

# OBD Repair Verification Cycles

## MX-13 OBD Troubleshooting

The On-Board Diagnostic (OBD) system is designed to monitor the performance of emission-related components and report detected conditions that could affect emissions compliance. Detected conditions are reported through diagnostic fault codes, set by an algorithm that includes the state value of various pressures, temperatures, and exhaust gas levels. These detected conditions are established under the diverse driving conditions the vehicle is expected to encounter.

The repair verification cycles presented in this document have been aligned to their related OBD fault codes, to enable a service check to be completed under a particular set of readiness conditions. These verification cycles present the fastest method to satisfy the necessary conditions that allow a particular diagnostic to establish a readiness state, so that a technician can confirm the related fault condition has been corrected.

The system overview diagram below is a representation of the OBD system ECUs and sensors.

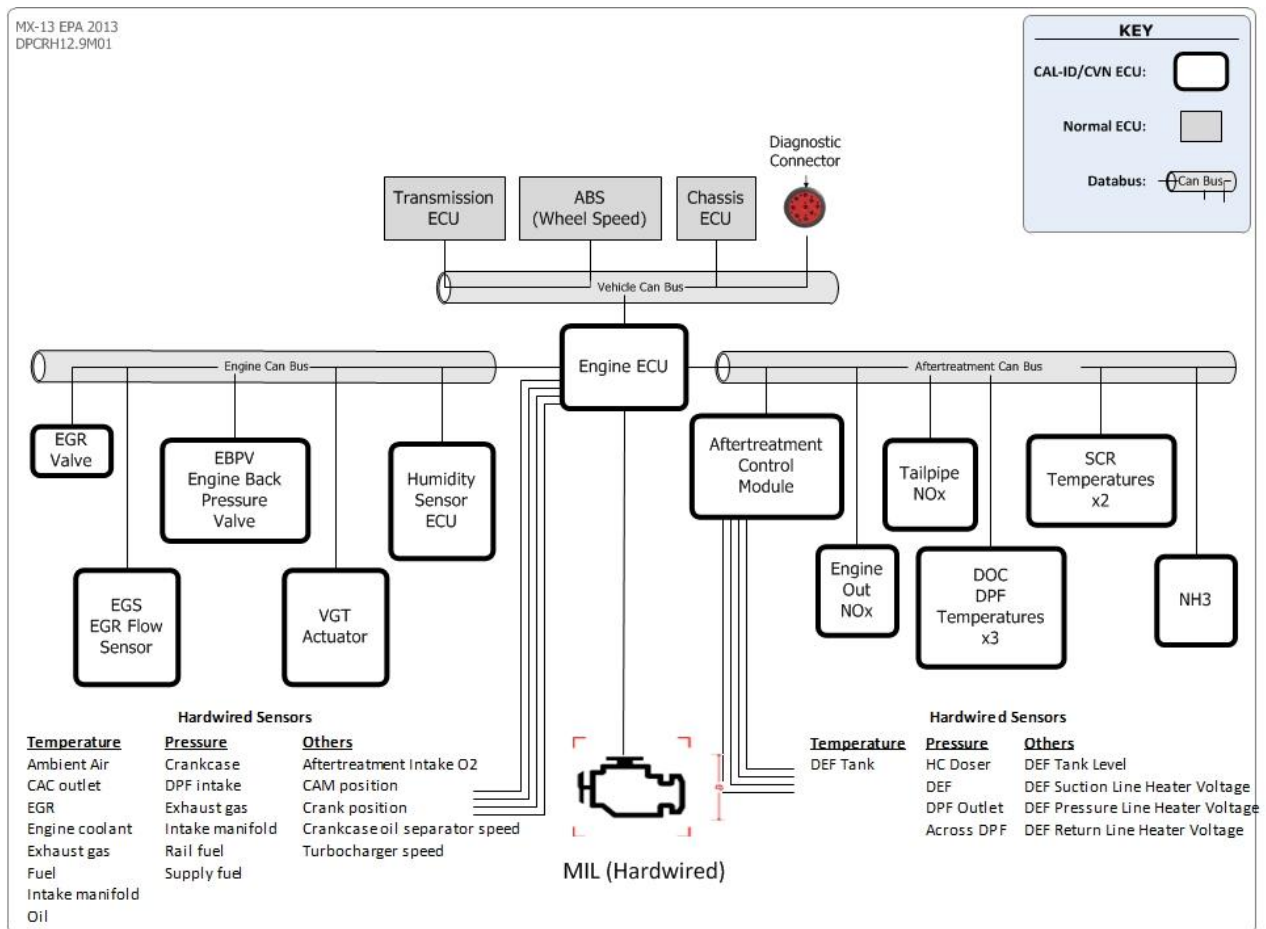


Figure 1 MX-13 OBD System Overview diagram



Strict observance of posted speed limits, traffic laws, and road conditions are required when performing these verification cycles.



