



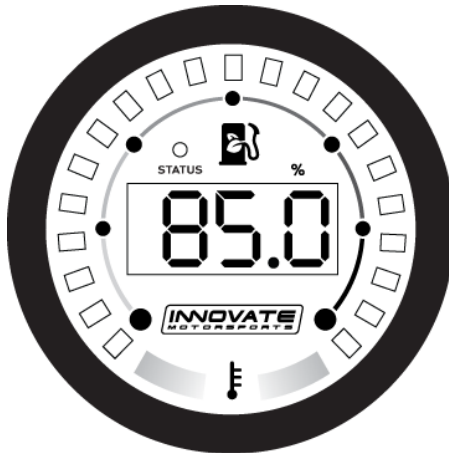
MTX-D

Ethanol Content and Fuel Temperature Gauge

User Manual



P/N 3912 kit does not include flex fuel sensor. The ECF-1 is compatible with GM P/Ns 13577429 and 13577379



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1. Installation

1.1 Gauge Mounting

The MTX-D gauge fits in any standard 2 1/16" (52mm) gauge pod. Mounting of the gauge should be done in such a manner that the cables are not being forcefully pulled and strained from the gauge itself. Route the sensor cable avoiding contact with the exhaust pipe and other hot sources that could melt the cable. Also avoid routing the sensor cable near ignition components or other sources of RF (radio frequency) and EMI (Electromagnetic interference) noise.

The MTX-D gauge is splash resistant (not water proof) and can be mounted so that it is exposed to the outdoor elements. The MTX-D should not be submerged and special consideration should be taken to protect the gauge from direct water spray (water coming from a pressurized source.) When replacing the bezel and/or gauge face verify that the o-ring is properly seated.

1.1.1 Changing the MTX-D's gauge face and/or bezel

1. Lay the MTX-D face down and remove the three #2 phillips screws from the outside rim of the back plate.
2. Carefully lift out the bezel from the gauge cup.
3. Configure the gauge as desired by changing the gauge face and or bezel.
4. Make sure every piece is positioned correctly using the locating tab and reassemble the gauge.
5. Reinstall the 3 #2 phillips screws.

1.1 Flex Fuel Sensor

P/N 3912 kit does not include flex fuel sensor. The ECF-1 is compatible with GM P/Ns 13577429 and 13577379

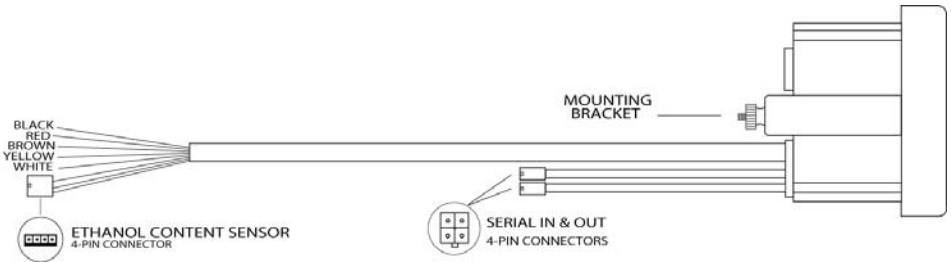


The installation of the flex fuel sensor requires knowledge of the fuel system. Improper installation can lead to catastrophic failure, and damage to vehicle and/or persons. It is highly recommend that the flex fuel sensor be installed by a reputable professional mechanic.

- The Flex Fuel sensor will report both ethanol content and fuel temperature.
- Plan for the flex fuel sensor installation. Additional fuel hose and adapters (not included) might be necessary to successfully install the sensor.

- The sensor can be installed in the feed or return line. Because of possible fuel restrictions, installation of the sensor in the return line might be the best choice.
- Before disconnecting any fuel line connections make sure to depressurize the fuel system.
- The orientation of the flex fuel sensor is not important, it can be mounted in any direction.
- **Check for fuel leaks!**

1.2 Main Gauge Wiring



- 1 Connect the **RED** wire to an isolated switched 12V source in your vehicle. A switched 12V source goes ON as soon as “key on” power is active. The circuit to which you will pull power from should be able to support a 2 amp draw. Make sure this connection is protected with a 5A fuse.



