

# EAT•N

# Cutler-Hammer

## CurrentWatch™ Current Sensors

Product Focus

Current Sensors  
Current Switches  
Ground Fault Sensors



### Introduction

Eaton's Cutler-Hammer® CurrentWatch family of current sensors provide high performance AC or DC current sensing for industrial use. These devices are ideal for providing status information or protection for electrified equipment. The CurrentWatch series is accurate, highly reliable and perfect for new or retrofit applications.

With models measuring up to 2,000 amps AC and 300 amps DC, CurrentWatch products can be used in a wide range of applications such as equipment monitoring, fan status, pump status and equipment protection. Target applications for current sensors include: detecting locked rotors; loss of load; open heater or lamp load; pump jams; suction loss; motor wellness; belt loss or slippage; and general mechanical wear or failure.

### A Family of Switches and Sensors

CurrentWatch products are available in both switch and sensor variety. Understanding this distinction is key to

choosing the right product for your application.

Current switches are set to trip at an over or undercurrent condition. A change in current will send an output signal notifying of an unwanted event. Current switches are designed with fixed or adjustable trip points and are ideal for providing information on AC electrified equipment.

Current sensors operate by monitoring current flow in equipment. The current magnitude is converted into a linear and proportional analog signal (4 – 20 mA, 0 – 5 V or 0 – 10 V). Small changes in current can be detected, avoiding costly repairs and mechanical problems before they occur. These sensors are magnetically isolated, contain internal signal conditioning, are safer to use than current transformers, do not require additional circuitry, and are completely self-contained in one compact package.

### Solid or Split-Core Housings

CurrentWatch products are available in either solid- or split-core housing types.

Solid-core housing models are ideal for new equipment installations where the conductor wire is ran through the fixed aperture.

Split-core models are perfect for retrofit applications because the housing can be opened to fit around an existing conductor. As such, split-core current sensors are easy to install, without re-wiring and

shutting down a process for long periods of time. The simplicity of installing split-core models reduces overall installation costs.

### Self-Powered

Some CurrentWatch products are self-powered, requiring no external power supply to function. Instead, the power required is induced from the monitored conductor. With self-powered sensors, just connect the output to a PLC, DDC or some overall management controller.

### Performance and Flexibility

Many applications can benefit from measuring current flow. Because of this, the use of current sensors has grown beyond just circuit protection and reporting. Now, technological advances in current sensing provide more ways to monitor, improve performance and control power consumption. And with the straightforward installation of CurrentWatch products, current sensing has never been easier to implement.

### Warranty Backed, Industry Approved

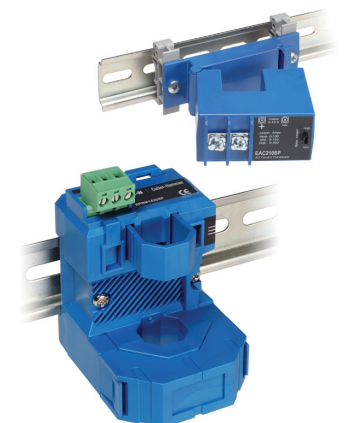
CurrentWatch products carry a five-year warranty and meet UL® and CE approvals. The proven technology of CurrentWatch is the right choice for your processes, equipment and overall continuous improvement approach to business.



ECS Series in Solid-Core Housing



EDC Series Current Sensor in Split-Core Housing



EAC Series with DIN-Rail Mounting Accessory and EPRM Series with DIN-Rail Mount Housing

