

CP5 SERIES

Single-phase current monitor



Description

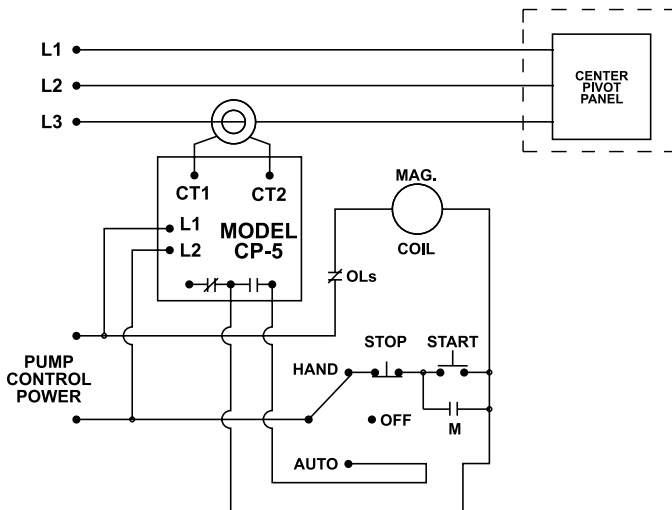
The CP5 Series are undercurrent monitors designed to monitor one leg of a 3-phase system. It is commonly used as a tower monitor on center pivot irrigation systems to detect stalled or jammed towers to prevent over watering.

The CP5 Series has both an adjustable trip level and an adjustable trip delay timer. When the current is sensed, the CP5 Series activates its output relay, thus starting the motor/pump. When the current in the monitored power line falls below the user-selectable trip point, the unit goes through a trip delay timer and then deactivates the output relay if the monitored current does not recover first.

Features & Benefits

FEATURES	BENEFITS
Adjustable trip level (0-5A)	Provides ability to precisely set the current trip point for any application
Adjustable trip delay (0-10m)	Prevents nuisance tripping due to power line fluctuations
600V rated relay contacts available on CP-5-460 model	Eliminates the need for a control transformer to step voltage down to 120 - 240V for a control circuit

Wiring Diagram



Specifications

Input Characteristics

Nominal Input Voltage

CP5115	115VAC
CP5460	460VAC
Frequency	50*/60Hz

Functional Characteristics

Operating Points

Trip Level	0-5 Amps
Trip Delay	0-10 minutes
Restart	1 second

Output Characteristics

Output Contact Rating (SPDT)

Pilot Duty	
CP5115	480VA @ 240VAC
CP5460	470VA @ 600VAC

General Characteristics

Terminal	
Torque	7 in.-lbs.
Wire Size	12-18AWG
Safety Marks	
UL	UL508 (File #E68520)
Dimensions	H 74.4 mm (2.93"); W 133.9 mm (5.27"); D 74.9 mm (2.95")
Weight	1 lb. (16 oz., 453.59 g)
Mounting Method	#8 screws

*Note: 50Hz will increase all delay timers by 20%

Ordering Information

MODEL	LINE VOLTAGE
CP5115	115VAC
CP5460	460VAC

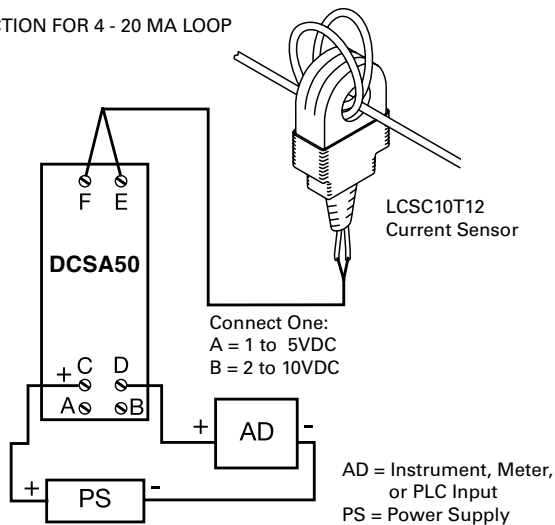
DCSA SERIES

Current Transducers

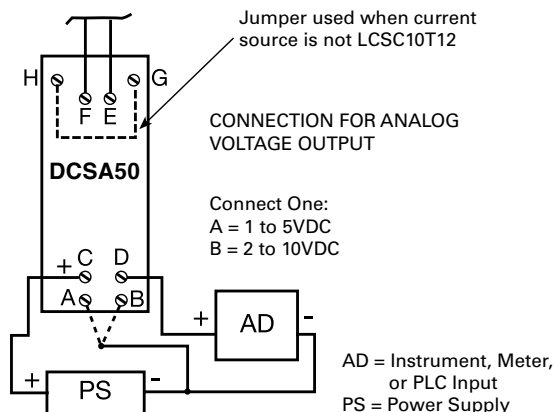


Wiring Diagram

CONNECTION FOR 4 - 20 MA LOOP



To LCSC10T12 Current Sensor



Description

The DCSA Series is a loop-powered, linear output current transducer that provides an output that is directly proportional to the RMS AC current passing through the LCSC10T12 sensor. The DCSA Series provides either an analog current or voltage: 4-20 mA, 1 to 5VDC, or 2 to 10VDC. Each unit is factory calibrated for monitoring (with the LCSC10T12 connected) in one of four ranges; 0-5, 0-10, 0-20, or 0-50A. Zero and span adjustments allow field calibration if needed. The DCSA Series mounts on both DIN 1 and DIN 3 rails.

Operation

The DCSA Series varies the effective resistance of its output in direct proportion to the current flowing in the conductor monitored by the LCSC10T12. Connecting the power supply to terminals C & D provides a 4 to 20mA DC current. Connect the power supply to terminals C & A to get 1 to 5VDC at terminal D. Connect the power supply to terminals C & B to get 2 to 10VDC at terminal D.

Features

- Mounts on DIN 1 or DIN 3 rail
- 0-50A in 4 ranges using LCSC10T12 sensor
- Loop powered from 10 to 30VDC
- Linear output from 4-20mA, 1-10VDC
- Zero & span adjustments
- Separate sensor & control unit

Accessories



LCSC10T12 Toroidal Current Sensor

Remote monitoring of currents up to 50A.

