

/// CURRENT MONITORS

ATC-Diversified Electronics has a Current Monitor available to fit almost any monitoring application. The operation of the CM Series, AC Current Monitor/Relays, is based on an internal current transformer magnetically coupling the solid state sensing circuitry to the line being monitored. The operation of the CD Series, DC Current Monitor/Relays, is based on an internal Hall-effect device with a magnetic concentrator coupling the solid state sensing circuitry to the line being monitored. When the monitored current reaches a preset threshold point, an internal relay switches. The

heavy duty contacts are used for instrumentation or signaling alarm circuits. The current sensing range of the ATC-Diversified Electronics AC Current Monitor/Relays can be increased by the use of an external Current Transformer. With the use of external Current Transformers you can monitor the current on almost any application. The feature matrix below shows the Current Monitor Series available from ATC-Diversified Electronics and highlights their features and specifications.

/// TYPICAL APPLICATIONS

The following are some typical applications for ATC-Diversified Electronics Current Monitors:

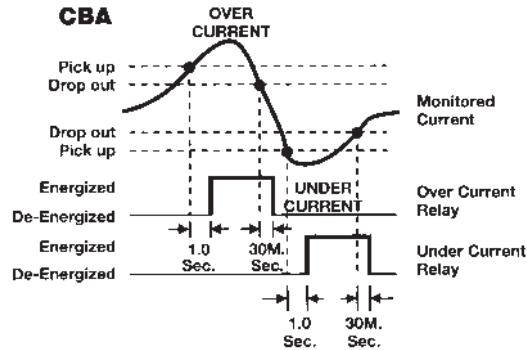
- Sense current demand level
- Run time totalizer
- Detect conveyor load jam
- Detect heater element failure
- Detect the use of dull bits or blades
- Detect runway lights and radio tower light failures
- Remote motor sensing
- Sense load loss
- Detect broken fan belts or chains

/// FEATURE MATRIX

SERIES	SENSING FEATURES				CONTROL VOLTAGE			ADJUSTABLE CURRENT RANGE						ENCLOSURE			RESET		TIME DELAY				UL RECOGNIZED FOR CANADA	
	OVER CURRENT	UNDER CURRENT	THREE PHASE UNBALANCE	SELF POWERED	24 VDC	24 VAC	120 VAC	0.25 (0.05 TO 0.25 AMPS)	1 (0.2 TO 1.0 AMPS)	5 (1.0 TO 5.0 AMPS)	10 (2.0 TO 10 AMPS)	20 (4.0 TO 20.0 AMPS)	30 (6.0 TO 30 AMPS)	"A" STYLE PLUG-IN	"D" STYLE SURFACE MOUNT	"E" STYLE SURFACE MOUNT	AUTOMATIC	MANUAL	FIXED (OPERATE)	ADJUSTABLE (OPERATE)	FIXED (RELEASE)	ADJUSTABLE (RELEASE)		UL RECOGNIZED
CBA	•	•					•	•	•	•	•	•			•	•			•		•			
CDD	•	•					•	•	•	•	•				•	•				•		•		
CDO	•						•	•	•	•	•				•	•				•	•			
CDU		•					•	•	•	•	•				•	•			•			•		
CLB	•		•				•		•	•					•	•	•		•		•			
CMB	•					•	•	1-10 amps fixed						•			•				•		•	
CMD	•	•			•	•	•	•	•	•	•				•	•				•		•		
CMG				•				20-36 amp fixed (0100 series only)							•		•				•		•	
CMI	•					•	•	•	•	•	•				•		•		•		•			
CML	•				•	•	•	•	•	•	•		•		•		•			•	•			
CMO	•				•	•	•	•	•	•	•		•		•	•				•	•			
CMU		•			•	•	•	•	•	•	•		•		•	•			•			•		

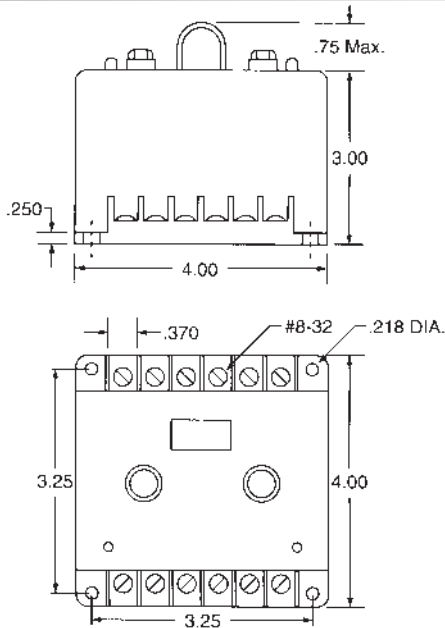
The CBA Series is used to detect **UNDER** and **OVER CURRENT CONDITIONS**. When the monitored current is within the normal current band, both internal relays are de-energized (Drop-out). When the current rises above the over current setting for longer than 1.0 second, the over current relay energizes (Pick-up). If the current falls below the under current setting for longer than 1.0 second, the under current relay energizes. When the monitored current returns to normal, the relays will automatically reset. The over and under current trip points are independently adjustable.

An External CT may be used to extend the range of the Current Monitor.

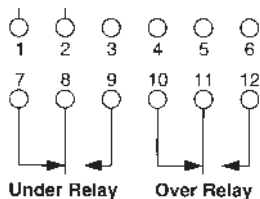


AC Current Band Monitor

DIMENSIONS (INCHES)



WIRING



SPECIFICATIONS

CONTROL VOLTAGE	120 VAC, 50/60 Hz	
TRIP POINTS	Over Current	
	Pick-up	See Table Below
	Drop-out	2% below Pick-up
	Under Current	
	Pick-up	See Table Below
	Drop-out	2% above Pick-up
OUTPUT	10 Amps @ 120 VAC, Resistive	
HYSTERESIS	2%	
RESPONSE TIME	Operate	1.0 SEC
	Release	30 mSEC
INDICATORS	LED's Show Over/Under Current Status	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
CONTACT ARRANGEMENT	(2) Form C Contacts. One Each for Over/Under	
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals	
WEIGHT	16 oz.	

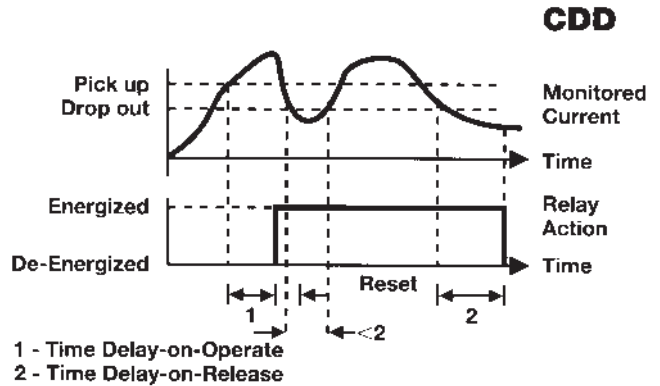
MODEL NUMBER	UNDER CURRENT RANGE	OVER CURRENT RANGE
CBA-120-ALE-1	0.2 to 1.0 amps, Adjustable	0.2 to 1.0 amps, Adjustable
CBA-120-ALE-5	1.0 to 5.0 amps, 1.0 to Adjustable	5.0 amps, Adjustable (1.0 to 5.0)
CBA-120-ALE-10	2.0 to 10 amps, Adjustable	2.0 to 10 amps, Adjustable
CBA-120-ALE-20	4.0 to 20 amps, Adjustable	4.0 to 20 amps, Adjustable
CBA-120-ALE-30	6.0 to 30 amps, Adjustable	6.0 to 30 amps, Adjustable
CBA-120-ALE-40	8.0 to 40 amps, Adjustable	8.0 to 40 amps, Adjustable



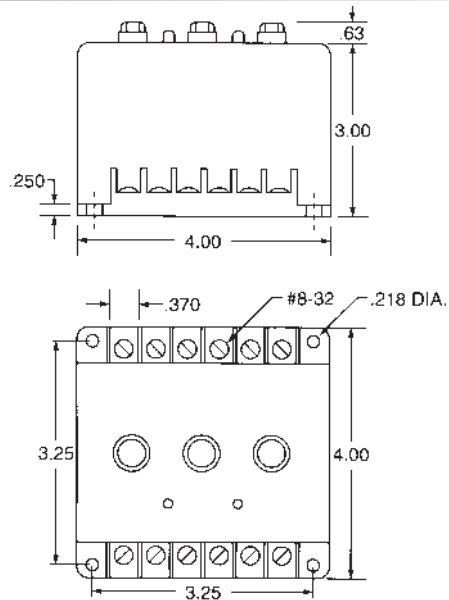
The CDD series may be used as an Over Current Monitor or an Under Current Monitor. The CDD has **adjustable Delay-on-Operate** and **adjustable Delay-on-Release** time delays. When the current exceeds the preset current trip point for longer than the Delay-on-Operate time delay, the internal relay will energize (Pick-up). When the current drops below the preset current trip point for longer than the Delay-on-Release time delay, the internal relay will de-energize (Drop-out). When used as an Over Current Monitor the Delay-on-Operate time delay is used to override inrush periods. When used as an Under Current Monitor, the Delay-on-Release timer is used to override a temporary under current condition.

