2007 BRAKES

On-Board Diagnostic (ABS) - MX-5 Miata

ABS SYSTEM WIRING DIAGRAM

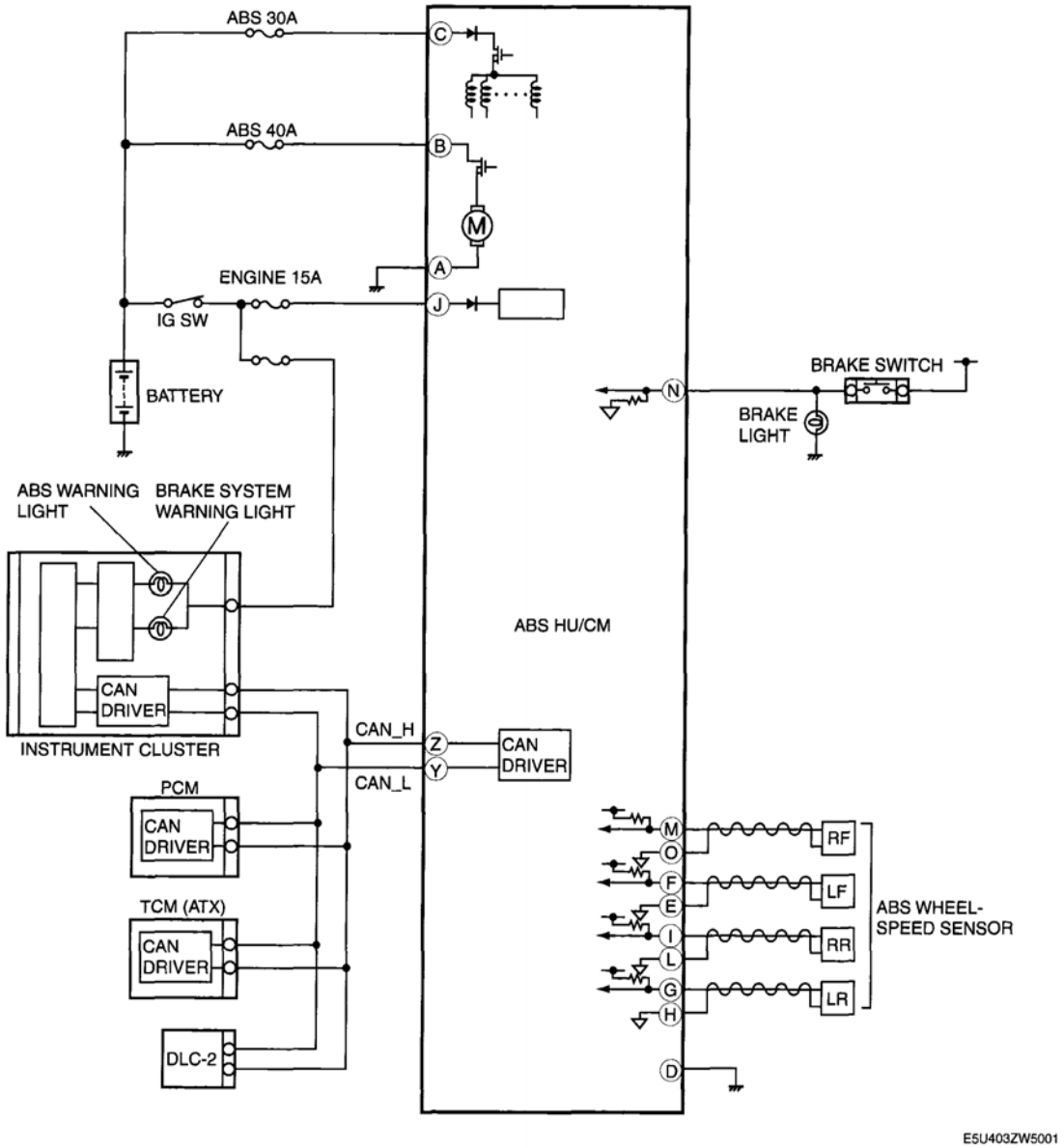


Fig. 1: ABS System Wiring Diagram
Courtesy of MAZDA MOTORS CORP.

ON-BOARD DIAGNOSIS [ABS]

ON-BOARD DIAGNOSTIC (OBD) TEST DESCRIPTION

- The OBD test inspects the integrity and function of the ABS and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  - Provides a quick inspection of the ABS usually performed at the start of each diagnostic procedure.
  - Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  - Read/clear diagnostic results, PID monitor and record and active command modes.

READ/CLEAR DIAGNOSTIC RESULTS

- This function allows you to read or clear DTCs in the ABS HU/CM memory.

PID/DATA MONITOR AND RECORD

- This function allows you to access certain data values, input signals, calculated values, and system status information.

ACTIVE COMMAND MODES

- This function allows you to control devices through the M-MDS.

READING DTCS PROCEDURE

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (laptop PC)
     - Select the "Toolbox" tab.
     - Select "Self Test".
     - Select "Modules".
     - Select "ABS".
   - When using the PDS (Pocket PC)
     - Select "Modules Tests".
     - Select "ABS".
     - Select "Self Test".
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the ABS.

