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## FP-100 Operations and Installation Manual

This manual is certified for use with  
instrument serial number

**ASL000000**

Use of this manual with any other  
instrument voids all warranties and may  
result in damage to the instrument

# READ THIS FIRST

Congratulations on the purchase of your FP-100 Fuel Pressure and Ammeter Indicator. This instrument is a complex precision instrument manufactured to exceed Airborne Equipment Standards DO-160D, DO-178B and TSO C47 standards. In order for your instrument to function correctly you will need to review the instructions in this brief manual.

This document covers the following instrument models:

- FP-100 Fuel Pressure and Ammeter Instrument

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**FP-100 Operations & Installation Manual – Ver. 1.2 – June 6, 2003**

## 1. Introduction

Your FP-100 Fuel Pressure and Ammeter Indicator will provide you with years of reliable service and generally outlast the life of your aircraft. The instrument is constructed from the highest quality components and has a design life in excess of 100,000 hours.

It is the most reliable instrument of its kind. Gone are the days of questioning the accuracy or operation of the instrument. No stuck needles, erroneous readings or instruments that keep you guessing as to their operational status.

Every reading you will see displayed on your instrument has been validated at least 256 times before you see it. This all happens in less than a second. When you see the result you know the instrument is functioning correctly as it is monitored by an independent microprocessor just to ensure that it is functioning correctly. In turn the main processor validates the independent monitoring processor. Any failure detected in either processor and your instrument display will be shut down or an error message displayed – depending on the failure status.

## 2. Display

In the normal operating mode, the main display of the instrument displays a graphical representation of the pressure and dc current status relative to the defined limits set by the user. The lower four-digit seven-segment display provides a mathematically computed display of the selected parameter.

“F M S” switch. Selects pressure, ammeter, voltmeter and set functions

Ammeter bar. Displays charge and discharge current relative to defined limits

When lit, indicates that the pressure is displayed on the digital display

Pressure bar. Displays pressure relative to defined limits

Digital display. Displays pressure in PSI, current in Amps, voltmeter and intensity select options



When lit, indicates that the current is displayed on the digital display

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### 3. Sender Installation

#### **WARNING:**

**Your aircraft fuel system is a life critical system. Installation of the fuel pressure transducer will cause serious hazards if not performed correctly. We recommend that this installation be installed by a competent person.**

#### **NOTE:**

In order to complete this installation you must have a working knowledge of the specific aircraft engine and fuel system that this instrument will be installed on. You must be able to locate and identify the existing pressure sender (if installed) and have the necessary tools to remove it as well as install the new item.

For installation on certified aircraft, this installation may only be performed by properly licensed personnel or competent persons under supervision of such licensed personnel, where applicable law permits.

#### **Pressure Transducer Installation**

**DO NOT INSTALL THE PRESSURE SENDER DIRECTLY ONTO ANY PORTION OF THE ENGINE.**

We recommend that the pressure sender be mounted on the firewall, away from heat and electrical sources. For the replacement of existing fuel pressure instruments where fuel lines are in the inside of the cockpit the fuel pressure transducer may be mounted in an appropriate location and connected to the existing fuel pressure line.

The pressure transducer has a 1/8" NTP fitting. Once mounted, connect the pressure port to the engine fuel pressure port or fuel line with an appropriate, flexible line (installer to supply). Note: It may be necessary to install an appropriate T should the aircraft fuel system not have a pressure take-off. Do not over tighten the flexible line / pressure transducer connection!

Attach the signal connector to the transducer. It is polarized and can only fit one way into the transducer. Confirm that it snaps firmly into place.

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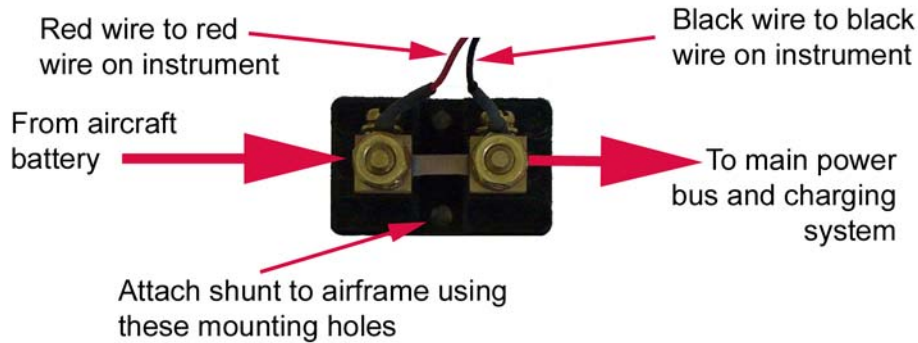
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**Ammeter Current Shunt**

