

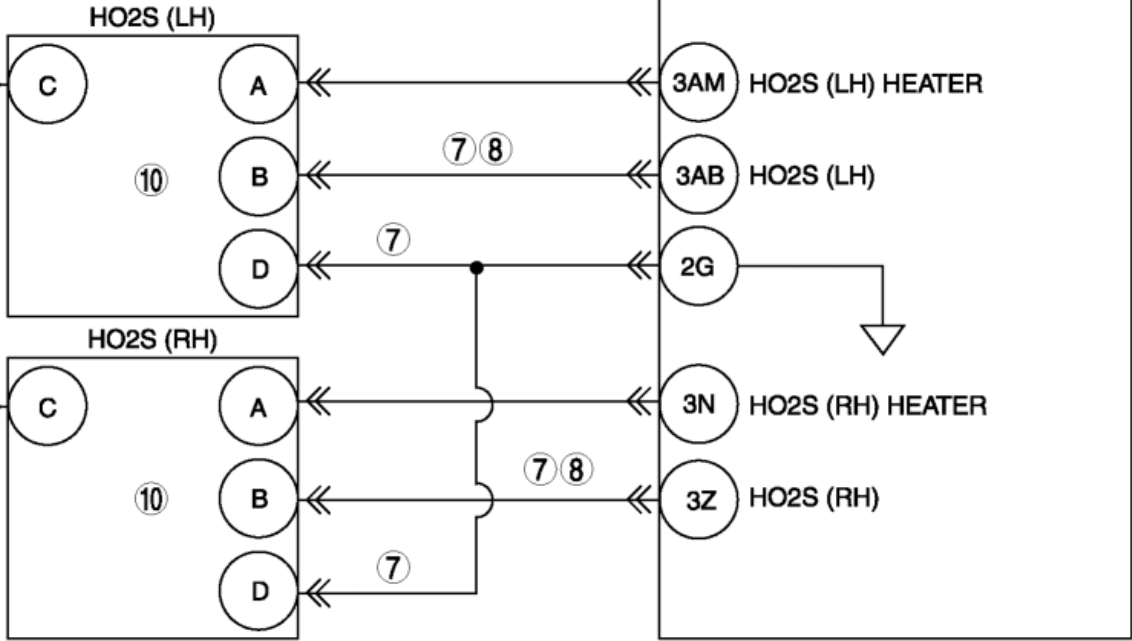
2012 - Mazda6 - Engine

DTC P2A01:00, P2A04:00 [MZI 3.7 V6]

DTC P2A01:00	P2A01:00: HO2S (RH) circuit range/performance
DTC P2A04:00	P2A04:00: HO2S (LH) circuit range/performance
DETECTION CONDITION	• P2A01:00 indicates that HO2S (RH) circuit range/performance • P2A04:00 indicates that HO2S (LH) circuit range/performance • The powertrain control module (PCM) monitors the heated oxygen sensor (HO2S) for an out of range low voltage concern. This DTC sets if the HO2S voltage is out of range low for a calibrated period of time.
POSSIBLE CAUSE	• Crossed HO2S and SIGRTN circuits • Contaminated or damaged HO2S • Deteriorating HO2S • Corrosion • Incorrect harness connections • P2A01:00: ▪ Open circuit in wiring harness between the following terminals: • HO2S (RH) terminal B—PCM terminal 3Z • HO2S (RH) terminal D—PCM terminal 2G ▪ Short to ground in wiring harness between HO2S (RH) terminal B and PCM terminal 3Z ▪ Short to power supply in wiring harness between HO2S (RH) terminal B and PCM terminal 3Z • P2A04:00: ▪ Open circuit in wiring harness between the following terminals: • HO2S (LH) terminal B—PCM terminal 3AB • HO2S (LH) terminal D—PCM terminal 2G ▪ Short to ground in wiring harness between HO2S (LH) terminal B and PCM terminal 3AB ▪ Short to power supply in wiring harness between HO2S (LH) terminal B and PCM terminal 3AB • PCM malfunction

