

2012 - Mazda6 - Engine

NO.29 SPARK PLUG CONDIT ION [MZI 3.7 V6]

29	SPARK PLUG CONDITION
DESCRIPTION	• Incorrect spark plug condition.
POSSIBLE CAUSE	NOTE: • Inspecting spark plugs condition can determine whether problem is related to a specific cylinder or possibly all cylinders. Wet/carbon stuck on specific plug: • Spark—Weak, not visible • Air/fuel mixture—Excessive fuel injection volume • Compression—No compression, low compression • Malfunction spark plug Grayish white with specific plug: • Air/fuel mixture—Insufficient fuel injection volume • Malfunction spark plug Wet/carbon is stuck on all plugs: • Spark—Spark rich, excessive fuel line pressure • Air/fuel mixture—Too rich • Erratic signal to PCM ▪ CHT sensor or related circuit malfunction ▪ MAF sensor or related circuit malfunction ▪ A/F sensor or related circuit malfunction ▪ HO2S or related circuit malfunction • Compression—Low compression • Clogging in intake/exhaust system • Poor fuel quality Grayish white with all plugs: • Air/fuel mixture—Too lean, insufficient fuel line pressure • Erratic signal to PCM ▪ CHT sensor or related circuit malfunction ▪ MAF sensor or related circuit malfunction ▪ A/F sensor or related circuit malfunction ▪ HO2S or related circuit malfunction

WARNING:

- The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:
 - Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.
 - 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 "BEFORE SERVICE PRECAUTION" and "AFTER SERVICE PRECAUTION " described in this manual. (See **BEFORE SERVICE PRECAUTION [MZI 3.7 V6]** .) (See **AFTER SERVICE PRECAUTION [MZI 3.7 V6]** .)

CAUTION:

- Disconnecting/connecting quick release connector without cleaning it may cause damage to fuel pipe and quick release connector. Always clean quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.

Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY SPARK PLUG CONDITION • Remove all spark plugs. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .) • Inspect the spark plug condition. (See SPARK PLUG INSPECTION [MZI 3.7 V6] .) • Is the spark plug condition normal?	Yes	Symptom troubleshooting completed.
		No	Specific plug is wet or covered with carbon: • Go to the next step. Specific plug looks grayish white: • Go to Step 7. All plugs are wet or covered with carbon: • Go to Step 9. All plugs look grayish white: • Go to Step 15.
2	DETERMINE IF MALFUNCTION CAUSE IS ENGINE OIL LOSS OR OTHER • Are the spark plug wet/covered with carbon by the engine oil?	Yes	Inspect all areas related to oil, working up and down.
		No	Go to the next step.
3	INSPECT SPARK PLUG • Inspect the spark plug for the following: ▪ Cracked insulator ▪ Heat range ▪ Air gap ▪ Worn electrode • Is the spark plug normal?	Yes	Go to the next step.
		No	Replace the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
4	INSPECT ENGINE COMPRESSION • Inspect the compression pressure at suspected	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection

	malfunctioning cylinder. (See COMPRESSION INSPECTION [MZI 3.7 V6].) Is the compression pressure correct?		results.
5	INSPECT IGNITION SYSTEM OPERATION - Install all spark plugs. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6].) - Perform the spark test at suspected malfunctioning cylinder. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Is strong blue spark visible? (Compare with normal cylinder.)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	INSPECT FUEL LINE PRESSURE - Install the fuel pressure gauge between the fuel pipe and fuel distributor. - Measure the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].) - Is the fuel line pressure correct?	Yes	Inspect the fuel injector for the following: - Open or short circuit in injector - Leakage - Injection volume Repair or replace the malfunctioning part according to the inspection results.
		No	Zero or low: - Inspect for the following: - Fuel pump relay - Fuel pump circuit - Fuel line for clogging - If there is no malfunction, replace the fuel pump unit. (Fuel pump or pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].) High: - Replace the fuel pump unit. (Pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].)
7	INSPECT SPARK PLUG Inspect the spark plug for	Yes	Go to the next step.

	the following: ▪ Heat range ▪ Air gap • Is the spark plug normal?	No	Replace the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
8	INSPECT FUEL INJECTOR OPERATION • Perform the Fuel Injector Operation Inspection. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6] .) • Do the fuel injectors operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
9	INSPECT AIR CLEANER ELEMENT • Is the air cleaner element free of clogging?	Yes	Go to the next step.
		No	Replace the air cleaner element.
10	INSPECT IGNITION SYSTEM OPERATION • Perform the spark test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6] .) • Is strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
11	INSPECT FUEL LINE PRESSURE • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Measure the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6] .) • Is the fuel line pressure correct?	Yes	Go to the next step.
		No	Zero or low: • Inspect for the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (Fuel pump or pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6] .) High: • Replace the fuel pump unit. (Pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
12	VERIFY CURRENT INPUT SIGNAL STATUS	Yes	Go to the next step.