Circuits that share power with the vehicle’s stereo, ignition system, ECU, lighting, or fuel pump should not be used. When in doubt, create an additional circuit using an automotive relay available at any automotive parts supplier. See the next section for a relay installation diagram.

- 2 The **BLACK** wire should be grounded to a solid ground source. The best possible ground source would be the battery ground (-) post. If other Innovate Motorsports devices are going to be daisy-chained along with the MTX-D, it is recommended that all devices be connected to a single ground point, ideally the battery ground (-) post.
- 3 Connect the **WHITE** wire to a headlight power wire (a wire that supplies current to the headlights). This enables the display to dim for better nighttime viewing. **DO NOT CONNECT THIS WIRE TO THE HEADLIGHT DIMMING WIRE.** Connection to this rheostat type of switch will cause the gauge to malfunction. If you chose not to utilize the dimming feature, connect the WHITE wire to ground.

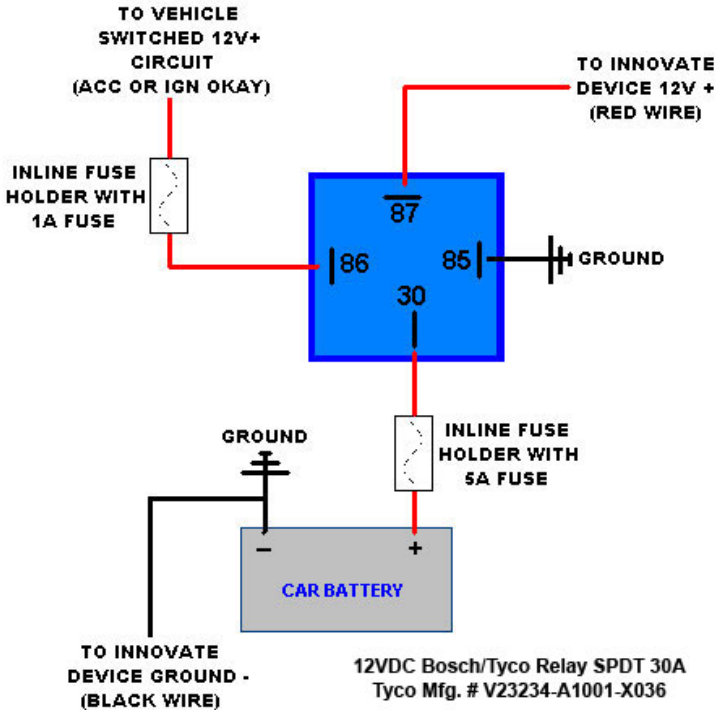
- 4 *Optionally*, the **YELLOW** (Ethanol %) and/or **BROWN** (Fuel Temp) analog outputs can be connected to the analog inputs of other devices such as data loggers or ECUs. If either one or both of these wires are not being used, isolate and tape the wire(s) out of the way.

The analog output is linear and fully programmable with the LM Programmer software. The factory default analog outputs are as follows:

Wire Color	Channel	Min	Max
Yellow	Ethanol %	0V = 0% Ethanol	5V = 100% Ethanol
Brown	Fuel Temp	0V = -40 degF	5V = 257 degF

It is assumed that the MTX-D and the device the analog output is being feed to are already sharing the same 'ground'. In a vehicle, this is generally true, but there can be small offsets in voltage when devices are grounded to, the chassis at different points. You can minimize these offsets by sharing a common ground point.

