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1995 MAZDA MX-3 OEM Service and Repair Workshop Manual

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Item	Definition	Unit	Condition/Specification
O2S11	A/F sensor current	μA	• Idle (after warm up): Approx. −39 μA • Deceleration fuel cut (accelerator pedal released from engine speed of 4,000 rpm or more): Approx. 3.84 mA

Function Inspection Using M-MDS

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: VERIFY RELATED REPAIR INFORMATION AVAILABILITY • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
2	PURPOSE: RECORD FREEZE FRAME DATA/SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (A/F sensor, HO2S related) on the repair order.	–	Go to Troubleshooting Diagnostic Procedure to perform the procedure from Step 1.

Troubleshooting Diagnostic Procedure

Intention of troubleshooting procedure

- Step 1−2
  - — Perform an inspection of the A/F sensor and PCM-related connectors.
- Step 3
  - — Inspect the wiring harness between the A/F sensor and PCM for deterioration.
- Step 4
  - — Perform a unit inspection of the A/F sensor.
- Step 5−6
  - — Verify that the primary malfunction is resolved and there are no other malfunctions.

STEP	INSPECTION	RESULTS	ACTION
1	PURPOSE: INSPECT A/F SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the A/F sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 5.
		No	Go to the next step.
2	PURPOSE: INSPECT PCM CONNECTOR CONDITION • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 5.
		No	Go to the next step.

OBD-II ON-BOARD SYSTEM READINESS TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))]

SM2896801

id0102s980060

• This shows the OBD-II systems operating status. If any monitor function is incomplete, the M-MDS will identify which monitor functio has not been completed. Misfires, Fuel System and Comprehensive Components (CCM) are continuous monitoring-type functions. The catalyst, evaporation system and oxygen sensor will be monitored under drive cycles. The OBD-II diagnostic system is initialized by performing the DTC cancellation procedure or disconnecting the negative battery terminal.

DTC U213D:00 [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))]

SM3511150

id0102s901210

DTC U213D:00	CAN communication: communication error to TCM (Local CAN)
DETECTION CONDITION	• Communication error between the PCM and TCM continues for 5 s or more.
FAIL-SAFE FUNCTION	• Controls the turbine rotation signal at 0. • Inhibits the AT torque reduction request.
POSSIBLE CAUSE	• CAN communication line malfunction between PCM and TCM • TCM malfunction • PCM malfunction
SYSTEM WIRING DIAGRAM	• Not applicable

Diagnostic Procedure

Step	Inspection	Results	Action
1	RECORD VEHICLE STATUS WHEN DTC WAS DETECTED TO UTILIZE WITH REPEATABILITY VERIFICATION • Record the freeze frame data/snapshot data. Note • Recording can be facilitated using the screen capture function of the PC.	–	Go to the next step.
2	VERIFY RELATED REPAIR INFORMATION OR SERVICE INFORMATION AVAILABILITY • Verify related Service Bulletins, on-line repair information, or Service Information availability. • Is any related Information available?	Yes	Perform repair or diagnosis according to the available information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	INSPECT FOR OTHER RELATED DTCs • Perform the DTC inspection for the PCM. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Are any other DTCs displayed?	Yes	Repair the malfunctioning location according to the applicable DTC troubleshooting. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)
		No	Go to the next step.
4	VERIFY TCM DTC • Perform the DTC inspection for the TCM. (See ON-BOARD DIAGNOSTIC SYSTEM DTC INSPECTION [TCM (FW6A-EL, FW6AX-EL)].) • Are any DTCs displayed?	Yes	Repair the malfunctioning location according to the applicable DTC troubleshooting. (See ON-BOARD DIAGNOSTIC SYSTEM DTC TABLE [TCM (FW6A-EL, FW6AX-EL)].)
		No	Go to the next step.

STEP	INSPECTION	RESULTS	ACTION
2	PURPOSE: VERIFY IF THERE IS ANY MALFUNCTION • Has any DTC or pending code been recorded?	Yes	Repair the malfunctioning location according to the applicable DTC troubleshooting. (See DTC TABLE [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)
		No	The corresponding troubleshooting for the inappropriate operation and control code is completed.

INAPPROPRIATE OPERATION AND CONTROL RECORD [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))]

SM2896647

id0102s904290

How to Use

Note

• Because the inappropriate operation and control record cannot be cleared, always check the odometer value and verify that repairs have not already been performed.

• If any inappropriate operation and control record is displayed, refer to the corresponding troubleshooting for the inappropriate operation and control code to explain to the customer, and perform malfunction diagnosis. (See Inappropriate Operation and Control Code Table.)

• When an inappropriate operation and control code not in the inappropriate operation and control code table is stored, the related module simultaneously stores the DTC. When an inappropriate operation and control code not in the inappropriate operation and control code table is stored, refer to the DTC troubleshooting to explain to the customer, and perform malfunction diagnosis.

Operation Procedure

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

2.After vehicle identification, select the following from the M-MDS initial screen.

(1)"Operational Record"

3.Then, select the followings from the screen menu.

(1)"Inappropriate Operation and Control Record"

(2)"PCM"

4.Display the DTC store record history according to the screen instructions.

