

Installation Instructions

CurrentWatch™ ECSJ Series Current Sensors

Self-Powered AC Current Sensors with Jumper Selectable Current Ranges



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
ECSJ400SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.O., 1A @ 240V AC
ECSJ406SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.O., 15A @ 120V AC
ECSJ401SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.C., 1A @ 240V AC
ECSJ407SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.C., 15A @ 120V AC
ECSJ420SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.O., 0.15A @ 30V DC
ECSJ424SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.O., 0.15A @ 30V DC
ECSJ421SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.C., 0.15A @ 30V AC
ECSJ404SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.O., 3A @ 120V AC
ECSJ405SC	Solid Core, 1-6/6-40/40-175A Current Ranges, N.C., 3A @ 120V AC
ECSJ402SP	Split Core, 1.75-6/6-40/40-200A Current Ranges, N.O., 1A @ 240V AC
ECSJ403SP	Split Core, 1.75-6/6-40/40-200A Current Ranges, N.C., 1A @ 240V AC
ECSJ422SP	Split Core, 1.75-6/6-40/40-200A Current Ranges, N.O., 0.15A @ 30V DC
ECSJ423SP	Split Core, 1.75-6/6-40/40-200A Current Ranges, N.O., 0.15A @ 30V DC

INTRODUCTION

The CurrentWatch™ ECSJ Series current operated switches provide the same dependable indication of status offered by the CurrentWatch™ ECS Series, but with the added benefit of increased setpoint accuracy.

A choice of three, jumper selectable input ranges allows the ECSJ Series to be tailored to an application, providing more precise control through improved setpoint resolution. Self-powering, isolated solid-state outputs, 1-6A, 6-40A and 40-200A input ranges, and a choice of split or solid core enclosures are standard.

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

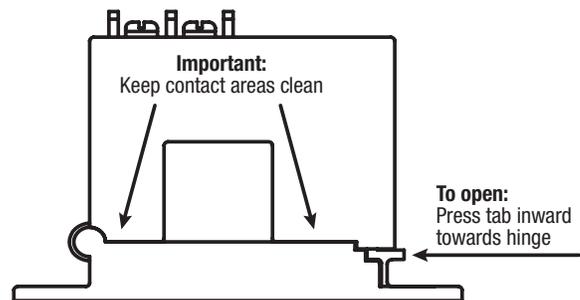
Considerations for all ECSJ Series models...

- 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 on a wire
- The high current (15A) solid state relay in the ECSJ406SC and ECSJ407SC models generates heat when the switched circuit rises over three amps. To dissipate this heat, mount the sensor on a steel or aluminum surface for at least one square foot (930 cm²). Thermal transfer compound is recommended.



Considerations for ECSJ split-core models...

- To open the switch, press the tab inward (toward the body of the switch) as shown below
- 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 the contact areas of split-core switches clean at all times



QUICK INSTALL GUIDE

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

1. Run the wire to be monitored through the aperture
2. Connect output wiring
 - a. Use up to 14 AWG copper wires
 - b. Ensure load matches the output shown on the switch label
3. Adjust the setpoint
 - a. Choose correct range by positioning the range jumper
 - b. Use the potentiometer to adjust the setpoint

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.

SETPOINT ADJUSTMENT

The CurrentWatch™ ECSJ Series features two setpoint adjustment mechanisms.

- First, select the setpoint range with the range jumper.
- Then, fine tune the setpoint with the four-turn potentiometer (pot). See the product label for amp ranges and jumper positions.

The four-turn pot is shipped from the factory set fully clock-wise to the lowest setpoint. Turning the pot counter-clockwise will increase the setpoint. The pot has a slip-clutch to prevent damage at either end of its rotation. To determine where the adjustment is, turn the pot all the way 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 and load and then 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 voltage variations of 10 to 15 percent.

