

Current and Voltage Sensors

EVT Series VoltageWatch



ECSJ Series CurrentWatch Current Switch



EACR Series CurrentWatch Current Sensor



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Unless otherwise noted, the products contained in this section should not be used for functional safety applications. These products were not designed or tested to IEC 60947-5-3 or recommended for functional safety.

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273),
in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada
call 1-800-426-9184.

Revision notes

Volume 8—Sensing Solutions, CA08100010E

Tab 7—Current and Voltage Sensors

Revision date	Section	Change page(s)	Description
09/08/2017	7.0	V7-T7-1	Updates to TOC
09/08/2017	7.1	V7-T7-7	Content edit
09/08/2017	7.2	V8-T7-10	Page deleted
09/08/2017	7.9	V8-T7-35	Drawing updated
09/08/2017	All	All	Revision date changed to September 2017



Powering Business Worldwide

Product Selection Guide

EVT Series VoltageWatch Voltage Sensors



Page V8-T7-5

Overview

Eaton's VoltageWatch™ sensor is a high-performance, true RMS sensor for sensing voltage in single- and three-phase installations.

Applications

Detect below normal or “brown out” voltage conditions; protect against possible motor overheating
Identify phase-loss conditions by detecting voltage reduction in one or more phases of a three-phase motor
Monitor overvoltage conditions associated with regenerative voltage to help in diagnosing/avoiding motor drive issues
Detect voltage conditions that may cause stress in or damage to soft starter components (SCRs)

Product Features

True RMS output—allows for use in situations where power supplied is non-sinusoidal
Standard 4–20 mA loop powered output—industry standard output works easily and reliably with existing controllers
Input/output isolation—input and output circuitry is electrically isolated for improved safety
Compact DIN rail mount enclosure—space-saving 35 mm wide enclosure mounts quickly for an attractive installation

Voltage Range

120, 240, 480 V

Approvals

UL® Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



Note

① **ECSJ Series:** ECSJ424SC, ECSJ404SC and ECSJ405SC not listed.

ECS Series CurrentWatch AC Current Switches



Page V8-T7-8

Overview

AC current switches for detecting overcurrent condition.

Applications

Electronic proof of flow—current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electro-mechanical pressure or flow switches
Conveyors—detect jams and overloads
Lighting circuits—easier to install and more accurate than photocells
Fans, pumps and heating elements—faster response than temperature sensors
Critical motors
Ancillary equipment

Product Features

Universal outputs—NO or NC solid-state switch for control circuits up to 240 Vac/Vdc, compatible with most automation systems
Self-powered—cuts installation and operating costs
Easily adjustable set point—increases application flexibility and speeds start-up
Solid- or split-core housings—versions tailored for each type of installation
LED indication—provides quick visual indication of contact status
Built-in mounting feet—simple, two-screw panel mount or attach with optional din-rail mounting kit accessory

Current Range

Fixed or adjustable set point, 1–150 A

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



ECSC Series Compact CurrentWatch Current Switches



Page V8-T7-10

Overview

AC/DC current switches for detecting AC current above 0.5 A trip point.

Applications

Independent monitoring of essential elements—monitor current flow to lights, heating coils, motors and other vital components within a system
Local disconnects—double check a contactor's auxiliary contact, which can incorrectly indicate the absence of a load
Control panels—indicates the presence or absence of current flow through circuit breakers and other components

Product Features

Outputs—NO or NC solid-state switch for control circuits up to 120 Vac/Vdc, compatible with most automation systems
Self-powered—cuts installation and operating costs
Compact size—great for applications with space restrictions
High sensitivity—detects 0.5 A without wrapping the conductor around the sensor several times

Current Range

0.5 A trip

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



ECSJ Series CurrentWatch AC Current Switches



Page V8-T7-13

Overview

Jumper selectable AC switches with solid-state output.

Applications

Electronic proof of flow—current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electro-mechanical pressure or flow switches
Conveyors—detect jams and overloads
Lighting circuits—easier to install and more accurate than photocells
Fans, pumps and heating elements—faster response than temperature sensors
Critical motors
Ancillary equipment

Product Features

Choice of NO or NC solid-state outputs—
1 A at 240 Vac
0.15 A at 30 Vdc
15 A at 120 Vac
3 A at 120 Vac
0.15 A at 30 Vdc, dual contact
Self-powered—cuts installation and operating costs
Easily adjustable set point—speeds start-up and reduces inventory
Solid- or split-core housings—choose the appropriate version for your application
LED indication—provides quick visual indication of output contact status
Built-in mounting feet—provide for a secure installation

Current Range

Adjustable set point, 1.75–200 A

Approvals ①

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



**ECS7 Series CurrentWatch
AC Current Switches**



Page V8-T7-17

Overview

Self-calibrating AC current switch with solid-state outputs.

Applications

Conveyors—use current overload models to detect conveyor jams caused by scenarios such as side-by-sides

Electronic proof of flow—more reliable than electro-mechanical pressure or flow switches, with no need for pipe or duct penetrations

Pump protection—provides overload (jams) and underload (suction loss) indication

Product Features

Self-powered and self-calibrating—reduces installation costs

Status monitoring, overload and operating window options—choose the operating style that matches your application

Universal output—AC or DC compatibility with any automation system

Current Range

Self-calibrating set point, 1.5–150 A

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



**ECSTD Series CurrentWatch
AC Current Switches**



Page V8-T7-21

Overview

AC current switches with time delay.

Applications

Motor protection—serves as an electronic proof-of-operation; detects current draw changes in motors when they encounter problems such as pumps running dry or pending bearing failure; non-intrusive and less expensive to install than differential pressure flow sensors or thermal switches

High inrush or temporary overload current—adjustable start-up/delay timer allows 0–15 second delay to eliminate nuisance trips from high inrush or short overload conditions

Product Features

Adjustable start-up/delay timer—field adjustable from 0–15 seconds to eliminate nuisance alarms due to start-up inrush or temporary overcurrent conditions

Choice of NO/NC/AC or universal outputs—contact ratings of 1.0 A at 240 Vac or universal outputs of 0.15 A at 240 Vac/Vdc (NO models) and 0.2 A at 135 Vac/Vdc (NC models) for use with most standard motor control systems

Improved ease of installation and use—self-powered, split-core models simplify installation, 1.0 A AC rating eliminates need for time delay relay, and status LED provides visual indication of set point trip and contact action

Current Range

Adjustable set point, 1.5–200 A

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



(ECSTD401SC and ECSTD402SC not listed)

**ECSD Series CurrentWatch
DC Current Switches**



Page V8-T7-25

Overview

DC switch with solid-state or mechanical relay output.

Applications

Electronic proof of flow—current operated switches eliminate the need for multiple pipe or duct penetrations

Welders—Instant indication of equipment status

Large drive motors—provide monitoring for field loss protection

Power supplies—detect and signal over-current condition before equipment damage

UPS—monitors battery output

Ancillary equipment

Product Features

Choice of mechanical relay or solid-state outputs—SPDT (Form C) relay, 5.0 A at 240 Vac or 30 Vdc

Solid-state, NO, 0.15 A at 240 Vac/Vdc

Easily adjustable set point—speeds start-up and reduces inventory

Compact, one-piece design—easily fits in crowded control panels

Input isolation—safer than shunt/relay combinations

Adaptive hysteresis—hysteresis is five percent of set point, allowing closer control than fixed-hysteresis switches

Solid-core housings

Current Range

Varies by model

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



**EAC Series CurrentWatch
AC Current Sensors**



Page V8-T7-28

Overview

AC current sensor with analog outputs and power supply options.

Applications

Automation equipment—analog current reading for remote monitoring and software alarms

Data loggers—self-powered sensor helps conserve data logger batteries

Panel meters—simple connection displays power consumption

Product Features

Highly accurate—factory matched and calibrated single-piece sensor is more accurate than traditional two-piece, field-installed solutions

Average responding—“average responding” algorithm gives an RMS output on pure sine waves, perfect for constant speed (linear) loads

Jumper selectable ranges—the ability to change input ranges reduces inventory and eliminates zero and span

Isolation—output is magnetically isolated from the input for safety and elimination of insertion loss (voltage drop)

Current Range

0–200 A

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



(EACP models not listed)

EACR Series CurrentWatch RMS Current Sensors



Page V8-T7-32

Overview

True RMS AC current sensing with 4–20 mA output.

Applications

VFD controlled loads—monitoring V_{dc} output indicates how the motor and attached load are operating
SCR controlled loads—accurate measurement of phase angle fired or burst fired (time proportioned) SCRs, with faster current measurement than temperature sensors
Switching power supplies and electronic ballasts—true RMS sensing is the most accurate way to measure power supply or ballast input power

Product Features

True RMS output—true RMS technology is accurate on distorted waveforms like VFD or SCR outputs
Jumper-selectable ranges—reduces inventory and eliminates zero and span
Isolation—output is magnetically isolated from the input for safety and elimination of insertion loss (voltage drop)

Current Range

0–200 A true RMS

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



EDC Series CurrentWatch DC Current Sensors



Page V8-T7-35

Overview

Current sensing for DC loads up to 300 A with analog outputs.

Applications

Battery banks—monitors load current, monitors charging current and verifies operation
Transportation—measures traction power or auxiliary loads
Electric heating elements—monitors heater loads with a faster response time than temperature sensors

Product Features

Jumper-selectable ranges—reduces inventory and eliminates zero or span pots
Isolation—output is magnetically isolated from the input for safety, also eliminating insertion loss (voltage drop)
Internal power regulation—cuts installation costs and works well, even with unregulated power
Split core design and built-in mounting brackets—makes installation quick and easy

Current Range

0–400 A

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



EGF Series CurrentWatch Ground Fault Sensors



Page V8-T7-39

Overview

Ground fault sensors with solid-state or mechanical relay outputs.

Applications

Personnel protection (typically 5 mA)—detects sensitive ground fault conditions, which could cause injury to people, and functions as a sensor and alarm trigger when applied as an input to an overall ground fault protection system
Equipment protection (typically 10 or 30 mA)—for applications where personnel protection is not the primary concern, higher set point capability helps eliminate nuisance tripping while still providing adequate ground fault detection to protect machine electronics

Product Features

Broad range of options to meet application needs—NO or NC, solid-state or mechanical relays, normally energized or normally de-energized contacts
Set point options maximize ease-of-use and application flexibility—field selectable 5, 10 or 30 mA set points on the EGF “Tri-set” models make user adjustments fast, sure and convenient
Compatible with standard equipment—application on single- and three-phases systems, ideal for use with shunt trip breakers, and magnetically isolated from monitored circuit and control power

Current Range

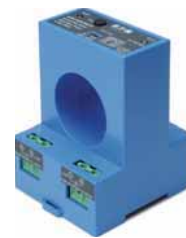
Fixed or adjustable 5/10/30 mA trip

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



EGFL Series CurrentWatch Ground Fault Sensors



Page V8-T7-44

Overview

Ground fault sensors with mechanical relays.

Applications

Personnel protection (typically 5 mA)—detects sensitive ground fault conditions, which could cause injury to people
Equipment protection (typically 10 or 30 mA)—for applications where personnel protection is not the primary concern, higher set point capability helps eliminate nuisance tripping
Regulatory—meets requirements as stipulated by governmental and industrial regulatory groups for ground fault sensing

Product Features

Broad range of options to meet application needs—mechanical relays, normally energized or normally de-energized contacts
Set point options maximize ease-of-use and application flexibility—field selectable 5, 10 or 30 mA set points on the EGFL “tri-set” models make user adjustments fast, sure and convenient
Compatible with standard equipment—application on single- and three-phase systems, ideal for use with shunt trip breakers, and magnetically isolated from monitored circuit and control power

Current Range

Tri-Set Adjustable, 5, 10 or 30 mA

Approvals

UL Listed
UL tested to Canadian safety standards
CE
RoHS Compliant



EVT Series VoltageWatch Voltage Sensors



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EVT Series VoltageWatch Voltage Sensors

Product Description

Eaton’s VoltageWatch™ sensor is a high-performance, true RMS sensor for sensing voltage in single- and three-phase installations. Applicable on nominal circuits of 120 V, 240 V and 480 V, this voltage sensor provides a fully isolated analog output proportional to rated nominal voltage in both sinusoidal and non-sinusoidal (variable frequency) situations. It is housed in a slim, compact, easy-to-install DIN rail mount enclosure.

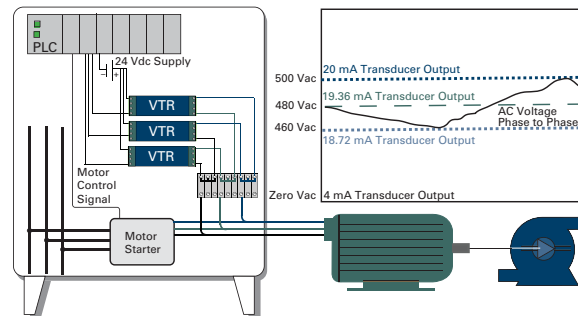
Ideal for situations where power quality is of interest or concern, the VoltageWatch sensor facilitates monitoring of supply voltage levels, identifying undervoltage or overvoltage conditions, and helping to protect critical motors and electronics. Designed with an industry-standard 4–20 mA output, VoltageWatch is easily coupled to a data logger, panel meter or PLC to enable basic trending of operational status of low voltage circuits up to real-time monitoring and reporting of supply voltage levels.

