

# CPT Series Control Transformers



(Inrush VA data should be obtained from the device manufacturers.)

The **inrush load power factor** is difficult to determine without detailed vector analysis of all the control components. In the absence of such information, we recommend that a 40% power factor be utilized.

## Six easy steps

Once the three circuit variables have been determined, follow these steps to select the proper transformer.

1. Determine your primary (supply) and secondary (output) voltage requirements, as well as the required frequency (i.e. 60 Hz).
2. Calculate the total sealed VA of your circuit.
3. Calculate the inrush VA by adding the inrush VA of all components being energized together. Remember to add the sealed VA of all components that do not have inrush VA (lamps, timers, etc.), as they do present a load to the transformer during maximum inrush. If the inrush for your components is unknown, assume a 40% inrush power factor.
4. Calculate the total inrush VA using one of two methods:
5. If the nominal supply voltage does not fluctuate more than 5%, then

$$\begin{aligned} \text{Total Inrush VA} &= \sqrt{(\text{VA sealed})^2 + (\text{VA inrush})^2} \\ &\text{or} \\ \text{Total Inrush VA} &= \text{VA Sealed} + \text{VA Inrush} \end{aligned}$$

reference the 90% secondary voltage column in the Regulation Data Table for the correct VA rating.

If the supply voltage varies up to 10%, the 95% secondary voltage column should be used to size the transformer.

6. Using the regulation data table below, select the appropriate VA rated transformer:
  - A. With a continuous VA rating that is equal to or greater than the value in Step 3.
  - B. With a maximum inrush VA equal to or greater than the value obtained in Step 5.

**Note:** See fuse section in this catalog for over-current protection chart for transformers.

Get years of reliable service from a quality transformer at a practical price

## CPT transformers for industrial applications

The CPT series of control transformers is specifically designed for high inrush applications requiring reliable output voltage stability. Designed to meet industrial applications where electromagnetic devices such as relays, solenoids, etc. are used, the CPT series transformers maximize inrush capability and output voltage regulation when electromagnetic devices are initially energized.

## Quality construction improves performance

The CPT series of control transformers uses Mylar, Nomex and other high-quality insulating materials. Insulation is used to electrically insulate turn to turn windings, layer to layer windings, primary to secondary windings and ground.

All CPT transformers are vacuum impregnated with VT polyester resin and oven-cured, which seals the surface and eliminates moisture. Filling the entire unit provides a strong mechanical bond and offers protection from the environment.

## Control transformer selection

To select the proper transformer, you must first determine three characteristics of the load circuit. They are total steady-state (sealed) VA, total inrush VA, and inrush load power factor.

**Total steady-state "sealed" VA** is the total amount of VA that the transformer must supply to the load circuit for an extended length of time. Calculate by adding the total steady-state VA of all devices in your control circuit. (The operating VA data for the devices should be available from the manufacturers.)

The **inrush VA** is the amount of VA that the transformer must supply for all components in the control circuit that are energized together. Consideration for the start-up sequence may be required.

**Transformer Regulation Data Table**

Part Number	Continuous VA Transformer Nameplate	Inrush VA @ 40% Power Factor		
		85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
CPT115-50-F	50	270	210	160
CPT115-75-F	75	435	365	255
CPT115-100-F	100	655	520	370
CPT115-150-F	150	1300	1010	700
CPT115-200-F	200	1975	1500	1020
CPT115-250-F	250	2680	2030	1340
CPT115-300-F	300	2970	2270	1510
CPT115-500-F	500	6300	5035	3305

**Note:** It is recommended that a control transformer be sized at a 40% power factor. Some components in a circuit, such as electromagnetic devices, typically operate at that level due to their inherently lower power factor. Selecting a transformer at 40% power factor will more than adequately size the unit for all the various loads in the circuit.