Ordering Information

MODEL	CURRENT RANGE WITH LCSC10T12	INPUT RANGE (F TO E)
DCSA5	0-5A	0-5mA AC
DCSA20	0-20A	0-20mA AC
DCSA50	0-50A	0-50mA AC

If you don't find the part you need, call us for a custom product 800-843-8848

DCSA SERIES

Specifications

Input

Ranges (without LCSC10T12 connected)

4 factory calibrated ranges in mA AC

0 - 5mA, 0 - 10mA, 0 - 20mA, or 0 - 50mA AC

Factory calibration

±0.5% of full scale

Repeat Accuracy

±0.25% of full scale under fixed conditions

Response Time

≈ 300ms

Temperature Coefficient

±0.05%/°C

Input to Output

Not isolated

Output

Type

Current directly proportional to input current

Analog

Range

4 - 20mA, or 1 to 5VDC or 2 to 10VDC

Supply Voltage*

10 to 30VDC

Momentary Voltage

40VDC for 1m

Zero Adjust

≈ 3.75 - 4.25mA

Span Adjust

18mA - 22mA

Adjustment

Mini-screw, multi-turn potentiometer

Protection

Dielectric Breakdown

≥ 2500V RMS terminals to mounting surface

Insulation Resistance

≥ 100 MΩ

Polarity

Units are reverse polarity protected

Mechanical

Mounting

DIN 1 & DIN 3 rail mounting

Termination

Wire clamp

For 22 - 14AWG (.336 mm² ... 2.5 mm²)

Environmental

Operating/Storage

Temperature

-30° to 60°C / -40° to 85°C

Humidity

95% relative, non-condensing

Weight

≈ 1.6 oz (45.4 g)

Accessory - LCSC10T12 Toroidal Sensor

Number of Turns 1000

Nominal Output Current

Full Range 0 - 50 mA

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

Burden ≤ 0.5 VA

Frequency

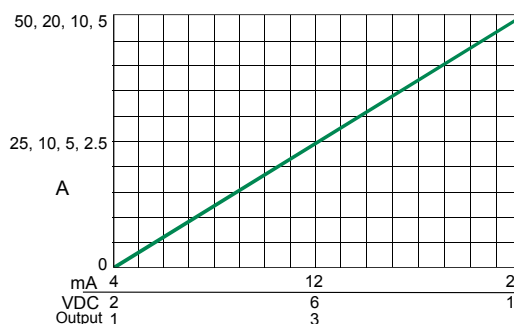
0 - 20A / 21 - 50A 20/100 Hz / 30/100 Hz

Sensor Hole 0.36 in. (9.14 mm) for up to #4 AWG (21.1 mm²) THHN wire

Weight ≈ 1 oz (28.3 g)

*Minimum loop-power supply voltage equals the minimum sensor voltage 10VDC plus the voltage drop developed across all the other loop devices at 20mA.

Monitored Current Amps Diagram

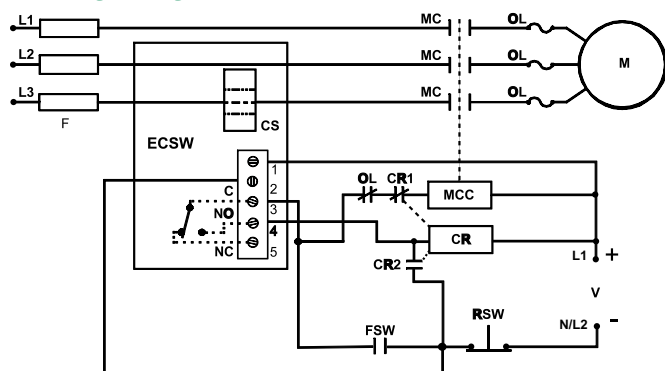


ECSW SERIES

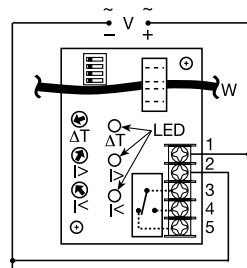
Current Sensors



Wiring Diagram



MC = Motor Contactor
M = Motor
F = Fuses
OL = Overload
RSW = Reset Switch
FSW = Fan or Float Contacts
CR = Control Relay
CS = Current Sensor
MCC = Motor Contactor Coil



V = Voltage
I> = Adjustable Overcurrent
I< = Adjustable Undercurrent
W = Monitored Wire
ΔT = Adjustable Trip Delay

Description

The ECSW Series of single-phase, AC window, current sensors includes adjustable overcurrent and undercurrent trip points. Detects locked rotor, jam, loss of load, an open heater or lamp load, a broken belt, or loss of suction. LED's aid in trip point adjustment and provide fault indication. The built-in toroidal sensor eliminates the need for an external current transformer. The output can be electrically latched after a fault, or automatically reset. Remote resetting of a latched output by removing input voltage. The unit includes switch selectable zero current detection and normally de-energized or energized output operation. Time delays are included to improve operation and eliminate nuisance tripping.

Features & Benefits

FEATURES	BENEFITS
Built-in toroidal current sensing	Eliminates need to install stand alone current transformer and provides isolation from monitored circuit
Encapsulated	Protects against shock, vibration, and humidity
LED indication	Visual indication for trip point adjustment and fault indication
Multiple switch selectable features	User selectable zero current detection, latched, normally de-energized, or energized output adds application flexibility
Adjustable trip delay	Eliminates nuisance tripping and prevents rapid cycling
Isolated 10A, SPDT output contacts	Allows control of loads for AC or DC voltages

Operation

When the input voltage is applied, sensing delay on startup begins and the output transfers (if normally energized is selected). Upon completion of the startup delay, sensing of the monitored current begins. As long as current is above undercurrent trip point and below the overcurrent trip point (inside the window), the output relay remains in its normal operating condition and both red LED's are OFF. The green LED glows when the output is energized. If current varies outside the window, the associated red LED glows, and the trip delay begins. If the current remains outside the window for the full

Ordering Information

MODEL	INPUT VOLTAGE	TRIP POINT ADJUST.	TRIP DELAY	SENSING DELAY ON STARTUP	CONNECT.
ECSW3LABT	24VDC	0.5 - 5A	0.150 - 7s	0.1s	Terminal blocks
ECSW4HBHT	120VAC	5 - 50A	0.5 - 50s	6s	Terminal blocks
ECSW4LADT	120VAC	0.5 - 5A	0.150 - 7s	2s	Terminal blocks
ECSW4LBHT	120VAC	0.5 - 5A	0.5 - 50s	6s	Terminal blocks
ECSW4MACT	120VAC	2 - 20A	0.150 - 7s	1s	Terminal blocks
ECSW4MBHT	120VAC	2 - 20A	0.5 - 50s	6s	Terminal blocks
ECSW4MBGT	120VAC	2 - 20A	0.5 - 50s	5s	Terminal blocks
ECSW6MBHT	230VAC	2 - 20A	0.5 - 50s	6s	Terminal blocks

If you don't find the part you need, call us for a custom product 800-843-8848

ECSW SERIES

trip delay, the relay transfers to fault condition state. If the current returns to normal levels (inside the window) during the trip delay, the red LED goes OFF, the trip delay is reset, and the output remains in the normal condition.

