Accutach Co. ClockGauge
Installation Guide
Rev 1.6

Thank you for your purchase of the Accutach Co. Mustang ClockGauge. It adds Coolant Temperature, Intake (or ambient) Air Temperature, Air/Fuel Ratio, Oil Pressure, Fuel Pressure and Voltage digital gauge functionality to your 1994 to 1997 Ford Mustang, 1993 to 1997 Ford Crown Victoria or 1993 to 2002 Mercury Grand Marquis dash clock. Note that Air/Fuel Ratio functionality requires the use of a compatible aftermarket Wideband O2 Sensor (not included). Oil Pressure gauge functionality requires the use of an Autometer 2242 100 PSI oil pressure sender (not included). Also, there is an output signal that will drive your stock oil pressure gauge in the same way the stock oil pressure sender does allowing you to simply replace your OEM oil pressure sender with the Autometer sensor. Coolant temperature gauge functionality will require the use of an AEM 30-2013 coolant temperature sensor kit (not included). Intake (or ambient) air temperature gauge functionality will require the use of an AEM 30-2014 intake air temperature sensor kit (not included). The AEM sensor kits come with compatible connectors. Fuel pressure gauge functionality will require the use of an Autometer 2246 100 PSI fuel pressure sender (not included). Accutach Co. sells an optional fuel pressure sensor mounting kit that allows you to remotely mount the fuel pressure sensor because the Autometer sensor should not be mounted directly on the fuel rail. That kit also includes the fuel pressure sensor connector pigtail.

This Install Guide will tell you what you need to know to successfully upgrade your clock to a Clock Gauge. It explains how to install the ClockGauge in a Mustang. Installation will be similar in a Crown Victoria or a Grand Marquis. Please see the ClockGauge User Manual for the information you will need to operate your ClockGauge.

If you are reading this Installation Guide prior to purchase, you must send in your OEM Ford clock for the upgrade or pay a core charge of $75.00. Your clock's display printed circuit board will be replaced, while your display, power supply board and case will be reused. The buttons on the cases that I have in stock are used and have different levels of wear. If you don't care about the condition of the button letters, feel free to order and then return your core later for a core charge refund.

Disclaimer

You use this product at your own risk. Accutach Co. is not responsible for any damage to your car or injury caused by the use of this product in any vehicle.

General

Read and understand this entire document before beginning your installation. Make sure you have all of the tools and supplies you will need prior to beginning the installation.

Do not use Scotch-lock style connectors or "twist and tape" methods of splicing. Properly crimped connectors will work, but improperly crimped connections will be unreliable. We recommend soldered splices using rosin core solder with shrink tubing insulation. We also recommend using DR-25 shrink tubing for any splices outside of the passenger compartment due to its resistance to oil and fuel contamination. You can buy DR-25 shrink tubing on Ebay.

Planning the Installation

You will need to purchase any sensors you will need (ECT, IAT, oil pressure, fuel pressure or wideband controller). You will also need to purchase a 12V LED, a 12V indicator light or an LED with a current–limiting resistor if you will be using the alarm output and will not be using a spare idiot light in your instrument cluster. You will need enough automotive hookup wire (24 ga. or larger) to run from the sensors you will use to the clock pod of your Mustang. You will also need a good soldering iron, some rosin core solder and shrink tubing. We recommend DR-25 shrink tubing (available on Ebay) for any solder joints under the hood since it is very resistant to oil and fuel contamination. We also recommend you protect the under-hood wiring with plastic conduit. Again, when we say "splice" in this document, we recommend that you use solder and shrink tubing to make and insulate the connections between wires.

You will need to decide which ClockGauge inputs and which outputs you will be using. The following are the list of available gauge functions and their inputs and outputs.

Clock function: The clock has no inputs and no outputs. Power and ground for the ClockGauge unit is supplied by the stock clock harness connector.

Engine Coolant Temperature Gauge function: The ECT Gauge function has an input that reads an AEM 30-2013 ECT sensor signal. The AEM 30-2013 kit comes with mating connector, pins & wire seals. If the ECT Gauge Alarm threshold has been set, then the ECT Gauge function can also set the Alarm output which can be used to light an LED or an instrument cluster idiot light.