Universal DC Current Monitor

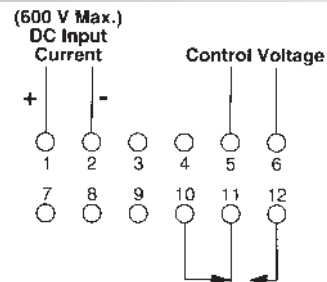
SPECIFICATIONS	
CONTROL VOLTAGE	120 VAC, 50/60 Hz
TRIP POINTS	Over Current
	Pick-up See order information
	Drop-out 5% below Pick-up
OUTPUT	SPDT, 10 Amps @ 240 VAC Resistive
HYSTERESIS	5%
RESPONSE TIME	Operate 0.2 to 10 SEC, Adjustable
	Release 0.2 to 10 SEC, Adjustable
INDICATORS	Trip (Amber) Glows when current is above the trip point
	Relay (Green) Glows when Relay is energized
RESET	Automatic
TEMPERATURE RATING	Operate 32° to 131°F (0° to +55°C)
	Storage -49° to 185°F (-45° to +85°C)
CONTACT ARRANGEMENT	(2) Form C Contacts. One Each for Over/Under
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals
WEIGHT	20 oz.



DIMENSIONS (INCHES)



WIRING

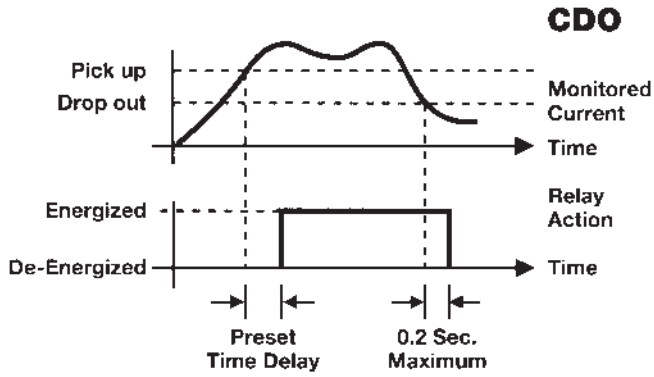


MODEL NUMBER >>>>>>	CDD	120	A	L	E
Control Voltage		120			
120 Volts		120			
Type of Voltage			AC	A	
Adjustment					
Lockshaft				L	
Features					
		0.2 to 1 amps, adj.			1
		0.5 to 2.5 amps, adj.			2.5
		1.0 to 5.0 amps, adj.			5
		2.0 to 10 amps, adj.			10
		4.0 to 20 amps, adj.			20

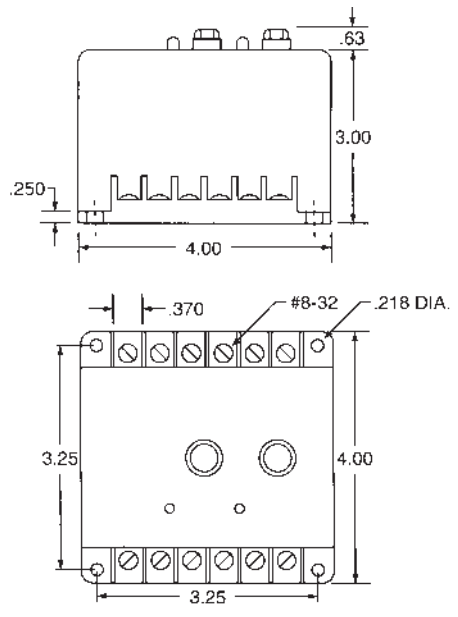
The CDO Series is used to detect over current conditions. The internal relay energizes (Pick-up) when the monitored current exceeds the preset trip point for longer than the adjustable time delay. The delay is incorporated to prevent nuisance tripping caused by inrush currents. The CDO has an automatic reset feature. The internal relay de-energizes (Drop-out) when the current drops 5% below the preset trip for longer than 0.2 seconds.



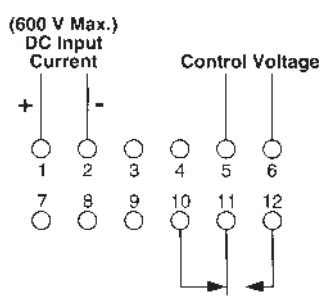
DC Over Current Monitor



DIMENSIONS (INCHES)



WIRING



SPECIFICATIONS

CONTROL VOLTAGE	120 VAC, 50/60 Hz	
TRIP POINTS	Over Current	
	Pick-up	See Order Information
	Drop-out	5% below Pick-up
OUTPUT	SPDT, 10 amp @ 240 VAC Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.2 to 10 SEC, Adjustable
	Release	0.2 SEC
INDICATORS	Trip (Red)	Glows On Over Current
	Relay (Green)	Glows when Relay is energized
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals	
WEIGHT	17 oz.	

MODEL NUMBER >>>>>	CDO	120	A	L	E
Control Voltage					
120 Volts		120			
Type of Voltage			AC		
Adjustment			A		
Lockshaft				L	
Features					
	0.2 to 1 amps. adj.				1
	0.5 to 2.5 amps. adj.				2.5
	1.0 to 5.0 amps. adj.				5
	2.0 to 10 amps. adj.				10
	4.0 to 20 amps. adj.				20

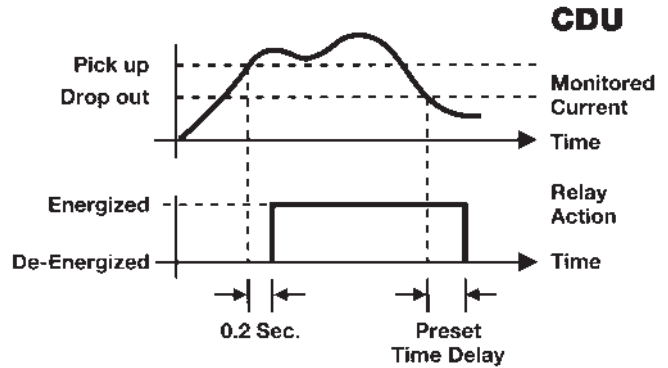
Current Monitors // CDO Series



DC Under Current Monitor/Relays

OPERATION

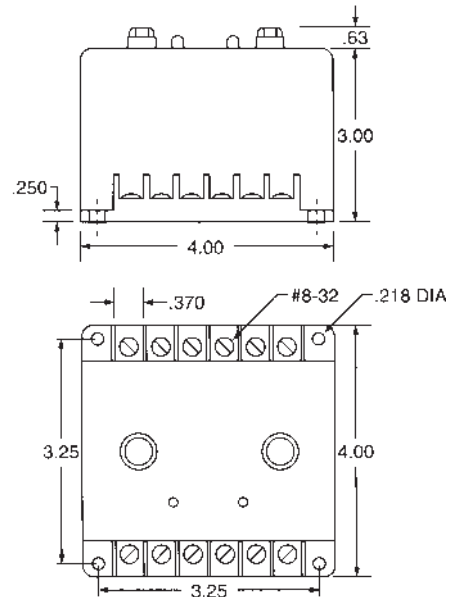
The CDU Series is used to detect **Under Current** conditions. The internal relay is energized (Pick-up) when the monitored current is above the pre-set trip point. The relay de-energizes (Drop-out) when the current falls below the trip point for longer than the adjustable delay. The delay is incorporated to prevent nuisance tripping caused by momentary line dips. The relay re-energizes when the current rises 5% above the Drop-out trip point for longer than 0.2 seconds. The relay has the automatic reset feature.