Reset: Remove input voltage or open latch switch. If zero current detection is selected, the unit will reset as soon as zero current is detected.

Operation With Zero Current Detection Enabled: If the current decreases to zero within the trip delay period, then zero current is viewed as an acceptable current level. The unit's output remains in its normal operating state. This allows the monitored load to cycle ON and OFF without nuisance tripping the ECSW. Zero current is defined as current flow of less than 250 milliamp-turns.

Note: When zero current detect is selected, the latching operation of switch SW2 is canceled; the output will not latch after a fault trip.

Notes on Operation

1. There is no hysteresis on the trip points. The overcurrent and undercurrent trip points should be adjusted to provide adequate protection against short cycling.
2. If the upper setpoint is set below the lower setpoint, both red LED's will glow indicating a setting error.
3. If zero current detection is selected (SW2 ON), and the system is wired to disconnect the monitored load, the system may short cycle. After the unit trips, the load de-energizes, and zero current is detected. The ECSW resets, and the load energizes again immediately and may be short cycled.
4. The sensing delay on start up only occurs when input voltage is applied. When zero current detection is selected, the trip delay must be longer than the duration of the inrush current or the unit will trip on the inrush current.

Typical Pump or Fan Protection Circuit Operation





Window Current Sensing: With the ECSW connected as shown in the diagram, a load may be monitored and controlled for over and undercurrent. The ECSW Series' on board CT (CS) may be placed on the line or load side of the contactor. The ECSW selection switches are set for zero current sensing (see Selector Switch SW2) and the output selection is normally de-energized (see Selector Switch SW3). The input voltage (V) is applied to the ECSW continually. As the control switch (FSW) is closed, the input voltage (V) is applied to the motor contactor coil (MCC), and the motor (M) energizes. As long as the current remains below the overcurrent and above the undercurrent trip points, the ECSW's output contacts remain de-energized. If the load current should rise above or fall below a trip point,

for the full trip delay, the normally open (NO) contact will close, energizing the control relay (CR) coil. The CR normally closed contact (CR1) opens and the MCC de-energizes and CR latches on through its normally open contacts (CR2). Reset is accomplished by momentarily opening the normally closed reset switch (RSW).

Note: If the current falls to zero within the trip delay, the ECSW remains de-energized. The sensing delay on startup occurs when input voltage is applied therefore trip delay must be longer than the duration of the motor's inrush current. The external latching relay CR2 is required in this system to prevent rapid cycling. A timer can be added to provide an automatic reset.

Selector Switch

ON ↔ OFF

		Not Used
SW1		Latched
SW2		Zero I
SW3		Output - Normally Energized

Mode Selection Switches

SW1 = Latched or Auto reset selector

OFF - Automatic reset after a fault

ON - Output relay latches after a fault trips the unit

SW2 = Zero current detection (below 250 mA)

OFF - Zero current detection disabled

ON - Zero current detection enabled

SW3 = Output during normal operation

OFF - Output relay de-energized

ON - Output relay energized

ECSW SERIES

Specifications

Sensor

Type Toroid, through hole wiring for up to #4 AWG (21.1 mm²) THHN wire

Mode Over & undercurrent trip points (window current sensing)

Trip Point Range 0.5 - 50A in 3 adjustable ranges

Tolerance Guaranteed range

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

Time Point vs Temp. & Voltage ±5%

Response Time ≤ 75ms

Frequency 45/500 Hz

Type of Detection Peak detection

Zero Current Detection < 250mA turns typical

Time Delay
Range 0.15 - 50s in 2 adjustable ranges or 0.1 - 50s fixed

Tolerance Adjustable: guaranteed range; Fixed: ±10%

Sensing Delay On Start Up Fixed = 0.1 - 6s in 1s increments

Tolerance +40% -0%

Delay vs. Temp. & Voltage ±15%

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

Mode: Switch Selectable

ON Energized during normal operation, de-energized after a fault

OFF De-energized during normal operation, energizes during a fault

Form Isolated, SPDT

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

1/2 hp @ 250VAC

Life Mechanical - 1 x 10⁶; Electrical - 1 x 10⁵

Latch

Type Electrical

Reset Remove input voltage

Function Switch selectable latching function

Protection

Surge

Circuitry

Isolation Voltage

Insulation Resistance

Mechanical

Mounting

screws

Dimensions

Termination

Environmental

Operating/Storage

Temperature

Humidity

Weight

IEEE C62.41-1991 Level A

Encapsulated

≥ 2500V RMS input to output

≥ 100 MΩ

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

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

D 44.5 mm (1.75")

0.197 in. (5 mm) terminal blocks for up to #12

(3.2 mm²) AWG wire

-40° to 60° C/-40° to 85° C

95% relative, non-condensing

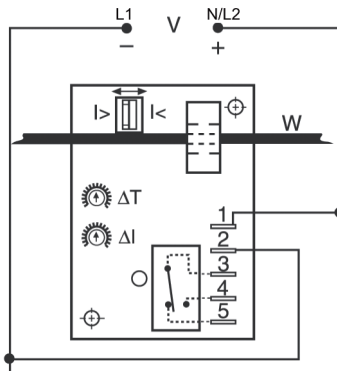
≅ 6.4 oz (181 g)

ECS SERIES

Current Sensors



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.

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.

Features & Benefits

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

If you don't find the part you need, call us for a custom product 800-843-8848

ECS SERIES

Specifications

Sensor

Type

Mode

Toroidal through hole wiring
Over or undercurrent, switch selectable on the unit or factory fixed
0.5 - 50A in 3 adjustable ranges or fixed

Trip Point Range

Tolerance

Adjustable

Fixed

Guaranteed range
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

Trip Point vs. Temperature

Response Time

Frequency

Type of Detection

$\pm 5\%$
 $\pm 5\%$
 $\leq 75\text{ms}$
45/500 Hz
Peak detection

Trip Delay

Type

Range

Adjustable

Factory Fixed

Delay vs. Temperature

Sensing Delay on Startup

Analog
0.150 - 7s; 0.5 - 50s (guaranteed ranges)
+/- 10%
 $\pm 15\%$
Factory fixed 0 - 6s: +40%, -0%

Input

Voltage

Tolerance

12VDC & 24VDC/AC

120 & 230VAC

AC Line Frequency

24, 120, or 230VAC; 12 or 24VDC
-15 - 20%
-20 - 10%
50/60 Hz

Output

Type

Form

Rating

Electromechanical relay
Isolated, SPDT
10A resistive @ 240VAC; 1/4 hp @ 125VAC;
1/2 hp @ 250VAC
Mechanical - 1×10^6 ; Electrical - 1×10^5

