

# Operating Instructions for the EIS Model 2000

The Model 2000 is specifically designed to require very little input from the pilot.

## Before using the Model 2000 for the first time:

1. Set the units for temperature. The instrument is set at the factory to Fahrenheit.
2. Set the engine limits according to the recommendations of the engine manufacturer. You may review these limits, and change them at any time quite easily, so it is practical to set limits more conservatively than recommended by the engine manufacturer, but above your normal operating conditions, to get the earliest warning when something deviates from normal.
3. Set the TachP/R setting as required for your instrument. (See below for more details.)
4. All settings in the instrument may be set back to the initial factory settings by holding the right button (“Display”) when turning on the instrument.

## Before Each Flight:

1. If the instrument includes the altimeter option, set it before each flight.
2. All engine limits are stored with a checksum. If the instrument determines a user setting has been somehow lost, it will generate a “Check Entries” message at power-up. If you see this message, carefully review all user settings.

## Detailed Description of the Features:

### Flight Timer

The flight timer shows you how long your flight has lasted. It resets at power up, and starts counting when the engine is running (based on the tachometer). It displays the previous flight time until the current flight time reaches 3 minutes, allowing you to easily recall the length of the previous flight. A warning can be set when the timer exceeds your preset limit to remind you to check your fuel.

### Favorite Page

The instrument will automatically select your favorite page when the checklist is ended, or the right button is double-clicked, or when leaving the “Set Pages”. Your favorite display page is entered under the “DISPLAY” setting in the “Set Limits” pages. It is the last setting on these pages.

### Combo Screen On-Screen Labels

Pressing the right button (“Display”) when on a combination page (that is, a page with no labels), will replace the numeric data with labels to identify the data. Releasing the button returns the numeric data to the page.

Double-clicking the “Display” button immediately takes you to your favorite page. Normally a combination page is used as your favorite.

### Altimeter Function

The altimeter function displays altitude on the first combination page. The altimeter must be set before each flight to account for the local barometric pressure. The altimeter is set on the “SET Pages” (See “Limits” below).

This altimeter functions as a standard aviation type altimeter. It provides 10 foot resolution, and conforms to the International Standard Atmosphere. The vertical speed function indicates the vertical speed in hundreds of feet per minute. An up or down arrow will appear immediately after it to show climb or descent. The vertical speed updates once per second.

### Calibrating the Altimeter/Barometric Pressure

To calibrate the altimeter so that the barometric pressure it registers is correct, the follow procedure should be followed. This procedure must be performed with a new instrument, and should be re-checked on an annual basis.

- Turn on the instrument and allow 5 minutes or more for its internal temperatures to stabilize.
- Using the Altimeter Set page, set the altimeter so that the barometric pressure display matches the current altimeter setting. Note that this is the 4 digit number immediately after the ALT label on this set page. No decimal point is provided, so an altimeter setting of 29.92 will be displayed as 2992
- Adjust the ALTCor setting on the configuration set pages so that the altitude display (in feet) matches the local elevation. The nominal value of the ALTCor is 128. Increasing this number by one will change the altimeter display by 6 feet.
- If your ALTCor falls outside the range of 50-200, you may have made a mistake in your calibration.

## Warning System Operation

The alarm system is the most important part of the system. It allows you to enjoy flying without the need to constantly monitor your instrument. Damaging engine conditions are made immediately obvious.

All alarms cause the warning light to flash, and the page to change automatically to a labeled screen which includes the out-of-limit parameter. The offending parameter is flashed on the display, along with the warning light until the problem goes away, or until it is acknowledged by pressing the “Next/Ack” button. Acknowledged alarms cause the warning light to stay on steady until the condition ends, and does not inhibit other alarms.

