

2012 - Mazda6 - Engine

DTC P0171:00, P0174:00 [MZI 3.7 V6]

DTC P0171:00	P0171:00: System too lean (RH)
DTC P0174:00	P0174:00: System too lean (LH)
DETECTI ON CONDI TION	• P0171:00 indicates that the fuel/air ratio is too lean (RH). • P0174:00 indicates that the fuel/air ratio is too lean (LH). • The adaptive fuel strategy continuously monitors the fuel delivery hardware. The test fails when the adaptive fuel tables reach a rich calibrated limit.
POSSI BLE CAUSE	Fuel System: • Damaged or worn fuel pump • Leaking fuel pump check valve • Ethanol content in fuel • Fuel supply line restricted • Damaged or leaking fuel pulse damper • Fuel filter plugged or dirty • Low fuel pressure or fuel nearly depleted • Purge solenoid valve is leaking when canister is clean • Leaking/contaminated fuel injectors Exhaust System: • Exhaust leaks in exhaust manifold gasket or mating gaskets before or near the A/F sensor Intake Air System: • Vacuum leaks • PCV system is leaking or valve is stuck open • Air leaks after MAF sensor • Improperly seated engine oil dipstick • Intake air turbulence due to incorrect air filter • Contaminated MAF sensor Electrical System:

- MAF sensor malfunction
- PCM malfunction

Diagnostic procedure

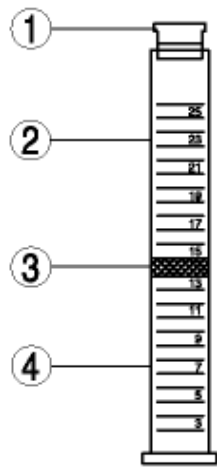
STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED • Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related Service Bulletins available?	Yes Perform repair or diagnosis according to the available Service Bulletins. • If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY RELATED PENDING CODE OR STORED DTCS • Switch the ignition to off, then to the ON (Engine off). • Verify related PENDING CODE or stored DTCs. • Are any DTCs present other than the following: ▪ P0171:00, P0174:00, P2195:00 or P2197:00?	Yes Go to the appropriate DTC troubleshooting procedures. (See DTC TABLE [MZI 3.7 V6] .)
		No Go to the next step.
4	PERFORM VISUAL INSPECTION ON INTAKE AIR SYSTEM AND ALL VACUUM HOSES • Switch the ignition to off. • Check the intake air system for leaks, obstructions, and damage. • Inspect the entire length of all the vacuum hoses for: ▪ Proper connections ▪ Damage or cracks ▪ Damaged or cracked vacuum hose joint • Verify the integrity of the positive crankcase ventilation (PCV) system. • Verify that the PCV valve part number is	Yes Repair if necessary. Then go to Step 7.
		No Go to the next step.

	correct. • Is a concern present?		
5	INSPECT FOR PRESENCE OF VACUUM LEAK NOTE: • Fuel trim values at idle are more sensitive to a vacuum leak. The vacuum leak (unmetered air) represents a larger portion of the total air flow at idle than at part throttle. • The BARO PID is not a commended PID to monitor when diagnosing a vacuum leak. BARO is calculated during high engine load, when the vacuum leak represents a small portion of the total air flow • When calculating the total fuel correction in the following steps, if LONGFT1 equals +13% and SHRTFT1 equals +23%, the total fuel correction for bank 1 equals +36%. If LONGFT2 equals +24% and SHRTFT2 equals -3% the total fuel correction for bank 2 equals +21%. • If the freeze frame ECT PID is available, stabilize the engine at the temperature recorded by the freeze frame ECT PID. If the freeze frame ECT PID is not available, maintain the engine coolant temperature between 82—101 °C {180—215 °F} and the intake air temperature at less than 46 °C {115 °F}. • Switch the ignition to ON (Engine running) • Access the PCM and monitor the ECT, CHT and IAT PIDs. • Access the PCM and monitor the LONGFT1, SHRTFT1, LONGFT2 and SHRTFT2 PIDs. • Allow the engine to stabilize at the temperature necessary to recreate the concern. NOTE: • If the engine speed cannot be increased to 3,500 rpm, increase the engine speed to the maximum RPM without activating RPM limiting. • Add and record the LONGFT PID value to the SHRTFT PID value for each bank, correction at idle. • Increase the engine speed to 3,500 rpm for 10 s. Record the LONGFT1, SHRTFT1, LONGFT2, and system SHRTFT2 PID values. • Add and record the LONGFT PID value to the SHRTFT PID value for each bank, correction at 3,500 rpm.	YesNo vacuum leak is present. Go to Step 8. NoGo to the next step.	