Life

Protection

Circuitry

Isolation Voltage

Insulation Resistance

Encapsulated
 $\geq 2500\text{V RMS}$ input to output
 $\geq 100 \text{ M}\Omega$

Mechanical

Mounting

Dimensions

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

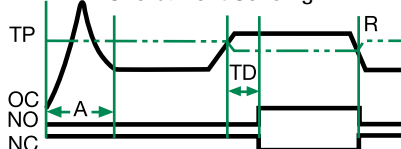
Humidity

Weight

-40° to 60°C / -40° to 85°C
95% relative, non-condensing
 $\approx 6.4 \text{ oz}$ (181 g)

Function Diagrams

Overcurrent Sensing



NO = Normally Open Contact

NC = Normally Closed Contact

A = Sensing Delay On Start Up

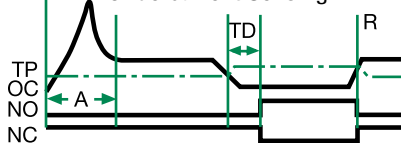
TD = Trip Delay

TP = Trip Point

R = Reset

OC = Monitored Current

Undercurrent Sensing

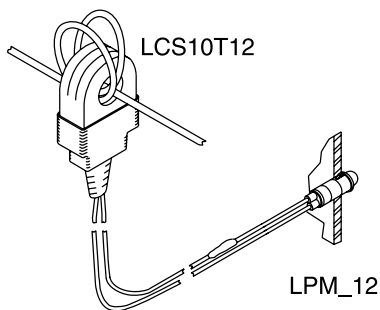


LCS10T12 / LPM SERIES

Current Indicators



Wiring Diagram



Wire Length: 500 ft.
(152.4m) max.
(Customer Supplied)

CAUTION: The LCS10T12 must be connected to the LPM12 or LPMG12 before current flows to prevent damage or shock hazard. Monitored wires must be properly insulated.

Description

The LCS10T12 connected to the LPM12 or LPMG12 indicator is a low cost, easy to use, go/no-go indication system for the remote monitoring of current flow. The LCS10T12 is installed on an adequately insulated wire of the monitored load. Its 12in. (30.4cm) leads are connected to the LPM12 or LPMG12 panel mount indicator directly or via customer supplied wires up to 500 feet (152.4m) long.

Operation

When the monitored current is 5A turns, the panel mount LPM indicator will glow. The LCS10T12 is designed to maximize the light output of the panel mount indicator. It can be used to monitor current flow of less than 5A by passing the monitored conductor 2 or more times through the sensor.

CAUTION: The LCS10T12 must be connected to the LPM12 or LPMG12 before current flows to prevent damage or a shock hazard. Monitored wires must be properly insulated.

Panel mount indicator designed to match the output of the LCS10T12. The LPM12 and LPMG12 come with 12 in. (30.4 cm) wires and a one piece mounting clip. Both devices install quickly in a 0.25 in. (6.35 mm) hole in panels from 0.031 - 0.062 in. (0.79 - 1.6 mm) thick.

Features

- Low cost go/no go indication
- May be connected to wires up to 500 feet (152.4 m) long
- Remote monitoring of currents up to 50A
- Green or red LED indicator available

Specifications

Monitored Current

Current Range		2 - 50A AC		
Wire Passes	Min. Current	Max. Current	Max. Inrush	Max. Wire Dia.
1	5A	50A	120A	0.355 in. (9.0 mm)
2	2.5A	25A	60A	0.187 in. (4.7 mm)
3	1.7A	16.6A	40A	0.15 in. (3.8 mm)
4	1.3A	12.5A	30A	0.125 in. (3.2 mm)
5	5/X	50/X	120/X	

Maximum Current

50A turns continuous

AC Line Frequency

50/60Hz

DC Resistance of Current Limiter

65 Ω

Mechanical

Sensor Hole

0.36 in. (9.14 mm) for up to #4 AWG (21.1 mm²) THHN wire

Termination

12 in. (30.4 cm) wire leads

Environmental

Operating/Storage

Temperature

-40° to 60°C/-40° to 85°C

Weight

LCS: ≈ 0.8 oz (23 g)

LPM: ≈ 0.2 oz (6 g)

Ordering Information

MODEL	DESCRIPTION
LCS10T12	AC Current Sensor
LPM12	Red LED Indicator
LPMG12	Green LED Indicator

If you don't find the part you need, call us for a custom product 800-843-8848

Protection Relays

Current Monitoring Relays and Transducers

LSRU SERIES

Load sensor



Description

The LSRU Series is a microcontroller-based family of load sensors. The LSRU family of products employ three basic types of control logic: motor control logic, alarm logic and feed control logic.

Motor Control Logic

Several combinations of functions are available in the LSRU, including overcurrent and undercurrent or either overcurrent or undercurrent with variable trip, restart or extended restart delay settings. These various versions of the LSRU trip on the respective fault and then automatically reset after the restart delay expires, in preparation for the next motor start. LSRUs do not trip on undercurrent when the load turns off, this is recognized as a normal condition.

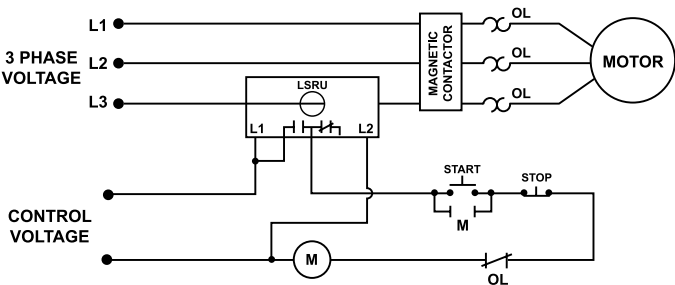
Alarm Logic

The LSRU-AL simply indicates whether the current is between the setpoints or outside of the setpoints. This product is best used with a PLC or other controller where status indication is desired.

Feed Control

The LSRU-FC is a load monitor intended to control feeder mechanisms in a variety of applications. It stops the feeder when the grinder, chipper, saw, auger, etc. nears overload. When the load is reduced to a preset level, the feeder is restarted.

Wiring Diagram



Features & Benefits

FEATURES	BENEFITS
LED indicator	Visual indication of relay status
Built in current sensor	Eliminates the need for a stand alone current transformer and also provides isolation between the monitored and control circuits
Adjustable current sensing range	Provides ability to precisely set the current trip point for any application

Ordering Information

See next page.