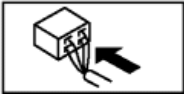
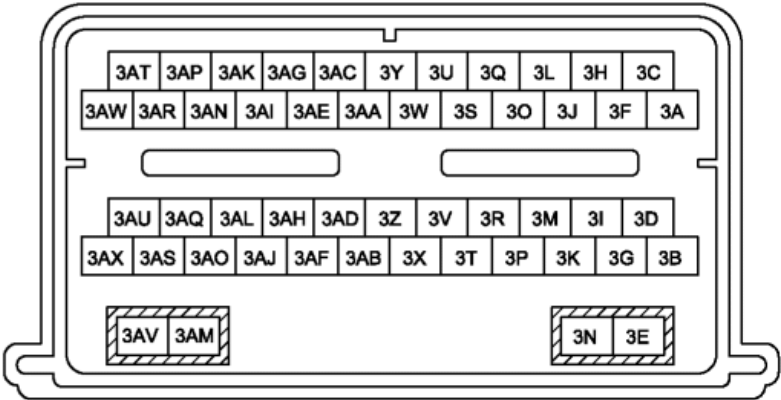
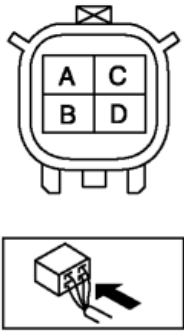
MAIN RELAY

PCM



HO2S (LH, RH)
WIRING HARNESS-SIDE
CONNECTOR

PCM
WIRING HARNESS-SIDE CONNECTOR



Diagnostic procedure

STEP	INSPECTION	ACTION
	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED	

1	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	VISUALLY INSPECT HO2S HARNESS - Switch the ignition to off. - Disconnect the suspect HO2S connector. - Visually inspect suspect HO2S for: - Pinched, shorted, and corroded wiring and pins - Oil or water contamination - Crossed sensor wires - Damaged HO2S - Is a concern present?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 11.
		No	Go to the next step.
4	CHECK FOR UNMETERED AIR LEAKS NOTE: - Fuel calculations can be affected by unmetered air leaks. - Carefully inspect the following areas for potential air leaks: - Hoses connecting to the MAF sensor assembly - Hoses connecting to the throttle body - Intake manifold gasket leaks - PCV system - Vacuum lines are disconnected - Improperly seated engine oil dipstick, tube or oil fill cap - Is a concern present?	Yes	Repair the source of the air leak. Go to Step 11.
		No	Go to the next step.
5	INSPECT FOR SOURCE OF POTENTIAL HO2S CONTAMINATION - Investigate the following items as potential sources of HO2S contamination: - Use of unapproved silicon sealers - Fuel contaminated by silicon additives - Excessive oil consumption - Glycol leaking internally in the engine - Lead-contaminated fuel - Short drive cycles in cold weather - Use of unapproved cleaning agents	Yes	Repair the source of the contamination. Change the engine oil and oil filter. Go to Step 11.
		No	Go to the next step.

	• Is a concern present?		
6	INSPECT EXHAUST SYSTEM AND FUEL SELECTION CONCERNS • Inspect the suspect exhaust system for the following: ▪ Leaks, cracks, or punctures at flanges and gaskets ▪ Aftermarket accessories and performance modifications ▪ Exhaust leaks at the HO2S • Verify with the customer that flex fuel is not being used on a non-flex fuel vehicle. • Is a concern present?	YesRepair or replace the malfunctioning part according to the inspection results, then go to Step 11.	
		NoGo to the next step.	
7	CHECK HO2S CIRCUIT(S) FOR OPEN IN HARNESS NOTE: • Diagnose the suspect sensor indicated by the DTC. • Verify the harness pins are in the correct location. • Suspect HO2S connector is disconnected. • Switch the ignition to off. • Disconnect the PCM connector. • Check the connector (both halves) for any water contamination and replace if necessary. • Measure the resistance between the following terminals (wiring harness-side): ▪ P2A01:00: • HO2S (RH) terminal B—PCM terminal 3Z • HO2S (RH) terminal D—PCM terminal 2G ▪ P2A04:00: • HO2S (LH) terminal B—PCM terminal 3AB • HO2S (LH) terminal D—PCM terminal 2G • Is the resistance less than 5 ohm?	YesGo to the next step.	
		NoRepair for open circuit, then go to Step 11.	
8	CHECK HO2S CIRCUIT FOR SHORT TO GROUND • Suspect HO2S and PCM connectors are disconnected. • Measure the resistance between the following suspect HO2S terminals: ▪ P2A01:00: • HO2S (RH) terminals B and D (wiring harness-side) • HO2S (RH) terminal B (wiring harness-side) and body ground	YesGo to the next step.	
		NoRepair for short circuit, then go to Step 11.	

