

2012 - Mazda6 - Engine

DTC P0301:00, P0302:00, P0303:00, P0304:00 [MZR 2.5]

DTC P0301:00	Cylinder No.1 misfire detected
DTC P0302:00	Cylinder No.2 misfire detected
DTC P0303:00	Cylinder No.3 misfire detected
DTC P0304:00	Cylinder No.4 misfire detected
DETECTION CONDITION	• The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires that occurred at 200 crankshaft revolutions and 1,000 crankshaft revolutions and calculates the misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred. Diagnostic support note • This is a continuous monitor (misfire). • The MIL illuminates if the PCM detects the misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • The MIL flashes if the PCM detects the misfire which can damage the catalytic converter during first drive cycle. • PENDING CODE is available if the PCM detects the misfire which affects emission performance during first drive cycle. • FREEZE FRAME DATA (Mode 2)/Snapshot data is available. • The DTC is stored in the PCM memory.
	• Erratic signal to PCM ▪ APP sensor signal malfunction

**POSSIBLE
CAUSE**

- ECT sensor signal malfunction
- IAT sensor signal malfunction
- MAF sensor signal malfunction
- CKP sensor signal malfunction
- TP sensor signal malfunction
- VSS signal malfunction
- Ignition system malfunction
 - Spark plug malfunction
 - Ignition coil related wiring harness malfunction
 - Ignition coil connector or terminal malfunction
 - Ignition coil malfunction
- Excessive air suction in intake air system (between dynamic chamber and cylinder head)
- Fuel injector operation malfunction
 - Fuel injector related wiring harness malfunction
 - Fuel injector connector or terminal malfunction
 - Fuel injector malfunction
- Engine malfunction
 - Insufficient engine compression
 - Engine coolant leakage
- PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	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 (misfire 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.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability.	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next

	Is any related repair information available?		step.
		No	Go to the next step.
3	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify pending and stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [MZR 2.5] .)
		No	Go to the next step.
4	VERIFY CURRENT INPUT SIGNAL STATUS - Access the following PIDs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - APP1 - APP2 - ECT - IAT - MAF - RPM - TP REL - VSS - Is there any signal that is far out of specification when switch the ignition to ON and the engine idles? (See PCM INSPECTION [MZR 2.5].)	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 16.
		No	Go to the next step.
5	VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION CAUTION: - While performing this step, always operate the vehicle in a safe and lawful manner. - When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 16.
		No	Go to the next step.

	RECORD capturing function and inspect later. • Access the following PIDs under the FREEZE FRAME DATA (Mode 2) condition. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) ▪ APP1 ▪ APP2 ▪ ECT ▪ IAT ▪ MAF ▪ RPM ▪ TP REL ▪ VSS • Is there any signal which causes drastic changes?		
6	INSPECT IGNITION SYSTEM OPERATION • Perform the Spark Test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5].) • Is strong blue spark visible at each cylinder?	Yes	Go to Step 10.
		No	Go to the next step.
7	INSPECT SPARK PLUG CONDITION • Remove the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZR 2.5].) • Inspect the spark plug. (See SPARK PLUG INSPECTION [MZR 2.5].) • Is there any malfunction?	Yes	Replace the spark plug, then go to Step 16.
		No	Go to the next step.
8	INSPECT IGNITION COIL RELATED WIRING HARNESS OR CONNECTOR CONDITION • Inspect the ignition coil related wiring harness condition (intermittent open or short) for all cylinders and connector for poor connection (such as damaged/pulled-out pins, corrosion).	Yes	Repair or replace the malfunctioning part according to inspection results, then go to Step 16.
		No	Go to the next step.