Install the ammeter current shunt in the main power bus/charging system line. Ensure that the connections to the shunt are secure and that the shunt is mounted in a location where no other aircraft systems will come into contact with the connection points.



**4. Instrument Installation**

Ensure that the pressure and current senders have been installed PRIOR to installing the instrument. **See *Sender Installation for full details (Section 3)***.

The FP-100 will fit any standard 2 ¼” aircraft mounting hole. Place the instrument in the hole from the rear of the panel and then attach it with the four screws provided. If you need to replace the screws, ensure that the threads do not penetrate the instrument more than ½”. Screws that penetrate the instrument further will cause severe damage to the instrument.

**WARNING**

This instrument is a highly sensitive and accurate instrument, however without proper wiring and connections it is possible to induce errors.

**Please read and follow all instructions carefully to ensure proper operation.**

The instrument has been software calibrated and never needs recalibration.

Now connect the supply and dimmer wiring. These wires may be trimmed to any desired length.

- BLACK**            Aircraft supply ground
- RED**             Master switched 14/28V bus (Instrument is internally fused)

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<b>BLUE</b>	28V Dimmer control (if required)
<b>WHITE</b>	14V Dimmer control (if required)

Next connect the sender signal wiring.

### **BLACK and RED Twisted Pair**

For the current shunt, connect the black and red twisted cable pair to the corresponding black and red cable pair from the shunt. These wires are polarity DEPENDENT. Use the supplied crimp connectors for this connection.

Do NOT un-twist these cable pairs. They are designed to reduce signal noise.

Where possible do NOT strap the signal wiring to other aircraft wiring.

If you need to trim the shunt signal leads trim the black and red leads from the shunt and not those from the instrument.

### **BLACK, RED and WHITE Twisted Cable**

**NOTE: These wires are polarity dependant. Connecting them incorrectly will cause permanent damage to either and/or both the instrument and solid-state transducer.**

Connect the **BLACK** wire from the instrument to the **BLACK** wire from the transducer.

Connect the **RED** wire from the instrument to the **RED** wire from the transducer.

Connect the **WHITE** wire from the instrument to the **GREEN** wire from the transducer.

Do NOT un-twist these cable pairs. They are designed to reduce signal noise.

Where possible do NOT strap the signal wiring to other aircraft wiring.

