

2012 - Mazda6 - Engine

NO.5 ENGINE STALLS-AFTER START/ AT IDLE [MZI 3.7 V6]

5	ENGINE STALLS—AFTER START/AT IDLE
DESCRIPTION	• Engine stops unexpectedly.
POSSIBLE CAUSE	• Vacuum leakage • Air leakage from intake-air system parts • Air cleaner restriction • Poor fuel quality • Electrical connector disconnection • Throttle valve restriction or clogged • PCM DTC is stored. • No battery power supply to PCM or poor ground • Erratic signal to PCM ▪ APP sensor or related circuit malfunction ▪ TP sensor or related circuit malfunction • Improper operation of drive-by-wire control system • Restriction in exhaust system • No signal from CKP sensor due to sensor, related wire or wrong installation • Ignition coil or related circuit malfunction • Spark plug malfunction • Fuel leakage from fuel injector • Fuel injector clogging • Inadequate fuel pressure ▪ Open or short circuit in fuel pump and related wiring harness ▪ Fuel pump mechanical malfunction ▪ Fuel line clogged ▪ Pressure regulator malfunction (built-in fuel pump unit) • Fuel leakage from fuel system • PCV valve malfunction • A/C system operation is improper. • Purge solenoid valve malfunction • Air leakage from intake air system when engine runs high speed • Improper operation variable valve timing control system • Low engine compression • Improper valve timing

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 RELATED PART CONDITION • Inspect for the following: ▪ Vacuum connection ▪ Air cleaner element ▪ No air leakage from intake-air system ▪ No restriction of intake-air system ▪ Proper sealing of intake manifold and components attached to intake manifold ▪ Ignition wiring ▪ Fuel quality: proper octane, contamination, winter/summer blend ▪ Electrical connections ▪ Smooth operation of throttle valve • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
2	VERIFY PCM DTC • Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS.	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See DTC TABLE [MZI 3.7 V6] .) Communication error message is displayed:

	(See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) Are there any DTCs displayed?		- Inspect the following: - Open circuit in wiring harness between main relay terminal C and PCM terminal 1BP or 1BK - Open circuit in wiring harness between main relay terminal D and PCM terminal 1AZ - Main relay is stuck open. - Open or short circuit in wiring harness between the DLC-2 and PCM terminals 1AH or 1AL - Open or poor ground circuit (PCM terminal 1B, 1J, 1E) - Poor connection of vehicle body ground - Repair or replace the malfunctioning part according to the inspection results.
		No	No DTC is displayed: Go to the next step.
3	INSPECT APP SENSOR SIGNAL - Access the PCM PIDs APP1 and APP2 using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Crank the engine with accelerator pedal released. - Are the APP1 and APP2 PIDs indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect for the following: - APP sensor (See ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [MZI 3.7 V6].) - Wiring harnesses and connectors for following: - PCM terminal 1Z—APP sensor terminal A - PCM terminal 1U—APP sensor terminal B - PCM terminal 1AD—APP sensor terminal C - PCM terminal 1AB—APP sensor terminal D - PCM terminal 1Y—APP sensor terminal E - PCM terminal 1X—APP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
4	INSPECT TP SENSOR SIGNAL - Access the PCM PIDs TP1 and TP2 using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Crank the engine with accelerator pedal released. - Are the TP1 and TP2 PIDs indicates the closed throttle position?	Yes	Go to the next step.
		No	Inspect for the following: - TP sensor (See THROTTLE POSITION (TP) SENSOR INSPECTION [MZI 3.7 V6].) - Wiring harnesses and connectors for following: - PCM terminal 2BO—TP sensor terminal A - PCM terminal 2BR—TP sensor terminal B - PCM terminal 2AL—TP sensor terminal C - PCM terminal 2AP—TP sensor terminal D

			▪ PCM terminal 2Z—TP sensor terminal E ▪ PCM terminal 2AN—TP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
5	DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER • Attempt to start the engine at part throttle. • Does the engine run smoothly at part throttle?	Yes Inspect drive-by-wire control system operation. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) Repair or replace the malfunctioning part according to the inspection results.	
		No	Go to the next step.
6	INSPECT DEFORMED IN EXHAUST SYSTEM • Visually inspect the exhaust system part. • Is there any deformed exhaust system part?	Yes Repair or replace the malfunctioning part according to the inspection results.	
		No	Go to the next step.
7	DETERMINE IF MALFUNCTION CAUSE IS CKP SENSOR WIRING HARNESS OR OTHER • Access the PCM PID RPM using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) • Is the RPM PID indicating engine speed during the engine cranking?	Yes Go to the next step.	
		No	Inspect for the following: • Open or short circuit in CKP sensor • Open or short circuit in wiring harness between CKP sensor terminal A and PCM terminal 2V • Open or short circuit in wiring harness between CKP sensor terminal B and PCM terminal 2R • Open or short circuit in CKP sensor wiring harnesses Repair or replace the malfunctioning part according to the inspection results. • If the CKP sensor and wiring harness are normal, go to the next step.
8	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.
9	INSPECT IGNITION SYSTEM RELATED WIRING HARNESS • Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. • Are wiring harness conditions normal?	Yes Go to the next step.	
		No	Repair or replace suspect wiring harness and connector.
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. • If symptoms occurs with the A/C on, go to Step 15.	
		No	Repair or replace the malfunctioning part according to the inspection results.