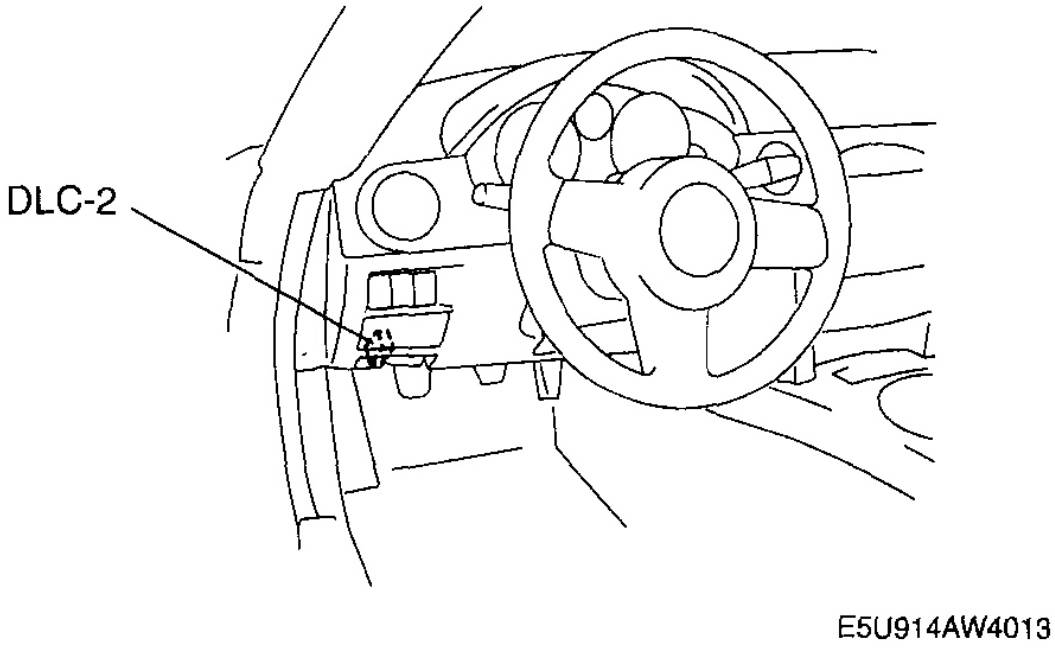


Fig. 2: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

CLEARING DTCS PROCEDURES

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (laptop PC)
        - Select the "Toolbox" tab.
        - Select "Self Test".
        - Select "Modules".
        - Select "ABS".
    - When using the PDS (Pocket PC)
        - Select "Modules Tests".
        - Select "ABS".
        - Select "Self Test".
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTC are displayed.

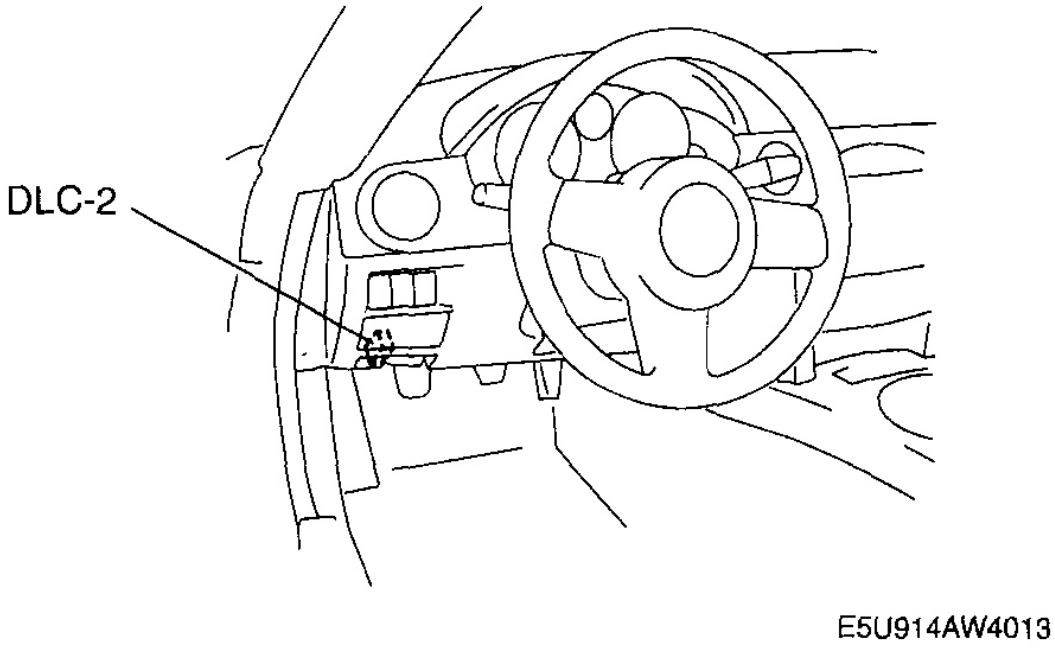


Fig. 3: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

PID/DATA MONITOR AND RECORD PROCEDURE

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (laptop PC)
        - Select the "Toolbox" tab.
        - Select "DataLogger".
        - Select "Modules".
        - Select "ABS".
    - When using the PDS (Pocket PC)
        - Select "Modules Tests".
        - Select "Optional" tab.
        - Select "ABS".
        - Select "DataLogger".
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

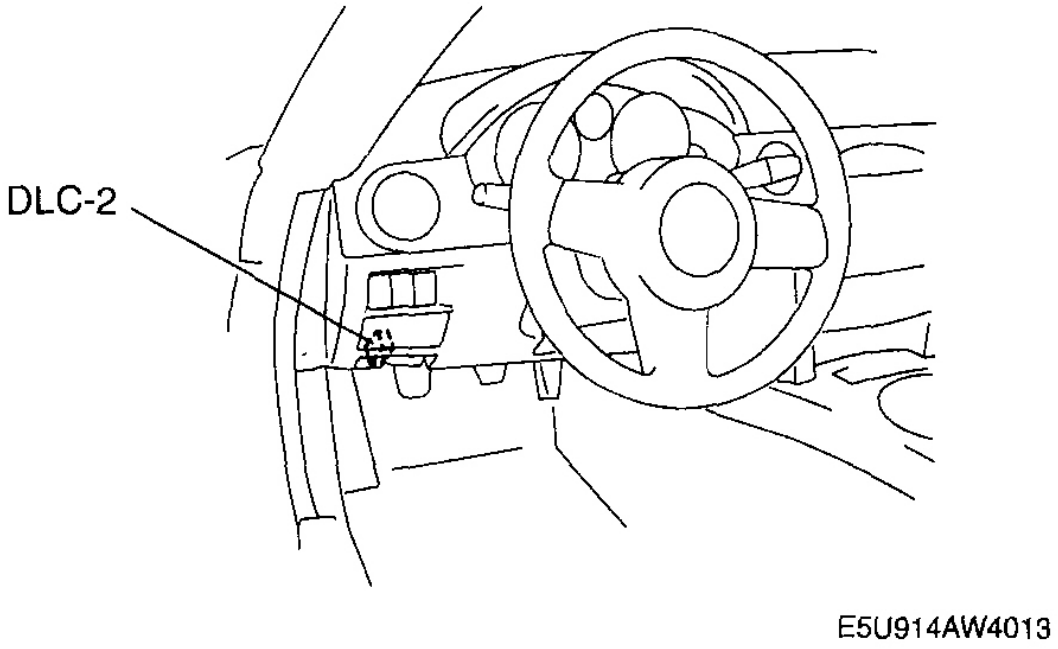


Fig. 4: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

NOTE: The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually using a active command modes function.

