EMP Surge Protector/Filter for AC / DC Power Supplies  
**USS-2-12V**

Excellent lightning and EMP protection of an earth-free and short-circuit current limited AC or DC power supply line pair up to max. 15 V / 6 A  
Protects against overvoltages produced by NEMP / HEMP, lightning or other transients  
High nominal operating current of 6 A  
Multi-stage protection/filter design providing high transient energy absorption capability  
Feed-through type steel body for direct installation to wall of Faraday cage  
Threat-level tested against HEMP according to MIL-STD-188-125, short and medium

Product  
The Meteolabor® USS-2 series protection circuits against surge and interference voltages are designed as feed-through type mechanical units for the protection of data and control line systems. Depending on the specific application different types are available.  
The highly effective multi-stage transient protection design combined with filtering components provides excellent protection against the effects of atmospheric discharges (lightning, electrostatic discharge) or a High Altitude Electro-Magnetic Pulse (HEMP), sometimes also referred to as Nuclear Electro-Magnetic Pulse (NEMP) or simply EMP. Special features of this series of protection circuits include high surge current capability, compact feed-through design and simple installation directly to Faraday cage. The USS-2-Serie is threat-level tested against EMP according to MIL-STD-188-125, short pulse and intermediate pulse.

Applications  
The Meteolabor® USS-2-12V overvoltage protector/filter is intended to protect earth-free AC or DC power supply lines, which are short-circuit current limited to < 0.5 A (or fused) against overvoltage effects caused by NEMP / HEMP or lightning strikes.  
USS-2-12V uses gas tube arrestors in combination with other elements. For reliable extinction of gas tube arrestors it is very important, that the short-circuit current of the power feeding source is fused with 6A or less, or the short circuit current must be limited to less than 0.5A.  
USS-2-12V has been used in many fixed installations (buildings, underground shelters etc.) as well as in portable and mobile systems like containers or shelters and vehicles, which were successfully EMP-tested according to RS105 of MIL-STD-461F.

Technical Data USS-2-12V

<table>
<thead>
<tr>
<th>Application</th>
<th>Low voltage power</th>
<th>Source and load must be earth-free and short-circuit current limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum operating voltage U_max</td>
<td>± 15 V DC / 10 V AC</td>
<td></td>
</tr>
<tr>
<td>Nominal operating current I_n</td>
<td>6 A</td>
<td>T_{amb} = 40 °C, short-circuit current must be limited to &lt; 0.5 A or fused 6A or less for safe extinction of gas tube arrester</td>
</tr>
<tr>
<td>DC resistance</td>
<td>2 x 40 mΩ</td>
<td></td>
</tr>
<tr>
<td>Max. surge current I_{surge}</td>
<td>2 x 10 kA</td>
<td>wire → ground/case, shape 8/20 μs, T_{amb} = 40 °C</td>
</tr>
<tr>
<td>Max. lightning impulse current I_{imp}</td>
<td>2x2 kA</td>
<td>Each wire → ground/case, shape 10/350 μs, at least 1 pulse</td>
</tr>
<tr>
<td>Residual voltage</td>
<td>&lt; 40 V</td>
<td>wire → wire, worst case, depending on pulse shape</td>
</tr>
<tr>
<td>Residual voltage</td>
<td>&lt; 700 V</td>
<td>wire → ground/case, worst case, depending on pulse shape</td>
</tr>
<tr>
<td>Average common mode attenuation</td>
<td>typ. 50 dB</td>
<td>at 50 Ω, from 30 MHz up to 2.4 GHz</td>
</tr>
<tr>
<td>DC earth leakage current</td>
<td>&lt; 1 μA</td>
<td>at U_{max}, T_{amb} = 40 °C</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>- 40 °C / + 85 °C</td>
<td></td>
</tr>
<tr>
<td>Connection terminals</td>
<td>2.8 / 6.3 mm</td>
<td>Choice of FASTON flat receptacle, solder or screw connection</td>
</tr>
<tr>
<td>Max. allowed installation torque</td>
<td>25 Nm</td>
<td>Not to be exceeded under all circumstances</td>
</tr>
<tr>
<td>Dimensions (Overall)</td>
<td>113 x 31.2 x 27 mm</td>
<td>Major dimensions, details see drawing</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 180 g</td>
<td></td>
</tr>
</tbody>
</table>
**Installation Layouts**

**Standard drilling layout for USS-2 series with standard hexagonal nut (included, spanner size 27mm)**

**Space saving “honeycomb” mounting hole layout for USS-2 series (requires optional slotted nut USS-SM2 and USS-SK2 spanner)**

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**Installation Instructions**

- The USS-2 series EMP protector/filters shall be installed by electrically skilled personnel.
- The electrical wiring must be done according to local regulations.
- The max. values stated in this datasheet must not be exceeded under any circumstances.
- Do not exceed max. installation torque of 25 Nm as this can destroy the device.
- USS-2 series EMP protector/filters may be directly installed into the wall of a Faraday cage as feed-through device. Otherwise the cabling on the protected side must be shielded for best performance.
- For space-saving installation of multiple protectors a “honeycomb” layout is recommended (see drawings).

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**General Recommendations for Protection Installation**

- In order to achieve the full performance of a protection circuit the application of good-practice EMC design techniques is necessary for the whole system to be protected.
- For EMP-protection usually a shield as an electromagnetic barrier to protect a certain volume is necessary. This shield avoids coupling of radiated disturbances inside the protected volume. In addition to shielding all penetrating wires must be protected from conducted transient interferences by an appropriate POE (point of entry) protection.
- Use tested, high quality POE (point of entry) protection elements for all wires entering an electromagnetic shield and install these as feed-through devices, e.g. the Meteolabor® USS-1, USS-2, USP, CSP or PLP series.

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**Ordering Information / Part Number**

**USS-2-12V** Surge protector/filter EMP USS2-12V

**USS-SM2** optional slotted nut

**USS-SK2** optional special socket spanner for slotted nut

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**Caution**

Maximum torque for installation screw shall not exceed 25 Nm