Intake Air (or Ambient) Temperature Gauge function: The IAT Gauge function has an input that reads an AEM 30-2014 IAT sensor signal. The AEM 30-2014 kit comes with mating connector, pins & wire seals. If the IAT Gauge alarm threshold has been set, then the IAT Gauge function can also set the same Alarm output which can be used to light the same LED or instrument cluster idiot light. If the IAT sensor is mounted in an intake air chamber, the gauge will display the temperature of the intake air. If the sensor is mounted inside of the front bumper, it will display the ambient temperature. The ambient temperature gauge display will only be accurate when the car is moving, causing ambient air flow over the sensor.

Oil Pressure Gauge function: The OP Gauge function has an input that reads an Autometer 2242 (not supplied) 100 PSI oil pressure sensor signal. If the OP Gauge Alarm threshold has been set, then the OP Gauge function can also set the same Alarm output which can be used to light the same LED or instrument cluster idiot light.

The OP Gauge function also has an output that can drive the stock Mustang oil pressure gauge. This allows you to replace the stock oil pressure gauge sender with the Autometer sensor for the ClockGauge, while retaining the function of the stock oil pressure gauge. An optional oil pressure connector pigtail can be purchased from any good auto parts store.

Fuel Pressure Gauge function: The FP Gauge function has an input that reads an Autometer 2246 (not supplied) 100 PSI fuel pressure sensor signal. The FP Gauge function also has a 5V reference output and reference ground for the fuel pressure sensor. An optional fuel pressure sensor mounting kit, including connector pigtail, mounting bracket, fuel hose and fittings can be purchased from Accutach Co. You will also need a length of high pressure fuel hose and fittings to remote mount the fuel pressure sensor. DO NOT mount the fuel pressure sensor directly on the fuel rail. The engine vibration will kill this expensive sensor. It killed one on my car. Trust me.

Volt Gauge function: The Volt Gauge function reads the battery voltage supplying the ClockGauge. There are no inputs or outputs. No sensor is required for this gauge function.

Air/Fuel Ratio Gauge function: The AFR Gauge function has an input reads the analog output signal of any wideband O2 sensor controller (not supplied) with an output voltage with the equation AFR=2*V+10. It has been tested with PLX Devices Wideband O2 sensor units such as the SM-AFR.

Contents of the Package

Your Accutach Co. ClockGauge package should contain a ClockGauge and a 9-pin sensor connector pigtail. If you have ordered an optional fuel pressure sensor pigtail and mounting kit, then they should be in the package as well.

Not Included with the ClockGauge

You will need enough automotive wire to reach from your clock pod to the various sensors you will be using with the ClockGauge. You will need solder, a soldering iron, a heat gun and shrink tubing. Oil and fuel resistant Raychem DR-25 Heat Shrink Tubing (available on Ebay) is recommended for splices in the engine compartment.

The Accutach Co. ClockGauge does not include any sensors. You will need to purchase the sensors needed to implement any of the gauge functions that you wish to use. Oil Pressure gauge functionality requires the use of an Autometer 2242 100 PSI oil pressure sender (Not Included). If you choose to use the Oil Pressure gauge function, you may need to purchase a standard Oil Pressure sensor connector from any good auto parts store. ECT gauge function will require an AEM 30-2013 sensor kit. IAT gauge function will require an AEM 30-2014 sensor kit. Air/Fuel Ratio functionality requires the use of a compatible aftermarket Wideband O2 Sensor (not included) with an analog output that uses the formula: AFR = 2*V +10. Fuel Pressure gauge functionality will require the use of an Autometer 2246 fuel pressure sender (not included). If you choose to use the Fuel Pressure gauge function, you will need to purchase a Sealed Metri-Pack 150 P2S pigtail (available for purchase from Accutach Co. as a part of the remote mount kit) unless you already are running an Autometer fuel pressure gauge. In that case, you can share the Autometer gauge signal with the Accutach Co. ClockGauge.