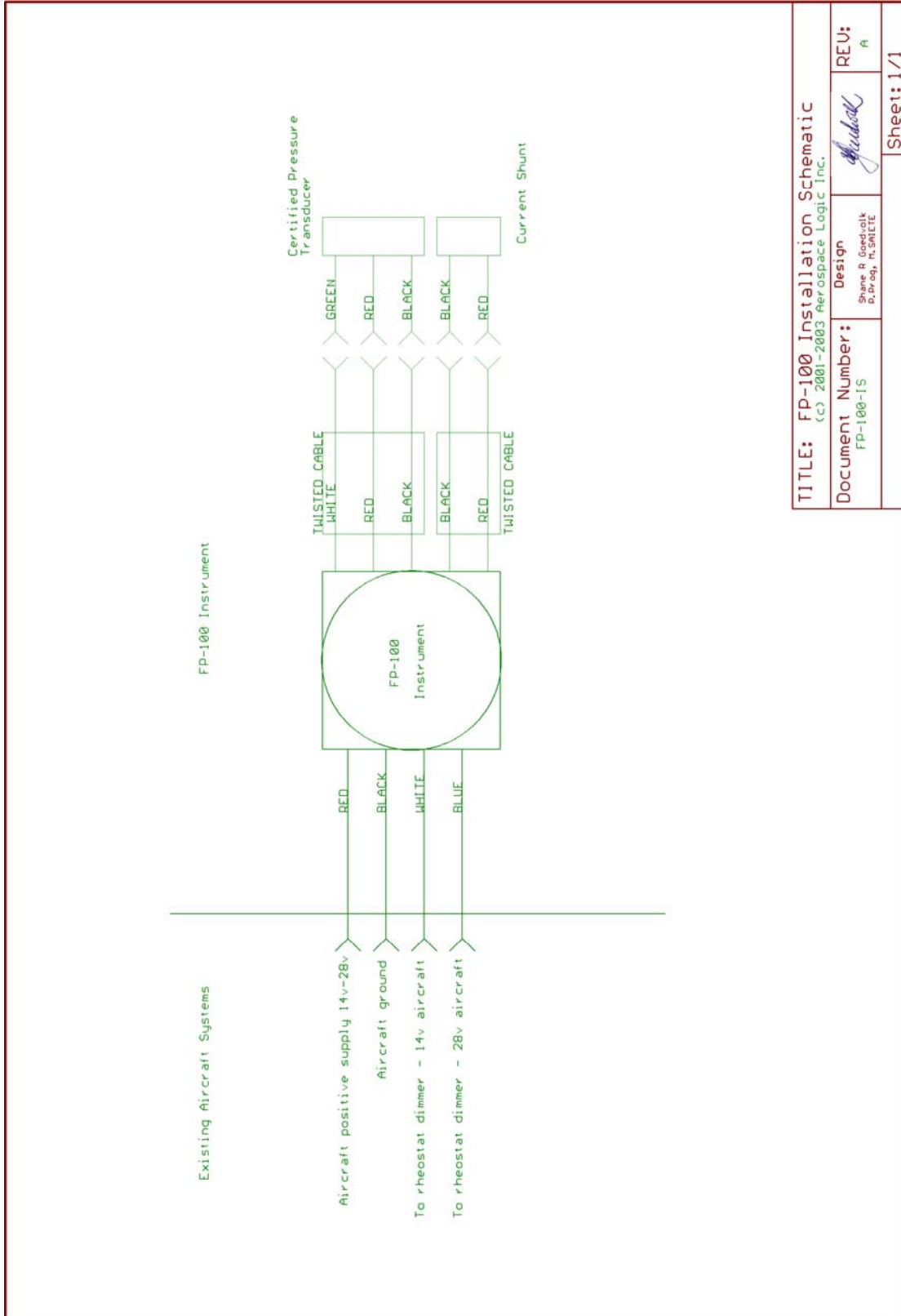
All wires may be trimmed to appropriate length.

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<b>TITLE: FP-100 Installation Schematic</b> (C) 2001-2003 Aerospace Logic Inc.		<b>REU:</b> A
<b>Document Number:</b> FP-100-IS	<b>Design</b> Shane R. Goedolk P. Eng., R. SAEITE	
		Sheet: 1/1

**5. Setup**

Once installed your instrument will require setup to match the specific engine and aircraft parameters as well as the user defined preferences.

Instrument setup is only required when a parameter or display configuration is to be changed. With proper planning you should only have to perform this function once in the life of the instrument. All information is stored in the instrument’s lifetime memory, which will be retained without battery power for up to 100 years.

To enter the setup mode ensure the power to the instrument is turned off. Then hold the “F M S” switch in the “S” position. Apply power to the instrument and hold the switch in this position until the **S.Et-** message is displayed.



**Current Shunt Value**

Now release the “F M S” switch to display the current shunt selection. The instrument will support 15A, 30A, 60A and 100A shunts that provide a 0mV-50mV output over their entire range. To toggle between the options, move the “F M S” switch to the “F” position and return it to the “M” position. Once the units of choice are displayed move the “F M S” switch to the “S” position and then back to the “M” position to save the selection.



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### Current Sensitivity Selection

Your aircraft electrical system will have varying loads at all times. At certain times these loads will vary a lot and at others not so much. You may set the sensitivity of the Ammeter portion of the instrument. You can choose to view current in 1Amp or 100mA steps. Moving the “F M S” switch to the “F” position and back to the “M” position will change the location of the decimal point in the “0.0” section. When in the “0.0” selection current will be displayed in 0.1A steps, ie. 10.6A. In the “00” selected mode current will be displayed in 1A steps, ie. 11A.