## Limits

All limits are set by pressing the left (“Next/Ack”) and center (“Previous”) buttons at the same time. Limits and other settings are displayed one at a time. As shown on the display, the left and center buttons changes the setting, and the right button takes you to the next setting. Limits are as follows:

- **Contrast** defaults to the best setting at power-up. It may be altered if desired to enhance readability.
- **Alt** shows the current altimeter setting. Altitude is manually set here.
- **Max Timer** gives you the maximum time before the flight timer will issue an alarm. The limit is entered in minutes. If you exceed this limit, it can be increased easily in flight.
- **Max OilP** is the maximum oil pressure.
- **Min OilP** is the minimum oil pressure.
- **Max OilT** is the maximum oil temperature
- **Max RPM** is the maximum RPM. This limit is set in 30 RPM increments.
- **Max Aux1** is the maximum for the Auxiliary 1 Input.
- **Min Aux1** is the minimum for the Auxiliary 1 Input.
- **Max Aux2** is the maximum for the Auxiliary 2 Input.
- **Min Aux2** is the minimum for the Auxiliary 2 Input.
- **Max Volt** is used to warn of overcharging due to a failed regulator. A good limit for this is 15.0 volts. If a battery is not used, this alarm is not required.
- **Min Volt** is used to warn of battery discharging. A good setting for this is 12.0 - 12.8 volts.
- **Max Cool** is the maximum coolant temperature.
- **Max EGT** is a very critical alarm, as high EGT can destroy an engine in seconds to minutes. It reflects the fuel/air mixture being burned by the engine. A typical limit is 1200-1250 degrees F.
- **Max CHT** warns of inadequate cooling.
- **Display** is used to enter your favorite display page.

## Configuration Set Pages

These pages contain information about the engine type and fuel probe calibration, are not normally used by the owner. These settings are preset at the factory. This settings are restored to the factory settings by holding the right button at power-up. These pages are accessed by pressing and holding the right and center buttons for 10 seconds, and include the following:

**Temp. Fahrenht/Celcius** - Selects units for the temperature display.

**TachP/R** - Indicates the number of pulses per revolution of the engine for tachometer sensing. Rotax CDI engines require a setting of 6. The Rotax 912 requires a setting of 1. HKS use a setting of 6. Jabiru use a setting of 5. Zanzatera engine use a setting of 2. All other engines, including Hirth, Zenoah, older (non-CDI) Rotax engines, and most others will use a setting of 2.

The TachP/R setting must be correct in order for the EIS to display an accurate RPM indication.

A simple test to help verify the RPM readings are accurate can be made by running the engine at night, and looking through the propeller at a florescent or mercury vapor light. The pulsation of the light will make the propeller to appear to stopped at various RPMs. Verify the propeller appears stopped at the RPMs shown in the following table. Note that this applies to lights powered by 60 Hz electrical power, such as that used in the United States and Canada. Also remember that this is the propeller RPM, and the engine RPM will be higher by the reduction ratio if the engine includes a propeller speed reduction unit.

2-Blade Propeller	3-Blade Propeller
600	240
720	300
1200	480
1440	600
1800	1200
3600	2400