1.2.1 Single Innovate Device Relay Wiring Instructions



1.3 Flex Fuel Sensor Wiring

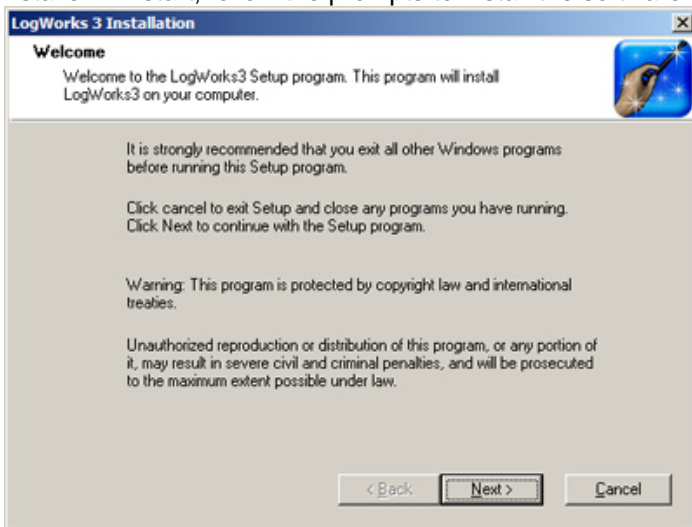
1. Fish the flex fuel sensor's 4 pin connector through the firewall, to the MTX-D gauge. Make sure to leave enough strain relief.
2. Connect the sensor's female 4 pin connector to the male 4 pin connector on the gauge.
3. Connect the Delphi 3 pin connector to the flex fuel sender.

2 Download the Logworks 3 software package

1. Open your web browser.
2. The LogWorks 3 software download will be the very first thing on the page, click the link to download the software.

2.1 Installing software

1. Double click on the Logworks 3 installer previously downloaded.
2. The installer will start, follow the prompts to install the software.



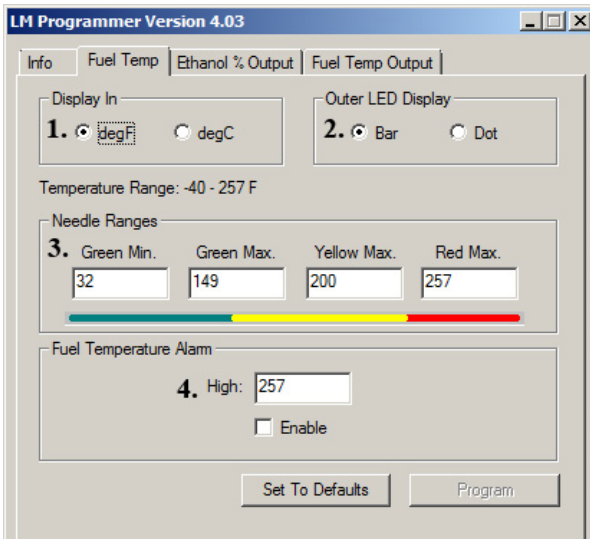
3. Once the software has been installed the LogWorks software, LM Programmer and MTX-D manual can then be located by navigating through Start->Programs->LogWorks3.

2.2 Connecting to LM Programmer

LM Programmer is used change the outer needle range, setup the fuel temp alarm, and program the two analog outputs.

1. Connect the OUT port of the MTX-D to the provided serial programming cable. Connect the other end of the serial programming cable to your computer. If your computer does not have a serial port, you can purchase a USB to Serial adapter from Innovate Motorsports (P/N 3733) or use any USB to serial adaptor that includes drivers. Make sure that nothing is connected to the IN port of the MTX-D
2. Power up the MTX-D.
3. Launch LM Programmer. The LM Programmer application can be launched from *Start->Programs->LogWorks3->LM Programmer* from the Windows task bar.

2.2.1 Fuel Temp tab



1. The **Display In** will allow the scale to be set as either Imperial or Metric unit of measure.
2. **Outer LED Display:** You are able to select between Bar or Dot. **Bar** allows the gauge's outer LEDs to flash incrementally. **Dot** allows the gauge's outer LEDs to flash each individual LED color (virtual needle.)
3. The **Needle Ranges** allows the configuration of each outer LED segment. The range displayed is user defined.
4. The **Fuel Temperature Alarm** will enable the gauge's outer LEDs to flash when the entered threshold value has been exceeded. To enable this feature the "Enable" option must be checked.

Whenever a change is made to the programming of the gauge click the **Program** button for the change to take effect. Once the gauge has been programmed the **Program** button will grey out.