Unless you have a specific reason we recommend you initially set your instrument to the “0.0” mode and change it should you require. Once you have made your chosen selection move the “F M S” switch to the “S” position and then back to the “M” position.



### Brightness (Intensity) Source Selection

If the instrument has been connected to an external rheostat for intensity control then select the **External** option. Otherwise select the **Internal** option. Once you have made your selection move the “F M S” switch once to the “S” position and then return it to the “M” position.



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**Maximum Charge Alarm and Bar Range**

The ammeter bar display can be configured for any suitable operating levels, irrespective of the shunt value previously set, however it cannot be greater than 1Amp less than the maximum value of the shunt. Typically this value should be set at the maximum charge rate for your electrical system.

Move the “F M S” switch to the “F” position to change the value. When the correct value is displayed move the switch to the “M” position to halt the change. If the amp value displayed is correct then move the switch to the “S” position and back to the “M” position.

The minimum amount for the maximum charge current is 6 Amps.



**Maximum Discharge Alarm and Bar Range**

In the same way that the charge current levels are set, select the discharge current level. Note: Any electrical discharge will always be indicated in red.

The minimum amount of discharge current is 4 Amps.



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### Fuel Pressure Settings

There are three parameters required for the correct operation of the pressure section of the indicator. They are:

1. Minimum operating pressure (Step 1)
2. Maximum operating pressure (Step 2)
3. Redline pressure (Step 3)

In many cases engine and airframe manufacturers will specify the maximum operating pressure as the same value as the redline pressure.

**NOTE: If this is the case in your application use a pressure of (redline – 2 PSI) for the setting in Step 2**

#### Step 1: Minimum Operating Pressure Setting

The minimum operating pressure setting is the minimum operating pressure as specified by the manufacturer. Refer to your POH or engine manufacturer's handbook for this value.



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**Step 2: Maximum Operating Pressure Setting**

The maximum operating pressure setting is the maximum operating pressure as specified by the manufacturer. Refer to your POH or engine manufacturer’s handbook for this value.

In many cases aircraft and engine manufacturers will specify a maximum operating pressure as the same value as the redline pressure.

**NOTE: If this is the case in your application use a pressure of (redline – 2 PSI) for the setting in this step.**



**Step 3: Redline Pressure Setting**

The redline pressure setting is the redline pressure as specified by the manufacturer. Refer to your POH or engine manufacturer’s handbook for this value.



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**donE**

Once the redline pressure has been saved the display will now show the characters **donE** and the instrument will restart. At this point you have completed all the setup and configuration of the instrument and it is ready for service.



The “donE”  
message is displayed  
when setup is has  
been completed

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## 6. Operation

When power is applied to the instrument it will display the model number and a **tESt** message with the complete display lit. Immediately following this it will display the fuel pressure and ammeter information. This is the normal operating mode.

The fuel pressure and ammeter will be displayed on the bars irrespective of the position of the “F M S” switch, which determines the value displayed on the digital display.

### Ammeter Display

By moving the “F M S” switch to the “M” position the electrical current status will be displayed, in amps with the “-“ sign indicating a discharge, on the digital display.



### Fuel Pressure Display

By moving the “F M S” switch to the “F” position the actual fuel pressure, in PSI, will be displayed on the digital display.



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**Voltmeter Display**

To invoke the voltmeter function, move the “F M S” switch once to the “S” position and then back to the “M” position. The current line voltage will be displayed on the digital display.

**NOTE: Both pressure and ammeter bars will be OFF during this display.**

With both PRES and AMPS indicators off the instrument is in the voltmeter mode

The line voltage is displayed on the digital display



From the normal mode move the “F M S” switch once to the “S” position and then back to the “M” position to display the voltmeter

**Increase Intensity Function**

This display function will only be accessible if the internal intensity control has been selected during the instrument setup. If you are using an external rheostat to control the intensity this function will not be available.

The increase intensity function is invoked from either the ammeter or voltmeter display (depending on instrument options installed). To invoke this function move the “F M S” switch once to the “S” position and then back to the “M” position.