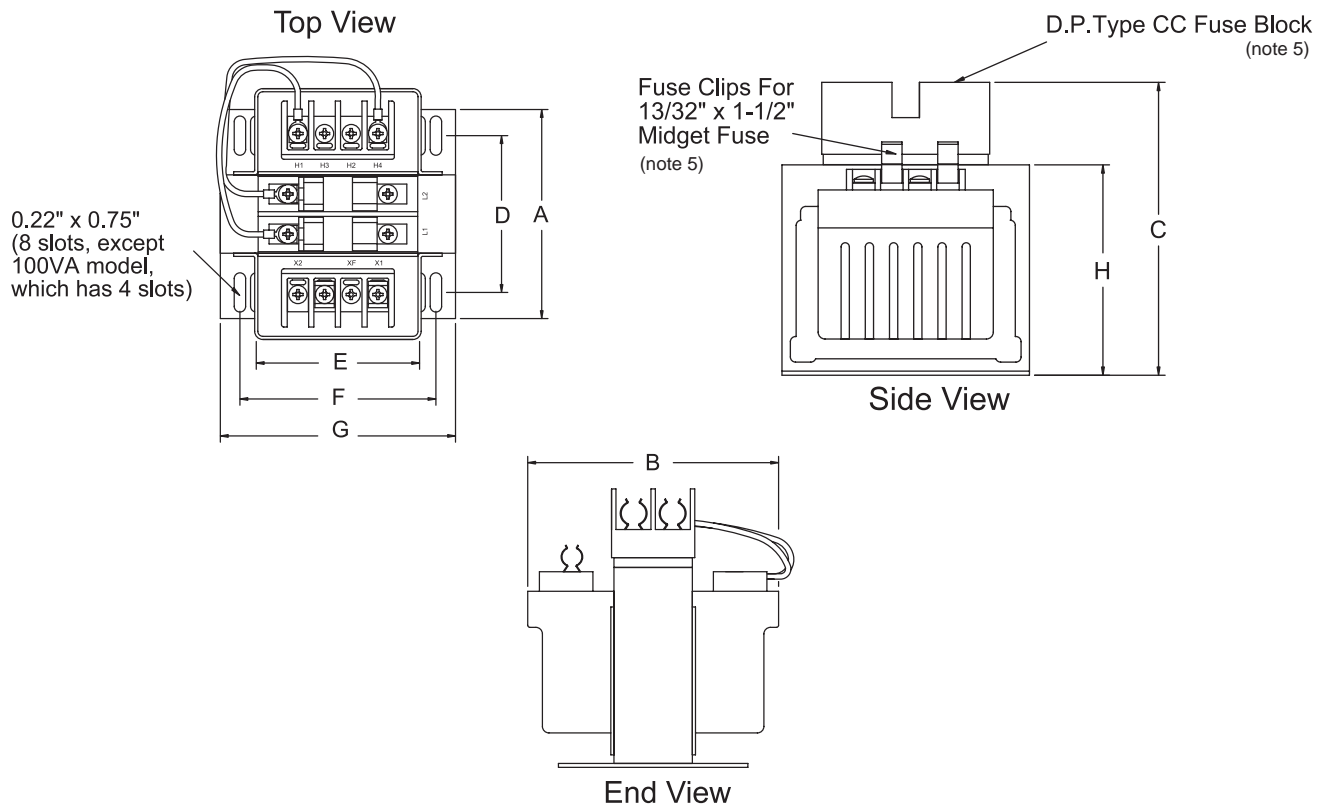
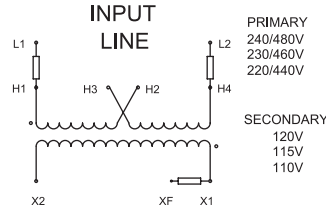
# CPT Series Control Transformers Specifications

## Features:

- UL/CSA/CE approved
- 50/60 Hz
- Primary: 240/480, 230/460, 220/440 VAC
- Secondary: 120, 115, 110 VAC
- Copper coils, epoxy encapsulated
- FK-3 fuse block: (note 5)
  - Primary: 2 x type CC rejection fuses
  - Secondary: One midget fuse
- Compatible with all CPTSG2, CPTSG3 and CPTSG4 finger-safe terminal covers (see price list)
- Universal mounting base

### Notes:

1. All dimensions are +/- 0.06 inches unless otherwise noted.
2. Transformers are CSA Certified (LR38216) and UL Listed (E50394) as Type 3AH.
3. Terminated with #8/32 Robertson/Phillips terminal screws.
4. Temperature class: 130, Temperature rise: 80 degrees C.
5. **FUSES NOT INCLUDED** (See Edison fuse section for HCTR fuses)
6. Jumper links to make primary series/parallel connections are supplied but not installed.
  - a. For 220-240V primary, jumper H1 to H3 and H2 to H4.
  - b. For 440-480V primary, jumper H2 to H3.