ACTIVE COMMAND MODES PROCEDURE

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
    - When using the IDS (laptop PC)
        - Select the "Toolbox" tab.
        - Select "DataLogger".
        - Select "Modules".
        - Select "ABS".
    - When using the PDS (Pocket PC)
        - Select "Modules Tests".

- Select "ABS".
- Select "DataLogger".

3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
    - If there is no operation sound from the relay, motor, and solenoid after the active command mode inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.

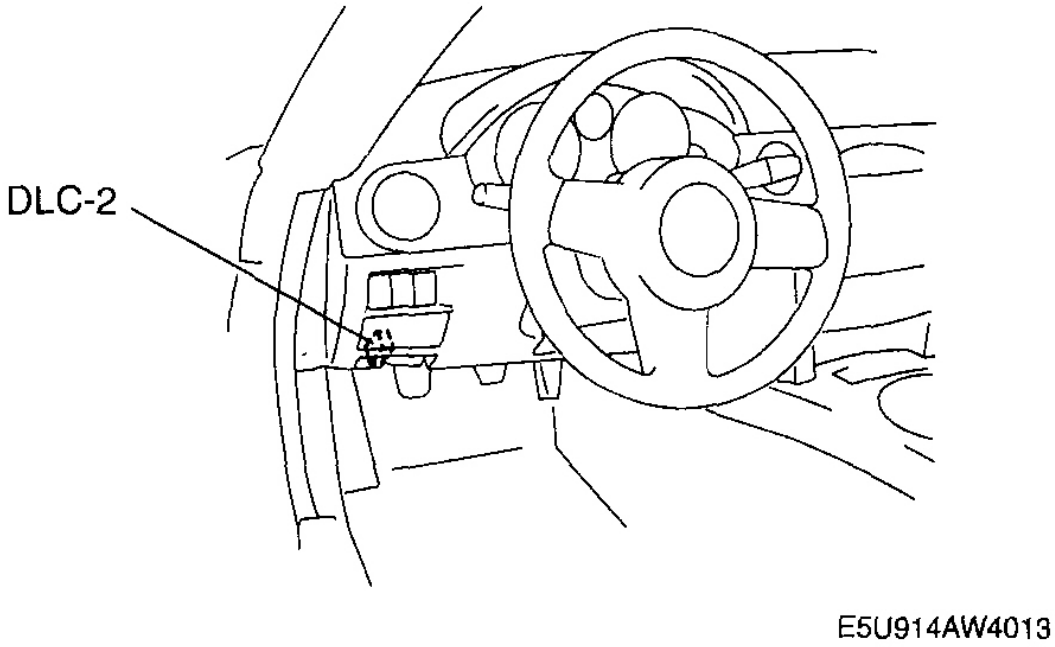


Fig. 5: Locating DLC-2 Connector
Courtesy of MAZDA MOTORS CORP.

DTC TABLE

DTC TABLE

DTC M-MDS	System malfunction location
B1317	Power supply system
B1318	Power supply system
B1342	ABS HU/CM system
B1484	Brake switch system
B2477	ABS HU/CM configuration

C1095	Pump motor, motor relay system
C1096	Pump motor, motor relay system
C1141	LF ABS sensor rotor system
C1142	RF ABS sensor rotor system
C1143	LR ABS sensor rotor system
C1144	RR ABS sensor rotor system
C1145	RF ABS wheel-speed sensor system
C1148	RF ABS wheel-speed sensor system
C1155	LF ABS wheel-speed sensor system
C1158	LF ABS wheel-speed sensor system
C1165	RR ABS wheel-speed sensor system
C1168	RR ABS wheel-speed sensor system
C1175	LR ABS wheel-speed sensor system
C1178	LR ABS wheel-speed sensor system
C1186	Fail-safe relay system
C1194	LF outlet solenoid valve system
C1198	LF inlet solenoid valve system
C1210	RF outlet solenoid valve system
C1214	RF inlet solenoid valve system
C1233	LF ABS wheel-speed sensor/ABS sensor rotor system
C1234	RF ABS wheel-speed sensor/ABS sensor rotor system
C1235	RR ABS wheel-speed sensor/ABS sensor rotor system
C1236	LR ABS wheel-speed sensor/ABS sensor rotor system
C1242	LR outlet solenoid valve system
C1246	RR outlet solenoid valve system
C1250	LR inlet solenoid valve system
C1254	RR inlet solenoid valve system
C1266	Fail-safe relay system
C1805	Incorrect ABS HU/CM installed
DTC U0073, U2516[MULTIPLEX COMMUNICATION SYSTEM]	CAN system communication error
DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]	Communication error to other module
DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]	Abnormal message from PCM

PID/DATA MONITOR TABLE

PID/DATA MONITOR TABLE

PID name (definition)	Unit/Condition	Operation condition (reference)	Action	ABS HU/CM terminal

ABS_VOLT (System battery voltage value)	V	• Ignition switch at ON: • **Approx. 12.2 V** • Idling: **Approx. 14.1 V**	Inspect the power supply circuit. (See **ABS SYSTEM INSPECTION** .)	J
ABSLF_I (Left front inlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSLF_O (Left front outlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSLR_I (Left rear inlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSLR_O (Left rear outlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSPMPRLY (Motor relay output state)	On/Off	• Relay activated: On • Relay not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSRF_I (Right front inlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSRF_O (Right front outlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSRR_I (Right rear inlet		• Solenoid valve activated: On	Inspect the ABS HU/CM.	