	Is the total fuel correction value difference between idle and 3,500 rpm less than 15%?		
6	LOCATE VACUUM LEAK	Yes	Repair if necessary. Then go to the next step.
	CAUTION: - Do not clamp or pinch a hard plastic hose. Use a vacuum cap or equivalent to restrict the hose. NOTE: - Restricting the EVAP vapor hose while the EVAP emission canister is purging may shift the SHRTFT. Perform a visual inspection if necessary. - When monitoring for a decrease in the SHRTFT PIDs in the following steps, if SHRTFT1 equals +15% and the hose is restricted, SHRTFT1 decreases to -7%. The total decrease in the SHRTFT PIDs equals 22%. - Locate the vacuum hose joint for the intake air and PCV systems. - Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. - Restrict the vacuum lines one at a time for 30 s. If a vacuum leak in the intake is present, the SHRTFT PID values decrease as the hose is restricted. - Is the decrease in the SHRTFT PIDs more than 15% when one of the vacuum hoses is restricted?	No	Inspect the intake air system for a vacuum leak in the intake manifold or intake gaskets. Repair if necessary. Then go to the next step.
7	VACUUM LEAK REPAIR VERIFICATION	Yes	Reset the keep alive memory. Then go to Step 26.
	NOTE: - If the freeze frame ECT PID is available, stabilize the engine at the temperature recorded by the freeze frame ECT PID. If the freeze frame ECT PID is not available, maintain the engine coolant temperature between 82—101 °C {180—215 °F} and the intake air temperature less than 46 °C {115 °F}. - Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. - Allow the engine to stabilize at the temperature necessary to recreate the concern. - Record the SHRTFT1 and SHRTFT2 PID values. - Switch the ignition to off. - Repair the vacuum leak. - Switch the ignition to ON (Engine running)	No	A vacuum leak is still present. Go to Step 6.

	• Allow the engine to stabilize at the temperature necessary to recreate the concern. • Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. • Compare the recorded SHRTFT PID values, prior to the no vacuum leak repair, to the current SHRTFT PID values. • Is the decrease in the SHRTFT PIDs more than 15%?		
8	INSPECT FUEL PRESSURE WARNING: • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE". NOTE: • For vehicle specific fuel pressure ranges, refer to the "FUEL LINE PRESSURE INSPECTION". • Remove the jumper wire(s). • Connect the A/F sensor connector. • Relieve the fuel pressure. • Connect the mechanical fuel pressure gauge. • Pressurize the fuel system. • Switch the ignition to ON (Engine running) • Allow the fuel pressure to stabilize. • Switch the ignition to off. • Switch the ignition to ON (Engine running) • Measure the fuel pressure. • Is the fuel pressure within the range for the vehicle being diagnosed?	Yes	Go to Step 19.
		No	Go to the next step.
9	INSPECT FUEL LINE PRESSURE • Switch the ignition to off. • Connect the mechanical fuel pressure gauge. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].) • Connect the FP connector. • Switch the ignition to ON (Engine off). • Pressurize the fuel system.	Yes	Go to Step 12.
		No	Go to the next step.

	• Cycle the key several times to charge the fuel system. • Relieve the fuel pressure. • Is the fuel pressure within range?		
10	INSPECT FUEL PUMP GROUND CIRCUIT FOR OPEN CIRCUIT IN WIRING HARNESS NOTE: • Refer to the Wiring Diagrams Manual for schematic and connector information. • Switch the ignition to off. • Disconnect the FP and fuel pump relay connectors. • Verify that continuity between FP (wiring harness-side connector) terminal D and ground. • Is there any continuity?	Yes	Go to the next step.
		No	Repair for an open circuit, then go to Step 26.
11	INSPECT FUEL PUMP POWER CIRCUIT FOR OPEN CIRCUIT IN WIRING HARNESS NOTE: • Refer to the Wiring Diagrams Manual for schematic and connector information. • Switch the ignition to off. • Disconnect the FP and fuel pump relay connectors. • Verify that continuity between FP (wiring harness-side connector) terminal B and fuel pump relay (wiring harness-side connector) terminal C. • Is there any continuity?	Yes	Go to Step 14.
		No	Repair for open circuit, then go to Step 26.
12	CALCULATE PERCENTAGE OF ETHANOL IN FUEL NOTE: • Use the illustration as an example for calculating the percentage of ethanol using the following steps. If the separation level is at 14 ml {14 cc, 0.85 in³}, the calculation is; 14 minus 4, then multiply by 5 to equal 50. The percentage of ethanol in the fuel is 50%	Yes	Go to the next step.
		No	Go to Step 14.