Inappropriate Operation and Control Code Table

Inappropriate operation and control code	Inappropriate operation and control code type	Reference
0x30	Temperature restriction control	(See INAPPROPRIATE OPERATION AND CONTROL RECORD 0x30 (TEMPERATURE RESTRICTION CONTROL) [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)
0x43	Unusual voltage of a battery	(See INAPPROPRIATE OPERATION AND CONTROL RECORD 0x43 (UNUSUAL VOLTAGE OF A BATTERY) [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	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 repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	INSPECT FUEL TANK PRESSURE SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the fuel tank pressure sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 9.
		No	Go to the next step.
4	INSPECT PCM CONNECTOR CONDITION • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 9.
		No	Go to the next step.
5	INSPECT FUEL TANK PRESSURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND • Verify that the fuel tank pressure sensor and PCM connectors are disconnected. • Inspect for continuity between the following terminals (wiring harness-side) and body ground: — Fuel tank pressure sensor terminal A — Fuel tank pressure sensor terminal C • Is there continuity?	Yes	Refer to the wiring diagram and verify whether or not there is a common connector between the following terminals: • Fuel tank pressure sensor terminal A—PCM terminal 2AU • Fuel tank pressure sensor terminal C—PCM termina 2AJ 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. • Repair or replace the malfunctioning part. If there is no common connector: • Repair or replace the wiring harness which has a short to ground. Go to Step 9.
		No	Go to the next step.

Item	Definition	Unit	Condition/Specification
FTP	Fuel tank pressure input from fuel tank	Pa {KPA}, mBar {BAR}, psi, in H20	• Ignition switched ON (engine off): Approx. −23 Pa {−2.3 kgf/m ^{2}, −0.0033 psi} • Idle (after warm up): −282− −46 Pa {−28.7− −4.7 kgf/m ^{2}, −0.0409− −0.0067 psi} • Racing (Engine speed 2,000 rpm): −1.47− −0.869 kPa {−0.0149− −0.0089 kgf/cm ^{2}, −0.213− −0.127 psi} • Racing (Engine speed 4,000 rpm): −1.69− −1.07 kPa {−0.0172− −0.0110 kgf/cm ^{2}, −0.245− −0.156 psi}
	Fuel tank pressure sensor voltage	V	• Ignition switched ON (engine off): Approx. 2.6 V • Idle (after warm up): 2.2−2.62 V • Racing (Engine speed 2,000 rpm): 1.9−1.91 V • Racing (Engine speed 4,000 rpm): 1.73−1.76 V

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION Note • Recording can be facilitated using the screen capture function of the PC. • Record the FREEZE FRAME DATA/snapshot data on the repair order.	−	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 repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	DETERMINE IF FUEL TANK PRESSURE SENSOR OR WIRING HARNESS MALFUNCTION • Access the FTP PID using the M-MDS. (See ON-BOARD DIAGNOSTIC TEST [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].) • Verify the FTP PID value. • Is the FTP PID value 5 V or B+?	Yes	Go to Step 7.
		No	Go to the next step.
4	INSPECT FUEL TANK PRESSURE SENSOR CONNECTOR CONDITION • Switch the ignition off. • Disconnect the fuel tank pressure sensor connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 12.
		No	Go to the next step.
5	INSPECT PCM CONNECTOR CONDITION • Disconnect the PCM connector. • Inspect for poor connection (such as damaged/pulled-out pins, corrosion). • Is there any malfunction?	Yes	Repair or replace the connector and/or terminals, then go to Step 12.
		No	Go to the next step.

DTC P0454:00 [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))]

SM2896693

id0102s930100

DTC P0454:00	Fuel tank pressure sensor intermittent malfunction
DETECTION CONDITION	• Any one of the following conditions is met: — The difference between the currently detected fuel tank pressure sensor input voltage and the previously detected input voltage is large. — The input voltage of the fuel tank pressure sensor remains low or high. **Diagnostic support note** • This is a continuous monitor (CCM). • The check engine light illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle. • FREEZE FRAME DATA/Snapshot data is available. • DTC is stored in the PCM memory.
FAIL-SAFE FUNCTION	• Not applicable
POSSIBLE CAUSE	• Wiring harness malfunction between PCM and fuel tank pressure sensor • Fuel tank pressure sensor malfunction — Intermittent open or short circuit in the fuel tank pressure sensor or fuel tank pressure sensor signal • PCM malfunction
SYSTEM WIRING DIAGRAM	• Not applicable