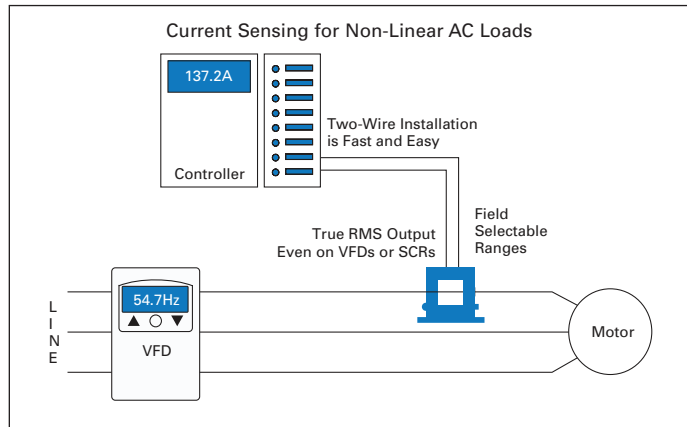
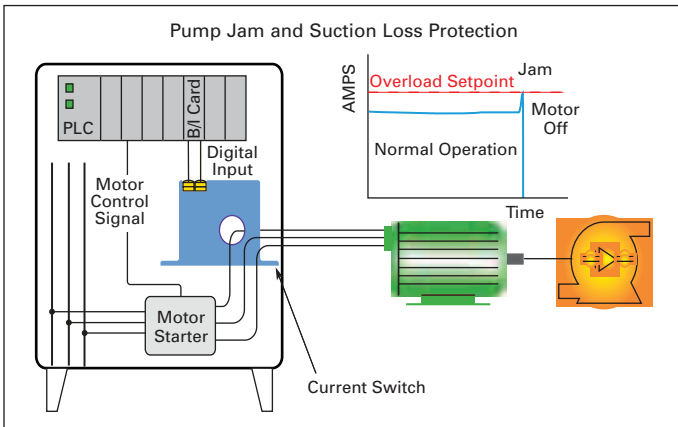
## Key Features

- AC current sensing up to 2,000 amps, DC current sensing up to 300 amps
- Solid- or split-core housings for easy installation in new or retrofit applications
- DIN-rail mountable housings and DIN-rail mounting accessory
- Visual LED indicators for easy setup and status
- Self-powered models available
- Field adjustable current sensing ranges allow for increased flexibility and reduced stock
- Normally-closed or normally-open output configurations
- Discrete or analog outputs (4 – 20 mA, 0 – 5 V, 0 – 10 V)
- Five-year warranty, UL and CE approvals

## Industrial Segments for CurrentWatch

- Agriculture
- Biotech and biofuels
- Industrial car wash
- Chemical treatment
- Extrusion processes
- Food and beverage
- Bottling and canning
- Generators
- Furnaces and kilns
- Lumber and logging
- Machine tool
- Manufacturing
- Material handling
- Material reduction
- Metalforming
- Mining
- Oil and gas
- Pharmaceutical
- Petrochemical
- Plastic and rubber molding
- Pumps and compressors
- Refrigeration
- Semiconductor processing
- Textile
- Water and wastewater

## EXAMPLE APPLICATIONS



## CURRENTWATCH GENERAL FEATURES AND CAPABILITIES

Description	Power Supply			Outputs		Housing		Current Range	Response Time	Approvals	
	Self Powered	Loop Powered	Auxiliary Powered	Discrete	Analog	Solid-Core	Split-Core				
<b>Current Switches</b>											
ECS Series	AC Current Switch	•	—	—	NO / NC	—	•	•	Fixed or Adjustable Set Point, 1 – 150 A	120 msec	UL and CE
ECSJ Series	AC Current Switch with Range Select	•	—	—	NO / NC	—	•	•	Adjustable Set Point, 1.75 – 200 A	40 – 120 msec	UL and CE
ECS7 Series	Self-Calibrating AC Current Switch	•	—	—	NO / NC	—	•	•	Self-Calibrating Set Point, 1.5 – 150 A	200 msec	UL and CE
ECSTD Series	AC Current Switch with Time Delay	•	—	—	NO / NC	—	•	•	Adjustable Set Point, 1.5 – 200 A	Adjustable, 0.2 – 15 sec	UL and CE
<b>Current Sensors</b>											
EAC Series	AC Current Sensor	•	•	•	—	4 – 20 mA, 0 – 5 V, 0 – 10 V	•	•	0 – 200 A	100 – 300 msec	UL and CE
EACR Series	AC Current Sensor, True RMS	—	•	—	—	4 – 20 mA, 0 – 5 V, 0 – 10 V	•	•	0 – 200 A True RMS	600 msec	UL and CE
EDC Series	DC Current Sensor	—	—	•	—	4 – 20 mA, 0 – 5 V, 0 – 10 V	•	•	0 – 300 A	20 – 100 msec	UL and CE
EPRM Series	AC Current Sensor with True RMS and DIN-Rail Mount	—	•	•	—	4 – 20 mA, 0 – 5 V, 0 – 10 V	—	•	0 – 400 A	< 500 msec < 1,000 msec	UL and CE, Pending
<b>Ground Fault Sensors</b>											
EGF Series	Ground Fault Sensor	—	—	•	NO / NC / Dual Contacts	—	•	—	Fixed or Adjustable 5/10/30 mA Trip	15 – 200 msec	UL Recognized CE

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## Power Supply Options for CurrentWatch™

Application Note

New Information  
May 2007

### Introduction

CurrentWatch sensors and switch models are available in three power supply options, termed **self-powered**, **loop-powered** and **auxiliary-powered**. Understanding how to wire and install each type will help you choose the best product for your application.