Optional Outputs

The ClockGauge has two outputs, an Alarm output and an Oil Pressure Gauge output. The Alarm output is designed to drive an idiot light whenever a preset threshold is exceeded in the Coolant Temperature, Intake Air Temperature or Oil Pressure gauge functions. The Oil Pressure Gauge output is designed to drive your stock OEM Oil pressure gauge, simulating the stock oil pressure sender. This allows you to replace the stock oil pressure sender with the Autometer sensor while retaining the stock OEM oil pressure gauge functionality. You can choose not to use either of these outputs as well.

Removing the Stock 94-97 Mustang Clock

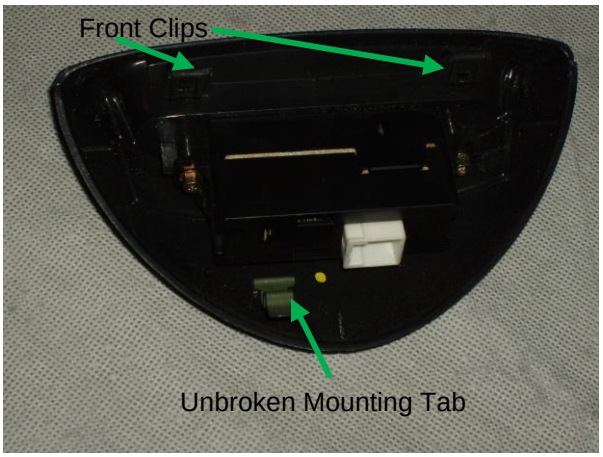
You will need to remove your stock clock from the clock pod and send it in to Accutach Co. or pay a core charge. If you want your specific clock case with its clock button wear pattern, you must send your clock in to Accutach Co. for retrofitting. If you are willing to accept someone else's clock case with its button wear pattern, you can simply order a ClockGauge and send in your clock for a core charge refund later.

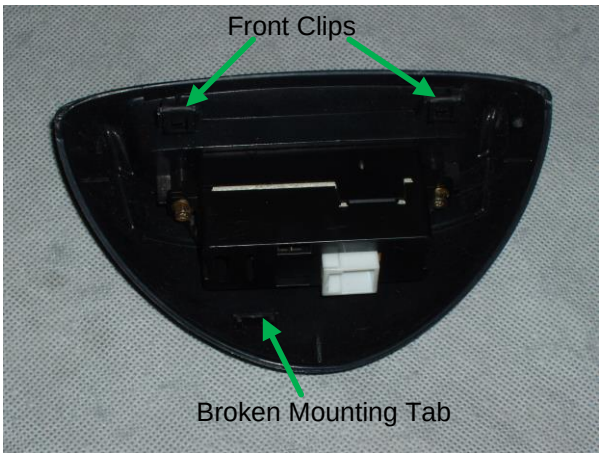
In this section, the rear of the clock pod refers to the rear of the pod as you face it while sitting in the driver's seat. The front of the clock pod refers to the face of the clock that faces you as you sit in the seat.

To remove your clock pod, slowly and carefully pry up under the face of the clock pod. Pry it up until the two clips barely clear the two holes in the dash. As soon as the clips clear the holes start to pull the entire pod towards you until the rear clip comes free from the large hole in the dash.

Don't pry up too far, too fast or you will risk breaking the rear clock pod tab as shown on the next page.

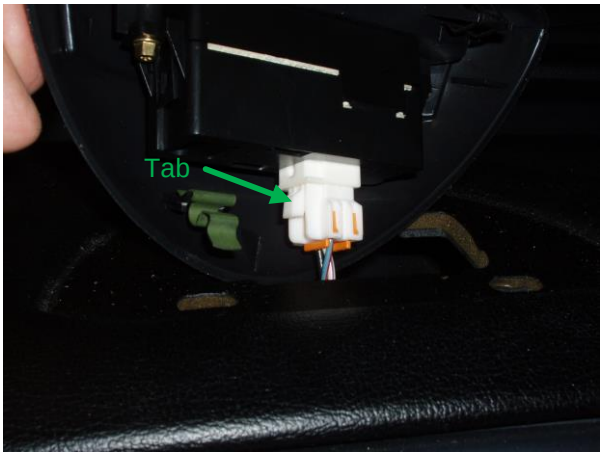
If you pull up to far, too fast, you will easily break off the single clip at the rear of the pod closest to the windshield. If that happens, you will need to find a replacement clock pod, so be very careful.