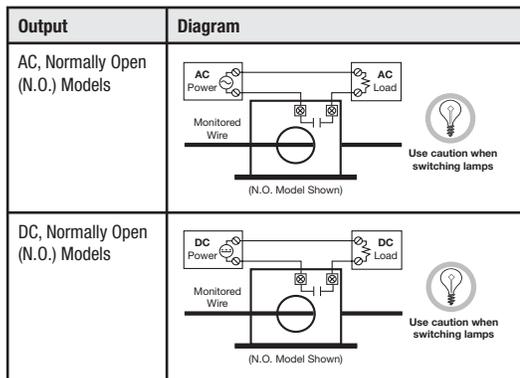
Typical Adjustment Steps

1. Move the jumper to the desired range. Then, turn the pot to the minimum setpoint (four turns clockwise).
 2. Have normal operating current running through the switch. The output should be tripped since the pot is at its minimum setpoint. For units with an LED, it should be flashing fast (two to three times per second).
 3. Turn the pot counter-clockwise until the unit un-trips. This is indicated by the slow flashing of the LED (once every two to three seconds), or by changing of the output switch status.
 4. Now turn the pot clockwise slowly until the unit trips again. It is now set at the current level being monitored.
 - a. To set underload, turn the pot about 1/8 turn further clockwise
 - b. To set overload, turn the pot about 1/8 turn further counter-clockwise
- For ECSJ421SC models, the LED does not flash. Steady LED-on indicates contact has been opened.

WIRING DIAGRAMS

Connect control or monitoring wires to the sensor. Use up to 14 AWG copper wire and tighten terminals to 7 inch-pounds torque. Be sure the output load does not exceed the switch rating. The DC output models are polarity sensitive.

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

Range Jumper	Range		Maximum Amps	
	Solid Core	Split Core	6 sec.	1 sec.
None	1-6A	1.75-6A	400A	600A
Mid	6-40A	6-40A	500A	800A
High	40-175A	40-200A	800A	1,200A

HYSTERESIS

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

TROUBLESHOOTING

Problem	Solution
Switch is always tripped	The jumper may be set in a range that is too low for current being monitored. Move jumper to the correct range.
	The setpoint may be too low. Turn pot counter-clockwise to increase setpoint.
	For DC models only, polarity might be mismatched. Check polarity on output wiring and correct as needed.
Switch will not trip	Switch may have been overloaded and contacts are burned out. Check the output load, remembering to include inrush on inductive loads (coils, motors, ballasts).
	The jumper may be set in a range that is too high for current being monitored. Move jumper to the correct range.
	The setpoint may be too high. Turn pot counter-clockwise to decrease setpoint.
	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.
	For split core models, the contact area may be dirty. Open the sensor and clean the contact area.

SPECIFICATIONS

	AC Models	DC Models
Power Supply	Self Powered—No Power Supply Needed	
Output	Isolated Solid State Switch	
Output Rating	Standard Models: 1.0A @ 240V AC Models Ending -04SC/-05SC: 3.0A @ 120V AC Models Ending -06SC/07SC: 15A @ 120V AC 10A @ 240V AC	Standard Models: 0.15A @ 30V DC ECSJ430SC: 0.15A @ 30V DC Form C SPDT
Off-State Leakage	N.O. Models: < 10 µA N.C. Models: 2.5 mA	N.O. Models: < 10 µA N.C. Models: 1.4 mA
Response Time	40-120 ms	
Setpoint Range	Solid Core Models: 1-6, 6-40, 40-175A Split Core Models: 1.75-6, 6-40 and 40-200A	
Hysteresis	Low: 6%; Mid: 4%; High: 3%	
Overload	1-6A: 6 sec. @ 400A; 1 sec. @ 600A 6-40A: 6 sec. @ 500A; 1 sec. @ 800A 40-175A: 6 sec. @ 800A; 1 sec. @ 1,200A	
Isolation Voltage	UL Listed to 1,270V AC, Tested to 5,000V AC	
Frequency Range	6-100Hz	
Sensing Aperture	Solid Core, Front Terminal Models: 0.55 in. (14mm) dia. Solid Core, Top Terminal Models: 0.74 in. (19mm) dia. Split Core Models: 0.85 in. (21.6mm) sq.	
Housing	UL94 V0 Flammability Rated	
Environmental	Operating Temperature: -58 to +122° F (-50 to +50° C)	
Approvals	UL 508 Industrial Control Equipment (USA and Canada) CE Certified	