2012 - Mazda6 - Engine

NO.13 KNOCKING/ PINGING-ACCELERATION/ CRUISE [MZI 3.7 V6]

13	KNOCKING/PINGING—ACCELERATION/CRUISE
DESCRIPTION	• Sound is heard when air/fuel mixture is ignited by something other than spark plug (such as hot spot in combustion chamber).

POSSIBLE CAUSE	• Engine overheating due to cooling system malfunction
	• IAT sensor malfunction
	• MAF sensor malfunction
	• PCM DTC is stored.
	• Inadequate engine compression
	• Erratic signal from CMP sensor
	• Erratic signal from CKP sensor
	• Inadequate fuel pressure
	  ▪ Intermittent open or short circuit in fuel pump circuit
	  ▪ Fuel pump mechanical malfunction
	  ▪ Fuel line restriction or clogging
	  ▪ Pressure regulator malfunction (built-in fuel pump unit)
	• KS malfunction
	• Improper ignition timing
	• Poor fuel quality (i.e. Fuel RON is not specified, excessive cleaning agents added in fuel.)
	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	**INSPECT COOLING SYSTEM FOR MALFUNCTION** • Access the PCM PID ECT using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Verify the ECT PID is **less than 116 °C {241 °F}** during driving. • Is the ECT PID less than specification?	Yes	Go to the next step.
		No	Inspect the CHT sensor. (See **CYLINDER HEAD TEMPERATURE (CHT) SENSOR INSPECTION [MZI 3.7 V6]**s.) • If the CHT sensor is normal, inspect the cooling system for cause of overheating. Repair or replace the malfunctioning part according to the inspection results.
2	**INSPECT IAT SENSOR AND MAF SENSOR SIGNALS** **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 RECORD capturing function and inspect later. • Access the following PCM PIDs using the M-MDS: (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) ▪ IAT ▪ MAF • Do the PIDs indicate the correct values under trouble condition? (See **PCM INSPECTION [MZI 3.7 V6]**.)	Yes	Go to the next step.
		No	IAT PID is not specified: • Inspect the IAT sensor. (See **INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [MZI 3.7 V6]**.) MAF PID is not specified: • Inspect the MAF sensor. (See **MASS AIR FLOW (MAF) SENSOR INSPECTION [MZI 3.7 V6]**.) Repair or replace the malfunctioning part according to the inspection results.
	VERIFY PCM DTC		

3	• Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Are there any DTCs displayed?	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See **DTC TABLE [MZI 3.7 V6]**.)
		No	No DTC is displayed: • Go to the next step.
4	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
5	**INSPECT CKP SENSOR** • Inspect the CKP sensor. (See **CRANKSHAFT POSITION (CKP) SENSOR INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	**INSPECT CMP SENSOR** • Inspect the CMP sensor. (See **CAMSHAFT POSITION (CMP) SENSOR INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
7	**INSPECT FUEL LINE PRESSURE** • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Start the engine and idle it. • Measure the fuel line pressure during idle. (See **FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6]**.) • Is the fuel line pressure correct during idle?	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]**.)
8	**INSPECT KS** • Inspect the KS. (See **KNOCK SENSOR (KS) INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Replace the KS. (See **KNOCK SENSOR (KS) REMOVAL/ INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
9	**INSPECT IGNITION TIMING** • Inspect the ignition timing. (See **ENGINE TUNE-UP [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the fuel.
10	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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	• 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
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		No	Inspect the CHT sensor. (See **CYLINDER HEAD TEMPERATURE (CHT) SENSOR INSPECTION [MZI 3.7 V6]**s.) • If the CHT sensor is normal, inspect the cooling system for cause of overheating. Repair or replace the malfunctioning part according to the inspection results.
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		No	IAT PID is not specified: • Inspect the IAT sensor. (See **INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [MZI 3.7 V6]**.) MAF PID is not specified: • Inspect the MAF sensor. (See **MASS AIR FLOW (MAF) SENSOR INSPECTION [MZI 3.7 V6]**.) Repair or replace the malfunctioning part according to the inspection results.
	VERIFY PCM DTC		

3	• Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS. (See **ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6]**.) • Are there any DTCs displayed?	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See **DTC TABLE [MZI 3.7 V6]**.)
		No	No DTC is displayed: • Go to the next step.
4	**INSPECT ENGINE COMPRESSION** • Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
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		No	Go to the next step.
6	**INSPECT CMP SENSOR** • Inspect the CMP sensor. (See **CAMSHAFT POSITION (CMP) SENSOR INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
7	**INSPECT FUEL LINE PRESSURE** • Install the fuel pressure gauge between the fuel pipe and fuel distributor. • Start the engine and idle it. • Measure the fuel line pressure during idle. (See **FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6]**.) • Is the fuel line pressure correct during idle?	Yes	Go to the next step.
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			High: • Replace the fuel pump unit. (Pressure regulator malfunction) (See **FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6]**.)
8	**INSPECT KS** • Inspect the KS. (See **KNOCK SENSOR (KS) INSPECTION [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Replace the KS. (See **KNOCK SENSOR (KS) REMOVAL/ INSTALLATION [MZI 3.7 V6]**.)
		No	Go to the next step.
9	**INSPECT IGNITION TIMING** • Inspect the ignition timing. (See **ENGINE TUNE-UP [MZI 3.7 V6]**.) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Replace the fuel.
10	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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