

## 2012 - Mazda6 - Engine

### DTC P0116:00 [MZR 2.5]

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DTC<br>P0116:00        | ECT sensor circuit range/performance problem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DETECTION<br>CONDITION | <ul style="list-style-type: none"> <li>The PCM monitors the maximum value and minimum value of engine coolant temperature when the engine is started and <b>5 min</b> have been passed after leaving the vehicle <b>6 h or more</b>. If difference between maximum and minimum values of engine coolant temperature is <b>below 6 °C { 11 °F}</b> the PCM determines that there is an ECT circuit range/performance problem.</li> </ul> <p><b>Diagnostic support note</b></p> <ul style="list-style-type: none"> <li>This is a continuous monitor (engine cooling system).</li> <li>The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.</li> <li>FREEZE FRAME DATA (Mode 2)/Snapshot data is available.</li> <li>The DTC is stored in the PCM memory.</li> </ul> |
| POSSIBLE<br>CAUSE      | <ul style="list-style-type: none"> <li>ECT sensor connector or terminal malfunction</li> <li>PCM connector or terminal malfunction</li> <li>ECT sensor malfunction</li> <li>Thermostat malfunction</li> <li>PCM malfunction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### Diagnostic procedure

| STEP | INSPECTION                                                                                           | ACTION                                                                                                         |
|------|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1    | <b>IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)</b>                                           | Yes Go to the next step.                                                                                       |
|      | <ul style="list-style-type: none"> <li>Is the DTC P0116:00 on FREEZE FRAME DATA (Mode 2)?</li> </ul> | No Go to troubleshooting for DTC on FREEZE FRAME DATA (Mode 2).<br>(See <a href="#">DTC TABLE [MZR 2.5]</a> .) |
| 2    | <b>VERIFY FREEZE FRAME DATA (MODE</b>                                                                | Yes Go to the next step.                                                                                       |

|   |                                                                                                                                                                                                                                                                                                 |     |                                                                                                                                                                                   |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <b>2) / SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED</b> <ul style="list-style-type: none"> <li>Have the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) been recorded?</li> </ul>                   | No  | Record the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step.                                         |
| 3 | <b>VERIFY RELATED REPAIR INFORMATION AVAILABILITY</b> <ul style="list-style-type: none"> <li>Verify related Service Bulletins and/or on-line repair information availability.</li> <li>Is any related repair information available?</li> </ul>                                                  | Yes | Perform repair or diagnosis according to the available repair information. <ul style="list-style-type: none"> <li>If the vehicle is not repaired, go to the next step.</li> </ul> |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 4 | <b>INSPECT ECT SENSOR CONNECTOR CONDITION</b> <ul style="list-style-type: none"> <li>Switch the ignition to off.</li> <li>Disconnect the ECT sensor connector.</li> <li>Inspect for poor connection (such as damaged/pulled-out pins, corrosion).</li> <li>Is there any malfunction?</li> </ul> | Yes | Repair or replace the terminal and/or connector, then go to Step 9.                                                                                                               |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 5 | <b>INSPECT PCM CONNECTOR CONDITION</b> <ul style="list-style-type: none"> <li>Disconnect the PCM connector.</li> <li>Inspect for poor connection (such as damaged/pulled-out pins, corrosion).</li> <li>Is there any malfunction?</li> </ul>                                                    | Yes | Repair or replace the terminal and/or connector, then go to Step 9.                                                                                                               |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 6 | <b>INSPECT ECT SENSOR</b> <ul style="list-style-type: none"> <li>Inspect the ECT sensor.<br/>(See <b>ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [MZR 2.5]</b>.)</li> <li>Is there any malfunction?</li> </ul>                                                                           | Yes | Replace the ECT sensor, then go to Step 9.<br><br>(See <b>ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/ INSTALLATION [MZR 2.5]</b> .)                                          |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 7 | <b>COMPARE ECT PID VALUE</b> <ul style="list-style-type: none"> <li>Prepare a new ECT sensor.</li> <li>Clear the DTC from the PCM memory using the M-MDS.<br/><br/>(See <b>AFTER REPAIR PROCEDURE</b></li> </ul>                                                                                | Yes | Go to the next step.                                                                                                                                                              |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to Step 9.                                                                                                                                                                     |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------|
|    | <p>[MZR 2.5].)</p> <ul style="list-style-type: none"><li>• Connect the ECT sensor connector to the new ECT sensor without installing to the engine.</li><li>• Switch the ignition to ON and record the ECT PID value.</li><li>• Switch the ignition to off.</li><li>• Replace the malfunction ECT sensor with new one.</li><li>• Start the engine and wait for <b>5 min.</b></li><li>• Record the ECT PID value.</li><li>• Is the difference between each ECT PID values <b>more than 6 °C { 11 °F }</b> ?</li></ul>                                                                            |     |                                                   |
| 8  | <p><b>INSPECT THERMOSTAT</b></p> <ul style="list-style-type: none"><li>• Cool down the engine.</li><li>• Inspect the thermostat.</li></ul> <p>(See <b>THERMOSTAT INSPECTION [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Is there any malfunction?</li></ul>                                                                                                                                                                                                                                                                                                                     | Yes | Replace the thermostat, then go to the next step. |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                              |
| 9  | <p><b>VERIFY DTC TROUBLESHOOTING COMPLETED</b></p> <ul style="list-style-type: none"><li>• Make sure to reconnect all disconnected connectors.</li><li>• Clear the DTC from the PCM memory using the M-MDS.</li></ul> <p>(See <b>AFTER REPAIR PROCEDURE [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Switch the ignition to off.</li><li>• Start the engine and warm it up completely.</li><li>• Perform the DTC Reading Procedure.</li></ul> <p>(See <b>ON-BOARD DIAGNOSTIC TEST [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Is the same DTC present?</li></ul> | Yes | Repeat the inspection from Step 1.                |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                              |
| 10 | <p><b>VERIFY AFTER REPAIR PROCEDURE</b></p> <ul style="list-style-type: none"><li>• Perform the "AFTER REPAIR PROCEDURE".</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes | Go to the applicable DTC inspection.              |