	- Access the following PCM PIDs: (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - ECT - O2S11 (When engine can be started.) - O2S12 (When engine can be started.) - O2S21 (When engine can be started.) - O2S22 (When engine can be started.) - MAF - Are all PIDs normal? (See PCM INSPECTION [MZI 3.7 V6].)	No	Repair or replace the malfunctioning part according to the inspection results.
13	INSPECT PURGE CONTROL SYSTEM OPERATION - Perform the purge control inspection. (When engine can be started.) (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Is the purge control correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
14	INSPECT ENGINE COMPRESSION - Perform the compression inspection. (See COMPRESSION INSPECTION [MZI 3.7 V6].) - Is the compression pressure correct?	Yes	Visually inspect for deformed exhaust system part. Repair or replace the malfunctioning part according to the inspection results. If normal, replace the fuel. (Poor quality fuel is used.)
		No	Repair or replace the malfunctioning part according to the inspection results.
15	INSPECT INTAKE-AIR SYSTEM FOR AIR SUCTION - Inspect the following: - Intake-	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.

	air system for air leakage (When the engine cannot be started.) ▪ Intake manifold vacuum (When the engine can be started.) • Is air sucked in from intake-air system?		
16	INSPECT FUEL LINE PRESSURE • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Measure the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].) • Is the fuel line pressure correct?	Yes Go to the next step.	
		No Zero or low: • Inspect for the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (Fuel pump or pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].) High: • Replace the fuel pump unit. (Pressure regulator malfunction) (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].)	
17	VERIFY CURRENT INPUT SIGNAL STATUS • Access the following PCM PIDs: (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) ▪ ECT ▪ O2S11 (When engine can be started.) ▪ O2S12	Yes Inspect the PCM ground condition. Repair or replace the malfunctioning part according to the inspection results.	
		No Repair or replace the malfunctioning part according to the inspection results.	

	(When engine can be started.) ▪ O2S21 (When engine can be started.) ▪ O2S22 (When engine can be started.) ▪ MAF • Are all PIDs normal? (See PCM INSPECTION [MZI 3.7 V6].)		
18	Verify test results. • If normal, return to diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [MZI 3.7 V6].) • If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. ▪ If vehicle is repaired, troubleshooting completed. ▪ If vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		

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CAUTION:

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Diagnostic procedure

STEP	INSPECTION	RESULTS	ACTION
1	VERIFY SPARK PLUG CONDITION • Remove all spark plugs. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .) • Inspect the spark plug condition. (See SPARK PLUG INSPECTION [MZI 3.7 V6] .) • Is the spark plug condition normal?	Yes	Symptom troubleshooting completed.
		No	Specific plug is wet or covered with carbon: • Go to the next step. Specific plug looks grayish white: • Go to Step 7. All plugs are wet or covered with carbon: • Go to Step 9. All plugs look grayish white: • Go to Step 15.
2	DETERMINE IF MALFUNCTION CAUSE IS ENGINE OIL LOSS OR OTHER • Are the spark plug wet/covered with carbon by the engine oil?	Yes	Inspect all areas related to oil, working up and down.
		No	Go to the next step.
3	INSPECT SPARK PLUG • Inspect the spark plug for the following: ▪ Cracked insulator ▪ Heat range ▪ Air gap ▪ Worn electrode • Is the spark plug normal?	Yes	Go to the next step.
		No	Replace the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
4	INSPECT ENGINE COMPRESSION • Inspect the compression pressure at suspected	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection

	malfunctioning cylinder. (See COMPRESSION INSPECTION [MZI 3.7 V6].) Is the compression pressure correct?		results.
5	INSPECT IGNITION SYSTEM OPERATION - Install all spark plugs. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6].) - Perform the spark test at suspected malfunctioning cylinder. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Is strong blue spark visible? (Compare with normal cylinder.)	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
6	INSPECT FUEL LINE PRESSURE - Install the fuel pressure gauge between the fuel pipe and fuel distributor. - Measure the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].) - Is the fuel line pressure correct?	Yes	Inspect the fuel injector for the following: - Open or short circuit in injector - Leakage - Injection volume Repair or replace the malfunctioning part according to the inspection results.
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	the following: ▪ Heat range ▪ Air gap • Is the spark plug normal?	No	Replace the spark plug. (See SPARK PLUG REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
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