Instrument is Dead

First determine if the instrument is getting any power. If the backlight is on, or the warning light comes on when pressing the left and center buttons, it IS getting power. (If the instrument is not a 2000, 4000 or 6000, the warning light will flash when the instrument is turned on also.) Note: The backlight is almost impossible to see under bright or outdoor conditions. Shield the instrument from bright light, and watch the display carefully when turning it on to determine if the backlight is working.

If the instrument is NOT getting power.

It is very rare for the instrument to be completely dead due to an internal failure. Most likely you will find that power is not being provided to the EIS due to an open circuit in the aircraft wiring, or the 4.8 volt excitation output or +12V fuel flow power output is grounded. This can be tested to disconnecting the 4.8V and 12V fuel power power outputs from the EIS, or by making a test cable that includes just the power and ground connections only, and use this to provide power directly to the instrument. Very often this test cable will confirm that the instrument is working properly, and will allow you to focus on your aircraft wiring with the knowledge that the problem is truly not in the instrument itself.

The only observed failure mode of the EIS that we have seen that causes it to be completely dead can occur if the instrument is plugged in, and a wire with 12 volt power on it touches the case of the EIS. This can burn out a circuit board trace inside the instrument. If this is case, a separate ground wire can be run to the case of the instrument to bypass this open. Often this will cure the problem. The instrument can then be used until such time as you wish to return it for repair. The repair is normally inexpensive.

If the instrument IS getting power.

If the instrument is getting power, but the display is blank, it is usually caused by either low voltage, or an incorrect contrast setting. The battery voltage should be checked to see if 12V or more is being supplied to the instrument. If not, charge your battery so that 12V or greater is supplied to the instrument. The display will begin to lighten as the voltage drops below 12V, and will typically disappear at about 10V depending on the temperature and contrast setting. Under cold conditions, with contrast set to a low value, the display could be clear at voltages as high as 11.8 volts.

The second reason for an loss of the display is that the contrast is simply set too low. A contrast setting of 0 or 1 is required at high temperatures (above 100 deg F), but will make the display hard, sometimes almost clear, at lower temperatures. To change the contrast, press and release the left and center buttons at the same time, then press the right button once. You are now on the contrast page. Press the left button to increase contrast. (This is not necessary with models 2000,4000,6000 as they automatically set the contrast, as does the Standard EIS with altimeter models with software version 8.5 or 8.6.

Instrument occasionally locks up or has erratic operation

Instrument locks up -- Stops working, but the backlight is still on. (The backlight can be hard to see in the daylight…you have to look very carefully.) The display may be visable, but frozen, or there may be nothing on the display.

This is usually caused by power interruptions to the EIS, and only affect the Model 3 version of the EIS (which is about 20 years old and can be identified by its two 9-pin d-sub connectors. This is usually caused by a loose electrical connection for power or ground. Often it will occur most often when taxing on grass or at landing since this tends to shake the wiring and flex the airplane the most, inducing the problem. Problems like this can be difficult to find because the problem does not exist all the time. The best techniques to find them are to turn the instrument on and move the wiring while an observer watches the instrument. You may be able to induce the problem in this manner, and locate its source.

Another method for solving this problem is to temporarily connect the power directly to the instrument from the battery (a separate test cable is used in place of the cable in the airplane). Fly the airplane to verify this has cured the problem. If it doesn't, the problem is in the instrument. If it does cure the problem, then move the connection from the battery to a place in the aircraft wiring that supply's power to the instrument. This tests the wiring between that point, and the battery. If that works, progressively move your test wires to connections further and further away from the battery along the connections that normally feed power and ground to the instrument until the problem is found.

Instruments manufactured after December of 1999 include a reset circuit that prevent the instrument from locking up due to power interruptions (although the flight timer will reset to 0:00:00 each time power is interrupted).

Oil and Coolant Temperature Troubleshooting - VDO Type Sensor (Single wire connection.)

Background

The EIS uses thermistor-type fluid temperature sensors. These sensors vary in resistance corresponding to changes in temperature. For all applications (except Lycoming/Continental engines, and older, Model 2 instruments), the EIS uses a VDO 300 deg F sensor with has one electrical connection to its body, and one to its top terminal. This sensor has a resistance of between 800-1300 ohms at room temperature. The EIS measures the resistance of the sensor via a 5-Volt excitation signal. This excitation is combined with the same pin that is used to sense the temperature.

