

Module 26

Malfunction Indicator Light (MIL) / Freeze Frame

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- The PGMFI System Overview—Part 2
- PGMFI Flash Type DTCs
- Inputs / Outputs—Part 1
- Inputs / Outputs—Part 2
- Engine Control Module
- Air Flow / MAP Sensor—Base Inj Pulse Width
- Fuel Delivery System
- Closed Loop Strategies—Theory
- Closed Loop Strategies—Case Studies
- Thermistor Inputs
- Throttle Position Sensor
- EGR Valve Lift Sensor
- MAP / BARO Sensor
- Ignition Inputs
- Vehicle Speed Sensor
- Oxygen Sensor
- Lean Air Fuel Sensor
- Miscellaneous Input Signals
- Fuel Injectors—Multi-Port Injection
- Fuel Injectors—Dual Point Injection
- Ignition System—Outputs
- Idle Air Control Valve

OBD-II Training Modules

- On Board Diagnostics—General Overview
- Diagnostic Trouble Codes
- MIL / Freeze Frame
- Scan Tool
- Scan Tool—Advanced
- Monitor Tests—Overview
- Comprehensive Component Monitor
- Catalyst Monitor
- EGR Monitor
- Evaporative Monitor
- Fuel System Monitor
- Misfire Monitor
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- "P" Codes

Miscellaneous Training Material

- Glossary of Terms

26 MIL / Freeze Frame

26.1 MIL General Information

The OBD-II system changed the way the MIL reports malfunctions. Prior to OBD-II, the MIL would illuminate only when a malfunction was detected. It would stay illuminated for the duration of the trip, but would reset on the next restart and not illuminate unless the malfunction reoccurred.

The MIL on an OBD-II equipped Honda works a lot differently. The MIL may not come on with the first occurrence of a malfunction and may stay on even if the fault is no longer present.

The MIL on OBD-II vehicles can only be used to notify the driver when a malfunction is occurring with a system that would effect the emissions of the car. Other systems on the car that do not effect emissions cannot use the MIL to notify the driver of problems, but must use a separate light. When a transmission DTC is set it will illuminate a transmission MIL (usually the D4 light). If, however, the transmission malfunction is one that could effect the emissions of the car the OBD-II MIL is illuminated also.

26.1.1 MIL Illumination

Screen Capture 26-1

ALTERNATOR.....	16%
ALT CTRL.....	14.5V
BRAKE SWITCH.....	OFF
A/C SWITCH.....	OFF
A/C CLUTCH.....	OFF
STARTER SW.....	OFF
SCS.....	OPEN
F INJECTOR.....	2.62ms
SPARK ADVANCE.....	42.0°
IAC VALVE.....	306mA
EVAP PC SOL.....	OFF
MIL.....	OFF

When the OBD-II system detects a malfunction, and sets a hard fault code, the MIL is continuously illuminated for the remainder of the trip. When a pending DTC is set, the MIL will not be illuminated.

A new feature with the OBD-II system is a blinking MIL. If a condition exists that could damage the catalytic converter, the MIL will blink until the condition does not exist.

The MIL is commanded on or off by the ECM. You can see the MIL command status by using an OBD-II compliant scan tool. Screen Capture 26-1 shows a car whose MIL has been commanded off. The MIL should initially illuminate for 2 seconds when a Honda is first started to check the bulb. If the MIL is not illuminating for the bulb check, check the ECM MIL command. If the command is for the MIL to be on but it is not, the problem is external of the ECM. It is not all that uncommon to find a used car that has had the light or wiring tampered with to keep the light from illuminating.

26.1.2 Extinguishing the MIL

Prior to OBD-II the MIL would reset on each new trip and not illuminate unless the malfunction still existed. The OBD-II MIL is extinguished only after a specific set of conditions have been met. There are two different set of conditions, which are:

26.1.3 Misfire and Fuel System Malfunctions

For misfire or fuel system (LT FT) malfunctions, the MIL is extinguished if the fault does not recur when monitored during three subsequent sequential drive cycles in which conditions are similar to those under which the malfunction was first determined. The RPM must be within 375, the load conditions within 20%, and the same warm-up status.

26.1.4 All Other Malfunctions

The MIL is extinguished after three subsequent sequential drive cycles during which the monitoring system responsible for illuminating the MIL functions without detecting the malfunction and if no other malfunction has been identified that would independently illuminate the MIL.