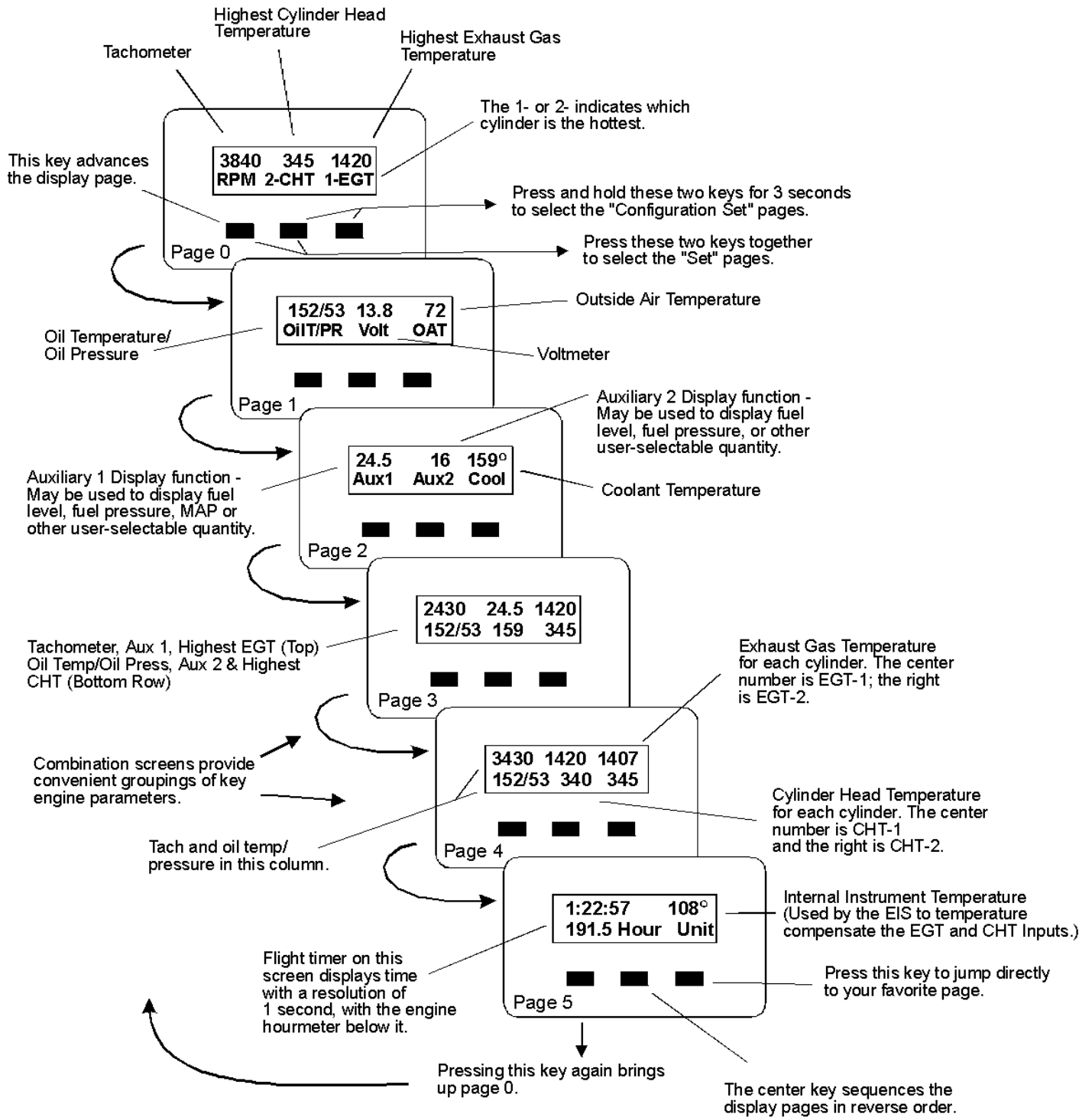
**CAUTION** : If there is ANY DOUBT that the tachometer is working correctly, use another tachometer that is known good to verify the EIS is giving the correct tachometer reading. Attempting a take-off with an inaccurate tachometer could result in less than full power being available, and this could be very dangerous.

**Aux1SF, Aux1Off, Aux1 (Forward/Reverse)** - Enter the scaling for the auxiliary 1 input here. See the appropriate sheet with the sensor for these settings.

**Aux2SF, Aux2Off, Aux2 (Forward/Reverse)** - Enter the scaling for the auxiliary 2 input here. See the appropriate sheet with the sensor for these settings.

**Hrs** - The hourmeter may be set here

**AltCor** - This is used to calibrate the altimeter so the altitude display and barometric pressure correspond. See the section above "Calibrating the Altimeter".



**Figure 1. Display Pages for the Model 2004 EIS (for 4-stroke engines)**

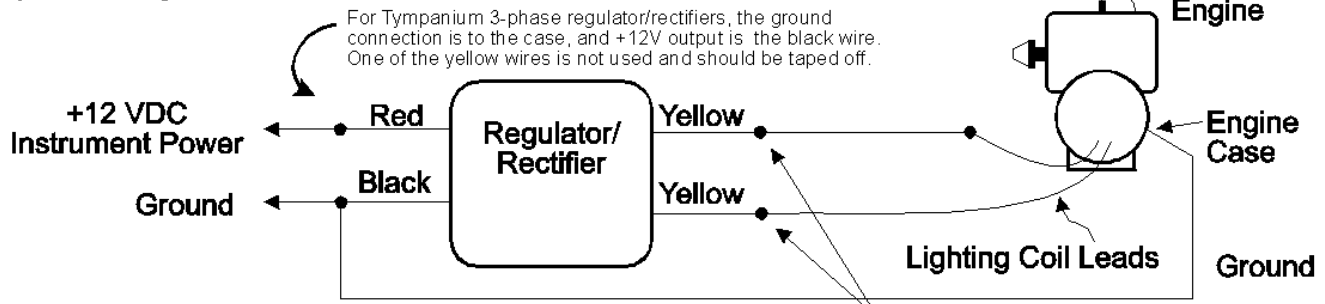


**Rotax (Tympanium) Regulator/Rectifiers** -- (Also applies to Jabiru, HKS, and most others not otherwise listed.) Only one of the two inputs to the regulator/rectifier will give a good tachometer reading. The incorrect lead will give a tachometer reading that decreases with engine rpm. The correct lead must be determined by trial and error.