2.2.2 Ethanol % Output tab

The ethanol percentage analog reference is output on the yellow wire from the main gauge harness. The factory default setting is 0V = 0% Ethanol and 5V = 100% Ethanol, but these values can be changed in the ethanol % output tab.

The ethanol % output tab displays the current setting programmed and allows user defined changes to the analog output. The graph display is automatically scaled to the selected voltages and ethanol percentage values entered.

The Error Voltage sets a voltage output if an error condition with the flex fuel sender were to exist.

2.2.3 Fuel Temp Output tab

The fuel temperature analog reference is output on the brown wire from the main gauge harness. The factory default setting is 0V = -40 degF and 5V = 257 degF, but these values can be changed in the fuel temp tab.

The fuel temp output tab displays the current setting programmed and allows user defined changes to the analog output. The graph display is automatically scaled to the selected voltages and fuel temperature values entered.

The Error Voltage sets a voltage output if an error condition with the flex fuel sender were to exist.

2.2.4 Updating the Firmware




Do not update the firmware if the versions are the same. A firmware update should only be necessary if there has been a new release that specifically fixes a problem that you are experiencing with the controller.

1. Connect the MTX-D to the computer and launch LM Programmer.
2. Once connected, LM Programmer will display the current version of the firmware that is installed in the MTX-D. **Do not update the firmware if the versions are the same. A firmware update should only be necessary if there has been a new release.**
3. On the very first tab of LM Programmer you will see a button labeled "Update Firmware," click this button.

4. Select the firmware file with the dld extension. If there have been revisions to the firmware, you will find them available for download from the Support section of the Innovate Motorsports web site.
5. The software will now prompt you to confirm that you wish to overwrite the firmware currently on your MTX-D.
6. Click OK, DO NOT power off or disconnect the MTX-D from the computer until the firmware progress screen completely disappears. Once finished, you may disconnect the unit from the computer and exit out of the software.

2.3 Logging data from your MTX-D with LogWorks

1. Connect the OUT port of the MTX-D to the provided serial programming cable. Connect the other end of the serial programming cable to your computer. If your computer does not have a serial port, you can purchase a USB to Serial adapter from Innovate Motorsports (P/N 3733) or use any USB to serial adaptor that includes drivers. Make sure that nothing is connected to the IN port of the MTX-D. Power up the MTX-D.
2. Launch LogWorks. The LogWorks application can be launched from *Start->Programs->LogWorks3->Logworks3* from the Windows task bar.
3. Once LogWorks launches go to *File->Connect*. You will be prompted to connect to the serial COM port. Select the COM port the device is connected to and then click Connect.
4. To start recording go to *File->New Realtime Log* or, in the Toolbar, click on the  Tool.

2.3.1 Adding and Logging MTS channels

The Innovate Motorsports' MTS (Modular Tuning System) allows you to daisy chain multiple devices together via the serial IN and OUT connectors to form one single synchronous log. MTS log chains can consist of a single unit connected directly to a laptop (connect your *MTX-D* directly to a computer,) two units, or multiple devices connected together, up to 32 channels

Innovate Motorsports' MTS devices have two types of serial interface connectors, the legacy 2.5mm stereo and the 4 pin Molex. The following patch cables are available to interface your devices together:

4 Pin Molex to 4 Pin Molex - 4ft	p/n 3846
2.5mm to 2.5mm Stereo - 4ft	p/n 3760
2.5mm to 2.5mm Stereo - 6in	p/n 3789
4 Pin Molex to 2.5mm Stereo - 4ft	p/n 3812

Appendix B: Error Codes and Troubleshooting Tips

Error Code	Error Meaning	Troubleshooting Tips
E10	Flex Fuel sensor not connected	<ol style="list-style-type: none"><li data-bbox="514 215 971 302">1. Verify that the connection at both the gauge and the sender is fully seated and secured.<li data-bbox="514 305 971 391">2. Check the integrity of the interface cable between the flex fuel sender and the gauge
E11	Fuel contamination or fuel over temperature	<ol style="list-style-type: none"><li data-bbox="514 438 971 492">1. Fuel contamination. For example, water in fuel.<li data-bbox="514 495 971 548">2. Fuel is above the max temp of 257 degF.