In the event a verification cycle must be interrupted due to weather or traffic conditions, the verification cycle can be resumed, and in the majority of instances, the diagnostic will still achieve its verification process. To ensure completion of the verification cycle, avoid sudden changes in vehicle speed unless specifically guided to do so.

Verification Cycle	Procedure
<b>Power-Up/Electrical</b>	With the brakes set, turn the key to the ON position with the engine off, and allow 10 seconds for the system to initialize and run diagnostics.
<b>Start-Up</b>	With the brakes set, start the engine and allow it to run at idle for 2 minutes.
<b>System Initiation</b>	Drive the truck under normal conditions until the coolant temperature reaches a minimum of 150°F. This cycle can be conducted with a loaded trailer or bobtail.
<b>Transient</b>	With the <b>System Initiation</b> cycle complete, under moderate engine load (A/C and Fan both ON), perform a series of brief accelerations, progressing from a lower to a higher speed until reaching a top speed of 40 mph. Once the top speed has been reached, perform several decelerations from a higher to a lower speed until reaching a bottom speed of 10 mph. Perform this cycle 5 times.
<b>Steady State</b>	<p>This cycle is best performed on a level grade road (least amount of incline possible) and under load using a trailer. If a loaded trailer is unavailable, produce engine load by turning the A/C and fan to ON.</p> <p>With the <b>System Initiation</b> cycle complete, proceed to a road with a minimum speed limit of 50 mph, then get to the highest gear possible with the engine speed between 1100-1500 rpm, and set the cruise control. Run this cycle for roughly 3 to 5 miles or in three separate 1-mile increments if a steady 3 to 5 miles is unachievable.</p>
<b>DEF Doser &amp; SCR</b>	<p>Perform the same procedure outlined for the Steady State cycle.</p> <p>Using DAVIE, select the following Monitor values to record:</p> <ul style="list-style-type: none"> <li>Exhaust Temperature Before SCR</li> <li>Exhaust Temperature After SCR</li> <li>Pump Module</li> </ul> <p>Once the SCR temperatures have reached a minimum of 536°F (280°C), continue the remainder of this cycle with the high idle. The monitored Pump Module value will indicate when dosing starts. Allow dosing to occur for a minimum of 15 minutes. Check the recorded values after the driving has been completed to verify temperatures and dosing.</p>
<b>Overrun</b>	<p>With the <b>System Initiation</b> cycle complete, proceed to a road with minimum speed limit of 50 mph. While remaining within the legally posted speed limit, get the truck in the highest gear possible with the engine speed at a minimum of 1800 rpm. Once the target engine speed has been reached, leave the truck in gear and release the accelerator pedal, allowing the truck to coast until the engine speed has reached 900 rpm. Perform this cycle 4 times.</p> <ul style="list-style-type: none"> <li>For Eaton Ultrashift transmissions, idle drop can only go to 1000 rpm</li> <li>For Alison Autoshift transmission, this test will not be able to be conducted</li> </ul>
<b>DPF &amp; DOC</b>	<p>This test can take up to 45 minutes to 1 hour to complete.</p> <p>Start the truck and using cruise control, bump and set the idle to 1,500 rpm. Connect DAVIE, and go to DPF Regeneration test. Follow the prompts to complete a Stationary Regeneration.</p>
<b>Cold Soak</b>	<ol style="list-style-type: none"> <li>The truck must remain off (key to OFF and the engine OFF) for 8-10 consecutive hours. Wait for this time to elapse before continuing.</li> <li>Perform the <b>Electrical &amp; Power-Up</b> cycle.</li> <li>Perform the <b>Start-Up</b> cycle.</li> </ol>