solenoid valve output state)	On/Off	• Solenoid valve not activated: Off	(See **ABS HU/CM INSPECTION** .)	-
ABSRR_O (Right rear outlet solenoid valve output state)	On/Off	• Solenoid valve activated: On • Solenoid valve not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
ABSVLVRLY (Fail-safe relay output state)	On/Off	• Fail-safe relay is activated: On • Fail-safe relay is deactivated: Off	Inspect ABS HU/CM. (See **ABS HU/CM INSPECTION**)	-
BOO_ABS (Brake pedal switch input)	On/Off	• Brake pedal depressed: On • Brake pedal released: Off	Inspect the brake switch.	N
CCNTABS (Number of continuous codes)	-	• DTCs detected: **1-255** • No DTCs detected: **0**	Perform the DTC inspection.	-
LF_WSPD (Left front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	E, F
LR_WSPD (Left rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	G, H
PMP_MOTOR (Pump motor output state)	On/Off	• Pump motor activated: On • Pump motor not activated: Off	Inspect the ABS HU/CM. (See **ABS HU/CM INSPECTION** .)	-
RF_WSPD (Right front ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	M, O
RR_WSPD (Right rear ABS wheel-speed sensor input)	KPH, MPH	• Vehicle stopped: **0 KPH, 0 MPH** • Vehicle running: Vehicle speed	Inspect the ABS wheel-speed sensor.	I, L

ACTIVE COMMAND MODES TABLE

Command name	Output part	Operation	Operating condition
LF_INLET	LF inlet solenoid valve	On/Off	Ignition switch at ON
LF_OUTLET	LF outlet solenoid valve		
LR_INLET	LR inlet solenoid valve		
LR_OUTLET	LR outlet solenoid valve		
PMP_MOTOR	Pump motor		
RF_INLET	RF inlet solenoid valve		
RF_OUTLET	RF outlet solenoid valve		
RR_INLET	RR inlet solenoid valve		
RR_OUTLET	RR outlet solenoid valve		

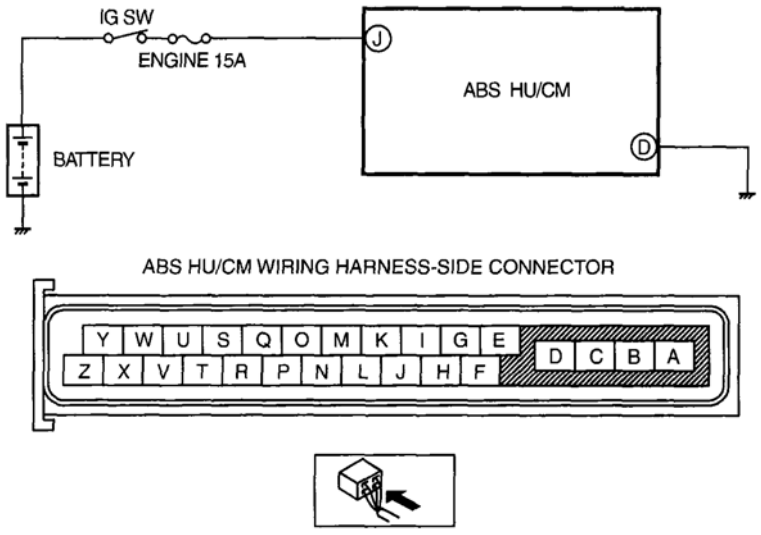
DTC B1317, B1318 [ABS]

DTC B1317, B1318 POSSIBLE CAUSE TABLE

DTC B1317, B1318	Power supply system

DETECTION CONDITION	• B1317
	  ○ The voltage at ABS HU/CM terminal J is **16.8 V** or more.
	• B1318
	  ○ The vehicle speed exceeds **6 km/h** and the voltage at ABS HU/CM terminal J is less than **9.6 V**

POSSIBLE CAUSE	• ENGINE 15 A fuse malfunction • Open circuit or short to ground in the wiring harness between the ABS HU/CM terminal J and the battery • Open circuit or faulty ground in the wiring harness between the ABS HU/CM terminal D and the body ground • Battery deterioration • Generator malfunction • Poor connection at connectors (female terminal)



DIAGNOSTIC PROCEDURE

DTC B1317, B1318 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT BATTERY VOLTAGE** • Is the battery terminal voltage normal?	Yes	Make sure that battery terminal connection is normal. Go to the next step.
		No	Charge or replace the battery, then go to Step 6. (See **BATTERY RECHARGING [LF]** .) (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
2	**INSPECT BATTERY GRAVITY** • Is battery specific gravity as specified?	Yes	Go to the next step.
		No	Replace the battery, then go to Step 6. (See **BATTERY REMOVAL/INSTALLATION [LF]** .)
3	**INSPECT CHARGING SYSTEM** • Are the generator and drive belt tensions normal?	Yes	Go to the next step.
		No	Replace generator and/or drive belt as necessary, then go to Step 6. (See **DRIVE BELT REPLACEMENT [LF]** .) (See **GENERATOR REMOVAL/INSTALLATION [LF]** .)

4	**INSPECT ABS HU/CM POWER SUPPLY FOR OPEN CIRCUIT** • Start the engine. • Measure the voltage between ABS HU/CM terminal J and ground. • Is the voltage **approx. 10 V?**	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between the ABS HU/CM and ground, then go to Step 6.
5	**INSPECT ABS HU/CM GROUND FOR POOR GROUND OR OPEN CIRCUIT** • Turn the ignition switch off. • Measure the resistance between ground and ABS HU/CM terminal D. • Is the resistance within **0-1 ohm?**	Yes	Go to the next step.
		No	If there is no continuity. • Repair or replace the wiring harness for open circuit between the ABS HU/CM and ground, then go to the next step. If the resistance is not within **0-1 ohm:** • Repair or replace harness for poor ground, then go to the next step.
6	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Is the same DTC present?	Yes	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
7	**VERIFY AFTER REPAIR PROCEDURE**	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)

	• Are any other DTCs present?	No	DTC troubleshooting completed.

