schaffner
shaping electrical power

# Ultra Compact and Versatile Filtered Power Entry Module

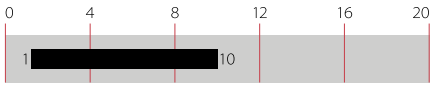
- Dual stage filter
- Ultra compact design
- Rated currents up to 10 A
- Dual fuse holder
- 2-pole rocker switch
- Good attenuation performance
- Faston or spring cage terminals

Check the video of our IEC Inlet Filters FN 9280 and FN 9290 on Youtube!

## Performance indicators

Attenuation performance

Rated current [A]




## Approvals

(CQC except HI-types; Patent US 20110227692/US 8766761; CN ZL201080069589.0)

Choosing FN 9280/90 product line brings you the rapid availability of a standard filter associated with the necessary safety acceptances and a high attenuation performance. For higher attenuation performance the FN 9290 family with a dual stage filter and identical panel cut-out can be used.

Standard IEC connector filters are a practical solution to pass EMI system approval in a short time. A wide selection of amperage ratings, mounting possibilities and also filters for medical applications are designed to offer you the best solution.

### Features and benefits

- Best conducted attenuation performance, based on chokes with high saturation resistance and excellent thermal behavior
- Deep-drawn iron-sheet housing for best possible shielding against magnetic fields
- Rear/front flange mounting or snap-in versions
- Dual and additional spare fuse holder
- 2-pole rocker switch
- Faston or spring cage terminals for more flexible assembly
- FN 929X B versions comply with the requirements of 1MOP acc. to IEC/EN 60601-1
- All versions according IEC/EN 62368-1

### Typical applications

- Portable electrical and electronic equipment
- Consumer goods
- EDP and office equipment
- Single-phase and switch-mode power supplies
- Test and measurement equipment
- Medical electrical devices (MD) and *In-Vitro*-Diagnostics (IVD) equipment
- Audio/Video, information and communication technologies

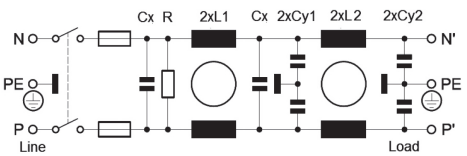
## Technical specifications

| | |
|---|---|
| **Maximum continuous operating voltage** | 250 VAC, 50/60 Hz |
| **Rated currents** | 1 to 10 A @ 40°C max. |
| **Operating frequency** | DC to 400 Hz |
| **Leakage current** | Standard: <500 uA at 250 VAC/50 Hz<br>Medical: <5 uA at 250 VAC/50 Hz |
| **High potential test voltage** | P –> PE 2000 VAC for 2 sec (standard types)<br>P –> PE 2500 VAC for 2 sec (B types)<br>P –> N 760 VAC for 2 sec |
| **Design corresponding to** | UL 1283, CSA 22.2 No. 8 1986, EN 60939, EN 60950, EN 60601-1, UL 544, EN 60320 |
| **Flammability corresponding to** | UL 94 V-2 or better |
| **Temperature range (operation and storage)** | – 25°C to +85°C (25/85/21) |
| **Protection category** | IP 40 according to IEC 60529 (front side) |
| **Terminals** | IP 20 spring cage safe against finger touch |
| **Spring cage wire range** | 0.2 –1.5 $mm^2$/24 –16 AWG single or flexible wire |
| **MTBF @ 40°C/230 V (Mil-HB-217F)** | > 1,000,000 hours |
| **Switch ratings** | |
| **Rocker switch** | 2-pole, dark not illuminated, Marking I - 0 |
| **USA (UL) and Canada (C-UL)** | 10 A, 125 VAC; 10 A, 250 VAC; 1/3 HP |
| **Europe (ENEC)** | 10 A (4 A), 250 VAC** |
| **Mechanical life** | 50,000 cycles |
| **Electrical specifications** | Inrush current 82 A<br>6,000 on-off operations according to UL 1054<br>10,000 on-off operations according to ENEC |
| **Fuse holder** | 2 fuses (Ø5 x 20 mm) max. 250 V (certified to IEC 60127-6) |
| **Power acceptance @ amb. temperature** | |

