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2004 MAZDA 3 / Axela Hatchback OEM Service and Repair Workshop Manual

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NO.7 ENGINE OIL WARNING LIGHT ILLUMINATED/MESSAGE RELATED TO ENGINE HYDRAULIC PRESSURE MALFUNCTION INDICATED IN DISPLAY [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

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7	ENGINE OIL WARNING LIGHT ILLUMINATED/MESSAGE RELATED TO ENGINE HYDRAULIC PRESSURE MALFUNCTION INDICATED IN DISPLAY
DESCRIPTION	• Engine oil warning light illuminated. • Message related to engine hydraulic pressure malfunction indicated in display.
POSSIBLE CAUSE	• Engine oil leakage • Improper engine oil level • Instrument cluster malfunction • PCM malfunction
SYSTEM WIRING DIAGRAM	Not applicable

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	INSPECT ENGINE OIL LEVEL • Inspect the engine oil level. (See ENGINE OIL LEVEL INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Inspect for engine oil leakage and repair or replace the malfunctioning location.
		No	Go to the next step.
2	LUBRICATE ENGINE OIL INSIDE ENGINE • Start the engine. • Increase and keep the engine speed at 2,500 rpm for 5 s. • Does the engine oil warning light illuminate?	Yes	Go to the next step.
		No	Symptom troubleshooting is completed. Go to Step 5.
3	VERIFY DTC • Retrieve the PCM and instrument cluster DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See DTC INSPECTION [INSTRUMENT CLUSTER].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) (See DTC TABLE [INSTRUMENT CLUSTER].)
		No	Go to the next step.
4	INSPECT INSTRUMENT CLUSTER • Inspect the instrument cluster. (See INSTRUMENT CLUSTER INSPECTION.) • Is there any malfunction?	Yes	Replace the instrument cluster, then go to the next step. (See INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Go to the next step.

26	SPARK PLUG CONDITION
POSSIBLE CAUSE	Note • Inspecting the spark plug conditions can determine whether a problem is related to a specific cylinder or possibly all cylinders. Wet/carbon stuck on specific plug: • Spark–Weak, not visible • Air/fuel mixture–Excessive fuel injection volume • Compression–No compression, low compression • Malfunction spark plug Grayish white with specific plug: • Air/fuel mixture–Insufficient fuel injection volume • Malfunction spark plug If a spark plug on a specific cylinder is damaged or corroded: • Malfunction spark plug — Damage or corrosion due to pre-ignition or knocking Wet/carbon is stuck on all plugs: • Spark–Spark weak • Air/fuel mixture–Too rich, excessive fuel line pressure • Erratic signal to PCM — ECT sensor or related circuit malfunction — MAF sensor or related circuit malfunction — A/F sensor or related circuit malfunction — HO2S or related circuit malfunction • Compression–Low compression • Restriction in intake/exhaust system Grayish white with all plugs: • Erratic signal to PCM — ECT sensor or related circuit malfunction — MAF sensor or related circuit malfunction — A/F sensor or related circuit malfunction — HO2S or related circuit malfunction • Air/fuel mixture–Too lean, insufficient fuel line pressure 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 [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) (See AFTER SERVICE PRECAUTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Caution • Disconnecting/connecting the quick release connector without cleaning it may 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 matter.

Caution

• Verify the malfunction symptom according to not only the PID value but also the symptom troubleshooting.