Application Description

True RMS Voltage Monitoring

- Detect below normal or “brown out” voltage conditions; protect against possible motor overheating
- Identify phase-loss conditions by detecting voltage reduction in one or more phases of a three-phase motor
- Monitor overvoltage conditions associated with regenerative voltage to help in diagnosing/avoiding motor drive issues
- Detect voltage conditions that may cause stress in or damage to soft starter components (SCRs)

Example Application—Phase Loss



Features

- **True RMS Output**—Allows for use in situations where power supplied is non-sinusoidal, such as VFD applications, poor power quality installations or other electrically harsh/challenging environments
- **Standard 4–20 mA Loop Powered Output**—Industry standard output works easily and reliably with existing controllers, data loggers and SCADA equipment
- **Input/Output Isolation**—Input and output circuitry is electrically isolated for improved safety
- **Compact DIN Rail Mount Enclosure**—Space-saving 35 mm wide enclosure mounts quickly for an attractive installation

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant

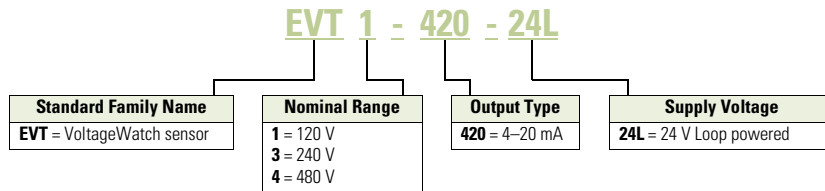


⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Catalog Number Selection

VoltageWatch EVT Series—Top Terminal Current Sensors



Product Selection

EVT Series



VoltageWatch EVT Series—Top Terminal Current Sensors

Power Supply	Output Signal	Nominal Voltage	Catalog Number
24 Vdc loop powered	4–20 mA	120	EVT1-420-24L
		240	EVT3-420-24L
		480	EVT4-420-24L

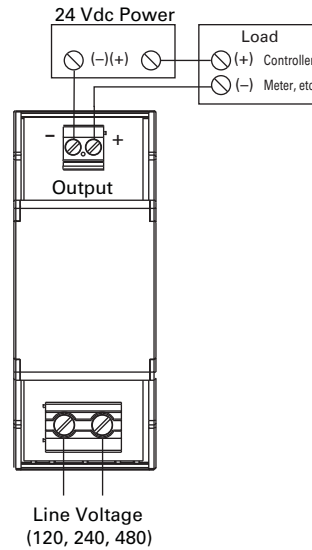
Technical Data and Specifications

VoltageWatch EVT Series

Description	Specification
Power supply	24 Vdc loop-powered
Input	120 V, 240 V, 480 V
Input over-range	+15% of nominal range
Output	4–20 mA proportional; capped at 24 mA maximum
Response time	250 ms (to 90% value)
Accuracy	<1%
Linearity	<0.5%
Loading	<500 ohms
Isolation voltage	2500 Vac
Frequency range	40–100 Hz
Operating temperature	–22 to 140 °F (–30 to 60 °C)
Mounting	DIN rail compatible
Case	UL 94 V0 flammability rated; noncorrosive thermoplastic
Environmental	14 to 122 °F (–10 to 50 °C), 0–95% RH noncondensing
EMC/immunity	EN50081-1, EN50082-2
Ripple	<1% (peak to peak)

Wiring Diagram

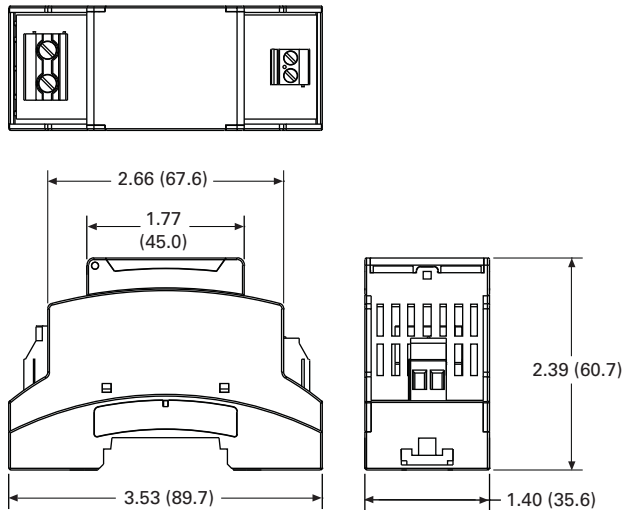
VoltageWatch EVT Series



Dimensions

Approximate Dimensions in Inches (mm)

Complete Unit



ECS Series CurrentWatch Current Switches



7

ECS Series CurrentWatch Current Switches

Product Description

The CurrentWatch™ ECS Series from Eaton's Electrical Sector is a family of solid-state adjustable current switches, ideal for providing status information on electrical equipment. The ECS is excellent for new installations, where the conductors run through the housing, requiring no cutting. These switches are also ideal for retrofits, since split-core models can be opened to fit around existing conductors. The current switch is accurate, reliable and easy to install.

The ECS can sense continuous currents from 1 to 150 A and does not require any supply voltage, as the power required is induced from the monitored conductor. The output is a non-polarity-sensitive solid-state contact for switching AC and DC circuits up to 240 Vac/dc. This switch also includes an LED indicating two states: on and below trip point, and above trip point with contacts energized. All ECS Series switches carry an unconditional five-year warranty.

For the most current information on this product, visit our Web site: www.eaton.com

Any change in current can be sensed with the ECS Series. A change in current may indicate motor failure, belt loss/slippage or mechanical failure. Any of these events can cause the current to drop significantly, tripping the switch and notifying the controller.

Application Description

Typical Applications

- **Electronic Proof of Flow**—Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electro-mechanical pressure or flow switches
- **Conveyors**—Detect jams and overloads
- **Lighting Circuits**—Easier to install and more accurate than photocells
- **Fans, Pumps and Heating Elements**—Faster response than temperature sensors
- **Critical Motors**
- **Ancillary Equipment**

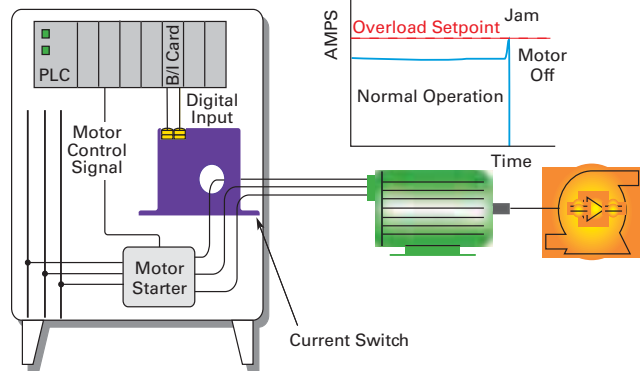
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Example Application— Pump Jam and Suction Loss Protection



Features

- **Universal Outputs**—NO or NC solid-state switch for control circuits up to 240 Vac/Vdc, compatible with most automation systems
- **Self-Powered**—Cuts installation and operating costs
- **Easily Adjustable Set Point**—Increases application flexibility and speeds start-up
- **Solid- or Split-Core Housings**—Versions tailored for each type of installation
- **LED Indication**—Provides quick visual indication of contact status
- **Built-In Mounting Feet**—Simple, two-screw panel mount or attach with optional DIN-rail mounting kit accessory

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant





⚠ DANGER

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Product Selection

ECS Series CurrentWatch Current Switches

Top Terminal Current Switches

	Power Supply	Aperture Size	Output Signal	Set Point and LED Configuration	Catalog Number
Solid-Core Housing 	Solid-Core Housing				
	Self powered (no external power needed)	0.74 in (19 mm)	Normally open	Adjustable 1–150 A set point with LED	ECSNOASC
				Fixed 0.75 A set point no LED	ECSNOFSC
	Self powered (no external power needed)	0.74 in (19 mm)	Normally closed	Fixed 5.5 A set point no LED	ECSNOFSCY1
				Adjustable 1–150 A set point with LED	ECSNCASC
				Fixed 0.75 A set point no LED	ECSNCFSC
Fixed 0.75 A set point no LED				ECSNCFSC	
Split-Core Housing 	Split-Core Housing				
	Self powered (no external power needed)	0.85 in (21.6 mm)	Normally open	Adjustable 1.75–150 A set point with LED	ECSNOASP
				Fixed 1.25 A set point no LED	ECSNOFSP
	Self powered (no external power needed)	0.85 in (21.6 mm)	Normally closed	Adjustable 1.75–150 A set point with LED	ECSNCASP
				Fixed 1.25 A set point no LED	ECSNCFSP
				Fixed 1.25 A set point no LED	ECSNCFSP
Fixed 1.25 A set point no LED				ECSNCFSP	

Accessories

DIN Rail Mounting Kit



ECS Series CurrentWatch Current Switches

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Note

① Sensor pictured for reference and not included in kit.

ECSC Series CurrentWatch AC Current Switches



7

ECSC Series Compact CurrentWatch Current Switches

Product Description

The CurrentWatch™ ECSC Series are a family of self-powered, solid-state current-operated switches that trigger when the current level sensed through the aperture exceeds the 0.5 A trip point threshold.

The solid-state output contacts can switch AC or DC, making the ECSC Series well suited for applications in automation systems.

Downtime and costly repairs can be avoided by utilizing Eaton's current sensor family; encompassing a broad range of products for cost-effective monitoring, status and predictive maintenance.

Application Description

Typical Applications

- Independent monitoring of essential elements—monitor current flow to lights, heating coils, motors, and other vital components within a system
- Local disconnects—double check a contactor's auxiliary contact, which can incorrectly indicate the absence of a load
- Control panels—indicate the presence or absence of current flow

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Features

- **Outputs**—NO or NC solid-state switch for control circuits up to 120 Vac/Vdc, compatible with most automation systems
- **Self-powered**—cuts installation and operating costs
- **Compact size**—great for applications with space constrictions
- **High sensitivity**—detects 0.5 A without wrapping the conductor around the sensor several times

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant


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For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

ECSC Series Compact CurrentWatch Current Switches

Current Switches

	Power Supply	Aperture Size	Output Signal	Set Point	Catalog Number
Solid-Core Housing	Solid-Core Housing				
	Self powered (no external power needed)	0.30 in (7.6 mm)	Normally open	0.5 A Trip	ECSCNOFSC
			Normally closed	0.5 A Trip	ECSCNCFSC



Technical Data and Specifications

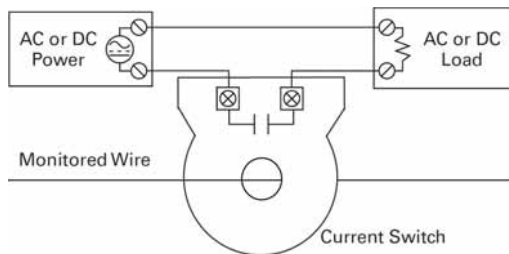
ECSC Series CurrentWatch Current Switches

Description	Specification
Power supply	Self-powered—no power supply needed
Output	Magnetically isolated solid-state switch
Output rating	0.15 A at 120 Vac/Vdc
Off-state leakage	<10 μ A
Response time	120 ms
Fixed set point	0.5 A
Hysteresis	Approximately 5% of 0.5 A trip point

Description	Specification
Overload	6 sec at 500 A; 1 sec at 1000 A
Isolation voltage	UL listed to 1270 Vac, tested to 5000 Vac
Frequency range	50–400 Hz
Sensing aperture	Solid-core housings: 0.30 in (7.6 mm)
Housing	UL94 V0 flammability rated
Environmental	Operating temperature: -4 to 122 °F (-20 to 50 °C)

Wiring Diagram

ECSC Series CurrentWatch Current Switches



7.3

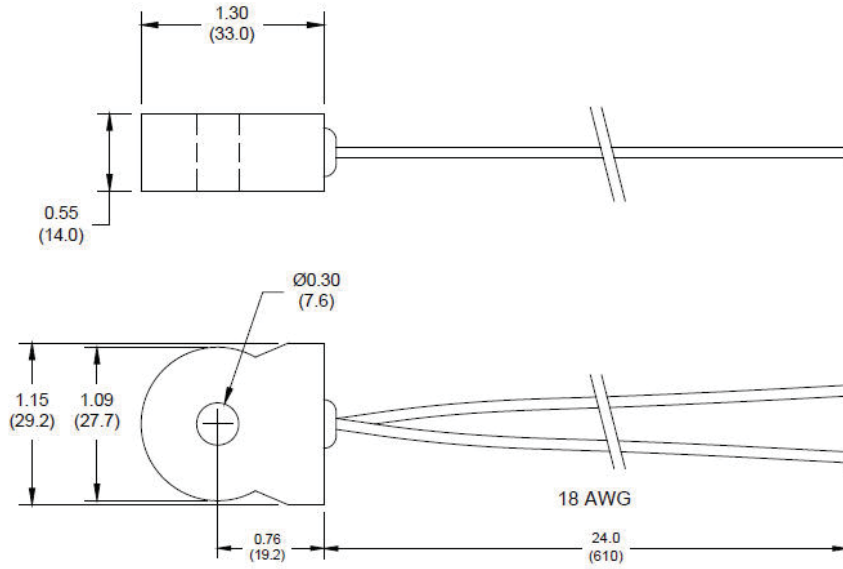
Current and Voltage Sensors

CurrentWatch ECSC Series

Dimensions

Approximate Dimensions in Inches (mm)

Solid-Core Housing



ECSJ Series CurrentWatch Current Switches



ECSJ Series CurrentWatch Current Switches

Product Description

The CurrentWatch ECSJ Series current operated switches from Eaton’s Electrical Sector provide the same dependable indication of status offered by the CurrentWatch ECS Series, but with the added benefit of increased set point precision. A choice of three, jumper-selectable input ranges allows the ECSJ Series to be tailored to an application, providing more precise control through improved set point resolution. Self-powering, isolated solid-state outputs, 1–6 A and 40–200 A input ranges, and a choice of split- or solid-core enclosures are standard.