LSRU SERIES

Ordering Information

MODEL	LINE VOLTAGE	CURRENT RANGE	DESCRIPTION
LSRU-024-AL-2	24VAC	5-25A	Alarm logic
LSRU-024-AL-3	24VAC	25-100A	Alarm logic
LSRU-115-AL-1.5	115VAC	0-10A	Alarm logic
LSRU-115-AL-2	115VAC	5-25A	Alarm logic
LSRU-115-AL-3	115VAC	25-100A	Alarm logic
LSRU-115-FC-1.5	115VAC	0-10A	Feed control logic
LSRU-115-OT-1.5	115VAC	0-10A	Motor control logic with overcurrent trip, adj trip delay (0.5-60s)
LSRU-115-OT-2	115VAC	5-25A	Motor control logic with overcurrent trip, adj trip delay (0.5-60s)
LSRU-115-OT-3	115VAC	25-100A	Motor control logic with overcurrent trip, adj trip delay (0.5-60s)
LSRU-115-OR-1.5	115VAC	0-10A	Motor control logic with overcurrent trip, adj restart delay (0.5-300s, manual)
LSRU-115-OR-2	115VAC	5-25A	Motor control logic with overcurrent trip, adj restart delay (0.5-300s, manual)
LSRU-115-UE-2	115VAC	5-25A	Motor control logic with undercurrent trip, adj ext restart delay (2-300m, manual)
LSRU-115-UT-2	115VAC	5-25A	Motor control logic with undercurrent trip, adj trip delay (0.5-60s)
LSRU-115-UT-3	115VAC	25-100A	Motor control logic with undercurrent trip, adj trip delay (0.5-60s)
LSRU-115-UR-2	115VAC	5-25A	Motor control logic with undercurrent trip, adj restart delay (0.5-300s, manual)
LSRU-115-OU-1.5	115VAC	0-10A	Motor control logic with overcurrent and undercurrent trip
LSRU-115-OU-2	115VAC	5-25A	Motor control logic with overcurrent and undercurrent trip
LSRU-115-OU-3	115VAC	25-100A	Motor control logic with overcurrent and undercurrent trip

PART # KEY

O = Overcurrent Trip

U = Undercurrent Trip

T = Adj. Trip Delay (0.5-60 seconds)

R = Adj. Restart Delay (0.5-300 seconds, Manual)

E = Adj. Extended Restart Delay (2-300 minutes, Manual)

1.5 = 0-10 Amps

2 = 5-25 Amps

3 = 25-100 Amps

Specifications

Functional Characteristics

Isolation 600VAC rms

Power 2 Watts

Motor Acceleration Time 2 seconds

When not selected as

an option:

Fixed Trip Delay 0.5 second

(-AL, -FC) 1 second

Fixed Restart Delay 1 second

(-AL only) as soon as current is within limits

(-FC only) 0.5 second

Input Characteristics

Control Power 24VAC or 115VAC

Output Characteristics

Output Contact Rating (SPDT)

Pilot Duty 480VA @ 240VAC

General Purpose 10A @ 240VAC

General Characteristics

Temperature Range -40° to 70°C (-40° to 158°F)

Wire Size #12-24AWG

Hole Size 0.725" diameter

Terminal Torque 7 in.-lbs.

Safety Marks

CSA, CSA-NRTL/C (File #46510)

CE

Dimensions

H 42.42 mm (1.67"); **W** 58.42 mm (2.3");

D 90.43 mm (3.56")

Weight 0.5 lb. (8 oz., 226.8 g)

Mounting Method Four #6 screws 3/4" in length

Caution: This product should not be relied upon solely for safety of life or safety applications.

LSRX / LSRX-C SERIES

Self-powered load sensor, low-cost
proof relay



Description

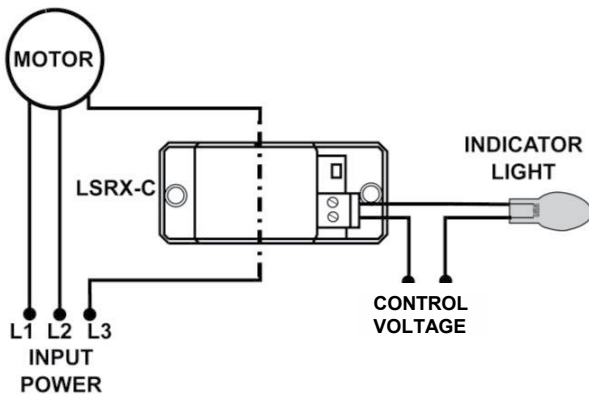
The LSRX/LSRX-C Series are AC current sensors designed to energize the output contact whenever 4.5 Amps or greater is present. The LSRX/LSRX-C Series is used commonly as an AC current proof relay to indicate if a motor is operating. It can also be used to interlock fans, compressors and motors; to indicate equipment status such as feed rates, tool wear, loss of prime on pumps, mixer viscosity and all types of current sensing conditions or to stage pump motors, chillers, or other machinery.

This device combines a current transformer (CT), transducer and high current output relay together to switch alarm circuits, contactors and most resistive or inductive loads. The LSRX/LSRX-C Series can perform the function of an auxiliary contact, yet has the advantages of universal application and isolation.

Features & Benefits

FEATURES	BENEFITS
Self-powered	Eliminates need for separate control voltage. Draws power from wire being monitored
Quick-connect terminals	Saves time at installation
LED indication	Visual indication of relay status
Built in current sensor will monitor up to 200A loads	Eliminates the need for a stand alone current transformer and also provides isolation between the monitored and control circuits

Wiring Diagram



Accessories



Informer IR Kit-36 (36" infrared adapter cable)

Attaches to the face of the unit to provide remote diagnostics without opening the panel.

Ordering Information

MODEL	DESCRIPTION
LSRX	Fast-on terminal
LSRX-C	Depluggable screw terminals
LSRX-OEM	Fast-on terminals, 10 pack

Specifications

Input Characteristics

Operating Current	5-200A Continuous
Minimum Pull-in Current	4.5A (typical), 7.0A (max)*
Power	Induced from AC conductor

Output Characteristics

Relay Output Rating (SPST - Form A)	
Pilot Duty	480VA @ 240VAC, B300
General Purpose	5A @ 240VAC
Electrical Life	1x10 ⁵
Mechanical Life	1x10 ⁷
Maximum Conductor Diameter	0.7 in.
Output Terminals	
LSRX	0.25" quick-connect fast-ons
LSRX-C	depluggable screw terminals
Torque Rating	3.0 in.-lbs.