The small Tympanium regulator rectifier (identified by its 2 yellow, 1 red and 1 black wires) often overcharges batteries. If your battery voltage exceeds 15 volts while using this regulator/rectifier, your battery will be damaged, and its life will be shortened.

Making the tachometer connection is dependant on the type of regulator/rectifier used, as noted here.

**Key West Regulator/Rectifier.** The gray tachometer lead must be used. The lighting coil wires may not be used as a tachometer source with this regulator/rectifier.



**Rotax 2-Stroke Engines :** The gray tach lead may be used for tachometer connections. The only drawback to this method is that the tach reading might (not always) go to zero when turning off one mag during the mag check, specially if the mag check is performed at low (less than 3000) RPM. . If a battery is used, tachometer connection may be made to the lighting coil as shown above to avoid loss of the tach reading during the mag check.

Connect the tachometer input of the EIS to either on of these lighting coil leads.

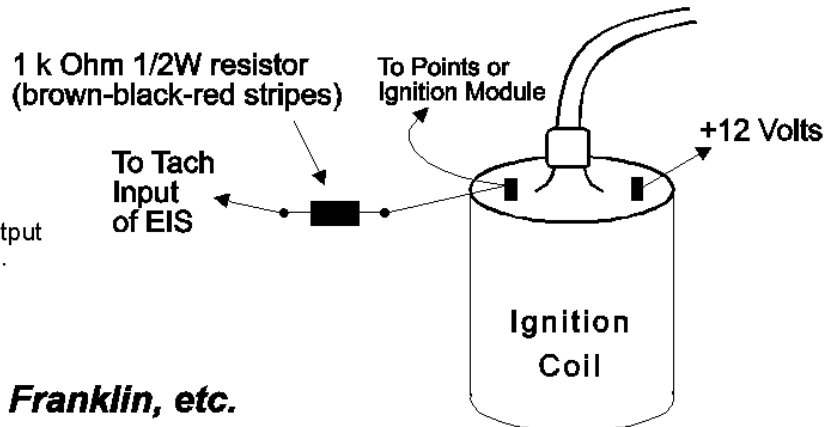
**Figure 7a. Tachometer Connections to Lighting Coil Equipped Engines (Rotax, Jabiru, Hirth, Zenoah, etc.)**

**Electronic Ignition**

Connect directly to the tach output from the ignition system. No resistor required.

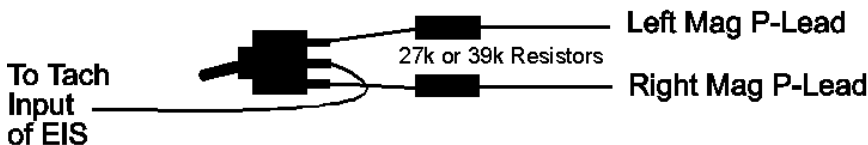
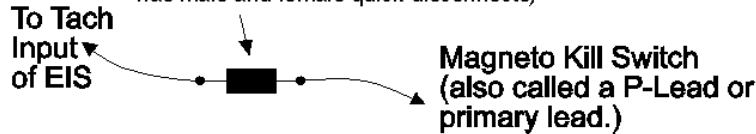
**Rotax 912/914**

Connect tach input to one of the two tachometer output wires. Connect the other tach output wire to ground.

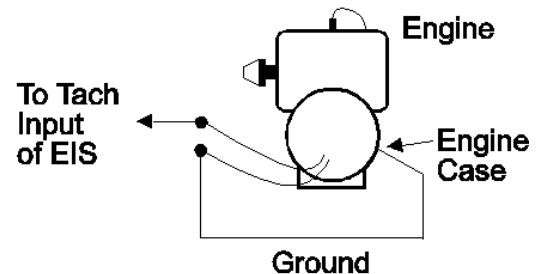


**Magneto Equipped Engines such as Lycoming/Continental, Franklin, etc.**

39 k Ohm 1/2W resistor (orange-white-orange stripes) or 27 k Ohm 1/2W resistor (red-violet-orange stripes) (This resistor is Included in parts pack - it is covered with black heat shrink tubing and has male and female quick-disconnects)