Application Description

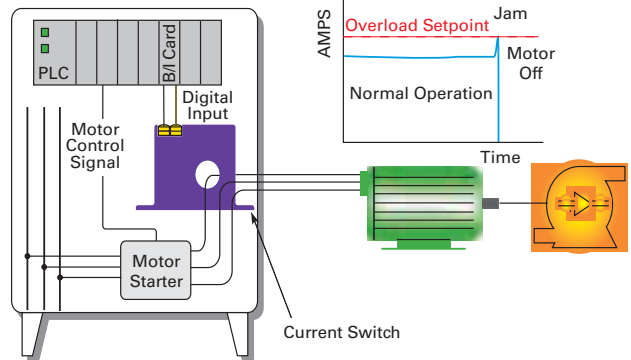
Typical Applications

- **Electronic Proof of Flow**—Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electro-mechanical pressure or flow switches
- **Conveyors**—Detect jams and overloads
- **Lighting Circuits**—Easier to install and more accurate than photocells
- **Fans, Pumps and Heating Elements**—Faster response than temperature sensors
- **Critical Motors**
- **Ancillary Equipment**

Contents

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ECSJ Series CurrentWatch Current Switches	
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Dimensions	V8-T7-16

Example Application—
Pump Jam and Suction Loss Protection



Features

- **Choice of NO or NC Solid-State Outputs**—
 - 1 A at 240 Vac
 - 0.15 A at 30 Vdc
 - 15 A at 120 Vac
 - 3 A at 120 Vac
 - 0.15 A at 30 Vdc, dual contact
- **Self-Powered**—Cuts installation and operating costs
- **Easily Adjustable Set Point**—Speeds start-up and reduces inventory
- **Solid- or Split-Core Housings**—Choose the appropriate version for your application
- **LED Indication**—Provides quick visual indication of output contact status
- **Built-In Mounting Feet**—Provide for a secure installation
- **UL, cUL and CE Approved**—Accepted worldwide

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant






Note: ECSJ424SC, ECSJ404SC and ECSJ405SC not listed.

⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Product Selection**ECSJ Series CurrentWatch Current Switches****Front and Top Terminal Switches**

	Power Supply	Aperture Size	Output Type, Voltage and Rating	Set Point and LED Configuration	Catalog Number
Solid-Core Housing with Front Terminal 	Solid-Core Housing with Front Terminal				
	Self-powered (no external power needed)	0.55 in (14 mm)	Normally open, 1 A at 240 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ400SC
			Normally open, 15 A at 120 Vac, 10 A at 240 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ406SC ①
			Normally closed, 1 A at 240 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ401SC
			Normally closed, 15 A at 120 Vac, 10 A at 240 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ407SC ①
			Dual contact, NO and NC, 0.15 A at 30 Vdc	Adjustable 1–6, 6–40 or 40–175 A set point without LED	ECSJ430SC ①
			Normally open, 0.15 A at 30 Vdc	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ420SC
			Adjustable 1–6, 6–40 or 40–175 A set point without LED	ECSJ424SC	
		Normally closed, 0.15 A at 30 Vdc	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ421SC	
Solid-Core Housing with Top Terminal 	Solid-Core Housing with Top Terminal				
	Self-powered (no external power needed)	0.74 in (19 mm)	Normally open, 3 A at 120 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ404SC
		Normally closed, 3 A at 120 Vac	Adjustable 1–6, 6–40 or 40–175 A set point with LED	ECSJ405SC	
Split-Core Housing 	Split-Core Housing				
	Self-powered (no external power needed)	0.85 in (21.6 mm)	Normally open, 1 A at 240 Vac	Adjustable 1.75–6, 6–40 or 40–200 A set point with LED	ECSJ402SP
			Normally closed, 1 A at 240 Vac	Adjustable 1.75–6, 6–40 or 40–200 A set point with LED	ECSJ403SP
			Normally open, 0.15 A at 30 Vdc	Adjustable 1.75–6, 6–40 or 40–200 A set point with LED	ECSJ422SP
		Normally closed, 0.15 A at 30 Vdc	Adjustable 1.75–6, 6–40 or 40–200 A set point with LED	ECSJ423SP	

Note

① Unit features built-in heatsink that adds to height. See dimension drawings on **Page V8-T7-16** for details.

Accessories

DIN Rail
Mounting KitECSJ Series CurrentWatch
Current Switches

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Technical Data and Specifications

ECSJ Series CurrentWatch Current Switches

Description	AC Solid-State Output Specification	DC Solid-State Output Specification
Power supply	Self-powered—no power supply needed	Self-powered—no power supply needed
Output	Isolated solid-state switch	Isolated solid-state switch
Output rating		
Standard models	1.0 A at 240 Vac	0.15 A at 30 Vdc
High current switching models	ECSJ404SC and ECSJ405SC: 3.0 A at 120 Vac	ECSJ430SC: 0.15 A at 30 Vdc, dual contact, NO and NC
Very high current switching models	ECSJ406SC and ECSJ407SC: 15 A at 120 Vac, 10 A at 240 Vac	—
Off-state leakage	NO models: <10 µA NC models: 2.5 mA	NO models: <10 µA NC models: 2.5 mA
Response time	40–120 ms	40–120 ms
Set point range (adjustable)	Solid-core models: 1–6, 6–40 and 40–175 A Split-core models: 1.75–6, 6–40 and 40–200 A	Solid-core models: 1–6, 6–40 and 40–175 A Split-core models: 1.75–6, 6–40 and 40–200 A
Hysteresis	Low: 6%; mid: 4%; high: 3%	Low: 6%; mid: 4%; high: 3%
Isolation voltage	UL listed to 1270 Vac, tested to 5000 Vac	UL listed to 1270 Vac, tested to 5000 Vac
Frequency range	6–100 Hz	6–100 Hz
Sensing aperture	Solid-core, front terminal models: 0.55 in (14 mm) Solid-core, top terminal models: 0.74 in (19 mm) Split-core models: 0.85 in (21.6 mm) sq.	Solid-core, front terminal models: 0.55 in (14 mm) Solid-core, top terminal models: 0.74 in (19 mm) Split-core models: 0.85 in (21.6 mm) sq.
Housing	UL94 V0 flammability rated	UL94 V0 flammability rated
Environmental	Operating temperature: –58 to 122 °F (–50 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –58 to 122 °F (–50 to 50 °C) Humidity: 0–95% RH, non-condensing

Overload Ratings

Housing	Range	Maximum Amperes	
		Six Seconds	One Second
Solid-core	1–6 A	400 A	600 A
	6–40 A	500 A	800 A
	40–175 A	800 A	1200 A
Split-core	1.75–6 A	400 A	600 A
	6–40 A	500 A	800 A
	40–200 A	800 A	1200 A

Note

① Sensor pictured for reference and not included in kit.

Wiring Diagrams ^{①②}

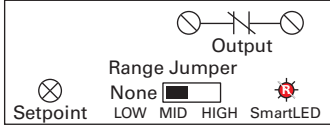
All Normally Open (NO) Models



ECSJ430SC (Dual Contact, NO and NC)



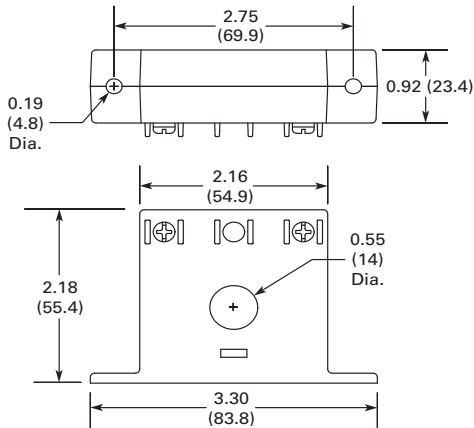
All Normally Closed (NC) Models



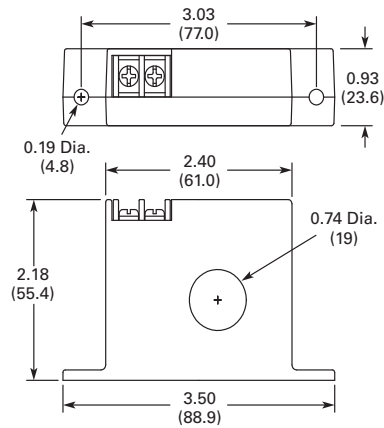
Dimensions

Approximate Dimensions in Inches (mm)

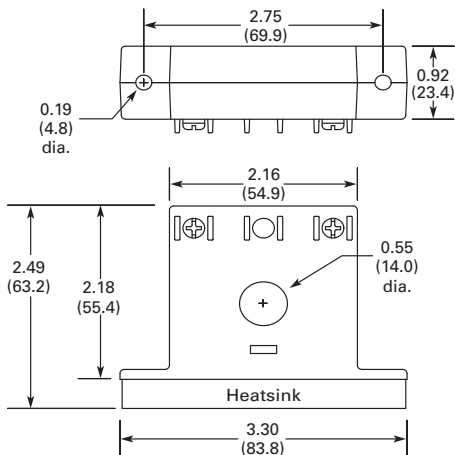
All Solid-Core Models with Front Terminals Except ECSJ406SC and ECSJ407SC



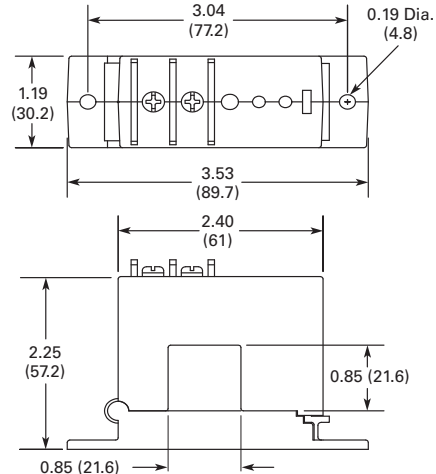
All Solid-Core Models with Top Terminals



ECSJ406SC and ECSJ407SC Solid-Core Models with Front Terminals



All Split-Core Models



Notes

- ① Terminals are #6 screws.
- ② DC contacts are polarity sensitive.

ECS7 Series CurrentWatch Current Switches



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ECS7 Series CurrentWatch Current Switches

Product Description

The CurrentWatch ECS7 Series load monitoring switches from Eaton’s Electrical Sector are designed for overload, underload or operating window applications. Upon sensing an average operating current, the ECS7 Series self-learns and establishes a limit-alarm trip point based on ±15% of the average expected current draw. The ECS7 Series is available in solid- or split-core housing styles.

Application Description

Typical Applications

- **Conveyors**—Use current overload models to detect conveyor jams caused by scenarios such as side-by-sides
- **Electronic Proof of Flow**—More reliable than electro-mechanical pressure or flow switches, with no need for pipe or duct penetrations
- **Pump Protection**—Provides overload (jams) and underload (suction loss) indication

Features

- **Self-Powered and Self-Calibrating**—Reduces installation costs
- **Status Monitoring, Overload and Operating Window Options**—Choose the operating style that matches your application
- **Universal Output**—AC or DC compatibility with any automation system

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ DANGER

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For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

ECS7 Series CurrentWatch Current Switches

Front and Top Terminal Switches

	Power Supply	Output Type	Aperture Size	Intelligent Logic	Catalog Number
Solid-Core Housing 	Solid-Core Housing Self-powered (no external power needed)	Normally open	0.74 in (19 mm)	Over/underload, 1.5–150 A self-calibrating	ECS701SC ①
				Overload only, 1.5–150 A self-calibrating	ECS700SC
				Underload only, 1.5–150 A self-calibrating	ECS702SC
Split-Core Housing 	Split-Core Housing Self-powered (no external power needed)	Normally open	0.85 in (21.6 mm)	Over/underload, 2.8–150 A self-calibrating	ECS711SP ①
				Overload only, 2.8–150 A self-calibrating	ECS710SP
				Underload only, 2.8–150 A self-calibrating	ECS712SP

Accessories

DIN Rail Mounting Kit



ECS7 Series CurrentWatch Current Switches

Description	Catalog Number
DIN rail mounting kit ②	EDINKIT

Notes

- ① Output is closed when current is within $\pm 15\%$ window.
- ② Sensor pictured for reference and not included in kit.

