

OPERATION

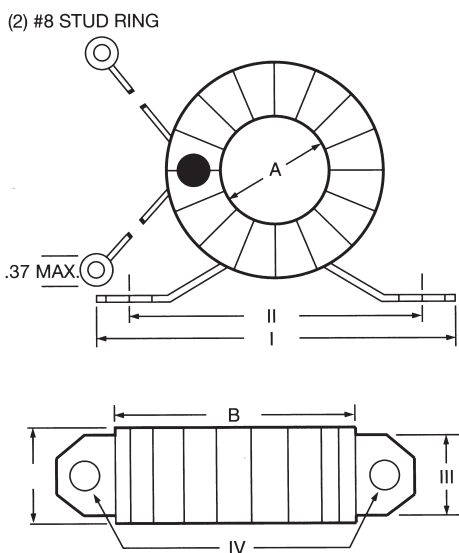
The **CT Current Transformers** are of the inserted primary type with the secondary toroidally wound over a core of oriented electrical steel. The windings are carefully insulated. The entire transformer is then dipped in PVC insulation compound which insures maximum protection against moisture, acids, 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)



- 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	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	1lb. 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.

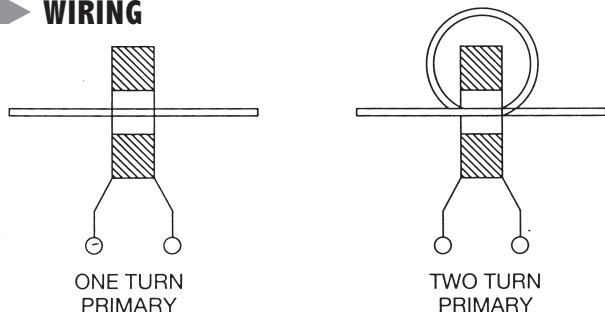
NOTES:

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.

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



▶ 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 176) 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:

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

- Example:
- Measure the current on each leg.
Assume A = 10 amps
 B = 12 amps
 C = 9 amps
 - Find Average $10 + 12 + 9 = 31$
 $\frac{31}{3} = 10.33$

 $I_{\max} = 12$
 $I_{\text{avg}} = 10.33$
 - Apply formula $12 - 10.33 = 1.67$
 $\frac{1.67}{12} = .139 \times 100 = 13.9\%$ 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:

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

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:

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

Example:

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

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

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.

ALTERNATING RELAYS

ATC-Diversified Electronics offers a wide variety of models for various staging requirements. The different models available are: **Duplexors, Triplexors, Quadraplexors, Special Function, and Expandable Alternating Relays.**

The **Alternating Relay** is used in multiple load installations to assure equal run time on all loads. They also allow for the addition of more capacity in the event of excess load requirements. The Alternating Relay provides equal run time on two or more loads by alternating the sequence in which the loads are allowed to start up. In each case, the alternating action is initiated each time the control switch across designated terminal opens. The control switch may be a float, a thermostat, a pressure switch, or a timer contact.

ALTERNATING CONTROLLERS

The **ARM Series, Alternating Controllers**, are used in multiple load installations to assure equal run time on all loads. They also allow for the addition of more capacity in the event of excess load requirements. The Alternating Controllers provide equal run time on two or more loads by alternating the sequence in which the loads are allowed to start up.

All **ARM** models feature **intrinsically safe inputs** and logic that allows the outputs to operate even if one of the inputs fails to open or close. For example: if the off switch fails to close, the lead load will not energize until both the lead and the lag switches close. An inrush delay on all models reduces line sags by preventing multiple loads from energizing simultaneously.

FEATURE MATRIX

Model Number	NUMBER OF LOADS SEQUENCED			ENCLOSURE STYLE		EXPANDABLE	EXTERNAL CLOCKING	AUTOMATIC ALTERNATING	FIELD SELECTABLE SEQUENCING	UL/CANADIAN UL RECOGNIZED	UL LISTED	CSA CERTIFIED
	2	3	4	A	E							
ARA-XXX-ABA	●			●				●		●		●
ARA-XXX-ACA	●			●				●		●		●
ARA-XXX-ADA	●			●				●		●		●
ARA-XXX-AEA	●			●				●		●		●
ARA-XXX-AFE		●			●		●	●			●	●
ARA-XXX-AGE			●		●		●	●			●	●
ARA-120-AHE		●			●		●	●				
ARA-120-AJE		●			●		●	●	●			
ARA-120-AME	●	●			●	●	●	●				
ARA-120-ANE		●	●		●	●	●	●				
ARB-XXX-ABA	●			●				●	●	●		●
ARB-XXX-ACA	●			●				●	●	●		●
ARB-XXX-ADA	●			●				●	●	●		●
ARB-XXX-AEA	●			●				●	●	●		●
ARC-XXX-AAA	●			●				●		●		
ARD-XXX-AAA	●			●				●	●	●		
AUC-XXX-AAA	●			●				●			●	
AUD-XXX-AAA	●			●				●	●		●	

FEATURE MATRIX

Model Number	NUMBER OF LOADS SEQUENCED			STYLE SURFACE MOUNT	PANEL MOUNT	AUTOMATIC ALTERNATING	SELECTABLE SEQUENCING	OUTPUT LOGIC (SOSO)	OUTPUT LOGIC (FOSO)	OMIT	LEAD SELECT	UL LISTED 913
	2	3	4									
ARM-XXX-AAE		●		●		●		●				●
ARM-XXX-AAEP		●		●	●	●		●				●
ARM-XXX-ABE		●		●		●			●			●
ARM-XXX-ABEP		●		●	●	●			●			●
ARM-XXX-ACE		●		●		●	●	●		●	●	●
ARM-XXX-ACEP		●		●	●	●	●	●		●	●	●
ARM-XXX-ADE		●		●		●	●		●		●	●
ARM-XXX-ADEP		●		●	●	●	●		●		●	●
ARM-XXX-AFE	●			●		●	●	●	●		●	●
ARM-XXX-AFEP	●			●	●	●	●	●	●		●	●
ARM-XXX-AGE			●	●		●		●				●
ARM-XXX-AGEP			●	●	●	●		●				●
ARM-XXX-AHE			●	●		●			●			●
ARM-XXX-AHEP			●	●	●	●		●				●