Problem : Fluid Temperature always reads 59 F (14 C).

This is the minimum value the EIS will display for fluid temperature inputs. It will read this whenever there is an open circuit in the fluid temperature sensing circuit. This means that one of the following problems exists:

1. There is no connection between the EIS fluid temperature input, and the sensor. That could mean the wrong input is connected to the fluid temperature sensor from the EIS, or the connection is open. In cases where the connection is open, it is most commonly found that the problem is at the quick disconnect that attaches to the sensor.

2. The case of the fluid temperature sensor must connect to ground. It is possible that teflon tape used to seal the sensor can electrically insulate the sensor from ground, or the engine is not connected to ground.

3. The instrument you are using is requires a 2-wire type sensor. Only Advanced EIS-A, instruments with an "S" in the software version, and the older (Model 2) instruments require 2-wire sensors. (Advanced EIS-A(VDO) uses the single wire VDO sensor, not the two-wire type.)

4. There is a very very small chance the instrument or the sensor is faulty. This is very rare.

A simple test can be performed to determine the source of the problem. Disconnect the wire going to the top of the sensor. Touch this wire to ground. With this wire shorted to ground, the EIS should register over 300 F (150 C). If it does, the sensor is either bad, or is not electrically connected to ground, as described in #2 above.

If the EIS still reads 59 F (14 C) with the input connected to ground, the problem is as described in #1 above.

Problem : Fluid Temperature always reads above 300 F (150 C).

This is cause by a short to ground. Disconnect the wire from the sensor. If the problem goes away, it indicates a bad (shorted) sensor. If the problem persists, it indicates that the connection to the EIS is shorted to ground.

Problem : Inaccurate Fluid Temperature Readings.

The most likely cause of this problem is simply that the instrument is operating in Celsius instead of Fahrenheit, or vice versa. The only cause of this would be the incorrect sensor is being used. (It must be a 300 deg F VDO sensor). It is very unlikely that the instrument of the sensor has become inaccurate, although it is possible. (We have yet to have one case in the first 2000 instruments). The accuracy of the sensor can be check by placing it it boiling water. A ground wire must be connected to its body while performing this test. It should register 212 F (100C) within a few degrees.

Problem: Fluid

Fuel Flow - Troubleshooting

Overview

The flow sensor provides an open/ground output that the instrument detects via a 5V pull-up through a resistor. The output from the flow sensor is a square wave that varies in frequency according to the flow rate.

The fuel flow connections are electrically protected inputs. The instrument is very unlikely to experience a failure in this circuit. The most likely cause of any problem associated with the fuel flow function is the wiring to the flow sensor, an incorrect FloCal entry, or a blocked flow sensor paddlewheel. Flow sensor failure is possible, and although more likely than a failure internal to the instrument, is not very likely.

Fuel Flow Reads 0.0 at all times.

1. Verify the FloCal entry on the combination set pages is not set to a value of zero, or near zero. It should be approximately 200 when using the FloScan fuel flow sending unit, and about 83 with the EI red cube.
2. Visually inspect the electrical connections to the flow sensor. Verify that the cable that plugs into the pigtail from the rear of the EIS is fully mated. Also verify the electrical connections from this cable to the flow sensor are secure, and that the wire colors are matched.
3. A voltmeter can be used to verify the electrical connections. 9-12 volts should be present between the black and red wires in the cable connecting to the flow sensor. Make this measurement at the flow sensor. (No voltage at the flow sensor suggest a broken wire.)
4. A test signal can be created to determine if the EIS is operating normally. This is accomplished by disconnecting the white wire from the flow sensor. This wire is then repeatedly touched to a source of electrical ground. This should cause the EIS to show a fuel flow of something greater than 0.0. If this test fails, check the electrical continuity of this wire connection to the EIS. If this test again fails, this suggests a failure in the EIS. If it passes, it suggests a possible malfunctioning flow sensor.
5. Re-connect the white wire to the flow sensor. Remove the fuel line connections to the flow sensor. Inspect for debris that could cause the paddlewheel inside the flow sensor to be stuck. Back flush the flow sensor. If no blockage is found, and all other tests passed, the flow sensor is faulty.