CPT Series Control Transformer Specifications														
Part Number	Price	Volt/Amp Rating	Output Current	Primary Voltage (50/60Hz)	Secondary Voltage	Shipping Weight (lbs.)	Dimensions (inches)							
							A	B	C	D	E	F	G	H
CPT115-50-F	<--->	50	0.43A	240/480, 230/460, 220/440,	120, 115, 110	3.60	3.41	3.75	4.07	2.50	NA	2.50	3.00	2.75
CPT115-75-F	<--->	75	0.65A			4.35	3.31	4.00	4.07	2.44	NA	2.50	3.00	2.75
CPT115-100-F	<--->	100	0.87A			5.15	3.50	4.50	4.07	2.63	NA	2.50	3.00	2.75
CPT115-150-F	<--->	150	1.30A			6.15	3.75	4.22	4.70	2.75	3.13	3.75	4.25	3.32
CPT115-200-F	<--->	200	1.74A			7.75	3.75	4.22	4.70	2.75	3.13	3.75	4.25	3.32
CPT115-250-F	<--->	250	2.17A			9.50	4.00	4.80	5.33	3.00	3.13	3.75	4.50	3.83
CPT115-300-F	<--->	300	2.61A			10.75	4.00	4.80	5.33	3.00	3.13	3.75	4.50	3.83
CPT115-500-F	<--->	500	4.35A			14.75	5.00	5.25	5.45	4.00	3.75	4.37	5.25	4.45

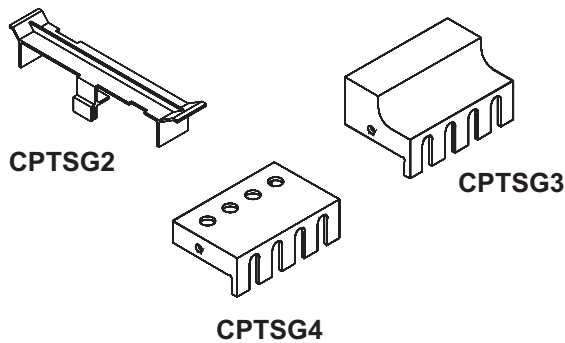
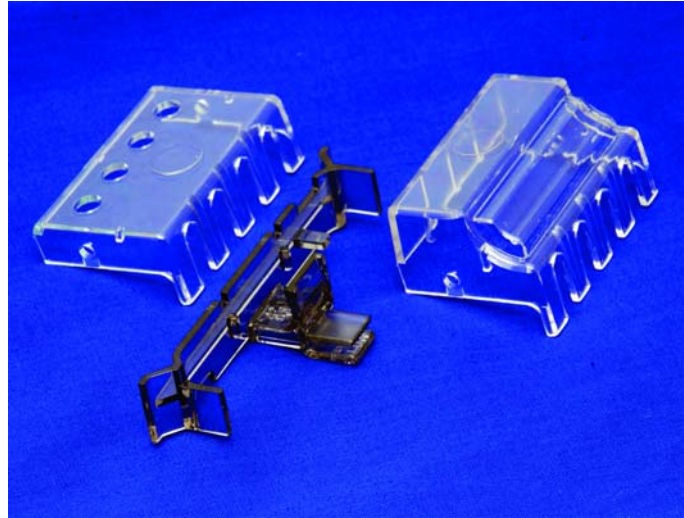
# CPT Series Transformers Terminal Covers