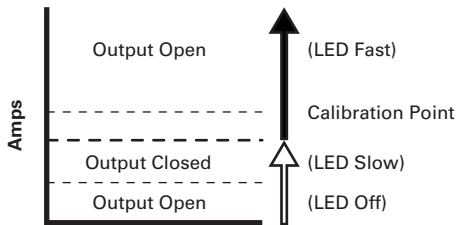
Technical Data and Specifications

ECS7 Series CurrentWatch Current Switches

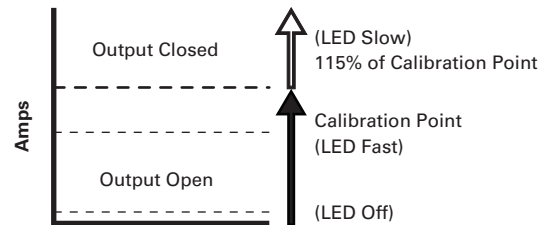
Description	Specification
Power supply	Self-powered—no power supply needed
Output	Magnetically isolated solid-state switch
Output rating	Normally open (NO) models: 0.3 A at 135 Vac/Vdc Not polarity sensitive
Off-state leakage	<10 μ A
Response time	200 ms
Set point range	Solid-core models: 1.5 to 150 A Split-core models: 2.8 to 150 A
Set point	Overload models: +15% of load Underload models: -15% of load Operating window: \pm 5% of set point
Hysteresis	5% of set point
Overload	500 A at 6 sec., 1000 A at 1 sec.
Isolation voltage	UL listed to 1270 Vac, tested to 5000 Vac
Frequency range	6–100 Hz
Sensing aperture	Solid-core models: 0.74 in (19 mm) dia. Split-core models: 0.85 in (21.6 mm) sq.
Housing	UL94 V0 flammability rated
Environmental	Operating temperature: -58 to 122 °F (-50 to 50 °C) Humidity: 0–95% RH, non-condensing

Current Switch Operation

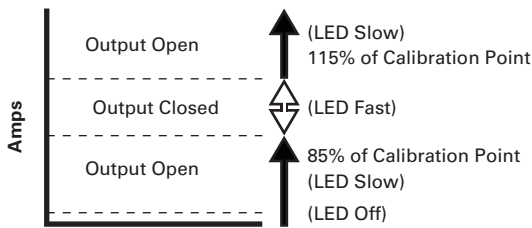
Underload Only Models



Overload Only Models



Over/Underload Models ①



Note

① Output is closed when current is within \pm 15% window.

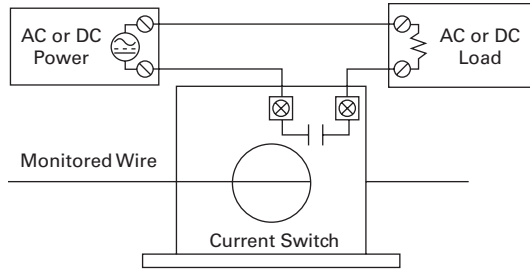
7.5

Current and Voltage Sensors

CurrentWatch ECS7 Series

Wiring Diagram

ECS7 Series CurrentWatch Current Switches

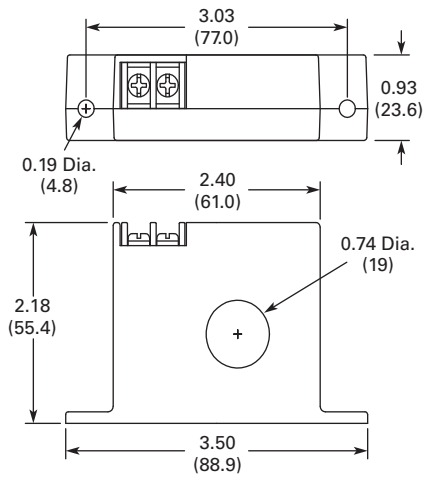


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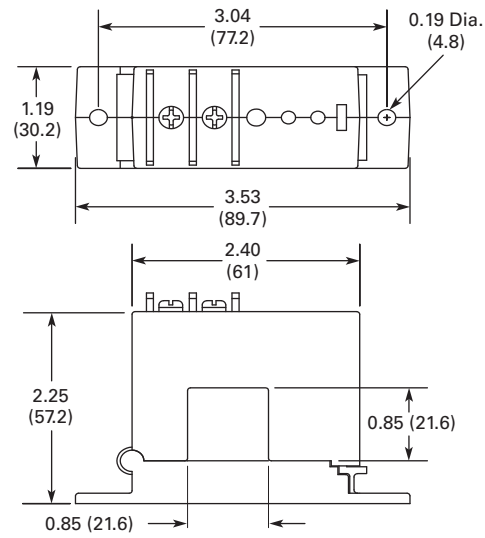
Dimensions

Approximate Dimensions in Inches (mm)

Solid-Core Housing



Split-Core Housing



ECSTD Series CurrentWatch Current Switches



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<i>Description</i>	<i>Page</i>
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ECSTD Series CurrentWatch Current Switches

Product Description

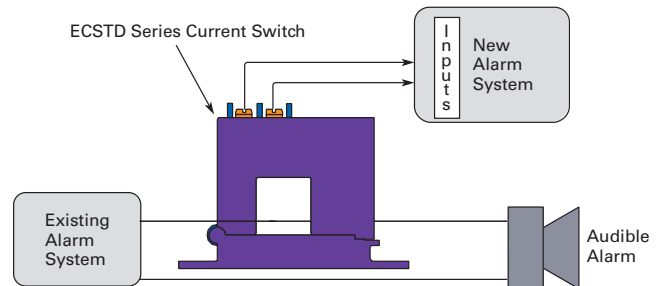
The CurrentWatch ECSTD Series from Eaton’s Electrical Sector is a family of high performance current-operated switches with field-adjustable time delay to help minimize nuisance trips during start-up and operation. Designed for motor status applications where set point accuracy and repeatability are critical, the ECSTD Series offers a linear set point characteristic and constant hysteresis. Standard features include self-powering, jumper-selectable ranges and a choice of outputs and housing styles.

Application Description

Typical Applications

- **Motor Protection**—Serves as an electronic proof-of-operation; detects current draw changes in motors when they encounter problems such as pumps running dry or pending bearing failure; non-intrusive and less expensive to install than differential pressure flow sensors or thermal switches; much quicker response time than Class 10 overload relays
- **High Inrush or Temporary Overload Current**—Adjustable start-up/delay timer allows 0–15 second delay to eliminate nuisance trips from high inrush or short overload conditions

Example Application—
Isolated Alarm System Interfacing



Features

- **Adjustable Start-Up/Delay Timer**—Field adjustable from 0–15 seconds to eliminate nuisance alarms due to start-up inrush or temporary overcurrent conditions
- **Choice of NO/NC AC or Universal Outputs**—Contact ratings of 1.0 A at 240 Vac or universal outputs of 0.15 A at 240 Vac/Vdc (NO models) and 0.2 A at 135 Vac/Vdc (NC models) for use with most standard motor control systems
- **Improved Ease of Installation and Use**—Self-powered, split-core models simplify installation, 1.0 A AC rating eliminates need for time delay relay, and status LED provides visual indication of set point trip and contact action
- **Industrial Grade Performance**—Constant hysteresis and linear response characteristics enhance set point accuracy

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant





Note: ECSTD401SC and ECSTD402SC not listed



DANGER

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Product Selection**ECSTD Series CurrentWatch Current Switches****AC Output Switches (NO/NC 1 A at 240 Vac)**

	Power Supply	Aperture Size	Output Type	Set Point Options	Catalog Number
Solid-Core Housing 	Self powered (no external power needed)	0.75 in (19 mm)	Normally open	Adjustable set points: 1.5–12, 12–55 or 50–175 A	ECSTD401SC
			Normally closed	Adjustable set points: 1.5–12, 12–55 or 50–175 A	ECSTD402SC
Split-Core Housing 	Self powered (no external power needed)	0.85 in (21.6 mm)	Normally open	Adjustable set points: 2–12, 12–55 or 50–200 A	ECSTD404SP
			Normally closed	Adjustable set points: 2–12, 12–55 or 50–200 A	ECSTD405SP

AC/DC Output Switches (NO 0.15 A at 240 Vac/Vdc, NC 0.2 A at 135 Vac/Vdc) ①

	Power Supply	Aperture Size	Output Type	Set Point Options	Catalog Number
Solid-Core Housing 	Self powered (no external power needed)	0.75 in (19 mm)	Normally open	Adjustable set points: 1.5–12, 12–55 or 50–175 A	ECSTD406SC
			Normally closed	Adjustable set points: 1.5–12, 12–55 or 50–175 A	ECSTD407SC
Split-Core Housing 	Self powered (no external power needed)	0.85 in (21.6 mm)	Normally open	Adjustable set points: 2–12, 12–55 or 50–200 A	ECSTD408SP
			Normally closed	Adjustable set points: 2–12, 12–55 or 50–200 A	ECSTD409SP

Note

① Preferred for PLC inputs.

Accessories

DIN Rail Mounting Kit



ECSTD Series CurrentWatch Current Switches

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Technical Data and Specifications

ECSTD Series CurrentWatch Current Switches

Description	Specification
Power supply	Self-powered—no power supply needed
Output	Magnetically isolated solid-state switch
Output rating	AC output models: NO/NC 1 A at 240 Vac AC/DC output models: NO 0.15 A at 240 Vac/Vdc; NC 0.20 A at 135 Vac/Vdc
Off-state leakage	<10 μ A
Response time	Adjustable 0.2 to 15 sec.
Set point range	Solid-core: 1.5–12, 12–55 or 50–175 A Split-core: 2–12, 12–55 or 50–200 A (jumper selectable)
Hysteresis	5% (constant)
Isolation voltage	5000 Vac (tested)
Frequency range	50–100 Hz
Sensing aperture	Solid-core models: 0.75 in (19 mm) dia. Split-core models: 0.85 in (21.6 mm) sq.
Housing	UL94 V0 flammability rated
Environmental	Operating temperature: 5 to 122 °F (–15 to 50 °C) Humidity: 0–95% RH, non-condensing

Overload Ratings

Housing	Range	Maximum Amperes		
		Continuous	Six Seconds	One Second
Solid-core	1.5–175 A	175 A	400 A	1000 A
Split-core	2–200 A	200 A	400 A	1000 A

LED Indication/Output Status

Monitored Amps	Output		
	NO	NC	Smart-LED (If Present)
None or minimum	Open	Closed	Off
Below trip level	Open	Closed	Slow (2 sec.)
Above trip level	Closed	Open	Fast (0.5 sec.)

Note

① Sensor pictured for reference and not included in kit.

7.6

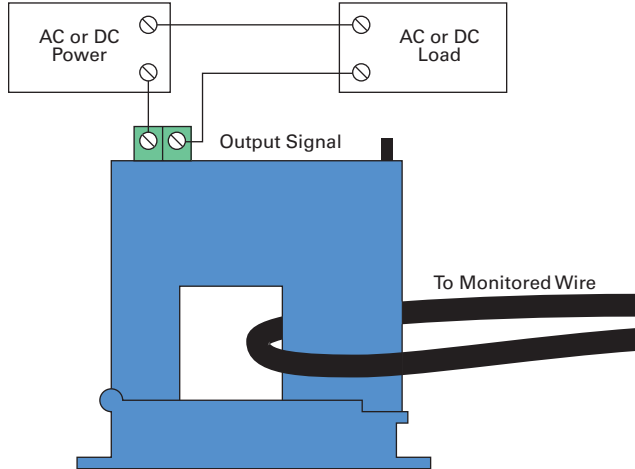
Current and Voltage Sensors

CurrentWatch ECSTD Series

Wiring Diagram

ECSTD Series CurrentWatch Current Switches

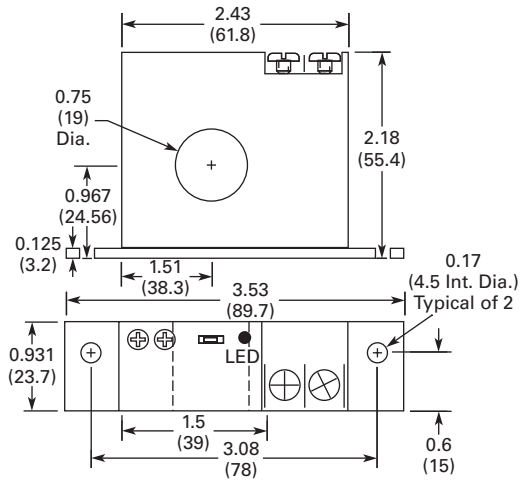
Normally open (NO) models shown



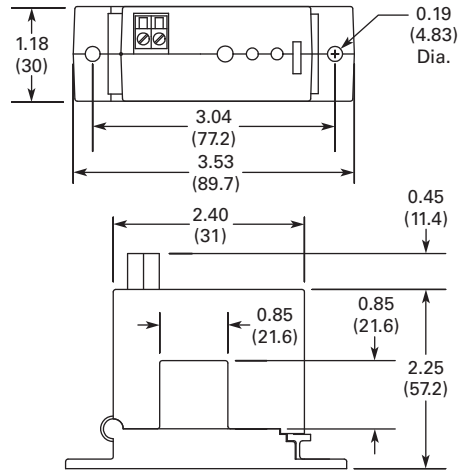
Dimensions

Approximate Dimensions in Inches (mm)

Solid-Core Housing



Split-Core Housing



ECSD Series CurrentWatch Current Switches



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ECSD Series CurrentWatch Current Switches

Product Description

The CurrentWatch ECSD Series current operated switches from Eaton’s Electrical Sector provides the same dependable indication of status offered by the CurrentWatch ECS Series, but with the added benefit of increased set point precision. A choice of three jumper-selectable input ranges allow the ECSD Series to be tailored to an application, providing more precise control through improved set point resolution. Features such as isolated solid-state or mechanical relay outputs; 4-20 A, 10-50 A, and 20-100 A input ranges are standard.

