedometer.

- If there is any malfunction, replace the front ABS wheel-speed sensor.

REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

1. Remove the trunk end trim. (See **TRUNK END TRIM REMOVAL/INSTALLATION** .)
2. Remove the partition board. (See **PARTITION BOARD REMOVAL/INSTALLATION** .)
3. Remove the trunk side trim. (See **TRUNK SIDE TRIM REMOVAL/INSTALLATION** .)
4. Remove the fuel-filler pipe protector. (See **FUEL TANK REMOVAL/INSTALLATION [LF]** .)
5. Remove in the order indicated in **Fig. 14** .
6. Install in the reverse order of removal.



1	Connector	3	Rear ABS wheel-speed sensor
2	Bolt		

Fig. 14: Identifying Rear ABS Wheel-Speed Sensor (With Torque Specifications)
Courtesy of MAZDA MOTORS CORP.

REAR ABS WHEEL-SPEED SENSOR INSPECTION

INSTALLATION VISUAL INSPECTION

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   1. Excessive looseness or play of the ABS wheel-speed sensor
   2. Deformation of the ABS wheel-speed sensor
   3. Deformation or damage of the ABS sensor rotor

CLEARANCE INSPECTION

1. Verify the clearance between the ABS sensor rotor and the ABS wheel-speed sensor.
   - If there is any malfunction, check for improper installation, and replace if necessary.

   Clearance

   0.8-1.6 mm {0.032-0.062 in}

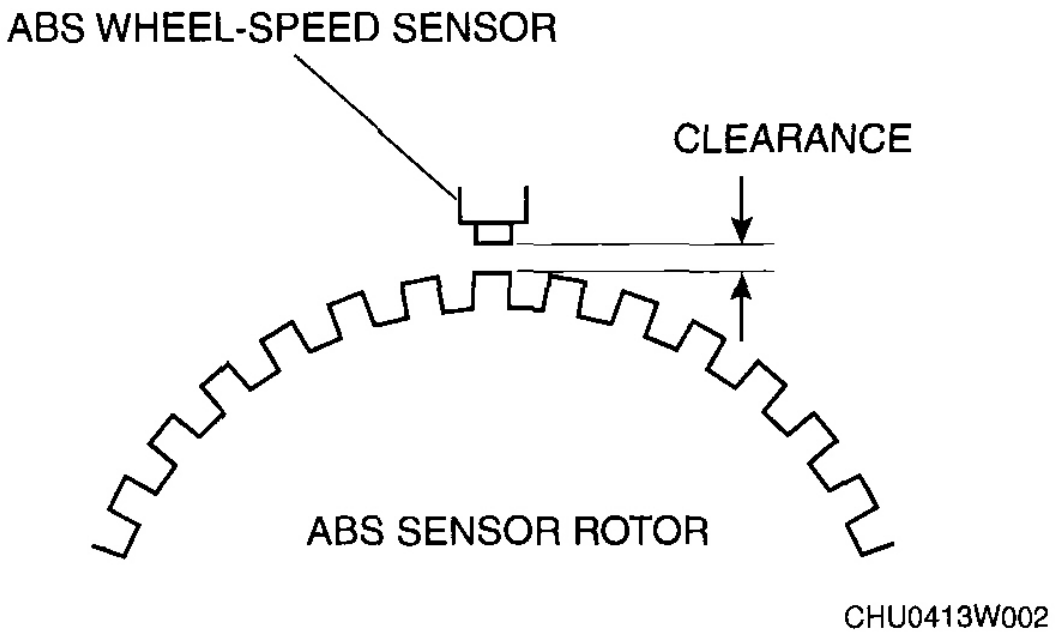


Fig. 15: Inspecting ABS Sensor-To-Rotor Clearance
Courtesy of MAZDA MOTORS CORP.

SENSOR OUTPUT VALUE INSPECTION

1. Turn the ignition switch off.
2. Connect the M-MDS or equivalent to the DLC-2.

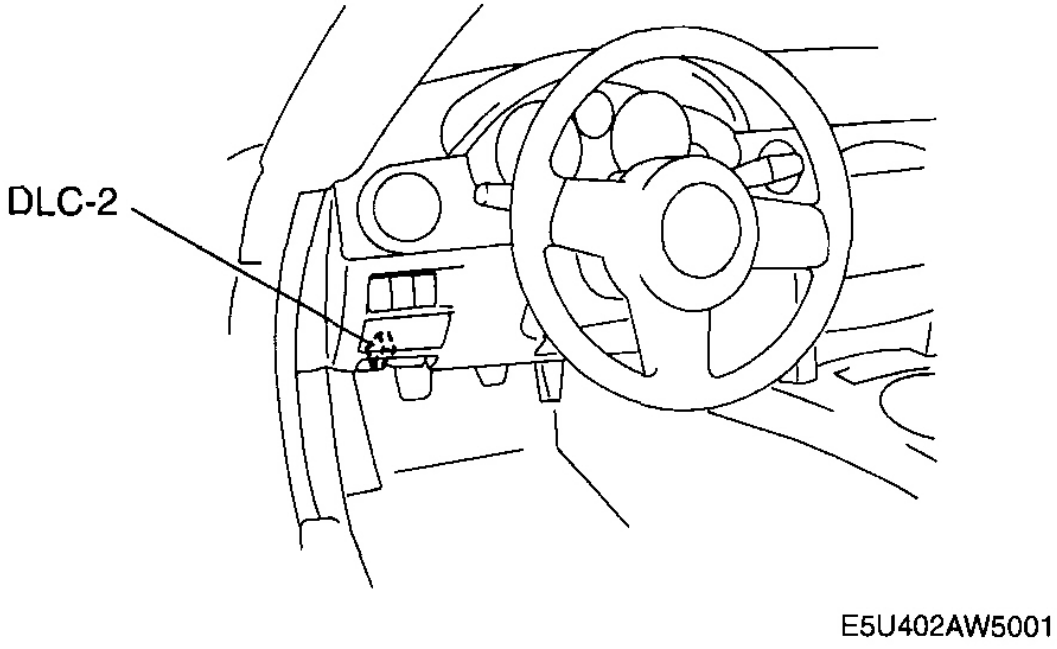


Fig. 16: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

3. Select the following PIDs using the M-MDS or equivalent:
   - LR_WSPD

     (LR wheel-speed sensor)

   - RR_WSPD

     (RR wheel-speed sensor)

4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS or equivalent shows the same value as the speedometer.
   - If there is any malfunction, replace the rear ABS wheel-speed sensor.