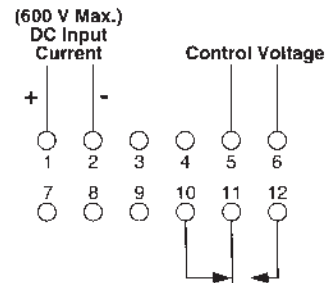
SPECIFICATIONS

CONTROL VOLTAGE	120 VAC, 50/60 Hz	
TRIP POINTS	Pick-up	5% above Drop-out
	Drop-out	See order information
OUTPUT	SPDT, 10 Amps @ 240 VAC Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.2 SEC
	Release	0.2 to 10 SEC, Adjustable
INDICATORS	Trip (Green)	Glows When Current is Above Preset Current Trip
	Relay (Green)	Glows when Relay is energized
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
CONTACT ARRANGEMENT	(2) Form C Contacts. One Each for Over/Under	
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals	
WEIGHT	17 oz.	

DIMENSIONS (INCHES)



WIRING



Current Monitors // CDU Series

MODEL NUMBER >>>>>	CDU	120	A	L	E	
Control Voltage		120				
120 Volts		120				
Type of Voltage			AC	A		
Adjustment						
Lockshaft				L		
Features						
		0.2 to 1 amps, adj.				1
		0.5 to 2.5 amps, adj.				2.5
		1.0 to 5.0 amps, adj.				5
		2.0 to 10 amps, adj.				10
		4.0 to 20 amps, adj.				20

OPERATION

The CLB Series is designed to protect three phase equipment against **Current Unbalance** and **Over Current** conditions.

The control voltage is continuously applied to supply the sensing circuitry and the internal relay. When the current of any phase approximately 20% above the maximum operating current, the inrush delay begins. This delay disables the over current sensors while high inrush currents are present. Any time the currents are outside the preset limits after completion of the inrush delay, the internal relay will de-energize (Drop-out).

A 2% differential (hysteresis) between Pick-up and Drop-out is incorporated to prevent chattering when operated in the automatic reset mode and the current is at the trip point.

The reset mode is selected as follows:

AUTOMATIC: Place a jumper between pins ten (10) and eleven (11).

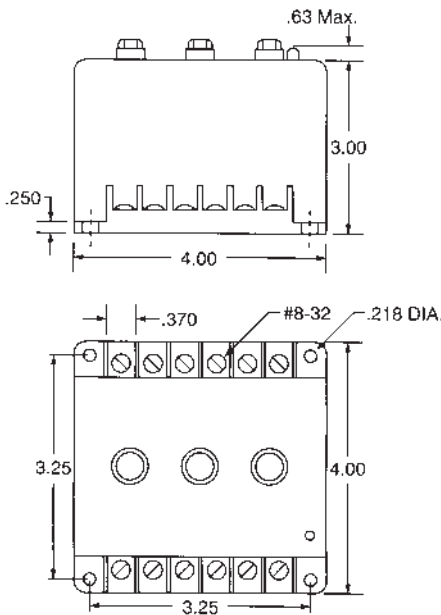
MANUAL: Place a normally open switch between pins ten (10) and eleven (11). When there is a loss and reapplication of the control voltage, the external switch must be closed before the circuit will again become operative.



3-Phase Current Unbalance & Over Current Monitor



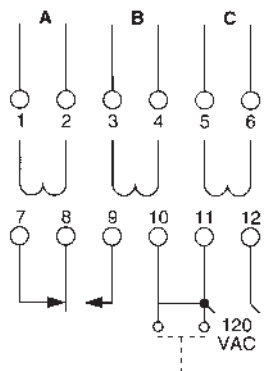
DIMENSIONS (INCHES)



SPECIFICATIONS

OPERATING VOLTAGE	3-Phase, 50/60 Hz, 600 V max	
CONTROL VOLTAGE	120 VAC, 50/60 Hz	
OVER CURRENT	See Table for Adjustable Ranges	
UNBALANCE RANGE	5% to 25%, Adjustable	
INRUSH DELAY	0.1 To 10 SEC, Adjustable; Initiated When Current of Any Phase rises 20% Above the Max. Operating Current	
OUTPUT	SPDT, 10 amp @ 240 VAC Resistive	
HYSTERESIS	2% of Unbalance Setting	
RESPONSE TIME	Operate	1 Second, Max.
	Release	100 mSEC
INDICATOR	LED Glow When All Conditions Are Normal	
RESET	Automatic or Manual	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
WEIGHT	13 oz.	

WIRING



MODEL NUMBER	CONTROL RANGE	OVER CURRENT RANGE
CLB-120-ALE-5	120 VAC	1.0 to 5.0 amps, Adjustable
CLB-120-ALE-10	120 VAC	2.0 to 10 amps, Adjustable



AC Go/No-Go Current Monitor/Relay

- Easy Installation
- No physical connection to the AC line that is being monitored
- Magnetically coupled by passing supply line through protruding Current Transformer
- Heavy Duty Contacts
- 8-Pin, Plug-in

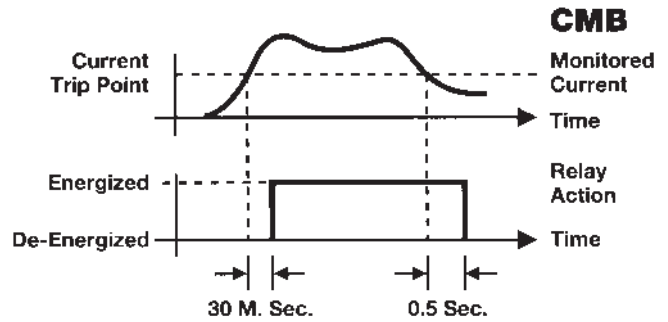
SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC; 50/60 Hz, 24 VDC	
TRIP POINTS	1-10 Amps, Fixed	
AC INPUT CURRENT	Up to 50 Amps	
OUTPUT	SPDT, 10 Amps @ 240 VAC Resistive; 211 VA @ 120 VAC Inductive; 1/6 Horsepower @ 120 VAC or 1/3 Horsepower @ 240 VAC	
POWER CONSUMPTION	3 Watts (Approximately)	
RESPONSE TIME	Operate	30 mSEC
	Release	0.5 SEC
LIFE EXPECTANCY	Mechanical	10 Million Operations (Minimum)
	Electrical	100,000 Operations @ Rated Load
DUTY CYCLE	Continuous	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
SOCKETS	RB-08 or PF083A	
ENCLOSURE	Lexan Dust Cover; 8-Pin plug-in	
WEIGHT	6 oz.	

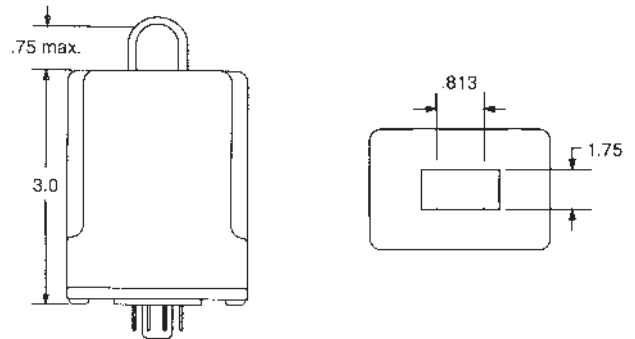
OPERATION

The CMB Series relay is used to detect the presence of AC current. When the monitored current exceeds the trip point for longer than 30 milliseconds, the internal relay energizes. When the monitored current drops below the trip point for longer than 0.5 seconds, the internal relay de-energizes. The Delay-on-Release is incorporated to prevent nuisance tripping caused by momentary dips in the load line.

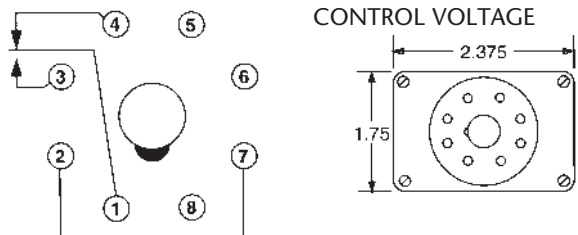
An External CT may be used to extend the range of the Current Monitor.