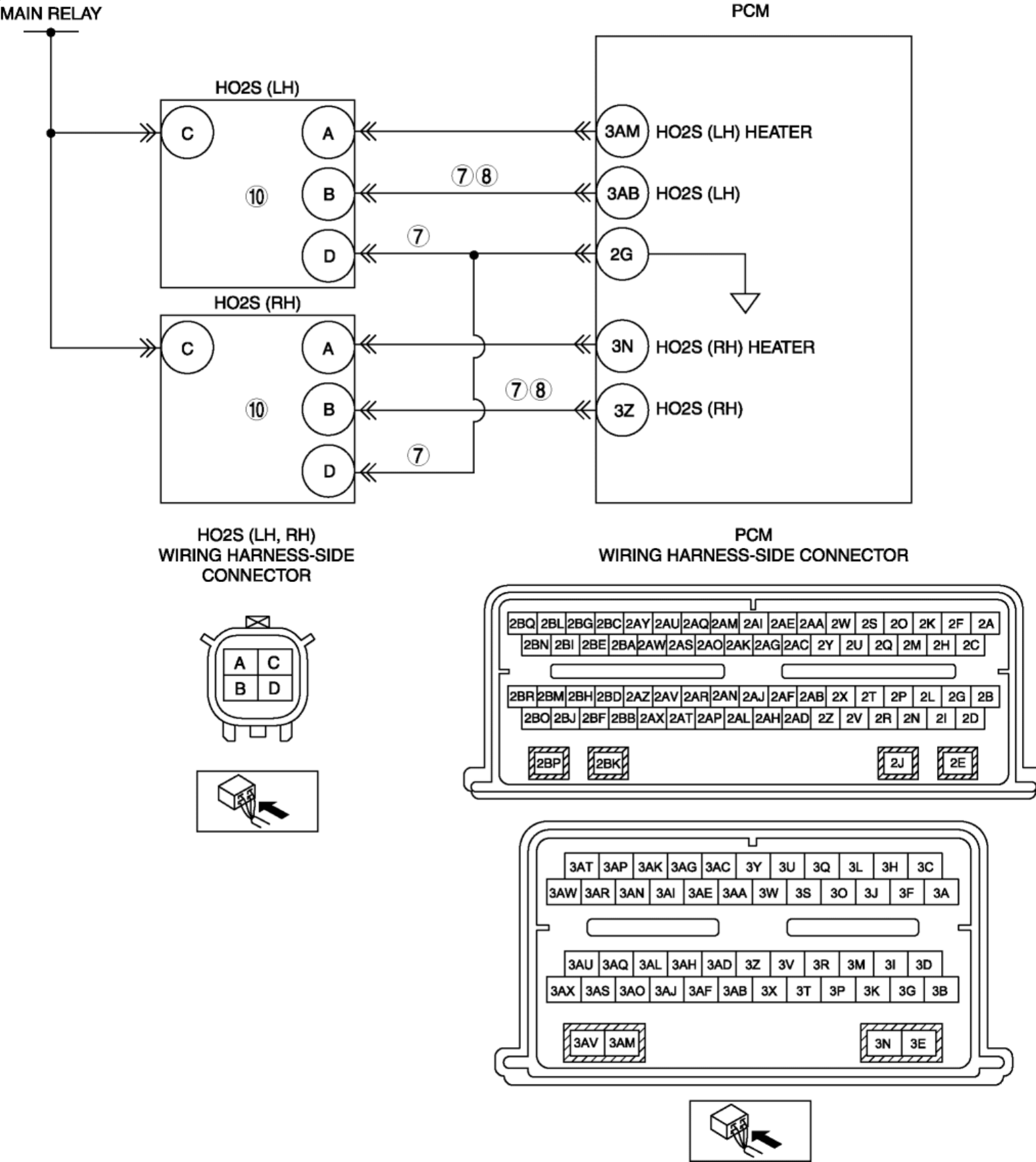
	▪ P2A04:00: • HO2S (LH) terminals B and D (wiring harness-side) • HO2S (LH) terminal B (wiring harness-side) and body ground • Is the resistance greater than 10 kilohms?		
9	CHECK HO2S CIRCUIT FOR SHORT TO VOLTAGE • Suspect HO2S and PCM connectors are disconnected. • Switch the ignition to ON (engine off). • Measure the voltage between the following suspect HO2S terminals (wiring harness-side) and body ground: ▪ HO2S (RH) terminal B (P2A01:00) ▪ HO2S (LH) terminal B (P2A04:00) • Is there any voltage?	Yes Repair for short circuit, then go to Step 11.	No Go to the next step.
10	CHECK HO2S CIRCUIT CONTINUITY NOTE: • HO2S is displayed as O2S on the scan tool. • Suspect HO2S and PCM connectors are disconnected. • Switch the ignition to off. • Reconnect the PCM connector. • Connect a 5 A fused jumper wire between suspect HO2S terminal (wiring harness-side) B and D • Start the engine and run it at idle. • Access the PCM and monitor the suspect HO2S signal PID. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) ▪ O2S11 (VOLT) PID (P2A01:00) ▪ O2S21 (VOLT) PID (P2A04:00) • Is the voltage greater than 1 V?	Yes Replace the HO2S, then go to the next step. (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/ INSTALLATION [MZI 3.7 V6] .)	No Go to the next step. (The system is operating normal at this time. The concern may have been caused by a loose or corroded connector.)
11	VERIFY TROUBLESHOOTING OF DTC P2A01:00, P2A04:00 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 KOEO or KOER self-test. (See KOEO/ KOER SELF TEST [MZI 3.7 V6].) • 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.
12	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". AFTER REPAIR PROCEDURE [MZI 3.7 V6]	Yes Go to the applicable DTC inspection. (See DTC TABLE [MZI 3.7 V6] .)	

