

## ECS SERIES

### Current Sensors



### Description

The ECS Series of single-phase AC current sensors is a universal, overcurrent or undercurrent sensing control. Its built-in toroidal sensor eliminates the inconvenience of installing a stand-alone current transformer. Includes onboard adjustments for current sensing mode, trip point, and trip delay. Detects over or undercurrent events like locked rotor, loss of load, an open heater or lamp load, or proves an operation is taking place or has ended.

### Operation

Input voltage must be supplied at all times for proper operation. When a fault is sensed throughout the trip delay, the output relay is energized. When the current returns to the normal run condition or zero, the output and the delay are reset. If a fault is sensed and then corrected before the trip delay is completed, the relay will not energize and the trip delay is reset to zero.

### Adjustment

Select the desired function, over or under current sensing. Set the trip point and trip delay to approximate settings. Apply power to the ECS and the monitored load. Turn adjustment and watch the LED. LED will light; turn slightly in opposite direction until LED is off. Adjustment can be done while connected to the control circuitry if the trip delay is set at maximum. To increase sensitivity, multiple turns may be made through the ECS's toroidal sensor. The appropriate trip point range is determined by multiplying the amperage load by the number of turns/passes through the toroidal sensor. When using an external CT, select a 2VA, 0-5A output CT rated for the current to be monitored. Select ECS adjustment range 0. Pass one secondary wire lead through the ECS toroid and connect the secondary leads together.

### Wiring Diagram



V = Voltage  
I> = Overcurrent  
I< = Undercurrent  
W = Insulated Wire Carrying Monitored Current

Relay contacts are isolated. Arrow on the toroid points toward the load.

### Ordering Information

See next page.

### Features & Benefits

| FEATURES  | BENEFITS   |
|---|--|
| <b>Built-in toroidal current sensing</b>          | Eliminates need to install stand-alone current transformer and provides isolation from monitored circuit |
| <b>Encapsulated</b>                               | Protects against shock, vibration, and humidity  |
| <b>Adjustable mode, trip point and trip delay</b> | Provides flexibility for use in many applications  |
| <b>10A, SPDT isolated relay output</b>            | Allows control of AC voltage loads   |

### Accessories



**P1015-13** (AWG 10/12), **P1015-64** (AWG 14/16), **P1015-14** (AWG 18/22) **Female Quick Connect**  
These 0.25 in. (6.35 mm) female terminals are constructed with an insulator barrel to provide strain relief.

## ECS SERIES

### Ordering Information

| MODEL        | SENSING                          | INPUT VOLTAGE | TRIP POINT ADJUSTABLE | TRIP DELAY | SENSING DELAY ON STARTUP |
|--------------|----------------------------------|---------------|-----------------------|------------|--------------------------|
| ECS20BC      | Selectable, over or undercurrent | 24VAC         | 0.5 - 5A              | 0.5 - 50s  | 1s                       |
| ECS21BC      | Selectable, over or undercurrent | 24VAC         | 2 - 20A               | 0.5 - 50s  | 1s                       |
| ECS2HBC      | Selectable, over or undercurrent | 24VAC         | 5 - 50A               | 0.5 - 50s  | 1s                       |
| ECS30AC      | Selectable, over or undercurrent | 24VDC         | 0.5 - 5A              | 0.150 - 7s | 1s                       |
| ECS40A       | Selectable, over or undercurrent | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 0s                       |
| ECS40AC      | Selectable, over or undercurrent | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 1s                       |
| ECS40BC      | Selectable, over or undercurrent | 120VAC        | 0.5 - 5A              | 0.5 - 50s  | 1s                       |
| ECS41A       | Selectable, over or undercurrent | 120VAC        | 2 - 20A               | 0.150 - 7s | 0s                       |
| ECS41AC      | Selectable, over or undercurrent | 120VAC        | 2 - 20A               | 0.150 - 7s | 1s                       |
| ECS41BC      | Selectable, over or undercurrent | 120VAC        | 2 - 20A               | 0.5 - 50s  | 1s                       |
| ECS41BD      | Selectable, over or undercurrent | 120VAC        | 2 - 20A               | 0.5 - 50s  | 2s                       |
| ECS41BH      | Selectable, over or undercurrent | 120VAC        | 2 - 20A               | 0.5 - 50s  | 6s                       |
| ECS4HBC      | Selectable, over or undercurrent | 120VAC        | 5 - 50A               | 0.5 - 50s  | 1s                       |
| ECS4HBH      | Selectable, over or undercurrent | 120VAC        | 5 - 50A               | 0.5 - 50s  | 6s                       |
| ECS60AH      | Selectable, over or undercurrent | 230VAC        | 0.5 - 5A              | 0.150 - 7s | 6s                       |
| ECS60BC      | Selectable, over or undercurrent | 230VAC        | 0.5 - 5A              | 0.5 - 50s  | 1s                       |
| ECS61BC      | Selectable, over or undercurrent | 230VAC        | 2 - 20A               | 0.5 - 50s  | 1s                       |
| ECS6HAH      | Selectable, over or undercurrent | 230VAC        | 5 - 50A               | 0.150 - 7s | 6s                       |
| ECSH21F2.5C  | Overcurrent                      | 24VAC         | 2 - 20A               | 2.5s       | 1s                       |
| ECSH30AC     | Overcurrent                      | 24VDC         | 0.5 - 5A              | 0.150 - 7s | 1s                       |
| ECSH31AD     | Overcurrent                      | 24VDC         | 2 - 20A               | 0.150 - 7s | 2s                       |
| ECSH31F.08D  | Overcurrent                      | 24VDC         | 2 - 20A               | 0.08s      | 2s                       |
| ECSH3HF0.08D | Overcurrent                      | 24VDC         | 5 - 50A               | 0.08s      | 2s                       |
| ECSH34F.08C  | Overcurrent                      | 24VDC         | 4A non-adjustable     | 0.08s      | 1s                       |
| ECSH40A      | Overcurrent                      | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 0s                       |
| ECSH40AC     | Overcurrent                      | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 1s                       |
| ECSH40AD     | Overcurrent                      | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 2s                       |
| ECSH41AC     | Overcurrent                      | 120VAC        | 2 - 20A               | 0.150 - 7s | 1s                       |
| ECSH41AD     | Overcurrent                      | 120VAC        | 2 - 20A               | 0.150 - 7s | 2s                       |
| ECSH41BC     | Overcurrent                      | 120VAC        | 2 - 20A               | 0.5 - 50s  | 1s                       |
| ECSH41F.08D  | Overcurrent                      | 120VAC        | 2 - 20A               | 0.08s      | 2s                       |
| ECSH4HAD     | Overcurrent                      | 120VAC        | 5 - 50A               | 0.150 - 7s | 2s                       |
| ECSH4HF.08D  | Overcurrent                      | 120VAC        | 5 - 50A               | 0.08s      | 2s                       |
| ECSH61AD     | Overcurrent                      | 230VAC        | 2 - 20A               | 0.150 - 7s | 2s                       |
| ECSL31A      | Undercurrent                     | 24VDC         | 2 - 20A               | 0.150 - 7s | 0s                       |
| ECSL40AC     | Undercurrent                     | 120VAC        | 0.5 - 5A              | 0.150 - 7s | 1s                       |
| ECSL40B      | Undercurrent                     | 120VAC        | 0.5 - 5A              | 0.5 - 50s  | 0s                       |
| ECSL40BH     | Undercurrent                     | 120VAC        | 0.5 - 5A              | 0.5 - 50s  | 6s                       |
| ECSL41A      | Undercurrent                     | 120VAC        | 2 - 20A               | 0.150 - 7s | 0s                       |
| ECSL41AD     | Undercurrent                     | 120VAC        | 2 - 20A               | 0.150 - 7s | 2s                       |
| ECSH4HAD     | Overcurrent                      | 120VAC        | 5 - 50A               | 0.150 - 7s | 2s                       |
| ECSL41AH     | Undercurrent                     | 120VAC        | 2 - 20A               | 0.150 - 7s | 6s                       |
| ECSL4HAC     | Undercurrent                     | 120VAC        | 5 - 50A               | 0.150 - 7s | 1s                       |
| ECSL4HBH     | Undercurrent                     | 120VAC        | 5 - 50A               | 0.5 - 50s  | 6s                       |
| ECSL61AH     | Undercurrent                     | 230VAC        | 2 - 20A               | 0.150 - 7s | 6s                       |
| ECSL6HAC     | Undercurrent                     | 230VAC        | 5 - 50A               | 0.150 - 7s | 1s                       |