Application Description

Typical Applications

- **Electronic Proof of Flow**—Current operated switches eliminate the need for multiple pipe or duct penetrations and are more reliable than electromechanical pressure or flow switches
- **Welders**—Instant indication of equipment status
- **Large Drive Motors**—Provide monitoring for field loss protection
- **Power Supplies**—Detect and signal over-current condition before equipment damage
- **UPS**—Monitors battery output
- **Ancillary Equipment**

Features

- **Choice of Mechanical Relay or Solid-state Outputs**
 - SPDT (Form C) relay, 5.0 A at 240 Vac or 30 Vdc
 - Solid-state, NO, 0.15 A at 240 Vac/Vdc
- **Easily Adjustable Set Point**—Speeds start-up and reduces inventory
- **Compact, One-Piece Design**—Easily fits in crowded control panels
- **Input Isolation**—Safer than shunt/relay combinations
- **Adaptive Hysteresis**—Hysteresis is five percent of set point, allowing closer control than fixed-hysteresis switches
- **Solid-Core Housings**
- **LED Indication**—Provides quick visual indication of output contact status
- **Built-In Mounting Feet**—Provide for a secure installation

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant



! DANGER

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For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

ECSD Series CurrentWatch Current Switches

Top Terminal Switches

Power Supply	Aperture Size	Output Type, Voltage and Rating	Set Point and LED Configuration	Catalog Number
Solid-Core Housings with Top Terminal				
12 Vac/Vdc	0.74 in (19 mm)	Solid-state, normally open, 0.15 A at 240 Vac/Vdc	Adjustable: 4–20, 10–50, 20–100 A	ECSD112SC
		Mechanical relay, SPDT (Form C), 5.0 A at 240 Vac, 30 Vdc		ECSD212SC
24 Vac/Vdc	0.74 in (19 mm)	Solid-state, normally open, 0.15 A at 240 Vac/Vdc	Adjustable: 4–20, 10–50, 20–100 A	ECSD124SC
		Mechanical relay, SPDT (Form C), 5.0 A at 240 Vac, 30 Vdc		ECSD224SC

Solid-Core Housing with Top Terminal



7

Accessories

DIN Rail Mounting Kit



ECSD Series CurrentWatch Current Switches

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Technical Data and Specifications

ECSD Series CurrentWatch Current Switches

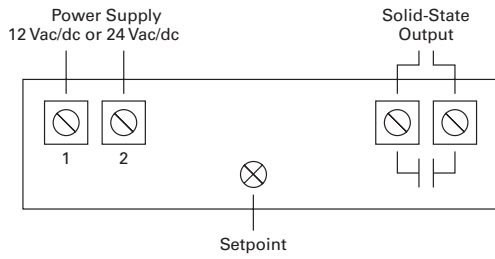
Description	Solid-State Output Models	Mechanical Relay Models
Power supply	12 Vac/Vdc (operates from 10–18 Vac/Vdc) 24 Vac/Vdc (operates from 20–28 Vac/Vdc)	12 Vac/Vdc (operates from 10–18 Vac/Vdc) 24 Vac/Vdc (operates from 20–28 Vac/Vdc)
Output	Isolated solid-state contact	Mechanical relay (SPDT)
Output rating	0.15 A at 240 Vac/Vdc Normally open	5.0 A at 240 Vac 5.0 A at 30 Vdc
Off-state leakage	<10 μ A	—
Response time	100 ms at 10% above set point 20 ms at 100% above set point	—
Set point range	Adjustable: 4–20, 10–50, 20–100 A	—
Hysteresis	5% of set point	—
Overload	1000% of range for 5 sec.	—
Isolation voltage	3 kV	—
Frequency range	DC to 400 Hz	—
Sensing aperture	Solid-core, 0.74 in (19 mm)	—
Housing	UL94 V0 flammability rated	—
Environmental	Operating temperature: –40 to 140 °F (–40 to 60 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing

Note

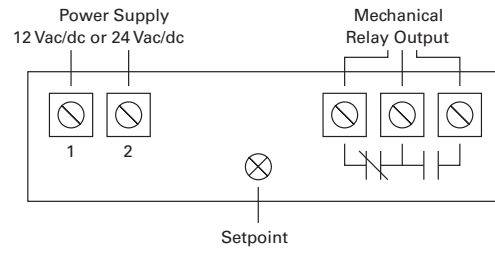
① Sensor pictured for reference and not included with kit.

Wiring Diagrams

Solid-State Output Models



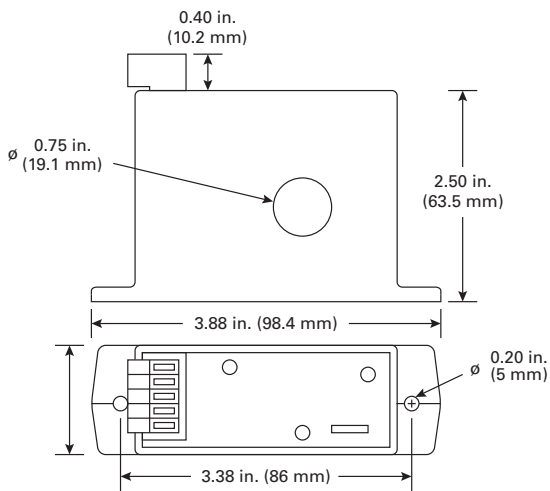
Mechanical Relay Models



Dimensions

Approximate Dimensions in Inches (mm)

Solid-Core Models



EAC Series CurrentWatch Current Sensors



7

EAC Series CurrentWatch Current Sensors

Product Description

The CurrentWatch EAC Series from Eaton's Electrical Sector combines a current transformer and signal conditioner into a single package. The EAC Series has jumper-selected current input ranges and industry standard outputs: 4–20 mA, 0–5 Vdc or 0–10 Vdc. This family of sensors is designed for application on "linear" or sinusoidal AC loads. Available in split-core or solid-core housings.

Application Description

Typical Applications

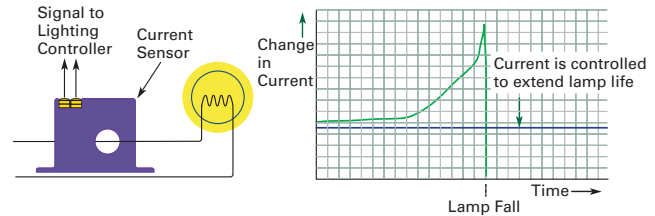
- **Automation Equipment**—Analog current reading for remote monitoring and software alarms
- **Data Loggers**—Self-powered sensor helps conserve data logger batteries
- **Panel Meters**—Simple connection displays power consumption

Contents

Description

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Dimensions	V8-T7-31

Example Application—
Preventative Maintenance of a Critical Lighting System

Features

- **Highly Accurate**—Factory matched and calibrated single-piece sensor is more accurate than traditional two-piece, field-installed solutions
- **Average Responding**—"Average Responding" algorithm gives an RMS output on pure sine waves, perfect for constant speed (linear) loads
- **Jumper Selectable Ranges**—The ability to change input ranges reduces inventory and eliminates zero and span
- **Isolation**—Output is magnetically isolated from the input for safety and elimination of insertion loss (voltage drop)

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications ①

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant






⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Product Selection

EAC Series CurrentWatch Current Sensors

Top Terminal Current Sensors

	Power Supply	Aperture Size	Output Signal	Current Range	Catalog Number
Solid-Core Housing 	Solid-Core Housings				
	Self-powered (no external power needed)	0.74 in (19 mm)	0–5 Vdc	10, 20 or 50 A	EAC105SC
				100, 150 or 200 A	EAC205SC
			0–10 Vdc	10, 20 or 50 A	EAC110SC
	100, 150 or 200 A	EAC210SC			
	24 Vdc loop-powered	4–20 mA	2 or 5 A	EAC0420SC	
10, 20 or 50 A			EAC1420SC		
100, 150 or 200 A			EAC2420SC		
Split-Core Housing 	Split-Core Housings—Self-Powered and 24 Vdc				
	Self-powered (no external power needed)	0.85 in (21.6 mm)	0–5 Vdc	10, 20 or 50 A	EAC105SP
				100, 150 or 200 A	EAC205SP
			0–10 Vdc	10, 20 or 50 A	EAC110SP
	100, 150 or 200 A	EAC210SP			
	24 Vdc loop-powered	4–20 mA	2 or 5 A	EAC0420SP	
10, 20 or 50 A			EAC1420SP		
100, 150 or 200 A			EAC2420SP		
Split-Core Housing 	Split-Core Housings—120 Vac and 24 Vac/Vdc				
	120 Vac	0.85 in (21.6 mm)	4–20 mA	2 or 5 A	EACP0420120SP ②
				10, 20 or 50 A	EACP1420120SP ②
				100, 150 or 200 A	EACP2420120SP ②
	24 Vac/Vdc	4–20 mA	2 or 5 A	EACP042024USP ②	
			10, 20 or 50 A	EACP142024USP ②	
100, 150 or 200 A			EACP242024USP ②		

Notes

- ① EACP models not listed.
- ② Not UL listed.

Accessories

DIN Rail
Mounting Kit

EAC Series CurrentWatch Current Sensors

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

7

Technical Data and Specifications

EAC Series CurrentWatch Current Sensors

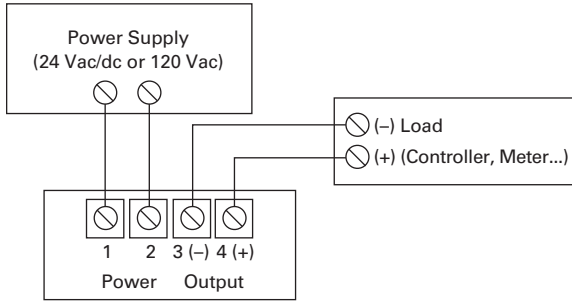
Description	Models with 0–5 Vdc Output Specification	Models with 0–10 Vdc Output Specification	Models with 4–20 mA Output Specification	EACP Series Only Specification
Power supply	Self-powered—no power supply needed	Self-powered—no power supply needed	12–40 Vdc loop-powered	Models ending -OSP: 120 Vac Models ending -USP: 24 Vac/Vdc (40 V maximum)
Output signal	0–5 Vdc	0–10 Vdc	4–20 mA	4–20 mA
Output limit	8.2 Vdc	15 Vdc	23 mA	22.4 mA
Accuracy	1.0% FS	1.0% FS	1.0% FS	1% FS
Response time	100 ms	100 ms	300 ms	100 ms
Frequency range	50–60 Hz	50–60 Hz	20–100 Hz	40–100 Hz
Loading	1M ohm minimum rated accuracy 100 kohms, add 1.3% error	1M ohm minimum rated accuracy 100 kohms, add 1.3% error	See power supply above	50 kohms minimum 500 kohms maximum
Isolation voltage	UL listed to 1270 Vac (tested to 5 kV)	UL listed to 1270 Vac (tested to 5kV)	UL listed to 1270 Vac (tested to 5kV)	UL listed to 1270 Vac (tested to 5kV)
Input ranges	Field selectable ranges from 0–200 A ③	Field selectable ranges from 0–200 A ③	Field selectable ranges from 0–200 A ③	0–200 A jumper selectable
Sensing aperture	Solid-core: 0.74 in (19 mm) dia. Split-core: 0.85 in (21.6 mm) sq.	Solid-core: 0.74 in (19 mm) dia. Split-core: 0.85 in (21.6 mm) sq.	Solid-core: 0.74 in (19 mm) dia. Split-core: 0.85 in (21.6 mm) sq.	0.85 in (21.6 mm)
Housing	UL94 V0 flammability rated	UL94 V0 flammability rated	UL94 V0 flammability rated	UL94 V0 flammability rated
Environmental	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing

Notes

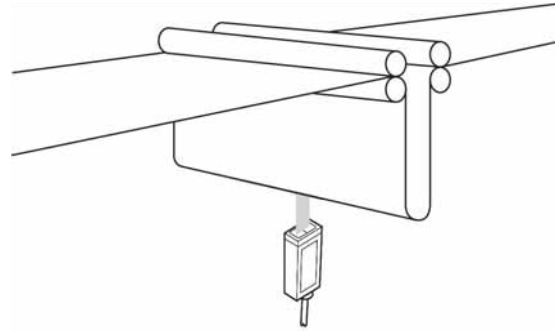
- ① Sensor pictured for reference and not included in kit.
- ② Does not apply to EACP series.
- ③ Additional custom ranges available from factory.

