MAINS-PLUGTRAB PT Series
Overvoltage Protection for Single Phase Equipment

Data Sheet 1298A

November 2000

Features

- Replaceable protection plugs
- 26 amp load current capability
- Visual indication of plug status
- Dry contact for remote indication of plug status
- 6.5 kA (8/20 µs) maximum surge current
- DIN-rail ground connection
- 24, 60, 120 and 230 V ac plugs available
- UL 1449 2nd edition pending

General Description

The MAINS-PLUGTRAB provides overvoltage protection from electrical transients caused by lightning, switching operations, utility actions, and de-energized inductive loads. It provides protection to power supplies, PLCs, PCs, controllers and other electrical equipment.

The MAINS-PLUGTRAB consists of two pieces: a hard-wired base and a removable plug. The base accepts wire sizes from 24 to 12 AWG. The metal mounting foot allows secure connection to the rail and provides a short path to ground for surge current, increasing the performance of protection for the equipment. The base is a feed-through terminal block. Power is not interrupted to the equipment regardless of plug status (or presence).

The plugs are available in several ratings from 24 to 230 V ac. Two-stage design provides both normal mode and common mode protection with metal oxide varistors (MOVs) and a gas tube. The plug contains a thermal disconnect which monitors the status of the MOV. When the MOV is removed from the circuit, a red lamp indicator illuminates to provide local indication that the plug should be replaced. A normally closed contact opens at the same time and can be used for remote indication of plug status.

The MAINS-PLUGTRAB is rated IP20 which generally is regarded as “finger-safe” or “touch-safe”.

Figure 1. MAINS-PLUGTRAB PT 2-PE/S Dimensions

Figure 2. MAINS-PLUGTRAB PT 2-PE/S Dimensions
Table 1. MAINS-PLUGTRAB Product Specifications

<table>
<thead>
<tr>
<th>PT 2-PE/S-...</th>
<th>24 AC</th>
<th>60 AC</th>
<th>120 AC</th>
<th>230 AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC category/VDE requirement class</td>
<td>III/D</td>
<td>III/D</td>
<td>III/D</td>
<td>III/D</td>
</tr>
<tr>
<td>Nominal voltage ( V_{n} ) (V AC)</td>
<td>24</td>
<td>60</td>
<td>120</td>
<td>230</td>
</tr>
<tr>
<td>Arrester rated voltage ( V_{e} ) (V AC)</td>
<td>34</td>
<td>100</td>
<td>150</td>
<td>250</td>
</tr>
<tr>
<td>Nominal current ( I_{n} ) (A)</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Leakage current ( I_{L} ) at ( V_{L} ) (L-N) (mA)</td>
<td>≤2.5</td>
<td>≤1.5</td>
<td>≤1.1</td>
<td>≤1.1</td>
</tr>
<tr>
<td>Leakage current to PE at ( V_{p} ) (μA)</td>
<td>≤1</td>
<td>≤1.5</td>
<td>≤1.5</td>
<td>≤1.5</td>
</tr>
<tr>
<td>Max. discharge surge current ( I_{max} ) (μA) (kA)</td>
<td>2/2</td>
<td>6.5/6.5</td>
<td>6/5.6</td>
<td>6.5/6.5</td>
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<tr>
<td>Protection level: (kV)</td>
<td>&lt;0.22/≤0.2</td>
<td>≤0.55/0.5</td>
<td>≤0.7/≤0.8</td>
<td>≤1.2/≤1.2</td>
</tr>
<tr>
<td>Response time ( t_{r} ) (ms)</td>
<td>≤25/≤100</td>
<td>≤25/≤100</td>
<td>≤25/≤100</td>
<td>≤25/≤100</td>
</tr>
<tr>
<td>Required back-up fuse max.: (A g/L/C)</td>
<td>26</td>
<td>26</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>Temperature range: (°C)</td>
<td>-25 up to +85</td>
<td>-25 up to +85</td>
<td>-25 up to +85</td>
<td>-25 up to +85</td>
</tr>
<tr>
<td>Protection type in acc. with IEC 529/EN 60 529</td>
<td>IP 20</td>
<td>IP 20</td>
<td>IP 20</td>
<td>IP 20</td>
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<tr>
<td>Insulation housing</td>
<td>PA</td>
<td>PA</td>
<td>PA</td>
<td>PA</td>
</tr>
<tr>
<td>Flammability class in acc. with UL 94</td>
<td>V0</td>
<td>V0</td>
<td>V0</td>
<td>V0</td>
</tr>
<tr>
<td>Stripping length</td>
<td>8 mm</td>
<td>8 mm</td>
<td>8 mm</td>
<td>8 mm</td>
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<tr>
<td>Thread/torque</td>
<td>M3/0.8 Nm</td>
<td>M3/0.8 Nm</td>
<td>M3/0.8 Nm</td>
<td>M3/0.8 Nm</td>
</tr>
</tbody>
</table>


**Installation Basics**

Overvoltage surge suppressors should be installed by electricians or technicians familiar with and authorized to work with such devices. The relevant safety regulations and guidelines for installation must be observed.