LSRX / LSRX-C SERIES

General Characteristics

Temperature Range:

Operating -20° to 70°C (-4° to 158°F)

Storage -40° to 80°C (-40° to 176°F)

Hole Size 0.72" diameter

Wire Size 12-26 AWG

Output Relay Status Indicator LED

Relative Humidity 10-95%, non-condensing per IEC 68-2-3

Standards Passed

Electrostatic Discharge (ESD) IEC 61000-4-2, Level 2, 4kV contact, 4kV air

Fast Transient Burst IEC 61000-4-4, Level 3, 2kV power,
1kV input/output

Surge

IEC 61000-4-5, Level 3, 2kV line-to-line;
2kV line-to-ground

Safety Marks

UL UL508 Recognized (File #E68520)

CE IEC 60947

Dimensions **H** 68.58 mm (2.7"); **W** 28.7 mm (1.13");
D 63.5 mm (2.5")

Weight 0.3 lb. (4.8 oz., 136.08 g)

Mounting Method Surface Mount

*Conductors may be looped for smaller motor applications.

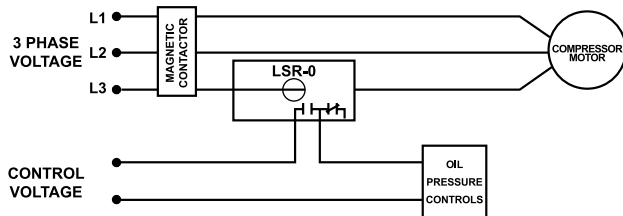
LSR-0

Self-powered load sensor/low-cost proof relay

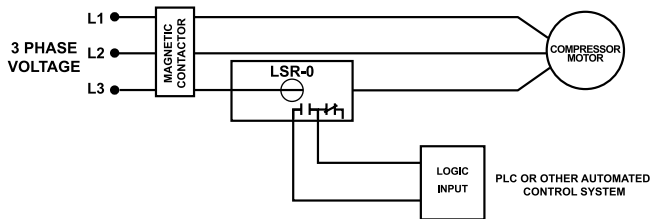


Wiring Diagram

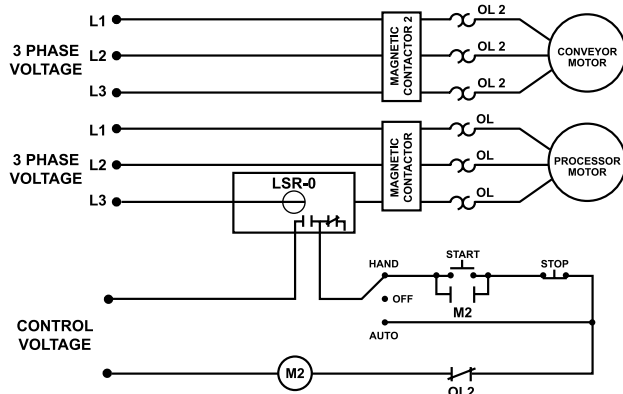
TYPICAL WIRING DIAGRAM FOR REFRIGERATION AND OIL FAILURE CONTROL



TYPICAL WIRING DIAGRAM FOR BUILDING AUTOMATION



TYPICAL WIRING DIAGRAM FOR BUILDING AUTOMATION



Description

The LSR-0 is a self-powered load sensor intended for use as a proof relay. It is used to verify that current is flowing as intended. It has a guaranteed 15A pull-in current and 2.5A drop-out current. Proof relays are typically used to interlock fans, compressors, motors, heating elements and other devices. The LSR-0 is self-powered, that is, it draws its power from the wire being monitored so it does not require separate control power wiring.

Features

- Self-powered
- Low cost proof relay
- Can monitor up to 135A loads

Specifications

Max Current Ratings

135A continuous

Functional Characteristics

Turn-on Threshold

Fixed, 15A (max.)*

Turn-off Threshold

2.5A (min.)

Power

Induced from conductor

Isolation

600VAC rms

Output Characteristics

Relay Output Rating:

Pilot Duty

480VA @ 240VAC

General Purpose

10A

General Characteristics

Temperature Range

-20° to 70°C (-4° to 158°F)

Wire Size

#12-24AWG

Hole Size

0.725" diameter

Terminal Torque

7 in.-lbs.

Safety Marks

CSA, CSA-NRTL/C

CE

(File #46510)

Dimensions

H 42.42 mm (1.67"); **W** 58.42 mm (2.3");

D 90.43 mm (3.56")

Weight

0.35 lb. (5.6 oz., 158.76 g)

Mounting Method

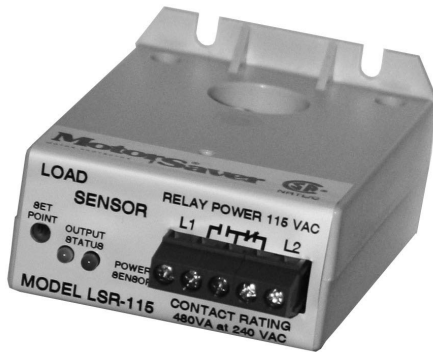
Four #6 screws 3/4" in length

*Conductors may be looped for smaller motor applications.

Caution: This product should not be relied upon solely for safety of life or safety applications.

LSR-XXX SERIES

Load sensor



Description

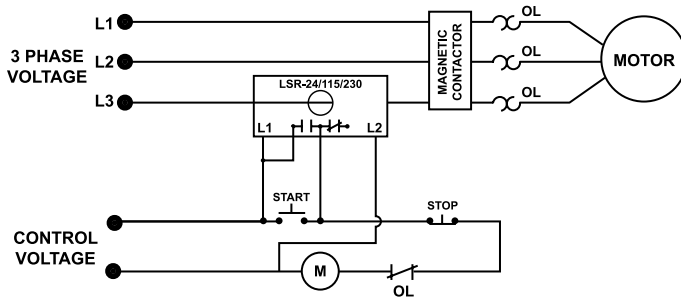
The LSR-xxx Series load sensors use current levels to determine feed rates, tool wear, loss of prime on pumps, mixer viscosity and all types of overload and underload conditions. They may also be used to stage pump motors, chillers and other machinery. These devices combine a current transformer (CT) with Form C (SPDT) relay contacts to switch alarm circuits, contactors or any resistive or inductive load. One simple screwdriver adjustment will calibrate the sensor for all single-phase or 3-phase applications up to 100hp.