Wiring Diagrams

EACP Models



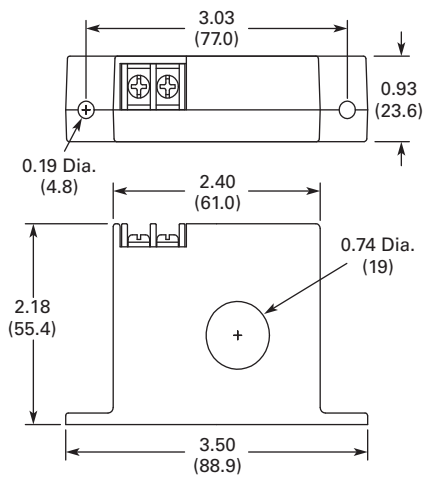
All Other Models



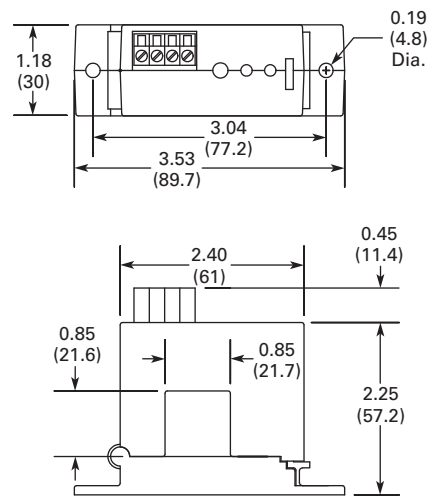
Dimensions

Approximate Dimensions in Inches (mm)

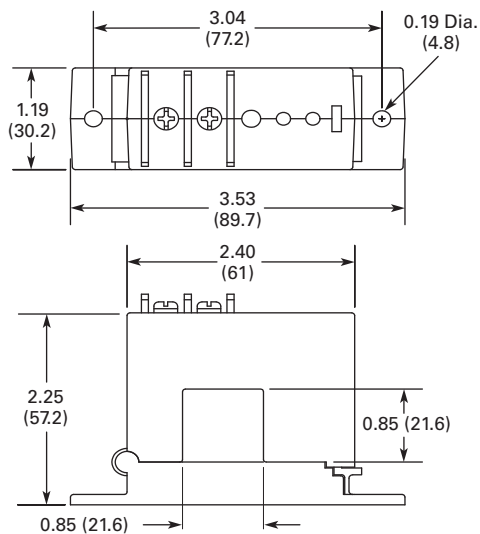
Solid-Core Housing



EACP Series



All Other Models



Note

- ① Pressure plate screw terminals.
12–22 AWG solid or stranded.
Field adjustable set point.

EACR Series CurrentWatch Current Sensors



Contents

<i>Description</i>	<i>Page</i>
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EACR Series CurrentWatch Current Sensors

Product Description

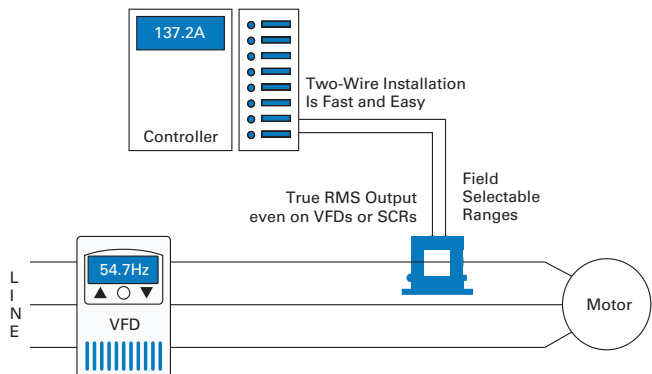
The CurrentWatch EACR Series current sensor family from Eaton’s Electrical Sector combines a current sensor and a “True RMS” signal conditioner into a single package. The EACR Series provides True RMS output on distorted waveforms found on VFD or SCR outputs, and on linear loads in “noisy” power environments. Available in solid- or split-core housings.

Application Description

Typical Applications

- **VFD Controlled Loads**—Monitoring VFD output indicates how the motor and attached load are operating
- **SCR Controlled Loads**—Accurate measurement of phase angle fired or burst fired (time proportioned) SCRs, with faster current measurement than temperature sensors
- **Switching Power Supplies and Electronic Ballasts**—True RMS sensing is the most accurate way to measure power supply or ballast input power

Example Application— Current Sensing for Non-Linear AC Loads



Why “True RMS”?

The current waveform of a typical linear load is a pure sine wave. In VFD and SCR applications, however, output waveforms are rough approximations of a sine wave. There are numerous spikes and dips in each cycle. The CurrentWatch EACR Series current sensors use a mathematical algorithm called “True RMS” which

integrates the actual waveform over time. The output is the amperage component of the true power (heating value) of the AC current waveform. True RMS is the only way to accurately measure distorted AC waveforms. Select the EACR Series sensors for nonlinear loads in “noisy” power environments.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Features

- **True RMS Output**—True RMS technology is accurate on distorted waveforms like VFD or SCR outputs
- **Jumper-Selectable Ranges**—Reduces inventory and eliminates zero and span
- **Isolation**—Output is magnetically isolated from the input for safety and elimination of insertion loss (voltage drop)

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant





⚠ DANGER

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Product Selection

EACR Series CurrentWatch Current Sensors

Top Terminal Current Sensors

	Power Supply	Aperture Size	Output Signal	Current Range	Catalog Number
Solid-Core Housing 	Solid-Core Housing 24 Vdc loop-powered	0.74 in (19 mm)	4–20 mA	2 or 5 A	EACR0420SC
				10, 20 or 50 A	EACR1420SC
				100, 150 or 200 A	EACR2420SC
Split-Core Housing 	Split-Core Housing 24 Vdc loop-powered	0.85 in (21.6 mm)	4–20 mA	2 or 5 A	EACR0420SP
				10, 20 or 50 A	EACR1420SP
				100, 150 or 200 A	EACR2420SP

Accessories

DIN Rail Mounting Kit



EACR Series CurrentWatch Current Sensors

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Note

① Sensor pictured for reference and not included in kit.

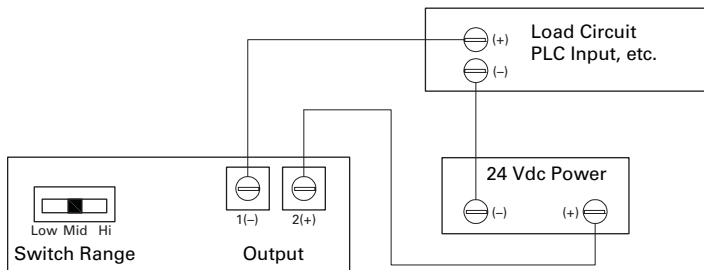
Technical Data and Specifications

EACR Series CurrentWatch Current Sensors

Description	Specification
Power supply	24 Vdc loop-powered, 40 Vdc maximum
Output signal	4–20 mA
Output limit	23 mA
Accuracy	1.0% FS
Response time	600 ms (to 90% step change)
Frequency range	10–400 Hz
Isolation voltage	UL listed to 1270 Vac (Tested to 5 kV)
Input ranges	Field selectable ranges from 0–200 A ^①
Sensing aperture	Solid-core: 0.74 in (19 mm) dia. Split-core: 0.85 in (21.6 mm) sq.
Housing	UL94 V0 flammability rated
Environmental	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing

Wiring Diagram

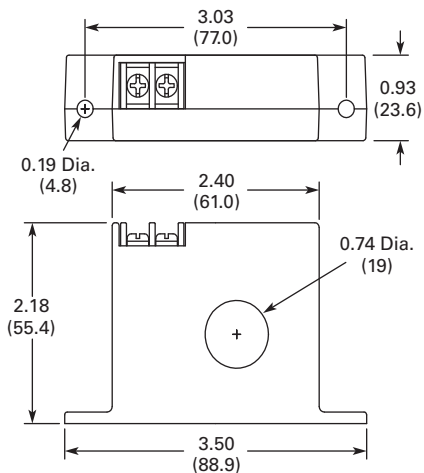
EACR Series CurrentWatch Current Sensors^②



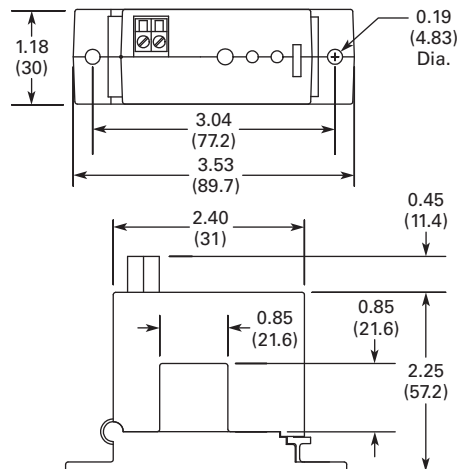
Dimensions

Approximate Dimensions in Inches (mm)

Solid-Core Housing



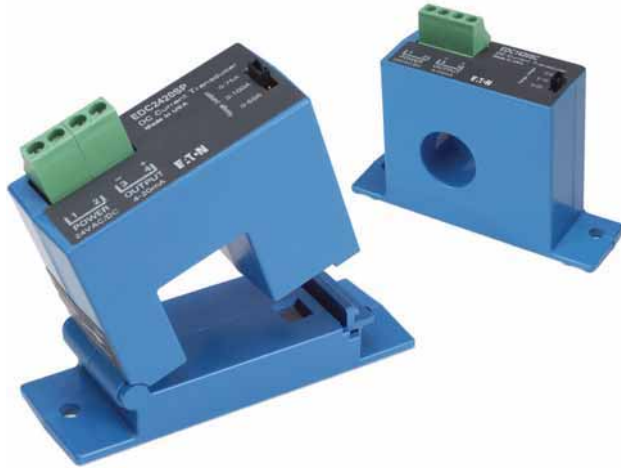
Split-Core Housing



Notes

- ① Additional custom ranges available from factory.
- ② Deadfront captive screw terminals (split-core housing models only).
12–22 AWG solid or stranded.
Observe polarity.

EDC Series CurrentWatch Current Sensors



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EDC Series CurrentWatch Current Sensors

Product Description

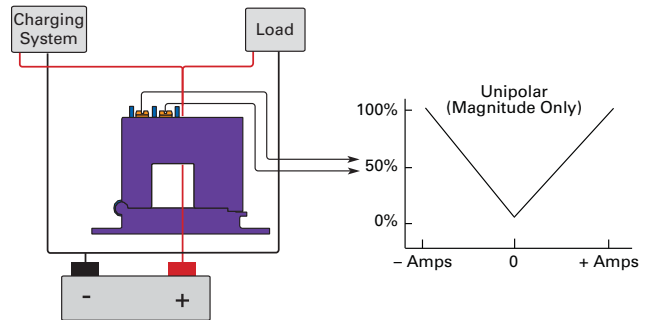
The CurrentWatch EDC Series from Eaton’s Electrical Sector combines a hall effect sensor and signal conditioner into a single package for use in DC current applications up to 300 A. The EDC Series has jumper-selected current input ranges and industry standard outputs: 4–20 mA, 0–5 Vdc or 0–10 Vdc. Available in split-core models for quick and easy installation.