**Mounting and Grounding**

Mounting is accomplished by snapping the device on a NS35 “DIN” rail. The mounting foot of the MAINS-PLUGTRAB provides a grounding path. A ground connection must be made to the DIN rail using a grounding terminal block or directly to the ground connection on the base. In order to ensure that the MAINS-PLUGTRAB functions correctly, equipotential bonding is necessary in accordance with the relevant specifications. In general, avoid the use of “daisy-chained” grounds and provide a direct connection from the system ground to the ground connection on the “IN” side of the MAINS-PLUGTRAB, or to a ground terminal back on the rail.

**Cables and Routing**

Protected and non-protected cables, including the conductors used for equipotential bonding, should not be close to or parallel to each other. They must be separated and/or shielded so that surge voltages cannot be coupled into the protected conductors. If cable crossing cannot be avoided, they should be laid at right angles to each other.

**Equipment Connection - Series**

The preferred connection of the MAINS-PLUGTRAB is to be wired in series with the protected equipment as shown in Figure 4. In this case, the cable providing electrical power should be connected to the base on the “IN” side. The cables leading to the protected equipment should be similarly connected to the terminal blocks on the “OUT” side of the base. It is important that the equipment ground is wired to terminal 4 of the base! (See Figure 3).

**Equipment Connection - Parallel**

Parallel connection of the MAINS-PLUGTRAB is possible in cases where the load current of the protected equipment exceeds the maximum load current capability of the base (26 amps). The wiring is shown in Figure 2. The MAINS-PLUGTRAB is wired via a stub connection on the “IN” side. For best results, minimize the length of wires supplying both the MAINS-PLUGTRAB and the protected equipment. (See Figure 5).

![Figure 3. MAINS-PLUGTRAB PT 2-PE/S Circuit Diagram](image-url)
MAINS-PLUGTRAB PT Series
Overvoltage Protection for Single Phase Equipment

Figure 4. MAINS-PLUGTRAB PT2-PE/S Equipment Connection Series

Figure 5. MAINS-PLUGTRAB PT2-PE/S Equipment Connection Parallel
MAINS-PLUGTRAB PT Series
Overvoltage Protection for Single Phase Equipment

Fusing
In a series installation, F1 in Figure 4 should not exceed the maximum operating current of the MAINS-PLUGTRAB (26 amps).

In a parallel installation, where the main fuse F1 is greater than the maximum operating current of the MAINS-PLUGTRAB, a back-up fuse F2 should be used which is no greater than 26 amps.

Remote Contact
The “dry”, normally closed alarm contact can be connected to a remote warning device. Care should be taken in the routing of the cable so over-voltage surges can not develop and damage the remote warning device. The use of shielded cables and I/O surge suppression (i.e. MCR-PLUGTRAB) is recommended. Do not exceed the maximum current and voltage rating of the contact . . . 1 amp and 250 Volts AC.

Red Indication Lamp
When the red lamp illuminates, it indicates that the protection plug should be replaced as soon as possible. Operating current will continue to be supplied to the protected equipment even when the lamp is lit although no surge protection is being provided.

Ordering Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT-BE/FM (Base)</td>
<td>28 39 28 2</td>
</tr>
<tr>
<td>PT 2-PE/S-24AC-ST</td>
<td>28 39 31 8</td>
</tr>
<tr>
<td>PT 2-PE/S-60AC-ST</td>
<td>28 39 32 1</td>
</tr>
<tr>
<td>PT 2-PE/S-120AC-ST</td>
<td>28 39 33 4</td>
</tr>
<tr>
<td>PT 2-PE/S-230AC-ST</td>
<td>28 39 34 7</td>
</tr>
</tbody>
</table>

Related Products
MCR-PLUGTRAB - protects I/O signals
NEF Filters - provide CE compliance for power filtering
SYSTEMTRAB - electrical distribution surge suppression

Figure 6. MAINS-PLUGTRAB PT2-PE/S Connections Diagram

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