F Series

SINGLE-PHASE DIGITAL SWITCHBOARD MONITORS
FVA, FVD, FAA, FAD, FF, FT MODELS

User's Manual

Revision 1.7
January 22, 2001
Doc # E116-7-01-17

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Customer Support & Repair Service

Customer support is available 9:00 A.M. to 4:30 P.M., Eastern Time, Monday through Friday. Please have the model, serial number and a detailed problem description available. If the problem concerns a particular reading, please have **all** meter readings available. When returning any merchandise to E.I.G., an RMA (Return Materials Authorization) number is required.

PRODUCT WARRANTY:	Electro Industries/GaugeTech warrants this product to be free from defects in material and workmanship for a period of 1 year from date of shipment. During the warranty period, we will, at our option, either repair or replace any product that proves to be defective. To exercise this warranty, fax or call our customer service department. You will receive prompt assistance and return instructions. Send the instrument, transportation prepaid, to the address above. Repairs will be made and the instrument will be returned.
LIMITATION OF WARRANTY:	**This warranty does not apply to defects resulting from unauthorized modification, misuse, or use for any reason other than electrical power monitoring. This unit is not to be used for primary over current protection. Any protection feature in this unit is to be used for alarm or secondary protection only.** **This warranty is in lieu of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose. Electro Industries/GaugeTech shall not be liable for any indirect, special or consequential damages arising from any authorized or unauthorized use of any Electro Industries / GaugeTech product.**
STATEMENT OF CALIBRATION:	This instrument has been inspected and tested in accordance with specifications published by Electro Industries/GaugeTech. The accuracy and calibration of this instrument are traceable to the National Bureau of Standards through equipment which is calibrated at planned intervals by comparison to certified standards.
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CHAPTER 1
OVERVIEW

1.1 Introduction

The F Series family of Single-Phased Digital Switchboard Monitors offers universal applications to a wide variety of industries, including commercial, industrial and power generation.

The various models perform a long list of monitoring tasks: Volts Monitor, Amps Monitor, Frequency Monitor, Potential Transformer Monitor, Current Transformer Monitor, DC Shunt Readout and Transducer Readout. Refer to the list of available models in section 1.3.

Options include True RMS Readings for AC models (suffix -RMS) and Extended Input Voltage to 600 Volts for FF models (suffix -G). The FF60-1000 models accurately measure frequency using a crystal oscillator and a unique phase lock loop scheme. This technique allows the unit to be calibration free. It also allows the monitor to reject noise on the incoming signal. Because the monitor fits a standard ANSI panel cutout, it provides an easy solution for upgrading or replacing analog switchboard meters.

The unit's 12-bit analog-to-digital converter provides **superb accuracy throughout the scale**, eliminating the chronic problem that analog meters have at the low end. Accuracy for DC Volts and Amps is 0.05% of full scale, ±1 digit; accuracy for AC Volts and Amps is 0.2% of full scale, ±1 digit. Resolution is often critical with a lightly loaded panel. This full 4-digit monitor has a resolution to 9999 counts. The unit updates in 600ms.

1.2 Features

- Highly Accurate 12-bit Resolution
- 4-digit Readout
- Any Scaling
- 0.8" Super-large, High Output LED's
- Universal Power Supply
- Directly Replaces ANSI C39.1 Analog Meters
- Heavy-duty metal enclosure, electrically protected power supply
- Frequency Range of 45 - 1000Hz

1.3 Choice of Models

The F Series Monitors can display any AC or DC value. It also has a 0-1mA or 4-20mA input for process and transducer signals. Below is a list of the available models:

MODELS	FULL-SCALE RANGE	MAXIMUM INPUT	BURDEN
VOLTS			
▪ FVA10 (AC)	9.999V		
▪ FVA100 (AC)	99.99V		
▪ FVA600 (AC)	600.0V		
▪ FVD10 (DC)	9.999V		
▪ FVD100 (DC)	99.99V		
▪ FVD600 (DC)	600.0V		
AMPS			
▪ FAA10 (AC)	9.999A		
▪ FAA20 (AC)	25.00A		
▪ FAD10 (DC)	9.999A		
▪ FAD20 (DC)	25.00A		
POTENTIAL TRANSFORMER MODEL			
▪ FVA120 (Use with 120V PT's.)	Specific Scaling	300V	
CURRENT TRANSFORMER MODEL			
▪ FAA5 (Use with 5A CT's.)	Specific Scaling	10A	
DC SHUNT READOUT			
▪ FAD50	Specific Scaling	100mV	
▪ FAD100 (Use with 50 and 100mV shunts)	Specific Scaling	200mV	
TRANSDUCER READOUT			
▪ FT1	Specific Scaling	2mA	
▪ FT20 (Use with 0-1 and 4-20mA transducers)	Specific Scaling	40mA	

FREQUENCY MONITOR	FREQUENCY RANGE	FREQUENCY RESOLUTION
▪ FF60	5.0 - 99.99 Hz	00.01 Hz
▪ FF400	50.0 - 999.9 Hz	000.1 Hz
▪ FF1000	5 - 9999 Hz	0001 Hz

OPTIONS

▪ Suffix -RMS	True RMS Readings (for AC Models)
▪ Suffix -G	Extended input voltage to 600 Volts (for FF Models)

CHAPTER 2
INSTALLATION

2.1 Easy Installation

The monitor fits a standard ANSI panel cutout provided in section 2.7 of this manual. Or, use the existing cutout, if you are replacing an existing panel monitor. Large screws on each corner of the monitor are used to secure the monitor to the appropriate panel.

The diagrams provided in this chapter show the measurements of the unit and many possible F Series wiring installations. Carefully select the diagram for your monitor and the appropriate configuration. After securing the monitor to the panel, make the electrical connection. The monitor is ready to provide years of accurate readings.

2.2 Installation Requirements

Before you install your new monitor, make sure you meet the following installation requirements:

Control Power Requirements

- 115V AC, ±20%; 6VA, 47-440Hz (Suffix 115A)
- 230V AC, ±20%; 6VA, 47-440Hz (Suffix 230A)
- 24-48V DC, ±20%; 6VA (Suffix D)
- 125V AC/DC, ±20%; 6VA (Suffix D2)

Burden

- Voltage: 0.1VA maximum
- Current: 0.1VA maximum

Operating Temperature

- -20 to +70°C

2.3 Calibration

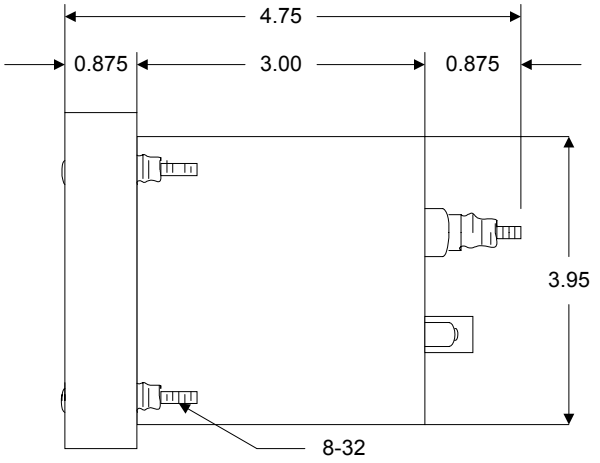
All switchboard instruments are calibrated at the factory and no initial calibration is required. The unit should not require calibration during the long life of the monitor. If the monitor does require re-calibration, send the unit to the factory for service. EIG can be contacted at the following location:

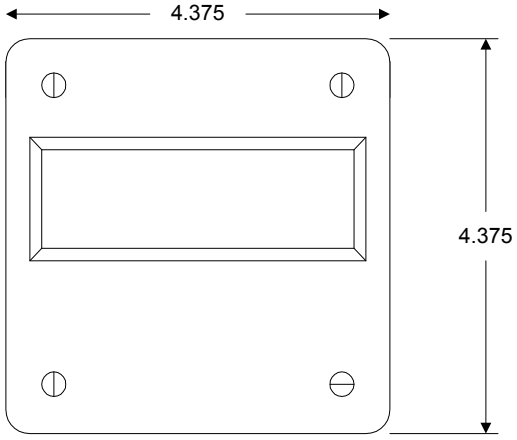
Electro Industries/ GaugeTech
1800 Shames Drive
Westbury, NY 11590 (USA)