## Finger-safe terminal covers

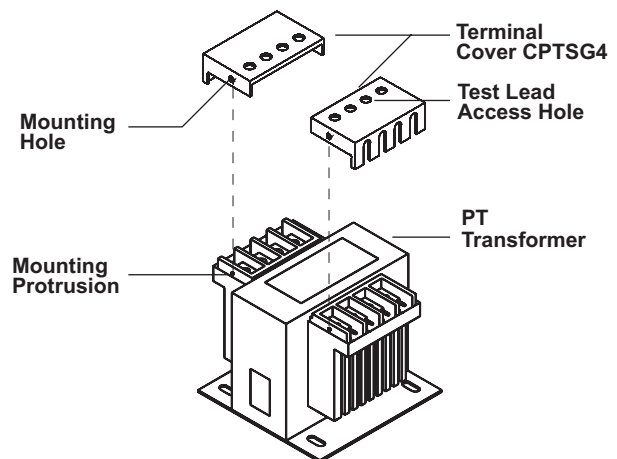
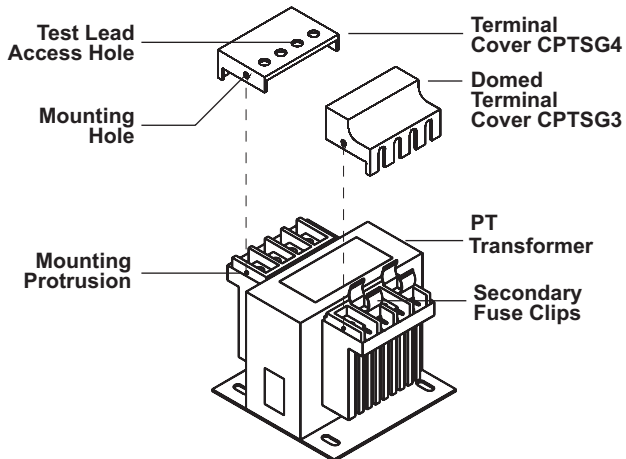
These one-piece molded terminal covers are a quick and easy way to provide safety and protection in the workplace. They protect operators from potential shock hazards and guard against accidental contact with the fuses.

### Features

- Strong, yet flexible, clear Lexan polyester material will not break or chip.
- See-through material allows view of the fuse and/or terminal connections.
- One size fits all; purchase all three for complete protection.



Terminal Covers			
Part Number	Pcs/Pkg	Price	Description.
<b>CPTSG2</b>	4	<--->	Safety puller fuse cover for primary fuse
<b>CPTSG3</b>	2	<--->	Domed terminal cover for secondary fuse
<b>CPTSG4</b>	2	<--->	Flat terminal cover, for unfused primary and/or unfused secondary terminals



# Recommendations for Overcurrent Protection - UL and CSA (North American) Standards

## UL and CSA (North American) Standards

North American standards, including UL 508, National Electric Code 450, and the Canadian Electrical Code, Part 1, require overcurrent protection on all control circuit transformers. There are two options for overcurrent protection:

### Option 1 (Primary only Protection)

Provide an overcurrent device in the primary circuit rated to the current of the transformer. The overcurrent limits are as follows:

- Primary 9 Amps or more: no more than 125% of rated current
- Primary 2 to 9 Amps: no more than 167% of rated current
- Primary less than 2 Amps: no more than 300% of rated current for power circuits  
no more than 500% of rated current for control circuits

*Note: This method is considered less desirable, as start-up inrush to the transformer can frequently surpass the current rating of the device and result in nuisance interruptions.*

### Option 2 (Primary and Secondary Protection)

The second option is to install overcurrent devices in both the primary and secondary circuits of the transformer. In this option, the secondary device must be rated no more than 125% of rated current of the transformer and the primary no more than 250%. CEC permits 300% overcurrent on the primary for this option.

In both options listed, it is recommended that time delay fuses be considered to avoid unnecessary interruptions.

## PRIMARY (UL and CSA)

To assist in the selection of fuses, the following chart recommends the maximum primary fuse rating in amperes. The first number shown is the maximum overcurrent protection when the primary current is less than 2 amps and the overcurrent protection device is rated for 300%. The second number (shown in brackets) is recommended when the primary is less than 2 amps and the overcurrent device is to be rated at 500% of rated current. Where only one number is indicated, the primary is 2 amps or more and one rating of overcurrent protection is shown as optimal. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Primary Voltage	CPT115 VA RATING							
	50	75	100	150	200	250	300	500
220	6/10	1	1-1/4	2	2-1/2	3-2/10	4	4
	(1-1/8)	(1-6/10)	(2-1/4)	(3-2/10)	(4-1/2)	(5-6/10)	(6-1/4)	
230	6/10	8/10	1-1/4	1-8/10	2-1/2	3-2/10	3-1/2	4
	(1)	(1-6/10)	(2)	(3-2/10)	(4)	(5)	(6-1/4)	
240	6/10	8/10	1-1/4	1-8/10	2-1/4	3	3-1/2	3-1/2
	(1)	(1-1/2)	(2)	(3)	(4)	(5)	(6-1/4)	
440	3/10	1/2	6/10	1-1/4	1-6/10	2	2-1/4	
	(1/2)	(8/10)	(1-1/8)	(1-6/10)	(2-1/4)	(2-8/10)	(3-2/10)	(5-6/10)
460	3/10	4/10	6/10	8/10	1-1/4	1-6/10	1-8/10	3-2/10
	(1/2)	(8/10)	(1)	(1-6/10)	(2)	(2-1/2)	(3-2/10)	(5)
480	3/10	4/10	6/10	8/10	1-1/4	1-1/2	1-8/10	3
	(1/2)	(3/4)	(1)	(1-1/2)	(2)	(2-1/2)	(3)	(5)

