

Installation Instructions

CurrentWatch™ ECSTD Series AC Current Switches with Time Delay



WARNING

IN ORDER TO AVOID ELECTRIC SHOCK OR OTHER POSSIBLE INJURY:

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

MODELS COVERED IN THIS MANUAL

Catalog Number	Description
ECSTD401SC	AC, Solid Core, N.O., 1.5-12, 12-55 or 50-175A Setpoints
ECSTD402SC	AC, Solid Core, N.C., 1.5-12, 12-55 or 50-175A Setpoints
ECSTD404SP	AC, Split Core, N.O., 2-12, 12-55 or 50-200A Setpoints
ECSTD405SP	AC, Split Core, N.C., 2-12, 12-55 or 50-200A Setpoints
ECSTD406SC	AC/DC, Solid Core, N.O., 1.5-12, 12-55 or 50-175A Setpoints
ECSTD407SC	AC/DC, Solid Core, N.C., 1.5-12, 12-55 or 50-175A Setpoints
ECSTD408SP	AC/DC, Split Core, N.O., 2-12, 12-55 or 50-200A Setpoints
ECSTD409SP	AC/DC, Split Core, N.C., 2-12, 12-55 or 50-200A Setpoints

INTRODUCTION

The CurrentWatch™ ECSTD Series are 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 setpoint accuracy and repeatability are critical, the ECSTD Series offers a linear setpoint characteristic and constant hysteresis.

Standard features include self-powering, jumper-selectable ranges and a choice of outputs and housing styles cases. Models are available which provide N.O. or N.C. AC contacts or solid-state N.O. or N.C. "universal" contact outputs which can switch AC or DC. Contact action can be delayed for up to 15 seconds by using the Time Delay Adjust potentiometer.

Eaton's current sensor family encompasses a broad range of products for cost-effective monitoring, status, and predictive maintenance. Downtime and costly repairs can be avoided by utilizing Eaton's products and technologies in your control systems.



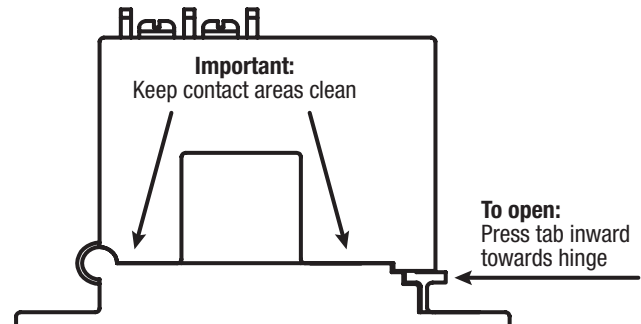
INSTALLATION

Considerations for all ECSTD Series models...

- Run wire to be monitored through the aperture (opening) in the switch body
- These switches can be located in the same environment as motors, contactors, heaters, pull-boxes and other electrical enclosures
- Mounting can be done in any position or hung directly on a wire with a wire tie
- Be sure to leave at least one inch distance between sensor and other magnetic devices

Considerations for split-core models only...

- Press the tab in the direction shown below to open the sensor.
- After placing the wire in the aperture, press the hinged portion firmly downward until a click is heard and the tab pops out fully.
- Keep split-core contact areas clean. Silicon grease is factory applied on the mating surfaces to prevent rust and improve performance. Be careful not to allow grit or dirt into the grease in the contact area, particularly on core mating surfaces of split core models. Sensor operation could be impaired if mating surfaces do not have good contact. Check visually before closing.



QUICK INSTALL GUIDE

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

1. Run the wire to be monitored through the aperture
2. Mount the sensor
3. Connect output wiring
 - a. Use up to 14 AWG copper wires
 - b. Ensure load matches the output shown on the switch label
4. Adjust the setpoint
 - a. Choose correct range by positioning the range jumper (removed for low, across two appropriate pins for medium, or high)
 - b. Use the potentiometer to adjust the setpoint

SETPOINT ADJUSTMENT

The CurrentWatch™ ECSTD Series setpoint and time delay are adjusted through two four-turn pots (on split-core models) and 15-turn pots (on solid-core models). The unit comes from the factory with setpoint and time delay set to the lowest level (fully counter-clockwise). Turning the pots clockwise will increase their value. All pots have a slip-clutch to prevent damage at either end of their rotation. To determine where the adjustment is, turn the pot all the way counter-clockwise. This will return it to the minimum setpoint.

Important Setpoint Adjustment Notes

- Output contacts are solid-state. Check output status by applying the appropriate voltage to the contacts and reading the voltage drop across the contacts. An Ohmmeter set on “continuity” will give misleading results.
- It is recommended the setpoint be adjusted to allow for the usual utility company voltage variations of 10 to 15 percent.