Item Number	Description
1	Stopper
2	Gasoline
3	Separation Point at 14ml
4	Ethanol / Water Mixture

- Switch the ignition to off.
- Take the recorded separation level from the previous step and subtract the amount of water added
- Multiply the new value by 5. This new value is the percentage of ethanol in the fuel
- Record the calculated percentage of ethanol in the fuel
- Is any ethanol present in the fuel?

13

DETERMINE IF PERCENTAGE OF ETHANOL IN FUEL IS LESS THAN 10%

- Verify the recorded calculated percentage of ethanol in the fuel.
- Is the calculated percentage of ethanol in the fuel less than 10%?

Yes Go to the next step.

No Replace the fuel.

Advise the customer of the correct fuel type required for this vehicle. Refer to the Owner's Manual Literature for additional information.

Go to Step 26.

14

INSPECT FUEL PRESSURE LEAKDOWN

NOTE:

- When the fuel pump is commanded off, the fuel pressure may substantially decrease and then stabilize
- During output state control, the fuel pump stays commanded on for only about 5 s.
- Mechanical fuel pressure gauge connected.
- Switch the ignition to ON (Engine running).

Yes Go to Step 16.

No Go to the next step.

	• Allow the fuel pressure to stabilize. • Switch the ignition to off. • Monitor the fuel pressure for 5 min. • Is the fuel pressure above fuel hold pressure after 5 min?		
15	INSPECT FUEL INJECTOR FLOW AND LEAKAGE NOTE: • Observe the Warnings, Cautions, and Notes. • Inspect the fuel injectors for leakage and flow rate using the injector flow tester or other method such as inspecting the intake manifold for fuel. • Are the test results satisfactory?	Yes	Go to the next step.
		No	Replace the suspect fuel injector, then go to Step 26.
16	MONITOR FUEL PRESSURE WHILE ROAD TESTING VEHICLE WARNING: • Strict observance of posted speed limits and attention to driving conditions are mandatory when performing the road test. Failure to follow these instructions may result in personal injury. NOTE: • Some concerns may only be present during certain fuel level conditions. Determine the fuel level at the time of the concern. Access the information from the customer information worksheet and the customer. • Switch the ignition to off. • Securely route the mechanical gauge so that the gauge is viewable while road testing the vehicle. • Start the engine and run it at idle. • Warm up the engine to normal operating temperature. • Monitor the mechanical gauge. • From a stop, accelerate to 89 km/h (55 mph) at full throttle. • Repeat 3 times. • Is the fuel pressure always greater than 240 kPa {2.45 kgf/cm², 34.8 psi}?	Yes	Unable to duplicate or identify the concern at this time. Go to Step 26.
		No	Go to the next step.
17	INSPECT FUEL SUPPLY LINE FOR RESTRICTION NOTE:	Yes	Replace the fuel filter (low-pressure side).

	• Observe the Warnings, Cautions, and Notes. • Switch the ignition to off. • Disconnect the fuel supply line at the fuel rail. • Disconnect the fuel supply line at the fuel pump. • Verify the fuel supply line for restriction. • Apply 21—34 kPa {0.22—0.34 kgf/cm², 3.1—4.9 psi} air pressure to the fuel supply line. • Does air flow freely through the line?	Go to the next step.
		No Repair the cause of the restriction, then go to Step 26.
18	VERIFY FUEL SYSTEM REPAIRED WARNING: • Strict observance of posted speed limits and attention to driving conditions are mandatory when carrying the road test. Failure to follow these instructions may result in personal injury. • Start the engine and run it at idle. • Warm up the engine to normal operating temperature. • Monitor the mechanical gauge. • From a stop, accelerate to 89 km/h (55 mph) at full throttle. • Repeat this 3 times. • Is the fuel pressure always greater than 240 kPa {2.45 kgf/cm², 34.8 psi}?	YesThe test is complete and no concerns are present. Go to Step 26.
		No Replace the fuel pump unit, then go to Step 26.
19	VERIFY FUEL SYSTEM FOR PRESSURE STABILITY-FAST LEAKDOWN • Mechanical fuel pressure gauge connected. • Switch the ignition to ON (Engine running). • Allow the fuel pressure to stabilize • Record the stabilized reading • Switch the ignition to off. • Monitor the fuel pressure for 10 s. • Measure the fuel line pressure after 10 s. • Does the fuel pressure remain within 34 kPa {0.35 kgf/cm², 4.9 psi} of the recorded reading after 10 s?	YesGo to Step 21.
		No Go to the next step.
20	INSPECT FOR EXTERNAL FUEL LEAK	YesRepair for fuel leakage, then go to Step 26.

