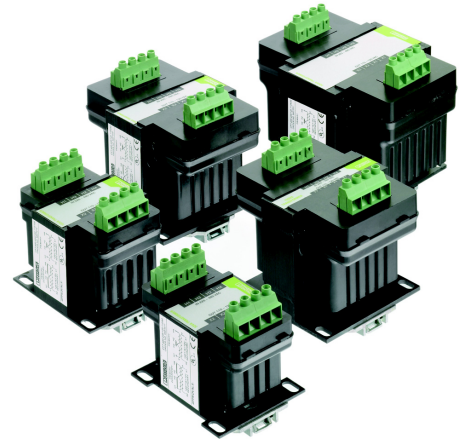


Control Panel Transformers

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.
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 | Class A, 55°C rise, 105°C class 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.

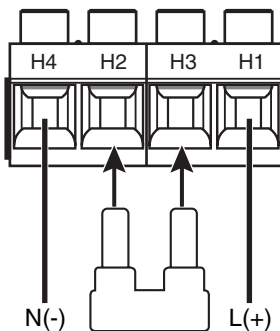


Figure 1 440/460/480 V AC primary voltage jumper installation

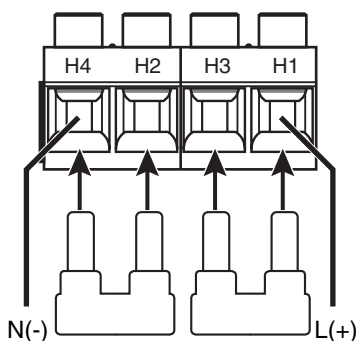


Figure 2 220/230/240 V AC primary voltage jumper installation

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

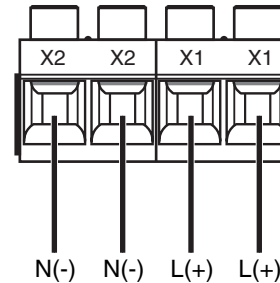


Figure 3 Secondary connections

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

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

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% 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 |