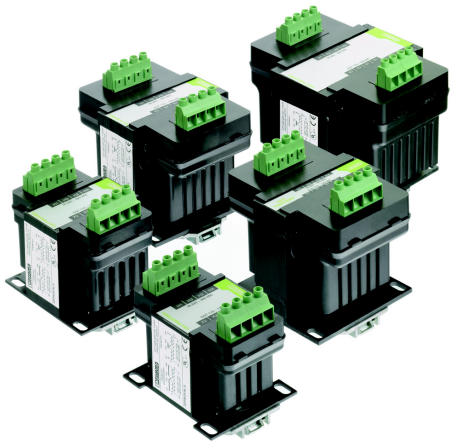
Control Panel Transformers

CPT Series of Rail-Mounted Transformers



INTERFACE

Data Sheet
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Description

The CPT-480-220/120-110… series of transformers provide reliable output voltage in industrial environments. High-power electromagnetic devices with high start-up power demands can overwhelm many transformers. CPT transformers can withstand the high inrush current while providing a proportional output voltage for sensitive electronic equipment.

Available in five power sizes, single-phase input voltages from nominal 230 or 460 V AC are transformed to a nominal 115 V AC. Input voltage is configured using the included jumpers.

Touch-safe COMBICON connectors with dual, secondary connection points allow multiple connection configurations. CPT transformers accommodate rail-mount (EN50022) or panel-mount installations.

Features

- Single-phase input voltages from 220 to 480 V AC
- Output voltage at one-half or one-fourth of input voltage
- High inrush capacity
- Stable, consistent output voltage level
- Flexible mounting with either rail or panel mounting

Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf.

This data sheet is valid for all products listed on the following page:

Ordering Data

Products

Description	Type	Order No.
Control transformer, 50 VA	CPT-480-229/120-110/50	5607017
Control transformer, 100 VA	CPT-480-229/120-110/100	5607018
Control transformer, 150 VA	CPT-480-229/120-110/150	5607019
Control transformer, 250 VA	CPT-480-229/120-110/250	5607020
Control transformer, 500 VA	CPT-480-229/120-110/500	5607021

Accessories

Description	Type	Order No.
Single Pole Fuse Holder, Class CC	UK 10.3-CC HESI	3048580
Single Pole Fuse Holder, Midget	UK 10.3-HESI N	3048386

Technical Data

Input Data	
Primary voltage	220, 230, 240, 440, 460, 480 V AC single-phase nominal
Frequency range	50-60 Hz
Connection method	COMBICON screw-type
Recommended fuse	Class CC

Output Data	
Secondary voltage range	110, 115, 120 V AC
Frequency range	50-60 Hz
Output VA	based on model
Recommended fuse	Midget
Connection method	COMBICON screw-type

General Data					
Insulation type	Vacuum-impregnated polyester resin				
Insulation system					
…/50, …/100, …/150	Class A, 55°C rise, 105°C class				
…/250, …/500	Class B, 80°C rise, 130°C class				
Mounting	NS 35 rail (EN50022) or panel				
	…/50	**…/100**	**…/150**	**…/250**	**…/500**
Weight - kg (lb.)	1.73 (3.82)	2.44 (5.37)	2.89 (6.37)	4.44 (9.78)	6.83 (15.03)
Height - mm (in.)	107 (4.21)	107 (4.21)	120 (4.72)	133 (5.24)	147 (5.79)
Width - mm (in.)	76 (3.00)	76 (3.00)	96 (3.78)	96 (3.78)	114 (4.50)
Depth - mm (in.)	79 (3.11)	88 (3.46)	104 (4.09)	104 (4.09)	120 (4.72)

Approvals	
	IEC EN61558-1 IEC EN61558-2-1
	NEMA ST-1 compliant
	ANSI/UL 506
	CSA C22-2 No. 66

Installation

DANGER!

Hazardous voltage. Disconnect power before servicing.

WARNING!

High temperatures may occur during operation. Allow to cool before servicing.

Safe operation depends upon proper installation. Before startup, ensure the following:

– The mains are connected correctly.
– Protection is provided against electrical shock.
– All supply lines are sized correctly and fuse-protected.
– All output cables are sized correctly for the maximum device output current and are fuse-protected.
– Sufficient air flow is provided around the devices. Allow at least 25 mm (1 in.) between the transformer and other components.

Connections and Jumper Position

The included jumpers must be properly positioned for the primary voltage. Secondary voltage is reduced to either 1/4 (Figure 1) or 1/2 (Figure 2) of the primary voltage based on the jumper position.