	Inspect the fuel tank, lines, and filler pipe for a fuel leak. Is a concern present?		No	Go to Step 23.
21	VERIFY FUEL SYSTEM FOR PRESSURE STABILITY-SLOW LEAKDOWN - Continue to monitor the fuel pressure for 1 min. - Does the fuel pressure remain within 34 kPa {0.35 kgf/cm², 4.9 psi} of the recorded reading after 1 min?	Yes	Go to the next step.	
		No	Go to Step 15.	
22	DETERMINE IF THE PERCENTAGE OF ETHANOL IN FUEL IS LESS THAN 10% - Check the recorded (calculated) percentage of ethanol in the fuel referring to Step 12 and 13. - Is the calculated percentage of ethanol in the fuel less than 10%?	Yes	Go to the next step.	
		No	Replace the fuel.	
			Advise the customer of the correct fuel type required for this vehicle. Refer to the Owner's Manual Literature for additional information.	
			Go to Step 26.	
23	INSPECT FUEL INJECTOR OPERATION - Perform the "Fuel Injector Operation Inspection" for the right bank (with DTC P0171:00) or the left bank (with DTC P0174:00). (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Does the fuel injector operate properly?	Yes	Go to the next step.	
		No	Replace the suspect fuel injector, then go to Step 26.	
24	VERIFY FUNCTIONALITY OF MAF SENSOR NOTE: - MAF PID value of less than 0.6 V may indicate an incorrectly installed air cleaner or a leak in the intake-air system. - Start the engine and run it at idle. - Allow the engine to stabilize at the correct operating temperature. - Access and monitor the MAF PID. - Inspect that the MAF PID at idle and P/N position is not greater than 30% of the normal MAF listed. Reference Values or not greater than 1.3 V. (See PCM INSPECTION [MZI 3.7 V6].) - Is the PID value within the expected range?	Yes	Unable to duplicate or identify the concern at this time.	
			Go to Step 26.	
		No	Go to the next step.	

25	INSPECT TO ISOLATE MAF SENSOR FROM LEAN DRIVEABILITY OCCURRENCE NOTE: • Due to increasingly stringent emission/OBD requirements, a fuel system DTC on some vehicles can be generated without a noticeable drivability concern with or without the MAF sensor disconnected. Under these conditions, if the MAF PID indicates a MAF sensor concern, replace the MAF sensor. • Switch the ignition to off. • Disconnect the MAF/IAT sensor connector. • Start the engine and run it at idle. • Drive the vehicle on the road. • Does the lean drivability symptom (lack of power, spark knock/detonation, buck/jerk or hesitation/surge on acceleration) disappear?	Yes	Replace the MAF/IAT sensor, then go to the next step.	(See MASS AIR FLOW (MAF)/ INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
		No	Go to the next step.	(The system is correctly at this time. The concern may have been caused by a loose or corroded connector.)
26	VERIFY TROUBLESHOOTING OF DTC P0171:00, P0174:00 HAS BEEN COMPLETED • Verify that all disconnected connectors are reconnected. • Switch the ignition to ON (Engine off). • Clear the DTC from the PCM memory using the M-MDS. • Perform the OBD-II DRIVE MODE up to Misfire, Fuel and HO2S Monitors (Step 11). (See OBD-II DRIVE MODE [MZI 3.7 V6] .) • Retrieve DTCs using the M-MDS. • 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 [MZI 3.7 V6] .) Go to the next step.
		No	Go to the next step.	
27	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [MZI 3.7 V6] .) • Are any DTCs present?	Yes	Go to the applicable DTC inspection.	(See DTC TABLE [MZI 3.7 V6] .)
		No	Troubleshooting completed.	