Features

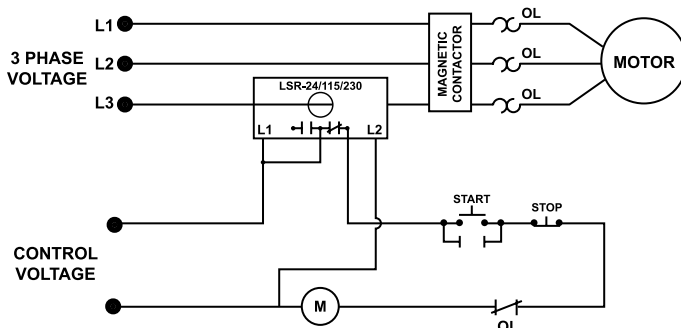
- Can monitor current of motors up to 100Hp
- Fine adjustment with 20-turn pot
- Status LEDs

Wiring Diagram

TYPICAL WIRING DIAGRAM FOR LOAD LOSS DETECTION



TYPICAL WIRING DIAGRAM FOR OVERLOAD DETECTION



Specifications

Functional Characteristics

Isolation 600VAC rms

Current Adjustment Range (Typical) 2-100A

Current Adjustment Range (Min-Max) 0.5-135A

Trip Setpoint Adjustable to $\pm 1\%$ range

Input Characteristics

Control Power:

LSR-24 24VAC

LSR-115 115VAC

LSR-230 230VAC

Max Current Ratings 135A max. continuous

Output Characteristics

Output Contact Rating (SPDT):

Pilot Duty 480VA @ 240VAC

General Purpose 10A

General Characteristics

Temperature Range -20° to 70°C (-4° to 158°F)

Wire Size #12-24AWG

Hole Size 0.725" diameter

Terminal Torque 7 in.-lbs.

Safety Marks

CSA, CSA-NRTL/C (File #46510)

CE IEC 60947

Dimensions

H 42.42 mm (1.67"); **W** 58.42 mm (2.3");

D 90.43 mm (3.56")

Weight 0.4 lb. (6.4 oz., 181.44 g)

Mounting Method Four #6 screws 3/4" in length

Caution: This product should not be relied upon solely for safety of life or safety applications.

Ordering Information

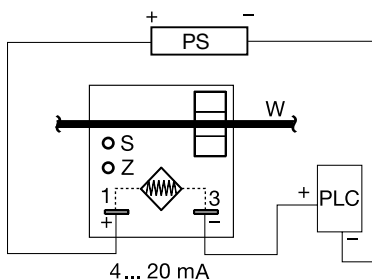
MODEL	LINE VOLTAGE
LSR-24	24VAC
LSR-115	115VAC
LSR-230	230VAC

TCSA SERIES

Current Transducers



Wiring Diagram



PS = Power Supply
Z = Zero Adjust
S = Span Adjust
W = Insulated Wire Carrying
Monitored Current
PLC = PLC Analog Input
or Meter Input

Ordering Information

MODEL	CURRENT RANGE
TCSA5	0-5A
TCSA10	0-10A
TCSA20	0-20A
TCSA50	0-50A

If you don't find the part you need, call us for a custom product 800-843-8848

Description

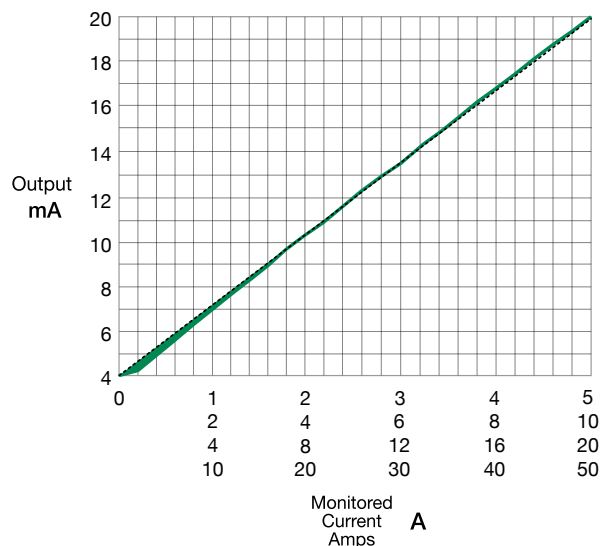
The TCSA Series is a loop-powered, linear output current transducer that provides an output that is directly proportional to the RMS AC current passing through the onboard toroid. The TCSA provides a 4 - 20mA output over a power supply range of 10 - 30VDC. Each unit is factory calibrated for monitoring in one of four ranges; 0-5, 0-10, 0-20, or 0-50A. The 0 - 5A range allows the use of external current transformers so loads up to 1200AC amps can be monitored.

Operation

The TCSA varies the effective resistance of its output in direct proportion to the current flowing in the monitored conductor. The unit is factory calibrated so that 0 amps provides a 4mA output and full span provides a 20mA output. Zero and span adjustments are provided for minor calibration adjustments in the field (if required).

Using an External Current Transformer (CT)

Select a 2VA, 0 to 5A output CT, rated for the current to be monitored. Select TCSA5. Pass one of the CT's secondary wire leads through the TCSA's toroid. Connect the CT's secondary leads together.



Features

- Monitors 0 - 50A in 4 ranges
- Loop powered from 10 to 30VDC
- Linear output from 4 - 20mA
- Zero & span adjustments
- Complete isolation between sensed current & control circuit

TCSA SERIES

Accessories



P1023-6 Mounting bracket

The 90° orientation of mounting slots makes installation/removal of modules quick and easy.



P1015-64 (AWG 14/16) Female Quick Connect

These 0.25 in. (6.35 mm) female terminals are constructed with an insulator barrel to provide strain relief.



P1015-18 Quick Connect to Screw Adapter

Screw adapter terminal designed for use with all modules with 0.25 in. (6.35 mm) male quick connect terminals.



C103PM (AL) DIN Rail

35 mm aluminum DIN rail available in a 36 in. (91.4 cm) length.



P1023-20 DIN Rail Adapter

Allows module to be mounted on a 35 mm DIN type rail with two #10 screws.

Specifications

Sensor

Type

Toroid, through hole wiring, alternating current, monitored conductor must be properly insulated
0 - 50A

Monitored AC Current

Ranges

4 Factory Calibrated Ranges

0 - 5A, 0 - 10A, 0 - 20A, or 0 - 50A

Factory Calibration

≤±2% of full scale

Maximum Allowable Current

Steady – 50A turns; Inrush – 300A turns for 10s

Repeat Accuracy

≤±0.25% of full scale under fixed conditions

Response Time

≅ 300ms

Burden

≤ 0.5VA

AC Line Frequency

0 - 20A / 21 - 50A

20 - 100Hz / 30 - 100Hz

Temperature Coefficient

±0.05%/°C

Output

Type: Series Connection

Current directly proportional to monitored current

Range

4 - 20mA

Sensor Supply Voltage*

10 to 30VDC

Momentary Voltage

40VDC for 1m

Zero Adjust

≅ 3.75 - 4.25mA

Span Adjust

18mA - 22mA

Adjustment

Mini-screw, 25-turn potentiometer

Protection

Dielectric Breakdown

≥ 2000V RMS terminals to mounting surface

Insulation Resistance

≥ 100 MΩ

Polarity

Units are reverse polarity protected

Mechanical

Mounting

Surface mount with one #10 (M5 x 0.8) screw

Dimensions

H 50.8 mm (2.0"); **W** 50.8 mm (2.0");

D 44.5 mm (1.75")

Termination

0.25 in. (6.35 mm) male quick connect terminals

Sensor Hole

0.36 in. (9.14 mm) for up to #4 AWG (21.1 mm²)

THHN wire

Environmental

Operating/Storage

Temperature

-30° to 60°C/-40° to 85°C

Humidity

95% relative, non-condensing

Weight

≅ 2.4 oz (68 g)

*Minimum loop-power supply voltage equals the minimum sensor voltage 10VDC plus the voltage drop developed across all the other loop devices at 20mA.