	Is there any malfunction?		
9	INSPECT IGNITION COIL - Inspect the ignition coil for all cylinders. (See IGNITION COIL INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes Replace the malfunctioning ignition coil, then go to Step 16. (See IGNITION COIL REMOVAL/ INSTALLATION [MZR 2.5] .)	
		No Go to the next step.	
10	INSPECT INTAKE AIR SYSTEM FOR AIR SUCTION - Inspect for air leakage at the following: - Around connection of dynamic chamber and intake manifold - Around connection of intake manifold and cylinder head NOTE: - Engine speed may change when rust penetrating agent is sprayed on the air suction area. - Is there any leakage?	Yes Repair or replace the malfunctioning part according to inspection results, then go to Step 16.	
		No Go to the next step.	
11	INSPECT FUEL INJECTOR OPERATION - Remove the intake air system parts. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5].) - Disconnect the fuel injector connector on suspected cylinder. - Connect the test light to the fuel injector terminals. - Inspect the test light during cranking. - Does the test light illuminate?	Yes Go to the next step.	
		No Go to Step 14.	
12	INSPECT FUEL INJECTOR RELATED WIRING HARNESS OR CONNECTOR CONDITION - Inspect the fuel injector related wiring harness condition (intermittent open or short) and connector for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the malfunctioning part according to inspection results, then go to Step 16.	
		No Go to the next step.	
13	INSPECT FUEL INJECTOR	Yes Replace the malfunctioning fuel injector,	

	- Remove the fuel injector. (See FUEL INJECTOR REMOVAL/ INSTALLATION [MZR 2.5].) - Switch the fuel injector with the fuel injector on other cylinder. - Start the engine and idle it. - Is the misfire DTC for cylinder which has a suspected fuel injector?		then go to Step 16. (See FUEL INJECTOR REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
14	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 16.
		No	Go to the next step.
15	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 results, then go to the next step.
		No	Go to the next step.
16	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].) - Start the engine and warm it up completely. - Perform the KOER self test. (See KOEO/ KOER SELF 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.
17	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.

[< Previous](#) [Next >](#)

© 2011 Mazda North American Operations, U.S.A.

[Back to Top](#)

2012 - Mazda6 - Engine

DTC P0301:00, P0302:00, P0303:00, P0304:00 [MZR 2.5]

DTC P0301:00	Cylinder No.1 misfire detected
DTC P0302:00	Cylinder No.2 misfire detected
DTC P0303:00	Cylinder No.3 misfire detected
DTC P0304:00	Cylinder No.4 misfire detected
DETECTION CONDITION	- The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires that occurred at 200 crankshaft revolutions and 1,000 crankshaft revolutions and calculates the misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred. Diagnostic support note - This is a continuous monitor (misfire). - The MIL illuminates if the PCM detects the misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - The MIL flashes if the PCM detects the misfire which can damage the catalytic converter during first drive cycle. - PENDING CODE is available if the PCM detects the misfire which affects emission performance during first drive cycle. - FREEZE FRAME DATA (Mode 2)/Snapshot data is available. - The DTC is stored in the PCM memory.
	- Erratic signal to PCM - APP sensor signal malfunction

**POSSIBLE
CAUSE**

- ECT sensor signal malfunction
- IAT sensor signal malfunction
- MAF sensor signal malfunction
- CKP sensor signal malfunction
- TP sensor signal malfunction
- VSS signal malfunction
- Ignition system malfunction
 - Spark plug malfunction
 - Ignition coil related wiring harness malfunction
 - Ignition coil connector or terminal malfunction
 - Ignition coil malfunction
- Excessive air suction in intake air system (between dynamic chamber and cylinder head)
- Fuel injector operation malfunction
 - Fuel injector related wiring harness malfunction
 - Fuel injector connector or terminal malfunction
 - Fuel injector malfunction
- Engine malfunction
 - Insufficient engine compression
 - Engine coolant leakage
- PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	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 (misfire 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.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability.	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next

	Is any related repair information available?		step.
		No	Go to the next step.
3	VERIFY RELATED PENDING AND STORED DTC - Switch the ignition to off, then to ON (engine off). - Verify pending and stored DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Are any other DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [MZR 2.5] .)
		No	Go to the next step.
4	VERIFY CURRENT INPUT SIGNAL STATUS - Access the following PIDs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - APP1 - APP2 - ECT - IAT - MAF - RPM - TP REL - VSS - Is there any signal that is far out of specification when switch the ignition to ON and the engine idles? (See PCM INSPECTION [MZR 2.5].)	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 16.
		No	Go to the next step.
5	VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA (MODE 2) CONDITION CAUTION: - While performing this step, always operate the vehicle in a safe and lawful manner. - When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND	Yes	Inspect the suspected sensor and related wiring harness. Repair or replace the malfunctioning part according to the inspection results, then go to Step 16.
		No	Go to the next step.