Typical Adjustment Steps

1. Identify expected Input Range and position jumper accordingly. For LOW range, remove jumper entirely. For MID or HIGH range, place jumper over proper two pins.
2. Turn the setpoint pot to the minimum value (four turns for split-core models and fifteen turns for solid-core models).
3. Have normal operating current running through the switch. The output should be tripped because the pot is at its minimum setpoint. For units with LED, it should be flashing fast (two to three times per second).
4. Turn the pot clockwise until the unit un-trips. This is indicated by the slow flashing of the LED (once every two to three seconds), or by the changing of the output switch status.
5. Now turn the pot counter-clockwise slowly until the unit trips again.
 - a. To set underload, turn the pot about 1/8 turn further counter-clockwise
 - b. To set overload, turn the pot about 1/8 turn further clockwise
6. Adjust the time delay of the contact action in the same fashion. Increase time delay by turning the pot clockwise. For split-core models, each quarter-turn corresponds *roughly* to one second of delay time. Expect ten turns for a 15 second delay.

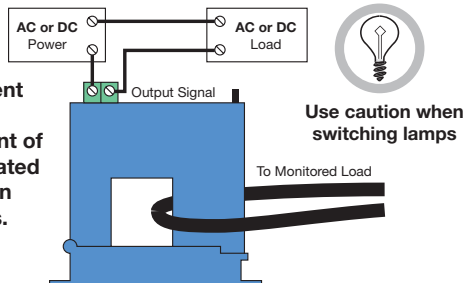
LED INDICATION / OUTPUT STATUS

Monitored Amps	Output		Smart-LED (If Present)
	N.O.	N.C.	
None or Minimum	Open	Closed	Off
Below Trip Level	Open	Closed	Slow (2 sec.)
Above Trip Level	Closed	Open	Fast (0.5 sec.)

WIRING DIAGRAM

Connect control or monitoring wires to the sensor. Use up to 14 AWG copper wire and tighten terminals to 5 inch-pounds torque. Be sure the output load does not exceed the solid state output rating.

CAUTION! Incandescent lamps can have “cold filament inrush” current of up to ten times their rated amperage. Use caution when switching lamps.



RANGES AND MAXIMUM AMPS

Housing	Range	Maximum Amps		
		Continuous	6 sec.	1 sec.
Solid Core	1.5-175A	150A	400A	1,000A
Split Core	2-200A	150A	400A	1,000A

HYSTERESIS

Setting	Hysteresis
Low	<0.01A
Mid	<0.1A
High	<0.5A

SWITCHING DELAY

Delay Type	Low Range	Mid Range	High Range
On Delay	0.23 sec. max.	0.05 sec. max.	0.03 sec. max.
Off Delay	0.02 sec. max.	0.02 sec. max.	0.01 sec. max.

TROUBLESHOOTING

Problem	Solution
Switch is always tripped	The setpoint may be too low. Turn pot clock-wise to increase setpoint.
	Switch may have been overloaded and contacts are burned out. Check the output load, remembering to include inrush on inductive loads (coils, motors).
Switch will not trip	The setpoint may be too high. Turn pot counter-clockwise to decrease setpoint.
	For split core models, the core contact area may be dirty. Open the sensor and clean the contact area.
	The monitored current may be below the minimum required. Loop the monitored wire several times through the aperture until the “sensed” current rises above the minimum. The sensed amps equals “actual amps” multiplied by the “number of loops.” Count loops on the inside of the aperture.
	Switch may have been overloaded and contacts are burned out. Check the output load, remembering to include inrush on inductive loads (coils, motors).

SPECIFICATIONS

Specification	Value
Power Supply	Self Powered—No Power Supply Needed
Output	Magnetically Isolated Solid State Switch
Output Rating	AC-Only Models: N.O./N.C. 1A @ 240V AC AC/DC Models: N.O. 0.15A @ 240V AC/DC N.C. 0.20A @ 135V AC/DC
Off-State Leakage	ECSTD402SC and ECSTD405SP Models: 2.5 mA All Other Models: Negligible
Response Time	Adjustable, 0.12 to 15 seconds
Setpoint Range	Solid Core Models: 1.5-12, 12-55 and 50-175A Split Core Models: 2-12, 12-55 and 50-200A
Setpoint Adjustment	Solid Core Models: 15-Turn Potentiometer Split Core Models: 4-Turn Potentiometer
Hysteresis	Constant 5% of Setpoint
Overload	See “Ranges and Maximum Amps” in Above Table
Isolation Voltage	UL Listed to 1,270V AC, Tested to 5,000V AC
Frequency Range	50-100Hz
Sensing Aperture	Solid Core Models: 0.75 in. (19mm) dia. Split Core Models: 0.85 in. (21.7mm) sq.
Housing	UL94 V0 Flammability Rated
Environmental	Operating Temperature: -58 to +149° F (-50 to +65° C) Humidity: 0-95% RH, Non-Condensing
Approvals	UL and ULC Listed (Pending) CE Certified (Pending)