DIMENSIONS (INCHES)



WIRING



MODEL NUMBER >>>>>>	CMB		F	A
Control Voltage				
	24 Volts AC	24	A	
	24 Volts DC	24	D	
	120 Volts AC	120	A	
Current Trip Points				
			1 amp	1
			2 amps	2
			3 amps	3
			4 amps	4
			5 amps	5
			6 amps	6
			7 amps	7
			8 amps	8
			9 amps	9
			10 amps	10

The CMC Series is used to detect a motor jam up and give the equipment an opportunity to clear itself before going into a lockout and alarm mode.

OPERATION

Control voltage is continuously applied to the CMC monitor. Upon application of the control voltage the Forward and Alarm Relays energize. When AC current is initially applied, the Inrush Time Delay is initiated to disable the over current sensor during the inrush period. (See 1 on graph).

On over current the Forward Relay de-energizes and the unit has a 5 second dead band, then the Reverse Relay energizes for the selected time delay. then, the Reverse Relay de-energizes, rests for the Dead Band and the Forward Relay energizes completing one full cycle (See 2 on graph). After one cycle is complete the Forward relay remains energized if conditions have returned to normal. If an overcurrent remains, the unit will go through the same operating sequence as before until jam is corrected or the number of preselected cycles have occurred.

The number of cycles that occur before lockout is field selectable from 1 to 9 cycles. to prevent the faults from accumulating and causing nuisance alarms, a Time Band is initiated upon sensing the first fault. Then, successive occurrences equaling the number of faults within the Time Band will cause alarm. The Formula for the time Band is 70 seconds x (Count-1)

When the number of cycles reaches the pre-selected count, the Forward, Reverse and Alarm Relays lock into the de-energized state. (See 3 on graph) Reset is accomplished by pressing the reset button.

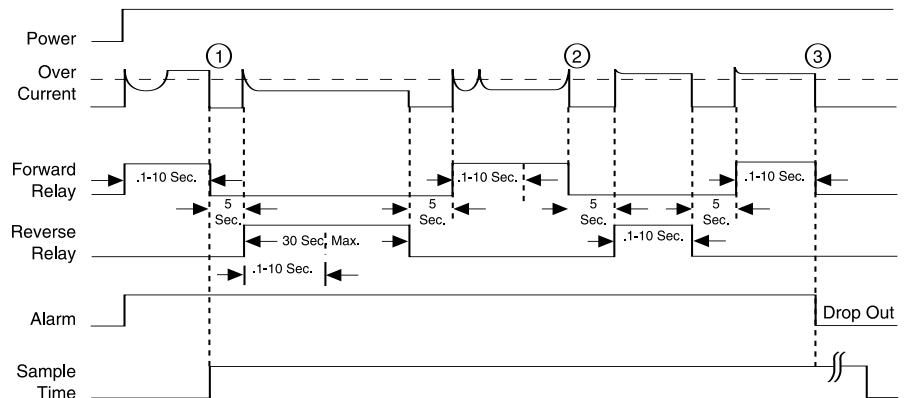
The LED indicator glows when the Forward Relay is energized. The CMC series operates in the fail safe mode as the relays are energized in normal conditions.

An External CT may be used to extend the range of the Current Monitor.

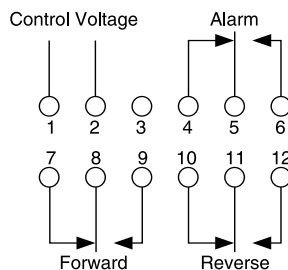


INCLUDES REVERSING RELAY & FAULT CONDITION COUNTER

AC Over Current Monitor



WIRING



SPECIFICATIONS

CONTROL VOLTAGE	120 VAC, 50/60 Hz	
OVER CURRENT	Inrush Delay	0.1 to 10 SEC, Adjustable (Forward and Reverse Operations)
	Alternating Delay	5 SEC, Fixed
	Reverse Operating Time	0.3 to 30 SEC, Adjustable
	Number of Fault Occurrences	Selector Switch, 1 to 9 occurrences; Must occur within the Sampling Time.
OUTPUT	(3) Separate SPDT 10 Amp Relay Contacts, (1) Forward, (1) Reverse, (1) Alarm	
INDICATOR	LED glows when Forward Relay is energized	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style E: Surface Mount Lexan #8-32 Screw Terminals	
WEIGHT	20 oz.	

MODEL NUMBER	CONTROL RANGE	ADJUSTMENT RANGE
CMC-24-ASE-5	24 VAC	1.0 to 5.0 amps
CMC-24-ASE-10	24VAC	2.0 to 10 amps
CMC-120-ASE-5	120 VAC	1.0 to 5.0 amps
CMC-120-ASE-10	120 VAC	2.0 to 10 amps

Current Monitors // CMC Series



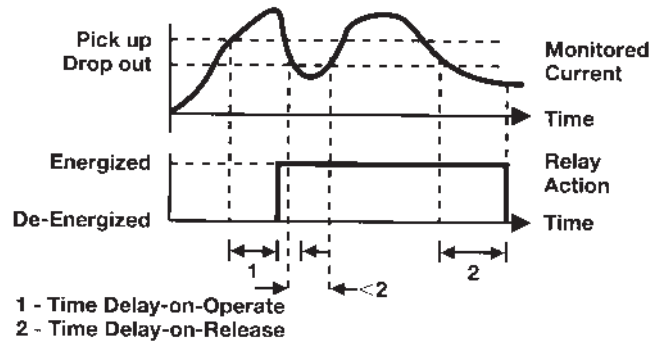
Universal AC Current Monitor

OPERATION

The CMD Series may be used as an Over Current Monitor or an Under Current Monitor. The CMD has **adjustable Delay-on-Operate** and **adjustable Delay-on-Release** time delays. When the current exceeds the preset current trip point for longer than the Delay-on-Operate time delay, the internal relay will energize (Pick-up). When the current drops below the preset current trip point for longer than the Delay-on-Release time delay, the internal relay will de-energize (Drop-out). When used as an over current monitor the Delay-on-Operate time delay is used to override inrush periods. When used as an under current monitor, the Delay-on-Release timer is used to override a temporary under current condition.

An External CT may be used to extend the range of the Current Monitor.

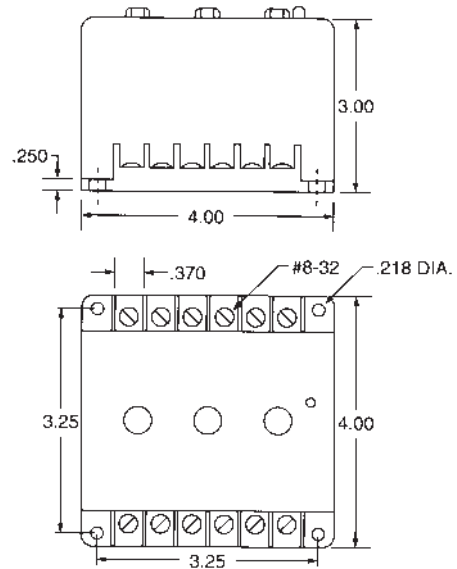
CMD



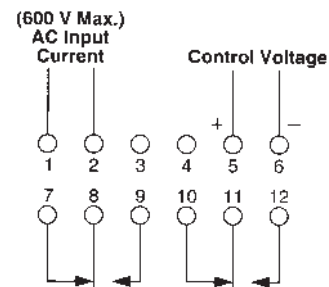
SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC; 50/60 Hz, 24 VDC	
TRIP POINTS	Pick-up	See order information
	Drop-out	5% below Pick-up
OUTPUT	DPDT, 10 Amp @ 120 VAC Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.1 to 10 SEC, Adjustable
	Release	0.3 to 30 SEC, Adjustable
INDICATORS	Glows when Relay is energized	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
SOCKETS	RB-08 or PF083A	
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals	
WEIGHT	13 oz.	

