

# Installation Instructions

## CurrentWatch™ EGF Series Ground Fault Sensors

### 120V AC or 24V AC/DC, N.O. or N.C. SPST Latching Relay Output



## WARNING

**IN ORDER TO AVOID ELECTRIC SHOCK OR OTHER POSSIBLE INJURY:**

- **DO NOT USE THIS PRODUCT FOR HUMAN SAFETY APPLICATIONS. IT WAS NOT DESIGNED, TESTED OR RECOMMENDED FOR THIS USE.**
- **DO NOT USE THIS PRODUCT IN HAZARDOUS LOCATIONS (E.G. EXPLOSIVE ATMOSPHERES). IT WAS NOT DESIGNED, TESTED OR RECOMMENDED FOR THIS USE.**
- **ENSURE THE PRODUCT IS PROPERLY WIRED TO THE CORRECT POWER SUPPLY FOR THE APPLICATION. REFER TO THE SPECIFICATIONS AND WIRING DIAGRAMS IN THIS MANUAL.**

### MODELS COVERED IN THIS MANUAL

Catalog Number	Description
EGF1NCLA050	120V AC, N.C. SPST Relay, 50 mA Setpoint
EGF1NOLA050	120V AC, N.O. SPST Relay, 50 mA Setpoint
EGF1NCLA100	120V AC, N.C. SPST Relay, 100 mA Setpoint
EGF1NOLA100	120V AC, N.O. SPST Relay, 100 mA Setpoint
EGF1NCLAT3	120V AC, N.C. SPST Relay, 5/10/30 mA Setpoint, Tri-Set
EGF1NOLAT3	120V AC, N.O. SPST Relay, 5/10/30 mA Setpoint, Tri-Set
EGF2NCLA050	24V AC/DC, N.C. SPST Relay, 50 mA Setpoint
EGF2NOLA050	24V AC/DC, N.O. SPST Relay, 50 mA Setpoint
EGF2NCLA100	24V AC/DC, N.C. SPST Relay, 100 mA Setpoint
EGF2NOLA100	24V AC/DC, N.O. SPST Relay, 100 mA Setpoint
EGF2NCLAT3	24V AC/DC, N.C. SPST Relay, 5/10/30 mA Setpoint, Tri-Set
EGF2NOLAT3	24V AC/DC, N.O. SPST Relay, 5/10/30 mA Setpoint, Tri-Set

### INTRODUCTION

The CurrentWatch™ EGF Series is a family of ground fault (earth leakage) sensors. Ground fault sensors help protect people, products, and processes from damage by ground fault conditions by monitoring all current-carrying conductors in grounded single- and three-phase delta or wye systems.



The EGF Series with mechanical outputs are available in solid-core housings with a choice of N.O. or N.C. SPST latching relays. All mechanical models can be ordered with a fixed setpoint or with a "tri-set" option, which provides three factory-set, field adjustable setpoints.

**Note that this manual only covers EGF Series models listed in the above table. This installation manual does not cover EGF Series models with auto-reset.**

### QUICK INSTALL GUIDE

The below steps can be followed to quickly install a CurrentWatch™ EGF Series switch.

1. Run all current carrying conductors through sensor window, using an auxiliary current transformer if conductors do not fit
2. Mount the sensor to a surface if needed
3. Connect output and power wiring
  - a. Use up to 14 AWG copper wires
  - b. Ensure power and load matches those shown on the sensor label
4. Test the unit
  - a. Pressing the "TEST" button will test the sensor's internal circuits
  - b. *CAUTION: The output and any connected loads will switch during the test process*

### INSTALLATION AND MOUNTING

Considerations for all EGF Series sensors...

- Run wire to be monitored through the aperture (opening) in the switch body, making sure all wires are oriented so that current flows in the same direction (see "Principal of Operation" section on reverse side)
- These sensors can be located in the same environment as motors, contactors, heaters, pull-boxes and other electrical enclosures
- Mounting can be done in any position or hung directly on a wire with a wire tie
- Be sure to leave at least one inch distance between sensor and other magnetic devices

Considerations for wiring EGF Series sensors...

- Use up to 10 AWG copper wire and tighten terminals to 4.5 inch-pounds torque
- Connect power wiring to terminals 1 and 2, making sure that the power supply matches the power rating on the sensor label
- Connect output wiring to terminals 3 and 4

### PRINCIPAL OF OPERATION

Under normal conditions, the current in one wire of a two wire load is equal in strength but opposite in sign to the current in other wire. The two wires create magnetic fields that cancel, a condition known as "Zero Sum Current." If any current leaks to ground (Ground Fault), the two currents become unbalances and there is a net resulting magnetic field. The EGF Series sensor detects this minute field and change the output state. This concept extends to three phase systems such as 3-wire Delta and to 4-wire Wye.

Single Phase (Phase to Neutral or Phase to Phase)	Three-Phase Delta (Includes Neutral if Load Uses Neutral)	Three-Phase Wye (Include Neutral if Load Uses Neutral)	Three-Phase Load (Using Auxiliary CT)

## WIRING

Use up to 14 AWG copper wire and tighten terminals to 4.5 inch-pounds torque. See diagram below.