STEP	INSPECTION	RESULTS	ACTION
9	**INSPECT AIR CLEANER ELEMENT** • Is the air cleaner element clean?	Yes	Go to the next step.
		No	Replace the air cleaner element.
10	**VERIFY CURRENT INPUT SIGNAL STATUS** • Access the following PIDs using the M-MDS: (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) — ECT — MAF — O2S11 (When engine can be started) — O2S12 (When engine can be started) • Are the PIDs normal? (See PCM INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].)	Yes	Go to the next step.
		No	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 [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) MAF PID is not as specified: • Inspect for an intermittent open circuit of the MAF sensor and the related wiring harness. (See MASS AIR FLOW (MAF) SENSOR INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) 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 [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) 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 [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) Repair or replace the malfunctioning part according to the inspection results.
11	**INSPECT PURGE CONTROL SYSTEM OPERATION** • Perform the Purge Control System Inspection when the engine can be started. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is there any malfunction?	Yes	Repair or replace the malfunctioning part according to the inspection results.
		No	Go to the next step.
12	**INSPECT IGNITION SYSTEM OPERATION** • Perform the Spark Test. (See ENGINE CONTROL SYSTEM OPERATION INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Is a strong blue spark visible at each cylinder?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.
13	**INSPECT ENGINE COMPRESSION** • Measure the compression pressure for each cylinder. (See COMPRESSION INSPECTION [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • Are compression pressures within specification?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the inspection results.

NO.23 SULFURIC SMELL OCCURS [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

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Troubleshooting item	Sulfuric smell occurs
Description	• Rotten egg smell (sulphur) from exhaust.
Possible cause	• Emission system-related part malfunction • Fuel with high sulfur content is being used **Note** • A very small amount of sulfur contained in the gasoline remains in the exhaust gas after combustion. When the engine combustion condition is close to complete combustion during driving at a constant speed, the sulfur in the exhaust gas is easily absorbed by the catalytic converter and sulfur storage increases. On the other hand, during engine start, engine warm-up, or driving under high-load conditions, the fuel injection amount is increased, which causes the concentration levels of contaminants (such as carbon monoxide and hydrocarbon) in the exhaust gas to increase, and the sulfur, which is adsorbed to such contaminants, is easily discharged. When a large amount of sulfur is discharged at once, sulfuric smell occurs. • If the vehicle is normal, the occurrence of sulfuric smell does not affect the driving performance or durability of the vehicle. • Replacing the catalytic converter does not fundamentally solve the occurrence of sulfuric smell.

Diagnostic Procedure

Step	Inspection	Results	Action
1	VERIFY PCM DTC • Perform the DTC inspection for the PCM. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs displayed?	Yes	Repair the malfunctioning location according to the applicable DTC troubleshooting. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	Go to the next step.

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	**VERIFY PCM DTC** • Retrieve PCM DTCs using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].) • Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION))].)
		No	Go to the next step.
2	**INSPECT COMMUNICATION LINE BETWEEN PCM AND INSTRUMENT CLUSTER** • Inspect for a short or open circuit between the following terminals: — Instrument cluster terminal B –Active driving display terminal J — Instrument cluster terminal D –Active driving display terminal L — Active driving display terminal I–Front body control module (FBCM) terminal 2K — Active driving display terminal K–Front body control module (FBCM) terminal 2I — Front body control module (FBCM) terminal 2P–PCM terminal 2S — Front body control module (FBCM) terminal 2N–PCM terminal 2T • Is the wiring harness normal?	Yes	Inspect the instrument cluster. (See INSTRUMENT CLUSTER INSPECTION.) • If there is any malfunction: — Repair or replace the malfunctioning part according to the inspection results, then go to the next step. (See INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
		No	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Instrument cluster terminal B–Active driving display terminal J • Instrument cluster terminal D–Active driving display terminal L • Active driving display terminal I–Front body control module (FBCM) terminal 2K • Active driving display terminal K–Front body control module (FBCM) terminal 2I • Front body control module (FBCM) terminal 2P–PCM terminal 2S • Front body control module (FBCM) terminal 2N–PCM terminal 2T **If there is a common connector:** • Determine the malfunctioning part by inspecting the common connector and the terminal for corrosion, damage, or pin disconnection, and the common wiring harness for a short to ground or open circuit. • Repair or replace the malfunctioning part. **If there is no common connector:** • Repair or replace the wiring harness which has a short to ground or open circuit. Go to the next step.
3	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. (See SYMPTOM DIAGNOSTIC INDEX [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)].) • If the malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis. — If the vehicle is repaired, troubleshooting is completed. — If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.		

CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

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×: Applicable

Item	MAIN RELAY CONTROL	DRIVE-BY-WIRE CONTROL	HYDRAULIC VARIABLE VALVE TIMING CONTROL	ELECTRIC VARIABLE VALVE TIMING CONTROL	FUEL INJECTION CONTROL SYSTEM	FUEL PUMP CONTROL	HIGH PRESSURE FUEL PUMP CONTROL	ELECTRONIC SPARK ADVANCE CONTROL	PURGE CONTROL
Input device									
APP sensor No.1, No.2		×	×		×			×	
TP sensor No.1, No.2		×			×				
MAF sensor		×	×	×	×		×	×	
IAT sensor No.1		×		×	×			×	
IAT sensor No.2		×		×	×			×	
MAP sensor		×		×	×			×	
CKP sensor		×	×	×	×	×	×	×	
Intake CMP sensor		×		×	×			×	
Exhaust CMP sensor		×	×		×		×	×	
ECT sensor		×	×	×	×		×	×	
Fuel pressure sensor		×			×	×	×		
BARO sensor		×		×	×				
Ion sensor No.1–No.4				×	×				
KS								×	
A/F sensor					×				
HO2S					×				
Refrigerant pressure sensor									

FOREWORD [SKYACTIV-G 2.5 (WITHOUT CYLINDER DEACTIVATION)]

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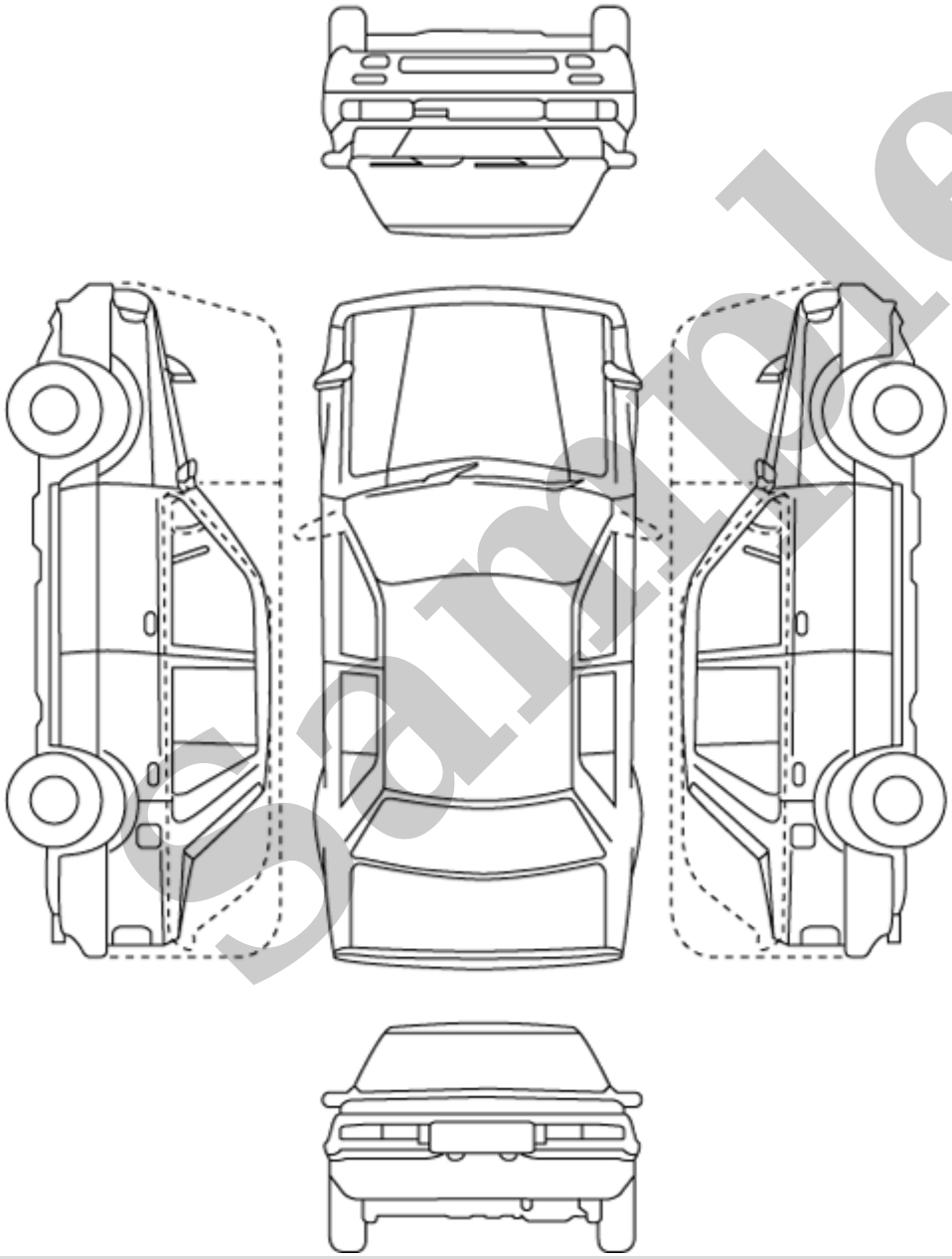
• If there is any vehicle malfunction complaint lodged by a customer, perform malfunction diagnosis according to the troubleshooting procedure.