HCTR Current Limiting Class CC Fuses				
Part Number	AMP Rating	Pcs/Pkg	Weight	Price
HCTR-25	0.25	10/1	0.2 lb	<--->
HCTR-5	0.5	10/1	0.2 lb	<--->
HCTR-75	0.75	10/1	0.2 lb	<--->
HCTR1	1	10/1	0.2 lb	<--->
HCTR1-25	1.25	10/1	0.2 lb	<--->
HCTR1-5	1.5	10/1	0.2 lb	<--->
HCTR2	2	10/1	0.2 lb	<--->
HCTR2-5	2.5	10/1	0.2 lb	<--->
HCTR3	3	10/1	0.2 lb	<--->
HCTR3-5	3.5	10/1	0.2 lb	<--->
HCTR4	4	10/1	0.2 lb	<--->
HCTR5	5	10/1	0.2 lb	<--->
HCTR6	6	10/1	0.2 lb	<--->
HCTR7-5	7.5	10/1	0.2 lb	<--->
HCTR8	8	10/1	0.2 lb	<--->
HCTR10	10	10/1	0.2 lb	<--->
HCTR15	15	10/1	0.2 lb	<--->
HCTR20	20	10/1	0.2 lb	<--->
HCTR25	25	10/1	0.2 lb	<--->
HCTR30	30	10/1	0.2 lb	<--->

*Note: See catalog page 26-65 for characteristic curves.*

# Recommendations for Overcurrent Protection - UL and CSA (North American) Standards, continued

## SECONDARY

The overcurrent protection listed below, in amperes, is 125% of the rated current of the transformer. Choose the next higher fuse rating if these numbers do not correspond with standard fuse selections.

Secondary Voltage	CPT115 VA RATING							
	50	75	100	150	200	250	300	500
<b>110</b>	3/4	1-1/8	1-1/2	2-1/4	3	3-1/2	4-1/2	7-1/2
<b>115</b>	6/10	1	1-4/10	2	2-8/10	3	4	7
<b>120</b>	6/10	1	1-1/4	2	2-1/2	3-2/10	4	6-1/4

MEN General Purpose Midget Class Fuses				
Part Number	AMP Rating	Pcs/Pkg	Weight	Price
<b>MEN-5</b>	0.5	10/1	0.2 lb	<-->
<b>MEN-6</b>	0.6	10/1	0.2 lb	<-->
<b>MEN1</b>	1	10/1	0.2 lb	<-->
<b>MEN1-4</b>	1.4	10/1	0.2 lb	<-->
<b>MEN1-5</b>	1.5	10/1	0.2 lb	<-->
<b>MEN2</b>	2	10/1	0.2 lb	<-->
<b>MEN2-5</b>	2.5	10/1	0.2 lb	<-->
<b>MEN3</b>	3	10/1	0.2 lb	<-->
<b>MEN3-5</b>	3.5	10/1	0.2 lb	<-->
<b>MEN4</b>	4	10/1	0.2 lb	<-->
<b>MEN5</b>	5	10/1	0.2 lb	<-->
<b>MEN6</b>	6	10/1	0.2 lb	<-->
<b>MEN7</b>	7	10/1	0.2 lb	<-->
<b>MEN8</b>	8	10/1	0.2 lb	<-->
<b>MEN10</b>	10	10/1	0.2 lb	<-->
<b>MEN12</b>	12	10/1	0.2 lb	<-->
<b>MEN15</b>	15	10/1	0.2 lb	<-->
<b>MEN20</b>	20	10/1	0.2 lb	<-->
<b>MEN25</b>	25	10/1	0.2 lb	<-->
<b>MEN30</b>	30	10/1	0.2 lb	<-->

Note: See catalog page 26-70 for characteristic curves.

### REFERENCES:

- UL 508, 32.7
- UL 845, 11.16 and 11.17
- NEC 430-72 (c) exception #2
- NEC 450-3 (b) 1 and 2
- CEEC Part 1, 26-256

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- DL205 PLC
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