* 10 A version is 8 A UL and CSA approved
** Value in () relates to the inductive current charge: cos γ = 0.65

## Typical electrical schematic

FN 9290 Standard types (B types without Cy)



## Filter selection table

| Filter* | Rated current @ 40°C [A] | Leakage current** @ 250 VAC /50 Hz (@ 120 VAC /60 Hz) [mA] | Inductance L1 [mH] | Inductance L2 [mH] | Capacitance Cx [nF] | Capacitance Cy1 [nF] | Capacitance Cy2 [nF] | Resistance R [kOhm] | Output connections | | Weight [g] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FN 9290-1-..** | 1 | 0.28 (0.16) | 10.9 | 10.9 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 147 |
| **FN 9290-2-..** | 2 | 0.28 (0.16) | 4.4 | 4.4 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| **FN 9290-4-..** | 4 | 0.28 (0.16) | 1.7 | 1.7 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| **FN 9290-6-..** | 6 | 0.28 (0.16) | 0.78 | 0.78 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 153 |
| **FN 9290-10-..** | 10 | 0.28 (0.16) | 0.32 | 0.32 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 154 |
| **FN 9290 B-1-..** | 1 | 0.00 | 10.9 | 10.9 | 220 | 0 | 0 | 1000 | -06 | -100 | 147 |
| **FN 9290 B-2-..** | 2 | 0.00 | 4.4 | 4.4 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| **FN 9290 B-4-..** | 4 | 0.00 | 1.7 | 1.7 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| **FN 9290 B-6-..** | 6 | 0.00 | 0.78 | 0.78 | 220 | 0 | 0 | 1000 | -06 | -100 | 153 |
| **FN 9290 B-10-..** | 10 | 0.00 | 0.32 | 0.32 | 220 | 0 | 0 | 1000 | -06 | -100 | 154 |
| **FN 9299-1-..** | 1 | 0.28 (0.16) | 10.9 | 10.9 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 147 |
| **FN 9299-2-..** | 2 | 0.28 (0.16) | 4.4 | 4.4 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| **FN 9299-4-..** | 4 | 0.28 (0.16) | 1.7 | 1.7 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 148 |
| **FN 9299-6-..** | 6 | 0.28 (0.16) | 0.78 | 0.78 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 153 |
| **FN 9299-10-..** | 10 | 0.28 (0.16) | 0.32 | 0.32 | 220 | 1.5 | 0.47 | 1000 | -06 | -100 | 154 |
| **FN 9299 B-1-..** | 1 | 0.00 | 10.9 | 10.9 | 220 | 0 | 0 | 1000 | -06 | -100 | 147 |
| **FN 9299 B-2-..** | 2 | 0.00 | 4.4 | 4.4 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| **FN 9299 B-4-..** | 4 | 0.00 | 1.7 | 1.7 | 220 | 0 | 0 | 1000 | -06 | -100 | 148 |
| **FN 9299 B-6-..** | 6 | 0.00 | 0.78 | 0.78 | 220 | 0 | 0 | 1000 | -06 | -100 | 153 |
| **FN 9299 B-10-..** | 10 | 0.00 | 0.32 | 0.32 | 220 | 0 | 0 | 1000 | -06 | -100 | 154 |

* To compile a complete part number, please replace the -.. with the required output connection style (e.g. FN 9289-1-06, FN 9282-4-100)
** Maximum leakage current under normal conditions (according to IEC60939-3)

## Product selector:

FN 92vww-xx-yy-zz

**Blank:** **Snap in range 1.0 to 2.5 mm**
Optional: 30: Snap in range >2.5 to 3.5 mm

**06:** **Fast-On 6.3 x 0.8 mm (spade/soldering)**
**100:** **Spring cage**

**1 to 10:** **Rated current [A]**

**Blank:** **Standard version**
**B:** **Medical version (without Y2-capacitor)**
Optional: B: Medical version (without YZ-capacitor)

**0:** **Flange version vertical/horizontal/front/rear mounting set**
**9:** **Snap-in version, snapper on horizontal side (top / bottom)**
Optional: 1: Rear Flange mounting (top / bottom)
2: Front Flange mounting (top / bottom)
3: Rear Flange mounting (left / right)
4: Front Flange mounting (left / right)
8: Snap-in version, snapper on vertical side (left / right)

**9:** **Dual stage filter**

All FN 9280/FN 9290 are equipped with a dual fuse holder with a spare fuse holder.