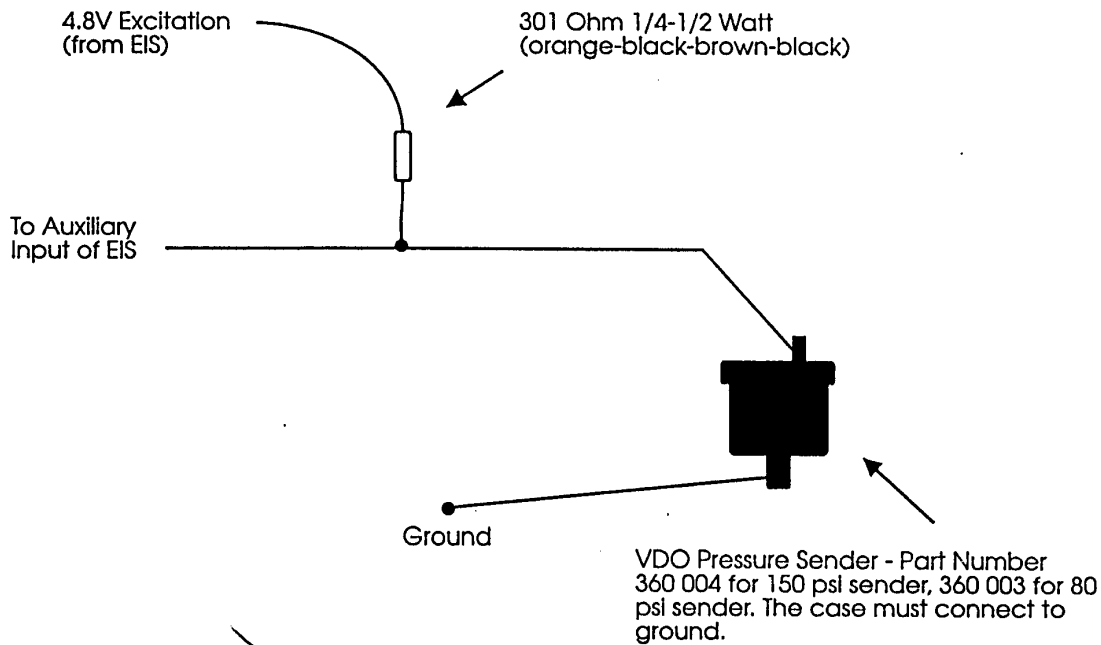


**Point-Type Ignition**



**Spare Lighting Coil**

**Figure 7b. Other Tachometer Connections (Model 2000/4000/6000 EIS)**



- o **Set AuxSF** to 182 for 150 psi sender , **91 for 80 psi sender**.
- o **Set AuxOff** to 29 for 150 psi sender, **15 for 80 psi sender**.
- o Set Aux sensing to normal (+) on Options page.

o CAUTION: Be sure to connect the resistor as shown. Connecting excitation power directly to the sensor could damage it.

o For the 150 psi sending unit, The EIS will calculate pressure to an accuracy of about +/-3 psi over the range of 0-80 psi. The actual oil pressure will be 4-8 psi higher than displayed for aux readings of 80-100

o For the 80 psi sending unit, The EIS will calculate pressure to an accuracy of about +/-1.5 psi over the range of 0-40 psi. The actual oil pressure will be 2-4 psi higher than displayed for aux readings of 40-50.