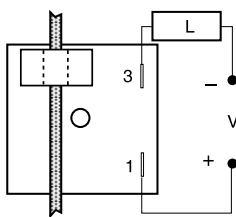
TCS SERIES

Current Sensor

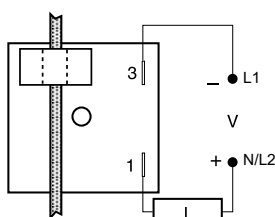


Wiring Diagram

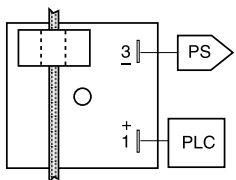
POSITIVE SWITCHING



NEGATIVE SWITCHING

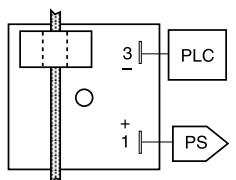


SINKING



L = Load
V = Voltage
PS = Power Supply
PLC = PLC Digital Input Module

SOURCING



Monitored AC conductor must be insulated.

Description

The TCS Series is a low cost method of go/no go current detection. It includes a solid-state output to sink or source current when connected directly to a standard PLC digital input module. Its normally open or normally closed output can also be used to control relays, lamps, valves, and small heaters rated up to 1A steady, 10A inrush. The TCS is self-powered (no external power required to operate the unit) and available with an adjustable actuation range of 2 - 20A or factory fixed actuation points from 2 - 45A.

Operation

Normally Open: When a current equal to or greater than the actuate current is passed through the toroidal sensor, the output closes. When the current is reduced to 95% of the actuate current or less, the output opens.

Normally Closed: When the current through the toroid is equal to or greater than the actuate current, the output opens. When the current is reduced below 95% of the actuate current, the output closes. To increase sensitivity, multiple turns may be made through the TCS's toroidal sensor. The trip point range is divided by the number of turns through the toroidal sensor to create a new range. When using an external CT, select a 2VA, 0-20A output CT rated for the current to be monitored. Select TCS adjustment range 0. Pass one secondary wire lead through the TCS' toroid and connect the secondary leads together.

Features & Benefits

FEATURES	BENEFITS
Self powered	No control voltage is required to operate the unit
Totally solid state and encapsulated	No moving parts to arc and wear out over time and encapsulated to protect against shock, vibration, and humidity
Can connect directly to PLC	Solid state output to sink or source current can be connected directly to a standard PLC digital input module
1A steady, 10A inrush solid-state output	Provides 100 million operations in typical conditions
Complete isolation between sensed current and control circuit	Allows you to monitor a load in a separate electrical system

Ordering Information

MODEL	OUTPUT VOLTAGE	ACTUATE CURRENT	OUTPUT FORM	MODEL	OUTPUT VOLTAGE	ACTUATE CURRENT	OUTPUT FORM
TCSG2A	3 to 50VDC	Fixed, 2A	Normally open	TCSH2B	24 to 240VAC	Fixed, 2A	Normally closed
TCSGAA	3 to 50VDC	2-20A adjustable	Normally open	TCSH5B	24 to 240VAC	Fixed, 5A	Normally closed
TCSGAB	3 to 50VDC	2-20A adjustable	Normally closed	TCSHAA	24 to 240VAC	2-20A adjustable	Normally open
TCSH2A	24 to 240VAC	Fixed, 2A	Normally open	TCSHAB	24 to 240VAC	2-20A adjustable	Normally closed

If you don't find the part you need, call us for a custom product 800-843-8848

TCS SERIES

Accessories



P1023-6 Mounting bracket

The 90° orientation of mounting slots makes installation/removal of modules quick and easy.



P1015-64 (AWG 14/16) Female Quick Connect

These 0.25 in. (6.35 mm) female terminals are constructed with an insulator barrel to provide strain relief.



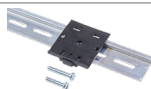
P1015-18 Quick Connect to Screw Adapter

Screw adapter terminal designed for use with all modules with 0.25 in. (6.35 mm) male quick connect terminals.



C103PM (AL) DIN Rail

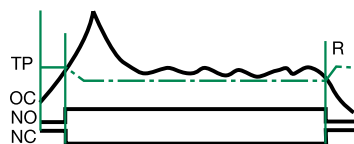
35 mm aluminum DIN rail available in a 36 in. (91.4 cm) length.



P1023-20 DIN Rail Adapter

Allows module to be mounted on a 35 mm DIN type rail with two #10 screws.

Function Diagram



TP = Trip Point
OC = Monitored Current
NO = Normally Open Output
NC = Normally Closed Output
R = Reset

Specifications

Sensor Type

Toroid, through hole wiring, alternating current, monitored wire must be properly insulated

Current to Actuate

Adjustable: - 2 - 20A, guaranteed range
Fixed: - 2 - 45A, +0/-20%

Reset Current

≅ 95% of the actuate current

Maximum Allowable Current

Steady - 50A turns
Inrush - 300A turns for 10s

Actuate Current vs. Temp. & Voltage

≤ ±5%

Response Times

Overcurrent - ≤ 200ms

Undercurrent - ≤ 1s

< 0.5VA

Burden Output Type

Solid state

Form

NO or NC

Rating

1A steady, 10A inrush

Voltage

AC - 24 to 240VAC +10/-20%

DC - 3 to 50VDC

Voltage Drop

AC NO & NC - ≅ 2.5V

DC NO & NC - ≅ 1.2V

Protection

Circuitry

Encapsulated

Dielectric Breakdown

≥ 2000V RMS terminals to mounting surface

Insulation Resistance

≥ 100 MΩ

Mechanical

Mounting

Surface mount with one #10 (M5 x 0.8) screw

Dimensions

H 50.8 mm (2"); **W** 50.8 mm (2");

D 44.5 mm (1.75")

Termination

0.25 in. (6.35 mm) male quick connect terminals (2)

Sensor Hole

0.36 in. (9.14 mm) for up to #4 AWG (21.1 mm²) THHN wire

Environmental

Operating/Storage

Temperature

-20° to 60°C / -40° to 85°C

Humidity

95% relative, non-condensing

Weight

≅ 2.6 oz (74 g)