**Note: All FN 9280/FN 9280 B/FN 9289/FN 9289 B/FN 9290/FN 9290 B/FN 9299/FN 9299 B are stock types from our distribution partners.**

Order Examples:

FN 9280 B-6-100: Medical version of single stage, dual fuse EMC/EMI filter, flange set for vertical/horizontal/front/rear mounting, 6 A, spring cage terminals, from stock available.

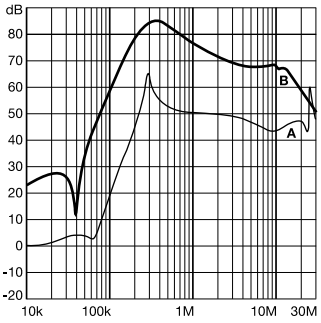
FN 9298-6-06-30: Dual stage, dual fuse EMC/EMI filter, snap-in version, snappers for snap-in panel thickness range >2.5 to 3.5 mm, snapper on vertical side, 6 A, fast-on terminals, non-stock order type

Accessories: The 4D flanges can be ordered separately. The order number is 427532. Please note that the minimum order quantity is one box of 50 pieces. One item includes both type of flanges (vertical and horizontal).

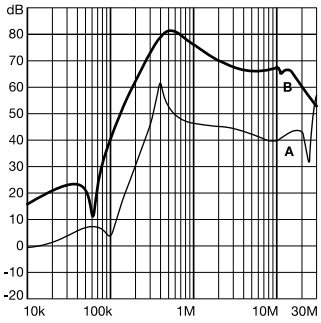
## Typical filter attenuation

**FN 9290 Series | Typical filter attenuation |** Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

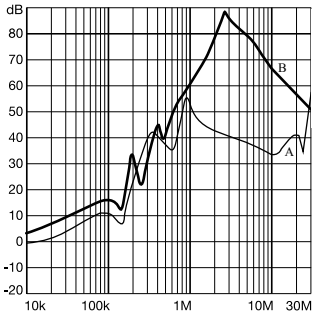
1 A types



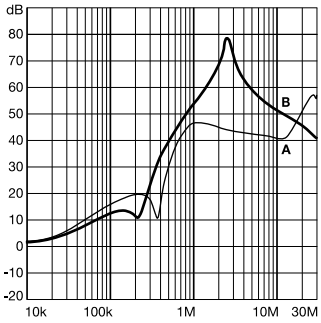

2 A types




4 – 6 A types