DTC B1342 [ABS]

DTC B1342 POSSIBLE CAUSE TABLE

DTC B1342	ABS HU/CM system
DETECTION CONDITION	• The ABS HU/CM on-board diagnostic function detects control module malfunction.
POSSIBLE CAUSE	• ABS HU/CM internal malfunction

DIAGNOSTIC PROCEDURE

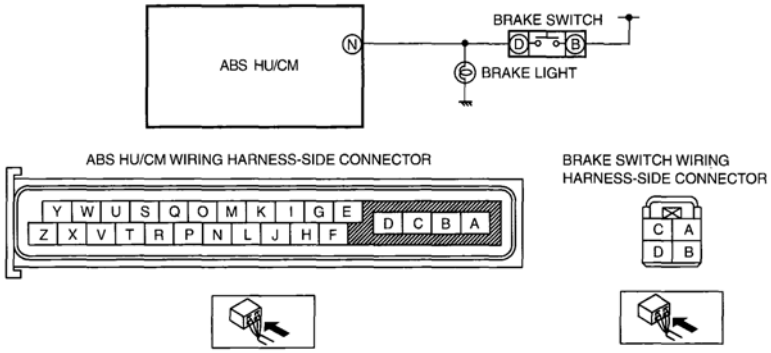
DTC B1342 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**VERIFY CURRENT STATUS OF MALFUNCTION** • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Is same DTC present?	Yes	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
2	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC B1484 [ABS]

DTC B1484 POSSIBLE CAUSE TABLE

DTC B1484	Brake switch system
DETECTION CONDITION	• Open circuit in the wiring harness between the ABS HU/CM terminal and the brake switch terminal
POSSIBLE CAUSE	• Brake switch malfunction • Open circuit in the wiring harness between the ABS HU/CM terminal N and the brake switch terminal D



DIAGNOSTIC PROCEDURE

DTC B1484 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT ABS HU/CM TO BRAKE SWITCH FOR OPEN CIRCUIT** • Turn the ignition switch off. • Disconnect the ABS HU/CM and brake switch connector. • Inspect for continuity ABS HU/CM terminal N and brake switch terminal D. • Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between ABS HU/CM and brake switch, then go to the next step.
2	**INSPECT BRAKE SWITCH** • Inspect the brake switch. • (See **BRAKE SWITCH INSPECTION** .) • Is the brake switch normal?	Yes	Go to the next step.
		No	Replace the brake switch, then go to the next step. (See **BRAKE PEDAL REMOVAL/INSTALLATION** .)
3	**VERIFY TROUBLESHOOTING COMPLETED**	Yes	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)

	• Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Are the same DTCs present?	No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTC present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC B2477 [ABS]

DTC B2477 POSSIBLE CAUSE TABLE

DTC B2477	ABS HU/CM configuration
DETECTION CONDITION	• Configuration setting failure is detected.
POSSIBLE CAUSE	• Module configuration procedure was not completed properly.

DIAGNOSTIC PROCEDURE

DTC B2477 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**VERIFY CONFIGURATION** • Has the ABS HU/CM configuration been performed?	Yes	Go to the next step.
		No	Perform configuration using the M-MDS. (See **ABS CONFIGURATION** .)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. • (See **CLEARING DTCS**	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM. (See **ABS HU/CM REMOVAL/INSTALLATION** .)

	PROCEDURES .) • Is the same DTC present?	No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

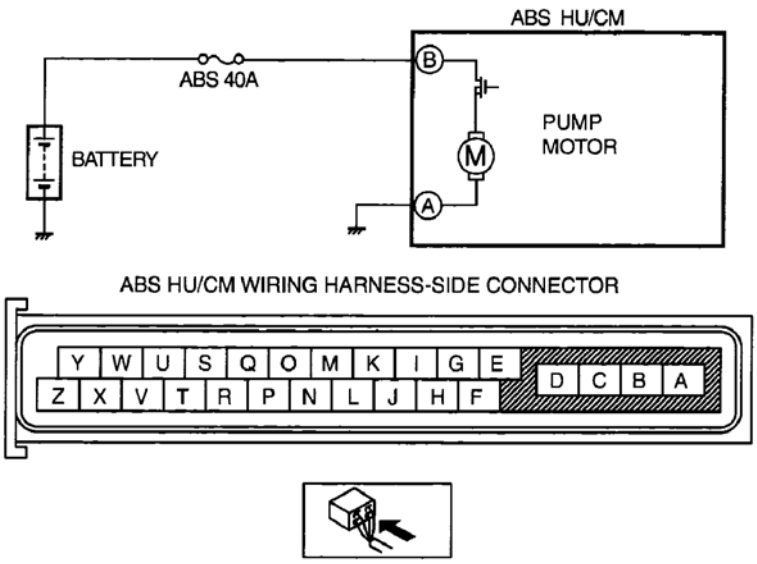
DTC C1095, C1096 [ABS]

DTC C1095, C1096 POSSIBLE CAUSE TABLE

DTC C1095, C1096	Pump motor, motor relay system

DETECTION CONDITION	• C1095
	  ○ When the pump motor monitor voltage remains at **2.0 V or more** for **1 s**
	  ○ ABS motor monitor OFF signal is input within specified time limit when the motor signal is switched from ON to OFF by ABS HU/CM.
	• C1096
	  ○ When the difference between the battery power supply voltage and pump motor power supply voltage remains at **4.0 V or more** for **0.1 s** or more while the pump motor is operating

POSSIBLE CAUSE	• ABS 40 A fuse malfunction • Open or short to ground circuit in the wiring harness between the battery and the ABS HU/CM terminal B • Open circuit in the wiring harness between the ABS HU/CM terminal A and the body ground • Open or short circuit in the ABS HU/CM internal motor relay, or stuck motor relay • Open or short circuit in the ABS HU/CM internal motor, or frozen motor • Fail-safe relay malfunction • Poor connection at connectors (female terminal)



DIAGNOSTIC PROCEDURE

DTC C1095, C1096 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT ABS FUSE CONDITION** • Is the ABS 40A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 5.
2	**INSPECT MOTOR RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch off. • Disconnect ABS HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between ABS HU/CM terminal B (harness-side) and ground. • Is the voltage **B+** ?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and ABS HU/CM terminal B, then go to Step 5.
3	**INSPECT PUMP MOTOR**	Yes	Go to the next step.

