

2012 - Mazda6 - Engine

DTC P0133:00 [MZR 2.5]

DTC P0133:00	A/F sensor circuit slow response
DETECTION CONDITION	• Oxygen sensor malfunction is detected by measuring of the average frequency of oxygen sensor signal, time required to pass from rich to lean, time required to pass from lean to rich. • The average frequency of oxygen sensor signal is more than the threshold value. MONITORING CONDITIONS ▪ EGR System, A/F sensor heater, HO2S heater, A/F sensor, HO2S, and TWC Repair Verification Drive Mode ▪ Following conditions are met: • A/F sensor heater monitor is completed. • Fuel system loop status is closed loop fuel control. ▪ ECT sensor and A/F sensor heater are normal ▪ Engine speed: 1,200—3,500 rpm ▪ Charging efficiency: 16—63 % ▪ Engine coolant temperature: above 60 °C { 140 °F} ▪ Intake airflow amount: 5—40 g/ s { 0.7—5.2 lb/ min} Diagnostic support note • This is an intermittent monitor. (A/F sensor, HO2S) • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.

POSSIBLE CAUSE	• A/F sensor connector or terminal malfunction • A/F sensor malfunction ▪ A/F sensor loose ▪ Exhaust system leakage • Purge solenoid valve malfunction • Fuel supply system malfunction or improper fuel line pressure ▪ Fuel leakage in fuel line from fuel distributor to fuel pump ▪ Clogged or restricted fuel filter ▪ Pressure regulator malfunction ▪ Fuel pump malfunction • Engine malfunction ▪ Insufficient engine compression ▪ Engine coolant leakage • A/F sensor malfunction ▪ Related wiring harness malfunction ▪ A/F sensor deterioration • PCM malfunction
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Diagnostic procedure

STEP	INSPECTION	ACTION
1	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2) • Is the DTC P0133:00 on FREEZE FRAME DATA (Mode 2)?	Yes Go to the next step.
		No Go to troubleshooting procedures for DTC on FREEZE FRAME DATA (Mode 2). (See DTC TABLE [MZR 2.5] .)
2	VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED • Have the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step.
3	VERIFY RELATED REPAIR INFORMATION AVAILABILITY	Yes Perform repair or diagnosis according to the available repair information.

	- Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	If the vehicle is not repaired, go to the next step.
4	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify the pending or stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Is the DTC P0443:00 also present?	Yes Go to the applicable DTC inspection. (See DTC P0443:00 [MZR 2.5].) No Go to the next step.
5	INSPECT A/ F SENSOR CONNECTOR CONDITION - Switch the ignition to off. - Disconnect the A/F sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal and/or connector, then go to Step 15. No Go to the next step.
6	INSPECT INSTALLATION OF A/ F SENSOR - Inspect installation of A/F sensor. - Is the A/F sensor installed securely?	Yes Go to the next step. No Retighten the A/F sensor, then go to Step 15. (See AIR FUEL RATIO (A/ F) SENSOR REMOVAL/ INSTALLATION [MZR 2.5].)
7	INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM - Visually inspect if there is any gas leakage between the exhaust manifold and A/F sensor. - Is there gas leakage?	Yes Repair or replace the malfunctioning part according to the inspection result, then go to Step 15. No Go to the next step.
8	INSPECT PURGE SOLENOID VALVE - Inspect the purge solenoid valve. (See PURGE SOLENOID VALVE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes Replace the purge solenoid valve, then go to Step 15. (See PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [MZR 2.5].) No Go to the next step.

9	INSPECT FUEL LINE PRESSURE - Inspect the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 12.
10	INSPECT FUEL LINE LEAKAGE - Visually inspect the leakage from fuel line between fuel distributor to fuel pump. - Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Go to the next step.
11	INSPECT FUEL FILTER - Visually inspect the foreign materials or stain inside fuel filter. - Is there any foreign materials or stain?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Replace the fuel pump unit, then go to Step 15. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5] .)
12	INSPECT ENGINE COMPRESSION - Inspect the engine compression. (See COMPRESSION INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 15.
		No	Go to the next step.
13	INSPECT SEALING OF ENGINE COOLANT PASSAGE - Perform the "ENGINE COOLANT LEAKAGE INSPECTION". (See ENGINE COOLANT LEAKAGE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Go to the next step.
14	INSPECT A/ F SENSOR - Reconnect all disconnected connectors. - Inspect the A/F sensor. (See AIR FUEL RATIO (A/ F) SENSOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See AIR FUEL RATIO (A/ F) SENSOR REMOVAL/ INSTALLATION [MZR 2.5] .)
		No	Inspect the related wiring harness. - If there is any malfunction: - Repair or

			replace the suspected wiring harness, then go to the next step. • If there is no malfunction: ▪ Go to the next step.
15	VERIFY DTC TROUBLESHOOTING COMPLETED • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) • Drive the vehicle under the monitoring conditions. • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) • Is the PENDING CODE for this DTC present?	Yes Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/ INSTALLATION [MZR 2.5].) Go to the next step.	
		No Go to the next step.	
16	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [MZR 2.5].) • Are any DTCs present?	Yes Go to the applicable DTC inspection. (See DTC TABLE [MZR 2.5].)	
		No DTC troubleshooting completed.	