Flow Rate is too Low

Flow sensor is partially blocked. - Clean the flow sensor.

Pulsation Dampener may be required if one of more of the following symptons are noted.

Fuel Flow is erratic
The flow rate is too high (or a FloCal entry of less than 140 is required to calibrate fuel flow).
Fuel flow may changes when an auxiliary pump is turned on or off.

This can be caused pressure pulses in the fuel line. It is most commonly seen on airplanes which use mostly metal fuel lines. A pulsation dampener can help with this problem. The damper can be constructed by installing a tee in the fuel line, running 1-2 feet of fuel line off the tee, and capping the end to trap air in this line. The tee can be positioned anywhere in the fuel system after the fuel pump.

The use of a pulsation dampener tends to help, but ultimately does not usually completely cure the above problems. In our experience we see about 1-2 gallons per hour caused by the action of the electric fuel pump with carburetorated engines. The net effect is that this causes the totalizer to be slightly lower than actual, but by a small enough amount that we don't feel it is worth the effort to include a pulsation dampener in most installations. (For example, leaving the fuel pump on for 15 minutes will result in a fuel totalizer that shows 0.25-0.5 gallons less than actual.)

Fuel Pressure via Aux Input– VDO

Overview

The VDO pressure sending unit converts a pressure into a variable resistance output. The sender is wired to the EIS in so that the 4.8V sensor excitation output provides a regulated voltage through a resistor to the sending unit. The variable resistance of the sending unit cause the voltage to vary across its terminals. With no pressure applied, the sensor will have about 10 ohms resistance. With increasing pressure, the resistance increases.

Problem: The fuel pressure reading is zero.

Verify the sensor is wired correctly by temporarily setting the following items on the configuration set pages as follows:

1. Set the forward/reverse sensing to forward (+ on the options page for the input the fuel pressure sender is connected to.)
2. Set the AUXSF to 250
3. Set the AUXOFF to 0

The auxiliary display will now show the voltage present on the auxiliary input line. (This assumes the aux input is the type that has a decimal point in its display. If the aux input you are using does not have a decimal point in it, such as on the standard EIS or Aux2 on the advanced EIS, the display will show 10x the actual voltage. That is, it will show 3.4 V as 34.)

If the auxiliary display is showing a voltage between 0.1-0.2 volts, the sensor is wired properly, and everything is correct. Either less the 1 psi is being provided to the sending unit, or the sending unit is defective.

If the aux input is showing a voltage of 0.0, there is an open connection between the 4.8V excitation (pin 1 of connector A) of the EIS, through the resistor, or to the sensor itself, or the connection from the aux input to the sensor is open circuit, or shorted to ground. (Another voltmeter may be used to check if there is about 0.1-0.2V across the fuel pressure sender. If 0.1-0.2V is present, the connection to the auxiliary input is open. If there is 0.0V across the sender, there is an open between pin 1 of the EIS, through the resistor, to the top of the sending unit.)

If the auxiliary input is showing about 4.8 volts, check for no ground connection to the sensor. The case of the sensor must make an electrical connection to ground.

If the auxiliary input is showing greater than 4.8 volts, there is a problem in the wiring of the airplane. Possibly 12V is being used instead of the 4.8V that should have been used from pin 1.

When completed with the troubleshooting, reset the auxiliary input as follows:

1. Set the forward/reverse sensing to forward (+ on the options page for the input the fuel pressure sender is connected to.)
2. Set the AUXSF and AUXOFF according to the sheet “Use of VDO 0-30 psi Pressure Sender with EIS Auxiliay Input”

If you are unable to determine the problem, record the reading you found while performing the above steps, and contact Grand Rapids Technologies, Inc.

Tachometer

Overview: The tachometer measures the engine RPM by determining the frequency of the tachometer signal from the engine. This information is combined with the pilot's entry of EMP (which is set according to the number of tachometer pulses per revolution of the engine) to allow the EIS to calculate engine RPM.