DIMENSIONS (INCHES)



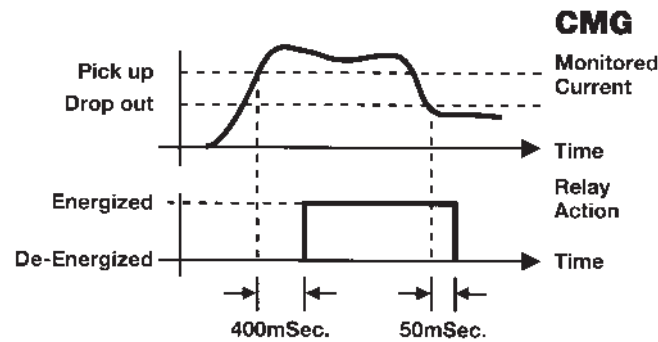
WIRING



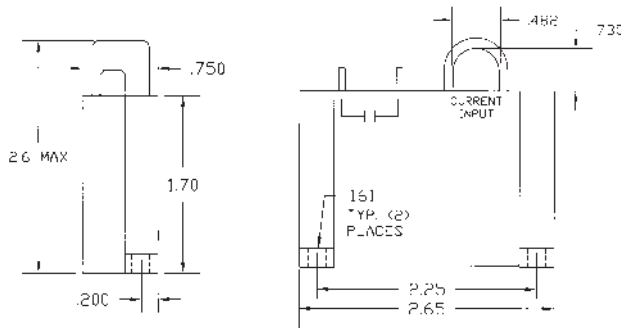
The CMG Series is a **self powered** Current Monitor/Relay that is used to detect the presence of AC current. When the monitored current exceeds the trip point for longer than 400 mSec., the internal relay energizes (Pick-up). When the monitored current drops below the trip point for longer than 50 mSec., the internal relay de-energizes (Drop-out). No physical connection is required as the line to be monitored is magnetically coupled by passing the conductor through the protruding Current Transformer of the monitor. No external supply is needed to power the monitor.

OPERATION

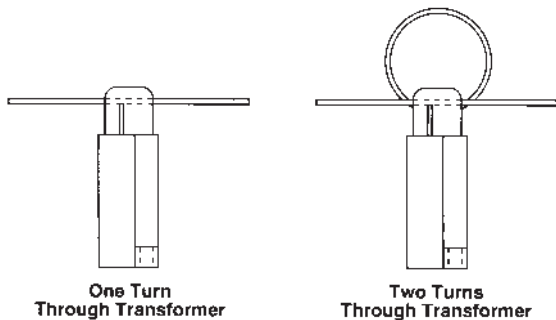
The current trip point specified is with one turn through the transformer. Each time the number of turns through the transformer doubles, the trip point effectively halves. Example: CMG-0100-20 will trip at 20 amps with one turn passing through the transformer. By placing two turns through the transformer, the relay will trip at 10 amps. Likewise, four turns will cause the relay to trip at 5 amps. (See below)



DIMENSIONS (INCHES)



WIRING



AC Self Powered Go/No-Go Current Monitor/Relays

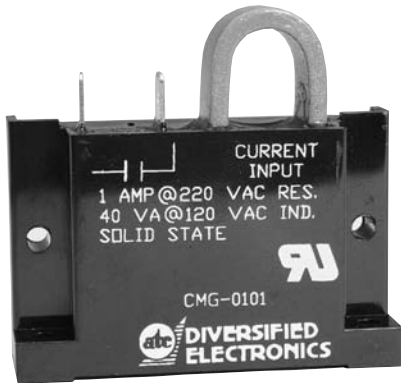


- No physical connection to the AC line that is being monitored
- Magnetically coupled by passing supply line through protruding Current Transformer
- Withstands 400 Ampere-Turns Continuous
- No supply voltage required
- Will operate on 24, 120, 240 or 480 VAC lines
- 1/4" Quick Disconnect Terminals

SPECIFICATIONS

CONTROL VOLTAGE	Not Required	
TRIP POINTS	Pick-up	See Order Information
	Drop-out	25% below Pick-up
OUTPUT	SPST - N.O., 5 Amps @ 240 VAC, Res. (Available as a normally closed contact upon request #CMG-0200)	
HYSTERESIS	25%	
RESPONSE TIME	Operate	400mSec. (Approximately)
	Release	50mSec.
ACCURACY	±5% on Pick-up	
TERMINATIONS	(2) 1/4" Quick Disconnect Terminals	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style "D" Surface Mounted	
WEIGHT	4 oz.	

MODEL NUMBER >>>>>	CMG	0100	
	Current Trip Points		
		20 amp	20
		24 amps	24
		28 amps	28
		32 amps	32
		36 amps	36



SOLID-STATE OUTPUT
SELF POWERED

AC GO/NO-GO Current Monitor

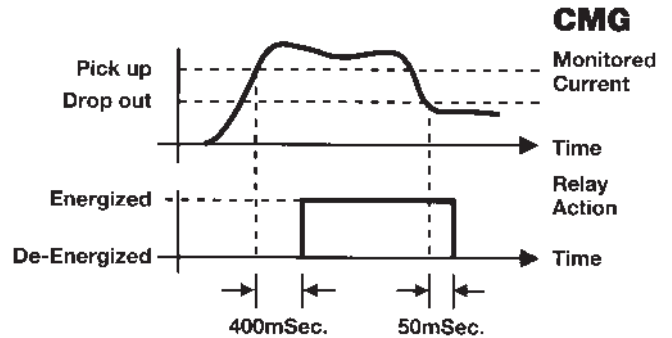
- No physical connection to the AC line that is being monitored
- Magnetically coupled by passing supply line through protruding Current Transformer
- No supply voltage required
- Will operate on 24, 120, 240 or 480 VAC lines
- Easy installation
- 1/4" Quick Disconnect Terminals

SPECIFICATIONS

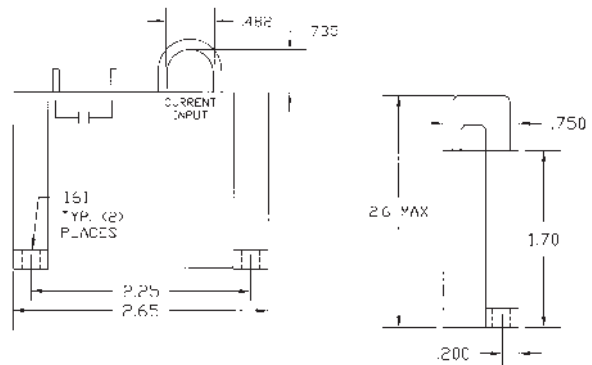
CONTROL VOLTAGE	Not Required	
TRIP POINTS	Pick-up	2 Amps
	Drop-out	25% below Pick-up
OUTPUT	Solid State, SPST-N.O. 1 Amp Resistive; 40 VA Run @ 120 VAC Inductive	
MAXIMUM CONTINUOUS CURRENT	200 Amp turns @ 25°C	
RESPONSE TIME	Operate	2-10 mSEC @ 130 Amps; 400 mSEC @ 10% over
	Release	400 mSEC (Approximately)
ABSOLUTE MAXIMUM OUTPUT VOLTAGE	280 VAC	
ACCURACY	20% on Pick-up	
TERMINATIONS	(2) 1/4" Quick Disconnect Terminals	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style "D" Surface Mounted	
WEIGHT	13 oz.	

OPERATION

The CMG-0101 Series is a solid state **self powered** Current Monitor that is used to detect the presence of AC current. When the monitored current exceeds the trip point for longer than 400 mSec., the output energizes (Pick-up). When the monitored current drops below the trip point for longer than 400 mSec., the output de-energizes (Drop-out). No physical connection is required as the line to be monitored is magnetically coupled by passing the conductor through the protruding Current Transformer of the monitor. No external supply is needed to power the monitor.



DIMENSIONS (INCHES)



ORDERING INFORMATION

MODEL NUMBER	DESCRIPTION
CMG-0101	AC GO/NO-GO Current Monitor

OPERATION

The CMI Series **Over Current Monitor** Relay operates in the **fail-safe mode** as the relay is energized (pick-up) when the monitored AC current is normal. The relay de-energizes (Drop-out) when the monitored current rises above the preset trip point or the control voltage is removed. When current is initially applied, a time delay begins. This inhibits the over current sensors while high inrush currents are present. The delay is field adjustable and is set so the delay period is slightly longer than the inrush time of the motor. If the monitored current is above the preset trip point when the delay elapses, the relay de-energizes. (Figure 1) If the current drops to the normal run current of the motor prior to the completion of the delay period, the relay remains energized until the current rises above the trip point, which indicates an abnormal condition. At that time the relay de-energizes and remains locked-out until the reset button is pressed or the control voltage is interrupted, and re-applied. (Figure 2) A typical application is for conveyor jam up detection.