2012 - Mazda6 - Engine

DTC P0171:00, P0174:00 [MZI 3.7 V6]

DTC P0171:00	P0171:00: System too lean (RH)
DTC P0174:00	P0174:00: System too lean (LH)
DETECTI ON CONDI TION	• P0171:00 indicates that the fuel/air ratio is too lean (RH). • P0174:00 indicates that the fuel/air ratio is too lean (LH). • The adaptive fuel strategy continuously monitors the fuel delivery hardware. The test fails when the adaptive fuel tables reach a rich calibrated limit.
POSSI BLE CAUSE	Fuel System: • Damaged or worn fuel pump • Leaking fuel pump check valve • Ethanol content in fuel • Fuel supply line restricted • Damaged or leaking fuel pulse damper • Fuel filter plugged or dirty • Low fuel pressure or fuel nearly depleted • Purge solenoid valve is leaking when canister is clean • Leaking/contaminated fuel injectors Exhaust System: • Exhaust leaks in exhaust manifold gasket or mating gaskets before or near the A/F sensor Intake Air System: • Vacuum leaks • PCV system is leaking or valve is stuck open • Air leaks after MAF sensor • Improperly seated engine oil dipstick • Intake air turbulence due to incorrect air filter • Contaminated MAF sensor Electrical System:

- MAF sensor malfunction
- PCM malfunction

Diagnostic procedure

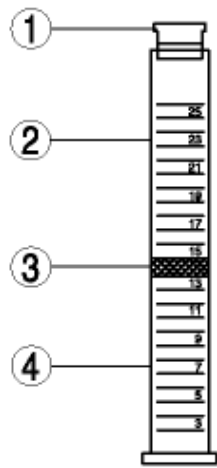
STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED • Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related Service Bulletins available?	Yes	Perform repair or diagnosis according to the available Service Bulletins. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY RELATED PENDING CODE OR STORED DTCS • Switch the ignition to off, then to the ON (Engine off). • Verify related PENDING CODE or stored DTCs. • Are any DTCs present other than the following: ▪ P0171:00, P0174:00, P2195:00 or P2197:00?	Yes	Go to the appropriate DTC troubleshooting procedures. (See DTC TABLE [MZI 3.7 V6] .)
		No	Go to the next step.
4	PERFORM VISUAL INSPECTION ON INTAKE AIR SYSTEM AND ALL VACUUM HOSES • Switch the ignition to off. • Check the intake air system for leaks, obstructions, and damage. • Inspect the entire length of all the vacuum hoses for: ▪ Proper connections ▪ Damage or cracks ▪ Damaged or cracked vacuum hose joint • Verify the integrity of the positive crankcase ventilation (PCV) system. • Verify that the PCV valve part number is	Yes	Repair if necessary. Then go to Step 7.
		No	Go to the next step.

	correct. • Is a concern present?		
5	INSPECT FOR PRESENCE OF VACUUM LEAK NOTE: • Fuel trim values at idle are more sensitive to a vacuum leak. The vacuum leak (unmetered air) represents a larger portion of the total air flow at idle than at part throttle. • The BARO PID is not a commended PID to monitor when diagnosing a vacuum leak. BARO is calculated during high engine load, when the vacuum leak represents a small portion of the total air flow • When calculating the total fuel correction in the following steps, if LONGFT1 equals +13% and SHRTFT1 equals +23%, the total fuel correction for bank 1 equals +36%. If LONGFT2 equals +24% and SHRTFT2 equals -3% the total fuel correction for bank 2 equals +21%. • If the freeze frame ECT PID is available, stabilize the engine at the temperature recorded by the freeze frame ECT PID. If the freeze frame ECT PID is not available, maintain the engine coolant temperature between 82—101 °C {180—215 °F} and the intake air temperature at less than 46 °C {115 °F}. • Switch the ignition to ON (Engine running) • Access the PCM and monitor the ECT, CHT and IAT PIDs. • Access the PCM and monitor the LONGFT1, SHRTFT1, LONGFT2 and SHRTFT2 PIDs. • Allow the engine to stabilize at the temperature necessary to recreate the concern. NOTE: • If the engine speed cannot be increased to 3,500 rpm, increase the engine speed to the maximum RPM without activating RPM limiting. • Add and record the LONGFT PID value to the SHRTFT PID value for each bank, correction at idle. • Increase the engine speed to 3,500 rpm for 10 s. Record the LONGFT1, SHRTFT1, LONGFT2, and system SHRTFT2 PID values. • Add and record the LONGFT PID value to the SHRTFT PID value for each bank, correction at 3,500 rpm.	YesNo vacuum leak is present. Go to Step 8. NoGo to the next step.	

