

## EMP Surge Protector / Filter for 1 pair 10/100 Mbit/s Ethernet USS-2-AQ

Excellent lightning and EMP protection for a single twisted pair of a 10/100 Mbit/s Ethernet link

Protects against overvoltages produced by NEMP / HEMP, lightning or other transients

Multi-stage protection/filter design providing high transient energy absorption capability

Input and output are isolated by a magnetic circuit

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-Series is threat-level tested against EMP according to MIL-STD-188-125, short pulse and intermediate pulse.

### Applications

Meteolabor® USS-2-AQ provides excellent protection for one twisted pair of a 10/100 Mbit/s Ethernet connection of sensitive electronics such as computers, telecommunication equipment etc. against the effects of lightning and EMP. Input and output are isolated by a magnetic circuit which provides best protection and filtering effect in a feed-through installation from an unprotected volume into a shielded and protected room.

For a 10/100 Mbit/s Ethernet link two pieces USS-2-AQ are required (1 piece per Rx or Tx twisted pair respectively). This guarantees optimized protection of mission critical equipment against very fast transient overvoltages (e.g. NEMP / HEMP).

The protectors/filters have 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-AQ

Application	Ethernet protection	1 pair 10/100 Mbit/s, not applicable for Power over Ethernet (PoE)
Max. operating voltage	±3V	Peak voltage between wire pair
Data rate	10 / 100 Mbit/s	Ethernet or Fast Ethernet as per IEEE 802.3
Max. surge current $I_{Max}$	2x10 kA	Each wire → ground/case, shape 8/20 μs, at least 1 pulse
Max. lightning impulse current $I_{imp}$	2x2 kA	Each wire → ground/case, shape 10/350 μs, at least 1 pulse
DC resistance input - output	Open circuit	Input / output isolated
Isolation resistance to ground	> 1 GΩ	Measured @ 100 V DC
Residual voltage common mode	< 20 V	Wires → ground/case, pulse 4 kV / 2 kA according to IEC 61000-4-5
Residual voltage differential mode	< 20 V	Wire → wire, pulse 4 kV / 2 kA according to IEC 61000-4-5
Connection terminals	2.8 / 6.3 mm	Choice of FASTON flat receptacle, solder or screw connection
Case material	Steel	Stainless / nickel-plated
Max. allowed installation torque	25 Nm	Not to be exceeded under all circumstances
Dimensions	27x32x113 mm	Major dimensions, details see drawing
Weight	approx. 180 g	

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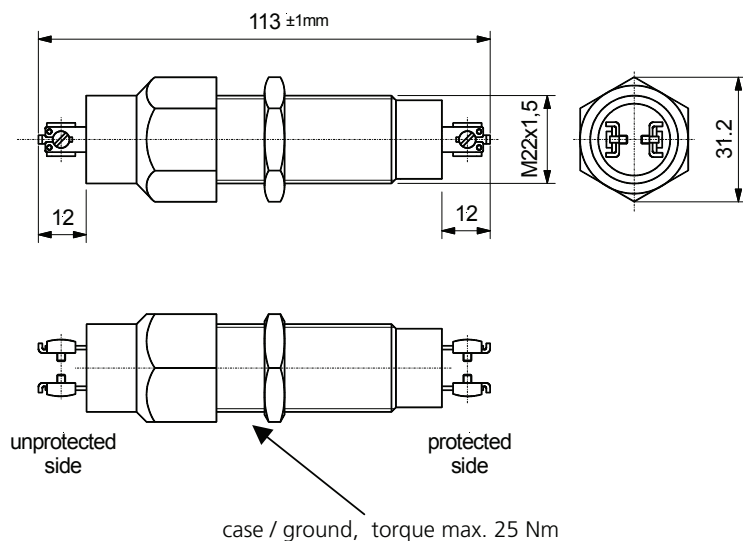
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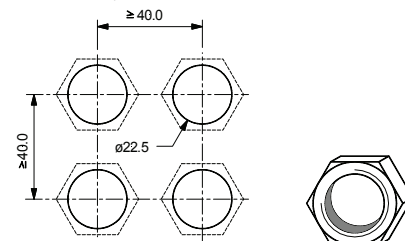


### Dimensions [mm]

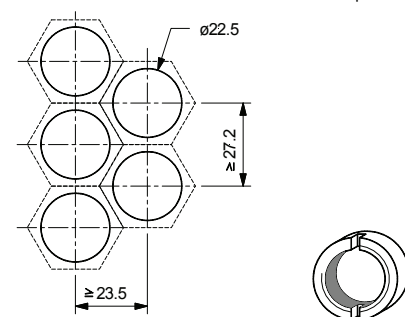


### Installation Layouts

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)



### Installation Notes

- 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).

### 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.

### Ordering Information / Part Number

**USS-2-AQ** Surge Protector/Filter EMP USS2-AQ  
 Note: For 10/100Mbit/s Ethernet link 2 pieces USS-2-AQ are required (1 piece per Rx or Tx twisted pair respectively)  
 NSN-Nr. 5920-12-354-9312

**USS-SM2** optional slotted nut  
**USS-SK2** optional special socket spanner for slotted nut

**Caution**  
 Maximum torque for installation screw shall not exceed 25 Nm

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