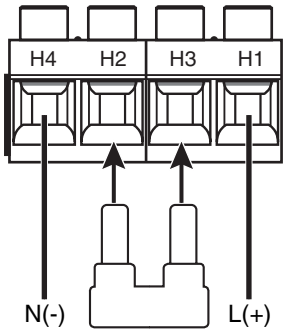

Figure 1 440/460/480 V AC primary voltage jumper installation

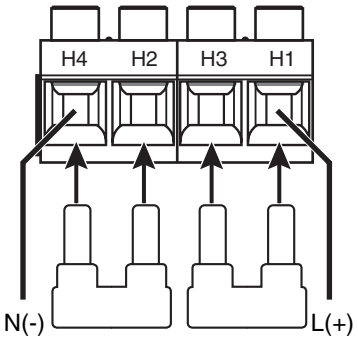

Figure 2 220/230/240 V AC primary voltage jumper installation

The secondary side of the transformer is connected as shown in Figure 3.

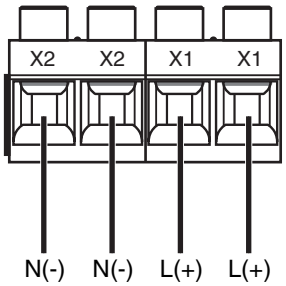

Figure 3 Secondary connections

Sizing a Control Panel Transformer

To select the proper transformer, three characteristics of the load circuit must first be determined: total steady-state (sealed) power, in VA; total inrush power; and inrush load power factor.

– The total, steady-state “sealed” power is the amount of power that the transformer must supply to the load circuit for an extended length of time. Simply add the total steady-state power of all devices in the control circuit. The operating power data of a component is available from the manufacturer.
– The total inrush power is the amount that the transformer must supply for all components in the control circuit which are energized together. Some consideration to the start-up sequence may be required. Inrush power can be obtained from the device manufacturer.
– The inrush load power factor is difficult to determine without detailed vector analysis of all the control circuit components. Such information is not generally available. Therefore, a 40% power factor is typically assumed.

Once the above circuit variables are determined, transformer selection is a six step process.

1. Determine the primary (supply) and secondary (output) voltage requirements, as well as the required frequency, i.e., 60 Hz.
2. Calculate the total steady-state power of the circuit.
3. Now calculate the total inrush power by adding the inrush power of all components being energized together. Remember to add the steady-state power of all components that do not have inrush power, (lamps, timers, etc.) as they do, however, present a load to the transformer during maximum inrush. If the inrush currents for the components in the circuit are not known, assume a 40% inrush power factor.

4. Calculate the total inrush power, in VA, using one of the two methods:

   Method A

   $$TotalInrush = \sqrt{sealedpower^2 + deviceinrush^2}$$

   Method B

   $$TotalInrush = sealedpower + deviceinrush$$

Method B will result in a slightly larger transformer being selected.

5. Using Table 1, select a control transformer with a power rating based on the following criteria:
   a. With a continuous power rating that is equal to or greater than the value in Step 2.
   b. With a maximum inrush power equal to or greater than the value obtained in Step 4.

   If the nominal supply voltage does not fluctuate more than 5%, refer to the 90% secondary voltage column in Table 1 for the correct VA rating. If the supply voltage varies upwards of 10%, the 95% secondary voltage column should be used to size the transformer.

Current standards require electromagnetic devices to operate reliably at a minimum of 85% of their rated voltage. However, contact life may be affected with continuous start-ups at that voltage level. Therefore, the minimum 85% secondary voltage in Table 1 is provided only as a reference.

Table 1 40% Power Factor

Transformer	Inrush power@40% Power Factor		
	85% Secondary Voltage	90% Secondary Voltage	95% Secondary Voltage
CPT-480-220/120-110/50	270	210	160
CPT-480-220/120-110/100	655	520	370
CPT-480-220/120-110/150	1300	1010	700
CPT-480-220/120-110/250	2680	2030	1340
CPT-480-220/120-110/500	6300	5035	3305

Fuse Selection

Primary

The fuse protection listed below, in amps, is 300% of the rated current of the transformer. Select the next higher fuse rating if these numbers do not correspond to standard fuse ratings.

Table 2 Primary Fuse Recommendations

Primary Voltage	VA Rating				
	50	100	150	250	500
220	0.60	1.25	2.00	3.20	4.00
230	0.60	1.25	1.80	3.20	4.00
240	0.60	1.25	1.80	3.00	3.50
440	0.30	0.60	1.00	1.60	3.20
460	0.30	0.60	0.80	1.60	3.20
480	0.30	0.60	0.80	1.50	3.00

Secondary

The fuse protection listed below, in amps, is 125% of the rated current of the transformer. Select the next higher fuse rating if these numbers do not correspond to standard fuse ratings.

Table 3 Secondary Fuse Recommendations

Secondary Voltage	VA Rating				
	50	100	150	250	500
110	0.75	1.50	2.25	3.50	7.50
115	0.60	1.40	2.00	3.00	7.00
120	0.60	1.25	2.00	3.20	6.25