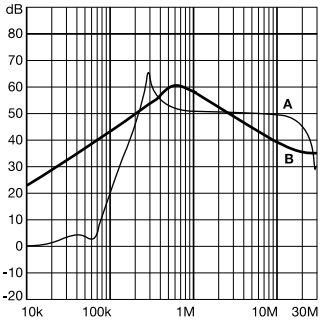



10 A types

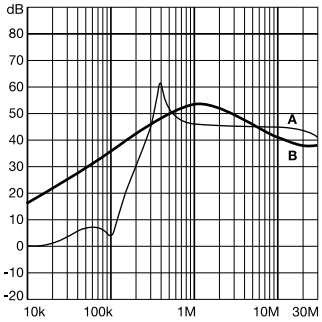



**FN 9290 B Series | Typical filter attenuation |** Per CISPR 17; A=50 Ω/50 Ω sym; B=50 Ω/50 Ω asym

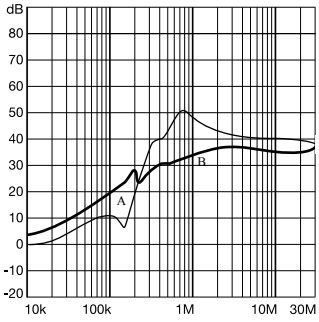
1 A types



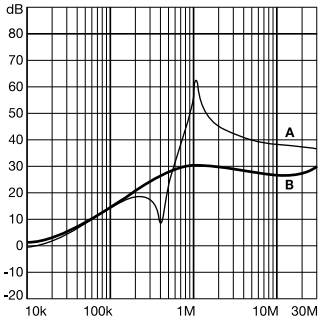

2 A types




4 – 6 A types

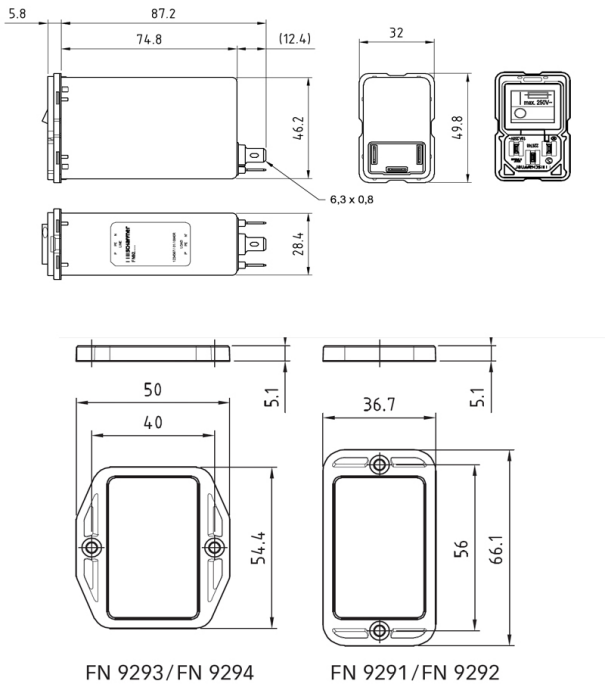



10 A types

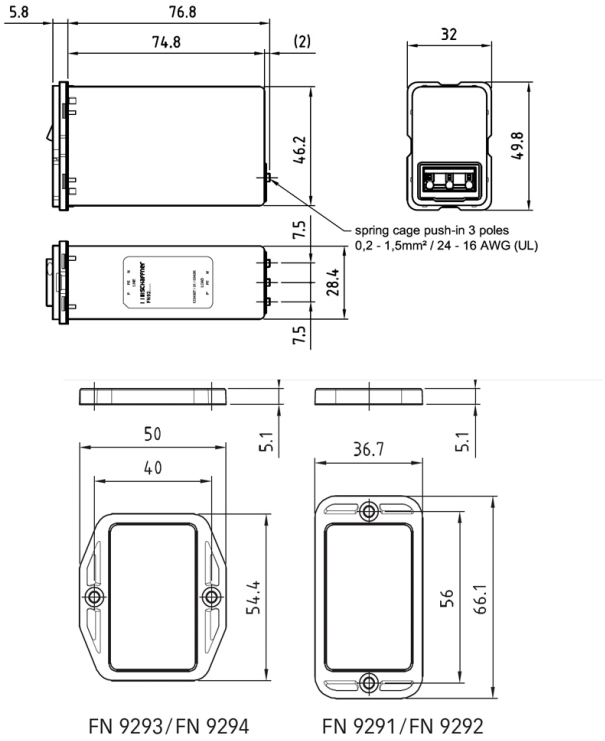


## Mechanical Data

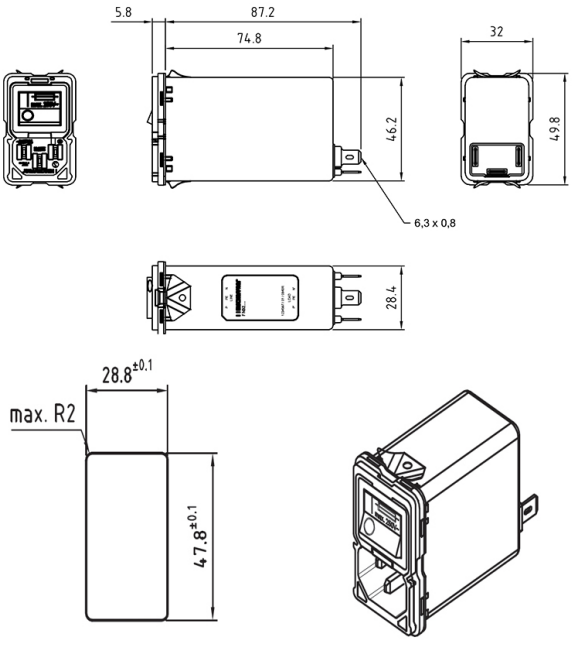
### FN 9290-x-06/FN 9290 B-x-06



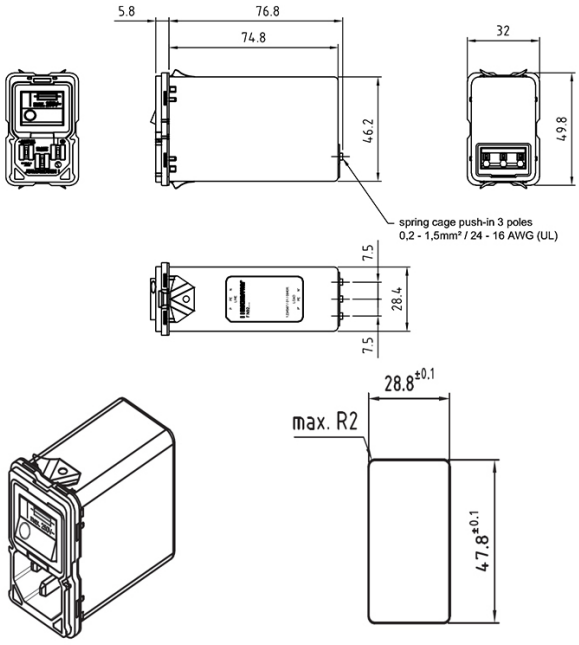

### FN 9290-x-100/FN 9290 B-x-100



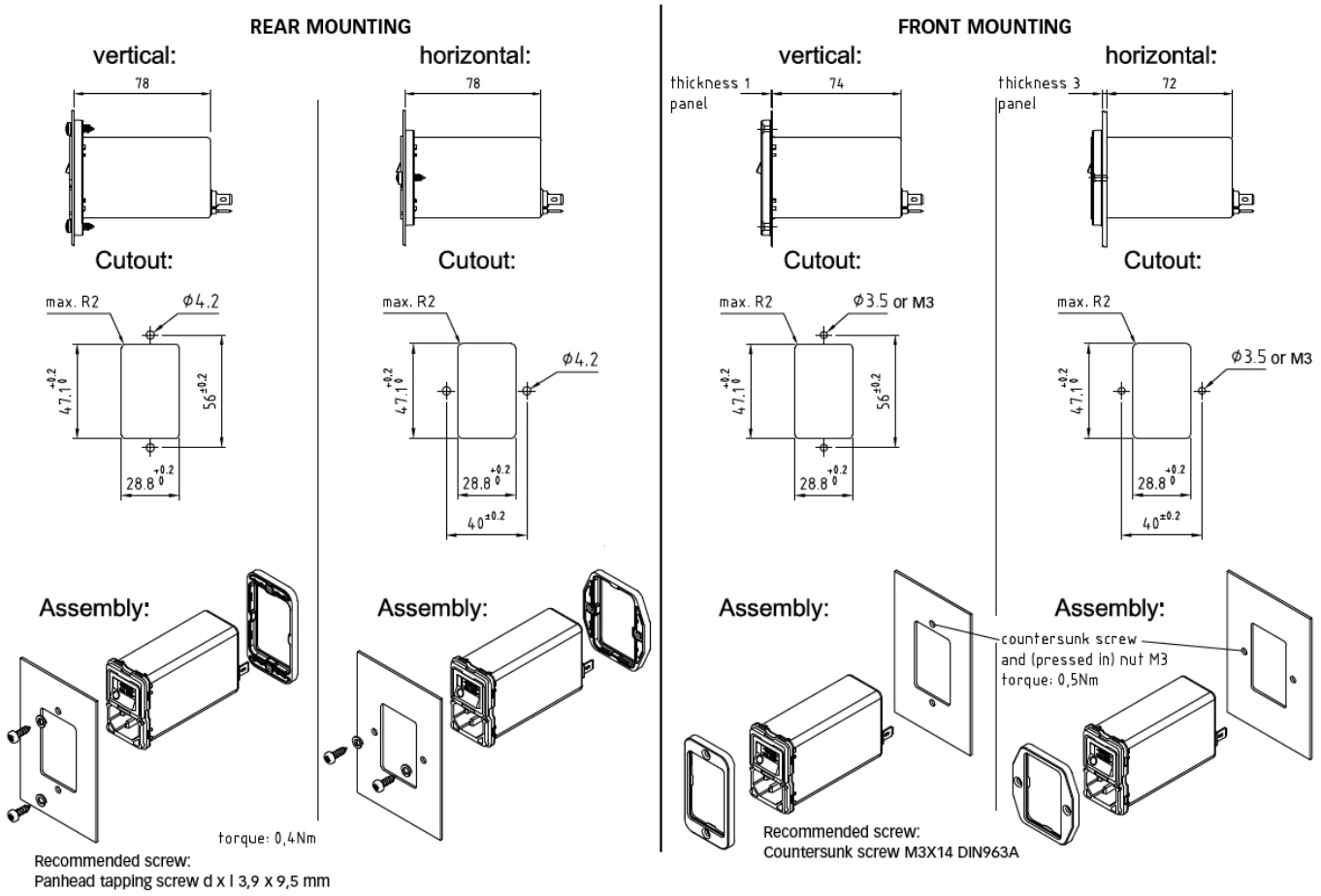

### FN 9299-x-06/FN 9299 B-x-06



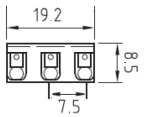

### FN 9299-x-100/FN 9299 B-x-100



## Assembly Instructions

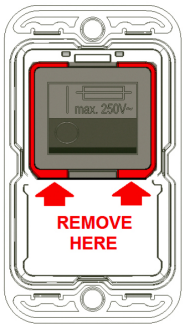


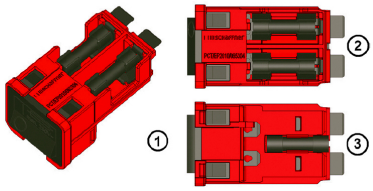

| | |
|---|---|
| **Terminal -100** | |
| **clamping range, solid wire / flex wire** | 0,20 mm² –1,5 mm², AWG24 –AWG16 |
| **operating force of slider** | max. 40 N |
| **recommended stripped length** | 8 mm |




Push the knob above the terminal to insert the wire.