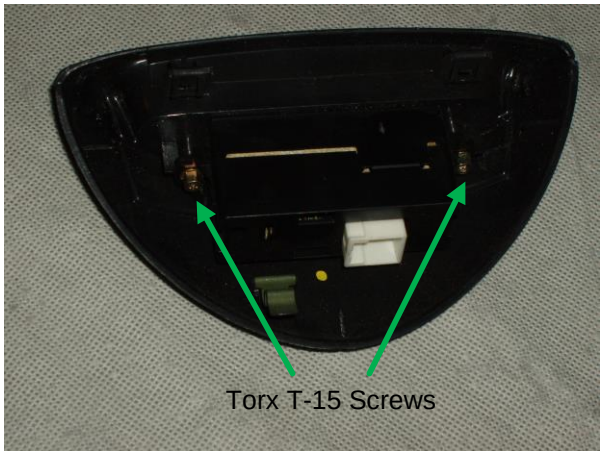




Once you have the clock pod free of the dash, press the tab on the clock wiring harness connector and disconnect the harness from the clock.

The clock pod will come free. There is enough slack in the dash harness to allow you to get access to the connector. Press the tab on the connector and it will pull out of the clock module and the clock pod will be free.





Remove the two Torx T-15 screws and the clock module will come free from the clock pod. You may want to tape your clock connector down so it will not get lost inside the dash while you install the ClockGauge.

Install the ClockGauge into the clock pod using the Torx T-10 screws that held the stock gauge in place. Set the clock pod aside until your ClockGauge sensor wiring is complete.

Removing the Stock Crown Victoria or Grand Marquis Clock

Carefully pry off the long dash bezel that holds the dash clock. Press the tab on the clock wiring harness connector and disconnect the harness from the clock. Remove the clock and bezel from the car.

Remove the stock clock from the bezel by removing the two Torx T-10 screws. You may want to tape your clock connector down so it will not get lost inside the dash while you install the ClockGauge.

Install the ClockGauge into the bezel using the Torx T-10 screws that held the stock gauge in place. Set the bezel aside until your ClockGauge sensor wiring is complete.

Preparing for Installation

You will need to install the sensors and run the wires (20 gauge or larger) to the clock pod for the gauge functions you choose to enable. Make sure you label all of the wires at the clock pod so you can splice them to the correct ClockGauge connector pigtail wires.

Installing and Wiring the AEM 30-2013 Engine Coolant Temperature Sensor

The AEM 30-2013 ECT sensor is mounted in a 1/8" NPT hole. Locate a suitable mounting location on the engine for your ECT sensor. Cut a length of hookup wire that will reach from your ECT sensor location through the firewall and to the clock hole in the dash. Cut another length of hookup wire long enough to reach from the sensor pigtail to a good chassis ground. Connect both wires to the connector pins and assemble the connector. Since the sensor is a resistive sensor, polarity of the connector does not matter. Connect the ground wire to your chassis ground.

Run the signal wire from the pigtail through the firewall if needed and up through the clock hole in the dash. Mark the wire end “ECT” for later connection to the sensor connector pigtail.