An External CT may be used to extend the range of the Current Monitor.



FAIL SAFE DETECTION OF MOTOR JAM UPS

AC Over Current Monitor

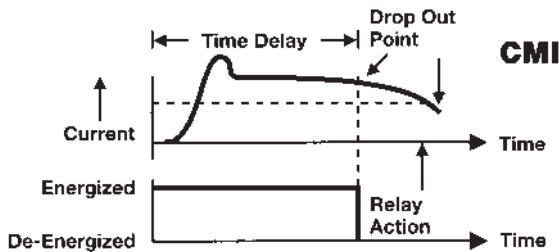


Figure 1

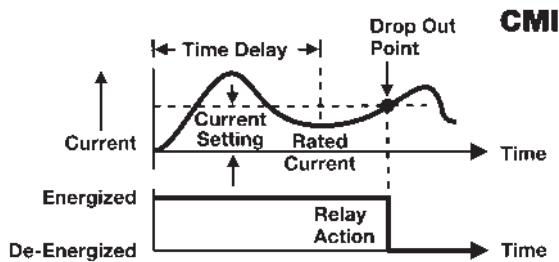
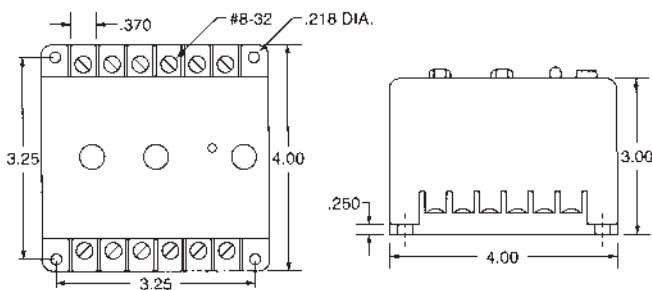
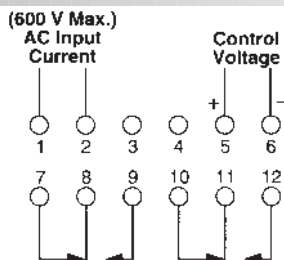


Figure 2

DIMENSIONS (INCHES)



WIRING



SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC/VDC, 50/60 Hz	
TRIP POINTS	Pick-up	See Order Information
	Drop-out	Press Reset Button or Restore Control Voltage
OUTPUT	DPDT, 10 Amps @ 120 VAC, Resistive	
TIME DELAY	0.2 to 10 SEC, Adjustable On Motor Starting	
OPERATING TIME	50 mSEC (After Initial Delay has Timed Out)	
CURRENT WITHSTAND	20 Times Nominal for 1 Second	
ISOLATION	2500 Volts Between Input and All Other Terminals	
INDICATOR	Glows on Normal Current	
RESET	Manual, Press Button or Interrupt Control Voltage	
RESET TIME	100 mSEC After Lock-Out	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Lexan Surface Mounted; #8-32 Screw Terminals	
WEIGHT	11 oz.	

MODEL NUMBER >>>>>	CMI	A	S	E
Control Voltage				
	24 Volts	24		
	120 Volts	120		
Current Trip Points				
	0.05 to 0.25 amps. adj.			.25
	0.2 to 1 amps. adj.			1
	1.0 to 5.0 amps. adj.			5
	2.0 to 10 amps. adj.			10
	4.0 to 20 amps. adj.			20



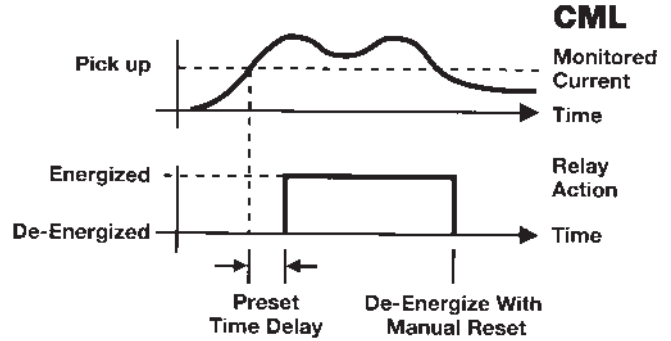
INCLUDES MANUAL RESET

AC Over Current Monitor

OPERATION

The CML Series is used to detect **over current conditions**. The internal relay energizes (Pick-up) when the monitored current exceeds the preset trip point for longer than the adjustable time delay period. The adjustable delay is incorporated to prevent nuisance tripping caused by motor inrush currents. The CML has the **manual reset** feature. The internal relay de-energizes (Drop-out) when the reset button is pressed. If the current is below the trip point when the button is released, the relay will remain de-energized. If the current is above the trip point, the relay will re-energize.

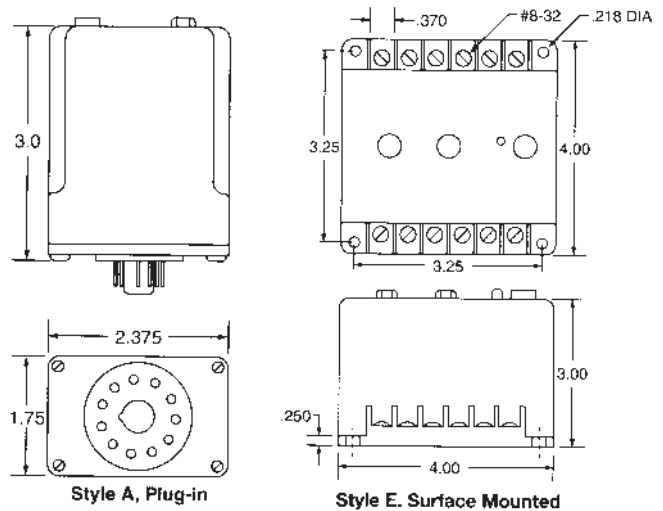
An External CT may be used to extend the range of the Current Monitor.



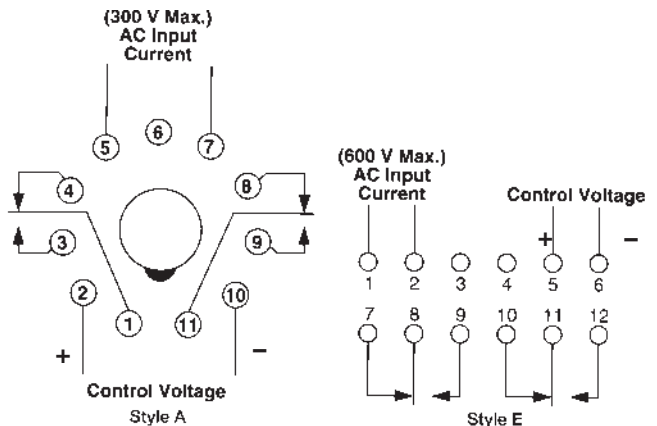
SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC/DC; 50/60 Hz	
TRIP POINTS	Pick-up	See order information
	Drop-out	5% below Pick-up (After Manual Reset)
OUTPUT	DPDT, 10 Amp @ 120 VAC Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.1 to 5 SEC, Adjustable
INDICATORS	LED Glows On Over Current (Style "E" Enclosure Only)	
RESET	Manual	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style A	Lexan Dust Cover; 11-pin Plug-in
	Style E	Lexan Surface Mounted; #8-32 Screw Terminals
SOCKET	Style A: RB-11	Style E: 13 oz.
WEIGHT	6 oz.	