All displays lit indicates intensity set mode

Indicates increase intensity mode



Move the “F M S” switch to the “F” position to increase the intensity. Move to “S” position when done

Intensity value

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To increase the intensity, move the “F M S” switch to the “F” position. The intensity will increase slowly initially and then speed up. Once the desired intensity is reached move the “F M S” switch back to the “M”

If the instrument is left in this mode for more than 10 seconds it will return to the normal operating mode.

To move to the next function move the “F M S” switch once to the “S” position and then back to the “M” position.

### Decrease Intensity Function

This display function will only be accessible if the internal intensity control has been selected during the instrument setup. If you are using an external rheostat to control the intensity this function will not be available.

The decrease intensity function is invoked after the increase intensity function. To invoke this function move the “F M S” switch once to the “S” position and then back to the “M” position.



To decrease the intensity, move the “F M S” switch to the “F” position. The intensity will decrease slowly initially and then speed up. Once the desired intensity is reached move the “F M S” switch back to the “M”

If the instrument is left in this mode for more than 10 seconds it will return to the normal operating mode.


To return to the normal operating mode, move the “F M S” switch once to the “S” position and then back to the “M” position.

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7. FP-100 Specifications

<p><b>Dimensions:</b></p> <ul style="list-style-type: none"> <li>• Fits standard 2.25" mounting hole</li> <li>• 2.45" X 2.45" X 1.6"</li> <li>• 2" viewing area</li> <li>• Weight: 5oz (excluding wire bundle)</li> </ul> <p><b>Display</b></p> <ul style="list-style-type: none"> <li>• Custom design color bar display</li> <li>• Multi-color sunlight visible</li> <li>• InGaAlPGaN LED technology</li> <li>• 100,000 hours operating life</li> <li>• Analog and digital readout of temperatures</li> </ul> <p><b>Maximum Ranges</b></p> <ul style="list-style-type: none"> <li>• Ammeter: +/- 100 Amps.</li> <li>• Pressure: 0 PSI – 50 PSI.</li> <li>• Voltmeter: 6.0v to 32v</li> </ul> <p><b>Accuracy</b></p> <ul style="list-style-type: none"> <li>• Ammeter: 100 mA</li> <li>• Pressure: 1 PSI (Better than 2% of scale as per TSO – SAE AS408)</li> <li>• Voltmeter: 1/10 Volt over full operating range</li> </ul> <p><b>Safety</b></p> <ul style="list-style-type: none"> <li>• Color coded display of values</li> <li>• Visual high and low alarms for each function</li> <li>• Dual processor monitoring with one second error shutoff</li> <li>• Internal over temperature shutoff</li> <li>• Floating point mathematical computations for high accuracy</li> <li>• Minimum 256 times measurement validation before display</li> <li>• 1 second scan rate</li> </ul> <p><b>Operating Temperature</b></p> <ul style="list-style-type: none"> <li>• -15C to 55C</li> <li>• 5F to 131F</li> </ul> <p><b>Power Consumption</b></p> <ul style="list-style-type: none"> <li>• 410mA Max (daytime operation)</li> <li>• 60mA Min (nighttime operation)</li> </ul>	<p><b>Display Units</b></p> <ul style="list-style-type: none"> <li>• Ammeter: Amps</li> <li>• Pressure: PSI</li> <li>• Voltmeter: Volts</li> </ul> <p><b>Display Pages/Functions</b></p> <ul style="list-style-type: none"> <li>• Pressure</li> <li>• Ammeter</li> <li>• Voltmeter</li> <li>• Two brightness selection pages (internal intensity selection)</li> </ul> <p><b>Intensity Control</b></p> <ul style="list-style-type: none"> <li>• Programmable user option</li> <li>• External using rheostat type dimmer</li> <li>• Internal selection programmable from the front panel</li> <li>• 256 level of brightness</li> </ul> <p><b>Operating Voltage</b></p> <ul style="list-style-type: none"> <li>• 6V-32V DC</li> </ul> <p><b>Transducers Supported</b></p> <ul style="list-style-type: none"> <li>• Pressure: Solid state transducers with an analog output of 0.5V to 4.5V over a pressure range of 0 PSI to 100 PSI</li> <li>• Ammeter: Current shunts of 15A, 30A, 60A and 100A rating with a full scale output of 50mV</li> </ul>
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