Installing and Wiring the AEM 30-2014 Intake Air Temperature Sensor

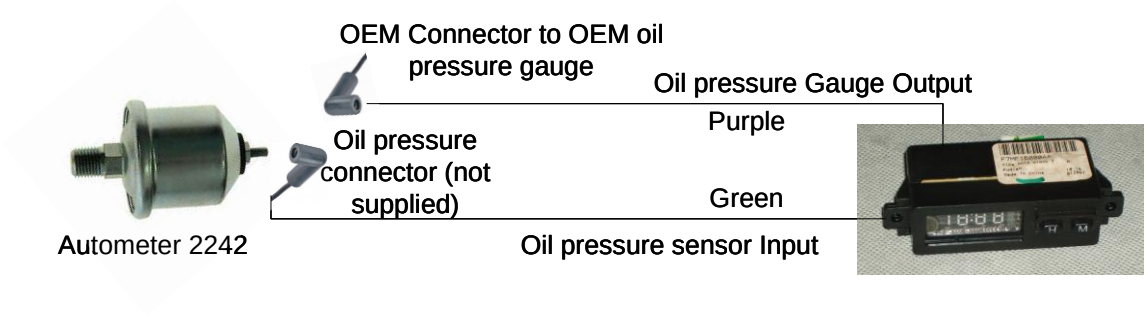
The AEM 30-2014 IAT sensor is mounted in a 1/8" NPT hole. Locate a suitable mounting location for your ECT sensor. In an naturally aspirated engine, anywhere in the intake air pipe will do. In a forced induction engine, the sensor should be mounted in the intake system after the blower or turbo. If the IAT gauge is to be used to measure ambient air temperature, the IAT sensor should be mounted under and behind the front bumper away from the radiator. Remember that ambient air temperature measurements will only be accurate when the car is moving because the air under the bumper will heat up when stopped.

Cut a length of hookup wire that will reach from your IAT sensor location through the firewall and to the clock hole in the dash. Cut another length of hookup wire long enough to reach from the sensor connector to a good chassis ground. Connect both wires to the connector piins and assemble the connector. Since the sensor is a resistive sensor, polarity of the connector does not matter. Connect the ground wire to your chassis ground.

Run the signal wire from the pigtail through the firewall if needed and up through the clock hole in the dash. Mark the wire end “IAT” for later connection to the sensor connector pigtail.

Installing and Wiring the Autometer 2242 Oil Pressure Sensor

If you plan to leave the stock Mustang oil pressure sender and gauge circuit intact, locate an available 1/8” NPT oil pressure port and install the Autometer oil pressure sensor. Splice automotive hookup wire to the oil pressure sensor connector you bought at an auto parts store and run the wire through the firewall and up to the clock pod hole in the dash. Label the wire “OP” for later connection to the sensor connector pigtail.



If you plan to replace the stock oil pressure sender with the Automerter 2242 oil pressure sensor, unplug the oil pressure connector from the stock sender, and remove the stock sender. Install the Autometer sensor. You can cut the stock oil pressure sender connector off of the harness and splice it onto automotive hookup wire. Run that hookup wire from the Autometer sensor through the firewall up to the clock pod hole and label the wire "OP" for later connection to the Dark Green wire of the sensor connector pigtail. Splice the stock oil pressure gauge wire where you cut off the stock connector to automotive hookup wire and run it through the firewall up through the clock hole in the dash. Label that wire "OP Gauge" for later connection to the Purple wire of the sensor connector pigtail. This wire will drive the stock oil pressure gauge. This output can sink up to 800mA of current, and is pulled low whenever there is more oil pressure than the programmed threshold.

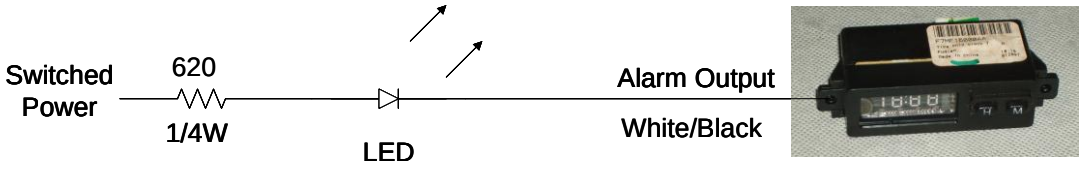
A benefit of this configuration is that you can set the pressure at which the stock OEM oil pressure gauge shows that your oil pressure has dropped too low.