Phone: (516) 334-0870
Fax: (516) 338-4741

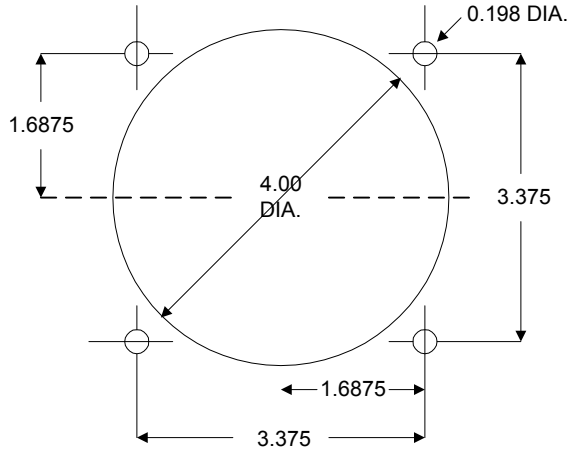
website: www.electroind.com
e-mail: sales@electroind.com

2.4: Switchboard Instrument Dimensions





RECOMMENDED CUTOUT

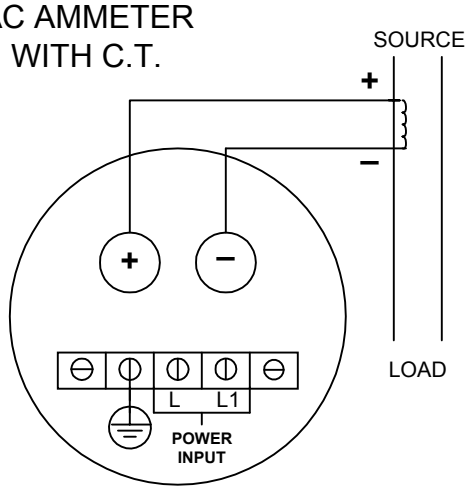


NOTE: All dimensions are in inches.

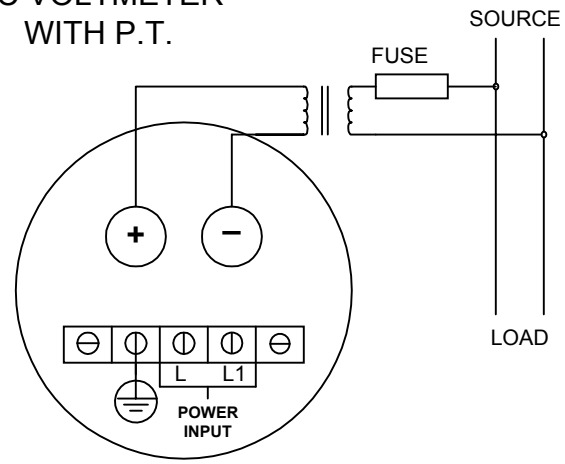
2.5 Electrical Connection Diagrams for A.C. Measurements

The back view of the instrument is shown.

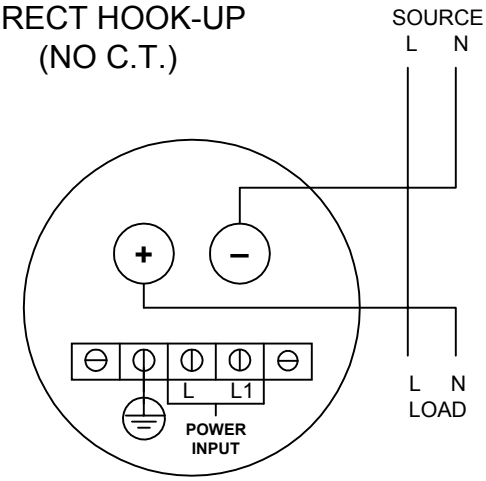
AC AMMETER
WITH C.T.