	RECORD capturing function and inspect later. • Access the following PIDs under the FREEZE FRAME DATA (Mode 2) condition. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) ▪ APP1 ▪ APP2 ▪ ECT ▪ IAT ▪ MAF ▪ RPM ▪ TP REL ▪ VSS • Is there any signal which causes drastic changes?		
6	INSPECT IGNITION SYSTEM OPERATION • Perform the Spark Test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5].) • Is strong blue spark visible at each cylinder?	Yes	Go to Step 10.
		No	Go to the next step.
7	INSPECT SPARK PLUG CONDITION • Remove the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZR 2.5].) • Inspect the spark plug. (See SPARK PLUG INSPECTION [MZR 2.5].) • Is there any malfunction?	Yes	Replace the spark plug, then go to Step 16.
		No	Go to the next step.
8	INSPECT IGNITION COIL RELATED WIRING HARNESS OR CONNECTOR CONDITION • Inspect the ignition coil related wiring harness condition (intermittent open or short) for all cylinders and connector for poor connection (such as damaged/pulled-out pins, corrosion).	Yes	Repair or replace the malfunctioning part according to inspection results, then go to Step 16.
		No	Go to the next step.

	Is there any malfunction?		
9	INSPECT IGNITION COIL - Inspect the ignition coil for all cylinders. (See IGNITION COIL INSPECTION [MZR 2.5].) - Is there any malfunction?	Yes Replace the malfunctioning ignition coil, then go to Step 16. (See IGNITION COIL REMOVAL/ INSTALLATION [MZR 2.5] .)	
		No Go to the next step.	
10	INSPECT INTAKE AIR SYSTEM FOR AIR SUCTION - Inspect for air leakage at the following: - Around connection of dynamic chamber and intake manifold - Around connection of intake manifold and cylinder head NOTE: - Engine speed may change when rust penetrating agent is sprayed on the air suction area. - Is there any leakage?	Yes Repair or replace the malfunctioning part according to inspection results, then go to Step 16.	
		No Go to the next step.	
11	INSPECT FUEL INJECTOR OPERATION - Remove the intake air system parts. (See INTAKE-AIR SYSTEM REMOVAL/ INSTALLATION [MZR 2.5].) - Disconnect the fuel injector connector on suspected cylinder. - Connect the test light to the fuel injector terminals. - Inspect the test light during cranking. - Does the test light illuminate?	Yes Go to the next step.	
		No Go to Step 14.	
12	INSPECT FUEL INJECTOR RELATED WIRING HARNESS OR CONNECTOR CONDITION - Inspect the fuel injector related wiring harness condition (intermittent open or short) and connector for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the malfunctioning part according to inspection results, then go to Step 16.	
		No Go to the next step.	
13	INSPECT FUEL INJECTOR	Yes Replace the malfunctioning fuel injector,	

	- Remove the fuel injector. (See FUEL INJECTOR REMOVAL/ INSTALLATION [MZR 2.5].) - Switch the fuel injector with the fuel injector on other cylinder. - Start the engine and idle it. - Is the misfire DTC for cylinder which has a suspected fuel injector?		then go to Step 16. (See FUEL INJECTOR REMOVAL/ INSTALLATION [MZR 2.5].)
		No	Go to the next step.
14	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 16.
		No	Go to the next step.
15	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 results, then go to the next step.
		No	Go to the next step.
16	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].) - Start the engine and warm it up completely. - Perform the KOER self test. (See KOEO/ KOER SELF 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.
17	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.

[< Previous](#) [Next >](#)

© 2011 Mazda North American Operations, U.S.A.

[Back to Top](#)