	Is the total fuel correction value difference between idle and 3,500 rpm less than 15%?		
6	LOCATE VACUUM LEAK	Yes	Repair if necessary. Then go to the next step.
	CAUTION: - Do not clamp or pinch a hard plastic hose. Use a vacuum cap or equivalent to restrict the hose. NOTE: - Restricting the EVAP vapor hose while the EVAP emission canister is purging may shift the SHRTFT. Perform a visual inspection if necessary. - When monitoring for a decrease in the SHRTFT PIDs in the following steps, if SHRTFT1 equals +15% and the hose is restricted, SHRTFT1 decreases to -7%. The total decrease in the SHRTFT PIDs equals 22%. - Locate the vacuum hose joint for the intake air and PCV systems. - Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. - Restrict the vacuum lines one at a time for 30 s. If a vacuum leak in the intake is present, the SHRTFT PID values decrease as the hose is restricted. - Is the decrease in the SHRTFT PIDs more than 15% when one of the vacuum hoses is restricted?	No	Inspect the intake air system for a vacuum leak in the intake manifold or intake gaskets. Repair if necessary. Then go to the next step.
7	VACUUM LEAK REPAIR VERIFICATION	Yes	Reset the keep alive memory. Then go to Step 26.
	NOTE: - If the freeze frame ECT PID is available, stabilize the engine at the temperature recorded by the freeze frame ECT PID. If the freeze frame ECT PID is not available, maintain the engine coolant temperature between 82—101 °C {180—215 °F} and the intake air temperature less than 46 °C {115 °F}. - Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. - Allow the engine to stabilize at the temperature necessary to recreate the concern. - Record the SHRTFT1 and SHRTFT2 PID values. - Switch the ignition to off. - Repair the vacuum leak. - Switch the ignition to ON (Engine running)	No	A vacuum leak is still present. Go to Step 6.

	• Allow the engine to stabilize at the temperature necessary to recreate the concern. • Access the PCM and monitor the SHRTFT1 and SHRTFT2 PIDs. • Compare the recorded SHRTFT PID values, prior to the no vacuum leak repair, to the current SHRTFT PID values. • Is the decrease in the SHRTFT PIDs more than 15%?		
8	INSPECT FUEL PRESSURE WARNING: • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes. To prevent this, always complete the "BEFORE REPAIR PROCEDURE". NOTE: • For vehicle specific fuel pressure ranges, refer to the "FUEL LINE PRESSURE INSPECTION". • Remove the jumper wire(s). • Connect the A/F sensor connector. • Relieve the fuel pressure. • Connect the mechanical fuel pressure gauge. • Pressurize the fuel system. • Switch the ignition to ON (Engine running) • Allow the fuel pressure to stabilize. • Switch the ignition to off. • Switch the ignition to ON (Engine running) • Measure the fuel pressure. • Is the fuel pressure within the range for the vehicle being diagnosed?	Yes	Go to Step 19.
		No	Go to the next step.
9	INSPECT FUEL LINE PRESSURE • Switch the ignition to off. • Connect the mechanical fuel pressure gauge. (See FUEL LINE PRESSURE INSPECTION [MZI 3.7 V6].) • Connect the FP connector. • Switch the ignition to ON (Engine off). • Pressurize the fuel system.	Yes	Go to Step 12.
		No	Go to the next step.

	• Cycle the key several times to charge the fuel system. • Relieve the fuel pressure. • Is the fuel pressure within range?		
10	INSPECT FUEL PUMP GROUND CIRCUIT FOR OPEN CIRCUIT IN WIRING HARNESS NOTE: • Refer to the Wiring Diagrams Manual for schematic and connector information. • Switch the ignition to off. • Disconnect the FP and fuel pump relay connectors. • Verify that continuity between FP (wiring harness-side connector) terminal D and ground. • Is there any continuity?	Yes	Go to the next step.
		No	Repair for an open circuit, then go to Step 26.
11	INSPECT FUEL PUMP POWER CIRCUIT FOR OPEN CIRCUIT IN WIRING HARNESS NOTE: • Refer to the Wiring Diagrams Manual for schematic and connector information. • Switch the ignition to off. • Disconnect the FP and fuel pump relay connectors. • Verify that continuity between FP (wiring harness-side connector) terminal B and fuel pump relay (wiring harness-side connector) terminal C. • Is there any continuity?	Yes	Go to Step 14.
		No	Repair for open circuit, then go to Step 26.
12	CALCULATE PERCENTAGE OF ETHANOL IN FUEL NOTE: • Use the illustration as an example for calculating the percentage of ethanol using the following steps. If the separation level is at 14 ml {14 cc, 0.85 in³}, the calculation is; 14 minus 4, then multiply by 5 to equal 50. The percentage of ethanol in the fuel is 50%	Yes	Go to the next step.
		No	Go to Step 14.