In general, 4-stroke engines like Lycoming, Continental, Rotax 912, Subaru, etc, will provide a dedicated tach signal, or a something almost as good (like the p-lead from a mag). Tachometer sensing from 2-stroke engines and HKS generally require that the lighting coil be used both as a tach source, and to charge the aircraft battery via a regulator/rectifier. Some 2-stroke engines will have other signals that could be used as a tachometer source.

Lighting Coil Equipped Engines (2-stroke engines, HKS, Jabiru etc.)

The switching characteristics of the regulator/rectifier is highly dependent on its type, the design of the lighting coil, the battery and its state of charge, the electrical load on the engine, and the engine RPM. Regulator/rectifiers generally operate by shorting the power input to them (the lighting coil leads) to control charging and thus regulate. Since the lighting coil is also used as the tach source, there are situations where the tachometer signal can be affected.

Generally, if the tachometer reading is not erratic, and the EMP setting is correct, the tach will be accurate.

Problem : Tachometer display is erratic at all or some engine RPMs.

Lighting Coil Equipped Engines with Batteries charged by lighting coil and regulator/rectifier.

This is most commonly caused by the switching characteristics of the regulator/rectifier. The lighting coil can not be used for tachometer connections with Key West regulator/rectifiers. For Tympanium single and three-phase regulator/rectifiers, this problem can be cured by moving the tachometer connection to the other regulator/rectifier lighting coil input, or in some cases, reversing of the lighting coil leads to the regulator/rectifier. This can also be cause by an EMP setting above 9 for an Advanced EIS. EMP settings above 9 are invalid for the Advanced model EIS.

Rotax Two-Stroke Engines : The gray tach lead will often give erratic tachometer readings around mid-range power, when the lighting coil is connected to a battery via a regulator/rectifier. Installing a 10k Ohm resistor inline between the gray tach lead and the tach input to the EIS will cure this problem. (This resistor is included in the parts pack, and is available at no charge from Grand Rapids Technologies. - Not required for model 2000/4000/6000 instruments as it is internal to the instrument.) The gray tach lead will not give a good tach reading when one of the two mags is turned off, as the signal on this wire comes from one of the mags, but other than this drawback it works no matter what is happening to the lighting coil.

Rotax 912/914 : On about 1 engine in 10, the tach reading from the dedicated tach output will be erratic. This is cured by reversing the two tach output wires from the engine, or installed a 10k Ohm resistor (1/4 W or larger) inline in the tachometer lead.

Lighting Coil Equipped Engines in airplanes without batteries.

When using the Tympanium 3-phase, or Key West regulator/rectifier, the lighting coil leads can not be used for sensing the engine RPM. On Rotax engines, the gray tach lead must be used. On some Rotax engines, erratic tach readings will be experienced at high rpm. In these cases a 10k Ohm resistor (included in the parts pack) is required. It is OK to use this resistor even if your tach readings are not erratic.

For Hirth engines, the spare, small lighting coil must be used for sensing engine RPM. Ground one side of this coil, and connect the other directly to the tach input of the EIS. The EMP must be set to 60.

Advanced (4-Stroke) EIS models :

Problem : Tachometer is inaccurate, reading a fixed percentage too high or low at all RPMs, although it is steady.

Almost certainly you have the EMP set incorrectly. When sensing engine RPM via the mag P-lead, it is common for a mag to generate ½ as many pulses you expected. (A mag for a 4-cylinder engine, would be expected to produce 2 pulses per revolution, but it might produce only 1.) Try changing the EMP setting accordingly.

Problem : Tachometer reads 0 at all times.

All Engines --

This is caused by no tachometer signal from the engine, or by an open circuit to the tachometer signal from the engine, or an EMP that is set to 0 on a Standard (2-stroke) EIS model instrument. Check you wiring to be sure you have a good connection to the EIS tachometer input.

When using the lighting coil as a tachometer source, a failed regulator/rectifiger can short out the lighting coil and causes a loss of the tachometer signal. A simple way to see if this is the case is to run the engine and observe the battery voltage using the EIS Volt display. If the voltage is 12.8V or less, the battery is not charging. Fix the charging problem and the tachometer problem will also be fixed. The charging problem can be caused by a bad regulator/rectifier, or wiring problem between it, the engine's lighting coil, or the battery.