26.2 Freeze Frame

26.2.1 Freeze Frame General Overview

A new feature with the OBD-II system is the ECM's ability to take a snapshot (freeze frame) of certain engine parameters when a DTC is set. This feature is a valuable diagnostic tool when working with intermittent problems. This information can be used by the tech to try and recreate the conditions that were present when the original malfunction occurred. It is recommended that you try to operate the vehicle within 10% of the recorded parameters to recreate a malfunction.

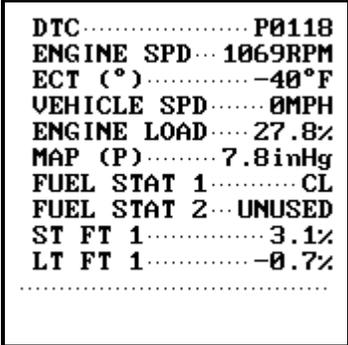
26.2.2 Freeze Frame Writing Strategy

OBD-II regulations only require that one freeze frame be used, however a manufacturer can make as many available as they want. Honda, like most manufactures, only captures one set of engine parameters. GM OBD-II systems capture as many as seven freeze frames.

The freeze frame will take a snap shot when the first hard DTC (turns on the MIL) is set. Subsequent DTCs will not have a freeze frame associated with them unless they have a higher priority. If another DTC is set that has the same priority, the freeze frame will not be overwritten. All DTCs have the same priority except for any misfire or fuel system (LT FT) DTCs which are on the same priority level but above all other DTCs

26.2.3 Freeze Frame Information

OBD-II regulations specify the parameters that are to be included in a freeze frame (shown in table below). Each manufacturer can add more parameters, but must include this base set of parameters. It is common to find more freeze frame parameters available when using an OEM scan tool, Vs a generic OBD-II scan tool. Screen Capture 26-2, was taken using a Mastertech in the generic OBD-II mode.

OBD-II Requirements	Honda Freeze Frame
DTC That Was Stored.	<p>Screen Capture 26-2</p> 
Calculated Load Value	
Engine RPM	
Fuel Trim Value	
Fuel Pressure (if available),	
Vehicle Speed	
Engine Coolant Temperature,	
Manifold Absolute Pressure	
Fuel System Status	

26.3 Service Issues

The new freeze frame feature can be a valuable diagnostic tool. To get the most use from this information you need to understand a two simple principles.

26.4 Record the Freeze Frame Parameters!

For the freeze frame data to be of any use to you, you obviously need to know what it is. You need to get in a habit of writing down the freeze frame data when it is available. If you follow the old practice of clearing the DTCs from the ECM and driving the car to see if the problem reoccurs, you will be erasing a lot of valuable information. Always record the freeze frame information before you clear the codes, even if you intend on resetting the codes and letting the customer drive the car to see if it will set the same DTC. The malfunction may occur intermittently and the stored freeze frame information may have the only useful information you have on the problem!

Keeping track of freeze frame data on many different vehicles may get to be a challenge. You can write the information down and file it in your customer's file, or record it in the customer's computer records. A better way may be to store the scan tool screen captures into a special database program for later retrieval.

There are several programs like this that are available, but my favorite is the AES Wave program. The folks at AES can sell you a serial cable for virtually any scan tool or digital storage oscilloscope (DSO). The cable is used to send the screen capture into the AES Wave database program which can be installed on a desktop or laptop computer. When you save a screen capture into the program you add all the vehicle information for easy retrieval in the future. All the screen captures used in these training modules are stored in the AES Wave program.

The nice thing about being able to save an unlimited amount of screen captures is you can save any screen capture from any DSO or scan tool, not just use it to store freeze frame information. Different DSOs and scan tools may take a different serial cable, but all the screen captures can be saved in the same AES Wave database program. You could even store digital photographs in it if you want ! Once you master how to work with image files, you can then start attaching them to e-mail and send the screen captures to anybody else in the world with e-mail.

26.5 Clearing Freeze Frame Data

The Honda OBD-II system will only write one freeze frame. As covered earlier in this module, a freeze frame will be overwritten if a DTC with a higher priority is set. The thing to remember here is the ECM cannot take another snapshot if the freeze frame is holding data. After you record the freeze frame data, you need to clear the DTC and its freeze frame. You can always remove power to the ECM to reset these, but you will lose any adaptive learning the ECM may have in memory. It is best to clear the DTC and freeze frame with a scan tool. When you clear the DTCs using an OBD-II compliant scan tool you will be clearing the DTCs, clearing the freeze frame, and resetting the status of all "once-per-trip" monitors to incomplete.