	(See	.)		
	• Are any DTCs present?		No Troubleshooting completed.	

2012 - Mazda6 - Engine

DTC P2A01:00, P2A04:00 [MZI 3.7 V6]

DTC P2A01:00	P2A01:00: HO2S (RH) circuit range/performance
DTC P2A04:00	P2A04:00: HO2S (LH) circuit range/performance
DETECTION CONDITION	• P2A01:00 indicates that HO2S (RH) circuit range/performance • P2A04:00 indicates that HO2S (LH) circuit range/performance • The powertrain control module (PCM) monitors the heated oxygen sensor (HO2S) for an out of range low voltage concern. This DTC sets if the HO2S voltage is out of range low for a calibrated period of time.
POSSIBLE CAUSE	• Crossed HO2S and SIGRTN circuits • Contaminated or damaged HO2S • Deteriorating HO2S • Corrosion • Incorrect harness connections • P2A01:00: ▪ Open circuit in wiring harness between the following terminals: • HO2S (RH) terminal B—PCM terminal 3Z • HO2S (RH) terminal D—PCM terminal 2G ▪ Short to ground in wiring harness between HO2S (RH) terminal B and PCM terminal 3Z ▪ Short to power supply in wiring harness between HO2S (RH) terminal B and PCM terminal 3Z • P2A04:00: ▪ Open circuit in wiring harness between the following terminals: • HO2S (LH) terminal B—PCM terminal 3AB • HO2S (LH) terminal D—PCM terminal 2G ▪ Short to ground in wiring harness between HO2S (LH) terminal B and PCM terminal 3AB ▪ Short to power supply in wiring harness between HO2S (LH) terminal B and PCM terminal 3AB • PCM malfunction



Diagnostic procedure

STEP	INSPECTION	ACTION
	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED	

1	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	VISUALLY INSPECT HO2S HARNESS - Switch the ignition to off. - Disconnect the suspect HO2S connector. - Visually inspect suspect HO2S for: - Pinched, shorted, and corroded wiring and pins - Oil or water contamination - Crossed sensor wires - Damaged HO2S - Is a concern present?	Yes	Repair or replace the malfunctioning part according to the inspection results, then go to Step 11.
		No	Go to the next step.
4	CHECK FOR UNMETERED AIR LEAKS NOTE: - Fuel calculations can be affected by unmetered air leaks. - Carefully inspect the following areas for potential air leaks: - Hoses connecting to the MAF sensor assembly - Hoses connecting to the throttle body - Intake manifold gasket leaks - PCV system - Vacuum lines are disconnected - Improperly seated engine oil dipstick, tube or oil fill cap - Is a concern present?	Yes	Repair the source of the air leak. Go to Step 11.
		No	Go to the next step.
5	INSPECT FOR SOURCE OF POTENTIAL HO2S CONTAMINATION - Investigate the following items as potential sources of HO2S contamination: - Use of unapproved silicon sealers - Fuel contaminated by silicon additives - Excessive oil consumption - Glycol leaking internally in the engine - Lead-contaminated fuel - Short drive cycles in cold weather - Use of unapproved cleaning agents	Yes	Repair the source of the contamination. Change the engine oil and oil filter. Go to Step 11.
		No	Go to the next step.