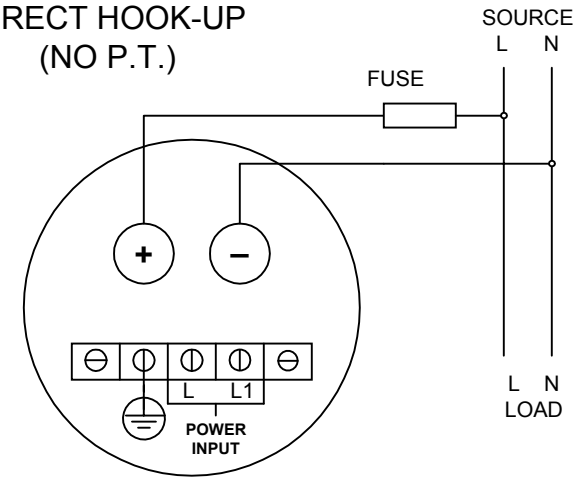
AC VOLTMETER
WITH P.T.



AC AMMETER
DIRECT HOOK-UP
(NO C.T.)



AC VOLTMETER
DIRECT HOOK-UP
(NO P.T.)

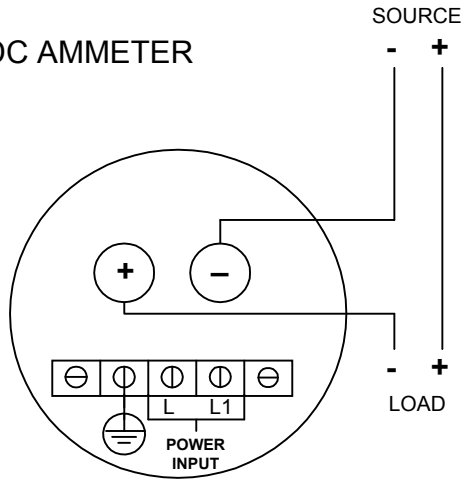


NOTE: Refer to Section 1.3, Choice of Models for Fuse Values.

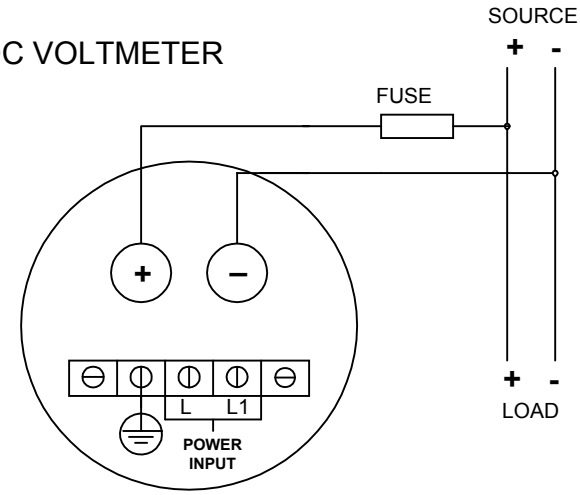
2.6 Electrical Connection Diagrams for D.C. Measurements

The back view of the instrument is shown. All measurements are in inches.