## Removal of the combined switch / fuse holder unit




Fuses are not in the scope of delivery.

An additional fuse mark on the switch indicates the fuses holders behind the switch. The red frame shows the outline of the removable unit.

With a simple tool like a Swiss Army knife or a screwdriver No 1 or smaller the unit (1) can be removed from the filter. On the topside (2) behind the switch there are two fuse holders for each live connection. On the bottom side (3) is a clip to carry an additional spare fuse.

Please visit www.schaffner.com to find more details on filter connectors.

## Accessories for IEC Inlet Filters and Power Entry Modules

The accessories displayed are a selection of available accessories for IEC Inlet filters and IEC Power entry modules. As they are displayed in a general way there might be variants of the filters where the accessories are not available.
For further information please ask your local Schaffner Sales Partner and visit our homepage https://www.schaffner.com/.

### Power Cord with Locking System for Inlet Filters IL 13, IL 13 P, IL 19

Link to Datasheet: Datasheet IEC C13/ C19 locking cable

The locking system has a tensile force of typical 200N.
It is recommended to use it with flange mount filters.
Lock Power Cords with IEC Inlets and Filters"
Schaffner power cords with IEC lock guard against
accidental disconnection of all electrical appliances
with an IEC inlet. No exchange or modification of the
IEC inlet or IEC inlet filter system is needed. Easy
retrofit for all electronic equipments and devices.

### IEC C13 Rewireable Connector for individual Power Cord with Locking System

Link to Datasheet: Datasheet IEC C13 rewireable

The locking system has a tensile force of typical 300N. It is recommended to use it with flange mount filters. For details refer to our Application Note "Using IEC Lock Power Cords with IEC Inlets and Filters" Schaffner power connector with IEC lock guard against accidental disconnection of all electrical appliances with an IEC inlet. No exchange or modification of the IEC inlet or IEC inlet filter system is needed. Easy retrofit for all electronic equipments and devices.

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