Application Description

Typical Applications

- **Battery Banks**—Monitor load current, monitor charging current and verify operation
- **Transportation**—Measures traction power or auxiliary loads
- **Electric Heating Elements**—Monitor heater loads with a faster response time than temperature sensors

Example Application—Battery Charging System



Features

- **Jumper-Selectable Ranges**—Reduce inventory and eliminate zero or span pots
- **Isolation**—Output is magnetically isolated from the input for safety, also eliminating insertion loss (voltage drop)
- **Internal Power Regulation**—Works well with low cost, unregulated power supplies
- **Split Core Design and Built-In Mounting Brackets**—Make installation quick and easy

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant






⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Product Selection

EDC Series CurrentWatch Current Sensors

Top Terminal Current Sensors

	Power Supply	Aperture Size	Output Signal	Current Range	Catalog Number
Split-Core Housing 	Split-Core Housing—Uni-Polar Output, see Output Graph on Page V8-T7-37				
	24 Vac/Vdc	0.85 in (21.6 mm)	0–5 Vdc	50, 75 or 100 A	EDC205SP
				100, 150 or 200 A	EDC305SP
				150, 225 or 300 A	EDC405SP
	0–10 Vdc			50, 75 or 100 A	EDC210SP
				100, 150 or 200 A	EDC310SP
				150, 225 or 300 A	EDC410SP
	4–20 mA			50, 75 or 100 A	EDC2420SP
				100, 150 or 200 A	EDC3420SP
				150, 225 or 300 A	EDC4420SP
Split-Core Housing 	Split-Core Housing—Bidirectional Output, see Output Graph on Page V8-T7-37				
	24 Vac/Vdc	0.85 in (21.6 mm)	–10 to +10 Vdc	0–100 A	EDCB100SP
				0–300 A	EDCB300SP
				0–400 A	EDCB400SP
Solid-Core Housing 	Solid-Core Housing—Single-Polarity Output, see Output Graph on Page V8-T7-37				
24 Vac/Vdc	0.75 in (19 mm)	4–20 mA	5, 10 or 20 A	EDC1420SC	

Accessories

DIN Rail Mounting Kit



CurrentWatch EDC Series

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

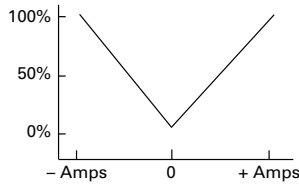
Technical Data and Specifications

EDC Series CurrentWatch Current Sensors

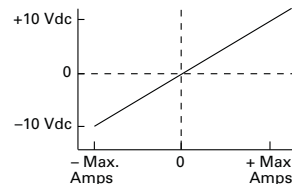
Description	Models with 0–5 Vdc Output Specification	Models with 0–10 Vdc Output Specification	Models with 4–20 mA Output Specification
Power supply	24 Vac/Vdc (22–38 Vac/Vdc) 2 VA maximum	24 Vac/Vdc (22–38 Vac/Vdc) 2 VA maximum	24 Vac/Vdc (22–38 Vac/Vdc) 2 VA maximum
Output signal	0–5 Vdc	0–10 Vdc	4–20 mA
Output limit	5.75 Vdc	11.5 Vdc	23 mA
Accuracy	Solid-core models: 1% FS Split-core models: 2% FS 300 A models: 1.5% FS	Solid-core models: 1% FS Split-core models: 2% FS 300 A models: 1.5% FS	Solid-core models: 1% FS Split-core models: 2% FS 300 A models: 1.5% FS
Response time	Solid-core models: 20 ms (to 90% of step change) Split-core models: 100 ms (to 90% of step change)	Solid-core models: 20 ms (to 90% of step change) Split-core models: 100 ms (to 90% of step change)	Solid-core models: 20 ms (to 90% of step change) Split-core models: 100 ms (to 90% of step change)
Frequency range	DC	DC	DC
Loading	25 kohms minimum	50 kohms minimum	650 ohms maximum
Isolation voltage	3 kV (monitored line to output)	3 kV (monitored line to output)	3 kV (monitored line to output)
Linearity	0.75% FS	0.75% FS	0.75% FS
Current ranges	Field selectable ranges from 0–300 A	Field selectable ranges from 0–300 A	Field selectable ranges from 0–300 A
Sensing aperture	Solid-core housings: 0.75 in (19 mm) dia. Split-core housings: 0.85 in (21.6 mm) sq.	Solid-core housings: 0.75 in (19 mm) dia. Split-core housings: 0.85 in (21.6 mm) sq.	Solid-core housings: 0.75 in (19 mm) dia. Split-core housings: 0.85 in (21.6 mm) sq.
Environmental	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing	Operating temperature: –4 to 122 °F (–20 to 50 °C) Humidity: 0–95% RH, non-condensing

Output Graphs

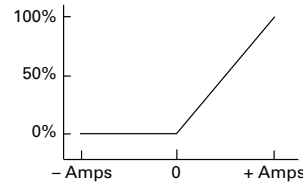
Uni-Polar Output for Split-Core



Bidirectional Output for Split-Core



Standard Analog Output for Solid-Core



Note

① Sensor pictured for reference and not included in kit.

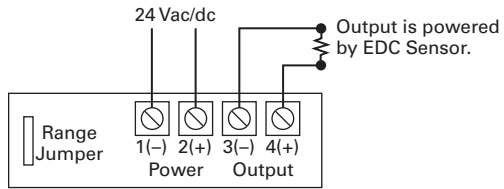
7.10

Current and Voltage Sensors

CurrentWatch EDC Series

Wiring Diagram

EDC Series CurrentWatch Current Sensors

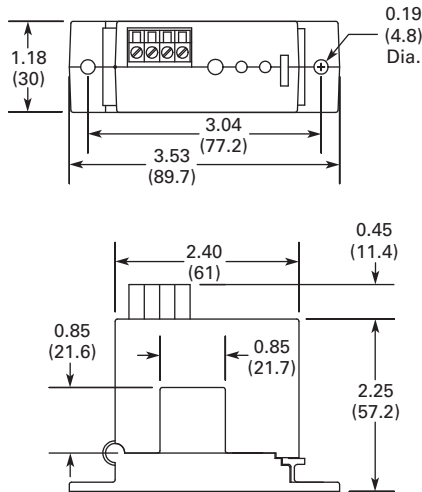


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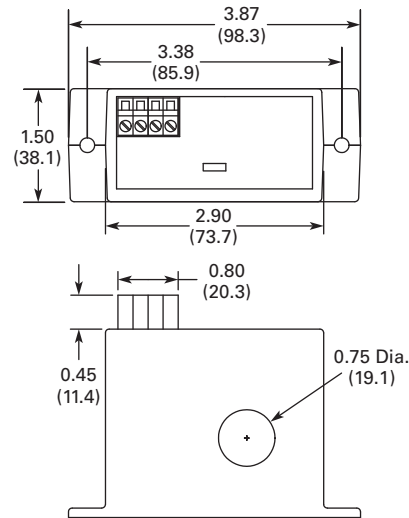
Dimensions

Approximate Dimensions in Inches (mm)

Split-Core Housing



Solid-Core Housing



EGF Series CurrentWatch Current Sensors



EGF Series CurrentWatch Current Sensors

Product Description

The CurrentWatch EGF Series from Eaton’s Electrical Sector 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 solid-state outputs offers the benefit of reliable, long-lasting solid-state switches. Solid-state design provides unlimited switch operating life, superior resistance to shock and vibration, zero off-state leakage, high switch speeds and high input-output isolation.

The EGF Series with mechanical relay outputs is available in solid-core housings with a choice of NO or NC SPST latching relays and a SPDT Form C relay with auto-reset.

Application Description

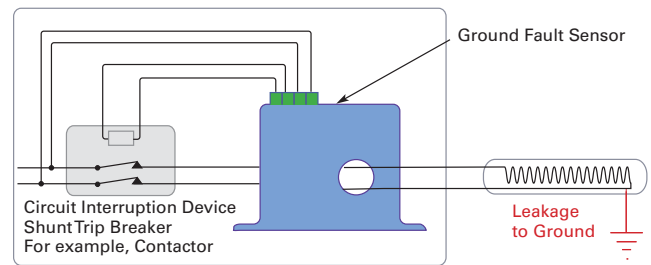
Typical Applications

- Personnel Protection (Typically 5 mA)**—Detects sensitive ground fault conditions, which could cause injury to people, and functions as a sensor and alarm trigger when applied as an input to an overall ground fault protection system
- Equipment Protection (Typically 10 or 30 mA)**—For applications where personnel protection is not the primary concern, higher set point capability helps eliminate nuisance tripping while still providing adequate ground fault detection to protect machine electronics
- Regulatory**—Meets requirements as stipulated by governmental and industrial regulatory groups for ground fault sensing

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Dimensions	V8-T7-43

Example Application—Insulation Breakdown Monitoring



“Zero Sequence” Operating Principle

In three-phase delta and wye systems, under normal conditions, current in the “hot” leg of a two-wire load is equal in magnitude but opposite in sign to the current in a neutral leg. As a result, the electromagnetic fields surrounding these two conductors cancel, producing a “zero sum current.” As

soon as current leaks to ground (fault condition), the two currents become imbalanced and a net magnetic field results. The CurrentWatch EGF Series sensors monitor this field and trip the contacts when the leakage rises above the set point.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Features

- **Broad Range of Options to Meet Application Needs**—NO or NC, solid-state or mechanical relays, normally energized or normally de-energized contacts
- **Set Point Options Maximize Ease-of-Use and Application Flexibility**—Field selectable 5, 10 or 30 mA set points on the EGF “tri-set” models make user adjustments fast, sure and convenient
- **Compatible with Standard Equipment**—Application on single- and three-phases systems, ideal for use with shunt trip breakers, and magnetically isolated from monitored circuit and control power

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Product Selection

EGF Series CurrentWatch Current Sensors

Solid-State Output Sensors

Solid-Core Housing



Power Supply	Set Point	AC Solid-State Output	DC Solid-State Output	Contacts	Catalog Number	
Solid-Core Housings						
120 Vac	Fixed, 50 mA	Solid-state, NO, 1 A at 240 Vac	—	Normally energized	EGF1NOACNE050	
				Normally de-energized	EGF1NOACDE050	
		Solid-state, NC, 1 A at 240 Vac	—	Normally energized	EGF1NCACNE050	
				Normally de-energized	EGF1NCACDE050	
		—	Solid-state, NO, 0.15 A at 30 Vdc	Normally energized	EGF1NODCNE050	
				Normally de-energized	EGF1NODCDE050	
	—	Solid-state, NC, 0.15 A at 30 Vdc	Normally energized	EGF1NCDCNE050		
			Normally de-energized	EGF1NCDCDE050		
	120 Vac	Fixed, 100 mA	Solid-state, NO, 1 A at 240 Vac	—	Normally energized	EGF1NOACNE100
					Normally de-energized	EGF1NOACDE100
			Solid-state, NC, 1 A at 240 Vac	—	Normally energized	EGF1NCACNE100
					Normally de-energized	EGF1NCACDE100
—			Solid-state, NO, 0.15 A at 30 Vdc	Normally energized	EGF1NODCNE100	
				Normally de-energized	EGF1NODCDE100	
—		Solid-state, NC, 0.15 A at 30 Vdc	Normally energized	EGF1NCDCNE100		
			Normally de-energized	EGF1NCDCDE100		
120 Vac		Tri-set adjustable, 5, 10 or 30 mA	Solid-state, NO, 1 A at 240 Vac	—	Normally energized	EGF3NOACNET3
					Normally de-energized	EGF3NOACDET3
			Solid-state, NC, 1 A at 240 Vac	—	Normally energized	EGF3NCACNET3
					Normally de-energized	EGF3NCACDET3
	—		Solid-state, NO, 0.15 A at 30 Vdc	Normally energized	EGF3NODCNET3	
				Normally de-energized	EGF3NODCDET3	
—	Solid-state, NC, 0.15 A at 30 Vdc	Normally energized	EGF3NCDCNET3			
		Normally de-energized	EGF3NCDCDET3			

Mechanical Relay Output Sensors

Solid-Core Housing



Power Supply	Set Point	Mechanical Relay Output	Contacts	Catalog Number	
Solid-Core Housings					
120 Vac	Fixed, 50 mA	Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NOLA050	
		Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NCLA050	
		Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)	Normally energized	EGF1SPDTNE050	
			Normally de-energized	EGF1SPDTDE050	
		Fixed, 100 mA	Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NOLA100
			Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NCLA100
	Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)		Normally energized	EGF1SPDTNE100	
		Normally de-energized	EGF1SPDTDE100		
	Tri-set adjustable, 5, 10 or 30 mA	Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NOLAT3	
			Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF1NCLAT3
				Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)	Normally energized
		Normally de-energized	EGF1SPDTDET3		
24 Vac/Vdc		Fixed, 50 mA	Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NOLA050
			Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NCLA050
	Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)		Normally energized	EGF2SPDTNE050	
			Normally de-energized	EGF2SPDTDE050	
	Fixed, 100 mA		Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NOLA100
			Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NCLA100
		Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)	Normally energized	EGF2SPDTNE100	
	Normally de-energized		EGF2SPDTDE100		
	Tri-set adjustable, 5, 10 or 30 mA	Mechanical relay, NO SPST relay, Form A (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NOLAT3	
			Mechanical relay, NC SPST relay, Form B (1 A at 120 Vac, 2 A at 30 Vdc)	Latching relay	EGF2NCLAT3
				Mechanical relay, SPDT Form C, auto-reset (1 A at 120 Vac, 2 A at 30 Vdc)	Normally energized
		Normally de-energized	EGF2SPDTDET3		

Accessories

DIN Rail Mounting Kit



EGF Series CurrentWatch Current Sensors

Description	Catalog Number
DIN rail mounting kit ①	EDINKIT

Note

① Sensor pictured for reference and not included in kit.