(See **DTC TABLE [MZR 2.5].**)

|  |                                                                                                                            |  |                                   |
|--|----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|
|  | (See <b>AFTER REPAIR PROCEDURE [MZR 2.5]</b> .)<br><ul style="list-style-type: none"><li>• Are any DTCs present?</li></ul> |  | No DTC troubleshooting completed. |
|--|----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|

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### DTC P0116:00 [MZR 2.5]

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DTC<br>P0116:00        | ECT sensor circuit range/performance problem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DETECTION<br>CONDITION | <ul style="list-style-type: none"> <li>The PCM monitors the maximum value and minimum value of engine coolant temperature when the engine is started and <b>5 min</b> have been passed after leaving the vehicle <b>6 h or more</b>. If difference between maximum and minimum values of engine coolant temperature is <b>below 6 °C { 11 °F}</b> the PCM determines that there is an ECT circuit range/performance problem.</li> </ul> <p><b>Diagnostic support note</b></p> <ul style="list-style-type: none"> <li>This is a continuous monitor (engine cooling system).</li> <li>The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.</li> <li>FREEZE FRAME DATA (Mode 2)/Snapshot data is available.</li> <li>The DTC is stored in the PCM memory.</li> </ul> |
| POSSIBLE<br>CAUSE      | <ul style="list-style-type: none"> <li>ECT sensor connector or terminal malfunction</li> <li>PCM connector or terminal malfunction</li> <li>ECT sensor malfunction</li> <li>Thermostat malfunction</li> <li>PCM malfunction</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

### Diagnostic procedure

| STEP | INSPECTION                                                                                                                                                      | ACTION                                                                                                         |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1    | <b>IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA (MODE 2)</b> <ul style="list-style-type: none"> <li>Is the DTC P0116:00 on FREEZE FRAME DATA (Mode 2)?</li> </ul> | Yes Go to the next step.                                                                                       |
|      |                                                                                                                                                                 | No Go to troubleshooting for DTC on FREEZE FRAME DATA (Mode 2).<br>(See <a href="#">DTC TABLE [MZR 2.5]</a> .) |
| 2    | <b>VERIFY FREEZE FRAME DATA (MODE</b>                                                                                                                           | Yes Go to the next step.                                                                                       |