DIMENSIONS (INCHES)



WIRING



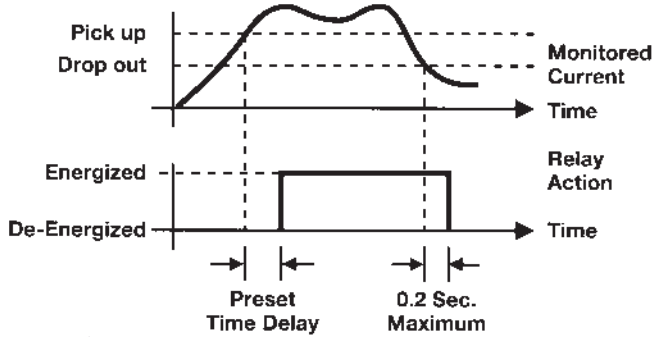
Current Monitors // CML Series

OPERATION

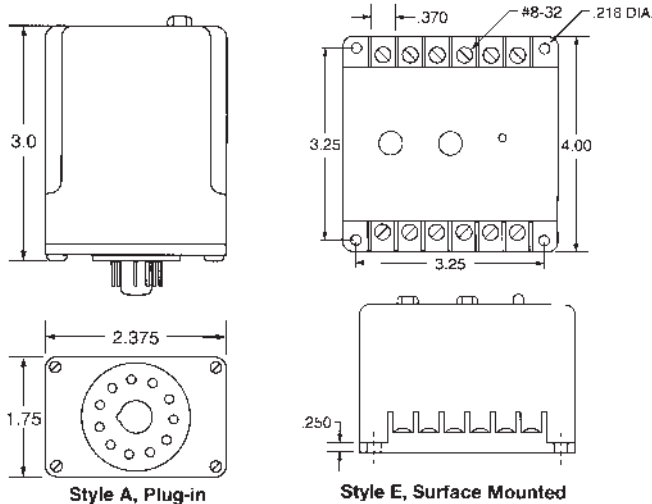
The CMO Series is used to detect over current conditions. The internal relay energizes (Pick-up) when the monitored current exceeds the preset trip point for longer than the **adjustable time delay**. The delay is incorporated to prevent nuisance tripping caused by motor inrush currents. The CMO has an **automatic reset feature**. The internal relay de-energizes (Drop-out) when the current drops 5% below the preset trip for longer than 0.2 seconds.

An External CT may be used to extend the range of the Current.

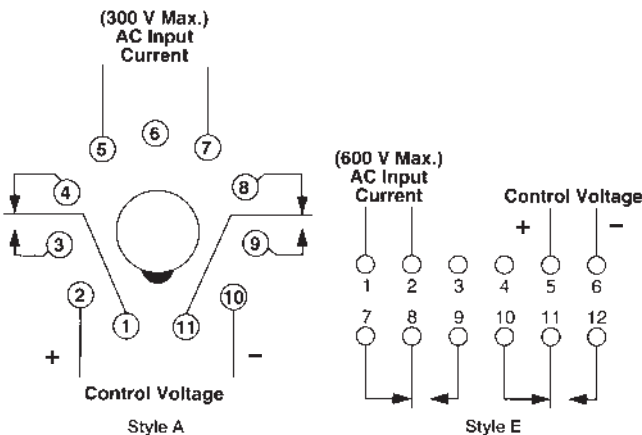
CMO



DIMENSIONS (INCHES)



WIRING



AC Over Current Monitor/Relays
ADJUSTABLE TIME DELAY

SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC/VDC; 50/60 Hz	
TRIP POINTS	Pick-up	See Order Information
	Drop-out	5% below Pick-up
OUTPUT	DPDT, 10 Amps @ 120 VAC, Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.1 to 5 SEC, Adjustable
	Release	0.2 SEC
INDICATOR	LED Glows On Over Current (Style "E" Enclosure Only)	
SOCKET	RB-11 Socket for Style A.	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style A	Lexan Dust Cover; 11-pin Plug-in
	Style E	Lexan Surface Mounted; #8-32 Screw Terminals
WEIGHT	Style A: 5 oz. Style E: 13 oz.	

MODEL NUMBER >>>>>	CMO	A	S	
Control Voltage				
	24 Volts	24		
	120 Volts	120		
Type of Control Voltage				
	AC	A		
Enclosure Style				
	Plug-In	A		
	Surface Mount		E	
Pick-Up Current Range				
	0.05 to 0.25 amps. adj. max continuous	3.4 amps		.25
	0.2 to 1 amps. adj. max continuous	11.9 amps		1
	1.0 to 5.0 amps. adj. max continuous	13.4 amps		5
	2.0 to 10 amps. adj. max continuous	25 amps		10
	4.0 to 20 amps. adj. max continuous	25 amps (Style E only)		20

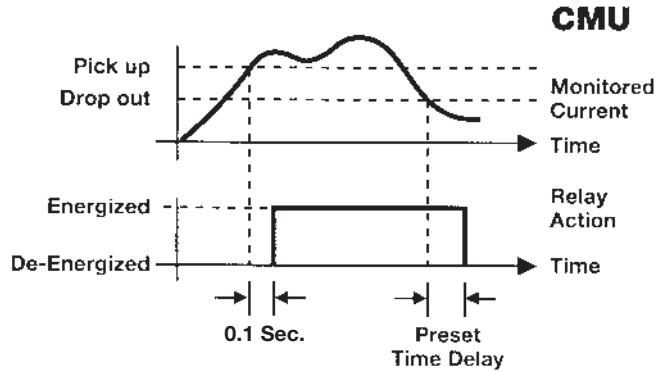


AC Under Current Monitor

OPERATION

The CMU Series is used to detect **under current** conditions. The internal relay is energized (Pick-up) when the monitored current is above the pre-set trip point. The relay de-energizes (Drop-out) when the current falls below the trip point for longer than the **adjustable delay**. The delay is incorporated to prevent nuisance tripping caused by momentary line dips. The relay re-energizes when the current rises 5% above the Drop-out trip point for longer than 0.1 seconds. The relay has the **automatic reset** feature.

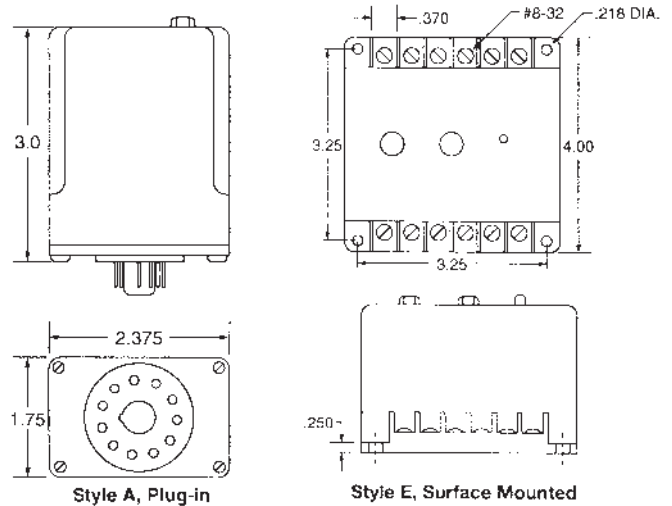
An external CT may be used to extend the range of the Current Monitor.



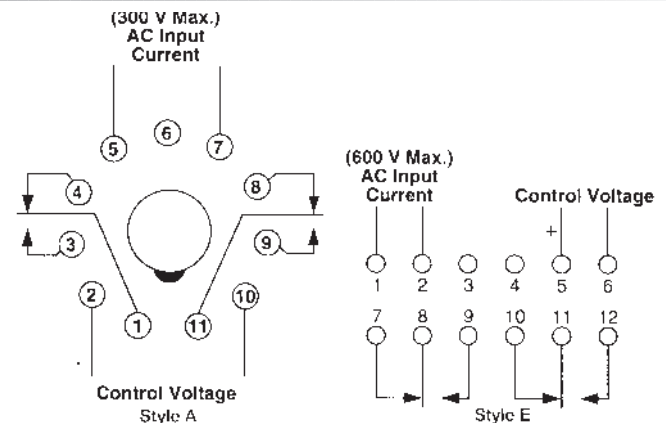
SPECIFICATIONS

CONTROL VOLTAGE	24 or 120 VAC/DC; 50/60 Hz	
TRIP POINTS	Pick-up	5% above Drop-out
	Drop-out	See order information
OUTPUT	DPDT, 10 Amp @ 120 VAC Resistive	
HYSTERESIS	5%	
RESPONSE TIME	Operate	0.1 SEC
	Release	0.1 to 5 SEC, Adjustable
INDICATORS	Glows When Current is Above Preset Current Trip Point (Style E Enclosure Only)	
RESET	Automatic	
TEMPERATURE RATING	Operate	32° to 131°F (0° to +55°C)
	Storage	-49° to 185°F (-45° to +85°C)
ENCLOSURE	Style A	Lexan Dust Cover; 11-Pin Plug-in
	Style E	Lexan Surface Mounted; #8-32 Screw Terminals
SOCKET	RB-11 Socket for Style A.	
WEIGHT	Style A	5 oz.
	Style E	10.5 oz.

