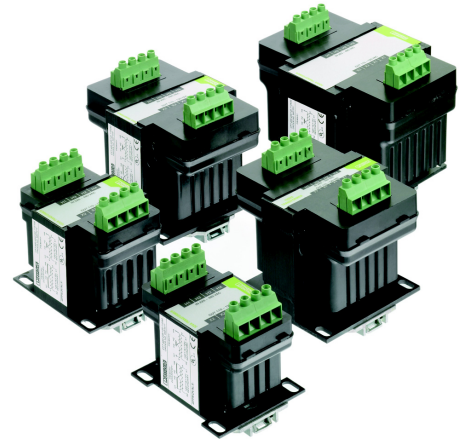


# Control Panel Transformers

## CPT Series of Rail-Mounted Transformers



### INTERFACE

Data Sheet  
2439\_en\_A

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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](http://www.download.phoenixcontact.com).

A conversion table is available on the Internet at  
[www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://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        | Class A, 55°C rise, 105°C class<br>Class B, 80°C rise, 130°C class |             |             |             |              |
| .../50, .../100, .../150 |                                                                    |             |             |             |              |
| .../250, .../500         |                                                                    |             |             |             |              |
| 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.

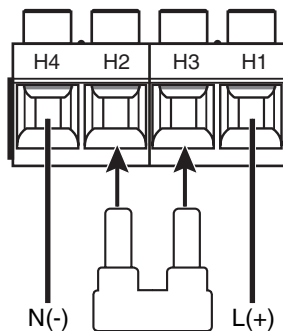


Figure 1 440/460/480 V AC primary voltage jumper installation

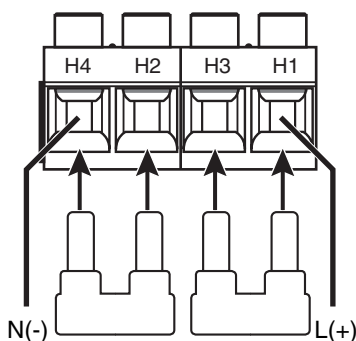


Figure 2 220/230/240 V AC primary voltage jumper installation

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

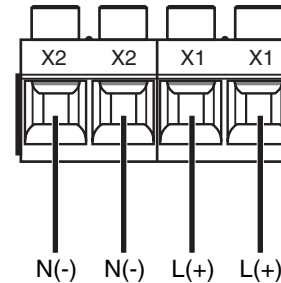


Figure 3 Secondary connections

## 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**

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

**Method B**

$$\text{TotalInrush} = \text{sealedpower} + \text{deviceinrush}$$



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:
- With a continuous power rating that is equal to or greater than the value in Step 2.
  - 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%<br>Power Factor |                             |                             |
|-------------------------|----------------------------------|-----------------------------|-----------------------------|
|                         | 85%<br>Secondary<br>Voltage      | 90%<br>Secondary<br>Voltage | 95%<br>Secondary<br>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<br>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<br>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 |