Installing and Wiring an Alarm Light

If any of the thresholds you have programmed have been exceeded, the alarm output will be pulled low for as long as the thresholds are exceeded or until the ClockGauge is put into setup mode. The alarm open collector output can sink up to 800mA of current.

If you use a 12V incandescent bulb or LED (Not Included), simply wire one side of the light to battery power and the other side to a piece of hookup wire you run to the clock pod hole in the dash. Label that wire "Alarm" for later connection to the sensor connector pigtail.

If you use a regular 20mA LED, make sure you wire the LED anode to battery power and connect a 620 Ohm, 1/4W current limiting resistor to the cathode. Connect the hookup wire to the clock pod to the other side of the resistor.



If you want to use an unused low side switched instrument cluster idiot light such as the OD light in a manual transmission car, you can remove the instrument cluster and splice automotive hookup wire to the OD light wire at the instrument cluster harness connector. In a 1994-1997 Mustang, that wire is a White/Lt Green wire on Pin 8 of the left hand cluster connector when you are sitting in the driver's seat facing the dash. Splice a wire to the side of the White/Light Green wire on the side that goes to the instrument cluster. Run that piece of automotive hookup wire to the clock hole in the dash and label it "Alarm" for later connection to the White/Black wire of the sensor connector pigtail. Shrink wrap the other end of the cut wire to prevent short circuits.

If you plan to repurpose a different idiot light on your stock Mustang cluster, do the same as above, except use the correct wire for the idiot light that you choose. You can locate the correct wire for your car by reading this page: https://websites.godaddy.com/blob/1975f84f-4935-4131-8404-5a914da1afb7/downloads/1bfptlo0o_97459.pdf?7801d48a

The following Mustang idiot lights are compatible with the ClockGauge's Alarm output: OD OFF, LO OIL or BRAKE. Do not use the LOW COOLANT light in GTs and Cobras due to the use of an anti-slosh module. Do not use the CHARGE INDICATOR, FASTEN SEAT BELT, THEFT or ABS lights in any Mustang as they are controlled by the power side, not the ground side.

Installing and Wiring the Autometer 2246 Fuel Pressure Sensor

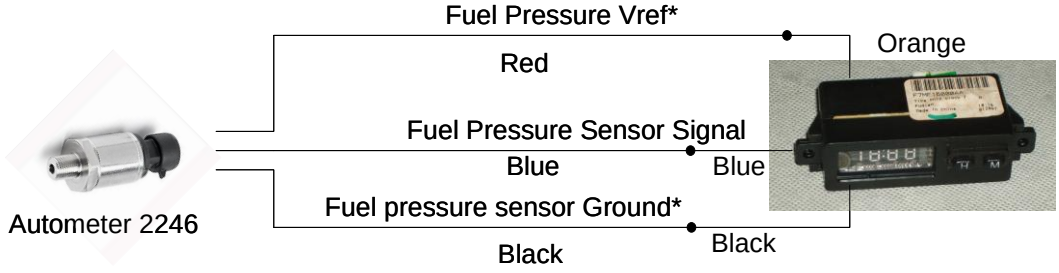
If you plan to use the Fuel Pressure gauge function, you will need to add an Autometer 2246 0-100 PSI fuel pressure sensor. You will also need the optional fuel pressure sensor pigtail connector (available for purchase as part of the optional fuel pressure sensor remote mounting kit at www.accutach.com). You will need to find a good location for your fuel pressure sensor. Autometer strongly recommends that you not mount the fuel pressure sensor to the fuel rail. The engine vibration will kill the sensor. AccuTach Co. recommends that you remote mount the sensor to the passenger shock tower using the 1" rubber cushion clamp included in the optional fuel pressure sensor remote mounting kit. Here is a write-up on how to remote mount a fuel pressure sensor: http://www.classictiger.com/mustang/UnderTheHood/FuelPressureSenderRelocation/FuelPressureSenderRelocation.htm

Once you have located your fuel pressure sensor mounting point, trim the supplied 18" fuel line to fit between the Schrader valve on the fuel rail and the fuel pressure sensor. Slide one eared collar onto each end of the fuel line, and then insert the barbed ends of the brass NPT fittings into each end of the fuel line. Slide the eared collars until they are about 1/4" from the end of the fuel line and crimp the ears down with diagonal cutters. Do not cut the collars with the cutters, just crimp them tightly.