### Power

Connect power wiring to Terminals 1 and 2. Be sure that the power supply matches the power rating on the sensor label.

### Output

Connect output wiring to Terminals 3 and 4.

### Reset Switch

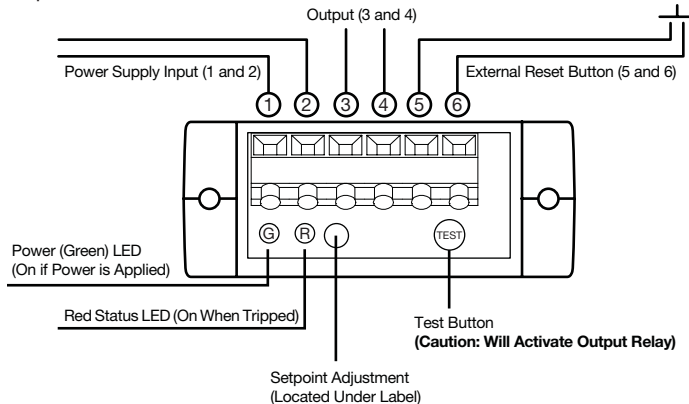
Connect a momentary dry contact to the Reset Terminals 5 and 6. Limit wire run to 200 feet of 18 AWG or larger wire.

### Momentary Reset

Only close the reset terminals momentarily—the sensor will not work properly if the reset terminals are closed (shorted) continuously. Limit wire run to 200 feet of 18 AWG or larger wire.

### Parallel Reset Connection

Multiple sensors may be connected to the same reset switch in parallel. Only the sensors that have detected a fault and have latched will be reset. A sensor will not reset unless the fault has dropped below setpoint.



## OPERATION

The EGF Series latching ground fault sensors operating in one of two states: Reset or Latched. If control power is removed, the sensor remains in it's last state (latched or reset).

### Reset

The sensor has not detected a fault and the output is in the “normal” position. For Normally Open (N.O.) sensors, the contact is normally open in the reset condition. For Normally Closed (N.C.) sensors, the contact is normally closed in the reset position.

### Latched

Upon detecting a fault or when the TEST switch is pressed, the output will switch and “latch.” The output will remain latched until the ground fault is removed and the output is reset by a momentary dry contact on Terminals 5 and 6.

### Testing

To test operation, gently press the TEST button. This simulates a fault and tests the internal switching circuits. After the test is complete, reset the sensor with a momentary dry contact on Terminals 5 and 6. **CAUTION: Any circuit connected to the sensor will be operated.**

### Adjusting Setpoint

While not as precise as having it set at the factory, the setpoint can be adjusted in the field. See wiring diagram for location of potentiometer. The best way to adjust the trip point is to develop a load of the magnitude at which you want the sensor to trip. A resistor of

4,000 ohms should provide a load of 30 mA at 120V AC, or a night light bulb of 4 watts should relate to 33 mA. With the load energized and passing through the sensing aperture, turn the potentiometer clockwise until the sensor trips. Then, back one-eighth of a turn and the setpoint should be correct.

When used with an external current transformer (CT), the sensor will be set to trip at a point much lower than without the CT. This set point adjustment should be done with the load passing through the CT in that application.

## POWER SUPPLY NOTES

All low-current ground-fault sensors are sensitive devices that require reasonable care in system design to avoid false trips caused by high electrical noise levels. Keep in mind that the best way to reduce noise in a system is to suppress it at its source.

- Keep the sensor power isolated from noisy circuits
- Do not power the sensor with the same circuit that switches contactors or other high current inductive loads

## SYSTEM GROUNDING

Good design practice and code require that all AC power systems be grounded. The EGF Series sensors are designed to work on grounded AC power systems. They may not operate properly on ungrounded systems.

## SPECIFICATIONS

Specification	Value
Power Supply	120V AC (Operates from 66-132V) 24V AC/DC (Operates from 19.2-28.8V)
Voltage Range	Up to 1,500V AC (Monitored Circuit)
Power Consumption	2.5W
Output	Latching Electromechanical Relay Normally Open Models Latch Closed Upon Sensed Fault Current Normally Closed Models Latch Open Upon Sensed Fault Current
Output Rating	1.0A @ 120V AC 2.0A @ 30V AC
Response Time	At 5% Over Setpoint: 200 ms At 50% Over Setpoint: 60 ms At 500% Over Setpoint: 15 ms
Setpoint Range	Selectable by Model Fixed Setpoints: 50, 100 mA Adjustable Setpoints: 5, 10, 30 mA (By Jumper)
Setpoint Adjustment	See “Adjust Setpoint” in “Operation” Section
Frequency Range	50-400Hz (Monitored Circuit)
Housing	UL94 V0 Flammability Rated
Dimensions	Case: 2.5 in. H x 2.8 in. W x 1.5 in. D (64x71x38mm) Aperture: 0.75 in. (19mm)
LED	Green = Power Supply Energized Red = Relay Has Operated
Environmental	Operating Temperature: +5 to +158° F (-15 to +70° C) Humidity: 0-95% RH, Non-Condensing
Approvals	UL Recognized