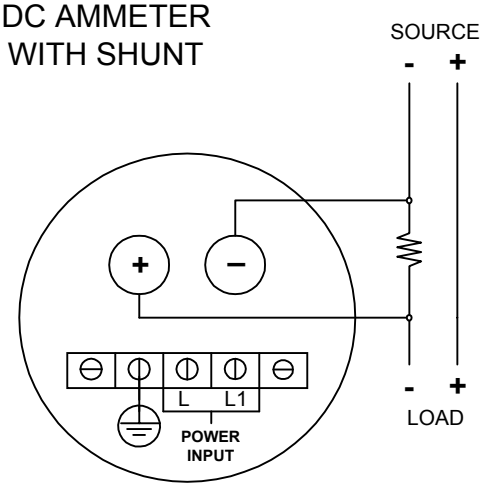
DC AMMETER



DC VOLTMETER

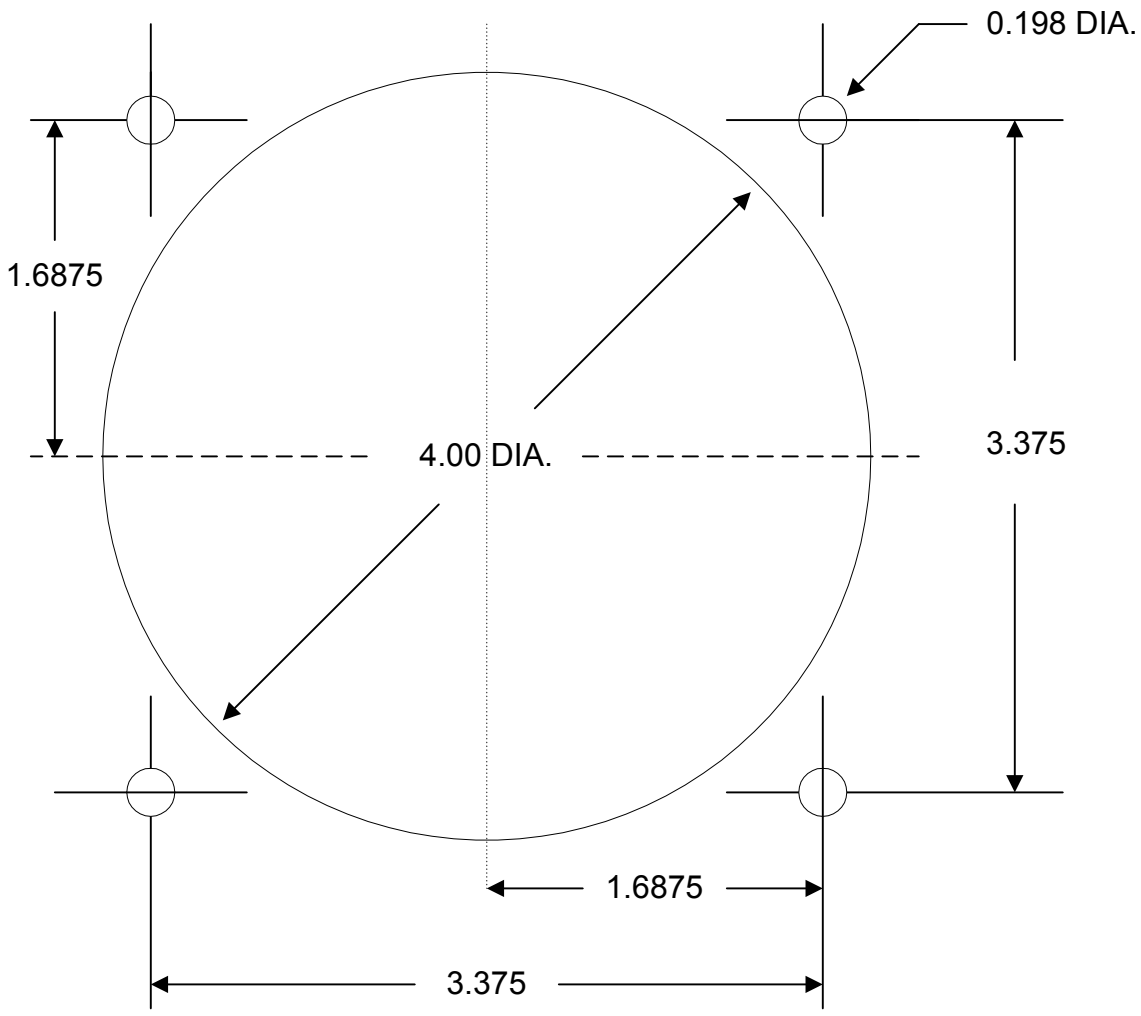


DC AMMETER
WITH SHUNT



NOTE: Refer to Section 1.3, Choice of Models for Fuse and Shunt Values.

2.7 Recommended Cutout for F Series



NOTE: All measurements are in inches.