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POSSIBLE CAUSE	• A/F sensor connector or terminal malfunction • A/F sensor malfunction ▪ A/F sensor loose ▪ Exhaust system leakage • Purge solenoid valve malfunction • Fuel supply system malfunction or improper fuel line pressure ▪ Fuel leakage in fuel line from fuel distributor to fuel pump ▪ Clogged or restricted fuel filter ▪ Pressure regulator malfunction ▪ Fuel pump malfunction • Engine malfunction ▪ Insufficient engine compression ▪ Engine coolant leakage • A/F sensor malfunction ▪ Related wiring harness malfunction ▪ A/F sensor deterioration • PCM malfunction
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Diagnostic procedure

STEP	INSPECTION	ACTION	
1	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2) Is the DTC P0133:00 on FREEZE FRAME DATA (Mode 2)?	Yes	Go to the next step.
		No	Go to troubleshooting procedures for DTC on FREEZE FRAME DATA (Mode 2). (See DTC TABLE [MZR 2.5] .)
2	VERIFY FREEZE FRAME DATA (MODE 2)/ SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED Have the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step.
3	VERIFY RELATED REPAIR INFORMATION AVAILABILITY	Yes	Perform repair or diagnosis according to the available repair information.

	- Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	If the vehicle is not repaired, go to the next step.
4	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify the pending or stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Is the DTC P0443:00 also present?	Yes Go to the applicable DTC inspection. (See DTC P0443:00 [MZR 2.5].) No Go to the next step.
5	INSPECT A/ F SENSOR CONNECTOR CONDITION - Switch the ignition to off. - Disconnect the A/F sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal and/or connector, then go to Step 15. No Go to the next step.
6	INSPECT INSTALLATION OF A/ F SENSOR - Inspect installation of A/F sensor. - Is the A/F sensor installed securely?	Yes Go to the next step. No Retighten the A/F sensor, then go to Step 15. (See AIR FUEL RATIO (A/ F) SENSOR REMOVAL/ INSTALLATION [MZR 2.5].)
7	INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM - Visually inspect if there is any gas leakage between the exhaust manifold and A/F sensor. - Is there gas leakage?	Yes Repair or replace the malfunctioning part according to the inspection result, then go to Step 15. No Go to the next step.
8	INSPECT PURGE SOLENOID VALVE - Inspect the purge solenoid valve. (See PURGE SOLENOID VALVE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes Replace the purge solenoid valve, then go to Step 15. (See PURGE SOLENOID VALVE REMOVAL/ INSTALLATION [MZR 2.5].) No Go to the next step.

9	INSPECT FUEL LINE PRESSURE - Inspect the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Go to the next step.
		No	Go to Step 12.
10	INSPECT FUEL LINE LEAKAGE - Visually inspect the leakage from fuel line between fuel distributor to fuel pump. - Is there any leakage?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Go to the next step.
11	INSPECT FUEL FILTER - Visually inspect the foreign materials or stain inside fuel filter. - Is there any foreign materials or stain?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Replace the fuel pump unit, then go to Step 15. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5] .)
12	INSPECT ENGINE COMPRESSION - Inspect the engine compression. (See COMPRESSION INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Perform the engine overhaul for repairs, then go to Step 15.
		No	Go to the next step.
13	INSPECT SEALING OF ENGINE COOLANT PASSAGE - Perform the "ENGINE COOLANT LEAKAGE INSPECTION". (See ENGINE COOLANT LEAKAGE INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection result, then go to Step 15.
		No	Go to the next step.
14	INSPECT A/ F SENSOR - Reconnect all disconnected connectors. - Inspect the A/F sensor. (See AIR FUEL RATIO (A/ F) SENSOR INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes	Replace the A/F sensor, then go to the next step. (See AIR FUEL RATIO (A/ F) SENSOR REMOVAL/ INSTALLATION [MZR 2.5] .)
		No	Inspect the related wiring harness. - If there is any malfunction: - Repair or

			replace the suspected wiring harness, then go to the next step. • If there is no malfunction: ▪ Go to the next step.
15	VERIFY DTC TROUBLESHOOTING COMPLETED • Make sure to reconnect all disconnected connectors. • Clear the DTC from the PCM memory using the M-MDS. (See AFTER REPAIR PROCEDURE [MZR 2.5].) • Drive the vehicle under the monitoring conditions. • Perform the Pending Trouble Code Access Procedure. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) • Is the PENDING CODE for this DTC present?	Yes Repeat the inspection from Step 1. • If the malfunction recurs, replace the PCM. (See PCM REMOVAL/ INSTALLATION [MZR 2.5].) Go to the next step.	
		No Go to the next step.	
16	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [MZR 2.5].) • Are any DTCs present?	Yes Go to the applicable DTC inspection. (See DTC TABLE [MZR 2.5].)	
		No DTC troubleshooting completed.	