11	VERIFY SPARK PLUG CONDITION - Verify the spark plug conditions when the spark plug removed in Step 10. - Is spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: - Inspect for fuel leakage from fuel injector. Spark plug is grayish white: - Inspect the fuel injector for clogging. Repair or replace the malfunctioning part according to the inspection results.
		No	Install the spark plugs on original cylinders. Go to the next step.
12	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].)
13	INSPECT FUEL SYSTEM FOR FUEL LEAKAGE - Visually inspect for fuel leakage at fuel injector O-ring and fuel line. - Service if necessary. - Is the fuel line pressure held after ignition is switched to off? (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See FUEL INJECTOR INSPECTION [MZI 3.7 V6] .) If the fuel injector is normal, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].)
14	INSPECT PCV VALVE NOTE: - The PCV valve cannot be reassembled once it is removed because the tabs will have been broken. Inspect the PCV valve without removing it from the vehicle. - Inspect the PCV valve with it installed. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE)	Yes	Replace the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
		No	Go to the next step.

	INSPECTION [MZI 3.7 V6].) Is there any malfunction?		
15	DETERMINE IF MALFUNCTION CAUSE IS A/C SYSTEM OR OTHER NOTE: - The following test is for stall concerns with the A/C on. If other symptoms exist, go to the next step. - Connect the pressure gauges to A/C low and high pressure side lines. - Turn the A/C on and measure low side and high side pressures. (See REFRIGERANT PRESSURE CHECK.) - Are pressures within specifications?	Yes	Go to the next step.
		No	If A/C is always on,: - Go to the symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". (See NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [MZI 3.7 V6].) For other symptoms: - Inspect the following: - Refrigerant charging amount - Cooling fan operation - Repair or replace the malfunctioning part according to the inspection results.
16	DETERMINE IF MALFUNCTION CAUSE IS EVAP CONTROL SYSTEM OR OTHER - Disconnect the vacuum hose between purge solenoid valve and intake manifold from purge solenoid side. - Plug opening end of vacuum hose. - Start the engine. - Is the engine stall now eliminated?	Yes	Inspect the following: - Purge solenoid valve is stuck open. - EVAP control system Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
17	INSPECT INTAKE AIR SYSTEM FOR AIR LEAKAGE Is the air leakage felt or heard at intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
18	INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION - Inspect variable valve timing control system operation. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Does the variable valve timing control function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
19	INSPECT IF MALFUNCTION CAUSE IS LOW ENGINE COMPRESSION OR VALVE TIMING Is the engine compression correct?	Yes	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.

20 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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WARNING:

- The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:
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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 RELATED PART CONDITION • Inspect for the following: ▪ Vacuum connection ▪ Air cleaner element ▪ No air leakage from intake-air system ▪ No restriction of intake-air system ▪ Proper sealing of intake manifold and components attached to intake manifold ▪ Ignition wiring ▪ Fuel quality: proper octane, contamination, winter/summer blend ▪ Electrical connections ▪ Smooth operation of throttle valve • Are all items normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results. Repeat Step 1.
2	VERIFY PCM DTC • Switch the ignition to ON (Engine off). • Retrieve any DTCs using the M-MDS.	Yes	DTC is displayed: • Go to the appropriate DTC inspection. (See DTC TABLE [MZI 3.7 V6] .) Communication error message is displayed:

	(See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) Are there any DTCs displayed?		- Inspect the following: - Open circuit in wiring harness between main relay terminal C and PCM terminal 1BP or 1BK - Open circuit in wiring harness between main relay terminal D and PCM terminal 1AZ - Main relay is stuck open. - Open or short circuit in wiring harness between the DLC-2 and PCM terminals 1AH or 1AL - Open or poor ground circuit (PCM terminal 1B, 1J, 1E) - Poor connection of vehicle body ground - Repair or replace the malfunctioning part according to the inspection results.
		No	No DTC is displayed: Go to the next step.
3	INSPECT APP SENSOR SIGNAL - Access the PCM PIDs APP1 and APP2 using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Crank the engine with accelerator pedal released. - Are the APP1 and APP2 PIDs indicating that the accelerator pedal is in the released position?	Yes	Go to the next step.
		No	Inspect for the following: - APP sensor (See ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION [MZI 3.7 V6].) - Wiring harnesses and connectors for following: - PCM terminal 1Z—APP sensor terminal A - PCM terminal 1U—APP sensor terminal B - PCM terminal 1AD—APP sensor terminal C - PCM terminal 1AB—APP sensor terminal D - PCM terminal 1Y—APP sensor terminal E - PCM terminal 1X—APP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
4	INSPECT TP SENSOR SIGNAL - Access the PCM PIDs TP1 and TP2 using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Crank the engine with accelerator pedal released. - Are the TP1 and TP2 PIDs indicates the closed throttle position?	Yes	Go to the next step.
		No	Inspect for the following: - TP sensor (See THROTTLE POSITION (TP) SENSOR INSPECTION [MZI 3.7 V6].) - Wiring harnesses and connectors for following: - PCM terminal 2BO—TP sensor terminal A - PCM terminal 2BR—TP sensor terminal B - PCM terminal 2AL—TP sensor terminal C - PCM terminal 2AP—TP sensor terminal D

