

# Installation Instructions

## CurrentWatch™ EGF Series Ground Fault Sensors

### 120V AC or 24V AC/DC, SPDT Form C Relay with Auto-Reset



## 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
EGF1SPDTE050	120V AC, SPDT Form C, 50 mA Setpoint, Normally De-Energized
EGF1SPDTE050	120V AC, SPDT Form C, 50 mA Setpoint, Normally Energized
EGF1SPDTE100	120V AC, SPDT Form C, 100 mA Setpoint, Normally De-Energized
EGF1SPDTE100	120V AC, SPDT Form C, 100 mA Setpoint, Normally Energized
EGF1SPDTE050	120V AC, SPDT Form C, 5/10/30 mA Setpoint, Normally De-Energized
EGF1SPDTE050	120V AC, SPDT Form C, 5/10/30 mA Setpoint, Normally Energized
EGF2SPDTE050	24V AC/DC, SPDT Form C, 50 mA Setpoint, Normally De-Energized
EGF2SPDTE050	24V AC/DC, SPDT Form C, 50 mA Setpoint, Normally Energized
EGF2SPDTE100	24V AC/DC, SPDT Form C, 100 mA Setpoint, Normally De-Energized
EGF2SPDTE100	24V AC/DC, SPDT Form C, 100 mA Setpoint, Normally Energized
EGF2SPDTE050	24V AC/DC, SPDT Form C, 5/10/30 mA Setpoint, Normally De-Energized
EGF2SPDTE050	24V AC/DC, SPDT Form C, 5/10/30 mA Setpoint, Normally Energized

### 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 Normally Energized or Normally De-Energized SPDT 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 with SPDT relays (listed in the above table). For installation manuals covering other models in the EGF Series family, please contact Eaton's Cutler-Hammer Sensor Application Engineers.**

### 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*

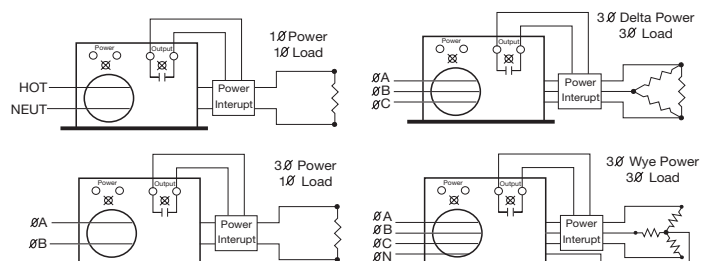
### INSTALLATION

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
- Connect power and output wiring using up to 14 AWG copper wire and tightening terminals to 7 inch-pounds torque

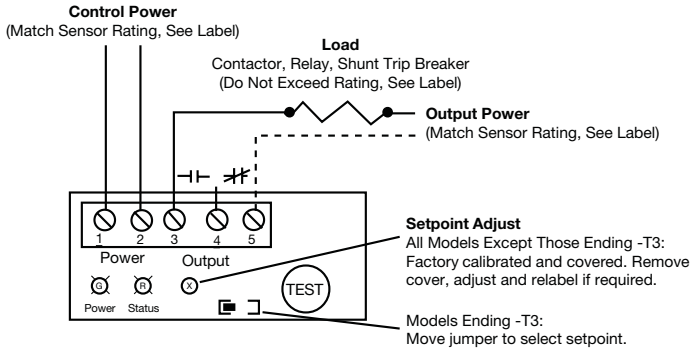
### PRINCIPLE OF OPERATION

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.



## WIRING

Run all current carrying conductors through the sensor aperture in the same direction. Connect power wiring to the sensor. Be sure the power supply matches the power rating on the sensor label. Use up to 14 AWG copper wire and tighten terminals to 7 inch-pounds torque. Connect output wiring to the sensor. Be sure that the output load is less than or equal to the output rating on the sensor label. Use up to 14 AWG copper wire and tighten terminals to 7 inch-pounds torque.



## OPERATION

To test operation, gently press the TEST button. This simulates a fault and tests the internal switching circuits. The following operation should be observed. **CAUTION: Any circuit connected to the sensor will be operated.**

### Normally Energized Models

Used for detecting ground faults and loss of control power.

Output	No Power		Control Power Applied			
			No Fault		Fault Detected	
	Output	LED	Output	LED	Output	LED
N.C.	Closed	Off	Open	Off	Closed	On
N.O.	Open	Off	Closed	Off	Open	On

### Normally De-Energized Models

Used for detecting ground faults only.

Output	No Power		Control Power Applied			
			No Fault		Fault Detected	
	Output	LED	Output	LED	Output	LED
N.C.	Closed	Off	Closed	Off	Open	On
N.O.	Open	Off	Open	Off	Closed	On

## SETPOINT ADJUSTMENT

The EGF Series sensors are factory calibrated to trip at the setpoint specified by the model number. While it is generally recommended not to change this setpoint, it can be done by following the below steps.

1. Connect control power and circuits. Run a conductor through the aperture with current equal to your desired setpoint.
2. Adjust setpoint to maximum by first removing the setpoint cover. Turn the adjustment pot five revolutions counter-clockwise to the maximum (least sensitive) setpoint. The Status LED should be off. The adjustment pot has a slip clutch so that you cannot feel or damage the end point.
3. Dial in the new setpoint by slowly turning the pot clockwise until the LED turns on. The sensor is now adjusted to trip at the current that is passing through the aperture. Reset the sensor.
4. Relabel the sensor with a new setpoint. Use a label maker or tape with a permanent marker.

## 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 (24V AC $\pm$ 15%, 24V DC $\pm$ 20%)
Voltage Range	Up to 1,500V AC (Monitored Circuit)
Power Consumption	2.5W
Output	SPTD Relay (Form C)
Output Rating	1.0A @ 120V AC 2.0A @ 30V DC
Response Time	At 5% Over Setpoint: 150 ms At 50% Over Setpoint: 100 ms
Setpoint Range	Selectable by Model Fixed Setpoints: 50, 100 mA Adjustable Setpoints: 5, 10, 30 mA (By Jumper)
Setpoint Adjustment	See "Setpoint Adjustment" 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	UL1053, Class 1 Recognized CSA Approved CE Certified