Item Number	Description
1	Stopper
2	Gasoline
3	Separation Point at 14ml
4	Ethanol / Water Mixture

- Switch the ignition to off.
- Take the recorded separation level from the previous step and subtract the amount of water added
- Multiply the new value by 5. This new value is the percentage of ethanol in the fuel
- Record the calculated percentage of ethanol in the fuel
- Is any ethanol present in the fuel?

13

DETERMINE IF PERCENTAGE OF ETHANOL IN FUEL IS LESS THAN 10%

- Verify the recorded calculated percentage of ethanol in the fuel.
- Is the calculated percentage of ethanol in the fuel less than 10%?

Yes Go to the next step.

No Replace the fuel.

Advise the customer of the correct fuel type required for this vehicle. Refer to the Owner's Manual Literature for additional information.

Go to Step 26.

14

INSPECT FUEL PRESSURE LEAKDOWN

NOTE:

- When the fuel pump is commanded off, the fuel pressure may substantially decrease and then stabilize
- During output state control, the fuel pump stays commanded on for only about 5 s.
- Mechanical fuel pressure gauge connected.
- Switch the ignition to ON (Engine running).

Yes Go to Step 16.

No Go to the next step.

	• Allow the fuel pressure to stabilize. • Switch the ignition to off. • Monitor the fuel pressure for 5 min. • Is the fuel pressure above fuel hold pressure after 5 min?		
15	INSPECT FUEL INJECTOR FLOW AND LEAKAGE NOTE: • Observe the Warnings, Cautions, and Notes. • Inspect the fuel injectors for leakage and flow rate using the injector flow tester or other method such as inspecting the intake manifold for fuel. • Are the test results satisfactory?	Yes	Go to the next step.
		No	Replace the suspect fuel injector, then go to Step 26.
16	MONITOR FUEL PRESSURE WHILE ROAD TESTING VEHICLE WARNING: • Strict observance of posted speed limits and attention to driving conditions are mandatory when performing the road test. Failure to follow these instructions may result in personal injury. NOTE: • Some concerns may only be present during certain fuel level conditions. Determine the fuel level at the time of the concern. Access the information from the customer information worksheet and the customer. • Switch the ignition to off. • Securely route the mechanical gauge so that the gauge is viewable while road testing the vehicle. • Start the engine and run it at idle. • Warm up the engine to normal operating temperature. • Monitor the mechanical gauge. • From a stop, accelerate to 89 km/h (55 mph) at full throttle. • Repeat 3 times. • Is the fuel pressure always greater than 240 kPa {2.45 kgf/cm², 34.8 psi}?	Yes	Unable to duplicate or identify the concern at this time. Go to Step 26.
		No	Go to the next step.
17	INSPECT FUEL SUPPLY LINE FOR RESTRICTION NOTE:	Yes	Replace the fuel filter (low-pressure side).

	• Observe the Warnings, Cautions, and Notes. • Switch the ignition to off. • Disconnect the fuel supply line at the fuel rail. • Disconnect the fuel supply line at the fuel pump. • Verify the fuel supply line for restriction. • Apply 21—34 kPa {0.22—0.34 kgf/cm², 3.1—4.9 psi} air pressure to the fuel supply line. • Does air flow freely through the line?	Go to the next step.
		No Repair the cause of the restriction, then go to Step 26.
18	VERIFY FUEL SYSTEM REPAIRED WARNING: • Strict observance of posted speed limits and attention to driving conditions are mandatory when carrying the road test. Failure to follow these instructions may result in personal injury. • Start the engine and run it at idle. • Warm up the engine to normal operating temperature. • Monitor the mechanical gauge. • From a stop, accelerate to 89 km/h (55 mph) at full throttle. • Repeat this 3 times. • Is the fuel pressure always greater than 240 kPa {2.45 kgf/cm², 34.8 psi}?	YesThe test is complete and no concerns are present. Go to Step 26.
		No Replace the fuel pump unit, then go to Step 26.
19	VERIFY FUEL SYSTEM FOR PRESSURE STABILITY-FAST LEAKDOWN • Mechanical fuel pressure gauge connected. • Switch the ignition to ON (Engine running). • Allow the fuel pressure to stabilize • Record the stabilized reading • Switch the ignition to off. • Monitor the fuel pressure for 10 s. • Measure the fuel line pressure after 10 s. • Does the fuel pressure remain within 34 kPa {0.35 kgf/cm², 4.9 psi} of the recorded reading after 10 s?	YesGo to Step 21.
		No Go to the next step.
20	INSPECT FOR EXTERNAL FUEL LEAK	YesRepair for fuel leakage, then go to Step 26.