Diagnostic Procedure

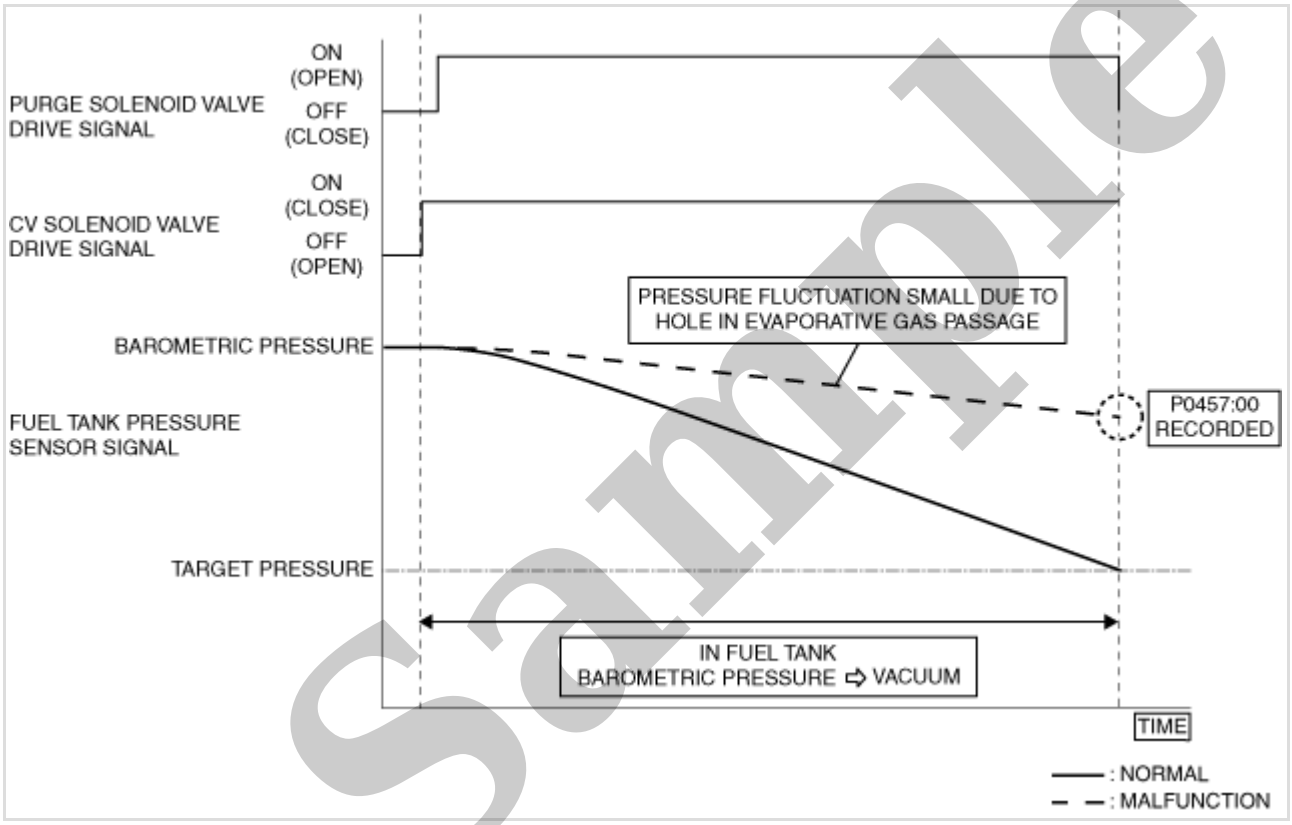
STEP	INSPECTION	RESULTS	ACTION
1	**RECORD VEHICLE STATUS AT TIME OF DTC DETECTION TO UTILIZE WITH REPEATABILITY VERIFICATION** **Note** **• Recording can be facilitated using the screen capture function of the PC.** • Record the FREEZE FRAME DATA/snapshot data on the repair order.	–	Go to the next step.
2	**VERIFY RELATED REPAIR INFORMATION AVAILABILITY** • Verify related Service Bulletins and/or on-line repair information availability. • Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No	Go to the next step.

System Wiring Diagram

• Not applicable

Function Explanation (DTC Detection Outline)

• The PCM closes the purge solenoid valve and CV solenoid valve while the vehicle is being driven, and seals the fuel tank. By opening the purge solenoid valve after sealing the fuel tank, evaporative gas in the fuel tank is inducted into the intake manifold, fuel tank pressure is reduced, and the pressure change of the fuel tank is measured by the fuel tank pressure sensor. If the pressure of the fuel tank does not reach the target vacuum after the specified time has elapsed since the pressure was measured, the PCM determines that there is an evaporative gas leakage. If the PCM determines that refueling was performed before the engine starts, according to the result of the refueling determination, the PCM determines that the fuel-filler cap is open and stores DTC P0457:00 (if PCM determines that refueling is not performed, it stores DTC P0455:00).
• If the fuel tank level increases after the engine starts, the PCM determines that refueling is performed by comparing the fuel tank level before one drive cycle with the fuel tank level after engine start.



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Repeatability Verification Procedure

1. Set the remaining fuel quantity in the fuel tank between 30–85 %.
2. Verify that OBD-II information (such as FREEZE FRAME DATA) has been obtained and recorded.
3. Clear the DTC from the PCM memory using the M-MDS. (See CLEARING DTC [PCM (SKYACTIV-G 2.5 (WITH CYLINDER DEACTIVATION))].)
4. Start the engine and switch the ignition off after 5 s have elapsed.
5. Leave the vehicle for 6 h or more.
6. Start the engine and leave it idling for 2 min.
7. Drive the vehicle for 30 min at a speed of 50 km/h {31 mph} or more (to increase temperature in fuel tank and generate evaporative gas).

Note