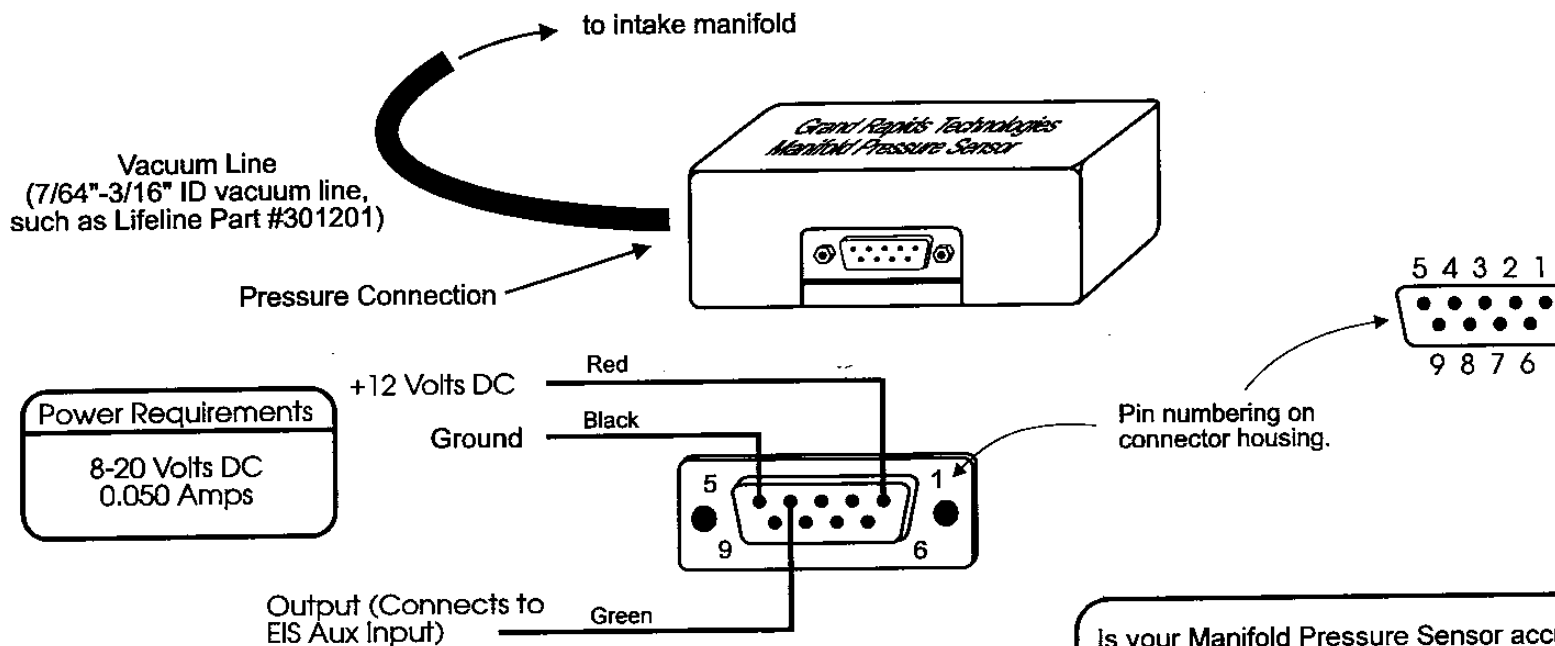
o If the auxiliary input includes a decimal point, the pressure displayed will be 1/10 of actual. For example, 35 psi will be displayed as 3.5 psi.

o See reverse side for troubleshooting information.

## Use of VDO 80 and 15 psi Pressure Senders with EIS Auxiliary Input\*

\*Note: This sheet is not required for oil pressure, as the instrument includes a dedicated input for oil pressure. This sheet is used when a pressure (such as fuel pressure) is being sensed through one of the auxiliary inputs.