Troubleshooting Procedure

Dealer name:	Vehicle body number:	Odometer reading:
Vehicle-in date:	Estimated repair completion date:	Person in-charge:
Subject (Content):		
Audio memory		

	1	2	3	4	5	6	Fuel level
FM1							E F
FM2							
AM							



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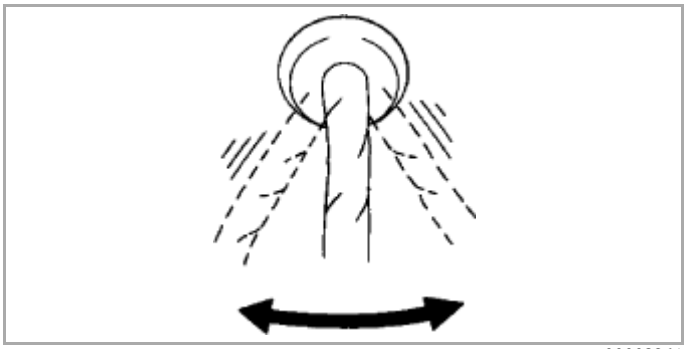
Action for Non-repeatable Malfunction

• If the malfunction does not recur, verify the malfunction cause by performing the following actions:

— Based on the repair order form, attempt to drive the vehicle or perform tests to replicate the malfunction, record the data at that time, and detect the malfunction cause.



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Inspection Method for Sensor Connectors or Wires

1.Connect the M-MDS to the DLC-2.

2.Switch the ignition ON (engine off).

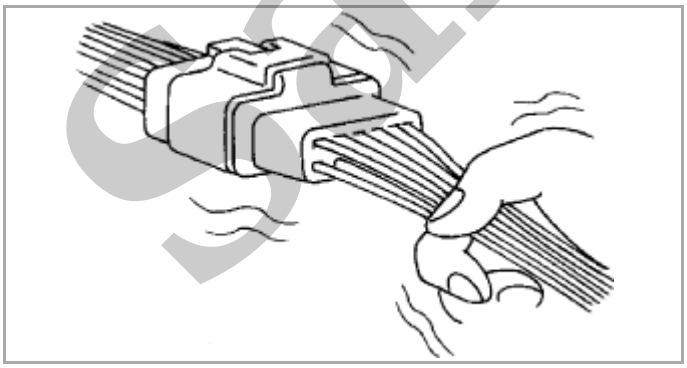
Note

- **If the engine starts and runs, perform the following steps during idling.**

3.Access the PIDs for the switch you are inspecting.

4.Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.

- If the PID value is unstable, check for poor connection.



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Inspection Method for Sensors

1.Connect the M-MDS to the DLC-2.

2.Switch the ignition ON (engine off).