A simple test is to disconnect the tach wire from the engine. Using **the tach lead to goes to the instrument**, tap this on and off onto a source of 12V power. This should cause the EIS to show some tach reading other than zero. If it does, the EIS is most likely working correctly. (This test will not work if any tach resistors are installed in the tach lead that are greater than 27k ohm.) If you are unable to get a non-zero tach reading while performing this test, perform a continuity test (using a test light or ohmmeter) to verify the wiring from the EIS connector to the end of the tach lead is good.

Rotax 914 (does not apply to Rotax 912) The tachometer output passes through the turbo control box. The tach output from this box is polarized (although Rotax fails to note this) so that it will only work when connected in one of the two possible ways. If you do not get a tachometer reading on a Rotax 914, reverse the tachometer connections.

For Rotax 2-cycle engines, a zero RPM reading can be experienced when using the gray tach lead during the Mag check. The gray tach lead is a tap off the coil used to power one of the mags. When this mag is shut down, the tach signal is reduced, and may be unreadable by the instrument. In some cases performing the mag check at 3500 RPM or higher may allow a tach reading to be made.

Note: For instruments which include an "EMP" setting (these are model 3, 2-stroke or Standard instruments), an EMP setting of zero will cause a tach to read zero at all times. Set the EMP according to the maual (typically 20 for Rotax CDI, 60 for all else.)

Serial Data

Serial data communication problems can require some trial and error to correct, as there are many possible problems that can give the same symptoms. The serial port in the EIS is used by the factory during the instruments manufacture, asssuring that it is functional when it leaves our factory. The port could be damaged if 12V power is connected to this output however.

Symptom -- Unable to recieve data from the EIS. (No data shows up on the computer screen when running the data collection program.)

1. Be sure the instrument is turned on, (it can be on any display page, including the "Set" pages) the serial data cable is connected to the PC, and the PC is running the data collection software with the correct COM port being specified. If you experience serial data problems it is often necessary to re-boot the PC to restore the serial port for normal operation.

2. Use a voltmeter to verify data is present at the 9-pin d-sub connector that plugs into the PC. To do this, connect the black lead (-) of the voltmeter to the signal ground pin (pin 5) and the red lead (+) to the Rec Data pin (pin 2). A fluctuating voltage between 0 and 6V or so should be observed. Move the red lead (+) to the Data Set Ready Pin (pin 6). A voltage of 5-12V should be observed on this pin. This voltage should be steady. (Not all computers required the Data Set Ready Pin connection, although it is advisable to make this connection.)

3. Verify the serial port being opened is correct. The data collection software prompts for which serial port is to be used. You may find that the correct port will cause the error message "Device timeout in line ..." when the cable from the EIS is not plugged into the computer, although this may not always be the case. The serial port may also be tested by connecting it to other devices (such as an external modem) to verify it functions properly.

See also the Readme file for the serial data. This has a detailed troubleshooting procedure.

Oil Pressure

Overview - The EIS measures oil pressure via a variable resistance oil pressure sending unit. The sending unit varies its resistance between its terminal and its case (which is a connection to ground). Its provides 10 ohm resistance at zero oil pressure, and about 1.2 ohms per psi (or about 100 ohms at 75 psi) for the 150 psi sending unit. The 80 psi (5 bar) sending unit is about 2.4 ohms per psi (or about 100 ohms at 38 psi).

Advanced EIS models (these can be identified by their two 9-pin connectors) include an OilZero setting. This can be used to account for an offset in the oil pressure sending unit. This setting should normally be 0. Set it to 0 before proceding further.

Problem: Oil Pressure displays 99 psi at all times

This indicates the electrical connection between the instrument and the sensor is open circuit. This is most likely caused when the wrong wire in connected to the oil pressure sending unit (so that the actual oil pressure input is unconnected). To verify you have a good electrical connection to the instruments oil pressure input, remove this wire from the oil pressure sending unit and touch it to the case of the engine (which should be ground). The oil pressure reading should read 0 psi. If it does, the instrument and the wiring to it is good, and the sensor, or its connection to ground is bad. (Note: It is possible for teflon tape applied to the threads of the oil pressure sending unit to electrically insulate it from ground. Do not use teflon tape to seal the oil pressure sending unit.