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**Notes:**

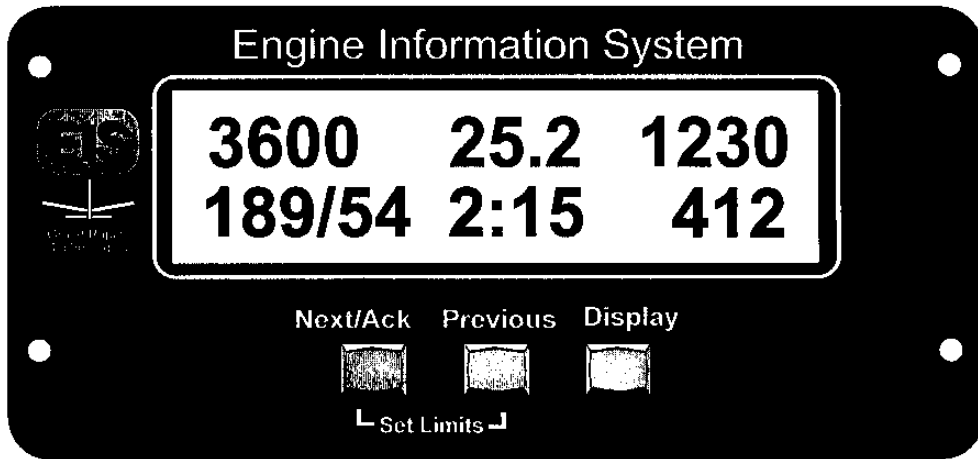
1. Mount the Adapter to avoid water, fuel, and extreme heat. The sensor should not be mounted in the engine compartment.
2. Turn off power to the adapter when not in use to avoid discharging the aircraft's battery.
3. Set the Auxiliary Scale Factor and Offset (AuxSF and AuxOff) as shown on label of sensor. These numbers are entered into the EIS on the configuration set pages, and are identified on these pages as AuxNSF and AuxNOff, or NSF and NOff, where N is a number identifying which auxiliary input it applies to. (For example, if the MAP sensor is wired to Auxiliary input 1, you will need to set Aux1SF and Aux1Off, or 1SF and 1Off, to the values shown on the label of the MAP Sensor.
4. In some cases, depending on the engine, and many other variables, the manifold pressure display may fluctuate up and down as much as an inch of mercury. This can be eliminated by installing an orifice with a hole drilled by a #70 bit in the manifold pressure vacuum line near the engine. This restriction provides a filtering effect, and prevents an air leak if the vacuum line was to fail any place after the orifice.
5. With the engine not running, the instrument will show a pressure reading equal to the altimeter setting less the 1" of mercury for every 1000 feet above sea level. For example, if the altimeter setting is 29.70, and your airport has an elevation of 700 feet, the correct reading for manifold pressure will be 29.0 with the engine not running.
6. The MAP-02 includes an Auxiliary Scale Factor and Offset for both a 2 digit reading (for displaying the pressure with a 1" of mercury resolution), and a 3 digit reading (for displaying manifold pressure with a 0.1" Hg resolution).

Is your Manifold Pressure Sensor accurate?

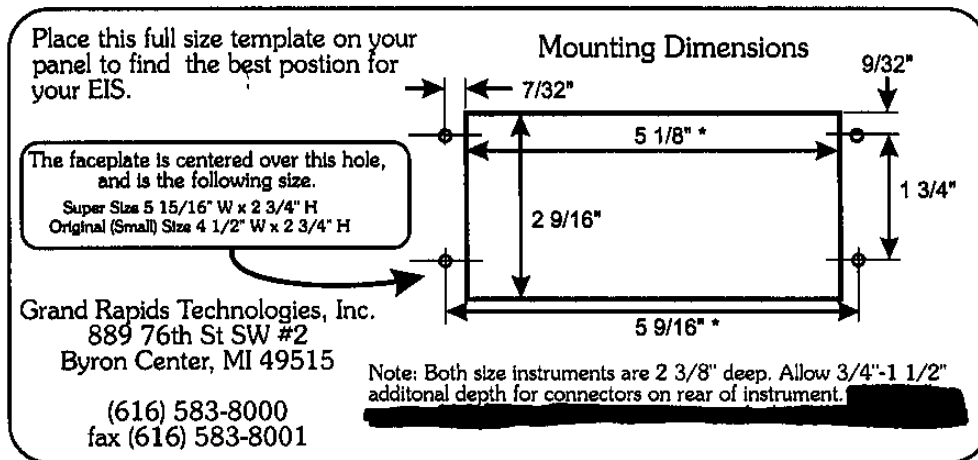
The manifold pressure reading will not be equal to the altimeter setting unless you are at sea level. See note 5 to determine the correct reading based on your field elevation and the current altimeter setting!

**Manifold Pressure Sensor**  
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# SUBARU ENGINE SETTINGS ONLY

EIS SETTINGS:			Readings During Flight Operations:		
PARAMETER	MINIMUM	MAXIMUM	TAXI	CLIMB	CRUISE
OIL PRESSURE	15PSI	90PSI	40PSI	70PSI	65PSI
FUEL PRESSURE	28PSI	40PSI	30PSI	36PSI	36PSI
OIL TEMPERATURE	0F	220F	120F	210F	185F
COOLANT TEMP.	0F	230F	150F	220F	200F
GEAR DRIVE TEMP.	0F	210F		190F	170F
VOLTAGE	11.5V	16V	13.8 - 14.4V	13.8 - 14.4V	13.8 - 14.4V
MANIFOLD PRESSURE	0"	34"	8-12"	34"	34"
PROP RPM	700	3000	750	2670	2300