DIMENSIONS (INCHES)



WIRING



Current Monitors // CMU Series

MODEL NUMBER >>>>>	CMU			S	
Control Voltage					
24 Volts	24				
120 Volts	120				
Type of Control Voltage					
AC	A				
DC	D				
Enclosure Style					
Plug-In	A				
Surface Mount	E				
Pick-Up Current Range					
0.05 to 0.25 amps. adj. max continuous 3.4 amps					.25
0.2 to 1 amps. adj. max continuous 11.9 amps					1
1.0 to 5.0 amps. adj. max continuous 13.4 amps					5
2.0 to 10 amps. adj. max continuous 25 amps					10
4.0 to 20 amps. adj. max continuous 25 amps					20

OPERATION

The CT Current Transformers are of the inserted primary type with the secondary toroidally wound over a core of oriented electrical steel. The windings are carefully insulated. The entire transformer is then dipped in PVC insulation compound which insures maximum protection against moisture, acids, alkaline, oils and abrasive particles. The securely fastened 24" 14 AWG leads are identified to the extent that the secondary current leaving the CT through the white lead is in phase with the primary current when the primary conductor enters the CT from the side identified by the black dot. To prevent shock and transformer damage, it is important that the secondary leads always form a continuous circuit when the current is flowing in the primary.

An External CT may be used to extend the range of the AC Current Monitors.

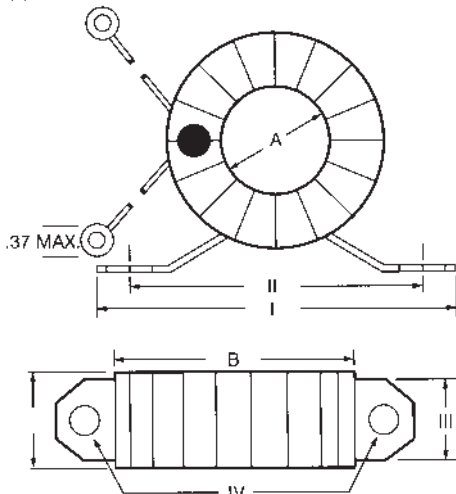


Current Transformers

DIMENSIONS (INCHES)

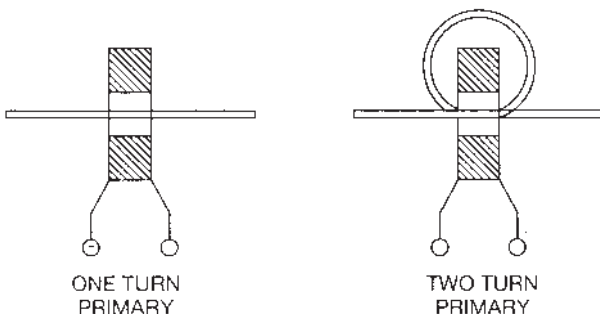
SEE CHART

(2) #8 STUD RING



GROUP SIZE	A	B	C	I	II	III	IV
1	1-1/4	3-3/4	2-3/4	5-1/4	4	2-1/8	0.281 x 0.5
2	1-1/4	3-7/8	1-1/4	4-1/2	3-7/8	7/8	0.250 x 0.375
3	1-1/4	3-1/2	1-1/4	4-1/2	3-7/8	7/8	0.250 x 0.375
4	1-7/8	4	1-1/4	4-1/2	3-7/8	7/8	0.250 x 0.375
5	3-3/8	6-1/2	1-11/16	7-7/8	6-1/2	1-1/8	0.281 x .5

WIRING



- 600 Volt Insulation
- 25 - 400 Hz Operation
- 25/5 to 2500/5 Amperes
- Optional Mounting Bracket (Add Suffix-B to part number)

SPECIFICATIONS

MODEL	RATIO	CAPACITY	ACCURACY	GROUP SIZE	WEIGHT
CT-25/5	25/5	2 V.A.	6.00%	1	3 lb. 5 oz.
CT-50/5	50/5	2 V.A.	6.00%	2	1lb. 6 oz.
CT-100/5	100/5	2 V.A.	3.00%	3	11lb. 4.5 oz.
CT-200/5	200/5	2 V.A.	1.50%	3	15 oz.
CT-500/5	500/5	2 V.A.	.60%	3	1 lb. 1 oz.
CT-1000/5	1000/5	2 V.A.	.30%	4	3 lb.
CT-2500/5	2500/5	5 V.A.	.10%	5	3 lb. 4 oz.

NOTES:

1. The current ratio in the table is the ratio of current in the primary/secondary with one turn on the primary. The ratio can be increased by adding turns on the primary.
2. The transformers may be installed at some distance from the load. However, the interconnecting conductor resistance must not cause the VA rating of the transformer to be exceeded.
3. CTs should not be operated at twice the rated currents. For example, CT-25/5 should not operate above 50/10 amps. With current too high overheating will occur.

THREE PHASE CURRENT UNBALANCE

Balanced or matched currents on a three phase system are difficult to maintain because of the many varying factors involved such as, unequal single phase loading, poor connections and cabling and/or dirty or burnt starter contacts.

Although these varying factors can be controlled to maintain as close as possible a balanced line, the unseen conditions such as overheated motor windings, burnt bearings, low voltage, high voltage and single phasing need to be constantly monitored to protect your valuable equipment.

The CLB Series Three Phase Current Unbalance and Over Current Monitor (page 35) offers this protection.

To determine the condition of your three phase line and to properly select the CLB Series percent unbalance setting a simple calculation formula is needed as follows:

$$\frac{(I \text{ max} - I \text{ avg})}{I \text{ max}} \times 100$$

Example: 1. Measure the current on each leg.

Assume A = 10 amps
 B = 12 amps
 C = 9 amps

2. Find Average $10 + 12 + 9 = 31$

$$\frac{31}{3} = 10.33$$

$$I \text{ max} = 12$$

$$I \text{ avg} = 10.33$$

3. Apply formula $12 - 10.33 = 1.67$

$$\frac{1.67}{12} = .139 \times 100 = 13.9\% \text{ unbalance}$$

EXTERNAL CURRENT TRANSFORMERS

The load or burden that can be connected to the secondary of the Current Transformer is usually specified in VA. The rated accuracy of the Current Transformer is guaranteed only when the sum of the VA ratings of all devices (ammeters, wattmeters, current monitors, etc.) connected to the secondary windings does not exceed the specified VA rating.

The interconnecting conductor resistance must also be considered, especially when the Transformer is installed at some distance from the Current Monitor or other load.

For the wiring, the VA can be calculated using Ohm's Law:

$$VA = E \times I = (I \times R) \times I = I^2R$$

Where I = 5 Amps and R is the DC resistance of the wire.

All of the standard DE Current Transformers have a rating of 2 VA except the 2500/5 version which has a 5 VA rating.

From the above formula we can also calculate the maximum resistance that can be connected to the secondary of a Current Transformer:

$$VA = I^2R, \text{ Hence } R = \frac{VA}{I^2}$$

Example:

$$VA = 2 \quad R_{\text{max}} = \frac{VA}{I^2} = \frac{2}{(5)^2} = 0.08 \text{ Ohms} = 80 \text{ milliohms}$$

$$VA = 5 \quad R_{\text{max}} = \frac{VA}{I^2} = \frac{2}{(5)^2} = 0.2 \text{ Ohms} = 200 \text{ milliohms}$$

If the only load on the Current Transformer is a DE Current Monitor, its VA rating (approx. 0.15 VA) is small compared to the Current Transformer rating and can be neglected. This means that the resistance of the wiring can be 80 milliohms max. for the 2 VA units and 200 milliohms max for the 5 V A unit.

Gauge	Ohms per 1000'	Milliohms per foot
AWG 14	2.5	2.5
AWG 16	4.0	4.0
AWG 18	6.4	6.4
AWG 20	10.0	10.0

Example:

For a 2 VA Current Transformer, the length of AWG 16 wire would be:

$$\frac{80 \text{ milliohms}}{4.0 \text{ milliohms/ft}} = 20'$$

Because we are dealing with a pair of wires, the maximum distance from the Current Transformer to the Current Monitor can be only 10 ft.

As we can see, it is important to keep the wire length to minimum, use heavy wire, and keep all connections clean and tight.