	GROUND FOR OPEN CIRCUIT • Turn the ignition switch off. • Inspect for continuity between ABS HU/CM terminal A (harness-side) and ground. • Is there continuity?	No	Repair or replace the wiring harness for open circuit between ABS HU/CM terminal A and ground, then go to Step 5.
4	**VERIFY PUMP MOTOR OPERATION** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access PMP_MOTOR active command modes using M-MDS. • Does the pump motor operate?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
5	**VERIFY TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Gradually slow down and stop the vehicle.	Yes	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.

	• Is the same DTC present?		
6	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC C1141, C1142, C1143, C1144 [ABS]

DTC C1141, C1142, C1143, C1144 POSSIBLE CAUSE TABLE

DTC	**C1141** **C1142** **C1143** **C1144**	**LF ABS sensor rotor system** **RF ABS sensor rotor system** **LR ABS sensor rotor system** **RR ABS sensor rotor system**
DETECTION CONDITION		• Periodic abnormality is detected in the signal wave pattern from the ABS wheel-speed sensors.
POSSIBLE CAUSE		• ABS wheel-speed sensor malfunction • ABS sensor rotor malfunction (foreign material adhering) • Improper installation of ABS wheel-speed sensor and/or sensor rotor • Excessive clearance between the ABS wheel-speed sensor and sensor rotor

DIAGNOSTIC PROCEDURE

DTC C1141, C1142, C1143, C1144 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABS WHEEL-SPEED SENSOR OUTPUT ERROR USING M-MDS** • Turn the ignition switch off.	Yes	Go to Step 4.

	• Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the vehicle speeds detected by the four ABS wheel-speed sensors are approximately the same. • Are the vehicle speeds approximately the same?	No	Go to the next step.
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.** • Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor. • (See **FRONT ABS WHEEL-SPEED SENSOR INSPECTION** .) • (See **REAR ABS WHEEL-SPEED SENSOR INSPECTION** .) • Is the clearance normal?	Yes	Go to the next step.
		No	Replace the ABS wheel-speed sensor, then go to Step 4. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .) (See **REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)

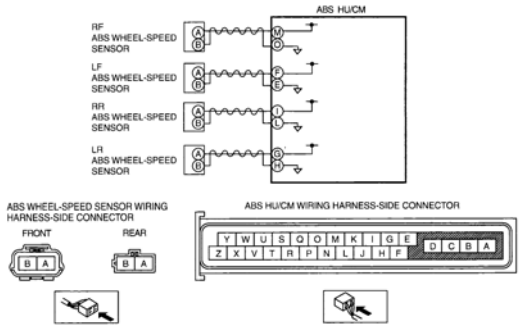
	Clearance Front: **0.3-1.0 mm {0.012-0.057 in}** **Rear: 0.8-1.6 mm {0.032-0.062 in}**		
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See **WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION** .) (See **REAR DRIVE SHAFT REMOVAL/INSTALLATION** .)
4	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
5	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC C1145, C1155, C1165, C1175 [ABS]

DTC C1145, C1155, C1165, C1175 POSSIBLE CAUSE TABLE

	C1145	**RF ABS wheel-speed sensor (open circuit) system** **LF ABS wheel-speed sensor**

DTC	**C1155** **C1165** **C1175**	**(open circuit) system** **RR ABS wheel-speed sensor (open circuit) system** **LR ABS wheel-speed sensor (open circuit) system**
DETECTION CONDITION		• Open circuit or short to ground has been detected in the ABS wheel-speed sensor wiring harness on any of the four vehicle wheels.
POSSIBLE CAUSE		• Open circuit or short to ground in the wiring harness between the following ABS HU/CM terminal and the ABS wheel-speed sensor terminal: ○ ABS HU/CM terminal M-RF ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal O-RF ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal F-LF ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal E-LF ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal I-RR ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal L-RR ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal G-LR ABS wheel-speed sensor terminal A

	○ ABS HU/CM terminal H-LR ABS wheel-speed sensor terminal B • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)
	

DIAGNOSTIC PROCEDURE

DTC C1145, C1155, C1165, C1175 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL - SPEED SENSOR USING M-MDS** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD	Yes	Go to Step 3.
		No	Go to the next step.

	• Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?		
2	**INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN ABS HU/CM AND ABS WHEEL-SPEED SENSOR** • Turn the ignition switch off. • Disconnect the ABS HU/CM connector and ABS wheel-speed sensor. • Inspect for continuity in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and ABS HU/CM connectors. ○ RF ABS wheel-speed sensor (+): M-A ○ RF ABS wheel-speed sensor (-): O-B ○ LF ABS wheel-speed sensor (+): F-A ○ LF ABS wheel-speed sensor (-): E-B ○ RR ABS wheel-speed sensor (+): I-A ○ RR ABS wheel-	Yes	Replace the ABS wheel-speed sensor, then go to the next step. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .) (See **REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)

	speed sensor (-): L-B ○ LR ABS wheel-speed sensor (+): G-A ○ LR ABS wheel-speed sensor (-): H-B • Is there continuity?	No	Repair or replace the wiring harness, then go to the next step.
3	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
4	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs output?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC C1148, C1158, C1168, C1178 [ABS]