### Self-Powered Models

Self-powered refers to the sensor or switch generating its own power needs — no external power is required. Instead of requiring an input voltage, these sensors derive power from the monitored conductor wire running through the sensor aperture. This results in an easier installation, as the installer does not have to find a power source and run additional wiring. Only the output is wired to a control or alarming device.

Self-powered models are available in the following families: ECS, ECSJ, ECS7, ECSTD and EAC Series.

### Loop-Powered Models

Loop-powered, or two-wire connection, indicates the sensor derives its power from the loop. Analog outputs are commonly found in loop-powered sensors. The most common supply voltage is +24V DC. A key benefit of loop power is that the voltage drop in the wiring does not affect the accuracy of the signal.

Loop-powered models are available in the following families: EAC, EACR and EPRM Series.

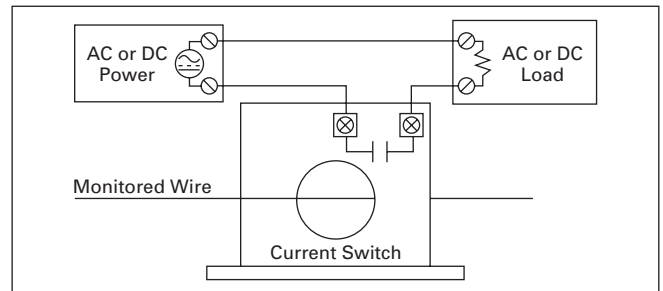


Figure 1. Wiring Diagram for Self-Powered Sensor

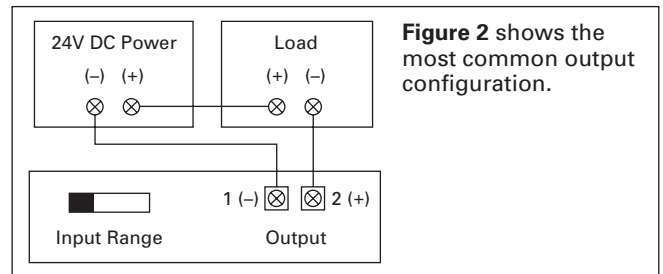


Figure 2. Wiring Diagram for Loop-Powered Sensor

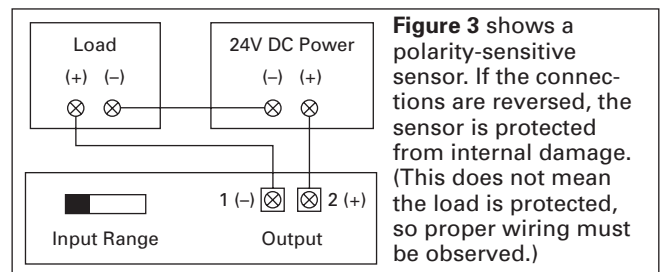


Figure 3. Alternate Wiring Diagram for Loop-Powered Sensor

Auxiliary-Powered Models

Auxiliary-powered, or four-wire connection, indicates the sensor requires an external power supply connected to the sensor to allow the internal electronics to function. Auxiliary-powered units can be connected to 120V AC or 24V AC/DC, depending on the model type. Polarity and load connections require proper connections to ensure correct functionality.

Auxiliary-powered models are available in the following families: EAC, EDC, EPRM and EGF Series.

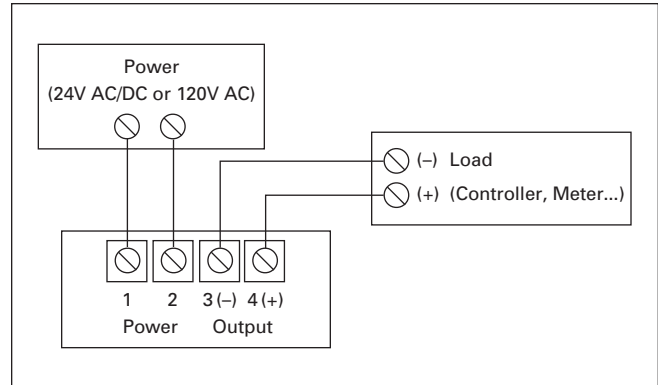


Figure 4. Wiring Diagram for Auxiliary-Powered Sensor

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