			- PCM terminal 2Z—TP sensor terminal E - PCM terminal 2AN—TP sensor terminal F Repair or replace the malfunctioning part according to the inspection results.
5	DETERMINE IF MALFUNCTION CAUSE IS DRIVE-BY-WIRE CONTROL SYSTEM OR OTHER - Attempt to start the engine at part throttle. - Does the engine run smoothly at part throttle?	Yes	Inspect drive-by-wire control system operation. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
6	INSPECT DEFORMED IN EXHAUST SYSTEM - Visually inspect the exhaust system part. - Is there any deformed exhaust system part?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
7	DETERMINE IF MALFUNCTION CAUSE IS CKP SENSOR WIRING HARNESS OR OTHER - Access the PCM PID RPM using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) - Is the RPM PID indicating engine speed during the engine cranking?	Yes	Go to the next step.
		No	Inspect for the following: - Open or short circuit in CKP sensor - Open or short circuit in wiring harness between CKP sensor terminal A and PCM terminal 2V - Open or short circuit in wiring harness between CKP sensor terminal B and PCM terminal 2R - Open or short circuit in CKP sensor wiring harnesses Repair or replace the malfunctioning part according to the inspection results. - If the CKP sensor and wiring harness are normal, go to the next step.
8	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.
9	INSPECT IGNITION SYSTEM RELATED WIRING HARNESS - Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders. - Are wiring harness conditions normal?	Yes	Go to the next step.
		No	Repair or replace suspect wiring harness and connector.
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. If symptoms occurs with the A/C on, go to Step 15.
		No	Repair or replace the malfunctioning part according to the inspection results.

11	VERIFY SPARK PLUG CONDITION - Verify the spark plug conditions when the spark plug removed in Step 10. - Is spark plug wet, covered with carbon or grayish white?	Yes	Spark plug is wet or covered with carbon: - Inspect for fuel leakage from fuel injector. Spark plug is grayish white: - Inspect the fuel injector for clogging. Repair or replace the malfunctioning part according to the inspection results.
		No	Install the spark plugs on original cylinders. Go to the next step.
12	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].)
13	INSPECT FUEL SYSTEM FOR FUEL LEAKAGE - Visually inspect for fuel leakage at fuel injector O-ring and fuel line. - Service if necessary. - Is the fuel line pressure held after ignition is switched to off? (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].)	Yes	Go to the next step.
		No	Inspect the fuel injector. (See FUEL INJECTOR INSPECTION [MZI 3.7 V6] .) If the fuel injector is normal, replace the fuel pump unit. (See FUEL PUMP UNIT REMOVAL/ INSTALLATION [MZI 3.7 V6].)
14	INSPECT PCV VALVE NOTE: - The PCV valve cannot be reassembled once it is removed because the tabs will have been broken. Inspect the PCV valve without removing it from the vehicle. - Inspect the PCV valve with it installed. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE)	Yes	Replace the PCV valve. (See POSITIVE CRANKCASE VENTILATION (PCV) VALVE REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
		No	Go to the next step.

	INSPECTION [MZI 3.7 V6].) Is there any malfunction?		
15	DETERMINE IF MALFUNCTION CAUSE IS A/C SYSTEM OR OTHER NOTE: - The following test is for stall concerns with the A/C on. If other symptoms exist, go to the next step. - Connect the pressure gauges to A/C low and high pressure side lines. - Turn the A/C on and measure low side and high side pressures. (See REFRIGERANT PRESSURE CHECK.) - Are pressures within specifications?	Yes	Go to the next step.
		No	If A/C is always on,: - Go to the symptom troubleshooting "NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". (See NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY [MZI 3.7 V6].) For other symptoms: - Inspect the following: - Refrigerant charging amount - Cooling fan operation - Repair or replace the malfunctioning part according to the inspection results.
16	DETERMINE IF MALFUNCTION CAUSE IS EVAP CONTROL SYSTEM OR OTHER - Disconnect the vacuum hose between purge solenoid valve and intake manifold from purge solenoid side. - Plug opening end of vacuum hose. - Start the engine. - Is the engine stall now eliminated?	Yes	Inspect the following: - Purge solenoid valve is stuck open. - EVAP control system Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
17	INSPECT INTAKE AIR SYSTEM FOR AIR LEAKAGE Is the air leakage felt or heard at intake-air system components while racing the engine to higher speed?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
18	INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION - Inspect variable valve timing control system operation. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Does the variable valve timing control function properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
19	INSPECT IF MALFUNCTION CAUSE IS LOW ENGINE COMPRESSION OR VALVE TIMING Is the engine compression correct?	Yes	Inspect the valve timing. Repair or replace the malfunctioning part according to the inspection results.
		No	Inspect for cause. Repair or replace the malfunctioning part according to the inspection results.

20 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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