DTC C1148, C1158, C1168, C1178 POSSIBLE CAUSE TABLE

DTC	**C1148**	**RF ABS wheel-speed sensor/ABS sensor rotor system**
	C1158	**LF ABS wheel-speed sensor/ABS sensor rotor system**
	C1168	**RR ABS wheel-speed sensor/ABS sensor rotor system**
	C1178	**LR ABS wheel-speed sensor/ABS sensor rotor system**
DETECTION CONDITION		• Vehicle wheel speed signals of any of the four vehicle

	wheels indicate abnormal acceleration that exceeds specification. • Vehicle wheel speed signals of any of the four vehicle wheels indicate speed that exceeds specification.
POSSIBLE CAUSE	• ABS wheel-speed sensor malfunction (low output, metal shavings on sensor) • ABS sensor rotor malfunction (chipping of sensor rotor teeth) • Poor installation of ABS wheel-speed sensor and/or sensor rotor (If the sensor rotor is installed at an angle, it may cause output of abnormal wave pattern at high speeds.) • Excessive clearance between the ABS wheel-speed sensor and sensor rotor

DIAGNOSTIC PROCEDURE

DTC C1148, C1158, C1168, C1178 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD	Yes	Go to Step 4.
		No	If there is a difference in speeds of the four wheels, go to the next step.

	LR_WSPD RF_WSPD RR_WSPD • Start the engine and drive the vehicle. • Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately. • Do the vehicle speeds correspond?		
2	**INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE** • **Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor.** **Clearance** **Front: 0.3-1.0 mm {0.012-0.057 in}** Rear: 0.8-1.6 mm {0.032-0.062 in}	Yes	Go to the next step.
		No	Replace the rear ABS wheel-speed sensor, then go to Step 4. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .) (See **REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)
3	**VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION** • Is the result normal?	Yes	Go to the next step.
		No	Replace the front wheel hub component or rear drive shaft, then go to the next step. (See **WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION** .) (See **REAR DRIVE SHAFT REMOVAL/INSTALLATION** .)
4	**VERIFY DTC TROUBLESHOOTING COMPLETED**	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the DSC HU/CM.

	• Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. • (See **Clearing DTCs Procedures** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Are the same DTCs present?		(See **DSC HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
5	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

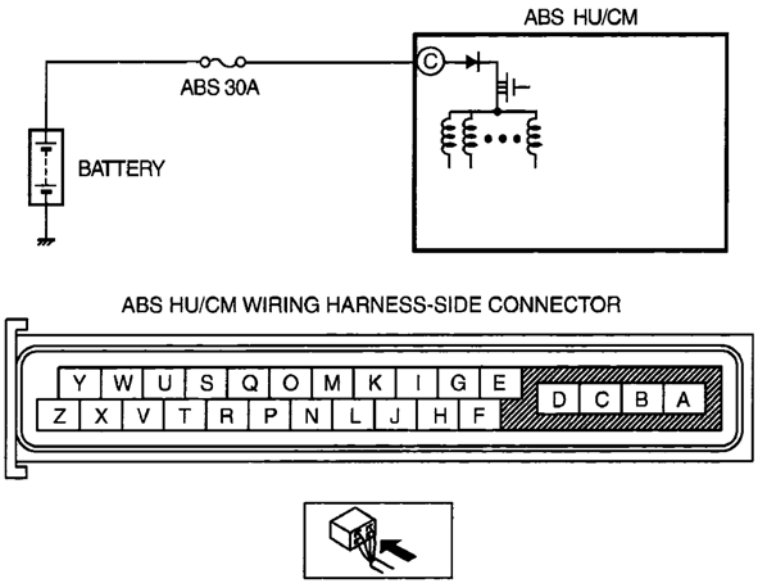
DTC C1186, C1266 [ABS]

DTC C1186, C1266 POSSIBLE CAUSE TABLE

DTC C1186, C1266	Fail-safe relay system

DETECTION CONDITION	• C1186
	  ○ ABS HU/CM internal valve relay remains OFF when valve relay ON is commanded.
	• C1266
	  ○ ABS HU/CM internal valve relay remains ON (stuck) when valve relay OFF is commanded.

POSSIBLE CAUSE	• ABS 30 A fuse malfunction • Open circuit or short to ground in the wiring harness between the battery and the ABS HU/CM terminal C • Open or short circuit in the ABS HU/CM internal valve relay, or stuck valve relay • Poor connection at connectors (female terminal)



DIAGNOSTIC PROCEDURE

DTC C1186, C1266 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT ABS FUSE CONDITION** • Is the ABS 30 A fuse normal?	Yes	Go to the next step.
		No	Replace the fuse, then go to Step 3.
2	**INSPECT VALVE RELAY POWER SUPPLY FOR OPEN CIRCUIT** • Turn the ignition switch off. • Disconnect ABS HU/CM connector. • Turn the ignition switch to the ON position (engine off). • Measure voltage between ABS HU/CM terminal C (harness-side) and ground. • Is voltage **B+?**	Yes	Go to the' next step.
		No	Repair or replace the wiring harness for open circuit between battery positive terminal and DSC HU/CM terminal C, then go to the next step.

3	**VERIFY TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Is the same DTC present?	Yes	Replace the ABS HU/CM, then go to next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 [ABS]

DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 POSSIBLE CAUSE TABLE

DTC	**C1194**	**LF outlet solenoid valve system**
	C1198	**LF inlet solenoid valve system**
	C1210	**RF outlet solenoid valve system**
	C1214	**RF inlet solenoid valve system**
	C1242	**LR outlet solenoid valve system**
	C1246	**RR outlet solenoid valve system**
	C1250	**LR inlet solenoid valve system**
	C1254	**RR inlet solenoid valve system**
DETECTION CONDITION		• Solenoid valve operation does not correspond to solenoid ON/OFF commands from the ABS HU/CM.
POSSIBLE CAUSE		• Open or short circuit in the ABS HU/CM internal solenoid valves • Solenoid valve malfunction • Poor connection at connectors

	(female terminal)