	Inspect the fuel tank, lines, and filler pipe for a fuel leak. Is a concern present?		No	Go to Step 23.
21	VERIFY FUEL SYSTEM FOR PRESSURE STABILITY-SLOW LEAKDOWN - Continue to monitor the fuel pressure for 1 min. - Does the fuel pressure remain within 34 kPa {0.35 kgf/cm², 4.9 psi} of the recorded reading after 1 min?	Yes	Go to the next step.	
		No	Go to Step 15.	
22	DETERMINE IF THE PERCENTAGE OF ETHANOL IN FUEL IS LESS THAN 10% - Check the recorded (calculated) percentage of ethanol in the fuel referring to Step 12 and 13. - Is the calculated percentage of ethanol in the fuel less than 10%?	Yes	Go to the next step.	
		No	Replace the fuel.	
			Advise the customer of the correct fuel type required for this vehicle. Refer to the Owner's Manual Literature for additional information.	
			Go to Step 26.	
23	INSPECT FUEL INJECTOR OPERATION - Perform the "Fuel Injector Operation Inspection" for the right bank (with DTC P0171:00) or the left bank (with DTC P0174:00). (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [MZI 3.7 V6].) - Does the fuel injector operate properly?	Yes	Go to the next step.	
		No	Replace the suspect fuel injector, then go to Step 26.	
24	VERIFY FUNCTIONALITY OF MAF SENSOR NOTE: - MAF PID value of less than 0.6 V may indicate an incorrectly installed air cleaner or a leak in the intake-air system. - Start the engine and run it at idle. - Allow the engine to stabilize at the correct operating temperature. - Access and monitor the MAF PID. - Inspect that the MAF PID at idle and P/N position is not greater than 30% of the normal MAF listed. Reference Values or not greater than 1.3 V. (See PCM INSPECTION [MZI 3.7 V6].) - Is the PID value within the expected range?	Yes	Unable to duplicate or identify the concern at this time.	
			Go to Step 26.	
		No	Go to the next step.	

25	INSPECT TO ISOLATE MAF SENSOR FROM LEAN DRIVEABILITY OCCURRENCE NOTE: • Due to increasingly stringent emission/OBD requirements, a fuel system DTC on some vehicles can be generated without a noticeable drivability concern with or without the MAF sensor disconnected. Under these conditions, if the MAF PID indicates a MAF sensor concern, replace the MAF sensor. • Switch the ignition to off. • Disconnect the MAF/IAT sensor connector. • Start the engine and run it at idle. • Drive the vehicle on the road. • Does the lean drivability symptom (lack of power, spark knock/detonation, buck/jerk or hesitation/surge on acceleration) disappear?	Yes	Replace the MAF/IAT sensor, then go to the next step.	(See MASS AIR FLOW (MAF)/ INTAKE AIR TEMPERATURE (IAT) SENSOR REMOVAL/ INSTALLATION [MZI 3.7 V6] .)
		No	Go to the next step.	(The system is correctly at this time. The concern may have been caused by a loose or corroded connector.)
26	VERIFY TROUBLESHOOTING OF DTC P0171:00, P0174:00 HAS BEEN COMPLETED • Verify that all disconnected connectors are reconnected. • Switch the ignition to ON (Engine off). • Clear the DTC from the PCM memory using the M-MDS. • Perform the OBD-II DRIVE MODE up to Misfire, Fuel and HO2S Monitors (Step 11). (See OBD-II DRIVE MODE [MZI 3.7 V6] .) • Retrieve DTCs using the M-MDS. • 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 [MZI 3.7 V6] .) Go to the next step.
		No	Go to the next step.	
27	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". (See AFTER REPAIR PROCEDURE [MZI 3.7 V6] .) • Are any DTCs present?	Yes	Go to the applicable DTC inspection.	(See DTC TABLE [MZI 3.7 V6] .)
		No	Troubleshooting completed.	