Technical Data and Specifications

EGF Series CurrentWatch Current Sensors

Description	Solid-State Output Models Specification	Mechanical Relay Output Models Specification
Power supply	120 Vac (55–110% of nominal voltage) 24 Vac/Vdc ($\pm 20\%$)	120 Vac (55–110% of nominal voltage) 24 Vac/Vdc ($\pm 20\%$)
Output contact type	Isolated dry contact	Mechanical relay
Output rating (switching current and switching voltage)	AC output switching models: 1 A at 240 Vac DC output switching models: 0.15 A at 30 Vdc	Auto reset models, SPDT relay: 1 A at 120 Vac; 2 A at 30 Vdc Latching models, SPST relay: 1 A at 120 Vac; 2 A at 30 Vdc
Off-state leakage	NO models: $<10 \mu\text{A}$ NC models: $<2.5 \text{ mA}$	None
Response time	200 ms at 5% above trip point 60 ms at 50% above trip point 15 ms at 500% above trip point	200 ms at 5% above trip point 60 ms at 50% above trip point 15 ms at 500% above trip point
Frequency range	50–400 Hz (monitored circuit)	50–400 Hz (monitored circuit)
Loading	2 VA maximum	2 VA maximum
Isolation voltage	5000 Vac (tested)	5000 Vac (tested)
Sensing aperture	0.74 in (19 mm) diameter	0.74 in (19 mm) diameter
LED indicator	Green LED for power ON status; red LED for contact status	Green LED for power ON status; red LED for contact status
Housing	UL94 V0 flammability rated	UL94 V0 flammability rated
Environmental	Operating temperature: -4 to $122 \text{ }^\circ\text{F}$ (-20 to $50 \text{ }^\circ\text{C}$) Humidity: 0–95% RH, non-condensing	Operating temperature: -4 to $122 \text{ }^\circ\text{F}$ (-20 to $50 \text{ }^\circ\text{C}$) Humidity: 0–95% RH, non-condensing

Output Tables

Protection from faults and control power loss.

Normally Energized Models

	No Power	Control Power Applied	
		No Fault	Fault
Normally open models	Open	Closed	Open
Normally closed models	Closed	Open	Closed

Normally De-Energized Models

	No Power	Control Power Applied	
		No Fault	Fault
Normally open models	Open	Open	Closed
Normally closed models	Closed	Closed	Open

Latching (Mechanical Relay Output) Models

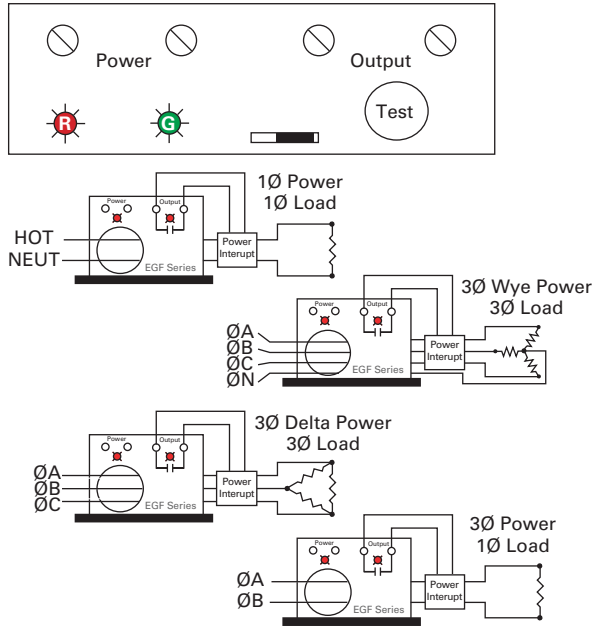
Latching models power up initially in the rest (normal) mode. If there is a fault condition or the test button is pushed, the output contacts will change state and latch.

The output will remain latched regardless of whether the fault is cleared or control power is removed. To reset the output, apply a momentary contact across “reset” terminals.

Wiring Diagrams

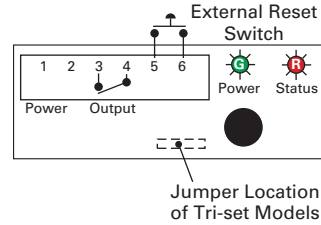
Solid-State Output Models

All Models

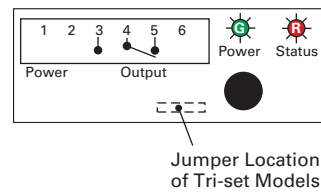


Mechanical Relay Output Models

Latching Models



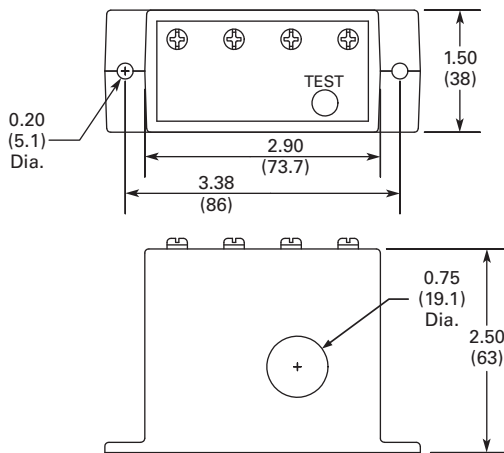
Auto Reset Models



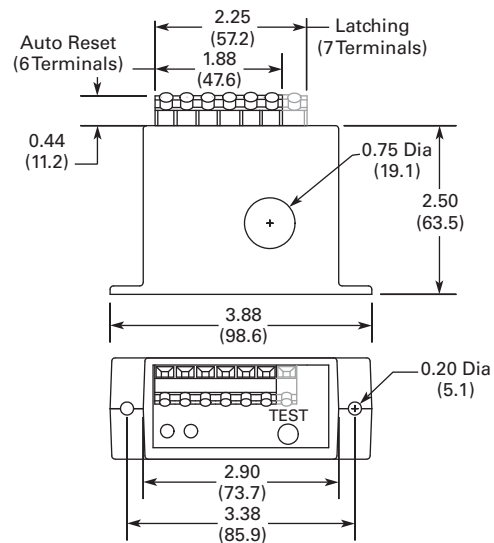
Dimensions

Approximate Dimensions in Inches (mm)

Solid-State Output Models



Mechanical Relay Models



EGFL Series CurrentWatch Current Sensors



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EGFL Series CurrentWatch Current Sensors

Product Description

The CurrentWatch EGFL Series from Eaton’s Electrical Sector 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. For more information, see “Zero Sequence” Operating Principle on this page. The EGFL Series is available with either solid-state or mechanical relay outputs.

The EGFL Series with mechanical relays are available in solid-core housings with a choice of NO or NC SPST latching relays and a SPDT Form C relay with auto-reset. All mechanical models can be ordered with a fixed set point or with a “tri-set” option, which provides three factory-set, field adjustable set points.

Application Description

Typical Applications

- Personnel Protection (Typically 5 mA)**—Detects sensitive ground fault conditions, which could cause injury to people, and functions as a sensor and alarm trigger when part of an overall ground fault protection system
- Equipment Protection (Typically 10 or 30 mA)**—For applications where personnel protection is not the primary concern, higher set point capability helps eliminate nuisance tripping while still providing adequate ground fault detection to protect machine electronics
- Regulatory**—Meets requirements as stipulated by governmental and industrial regulatory groups for ground fault sensing

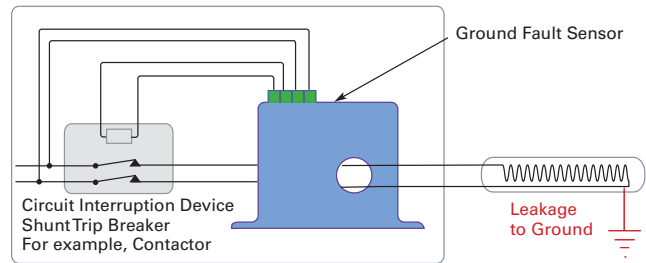
Contents

Description

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Dimensions	V8-T7-46

Example Application—Insulation Breakdown Monitoring



“Zero Sequence” Operating Principle

In three-phase delta and wye systems, under normal conditions, current in the “hot” leg of a two-wire load is equal in magnitude but opposite in sign to the current in a neutral leg. As a result, the electromagnetic fields surrounding these two conductors cancel, producing a “zero sum current.” As

soon as current leaks to ground (fault condition), the two currents become imbalanced and a net magnetic field results. The CurrentWatch EGFL Series sensors monitor this field and trip alarm contacts when the leakage rises above the set point.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578.

For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Features

- **Broad Range of Options to Meet Application Needs**—Mechanical relays, normally energized or normally de-energized contacts
- **Set Point Options Maximize Ease-of-Use and Application Flexibility**—Field selectable 5, 10 or 30 mA set points on the EGFL “tri-set” models make user adjustments fast, sure and convenient
- **Compatible with Standard Equipment**—Application on single- and three-phase systems, ideal for use with shunt trip breakers, and magnetically isolated from monitored circuit and control power

Standards and Certifications

- UL Listed
- UL tested to Canadian safety standards
- CE
- RoHS Compliant




⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

Product Selection

EGFL Series CurrentWatch Current Sensors

Mechanical Relay Sensors

	Power Supply	Set Point	Output Type	Contacts	Catalog Number
Solid-Core Housing 	Solid-Core Housings				
	120 Vac	Tri-set adjustable, 5, 10 or 30 mA	Mechanical relay, NO SPST relay, Form A	Latching relay	EGFL1NOLAT3
			Mechanical relay, NC SPST relay, Form B	Latching relay	EGFL1NCLAT3
			Mechanical relay, SPDT Form C, auto-reset	Normally energized	EGFL1SPDTNET3
	Normally de-energized	EGFL1SPDDET3			
	24 Vac/Vdc	Tri-set adjustable, 5, 10 or 30 mA	Mechanical relay, NO SPST relay, Form A	Latching relay	EGFL2NOLAT3
			Mechanical relay, NC SPST relay, Form B	Latching relay	EGFL2NCLAT3
			Mechanical relay, SPDT Form C, auto-reset	Normally energized	EGFL2SPDTNET3
				Normally de-energized	EGFL2SPDDET3

Technical Data and Specifications

EGFL Series CurrentWatch Current Sensors

Description	Specifications
Power supply	120 Vac (55–110% of nominal voltage) 24 Vac/Vdc (± 20%)
Output signal	Mechanical relay
Output rating	Auto reset models, SPDT relay: 1 A at 125 Vac; 2 A at 30 Vdc Latching models, SPST relay: 1 A at 125 Vac; 2 A at 30 Vdc
OFF-state leakage	None
Response time	200 ms at 5% above trip point 60 ms at 50% above trip point 15 ms at 500% above trip point
Frequency range	50–400 Hz (monitored circuit)
Loading	2 VA max.
Isolation voltage	5000 Vac (tested)
Sensing aperture	1.83 in (46.5 mm) diameter
LED indicator	Green LED for power ON status Red LED for contact status
Housing	UL94 V0 flammability rated
Environmental	Operating temperature: –4 to +122 °F (–20 to +50 °C) Humidity: 0–95% RH, non-condensing

7.12

Current and Voltage Sensors

CurrentWatch EGFL Series

Output Tables

Protection from faults and control power loss.

Normally Energized Models

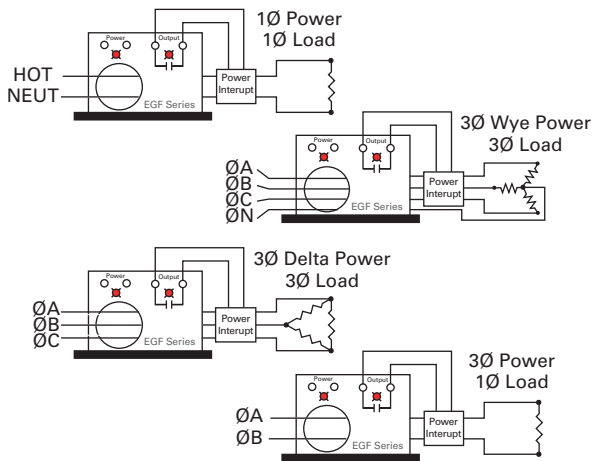
	No Power	Control Power Applied	
		No Fault	Fault
Normally open models	Open	Closed	Open
Normally closed models	Closed	Open	Closed

Normally De-Energized Models

	No Power	Control Power Applied	
		No Fault	Fault
Normally open models	Open	Open	Closed
Normally closed models	Closed	Closed	Open

Wiring Diagrams

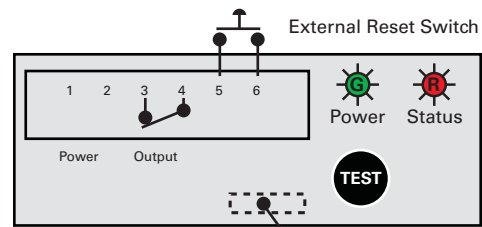
General Wiring Diagram for Ground Fault Sensors



Latching Models

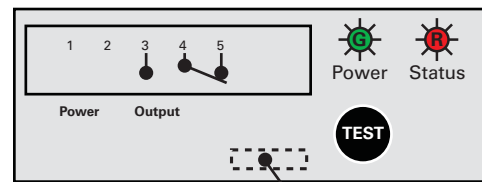
Latching models power up initially in the rest (normal) mode. If there is a fault condition or the test button is pushed, the output contacts will change state and latch. The output will remain latched regardless of whether the fault is cleared or control power is removed. To reset the output, apply a momentary contact across "reset" terminals.

Latching Models



Jumper Location for Tri-Set Models

Auto Reset Models



Jumper Location for Tri-Set Models

Dimensions

Approximate Dimensions in Inches (mm)

Mechanical Relay Models