DIAGNOSTIC PROCEDURE

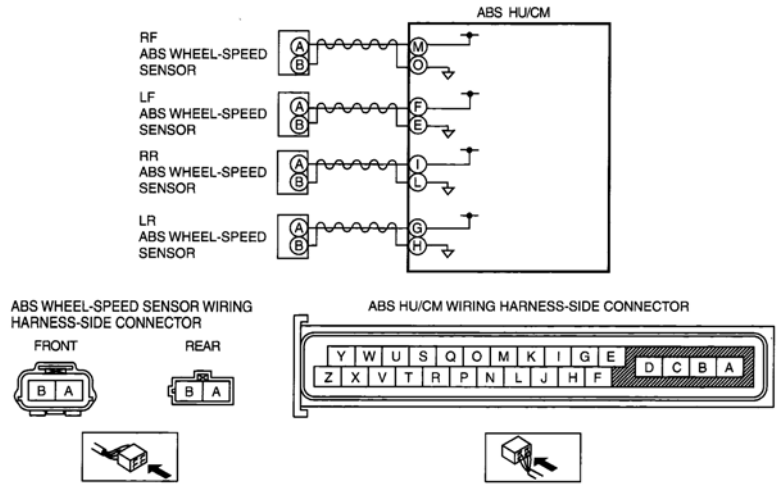
DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**VERIFY SOLENOID VALVE OPERATION** • Turn the ignition switch off. • Connect the M-MDS to the DLC-2. • Turn the ignition switch to the ON position (engine off). • Access the active command mode for the solenoid valve using the M-MDS. • Does the solenoid valve operate?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
2	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Gradually slow down and stop vehicle. • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
3	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.

DTC C1233, C1234, C1235, C1236 [ABS]

DTC C1233, C1234, C1235, C1236 POSSIBLE CAUSE TABLE

DTC	**C1233**	**LF ABS wheel-speed sensor (short to ground) system**
	C1234	**RF ABS wheel-speed sensor (short to ground) system**
	C1235	**RR ABS wheel-speed sensor (short to ground) system**
	C1236	**LR ABS wheel-speed sensor (short to ground) system**
DETECTION CONDITION		• The vehicle wheel speed of any of the four vehicle wheels is **2.75 km/h {1.71 mph} or less** when driving at the specified vehicle speed or more.
POSSIBLE CAUSE		• Short to ground in the wiring harness between the following ABS HU/CM terminal and the ABS wheel-speed sensor terminal: ○ ABS HU/CM terminal M-RF ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal O-RF ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal F-LF ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal E-LF ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal I-RR ABS wheel-speed sensor terminal A ○ ABS HU/CM

	terminal L-RR ABS wheel-speed sensor terminal B ○ ABS HU/CM terminal G-LR ABS wheel-speed sensor terminal A ○ ABS HU/CM terminal H-LR ABS wheel-speed sensor terminal B • ABS wheel-speed sensor malfunction • Poor connection at connectors (female terminal)
	

DIAGNOSTIC PROCEDURE

DTC C1233, C1234, C1235, C1236 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL - SPEED SENSOR USING M-MDS** • Turn the ignition switch off.	Yes	Go to Step 3.

	• Connect the M-MDS to the DLC-2. • Select the following PIDs using the M-MDS: LF_WSPD LR_WSPD RF_WSPD RR_WSPD • Drive the vehicle. • Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor. • Are the wheel-speed signals transmitted?	No	Go to the next step.
2	**INSPECT A SHORT TO GROUND IN THE WIRING HARNESS BETWEEN THE ABS HU/CM AND THE ABS WHEEL-SPEED SENSOR** • Turn the ignition switch off. • Disconnect the ABS HU/CM connector and the ABS wheel-speed sensor connector. • Inspect for a short to ground in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and ABS HU/CM connectors. ○ RF ABS wheel-	Yes	Replace the ABS wheel-speed sensor, then go to the next step. (See **FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .) (See **REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION** .)

	speed sensor (+): M-A ○ RF ABS wheel-speed sensor (-): O-B ○ LF ABS wheel-speed sensor (+): F-A ○ LF ABS wheel-speed sensor (-): E-B ○ RR ABS wheel-speed sensor (+): I-A ○ RR ABS wheel-speed sensor (-): L-B ○ LR ABS wheel-speed sensor (+): G-A ○ LR ABS wheel-speed sensor (-): H-B • Is there continuity?	No	Repair or replace the wiring harness, then go to the next step.
3	**VERIFY THAT THE SAME DTC IS NOT PRESENT** • Clear the DTCs from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.** • Are the same DTCs present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.
4	**VERIFY THAT NO OTHER DTCS ARE PRESENT** • Are any other DTCs	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)

	output?		

DTC C1805 [ABS]

DTC C1805 POSSIBLE CAUSE TABLE

DTC C1805	Incorrect ABS HU/CM installed
DETECTION CONDITION	• The programmed vehicle information and the data received from the CAN do not correspond.
POSSIBLE CAUSE	• The correct ABS HU/CM is not installed.

DIAGNOSTIC PROCEDURE

DTC C1805 DIAGNOSTIC PROCEDURE TABLE

STEP	INSPECTION		ACTION
1	**VERIFY THAT THE CORRECT ABS HU/CM IS INSTALLED** • Verify the part number of the ABS HU/CM. • Is the part number correct?	Yes	Go to the next step.
		No	After replacing the ABS, go to Step 3. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
2	**PERFORM CONFIGURATION** • Was configuration performed normally?	Yes	Go to the next step.
		No	Replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
3	**VERIFY DTC TROUBLESHOOTING COMPLETED** • Make sure to reconnect all disconnected connectors. • Clear the DTC from the memory. • (See **CLEARING DTCS PROCEDURES** .) • Is the same DTC present?	Yes	Repeat the inspection from Step 1. If the malfunction recurs, replace the ABS HU/CM, then go to the next step. (See **ABS HU/CM REMOVAL/INSTALLATION** .)
		No	Go to the next step.

4	**VERIFY AFTER REPAIR PROCEDURE** • Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See **DTC Table** .)
		No	DTC troubleshooting completed.