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## ECS SERIES

### Specifications

#### Sensor

**Type** Toroidal through hole wiring  
**Mode** Over or undercurrent, switch selectable on the unit or factory fixed

**Trip Point Range** 0.5 - 50A in 3 adjustable ranges or fixed

#### Tolerance

**Adjustable** Guaranteed range  
**Fixed** 0.5 - 25A: 0.5A or  $\pm 5\%$  whichever is less;  
26 - 50A:  $\pm 2.5\%$

**Maximum Allowable Current** Steady – 50A turns;  
Inrush – 300A turns for 10s

**Trip Point Hysteresis**  $\approx \pm 5\%$

**Trip Point vs. Temperature**  $\pm 5\%$

**Response Time**  $\leq 75\text{ms}$

**Frequency** 45/500 Hz

**Type of Detection** Peak detection

#### Trip Delay

**Type** Analog

#### Range

**Adjustable** 0.150 - 7s; 0.5 - 50s (guaranteed ranges)

**Factory Fixed**  $\pm 10\%$

**Delay vs. Temperature**  $\pm 15\%$

**Sensing Delay on Startup** Factory fixed 0 - 6s: +40%, -0%

#### Input

**Voltage** 24, 120, or 230VAC; 12 or 24VDC

#### Tolerance

**12VDC & 24VDC/AC** -15 - 20%

**120 & 230VAC** -20 - 10%

**AC Line Frequency** 50/60 Hz

#### Output

**Type** Electromechanical relay

**Form** Isolated, SPDT

**Rating** 10A resistive @ 240VAC; 1/4 hp @ 125VAC;

1/2 hp @ 250VAC

**Life** Mechanical –  $1 \times 10^6$ ; Electrical –  $1 \times 10^5$

#### Protection

**Circuitry** Encapsulated

**Isolation Voltage**  $\geq 2500\text{V RMS}$  input to output

**Insulation Resistance**  $\geq 100 \text{ M}\Omega$

#### Mechanical

**Mounting** Surface mount with two #6 (M3.5 x 0.6) screws

**Dimensions** **H** 88.9 mm (3.5"); **W** 63.5 mm (2.5");

**D** 44.5 mm (1.75")

**Termination** 0.25 in. (6.35 mm) male quick connect terminals (5)

#### Environmental

**Operating/Storage Temperature** -40° to 60°C / -40° to 85°C

**Humidity** 95% relative, non-condensing

**Weight**  $\approx 6.4 \text{ oz}$  (181 g)

### Function Diagrams



NO = Normally Open Contact  
NC = Normally Closed Contact  
A = Sensing Delay On Start Up  
TD = Trip Delay  
TP = Trip Point  
R = Reset  
OC = Monitored Current

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