|   |                                                                                                                                                                                                                                                                                                 |     |                                                                                                                                                                                   |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | <b>2) / SNAPSHOT DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED</b> <ul style="list-style-type: none"> <li>Have the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS (engine cooling system related) been recorded?</li> </ul>                   | No  | Record the FREEZE FRAME DATA (Mode 2)/snapshot data and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step.                                         |
| 3 | <b>VERIFY RELATED REPAIR INFORMATION AVAILABILITY</b> <ul style="list-style-type: none"> <li>Verify related Service Bulletins and/or on-line repair information availability.</li> <li>Is any related repair information available?</li> </ul>                                                  | Yes | Perform repair or diagnosis according to the available repair information. <ul style="list-style-type: none"> <li>If the vehicle is not repaired, go to the next step.</li> </ul> |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 4 | <b>INSPECT ECT SENSOR CONNECTOR CONDITION</b> <ul style="list-style-type: none"> <li>Switch the ignition to off.</li> <li>Disconnect the ECT sensor connector.</li> <li>Inspect for poor connection (such as damaged/pulled-out pins, corrosion).</li> <li>Is there any malfunction?</li> </ul> | Yes | Repair or replace the terminal and/or connector, then go to Step 9.                                                                                                               |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 5 | <b>INSPECT PCM CONNECTOR CONDITION</b> <ul style="list-style-type: none"> <li>Disconnect the PCM connector.</li> <li>Inspect for poor connection (such as damaged/pulled-out pins, corrosion).</li> <li>Is there any malfunction?</li> </ul>                                                    | Yes | Repair or replace the terminal and/or connector, then go to Step 9.                                                                                                               |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 6 | <b>INSPECT ECT SENSOR</b> <ul style="list-style-type: none"> <li>Inspect the ECT sensor.<br/>(See <b>ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION [MZR 2.5]</b>.)</li> <li>Is there any malfunction?</li> </ul>                                                                           | Yes | Replace the ECT sensor, then go to Step 9.<br><br>(See <b>ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/ INSTALLATION [MZR 2.5]</b> .)                                          |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                                                                                                                                                              |
| 7 | <b>COMPARE ECT PID VALUE</b> <ul style="list-style-type: none"> <li>Prepare a new ECT sensor.</li> <li>Clear the DTC from the PCM memory using the M-MDS.<br/><br/>(See <b>AFTER REPAIR PROCEDURE</b></li> </ul>                                                                                | Yes | Go to the next step.                                                                                                                                                              |
|   |                                                                                                                                                                                                                                                                                                 | No  | Go to Step 9.                                                                                                                                                                     |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |     |                                                   |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------|
|    | <p>[MZR 2.5].)</p> <ul style="list-style-type: none"><li>• Connect the ECT sensor connector to the new ECT sensor without installing to the engine.</li><li>• Switch the ignition to ON and record the ECT PID value.</li><li>• Switch the ignition to off.</li><li>• Replace the malfunction ECT sensor with new one.</li><li>• Start the engine and wait for <b>5 min.</b></li><li>• Record the ECT PID value.</li><li>• Is the difference between each ECT PID values <b>more than 6 °C { 11 °F }</b> ?</li></ul>                                                                            |     |                                                   |
| 8  | <p><b>INSPECT THERMOSTAT</b></p> <ul style="list-style-type: none"><li>• Cool down the engine.</li><li>• Inspect the thermostat.</li></ul> <p>(See <b>THERMOSTAT INSPECTION [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Is there any malfunction?</li></ul>                                                                                                                                                                                                                                                                                                                     | Yes | Replace the thermostat, then go to the next step. |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                              |
| 9  | <p><b>VERIFY DTC TROUBLESHOOTING COMPLETED</b></p> <ul style="list-style-type: none"><li>• Make sure to reconnect all disconnected connectors.</li><li>• Clear the DTC from the PCM memory using the M-MDS.</li></ul> <p>(See <b>AFTER REPAIR PROCEDURE [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Switch the ignition to off.</li><li>• Start the engine and warm it up completely.</li><li>• Perform the DTC Reading Procedure.</li></ul> <p>(See <b>ON-BOARD DIAGNOSTIC TEST [MZR 2.5].</b>)</p> <ul style="list-style-type: none"><li>• Is the same DTC present?</li></ul> | Yes | Repeat the inspection from Step 1.                |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | No  | Go to the next step.                              |
| 10 | <p><b>VERIFY AFTER REPAIR PROCEDURE</b></p> <ul style="list-style-type: none"><li>• Perform the "AFTER REPAIR PROCEDURE".</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Yes | Go to the applicable DTC inspection.              |

(See **DTC TABLE [MZR 2.5].**)

|  |                                                                                                                            |  |                                   |
|--|----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|
|  | (See <b>AFTER REPAIR PROCEDURE [MZR 2.5]</b> .)<br><ul style="list-style-type: none"><li>• Are any DTCs present?</li></ul> |  | No DTC troubleshooting completed. |
|--|----------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------|