	• Is a concern present?		
6	INSPECT EXHAUST SYSTEM AND FUEL SELECTION CONCERNS • Inspect the suspect exhaust system for the following: ▪ Leaks, cracks, or punctures at flanges and gaskets ▪ Aftermarket accessories and performance modifications ▪ Exhaust leaks at the HO2S • Verify with the customer that flex fuel is not being used on a non-flex fuel vehicle. • Is a concern present?	YesRepair or replace the malfunctioning part according to the inspection results, then go to Step 11.	
		NoGo to the next step.	
7	CHECK HO2S CIRCUIT(S) FOR OPEN IN HARNESS NOTE: • Diagnose the suspect sensor indicated by the DTC. • Verify the harness pins are in the correct location. • Suspect HO2S connector is disconnected. • Switch the ignition to off. • Disconnect the PCM connector. • Check the connector (both halves) for any water contamination and replace if necessary. • Measure the resistance between the following terminals (wiring harness-side): ▪ P2A01:00: • HO2S (RH) terminal B—PCM terminal 3Z • HO2S (RH) terminal D—PCM terminal 2G ▪ P2A04:00: • HO2S (LH) terminal B—PCM terminal 3AB • HO2S (LH) terminal D—PCM terminal 2G • Is the resistance less than 5 ohm?	YesGo to the next step.	
		NoRepair for open circuit, then go to Step 11.	
8	CHECK HO2S CIRCUIT FOR SHORT TO GROUND • Suspect HO2S and PCM connectors are disconnected. • Measure the resistance between the following suspect HO2S terminals: ▪ P2A01:00: • HO2S (RH) terminals B and D (wiring harness-side) • HO2S (RH) terminal B (wiring harness-side) and body ground	YesGo to the next step.	
		NoRepair for short circuit, then go to Step 11.	

	▪ P2A04:00: • HO2S (LH) terminals B and D (wiring harness-side) • HO2S (LH) terminal B (wiring harness-side) and body ground • Is the resistance greater than 10 kilohms?		
9	CHECK HO2S CIRCUIT FOR SHORT TO VOLTAGE • Suspect HO2S and PCM connectors are disconnected. • Switch the ignition to ON (engine off). • Measure the voltage between the following suspect HO2S terminals (wiring harness-side) and body ground: ▪ HO2S (RH) terminal B (P2A01:00) ▪ HO2S (LH) terminal B (P2A04:00) • Is there any voltage?	Yes Repair for short circuit, then go to Step 11.	No Go to the next step.
10	CHECK HO2S CIRCUIT CONTINUITY NOTE: • HO2S is displayed as O2S on the scan tool. • Suspect HO2S and PCM connectors are disconnected. • Switch the ignition to off. • Reconnect the PCM connector. • Connect a 5 A fused jumper wire between suspect HO2S terminal (wiring harness-side) B and D • Start the engine and run it at idle. • Access the PCM and monitor the suspect HO2S signal PID. (See ON-BOARD DIAGNOSTIC TEST [MZI 3.7 V6].) ▪ O2S11 (VOLT) PID (P2A01:00) ▪ O2S21 (VOLT) PID (P2A04:00) • Is the voltage greater than 1 V?	Yes Replace the HO2S, then go to the next step. (See HEATED OXYGEN SENSOR (HO2S) REMOVAL/ INSTALLATION [MZI 3.7 V6] .)	No Go to the next step. (The system is operating normal at this time. The concern may have been caused by a loose or corroded connector.)
11	VERIFY TROUBLESHOOTING OF DTC P2A01:00, P2A04:00 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 KOEO or KOER self-test. (See KOEO/ KOER SELF TEST [MZI 3.7 V6].) • 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.
12	VERIFY AFTER REPAIR PROCEDURE • Perform the "AFTER REPAIR PROCEDURE". AFTER REPAIR PROCEDURE [MZI 3.7 V6]	Yes Go to the applicable DTC inspection. (See DTC TABLE [MZI 3.7 V6] .)	

	(See	.)		
	• Are any DTCs present?		No Troubleshooting completed.	