Carefully bleed the fuel pressure from the fuel rail. One good way is to start the car with the fuel pump fuse removed, and let it run until the car dies. Then remove the Schrader valve from the fuel rail. Put some fuel resistant thread sealer on the fuel pressure sensor and install it into the female fitting on the fuel line. Replace the fuel pump fuse if you removed it and power up the fuel pump to check for fuel leaks. Fix any fuel leaks before continuing.

Once you have no fuel leaks, mount the fuel pressure sensor to its chosen location and plug in the fuel pressure sensor connector pigtail. Splice three lengths of automotive hookup wire to the fuel pressure sensor connector pigtail Red, Black and Blue wires. Run those wires through the firewall up to the clock pod dash hole and label the Red wire "VREF", the Black wire "GND" and the Blue wire "FP" for later connection to the Blue wire of the sensor connector pigtail.

Note: if you already have an Autometer fuel pressure gauge with the specified fuel pressure sensor, do not connect the Red or Black wires of the ClockGauge. Splice the Blue wire of the sensor connector pigtail to the Autometer gauge's Blue sensor wire to share the fuel pressure sensor between the Autometer gauge and the Accutach ClockGauge.



* Do not connect these wire to the sensor pigtail if you are already running the Autpmeter fuel pressure gauge. Sensor power will come from the gauge instead.

Wiring the Wideband O2 Sensor AFR Input

If you plan to use the Air/Fuel Ratio gauge function, you will need to purchase and install a compatible wideband O2 sensor. Any wideband sensor with a gauge or datalogging output that has the following equation will work: AFR = 2 * Voltage + 10 (or Lambda = 0.137 * V + 0.683). The PLX Devices M300TE is one such compatible wideband O2 sensor. If the Wideband O2 controller analog output is programmable, be sure to set it to the mode where the output has that equation. We use the PLX M-300 Wideband sensor.

Splice automotive hookup wire to the analog output of the wideband O2 sensor controller. Run that wire up to the clock hole in the dash and label it "WB" for later connection to the Gray wire of the sensor connector pigtail.

Wiring the Sensor Connector Pigtail

At this point, you should have all of the sensor wires that you will be using run up to the clock pod hole in the top of the dash.

Pin 1 of the 9-pin sensor connector is marked with an asterisk, * on the PCB.

Splice the wire labeled "WB" to the Gray colored wire on the sensor connector pigtail. (Pin 1)
Splice the wire labeled "IAT" to the Yellow colored wire on the sensor connector pigtail. (Pin 2)
Splice the wire labeled "OP" to the Dark Green colored wire on the sensor connector pigtail. (Pin 3)
Splice the wire labeled "OP Gauge" to the Purple colored wire on the sensor connector pigtail. (Pin 4)
Splice the wire labeled "VREF" to the Orange colored wire on the sensor connector pigtail. (Pin 5)
Splice the wire labeled "Alarm" to the White/Black colored wire on the sensor connector pigtail. (Pin 6)
Splice the wire labeled "GND" to the Black colored wire on the sensor connector pigtail. (Pin 7)
Splice the wire labeled "ECT" to the Light Green colored wire on the sensor connector pigtail. (Pin 8)
Splice the wire labeled "FP" to the Blue colored wire on the sensor connector pigtail. (Pin 9)

Installing the ClockGauge

Plug the sensor connector into the ClockGauge. Plug the clock connector into the ClockGauge. The clock should power up and display the clock (assigned to the H button) with "12:00" on the display. Please see the user manual for how to set up and use the ClockGauge. The default gauge function assigned to the M button is the ECT gauge function.

To finish the installation in a Mustang, simply slide the front clock pod clip into the clock pod hole nearest the windshield, align the two rear clips with their holes and press down on the pod until the clips snap into place. To finish the installation in a Crown Vic or Grand Marquis, simply clip the bezel back into place.