If the reading does not go to zero when the oil pressure wire is shorted to ground, use a continuity tester or ohm meter to verify a good electrical connection from the connector that plugs into the instrument to the end of the wire where it attaches to the oil pressure sending unit. It is very rare for the instrument to have a failure such that it does not read oil pressure correctly.

Problem: Oil Pressure displays 0 psi at all times

Verify the connection between the instrument and the sending unit is not shorted to ground by disconnecting the wire to the oil pressure sending unit. If this causes the oil pressure reading to read 99 psi, there is no short in this wire. If it remains at 0, this wire is shorted to ground.

If there is no short in the wire, either the oil pressure is actually 0, or the oil pressure sending unit is failed.

Problem: Intermittent Oil Pressure Fluctuations

This either an intermittent electrical connection (intermittent short if the pressure drops, or intermittent open if the pressure increases), or the engine's oil pressure is actually fluctuating. Although theoretically possible, it is very unlikely the instrument itself is the source of this problem.

All EGT & CHT Readings are Erratic

The ground wire to the EIS must connect to the case of the engine. If this wire is missing, all or most EGTs and CHTs will be erratic, and the tachometer may be affected.

All EGTs & CHTs Read too high or two low

If this is an external cold-junction version, this can be caused by a bad reading on the OAT probe. If the OAT probe reads 20 degrees too high, so will the EGTs and CHTs.

EGT Troubleshooting

EGT reads about 1/2 of expected reading

Instrument is in deg C mode (other temperature readings will also be affected.
Probes are inserted too far into manifold and are touching the other side of the manifold.

Erratic EGT or CHT Reading

An open connection to one lead of the probe, or an open in the probe itself will often cause an erratic reading. A simple way to check for an open is to remove the d-sub connector from the instrument. Refer to the EIS manual to identify the EGT and CHT probe connections to this connector. Using a volt/ohm meter set to ohms, touch one meter lead to ground, and check each of the EGT/CHT pins to see if any of them are open circuit. Since the EGT and CHT probes are grounded type probes, each EGT and CHT leads should register very close to zero ohms to ground (any reading less than 20 ohms is good). Typically the open circuit will be found at the quick-disconnect on the probe itself, or where the probe plugs onto the extension wire.

In very rare circumstances the case of the engine may not be grounded. This is practically impossible if the engine includes an electric starter (unless the ground cable to the engine has broken). For engines that do not have an electric starter, the case of the engine must be tied to ground. Measuing the DC voltage between the case of the EIS and the engine should show less than 0.050 volts (50 mV), although up to 0.5V is acceptable when all electrical systems are tuned on in the airplane. With the airplane's electrical system off, the resitance between the case of the EIS and the engine should be less than 1 ohm.

EGT Probe Positioning

Position EGT probes 2-8 inches from the edge of the manifold for 4-stroke engines. It is not critical on 4-stroke engines.

Position EGT probes as recommended by the engine manufacturer for 2-stroke engine. It IS critical for these engines. If the manufacture does not specify, 4 inches from the edge of the piston (not the edge of the manifold) is a good rule-of-thumb.

Sharing EGT and/or CHT Probes with other gauges

No probes which connect to the EIS can be also connected to an analog gauges. They will interact and cause inaccurate readings. It **may** (not always) be possible to share the same probe with another electronic instrument.

The tachometer signal and the voltmeter can be shared.

MAP Sensor

Always reads the same value and is too high.

Ground may be missing. To test, turn on the power to the instrument and MAP sensor. Using a voltmeter, touch the black lead to the ground for the airplane. Touch the red voltmeter lead to the metal part of the d-sub connector of the MAP sensor, with the connector plugged into the sensor. You should measure less than 0.020 volts (20 mV). If you measure something in the range of volts, the ground is missing.

Airspeed

Symptom - Airspeed does not register above 50 mph (40 knots) or so.

Cause - Pitot and Static Port Connections are reversed.

MAP Sensor

MAP will display absolute air pressure. At sea level, it will match the altimeter setting. For every 100 feet above sea level, it will read 0.1" less than the altimeter setting.

