

2012 - Mazda6 - Engine

NO.19 EXHAUST SMOKE [MZR 2.5]

19	EXHAUST SMOKE
DESCRIPTION	• Blue, black, or white smoke from exhaust system.
POSSIBLE CAUSE	Blue smoke (Burning oil): • PCV valve malfunction • Engine internal oil leakage White smoke (Water in combustion): • Cooling system malfunction (coolant loss) • Engine internal coolant leakage Black smoke (Rich fuel mixture): • Air cleaner restriction • Intake air system is collapsed or restricted. • Erratic signal to PCM ▪ APP sensor or related wiring harness malfunction ▪ ECT sensor or related wiring harness malfunction ▪ IAT sensor or related wiring harness malfunction ▪ MAF sensor or related wiring harness malfunction ▪ MAP sensor or related wiring harness malfunction ▪ A/F sensor or related wiring harness malfunction ▪ HO2S or related wiring harness malfunction ▪ TP sensor or related wiring harness malfunction ▪ VSS or related wiring harness malfunction • Excessive or insufficient fuel pressure ▪ Fuel pump relay or fuel pump circuit malfunction ▪ Restriction in fuel line ▪ Pressure regulator malfunction (built-into fuel pump unit) ▪ Fuel pump malfunction • Ignition system malfunction • CMP sensor malfunction • Improper engine compression • Improper fuel injection timing and/or amount WARNING:

The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:

- 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 [MZR 2.5]**.) (See **AFTER SERVICE PRECAUTION [MZR 2.5]**.)

CAUTION:

- **Disconnecting/ connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and the quick release connector. Always clean the 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 EXHAUST GAS COLOR • What color is the smoke coming from the exhaust system?	Blue	Burning oil is indicated. • Go to the next step.
		White	Water in the combustion is indicated. • Go to Step 3.
		Black	Rich fuel mixture is indicated. • Go to Step 4.
2	INSPECT IF MALFUNCTION CAUSE IS PCV VALVE OR OTHER • Inspect the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION [MZR 2.5].) • Is the PCV valve normal?	Yes	Inspect for the following: • Damaged valve guide, stems or valve seals • Blocked oil drain passage in the cylinder head • Piston ring is not seated, seized or worn. • Damaged cylinder bore Repair or replace the malfunctioning part according to the inspection results. • If other drivability symptoms are present, return to the diagnostic index to service any additional symptoms.
		No	Replace the PCV valve and the oil separator as a single unit, then go to the next step. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/ INSTALLATION [MZR 2.5] .)
3	INSPECT COOLING SYSTEM FOR LEAKAGE • Does the cooling system hold pressure?	Yes	Inspect for the following: • Cylinder head gasket leakage • Intake manifold gasket leakage • Cracked or porous engine block Repair or replace the malfunctioning part according to the inspection results. • If other drivability symptoms are present, return to

			diagnostic index to service any additional symptoms.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.
4	INSPECT INTAKE AIR SYSTEM - Inspect for the following: - Air cleaner restriction - Collapsed or restricted intake air system - Restricted fuel return line - Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 4.
5	VERIFY PCM DTC - Retrieve any DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZR 2.5].) - Are there any DTCs displayed?	Yes	Go to the appropriate DTC inspection. (See DTC TABLE [MZR 2.5].)
		No	Go to the next step.
6	VERIFY CURRENT INPUT SIGNAL STATUS 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 [MZR 2.5].) - APP1 - APP2 - ECT	Yes	Go to the next step.
		No	APP1, APP2 PIDs are not specified: - Inspect if the output signal APP sensor changes smoothly. (See ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [MZR 2.5].) ECT PID is not as specified: - Inspect for an intermittent open circuit of the ECT sensor and the related wiring harness. (See ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [MZR 2.5].) IAT PID is not specified: - Inspect for an intermittent open circuit of the IAT sensor and the related wiring harness. (See INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION [MZR 2.5].) MAF PID is not specified: - Inspect for an intermittent open circuit of MAF sensor and the related wiring harness. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [MZR 2.5].)

	▪ IAT ▪ MAF ▪ MAP ▪ O2S11 ▪ O2S12 ▪ TP1 ▪ TP2 ▪ VSS • Monitor the PIDs under the black smoke appeared engine condition. • Do the PIDs indicate normal according to engine conditions? (See PCM INSPECTION [MZR 2.5].)	MAP PID is not as specified: • Inspect for an intermittent open circuit of the MAP sensor and the related wiring harness. (See MANI FOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION [MZR 2.5].) O2S11 PID is not as specified: • Inspect for an intermittent open circuit of the A/F sensor and the related wiring harness. (See AIR FUEL RATIO (A/ F) SENSOR INSPECTION [MZR 2.5].) O2S12 PID is not as specified: • Inspect for an intermittent open circuit of the HO2S and the related wiring harness. (See HEATED OXYGEN SENSOR (HO2S) INSPECTION [MZR 2.5].) TP1, TP2 PIDs are not as specified: • Inspect if the output signal from the TP sensor changes smoothly. (See THROTTLE POSITION (TP) SENSOR INSPECTION [MZR 2.5].) VSS PID is not specified: • Inspect for an intermittent open circuit in the VSS and related wiring harness. (See VEHI CLE SPEED SENSOR (VSS) INSPECTION [FS5A-EL].) Repair or replace the malfunctioning part according to the inspection result.				
7	INSPECT FUEL LINE PRESSURE • Inspect the fuel line pressure. (See FUEL LINE PRESSURE INSPECTION [MZR 2.5].) • Is the fuel line pressure correct?	<table><tr><td>Yes</td><td>Go to the next step.</td></tr><tr><td>No</td><td> Zero or low: • Inspect the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5].) High: • Replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5].) </td></tr></table>	Yes	Go to the next step.	No	Zero or low: • Inspect the following: ▪ Fuel pump relay ▪ Fuel pump circuit ▪ Fuel line for clogging • If there is no malfunction, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5].) High: • Replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZR 2.5].)
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8	INSPECT IGNITION SYSTEM OPERATION • Perform the Spark Test.	<table><tr><td>Yes</td><td>Go to the next step.</td></tr><tr><td>No</td><td>Repair or replace the malfunctioning part according to the inspection</td></tr></table>	Yes	Go to the next step.	No	Repair or replace the malfunctioning part according to the inspection
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	(See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZR 2.5].) Is a strong blue spark visible at each cylinder?		results.
9	INSPECT CMP SENSOR - Inspect the CMP sensor. (See CAMSHAFT POSITION (CMP) SENSOR INSPECTION [MZR 2.5].) - Is the CMP sensor normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
10	INSPECT ENGINE COMPRESSION - Measure the compression pressure for each cylinder. (See COMPRESSION INSPECTION [MZR 2.5].) - Are compression pressures within specified?	Yes	Inspect the fuel injector for each cylinder. (See FUEL INJECTOR INSPECTION [MZR 2.5].) Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect for the followings: - Damaged the valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Repair or replace the malfunctioning part according to the inspection results.
11	- Verify test results. - If normal, return to diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [MZR 2.5].) - 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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