Typical readings at idle are 14-20". Cruise 24-26".

Problems:

Reads very low all the time. Does not change. - Scale factor is zero

Inaccurate and too low, but changes with changes in pressure. - Scale Factor and Offset not entered.

Reads correct when engine not running, but too high with engine running. - Leak in hose connection to the MAP sensor at the sensor. Ok to use a wire tie to secure this connection.

Warning Light

Warning light does not come on. - This can be verified by going to the set limits pages. While on a set limits page, the instrument will turn the warning light on steady. The warning light will also flash on for about ½ second or so when the instrument is turned on.

Possible causes

Wiring to the warning light is open circuit - Disconnect the d-sub connector which included the warning light output. Turn on the power, and measure the voltage on the pin in the cable for the warning light. 12V power should be present on this pin. If it is not, the wiring to the warning light is open circuit, or the bulb is bad.

Warning light is burned out. Test light by applying 12V power to one terminal, and ground to the other. The light should illuminate.

If the above tests are OK, the warning light may be drawing too much current. The instrument will not turn on the warning light if it draws more than about 120 mA. Replace the warning light.

Warning Light is Always On -

If the warning light flashes when the instrument is turned on, this indicates the warning light is being properly controlled by the instrument. In this case, the warning light will be on steady if an alarm is active, and has been acknowledged, or when on a set limits page. (Remember that the warning light will be on steady when on as set page.)

To identify the which alarm is causing the warning light to remain on, turn the instrument on, allow about 10 seconds for the instrument to initialize, ***and without pressing any buttons***, note the label on the display below the flashing number. Press the left button one time, and note if any other flashing numbers appear, and if so, note the label below the flashing number. Check the limits associated with these items. When reviewing the limits you have set, note that some limits are upper and some are lower, and the carb temp is actually a range between upper and lower. Also note that on older instruments (those with 9-pin d-sub connectors), some instrument only included one voltmeter limit…this being a lower limit.

Warning Light never flashes when the instrument is turned on - This indicates the instrument is not receiving power (in which case it will not be operating), or the warning light connection between the instrument and the warning light is shorted to ground, or the instrument has a faild warning light output. To test, turn off power, and disconnect the cable from the instrument that incudes the warning light connection. Re-apply power. If the warning light remains off with the instrument disconnected, but comes on steady when the instrument is connected, the instrument has a failed warning light output. (This is very rare, as the warning light output protects itself from damage due to most electrical faults.) If the warning light remains on when the cable is disconnected from the instrument, there is a short to ground of the warning light output wire in the aircraft wiring.

Ampmeter Troubleshooting

The amp sensor is powered by the 4.8V output from the EIS. The sensor will provide half of this voltage (about 2.4V) when no current is being sensed. The voltage will increase about 0.015V for each amp that is sensed. The amp sensor should be wired and the EIS configured according to the sheet, "Hall Effect Current Sensor".

Testing the Amp Sensor

Amp sensor mounted on the battery cable - With the engine off, and no battery charger connected, verify the amp meter reading changes as various electrical loads are turned on or off.

Amp sensor mounted on the alternator cable - The ampmeter should read close to zero (+/- 2 amps) when the engine is off. When the engine is on, the ampmeter reading will show the current used to charge the battery, and to run the electrical system of the airplane.

Ampmeter always reads zero, or close to zero.

The sensor is physically damged. Visually inspect the sensor to see that the sensor is intact.

This reading is normal when the sensor is mounted in the cable going to the battery. In this configuration you will only see a significant indication when the engine is not running and there is a significant electrical load on the battery. When the engine is running it will provide the electrical power, and the only power going into the battery will be the power necessary to keep the battery charged. If the battery is already charged, the current required may be less than 1 amp.

Ampmeter reads a very low value.

The aux input to the amp sensor is unconnected, or the amp sensor is wired to a different aux input.

Ampmeter reads a very high value.

The ground wire to the amp sensor is unconnected. It is also possible a different aux input has more than 6V applied to it, and it influencing this aux input also.

Ampmeter reads a value that is incorrect (too high or too low).

The EIS aux input is not configured correctly.

The ground voltage is changing between the EIS and the sensor. Ideally the